

# 2021 UNDERGROUND CONSTRUCTION STANDARDS

Historical Record: 5/21/2021  
External Version



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## **ATTENTION:**

THESE STANDARDS WERE DEVELOPED FOR MAINTAINING SAFETY AND RELIABILITY OF THE ELECTRIC DISTRIBUTION AND SERVICE SYSTEMS.

THE INTENT OF THIS STANDARD IS TO GUIDE ENGINEERS, DESIGNERS/PLANNERS AND CONSTRUCTION PERSONNEL AND PROVIDE TYPICAL CONSTRUCTION METHODS FOR ELECTRIC DISTRIBUTION. NOT ALL ARRANGEMENTS ARE DEPICTED AND IT IS THE USER'S RESPONSIBILITY TO APPLY THESE STANDARDS APPROPRIATELY. ALL USERS MUST USE GOOD JUDGMENT. STANDARDS ARE UPDATED AS NEEDED. CONSULT EDE FOR LATEST VERSION. SDG&E STANDARDS MUST BE APPLIED. PRE-CONSTRUCTION APPROVAL OF A "DEVIATION REQUEST" IS REQUIRED FOR ANY EXCEPTION TO THESE STANDARDS. ANY ALTERATIONS, MODIFICATIONS OR IMPROVEMENTS TO THIS AND ALL STANDARDS MUST BE REVIEWED, APPROVED AND DOCUMENTED BY EDE-CONSTRUCTION STANDARDS AND DISTRICT C&O'S.

THE CPUC'S GENERAL ORDER 95 RULES/REQUIREMENTS ARE NOT INTENDED FOR USE AS COMPLETE CONSTRUCTION SPECIFICATIONS BUT EMPLOY ONLY THE MINIMUM REQUIREMENTS WHICH ARE MOST IMPORTANT FROM THE STANDPOINT OF SAFETY AND RELIABILITY. SDG&E MAY IMPOSE STRICTER RULES AND REQUIREMENTS IN THE INTEREST OF MAINTAINING SAFETY AND RELIABILITY OF OUR ELECTRICAL SYSTEM.

CONSTRUCTION SHALL BE ACCORDING TO ACCEPTED GOOD PRACTICE FOR GIVEN LOCAL CONDITIONS IN ALL SITUATIONS NOT SPECIFIED IN THE STANDARD.

SDG&E WILL NOT ACCEPT ANY SYSTEM DESIGN OR INSTALLATION WHICH DOES NOT CONFORM TO THESE STANDARDS. DEVIATIONS CANNOT BE GRANTED WHICH CONFLICT WITH THE CPUC GENERAL ORDERS OR OTHER GOVERNING AGENCIES. THESE MAY INCLUDE SEPARATION FROM ENERGIZED FACILITIES AND WORKING CLEARANCES.

BASED ON UNUSUAL OR UNSAFE SITE CONDITIONS SDG&E MAY IN THE INTEREST OF SAFETY OR RELIABILITY REQUIRE CONSTRUCTION MEASURES BEYOND THOSE SPECIFICALLY STATED IN THIS MANUAL.

EXCEPT FOR A REQUIREMENT TO IMMEDIATELY ADOPT NEWLY PUBLISHED STANDARDS, THE APPLICATION OF NEWLY PUBLISHED STANDARDS IS REQUIRED FOR ALL WORK UP TO THE 30% PROJECT DESIGN APPROVAL LEVEL. ALL DESIGN AND CONSTRUCTION WORK AFTER 30% PROJECT DESIGN APPROVAL MAY USE CONSTRUCTION STANDARDS THAT IMMEDIATELY PRECEDE THE NEWLY UPDATED STANDARD, UNLESS THE IMMEDIATE ADOPTION OF NEWLY PUBLISHED STANDARDS IS MANDATED.

USE OF "BLOCK STOCK" MUST BE COORDINATED WITH INVENTORY & LOGISTICS AND IS GENERALLY ONLY APPLIED AS A "LAST RESORT" AFTER CONSULTATION AND AGREEMENT WITH STAKEHOLDERS AND AN ALTERNATE SOLUTION, SUPPLIER, MATERIAL OR METHOD IS DEEMED ACCEPTABLE AND AVAILABLE.

IF YOU HAVE ANY QUESTIONS REGARDING THE CONTENT OF THESE MANUALS PLEASE EMAIL [CONSTRUCTIONSTANDARDSADMINISTRATORS@SEMPRAUTILITIES.COM](mailto:CONSTRUCTIONSTANDARDSADMINISTRATORS@SEMPRAUTILITIES.COM) OR CONTACT:

| MANUAL                              | OWNER           | EMAIL ADDRESS  | PHONE          |
|-------------------------------------|-----------------|--|----------------|
| Electric Distribution Design Manual | Martha Lachmayr | <a href="mailto:mlachmayr@sdge.com">mlachmayr@sdge.com</a>     | (858) 654-8245 |
| Overhead Construction Standards     | Greg Walters    | <a href="mailto:gwalters@sdge.com">gwalters@sdge.com</a>       | 858) 654-8396  |
| Service Standards & Guide           | Israel Juarez   | <a href="mailto:ijuarez@sdge.com">ijuarez@sdge.com</a>         | (858) 636-3941 |
| Underground Construction Standards  | Eddie Alcobia   | <a href="mailto:ealcobia@sdge.com">ealcobia@sdge.com</a>       | (619) 574-4988 |
| Electric Standard Practices         | Joey Kucharyski | <a href="mailto:jkucharyski@sdge.com">jkucharyski@sdge.com</a> | (760) 566-5919 |
| Tool Catalog                        | Roy Guilao      | <a href="mailto:rguilao@sdge.com">rguilao@sdge.com</a>         | (760) 672-6211 |

### PRINTED COPIES:

FOR PRINTED VERSIONS, WITH BINDER AND TAPS, OF THE **OVERHEAD CONSTRUCTION STANDARDS** PLEASE CONTACT [CONSTRUCTIONSTANDARDSADMINISTRATORS@SEMPRAUTILITIES.COM](mailto:CONSTRUCTIONSTANDARDSADMINISTRATORS@SEMPRAUTILITIES.COM). THESE WILL BE PROVIDED AT THE COST OF YOUR DEPARTMENT. PLEASE INCLUDE IN THE EMAIL:

- NAME, COST CENTER #, I/O #, MAIL STOP #

### NOTE:

IF YOU HAVE AN EXISTING BINDER WITH TABS YOU CAN PRINT DIRECTLY FROM THIS PDF AT YOUR LOCATION. PLEASE ENSURE THE FOLLOWING SETTINGS WHEN PRINTING:

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## SUMMARY OF CHANGES

[illegible]

## ARCHIVED BOOKS AVAILABLE ON THE INTERNAL VERSION







# UNDERGROUND CONSTRUCTION STANDARDS

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## **3000 General Information**

Construction Standards Request form and Procedure. Deviation Request Form.

## **3100 Practices**

Switch Numbering, Structure Numbering. GFIS Maps Electric Conduit Field Mapping

## **3200 Identification**

Pull String, Communication Conduit, Transformer, Fuse and Conduit Identification. Decals and Tags.

## **3300 Substructures, Conduits**

Handholes, Manholes, False Curbs. Sump Pumps, Trenching and Backfills. Conduit Installation and Stub Markers.

## **3400 Pads, Retaining Walls, Clearances**

Pads, Box Pads Masonry Retaining Walls, Clearance Requirements for Pad-mounted and subsurface equipment, Sound Enclosures.

## **3500 Pad Mounted/Wall Mounted Sectionalizing Equipment**

Single and Three Phase Fuse Cabinets, Single and Three Phase Terminators, Cable Junction Pedestal, PME Air Break Switchgear, Vista Gas Insulated Vacuum Switchgear - SCADA and Manual, and Trayer Oil Insulated Vacuum Switchgear - SCADA and Manual.

## **3600 Subsurface Sectionalizing Equipment**

Substructure Use and Limitations Reference Sheet, Unobstructed Space, Cable and Connector Placement, Equipment Assemblies, Vista Gas Insulated Vacuum Switchgear, and G&W Gas Insulated Switchgear.

## **3700 Transformers**

Single and Three Phase Transformers, Bay-o-net Fuses, XD Transformers

## **3800 Capacitors**

Pad-Mounted Capacitors

## **3900 Secondaries/Services**

Cathodic Protection Station, Secondary Test Procedure, Services, Sealing Service Lateral Conduit Instructions.



## **4000 Cables**

Six Hundred Volt Cable Sizes, 12kV Cable Sizes, Minimum Bending Radius for Underground Cables, Cable Pulling Eyes.

## **4100 Terminations, Splicing Connections**

Cable End Seals, Outdoor Cable Terminals for Polyethylene Cable, Transition Module, Stacking Adaptors, Slip-Fit Connectors, 200A Dead Break and Loadbreak, 600A Elbow Tees, Cam-Link Connectors, 600A CLEER Cable Tap.

## **4200 Cable Poles**

Joint Cable Pole Riser Positions, Pole Quadrant and Riser Identification, Underground Service from an Overhead Line, 12.47kV Cable Poles.

## **4300 Fuses, Fault Indicators**

Fuse Application Guide, Primary Current-Limiting Fuse Installation, Electronic Sectionalizer, Current Limiting to SM-4 Conversion for PME Switch, Transformer Fusing Table, Fault Indicator Installation.

## **4400 Lighting**

High Intensity Discharge Lamps, Replacement Refractors, High and Low-Pressure Sodium Vapor Luminaires, Walk Way Lighting, Direct Burial Pole Installation.

## **4500 Grounding**

Trench Ground Wire, Equipment Grounding, Grounding Telco Conductors in Pad-Mounted Equipment, Neutral and Ground Wire Schematic Diagram.

## **4600 Telecommunications, SCADA**

Telecommunications Splicing Pedestal, Conduit Trenches and Riser, Pulling Grips, Handhole Installation for Locating Stations for Fiber Optic Cable. Pad-Mounted vista SCADA installation, PME SCADA installation, Subsurface Vista Installation. Antenna Poles.

## **4700 Miscellaneous Equipment**

Padmounted Voltage Regulation. Misc Equipment

## **4800 Vault Standards**

Electric Vault Requirements & Specification.



3000 - GENERAL  
INFORMATION



3000 - GENERAL  
INFORMATION



**PAGE****SUBJECT**

|      |   |
|------|---|
| 3002 | PEDESTRIAN PATH OF TRAVEL AND ACCESSIBILITY |
| 3003 | STANDARD PAGE FORMAT                        |
| 3005 | DEVIATION REQUEST FORM AND PROCEDURE        |

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Indicates Latest Revision

Completely Revised

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

GENERAL INFORMATION  
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|                 |                   |     | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |       |     |                    |     |          |    |                     |     |     |                     |
|                 |                   |     | PEDESTRIAN PATH OF TRAVEL AND ACCESSIBILITY                    |       |     |                    |     |          |    |                     |     |     |                     |



**DEFINITIONS (CONT'D):**

- **PROJECT AREA:** THE ENTIRE WIDTH OF THE PUBLIC RIGHT-OF-WAY THROUGHOUT THE LENGTH UPON WHICH WORK IS PROPOSED OR UNDERTAKEN. PROJECT AREA MAY CONSIST OF A SINGLE ROUTE OR MULTIPLE ROUTES.
- **PUBLIC RIGHT-OF-WAY:** LAND, PROPERTY, OR INTEREST THEREIN, USUALLY IN A CORRIDOR, ACQUIRED FOR OR DEVOTED TO TRANSPORTATION PURPOSES AND SUBJECT TO THE CONTROL OF A PUBLIC AGENCY.
- **RAILING:** A BARRIER LOCATED NEAR THE OPEN SIDES OF ELEVATED WALKING SURFACES TO MINIMIZE THE POSSIBILITY OF AN ACCIDENTAL FALL OR SLIP FROM THE WALKING SURFACE TO THE LOWER LEVEL.
- **RUNNING GRADE:** THE GRADE THAT IS PARALLEL TO THE DIRECTION OF TRAVEL.
- **SIDEWALK:** THAT PORTION OF A PUBLIC RIGHT-OF-WAY BETWEEN THE BACK OF THE CURB LINE OR LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE, THAT IS DEFINED BY AN IMPROVED SURFACE AND INTENDED FOR USE BY PEDESTRIANS.
- **SIDEWALK/STREET TRANSITION:** THE TRANSITION BETWEEN THE PUBLIC SIDEWALK AND A MARKED CROSSWALK OR INTENDED STREET CROSSING, MEDIAN REFUGE, ISLAND, OR OTHER LOCATION WHERE A PEDESTRIAN ACCESS ROUTE CROSSES OR ENTERS THE ROADWAY OR A DRIVEWAY.
- **SIGN:** ANY PEDESTRIAN OR TRAFFIC CONTROL DEVICE THAT COMMUNICATES INFORMATION TO PEDESTRIANS OR ROAD USERS THROUGH A WORD OR SYMBOL LEGEND. SIGNS DO NOT INCLUDE TRAFFIC CONTROL SIGNALS, PAVEMENT MARKINGS, DELINEATORS, OR CHANNELIZATION DEVICES.
- **WORKSITE OR ZONE:** AN AREA OF A PUBLIC RIGHT-OF-WAY WITH CONSTRUCTION, MAINTENANCE OR UTILITY WORK ACTIVITIES. IT MAY CONSIST OF A SINGLE ROUTE OR MULTIPLE ROUTES, AND INCLUDES THE ENTIRE WIDTH OF THE PUBLIC RIGHT-OF-WAY THROUGHOUT THE LENGTH UPON WHICH WORK IS PROPOSED OR UNDERTAKEN.

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

**POLICY:**

- I. ALL WORKSITES THAT ENCROACH UPON A SIDEWALK, WALKWAY OR CROSSWALK SHALL ACCOMMODATE THE NEEDS OF ALL PEDESTRIANS. SPECIAL CONSIDERATION SHALL BE GIVEN TO ACCESSIBILITY FOR PERSONS WITH DISABILITIES, INCLUDING THOSE WHO USE WHEELCHAIRS OR OTHER MOBILITY DEVICES, WHO ARE BLIND OR VISUALLY IMPAIRED OR WHO ARE DEAF OR HARD OF HEARING.
- II. PEDESTRIAN SAFETY AND ACCESSIBILITY CONSIDERATIONS, INCLUDING CONSIDERATION OF NECESSARY EQUIPMENT TO CREATE A SAFE AND ACCESSIBLE PATH OF TRAVEL AROUND THE WORKSITE, SHALL BE INCLUDED DURING WORKSITE PLANNING ASSESSMENTS.
- III. PEDESTRIANS SHALL HAVE A SMOOTH, CLEARLY DELINEATED PATH OF TRAVEL THROUGH OR AROUND A WORK AREA UNTIL A PROJECT IS COMPLETED AND SHALL BE PROTECTED FROM POTENTIAL INJURY CAUSED BY ELECTRIC CONSTRUCTION WORK.

### RESPONSIBILITIES:

- IV. CONSTRUCTION AND OPERATIONS AND MAINTENANCE AND OPERATIONS DISTRICTS ARE RESPONSIBLE FOR COMPLIANCE AND IMPLEMENTATION OF THIS STANDARD AND ITS ASSOCIATED STANDARDS AND/OR ELECTRIC STANDARD PRACTICES AS THEY RELATE TO PEDESTRIAN PATH OF TRAVEL AND ACCESSIBILITY.
- V. EMPLOYEES ARE RESPONSIBLE FOR ADHERENCE TO STANDARDS, GUIDELINES, ELECTRIC STANDARD PRACTICES, AND POLICIES AND PROCEDURES WHILE PERFORMING ALL DUTIES.

### GENERAL DESCRIPTION OF REQUIREMENTS:

- VI. THIS STANDARD IS DESIGNED TO ENSURE THE PROVISION OF ONE OR MORE TEMPORARY, ACCESSIBLE PATHS OF TRAVEL AROUND THE WORKSITE, FOR ALL DISRUPTED SURFACES WITHIN THE SCOPE OF THE PROJECT. THIS PROCEDURE APPLIES TO ALL WORKSITES WHERE THE WORK AREA ENCROACHES UPON A DESIGNATED PUBLIC RIGHT-OF-WAY PEDESTRIAN PATH OF TRAVEL (SIDEWALK, WALKWAY OR CROSSWALK AREA).

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|                 |                   | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |       |     |                    |     |          |    |                     |     |     |                     |
|                 |                   | PEDESTRIAN PATH OF TRAVEL AND ACCESSIBILITY                    |                           |       |     |                    |     |          |    |                     |     |     |                     |



VII. EMPLOYEES WORKING ON A SIDEWALK THAT ARE UNABLE TO PROVIDE A SUITABLE AND PROTECTED 48-INCH WIDE PEDESTRIAN PATH OF TRAVEL ON THE SIDEWALK, SHALL ENSURE A SAFE AND ACCESSIBLE PATH OF TRAVEL FOR PEDESTRIANS AROUND THE WORKSITE, OR CLOSE THE SIDEWALK TO ALL TRAFFIC AND DIRECT ALL PEDESTRIANS TO AN ALTERNATE CIRCULATION PATH.

VIII. IMPROVEMENTS WITHIN A WORKSITE IN THE PUBLIC RIGHT-OF-WAY THAT ARE REMOVED OR DISTURBED DURING THE COMPANY'S ACTIVITIES AT THE SITE, SHALL BE REPLACED WITH CONSTRUCTION THAT MEETS THE ACCESSIBILITY REQUIREMENTS AS DESCRIBED IN THESE GUIDELINES.


(IX) EVERY WORKSITE OR ZONE WHERE THE NORMAL PEDESTRIAN PATH OF TRAVEL IS INTERRUPTED, BLOCKED, LOCATED DIRECTLY ADJACENT TO A WORK AREA OR OTHERWISE IMPACTED BY THE WORK, SHALL HAVE AT LEAST ONE, AND POTENTIALLY SEVERAL, TEMPORARY AND ACCESSIBLE PATHS OF TRAVEL PROVIDED. WHERE THE AUTHORITY HAVING JURISDICTION DICTATES SPECIFIC REQUIREMENTS, THE COMPANY SHALL PERFORM ITS CONSTRUCTION IN COMPLIANCE WITH THAT AUTHORITY. IN SITUATIONS WHERE THE AUTHORITY HAVING JURISDICTION HAS SPECIFIED REQUIREMENTS WHICH PROVIDE LESS ACCESS THAN THE REQUIREMENTS IN THIS SECTION, THE COMPANY SHALL USE THE REQUIREMENTS IN THIS SECTION WHICH PROVIDE MORE ACCESS, UNLESS THE AUTHORITY HAVING JURISDICTION EXPLICITLY CONTRADICTS OUR REQUIREMENTS.

- PEDESTRIANS SHALL BE INFORMED OF CHANGES IN THE TRAVEL PATH IN A MANNER THAT IS READILY UNDERSTANDABLE.

- WORKSITES THAT ARE REQUIRED FOR THE RESOLUTION OF PROBLEMS CAUSED BY AN EMERGENCY, NATURAL DISASTER, SUBSTANTIAL ACCIDENT OR SIMILAR UNUSUAL OR EXTREME CONDITIONS WHERE PROTECTION OF THE HEALTH AND SAFETY OF THE PUBLIC SUPERSEDES ANY OTHER CONSIDERATIONS. SUCH CONDITIONS SHALL NOT EXCEED A DURATION OF ONE WEEK.

b. **ALTERNATE CIRCULATION PATH PROTECTION:** THE ALTERNATE CIRCULATION PATH SHALL NOT HAVE ABRUPT CHANGES IN GRADE, ELEVATION OR TERRAIN. THE ALTERNATE CIRCULATION PATH SHALL HAVE NO PROTRUSIONS UP TO A HEIGHT OF 80 INCHES, INCLUDING SCAFFOLDING AND SCAFFOLDING BRACES. WHEN OVERHEAD WORK IS CONDUCTED, THE PEDESTRIAN PASSAGE AREA BELOW SHALL BE PROTECTED OR REROUTED. WHERE THE ALTERNATE CIRCULATION PATH IS ADJACENT TO HAZARDOUS CONDITIONS, THE PATH SHALL BE PROTECTED WITH A BARRICADE, CONSISTENT WITH THE REQUIREMENTS DESCRIBED IN THIS STANDARD. MOVEMENT BY WORK VEHICLES AND EQUIPMENT ACROSS AN ALTERNATE CIRCULATION PATH SHOULD BE AVOIDED WHENEVER POSSIBLE. IF VEHICLES AND EQUIPMENT NEED TO TRAVEL ACROSS AN ALTERNATE CIRCULATION PATH, EMPLOYEES SHALL USE FLAGGERS OR EQUAL METHODS TO DIRECT VEHICULAR TRAFFIC.

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**NOTES (CONT'D):**

- c. **TEMPORARY FACILITIES:** TEMPORARY FACILITIES IN THE PUBLIC RIGHT-OF-WAY, INCLUDING TEMPORARY WALKING SURFACES, CURB RAMPS, AND SIMILAR FEATURES, SHALL CONFORM TO THE ACCESSIBILITY REQUIREMENTS FOR NEW OR REPLACEMENT CONSTRUCTION, EXCEPT AS DESCRIBED IN THIS SECTION. (XVI)(XVII)(XVIII)(XIX)
- d. **PROHIBITED REDUCTION IN ACCESSIBILITY:** TEMPORARY FACILITIES SHALL NOT HAVE AN EFFECT THAT DECREASES THE ACCESSIBILITY OF AN EXISTING PUBLIC RIGHT-OF-WAY OR SITE ARRIVAL POINTS TO BUILDINGS OR FACILITIES ADJACENT TO THE ALTERED PORTION OF THE PUBLIC RIGHT-OF-WAY. HOWEVER, WHERE ACCESSIBLE PEDESTRIAN FACILITIES DO NOT EXIST OR ARE DEFICIENT, TEMPORARY FACILITIES ARE NOT REQUIRED TO BE PROVIDED IN EXCESS OF THE DEGREE OF ACCESSIBILITY PRESENT PRIOR TO THE BEGINNING OF THE WORK.
- e. **WORKSITE CONDITIONS:** TOOLS, EQUIPMENT OR MATERIALS MAY NOT BE STORED WITHIN THE ALTERNATE CIRCULATION PATH. HEAVY EQUIPMENT WITH PROTRUDING PARTS SHALL NOT BE LOCATED IN OR PROJECTED INTO THE PATH OF TRAVEL. DEBRIS SHOULD BE REMOVED FROM ALL TEMPORARY PATHS OF TRAVEL, AND SUCH AREAS SHALL BE PROPERLY DRAINED.

## **(XII) DESIGN REQUIREMENTS FOR SIDEWALKS AND PEDESTRIAN PATHS OF TRAVEL:**

- a. **SURFACES:** EACH PART OF THE UNALTERED PATH OF TRAVEL OR THE ALTERNATE CIRCULATION PATH SHALL BE AN "IMPROVED SURFACE" THAT IS FIRM, STABLE, AND SLIP-RESISTANT. SEE DEFINITIONS.
- b. **CLEAR WIDTH:** EACH PART OF THE UNALTERED PATH OF TRAVEL OR THE ALTERNATE CIRCULATION PATH SHALL BE AT LEAST FOUR FEET (48 INCHES) WIDE.

**EXCEPTION 1:** THE CLEAR WIDTH NEED NOT BE WIDER THAN THE EXISTING CLEAR WIDTH OF THE IMPROVED SURFACE OF THE SIDEWALK OR WALKWAY.

**EXCEPTION 2:** THE CLEAR WIDTH MAY BE REDUCED TO 36 INCHES FOR A DISTANCE OF 48 INCHES.

**EXCEPTION 3:** THE CLEAR WIDTH MAY BE REDUCED TO 36 INCHES IF UNUSUAL SITE CONSTRAINTS (SUCH AS PERMANENT FENCES OR REDUCED RIGHT-OF-WAY WIDTH) PRECLUDE AN EFFECTIVE METHOD FOR PROVIDING THE FULL WIDTH, BUT IN NO CASE SHALL THE DISTANCE OF SUCH REDUCTION BE MORE THAN 20 FEET.

- c. SLOPES AND CROSS-SLOPES OF THE ALTERNATE CIRCULATION PATH SHALL NOT EXCEED 5% OR 2%, RESPECTIVELY.
- d. **CHANGES IN LEVEL:** CHANGES IN LEVEL IN THE UNALTERED PATH OF TRAVEL OR THE ALTERNATE CIRCULATION PATH SHALL NOT EXCEED 1/2-INCH VERTICAL. A 1/4-INCH VERTICAL CHANGE IN LEVEL MAY BE MADE WITHOUT PROVISIONS FOR BEVELING THE LIP OF THE CHANGE. CHANGES BETWEEN 1/4-INCH AND 1/2-INCH MUST BE BEVELED AT A 1:2 RATIO.
- e. **PEDESTRIAN TRAFFIC PLATES:** WORKSITE TRENCHES OR EXCAVATIONS MAY BE BRIDGED WITH STURDY PLYWOOD OR METAL PLATES AS LONG AS THE SURFACE IS CONTINUOUS AND STABLE, WITH NO GAPS OR CHANGES IN LEVEL, INCLUDING LIP EDGES FACING THE PATH OF TRAVEL, GREATER THAN 1/2-INCH. A 1/4-INCH VERTICAL CHANGE IN LEVEL MAY BE MADE WITHOUT PROVISIONS FOR BEVELING THE LIP OF THE CHANGE. CHANGES BETWEEN 1/4-INCH AND 1/2-INCH MUST BE BEVELED AT A 1:2 RATIO. TRENCH PLATES SHALL BE USED WITH AN APPROPRIATE AMOUNT OF COLD MIX PACK OR SIMILAR MATERIALS TO PROVIDE A SMOOTH TRANSITION FROM THE SIDEWALK OR STREET TO THE PLATE. IF PLATES HAVE THE POTENTIAL TO MOVE AND CAUSE A HAZARD, THEY MAY BE RECESSED INTO THE WALKWAY. OTHER METHODS SUCH AS EXPANSION BOLTS MAY ALSO BE USED TO PREVENT PLATE MOVEMENT. BEVELED EDGES OR FEATHERED/COMPACTED ASPHALT OR CONCRETE SHALL BE PROVIDED AT A BEVEL OF ONE VERTICAL TO TWO HORIZONTAL. IF METAL TRENCH PLATES IN THE PATH OF TRAVEL HAVE "LIFT HOLES" TO ALLOW A CHAIN WITH A HOOK TO MOVE THE PLATES, SUCH HOLES SHALL BE PLUGGED WITH MATERIAL SUCH AS WOOD OR PLASTIC PLUGS TO FILL IN THE LIFT HOLES AND AVOID CREATING A TRIPPING HAZARD.

### XIII DESIGN REQUIREMENTS FOR TEMPORARY CURB RAMPS:

- a. TEMPORARY CURB RAMPS SHALL BE USED WHEN PEDESTRIANS ARE DIVERTED OFF THE SIDEWALK OR WALKWAY INTO THE STREET ADJACENT TO THE WORKSITE. CURB RAMPS SHALL PROVIDE ALL PEDESTRIANS ADEQUATE TRANSITION FROM THE SIDEWALK INTO THE STREET AND BACK ONTO THE SIDEWALK.
- b. TEMPORARY CURB RAMPS SHALL BE A MINIMUM OF 48 INCHES WIDE. CURB RAMPS SHALL HAVE A MAXIMUM RUNNING SLOPE OF 1:12 (ONE FOOT RUN FOR EVERY INCH OF THE CURB) OR 8.33%. ALL CURB RAMPS MUST HAVE SMOOTH ON AND OFF TRANSITIONS AT THE TOP AND BOTTOM. CURB RAMPS SHALL BE LOCATED SO THAT THEY DO NOT PROJECT INTO VEHICULAR TRAFFIC LANES OR CAUSE PEDESTRIANS TO ENTER OR EXIT INTO TRAFFIC LANES. RAISED CURB RAMPS SHALL HAVE "CURBING" AT LEAST TWO-INCH HIGH AROUND ANY OPEN SIDES TO PREVENT AGAINST FALLING HAZARDS. TEMPORARY CURB RAMPS DO NOT REQUIRE THE USE OF DETECTABLE WARNINGS.

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## NOTES (CONT'D):

- c. TEMPORARY CURB RAMPS MAY BE ANY OF THE THREE FOLLOWING TYPES:

**PREFABRICATED METAL RAMPS AND LANDINGS:** STANDARD METAL CURB RAMPS PROVIDED BY THE COMPANY, INCLUDING A FIVE-FOOT BY FIVE-FOOT LANDING WITH ADJUSTABLE "FEET" AND WITH A TWO-INCH HIGH CURB AT THE BACK AND SIDE, A FOUR-FOOT WIDE ADJUSTABLE SLOPING RAMP SECTION, WITH ADJUSTABLE BOTTOM TRANSITION PLATE AND A TWO-INCH HIGH CURB AT EACH SIDE, AND METAL RAILINGS AT THE SIDE OF THE LANDING AND SLOPING RAMP. (a)

**SITE CONSTRUCTED RAMPS:** CURB RAMPS CONSTRUCTED FROM ONE-INCH OR THICKER PLYWOOD, WITH TWO-INCH HIGH WOOD CURBING, AND WITH THE BOTTOM BEVELED TO CONFORM TO THE STREET SURFACE. (b)

**EXISTING DRIVEWAYS** MAY BE UTILIZED FOR CURB RAMPS UNDER THE FOLLOWING CONDITIONS:

THE DRIVEWAY SLOPE DOES NOT EXCEED 1:10 (10%)

A 1.5-INCH WIDE X ONE-INCH HIGH X FOUR-FOOT LONG METAL OR WOOD WEDGE IS POSITIONED AT THE BOTTOM OF THE DRIVEWAY RAMP,

FOR COMMERCIAL DRIVEWAYS WIDE ENOUGH TO PROVIDE FOR SAFE IN AND OUT VEHICULAR TRAFFIC, A FOUR-FOOT PORTION OF THE DRIVEWAY IS BARRICADED FROM VEHICULAR USE.

FOR RESIDENTIAL DRIVEWAYS, EITHER A FOUR-FOOT PORTION OF THE DRIVEWAY IS BARRICADED FROM VEHICULAR USE AND THE DRIVEWAY CLOSED TO ALL VEHICULAR USE, OR THE VEHICULAR TRAFFIC ACROSS THE DRIVEWAY IS CONTINUOUSLY MONITORED BY WORKERS.

### (XIV) DESIGN REQUIREMENTS FOR BARRICADES:

- a. BARRICADES SHALL BE PROVIDED AT THE FOLLOWING LOCATIONS:

BETWEEN THE EXISTING PEDESTRIAN ACCESS ROUTE, IF UNALTERED, AND ANY ADJACENT WORKSITE OR ZONE,

BETWEEN AN ALTERNATE CIRCULATION PATH AND ANY ADJACENT WORKSITE OR ZONE,

BETWEEN AN ALTERNATE CIRCULATION PATH AND THE VEHICULAR WAY, IF THE ALTERNATE CIRCULATION PATH IS DIVERTED INTO THE STREET,

BETWEEN AN ALTERNATE CIRCULATION PATH AND ANY PROTRUDING OBJECTS, DROP-OFFS OR OTHER HAZARDS TO PEDESTRIANS.

- b. **VEHICULAR BARRICADES:** BARRICADES SUCH AS K-RAILS OR SIMILAR SOLID RAILINGS SHALL BE USED TO SEPARATE VEHICULAR TRAFFIC AND THE ALTERNATE PEDESTRIAN ROUTE IN AREAS WHERE THE VOLUME AND SPEED OF VEHICULAR TRAFFIC IS HIGH. SUCH BARRICADES SHALL HAVE SUFFICIENT STRENGTH AND LOW DEFLECTION CHARACTERISTICS TO KEEP VEHICLES FROM INTRUDING INTO THE ALTERNATE PEDESTRIAN ROUTE OR WORKSITES. SHORT, NON-CONTINUOUS SEGMENTS SHOULD BE AVOIDED, AS THEY INCREASE THE POTENTIAL FOR INJURY TO BOTH VEHICLE OCCUPANTS AND PEDESTRIANS, AND PRESENT BLUNT LEADING ENDS. WHEN USING SUCH BARRICADES, ADJACENT SEGMENTS SHOULD BE CONTINUOUS AND PROPERLY JOINED.

- c. **PEDESTRIAN BARRICADES:** A BARRICADE AT THE EXISTING PEDESTRIAN ACCESS ROUTE OR THE ALTERNATE CIRCULATION PATH SHALL BE CONTINUOUS, STABLE AND NON-FLEXIBLE. A BARRICADE CAN BE ANY MATERIAL THAT PROTECTS PEDESTRIANS WITHOUT MATERIALLY IMPAIRING THE PEDESTRIAN PATH OF TRAVEL. IT SHALL HAVE A SOLID TOE RAIL WITH ITS TOP EDGE AT SIX INCHES MINIMUM IN HEIGHT AND ITS BOTTOM EDGE NO HIGHER THAN 1.5 INCHES OFF THE ADJACENT SURFACE. IT SHALL HAVE A CONTINUOUS TOP RAILING MOUNTED AT A HEIGHT OF 36 TO 42 INCHES. BASES SHALL BE USED AT EACH END OF EACH BARRICADE AND TAPED OR TIED AT THE TOP TO PROVIDE PROPER SUPPORT AND STABILITY.

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5 OF 8

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

PEDESTRIAN PATH OF TRAVEL AND ACCESSIBILITY

OH102.5  
UG3002.5



**NOTES (CONT'D):**

**CAUTION:**

- \* TAPE ALONE WOULD NOT PROVIDE AN ADEQUATE BARRICADE AND SHOULD NOT BE USED TO DELINEATE THE ALTERNATE CIRCULATION PATH.
- \*\* CONES OR UNCONNECTED "A-FRAMES" OR CONNECTED A-FRAMES WITHOUT A HANDRAIL AND TOE RAIL SHOULD NOT BE USED TO DIRECT PEDESTRIAN TRAFFIC. NO BARRIER SUPPORT MEMBER SHALL PROTRUDE MORE THAN FOUR INCHES BEYOND THE TOP RAIL INTO THE ALTERNATE CIRCULATION PATH.

**EXCEPTION 1:** BARRICADES SHALL NOT BE REQUIRED WHERE THE WORKSITE OR ALTERNATE CIRCULATION PATH IS ENCLOSED WITH A SOLID FENCE OR WALL.

**EXCEPTION 2:** BARRICADES SHALL NOT BE REQUIRED WHEN THE WORKSITE OR ZONE REQUIRES ONLY THE USE OF HAND TOOLS AND NO HOLES OR EXCAVATIONS AS LONG AS WORKERS ARE PRESENT TO MONITOR AND ASSIST ANY PEDESTRIAN TRAFFIC.

**(XV) WARNINGS AND SIGNAGE:**

WHEN AN ALTERNATE CIRCULATION PATH OR A BARRICADE IS CREATED IN THE PUBLIC RIGHT-OF-WAY, A WARNING AND/OR APPROPRIATE SIGNAGE SHALL BE PROVIDED.

- a. WARNINGS SHALL BE LOCATED AT BOTH THE NEAR-SIDE AND THE FAR-SIDE OF THE INTERSECTION PRECEDING A TEMPORARY AND COMPLETELY BLOCKED PEDESTRIAN ACCESS ROUTE. SIGNAGE LOCATED AT THE INTERSECTION PRECEDING THE BLOCKED WAY SHALL BE PROVIDED.
- b. SIGNS SHALL BE PLACED AT INTERSECTIONS SO PEDESTRIANS ARE NOT CONFRONTED WITH MID-BLOCK WORKSITES THAT COULD CAUSE THEM TO SKIRT THE WORK ZONE OR MAKE A MID-BLOCK CROSSING. AMPLE ADVANCE NOTIFICATION OF SIDEWALK CLOSURES IS IMPORTANT. DETOUR SIGNS ARE REQUIRED TO DIRECT ALL PEDESTRIANS TO USE THE ALTERNATE CIRCULATION PATH, IF PROVIDED. IF CONSTRUCTION TEMPORARILY AFFECTS TRAFFIC SIGNALS, ALTERNATIVE VISUAL SIGNALS ARE REQUIRED. (c)

**(XVI) NEW OR REPLACEMENT CONSTRUCTION:**

WHERE THE REQUIRED SCOPE OF WORK AT A WORKSITE OR ZONE REQUIRES THE REMOVAL OF EXISTING FACILITIES, INCLUDING SIDEWALKS, WALKWAYS, DRIVEWAY APPROACHES, CURB RAMPS, AND SIMILAR ELEMENTS WITHIN THE PUBLIC RIGHT-OF-WAY OR WHERE LOCAL PERMITTING PROCESSES REQUIRE IT, NEW OR REPLACEMENT FACILITIES SHALL BE CONSTRUCTED BY THE COMPANY AFTER THE COMPLETION OF ALL WORK WITHIN THE WORKSITE OR ZONE. WHERE THE AUTHORITY HAVING JURISDICTION DICTATES SPECIFIC REQUIREMENTS, THE COMPANY SHALL PERFORM ITS CONSTRUCTION IN COMPLIANCE WITH THAT AUTHORITY. IN SITUATIONS WHERE THE AUTHORITY HAVING JURISDICTION HAS SPECIFIED REQUIREMENTS WHICH PROVIDE LESS ACCESS THAN THE REQUIREMENTS IN THIS SECTION, THE COMPANY SHALL USE THE REQUIREMENTS IN THIS SECTION WHICH PROVIDE MORE ACCESS, UNLESS THE AUTHORITY HAVING JURISDICTION EXPLICITLY CONTRADICTS OUR REQUIREMENTS.

**(XVII) PUBLIC SIDEWALKS:**

WHERE REPLACED OR NEWLY CONSTRUCTED, PUBLIC SIDEWALKS SHALL COMPLY WITH THIS SECTION.

- a. **PEDESTRIAN ACCESS ROUTE:** WHERE PUBLIC SIDEWALKS ARE PROVIDED, THEY SHALL CONTAIN A PEDESTRIAN ACCESS ROUTE.
- b. **CLEAR WIDTH:** THE MINIMUM CLEAR WIDTH OF A PEDESTRIAN ACCESS ROUTE SHALL BE 48 INCHES, EXCLUSIVE OF THE WIDTH OF THE CURB.

**EXCEPTION 1:** THE CLEAR WIDTH MAY BE REDUCED TO 36 INCHES IF UNUSUAL SITE CONSTRAINTS (SUCH AS PERMANENT FENCES OR REDUCED RIGHT-OF-WAY WIDTH) PRECLUDE AN EFFECTIVE METHOD FOR PROVIDING THE FULL WIDTH. BUT IN NO CASE SHALL THE DISTANCE OF SUCH REDUCTION BE MORE THAN 20 FEET.

- c. **CROSS-SLOPE:** THE CROSS-SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL NOT EXCEED 1:48 (2%).
- d. **RUNNING GRADE:** THE RUNNING GRADE OF THE PEDESTRIAN ACCESS ROUTE SHALL NOT EXCEED 1:20 (5%), EXCEPT THAT STEEPER GRADES CONSISTENT WITH GRADES ESTABLISHED FOR THE ADJACENT ROADWAY MAY BE PROVIDED.
- e. **SURFACES:** THE SURFACES OF THE PEDESTRIAN ACCESS ROUTE SHALL BE SMOOTH, FIRM, AND SLIP-RESISTANT.

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## XVIII CURB RAMPS:

- ## XVIII CURB RAMPS:

## XVIII CURB RAMPS:

- ## XVIII CURB RAMPS:

## XVIII CURB RAMPS:

## XVIII CURB RAMPS:



**NOTES (CONT'D):**

- j. **CHANGES IN LEVEL:** VERTICAL CHANGES IN LEVEL SHALL NOT BE PERMITTED ON CURB RAMPS, LANDINGS OR GUTTER AREAS DIRECTLY IN FRONT OF CURB RAMPS.
- k. **GUTTER SLOPE:** THE COUNTER SLOPE OF THE GUTTER AREA OR STREET AT THE FOOT OF A CURB RAMP OR LANDING SHALL BE 1:20 (5%) MAXIMUM, MEASURED FOR A DISTANCE OF 8 INCHES FROM THE CURB LINE.

**XIX DRIVEWAY APPROACHES OR RAMPS:**

- a. **WHERE REQUIRED:** WHERE THE PEDESTRIAN ACCESS ROUTE CROSSES A VEHICULAR ENTRANCE TO AN ADJACENT PROPERTY, A DRIVEWAY APPROACH SHALL BE PROVIDED THAT MEETS THE REQUIREMENTS OF THIS SECTION.
- b. **PEDESTRIAN ACCESS ROUTE WIDTH:** EACH DRIVEWAY APPROACH SHALL INCLUDE A LEVEL AREA WITH A CROSS-SLOPE OF NO MORE THAN 2% FOR A CLEAR WIDTH OF FOUR FEET (48 INCHES).

**EXCEPTION 1:** THE CLEAR WIDTH MAY BE REDUCED TO 36 INCHES IF UNUSUAL SITE CONSTRAINTS (SUCH AS PERMANENT FENCES OR REDUCED RIGHT-OF-WAY WIDTH) PRECLUDE AN EFFECTIVE METHOD FOR PROVIDING THE FULL WIDTH, BUT IN NO CASE SHALL THE DISTANCE OF SUCH REDUCTION BE MORE THAN 20 FEET.

- c. **DRIVEWAY LIP:** EACH DRIVEWAY RAMP SHALL HAVE A ONE-INCH VERTICAL LIP AT THE STREET.

**REFERENCE:**

- a. REFER TO ESP138, ATTACHMENT "C".
- b. REFER TO ESP138, ATTACHMENT "D".
- c. FOR TYPICAL TRAFFIC CONTROL DEVICE USAGE AND TECHNIQUES FOR PEDESTRIAN MOVEMENT THROUGH WORK ZONES, SEE ESP138, ATTACHMENTS E & G.

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**SCOPE:** THIS PAGE DESCRIBES GENERAL INFORMATION CONCERNING THE FORMAT FOR STANDARD PAGES.

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

**PAGE FORMAT**

I. NOTE CALL-OUT:

- a. AN UNCIRCLED LETTERED NOTE (E.G., A) REFERS TO THE ENTIRE PAGE. REFERENCE TO THAT NOTE DOES NOT NORMALLY APPEAR ELSEWHERE ON THAT PAGE.
- b. A CIRCLED LETTERED NOTE (E.G., (A)) REFERS TO A SPECIFIC PORTION OF THE PAGE. THE CIRCLED LETTER WILL BE REPLACED ELSEWHERE ON THAT PAGE.

II. THE FOLLOWING NOTES FOUND IN THE TITLE BLOCK (AT THE BOTTOM OF PAGE), ARE METHODS OF INDICATING PAGE CHANGES AND/OR ADDITIONS.

- a. ☒ "INDICATES LATEST REVISION" (OLD VERSIONS) OR "INDICATES LATEST REVISION" (NEW VERSIONS)  
SHADING OR ORANGE FONT INDICATES THE MOST RECENT CHANGES AND/OR ADDITIONS ON A PAGE.
- b. ☒ "COMPLETELY REVISED"  
THIS NOTE IS USED TO INDICATE THE PAGE HAS HAD MAJOR CHANGES.
- c. ☒ "NEW PAGE"  
THIS NOTE IS USED TO INDICATE THE PAGE IS NEW.
- d. ☒ "INFORMATION REMOVED"  
THIS NOTE INDICATES INFORMATION HAS BEEN DELETED.

III. PAGE NUMBERS WITH A DECIMAL INDICATE THAT THE STANDARD TAKES MORE THAN ONE PAGE.

IV. ALL STANDARD PAGES WILL BE MARKED WITH THE ABBREVIATION FOR THE MANUAL THEY EXIST IN. IF THE STANDARD EXISTS IN MORE THAN ONE MANUAL ALL ABBREVIATIONS AND STANDARD NUMBERS WILL BE INDICATED.

V. STANDARD PAGES WHICH APPEAR IN THE SERVICES STANDARDS & GUIDE MANUAL WILL BE INDICATED IN THE REFERENCE SECTION.

**REFERENCE:** NONE

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| C               | UPDATED STANDARDS | -  | GW                        | JS  | CZH | 11/15/2018         | F   |            |     |                     |     |     |           |
| B               | NOTES UPDATE      | -  | GW                        | JS  | MDJ | 3/1/2018           | E   |            |     |                     |     |     |           |
| A               | NOTES UPDATE      | -  | GW                        | IL  | MDJ | 10/25/2016         | D   | FORMATTING | EDM | JKI                 | -   | -   | 12/7/2020 |
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|                 | CONSTRUCTION STANDARDS/DEVIATION<br>REQUEST FORM AND PROCEDURE |   |                    |          |                     |                     |



3100 - PRACTICES



3100 - PRACTICES



**PAGE****SUBJECT**

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| 3111 | DISTRIBUTION STRUCTURE NUMBERING |
| 3113 | GIS UG MAP SYMBOL TABLE          |
| 3140 | CONTAMINATION DISTRICTS          |
| 3150 | ELECTRIC CONDUIT FIELD MAPPING   |

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| B   | UPDATES TO 3140   | -  | JS | TR    | MDJ    | 8/3/2016  | E   | FORMATTING        | EDM | JK | -   | -   | 1/13/2021 |
| A   | 3112 MOVED TO FMO | -  | JC | TR    | JS/MDJ | 10/7/2015 | D   | EDITORIAL CHANGES | -   | JK | JS  | CZH | 5/18/2018 |

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IDENTIFICATION



3200 -  
IDENTIFICATION



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SUBSTRUCTURES /  
CONDUITS



3300 -  
SUBSTRUCTURES /  
CONDUITS



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| 3377.1 & .2 | CONDUIT STUB MARKER AND TRACER WIRE LOCATING SYSTEM                                 |
| 3377.3      | GAS STUB MARKER   |
| 3378        | CONDUIT INSTALLATION IN BRIDGES   |
| 3379        | CONDUIT MANDRELING  |
| 3382        | CONDUIT SUBSTRUCTURE ADAPTORS   |
| 3383        | CONDUIT SPLICING INSTALLATION FOR CABLE-IN-CONDUIT (PID & SIDA)                     |

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| C               | ADDED 3327        | JS   | JS                        | CZH  | 11/1/2018 | F                  |        |    |          |      |      |                     |  |        |
| B               | EDITORIAL CHANGES | JK   | JS                        | CZH  | 5/18/2018 | E                  |        |    |          |      |      |                     |  |        |
| A               | EDITORIAL CHANGES | ML   | AW                        | MDJ  | 2/13/2018 | D                  |        |    |          |      |      |                     |  |        |
| SHEET<br>1 OF 1 |                   | X  | Indicates Latest Revision |      |           | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG3301 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |           |                    |        |    |          |      |      |                     |  |        |
|                 |                   | SUBSTRUCTURE, CONDUIT<br>TABLE OF CONTENTS       |                           |      |           |                    |        |    |          |      |      |                     |  |        |








FOR EQUIPMENT LIMITATIONS, TERMINATION CONFIGURATIONS  
AND UNOBSTRUCTED SPACE REQUIREMENTS, SEE STANDARDS 3605 THRU 3649

|   |  |
|---|--|
| <p>3309.1<br/>36" X 24-1/4" X 18"<br/>HANDHOLE</p>                                  | <p>HANDHOLE CAN BE USED IN SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS FOR THE TERMINATION AND CONNECTION OF SINGLE-PHASE SECONDARIES AND SERVICES. HANDHOLE MUST BE INSTALLED IN NON-TRAFFIC AREAS WHERE VEHICLES CANNOT DRIVE OVER OR PARK ON TOP OF HANDHOLE. NEVER INSTALL IN STREETS OR DRIVEWAYS.</p>   |
| <p>3309.2<br/>36" X 24-1/4" X 26"<br/>HANDHOLE</p>                                  | <p>HANDHOLE CAN BE USED IN SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS FOR THE TERMINATION AND CONNECTION OF SINGLE-PHASE AND LIMITED THREE-PHASE SECONDARIES AND SERVICES. HANDHOLE MUST BE INSTALLED IN NON-TRAFFIC AREAS WHERE VEHICLES CANNOT DRIVE OVER OR PARK ON TOP OF HANDHOLE. NEVER INSTALL IN STREETS OR DRIVEWAYS. WHEN A 3309 IS REQUIRED IN A TRAFFIC AREA, SUBSTITUTE THE 3309 WITH THE 3313 AND TRAFFIC COVER. 3313 REQUIRES TRUCK ACCESS FOR INSTALLATION AND MAINTENANCE.</p>  |
| <p>3311<br/>14" X 66" X 14"<br/>HANDHOLE</p>  | <p>FOR PRIMARY AND SECONDARY CABLE TRAINING BETWEEN TWO SINGLE-PHASE PAD-MOUNTED TRANSFORMERS CONNECTED IN AN OPEN-DELTA BANK.</p>   |
| <p>3311<br/>14" X 108" X 14"<br/>HANDHOLE</p>                                       | <p>FOR PRIMARY AND SECONDARY CABLE TRAINING BETWEEN THREE SINGLE-PHASE PAD-MOUNTED TRANSFORMERS CONNECTED IN A CLOSED DELTA-BANK WHEN HKR TRANSFORMER CANNOT BE USED.</p>  |
| <p>3312<br/>17" X 30" X 12"<br/>HANDHOLE-1 BODY<br/>SECONDARY AND<br/>UNDER PAD</p> | <p>3312 HANDHOLE MAY BE USED FOR REPLACEMENT OF EXISTING FACILITIES USE <del>3309.1</del> IF POSSIBLE. ALL FACILITIES REQUIRING 30" X 17" BOX UNDER PAD MOUNTED EQUIPMENT.</p>   |
| <p>3313<br/>24" X 36" X 24"<br/>HANDHOLE</p>  | <p>HANDHOLE CAN BE USED IN SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS FOR TERMINATION AND CONNECTION OF SINGLE-PHASE OR THREE-PHASE SECONDARIES AND SERVICES OR SINGLE-PHASE PRIMARY. SECONDARIES AND PRIMARY ARE NOT PERMITTED IN THE SAME HANDHOLE. HANDHOLE WITH PARKWAY COVER MUST BE INSTALLED IN AREAS WHERE VEHICLES CANNOT DRIVE OVER OR PARK ON TOP OF HANDHOLE. HANDHOLE WITH A TRAFFIC COVER MAY BE INSTALLED IN STREETS OR DRIVEWAYS BUT ONLY WHEN A <b>NON-TRAFFIC LOCATION IS UNAVAILABLE</b>. REQUIRES TRUCK ACCESS FOR INSTALLATION AND MAINTENANCE.</p> |


| REV             | CHANGE            | BY  | DSGN | APPV | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE      |
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| A               | EDITORIAL CHANGES | JS  | TR   | MDJ  | 10/27/2016 | D   |        |    |      |      |           |
| SHEET<br>1 OF 2 |                   | <div>  Indicates Latest Revision           Completely Revised           New Page           Information Removed         </div> <div>SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD</div> <div>SUBSTRUCTURE APPLICATIONS</div> |      |      |            |     |        |    |      |      | UG 3302.1 |
|                 |                   |   |      |      |            |     |        |    |      |      |           |
|                 |                   |   |      |      |            |     |        |    |      |      |           |



FOR EQUIPMENT LIMITATIONS, TERMINATION CONFIGURATIONS  
AND UNOBSTRUCTED SPACE REQUIREMENTS, SEE STANDARDS 3605 THRU 3649

|  |  |
|--|--|
| <p>3314<br/>3' X 6' X 4'<br/>HANDHOLE</p>                                  | <p>HANDHOLE CAN BE USED IN SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS FOR THE TERMINATION AND CONNECTION OF SINGLE-PHASE AND THREE-PHASE PRIMARY LOCAL DISTRIBUTION AND/OR SECONDARIES AND SERVICES. HANDHOLE WITH PARKWAY COVER MUST BE INSTALLED IN AREAS WHERE VEHICLES CANNOT DRIVE OVER OR PARK ON TOP OF HANDHOLE. IF A NEW 3314 HANDHOLE IS REQUIRED IN A STREET OR DRIVEWAY WHERE A <b>NON-TRAFFIC LOCATION IS UNAVAILABLE</b>, IT MUST BE SUBSTITUTED WITH A 3315 HANDHOLE AND TRAFFIC COVER. IF A TRAFFIC COVER IS REQUIRED ON AN EXISTING 3314 HANDHOLE LOCATED IN A VEHICULAR AREA, USE THE 3315 "TRAFFIC COVER ASSEMBLY". REQUIRES TRUCK ACCESS FOR INSTALLATION AND MAINTENANCE. (THE 3523 IS PREFERRED)</p> |
| <p>3315<br/>4' X 6'-6" X 6"<br/>HANDHOLE</p>                               | <p>HANDHOLE CAN BE USED IN SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS FOR THE TERMINATION AND CONNECTION OF SINGLE-PHASE AND THREE-PHASE PRIMARY LOCAL DISTRIBUTION, THREE-PHASE PRIMARY FEEDERS, SECONDARIES AND SERVICES. HANDHOLE WITH PARKWAY COVER MUST BE INSTALLED IN AREAS WHERE VEHICLES CANNOT DRIVE OVER OR PARK ON TOP OF HANDHOLE. HANDHOLE WITH A TRAFFIC COVER MAY BE INSTALLED IN STREETS OR DRIVEWAYS BUT ONLY WHEN A <b>NON-TRAFFIC LOCATION IS UNAVAILABLE</b>. REQUIRES TRUCK ACCESS FOR INSTALLATION AND MAINTENANCE.</p>   |
| <p>3316<br/>5' X 8'-6" X 6'-6"<br/>HANDHOLE</p>                            | <p>HANDHOLE CAN BE USED IN SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS FOR THE TERMINATION AND CONNECTION OF SINGLE-PHASE AND THREE-PHASE PRIMARY LOCAL DISTRIBUTION, THREE-PHASE PRIMARY FEEDERS, 4-WAY SWITCH, SECONDARIES AND SERVICES. HANDHOLES WITH PARKWAY COVER MUST BE INSTALLED IN AREAS WHERE VEHICLES CANNOT DRIVE OVER OR PARK ON TOP OF HANDHOLE. HANDHOLES WITH TRAFFIC COVER MAY BE INSTALLED IN STREETS OR DRIVEWAYS BUT ONLY WHEN A <b>NON-TRAFFIC LOCATION IS UNAVAILABLE</b>. REQUIRES TRUCK ACCESS FOR INSTALLATION AND MAINTENANCE.</p>   |
| <p>3317<br/>6' X 8' 5'-10"<br/>HANDHOLE</p>                                | <p>HANDHOLE CAN BE USED IN EXISTING SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS AND OTHER NON-NEW DEVELOPMENT PROJECTS. TO BE USED <b>ONLY</b> TO INSTALL THE "VISTA" SUB-SURFACE, SURFACE OPERABLE 4-WAY SWITCH, AND TERMINATE ON SWITCH THREE-PHASE PRIMARY FEEDERS, SINGLE &amp; THREE-PHASE LOCAL DISTRIBUTION CABLES. HANDHOLE MUST BE INSTALLED IN NON-TRAFFIC AREAS WHERE VEHICLES CANNOT DRIVE OVER OR PARK ON TOP OF HANDHOLE. REQUIRES TRUCK ACCESS FOR INSTALLATION AND MAINTENANCE.</p>   |
| <p>3325<br/>8' X 14' X 9'-6"<br/>3326<br/>8' X 20' X 9'-6"<br/>MANHOLE</p> | <p>MANHOLE CAN BE USED IN SINGLE-FAMILY RESIDENTIAL, MULTI-FAMILY, AND COMMERCIAL DEVELOPMENTS FOR TERMINATION AND CONNECTION OF LOCAL PRIMARY DISTRIBUTION THREE-PHASE PRIMARY FEEDERS, SECONDARIES AND SERVICES AND ON-OFF OR 4 WAY SWITCHES. MANHOLE CAN BE INSTALLED IN NON-TRAFFIC OR STREET LOCATIONS. REQUIRES TRUCK ACCESS FOR INSTALLATION AND MAINTENANCE. SEE PAGE 3605.2 FOR 4-WAY SWITCH MANHOLE REQUIREMENTS.</p>  |

| REV | CHANGE            | BY | DSGN | APPV | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE |
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| SHEET<br>2 OF 2 |  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3302.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |                    |          |                     |           |
|                 | SUBSTRUCTURE APPLICATIONS   |                           |                    |          |                     |           |



**SCOPE:** THIS STANDARD LISTS THE CONCRETE PRODUCTS USED IN SUBSURFACE INSTALLATIONS.

| CONCRETE PRODUCTS   | STANDARD PAGE | TO BE INSTALLED BY:               | CRANE REQUIRED <sup>(B)</sup> |
|---|---------------|-----------------------------------|-------------------------------|
| HANDHOLE:<br>3309.1- 37" X 26" X 18"<br>3309.2- 37" X 26" X 26" | 3309          | CREWS OR CONTRACTOR               | NO                            |
| HANDHOLE:<br>14" x 66" x 14"<br>14" x 108" x 14"                | 3311          | CREWS OR CONTRACTOR               | NO                            |
| HANDHOLE:<br>17" x 30" x 12"                                    | 3312          | CREWS OR CONTRACTOR               | NO                            |
| HANDHOLE:<br>24" x 36" x 24"                                    | 3313          | CREWS OR CONTRACTOR               | NO                            |
| HANDHOLE:<br>36" x 72" x 48"                                    | 3314          | CREWS OR CONTRACTOR (A)           | NO                            |
| HANDHOLE:<br>4' x 6'-6" x 6'                                    | 3315          | CREWS OR CONTRACTOR (A)           | NO                            |
| HANDHOLE:<br>5' x 8'-6" x 6'-6"                                 | 3316          | CREWS, CONTRACTOR OR SUPPLIER (A) | NO                            |
| HANDHOLE:<br>6' X 8" x 6'-6"                                    | 3317          | CREWS OR CONTRACTOR (A)           | YES                           |
| MANHOLE:<br>8' x 14' x 8'-6"                                    | 3325          | CREWS, CONTRACTOR OR SUPPLIER     | YES                           |
| MANHOLE:<br>8' x 20' x 9'-6"                                    | 3326          | CREWS, CONTRACTOR OR SUPPLIER     | YES                           |
| MANHOLE NECK & COVER-TRAFFIC BEARING<br>48" x 60"               | 3332          | CREWS OR CONTRACTOR               | NO                            |

## INSTALLATION:

- (A) SUPPLIER WILL SET SUBSTRUCTURE ON JOB SITE IF EXCAVATION IS COMPLETED.
- (B) WHEN SUPPLIER'S OR SDG&E'S EQUIPMENT CANNOT GET CLOSE ENOUGH TO EXCAVATE DUE TO SOFT SAND, ETC. A CRANE WILL BE REQUIRED.

**NOTES:**

I. SPECIAL ORDER MANHOLES LARGER THAN THOSE LISTED WILL BE INSTALLED BY SUPPLIER/CONTRACTOR.

**REFERENCE:**

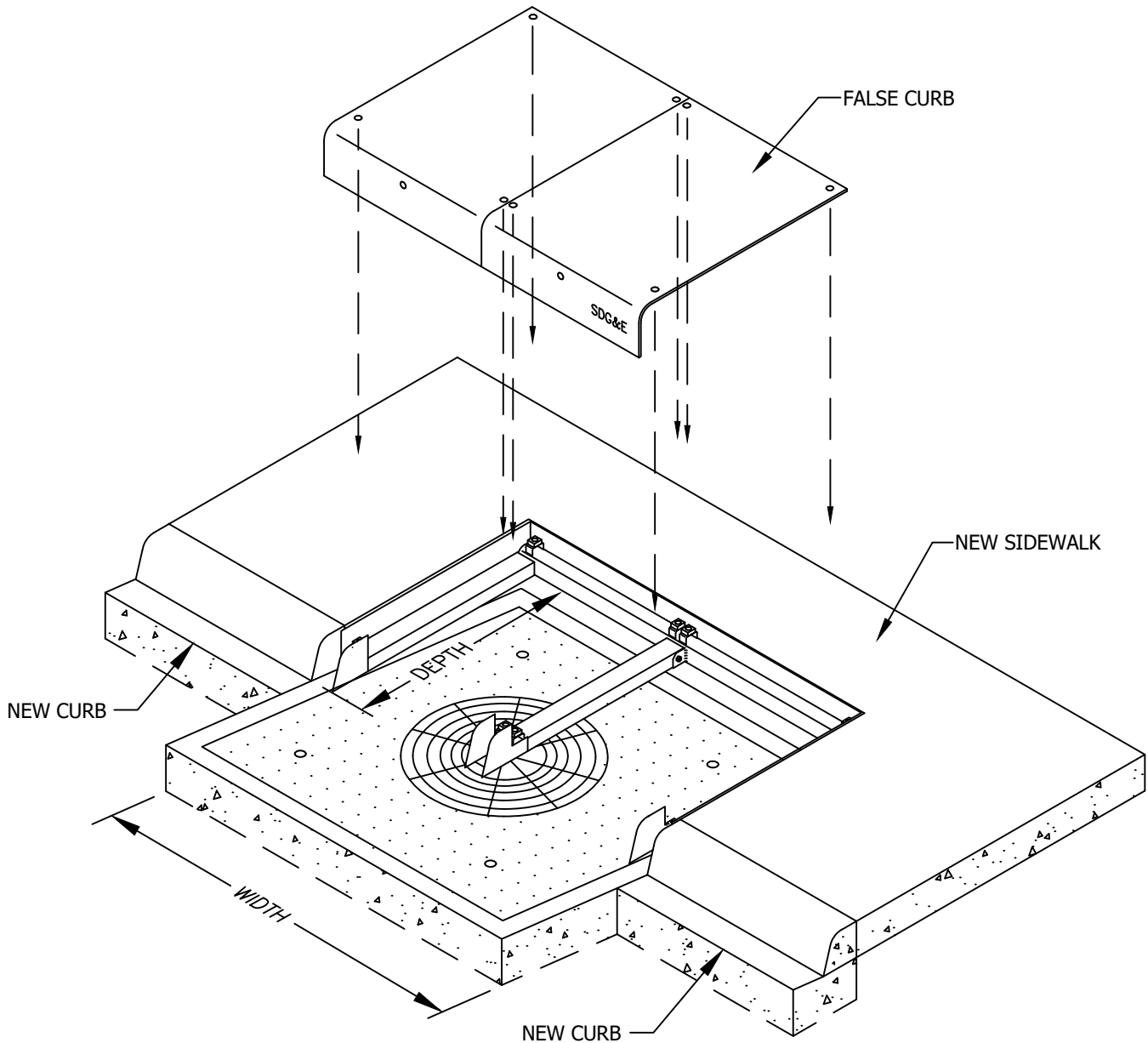
a. FOR WATER SEALING CONCRETE SECTIONS, SEE STANDARD 3306.

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| REV             | CHANGE            | BY  | DSGN                      | APPV | DATE       | REV                | CHANGE | BY | DSGN     | APPV | DATE |                     |  |         |
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| B               |                   |   |                           |      |            | E                  |        |    |          |      |      |                     |  |         |
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                |                           |      |            |                    |        |    |          |      |      |                     |  |         |
|                 |                   | CONCRETE PRODUCTS<br>HANDHOLES, MANHOLES, COVERS AND ENCLOSURES |                           |      |            |                    |        |    |          |      |      |                     |  |         |



**SCOPE:** THIS STANDARD PROVIDES INFORMATION ON HOW TO APPLY, ORDER, AND INSTALL FALSE CURBS.



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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |      |            |                    |        |    |          |      |      |                     |  |           |
|                 |                   | FALSE CURB  |                           |      |            |                    |        |    |          |      |      |                     |  |           |



| REV             | CHANGE            | BY   | DSGN                      | APPV | DATE       | REV                | CHANGE | BY | DSGN     | APPV | DATE |                     |  |           |
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| B               |                   |  |                           |      |            | E                  |        |    |          |      |      |                     |  |           |
| A               | EDITORIAL CHANGES | JS   | TR                        | MDJ  | 10/27/2016 | D                  |        |    |          |      |      |                     |  |           |
| SHEET<br>2 OF 3 |                   | <div><div></div><div></div></div>                | Indicates Latest Revision |      |            | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG 3304.2 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |            |                    |        |    |          |      |      |                     |  |           |
|                 |                   | FALSE CURB                                       |                           |      |            |                    |        |    |          |      |      |                     |  |           |



## INSTALLATION:

- A. WORK WITH THE LIAISON PLANNER TO SEE IF THE MUNICIPALITY'S CONTRACTOR WILL INSTALL THE FALSE CURBS. IF THEY ARE INTERESTED AND THE MUNICIPALITY APPROVES, THEN THEY ARE TO SUBMIT A BID FOR THE INSTALLATION COST. IF THE BID IS APPROVED BY THE LIAISON PLANNER AND SUPERVISOR, THE LIAISON PLANNER WILL NOTIFY THE CONTRACTOR. THE CONTRACTOR, AT THIS TIME, MAY ALSO PROVIDE SDG&E WITH A RELEASE FORM, WHICH, AS THE MUNICIPALITY'S CONTRACTOR, ALLOWS THEM TO INSTALL THE FALSE CURBS. IF WE DO NOT ACCEPT THE BID, THEN SDG&E WILL INSTALL THE CURBS AND COORDINATE WITH THE CONTRACTOR. PROVIDE CITY CONTRACTOR WITH A COPY OF THE WORK ORDER.
- B. THE MUNICIPALITY'S CONTRACTOR WILL WORK WITH THE DISTRICT AND PROJECT COORDINATOR ON THE ACTUAL INSTALLATION OF THE FALSE CURBS. THE CONTRACTOR IS RESPONSIBLE FOR PICK-UP OF MATERIAL FROM THE C&O DISTRICT.
- C. UPON COMPLETION OF THE WORK BY THE MUNICIPALITY'S CONTRACTOR, THEY ARE TO SUBMIT A REQUEST FOR PAYMENT. UPON RECEIPT, THE LIAISON PLANNER WILL PREPARE A REQUEST FOR VOUCHER CHECK FORM. PAYMENT IS TO BE MADE TO THE CONTRACTOR AND CHARGED TO THE APPROPRIATE BUDGET.

## DESIGN (DPSS)

BE SURE TO INDICATE AT THE LOCATION (WHERE THE FALSE CURBS ARE BEING INSTALLED) THAT THE MUNICIPALITY'S CONTRACTOR IS DOING THE INSTALLATION. SDG&E WILL BE LOWERING THE SUBSTRUCTURE AND INSTALLING A TRAFFIC COVER.

**REFERENCE:**

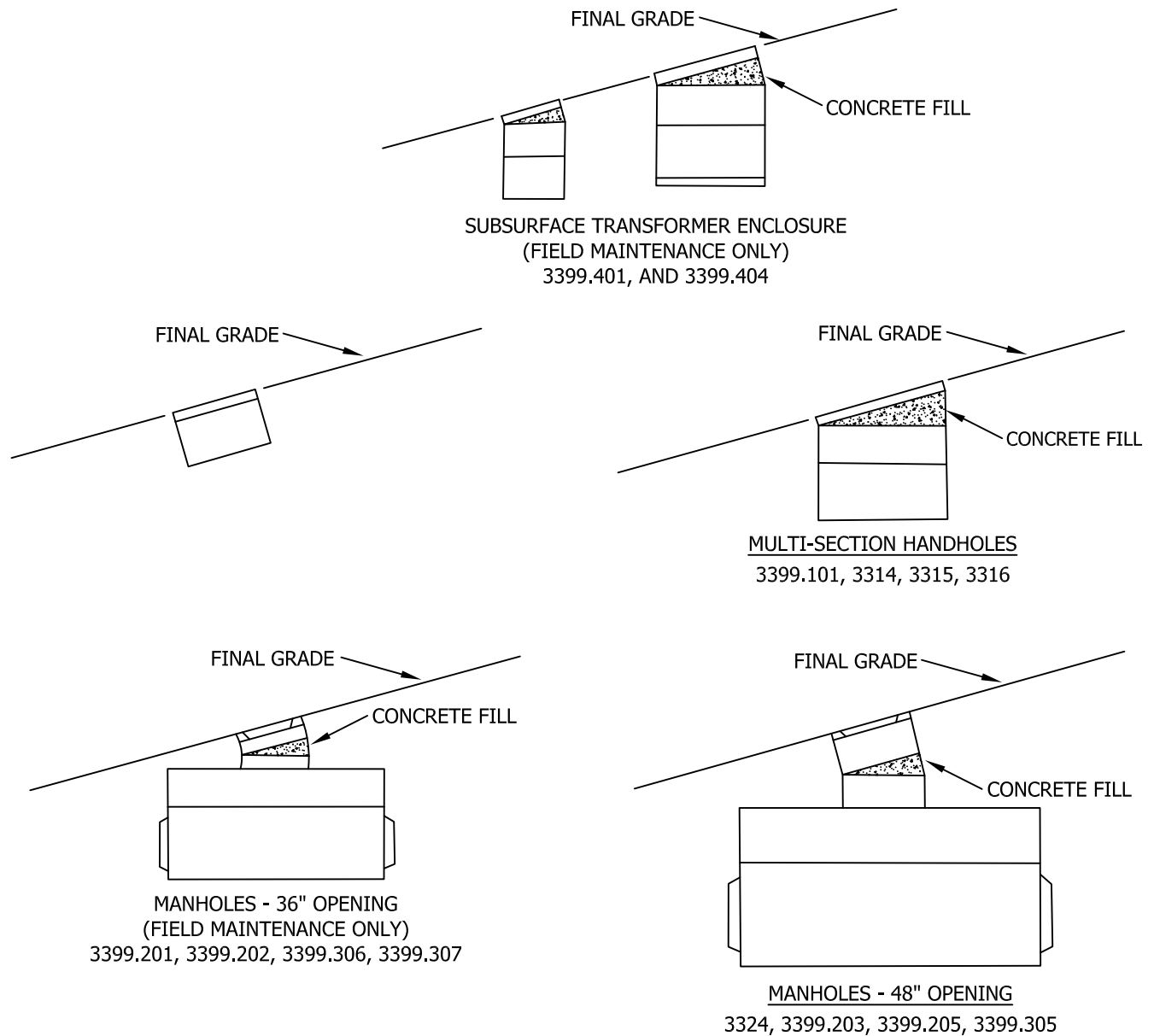
- a. SEE STANDARD 3314 FOR HANDHOLE EQUIPMENT ENCLOSURE (INSIDE DIMENSIONS - 3' X 6').
- b. SEE STANDARD 3315 FOR HANDHOLE EQUIPMENT ENCLOSURE (INSIDE DIMENSIONS - 4' X 6').
- c. SEE STANDARD 3316 FOR HANDHOLE EQUIPMENT ENCLOSURE INSIDE DIMENSIONS - 5' X 8'-6").
- d. SEE STANDARD 3332.1 FOR 48" X 60" NECK AND COVER TRAFFIC BEARING.
- e. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                    |     |          |    |                     |      |           |
|                 |                   | FALSE CURB                                       |                           |      |                    |     |          |    |                     |      |           |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIRED TO SET SUBSTRUCTURES ON SLOPING GRADES.



## INSTALLATION:

- A. ALIGN TOP SECTION TO FINAL GRADE. POUR CONCRETE (4 SACK MIX WITH 3/8" PEA GRAVEL OR AS REQUIRED BY CITY OR COUNTY, CAL. TRANS. OR U.S. GOVERNMENT CODES).

**REFERENCE:**

- a. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (SUBSTRUCTURE PLACEMENT).
- b. SEE STANDARDS 3484 AND 3487 FOR RETAINING WALLS WHERE BANKS OR EXCESSIVE SLOPES EXIST.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD  |                           |      |            |                    |        |    |          |      |      |                     |  |         |
|                 |                   | INSTALLATION OF SUBSTRUCTURES ON SLOPING SURFACES |                           |      |            |                    |        |    |          |      |      |                     |  |         |

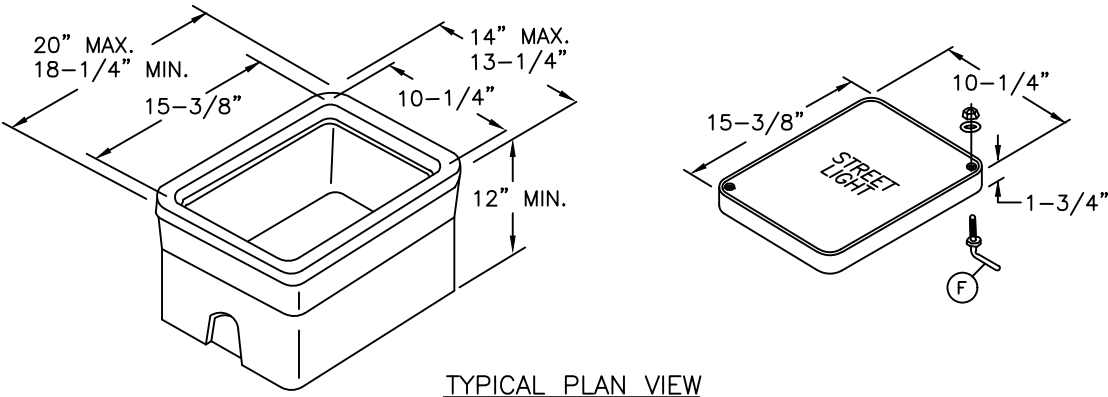


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| A               | EDITORIAL CHANGES | JS  | TR                        | MDJ  | 10/27/2016 | D                  |        |    |          |      |      |                     |  |         |
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD        |                           |      |            |                    |        |    |          |      |      |                     |  |         |
|                 |                   | JOINT (PLASTIC-MASTIC) SEALING COMPOUND<br>INSTALLATION |                           |      |            |                    |        |    |          |      |      |                     |  |         |

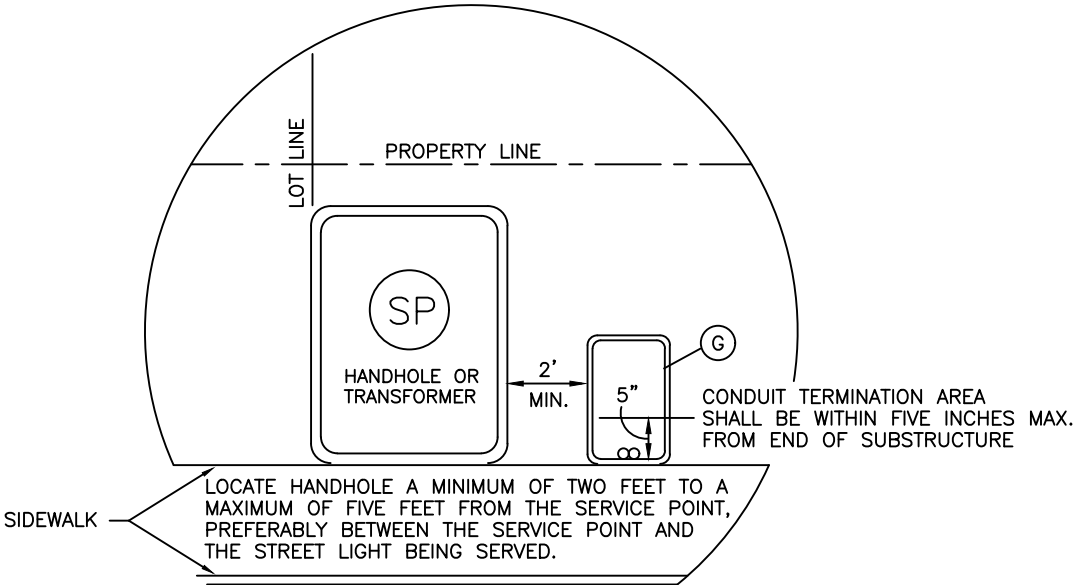


**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3-1/2 STREET LIGHT HANDHOLE FOR THE CITY OF SAN DIEGO "ONLY".

NO. 3-1/2 STREET LIGHT HANDHOLE  
SUPPLIED BY CITY OF SAN DIEGO



TYPICAL PLAN VIEW



**NOTES:**

I. THE ONLY LOCATION FOR A NO. 3-1/2 HANDHOLE IS IN NON-VEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.).

**BILL OF MATERIAL FOR STREET LIGHT HANDHOLE**

| ITEM | DESCRIPTION        | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|------|--------------------|----------|--------------|----------------|
| 1    | NO. 3-1/2 HANDHOLE | 1        | *            | 31/2PB         |

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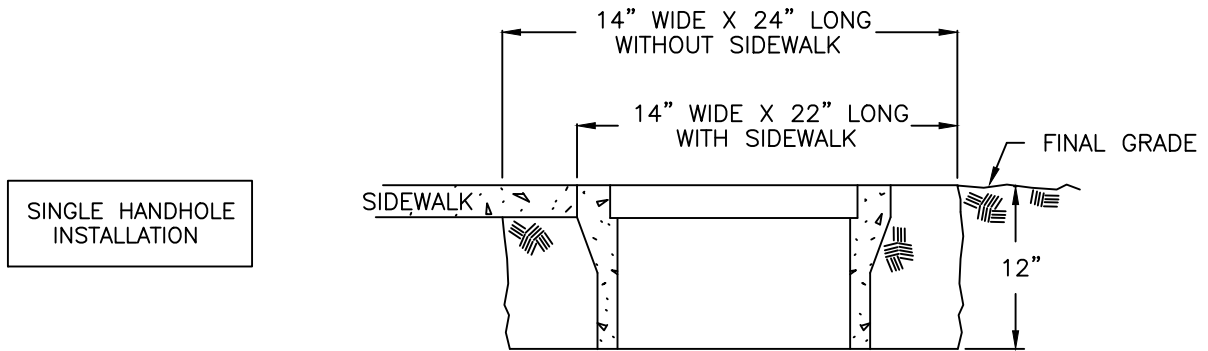
SDG&E ELECTRIC UNDERGROUND STANDARD

HANDHOLE  
(INSIDE DIMENSIONS - 10-1/4" X 15-3/8")

UG 3308.1



## EXCAVATION DIMENSIONS



### INSTALLATION:

- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO GAS AND FOREIGN UTILITY PLACEMENTS. ANY CHANGE IN LOCATION BY DISTRICT CONSTRUCTION REQUIRES PRIOR APPROVAL FROM SERVICE PLANNING.
  - B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING ABOVE. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW EXTRA SPACE FOR SETTING THE SUBSTRUCTURE AND TAMPING THE BACKFILL.
  - C. TO DETERMINE FINAL GRADE, MEASURE FROM THE TOP OF CURB OR ESTABLISHED GRADE.
  - D. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTION. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE. SET HAND-HOLE AT FINAL GRADE.
- (F) APPLY SILICONE GREASE (STOCK NUMBER S391424), TO THE BOLTS WHEN SECURING THE COVER TO REDUCE REMOVAL AND INSTALLATION DIFFICULTIES.
  - (G) IF RIGHT-OF-WAY OR OBSTRUCTIONS CAUSE A PROBLEM, THE HANDHOLE MAY BE TURNED TO WHERE THE LONG SIDE OF THE HANDHOLE PARALLELS THE SIDEWALK OR PROPERTY LINE.

### REFERENCE:

- a. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS. (USE 3312)
- b. SEE STANDARD 3485 WHEN SETTING HANDHOLE ON A SLOPING GRADE.
- c. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS. (USE 3312)
- d. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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**SHEET  
2 OF 2**

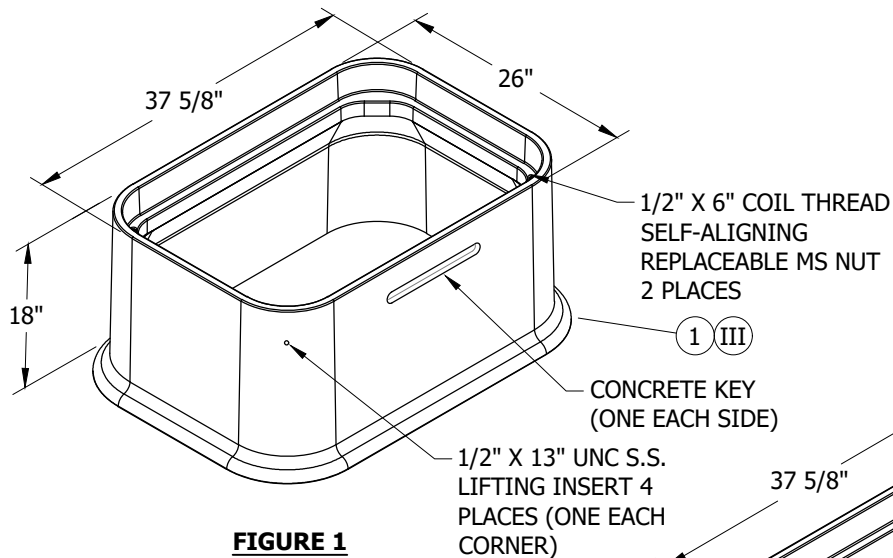
SDG&E ELECTRIC UNDERGROUND STANDARD

HANDHOLE  
(INSIDE DIMENSIONS - 10-1/4" X 15-3/8")

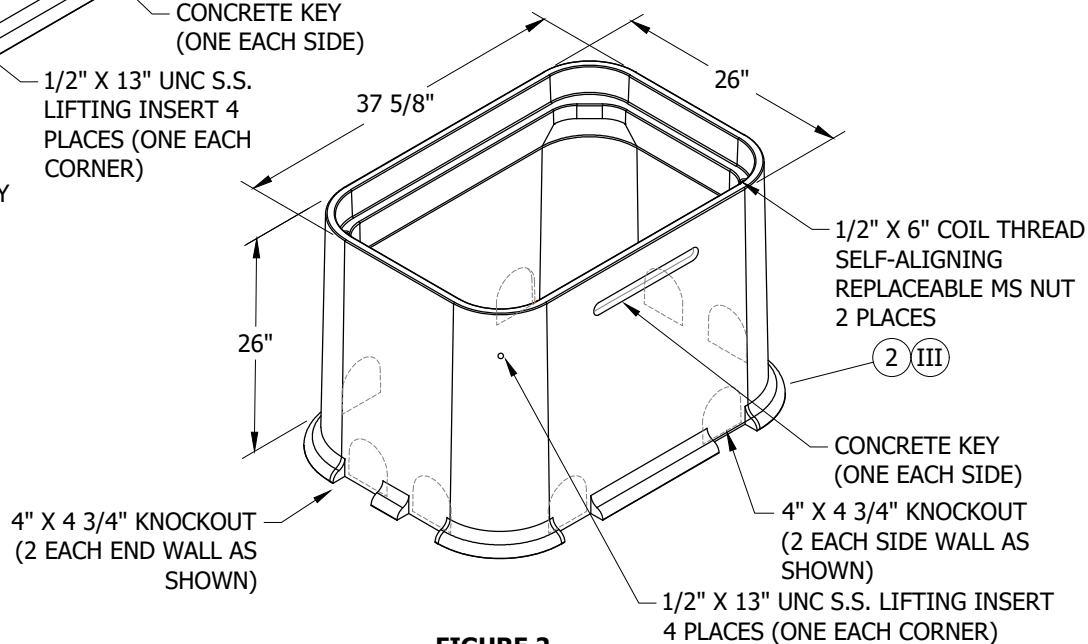
**UG 3308.2**



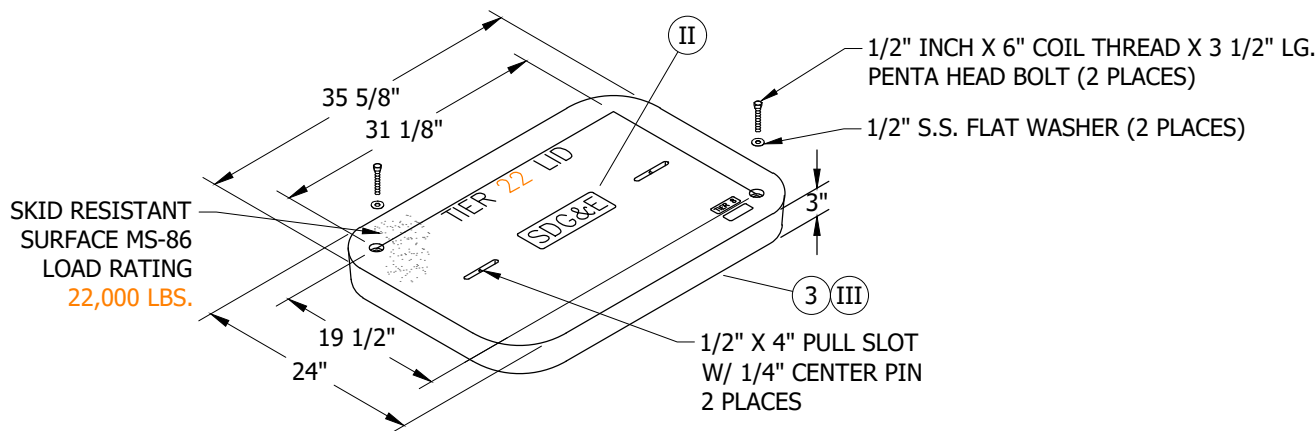
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR 3309 HANDHOLES.



**FIGURE 1**  
3309.1 HANDHOLE BODY



**FIGURE 2**  
3309.2 HANDHOLE BODY



**FIGURE 3**  
3309.1 & 3309.2 HANDHOLE COVER

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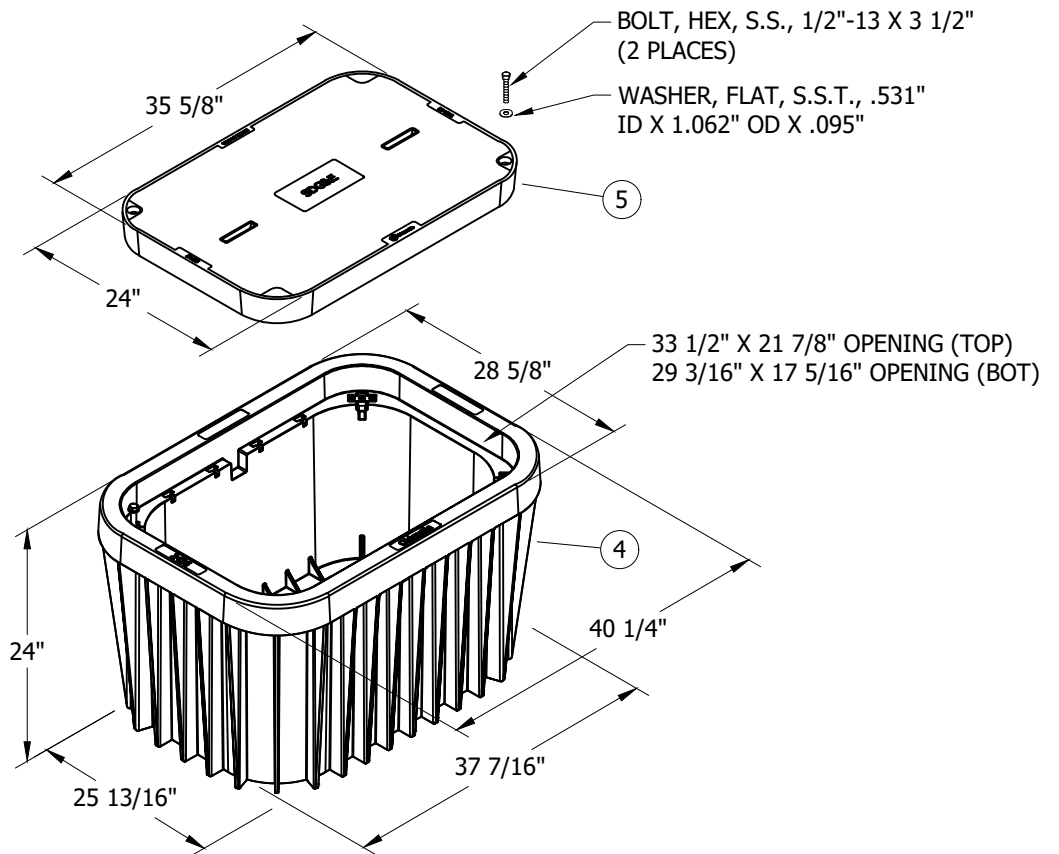
**SHEET**  
**1 OF 4**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

HANDHOLE POLYMER CONCRETE  
(37" X 26" X 18")

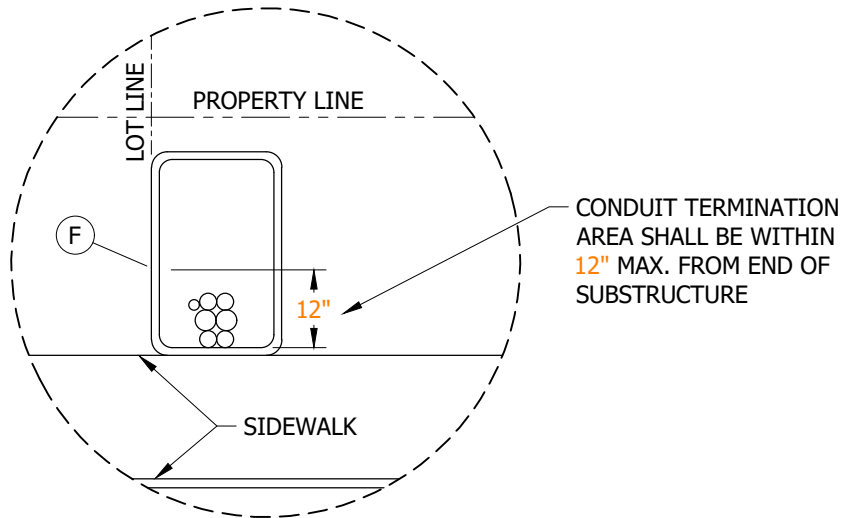
**UG3309.1**





**FIGURE 4**  
3309.3 HANDHOLE BODY WITH  
3309.3 (TIER 22) COVER

HANDHOLE MAY BE INSTALLED ON  
EITHER SIDE OF LOT LINE OR IN  
CENTER OF LOT LINE IN AREA  
WITH LIMITED SPACE. BUTT  
AGAINST BACK OF SIDEWALK.



**FIGURE 5**  
TYPICAL PLAN VIEW

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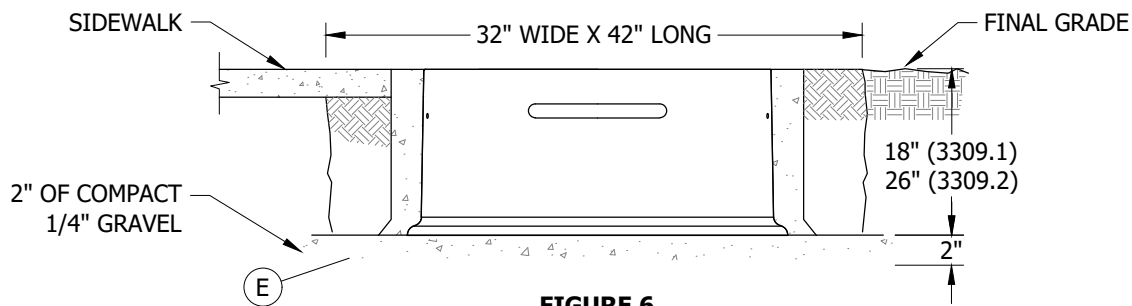
**SHEET**  
**2 OF 4**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

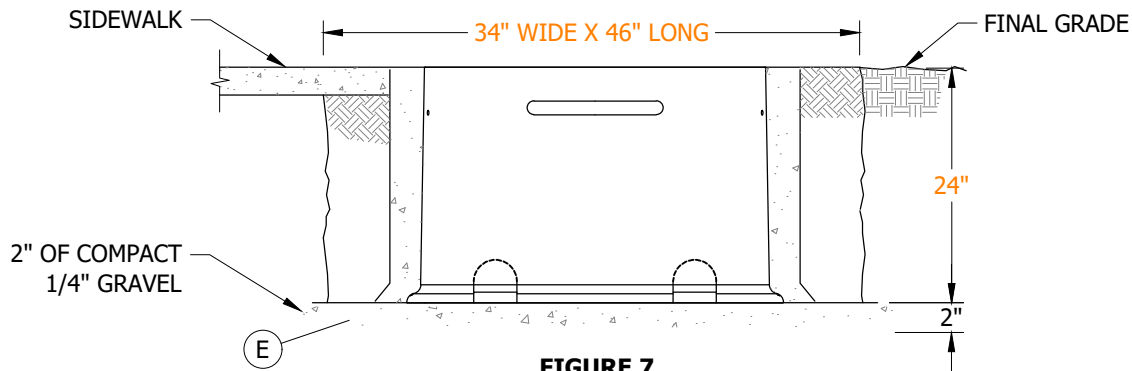
HANDHOLE POLYMER CONCRETE  
(HEAVY DUTY COVER FOR 3309)

**UG3309.2**





**FIGURE 6**  
3309.1 & 3309.2 EXCAVATION DIMENSIONS



**FIGURE 7**  
3309.3 EXCAVATION DIMENSIONS

#### INSTALLATION:

- A. ESTABLISH HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO GAS AND FOREIGN UTILITY PLACEMENTS. ANY CHANGE IN LOCATION BY CONSTRUCTION REQUIRES PRIOR APPROVAL FROM SERVICE PLANNING.
- B. AFTER LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING ABOVE. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW EXTRA SPACE FOR SETTING THE SUBSTRUCTURE AND TAMPING THE BACKFILL.
- C. TO DETERMINE FINAL GRADE, MEASURE FROM TOP OF CURB OR ESTABLISHED GRADE.
- D. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE. SET HANDHOLE TOP AT FINAL GRADE.
- (E) BOX SHALL BE SET ON 2 INCHES OF COMPACT 1/4-INCH GRAVEL.
- (F) IF RIGHT OF WAY OR OBSTRUCTIONS CAUSE A PROBLEM, LONG SIDE OF HANDHOLE MAY BE PLACED PARALLEL TO THE SIDEWALK OR PROPERTY LINE.

#### BILL OF MATERIALS:

| ITEM   | DESCRIPTION   | DIMENSIONS                               | WEIGHT                        | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS | SAP CU   |
|--------|---|--|-------------------------------|----------|---------------|--------------------|--------------|----------|
| 1<br>3 | BOX, HANDHOLE, 3309.1, SECONDARY COVER, HANDHOLE, 3309.1 & 3309.2 | 37 5/8" X 26" X 18"<br>35 5/8" X 24"     | 144 LBS. MAX.<br>55 LBS. MAX. | 1<br>1   | --            | S162688            | 330913       | 330913HH |
| 2<br>3 | BOX, HANDHOLE, 3309.2, SECONDARY COVER, HANDHOLE, 3309.1 & 3309.2 | 37 5/8" X 26" X 26"<br>35 5/8" X 24"     | 199 LBS. MAX.<br>55 LBS. MAX. | 1<br>1   | --            | S162690            | 330926       | 330926HH |
| 3      | COVER, HANDHOLE, 3309.1 & 3309.2                                  | 35 5/8" X 24"                            | 55 LBS. MAX. (I)              | 1        | --            | S459952            | 09-COV       | --       |
| 4<br>5 | BOX, HANDHOLE, 3309.3<br>COVER, HANDHOLE, 3309.3                  | 40 1/4" X 38 5/8" X 24"<br>35 5/8" X 24" | 80 LBS.<br>151 LBS.           | 1<br>1   | --            | S162422<br>S459950 | --<br>--     | --<br>-- |

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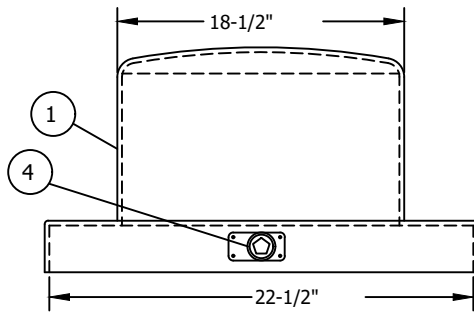
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| SHEET<br>3 OF 4 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3309.3 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |                           |                    |          |                     |          |
|                 | HANDHOLE POLYMER CONCRETE<br>(EXCAVATION DIMENSIONS) |                           |                    |          |                     |          |



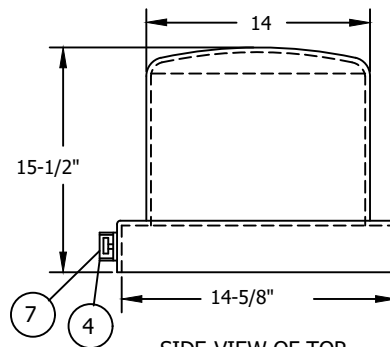
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |                           |                    |          |                     |          |
|                 | HANDHOLE POLYMER CONCRETE<br>(EXCAVATION DIMENSIONS) |                           |                    |          |                     |          |



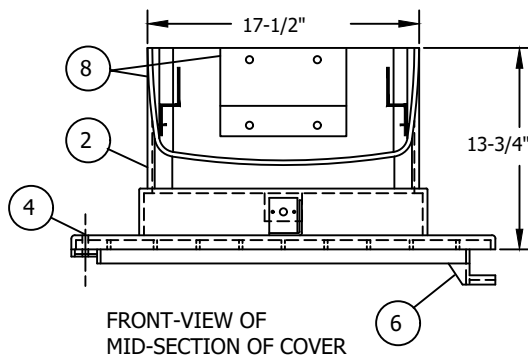
**SCOPE:** THIS STANDARD COVERS THE PENCELL SECONDARY BOX PEDESTAL. THIS SECONDARY PEDESTAL IS DESIGN FOR AND SHALL BE LOCATED IN GREEN BELTS, EXTREME WET ENVIRONMENTS, AREAS WITH HIGH VEGETATION THAT MAY COVER A SECONDARY BOX AND OTHER SIMILAR AREAS. ANY SPECIAL APPLICATION OF THIS FACILITY SHALL REQUIRE A DEVIATION REQUEST.



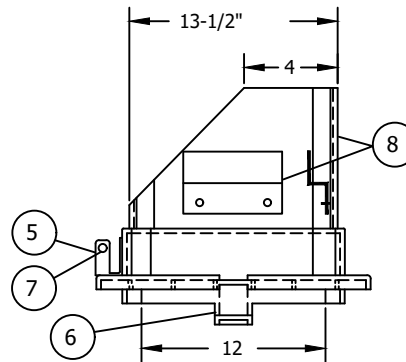
FRONT-VIEW OF TOP  
SECTION OF COVER



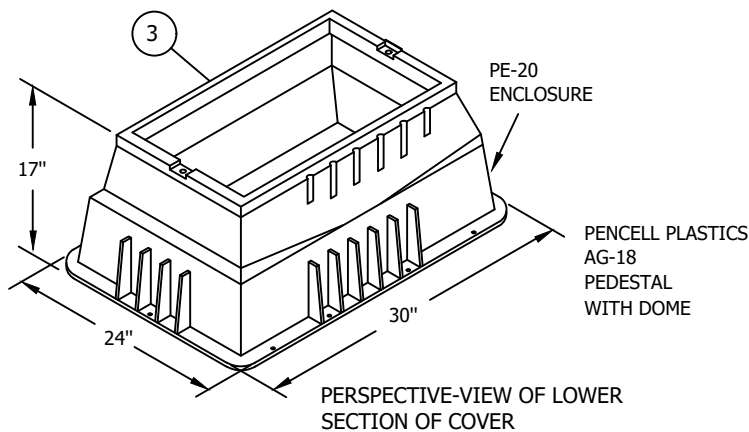
SIDE-VIEW OF TOP  
SECTION OF COVER



FRONT-VIEW OF  
MID-SECTION OF COVER



SIDE-VIEW OF TOP  
MID-SECTION OF COVER



PERSPECTIVE-VIEW OF LOWER  
SECTION OF COVER



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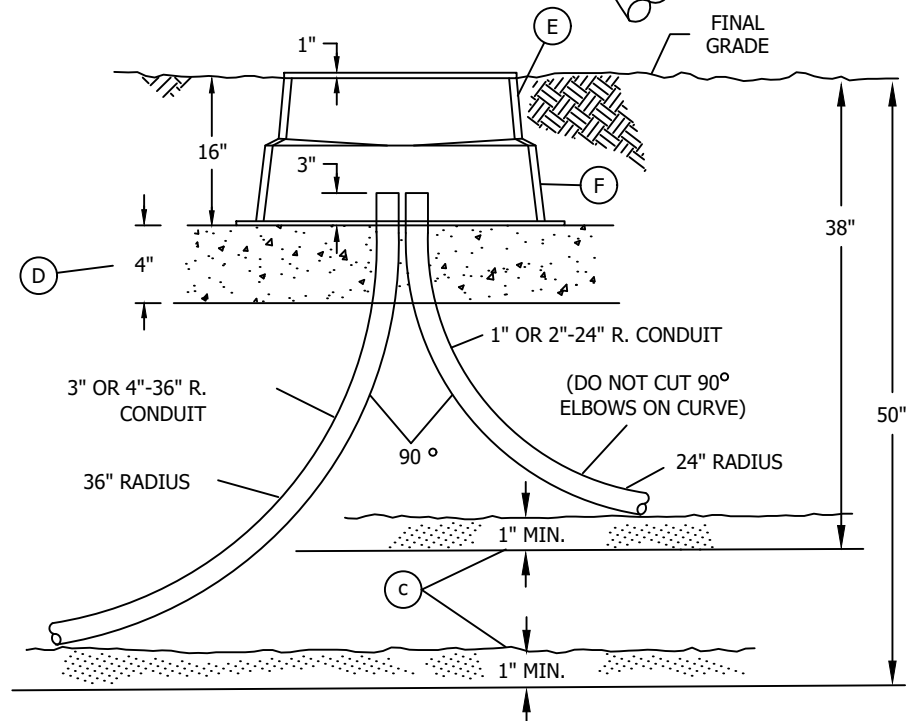
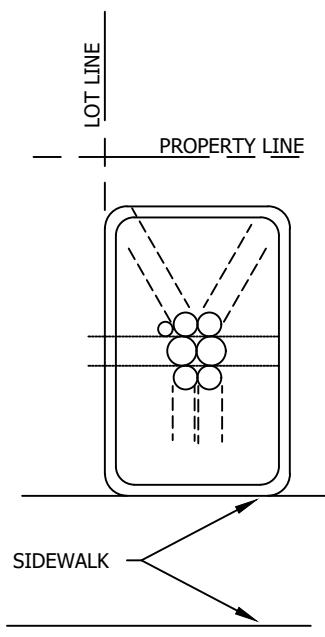
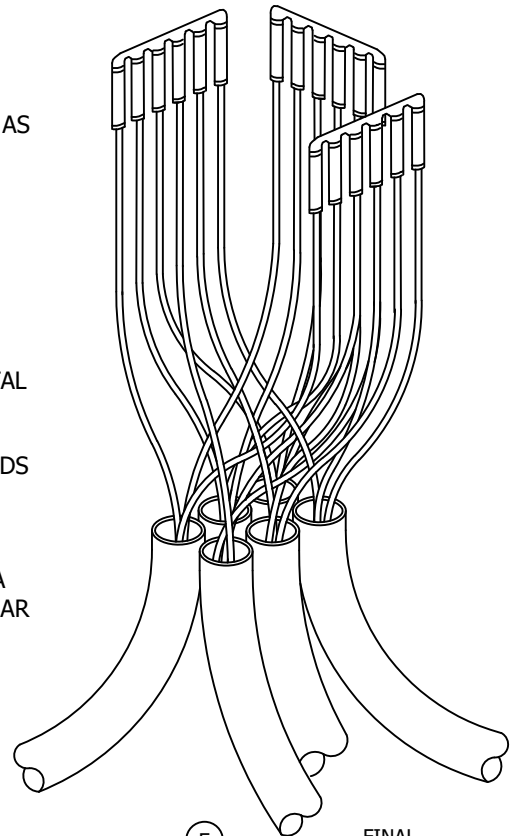
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

PENCELL SECONDARY BOX  
PEDESTAL WITH DOME

UG 3310.1





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| A               | EDITORIAL CHANGES | JC   | TR                        | MDJ  | 9/1/2015 | D                  |        |    |          |      |      |                     |  |           |
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |          |                    |        |    |          |      |      |                     |  |           |
|                 |                   | PENCELL SECONDARY BOX<br>PEDESTAL WITH DOME      |                           |      |          |                    |        |    |          |      |      |                     |  |           |



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                        | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|------|------------------------------------|----------|--------------|----------------|
| 1    | PEDESTAL COVER                     | 1        | S525348      | 3310           |
| 2    | PEDESTAL BASE                      | 1        |              |                |
| 3    | BOX ENCLOSURE                      | 1        |              |                |
| 4    | PENTA BOLT                         | 1        | INCLUDED     | -              |
| 5    | LOCKING LATCH                      | 1        | INCLUDED     | -              |
| 6    | MOLDED KEY LOCK                    | 1        | INCLUDED     | -              |
| 7    | KEYLESS LOCK                       | 2        | S738440      | -              |
| 8    | CABLE, CONNECTION MOUNTING BRACKET | 3        | INCLUDED     | -              |
| X    | EXCAVATION, 3310                   | 1        | -            | X10H           |

### INSTALLATION:

- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO GAS AND FOREIGN UTILITY PLACEMENTS. ANY CHANGE IN LOCATION BY DISTRICT CONSTRUCTION REQUIRES PRIOR APPROVAL FROM SERVICE PLANNING.
- B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING ABOVE. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW EXTRA SPACE FOR SETTING THE SUBSTRUCTURE AND TAMPING THE BACKFILL.
- C. TO DETERMINE FINAL GRADE, MEASURE FROM THE TOP OF CURB OR ESTABLISHED GRADE.
- D. ADD FOUR-INCH OF GRAVEL AND COMPACT BOTTOM OF EXCAVATION AND SET FINAL GRADE.
- E. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE. SET HANDHOLE AT FINAL GRADE. BOX SHOULD BE SET ONE-INCH ABOVE GRADE. DO NOT BACK FILL WITH LARGE ROCKS.
- F. INSTALL PULLING AND MEASURING TAPE IN CONDUIT.

**REFERENCE:**

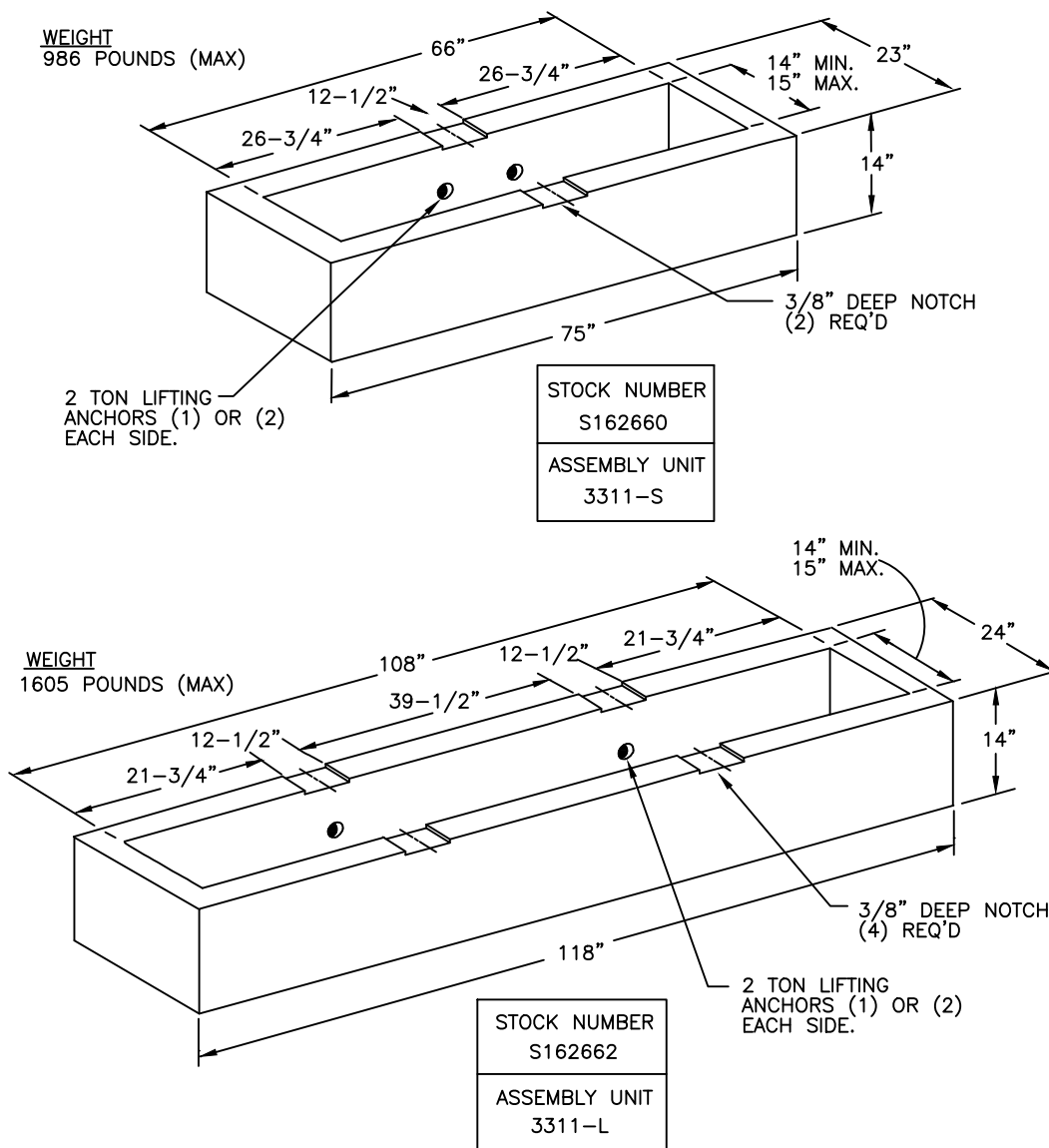
- a. SEE STANDARD 3302 FOR SUBSTRUCTURE APPLICATIONS.
- b. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- c. SEE STANDARD 3370 FOR TRENCH DEPTHS, BASE SHADING AND BACKFILL REQUIREMENTS.
- d. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE STANDARD 3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM NUMBER OF CABLES, CONNECTORS, AND CONDUITS).

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| A               | EDITORIAL CHANGES | JC   | TR                        | MDJ  | 9/1/2015 | D                  |        |    |          |      |      |                     |  |           |
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |          |                    |        |    |          |      |      |                     |  |           |
|                 |                   | PENCELL SECONDARY BOX<br>PEDESTAL WITH DOME      |                           |      |          |                    |        |    |          |      |      |                     |  |           |



**SCOPE:** THIS STANDARD COVERS THE 3311-S AND 3311 L TROUGHS. THESE STRUCTURES GO BELOW THE PAD FOR OPEN/CLOSED DELTA TRANSFORMER INSTALLATIONS FOR CABLE TRAINING. TO BE USED FOR CABLE TRAINING BETWEEN SINGLE-PHASE PAD-MOUNTED TRANSFORMERS. USE 66" - 2-12KV PAD-MOUNTED TRANSFORMERS FOR OPEN DELTA BANKS AND PAD-MOUNTED SWITCH INSTALLATIONS. 108" - 3-12KV PAD-MOUNTED TRANSFORMERS FOR CLOSED DELTA BANKS.



**REFERENCE:**

a. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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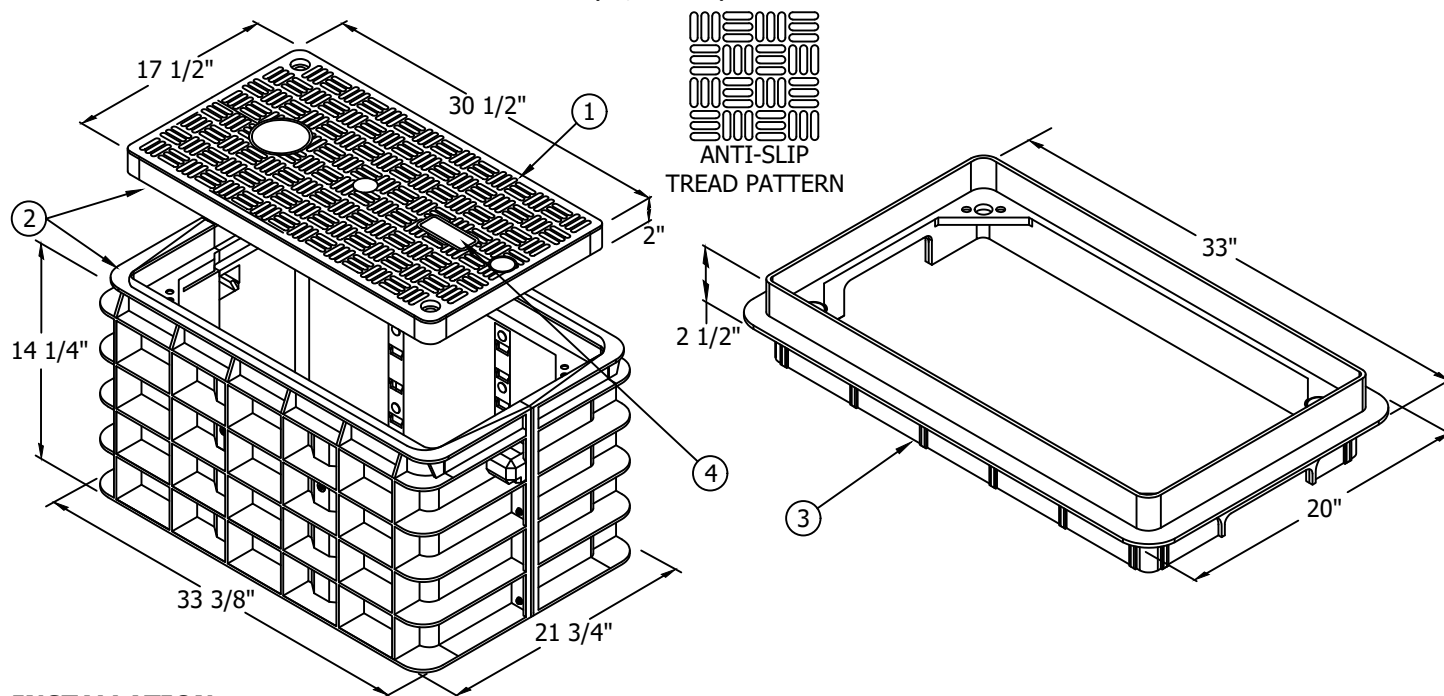
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| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 6/2/2016 | D   |        |    |      |      |      |

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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD                        |   |   |  |         |
|                 | HANDHOLE 14" X 66" X 14"<br>14" X 108" X 14"               |   |   |  |         |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF HIGH DENSITY POLYETHYLENE (HDPE) BOXES AND LIDS.

**ATTENTION:** THESE BOXES AND LIDS ARE TO BE USED ON SECONDARY ONLY. THE STRENGTH DESIGN RATING OF BOX AND LID IS TIER 22 (22,500 LBS). **NOT TRAFFIC RATED.**



## INSTALLATION:

- A. TO SECURE THE SHIELD COVER TO THE BOX, USE TWO PENTA LAG SCREWS PROVIDED WITH THE UNIT.
- B. TO SECURE THE RAISING RING TO THE BOX, LOCATE THE LARGER HOLES ON THE RING AND ATTACH TO THE BOX USING TWO LAG SCREWS. ATTACH THE SHIELD COVER TO THE RING USING THE TWO PENTA LAG SCREWS.
- C. A SHIELD COVER MAY BE USED TO REPLACE A CONCRETE LID. TO ATTACH THE SHIELD COVER TO A CONCRETE BOX, TWO SWING BOLTS MUST BE USED.
- D. A RAISING RING MAY BE USED TO RAISE THE HEIGHT OF A CONCRETE BOX. TO ATTACH THE RING TO THE BOX, CLEAN THE TOP OF THE BOX AND INSERT THE RING BY APPLYING PRESSURE. NO BOLTS ARE REQUIRED. USE TWO PENTA LAG SCREWS TO SECURE THE SHIELD COVER TO THE RAISING RING.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION           | QUANTITY | STOCK NUMBER | ASSEMBLY UNIT |
|------|-----------------------|----------|--------------|---------------|
| 1    | SHIELD COVER          | 1        | S286750      | 3312SH        |
| 2    | HDPE AND SHIELD COVER | 1        | S162424      | 3312CB        |
| 3    | RAISING RING          | 1        | S596750      | 3312RR        |
| 4    | LIFT PIN COVER        | 1        | --           | --            |

**NOTES:**

- Ⓘ THE RAISING RING CAN BE USED FOR RAISING THE LID 2-1/2".
- Ⓜ TO LIFT THE LID, REMOVE THE LIFT PIN COVER AND REPLACE WHEN DONE. (MUST BE IN PLACE TO PREVENT TRIPPING HAZARD PER AMERICAN DISABILITY ACT.)

**REFERENCE:** NONE

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| C   | EDITORIAL CHANGES                | JC | JS   | CZH  | 4/22/2019 | F   |        |    |      |      |      |
| B   | BILL OF MATERIALS & NOTES UPDATE | JC | JS   | CZH  | 12/1/2018 | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE                   | JC | JS   | CZH  | 7/9/2018  | D   |        |    |      |      |      |

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                 |                           |                    |          |                     |
| <p style="text-align: center;">HDPE HANDHOLE<br/>(HIGH DENSITY POLYETHYLENE)</p> |                           |                    |          |                     |

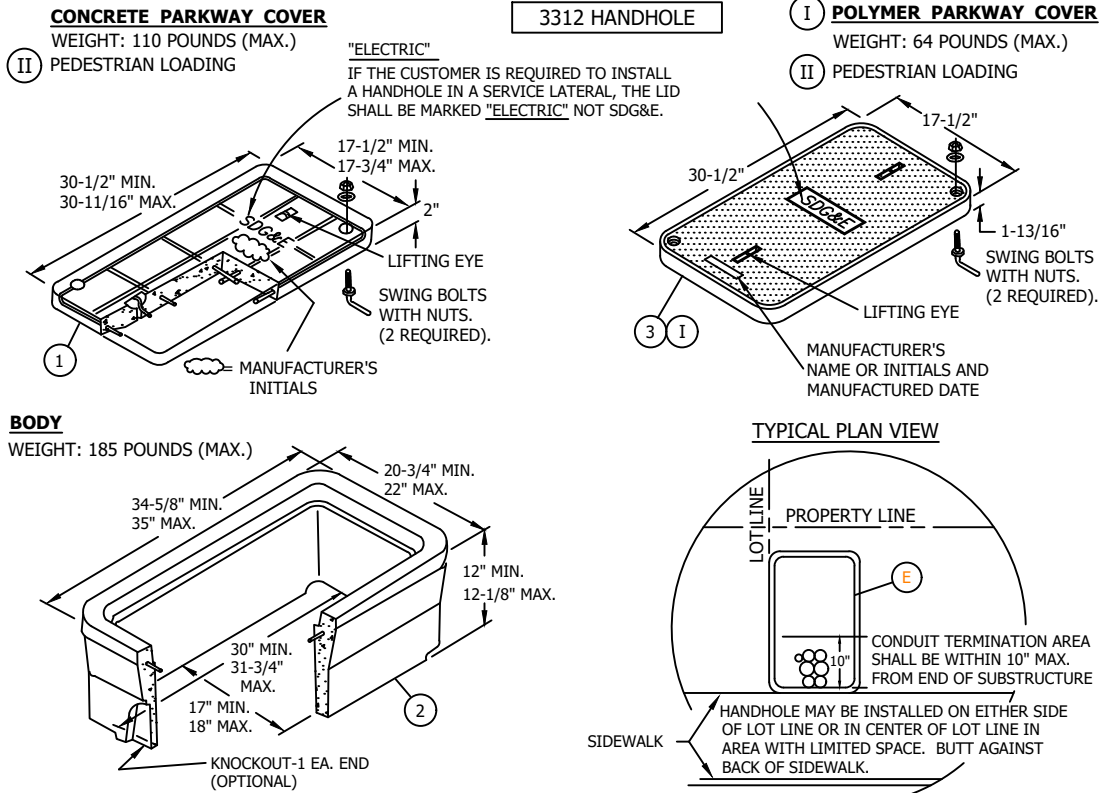
UG3312.1



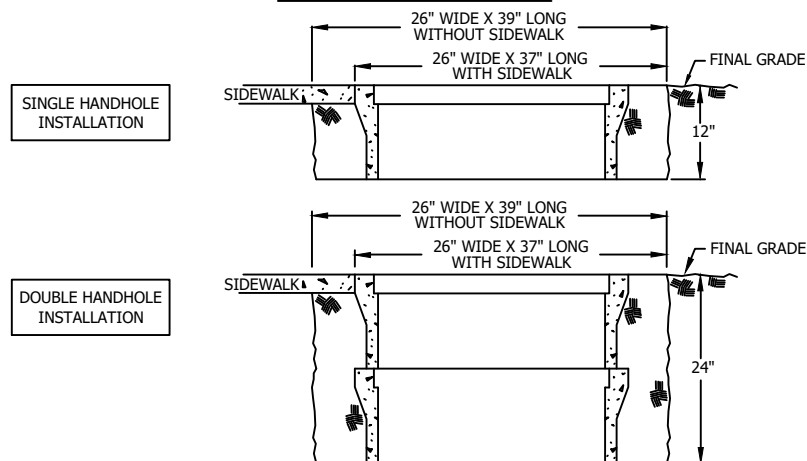
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3312 HANDHOLE.

**ATTENTION:** THE 3312 IS FOR LIKE IN-KIND REPLACEMENT **ONLY**. IF SPACE IS AVAILABLE, A 3309.1 OR 2 SHOULD BE USED TO REPLACE THEM. THE 3309.1&2 IS THE PREFERRED BOX FOR PARKWAY SECONDARY INSTALLATIONS.

THE 3312 WILL STILL BE THE BOX USED FOR UNDER PAD APPLICATION AT THIS TIME



#### EXCAVATION DIMENSIONS



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|-----|----------------------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   | EDITORIAL CHANGES                | JC | JS   | CZH  | 4/22/2019 | F   |        |    |      |      |      |
| B   | BILL OF MATERIALS & NOTES UPDATE | JC | JS   | CZH  | 12/1/2018 | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE                   | JC | JS   | CZH  | 7/9/2018  | D   |        |    |      |      |      |

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Information Removed

SHEET  
2 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

HANDHOLE  
(INSIDE DIMENSIONS - 17" X 30")

UG3312.2



## INSTALLATION:

- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO GAS AND FOREIGN UTILITY PLACEMENTS. ANY CHANGE IN LOCATION BY DISTRICT CONSTRUCTION REQUIRES PRIOR APPROVAL FROM SERVICE PLANNING.
- B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING ABOVE. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW EXTRA SPACE FOR SETTING THE SUBSTRUCTURE AND TAMPING THE BACKFILL.
- C. TO DETERMINE FINAL GRADE, MEASURE FROM THE TOP OF CURB OR ESTABLISHED GRADE.
- D. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE. SET HANDHOLE AT FINAL GRADE.
- E. IF RIGHT OF WAY OR OBSTRUCTIONS CAUSE A PROBLEM, THE HANDHOLE MAY BE TURNED TO WHERE THE LONG SIDE OF THE HANDHOLE PARALLELS THE SIDEWALK OR PROPERTY LINE.

**BILL OF MATERIALS FOR SINGLE-BODY HANDHOLE:**

| ITEM | DESCRIPTION                  | QUANTITY | STOCK NUMBER | STOCK NUMBER                    | ASSEMBLY UNITS |                                |
|------|------------------------------|----------|--------------|---------------------------------|----------------|--------------------------------|
| 1    | COVER, PARKWAY<br>(CONCRETE) | 1        | S286808      | COMPLETE<br>HANDHOLE<br>S162676 | 3312C0         | COMPLETE<br>HANDHOLE<br>3312-1 |
| 2    | BODY, HANDHOLE               | 1        | S162426      |                                 | 3312-0         |                                |
| 3①   | COVER, PARKWAY<br>(POLYMER)  | 1        | S286818      | --                              | 3312CP         | --                             |

**BILL OF MATERIALS FOR DOUBLE-BODY HANDHOLE:**

| ITEM  | DESCRIPTION                  | QUANTITY | STOCK NUMBER | STOCK NUMBER                                   | ASSEMBLY UNITS |                                |
|-------|------------------------------|----------|--------------|--|----------------|--------------------------------|
| 1     | COVER, PARKWAY<br>(CONCRETE) | 1        | S286808      | COMPLETE<br>DOUBLE-BODY<br>HANDHOLE<br>S162678 | 3312C0         | COMPLETE<br>HANDHOLE<br>3312-2 |
| 2     | BODY, HANDHOLE               | 2        | S162426      |  | 3312-0         |                                |
| 3 (I) | COVER, PARKWAY<br>(POLYMER)  | 1        | S286818      | --   | 3312CP         | --                             |

**NOTES:**

- (I) THE POLYMER COVER CAN BE USED FOR REPLACEMENT OF BROKEN CONCRETE LIDS.
- (II) USE THE 3313 HANDHOLE AND STEEL TRAFFIC COVER FOR TRAFFIC INSTALLATIONS.

**REFERENCE:**

- a. SEE STANDARD 3302 FOR SUBSTRUCTURE APPLICATIONS.
- b. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- c. SEE STANDARD 3485 WHEN SETTING HANDHOLE ON A SLOPING GRADE.
- d. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE STANDARD 3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM NUMBER OF CABLES, CONNECTORS AND CONDUITS).
- f. SEE STANDARD 4173 FOR TRENCH DEPTH, CONDUIT AND CABLE INSTALLATION.
- g. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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| REV             | CHANGE                           | BY   | DSGN                      | APPV | DATE      | REV                | CHANGE | BY | DSGN     | APPV | DATE |                     |  |          |
|-----------------|----------------------------------|--|---------------------------|------|-----------|--------------------|--------|----|----------|------|------|---------------------|--|----------|
| C               | EDITORIAL CHANGES                | JC   | JS                        | CZH  | 4/22/2019 | F                  |        |    |          |      |      |                     |  |          |
| B               | BILL OF MATERIALS & NOTES UPDATE | JC   | JS                        | CZH  | 12/1/2018 | E                  |        |    |          |      |      |                     |  |          |
| A               | ORIGINAL ISSUE                   | JC   | JS                        | CZH  | 7/9/2018  | D                  |        |    |          |      |      |                     |  |          |
| SHEET<br>3 OF 3 |                                  | X  | Indicates Latest Revision |      |           | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG3312.3 |
|                 |                                  | SDG&E ELECTRIC UNDERGROUND CONSTRCTON STANDARD |                           |      |           |                    |        |    |          |      |      |                     |  |          |
|                 |                                  | HANDHOLE<br>(INSIDE DIMENSIONS - 17" X 30")    |                           |      |           |                    |        |    |          |      |      |                     |  |          |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3313 HANDHOLE.

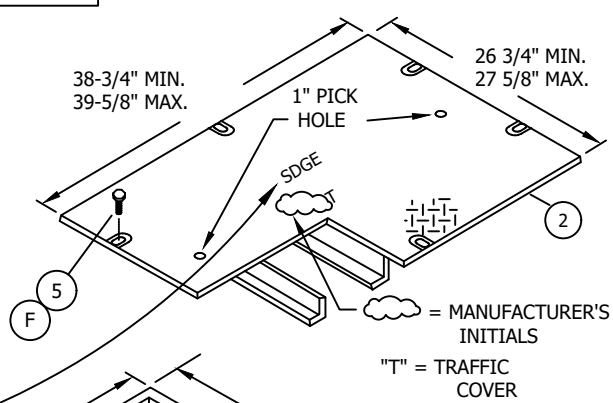
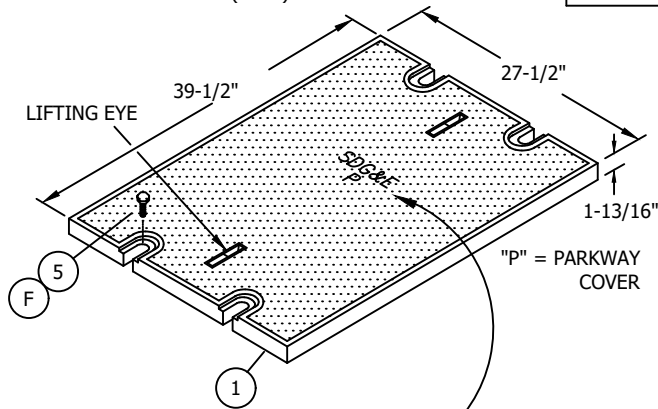
PARKWAY COVER

WEIGHT: 96 POUNDS (MAX.)

3313 HANDHOLE

STEEL TRAFFIC COVER

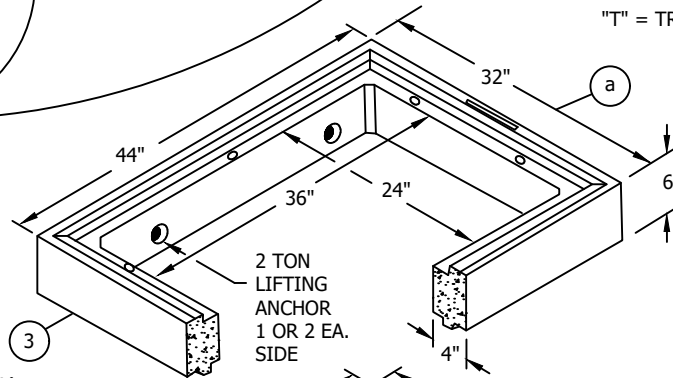
WEIGHT: 149.3 POUNDS (MAX.)



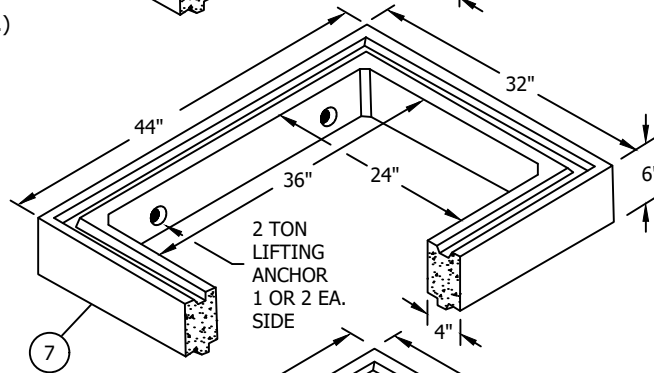
"ELECTRIC"  
IF THE CUSTOMER IS  
REQUIRED TO INSTALL  
A HANDHOLE IN A  
SERVICE LATERAL, THE  
LID SHALL BE MARKED  
"ELECTRIC" NOT SDG&E.

6" TOP SECTION

WEIGHT: 285 POUNDS (MAX.)

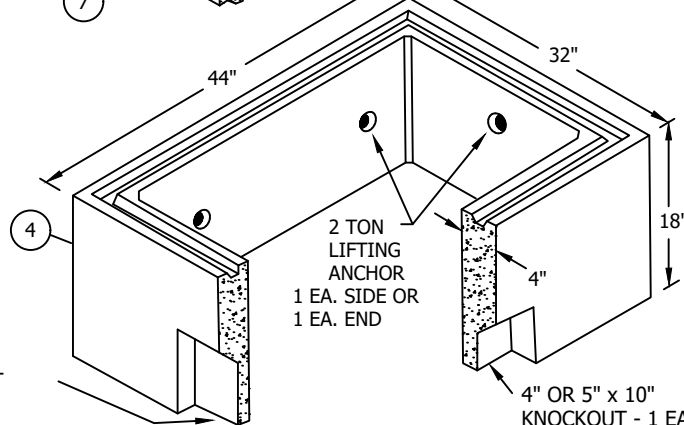


6" INTERMEDIATE  
EXTENSION SECTION  
WEIGHT: 267 POUNDS (MAX.)  
(TO BE ORDERED ONLY  
FOR ADDITIONAL HEIGHT)



18" BASE SECTION

WEIGHT: 885 POUNDS (MAX.)



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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | ADD 3313 L & XL   | GW | JS   | CZH  | 6/1/2018  | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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SHEET  
1 OF 7

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

HANDHOLE

24" x 36" (INSIDE DIMENSIONS)

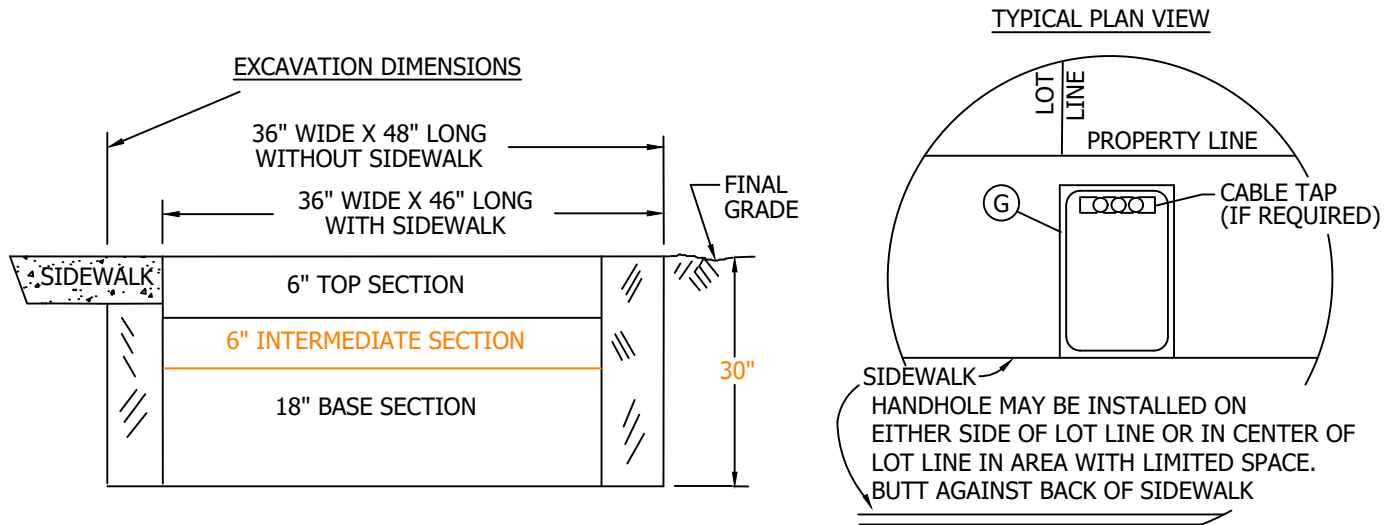
30" x 48" (INSIDE DIMENSIONS)

UG3313.1



## INSTALLATION:

- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO GAS AND FOREIGN UTILITY PLACEMENTS. RELOCATING THE HANDHOLE REQUIRES PRIOR APPROVAL FROM A CUSTOMER PROJECT PLANNER.
- B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING BELOW. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW EXTRA SPACE FOR SETTING THE SUBSTRUCTURE AND TAMPING THE BACKFILL.



- C. TO DETERMINE FINAL GRADE, MEASURE FROM THE TOP OF CURB OR ESTABLISHED GRADE.
- D. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. SET HANDHOLE AT FINAL GRADE. PLACE PLASTIC-MASTIC SEALANT BETWEEN ALL SECTIONS.
- (F) APPLY LUBRICANT (EZ-1) TO THE BOLTS WHEN SECURING THE COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. TIGHTEN DOWN BOLTS WITH TORQUE WRENCH TO 30 FT./LBS. MIN., 40 FT./LBS. MAX.
- (G) IF RIGHT OF WAY OR OBSTRUCTIONS CAUSE A PROBLEM, THE HANDHOLE MAY BE TURNED TO WHERE THE LONG SIDE OF THE HANDHOLE PARALLELS THE SIDEWALK OR PROPERTY LINE. IF THE HANDHOLE HOUSES A CABLE TAP, THE HANDHOLE IS NOT TO BE TURNED AND THE TYPICAL PLAN VIEW OUTLINED IN THE STANDARD MUST BE FOLLOWED. (CABLE TAP IS MOUNTED ON THE END OF HANDHOLE AND THE 5 FOOT CLEARANCE FOR HOT STICK OPERATION WOULD BE ON THE SIDEWALK SIDE).

**NOTE:** LOCATE SECONDARY CONDUITS WITHIN 12 INCHES OF THE END OF THE HANDHOLE CLOSEST TO THE SIDEWALK.

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | ADD 3313 L & XL   | GW | JS   | CZH  | 6/1/2018  | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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|-----------------|--|---|--------------------|----------|---------------------|----------|
| SHEET<br>2 OF 7 | Indicates Latest Revision                                      | X | Completely Revised | New Page | Information Removed | UG3313.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD               |   |                    |          |                     |          |
|                 | HANDHOLE   |   |                    |          |                     |          |
|                 | 24" x 36" (INSIDE DIMENSIONS)<br>30" x 48" (INSIDE DIMENSIONS) |   |                    |          |                     |          |



**BILL OF MATERIALS FOR PARKWAY 3313 HANDHOLE:**

| ITEM | DESCRIPTION                         | QUANTITY | STOCK NUMBER |  | ASSEMBLY UNITS |   |
|------|-------------------------------------|----------|--------------|--|----------------|---|
| 1    | COVER, PARKWAY                      | 1        | S286834      | COMPLETE<br>PARKWAY<br>HANDHOLE<br>S400300 | 3313CP         | COMPLETE<br>PARKWAY<br>HANDHOLE<br>3313PC |
| 3    | TOP SECTION, 6"                     | 1        | S336218      |  | -              |   |
| 4    | BASE SECTION, 18"                   | 1        | S162664      |  | -              |   |
| 5    | BOLT, PENTAHEAD 1/2" X 1-1/2"       | 6        | S156004      |  | -              |   |
| 6    | SEALANT, PLASTIC-MASTIC             | AS REQ'D | S631872      |  | -              |   |
| 7    | EXTENSION SECTION, INTERMEDIATE, 6" | AS REQ'D | S336368      | -  | 3313X1         | -   |
| 8    | LUBRICANT EZ-1                      | AS REQ'D | S469764      | -  | -              | -   |

**BILL OF MATERIALS FOR TRAFFIC 3313 HANDHOLE:**

| ITEM | DESCRIPTION                         | QUANTITY | STOCK NUMBER |   | ASSEMBLY UNITS |   |
|------|-------------------------------------|----------|--------------|---|----------------|---|
| 1    | COVER, TRAFFIC (STEEL)              | 1        | S286838      | COMPLETE TRAFFIC<br>HANDHOLE<br>S400302 | 3313TO         | COMPLETE<br>TRAFFIC<br>HANDHOLE<br>3313TC |
| 3    | TOP SECTION, 6"                     | 1        | S336218      |   | -              |   |
| 4    | BASE SECTION, 18"                   | 1        | S162664      |   | -              |   |
| 5    | BOLT, PENTAHEAD 1/2" X 1-1/2"       | 6        | S156004      |   | -              |   |
| 6    | SEALANT, PLASTIC-MASTIC             | AS REQ'D | S631872      |   | -              |   |
| 7    | EXTENSION SECTION, INTERMEDIATE, 6" | AS REQ'D | S336368      | -                                       | 3313X1         | -   |
| 8    | LUBRICANT EZ-1                      | AS REQ'D | S469764      | -                                       | -              | -   |

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | ADD 3313 L & XL   | GW | JS   | CZH  | 6/1/2018  | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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SHEET  
3 OF 7

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

HANDHOLE

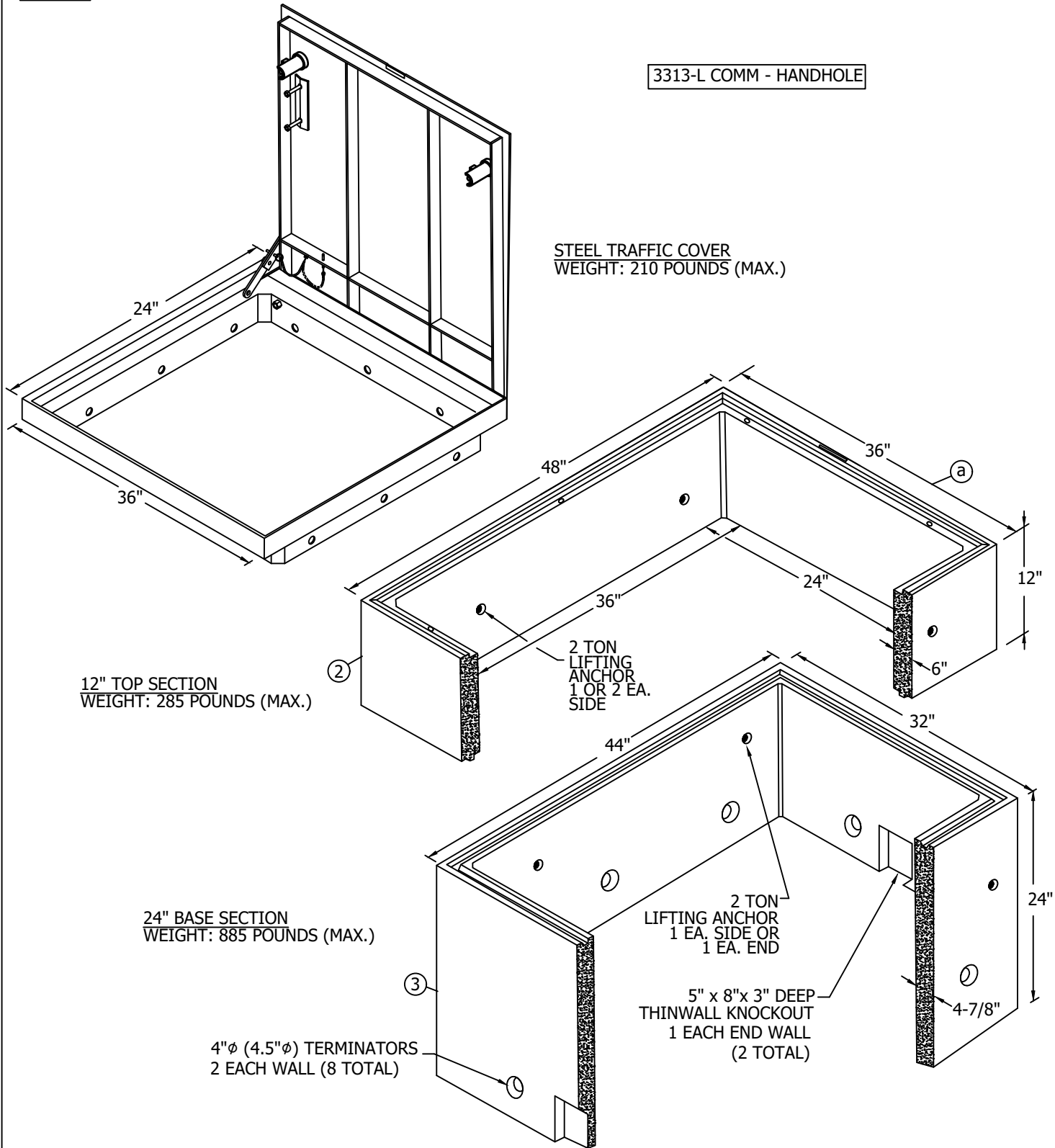
24" x 36" (INSIDE DIMENSIONS)

30" x 48" (INSIDE DIMENSIONS)

UG3313.3



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3313 COMMUNICATION HANDHOLE.



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|-----|-------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | ADD 3313 L & XL   | GW | JS   | CZH  | 6/1/2018  | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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SHEET  
4 OF 7

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

HANDHOLE

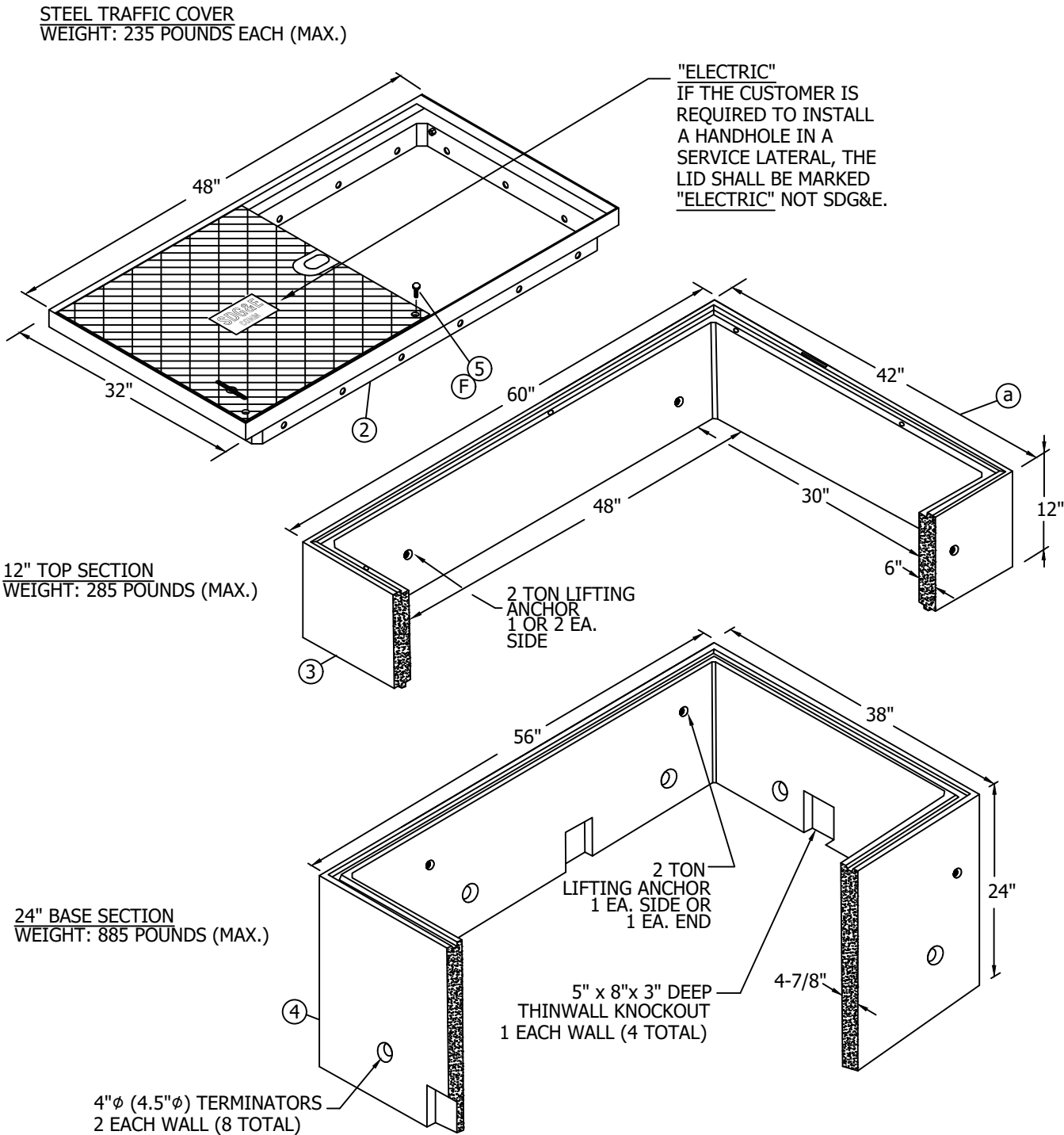
24" x 36" (INSIDE DIMENSIONS)  
30" x 48" (INSIDE DIMENSIONS)

UG3313.4



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3313 HANDHOLE.

3313-XL COMM - HANDHOLE



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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | ADD 3313 L & XL   | GW | JS   | CZH  | 6/1/2018  | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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SHEET  
5 OF 7

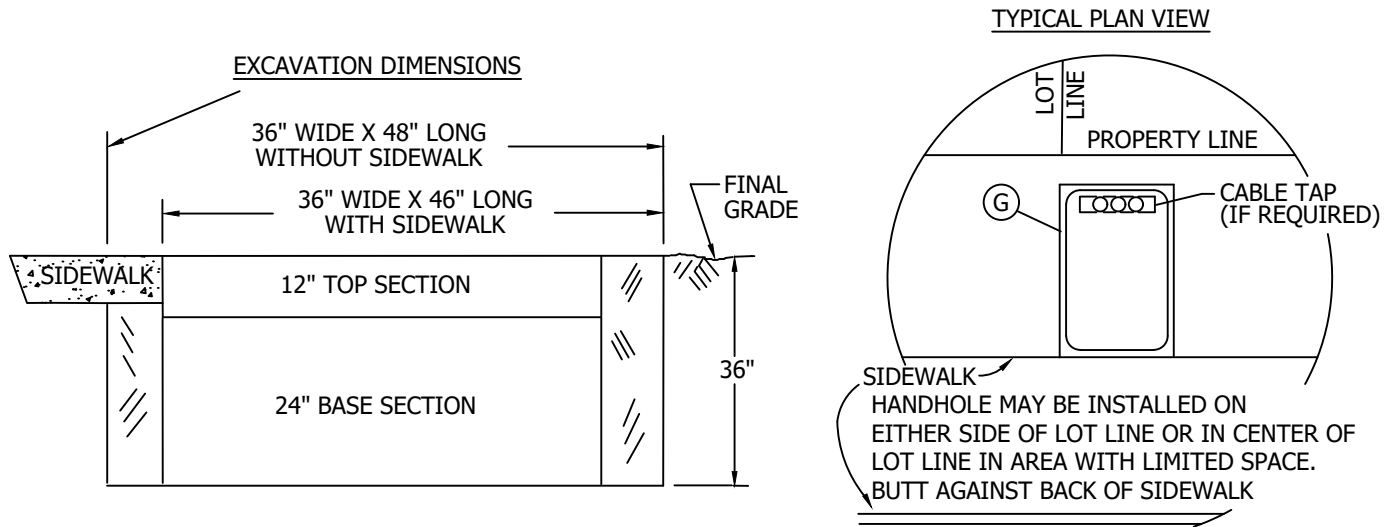
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD  
HANDHOLE  
24" x 36" (INSIDE DIMENSIONS)  
30" x 48" (INSIDE DIMENSIONS)

UG3313.5



## INSTALLATION:

- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO GAS AND FOREIGN UTILITY PLACEMENTS. RELOCATING THE HANDHOLE REQUIRES PRIOR APPROVAL FROM A CUSTOMER PROJECT PLANNER.
- B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING BELOW. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW EXTRA SPACE FOR SETTING THE SUBSTRUCTURE AND TAMPING THE BACKFILL.



- C. TO DETERMINE FINAL GRADE, MEASURE FROM THE TOP OF CURB OR ESTABLISHED GRADE.
- D. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. SET HANDHOLE AT FINAL GRADE. PLACE PLASTIC-MASTIC SEALANT BETWEEN ALL SECTIONS.
- F. APPLY LUBRICANT (EZ-1) TO THE BOLTS WHEN SECURING THE COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. TIGHTEN DOWN BOLTS WITH TORQUE WRENCH TO 30 FT./LBS. MIN., 40 FT./LBS. MAX.
- G. IF RIGHT OF WAY OR OBSTRUCTIONS CAUSE A PROBLEM, THE HANDHOLE MAY BE TURNED TO WHERE THE LONG SIDE OF THE HANDHOLE PARALLELS THE SIDEWALK OR PROPERTY LINE. IF THE HANDHOLE HOUSES A CABLE TAP, THE HANDHOLE IS NOT TO BE TURNED AND THE TYPICAL PLAN VIEW OUTLINED IN THE STANDARD MUST BE FOLLOWED. (CABLE TAP IS MOUNTED ON THE END OF HANDHOLE AND THE 5 FOOT CLEARANCE FOR HOT STICK OPERATION WOULD BE ON THE SIDEWALK SIDE).

**NOTE:** LOCATE SECONDARY CONDUITS WITHIN 12 INCHES OF THE END OF THE HANDHOLE CLOSEST TO THE SIDEWALK.

### BILL OF MATERIALS FOR 3313 HANDHOLE (24" X 36"):

| ITEM | DESCRIPTION                   | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|------|-------------------------------|----------|--------------|----------------|
| 1    | COVER, FRAME AND LIDS (STEEL) | 1        | S286838      | 3313TO         |
| 2    | TOP SECTION, 12"              | 1        | S336218      | -              |
| 3    | BASE SECTION, 24"             | 1        | S162664      | -              |
| 4    | BOLT, PENTAHEAD 1/2" X 1-1/2" | 6        | S156004      | -              |
| 5    | SEALANT, PLASTIC-MASTIC       | AS REQ'D | S631872      | -              |
| 6    | LUBRICANT EZ-1                | AS REQ'D | S469764      | -              |

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | ADD 3313 L & XL   | GW | JS   | CZH  | 6/1/2018  | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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Information Removed

SHEET  
6 OF 7

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

HANDHOLE  
24" x 36" (INSIDE DIMENSIONS)  
30" x 48" (INSIDE DIMENSIONS)

UG3313.6



**BILL OF MATERIALS FOR 3313 HANDHOLE (30" X 48"):**

| ITEM | DESCRIPTION                        | QUANTITY | STOCK NUMBER |   | ASSEMBLY UNITS |  |
|------|------------------------------------|----------|--------------|---|----------------|--|
| 2    | COVER, FRAME AND DUAL LIDS (STEEL) | 1        |              | COMPLETE COMM<br>HANDHOLE<br>(TRAFFIC RATED)<br>S400316 |                | COMPLETE COMM<br>HANDHOLE<br>(TRAFFIC RATED)<br>3313COMMTD |
| 3    | TOP SECTION, 12"                   | 1        | S336218      |   | -              |  |
| 4    | BASE SECTION, 24"                  | 1        | S162664      |   | -              |  |
| 5    | BOLT, PENTAHEAD 1/2" X 1-1/2"      | 6        | S156004      |   | -              |  |
| 6    | SEALANT, PLASTIC-MASTIC            | AS REQ'D | S631872      |   | -              |  |
| 7    | LUBRICANT EZ-1                     | AS REQ'D | S469764      | -   | -              | -  |

**NOTES:**

- I. HANDHOLE SECTIONS AND PARKWAY COVERS FROM DIFFERENT SUPPLIERS ARE INTERCHANGEABLE.
- II. THE PREFERRED LOCATION FOR A 3313 HANDHOLE IS IN NON-VEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.). USE A PARKWAY COVER IN THESE AREAS.
- III. HANDHOLES WITH A TRAFFIC COVER MAY BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC, BUT ONLY WHEN THERE IS NO NON-TRAFFIC LOCATION AVAILABLE.
- IV. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.

**REFERENCE:**

- a. SEE STANDARD 3211 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE STANDARD 3302 FOR SUBSTRUCTURE APPLICATIONS.
- c. SEE STANDARD 3306 FOR INSTALLATION OF PLASTIC-MASTIC SEALANT.
- d. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- e. SEE STANDARD 3485 WHEN SETTING HANDHOLE ON A SLOPING GRADE.
- f. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- g. SEE STANDARD 3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM NUMBER OF CABLES, CONNECTORS AND CONDUITS).
- h. SEE STANDARD 3660 FOR CABLE TAP, GROUND GRID AND CONDUIT INSTALLATION ON 6.9 ONE-PHASE SYSTEM.
- i. SEE STANDARD 3312 FOR POSITIONING SECONDARY CONDUITS
- j. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | ADD 3313 L & XL   | GW | JS   | CZH  | 6/1/2018  | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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Information Removed

**SHEET  
7 OF 7**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

HANDHOLE

24" x 36" (INSIDE DIMENSIONS)

30" x 48" (INSIDE DIMENSIONS)

**UG3313.7**



**SCOPE:** THIS STANDARD SHOWS THE MATERIAL AND INSTALLATION REQUIREMENTS FOR A 3314 HANDHOLE.

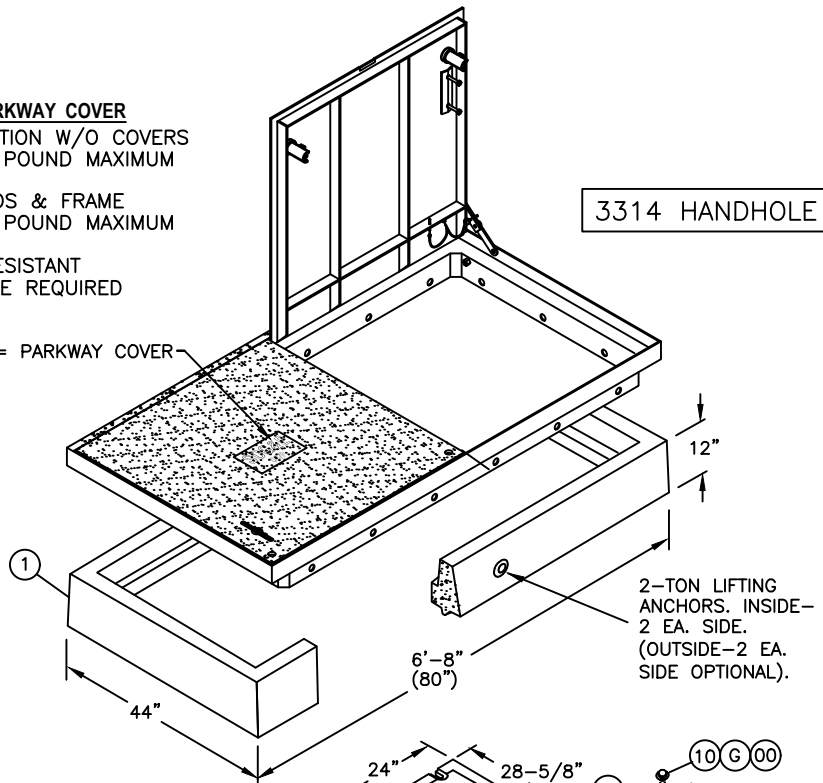
**CONCRETE PARKWAY COVER**

12" TOP SECTION W/O COVERS  
WEIGHT: 952 POUND MAXIMUM

ALUMINUM LIDS & FRAME  
WEIGHT: 225 POUND MAXIMUM

SLIP RESISTANT  
SURFACE REQUIRED

"P" = PARKWAY COVER



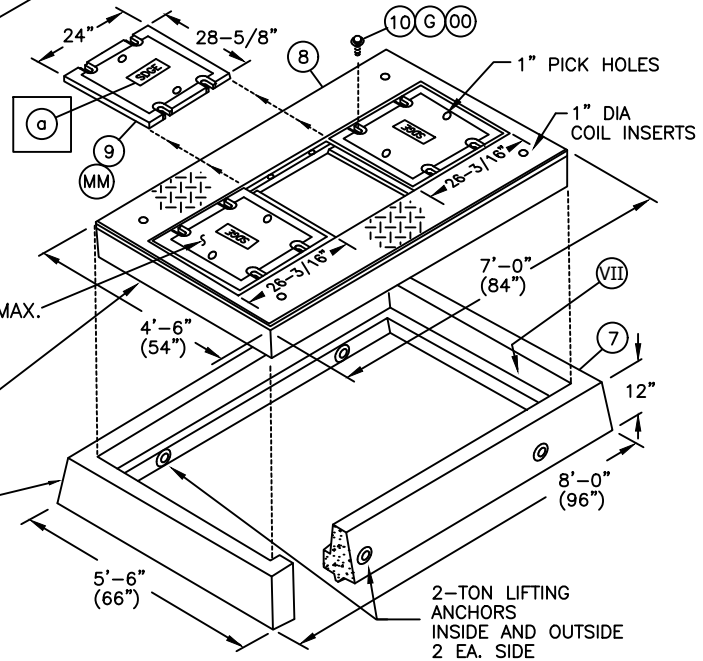
**3315 TRAFFIC COVER ASSEMBLY**

FOR EXISTING 3314 HANDHOLES ONLY  
LOCATED IN A VEHICULAR AREA, USE  
THE 3315 "TRAFFIC COVER ASSEMBLY  
SHOWN" AS A REPLACEMENT. (SEE  
NOTES: FOR NEW INSTALLATIONS)

CAST IRON COVERS  
TOTAL WEIGHT: 705 POUND MAX.

CONCRETE COVER  
WEIGHT: 2000 POUND MAX.

CONCRETE NECKING  
WEIGHT: 2245 POUND MAX.



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SDG&E ELECTRIC UNDERGROUND STANDARD

HANDHOLE EQUIPMENT ENCLOSURE  
(INSIDE DIMENSIONS - 3' X 6')

UG 3314.1

SHEET  
1 OF 6



## 3314 HANDHOLE



WEIGHT: 970 POUND MAX.

(TO BE ORDERED ONLY  
FOR ADDITIONAL HEIGHT)

BASE ENCLOSURE  
3' x 6' x 3'

WEIGHT: 4470 POUND MAX.

2 TON LIFTING ANCHORS  
(2) EA. SIDE OR;  
(4) IN FLOOR.

(2) 1/2 X 13  
BRONZE INSERTS  
(OPPOSITE CORNERS)

19 1/2" MIN.  
22" MAX.

4" DIA. KNOCKOUTS -  
4 EA. END - 8 TOTAL

11" MIN.  
12 3/4" MAX.

END KNOCKOUT  
MAY BE FLUSH —  
WITH BOTTOM OF  
BASE ENCLOSURE.

PULL IRONS  
1 EACH END

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SDG&amp;E ELECTRIC UNDERGROUND STANDARD

## HANDHOLE EQUIPMENT ENCLOSURE (INSIDE DIMENSIONS - 3' X 6')

UG 3314.2



**NOTES:**

- I. HANDHOLE SECTIONS AND PARKWAY COVERS FROM DIFFERENT SUPPLIERS ARE INTERCHANGEABLE.
- II. CAST IRON COVERS FROM DIFFERENT SUPPLIERS ARE INTERCHANGEABLE.
- III. THE PREFERRED LOCATION FOR A 3314 HANDHOLE IS IN NONVEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.). USE A PARKWAY COVER IN THESE AREAS.
- IV. IF A NEW 3314 HANDHOLE IS REQUIRED IN A VEHICULAR AREA, IT MUST BE SUBSTITUTED WITH A 3315 HANDHOLE AND TRAFFIC COVER. ON AN EXISTING 3314 HANDHOLE LOCATED IN A VEHICULAR AREA, USE THE 3315 HANDHOLE "TRAFFIC COVER ASSEMBLY."
- V. 3314 HANDHOLE "TRAFFIC COVER ASSEMBLY" IS THE SAME SIZE AS THE 3315 HANDHOLE "TRAFFIC COVER ASSEMBLY."
- VI. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | STOCK NUMBER | COMPLETE PARKWAY HANDHOLE | ASSEMBLY UNITS |                           |
|------|--|----------|--------------|---------------------------|----------------|---------------------------|
| 1    | EXTENSION, 12" TOP SECTION   | 1        | S336210      |                           | 3314FO         | COMPLETE PARKWAY HANDHOLE |
| 2    | COVER, PARKWAY, FRAME AND LIDS   | 1        | S636036      | STOCK NO. S400304         | 3314AL         |                           |
| 3    | ENCLOSURE, BASE, 3' X 6' X 3' (INSIDE DIMENSIONS)                          | 1        | S162680      |                           | —              | 3314PC                    |
| 4    | SEALANT, PLASTIC—MASTIC (NOT SHOWN)  | AS REQ'D | S631872      |                           | —              |                           |
| 5    | BOLT, PENTAHEAD. 1/2 X 2-1/2"  | (8) PKWY | S156012      |                           | —              | 3314HC                    |
| 6    | COVER, HALF WITH/UPPER LIP, PARKWAY (FOR USE IN TRANSFORMER INSTALLATIONS) | 1        | S286843      |                           | 3314HC         |                           |
| 7    | COVER, NECKING, TRAFFIC, 12"   | 1        | S287738      |                           | —              |                           |
| 8    | COVER, CONCRETE, TRAFFIC   | 1        | S287736      |                           | —              |                           |
| 9    | COVER, CAST—IRON, TRAFFIC (3 PC)   | 1        | S287734      |                           | —              |                           |
| 10   | BOLT, PENTAHEAD, 1/2" X 2 1/2"   | 12"      | S156012      |                           | —              |                           |
|      | WASHER, 1/2", FLAT ROUND STAINLESS STEEL                                   | 12"      | S799680      |                           | —              | 3314X1                    |
| 11   | EXTENSION SECTION, INTERMEDIATE, 12"                                       | AS REQ'D | S336212      |                           | 3314X1         |                           |
| 12   | SILICONE GREASE (NOT SHOWN)  | AS REQ'D | S391424      |                           | —              |                           |
| 13   | PRIMER (NOT SHOWN)   | AS REQ'D | S557696      |                           | —              |                           |
| 14   | GRAVEL, 3/8"—3/4"  | AS REQ'D | —            |                           | —              |                           |

**INSTALLATION - HANDHOLE WITH "PARKWAY COVER ASSEMBLY":**

- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE HANDHOLE REQUIRES APPROVAL FROM PROJECT MANAGEMENT.
- B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING BELOW. THE WIDTH AND LENGTH DIMENSIONS GIVEN, ALLOW AN EXTRA 8 INCHES FOR SETTING THE SUBSTRUCTURE.

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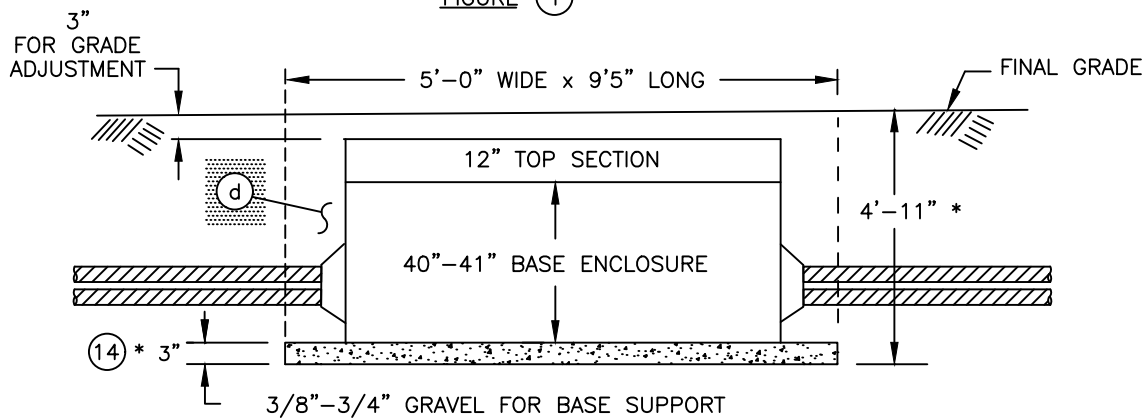
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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD                           |   |   |  |           |
|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 3' X 6') |   |   |  |           |



# EXCAVATION DIMENSIONS

## PARKWAY COVER ASSEMBLY

FIGURE ①



\* EXCAVATION DEPTH ALLOWS 3 INCHES FOR ADJUSTMENT TO FINAL GRADE AND AN ADDITIONAL 3 INCHES FOR PLACEMENT OF GRAVEL AS BASE SUPPORT.

- C. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. PLACE PLASTIC-MASTIC SEALANT BETWEEN ALL SECTIONS. DO NOT APPLY SEALANT UNDER THE TOP SECTION IF CONCRETE IS REQUIRED FOR GRADE ADJUSTMENT. ASSURE THE SUBSTRUCTURE WALLS ARE STRAIGHT AND THE FLOOR IS LEVEL.
- D. TO DETERMINE FINAL GRADE ONE OF THE TWO FOLLOWING METHODS MAY BE USED: 1) WHEN CURB OR GRADE LEVEL IS ALREADY ESTABLISHED, MEASURE FROM THE TOP OF CURB OR GRADE, OR 2) HAVE THE FIELD ENGINEER SET THE GRADE STAKES. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE LEVEL.
- F. ALIGN HANDHOLE COVER TO FINAL GRADE USING BRICKS OR WOODEN WEDGES. BEFORE POURING CONCRETE (4-SACK MIX WITH 3/8 INCH PEA GRAVEL, OR AS REQUIRED BY CITY OR COUNTY CODES), FRAME THE INSIDE OPEN AREA BETWEEN SECTIONS SO CONCRETE CAN BE POURED FROM THE OUTSIDE OF THE TOP COVER SECTION. MAKE SURE THE BRICKS OR WOODEN WEDGES DO NOT SHOW FROM THE INSIDE ONCE THE CONCRETE IS POURED. THE INSIDE FRAME MAY BE OMITTED IF THE CONCRETE IS NOT TOO WET. IF FRAME IS OMITTED, TROWEL CONCRETE SMOOTH ON THE INSIDE.
- ⑥ APPLY EZ-1 TO THE PENTAHEAD BOLTS WHEN SECURING THE COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. TIGHTEN DOWN BOLTS WITH TORQUE WRENCH TO 30 FT./LBS. MIN., 40 FT./LBS. MAX.

### INSTALLATION: – EXISTING HANDHOLE WITH A "3315 TRAFFIC COVER ASSEMBLY":

- AA. ESTABLISH THE COVER LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS AND CHECK THE LOCATION OF ANY EXISTING CABLE TAPS.
- BB. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWINGS BELOW AND ON PAGE 3314.5. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW AN EXTRA 8 INCHES FOR SETTING THE 3315 TRAFFIC COVER ASSEMBLY. EXCAVATING MUST BE DONE ACCURATELY FOR PROPER PLACEMENT OF THE "TRAFFIC COVER ASSEMBLY" ASSURING CABLE TAP ACCESS FOR HOT STICK OPERATION.

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SDG&E ELECTRIC UNDERGROUND STANDARD

HANDHOLE EQUIPMENT ENCLOSURE  
(INSIDE DIMENSIONS - 3' X 6')

UG 3314.4

SHEET  
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EXCAVATION DIMENSIONS CONT:

EXCAVATION DIMENSIONS – WIDTH AND LENGTH

TRAFFIC COVER ASSEMBLY

TOP VIEW

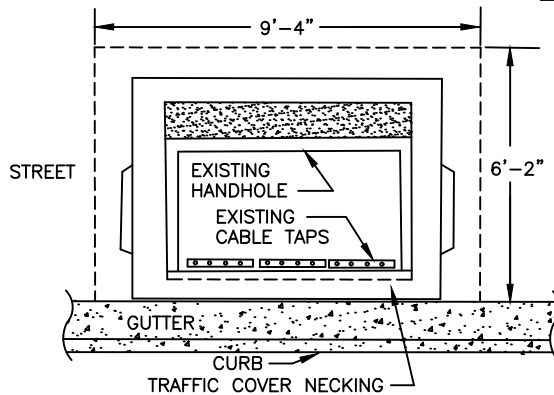


FIGURE ②

EXISTING HANDHOLE – WITH EXISTING  
CABLE TAPS ON THE "CURB SIDE".

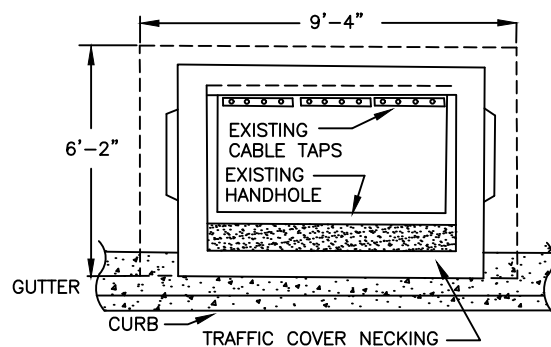


FIGURE ③

EXISTING HANDHOLE – WITH EXISTING  
CABLE TAPS ON THE "STREET SIDE".

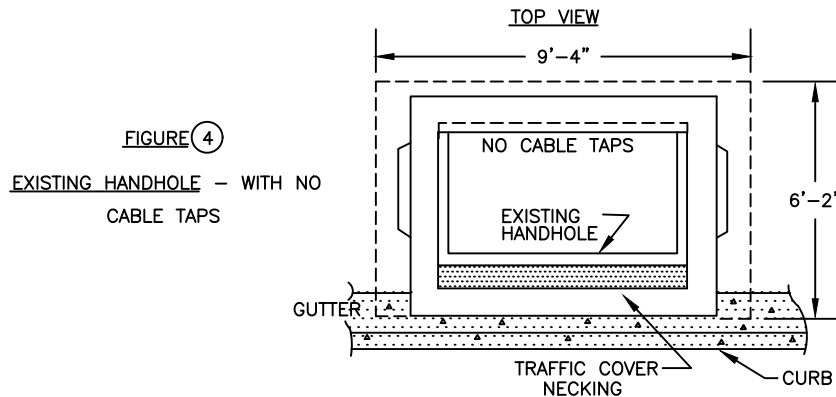



FIGURE ④

EXISTING HANDHOLE – WITH NO  
CABLE TAPS

- CC. IF COVER IS GOING TO BE SET IN ANY PORTION OF A CONCRETE GUTTER OR STREET, THE CONCRETE MUST BE "SAWCUT" BEFORE EXCAVATING. ASPHALT MUST BE SCORED WITH A JACKHAMMER OR CLAYDIGGER. MEASURE AROUND EXISTING HANDHOLE AND CUT ACCORDINGLY.
- FF. DIG DOWN 18 INCHES AND REMOVE THE EXISTING TOP SECTION (OLD STYLE TWO PIECE METAL TRAFFIC COVER, SEE 3399.104). IF THE EXISTING TOP SECTION IS 24 INCHES, REMOVE IT AND REPLACE WITH A 12 INCH INTERMEDIATE SECTION.
- GG. BEFORE SETTING TRAFFIC COVER NECKING, ITEM 6, PAINT THE UNDERSIDE WITH PRIMER. THIS WILL REDUCE ANY REMOVAL DIFFICULTIES IN CASE OF RETROFIT OR GRADE ADJUSTMENTS. SEE INSTALLATION DRAWING ON PAGE 3314.6.
- HH. SET THE TRAFFIC COVER, ITEM 6, USING THE INSIDE LIFTING ANCHORS TO PREVENT ANY PROBLEMS REMOVING THE LIFTING DEVICE. LINE UP THE INSIDE EDGE OF THE TRAFFIC COVER NECKING WITH THE INSIDE EDGE OF THE HANDHOLE INTERMEDIATE SECTION ON THE SAME SIDE THE CABLE TAPS ARE LOCATED. IF HANDHOLE DOES NOT HOUSE CABLE TAPS, ALIGN THE INSIDE EDGE OF THE 3315 HANDHOLE TRAFFIC COVER NECKING WITH THE INSIDE EDGE OF THE INTERMEDIATE HANDHOLE SECTION ON THE STREET SIDE. THIS IS THE KEY ALIGNMENT TO THE ENTIRE INSTALLATION. SEE INSTALLATION DRAWING ON PAGE 3314.6.

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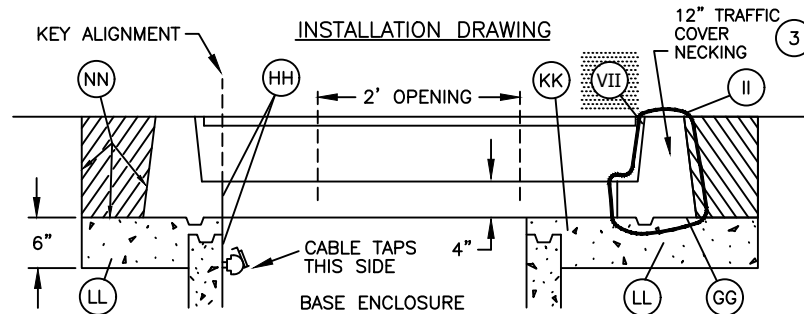
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|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 3' X 6')                       |                           |                    |          |                     |           |



- II IF ANY OF THE TRAFFIC COVER NECKING WILL BE SET IN CONCRETE (ALONG A CURB OR IN A CONCRETE STREET), WRAP 4 OR 6 MIL POLYETHYLENE SHEETING COMPLETELY AROUND THE NECKING AND TIE WITH TAPE. THIS WILL PREVENT EXISTING CONCRETE AND NEW CONCRETE FROM BONDING MAKING IT EASIER TO RAISE COVER IN THE FUTURE. SEE INSTALLING DRAWING ON PAGE 3314.6.
- JJ. TO DETERMINE FINAL GRADE, ONE OF THE TWO FOLLOWING METHODS MAY BE USED: 1) WHEN CURB OR GRADE LEVEL IS ALREADY ESTABLISHED, MEASURE FROM THE TOP OF CURB OR GRADE, OR 2) HAVE THE FIELD ENGINEER SET THE GRADE STAKES. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE LEVEL.
- KK ALIGN TRAFFIC COVER NECKING TO GRADE USING BRICKS OR WOODEN WEDGES. POUR CONCRETE (4-SACK MIX WITH 3/8 INCH PEA GRAVEL OR AS REQUIRED BY CITY OR COUNTY CODES) INSIDE OF NECKING AND INTO THE OVERLAPPING AREA OF SECTIONS. SMOOTH CONCRETE WITH GROUT AND TROWEL. SEE INSTALLATION DRAWING ON PAGE 3314.6.
- LL ON THE OUTSIDE OF THE NECKING, POUR AND PACK CONCRETE UNDERNEATH WITH A SHOVEL UP TO THE BOTTOM OF THE NECKING AND UP TO FINAL GRADE LEVEL AT THE CURB. SMOOTH OUT ANY EXCESS CONCRETE COMING THROUGH ON INSIDE OF HANDHOLE. TRIM AWAY EXCESS PLASTIC SHEETING. SEE INSTALLATION DRAWING ON PAGE 3314.6.
- MM INSTALL THE CONCRETE COVER, ITEM 7, AND CAST IRON COVERS. SLIDE OUTSIDE CAST IRON COVERS ON FIRST AND THE CENTER CAST IRON COVER ON LAST. WHEN REMOVING COVERS, SLIDE CENTER COVER OFF FIRST. SEE DRAWING ON PAGE 3316.1.
- NN BEFORE BACKFILLING, SPRAY RS-1 EMULSION TO THE INSIDE OF THE EXCAVATION TO HELP THE ASPHALT ADHERE. BACKFILL EXCAVATION WITH ASPHALT AND TAMP DOWN.
- OO APPLY LUBRICANT (EZ-1) TO THE PENTAHEAD BOLTS WHEN SECURING THE COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. TIGHTEN DOWN BOLTS WITH TORQUE WRENCH TO 30 FT./LBS. MIN., 40 FT./LBS. MAX.

**NOTE:**

- VII WHEN TRAFFIC COVER IS REMOVED CHECK GASKET MATERIAL AND REPLACE AS NEEDED. SDG&E STOCK NUMBER (S341020).



**REFERENCE:**

- a. SEE STANDARD 3211 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE STANDARD 3302 FOR SUBSTRUCTURE APPLICATIONS.
- c. SEE STANDARD 3306 FOR INSTALLATION OF PLASTIC-MASTIC SEALANT.
- d. SEE STANDARD 3365 FOR SLURRY BACKFILL.
- e. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- f. SEE STANDARD 3485 WHEN SETTING HANDHOLE ON A SLOPING GRADE.
- g. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE STANDARD 3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM NUMBER OF CABLES, CONNECTORS AND CONDUITS).
- i. SEE PAGES 3399.105 AND 3399.106 FOR REPAIRING "OLD STYLE" 3314 HANDHOLES WITH PARKWAY COVERS.
- j. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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SDG&E ELECTRIC UNDERGROUND STANDARD

**HANDHOLE EQUIPMENT ENCLOSURE  
(INSIDE DIMENSIONS - 3' X 6')**

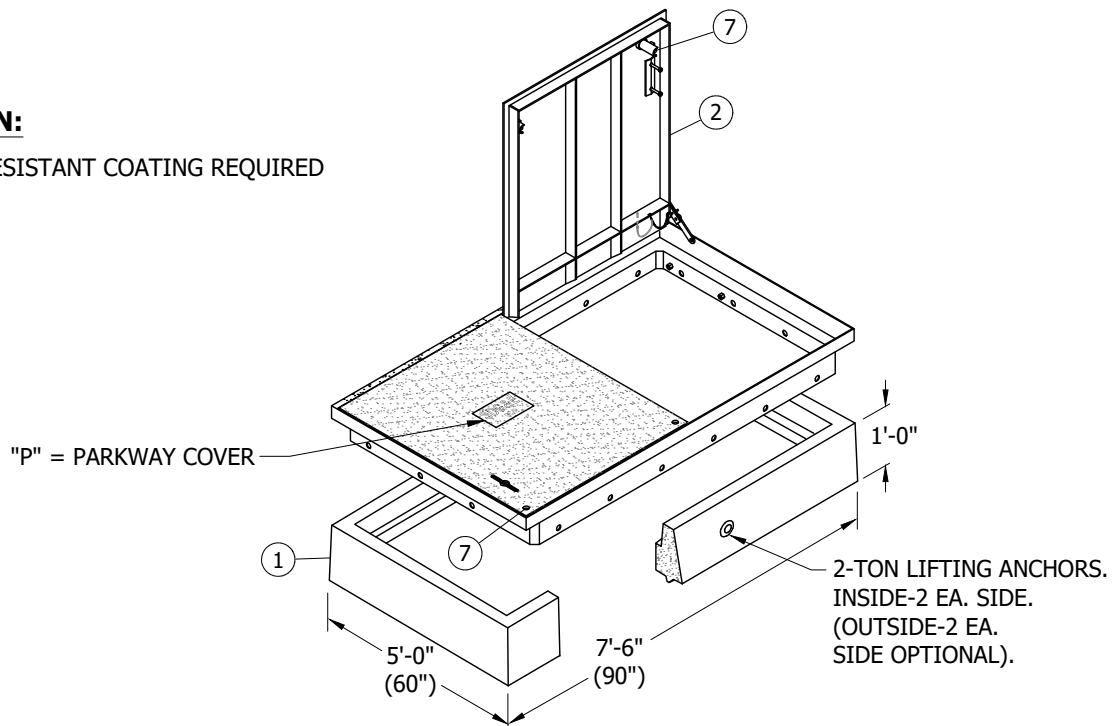
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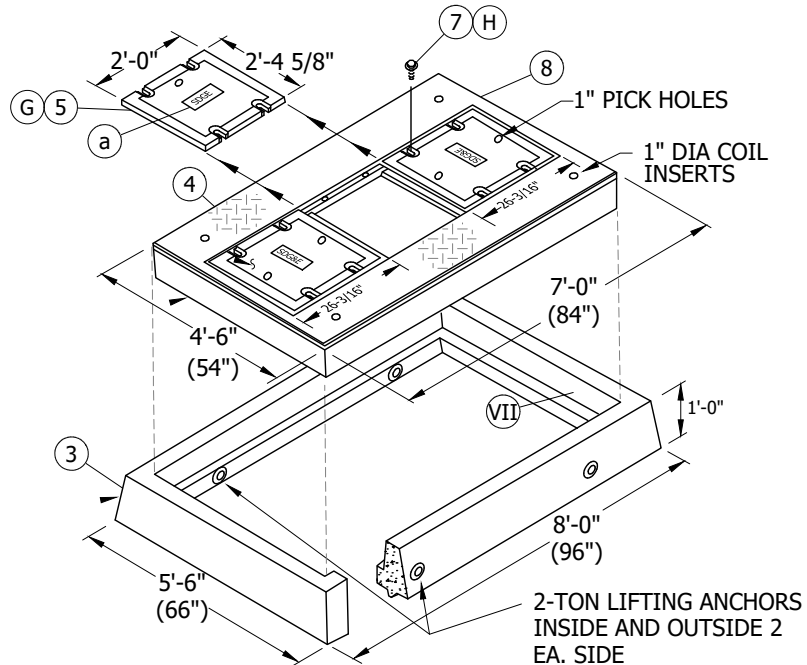
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENT FOR A 3315 HANDHOLE.

**ATTENTION:**

\* SLIP RESISTANT COATING REQUIRED



**FIGURE 1**  
PARKWAY COVER ASSEMBLY  
3315 HANDHOLE



**FIGURE 2**  
TRAFFIC COVER ASSEMBLY  
3315 HANDHOLE

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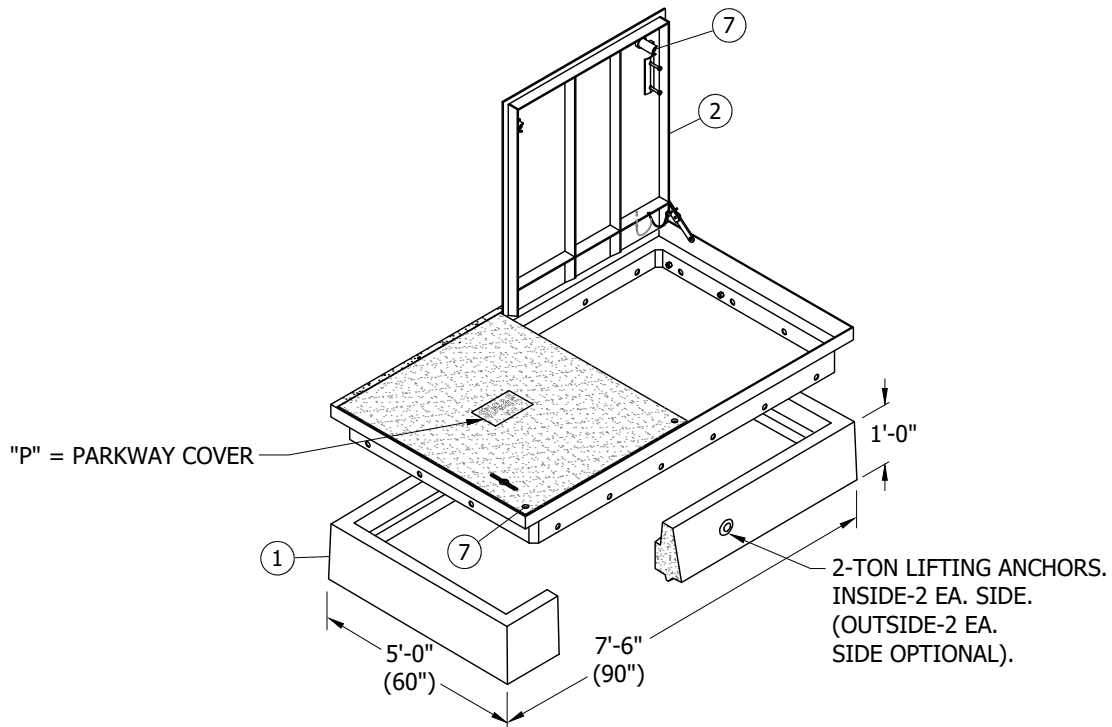
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

HANDHOLE EQUIPMENT ENCLOSURE  
(INSIDE DIMENSIONS - 4' X 6'-6")

UG3315.1





**FIGURE 3**  
PARKWAY FLUSH COVER ASSEMBLY

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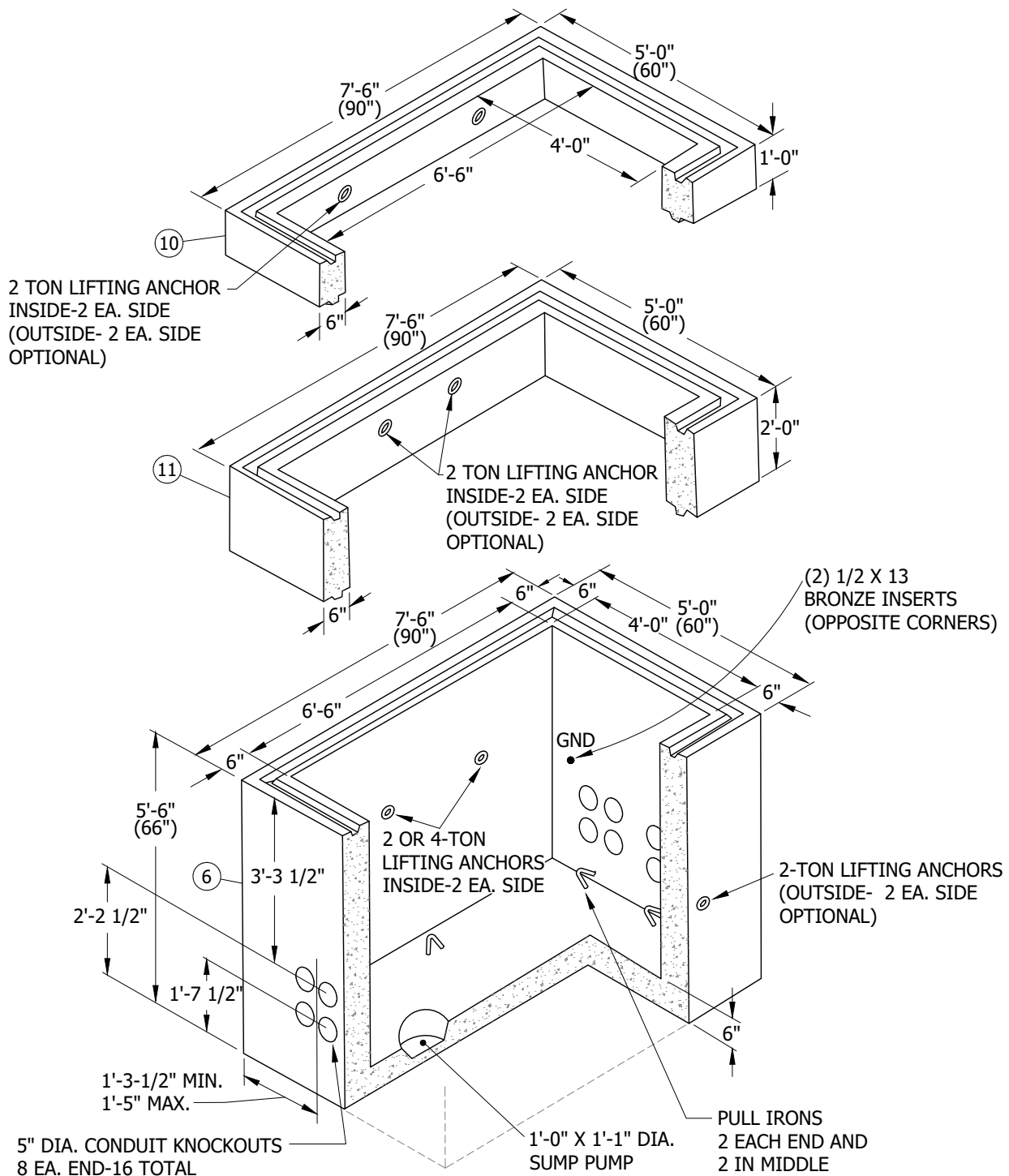
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

HANDHOLE EQUIPMENT ENCLOSURE  
(INSIDE DIMENSIONS - 4' X 6'-6")

**UG3315.2**





**FIGURE 4**  
HANDHOLE ASSEMBLY

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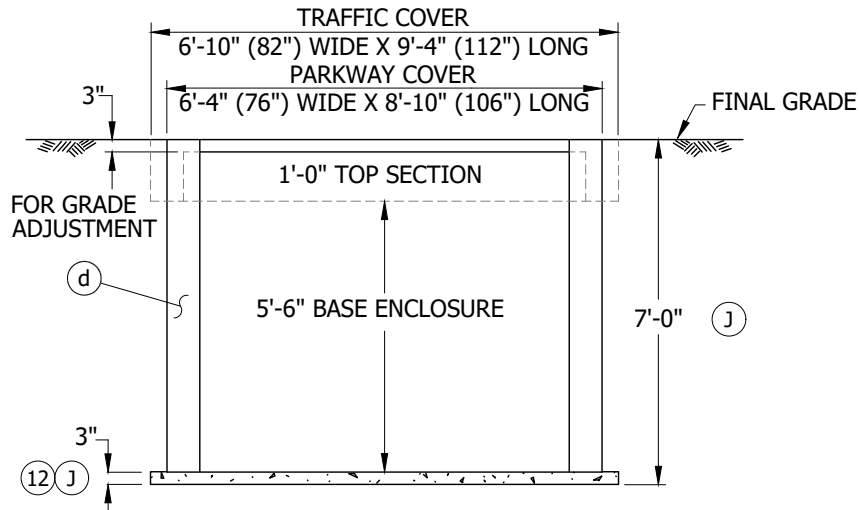
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**HANDHOLE EQUIPMENT ENCLOSURE**  
(INSIDE DIMENSIONS - 4' X 6'-6")

**UG3315.3**





**FIGURE 5**  
EXCAVATION DIMENSIONS

### INSTALLATION:

- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE HANDHOLE REQUIRES APPROVAL FROM PROJECT MANAGEMENT.
- B. AFTER THE LOCATION IS ESTABLISHED MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER FIGURE 5. THE WIDTH AND LENGTH DIMENSIONS GIVEN, ALLOW AN EXTRA 8 INCHES FOR SETTING THE SUBSTRUCTURE.
- C. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. PLACE PLASTIC-MASTIC SEALANT BETWEEN ALL SECTIONS. USE DOUBLE SEAL IF FIELD CONDITIONS INDICATE THAT WATER WILL PENETRATE THE JOINTS. DO NOT APPLY SEALANT UNDER THE TOP SECTION IF CONCRETE IS REQUIRED FOR GRADE ADJUSTMENT. ASSURE THE SUBSTRUCTURE WALLS ARE STRAIGHT AND THE FLOOR IS LEVEL.
- D. TO DETERMINE FINAL GRADE, ONE OF THE FOLLOWING METHODS MAY BE USED: 1) WHEN CURB OR GRADE LEVEL IS ALREADY ESTABLISHED, MEASURE FROM THE TOP OF CURB OR GRADE OR 2) HAVE THE FIELD ENGINEER SET THE GRADE STAKES. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE LEVEL.
- E. ALIGN HANDHOLE COVER TO FINAL GRADE USING BRICKS OR WOODEN WEDGES. BEFORE POURING CONCRETE (4-SACK MIX WITH 3/8 INCH PEA GRAVEL OR AS REQUIRED BY CITY OR COUNTY CODES), FRAME THE INSIDE OPEN AREA BETWEEN SECTIONS SO CONCRETE CAN BE POURED FROM THE OUTSIDE OF THE TOP COVER SECTION. MAKE SURE THE BRICKS OR WOODEN WEDGES DO NOT SHOW FROM THE INSIDE ONCE THE CONCRETE IS POURED. THE INSIDE FRAME MAY BE OMITTED IF THE CONCRETE IS NOT TOO WET. IF FRAME IS OMITTED, TROWEL CONCRETE SMOOTH ON THE INSIDE.
- F. INSTALL CONDUITS USING THE BOTTOM OUTSIDE (CLOSEST TO THE WALL) KNOCKOUTS FIRST.
- (G) WHEN INSTALLING TRAFFIC COVER, PLACE OUTSIDE CAST IRON COVERS ON FIRST, THEN SLIDE THE CENTER CAST IRON COVER ON LAST. WHEN REMOVING CAST IRON COVERS, SLIDE CENTER COVER OFF FIRST. SEE FIGURES 1-3.
- (H) APPLY LUBRICANT (EZ-1) TO PENTAHEAD BOLTS WHEN SECURING COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. TIGHTEN DOWN BOLTS WITH TORQUE WRENCH TO 30 FT./LBS. MIN., 40 FT./LBS. MAX.
- (J) EXCAVATION DEPTH ALLOWS 3 INCHES FOR ADJUSTMENT TO FINAL GRADE AND AN ADDITIONAL 3 INCHES FOR REPLACEMENT OF GRAVEL AS BASE SUPPORT.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                |                    |          |                     |          |
|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 4' X 6'-6") |                    |          |                     |          |



| PARKWAY 3315 HANDHOLE |   |               |          |               |               |  |              |  |
|-----------------------|---|---------------|----------|---------------|---------------|--|--------------|--|
| ITEM                  | DESCRIPTION   | WEIGHT (LBS.) | QUANTITY | STANDARD PAGE | STOCK NUMBER  | STOCK NUMBER                             | DESIGN UNITS |  |
| 1                     | FRAME, PARKWAY, 12" (IX)  | 1,690 MAX.    | 1        | -             | S361354       | COMPLETE PARKWAY HANDHOLE S400306 (VIII) | 3315FO       | COMPLETE PARKWAY HANDHOLE 3315PC         |
| 2                     | COVER, ALUMINUM PARKWAY FRAME & COVERS  | 290 MAX.      | 1        | -             | S636040       |  | 3315A1       |  |
|                       | COVER, ALUMINUM PARKWAY, FLUSH MOUNT, HINGED  | -             | 1        | -             | S286986 (XI)  |  | 3315OT (XI)  |  |
|                       |   |               |          |               | S286736 (XII) |  | 7CO-15 (XII) |  |
| 6                     | ENCLOSURE, 60" BASE   | 11,320 MAX.   | 1        | -             | S334356       |  | -            |  |
| 7                     | BOLT, PENTAHEAD, 1/2" X 2-1/2"  | -             | 12       | -             | S156012       | -  |              |  |
| 8                     | SEALANT, PLASTIC-MASTIC   | -             | AS REQ'D | -             | S631872       | -  | -            |  |
| 9                     | LUBRICANT, EZ-1   | -             | AS REQ'D | -             | S469764       | -  | -            | -  |
| 10                    | EXTENSION SECTION, SPECIAL 12" (FOR USE IN 3440 SWITCH PAD INST. OR FOR GRADING AND/OR ADDITIONAL HEADROOM) | 1,725 MAX.    | AS REQ'D | -             | S336246       | -  | 3315X1       | -  |
| 11                    | EXTENSION SECTION, 24" (USE FOR GRADING AND/OR ADDITIONAL HEADROOM)   | 3,450 MAX.    | AS REQ'D | -             | S336240       | -  | 3315X2       | -  |
| 12                    | GRAVEL, 3/8" - 3/4"   | -             | AS REQ'D | -             | -             | -  | -            | -  |
| TRAFFIC 3315 HANDHOLE |   |               |          |               |               |  |              |  |
| 3                     | COVER, NECKING, CONCRETE, TRAFFIC, 12"  | 2,245 MAX.    | 1        | -             | S287738       | COMPLETE TRAFFIC HANDHOLE S400308        | 3315TA       | COMPLETE TRAFFIC PARKWAY HANDHOLE 3315TC |
| 4                     | COVER, CONCRETE, TRAFFIC  | 2,000 MAX.    | 1        | -             | S287736       |  |              |  |
| 5                     | COVER, CAST IRON, TRAFFIC (3 PC.)   | 680 MAX.      | 1        | -             | S287734       |  |              |  |
| 6                     | ENCLOSURE, BASE, 60" (INSIDE DIMENSION)   | 11,320 MAX.   | 1        | -             | S334356       |  |              |  |
| 7                     | BOLT, PENTAHEAD, 1/2" X 2-1/2"  | -             | 12       | -             | S156012       |  | -            |  |
|                       | WASHER, 1/2", FLAT ROUND STAINLESS STEEL  | -             | 12       | -             | S799680       | -  |              |  |
| 8                     | SEALANT, PLASTIC-MASTIC   | -             | AS REQ'D | -             | S631872       | -  | -            |  |
| 9                     | LUBRICANT EZ-1  | -             | AS REQ'D | -             | S469764       | -  | -            |  |
| 10                    | EXTENSION SECTION, 12" (FOR USE IN 3440 SWITCH PAD INST. OR FOR GRADING AND/OR ADDITIONAL HEADROOM)         | 1,725 MAX.    | AS REQ'D | -             | S336246       | -  | 3315X1       | -  |
| 11                    | EXTENSION SECTION, 24" (USE FOR GRADING AND/OR ADDITIONAL HEADROOM)   | 3,450 MAX.    | AS REQ'D | -             | S336240       | -  | 3315X2       | -  |
| 12                    | GRAVEL, 3/8"-3/4"   | -             | AS REQ'D | -             | -             | -  | -            | -  |

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|   | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 4' X 6'-6") |                    |          |                     |          |



- I. HANDHOLE SECTIONS AND PARKWAY COVERS FROM DIFFERENT SUPPLIERS ARE INTERCHANGEABLE.
- II. CAST IRON COVERS FROM DIFFERENT SUPPLIERS ARE INTERCHANGEABLE.
- III. THE PREFERRED LOCATION FOR A 3315 HANDHOLE IS IN NONVEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.). USE A PARKWAY COVER IN THESE AREAS.
- IV. HANDHOLES WITH A TRAFFIC COVER MAY BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC, BUT ONLY WHEN THERE IS NO NON-TRAFFIC LOCATION AVAILABLE.
- V. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.
- VI. 3315 HANDHOLES ARE DELIVERED BY THE SUPPLIER TO JOB SITE.
- VII. WHEN TRAFFIC COVER IS REMOVED CHECK GASKET MATERIAL AND REPLACE AS NEEDED. SDG&E STOCK NUMBER (S341020).**
- VIII. DOES NOT INCLUDE FLUSH MOUNT COVER.**
- IX. WEIGHT DOES NOT INCLUDE COVERS.**
- XI. USED ONLY FOR CMP REPLACEMENTS.**
- XII. USED FOR NEW CONSTRUCTION AND NON-CMP RELATED REPLACEMENTS.**

- a. SEE UG3211 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE UG3302 FOR SUBSTRUCTURE APPLICATIONS.
- c. SEE UG3306 FOR INSTALLATION OF PLASTIC-MASTIC SEALANT.
- d. SEE UG3365 FOR SLURRY BACKFILL.
- e. SEE UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- f. SEE UG3485 WHEN SETTING HANDHOLE ON A SLOPING GRADE.
- g. SEE UG3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE UG3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM NUMBER OF CABLES, CONNECTORS AND CONDUITS).
- i. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

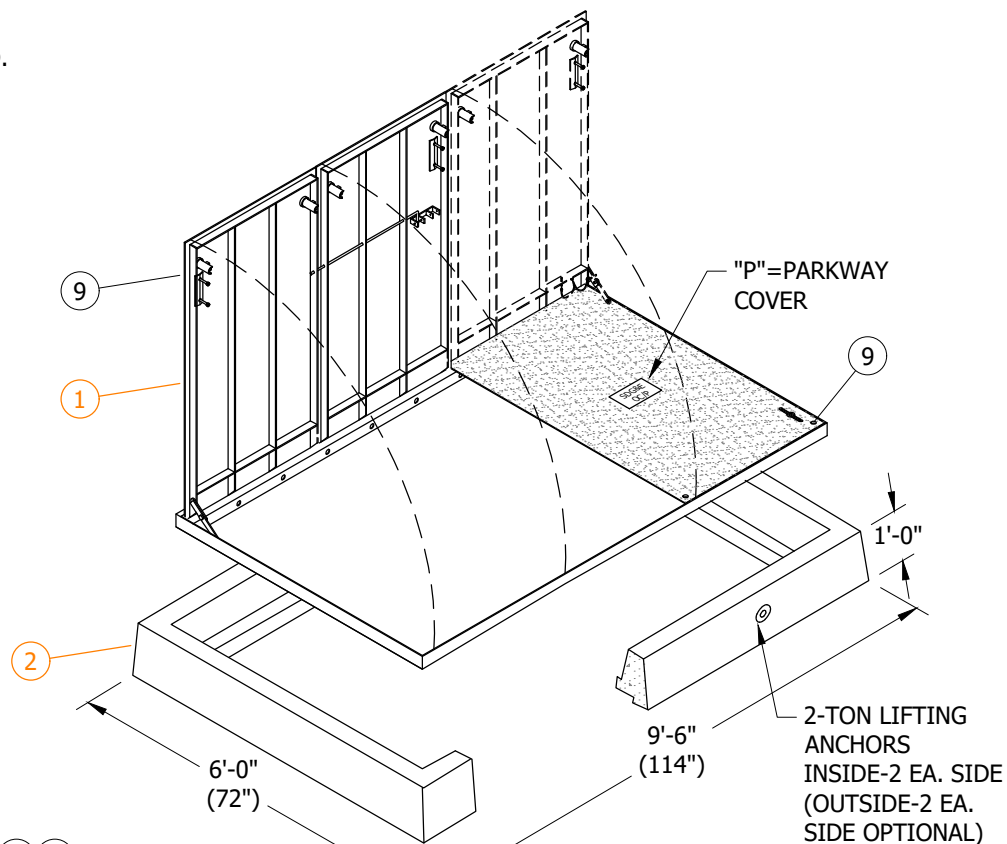
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|                 |                   | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 4' X 6'-6") |                           |      |            |                    |        |          |      |                     |      |          |



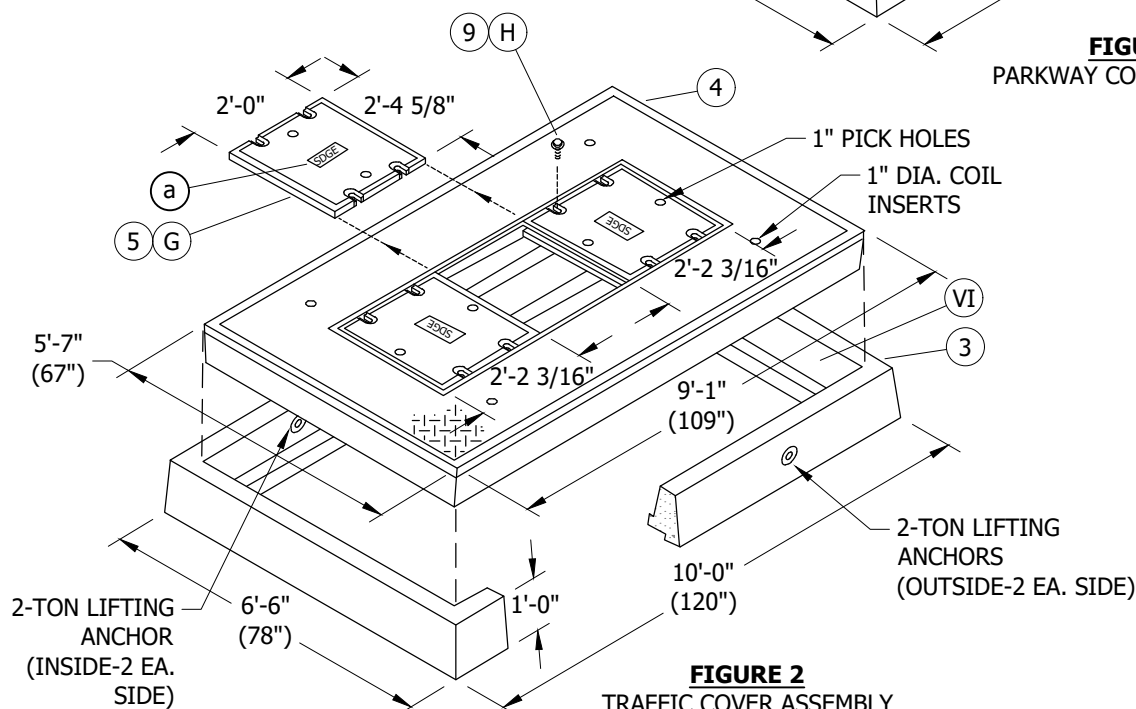
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3316 HANDHOLE.

**ATTENTION:**

- \* SLIP RESISTANT COATING REQUIRED.



**FIGURE 1**  
PARKWAY COVER ASSEMBLY



**FIGURE 2**  
TRAFFIC COVER ASSEMBLY

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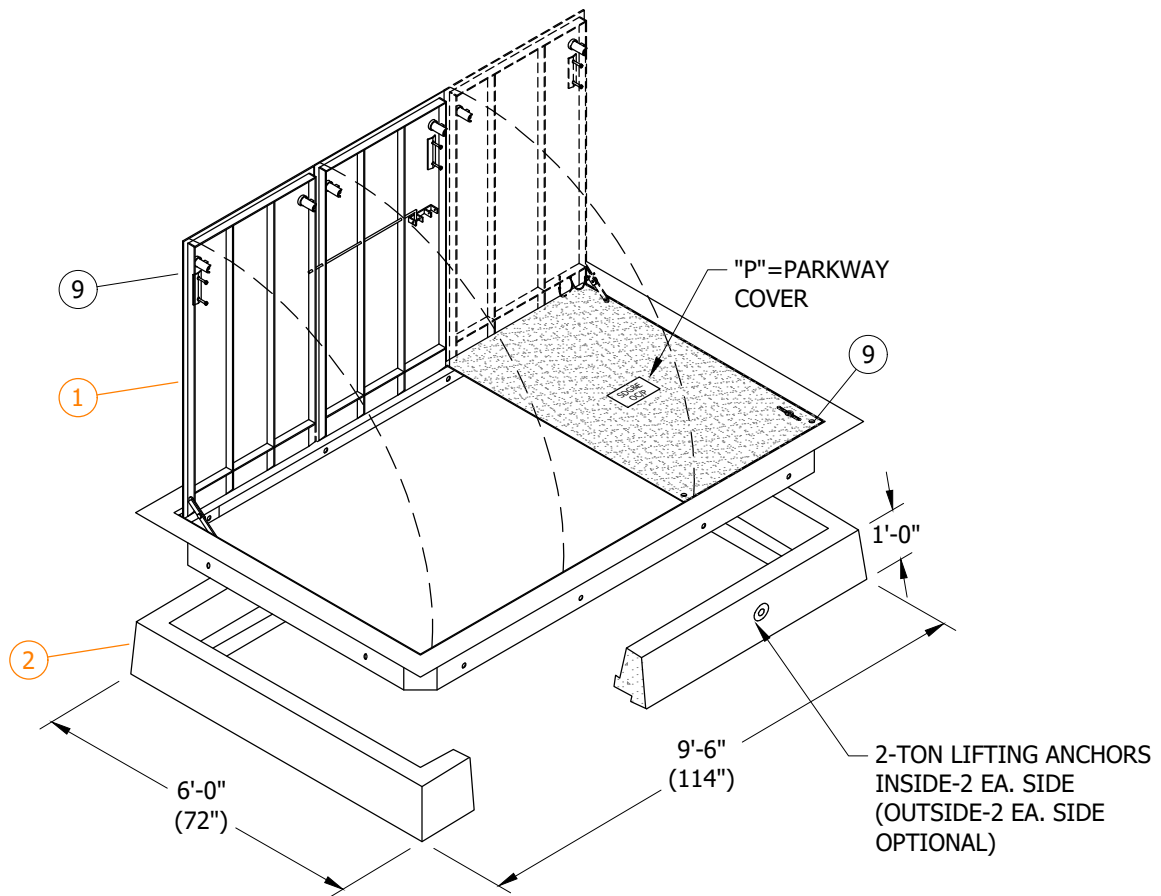
**SHEET**  
**1 OF 6**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

HANDHOLE EQUIPMENT ENCLOSURE  
(INSIDE DIMENSIONS - 5' X 8'-6")

**UG3316.1**





**FIGURE 3**  
PARKWAY FLUSH COVER  
ASSEMBLY

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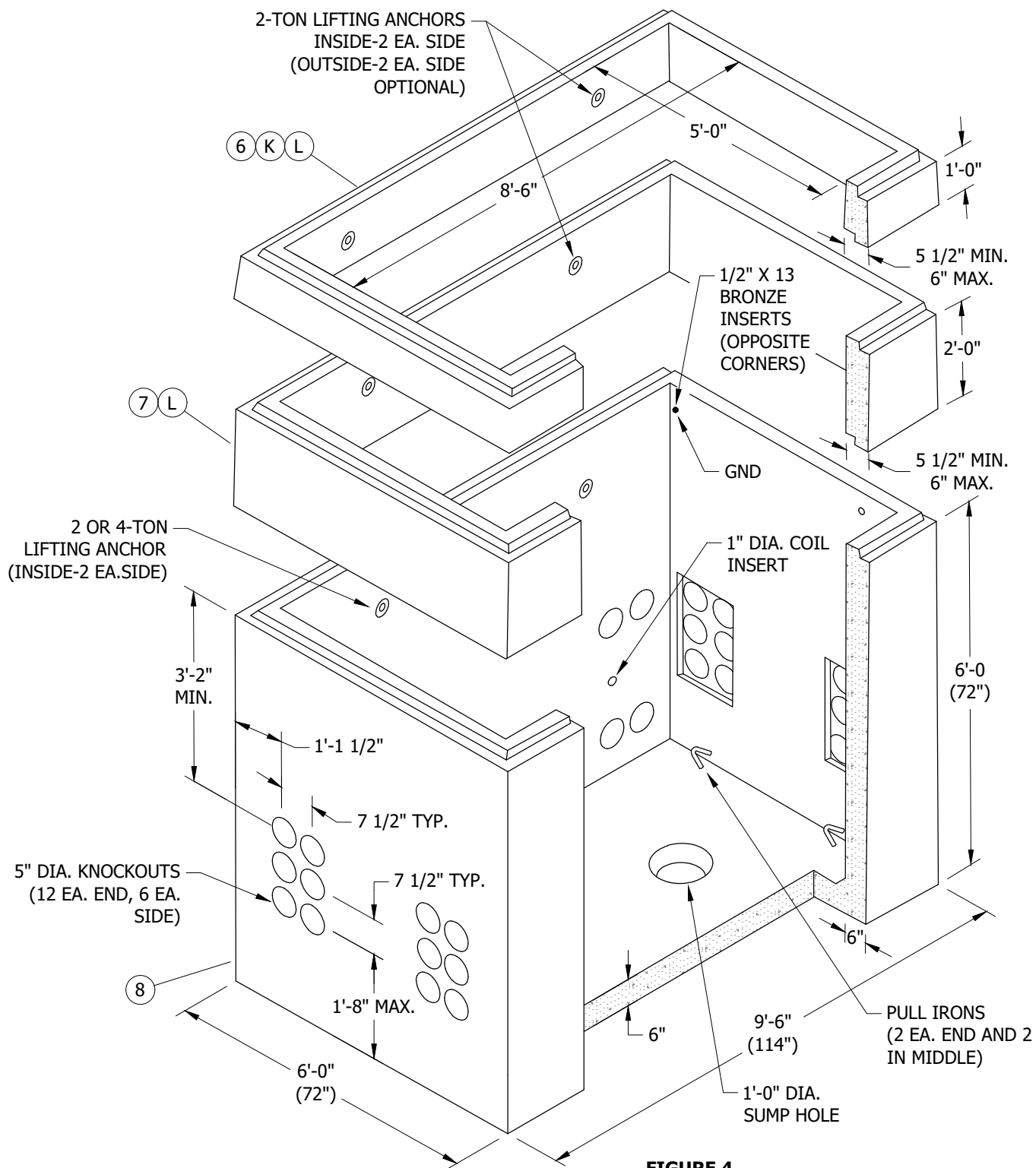
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                |                           |                    |          |                     |
| HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 5' X 8'-6") |                           |                    |          |                     |

**SHEET**  
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**UG3316.2**





**FIGURE 4**  
HANDHOLE ASSEMBLY

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**HANDHOLE EQUIPMENT ENCLOSURE**  
(INSIDE DIMENSIONS - 5' X 8'-6")

**UG3316.3**





- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE HANDHOLE TO ANOTHER LOCATION REQUIRES APPROVAL FROM PROJECT MANAGEMENT.
- B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER FIGURE 5. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW AN EXTRA 8 INCHES FOR SETTING THE SUBSTRUCTURE.
- C. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. PLACE PLASTIC-MASTIC SEALANT BETWEEN ALL SECTIONS. USE DOUBLE SEAL IF FIELD CONDITIONS INDICATE THAT WATER WILL PENETRATE THE JOINTS. DO NOT APPLY SEALANT UNDER THE TOP SECTION IF CONCRETE IS REQUIRED FOR GRADE ADJUSTMENT. ASSURE THE SUBSTRUCTURE WALLS ARE STRAIGHT AND THE FLOOR IS LEVEL.
- D. TO DETERMINE FINAL GRADE, ONE OF THE TWO FOLLOWING METHODS MAY BE USED:
  1. WHEN CURB OR GRADE LEVEL IS ALREADY ESTABLISHED, MEASURE FROM TOP OF CURB OR GRADE OR
  2. HAVE THE FIELD ENGINEER SET GRADE STAKES. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE LEVEL.
- E. ALIGN HANDHOLE COVER TO FINAL GRADE USING BRICKS OR WOODEN WEDGES. BEFORE POURING CONCRETE (4-SACK MIX WITH 3/8-INCH GRAVEL OR AS REQUIRED BY CITY OR COUNTY CODES), FRAME INSIDE OPEN AREA BETWEEN SECTIONS SO CONCRETE CAN BE POURED FROM OUTSIDE OF TOP COVER SECTION. MAKE SURE BRICKS OR WOODEN WEDGES DO NOT SHOW FROM THE INSIDE ONCE CONCRETE IS POURED. THE INSIDE FRAME MAY BE OMITTED IF THE CONCRETE IS NOT TOO WET. IF FRAME IS OMITTED, TROWEL CONCRETE SMOOTH ON THE INSIDE.
- F. INSTALL CONDUITS USING THE BOTTOM OUTSIDE (CLOSEST TO THE WALL) KNOCKOUTS FIRST.
- G. WHEN INSTALLING TRAFFIC COVER, PLACE THE OUTSIDE CAST IRON COVERS ON FIRST, THEN SLIDE THE CENTER CAST IRON COVER ON LAST. WHEN REMOVING CAST IRON COVERS, SLIDE CENTER COVER OFF FIRST. SEE FIGURES 1-4.
- H. APPLY LUBRICANT (EZ-1) TO THE PENTAHEAD BOLTS WHEN SECURING COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. TIGHTEN DOWN BOLTS WITH TORQUE WRENCH TO 30 FT-LBS MIN., 40 FT-LBS MAX.
- J. CORE BORE INDENTATIONS ARE PROVIDED AND SHOULD BE UTILIZED WHEN INSTALLING CONDUITS FROM THE SIDE. THESE INDENTATIONS ARE EITHER ON THE INSIDE OR OUTSIDE OF THE LONG SIDE WALLS. DO NOT CORE BORE OTHER THAN THE PROVIDED INDENTATIONS AS IT MAY REDUCE THE STRUCTURAL INTEGRITY.
- K. MAY BE USED WITH UG3341 SWITCH PAD INSTALLATION.
- L. MAY BE USED FOR GRADING AND/OR ADDITIONAL HEADROOM.
- M. EXCAVATION DEPTH ALLOWS 3 INCHES FOR ADJUSTMENT TO FINAL GRADE AND AN ADDITIONAL 3 INCHES FOR REPLACEMENT OF GRAVEL AS BASE SUPPORT.

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|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 5' X 8'-6") |                           |                    |          |                     |          |



**BILL OF MATERIALS:**

| ITEM                            | DESCRIPTION                                   | WEIGHT<br>(LBS) | QUANTITY | STANDARD<br>PAGE | STOCK<br>NUMBER | STOCK<br>NUMBER  | DESIGN<br>UNITS |
|---------------------------------|---|-----------------|----------|------------------|-----------------|--|-----------------|
| 3316 PARKWAY HANDHOLE           |   |                 |          |                  |                 |  |                 |
| 1                               | COVER, PARKWAY, ALUMINUM 4-PC.                | 445 TOTAL       | 1        | --               | S286756         | COMPLETE<br>PARKWAY<br>HANDHOLE<br>S400310<br><br>Ⓡ<br><br>COMPLETE<br>PARKWAY<br>HANDHOLE<br>3316PC | 3316CA          |
|                                 | COVER, PARKWAY, ALUMINUM, FLUSH MOUNT, HINGED | --              | 1        | --               | S248164         |  | --              |
| 2                               | FRAME, PARKWAY, 12"                           | 1,960 MAX.      | 1        | --               | S248170         |  | 3316FO          |
| 8                               | ENCLOSURE, BASE, 72"                          | 16.220 MAX.     | 1        | --               | S248174         |  |                 |
| 9                               | BOLT, PENTAHEAD, 1/2" X 2 1/2"                | --              | 16       | --               | S156012         |  |                 |
|                                 | WASHER, 1/2", FLAT ROUND STAINLESS STEEL      | --              | 16       | --               | S799680         |  |                 |
| 10                              | SEALANT, PLASTIC-MASTIC                       | --              | AS REQ'D | --               | S631872         |  |                 |
| 11                              | LUBRICANT EZ-1                                | --              | AS REQ'D | --               | S469764         |  |                 |
| 12                              | GRAVEL, 3/8" - 3/4" (3" BASE)                 | --              | AS REQ'D | --               | --              |  |                 |
| 3316 TRAFFIC HANDHOLE           |   |                 |          |                  |                 |  |                 |
| 3                               | NECKING, CONCRETE, TRAFFIC, 12"               | 2,535 MAX.      | 1        | --               | S248166         | COMPLETE<br>TRAFFIC<br>HANDHOLE<br>S400312   | 3316TA          |
| 4                               | COVER, CONCRETE, TRAFFIC                      | 3,775 MAX.      | 1        | --               | S248168         |  |                 |
| 5                               | COVER, CAST-IRON, TRAFFIC (3 PC.)             | 680 TTL. MAX.   | 1        | --               | S287734         |  |                 |
| 8                               | ENCLOSURE, BASE, 72"                          | 16,220 MAX.     | 1        | --               | S248174         |  |                 |
| 9                               | BOLT, PENTAHEAD, 1/2" X 2 1/2"                | --              | 12       | --               | S156012         |  |                 |
|                                 | WASHER, 1/2", FLAT ROUND STAINLESS STEEL      | --              | 12       | --               | S799680         |  |                 |
| 10                              | SEALANT, PLASTIC-MASTIC                       | --              | AS REQ'D | --               | S631872         |  |                 |
| 11                              | LUBRICANT EZ-1                                | --              | AS REQ'D | --               | S469764         |  |                 |
| 12                              | GRAVEL, 3/8" - 3/4" (3" BASE)                 | --              | AS REQ'D | --               | --              |  |                 |
| 3316 SPECIAL EXTENSION SECTIONS |   |                 |          |                  |                 |  |                 |
| 6                               | EXTENSION SECTION, SPECIAL 12"                | 2,175 MAX.      | AS REQ'D | --               | S336208         | --   | 3316X1          |
| 7                               | EXTENSION SECTION, SPECIAL 24"                | 4,350 MAX.      | AS REQ'D | --               | S248162         | --   | 3316X2          |

**NOTES:**

- I. HANDHOLE SECTIONS AND COVERS FROM DIFFERENT SUPPLIERS ARE INTERCHANGEABLE.
- II. THE PREFERRED LOCATION FOR A 3316 HANDHOLE IS IN NONVEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.). USE A PARKWAY COVER IN THESE AREAS.
- III. HANDHOLES WITH A TRAFFIC COVER MAY BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC, BUT ONLY WHEN THERE IS NO NON-TRAFFIC LOCATION AVAILABLE.
- IV. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.
- V. 3316 HANDHOLES ARE DELIVERED BY THE SUPPLIER TO JOB SITE.
- (VI) WHEN TRAFFIC COVER IS REMOVED, CHECK GASKET MATERIAL AND REPLACE AS NEEDED. SDG&E STOCK NUMBER (S341020).
- (VII) DOES NOT INCLUDE FLUSH MOUNT COVER.
- (VIII) WEIGHT DOES NOT INCLUDE COVERS.

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| C   | DRAWING UPDATE    | -  | ADW | JES | CZH    | 11/12/2019 | F   |                          |     |     |     |     |           |
| B   | EDITORIAL CHANGES | -  | DG  | JS  | CZH    | 12/1/2018  | E   |                          |     |     |     |     |           |
| A   | EDITORIAL CHANGES | -  | JC  | TR  | JS/MDJ | 8/12/2015  | D   | BILL OF MATERIALS UPDATE | EDM | ADW | JES | CZH | 11/9/2020 |

|                 |  |                           |                    |          |                     |          |
|-----------------|--|---------------------------|--------------------|----------|---------------------|----------|
| SHEET<br>5 OF 6 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3316.5 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                |                           |                    |          |                     |          |
|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 5' X 8'-6") |                           |                    |          |                     |          |



- a. SEE UG3211 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE UG3302 FOR SUBSTRUCTURE APPLICATIONS.
- c. SEE UG3306 FOR INSTALLATION OF PLASTIC-MASTIC SEALANT.
- d. SEE [UG3365.2](#) FOR SLURRY BACKFILL.
- e. SEE UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- f. SEE UG3485 WHEN SETTING HANDHOLE ON A SLOPING GRADE.
- g. SEE UG3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE UG3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM NUMBER OF CABLES, CONNECTORS, AND CONDUITS).

| REV | CHANGE            | DR | BY  | DSN | APV    | DATE       | REV | CHANGE                   | DR  | BY  | DSN | APV | DATE      |
|-----|-------------------|----|-----|-----|--------|------------|-----|--------------------------|-----|-----|-----|-----|-----------|
| C   | DRAWING UPDATE    | -  | ADW | JES | CZH    | 11/12/2019 | F   |                          |     |     |     |     |           |
| B   | EDITORIAL CHANGES | -  | DG  | JS  | CZH    | 12/1/2018  | E   |                          |     |     |     |     |           |
| A   | EDITORIAL CHANGES | -  | JC  | TR  | JS/MDJ | 8/12/2015  | D   | BILL OF MATERIALS UPDATE | EDM | ADW | JES | CZH | 11/9/2020 |

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| SHEET<br>6 OF 6 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3316.6 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                |                           |                    |          |                     |          |
|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 5' X 8'-6") |                           |                    |          |                     |          |



SHEET  
1 OF 4



**NOTES:**

- I. ALL INTERIOR HARDWARE SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.
- II. HANDHOLE SECTIONS AND COVERS FROM DIFFERENT SUPPLIERS ARE NOT INTERCHANGEABLE.
- III. THE ONLY LOCATION FOR A 3317 HANDHOLE IS IN NONVEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.). THE 3317 IS SUPPLIED WITH PARKWAY COVERS ONLY!
- IV. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.
- V. 3317 HANDHOLES ARE DELIVERED BY THE SUPPLIER TO JOB SITE.
- VI. THIS HANDHOLE TO BE INSTALLED ONLY WHEN THERE IS INSUFFICIENT SPACE FOR PME, TRAYER SWITCH.

**BILL OF MATERIAL FOR 3317 HANDHOLE:**


| ITEM | DESCRIPTION               | QUANTITY | STOCK NUMBER | STOCK NUMBER     | ASSEMBLY UNITS |
|------|---------------------------|----------|--------------|------------------|----------------|
| 1    | TOP SECTION W/COVERS      | 1        | S334430      | COMPLETE         | 3317SE         |
| 2    | 24" INTERMEDIATE SECTION  | 1        | —            | PARKWAY HANDHOLE | —              |
| 3    | 47" BASE SECTION          | 1        | —            |                  | —              |
| 4    | UPPER PLATFORM W/SUPPORTS | 1        |              |                  |                |
| 5    | SPRING ASSISTED COVERS    | 2        |              |                  |                |
| 6    | SWITCH SUPPORT            | 1        |              |                  |                |
| 7    | CABLE SUPPORT BRACKET     | 1        |              |                  |                |
| 8    | LOWER PLATFORM W/SUPPORTS | 1        |              |                  |                |
| 9    | 5" SIDE CONDUIT KNOCKOUT  | 2        |              |                  |                |
| 10   | PULLING IRON              | 4        |              |                  |                |
| 11   | GRAVEL, 3/8" – 3/4"       | AS REQ'D |              |                  |                |

**INSTALLATION:**

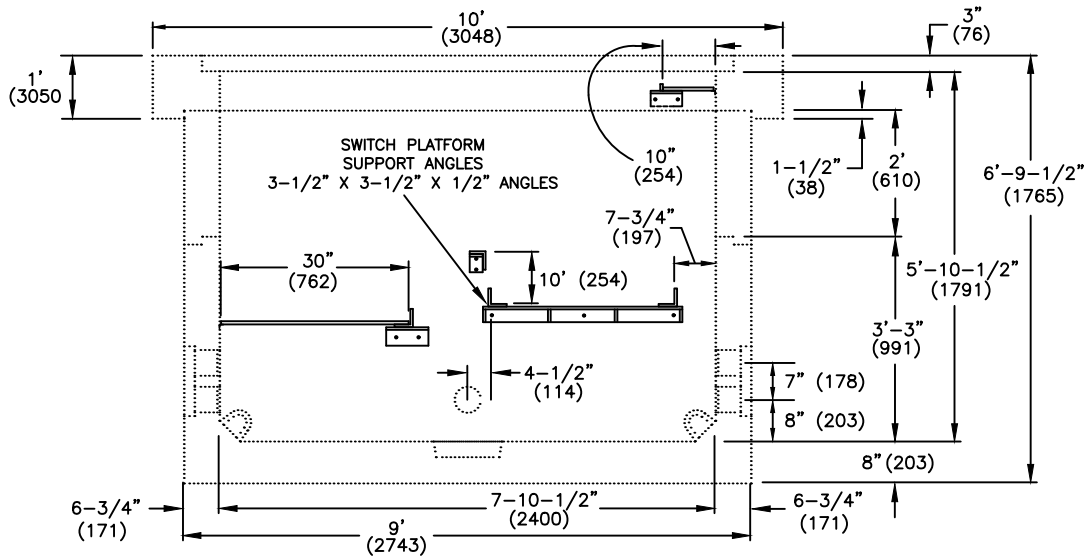
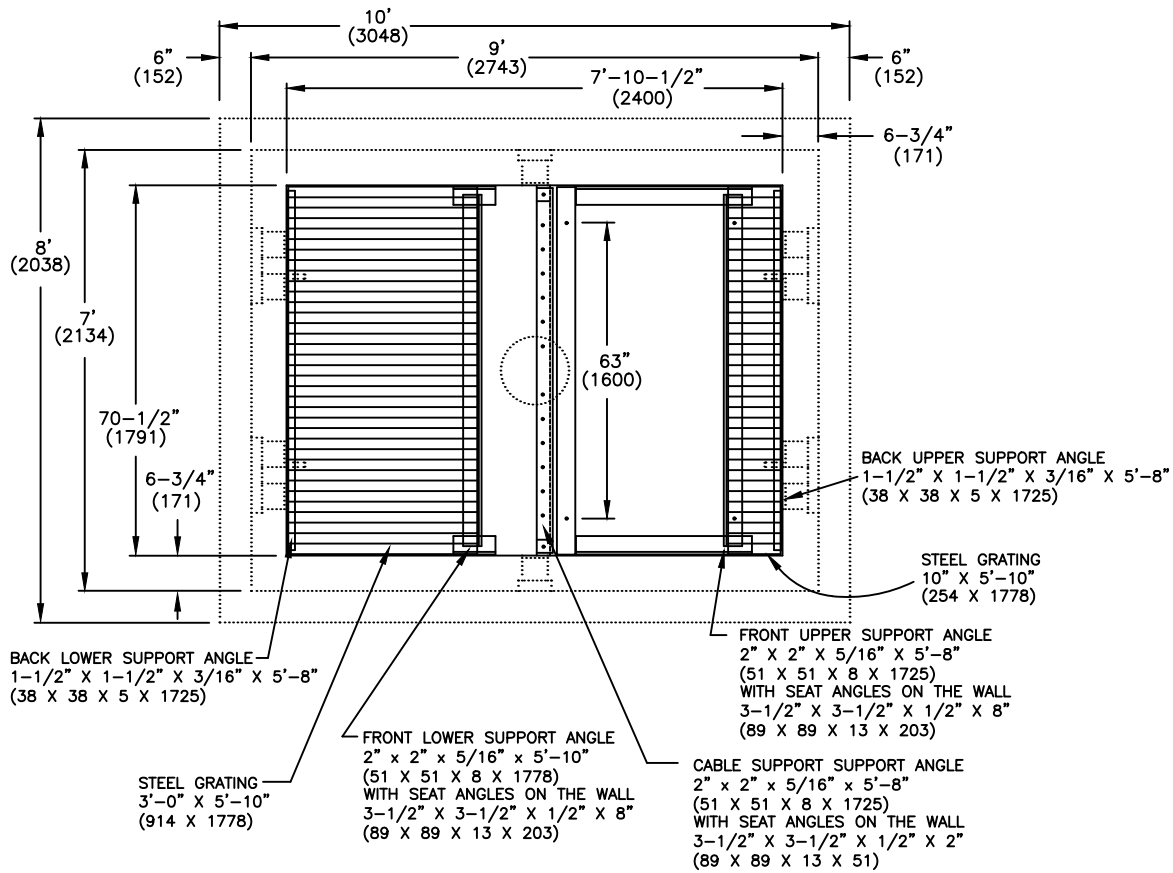
- A. ESTABLISH THE HANDHOLE LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE HANDHOLE TO ANOTHER LOCATION REQUIRES APPROVAL FROM PROJECT MANAGEMENT.
- B. AFTER THE LOCATION IS ESTABLISHED, MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH, LENGTH AND DEPTH PER DRAWING BELOW. THE WIDTH AND LENGTH DIMENSIONS GIVEN, ALLOW AN EXTRA 8 INCHES MIN. (203) FOR SETTING THE SUBSTRUCTURE.
- C. EXCAVATION IS NOW PREPARED FOR INSTALLATION OF SUBSTRUCTURE SECTIONS. PLACE PLASTICMASTIC SEALANT BETWEEN SECTIONS. USE DOUBLE SEAL IF FIELD CONDITIONS INDICATE THAT WATER WILL PENETRATE THE JOINTS. DO NOT APPLY SEALANT UNDER THE TOP SECTION IF CONCRETE IS REQUIRED FOR GRADE ADJUSTMENT. ASSURE THE SUBSTRUCTURE WALLS ARE STRAIGHT AND THE FLOOR IS LEVEL.
- D. TO DETERMINE FINAL GRADE, ONE OF THE TWO FOLLOWING METHODS MAY BE USED: 1) WHEN CURB OR GRADE LEVEL IS ALREADY ESTABLISHED, MEASURE FROM THE TOP OF CURB OR GRADE OR 2) HAVE THE FIELD ENGINEER SET THE GRADE STAKES. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE LEVEL.
- E. ALIGN HANDHOLE COVER TO FINAL GRADE USING BRICKS OR WOODEN WEDGES. BEFORE POURING CONCRETE (4-SACK MIX WITH 3/8 INCH GRAVEL OR AS REQUIRED BY CITY OR COUNTY CODES). FRAME THE INSIDE OPEN AREA BETWEEN SECTIONS SO CONCRETE CAN BE POURED FROM THE OUTSIDE OF THE TOP COVER SECTION. MAKE SURE THE BRICKS OR WOODEN WEDGES DO NOT SHOW FROM THE INSIDE ONCE THE CONCRETE IS POURED. THE INSIDE FRAME MAY BE OMITTED IF THE CONCRETE IS NOT TOO WET. IF FRAME IS OMITTED, TROWEL CONCRETE SMOOTH ON THE INSIDE.
- F. INSTALL CONDUITS USING THE BOTTOM KNOCKOUTS FIRST.
- G. INSTALL 2–5" CONDUITS IN THE TWO UPPERMOST KNOCKOUTS OPPOSITE OR UNDER SWITCH WAY 4 FOR SCADA.

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   |                   |    |      |      |           | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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|-----------------|---|---------------------------|--------------------|----------|---------------------|-----------|
| SHEET<br>2 OF 4 |  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3317.2 |
|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |                    |          |                     |           |
|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 6' X 8') (1829 X 2438)         |                           |                    |          |                     |           |





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| REV | CHANGE                  | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
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| C   |                         |    |      |      |           | F   |        |    |      |      |      |
| B   |                         |    |      |      |           | E   |        |    |      |      |      |
| A   | NO CHANGES - REAFFIRMED | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |



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3 OF 4

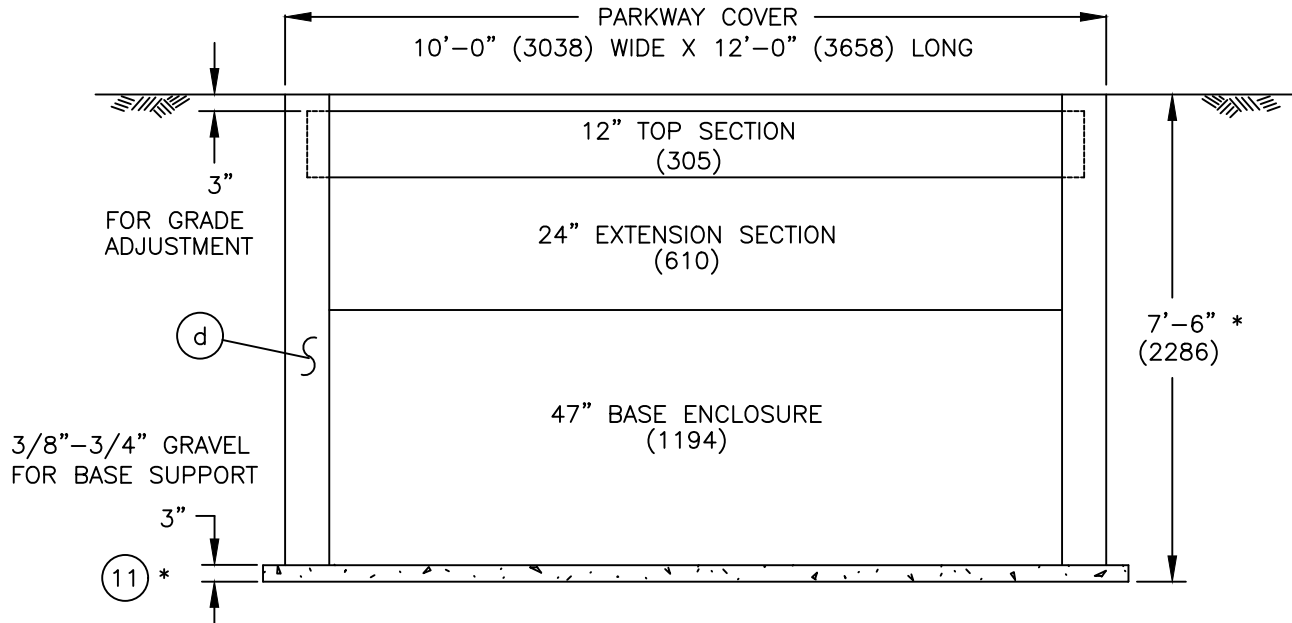
SDG&E ELECTRIC UNDERGROUND STANDARD

HANDHOLE EQUIPMENT ENCLOSURE  
(INSIDE DIMENSIONS - 6' X 8') (1829 X 2438)

UG 3317.3



## EXCAVATION DIMENSIONS




**\*EXCAVATION DEPTH ALLOWS 3 INCHES (76) FOR ADJUSTMENT TO FINAL GRADE AND AN ADDITIONAL 3 INCHES (76) FOR REPLACEMENT OF GRAVEL AS BASE SUPPORT.**

### REFERENCE:

- a. SEE STANDARD 3211 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE STANDARD 3302 FOR SUBSTRUCTURE APPLICATIONS.
- c. SEE STANDARD 3306 FOR INSTALLATION OF PLASTIC-MASTIC SEALANT.
- d. SEE STANDARD 3365 FOR SLURRY BACKFILL.
- e. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- f. SEE STANDARD 3485 WHEN SETTING HANDHOLE ON A SLOPING GRADE.
- g. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE STANDARD 3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM)
- i. SEE STANDARD 3670 FOR SUBSURFACE/SURFACE SWITCH.
- j. SEE STANDARD 3671 FOR INSTALLATION OF SUBSURFACE/SURFACE OPERABLE SWITCH.
- k. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

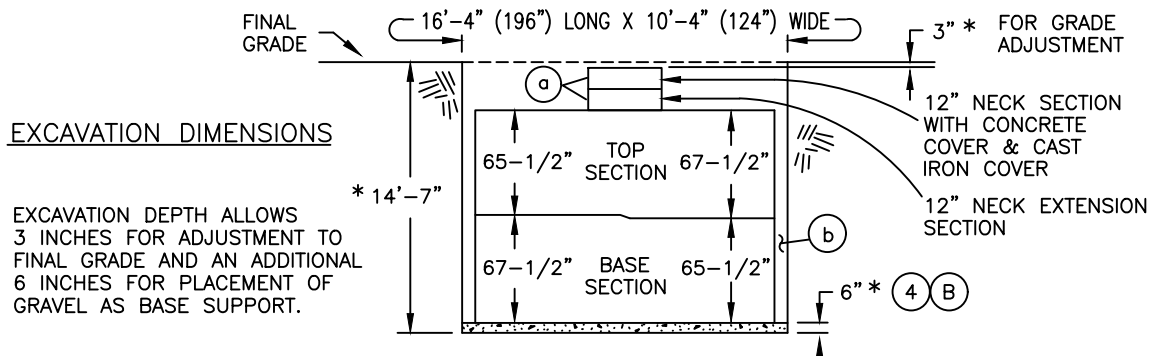
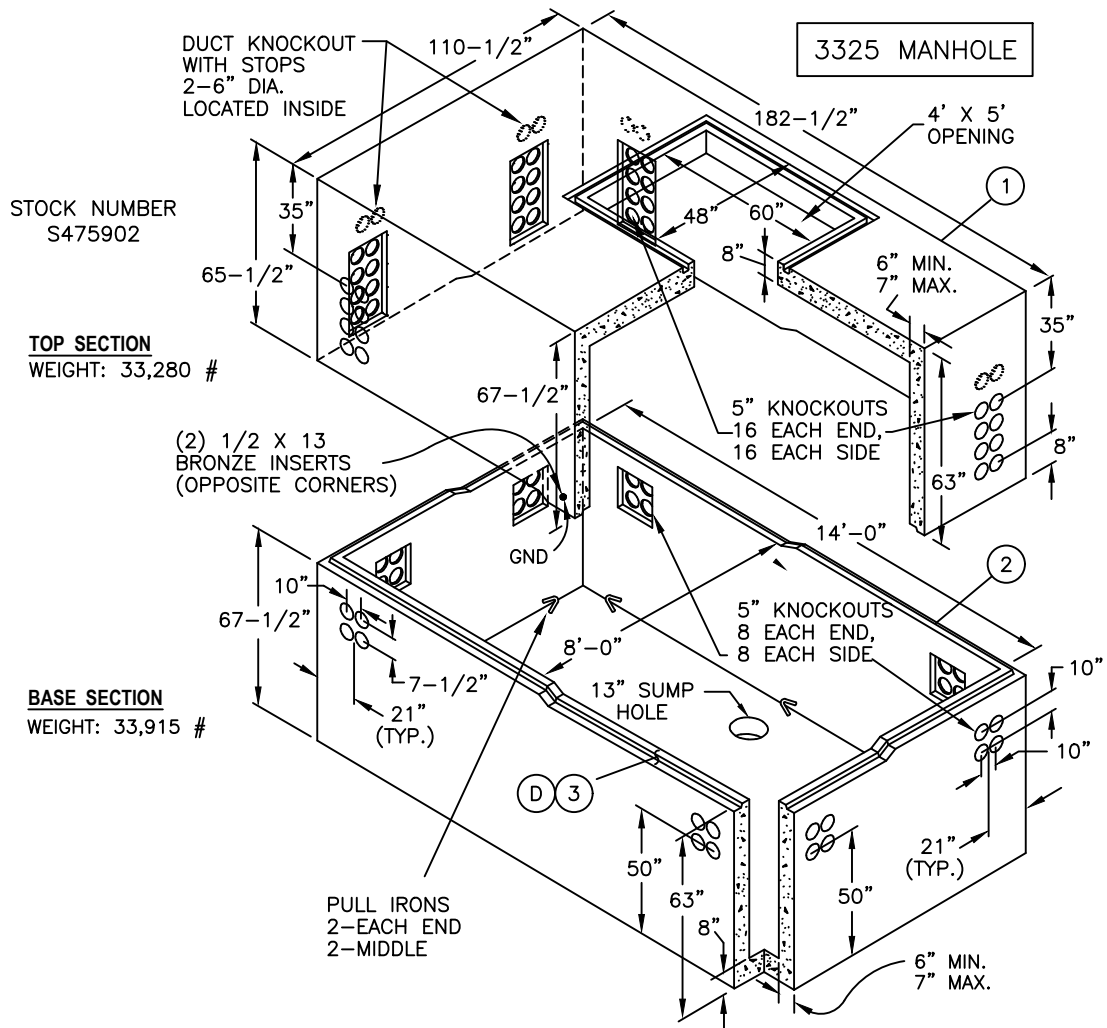
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| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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|-----------------|---|---------------------------|--------------------|----------|---------------------|-----------|
| SHEET<br>4 OF 4 |  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3317.4 |
|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |                    |          |                     |           |
|                 | HANDHOLE EQUIPMENT ENCLOSURE<br>(INSIDE DIMENSIONS - 6' X 8') (1829 X 2438)         |                           |                    |          |                     |           |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3325 MANHOLE.



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| A   | COMPLETELY REVISED | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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SDG&E ELECTRIC UNDERGROUND STANDARD

MANHOLE, TUB TYPE  
8' X 14' X 9'-6"

UG 3325.1

SHEET  
1 OF 2



**NOTES:**

- I. MANHOLE SECTIONS AND COVERS FROM DIFFERENT SUPPLIERS ARE NOT INTERCHANGEABLE.
- II. THE PREFERRED LOCATION FOR A 3325 MANHOLE IS IN NONVEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.).
- III. 3325 MANHOLES ARE DELIVERED BY THE SUPPLIER TO JOB SITE.
- IV. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                 | QUANTITY | CONSTR. STD<br>OR PAGE NO. | STOCK<br>NUMBER | ASSEMBLY<br>UNIT |
|------|-----------------------------|----------|----------------------------|-----------------|------------------|
| 1    | TOP SECTION, 4'-9"          | 1        | 3325.1                     | S475902         | 3325MH           |
| 2    | BASE SECTION, 4'-9"         | 1        | 3325.1                     |                 |                  |
| 3    | SEALANT, PLASTIC MASTIC (D) | AS REQ'D | 3306                       | S631872         | -                |
| 4    | GRAVEL, 3/8" - 3/4" (B)     | AS REQ'D | -                          | -               | -                |

**INSTALLATION:**


- A. ESTABLISH THE MANHOLE LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE MANHOLE TO ANOTHER LOCATION REQUIRES APPROVAL FROM SERVICE PLANNING.
- (B) PLACE GRAVEL 6" DEEP ON EXCAVATION BOTTOM AND SET MANHOLE LEVEL.
- C. FOR 48" X 60" MANHOLE NECK AND COVER, SEE STANDARD 3332.
- (D) USE MASTIC SEALING COMPOUND IN ALL SECTIONS (SEE STANDARD 3306).
- E. INSTALL CONDUITS USING THE BOTTOM OUTSIDE (CLOSEST TO THE WALL) KNOCKOUTS FIRST.
- F. USE #2 AWG BARE COPPER (STOCK NUMBER 812816) FOR GROUNDS WITH SERVICE POST CONNECTOR (STOCK NUMBER 262560).
- G. ON INITIAL CABLE INSTALLATION, OCCUPY LOWEST CONDUIT OPENINGS FIRST.

**REFERENCE:**

- (a) SEE STANDARD 3332 FOR MANHOLE NECK AND COVER TRAFFIC BEARING.
- (b) SEE STANDARD 3365 FOR SLURRY BACKFILL.
- c. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   |                   |    |      |      |           | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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2 OF 2**

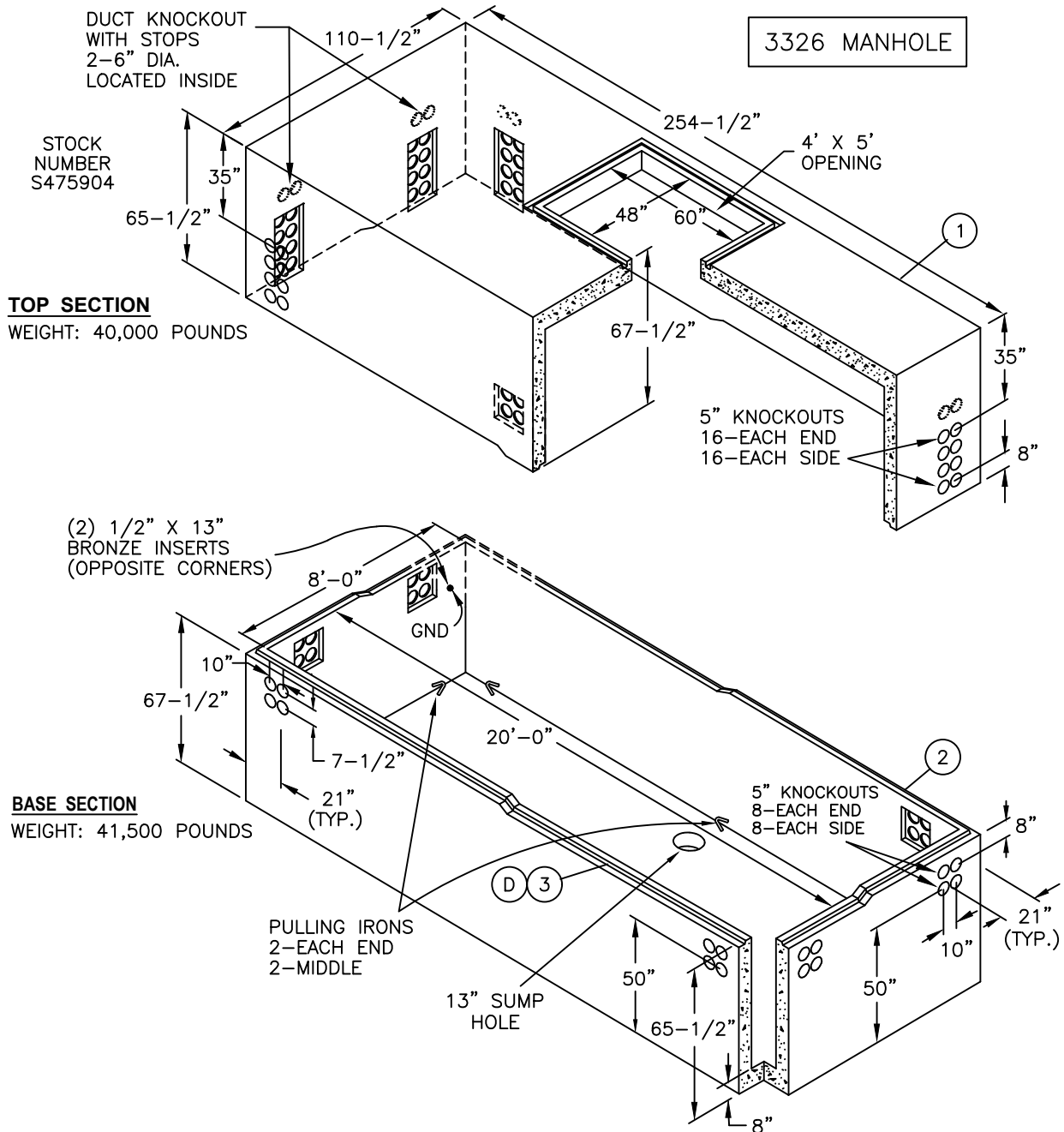
SDG&E ELECTRIC UNDERGROUND STANDARD

MANHOLE, TUB TYPE  
8' X 14' X 9'-6"

**UG 3325.2**



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3326 MANHOLE.



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| B   |                    |    |      |      |           | E   |        |    |      |      |      |
| A   | COMPLETELY REVISED | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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**SHEET**  
**1 OF 2**

SDG&E ELECTRIC UNDERGROUND STANDARD

**MANHOLE, TUB TYPE**  
**8' X 20' X 9'-6"**

**UG 3326.1**



**NOTES:**

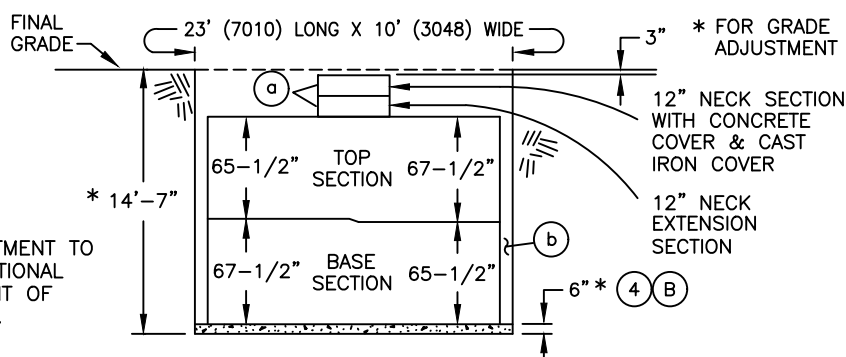
- I. MANHOLE SECTIONS AND COVERS FROM DIFFERENT SUPPLIERS ARE NOT INTERCHANGEABLE.
- II. THE PREFERRED LOCATION FOR A 3326 MANHOLE IS IN NONVEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.).
- III. 3325 MANHOLES ARE DELIVERED BY THE SUPPLIER TO JOB SITE.
- IV. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                 | QUANTITY | CONSTR. STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNIT |
|------|-----------------------------|----------|-------------------------|--------------|---------------|
| 1    | TOP SECTION, 4'-9"          | 1        | 3326.1                  | S475904      | 3326MH        |
| 2    | BASE SECTION, 4'-9"         | 1        | 3326.1                  |              |               |
| 3    | SEALANT, PLASTIC MASTIC (D) | AS REQ'D | 3306                    | S631872      | -             |
| 4    | GRAVEL, 3/8" - 3/4" (B)     | AS REQ'D | -                       | -            | -             |

**EXCAVATION:****EXCAVATION DIMENSIONS**

\* EXCAVATION DEPTH ALLOWS THREE INCHES FOR ADJUSTMENT TO FINAL GRADE AND AN ADDITIONAL SIX INCHES FOR PLACEMENT OF GRAVEL AS BASE SUPPORT.

**INSTALLATION:**

- A. ESTABLISH THE MANHOLE LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE MANHOLE TO ANOTHER LOCATION REQUIRES APPROVAL FROM SERVICE PLANNING.
- (B) PLACE GRAVEL SIX INCHES DEEP ON EXCAVATION BOTTOM AND SET MANHOLE LEVEL.
- C. FOR 48" X 60" MANHOLE NECK AND COVER, SEE STANDARD 3332.
- (D) USE MASTIC SEALING COMPOUND IN ALL SECTIONS (SEE STANDARD 3306).
- E. INSTALL CONDUITS USING THE BOTTOM OUTSIDE (CLOSEST TO THE WALL) KNOCKOUTS FIRST.
- F. USE #2 AWG BARE COPPER (STOCK NUMBER S812816) FOR GROUNDS WITH SERVICE POST CONNECTOR (STOCK NUMBER S262560).
- G. ON INITIAL CABLE INSTALLATION, OCCUPY LOWEST CONDUIT OPENINGS FIRST.

**REFERENCE:**

- (a) SEE STANDARD 3332 FOR MANHOLE NECK AND COVER TRAFFIC BEARING.
- (b) SEE STANDARD 3365 FOR SLURRY BACKFILL.

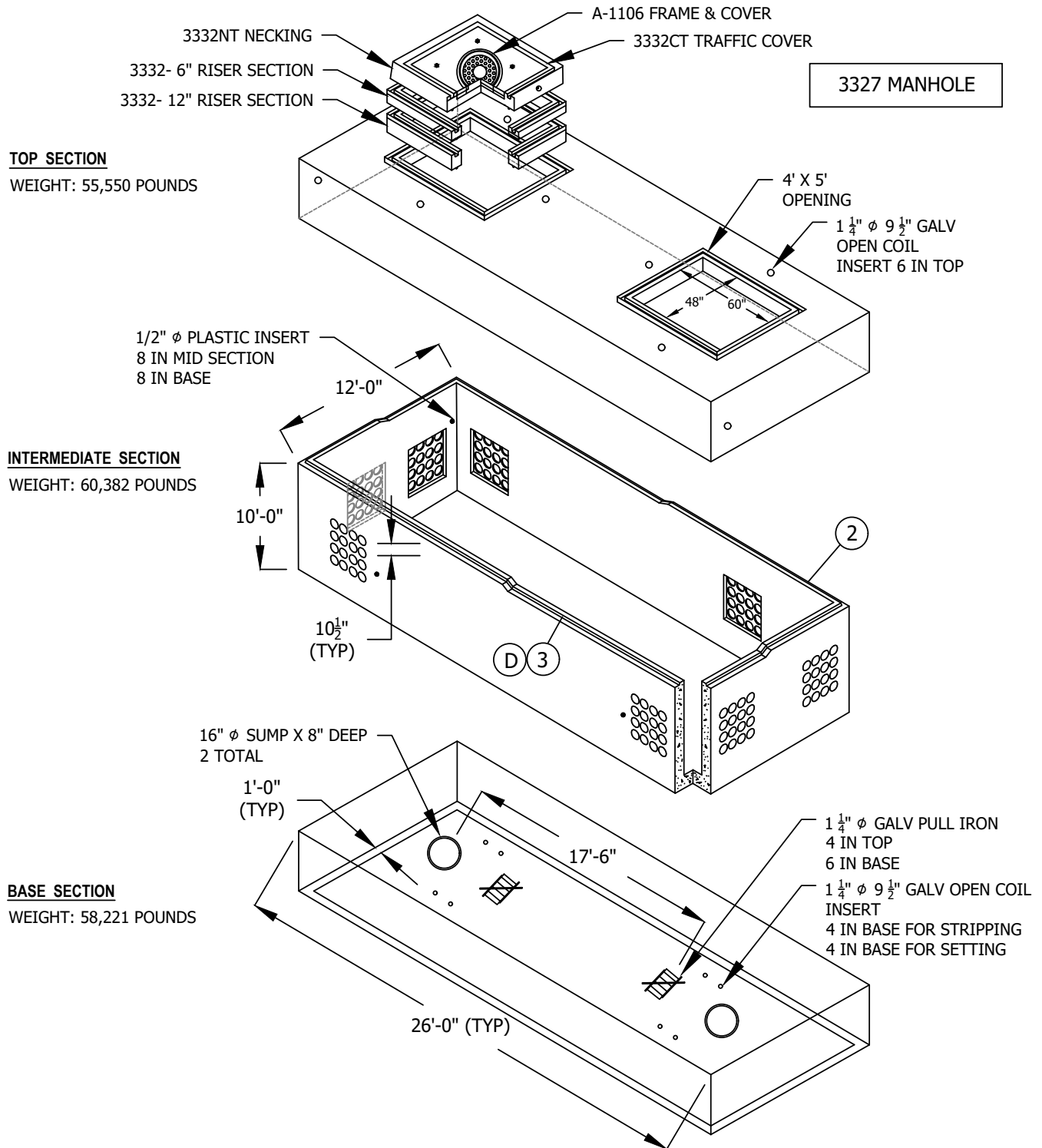
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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   |                   |    |      |      |           | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

|                 |                                       |                           |                    |          |                     |           |
|-----------------|---------------------------------------|---------------------------|--------------------|----------|---------------------|-----------|
| SHEET<br>2 OF 2 | <div></div>                           | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3326.2 |
|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |                    |          |                     |           |
|                 | MANHOLE, TUB TYPE<br>8' X 20' X 9'-6" |                           |                    |          |                     |           |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR A 3327 MANHOLE.



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| C   |                |    |      |      |           | F   |        |    |      |      |      |
| B   |                |    |      |      |           | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE | GW | JS   | CZH  | 11/1/2018 | D   |        |    |      |      |      |

|                 |   |                    |   |          |                     |          |
|-----------------|---|--------------------|---|----------|---------------------|----------|
| SHEET<br>1 OF 2 | Indicates Latest Revision                           | Completely Revised | X | New Page | Information Removed | UG3327.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD    |                    |   |          |                     |          |
|                 | SUBSTATION MANHOLE VAULT<br>10'-0" X 24'-0" X 8'-0" |                    |   |          |                     |          |



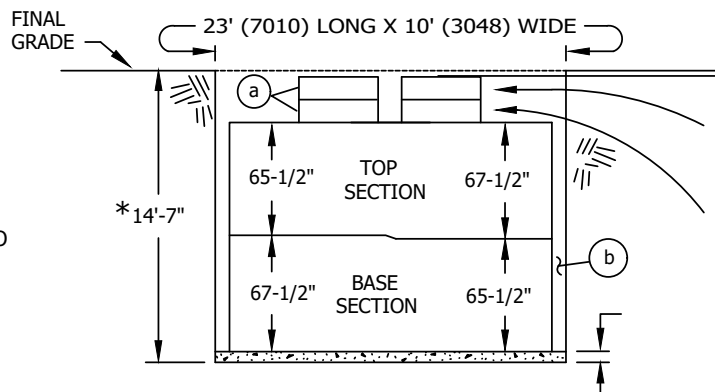
## INSTALLATION:

- A. ESTABLISH THE MANHOLE LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE MANHOLE TO ANOTHER LOCATION REQUIRES APPROVAL FROM SERVICE PLANNING.
- B. PLACE GRAVEL SIX INCHES DEEP ON EXCAVATION BOTTOM AND SET MANHOLE LEVEL.**
- C. FOR 48" X 60" MANHOLE NECK AND COVER, SEE STANDARD 3332.
- D. USE MASTIC SEALING COMPOUND IN ALL SECTIONS (SEE STANDARD 3306).**
- E. INSTALL CONDUITS USING THE BOTTOM OUTSIDE (CLOSEST TO THE WALL) KNOCKOUTS FIRST.
- F. USE #2 AWG BARE COPPER (STOCK NUMBER S812816) FOR GROUNDS WITH SERVICE POST CONNECTOR (STOCK NUMBER S262560).
- G. ON INITIAL CABLE INSTALLATION, OCCUPY LOWEST CONDUIT OPENINGS FIRST.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION         | QUANTITY | CONSTR. STD<br>OR PAGE NO. | STOCK<br>NUMBER | ASSEMBLY<br>UNIT |
|------|---------------------|----------|----------------------------|-----------------|------------------|
| 1    | TOP SECTION,        | 1        | 3327.1                     | S475906         | 3327MH           |
| 2    | BASE SECTION,       | 1        | 3327.1                     |                 |                  |
| 3    | SEALANT, PLASTIC    | AS REQ'D | 3306                       | S631875         | -                |
| 4    | GRAVEL, 3/8" - 3/4" | AS REQ'D | -                          | -               | -                |

**EXCAVATION:**



### EXCAVATION DIMENSIONS

\* EXCAVATION DEPTH ALLOWS  
THREE INCHES FOR ADJUSTMENT TO  
FINAL GRADE AND AN ADDITIONAL  
SIX INCHES FOR PLACEMENT OF  
GRAVEL AS BASE SUPPORT.

**NOTES:**

- I. MANHOLE SECTIONS AND COVERS FROM DIFFERENT SUPPLIERS ARE NOT INTERCHANGEABLE.
- II. THE PREFERRED LOCATION FOR A 3327 MANHOLE IS IN NONVEHICULAR TRAFFIC AREAS (BEHIND CURBS, PARKWAY POSITION, ETC.).
- III. 3325 MANHOLES ARE DELIVERED BY THE SUPPLIER TO JOB SITE.
- IV. LIFTING ANCHORS ARE NOT TO BE USED FOR CABLE PULLING.

**REFERENCE:**

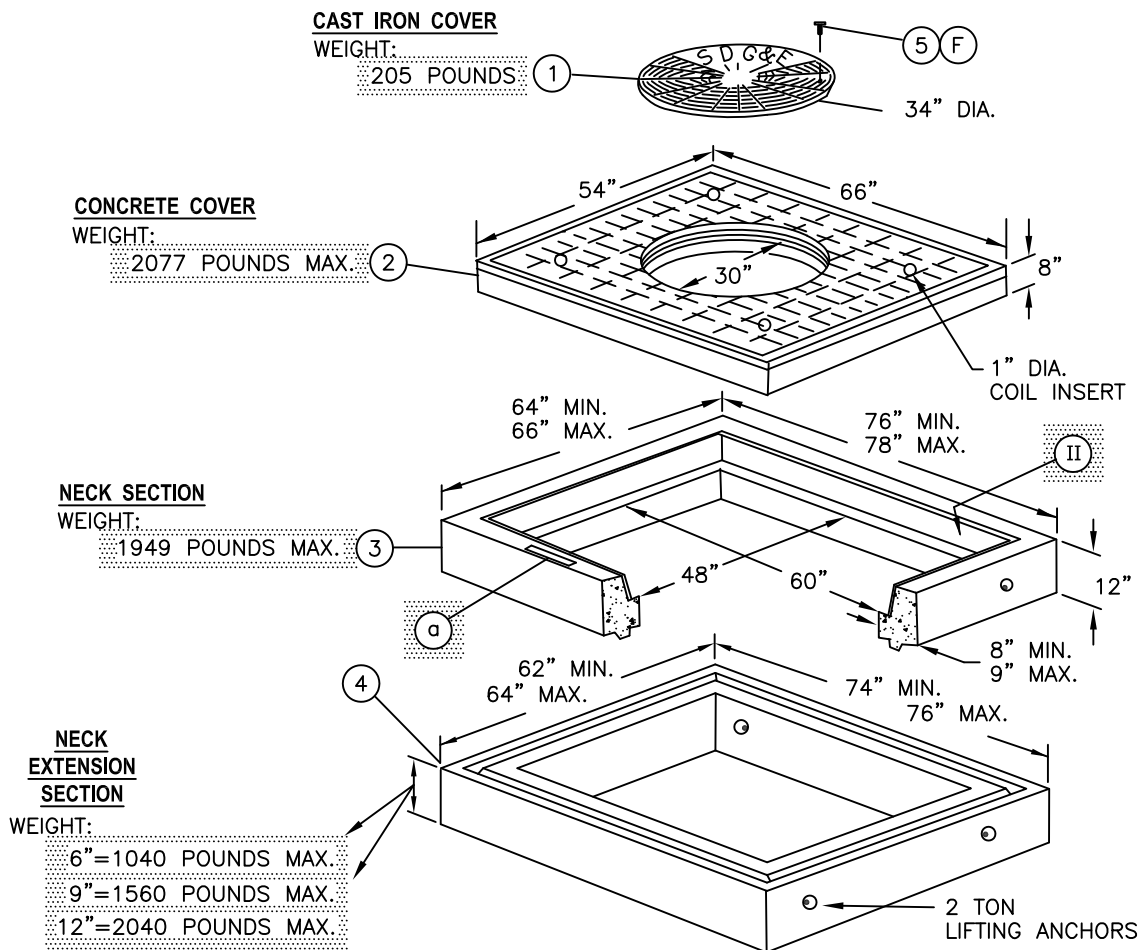
- (a) SEE STANDARD 3332 FOR MANHOLE NECK AND COVER TRAFFIC BEARING.
- (b) SEE STANDARD 3365 FOR SLURRY BACKFILL.

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| A               | ORIGINAL ISSUE | GW  | JS   | CZH                | 11/1/2018 | D   |          |    |                     |      |          |
| SHEET<br>2 OF 2 |                | Indicates Latest Revision                           |      | Completely Revised |           | X   | New Page |    | Information Removed |      |          |
|                 |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD    |      |                    |           |     |          |    |                     |      | UG3327.2 |
|                 |                | SUBSTATION MANHOLE VAULT<br>10'-0" X 24'-0" X 8'-0" |      |                    |           |     |          |    |                     |      |          |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR THE MANHOLE NECK, NECK EXTENSION, AND COVER USED FOR ACCESS TO A 3325 AND 3326 MANHOLE.



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                         | QUANTITY | CONST STD | STOCK NUMBER | ASSEMBLY UNITS |       |
|------|-------------------------------------|----------|-----------|--------------|----------------|-------|
| 1    | COVER, DUCTILE IRON 34" 864 MM      | 1        | —         | S287056      | MH-COV         | 24NKC |
| 2    | COVER, CONCRETE                     | 1        | —         | S287110      | —              |       |
| 3    | NECK, SECTION                       | 1        | —         | S597300      | 24MHNK         |       |
| 4    | NECK, EXTENSION SECTION             | AS REQ'D | 6"        | S493550      | 24NK06         |       |
|      |                                     |          | 9"        | S493564      | 24NK09         |       |
|      |                                     |          | 12"       | S493495      | 24NK12         |       |
| 5    | BOLT, HEX HEAD 5/8" X 1-1/2"        | 4        | —         | S156758      | —              |       |
| 6    | SEALANT, PLASTIC-MASTIC (NOT SHOWN) | AS REQ'D | 3306      | S631872      | —              |       |
| 7    | INHIBITOR (NOT SHOWN)               | AS REQ'D | —         | S247200      | —              |       |

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| SHEET<br>1 OF 2 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS             |   |                                   | UG 3332.1                                    |
|                 | 48" X 60" MANHOLE NECK AND COVER TRAFFIC BEARING              |   |                                   |  |



**INSTALLATION:**

- A. PLACE PLASTIC-MASTIC SEALANT BETWEEN ALL SECTIONS. DO NOT APPLY SEALANT UNDER THE TOP SECTION IF CONCRETE IS REQUIRED FOR GRADE ADJUSTMENT.
- B. TO DETERMINE FINAL GRADE, ONE OF THE TWO FOLLOWING METHODS MAY BE USED: 1) CURB OR GRADE LEVEL IS ALREADY ESTABLISHED, MEASURE FROM THE TOP OF CURB OR GRADE OR 2) HAVE THE FIELD ENGINEER SET THE GRADE STAKES. AFTER GRADE LEVEL IS ESTABLISHED, SET A STRING LINE FOR CHECKING GRADE LEVEL.
- C. ALIGN MANHOLE COVER TO FINAL GRADE USING BRICKS OR WOODEN WEDGES. BEFORE POURING CONCRETE (4-SACK MIX WITH 3/8 INCH PEA GRAVEL OR AS REQUIRED BY CITY OR COUNTY CODES), FRAME THE INSIDE OPEN AREA BETWEEN SECTIONS SO CONCRETE CAN BE POURED FROM THE OUTSIDE OF THE TOP COVER SECTION. MAKE SURE THE BRICKS OR WOODEN WEDGES DO NOT SHOW FROM THE INSIDE ONCE THE CONCRETE IS POURED. THE INSIDE FRAME MAY BE OMITTED IF THE CONCRETE IS NOT TOO WET. IF FRAME IS OMITTED, TROWEL CONCRETE SMOOTH ON THE INSIDE.

## D. DEPTHS OF MANHOLE ROOF BELOW GRADE:

0" - EXTENSION 1'-0"      9" - EXTENSION 1'-9"  
 6" - EXTENSION 1'-6"      12" - EXTENSION 2'-0"

- (F) APPLY INHIBITOR TO THE BOLTS WHEN SECURING THE COVER TO REDUCE INSTALLATION OR REMOVAL DIFFICULTIES.

**NOTES:**

- I. CAST IRON COVERS FROM DIFFERENT SUPPLIERS ARE INTERCHANGEABLE. THE CONCRETE COVER, NECK SECTION AND NECK EXTENSION SECTION FROM DIFFERENT SUPPLIERS ARE NOT INTERCHANGEABLE.
- II. WHEN TRAFFIC COVER IS REMOVED CHECK GASKET MATERIAL AND REPLACE AS NEEDED. SDG&E STOCK NUMBER (S341020).

**REFERENCE:**

- a. SEE STANDARD 3211 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE STANDARD 3302 FOR SUBSTRUCTURE APPLICATIONS.
- c. SEE STANDARD 3306 FOR INSTALLATION OF PLASTIC-MASTIC SEALANT.
- d. SEE STANDARD 3365 FOR SLURRY BACKFILL.
- e. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- f. SEE STANDARD 3485 FOR SETTING MANHOLE ON SLOPING GRADE.
- g. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE STANDARD 3605 FOR SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET (MAXIMUM NUMBER OF CABLES, CONNECTORS AND CONDUITS).

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| SHEET<br>2 OF 2 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   | UG 3332.2 |
|                 | 48" X 60" MANHOLE NECK AND<br>COVER TRAFFIC BEARING |           |







**SUMP PUMP INSTALLATION IN  
A 3324/25/26/27 MANHOLE**

**FIG. 3**

FACE/CURB  
VARIES  
SIDEWALK  
STREET  
APPROX. 1'  
CONDUIT CONFIGURATION INSTALLED IN SIDEWALK  
CONDUIT CONFIGURATION INSTALLED IN STREET  
TOP VIEW OF MANHOLE CENTER SECTION  
MANHOLE OPENING

Labels: 23, 24, 25, 26, 27, 28, 4, 6, 2, 3, 4, 5, 17, 18, 19, 20, I, 1, 2, 5.

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| A   | REPL'D PUMP MODEL | ML | AW   | MDJ  | 2/13/2018 | D   |        |    |      |      |      |

UG 3362.2



### **BILL OF MATERIALS:**

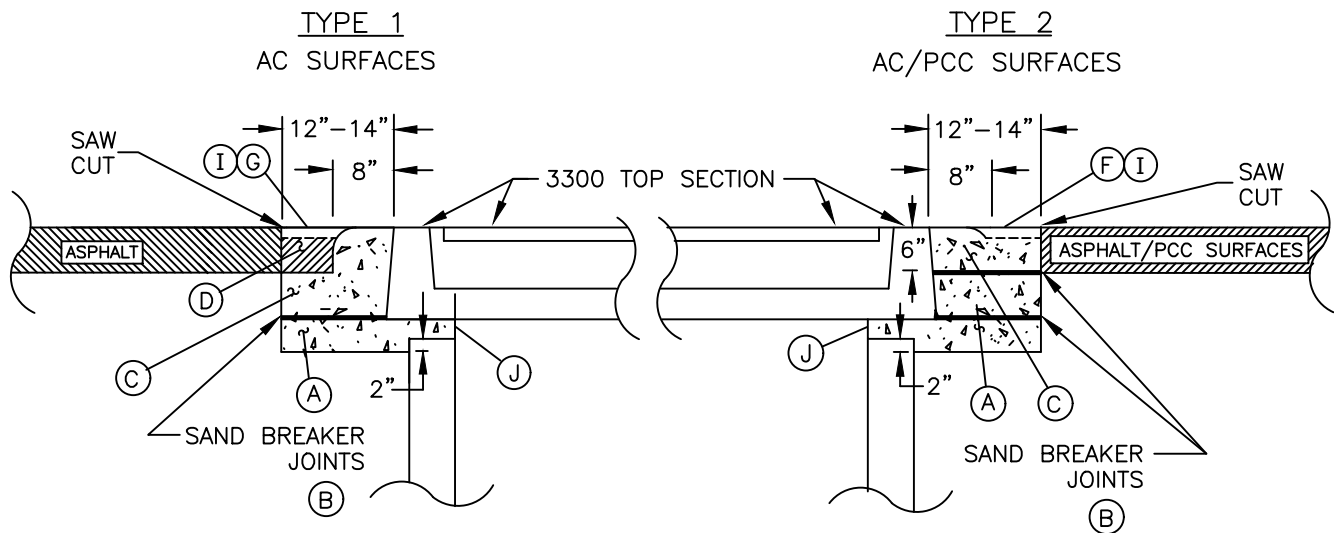
| ITEM | DESCRIPTION   | QUANTITY | STOCK NO. | ASSEMBLY UNITS   |
|------|---|----------|-----------|--|
| 1    | SUMP PUMP AUTOMATED                                   | 1        | 561570    | ECOPMP   |
| 2    | HOSE, 1-1/2", PVC (E)(F)                              | AS REQ'D | 417200    | 1-1/2F   |
| 3    | VALVE, CHECK, 1-1/2"                                  | 1        | 783110    | -  |
| 4    | CONDUIT, PVC 40, 1-1/2"                               | AS REQ'D | 251232    | 1-1/2C   |
| 5    | ELBOW, 90°, 1-1/2"                                    | 3        | 325476    | COMPLETE PUMP ASSEMBLY<br>INTERNAL<br><br>SUMPAS<br><br>COMPLETE ASSEMBLY<br>TO INCLUDE ITEMS 1<br>THRU 12           |
| 6    | COUPLING, PVC 40, 1-1/2" (E)(F)                       | AS REQ'D | 280320    |  |
| 7    |   |          |           |  |
| 8    | HOLDER, FUSE  | 1        | 443392    |  |
| 9    | CARTRIDGE, FUSE, 15A, BUSS FNM15                      | 1        | 363790    |  |
| 10   | HEAT-SHRINK, TUBE, 1.3" ID X 6"                       | 3        | 777984    |  |
| 11   |   |          |           |  |
| 12   | WIRE, #8 THW 600 V COPPER                             | AS REQ'D | 808320    |  |
| 13   | SOLVENT CEMENT (E)                                    | AS REQ'D | 213232    | -  |
| 14   | SEALING COMPOUND (I)                                  | 1        | 442976    |  |
| 15   |   |          |           |  |
| 16   | CONNECTOR, STA-KON OR EQUIVALENT                      | 3        | 258712    |  |
| 17   | PIPE STRAP, TWO HOLE, 1-1/2", STAINLESS STEEL         | AS REQ'D | 697664    |  |
| 18   | ANCHOR BOLT 1/4" X 2-1/4", STAINLESS STEEL            | AS REQ'D | 107660    |  |
| 19   | ADAPTER, THREADED 1-1/4" TO 1-1/2" SLIP               | 1        | 102064    |  |
| 20   | TIE STRAP   | AS REQ'D | 738440    |  |
| 21   | WIRE, TWO #8, 600V ALUMINUM INSULATED CABLE (U10.011) | AS REQ'D | 196176    |  |
| 22   | SERVICE CONNECTOR                                     | 1        | 258496    | COMPLETE CONDUIT<br>INSTALLATION<br>EXTERNAL<br><br>X-COND<br>COMPLETE ASSEMBLY<br>TO INCLUDE ITEMS<br>4, 23 THRU 28 |
| 23   | CONDUIT, PVC, 40, 3"                                  | 10' MAX  | 251360    |  |
| 24   | ELBOW, 90°, PVC, 40, 3"                               | 2        | 321818    |  |
| 25   | COUPLING, PVC, 40, 3"                                 | AS REQ'D | 280448    |  |
| 26   | REDUCER, PVC, 80, 3"-2"                               | 1        | 573392    |  |
| 27   | COUPLING, PVC, 40, 2"                                 | 1        | 280384    |  |
| 28   | REDUCER, NESTING BUSHING, PVC, 40, 2" X 1-1/2"        | 1        | 573411    |  |

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| A               | REPL'D PUMP MODEL | ML                        | AW                        | MDJ  | 2/13/2018    | D                  |        |    |          |      |                     |           |
| SHEET<br>3 OF 3 |                   | <div></div>               | Indicates Latest Revision |      | <div>X</div> | Completely Revised |        |    | New Page |      | Information Removed | UG 3362.3 |
|                 |                   | SDG&E ELECTRIC STANDARDS  |                           |      |              |                    |        |    |          |      |                     |           |
|                 |                   | SUMP PUMP INSTALLATION    |                           |      |              |                    |        |    |          |      |                     |           |
|                 |                   | MANHOLES<br>3324/25/26/27 |                           |      |              |                    |        |    |          |      |                     |           |



**SCOPE:** THIS STANDARD SHOWS RESURFACING OF AN EXISTING STREET AFTER THE INSTALLATION OR RAISING OF A 3300 SUBSTRUCTURE.



**INSTALLATION:**

- (A) CONCRETE 6 SACK MIX (560-C-3250) WITH ONE-INCH ROCK.
- (B) INSTALL 1/2-INCH LAYER OF WASHED CONCRETE SAND OR OTHER BOND BREAKERS EVERY SIX INCHES FOR POSITIVE CONSTRUCTION BREAKER JOINTS. IF SUBSTRUCTURE IS RAISED AT A LATER DAY DUE TO STREET RESURFACING, ETC., BREAKER JOINT WILL EASE RAISING SUBSTRUCTURE.
- (C) CONCRETE 6 SACK MIX (560-C-3250). APRON EIGHT INCHES IN WIDTH, TROWELED SURFACE 1/4-INCH ROLLED EDGE (SIDEWALK EDGING TOOL). CONCRETE APRON SERVES AS PROTECTION FOR SUBSTRUCTURE.
- (D) ASPHALT ROAD BASE, SIX-INCH MINIMUM. DEPTH.
- (F) FOR AC SURFACES, MAINTAIN CONCRETE BASE SURFACE 1/8-INCH LOW TO LEAVE ENOUGH ROOM FOR CLASS 'F' ASPHALT TO BE EVENLY SPREAD, RESULTING IN A SMOOTH (FLAT) EXISTING SURFACE BETWEEN EXISTING ROADWAY AND 3300 TOP (NECK) SECTION.
- (G) CLASS 'F' ASPHALT SPREAD EVENLY, RESULTING IN A SMOOTH TRANSITION SURFACE FROM ROADWAY TO 3300 TOP (NECK) SECTION.
- (H) INSTALL 1/2-INCH LAYER OF WASHED CONCRETE SAND OR OTHER BOND BREAKERS IF CONCRETE UNDER TOP (NECK) SECTION EXCEEDS THREE INCHES.
- (I) FOR AC SURFACES CLASS 'F' ASPHALT SHALL BE SEALED WITH ASPHALTIC TYPE EMULSION THEN SAND SEALED.
- (J) FRAME THE INSIDE OPEN AREA BETWEEN SECTIONS SO CONCRETE CAN BE POURED FROM OUTSIDE THE SUBSTRUCTURE.
- K. THE INSTALLATION SHALL MEET LOCAL GOVERNMENTAL REQUIREMENTS. IF THIS STANDARD DOES NOT CONFORM, FOLLOW AGENCY, GOVERNMENTAL REQUIREMENTS.

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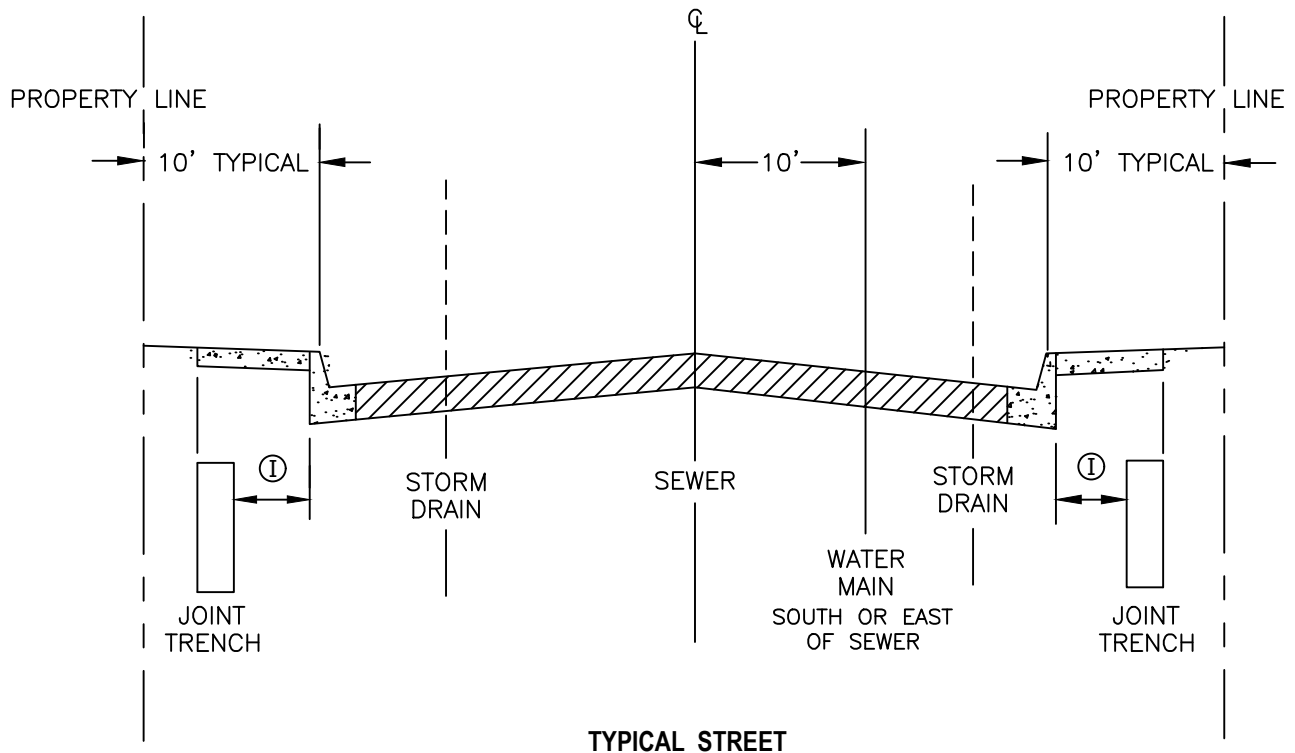
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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD                        |   |   |  |         |
|                 | STREET RESURFACING   |   |   |  |         |



**SCOPE:** THIS STANDARD SHOWS TYPICAL UTILITY LOCATIONS IN LOCAL AND COLLECTOR STREETS IN SAN DIEGO COUNTY.

### NEW CONSTRUCTION



### NOTES:

- ① AT CATCH BASIN LOCATIONS, JOINT TRENCH SHALL BE 4 FEET MINIMUM FROM BACK OF CURB TO INSIDE WALL OF TRENCH.

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**SHEET  
1 OF 3**

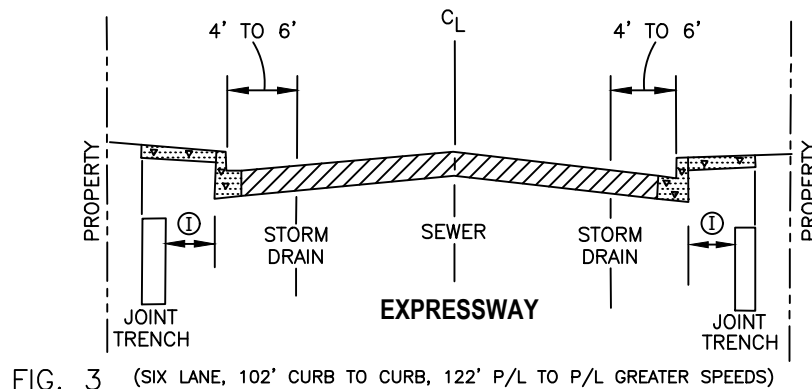
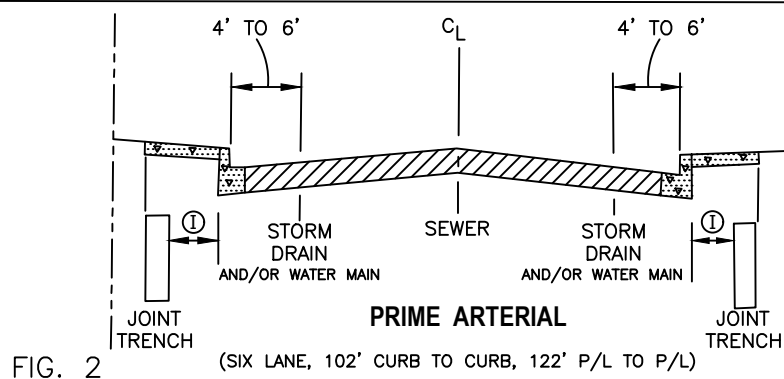
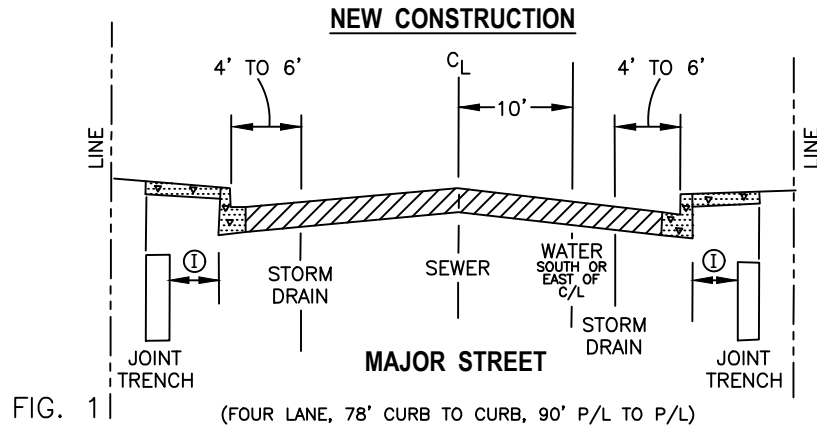
SDG&E ELECTRIC UNDERGROUND STANDARD

UTILITY LOCATIONS IN LOCAL AND  
COLLECTOR STREETS IN S.D. COUNTY

**UG 3364.1**



**SCOPE:** THIS STANDARD SHOWS TYPICAL UTILITY LOCATIONS IN MAJOR STREETS, PRIME ARTERIALS, AND EXPRESSWAYS IN SAN DIEGO COUNTY.



**NOTES:**

- ① AT CATCH BASIN LOCATIONS, JOINT TRENCH SHALL BE 4 FEET MINIMUM FROM BACK OF CURB TO INSIDE WALL OF TRENCH.

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**SHEET**  
**2 OF 3**

SDG&E ELECTRIC UNDERGROUND STANDARD

UTILITY LOCATIONS IN MAJOR STREETS, PRIME  
ARTERIALS, AND EXPRESSWAYS IN S.D. COUNTY

**UG 3364.2**



**SCOPE:** THIS STANDARD SHOWS TYPICAL JOINT TRENCH LOCATION FOR UNDERGROUND CONVERSIONS IN SAN DIEGO COUNTY.

### UNDERGROUND CONVERSIONS

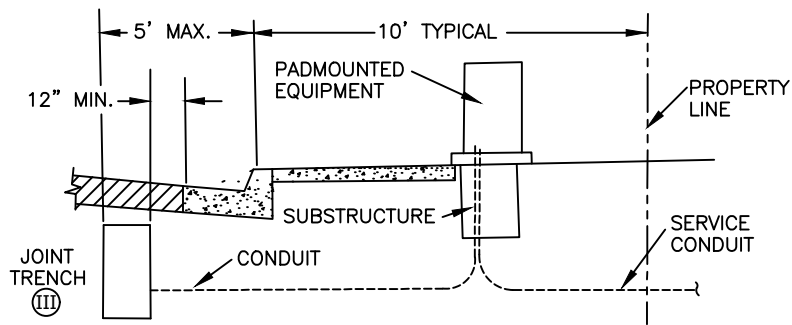


FIG. 1 SIDEWALK NEXT TO CURB

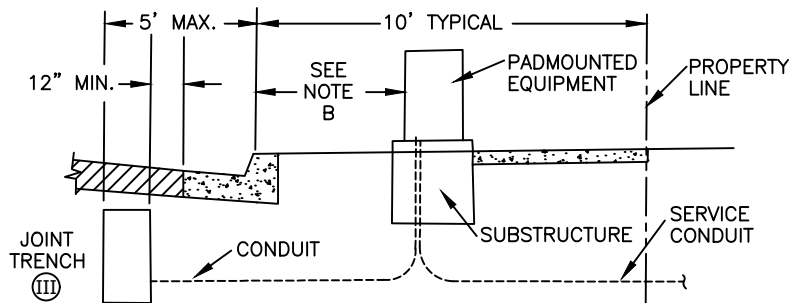


FIG. 2 SIDEWALK NEXT TO PROPERTY LINE

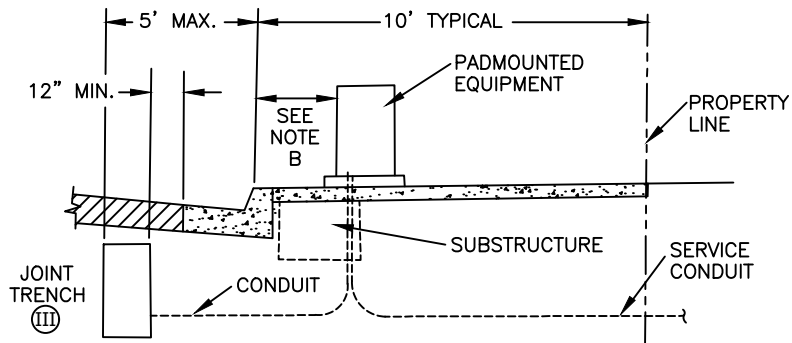


FIG. 3 SIDEWALK NEXT TO CURB AND PROPERTY LINE

**NOTES:**

- I. SIDEWALK SHALL HAVE A MINIMUM OF FOUR (4) FOOT CLEAR AREA (PATH, NOT INCLUDING CURB) PASSING PEDESTALS, PULLBOXES AND OTHER STRUCTURES (SEE STANDARD 3002).
- II. FOR CLEARANCES, SEE UNDERGROUND STANDARDS 3481, 3486, AND 3483.
- III \* STREET LIGHTS, GAS, UNDERGROUND ELECTRIC, TELEPHONE AND CATV.

**REFERENCE:**

- a. SEE GAS STANDARDS 7425.1, 7425.2, & 7425.3 [FOR INTERNAL USE ONLY]

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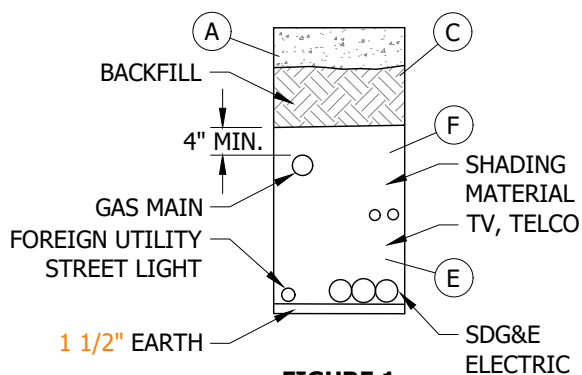
**SHEET  
3 OF 3**

SDG&E ELECTRIC UNDERGROUND STANDARD  
JOINT TRENCH TYPICAL LOCATION  
FOR UNDERGROUND CONVERSIONS IN S.D. COUNTY

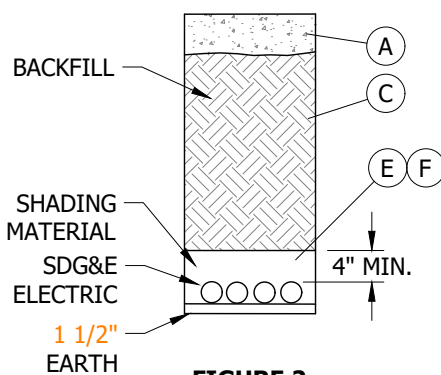
**UG 3364.3**



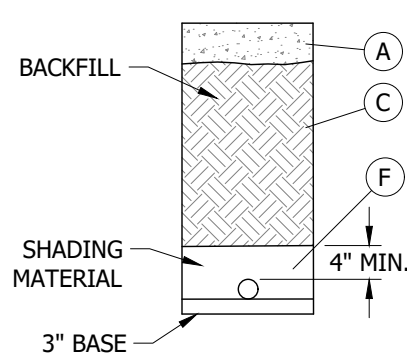
**SCOPE:** THIS STANDARD SHOWS TYPICAL PLACEMENT OF BASE, SHADING, AND IMPORTED OR NATIVE BACKFILL MATERIAL FOR SDG&E FACILITIES IN SAN DIEGO COUNTY. IMPORTED OR NATIVE BACKFILL IS THE ALTERNATE BACKFILL MATERIAL, ONE SACK SLURRY IS THE PREFERRED BACKFILL MATERIAL.



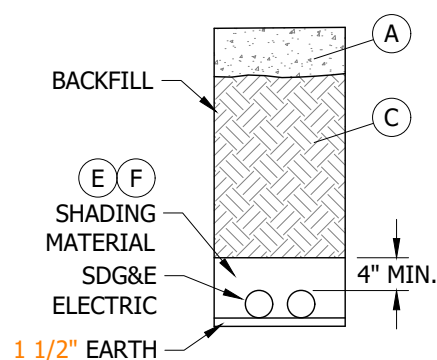
**FIGURE 1**  
JOINT TRENCH



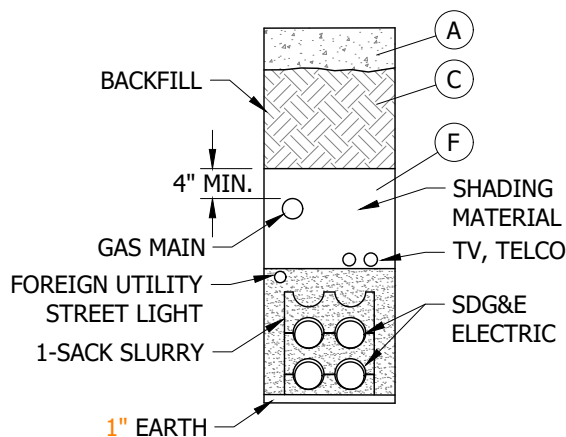
**FIGURE 2**  
ELECTRIC ONLY



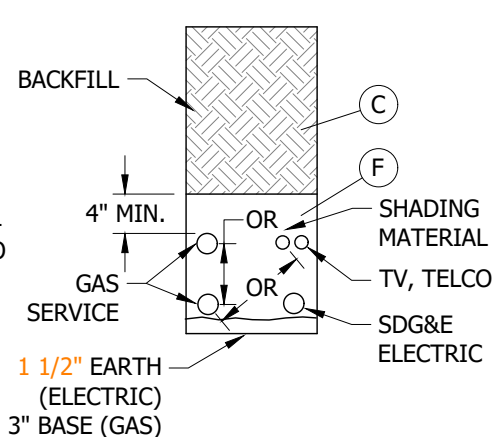
**FIGURE 3**  
SINGLE GAS ONLY



**FIGURE 4**  
ELECTRIC ONLY



**FIGURE 5**  
JOINT TRENCH  
WITH SLURRY



**FIGURE 6**  
SERVICE TRENCH ON  
PRIVATE PROPERTY

## INSTALLATION:

- (A) DOES NOT CONFORM, FOLLOW AGENCY AND GOVERNMENTAL REQUIREMENTS.
- B. SHADING MATERIAL SHALL MEET GAS STANDARD 7405 OR UNDERGROUND 3370/3371 SPECIFICATIONS AND MUST BE APPROVED BY AN SDG&E INSPECTOR.
- (C) BACKFILL MATERIAL SHALL MEET THE GOVERNMENTAL (PERMITTING) AGENCIES REQUIREMENTS AND SDG&E STANDARDS. ROCKS GREATER THAN 6 INCHES ARE NOT ALLOWED IN BACKFILL MATERIAL. (b)
- D. IF FOREIGN UTILITIES REQUIRE ENCASEMENT, MAINTAIN CLEARANCES AND PROVIDE BASE FOR GAS MAIN.
- (E) ALL 5-INCH PRIMARY CONDUITS SHALL BE INSTALLED WITH SPACERS AND ENCASED WITH CONCRETE SLURRY (1 SACK MIX).
- (F) THE MINIMUM COMPACTED SHADING MATERIAL OVER THE UPPERMOST GAS PIPE OR CONDUIT SHALL BE 4 INCHES.

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1 OF 6

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

IMPORTED OR NATIVE BACKFILL

UG3365.1



**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- a. SEE UG3365 (GAS STANDARD 7410) FOR SLURRY BACKFILL.
- b** SEE UG3370, UG3371 NOTE D (GAS STANDARD 7403 NOTE D) FOR UTILITY PLACEMENT, CLEARANCES, MINIMUM SHADING, COVER, AND COMPACTION.
- c. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.
- d. SEE GAS STANDARD G7409.

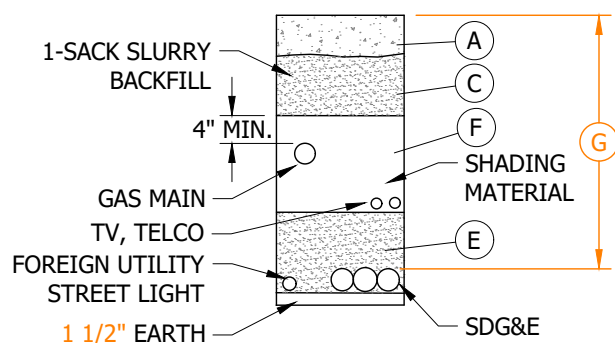
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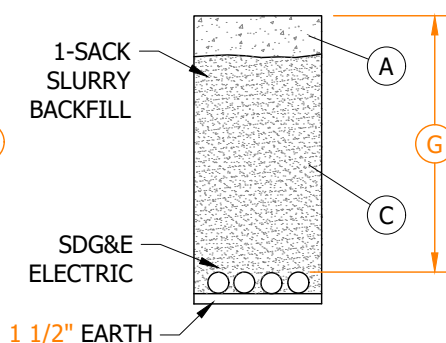
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | SLURRY BACKFILL                                   |                           |  |                    |  |          |  |                     |          |



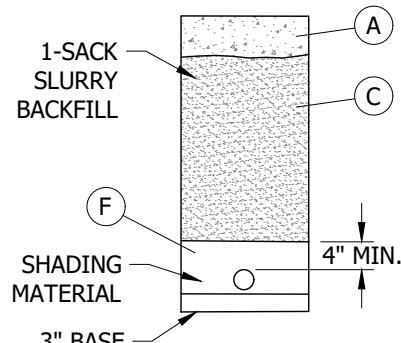
**SCOPE:** THIS STANDARD SHOWS TYPICAL PLACEMENT OF BASE, SHADING, AND SLURRY BACKFILL FOR SDG&E FACILITIES IN SAN DIEGO COUNTY.



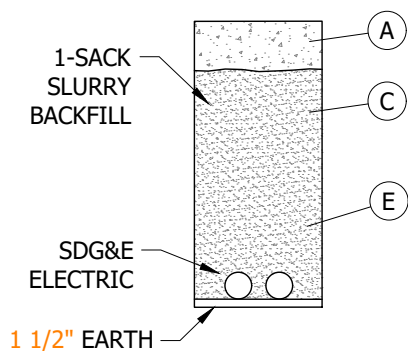
**FIGURE 1**  
JOINT TRENCH



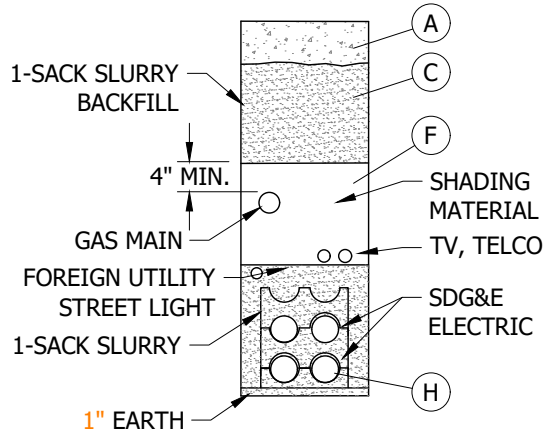
**FIGURE 2**  
ELECTRIC ONLY



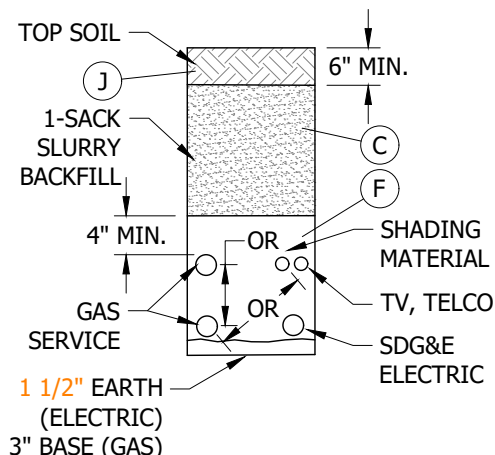
**FIGURE 3**  
SINGLE GAS ONLY



**FIGURE 4**  
ELECTRIC ONLY



**FIGURE 5**  
JOINT TRENCH



**FIGURE 6**  
SERVICE TRENCH ON  
PRIVATE PROPERTY

## INSTALLATION:

- (A) ALL TRENCH RESURFACING SHALL BE DONE ACCORDING TO GOVERNMENTAL AGENCIES REQUIREMENTS.
- B. SHADING MATERIAL SHALL MEET GAS STANDARD 7405 OR UG3370 & UG3371 SPECIFICATIONS AND MUST BE APPROVED BY AN SDG&E AUTHORIZED INSPECTOR.
- (C) BACKFILL MATERIAL SHALL MEET THE GOVERNMENTAL (PERMITTING) AGENCIES REQUIREMENTS AND SDG&E STANDARDS. THE SAND USED FOR THE ONE SACK SLURRY OR TWO SACK, IF REQUIRED BY GOVERNMENTAL AGENCIES, MUST MEET THE CONCRETE SAND SPECIFICATION LISTED IN THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK) AND CONTAIN NO GRAVEL. SLURRY MUST BE FIRM BEFORE A PAVEMENT CONCRETE CAP IS INSTALLED. SLURRY IS TYPICALLY USED FOR BACKFILLING AROUND SUBSTRUCTURES, UNDER EQUIPMENT PADS, FOR TRENCHES IN EXISTING PAVED AREAS, AND UNDER CONCRETE OR PAVED DRIVEWAYS.
- D. IT MAY NOT BE APPROPRIATE TO USE ONE SACK SLURRY UNDER THE THE FOLLOWING CIRCUMSTANCES:
  1. GOVERNMENTAL AGENCIES DO NOT ALLOW ONE SACK OR MAY REQUIRE TWO SACK SLURRY BACKFILL.
  2. INACCESSIBILITY OF CONCRETE TRUCKS DELIVERING SLURRY.
  3. WHEN SLURRY IS NOT COST EFFECTIVE.
  4. NEW RESIDENTIAL SUBDIVISIONS, SINGLE FAMILY RESIDENCE SERVICE TRENCH
  5. SHALLOW WELD HOLES, POT HOLES, ETC.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SLURRY BACKFILL

UG3365.3



- (E) ALL 5-INCH PRIMARY CONDUITS SHALL BE INSTALLED WITH SPACERS AND ENCASED WITH CONCRETE SLURRY (1 SACK MIX).
- (F) MINIMUM COMPACTED SHADING MATERIAL OVER THE UPPERMOST GAS PIPE OR CONDUIT SHALL BE 4 INCHES. THE GAS MAIN OR GAS SERVICE SHALL NEVER BE CONCRETE OR SLURRY ENCASED AND SHALL HAVE THE PROPER BASE, SHADING, BACKFILL AND COMPACTION.
- (G) MAINTAIN MINIMUM 30 INCHES COVER OVER PRIMARY, SECONDARIES AND SERVICES ON DIRECT BURIAL CONDUIT INSTALLATIONS. A MINIMUM OF 24 INCHES OF COVER IS REQUIRED FROM FINISHED SURFACE TO TOP OF ELECTRIC CONDUIT PACKAGE WHEN TRENCHING IN ROADS THAT ARE OWNED AND MAINTAINED BY A FEDERAL, STATE OR LOCAL GOVERNING AGENCY AND WHEN SUCH COVER IS ALLOWED BY THE GOVERNING AGENCY.  
  
A MINIMUM OF 30 INCHES OF COVER FROM FINISHED SURFACE TO TOP OF ELECTRIC CONDUIT PACKAGE IS REQUIRED FOR ELECTRIC DUCT PACKAGES IN PRIVATE DIRT ROADS.
- (H) USE APPROVED SDG&E CONDUIT AND SPACERS.
- (J) ON SERVICES IN PRIVATE YARDS, ALLOW FOR 6 INCHES OF TOP SOIL FOR LANDSCAPING PURPOSES.
- K. IF FOREIGN UTILITIES REQUIRE ENCASEMENT, MAINTAIN CLEARANCES AND PROVIDE BASE FOR GAS MAIN.

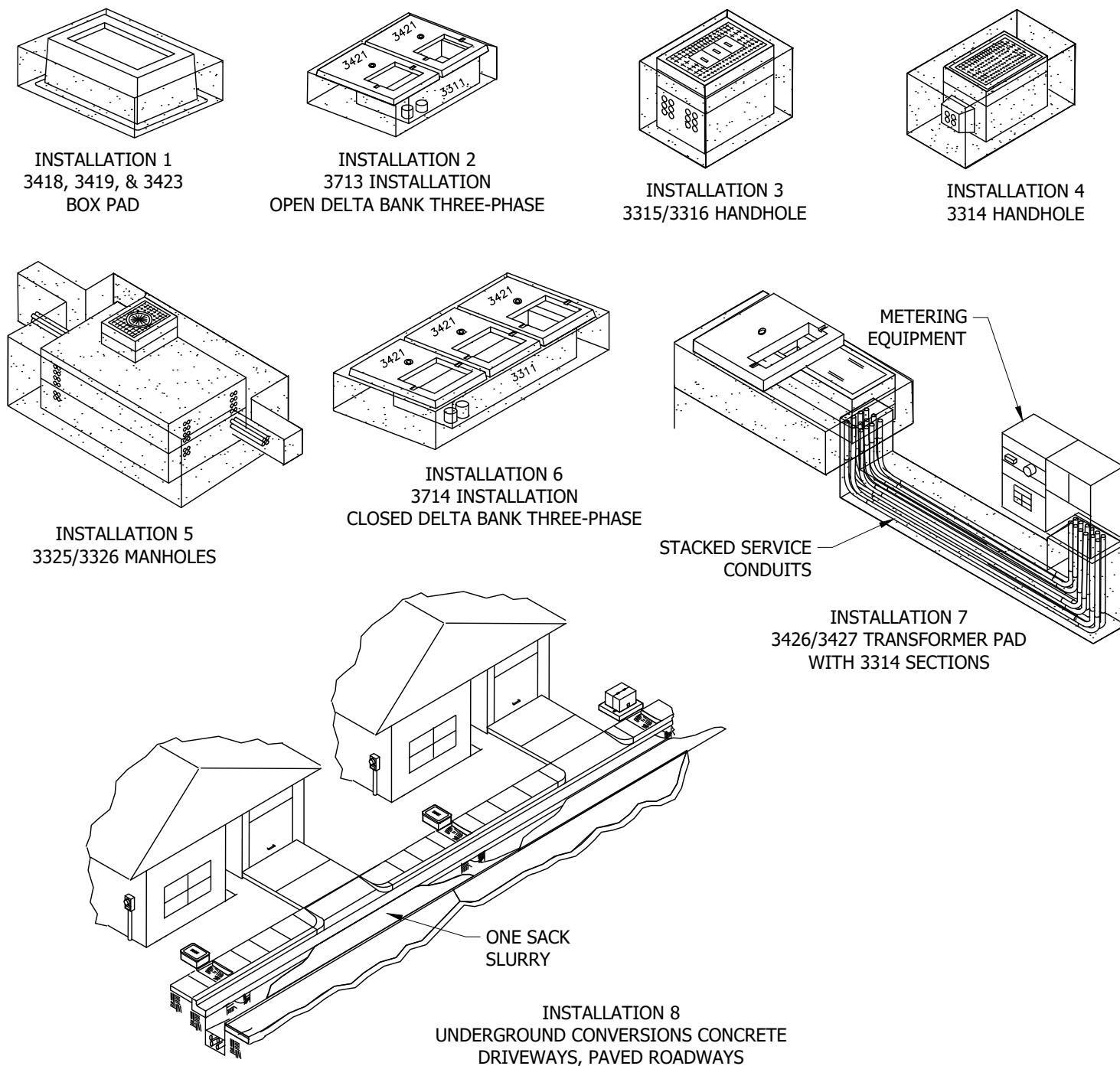
**NOTES:** NONE

- a. SEE UG3370 & UG3371 (GAS STANDARD 7403) FOR UTILITY PLACEMENT, CLEARANCES, MINIMUM SHADING, COVER, AND COMPACTION.
- b. SEE UG3376.1 FOR 1 SACK CONCRETE SLURRY MIX AND 2 SACK 3/8-INCH GRAVEL CONCRETE MIX OR AS REQUIRED BY GOVERNMENTAL AGENCY.
- c. SEE UG3365.1 OR GAS STANDARD 7409 FOR ALTERNATE IMPORTED OR NATIVE BACKFILL.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |     |                    |     |          |    |                     |     |     |          |
|                 |                   | SLURRY BACKFILL                                   |                           |     |     |                    |     |          |    |                     |     |     |          |



**SCOPE:** THIS STANDARD SHOWS TYPICAL PLACEMENT OF BASE, SHADING AND ONE SACK SLURRY BACKFILL AS A PREFERRED METHOD OF BACKFILL FOR SDG&E FACILITIES.



**FIGURE 1**  
TYPICAL SLURRY INSTALLATIONS

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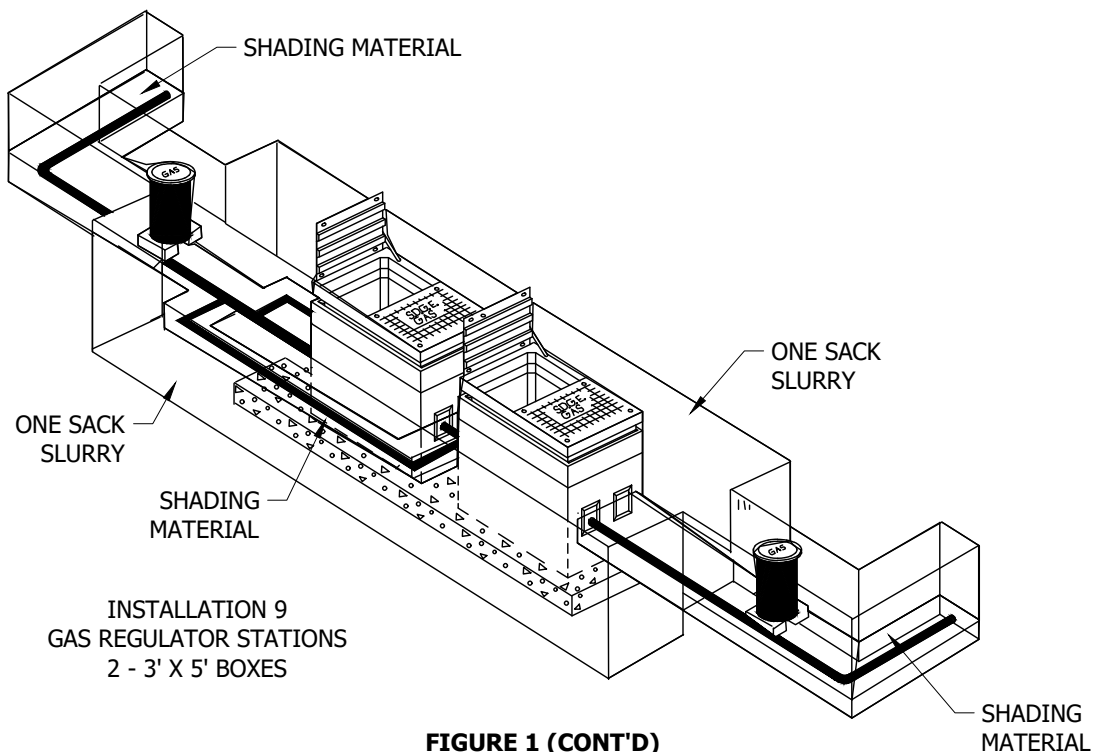
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SLURRY BACKFILL

UG3365.5





**FIGURE 1 (CONT'D)**  
TYPICAL SLURRY INSTALLATIONS

### **INSTALLATION:**

- A. ONE SACK SLURRY IS THE PREFERRED METHOD FOR BACKFILL.
- B. IMPORTED OR NATIVE BACKFILL IS THE ALTERNATE METHOD FOR BACKFILL.
- C. SLURRY IS TYPICALLY USED FOR BACKFILLING AROUND SUBSTRUCTURES, UNDER EQUIPMENT PADS, FOR TRENCHES IN EXISTING PAVED AREAS AND UNDER CONCRETE OR PAVED DRIVEWAYS.
- D. SLURRY IS THE ONLY ALLOWED BACKFILL AROUND FIBERGLASS BOX PADS.
- E. IT MAY NOT BE APPROPRIATE TO USE ONE SACK SLURRY UNDER THE FOLLOWING CIRCUMSTANCES:
  - 1. GOVERNMENTAL (PERMITTING) AGENCIES DO NOT ALLOW ONE SACK SLURRY OR MAY REQUIRE TWO SACK SLURRY BACKFILL.
  - 2. INACCESSIBILITY OF CONCRETE TRUCKS DELIVERING SLURRY.
  - 3. WHEN SLURRY IS NOT COST EFFECTIVE.
  - 4. NEW RESIDENTIAL SUBDIVISIONS, SINGLE FAMILY RESIDENT SERVICES.
  - 5. SHALLOW WELD HOLES, POT HOLES, ETC.

**(F)** MINIMUM COMPACTED SHADING MATERIAL OVER THE UPPERMOST GAS PIPE OR CONDUIT SHALL BE 4 INCHES. THE GAS MAIN OR GAS SERVICE SHALL NEVER BE CONCRETE OR SLURRY ENCASED AND SHALL HAVE THE PROPER BASE, SHADING, BACKFILL AND COMPACTION.

**BILL OF MATERIALS:** NONE

### **NOTES:**

- I. GAS PIPE SHALL NOT BE SLURRY ENCASED. **(F)**

### **REFERENCE:**

- a. SEE UG3365.1 (GAS STANDARD G7409) FOR ALTERNATE IMPORTED OR NATIVE BACKFILL.

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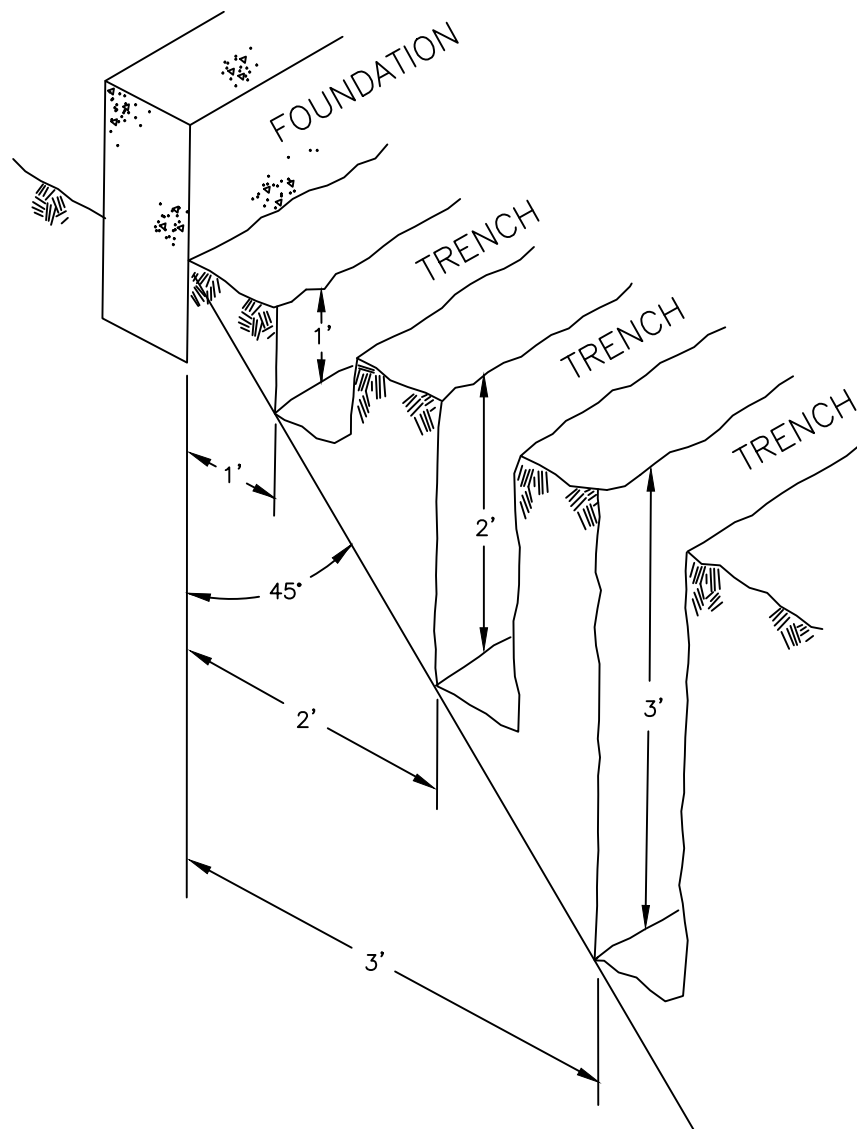
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SLURRY BACKFILL

**UG3365.6**



**SCOPE:** THIS STANDARD DEMONSTRATES THE 45 DEGREE RULE THAT SHALL BE FOLLOWED WHEN EXCAVATING A TRENCH THAT PARALLELS ANY FOUNDATION.




**NOTES:**

- I. WHERE TRENCHES ARE MADE PARALLEL TO A BUILDING OR STRUCTURE AND ARE DEEPER THAN THE BUILDING OR STRUCTURE FOOTING, SUCH TRENCHES SHALL BE A MINIMUM DISTANCE AWAY FROM THE FOOTING AT LEAST EQUAL TO DEPTH OF THE TRENCH UNLESS PERMISSION TO VARY HEREFROM IS GRANTED BY THE ENFORCING AGENCY.

NOTE THAT THE DEPTH FOR A TRENCH PARALLELING ANY FOUNDATION IS LIMITED BY THE DISTANCE FROM THE FOUNDATION. FOR EXAMPLE, TRENCH DEPTH FOR A TRENCH WITH NEAREST SIDE TWO FEET FROM A FOUNDATION IS LIMITED TO A TWO FOOT DEPTH.

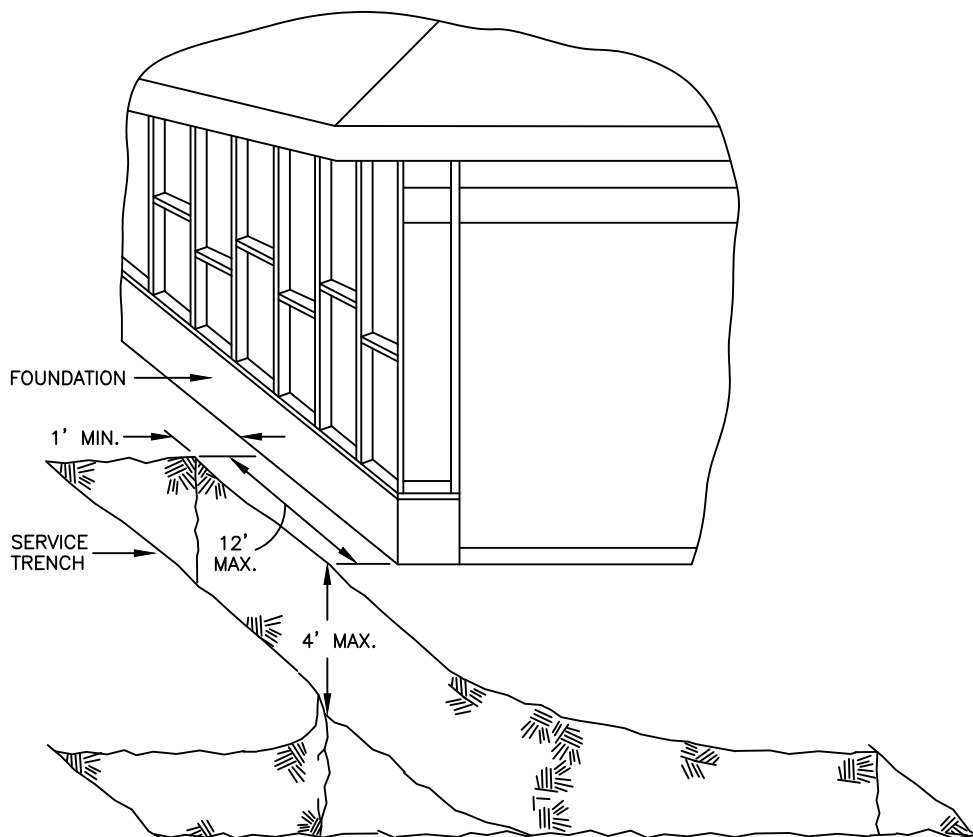
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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |  |                    |  |          |  |                     |           |
|                 | TRENCH PARALLELING FOUNDATIONS  |                           |  |                    |  |          |  |                     |           |



**SCOPE:** THIS STANDARD SHOWS A TYPICAL SERVICE TRENCH EXCAVATION PARALLELING A RESIDENTIAL BUILDING. (EXCEPTION TO 45 DEGREE RULE ON UG. STD. 3367.1/GAS STD. 7415.1)



**INSTALLATION:**

- A. THE FOLLOWING CONDITION(S) MUST BE MET:
1. BUILDING HAS A CONTINUOUS CONCRETE SLAB.
  2. BUILDING HEIGHT IS LIMITED TO TWO STORIES.
  3. BUILDING HEIGHT IS LIMITED TO TWO STORIES.  
12 FOOT LENGTH ALONG THE FOUNDATION, AND MUST NOT EXCEED A 4 FOOT DEPTH.
  4. SOIL CONDITIONS MUST BE STABLE AND MUST NOT CAUSE UNDERMINING OF THE FOUNDATION.
  5. TRENCH WALLS MUST BE STABLE DURING AND AFTER EXCAVATION.
- B. IF THE CONDITION(S) IN NOTE A CANNOT BE MET, THEN THE 45 DEGREE RULE MUST BE FOLLOWED. SEE STANDARD 3367.1.

**REFERENCE:**

- a. SEE GAS STANDARDS 7415.1 & 7415.2 [FOR INTERNAL USE ONLY]
- b. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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SDG&E ELECTRIC UNDERGROUND STANDARD

TRENCH PARALLELING FOUNDATIONS

**UG 3367.2**



## SCOPE:

THIS STANDARD COVERS BIO-RETENTION FACILITIES AND SDG&E'S 600 AMP AND 200 AMP UNDERGROUND ELECTRIC SECONDARY, SERVICES AND GAS FACILITIES LOCATED ON RESIDENTIAL, COMMERCIAL, FEDERAL, STATE, AND MUNICIPAL LAND AND ALL OTHER PROPERTY TYPES. THE STANDARD APPLIES, BUT IS NOT LIMITED TO BIO-RETENTION BASINS AND/OR SWALES. BIO-RETENTION FACILITIES ARE WET FACILITIES THAT WILL REQUIRE MAINTENANCE OVER TIME. THESE FACILITIES WILL REQUIRE MAJOR TRENCHING AND MAY BE LOCATED WITHIN STREETS AND PRIVATE PROPERTY PRESENTING POTENTIAL CONFLICTS WITH SDG&E PRIMARY AND SECONDARY ELECTRIC CABLE AND CONDUITS, ELECTRIC SERVICES, GAS AND ANY OTHER SDG&E FACILITIES.

BIO-RETENTION FACILITIES ARE DESIGNED TO CONTROL WATER RUN-OFF AND POSSIBLE DRAINAGE OVER-FLOW OF STORM WATER. DURING THE DESIGN PHASE FOR THESE FACILITIES CUSTOMERS MUST DESIGN TO MEET THE REQUIREMENTS OF SDG&E UNDERGROUND CONSTRUCTION 3364.1, .2, AND .3 FOR LOCATION, AND NOT ENCROACH ON SDG&E'S STANDARD FACILITY LOCATIONS. SINCE BIO-RETENTION FACILITIES ARE A WET UTILITY, SIMILAR TO STORM DRAINS AND WATER RELATED FACILITIES, THEY MUST COORDINATE WITH SDG&E TRENCHING AND FACILITY LOCATIONS, AND MEET FACILITY SEPARATION REQUIREMENTS SHOWN IN SDG&E UNDERGROUND CONSTRUCTION STANDARD 3370 FOR SAN DIEGO COUNTY AND UNDERGROUND CONSTRUCTION STANDARD 3371 FOR ORANGE COUNTY.

IN ACCORDANCE WITH THESE UNDERGROUND CONSTRUCTION STANDARDS, BIO-RETENTION FACILITIES MUST MAINTAIN 5 FEET SEPARATION WHEN INSTALLED PARALLEL TO ALL SDG&E FACILITIES. A MINIMUM 6 INCH SEPARATION SHALL BE MAINTAINED WHEN BIO-RETENTION DUCTS AND/OR CONDUITS CROSS SDG&E FACILITIES. BIO-RETENTION DUCTS OR CONDUITS THAT CROSS SDG&E FACILITIES MUST BE RIGID PIPE WITHOUT ANY PERFORATION FOR A DISTANCE OF 5 FEET MINIMUM ON EITHER SIDE OF, AND IN THE AREA OF, WHERE THEY CROSS SDG&E FACILITIES. IN ORDER TO MAINTAIN SAFE OPERATIONAL AND MAINTENANCE ACCESS, SDG&E FACILITIES SHALL NOT BE INSTALLED OVER, UNDER OR WITHIN BIO-RETENTION SWALES, BASINS, CELLS OR ANY OTHER OPEN HOLDING AREA FOR BIO-RETENTION.

BIO-RETENTION FACILITIES SHALL NOT ENCROACH ON SDG&E MANHOLES, HAND-HOLES, PAD MOUNTED EQUIPMENT, OVERHEAD POLES AND ANCHORS, AND ANY OTHER OVERHEAD FACILITIES. THIS APPLIES TO GAS METERS, GAS VALVES AND RELATED GAS FACILITIES SUCH AS GAS REGULATION FACILITIES.



**NOTE:**

- I. REFER TO BIO-RETENTION APPLICATION GUIDE FOR MORE INFORMATION ABOUT HOW TO APPLY THE BIO-RETENTION/WET FACILITIES STANDARD.

**REFERENCE:**

- a. SEE UNDERGROUND CONSTRUCTION STANDARD 3364.1 - 3364.3 FOR UTILITY LOCATIONS.
- b. SEE UNDERGROUND CONSTRUCTION STANDARD 3370 AND 3371 FOR UNDERGROUND DISTRIBUTION TRENCHES AND UTILITY POSITIONS.

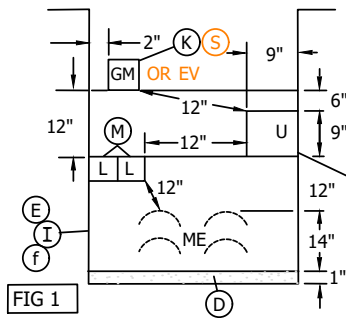
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|                 |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |      |           |                    |        |   |          |      |      |                     |  |         |
|                 |                | BIO RETENTION/WET FACILITIES STANDARD   |                           |      |           |                    |        |   |          |      |      |                     |  |         |

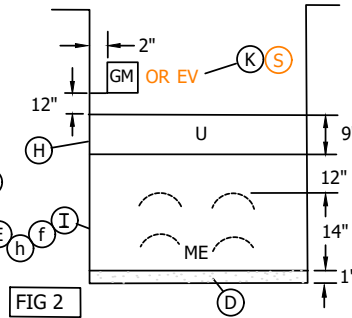


**SCOPE:** THIS STANDARD SHOWS TYPICAL PLACEMENT OF UTILITIES WITHIN TRENCHES FOR DISTRIBUTION AND SERVICE IN DEDICATED R/W (STREET) AND PRIVATE PROPERTY, AND PROVIDES THE MINIMUM DEPTH AND CLEARANCE THAT MUST BE MAINTAINED BETWEEN VARIOUS UTILITIES OCCUPYING THE SAME TRENCH IN SAN DIEGO COUNTY.

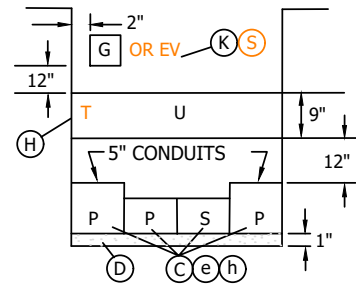
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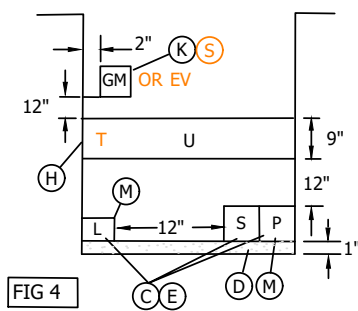


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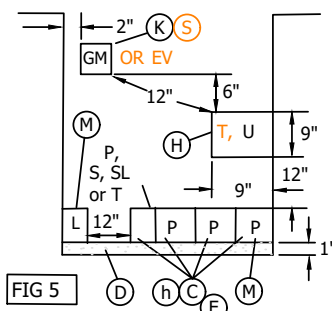


(SEE STANDARD 3376 FOR OTHER CONDUIT/TRENCH CONFIGURATIONS)

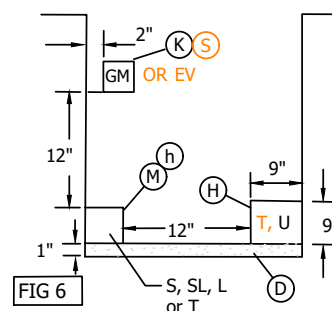
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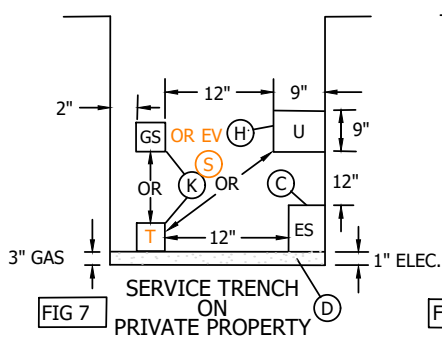
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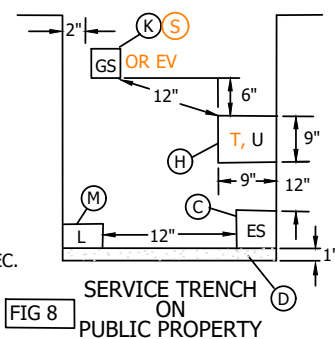
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PROPERTY SIDE



PROPERTY SIDE



| LEGEND |   |
|--------|---|
| GM     | GAS MAIN  |
| GS     | GAS SERVICE   |
| P      | PRIMARY ELECTRIC  |
| S      | SECONDARY ELECTRIC  |
| ES     | ELECTRIC SERVICE  |
| ME     | MULTIPLE ELECTRIC (P OR S OR ES OR T, STACKED CONFIGURATION INCLUDING SPACERS AND 1-SACK CONCRETE SLURRY) |
| SL     | SDG&E STREET LIGHT  |
| L      | FOREIGN UTILITY STREET LIGHT  |
| U      | FOREIGN UTILITY (TELCO, CATV)   |
| T      | SDG&E TELECOMMUNICATIONS (R)  |
| EV     | SDG&E ELECTRIC VEHICLE CHARGER (120V THRU 480V)   |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

UNDERGROUND DISTRIBUTION (UD) TRENCHES AND  
UTILITY POSITIONING - S.D. COUNTY

UG3370.1



**SCOPE:** THE FOLLOWING CHARTS SHOW THE MINIMUM COVER FOR EACH UTILITY, THE MINIMUM SEPARATION BETWEEN SPACE ALLOTMENTS AND THE MAXIMUM SIZE FOR EACH SPACE ALLOTMENT. TO READ THE CHARTS, READ ACROSS AND DOWN UNTIL THE TWO JOIN IN A SQUARE, AND THAT IS THE DISTANCE REQUIRED BETWEEN THE TWO UTILITIES.

**EXAMPLE**

|    |                  | VERTICAL | HORIZONTAL |
|----|------------------|----------|------------|
|    |                  | ES       | GS         |
|    |                  | ↓        | ↓          |
| ES | ELECTRIC SERVICE | → (C) →  | 12"        |

UNDER VERTICAL, "ES" & "ES" JOIN AT (C) WHICH REFERS TO INSTALLATION NOTE (C).

UNDER HORIZONTAL, "ES" & "GS" JOIN AT 12 INCHES WHICH WOULD BE THE DISTANCE REQUIRED FROM THE OUTER EDGE OF THE ELECTRIC SERVICE (SPACE ALLOTMENT) TO THE OUTER EDGE OF GAS SERVICE (SPACE ALLOTMENT).

**MAIN TRENCH, [SERVICE TRENCH PUBLIC PROPERTY] (MINIMUM SEPARATION FORM)**

|          |  | VERTICAL  |     |     |     |     |     |     |     |     |          | HORIZONTAL |     |     |     |     |     |                  |     |               |                                   |                        |  |
|----------|--|---|-----|-----|-----|-----|-----|-----|-----|-----|----------|------------|-----|-----|-----|-----|-----|------------------|-----|---------------|-----------------------------------|------------------------|--|
|          |  | GM<br>GS  | P   | S   | ES  | SL  | ME  | L   | U   | EV  | GM<br>GS | P          | S   | ES  | SL  | ME  | L   | U                | EV  | *MIN<br>COVER | FACILITY SPACE<br>ALLOTMENT (MAX) |                        |  |
| GM<br>GS | GAS MAIN<br>GAS SERVICE                            | <div><div>D</div><div>K</div><div>N</div><div>P</div><div>O</div><div>G</div><div>d</div><div>e</div></div> | -   | 12" | 12" | 12" | 12" | 12" | (H) | (S) | -        | -          | -   | -   | -   | -   | -   | -                | (H) | (S)           | 30" MIN<br>42" MAX                | 4-1/2" x 4-1/2"        |  |
| P        | PRIMARY ELECTRIC                                   | <div><div>f</div><div>d</div><div>D</div><div>M</div><div>P</div><div>e</div></div>                         | 12" | (C) | (C) | (C) | (C) | (C) | -   | 12" | (S)      | -          | (C) | (C) | (C) | (C) | (C) | 12"              | -   | (S)           | 30"                               | 5-1/2" x 5-1/2"        |  |
| S        | SECONDARY ELECTRIC                                 | <div><div>f</div><div>d</div><div>D</div><div>P</div><div>e</div></div>                                     | 12" | (C) | (C) | (C) | (C) | (C) | -   | 12" | 12"      | -          | (C) | (C) | (C) | (C) | (C) | 12"              | 12" | 12"           | 30"                               | 5-1/2" x 5-1/2"        |  |
| ES       | ELECTRIC SERVICE                                   | <div><div>f</div><div>d</div><div>D</div><div>P</div><div>e</div></div>                                     | 12" | (C) | (C) | (C) | (C) | (C) | -   | 12" | 12"      | -          | (C) | (C) | (C) | (C) | (C) | 12"              | 12" | 12"           | 30"                               | 5-1/2" x 5-1/2"        |  |
| SL       | SDG&E STREET LIGHT                                 | <div><div>f</div><div>d</div><div>D</div><div>L</div><div>M</div><div>P</div><div>e</div></div>             | 12" | (C) | (C) | (C) | (C) | (C) | -   | 12" | 12"      | -          | (C) | (C) | (C) | (C) | (C) | 12"              | 12" | 12"           | 30"                               | 2-1/2" x 2-1/2"        |  |
| ME       | MULTIPLE ELECTRIC                                  | <div><div>H</div><div>f</div><div>L</div><div>a</div><div>P</div></div>                                     | 12" | (C) | (C) | (C) | (C) | (C) | 12" | 12" | 12"      | -          | (C) | (C) | (C) | (C) | (C) | -                | -   | 12"           | 30"                               | 18" x 14"<br>(4 DUCTS) |  |
| L        | FOREIGN UTILITY<br>STREET LIGHT                    | <div><div>d</div><div>F</div><div>M</div><div>e</div></div>   | 12" | -   | -   | -   | -   | 12" | -   | 12" | 12"      | -          | 12" | 12" | 12" | 12" | -   | 1"<br>OR<br>LESS | 12" | 12"           | 24"                               | 2-1/2" x 2-1/2"        |  |
| U        | FOREIGN UTILITY<br>(TELCO, CATV)                   | <div><div>F</div><div>H</div><div>J</div><div>e</div><div>d</div></div>                                     | (H) | 12" | 12" | 12" | 12" | 12" | -   | 12" | (H)      | -          | 12" | 12" | 12" | -   | 12" | -                | 12" | 24"           | 9" x 24"                          |                        |  |
| T        | SDG&E<br>TELECOMMUNICATIONS                        | <div><div>C</div><div>Y</div></div>   | 12" | (C) | (C) | (C) | (C) | (C) | -   | 12" | 12"      | -          | (C) | (C) | (C) | (C) | (C) | 12"              | 12" | 12"           | 30"                               | 4-1/2" x 4-1/2"        |  |
| EV       | SDG&E ELECTRIC VEHICLE<br>CHARGER (480V THRU 120V) |   | (S) | (S) | 12" | 12" | 12" | 12" | 12" | 12" | -        | (S)        | (S) | 12" | 12" | 12" | 12" | 12"              | 12" | -             | 30"                               | 5-1/2" x 5-1/2"        |  |

\* ALL MINIMUM COVER DEPTHS MEASURED FROM FINAL GRADE. REDUCED DEPTHS IN NOTE (B) ARE LESSER DEPTHS THAN WHAT IS SHOWN UNDER "MINIMUM COVER".

**SERVICE TRENCH PRIVATE PROPERTY (MINIMUM SEPARATION FROM)**

|    |   |                   | VERTICAL |     |     |     |     |     | HORIZONTAL |     |     |     |            |     |                    |                                 |
|----|---|-------------------|----------|-----|-----|-----|-----|-----|------------|-----|-----|-----|------------|-----|--------------------|---------------------------------|
|    |   |                   | GS       | ES  | ME  | U   | L   | EV  | GS         | ES  | ME  | U   | L          | EV  | *MIN COVER         | FACILITY SPACE ALLOTMENT (MAX)  |
| GS | GAS SERVICE                                     | (d e D G K N O P) | -        | 12" | 12" | -   | 12" | (S) | -          | 12" | -   | 12" | 12"        | (S) | 24" MIN<br>42" MAX | 2-1/2" x 2-1/2"                 |
| ES | ELECTRIC SERVICE                                | (e f d D G P)     | 12"      | (C) | (C) | 12" | 12" | 12" | 12"        | (C) | (C) | 12" | 12"        | 12" | 24"                | 5-1/2" x 5-1/2"                 |
| ME | MULTIPLE ELECTRIC                               | (f I P)           | 12"      | (C) | (C) | 12" | 12" | 12" | -          | (C) | (C) | -   | -          | 12" | 24"                | WILL VARY DUE TO BOARD AMPACITY |
| U  | FOREIGN UTILITY (TELCO, CATV)                   | (e d F H J)       | -        | 12" | 6"  | -   | 12" | 12" | 12"        | -   | -   | 12" | 12"        | 12" | 18"                | 9" x 9"                         |
| L  | FOREIGN UTILITY STREET LIGHT                    | (e d F M)         | 12"      | 12" | 12" | 12" | -   | 12" | 12"        | 12" | -   | 12" | 1" OR LESS | 12" | 18"                | 2-1/2" x 2-1/2"                 |
| EV | SDG&E ELECTRIC VEHICLE CHARGER (480V THRU 120V) |                   | (S)      | 12" | 12" | 12" | 12" | -   | (S)        | 12" | 12" | 12" | 12"        | -   | 24"                | 5-1/2" x 5-1/2"                 |

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**SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD**

**UNDERGROUND DISTRIBUTION (UD) TRENCHES AND  
UTILITY POSITIONING - S.D. COUNTY**

**UG3370.2**



**INSTALLATION:**

- A. AN EFFORT SHOULD BE MADE TO KEEP THE TRENCH DEPTH LESS THAN 60 INCHES. IF A PERSON IS REQUIRED TO ENTER A TRENCH 60 INCHES OR DEEPER, IT SHALL BE SHORED, BENCHED, OR SLOPED TO PREVENT MOVEMENT OF EARTH THAT MAY ENDANGER LIFE OR PROPERTY. THE TRENCH CONFIGURATION, UTILITY POSITIONING AND ALL OTHER RELATED CONSTRUCTION MUST CONFORM TO THIS STANDARD AND THE STATE OF CALIFORNIA PUBLIC UTILITIES COMMISSION GENERAL ORDERS 128 AND 112D, AND ANY OTHER APPROPRIATE GOVERNMENTAL AGENCY HAVING JURISDICTION OVER CONSTRUCTION.

NOTE: BENCHING THE TRENCH IS FOR SAFETY REASONS ONLY AND NOT TO BE USED FOR INSTALLATION PURPOSES.

- Ⓑ THE TRENCH DEPTH IN THIS STANDARD SHALL BE FOLLOWED FOR ALL NORMAL INSTALLATIONS. IN INSTALLATIONS WHERE THE TRENCH DEPTH CANNOT BE MET, G.O. 128 REQUIRES ONE OF THE FOLLOWING: (1) STEEL, OR (2) SCHEDULE 40 PVC OR SCHEDULE 80 PVC CONDUIT WITH A MINIMUM WALL THICKNESS OF 0.15 INCHES, OR (3) A 3 INCH LAYER OF CONCRETE (2 SACK 3/8" ROCK) ABOVE AND 2 INCHES ON EACH SIDE OF THE CONDUIT. REDUCED DEPTHS MUST BE APPROVED BY BOTH THE CUSTOMER PROJECT PLANNER AND SDG&E INSPECTOR.
- Ⓒ ANY CONDUIT COMBINATION SMALLER THAN 5 INCH, (NOT MULTIPLE ELECTRIC-ME OR SERVICE CONDUITS) ARE PERMITTED WITHOUT SEPARATION WHEN INSTALLED IN A HORIZONTAL CONFIGURATION. SDG&E TELECOMMUNICATIONS SPACE ALLOTMENT IS PERMITTED NEXT TO THE ELECTRIC SPACE ALLOTMENTS WITHOUT SEPARATION. (6 INCH MINIMUM TRENCH WIDTH, 24 INCH MAXIMUM TRENCH WIDTH) (SEE STANDARD 3376 FOR CONDUIT/TRENCH CONFIGURATION).
- Ⓓ BASE AND SHADING MATERIAL FOR GAS TRENCH ONLY:  
IMPORTED MATERIAL CONSISTING OF NATURAL SAND OR MANUFACTURED SAND, EXISTING NATIVE MATERIAL, OR COMBINATIONS MAY BE USED FOR BASE AND SHADING MATERIAL PROVIDED IT COMPLIES WITH GAS STANDARD G7405 AND IS OF A QUALITY THAT WILL COMPLY WITH COMPACTION REQUIREMENTS OF GOVERNMENTAL AGENCIES. STANDARD G7405 SPECIFIES THAT THE MATERIAL MUST HAVE A MIXTURE OF PARTICLE SIZES ALL SMALLER THAN 1/2 INCHES. EXISTING NATIVE MATERIAL AND IMPORTED MATERIAL PROVIDED BY A DEVELOPER DOES NOT HAVE TO BE TESTED BY AN INDEPENDENT PROFESSIONAL TESTING FIRM IF, IN THE OPINION OF THE INSPECTOR, IT MEETS THE G7405 SPECIFICATION.

SHADING MATERIAL FOR ELECTRIC TRENCH ONLY: ELECTRIC SHADING MATERIAL (ESM) SPECIFICATION.

ACCEPTABLE MATERIAL FOR (DB) DIRECT BURIED CONDUITS.

NATURAL SAND, MANUFACTURED SAND, DECOMPOSED GRANITE, ROCK FREE SANDY LOAM, EXISTING NATIVE MATERIAL OR COMBINATION THEREOF. AGGREGATE COMPOSITION SHALL BE CAPABLE OF PASSING THROUGH A 1/2 INCH SIEVE. GRAVELS SHALL NOT AMOUNT TO MORE THAN 50% OF THE MIXTURE. SCREENING OR OTHER SUITABLE MEANS MAY BE REQUIRED AT THE DISCRETION OF THE SDG&E INSPECTOR TO MEET THIS (ESM) SHADING MATERIAL SPECIFICATION. NOT ACCEPTABLE ARE SOILS OF HIGHLY ORGANIC CONTENT IDENTIFIED BY ODOR OR SPONGY FEEL AND HIGHLY PLASTIC (SOGGY) CLAYS, SILTS OR METALLIC SLAG.

BASE AND SHADING MATERIAL FOR JOINT GAS AND ELECTRIC TRENCH:

WHEN BOTH GAS AND ELECTRIC ARE INSTALLED IN THE SAME TRENCH, THE BASE AND SHADING MATERIAL WHICH COMPLIES WITH GAS STANDARD G7405 SHALL BE USED FOR THE GAS PIPE. ELECTRIC SHADING MATERIAL (ESM) MAY BE USED FOR SHADING MATERIAL ON ELECTRIC CONDUIT.

BACKFILL MATERIAL FOR GAS AND/OR ELECTRIC:

THE MATERIAL USED FOR BACKFILLING THE TRENCH ABOVE THE SHADING MATERIAL AND EXTENDING UPWARD TO THE SUBGRADE SHALL BE FREE OF ROCKS OR CLODS LARGER THAN 6 INCHES IN ANY DIMENSION. THE COARSE MATERIAL SHALL BE WELL DISTRIBUTED THROUGHOUT THE FINER MATERIAL. THE AMOUNT OF ROCKS OR CLODS SHALL BE LIMITED, IN THE OPINION OF THE INSPECTOR, TO ALLOW FOR BAR TESTING FOR GAS LEAKS. THE BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF ALL APPLICABLE CODES, ORDINANCES AND SDG&E STANDARDS AND BE FREE OF DEBRIS AND ORGANIC MATTER. 1-SACK CONCRETE SLURRY MIX MAY BE USED FOR FOR BACKFILL MATERIAL IF THE PIPE GAS IS SHADED WITH A MINIMUM OF 4 INCHES OF COMPACTED SHADING MATERIAL. 1-SACK CONCRETE SLURRY MIX IS PREFERRED FOR BACKFILL. THE SLURRY INSTALLATION SHALL MEET MEET THE REQUIREMENTS OF GOVERNMENTAL AGENCIES AND SDG&E STANDARDS.

BASE INSTALLATION FOR GAS:

FOR GAS, 3 INCHES OF BASE MATERIAL IS REQUIRED ON THE BOTTOM OF THE TRENCH TO PREVENT DAMAGE FROM ROCKS, SAGS, OR POCKETS.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                |                    |          |                     |          |
|                 | UNDERGROUND DISTRIBUTION (UD) TRENCHES AND<br>UTILITY POSITIONING - S.D. COUNTY |                    |          |                     |          |



**INSTALLATION (CON'T):**EARTH TRENCH BOTTOM INSTALLATION FOR ELECTRIC: (EB & DB CONDUIT)

THE 1 INCH EARTH TRENCH BOTTOM SHALL BE STABLE WITH A UNIFORM GRADE CONTAINING NO HARD CLODS, ROCKS, ETC. THAT MAY DAMAGE THE CONDUIT. IF, IN THE OPINION OF THE SDG&E INSPECTOR, THE CONDUIT MAY BE DAMAGED, TAMPING, WETTING OR A 3 INCH BASE ELECTRIC SHADING MATERIAL (ESM) MAY BE REQUIRED.

SHADING INSTALLATION:

A MINIMUM COVER OF 4 INCHES OF COMPACTED SHADING MATERIAL (4 INCHES AFTER COMPACTION) SHALL BE REQUIRED ABOVE THE GAS PIPE AND ELECTRIC CONDUIT. A MINIMUM COVER OF 12 INCHES OF COMPACTED SHADING MATERIAL WILL BE REQUIRED IF, IN THE OPINION OF THE INSPECTOR, THERE IS AN EXCESSIVE AMOUNT OF ROCK AND CLODS IN THE BACKFILL. THE SHADING MATERIAL MUST BE INSTALLED AND COMPACTED AT EACH LEVEL BEFORE INSTALLING THE NEXT UTILITY. THE SHADING MATERIAL MUST BE INSTALLED BEFORE THE TRENCH IS BACKFILLED TO PREVENT DAMAGE FROM ROCKS, CLODS, ETC. GAS PIPE SHALL NEVER BE CONCRETE OR SLURRY ENCASED, AND SHALL HAVE THE PROPER BASE, SHADING, BACKFILL, AND COMPACTION.

COMPACTION:

EXTREME CARE SHALL BE TAKEN TO ENSURE THAT SHADING MATERIAL IS ADEQUATELY COMPACTED BOTH UNDERNEATH AND AROUND GAS PIPE AND FITTINGS TO PREVENT EXCESSIVE STRESS AND SHEARING FORCES HAND TEMP AROUND FITTINGS WHERE MECHANICAL COMPACTION CANNOT BE USED. COMPACTION WITH A HYDRAHAMMER OR SIMILAR EQUIPMENT SHALL NOT BE ALLOWED ON TRENCHES WHERE POLYETHYLENE PIPE HAS BEEN INSTALLED. WHEN THE SHEEP'S FOOT METHOD OF COMPACTION IS USED, A MINIMUM OF 18" OF COVER IS REQUIRED BEFORE COMPACTION. WHEEL ROLLING WITH A HEAVY VEHICLE, COMBINED WITH ADEQUATE MECHANICAL COMPACTION, IF NEEDED, IS ALLOWED FOR COMPACTION BACKFILL MATERIAL PROVIDED A MINIMUM OF 4 INCHES OF MECHANICALLY COMPACTED SHADE MATERIAL AND A MINIMUM OF 12" OF BACKFILL MATERIAL EXISTS OVER THE GAS PIPE OR ELECTRICAL CONDUIT. WHEN FLOODING OF THE TRENCH IS DONE TO CONSOLIDATE BACKFILL, CARE MUST BE TAKEN TO ENSURE THAT GAS PIPE OR ELECTRIC CONDUIT HAS NOT FLOATED FROM ITS POSITION IN THE TRENCH. COMPACTION BY THE WATER JETTING METHOD IS NOT ALLOWED. SHADING AND BACKFILL SHALL BE COMPACTED IN ACCORDANCE WITH GOVERNMENTAL AGENCIES AND SHALL HAVE A MINIMUM OF 90 PERCENT RELATIVE COMPACTION.

ALL BASE, SHADING, AND BACKFILL MATERIAL MUST BE APPROVED BY AN SDG&E INSPECTOR.

- (E) ONE OR MORE 5 INCH PRIMARY CONDUITS SHALL BE SLURRY ENCASED.
- (F) FOREIGN UTILITIES MUST NOT BE LOCATED UNDER ANY SDG&E FACILITIES, SUCH AS HANDHOLES, TRANSFORMER PADS, ETC.
- (G) MINIMUM TRENCH WIDTH

|                             | UTILITY  | PIPE/CONDUIT SIZE                         | MINIMUM WIDTH          |
|-----------------------------|--|---|------------------------|
| GAS                         | SINGLE GAS - SERVICE                                   | 1 INCH AND LESS                           | 6 INCHES               |
|                             | SINGLE GAS   | 2 INCH                                    | 9 INCHES               |
|                             | SINGLE GAS   | 3 AND 4 INCHES                            | 12 INCHES              |
|                             | SINGLE GAS   | 6 AND 8 INCHES                            | 18 INCHES              |
| ELECT.<br>MAIN<br>TRENCH    | ALL CONDUIT SIZES INCLUDING 2 - 5 INCHES               |   |                        |
|                             | ELECTRIC   | ALL SIZES                                 | 6 INCHES               |
|                             | JOINT UTILITIES  | ALL PERMITTED SIZES<br>(6 AND 8 INCH GAS) | 12 INCHES<br>18 INCHES |
|                             | MULTIPLE ELECTRIC                                      | SPACERS AND 1-SACK CONCRETE SLURRY        | 9 INCHES               |
| ELECT.<br>SERVICE<br>TRENCH | SINGLE ELECT.  | 2 INCH CONDUIT                            | 6 INCHES               |
|                             | SINGLE ELECTRIC & FOREIGN<br>UTILITIES (EXCLUDING GAS) | 2 INCH CONDUIT                            | 6 INCHES               |
|                             | ELECTRIC   | ALL SIZES                                 | 9 INCHES               |
|                             | SINGLE ELECTRIC & FOREIGN<br>UTILITIES (EXCLUDING GAS) | LARGER THAN 2 INCH                        | 12 INCHES              |
|                             | JOINT UTILITIES  | ALL PERMITTED SIZES                       | 12 INCHES              |
|                             | MULTIPLE ELECTRIC                                      | SPACERS AND 1-SACK CONCRETE SLURRY        | 9 INCHES               |

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|                 | UNDERGROUND DISTRIBUTION (UD) TRENCHES AND<br>UTILITY POSITIONING - S.D. COUNTY |                    |          |                     |          |







| <b><u>INSTALLATION (CON'T):</u></b>   |  |
|---|--|
| <u>UTILITY</u>  | <u>VERTICAL (CROSSING)<br/>SEPARATION MIN.</u>   |
| ALL WET UTILITIES, TELCO, TV, GAS, ELECT.   | 6 INCHES   |
| FUEL OIL, GASOLINE, DIESEL  | FROM GAS, 12 INCHES<br>FROM ELECT. 6 INCHES  |
| ARC-WELDABLE PIPELINES 3" AND LARGER  | 18 INCHES  |
| STEAM<br>(SEE NOTE)   | FROM GAS, POLY PIPE 5 FEET<br>FROM ELECT., 5 FEET  |
| NOTE: PLACE INSULATING BARRIER BETWEEN STEAM MAIN AND POLYETHYLENE PIPE AND/OR ELECTRIC.  |  |
| <b><u>MINIMUM SEPARATION SERVICE TRENCH</u></b>   |  |
| IN A SERVICE TRENCH, WATER, SEWER, PROPANE GAS, SPRINKLER, DRAIN, LEACH LINES, PRIVATELY OWNED UTILITIES I.E., PRIVATE TELCO, VIDEO, AUDIO, SECURITY WIRES, FIRE ALARM, STREET LIGHTING, ETC., ARE NOT PERMITTED IN THE SAME TRENCH WITH GAS OR ELECTRIC. WHEN THESE FACILITIES PARALLEL GAS OR ELECTRIC, 12 INCHES SEPARATION BETWEEN SEPARATE TRENCHES SHALL BE MAINTAINED BETWEEN THE UTILITIES WITH AT LEAST 12 INCHES OF UNDISTURBED NATIVE SOIL BETWEEN TRENCHES. PROPANE GAS SHALL ALWAYS HAVE A 5 FOOT SEPARATION. WHEN CROSSING, A 6 INCH VERTICAL SEPARATION IS REQUIRED. |  |
| (EXCEPTION) WHEN THERE IS NO SDG&E GAS IN THE SERVICE TRENCH, A SINGLE NATURAL GAS LINE MAY BE INSTALLED IN THE TRENCH, PROVIDED A 12 INCH RADIAL SEPARATION IS MAINTAINED. (THIS IS FOR AN INDIVIDUAL HOUSE ON A CASE BY CASE BASIS, NOT A GROUP OF HOUSES/BUILDINGS).   |  |
| FUEL OIL, GASOLINE, AND DIESEL LINES MUST MAINTAIN A 15 FOOT SEPARATION FROM GAS PIPELINES AND A FIVE FOOT SEPARATION WITH THREE FEET OF UNDISTURBED SOIL SEPARATION FROM ELECTRIC CONDUITS.  |  |
| IF FIELD CONDITIONS WILL NOT PERMIT THESE SEPARATIONS, THEN APPROVAL OF REDUCED SEPARATIONS MUST COME FROM BOTH THE CUSTOMER PROJECT PLANNER AND SDG&E INSPECTOR.   |  |
| WHEN FIELD CONDITIONS WILL NOT PERMIT STANDARD PARALLEL SEPARATIONS, A 12 INCH MINIMUM SEPARATION IS REQUIRED. PROPANE GAS SHALL ALWAYS HAVE A 5 FOOT SEPARATION.   |  |
| <b>(K)</b>  | THE GAS MAIN SHALL BE THE LAST INSTALLED, SHALL BE ON THE PROPERTY SIDE OF THE TRENCH, AND SHALL HAVE A MINIMUM OF INCH PAD (AFTER COMPACTION) OF SHADING MATERIAL THE WIDTH OF THE TRENCH ABOVE ANY FOREIGN UTILITY. ANY CROSSING INVOLVING GAS SHALL MAINTAIN A MINIMUM VERTICAL SEPARATION OF 6 INCHES. A GAS SERVICE INSTALLED IN A MAIN TRENCH OR A SERVICE TRENCH ON PUBLIC PROPERTY SHALL REQUIRE THE SAME COVER AND CLEARANCES AS A GAS MAIN. A GAS SERVICE IN A TRENCH ON PRIVATE PROPERTY MAY BE INSTALLED ON THE SAME LEVEL AS FOREIGN UTILITY OR ELECTRIC, BUT SHALL NOT BE DEEPER THAN THE ELECTRIC SERVICE. SDG&E INSPECTOR IS TO DETERMINE AT WHICH LEVEL THE GAS SERVICE IS INSTALLED ON PRIVATE PROPERTY. |
| <b>(L)</b>  | SDG&E INSTALLED STREET LIGHT CIRCUITS, WHEN INSTALLED ALONE IN A TRENCH, SHALL BE AT A MINIMUM DEPTH OF 24 INCHES EVERYWHERE EXCEPT ON PRIVATE PROPERTY, WHERE THE MINIMUM MAY BE 18 INCHES BELOW FINAL GRADE.   |
| <b>(M)</b>  | THE ELECTRIC PRIMARY WILL BE ON THE STREET SIDE OF THE TRENCH. THE SDG&E STREET LIGHT CIRCUITS WILL BE ON THE PROPERTY SIDE OF THE TRENCH WHENEVER POSSIBLE. FOREIGN UTILITY STREET LIGHTS (NOT SERIES) SHALL BE ON THE PROPERTY SIDE OF THE TRENCH AT THE SAME LEVEL AS SDG&E CONDUITS AND SHALL MAINTAIN A 12 INCH RADIAL SEPARATION. ALL UTILITIES SHALL MAINTAIN A 6 INCH SEPARATION WHEN CROSSING ALL SDG&E ELECTRIC. FOR SEPARATION ON THE SERVICE TRENCH, SEE CHART ON PAGE 7403.2 (3370.2).  |

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                |                           |      |                    |     |          |    |                     |      | UG3370.6 |
|                 |                   | UNDERGROUND DISTRIBUTION (UD) TRENCHES AND<br>UTILITY POSITIONING - S.D. COUNTY |                           |      |                    |     |          |    |                     |      |          |



### **INSTALLATION (CON'T):**

### MINIMUM SEPARATION SERVICE TRENCH (CON'T)

- ① MINIMUM HORIZONTAL SEPARATION FROM GAS PIPE TO ANY FOREIGN SUBSTRUCTURE (VAULTS, HANDHOLES, ETC.) SHALL BE 12 INCHES.
- ② GAS LINES MUST NOT BE LOCATED UNDER ANY STRUCTURE, SUCH AS BUILDINGS, CARPORTS, PATIOS, BREEZEWAYS, EQUIPMENT PADS, AND FACILITIES, SUCH AS SPLICE BOXES FOR ELECTRIC, CATV, TELCO, ETC. TREES OR SHRUBBERY MUST NOT BE PLANTED OVER ANY GAS PIPELINE. A THREE FOOT SEPARATION MUST BE MAINTAINED BETWEEN THE TREE ROOT BALL AND THE GAS PIPELINE.
- ③ IF AN AGENCY OR UTILITY SUCH AS THE U.S. GOVERNMENT, SAN DIEGO UNIFIED PORT DISTRICT, TELCO, CATV, ETC. REQUIRES CONCRETE ENCASEMENT, CONCRETE MAY BE SUBSTITUTED FOR THE BACKFILL. BASE & SHADING SHALL BE PER SDG&E STANDARDS. ON SDG&E CONDUITS, EITHER DIRECT BURIED OR CONCRETE ENCASED, A MINIMUM INCH COMPACTED SHADING MATERIAL SHALL BE INSTALLED OVER THE UPPERMOST DB CONDUITS BEFORE THE CONCRETE BACKFILL IS INSTALLED. ALL OTHER INSTALLATIONS SHALL PROVIDE THE REQUIRED MATERIALS AS SPECIFIED IN THIS STANDARD AND STANDARDS 3365 & 3376.

NOTE: THE GAS MAIN, GAS SERVICE SHALL NEVER BE CONCRETE OR SLURRY ENCASED AND SHALL HAVE THE PROPER BASE, SHADING, BACKFILL, AND COMPACTION.

- Q. MINIMUM SEPARATION OF ANY FOREIGN UTILITY INCLUDING WATER PIPES, SEWER, ETC., FROM SDG&E SUBSTRUCTURES SHALL BE 12 INCHES. PROPANE GAS SHALL BE 5 FEET.
- Ⓡ SDG&E FIBER OPTIC COMMUNICATION CONDUIT MUST BE INSTALLED IN ALL NEW DISTRIBUTION MAIN FEEDER TRENCHES.
- Ⓢ ELECTRIC VEHICLE CHARGER SERVICE IS PROHIBITED IN JOINT TRENCH WITH GAS LINE OR PRIMARY ELECTRIC.

**NOTES:**

- I. DRAWINGS ARE NOT TO SCALE.
- II. SPACE ALLOTMENTS (OTHER THAN FOREIGN UTILITY) ARE 1/2-INCH LARGER THAN THE NOMINAL SIZE OF GAS MAIN, GAS SERVICE OR ELECTRIC CONDUIT. SEE INSTALLATION NOTE H FOR FOREIGN UTILITY SPACE ALLOTMENT.
- III. TYPICAL TRENCH SECTIONS ARE DESIGNED FOR INSTALLATIONS WHERE EACH OCCUPANT IS UTILIZING ENTIRE SPACE ALLOTMENT. SIZE OF SPACE ALLOTMENTS MAY BE REDUCED OR ADDITIONAL ALLOTMENTS MAY BE ADDED PROVIDED MINIMUM COVER AND CLEARANCES ARE MAINTAINED, AS LISTED ON PAGE 3370.2. ONLY ONE FOREIGN UTILITY SPACE ALLOTMENT FOR TELCO AND/OR CATV IS ALLOWED PER TRENCH. WIDTH AND DEPTH OF THE TRENCH MUST BE ADJUSTED ACCORDING TO SPACE ALLOTMENTS, MINIMUM CLEARANCES AND MINIMUM COVER.
- IV. GAS PIPE REQUIRES A MINIMUM OF 12 INCHES RADIAL SEPARATION FROM ALL UTILITIES.

**REFERENCE:**

- a. SEE STANDARD PAGE 3364.1 FOR UTILITY LOCATIONS IN LOCAL AND COLLECTOR STREETS.
- b. SEE STANDARD PAGE 3364.2 FOR UTILITY LOCATIONS IN MAJOR STREETS, PRIME ARTERIALS AND EXPRESSWAYS.
- c. SEE STANDARD PAGE 3364.3 FOR JOINT TRENCH TYPICAL LOCATION FOR UNDERGROUND CONVERSIONS.
- d. SEE STANDARD PAGE 3365 FOR IMPORTED OR NATIVE BACKFILL MATERIAL.
- e. SEE STANDARD PAGE 3365 FOR SLURRY BACKFILL MATERIAL.
- f. CONCRETE OR CONCRETE SLURRY ENCASEMENT OF ELECTRIC CONDUITS SHALL BE IN ACCORDANCE WITH STANDARD 3376.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                |                           |      |           |                    |        |    |          |      |      |                     |  |          |
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**REFERENCE (CON'T):**

- g. SEE STANDARD PAGE 3376, 3421, 3425, 3426, AND 3427 FOR CONDUIT CONFIGURATIONS ALLOWED IN THE SERVICE TRENCH.
- h** SEE STANDARD 4620 TELECOMMUNICATIONS INSTALLATION.
- i. FOR TRENCHING AND SHORING QUESTIONS, SEE SDG&E TRENCHING AND SHORING MANUAL.
- j. SEE GAS STANDARDS 7403.1, 7403.2, 7403.3, 7403.4, 7403.5, & 7403.6 [FOR INTERNAL USE ONLY]
- k. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL

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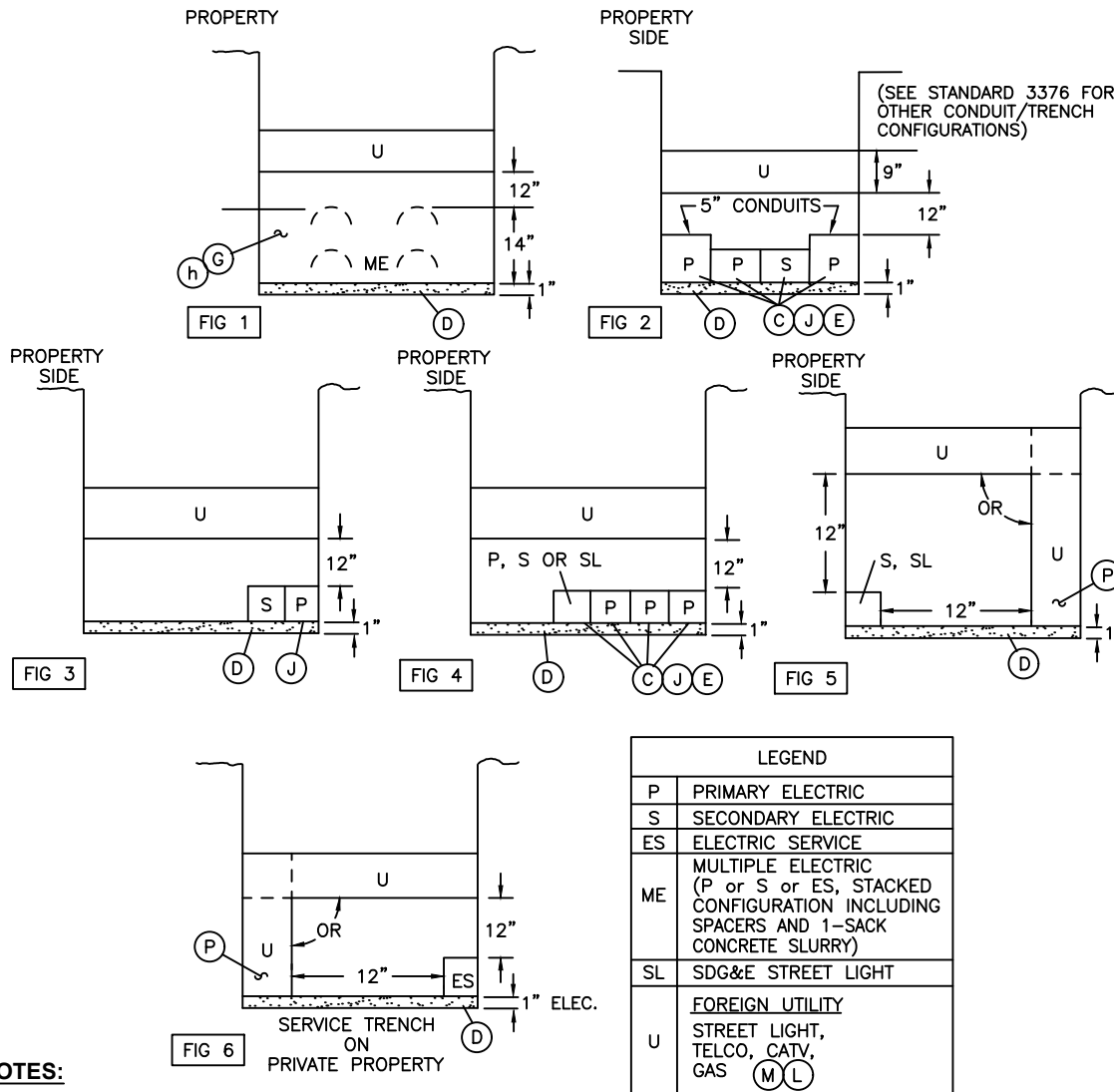
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

UNDERGROUND DISTRIBUTION (UD) TRENCHES AND  
UTILITY POSITIONING - S.D. COUNTY

**UG3370.8**



**SCOPE:** THIS STANDARD SHOWS TYPICAL PLACEMENT OF UTILITIES WITHIN TRENCHES FOR DISTRIBUTION AND SERVICE IN DEDICATED R/W (STREET) AND PRIVATE PROPERTY, AND PROVIDES THE MINIMUM DEPTH AND CLEARANCE THAT MUST BE MAINTAINED BETWEEN VARIOUS UTILITIES OCCUPYING THE SAME TRENCH IN ORANGE COUNTY.



**NOTES:**

- DRAWINGS ARE NOT TO SCALE.
- SPACE ALLOTMENTS (OTHER THAN FOREIGN UTILITY) ARE 1/2 INCH LARGER THAN THE NOMINAL SIZE OF ELECTRIC CONDUIT.
- TYPICAL TRENCH SECTIONS ARE DESIGNED FOR INSTALLATIONS WHERE EACH OCCUPANT IS UTILIZING HIS ENTIRE SPACE ALLOTMENT. SIZE OF SPACE ALLOTMENT MAY BE REDUCED OR ADDITIONAL ALLOTMENTS MAY BE ADDED PROVIDING MINIMUM COVER AND CLEARANCES ARE MAINTAINED AS LISTED ON PAGE 3371.2. ONLY ONE FOREIGN UTILITY SPACE ALLOTMENT IS ALLOWED PER TRENCH. WIDTH AND DEPTH OF THE TRENCH MUST BE ADJUSTED ACCORDING TO SPACE ALLOTMENTS, MINIMUM CLEARANCES AND MINIMUM COVER.

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SDG&E ELECTRIC UNDERGROUND STANDARD

UNDERGROUND DISTRIBUTION (UD) TRENCHES  
AND UTILITY POSITIONING - ORANGE COUNTY

UG 3371.1



THE FOLLOWING CHARTS SHOW THE COVER FOR EACH UTILITY, THE MINIMUM SEPARATION BETWEEN SPACE ALLOTMENTS AND THE MAXIMUM SIZE FOR EACH SPACE ALLOTMENT. TO READ THE CHARTS, READ ACROSS AND DOWN UNTIL THE TWO JOIN IN A SQUARE, AND THAT IS THE DISTANCE REQUIRED BETWEEN THE TWO UTILITIES.

EXAMPLE

|    |                  | VERTICAL |   | HORIZONTAL |  |
|----|------------------|----------|---|------------|--|
|    |                  | ES       |   | U          |  |
|    |                  | ↓        |   | ↓          |  |
| ES | ELECTRIC SERVICE | →        | Ⓢ | 12"        |  |

UNDER VERTICAL, 'ES & ES' JOIN AT Ⓢ WHICH REFERS TO INSTALLATION NOTE Ⓢ.

UNDER HORIZONTAL, 'ES & U' JOIN AT 12 INCHES WHICH WOULD BE THE DISTANCE REQUIRED FROM THE OUTER EDGE OF THE ELECTRIC SERVICE (SPACE ALLOTMENT) TO THE OUTER EDGE OF THE FOREIGN UTILITY (SPACE ALLOTMENT).

**MAIN TRENCH, [SERVICE TRENCH PUBLIC PROPERTY] (MINIMUM SEPARATION FROM)**

|    |  | VERTICAL |     |     |     |     |     | HORIZONTAL |     |     |     |    |     | *MIN.<br>COVER | FACILITY SPACE<br>ALLOTMENT (MAX)        |
|----|--|----------|-----|-----|-----|-----|-----|------------|-----|-----|-----|----|-----|----------------|--|
|    |  | P        | S   | ES  | SL  | ME  | U   | P          | S   | ES  | SL  | ME | U   |                |  |
| P  | PRIMARY ELECTRIC (d e f D J F N)                             | Ⓢ        | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ   | 12" | Ⓢ          | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ  | —   | 30"            | 5-1/2" X 5-1/2"                          |
| S  | SECONDARY ELECTRIC (d e f D N)                               | Ⓢ        | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ   | 12" | Ⓢ          | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ  | 12" | 30"            | 5-1/2" X 5-1/2"                          |
| ES | ELECTRIC SERVICE (d e f D N)                                 | Ⓢ        | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ   | 12" | Ⓢ          | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ  | 12" | 30"            | 5-1/2" X 5-1/2"                          |
| SL | SDG&E STREET LIGHT (d e f D I J N)                           | Ⓢ        | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ   | 12" | Ⓢ          | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ  | 12" | 30"            | 2-1/2" X 2-1/2"                          |
| ME | MULTIPLE ELECTRIC (G f Y N)                                  | Ⓢ        | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ   | 12" | Ⓢ          | Ⓢ   | Ⓢ   | Ⓢ   | Ⓢ  | —   | 30"            | 18" X 14" (4 DUCTS)                      |
| U  | FOREIGN UTILITY<br>STREET LIGHT,<br>TELCO, CATV<br>(H L M O) | 12"      | 12" | 12" | 12" | 12" | —   | —          | 12" | 12" | 12" | —  | —   | 30"            | 9" X 24"<br>HORIZONTAL<br>OR<br>VERTICAL |
|    | GAS (L M)  |          |     |     |     |     |     |            | —   | —   | —   |    |     |                |  |

\* ALL MINIMUM COVER DEPTHS MEASURED FROM FINAL GRADE. REDUCED DEPTHS IN NOTE Ⓢ ARE LESSER DEPTHS THAN WHAT IS SHOWN UNDER "MINIMUM COVER".


— NOT ALLOWED.

**SERVICE TRENCH PRIVATE PROPERTY (MINIMUM SEPARATION FROM)**

|    |  | VERTICAL |     |     | HORIZONTAL |    |     | * MIN.<br>COVER | FACILITY SPACE<br>ALLOTMENT (MAX)                 |
|----|--|----------|-----|-----|------------|----|-----|-----------------|---|
|    |  | ES       | ME  | U   | ES         | ME | U   |                 |   |
| ES | ELECTRIC SERVICE (d e f D F K N)                             | Ⓢ        | Ⓢ   | 12" | Ⓢ          | Ⓢ  | 12" | 24"             | 5-1/2" X 5-1/2"                                   |
| ME | MULTIPLE ELECTRIC (G f h N)                                  | Ⓢ        | Ⓢ   | 12" | Ⓢ          | Ⓢ  | —   | 24"             | WILL VARY DUE TO BOARD<br>AMPACITY — SEE STD 3376 |
| U  | FOREIGN UTILITY<br>STREET LIGHT,<br>TELCO, CATV<br>(H K L M) | 12"      | 12" | —   | 12"        | —  | —   | 24"             | 9" X 24"<br>HORIZONTAL OR<br>VERTICAL             |
|    | GAS (L M)  |          |     |     |            |    |     |                 |   |

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**INSTALLATION:**

- A. AN EFFORT SHOULD BE MADE TO KEEP THE TRENCH DEPTH LESS THAN 60 INCHES. IF A PERSON IS REQUIRED TO ENTER A TRENCH 60 INCHES OR DEEPER, IT SHALL BE SHORED, BENCHED, OR SLOPED TO PREVENT MOVEMENT OF EARTH THAT MAY ENDANGER LIFE OR PROPERTY. THE TRENCH CONFIGURATION, UTILITY POSITIONING AND ALL OTHER RELATED CONSTRUCTION MUST CONFORM TO THIS STANDARD AND THE STATE OF CALIFORNIA PUBLIC UTILITIES COMMISSION GENERAL ORDERS 128 AND 112D, AND ANY OTHER APPROPRIATE GOVERNMENTAL AGENCY HAVING JURISDICTION OVER CONSTRUCTION.

NOTE: BENCHING THE TRENCH IS FOR SAFETY REASONS ONLY AND NOT TO BE USED FOR INSTALLATION PURPOSES.

- (B) THE TRENCH DEPTH IN THIS STANDARD SHALL BE FOLLOWED FOR ALL NORMAL INSTALLATIONS. IN INSTALLATIONS WHERE THE TRENCH DEPTH CANNOT BE MET, G.O. 128 REQUIRES ONE OF THE FOLLOWING: (1) STEEL, OR (2) SCHEDULE 40 PVC OR SCHEDULE 80 PVC CONDUIT WITH A MINIMUM WALL THICKNESS OF 0.15 INCHES, OR (3) A 3 INCH LAYER OF CONCRETE (2 SACK 3/8" ROCK) ABOVE AND 2 INCHES ON EACH SIDE OF THE CONDUIT. REDUCED DEPTHS MUST BE APPROVED BY BOTH THE PROJECT MANAGEMENT SPECIALIST AND SDG&E INSPECTOR.
- (C) ANY CONDUIT COMBINATION SMALLER THAN 5 INCH, (NOT MULTIPLE ELECTRIC-ME OR SERVICE CONDUITS) ARE PERMITTED WITHOUT SEPARATION WHEN INSTALLED IN A HORIZONTAL CONFIGURATION. (6 INCH MINIMUM TRENCH WIDTH, 24 INCH MAXIMUM TRENCH WIDTH) (SEE STANDARD 3376 FOR CONDUIT/TRENCH CONFIGURATION).

- (D) SHADING MATERIAL FOR GAS AND/OR ELECTRIC:  
WHEN BOTH GAS AND ELECTRIC ARE INSTALLED IN THE SAME TRENCH, THE ELECTRIC SHADING MATERIAL (ESM) SHALL BE USED FOR SHADING THE ELECTRIC CONDUITS. THE LOCAL GAS CO. SHALL SPECIFY THE MATERIAL REQUIRED FOR THEIR PORTION OF THE TRENCH.

SHADING MATERIAL FOR ELECTRIC TRENCH ONLY: ELECTRIC SHADING MATERIAL (ESM) SPECIFICATION. ACCEPTABLE MATERIAL FOR (DB) DIRECT BURIED CONDUITS. NATURAL SAND, MANUFACTURED SAND, DECOMPOSED GRANITE, ROCK FREE SANDY LOAM, EXISTING NATIVE MATERIAL OR COMBINATION THEREOF. AGGREGATE COMPOSITION SHALL BE CAPABLE OF PASSING THROUGH A 1/2 INCH SIEVE. GRAVELS SHALL NOT AMOUNT TO MORE THAN 50% OF THE MIXTURE. SCREENING OR OTHER SUITABLE MEANS MAY BE REQUIRED AT THE DISCRETION OF THE SDG&E INSPECTOR TO MEET THIS (ESM) SHADING MATERIAL SPECIFICATION.

NOT ACCEPTABLE ARE SOILS OF HIGHLY ORGANIC CONTENT IDENTIFIED BY ODOR OR SPONGY FEEL AND HIGHLY PLASTIC (SOGGY) CLAYS, SILTS OR METALLIC SLAG.

BACKFILL MATERIAL FOR GAS AND/OR ELECTRIC:  
THE MATERIAL USED FOR BACKFILLING THE TRENCH ABOVE THE SHADING MATERIAL AND EXTENDING UPWARD TO THE SUBGRADE SHALL BE FREE OF ROCKS OR CLODS LARGER THAN 6 INCHES IN ANY DIMENSION. THE COARSE MATERIAL SHALL BE WELL DISTRIBUTED THROUGHOUT THE FINER MATERIAL. THE AMOUNT OF ROCKS OR CLODS SHALL BE LIMITED, AND MUST BE APPROVED BY AN SDG&E INSPECTOR. THE BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF ALL APPLICABLE CODES, ORDINANCES AND SDG&E STANDARDS AND BE FREE OF DEBRIS AND ORGANIC MATTER. 1 - SACK CONCRETE SLURRY MIX IS THE PREFERRED BACKFILL MATERIAL. THE SLURRY INSTALLATION SHALL MEET THE REQUIREMENTS OF GOVERNMENTAL AGENCIES, LOCAL GAS CO. AND SDG&E STANDARDS.

EARTH TRENCH BOTTOM INSTALLATION FOR ELECTRIC: (EB & DB CONDUIT)  
THE 1 INCH EARTH TRENCH BOTTOM SHALL BE STABLE WITH A UNIFORM GRADE CONTAINING NO HARD CLODS, ROCKS, ETC. THAT MAY DAMAGE THE CONDUIT. IF, IN THE OPINION OF THE SDG&E INSPECTOR, THE CONDUIT MAY BE DAMAGED, TAMPING, WETTING OR A 3 INCH BASE ELECTRIC SHADING MATERIAL (ESM) MAY BE REQUIRED.


SHADING INSTALLATION:  
A MINIMUM COVER OF 4 INCHES OF COMPACTED SHADING MATERIAL (4 INCHES AFTER COMPACTION) SHALL BE REQUIRED ABOVE THE ELECTRIC CONDUIT. A MINIMUM COVER OF 12 INCHES OF COMPACTED SHADING MATERIAL WILL BE REQUIRED IF, IN THE OPINION OF THE INSPECTOR, THERE IS AN EXCESSIVE AMOUNT OF ROCK AND CLODS IN THE BACKFILL. THE SHADING MATERIAL MUST BE INSTALLED AND COMPACTED AT EACH LEVEL BEFORE INSTALLING THE NEXT UTILITY. THE SHADING MATERIAL MUST BE INSTALLED BEFORE THE TRENCH IS BACKFILLED TO PREVENT DAMAGE FROM ROCKS, CLODS, ETC. GAS PIPE SHALL NEVER BE CONCRETE OR SLURRY ENCASED, AND SHALL HAVE THE PROPER BASE, SHADING, BACKFILL, AND COMPACTION.

COMPACTION:  
EXTREME CARE SHALL BE TAKEN TO ENSURE THAT SHADING MATERIAL IS ADEQUATELY COMPACTED BOTH UNDERNEATH AND AROUND GAS PIPE AND FITTINGS TO PREVENT EXCESSIVE STRESS AND SHEARING FORCES. HAND TAMP AROUND FITTINGS WHERE MECHANICAL COMPACTION CANNOT BE USED. COMPACTION WITH A HYDRAHAMMER OR SIMILAR EQUIPMENT SHALL NOT BE ALLOWED ON TRENCHES WHERE POLYETHYLENEPIPE HAS BEEN INSTALLED. WHEN THE SHEEP'S FOOT METHOD OF COMPACTION IS USED, A MINIMUM OF 18" OF COVER IS REQUIRED BEFORE COMPACTION. WHEEL ROLLING WITH A HEAVY VEHICLE, COMBINED WITH ADEQUATE MECHANICAL COMPACTION, IF NEEDED, IS ALLOWED FOR COMPACTION BACKFILL MATERIAL PROVIDED A MINIMUM OF 6 INCHES OF MECHANICALLY COMPACTED SHADE MATERIAL AND A MINIMUM OF 12" OF BACKFILL MATERIAL EXISTS OVER THE GAS PIPE OR ELECTRICAL CONDUIT. WHEN FLOODING OF THE TRENCH IS DONE TO CONSOLIDATE BACKFILL, CARE MUST BE TAKEN TO ENSURE THAT GAS PIPE OR ELECTRIC CONDUIT IS NOT FLOATED FROM ITS POSITION HAS IN THE TRENCH. COMPACTION BY THE WATER JETTING METHOD IS NOT ALLOWED. SHADING AND BACKFILL SHALL BE COMPACTED IN ACCORDANCE WITH GOVERNMENTAL AGENCIES AND SHALL HAVE A MINIMUM OF 90 PERCENT RELATIVE COMPACTION.

ALL BASE, SHADING, AND BACKFILL MATERIAL MUST BE APPROVED BY AN SDG&E INSPECTOR.

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(E) ONE OR MORE 5 INCH PRIMARY CONDUITS SHALL BE SLURRY ENCASED.

(F) MINIMUM TRENCH WIDTH

|                             | UTILITY   | CONDUIT SIZE                       | MINIMUM WIDTH |
|-----------------------------|---|------------------------------------|---------------|
| ELECT.<br>MAIN TRENCH       | ALL CONDUIT SIZES INCLUDING 2-5 INCHES              |                                    |               |
|                             | ELECTRIC  | ALL SIZES                          | 6 INCHES      |
|                             | JOINT UTILITIES                                     | ALL SIZES                          | 12 INCHES     |
|                             | MULTIPLE ELECTRIC                                   | SPACERS AND 1-SACK CONCRETE SLURRY | 9 INCHES      |
| ELECT.<br>SERVICE<br>TRENCH | SINGLE ELECT.                                       | 2 INCH CONDUIT                     | 6 INCHES      |
|                             | SINGLE ELECTRIC & FOREIGN UTILITIES (EXCLUDING GAS) | 2 INCH CONDUIT                     | 6 INCHES      |
|                             | ELECTRIC  | ALL SIZES                          | 9 INCHES      |
|                             | SINGLE ELECTRIC & FOREIGN UTILITIES (EXCLUDING GAS) | LARGER THAN 2 INCH                 | 12 INCHES     |
|                             | JOINT UTILITIES                                     | ALL PERMITTED SIZES                | 12 INCHES     |
|                             | MULTIPLE ELECTRIC                                   | SPACERS AND 1-SACK CONCRETE SLURRY | 9 INCHES      |

IF ANY OBSTRUCTION IS ENCOUNTERED (WATER PIPES, ETC.), A 2 FOOT WIDE X 3 FOOT LONG HOLE MAY BE REQUIRED FOR WORKING ROOM IN THE AREA OF THE OBSTRUCTION. THIS IS TO BE DETERMINED BY AN SDG&E INSPECTOR.

(G) ALL EB CONDUIT, REGARDLESS OF THE SIZE, SHALL BE CONCRETE ENCASED WITH 1-SACK CEMENT SLURRY. DB CONDUIT MAY ALSO BE CONCRETE OR SLURRY ENCASED IF INCLUDED IN THE MULTIPLE ELECTRIC PACKAGE. IN A SERVICE TRENCH, ALL EB CONDUIT SHALL BE ENCASED WITH CEMENT 1-SACK SLURRY.

(H) MINIMUM SEPARATION MAIN TRENCH

UTILITY  
TELCO MULTIPLE CONCRETE DUCT (CONDEX),  
TRANSITE, WATER, SEWER, FUEL, OIL, DIESEL,  
PROPANE GAS, SPRINKLER, DRAIN, LEACH  
LINES, STEEL GAS MAIN LARGER THAN 2",  
PRIVATELY OWNED UTILITIES, I.E. PRIVATE TELCO  
VIDEO, AUDIO, SECURITY WIRES, FIRE ALARM,  
STREET LIGHTING ETC., STEEL GAS MAIN  
LARGER THAN 2"

WATER, SEWER, EXISTING GAS OR ELECTRIC,  
STORM DRAINS, STEAM, IRRIGATION PIPE,  
SPRINKLER PIPE LARGER THAN 4", PRIVATE  
TELCO TRANSITE, PROPANE GAS

SEWAGE LEACH LINES OR SEEPAGE PITS

IRRIGATION, SPRINKLER PIPE 4" AND LESS

FUEL OIL, GASOLINE, DIESEL

HORIZONTAL SEPARATION

NOT PERMITTED  
IN TRENCH

\* 5 FEET WITH 3 FEET  
OF UNDISTURBED SOIL

5 FEET FROM MAIN TRENCH  
FOR EACH 1' DEPTH  
OF MAIN TRENCH

\* 3 FEET PROVIDED DEPTH  
OF PIPE DOES NOT EXCEED  
DEPTH OF ELECTRIC.


5 FEET  
WITH 3 FEET OF  
UNDISTURBED SOIL

IN CONSIDERATION OF SAFETY FOR THE GENERAL PUBLIC, PERSONS ENGAGED IN CONSTRUCTION, PROPERTY AND OPERATION AND MAINTENANCE OF SDG&E SYSTEM, PROPANE GAS LINES ARE NOT PERMITTED IN A JOINT TRENCH WITH SDG&E FACILITIES.

\* IF FIELD CONDITIONS WILL NOT PERMIT ANY OF THESE SEPARATIONS, THEN APPROVAL OF REDUCED SEPARATIONS MUST COME FROM BOTH THE CUSTOMER PROJECT PLANNER AND SDG&E INSPECTOR. ON FIELD CONDITIONS THAT WILL NOT PERMIT STANDARD PARALLEL SEPARATIONS, A 12 INCH MINIMUM SEPARATION IS REQUIRED. PROPANE GAS SHALL ALWAYS HAVE A 5 FOOT SEPARATION.

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| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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| SHEET<br>4 OF 5 |  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3371.4 |
|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |                    |          |                     |           |
|                 | UNDERGROUND DISTRIBUTION (UD) TRENCHES<br>AND UTILITY POSITIONING - ORANGE COUNTY   |                           |                    |          |                     |           |



(H) CON'T.

| <u>UTILITY</u>                            | <u>VERTICAL (CROSSING)<br/>SEPARATION MIN.</u> |
|---|--|
| ALL WET UTILITIES, TELCO, TV, GAS, ELECT. | 6 INCHES                                       |
| FUEL OIL, GASOLINE, DIESEL                | 6 INCHES                                       |
| ARC-WELDABLE PIPELINES 4" AND LARGER      | 18 INCHES                                      |
| STEAM (SEE NOTE)                          | 5 FEET   |

NOTE: PLACE INSULATING BARRIER BETWEEN STEAM MAIN AND GAS AND/OR ELECTRIC.

MINIMUM SEPARATION SERVICE TRENCH

IN A SERVICE TRENCH, WATER, SEWER, PROPANE GAS, SPRINKLER, DRAIN, LEACH LINES, PRIVATELY OWNED UTILITIES i.e. PRIVATE TELCO, VIDEO, AUDIO, SECURITY WIRES, FIRE ALARM, STREET LIGHTING ETC., ARE NOT PERMITTED IN THE SAME TRENCH WITH ELECTRIC. WHEN THESE FACILITIES PARALLEL ELECTRIC, 12 INCHES SEPARATION BETWEEN SEPARATE TRENCHES SHALL BE MAINTAINED BETWEEN THE UTILITIES WITH AT LEAST 12 INCHES OF UNDISTURBED NATIVE SOIL BETWEEN TRENCHES. PROPANE GAS SHALL ALWAYS HAVE A 5 FOOT SEPARATION. WHEN CROSSING, A 6 INCH VERTICAL SEPARATION IS REQUIRED.

(EXCEPTION) WHEN THERE IS NO SOUTHERN CAL. GAS IN THE SERVICE TRENCH, A SINGLE NATURAL GAS LINE MAY BE INSTALLED IN THE TRENCH PROVIDED A 12 INCH RADIAL SEPARATION IS MAINTAINED. (THIS IS FOR AN INDIVIDUAL HOUSE ON A CASE BY CASE BASIS, NOT A GROUP OF HOUSES/BUILDINGS).

FUEL OIL, GASOLINE, AND DIESEL LINES MUST MAINTAIN A FIVE FOOT SEPARATION WITH THREE FEET OF UNDISTURBED SOIL SEPARATION FROM ELECTRIC CONDUITS.

IF FIELD CONDITIONS WILL NOT PERMIT THESE SEPARATIONS, THEN APPROVAL OF REDUCED SEPARATIONS MUST COME FROM BOTH THE CUSTOMER PROJECT PLANNER AND SDG&E INSPECTOR.

WHEN FIELD CONDITIONS WILL NOT PERMIT STANDARD PARALLEL SEPARATIONS, A 12 INCH MINIMUM SEPARATION IS REQUIRED. PROPANE GAS SHALL ALWAYS HAVE A 5 FOOT SEPARATION.


- (I) SDG&E INSTALLED STREET LIGHT CIRCUITS, WHEN INSTALLED ALONE IN A TRENCH, SHALL BE AT A MINIMUM DEPTH OF 24 INCHES EVERYWHERE, EXCEPT ON PRIVATE PROPERTY, WHERE THE MINIMUM MAY BE 18 INCHES BELOW FINAL GRADE.
- (J) THE ELECTRIC PRIMARY WILL BE ON THE STREET SIDE OF THE TRENCH. THE SDG&E STREET LIGHT CIRCUITS WILL BE ON THE PROPERTY SIDE OF THE TRENCH WHENEVER POSSIBLE. ALL UTILITIES SHALL MAINTAIN A 6 INCH SEPARATION WHEN CROSSING ALL SDG&E ELECTRIC. (FOR SEPARATION ON THE SERVICE TRENCH, SEE CHART ON PAGE 3371.2).
- (K) ON CONVERSIONS A SINGLE ELECTRIC SERVICE ("ES") IN THE SERVICE TRENCH MAY BE INSTALLED WITHOUT SEPARATION FROM TELCO AND CATV.
- (L) THE "SOUTHERN CAL." GAS MAIN OR GAS SERVICE SHALL NOT BE PLACED AT THE SAME LEVEL AS ELECTRIC.
- (M) FOREIGN UTILITIES MUST NOT BE LOCATED UNDER ANY SDG&E ELECTRIC FACILITIES, SUCH AS HANDHOLES, TRANSFORMER PADS, ETC..
- (N) IF AN AGENCY OR UTILITY SUCH AS THE U.S. GOVERNMENT, SAN DIEGO UNIFIED PORT DISTRICT, TELCO, CATV, ETC., REQUIRES CONCRETE ENCASEMENT, CONCRETE MAY BE SUBSTITUTED FOR THE BACKFILL. BASE & SHADING SHALL BE PER SDG&E STANDARDS. ON SDG&E CONDUITS, EITHER DIRECT BURIED OR CONCRETE ENCASED, A MINIMUM 6 INCH COMPACTED SHADING MATERIAL SHALL BE INSTALLED OVER THE UPPERMOST DB CONDUITS BEFORE THE CONCRETE BACKFILL IS INSTALLED. ALL OTHER INSTALLATIONS SHALL PROVIDE THE REQUIRED MATERIALS AS SPECIFIED IN THIS STANDARD AND STANDARDS 3365 & 3376. NOTE: THE GAS MAIN, GAS SERVICE SHALL NEVER BE CONCRETE OR SLURRY ENCASED AND SHALL HAVE THE PROPER BASE, SHADING, BACKFILL, AND COMPACTION.
- (O) MINIMUM SEPARATION OF ANY FOREIGN UTILITY INCLUDING WATER PIPES, SEWER, ETC., FROM SDG&E SUBSTRUCTURES SHALL BE 12 INCHES. PROPANE GAS SHALL BE 5 FEET.

REFERENCE:

- a. SEE STANDARD PAGE 3364.1 FOR UTILITY LOCATIONS IN LOCAL AND COLLECTOR STREETS.
- b. SEE STANDARD PAGE 3364.2 FOR UTILITY LOCATIONS IN MAJOR STREETS, PRIME ARTERIALS AND EXPRESSWAYS.
- c. SEE STANDARD PAGE 3364.3 FOR JOINT TRENCH TYPICAL LOCATION FOR UNDERGROUND CONVERSIONS.
- (d) SEE STANDARD PAGE 3365 FOR IMPORTED OR NATIVE BACKFILL MATERIAL.
- (e) SEE STANDARD PAGE 3365 FOR SLURRY BACKFILL MATERIAL.
- (f) SEE STANDARD 3367 FOR TRENCH PARALLELING FOUNDATIONS.
- g. SEE STANDARD 3370 FOR SAN DIEGO COUNTY JOINT TRENCH STANDARD.
- (h) CONCRETE OR CONCRETE SLURRY ENCASEMENT OF ELECTRIC CONDUITS SHALL BE IN ACCORDANCE WITH STANDARD 3376.
- i. SEE STANDARD PAGE 3376, 3421, 3425, 3426, AND 3427 FOR CONDUIT CONFIGURATIONS ALLOWED IN THE SERVICE TRENCH.
- j. FOR TRENCHING AND SHORING QUESTIONS, SEE SDG&E TRENCHING AND SHORING MANUAL.
- k. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/26/2016 | D   |        |    |      |      |      |

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| SHEET<br>5 OF 5 |  Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3371.5 |
|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                    |          |                     |           |
|                 | UNDERGROUND DISTRIBUTION (UD) TRENCHES<br>AND UTILITY POSITIONING - ORANGE COUNTY                             |                    |          |                     |           |



|                 |                                       |                    |          |                     |           |
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| SHEET<br>1 OF 2 | Indicates Latest Revision             | Completely Revised | New Page | Information Removed | UG 3372.1 |
|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                    |          |                     |           |
|                 | CONDUIT SIZING FOR UNDERGROUND CABLES |                    |          |                     |           |



**NOTES:**

- II. IF FUTURE LOAD GROWTH REQUIRES LARGER CABLE THAN INITIAL REQUIREMENTS, SIZE CONDUIT FOR FUTURE NEEDS. PROJECT MANAGEMENT SUPERVISOR'S APPROVAL IS REQUIRED.

**INSTALLATION:**

- A. INSTALL CONDUIT AS SPECIFIED ON PAGE 3372.1.
- (B) 2/0, 350, 750 COMP, 1000 PRIMARY CABLES ARE ONLY PURCHASED IN TRIPLEX CONFIGURATION.
- (C) 2-1/C #2 SOL PECN-PEJ CABLES MAY BE PARALLELED IN A 3-INCH CONDUIT FOR SINGLE-PHASE 12 KV LOAD.
- (D) 3-1/C #2 SOL PECN-PEJ CABLES MAY BE PARALLELED IN A 4-INCH CONDUIT FOR THREE-PHASE LOAD.
- (F) MAY BE INSTALLED IN EXISTING 4-INCH CONDUITS.
- (G) MAY BE INSTALLED IN EXISTING 3-INCH CONDUITS.
- (H) CONDUIT FROM A RISER POLE TO THE FIRST LOCATION SHALL BE 2 INCH MINIMUM.

**REFERENCE:**

- a. SEE PAGE 3399.701 (FIELD MAINTENANCE ONLY), FOR "CONDUIT SIZING CHARTS" OF CABLES NO LONGER PURCHASED.
- b. SEE PAGE 3942.1 FOR RESIDENTIAL OR COMMERCIAL SERVICE LATERAL CONDUIT REQUIREMENTS.
- (C) SEE STANDARD 4204 FOR CABLE POLE RISER INSTALLATION.
- d. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/24/2016 | D   |        |    |      |      |      |

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**SHEET  
2 OF 2**

SDG&E ELECTRIC UNDERGROUND STANDARD

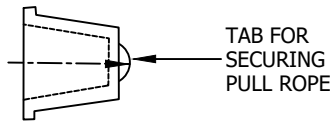
CONDUIT SIZING FOR UNDERGROUND CABLES

**UG 3372.2**

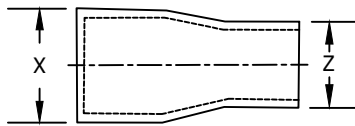




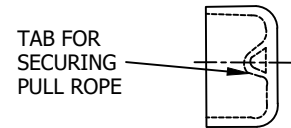


**CONDUIT PLUG**

| CONDUIT SIZE | STOCK NUMBER | ASSEMBLY UNITS |
|--------------|--------------|----------------|
| 2"           | S544768      | PLUG-2         |
| 3"           | S544800      | PLUG-3         |
| 4"           | S544704      | PLUG-4         |
| 5"           | S544736      | PLUG-5         |

**CONDUIT BELL REDUCER**

| CONDUIT SIZE X TO Z | STOCK NUMBER | ASSEMBLY UNITS |
|---------------------|--------------|----------------|
| 3" - 2"             | S573376      | RED3-2         |
| 4" - 3"             | S573380      | RED4-3         |
| 5" - 4"             | S573384      | RED5-4         |

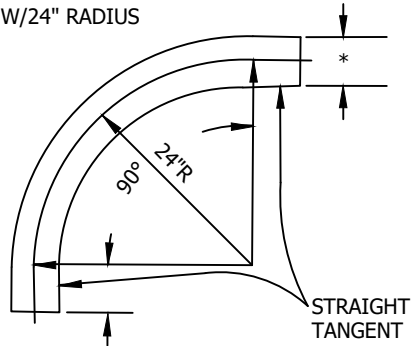
**CONDUIT END CAP**

| CONDUIT SIZE | STOCK NUMBER | ASSEMBLY UNITS |
|--------------|--------------|----------------|
| 2"           | S203296      | CAP-02         |
| 3"           | S203328      | CAP-03         |
| 4"           | S203360      | CAP-04         |
| 5"           | S203392      | CAP-05         |

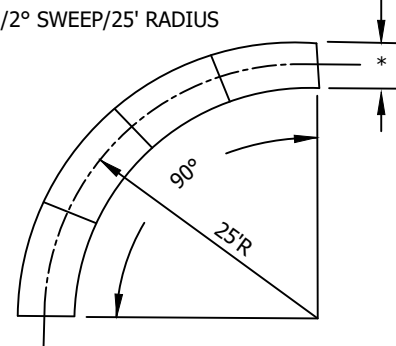
**CONDUIT BENDS**

(EXAMPLES)

90° ELBOW/24" RADIUS



22-1/2° SWEEP/25' RADIUS

**BILL OF MATERIAL:**

| NOMINAL CONDUIT SIZE | DEGREE OF CURVATURE | RADIUS OF CURVATURE  | TYPE OF CONDUIT | STOCK NUMBER | ASSEMBLY UNITS  |         |          |
|----------------------|---------------------|----------------------|-----------------|--------------|-----------------|---------|----------|
|                      |                     |                      |                 |              | CONCRETE ENCASE | PRIMARY | SEC/SERV |
| 2"                   | 22-1/2°             | 25'-0"               | DB 60           | S321808      | 1EB2-S          | 1DB2PS  | 1DB2SS   |
|                      | 45°                 | 24" (SECONDARY ONLY) | DB 60           | S321920      | --              | --      | 1DB2S8   |
|                      | 45°                 | 36"                  | DB 60           | S321810      | 1EB2-8          | 1DB2-8  | --       |
|                      | 90°                 | 24" (SECONDARY ONLY) | DB 60           | S321984      | --              | --      | 1DB2SB   |
|                      | 90°                 | 36"                  | DB 60           | S321812      | 1EB2-B          | 1DB2-B  | --       |
| 3"                   | 11-1/4°             | 25'-0"               | DB 60           | S321876      | 1EB3-C          | 1DB3-C  | 1DB3SC   |
|                      | 22-1/2°             | 25'-0"               | DB 60           | S322144      | 1EB3-S          | 1DB3PS  | 1DB3SS   |
|                      | 45°                 | 36"                  | DB 60           | S321878      | 1EB3-8          | 1DB3-8  | 1DB3S8   |
|                      | 90°                 | 36"                  | DB 60           | S322048      | 1EB3-B          | 1DB3-B  | 1DB3SB   |
| 4"                   | 11-1/4°             | 25'-0"               | DB 100          | S321884      | 1EB4-C          | 1DB4-C  | 1DB3SC   |
|                      | 22-1/2°             | 25'-0"               | DB 100          | S321826      | 1EB4-S          | 1DB4PS  | 1DB4SS   |
|                      | 45°                 | 36"                  | DB 100          | S321942      | 1EB4-8          | 1DB4-8  | 1DB4S8   |
|                      | 90°                 | 36"                  | DB 100          | S322082      | 1EB4-B          | 1DB4-B  | 1DB4SB   |
| 5"                   | 11-1/4°             | 25'-0"               | DB 60           | S321882      | 1EB5-C          | 1DB4-C  | 1DB5SC   |
|                      | 22-1/2°             | 25'-0"               | DB 60           | S321856      | 1EB5-S          | 1DB5PS  | 1DB5SS   |
|                      | 45°                 | 60"                  | SCH 80          | TBD          | 1EB5-8          | 1DB5-8  | 1DB5S8   |
|                      | 90°                 | 60"                  | SCH 80          | TBD          | 1EB5-B          | 1DB5-B  | 1DB5SB   |

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| C   | TABLE UPDATE      | EDM | EJA | GLW | CZH   | 5/11/2020 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | JS  | JS  | CZH   | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -   | -   | TR/JW | 8/10/2004 | D   |        |    |    |     |     |      |



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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CONDUIT AND CONDUIT FITTINGS  
ED & DB

UG3373.2

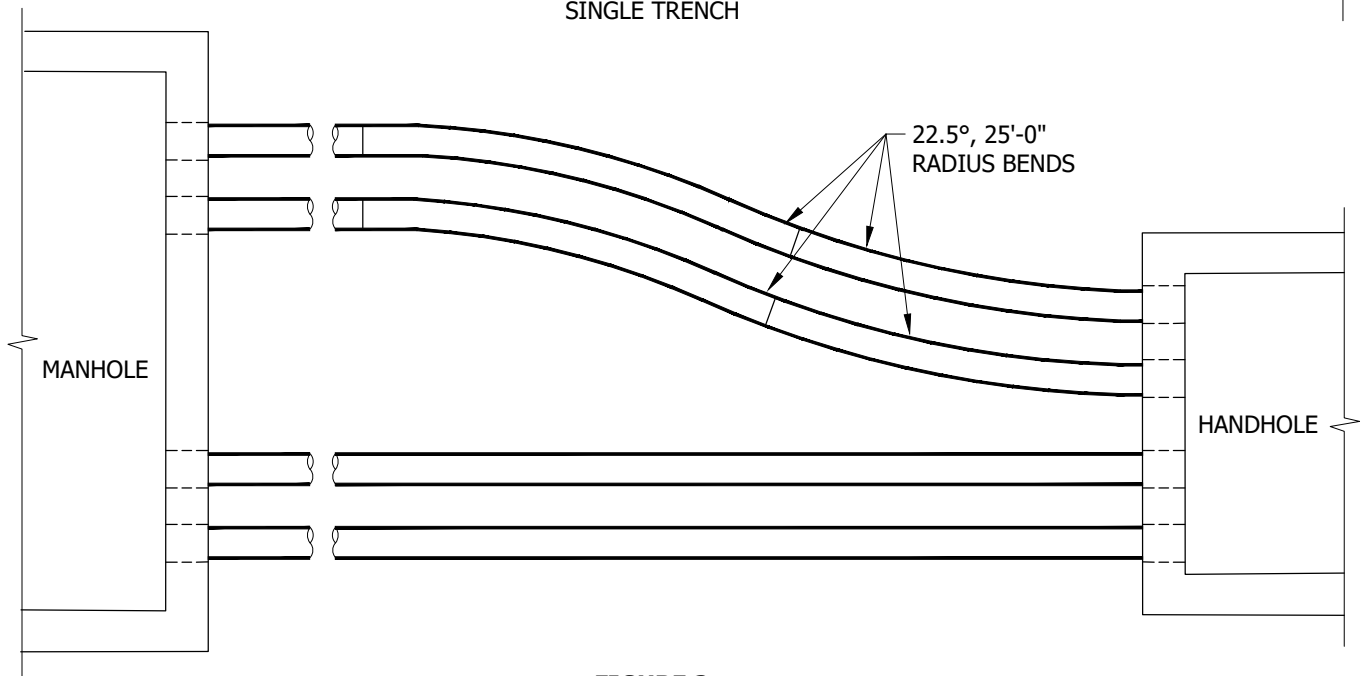
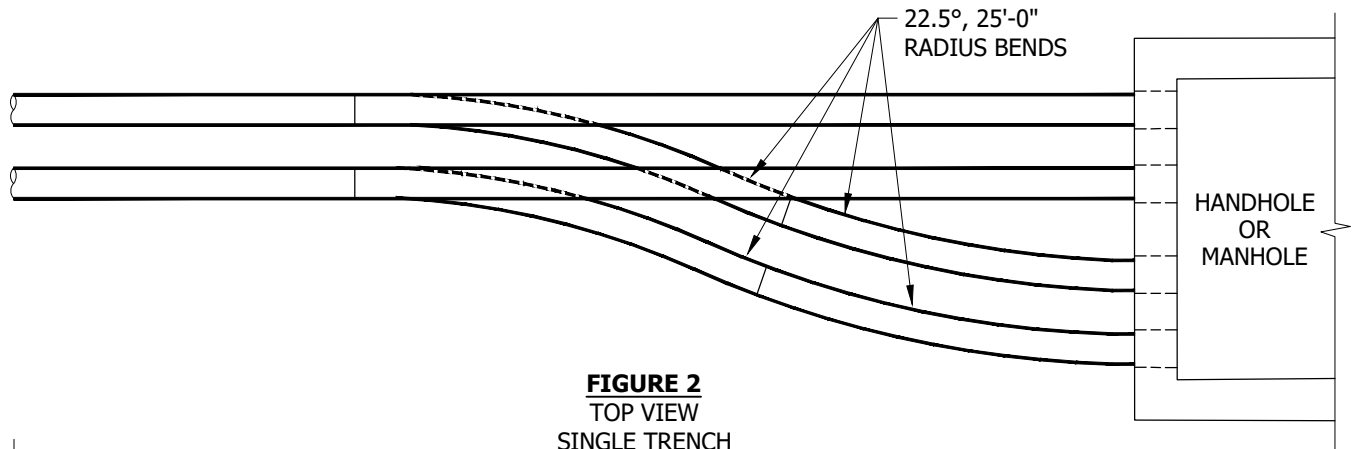






## INSTALLATION (CONT'D):

3. UNLESS OTHERWISE SPECIFIED ON THE JOB PRINT, INSTALL CONDUIT USING THE BOTTOM SET OF TERMINATOR KNOCKOUTS FIRST. IF ONLY ONE CONDUIT IS REQUIRED, USE THE BOTTOM OUTSIDE (CLOSET TO WALL) KNOCKOUT.
  4. WHEN CONDUITS MUST ENTER THE SUBSTRUCTURE IN ANY AREA WHERE TERMINATION KNOCKOUTS ARE NOT PROVIDED, THE SUBSTRUCTURE MUST BE CORE BORED. CORE BORING LOCATIONS WILL BE SPECIFIED BY THE CUSTOMER PROJECT PLANNER AND MUST BE APPROVED (CLOSET TO WALL) KNOCKOUT. **AN EFFORT SHOULD BE MADE TO MAINTAIN 5 FEET OF STRAIGHT PRIMARY CONDUIT FOR 90 DEGREE BENDS JUST OUTSIDE ANY SUBSTRUCTURE.**
  5. WHEN SUBSTRUCTURE REINFORCING STEEL IS EXPOSED BY CORE BORING, IT MUST BE COATED WITH GALVANOX (STOCK NUMBER S516064) AND THEN COATED WITH COAL TAR EPOXY (STOCK NUMBER S241000) TO MOISTURE SEAL. AFTER CONDUIT IS TERMINATED IN THE SUBSTRUCTURE, SEAL THE SUBSTRUCTURE ENTRANCE WITH CEMENT GROUT.
- G. TYPICAL METHODS FOR ROUTING CONDUITS INTO HANDHOLES AND MANHOLES: (VII)



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| C   |                          |     |     |     |     |           | F   |        |    |    |     |     |      |
| B   | INSTALLATION UPDATE      | EDM | EJA | GLW | CZH | 10/9/2020 | E   |        |    |    |     |     |      |
| A   | NO CHANGES - RE-AFFIRMED | -   | JS  | TR  | MDJ | 5/24/2016 | D   |        |    |    |     |     |      |



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CONDUIT INSTALLATION PRACTICES

UG3374.2



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION             | CATALOG NO. | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------|-------------|----------|---------------|--------------|--------------|
| 1    | SOLVENT CEMENTS (CLEAR) | PERMALITE   | 405C     | --            | S213232      | --           |
|      |                         | CERTAINTED  | 85172    | --            |              | --           |
|      |                         | CARLON      | VC9982   | --            |              | --           |
| 2    | GALVANOX PAINT (F)      | --          | --       | --            | S516064      | --           |
| 3    | COAL TAR EPOXY (F)      | --          | --       | --            | S241000      | --           |

**NOTES:**

- I. EACH CONDUIT RUN BETWEEN SUBSTRUCTURES, PADS, CUSTOMER SERVICE, RISERS, ETC., SHALL BE ONE SIZE CONDUIT CONTINUOUSLY, I.E., NO REDUCERS ARE ALLOWED WITHIN A CONDUIT RUN EXCEPT WHERE THE CONDUIT ENTERS THE SUBSTRUCTURE OR ABOVE THE GROUND LEVEL ON A RISER POLE. IF A STUBOUT IS LARGER THAN THE CONDUIT REQUIRED, CONTINUE USING THE LARGER SIZE CONDUIT TO THE FIRST TERMINATION POINT THEN CONTINUE WITH THE SMALLER CONDUIT SIZED FOR THE CABLE. DEVIATIONS MUST BE APPROVED BY SDG&E'S CONSTRUCTION STANDARDS GROUP.
- II. ROUNDNESS OF CONDUIT MUST BE MAINTAINED AT ALL TIMES.
- III. DO NOT CUT SWEEPS & ELBOWS, THEY ARE NOT SIZED TO ACCEPT COUPLINGS.
- IV. ALL BENDS, SWEEPS AND ELBOWS SHOWN ON JOB PRINT MUST BE INCLUDED IN CABLE PULLING CALCULATION.
- V. FIELD BENDS ARE NOT ACCEPTABLE.
- VI. TO AVOID CUTTING THE CONDUIT BENDS, SUBSTRUCTURES AND/OR CABLE POLES WHICH REQUIRE A 90° BEND SHALL BE LOCATED FAR ENOUGH AWAY FROM EACH OTHER TO ALLOW ROOM ENOUGH FOR THE TWO 90° BENDS. THIS WILL VARY DEPENDING ON THE SIZE OF THE 90° BEND.
- (VII) IN EACH SUBSTRUCTURE AS MANY CONDUIT KNOCKOUTS MAY BE USED AS NEEDED, PROVIDING PROPER INSTALLATION IS FOLLOWED AND REQUIRED UNOBSTRUCTED SPACE IS MAINTAINED. INSTALL CONDUITS USING THE LOWER SET OF KNOCKOUTS FIRST, UNLESS OTHERWISE SPECIFIED ON JOB PRINT. IF ONLY ONE CONDUIT IS REQUIRED, USE THE BOTTOM OUTSIDE (CLOSEST TO THE WALL) KNOCKOUT.

**REFERENCE:**

- a. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.

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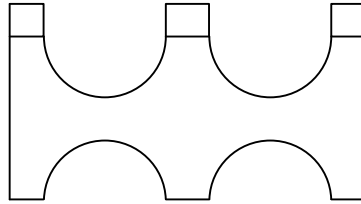
| REV | CHANGE                   | DR  | BY  | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|--------------------------|-----|-----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                          |     |     |     |     |           | F   |        |    |    |     |     |      |
| B   | INSTALLATION UPDATE      | EDM | EJA | GLW | CZH | 10/9/2020 | E   |        |    |    |     |     |      |
| A   | NO CHANGES - RE-AFFIRMED | -   | JS  | TR  | MDJ | 5/24/2016 | D   |        |    |    |     |     |      |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | CONDUIT INSTALLATION PRACTICES                    |                           |                    |          |                     |          |

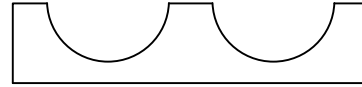


**SCOPE:** THIS STANDARD SHOWS CONDUIT SPACERS FOR MULTI-DUCT INSTALLATION.

INTERMEDIATE SPACER OR  
BASE SPACER USED IN BRIDGE CELLS



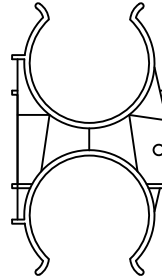
BASE SPACER



**BILL OF MATERIAL:**

| CONDUIT SIZE | DESCRIPTION                           | QUANTITY | STOCK NUMBER |
|--------------|---------------------------------------|----------|--------------|
| 5"           | INTERMEDIATE SPACER                   | AS REQ'D | 663528       |
| 5"           | 1" BASE SPACER                        | AS REQ'D | 663530       |
| 5"           | BASE SPACER<br>(USED IN BRIDGE CELLS) | AS REQ'D | 663008       |

5 INCH VERTICAL SPACER FOR 9 INCH WIDTH TRENCH



**BILL OF MATERIAL:**

| CONDUIT SIZE | DESCRIPTION     | QUANTITY | STOCK NUMBER |
|--------------|-----------------|----------|--------------|
| 5"           | VERTICAL SPACER | AS REQ'D | 663532       |

**REFERENCE:**

- a. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL

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**SHEET**  
**1 OF 1**

SDG&E ELECTRIC UNDERGROUND STANDARD

CONDUIT SPACER DATA

**UG 3375**



**SCOPE:** THIS STANDARD SHOWS CEMENT AND SLURRY MIXTURE. ALSO SHOWN ARE CONCRETE SLURRY ENCASED CONDUIT INSTALLATIONS.

### TABLE 1

| DATA FOR CONDUITS WHICH ARE NORMALLY INSTALLED 2 CONDUITS WIDE AND 1 THRU 4 ROWS HIGH |  |             |
|---|--|-------------|
| NUMBER OF CONDUITS IN TRENCH  | CONCRETE PER 100 FT OF TRENCH, CUBIC YARDS |             |
|   | 4" CONDUITS                                | 5" CONDUITS |
| 2   | 5.5  | 5.2         |
| 4   | 8.7  | 8.5         |
| 6   | 12.4                                       | 11.8        |
| 8   | 16.1                                       | 15.1        |

## TABLE 2

| INGREDIENTS FOR 1 - SACK CONCRETE SLURRY MIX (PER YARD) |                         |               |        |     |           |     |  |              |              |
|---|-------------------------|---------------|--------|-----|-----------|-----|--|--------------|--------------|
| CEMENT<br>FOR   | AIR<br>ENTRAINMENT<br>% | SAND<br>(LBS) | GRAVEL |     | CEMENT    |     | MAX., TOTAL<br>WATER PER SACK<br>OF CEMENT (GALS.) | SLUMP        |              |
|   |                         |               | SIZE   | LBS | SAC<br>KS | LBS |  | MIN.<br>(IN) | MAX.<br>(IN) |
| ENCASEMENT  | 0 -2                    | 3000 ± 50     | -      | -   | 1         | 94  | 60 GALS PER YARD                                   | 6            | 8            |

### TABLE 3

| INGREDIENTS FOR 2 - SACK CONCRETE SLURRY MIX (PER YARD) |                         |               |        |           |           |     |  |              |              |
|---|-------------------------|---------------|--------|-----------|-----------|-----|--|--------------|--------------|
| CEMENT<br>FOR   | AIR<br>ENTRAINMENT<br>% | SAND<br>(LBS) | GRAVEL |           | CEMENT    |     | MAX., TOTAL<br>WATER PER SACK<br>OF CEMENT (GALS.) | SLUMP        |              |
|   |                         |               | SIZE   | LBS       | SAC<br>KS | LBS |  | MIN.<br>(IN) | MAX.<br>(IN) |
| ENCASEMENT  | 0 -2                    | 1600 ± 20     | 3/8    | 1600 ± 20 | 2         | 188 | 50 GALS PER YARD                                   | 6            | 8            |

## INSTALLATION:

**SECONDARY SERVICE TRENCH:** (a) (b) (c)

- A. INSTALLATION WHERE CONCRETE SLURRY ENCASEMENT (1 SACK MIX) AND SPACERS ARE REQUIRED:
1. WHEN CONDUITS ARE IN A STACKED CONFIGURATION WITH SPACERS, ENCASED BURIED (EB) CONDUITS MUST BE ENCASED WITH 1 SACK SLURRY. DIRECT BURIED (DB) CONDUITS ARE ALSO ACCEPTABLE WHEN EXTENDED FROM A DIRECT BURIED TRENCH INTO THE STACKED CONFIGURATION.
- B. INSTALLATION FOR CONCRETE SLURRY ENCASEMENT (1 SACK MIX) OR IMPORTED/NATIVE MATERIAL WITHOUT SPACERS:
1. WHEN CONDUITS ARE SIDE BY SIDE ON THE BOTTOM OF THE TRENCH (4 CONDUITS MAX.). IN THE TRANSITION AREA WHERE THE CONDUITS FROM THE BOTTOM OF THE TRENCH START TOWARD THE SURFACE (THE STRAIGHT PORTION BY THE 90 BEND), SPACERS MAY BE REQUIRED TO ALLOW THE 90 BENDS TO ENTER STRAIGHT INTO THE PAD OPENING. USE DIRECT BURIED (DB) CONDUIT WITH IMPORTED NATIVE MATERIAL. USE ENCASED BURIED (EB) CONDUITS WITH CONCRETE SLURRY ENCASEMENT (1 SACK MIX). DIRECT BURIED (DB) CONDUITS ARE ALSO ACCEPTABLE.
  2. IF THE SERVICE CONDUIT EXTENDS INTO THE MAIN TRENCH WHERE STACKING IS REQUIRED, ALL CONDUITS SHALL BE INSTALLED IN ONE PACKAGE WITH SPACERS AND 1 SACK SLURRY.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | CONDUIT<br>ENCASED MULTI-CONDUIT INSTALLATION     |                           |  |                    |  |          |  |                     |          |

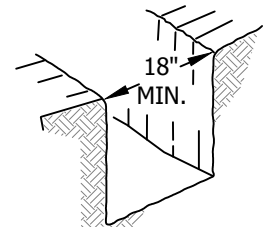


## INSTALLATION (CONT'D):

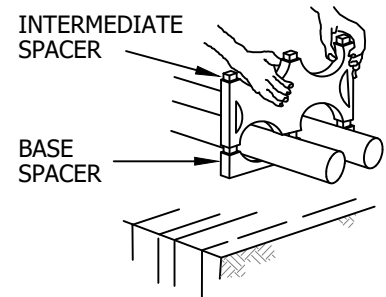
### MAIN FEEDER TRENCH OR PRIMARY TRENCH: (c) (d)

#### C. INSTALLATION WHERE CONCRETE SLURRY ENCASEMENT (1 SACK MIX) AND SPACERS ARE REQUIRED:

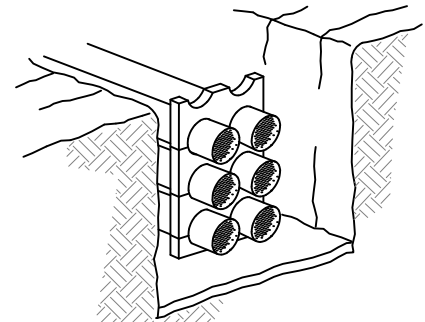
1. ALL 5-INCH PRIMARY CONDUITS SHALL BE INSTALLED WITH SPACERS AND ENCASED WITH CONCRETE SLURRY (1 SACK MIX).
2. WHEN CONDUITS ARE IN A STACKED CONFIGURATION WITH SPACERS, ENCASED BURIED (EB) CONDUITS MUST BE ENCASED WITH 1 SACK SLURRY.
3. EXCAVATE TRENCH TO REQUIRED DEPTH AND WIDTH. SEE STANDARDS 3376, 3370 OR 3371 FOR TRENCHING REQUIREMENTS.
4. MULTI-SIZED CONDUIT SYSTEMS TO BE A MAXIMUM OF TWO CONDUITS WIDE AND FIVE CONDUITS HIGH (UP TO TEN \* SPACER POSITIONS IN ONE TRENCH). IF MORE THAN TEN POSITIONS ARE REQUIRED, A SEPARATE CONDUIT BANK SHALL BE INSTALLED IN A SEPARATE TRENCH. MAINTAIN 5 FEET SEPARATION WITH 3 FEET OF UNDISTURBED NATIVE SOIL BETWEEN TRENCHES.
5. ASSEMBLE CONDUITS IN SPACERS ON TOP OF THE GROUND OR IN THE TRENCH. PLACE SPACERS 8 TO 10 FEET APART.
6. SPOT POUR 1 SACK OVER CONDUITS APPROXIMATELY AT 25 FOOT INTERVALS TO PREVENT CONDUITS FROM FLOATING.
7. A CONCRETE ENVELOPE USING 1 SACK CONCRETE MIX (PER TABLE 2) IS TO BE POURED AROUND AND OVER THE CONDUITS. TRENCH BACKFILL MATERIAL SHALL MEET THE GOVERNING AUTHORITY'S REQUIREMENTS AND COMPANY STANDARDS.
8. TWO OR THREE 2-INCH CONDUITS MAY BE INSTALLED IN ONE SPACER POSITION.



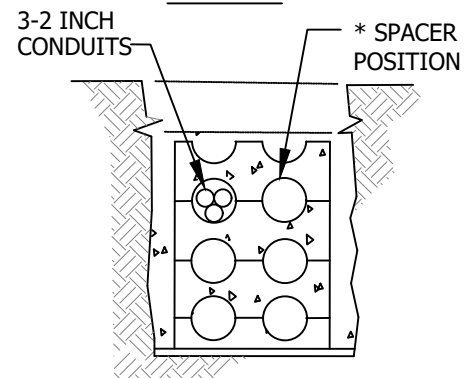
**FIGURE 1**



**FIGURE 2**



**FIGURE 3**



**FIGURE 4**

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | CONDUIT<br>ENCASED MULTI-CONDUIT INSTALLATION     |                           |                    |          |                     |          |



D. MAXIMUM TWO 5-INCH CONDUITS USING CONDUIT SPACERS. ELECTRIC TRENCH ONLY.

- 
- 9"  
MIN.
- 30"  
MIN.
- 43-1/2"
- 1 SACK  
CONCRETE  
SLURRY
- 5"
- 5"
- 1 1/2" EARTH
- FIGURE 5**

- 

### FIGURE 6

#### EXAMPLES

| REV             | CHANGE              | DR  | BY                        | DSN | APV | DATE               | REV | CHANGE   | DR | BY                  | DSN | APV      | DATE |
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|                 |                     | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |     |                    |     |          |    |                     |     |          |      |
|                 |                     | CONDUIT<br>ENCASED MULTI-CONDUIT INSTALLATION     |                           |     |     |                    |     |          |    |                     |     |          |      |



F. CONDUITS FIVE INCHES OR LESS, CONCRETE SLURRY ENCASEMENT 1 SACK MIX OR IMPORTED/ NATIVE MATERIAL.

1. ANY CONDUIT COMBINATION SMALLER THAN 5 INCHES MAY BE INSTALLED SIDE BY SIDE ON BOTTOM OF TRENCH. (6 INCH MINIMUM TRENCH WIDTH, 24 INCH MAXIMUM TRENCH WIDTH).
2. THE CONDUIT COMBINATIONS DESCRIBED MAY BE USED IN A JOINT TRENCH CONFIGURATION.
3. USE DIRECT BURIED (DB) CONDUIT WHEN THEY ARE TO BE ENCASED OR IMPORTED/NATIVE BACKFILL IS USED.
4. NARROW TRENCHES, 6 INCHES THROUGH 12 INCHES REQUIRE 1 SACK CONCRETE SLURRY OR MINIMUM 90% COMPACTION FOR IMPORTED OR NATIVE MATERIAL.
5. SEE STANDARD 3365 FOR TYPICAL PLACEMENT AND PREFERRED TRENCH MATERIAL.
- ⑥ 12" MINIMUM SLURRY COVER.
- ⑦ 1-1/2" MINIMUM SEPARATION REQUIRED BETWEEN CONDUITS AND BETWEEN CONDUIT AND OUTER WALL SURFACES.
8. **STACKING CONDUIT IS PROHIBITED WITHOUT SPACERS.**

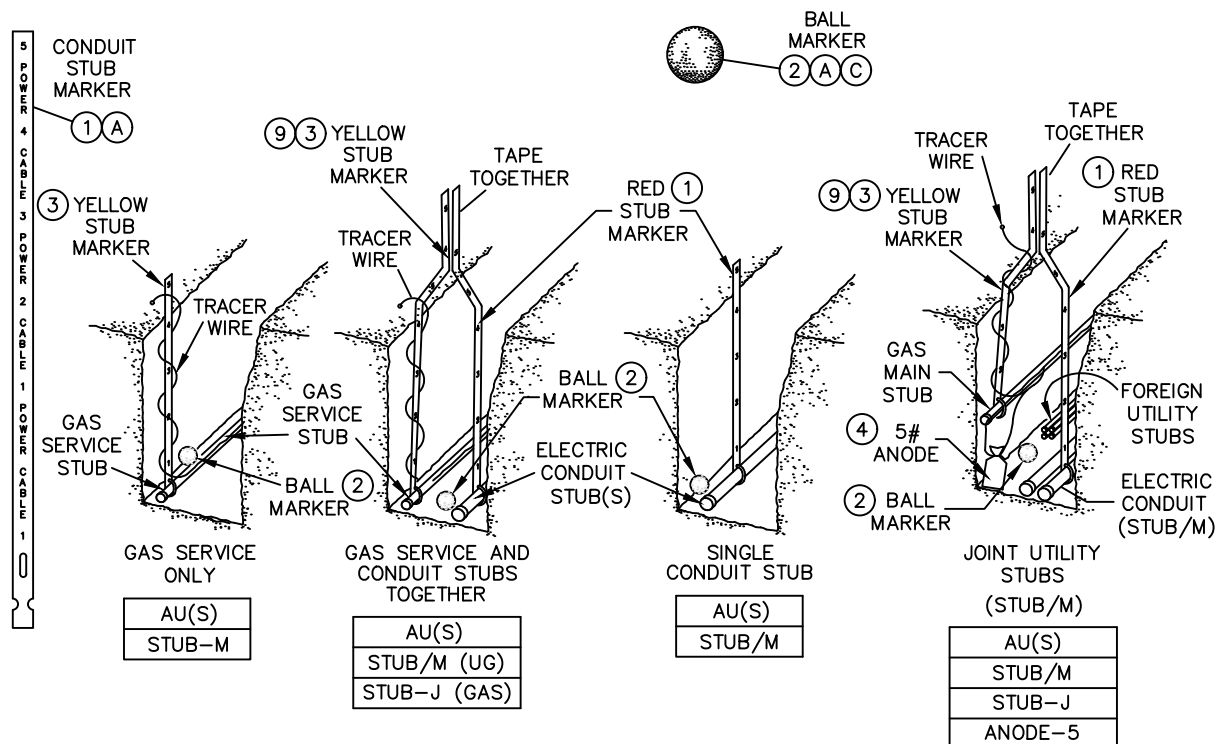
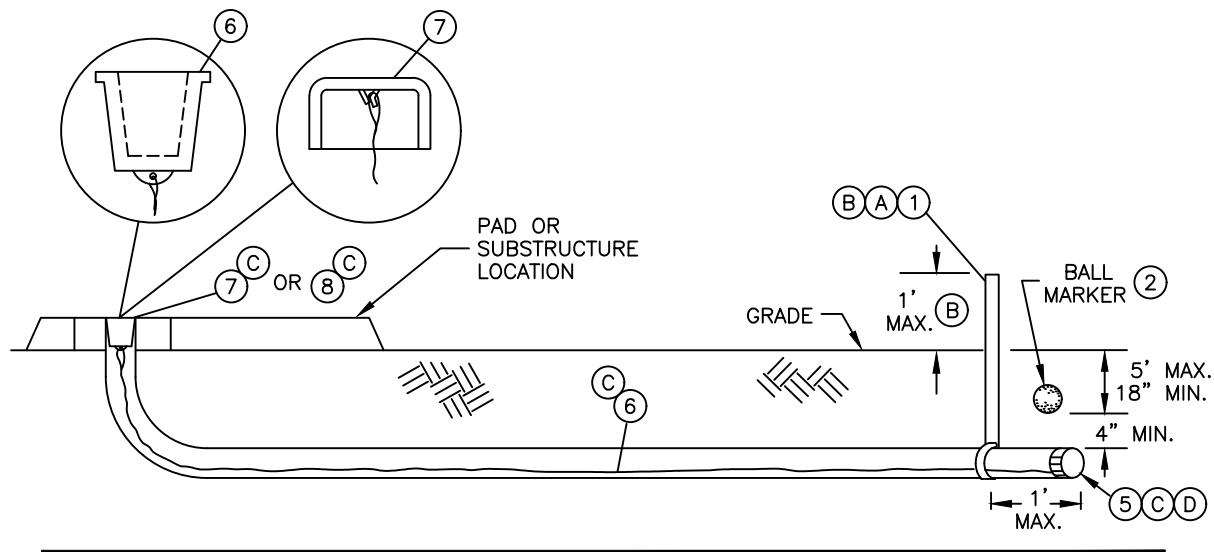
**NOTES:** NONE

- a) AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.
- b) SEE UG 3421.2, 3425.2, 3426.3, AND 3427.3 FOR CONDUIT PLACEMENT AND TRENCH CONFIGURATION.
- c) SEE UG 3370.3 OR 3371.3 FOR SHADING/BACKFILL REQUIREMENTS, AND TRENCH DEPTH.
- d) SEE DESIGN MANUAL 5722 FOR FEEDER CONDUIT APPLICATIONS.

| REV             | CHANGE              | DR  | BY                        | DSN | APV | DATE               | REV | CHANGE   | DR | BY                  | DSN | APV      | DATE |
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|                 |                     | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |     |                    |     |          |    |                     |     |          |      |
|                 |                     | CONDUIT<br>ENCASED MULTI-CONDUIT INSTALLATION     |                           |     |     |                    |     |          |    |                     |     |          |      |




**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIRED FOR INSTALLING THE CONDUIT STUB MARKER AND BALL MARKER LOCATING SYSTEM USED TO LOCATE AND SHOW THE DEPTH OF PRIMARY, SECONDARY AND SERVICE CONDUIT STUBS.



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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |                    |          |                     |           |
|                 | CONDUIT STUB MARKER AND BALL MARKER<br>LOCATING SYSTEM                              |                           |                    |          |                     |           |



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                          | QUANTITY | CONSTR. STD<br>OR PAGE NO. | STOCK<br>NUMBER | ASSEMBLY<br>UNITS |
|------|--------------------------------------|----------|----------------------------|-----------------|-------------------|
| 1    | MARKER, CONDUIT STUB (COLOR-RED)     | 1        | 3377.1                     | S476302         | STUB/M            |
| 2    | BALL MARKER                          | 1        |                            | S476492         |                   |
| 3    | MARKER, GAS STUB (COLOR YELLOW)      | 1        | 3377.1 & .3                | S476304         | STUB-M            |
| 4    | ANODE, 5 LB                          | 1        | —                          | S109360         | ANODE-5           |
| 5    | TAPE, GRAY                           | AS REQ'D | —                          | S721120         | —                 |
| 6    | PULLING AND MEASURING TAPE           | AS REQ'D | —                          | S721700         | —                 |
| 7    | PLUG, CONDUIT                        | AS REQ'D | 3373.2                     | —               | —                 |
| 8    | CAP, CONDUIT END                     | AS REQ'D | 3373.2                     | —               | —                 |
| 9    | MARKER, GAS STUB ONLY (COLOR YELLOW) | AS REQ'D | 3377.1 & .3                | S476304         | STUB-J            |

### INSTALLATION:

- (A) INSTALL CONDUIT STUB MARKERS AND BALL MARKERS ON ALL STUBS (REGARDLESS OF LENGTH), 1' MAXIMUM INWARD FROM THE END. IF MORE THAN ONE CONDUIT IS STUBBED OUT AT THE SAME LOCATION, INSTALL ONE BALL MARKER ABOVE THE CONDUIT(S) ONLY.
- (B) LOOP THE STUB MARKER AROUND THE CONDUIT. IF THE MARKER IS NOT LONG ENOUGH TO SHOW ABOVE GRADE LEVEL, TAPE A SECOND MARKER TO THE FIRST MARKER.
- (C) INSTALL THE PULLING TAPE INSIDE THE CONDUIT LEAVING SLACK AT THE PAD OR SUBSTRUCTURE END. AT THE SAME END, THE PULL ROPE MUST BE SECURELY ATTACHED TO EITHER A CONDUIT CAP OR TIE AND TAPE THE PULL ROPE TO THE END OF THE CONDUIT WITH GRAY TAPE.
- (D) AT THE CONDUIT STUB END, TIE THE PULLING TAPE TO THE END OF THE CONDUIT AND TAPE THE END OF THE STUB OVER THE PULLING TAPE WITH GRAY TAPE.

**REFERENCE:**

- a. SEE STANDARD PAGE 3370 FOR MINIMUM CONDUIT COVER AND CONDUIT PLACEMENT.
- b. SEE STANDARD PAGE 3373.2 FOR CONDUIT PLUG OR CONDUIT CAP STOCK NUMBERS.
- c. SEE STANDARD PAGE 3377.1 & .3 FOR GAS STUB MARKER AND BALL MARKER LOCATING SYSTEM.
- d. SEE "ELECTRIC STANDARD PRACTICE" NO. 226 FOR THE MARKER LOCATING UNIT.
- e. SEE GAS STANDARDS D 7243, AND D 7244 FOR POLICY ON MARKING GAS STUBS.

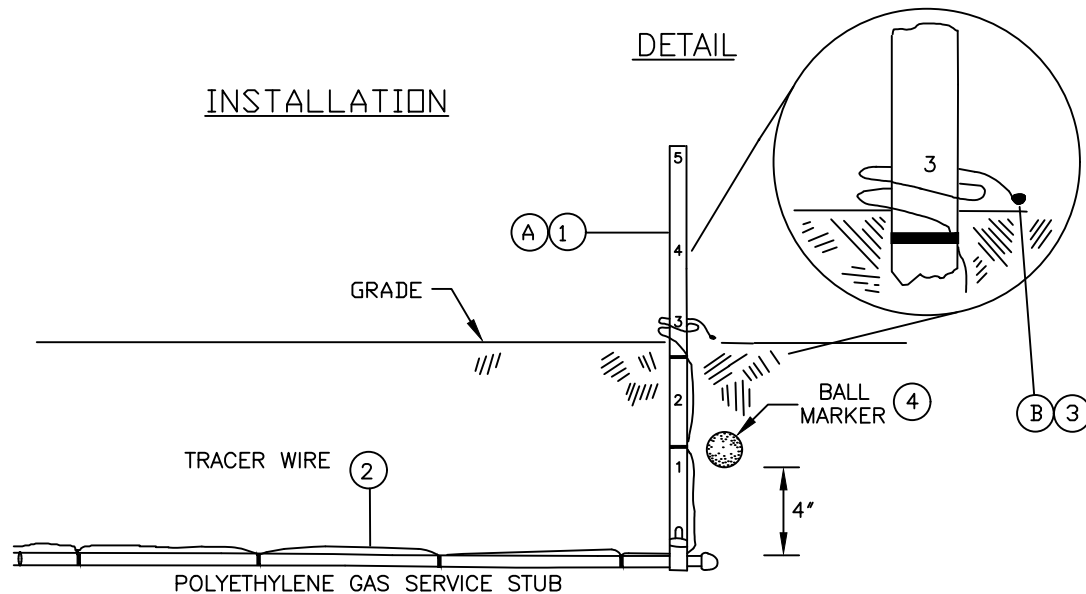
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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD                    |                    |          |                     |           |
|                 | CONDUIT STUB MARKER AND BALL MARKER<br>LOCATING SYSTEM |                    |          |                     |           |



**SCOPE:** THIS STANDARD SETS FORTH THE PROCEDURE FOR INSTALLING A GAS SERVICE STUB LOCATING MARKER.



**NOTES:**

I. THE INSTALLER SHALL FURNISH AND INSTALL ALL THE MATERIAL SHOWN IN THIS STANDARD.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                              | QUANTITY | STOCK NUMBER |
|------|--|----------|--------------|
| 1    | MARKER, GAS STUB (COLOR YELLOW)          | 1        | S476304      |
| 2    | WIRE, TRACER (#14 AWG 600V COLOR YELLOW) | AS REQ'D | S809200      |
| 3    | SEALING COMPOUND                         | AS REQ'D | S442976      |
| 4    | BALL MARKER                              | 1        | S476492      |

### INSTALLATION:

- (A) ATTACH A YELLOW PLASTIC GAS MARKER TO THE END OF THE GAS SERVICE AND EXTEND ABOVE GRADE.
- (B) BRING THE YELLOW TRACER WIRE UP FROM THE POLY GAS SERVICE STUB AND TAPE IT TO THE YELLOW MARKER AT GRADE LEVEL. CUT THE TRACER WIRE 2' ABOVE GRADE AND COIL AROUND THE MARKER AT GRADE LEVEL. SEAL TIP OF THE TRACER WIRE WITH AQUA-SEAL AND ELECTRICAL TAPE TO PREVENT GROUNDING.
- C. AN APPROVED BALL MARKER WILL BE INSTALLED AT EACH STUB IN ACCORDANCE WITH REFERENCE D.

**REFERENCE:**

- f. SEE GAS STANDARDS 7241, 7244, 7344, & 7243 [FOR INTERNAL USE ONLY]  
g. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL

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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD |                    |          |                     |           |
|                 | GAS STUB MARKER                     |                    |          |                     |           |



**SCOPE:** THIS SECTION EXPLAINS THE PROCESS REQUIRED TO INSTALL ELECTRIC CONDUIT IN NEW AND EXISTING BRIDGES. THIS INCLUDES SLAB, CLOSED CELL, T-SECTIONED, AND CUSTOM BRIDGES.

## DISCUSSION

CONDUIT INSTALLATION DESIGN IN BRIDGES IS PROJECT SPECIFIC WORK. ALMOST EVERY BRIDGE HAS ITS OWN UNIQUE DESIGN AND CONDUIT ATTACHMENT REQUIREMENTS. DEVELOPING A STANDARD THAT COVERS CONDUIT INSTALLATION IN ALL TYPES OF BRIDGES WOULD PRODUCE A DOCUMENT CONTAINING SO MUCH INFORMATION THAT IT WOULD NOT BE PRACTICAL TO USE. THE CIVIL/STRUCTURAL ENGINEERING SECTION HAS EXPERIENCE IN DESIGNING CONDUIT SUPPORTS TO RESIST SEISMIC REQUIREMENTS AND BRIDGE CONSTRAINTS. THE CUSTOMER PROJECT PLANNER SHOULD CONTACT THE CIVIL/STRUCTURAL ENGINEERING SECTION ONCE THEY RECEIVE A BRIDGE JOB. THE CIVIL/STRUCTURAL ENGINEERING SECTION WILL PROVIDE INFORMATION COLLECTION, DESIGN, DRAWINGS, AND FIELD SUPPORT SERVICE AS REQUIRED.

## PROCESS

1. CONTACT THE CIVIL/STRUCTURAL ENGINEERING SECTION ONCE ELECTRIC CONDUIT IS PROPOSED ON A NEW OR EXISTING BRIDGE.

CONTACT:

CIVIL/STRUCTURAL ENGINEERING MANAGER

CIVIL/STRUCTURAL ENGINEERING OFFICE ASSISTANT

.....  
 .....(858) 636-6815

(858) 654-1615

2. A CIVIL/STRUCTURAL ENGINEER WILL BE ASSIGNED TO THE PROJECT. THE ENGINEER DEVELOP THE SCOPE OF WORK, ATTEND MEETINGS AND COMPILE BRIDGE AND SEISMIC INFORMATION. THE ENGINEER WILL ALSO PROVIDE ELECTRIC CONDUIT SUPPORT ANCHORAGE DESIGN AND DRAWINGS, BILL OF MATERIALS INCLUDING STOCK NUMBERS, DPSS ASSEMBLY UNITS (AU) CALL OUTS, AND CONSTRUCTION SUPPORT.
3. THE CUSTOMER PROJECT PLANNER WILL RETAIN PROJECT AND JOB RESPONSIBILITY, NEGOTIATIONS, AND BE THE MAIN CONTACT WITH THE CUSTOMER. THE CUSTOMER PROJECT PLANNER WILL WORK CLOSELY WITH THE CIVIL/STRUCTURAL ENGINEER IN DESIGN COORDINATION, ATTENDING MEETINGS, AND FINALIZING THE JOB DESIGN. FINAL JOB COSTS, DPSS AU DATA ENTRY, AND COMPLETE FINAL JOB PACKAGE WILL ALSO BE PERFORMED BY THE CUSTOMER PROJECT PLANNER.

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| SHEET<br>1 OF 1 |                   | <div><div></div><div></div></div>                | Indicates Latest Revision |      |            | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG 3378 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |            |                    |        |    |          |      |      |                     |  |         |
|                 |                   | CONDUIT INSTALLATION IN BRIDGES                  |                           |      |            |                    |        |    |          |      |      |                     |  |         |



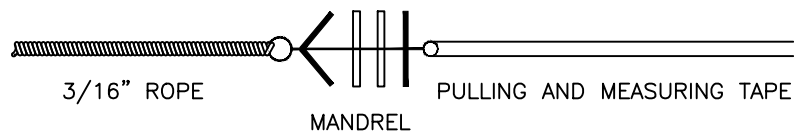
**SCOPE:** THIS STANDARD DESCRIBES THE PROCEDURE FOR MANDRELING CONDUITS AND THE INSTALLATION OF PULLING AND MEASURING TAPE.

**INSTALLATION:**

- A. ALL MANDRELING MUST BE DONE IN THE PRESENCE OF QUALIFIED SDG&E PERSONNEL.
- B. AFTER CONDUITS ARE INSTALLED, THEY MUST BE MANDRELED BY THE CONDUIT INSTALLER TO CHECK THE INSIDE DIAMETER AND PROVIDE A PATH FREE OF OBSTRUCTIONS.
- C. IN EACH CONDUIT RUN, USE A MANDREL EQUIVALENT TO THE SIZE CONDUIT BEING MANDRELED. THE MANDREL MUST BE SIZED TO THE SMALLEST INSIDE CONDUIT DIAMETER FOR THE TOTAL LENGTH OF THE RUN.
- D. IF THE MANDREL WILL NOT PASS THROUGH AN OBSTRUCTION, THE CONDUIT MUST BE REPLACED OR REPAIRED AT THAT POINT BY THE INSTALLER.
- E. THE PULLING TAPE SHALL BE PULLED IN BEHIND THE MANDREL. WHEN THE PULLING AND MEASURING TAPE IS INSTALLED IT SHALL BE ONE CONTINUOUS LENGTH WITHOUT KNOTS FOR THE ACCURATE MEASUREMENT FOR CONDUCTOR INSTALLATION AND THE PULLING OF CONDUCTORS OR WINCH LINES.
- F. THE CONDUIT INSTALLER MUST PROVIDE 3/4" PULLING AND MEASURING TAPE (STOCK NUMBER 721700) IN EACH CONDUIT. THE PULLING TAPE MUST BE APPROVED BY SDG&E AND HAVE A MINIMUM AVERAGE TENSILE STRENGTH OF 2500 LBS. PULLING TAPE TAILS OF 24 INCHES SHALL BE SECURED AT EACH END OF CONDUIT.

**REFERENCE:**

- a. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL.
- b. SEE SDG&E ELECTRIC STANDARD, PRACTICE MANUAL NUMBER 217, FOR INSTALLATION OF PULLING AND MEASURING TAPE AND MANDRELING.




**MATERIAL DATA:**

CABLE PULLING AND MEASURING TAPE: SDG&E APPROVED TENSILE STRENGTH 2500 LBS, WOVEN POLYESTER HIGH STRENGTH, CONTINUOUS FILAMENT, PRE LUBRICATED 3/4" WITH FOOTAGE MARKING.

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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |                    |          |                     |         |
|                 | CONDUIT MANDRELING  |                           |                    |          |                     |         |



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| SHEET<br>1 OF 2 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3382.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |                    |          |                     |           |
|                 | CONDUIT SUBSTRUCTURE ADAPTORS                    |                           |                    |          |                     |           |



- (A) USE SOLVENT CEMENT TO CEMENT THE ADAPTOR INTO THE PREFERRED TERMINATOR KNOCKOUT.
- (B) MAKE SURE THE CONDUIT ENTERS THE ADAPTOR STRAIGHT. THIS REQUIRES A MOUND OF DIRT APPROXIMATELY ONE OR TWO FEET OUTSIDE THE SUBSTRUCTURE (SEE DRAWING ON PREVIOUS PAGE). LEAVE 24 INCHES OF THE CONDUIT EXPOSED BEYOND THE SUBSTRUCTURE TERMINATOR INSIDE THE SUBSTRUCTURE. THIS WILL ALLOW MOVEMENT OF THE CONDUIT UNTIL THE TRENCH IS BACKFILLED.
- (C) AFTER THE TRENCH IS BACKFILLED, THE CONNECTION CREW SHALL INSTALL EITHER THE HEAT SHRINK SLEEVE OR TAPE WHERE THE CONDUIT AND ADAPTOR JOIN. NEXT MAKE THE FINAL CUT ON THE CONDUIT JUST BEYOND THE HEAT SHRINK SLEEVE OR TAPE AND DISREGARD THE THE EXCESS CONDUIT.
- (D) ON SINGLE ENTRANCE ADAPTORS (STYLE A ON PREVIOUS PAGE), APPLY ONE LAYER OF AQUA-SEAL AND TWO LAYERS OF GRAY TAPE AT THE POINT WHERE THE CONDUIT ENTERS THE ADAPTOR INSIDE THE SUBSTRUCTURE.
- (F) ONE ENTRANCE OF THE TRIPLE ENTRANCE ADAPTOR IS CAPPED SO IT MAY BE USED AS A TWO WAY ADAPTOR. THE CAP MAY BE CUT OFF IF THE THIRD CONDUIT ENTRANCE IS NEEDED.
- (G) HEAT SHRINK SLEEVES ARE REQUIRED ON DOUBLE AND TRIPLE ENTRANCE ADAPTORS (STYLE B ON PREVIOUS PAGE), INSTEAD OF THE HAND TAPED APPLICATION. BOTH METHODS DESCRIBED WILL PREVENT WATER AND OTHER DEBRIS FROM ENTERING THE SUBSTRUCTURE.

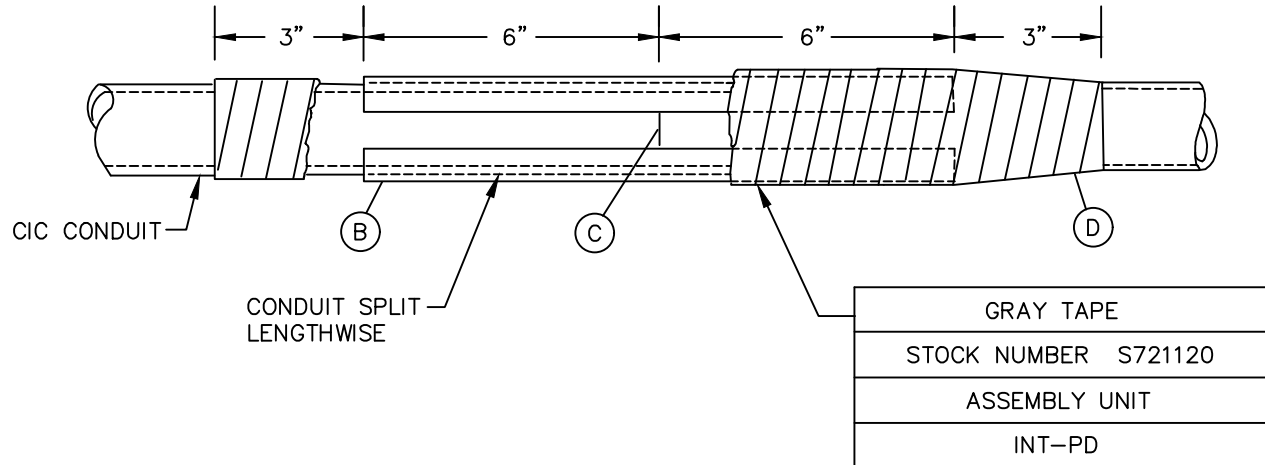
a. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL

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|  |                   |    | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |      |                    |     |          |    |                     |      |           |
|  |                   |    | CONDUIT SUBSTRUCTURE ADAPTORS                    |      |                    |     |          |    |                     |      |           |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR SPLICING OR REPAIRING CABLE-IN-CONDUIT (CIC) CONDUIT OR FLEXIBLE CONDUIT.

### SPLICING DETAIL



### **NOTES:**

- I. THIS METHOD SHALL BE USED FOR SPLICING FLEXIBLE CONDUIT, PID AND SIDA CONDUIT INCLUDING SIDA IN CORRUGATED CONDUIT WHENEVER REPAIR, REPLACEMENT OR EXTENSION IS NECESSARY.

### **INSTALLATION:**

- A. ASSURE CONDUIT SURFACES ARE CLEAN AND DRY.
- (B) CUT AND SPLIT LENGTHWISE A PIECE OF CONDUIT A MINIMUM OF 12 INCHES LONG THAT IS THE SAME SIZE CONDUIT AS BEING SPLICED.
- (C) CHAMFER THE INSIDE OF THE CONDUIT AND BUTT THE ENDS BEING SPLICED AS CLOSE TOGETHER AS POSSIBLE. PLACE SPLIT SECTION OVER THE CONDUITS BEING JOINED.
- (D) WRAP TWO HALF LAP LAYERS OF GRAY TAPE OVER SPLIT SECTION OF THE CIC CONDUIT. OVERLAP ENDS OF SPLIT SECTION AND ONTO CIC CONDUIT A MINIMUM OF 3 INCHES.

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**SHEET  
1 OF 1**

SDG&E ELECTRIC UNDERGROUND STANDARD

CONDUIT SPLICING INSTALLATION FOR  
CABLE - IN - CONDUIT (PID & SIDA)

**UG 3383**







3400 - PADS,  
RETAINING WALLS,  
CLEARANCES



3400 - PADS,  
RETAINING WALLS,  
CLEARANCES



| <u>PAGE</u> | <u>SUBJECT</u>   |
|-------------|--|
| 3405        | EQUIPMENT, PAD AND SUBSTRUCTURE CROSS REFERENCE  |
| 3408        | PAD MOUNTED EQUIPMENT WIRE ENTRY PREVENTION  |
| 3409        | RTU PAD FOR VISTA SWITCH WITH REMOTE RTU   |
| 3410        | 600A - 200A TERMINATOR PAD   |
| 3414        | CAPACITOR PAD  |
| 3415        | SERVICE RESTORER PAD   |
| 3416        | 12KV THREE-PHASE 200A TERMINATING CABINET PAD  |
| 3417        | 600A TERMINATING CABINET PAD   |
| 3418        | BOX PAD FOR PME-3 AND PME-5 SWITCHES   |
| 3419        | BOX PAD FOR 3-WAY PAD MOUNTED SWITCH   |
| 3421        | SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD   |
| 3423        | BOX PAD W/ TEMPORARY COVER FOR PME 9, 10 & 11 AND 2 SIDED TRAYER SWITCHES                      |
| 3425        | THREE-PHASE DEADFRONT TRANSFORMER PAD INSTALLATION 3425  |
| 3426        | THREE-PHASE DEADFRONT TRANSFORMER PAD INSTALLATION 3426  |
| 3427        | THREE-PHASE DEADFRONT/LIVEFRONT TRANSFORMER PAD INSTALLATION 3427                              |
| 3428        | BOX PAD FOR 4-WAY TRAYER PAD MOUNTED SWITCH  |
| 3429        | BOX PAD FOR 5-WAY TRAYER PAD MOUNTED SWITCH  |
| 3478        | TRANSFORMER SOUND ENCLOSURE  |
| 3479        | EQUIPMENT BARRIER PROTECTION AND CLEARANCE   |
| 3480        | CLEARANCE REQUIREMENTS FOR PAD MOUNTED AND SUBSURFACE EQUIPMENT FROM ABOVE GROUND OBJECTS      |
| 3481        | MINIMUM OPERATING CLEARANCE REQUIREMENTS FOR PAD MOUNTED EQUIPMENT                             |
| 3482        | MINIMUM OPERATING CLEARANCE REQUIREMENTS FOR SUBSURFACE EQUIPMENT                              |
| 3483        | MINIMUM OPERATING CLEARANCE REQUIREMENTS FOR PAD MOUNTED AND SUBSURFACE EQUIPMENT              |
| 3484        | PAD INSTALLATION FOR PAD MOUNTED EQUIPMENT, SLOPING GRADE INSTALLS, FIBERGLASS RETAINING WALLS |

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| A               | UPDATES TO 3421   | -   | KR   | JS  | MDJ | 7/25/2017          | D   |          |    |                     |     |          |      |
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**PAGE****SUBJECT**

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| 3485 | SUBSTRUCTURE INSTALLATION ON SLOPING GRADES  |
| 3486 | RETAINING WALL REQUIREMENTS AND CLEARANCES   |
| 3487 | RETAINING WALL REQUIREMENTS AND SINGLE PHASE TRANSFORMER PAD LOCATIONS SHOWING CATV AND/OR TELCO LOCATIONS |
| 3488 | CLEARANCES BETWEEN SDG&E FACILITIES AND OTHER ABOVE GROUND OBJECTS   |
| 3489 | MASONRY RETAINING WALLS - TYPES 1, 2, 3, 4, 5, 6 - LEVEL AND SLOPING BACKFILL                              |

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|                 | PADS, RETAINING WALLS, CLEARANCES<br>TABLE OF CONTENTS |                           |  |                    |  |          |  |                     |          |



**SCOPE:** THIS STANDARD SHOWS A CHART CROSS REFERENCING PAD MOUNTED EQUIPMENT WITH THE PAD AND SUBSTRUCTURES USED FOR INSTALLATION. READ FROM LEFT TO RIGHT.

**TABLE 1**

| EQUIPMENT PAD AND SUBSTRUCTURE CROSS REFERENCE    |                      |   |               |                |   |
|---|----------------------|---|---------------|----------------|---|
| EQUIPMENT   |                      | PAD   |               | HANDHOLE       |   |
| TYPE  | STANDARD PAGE        | TYPE  | STANDARD PAGE | TYPE/ STANDARD | INSIDE DIMENSIONS (IN)  |
| SINGLE-PHASE FUSE PAD                             | 3512                 | TRANSFORMER/UTILITY EQUIPMENT PAD                                   | 3421          | 3312           | 17 X 30   |
| THREE-PHASE SWITCHING CAB FUSED                   | --                   |   |               |                |   |
| THREE-PHASE SWITCHING CAB FUSED (FEED THRU)       | 3514                 |   |               |                |   |
| SINGLE-PHASE <b>TERMINATOR</b>                    | 3522                 |   |               |                |   |
| THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET | 3523                 | THREE-PHASE LOW PROFILE TERMINATOR PAD                              | 3416          | 3311           | 14 X 66 X 14  |
| 60A TERMINATING CABINET (DEADFRONT)               | 3582                 | 600A TERMINATING CABINET PAD  | 3417          | 3313           | BASE SECTION  |
| PAD MOUNTED PME 3 SWITCH                          | 3583                 | PME 3 BOX PAD   | 3418          | --             | --  |
| 3-WAY PAD MOUNTED SWITCH                          | 3586                 | BOX PAD   | 3419          | --             | --  |
| PAD MOUNTED PME 9, 10 & 11 SWITCHES               | 3567                 | PME 9, 10 & 11 BOX PAD  | 3423          | --             | --  |
| PAD MOUNTED SERVICE RESTORER                      | 3575                 | SERVICE RESTORER PAD  | 3415          | 3313           | (1) 18" BASE SECTION  |
| --  | 3711<br>3712<br>3713 | TRANSFORMER/UTILITY EQUIPMENT PAD                                   | 3421          | --             | --  |
| --  | --                   | THREE-PHASE TRANSFORMER PAD (THRU 300 KVA DEADFRONT)                | 3425          | --             | --  |
| 1200 KVAR PAD MOUNT CAPACITOR                     | --                   | CAPACITOR PAD   | 3414          | --             | --  |
| 600A TO 200A TERMINATOR                           | 3410                 | TERMINATOR PAD  | 3410          | 3314           | 36 X 72   |
| --  | 3751                 | THREE-PHASE TRANSFORMER PAD (500-1000 KVA DEADFRONT)                | 3426          | 3314           | 12" TOP SECTION (IF REQ'D) & (2) 3314<br>12" INTERMEDIATE EXTENSION SECTIONS (IF REQ'D) |
| --  |                      | THREE-PHASE TRANSFORMER PAD (225-2500 KVA DEADFRONT) <sup>(A)</sup> | 3427          |                |   |
| --  | 3755                 | THREE-PHASE TRANSFORMER PAD (3750 HHR KVA DEADFRONT)                | 3425          | --             | --  |
| 1200 KVAR PAD MOUNTED CAPACITOR                   | --                   | CAPACITOR PAD   | 3414          | --             | --  |

**INSTALLATION:**

(A) FOR USE WHEN CONDUIT REQUIREMENTS ARE GREATER THAN THE MAXIMUM SHOWN IN UG3426.

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. UNOBSTRUCTED READY ACCESS FOR THE UTILITIES VEHICLES AND EQUIPMENT MUST BE MAINTAINED TO INSTALL, REMOVE, OR MAINTAIN THESE FACILITIES.

**REFERENCE:** NONE

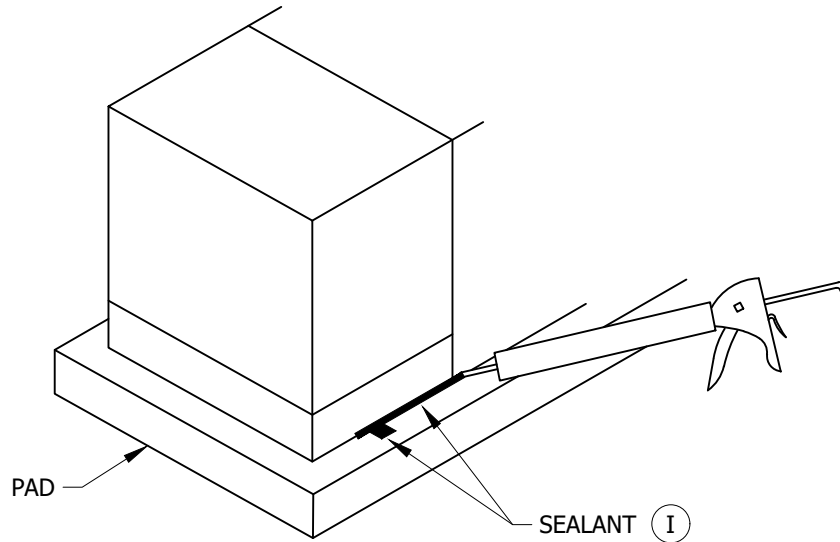
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**SCOPE:** THIS STANDARD SHOWS SEALANT USED TO FILL GAPS BETWEEN CONCRETE PADS AND PAD MOUNTED EQUIPMENT TO PREVENT A PERSON FROM PASSING A WIRE OR OTHER CONDUCTING MATERIAL FROM THE THE OUTSIDE INTO A COMPARTMENT WITH EXPOSED LIVE PARTS AFTER THE EQUIPMENT IS CLOSED AND LOCKED.



**FIGURE 1**

## INSTALLATION:

- A. ON ALL PAD MOUNTED TRANSFORMERS, APPLY SEALANT AROUND THE FRONT OR SILL OF THE TRANSFORMER NEXT TO CONCRETE PAD AND THE "PAD UNISTRUT" INSIDE AND OUT. THIS WILL PREVENT ANY POSSIBLE WIRE ENTRY. ON ALL OTHER PAD MOUNTED EQUIPMENT CHECK INSTALLATION USING A #18 AWG WIRE OR EQUIVALENT FOR GAPS BETWEEN EQUIPMENT BASE AND TOP OF PAD, INCLUDING EXPOSED UNISTRUT ENTRANCES. APPLY SEALANT WHERE NECESSARY TO PREVENT WIRE ENTRY. (B)
- (B) USE EXTREME CAUTION WHEN CHECKING ENERGIZED EQUIPMENT AND USE INSULATING BARRIERS AS NECESSARY.
- C. BEFORE APPLYING SEALANT, CAREFULLY FOLLOW INSTRUCTIONS ON THE CARTRIDGE. CLEAN SURFACE WITH SOLVENT AND APPLY SEALANT WITH A CAULKING GUN. DO NOT SEAL MANHOLE OR HANDHOLE COVERS.
- D. MAINTENANCE:  
REPLACE ANY SEALANT THAT MAY BE LOOSE OR BROKEN. IF NEW SEALANT WILL NOT ADHERE TO EXISTING SEALANT, REMOVE IT AND FOLLOW INSTALLATION STEP C.

**BILL OF MATERIALS:** NONE

**NOTES:**

- ① SEALANT STOCK NUMBER S631800.

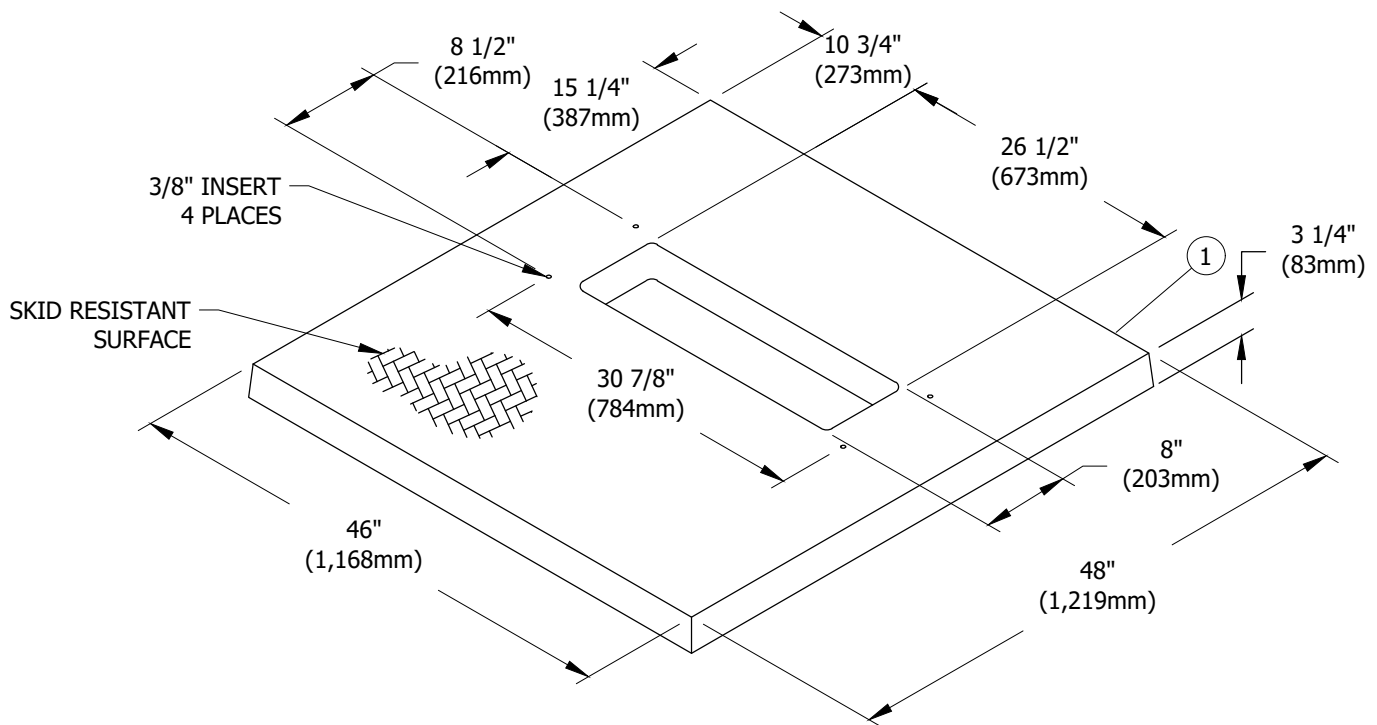
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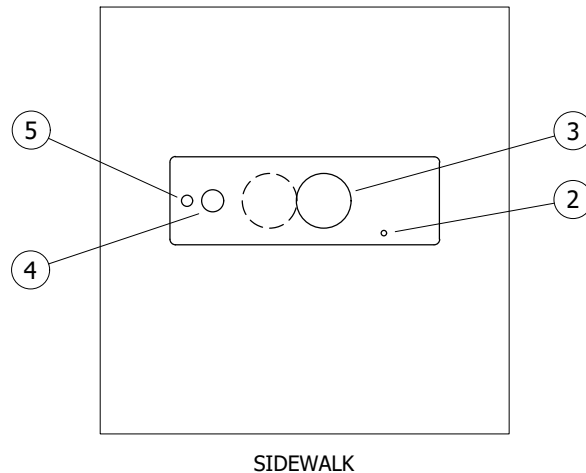
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| C               |            |   |                           |     |        |                    | F   |          |    |                     |     |     |      |          |
| B               | FORMATTING | EDM   | JK                        | -   | -      | 11/5/2020          | E   |          |    |                     |     |     |      |          |
| A               | REVISION   | -   | -                         | -   | TR/MJC | 9/20/2013          | D   |          |    |                     |     |     |      |          |
| SHEET<br>1 OF 1 |            | X   | Indicates Latest Revision |     |        | Completely Revised |     | New Page |    | Information Removed |     |     |      | UG3408.1 |
|                 |            | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |        |                    |     |          |    |                     |     |     |      |          |
|                 |            | PAD-MOUNTED EQUIPMENT WIRE ENTRY PREVENTION       |                           |     |        |                    |     |          |    |                     |     |     |      |          |



**SCOPE:** THIS STANDARD SHOWS RTU PAD FOR S&C REMOTE. REMOTE TERMINAL UNITS.



**FIGURE 1**  
ISOMETRIC VIEW



**FIGURE 1**  
**PLAN VIEW**

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SHEET  
1 OF 2

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

RTU PAD FOR VISTA SWITCH WITH REMOTE RTU

UG3409.1




- A. SET PAD LEVEL TO FINAL AND INSTALL EQUIPMENT GROUND.
- B. PLACE ONE OR TWO 5-INCH CONDUIT, ONE 2-INCH CONDUIT, ONE 1-INCH CONDUIT AND EQUIPMENT GROUND WITHIN PAD OPENING.
- C. TERMINATE ALL CONDUITS FLUSH WITH THE TOP OF THE PAD. DO NOT CUT INTO THE CURVED PORTION OF THE ELBOWS. RADIUS OF CURVATURE IS 36-INCH MINIMUM OF 3-INCH, 5-INCH CONDUITS.

| ITEM | DESCRIPTION                | WEIGHT (LBS) | APPROVED MFG | MFG PART NUMBER | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|----------------------------|--------------|--------------|-----------------|----------|---------------|--------------|--------------|
| 1    | PAD - REMOTE TERMINAL UNIT | 108 (49KGS)  | QUAZITE      | PL4846WA        | 1        | 3409.1        | S513428      | RTUPAD       |
| 2    | EQUIPMENT GROUND           | --           | --           | --              | 1        | 4510          | --           | TG-T-W       |
| 3    | 5-INCH CONDUIT             | --           | --           | --              | AS REQ'D | 3373.1        | S249728      | --           |
| 4    | 2-INCH CONDUIT             | --           | --           | --              | 1        |               | S249632      | 1DB2-S       |
| 5    | 1-INCH PE                  | --           | --           | --              | 1        |               | S249630      | 1"PE         |

I. THIS PAD IS NOT TO BE POURED IN PLACE.

- a. SEE UG3211.3 FOR PAD IDENTIFICATION.
- b. SEE UG3370 OR UG3371 FOR TRENCH, UTILITY POSITIONING, SHADING AND BACKFILL REQUIREMENTS.
- c. SEE [UG3479](#) FOR TRANSFORMER BARRIER PROTECTION.
- d. SEE [UG3480](#), [UG3481](#), [UG3482](#) & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- e. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- f. SEE UG3486 & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- g. SEE [UG3489](#) FOR RETAINING WALLS.
- h. SEE UG4512 FOR EQUIPMENT GROUNDING.

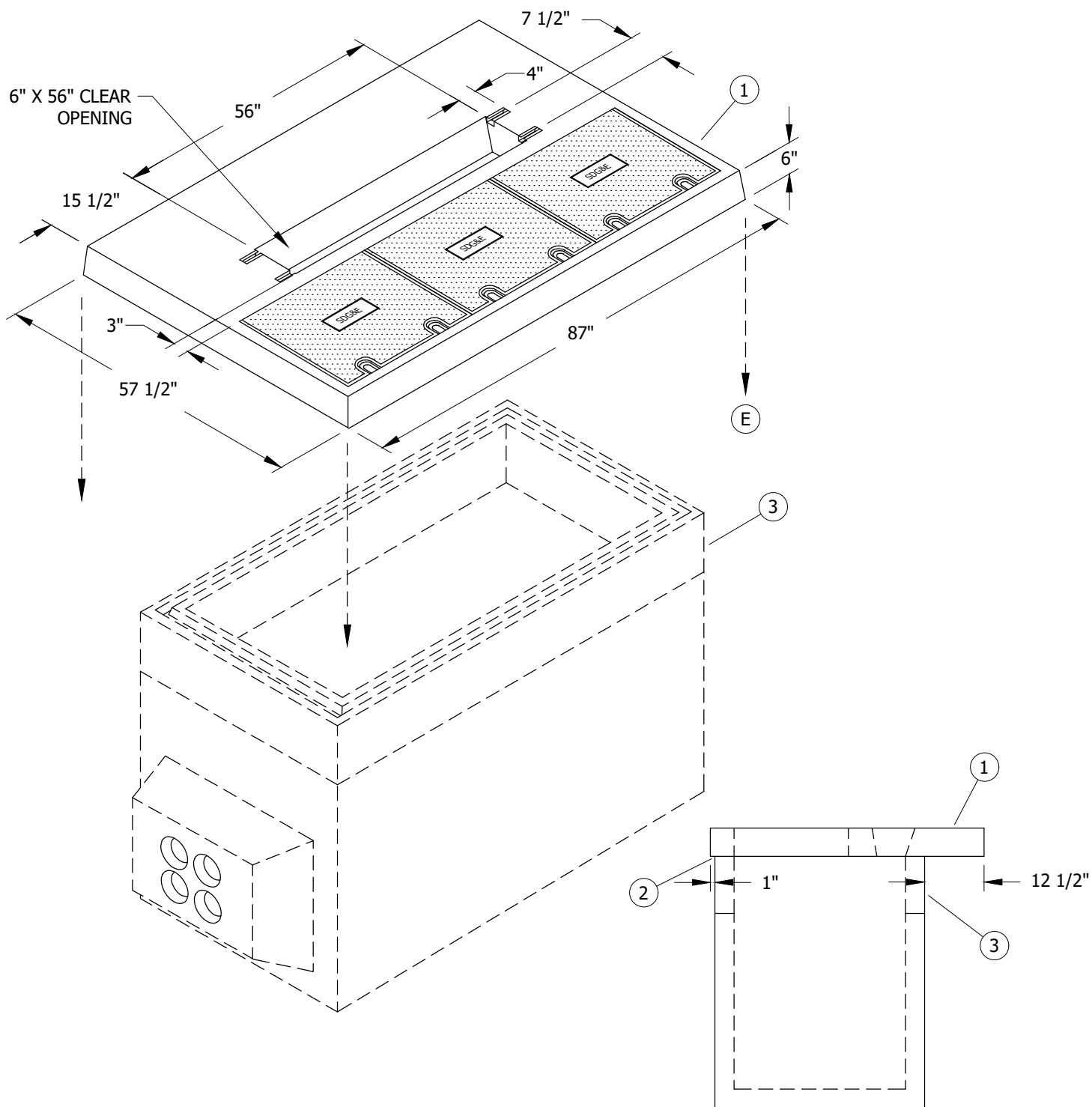
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                   |                           |                    |          |                     |
| RTU PAD FOR VISTA SWITCH WITH REMOTE RTU  |                           |                    |          |                     |

UG3409.2



**SCOPE:** THIS STANDARD SHOWS THE PAD USED WITH THE 600A TO 200A DEADFRONT TERMINATOR INSTALLED ON TOP OF AN EXISTING 3314 HANDHOLE.



**FIGURE 1**

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**SHEET  
1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A TO 200A TERMINATOR PAD

**UG3410.1**



**INSTALLATION:**

- A. THIS PAD IS NOT TO BE INSTALLED ON NEW CONSTRUCTION. PAD IS TO BE INSTALLED ON THE TOP OF AN EXISTING 3314 HANDHOLE. MAY ALSO BE INSTALLED ON A "B" BOX PROVIDING THE TOP SECTION HAS BEEN MODIFIED OR REPLACED WITH 3314 INTERMEDIATE SECTIONS.
- B. WHEN THE EXISTING HANDHOLE TOP SECTION HAS BEEN SET TO A SLOPING GRADE, THE TOP SECTION OF HANDHOLE MUST RE-GRADED AND SET LEVEL.
- C. INSTALL A THIN LAYER OF SEALANT MASTIC BETWEEN HANDHOLE TOP SECTION AND PAD.
- D. APPLY LUBRICANT SUCH AS EZ-1 TO THE PENTAHEAD BOLTS WHEN SECURING THE COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. TIGHTEN DOWN BOLTS WITH A TORQUE WRENCH TO 30 FT./IBS MIN., 40FT/IBS. MAX.
- (E) PAD SHOULD NOT BE INSTALLED ON EXISTING HANDHOLES LOCATED IN SIDEWALKS.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                         | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | SAP CU  |
|------|-------------------------------------|--------------|----------|---------------|--------------|--------------|---------|
| 1    | TERMINATOR PAD                      | 1,480 MAX.   | 1        | --            | S514260      | 3410         | 3410PAD |
| 2    | SEALANT, PLASTIC-MASTIC (NOT SHOWN) | --           | AS REQ'D | --            | S631872      | --           | --      |
| 3    | EXISTING 3314 HANDHOLE              | --           | 1        | 3314          | --           | --           | --      |

**NOTES:** NONE**REFERENCE:**

- a. SEE [UG3479](#) FOR BARRIER PROTECTION AND CLEARANCE.
- b. SEE [UG3480](#), [UG3481](#), [UG3482](#) & [UG3483](#) FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- c. SEE [UG3484](#) FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- d. SEE [UG3486](#) & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE [UG3489](#) FOR RETAINING WALLS.
- f. SEE [UG3524](#) FOR 600A TO 200A TERMINATOR.

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| B   | EDITORIAL CHANGES | -   | JS | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
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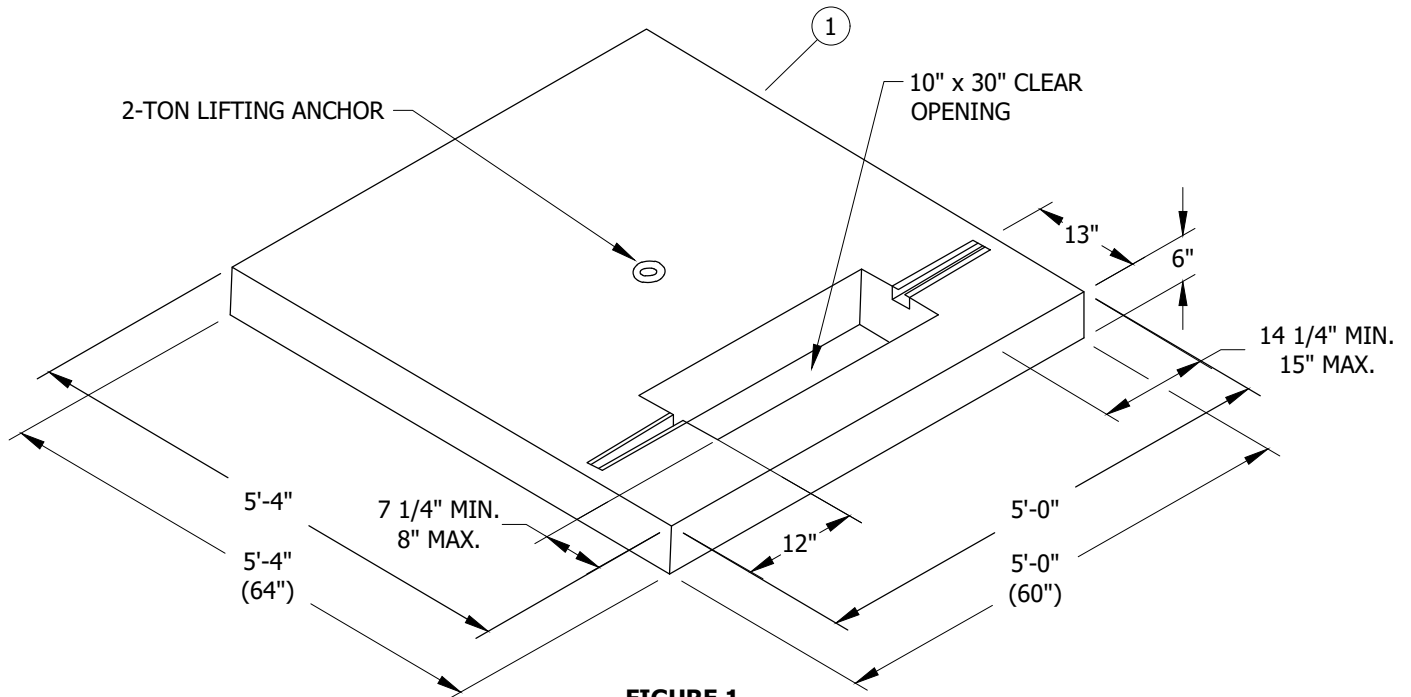
SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A TO 200A TERMINATOR PAD

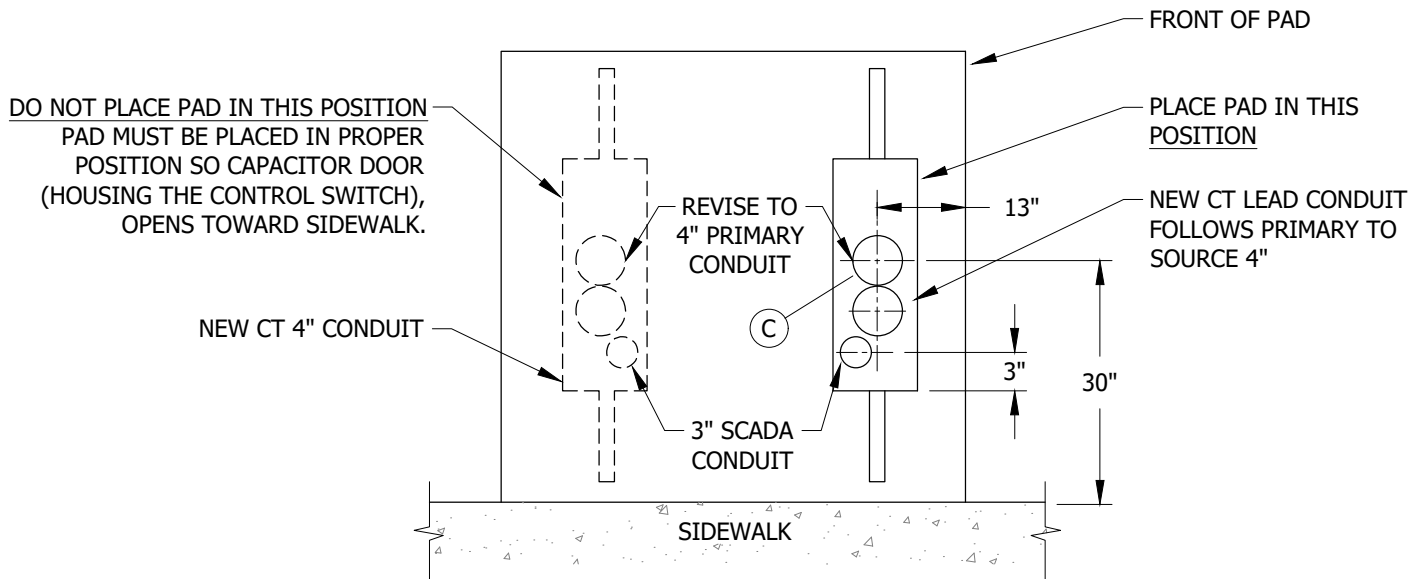
UG3410.2



**SCOPE:** THIS STANDARD SHOWS THE PAD MOUNTED SCADA CAPACITOR PAD AND CONDUIT PLACEMENT USED WITH THE 1200 KVAR PAD MOUNTED SCADA CAPACITOR.



**FIGURE 1**  
ISOMETRIC VIEW



**FIGURE 1**  
TOP VIEW

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                          |                    |                          |          |                          |                     |
| CAPACITOR PAD                                     |                           |                          |                    |                          |          |                          |                     |

SHEET  
1 OF 2

UG3414.1



**INSTALLATION:**

- (A) THIS PAD MAY NOT BE POURED IN PLACE. USE PRECAST PADS ONLY.
- B. 4" CONDUITS SHOULD CONNECT TO THE ORIGINATION POINT OF THE PRIMARY (HANDHOLE/MANHOLE).
- (C) TERMINATE ALL CONDUIT FLUSH WITH TOP OF PAD.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION       | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------|--------------|----------|---------------|--------------|--------------|
| 1    | CAPACITOR PAD (A) | 1,850 MAX.   | 1        | --            | S514280      | CAP-PD       |

**NOTES:** NONE**REFERENCE:**

- SEE UG3211.3 FOR PAD IDENTIFICATION.
- SEE UG3479 FOR BARRIER PROTECTION AND CLEARANCE.
- SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- SEE UG3489 FOR RETAINING WALLS.
- SEE UG3821 FOR INSTALLATION REQUIREMENTS FOR PAD MOUNTED CAPACITOR.
- SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.

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CAPACITOR PAD

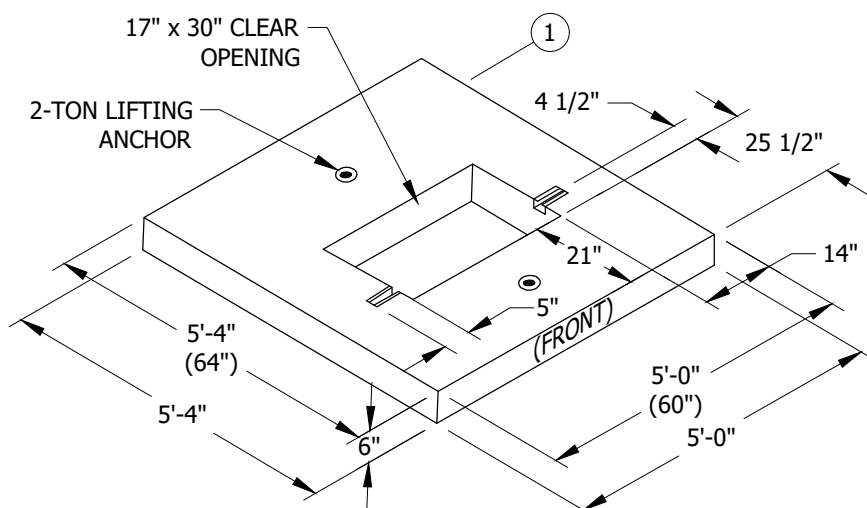
UG3414.2



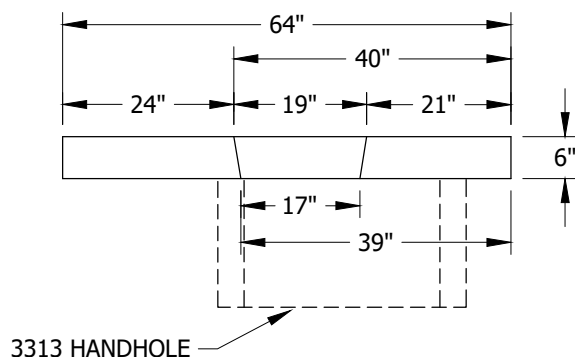
**SCOPE:** THIS STANDARD SHOWS THE PAD MOUNTED SERVICE RESTORER PAD AND CONDUIT PLACEMENT USED WITH THE PAD MOUNTED SERVICE RESTORER.

**ATTENTION:**

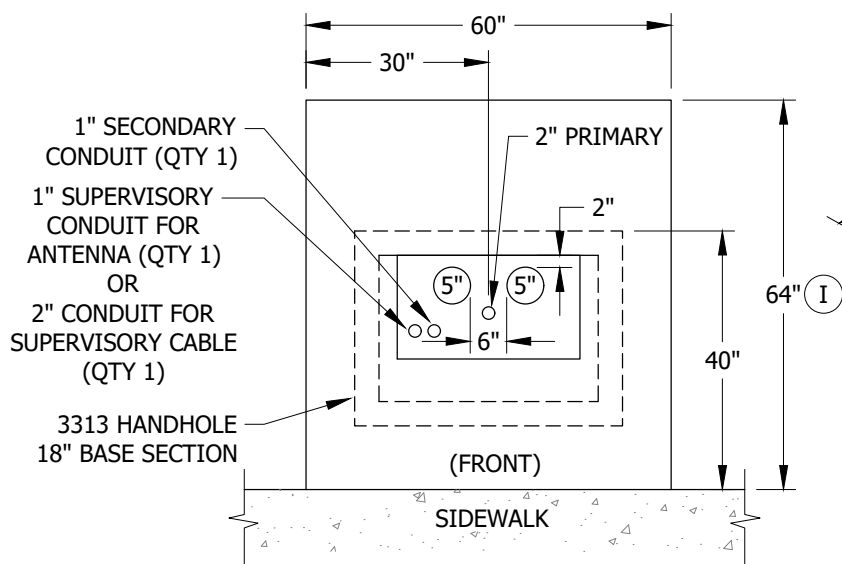
- \* PAD MAY NOT BE POURED IN PLACE. USE PRECAST PADS ONLY.



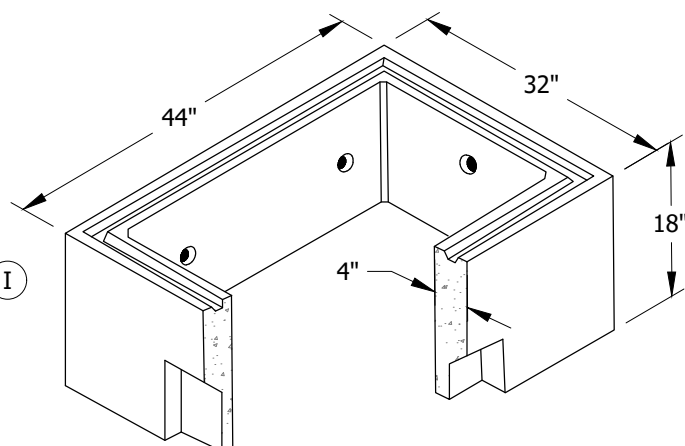
**FIGURE 1**  
PAD FOR EATON-COOPER SERVICE RESTORER  
ISOMETRIC VIEW



**FIGURE 1**  
PAD FOR EATON-COOPER SERVICE RESTORER  
PROFILE VIEW



**FIGURE 1**  
PAD FOR EATON-COOPER SERVICE RESTORER (I)  
PREFERRED INSTALLATION  
PLAN VIEW



**FIGURE 1**  
3313 HANDHOLE 18" BASE SECTION  
ISOMETRIC VIEW

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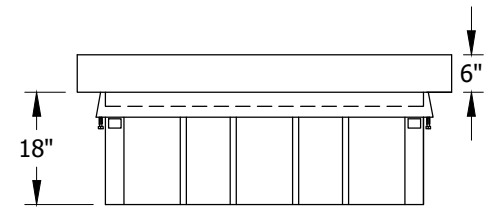
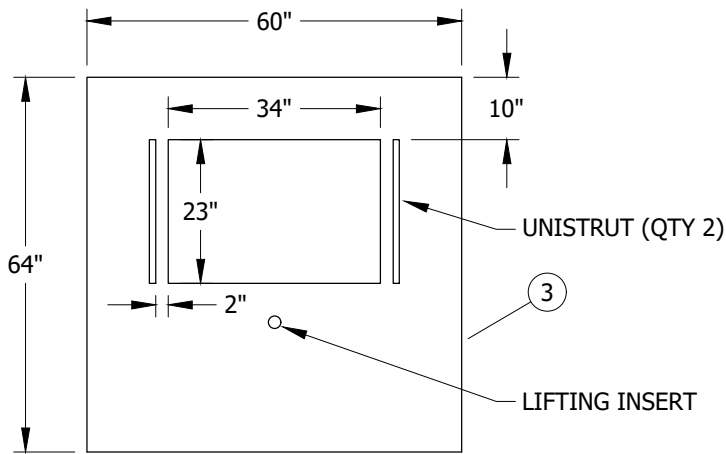
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SERVICE RESTORER PAD

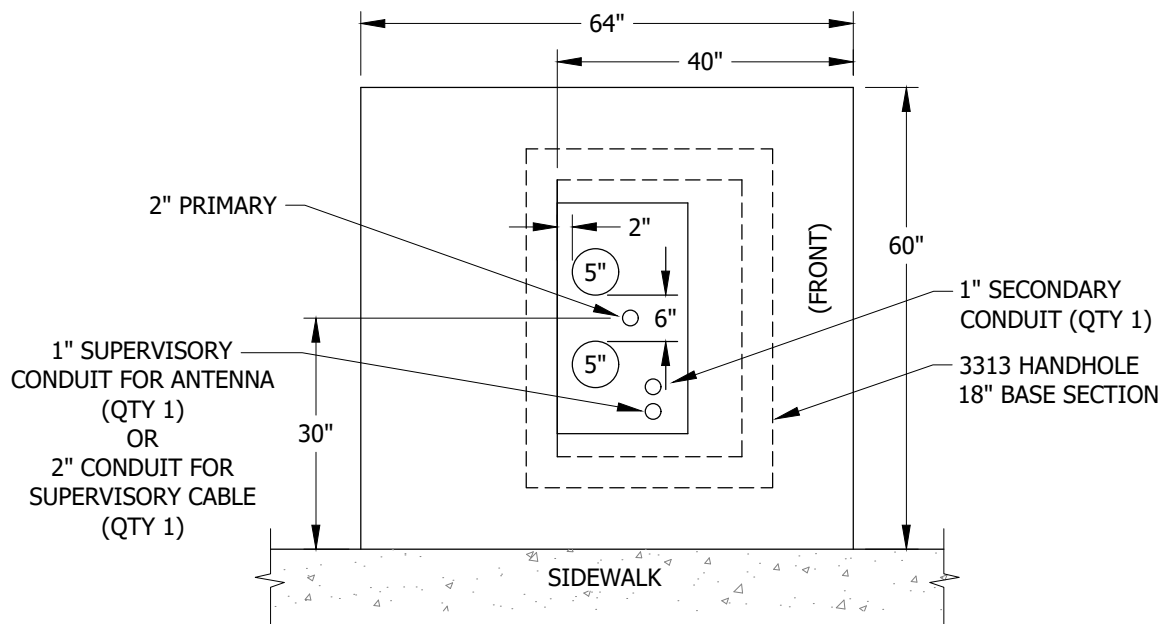
UG3415.1





**FIGURE 2**  
PAD FOR ISG AND FUTURE SERVICE RESTORERS  
PROFILE VIEW

**FIGURE 2**  
PAD FOR ISG AND FUTURE SERVICE RESTORERS  
PLAN VIEW



**FIGURE 3**  
ALTERNATE INSTALLATION (D) (i)  
PLAN VIEW

**ATTENTION:**

\* DEVIATION REQUEST IS REQUIRED FOR PAD ALTERNATE INSTALLATION. (i)

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SERVICE RESTORER PAD

UG3415.2



**INSTALLATION:**

- A. SET PAD LEVEL TO FINAL GRADE AND INSTALL EQUIPMENT GROUND.
- B. TERMINATE CONDUITS 3 INCHES ABOVE THE BOTTOM OF THE 3313 HANDHOLE.
- C. INSTALL SECONDARY CONDUIT WHEN SOURCE IS WITHIN PLUS OR MINUS 50 FEET, OTHERWISE INSTALL "N" TRANSFORMER.
- Ⓓ PLACE PAD IN THIS POSITION TO ALLOW DOOR, HOUSING CONTROL TO OPEN TOWARD THE SIDEWALK.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                     | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | MACRO  |
|------|---|--------------|----------|---------------|--------------|--------------|--------|
| 1    | PAD, LEGACY RECLOSER, FOR EATON-COOPER RECLOSER | 1,825 MAX.   | 1        | --            | S514282      | --           | 3415-B |
| 2    | BASE SECTION, 3313 HANDHOLE, 18"                | 885 MAX.     | 1        | 3313          | S162664      | 3313-B       |        |
| 3    | PAD, RESTORER, ISG/SERVICE                      | --           | 1        | --            | S514262      | 3415-I       | --     |

**NOTES:**

- Ⓘ 64" WILL NORMALLY REQUIRE A RIGHT-OF-WAY. USE ALTERNATE INSTALLATION WHEN RIGHT-OF-WAY CANNOT BE OBTAINED.

**REFERENCE:**

- a. SEE [UG3479](#) FOR BARRIER PROTECTION AND CLEARANCE.
- b. SEE [UG3480](#), [UG3481](#), [UG3482](#) & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- c. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- d. SEE UG3486 & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE [UG3489](#) FOR RETAINING WALLS.
- f. SEE UG3575 FOR PAD MOUNTED SERVICE RESTORER.
- g. SEE UG3576 FOR INSTALLATION REQUIREMENTS FOR PAD MOUNTED SERVICE RESTORER.
- h. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- Ⓙ SEE UG3005 FOR DEVIATION REQUEST FORM AND PROCEDURE.

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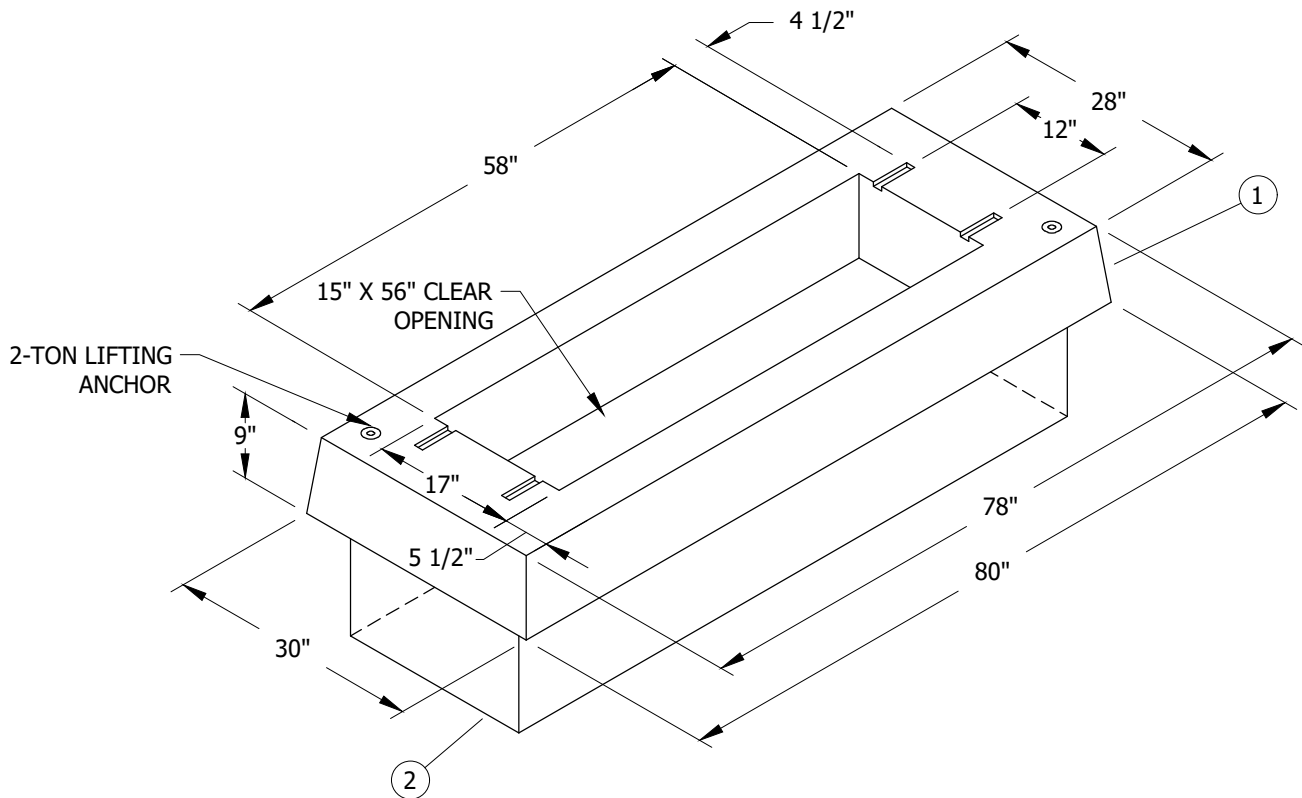
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SERVICE RESTORER PAD

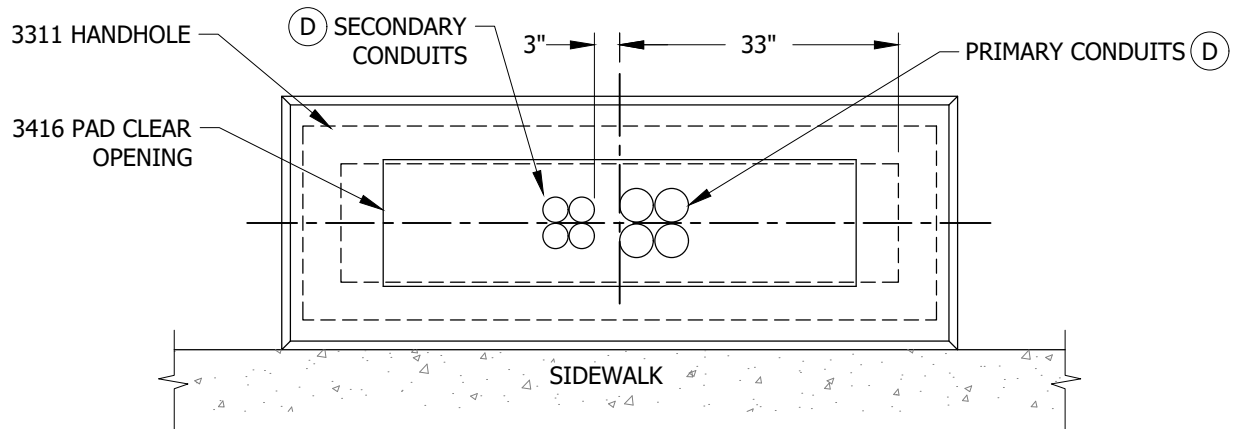
UG3415.3



**SCOPE:** THIS STANDARD SHOWS THE PAD AND HANDHOLE USED WITH THE PAD MOUNTED 200A LOW PROFILE CABLE TERMINATING CABINET. CONDUIT PLACEMENT IS ALSO SHOWN.



**FIGURE 1**



**FIGURE 2**  
PLAN VIEW

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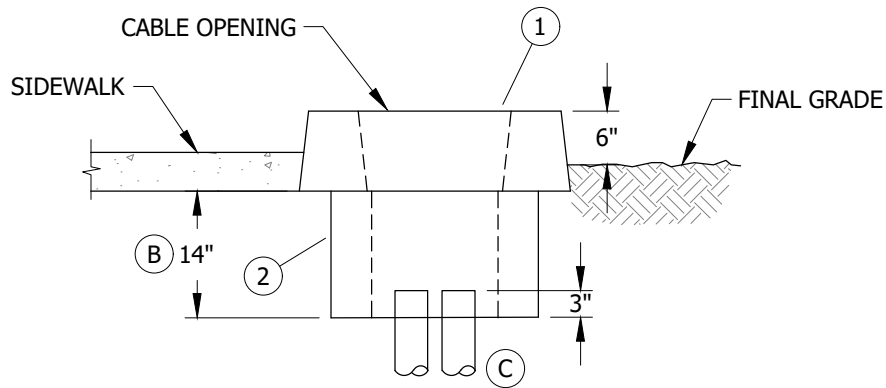
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

3416 PAD & HANDHOLE INSTALLATIONS FOR PAD MOUNTED  
12KV THREE-PHASE 200A TERMINATING CABINET

**UG3416.1**





**FIGURE 3**  
INSTALLATION LOCATION DETAIL

**INSTALLATION:**

**3416 PAD OVER 3311 HANDHOLE**

- A. INSTALL CONDUITS AS SHOWN.
- (B) THE PAD AND HANDHOLE LOCATION IS TO BE MARKED OUT PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING PAD AND HANDHOLES REQUIRES APPROVAL FROM SERVICE PLANNING. ONCE THE LOCATION HAS BEEN ESTABLISHED, MARK OUT DIMENSIONS FOR AN EXCAVATION OF 2'-5" WIDE X 6'-9" LONG. THE DEPTH OF THE EXCAVATION IS 17 INCHES ALLOWING THE BOTTOM OF THE PAD TO SET 3" BELOW GRADE.
- (C) PLACE ALL PRIMARY AND SECONDARY CONDUITS WITHIN THE HANDHOLE. TERMINATE PRIMARY AND SECONDARY CONDUITS 3 INCHES ABOVE THE BOTTOM OF HANDHOLE. DO NOT CUT INTO THE CURVED PORTION OF THE ELBOWS.

(D) **TABLE 1**

| SECONDARY CONDUIT COMBINATIONS (E) |        |        |                |
|------------------------------------|--------|--------|----------------|
| 2-INCH                             | 3-INCH | 4-INCH | TOTAL CONDUITS |
| --                                 | 5      | --     | 5              |
| 4                                  | 3      | --     | 7              |
| 5                                  | 2      | --     | 7              |
| 6                                  | 1      | --     | 7              |
| 7                                  | --     | --     | 7              |
| 1                                  | --     | 4      | 5              |
| --                                 | 1      | 4      | 5              |
| 1                                  | 1      | 3      | 5              |
| --                                 | 3      | 2      | 5              |
| --                                 | 4      | 1      | 5              |
| 4                                  | --     | 3      | 7              |
| 5                                  | --     | 2      | 7              |
| 6                                  | --     | 1      | 7              |

**TABLE 2**

| PRIMARY CONDUIT COMBINATIONS |        |        |                |
|------------------------------|--------|--------|----------------|
| 2-INCH                       | 3-INCH | 4-INCH | TOTAL CONDUITS |
| --                           | --     | 4      | 4              |
| 3                            | --     | 3      | 6              |
| --                           | 3      | 1      | 4              |

- (E) MAY INCLUDE TWO ADDITIONAL ONE INCH CONDUITS FOR STREET LIGHTS.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

3416 PAD & HANDHOLE INSTALLATIONS FOR PAD MOUNTED  
12KV THREE-PHASE 200A TERMINATING CABINET

**UG3416.2**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                     | WEIGHT<br>(LBS) | QUANTITY | STANDARD<br>PAGE | STOCK<br>NUMBER | DESIGN<br>UNITS | SAP CU  |
|------|---------------------------------|-----------------|----------|------------------|-----------------|-----------------|---------|
| 1    | PAD SECTION, 3416               | 1,200           | 1        | 3416.1           | S514020         | 3416            | 3416PAD |
| 2    | HANDHOLE, 3311, 14" X 66" X 14" | --              | 1        | 3311             | S162660         |                 |         |

**NOTES:**

I. PAD SECTION MAY NOT BE POURED IN PLACE.

**REFERENCE:**

- a. SEE [UG3211.3](#) FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE [UG3479](#) FOR EQUIPMENT BARRIER PROTECTION.
- c. SEE [UG3480](#), [UG3481](#), [UG3482](#) & [UG3483](#) FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- d. SEE [UG3484](#) FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- e. SEE [UG3486](#) & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- f. SEE [UG3489](#) FOR RETAINING WALLS.
- g. SEE [UG3523](#) FOR PAD MOUNTED CABLE TERMINATING CABINET.
- h. SEE [UG4510](#) FOR PREFERRED AND ALTERNATE TRENCH GROUND WIRE.
- i. SEE [UG4512](#) FOR EQUIPMENT GROUNDING INSTALLATION.
- j. SEE [UG4514](#) FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.

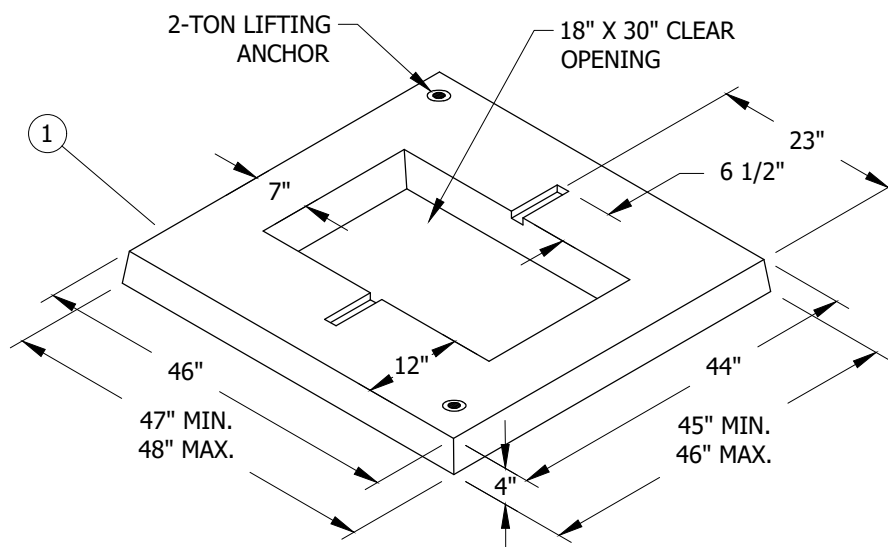
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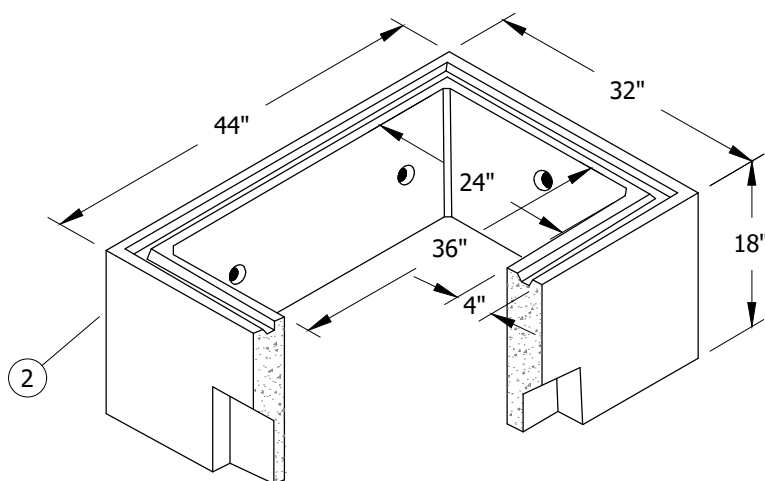
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|                 | 3416 PAD & HANDHOLE INSTALLATIONS FOR PAD MOUNTED<br>12KV THREE-PHASE 200A TERMINATING CABINET |                           |                          |                    |                          |          |                          |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE PAD AND HANDHOLE USED WITH THE PAD MOUNTED 600A TERMINATING CABINET. CONDUIT PLACEMENT IS ALSO SHOWN.



**FIGURE 1**  
ISOMETRIC VIEW



**FIGURE 2**  
3313 HANDHOLE, 18" BASE SECTION

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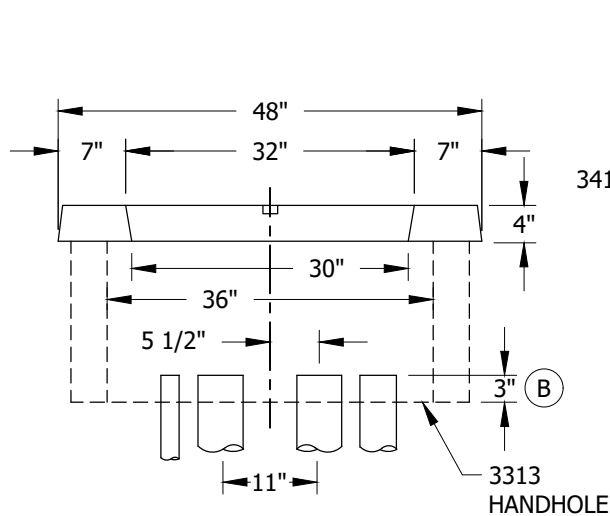
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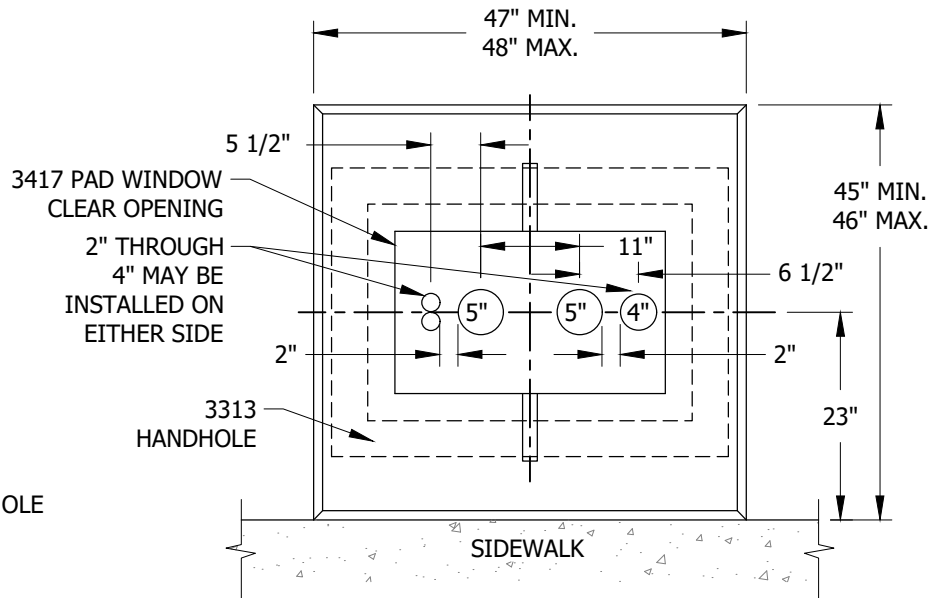
600A TERMINATING CABINET PAD

UG3417.1





**FIGURE 3**  
SIDE VIEW



**FIGURE 3**  
PLAN VIEW

### INSTALLATION:

- A. SET PAD LEVEL TO FINAL GRADE AND INSTALL EQUIPMENT GROUND.
- (B) TERMINATE CONDUITS 3 INCHES ABOVE THE BOTTOM OF THE 3313 HANDHOLE.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                   | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | SAP CU  |
|------|-------------------------------|--------------|----------|---------------|--------------|--------------|---------|
| 1    | PAD, 600A TERMINATING CABINET | 619 MAX.     | 1        | --            | S514022      | 3417         | 3417PAD |
| 2    | HANDHOLE, 3313 BASE SECTION   | 885 MAX.     | 1        | 3313          | S162664      |              |         |

### NOTES:

- I. PAD MAY NOT BE POURED IN PLACE. USE PRECAST PADS ONLY.
- II. MAY INCLUDE TWO ADDITIONAL ONE INCH CONDUITS FOR STREET LIGHTS.

### REFERENCE:

- a. SEE UG3479 FOR BARRIER PROTECTION AND CLEARANCE.
- b. SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- c. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- d. SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE UG3489 FOR RETAINING WALLS.
- f. SEE UG3582 FOR INSTALLATION REQUIREMENTS FOR PAD MOUNTED 600A TERMINATING CABINET.
- g. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.

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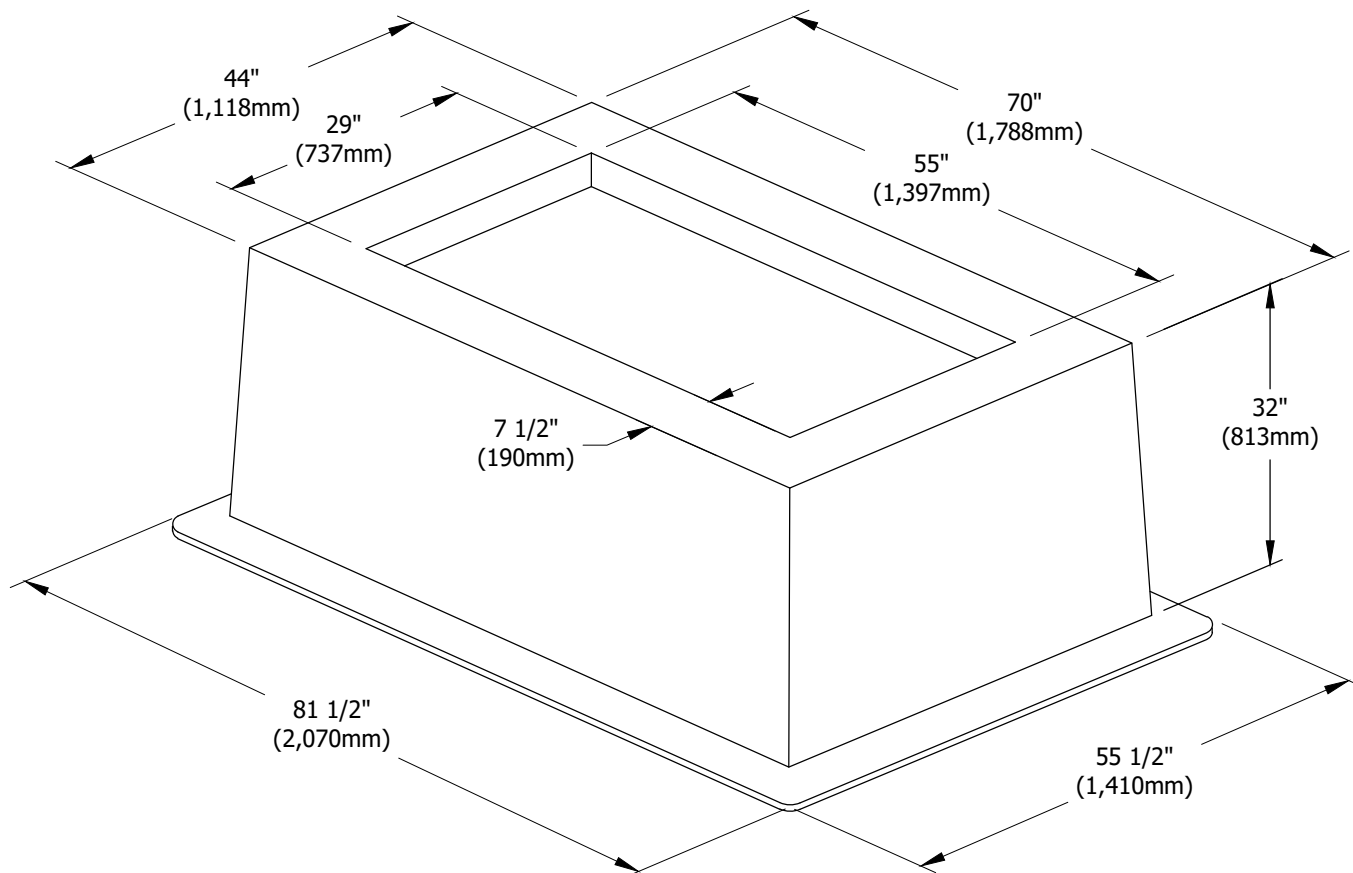
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A TERMINATING CABINET PAD

UG3417.2



**SCOPE:** THIS STANDARD SHOWS THE BOX PAD AND CONDUIT PLACEMENT FOR THE PME-3 AND PME-5 PAD MOUNTED AIR BREAK SWITCHES.



**FIGURE 1** (II)

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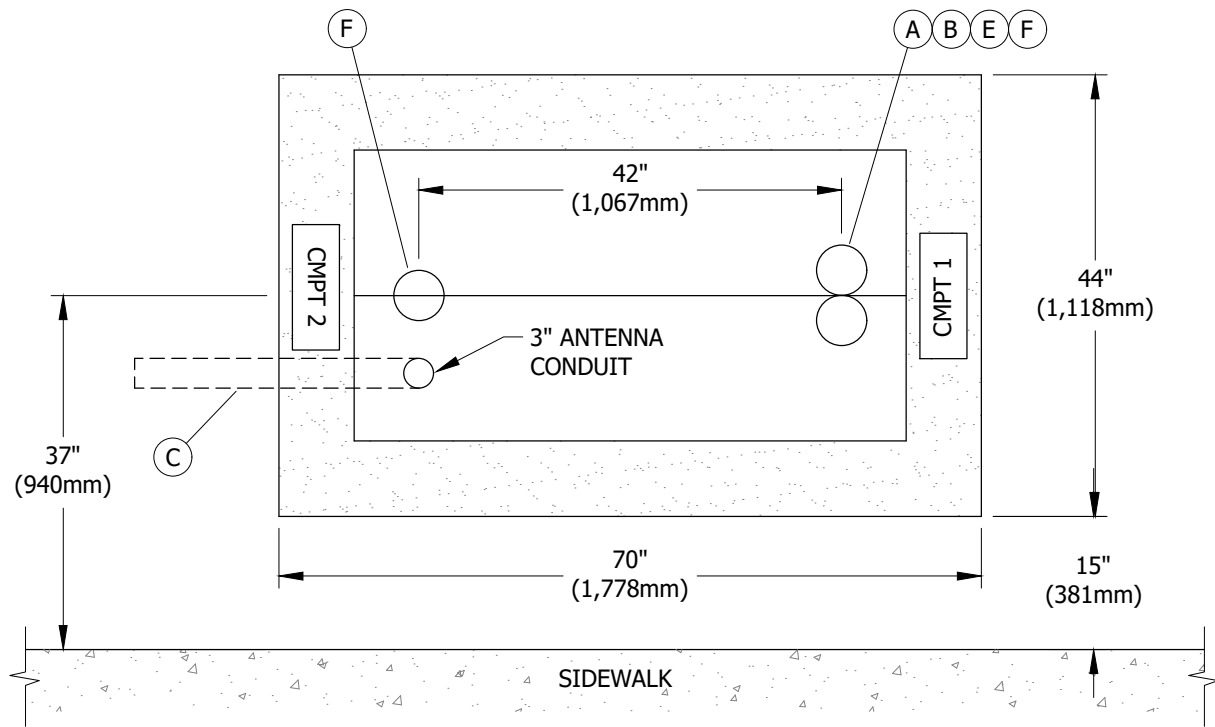
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

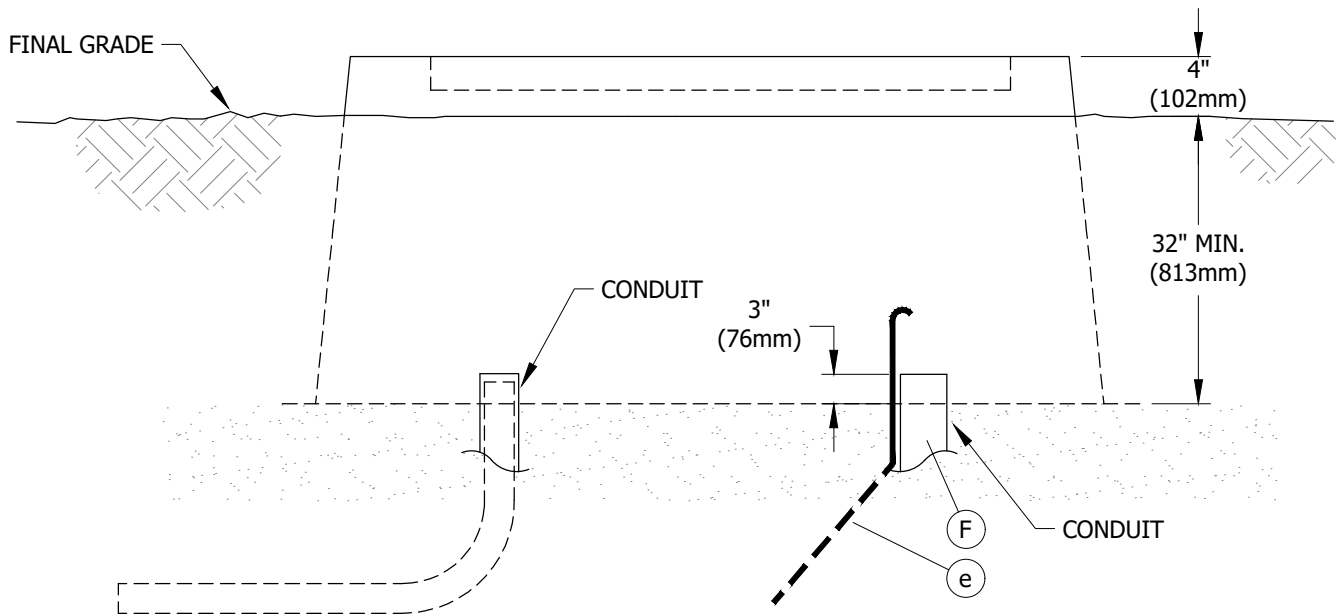
BOX PAD FOR PME-3 AND PME-5 SWITCHES

**UG3418.1**





**FIGURE 2**  
BOX & CONDUIT PLACEMENT  
PLAN VIEW



**FIGURE 2**  
BOX & CONDUIT PLACEMENT  
SIDE VIEW

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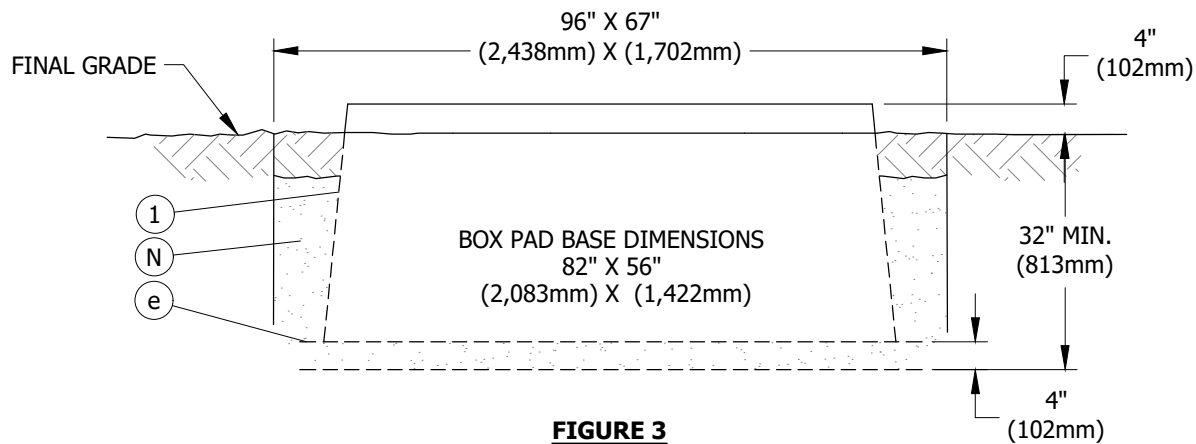
SHEET  
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD FOR PME-3 AND PME-5 SWITCHES

UG3418.2





**FIGURE 3**  
EXCAVATION DIMENSIONS

## INSTALLATION:

### CONDUIT:

- (A) INSTALL CONDUITS AND TERMINATE THEM NOT LESS THAN 3 INCHES (76mm) ABOVE THE GRAVEL BASE.
- (B) DO NOT CUT THE 90 DEGREE ELBOWS ON CURVE.
- (C) STUB ONE 3-INCH (76mm) CONDUIT FROM CMPT #2, 4 FEET (1,219mm) FROM THE BOTTOM FLANGE OF BOX PAD.
- D. NO MORE THAN 2 CONDUITS MAY BE INSTALLED IN COMPARTMENTS 1 & 2. ONE ADDITIONAL 3-INCH (76mm) CONDUIT IS ALLOWED IN CMPT 2 FOR SCADA ANTENNA.
- (E) WHEN TWO CONDUITS ARE INSTALLED IN ONE COMPARTMENT, PLACE CONDUITS SIDE BY SIDE CENTERED ON THE APPROPRIATE DIMENSION.
- (F) COMPLETELY SLURRY ENCASE ALL 5-INCH 90-DEGREE BENDS TO WITHIN 7 INCHES OF THE FINISH CUT OF THE CONDUIT.

### BOX PAD:

- G. THE BOX PAD LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE BOX REQUIRES APPROVAL FROM PROJECT MANAGEMENT. WHEN INSTALLING ADJACENT TO NEW OR EXISTING HANDHOLES ALLOW 17 FEET MINIMUM FROM THE CLOSEST EDGE OF HANDHOLE TO THE CENTERLINE OF THE BOX PAD.
- H. MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH AND LENGTH PER DRAWING BELOW. THE WIDTH, AND LENGTH DIMENSIONS GIVEN, ALLOW AN EXTRA 12 INCHES (305mm) FOR SETTING BOX PAD.
- J. ADD 4 INCHES (102mm) OF GRAVEL TO BOTTOM OF EXCAVATION AND THEN COMPACT THIS MATERIAL BY HAND OR MACHINE.
- K. PLACE THE BOX PAD IN THE EXCAVATION WITH THE LONG SIDE OF THE BOX PAD PARALLEL TO AND 15 INCHES (381mm) FROM THE BACK EDGE OF THE SIDEWALK.
- L. LEVEL BOX PAD.
- M. SET THE TOP SURFACE OF THE BOX PAD 4 INCHES (102mm) ABOVE FINAL GRADE.
- (N) BACKFILL THE OUTSIDE WITH ONE SACK SLURRY. STOP SLURRY 6 INCHES (152mm) FROM FINISH GRADE, CONTINUE TO BACKFILL WITH NATIVE SOIL TO FINISH GRADE.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION  | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|--------------|----------|---------------|--------------|--------------|
| 1    | BOX PAD, 70" X 44" X 32" (1,778mm X 1,118mm X 813mm) | 195 (88KG)   | 1        | --            | S614040      | --           |
| 2    | GRAVEL, 3/8" - 3/4"                                  | --           | AS REQ'D | --            | S601600      | 3428BP       |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD FOR PME-3 AND PME-5 SWITCHES

UG3418.3



**NOTES:**

- I. LOCATE THE LINE SIDE CONDUIT OR FEED TO THE SWITCH IN COMPARTMENT 1. COMPARTMENT 1 SHALL BE LOCATED ON THE RIGHT SIDE OF BOX PAD WHEN VIEWED FROM THE SIDEWALK OR STREET SIDE OF THE BOX PAD.
- II APPEARANCE AND DIMENSIONS MAY VARY SLIGHTLY BETWEEN MANUFACTURERS.

**REFERENCE:**

- a. SEE UG3211.3 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE UG3365.2 FOR SLURRY BACKFILL.
- c. SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- d. SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e SEE UG4510 FOR TRENCH GROUND WIRE.
- f. SEE UG3583 FOR PME-3 SWITCH INSTALLATION.

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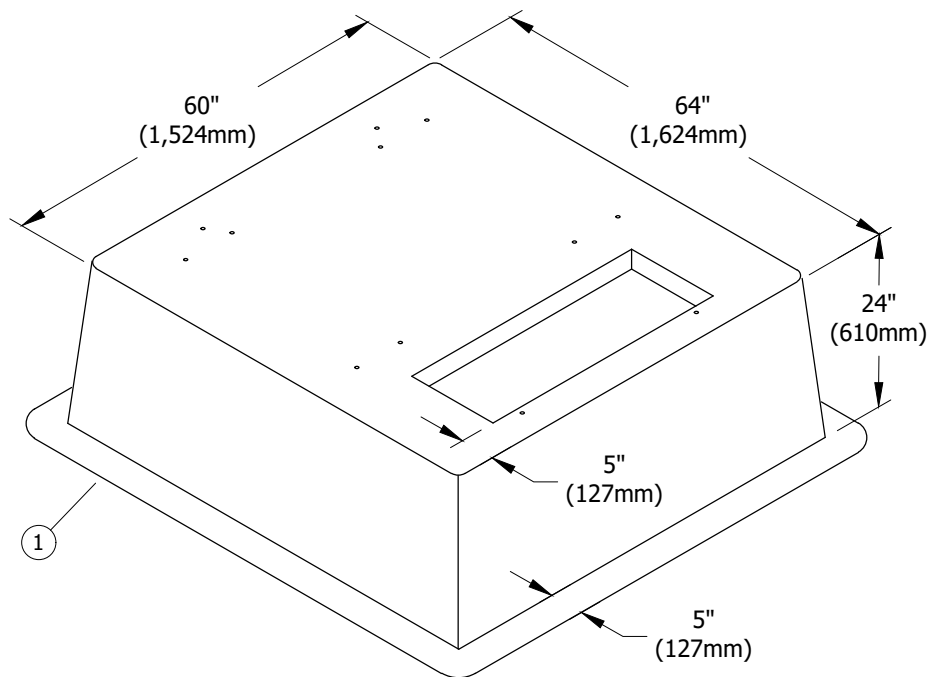
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD FOR PME-3 AND PME-5 SWITCHES

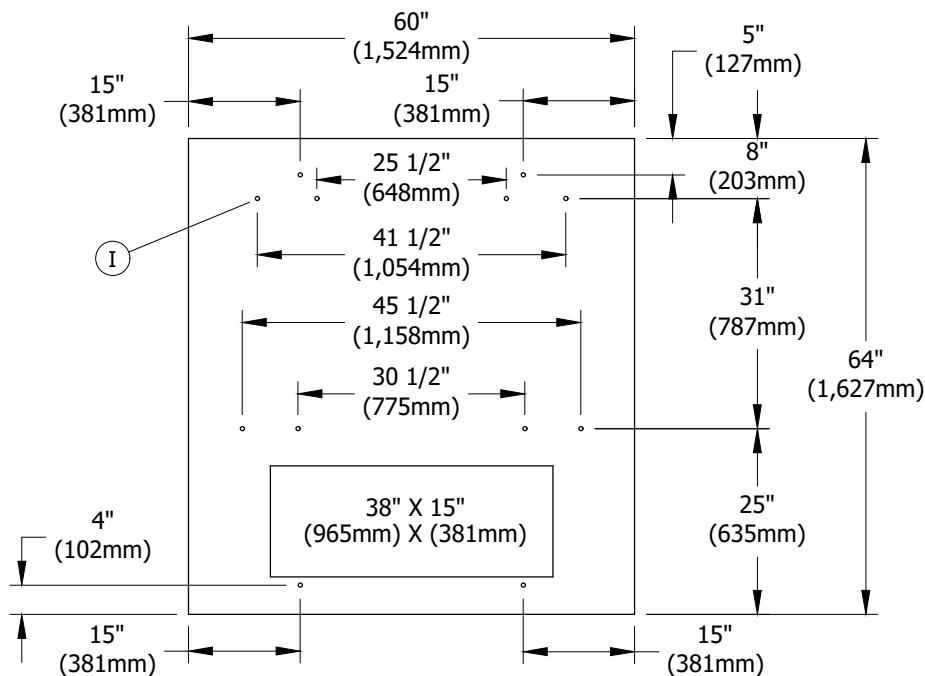
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**SCOPE:** THIS STANDARD SHOWS THE BOX PAD FOR THE THREE-WAY PAD MOUNTED SWITCH.



**FIGURE 1**  
ISOMETRIC VIEW



**FIGURE 1**  
PLAN VIEW

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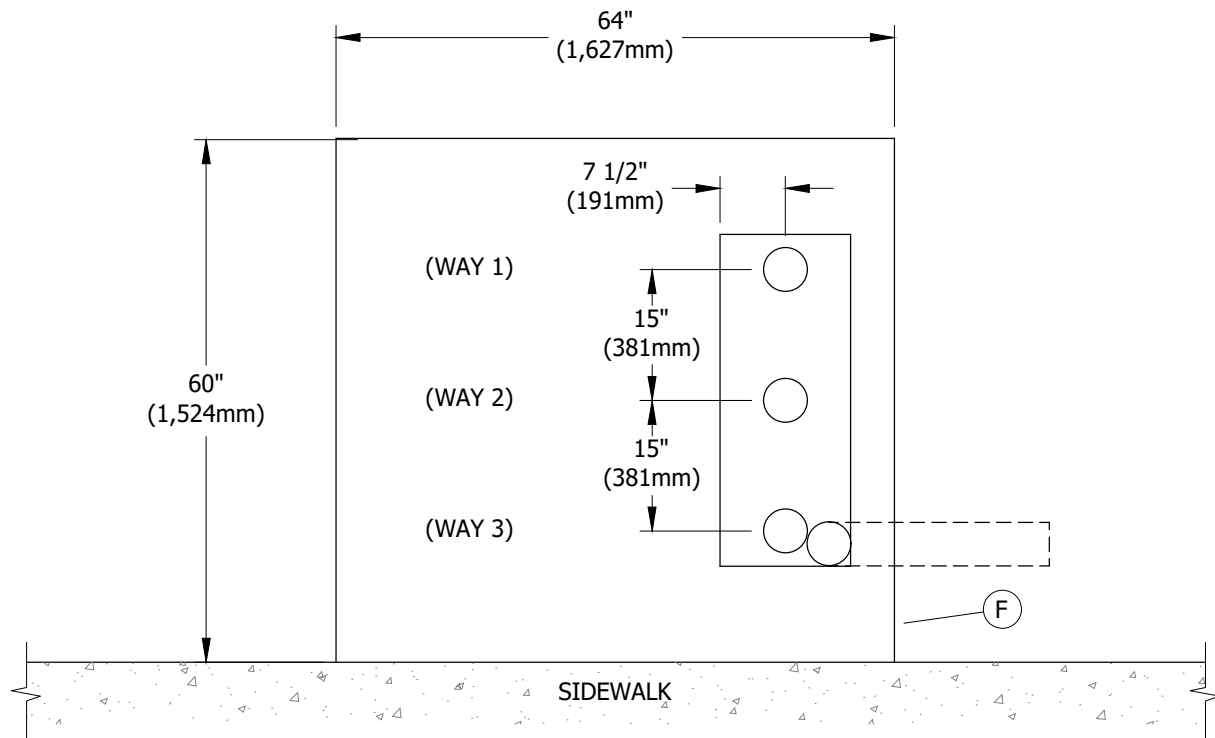
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

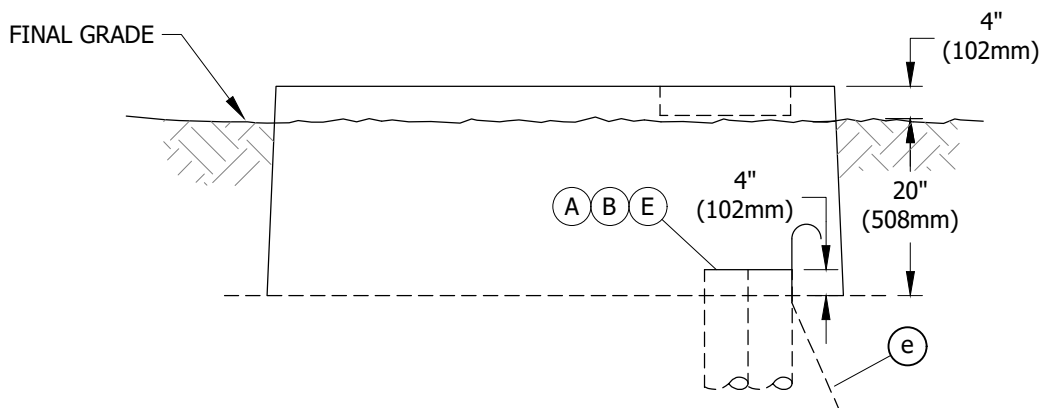
BOX PAD FOR 3-WAY PAD MOUNTED SWITCH

UG3419.1





**FIGURE 2**  
BOX PAD & CONDUIT PLACEMENT  
PLAN VIEW



**FIGURE 2**  
BOX PAD & CONDUIT PLACEMENT  
SIDE VIEW

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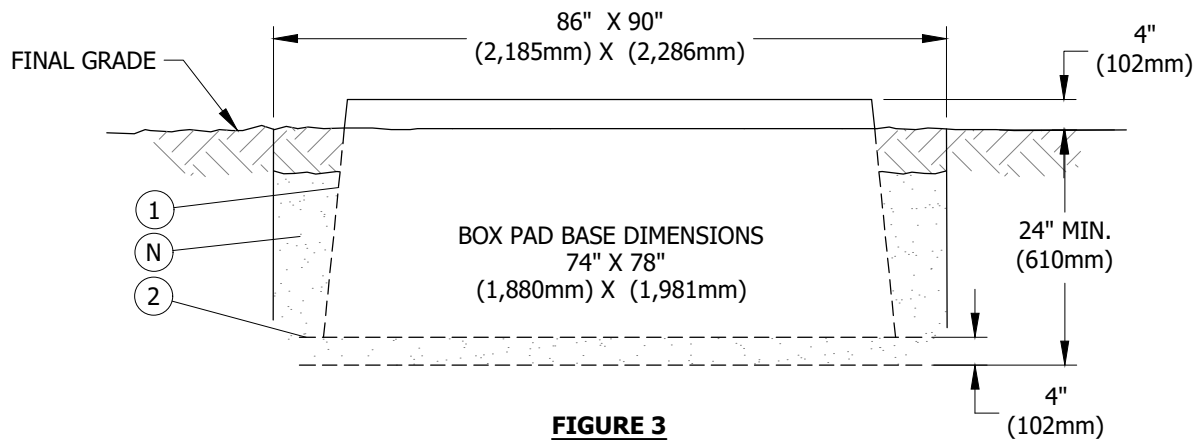
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| BOX PAD FOR 3-WAY PAD MOUNTED SWITCH              |                           |                          |                    |                          |          |                          |                     |

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UG3419.2





**FIGURE 3**  
EXCAVATION DIMENSIONS

## INSTALLATION:

### CONDUIT:

- (A) INSTALL CONDUITS AND TERMINATE THEM NOT LESS THAN 3 INCHES (76mm) ABOVE THE GRAVEL BASE.
- (B) DO NOT CUT THE 90 DEGREE ELBOWS ON CURVE.
- C. STUB ONE 5-INCH (127mm) CONDUIT FROM THE STREET SIDE OF WINDOW FOUR FEET FROM THE BOTTOM FLANGE OF BOX PAD.
- D. INSTALL ONE CONDUIT PER SWITCH WAY. ONE ADDITIONAL CONDUIT MAY BE INSTALLED FOR SCADA POWER SOURCE.
- (E) COMPLETELY SLURRY ENCASE ALL 5-INCH 90-DEGREE BENDS TO WITHIN 7 INCHES (178mm) OF THE FINISH CUT OF THE CONDUIT.

### BOX PAD:

- (F) ALWAYS INSTALL BOX PAD WITH LONG SIDE PARALLEL TO STREET OR SIDEWALK WITH OPENING TO THE RIGHT.
- G. ESTABLISH THE BOX PAD LOCATION PAYING PARTICULAR ATTENTION TO FOREIGN UTILITY PLACEMENTS. RELOCATING THE BOX REQUIRES APPROVAL FROM PROJECT MANAGEMENT. WHEN INSTALLING ADJACENT TO NEW OR EXISTING HANDHOLES ALLOW 17 FEET MINIMUM FROM THE CLOSEST EDGE OF HANDHOLE TO THE CENTERLINE OF THE BOX PAD.
- H. MARK OUT DIMENSIONS FOR THE EXCAVATION WIDTH AND LENGTH PER DRAWING BELOW. THE WIDTH AND LENGTH DIMENSIONS GIVEN ALLOW AN EXTRA 12 INCHES (305mm) FOR SETTING BOX PAD.
- J. ADD 4 INCHES (102mm) OF GRAVEL TO BOTTOM OF EXCAVATION AND THEN COMPACT THIS MATERIAL BY HAND OR MACHINE.
- K. PLACE THE BOX PAD IN THE EXCAVATION WITH THE LONG SIDE OF THE BOX PAD PARALLELED TO AND AS CLOSE AS POSSIBLE TO BACK EDGE OF SIDEWALK.
- L. LEVEL BOX PAD.
- M. SET THE TOP SURFACE OF THE BOX PAD 4 INCHES (102mm) ABOVE FINAL GRADE.
- (N) BACKFILL THE OUTSIDE WITH ONE SACK SLURRY. STOP SLURRY 6 INCHES (152mm) FROM FINISH GRADE; CONTINUE TO BACKFILL WITH NATIVE SOIL TO FINISH GRADE.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION   | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|--------------|----------|---------------|--------------|--------------|
| 1    | PAD, BOX, 60" X 64" X 24" (1,524mm X 1,627mm X 610mm) | 210 (95 KG)  | 1        | --            | S513904      | 3419BP       |
| 2    | GRAVEL, 3/8" - 3/4"                                   | --           | AS REQ'D | --            | S601600      | --           |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD FOR 3-WAY PAD MOUNTED SWITCH

UG3419.3



**NOTES:**

- ① SIZE OF INSERT IS 1/2 X 13.

**REFERENCE:**

- a. SEE UG3211.3 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE UG3365.2 FOR SLURRY BACKFILL.
- c. SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- d. SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- ② SEE UG4510 FOR TRENCH GROUND WIRE.
- f. SEE UG3585 & UG3586 FOR SWITCH INSTALLATION.

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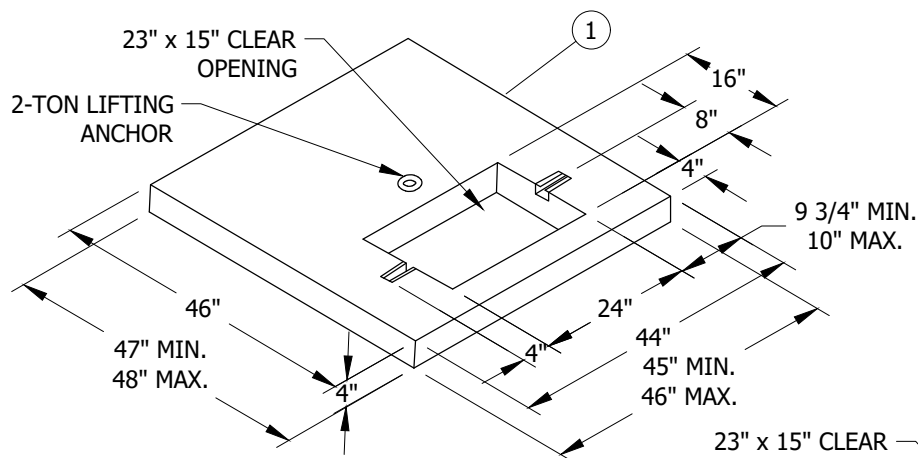
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD FOR 3-WAY PAD MOUNTED SWITCH

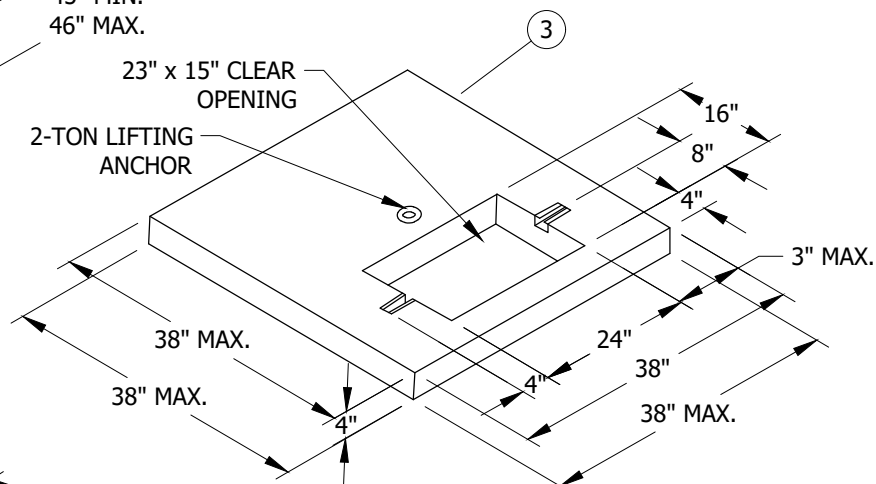
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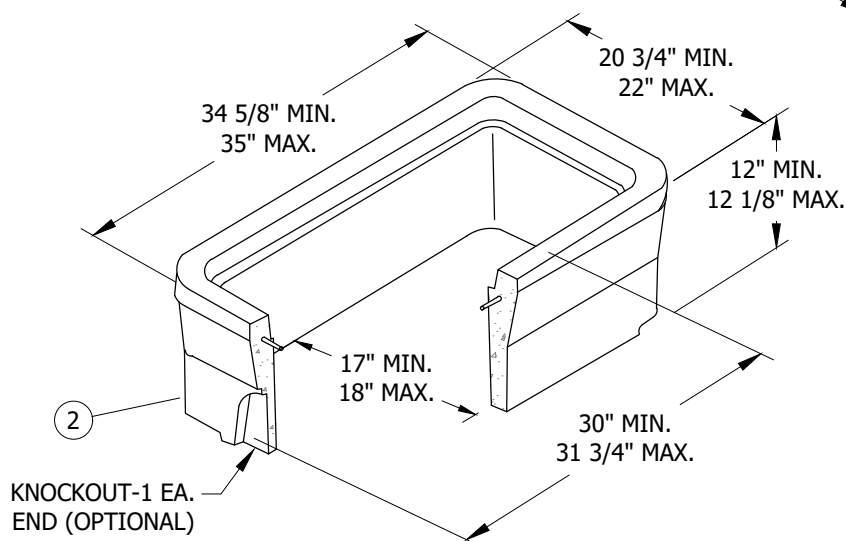
**SCOPE:** THIS STANDARD SHOWS THE PAD AND INSTALLATION REQUIREMENTS FOR THE ALLOWABLE CONDUIT COMBINATIONS AND CONFIGURATIONS FOR A SINGLE-PHASE TRANSFORMER, THREE-PHASE FUSE CABINET, SINGLE-PHASE FUSE CABINET AND SINGLE-PHASE CABLE TERMINATOR. THIS ALSO INCLUDES THE 'SP2' SHORT TRANSFORMER PAD USED FOR IN-KIND REPLACEMENTS WHERE THE STANDARD UG3421 PAD WILL NOT FIT.



**FIGURE 1**  
UG3421 PAD



**FIGURE 2**  
UG3421 'SP2' PAD (II)



**FIGURE 3**  
UG3312 HANDHOLE (I)

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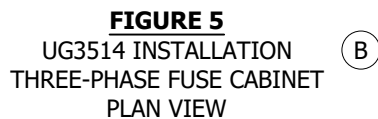
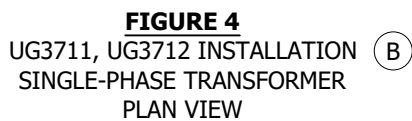
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD

**UG3421.1**

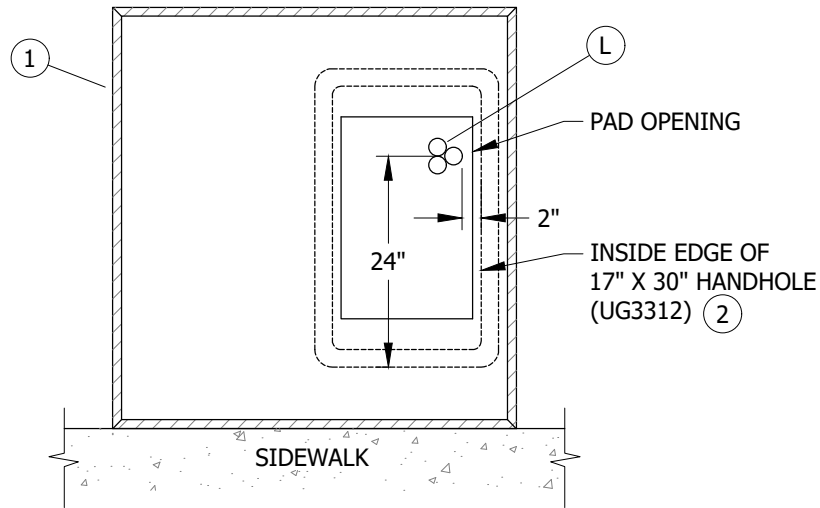




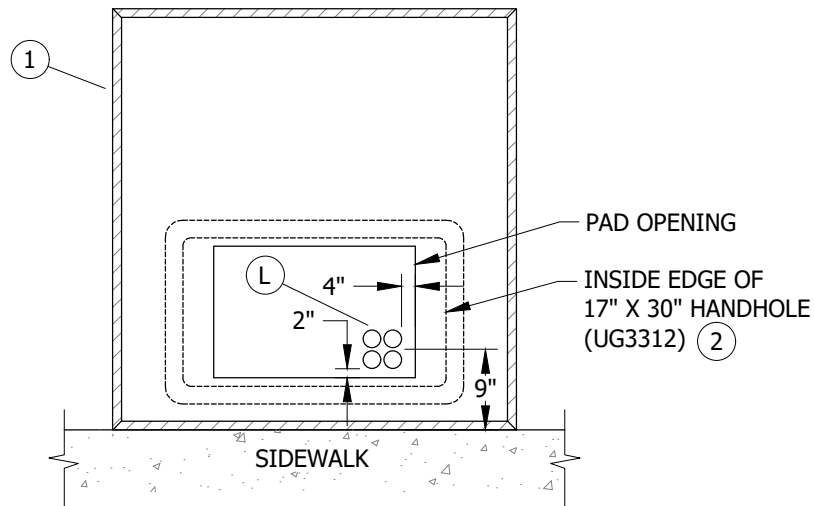
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD    |                           |                    |          |                     |          |





**FIGURE 6**  
UG3512 INSTALLATION  
SINGLE-PHASE FUSE CABINET  
PLAN VIEW



**FIGURE 7**  
UG3522 INSTALLATION  
SINGLE-PHASE CABLE TERMINATOR  
PLAN VIEW

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SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD

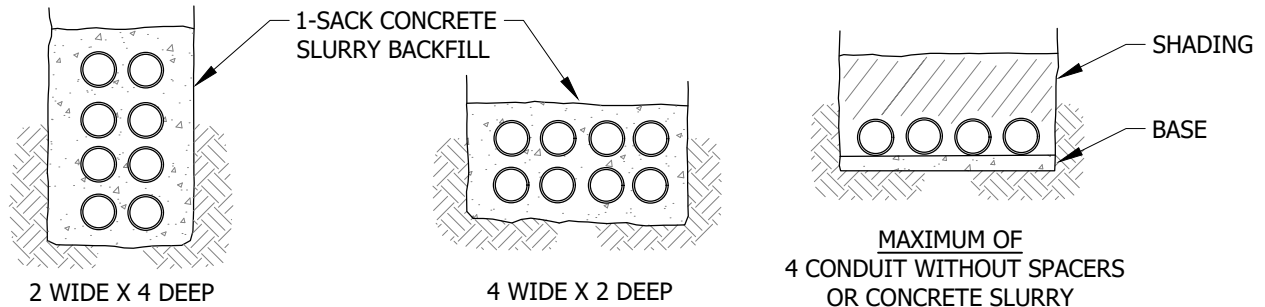
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## INSTALLATION:

### SINGLE-PHASE TRANSFORMER

- A. SET PAD LEVEL TO FINAL GRADE AND INSTALL EQUIPMENT GROUND.
- (B) PLACE ALL PRIMARY AND SECONDARY CONDUITS WITHIN THE PAD OPENING AS SHOWN IN FIGURES 4 & 5. DO NOT CUT INTO THE CURVED PORTION ON THE ELBOWS. RADIUS OF CURVATURE IS 36-INCH MINIMUM FOR 3-INCH AND 4-INCH CONDUITS. PLACE ALL CONDUIT WITH 3/0 OR LARGER CABLE TOWARDS THE REAR OF THE 12-INCH SECONDARY AREA. (C)
- (C) PRIMARY CONDUITS IN RIGHT HAND CORNER SHALL HAVE 2-INCH CLEARANCE FROM FRONT AND SIDE OF PAD.
- (D) THE CONDUIT CONFIGURATION REQUIREMENT BETWEEN TERMINATING POINTS LIMITS THE SECONDARY CONDUIT CONFIGURATION TO 2 WIDE X 4 DEEP OR 4 WIDE X 2 DEEP (NO ONE CONDUIT IS TO BE COMPLETELY SURROUNDED ON ALL FOUR SIDES BY OTHER CONDUITS), USING SPACERS AND 1 SACK CONCRETE SLURRY BACKFILL. CONDUITS MAY ALSO BE INSTALLED SIDE BY SIDE ON THE BOTTOM OF THE TRENCH WITHOUT SPACERS OR CONCRETE SLURRY (4 CONDUITS MAX.). IN THE TRANSITION AREA WHERE THE CONDUITS FROM THE BOTTOM OF THE TRENCH START TOWARD THE SURFACE (THE STRAIGHT PORTION BY THE 90° BEND), SPACERS MAY BE REQUIRED TO ALLOW THE 90° BENDS TO ENTER STRAIGHT INTO THE PAD OPENING. AT THE SURFACE POINT, THE CONDUITS MAY BE BUNDLED TOGETHER. USE SDG&E APPROVED BASE, SHADING AND BACKFILL.



**FIGURE 8 (D)**

- E. THE PRIMARY AND SECONDARY CONDUIT COMBINATIONS ALLOWED ARE SHOWN IN THE CHART BELOW. READ DOWN DESIRED COLUMN UNTIL THE NUMBER OF RUNS BEING INSTALLED ARE LOCATED, THEN READ ACROSS THE ROW CHECKING FOR ADDITIONAL ALLOWABLE RUNS. THE SUM OF THE COLUMNS SHALL NOT EXCEED THE TOTAL CONDUITS ALLOWED.

**TABLE 1**

| SECONDARY CONDUIT COMBINATIONS |               |               |                             |
|--------------------------------|---------------|---------------|-----------------------------|
| 2" (EB OR DB)                  | 3" (EB OR DB) | 4" (EB OR DB) | TOTAL CONDUITS ALLOWED (VI) |
| --                             | 6             | --            | 7                           |
| 2                              | 4             | --            | 7                           |
| 3                              | 3             | --            | 7                           |
| 4                              | 2             | --            | 7                           |
| 7                              | --            | --            | 7                           |
| 1                              | --            | 4             | 5                           |
| --                             | 1             | 4             | 5                           |
| 1                              | 1             | 3             | 5                           |
| --                             | 3             | 2             | 5                           |
| --                             | 4             | 1             | 5                           |
| 4                              | --            | 3             | 7                           |
| 5                              | --            | 2             | 7                           |
| 6                              | --            | 1             | 7                           |

**TABLE 2**

| PRIMARY CONDUIT COMBINATIONS |               |                              |
|------------------------------|---------------|------------------------------|
| 2" (EB OR DB)                | 3" (EB OR DB) | TOTAL CONDUITS ALLOWED (VII) |
| 4                            | --            | 4                            |
| 2                            | 2             | 4                            |
| 2                            | 1             | 3                            |
| 1                            | 2             | 3                            |
| 2                            | --            | 2                            |
| --                           | 2             | 2                            |
| 1                            | --            | 1                            |
| --                           | 1             | 1                            |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD

UG3421.4



F. TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD.

G. WHEN THE NUMBER OF REQUIRED CONDUITS IS LESS THAN THE TOTAL CONDUITS ALLOWED IN THE TABLE, INSTALL CONDUITS IN NUMBERED SEQUENCE AS SHOWN IN FIGURE 4.

H. IN SOFT SOILS, A CONCRETE BACKFILL (1-SACK MIX) 12 INCHES BEYOND THE SIDE EDGES OF THE PAD AND 12 INCHES DEEP IS REQUIRED UNDER THE TRANSFORMER PAD.

J. SET PAD LEVEL TO FINAL GRADE AND INSTALL EQUIPMENT GROUND. TERMINATE CONDUITS 3 INCHES ABOVE BOTTOM OF HANDHOLE. INSTALL CONDUITS.

K. THE MAXIMUM PRIMARY CONDUITS ALLOWED ARE ULTIMATE 4 RUNS OF 4-INCH CONDUIT AS SHOWN IN FIGURE 5.

① SET PAD LEVEL TO FINAL GRADE AND INSTALL EQUIPMENT GROUND. TERMINATE CONDUITS 3 INCHES ABOVE BOTTOM OF HANDHOLE. INSTALL CONDUITS AS SHOWN IN FIGURE 5, 6 & 7.

1. INSTALL CONDUITS #1 AND #2 WHENEVER THERE IS JUST ONE LINE AND ONE LOAD CABLE.
2. INSTALL CONDUITS #3 AND/OR #4 FOR THE SECOND LOAD OR LINE CABLE.

| ITEM | DESCRIPTION   | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | MACRO  |
|------|---|--------------|----------|---------------|--------------|--------------|--------|
| 1    | PAD, SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD | 619 MAX.     | 1        | --            | S514240      | 3421-1       | FC3PAD |
| 2    | HANDHOLE, BODY                                      | 185 MAX.     | 1        | 3312          | S162426      | 3312-1       |        |
| 3    | PAD, TRANSFORMER, 'SP2', 38" X 38"                  | 505 MAX.     | 1        | --            | S514242      | 3421-2       | --     |

- ① REQUIRED FOR THREE-PHASE FUSE CABINET, SINGLE-PHASE FUSE CABINET AND SINGLE-PHASE CABLE TERMINATOR.
- ② TO BE USED ONLY FOR IN-KIND REPLACEMENTS. NOT FOR NEW INSTALLATIONS.
- III. TRANSFORMER COOLING FINS MAY OVERHANG REAR OF PAD BY 6 INCHES.
- IV. FIVE-INCH CONDUIT NOT ALLOWED IN THESE INSTALLATIONS.
- V. PAD MAY NOT BE POURED-IN-PLACE.
- ⑥ SECONDARY CONDUITS MAY INCLUDE TWO ADDITIONAL ONE-INCH CONDUITS FOR STREET LIGHTS.
- ⑦ ONE 4-INCH OR ONE 5-INCH PRIMARY CONDUIT IS ALLOWED WHEN THE CONDUIT IS EXTENDED FROM AN EXISTING STUBOUT.

- a. SEE [UG3211.3](#) FOR PAD IDENTIFICATION.
- b. SEE UG3370 OR UG3371 FOR TRENCH, UTILITY POSITIONING, SHADING AND BACKFILL REQUIREMENTS.
- c. SEE UG3376 FOR CONCRETE SLURRY, SHADING AND TYPE OF CONDUIT.
- d. SEE [UG3479](#) FOR BARRIER PROTECTION AND CLEARANCE.
- e. SEE [UG3487](#) FOR SINGLE-PHASE TRANSFORMER LOCATIONS NEXT TO CATV AND/OR TELCO.
- f. SEE [UG3480](#), [UG3481](#), [UG3482](#) & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- g. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- h. SEE UG3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- i. SEE UG3485 AND UG3487 FOR RETAINING WALLS.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD    |                           |                    |          |                     |          |



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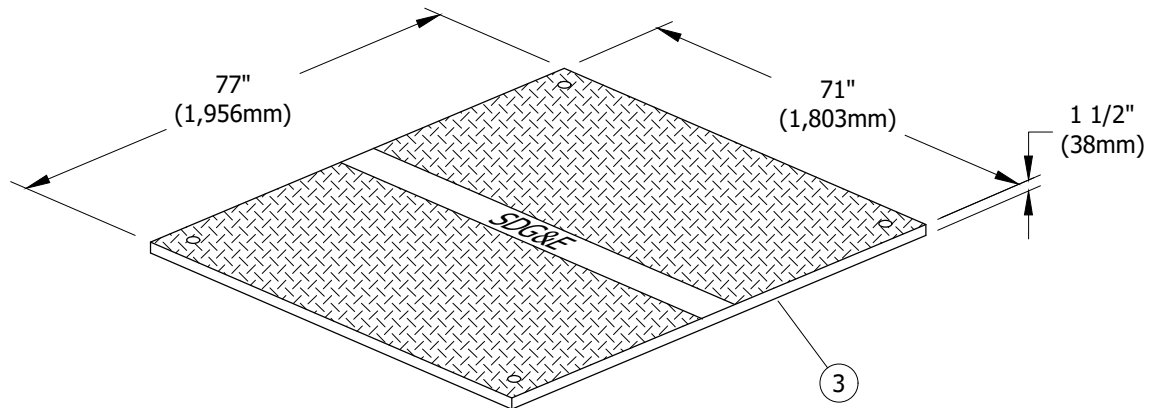
- j. SEE [UG3512](#) FOR SINGLE-PHASE LOW PROFILE FUSED SWITCHING CABINET.
- k. SEE [UG3522](#) FOR SINGLE-PHASE LOW PROFILE TERMINATOR INSTALLATION.
- l. SEE UG3711, UG3712 AND UG3713 FOR TRANSFORMER INSTALLATIONS.
- m. SEE UG4512 FOR EQUIPMENT GROUNDING.
- n. SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.

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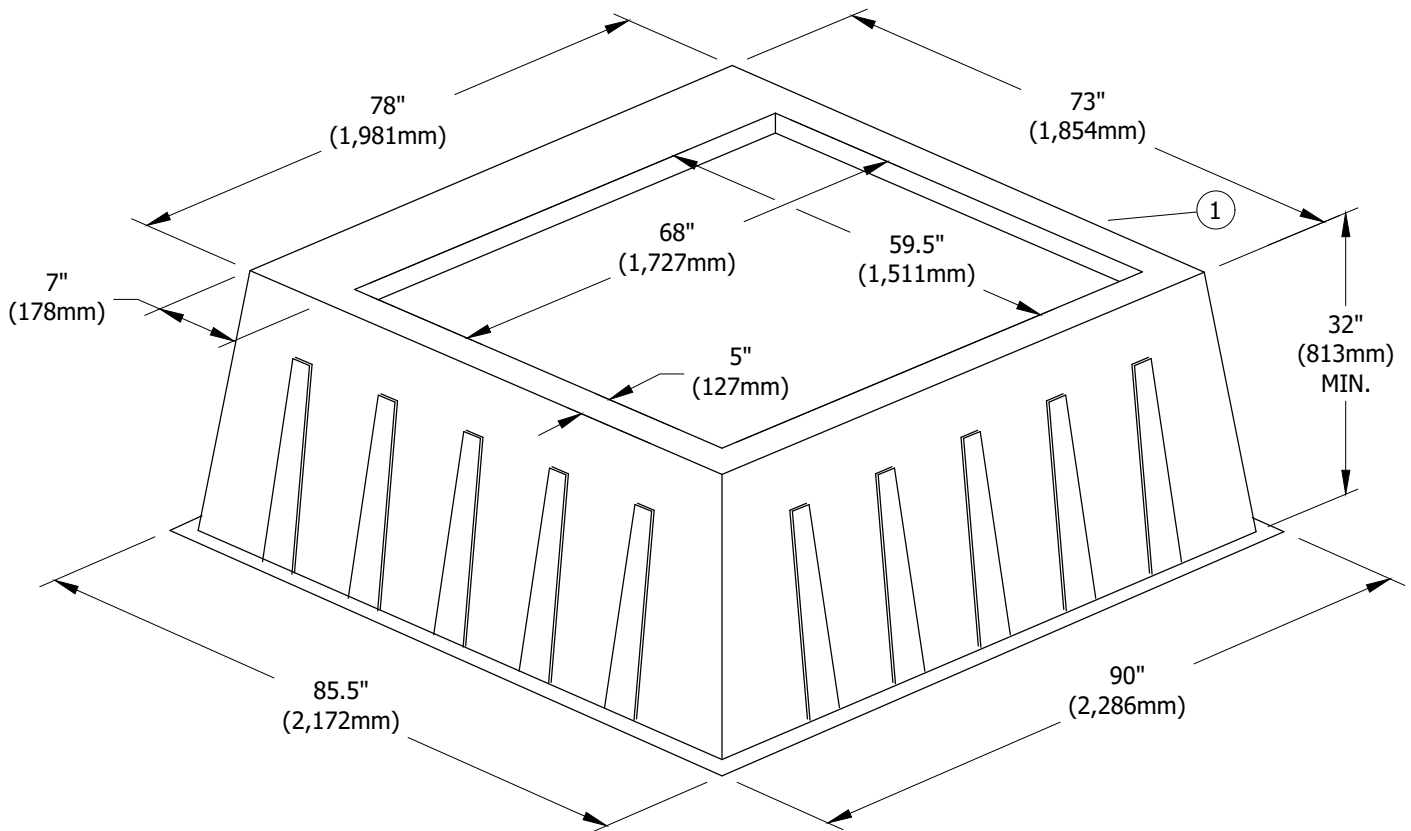
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|                 |               | SINGLE-PHASE TRANSFORMER/UTILITY EQUIPMENT PAD    |                           |     |       |                    |     |                   |     |                     |     |          |           |



**SCOPE:** THIS STANDARD SHOWS THE BOX PAD **W/TEMPORARY COVER** AND CONDUIT PLACEMENT FOR THE PAD MOUNTED PME 9, 10, 11 AIR BREAK AND 2 SIDED 4-WAY TRAYER SWITCHES.



**FIGURE 1**  
TEMPORARY COVER



**FIGURE 2** (I)  
BOX PAD

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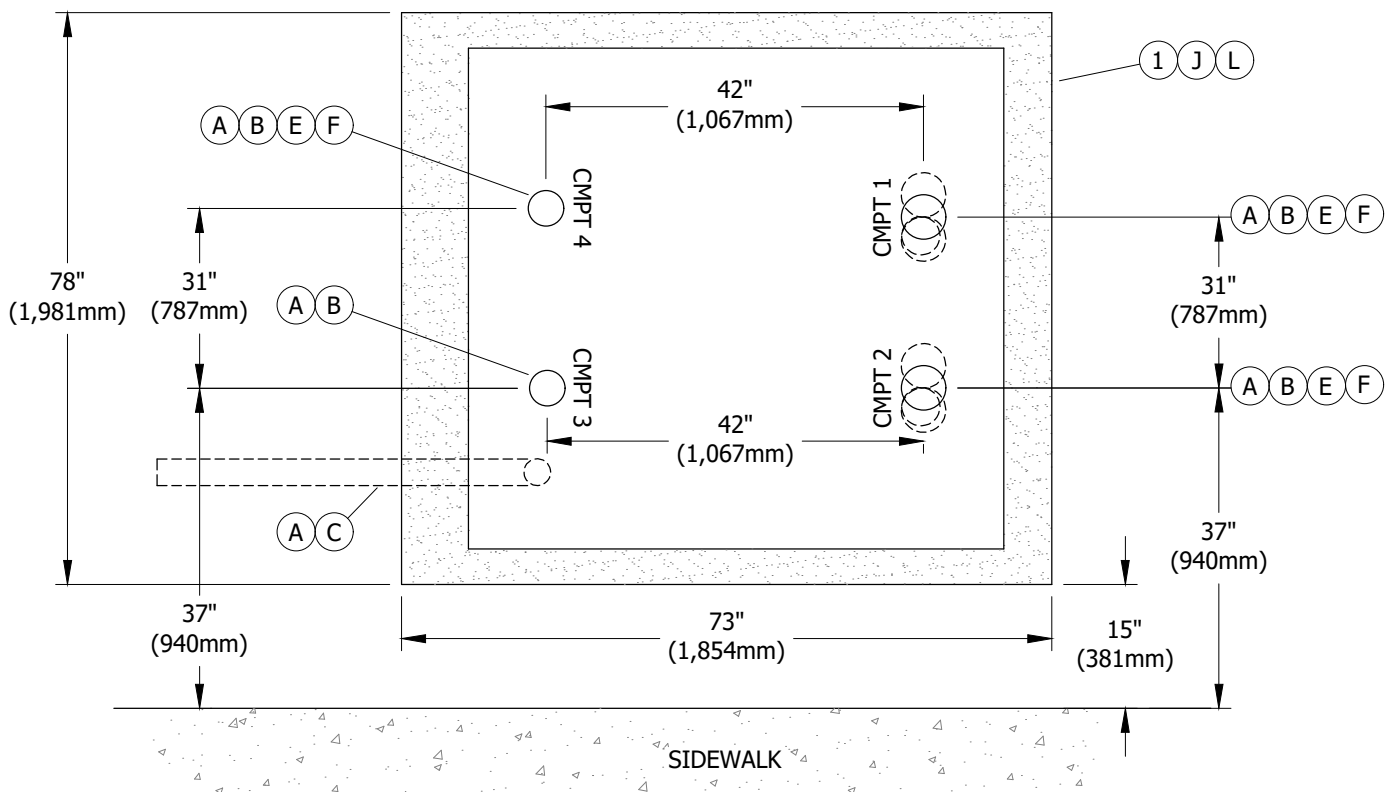
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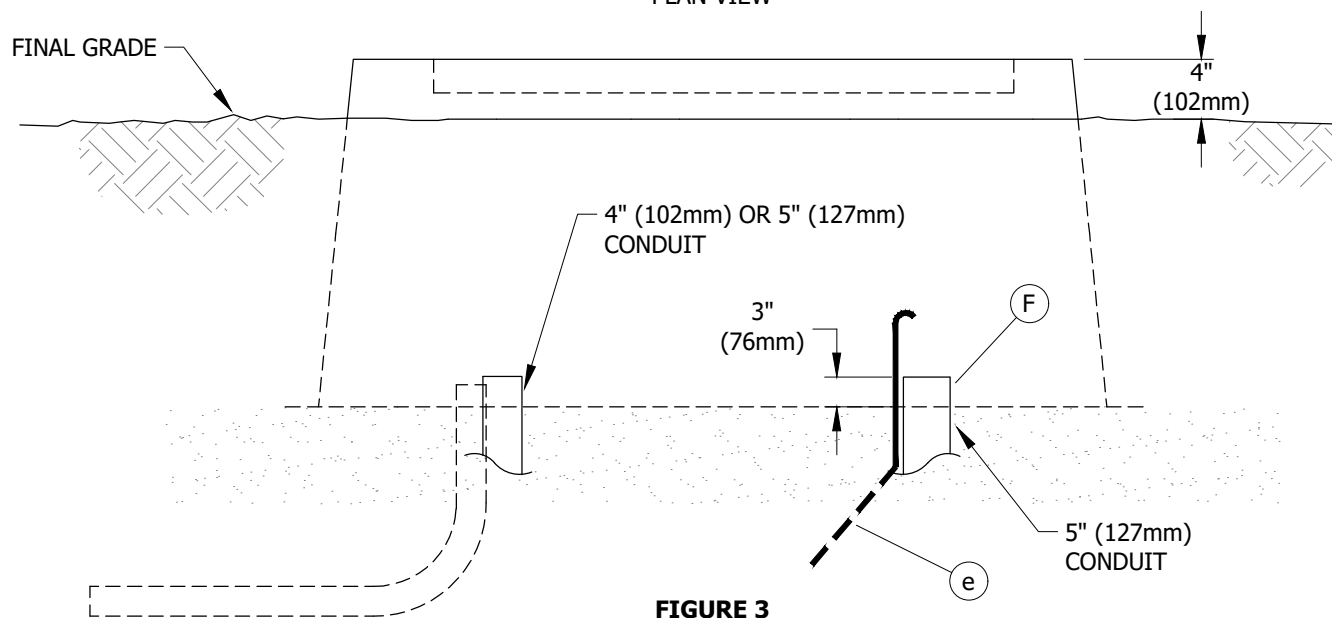
BOX PAD W/ TEMPORARY COVER FOR  
PME 9, 10, 11 AND 2 SIDED TRAYER SWITCHES

**UG3423.1**





**FIGURE 3**  
BOX & CONDUIT PLACEMENT  
PLAN VIEW



**FIGURE 3**  
BOX & CONDUIT PLACEMENT  
SIDE VIEW

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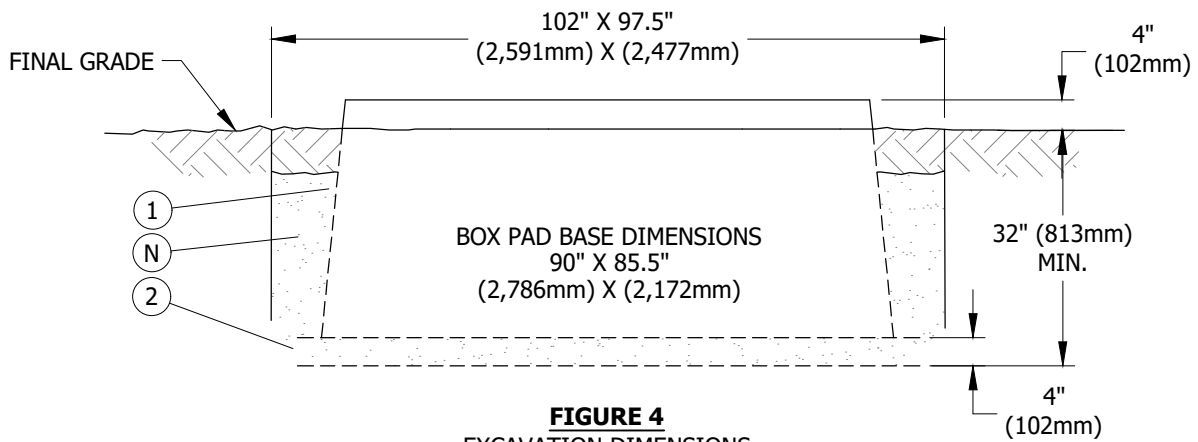
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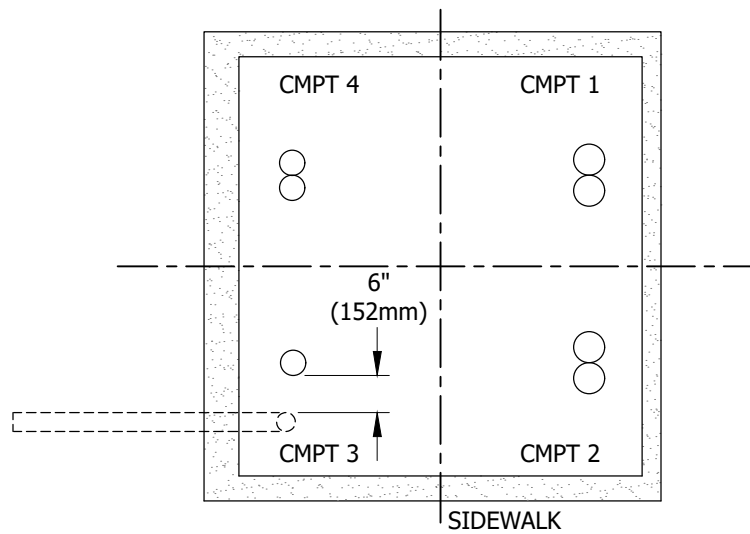
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**UG3423.2**





**FIGURE 4**  
EXCAVATION DIMENSIONS



**FIGURE 5**

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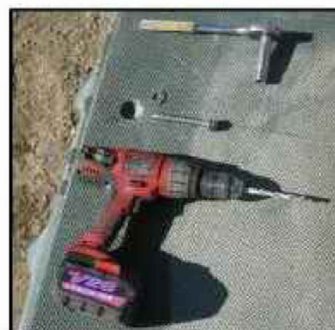
BOX PAD W/ TEMPORARY COVER FOR  
PME 9, 10, 11 AND 2 SIDED TRAYER SWITCHES

**UG3423.3**



**TABLE 1**

| CONDUIT COMBINATIONS      |   |         |   |   |
|---------------------------|---|---------|---|---|
| SWITCH TYPE               | CMPT #1   | CMPT #2 | CMPT #3   | CMPT #4   |
| PME-9                     | 5" (127mm)<br>(QTY 1)<br>+<br>2" (51mm) THRU 5" (127mm)<br>(QTY 1)<br><br>TOTAL QTY = 2 |         | 4" (102mm) OR 5" (127mm)<br>(QTY 1)<br>+<br>3" (76mm)<br>FOR SCADA ANTENNA ONLY<br>(QTY 1)<br><br>TOTAL QTY = 2 | 4" (102mm) OR 5" (127mm)<br>(QTY 2)<br><br>TOTAL QTY = 2                                |
| PME-10 (II)               |   |         | 5" (127mm)<br>(QTY 2)<br>+<br>3" (76mm)<br>FOR SCADA ANTENNA ONLY<br>(QTY 1)<br><br>TOTAL QTY = 3               | 5" (127mm)<br>(QTY 1)<br>+<br>2" (51mm) THRU 5" (127mm)<br>(QTY 1)<br><br>TOTAL QTY = 2 |
| TRAYER 2-SIDED 4-WAY (II) |   |         | 4" (102mm) OR 5" (127mm)<br>(QTY 1)<br>+<br>3" (76mm)<br>FOR SCADA ANTENNA ONLY<br>(QTY 1)<br><br>TOTAL QTY = 2 |   |
| PME-11                    |   |         |   |   |



**FIGURE 6**  
TEMPORARY 3423 PME AND TRAYER PAD COVER INSTALLATION (O) (III) (IV)

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD W/ TEMPORARY COVER FOR  
PME 9, 10, 11 AND 2 SIDED TRAYER SWITCHES

**UG3423.4**



**CONDUIT:**

- BOX PAD:**

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|                 |                   | BOX PAD W/ TEMPORARY COVER FOR<br>PME 9, 10, 11 AND 2 SIDED TRAYER SWITCHES |                           |     |     |                    |     |          |    |                     |     |     |      |          |



**NOTES:**

- I APPEARANCE AND DIMENSIONS MAY VARY SLIGHTLY BETWEEN MANUFACTURERS.
- II WHEN ONLY THREE OF THE FOUR SWITCH POSITIONS WILL BE UTILIZED, PULL CABLES IN COMPARTMENTS 1, 2 AND 4 FIRST.
- III ALL PARTIES INCLUDING APPLICANT INSTALLERS, CONTRACT CONSTRUCTION CREWS AND SDG&E CREWS THAT INSTALL THE PAD 3423 ARE REQUIRED TO INSTALL A TEMPORARY PAD COVER AT ALL PME 9, 10 AND 11, AND 2-SIDED TRAYER SWITCH LOCATIONS. THE ONLY EXCEPTION TO THIS STANDARD APPLICATION IS THAT THE SWITCH SHALL BE INSTALLED ON THE PAD THE SAME DAY AFTER THE PAD IS INSTALLED.
- IV WHEN TEMPORARY COVERS ARE REMOVED, THEY SHALL BE RETURNED TO THE DISTRICT OF RECORD AND CREDITED BACK AS THE PAD COVER IS REUSABLE FOR OTHER FUTURE INSTALLATIONS.
- X THIS ITEM IS EXEMPT.

**REFERENCE:**

- a. SEE UG3211.3 FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE UG3365.2 FOR SLURRY BACKFILL.
- c. SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- d. SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE UG4510 FOR TRENCH GROUND WIRE.

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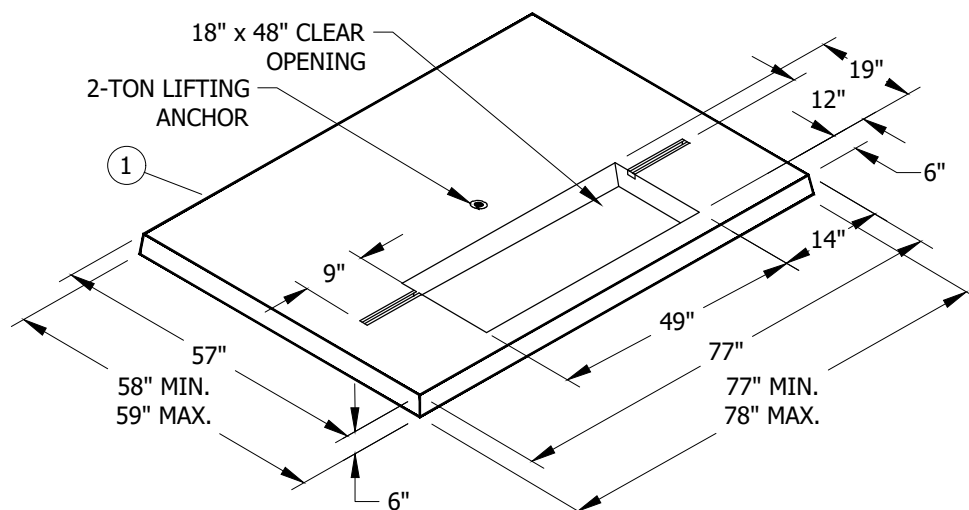
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BOX PAD W/ TEMPORARY COVER FOR  
PME 9, 10, 11 AND 2 SIDED TRAYER SWITCHES

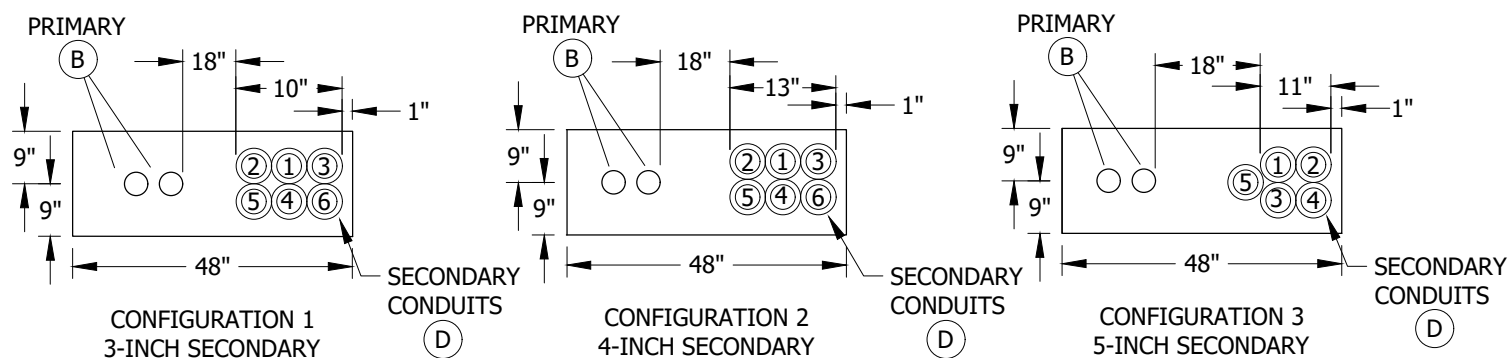
UG3423.6



**SCOPE:** THIS STANDARD SHOWS REQUIREMENTS FOR INSTALLING A 3425 THREE-PHASE PAD FOR DEADFRONT TRANSFORMER APPLICATION THROUGH 300 KVA. ALSO FOR 3750 KVA HHR DEADFRONT BOOSTER TRANSFORMER AND PRIMARY METER CABINET.

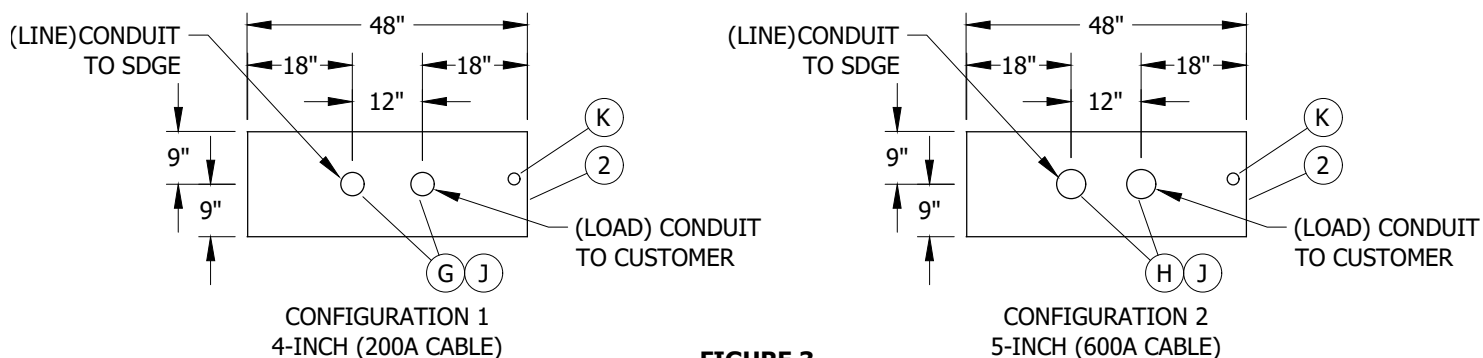


**FIGURE 1**



**FIGURE 2**

MAXIMUM PRIMARY CONDUITS ALLOWED (B C D E)  
TWO RUNS OF 4-INCH (EB OR DB)



**FIGURE 3**

MAXIMUM OF TWO PRIMARY CONDUITS ALLOWED FOR  
PRIMARY METER CABINET

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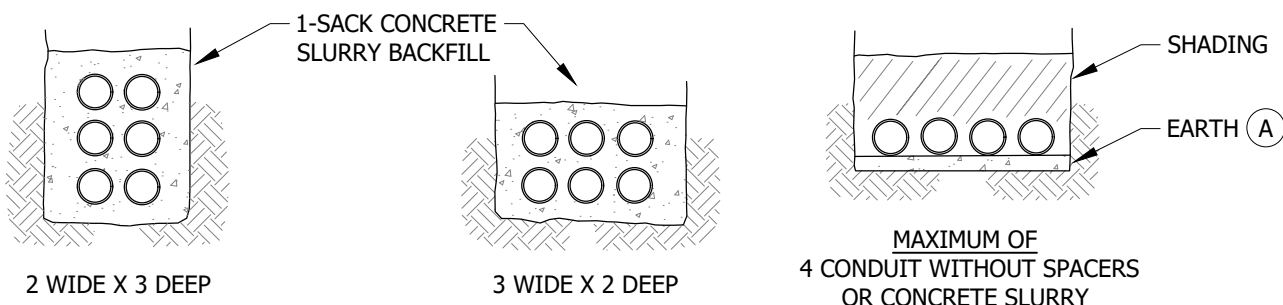
THREE-PHASE DEADFRONT TRANSFORMER PAD INSTALLATION 3425

**UG3425.1**



## INSTALLATION:

- (A) 1-INCH EARTH IN THE BOTTOM OF THE TRENCH IS REQUIRED TO PREVENT DAMAGE FROM ROCKS, SAGS, AND POCKETS.
- (B) PLACE ALL PRIMARY AND SECONDARY CONDUITS WITHIN THE PAD OPENING AS SHOWN IN FIGURES 2 & 3. TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH THE TOP OF THE PAD. DO NOT CUT INTO THE CURVED PORTION OF THE ELBOWS. RADIUS OF CURVATURE IS 36-INCH MINIMUM FOR 3-INCH, 4-INCH AND 5-INCH CONDUITS.
- (C) THE CONDUIT CONFIGURATION REQUIREMENT BETWEEN TERMINATING POINTS LIMITS THE SECONDARY CONDUIT CONFIGURATION TO 2 WIDE X 3 DEEP OR 3 WIDE X 2 DEEP (NO ONE CONDUIT IS TO BE COMPLETELY SURROUNDED ON ALL FOUR SIDES BY OTHER CONDUITS), USING SPACERS AND 1 SACK CONCRETE SLURRY BACKFILL. CONDUITS MAY ALSO BE INSTALLED SIDE BY SIDE ON THE BOTTOM OF THE TRENCH WITHOUT SPACERS OR CONCRETE SLURRY (FOUR CONDUITS MAX.). IN THE TRANSITION AREA WHERE THE CONDUITS FROM THE BOTTOM OF THE TRENCH START TOWARD THE SURFACE (THE STRAIGHT PORTION BY THE 90° BEND), SPACERS MAY BE REQUIRED TO ALLOW THE 90° BENDS TO ENTER STRAIGHT INTO THE PAD OPENING. AT THE SURFACE POINT, THE CONDUITS MAY BE BUNDLED TOGETHER. USE SDG&E APPROVED BASE, SHADING AND BACKFILL.



**FIGURE 4 (C)**

- (D) ANY COMBINATION OF 3, 4 OR 5-INCH SECONDARY CONDUITS MAY BE USED, PROVIDED THEY DO NOT EXCEED THE TOTAL OF 6 OR THE MAXIMUM OF EACH SIZE CONDUIT AS SPECIFIED IN FIGURE 2. AN EXCEPTION WOULD BE WHEN THE TRANSFORMER FEEDS ONE CUSTOMER WITH A 2000A MAIN WHICH REQUIRES FIVE 5-INCH CONDUITS. NO FUTURE CUSTOMERS ARE ALLOWED IN THIS INSTALLATION. TWO EXTRA 1-INCH OR TWO EXTRA 2-INCH CONDUITS MAY BE ADDED TO SERVE STREET LIGHTS, RECREATION BUILDINGS, ETC.
- (E) WHEN NUMBER OF REQUIRED CONDUITS IS LESS THAN THE TOTAL ALLOWABLE SHOWN IN FIGURE 2, INSTALL IN NUMBERED SEQUENCE AS SHOWN.
- F. IN SOFT SOILS A CONCRETE BACKFILL (1-SACK MIX.) IS REQUIRED UNDER THE PAD, 12 INCHES BEYOND THE SIDE EDGES OF PAD AND 12 INCHES DEEP.
- (G) MAXIMUM NUMBER OF CONDUITS ALLOWED FOR 200A APPLICATION IS TWO 4-INCH PRIMARY CONDUITS. NO COMBINATION OF DIFFERENT SIZE PRIMARY CONDUITS ALLOWED. NO SECONDARY CONDUITS ALLOWED.
- (H) MAXIMUM NUMBER OF CONDUITS ALLOWED FOR 600A APPLICATION IS TWO 5-INCH PRIMARY CONDUITS. NO COMBINATION OF DIFFERENT SIZE PRIMARY CONDUITS ALLOWED. NO SECONDARY CONDUITS ALLOWED.
- (J) PLACE PRIMARY CONDUITS WITHIN THE PAD OPENING AS SHOWN IN FIGURES 2 & 3. TERMINATE PRIMARY CONDUITS 3 INCHES ABOVE THE BOTTOM OF 3311 HANDHOLE. 3311 HANDHOLE TO BE INSTALLED WITH PRIMARY METER APPLICATIONS. DO NOT CUT THE CURVED PORTION OF CONDUIT ELBOWS. RADIUS OF CURVATURE IS 36 INCHES MINIMUM FOR 4-INCH OR 5-INCH CONDUITS.
- (K) WHEN METER WILL NOT BE ATTACHED TO PRIMARY METER CABINET, INSTALL 1-INCH CONDUIT TO REMOTE METER LOCATION. 1-INCH CONDUIT NOT REQUIRED WHEN METER ATTACHED.

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**SHEET**  
**2 OF 3**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE DEADFRONT TRANSFORMER PAD INSTALLATION 3425

**UG3425.2**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION    | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | MACRO UNITS |
|------|----------------|--------------|----------|---------------|--------------|--------------|-------------|
| 1    | PAD            | 1,900 MAX.   | AS REQ'D | --            | S513998      | 3425-3       | 3425-M      |
| 2    | HANDHOLE, 3311 | --           | AS REQ'D | --            | S162660      | 3311-S       |             |

**NOTES:**


- I. TRANSFORMER COOLING FINS MAY OVERHANG REAR OF PAD BY 6 INCHES.
- II. IF NUMBER OF SECONDARY CONDUITS IS GREATER THAN MAXIMUM SHOWN, USE PAD PER UG3426 OR UG3427.
- III. TRANSFORMER PAD MAY NOT BE POURED IN PLACE. USE PRECAST PADS ONLY.

**REFERENCE:**

- a. SEE [UG3211.3](#) FOR PAD IDENTIFICATION.
- b. SEE UG3370 OR 3371 FOR TRENCH, UTILITY POSITIONING, SHADING AND BACKFILL REQUIREMENTS.
- c. SEE UG3376 FOR CONCRETE SLURRY.
- d. SEE [UG3479](#) FOR TRANSFORMER BARRIER PROTECTION.
- e. SEE [UG3480](#), [UG3481](#), [UG3482](#) & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- f. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- g. SEE UG3486 & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE [UG3489](#) FOR RETAINING WALLS.
- i. SEE UG3751 FOR TRANSFORMER INSTALLATION.
- j. SEE UG4512 FOR EQUIPMENT GROUNDING.
- k. SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.

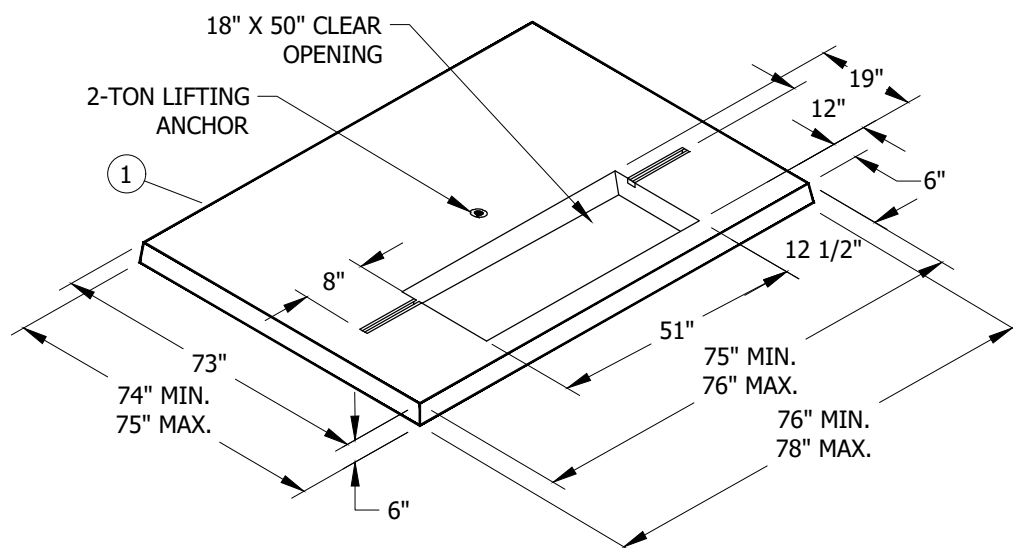
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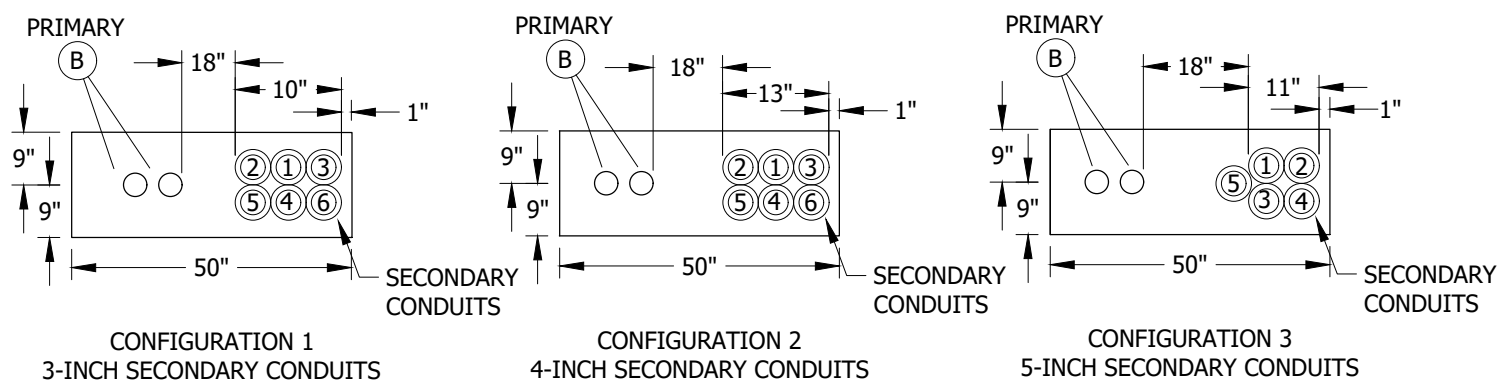
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                   |                           |                    |          |                     |          |
|                 | THREE-PHASE DEADFRONT TRANSFORMER PAD INSTALLATION 3425                             |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS REQUIREMENTS FOR INSTALLING A 3426 THREE-PHASE PAD FOR DEADFRONT TRANSFORMER APPLICATION THROUGH 1000 KVA.



**FIGURE 1**  
PAD



**FIGURE 2**  
MAXIMUM PRIMARY CONDUITS ALLOWED (B C D E H)  
TWO RUNS OF 4-INCH (EB OR DB)

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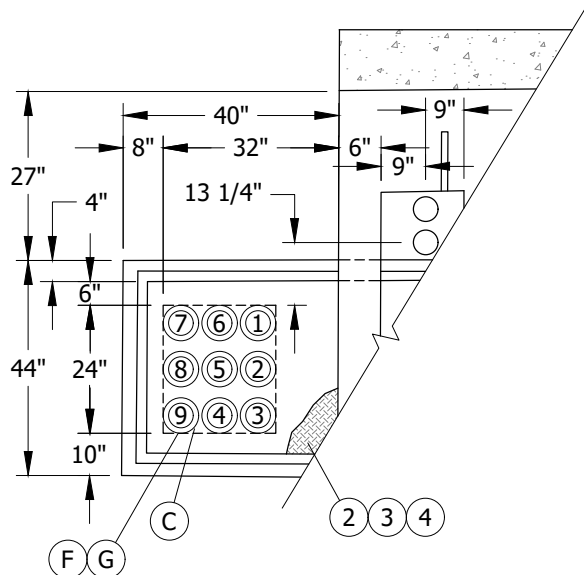
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE **DEADFRONT** TRANSFORMER PAD INSTALLATION 3426

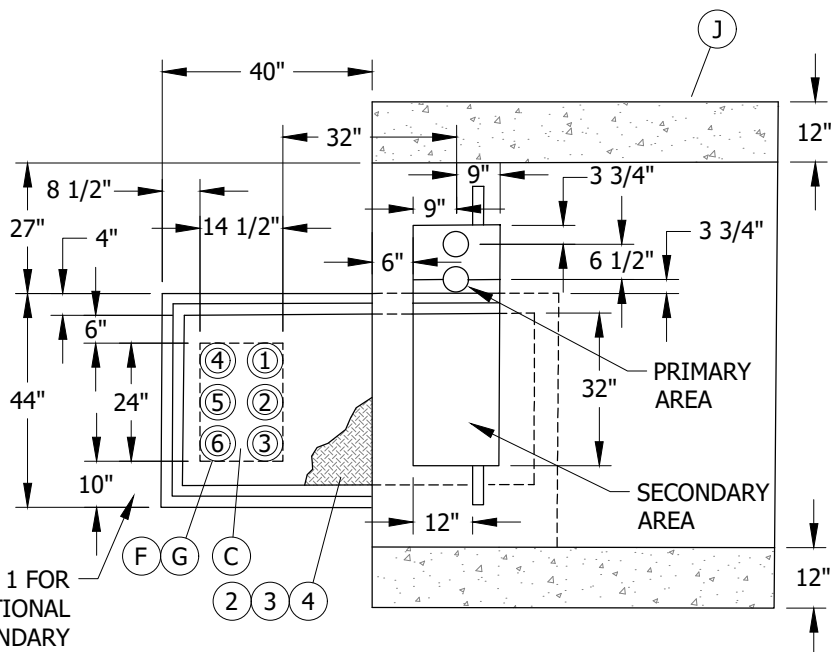
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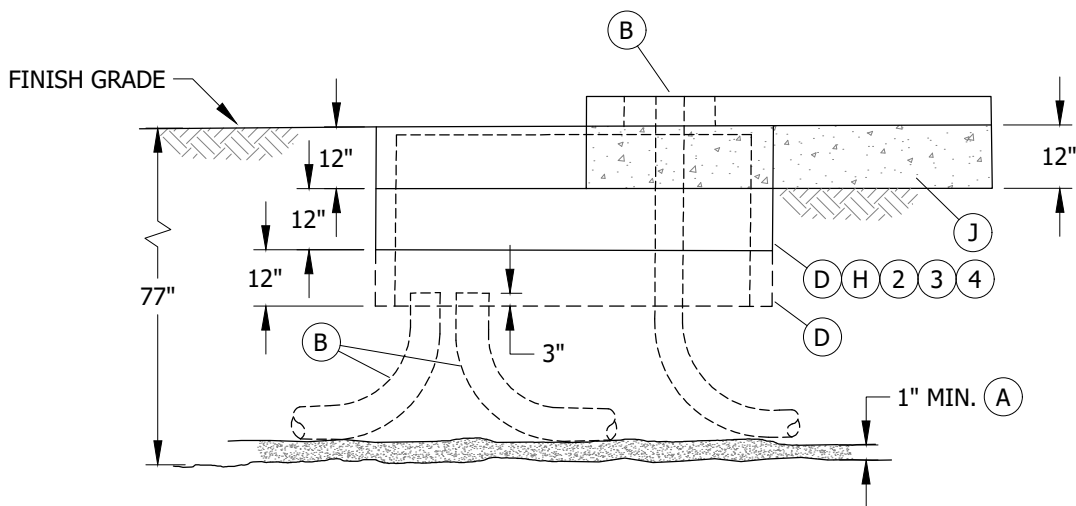


**DETAIL 1**  
TYPICAL INSTALLATION FOR  
NINE 3-INCH OR NINE 4-INCH  
SECONDARY CONDUITS

SEE DETAIL 1 FOR  
ADDITIONAL  
SECONDARY  
CONDUIT SIZES



**FIGURE 3**  
MAXIMUM PRIMARY CONDUITS ALLOWED  
TWO RUNS OF 4-INCH (EB OR DB)



**FIGURE 4**  
TYPICAL INSTALLATION FOR SIX 5-INCH  
SECONDARY CONDUITS

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

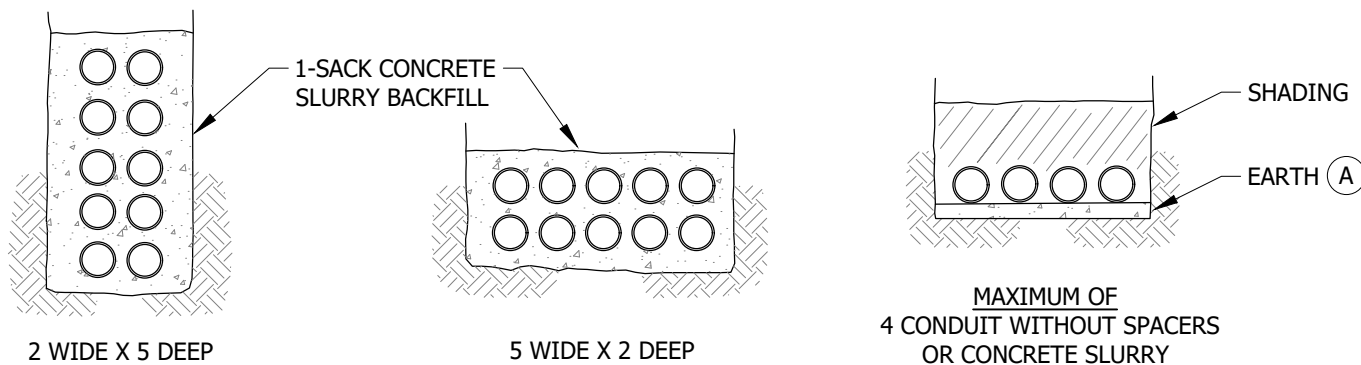
THREE-PHASE DEADFRONT TRANSFORMER PAD INSTALLATION 3426

UG3426.2



## INSTALLATION:

- (A) 1-INCH EARTH IN THE BOTTOM OF TRENCH IS REQUIRED TO PREVENT DAMAGE FROM ROCKS, SAGS AND POCKETS.
- (B) PLACE ALL SECONDARY CONDUITS WITHIN THE PAD OR HANDHOLE OPENING AS SHOWN IN FIGURES 2-4. TERMINATE PRIMARY OR SECONDARY CONDUITS FLUSH WITH THE TOP OF THE PAD. WHEN A HANDHOLE IS REQUIRED FOR SECONDARY CONDUITS, TERMINATE THEM NOT LESS THAN 3 INCHES ABOVE BOTTOM OF HANDHOLE. DO NOT CUT INTO THE CURVED PORTION OF THE ELBOWS. RADIUS OF CURVATURE IS 36 INCHES MINIMUM FOR 3-INCH, 4-INCH AND 5-INCH CONDUITS.
- (C) THE CONDUIT CONFIGURATION REQUIREMENT BETWEEN TERMINATING POINTS LIMITS THE SECONDARY CONDUIT CONFIGURATION TO TWO WIDE X FIVE DEEP OR FIVE WIDE X TWO DEEP (NO ONE CONDUIT IS TO BE COMPLETELY SURROUNDED ON ALL FOUR SIDES BY OTHER CONDUITS), USING SPACERS AND ONE SACK CONCRETE SLURRY BACKFILL. CONDUITS MAY ALSO BE INSTALLED SIDE BY SIDE ON THE BOTTOM OF THE TRENCH WITHOUT SPACERS OR CONCRETE SLURRY (FOUR CONDUITS MAX.). IN THE TRANSITION AREA WHERE THE CONDUITS FROM THE BOTTOM OF THE TRENCH START TOWARD THE SURFACE (THE STRAIGHT PORTION BY THE 90° BEND), SPACERS MAY BE REQUIRED TO ALLOW THE 90° BENDS TO ENTER STRAIGHT INTO THE PAD OPENING. AT THE SURFACE POINT, THE CONDUITS MAY BE BUNDLED TOGETHER. USE SDG&E APPROVED BASE, SHADING AND BACKFILL.



**FIGURE 5** (C)

- (D) THE TOP AND INTERMEDIATE 3314 HANDHOLE SECTIONS MAY BE ELIMINATED WHEN INSTALLATION SERVES ONLY ONE CUSTOMER ULTIMATELY AND CONDUIT REQUIREMENTS DO NOT EXCEED WHAT IS SHOWN IN FIGURE 2 OR AS SPECIFIED IN NOTE E. IF MORE THAN FIVE 5-INCH CONDUITS ARE USED (REGARDLESS OF THE NUMBER OF CUSTOMERS), ONE TOP SECTION AND TWO INTERMEDIATE SECTIONS ARE REQUIRED.
- (E) **FOR SECONDARY INSTALLATION WITHOUT A HANDHOLE (ULTIMATELY ONE CUSTOMER ONLY),** ANY COMBINATION OF 3-INCH, 4-INCH OR 5-INCH SECONDARY CONDUITS MAY BE USED PROVIDED THEY DO NOT EXCEED A TOTAL OF SIX OR THE TOTAL OF EACH SIZE CONDUIT SHOWN IN FIGURE 2. TWO EXTRA 1-INCH OR TWO EXTRA 2-INCH CONDUITS MAY BE ADDED TO SERVE STREET LIGHT, RECREATION BUILDINGS, ETC.
- (F) **FOR SECONDARY INSTALLATIONS IN A HANDHOLE,** ANY COMBINATION OF 3-INCH, 4-INCH, OR 5-INCH SECONDARY CONDUITS MAY BE USED, PROVIDED THEY DO NOT EXCEED THE TOTAL OF NINE OR THE MAXIMUM OF EACH SIZE CONDUIT (SEE FIGURES 3 & 4). TWO EXTRA 1-INCH OR TWO EXTRA 2-INCH CONDUITS MAY BE ADDED TO SERVE STREET LIGHT, RECREATION BUILDINGS, ETC.
- (G) WHEN THE NUMBER OF REQUIRED CONDUITS IS LESS THAN THE TOTAL SHOWN ON THE SKETCHES, INSTALL THE CONDUITS IN NUMBERED SEQUENCE AS SHOWN.
- (H) IF THE INSTALLATION IS FOR A 12KV TO 4KV TRANSFORMER (HPR TYPE), DO NOT USE HANDHOLE AND TERMINATE CONDUITS FLUSH WITH TOP OF PAD.
- (J) IN SOFT SOILS A CONCRETE BACKFILL (1-SACK MIX.) IS REQUIRED UNDER THE PAD, 12 INCHES BEYOND THE SIDE EDGES OF PAD AND 12 INCHES DEEP.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE **DEADFRONT** TRANSFORMER PAD INSTALLATION 3426

**UG3426.3**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                    | WEIGHT (LBS)             | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | MACRO UNITS |
|------|--------------------------------|--------------------------|----------|---------------|--------------|--------------|-------------|
| 1    | PAD                            | 2,430 MIN.<br>2,690 MAX. | 1        | --            | S514005      | 3426B0       | 3426B3      |
| 2    | HANDHOLE SECTION, TOP          | --                       | 1        | 3314          | S336210      | --           |             |
| 3    | HANDHOLE SECTION, INTERMEDIATE | --                       | 2        |               | S336212      | --           |             |
| 4    | COVER, PARKWAY                 | --                       | 1        |               | S286843      | --           |             |

**NOTES:**

- I. TRANSFORMER COOLING FINS MAY OVERHANG REAR OF PAD BY 6 INCHES.
- II. IF NUMBER OF SECONDARY CONDUITS IS GREATER THAN MAXIMUM SHOWN, USE PAD 3427. ①
- III. TRANSFORMER PAD MAY NOT BE POURED IN PLACE. USE PRECAST PADS ONLY.

**REFERENCE:**

- a. SEE **UG3211.3** FOR PAD IDENTIFICATION.
- b. SEE UG3370 OR UG3371 FOR TRENCH, UTILITY POSITIONING, SHADING AND BACKFILL REQUIREMENTS.
- c. SEE UG3376 FOR CONCRETE SLURRY, SHADING AND TYPE OF CONDUIT.
- d. SEE **UG3479** FOR TRANSFORMER BARRIER PROTECTION.
- e. SEE **UG3480, UG3481, UG3482 & UG3483** FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- f. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- g. SEE UG3486 & **UG3487** FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE **UG3489** FOR RETAINING WALLS.
- i. SEE UG3751 FOR TRANSFORMER INSTALLATION.
- j. SEE UG4512 FOR EQUIPMENT GROUNDING.
- k. SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.

① SEE **UG3427, THREE-PHASE TRANSFORMER PAD INSTALLATION 3427.**

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE **DEADFRONT** TRANSFORMER PAD INSTALLATION 3426

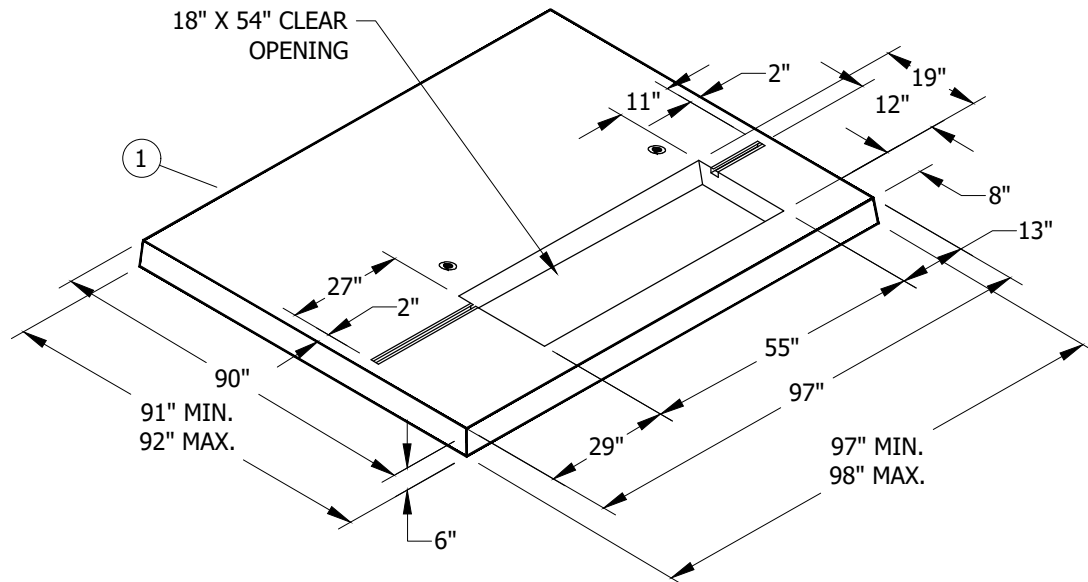
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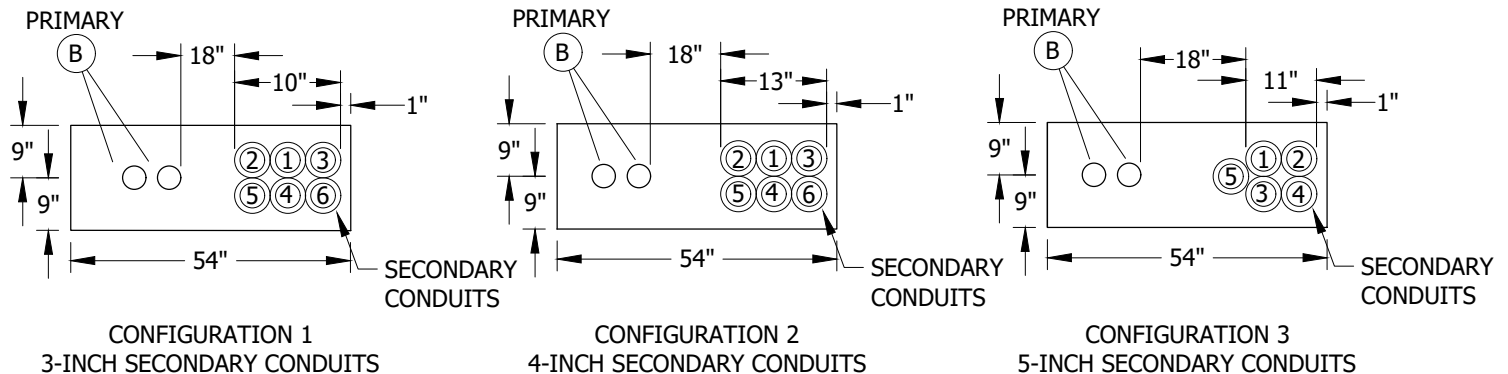
**SCOPE:** THIS STANDARD SHOWS THE REQUIREMENTS FOR INSTALLING A 3427 THREE-PHASE PAD FOR DEADFRONT TRANSFORMER APPLICATION FROM 1,500 KVA THROUGH 2,500 KVA AND 3,000 KVA LIVEFRONT TRANSFORMER.

**ATTENTION:**

- \* DEADFRONT TRANSFORMERS BETWEEN 225 KVA & 1,000 KVA MAX. ARE TO BE USED ON THIS PAD WHENEVER THE CONDUIT REQUIREMENTS ARE GREATER THAN THE MAXIMUM SHOWN ON UG3425 OR UG3426. (I)



**FIGURE 1**  
PAD



**FIGURE 2**  
MAXIMUM PRIMARY CONDUITS ALLOWED (B C E G)  
TWO RUNS OF 4-INCH (EB OR DB)

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE DEADFRONT/LIVEFRONT TRANSFORMER PAD  
INSTALLATION 3427

UG3427.1

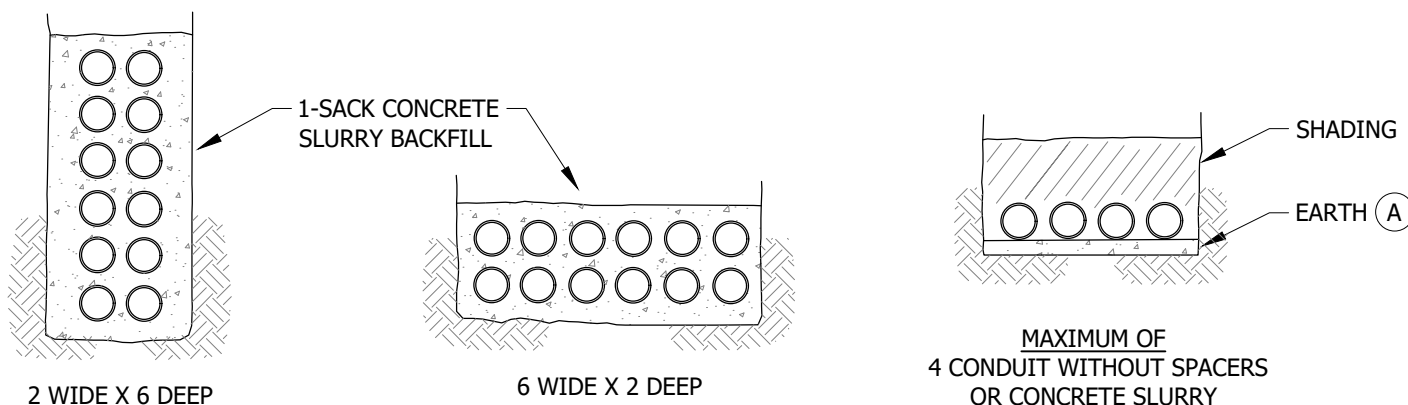






## INSTALLATION:

- (A) 1-INCH EARTH IN THE BOTTOM OF THE TRENCH IS REQUIRED TO PREVENT DAMAGE FROM ROCKS, SAGS OR POCKETS.
- (B) PLACE ALL SECONDARY CONDUITS WITHIN THE PAD OR HANDHOLE OPENING AS SHOWN IN FIGURES 2 & 3. TERMINATE PRIMARY OR SECONDARY CONDUITS FLUSH WITH TOP OF THE PAD. WHEN A HANDHOLE IS REQUIRED FOR SECONDARY CONDUITS, TERMINATE THEM NOT LESS THAN 3 INCHES ABOVE BOTTOM OF HANDHOLE. DO NOT CUT INTO THE CURVED PORTION OF THE ELBOWS. RADIUS OF CURVATURE IS 36 INCHES MINIMUM FOR 3-INCH, 4-INCH AND 5-INCH CONDUITS.
- (C) THE CONDUIT CONFIGURATION REQUIREMENT BETWEEN TERMINATING POINTS LIMITS THE SECONDARY CONDUIT CONFIGURATION TO TWO WIDE X SIX DEEP OR SIX WIDE X TWO DEEP (NO ONE CONDUIT IS TO BE COMPLETELY SURROUNDED ON ALL FOUR SIDES BY OTHER CONDUITS) USING SPACERS AND 1 SACK CONCRETE SLURRY BACKFILL. CONDUITS MAY ALSO BE INSTALLED SIDE BY SIDE ON THE BOTTOM OF THE TRENCH WITHOUT SPACERS OR CONCRETE SLURRY (FOUR CONDUITS MAX.). IN THE TRANSITION AREA WHERE THE CONDUITS FROM THE BOTTOM OF THE TRENCH START TOWARD THE SURFACE (THE STRAIGHT PORTION BY THE 90° BEND), SPACERS MAY BE REQUIRED TO ALLOW THE 90° BENDS TO ENTER STRAIGHT INTO THE PAD OPENING. AT THE SURFACE POINT, THE CONDUITS MAY BE BUNDLED TOGETHER. USE SDG&E APPROVED BASE, SHADING AND BACKFILL.



**FIGURE 4** (C)

- (D) THE 3314 HANDHOLE SECTIONS ARE NOT REQUIRED WHEN INSTALLATION SERVES ONLY ONE CUSTOMER ULTIMATELY AND CONDUIT REQUIREMENTS DO NOT EXCEED THAT SHOWN IN FIGURE 2 OR AS SPECIFIED IN NOTE E. IF MORE THAN FIVE 5-INCH CONDUITS ARE USED (REGARDLESS OF THE NUMBER OF CUSTOMERS), ONE TOP SECTION AND TWO INTERMEDIATE ARE REQUIRED.
- (E) **FOR SECONDARY INSTALLATIONS WITHOUT A HANDHOLE (ULTIMATELY ONE CUSTOMER ONLY)**, ANY COMBINATION OF 3-INCH, 4-INCH OR 5-INCH SECONDARY CONDUITS MAY BE USED PROVIDED THEY DO NOT EXCEED THE TOTAL OF EACH SIZE CONDUIT SHOWN IN FIGURE 2. TWO EXTRA 1-INCH OR TWO EXTRA 2-INCH CONDUITS MAY BE ADDED TO SERVE STREET LIGHT, RECREATION BUILDINGS, ETC.
- (F) **FOR SECONDARY INSTALLATIONS IN A HANDHOLE**, ANY COMBINATION OF 3-INCH, 4-INCH OR 5-INCH SECONDARY CONDUITS MAY BE USED PROVIDED THEY DO NOT EXCEED THE TOTAL OF 12 OR THE MAXIMUM OF EACH SIZE CONDUIT (12-3", 12-4" OR 12-5"). TWO EXTRA 1-INCH OR TWO EXTRA 2-INCH CONDUITS MAY BE ADDED TO SERVE STREET LIGHT, RECREATION BUILDINGS, ETC.
- (G) WHEN NUMBER OF REQUIRED CONDUITS IS LESS THAN TOTAL SHOWN ON SKETCHES, INSTALL CONDUITS IN NUMBERED SEQUENCE AS SHOWN.
- (H) A CONCRETE BACKFILL (1-SACK MIX.) IS REQUIRED UNDER THE PAD, 12 INCHES BEYOND THE SIDE EDGES OF PAD AND 12 INCHES DEEP.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE DEADFRONT/LIVEFRONT TRANSFORMER PAD  
INSTALLATION 3427

UG3427.3



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                    | WEIGHT (LBS)             | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | MACRO UNITS |
|------|--------------------------------|--------------------------|----------|---------------|--------------|--------------|-------------|
| 1    | PAD                            | 4,000 MIN.<br>4,100 MAX. | 1        | --            | S514012      | 3427B0       | 3427B3      |
| 2    | HANDHOLE SECTION, TOP          | --                       | 1        | 3314          | S332610      | --           |             |
| 3    | HANDHOLE SECTION, INTERMEDIATE | --                       | 2        |               | S336212      | --           |             |
| 4    | COVER, PARKWAY                 | --                       | 1        |               | S286843      | --           |             |
| 5    | BACKFILL, CONCRETE             | --                       | AS REQ'D | --            | --           | 3427CB       | --          |

**NOTES:**

- I. SET TRANSFORMER ON THE PAD AS FAR TO THE LEFT AS POSSIBLE IN ORDER TO OBTAIN MAXIMUM CLEARANCE IN THE SECONDARY COMPARTMENT FOR CABLE TRAINING.
- II. TRANSFORMER COOLING FINS MAY OVERHANG REAR OF PAD BY 6 INCHES.
- III. PAD MAY NOT BE POURED IN PLACE. USE PRECAST PADS ONLY.

**REFERENCE:**

- a. SEE [UG3211.3](#) FOR PAD IDENTIFICATION.
- b. SEE UG3370 OR UG3371 FOR TRENCH, UTILITY POSITIONING, SHADING AND BACKFILL REQUIREMENTS.
- c. SEE UG3376 FOR CONCRETE SLURRY, SHADING AND TYPE OF CONDUIT.
- d. SEE [UG3479](#) FOR TRANSFORMER BARRIER PROTECTION.
- e. SEE [UG3480](#), [UG3481](#), [UG3482](#) & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- f. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- g. SEE UG3486 & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE [UG3489](#) FOR RETAINING WALLS.
- i. SEE UG3751 FOR TRANSFORMER INSTALLATION.
- j. SEE UG4512 FOR EQUIPMENT GROUNDING.
- k. SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.
- ① SEE [UG3755](#) FOR CONDUIT PLACEMENT OF STEP-DOWN TRANSFORMER INSTALLATION.

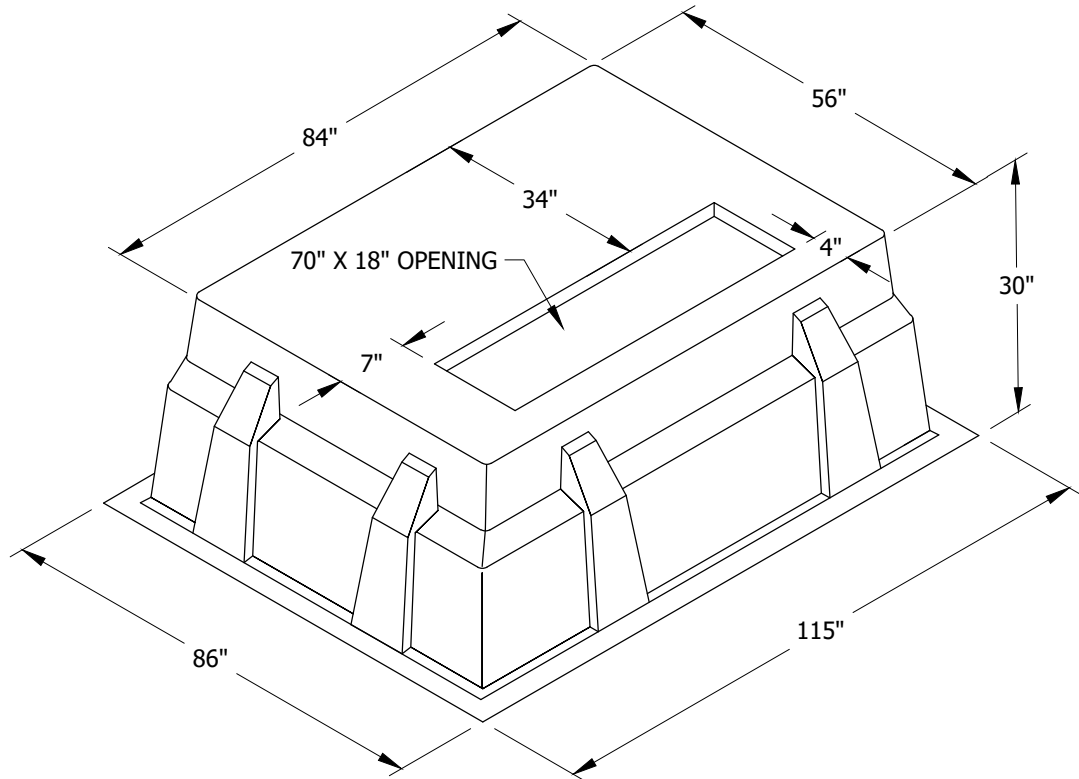
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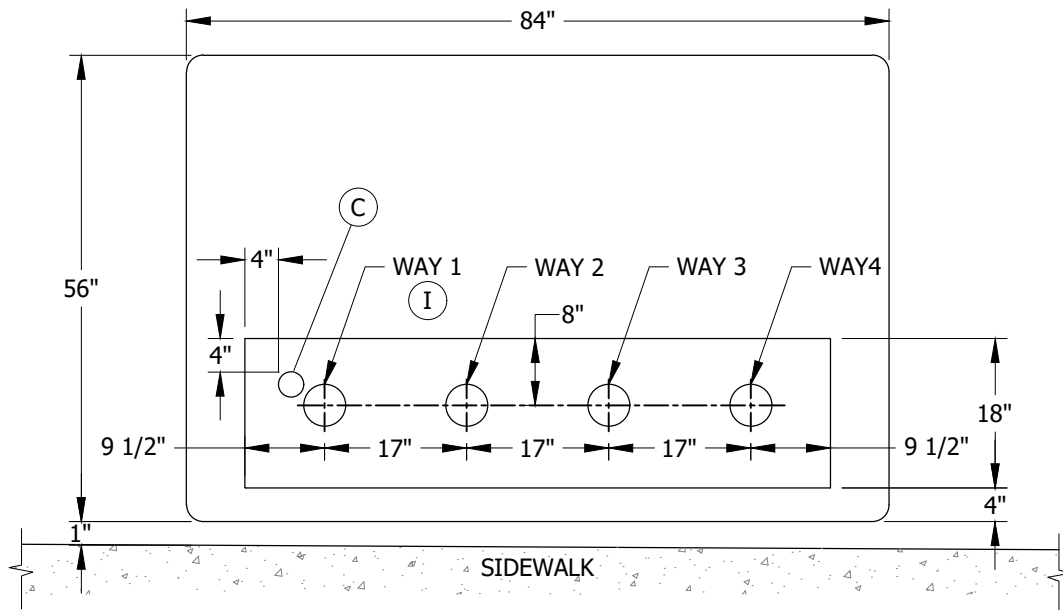
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                    |                           |                    |          |                     |          |
|                 | THREE-PHASE DEADFRONT/LIVEFRONT TRANSFORMER PAD<br>INSTALLATION 3427 |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE BOX PAD TRAYER 4-WAY SWITCH.



**FIGURE 1**  
ISOMETRIC VIEW



**FIGURE 1** (F)  
PLAN VIEW

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD FOR 4-WAY TRAYER PAD MOUNTED SWITCH

UG3428.1







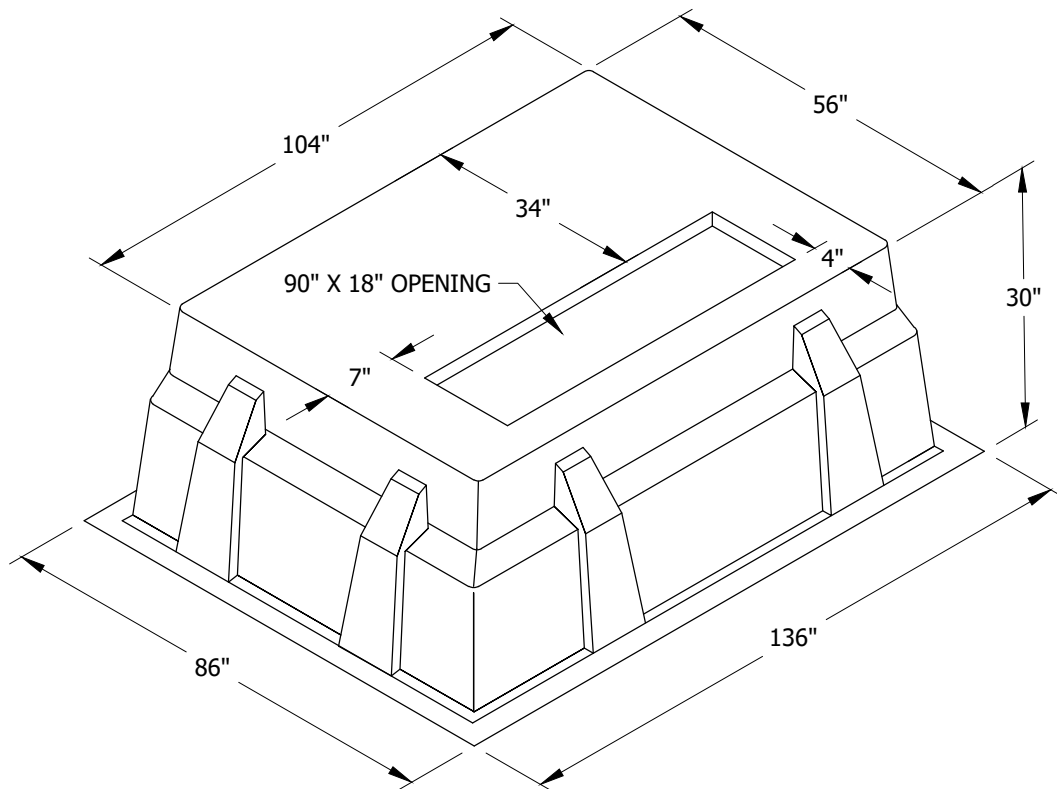
## CONDUIT

- ## BOX PAD

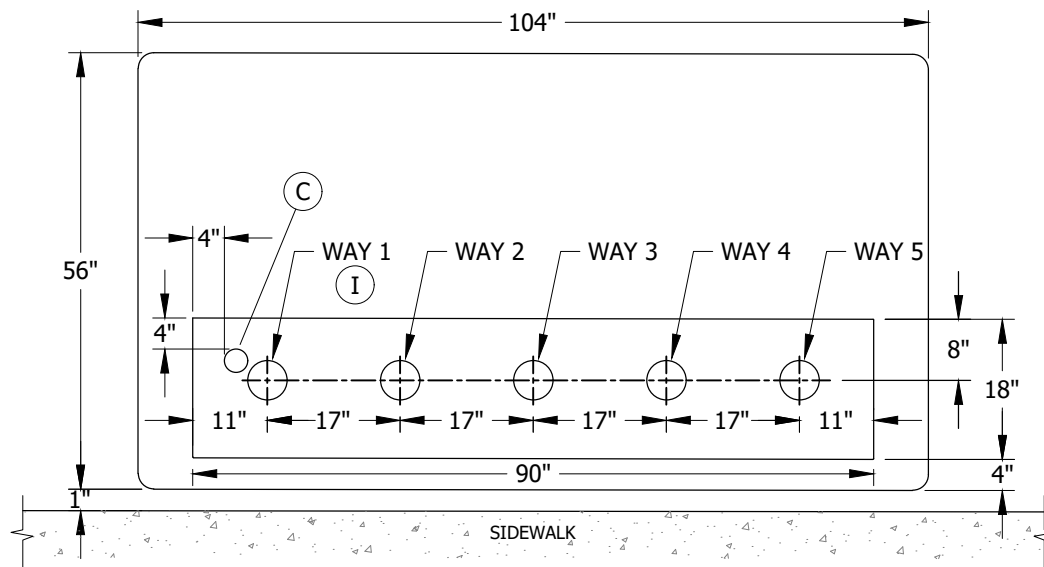
- UG3428.3



**SCOPE:** THIS STANDARD SHOWS THE BOX PAD TRAYER 5-WAY SWITCH.



**FIGURE 1**  
ISOMETRIC VIEW



**FIGURE 2** (F)  
PLAN VIEW

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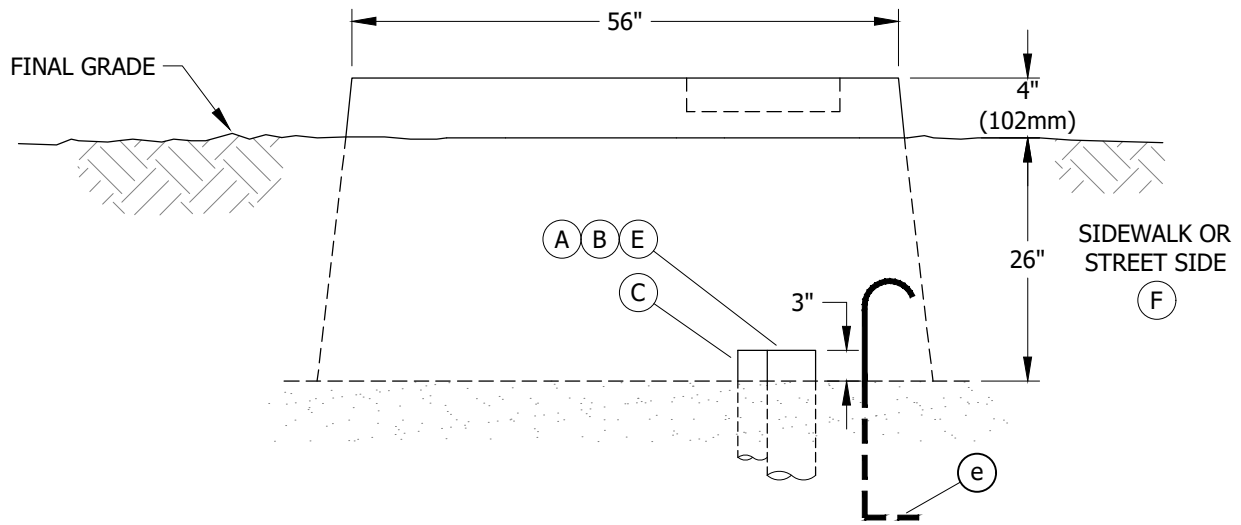
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                          |                    |                          |          |                          |                     |
| BOX PAD FOR 5-WAY TRAYER PAD MOUNTED SWITCH       |                           |                          |                    |                          |          |                          |                     |

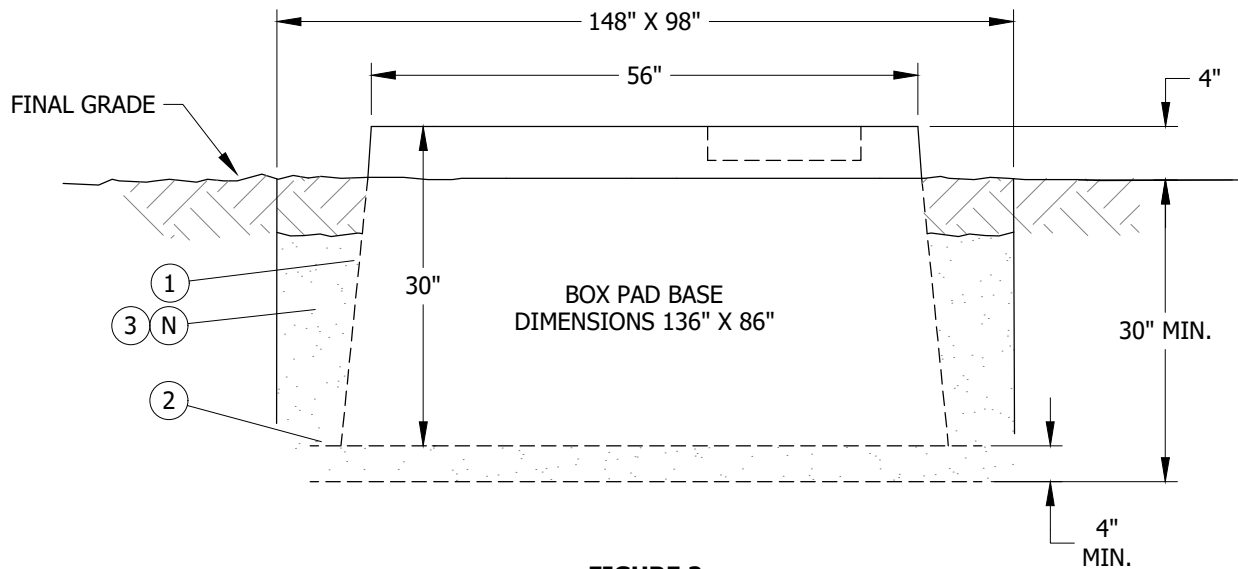
SHEET  
1 OF 3

UG3429.1





**FIGURE 1**  
LEFT SIDE VIEW



**FIGURE 2**  
EXCAVATION DIMENSIONS

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**2 OF 3**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

BOX PAD FOR 5-WAY TRAYER PAD MOUNTED SWITCH

**UG3429.2**



## CONDUIT

- ## BOX PAD

- | ITEM | DESCRIPTION              | MANUFACTURER  | MANUFACTURER PART NUMBER | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--------------------------|---------------|--------------------------|----------|---------------|--------------|--------------|
| 1    | PAD, BOX                 | PROGLASS, INC | SG1045630                | 1        | --            | S514036      | 3429BP       |
| 2    | GRAVEL, 3/8" - 3/4"      | --            | --                       | AS REQ'D | --            | S601600      |              |
| 3    | SLURRY, 1 SLACK          | --            | --                       | AS REQ'D | --            | S656400      |              |
| 4    | EXCAVATION, BOX PAD (II) | --            | --                       | 1        | --            | --           | X3429        |

- a. SEE [UG3211.3](#) FOR INSTALLATION OF IDENTIFICATION TAG.
- b. SEE [UG3365.2](#) FOR SLURRY BACKFILL.
- c. SEE [UG3480](#), [UG3481](#), [UG3482](#) & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- d. SEE UG3486 & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE UG4510 FOR TRENCH GROUND WIRE.
- f. SEE UG3550 FOR SWITCH INSTALLATION.

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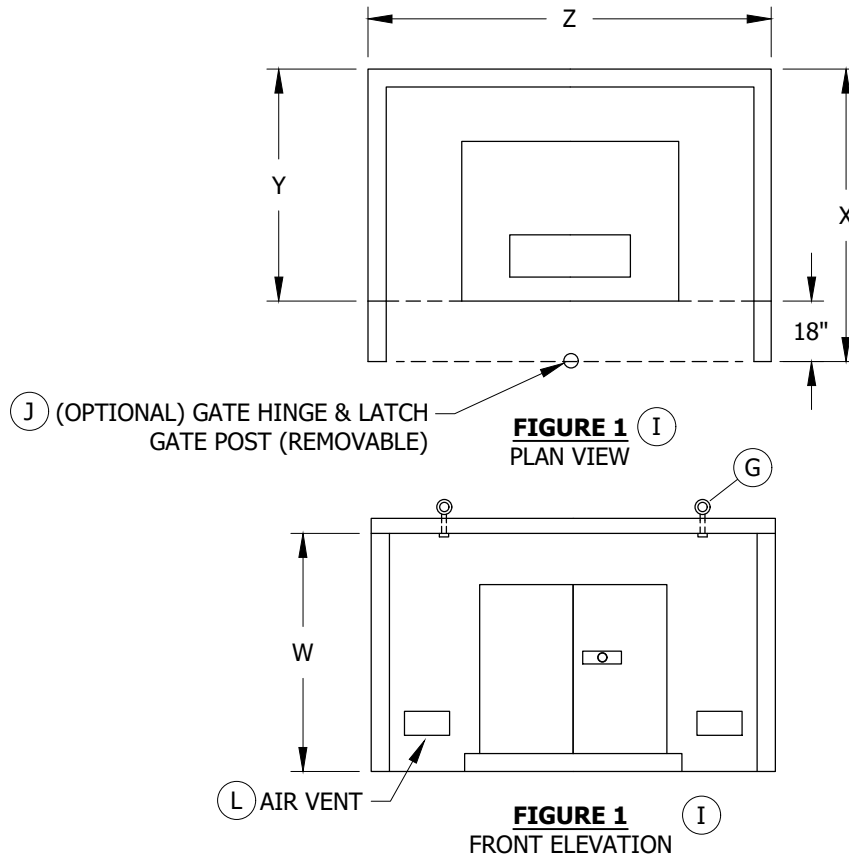
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | BOX PAD FOR 5-WAY TRAYER PAD MOUNTED SWITCH       |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE DIMENSIONAL CRITERIA FOR INSTALLATION OF PAD MOUNTED TRANSFORMER SOUND ENCLOSURES. ENCLOSURES ARE TO BE USED WHEN TRANSFORMERS NOISE IS TO BE REDUCED.

**ATTENTION:**

\* THIS IS AN ON GRADE FACILITY ONLY.



**INSTALLATION:**

- CUSTOMER SHALL INSTALL, OWN, AND MAINTAIN TRANSFORMER ENCLOSURE.
- ENCLOSURE WALLS SHALL CONSIST OF EITHER REINFORCED CONCRETE, NOT LESS THAN 6 INCHES THICK, OR REINFORCED CONCRETE BLOCK, NOT LESS THAN 8 INCHES THICK.
- THE ENCLOSURE MUST BE DESIGNED TO MEET BUILDING CODE REQUIREMENTS. DESIGN CALCULATIONS AND DRAWINGS ARE TO BE STAMPED AND SIGNED BY A CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA.
- INSIDE DIMENSIONS OF ENCLOSURE TO BE BASED ON TRANSFORMER PAD SELECTION AS DESIGNATED BY SDG&E PLANNER/DESIGNER.

**TABLE 1**

| MINIMUM REQUIREMENTS FOR DEADFRONT TRANSFORMER INSTALLATIONS THROUGH 1,000KVA (E) |        |        |            |        |
|---|--------|--------|------------|--------|
| PAD (UGS REF.)  | Z (IN) | Y (IN) | X (IN) (J) | W (IN) |
| 3421  | 94     | 72     | 90         | 52     |
| 3425  | 126    | 83     | 101        | 89     |
| 3426  | 126    | 99     | 117        | 98     |
| 3427  | 146    | 116    | 134        | 114    |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

TRANSFORMER SOUND ENCLOSURE

**UG3478.1**



- (E) HEIGHT REQUIREMENTS MAY INCREASE FOR LARGER TRANSFORMER INSTALLATIONS. FUTURE LOAD ADDITIONS SHOULD BE CONSIDERED.
- F. ENCLOSURE COVER TO BE PITCHED (2%) TO PROMOTE DRAINAGE TO SIDE OR REAR OF ENCLOSURE.
- (G) ENCLOSURE COVER TO BE CONSTRUCTED OF STEEL OR STEEL REINFORCED CONCRETE. SOLID COVER TO BE REMOVABLE AND FITTED WITH FOUR (4) REMOVABLE LIFTING EYES. COVER WEIGHT SHALL BE STENCILED ON UNDERSIDE OF COVER.
- H. ENCLOSURE COVER TO BE SECURED TO WALL STRUCTURE WITH PINS OR BOLTS TO PREVENT LATERAL MOVEMENT.
- (J) WHEN OPTIONAL ENCLOSURE GATE IS PROVIDED, USE LENGTH X SHOWN ABOVE. GATE CONSTRUCTION TO PROVIDE FULL VENTILATION. GATE MUST BE A MINIMUM OF 18 INCHES IN FRONT OF TRANSFORMER PAD. GATE TO BE LATCHED WITH HASP FOR SDG&E PADLOCK.
- K. MINIMUM CRANE OPERATING HEADROOM CLEARANCE IS 20 FEET ABOVE PAD. UTILITY TRUCK ACCESS TO BE WITHIN 10 FEET OF ENCLOSURE.
- (L) 8" X 16" VENT OPENINGS ARE REQUIRED IN WALL, (8 INCHES FROM BASE AND 8 INCHES FROM EACH REAR CORNER). DO NOT VENT INTO BUILDINGS.
- M. A MINIMUM OF 3 1/2-INCH THICK CONCRETE IS REQUIRED BETWEEN WALL AND PAD. SLOPE CONCRETE SLIGHTLY TOWARD THE FRONT IN ALL INSTALLATIONS.
- N. OPEN SIDE OF ENCLOSURE REQUIRES 8'-0" CLEAR WORK AREA IN FRONT OF PAD. AVOID FACING OPEN SIDE TO ADJACENT BUILDINGS OR INACCESSIBLE AREAS.

**NOTES:**

- REFERENCE:**

- a. SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS FOR PAD MOUNTED AND SUBSURFACE EQUIPMENT.
- b. SEE UG3484 TO SET TRANSFORMER PADS FOR NOISE CONTROL.
- c. SEE DM5612 FOR TRANSFORMER NOISE CRITERIA.
- d. PAD LOCATED OR POSITIONED IN RELATION TO ADJACENT BUILDINGS SHALL BE PER UG3483.

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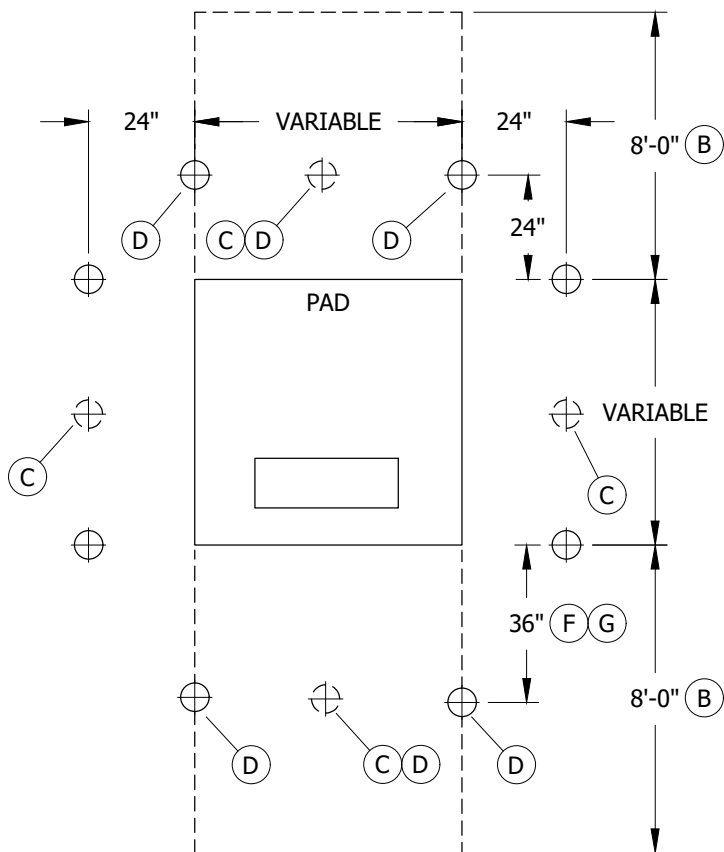
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |     |                    |     |          |    |                     |     |     |      |          |
|                 |                   | TRANSFORMER SOUND ENCLOSURE                       |                           |     |     |                    |     |          |    |                     |     |     |      |          |



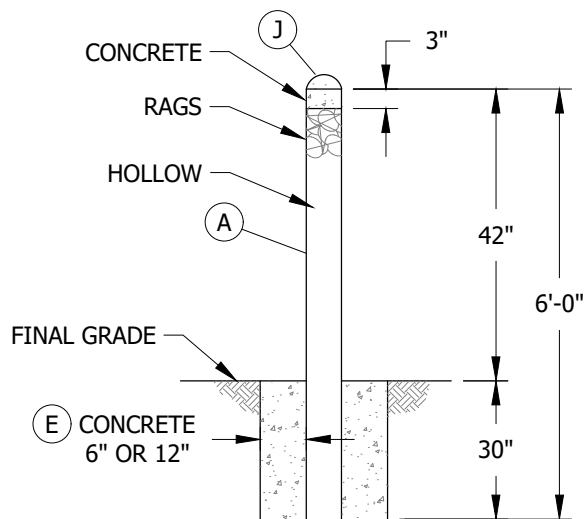
**SCOPE:** THIS STANDARD ILLUSTRATES BARRIER POST USAGE WHEN NEEDED TO PROTECT SDG&E FACILITIES FROM PASSENGER VEHICLES, TRUCKS, FORK LIFTS, TRAILERS OR OTHER HEAVY MOBILE ITEMS (E.G. DUMPSTERS).

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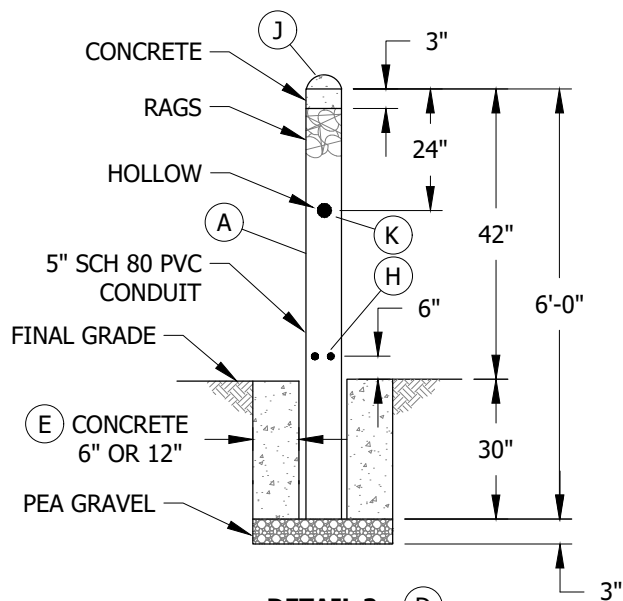
- \* CALL "UNDERGROUND SERVICE ALERT" (U.S.A.) TWO WORKING DAYS BEFORE YOU DIG TO VERIFY THE LOCATION OF UNDERGROUND UTILITIES. CALL TOLL FREE: 1-800-422-4133 OR 811



**FIGURE 1**



**DETAIL 1**  
NON-REMOVABLE BARRIER POST



**DETAIL 2**  
REMOVABLE BARRIER POST

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**1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

EQUIPMENT BARRIER PROTECTION AND CLEARANCE

**UG3479.1**



**INSTALLATION:**

- (A) USE 4-INCH STEEL PIPE, (NOT GALVANIZED) WITH A MINIMUM WALL THICKNESS OF 0.188 INCHES. THE PIPE SHALL BE PRIMED AND PAINTED WHITE.
- (B) AN 8-FOOT MINIMUM CLEARANCE FROM ANY ABOVE GROUND OBJECT IS REQUIRED IN FRONT OF PAD WHERE EQUIPMENT DOOR OPENS FOR HOT STICK OPERATION.
- (C) WHEN USING THE LARGER 3427 TRANSFORMER PAD OR PAD MOUNTED SWITCH PAD, ADDITIONAL BARRIERS ARE REQUIRED AS SHOWN.
- (D) ALL BARRIERS REQUIRED IN FRONT OF EQUIPMENT DOORS MUST BE REMOVABLE.
- (E) THE CONCRETE ENCASEMENT SHALL BE A MINIMUM OF 6 INCHES THICK IN STABLE SOIL AND 12 INCHES THICK IN SANDY OR UNSTABLE SOIL.
- (F) MAY BE REDUCED TO 24 INCHES IN TIGHT AREAS.
- (G) INCREASE DISTANCE AS REQUIRED FOR A THREE-PHASE TRANSFORMER WITH HANDHOLE.
- (H) DRILL FOUR 1/4-INCH DIAMETER HOLES AS SHOWN TO PREVENT SUCTION.
- (J) A WELDED CAP OR BLANK MAY BE USED IN LIEU OF CONCRETE CAP.
- (K) DRILL AN 11/16-INCH HOLE COMPLETELY THROUGH REMOVABLE POST. THIS WILL ALLOW FOR A 5/8-INCH BOLT WHICH MAY BE USED FOR REMOVAL OF THE POST.

**BILL OF MATERIALS:** NONE**NOTES:**

- I. CAUTION MUST BE TAKEN WHEN INSTALLING BARRIER POSTS SO THERE IS NO CONTACT WITH UNDERGROUND UTILITIES.
- II. DO NOT INSTALL TRAFFIC POSTS IF ABOVE GROUND OBJECTS EXIST WHICH PROTECT PAD MOUNTED EQUIPMENT FROM VEHICULAR TRAFFIC.

**REFERENCE:**

- a. SEE [UG3480](#), [UG3481](#), [UG3482](#) & [UG3483](#) FOR SPECIFIC OPERATING CLEARANCE REQUIREMENTS FOR PAD MOUNTED EQUIPMENT.
- b. SEE DM5240.2-.3 FOR CRITERIA TO LOCATE PAD MOUNTED EQUIPMENT IN PUBLIC RIGHT-OF-WAY.
- c. SEE DM5240.4 TO DETERMINE WHEN TO INSTALL BARRIER POSTS TO PROTECT PAD MOUNTED EQUIPMENT ALONG SIDE ROADWAYS.

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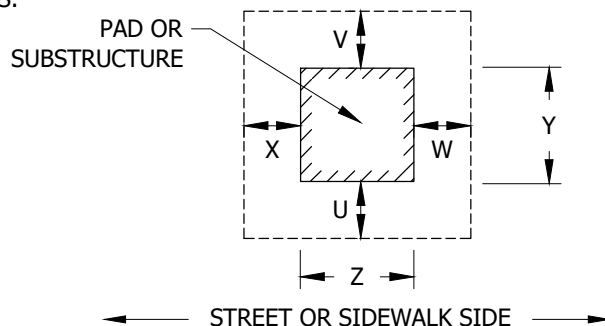
SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

EQUIPMENT BARRIER PROTECTION AND CLEARANCE

**UG3479.2**



**SCOPE:** THIS STANDARD SHOWS THE MINIMUM RETAINING WALL AND OPERATING CLEARANCES REQUIRED FOR PADS AND SUBSURFACE STRUCTURES.



**FIGURE 1**

**TABLE 1**

| PAD OR SUBSTRUCTURE OPERATING CLEARANCES (VI)                    |               |   |                  |                                  |                 |                |                 |
|--|---------------|---|------------------|----------------------------------|-----------------|----------------|-----------------|
| PAD USAGE  | STANDARD PAGE | PAD OR STRUCTURE DIMENSIONS AND MINIMUM OPERATING WIDTH |                  | MINIMUM CLEARANCE DIMENSIONS (C) |                 |                |                 |
|  |               | Z   | Y                | X                                | W               | V              | U               |
| RTU PAD  | 3409          | 3'-10"<br>(1168)  | 4'-0"<br>(1219)  | 18"<br>(457)                     | 18"<br>(457)    | 18"<br>(457)   | 8'-0"<br>(2438) |
| THREE-PHASE CABLE TERMINATING CABINET 600A TO 200A               | 3410          | 7'-3"<br>(2210)   | 4'-9"<br>(1461)  | 18"<br>(457)                     | 18"<br>(457)    | 18"<br>(457)   | 8'-0"<br>(2438) |
| THREE-PHASE CAPACITOR  | 3414          | 5'-4"<br>(1626)   | 5'-0"<br>(1524)  | 8'-0"<br>(2438)                  | 8'-0"<br>(2438) | 18"<br>(457)   | 18"<br>(457)    |
| THREE-PHASE SERVICE RESTORER                                     | 3415          | 5"<br>(1524)  | 4'-9"<br>(1461)  | 18"<br>(457)                     | 18"<br>(457)    | 18"<br>(457)   | 8'-0"<br>(2438) |
|  |               | 5'-4"<br>(1626)   | 5'-0"<br>(1524)  | 4'-0"<br>(1219)                  | 8'-0"<br>(2438) | 18"<br>(457)   | 18"<br>(457)    |
| THREE-PHASE CABLE TERMINATING CABINET (200A)                     | 3416          | 6'-8"<br>(2210)   | 2'-6"<br>(762)   | 18"<br>(457)                     | 18"<br>(457)    | 18"<br>(457)   | 8'-0"<br>(2438) |
| THREE-PHASE CABLE TERMINATING CABINET (600A)                     | 3417          | 4'-0"<br>(1219)   | 3'-10"<br>(1168) | 8'-0"<br>(2438)                  | 8'-0"<br>(2438) | 18"<br>(457)   | 18"<br>(457)    |
| THREE-PHASE PME 3 SWITCH (600A)                                  | 3418          | 5'-10"<br>(1788)  | 3'-8"<br>(1118)  | 8'-0"<br>(2438)                  | 8'-0"<br>(2438) | 18"<br>(457)   | 4'-4"<br>(1321) |
| 3-WAY VISTA BOX PAD  | 3419          | 5'-4"   | 5'-1"            | 3'-0"                            | 8'-0"           | 18"            | 18"             |
| SINGLE-PHASE CABLE TERMINATOR (FUTURE TRANSFORMER INSTALLATIONS) | 3421          | 3'-10"<br>(1168)  | 4'-0"<br>(1219)  | 18"<br>(457)                     | 18"<br>(457)    | 18"<br>(457)   | 8'-0"<br>(2438) |
| THREE-PHASE FUSE CABINET (VERTICAL & HORIZONTAL MOUNT)           | 3421          | 4'-0"<br>(1219)   | 3'-10"<br>(1168) | 8'-0"<br>(457)                   | 8'-0"<br>(457)  | 18"<br>(457)   | 18"<br>(2438)   |
| SINGLE-PHASE FUSED SECTIONALIZING CABINET                        | 3421          | 4'-0"<br>(1219)   | 3'-10"<br>(1168) | 8'-0"<br>(2438)                  | 8'-0"<br>(2438) | 18"<br>(457)   | 18"<br>(457)    |
| SINGLE-PHASE CABLE TERMINATOR                                    | 3421          | 3'-10"<br>(1168)  | 4'-0"<br>(1219)  | 18"<br>(457)                     | 18"<br>(457)    | 18"<br>(457)   | 8'-0"<br>(2438) |
| SINGLE-PHASE TRANSFORMER (25-167KVA)                             | 3421          | 3'-10"<br>(1168)  | 4'-0"<br>(1219)  | 18"<br>(457)                     | 18"<br>(457)    | 18"<br>(457)   | 8'-0"<br>(2438) |
| PAD MOUNTED MVI FUSE CABINET                                     | 3421          | 3'-10"<br>(1168)  | 4'-0"<br>(1219)  | 48"<br>(1219)                    | 48"<br>(1219)   | 18"<br>(457)   | 8'-0"<br>(2438) |
| THREE-PHASE PME 9 SWITCH (600A)                                  | 3423          | 6'-1"<br>(1854)   | 6'-6"<br>(1981)  | 8'-0"<br>(2438)                  | 8'-0"<br>(2438) | 4'-4"<br>(457) | 4'-4"<br>(1321) |
| THREE-PHASE PME 10 SWITCH (600A)                                 | 3423          | 6'-1"<br>(1854)   | 6'-6"<br>(1981)  | 8'-0"<br>(2438)                  | 8'-0"<br>(2438) | 4'-4"<br>(457) | 4'-4"<br>(1321) |

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CLEARANCE REQUIREMENTS FOR PAD MOUNTED AND  
SUBSURFACE EQUIPMENT FROM ABOVE GROUND OBJECTS

UG3480.1



**TABLE 1 (CONT'D)**

| PAD OR SUBSTRUCTURE OPERATING CLEARANCES (VI)      |               |   |               |                                  |              |              |              |
|--|---------------|---|---------------|----------------------------------|--------------|--------------|--------------|
| PAD USAGE  | STANDARD PAGE | PAD OR STRUCTURE DIMENSIONS AND MINIMUM OPERATING WIDTH |               | MINIMUM CLEARANCE DIMENSIONS (C) |              |              |              |
|  |               | Z   | Y             | X                                | W            | V            | U            |
| THREE-PHASE PME 11 SWITCH (600A)                   | 3423          | 6'-1" (1854)  | 6'-6" (1981)  | 8'-0" (2438)                     | 8'-0" (2438) | 4'-4" (457)  | 4'-4" (1321) |
| THREE-PHASE AUTOMATIC TRANSFER SWITCH (600A S & C) | 3423          | 6'-1" (1854)  | 6'-6" (1981)  | 8'-0" (2438)                     | 8'-0" (2438) | 18" (457)    | 6" (1829)    |
| THREE-PHASE PRIMARY METER CABINET                  | 3425          | 6'-6" (1981)  | 4'-11" (1499) | 18" (457)                        | 18" (457)    | 5'-0" (1524) | 8'-0" (2438) |
| THREE-PHASE TRANSFORMER                            | 3425          | 6'-6" (1981)  | 4'-11" (1499) | 18" (457)                        | 18" (457)    | 2'-0" (610)  | 8'-0" (2438) |
| THREE-PHASE TRANSFORMER                            | 3426          | 6'-6" (1981)  | 6'-3" (1905)  | 18" (457)                        | 18" (457)    | 2'-0" (610)  | 8'-0" (2438) |
| THREE-PHASE LIVEFRONT TRANSFORMER                  | 3427          | 8'-2" (2489)  | 7'-8" (2337)  | 18" (457)                        | 18" (457)    | 2'-0" (610)  | 8'-0" (2438) |
| THREE-PHASE TRAYER SWITCH 4-WAY                    | 3428          | 7'-0" (2134)  | 4'-8" (1422)  | 4'-4" (1321)                     | 18" (457)    | 2'-0" (610)  | 8'-0" (2438) |
| THREE-PHASE TRAYER SWITCH 5-WAY                    | 3429          | 8'-8" (2642)  | 4'-8" (1422)  | 4'-4" (1321)                     | 18" (457)    | 2'-0" (610)  | 8'-0" (2438) |

**TABLE 2**

| CABLE JUNCTION PEDESTAL (VI) |               |   |             |                                  |               |               |              |
|------------------------------|---------------|---|-------------|----------------------------------|---------------|---------------|--------------|
| STRUCTURE USAGE              | STANDARD PAGE | PAD OR STRUCTURE DIMENSIONS AND MINIMUM OPERATING WIDTH |             | MINIMUM CLEARANCE DIMENSIONS (C) |               |               |              |
|                              |               | Z   | Y           | X                                | W             | V             | U            |
| PRIMARY                      | 3523          | 4'-10" (1473)   | 2'-6" (762) | 18" (457) (V)                    | 18" (457) (V) | 18" (457) (V) | 8'-0" (2438) |

**TABLE 3**

| SUBSTRUCTURE CLEARANCES FROM ABOVE GROUND OBJECTS (VI) |               |   |              |                                  |              |                    |              |
|--|---------------|---|--------------|----------------------------------|--------------|--------------------|--------------|
| STRUCTURE USAGE  | STANDARD PAGE | PAD OR STRUCTURE DIMENSIONS AND MINIMUM OPERATING WIDTH |              | MINIMUM CLEARANCE DIMENSIONS (C) |              |                    |              |
|  |               | Z   | Y            | X                                | W            | V                  | U            |
| SECONDARY  | 3312          | 1'-10" (559)  | 2'-11" (889) | 18" (457)                        | 18" (457)    | 18" (457)          | 5'-0" (1524) |
| SECONDARY/PRIMARY                                      | 3313          | 2'-8" (813)   | 3'-8" (1118) | 18" (457)                        | 18" (457)    | 18" (457)          | 5'-0" (1524) |
| SECONDARY/PRIMARY                                      | 3314          | 6'-8" (2032)  | 3'-8" (1118) | 5'-0" (1524)                     | 5'-0" (1524) | 18" (457)          | 5'-0" (1524) |
| SECONDARY/PRIMARY                                      | 3315          | 7'-6" (2286)  | 5'-0" (1524) | 5'-0" (1524)                     | 5'-0" (1524) | 5'-0" (1524) (VII) | 5'-0" (1524) |
| SECONDARY/PRIMARY                                      | 3316          | 9'-6" (2896)  | 6'-0" (1829) | 5'-0" (1524)                     | 5'-0" (1524) | 5'-0" (1524) (VII) | 5'-0" (1524) |
| PRIMARY SWITCH ENCLOSURE                               | 3317          | 10'-0" (3048)   | 8'-0" (2438) | 5'-0" (1524)                     | 5'-0" (1524) | 18" (457)          | 18" (457)    |
| NECK SECTION, SECONDARY/PRIMARY (3325, 3326 MANHOLE)   | 3332          | 10'-0" (1930)   | 8'-0" (1676) | 5'-0" (1524)                     | 5'-0" (1524) | 18" (457)          | 5'-0" (1524) |

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CLEARANCE REQUIREMENTS FOR PAD MOUNTED AND  
SUBSURFACE EQUIPMENT FROM ABOVE GROUND OBJECTS

UG3480.2



**INSTALLATION:** REFER TO UG3483

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. THIS STANDARD DOES NOT APPLY TO EXISTING COMMUNICATION PEDESTALS PROVIDING THEY ARE NO CLOSER THAN 4 INCHES TO THE PAD AND THEY DO NOT OBSTRUCT THE DOORS OR THE 8-FOOT WORK SPACE.
- II. THIS PAGE DOES NOT APPLY TO PREFORMED RETAINING WALLS IN UG3484.3.
- III. WALL MOUNTED FUSE CABINETS REQUIRE 8-FOOT MINIMUM CLEARANCE IN FRONT OF THE CABINET FOR HOT STICK OPERATION.
- IV. THE OPERATING CLEARANCES DESCRIBED IN THIS STANDARD SHALL APPLY TO BUSHES, HEDGES AND OTHER LANDSCAPING MATERIALS. LOW GROUND COVER IS EXCLUDED.
- (V) RETAINING WALLS ARE NOT REQUIRED WHEN THE SLOPE REMAINS 6 INCHES BELOW AND PARALLEL TO THE JOINT BETWEEN THE BASE AND COVER OF TERMINATOR. (d)
- (VI) THE NUMBERS IN PARENTHESIS IN THE TABLES REPRESENT THE MILLIMETER MEASUREMENT OF THE FEET/INCHES NUMBER ABOVE IT.
- (VII) 5-FOOT OPERATING CLEARANCE IS REQUIRED ONLY FOR HOT STICK OPERATION OF LOADBREAK EQUIPMENT (CABLE TAP(S) WITH LOADBREAK ELBOWS LOCATED ON THE STREET SIDE OF HANDHOLE), IF THIS LOADBREAK EQUIPMENT IS NOT PRESENT OR NO FUTURE CABLE TAPS ARE ANTICIPATED IN THIS AREA, MAINTAIN 18-INCH MINIMUM CLEARANCE.

**REFERENCE:**

- a. SEE UG3487 FOR RETAINING WALL REQUIREMENTS AND ONE-PHASE TRANSFORMER PAD LOCATIONS SHOWING CATV AND/OR TELCO LOCATIONS.
- b. SEE UG3488 FOR CLEARANCES BETWEEN SDG&E FACILITIES AND OTHER ABOVE GROUND OBJECTS.
- (c) SEE UG3483.
- (d) SEE UG3523.

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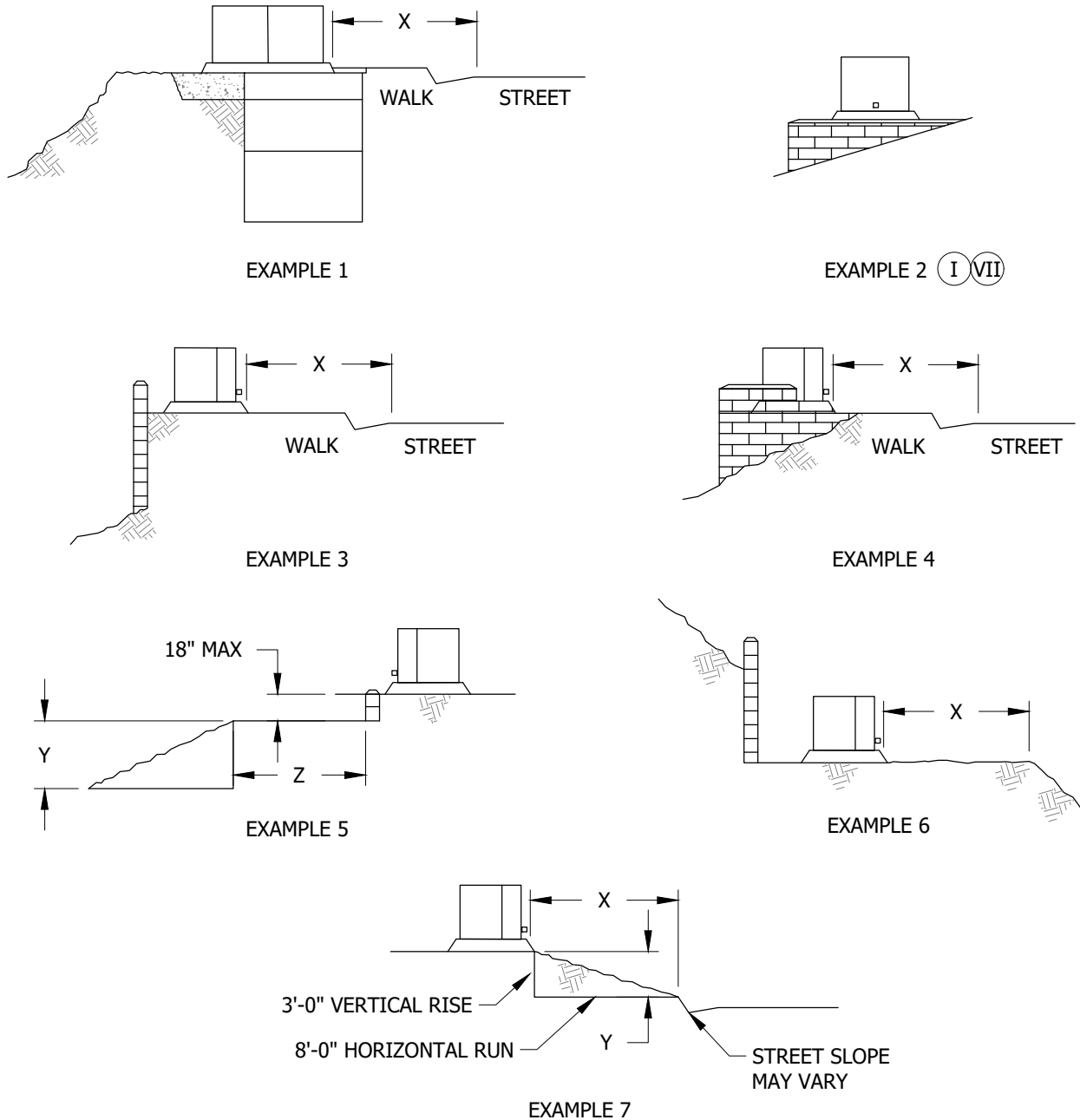
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CLEARANCE REQUIREMENTS FOR PAD MOUNTED AND  
SUBSURFACE EQUIPMENT FROM ABOVE GROUND OBJECTS

UG3480.3



**SCOPE:** THIS STANDARD SHOWS MINIMUM OPERATING CLEARANCE REQUIREMENTS FOR PAD MOUNTED EQUIPMENT.



**FIGURE 1**  
PAD MOUNTED EQUIPMENT HOT STICK OPERATION CLEARANCE EXAMPLES

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MINIMUM OPERATING CLEARANCE REQUIREMENTS  
FOR PAD MOUNTED EQUIPMENT

UG3481.1



**INSTALLATIONS:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. X = IN FRONT OF PAD.
- II. X = 8-FOOT MIN. FOR HOT STICK OPERATION.
- III. Y = SLOPE OF GRADE IN FRONT OF THE PAD NOT TO EXCEED 8-FOOT HORIZONTAL RUN TO 3-FOOT VERTICAL RISE.
- IV. Z = 6-FOOT MIN. FLAT GRADE FOR HOT STICK OPERATION.
- V. AN EFFORT SHOULD BE MADE TO KEEP THE X MEASUREMENT TO A FLAT GRADE. IF THIS IS NOT POSSIBLE, THE X MEASUREMENT SHALL NOT EXCEED AN 8-FOOT HORIZONTAL RUN TO 3-FOOT VERTICAL RISE.
- VI. AN 8-FOOT CLEARANCE IS REQUIRED IN FRONT OF THE PADMOUNT EQUIPMENT FOR HOT STICK OPERATION. SDG&E HANDHOLES AND MANHOLES MAY OCCUPY OR BE INSTALLED WITHIN THE 8-FOOT CLEARANCE. PROVIDE A 5-FOOT CLEARANCE FROM PADS TO 3314 AND LARGER SUBSTRUCTURES.
- VII. THE SLOPE IN FRONT OF THE PAD SHALL NOT EXCEED AN 8-FOOT HORIZONTAL RUN TO 3-FOOT VERTICAL RISE.

**REFERENCE:**

- a. SEE UG3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- b. SEE UG3484 FOR INSTALLATION OF PAD MOUNTED EQUIPMENT.

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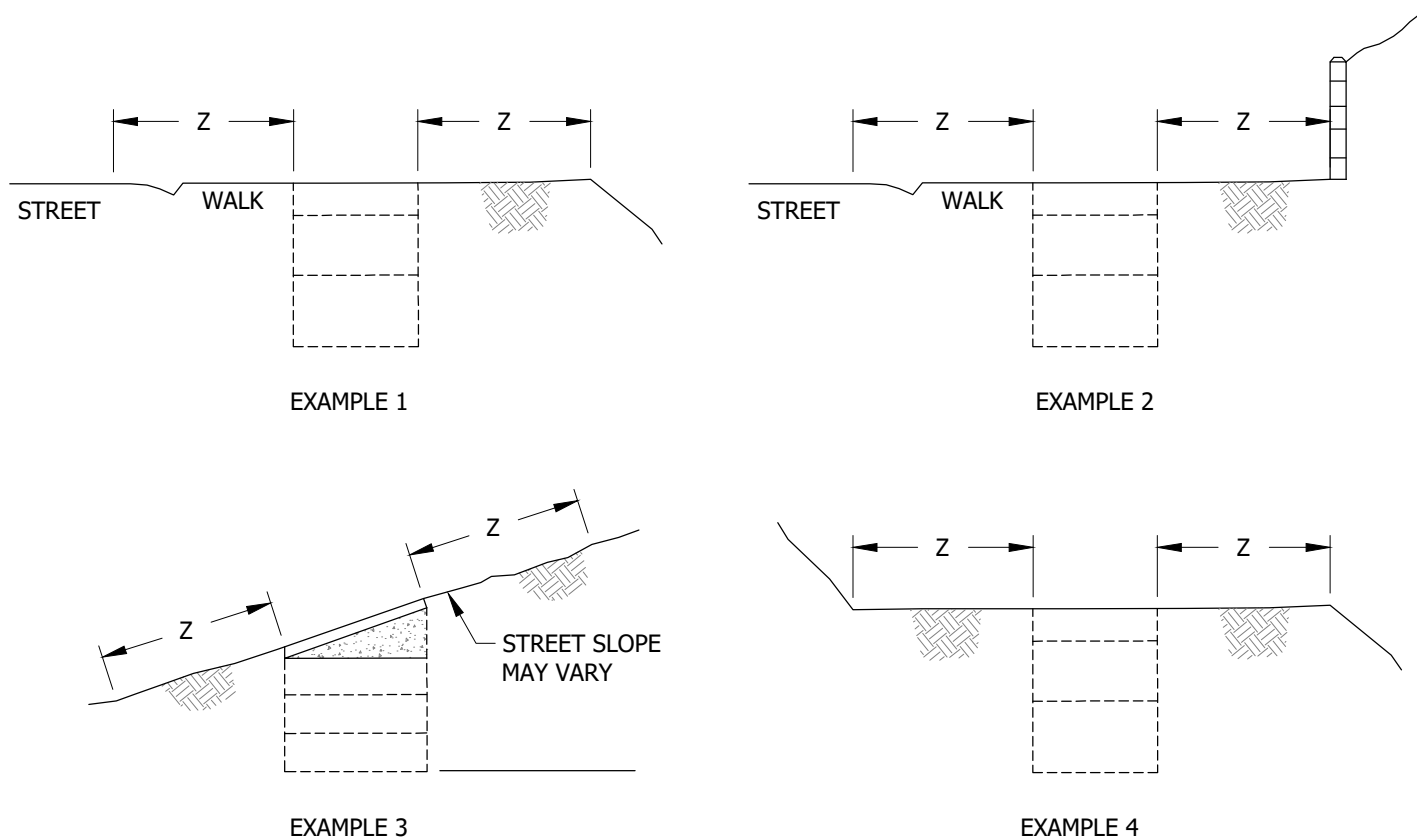
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MINIMUM OPERATING CLEARANCE REQUIREMENTS  
FOR PAD MOUNTED EQUIPMENT

UG3481.2



**SCOPE:** THIS STANDARD SHOWS MINIMUM OPERATING CLEARANCES FOR SUBSURFACE EQUIPMENT.



**FIGURE 1**  
SUBSURFACE EQUIPMENT HOT STICK OPERATION CLEARANCE EXAMPLES (I)

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- (I) Z = 5-FOOT MIN. WHEN HOT STICK OPERATION IS REQUIRED, OTHERWISE BASIC CLEARANCES APPLY. (b)
- II. IF THE SUBSTRUCTURE IS NOT TO BE LOCATED IN THE STREET, AN EFFORT SHOULD BE MADE TO KEEP THE Z MEASUREMENT TO A FLAT GRADE. IF THIS IS NOT POSSIBLE, THE Z MEASUREMENT SHALL NOT EXCEED AN 8-FOOT HORIZONTAL RUN TO 3-FOOT VERTICAL RISE.
- III. A 5-FOOT CLEARANCE IS REQUIRED IN FRONT OF THE SUBSTRUCTURE FOR HOT STICK OPERATION. SDG&E HANDHOLES AND MANHOLES MAY OCCUPY OR BE INSTALLED WITHIN THE 8-FOOT CLEARANCE REQUIRED IN FRONT OF SDG&E "PAD MOUNTED" EQUIPMENT. PROVIDE A 5-FOOT CLEARANCE FROM PAD TO 3314 AND LARGER SUBSTRUCTURES.

**REFERENCE:**

- a. SEE UG3485 FOR INSTALLATIONS OF SUBSTRUCTURES ON SLOPING GRADES.
- (b) SEE "MINIMUM OPERATING CLEARANCE REQUIREMENTS" ON UG3480, UG3481 AND UG3483.

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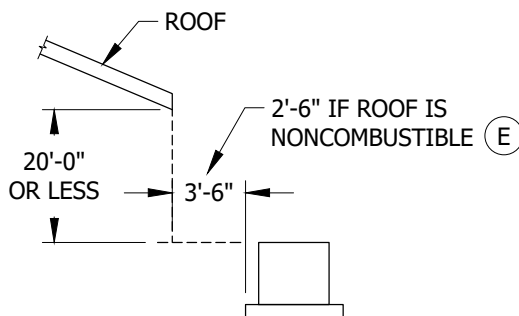
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MINIMUM OPERATING CLEARANCE REQUIREMENTS  
FOR SUBSURFACE EQUIPMENT

**UG3482.1**



**SCOPE:** THIS STANDARD SHOWS MINIMUM OPERATING CLEARANCES FOR PAD MOUNTED AND SUBSURFACE EQUIPMENT.



**FIGURE 1**

**INSTALLATION:**

- A. CLEARANCES SHALL BE MEASURED FROM ALL ABOVE-GROUND OBJECTS. PADS WHERE DIMENSION "U" IS LESS THAN 5 FEET FROM EDGE OF PAVEMENT OR FRONT OF CURB, AND NO ABOVE-GROUND OBJECTS TO PROTECT EQUIPMENT EXIST, SHALL HAVE BARRIER PROTECTION. (b) (h)
- B. DIMENSION "V" SHALL BE THE SAME AS DIMENSION "U" WHEN CABLE TAPS ARE ON BOTH SIDES OF THE HANDHOLE. (h)
- C. CLEARANCES ARE REQUIRED AT THE SIDE(S) OR END(S) OF SUBSTRUCTURES, PAD MOUNTED EQUIPMENT, ETC., WHERE HOT STICK OPERATION IS REQUIRED. SDG&E HANDHOLES AND MANHOLES MAY OCCUPY OR BE INSTALLED WITHIN THE REQUIRED CLEARANCES. PROVIDE A 5-FOOT CLEARANCE FROM PADS TO 3314 AND LARGER SUBSTRUCTURES.
- D. FOR EQUIPMENT CONTAINING OIL & CAPACITORS NEXT TO COMBUSTIBLE BUILDINGS, THE "X", "W", "V" DIMENSIONS SHALL NOT BE LESS THAN 3 FEET FROM BUILDING SURFACES. FOR ALL TRANSFORMERS, DIMENSION "V" MUST BE INCREASED TO 3'-6" FOR COMBUSTIBLE BUILDING SURFACES OR 2'-6" FOR NONCOMBUSTIBLE BUILDING SURFACES ALLOWING ROOM FOR TRANSFORMER COOLING FINS IN EACH INSTALLATION. "X" & "W" DIMENSIONS MAY BE REDUCED TO 2 FEET IF BUILDING SURFACES ARE NONCOMBUSTIBLE AND NOISE CLEARANCE REQUIREMENTS ARE MET FOR TRANSFORMERS. (h) (i)
- (E) **"NONCOMBUSTIBLE"** BUILDING SURFACES OR MATERIALS APPROVED BY THE UNIFORM BUILDING CODE AS HAVING A MINIMUM FIRE RATING OF ONE HOUR INCLUDE BUT ARE NOT LIMITED TO:
  1. STEEL STUDDED DRYWALL, STEEL STUDDED STUCCO OR OTHER MATERIALS ON STEEL STUDS HAVING MINIMUM FIRE RATING OF ONE HOUR:
  2. BRICK, CLAY, TILE, CONCRETE, IRON, STEEL AND STONE.
- F. **"COMBUSTIBLE"** BUILDING SURFACES OR MATERIALS INCLUDE BUT ARE NOT LIMITED TO WOOD STUDDED STUCCO AND WOOD STUDDED DRYWALL.
- G. IF ROOF OVERHANG IS 20 FEET OR LESS ABOVE TOP OF ANY PAD MOUNTED EQUIPMENT, THE MINIMUM HORIZONTAL CLEARANCE FROM END OF OVERHANG TO THE NEAREST EDGE OF THE PAD SHALL NOT BE LESS THAN 3'-6" OR 2'-6" IF THE OVERHANG IS NONCOMBUSTIBLE AND THE CLEARANCE DOES NOT CREATE A NOISE PROBLEM. IF THE ROOF OVERHANG IS MORE THAN 20 FEET, THE PAD MOUNTED EQUIPMENT MAY BE PLACED UNDER THE OVERHANG. IF IN DOUBT THAT A NOISE PROBLEM MAY DEVELOP, CONTACT DESIGN PLANNING.
- H. PADS ARE PERMITTED IN THE SIDEWALKS PROVIDED THE WALK IS WIDER THAN 4 FEET NOT INCLUDING THE CURB. A 4-FOOT USEABLE WALKWAY (NOT INCLUDING THE CURB) MUST BE PROVIDED FOR WHEELCHAIR ACCESS. DO NOT INSTALL PADS IN TRAILS SUCH AS BIKE, JOGGING, WALKING, EQUESTRIAN, ETC.
- J. ANY UNDERGROUND FACILITY, SUBSURFACE OR PAD MOUNTED WITH LOADBREAK CAPABILITY, E.G., CABLE TAPS IN HANDHOLES, PAD MOUNTED TRANSFORMERS AND FUSED SWITCHING CABINET, SHALL MAINTAIN A 25-FOOT RADIAL CLEARANCE FROM ANY TANK, VENT OF FILL-TUBE THAT CONTAINS FLAMMABLE LIQUIDS, GASES, VAPORS OR MIXTURES. DIESEL FUEL IS COMBUSTIBLE BUT NOT FLAMMABLE, THEREFORE DIESEL TANKS ARE ALLOWED WITHIN THE 25-FOOT RADIUS. (g)

**BILL OF MATERIALS:** NONE

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**SHEET  
1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

MINIMUM OPERATING CLEARANCE REQUIREMENTS FOR  
PAD MOUNTED AND SUBSURFACE EQUIPMENT

**UG3483.1**



**NOTES:** NONE

**REFERENCE:**

- a. SEE UG3478 FOR TRANSFORMER SOUND ENCLOSURE.
- b. SEE **UG3479** FOR EQUIPMENT BARRIER PROTECTION AND CLEARANCE.
- c. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT AND FOR SETTING TRANSFORMER PADS FOR NOISE CONTROL.
- d. SEE UG3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE **UG3489** FOR RETAINING WALLS.
- f. SEE DM5612 FOR TRANSFORMER NOISE CLEARANCE REQUIREMENTS.
- g. SEE **SG316** FOR INSTALLING UNDERGROUND SERVICE LATERAL TO GASOLINE DISPENSING AND SERVICE STATIONS.
- h. SEE UG3480 FOR RELATED FIGURE.
- i. SEE G.O. 128 RULE 34.3 D.

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| C   | REVISION REASON | -  | -  | -   | MF/JJ  | 9/25/2006 | F   | FORMATTING        | EDM | EJA | GLW | CZH   | 11/5/2020  |
| B   | REVISION        | -  | -  | -   | DLB/RD | 1/1/1996  | E   | EDITORIAL CHANGES | -   | AW  | JS  | MF/JJ | 11/12/2019 |
| A   | REVISION        | -  | -  | -   | DLB/RD | 1/1/1993  | D   | REVISION REASON   | -   | -   | -   | TR/DW | 2/27/2013  |

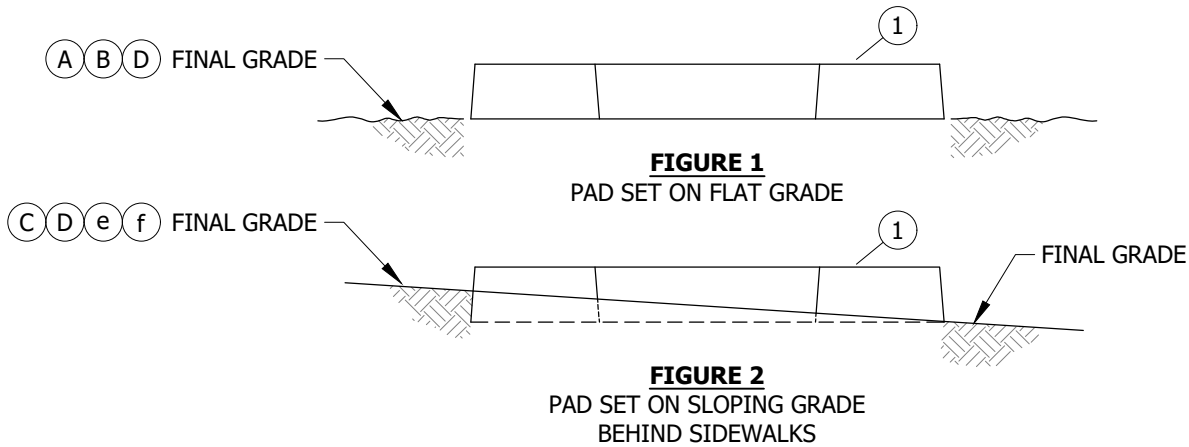
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                    |                           |                    |          |                     |
| MINIMUM OPERATING CLEARANCE REQUIREMENTS FOR<br>PAD MOUNTED AND SUBSURFACE EQUIPMENT |                           |                    |          |                     |

**SHEET  
2 OF 2**

**UG3483.2**



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF PADS USED FOR MOUNTING PAD MOUNTED EQUIPMENT.



## INSTALLATION:

- (A) SET PADS TO FINAL GRADE. SET 3416 PAD 6 INCHES ABOVE AND 3 INCHES BELOW FINAL GRADE.
- (B) PADS ARE PERMITTED IN SIDEWALK PROVIDED THE WALK IS WIDER THAN 4 FEET NOT INCLUDING THE CURB. IN SIDEWALK OR PAVED AREAS, SET PADS 2 INCHES ABOVE PAVEMENT. SET 3440 PAD 3 INCHES ABOVE PAVEMENT. IN AREAS WHERE THERE IS LIMITED SPACE AND 4 FEET CANNOT BE OBTAINED, PAD MAY BE SET FLUSH WITH THE WALK IN ORDER TO OBTAIN THE REQUIRED 4-FOOT DISTANCE. THIS IS PROVIDED IT IS APPROVED BY GOVERNMENTAL (PERMITTING AGENCIES) AND IT IS NOT A LOW AREA WHERE WATER MAY DRAIN OR COLLECT.
- (C) FOR PADS ON SLOPING GRADES BEHIND SIDEWALKS IN PAVED OR UNPAVED AREAS, SET UP TO HALF OF THE PAD BELOW GRADE ON THE HIGH SIDE OF THE SLOPE (DO NOT EXCEED HALF THE PAD). ON THE LOW SIDE OF THE SLOPE SET THE PAD TO THE FINAL GRADE (SEE FIGURE 2).
- (D) SET TRANSFORMER PADS FOR NOISE CONTROL AS FOLLOWS.
  - 1. FOR TRANSFORMER PADS WITHIN A PAVED AREA, LEAVE 6 INCHES OF EARTH BENEATH PAD AND INSTALL FELT EXPANSION JOINT AROUND SIDES OF PAD, OR INSTALL FELT EXPANSION JOINT BENEATH AND AROUND SIDES OF PAD.
  - 2. TRANSFORMER PADS LOCATED OVER AN UNDERGROUND PARKING AREA OF A BUILDING MUST BE PLACED BETWEEN WALLS AND NOT OVER BEARING WALLS.

### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER        | DESIGN UNITS |
|------|-------------|----------|---------------|---------------------|--------------|
| 1    | PAD (h)     | 1        | --            | REFER TO WORK ORDER | --           |

**NOTES:** NONE

**REFERENCE:**

- a. SEE [UG3211.3](#) FOR EQUIPMENT PAD IDENTIFICATION.
- b. SEE [UG3478](#) FOR TRANSFORMER SOUND ENCLOSURE.
- c. SEE [UG3479](#) FOR EQUIPMENT BARRIER PROTECTION.
- d. SEE [UG3480](#), [UG3481](#), [UG3482](#) & [UG3483](#) FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- e. SEE [UG3486](#) & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |     |                    |     |          |    |                     |     |     |      |          |
|                 |                   | PAD INSTALLATION FOR PAD MOUNTED EQUIPMENT        |                           |     |     |                    |     |          |    |                     |     |     |      |          |



- f. SEE [UG3489](#) FOR RETAINING WALL REQUIREMENTS.
- g. SEE UG4510 FOR PREFERRED AND ALTERNATE TRENCH GROUND WIRE INSTALLATION.
- h. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- i. SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.

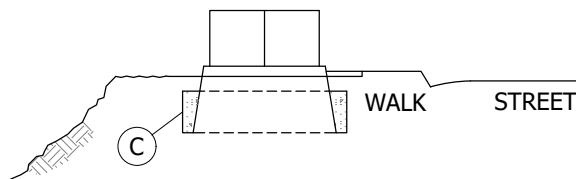
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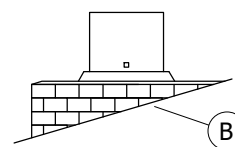
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | PAD INSTALLATION FOR PAD MOUNTED EQUIPMENT        |                           |  |                    |  |          |  |                     |          |



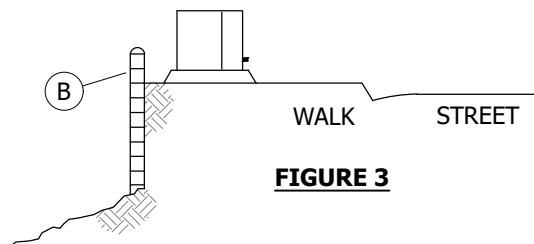
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIRED TO SET EQUIPMENT PAD ON SLOPING GRADES.



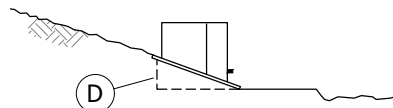
**FIGURE 1**



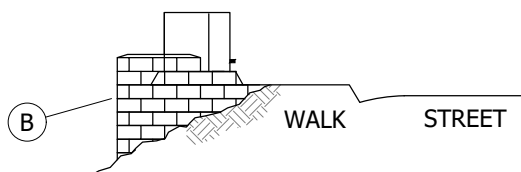
**FIGURE 2**



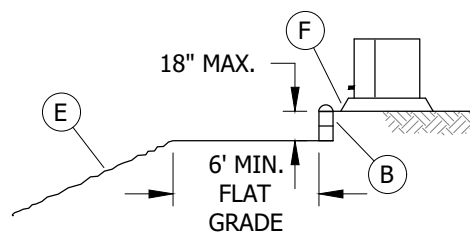
**FIGURE 3**



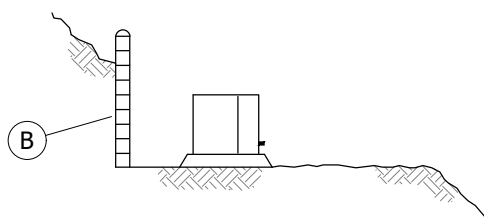
**FIGURE 4**



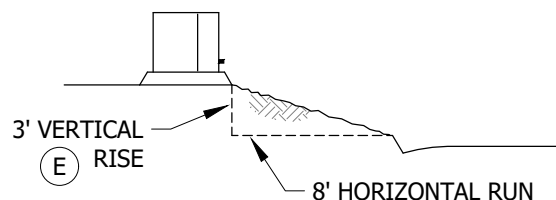
**FIGURE 5**



**FIGURE 6**



**FIGURE 7**



**FIGURE 8**

**INSTALLATION:**

- A. ALIGN PAD TO FINAL GRADE.
- (B) INSTALL CONCRETE BLOCK AS REQUIRED.
- (C) FOR 600A THREE-PHASE PAD MOUNTED SWITCH, SLURRY BACKFILL (1 SACK SAND SLURRY) 22 INCHES DEEP AROUND THE 3423 PAD BOX.
- (D) INSTALL PREFORMED PLASTIC RETAINING WALLS AS REQUIRED.
- (E) SLOPE OF GRADE IN FRONT OF THE PAD NOT TO EXCEED 8-FOOT HORIZONTAL RUN TO 3-FOOT VERTICAL RISE.
- (F) BUTT THE FRONT OF THE PAD AGAINST THE WALL.

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. AN 8-FOOT CLEARANCE IS REQUIRED IN FRONT OF THE PADMOUNT EQUIPMENT FOR HOT STICK OPERATION. COMPANY HANDHOLES AND MANHOLES MAY OCCUPY OR BE INSTALLED WITHIN THE 8-FOOT CLEARANCE. PROVIDE A 5-FOOT CLEARANCE FROM PADS TO 3314 AND LARGER SUBSTRUCTURES.

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**SHEET  
3 OF 6**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD INSTALLATION FOR PAD MOUNTED EQUIPMENT  
SLOPING GRADES

UG3484.3



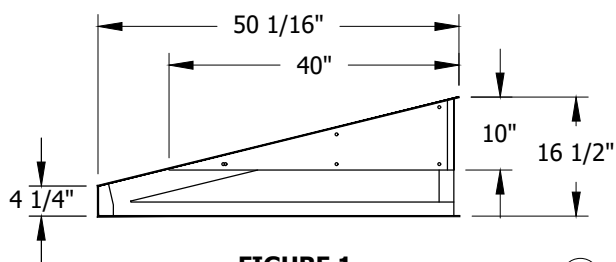
**REFERENCE:**

- a. SEE [UG3480](#), [UG3481](#), [UG3482](#) & [UG3483](#) FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- b. SEE [UG3484](#) FOR INSTALLATION OF PAD MOUNTED EQUIPMENT.
- c. SEE [UG3486](#) & [UG3487](#) FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.

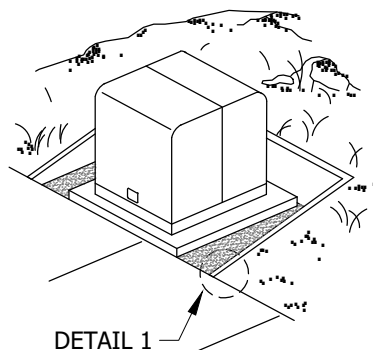
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|  |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS            |                           |     |     |                    |     |          |    |                     |     |     |      |          |
|  |                   | PAD INSTALLATION FOR PAD MOUNTED EQUIPMENT<br>SLOPING GRADES |                           |     |     |                    |     |          |    |                     |     |     |      |          |
|  |                   |  |                           |     |     |                    |     |          |    |                     |     |     |      |          |



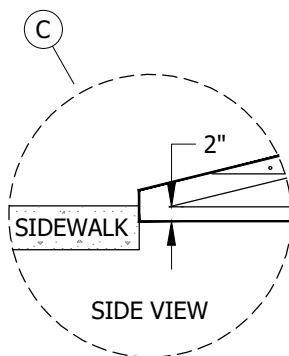
**SCOPE:** THIS STANDARD SHOWS THE PREFORMED PLASTIC RETAINING WALL USED TO PROTECT PAD MOUNTED EQUIPMENT AGAINST CORROSION FROM SOIL CONTACT ON SLOPE.



**FIGURE 1**  
SIDE ELEVATION



**FIGURE 2**  
TYPICAL INSTALLATION



**FIGURE 1**  
ISOMETRIC VIEW

**DETAIL 1**

**TABLE 1** II

| WALL USAGE |   |                          |
|------------|---|--------------------------|
| PAD STD    | PAD USAGE                                 | EQUIPMENT STD OR SECTION |
| 3421       | 1 PHASE TRANSFORMER/UTILITY EQUIPMENT PAD | 3700                     |

### INSTALLATION:

- SET THE PAD. EXCAVATE AROUND THE PAD AREA ALLOWING ROOM FOR THE WALL. EXCAVATION SHALL BE LEVEL ALLOWING AN EXTRA 7 INCHES OUTSIDE THE WALL FOR BACKFILL AND TAMPING.
- THE BOTTOM PORTION OF THE EXCAVATION SHALL START 2 INCHES BELOW GROUND LEVEL AND CONTINUE INTO THE SLOPING BANK.
- SET THE WALL. FILL AND TAMP THE BACKFILL. THE PREFERRED INSTALLATION IS TO BUTT THE 4 1/4-INCH PORTION AGAINST THE SIDEWALK AS SHOWN IN DETAIL A. IF THIS IS NOT POSSIBLE, POUR CONCRETE BETWEEN THE PAD AND SIDEWALK. IN RURAL AREAS WITHOUT SIDEWALKS, CONCRETE IS NOT REQUIRED IN FRONT OF THE PAD AND WALL.
- CONCRETE OR ASPHALT IS REQUIRED BETWEEN THE WALL AND THE PAD AND SHALL BE A MINIMUM OF 3 1/2 INCHES THICK. SLOPE THE CONCRETE OR ASPHALT SLIGHTLY TOWARD THE FRONT IN ALL INSTALLATIONS.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION              | WEIGHT (LBS) | COLOR                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--------------------------|--------------|--------------------------|----------|---------------|--------------|--------------|
| 1    | WALL, RETAINING, PLASTIC | 90           | GOLDEN BROWN (SANDSTONE) | AS REQ'D | --            | S413496      | RW-PRE       |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD INSTALLATION FOR PAD MOUNTED EQUIPMENT  
FIBERGLASS RETAINING WALLS

UG3484.5



**NOTES:**

- I. WALL SHALL BE USED ON SLOPING GRADES WHERE A RETAINING WALL OF 14 INCHES OR LESS IS REQUIRED. MAXIMUM SLOPE OF RETAINED EARTH: 4 TO 1 (HORIZONTAL RUN TO VERTICAL RISE).
- II THIS TYPE WALL TO BE USED ONLY IN INSTALLATIONS PER TABLE 1.

**REFERENCE:**

- a. SEE UG3484 FOR INSTALLATION OF PAD MOUNTED EQUIPMENT.
- b. SEE UG3486 FOR CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- c. SEE UG3489 FOR MASONRY RETAINING WALL.
- d. SEE UG4512 FOR EQUIPMENT GROUNDING.

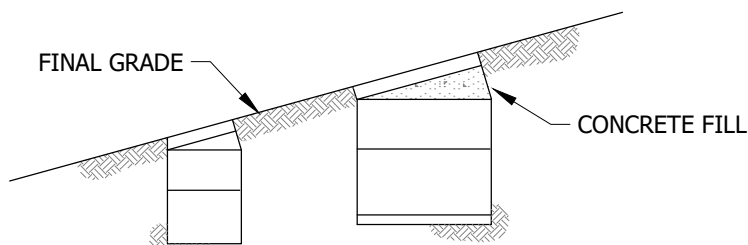
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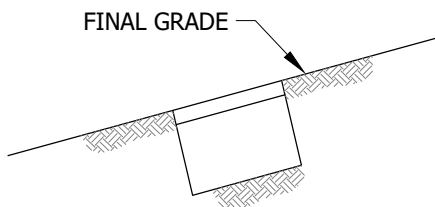
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                        |                           |  |                    |  |          |  |                     |          |
|                 | PAD INSTALLATION FOR PAD MOUNTED EQUIPMENT<br>FIBERGLASS RETAINING WALLS |                           |  |                    |  |          |  |                     |          |



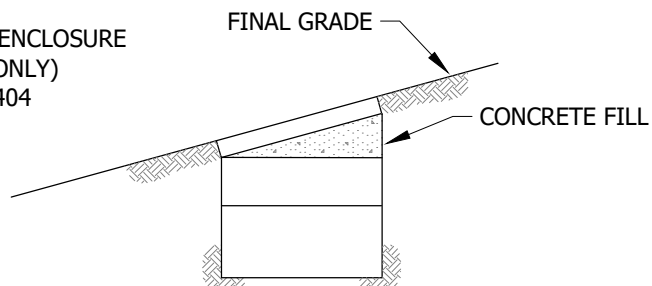
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIRED TO SET SUBSTRUCTURES ON SLOPING GRADES.



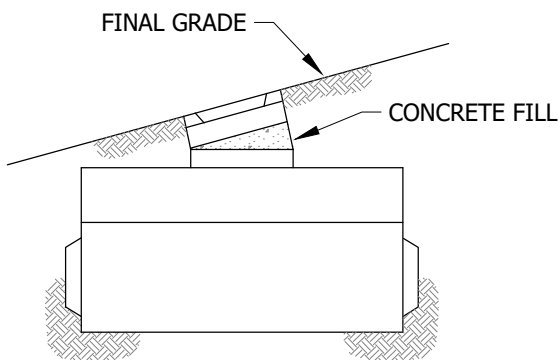
**FIGURE 1**  
SUBSURFACE TRANSFORMER ENCLOSURE  
(FIELD MAINTENANCE ONLY)  
3399.401 AND 3399.404



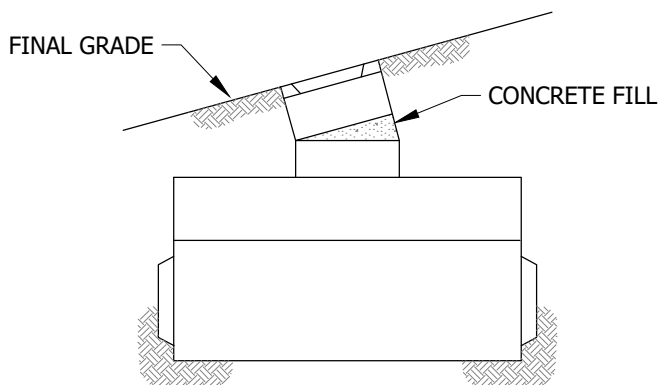
**FIGURE 2**  
NO CONCRETE FILL REQ'D  
HANDHOLES 3312, 3313



**FIGURE 3**  
MULTI-SECTION HANDHOLES  
3399.101, 3314, 3315, 3316



**FIGURE 4**  
MANHOLES - 36" OPENING  
(FIELD MAINTENANCE ONLY)  
3399.201, 3399.202, 3399.306, 3399.307



**FIGURE 5**  
MANHOLES - 48" OPENING  
3325, 3326, 3399.203, 3399.205, 3399.305

**INSTALLATION:**

- ALIGN TOP SECTION TO FINAL GRADE. POUR CONCRETE (4-SACK MIX WITH 3/8" PEA GRAVEL OR AS REQUIRED BY CITY OR COUNTY CODES).

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (SUBSTRUCTURE PLACEMENT).
- SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- SEE UG3489 FOR RETAINING WALLS WHERE BANKS OR EXCESSIVE SLOPES EXIST.

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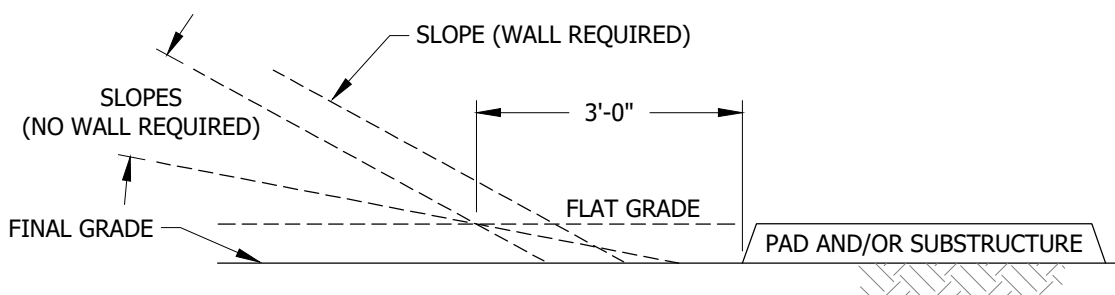
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SUBSTRUCTURE INSTALLATION ON SLOPING GRADES

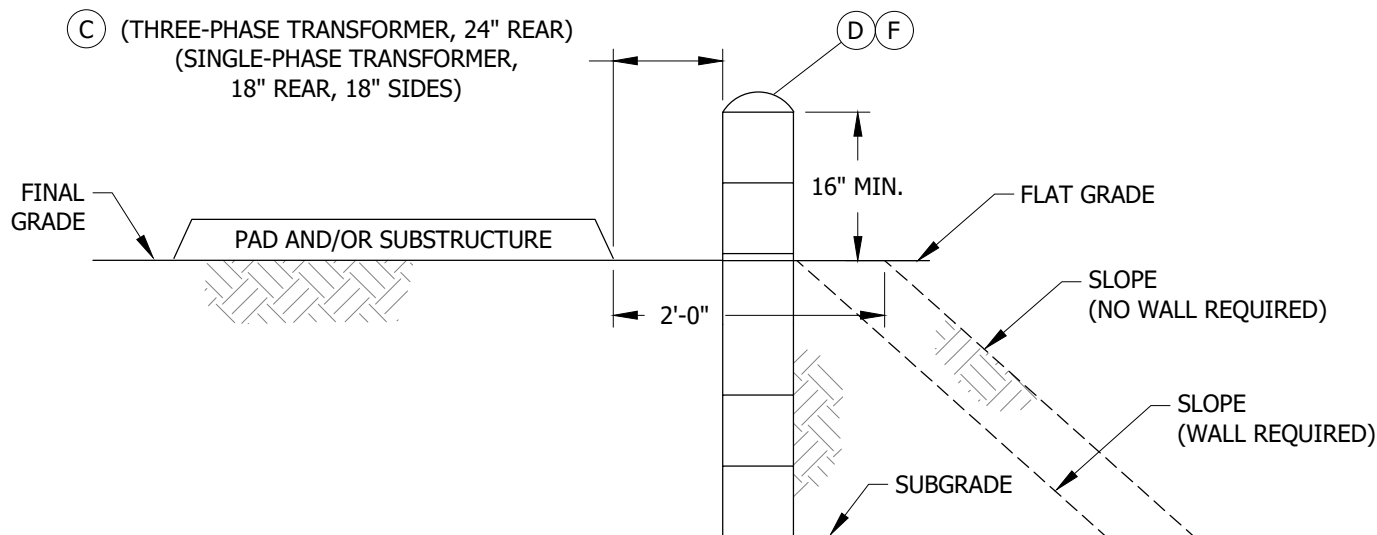
UG3485.1



**SCOPE:** THIS STANDARD SHOWS WHEN RETAINING WALLS ARE REQUIRED AND MINIMUM CLEARANCE REQUIREMENTS FROM PAD MOUNTED AND/OR SUBSURFACE EQUIPMENT FROM REVERSE SUBGRADE RETAINING WALLS.



**FIGURE 1**  
WHEN RETAINING WALLS ARE REQUIRED (A)



**FIGURE 2**  
MINIMUM CLEARANCE REQUIREMENTS FROM PAD MOUNTED AND/OR SUBSURFACE EQUIPMENT TO REVERSE SUBGRADE RETAINING WALLS

**INSTALLATION:**

- (A) WALLS ARE REQUIRED WHEN SLOPE COMES WITHIN THREE FEET OF A FLAT GRADE ADJACENT TO A PAD OR SUBSTRUCTURE. THE FLAT GRADE IS ESTABLISHED FROM THE TOP OF A PAD. SEE FIGURE 1.
- B. SDG&E WILL DETERMINE WHEN WALLS ARE REQUIRED IF THEY ARE NOT INCLUDED ON THE JOB PRINT.
- (C) MINIMUM OPERATING CLEARANCE REQUIREMENTS SHALL PREVAIL WHEN HOT STICK OPERATION OF LOADBREAK EQUIPMENT IS REQUIRED. (a)
- (D) WALLS ARE REQUIRED WHEN SLOPE COMES WITHIN TWO FEET OF A FLAT GRADE ADJACENT TO A PAD OR SUBSTRUCTURE. THE FLAT GRADE IS ESTABLISHED FROM THE BOTTOM OF A PAD.
- E. A MINIMUM OF 90% COMPACTION IS REQUIRED UNDER THE PAD AREA AND THE TWO-FOOT FLAT GRADE AREA ADJACENT TO THE PAD AND/OR SUBSTRUCTURE.
- (F) SAFETY FENCING SHALL BE INSTALLED WHEN REQUIRED BY CITY OR COUNTY CODES.

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**SHEET**  
**1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

RETAINING WALL REQUIREMENTS AND CLEARANCES

UG3486.1



**BILL OF MATERIALS:** NONE

**NOTES:**

I. THIS STANDARD DOES NOT APPLY TO THE PREFORMED PLASTIC RETAINING WALL SHOWN ON UG3484.

**REFERENCE:**

- a. SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENT (SUBSTRUCTURE PLACEMENT).
- b. SEE UG3484 AND UG3489 FOR RETAINING WALLS.
- c. SEE UG3423 FOR SWITCH PAD CLEARANCE REQUIREMENTS.

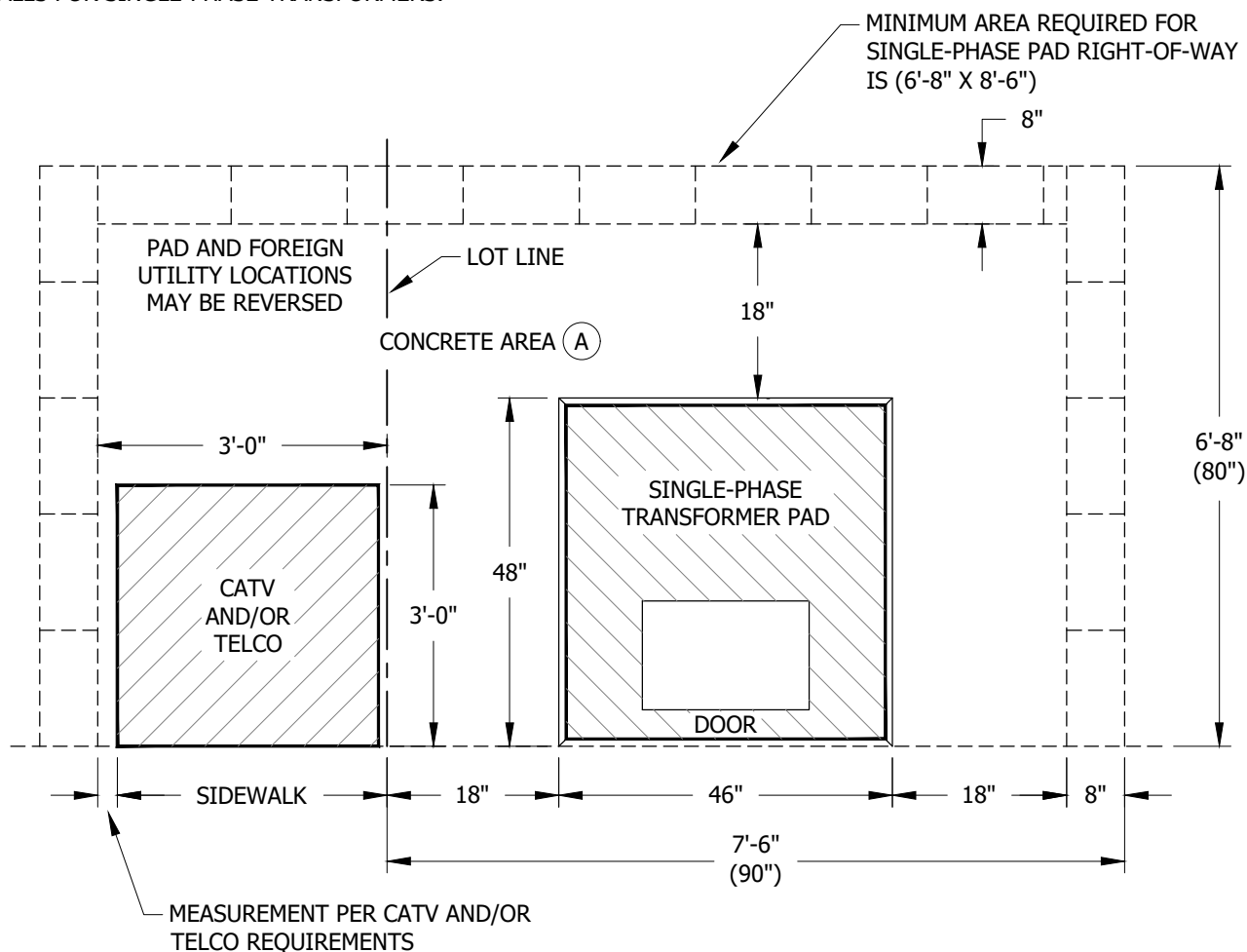
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | RETAINING WALL REQUIREMENTS AND CLEARANCES        |                           |  |                    |  |          |  |                     |          |



**SCOPE:** THIS STANDARD SHOWS SINGLE-PHASE TRANSFORMER PAD LOCATIONS ADJACENT TO CATV AND/TELCO AND RETAINING WALLS FOR SINGLE-PHASE TRANSFORMERS.



**FIGURE 1**

**INSTALLATION:**

(A) THE CONCRETE AREA SHALL BE A MINIMUM OF 3 1/2 INCHES THICK. SLOPE THE CONCRETE TOWARD THE FRONT OR SIDEWALK.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- SEE UG3480, UG3481, UG3482 & UG3483 FOR PAD CLEARANCE REQUIREMENTS WITHOUT CATV AND/OR TELCO.
- SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- SEE UG3489 FOR RETAINING WALLS.
- SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- SEE UG3488 CLEARANCES BETWEEN SDG&E FACILITIES AND OTHER ABOVE GROUND OBJECTS.

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**1 OF 1**

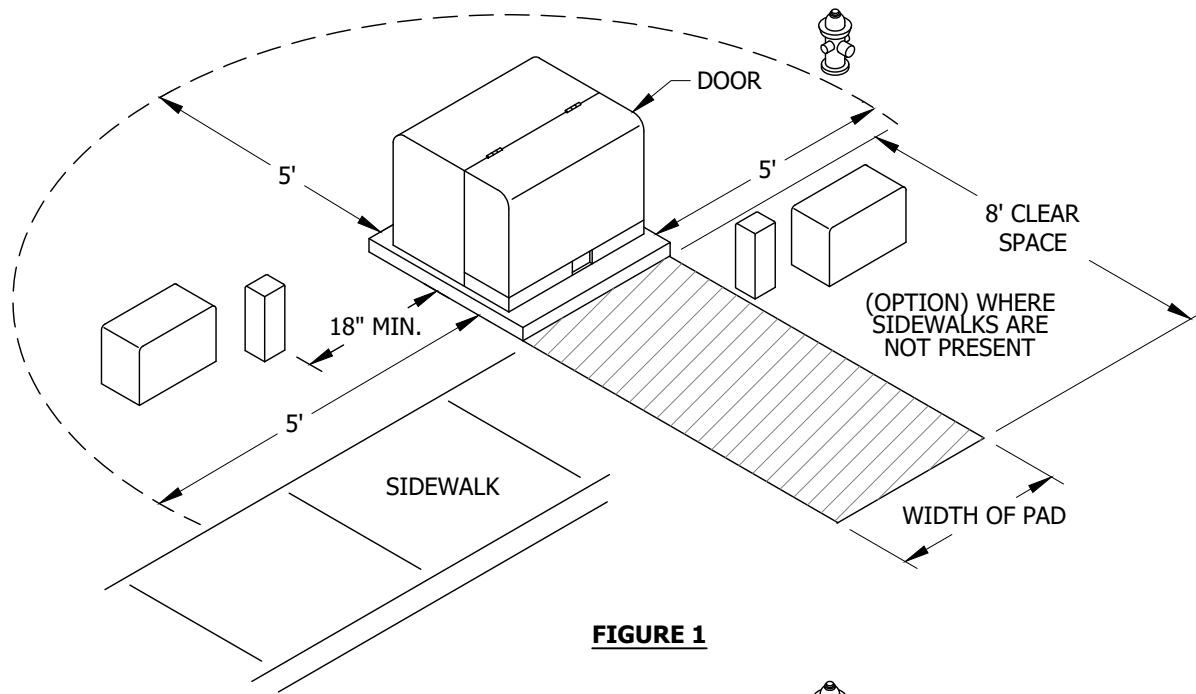
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

RETAINING WALL REQUIREMENTS AND SINGLE-PHASE TRANSFORMER  
PAD LOCATIONS SHOWING CATV AND/OR TELCO LOCATIONS

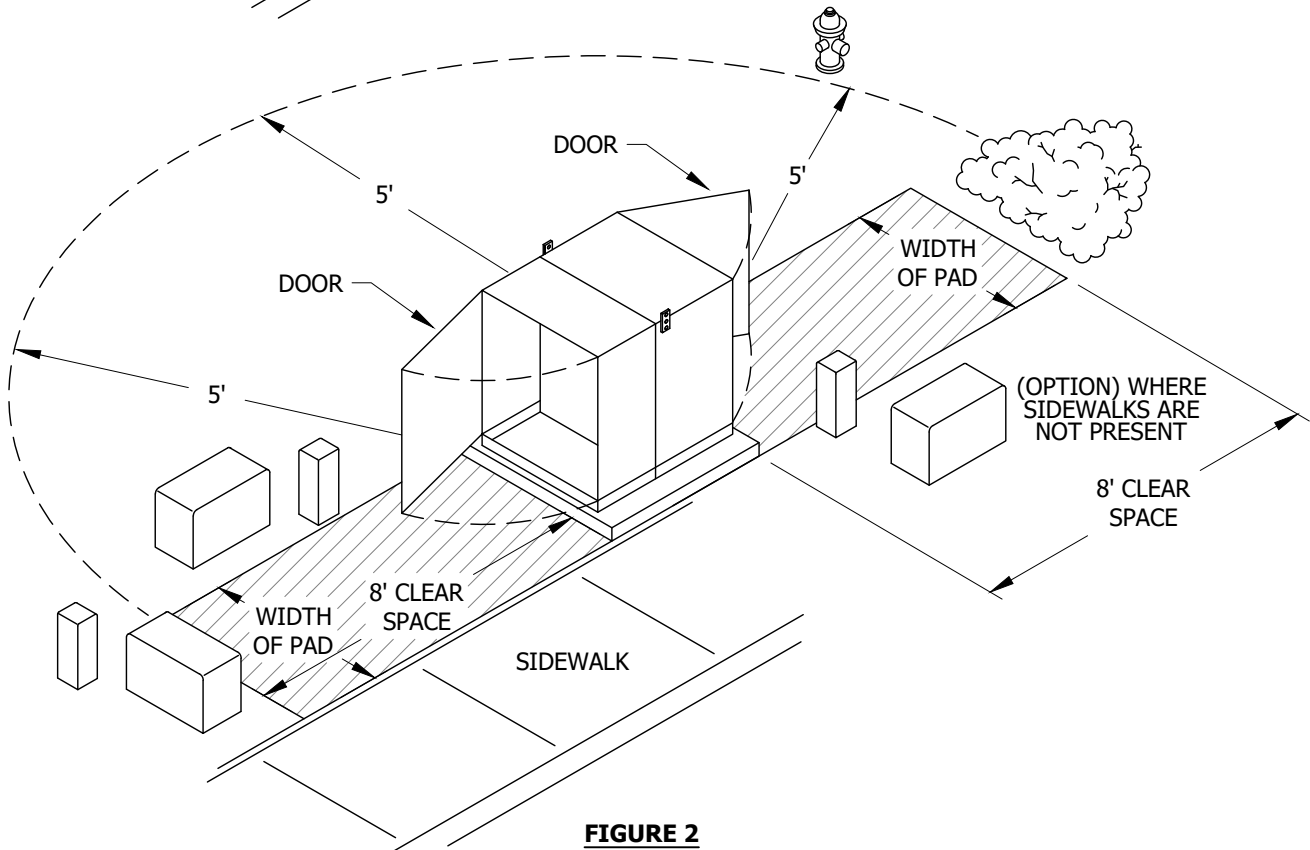
**UG3487.1**



**SCOPE:** THE PURPOSE OF THIS DRAWING IS TO ILLUSTRATE THE REQUIRED CLEARANCES FROM ABOVE GROUND OBJECTS AND MINIMUM HOT STICK CLEARANCE.



**FIGURE 1**



**FIGURE 2**

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**SHEET  
1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CLEARANCES BETWEEN SDG&E FACILITIES  
AND OTHER ABOVE GROUND OBJECTS

**UG3488.1**



**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

I. WET UTILITIES INCLUDING FIRE HYDRANTS, STAND PIPES, ABOVE GROUND WATER METERS, BACK FLOW VALVES AND OTHER ABOVE GROUND WET UTILITY EQUIPMENT SHALL BE A MINIMUM 5 FEET FROM PAD MOUNTED SDG&E FACILITIES AND 8 FEET FOR THE WORK SPACE.

**REFERENCE:**

a. SEE UG3487 FOR RETAINING WALL REQUIREMENTS AND SINGLE-PHASE PAD LOCATIONS SHOWING CATV FOR TELCO LOCATIONS.

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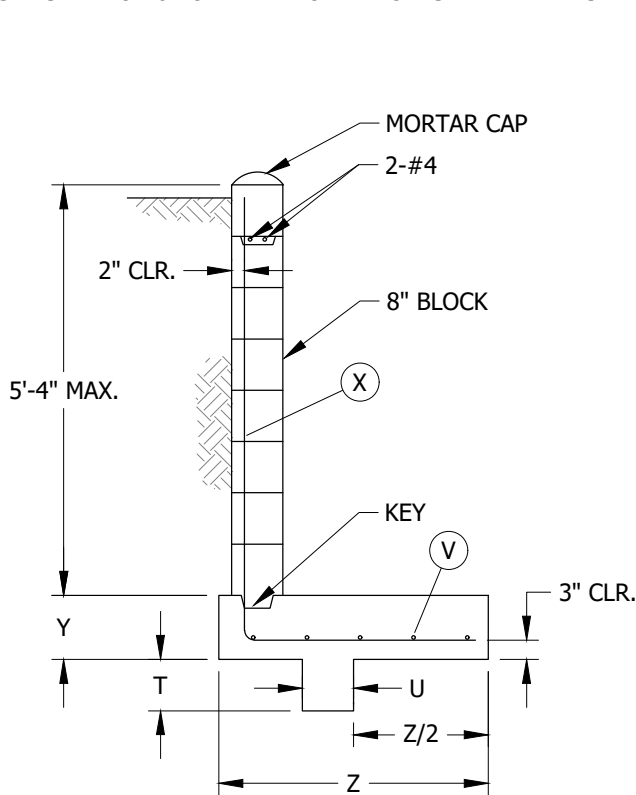
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|                 | CLEARANCES BETWEEN SDG&E FACILITIES<br>AND OTHER ABOVE GROUND OBJECTS |                           |  |                    |  |          |  |                     |          |



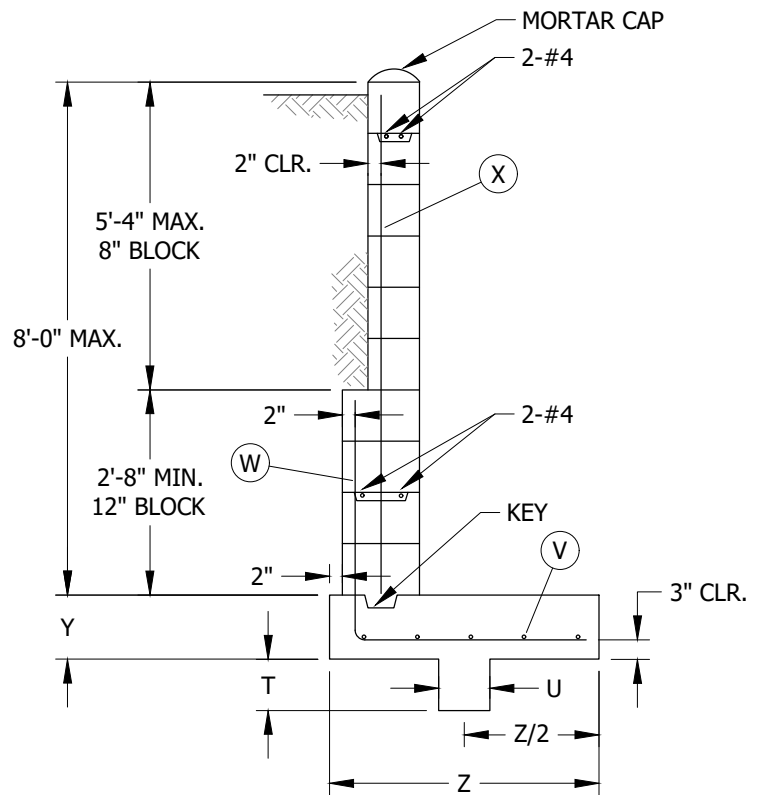
**SCOPE:** THIS STANDARD SHOWS RETAINING WALLS FOR LEVEL BACKFILL TO PROTECT PAD MOUNTED AND SUBSURFACE EQUIPMENT.

**ATTENTION:**

- \* SEE FIGURE 14 FOR STEPPED WALL FOOTING DETAILS.
- \*\* SEE SHEET 9-10 FOR ADDITIONAL NOTES AND DETAILS.



**FIGURE 1**  
C-1 TYPICAL SECTION  
5'-4" MAX.



**FIGURE 2**  
C-1 TYPICAL SECTION  
OVER 5'-4"

**TABLE 1 (C-1)**

| DIMENSIONS AND REINFORCING STEEL |                  |                   |          |          |      |                |        |
|----------------------------------|------------------|-------------------|----------|----------|------|----------------|--------|
| WALL HEIGHT                      | FOUNDATION DEPTH | FOUNDATION HEIGHT | REBAR    |          |      | FOUNDATION KEY |        |
|                                  | Z (MIN.)         | Y (MIN.)          | X        | W        | V    | U (IN)         | T (IN) |
| 1'-4"                            | 2'-4"            | 8"                | #4 @ 32" | --       | 4-#4 | 8              | 8      |
| 2'-0"                            | 2'-4"            | 8"                | #4 @ 32" | --       | 4-#4 | 8              | 8      |
| 2'-8"                            | 2'-4"            | 8"                | #4 @ 32" | --       | 4-#4 | 8              | 8      |
| 3'-4"                            | 2'-4"            | 8"                | #4 @ 32" | --       | 4-#4 | 8              | 8      |
| 4'-0"                            | 3'-6"            | 10"               | #4 @ 16" | --       | 5-#4 | 8              | 8      |
| 4'-8"                            | 3'-6"            | 10"               | #4 @ 16" | --       | 5-#4 | 8              | 8      |
| 5'-4"                            | 3'-6"            | 10"               | #4 @ 16" | --       | 5-#4 | 8              | 8      |
| 6'-0"                            | 5'-4"            | 1'-0"             | #4 @ 16" | #6 @ 16" | 6-#4 | 12             | 12     |
| 6'-8"                            | 5'-4"            | 1'-0"             | #4 @ 16" | #6 @ 16" | 6-#4 | 12             | 12     |
| 7'-4"                            | 5'-4"            | 1'-0"             | #4 @ 16" | #6 @ 16" | 6-#4 | 12             | 12     |
| 8'-0"                            | 5'-4"            | 1'-0"             | #4 @ 16" | #6 @ 16" | 6-#4 | 12             | 12     |

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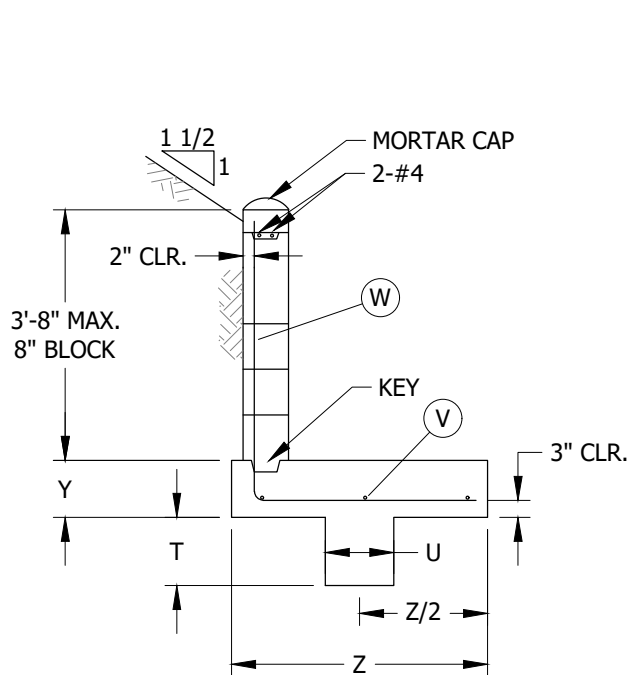
**SHEET**  
**1 OF 10**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

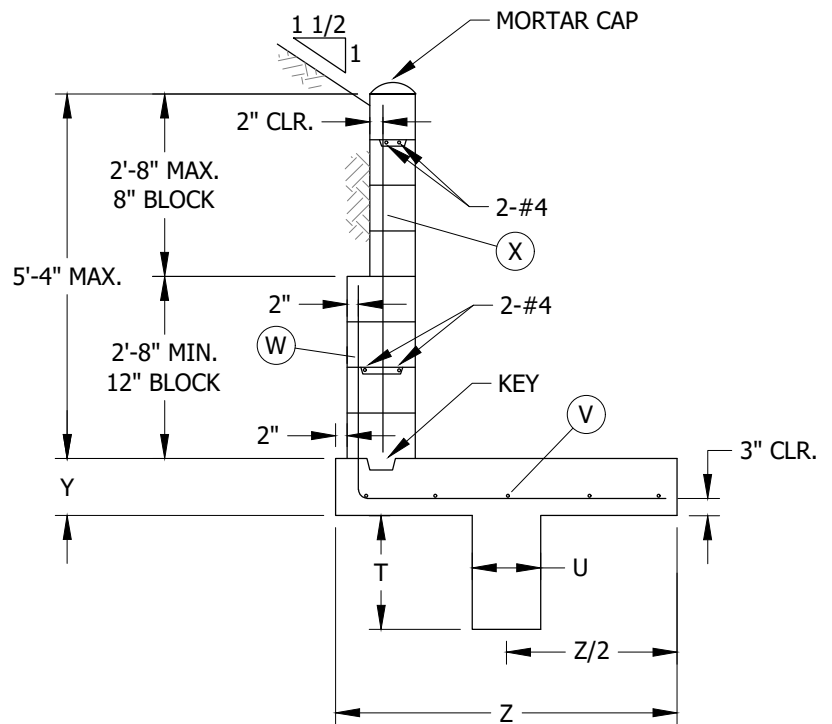
**MASONRY RETAINING WALLS**  
**TYPE 1 - LEVEL BACKFILL**

**UG3489.1**





**FIGURE 3**  
C-2 TYPICAL SECTION  
3'-8" MAX.



**FIGURE 4**  
C-2 TYPICAL SECTION  
OVER 3'-8"

**TABLE 2 (C-2)**

| DIMENSIONS AND REINFORCING STEEL |                  |                   |          |          |      |                |        |
|----------------------------------|------------------|-------------------|----------|----------|------|----------------|--------|
| WALL HEIGHT                      | FOUNDATION DEPTH | FOUNDATION HEIGHT | REBAR    |          |      | FOUNDATION KEY |        |
|                                  | Z (MIN.)         | Y (MIN.)          | X        | W        | V    | U (IN)         | T (IN) |
| 1'-4"                            | 3'-9"            | 10"               | --       | #4 @ 16" | 3-#4 | 12             | 12     |
| 2'-0"                            | 3'-9"            | 10"               | --       | #4 @ 16" | 3-#4 | 12             | 12     |
| 2'-8"                            | 3'-9"            | 10"               | --       | #4 @ 16" | 3-#4 | 12             | 12     |
| 3'-4"                            | 3'-9"            | 10"               | --       | #4 @ 16" | 3-#4 | 12             | 12     |
| 4'-0"                            | 5'-0"            | 10"               | #4 @ 16" | #6 @ 16" | 5-#4 | 12             | 20     |
| 4'-8"                            | 5'-0"            | 10"               | #4 @ 16" | #6 @ 16" | 5-#4 | 12             | 20     |
| 5'-4"                            | 5'-0"            | 10"               | #4 @ 16" | #6 @ 16" | 5-#4 | 12             | 20     |

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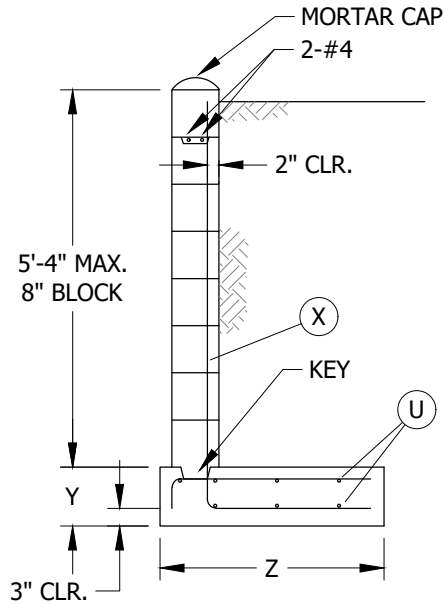
SHEET  
2 OF 10

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

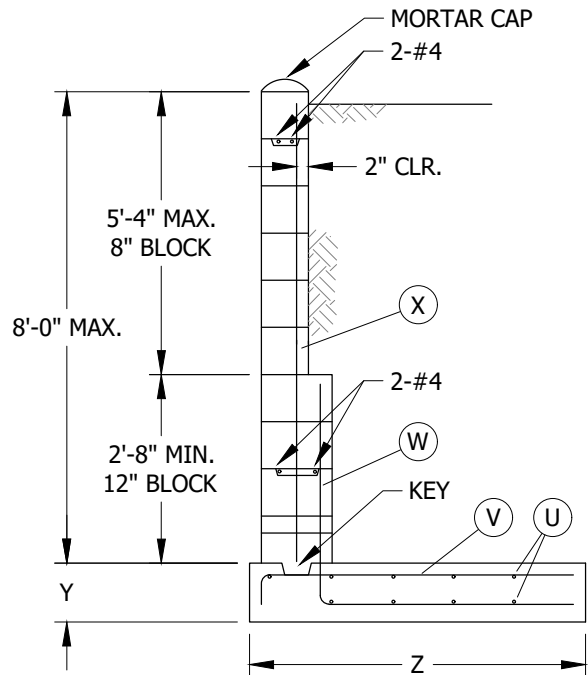
MASONRY RETAINING WALLS  
TYPE 2 - SLOPING BACKFILL

UG3489.2





**FIGURE 5**  
C-3 TYPICAL SECTION  
5'-4" MAX.



**FIGURE 6**  
C-3 TYPICAL SECTION  
OVER 5'-4"

**TABLE 3 (C-3)**

| DIMENSIONS AND REINFORCING STEEL |                     |                      |          |          |          |      |
|----------------------------------|---------------------|----------------------|----------|----------|----------|------|
| WALL<br>HEIGHT                   | FOUNDATION<br>DEPTH | FOUNDATION<br>HEIGHT | REBAR    |          |          |      |
|                                  | Z (MIN.)            | Y (MIN.)             | X        | W        | V        | U    |
| 1'-4"                            | 2'-4"               | 8"                   | #4 @ 32" | --       | #4 @ 32" | 5-#4 |
| 2'-0"                            | 2'-4"               | 8"                   | #4 @ 32" | --       | #4 @ 32" | 5-#4 |
| 2'-8"                            | 2'-4"               | 8"                   | #4 @ 32" | --       | #4 @ 32" | 5-#4 |
| 3'-4"                            | 2'-4"               | 8"                   | #4 @ 32" | --       | #4 @ 32" | 5-#4 |
| 4'-0"                            | 3'-2"               | 10"                  | #4 @ 16" | --       | #4 @ 16" | 6-#4 |
| 4'-8"                            | 3'-2"               | 10"                  | #4 @ 16" | --       | #4 @ 16" | 6-#4 |
| 5'-4"                            | 3'-2"               | 10"                  | #4 @ 16" | --       | #4 @ 16" | 6-#4 |
| 6'-0"                            | 4'-9"               | 1'-0"                | #4 @ 16" | #6 @ 16" | #6 @ 16" | 7-#4 |
| 6'-8"                            | 4'-9"               | 1'-0"                | #4 @ 16" | #6 @ 16" | #6 @ 16" | 7-#4 |
| 7'-4"                            | 4'-9"               | 1'-0"                | #4 @ 16" | #6 @ 16" | #6 @ 16" | 7-#4 |
| 8'-0"                            | 4'-9"               | 1'-0"                | #4 @ 16" | #6 @ 16" | #6 @ 16" | 7-#4 |

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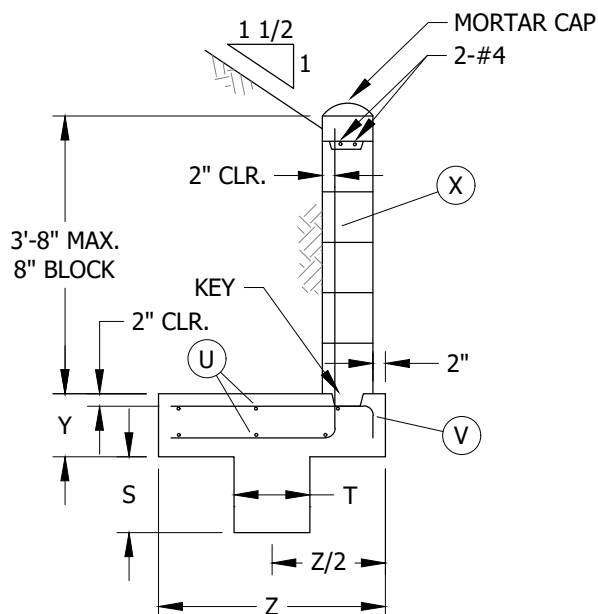
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

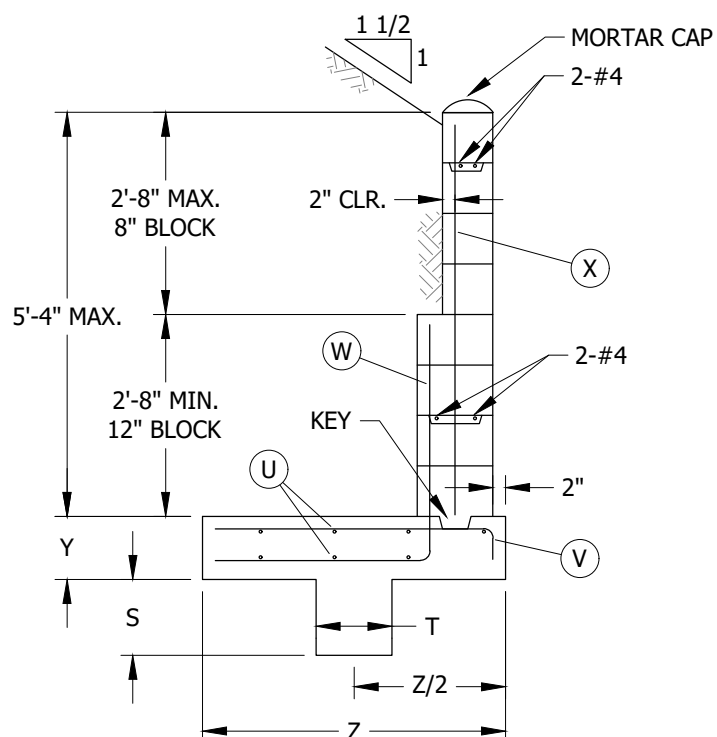
**MASONRY RETAINING WALLS**  
**TYPE 3 - LEVEL BACKFILL**

**UG3489.3**





**FIGURE 7**  
C-4 TYPICAL SECTION  
3'-8" MAX.



**FIGURE 8**  
C-4 TYPICAL SECTION  
OVER 3'-8"

**TABLE 4 (C-4)**

| DIMENSIONS AND REINFORCING STEEL |                  |                   |          |          |          |      |                |        |
|----------------------------------|------------------|-------------------|----------|----------|----------|------|----------------|--------|
| WALL HEIGHT                      | FOUNDATION DEPTH | FOUNDATION HEIGHT | REBAR    |          |          |      | FOUNDATION KEY |        |
|                                  | Z (MIN.)         | Y (MIN.)          | X        | W        | V        | U    | T (IN)         | S (IN) |
| 1'-4"                            | 3'-0"            | 8"                | #4 @ 16" | --       | #6 @ 16" | 6-#4 | 12             | 12     |
| 2'-0"                            | 3'-0"            | 8"                | #4 @ 16" | --       | #6 @ 16" | 6-#4 | 12             | 12     |
| 2'-8"                            | 3'-0"            | 8"                | #4 @ 16" | --       | #6 @ 16" | 6-#4 | 12             | 12     |
| 3'-4"                            | 3'-0"            | 8"                | #4 @ 16" | --       | #6 @ 16" | 6-#4 | 12             | 12     |
| 4'-0"                            | 4'-0"            | 10"               | #4 @ 16" | #6 @ 16" | #6 @ 8"  | 8-#4 | 12             | 12     |
| 4'-8"                            | 4'-0"            | 10"               | #4 @ 16" | #6 @ 16" | #6 @ 8"  | 8-#4 | 12             | 12     |
| 5'-4"                            | 4'-0"            | 10"               | #4 @ 16" | #6 @ 16" | #6 @ 8"  | 8-#4 | 12             | 12     |

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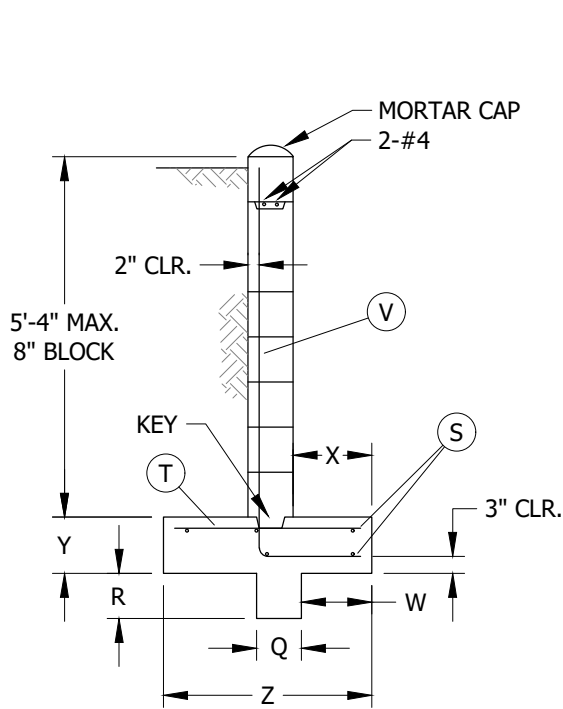
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

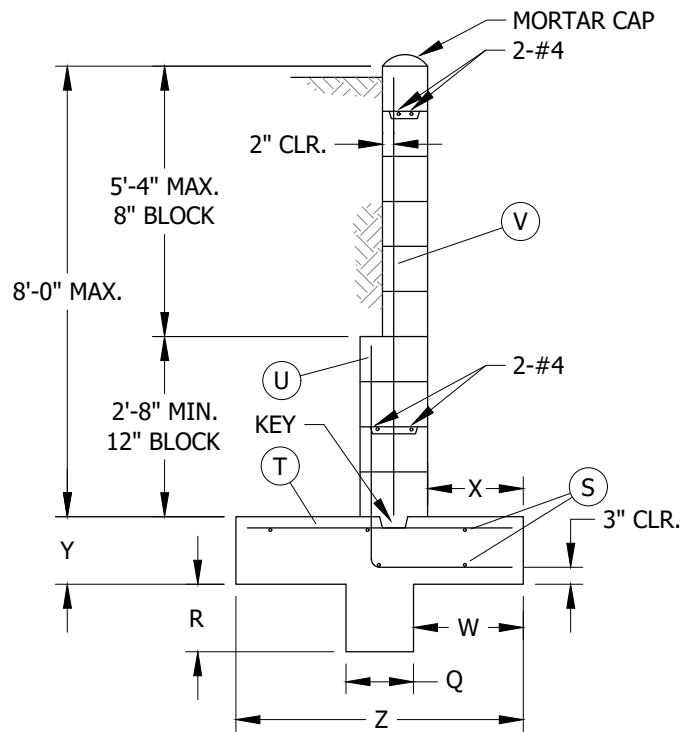
MASONRY RETAINING WALLS  
TYPE 4 - SLOPING BACKFILL

UG3489.4





**FIGURE 9**  
C-5 TYPICAL SECTION  
5'-4" MAX.



**FIGURE 10**  
C-5 TYPICAL SECTION  
OVER 5'-4"

**TABLE 5 (C-5)**

| DIMENSIONS AND REINFORCING STEEL |                  |                   |       |           |          |          |          |      |                |        |
|----------------------------------|------------------|-------------------|-------|-----------|----------|----------|----------|------|----------------|--------|
| WALL HEIGHT                      | FOUNDATION DEPTH | FOUNDATION HEIGHT | X     | W         | REBAR    |          |          |      | FOUNDATION KEY |        |
|                                  | Z (MIN.)         | Y (MIN.)          |       |           | V        | U        | T        | S    | R (IN)         | Q (IN) |
| 1'-4"                            | 2'-1"            | 8"                | 9"    | 8 1/2"    | #4 @ 32" | --       | #4 @ 32" | 5-#4 | 8              | 8      |
| 2'-0"                            | 2'-1"            | 8"                | 9"    | 8 1/2"    | #4 @ 32" | --       | #4 @ 32" | 5-#4 | 8              | 8      |
| 2'-8"                            | 2'-1"            | 8"                | 9"    | 8 1/2"    | #4 @ 32" | --       | #4 @ 32" | 5-#4 | 8              | 8      |
| 3'-4"                            | 2'-1"            | 8"                | 9"    | 8 1/2"    | #4 @ 32" | --       | #4 @ 32" | 5-#4 | 8              | 8      |
| 4'-0"                            | 3'-1"            | 10"               | 1'-2" | 1'-1/2"   | #4 @ 16" | --       | #4 @ 16" | 5-#4 | 8              | 8      |
| 4'-8"                            | 3'-1"            | 10"               | 1'-2" | 1'-1/2"   | #4 @ 16" | --       | #4 @ 16" | 5-#4 | 8              | 8      |
| 5'-4"                            | 3'-1"            | 10"               | 1'-2" | 1'-1/2"   | #4 @ 16" | --       | #4 @ 16" | 5-#4 | 8              | 8      |
| 6'-0"                            | 4'-3"            | 1'-0"             | 1'-5" | 1'-7 1/2" | #4 @ 16" | #7 @ 16" | #4 @ 16" | 6-#4 | 12             | 12     |
| 6'-8"                            | 4'-3"            | 1'-0"             | 1'-5" | 1'-7 1/2" | #4 @ 16" | #7 @ 16" | #4 @ 16" | 6-#4 | 12             | 12     |
| 7'-4"                            | 4'-3"            | 1'-0"             | 1'-5" | 1'-7 1/2" | #4 @ 16" | #7 @ 16" | #4 @ 16" | 6-#4 | 12             | 12     |
| 8'-0"                            | 4'-3"            | 1'-0"             | 1'-5" | 1'-7 1/2" | #4 @ 16" | #7 @ 16" | #4 @ 16" | 6-#4 | 12             | 12     |

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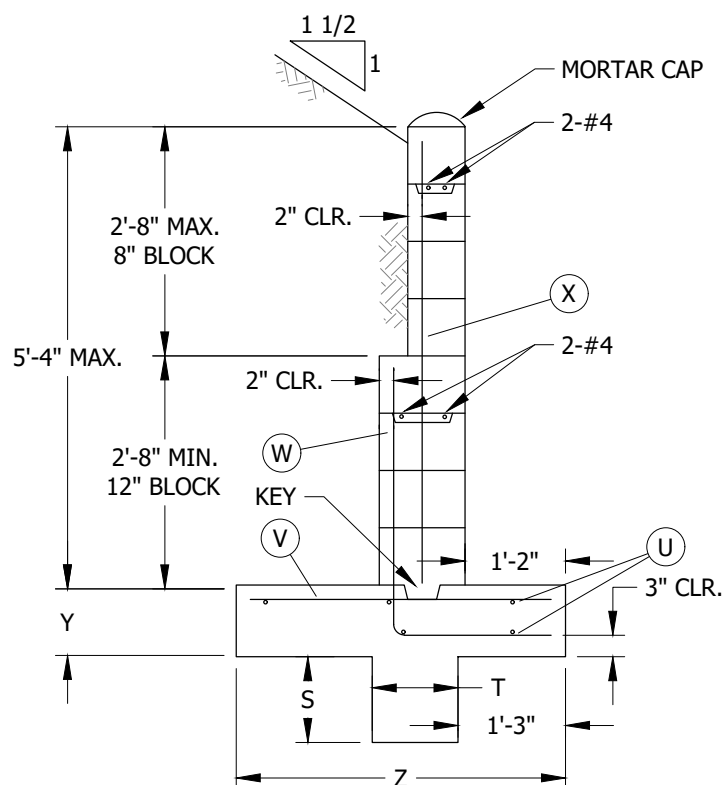
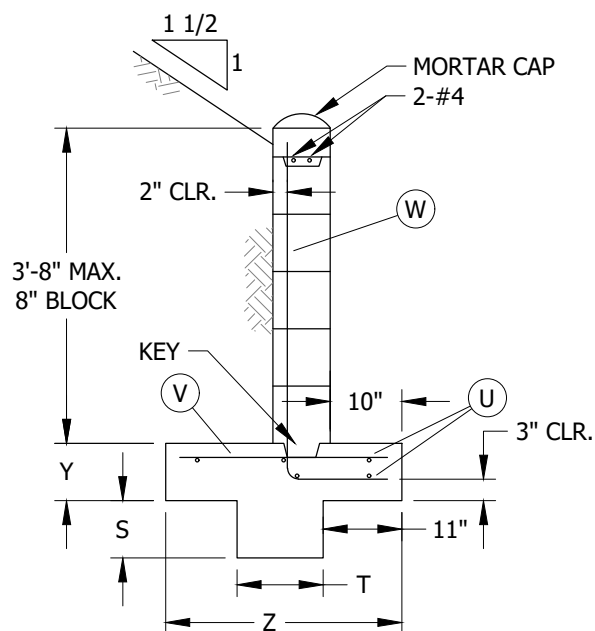
**SHEET**  
**5 OF 10**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**MASONRY RETAINING WALLS**  
**TYPE 5 - LEVEL BACKFILL**

**UG3489.5**



**TABLE 6 (C-6)**

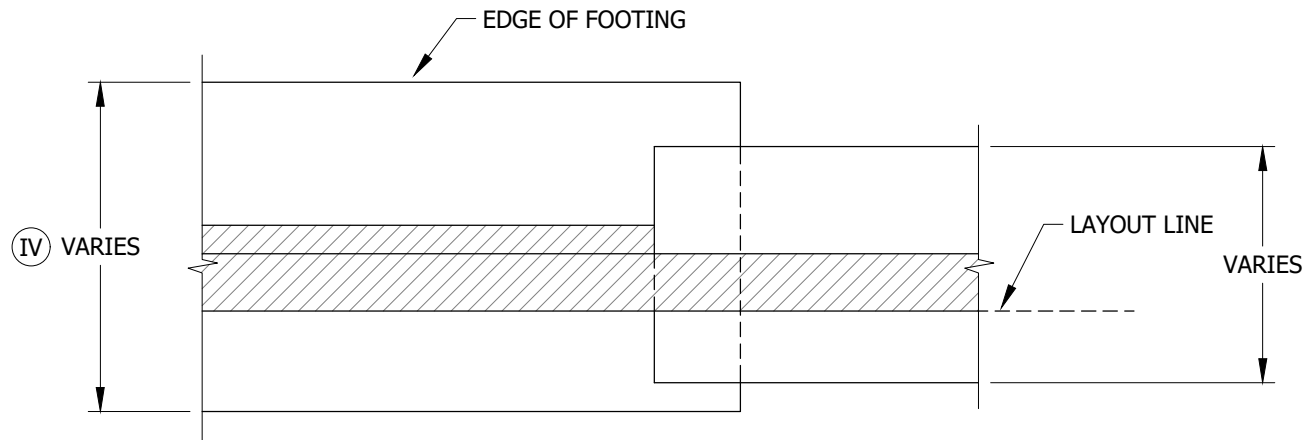
| Dimensions and Reinforcing Steel |                  |                   |          |          |          |      |                |        |
|----------------------------------|------------------|-------------------|----------|----------|----------|------|----------------|--------|
| Wall Height                      | Foundation Depth | Foundation Height | Rebar    |          |          |      | Foundation Key |        |
|                                  | Z (Min.)         | Y (Min.)          | X        | W        | V        | U    | T (in)         | S (in) |
| 1'-4"                            | 2'-9"            | 8"                | --       | #4 @ 16" | #5 @ 16" | 5-#4 | 12             | 8      |
| 2'-0"                            | 2'-9"            | 8"                | --       | #4 @ 16" | #5 @ 16" | 5-#4 | 12             | 8      |
| 2'-8"                            | 2'-9"            | 8"                | --       | #4 @ 16" | #5 @ 16" | 5-#4 | 12             | 8      |
| 3'-4"                            | 2'-9"            | 8"                | --       | #4 @ 16" | #5 @ 16" | 5-#4 | 12             | 8      |
| 4'-0"                            | 3'-10"           | 10"               | #4 @ 16" | #6 @ 16" | #5 @ 16" | 5-#4 | 12             | 12     |
| 4'-8"                            | 3'-10"           | 10"               | #4 @ 16" | #6 @ 16" | #5 @ 16" | 5-#4 | 12             | 12     |
| 5'-4"                            | 3'-10"           | 10"               | #4 @ 16" | #6 @ 16" | #5 @ 16" | 5-#4 | 12             | 12     |

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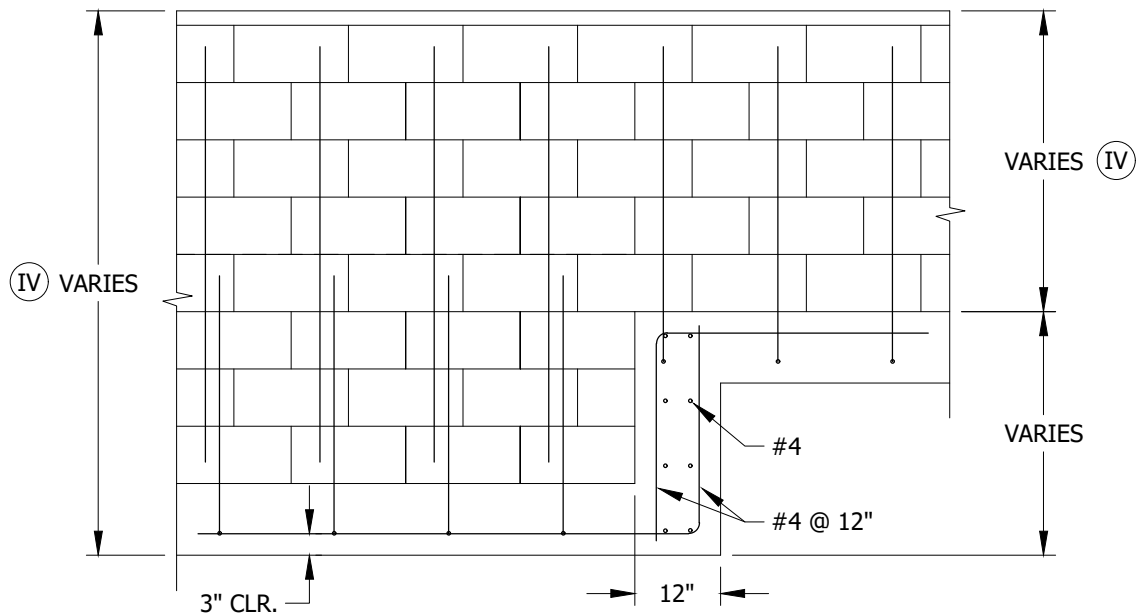
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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |                           |                    |          |                     |          |
|                  | MASONRY RETAINING WALLS<br>TYPE 6 - SLOPING BACKFILL |                           |                    |          |                     |          |





**FIGURE 13**  
PLAN VIEW



**FIGURE 13** (V)  
ELEVATION VIEW

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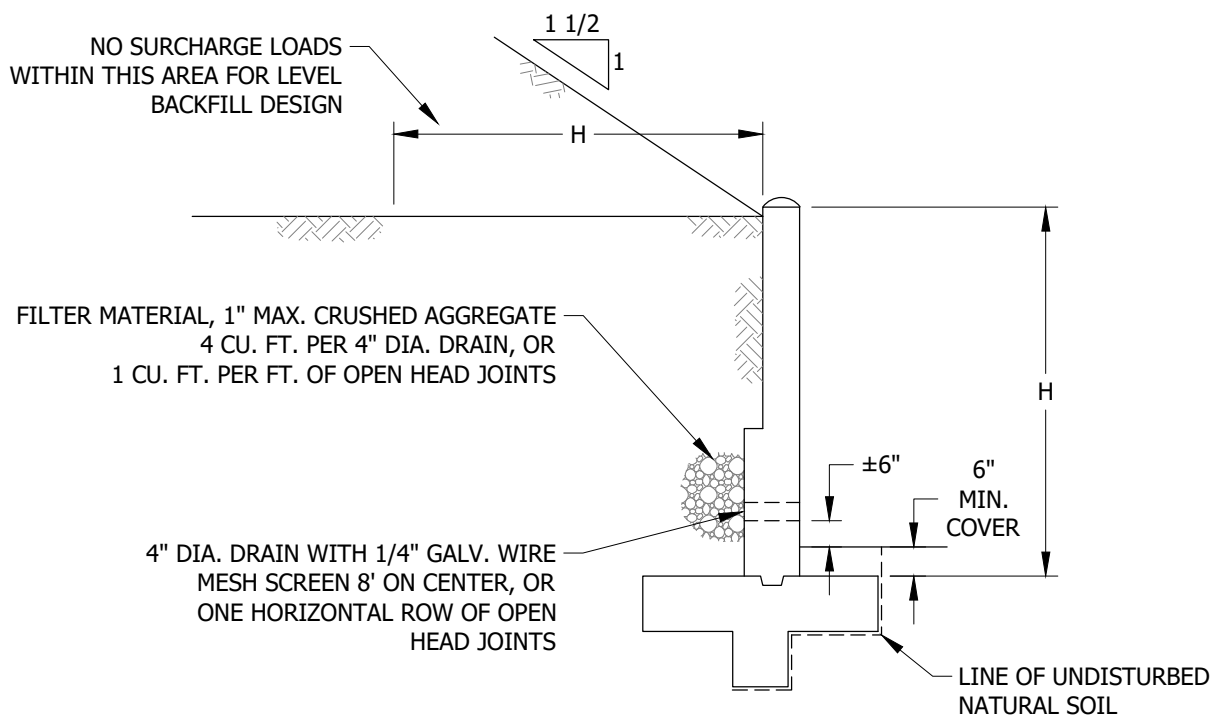
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| MASONRY RETAINING WALLS<br>TYPE 6 - SLOPING BACKFILL |                           |                    |          |                     |

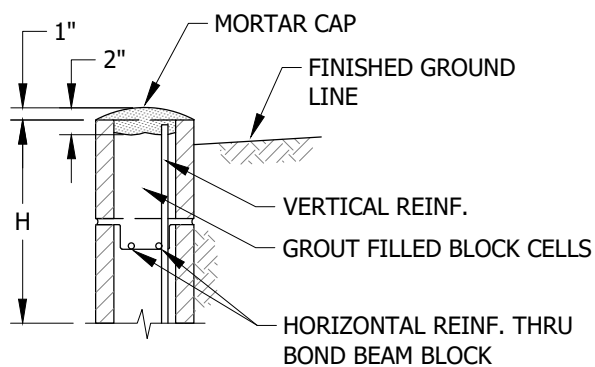
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**7 OF 10**

**UG3489.7**

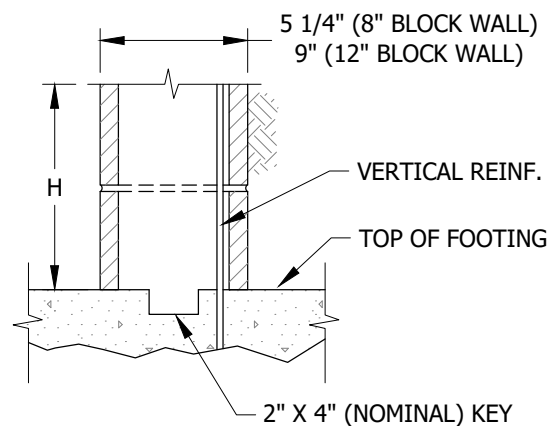




**FIGURE 14**  
TYPICAL SECTION



**FIGURE 14**  
CAP DETAIL



**FIGURE 14**  
KEY DETAIL

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**MASONRY RETAINING WALLS**  
**DETAILS**

**UG3489.8**



**INSTALLATION:**

A. FILL ALL BLOCK CELLS WITH GROUT.

**BILL OF MATERIALS:** NONE**NOTES:**

- I. THIS STANDARD WAS DEVELOPED BASED ON THE SAN DIEGO REGIONAL STANDARD DRAWINGS.
- II. ALL MASONRY WALLS SHALL BE CONSTRUCTED WITH CAP, KEY AND DRAINAGE DETAILS AS SHOWN HEREON.
- III. 4-INCH DIAMETER DRAIN MAY BE FORMED BY PLACING A BLOCK ON ITS SIDE.
- IV. WALL HEIGHTS AND FOOTING TYPES VARY DEPENDING ON SELECTED RETAINING WALL TYPE AND SITE CONDITIONS.
- V. HORIZONTAL REINFORCEMENT NOT SHOWN.
- VI. WALLS ARE TO BE USED ONLY FOR THE LOADING CONDITIONS SHOWN FOR EACH TYPE WALL. THE DESIGN HEIGHTS ARE MEASURED FROM THE TOP OF THE FOUNDATION, NOT FROM FINISHED GRADE AND ARE NOT TO BE EXCEEDED WHEN USING THESE STANDARD DESIGNS. WALLS NOT MEETING THE SPECIFICATIONS IN THIS STANDARD ARE TO BE DESIGNED BY CIVIL/STRUCTURAL ENGINEERING FOR THE SPECIFIC CONDITIONS REQUIRED.
- VII. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ADEQUATE ERECTION, SHORING AND BRACING AS REQUIRED FOR STABILITY OF ALL WALLS AND EMBANKMENTS DURING ALL PHASES OF CONSTRUCTION.
- VIII. BEFORE COMMENCING ANY EXCAVATIONS, THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES, VALVE BOXES, VAULTS OR ANY OTHER UNDERGROUND OBSTRUCTIONS, AND NOT PERFORM ANY WORK THAT WILL INTERFERE WITH THEIR SERVICE. NOTIFY SDG&E OF ANY OBSTRUCTIONS FOUND THAT INTERFERE WITH CONSTRUCTION.
- IX. TO INSURE PROPER BONDING BETWEEN THE FOOTING AND WALL, A MORTAR KEY SHALL BE FORMED BY EMBEDDING A FLAT 2x4 FLUSH WITH AND AT THE TOP OF THE FRESHLY POURED FOOTING. THE 2x4 SHOULD BE REMOVED AFTER THE CONCRETE HAS STARTED TO HARDEN (APPROXIMATELY 1 HOUR).
- XI. WALL DRAINS SHALL BE PROVIDED AS SHOWN IN THIS STANDARD.
- XII. NO BACKFILL MATERIAL SHALL BE PLACED AGAINST MASONRY RETAINING WALLS UNTIL GROUT HAS REACHED DESIGN STRENGTH OR UNTIL GROUT HAS CURED FOR A MINIMUM OF 28 DAYS AND BUILDING DEPARTMENT INSPECTION IS COMPLETE. COMPACTION OF BACKFILL MATERIAL BY JETTING OR PONDING WITH WATER WILL NOT BE PERMITTED. EACH LAYER OF BACKFILL SHALL BE MOISTENED AND THOROUGHLY TAMPED, ROLLED OR OTHERWISE COMPACTED UNTIL THE RELATIVE COMPACTING IS NOT LESS THAN 90%.
- XIII. SAFETY FENCING SHALL BE INSTALLED AT THE TOP OF THE WALL AS REQUIRED BY THE AGENCY.
- XIV. **REINFORCED CONCRETE:**
  - a. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 2,000 PSI, MAXIMUM 4-INCH SLUMP (MAX. SLUMP OF 8-INCH PERMITTED WITH ADDITION OF APPROVED PLASTICIZER) AND MAXIMUM 1-INCH AGGREGATE. MAXIMUM WATER/CEMENT RATIO TO BE 0.45. CEMENT SHALL CONFORM TO 'TYPE II MODIFIED' AS DEFINED BY THE MOST CURRENT EDITION OF CALTRANS STANDARD SPECIFICATIONS.
  - b. ALL REINFORCING STEEL SHALL BE WELL-SECURED IN POSITION PRIOR TO PLACING CONCRETE.
  - c. BOTTOMS OF FOUNDATIONS SHALL BE CLEANED OF LOOSE MATERIAL AND DAMPENED PRIOR TO PLACING CONCRETE IN FOOTINGS.
  - d. CONSTRUCTION JOINTS ARE TO BE USED ONLY WHERE SHOWN ON THE APPROVED PLANS. ADDITIONAL JOINTS PROPOSED BY THE CONTRACTOR MUST BE APPROVED BY SDG&E PRIOR TO START OF CONSTRUCTION. THE SURFACE OF ALL CONSTRUCTION JOINTS SHALL BE CLEANED AND ROUGHENED BY REMOVING THE ENTIRE SURFACE AND EXPOSING CLEAN AGGREGATE SOLIDLY EMBEDDED IN MORTAR PRIOR TO PLACING NEW CONCRETE. SURFACE AT JOINTS SHALL BE ROUGHENED TO 1/4-INCH MINIMUM AMPLITUDE.
  - e. ALL CONCRETE SHALL BE MIXED, DELIVERED, PLACED AND CURED PER THE LATEST EDITION OF ACI 301. MECHANICAL VIBRATORS SHALL BE USED.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**MASONRY RETAINING WALLS  
GENERAL NOTES**

**UG3489.9**



## XV. CONCRETE BLOCK MASONRY:

- ## XVI. REINFORCING STEEL:

- ### TABLE 7

**XVII. INSPECTIONS:** CALL THE GOVERNING JURISDICTION FOR INSPECTIONS AS FOLLOWS:

- REFERENCE:** NONE

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|                               |                    |  | <div>MASONRY RETAINING WALLS<br/>GENERAL NOTES</div> |     |                    |           |     |        |          |    |     |     |                     |  |                      |







3500 - PAD/WALL  
MOUNTED  
SECTIONALIZING  
EQUIPMENT



3500 - PAD/WALL  
MOUNTED  
SECTIONALIZING  
EQUIPMENT



**PAGE****SUBJECT****FUSE CABINETS**

|      |  |
|------|--|
| 3511 | PAD MOUNTED AIRBREAK PME-5 FUSED SWITCH CABINET, 12KV, 200A, THREE-PHASE                             |
| 3512 | SINGLE-PHASE, LOW PROFILE FUSED SWITCHING CABINET - 6,930V   |
| 3514 | THREE-PHASE FUSE CABINET WITH HORIZONTAL MOUNTED FUSES - 12KV WITH FEED THRU CAPABILITY              |
| 3515 | THREE-PHASE FUSE CABINET WITH VERTICAL MOUNTED FUSE AND FUSE BYPASS - 12KV WITH FEED THRU CAPABILITY |
| 3516 | THREE-PHASE WALL MOUNTED FUSE CABINET - 12KV, 200A   |

**TERMINATING CABINETS**

|      |   |
|------|---|
| 3517 | 200A LIVEFRONT TO DEADFRONT TERMINATING CABINET                           |
| 3518 | 600A LIVEFRONT TO DEADFRONT TERMINATING CABINET                           |
| 3522 | SINGLE-PHASE, LOW PROFILE CABLE TERMINATING CABINET - 6,930V              |
| 3523 | THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET, 12KV, 200A             |
| 3524 | THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET, 12KV, 200A/600A        |
| 3525 | THREE-PHASE PAD MOUNTED TERMINATING CABINET, 12KV, 600A AND 3313 HANDHOLE |

**SWITCH CABINETS**

|      |  |
|------|--|
| 3550 | PAD MOUNTED SWITCH GEAR  |
| 3551 | 4-WAY MANUAL   |
| 3552 | 4-WAY SCADA  |
| 3553 | 4-WAY SCADA HIGH SPEED TRIP COIL   |
| 3554 | 2 SIDED 4-WAY SCADA  |
| 3555 | 5-WAY SCADA  |
| 3560 | INNOVATIVE SWITCH GEAR   |
| 3567 | PAD MOUNTED AIRBREAK PME 9, 10 AND 11 SECTIONALIZING SWITCH, 12KV, 600A, THREE-PHASE                 |
| 3568 | INSTALLATION OF PAD MOUNTED AIRBREAK PME 9, 10 AND 11 SECTIONALIZING SWITCH, 12KV, 600A, THREE-PHASE |

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| D   | UPDATES TO 3522     | -  | JS  | JS  | MDJ | 6/27/2017 | G   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 |
| C   | UPDATES TO 3523     | -  | JS  | TR  | MDJ | 8/11/2016 | F   | ADDED 3517 & 3518 | -   | GW | JS  | CZH | 11/1/2018 |
| B   | ADDITION OF 3550.4A | -  | JBH | TR  | MDJ | 8/5/2016  | E   | EDITORIAL CHANGES | -   | JK | JS  | CZH | 5/18/2018 |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD MOUNTED SECTIONALIZING EQUIPMENT  
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**PAGE****SUBJECT**

|                          |  |
|--------------------------|--|
| 3580                     | PAD MOUNTED MVI SWITCH ENCLOSURE   |
| 3583                     | PAD MOUNTED AIRBREAK PME-3 SECTIONALIZING SWITCH CABINET, 12KV, 600A                 |
| 3584                     | INSTALLATION OF PAD MOUNTED AIRBREAK PME-3 SECTIONALIZING SWITCH CABINET, 12KV, 600A |
| 3585                     | PAD MOUNTED 3-WAY 600A SF-6 GAS SWITCH CABINET (VISTA)                               |
| 3586                     | INSTALLATION OF PAD MOUNTED 3-WAY 600A SF-6 GAS SWITCH CABINET (VISTA)               |
| 3588                     | INSTALLATION OF PAD MOUNTED AIRBREAK PME-5 FUSED SWITCH CABINET, 12KV, 200A          |
| <b>SERVICE RESTORERS</b> |  |
| 3590                     | PAD MOUNTED SERVICE RESTORER - 12KV, 600A, THREE-PHASE                               |
| 3591                     | INSTALLATION OF PAD MOUNTED SERVICE RESTORER - 12KV, 600A, AND 3313 HANDHOLE         |

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PAD MOUNTED SECTIONALIZING EQUIPMENT  
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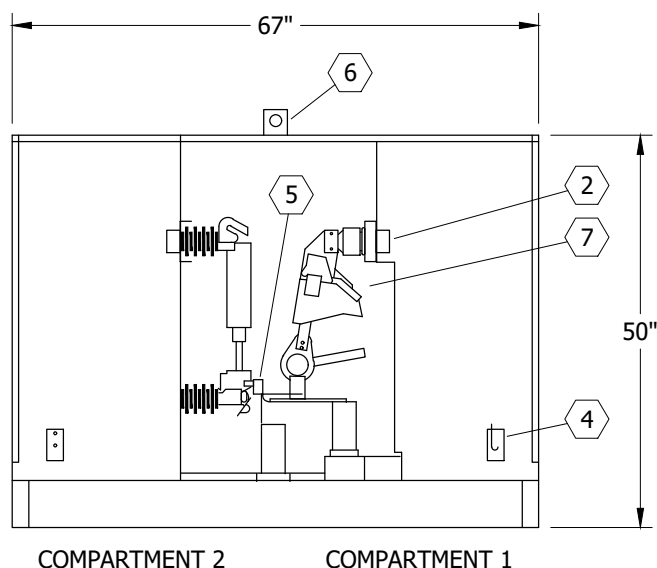
UG3501.2



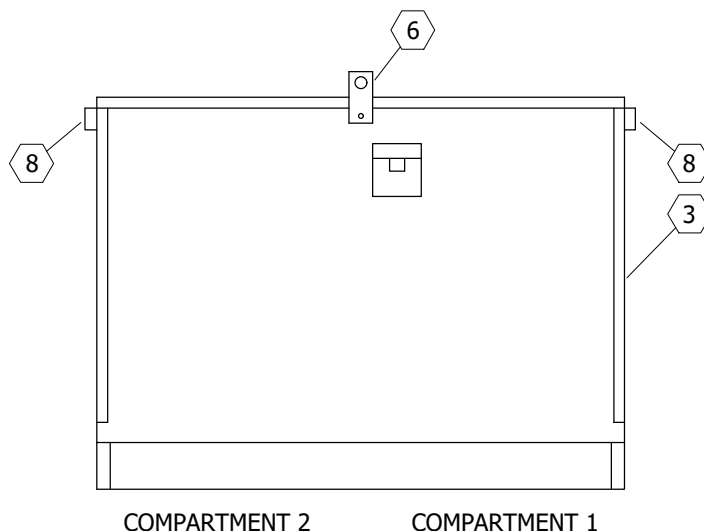
**SCOPE:** THIS STANDARD SHOWS INSTALLATION FOR THE PME-5 FUSE CABINET. APPROVED APPLICATIONS OF THIS STANDARD INCLUDE FEEDER TAPS FOR CERTAIN LOCAL DISTRIBUTION LOADS, AND FIELD MAINTENANCE JOBS REPLACING OLDER PMH-5 (LIVEFRONT) CABINETS.

**ATTENTION:**

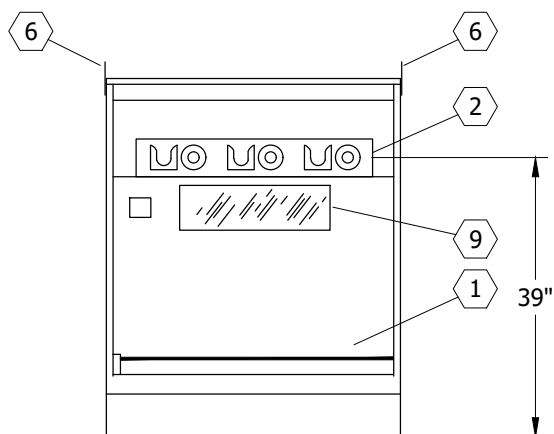
- \* THIS DEVICE DOES NOT QUALIFY AS A SWITCH, FOR THE PURPOSES OF FEEDER CIRCUIT DESIGN CRITERIA. NOTE THAT ALL TERMINATIONS ON THE PME-5 USE 200A CONNECTORS. FUSING HARDWARE FOR THE PME-5 IS COMMON TO THE PME-9 AND PME-11, AND CAN ACCOMMODATE X-LIMITER CLF, OR SM-4 EXPULSION FUSING, WITH THE REQUIRED MODIFICATIONS.



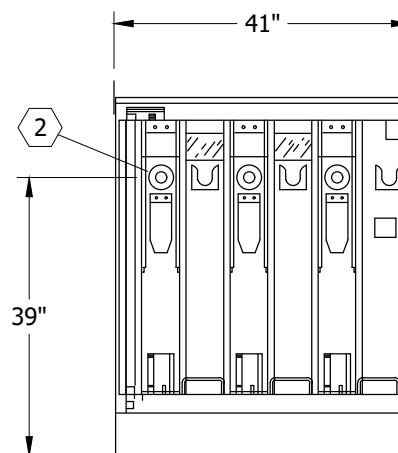
**FIGURE 1**  
SIDE VIEW  
EXPOSED



**FIGURE 1**  
SIDE VIEW



**FIGURE 2**  
COMPARTMENT 1  
END VIEW



**FIGURE 3**  
COMPARTMENT 2  
END VIEW

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| A   | REVISION          | -   | -  | -   | -   | 3/1/2002  | D   |        |    |    |     |     |      |

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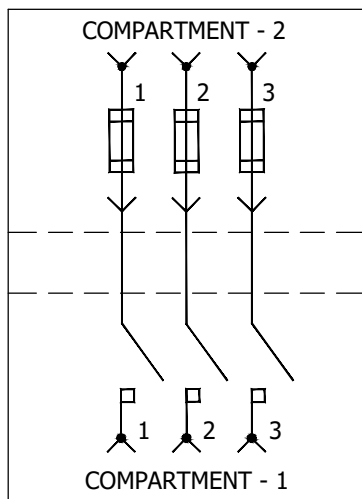
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

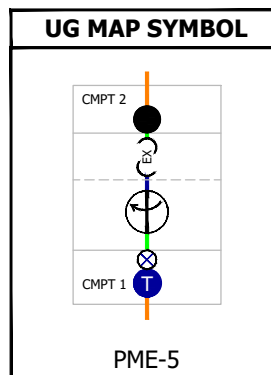
PAD MOUNTED AIRBREAK PME-5 FUSED SWITCH CABINET  
12KV, 200A, THREE-PHASE

UG3511.1





**FIGURE 4**  
PME-5  
CONNECTION DIAGRAM



**TABLE 1**

| SWITCH PARTS LIST |                                    |
|-------------------|------------------------------------|
| ITEM              | DESCRIPTION                        |
| 1                 | BAR, GROUND                        |
| 2                 | WELL, BUSHING, 200A                |
| 3                 | NAME PLATE, (ON OUTSIDE OF DOOR)   |
| 4                 | PLATE, GROUNDING                   |
| 5                 | BUS, 200A                          |
| 6                 | TABS, LIFTING (III)                |
| 7                 | SWITCH, MINI-RUPTER, 200A          |
| 8                 | SWITCH OPERATOR, (SCADA ONLY)      |
| 9                 | LOCKING PROVISION, PENTAHEAD LATCH |
| 10                | WINDOW, VIEWING, LEXAN SWITCH (II) |

**TABLE 2**

| ELECTRIC RATINGS                              |         |
|---|---------|
| VOLTAGE                                       | 14.4KV  |
| B.I.L.  | 95KV    |
| CURRENT, CONDITIONS                           | 200A    |
| LOADMAKE AND LOADBREAK                        | 200A    |
| MOMENTARY AND FAULT CLOSE (RMS, ASYMMETRICAL) | 22,400A |
| MOMENTARY AND FAULT CLOSE (RMS, SYMMETRICAL)  | 14,000A |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- (I) WEIGHT: 1,100 LBS MAX.
- (II) NOT SHOWN IN FIGURES.
- (III) REMOVE AFTER INSTALLATION AND REPLACE BOLTS, STORE INSIDE CABINET.

**REFERENCE:**

- a. SEE UG3214 FOR SWITCH IDENTIFICATION.
- b. SEE UG3418 FOR BOX PAD INSTALLATION FOR PAD MOUNTED, 600A, 12KV SWITCH.
- c. SEE UG3588 FOR SWITCH INSTALLATION.

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|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   | MOVED FROM UG3587 | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 3/1/2002  | D   |        |    |    |     |     |      |



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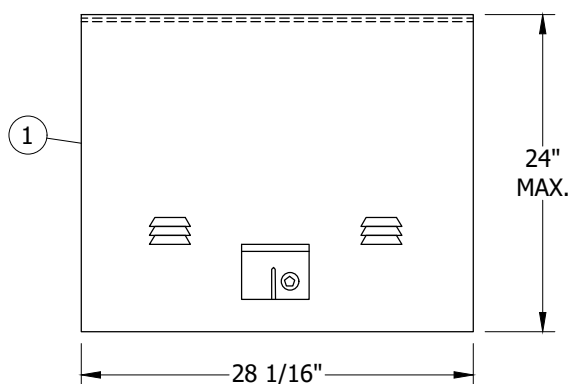
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD MOUNTED AIRBREAK PME-5 FUSED SWITCH CABINET  
12KV, 200A, THREE-PHASE

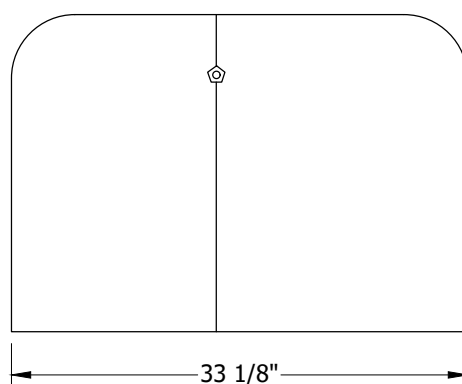
UG3511.2



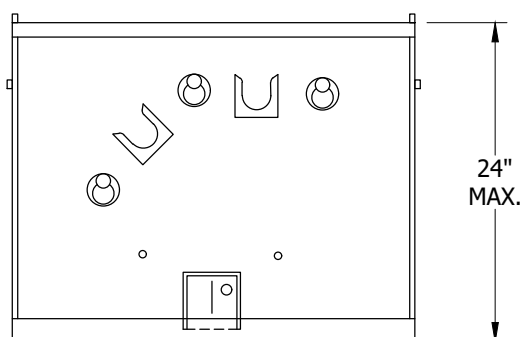
**SCOPE:** THIS STANDARD SHOWS PAD MOUNTED SINGLE-PHASE FUSED SWITCHING CABINET AND INSTALLATION REQUIREMENTS FOR FUSING SINGLE-PHASE LOAD IN UNDERGROUND SYSTEM.



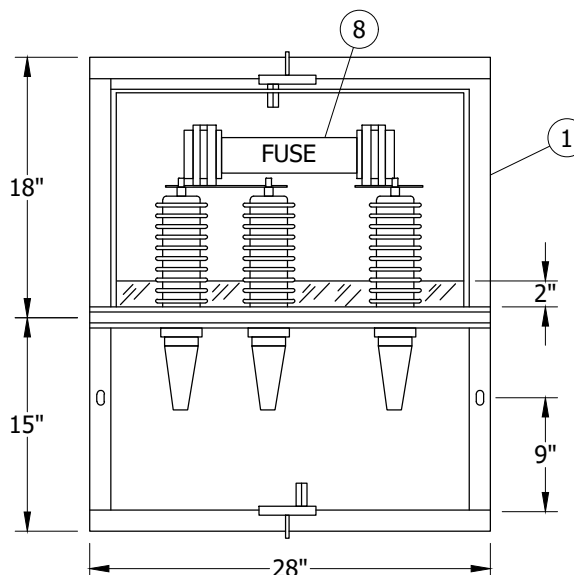
**FIGURE 1**  
FRONT VIEW



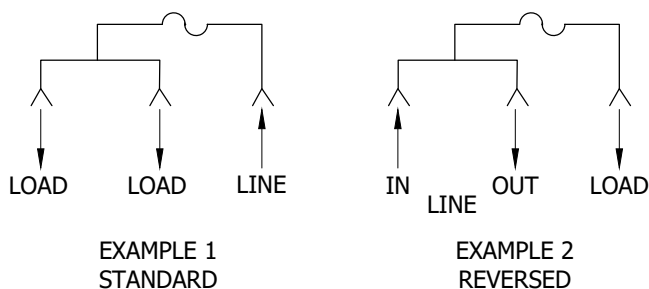
**FIGURE 1**  
SIDE VIEW



**FIGURE 2**  
FRONT VIEW  
EXPOSED



**FIGURE 2**  
PLAN VIEW  
EXPOSED



**FIGURE 3**

**TABLE 1**

| RATINGS   |     |
|-----------|-----|
| FUSE (KV) | 8.3 |
| AMPERES   | 200 |
| KV-BIL    | 95  |

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| C   |                       |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | FORMATTING            | EDM | JK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
| A   | NO CHANGES-REAFFIRMED | -   | JC | TR  | MDJ | 9/17/2015 | D   |        |    |    |     |     |      |

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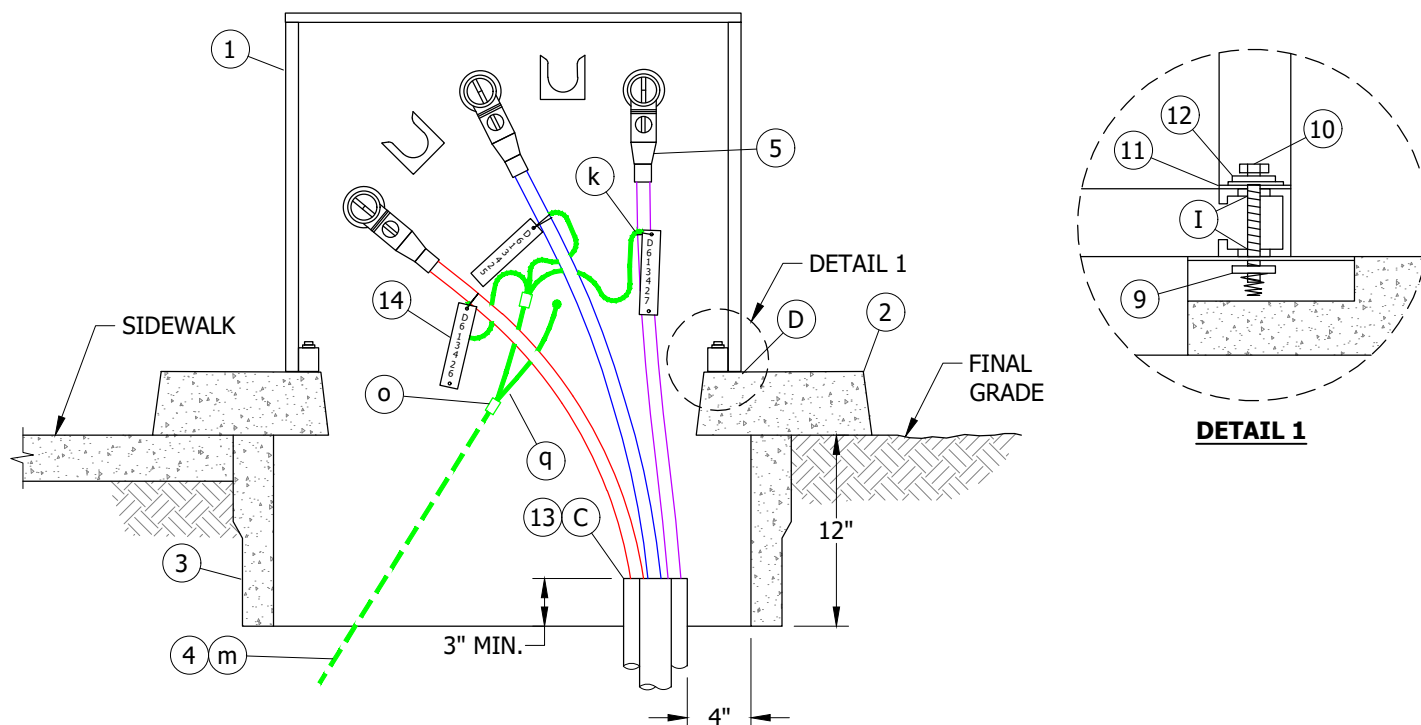
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SINGLE-PHASE, LOW PROFILE FUSED  
SWITCHING CABINET - 6,930V

UG3512.1





**FIGURE 4**

### INSTALLATION:

- A. THIS INSTALLATION IS LIMITED TO A MAXIMUM OF THREE SINGLE-PHASE, #2 AL PRIMARY CABLES.
- B. SET PAD AND HANDHOLE, INSTALL EQUIPMENT GROUND.
- (C) TERMINATE CONDUITS AS SHOWN AND SEAL CONDUITS WITH SEALING COMPOUND.
- (D) BASE OF CABINET SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (E) KEYLESS LOCKS TO BE ATTACHED TO LATCHING MECHANISM ON FUSE CABINET AND PENTAHEAD BOLTS TO BE THREADED IN COMPLETELY.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                                | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | CABINET, LOW PROFILE, FUSED                | 1        | -             | S190438      | FC-1PH       |
| 2    | TRANSFORMER/UTILITY, SINGLE-PHASE          | 1        | 3421          | S514240      | FC3PAD       |
| 3    | HANDHOLE                                   | 1        | 3312          | S162426      | 3312-0       |
| 4    | WIRE, GROUND, TRENCH (m)                   | AS REQ'D | 4510          | -            | -            |
| 5    | ELBOW, LOADBREAK, 14.4K, 200A              | AS REQ'D | 4190-4191     | -            | -            |
| 6    | RECEPTACLE, INSULATING (II)                | AS REQ'D | 4195          | S204304      | -            |
| 7    | LOCK, KEYLESS (E II)                       | 2        | -             | S468010      | -            |
| 8    | FUSE                                       | 1        | 4311-4314     | -            | -            |
| 9    | NUT, CLAMPING CHANNEL W/SPRING, 1/2"       | 2        | -             | S503520      | -            |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 2 1/2" | 2        | -             | S616352      | -            |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"  | 2        | -             | S799488      | -            |
| 12   | WASHER, LOCK, BRONZE, 1/2"                 | 2        | -             | S796416      | -            |

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|-----|-----------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                       |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | FORMATTING            | EDM | JK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
| A   | NO CHANGES-REAFFIRMED | -   | JC | TR  | MDJ | 9/17/2015 | D   |        |    |    |     |     |      |



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**SHEET  
2 OF 3**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**SINGLE-PHASE, LOW PROFILE FUSED  
SWITCHING CABINET - 6,930V**

**UG3512.2**



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION                 | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|----------|---------------|--------------|--------------|
| 13   | SEALING COMPOUND (C)        | AS REQ'D | -             | S442976      | -            |
| 14   | TAGS, IDENTIFICATION, CABLE | AS REQ'D | 3202          | -            | -            |

**NOTES:**

(I) FUSE CABINET COMES WITH 5/8" X 1" SLOT IN CENTER OF UNISTRUT FRAME (TYP).

(II) NOT SHOWN ON FIGURES.

**REFERENCE:**

- a. SEE UG3202 FOR CABLE IDENTIFICATION.
- b. SEE UG3211, UG3212 (PREVIOUS # UG3211.1-.4) FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- c. SEE UG3221 FOR HIGH VOLTAGE DECAL.
- d. SEE UG3408 FOR WIRE ENTRY PREVENTION.
- e. SEE UG3421 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- f. SEE UG3479 FOR BARRIER PROTECTION.
- g. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- h. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- i. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- j. SEE UG3489 FOR RETAINING WALLS.
- (k) SEE UG4108 FOR SEALING JACKETED CABLE.
- l. SEE UG4302, UG4311, AND UG4312 FOR FUSING.
- (m) SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- n. SEE UG4512 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (o) SEE UG4512 FOR GROUNDING EQUIPMENT.
- p. SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.
- (q) SEE UG4520-UG4521 (PREVIOUS # UG4520.1-.9) FOR GROUNDING PAD MOUNTED EQUIPMENT.

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| C   |                       |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | FORMATTING            | EDM | JK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
| A   | NO CHANGES-REAFFIRMED | -   | JC | TR  | MDJ | 9/17/2015 | D   |        |    |    |     |     |      |



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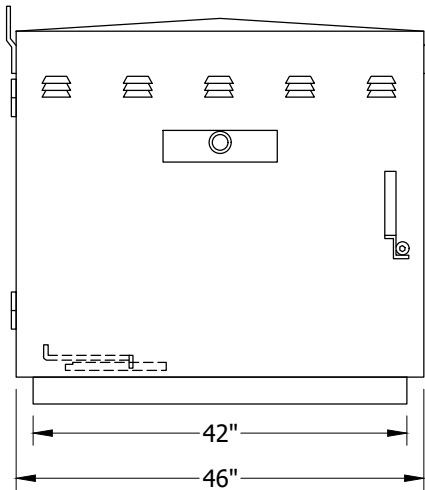
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SINGLE-PHASE, LOW PROFILE FUSED  
SWITCHING CABINET - 6,930V

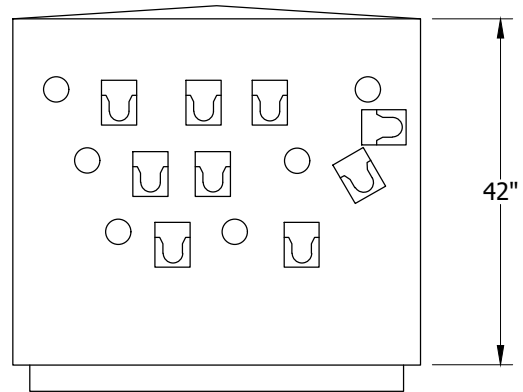
UG3512.3



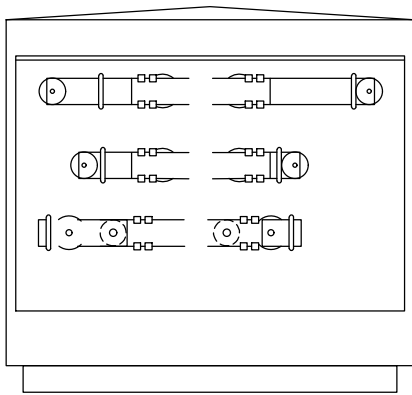
**SCOPE:** THIS STANDARD SHOWS PAD MOUNTED THREE-PHASE FUSE CABINET WITH HORIZONTAL MOUNTED FUSES WITH FEED THRU CAPABILITY AND INSTALLATION REQUIREMENTS USED FOR FUSING WYE AND DELTA LOADS IN UNDERGROUND SYSTEM.



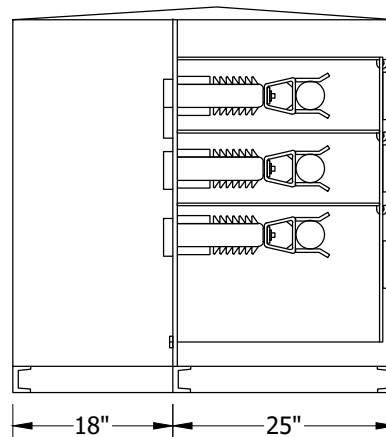
**FIGURE 1**  
FRONT VIEW



**FIGURE 1**  
FRONT VIEW  
EXPOSED



**FIGURE 1**  
REAR VIEW



**FIGURE 1**  
SIDE VIEW  
EXPOSED

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| B   | FORMATTING            | EDM | JK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
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**SHEET**  
**1 OF 3**



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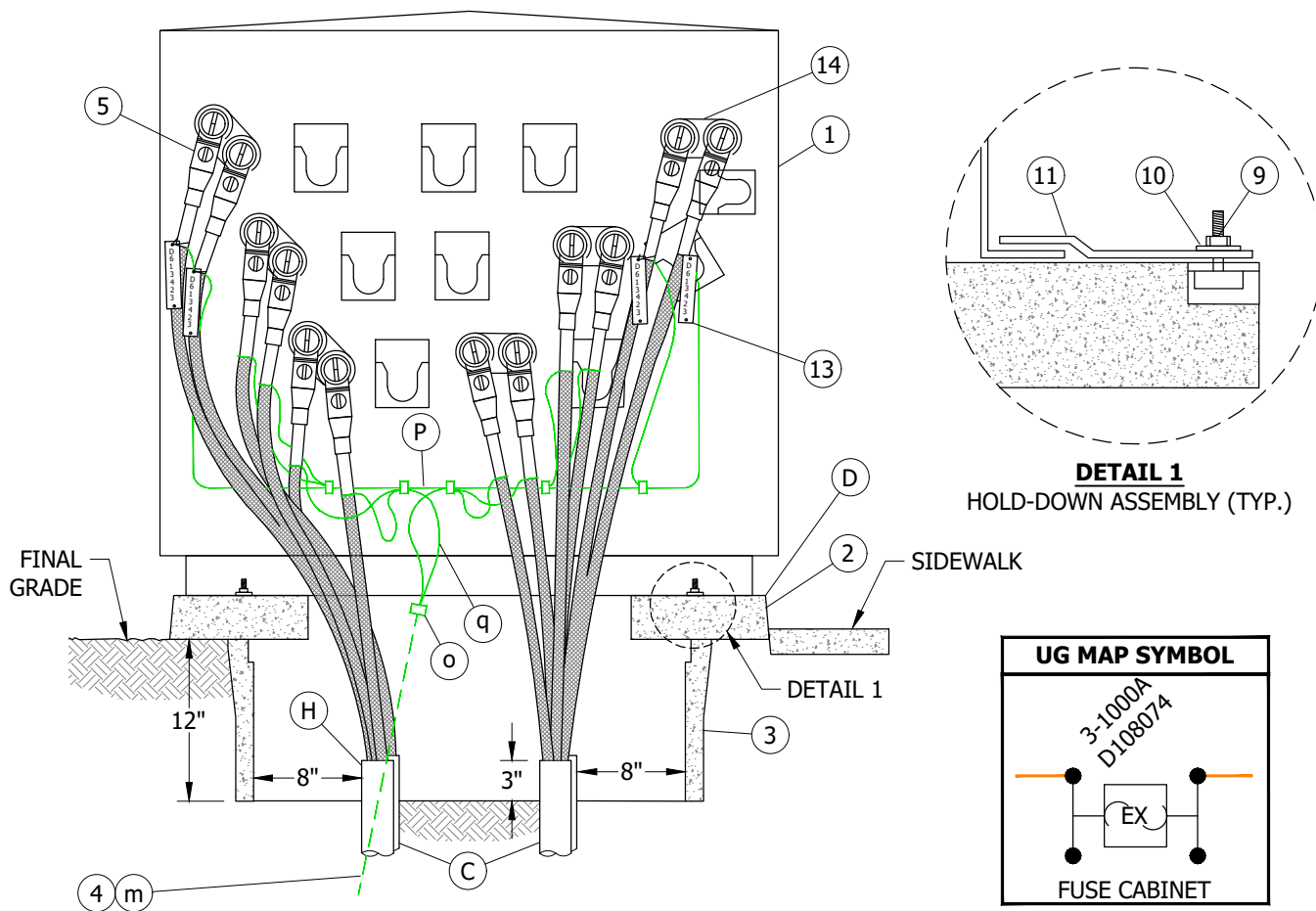
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE, FUSE CABINET WITH  
HORIZONTAL MOUNTED FUSES - 12KV  
WITH FEED THRU CAPABILITY

UG3514.1





**FIGURE 2**

**INSTALLATION:**

- A. THIS INSTALLATION IS LIMITED TO A MAXIMUM OF FOUR THREE-PHASE, 2/0 AL CABLES AND SMALLER.
- B. SET PAD AND HANDHOLE, INSTALL EQUIPMENT GROUND.
- C. TERMINATE CONDUITS AS SHOWN AND SEAL CONDUITS WITH SEALING COMPOUND.
- D. BASE OF CABINET SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- E. INSTALL SIX FEED-THRU INSERTS.
- F. INSTALL SINGLE BARREL FUSE ALL THE WAY BACK IN DOUBLE BARREL FUSE CLIPS NEAREST THE INSULATOR.
- G. KEYLESS LOCKS TO BE ATTACHED TO LATCHING MECHANISM ON FUSE CABINET AND PENTAHEAD BOLTS TO BE THREADED IN COMPLETELY.
- H. PREFERRED CONDUIT INSTALLATION IS LINE IN ON LEFT LOAD OUT ON RIGHT.

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| C   |                       |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | FORMATTING            | EDM | JK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
| A   | NO CHANGES-REAFFIRMED | -   | JC | TR  | -   | 6/3/2015  | D   |        |    |    |     |     |      |

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**SHEET  
2 OF 3**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE, FUSE CABINET WITH  
HORIZONTAL MOUNTED FUSES - 12KV  
WITH FEED THRU CAPABILITY

**UG3514.2**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | CABINET, FUSE, THREE-PHASE, HORIZ. MOUNT (G)                 | 1        | -             | S190454      | FC3PFT       |
| 2    | PAD WITH BOX, TRANSFORMER/UTILITY EQUIPMENT, SINGLE-PHASE    | 1        | 3421          | S514240      | FC3PAD       |
| 3    | HANDHOLE, 17" X 30"  | 1        | 3312          | S162426      | -            |
| 4    | WIRE, GROUND, TRENCH (m)                                     | AS REQ'D | 4510          | -            | -            |
| 5    | ELBOW, LOADBREAK, 14.4KV 200A                                | AS REQ'D | 4190 - 4191   | -            | -            |
| 6    | RECEPTACLE, INSULATING (I)                                   | AS REQ'D | 4195          | S204304      | -            |
| 7    | LOCKS, KEYLESS (G)(I)  | 2        | -             | S468010      | -            |
| 8    | FUSE (F)(I)  | 3        | 4311 - 4314   | -            | -            |
| 9    | NUT, STUD, 1/2" X 1 3/8"                                     | 2        | -             | S507000      | -            |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"                    | 2        | -             | S799488      | -            |
| 11   | HOLD DOWN (SUPPLIED WITH CABINET)                            | 2        | -             | -            | -            |
| 12   | COMPOUND, SEALING (C)(I)                                     | AS REQ'D | -             | S442976      | -            |
| 13   | TAGS, IDENTIFICATION, CABLE (C)                              | AS REQ'D | 3202          | -            | -            |
| 14   | BUSHING, FEED-THRU LOADBREAK (NOT SUPPLIED WITH CABINET) (E) | 6        | 4195          | S544678      | FEED-1       |
| 15   | NUT, STANDARD HEX, STAINLESS STEEL (I)                       | 2        | -             | S505536      | -            |

**NOTES:**

(I) NOT SHOWN ON FIGURES.

**REFERENCE:**

- SEE UG3202 FOR CABLE IDENTIFICATION.
- SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- SEE UG3221 FOR HIGH VOLTAGE DECAL.
- SEE UG3408 FOR WIRE ENTRY PREVENTION.
- SEE UG3421 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- SEE UG3479 FOR BARRIER PROTECTION.
- SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- SEE UG3484 FOR INSTALLATION OF PAD MOUNTED EQUIPMENT.
- SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- SEE UG3489 FOR RETAINING WALLS.
- SEE UG4108 FOR SEALING JACKETED CABLE.
- SEE UG4302, UG4311, AND UG4312 FOR FUSING.
- (m) SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- n. SEE UG4512 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (o) SEE UG4512 FOR GROUNDING EQUIPMENT.
- (p) SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.
- (q) SEE UG4520 AND UG4521 (PREVIOUS # UG4520.1-.9) FOR GROUNDING PAD MOUNTED EQUIPMENT.

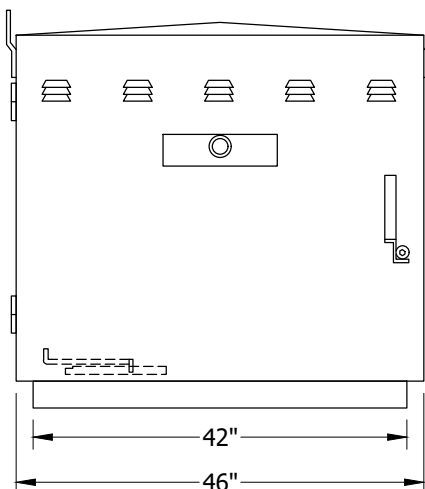
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| C   |                       |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | FORMATTING            | EDM | JK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
| A   | NO CHANGES-REAFFIRMED | -   | JC | TR  | -   | 6/3/2015  | D   |        |    |    |     |     |      |

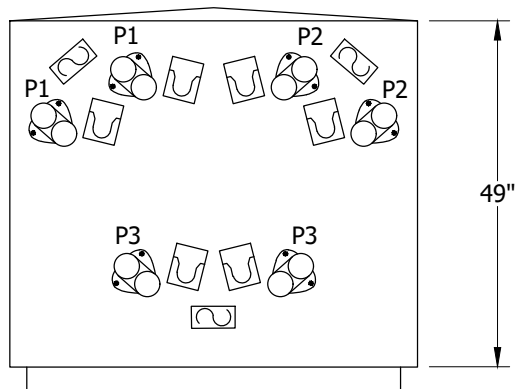
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| SHEET<br>3 OF 3 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3514.3 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  |                           |                    |          |                     |          |
|                 | THREE-PHASE, FUSE CABINET WITH<br>HORIZONTAL MOUNTED FUSES - 12KV<br>WITH FEED THRU CAPABILITY |                           |                    |          |                     |          |



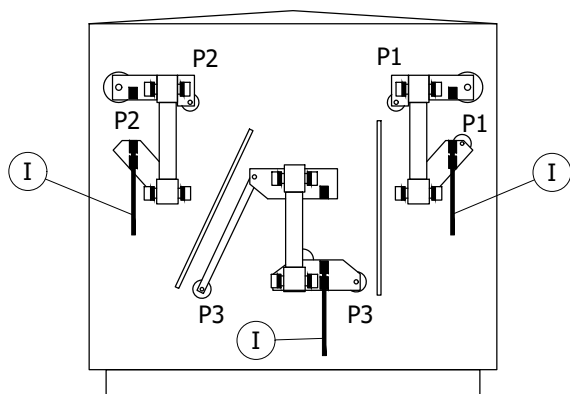
**SCOPE:** THIS STANDARD SHOWS PAD MOUNTED THREE-PHASE FUSE CABINET WITH VERTICAL MOUNTED FUSES AND FUSE BYPASS WITH FEED THRU CAPABILITY AND INSTALLATION REQUIREMENTS USED FOR FUSING WYE AND DELTA LOADS IN UNDERGROUND SYSTEM.



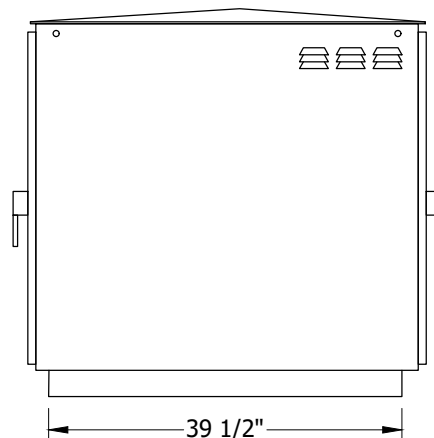
**FIGURE 1**  
FRONT VIEW



**FIGURE 1**  
FRONT VIEW  
EXPOSED



**FIGURE 1**  
REAR VIEW  
EXPOSED



**FIGURE 1**  
SIDE VIEW

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|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 12/8/2005 | D   |        |    |    |     |     |      |



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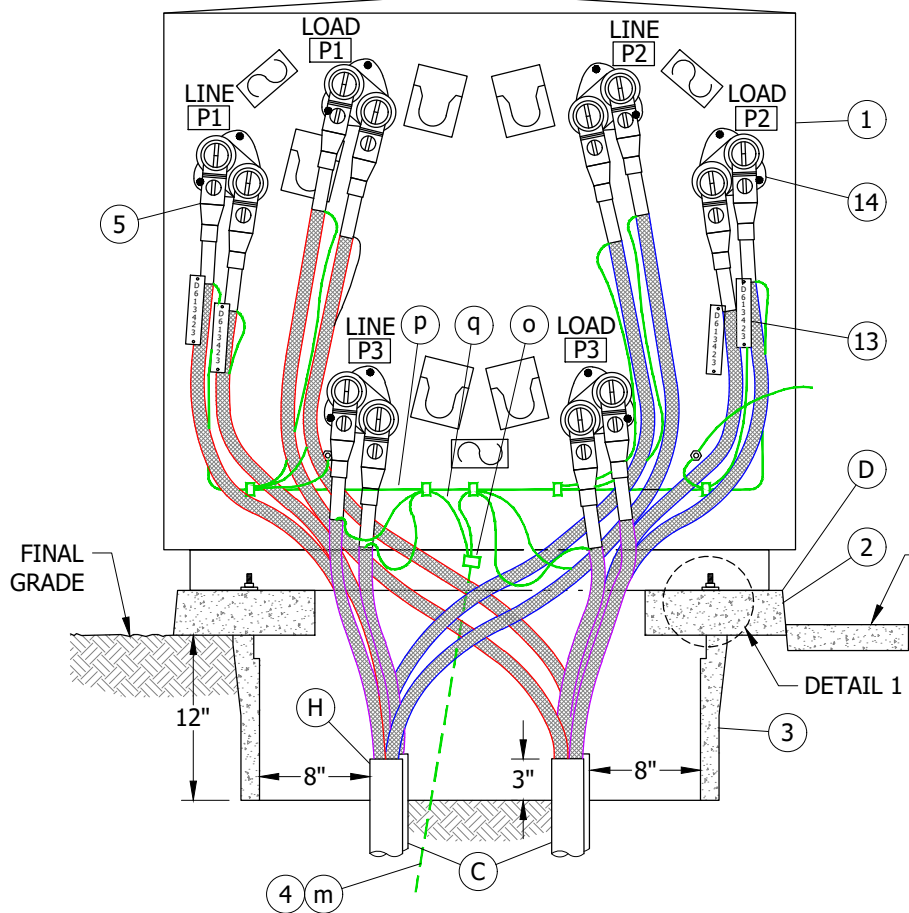
SHEET  
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE, FUSE CABINET WITH  
VERTICAL MOUNTED FUSE AND FUSE BYPASS - 12KV  
WITH FEED THRU CAPABILITY

UG3515.1





**FIGURE 2**

### INSTALLATION:

- A. THIS INSTALLATION IS LIMITED TO A MAXIMUM OF FOUR THREE-PHASE, 2/0 AL CABLES AND SMALLER.
- B. SET PAD AND HANDHOLE, INSTALL EQUIPMENT GROUND.
- (C) TERMINATE CONDUITS AS SHOWN AND SEAL CONDUITS WITH SEALING COMPOUND.
- (D) BASE OF CABINET SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (E) INSTALL SIX FEED-THRU INSERTS.
- (F) INSTALL SINGLE BARREL FUSE ALL THE WAY BACK IN DOUBLE BARREL FUSE CLIPS NEAREST THE INSULATOR.
- (G) KEYLESS LOCKS TO BE ATTACHED TO LATCHING MECHANISM ON FUSE CABINET AND PENTAHEAD BOLTS TO BE THREADED IN COMPLETELY.
- (H) PREFERRED CONDUIT INSTALLATION IS LINE IN ON LEFT LOAD OUT ON RIGHT.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | CABINET, FUSE, THREE-PHASE, VERTICAL MOUNT (G)            | 1        | -             | S190452      | FC3PBP       |
| 2    | PAD WITH BOX, TRANSFORMER/UTILITY EQUIPMENT, SINGLE-PHASE | 1        | 3421          | S514240      | FC3PAD       |

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|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 12/8/2005 | D   |        |    |    |     |     |      |

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**SHEET  
2 OF 3**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE, FUSE CABINET WITH  
VERTICAL MOUNTED FUSE AND FUSE BYPASS - 12KV  
WITH FEED THRU CAPABILITY

**UG3515.2**



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 3    | HANDHOLE, 17" X 30"  | 1        | 3312          | S162426      | -            |
| 4    | WIRE, GROUND, TRENCH (m)                                     | AS REQ'D | 4510          | -            | -            |
| 5    | ELBOW, LOADBREAK, 14.4KV 200A                                | AS REQ'D | 4190 - 4191   | -            | -            |
| 6    | RECEPTACLE, INSULATING (II)                                  | AS REQ'D | 4195          | S204304      | -            |
| 7    | LOCKS, KEYLESS (G II)  | 2        | -             | S468010      | -            |
| 8    | FUSE (F II)  | 3        | 4311 - 4314   | -            | -            |
| 9    | NUT, STUD, 1/2" X 1 3/8"                                     | 2        | -             | S507000      | -            |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"                    | 2        | -             | S799488      | -            |
| 11   | HOLD DOWN (SUPPLIED WITH CABINET)                            | -        | -             | -            | -            |
| 12   | COMPOUND, SEALING (C II)                                     | AS REQ'D | -             | S442976      | -            |
| 13   | TAGS, IDENTIFICATION, CABLE (C)                              | AS REQ'D | 3202          | -            | -            |
| 14   | BUSHING, FEED-THRU LOADBREAK (NOT SUPPLIED WITH CABINET) (E) | 6        | 4195          | S544678      | FEED-1       |
| 15   | NUT, STANDARD HEX, STAINLESS STEEL (II)                      | 2        | -             | S505536      | -            |

**NOTES:**

(I) HOTSTICK OPERABLE KNIFE BLADE SWITCH FOR FUSE BYPASS AND 200A LOOP OPERATIONS.

(II) NOT SHOWN ON FIGURES.

III. CHECK KNIFE BLADES IN OPEN POSITION BEFORE ENERGIZING CABINET.

**REFERENCE:**

- a. SEE UG3202 FOR CABLE IDENTIFICATION.
- b. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- c. SEE UG3221 FOR HIGH VOLTAGE DECAL.
- d. SEE UG3408 FOR WIRE ENTRY PREVENTION.
- e. SEE UG3421 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- f. SEE UG3479 FOR BARRIER PROTECTION.
- g. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- h. SEE UG3484 FOR INSTALLATION OF PAD MOUNTED EQUIPMENT.
- i. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- j. SEE UG3489 FOR RETAINING WALLS.
- k. SEE UG4108 FOR SEALING JACKETED CABLE.
- l. SEE UG4302, UG4311, AND UG4312 FOR FUSING.
- (m) SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- n. SEE UG4512 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (o) SEE UG4512 FOR GROUNDING EQUIPMENT.
- (p) SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.
- (q) SEE UG4520 AND UG4521 (PREVIOUS # UG4520.1-.9) FOR GROUNDING PAD MOUNTED EQUIPMENT.

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| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 12/8/2005 | D   |        |    |    |     |     |      |



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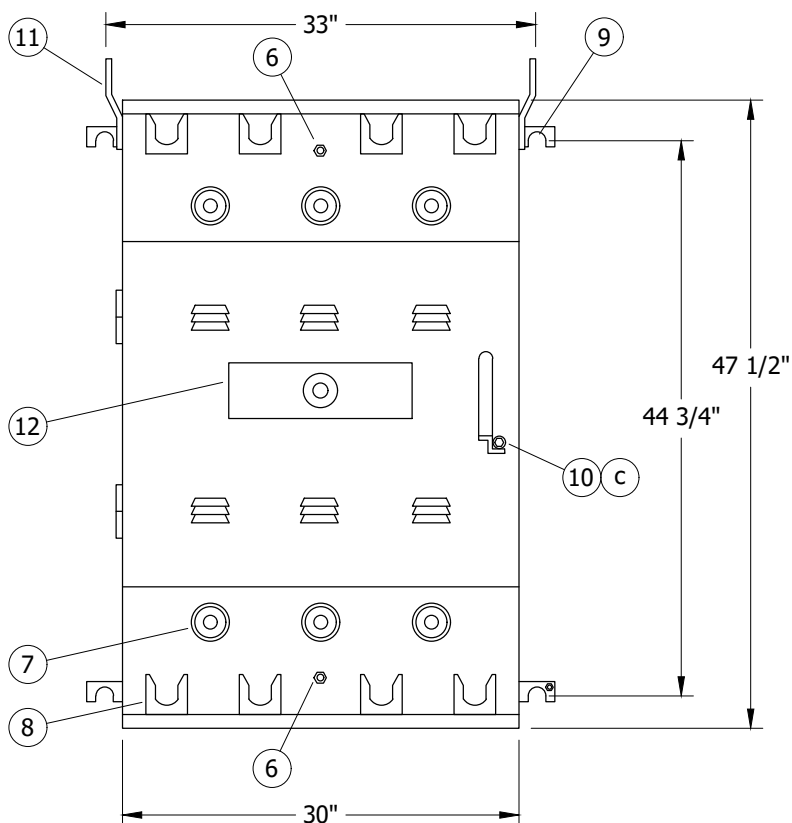
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE, FUSE CABINET WITH  
VERTICAL MOUNTED FUSE AND FUSE BYPASS - 12KV  
WITH FEED THRU CAPABILITY

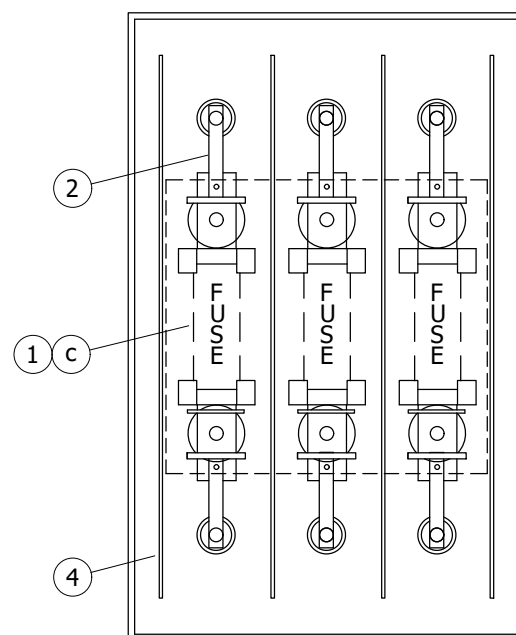
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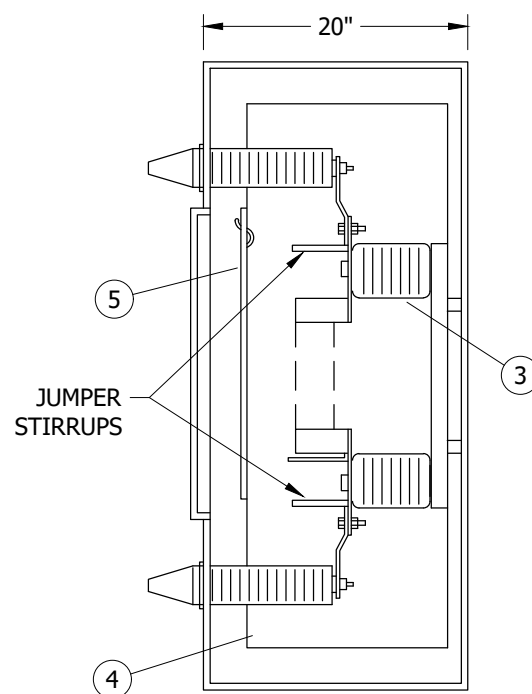
**SCOPE:** THIS STANDARD SHOWS A 12KV, 200A WALL MOUNTED FUSE CABINET USED FOR FUSING IN TRANSFORMER VAULTS.



**FIGURE 1**  
FRONT



**FIGURE 1**  
FRONT SECTION



**FIGURE 1**  
SIDE SECTION

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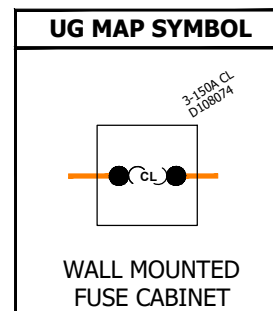
THREE-PHASE WALL MOUNTED FUSE CABINET  
12KV, 200A

## UG3516.1



**TABLE 1**

| ELECTRIC RATING |       |
|-----------------|-------|
| VOLTAGE         | 15KV  |
| B.I.L.          | 110KV |
| MAX FUSE SIZE   | 200A  |

**INSTALLATION:**

- A. BUSHING WELLS WILL ACCEPT BUSHING PLUGS (S544676) OR FEED-THRU INSERTS (S544678) FOR LOADBREAK CAPABILITY.
- B. INSTALL FEED-THRU INSERTS ON LOAD SIDE OF ALL CABINETS.
- Ⓒ CABINET DOOR HANDLE DOES NOT REQUIRE A PADLOCK.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | WEIGHT (LBS) | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|--------------|----------|---------------|--------------|--------------|
| 1    | CABINET, FUSE, WALL MOUNTED, THREE-PHASE           | 380          | 1        | --            | S190446      | FC-VLT       |
| 2    | BUS, COPPER  | --           | 1        | --            |              |              |
| 3    | BUSHING  | --           | 1        | --            |              |              |
| 4    | BARRIER  | --           | 1        | --            |              |              |
| 5    | BARRIER, REMOVABLE                                 | --           | 1        | --            |              |              |
| 6    | GROUNDING POSITION                                 | --           | 1        | --            |              |              |
| 7    | BUSHING WELL                                       | --           | 1        | --            |              |              |
| 8    | PARKING STAND                                      | --           | 1        | --            |              |              |
| 9    | BRACKET, MOUNTING                                  | --           | 1        | --            |              |              |
| 10   | CABINET DOOR HANDLE AND PENTAHEAD BOLT PROVISION Ⓒ | --           | 1        | --            |              |              |
| 11   | TABS, LIFTING                                      | --           | 1        | --            |              |              |
| 12   | DECAL, MR OUCH                                     | --           | 1        | --            |              |              |
| 13   | NAMEPLATE (ON INSIDE OF DOOR) Ⓓ                    | --           | 1        | --            |              |              |
| 14   | FUSE, CURRENT LIMITING, 150A Ⓓ Ⓒ                   | --           | 1        | --            | S363687      | --           |

**NOTES:**

- I. WALL MOUNTED FUSE CABINET (S190444) IS DELIVERED FROM THE SUPPLIER WITH ALL THE PARTS LISTED IN THE BILL OF MATERIALS EXCEPT FUSES.

Ⓓ NOT SHOWN ON FIGURES.

**REFERENCE:**

- a. SEE TRANSFORMER VAULTS SPECIFICATIONS BOOK FOR INSTALLATION LOCATION.
- b. SEE UG3480, UG3481, UG3482, AND UG3483 FOR CLEARANCE IN FRONT OF CABINET.
- Ⓒ SEE UG4302 FOR FUSE APPLICATION GUIDE.

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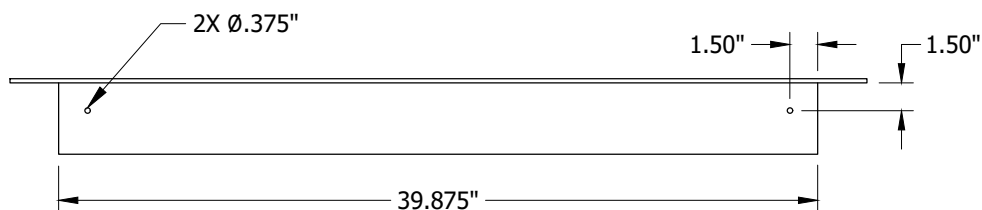
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THREE-PHASE WALL MOUNTED FUSE CABINET  
12KV, 200A

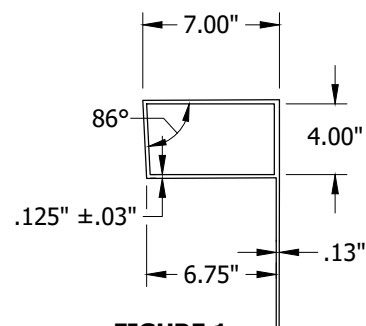
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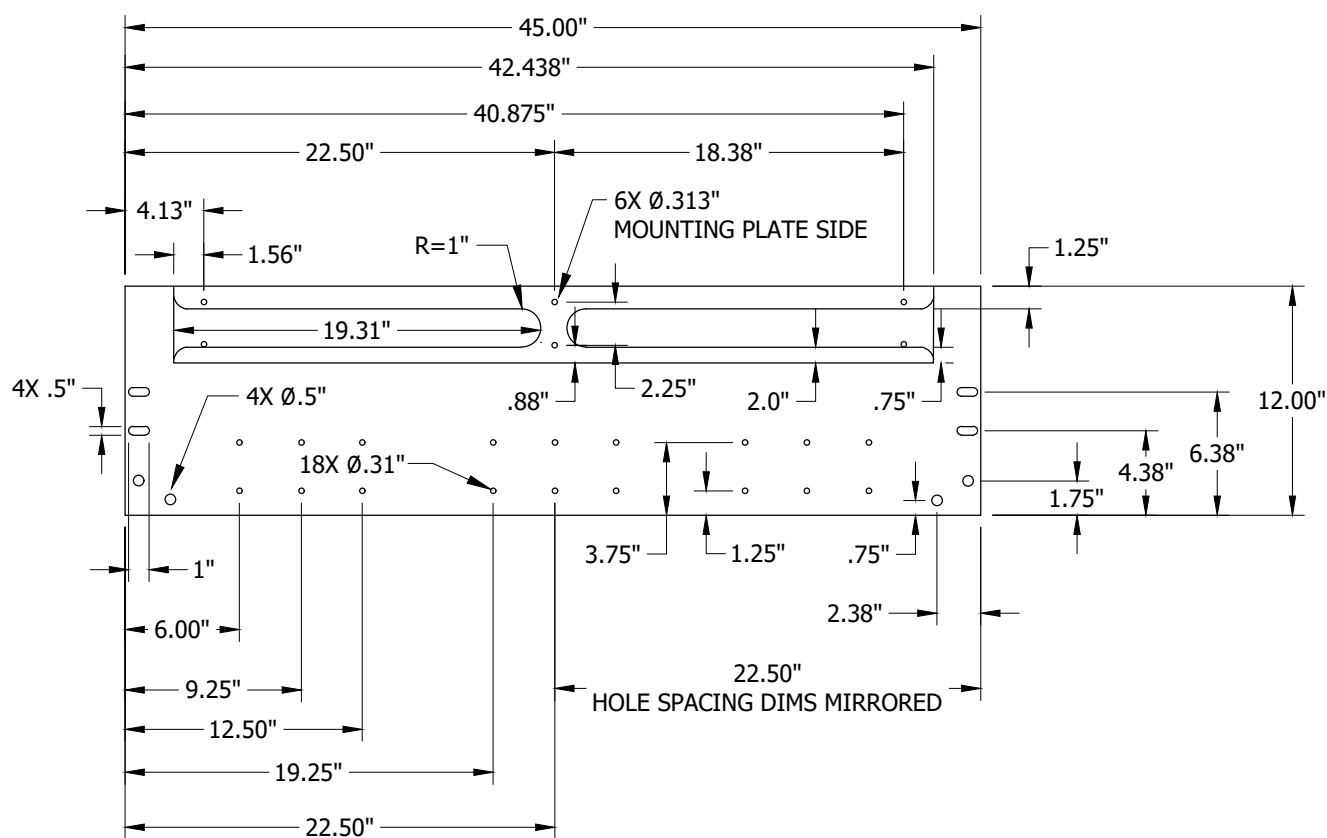
**SCOPE:** THIS STANDARD SHOWS THE ASSEMBLY OF A 200A CABINET PLATE.



**FIGURE 1**  
200A CABINET PLATE ASSEMBLY  
TOP VIEW



**FIGURE 1**  
200A CABINET PLATE ASSEMBLY  
SIDE VIEW



**FIGURE 1**  
200A CABINET PLATE ASSEMBLY  
FRONT VIEW

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200A LIVEFRONT TO DEADFRONT **TERMINATING CABINET**

**UG3517.1**





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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | 200A LIVEFRONT TO DEADFRONT TERMINATING CABINET   |                           |                    |          |                     |          |



**INSTALLATION:**

A. INSTALL #2, 2/0 OR 2SOL ELBOWS DEPENDING ON THE WIRE BEING INSTALLED.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | PLATE, CABINET, 200A                                    | 1        | -             | S168400      | BRK200A      |
| 2    | 4 WAY DEADFRONT TERMINATION ASSEMBLY                    | AS REQ'D | 4179          | S718328      | TAP4NB       |
| 3    | 3421 PAD  | 1        | -             | S514240      | UG3421-1     |
| 4    | 3312 HANDHOLE (CONCRETE OR PVC BOX) (LEAVE LID IN YARD) | 1        | -             | S162424      | 3312-0       |
| 5    | CABINET, MVI/MVS, MULTI USE                             | 1        | 3580          | S190490      | DMV-12       |
| 6    | ASSEMBLY, BOLT, 2"                                      | AS REQ'D | -             | S148800      | -            |
| 7    | ELBOWS AND WIRE, 200A                                   | AS REQ'D | -             | -            | -            |
| 8    | WIRE, BARE COPPER 4/0 STR, SOFT DRAWN (IV)              | AS REQ'D | -             | S812764      | 4/0-SD       |
| 9    | RECEPTACLE, INSULATION, 200A (IV)                       | AS REQ'D | 4179-4180     | S204304      | INSREC       |
| 10   | WIRE, BARE COPPER, #2, 7 STRANDED, SOFT DRAWN (IV)      | AS REQ'D | -             | S812818 (X)  | GDWIRE       |

**NOTES:**

- I. WHEN REMOVING ANY LIVEFRONT EQUIPMENT AND INSTALLING THE NEW TERMINATOR CONVERSION CABINET REMOVE THE UNJACKETED CABLE AND INSTALL NEW JACKETED CABLE. DO NOT SPLICE UNJACKETED CABLE.
- II. MAKE SURE WHEN MAKING UP THE NEW CABLE THAT THE CABLE IS MADE LONG ENOUGH TO BE INSTALLED ON THE STAND-OFF POSITION IN CASE OF DE-ENERGIZING THE CABLE BECAUSE OF TROUBLE USE THE 600/200A TERMINATOR PAD IF THE WIRE DOESN'T LINE UP IN THE 200A PAD.
- III. TERMINATE THE CABLE WITH ENOUGH SLACK TO REACH THE STANDOFF POSITIONS ABOVE THE 4 WAYS.

(IV) NOT SHOWN ON FIGURES.

(X) THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

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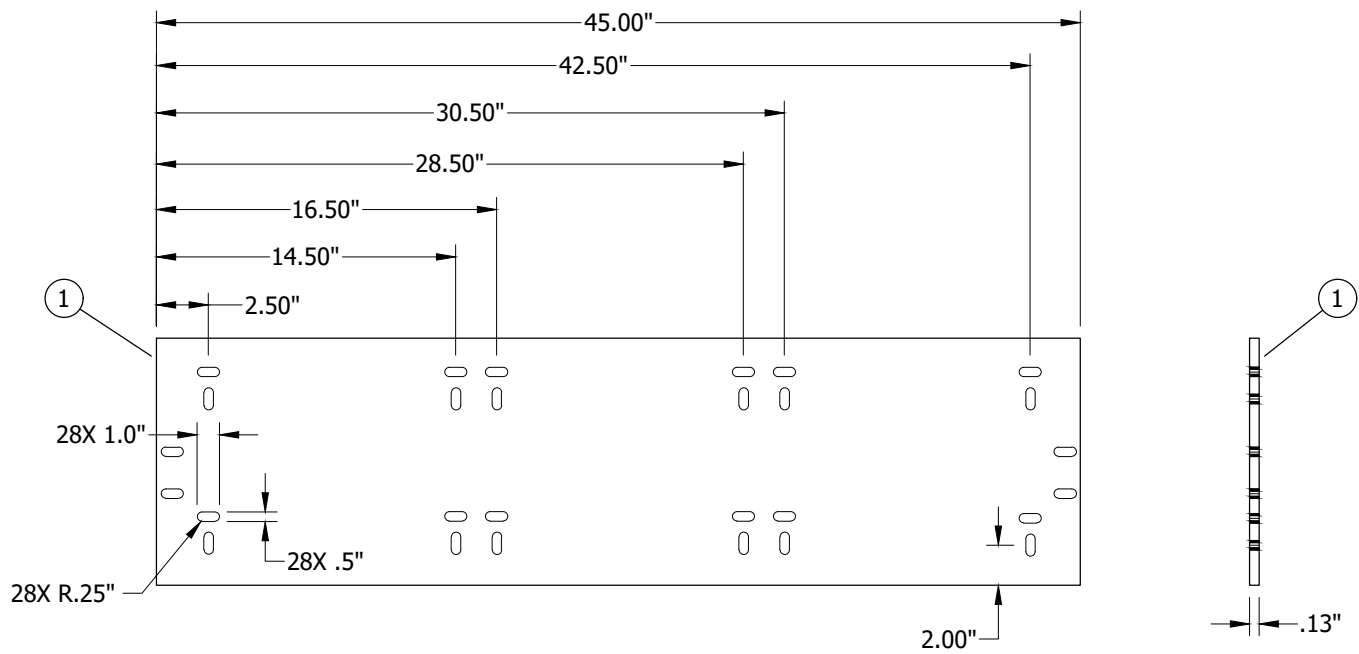
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200A LIVEFRONT TO DEADFRONT **TERMINATING CABINET**

UG3517.3



**SCOPE:** THIS STANDARD SHOWS THE ASSEMBLY OF A 600A CABINET PLATE.



**FIGURE 1**  
600A CABINET PLATE ASSEMBLY

600A & 200A  
COMBINATION  
(2)(7)(A)



**FIGURE 2**

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| C   | FORMATTING    | EDM | JK  | -   | -   | 5/17/2021  | F   |        |    |    |     |     |      |
| B   | FIGURE UPDATE | -   | EJA | GLW | CZH | 11/12/2019 | E   |        |    |    |     |     |      |
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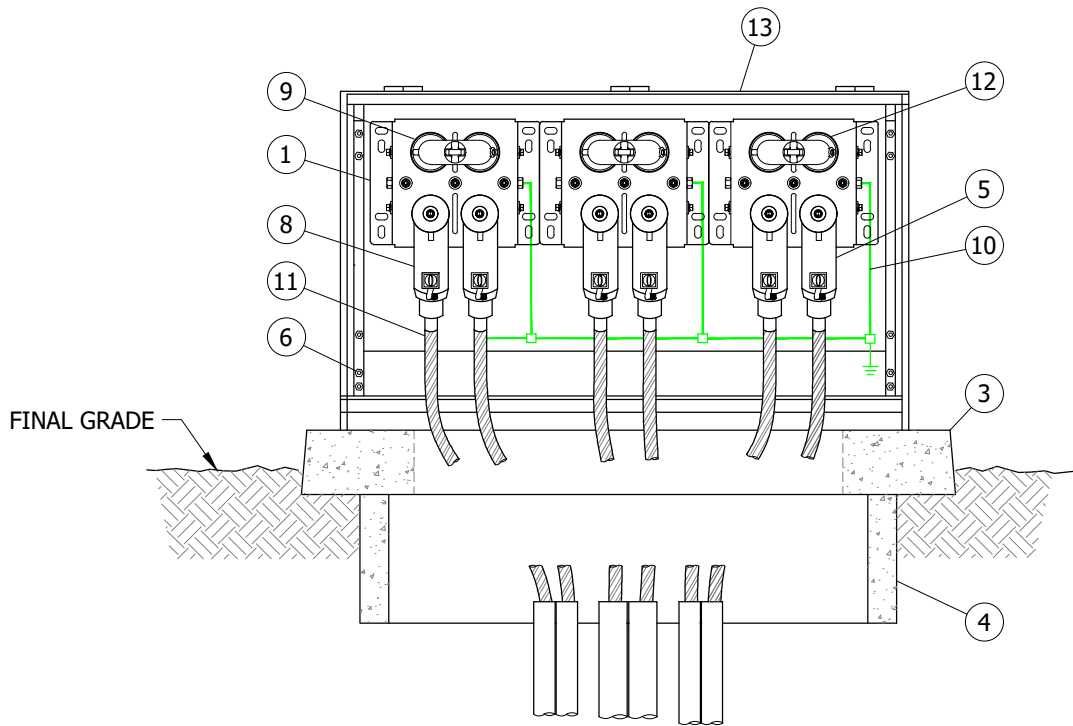
SHEET  
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A LIVEFRONT TO DEADFRONT TERMINATING CABINET

UG3518.1





**FIGURE 3**  
600A FRONT VIEW

### INSTALLATION:

- (A) INSTALL 200A REDUCING TAP WELLS FOR GROUNDING OR 200A CABLE WELLS.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | PLATE, CABINET, 304 STAINLESS STEEL, 600A           | 1        | -             | S168402      | -            |
| 2    | TAP WELL, REDUCING, 200A (TAP PLUG, ELBOW) (III)    | AS REQ'D | 4181          | S547328      | -            |
| 3    | 3421-600A PAD                                       | 1        | -             | S514042      | UG3421-2     |
| 4    | 3312 HANDHOLE (CONCRETE)                            | 1        | -             | S162476      | 3312-0       |
| 5    | ELBOW TEE BODY, 15KV, 600A W/ CAPACITIVE TEST POINT | 6 EACH   | -             | S326578      | ELBO-T       |
| 6    | ASSEMBLY, BOLT, 2"                                  | AS REQ'D | -             | S148800      | -            |
| 7    | 200A ELBOWS AND WIRE (III)                          | AS REQ'D | -             | -            | -            |
| 8    | EXTENSION BUSHING, 600A W/ LOAD TAP PLUG            | AS REQ'D | -             | S336198      | EXLRTP       |
| 9    | RECEPTACLE, INSULATION, 200A                        | AS REQ'D | 4179-4180     | S204304      | INSREC       |
| 10   | WIRE, BARE COPPER, #2, 7 STR., SOFT DRAWN           | AS REQ'D | -             | S812818 (X)  | GDWIRE       |
| 11   | WIRE, BARE COPPER, 4/0, STR., SOFT DRAWN            | AS REQ'D | -             | S812764      | 4/0-SD       |
| 12   | JUNCTION BAR, 600A CLEER, 15KV, LOADBREAK - SQUARE  | 3        | 4198          | S439872      | CCL-JB       |
| 13   | CABINET, MVI/MVS, MULTI USE                         | 1        | 3580          | S190490      | DMV12        |

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| C   | FORMATTING    | EDM | JIK | -   | -   | 5/17/2021  | F   |        |    |    |     |     |      |
| B   | FIGURE UPDATE | -   | EJA | GLW | CZH | 11/12/2019 | E   |        |    |    |     |     |      |
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A LIVEFRONT TO DEADFRONT TERMINATING CABINET

UG3518.2



**NOTES:**

- I. WHEN REMOVING ANY LIVEFRONT EQUIPMENT AND INSTALLING THE NEW TERMINATOR CONVERSION CABINET REMOVE THE UNJACKETED CABLE AND INSTALL NEW JACKETED CABLE.
- II. MAKE SURE WHEN MAKING UP THE NEW CABLE THAT THE CABLE IS MADE LONG ENOUGH TO BE INSTALLED ON THE STAND-OFF POSITION IN CASE OF DE-ENERGIZING THE CABLE BECAUSE OF TROUBLE USE THE 600/200A TERMINATOR PAD IF THE WIRE DOESN'T LINE UP IN THE 200A PAD.

III NOT SHOWN ON FIGURES.

X THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

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| B   | FIGURE UPDATE | -   | EJA | GLW | CZH | 11/12/2019 | E   |        |    |    |     |     |      |
| A   | ORIGINAL      | -   | GLW | JES | CZH | 10/01/2018 | D   |        |    |    |     |     |      |



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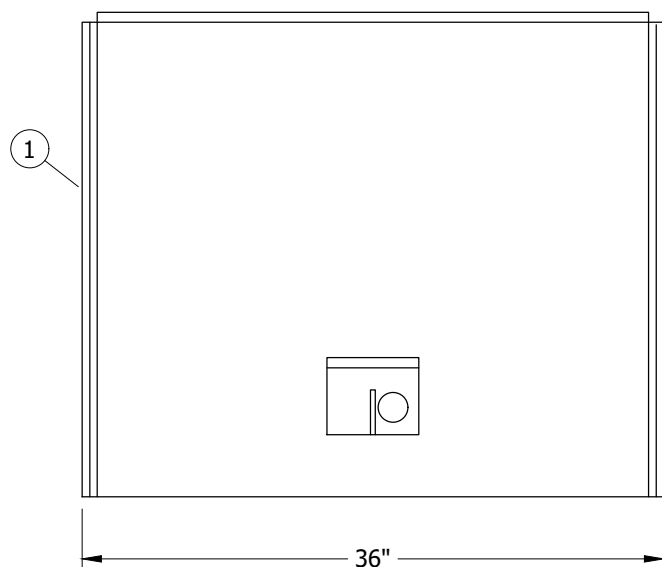
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A LIVEFRONT TO DEADFRONT **TERMINATING CABINET**

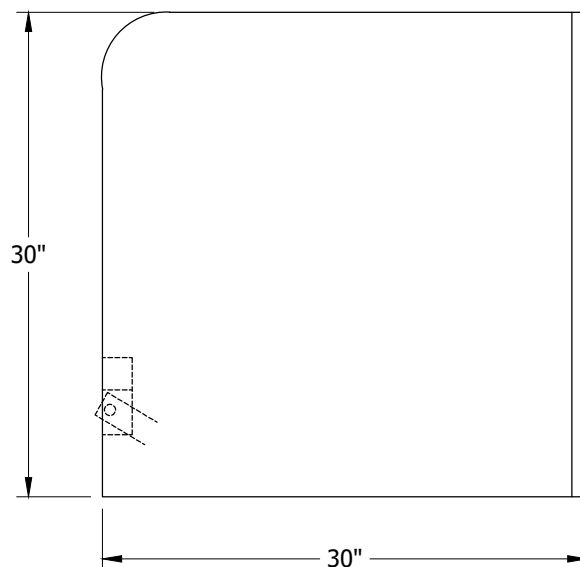
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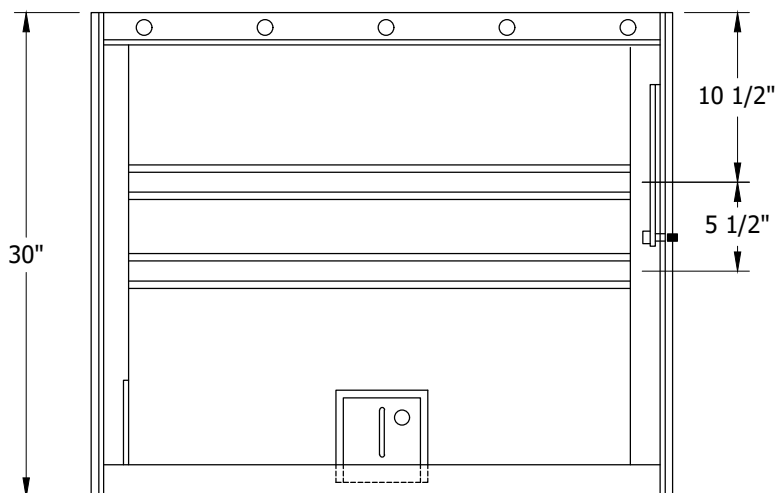
**SCOPE:** THIS STANDARD SHOWS THE PAD MOUNTED, SINGLE-PHASE, LOW PROFILE CABLE TERMINATING **CABINET** INSTALLATION REQUIREMENTS USED WHEN #2 CABLE IS TERMINATED OR PLANNED TO BE TERMINATED.



**FIGURE 1**  
FRONT VIEW



**FIGURE 1**  
SIDE VIEW



**FIGURE 1**  
FRONT VIEW  
EXPOSED

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| C   | DRAWING UPDATE        | -  | JS | TR  | MDJ    | 11/28/2016 | F   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021  |
| B   | NO CHANGES-REAFFIRMED | -  | JC | TR  | JS/MDJ | 09/30/2015 | E   | EDITORIAL CHANGES | -   | SL | JES | CZH | 10/18/2019 |
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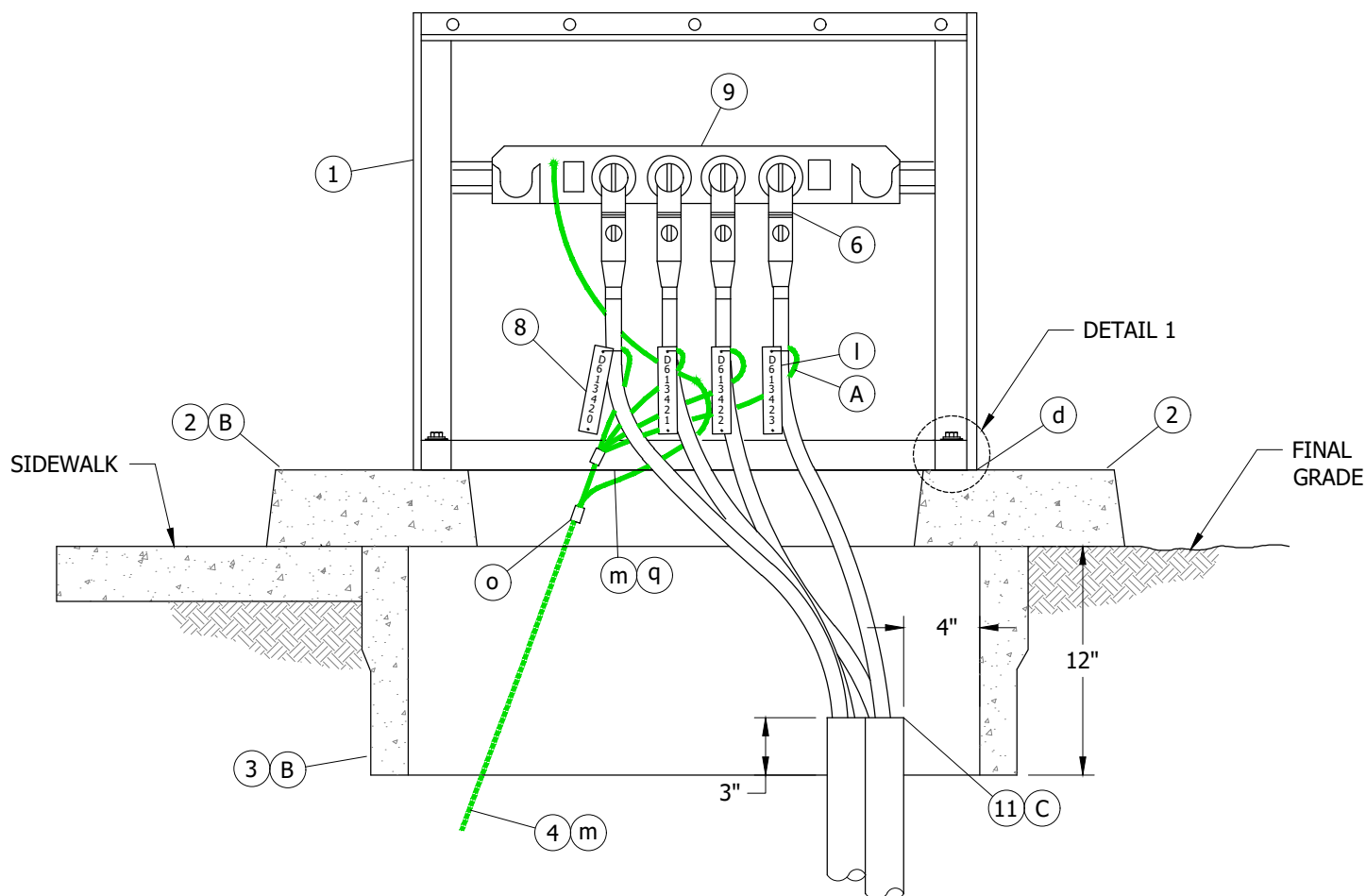
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**1 OF 4**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

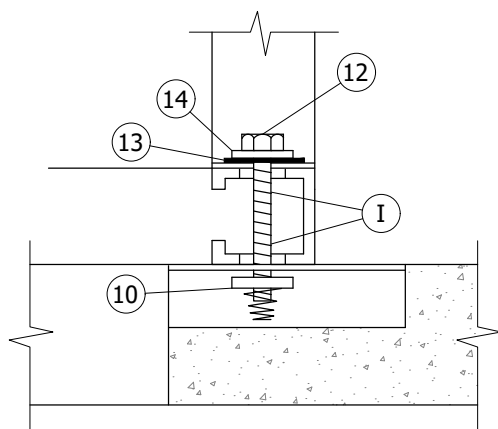
SINGLE-PHASE, LOW PROFILE CABLE **TERMINATING CABINET**, 6,930V

**UG3522.1**





**FIGURE 2**  
CABLE TAP INSTALLATION  
W/3421 PAD



**DETAIL 1**  
HOLD DOWN ASSEMBLY  
TYPICAL BOTH SIDES

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SINGLE-PHASE, LOW PROFILE CABLE **TERMINATING CABINET**, 6,930V

**UG3522.2**



**INSTALLATION:**

- (A) THIS INSTALLATION IS LIMITED TO A MAXIMUM OF 4 SINGLE-PHASE #2 AL PRIMARY CABLES WITH ONE 3 OR 4 WAY CABLE TAP.
- (B) SET PAD AND HANDHOLE, INSTALL EQUIPMENT GROUND.
- (C) TERMINATE CONDUITS AS SHOWN AND SEAL CONDUITS WITH SEALING COMPOUND.
- (D) KEYLESS LOCK TO BE ATTACHED TO LATCHING MECHANISM ON CABINET AND PENTAHEAD BOLT TO BE THREADED IN COMPLETELY.
- (E) FOR FIELD MAINTENANCE INSTALLS USE S732966/TERM-1.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | CABINET, LOW PROFILE CABLE TERMINATOR, SINGLE-PHASE (E) | 1        | 3522          | S190430      | SWTERM       |
| 2    | PAD, TRANSFORMER/UTILITY EQUIPMENT, SINGLE-PHASE        | 1        | 3421          | S514240      | FC3PAD       |
| 3    | HANDHOLE  | 1        | 3312          | S162426      | -            |
| 4    | EQUIPMENT, PAD GROUNDING (m)                            | 1        | 4512          | -            | -            |
| 5    | RECEPTACLE, INSULATING (II)                             | AS REQ'D | 4180          | S204304      | -            |
| 6    | ELBOW, LOADBREAK, 14.4KV 200A                           | AS REQ'D | 4190-4191     | -            | -            |
|      | ELBOW, LOADBREAK, FUSED 6930, 200A                      |          |               |              |              |
| 7    | LOCK, KEYLESS (D)(II)                                   | 1        | -             | S468010      | -            |
| 8    | TAGS, IDENTIFICATION, CABLE                             | AS REQ'D | 3202          | -            | -            |
| 9    | CABLE TAP, 4-WAY  | AS REQ'D | 4180          | -            | TAP-4W       |
|      | CABLE TAP, 3-WAY  |          |               |              | TAP-3W       |
|      | PLUG, STAND-OFF   |          |               |              | S/OPLG       |
|      | BUSHING, FEED-THRU                                      |          |               |              | FEED-B       |
| 10   | NUT, CLAMPING CHANNEL W/SPRING, 1/2"                    | 2        | -             | S503520      | -            |
| 11   | COMPOUND, SEALING (C)                                   | AS REQ'D | -             | S442976      | -            |
| 12   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 2 1/2"              | 2        | -             | S616352      | -            |
| 13   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"               | 2        | -             | S799488      | -            |
| 14   | WASHER, LOCK, BRONZE, 1/2"                              | 2        | -             | S796416      | -            |

**NOTES:**

- (I) TERMINATOR COMES WITH 5/8" X 1" SLOT IN CENTER OF FRAME UNISTRUT (TYPICAL BOTH SIDES)
- (II) NOT SHOWN IN FIGURES.

**REFERENCE:**

- a. SEE UG3202 FOR CABLE IDENTIFICATION.
- b. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- c. SEE UG3221 FOR HIGH VOLTAGE DECAL.
- (d) SEE UG3408 FOR WIRE ENTRY PREVENTION.
- e. SEE UG3421 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- f. SEE UG3479 FOR BARRIER PROTECTION.
- g. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SINGLE-PHASE, LOW PROFILE CABLE TERMINATING CABINET, 6,930V

UG3522.3



**REFERENCE (CONT'D):**

- h. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- i. SEE UG3486, **UG3487**, AND **UG3488** FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- j. SEE **UG3489** FOR RETAINING WALLS.
- k. SEE UG3605 AND UG3660 FOR SINGLE-PHASE SUBSURFACE SECTIONALIZING.
- l. SEE UG4108 FOR SEALING JACKETED CABLE.
- m. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- n. SEE UG4512 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- o. SEE UG4512 FOR EQUIPMENT GROUNDING.
- p. SEE UG4514 FOR GROUNDING TELCO CONDUCTOR IN PAD MOUNTED EQUIPMENT.
- q. SEE UG4520 AND **UG4521 (PREVIOUS # UG4520)** FOR GROUNDING PAD MOUNTED EQUIPMENT.
- r. SEE UG3675 FOR SINGLE PHASE MVI INSTALLATION.
- s. SEE UG4191 FOR FUSED ELBOW INSTALLATION.

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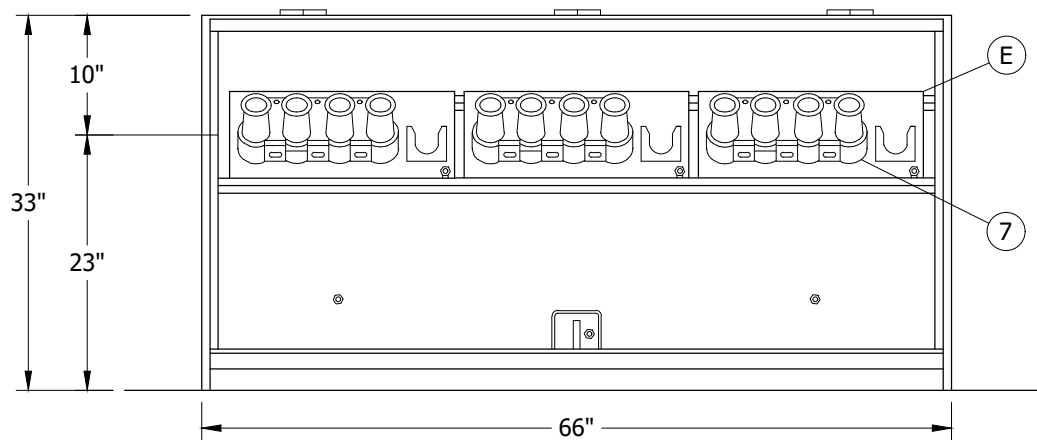
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SINGLE-PHASE, LOW PROFILE CABLE **TERMINATING CABINET**, 6,930V

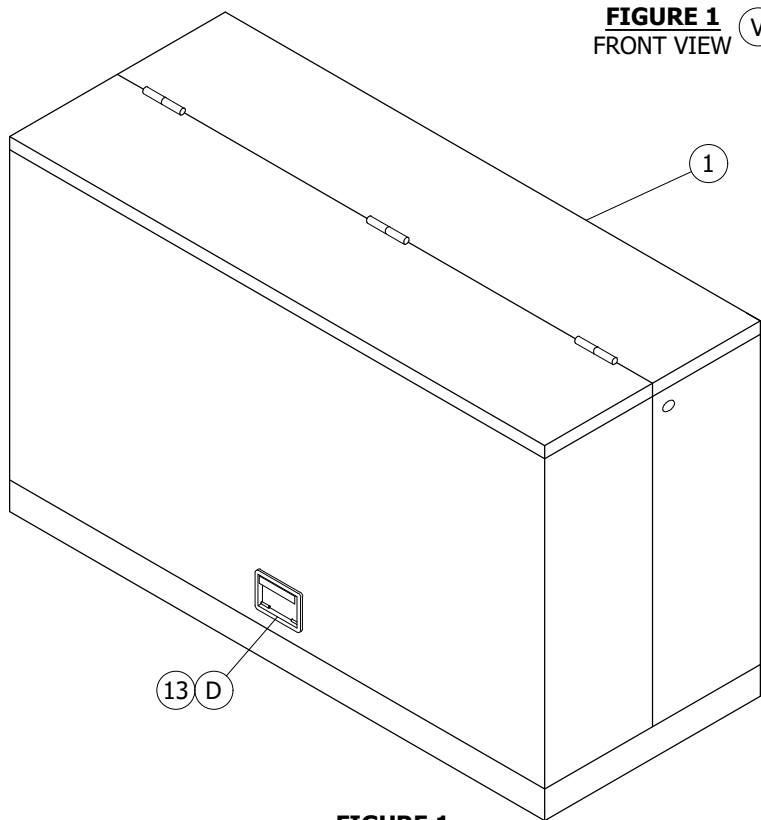
**UG3522.4**



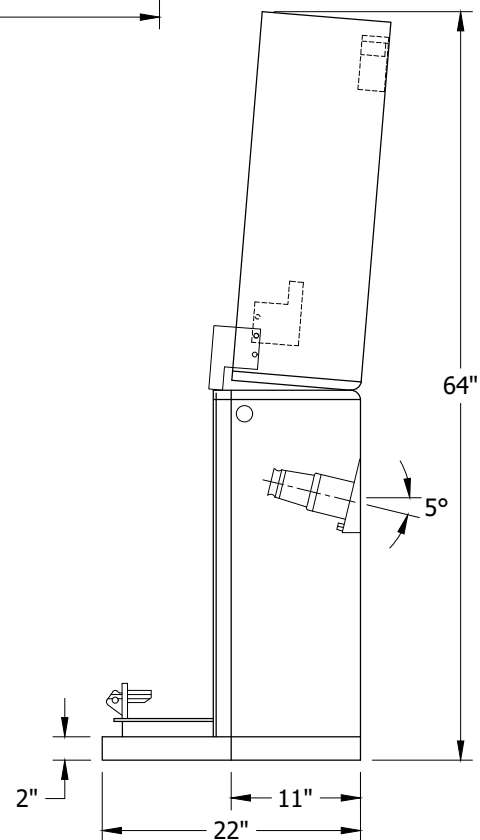
**SCOPE:** THIS STANDARD SHOWS THE PAD MOUNTED, THREE-PHASE, LOW PROFILE, DEADFRONT, METAL TERMINATING CABINET.



**FIGURE 1**  
FRONT VIEW (V)



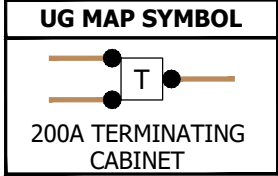
**FIGURE 1**  
ISOMETRIC VIEW



**FIGURE 1**  
SIDE VIEW

**TABLE 1**

| RATINGS      |          |
|--------------|----------|
| KV-BIL       | 95       |
| AMPERES      | 200      |
| WEIGHT (LBS) | 290 MAX. |



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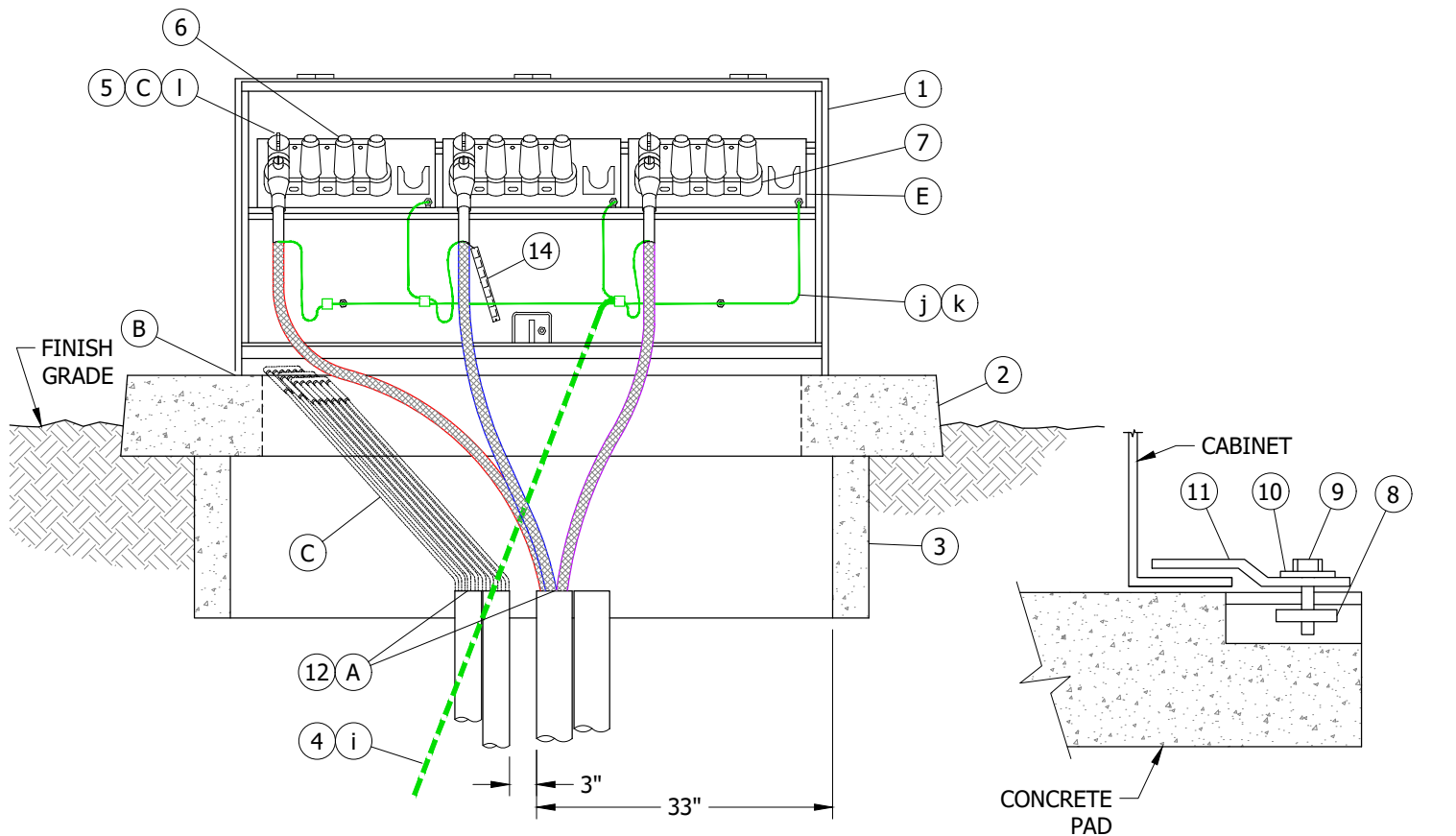
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |                    |          |                     |
| THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET<br>12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL |                           |                    |          |                     |

**UG3523.1**





**FIGURE 2**  
CABLE TAP INSTALLATION W/ 3416 PAD (VI)  
FRONT VIEW

**DETAIL 1**  
HOLD-DOWN ASSEMBLY  
TYPICAL BOTH SIDES OF EQUIPMENT PAD

### INSTALLATION:

- (A) SEAL CONDUITS WITH SEALING COMPOUND.
- (B) BASE OF CABINET SHALL BE CAULKED ONLY TO PREVENT POSSIBLE WIRE ENTRY.
- (C) FUSED ELBOWS 1 PER CABLE TAP, SECONDARY ALLOWED.
- (D) KEYLESS LOCK TO BE ATTACHED TO LATCHING MECHANISM ON CABINET AND PENTAHEAD BOLT TO BE THREADED IN COMPLETELY.
- (E) CABLE TAP PLATES SUPPLIED WITH CABINET ARE ADJUSTABLE & REMOVABLE.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------------|----------|---------------|--------------|--------------|
| 1    | CABINET, THREE-PHASE TERMINATING   | 1        | 3523          | S732974      | CT-CAB       |
| 2    | PAD, 3416                          | 1        | 3416          | S514020      | 3416         |
| 3    | HANDHOLE, 3311, 14" X 66" X 14"    | 1        | 3311          | S162660      |              |
| 4    | WIRE, TRENCH GROUND (i)            | AS REQ'D | 4510          | -            | -            |
| 5    | ELBOW, LOADBREAK, 14.4KV, 200A (C) | AS REQ'D | 4191          | -            | -            |
| 6    | RECEPTACLE, INSULATING             | AS REQ'D | 4195          | S204304      | -            |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET**  
**12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL**

**UG3523.2**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 7    | CABLE TAP, 4 WAY ONLY, (WITHOUT BRACKET)   | 3        | 4195          | S718338      | TAP4NB       |
| 8    | NUT, CLAMPING CHANNEL, W/ SPRING, 1/2"     | 4        | -             | S505520      | -            |
| 9    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2" | 4        | -             | S616192      | -            |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"  | 4        | -             | S799488      | -            |
| 11   | HOLD DOWN (SUPPLIED WITH CABINET)          | 4        | -             | -            | -            |
| 12   | SEALING COMPOUND (A)                       | AS REQ'D | -             | S442976      | -            |
| 13   | LOCK, KEYLESS (D)                          | 1        | -             | S468010      | -            |
| 14   | TAG, CABLE IDENTIFICATION                  | AS REQ'D | 3202          | -            | -            |

**NOTES:**

- I. THE PAD MOUNTED TERMINATOR IS DESIGNED FOR 2/0 AND SMALLER 15KV CABLES AND SECONDARY CABLE AND CONNECTIONS.
- II. THIS TERMINATOR MAY ALSO REPLACE LIVEFRONT TERMINATORS, IF SPACE IS AVAILABLE.
- III. THIS TERMINATOR AND PAD SHOULD BE LOCATED IN AREAS THAT ARE FLAT AND CONCRETED, SUCH AS AREAS NEXT TO SIDEWALKS AND STREETS, THAT PROVIDE ADEQUATE WORK SPACE AND LIVE-LINE TOOL OPERATION SPACE.
- IV. SECONDARY CABLES MAY BE TERMINATED IN THIS TERMINATING FACILITY.
- (V) CABLE TAP PLATES ARE SUPPLIED WITH CABINET.
- (VI) PAD MOUNTED INSTALLATION WHEN TERMINATING 2/0 AND SMALLER CABLE.

**REFERENCE:**

- a. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- b. SEE UG3408 FOR WIRE ENTRY PREVENTION AND MOISTURE ENTRY.
- c. SEE UG3416 FOR PAD AND HANDHOLE INSTALLATION.
- d. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- e. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- f. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- g. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE UG3489 FOR RETAINING WALLS.
- (i) SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- (j) SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- (k) SEE UG4520-UG4521 (PREVIOUS # UG4520.1-.9) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- (l) SEE UG4525 FOR GROUNDING CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS

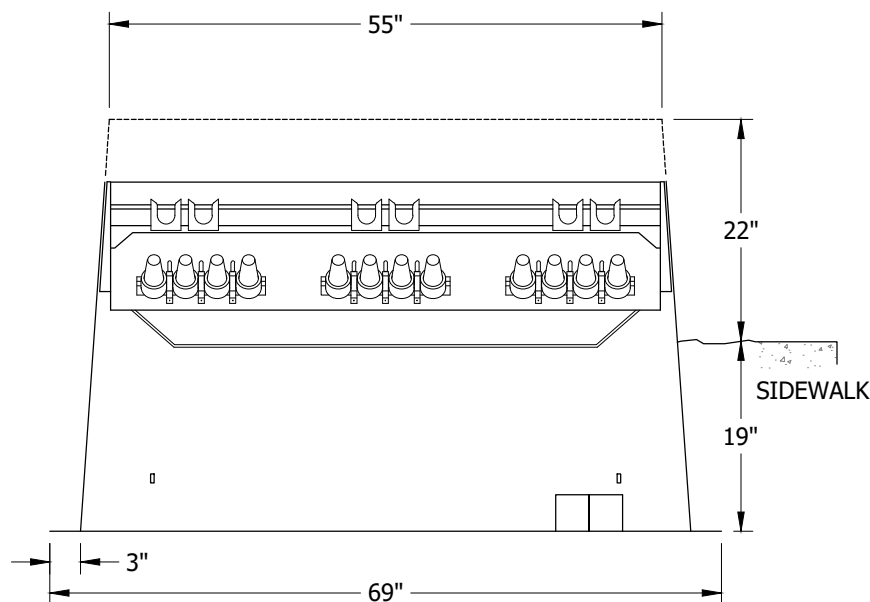
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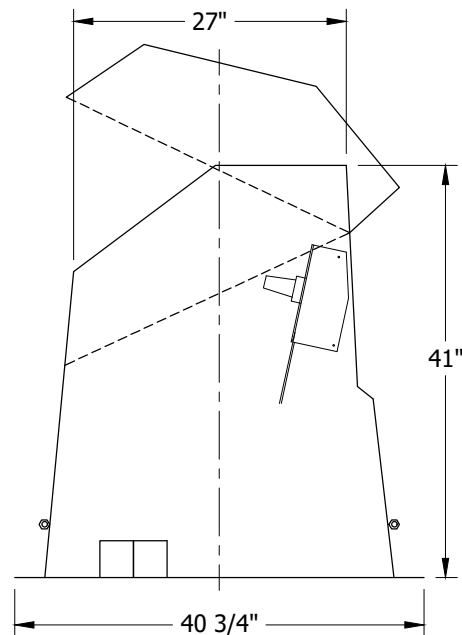
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|                 | THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET<br>12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL |                           |                    |          |                     |          |



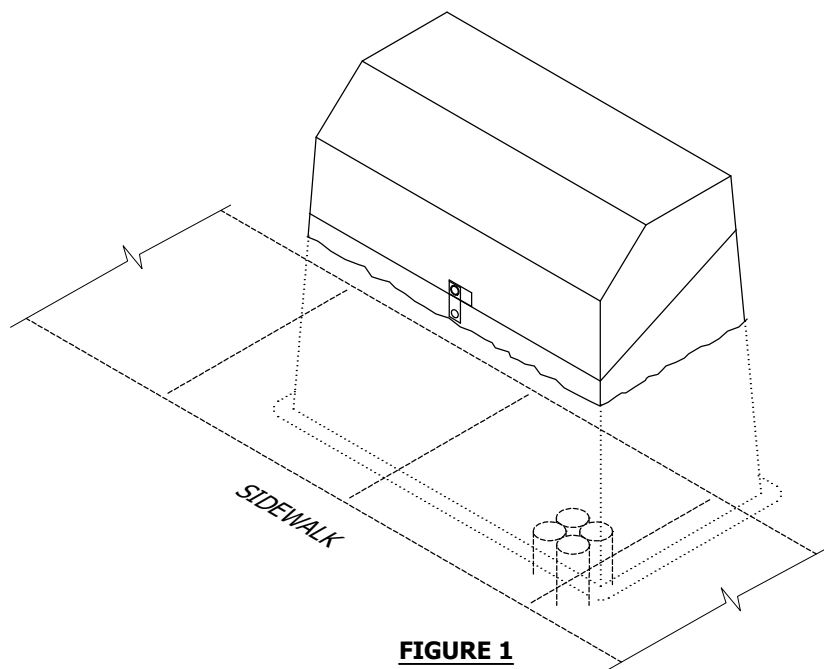
**SCOPE:** THIS STANDARD SHOWS THE DEADFRONT CABLE JUNCTION PEDESTAL, USED FOR TERMINATING 2/0 AND SMALLER CABLE.



**FIGURE 1**  
FRONT VIEW



**FIGURE 1**  
SIDE VIEW



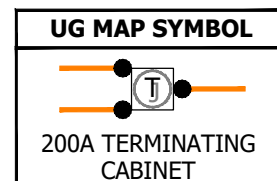
**FIGURE 1**  
ISOMETRIC VIEW

**TABLE 1**

| RATINGS      |     |
|--------------|-----|
| KV-BIL       | 95  |
| AMPERES      | 200 |
| WEIGHT (LBS) | 200 |

**TABLE 2**

| APPROVED MANUFACTURER<br>AND PART NUMBER |
|--|
| PRO GLASS SE 30-41-L22415                |



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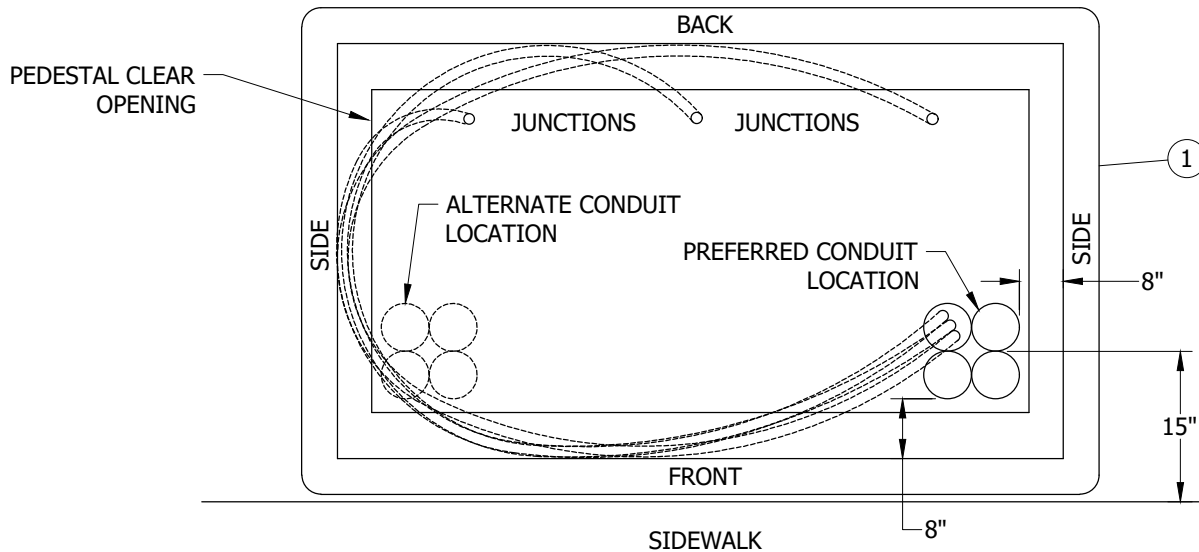
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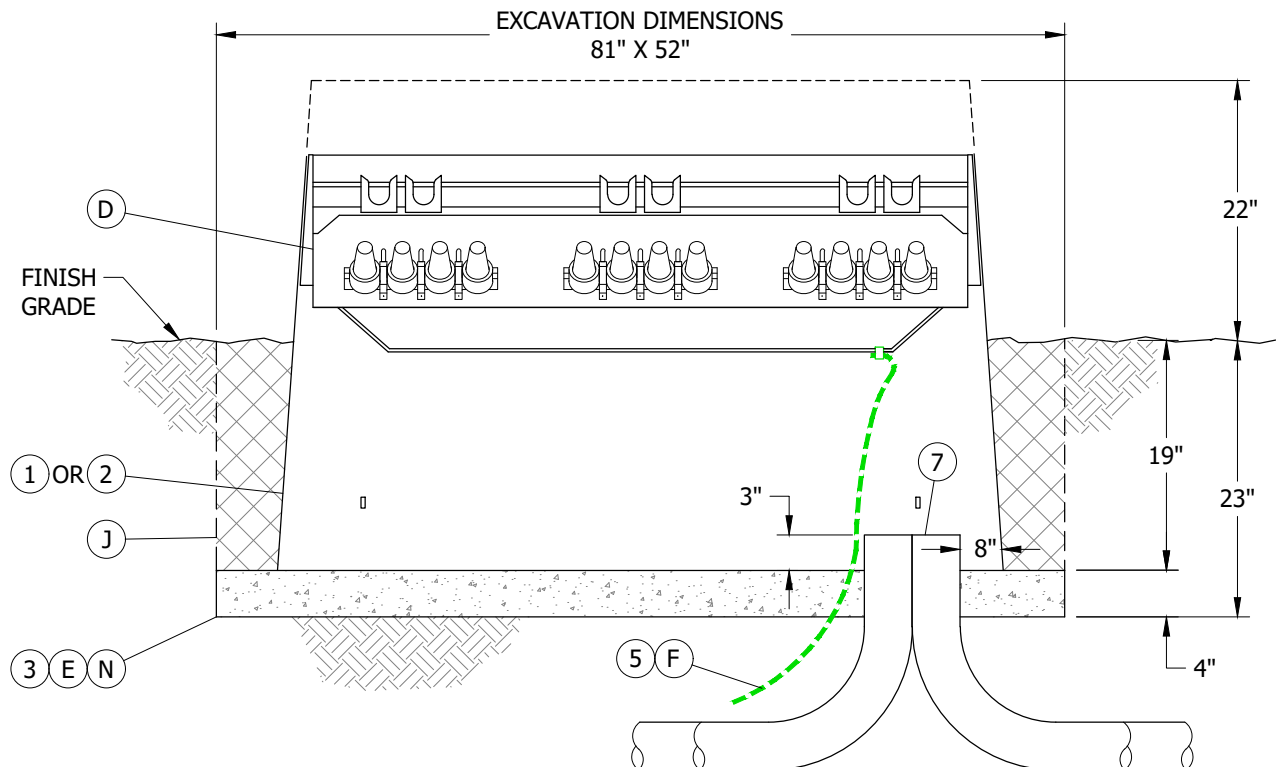
**THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET**  
**12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL**

**UG3523.4**





**FIGURE 2**  
CONDUIT AND PEDESTAL INSTALLATION  
TOP VIEW



**FIGURE 2**  
FRONT VIEW

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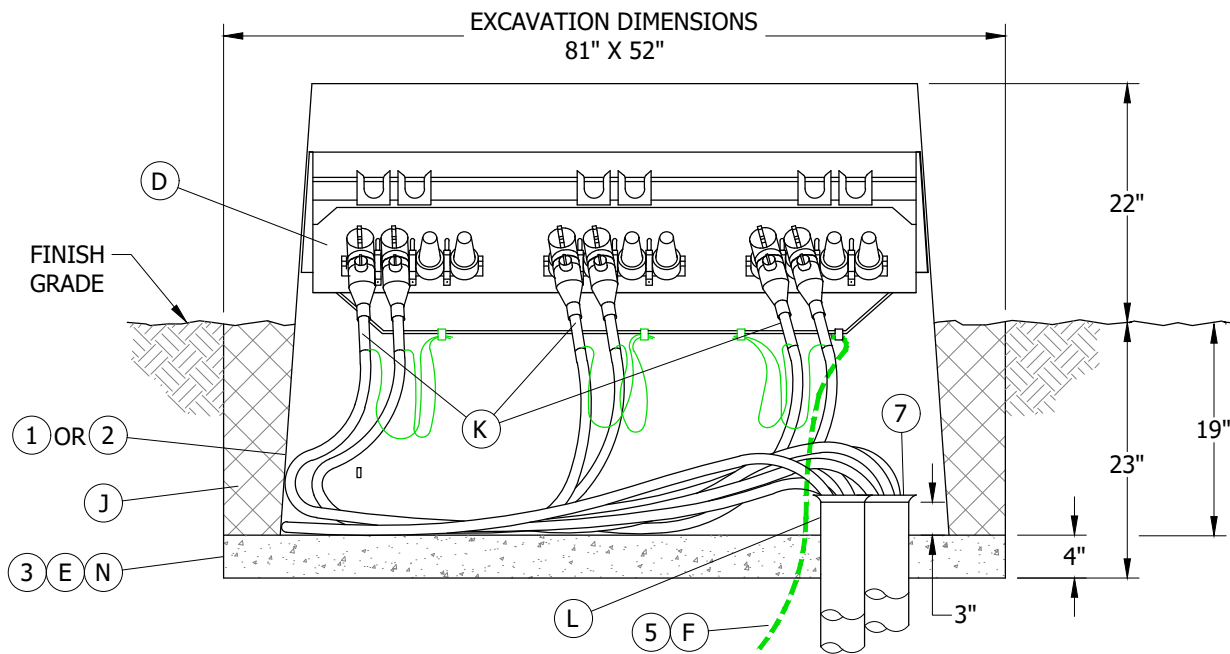
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**THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET**  
**12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL**

**UG3523.5**





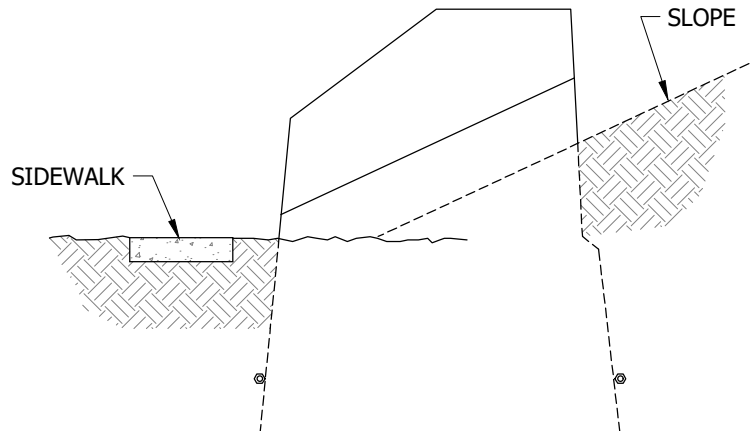
**FIGURE 3**  
FRONT VIEW

**TABLE 1**

| PRIMARY CONDUIT COMBINATIONS |        |        |                        |
|------------------------------|--------|--------|------------------------|
| 2 (IN)                       | 3 (IN) | 4 (IN) | TOTAL ALLOWED CONDUITS |
| -                            | -      | 4      | 4                      |
| 3                            | -      | 3      | 6                      |
| -                            | 3      | 1      | 4                      |

**ATTENTION:**

- \* RETAINING WALLS ARE NOT REQUIRED WHEN THE SLOPE REMAINS SIX INCHES BELOW AND PARALLEL TO THE JOINT BETWEEN BASE AND COVER OF TERMINATOR.



**FIGURE 4**  
SIDE VIEW

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**SHEET**  
**6 OF 8**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET**  
**12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL**

**UG3523.6**



**FOR CABLE JUNCTION PEDESTAL:**

- ### BILL OF MATERIALS:

| ITEM | DESCRIPTION                                | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | CABLE JUNCTION PEDESTAL W/ 3 CABLE TAPS    | 1        | -             | S525354      | DFCJP3       |
| 2    | CABLE JUNCTION PEDESTAL WITHOUT CABLE TAPS | 1        | -             | S525356      | DFCJP0       |
| 3    | GRAVEL, 3/8" X 3/4"                        | AS REQ'D | -             | S601600      | -            |
| 4    | CABLE TAPS (NOT NEEDED WITH ITEM 1) (II)   | AS REQ'D | 4195          | -            | -            |
| 5    | WIRE, TRENCH GROUND                        | 1        | 4510          | -            | TG-E-W       |
| 6    | GROUND BAR (II)                            | 1        | -             | -            | -            |
| 7    | PROTECTOR, CABLE                           | 1        | -             | S558720      | -            |

I. THE DEADFRONT JUNCTION PEDESTAL SHOULD NOT BE CONCRETE ENCASED AT THE SURFACE, FOR LEVEL CONCRETED AREAS THE THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET IS RECOMMENDED. (1)

**REFERENCE:**

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| REV | CHANGE            | DR  | BY  | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|-----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                   |     |     |     |     |           | F   |        |    |    |     |     |      |
| B   | FORMATTING        | EDM | JIK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
| A   | EDITORIAL CHANGES | -   | JS  | TR  | MDJ | 8/11/2016 | D   |        |    |    |     |     |      |

|                 |   |                           |                    |          |                     |          |
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| SHEET<br>7 OF 8 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3523.7 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |                    |          |                     |          |
|                 | THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET<br>12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL |                           |                    |          |                     |          |



**REFERENCE (CONT'D):**

- d. SEE UG3486, **UG3487 AND UG3488** FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- e. SEE **UG3489** FOR RETAINING WALLS.
- f. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- g. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- h. SEE UG4520 (**PREVIOUS # UG4520.1-.7**) AND UG4521 (**PREVIOUS # 4520.8-.9**) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- i. SEE UG4525 FOR GROUNDING CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- j. SEE UG3221 FOR HIGH VOLTAGE TAGS.
- k. SEE UG3240 FOR WORKING SPACE TAGS.
- ① SEE UG3325 FOR MANHOLE STANDARDS.
- m. SEE **UG3202**
- n. SEE **UG3203**

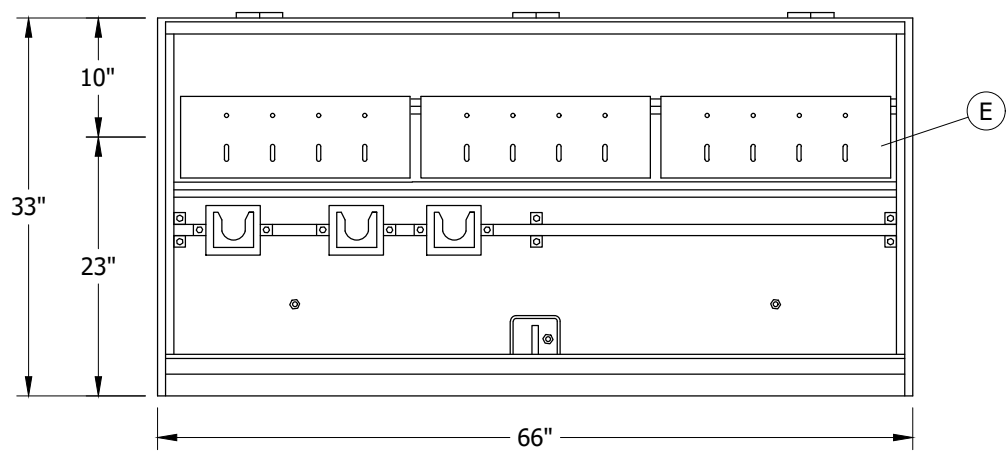
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| C   |                   |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | E   |        |    |    |     |     |      |
| A   | EDITORIAL CHANGES | -   | JS | TR  | MDJ | 8/11/2016 | D   |        |    |    |     |     |      |

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| SHEET<br>8 OF 8 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3523.8 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |                    |          |                     |          |
|                 | THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET<br>12KV, 200A DEADFRONT CABLE JUNCTION PEDESTAL |                           |                    |          |                     |          |



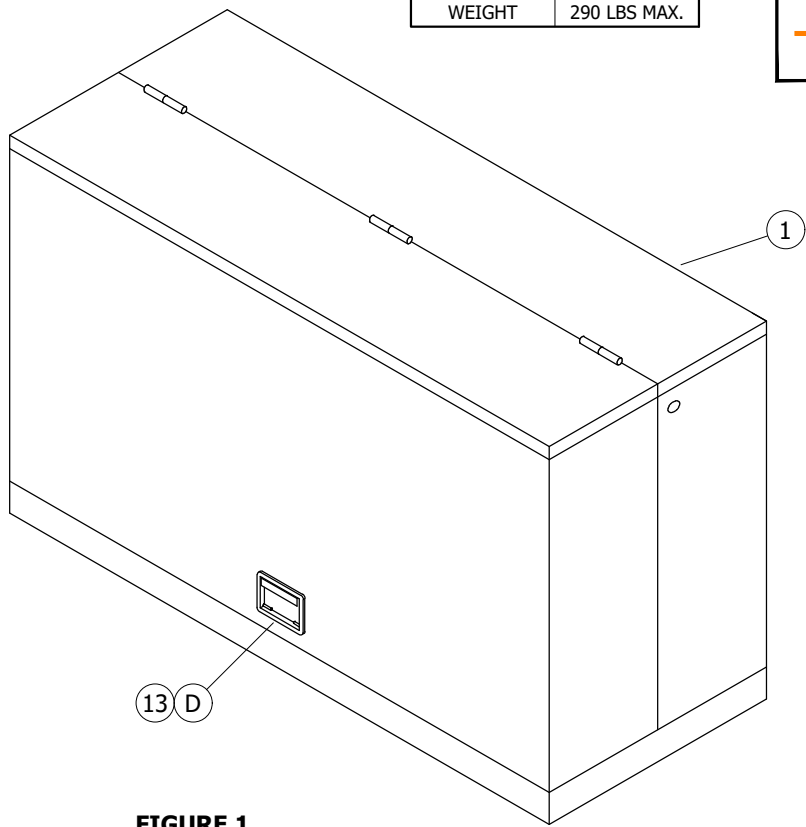
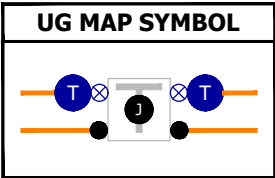
**SCOPE:** THIS STANDARD SHOWS THE 600A/200A PAD MOUNTED LOW PROFILE TERMINATING CABINET (FOR FIELD MAINTENANCE).



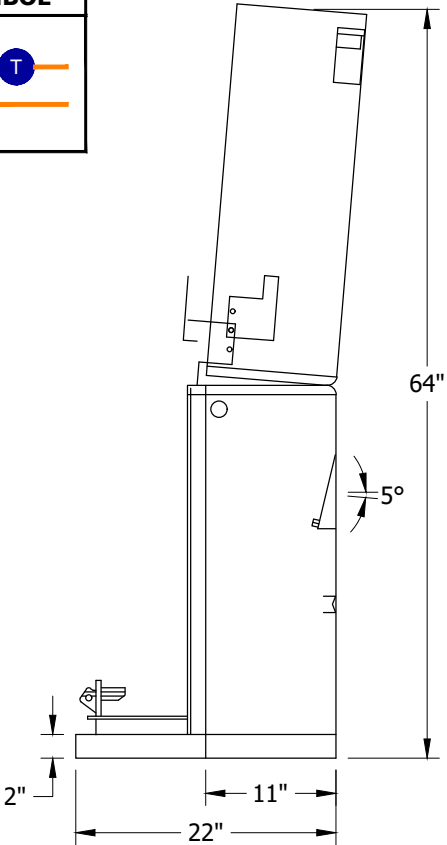
**FIGURE 1**  
FRONT VIEW

**TABLE 1**

| RATINGS |              |
|---------|--------------|
| KV-BIL  | 95           |
| AMPERES | 600          |
| WEIGHT  | 290 LBS MAX. |



**FIGURE 1**  
ISOMETRIC VIEW



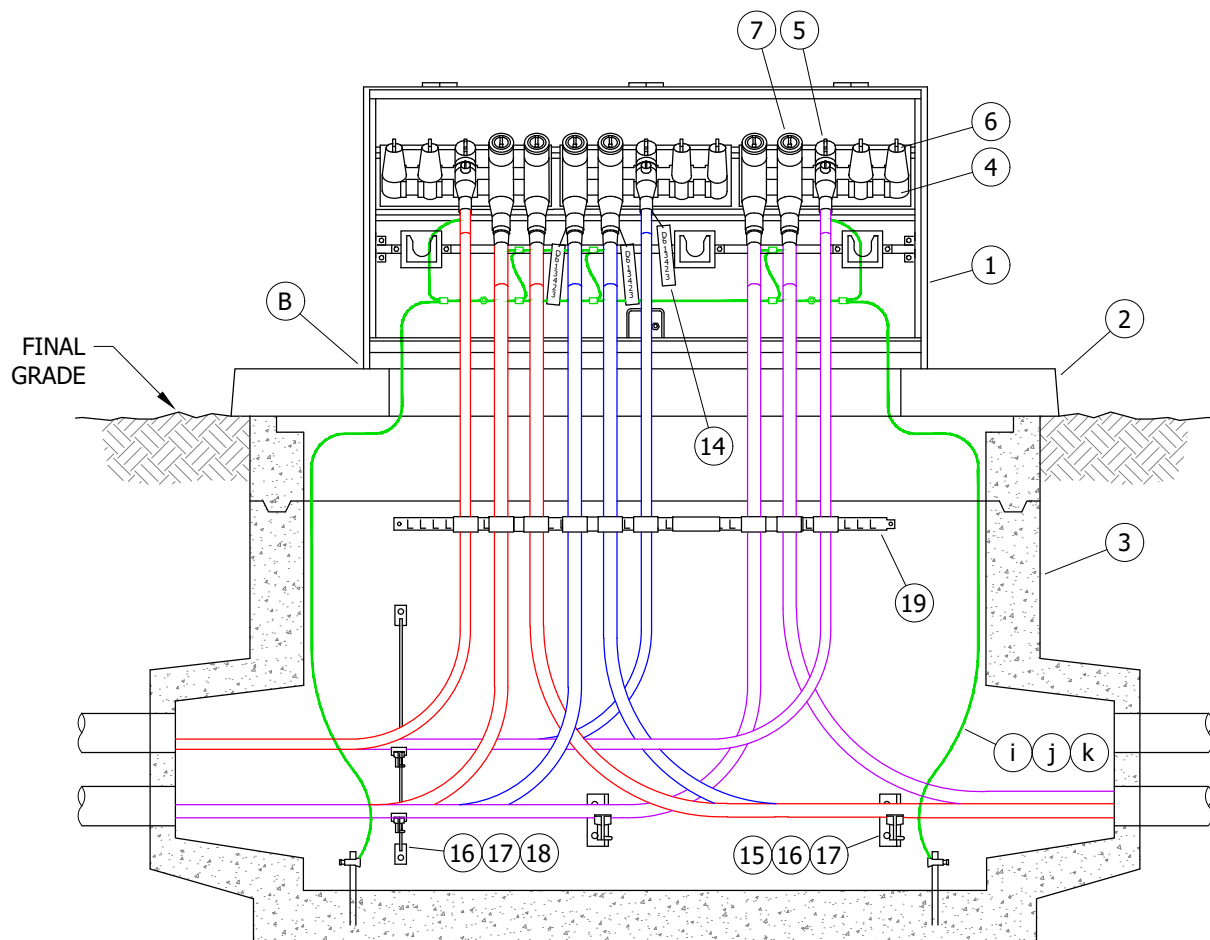
**FIGURE 1**  
SIDE VIEW

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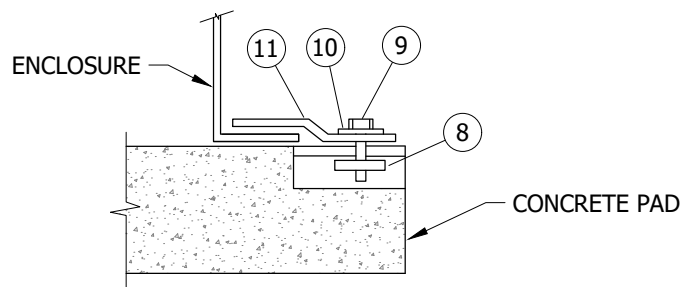
| REV | CHANGE            | DR  | BY | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 4/11/2012 | D   |        |    |    |     |     |      |

|                 |  |                           |                          |                    |                          |          |                          |                     |          |
|-----------------|--|---------------------------|--------------------------|--------------------|--------------------------|----------|--------------------------|---------------------|----------|
| SHEET<br>1 OF 3 | <input checked="" type="checkbox"/>                                  | Indicates Latest Revision | <input type="checkbox"/> | Completely Revised | <input type="checkbox"/> | New Page | <input type="checkbox"/> | Information Removed | UG3524.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                    |                           |                          |                    |                          |          |                          |                     |          |
|                 | THREE-PHASE LOW PROFILE CABLE<br>TERMINATING CABINET 12KV, 600A/200A |                           |                          |                    |                          |          |                          |                     |          |





**FIGURE 2**  
FRONT VIEW  
600A/200A JUNCTION & CABLE INSTALLATION  
WITH 3410 NEW PAD



**FIGURE 3**  
HOLD-DOWN ASSEMBLY DETAIL  
TYPICAL BOTH SIDES OF EQUIPMENT PAD

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| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 4/11/2012 | D   |        |    |    |     |     |      |



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SHEET  
2 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE LOW PROFILE CABLE  
TERMINATING CABINET 12KV, 600A/200A

UG3524.2



- (A) SEAL CONDUITS WITH SEALING COMPOUND.
- (B) BASE OF CABINET SHALL BE CAULKED ONLY TO PREVENT POSSIBLE WIRE ENTRY.
- (C) FUSED ELBOWS AND SECONDARIES ARE ACCEPTABLE.
- (D) KEYLESS LOCK TO BE ATTACHED TO LATCHING MECHANISM ON CABINET AND PENTAHEAD BOLT TO BE THREADED IN COMPLETELY.
- (E) JUNCTION SUPPORT PLATES SUPPLIED WITH CABINET ARE REMOVABLE.

| ITEM | DESCRIPTION                                | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | CABINET, THREE-PHASE CABLE TERMINATING     | 1        | 3524          | S732944      | MT-CAB       |
| 2    | PAD, 3410                                  | 1        | 3410          | S514260      | 3410         |
| 3    | HANDHOLE, EXISTING                         | 1        | -             | -            | -            |
| 4    | JUNCTION, 600A/200A                        | 3        | 4186          | S439860      | JUN6/2       |
| 5    | ELBOW, LOADBREAK, 14.4KV, 200A (A)         | AS REQ'D | 4191          | -            | -            |
| 6    | RECEPTABLE, INSULATING                     | AS REQ'D | 4195          | S204304      | INSREC       |
| 7    | TEE, ELBOW                                 | AS REQ'D | -             | S326578      | ELBO-T       |
| 8    | NUT, CLAMPING CHANNEL, W/SPRING, 1/2"      | 4        | -             | S505520      | -            |
| 9    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2" | 4        | -             | S616192      | -            |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"  | 4        | -             | S799488      | -            |
| 11   | HOLD DOWN (SUPPLIED WITH CABINET)          | 4        | -             | -            | -            |
| 12   | SEALING COMPOUND (A) (I)                   | AS REQ'D | -             | S442976      | -            |
| 13   | KEYLESS LOCK (D) (I)                       | 1        | -             | S468010      | -            |
| 14   | CABLE IDENTIFICATION TAGS                  | AS REQ'D | 3202          | -            | -            |
| 15   | ADAPTER, FOR CABLE ARMS                    | AS REQ'D | 4177/4178     | S102016      | -            |
| 16   | CABLE ARMS, 2, 3 OR 4 POSITIONS            | AS REQ'D | 4177/4178     | -            | -            |
| 17   | CABLE INSULATORS                           | AS REQ'D | 4177/4178     | S430592      | -            |
| 18   | HANGER, FOR CABLE ARMS                     | AS REQ'D | 4177/4178     | S564480      | -            |
| 19   | HANGER, 30"                                | 2        | -             | S503520      | -            |

(I) NOT SHOWN ON FIGURES.

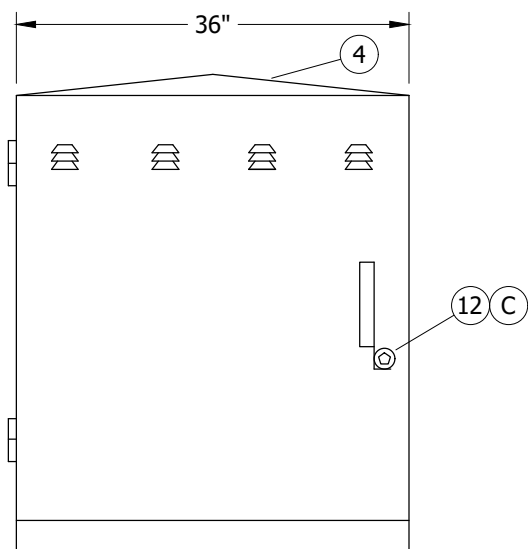
- a. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- b. SEE UG3408 FOR WIRE ENTRY PREVENTION.
- c. SEE UG3410 FOR PAD INSTALLATION.
- d. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- e. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- f. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- g. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- h. SEE UG3489 FOR RETAINING WALLS.
- i. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- j. SEE UG4520 AND UG4521 (PREVIOUS # UG4520) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- k. SEE UG4525 FOR GROUNDING CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.

| REV | CHANGE            | DR  | BY | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
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| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 4/11/2012 | D   |        |    |    |     |     |      |

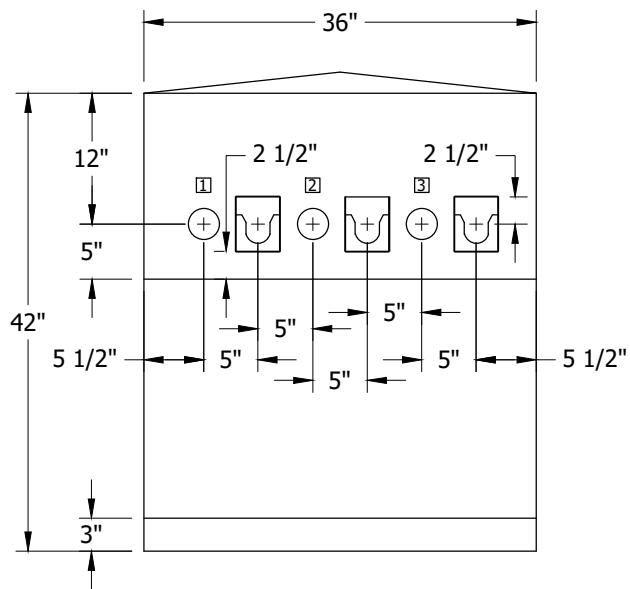
|                 |  |                           |                    |          |                     |          |
|-----------------|--|---------------------------|--------------------|----------|---------------------|----------|
| SHEET<br>3 OF 3 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3524.3 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                    |                           |                    |          |                     |          |
|                 | THREE-PHASE LOW PROFILE CABLE<br>TERMINATING CABINET 12KV, 600A/200A |                           |                    |          |                     |          |



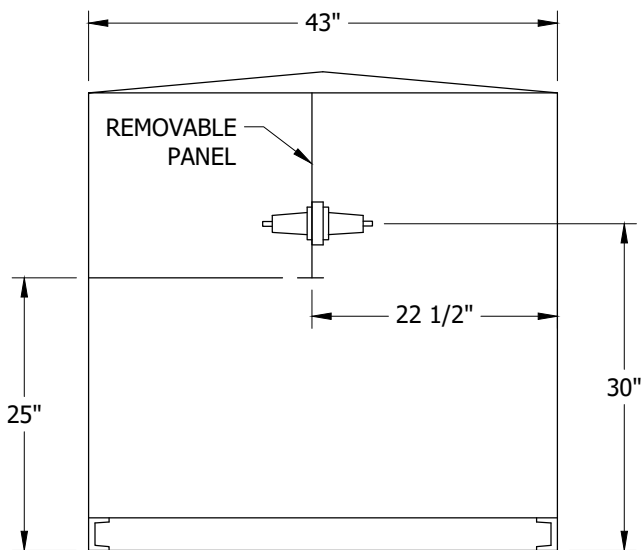
**SCOPE:** THIS STANDARD SHOWS THE PAD MOUNTED THREE-PHASE 600A TERMINATING CABINET AND INSTALLATION REQUIREMENTS USED WHEN FEEDER AND DISTRIBUTION CABLE IS TERMINATED.



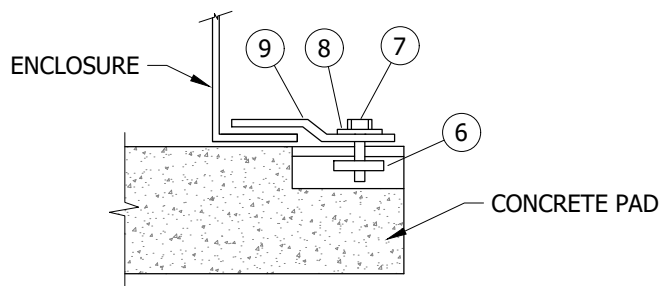
**FIGURE 1**  
FRONT AND REAR VIEW



**FIGURE 1**  
FRONT VIEW  
EXPOSED



**FIGURE 1**  
SIDE VIEW  
EXPOSED



**FIGURE 2**  
HOLD-DOWN ASSEMBLY DETAIL  
TYPICAL BOTH SIDES OF EQUIPMENT PAD

**TABLE 1**

| RATINGS |     |
|---------|-----|
| AMPERES | 600 |
| KV-BIL  | 175 |

**UG MAP SYMBOL**



600A TERMINATING  
CABINET

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|-----|-------------------|----|----|-----|-----|-----------|-----|-------------------|-----|----|-----|-----|-----------|
| C   | DRAWING UPDATE    | -  | JK | JS  | CZH | 6/1/2018  | F   |                   |     |    |     |     |           |
| B   | EDITORIAL CHANGES | -  | BR | BR  | MDJ | 3/13/2017 | E   |                   |     |    |     |     |           |
| A   | EDITORIAL CHANGES | -  | -  | -   | -   | 3/1/2002  | D   | MOVED FROM UG3582 | EDM | JK | -   | -   | 5/17/2021 |

**SHEET**  
**1 OF 3**

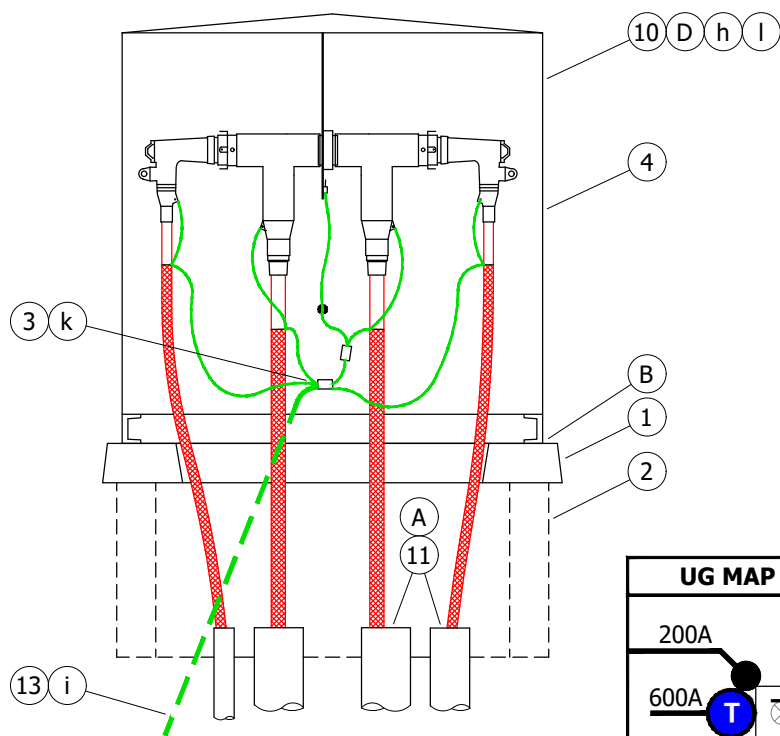
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

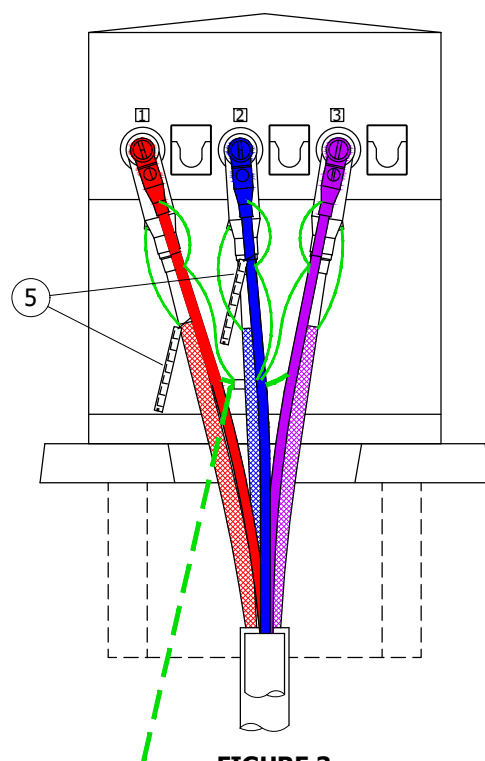
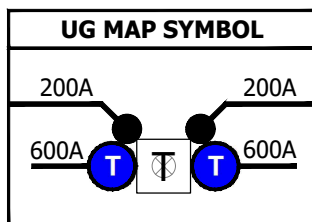
THREE-PHASE PAD MOUNTED TERMINATING CABINET  
12KV, 600A AND 3313 HANDHOLE

**UG3525.1**





**FIGURE 3**  
SIDE VIEW



**FIGURE 3**  
SIDE VIEW

### INSTALLATION:

- (A) SEAL CONDUITS WITH SEALING COMPOUND.
- (B) BASE OF CABINET SHALL BE CAULKED TO PREVENT MOISTURE ENTRY AND POSSIBLE TAMPERING.
- (C) SECURE BOTH DOORS WITH PENTAHEAD BOLTS KEYLESS LOCKS.
- (D) FUSED ELBOWS ARE ACCEPTABLE.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                                 | QUANTITY | STANDARD PAGE  | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|----------------|--------------|--------------|
| 1    | PAD, 600A, TERMINATING CABINET              | 1        | 3417           | S514022      | 3417         |
| 2    | HANDHOLE, 3313 BASE SECTION                 | 1        | 3313           | S162664      |              |
| 3    | GROUNDING EQUIPMENT FOR TERMINATING CABINET | 1        | 4520           | -            | -            |
| 4    | CABINET, TERMINATING                        | 1        | 3525           | S732938      | 600CAB       |
| 5    | TAGS, IDENTIFICATION                        | AS REQ'D | 3202/3213-3218 | -            | -            |
| 6    | NUT, CLAMPING CHANNEL                       | 2        | -              | S503520      | -            |
| 7    | SCREW, HEX HEAD CAP, BRONZE 1/2" X 1 1/2"   | 2        | -              | S616192      | -            |
| 8    | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"   | 2        | -              | S799488      | -            |
| 9    | HOLD DOWN (SUPPLIED WITH CABINET)           | 2        | -              | -            | -            |
| 10   | 12KV, 200A, LOADBREAK AND 600A CONNECTORS   | AS REQ'D | 4181           | -            | -            |
| 11   | COMPOUND, SEALING                           | AS REQ'D | -              | S442976      | -            |
| 12   | LOCK, KEYLESS                               | 2        | -              | S468010      | -            |
| 13   | WIRE, TRENCH GROUND                         | AS REQ'D | 4510           | -            | -            |

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| C   | DRAWING UPDATE    | -  | JK | JS  | CZH | 6/1/2018  | F   |                   |     |    |     |     |           |
| B   | EDITORIAL CHANGES | -  | BR | BR  | MDJ | 3/13/2017 | E   |                   |     |    |     |     |           |
| A   | EDITORIAL CHANGES | -  | -  | -   | -   | 3/1/2002  | D   | MOVED FROM UG3582 | EDM | JK | -   | -   | 5/17/2021 |

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**SHEET**  
**2 OF 3**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

THREE-PHASE PAD MOUNTED TERMINATING CABINET  
12KV, 600A AND 3313 HANDHOLE

**UG3525.2**



**NOTES:** NONE

**REFERENCE:**

- a. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- b. SEE UG3417 FOR PAD AND HANDHOLE INSTALLATION.
- c. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- d. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- e. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- f. SEE UG3486, UG3487 AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- g. SEE UG3489 FOR RETAINING WALLS.
- h. SEE UG4181 FOR CONNECTOR ASSEMBLIES IDENTIFICATION CHART.
- i. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- J. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- k. SEE UG4520 AND UG4521 (PREVIOUS # UG4520) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- l. SEE UG4525 FOR GROUNDING CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.

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|-----|-------------------|----|----|-----|-----|-----------|-----|-------------------|-----|----|-----|-----|-----------|
| C   | DRAWING UPDATE    | -  | JK | JS  | CZH | 6/1/2018  | F   |                   |     |    |     |     |           |
| B   | EDITORIAL CHANGES | -  | BR | BR  | MDJ | 3/13/2017 | E   |                   |     |    |     |     |           |
| A   | EDITORIAL CHANGES | -  | -  | -   | -   | 3/1/2002  | D   | MOVED FROM UG3582 | EDM | JK | -   | -   | 5/17/2021 |

|                 |   |                           |                    |          |                     |          |
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| SHEET<br>3 OF 3 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3525.3 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                           |                           |                    |          |                     |          |
|                 | THREE-PHASE PAD MOUNTED TERMINATING CABINET<br>12KV, 600A AND 3313 HANDHOLE |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD COVERS PAD MOUNTED 600A, 15KV THREE-PHASE LIQUID INSULATED VACUUM SWITCH GEAR WITH VISIBLE DISCONNECTS.

**ATTENTION:**

- \* DUE TO DIVERSE ENVIRONMENTAL CONDITIONS, THE SWITCH GEAR IS CONSTRUCTED OF STAINLESS STEEL. THE LIQUID INSULATION IS NOT SUBJECTED TO ARC CONTAMINATION DURING SWITCHING AND WILL NOT REQUIRE TESTING.

**TABLE 1**

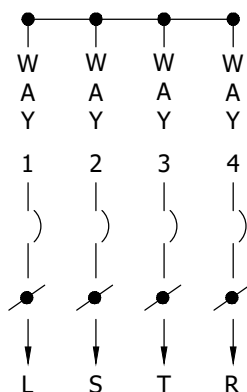
| ELECTRICAL RATINGS               |                        |
|----------------------------------|------------------------|
| VOLTAGE                          | 15.5KV                 |
| CURRENT, CONTINUES               | 600A                   |
| B.I.L                            | 95KV                   |
| MAXIMUM INTERRUPTING CURRENT VFI | 12.5KA - (SYMMETRICAL) |
| MOMENTARY MAKE AND LATCH         | 20KA - (ASYMMETRICAL)  |
| B.I.L. ACROSS OPEN VFI           | 125KV                  |

**TABLE 2**

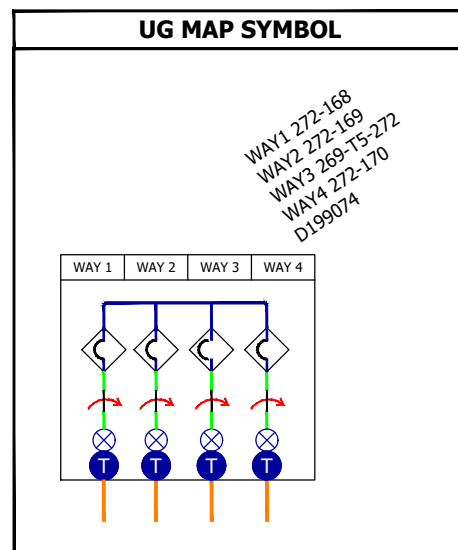
| SWITCH INFORMATION         |              |              |
|----------------------------|--------------|--------------|
| TYPE OF SWITCH             | STOCK NUMBER | DESIGN UNITS |
| 4-WAY MANUAL SWITCH        | S709052      | 4WAYTM       |
| 4-WAY SCADA SWITCH         | S704732      | 4WAYTS       |
| 5-WAY SCADA SWITCH         | S704734      | 5WAYTS       |
| 4-WAY SCADA SWITCH 2-SIDED | S704736      | 4WTPES       |
| 4-WAY SCADA SWITCH HSTC    | S704738      | 4WTFTS       |

**TABLE 3**

| SWITCH GEAR INTERNAL DESIGNATION LOCATIONS |              |
|--|--------------|
| DESIGNATION                                | LOCATION     |
| L  | LEFT         |
| S  | 4TH POSITION |
| T  | TAP          |
| R  | RIGHT        |



**FIGURE 1**  
4-WAY MANUAL CONNECTION DIAGRAM  
(SEE TABLE 3)



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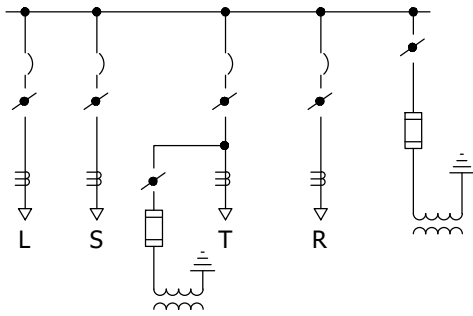
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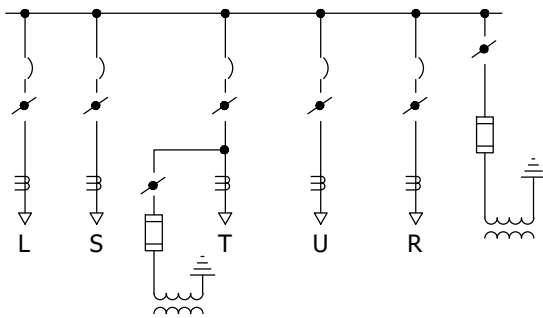
PAD MOUNTED SWITCH GEAR

UG3550.1

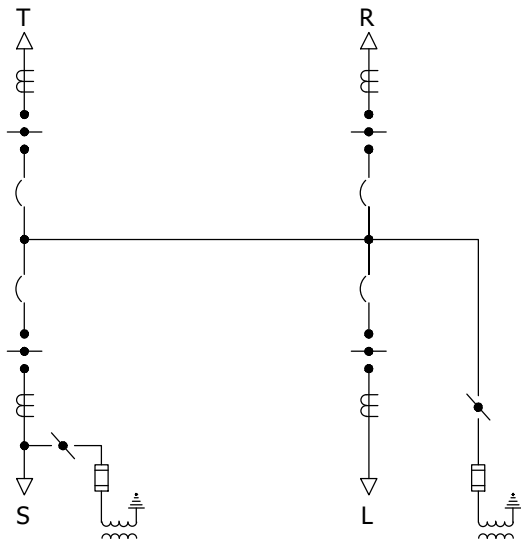




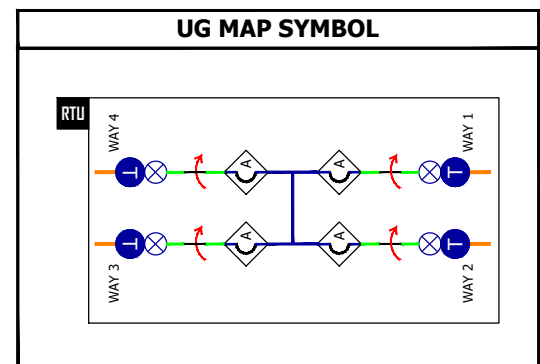
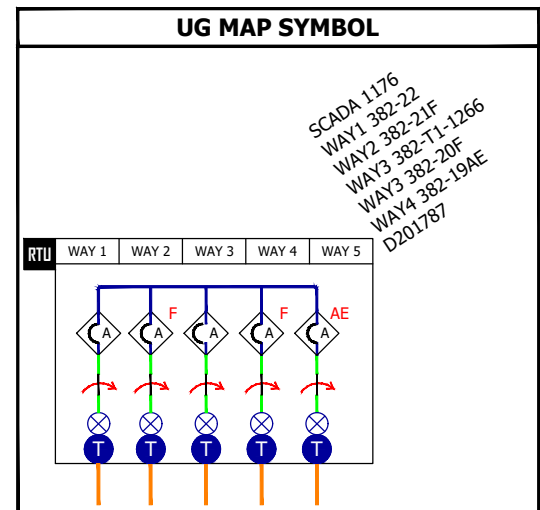
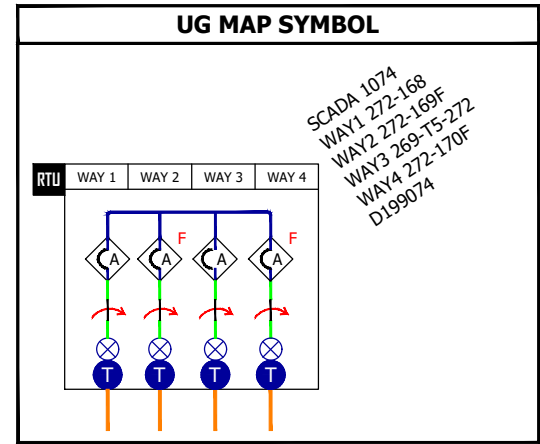
**FIGURE 2**  
4-WAY SCADA CONNECTION DIAGRAM



**FIGURE 3**  
5-WAY SCADA CONNECTION DIAGRAM



**FIGURE 4**  
4-WAY 2 SIDED SCADA CONNECTION DIAGRAM



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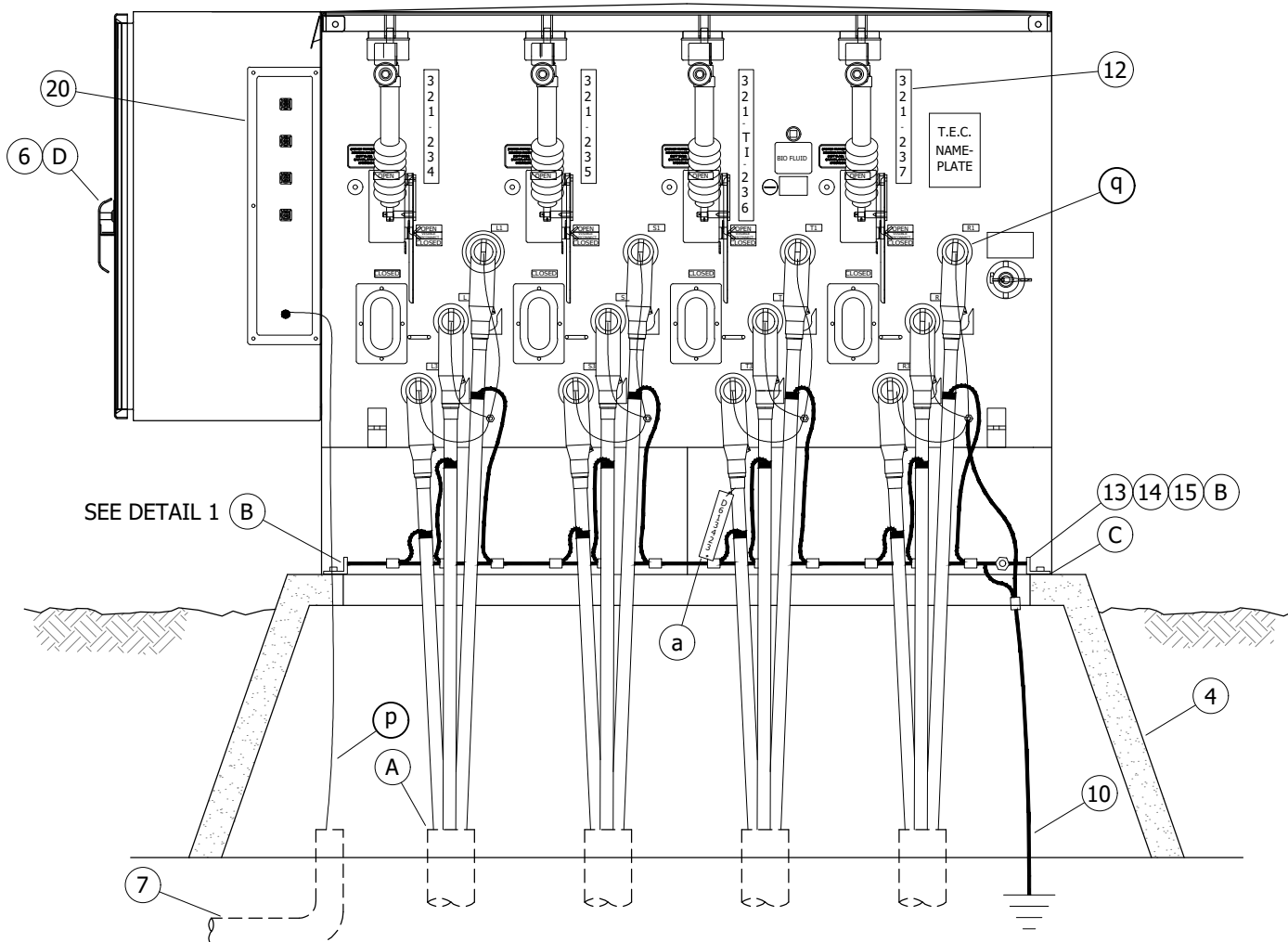
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

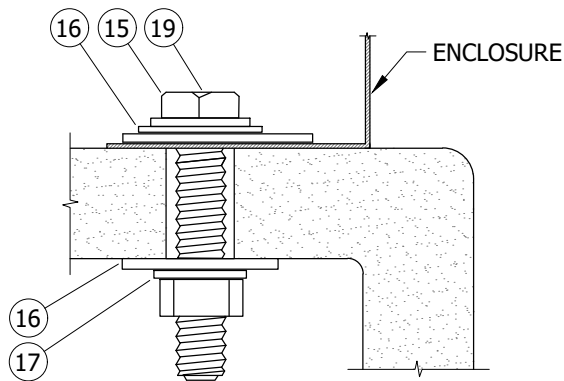
PAD MOUNTED SWITCH GEAR

UG3550.2





**FIGURE 5**



**DETAIL 1**  
HOLD DOWN  
(USE STAINLESS STEEL TIE DOWNS PROVIDED)

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**3 OF 5**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD MOUNTED SWITCH GEAR

**UG3550.3**



- (A) SEAL ALL CONDUITS WITH SEALING COMPOUND.
- (B) SET THE SWITCH ON THE BOX PAD. USING A 1/2 INCH DRILL BIT, DRILL THROUGH THE EXISTING HOLES IN THE SILL FLANGE AND THROUGH THE BOX PAD. BOLT DOWN AS SHOWN IN DETAIL 1.
- (C) BASE OF CABINET SHALL BE CAULKED ONLY TO PREVENT POSSIBLE WIRE ENTRY.
- (D) SECURE THE SWITCH DOORS AND THE SWITCH OPERATING HANDLE COVERS WITH LEVEL 3 LOCKS.

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE  | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|----------------|--------------|--------------|
| 1    | 4-WAY MANUAL (IX)                                       | 1        | --             | --           | --           |
|      | 4-WAY SCADA (IX)  | 1        | --             | --           | --           |
| 2    | 5-WAY SCADA (IX)  | 1        | --             | --           | --           |
| 3    | 4-WAY SCADA, 2 SIDED (SEE 3423 BOX PAD) (IX)            | 1        | --             | --           | --           |
| 4    | BOX PAD   | 1        | 3428/3429/3423 | AS REQ'D     | AS REQ'D     |
| 5    | CONNECTORS, 12KV 600/200A (IX)                          | AS REQ'D | 4186           | --           | --           |
| 6    | PADLOCK   | 2        | --             | S514848      | 4WTFTS       |
| 7    | SCADA ANTENNA INSTALLATION                              | --       | 4640           | --           | --           |
| 8    | CONNECTOR POST, 1/0 (IX)                                | 5        | --             | S262560      | SPCONN       |
| 9    | WIRE, COPPER, 4/0 (IX)                                  | AS REQ'D | 4520.8, .9     | S812764      | 4/0-SD       |
| 10   | WIRE, BARE COPPER, #2 7 STR. SOFT-DRAWN                 | 1        | 4510           | S812818 (X)  | TG-E-W       |
| 11   | SEALING COMPOUND (IX)                                   | AS REQ'D | 3948.1         | S442976      | SEAL-6       |
| 12   | SWITCH POSITION TAGGING                                 | --       | 3212.2         | --           | --           |
| 13   | EYE BOLT, STAINLESS STEEL, 6" X 1/2"                    | 1        | --             | S150582      | --           |
| 14   | BRACKET, ANGLE, STAINLESS STEEL, 2" X 3"                | 2        | --             | S166072      | --           |
| 15   | BOLT, TIE DOWN, STAINLESS STEEL, 3 1/2" X 1/2" (B)      | 4        | --             | S148804      | --           |
| 16   | WASHER, STANDARD FLAT BRONZE, 1/2"                      | 8        | --             | S799488      | --           |
| 17   | WASHER, LOCK SPRING                                     | 4        | --             | S796416      | --           |
| 18   | CABLE IDENTIFICATION TAGS (IX)                          | AS REQ'D | 3202.3         | --           | --           |
| 19   | ANCHOR, CONCRETE, STAINLESS STEEL, 1/2" X 3 3/4" (VIII) | 4        | --             | S107654      | CNCANC       |
| 20   | INTEGRATED REMOTE TERMINAL (SCADA ONLY)                 | 1        | --             | --           | --           |

**APPLICATION:**

- I. THE FOOTPRINT OF THE SWITCH AND UP FRONT WORK SPACE WILL ALLOW IT TO BE INSTALLED ON THE W SERIES SWITCH FACILITIES INCLUDING 3440, 3441 PADS ON HAND HOLES AND THE TROUGH STYLE SWITCH PADS. IT MAY BE USED WHEN LIMITED RIGHT-OF-WAY ISSUES EXIST FOR CONVERSIONS AND WHERE THERE IS LIMITED SPACE FOR NEW CONSTRUCTION.
- II. FOR NEW CONSTRUCTION, THE WAY POSITION MARKED T (THIRD POSITION FROM THE LEFT) SHALL BE USED AS THE OPEN TIE FOR ALL SWITCHES. WHEN REPLACING EXISTING SWITCHES, THE TIE POSITIONS ARE ESTABLISHED AND CONNECTED AS DESIGNED TO AVOID MAJOR RE-CABLING. CONNECT AS BUILT.
- III. THE USE OF FUSED ELBOWS WILL BE LIMITED TO ONE FUSED ELBOW ONLY ON THE RIGHT OR LEFT SIDE SWITCH WAY POSITION. NO DEVIATION WILL BE GRANTED FOR MORE THAN ONE FUSED ELBOW IN SWITCH CABINET.
- IV. TAPPING THE BACK OF 600A TEES FOR 200A DISTRIBUTION WILL BE LIMITED TO SWITCH CHANGE OUTS WITH EXISTING 200A TAPS.

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|                 |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |       |                    |     |                   |     |                     |     |     |           |          |
|                 |          | PAD MOUNTED SWITCH GEAR                           |                           |     |       |                    |     |                   |     |                     |     |     |           |          |



**NOTES (CONT'D):**

- V. ROUTINE REPLACEMENT OF EXISTING 4-WAY PADMOUNT SWITCHES IS LIMITED TO THE 'W' TYPE CONFIGURATIONS ABOVE 3315 & 3316 HH'S AND THE 'D' TYPE CONFIGURATIONS ABOVE 3311 HH'S.
- VI. ANOTHER 'D' CONFIGURATION CONSISTS OF SUBSURFACE SWITCHES MOUNTED ABOVE 3315 HH'S. THESE DO NOT LEND THEMSELVES TO SIMPLE REPLACEMENT OF THE SWITCH. THESE INSTALLATIONS ARE COMMONLY CALLED 'I-BEAM' OR 'RAIL' SWITCHES. A DEVIATION REQUEST IS REQUIRED WHEN ATTEMPTING TO REPLACE THESE WITH A PADMOUNT STYLE SWITCH.
- VII. FOR NEW CONSTRUCTION AND CONVERSIONS THIS SWITCH SHOULD NOT BE USED TO TAP FEEDER CABLES. TAPS ON THE BACK OF 600A TEES IMPEDE GROUNDING AND LIMIT USE OF SWITCH POSITIONS DURING ROUTINE SWITCHING PROCEDURES AND OUTAGE SITUATIONS. TAP FEEDER SEGMENTS BETWEEN SWITCH POSITIONS USING 600A TERMINATORS OR TAP THE SWITCH POSITION WITH DISTRIBUTION CABLE ONLY.
- VIII USE WHEN MOUNTING ON CONCRETE PAD.
- IX NOT SHOWN ON FIGURES.
- X THIS ITEM IS EXEMPT.

**REFERENCE:**

- a SEE UG3202 FOR CABLE IDENTIFICATION.
- b. SEE UG3211 FOR ATTACHING STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- c. SEE UG3221 FOR HIGH VOLTAGE DECAL.
- d. SEE UG3408 FOR WIRE ENTRY PREVENTION.
- e. SEE UG3428 & UG3429 FOR BOX PAD AND CONDUIT PLACEMENT.
- f. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- g. SEE UG3480, UG3481, UG3482 & UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- h. SEE UG3486 & UG3487 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- i. SEE UG3489 FOR RETAINING WALLS.
- j. SEE UG3212.3 & 4 FOR PAD MOUNTED SWITCH IDENTIFICATION.
- k. SEE UG4355 FOR FAULT INDICATOR INSTALLATION.
- l. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- m. SEE UG4520 FOR EQUIPMENT GROUNDING.
- n. SEE UG4525 FOR GROUNDING PREMOLDED CONNECTORS.
- o. SEE UG4520.8 & UG4520.9 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- p SEE UG4642 FOR SCADA INSTALLATION.
- q SEE UG4181.19-23 FOR 600/200A CONNECTIONS.

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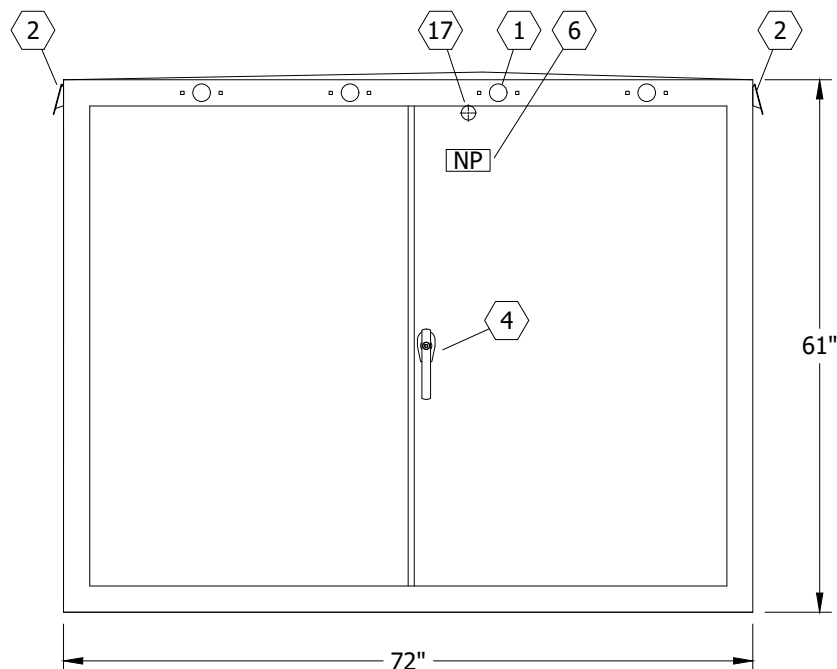
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD MOUNTED SWITCH GEAR

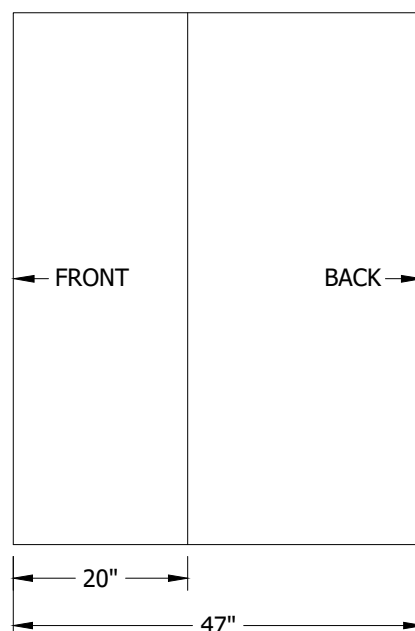
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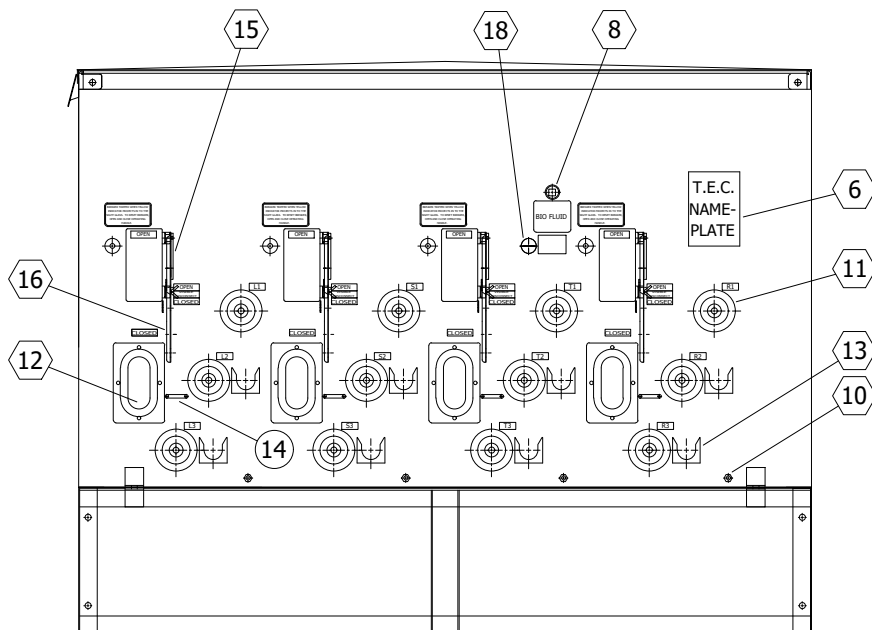
**SCOPE:** THIS STANDARD ILLUSTRATES A 4-WAY MANUAL SWITCH.



**FIGURE 1**  
FRONT VIEW  
SEE TABLE 1



**FIGURE 1**  
SIDE VIEW  
SEE TABLE 1



**FIGURE 2**  
FRONT VIEW  
CABINET REMOVED  
SEE TABLE 1

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

4-WAY MANUAL

UG3551.1



**TABLE 1**

| PARTS LIST <span style="border: 1px solid orange; border-radius: 50%; padding: 2px;">a</span> |  |
|---|--|
| ITEM  | DESCRIPTION                                    |
| 1   | WINDOW, FAULT INDICATOR                        |
| 2   | EYE, LIFTING                                   |
| 3   | CABINET, SCADA                                 |
| 4   | HANDLE, CABINET, PAD LOCKABLE                  |
| 5   | FUSE, POWER TRANSFORMER DRY WELL, 8.3KV, 3A CL |
| 6   | NAMEPLATE                                      |
| 7   | ACTUATOR, DC LINEAR, 24V                       |
| 8   | PLUG, OIL FILL                                 |
| 9   | INDICATOR, FAULT TRIP                          |
| 10  | NUTS, EQUIPMENT GROUND, 1/2"                   |
| 11  | BUSHING/CONNECTOR, 600A                        |
| 12  | DISCONNECT, VISIBLE, WINDOW VIEW TRI-PHASE     |
| 13  | PARKING STAND                                  |
| 14  | PROVISION FOR ROPE OPERATION                   |
| 15  | HANDLE, TRI-PHASE VISIBLE DISCONNECT OPERATOR  |
| 16  | HANDLE, VACUUM SWITCH OPERATING                |
| 17  | BOLT, PENTA, PAD LOCKABLE                      |
| 18  | LIQUID LEVEL GAUGE, 901A                       |
| 19  | ANTENNA CONNECTION, SCADA                      |
| 20  | DECAL: "PULL TO CLOSE MANUALLY"                |
| 21  | HANDLE, HIGH SPEED TRIP CLOSE MANUAL           |

**INSTALLATION:** NONE**BILL OF MATERIALS:** NONE**NOTES:**

I. WEIGHT: 4,350 LBS.

**REFERENCE:**

- a ITEMS ARE REFERENCED ON FIGURES FOUND IN THIS STANDARD AS WELL AS, UG3552, UG3553, UG3554 & UG3555.
- b. FOR ADDITIONAL INFORMATION, REFER TO UG3550.

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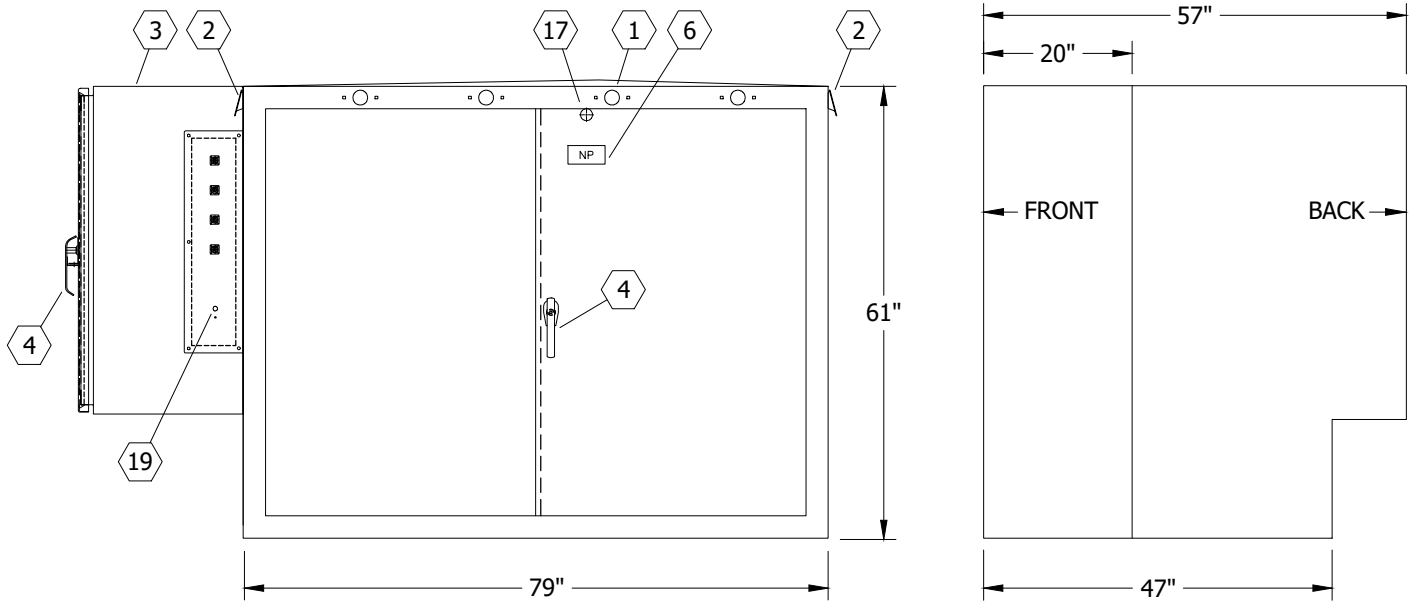
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4-WAY MANUAL

UG3551.2

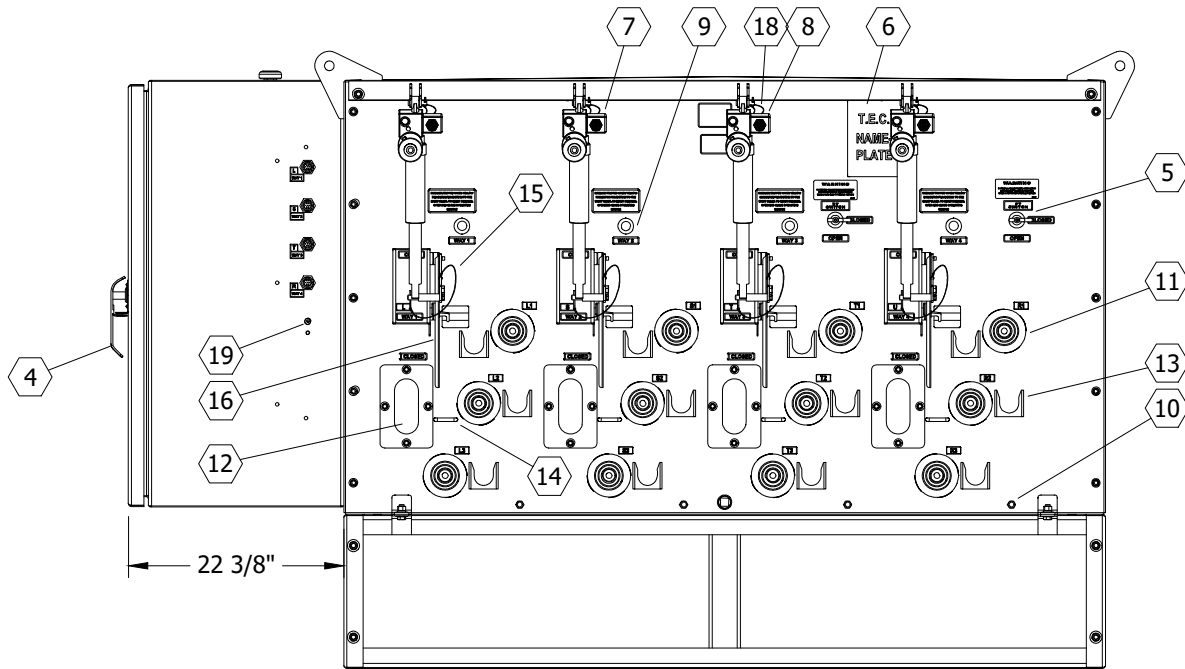


**SCOPE:** THIS STANDARD ILLUSTRATES A 4-WAY SCADA SWITCH.



**FIGURE 1**  
FRONT VIEW  
SEE UG3550 TABLE 1

**FIGURE 1**  
SIDE VIEW  
SEE UG3550 TABLE 1



**FIGURE 1**  
FRONT VIEW  
CABINET REMOVED  
SEE UG3550 TABLE 1

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

4-WAY SCADA

UG3552.1



**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

I. WEIGHT: 5,535 LBS.

**REFERENCE:**

a. FOR ADDITIONAL INFORMATION, REFER TO UG3550.

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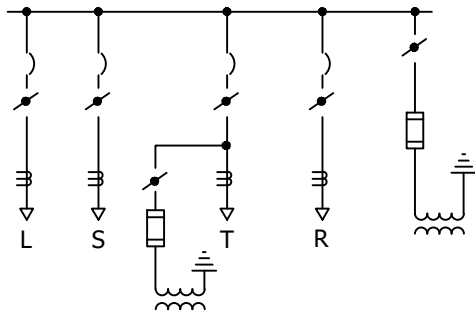
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | 4-WAY SCADA                                       |                           |  |                    |  |          |  |                     |          |



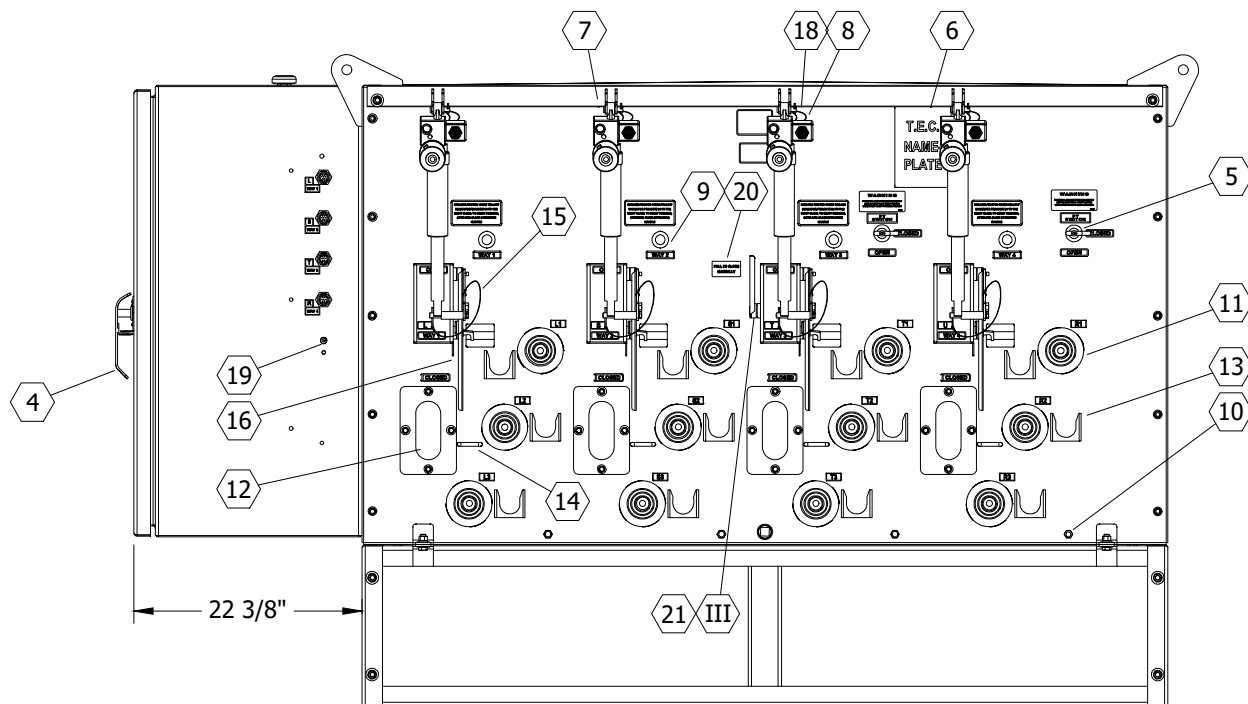
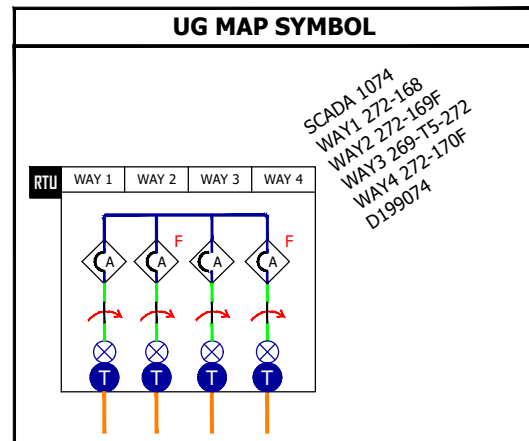
**SCOPE:** THIS STANDARD ILLUSTRATES A 4-WAY SCADA HIGH SPEED TRIP COIL SWITCH.

**CAUTION:**

- \* THE 4-WAY SCADA HIGH SPEED TRIP COIL SWITCH IS ONLY TO BE USED FOR RENEWABLE ENERGY/ALTERNATIVE RESOURCES SUCH AS BATTERY STORAGE FACILITIES.



**FIGURE 1**  
4-WAY SCADA HIGH SPEED TRIP COIL  
CONNECTION DIAGRAM



**FIGURE 2**  
FRONT VIEW  
CABINET REMOVED  
SEE UG3550 TABLE 1

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SHEET  
1 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

4-WAY SCADA  
HIGH SPEED TRIP COIL

UG3553.1



**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. WEIGHT: 5,535 LBS.
- II. ENCLOSURE DIMENSIONS ARE THE SAME AS THE 4-WAY SCADA SWITCH. (a)
- (III) WAY THREE CONTAINS A HIGH SPEED CLOSE COIL THAT CAN BE OPERATED VIA THE 487E RELAY OR THE MANUAL CLOSE HANDLE.

**REFERENCE:**

- (a) REFER TO UG3552.
- b. REFER TO UG3550 FOR ADDITIONAL INFORMATION.

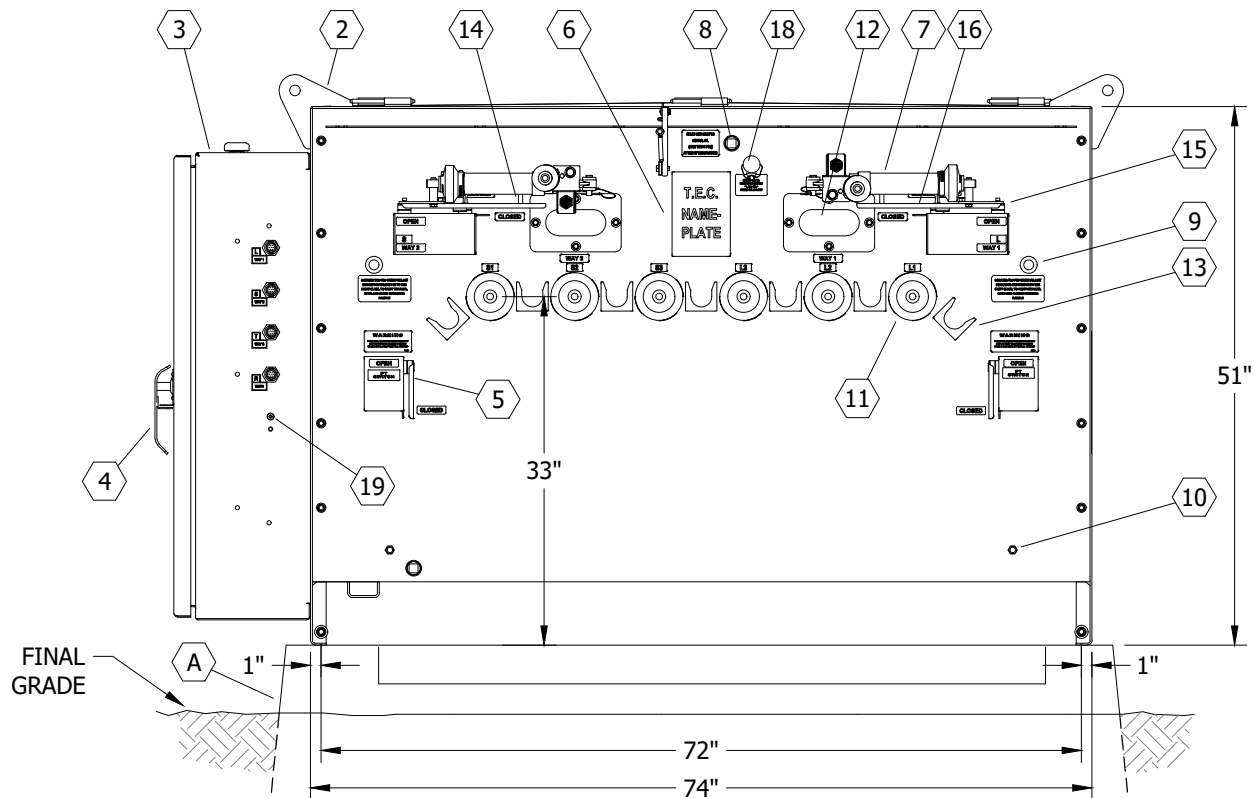
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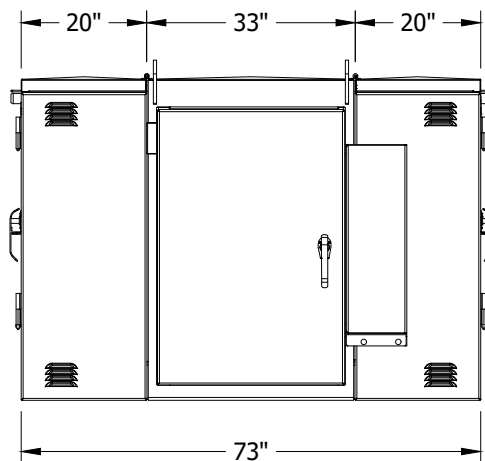
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | 4-WAY SCADA<br>HIGH SPEED TRIP COIL               |                           |  |                    |  |          |  |                     |          |



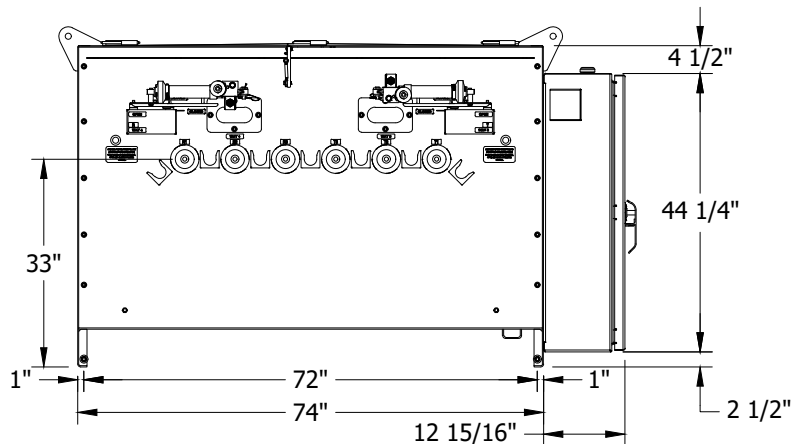
**SCOPE:** THIS STANDARD ILLUSTRATES A 2-SIDED 4-WAY SCADA SWITCH.



**FIGURE 1**  
FRONT VIEW  
CABINET REMOVED  
SEE UG3550 TABLE 1



**FIGURE 1**  
SIDE VIEW  
SEE UG3550 TABLE 1



**FIGURE 1**  
REAR VIEW  
CABINET REMOVED  
SEE UG3550 TABLE 1

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SHEET  
1 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

2 SIDED 4-WAY SCADA

UG3554.1



**INSTALLATION:**

A. REFER TO UG3550 FOR ADDITIONAL INFORMATION.

**BILL OF MATERIALS:** NONE

**NOTES:**

I. WEIGHT: 5,545 LBS.

**REFERENCE:**

a. REFER TO UG3550 FOR ADDITIONAL INFORMATION.

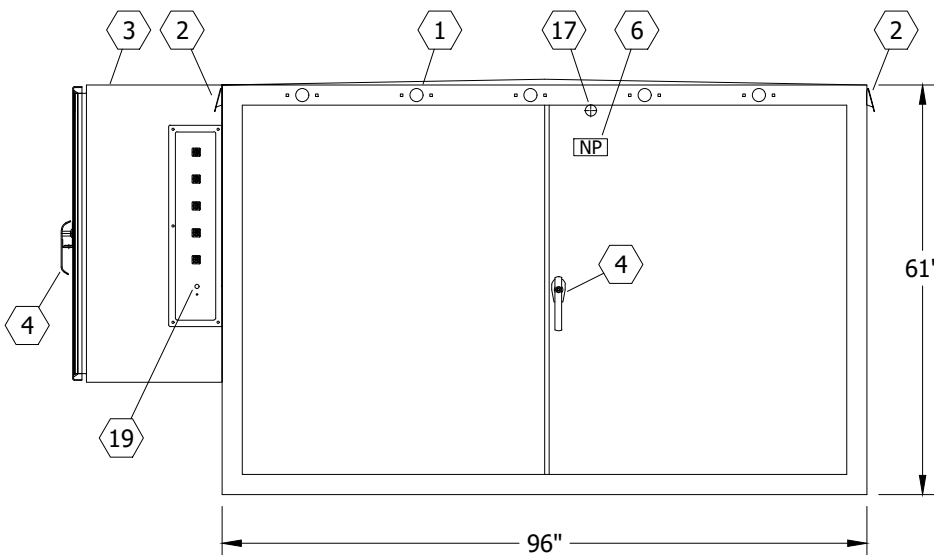
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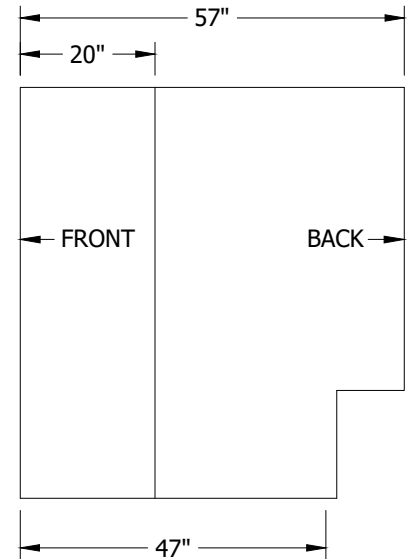
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | 2 SIDED 4-WAY SCADA                               |                           |  |                    |  |          |  |                     |          |



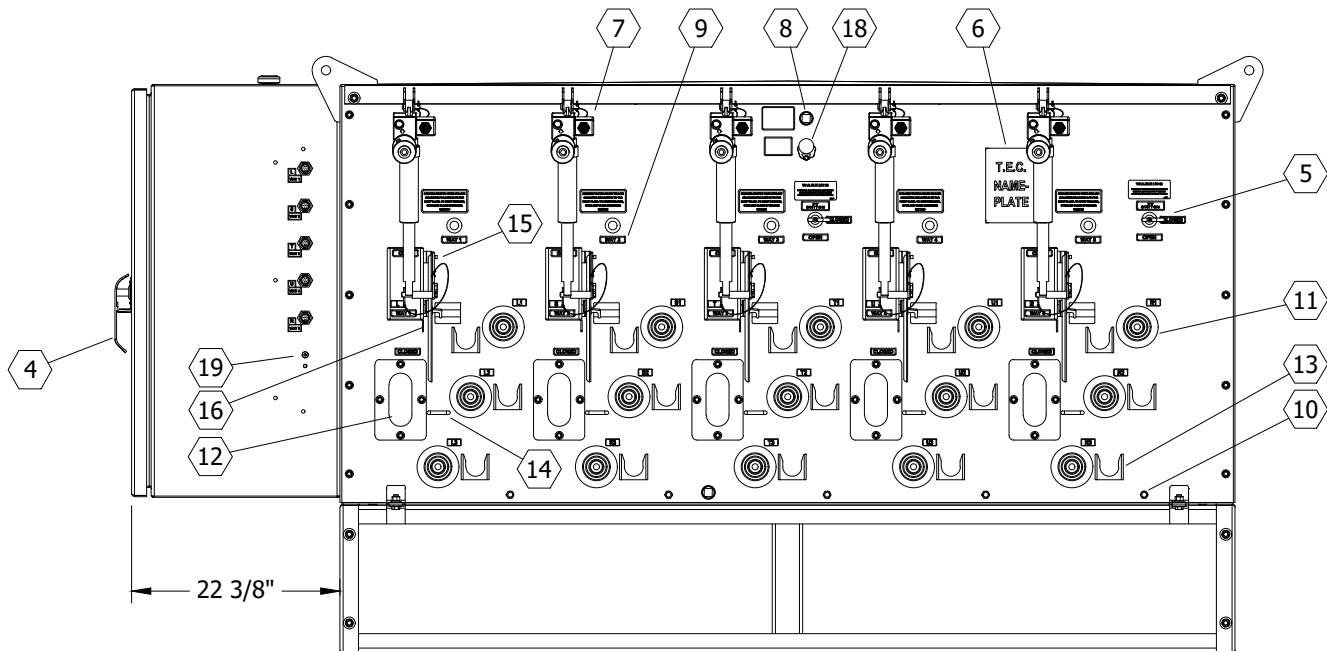
**SCOPE:** THIS STANDARD ILLUSTRATES A 5-WAY MANUAL SWITCH.



**FIGURE 1**  
FRONT VIEW  
SEE UG3550 TABLE 1



**FIGURE 1**  
SIDE VIEW  
SEE UG3550 TABLE 1



**FIGURE 1**  
FRONT VIEW  
CABINET REMOVED  
SEE UG3550 TABLE 1

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SHEET  
1 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

5-WAY SCADA

UG3555.1



**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

I. WEIGHT: 6,450 LBS.

**REFERENCE:**

a. REFER TO UG3550 FOR ADDITIONAL INFORMATION.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | 5-WAY SCADA                                       |                           |  |                    |  |          |  |                     |          |



**SCOPE:** THIS STANDARD COVERS PAD & WALL MOUNTED (200 & 600 AMP) INNOVATIVE SWITCH GEARS, 15KV THREE PHASE SOLID-DIELECTRIC-IN-AIR, AND COMES AS A VACUUM LOAD-BREAK SWITCH, AS WELL AS A VACUUM FAULT INTERRUPTER WITH VISIBLE DISCONNECTS. DUE TO DIVERSE ENVIRONMENTAL CONDITIONS THE SWITCH GEAR IS CONSTRUCTED OF STAINLESS STEEL AND POWDER COATED.

**ATTENTION:**

- \* SINGLE SIDED SWITCHES, NEVER LIFT THE PALLET BY THE PADMOUNT ENCLOSURE. THE BOLTS HOLDING THE ENCLOSURE TO THE PALLET WILL NOT SUPPORT THE WEIGHT OF THE SWITCH TANK AND STAND INSIDE.
- \*\* THIS WARNING DOES NOT APPLY TO THE FOUR WAY, TWO SIDED SWITCH AS THE TANK AND CABINET ARE ASSEMBLED TOGETHER BY THE MANUFACTURER.
- \*\*\* ISG SWITCHES ARE RATED FOR 12KV USAGE. FOR A 4KV RATED SWITCH REMOVE THE 12KV PT AND INSTALL A 4KV PT. CONTACT KEARNY SCADA CREW FOR JOINT MEET TO COMPLETE.

**TABLE 1**

| INNOVATIVE SWITCH GEAR ELECTRICAL RATINGS               |   |        |
|---|---|--------|
|   | SCADA   | MANUAL |
| VOLTAGE   | 15.5KV/4KV  | 25KV   |
| CURRENT, CONTINUOUS                                     | 600 AMP/200 AMP   |        |
| B.I.L.  | 95KV  |        |
| MAXIMUM INTERRUPTING CURRENT VACCU<br>FAULT INTERRUPTER | 12.5KA (SYMMETRICAL)<br>20KA (ASYMMETRICAL) AT 32.5 KA PEAK CURRENT |        |
| MOMENTARY MAKE AND LATCH                                | 12.5KA (SYMMETRICAL)<br>20KA (ASYMMETRICAL) AT 32.5 KA PEAK CURRENT |        |
| B.I.L. ACROSS OPEN VACUUM FAULT<br>INTERRUPTER          | 125KV   |        |

**INSTALLATION:**

SEE SHEET 3560.40  
IF VIEWING AS AN ELECTRONIC PDF [CLICK HERE](#) TO JUMP TO "INSTALLATIONS".

**NOTES:**


SEE SHEET 3560.49  
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**REFERENCE:**

SEE SHEET 3560.50  
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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                   |                           |                    |          |                     |          |
|                  | INNOVATIVE SWTICHGEAR PAD AND WALL-MOUNT  |                           |                    |          |                     |          |



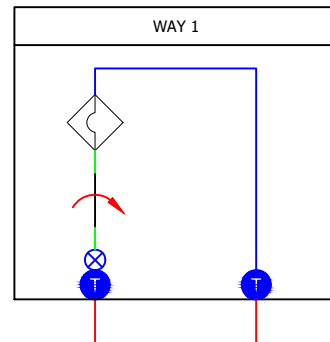








WAY 1 XXX-XXX  
XXXXXXXX



**FIGURE 2**  
MAP SYMBOL

**FIGURE 3**  
MANUFACTURER LABEL

| APPROXIMATE SYSTEM WEIGHTS |         |
|----------------------------|---------|
| DESCRIPTION                | WEIGHT  |
| S201022-007 SWITCH TANK    | 420 LBS |
| MOTOR OPERATOR             | 35 LBS  |
| PENDANT                    | 20 LBS  |
| RELAY                      | 30 LBS  |

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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |          |
|                  | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |          |



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | IN/OUT WALL MOUNT 200A MANUAL (ISG)            | 1        | -             | S190460      | IS2WFM       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560      | -            |
| 5    | WIRE, #2 COPPER GROUND TRENCH                  | 1        | 4510          | S812816      | TG-E-W       |
| 6    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528      | -            |
| 7    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560      | SPCONN       |
| 8    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520      | -            |
| 9    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192      | -            |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488      | -            |
| 11   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416      | -            |
| 12   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804      | -            |
| 13   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072      | -            |
| 14   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -            |
| 15   | PADLOCK  | AS REQ.  | -             | S514848      | -            |
| 16   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600      | -            |
| 17   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880      | -            |
| 18   | HEADER BOARDS (INCLUDES TIME TO I & R)         | AS REQ.  | -             | -            | H-BRDS       |

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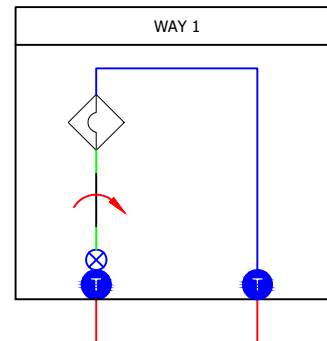
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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |  |          |  |                     |          |
|                  | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |  |          |  |                     |          |



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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |          |
|                  | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |          |



WAY 1 XXX-XXX  
XXXXXX



**FIGURE 2**  
MAP SYMBOL



| APPROXIMATE SYSTEM WEIGHTS |         |
|----------------------------|---------|
| DESCRIPTION                | WEIGHT  |
| S201066-007 SWITCH TANK    | 420 LBS |
| MOTOR OPERATOR             | 35 LBS  |
| PENDANT                    | 20 LBS  |
| RELAY                      | 20 LBS  |

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| <div style="text-align: center;"> <p><b>SHEET</b></p> <p><b>7 OF 50</b></p> </div> | <div style="display: flex; justify-content: space-between; align-items: center;"> <span>Indicates Latest Revision</span> <span><span style="color: red; font-weight: bold;">X</span></span> <span>Completely Revised</span> <span>New Page</span> <span>Information Removed</span> </div> |  |  |  | <div style="text-align: center;"> <p><b>UG3560.7</b></p> </div> |
|  | <p><b>SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS</b></p>   |  |  |  |   |
|  | <p><b>INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT</b></p>  |  |  |  |   |



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | IN/OUT WALL MOUNT 600A MANUAL (ISG)            | 1        | -             | S704750      | 1S2W6M       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560      | -            |
| 5    | WIRE, 4/0 COPPER                               | AS REQ.  | 4520.8        | S812764      | 4/0-SD       |
| 6    | WIRE, #2 COPPER GROUND TRENCH                  | 1        | 4510          | S812816      | TG-E-W       |
| 7    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528      | -            |
| 8    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560      | SPCONN       |
| 9    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520      | -            |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192      | -            |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488      | -            |
| 12   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416      | -            |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804      | -            |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072      | -            |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -            |
| 16   | PADLOCK  | AS REQ.  | -             | S514848      | -            |
| 17   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600      | -            |
| 18   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880      | -            |
| 19   | HEADER BOARDS (INCLUDES TIME TO I & R)         | AS REQ.  | -             | -            | H-BRDS       |

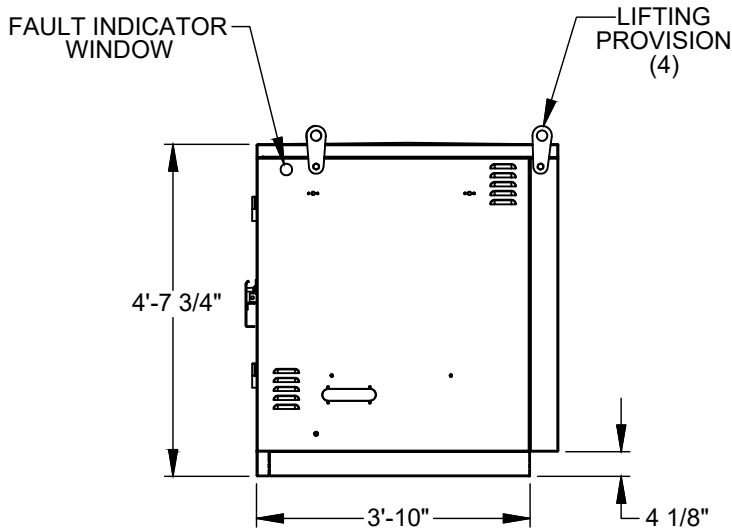
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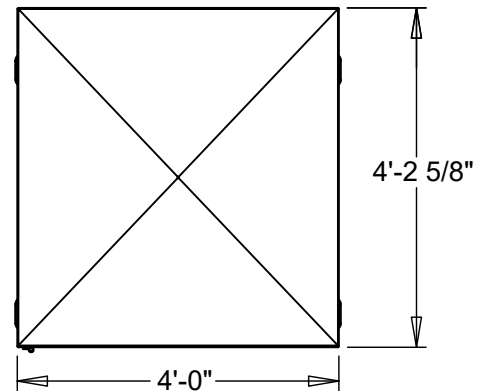
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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |          |
|                  | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |          |



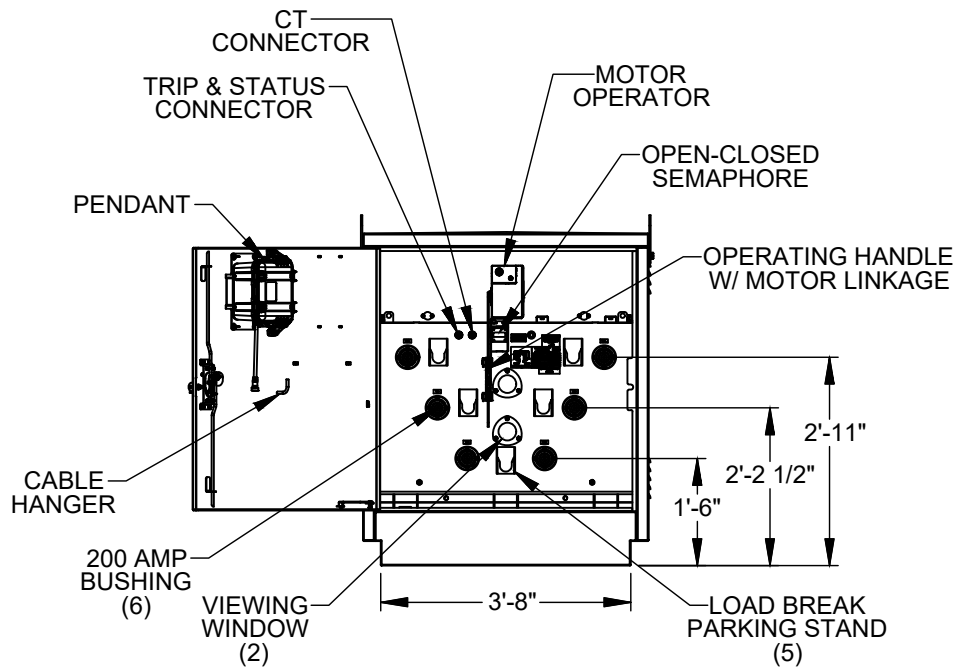
# IN/OUT SINGLE SIDED PADMOUNT 200A MANUAL/ NON-SCADA



**FIGURE 1**  
SIDE VIEW



**FIGURE 2**  
TOP VIEW



**FIGURE 3**  
FRONT VIEW

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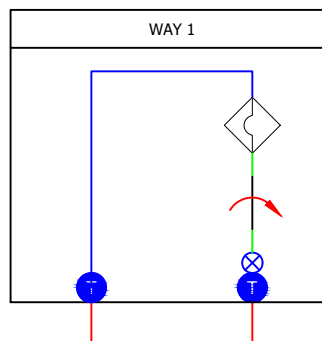
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.9



WAY 1 XXX-XXX  
XXXXXX



**FIGURE 2**  
MAP SYMBOL



| APPROXIMATE SYSTEM WEIGHTS |         |
|----------------------------|---------|
| DESCRIPTION                | WEIGHT  |
| PS201022-108 SWITCH TANK   | 480 LBS |
| ENCLOSURE                  | 550 LBS |
| MOTOR OPERATOR             | 35 LBS  |
| PENDANT                    | 20 LBS  |
| RELAY                      | 20 LBS  |

**FIGURE 3**  
MANUFACTURER LABEL

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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |



## BILL OF MATERIALS:

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | IN/OUT SINGLE SIDED PADMOUNT 200A MANUAL (ISG) | 1        | -             | S190462      | IS2PF2       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560      | -            |
| 5    | WIRE, #2/7 COPPER GROUND                       | 1        | 4510          | S812818      | TG-E-W       |
| 6    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528      | -            |
| 7    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560      | SPCONN       |
| 8    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520      | -            |
| 9    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192      | -            |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488      | -            |
| 11   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416      | -            |
| 12   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804      | -            |
| 13   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072      | -            |
| 14   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -            |
| 15   | SEALANT, CAULKING                              | 1        | 3408          | S631800      | -            |
| 16   | PADLOCK  | AS REQ.  | -             | S514848      | -            |
| 17   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600      | -            |
| 18   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880      | -            |
| 19   | 3312 SECONDARY HANDHOLE                        | AS REQ.  | -             | S162426      | 3312-0       |
| 20   | CONCRETE PAD WITH 3312, SINGLE OR THREE PHASE  | AS REQ.  | -             | S514240      | FC3PAD       |

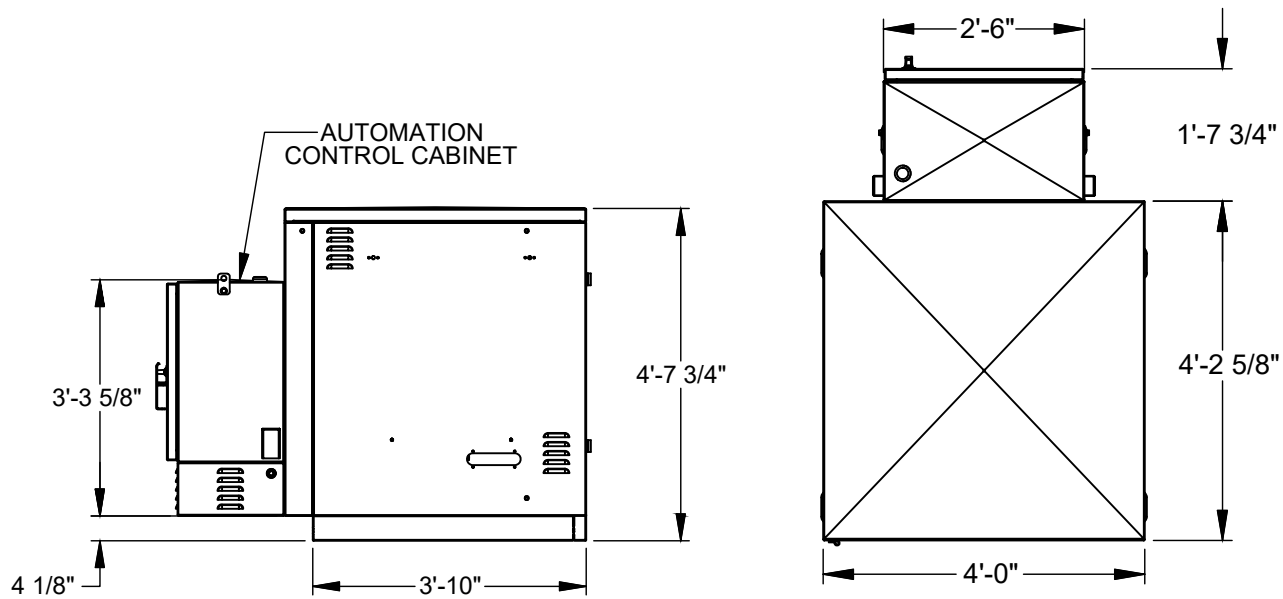
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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                                     |                    |                          |          |                          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |                                     |                    |                          |          |                          |                     |           |

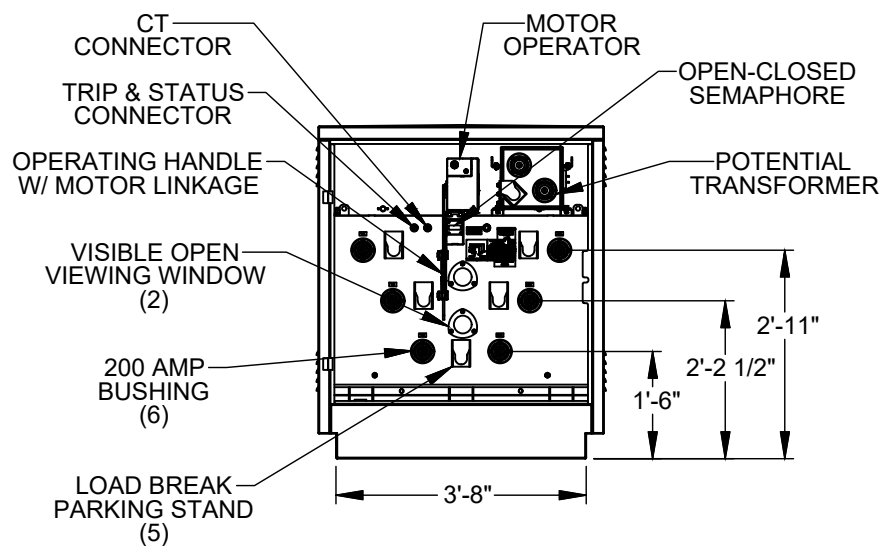


# IN/OUT SINGLE SIDED PADMOUNT 200A SCADA



**FIGURE 1**  
SIDE VIEW

**FIGURE 2**  
TOP VIEW



**FIGURE 1**  
FRONT VIEW- DOOR HIDDEN

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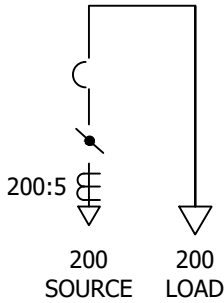
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

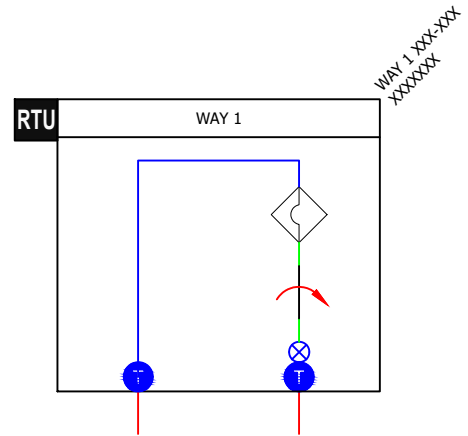
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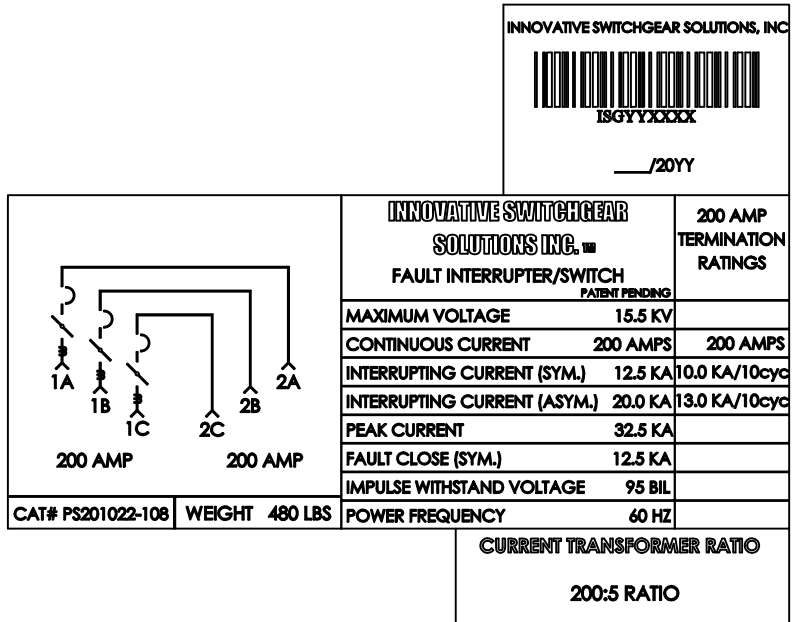
## IN/OUT SINGLE SIDED PADMOUNT 200A SCADA



**FIGURE 1**  
IN/OUT SINGLE SIDED PADMOUNT 200A  
SCADA CONNECTION DIAGRAM



**FIGURE 2**  
MAP SYMBOL




**FIGURE 3**  
MANUFACTURER LABEL

### TABLE 1

| APPROXIMATE SYSTEM WEIGHTS |         |
|----------------------------|---------|
| DESCRIPTION                | WEIGHT  |
| PS201022-108 SWITCH TANK   | 480 LBS |
| ENCLOSURE                  | 550 LBS |
| POTENTIAL TRANSFORMER      | 125 LBS |
| MOTOR OPERATOR             | 35 LBS  |
| AUTOMATION CONTROL CABINET | 400 LBS |

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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | IN/OUT SINGLE SIDED PADMOUNT 200A SCADA (ISG)  | 1        | -             | S190464      | ISG21S       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560      | -            |
| 5    | WIRE, #2/7 COPPER GROUND                       | 1        | 4510          | S812818      | TG-E-W       |
| 6    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528      | -            |
| 7    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560      | SPCONN       |
| 8    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520      | -            |
| 9    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192      | -            |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488      | -            |
| 11   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416      | -            |
| 12   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804      | -            |
| 13   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072      | -            |
| 14   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -            |
| 15   | SEALANT, CAULKING                              | 1        | 3408          | S631800      | -            |
| 16   | PADLOCK  | AS REQ.  | -             | S514848      | -            |
| 17   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600      | -            |
| 18   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880      | -            |
| 19   | 3112 SECONDARY HANDHOLE                        | AS REQ.  | -             | S162426      | 3312-0       |
| 20   | CONCRETE PAD WITH 3312, SINGLE OR THREE PHASE  | AS REQ.  | -             | S514240      | FC3PAD       |

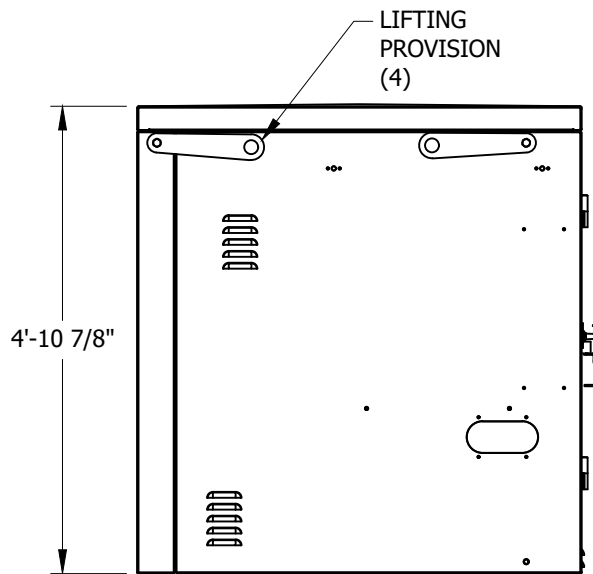
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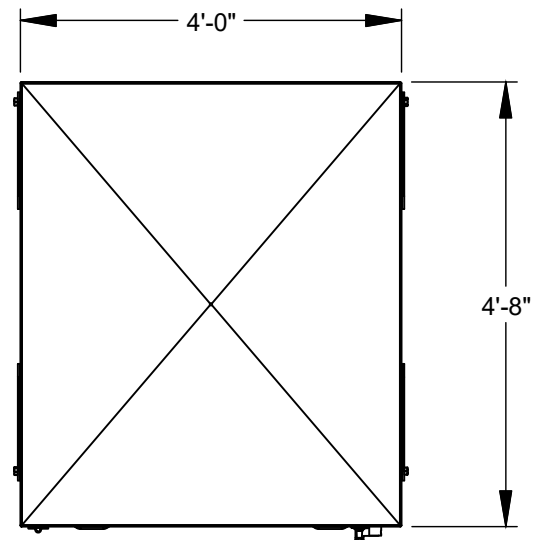
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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                                     |                    |                          |          |                          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |                                     |                    |                          |          |                          |                     |           |



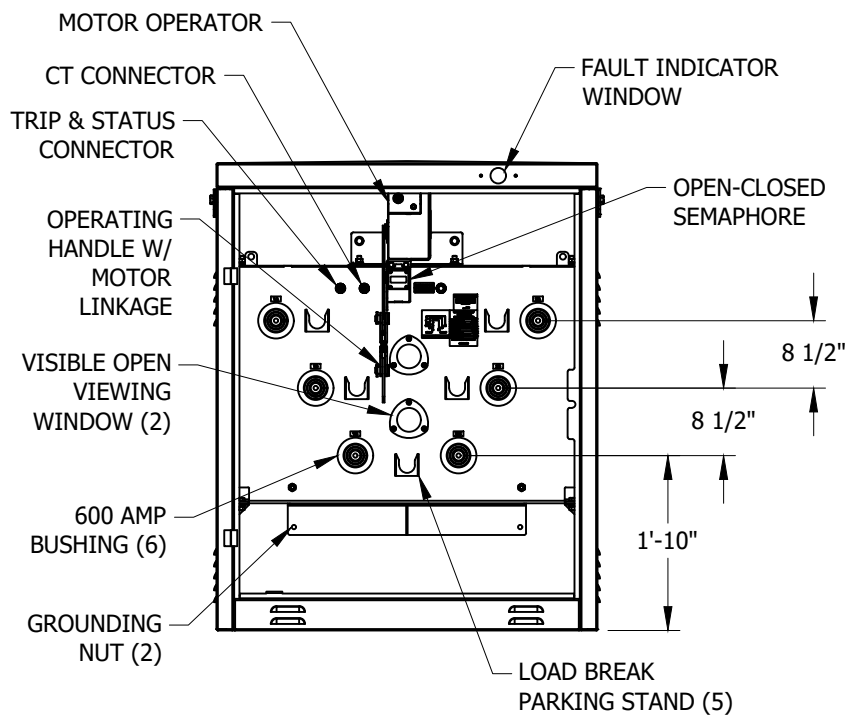
## IN/OUT SINGLE SIDED PADMOUNT 600A MANUAL/ NON-SCADA



**FIGURE 1**  
SIDE VIEW



**FIGURE 2**  
TOP VIEW



**FIGURE 3**  
FRONT VIEW

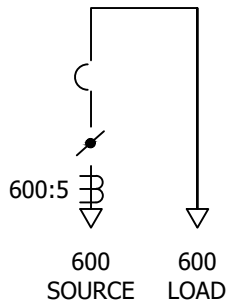
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |

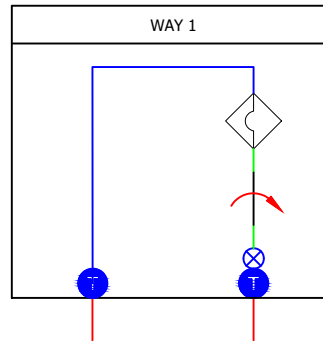


# IN/OUT SINGLE SIDED PADMOUNT 600A MANUAL/ NON-SCADA



**FIGURE 1**

IN/OUT SINGLE SIDED PADMOUNT 600A MANUAL  
CONNECTION DIAGRAM



**FIGURE 2**

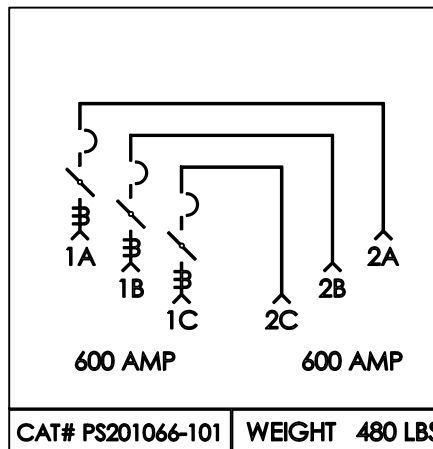
MAP SYMBOL

INNOVATIVE SWITCHGEAR SOLUTIONS, INC



ISGYXXXXX

\_\_\_/20YY



INNOVATIVE SWITCHGEAR  
SOLUTIONS INC. <sup>TM</sup>

FAULT INTERRUPTER/SWITCH

PATENT PENDING

MAXIMUM VOLTAGE 15.5 KV

CONTINUOUS CURRENT 600 AMPS

INTERRUPTING CURRENT (SYM.) 12.5 KA

INTERRUPTING CURRENT (ASYM.) 20.0 KA

PEAK CURRENT 32.5 KA

FAULT CLOSE (SYM.) 12.5 KA

IMPULSE WITHSTAND VOLTAGE 95 BIL

POWER FREQUENCY 60 HZ

CURRENT TRANSFORMER RATIO

600:5 RATIO

**TABLE 1**

| APPROXIMATE SYSTEM WEIGHTS |         |
|----------------------------|---------|
| DESCRIPTION                | WEIGHT  |
| PS201066-101 SWITCH TANK   | 480 LBS |
| ENCLOSURE                  | 715 LBS |
| MOTOR OPERATOR             | 35 LBS  |
| RELAY                      | 20 LBS  |
| PENDANT                    | 20 LBS  |

**FIGURE 3**  
MANUFACTURER LABEL

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.16



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER                  | DESIGN UNITS               |
|------|--|----------|---------------|-------------------------------|----------------------------|
| 1    | IN/OUT SINGLE SIDED PADMOUNT 600A MANUAL (ISG) | 1        | -             | S704804                       | IS6PFM                     |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -                             | -                          |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680                       | CFE2SL                     |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560                       | -                          |
| 5    | WIRE, 4/0 COPPER                               | AS REQ.  | 4520.8        | S812764                       | 4/0-SD                     |
| 6    | WIRE, #2 COPPER GROUND TRENCH                  | 1        | 4510          | S812816                       | TG-E-W                     |
| 7    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528                       | -                          |
| 8    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560                       | SPCONN                     |
| 9    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520                       | -                          |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192                       | -                          |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488                       | -                          |
| 12   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416                       | -                          |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804                       | -                          |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072                       | -                          |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654                       | -                          |
| 16   | SEALANT, CAULKING                              | 1        | 3408          | S631800                       | -                          |
| 17   | PADLOCK  | AS REQ.  | -             | S514848                       | -                          |
| 18   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600                       | -                          |
| 19   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880                       | -                          |
| 20   | 3312 SECONDARY HANDHOLE                        | 1        | 3312          | S286750<br>S162424<br>S596750 | 3312SH<br>3312CB<br>3312RR |
| 22   | CONCRETE PAD                                   | AS REQ.  | 3414          | S514280                       | CAP-PD                     |

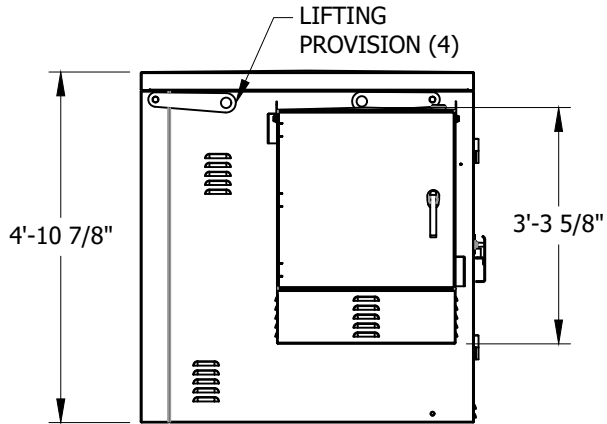
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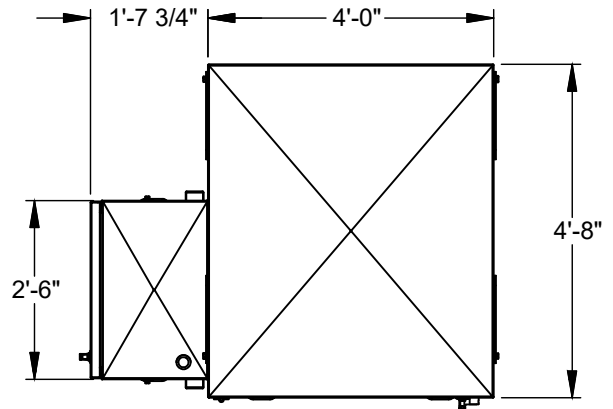
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |  |          |  |                     |           |



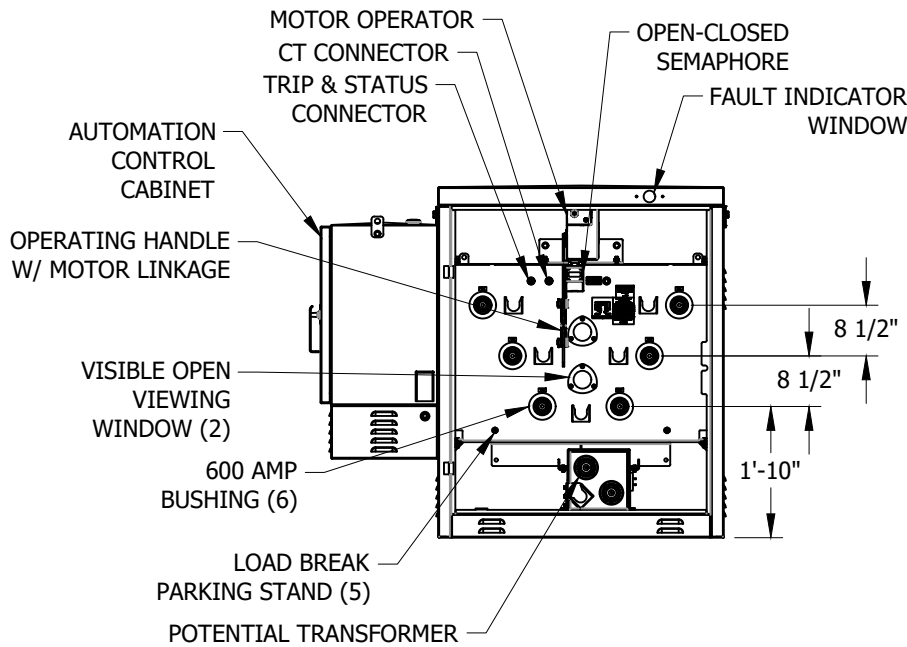
## IN/OUT SINGLE SIDED PADMOUNT 600A SCADA



**FIGURE 1**  
**SIDE VIEW**



**FIGURE 2**  
**TOP VIEW**



**FIGURE 3**  
FRONT VIEW

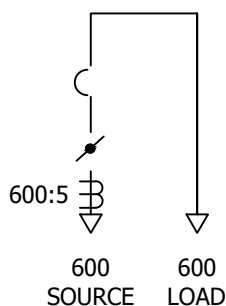
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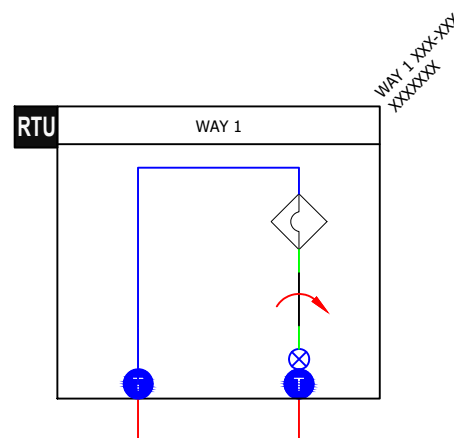


## IN/OUT SINGLE SIDED PADMOUNT 600A SCADA



**FIGURE 1**

IN/OUT SINGLE SIDED PADMOUNT 600A SCADA  
CONNECTION DIAGRAM



**FIGURE 2**

MAP SYMBOL

INNOVATIVE SWITCHGEAR SOLUTIONS, INC



ISGYYXXXX

\_\_\_/20YY

INNOVATIVE SWITCHGEAR  
SOLUTIONS INC.™

FAULT INTERRUPTER/SWITCH

PATENT PENDING

MAXIMUM VOLTAGE 15.5 KV

CONTINUOUS CURRENT 600 AMPS

INTERRUPTING CURRENT (SYM.) 12.5 KA

INTERRUPTING CURRENT (ASYM.) 20.0 KA

PEAK CURRENT 32.5 KA

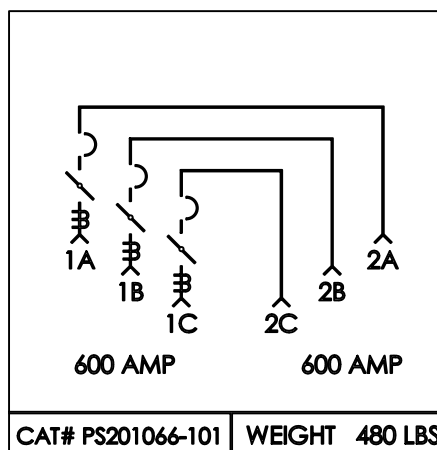
FAULT CLOSE (SYM.) 12.5 KA

IMPULSE WITHSTAND VOLTAGE 95 BIL

POWER FREQUENCY 60 HZ

CURRENT TRANSFORMER RATIO

600:5 RATIO



CAT# PS201066-101

WEIGHT 480 LBS

**TABLE 1**

| APPROXIMATE SYSTEM WEIGHTS |         |
|----------------------------|---------|
| DESCRIPTION                | WEIGHT  |
| PS201066-101 SWITCH TANK   | 480 LBS |
| ENCLOSURE                  | 715 LBS |
| MOTOR OPERATOR             | 35 LBS  |
| POTENTIAL TRANSFORMER      | 125 LBS |
| AUTOMATION CONTROL CABINET | 400 LBS |

**FIGURE 3**

MANUFACTURER LABEL

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19 OF 50

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.19



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | IN/OUT SINGLE SIDED PADMOUNT 600A SCADA (ISG)  | 1        | -             | S704800      | ISG61S       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560      | -            |
| 5    | WIRE, 4/0 COPPER                               | AS REQ.  | 4520.8        | S812764      | 4/0-SD       |
| 6    | WIRE, #2 COPPER GROUND TRENCH                  | 1        | 4510          | S812816      | TG-E-W       |
| 7    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528      | -            |
| 8    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560      | SPCONN       |
| 9    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520      | -            |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192      | -            |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488      | -            |
| 12   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416      | -            |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804      | -            |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072      | -            |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -            |
| 16   | SEALANT, CAULKING                              | 1        | 3408          | S631800      | -            |
| 17   | PADLOCK  | AS REQ.  | -             | S514848      | -            |
| 18   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600      | -            |
| 19   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880      | -            |
| 20   | CONCRETE PADMOUNT                              | AS REQ.  | 3414          | S514280      | CAP-PD       |

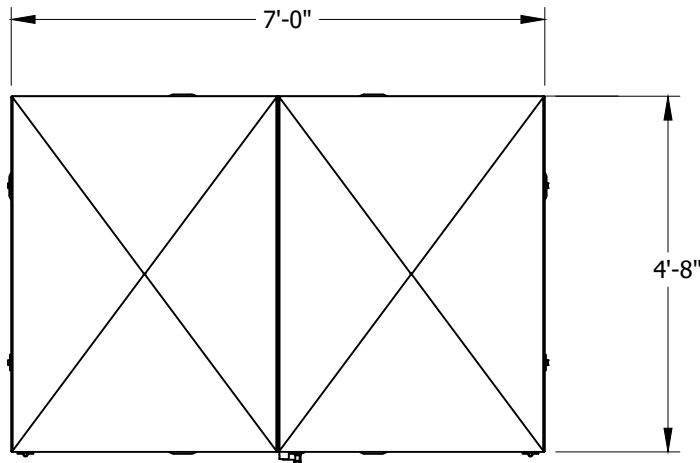
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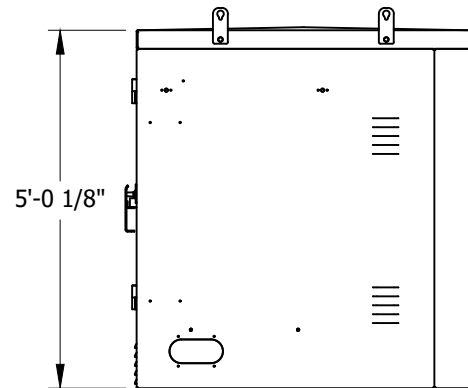
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |



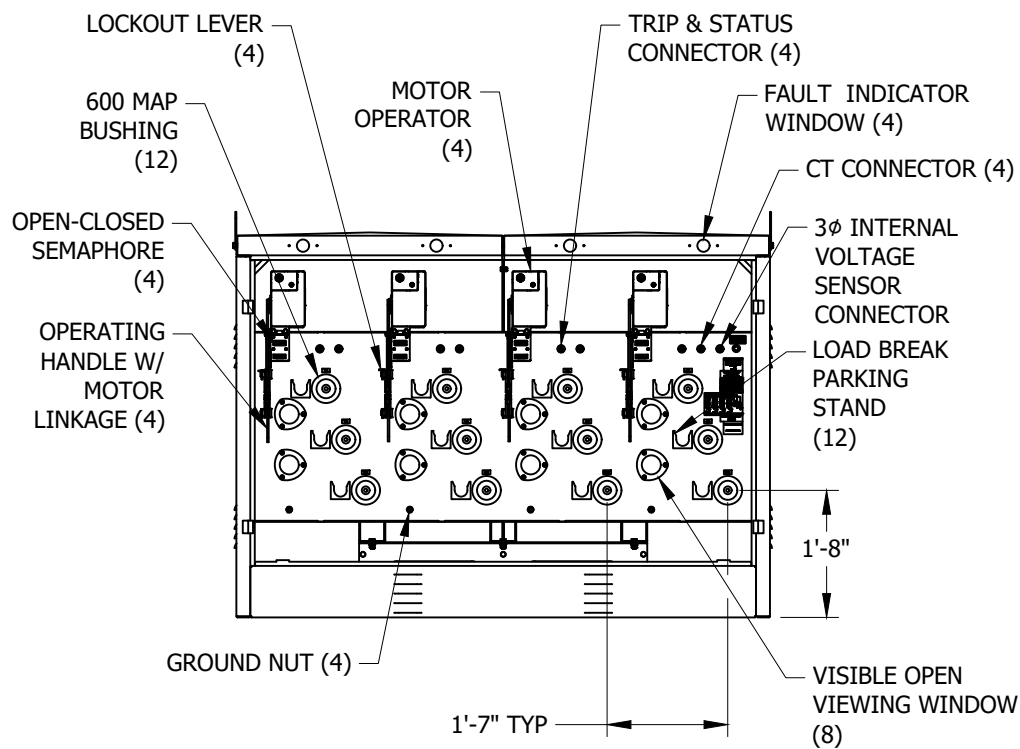
## **4-WAY SINGLE SIDED PADMOUNT 600A MANUAL/ NON-SCADA**



**FIGURE 1**  
**TOP VIEW**



**FIGURE 2**  
**SIDE VIEW**



**FIGURE 3**  
FRONT VIEW

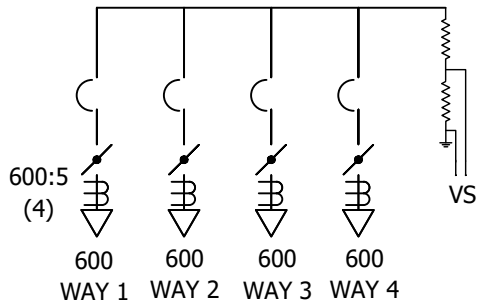
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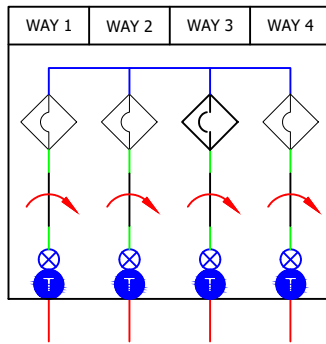
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |



## 4-WAY SINGLE SIDED PADMOUNT 600A MANUAL/ NON-SCADA



**FIGURE 1**  
4-WAY SINGLE SIDED PADMOUNT 600A MANUAL  
CONNECTION DIAGRAM



**FIGURE 3**  
MAP SYMBOL

**TABLE 1**

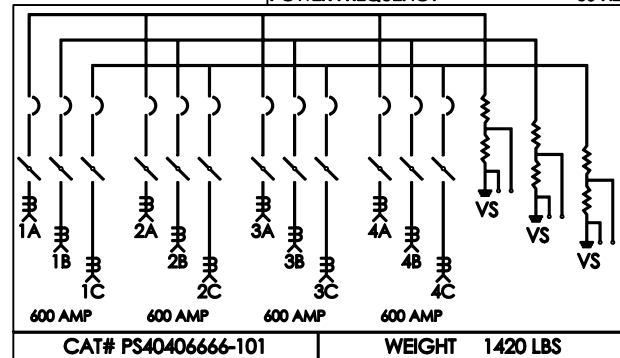
| APPROXIMATE SYSTEM WEIGHTS |             |
|----------------------------|-------------|
| DESCRIPTION                | WEIGHT      |
| PS40406666-101 SWITCH TANK | 1,420 LBS   |
| MOTOR OPERATORS            | 35 LBS EACH |
| STAND                      | 160 LBS     |
| ENCLOSURE                  | 915 LBS     |
| J-BOX                      | 10 LBS      |
| PENDANT                    | 20 LBS      |



**INNOVATIVE SWITCHGEAR  
SOLUTIONS INC.™**  
**FAULT INTERRUPTER/SWITCH**

PATENT PENDING

|                              |          |
|------------------------------|----------|
| MAXIMUM VOLTAGE              | 15.5 KV  |
| CONTINUOUS CURRENT           | 600 AMPS |
| INTERRUPTING CURRENT (SYM.)  | 12.5 KA  |
| INTERRUPTING CURRENT (ASYM.) | 20.0 KA  |
| PEAK CURRENT                 | 32.5 KA  |
| FAULT CLOSE (SYM.)           | 12.5 KA  |
| IMPULSE WITHSTAND VOLTAGE    | 95 BIL   |
| POWER FREQUENCY              | 60 HZ    |



**CAT# PS40406666-101**  
**WEIGHT 1420 LBS**  
**CURRENT TRANSFORMER RATIO**  
**600:5 RATIO**

**INTERNAL VOLTAGE SENSORS**  
**RATED 12470/7200:120**

**FIGURE 2**  
MANUFACTURER LABEL

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22 OF 50**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.22



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER                  | DESIGN UNITS    |
|------|--|----------|---------------|-------------------------------|-----------------|
| 1    | 4-WAY SINGLE SIDED PADMOUNT 600A MANUAL (ISG)                      | 1        | -             | S709054                       | ISG4WM          |
| 2    | 12KV, 600/200 AMP CONNECTIONS                                      | AS REQ.  | 4181.19       | -                             | -               |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)                      | AS REQ.  | 4191          | S321680                       | CFE2SL          |
| 4    | 1/0 CONNECTOR POST   | 5        | -             | S262560                       | -               |
| 5    | WIRE, 4/0 COPPER   | AS REQ.  | 4520.8        | S812764                       | 4/0-SD          |
| 6    | WIRE, #2 COPPER GROUND TRENCH                                      | 1        | 4510          | S812816                       | TG-E-W          |
| 7    | BOLT, EYE, STAINLESS STEEL   | AS REQ.  | -             | S150528                       | -               |
| 8    | CONNECTOR, SERVICE POST  | 4        | 3711.3        | S262560                       | SPCONN          |
| 9    | NUT, CLAMPING CHANNEL  | AS REQ.  |               | S503520                       | -               |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"                         | AS REQ.  |               | S616192                       | -               |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"                          | AS REQ.  |               | S799488                       | -               |
| 12   | WASHER, SPRING, LOCK   | AS REQ.  |               | S796416                       | -               |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN                      | 4        | -             | S148804                       | -               |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"                         | AS REQ.  | 4520.8        | S166072                       | -               |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD                     | AS REQ.  | -             | S107654                       | -               |
| 16   | SEALANT, CAULKING  | 1        | 3408          | S631800                       | -               |
| 17   | PADLOCK  | AS REQ.  | -             | S514848                       | -               |
| 18   | CABLE, #2 AWG, SOLID 1/C   | AS REQ.  | 4003.1        | S197600                       | -               |
| 19   | 5/8" X 14" MACHINE BOLT  | AS REQ.  | 392.1         | S154880                       | -               |
| 20   | 3440 & 3441 CONCRETE SKIRT (CONCRETE SKIRT REQUIRED FOR RETROFIT.) | 1        | 3560.38       | S248205                       | CC-WLK          |
| 21   | FIBERGLASS PADMOUNT  | AS REQ.  | 3428          | S514026<br>S601600<br>S656400 | 3428BP<br>X3428 |
| 22   | CONCRETE PADMOUNT  | AS REQ.  | 3441          | -                             | -               |

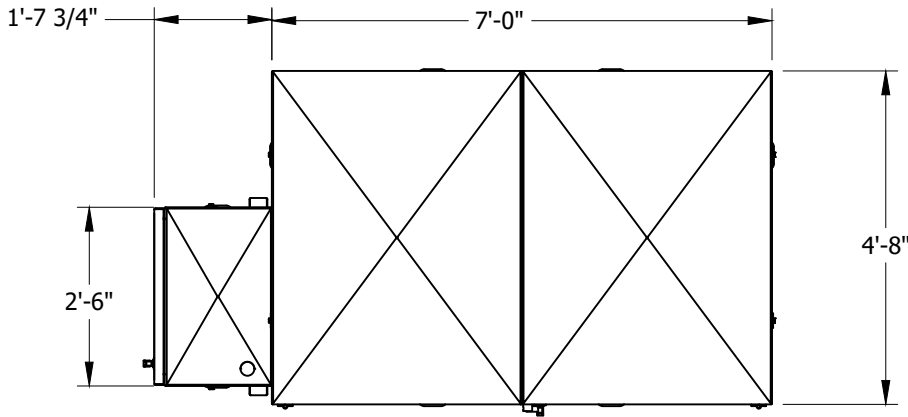
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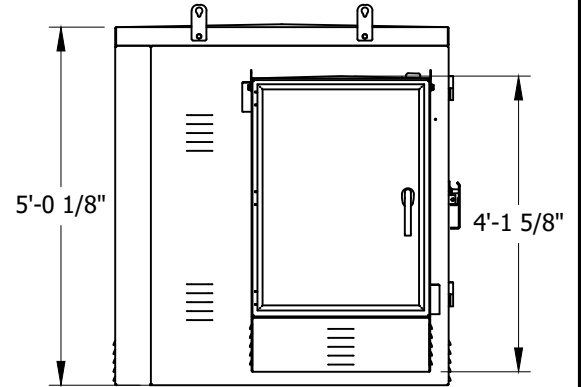
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |                                     |                    |                          |          |                          |                     |           |



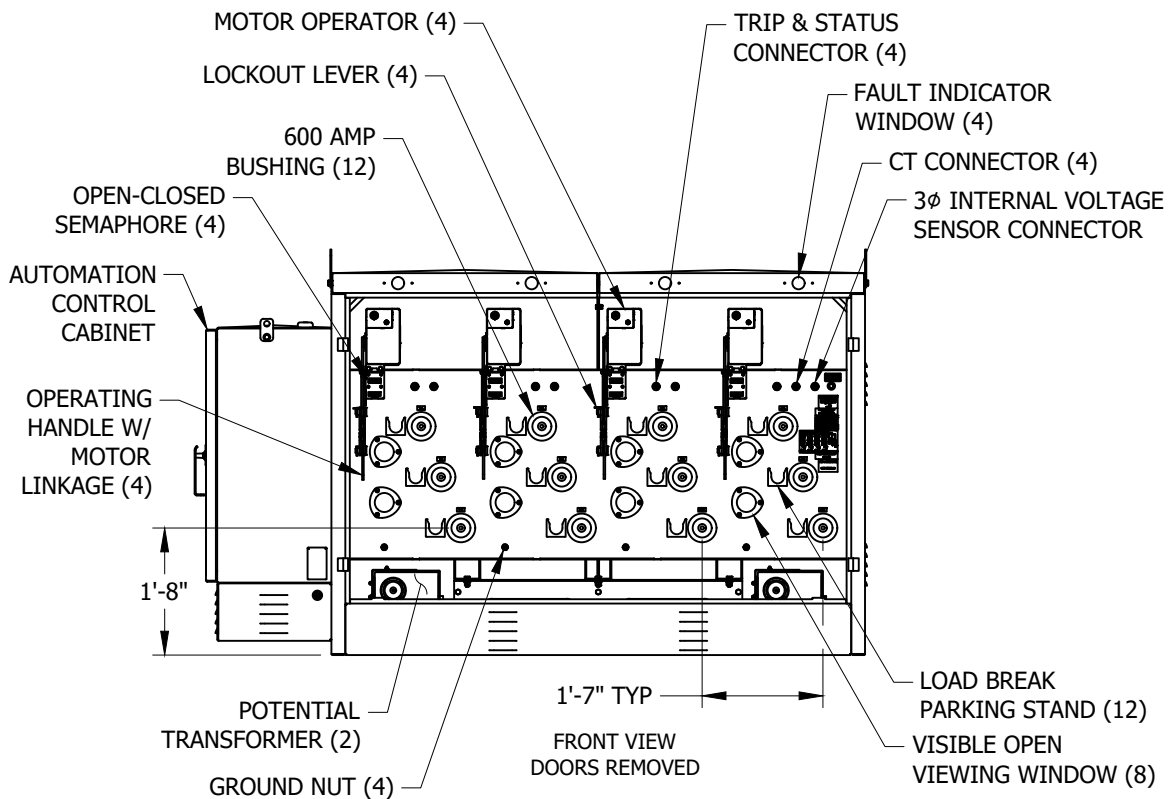
## 4-WAY SINGLE SIDED PADMOUNT 600A SCADA



**FIGURE 1**  
TOP VIEW



**FIGURE 2**  
SIDE VIEW



**FIGURE 3**  
FRONT VIEW

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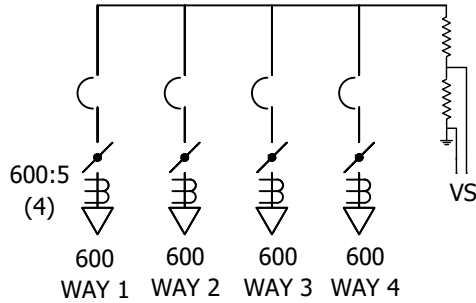
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

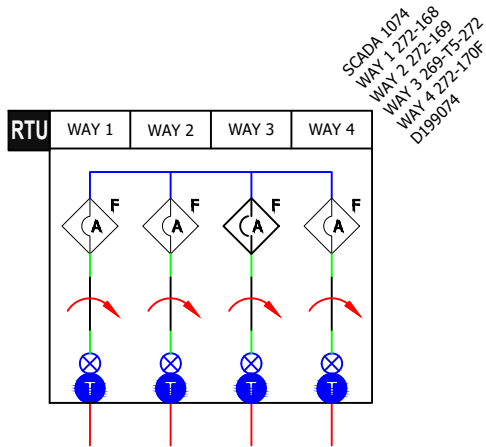
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## 4-WAY SINGLE SIDED PADMOUNT 600A SCADA



**FIGURE 1**  
4-WAY SINGLE SIDED PADMOUNT 600A SCADA  
CONNECTION DIAGRAM



**FIGURE 3**  
MAP SYMBOL

**TABLE 1**

| APPROXIMATE SYSTEM WEIGHTS |              |
|----------------------------|--------------|
| DESCRIPTION                | WEIGHT       |
| PS40406666-101 SWITCH TANK | 1,420 LBS    |
| MOTOR OPERATORS            | 35 LBS EACH  |
| STAND                      | 160 LBS      |
| POTENTIAL TRANSFORMER      | 130 LBS EACH |
| ENCLOSURE                  | 915 LBS      |
| CONTROL CABINET            | 500 LBS      |

INNOVATIVE SWITCHGEAR SOLUTIONS, INC.



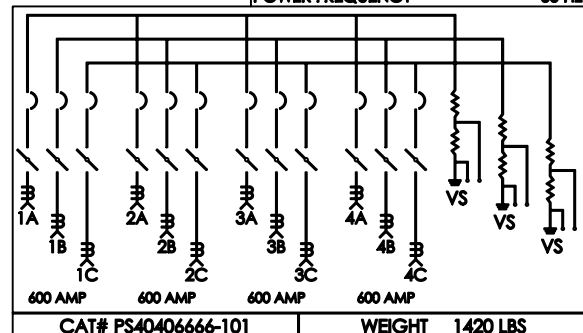
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**INNOVATIVE SWITCHGEAR  
SOLUTIONS INC.**  
FAULT INTERRUPTER/SWITCH

PATENT PENDING

|                              |          |
|------------------------------|----------|
| MAXIMUM VOLTAGE              | 15.5 KV  |
| CONTINUOUS CURRENT           | 600 AMPS |
| INTERRUPTING CURRENT (SYM.)  | 12.5 KA  |
| INTERRUPTING CURRENT (ASYM.) | 20.0 KA  |
| PEAK CURRENT                 | 32.5 KA  |
| FAULT CLOSE (SYM.)           | 12.5 KA  |
| IMPULSE WITHSTAND VOLTAGE    | 95 BIL   |
| POWER FREQUENCY              | 60 HZ    |



CAT# PS40406666-101

WEIGHT 1420 LBS

CURRENT TRANSFORMER RATIO

600:5 RATIO

INTERNAL VOLTAGE SENSORS

RATED 12470/7200:120

**FIGURE 2**  
MANUFACTURER LABEL

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25 OF 50**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.25



## BILL OF MATERIALS:

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER                  | DESIGN UNITS    |
|------|--|----------|---------------|-------------------------------|-----------------|
| 1    | 4-WAY SINGLE SIDED PADMOUNT 600A SCADA (ISG)                       | 1        | -             | S704724                       | ISG4WS          |
| 2    | 12KV, 600/200 AMP CONNECTIONS                                      | AS REQ.  | 4181.19       | -                             | -               |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)                      | AS REQ.  | 4191          | S321680                       | CFE2SL          |
| 4    | 1/0 CONNECTOR POST   | 5        | -             | S262560                       | -               |
| 5    | WIRE, 4/0 COPPER   | AS REQ.  | 4520.8        | S812764                       | 4/0-SD          |
| 6    | WIRE, #2 COPPER GROUND TRENCH                                      | 1        | 4510          | S812816                       | TG-E-W          |
| 7    | BOLT, EYE, STAINLESS STEEL   | AS REQ.  | -             | S150528                       | -               |
| 8    | CONNECTOR, SERVICE POST  | 4        | 3711.3        | S262560                       | SPCONN          |
| 9    | NUT, CLAMPING CHANNEL  | AS REQ.  |               | S503520                       | -               |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"                         | AS REQ.  |               | S616192                       | -               |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"                          | AS REQ.  |               | S799488                       | -               |
| 12   | WASHER, SPRING, LOCK   | AS REQ.  |               | S796416                       | -               |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN                      | 4        | -             | S148804                       | -               |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"                         | AS REQ.  | 4520.8        | S166072                       | -               |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD                     | AS REQ.  | -             | S107654                       | -               |
| 16   | SEALANT, CAULKING  | 1        | 3408          | S631800                       | -               |
| 17   | PADLOCK  | AS REQ.  | -             | S514848                       | -               |
| 18   | CABLE, #2 AWG, SOLID 1/C   | AS REQ.  | 4003.1        | S197600                       | -               |
| 19   | 5/8" X 14" MACHINE BOLT  | AS REQ.  | 392.1         | S154880                       | -               |
| 20   | 3440 & 3441 CONCRETE SKIRT (CONCRETE SKIRT REQUIRED FOR RETROFIT.) | 1        | 3560.38       | S248205                       | CC-WLK          |
| 21   | FIBERGLASS PADMOUNT  | AS REQ.  | 3428          | S514026<br>S601600<br>S656400 | 3428BP<br>X3428 |
| 22   | CONCRETE PADMOUNT  | AS REQ.  | 3441          | -                             | -               |

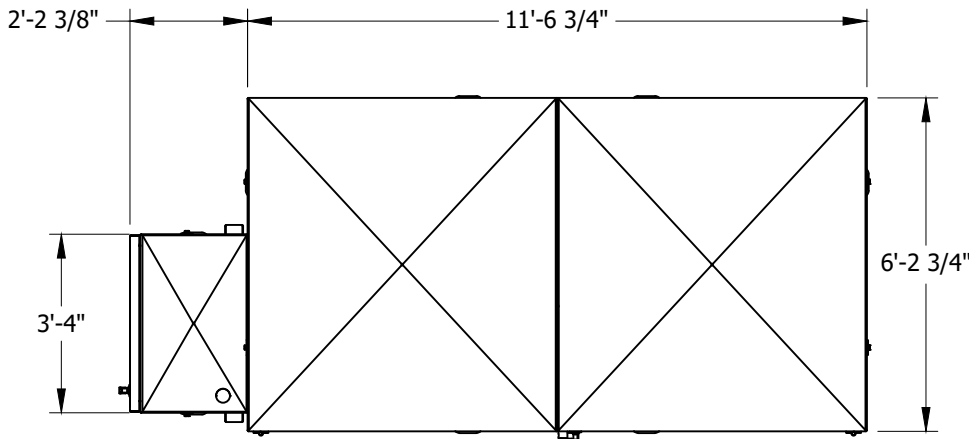
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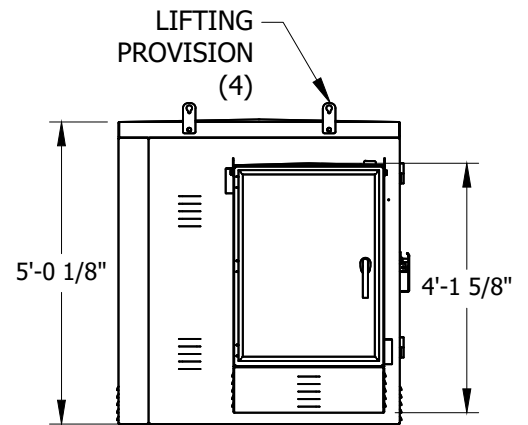
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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |



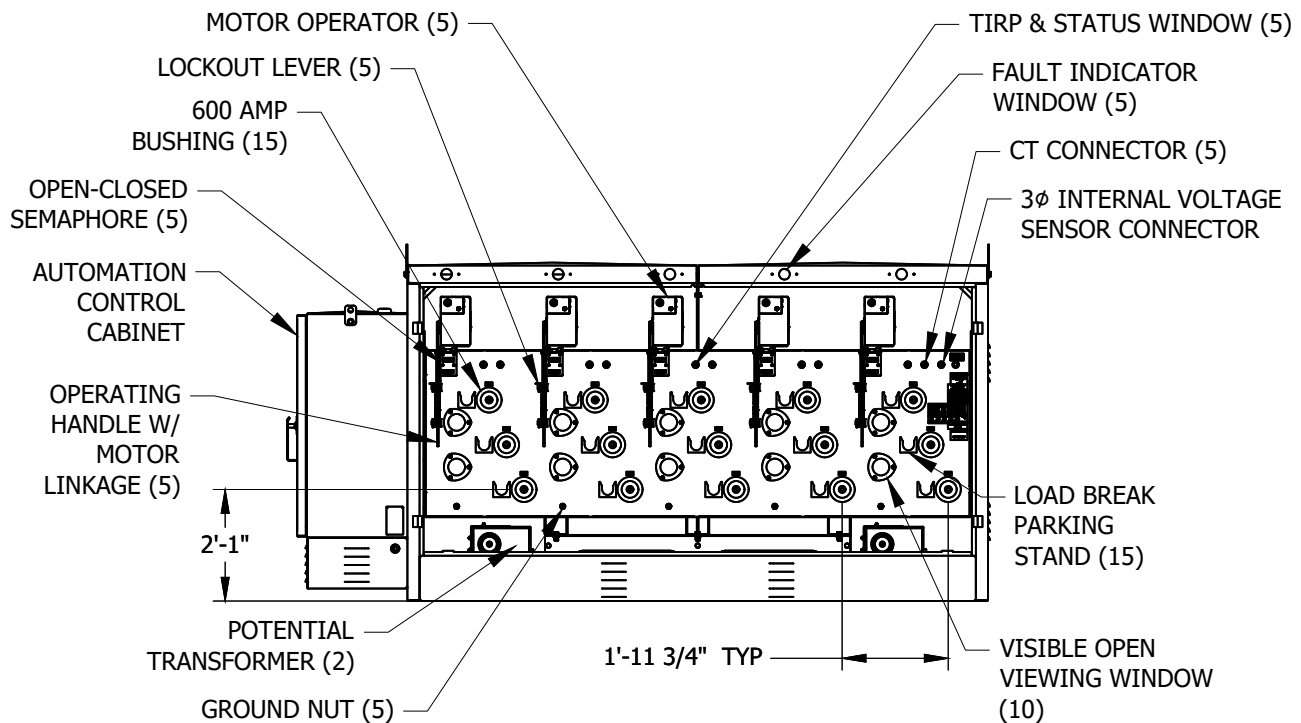
## 5-WAY SINGLE SIDED PADMOUNT 600A SCADA



**FIGURE 1**  
TOP VIEW



**FIGURE 2**  
SIDE VIEW



**FIGURE 3**  
FRONT VIEW  
DOORS REMOVED

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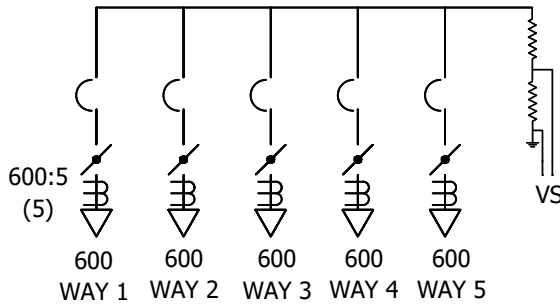
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

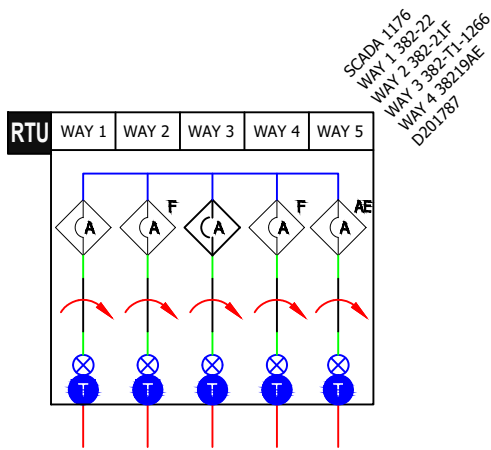
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## 5-WAY SINGLE SIDED PADMOUNT 600A SCADA



**FIGURE 1**  
5-WAY SINGLE SIDED PADMOUNT 600A SCADA  
CONNECTION DIAGRAM



**FIGURE 3**  
MAP SYMBOL

**TABLE 1**

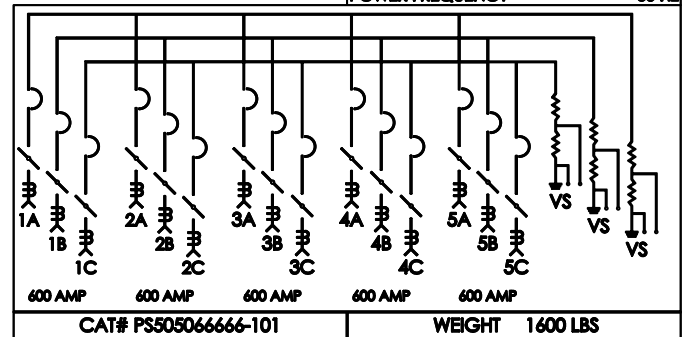
| APPROXIMATE SYSTEM WEIGHTS  |              |
|-----------------------------|--------------|
| DESCRIPTION                 | WEIGHT       |
| PS505066666-101 SWITCH TANK | 1,600 LBS    |
| MOTOR OPERATORS             | 35 LBS EACH  |
| STAND                       | 170 LBS      |
| POTENTIAL TRANSFORMERS      | 130 LBS EACH |
| ENCLOSURE                   | 1,055 LBS    |
| CONTROL CABINET             | 500 LBS      |



**INNOVATIVE SWITCHGEAR  
SOLUTIONS INC.**  
FAULT INTERRUPTER/SWITCH

PATENT PENDING

|                              |          |
|------------------------------|----------|
| MAXIMUM VOLTAGE              | 15.5 KV  |
| CONTINUOUS CURRENT           | 600 AMPS |
| INTERRUPTING CURRENT (SYM.)  | 12.5 KA  |
| INTERRUPTING CURRENT (ASYM.) | 20.0 KA  |
| PEAK CURRENT                 | 32.5 KA  |
| FAULT CLOSE (SYM.)           | 12.5 KA  |
| IMPULSE WITHSTAND VOLTAGE    | 95 BIL   |
| POWER FREQUENCY              | 60 HZ    |



CAT# PS505066666-101

WEIGHT 1600 LBS

CURRENT TRANSFORMER RATIO  
600:5 RATIO

INTERNAL VOLTAGE SENSORS

RATED 12470/7200:120

**FIGURE 2**  
MANUFACTURER LABEL

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.28



## BILL OF MATERIALS:

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | 5-WAY SINGLE SIDED PADMOUNT 600A SCADA         | 1        | -             | S704728      | ISG5WS       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560      | -            |
| 5    | WIRE, 4/0 COPPER                               | AS REQ.  | 4520.8        | S812764      | 4/0-SD       |
| 6    | WIRE, #2 COPPER GROUND TRENCH                  | 1        | 4510          | S812816      | TG-E-W       |
| 7    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528      | -            |
| 8    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560      | SPCONN       |
| 9    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520      | -            |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192      | -            |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488      | -            |
| 12   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416      | -            |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804      | -            |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072      | -            |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -            |
| 16   | SEALANT, CAULKING                              | 1        | 3408          | S631800      | -            |
| 17   | PADLOCK  | AS REQ.  | -             | S514848      | -            |
| 18   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600      | -            |
| 19   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880      | -            |
| 20   | 3440 & 3441 CONCRETE SKIRT                     | 1        | 3560.38       | S248205      | CC-WLK       |
| 21   | FIBERGLASS PADMOUNT                            | AS REQ.  | 3429.3        | -            | -            |
| 22   | CONCRETE PADMOUNT                              | AS REQ.  | 3441          | -            | -            |

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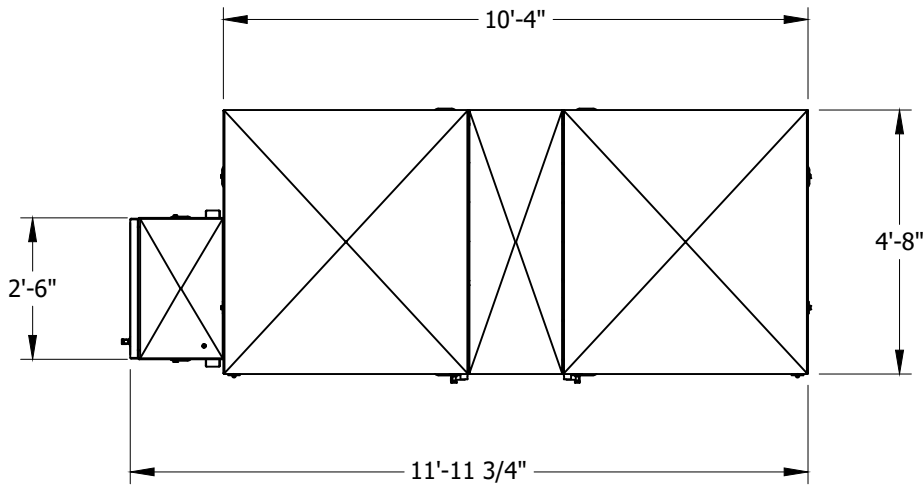
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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |



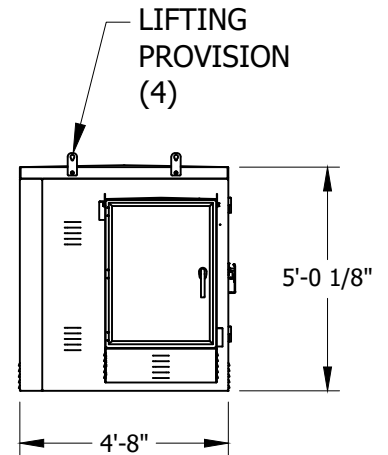
## 6-WAY SINGLE SIDED PADMOUNT 600A SCADA

### ATTENTION:

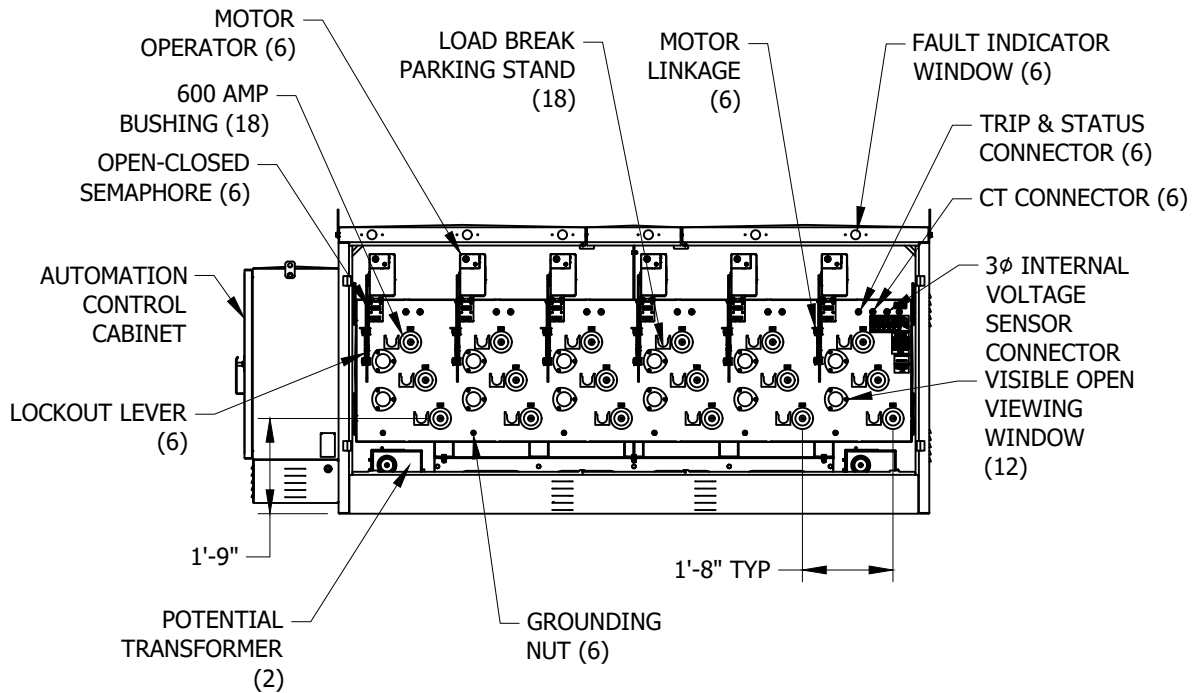
6-WAY ISG SWITCHGEAR: WAYS 1-5 ARE FAULT INTERRUPTING CAPABLE. WAY 6 WILL ONLY BE USED AS A SWITCH OR TIE POSITION.



**FIGURE 1**  
TOP VIEW



**FIGURE 2**  
SIDE VIEW



**FIGURE 3**  
FRONT VIEW

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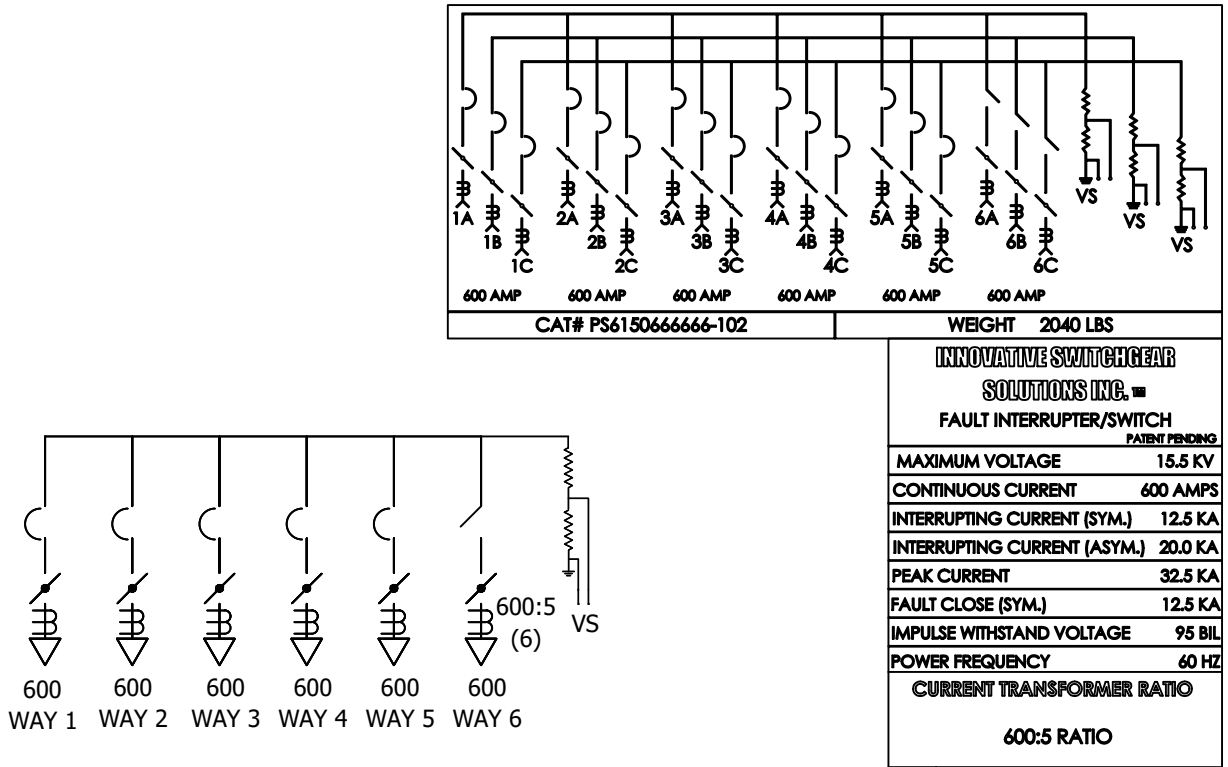
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.30



## 6-WAY SINGLE SIDED PADMOUNT 600A SCADA



**FIGURE 1**  
6-WAY SINGLE SIDED PADMOUNT 600A SCADA  
CONNECTION DIAGRAM

## TABLE 1

| APPROXIMATE SYSTEM WEIGHTS   |              |
|------------------------------|--------------|
| DESCRIPTION                  | WEIGHT       |
| PS6150666666-102 SWITCH TANK | 2,040 LBS    |
| STAND                        | 240 LBS      |
| MOTOR OPERATORS              | 35 LBS EACH  |
| POTENTIAL TRANSFORMERS       | 105 LBS EACH |
| ENCLOSURE                    | 1,215 LBS    |
| AUTOMATION CONTROL CABINET   | 500 LBS      |

**FIGURE 2**  
MANUFACTURER LABEL

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.31



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE    | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|------------------|--------------|--------------|
| 1    | 6-WAY SINGLE SIDED PADMOUNT 600A SCADA         | 1        | -                | S704810      | ISG6WS       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19          | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191             | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -                | S262560      | -            |
| 5    | WIRE, 4/0 COPPER                               | AS REQ.  | 4520.8           | S812764      | 4/0-SD       |
| 6    | WIRE, #2 COPPER GROUND TRENCH                  | 1        | 4510             | S812816      | TG-E-W       |
| 7    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -                | S150528      | -            |
| 8    | CONNECTOR, SERVICE POST                        | 4        | 3711.3<br>3679.2 | S262560      | SPCONN       |
| 9    | NUT, CLAMPING CHANNEL                          | AS REQ.  |                  | S503520      | -            |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |                  | S616192      | -            |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |                  | S799488      | -            |
| 12   | WASHER, SPRING, LOCK                           | AS REQ.  |                  | S796416      | -            |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -                | S148804      | -            |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8           | S166072      | -            |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -                | S107654      | -            |
| 16   | SEALANT, CAULKING                              | 1        | 3408             | S631800      | -            |
| 17   | PADLOCK  | AS REQ.  | -                | S514848      | -            |
| 18   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1           | S197600      | -            |
| 19   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1            | S154880      | -            |
| 20   | FIBERGLASS BOX PAD                             | AS REQ.  | 3560.28          | S514032      | ISG6WY       |

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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |                                     |                    |                          |          |                          |                     |           |



**ATTENTION:**  
SPECIALTY PAD FOR 6-WAY ISG ONLY



| 6-WAY SPECIALTY PAD |        |
|---------------------|--------|
| STOCK CODE          | AU     |
| S514032             | ISG6WY |

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Diagram illustrating the installation of a three-phase meter using a J-BOX and a pendant connection. The meter is mounted on the J-BOX, and the pendant is connected to the meter. The diagram shows the meter, J-BOX, and pendant connection.

PENDANT

J-BOX

WAY 4

Diagram illustrating a four-way traffic intersection with four approaches labeled WAY 1, WAY 2, WAY 3, and WAY 4. Each approach has a red stop line, a blue circle with a white 'T' (through traffic), a blue circle with a white 'A' (left turn), and a blue circle with a white 'X' (right turn). Red arrows indicate traffic flow: straight through (green line), left turn (green line), and right turn (red arrow). A blue line connects the left-turn circles of WAY 2 and WAY 3, indicating a shared left-turn lane.

|   |                 |
|---|-----------------|
| <b>INNOVATIVE SWITCHGEAR SOLUTIONS INC. ■</b><br><b>FAULT INTERRUPTER/SWITCH</b><br><small>PATENT PENDING</small> |                 |
| <b>MAXIMUM VOLTAGE</b>  | <b>15.5 KV</b>  |
| <b>CONTINUOUS CURRENT</b>   | <b>600 AMPS</b> |
| <b>INTERRUPTING CURRENT (SYM.)</b>  | <b>12.5 KA</b>  |
| <b>INTERRUPTING CURRENT (ASYM.)</b>   | <b>20.0 KA</b>  |
| <b>PEAK CURRENT</b>   | <b>32.5 KA</b>  |
| <b>FAULT CLOSE (SYM.)</b>   | <b>12.5 KA</b>  |
| <b>IMPULSE WITHSTAND VOLTAGE</b>  | <b>95 BIL</b>   |
| <b>POWER FREQUENCY</b>  | <b>60 HZ</b>    |


  

|                           |                        |
|---------------------------|------------------------|
| <b>CAT# P40406666-101</b> | <b>WEIGHT 1740 LBS</b> |
|---------------------------|------------------------|

|  |
|--|
| <b>CURRENT TRANSFORMER RATIO</b><br><br><b>600:5 RATIO</b> |
|--|

|   |
|---|
| <b>INNOVATIVE SWITCHGEAR SOLUTIONS, INC.</b><br><br>ISGYYXXXX<br>____/20YY |
|---|

|  |
|--|
| <b>INTERNAL VOLTAGE SENSORS</b><br><br><b>RATED 12470/7200:120</b> |
|--|

| APPROXIMATE SYSTEM WEIGHTS |             |
|----------------------------|-------------|
| DESCRIPTION                | WEIGHT      |
| P40406666-101 SWITCH TANK  | 1,740 LBS   |
| MOTOR OPERATORS            | 35 LBS EACH |
| ENCLOSURE                  | 950 LBS     |
| J-BOX                      | 10 LBS      |
| PENDANT                    | 25 LBS      |

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### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                       | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | 4-WAY DOUBLE SIDED PADMOUNT 600A MANUAL/NON-SCADA | 1        | -             | S704742      | IS4P6M       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                     | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUZE INCLUDED)     | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                                | 5        | -             | S262560      | -            |
| 5    | WIRE, 4/0 COPPER                                  | AS REQ.  | 4520.8        | S812764      | 4/0-SD       |
| 6    | WIRE, #2 COPPER GROUND TRENCH                     | 1        | 4510          | S812816      | TG-E-W       |
| 7    | BOLT, EYE, STAINLESS STEEL                        | AS REQ.  | -             | S150528      | -            |
| 8    | CONNECTOR, SERVICE POST                           | 4        | 3711.3        | S262560      | SPCONN       |
| 9    | NUT, CLAMPING CHANNEL                             | AS REQ.  |               | S503520      | -            |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"        | AS REQ.  |               | S616192      | -            |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"         | AS REQ.  |               | S799488      | -            |
| 12   | WASHER, SPRING, LOCK                              | AS REQ.  |               | S796416      | -            |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN     | 4        | -             | S148804      | -            |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"        | AS REQ.  | 4520.8        | S166072      | -            |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD    | AS REQ.  | -             | S107654      | -            |
| 16   | 5/8" X 14" MACHINE BOLT                           | AS REQ.  | 392.1         | S154880      | -            |
| 17   | PADLOCK   | AS REQ.  | -             | S514848      | -            |
| 18   | CABLE, #2 AWG, SOLID 1/C                          | AS REQ.  | 4003.1        | S197600      | -            |
| 19   | FIBERGLASS BOX PAD                                | AS REQ.  | 3423.3        | S514028      | 3423BP       |

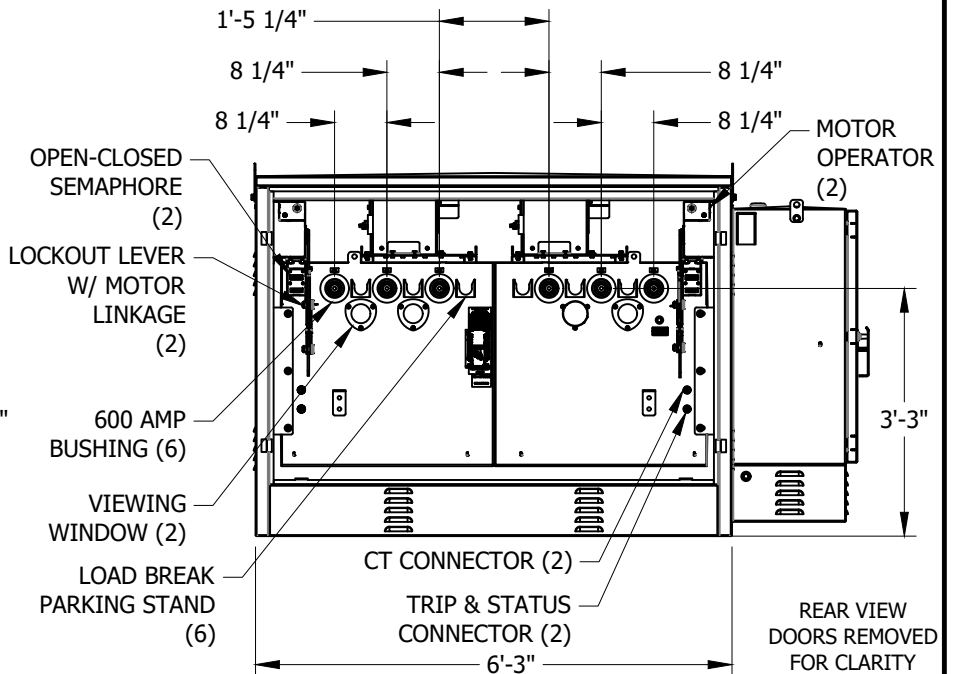
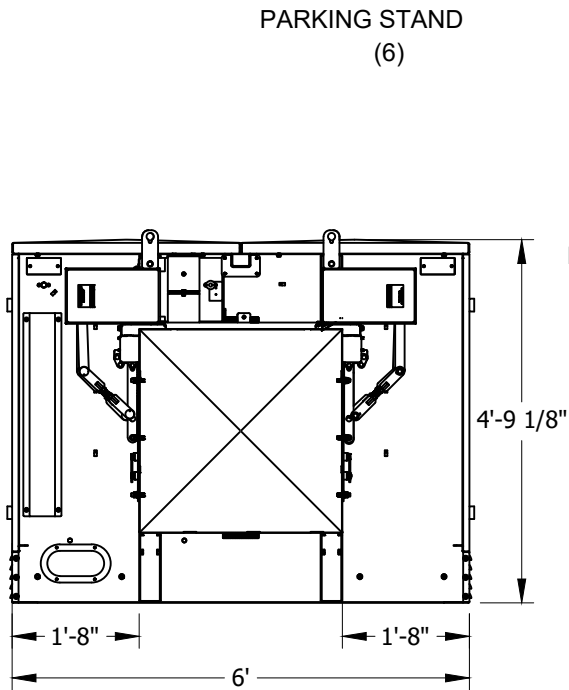
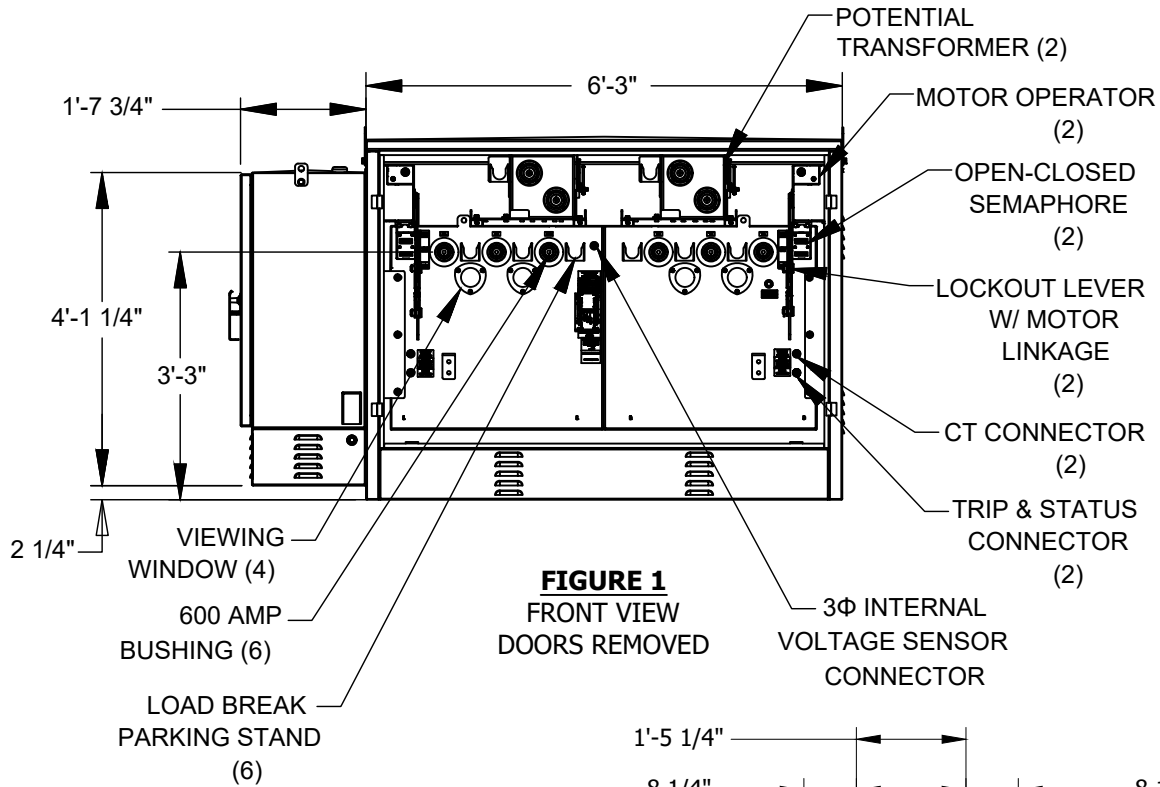
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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |          |                     |           |



## 4-WAY DOUBLE SIDED PADMOUNT 600A SCADA



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**37 OF 50**

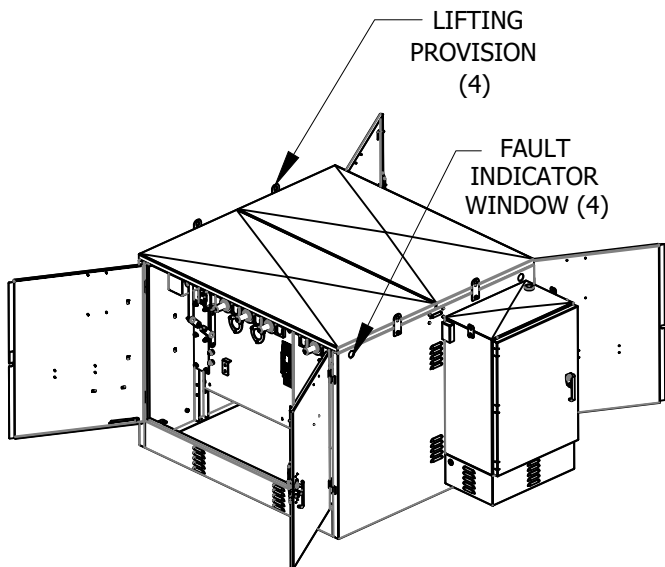
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

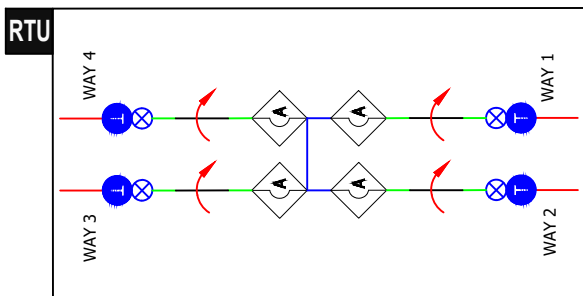
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## 4-WAY DOUBLE SIDED PADMOUNT 600A SCADA



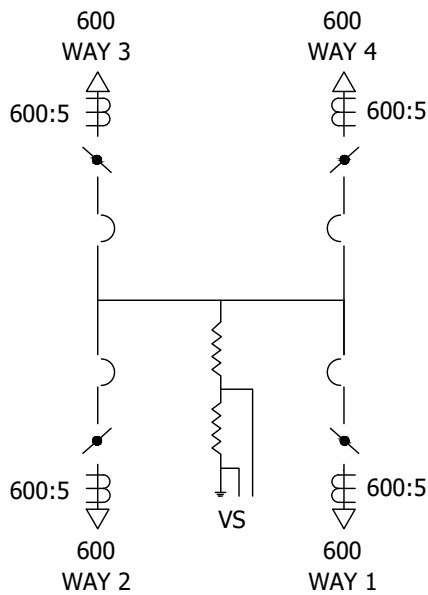
**FIGURE 1**  
ISOMETRIC VIEW



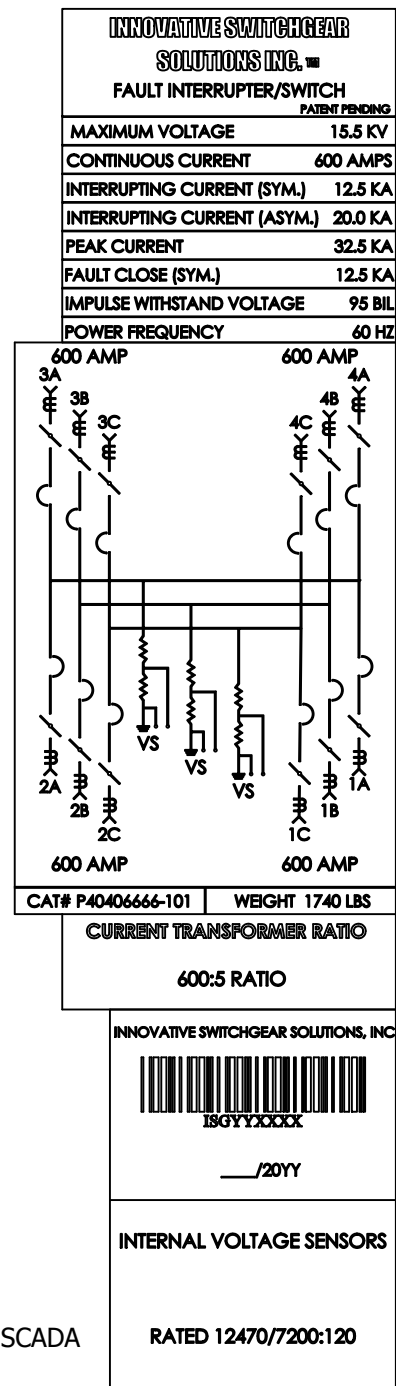
**FIGURE 3**  
MAP SYMBOL

### TABLE 1

| APPROXIMATE SYSTEM WEIGHTS |              |
|----------------------------|--------------|
| DESCRIPTION                | WEIGHT       |
| P40406666-101 SWITCH TANK  | 1,740 LBS    |
| MOTOR OPERATORS            | 35 LBS EACH  |
| POTENTIAL TRANSFORMERS     | 130 LBS EACH |
| ENCLOSURE                  | 950 LBS      |
| CONTROL CABINET            | 500 LBS      |



**FIGURE 4**  
4-WAY DOUBLE SIDED PADMOUNT 600A SCADA  
CONNECTION DIAGRAM



**FIGURE 2**  
MANUFACTURER LABEL

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.38



**4-WAY DOUBLE SIDED PADMOUNT 600A SCADA**

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | 4-WAY DOUBLE SIDED PADMOUNT 600A SCADA         | 1        | -             | S704726      | ISG42P       |
| 2    | 12KV, 600/200 AMP CONNECTIONS                  | AS REQ.  | 4181.19       | -            | -            |
| 3    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)  | AS REQ.  | 4191          | S321680      | CFE2SL       |
| 4    | 1/0 CONNECTOR POST                             | 5        | -             | S262560      | -            |
| 5    | WIRE, 4/0 COPPER                               | AS REQ.  | 4520.8        | S812764      | 4/0-SD       |
| 6    | WIRE, #2 COPPER GROUND TRENCH                  | 1        | 4510          | S812816      | TG-E-W       |
| 7    | BOLT, EYE, STAINLESS STEEL                     | AS REQ.  | -             | S150528      | -            |
| 8    | CONNECTOR, SERVICE POST                        | 4        | 3711.3        | S262560      | SPCONN       |
| 9    | NUT, CLAMPING CHANNEL                          | AS REQ.  |               | S503520      | -            |
| 10   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"     | AS REQ.  |               | S616192      | -            |
| 11   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"      | AS REQ.  |               | S799488      | -            |
| 12   | WASHER, SPRING, LOCK                           | AS REQ.  |               | S796416      | -            |
| 13   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN  | 4        | -             | S148804      | -            |
| 14   | BRACKET, ANGLE, STAINLESS STEEL<br>2" X 3"     | AS REQ.  | 4520.8        | S166072      | -            |
| 15   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -            |
| 16   | 5/8" X 14" MACHINE BOLT                        | AS REQ.  | 392.1         | S154880      | -            |
| 17   | PADLOCK  | AS REQ.  | -             | S514848      | -            |
| 18   | CABLE, #2 AWG, SOLID 1/C                       | AS REQ.  | 4003.1        | S197600      | -            |
| 19   | FIBERGLASS BOX PAD                             | AS REQ.  | 3423.3        | S514028      | 3423BP       |

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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |   |                    |  |          |  |                     |           |



# **INSTALLATION:**

A. FOR SINGLE PADMOUNT APPLICATIONS, THE SWITCH TANK IS SHIPPED INSIDE THE ENCLOSURE ON ITS BACK WITH THE BUSHINGS FACING UP. THE SWITCH STAND AND ANY OPTIONAL ITEMS TO COMPLETE THE PACKAGE WILL BE SHIPPED INSIDE THE PADMOUNT ENCLOSURE. SEE FIGURE 1.

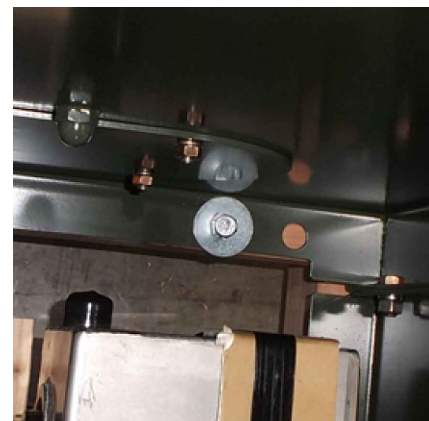


**FIGURE 1**

B. FOUR INTERNAL AND TWO EXTERNAL BOLTS SECURE THE ENCLOSURE TO THE PALLET. REMOVE THESE BOLTS TO LIFT THE ENCLOSURE FROM THE PALLET. THE DOORS MAY BE OPENED OR REMOVED TO HELP GUIDE THE ENCLOSURE OVER THE EQUIPMENT. SEE FIGURE 2 AND 3.



**FIGURE 2**



**FIGURE 3**

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# **INSTALLATION (CON'T):**

C. THREE LIFTING PROVISIONS ARE PROVIDED ON BOTH ENDS OF THE SWITCH TANK. THESE LIFTING PROVISIONS ROTATE 360 DEGREES. SEE FIGURE 4 AND 5.

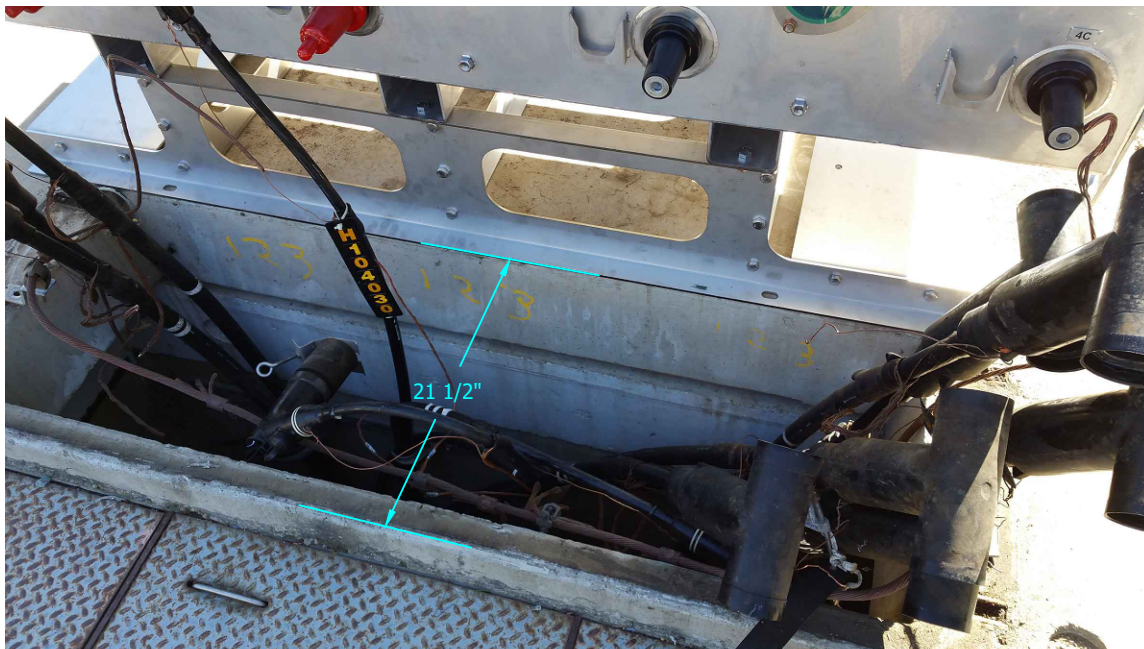


**FIGURE 4**



**FIGURE 5**

D. MOTOR OPERATOR LINKAGE REQUIRES 20-INCHES OF SPACE IN THE OPEN POSITION TO NOT IMPACT THE PADMOUNT ENCLOSURE DOORS. LEAVE 21 1/2 INCHES FROM THE FACE OF THE SWITCH TO THE PADMOUNT ENCLOSURE DOORS. SEE FIGURE 6.



**FIGURE 6**

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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT                   |                    |          |                     |           |



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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |                           |                    |          |                     |           |



**INSTALLATION (CON'T):**

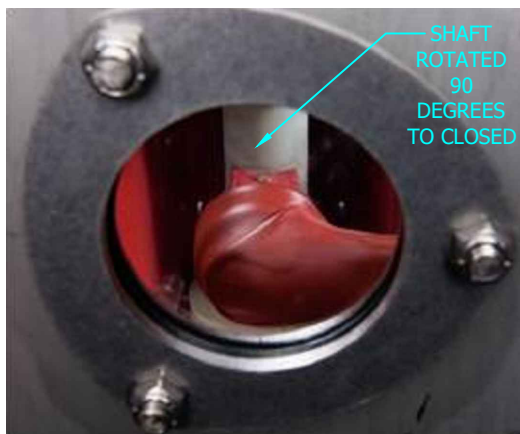
H. THE POLYCARBONATE VIEWING WINDOWS FOR THE CLOSED/OPEN VACUUM CONTACT SEMAPHORE ARE COVERED AT THE FACTORY WITH GREEN ULTRAVIOLET PROTECTIVE TAPE. REMOVE THE TAPE UPON COMPLETION OF INSTALLATION. IF THE TAPE IS INADVERTENTLY REMOVED PRIOR TO INSTALLATION, PLEASE COVER THE LENSES OR APPLY ULTRAVIOLET PROTECTIVE TAPE TO KEEP THE WINDOWS FROM YELLOWING. SEE FIGURE 10.

**FIGURE 10**

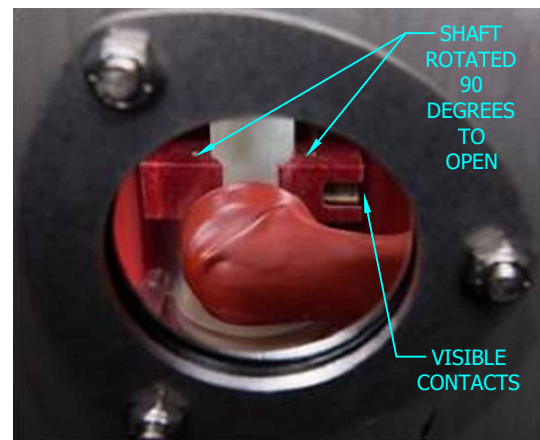
J. THE ONE OPERATING HANDLE OPENS THE VACUUM INTERRUPTS FIRST SO THAT THE ELECTRICAL INTERRUPTION IS ALWAYS PERFORMED WITHIN THE VACUUM INTERRUPTS AND THEN THE VISIBLE OPEN ISOLATION POINT (VOIP) SWITCH OPENS.

K. FOR PADMOUNT VIEW OF THE CONTACTS:

1. FOR SINGLE SIDE PADMOUNT, VAULTMOUNT, AND SUBMERSIBLE, THE VIEW OF THE OPEN CONTACTS IS FROM THE TOP OF THE MECHANISM. SEE FIGURES 11 AND 12 BELOW.



VISIBLE OPEN SHAFT  
"CLOSED"

**FIGURE 11**

VISIBLE OPEN SHAFT "OPEN",  
ISOLATED AND VISIBLE

**FIGURE 12**

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

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Figure 1 shows two circular ports on a metallic surface. Each port has a central sensor or probe and is secured by four green fasteners or bolts. The ports are arranged side-by-side, with a red circular feature visible above the right port.

**FIGURE 13****FIGURE 14**

WAY/MOTOR OPERATOR SELECTOR

POWER-ON/OFF

CONTROL HEALTHY

120V AC INPUT

BLUE LED-WAY SELECTED

**FIGURE 15**

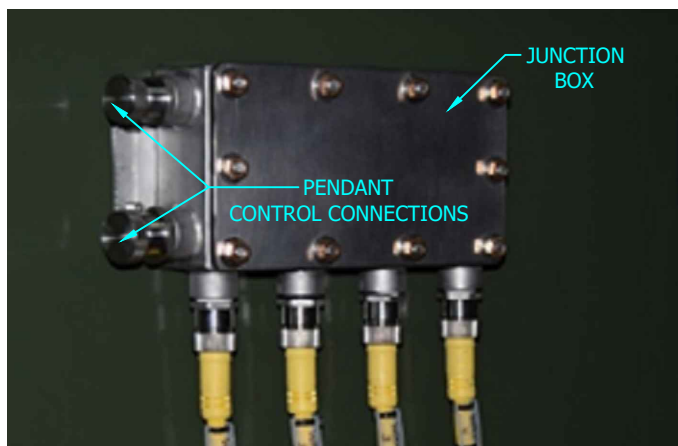
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT          |                           |                    |          |                     |           |



**INSTALLATION (CON'T):**

M. PENDANT CONTROLLER MUST BE CONNECTED TO THE JUNCTION BOX PICTURED BELOW TO OPERATE MOTOR OPERATORS. JUNCTION BOX CONNECTIONS ARE SEVEN-PIN AND 12-PIN, SO THEY CANNOT BE INSTALLED INCORRECTLY. SEE FIGURE 16.

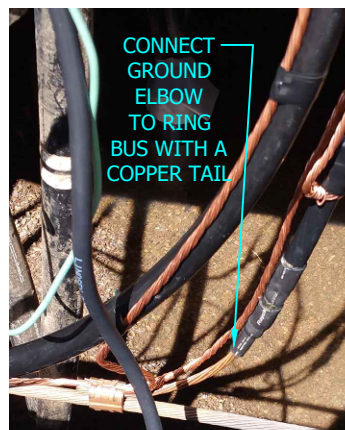
**FIGURE 16**

N. WITH THE ABILITY TO REMOTELY OPERATE THE MOTOR OPERATIONS ON THE SWITCH. THE ACTUATOR ARMS SHALL NOT BE LOCKED.

**SCADA UNITS**

O. ALL SOURCE AND TIE POSITIONS SHALL BE PHASE IDENTIFIED WITH THE AP30. THE SWITCH SHALL BE MARKED FOR "A", "B" AND "C" PHASES.

P. THERE ARE TWO REDUNDANT POTENTIAL TRANSFORMERS (PTs) THAT ARE CONNECTED PHASE TO GROUND. PTs TO BE CONNECT ON THE SOURCE SIDE AND TIE POSITION OF THE SWITCH (IF NO TIE EXISTS ON SWITCH, CHOOSE POSITION WITH DOWNSTREAM TIE SWITCH). IF APPLICABLE, ON THE CENTER PHASE POSITION. PHASE CONNECTION TO THE P.T. IS TO BE MADE WITH A FUSED ELBOW AS THE P.T. DOES NOT HAVE ITS OWN PROTECTION. GROUND ELBOW TO BE STRIPPED AND CONNECTED TO A COPPER TAIL AND THEN HARD TAPPED TO THE GROUND RING BUS. SEE FIGURE 17 AND 18.

**FIGURE 17****FIGURE 18**

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## INSTALLATION (CON'T):

Q. WHEN INSTALLING THE PTs, WE MUST BOND ALL OF THE BASE PLATES OF H2 AND H1 TO GROUND SOURCE/RING BUS. FAILURE TO DO SO WILL RESULT IN THE RING BUS HAVING HIGH VOLTAGE CAPABILITY AND COULD RESULT IN UNFAVORABLE CONSEQUENCES. (ALL RED ARROWS ARE POINTING TO BONDS)



**FIGURE 19**

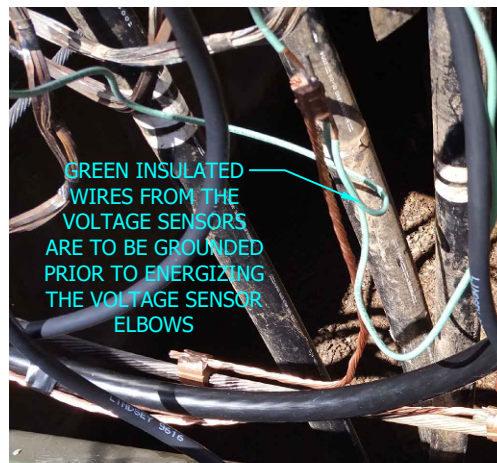


**FIGURE 20**



**FIGURE 21**

R. WARNING: VOLTAGE SENSORS ARE TO BE GROUNDED PRIOR TO ENERGIZING. VOLTAGE SENSOR ARE TO BE CONNECTED TO THE TIE POSITION OF THE SWITCH. IF APPLICABLE USING A FEED THRU DEVICE ON THE P.T. WILL ALLOW FOR THE VOLTAGE SENSOR AND P.T. TO BE CONNECTED TO THE SAME SWITCH POSITION. SEE FIGURE 22.



**FIGURE 22**

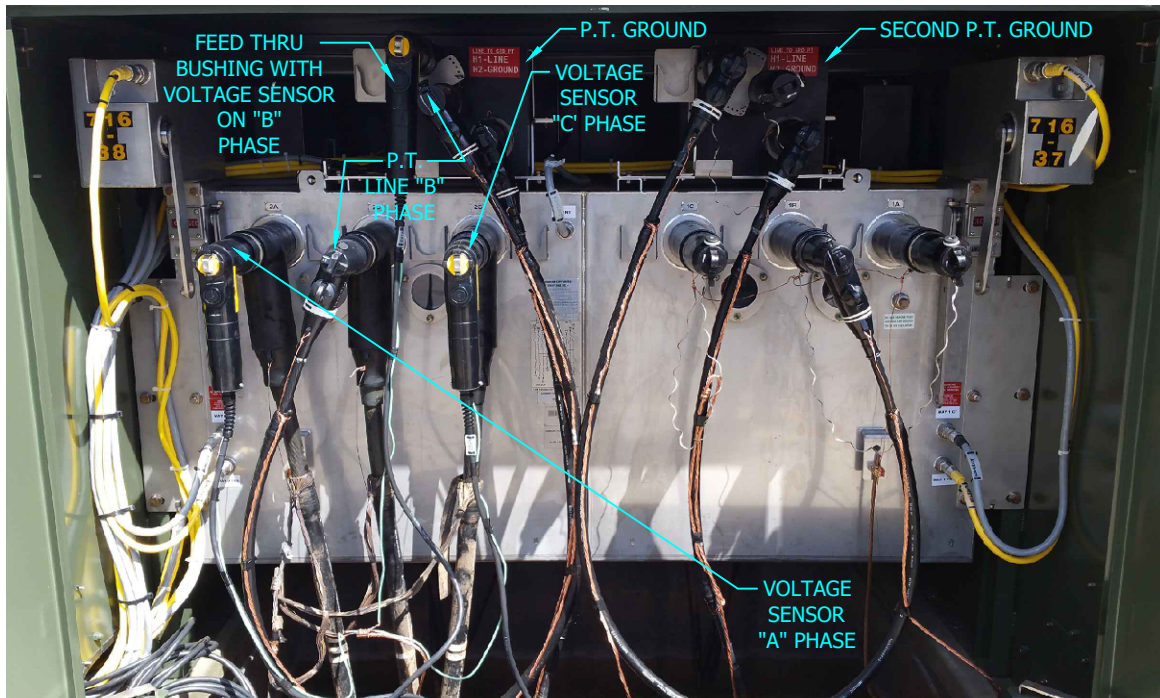
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT                   |                    |          |                     |           |

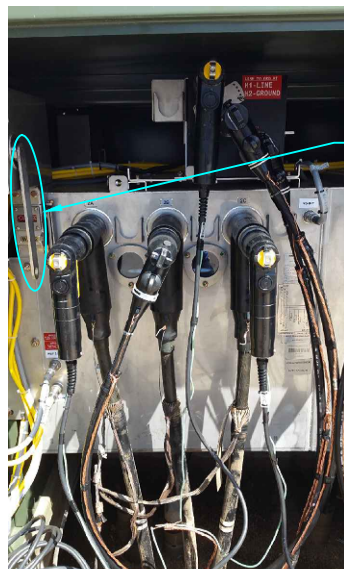


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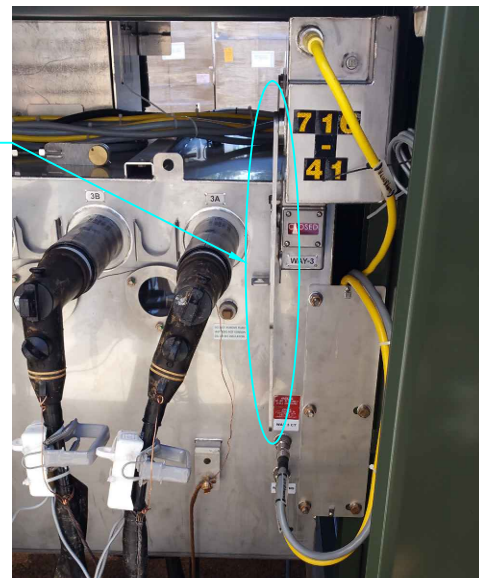


**FIGURE 23**

S. PRIOR TO ENERGIZING, CHECK TO MAKE SURE MOTOR OPERATOR ACTUATOR ARMS CAN FUNCTION UNOBSTRUCTED. P.T. ELBOWS SHALL BE PLACED ON THE CENTER PHASE POSITION OF THE SWITCH. FAULT INDICATORS SHALL BE POSITIONED AWAY FROM THE TRAVEL OF THE MOTOR OPERATOR ACTUATOR ARMS. SEE FIGURE 24 AND 25.



**FIGURE 24**



**FIGURE 25**

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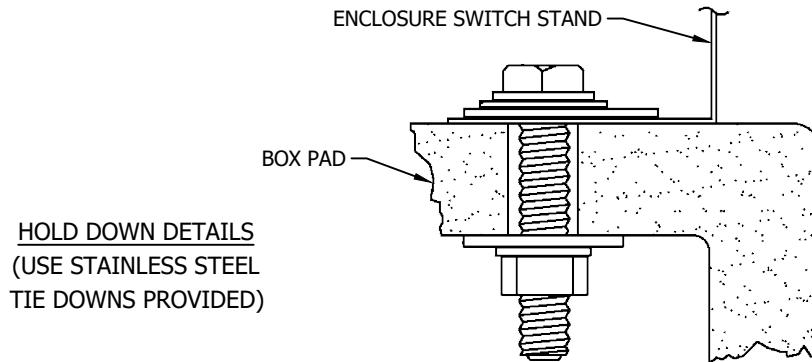
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|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT                   |                    |          |                     |           |



## INSTALLATION (CON'T):

### PAD MOUNT OPTIONS

**T.** SET THE SWITCH ON THE BOX PAD. USING A 1/2 INCH DRILL BIT, DRILL THROUGH THE EXISTING HOLES IN THE SILL FLANGE AND THROUGH THE BOX PAD. BOLT DOWN AS SHOWN IN HOLD DOWN DETAIL. SEE FIGURE 26.

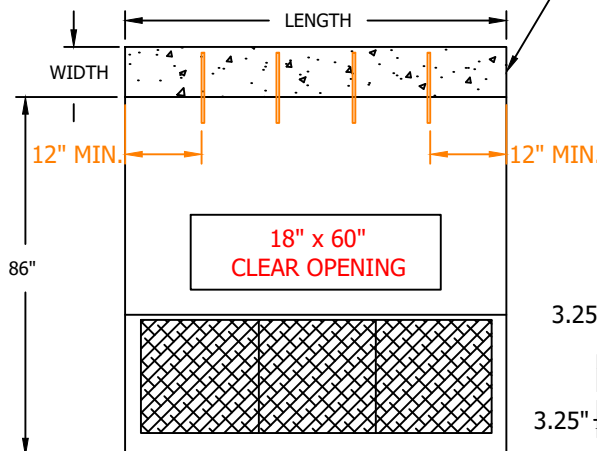


**FIGURE 26**

**U.** THE FOOTPRINT OF THE INNOVATIVE SWITCH AND UP FRONT WORK SPACE WILL ALLOW IT TO BE INSTALLED ON THE "W" SERIES SWITCH FACILITIES INCLUDING 3440, 3441 PADS ON HAND HOLES AND THE TROUGH STYLE SWITCH PADS WITH A MODIFICATION. IT MAY BE USED WHEN LIMITED RIGHT OF WAY ISSUES MAY EXIST FOR CONVERSIONS AND LIMITED SPACE FOR NEW CONSTRUCTION. INNOVATIVE SWITCH INSTALLS ON EXISTING "W" PADS MAY NEED TO HAVE THE SKIRT EXTENDED TO ACCEPT THE LARGER SWITCH FOOT PRINT. SEE FIGURE 27, 28 AND 29.



**FIGURE 27**



**FIGURE 28**  
TOP VIEW

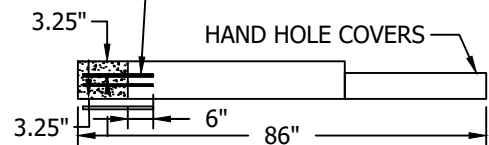
CONCRETE SKIRT POUR:  
LENGTH X WIDTH X HEIGHT (INCHES)

3440: 90" X 12" X 9"

3441: 114" X 12" X 9"  
EXTENSION SKIRT

#### REBAR DETAIL

COREDRIILL 6" HOLES INTO EXISTING 3440 PAD. EPOXY #4 REBAR INTO PAD AND CONNECT TO NEW 12"X9' EXTENSION SKIRT.



**FIGURE 29**  
SIDE VIEW

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT

UG3560.48



**NOTES:**

- I. WHEN REPLACING EXISTING SWITCHES, THE TIE POSITIONS ARE ESTABLISHED AND CONNECTED AS DESIGNED TO AVOID MAJOR RE-CABLING, CONNECT AS-BUILT. NEW INSTALLATIONS WILL FOLLOW THE DESIGN MANUAL.
- II. INNOVATIVE SWITCHGEAR'S PRODUCTS DO NOT CONTAIN ANY OIL OR SF6 GAS FOR THE ELECTRICAL ARC INTERRUPTION OR FOR COMPONENT INSULATION. INNOVATIVE SWITCHGEAR CONTAINS ONLY MECHANISMS, INSULATED BUS WORK AND DRY AIR. DO NOT REMOVE THE PRESSURE TEST PLUG ON THIS VESSEL. EACH UNIT HAS BEEN PRESSURE TESTED AND PERMANENTLY FACTORY SEALED. THE SWITCH TANK IS FILLED WITH THREE TO FIVE POUNDS OF DRY AIR TO KEEP THE STRUCTURAL INTEGRITY OF THE TANK **AT SEA LEVEL**.
- III. THE USE OF FUSED ELBOWS WILL BE FOR THE ADDITION OF POTENTIAL TRANSFORMERS FOR SCADA APPLICATIONS AND LIMITED TO TWO FUSED ELBOW ONLY ONE PER SWITCH WAY POSITION. NO DEVIATION WILL BE GRANTED FOR MORE THAN TWO FUSED ELBOWS IN THE INNOVATIVE SWITCH CABINET. **THE 30A FUSED ELBOW (S321680) AND 10 FEET OF #2 CABLE (197600) WILL BE MADE BY LINE CREWS (KEARNY MAY ALSO AS NEEDED) TO INSTALL SCADA INSTALLATIONS. PT PLACEMENT WILL BE DETERMINED BY KEARNY (FOR DOUBLE-SIDED UNITS, THE PTS MAY BE PLACED ON THE OPPOSITE SIDE SO THAT THE PTS ARE ALWAYS ON THE SAME SIDE OF THE BUSHINGS REQUIRING FUSED ELBOWS).**
- IV. TAPPING THE BACK OF 600 AMP TEES FOR 200 AMP DISTRIBUTION WILL BE LIMITED TO SWITCH CHANGE OUTS WITH EXISTING 200 AMP TAPS.
- V. FOR NEW CONSTRUCTION AND CONVERSIONS THIS INNOVATE SWITCH SHOULD NOT BE USED TO TAP FEEDER CABLES. TAPS ON THE BACK OF 600 AMP TEES IMPEDE GROUNDING AND LIMIT USE OF SWITCH POSITIONS DURING ROUTING SWITCHING PROCEDURES AND OUTAGE SITUATIONS. TAP FEEDER SEGMENTS BETWEEN SWITCH POSITIONS USING 600 AMP TERMINATORS OR TAP THE SWITCH POSITION WITH DISTRIBUTION CABLE ONLY.
- VI. ROUTINE REPLACEMENT OF EXISTING 4 WAY PADMOUNT SWITCHES IS LIMITED TO THE 'W' TYPE CONFIGURATIONS ABOVE 3315 & 3316 HAND HOLES AND THE 'D' TYPE CONFIGURATIONS ABOVE 3311 HAND HOLES. FOR "W" INSTALLED EQUIPMENT, 12" DEPTH SKIRT IS REQUIRED ALONG REAR OF PAD.
- VII. ANOTHER 'D' CONFIGURATION CONSISTS OF SUBSURFACE SWITCHES MOUNTED ABOVE 3315 HAND HOLES. THESE DO NOT LEND THEMSELVES TO SIMPLE REPLACEMENT OF THE SWITCH. THESE INSTALLATIONS ARE COMMONLY CALLED "I-BEAM" OR "RAIL" SWITCHES. A DEVIATION REQUEST IS REQUIRED WHEN ATTEMPTING TO REPLACE THESE WITH A PADMOUNT STYLE SWITCH.
- VIII. ALL ISG MANUAL SWITCHES ARE "SCADA-READY (CAPABLE OF BEING RETROFITTED TO SCADA)" AND POTENTIALLY FAULT INTERRUPTING USING OTHER CONTROLLERS/RELAYS.
- IX. IF INSTALLING ON 3440/3441 PAD, PLEASE REFER TO THE 12" EXTENSION FIGURES 16A-C.
- XI. ALL MANUAL SWITCHES CAN BE USED ON 12 AND 4 KV APPLICATIONS
- XII. FOR THE 4 WAY DOUBLE SIDED SWITCH APPLICATIONS FOR REPLACEMENT OF PME-9 AND PME-11 SWITCHES, THE ISG UNITS HAVE 600A BUSHINGS ON ALL POSITIONS.
- XIII. ISG MANUAL SWITCHES REFER TO MOTORIZED OPERATORS INSTALLED AND CAN BE OPERATED WITH THE LEVER VIA HOOKSTICK. ISG SCADA REFERS TO THE CONTROLLER WITH THE FAULT INTERRUPTING AND COMMUNICATIVE FEATURES TO INCLUDE MOTOR OPERATORS. **ISG NON-SCADA REFERS TO MANUAL SWITCHES, BUT MAY BE RETROFITTED TO INCLUDE NON-COMMUNICATIVE RELAYS/CONTROLLERS.**
- XIV. **REGARDING THE 6 WAY ISG SWITCHGEAR: WAYS 1-5 ARE FAULT INTERRUPTING CAPABLE. WAY 6 WILL ONLY BE USED AS A SWITCH OR TIE POSITION.**

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| SHEET<br>49 OF 50 | <div><div>X</div><div>Indicates Latest Revision</div></div> | Completely Revised | New Page | Information Removed | UG3560.49 |
|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS           |                    |          |                     |           |
|                   | INNOVATIVE SWITCHGEAR PAD AND WALL-MOUNT                    |                    |          |                     |           |




**REFERENCE:**

- a. CABLE IDENTIFICATION, SEE UNDERGROUND STANDARD 3202.
- b. ATTACHING STRUCTURE/EQUIPMENT IDENTIFICATION TAG, SEE UNDERGROUND STANDARD 3211.
- c. HIGH VOLTAGE DECAL, SEE UNDERGROUND STANDARD 3221.
- d. WIRE ENTRY PREVENTION, SEE UNDERGROUND STANDARD 3408.
- e. BOX PAD AND CONDUIT PLACEMENT, SEE UNDERGROUND STANDARD 3428/3429.
- f. BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC, SEE UNDERGROUND STANDARD 3481.
- g. MINIMUM OPERATING CLEARANCE REQUIREMENTS, SEE UNDERGROUND STANDARD 3483.
- h. RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS, SEE UNDERGROUND STANDARD 3486.
- i. RETAINING WALLS, SEE UNDERGROUND STANDARD 3487.
- j. PAD-MOUNTED SWITCH IDENTIFICATION, SEE UNDERGROUND STANDARD 3212.2.
- k. FAULT INDICATOR INSTALLATION, SEE UNDERGROUND STANDARD 4355.
- l. (PREFERRED 1) AND (ALTERNATE TRENCH GROUND WIRE), SEE UNDERGROUND STANDARD 4510.
- m. EQUIPMENT GROUNDING, SEE UNDERGROUND STANDARD 4520.
- n. GROUNDING PREMOLDED CONNECTORS, SEE UNDERGROUND STANDARD 4525.
- o. NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM, SEE UNDERGROUND STANDARD 4520.8 & 4520.9.
- p. SCADA INSTALLATION, SEE UNDERGROUND STANDARD 4640.4 & 4640.5.

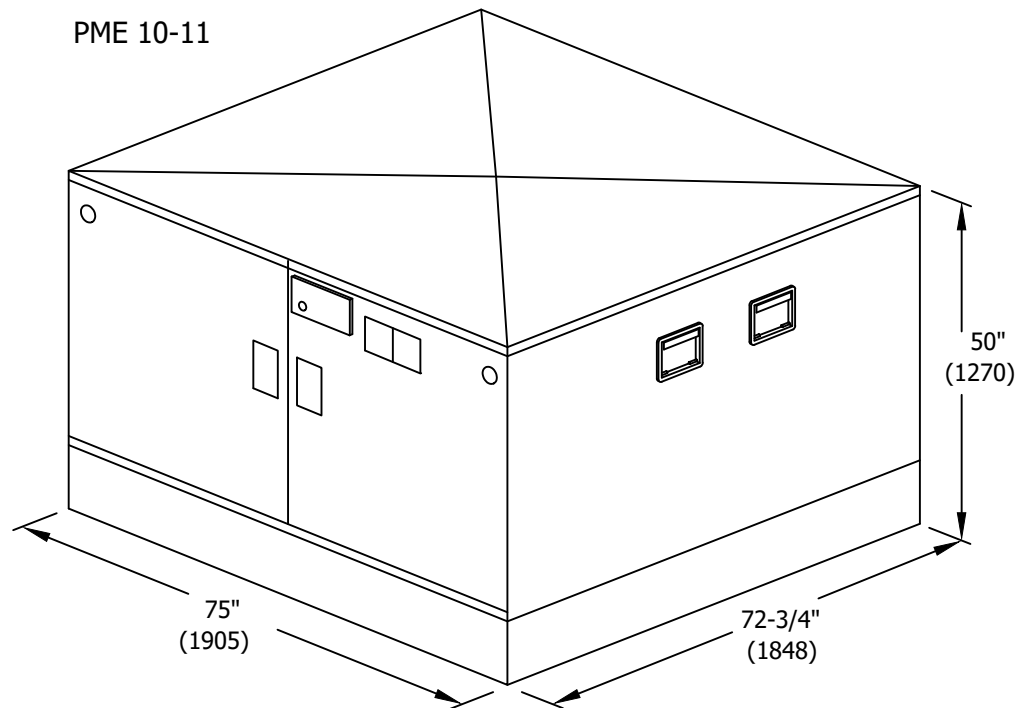
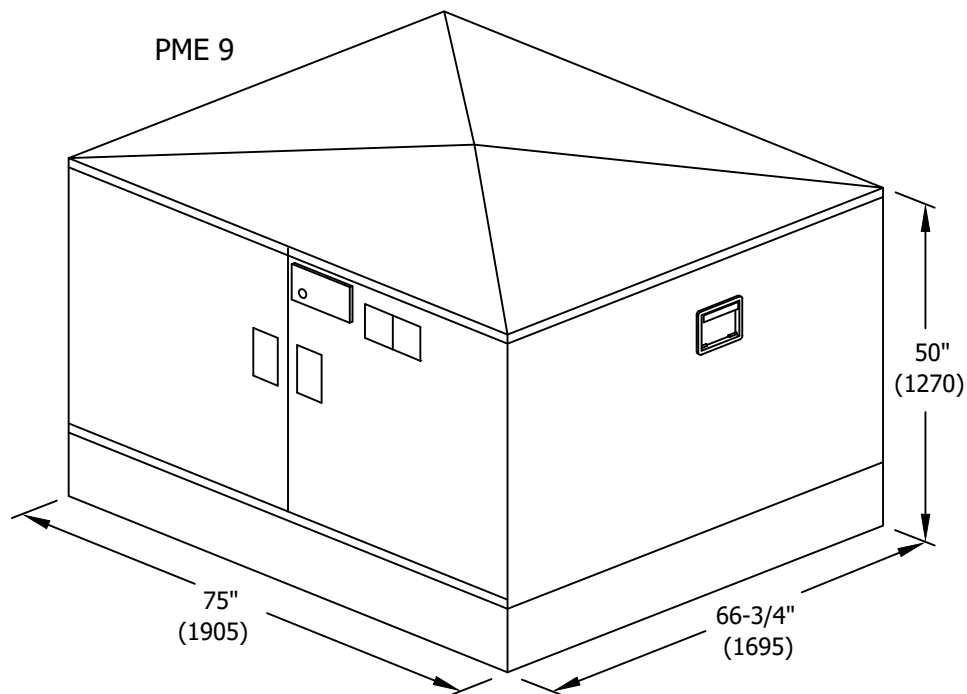
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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                   |                           |                    |          |                     |           |
|                   | INNOVATIVE SWTICHGEAR PAD AND WALL-MOUNT  |                           |                    |          |                     |           |



**SCOPE:** THIS STANDARD SHOWS A TYPICAL 12KV, 600 AMP AIR BREAK PME 9, 10 & 11 SECTIONALIZING SWITCH.



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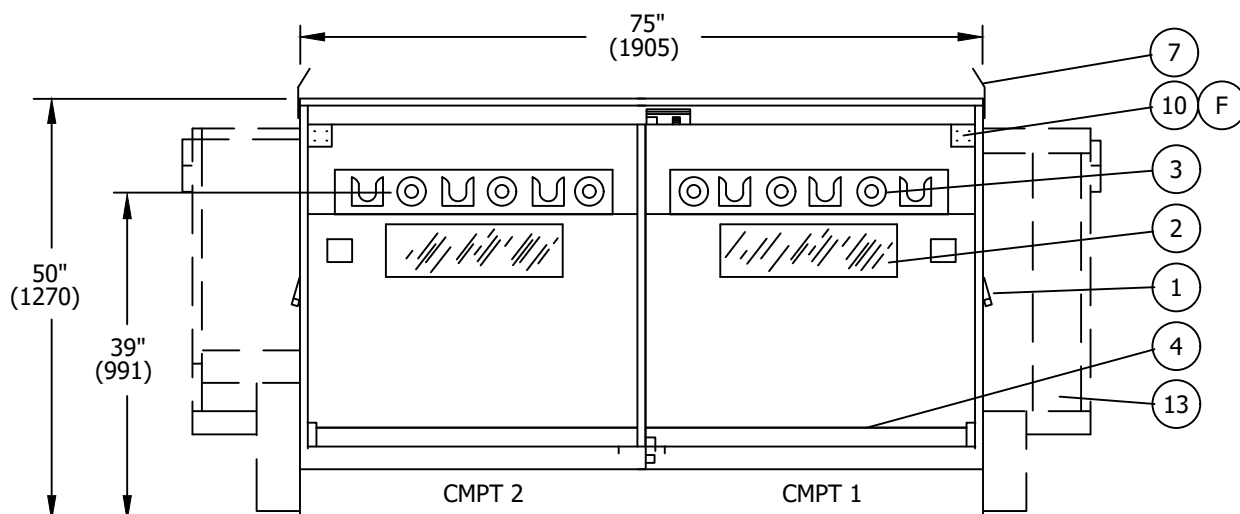
SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

PAD-MOUNTED AIR BREAK PME 9, 10 & 11  
SECTIONALIZING SWITCH 12KV, 600 AMP, THREE-PHASE

UG3567.1



**SCOPE:** THIS STANDARD SHOWS A TYPICAL 12KV, 600 AMP AIR BREAK PME 9, 10 & 11 SECTIONALIZING SWITCH.



VIEW OF COMPARTMENT 1 & 2

**WEIGHT:**

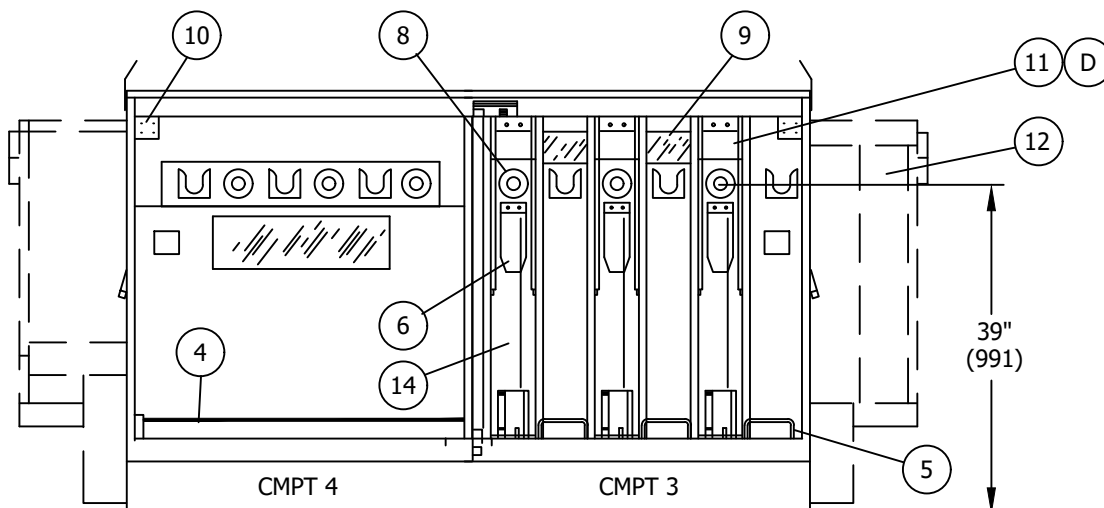
PME-9 2420 IBS. (1098 KG)\*

PME-10 2475 IBS. (1123 KG)\*

PME-11 2525 IBS. (1145 KG)\*

MAXIMUM WEIGHT FOR SCADA EQUIPPED SWITCHES.

\* MAXIMUM WEIGHT FOR SCADA EQUIPPED SWITCHES.



VIEW OF COMPARTMENT 3 & 4

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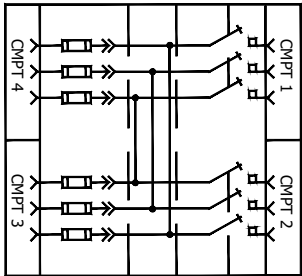
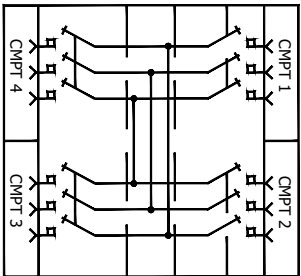
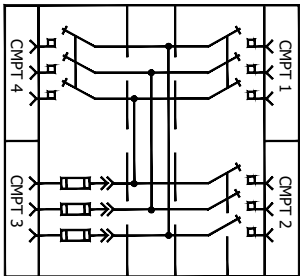
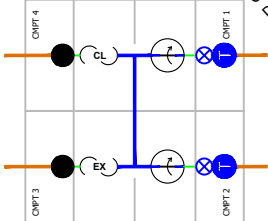
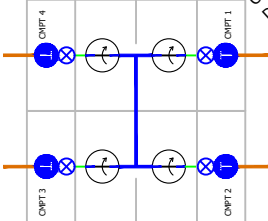
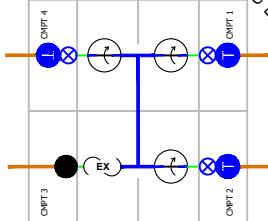
SDG&E ELECTRIC UNDERGROUND CONSTRUCION STANDARD

PAD-MOUNTED AIR BREAK PME 9, 10 & 11  
SECTIONALIZING SWITCH 12KV, 600 AMP, THREE-PHASE

**UG3567.2**



| EQUIPMENT RATINGS:                           |            |
|--|------------|
| VOLTAGE                                      | 14.4       |
| B.I.L.                                       | 95         |
| CURRENT, CONDITIONS (GANG OPERATED)          | 600 AMP    |
| LOADMAKE AND LOADBREAK (GANG OPERATED)       | 600 AMP    |
| MOMENTARY AND FAULT CLOSE (RMS, SYMMETRICAL) | 14,000 AMP |

|                       |   |   |  |
|-----------------------|---|---|--|
| CONNECTION<br>DIAGRAM |    |   |   |
|                       | PME-9   | PME-10  | PME-11   |
|                       |  <p>CMPT2 959-13<br/>CMPT2 959-14<br/>CMPT3 3-200A<br/>CMPT4 3-140A<br/>D151013</p> |  <p>CMPT2 959-13<br/>CMPT2 959-14<br/>CMPT3 3-200A<br/>CMPT4 3-140A<br/>D151013</p> |  <p>CMPT2 956-166<br/>CMPT2 956-167<br/>CMPT3 3-200A<br/>CMPT4 956-168<br/>D155482</p> |

#### BILL OF MATERIAL:

| ITEM | DESCRIPTION  |
|------|--|
| 1    | FOLDING SWITCH OPERATING HANDLE  |
| 2    | LEXAN VIEWING WINDOW (600 AMP SWITCH)  |
| 3    | 600 AMP STUD BUSHING   |
| 4    | GROUND ROD (FOR PERSONAL GROUNDS ONLY)   |
| 5    | GROUND RODS & CABLE GUIDES FOR FUSES   |
| 6    | INTERLOCK TO REQUIRE REMOVAL OF THE LBE ACCESS TO FUSE                           |
| 7    | LIFTING TABS (REMOVE AFTER INSTALLATION AND REPLACE BOLTS, STORE INSIDE CABINET) |
| 8    | 200 AMP BUSHING WELLS  |
| 9    | LEXAN VIEWING WINDOW (BLOWN FUSE INDICATOR)                                      |
| 10   | FAULT INDICATOR MOUNTING BRACKET   |
| 11   | FUSE COMPARTMENT   |
| 12   | LOW VOLTAGE COMPARTMENT (SCADA ONLY)   |
| 13   | SWITCH OPERATOR (SCADA ONLY)   |
| 14   | TRANSFUSER DOOR  |

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SHEET  
3 OF 4

SDG&E ELECTRIC UNDERGROUND CONSTRUCION STANDARD

PAD-MOUNTED AIR BREAK PME 9, 10 & 11  
SECTIONALIZING SWITCH 12KV, 600 AMP, THREE-PHASE

UG3567.3



**NOTES:**

\* PAD-MOUNTED SWITCH (STOCK NUMBERS PME-9 #708970, PME-10 #708972 AND PME-11 #708974) ARE DELIVERED FROM THE SUPPLIER WITH ALL THE PARTS LISTED EXCEPT FOR FUSES AND 200A LOAD BREAK BUSHING INSERTS.

**REFERENCE:**

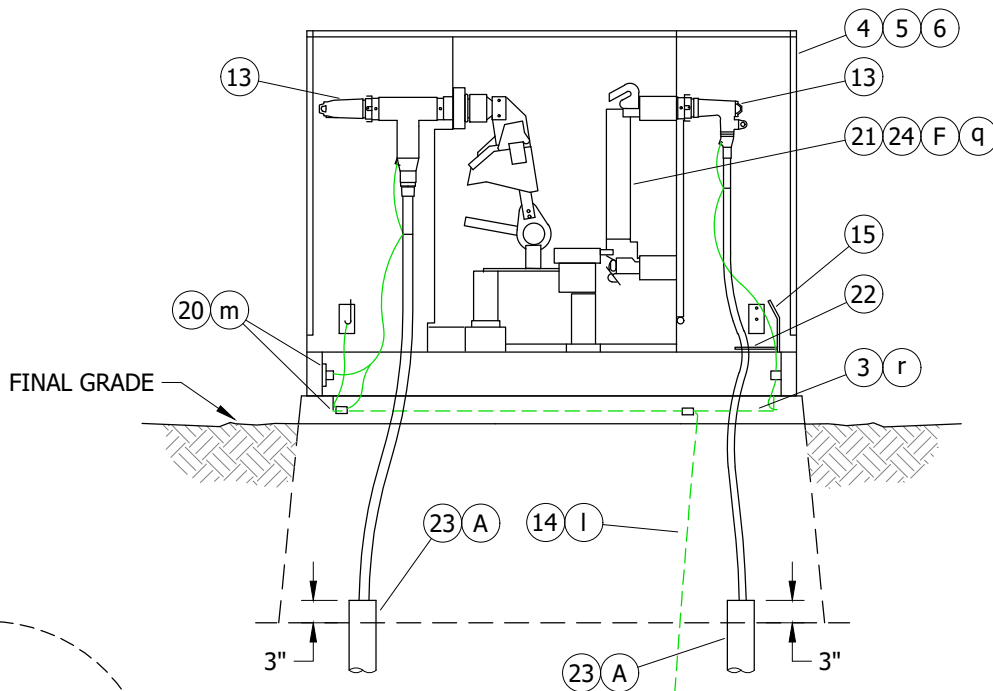
- A. SEE STANDARD 3212.2 FOR SWITCH IDENTIFICATION.
- B. SEE STANDARD 3423 FOR BOX PAD AND CONDUIT PLACEMENT.
- C. SEE STANDARD 3568 FOR SWITCH INSTALLATION.
- D. SEE STANDARD 4302 FOR FUSE APPLICATION GUIDE.
- E. SEE STANDARD 4355.3 FOR FAULT INDICATOR INSTALLATION.
- F. SEE DESIGN STANDARD 6113 FOR AUTOMATIC FAULT INDICATOR APPLICATION.

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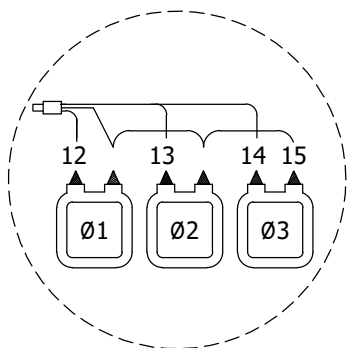
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD   |                           |      |                    |     |          |    |                     |      |          |
|                 |                   | PAD-MOUNTED AIR BREAK PME 9, 10 & 11<br>SECTIONALIZING SWITCH 12KV, 600 AMP, THREE-PHASE |                           |      |                    |     |          |    |                     |      |          |



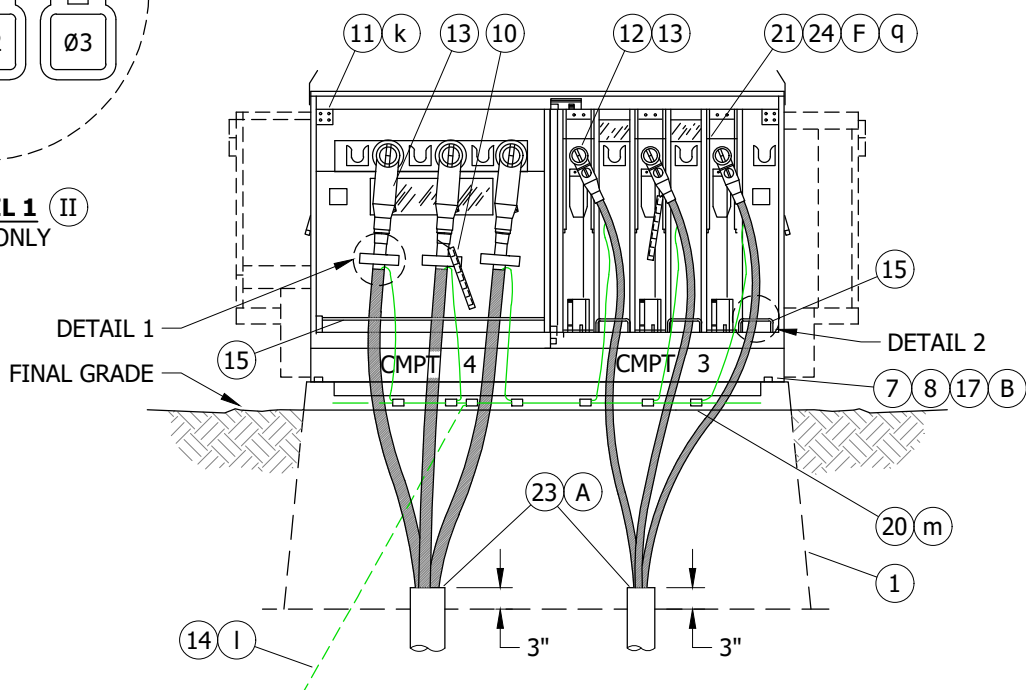
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION FOR PAD MOUNTED, 12KV, 600A, AIR BREAK, PME 9, 10 AND 11 SECTIONALIZING SWITCH CABINET.



**FIGURE 1**

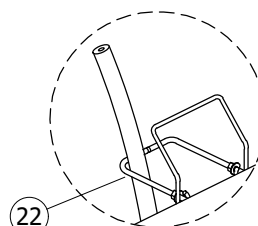


**DETAIL 1** II  
SCADA ONLY



**FIGURE 2**

VIEW OF COMPARTMENT 3 AND 4



**DETAIL 2**

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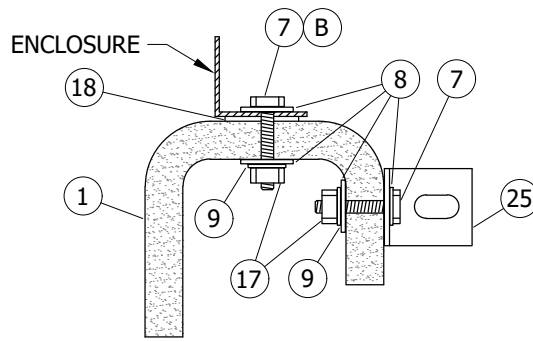
SHEET  
1 OF 4

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF PAD MOUNTED AIR BREAK PME 9, 10 AND 11  
SECTIONALIZING SWITCH CABINET, 12KV, 600A, THREE-PHASE

UG3568.1





**FIGURE 3**  
HOLD-DOWN DETAIL AND RING BUSS SUPPORT

### INSTALLATION:

- (A) SEAL CONDUITS WITH SEALING COMPOUND.
- (B) SET THE SWITCH ON THE BOX PAD. USING A 1/2-INCH DRILL BIT, DRILL THROUGH THE EXISTING HOLES IN THE SILL FLANGE AND THROUGH THE BOX PAD. BOLT DOWN AS SHOWN IN HOLD DOWN DETAIL.
- C. BASE OF CABINET SHALL BE CAULKED ONLY TO PREVENT POSSIBLE WIRE ENTRY.
- D. INSTALL RING BUSS SO THAT IT DOES NOT INTERFERE WITH TRANSFUSER DOORS.
- E. SECURE THE SWITCH DOORS AND THE SWITCH OPERATING HANDLE COVERS WITH PME LOCKS.
- (F) INSTALL CURRENT LIMITING OR SML-4Z FUSES PER FUSE REQUEST.
- G. FOR THE PME-10 ONLY. WHEN ONLY THREE OF THE FOUR SWITCH POSITION WILL BE UTILIZED, PULL CABLES IN COMPARTMENTS 1, 2 AND 4 FIRST.
- H. SOURCE TRANSFER SWITCHES REQUIRE A SPECIAL FACILITIES AGREEMENT. CONTACT DISTRIBUTION STANDARDS FOR ADDITIONAL INFORMATION.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                                | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | BOX PAD FOR PME 9, 10, 11                  | 1        | 3423          | S514028      | 3423BP       |
| 2    | PADLOCK, PME                               | 6        | -             | S514862      | -            |
| 3    | WIRE, THW, 4/0                             | AS REQ'D | 4530          | S808224      | -            |
| 4    | SWITCH, MANUAL, PME 9                      | AS REQ'D | 3568          | S708970      | PME-09       |
|      | SWITCH, SCADA, PME 9                       |          |               | S708978      | PME-9S       |
|      | TRANSFER, SOURCE, PME 9                    |          | -             | -            | -            |
| 5    | SWITCH, MANUAL, PME 10                     | AS REQ'D | 3568          | S708972      | PME-10       |
|      | SWITCH, SCADA, PME 10                      |          |               | S708981      | PME-10S      |
| 6    | SWITCH, MANUAL, PME 11                     | AS REQ'D | 3568          | S708974      | PME-11       |
|      | SWITCH, SCADA, PME 11                      |          |               | S708976      | PME-11S      |
| 7    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2" | 4        | -             | S616192      | -            |
| 8    | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"  | 8        | -             | S799488      | -            |
| 9    | WASHER, LOCK SPRING                        | 4        | -             | S796416      | -            |
| 10   | TAGS, CABLE IDENTIFICATION                 | AS REQ'D | -             | -            | -            |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  |                           |                    |          |                     |          |
|                 | INSTALLATION OF PAD MOUNTED AIR BREAK PME 9, 10 AND 11<br>SECTIONALIZING SWITCH CABINET, 12KV, 600A, THREE-PHASE |                           |                    |          |                     |          |



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION                              | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 11   | AUTOMATIC FAULT INDICATOR                | AS REQ'D | 4355          | -            | -            |
| 12   | BUSHING PLUG                             | AS REQ'D | 4179-4180     | S544676      | BSHPLG       |
| 13   | 12KV, 200A LOADBREAK AND 600A CONNECTORS | AS REQ'D | 4181          | -            | -            |
| 14   | WIRE, TRENCH GROUND                      | 1        | 4510          | -            | TG-E-W       |
| 15   | GROUNDING ROD, BY MANUFACTURER           | -        | -             | -            | -            |
| 16   | DECALS (III)                             | AS REQ'D | 3213-3218     | -            | -            |
| 17   | NUT, HEX, BRONZE, 1/2"                   | 4        | -             | S506112      | -            |
| 18   | GASKET, BY MANUFACTURER                  | -        | -             | -            | -            |
| 19   | NUT, CLAMPING CHANNEL (III)              | 4        | -             | S506112      | -            |
| 20   | CONNECTOR, COMPRESSION                   | AS REQ'D |               | -            | -            |
| 21   | FUSE, CURRENT LIMITING, 140A X-LIMITER   | AS REQ'D | 4312          | S365730      | XL-140       |
| 22   | CABLE GUIDE, BY MANUFACTURER             | -        | -             | -            | -            |
| 23   | SEALING COMPOUND                         | AS REQ'D | -             | S442976      | -            |
| 24   | KIT CONVERSION CL TO SME-4Z FOR PME      | 1        | -             | S442944      | CL-SM4-      |
| 25   | BRACKET, STAINLESS STEEL, 2" X 3"        | 4        | -             | S166072      | -            |

**NOTES:**

I. INSTALL SWITCH WITH SWITCH OPERATING HANDLE DOORS OR MOTOR OPERATORS FACING THE STREET WITH COMPARTMENTS 1 AND 2 ON THE RIGHT WHEN FACING THE SWITCH.

(II) CURRENT SENSORS TO BE INSTALLED BY SCADA CREW.

(III) NOT SHOWN ON FIGURES.

**REFERENCE:**

- a. SEE UG3202 FOR CABLE IDENTIFICATION.
- b. SEE UG3211 FOR ATTACHING STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- c. SEE UG3221 FOR HIGH VOLTAGE DECAL.
- d. SEE UG3408 FOR WIRE ENTRY PREVENTION.
- e. SEE UG3423 FOR BOX PAD AND CONDUIT PLACEMENT.
- f. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- g. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- h. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- i. SEE UG3511 FOR RETAINING WALLS.
- j. SEE UG4302 FOR FUSE APPLICATION GUIDE.
- (k) SEE UG4355 FOR FAULT INDICATOR INSTALLATION.
- (l) SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- (m) SEE UG4520 AND UG4521 (PREVIOUS # UG4520) FOR EQUIPMENT GROUNDING.

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |                    |          |                     |
| INSTALLATION OF PAD MOUNTED AIR BREAK PME 9, 10 AND 11 SECTIONALIZING SWITCH CABINET, 12KV, 600A, THREE-PHASE |                           |                    |          |                     |

SHEET  
3 OF 4

UG3568.3



**REFERENCE (CONT'D):**

- n. SEE UG4525 FOR GROUNDING PREMOLDED CONNECTORS.
- o. SEE UG4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- p. SEE DM6113 FOR AUTOMATIC FAULT INDICATOR APPLICATION.
- q. SEE UG4310 FOR CONVERSION KIT FOR CURRENT LIMITING TO SML-4Z FUSE HOLDERS.
- r. SEE UG4520, UG4521 (PREVIOUS # UG4520) AND UG4530 FOR GROUNDING.

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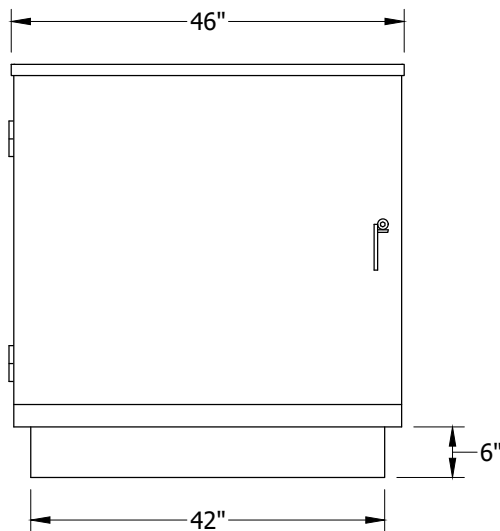
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| SHEET<br>4 OF 4 | X  | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed | UG3568.4 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  |                           |  |                    |  |          |  |                     |          |
|                 | INSTALLATION OF PAD MOUNTED AIR BREAK PME 9, 10 AND 11<br>SECTIONALIZING SWITCH CABINET, 12KV, 600A, THREE-PHASE |                           |  |                    |  |          |  |                     |          |



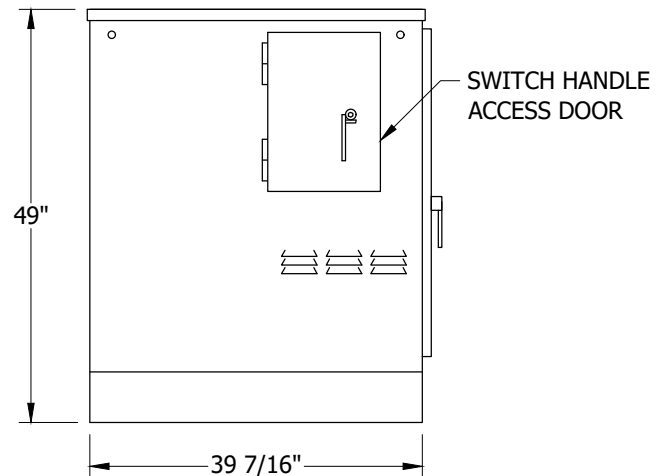
**SCOPE:** THIS STANDARD COVERS THE USE OF THE ELASTIMOLD 200/200A MOLDED VACUUM INTERRUPTER HOUSED IN THE DURHAM MVI ENCLOSURE; IT CAN REPLACE A STANDARD FUSE CABINET ON A 3421 EQUIPMENT PAD.



**FIGURE 1** I



**FIGURE 2**  
FRONT VIEW



**FIGURE 2**  
SIDE VIEW

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

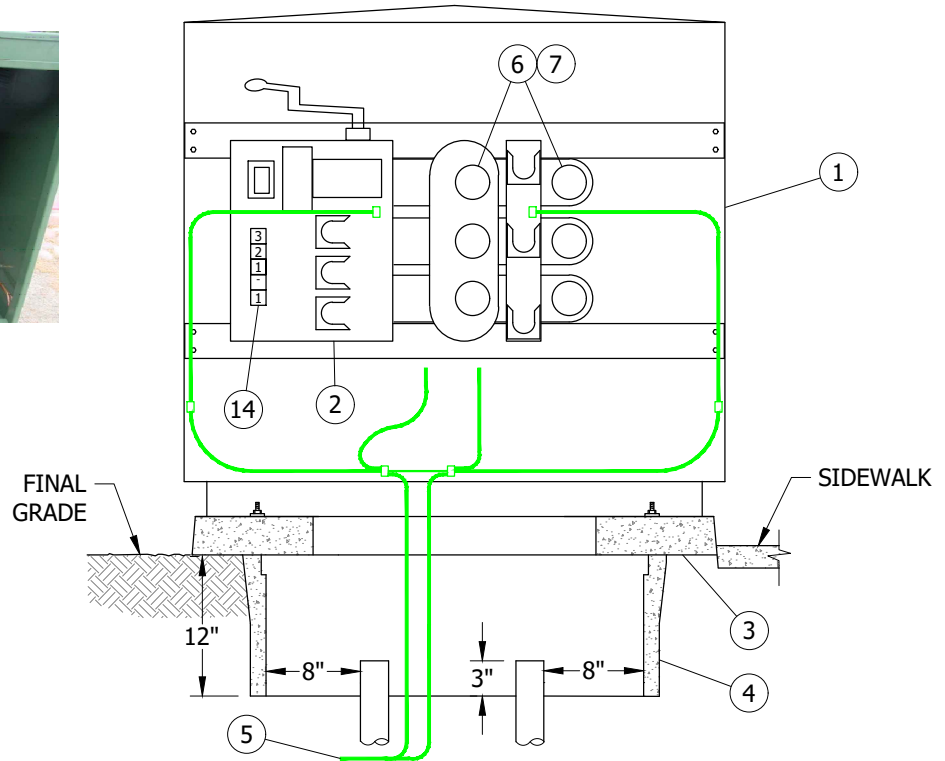
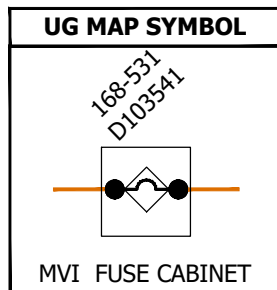
PAD MOUNTED MVI SWITCH ENCLOSURE

UG3580.1





**FIGURE 3**



**FIGURE 4**

### INSTALLATION:

- A. THIS INSTALLATION IS LIMITED TO ONE THREE-PHASE RUN IN AND OUT; THE MVI WILL NOT ACCOMMODATE FEED THRU BUSHINGS.
- B. PREFERRED CONDUIT PLACEMENT AND CABLE CONNECTION IS LINE ON THE LEFT AND LOAD ON THE RIGHT FACING THE SWITCH.
- C. MVI MUST BE PRE-PROGRAMMED FOR EACH FACILITY LOCATION BY KEARNY BEFORE THE UNIT IS INSTALLED AND ENERGIZED.
- D. CABINET HAS 4 LIFTING 1/2 X 13 THREAD INSERTS FOR LIFTING BOLTS WHEN INSTALLING THE CABINET AND MVI.
- E. INSTALLING THE MVI IN THE DURHAM PAD MOUNTING CABINET: UN-BOLT AND REMOVE THE LID OF THE CABINET AND UN-PIN SWITCH HANDLE FOR EASY INSTALLATION. BOLT MVI IN THE FAR LEFT BOLT HOLES, WITH THE SWITCH HANDLE FACING THE SIDE SWITCHING DOOR. (SWITCH HANDLE MAY REQUIRE BENDING UP ONE-INCH TO CLEAR SIDE DOOR HARDWARE).
- F. 6 BUSHING PLUGS REQUIRE BONDING TO THE MVI SWITCH; THE MVI MUST BE GROUNDED TO THE CABINET AND THE TRENCH GROUNDS. CONCENTRIC NEUTRALS SHALL BE CONNECTED TO THE TRENCH GROUND, CABINET AND MVI.
- G. ADDITIONAL TAGGING OF FACILITY NUMBERS ON INSIDE OF DOOR AND CIRCUIT SWITCH NUMBER ON THE MVI SWITCH.
- H. SIDE AND FRONT DOOR SHALL BE LOCKED WITH KEYLESS LOCKS.
- J. USE THE 4-WAY ADJUSTABLE JUNCTION TAP FOR STANDOFF GROUNDING (S305712).

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD MOUNTED MVI SWITCH ENCLOSURE

UG3580.2



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | CABINET, ENCLOSURE, FOR MVI/MVS                        | 1        | -             | S190490      | DMV12        |
| 2    | MVI, 3-Ø 200A LINE, 200A LOAD                          | 1        | -             | S708410      | S23PFI       |
| 3    | PAD\W-BOX, TRANSFORMER\UTILITY EQUIPMENT, SINGLE-PHASE | 1        | 3421          | S514240      | FC3PAD       |
| 4    | HANDHOLE, 17" X 30"                                    | 1        | 3312          | S162426      | TERM3F       |
| 5    | WIRE, GROUND, TRENCH, COPPER, #2                       | AS REQ'D | 4510          | -            | -            |
| 6    | ELBOW, LOADBREAK, 14.4KV, 200A                         | AS REQ'D | 4190 - 4191   | -            | -            |
| 7    | PLUG, BUSHING (F)                                      | 6        | 4180          | S544676      | BSHPLG       |
| 8    | LOCKS, KEYLESS (II)                                    | 2        | -             | S468010      | -            |
| 9    | NUT, STUD, 1/2" X 1 3/8" (II)                          | 2        | -             | S507000      | RSRARM       |
| 10   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2" (II)         | 2        | -             | S799488      | -            |
| 11   | HOLD DOWN (SUPPLIED WITH CABINET) (II)                 | 2        | -             | -            | -            |
| 12   | SEALING COMPOUND (II)                                  | AS REQ'D | -             | S442976      | -            |
| 13   | TAGS, IDENTIFICATION, CABLE                            | AS REQ'D | 3202          | -            | -            |
| 14   | TAGS, IDENTIFICATION, SWITCH                           | AS REQ'D | -             | -            | -            |
| 15   | NUT, STANDARD HEX, STAINLESS STEEL (II)                | 2        | -             | S505536      | -            |

**NOTES:**

(I) THIS APPLICATION OFFERS THE ABILITY TO PROGRAM AN INTERRUPTION CURRENT CURVE AND A THREE-PHASE SWITCH FOR HIGHER LOAD AND RELIABILITY ISSUES OF EXISTING FACILITIES. THE THREE-PHASE SWITCH WILL ALSO REDUCE THE POSSIBILITY OF FERRO-RESONANCE DURING SERVICE RESTORATION.

(II) NOT SHOWN ON FIGURES.

**REFERENCE:**

- SEE UG3202 FOR CABLE IDENTIFICATION.
- SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- SEE UG3221 FOR HIGH VOLTAGE DECAL.
- SEE UG3408 FOR WIRE ENTRY PREVENTION.
- SEE UG3489 FOR RETAINING WALLS.
- SEE UG4108 FOR SEALING JACKETED CABLE.
- SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- SEE UG4512 FOR EQUIPMENT GROUNDING.
- SEE UG4520 AND UG4521 (PREVIOUS # UG4520.1-.9) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- SEE UG4505 FOR GROUNDING HARDWARE AND CONNECTIONS.
- SEE UG3675 FOR MVI SPECIFICATIONS.

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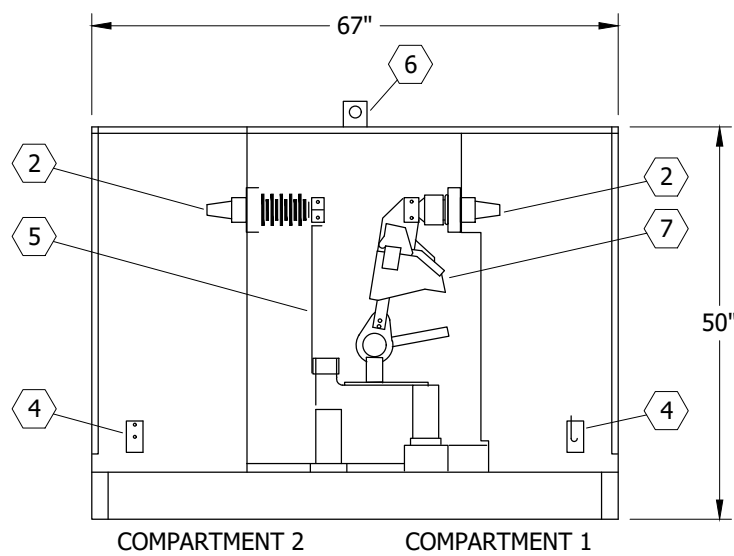
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PAD MOUNTED MVI SWITCH ENCLOSURE

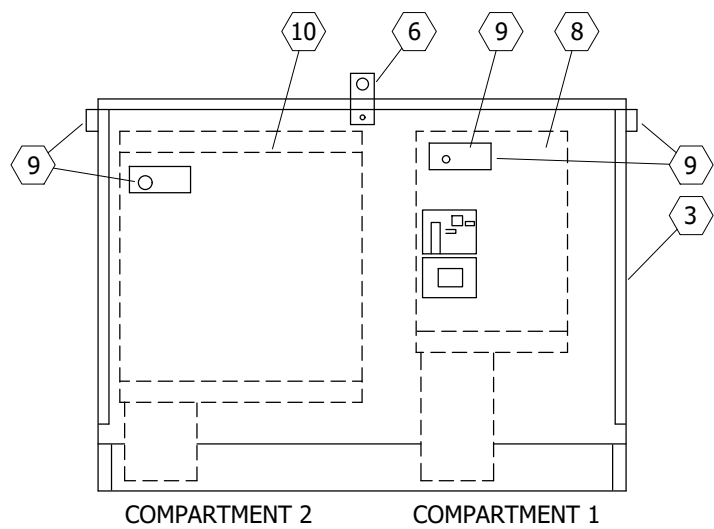
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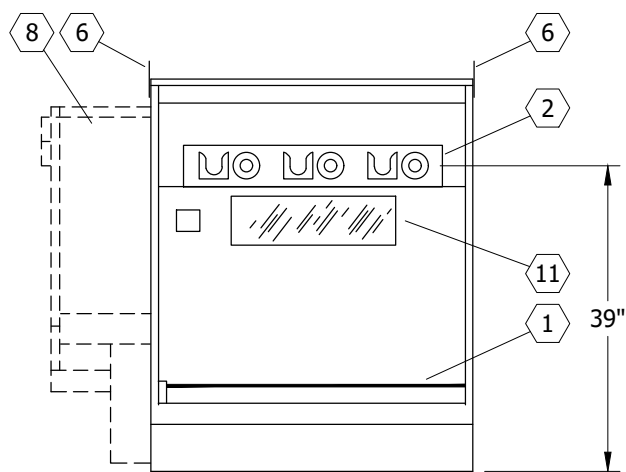
**SCOPE:** THIS STANDARD SHOWS A 12KV, 600A AIR BREAK PME 3 SECTIONALIZING SWITCH CABINET.



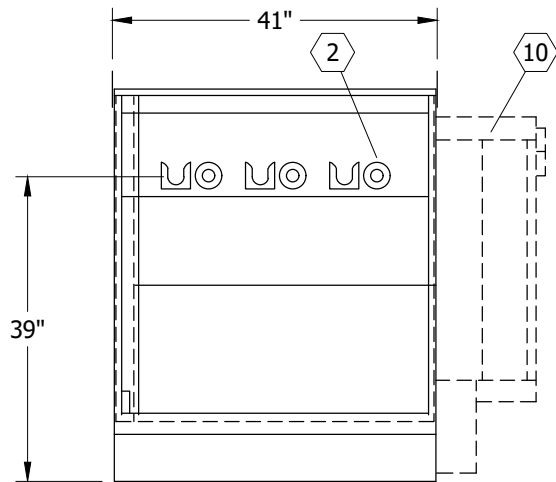
**FIGURE 1**  
SIDE VIEW



**FIGURE 1**  
SIDE VIEW



**FIGURE 1**  
COMPARTMENT 1  
END VIEW



**FIGURE 1**  
COMPARTMENT 2  
END VIEW

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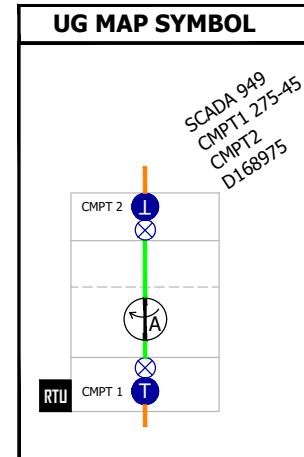
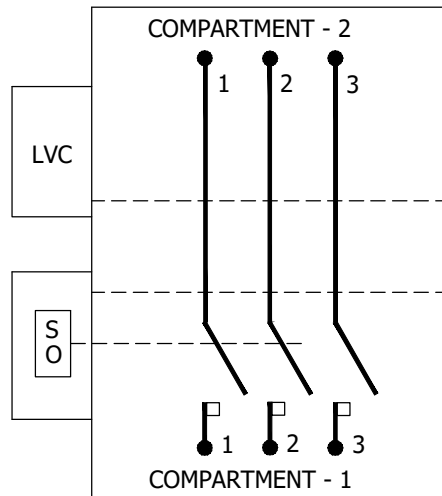
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|-----------------|--|



**TABLE 1**

| ELECTRIC RATINGS                              |         |
|---|---------|
| VOLTAGE                                       | 14.4KV  |
| B.I.L.  | 95KV    |
| CURRENT, CONDITIONS                           | 600A    |
| LOADMAKE AND LOADBREAK                        | 600A    |
| MOMENTARY AND FAULT CLOSE (RMS, ASYMMETRICAL) | 22,400A |
| MOMENTARY AND FAULT CLOSE (RMS, SYMMETRICAL)  | 14,000A |



**FIGURE 2**  
PME 3  
CONNECTION DIAGRAM

| SWITCH PARTS LIST |                                       |
|-------------------|---------------------------------------|
| ITEM              | DESCRIPTION                           |
| ①                 | BAR, GROUND                           |
| ②                 | BUSHING, 600A                         |
| ③                 | PLATE, NAME (ON OUTSIDE OF DOOR)      |
| ④                 | PLATE, GROUNDING                      |
| ⑤                 | BUS, 600A                             |
| ⑥                 | TABS, LIFTING (II)                    |
| ⑦                 | SWITCH, 600A MINI-RUPTER              |
| ⑧                 | OPERATOR, SWITCH (SCADA ONLY)         |
| ⑨                 | PROVISION, PENTAHEAD LATCH LOCKING    |
| ⑩                 | COMPARTMENT, LOW VOLTAGE (SCADA ONLY) |
| ⑪                 | WINDOW, LEXAN SWITCH VIEWING          |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

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| REV | CHANGE            | DR  | BY | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
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SHEET  
2 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD MOUNTED AIR BREAK PME 3 SECTIONALIZING SWITCH CABINET  
12KV, 600A

UG3583.2



Ⓘ WEIGHT: 1,040 LBS MAX.

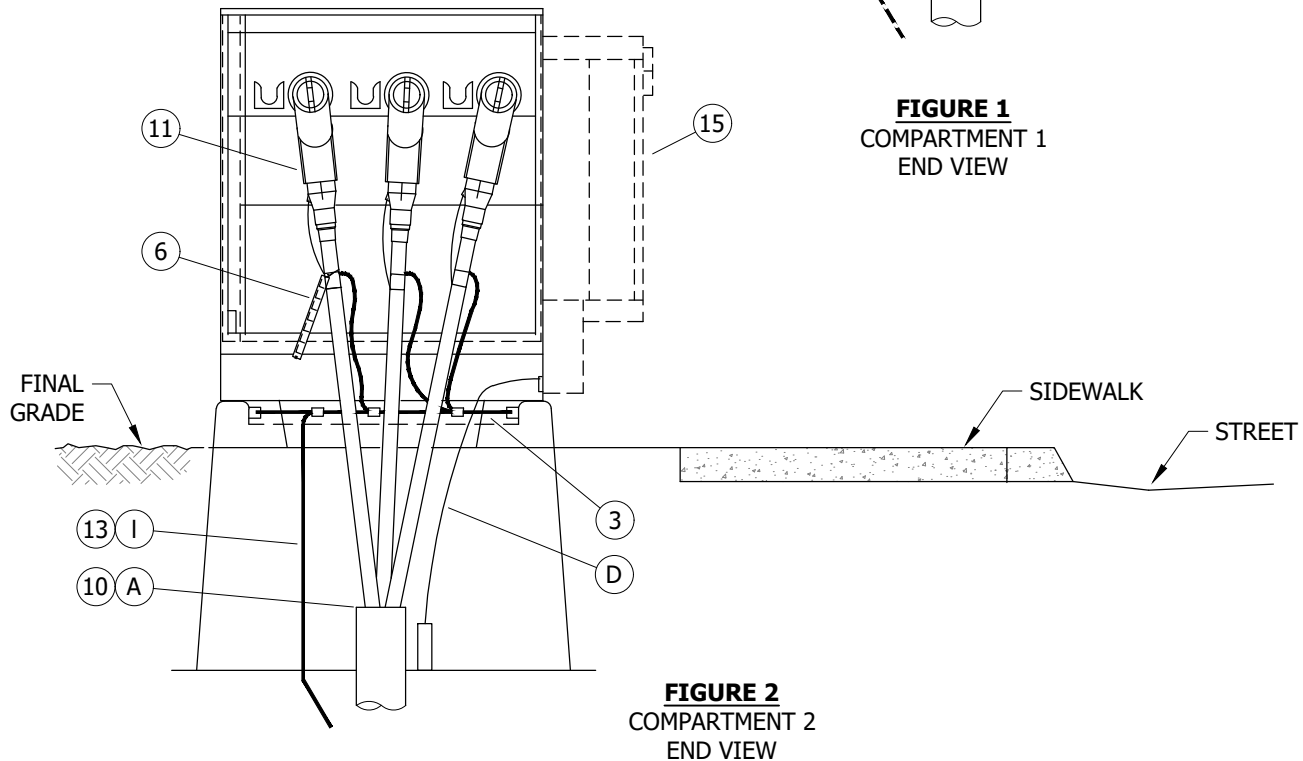
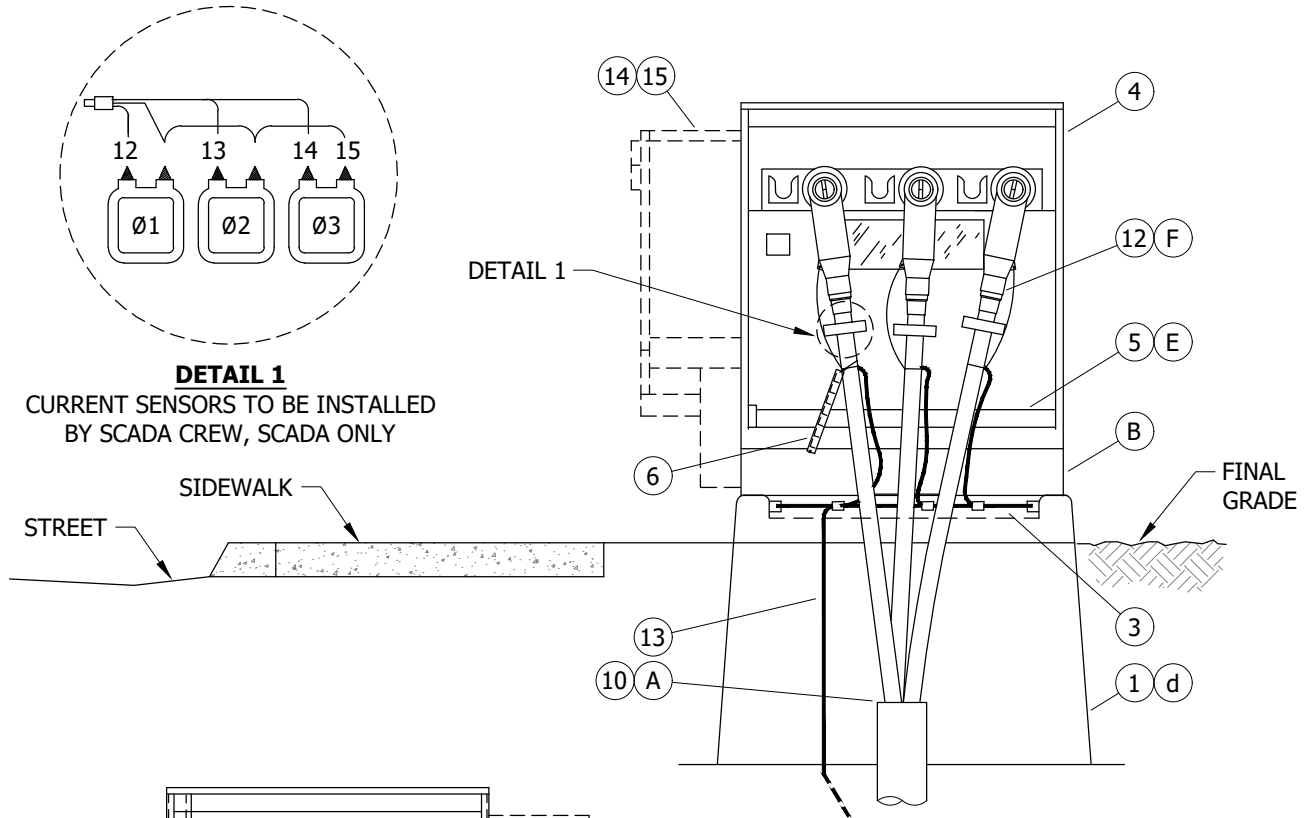
Ⓣ REMOVE AFTER INSTALLATION, REPLACE BOLTS AND STORE INSIDE CABINET.

- a. SEE [UG3214](#) FOR SWITCH IDENTIFICATION.
- b. SEE UG3418 FOR BOX PAD INSTALLATION FOR PAD MOUNTED 600A, 12KV SWITCH.
- c. SEE UG3584 FOR SWITCH INSTALLATION.
- d. SEE UG4355 FOR FAULT INDICATOR INSTALLATION.
- e. SEE DM6113 FOR AUTOMATIC FAULT INDICATOR APPLICATION.

[illegible]



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION FOR PAD MOUNTED AIR BREAK 12KV, 600A PME 3 SECTIONALIZING SWITCH CABINET.



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| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 3/1/2002  | D   |        |    |    |     |     |      |

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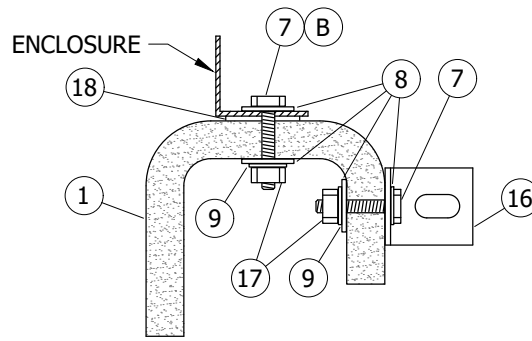
SHEET  
1 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF PAD MOUNTED AIRBREAK PME 3  
SECTIONALIZING SWITCH CABINET, 12KV, 600A

UG3584.1





**FIGURE 3**  
HOLD-DOWN DETAIL AND RING BUSS SUPPORT

### INSTALLATION:

- (A) SEAL CONDUITS WITH SEALING COMPOUND.
- (B) BASE OF CABINET SHALL BE CAULKED ONLY TO PREVENT WIRE ENTRY.
- C. SECURE ALL OF THE SWITCH DOORS WITH PENTAHEAD BOLTS AND SCHLAGE PME SERIES LOCKS.
- (D) SUPERVISORY OR ANTENNA CABLE AS REQUIRED FOR SCADA.
- (E) DO NOT CONNECT CONCENTRIC TO GROUND BAR.
- (F) CURRENT SENSORS TO BE INSTALLED BY SCADA CREW.
- (G) INSTALL CONDUITS SO THAT THE FEED IS CONNECTED TO THE SWITCH IN COMPARTMENT 1. COMPARTMENT 1 SHALL BE ON THE RIGHT SIDE AS ONE FACES THE CABINET FROM THE STREET OR SIDEWALK.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                                | QUANTITY | STANDARD PAGE  | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|----------------|--------------|--------------|
| 1    | BOX PAD, FOR PME 3, AIR BREAK SWITCH       | 1        | 3418           | S514040      | 3418BP       |
| 2    | PADLOCK (I) (G)                            | AS REQ'D | -              | S514848      | PME-3C       |
| 3    | WIRE, THW 4/0 (D)                          | AS REQ'D | 4530           | S808224      | THW4/0       |
| 4    | SWITCH, PME 3, MANUAL                      | AS REQ'D | 3584           | S708968      | PME-03       |
|      | SWITCH, PME 3, SCADA                       | AS REQ'D | 3584           | S708980      | PME-3S       |
| 5    | GROUND BAR                                 | AS REQ'D | -              | -            | -            |
| 6    | IDENTIFICATION TAGS                        | AS REQ'D | 3202/3213-3218 | -            | -            |
| 7    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2" | 4        | -              | S616192      | -            |
| 8    | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"  | 8        | -              | S799488      | -            |
| 9    | SPRING, WASHER LOCK                        | 4        | -              | S796416      | -            |
| 10   | SEALING COMPOUND                           | AS REQ'D | -              | S442976      | -            |
| 11   | CONNECTORS, 12KV, CAMLINK OPERABLE, 600A   | AS REQ'D | 4187           | -            | C-LINK       |
| 12   | CURRENT SENSORS (SCADA ONLY)               | -        | -              | -            | -            |
| 13   | WIRE, TRENCH GROUND                        | AS REQ'D | 4510           | -            | TG-T-W       |
| 14   | SWITCH OPERATOR (SCADA ONLY)               | -        | -              | -            | -            |
| 15   | RTU (SCADA ONLY)                           | -        | -              | -            | -            |
| 16   | BRACKET, STAINLESS STEEL, 2" X 3"          | 4        | -              | S166072      | -            |
| 17   | NUT, 1/2" HEX BRONZE                       | 4        | -              | S506112      | -            |
| 18   | GASKET (BY MANUFACTURER)                   | -        | -              | -            | -            |
| 19   | CONNECTOR, COMPRESSION (I)                 | AS REQ'D | -              | -            | -            |

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SHEET  
2 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF PAD MOUNTED AIRBREAK PME 3  
SECTIONALIZING SWITCH CABINET, 12KV, 600A

UG3584.2



(I) NOT SHOWN OF FIGURES.

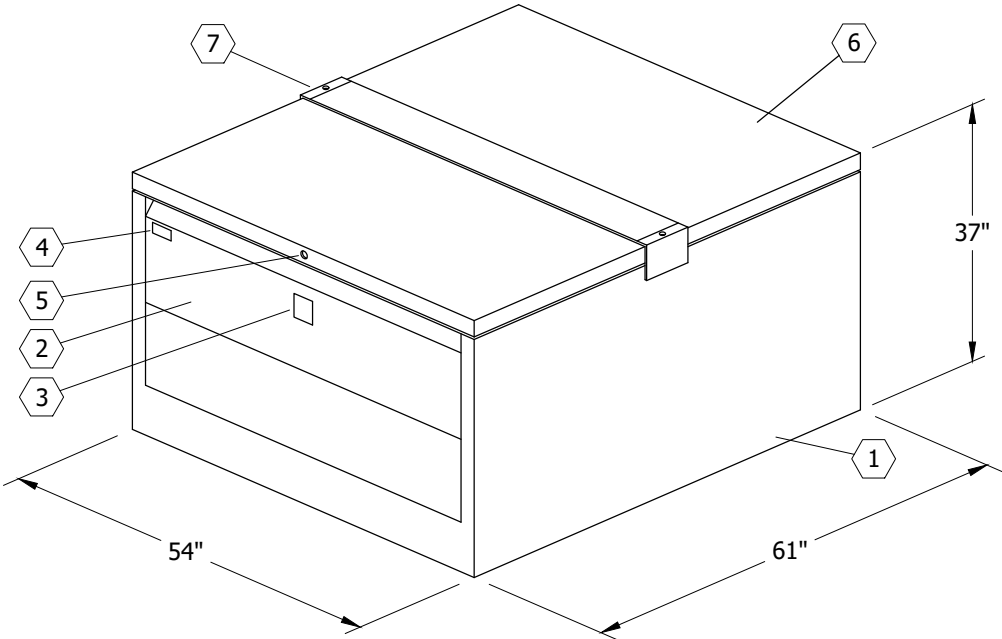
- a. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- b. SEE UG3213, UG3214, UG3215, UG3216, UG3217, AND UG3218 FOR SWITCH IDENTIFICATION.
- c. SEE UG3408 FOR WIRE ENTRY PREVENTION AND MOISTURE ENTRY.
- d. SEE UG3418 FOR BOX PAD INSTALLATION.
- e. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- f. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- g. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- h. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- i. SEE UG3489 FOR RETAINING WALLS.
- j. SEE UG3583 FOR PAD MOUNTED PME 3 SECTIONALIZING SWITCH.
- k. SEE UG4108 FOR INSTRUCTIONS TO SEAL JACKETED CABLE.
- l. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- m. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- n. SEE UG4520 AND UG4521 (PREVIOUS # UG4520.1-.9) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- o. SEE UG4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- p. SEE UG4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- q. SEE UG4187 FOR CAM-LINK CONNECTION.

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| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -  | -   | -   | 3/1/2002  | D   |        |    |    |     |     |      |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                       |                           |                    |          |                     |          |
|                 | INSTALLATION OF PAD MOUNTED AIRBREAK PME 3<br>SECTIONALIZING SWITCH CABINET, 12KV, 600A |                           |                    |          |                     |          |



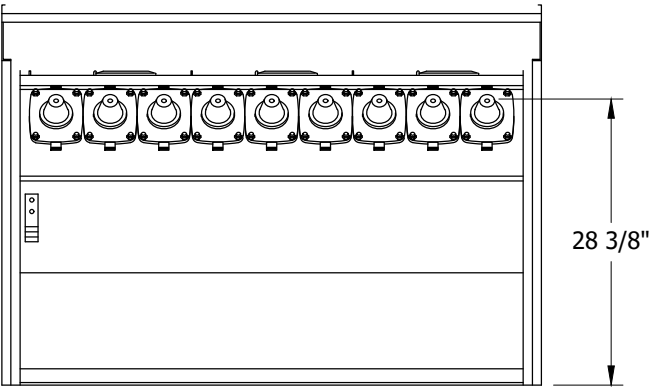
**SCOPE:** THIS STANDARD SHOWS THE PAD MOUNTED 3-WAY 12KV 600A SF-6 GAS SWITCH **CABINET**.



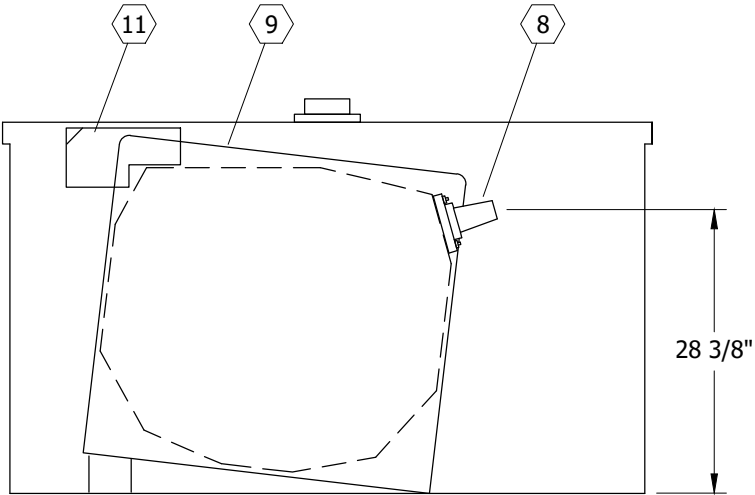
**FIGURE 1**  
ISOMETRIC VIEW

**TABLE 1**

| EQUIPMENT     | WEIGHT (LBS) |
|---------------|--------------|
| MANUAL SWITCH | 825          |
| SCADA SWITCH  | 1050         |
| ENCLOSURE     | 370          |



**FIGURE 1**  
FRONT VIEW



**FIGURE 1**  
SIDE VIEW

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| C   | FORMATTING        | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
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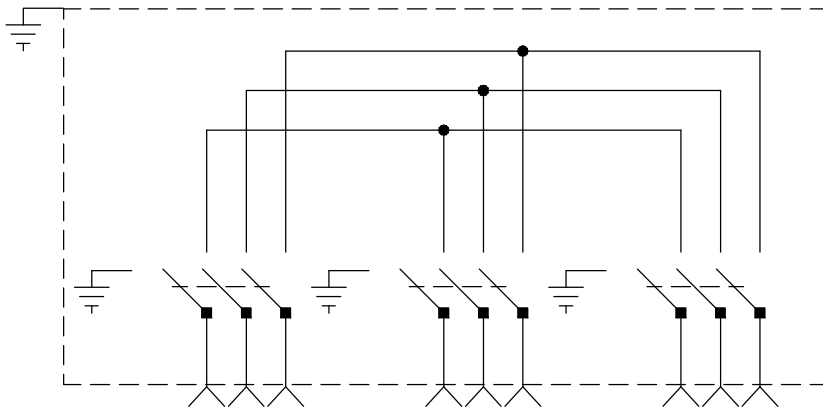
SHEET  
1 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

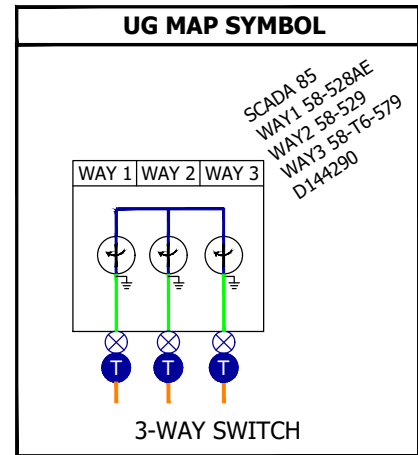
PAD MOUNTED 3-WAY 600A SF-6 GAS SWITCH **CABINET** (VISTA)

UG3585.1





**FIGURE 2**  
CONNECTION DIAGRAM



**TABLE 2**

| ELECTRIC RATING                              |         |
|--|---------|
| VOLTAGE                                      | 14.4KV  |
| B.I.L.                                       | 95KV    |
| CURRENT, CONDITIONS                          | 600A    |
| LOADMAKE AND LOADBREAK                       | 600A    |
| MOMENTARY AND FAULT CLOSE (RMS, SYMMETRICAL) | 12,500A |

**TABLE 3**

| SWITCH STOCK NUMBER |              |             |
|---------------------|--------------|-------------|
| 600A                | STOCK NUMBER | DESIGN UNIT |
| (STAINLESS STEEL)   | S709046      | 3WAY-V      |
| SCADA 3-WAY         | S704698      | 3WAYVS      |

**TABLE 4**

| GAS SWITCH PARTS LIST |   |
|-----------------------|---|
| ITEM                  | DESCRIPTION   |
| 1                     | ENCLOSURE, PAD MOUNTED                              |
| 2                     | PANEL, REMOVABLE                                    |
| 3                     | SIGN, WARNING                                       |
| 4                     | NAME PLATE  |
| 5                     | LOCKING MECHANISM, PENTAHEAD BOLT                   |
| 6                     | LIFT-UP ROOF, HINGED                                |
| 7                     | TAB, RETRACTABLE LIFTING                            |
| 8                     | BUSHING, 600A                                       |
| 9                     | TANK, SUBMERSIBLE, STAINLESS STEEL, SF-6, INSULATED |
| 10                    | WINDOWS, FAULT INDICATOR (I)                        |
| 11                    | MOTOR OPERATOR, "SCADA ONLY"                        |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

(I) NOT SHOWN ON FIGURES.

**REFERENCE:** NONE

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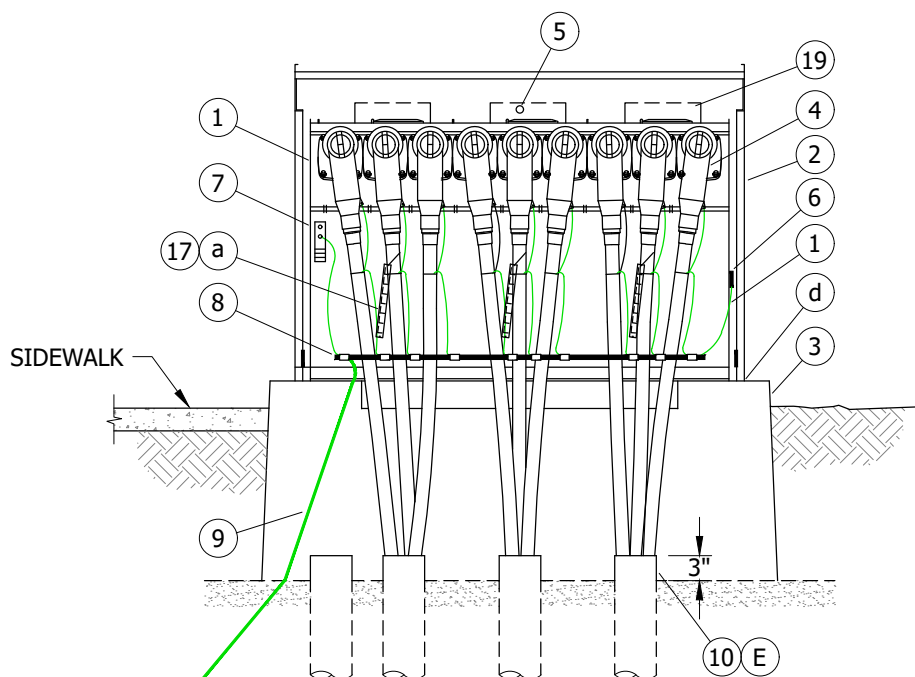
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PAD MOUNTED 3-WAY 600A SF-6 GAS SWITCH CABINET (VISTA)

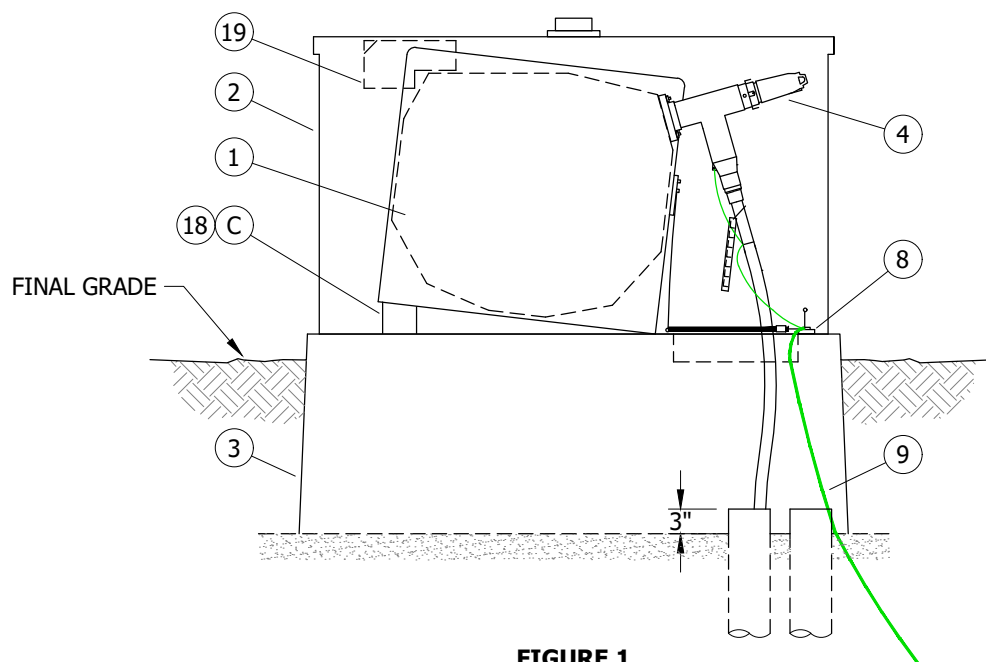
UG3585.2



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION FOR PAD MOUNTED 3-WAY 600A SF-6 GAS SWITCH CABINET (VISTA).



**FIGURE 1**  
**FRONT VIEW**



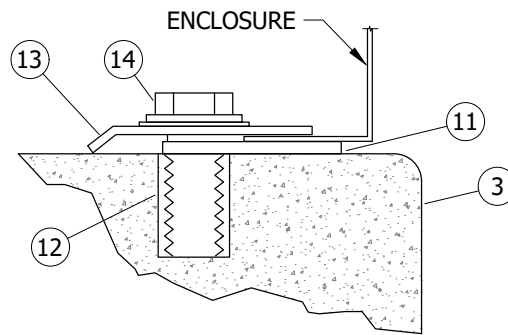
**FIGURE 1**  
**SIDE VIEW**

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                         |                           |                    |          |                     |          |
|                 | INSTALLATION OF PAD MOUNTED 3-WAY 600A<br>SF-6 GAS SWITCH CABINET (VISTA) |                           |                    |          |                     |          |





**FIGURE 2 II**  
HOLD DOWN DETAIL

### INSTALLATION:

- A. THE SWITCH AND ENCLOSURE ARE SHIPPED ON ONE PALLET BUT ARE TWO SEPARATE ITEMS.
- B. DO NOT ATTEMPT TO LIFT THE SWITCH AND SWITCH ENCLOSURE AT ONE TIME, DAMAGE WILL OCCUR TO THE ENCLOSURE LIFTING DEVICES.
- C. DO NOT REMOVE THE GALVANIZED REAR SWITCH MOUNTING BRACKET SUPPLIED BY THE MANUFACTURER.
- D. MOUNT SWITCH TO PAD USING 1/2" X 1 1/2" BRONZE CAP SCREWS.
- E. SEAL CONDUIT WITH SEALING COMPOUND.
- F. LOADBREAK ELBOWS SHALL NOT BE LANDED ON THE BACK OF THE 600A TEES EXCEPT FOR 1 LOADBREAK ELBOW FOR A SINGLE-PHASE TRANSFORMER (6930). THREE LOADBREAK ELBOWS MAY BE INSTALLED WHEN CONNECTED TO SWITCH WITH NO 600A TEES.
- G. SCADA INSTALLATIONS REQUIRE AN ADDITIONAL PAD FOR THE RTU. AN ADDITIONAL 120V SOURCE MUST BE PROVIDED TO THE RTU.
- H. SCADA SWITCHES INCLUDE THE RTU AND CABLES, CONTROL CABLES ARE 45 FEET IN LENGTH. RTU PAD SHALL BE NO MORE THAN 30 FEET FROM SWITCH.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                            | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|--|----------|---------------|--------------------|--------------|
| 1    | SWITCH, 3-WAY, 600A                    | 1        | 3585          | S709046<br>S704698 | 3WAY-V       |
|      | SWITCH, SCADA, 3-WAY, 600A (H)         | 1        |               |                    | 3WAYVS       |
| 2    | ENCLOSURE, PAD MOUNT                   | 1        |               |                    | -            |
| 3    | BOX PAD                                | 1        | 3419          | S513904            | 3419BP       |
| 4    | CONNECTORS, 12KV, 600/200A             | AS REQ'D | -             | -                  | -            |
| 5    | PADLOCK (C)                            | 2        | -             | S514848            | 4WTFTS       |
| 6    | ENCLOSURE, GROUND PAD                  | -        | -             | -                  | -            |
| 7    | SWITCH, GROUND PAD                     | -        | -             | -                  | -            |
| 8    | RING BUSS, 4/0 COPPER                  | -        | -             | -                  | -            |
| 9    | GROUND, TRENCH, COPPER, #2             | 1        | 4510          | -                  | TG-E-Q       |
| 10   | SEALING COMPOUND                       | AS REQ'D | 3948          | S442976            | -            |
| 11   | GASKET, BY MANUFACTURER                | -        | -             | -                  | -            |
| 12   | INSERT, 1/2" X 13, BY PAD MANUFACTURER | -        | -             | -                  | -            |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                         |                           |                    |          |                     |          |
|                 | INSTALLATION OF PAD MOUNTED 3-WAY 600A<br>SF-6 GAS SWITCH CABINET (VISTA) |                           |                    |          |                     |          |



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 13   | HOLD DOWN, BY MANUFACTURER  | -        | -             | -            | -            |
| 14   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2"                                    | 6        | -             | S616192      | -            |
| 15   | WASHER, STANDARD FLAT, BRONZE, 1/2" <span style="color: orange;">(III)</span> | 6        | -             | S799488      | -            |
| 16   | WASHER, LOCK SPRING <span style="color: orange;">(III)</span>                 | 6        | -             | S796416      | -            |
| 17   | TAGS, CABLE IDENTIFICATION  | AS REQ'D | 3202          | -            | -            |
| 18   | BRACKET, REAR SWITCH MOUNTING   | 2        | -             | -            | -            |
| 19   | MOTOR OPERATOR, "SCADA ONLY"  | 3        | 3586          | -            | -            |

**NOTES:**

I. SCADA SWITCH REQUIRES SEPARATE PAD MOUNTED RTU AND EXTERNAL 120V POWER SOURCE.

(II) 1/2 X 13 THREADED INSERTS INSTALLED IN 3419 PAD.

(III) NOT SHOWN ON FIGURES.

**REFERENCE:**

- (a) SEE UG3202 FOR CABLE IDENTIFICATION.
- b. SEE UG3211 FOR ATTACHING STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- c. SEE UG3221 FOR HIGH VOLTAGE DECAL.
- (d) SEE UG3408 FOR WIRE ENTRY PREVENTION.
- e. SEE UG3419 FOR BOX PAD AND CONDUIT PLACEMENT.
- f. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- g. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- h. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- i. SEE UG3489 FOR RETAINING WALLS.
- j. SEE UG3409 RTU PAD.
- k. SEE UG4355 FOR FAULT INDICATOR INSTALLATION.
- l. SEE UG4510 FOR PREFERRED I AND ALTERNATE TRENCH GROUND WIRE.
- m. SEE UG4520 AND UG4521 (PREVIOUS # UG4520) FOR EQUIPMENT GROUNDING.
- n. SEE UG4525 FOR GROUNDING PREMOLDED CONNECTORS.
- o. SEE UG4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- p. SEE DM6113 FOR AUTOMATIC FAULT INDICATOR APPLICATION.

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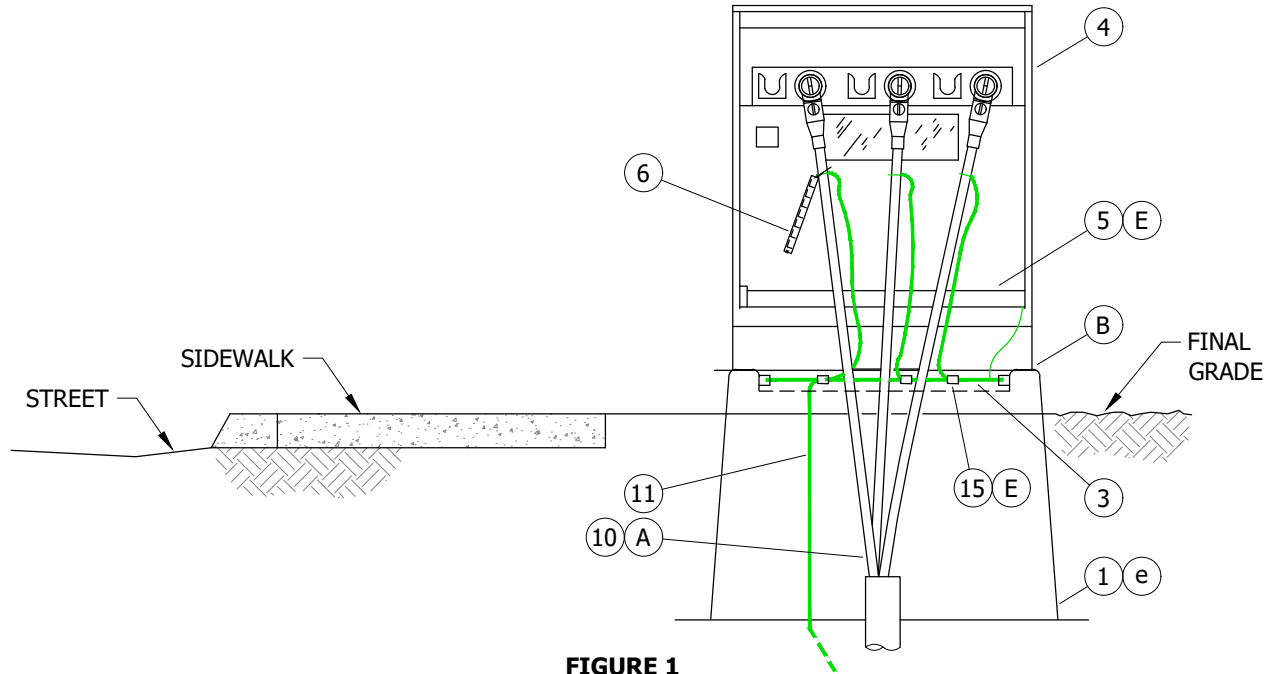
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF PAD MOUNTED 3-WAY 600A  
SF-6 GAS SWITCH CABINET (VISTA)

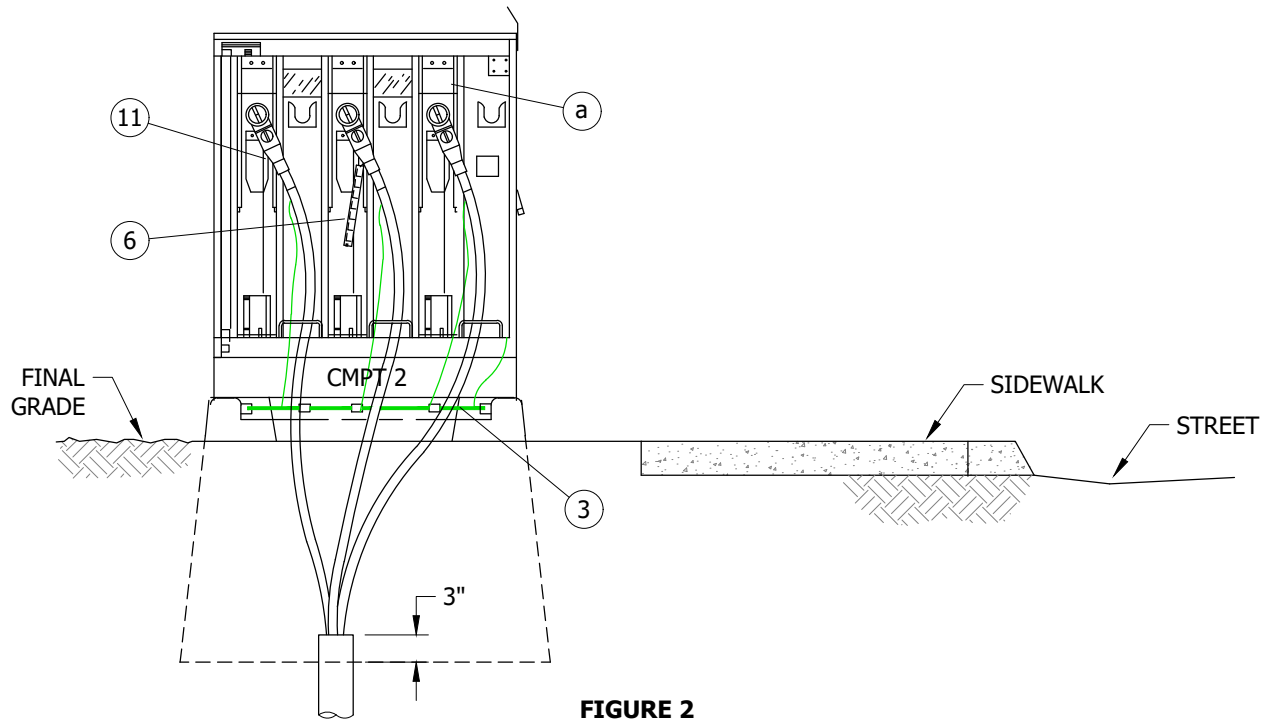
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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION FOR PAD MOUNTED AIRBREAK 12KV, 200A, PME-5 FUSED SWITCH CABINET.



**FIGURE 1**  
COMPARTMENT 1  
END VIEW



**FIGURE 2**  
COMPARTMENT 2  
END VIEW

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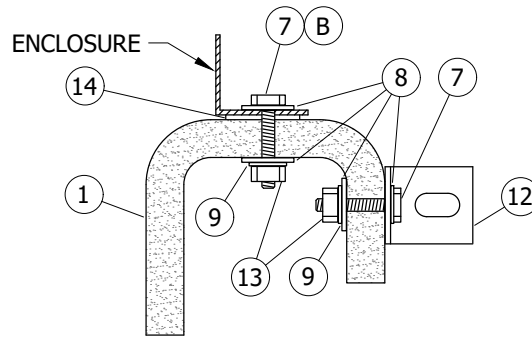
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**SHEET**  
**1 OF 3**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
INSTALLATION OF PAD MOUNTED AIRBREAK PME-5 FUSED SWITCH CABINET  
12KV, 200A

UG3588.1





**FIGURE 3**  
HOLD-DOWN DETAIL AND RING BUSS SUPPORT

### INSTALLATION:

- (A) SEAL CONDUITS WITH SEALING COMPOUND.
- (B) BASE OF CABINET SHALL BE CAULKED ONLY TO PREVENT WIRE ENTRY.
- C. SECURE ALL OF THE SWITCH DOORS WITH PENTAHEAD BOLTS AND 30 SERIES LOCKS.
- (D) DO NOT CONNECT CONCENTRIC TO GROUND BAR.
- (E) INSTALL CONDUITS SO THAT THE FEED IS CONNECTED TO THE SWITCH IN COMPARTMENT 1. COMPARTMENT 1 SHALL BE ON THE RIGHT SIDE AS ONE FACES THE CABINET FROM THE STREET OR SIDEWALK.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                                | QUANTITY     | STANDARD PAGE  | STOCK NUMBER | DESIGN UNITS |
|------|--|--------------|----------------|--------------|--------------|
| 1    | BOX PAD, FOR PME 3, AIR BREAK SWITCH       | 1            | 3418           | S514040      | 3418BP       |
| 2    | PADLOCK                                    | (I) AS REQ'D | -              | S514848      | 4WTFTS       |
| 3    | WIRE, 4/0 THW                              | (D) AS REQ'D | 4530           | S808224      | THW4/0       |
| 4    | SWITCH, PME-5                              | AS REQ'D     | 3511           | S708969      | PME-05       |
| 5    | GROUND BAR                                 | AS REQ'D     | -              | -            | -            |
| 6    | TAGS, IDENTIFICATION                       | AS REQ'D     | 3202/3213-3218 | -            | -            |
| 7    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2" | 4            | -              | S616192      | -            |
| 8    | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"  | 8            | -              | S799488      | -            |
| 9    | WASHER, LOCK SPRING                        | 4            | -              | S796416      | -            |
| 10   | SEALING COMPOUND                           | AS REQ'D     | -              | S442976      | -            |
| 11   | WIRE, TRENCH GROUND                        | AS REQ'D     | 4510           | -            | TG-E-W       |
| 12   | BRACKET, STAINLESS STEEL, 2" X 3"          | 4            | -              | S166072      | -            |
| 13   | NUT, HEX, BRONZE, 1/2"                     | 4            | -              | S506112      | -            |
| 14   | GASKET, BY MANUFACTURER                    | -            | -              | -            | -            |
| 15   | CONNECTOR, COMPRESSION                     | AS REQ'D     | -              | -            | -            |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                             |                           |                    |          |                     |          |
|                 | INSTALLATION OF PAD MOUNTED AIRBREAK PME-5 FUSED SWITCH CABINET<br>12KV, 200A |                           |                    |          |                     |          |



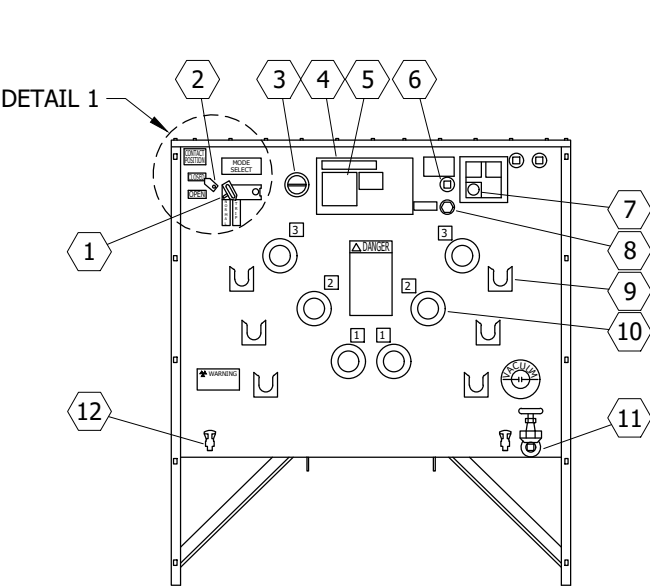
(I) NOT SHOWN OF FIGURES.

- a. SEE UG4310 FOR SM-4 FUSE CONVERSION.
- b. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- c. SEE UG3213, UG3214, UG3215, UG3216, UG3217, AND UG3218 FOR SWITCH IDENTIFICATION.
- d. SEE UG3408 FOR WIRE ENTRY PREVENTION AND MOISTURE ENTRY.
- e. SEE UG3418 FOR BOX PAD INSTALLATION.
- f. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- g. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- h. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- i. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM SUBGRADE RETAINING WALLS.
- j. SEE UG3489 FOR RETAINING WALLS.
- k. SEE UG3511 FOR PAD MOUNTED, PME-5, 200A, FUSED SWITCH.
- l. SEE UG4108 FOR INSTRUCTIONS TO SEAL JACKETED CABLE.
- m. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- n. SEE UG4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- o. SEE UG4520 AND UG4521 (PREVIOUS # UG4520) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- p. SEE UG4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- q. SEE UG4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.

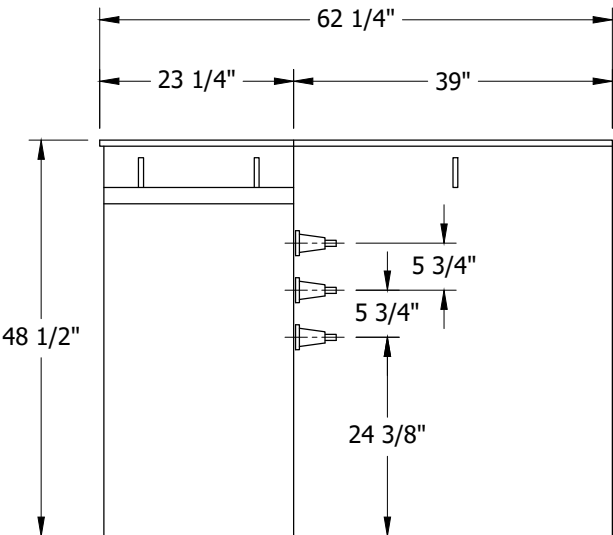
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|                 |                   |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                             |     |     |                    |     |          |    |                     |     |     |      |
|                 |                   |          | INSTALLATION OF PAD MOUNTED AIRBREAK PME-5 FUSED SWITCH CABINET<br>12KV, 200A |     |     |                    |     |          |    |                     |     |     |      |
|                 |                   | UG3588.3 |   |     |     |                    |     |          |    |                     |     |     |      |



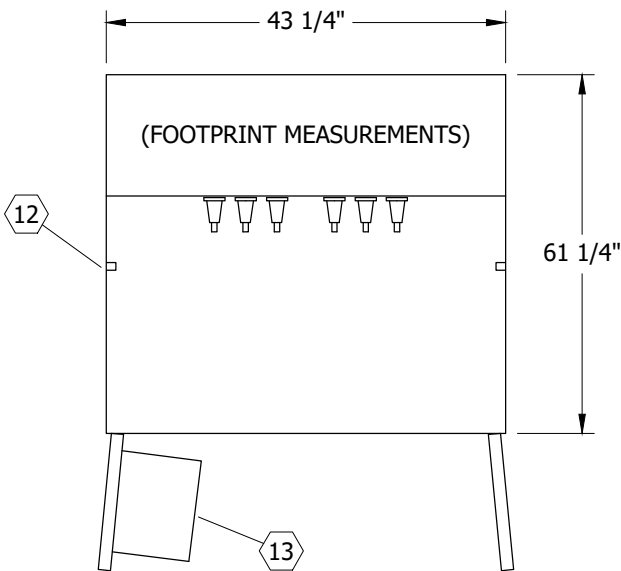
**SCOPE:** THIS STANDARD SHOWS A 12KV, 600A SERVICE RESTORER USED FOR PAD MOUNTED APPLICATIONS.



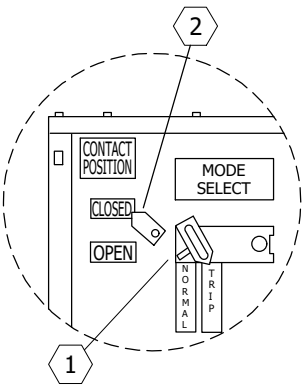
**FIGURE 1** IV  
FRONT VIEW  
TANK ONLY  
SEE TABLE 1



**FIGURE 1**  
SIDE VIEW



**FIGURE 1**  
TOP VIEW  
SEE TABLE 1



**DETAIL 1**

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| C   | MOVED FROM UG3575 | EDM | JKI | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW  | JS  | CZH | 7/1/2018  | E   |        |    |    |     |     |      |
| A   | REVISION          | -   | -   | -   | -   | 1/1/1994  | D   |        |    |    |     |     |      |

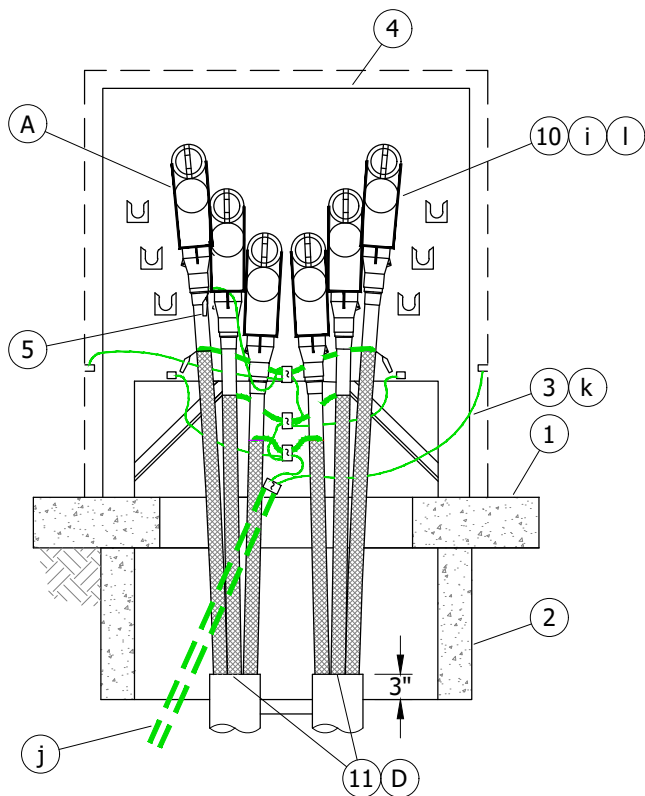
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| SHEET<br>1 OF 2 | 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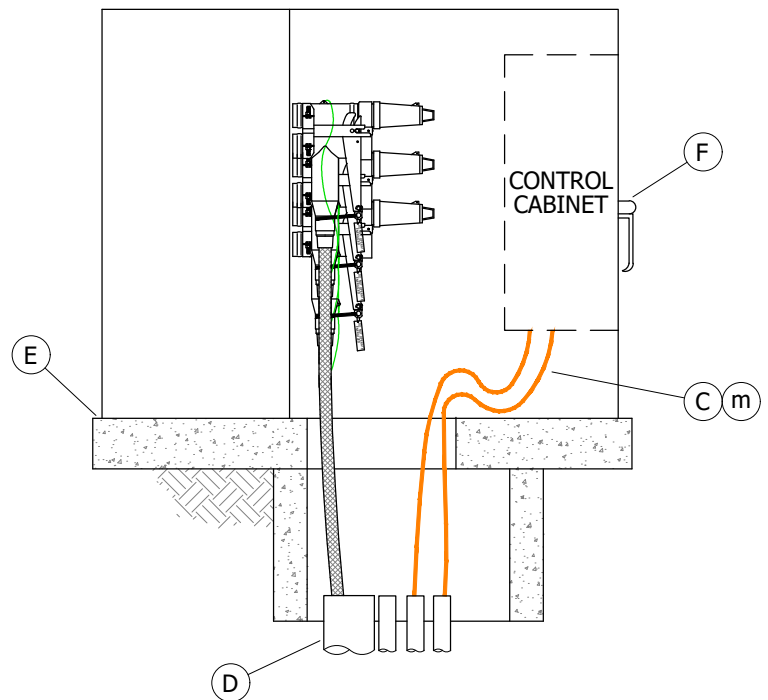




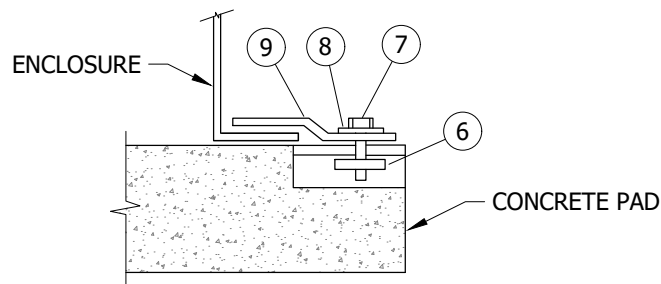
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION FOR PAD MOUNTED 12KV, 600A SERVICE RESTORER OVER A 3313 HANDHOLE WITH CAM-LINK CONNECTORS.



**FIGURE 1**  
FRONT VIEW



**FIGURE 1**  
SIDE VIEW



**FIGURE 2**  
HOLD-DOWN ASSEMBLY DETAIL  
TYPICAL BOTH SIDES OF EQUIPMENT PAD

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| C   | MOVED FROM UG3576 | EDM | JK | -   | -   | 5/17/2021 | F   |        |    |    |     |     |      |
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SHEET  
1 OF 3

SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INSTALLATION OF PAD MOUNTED SERVICE RESTORER 12KV, 600A AND 3313 HANDHOLE

## UG3591.1



- ☒ A. THE ONLY 200A CABLE ALLOWED WILL BE SINGLE-PHASE TAPPED OFF THE TEES ON THE LINE SIDE, FUSED ELBOWS ARE ACCEPTABLE.
- ☐ B. LINE SIDE, FUSED ELBOWS ARE ACCEPTABLE.
- ☐ C. AN ANTENNA MAY BE REQUIRED IF SUPERVISORY CABLE IS NOT AVAILABLE.
- ☐ D. SEAL CONDUITS WITH SEALING COMPOUND.
- ☐ E. BASE OF CABINET SHALL BE CAULKED TO PREVENT WIRE ENTRY.
- ☐ F. LOCK THE SWITCH DOOR WITH A SCHLAGE ELEC SERIES LOCK.

| ITEM | DESCRIPTION                                      | QUANTITY | STANDARD PAGE  | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|----------------|--------------|--------------|
| 1    | PAD, SERVICE RESTORER                            | 1        | 3415           | S514282      | 3415-B       |
| 2    | HANDHOLE, 3313 BASE SECTION                      | 1        | 3313           | S162664      |              |
| 3    | EQUIPMENT, GROUNDING FOR SERVICE RESTORER (k)    | 1        | 4520           | -            | -            |
| 4    | SERVICE RESTORER                                 | 1        | 3590           | S572112      | RESTOR       |
| 5    | TAGS, IDENTIFICATION                             | AS REQ'D | 3202/3213-3218 | -            | -            |
| 6    | NUT, CLAMPING CHANNEL                            | 2        | -              | S503520      | -            |
| 7    | SCREW, HEX HEAD CARP, BRONZE, 1/2" X 1 1/2"      | 2        | -              | S616192      | -            |
| 8    | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"        | 2        | -              | S799488      | -            |
| 9    | HOLD DOWN (SUPPLIED WITH CABINET)                | 2        | -              | -            | -            |
| 10   | CONNECTORS, 12KV, 600A, CAM-LINK OPERABLE (i)(l) | 6        | 4187           | S270240      | C-LINK       |
| 11   | SEALING COMPOUND (D)                             | AS REQ'D | -              | S442976      | -            |
| 12   | PADLOCK, SCHLAGE ELEC SERIES (iv)(F)             | 1        | -              | S514848      | 4WTFTS       |
| 13   | LINK, VISIBLE (iv)                               | 3        | 4187           | S270242      | V-LINK       |

- I. ALL 200A CONNECTORS ON THE SERVICE RESTORER MUST BE LOADBREAK.
- II. 120V AC SECONDARY MUST BE BROUGHT UP TO THE SERVICE RESTORER FOR CONTROL POWER. THE ACTUAL LOAD FOR THE CONTROL IS MINIMAL. USE THE UG STREETLIGHT NOMOGRAPH, DM5431 TO SIZE CONTROL POWER SECONDARY USING THE LOWEST POWER LEVEL SHOWN ON LINE "A". LIMIT TOTAL VOLTAGE DROP FROM THE TRANSFORMER STATION TO LESS THAN 4 PERCENT.
- III. IF SECONDARY IS NOT AVAILABLE INSTALL AN "N" 1.5KVA TRANSFORMER INSIDE THE SERVICE RESTORER AIR CABINET.
- IV. NOT SHOWN ON FIGURES.

- a. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- b. SEE UG3415 FOR PAD AND HANDHOLE INSTALLATION.
- c. SEE UG3479 FOR BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC.
- d. SEE UG3480, UG3481, UG3482, AND UG3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- e. SEE UG3484 FOR PAD INSTALLATION OF PAD MOUNTED EQUIPMENT.
- f. SEE UG3486, UG3487, AND UG3488 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE.
- g. SEE UG3489 FOR RETAINING WALLS.

| REV             | CHANGE            | DR       | BY   | DSN | APV | DATE               | REV | CHANGE   | DR | BY                  | DSN | APV | DATE |
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| B               | EDITORIAL CHANGES | -        | AW   | JS  | CZH | 7/1/2018           | E   |          |    |                     |     |     |      |
| A               | REVISION          | -        | -  | -   | -   | 1/1/2000           | D   |          |    |                     |     |     |      |
| SHEET<br>2 OF 3 |                   | X        | Indicates Latest Revision  |     |     | Completely Revised |     | New Page |    | Information Removed |     |     |      |
|                 |                   |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                            |     |     |                    |     |          |    |                     |     |     |      |
|                 |                   |          | INSTALLATION OF PAD MOUNTED SERVICE RESTORER<br>12KV, 600A AND 3313 HANDHOLE |     |     |                    |     |          |    |                     |     |     |      |
|                 |                   | UG3591.2 |  |     |     |                    |     |          |    |                     |     |     |      |



REFERENCE (CONT'D):

- h. SEE UG3590 FOR PAD MOUNTED SERVICE RESTORER.
- i. SEE UG4187 FOR CAM-LINK OPERABLE 600A CONNECTOR.
- j. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- k. SEE UG4520 AND UG4521 (PREVIOUS # UG4520) FOR GROUNDING PAD MOUNTED EQUIPMENT.
- l. SEE UG4525 FOR GROUNDING CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- m. SEE UG4645, UG4646, AND UG4647 FOR SCADA POLE AND ANTENNA.
- n. SEE UG3709 FOR THE N 1.5KVA (6930/120V) DRY TYPE TRANSFORMER.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                            |                           |  |                    |  |          |  |                     |          |
|                 | INSTALLATION OF PAD MOUNTED SERVICE RESTORER<br>12KV, 600A AND 3313 HANDHOLE |                           |  |                    |  |          |  |                     |          |



3600 - SUBSURFACE  
SECTIONALIZING  
EQUIPMENT



3600 - SUBSURFACE  
SECTIONALIZING  
EQUIPMENT



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| B  | ADDED 3680 | DG   | JS                        | CZH  | 5/1/2018  | E                  |        |    |          |      |      |                     |  |          |
| A  | ADDED 3679 | DS   | TR                        | MDJ  | 5/13/2016 | D                  |        |    |          |      |      |                     |  |          |
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|  |            | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD         |                           |      |           |                    |        |    |          |      |      |                     |  |          |
|  |            | SUBSURFACE SECTIONALIZING EQUIPMENT<br>TABLE OF CONTENTS |                           |      |           |                    |        |    |          |      |      |                     |  |          |







| SUBSTRUCTURE  | MAJOR USE OF LIMITATION  |
|---|--|
| 3309.1<br>36" X 24-1/4" X 18"<br>SINGLE-PHASE HANDHOLE                | 3309.1 HANDHOLE SINGLE PHASE ALLOWS A MAX OF 3 CONNECTORS WITH 8 TERMINAL POSITIONS EACH. THE 8 RUNS SHALL NOT EXCEED ONE RUN 500 KCMIL, 3 RUNS 350 KCMIL, 2 RUNS 3/0 AND ONE STREET LIGHT RUN.  |
| 3309.2<br>36" X 24-1/4" X 26"<br>SINGLE-PHASE HANDHOLE                | 3309.2 HANDHOLE SINGLE PHASE ALLOWS A MAX OF 3 CONNECTORS WITH 7 TERMINAL POSITIONS EACH. THE 7 RUNS SHALL NOT EXCEED 2 RUNS 500 KCMIL, 2 RUNS 350 KCMIL, 2 RUNS 3/0 AND ONE STREET LIGHT RUN.   |
| 3309.2<br>36" X 24-1/4" X 26"<br>THREE-PHASE HANDHOLE                 | 3309.2 HANDHOLE THREE-PHASE ALLOWS A MAX OF 4 CONNECTORS WITH 7 TERMINAL POSITIONS EACH. THIS SHALL NOT EXCEED 5 RUNS THREE-PHASE CONSISTING OF ONE RUN 350 KCMIL AND 4 RUNS 3/0 AND ONE STREET LIGHT RUN.   |
| 3311<br>14" X 66" X 14"<br>HANDHOLE                                   | FOR PRIMARY AND SECONDARY CABLE TRAINING BETWEEN TWO SINGLE-PHASE PAD-MOUNT TRANSFORMER CONNECTED IN AN OPEN DELTA BANK.   |
| 3311<br>14" X 108" X 14"<br>HANDHOLE                                  | FOR PRIMARY AND SECONDARY CABLE TRAINING BETWEEN THREE SINGLE-PHASE PAD-MOUNT TRANSFORMERS FOR CLOSED DELTA BANK, WHEN HKR TRANSFORMER CANNOT BE USED.   |
| 3312<br>17" X 30" X 12"<br>HANDHOLE-1 BODY<br>SECONDARY AND UNDER PAD | 3312 HANDHOLE MAY BE USED FOR REPLACEMENT OF EXISTING FACILITIES. ALL EQUIPMENT FACILITIES REQUIRING 30" X 17" BOX UNDER PAD MOUNTED EQUIPMENT.  |
| 3313<br>24" X 36" X 24"<br>HANDHOLE<br>(SECONDARY)                    | HANDHOLE ALLOWS A MAXIMUM OF FOUR RUNS OF 350 KCMIL SINGLE-PHASE OR THREE-PHASE PLUS SERVICES SMALLER THAN 350, OR A MAXIMUM OF THREE RUNS OF 500 KCMIL SINGLE-PHASE OR THREE-PHASE. NO PRIMARY AND SECONDARY ALLOWED TOGETHER. NO 1000 KCMIL ALLOWED.   |
| 3313<br>24" X 36" X 24"<br>HANDHOLE<br>(PRIMARY)                      | HANDHOLE ALLOWS SINGLE-PHASE (6.9KV OR 12KV) PRIMARY CABLE DEADBREAK CONNECTIONS FOR TWO RUNS (200 AMP TEE CONNECTOR WITH DEADBREAK ELBOWS ONLY, NOT A STRAIGHT SPLICE) OR ONE 3-WAY CABLE TAP AND LOADBREAK ELBOWS WITH THREE CABLE RUNS MAXIMUM. #2 SOLID IS THE MAXIMUM CABLE ON EACH INSTALLATION. <u>NO FUSED ELBOWS OR 4-WAY CABLE TAPS ALLOWED. NO SECONDARY ALLOWED.</u>   |
| 3314<br>36" X 6" X 48"<br>HANDHOLE<br>(PRIMARY & SECONDARY)           | FOR THREE-PHASE #2/0 OR SMALLER PRIMARY CABLE PLUS SECONDARIES (500 KCMIL MAX). <u>AN UNOBSTRUCTED SPACE OF 18" X 42" MUST BE MAINTAINED.</u><br>EXAMPLE:<br>A MAXIMUM INSTALLATION WOULD BE THREE 4-WAY CABLE TAPS WITH LOADBREAK ELBOWS ON ONE WALL AND TWO RUNS OF 3/C - 2/0 ON OPPOSITE WALL. ONE OF THESE RUNS CAN HAVE THREE STRAIGHT SPLICES (PAGE 3646.1, FIGURE 1). THIS WOULD NOT ALLOW ANY SECONDARIES, FUSED OR ELBOWS. TO OBTAIN REQUIRED UNOBSTRUCTED SPACE, THE 3/C - 2/0 SPLICES AND STRAIGHT RUN MUST BE RACKED ON THE SMALL CABLE HOOKS (SEE STANDARD 4178). SEE STANDARD 3649 FOR EQUIPMENT COMBINATION GUIDELINES. |

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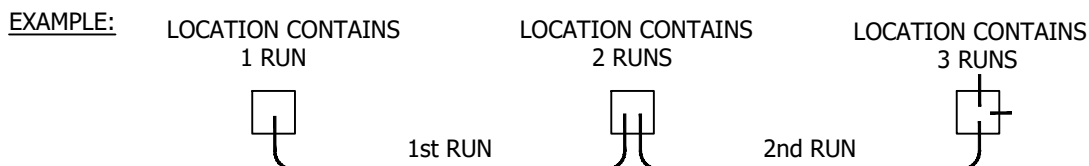
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |                    |          |                     |          |
|                 | SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET |                           |                    |          |                     |          |



| SUBSTRUCTURE   | MAJOR USE OF LIMITATION  |
|--|--|
| 3315<br>4'X 6'-6"X 6'-7"<br>HANDHOLE<br>(PRIMARY & SECONDARY)                            | FOR ALL SIZES OF PRIMARY AND UP TO 500 KCMIL SECONDARY CABLES MAX. <u>AN UNOBSTRUCTED SPACE OF 18" X 48" MUST BE MAINTAINED.</u><br>EXAMPLE:<br>MAXIMUM INSTALLATION CONSISTS OF 3-350 KCMIL OR LARGER ELBOW TEE SPLICED THREE-PHASE PRIMARY CIRCUITS ON OPPOSITE WALLS, EACH ONE TAPPED WITH ONE THREE-PHASE DISTRIBUTION RUN. <u>THE THREE TEE COMBINATION SHALL ONLY BE USED TO FEED A SWITCHED TIE POSITION.</u>   |
| 3316<br>5' X 8'-6" X 7'<br>HANDHOLE<br>(PRIMARY & SECONDARY)                             | FOR ALL SIZES OF PRIMARY AND UP TO 500 KCMIL SECONDARY CABLES MAX. <u>AN UNOBSTRUCTED SPACE OF 22" X 72" MUST BE MAINTAINED.</u><br>EXAMPLE:<br>MAXIMUM INSTALLATION CONSISTS OF 3-350 KCMIL OR LARGER ELBOW TEE SPLICED THREE-PHASE PRIMARY CIRCUITS ON OPPOSITE WALLS, EACH ONE TAPPED WITH ONE THREE-PHASE DISTRIBUTION RUN. IN THE SAME HANDHOLE, 6-200 AMP TEES W/12 DEADBREAK ELBOWS OR 600 VOLT CONNECTORS ON OPPOSITE WALLS. <u>THE THREE TEE COMBINATION SHALL ONLY BE USED TO FEED A SWITCHED TIE POSITION.</u>  |
| 3317<br>(SWITCH ENCLOSURE)<br>6' X 8' X 7'<br>HANDHOLE<br>(PRIMARY & SECONDARY)          | FOR ALL SIZES OF PRIMARY CABLE CONNECTED TO SWITCH. SECONDARY CABLE IS LIMITED TO A FEED TO SUMP PUMP AND/OR SCADA. AN UNOBSTRUCTED SPACE OF 36" X 70" (914 X 1788) MUST BE MAINTAINED. NO CABLE MAY PASS THROUGH OR BE SPLICED IN STRUCTURE.  |
| 3325<br>8' X 14' X 9'-6"<br>3326<br>8' X 20' X 9'-6"<br>MANHOLE<br>(PRIMARY & SECONDARY) | FOR ALL SIZES OF PRIMARY AND UP TO 500 KCMIL SECONDARY CABLES MAX. <u>AN UNOBSTRUCTED SPACE OF 36" X 10" FOR 14 FOOT MANHOLE. OR 36" X 16' FOR 20 FOOT MANHOLE MUST BE MAINTAINED.</u><br>EXAMPLE:<br>MAXIMUM INSTALLATION CONSISTS OF ONE 4-WAY SWITCH IN A 14 FOOT LONG MANHOLE AND TWO 4-WAY SWITCHES IN A 20 FOOT LONG MANHOLE. A 20 FOOT LONG MANHOLE IS THE MAXIMUM ALLOWABLE SIZE. NO CABLE TAPS ALLOWED. ALWAYS MAINTAIN AN UNOBSTRUCTED SPACE, AS MENTIONED ABOVE, TO ALLOW ACCESSIBILITY TO CABLE, EQUIPMENT, AND CONDUIT. SEE STANDARD 3649 FOR EQUIPMENT COMBINATION GUIDE-LINES. SEE STANDARD 4004 FOR MINIMUM BENDING RADII. |

### INSTALLATION:

- TO AVOID CUTTING THE CONDUIT BENDS, SUBSTRUCTURES AND/OR CABLE POLES WHICH REQUIRE A 90° BEND SHALL BE LOCATED FAR ENOUGH AWAY FROM EACH OTHER TO ALLOW ROOM ENOUGH FOR THE TWO 90° BENDS. THIS WILL VARY DEPENDING ON THE SIZE OF THE 90° BEND.
- IN EACH SUBSTRUCTURE, AS MANY CONDUIT KNOCKOUTS MAY BE USED AS NEEDED, PROVIDING PROPER INSTALLATION IS FOLLOWED AND REQUIRED UNOBSTRUCTED SPACE IS MAINTAINED. INSTALL CONDUITS USING THE LOWER SET OF KNOCKOUTS FIRST, UNLESS OTHERWISE SPECIFIED ON JOB PRINT. IF ONLY ONE CONDUIT IS REQUIRED, USE THE BOTTOM OUTSIDE (CLOSEST TO THE WALL) KNOCKOUT.
- 'ONE RUN' = CABLE IN CONDUIT FROM ONE LOCATION TO ANOTHER LOCATION.



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2 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

SUBSTRUCTURE USE AND LIMITATIONS REFERENCE SHEET

UG3605.2



**SCOPE:** THIS STANDARD DESCRIBES THE SPACE LIMITATIONS AND PROPER CABLE AND EQUIPMENT INSTALLATION STANDARDS IN SUBSTRUCTURES.

THERE ARE FIVE STANDARDS PERTAINING TO THE PROPER INSTALLATION OF EQUIPMENT IN SUBSTRUCTURES.

UNOBSTRUCTED SPACE - STANDARD 3645

UNOBSTRUCTED SPACE REQUIREMENTS FOR EACH SUBSTRUCTURE.

## CABLE AND CONDUIT PLACEMENT - STANDARD 3646

### PROPER CABLE AND CONDUIT INSTALLATION.

EQUIPMENT DIMENSIONS AND PLACEMENT - STANDARD 3647

## PROPER INSTALLATION AND APPLICATION OF CABLE RACKING.

EQUIPMENT ASSEMBLIES - STANDARD 3648

THE COMMON EQUIPMENT ASSEMBLIES ARE ILLUSTRATED AND DIMENSIONED FOR EASE OF DESIGN AND INSTALLATION IN SUBSTRUCTURES.

EQUIPMENT COMBINATION GUIDELINES - STANDARD 3649

THIS STANDARD PRESENTS ILLUSTRATIONS OF THE MOST COMMON EQUIPMENT CONFIGURATIONS THAT ARE ALLOWED OR NOT ALLOWED IN VARIOUS SUBSTRUCTURES.

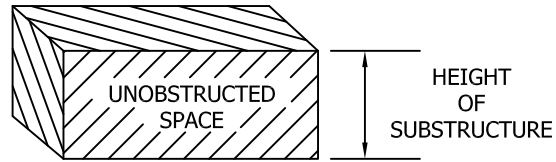
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCION STANDARD |                           |      |           |                    |        |    |          |      |      |                     |  |          |
|                 |                   | EQUIPMENT INSTALLATIONS IN SUBSTRUCTURES        |                           |      |           |                    |        |    |          |      |      |                     |  |          |

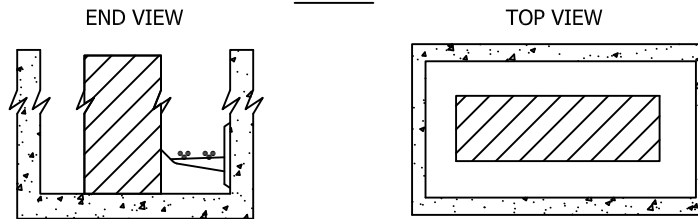


**SCOPE:** THIS STANDARD SHOWS THE MINIMUM UNOBSTRUCTED SPACE REQUIRED INSIDE A SUBSTRUCTURE TO ALLOW PERSONNEL TO PERFORM WORK SAFELY AND FREE FROM ANY OBSTRUCTIONS.

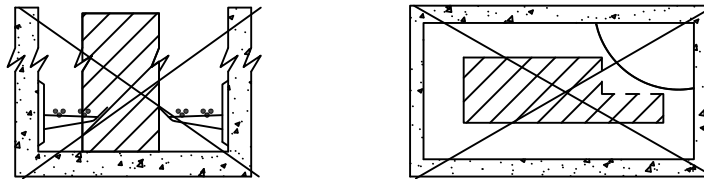
## UNOBSTRUCTED SPACE



RIGHT



**WRONG**



## SUBSTRUCTURE

3314  
3315  
3316  
3316 & SUBSURFACE/SURFACE  
OPERABLE SWITCH  
3325 - 14' LONG  
3326 - 20' LONG

## UNOBSTRUCTED SPACE

18" X 42"  
18" X 48"  
22" X 72"  
  
20" X 60"  
36" X 10'  
36" X 16'

**NOTES:**

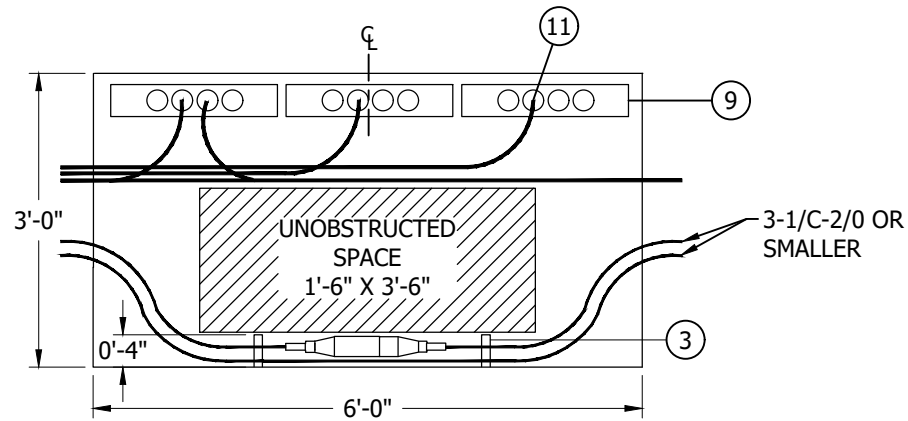
- I. AN UNOBSTRUCTED SPACE MUST BE MAINTAINED IN EACH SUBSTRUCTURE TO ALLOW PERSONNEL TO SAFELY ENTER OR EXIT THE SUBSTRUCTURE AND PERFORM WORK.
- II. AN UNOBSTRUCTED SPACE SHOULD BE IN THE CENTER OF A SUBSTRUCTURE WHENEVER POSSIBLE.
- III. THE UNOBSTRUCTED SPACE MAY BE REDUCED DURING CONSTRUCTION FOR PULLING, TRAINING AND TERMINATING CABLES, ETC., BUT NO PORTION OF THE FINAL UNOBSTRUCTED SPACE MAY BE REDUCED BY CABLES, CABLE RACKS, ETC.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD |                           |      |          |                    |        |    |          |      |      |                     |  |          |
|                 |                   | UNOBSTRUCTED SPACE                               |                           |      |          |                    |        |    |          |      |      |                     |  |          |



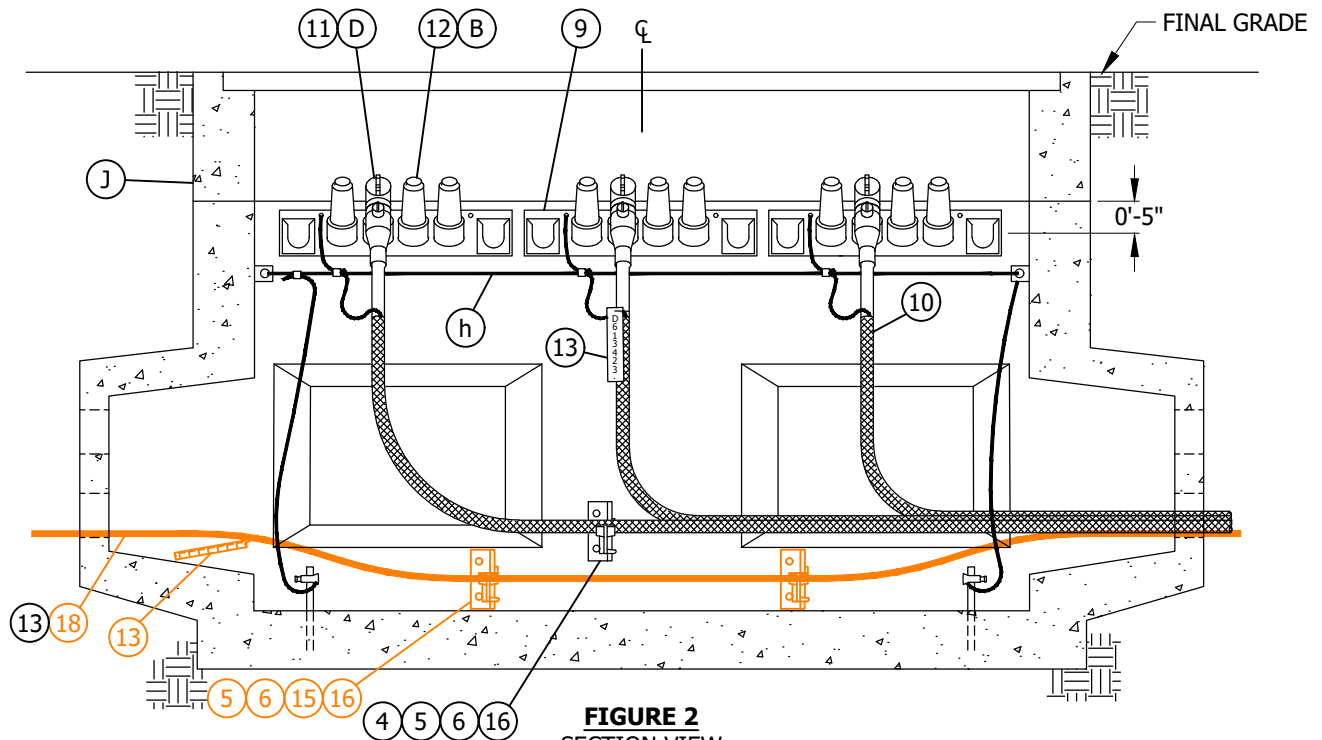
**SCOPE:** THIS STANDARD SHOWS CABLE PLACEMENT IN 3314 AND 3315 SUBSTRUCTURES TO ASSURE PROPER CABLE TRAINING.



**FIGURE 1**  
TOP VIEW  
3314 HANDHOLE

**ATTENTION:**

\* CABLE PULLED STRAIGHT THROUGH MUST ENTER AND EXIT THE SAME CONDUIT POSITION ON OPPOSITE ENDS. (m)



**FIGURE 2**  
SECTION VIEW  
3314 HANDHOLE

**ATTENTION:**

\* CABLE PULLED STRAIGHT THROUGH MUST ENTER AND EXIT THE SAME CONDUIT POSITION ON OPPOSITE ENDS.

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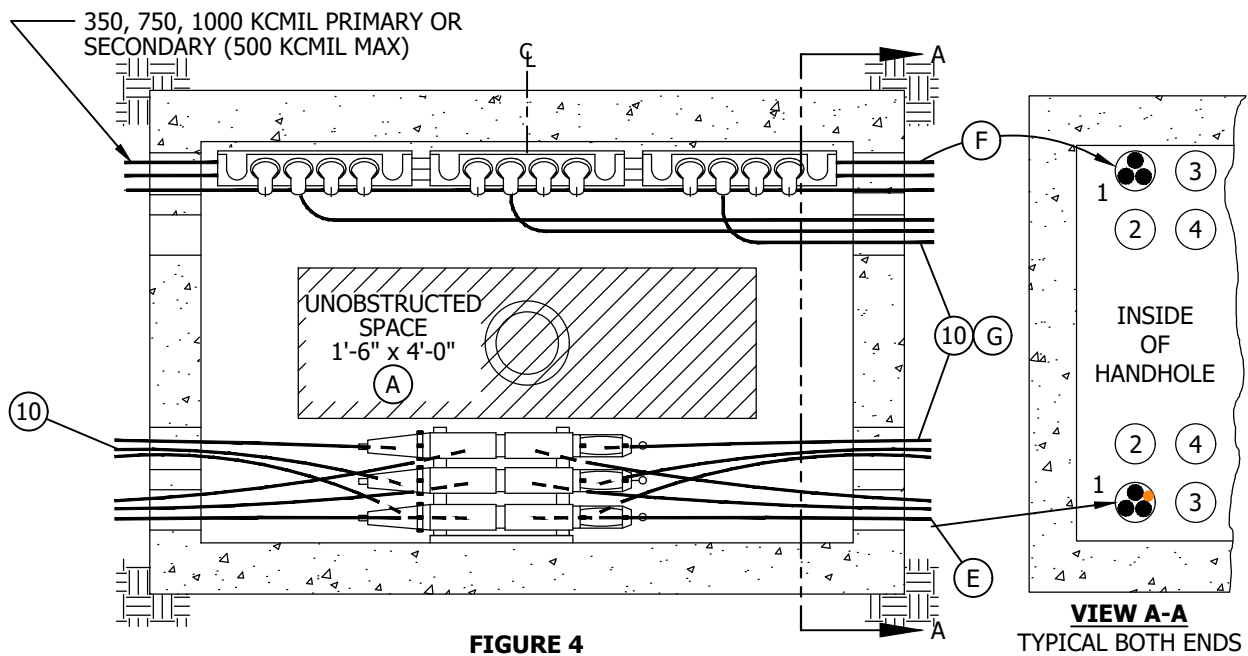
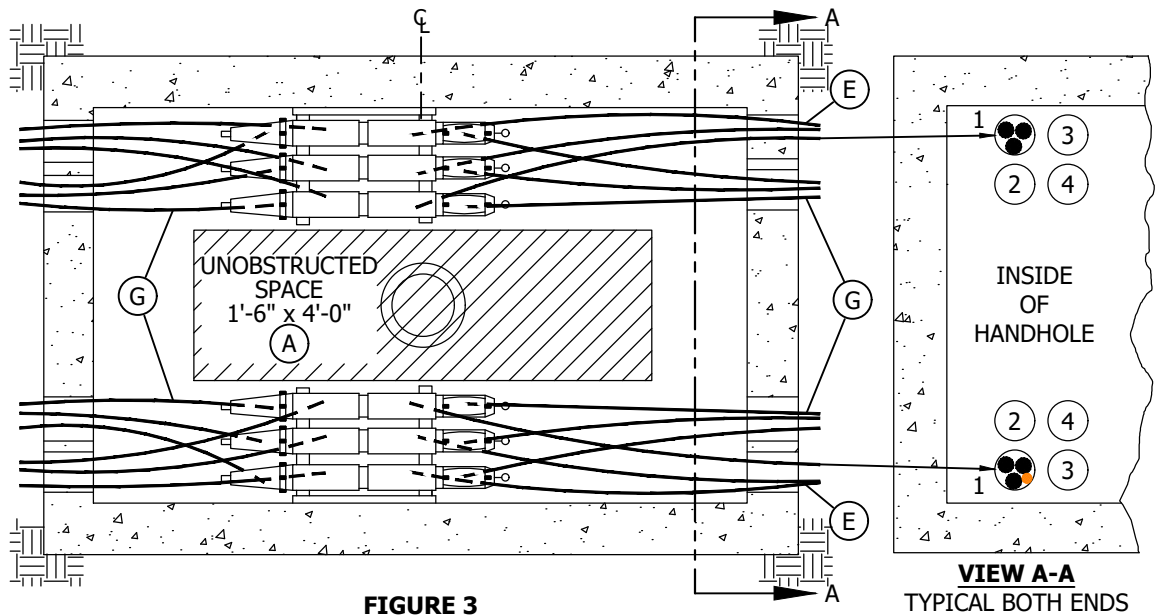
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                          |                    |                          |          |                          |                     |
| CABLE AND CONNECTOR PLACEMENT                     |                           |                          |                    |                          |          |                          |                     |

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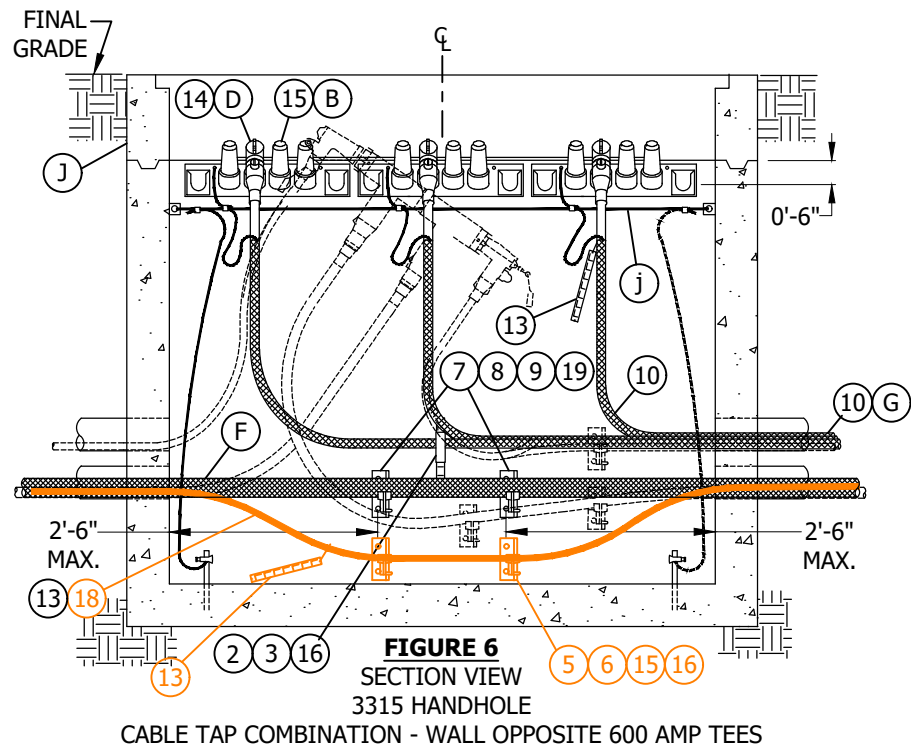
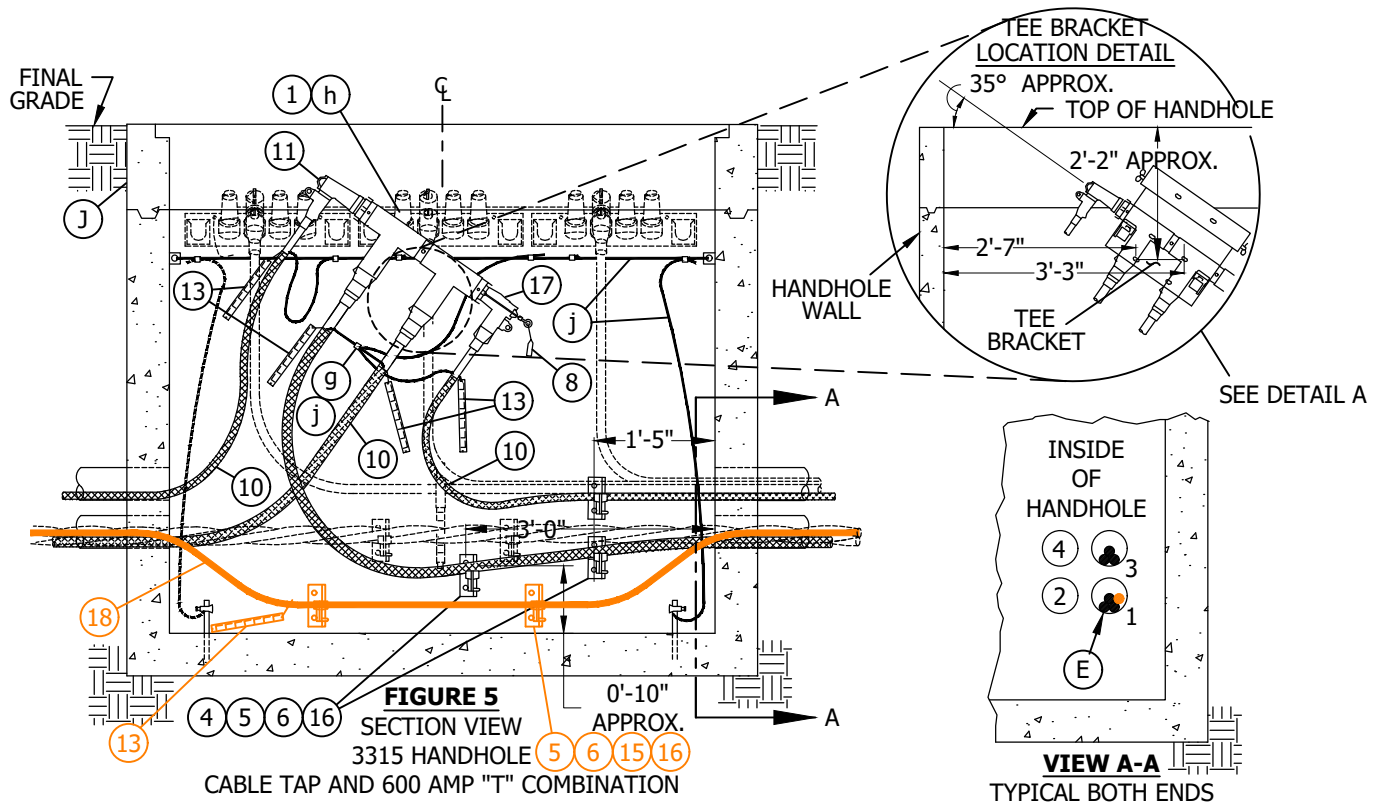
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE AND CONNECTOR PLACEMENT

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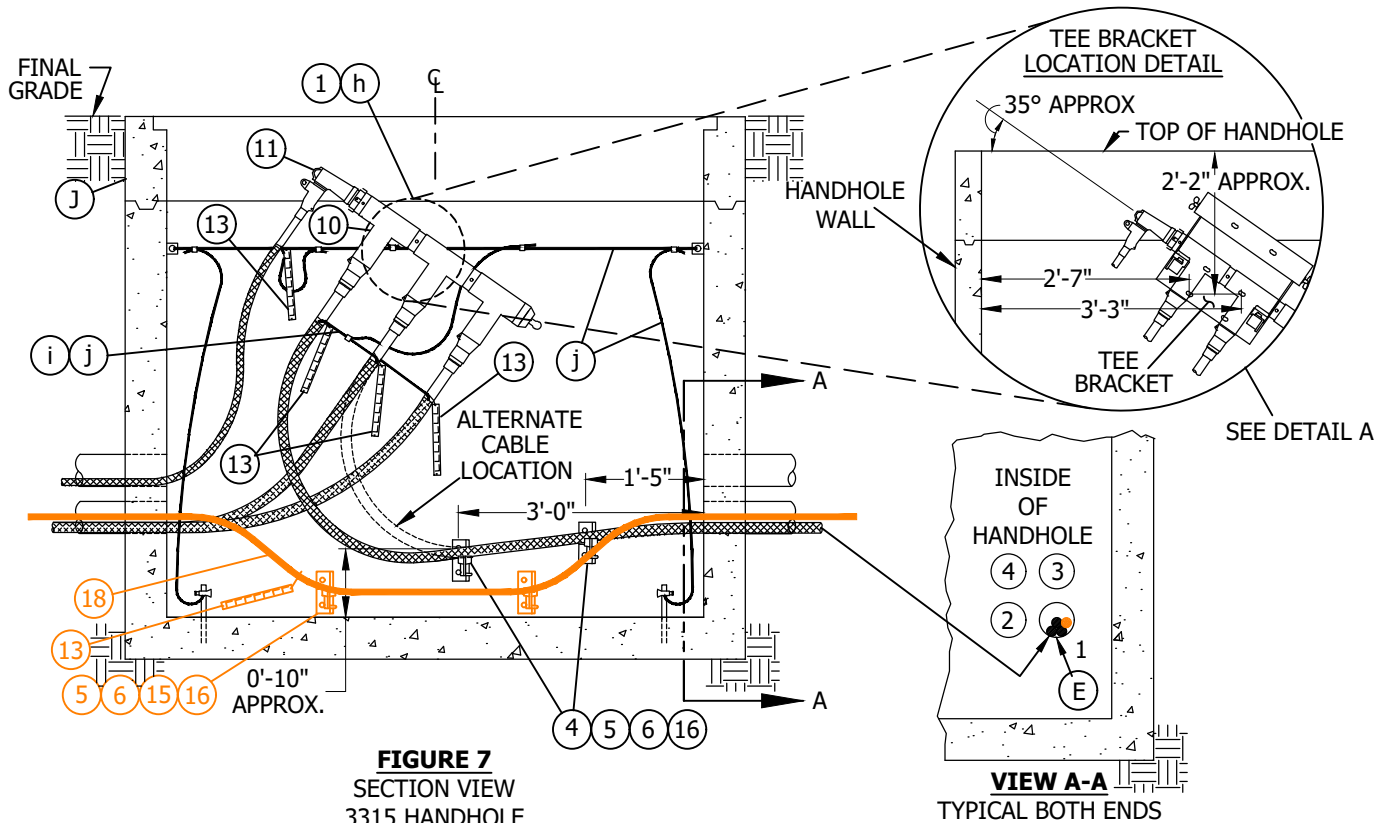
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE AND CONNECTOR PLACEMENT

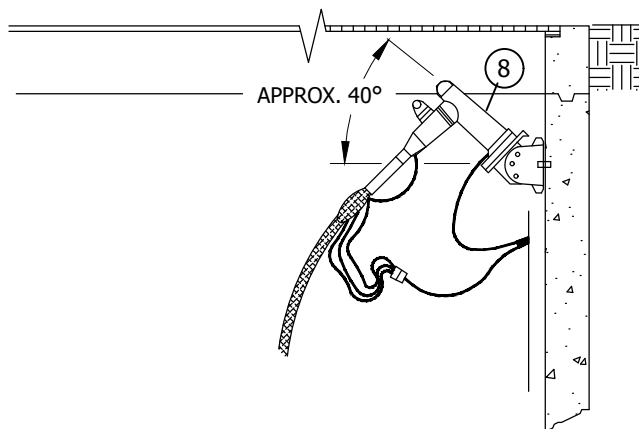
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**FIGURE 7**  
SECTION VIEW  
3315 HANDHOLE

**VIEW A-A**  
TYPICAL BOTH ENDS



**DETAIL A**  
SECTION VIEW  
3314, 3315 & 3316 HANDHOLES  
CABLE TAP ANGLE

**ATTENTION:**

- \* BEFORE DESIGNING THE INSTALLATION OF HANDHOLES, IT IS IMPORTANT TO FIRST DETERMINE ON WHICH SIDE THE CABLE TAPS WILL BE PLACED, THEN INSTALL THE OTHER CABLES ACCORDINGLY. DO NOT INSTALL CABLE TAPS ON HANDHOLE ENDS. (SEE PAGE 3647.1 FOR PLACEMENT OF CABLE TAPS).

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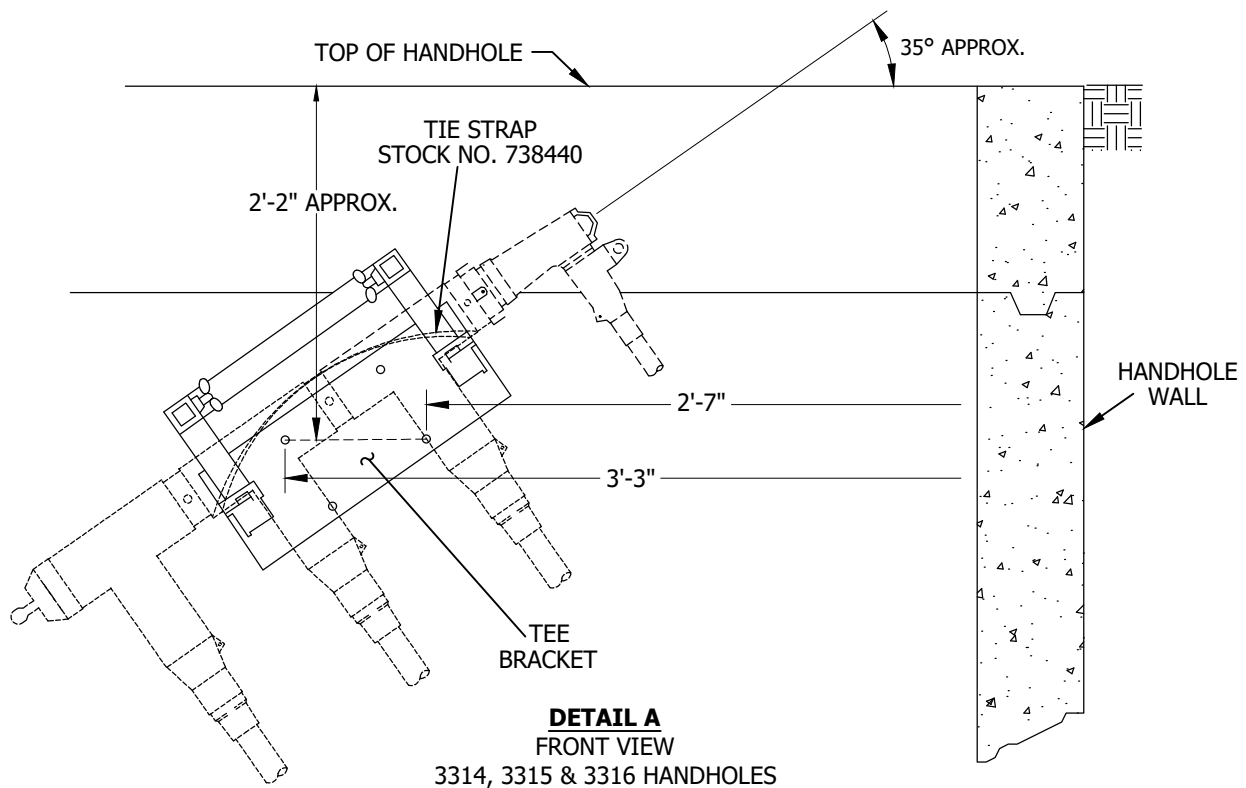
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE AND CONNECTOR PLACEMENT

UG3646.4





#### ATTENTION:

\* THIS ILLUSTRATION APPLIES TO 2-WAY OR 3-WAY 600 AMP TEE COMBINATION. (MAY BE INSTALLED AT EITHER END.)

#### INSTALLATION:

- (A) LEAVE AN UNOBSTRUCTED SPACE FREE OF CABLE INTRUSION BY CABLING AROUND WALLS. UNUSED CONDUITS MUST BE ACCESSIBLE FOR FUTURE CABLES. LEAVE ADEQUATE SPACE FOR BLOWING PULL ROPES IN CONDUITS AND/OR CABLE PULLING.
- (B) AS TAP POSITIONS ARE USED, REDUCE QUANTITY OF ITEM 15 ACCORDINGLY.
- (C) NOTE ORIENTATION OF ELBOW TEES AND CABLE LOOPS TO ALLOW FOR CABLE EXPANSION TO PREVENT DAMAGE.
- (D) LOADBREAK ELBOWS SHOULD ALWAYS BE POSITIONED VERTICALLY TO ALLOW FOR MAXIMUM ELECTRICAL GROUND CLEARANCE TO ADJACENT ELBOWS WHEN SWITCHING ENERGIZED. CABLES BE INSERTED STRAIGHT INTO ELBOWS SO AS NOT TO ALLOW BENDING OF ELBOW ENTRANCE. ELBOWS SHOULD BE INSTALLED AT APPROXIMATELY 40 DEGREE ANGLE.
- (E) 350, 750 OR 1000 KCMIL CABLES TO BE TERMINATED WITH 600 AMP TEE CONNECTORS SHALL BE ON THE WALL OPPOSITE ANY CABLE TAPS. THIS CABLE SHALL BE IN THE BOTTOM OUTSIDE CONDUIT ENTERING AND LEAVING AND SHALL BE RACKED OR TERMINATED ON THE SAME WALL OF THE CONDUIT BANK THAT THE CABLE ENTERS AND LEAVES (POSITION 1). USE POSITIONS 3 AND 4 FOR SMALLER CABLES (SEE FIGURES 4 AND 5).
- (F) 350, 750 AND 1000 KCMIL PRIMARY OR CABLES PULLED STRAIGHT THROUGH WITHOUT ANY TERMINATIONS SHALL BE PULLED IN THE BOTTOM CONDUITS (POSITION 1 AND 2) AND SHALL BE RACKED ON THE SAME WALL OF THE DUCT BANK THAT THE CABLE ENTERS AND LEAVES. (DO NOT INSTALL ON THE SAME SIDE AS 600 AMP TEES).
- (G) #2 OR 2/0 PRIMARY CABLES OR SECONDARY (500 KCMIL MAX.) MAY BE PULLED IN ANY CONDUIT NOT USED FOR LARGER CABLES AS DESCRIBED IN INSTALLATION NOTES 'E' AND 'F'. IF CONDUITS ARE NOT BEING USED AS DESCRIBED IN THESE NOTES, LEAVE THEM EMPTY FOR FUTURE LARGER SIZED CABLES UNLESS THERE IS NO POSSIBLE FUTURE LOAD.
- H. DO NOT USE UNISTRUT FOR MOUNTING CABLE TAPS.
- (J) DO NOT INSTALL EQUIPMENT ON 12 INCH TOP SECTION OF HANDHOLES AS THIS SECTION IS USED FOR FINAL GRADE ADJUSTMENTS.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE AND CONNECTOR PLACEMENT

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## **INSTALLATION (CONT'D.):**

- K. FOR MAINTENANCE OR TROUBLE SITUATIONS THAT INVOLVE CABLE WITH FIBER OPTIC CABLE IN THE SAME CONDUIT, CUT THE FIBER IN THE CLEAR AND ALWAYS REINSTALL NEW POWER CABLE WITH MAXCELL SLEEVE AND FIBER OPTIC. (n)
1. INSTALLATION NOTE: (MAXCELL SLEEVE SHALL HAVE TWENTY FEET OF SLACK BEYOND THE CONDUIT)
- L. IF A CONDUIT HAS FIBER OPTIC CABLE ALREADY INSTALLED AND IS NEEDED FOR UG CABLE, INSTALL NEW CABLE WITH MAXCELL SLEEVE AND FIBER OPTIC.
- M. FIBER OPTIC CABLE WILL BE INSTALLED BY SDG&E CREWS.
- N. TELECOMMUNICATION CREWS TO MAKE FIBER OPTIC CABLE TERMINATIONS.

### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                            | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | TEE BRACKET (INSULATORS INCLUDED) (f)  | 1        | 4178          | S166675      | T/BRKT       |
| 2    | HANGER, 15"                            | AS REQ'D | 4178          | S564512      | -            |
| 3    | CABLE HOOK, 2-1/2"                     | AS REQ'D | 4178          | S415110      | -            |
| 4    | INSULATOR, CABLE                       | AS REQ'D | 4178          | S430592      | -            |
| 5    | ADAPTER, CABLE ARM                     | AS REQ'D | 4178          | S102016      | -            |
| 6    | ARM, CABLE, 3-WAY                      | AS REQ'D | 4178          | S110528      | -            |
| 7    | CONNECTOR ASSEMBLY, 200/600 AMP        | AS REQ'D | 4181.1        | -            | -            |
| 8    | TAG, DO NOT OPERATE ENERGIZED          | 3        | 3232          | S547966      | -            |
| 9    | CABLE TAP, 12KV, 3-WAY OR 4-WAY        | 3        | 4192.4        | -            | -            |
| 10   | CABLE, #2 OR #2/0 PECN                 | AS REQ'D | 4002.2        | -            | -            |
| 11   | ELBOW, LOADBREAK, 12KV (B)             | AS REQ'D | 4191.1        | -            | -            |
| 12   | CAP, INSULTING RECEPTACLE              | AS REQ'D | 4192.1        | S204304      | INSREC       |
| 13   | CABLE IDENTIFICATION TAGS              | AS REQ'D | 3202          | -            | -            |
| 14   | ELBOW, DEADBREAK, 12KV                 | AS REQ'D | 4196.1        | -            | -            |
| 15   | ARM. CABLE, 4-WAY                      | AS REQ'D | 4178          | S110560      | -            |
| 16   | ARM, CABLE, 4-WAY (f)                  | AS REQ'D | 4178          | S738440      | -            |
| 17   | INSULATOR, UNISTRUT (REPLACEMENT ITEM) | AS REQ'D | 4178          | S430560      | -            |
| 18   | CABLE, FIBER OPTIC                     | AS REQ'D | 4600          | -            | -            |

**NOTES:** NONE

**REFERENCE:**

- a. SEE STANDARD 3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- b. SEE STANDARD 3374 FOR CONDUIT TERMINATION.
- c. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- d. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- e. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- f. SEE STANDARD 3487 FOR RETAINING WALLS.
- g. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART.
- h. SEE STANDARD 4178 FOR TEE BRACKET AND STAND OFF BAR.

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| C   | FIGURE UPDATE     | EDM | ADW | JES | CZH | 7/13/20  | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | -   | AW  | JS  | CZH | 7/1/2018 | E   |        |    |    |     |     |      |
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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                  | CABLE AND CONNECTOR PLACEMENT                     |                           |  |                    |  |          |  |                     |          |



**REFERENCE (CONT'D):**

- i SEE STANDARD 4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- j SEE STANDARD 4540 FOR GROUNDING SUBSTRUCTURES AND EQUIPMENT.
- k. SEE STANDARD 4550 FOR GROUNDING TELCO CONDUCTOR IN HANDHOLES.
- l. SEE DESIGN MANUAL PAGE 5721 FOR CONDUIT POSITION WITHIN SUBSTRUCTURES.
- m SEE PAGE 3647.1 FOR PLACEMENT OF CABLE TAPS.
- n CONTACT STEVEN HUNDLEY, PROJ. MGR - 111  
EMAIL: SHUNDLEY@SDGE.COM  
WORK PHONE: 619.676.7790  
CELL: 619.929.8705

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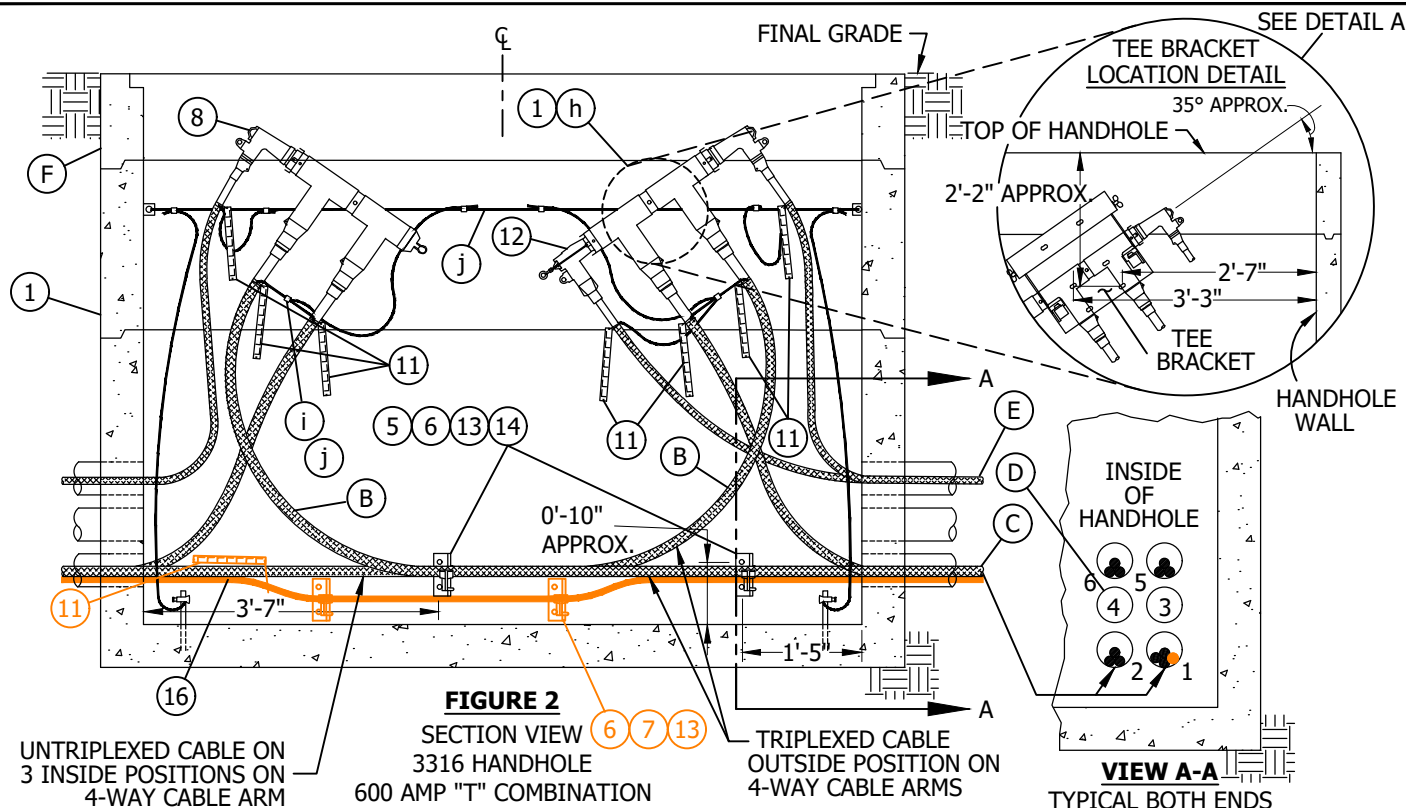
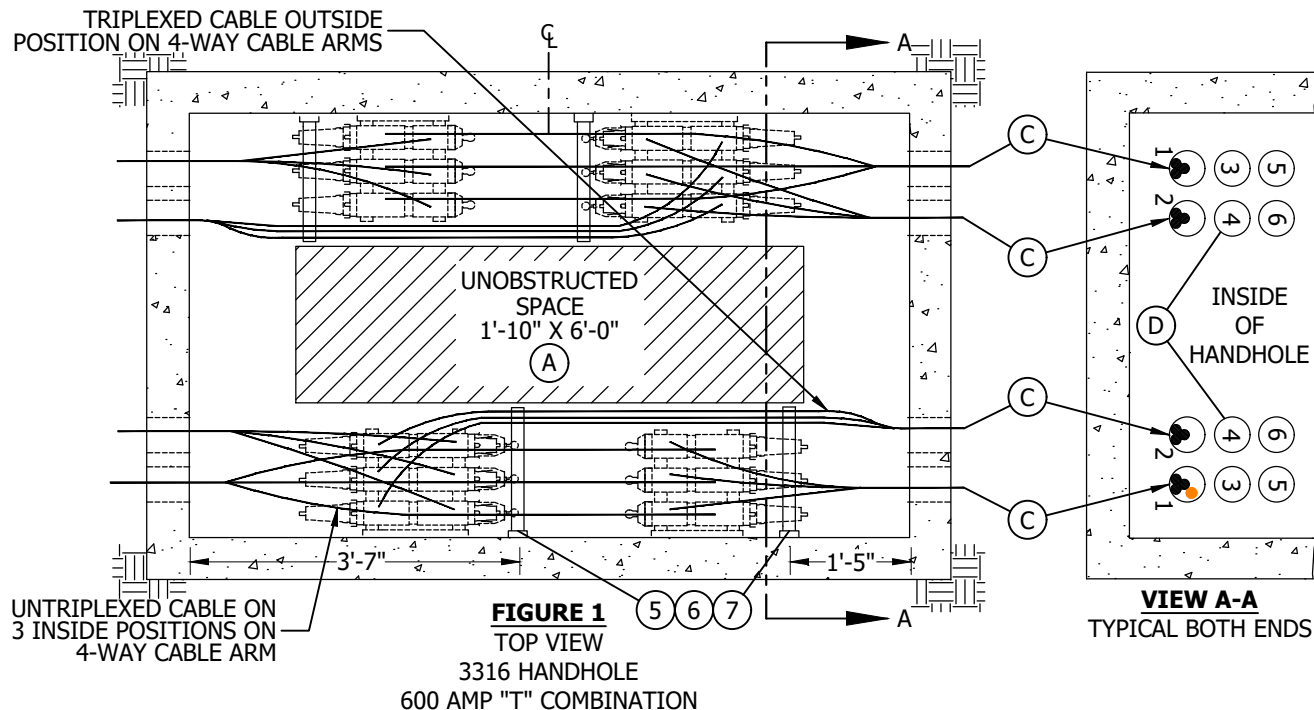
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE AND CONNECTOR PLACEMENT

UG3646.7



**SCOPE:** THIS STANDARD SHOWS CABLE PLACEMENT IN 3316 STRUCTURES TO ENSURE PROPER CABLE TRAINING.



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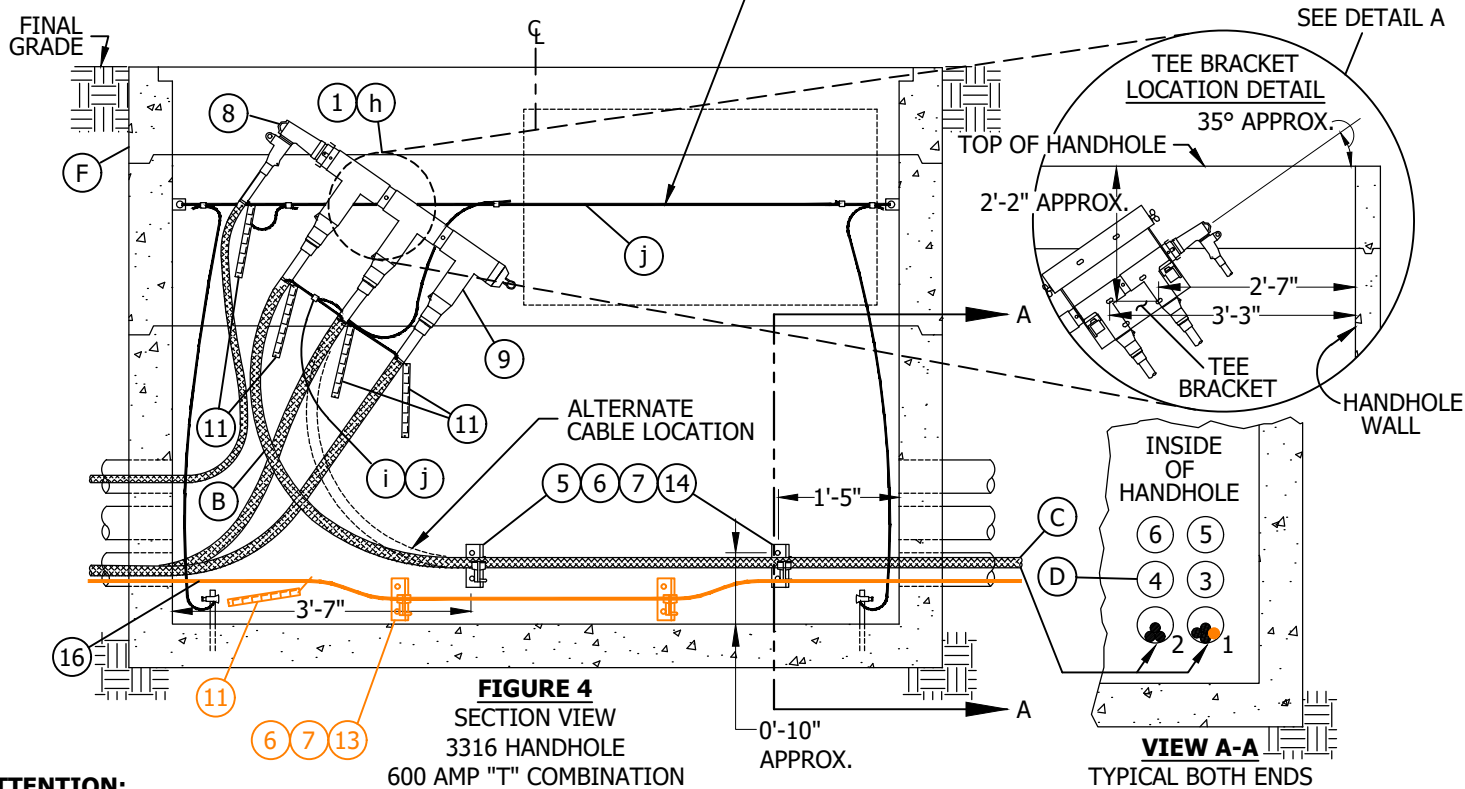
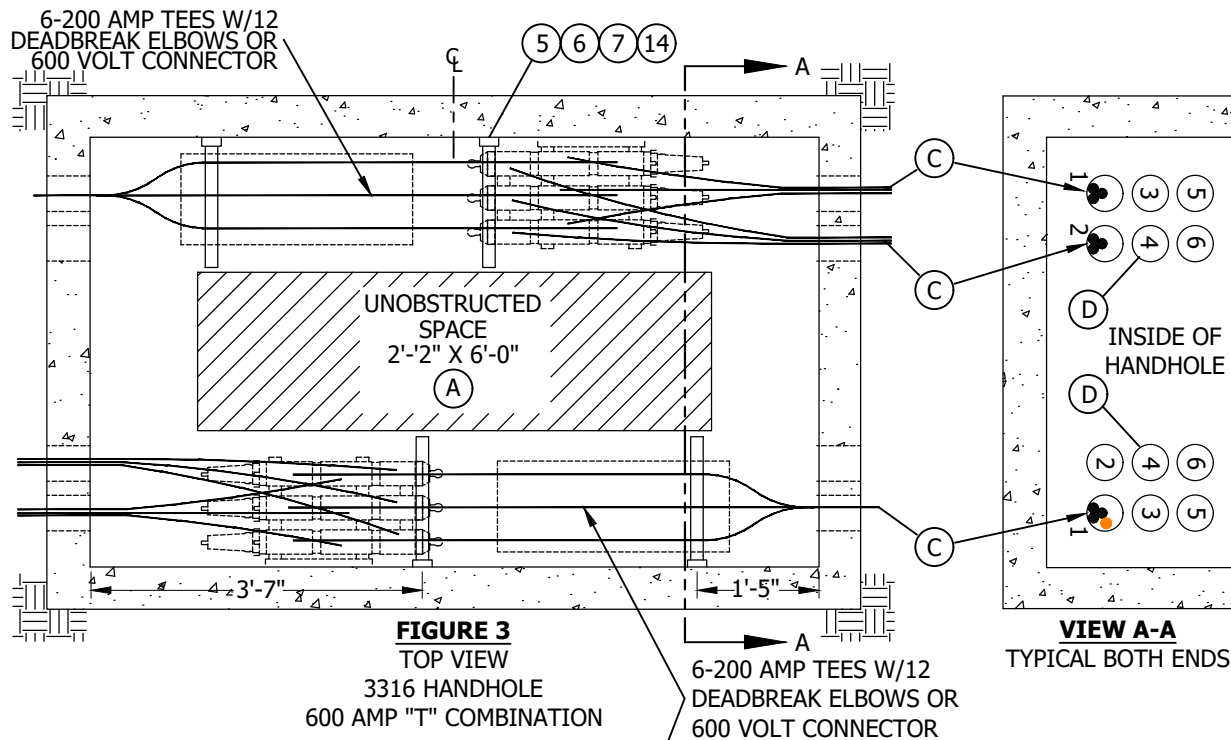
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE AND CONNECTOR PLACEMENT

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**ATTENTION:**

\* CABLE PULLED STRAIGHT THROUGH MUST ENTER AND EXIT CONDUIT POSITIONS ON OPPOSITE ENDS.

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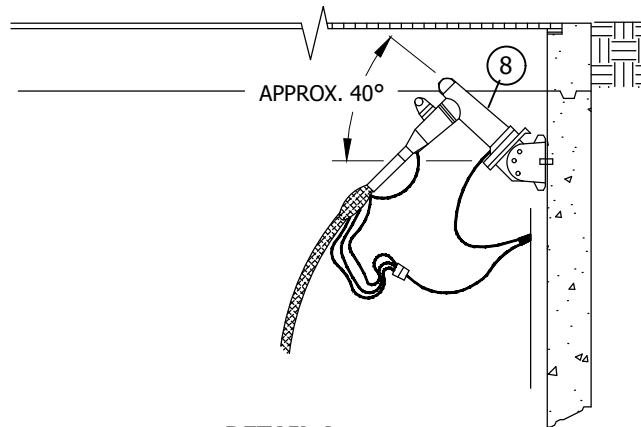
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CABLE AND CONNECTOR PLACEMENT

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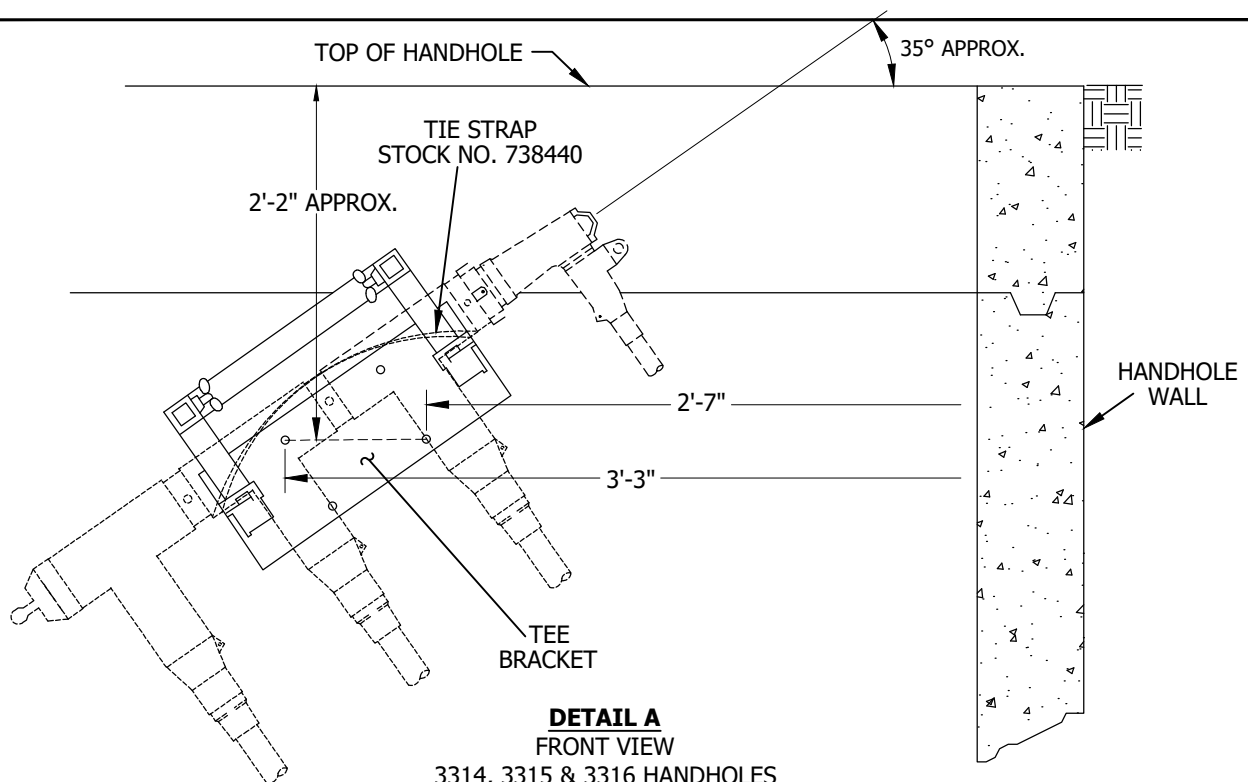




**DETAIL A**  
SECTION VIEW  
3314, 3315 & 3316 HANDHOLES  
CABLE TAP ANGLE

**ATTENTION:**

- \* BEFORE DESIGNING THE INSTALLATION OF HANDHOLES, IT IS IMPORTANT TO FIRST DETERMINE ON WHICH SIDE THE CABLE TAPS WILL BE PLACED, THEN INSTALL THE OTHER CABLES ACCORDINGLY. DO NOT INSTALL CABLE TAPS ON HANDHOLE ENDS. (SEE PAGE 3647.1 FOR PLACEMENT OF CABLE TAPS).



**DETAIL A**  
FRONT VIEW  
3314, 3315 & 3316 HANDHOLES  
TEE BRACKET ANGLE & INSTALLATION MEASUREMENTS

**ATTENTION:**

- \* THIS ILLUSTRATION APPLIES TP 2-WAY OR 3-WAY 600 AMP TEE COMBINATION. (MAY BE INSTALLED AT EITHER END.)

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE AND CONNECTOR PLACEMENT

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- (A) LEAVE AN UNOBTSTRUCTED SPACE FREE OF CABLE INTRUSION BY CABLING AROUND WALLS. UNUSED CONDUITS MUST BE ACCESSIBLE FOR FUTURE CABLES. LEAVE ADEQUATE SPACE FOR BLOWING PULL ROPES IN CONDUITS AND/OR CABLE PULLING.
- (B) NOTE ORIENTATION OF ELBOW TEES AND CABLE LOOPS TO ALLOW FOR CABLE EXPANSION AND TO PREVENT DAMAGE.
- (C) THE CABLES TERMINATED ON THE TEE BRACKET SHALL BE RACKED OR TERMINATED ON THE SAME WALL OF THE CONDUIT BANK THAT THE CABLE ENTERS AND LEAVES (POSITION 1 & 2).
- (D) USE POSITION #4 FOR SPARE FEEDER CONDUIT.
- (E) #2 OR 2/0 PRIMARY CABLES MAY BE PULLED IN ANY CONDUIT NOT USED FOR LARGER CABLES AS DESCRIBED IN INSTALLATION NOTES "C" AND "D". IF CONDUITS ARE NOT BEING USED AS DESCRIBED IN THESE NOTES, LEAVE THEM EMPTY FOR FUTURE LARGER SIZED CABLES UNLESS THERE IS NO POSSIBLE FUTURE LOAD.
- (F) DO NOT INSTALL EQUIPMENT ON TOP SECTION OF HANDHOLES AS THIS IS USED FOR FINAL GRADE ADJUSTMENT.
- G. FOR MAINTENANCE OR TROUBLE SITUATIONS THAT INVOLVE FIBER OPTIC CABLES, ALWAYS REINSTALL FIBER OPTIC. IF A CONDUIT HAS FIBER OPTIC CABLES ALREADY INSTALLED AND IS NEEDED FOR UG CABLE, INSTALL FIBER OPTIC CABLES WITH NEW CABLE.

| ITEM | DESCRIPTION                            | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | TEE BRACKET (INSULATORS INCLUDED)      | 1        | 4178          | S166675      | -            |
| 2    | CLAMP, GROUND ROD                      | 2        | -             | S230018 (X)  | -            |
| 3    | WIRE, BARE COPPER #2                   | AS REQ'D | -             | S812818 (X)  | -            |
| 4    | WIRE, BARE COPPER #1/0                 | AS REQ'D | -             | S812752      | -            |
| 5    | INSULATOR, CABLE                       | AS REQ'D | 4178          | S430592      | -            |
| 6    | ADAPTOR, CABLE ARM                     | AS REQ'D | 4178          | S102016      | -            |
| 7    | ARM, CABLE, 3-WAY                      | AS REQ'D | 4178          | S110528      | -            |
| 8    | ELBOW, LOADBREAK, 12KV                 | AS REQ'D | 4191.1        | -            | -            |
| 9    | CONNECTOR ASSEMBLY, 200/600 AMP        | AS REQ'D | 4181.1        | -            | -            |
| 10   | TAG, DO NOT OPERATE ENERGIZED          | 12       | 3232          | S647966      | -            |
| 11   | CABLE IDENTIFICATION TAGS              | AS REQ'D | 3202          | -            | -            |
| 12   | ELBOW, DEADBREAK, 12KV                 | AS REQ'D | 4196.1        | -            | -            |
| 13   | ARM. CABLE, 4-WAY                      | AS REQ'D | 4178          | S110560      | -            |
| 14   | TIE STRAP                              | AS REQ'D | 4178          | S738440      | -            |
| 15   | INSULATOR, UNISTRUT (REPLACEMENT ITEM) | AS REQ'D | 4178          | S430592      | -            |
| 16   | CABLE, FIBER OPTIC                     | AS REQ'D | 4600          | -            | -            |

☒ THIS ITEM IS EXEMPT.

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|                   |   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                    |          |                     |           |
|                   |   | CABLE AND CONNECTOR PLACEMENT                     |                    |          |                     |           |



**REFERENCE:**

- a. SEE STANDARD 3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- b. SEE STANDARD 3374 FOR CONDUIT TERMINATION.
- c. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- d. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- e. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- f. SEE STANDARD 3487 FOR RETAINING WALLS.
- g. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART.
- h. SEE STANDARD 4178 FOR TEE BRACKET AND STAND OFF BAR.
- i. SEE STANDARD 4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- j. SEE STANDARD 4540 FOR GROUNDING SUBSTRUCTURES AND EQUIPMENT.
- k. SEE STANDARD 4550 FOR GROUNDING TELCO CONDUCTOR IN HANDHOLES.

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CABLE AND CONNECTOR PLACEMENT

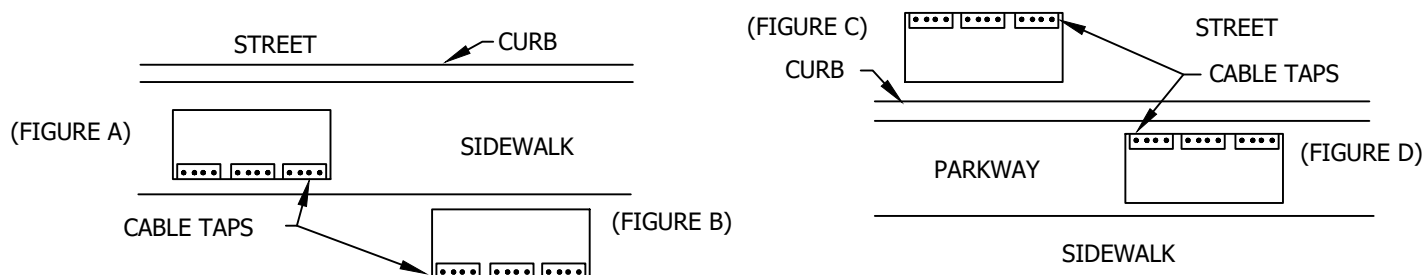
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**SCOPE:** THIS STANDARD SHOWS CABLE TAP PLACEMENT AND DIMENSIONAL AREA NEEDED TO INSTALL THE COMPONENTS SO THAT AN UNOBSTRUCTED SPACE IN THE MIDDLE OF THE SUBSTRUCTURE IS PROVIDED.

### CABLE RACKING

- USE THE FOLLOWING ILLUSTRATIONS TO DETERMINE THE WALL ON WHICH TO INSTALL CABLE TAPS IN A 3314, 3315 OR 3316 HANDHOLE. IF FIELD CONDITIONS DO NOT ALLOW A 5 FOOT MINIMUM CLEARANCE FOR HOT STICK OPERATION OF THE CABLE TAPS, CABLE TAPS MAY BE LOCATED ON THE OPPOSITE WALL TO OBTAIN THE 5 FOOT MINIMUM CLEARANCE. THIS SHOULD BE DONE IN THE DESIGN STAGE OF THE JOB.



- TABLE 1 INDICATES THE DISTANCE REQUIRED FOR CABLE TAPS AND ELBOWS FROM FACE OF WALL TO OUTER PORTION OF CABLE RADIUS. DO NOT INSTALL CABLE TAPS ON UNISTRUT IN SUBSTRUCTURE.

**TABLE 1**

| DESCRIPTION  | DISTANCE "A" (MAXIMUM FROM WALL) | DRAWING |
|--|----------------------------------|---------|
| LOADBREAK ELBOW ON A CABLE TAP   | 14"                              |         |
| LOADBREAK ELBOW ON STANDOFF PLUG<br>(THIS IS A PERMANENT INSTALLATION FOR THE LOOP SYSTEM) | 17"                              |         |
| FUSED ELBOW ON CABLE TAP   | 17"                              |         |

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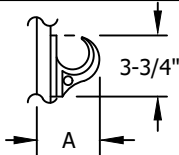
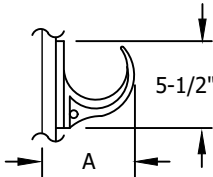

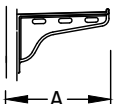
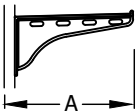
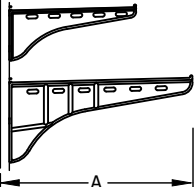
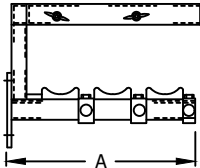
EQUIPMENT DIMENSIONS AND PLACEMENT

**UG3647.1**



3. TABLE 2 INDICATES THE DISTANCE REQUIRED FROM FACE OF WALL AND MAXIMUM CABLE SIZE.

TABLE 2

| DESCRIPTION  | DISTANCE "A"<br>(MAXIMUM FROM WALL) | DRAWING   | MAXIMUM CABLING  |
|--|-------------------------------------|---|--|
| <u>SMALL CABLE HOOK &amp; HANGER</u><br>HOOK STOCK NUMBER S415430<br>HANGER STOCK NUMBERS:<br>12" HANGER S677282<br>24" HANGER S677284<br>36" HANGER S677286 | 4"                                  |    | <u>SECONDARY</u><br>3-500 & 1-350 KCMIL<br><u>PRIMARY</u><br>1/C-ALL SIZES OR<br>3-1/C-2/0<br>(ALL 200 AMP CONNECTORS WILL FIT IN THIS HOOK) |
| <u>LARGE CABLE HOOK &amp; HANGER</u><br>HOOK STOCK NUMBER S610950<br>HANGER STOCK NUMBERS:<br>12" HANGER S677282<br>24" HANGER S677284<br>36" HANGER S677286 | 6"                                  |    | <u>SECONDARY</u><br>3-1000 & 1-500 KCMIL<br><u>PRIMARY</u><br>3-1/C-350 KCMIL,<br>750 KCMIL<br>AND 1000 KCMIL                                |
| <u>2-WAY CABLE ARM &amp; HANGER</u><br>ARM STOCK NUMBER S110562<br>HANGER AS NEEDED  | 7.5"                                |    | <u>PRIMARY &amp; SECONDARY</u><br>1/C, 3-1/C OR 4-1/C<br>ALL SIZES   |
| <u>3-WAY CABLE ARM &amp; HANGER</u><br>ARM STOCK NUMBER S110568<br>HANGER AS NEEDED  | 9.75"                               |    | <u>PRIMARY &amp; SECONDARY</u><br>1/C, 3-1/C OR 4-1/C<br>ALL SIZES   |
| <u>4-WAY CABLE ARM &amp; HANGER</u><br>ARM STOCK NUMBER S110574<br>HANGER AS NEEDED  | 12.25"                              |    | <u>PRIMARY &amp; SECONDARY</u><br>1/C, 3-1/C OR 4-1/C<br>ALL SIZES   |
| <u>ADAPTOR FOR CABLE ARMS AS NEEDED</u><br>STOCK NUMBERS<br>14" S110580<br>20" S110588   | 15.9"<br>21.50"                     |   | <u>PRIMARY &amp; SECONDARY</u><br>1/C, 3-1/C OR 4-1/C<br>ALL SIZES   |
| <u>TEE BRACKET</u><br>STOCK NUMBER S166675   | 15"                                 |  | <u>PRIMARY</u><br>3-1/C-350 KCMIL,<br>750 KCMIL<br>AND 1000 KCMIL  |

**NOTES:**

- I. EACH NOTCH IN THE CABLE ARM WILL ALLOW EITHER 1/C, 3-1/C OR 4-1/C CABLES.
- II. DO NOT INSTALL EQUIPMENT ON TOP SECTION OF HANDHOLES AS THIS SECTION IS USED FOR FINAL GRADE ADJUSTMENTS.

## INSTALLATION:

- A. ON CABLE HANGERS WITH CABLE HOOKS, LEAVE ONE HOLE OPEN BETWEEN EACH HOOK.

**REFERENCE:**

- a. SEE STANDARD 4178 FOR CABLE HANGERS AND ACCESSORIES.
- b. SEE STANDARD 4178 FOR TEE BRACKET AND STAND OFF BAR.

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| REV             | CHANGE            | BY   | DSGN                      | APPV | DATE     | REV                | CHANGE | BY | DSGN     | APPV | DATE |                     |  |          |
|-----------------|-------------------|--|---------------------------|------|----------|--------------------|--------|----|----------|------|------|---------------------|--|----------|
| C               |                   |  |                           |      |          | F                  |        |    |          |      |      |                     |  |          |
| B               | EDITORIAL CHANGES | AW   | JS                        | CZH  | 7/1/2018 | E                  |        |    |          |      |      |                     |  |          |
| A               | REVISION          |  |                           |      | 1/1/1989 | D                  |        |    |          |      |      |                     |  |          |
| SHEET<br>2 OF 2 |                   | X  | Indicates Latest Revision |      |          | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG3647.2 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD |                           |      |          |                    |        |    |          |      |      |                     |  |          |
|                 |                   | EQUIPMENT DIMENSIONS AND PLACEMENT               |                           |      |          |                    |        |    |          |      |      |                     |  |          |

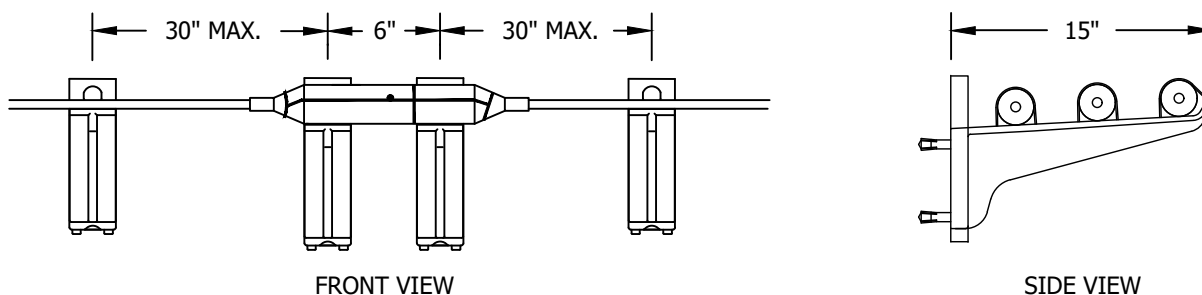


**SCOPE:** THIS STANDARD SHOWS COMMON EQUIPMENT ASSEMBLIES USED IN SUBSTRUCTURE CONSTRUCTION. SEE STD. 4178.5.

## EQUIPMENT ASSEMBLIES

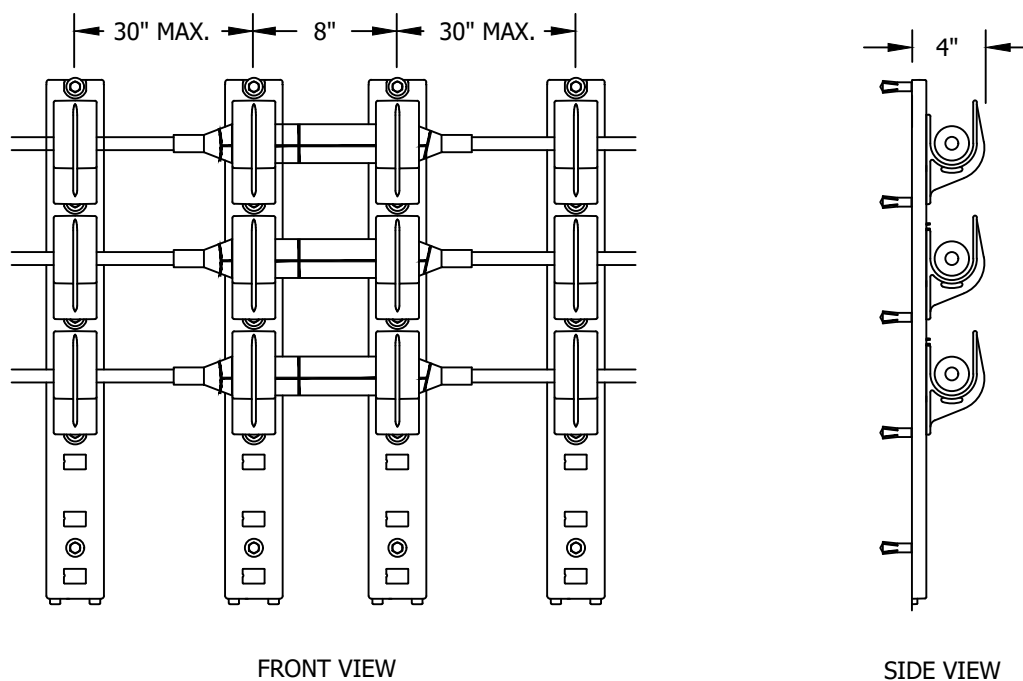
### 3315 & 3316 HANDHOLE OR MANHOLE INSTALLATIONS

3-1/C CABLE WITH 200 AMP SPLICES INSTALLED ON ADAPTORS AND 3-WAY CABLE ARMS. HANGERS S677282 & S110562 MAY BE USED WHEN MORE THAN ONE LEVEL OF CABLE IS REQUIRED.



### 3314 HANDHOLE INSTALLATION

THIS INSTALLATION IS NORMALLY USED IN A 3314 TO OBTAIN UNOBSTRUCTED SPACE. 3-1/C CABLE WITH 200 AMP SPLICES INSTALLED ON HANGERS AND SMALL CABLE HOOKS. S677286 & S415430, SEE STD. 4178.5.



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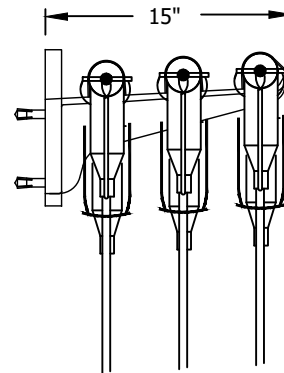
| REV | CHANGE            | BY | DSGN | APPV | DATE     | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |          | F   |        |    |      |      |      |
| B   | EDITORIAL CHANGES | AW | JS   | CZH  | 7/1/2018 | E   |        |    |      |      |      |
| A   | REVISION          |    |      |      | 1/1/1987 | D   |        |    |      |      |      |

|  |                           |                    |          |                     |
|--|---------------------------|--------------------|----------|---------------------|
| X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed |
| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |                    |          |                     |
| EQUIPMENT ASSEMBLIES                             |                           |                    |          |                     |

UG3648.1



3-1/C CABLE WITH 200 AMP TEES AND DEADBREAK ELBOWS INSTALLED ON ADAPTORS AND 3-WAY CABLE ARMS. HANGERS S677282 & S110562 MAY BE USED WHEN MORE THAN ONE LEVEL OF CABLE IS REQUIRED. FIBER CABLE ARM'S MAY BE TRIMMED TO FIT BETWEEN DEAD BREAK CONNECTORS SEE STD. 4178.5.



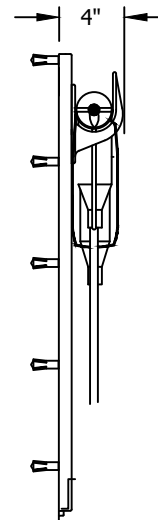
FRONT VIEW

SIDE VIEW

THIS INSTALLATION IS NORMALLY USED IN A 3314 TO OBTAIN UNOBSTRUCTED SPACE.

Diagram illustrating the rear panel of the 19-inch rackmount unit, showing cable management and dimensions:

- Overall width: 19-1/2"
- Distance between cable management sections: 6"
- Dimensions for cable management sections: 30" MAX.
- Labels indicating cable management options: "DO NOT CABLE (REQUIRED)" and "DO NOT CABLE (OPTIONAL)".



FRONT VIEW

### SIDE VIEW

| REV | CHANGE            | BY | DSGN | APPV | DATE     | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |          | F   |        |    |      |      |      |
| B   | EDITORIAL CHANGES | AW | JS   | CZH  | 7/1/2018 | E   |        |    |      |      |      |
| A   | REVISION          |    |      |      | 1/1/1987 | D   |        |    |      |      |      |

Information Removed

SDG&amp;E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD

UG3648.2






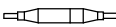
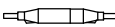







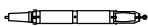
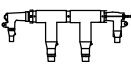

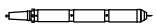
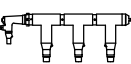



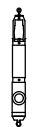

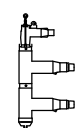


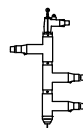


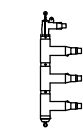

**SCOPE:** THIS STANDARD SHOWS THE MAXIMUM EQUIPMENT COMBINATIONS THAT CAN BE UTILIZED IN A 3314, 3315, 3316 OR 3324 SUBSTRUCTURE.

**ATTENTION:**

\* FIND THE COMBINATION THAT REPRESENTS THE INSTALLATION, THEN CHECK THE LEGEND FOR COINCIDING SYMBOL AND REFERENCE TO THE EQUIPMENT ASSEMBLY OR CABLE HANGER STANDARDS PAGE.

\*\* ONLY INSTALL THE THREE TEE COMBINATIONS SHOWN IN THESE STANDARDS TO FEED A SWITCHED TIE POSITION.

**TABLE 1**

| LEGEND  |   |   |   |   |                       |
|---------|---|---|---|---|-----------------------|
|         | TOP VIEW  | FRONT VIEW  | SIDE VIEW   | DESCRIPTION   | CONSTRUCTION STANDARD |
| 200 AMP |    |    |    | LOADBREAK CABLE TAP   | 4192.4                |
|         |    |    |    | DEADBREAK ELBOW TEE   | 4196.3                |
|         |    |    |    | DEADBREAK ELBOW TEE   | 4196.1 & 4196.3       |
| 600 AMP |    |    |    | 600 AMP EXTENSION SPLICE  | 4185                  |
|         |    |    |    | 600 AMP TEES WITH LOADBREAK ELBOW OR 200 AMP RECEPTACLES, ALSO WITH OR WITHOUT DEADBREAK ELBOWS IN A HANDHOLE     | 4182.1                |
|         |    |    |    | 600 AMP TEES WITH LOADBREAK ELBOWS OR 200 AMP INSULATING RECEPTACLES, ALSO WITHOUT DEADBREAK ELBOWS IN A HANDHOLE | 4182.1                |
|         |  |   |   | 600 AMP TEES WITH OR WITHOUT DEADBREAK ELBOWS IN A MANHOLE  | 4182.1                |
|         |  |  |  | 600 AMP TEES WITH OR WITHOUT DEADBREAK ELBOWS IN A MANHOLE  | 4182.1                |
|         |  |  |  | 600 AMP TEES WITH OR WITHOUT DEADBREAK ELBOWS IN A MANHOLE  | 4182.1                |
|         |  |  |  | 600 AMP TEES WITH OR WITHOUT DEADBREAK ELBOWS IN A MANHOLE  | 4182.1                |

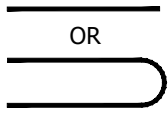




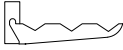
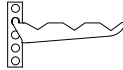


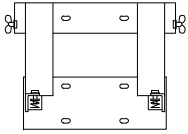
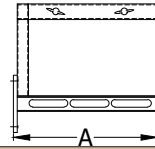


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| REV | CHANGE            | BY  | DSGN | APPV | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|-----|------|------|------------|-----|--------|----|------|------|------|
| C   | FIGURE UPDATE     | EJA | GLW  | CZH  | 11/9/2020  | F   |        |    |      |      |      |
| B   | EDITORIAL CHANGES | AW  | JS   | CZH  | 07/01/2018 | E   |        |    |      |      |      |
| A   | REVISION          | -   | -    | -    | 01/01/1996 | D   |        |    |      |      |      |

|                  |   |
|------------------|---|
| SHEET<br>1 OF 22 | 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**TABLE 1 (CONT'D)**

| LEGEND        |   |   |   |  |                       |
|---------------|---|---|---|--|-----------------------|
|               | TOP VIEW  | FRONT VIEW  | SIDE VIEW   | DESCRIPTION  | CONSTRUCTION STANDARD |
| 200 & 600 AMP |    |    |    | SECONDARY OR PRIMARY CABLE PULLED STRAIGHT THROUGH WITHOUT ANY SPLICES | ----                  |
| 600 VOLT      |    |    | ----  | 600 VOLT SECONDARY CONNECTOR   | 4173.1-.3             |
|               | ----  | ----  |    | ADAPTER AND 2, 3, OR 4 WAY CABLE ARMS                                  | 4178                  |
|               | ----  | ----  |    | HANGER AND 2, 3, OR 4 WAY CABLE ARMS                                   | 4178                  |
|               | ----  | ----  |    | HANGER AND SMALL CABLE HOOK  | 4178                  |
|               | ----  | ----  |  | HANGER AND LARGE CABLE HOOK  | 4178                  |
|               | ----  |  |  | TEE BRACKET  | 4178                  |
|               | ----  |  | ----  | STAND OFF BAR  | 4178                  |
|               |  | ----  | ----  | PAD-MOUNTED SWITCH AREA  | 3560.2-.4             |

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| REV | CHANGE            | BY  | DSGN | APPV | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|-----|------|------|------------|-----|--------|----|------|------|------|
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| B   | EDITORIAL CHANGES | AW  | JS   | CZH  | 07/01/2018 | E   |        |    |      |      |      |
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

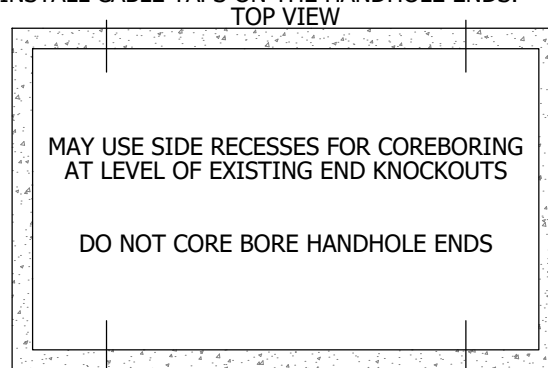
EQUIPMENT COMBINATION GUIDELINES

UG3649.2



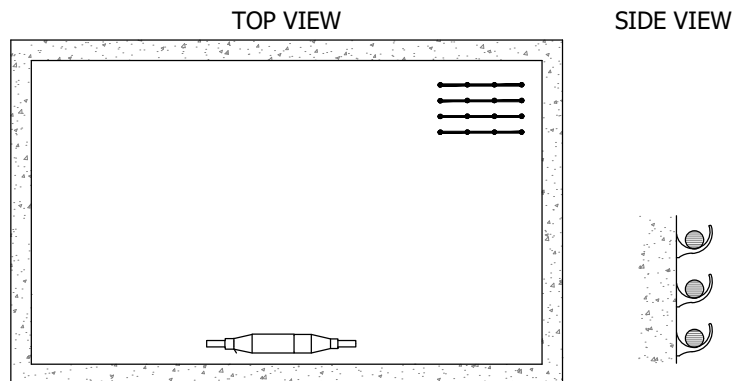
## INSTALLATION:

- A. THE ALLOWED INSTALLATIONS SHOWN ARE TYPICAL. OTHER CONFIGURATIONS MAY BE DESIGNED PROVIDED EQUIPMENT LIMITATIONS AND THE UNOBSTRUCTED SPACE REQUIREMENT IS PROVIDED TO ALLOW PERSONNEL TO PERFORM WORK SAFELY AND ALLOW ACCESS INTO THE HANDHOLE AND TO THE CONDUITS.
- B. #2 OR 2/0 PRIMARY CABLES OR SECONDARY (500 KCMIL MAX.) MAY BE PULLED IN ANY CONDUIT NOT USED FOR LARGER CABLES.
- C. CABLE PULLED STRAIGHT THROUGH SHOULD BE PULLED INTO BOTTOM CONDUITS WHEN CONDUITS ARE AVAILABLE AND MUST ENTER AND EXIT THE SAME CONDUIT POSITIONS ON OPPOSITE ENDS OF THE SUBSTRUCTURE.
- D. THE NOT ALLOWED EQUIPMENT COMBINATION GUIDELINES SHOWN ARE DUE TO:
1. NOT ENOUGH ROOM TO ALLOW PROPER CABLE BENDING RADIUS
  2. NOT ENOUGH "UNOBSTRUCTED SPACE" OR "CLEAR PERSONNEL ACCESS OPENING"
  3. TOO MANY CABLES TO ALLOW PROPER CABLE TRAINING
  4. MORE CABLES THAN CABLE KNOCKOUTS PROVIDED
- E. DRAWINGS ARE NOT TO SCALE.
- F. IN THE 3314, 3315 AND 3316, DO NOT INSTALL CABLE TAPS ON THE HANDHOLE ENDS.



ALLOWED

(ONLY USE SIDE WALLS WHEN THERE ARE NO END KNOCKOUTS AVAILABLE OR  
THERE IS NOT ENOUGH ROOM TO INSTALL A 90° BEND OR SWEEP)



ALLOWED

### FIGURE 1

3314

FOR THREE-PHASE 2/0 AND SMALLER PRIMARY CABLES AND UP TO 500 KCMIL SECONDARY  
CABLES MAXIMUM.

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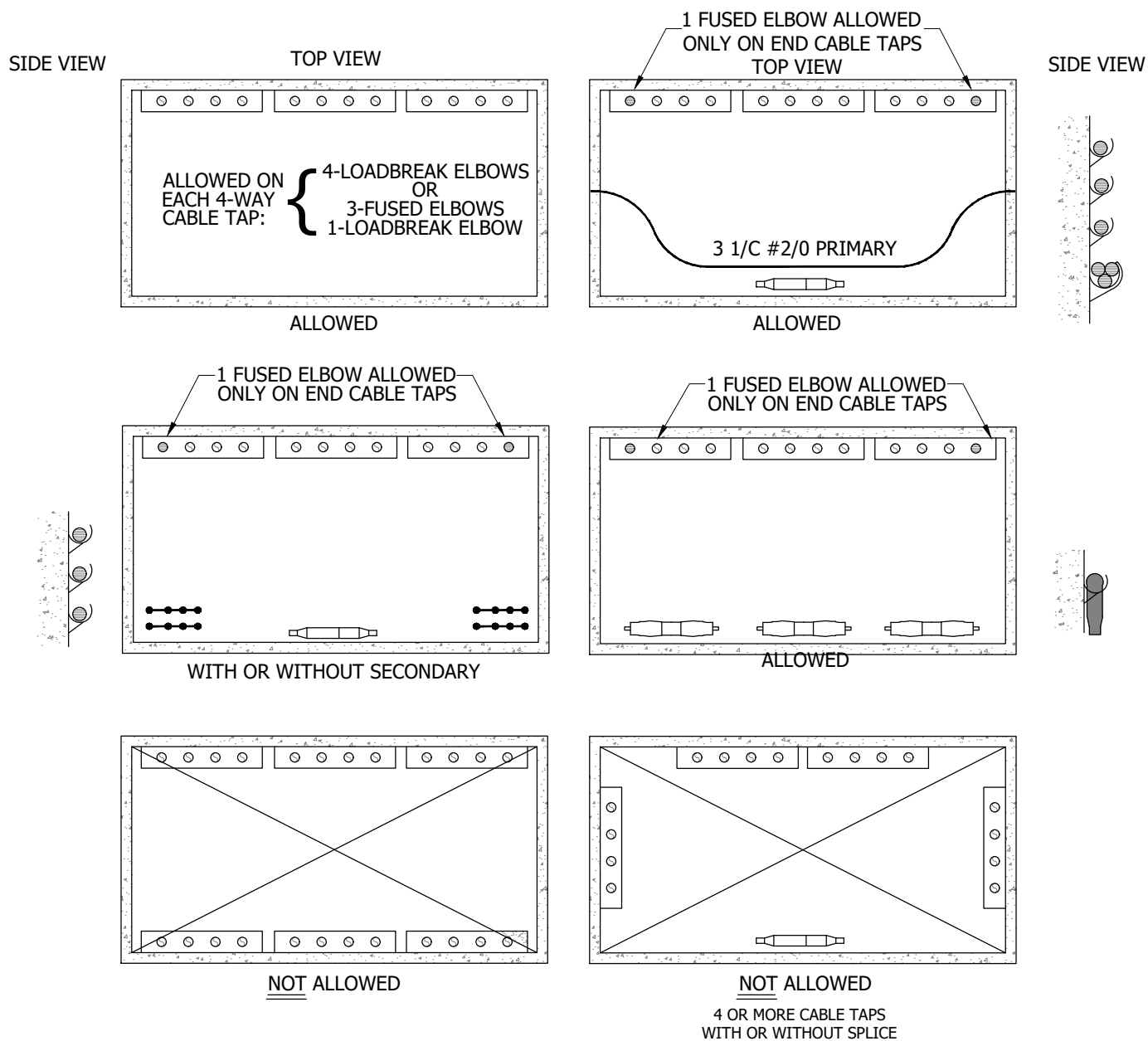
EQUIPMENT COMBINATION GUIDELINES

UG3649.3



## INSTALLATION (CONT'D):

- G. WHEN A FUSED ELBOW OR LOADBREAK ELBOW ON STAND OFF PLUG (INSTALLATION FOR LOOP SYSTEM) IS INSTALLED ON THE CENTER CABLE TAP, NO OTHER CABLE OR CONNECTORS WILL BE ALLOWED ON THE OPPOSITE WALL FROM THE CENTER CABLE TAP DUE TO THE LACK OF SPACE.



**FIGURE 2**  
3314

FOR THREE-PHASE 2/0 AND SMALLER PRIMARY CABLES AND UP TO 500 KCMIL SECONDARY CABLES MAXIMUM

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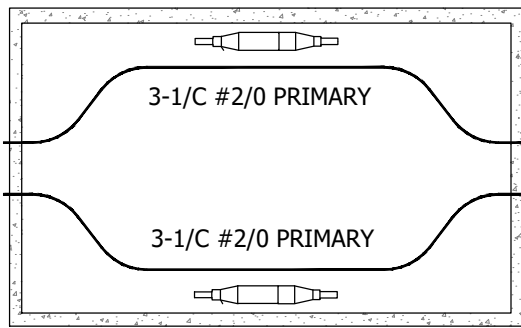
  

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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                    |          |                     |          |
|                  | EQUIPMENT COMBINATION GUIDELINES                  |                    |          |                     |          |



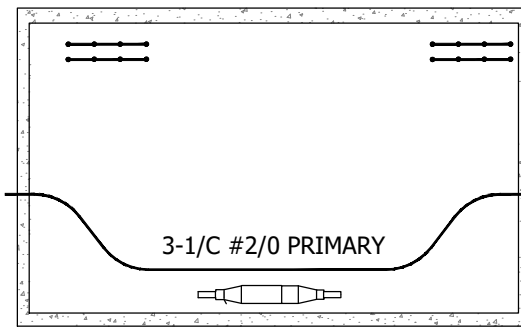
SIDE VIEW

TOP VIEW



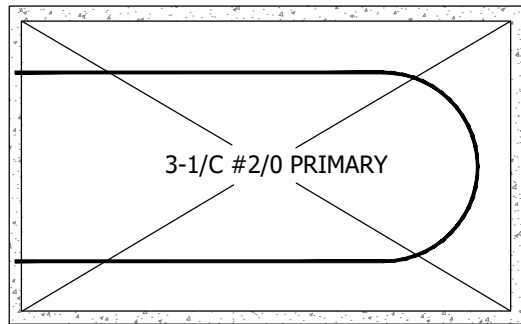
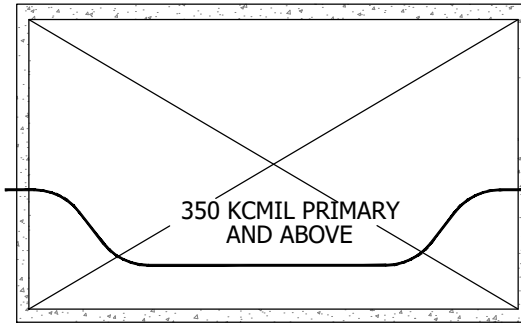
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TOP VIEW



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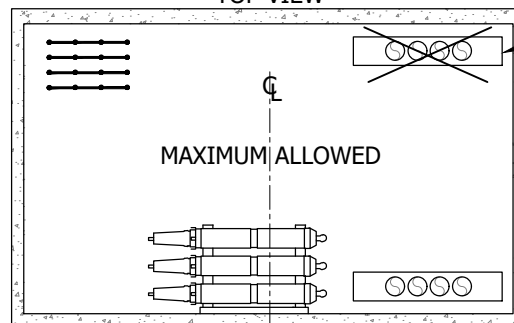
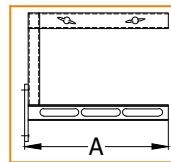
SIDE VIEW

NOT ALLOWEDNOT ALLOWED  
WITH OR WITHOUT SPLICES**FIGURE 3**

3314

FOR THREE-PHASE 2/0 AND SMALLER PRIMARY CABLES AND UP TO 500 KCMIL SECONDARY CABLES MAXIMUM

TOP VIEW

SECOND CABLE TAP NOT  
ALLOWED ANYWHERE  
IN HANDHOLETEE BRACKET  
SN/166675  
AU T/BRKTONLY FOR EXISTING HANDHOLES WITH 750 KCMIL MAX.  
INSTALLED ON A TEE BRACKET**FIGURE 4**

3314

FOR THREE-PHASE 750 AND SMALLER PRIMARY CABLES AND UP TO 500 KCMIL SECONDARY CABLES MAXIMUM

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EQUIPMENT COMBINATION GUIDELINES

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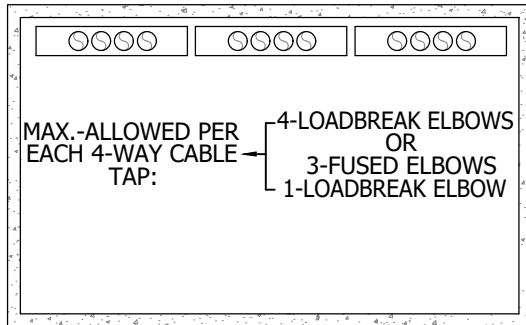


SIDE VIEW

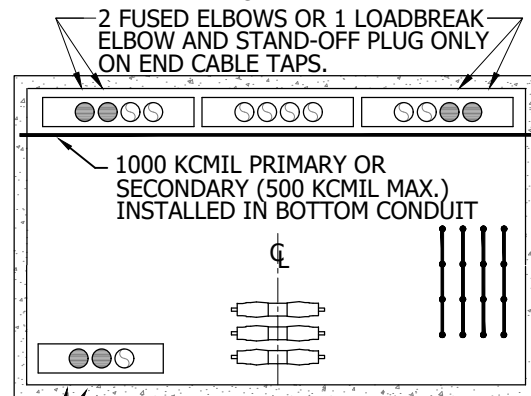
TOP VIEW

TOP VIEW

SIDE VIEW

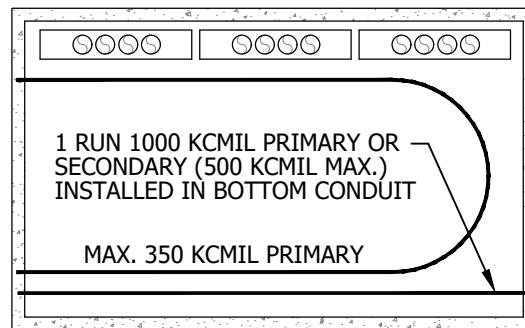


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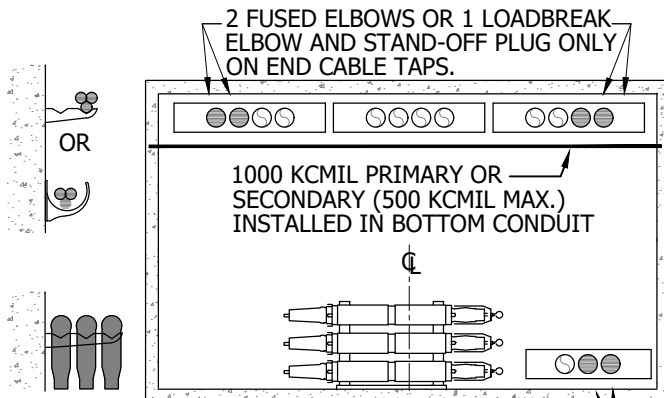


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4TH CABLE TAP AND 2 FUSED ELBOWS OR, 1 LOADBREAK ELBOW AND STAND-OFF PLUG ON END OF CABLE TAP (3 WAY ONLY).

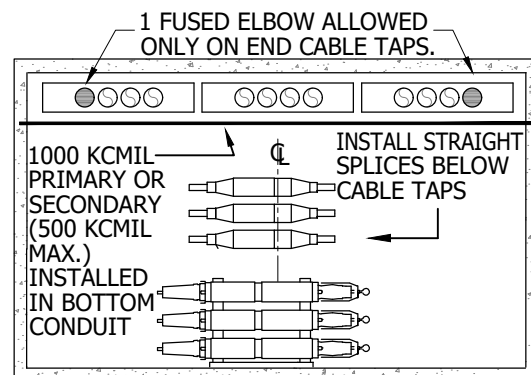


ALLOWED



ALLOWED

4TH CABLE TAP AND 2 FUSED ELBOWS OR, 1 LOADBREAK ELBOW AND STAND-OFF PLUG ON END OF CABLE TAP (3 WAY ONLY).



ALLOWED

**FIGURE 5**

3315

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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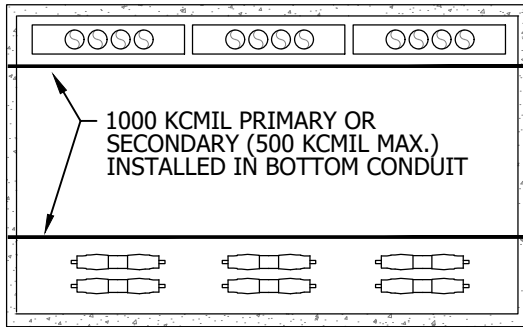
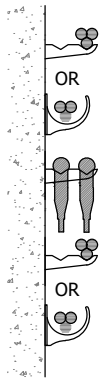
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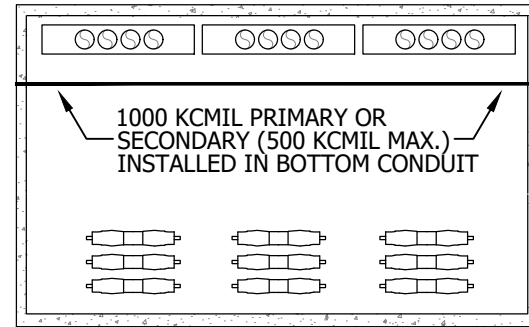
SIDE VIEW

TOP VIEW  
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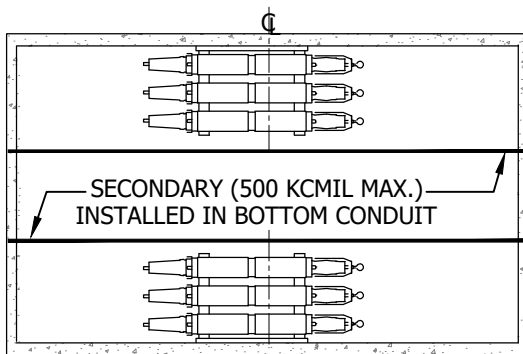
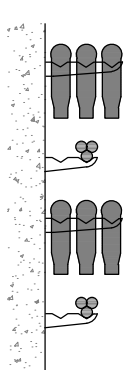
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TOP VIEW  
NO FUSED ELBOWS

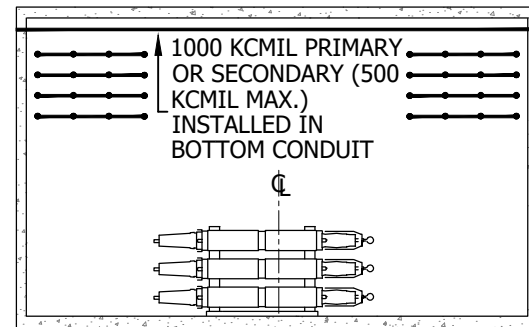
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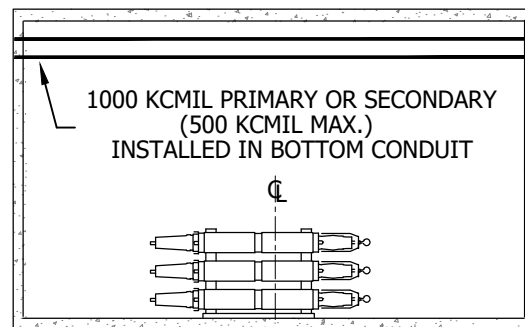
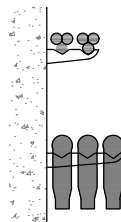
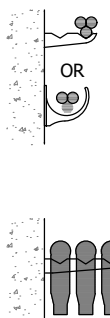
ALLOWED



ALLOWED



ALLOWED



ALLOWED

**FIGURE 6**  
3315

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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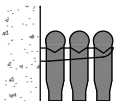
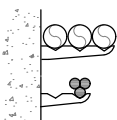
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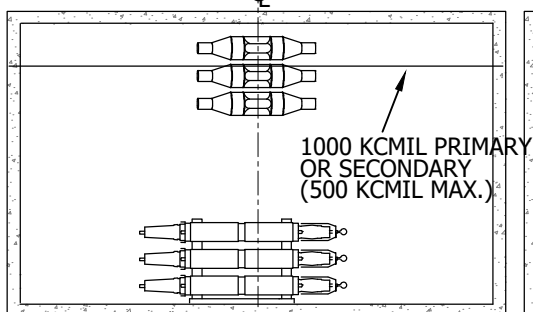
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SIDE VIEW

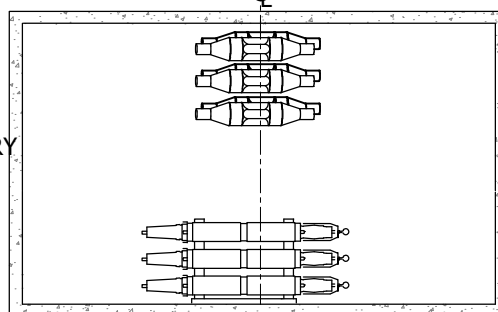


TOP VIEW



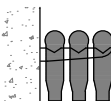
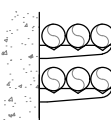
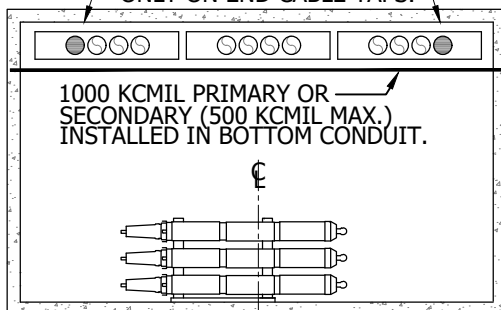
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TOP VIEW

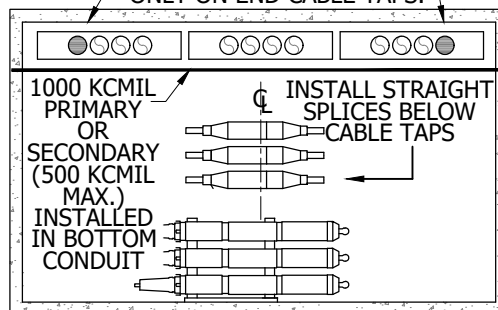


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SIDE VIEW

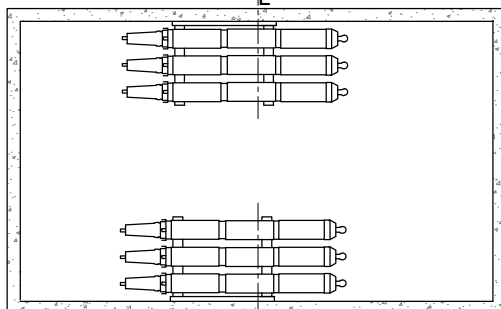
1 FUSED ELBOW ALLOWED  
ONLY ON END CABLE TAPS.

ALLOWED

1 FUSED ELBOW ALLOWED  
ONLY ON END CABLE TAPS.

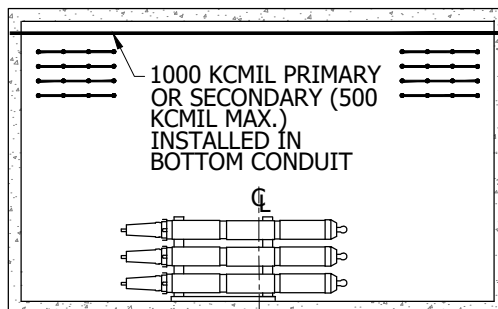
ALLOWED

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ALLOWED

CL



ALLOWED

**FIGURE 7**

3315

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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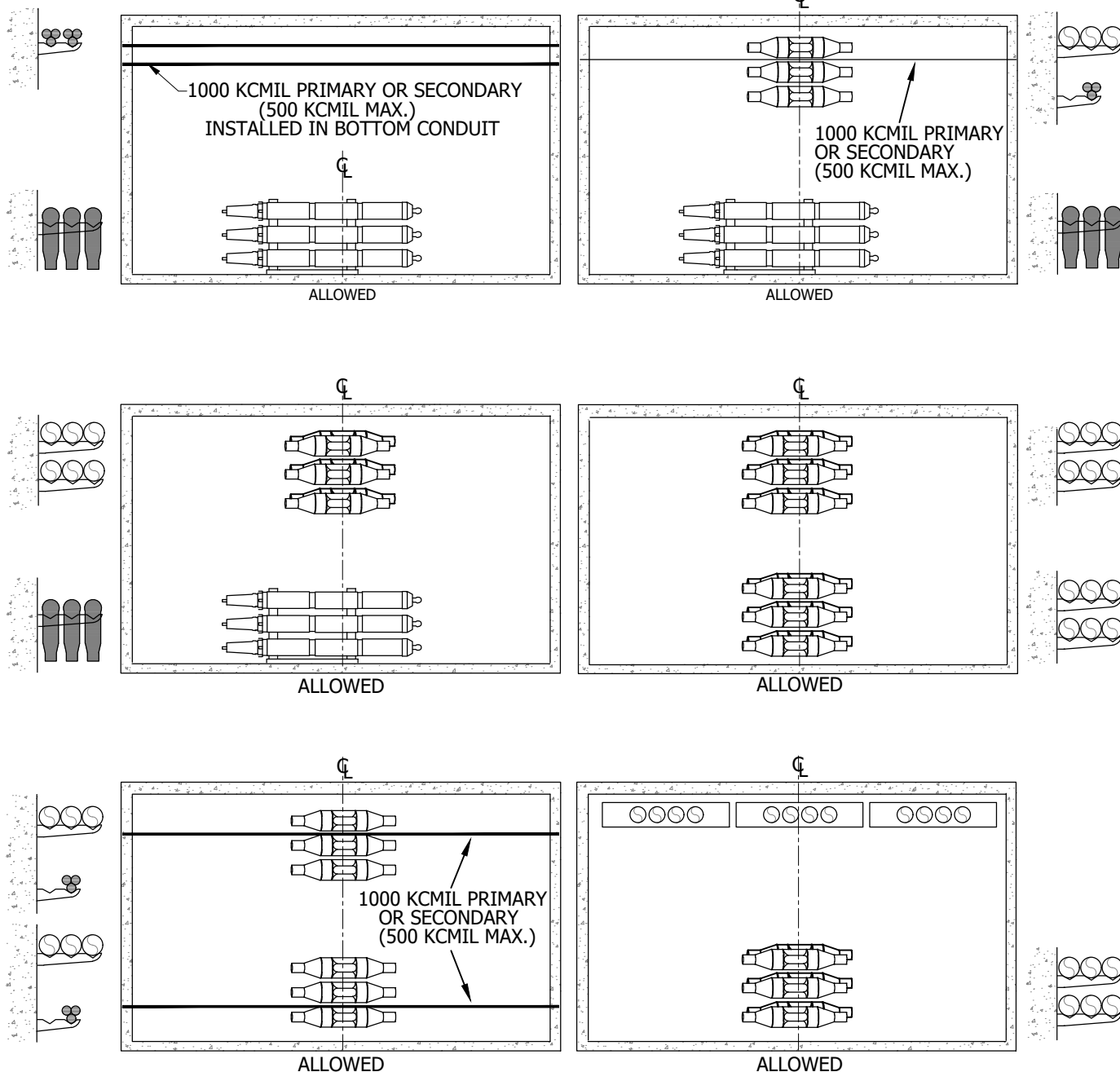


SIDE VIEW

TOP VIEW

TOP VIEW

SIDE VIEW

**FIGURE 8**

3315

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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EQUIPMENT COMBINATION GUIDELINES

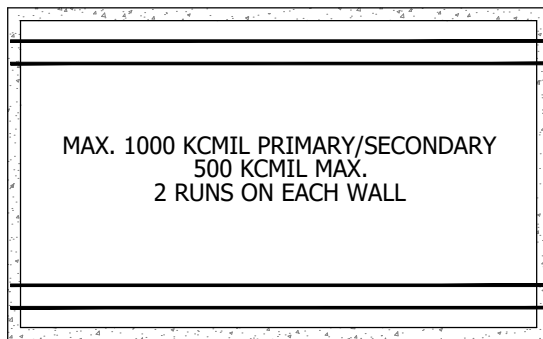
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SIDE VIEW

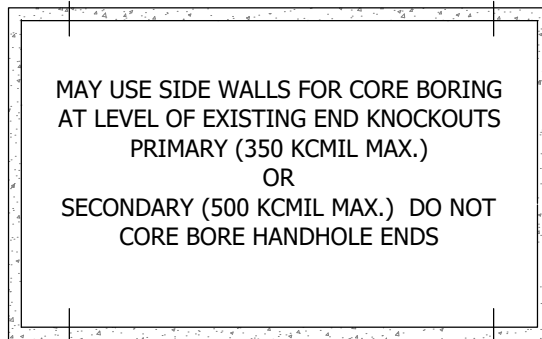


TOP VIEW



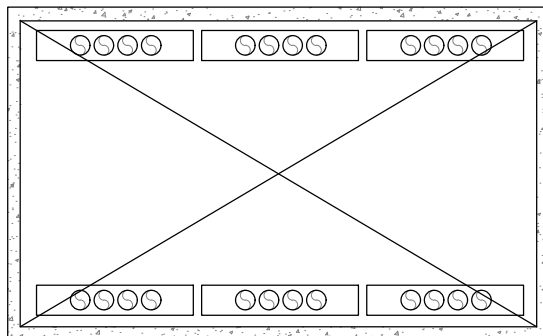
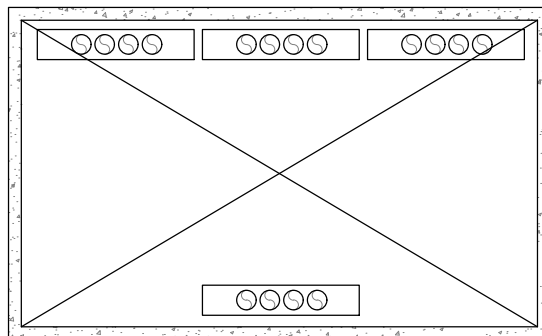
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TOP VIEW

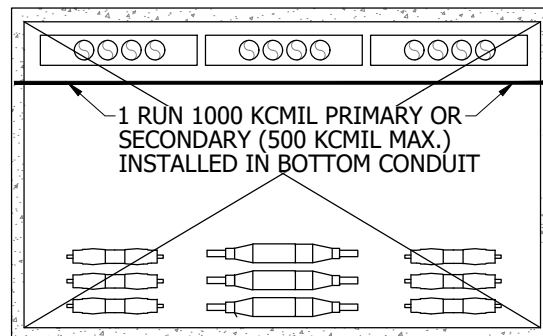
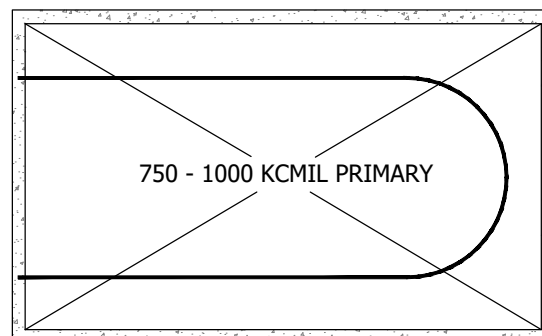


ALLOWED

(ONLY USE SIDE WALLS WHEN THERE ARE NO END KNOCKOUTS AVAILABLE OR THERE IS NOT ENOUGH ROOM TO INSTALL A 90° BEND OR SWEEP)

NOT ALLOWEDNOT ALLOWED

NO FUSED ELBOWS

NOT ALLOWEDNOT ALLOWED

**FIGURE 9**  
3315

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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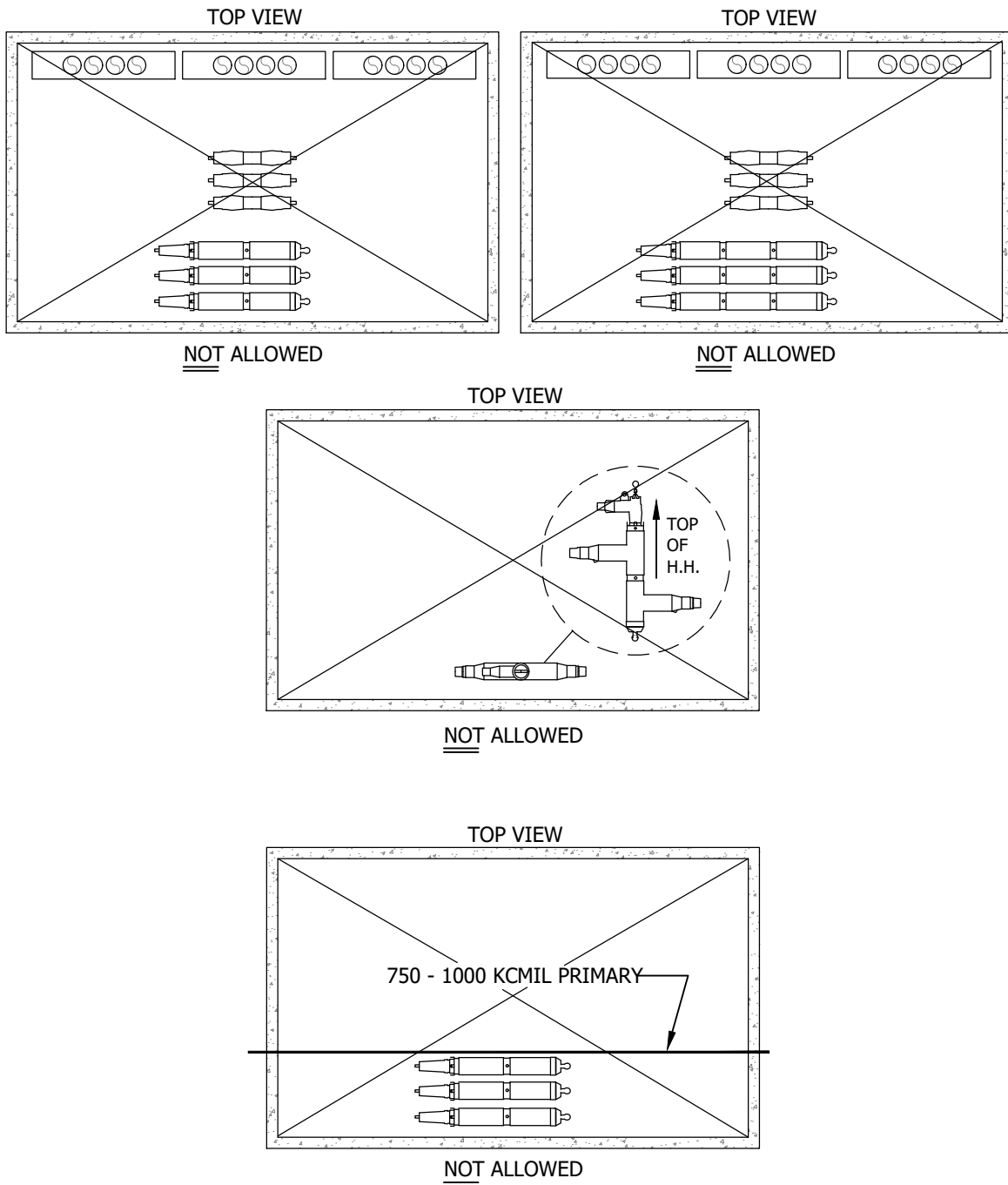
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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

EQUIPMENT COMBINATION GUIDELINES

UG3649.10





**FIGURE 10**  
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FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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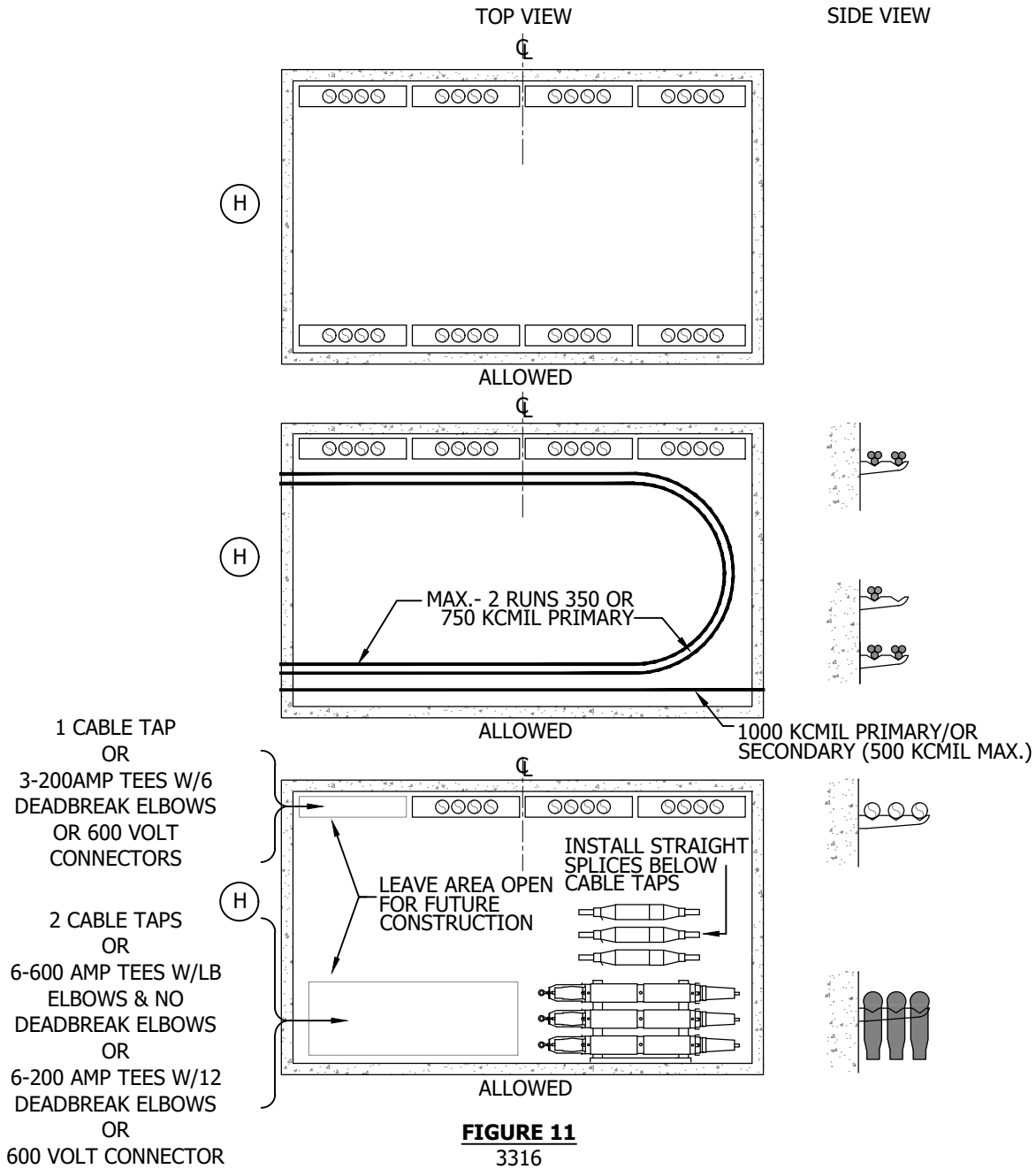
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|   | EQUIPMENT COMBINATION GUIDELINES                  |                    |          |                     |           |



## INSTALLATION (CONT'D):

- (H) ONLY 3 CABLE TAPS ALLOWED ON EITHER WALL WHEN HANDHOLE REQUIRES A TRAFFIC COVER. TAPS MUST BE GROUPED TOGETHER AND CENTERED ON THE WALL.
- J. WHEN ONLY ONE SET OF 600 AMP TEES ARE INSTALLED, USE THE BOTTOM OUTSIDE CONDUIT CLOSEST TO THE WALL.
- K. THERE IS NO LIMITATION TO THE NUMBER OF FUSED ELBOWS ALLOWED IN 3316 HANDHOLES.



FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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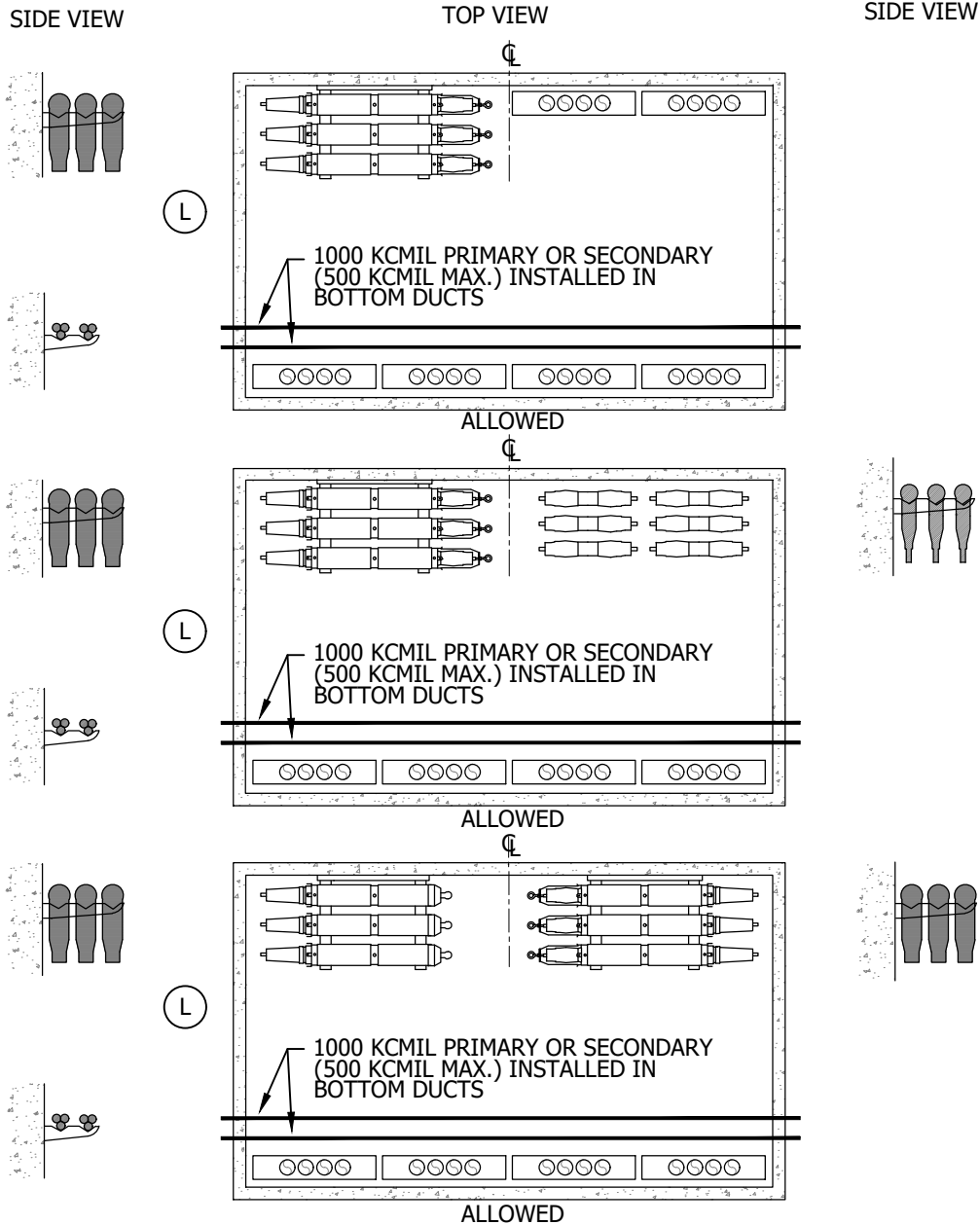
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## INSTALLATION (CONT'D):

- (L) ONLY 3 CABLE TAPS ALLOWED ON EITHER WALL WHEN HANDHOLE REQUIRES A TRAFFIC COVER. TAPS MUST BE GROUPED TOGETHER AND CENTERED ON THE WALL.
- M. WHEN ONLY ONE SET OF 600 AMP TEES ARE INSTALLED, USE THE BOTTOM OUTSIDE CONDUIT CLOSEST TO THE WALL.
- N. #2 OR 2/0 PRIMARY CABLES OR SECONDARY (500 KCMIL MAX.) MAY BE PULLED IN ANY CONDUIT NOT USED FOR LARGER CABLES.



FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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EQUIPMENT COMBINATION GUIDELINES

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## INSTALLATION (CONT'D):

- ONLY 3 CABLE TAPS ALLOWED ON EITHER WALL WHEN HANDHOLE REQUIRES A TRAFFIC COVER. TAPS MUST BE GROUPED TOGETHER AND CENTERED ON THE WALL.
- P. WHEN ONLY TWO SETS OF 600 AMP TEES ARE REQUIRED, INSTALL THEM ON ONE WALL. LEAVE THE OPPOSITE WALL OPEN FOR FUTURE CONSTRUCTION.

SIDE VIEW

TOP VIEW

SIDE VIEW

○

1000 KCMIL PRIMARY OR SECONDARY  
(500 KCMIL MAX.)  
INSTALLED IN BOTTOM CONDUITS

ALLOWED

1000 KCMIL PRIMARY OR SECONDARY  
(500 KCMIL MAX.)  
INSTALLED IN BOTTOM CONDUITS

ALLOWED

ALLOWED

**FIGURE 13**

3316

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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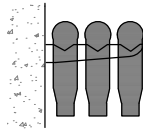
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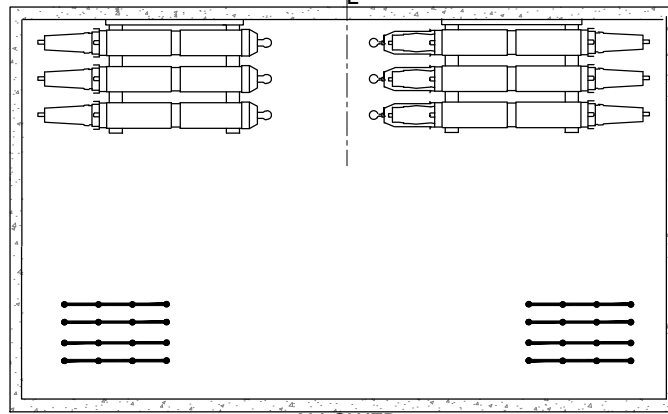
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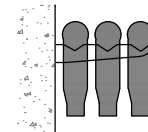
SIDE VIEW



TOP VIEW

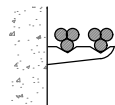
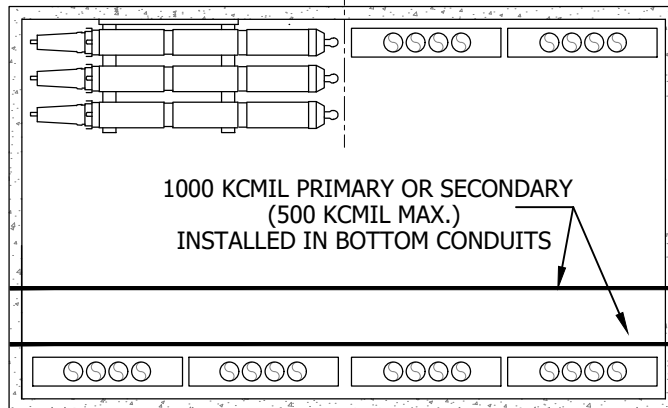
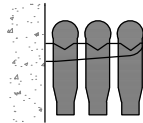
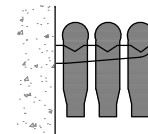
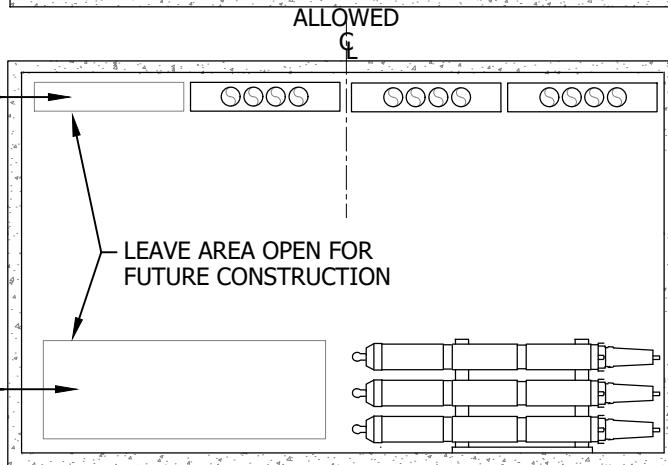


SIDE VIEW



1 CABLE TAP  
OR  
3-200AMP TEES W/6  
DEADBREAK ELBOWS  
OR  
600 VOLT CONNECTORS

2 CABLE TAP  
OR  
6-200 AMP TEES W/12  
DEADBREAK ELBOWS  
OR  
600 VOLT CONNECTORS



ALLOWED

**FIGURE 14**

3316

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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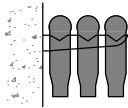
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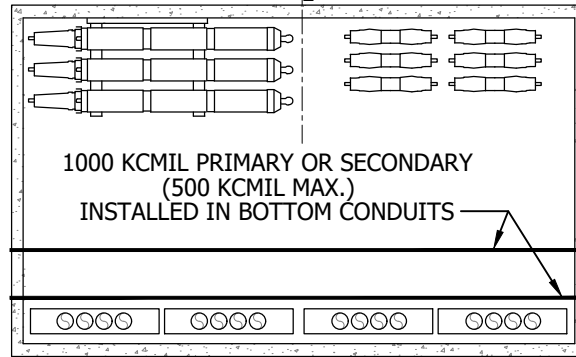
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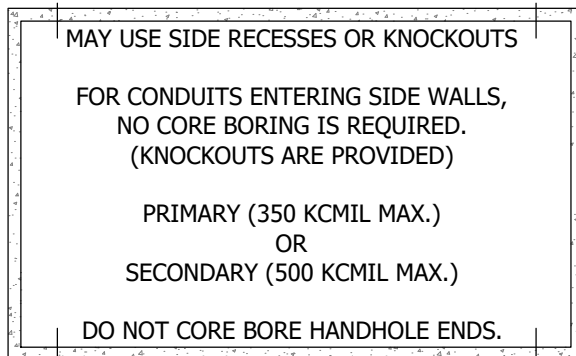
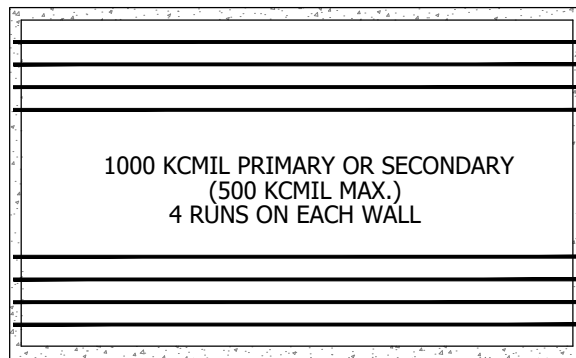
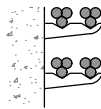
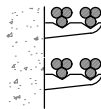
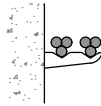
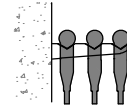
SIDE VIEW



TOPVIEW



SIDE VIEW



(ONLY USE SIDE WALLS WHEN THERE ARE NO END KNOCKOUTS AVAILABLE OR THERE IS NOT ENOUGH ROOM TO INSTALL A 90° BEND OR SWEEP)

**FIGURE 15**

3316

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500KCMIL SECONDARY CABLES MAXIMUM

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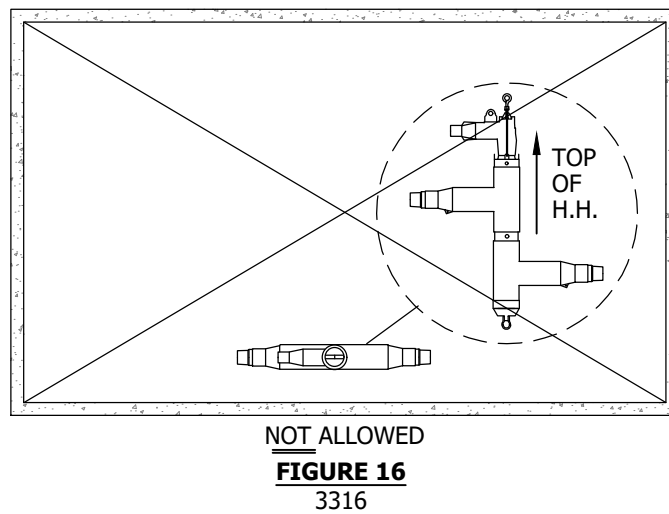
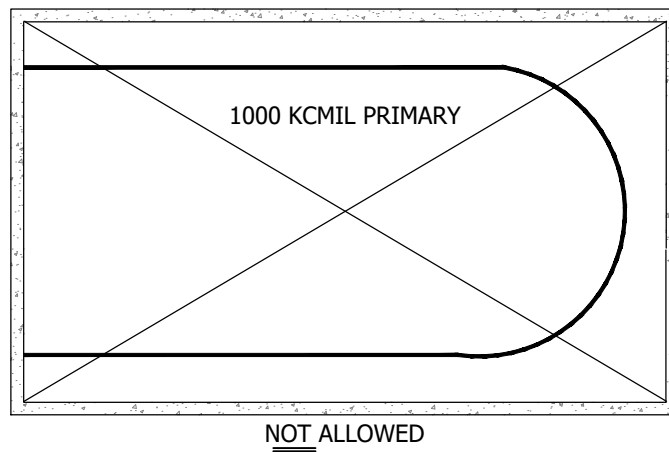
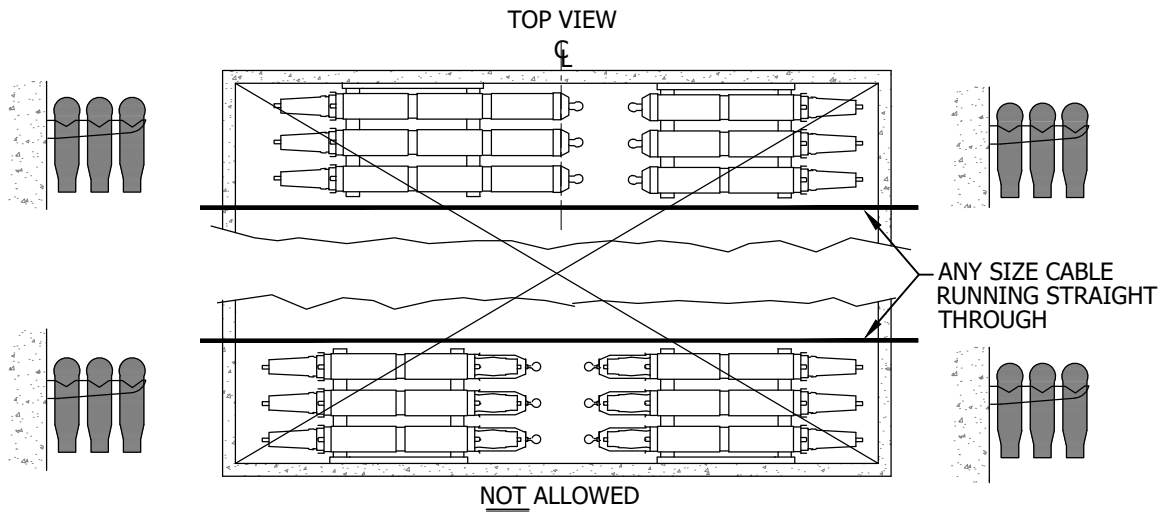
SHEET  
16 OF 22

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

EQUIPMENT COMBINATION GUIDELINES

UG3649.16





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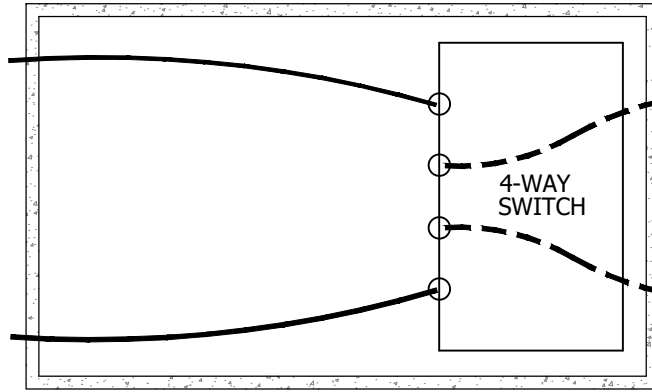
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

EQUIPMENT COMBINATION GUIDELINES

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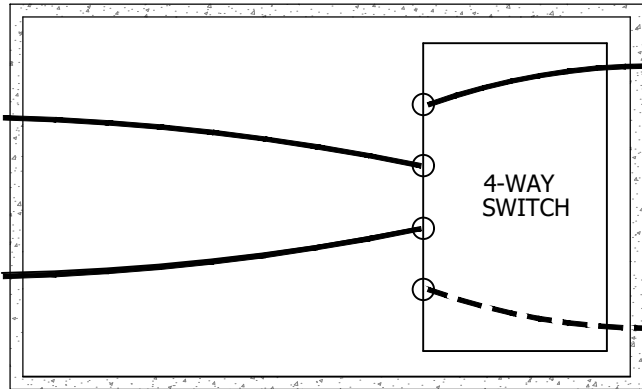
TOP VIEW  
PROPERTY SIDE



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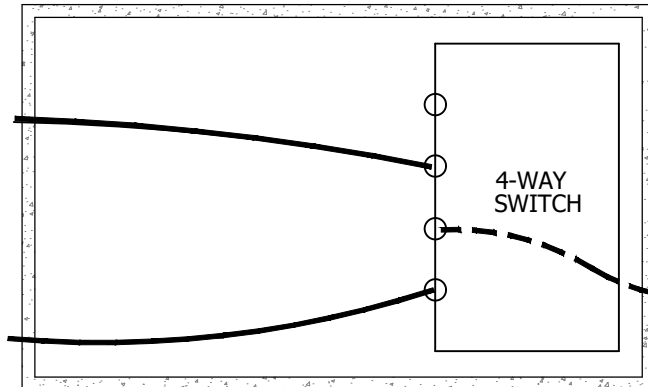
- LOWER CONDUITS KNOCKOUTS FOR FEEDER CABLE.
- UPPER CONDUITS KNOCKOUTS FOR LOCAL DISTRIBUTION CABLE.

TOP VIEW



SEE PAGES  
3671.1 FOR  
PREFERRED  
CONDUITS.

TOP VIEW



**FIGURE 17**

3317

WITH SUBSURFACE/SURFACE OPERABLE SWITCH FOR ALL SIZES PRIMARY. NO SECONDARY OTHER THAN SUMP PUMP AND/OR SCADA FEED.

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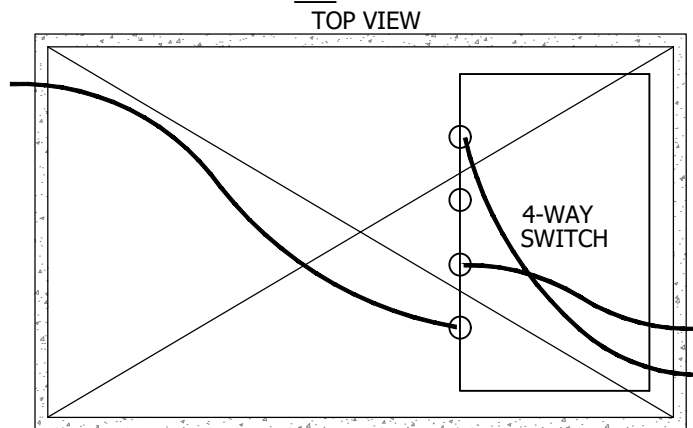
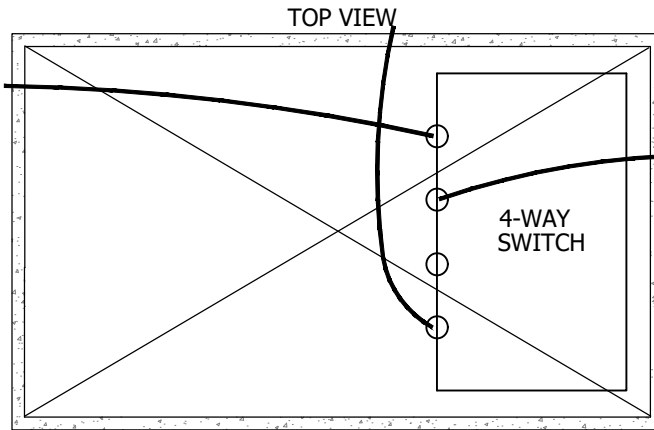
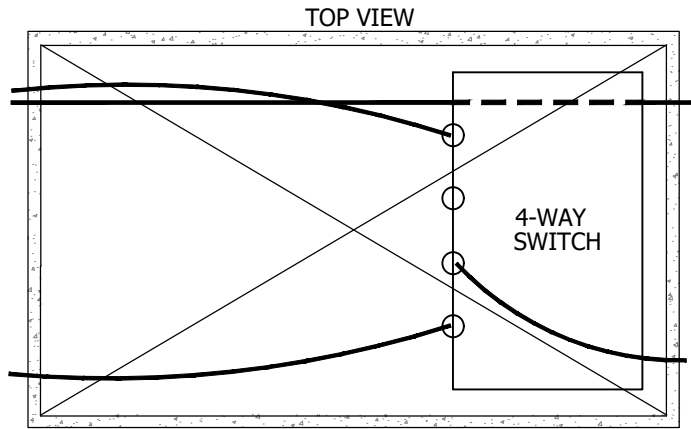
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

EQUIPMENT COMBINATION GUIDELINES

UG3649.18





NOT ALLOWED

**FIGURE 18**

3317

WITH SUBSURFACE/SURFACE OPERABLE SWITCH FOR ALL SIZES PRIMARY. NO SECONDARY OTHER THAN SUMP PUMP AND/OR SCADA FEED.

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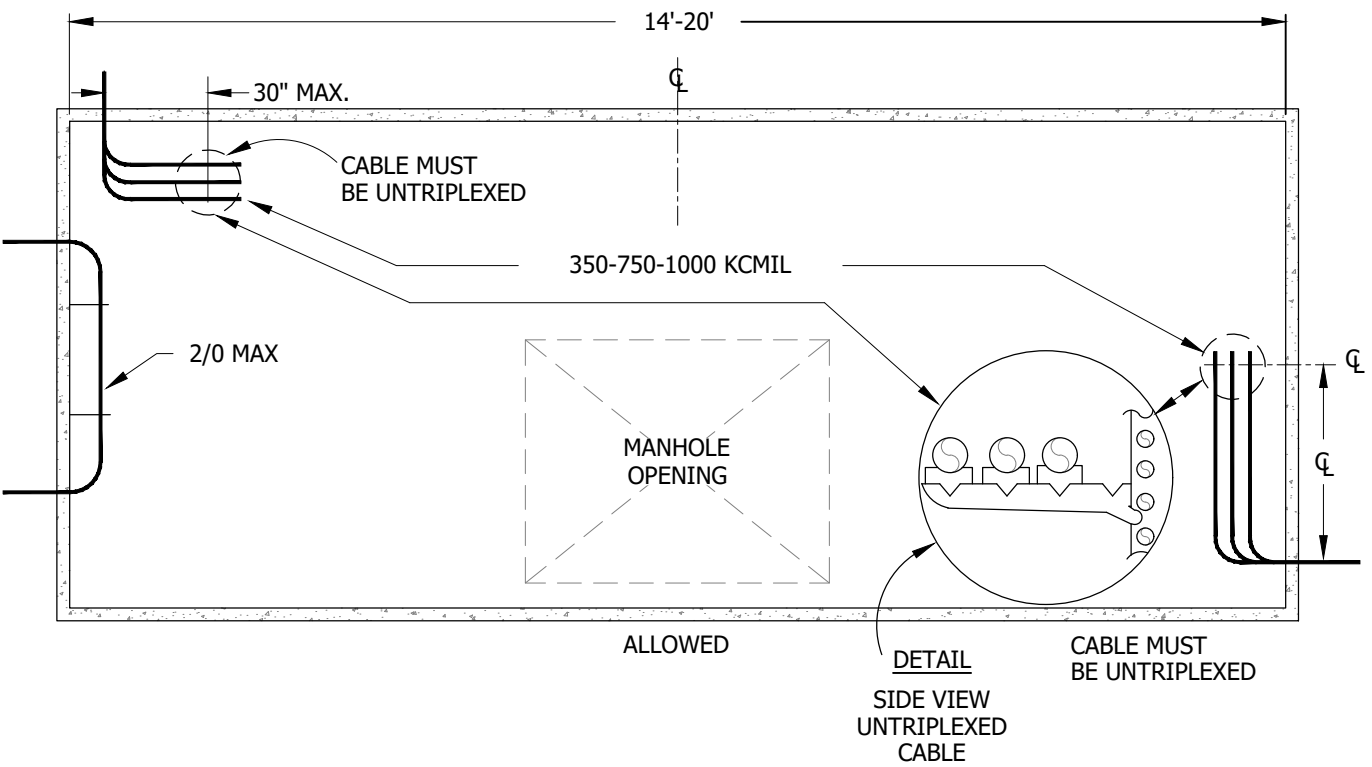
EQUIPMENT COMBINATION GUIDELINES

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**INSTALLATION (CONT'D):**

- Q. WHEN CABLE ENTERS THE MANHOLE AND MAKES AN IMMEDIATE 90° BEND AS SHOWN IN FIGURE 19, IT MUST BE UNTRIPLEXED AND INSTALLED IN THE THREE OUTSIDE POSITIONS NEAREST THE END OF A 4-WAY STEP (SEE DETAIL BELOW).



**FIGURE 19**  
3325/3326

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500 KCMIL SECONDARY CABLES MAXIMUM  
THE PREFERRED INSTALLATION FOR SECONDARY CABLE & CONNECTIONS IS IN A HANDHOLE,  
USE A 3312 OR 3313 AND BYPASS THE MANHOLE IF POSSIBLE

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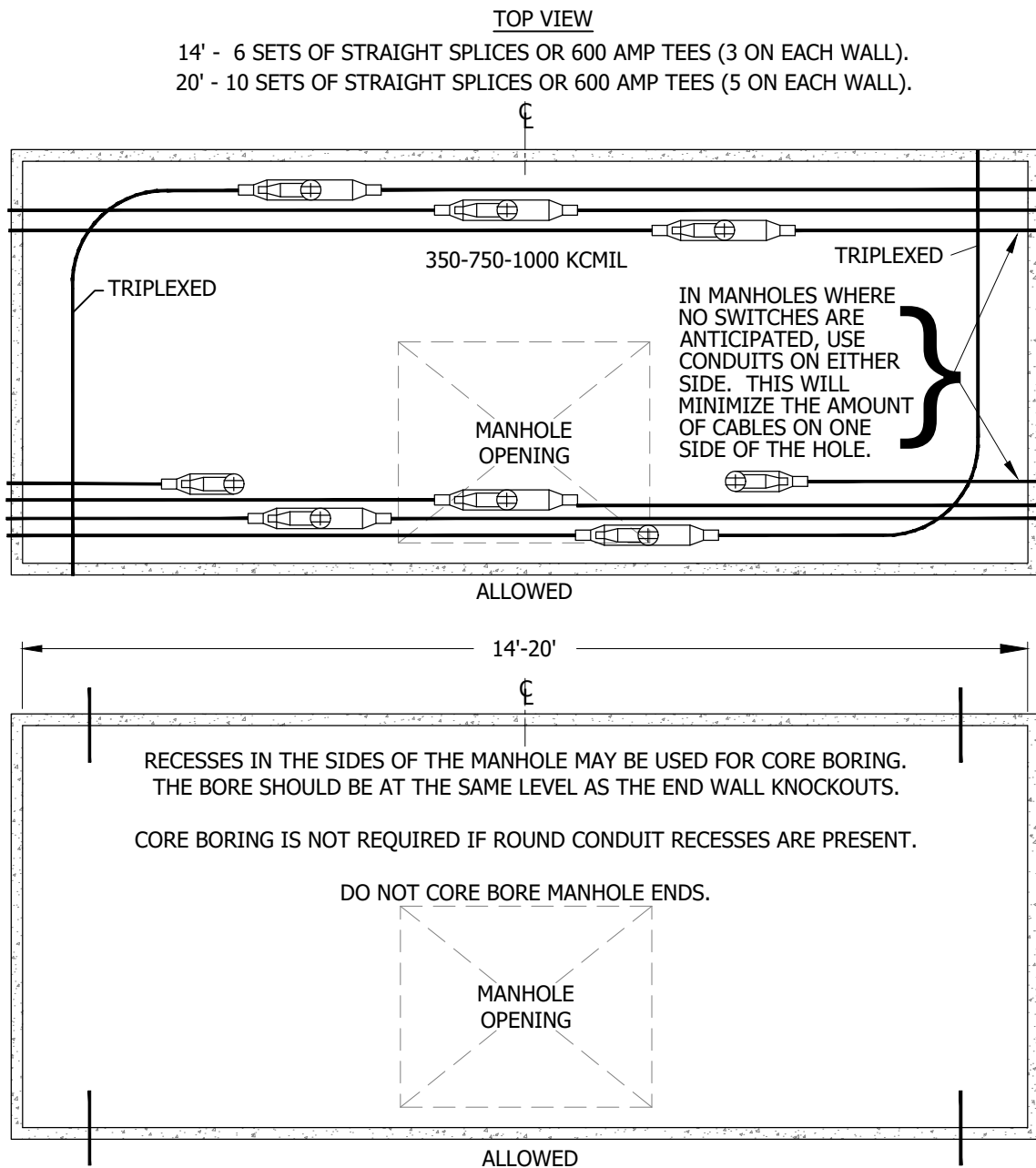
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## INSTALLATION (CONT'D):

- R. CABLES PULLED STRAIGHT THROUGH THE MANHOLE MAY BE POSITIONED ADJACENT TO THE SPLICED CABLES.
- S. ONLY USE A 20 FOOT MANHOLE WHEN TWO 4-WAY SWITCHES ARE REQUIRED.



**FIGURE 20**  
3325/3326

FOR ALL SIZES OF PRIMARY CABLES AND UP TO 500 KCMIL SECONDARY CABLES MAXIMUM.

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| EQUIPMENT COMBINATION GUIDELINES                  |                           |                    |          |                     |

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**UG3649.21**



T. THE 6 WAY SWITCH SCADA AND FAULT INTERRUPTERS IS THE PREFERRED SWITCH FOR VAULTS.

U. FOUR AND SIX WAY VISTA SWITCHES MAY BE INSTALLED IN DRY VAULTS WITHOUT A DEVIATION REQUEST.



**FIGURE 21**  
WALK-IN VAULTS

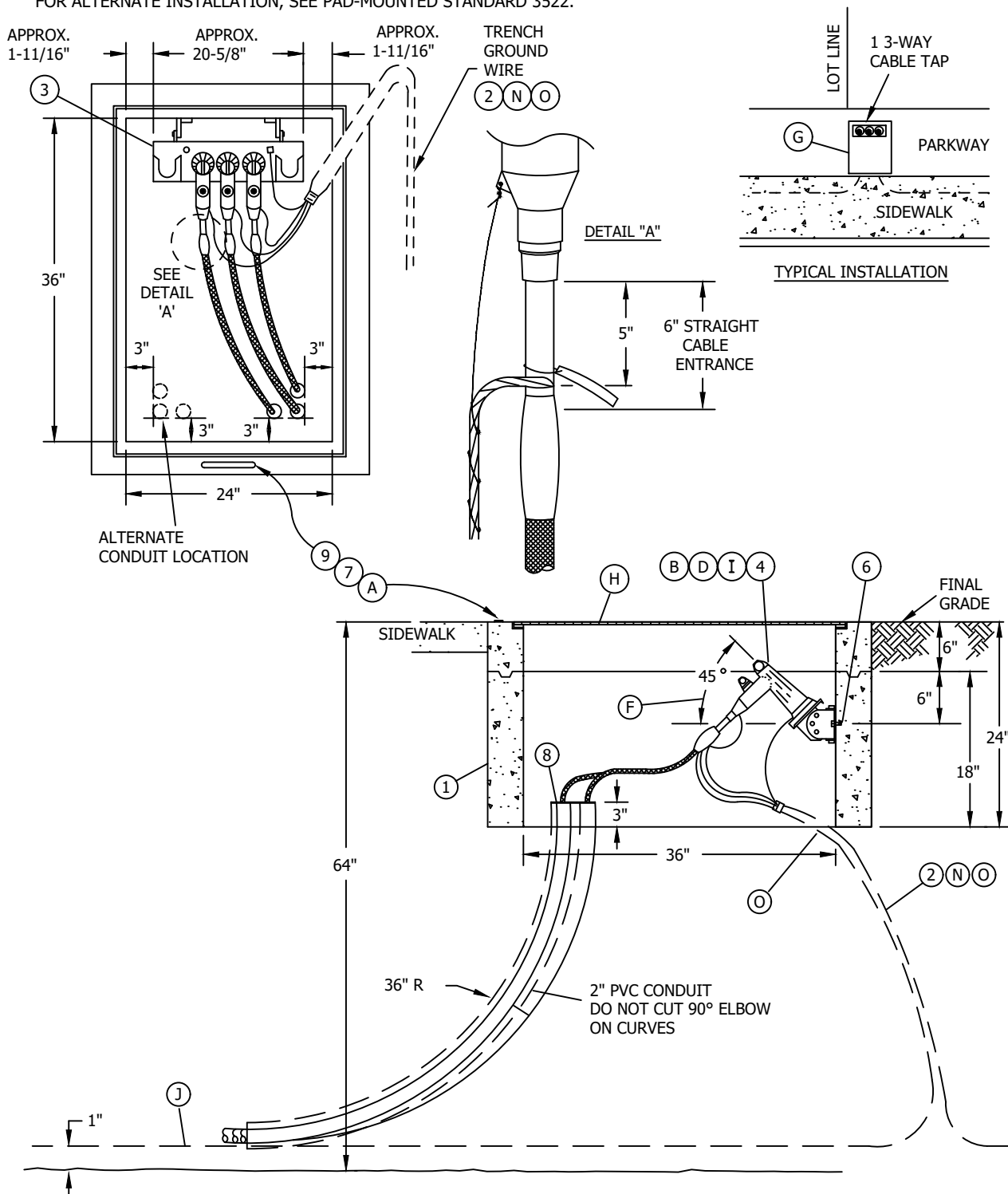
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|                               |                   | EQUIPMENT COMBINATION GUIDELINES                  |                           |      |                    |     |          |    |                     |      |                      |



**SCOPE:** TO PROVIDE A SUBSURFACE TERMINATING POINT WITH 3-WAY CABLE TAP, FOR SINGLE-PHASE 6.9KV SUPPLY AND BRANCH LOADS.  
FOR ALTERNATE INSTALLATION, SEE PAD-MOUNTED STANDARD 3522.



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

SECTIONALIZING HANDHOLE 200 AMP, 6.9KV SINGLE PHASE

UG3660.1



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|-----------------------|--------------|----------------|
| 1    | HANDHOLE, 24" X 36"                                | 1        | 3313                  | -            | 3313PC         |
| 2    | GROUNDING EQUIPMENT (N) (O)                        | AS REQ'D | 4540                  | -            | -              |
| 3    | CABLE TAP, 12KV 3-WAY                              | 1        | -                     | 718312       | TAP-3W         |
| 4    | ELBOW, LOADBREAK 12KV AND/OR INSULATING RECEPTACLE | AS REQ'D | 4191 & 4192           | -            | -              |
| 5    | CABLE IDENTIFICATION TAGS                          | AS REQ'D | 3202                  | -            | -              |
| 6    | ANCHOR BOLT CONCRETE                               | 2        | -                     | 107654       | CNCANC         |
| 7    | STRUCTURE IDENTIFICATION                           | 1        | 3211                  | -            | -              |
| 8    | AQUA-SEAL OR EQUIVALENT                            | AS REQ'D | -                     | 442996       | -              |
| 9    | EPOXY  | AS REQ'D | -                     | 213244       | -              |

**NOTES:**

- I. BEFORE BEGINNING THE INSTALLATION, STUDY ANY KIT INSTRUCTION AND FOLLOW THE DIMENSIONS ON INSTALLATION DRAWING.
- II. CUT CONDUIT, INSTALL AQUA SEAL AROUND CABLE AND CONDUIT, SET HANDHOLE, INSTALL GROUND GRID AND COMPACT SOIL TO 90% AROUND BOX AREA. (SEE STANDARD 3305 FOR SETTING TO FINAL GRADE IF SLOPED).
- III. INSTALL CABLE RACK AND TRAIN CABLES TO MAKE SURE THAT YOU HAVE 6" OF STRAIGHT CABLE WHERE IT ENTERS THE ELBOWS. ALSO HAVE AT LEAST 10 TIMES THE CABLE DIAMETER AS MINIMUM BENDING RADIUS.
- IV. INSTALL ELBOWS ON CABLES AND SEAT EACH ONE ONTO THE RACK WITH A HOT STICK. MAKE SURE THERE IS A LIGHT COATING OF SILICONE INSIDE THE ELBOW AND ALSO ON THE RACK BUSHING PER MANUFACTURER'S INSTRUCTIONS. (STANDARD 4191).
- V. REMOVE EACH CAPACITIVE TEST CAP, LUBE CAP AND TEST POINT WITH A LIGHT COATING OF SILICONE GREASE, INSTALL CAP AND ROTATE 5 TIMES CLOCKWISE. LUBING WILL ALLOW EASIER REMOVAL OF THE CAP AND PREVENT CORROSION OF THE TEST POINT.
- VI. INSTALL CABLE TAGS AND STRUCTURE IDENTIFICATION. (STANDARD 3211 AND 3202) G.O. 128, 35.1.

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SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD

SECTIONALIZING HANDHOLE 200 AMP, 6.9KV SINGLE PHASE

UG3660.2



**NOTES (CONT'D):**

- VII. INSTALL CONCENTRIC NEUTRAL GROUNDS AS SHOWN ON SKETCH LEAVING ENOUGH SLACK TO OPERATE ELBOW.
- VIII. BOLT DOWN LID WITH 1/2" PENTAHEAD BOLTS AFTER APPLYING INHIBITOR ON THREADS OF EACH BOLT. (G.O. 128, 32.7).
- IX. INSTALL STRUCTURE IDENTIFICATION TAG WITH EPOXY. STANDARD 3211.

## INSTALLATION:

- A. STRUCTURE IDENTIFICATION, SEE STANDARD 3211.
- B. ELBOWS SHALL ALWAYS BE TRAINED VERTICALLY TO ALLOW FOR MAXIMUM ELECTRICAL GROUND CLEARANCE TO ADJACENT ELBOWS WHEN SWITCHING ENERGIZED. SEE STANDARD 4191.
- C. NO SECONDARY ALLOWED WITH THIS INSTALLATION.
- D. WHEN TAP POSITION IS UNUSED, INSTALL INSULATING RECEPTACLE.
- F. CABLE TAP ANGLE SHALL BE ADJUSTED (45 DEGREES UP FROM HORIZONTAL ON FLAT TERRAIN) TO ALLOW FOR STRAIGHT INSERTION OF ELBOW INTO BUSHING WITH HOT STICK.
- G. IF RIGHT OF WAY OR OBSTRUCTIONS CAUSE A PROBLEM, THE HANDHOLE MAY BE TURNED TO WHERE THE LONG SIDE OF THE HANDHOLE PARALLELS THE SIDEWALK OR PROPERTY LINE. IF THE HANDHOLE HOUSES A CABLE TAP, THE HANDHOLE IS NOT TO BE TURNED AND THE TYPICAL PLAN VIEW OUTLINED IN THIS STANDARD MUST BE FOLLOWED. (CABLE TAP IS MOUNTED ON THE END OF THE 5 FOOT CLEARANCE FOR HOT STICK OPERATION WOULD BE ON THE SIDEWALK SIDE).
- H. APPLY SILICONE GREASE TO THE PENTAHEAD BOLTS WHEN SECURING THE COVERS TO REDUCE REMOVAL OR INSTALLATION DIFFICULTIES. (G.O. 128, 32.7).
- I. **FOUR WAY RACKS, AND FUSED ELBOWS ARE NOT ALLOWED.**
- J. FOR 1" BASE, SEE STANDARD 3370 OR 3371.

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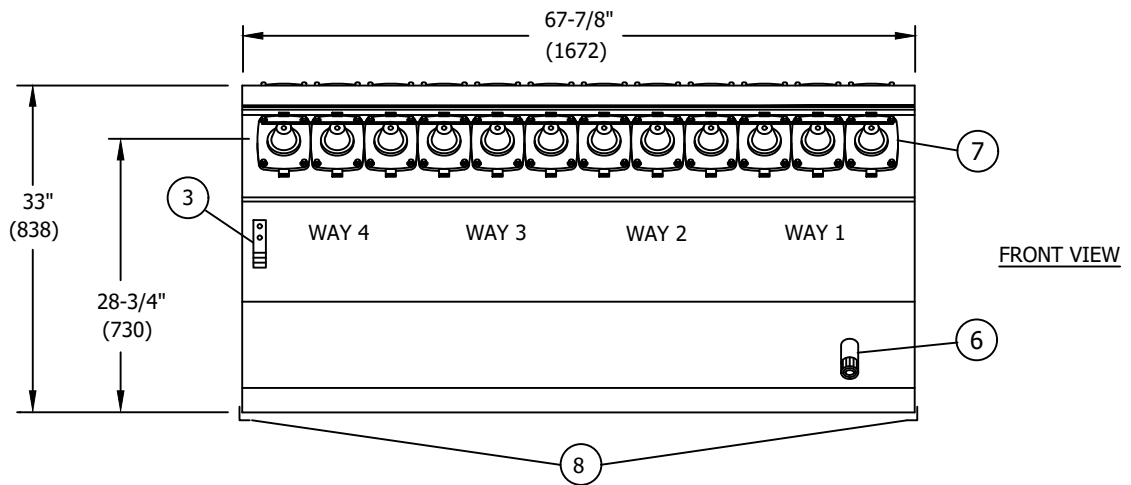
- L. SEE STANDARD 3522 FOR PADMOUNTED SINGLE-PHASE SECTIONALIZING.
- M. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART.
- N SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- O SEE STANDARD 4540 FOR GROUNDING SUBSTRUCTURES AND EQUIPMENT WHEN DIFFERENT PARTIES ARE RESPONSIBLE FOR THE CONDUIT AND PAD INSTALLATION.

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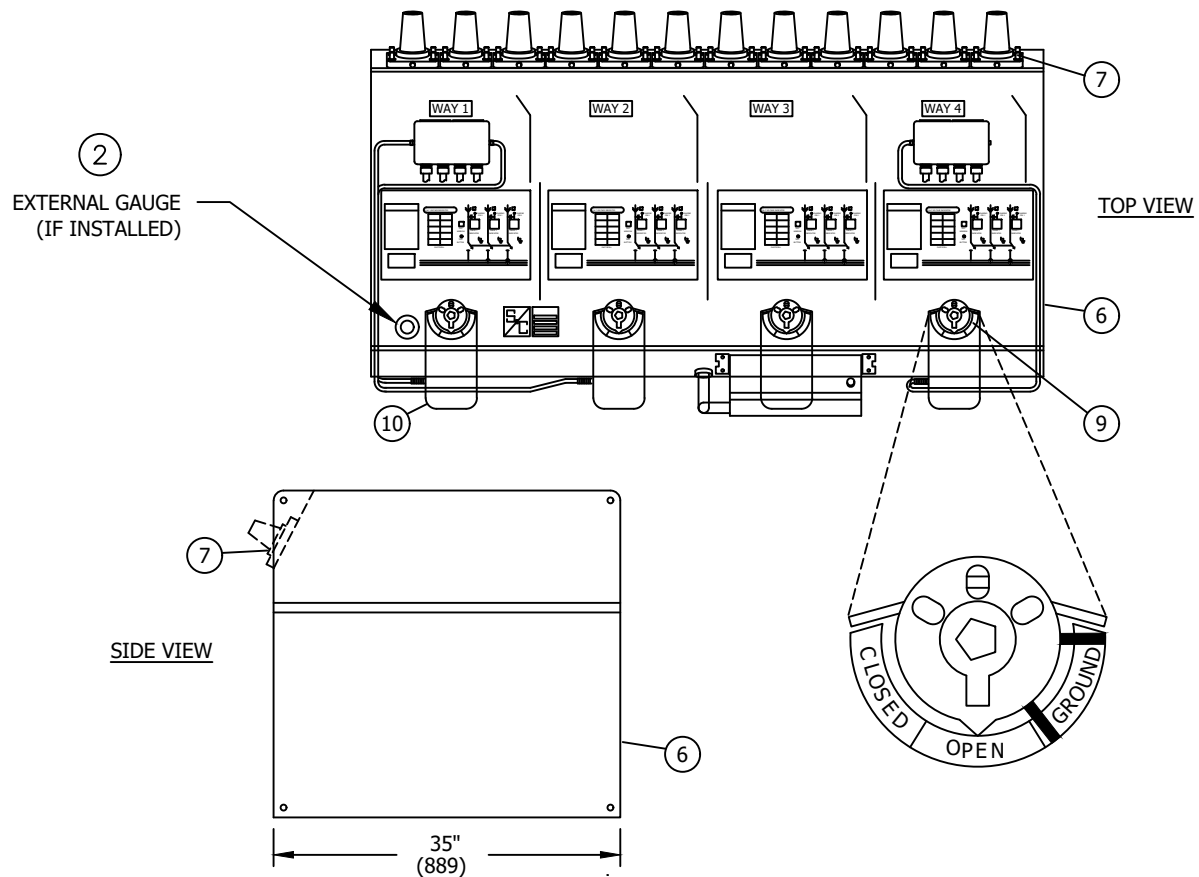
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|                 |                   | SECTIONALIZING HANDHOLE 200 AMP, 6.9KV SINGLE PHASE |                           |      |                    |     |          |    |                     |      |          |



**SCOPE:** THIS STANDARD SHOWS A SUBSURFACE/SURFACE OPERABLE 600 AMP (VISTA) SF-6 GAS SWITCH.



WEIGHT:  
MANUAL - 1100 LBS (499) KG  
SCADA - 1300 LBS (590) KG



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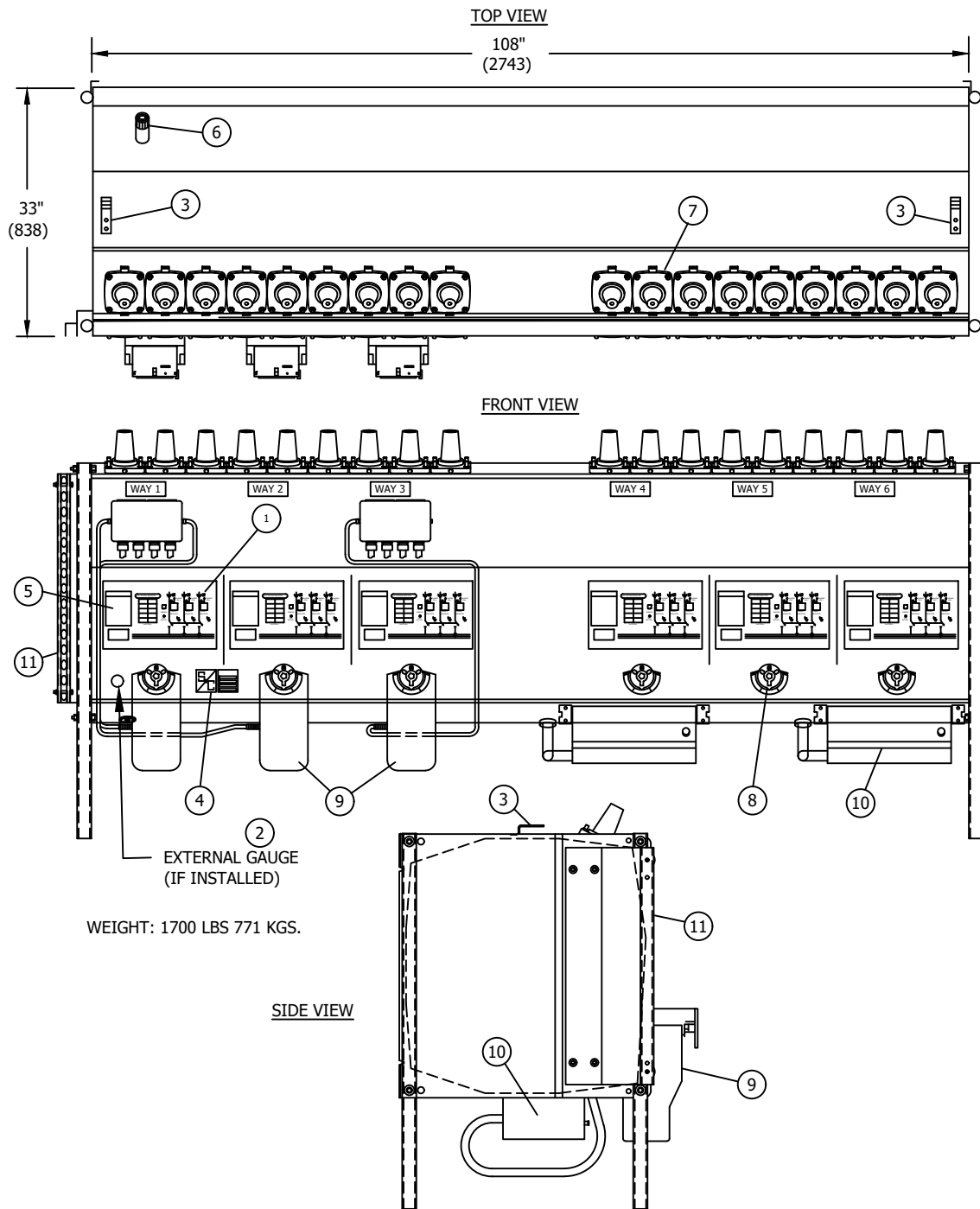
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD             |                           |                    |          |                     |           |
|                 | 600 AMP SUBSURFACE/SURFACE OPERABLE<br>4-WAY SF-6 GAS SWITCH |                           |                    |          |                     |           |







**SCOPE:** THIS STANDARD SHOWS A VISTA 6 WAY SWITCH (3-600 A SWITCHES W/3-600A FAULT INTERRUPTERS). FOR DRY VAULT INSTALLATION ONLY. NO DEVIATION REQUEST REQUIRED.



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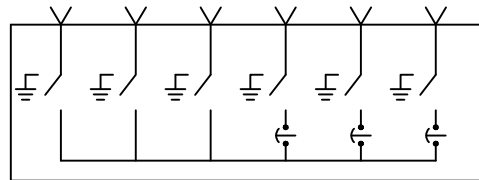
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD       |                           |                    |          |                     |           |
|                 | 600A 6-WAY SF-6 GAS SWITCH<br>W/3 - FAULT INTERRUPTERS |                           |                    |          |                     |           |



| ELECTRICAL RATINGS                           |            |
|--|------------|
| VOLTAGE                                      | 15.5 KV    |
| BIL  | 95 KV      |
| CURRENT, CONTINUOUS                          | 600 AMP    |
| LOADMAKE AND LOADBREAK                       | 600 AMP    |
| MOMENTARY AND FAULT CLOSE (RMS, SYMMETRICAL) | 16,000 AMP |
| FAULT INRERRUPTER (LOAD DROPPING)            | 600 AMP    |

|                         |                   |               |
|-------------------------|-------------------|---------------|
| 600 AMP                 | UNIT STOCK NUMBER | ASSEMBLY UNIT |
| 6-WAY (STAINLESS STEEL) | 708986            | 633-V         |

TYPICAL ONE LINE DIAGRAM



6-WAY ONE LINE DIAGRAM

SWITCH PARTS LIST

| ITEM | DESCRIPTION                            | ITEM | DESCRIPTION              |
|------|--|------|--------------------------|
| 1    | OPERATING PANEL AND CONNECTION DIAGRAM | 7    | 600 AMP BUSHING ASSEMBLY |
| 2    | SF-6 FILL VALVE                        | 8    | OPERATING MECHANISMS     |
| 3    | GROUND LUG                             | 9    | MOTOR OPERATORS          |
| 4    | NAME PLATE                             | 10   | OVER CURRENT CONTROLS    |
| 5    | PRESSURE GAUGE (UNDERWINDOW)           | 11   | CONTROL CABLE SUPPORT    |
| 6    | PRESSURE RELIEF VALVE                  |      |                          |

#### INSTALLATION:

- THE 6-WAY SWITCH SHALL BE INSTALLED ON 54" LEGS AND BOLTED TO THE WALL WITH THE 24" STAND-OFF BRACKET SUPPLIED WITH THE SWITCH LEG KIT. ATTACH THE BRACKETS TO THE SWITCH USING THE TOP LEG BOLTS. (\$457180).
- A SWITCH LEG KIT IS INCLUDED IN THE 6-WAY VISTA SWITCH AU. FOR A 4-WAY SWITCH INSTALLED IN A VAULT THE SWITCH LEGS MUST BE ORDERED SEPARATELY. (\$457180 VS-LEG)
- LOADBREAK ELBOWS SHALL NOT BE CONNECTED TO THE BACK OF THE 600 AMPS TEES. 200 AMP LOADBREAK ELBOWS MAY BE CONNECTED TO THE FAULT INTERRUPTERS PROVIDING THERE ARE NO 600 AMP CONNECTORS AT THAT POSITION.
- SCADA RTU AND ALL CONTROL CABLES ARE INCLUDED WITH SWITCH. CONTROL CABLES ARE 50' LONG.

#### NOTES:

- PRESSURE GAUGE IS LOCATED UNDER THE LEFT HAND SIDE WINDOW. IT IS TEMPERATURE AND ALTITUDE COMPENSATED.
- SWITCHES ARE DELIVERED FROM THE SUPPLIERS WITH ALL THE PARTS LISTED IN THE PARTS LISTED.
- OPERATION SELECTOR PREVENTS INADVERTENT OPERATION FROM THE CLOSED POSITION DIRECTLY TO THE GROUND POSITION AND VICE VERSA.
- THE SWITCHES SHALL BE USED WITH POLYETHYLENE CABLES AND 600 AMP ELBOW TEES.

#### REFERENCE:

- SEE STANDARD 3212 FOR SWITCH IDENTIFICATION.
- SEE STANDARD 3649 FOR EQUIPMENT COMBINATION GUIDELINES FOR SWITCHES IN MANHOLES.
- SEE STANDARD 3671 FOR 4-WAY SWITCH INSTALLATION IN A 3317 HANDHOLE.
- SEE STANDARD 4181.19 FOR SWITCH CONNECTIONS.
- SEE DESIGN STANDARD 6111 FOR SWITCH APPLICATION.

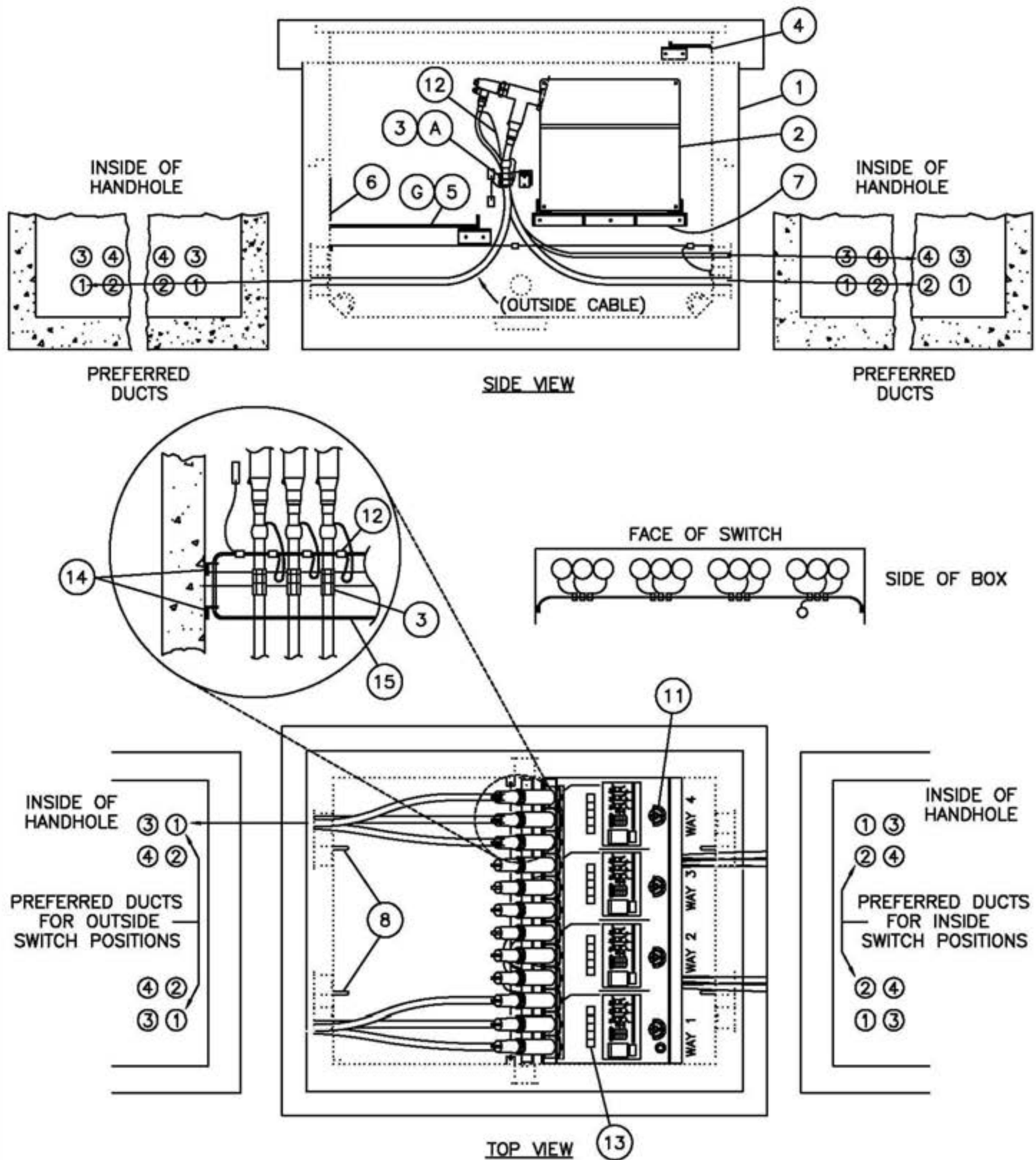
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| C   |                   |    |      |      |         | F   |        |    |      |      |      |
| B   |                   |    |      |      |         | E   |        |    |      |      |      |
| A   | REFERENCES UPDATE | DG | TR   | MDJ  | 6/01/16 | D   |        |    |      |      |      |

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| SHEET<br>4 OF 4 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG 3670.4 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD       |                           |                    |          |                     |           |
|                 | 600A 6-WAY SF-6 GAS SWITCH<br>W/3 - FAULT INTERRUPTERS |                           |                    |          |                     |           |



**TYPICAL INSTALLATION DRAWINGS  
SUBSURFACE/SURFACE OPERATE SWITCH IN A 3317 HANDHOLE**



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SDG&E ELECTRIC STANDARDS

3671.1

INSTALLATION OF SUBSURFACE/SURFACE  
OPERABLE SWITCH IN A 3317 HANDHOLE

REVISION

DATE 10-23-00

APPD *[Signature]*



**NOTES:**

- OTHER CONFIGURATIONS MAY BE DESIGNED PROVIDED CABLES DO NOT CROSS FROM ONE SIDE OF THE STRUCTURE TO THE OTHER.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                             | QUANTITY | CONST STD OR PG NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|----------|---------------------|--------------|----------------|
| 1    | HANDHOLE 6' X 8' (1829 X 2438)          | 1        | 3317                | 334430       | 3317SE         |
| 2    | 12KV SUBSURFACE/SURFACE OPERABLE SWITCH | 1        | 3670                | 708998       | 4WY-V          |
| 3    | BRACKET, MOUNTING MBS-6                 | AS REQ'D | —                   | 165530       | —              |
| 4    | UPPER STEEL GRATING                     | 1        | —                   | —            | —              |
| 5    | LOWER STEEL GRATING                     | 1        | —                   | —            | —              |
| 6    | GROUND CONNECTION                       | —        | —                   | —            | —              |
| 7    | SWITCH SUPPORT                          | —        | —                   | —            | —              |
| 8    | PULLING IRONS                           | —        | —                   | —            | —              |
| 9    | AUTOMATIC FAULT INDICATORS              | AS REQ'D | 4352                | —            | —              |
| 10   | ANCHOR, CONCRETE STAINLESS STEEL        | AS REQ'D | —                   | —            | —              |
| 11   | PADLOCK, SCHLAGE ELECTRIC SERIES        | 8        | —                   | 514848       | —              |
| 12   | CONNECTOR, COMPRESSION                  | AS REQ'D | 4172                | —            | —              |
| 13   | DECALS                                  | AS REQ'D | 3212                | —            | —              |


**INSTALLATION:**

- A. MBS-6 MOUNTING BRACKETS SHALL BE BOLTED TO THE TOP OF THE CABLE SUPPORT BRACKET.  
 B. BOLT THE SWITCH TO THE SWITCH SUPPORT ANGLES  
 C. NO SECONDARY ALLOWED IN THIS INSTALLATION OTHER THAN THE FEED TO THE SUMP PUMP OR SCADA.  
 D. 200 AMP CABLES SHALL BE PULLED IN UPPER CONDUITS (3 AND 4).  
 E. DO NOT PIGGYBACK 600 AMP TEES (ONE ON TOP OF THE OTHER) AT ANY TIME ON THE SWITCH BUSHINGS.  
 F. INSTALL SWITCH IDENTIFICATION NUMBER AND CABLE I.D. AS SHOWN IN STANDARD 3200.  
 G. LOWER STEEL GRATING IS REMOVABLE FOR CABLE PULLING.  
 GG. LOADBREAK ELBOWS SHALL NOT BE LANDED ON THE BACK OF THE 600 AMP TEES EXCEPT FOR 1 LOADBREAK ELBOW FOR A SINGLE-PHASE TRANSFORMER (6930). THREE LOADBREAK ELBOWS MAY BE INSTALLED WHEN CONNECTED TO SWITCH WITH NO 600 AMP TEES.

**REFERENCE:**

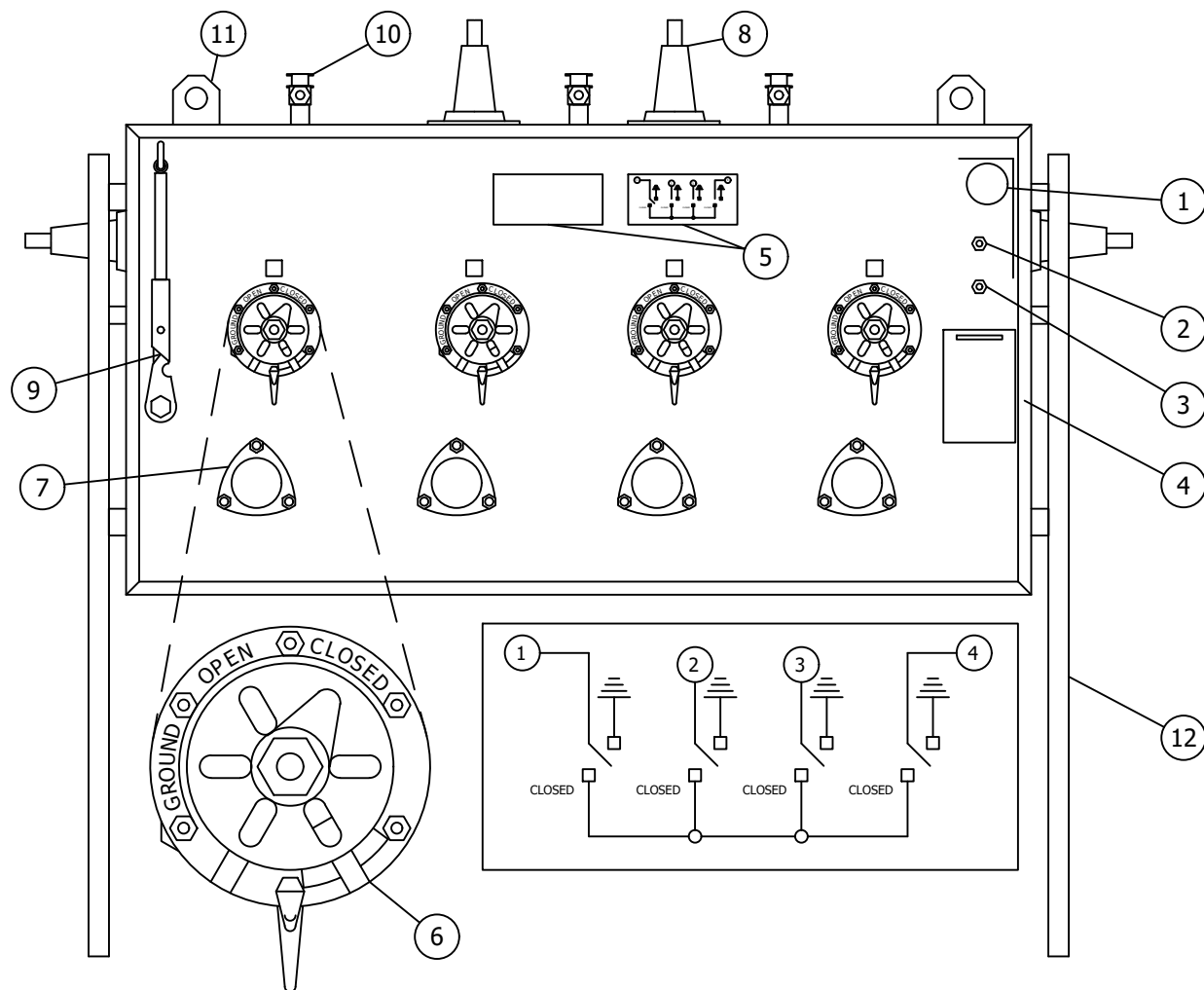
- H. SEE STANDARD 3670 FOR SUBSURFACE SWITCH  
 I. SEE STANDARD 3212 FOR INSTALLING SWITCH IDENTIFICATION NUMBERS AND STANDARD 3202 FOR INSTALLING CABLE I.D. TAGS.  
 J. SEE PAGE 3374.3 FOR CONDUIT INSTALLATION PRACTICES.  
 K. SEE STANDARD 3362 FOR SUMP PUMP INSTALLATION.  
 L. SEE STANDARD 4181 FOR 12KV 200 AMP AND 600 AMP CONNECTOR ASSEMBLIES.  
 M. SEE STANDARD 4530 FOR NEUTRAL AND GROUND WIRE DIAGRAM.  
 N. SEE STANDARD 4540 FOR GROUNDING STRUCTURES & EQUIPMENT.  
 O. SEE DESIGN STANDARD 6111 FOR SWITCH APPLICATION.  
 P. SEE DESIGN STANDARD 6113 FOR AUTOMATIC FAULT INDICATOR APPLICATION.

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| REVISION                                | SDG&E ELECTRIC STANDARDS  |                    |          |                     |
| DATE 1-12-01<br>APPD <i>[Signature]</i> | INSTALLATION OF SUBSURFACE/SURFACE OPERABLE SWITCH IN A 3317 HANDHOLE   |                    |          |                     |
|   | 3671.2  |                    |          |                     |



THE G-RAM IS THE REPLACEMENT FOR BOTH GAS AND OIL SWITCHES WHEN THEY CANNOT BE PAD MOUNTED.



| ITEM | DESCRIPTION                        | ITEM | DESCRIPTION                     |
|------|------------------------------------|------|---------------------------------|
| 1    | PRESSURE GAUGE                     | 7    | CONTACT POSITION VIEWING WINDOW |
| 2    | FILL VALVE                         | 8    | 600 AMP BUSHING CONNECTION      |
| 3    | PROVISION FOR LOW PRESSURE WARNING | 9    | OPERATING HANDLE                |
| 4    | SF6 TEMPERATURE AND PRESSURE CHART | 10   | EQUIPMENT GROUNDING POINTS      |
| 5    | NAME PLATE AND ONE LINE DIAGRAM    | 11   | EQUIPMENT LIFTING POINTS        |
| 6    | OPERATING SHAFT AND LOCKING ASSY.  | 12   | SUPPORT LEGS                    |

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| B   | EDITORIAL CHANGES | AW | JS   | CZH   | 7/1/2018  | E   |        |    |      |      |      |
| A   | REVISION          |    |      | TR/JJ | 5/20/2005 | D   |        |    |      |      |      |

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| SHEET<br>1 OF 2 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3672.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD      |                           |                    |          |                     |          |
|                 | G & W G-RAM 4-WAY GAS SWITCH WITH GROUNDING POSITIONS |                           |                    |          |                     |          |







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| SHEET<br>1 OF 4 | Indicates Latest Revision  | Completely Revised | X | New Page | Information Removed | UG 3675.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                         |                    |   |          |                     |           |
|                 | SUBSURFACE APPLICATION OF ELASTIMOLD<br>MOLDED VACUUM SWITCH/INTERRUPTER |                    |   |          |                     |           |



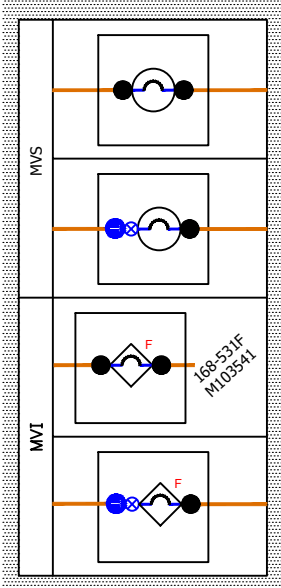
| ELASTIMOLD MVS AND MVI ELECTRICAL RATINGS          |                 |
|--|-----------------|
| CONTINUOUS CURRENT                                 | 200A            |
| BASIC INSULATION LEVEL (BIL)                       | 95kV            |
| VOLTAGE CLASS                                      | 15.5kV          |
| ASYMMETRICAL MOMENTARY AND 3 OPERATION FAULT CLOSE | 20kA            |
| SYMMETRICAL 1 SECOND FAULTING RATING               | 12.5kA          |
| CAPACITOR OR CABLE CHARGING INTERRUPTING           | 40A             |
| AMBIENT TEMPERATURE RANGE                          | -30°C TO + 40°C |

**TABLE 1 - MVS AND MVI ELECTRICAL RATINGS**

| DESCRIPTION                     | STOCK NUMBER | ASSEMBLY UNIT |
|---------------------------------|--------------|---------------|
| MVS, 1-0, 200A LINE, 200A LOAD  | S708400      | S21P          |
| *MVI, 1-0, 200A LINE, 200A LOAD | S708402      | S21PFI        |
| MVS, 3-0, 200A LINE, 200A LOAD  | S708412      | S23P          |
| *MVI, 3-0, 200A LINE, 200A LOAD | S708410      | S23PFI        |
| MVS, 3-0, 600A LINE, 200A LOAD  | S708414      | S63P          |
| *MVI, 3-0, 600A LINE, 200A LOAD | S708416      | S63PFI        |
| *MVI, 3-0, 600A LINE, 600A LOAD | S708418      | S66PFI        |

**TABLE 2 - MVS AND MVI STOCK NUMBERS**

\* - STOCKED AT KEARNY ONLY.



**INSTALLATION:**

1. SUB-SURFACE INSTALLATION FOR WALK IN VAULTS AND MANHOLES. CAN BE APPLIED AT 12kV OR 4kV. CAN BE INSTALLED IN HANDHOLES AS LONG AS THE SWITCH CAN BE OPEN/CLOSED FROM OUTSIDE STRUCTURE, AND THE ELBOWS CAN BE REMOVED USING A SHOTGUN. REQUIRED WORKING SPACE DIMENSIONS MUST BE RESPECTED.
2. SWITCH CAN BE MOUNTED ON THE FLOOR OR WALL, HORIZONTAL OR VERTICAL USING HILTI 1/2 INCH DRIVE IN STUDS.
3. PROVISIONS MUST BE PROVIDED FOR REMOTE RIGGING (ROPE OPERATION) IF THE SWITCH CANNOT BE OPERATED USING A HOOK STICK FROM OUTSIDE THE STRUCTURE. SEE PAGE 3675.3
4. ALL BUSHING PLUGS MUST BE BONDED TO THE SWITCH BODY GROUND.
5. FOR GROUNDING INSTRUCTIONS SEE STANDARD 4530.2
6. LOCK SWITCH HANDLE WHEN IN FINAL POSITION (OPEN OR CLOSED). USE NON-FERROUS LOCK STOCK # 468010

**TABLE 3 - MVS AND MVI MAP SYMBOLS**

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| B   |          |    |      |          |           | E   |        |    |      |      |      |
| A   | REVISION |    |      | TR / MJC | 6/18/2012 | D   |        |    |      |      |      |

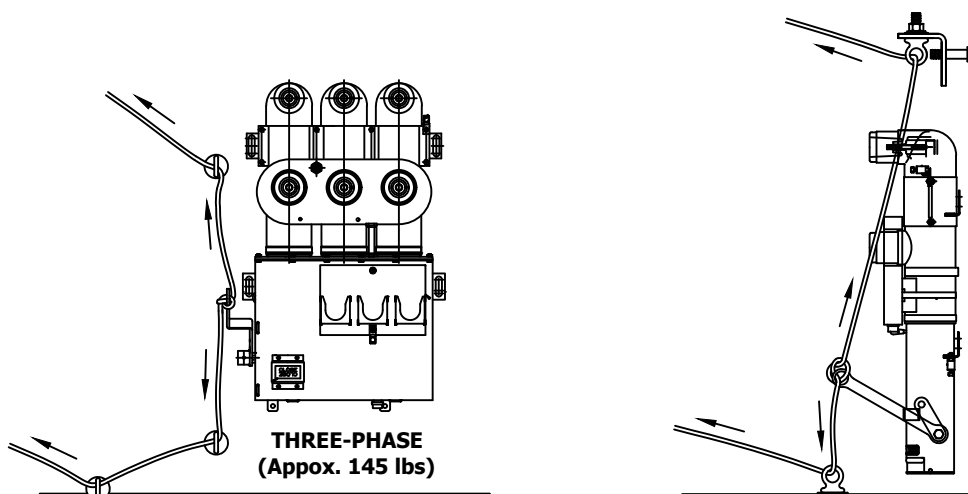
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| SHEET<br>2 OF 4 | <div><div>X</div><div>Indicates Latest Revision</div></div>              | <div><div></div><div>Completely Revised</div></div> | <div><div></div><div>New Page</div></div> | <div><div></div><div>Information Removed</div></div> | UG 3675.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                         |   |   |  |           |
|                 | SUBSURFACE APPLICATION OF ELASTIMOLD<br>MOLDED VACUUM SWITCH/INTERRUPTER |   |   |  |           |



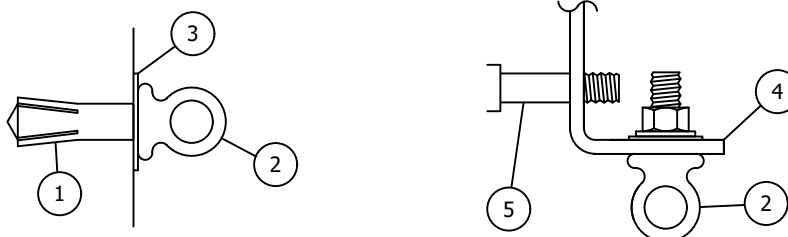
**SCOPE:** REMOTE RIGGING HARDWARE INSTALLATION FOR MVI AND MVS SWITCHES:

## INSTALLATION:

1. APPLY EYE BOLTS AS NEEDED TO OPEN AND CLOSE MVI AND MVS SWITCHES FOR REMOTE OPERATION WITH ROPE.
2. ADDITIONAL POINTS MAY BE ADDED WITH L BRACKETS FOR ROPE RIGGING TO THE SURFACE OPENING OR DOOR ACCESS.
3. SEE THE DRIVE IN ANCHOR INSTALLATION IN CONSTRUCTION STANDARD 4178.4, REQUIRES 5/8 INCH CONCRETE DRILL AND DRIVE IN ANCHOR SETTING TOOL S746758. THE STAINLESS STEEL EYE BOLT WILL THREAD INTO THE ANCHOR.



## REMOTE RIGGING ARRANGEMENTS (EXAMPLE)



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                                   | QUANTITY | CONST STD. OR PAGE NO | STOCK NUMBER |
|------|---|----------|-----------------------|--------------|
| 1    | DROP IN ANCHOR STAINLESS STEEL                | AS REQ'D | 4178.4                | S108862      |
| 2    | EYE BOLT 1-1/2" X 1/2" STAINLESS STEEL        | AS REQ'D | 4505                  | S1152710     |
| 3    | WASHER 1/2" STAINLESS                         | AS REQ'D | 4505                  | S799680      |
| 4    | L BRACKET STAINLESS STEEL 2" X 3"             | AS REQ'D | 4505                  | S166072      |
| 5    | ANCHOR CONCRETE STAINLESS STEEL 1/2" X 3-1/2" | AS REQ'D | 4505                  | S107654      |

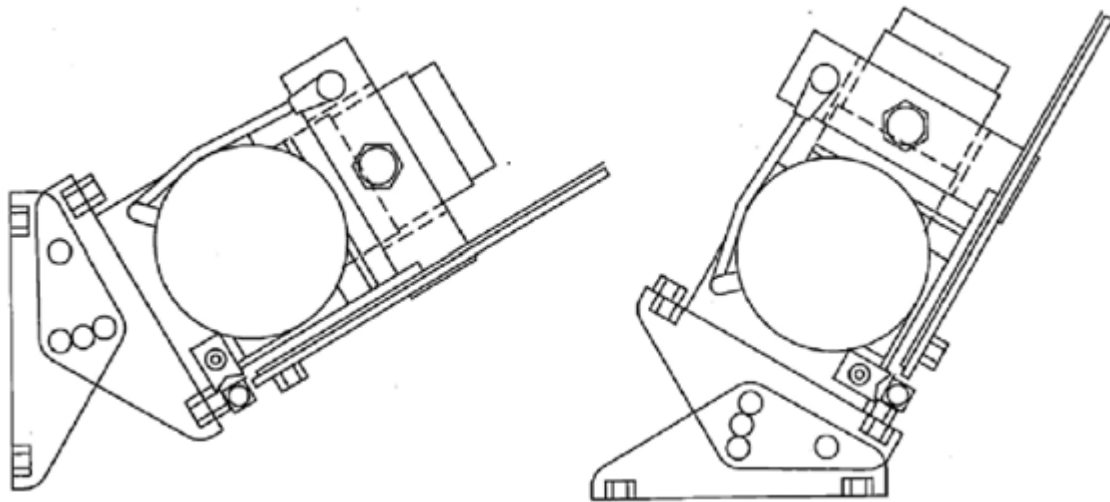
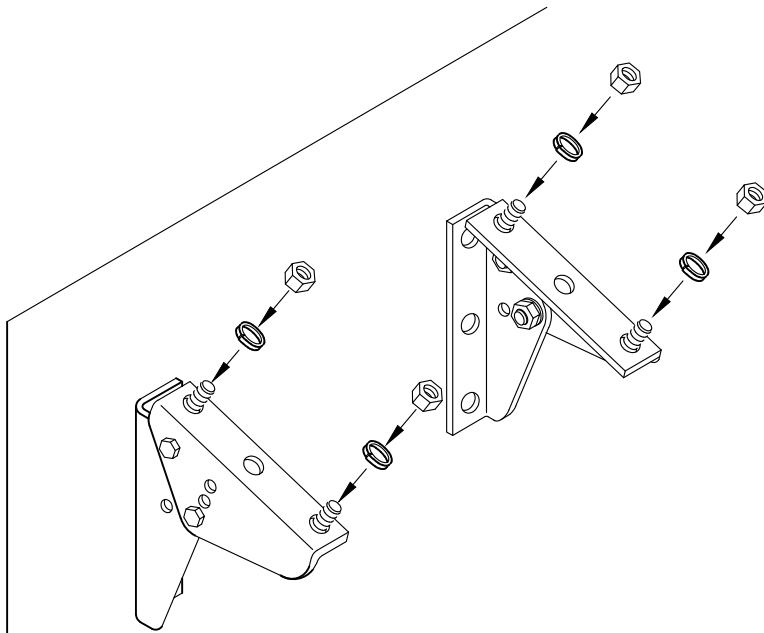
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| B   |          |    |      |       |            | E   |        |    |      |      |      |
| A   | REVISION |    |      | WT/MC | 05/25/2010 | D   |        |    |      |      |      |

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| SHEET<br>3 OF 4 | Indicates Latest Revision  | Completely Revised | X | New Page | Information Removed | UG 3675.3 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                         |                    |   |          |                     |           |
|                 | SUBSURFACE APPLICATION OF ELASTIMOLD<br>MOLDED VACUUM SWITCH/INTERRUPTER |                    |   |          |                     |           |



**SCOPE:** THIS SHOWS A TILT MOUNT ADAPTER FOR SINGLE-PHASE MVI AND MVS.



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                       | QUANTITY | CONST STD. OR PAGE NO | STOCK NUMBER | ASSEMBLY UNIT |
|------|-----------------------------------|----------|-----------------------|--------------|---------------|
| 1    | BRACKET SINGLE-PHASE MVI/MVS      | 2        | -                     | S164636      | TMA-EM        |
| 2    | ANC 1/2" X 3-1/2" STAINLESS STEEL | 4        | -                     | S107654      | CNCANC        |

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| A   | REVISION |    |      | TR / DW | 5/21/2014 | D   |        |    |      |      |      |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                         |                    |  |                     |           |
|                 | SUBSURFACE APPLICATION OF ELASTIMOLD<br>MOLDED VACUUM SWITCH/INTERRUPTER |                    |  |                     |           |

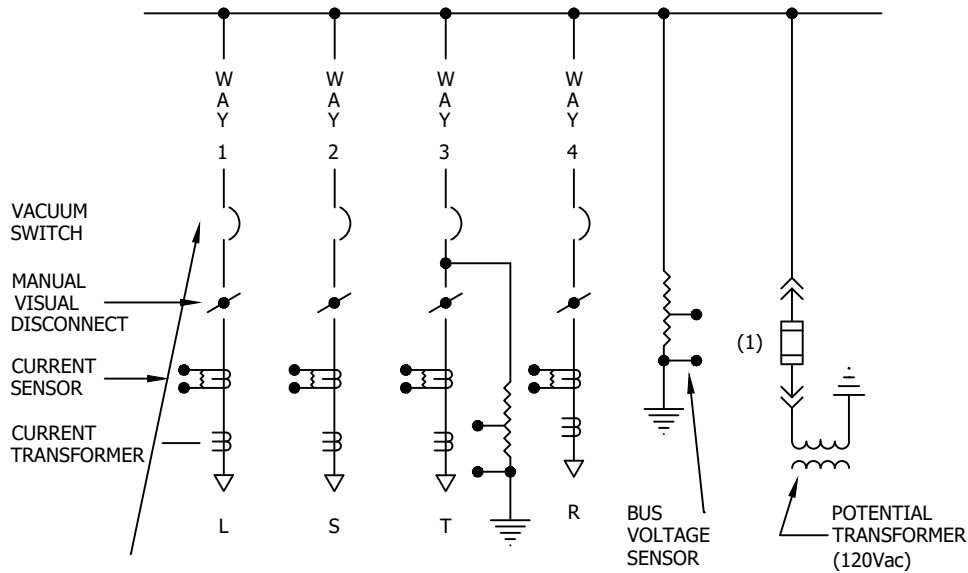


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| SHEET<br>1 OF 8 | X  | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed | UG3677.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD |                           |  |                    |  |          |  |                     |          |
|                 | TRAYER VAULT-MOUNTED SWITCH GEAR                 |                           |  |                    |  |          |  |                     |          |

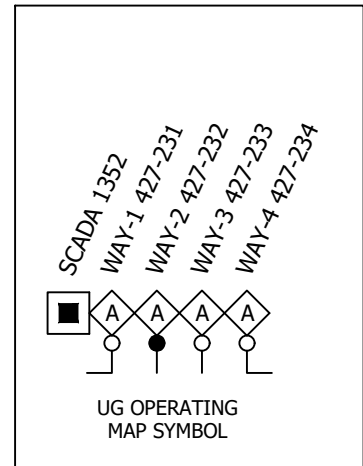


## 4-WAY SCADA TRAYER VAULT-MOUNT

**4-WAY SCADA VAULT-MOUNT  
CONNECTION DIAGRAM**

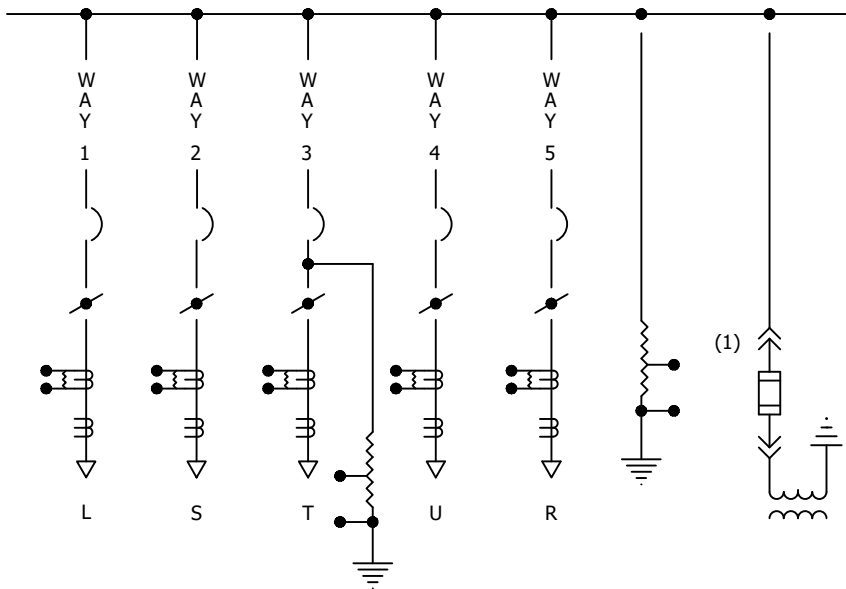


**MAP SYMBOL**

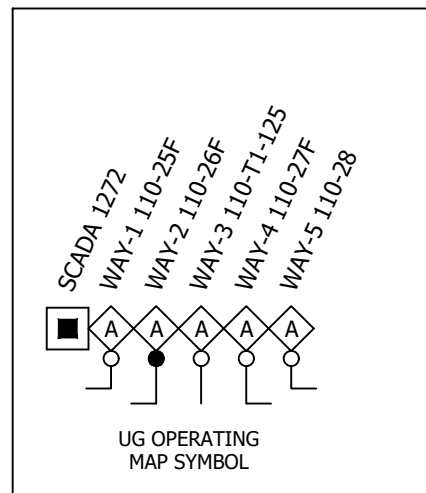


## 5-WAY SCADA TRAYER VAULT-MOUNT

**5-WAY SCADA VAULT-MOUNT  
CONNECTION DIAGRAM**



**MAP SYMBOL**



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| B   | EDITORIAL CHANGES | AW | JS   | CZH  | 7/1/2018 | E   |        |    |      |      |      |
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**SHEET  
2 OF 8**

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SDG&E ELECTRIC UNDERGROUND CONSTRUCION STANDARD

TRAYER VAULT-MOUNTED SWITCH GEAR

UG3677.2



## INSTALLATION:

- A. ALL CONDUITS THAT ENTER FROM THE OUTSIDE SHALL BE SEALED WITH DUCT PLUGS, SEE STD. 3960 "ELEVATION OF CUSTOMER FACILITIES PREVENTING WATER ENTRY". CONDUITS SHALL ALSO BE SEALED FROM FACILITIES THAT TRANSITION TO THE VAULT. CONDUITS WITH CABLE SHALL BE SEALED WITH THE TYCO RAYFLATE SYSTEM. SEE STD. 3948.4
- B. SWITCHES MUST BE ATTACHED TO THE FLOOR AND THE WALL. THE WALL ANCHOR MOUNT BRACKETS ARE ADJUSTABLE FOR CABLE TRAINING AND CABLE TRANSITION BEHIND THE SWITCH IF NECESSARY.
- C. THE DRILLING PATTERN ON THE SWITCH STAND MATCHES THE UNDERGROUND DEVICES PLASTIC CABLE RACKS FOR ATTACHMENT OF CABLE HOOKS AND ARMS.
- D. EACH 4 WAY MANUAL TRAYER SWITCH COMES WITH A MOTOR ACTUATOR FOR REMOTE SWITCHING. THE UNIT MAY BE MOVED TO ANY POSITION FOR REMOTE SWITCHING OPERATIONS. IT MAY BE POWERED BY THE INTERNAL 120 VOLT SOURCE OF THE VAULT OR A GENERATOR FOR EXTENDED OUTAGES.
- E. 600/200 AMP CONNECTION APPLICATION SEE STD. 4181.19, 20 AND 21.
- F. THE 4/0 GROUND MAY RING THE SWITCH STAND JUST BELOW THE SWITCH USING THE 2" X 3" INCH STAINLESS STEEL(L) BRACKETS AND 1/2" X 6" PULLING AND 1 1/2" X 1/2" STAINLESS STEEL SHOULDER BOLT. THE STAND HAS MULTIPLE 1/2" HOLES ON ALL SIDES FOR ATTACHMENT POINTS. THE 4/0 RING GROUND MUST BE ATTACHED TO THE VAULT GROUND SYSTEM. SEE STD. 4520.8, .9
- G. THE SCADA RTU CABINET MUST HAVE A MINIMUM OF 48" FROM THE WALL FOR WORK SPACE. THE STANDARD 8 FOOT WORK SPACE MUST BE MAINTAINED IN FRONT OF THE SWITCH FOR LIVE LINE TOOL OPERATIONS. SEE STD. 3483 FOR OPERATING CLEARANCE REQUIREMENTS.
- H. SEE STANDARD 3212.2 FOR TAGGING OF THE WAY POSITIONS ON THE FACE OF THE SWITCH.
- J. LOCKS: ALL MANUAL SWITCHES SHALL BE LOCKED, SCADA SWITCH POSITIONS THAT ARE NOT OCCUPIED SHALL BE LOCKED. LOCKS SHALL BE AVAILABLE FOR THE LOCK OUT AND TAGGING FOR ALL D.S.O. OPERATIONS.
- K. THE USE OF FUSED ELBOWS WILL BE LIMITED TO ONE FUSED ELBOW ONLY ON THE RIGHT OR LEFT SIDE SWITCH WAY POSITION. NO DEVIATION WILL BE GRANTED FOR MORE THAN ONE FUSE ELBOW IN THE TRAYER SWITCH.
- L. TAPPING THE BACK OF 600 AMP TEES FOR 200 AMP DISTRIBUTION WILL BE LIMITED TO SWITCH CHANGE OUTS WITH EXISTING 200 AMP TAPS.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                            | QUANTITY | CONST STD OR PAGE NO.    | STOCK NUMBER         | ASSEMBLY UNIT |
|------|--|----------|--------------------------|----------------------|---------------|
| 1    | 4-WAY MANUAL                           | 1        | SEE STD. FOR APPLICATION | S704730              | 4WYTMV        |
|      | 4-WAY SCADA                            | 1        |                          | S704712              | 4WYTSV        |
|      | 5-WAY SCADA                            | 1        |                          | S704714              | 5WYTSV        |
| 2    | WALL ANCHORS                           | 4        | -                        | SUPPLIED WITH SWITCH |               |
| 3    | 12KV 600/200 AMP CONNECTORS            | AS REQ'D | 4186.19, .20, .21        | -                    | -             |
| 4    | PADLOCK                                | AS REQ'D |                          | 514848               | -             |
| 5    | ANCHOR, CONCRETE STAINLESS STEEL       | 12       | 4178                     | 107654               | CNCANC        |
| 6    | 1/0 CONNECTOR POST                     | 5        | -                        | 262560               | USPCON        |
| 7    | 4/0 COPPER WIRE                        | AS REQ'D | 4520.8, .9               | 812764               | 4/0-SD        |
| 8    | 4/0 COPPER TRENCH GROUND               | AS REQ'D | 4510                     | 812816               | TG-E-W        |
| 9    | SEALING COMPOUND                       | AS REQ'D | 3948.1                   | 442976               | SEAL-6        |
| 10   | SWITCH POSITION TAGGING                | -        | 3212.2                   | -                    | -             |
| 11   | EYE BOLT 6" X 1/2" STAINLESS           | 2        | -                        | 150582               | -             |
| 12   | 2" X 3" STAINLESS STEEL ANGEL BRACKET  | 4        | 4520.8, .9               | S166072              | -             |
| 13   | EYE BOLT STAINLESS STEEL 1-1/2" X 1/2" | 2        |                          | S152710              |               |
| 14   | WASHER STANDARD FLAT BRONZE 1/2"       | 8        | -                        | 799488               | -             |
| 15   | WASHER LOCK SPRING                     | 4        | -                        | 796416               | -             |
| 16   | CABLE IDENTIFICATION                   | AS REQ'D | 3202.3                   | -                    | -             |

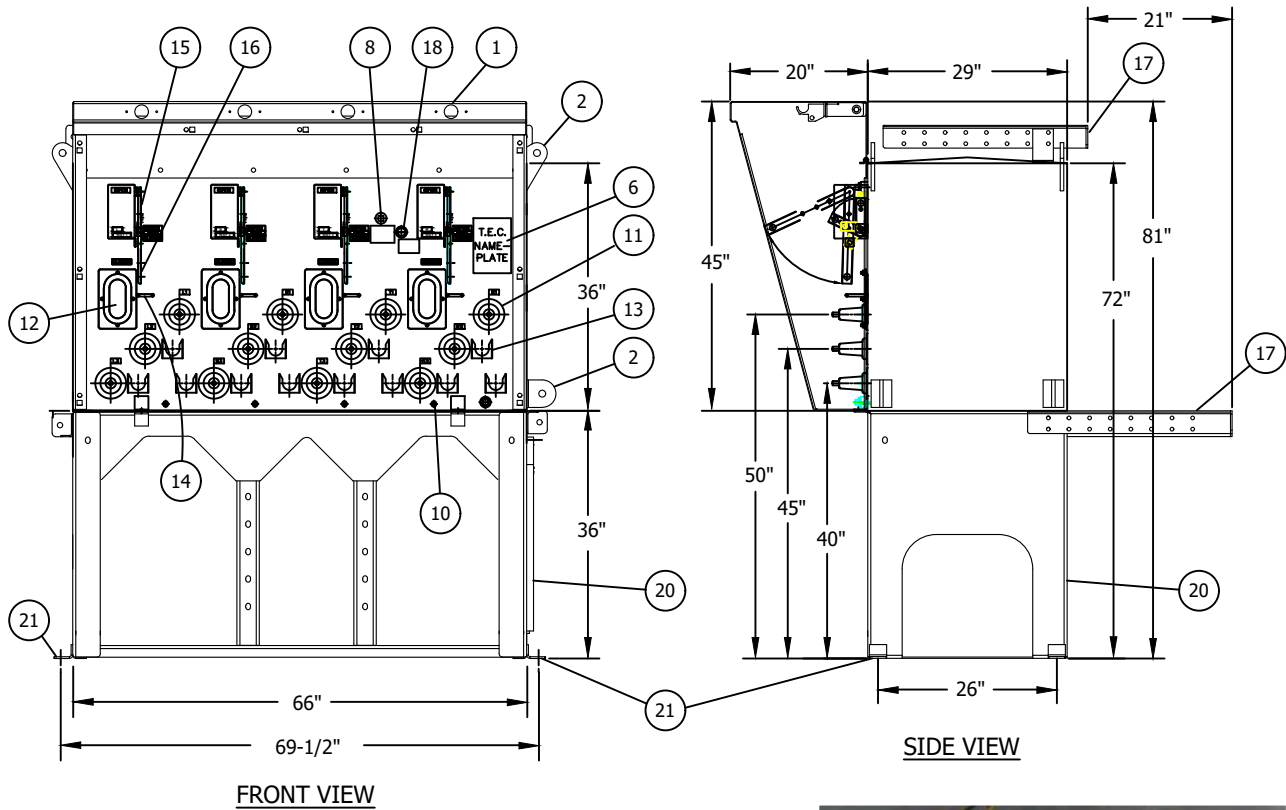
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD |                           |  |                    |  |          |  |                     |          |
|                 | TRAYER VAULT-MOUNTED SWITCH GEAR                 |                           |  |                    |  |          |  |                     |          |

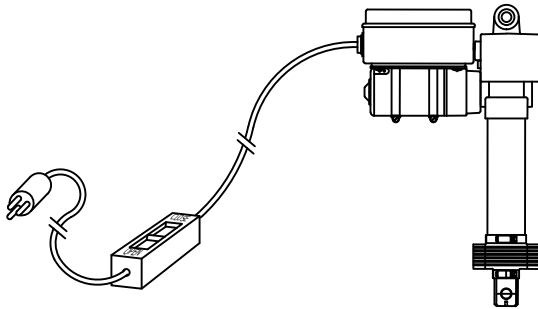


## 4-WAY MANUAL



SEE ITEM DESCRIPTIONS ON PAGE 3677.7

WEIGHT: 2845 LBS



### NOTE:

III. EACH 4-WAY MANUAL SWITCH COMES WITH A 120 VOLT PIN-IN MOVABLE LINEAR ACTUATOR. IT MAY BE PLUGGED IN AT THE VAULT OR GENERATOR.



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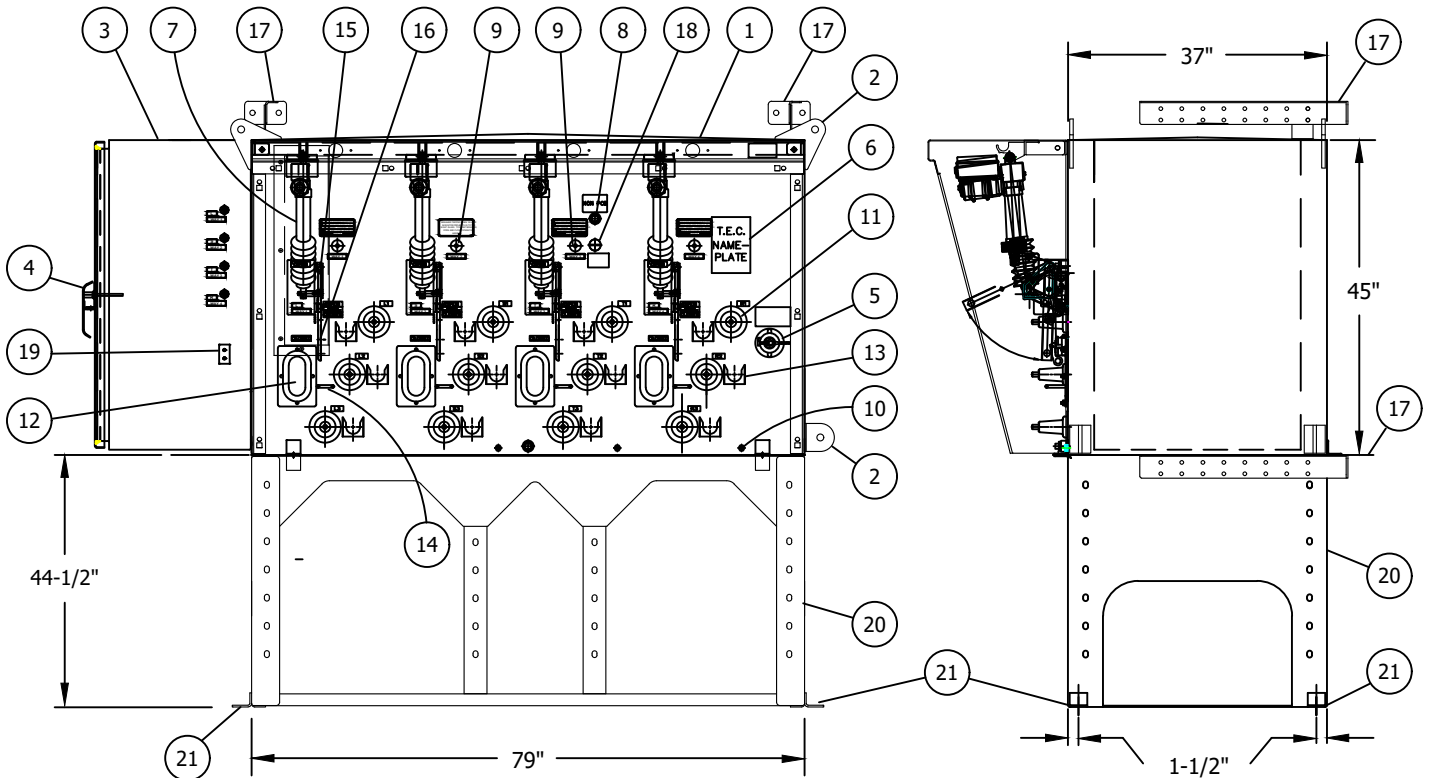
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

TRAYER VAULT-MOUNTED SWITCH GEAR

**UG3677.4**



## 4-WAY SCADA



FRONT VIEW

SIDE VIEW

SEE ITEM DESCRIPTIONS ON PAGE 3677.7

WEIGHT: 5320 LBS.

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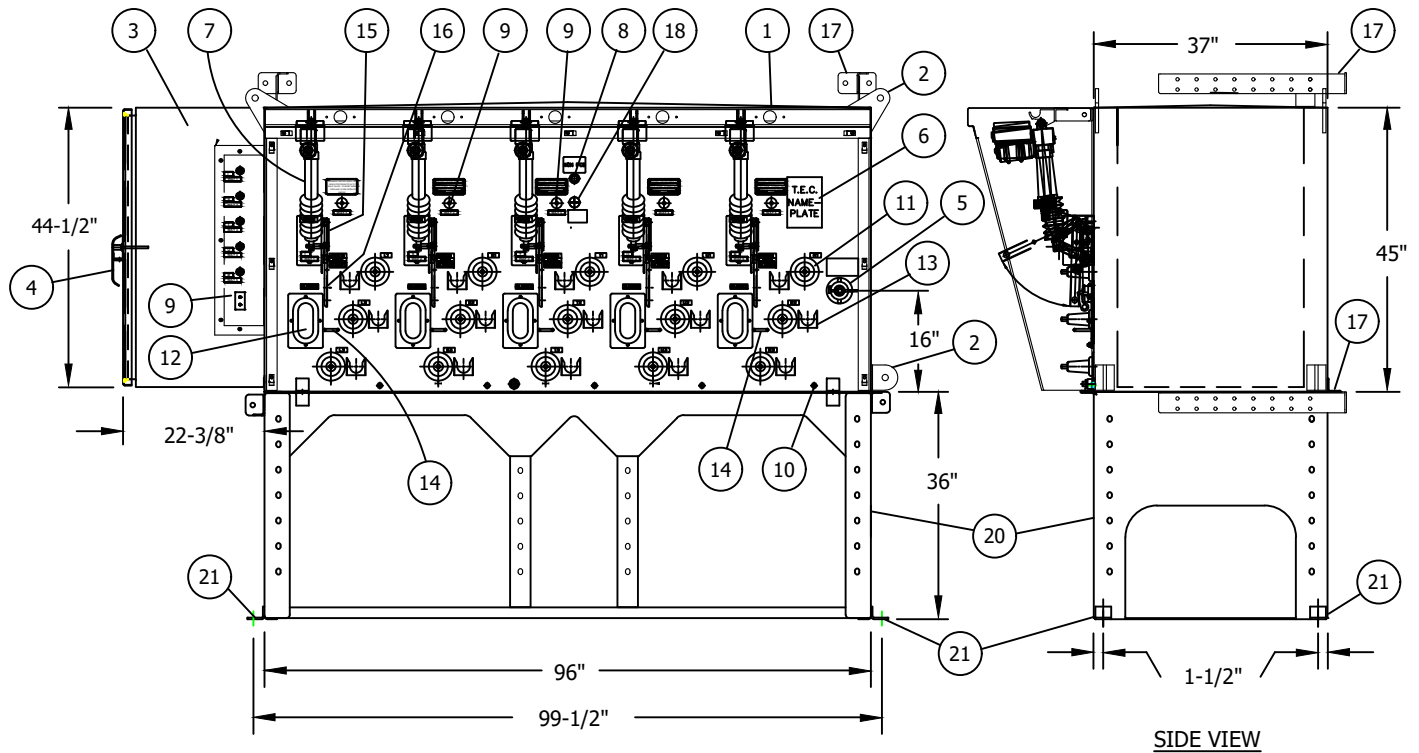
TRAYER VAULT-MOUNTED SWITCH GEAR

**UG3677.5**



WEIGHT: 6170 LBS.

## 5-WAY SCADA



SEE ITEM DESCRIPTIONS ON PAGE 3677.7



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

TRAYER VAULT-MOUNTED SWITCH GEAR

**UG3677.6**



**NOTES:**

IV. WHEN A TRAYER SCADA SWITCH IS FIRST ENERGIZED, THE SWITCH POSITIONS MUST BE MANUALLY OPERATED UNTIL THE KEARNY CREW INSTALLS ALL SCADA EQUIPMENT AND PROGRAMS THE SWITCH. THIS WILL REQUIRE THE CREW OPERATOR TO:

- 1) REMOVE THE YELLOW CONTROL CORD FROM THE LINEAR ACTUATOR
- 2) UN-PIN THE LINEAR ACTUATOR FROM THE VACUUM SWITCH HANDLE
- 3) DE-COUPLE THE LINEAR ACTUATOR FROM THE VACUUM SWITCH HANDLE
- 4) REVERSE THE DIRECTION OF THE LINEAR ACTUATOR BY UN-PINNING AND RE-PINNING AT IT'S HINGE POINT (REFER TO THE FOLLOW PICTURE).



## TRAYER SWITCH DETAILS

| ITEM | DESCRIPTION                                       |
|------|---|
| 1    | FAULT INDICATOR WINDOW                            |
| 2    | LIFTING EYE                                       |
| 3    | SCADA CABINET                                     |
| 4    | CABINET HANDLE, PAD LOCKABLE                      |
| 5    | POWER TRANSFORMER DRY WELL FUSE, 8.3 KV, 3 AMP CL |
| 6    | NAME PLATE  |
| 7    | 24 VOLT DC LINEAR ACTUATOR                        |
| 8    | OIL FILL PLUG                                     |
| 9    | FAULT TRIP INDICATOR                              |
| 10   | EQUIPMENT GROUND NUTS 1/2"                        |
| 11   | 600 AMP BUSHING/CONNECTOR                         |
| 12   | WINDOW VIEW TRI-PHASE VISIBLE DISCONNECT          |
| 13   | PARKING STAND                                     |
| 14   | PROVISION FOR ROPE OPERATION                      |
| 15   | TRI PHASE VISIBLE DISCONNECT OPERATOR HANDLE      |
| 16   | VACUUM SWITCH OPERATING HANDLE                    |
| 17   | WALL MOUNTING BRACKET                             |
| 18   | LIQUID LEVEL GAUGE, TRAYER 901A                   |
| 19   | ANTENNA CONNECTION, SCADA                         |
| 20   | SWITCH BASE                                       |
| 21   | FLOOR ATTACHMENTS                                 |

5) TRAYER VAULT MOUNT SCADA SWITCHES COME WITH A REMOTE WAY POSITION PLUG-IN HAND HELD OPERATOR, WHEN THE UNIT IS PLACED ON LOCAL CONTROL FOR VAULT OPERATIONS IF REQUESTED BY THE SWITCHING CENTER DSO. IT CAN BE FOUND IN THE LOW VOLTAGE CONTROL CABINET DOOR. CONTROL POWER MUST BE AVAILABLE FOR THIS TO WORK, OTHERWISE SWITCHING MUST BE DONE MANUALLY.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD |                           |      |          |                    |        |    |          |      |      |                     |  |          |
|                 |                   | TRAYER VAULT-MOUNTED SWITCH GEAR                 |                           |      |          |                    |        |    |          |      |      |                     |  |          |



**REFERENCE:**

- a. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- b. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- c. PAD-MOUNTED SWITCH IDENTIFICATION SEE STANDARD 3212.2.
- d. SEE STANDARD 4355 FOR FAULT INDICATOR INSTALLATION.
- e. SEE STANDARD 4510 FOR (STANDARD) AND (ALTERNATE TRENCH GROUND WIRE).
- f. SEE STANDARD 4520 FOR EQUIPMENT GROUNDING.
- g. SEE STANDARD 4525 FOR GROUNDING PREMOLDED CONNECTORS.
- h. SEE STANDARD 4520.8, .9 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- i. SEE STANDARD 4640.11 FOR SCADA INSTALLATION.

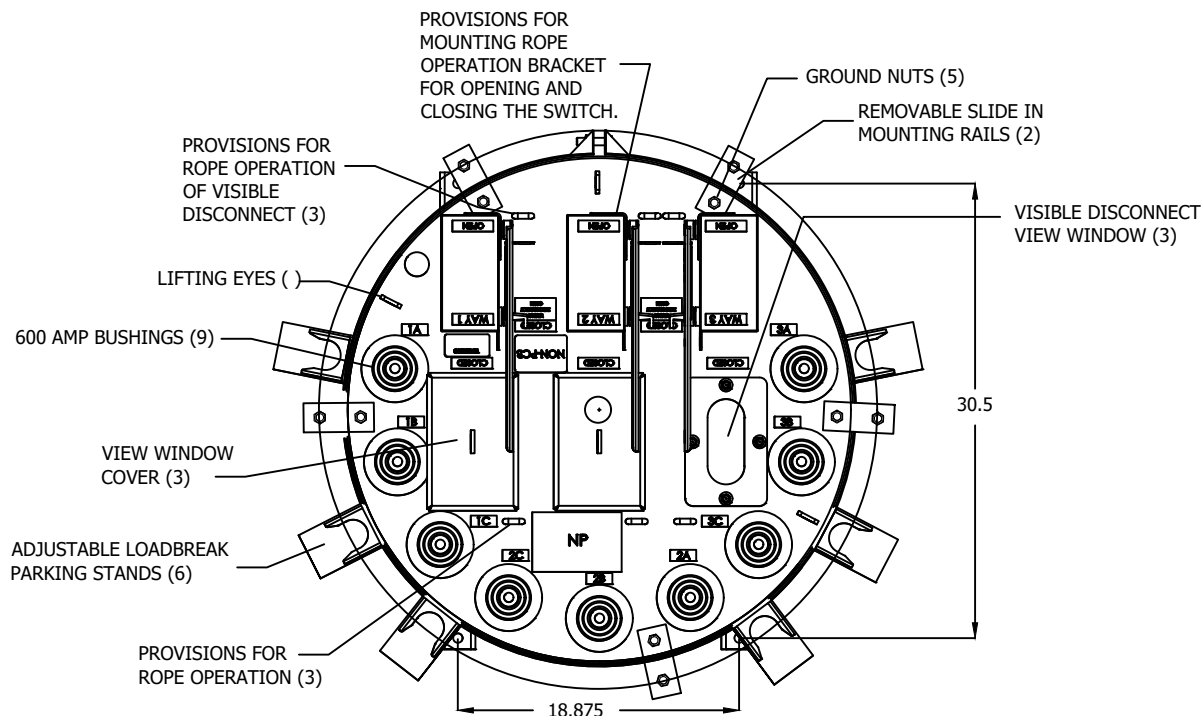
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|                 | TRAYER VAULT-MOUNTED SWITCH GEAR                 |                           |  |                    |  |          |  |                     |          |

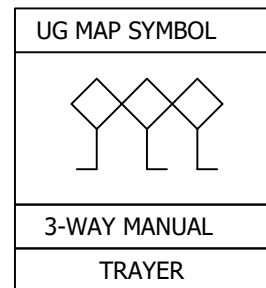
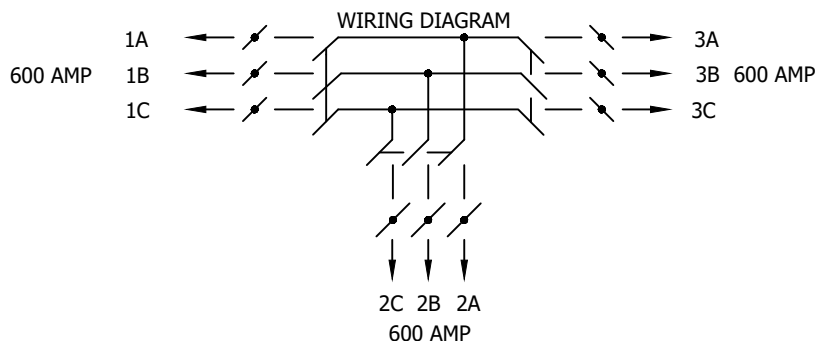


**NOTE:** SOME APPLICATIONS WILL REQUIRE A DEVIATION FOR INSTALLATION. THIS SWITCH MAY BE MOUNTED IN A VERTICAL POSITION. THIS SWITCH SHOULD FIT IN STRUCTURES IN THE FMO PAGES 3399 WITH THE 36" OR LARGER ROUND OPENINGS IN SOME LOCATIONS. IT MAY BE REQUIRED TO REMOVE THE TOP SECTION TO GET TO THE 36" OPENING.



|   |                                       |
|---|---------------------------------------|
| 600 AMP   | 20,000 ASY MAKE AND LATCH             |
| 3 WAY MANUAL OPERATION, WITH<br>VISIBLE OPEN ON EACH POSITION | WEIGHT: 1245 LBS                      |
| 14.4 KV VOLTAGE   | STAINLESS STEEL                       |
| 14,300 SYM AMPS MOMENTARY                                     | APPROX. LIQUID VOLUME: 112 GALLONS    |
|   | NON PCB MINERAL OIL LIQUID INSULATION |

| ITEM | DESCRIPTION         | QUANTITY | CONST STD OR<br>PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|---------------------|----------|--------------------------|--------------|----------------|
| SWI  | 3-WAY TRAYER MANUAL | 1        | 3678.1                   | S708570      | 3WAYTM         |



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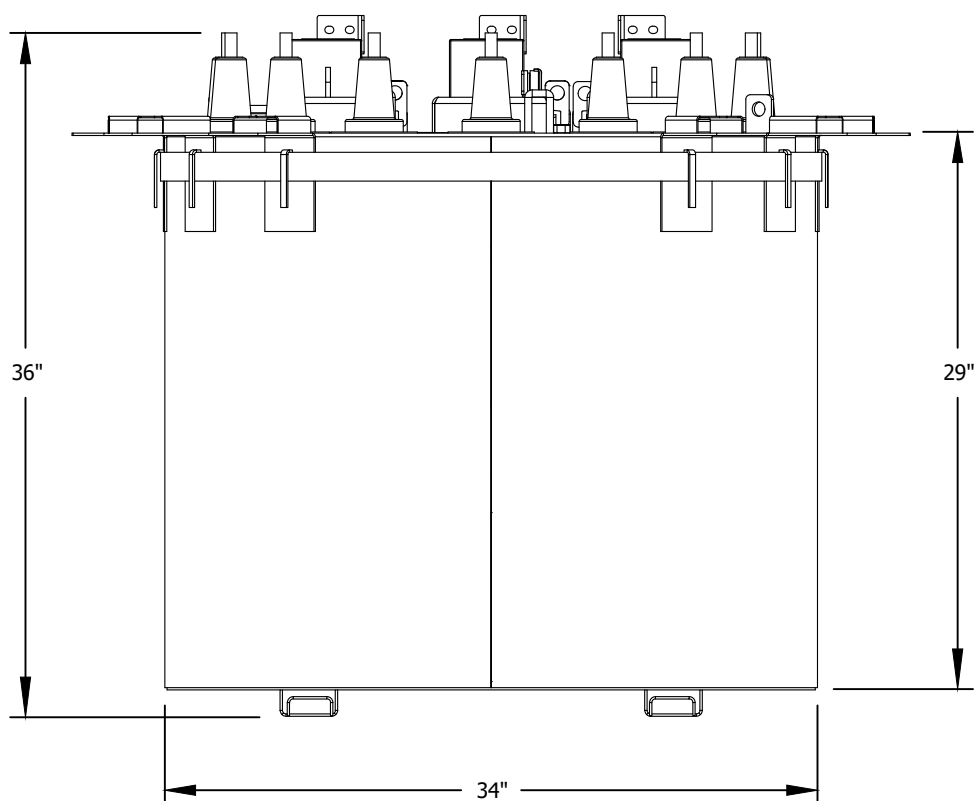
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD               |                           |                    |          |                     |          |
|                 | TRAYER 3-WAY SUBMERSIBLE LIQUID<br>INSULATED VACUUM SWITCHGEAR |                           |                    |          |                     |          |



## INSTALLATION:

- A. **FOR 36" OPENING:** REMOVE THE STAND OFF BUSHING BAND AND PUSH THE SUPPORTS IN FOR PREPARATION TO LOWER SWITCH INTO STRUCTURE.
- B. SWITCH **SHALL ONLY** BE LIFTED USING SPECIFIED MANUFACTURER'S LIFT POINTS.
- C. IT IS REQUIRED THAT THE UNIT BE BOLTED TO THE FLOOR OF THE STRUCTURE. IF USING THE MOUNTING BRACKET SWITCH MUST BE BOLTED TO THE BRACKET AND BRACKET BOLTED TO THE FLOOR.
- D. USE ONLY EQUIPMENT GROUND POINTS SPECIFIED IN THE STANDARD.
- E. THE SWITCH COMES WITH 6 200 AMP STAND OFF POSITIONS, LOOSEN THE NUT AND BOLT AND ADJUST THE STAND OFF BRACKETS AS NEEDED, RE-TIGHTEN THE BOLT AND NUT ON THE SUPPORT BAND.
- F. EACH VISUAL OPEN HAS A COVER TO KEEP THE VIEW PORT CLEAN, IT CAN ONLY BE REMOVED WHEN THE SWITCH IS IN THE OPEN POSITION.
- G. THE SWITCH HAS RIGGING POINTS FOR REMOTE OPERATION, THESE CAN ALSO BE APPLIED TO THE WALLS, FLOOR AND CEILING AS NEEDED. SEE STD. 3675.3 FOR RIGGING.
- H. BUSHING PLUGS MAY BE APPLIED ON THE BACK OF THE TEE'S FOR EACH WAY POSITION FOR TESTING AND GROUNDING AS NEEDED. CHECK WORK SPACE FOR LIVE LINE TOOL OPERATION.



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

TRAYER 3-WAY SUBMERSIBLE LIQUID  
INSULATED VACUUM SWITCHGEAR

UG3678.2



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                                 | QUANTITY | CONST STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|----------|-----------------------|--------------|----------------|
| 1    | STRUCTURE GROUND RING BUSS                  | AS REQ'D | 4540                  | S812816      | GOWIRE         |
| 2    | CABLE RACKS UG DEVICES                      | AS REQ'D | 4178.4                |              |                |
| 3    | ADJUSTABLE STAND OFF PARKING                | 6        |                       |              |                |
| 4    | GROUND POINT CONNECTION                     |          | 4540/4505             |              |                |
| 5    | MOUNTING RAILS, PULL OUT BOLT DOWN TO FLOOR | 4        | 4178                  | S107654      | CNCANC         |
| 6    | VISIBLE DISCONNECT VIEW WINDOW              |          |                       |              |                |
| 7    | SWITCH HANDLE                               |          |                       |              |                |
| 8    | GROUND HARDWIRE                             | AS REQ'D | 4505                  |              |                |
| 9    | 4/0 SOFT DRAWN COPPER                       | AS REQ'D |                       | S812764      | 4/0-SD         |
| 10   | MOUNTING BRACKET GROUND                     |          |                       |              |                |
| 11   | LIQUID LEVEL INDICATOR                      |          |                       |              |                |
| 12   | LIFT POINT BRACKETS                         | 3        |                       |              |                |
| 13   | PROVISIONS FOR ROPE OPERATIONS              | 6        |                       |              |                |
| 14   | 3316 HANDHOLE TRAFFIC                       | 1        | 3316.3                | S400312      | 3316TC         |
| 15   | 3317 HANDHOLE PARKWAY                       | 1        | 3317.2                | S334430      | 3317SE         |
| 16   | BUSHING EXTENSION                           | 3        | 4181.31               | S336704      | BUSH-X         |
| 17   | ELBOW TAP PLUG                              | 6        | 4181.31               | S547328      | BTP650         |
| 18   | CABLE ADAPTER                               | 6        | 4181.31               | AS REQ'D     |                |
| 19   | CONNECTOR LUG                               | 6        | 4181.31               | AS REQ'D     |                |
| 20   | ELBOW TEE                                   | 6        | 4181.31               | S326578      | BLBO-T         |
| 21   | BRONZE EYE BOLT                             | 6        | 4505                  | S471232      | TL1/0          |
| 22   | SPLIT BOLT STUD GROUND                      | 6        | 4505                  | S262560      | USPCON         |
| 23   | PAD LOCK SCHLAGE                            | 3        |                       | S514848      | 4WTFTS         |
| 24   | FAULT INDICATOR                             | AS REQ'D | 4352.5                |              |                |

**REFERENCE:**

- SEE STANDARD 3212 FOR SWITCH IDENTIFICATION.
- SEE STANDARD 3649 FOR EQUIPMENT COMBINATION GUIDELINES FOR SWITCHES IN MANHOLES.
- SEE STANDARD 4002.2 FOR WIRE INFORMATION.
- SEE STANDARD 4108 FOR SEALING JACKETED CABLE.
- SEE STANDARD 4181.19 FOR SWITCH CONNECTIONS.
- SEE STANDARD PAGE 4512.1 FOR (PREFERRED II ) EQUIPMENT GROUNDING INSTALLATION.
- SEE STANDARD 4520.8 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- SEE DESIGN STANDARD 6111 FOR SWITCH APPLICATION.

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SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD

TRAYER 3-WAY SUBMERSIBLE LIQUID  
INSULATED VACUUM SWITCHGEAR

**UG3678.3**



- A. REQUIRES DEVIATION FOR THIS INSTALLATION.
- B. THIS INSTALLATION HAS OPERATION LIMITATIONS AND MUST BE DE-ENERGIZED TO WORK ON.
- C. NO OTHER CABLE OR EQUIPMENT MAY BE INSTALLED IN THIS STRUCTURE.
- D. WHEN BOX IS SET SUMP SHOULD BE OPEN NOT COVERED BY SWITCH.
- E. CONDUITS SHOULD USE TOP KNOCK OUTS FOR BETTER CABLE TRAINING.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD            |                           |  |                    |  |          |  |                     |          |
|                 | TRAYER 3-WAY SUBMERSIBLE LIQUID INSULATED VACUUM SWITCHGEAR |                           |  |                    |  |          |  |                     |          |



THIS PAGE COVERS THE TRAYER 3 WAY IN A MAN HOLE.

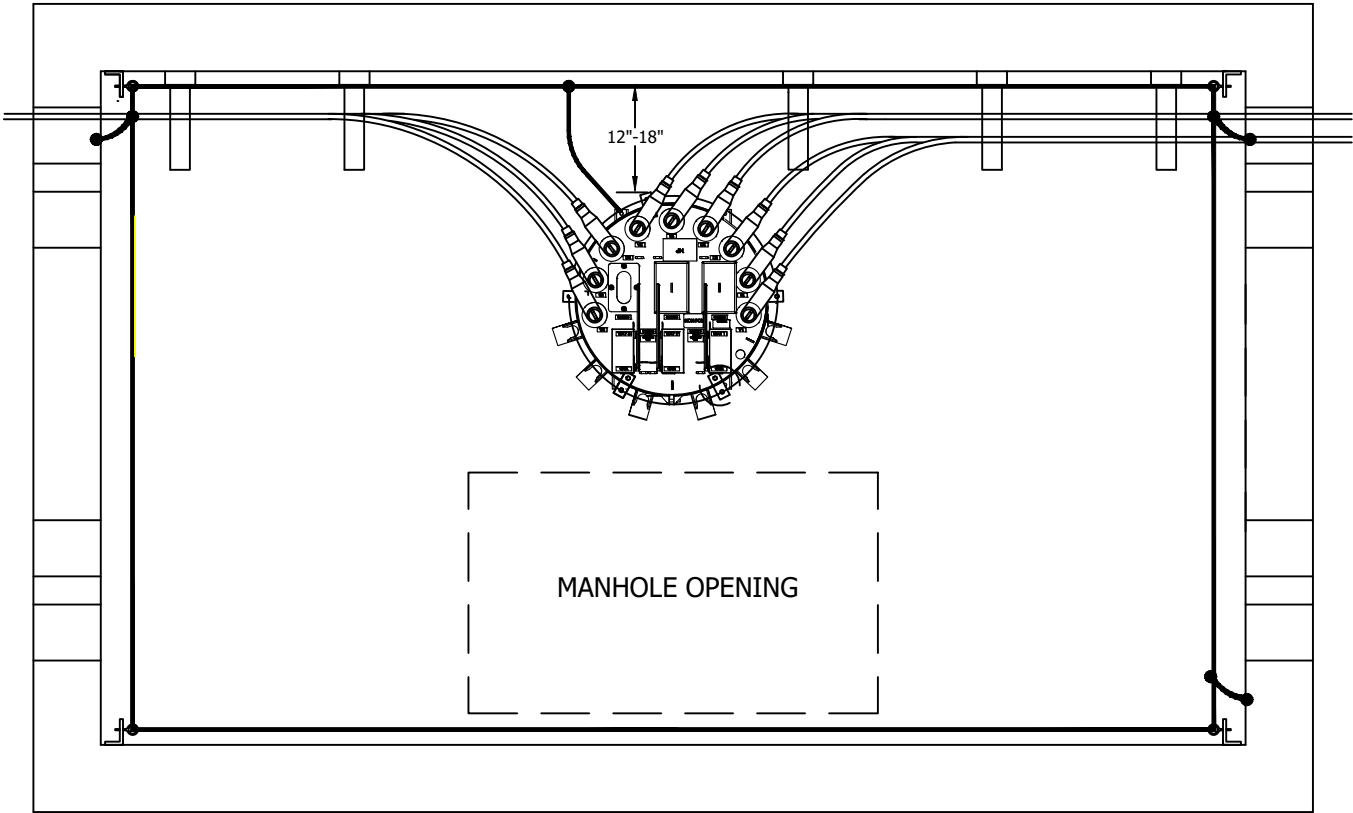
THE BUSHINGS SHOULD ALWAYS FACE THE WALL FOR CLEAR CABLE TRAINING AND SWITCH OPERATIONS.

THE SWITCH SHALL BE LOCATED 12" TO 18" INCHES OFF THE WALL TO ALLOW OTHER CABLE RUN CLEARANCES BEHIND THE SWITCH.

THE SWITCH SHALL BE BOLTED TO THE FLOOR USING THE EXTENSION BRACKETS ON THE BOTTOM.

SWITCH WAY POSITION 2 BUSHINGS SHALL HAVE THE 12 INCH TEE EXTENSIONS APPLIED TO PROVIDE CABLE SEPARATION AND CLEAR ACCESS TO THE TEE'S FOR GROUNDING OPERATIONS IF REQUIRED. THE TEE EXTENSION ALLOWS THE WAY POSITION 2 CABLES TO BE RACKED AT A HIGH LEVEL.

USE THE UNDERGROUND DEVICES FIBER CABLE STEPS AND HOOKS TO SECURE THE CABLE.



TOP VIEW FACING DOWN

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SDG&E ELECTRIC UNDERGROUND CONSTRCUTION STANDARD

TRAYER 3-WAY SUBMERSIBLE LIQUID  
INSULATED VACUUM SWITCHGEAR

**UG3678.5**



UG 3679.1







**NOTES:**

- I. WHEN MOVING TRAYER SWITCH FROM STAND, ENSURE TO HAVE BLOCKS/SUPPORTS UNDER THE FRONT END OF THE SWITCH TO PREVENT TANK FROM BEING FLUSH WITH THE GROUND. WITHOUT BLOCKS/SUPPORTS, DAMAGE WILL OCCUR TO THE DISCONNECT SWITCH HANDLES.
- II. PLACE SWITCH ON OPPOSITE SIDE OF MANHOLE OPENING.
- III. THE OPERATION SELECTOR PREVENTS INADVERTENT OPERATION FROM THE CLOSED POSITION TO THE OPEN POSITION AND OPEN TO GROUND POSITION.
- IV. SWITCH IS DESIGNED TO BE OPERATED REMOTELY FOR SINGLE SWITCH OPERATIONS. THIS SWITCH IS NOT TO BE OPERATED MULTIPLE TIMES IN SHORT DURATIONS WHICH COULD RESULT IN DAMAGE TO THE GEARING.
- V. THE TRAYER IS A MANUALLY OPERATED SWITCH AND NOT SCADA ADAPTABLE.
- VI. PERFORM REMOTE SWITCHING OPERATIONS USING THE TRAYER MANUAL SWITCH BAG AND BLOCKS KIT. THIS TOOL IS AVAILABLE AT EACH ELECTRIC DISTRIBUTION DISTRICT.
- VII. FOR NEW CONSTRUCTION AND CONVERSIONS, THIS TRAYER SWITCH SHOULD NOT BE USED TO TAP FEEDER CABLES. TAPS ON THE BACK OF 600 AMP TEES IMPEDE GROUNDING AND LIMIT USE OF SWITCH POSITIONS DURING ROUTINE SWITCHING PROCEDURES AND OUTAGE SITUATIONS. TAP FEEDER SEGMENTS BETWEEN SWITCH POSITIONS USING 600 AMP TERMINATORS OR TAP THE SWITCH POSITION WITH DISTRIBUTION CABLE ONLY.

## REFERENCES:

- a. SEE UNDERGROUND STANDARD 3212 SWITCH IDENTIFICATION
- b. SEE UNDERGROUND STANDARD 4530.1 NEUTRAL AND GROUNDING WIRE DIAGRAM
- c. SEE UNDERGROUND STANDARD 4181.14, 4181.15, 4181.16, 4181.17 CONNECTOR ASSEMBLIES
- d. SEE UNDERGROUND STANDARD 3649.29, 3649.30 EQUIPMENT COMBINATION GUIDELINES
- e. SEE ELECTRIC STANDARD PRACTICE 221: REMOTE SWITCHING PROCEDURES

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                    |          |                     |           |      |      |      |
|                 |                   | TRAYER 4-WAY GROUNDED VACUUM SWITCH              |                           |      |                    |          |                     |           |      |      |      |



**NOTE:** THIS IS AN INITIAL CONSTRUCTION STANDARD RELEASE. AS SWITCHES ARE INSTALLED, MORE DETAILS WILL BE UPDATED FOR EACH TYPE OF SWITCH BELOW. PLEASE COORDINATE WITH EDE FOR INQUIRIES.

| INNOVATIVE SWITCHGEAR ELECTRICAL RATINGS              |   |        |
|---|---|--------|
|   | SCADA   | MANUAL |
| VOLTAGE   | 15.5KV/4KV  | 25KV   |
| CURRENT, CONTINUOUS                                   | 600 AMP/200 AMP   |        |
| B.I.L.  | 95KV  |        |
| MAXIMUM INTERRUPTING CURRENT VACUUM FAULT INTERRUPTER | 12.5KA (SYMMETRICAL)<br>20KA (ASYMMETRICAL) AT 32.5 KA PEAK CURRENT |        |
| MOMENTARY MAKE AND LATCH                              | 12.5KA (SYMMETRICAL)<br>20KA (ASYMMETRICAL) AT 32.5 KA PEAK CURRENT |        |
| B.I.L. ACROSS OPEN VACUUM FAULT INTERRUPTER           | 125KV   |        |

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IF VIEWING AS AN ELECTRONIC PDF **CLICK HERE** TO JUMP TO "REFERENCES".

**IF VIEWING AS AN ELECTRONIC PDF [CLICK HERE](#) TO JUMP TO "BILL OF MATERIALS".**

**IF VIEWING AS AN ELECTRONIC PDF [CLICK HERE](#) TO JUMP TO "INSTALLATIONS".**

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|                  |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |                           |     |     |                    |     |          |    |                     |     |     |          |  |
|                  |                   | INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT |                           |     |     |                    |     |          |    |                     |     |     |          |  |



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------|--------------|----------------|
| 1    | TWO-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA                  | 1        | 3680          | S704752      | IS2S6M         |
|      | THREE-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA                |          |               | S704754      | IS3S6M         |
|      | THREE-WAY SUBMERSIBLE STAND                                |          |               | S677220      | IS3SDM         |
|      | FOUR-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA                 |          |               | S704756      | IS4S6M         |
|      | FOUR-WAY SUBMERSIBLE 600A SCADA 12KV W/ PEDESTAL           |          |               | S704816      | IS4S6S         |
|      | FOUR-WAY SUBMERSIBLE STAND (MANUAL & SCADA)                |          |               | S677222      | IS4SDM         |
|      | FOUR-WAY VAULT MOUNT 600A MANUAL/NON-SCADA                 |          |               | S704758      | IS4V6M         |
|      | FOUR-WAY VAULT MOUNT 600A SCADA 12KV                       |          |               | S709302      | IS4V6S         |
|      | FIVE-WAY VAULT MOUNT 600A SCADA 12KV                       |          |               | S704760      | IS5V6S         |
|      | SIX-WAY VAULT MOUNT 600A SCADA 12KV                        |          |               | S704762      | IS6V6S         |
|      | SCHNEIDER P116 5A RELAY (WALL-MOUNT) (SEE NOTE IN SECTION) |          |               | S588400      | SCR5S          |
| 2    | MANHOLES   | AS REQ.  | 3324-3326     | -            | -              |
|      | DRY VAULTS   | AS REQ.  | -             | -            | -              |
|      | HANDHOLES  | AS REQ.  | 3314-3317     | -            | -              |
| 4    | 12KV, 600/200 AMP CONNECTIONS                              | AS REQ.  | 4181.19       | -            | -              |
| 5    | ELBOW, FUSED, 2 SOLID, 30 AMP (FUSE INCLUDED)              | AS REQ.  | 4191          | S321680      | CFE2SL         |
| 6    | 1/0 CONNECTOR POST   | 5        | -             | S262560      | -              |
| 7    | WIRE, 4/0 COPPER   | AS REQ.  | 4520.8        | S812764      | 4/0-SD         |
| 8    | WIRE, #2 COPPER GROUND TRENCH                              | 1        | 4510          | S812816      | TG-E-W         |
| 9    | BOLT, EYE, STAINLESS STEEL                                 | AS REQ.  | -             | S150528      | -              |
| 10   | CONNECTOR, SERVICE POST                                    | AS REQ.  | 3711.3        | S262560      | SPCONN         |
| 11   | NUT, CLAMPING CHANNEL                                      | AS REQ.  |               | S503520      | -              |
| 12   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"                 | AS REQ.  |               | S616192      | -              |
| 13   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"                  | AS REQ.  |               | S799488      | -              |
| 14   | WASHER, SPRING, LOCK                                       | AS REQ.  |               | S796416      | -              |
| 15   | BOLT, 3-1/2" X 1/2" STAINLESS STEEL, TIE DOWN              | 4        | -             | S148804      | -              |
| 16   | BRACKET, ANGLE, STAINLESS STEEL 2" X 3"                    | AS REQ.  | 4520.8        | S166072      | -              |

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

UG3680.2



**BILL OF MATERIALS (CON'T):**

| ITEM | DESCRIPTION                                    | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------|--------------|----------------|
| 17   | ANCHOR, 1/2" X 3-3/4" MOUNTING ON CONCRETE PAD | AS REQ.  | -             | S107654      | -              |
| 18   | SEALING COMPOUND                               | AS REQ.  | 3948          | S442976      | -              |
| 19   | PADLOCK  | AS REQ.  | -             | S514848      | -              |
| 20   | SWITCH POSITION TAGGING                        | -        | 3212          | -            | -              |
| 21   | CABLE IDENTIFICATION                           | AS REQ.  | 3202          | -            | -              |
| 22   | CABLE, #2 AWG, SOLID 1/C"                      | AS REQ.  | 4003.1        | S197600      | -              |

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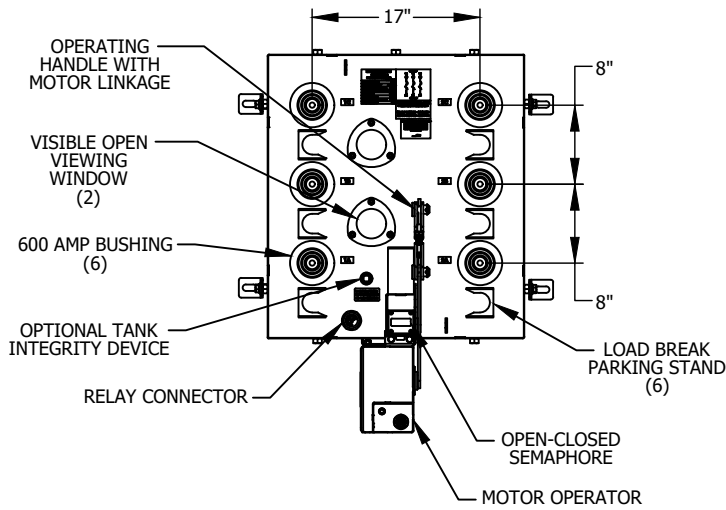
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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

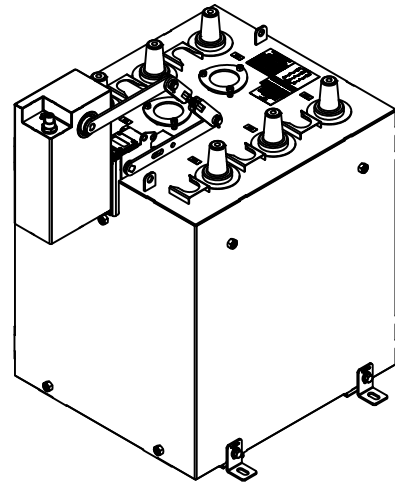
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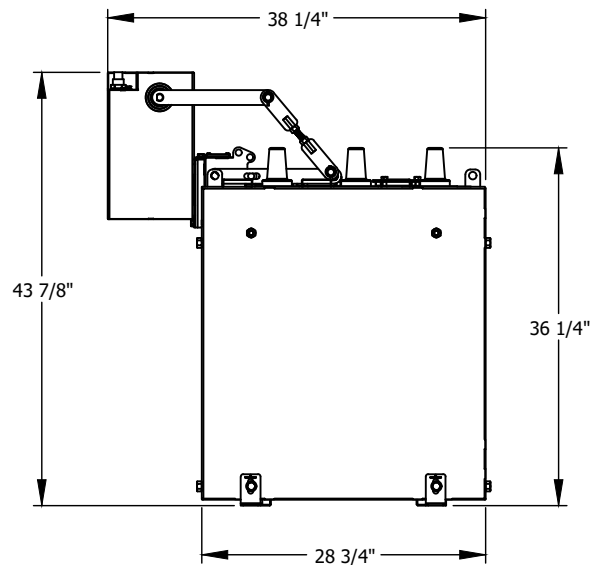
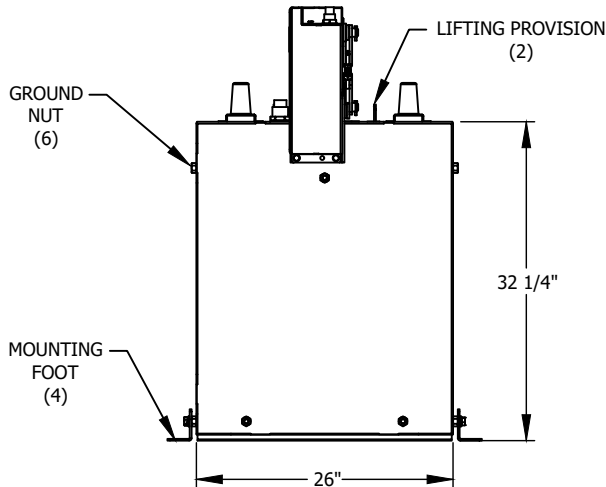
## TWO-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA



**TOP VIEW**



**ANGLE VIEW**



**SIDE VIEWS**

### NOTES:

1. PACKAGE INCLUDES: (1) S201066-008 SWITCH TANK, (1) CT SHORTING PLUG, (1) MOTOR OPERATOR WITH HANDLE LINKAGE, (1) JUNCTION CONTROL BOX, (1) PENDANT CONTROL, (2) 50FT CABLES

### APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 420 LBS

MOTOR OPERATOR: 35 LBS EACH

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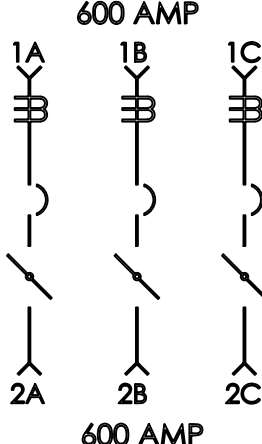
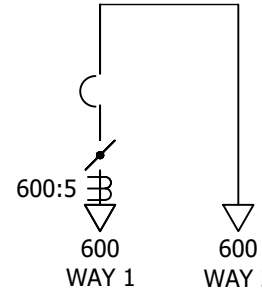

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

UG3680.4



**TWO-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA**

|  |          |   |                |
|--|----------|---|----------------|
| <b>INNOVATIVE SWITCHGEAR</b><br><b>SOLUTIONS INC.™</b><br><b>FAULT INTERRUPTER/SWITCH</b><br><small>PATENT PENDING</small> |          |   |                |
| MAXIMUM VOLTAGE  | 25 KV    |   |                |
| CONTINUOUS CURRENT   | 600 AMPS |   |                |
| INTERRUPTING CURRENT (SYM.)  | 12.5 KA  |   |                |
| INTERRUPTING CURRENT (ASYM.)   | 20.0 KA  |   |                |
| PEAK CURRENT   | 32.5 KA  |   |                |
| FAULT CLOSE (SYM.)   | 12.5 KA  |   |                |
| IMPULSE WITHSTAND VOLTAGE  | 125 BIL  |   |                |
| POWER FREQUENCY  | 60 HZ    |   |                |
|  |          | CAT# S201066-008  | WEIGHT 420 LBS |
|  |          | CURRENT TRANSFORMER RATIOS  |                |
|  |          | 200 AMP BUSHINGS = 200:5 RATIO  |                |
|  |          | 600 AMP BUSHINGS = 600:5 RATIO  |                |
|    |          | <b>INNOVATIVE SWITCHGEAR SOLUTIONS, INC</b><br><br>ISGYYXXXX<br>____/20YY |                |

**TWO-WAY SUBMERSIBLE 600A MANUAL  
CONNECTION DIAGRAM**

**NOTES:**

1. PACKAGE INCLUDES: (1) S201066-008 SWITCH TANK, (1) CT SHORTING PLUG, (1) MOTOR OPERATOR WITH HANDLE LINKAGE, (1) JUNCTION CONTROL BOX, (1) PENDANT CONTROL, (2) 50FT CABLES

**APPROXIMATE SYSTEM WEIGHTS**

SWITCH TANK: 420 LBS

MOTOR OPERATOR: 35 LBS EACH

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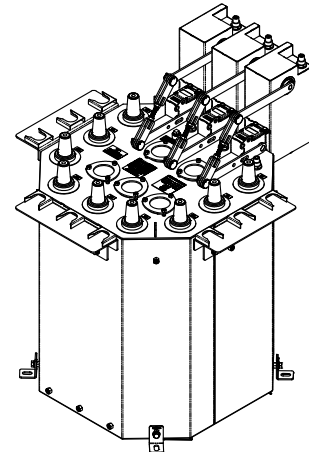
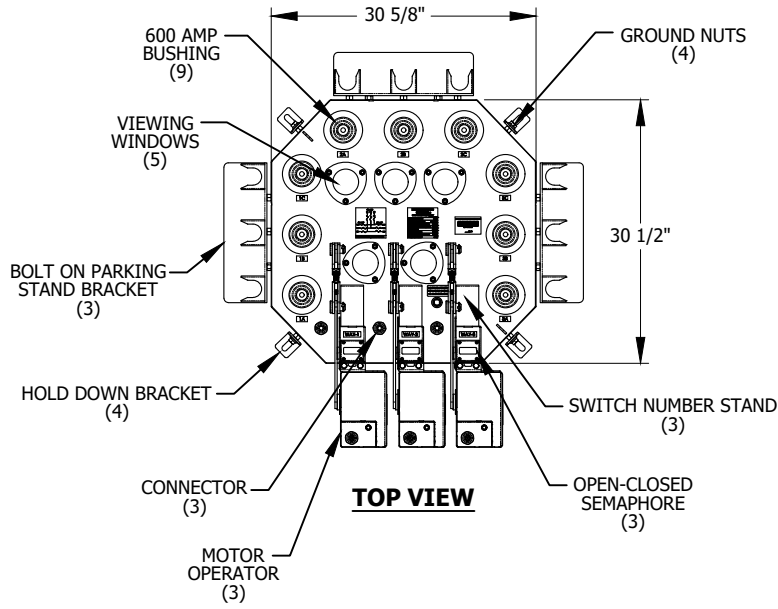
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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

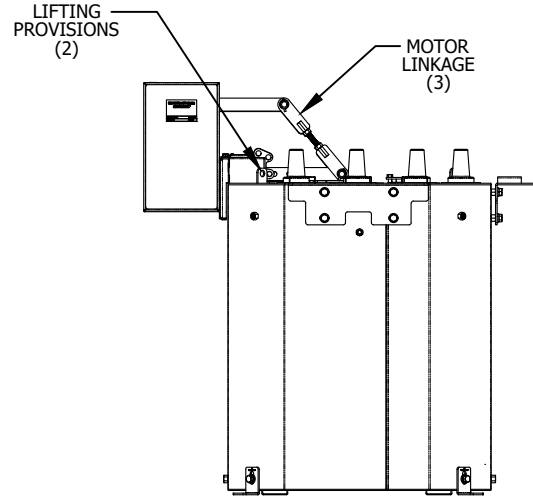
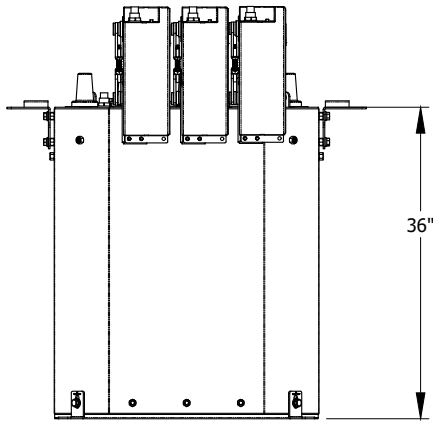
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# THREE-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA



ANGLE VIEW



SIDE VIEWS

## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 620 LBS

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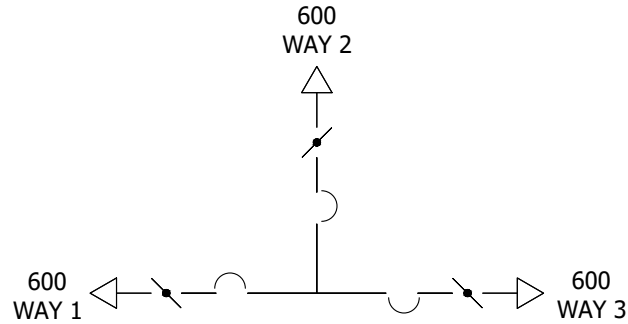
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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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**THREE-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA****THREE-WAY SUBMERSIBLE 600A MANUAL  
CONNECTION DIAGRAM**

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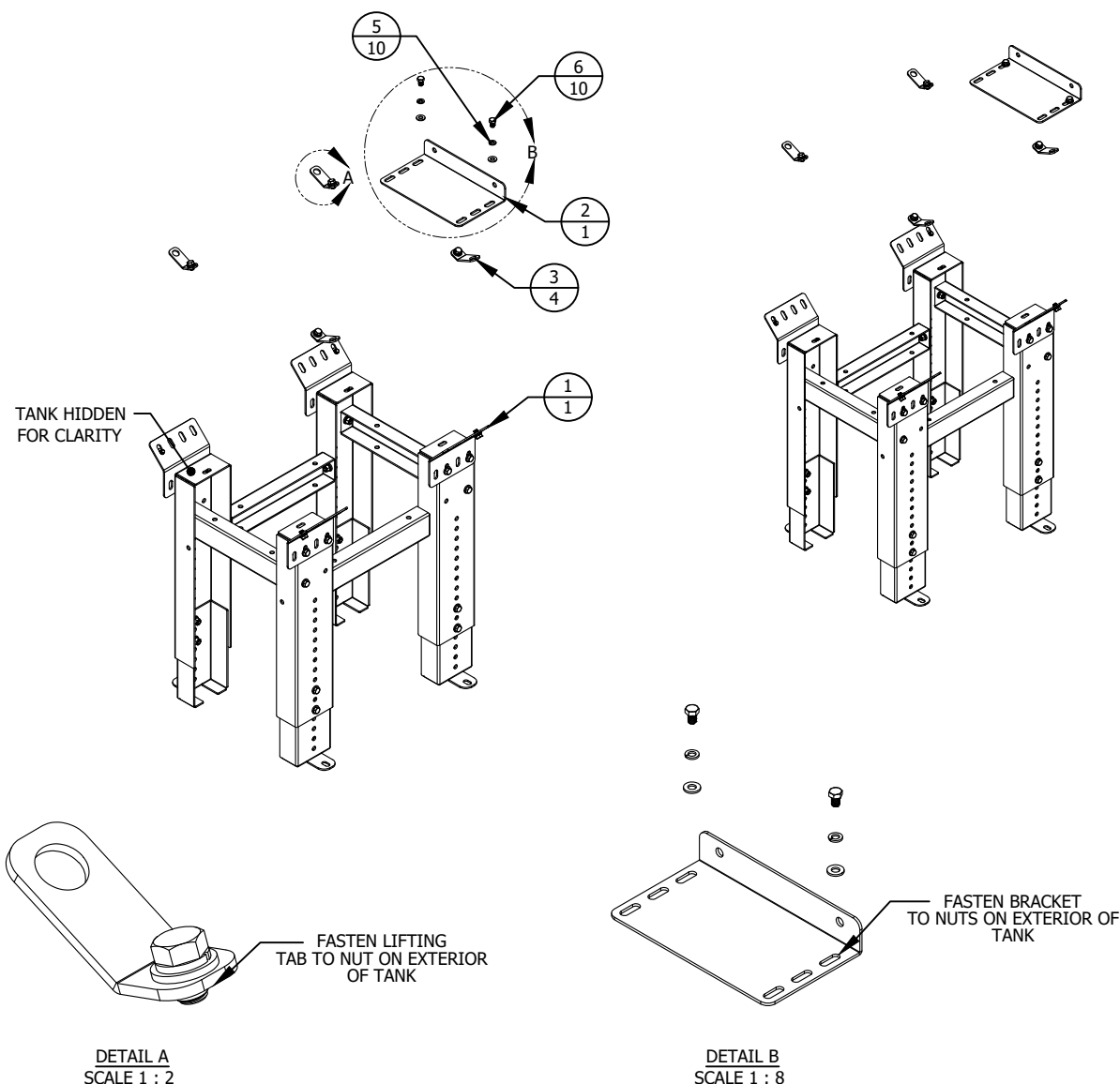
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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

UG3680.7



# THREE-WAY SUBMERSIBLE STAND



## BILL OF MATERIALS:

| ITEM | DESCRIPTION  | QUANTITY | STOCK NUMBER |
|------|--|----------|--------------|
| 1    | STAND SET, QUAD CHANNEL, ADJUSTABLE, SIDE MOUNT, OCTAGONAL 3 WAY                 | 1        | SS-10003     |
| 2    | BRACKET, 3WAY NO VO, TO WALL   | 1        | SMP-10693    |
| 3    | LIFTING EYE, BOLT ON 1/2" NUT  | 4        | SMP-10263    |
| 4    | WASHER,FLAT,18-8, 1/2" SAE, MMC# 96659A110                                       | 10       | PP-10218     |
| 5    | WASHER, LOCK, 18-8 SS, 1/2" SIZE, .87"OD, .12" MIN THICK, MMC#92146A033 OR EQUIV | 10       | PP-10097     |
| 6    | SCREW, HC, 1/2"-13, 3/4"L, SILICON BRONZE, ALLIED BOLT#14136                     | 10       | PP-10402     |

## STAND WEIGHTS:

|               |               |
|---------------|---------------|
| $\frac{1}{1}$ | BASE 160 LBS  |
| $\frac{2}{1}$ | BRACKET 10LBS |

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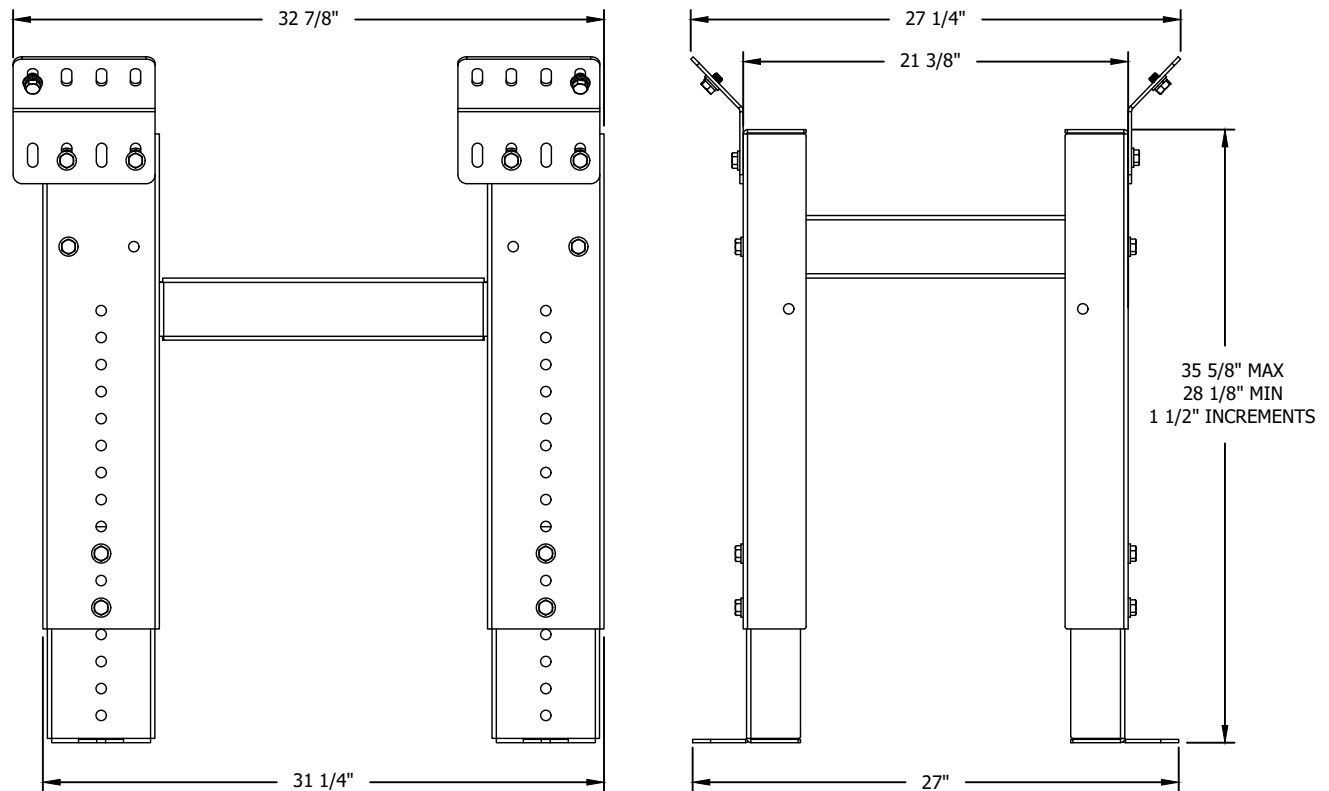
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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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# **THREE-WAY SUBMERSIBLE STAND**



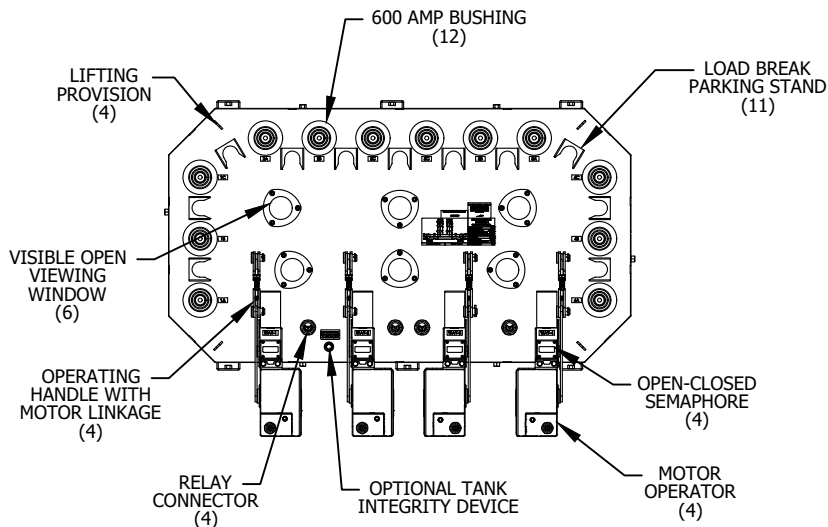
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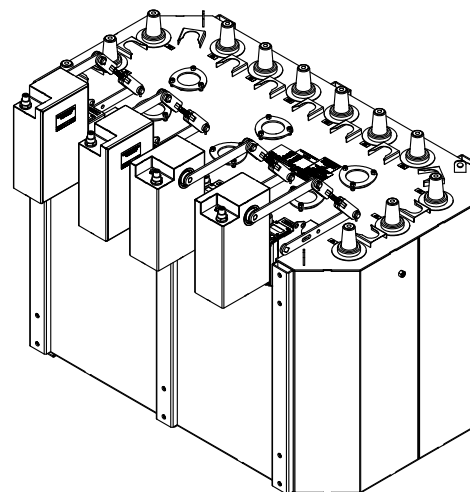
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|                  | INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT       |   |   |  |          |



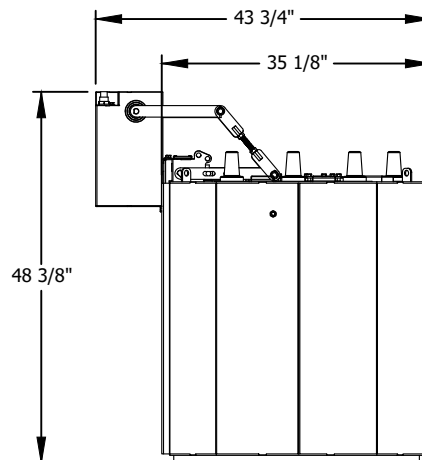
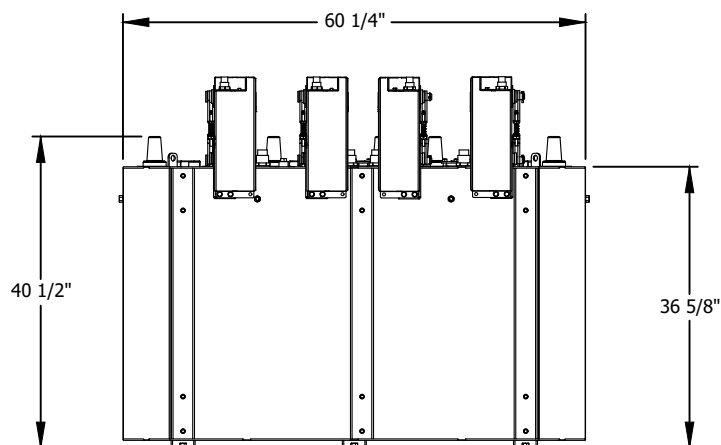
# FOUR-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA



TOP VIEW



ANGLE VIEW



SIDE VIEWS

## NOTES:

1. PACKAGE INCLUDES: (1) S40406666-008 SWITCHGEAR, (4) MOTOR OPERATORS, (1) PENDANT CONTROL, (1) JUNCTION BOX, (4) CT SHORTING PLUGS

## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 1200 LBS

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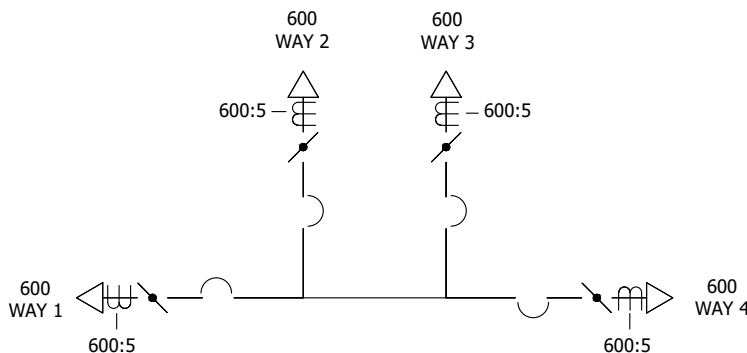
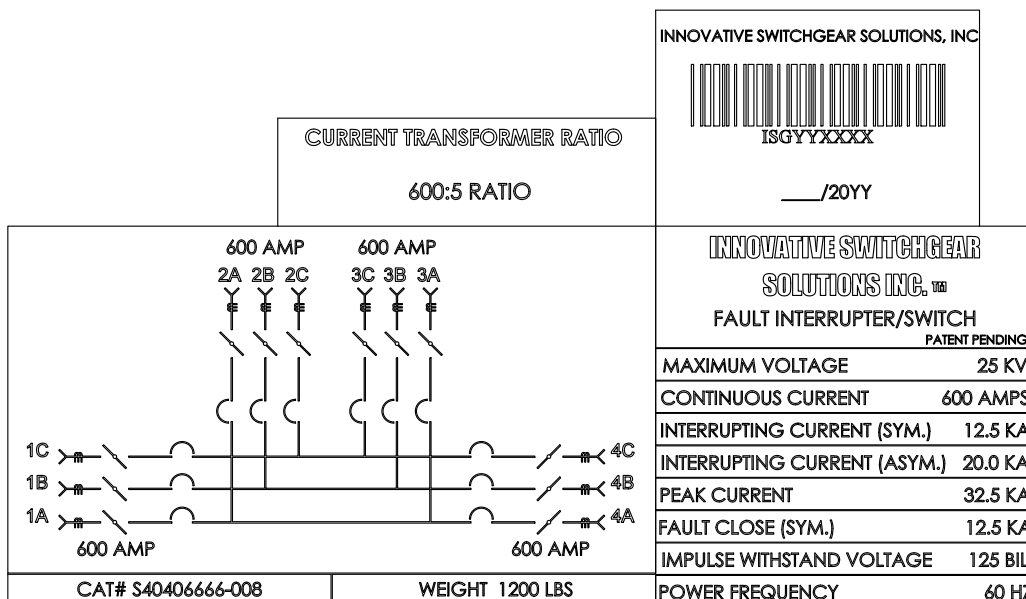
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

UG3680.10



# FOUR-WAY SUBMERSIBLE 600A MANUAL/NON-SCADA



**FOUR-WAY SUBMERSIBLE 600A MANUAL  
CONNECTION DIAGRAM**

**NOTES:**

- PACKAGE INCLUDES: (1) S40406666-008 SWITCHGEAR,  
(4) MOTOR OPERATORS, (1) PENDANT CONTROL, (1) JUNCTION BOX,  
(4) CT SHORTING PLUGS

**APPROXIMATE SYSTEM WEIGHTS**

SWITCH TANK: 1200 LBS

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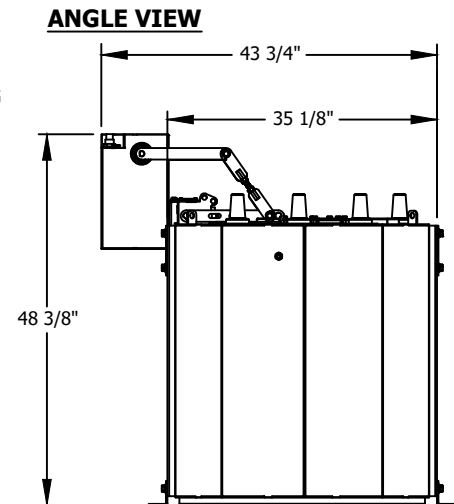
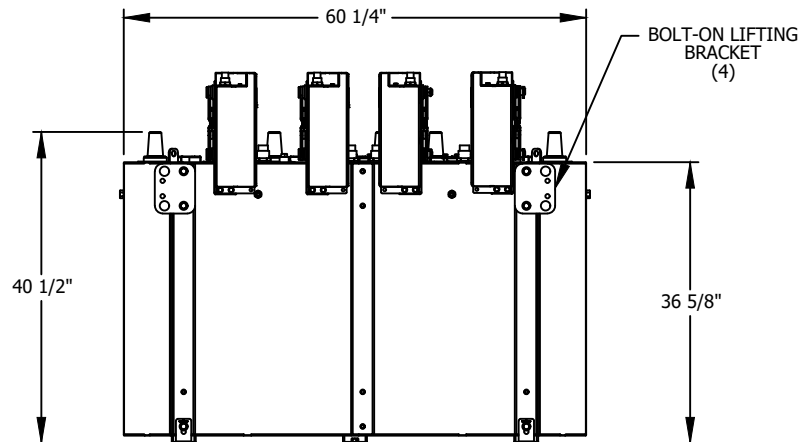
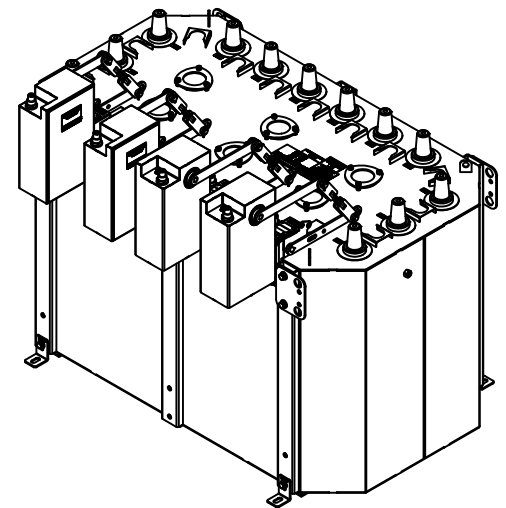
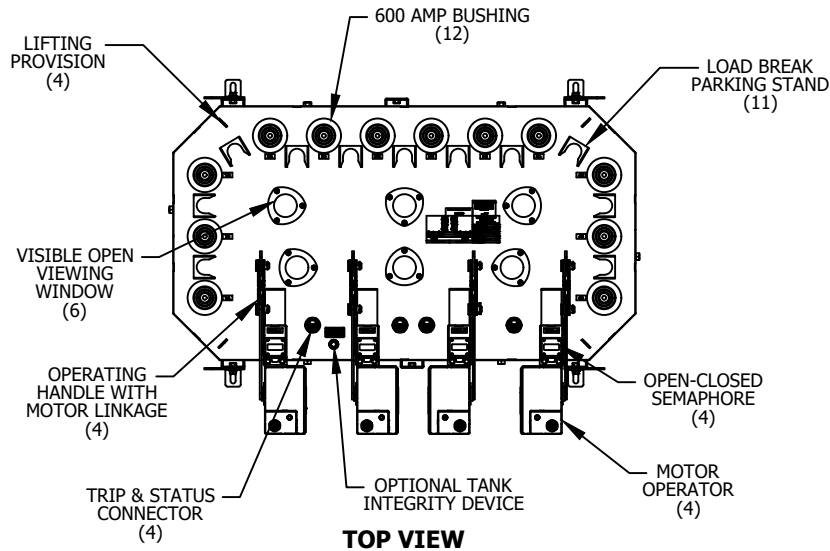
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

UG3680.11



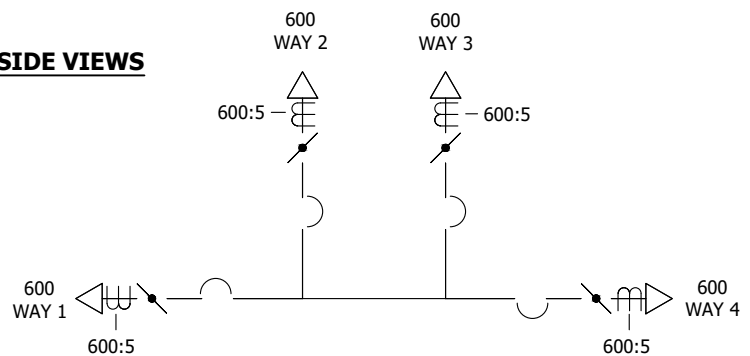
# FOUR-WAY SUBMERSIBLE 600A SCADA 12KV W/ PEDESTAL



## SIDE VIEWS

### APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 1200 LBS  
 MOTOR OPERATORS: 35 LBS EACH  
 LIFTING BRACKETS: 2 LBS EACH  
 POTENTIAL TRANSFORMERS WITH CRADLE: 145 LBS EACH  
 CONTROL CABINET WITH PEDESTAL: 585 LBS



### FOUR-WAY SUBMERSIBLE 600A SCADA CONNECTION DIAGRAM

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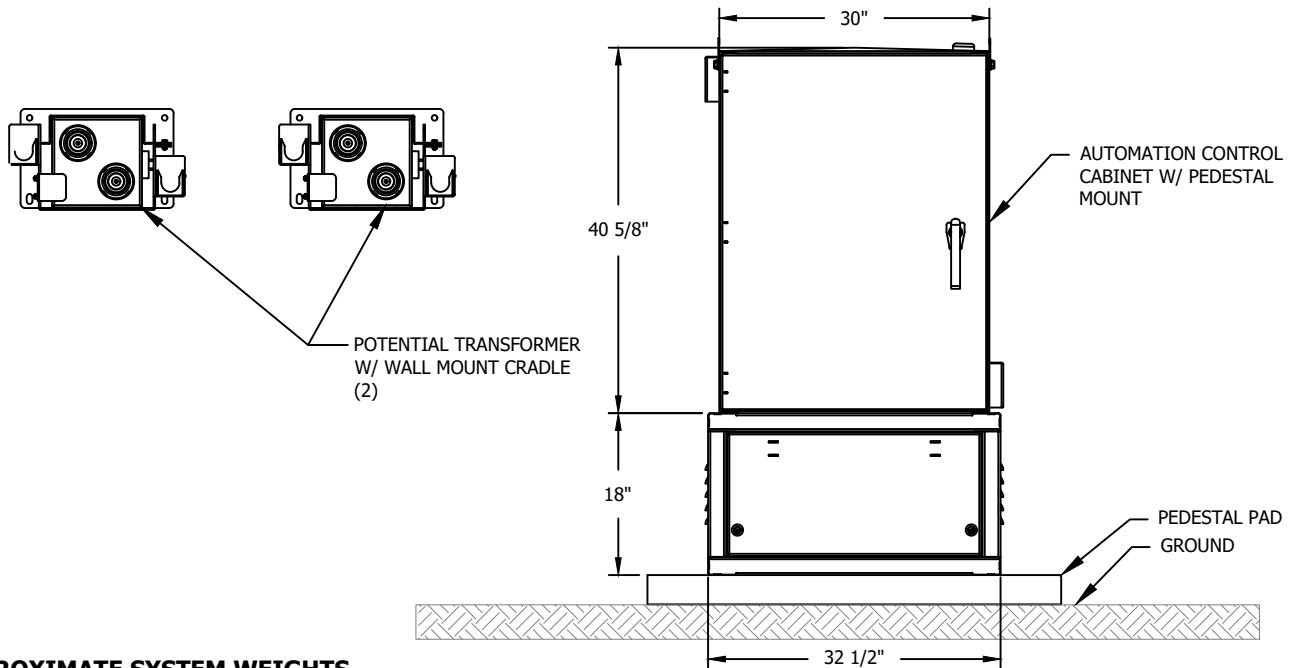
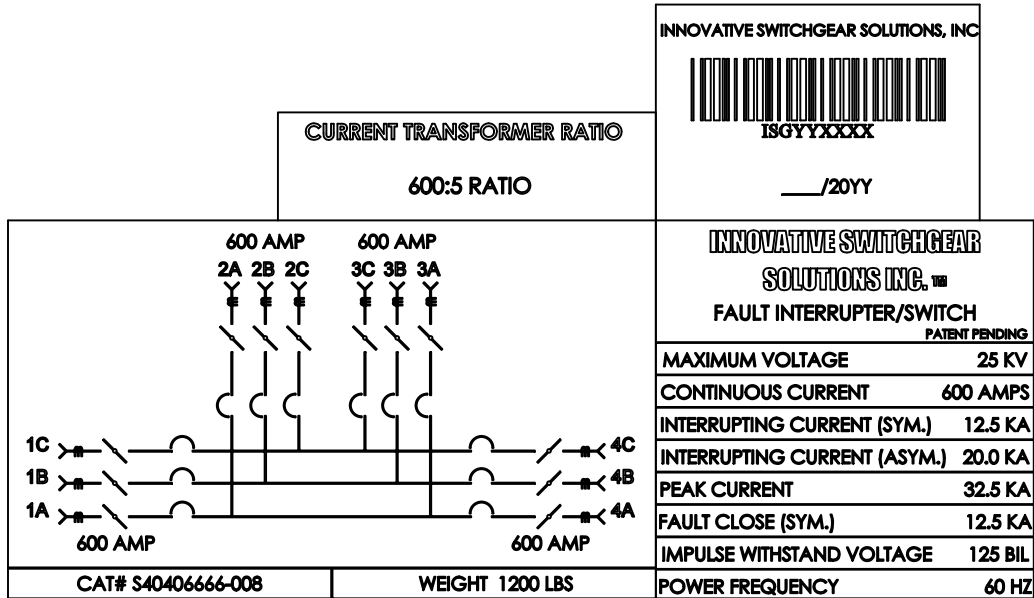
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
 SUBMERSIBLE AND VAULT MOUNT

UG3680.12



# FOUR-WAY SUBMERSIBLE 600A SCADA 12KV W/ PEDESTAL



## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 420 LBS

MOTOR OPERATOR: 35 LBS EACH

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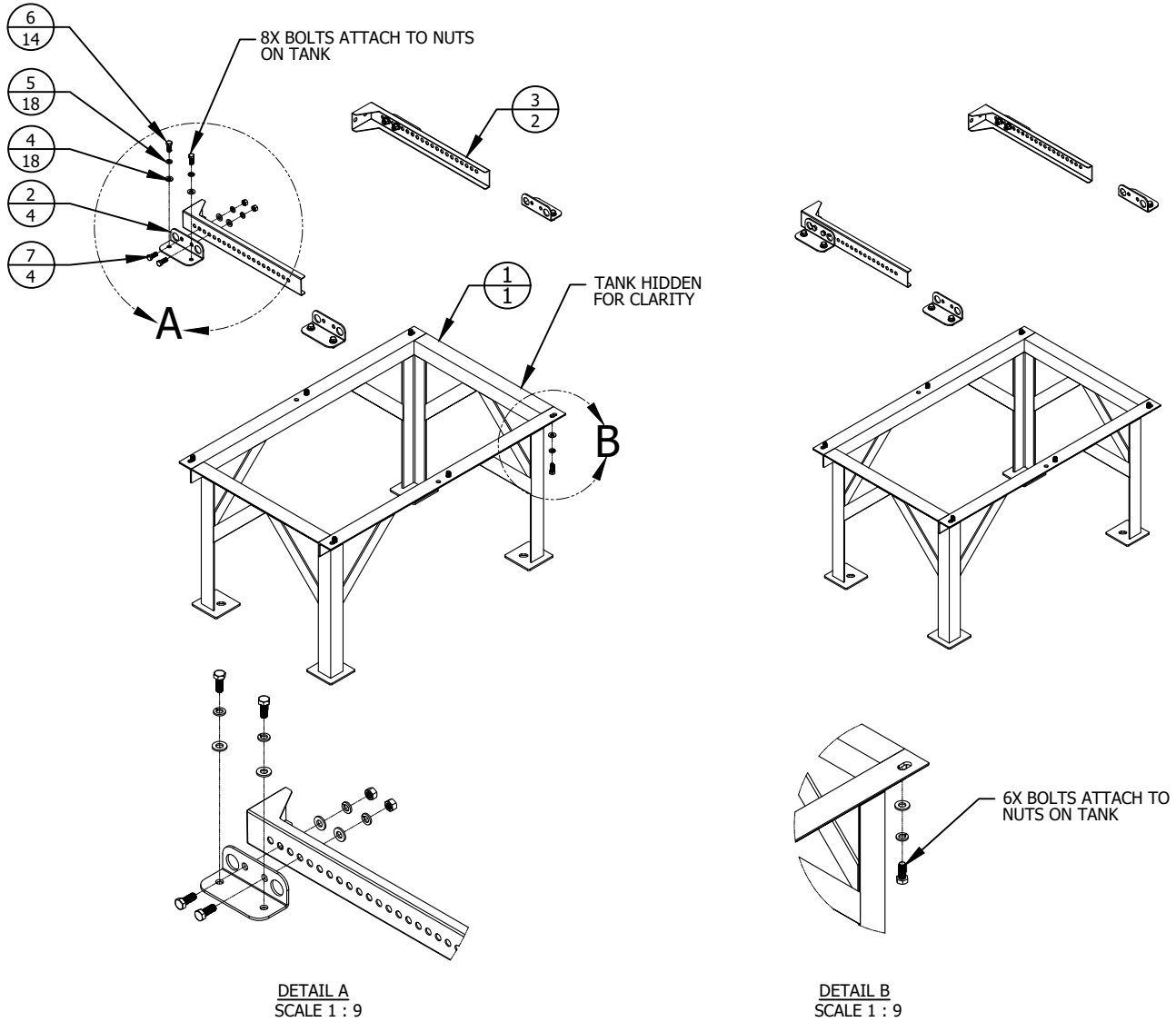
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

UG3680.13



## FOUR-WAY SUBMERSIBLE STAND (MANUAL & SCADA)



### BILL OF MATERIALS:

| ITEM | DESCRIPTION   | QUANTITY | STOCK NUMBER |
|------|---|----------|--------------|
| 1    | ASSY, STAND, 4-WAY, SUB, 304 S/S, FOR S40406666-0_                                | 1        | SMA-20188    |
| 2    | BRACKET, LIFTING, WALL MOUNT  | 4        | SMP-10887    |
| 3    | BRACKET, WALL ATTACHMENT  | 2        | SMP-10888    |
| 4    | WASHER, FLAT, 18-8, 1/2" SAE, MMC# 96659A110                                      | 18       | PP-10218     |
| 5    | WASHER, LOCK, 18-8 SS, 1/2" SIZE, .87" OD, .12" MIN THICK, MMC#92146A033 OR EQUIV | 18       | PP-10097     |
| 6    | SCREW, HEX CAP, 1/2-13, 1-1/4"L, SILICON BRONZE                                   | 14       | PP-10400     |
| 7    | SCREW, HC 18-8, 1/2-13 X 1 1/4" MMC#92240A714                                     | 4        | PP-10215     |
| 8    | NUT, 1/2-13, SILICON BRONZE, FASTENAL #74967                                      | 4        | PP-10366     |

### STAND WEIGHTS:

|               |                            |
|---------------|----------------------------|
| $\frac{1}{1}$ | BASE 105 LBS               |
| $\frac{3}{2}$ | WALL BRACKET 5 LBS EACH    |
| $\frac{2}{4}$ | LIFTING BRACKET 2 LBS EACH |

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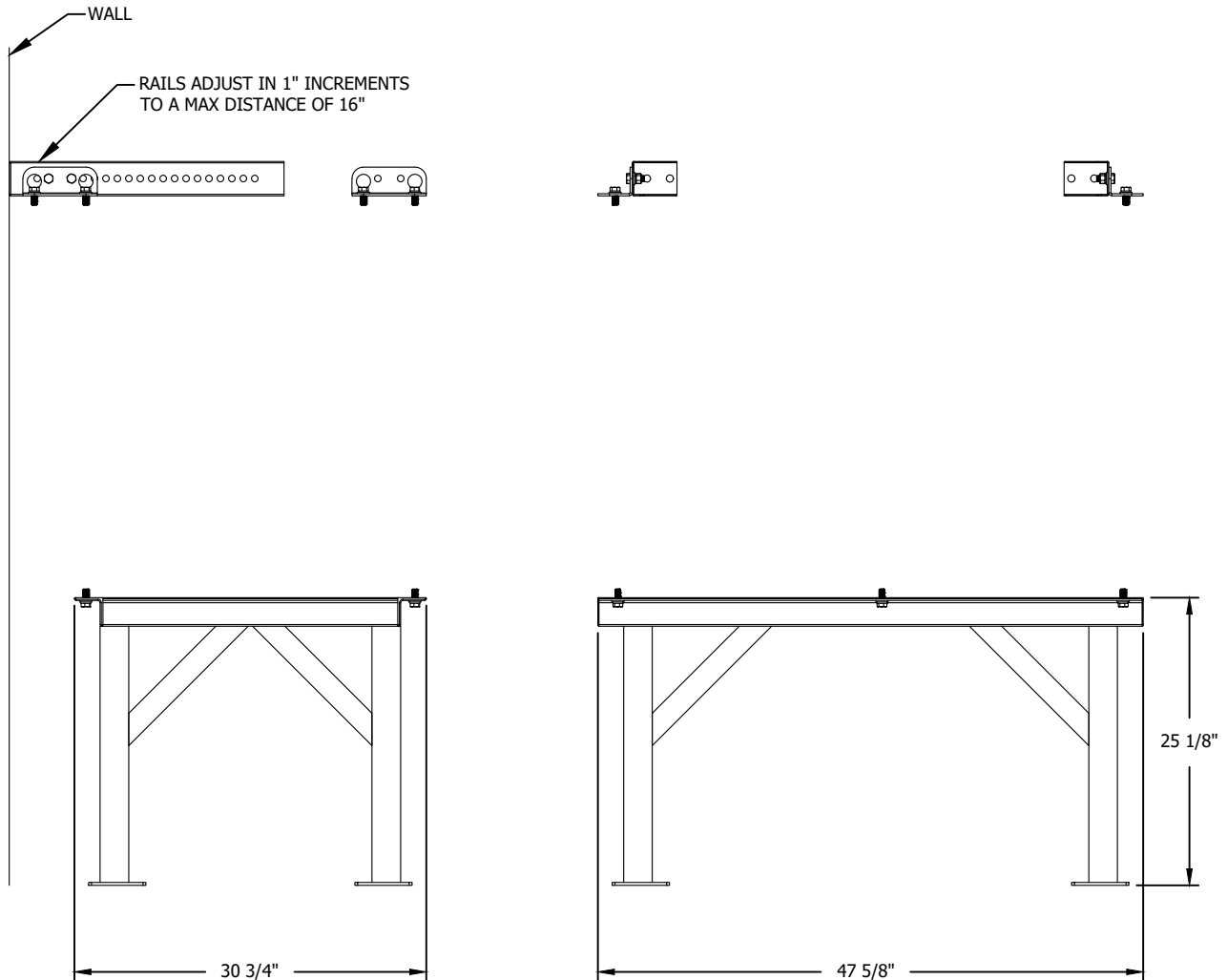
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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# **FOUR-WAY SUBMERSIBLE STAND (MANUAL & SCADA)**



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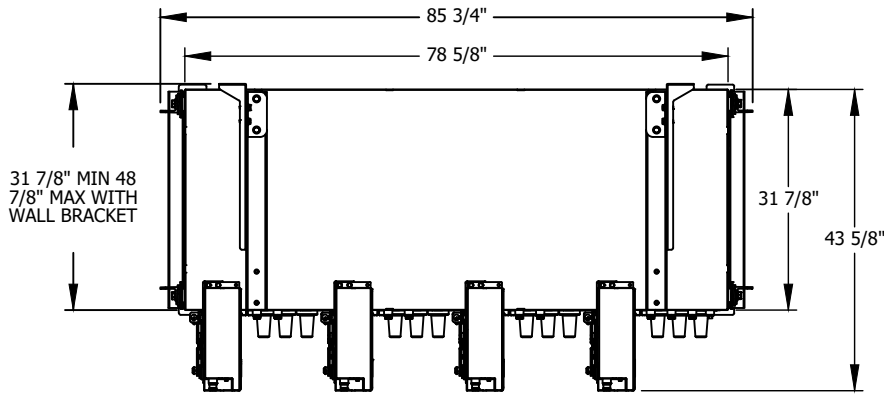
**SHEET  
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS             |   |                                   |  |
| INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT          |   |                                   |  |

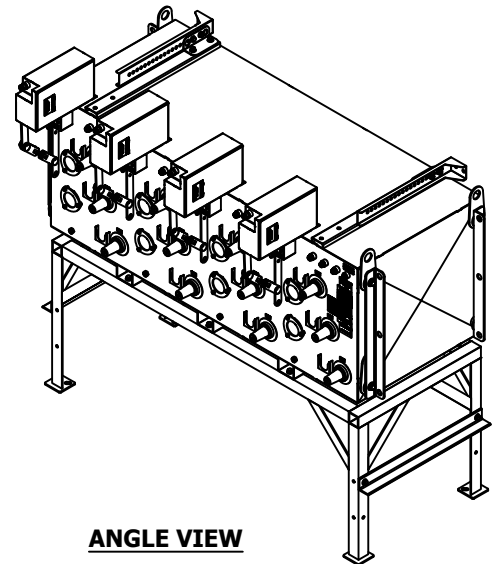
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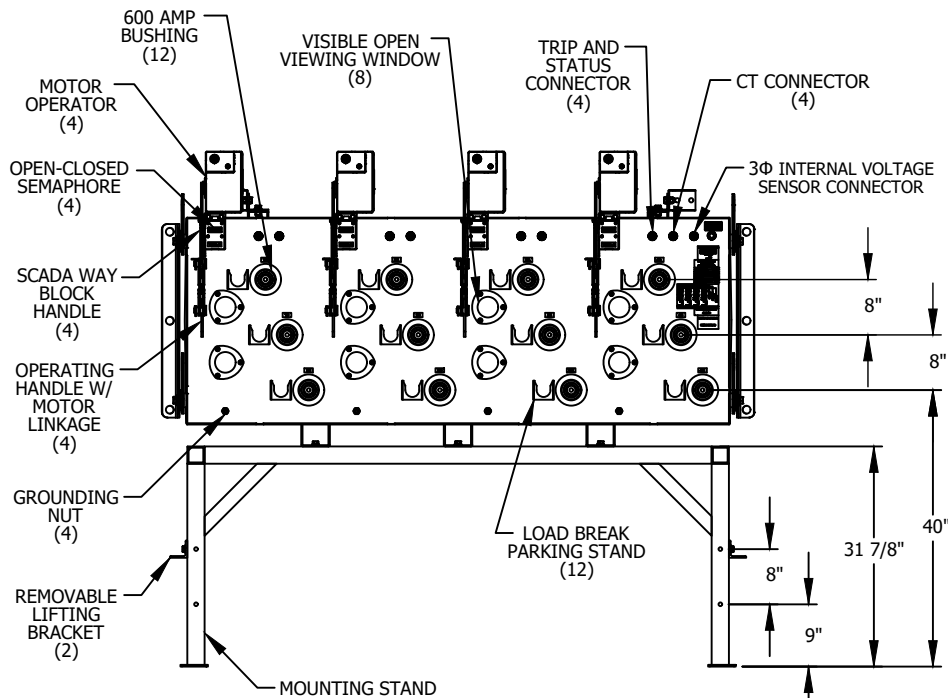
# FOUR-WAY VAULT MOUNT 600A MANUAL/NON-SCADA



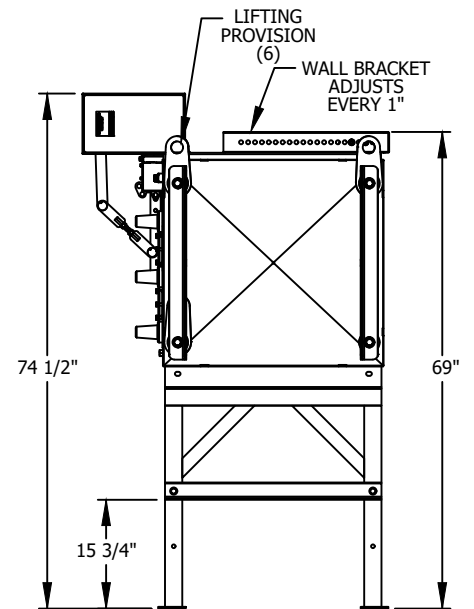
TOP VIEW



ANGLE VIEW



SIDE VIEWS



## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 1420 LBS

STAND AND BRACKETS: 195 LBS

MOTOR OPERATORS: 35 LBS EACH

## INTERNAL VS:

12470/7200 LINE TO GROUND

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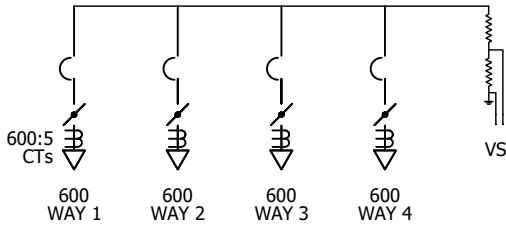
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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# FOUR-WAY VAULT MOUNT 600A MANUAL/NON-SCADA

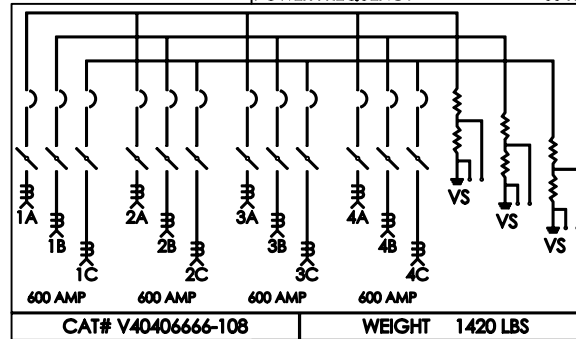


**FOUR-WAY VAULT MOUNT 600A MANUAL  
CONNECTION DIAGRAM**



**INNOVATIVE SWITCHGEAR  
SOLUTIONS INC. ■**  
FAULT INTERRUPTER/SWITCH  
PATENT PENDING

|                              |          |
|------------------------------|----------|
| MAXIMUM VOLTAGE              | 15.5 KV  |
| CONTINUOUS CURRENT           | 600 AMPS |
| INTERRUPTING CURRENT (SYM.)  | 12.5 KA  |
| INTERRUPTING CURRENT (ASYM.) | 20.0 KA  |
| PEAK CURRENT                 | 32.5 KA  |
| FAULT CLOSE (SYM.)           | 12.5 KA  |
| IMPULSE WITHSTAND VOLTAGE    | 95 BIL   |
| POWER FREQUENCY              | 60 HZ    |



**CAT# V40406666-108**  
**WEIGHT 1420 LBS**  
**CURRENT TRANSFORMER RATIO**  
**600:5 RATIO**

**INTERNAL VOLTAGE SENSORS**

**RATED 12470/7200:120**

## **APPROXIMATE SYSTEM WEIGHTS**

SWITCH TANK: 1420 LBS

STAND AND BRACKETS: 195 LBS

MOTOR OPERATORS: 35 LBS EACH

## **INTERNAL VS:**

12470/7200 LINE TO GROUND

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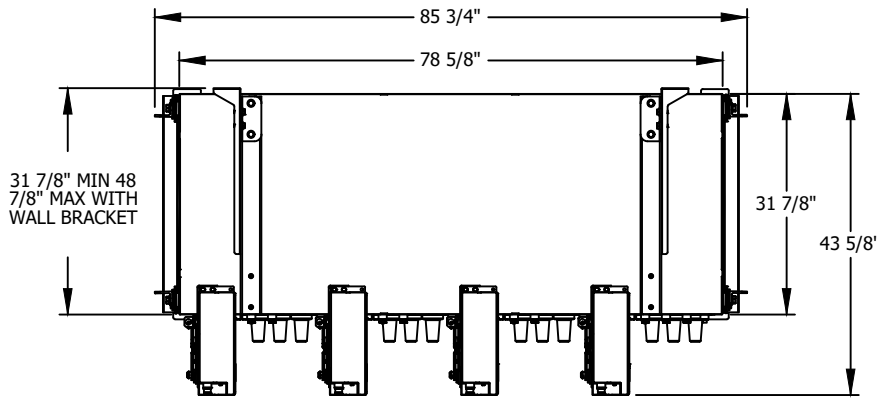
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

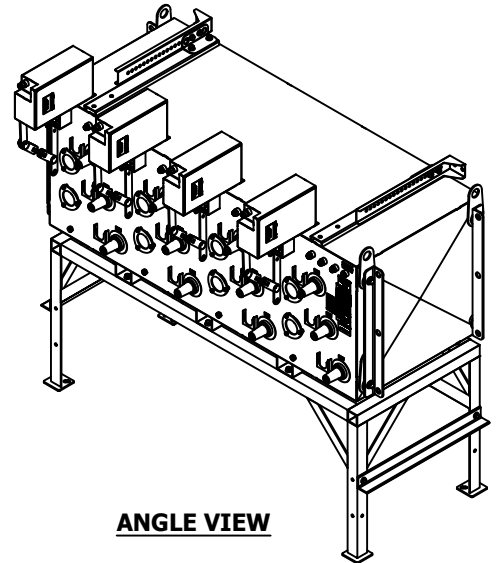
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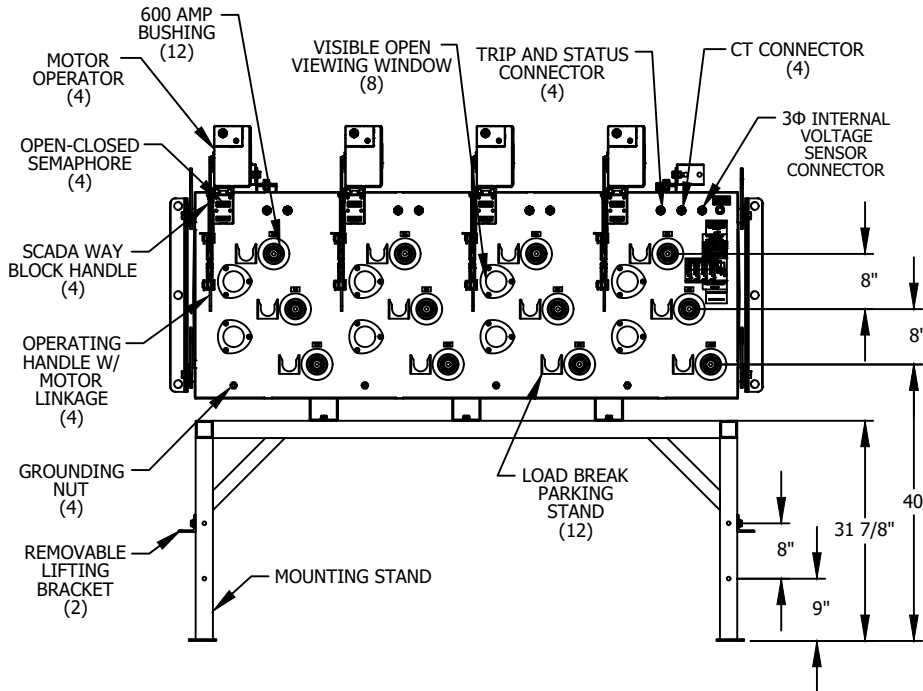
# FOUR-WAY VAULT MOUNT 600A SCADA 12KV



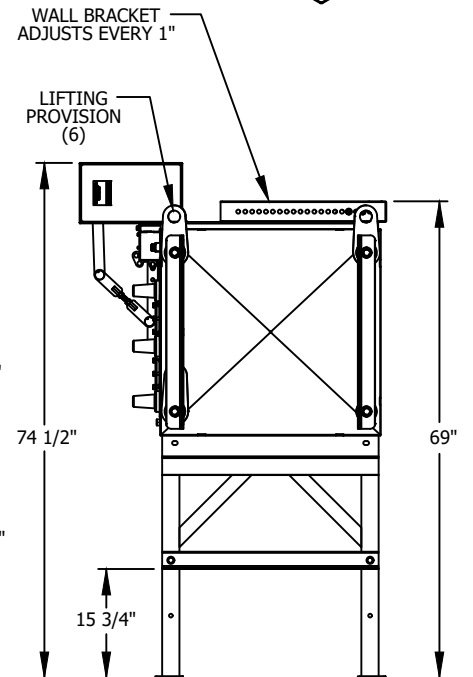
TOP VIEW



ANGLE VIEW



SIDE VIEWS



## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 1420 LBS  
STAND AND BRACKETS: 195 LBS  
MOTOR OPERATORS: 35 LBS EACH  
CONTROL CABINET: 500 LBS  
POTENTIAL TRANSFORMERS: 130 LBS EACH

## PT:

12470/7200 LINE TO GROUND

## INTERNAL VS:

12470/7200 LINE TO GROUND EXTERNAL

## EXTERNAL VS:

12470/7200 LINE TO GROUND

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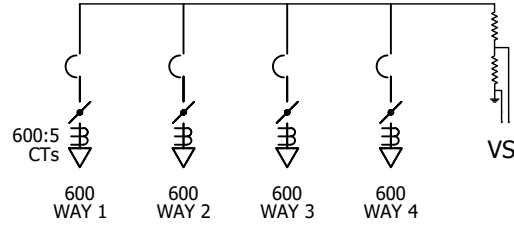
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

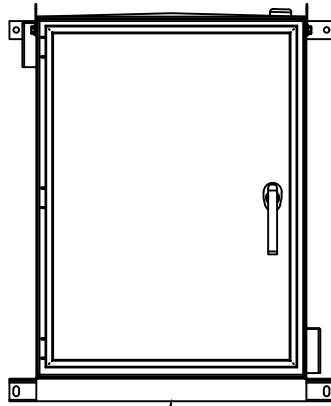
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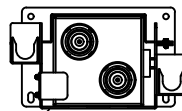
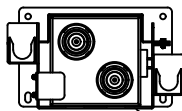
# FOUR-WAY VAULT MOUNT 600A SCADA 12KV



**FOUR-WAY VAULT MOUNT 600A SCADA  
CONNECTION DIAGRAM**



CONTROL CABINET  
WITH WALL MOUNTING  
PROVISION

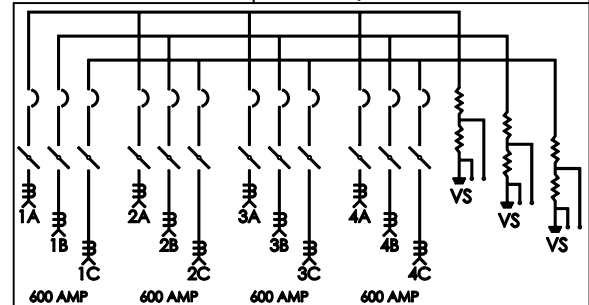


POTENTIAL TRANSFORMER  
WITH WALL MOUNTING  
PROVISION  
(2)



**INNOVATIVE SWITCHGEAR  
SOLUTIONS INC. ■  
FAULT INTERRUPTER/SWITCH**

|                              |          |
|------------------------------|----------|
| PATENT PENDING               |          |
| MAXIMUM VOLTAGE              | 15.5 KV  |
| CONTINUOUS CURRENT           | 600 AMPS |
| INTERRUPTING CURRENT (SYM.)  | 12.5 KA  |
| INTERRUPTING CURRENT (ASYM.) | 20.0 KA  |
| PEAK CURRENT                 | 32.5 KA  |
| FAULT CLOSE (SYM.)           | 12.5 KA  |
| IMPULSE WITHSTAND VOLTAGE    | 95 BIL   |
| POWER FREQUENCY              | 60 HZ    |



CAT# V40406666-108

WEIGHT 1420 LBS

CURRENT TRANSFORMER RATIO

600:5 RATIO

INTERNAL VOLTAGE SENSORS

RATED 12470/7200:120

## **APPROXIMATE SYSTEM WEIGHTS**

SWITCH TANK: 420 LBS  
STAND AND BRACKETS: 195 LBS  
MOTOR OPERATORS: 35 LBS EACH  
CONTROL CABINET: 500 LBS  
POTENTIAL TRANSFORMERS: 130 LBS EACH

## **PT:**

12470/7200 LINE TO GROUND

## **INTERNAL VS:**

12470/7200 LINE TO GROUND EXTERNAL

## **EXTERNAL VS:**

12470/7200 LINE TO GROUND

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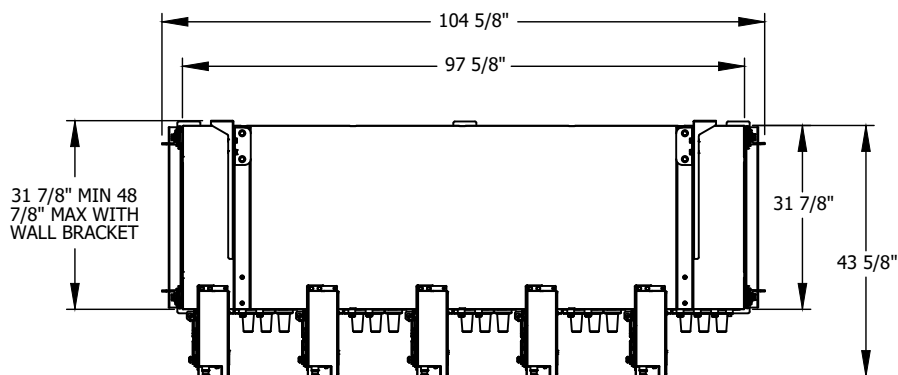
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

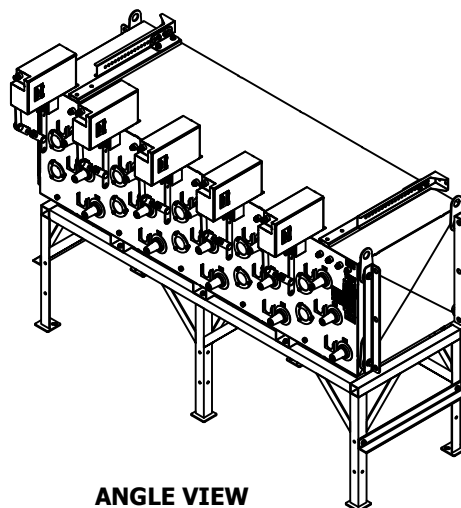
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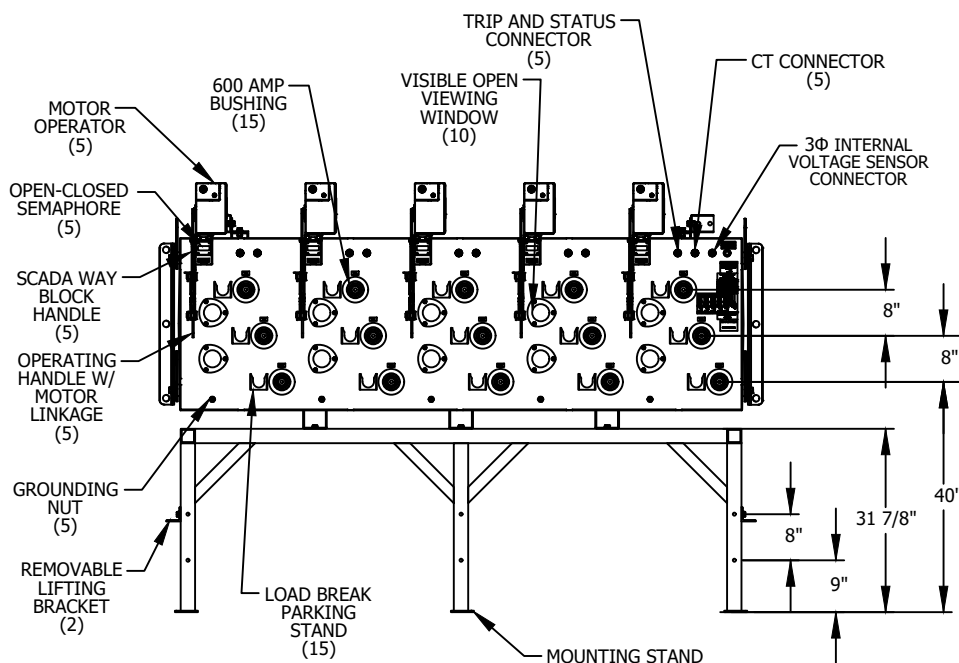
# FIVE-WAY VAULT MOUNT 600A SCADA 12KV



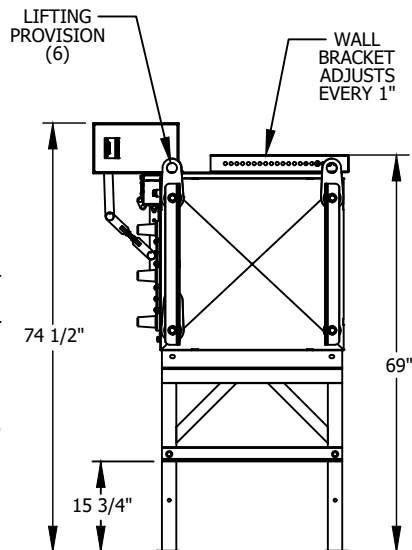
TOP VIEW



ANGLE VIEW



SIDE VIEWS



## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 1750 LBS  
 STAND AND BRACKETS: 240 LBS  
 MOTOR OPERATORS: 35 LBS EACH  
 CONTROL CABINET: 500 LBS  
 POTENTIAL TRANSFORMERS: 130 LBS EACH

## PT:

12470/7200 LINE TO GROUND

## INTERNAL VS:

12470/7200 LINE TO GROUND

## EXTERNAL VS:

12470/7200 LINE TO GROUND

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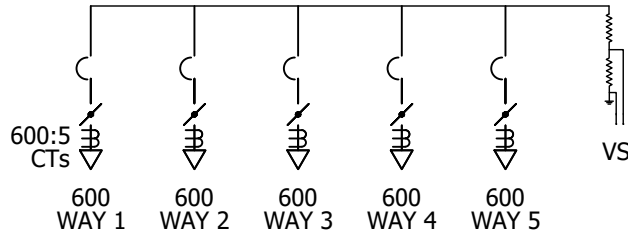
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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

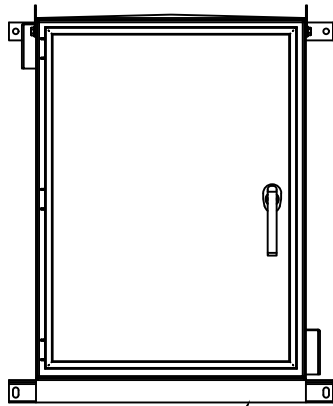
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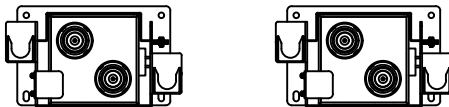
# **FIVE-WAY VAULT MOUNT 600A SCADA 12KV**



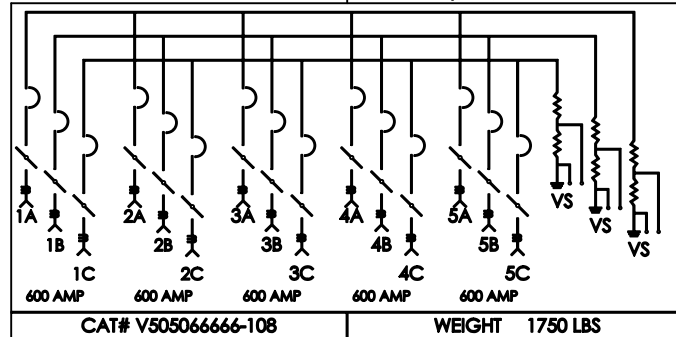
**FIVE-WAY VAULT MOUNT 600A SCADA  
CONNECTION DIAGRAM**



CONTROL CABINET  
WITH WALL MOUNTING  
PROVISION  
(2)



POTENTIAL TRANSFORMER  
WITH WALL MOUNTING  
PROVISION  
(2)



CAT# V505066666-108

WEIGHT 1750 LBS

CURRENT TRANSFORMER RATIO

600:5 RATIO

INTERNAL VOLTAGE SENSORS

RATED 12470/7200:120



|  |          |
|--|----------|
| INNOVATIVE SWITCHGEAR SOLUTIONS INC. ■ |          |
| FAULT INTERRUPTER/SWITCH               |          |
| PATENT PENDING                         |          |
| MAXIMUM VOLTAGE                        | 15.5 KV  |
| CONTINUOUS CURRENT                     | 600 AMPS |
| INTERRUPTING CURRENT (SYM.)            | 12.5 KA  |
| INTERRUPTING CURRENT (ASYM.)           | 20.0 KA  |
| PEAK CURRENT                           | 32.5 KA  |
| FAULT CLOSE (SYM.)                     | 12.5 KA  |
| IMPULSE WITHSTAND VOLTAGE              | 95 BIL   |
| POWER FREQUENCY                        | 60 HZ    |

## **APPROXIMATE SYSTEM WEIGHTS**

SWITCH TANK: 1420 LBS  
STAND AND BRACKETS: 195 LBS  
MOTOR OPERATORS: 35 LBS EACH  
CONTROL CABINET: 500 LBS  
POTENTIAL TRANSFORMERS: 130 LBS EACH

## **PT:**

12470/7200 LINE TO GROUND

## **INTERNAL VS:**

12470/7200 LINE TO GROUND EXTERNAL

## **EXTERNAL VS:**

12470/7200 LINE TO GROUND

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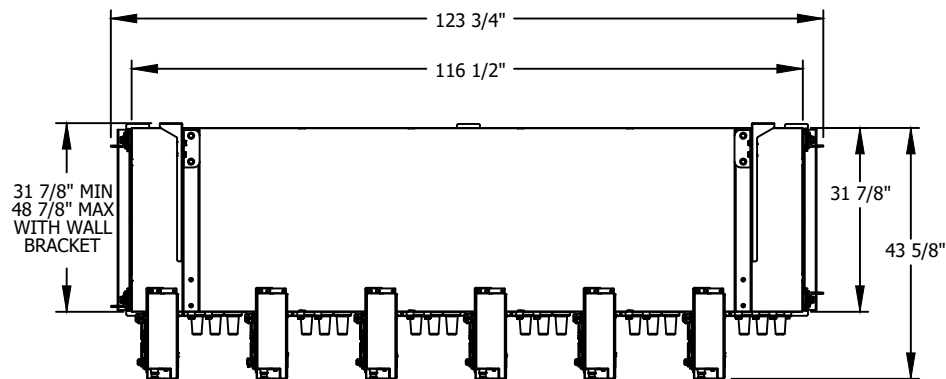
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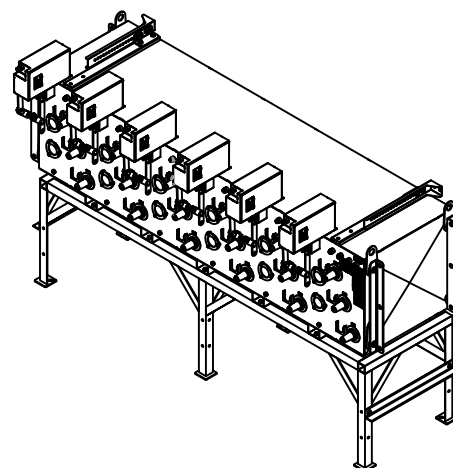
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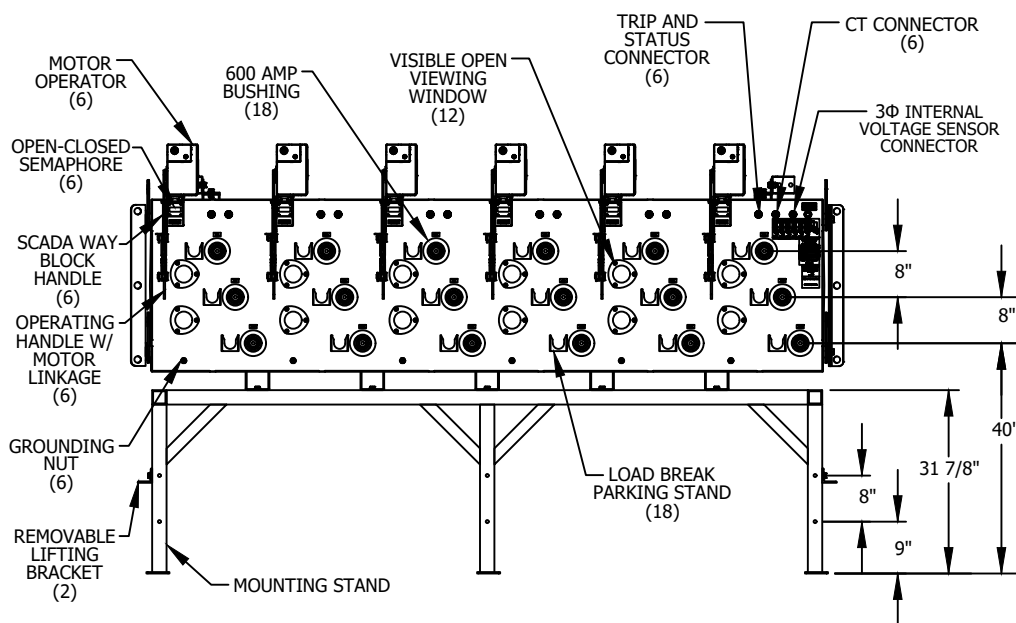
# SIX-WAY VAULT MOUNT 600A SCADA 12KV



TOP VIEW



ANGLE VIEW



SIDE VIEWS

## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 2040 LBS  
 STAND WITH BRACKETS: 325 LBS TOTAL  
 MOTOR OPERATORS: 35 LBS EACH  
 AUTOMATION CONTROL CABINET: 500 LBS  
 POTENTIAL TRANSFORMERS WITH CRADLE: 145 LBS EACH

## PT:

12470/7200 LINE TO GROUND

## INTERNAL VS:

12470/7200 LINE TO GROUND

## EXTERNAL VS:

12470/7200 LINE TO GROUND

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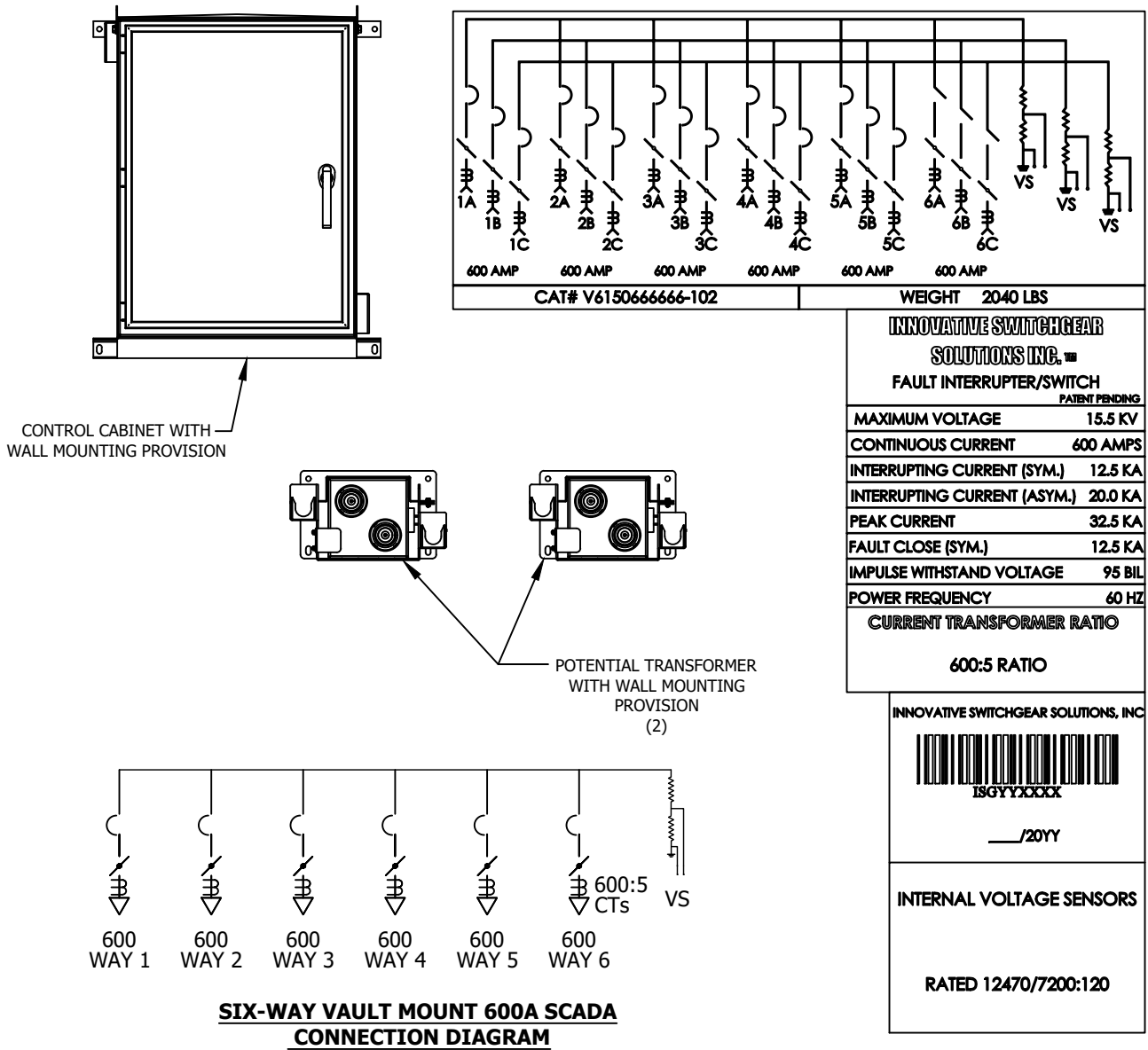
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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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# SIX-WAY VAULT MOUNT 600A SCADA 12KV



## APPROXIMATE SYSTEM WEIGHTS

SWITCH TANK: 2040 LBS  
 STAND WITH BRACKETS: 325 LBS TOTAL  
 MOTOR OPERATORS: 35 LBS EACH  
 AUTOMATION CONTROL CABINET: 500 LBS  
 POTENTIAL TRANSFORMERS WITH CRADLE: 145 LBS EACH

## PT:

12470/7200 LINE TO GROUND

## INTERNAL VS:

12470/7200 LINE TO GROUND

## EXTERNAL VS:

12470/7200 LINE TO GROUND

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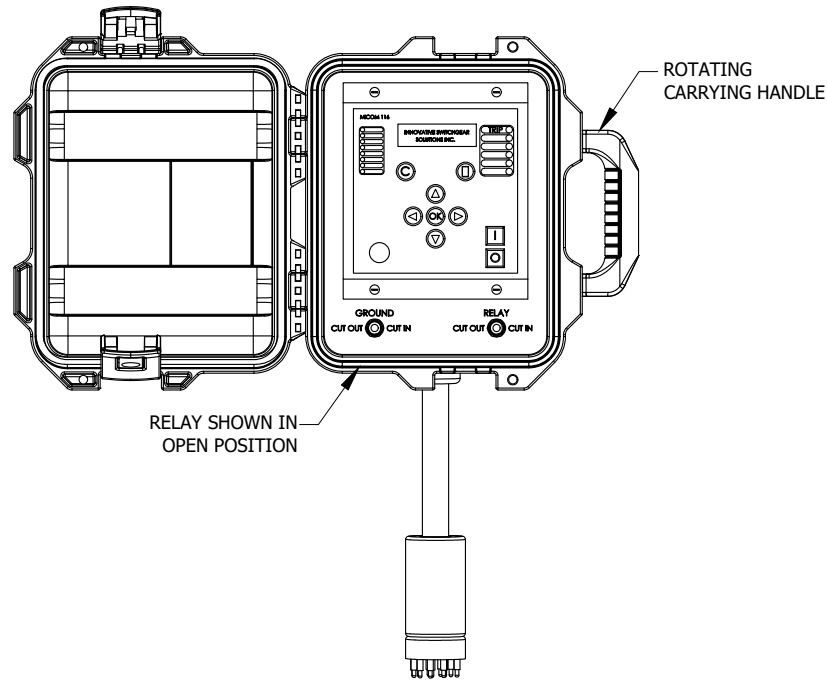
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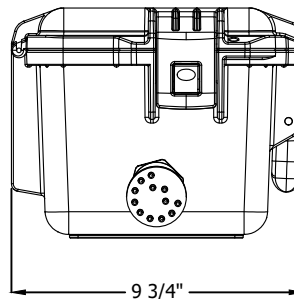


## SCHNEIDER P116 5A RELAY

**NOTE: CURRENTLY UNDER EVALUATION, DO NOT USE WITHOUT APPROVAL FROM EDE**



### FRONT VIEW



### SIDE VIEW

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|                   | INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT |                           |                    |          |                     |           |



**INSTALLATIONS (PAD APPLICATIONS USED AS REFERENCE UNTIL UNITS ARE INSTALLED):**

A. FOR SINGLE PADMOUNT APPLICATIONS, THE SWITCH TANK IS SHIPPED INSIDE THE ENCLOSURE ON ITS BACK WITH THE BUSHINGS FACING UP. THE SWITCH STAND AND ANY OPTIONAL ITEMS TO COMPLETE THE PACKAGE WILL BE SHIPPED INSIDE THE PADMOUNT ENCLOSURE. SEE FIGURE 1.



FIGURE 1

### INSTALLATIONS (CON'T):

B. FOR INTERNAL AND TWO EXTERNAL BOLTS SECURE THE ENCLOSURE TO THE PALLET. REMOVE THESE BOLTS TO LIFT THE ENCLOSURE FROM THE PALLET. THE DOORS MAY BE OPENED OR REMOVED TO HELP GUIDE THE ENCLOSURE OVER THE EQUIPMENT. SEE FIGURE 2A AND 2B.



FIGURE 2A

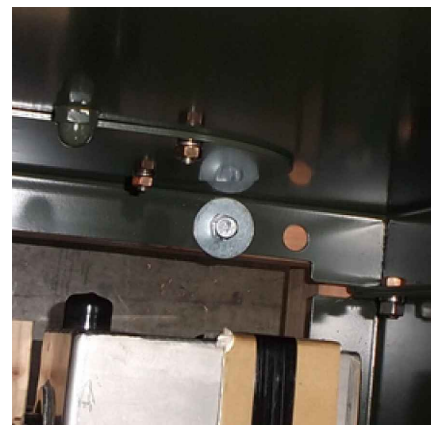


FIGURE 2B

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|                   |                   | INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT |                           |     |     |                    |     |          |    |                     |     |     |      |           |

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|                   |                   | INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT |                           |     |     |                    |     |          |    |                     |     |     |      |           |



C. THREE LIFTING PROVISIONS ARE PROVIDED ON BOTH ENDS OF THE SWITCH TANK. THESE LIFTING PROVISIONS ROTATE 360 DEGREES. SEE FIGURE 3A AND 3B.



FIGURE 3A



FIGURE 3B

D. MOTOR OPERATOR LINKAGE REQUIRES 20-INCHES OF SPACE IN THE OPEN POSITION TO NOT IMPACT THE PADMOUNT ENCLOSURE DOORS. LEAVE 21 1/2 INCHES FROM THE FACE OF THE SWITCH TO THE PADMOUNT ENCLOSURE DOORS. SEE FIGURE 4.

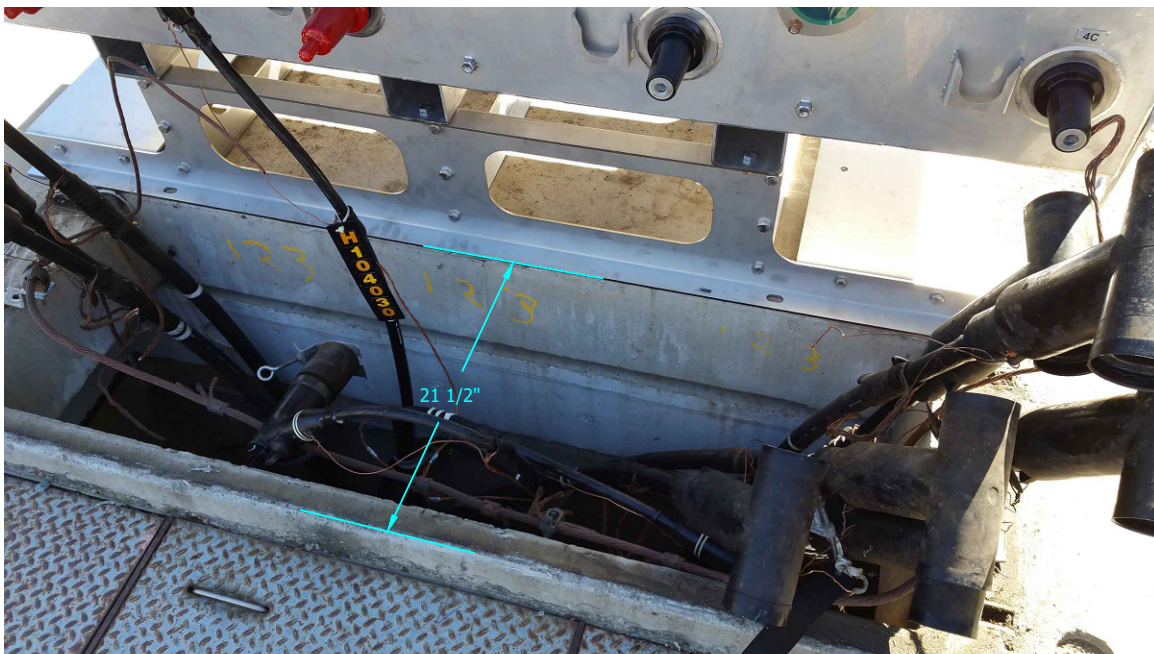


FIGURE 4

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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E. **MOTOR OPERATORS AND LINKAGES ARE MATED TO THE SWITCH AND IDENTIFIED AT THE MANUFACTURING PLANT.** MOUNT MOTOR OPERATORS WITH CORRESPONDING WAYS AFTER THE CABLE HAS BEEN LANDED AND PRIOR TO MOUNTING THE ENCLOSURE. SEE FIGURE 5A AND 5B.

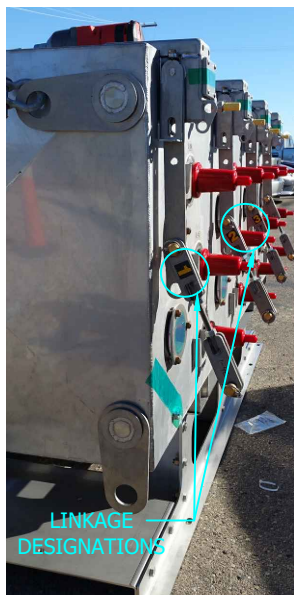


FIGURE 5A

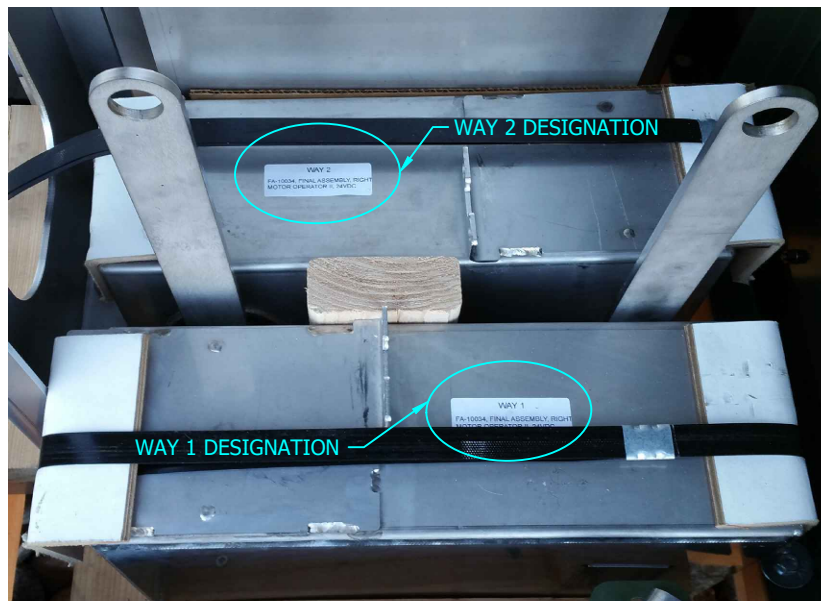


FIGURE 5B

F. INNOVATIVE SWITCHGEAR HAS A UNIQUE FEATURE ALLOWING THE ENCLOSURE TO BE REMOVED WHILE THE SWITCH REMAINS INTACT. THIS WILL BETTER FACILITATE IN WIRE PULLING AND SWITCH MAKE-UP. SWITCH STAND AND ENCLOSURE MUST BE SECURED TO THE PAD AND GROUNDED INDIVIDUALLY.

G. ON NON-SCADA UNITS, ONCE THE ENCLOSURE IS SECURE, ATTACH THE CABLES FROM THE JUNCTION BOX TO THE MOTOR OPERATORS. EACH CABLE IS DESIGNATED AND MARKED WITH A WAY POSITION. SEE FIGURE 6.



FIGURE 6

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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H. THE POLYCARBONATE VIEWING WINDOWS FOR THE CLOSED/OPEN VACUUM CONTACT SEMAPHORE ARE COVERED AT THE FACTORY WITH GREEN ULTRAVIOLET PROTECTIVE TAPE. REMOVE THE TAPE UPON COMPLETION OF INSTALLATION. IF THE TAPE IS INADVERTENTLY REMOVED PRIOR TO INSTALLATION, PLEASE COVER THE LENSES OR APPLY ULTRAVIOLET PROTECTIVE TAPE TO KEEP THE WINDOWS FROM YELLOWING. SEE FIGURE 7.



FIGURE 7

I. THE ONE OPERATING HANDLE OPENS THE VACUUM INTERRUPTS FIRST SO THAT THE ELECTRICAL INTERRUPTION IS ALWAYS PERFORMED WITHIN THE VACUUM INTERRUPTS AND THE THE VISIBLE OPEN ISOLATION POINT (VOIP) SWITCH OPENS.

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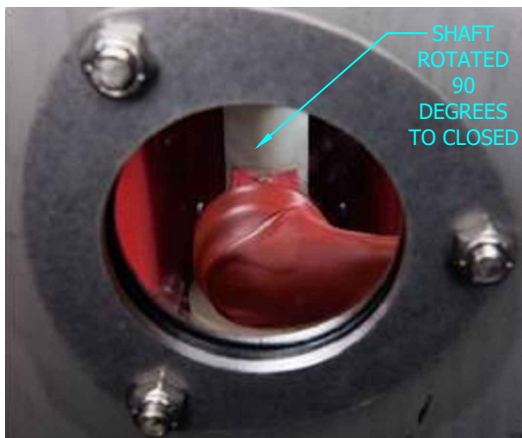
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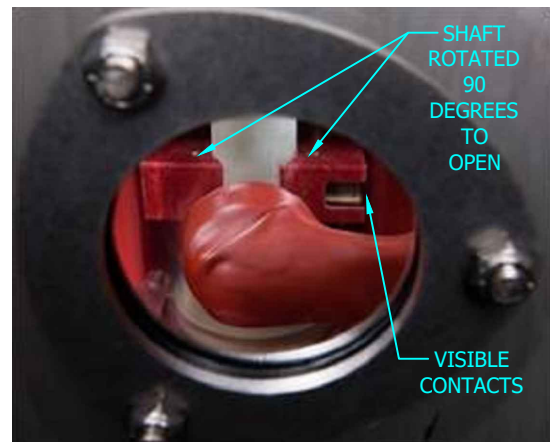
J. FOR VIEW OF THE CONTACTS:

-FOR SINGLE SIDE PADMOUNT, VAULT MOUNT, AND SUBMERSIBLE, THE VIEW OF THE OPEN CONTACTS IS FROM THE TOP OF THE MECHANISM. SEE FIGURES 8A AND 8B BELOW.



VISIBLE OPEN SHAFT  
"CLOSED"

FIGURE 8A



VISIBLE OPEN SHAFT "OPEN",  
ISOLATED AND VISIBLE

FIGURE 8B

- FOR DOUBLE SIDE PADMOUNT APPLICATIONS, THE VIEW OF THE OPEN CONTACTS IS FROM THE SIDE OF THE MECHANISM, SEE FIGURES 8C AND 8D.



VISIBLE OPEN SHAFT  
"OPEN"

FIGURE 8C



VISIBLE CLOSED SHAFT  
"CLOSED"

FIGURE 8D

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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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K. PENDANT CONTROLLERS ARE PROVIDED TO POWER AND CONTROL ALL THE MOTOR OPERATORS FROM OUTSIDE THE ENCLOSURE. THESE PORTABLE CONTROLLERS ARE DESIGNED TO PROVIDE FIELD PERSONNEL THE ABILITY TO PLUG INTO A JUNCTION BOX TO DETERMINE STATUS OF ALL THE MOTORS AND TO CONTROL MULTIPLE MOTOR OPERATORS LOCALLY WITH EXTERNAL 120V AC POWER PLUGGED INTO THE PENDANT CONTROL. **CAUTION:** THE "CONTROL HEALTHY" LIGHT WILL ONLY LIGHT WHEN THE TOGGLE SWITCH IS TURNED ON AND WHEN CONNECTED TO A "PURE SINE WAVE" SOURCE OF 120V AC POWER. SQUARE SINE WAVE OR MODIFIED SINE WAVE INVERTERS WILL NOT POWER THIS DEVICE AND MAY DAMAGE THE CONTROL. SEE FIGURE 9.



FIGURE 9

L. PENDANT CONTROLLER MUST BE CONNECTED TO THE JUNCTION BOX PICTURED BELOW TO OPERATE MOTOR OPERATORS. JUNCTION BOX CONNECTIONS ARE SEVEN-PIN AND 12-PIN, SO THEY CANNOT BE INSTALLED INCORRECTLY. SEE FIGURE 10.

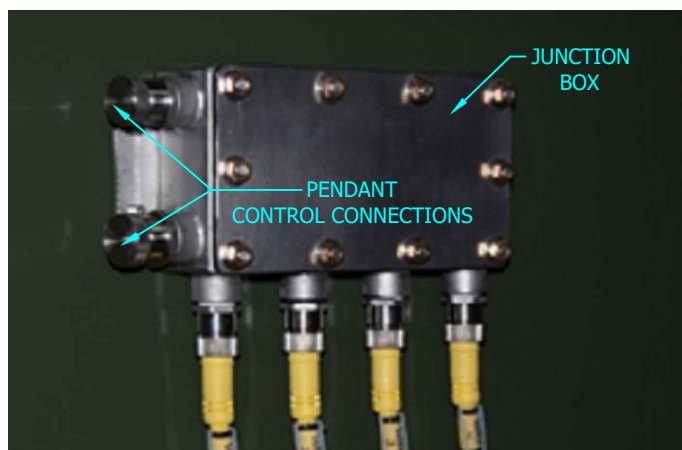


FIGURE 10

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INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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M. WITH THE ABILITY TO REMOTELY OPERATE THE MOTOR OPERATIONS ON THE SWITCH. THE ACTUATOR ARMS SHALL NOT BE LOCKED.

### SCADA UNITS:

N. ALL SOURCE AND TIE POSITIONS SHALL BE PHASE IDENTIFIED WITH THE AP30. THE SWITCH SHALL BE MARKED FOR "A", "B" AND "C" PHASES.

O. THERE ARE TWO REDUNDANT POTENTIAL TRANSFORMERS (PTs) THAT ARE CONNECTED PHASE TO GROUND. PTs TO BE CONNECT ON THE SOURCE SIDE AND TIE POSITION OF THE SWITCH (IF NO TIE EXISTS ON SWITCH, CHOOSE POSITION WITH DOWNSTREAM TIE SWITCH). IF APPLICABLE, ON THE CENTER PHASE POSITION. PHASE CONNECTION TO THE P.T. IS TO BE MADE WITH A FUSED ELBOW AS THE P.T. DOES NOT HAVE ITS OWN PROTECTION. GROUND ELBOW TO BE STRIPPED AND CONNECTED TO A COPPER TAIL AND THEN HARD TAPPED TO THE GROUND RING BUS. SEE FIGURE 11A AND 11B.

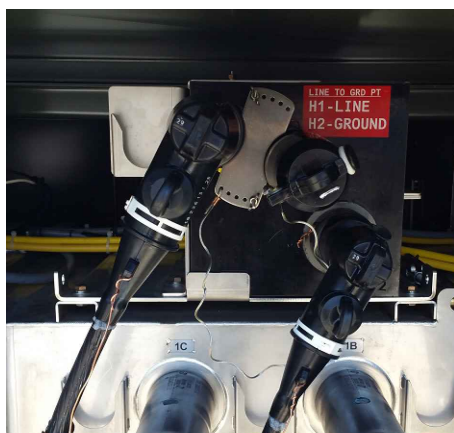


FIGURE 11A



FIGURE 11B

P. WHEN INSTALLING THE PTs, WE MUST BOND ALL OF THE BASE PLATES OF H2 AND H1 TO GROUND SOURCE/RING BUS. FAILURE TO DO SO WILL RESULT IN THE RING BUS HAVING HIGH VOLTAGE CAPABILITY AND COULD RESULT IN UNFAVORABLE CONSEQUENCES.



FIGURE 12A



FIGURE 12B



FIGURE 12C

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

UG3680.31







R. PRIOR TO ENERGIZING, CHECK TO MAKE SURE MOTOR OPERATOR ACTUATOR ARMS CAN FUNCTION UNOBSTRUCTED. P.T. ELBOWS SHALL BE PLACED ON THE CENTER PHASE POSITION OF THE SWITCH. FAULT INDICATORS SHALL BE POSITIONED AWAY FROM THE TRAVEL OF THE MOTOR OPERATOR ACTUATOR ARMS. SEE FIGURE 14A AND 14B.



FIGURE 15A

P.T. ELBOW  
SHALL BE  
PLACED ON THE  
CENTER PHASE  
TO ALLOW THE  
MOTOR  
ACTUATOR THE  
NECESSARY  
CLEARANCE TO  
OPERATE

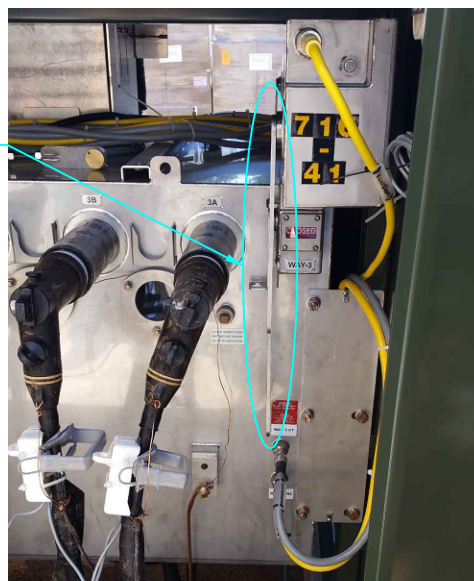


FIGURE 15B

### PAD MOUNT OPTIONS:

S. SET THE SWITCH ON THE BOX PAD. USING A 1/2 INCH DRILL BIT, DRILL THROUGH THE EXISTING HOLES IN THE SILL FLANGE AND THROUGH THE BOX PAD. BOLT DOWN AS SHOWN IN HOLD DOWN DETAIL. SEE FIGURE 15.

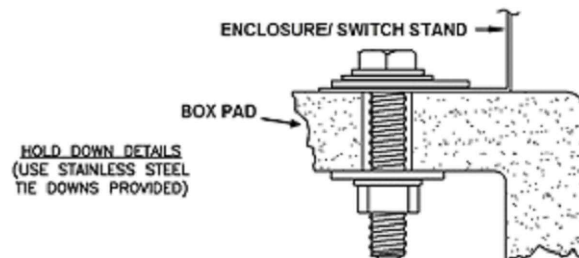


FIGURE 16

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INNOVATIVE SWITCHGEAR  
SUBMERSIBLE AND VAULT MOUNT

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**NOTES:**

I. WHEN REPLACING EXISTING SWITCHES, THE TIE POSITIONS ARE ESTABLISHED AND CONNECTED AS DESIGNED TO AVOID MAJOR RE-CABLING, CONNECT AS-BUILT. NEW INSTALLATIONS WILL FOLLOW THE DESIGN MANUAL.

II. INNOVATIVE SWITCHGEAR'S PRODUCTS DO NOT CONTAIN ANY OIL OR SF6 GAS FOR THE ELECTRICAL ARC INTERRUPTION OR FOR COMPONENT INSULATION. INNOVATIVE SWITCHGEAR CONTAINS ONLY MECHANISMS, INSULATED BUS WORK AND DRY AIR. DO NOT REMOVE THE PRESSURE TEST PLUG ON THIS VESSEL. EACH UNIT HAS BEEN PRESSURE TESTED AND PERMANENTLY FACTORY SEALED. THE SWITCH TANK IS FILLED WITH THREE TO FIVE POUNDS OF DRY AIR TO KEEP THE STRUCTURAL INTEGRITY OF THE TANK **AT SEA LEVEL**.

III. THE USE OF FUSED ELBOWS WILL BE FOR THE ADDITION OF POTENTIAL TRANSFORMERS FOR SCADA APPLICATIONS AND LIMITED TO TWO FUSED ELBOW ONLY ONE PER SWITCH WAY POSITION. NO DEVIATION WILL BE GRANTED FOR MORE THAN TWO FUSED ELBOWS IN THE INNOVATIVE SWITCH CABINET. THE 30A FUSED ELBOW (S321680) AND 10 FEET/LENGTH FROM PT TO OPENING OF SUBSTRUCTURE OF #2 CABLE (S197600) WILL BE MADE IN HOUSE BY LINE CREW (OR BY KEARNY AS NECESSARY) TO INSTALL SCADA INSTALLATIONS.

IV. TAPPING THE BACK OF 600 AMP TEES FOR 200 AMP DISTRIBUTION WILL BE LIMITED TO SWITCH CHANGE OUTS WITH EXISTING 200 AMP TAPS.

V. FOR NEW CONSTRUCTION AND CONVERSIONS THIS INNOVATE SWITCH SHOULD NOT BE USED TO TAP FEEDER CABLES. TAPS ON THE BACK OF 600 AMP TEES IMPEDE GROUNDING AND LIMIT USE OF SWITCH POSITIONS DURING ROUTING SWITCHING PROCEDURES AND OUTAGE SITUATIONS. TAP FEEDER SEGMENTS BETWEEN SWITCH POSITIONS USING 600 AMP TERMINATORS OR TAP THE SWITCH POSITION WITH DISTRIBUTION CABLE ONLY.

VI. ALL ISG MANUAL SWITCHES ARE "SCADA-READY (CAPABLE OF BEING RETROFITTED TO SCADA)" AND POTENTIALLY FAULT INTERRUPTING USING OTHER CONTROLLERS/RELAYS.

VII. ALL MANUAL SWITCHES CAN BE USED ON 12 AND 4 KV APPLICATIONS.

VIII. ISG MANUAL SWITCHES REFER TO MOTORIZED OPERATORS INSTALLED AND CAN BE OPERATED WITH THE LEVER VIA HOOKSTICK. ISG SCADA REFERS TO THE CONTROLLER WITH THE FAULT INTERRUPTING AND COMMUNICATIVE FEATURES TO INCLUDE MOTOR OPERATORS. **ISG NON-SCADA REFERS TO MANUAL SWITCHES, BUT CAPABLE OF RETROFITTING WITH NON-COMMUNICATIVE RELAYS/CONTROLLERS.**

IX. REGARDING THE 6 WAY ISG SWITCHGEAR: WAYS 1-5 ARE FAULT INTERRUPTING CAPABLE. WAY 6 WILL ONLY BE USED AS A SWITCH OR TIE POSITION.

X. THE 3 AND 4 WAY SUBMERSIBLE SWITCHES CAN BE INSTALLED ON THEIR BACKS SO THAT THE BUSHINGS ARE POINTED VERTICALLY. THE STANDS AVAILABLE ARE OPTIONAL AND ALLOW FOR A HORIZONTALLY MOUNTED SWITCH/BUSHING CONFIGURATION TO BE USED AS NEEDED.

XI. FOR EASE OF OPERATION AND STATUS OF AN ISG SUBMERSIBLE SWITCH, THE PENDANT CONTROLLER IN A MANHOLE SHOULD BE INSTALLED NEAR THE TOP PORTION (ROOF) OF THE MANHOLE.

-PREFERRED METHOD WILL BE ATTACHED TO THE BOTTOM SIDE OF THE TOP SECTION NEAR THE LID. THIS WILL ALLOW FOR EASY ACCESS TO THE PENDANT CONTROLLER WITHOUT REMOVING THE TOP SECTION AND IF NECESSARY, WAITING FOR FLOODED STRUCTURES TO BE PUMPED.

-ALTERNATIVE METHOD WILL BE ATTACHED ON THE TOP SIDE OF THE MANHOLE, JUST OUTSIDE OF THE TOP SECTION PORTION. THIS WILL ALLOW FOR ANOTHER METHOD OF EASIER ACCESS TO THE PENDANT CONTROLLER WITHOUT WAITING FRO FLOODED STRUCTURES TO BE PUMPED.

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|                   | INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT |                           |  |                    |  |          |  |                     |           |



**NOTES:****XII. RESTRICTIONS/LIMITATIONS -**

- ALL SUBMERSIBLE SWITCHGEAR WILL BE LIMITED TO MANHOLES CURRENTLY.
- VAULT MOUNTED SWITCHGEAR ARE LIMITED TO DRY TYPE VAULTS ONLY.

**XIII. ALL SWITCH PAGES WITH PARENTHESIS "()" AROUND A NUMBER REFLECT THE QUANTITY OF THE IDENTIFIED EQUIPMENT FROM THE MANUFACTURER. THERE ARE ALSO INTERNAL "BILL OF MATERIALS" WITHIN SOME OF THE SPECIFIC SWITCH TYPES REFERENCING FROM THE MANUFACTURER.**

**XIV. FOR SUBMERSIBLE SWITCHES, DO NOT ASSEMBLE THE STAND TO THE SWITCH UNTIL AFTER INSTALLATION WITHIN THE SUBSTRUCTURE.**

**XV. OLDER MANHOLES MAY NOT HAVE THE 4' X 5' OPENING THAT IS INTENDED FOR MOST SUBMERSIBLE APPLICATIONS (4 AND 5-WAY). PLEASE CONTACT EDE CONSTRUCTION STANDARDS ADMINISTRATORS TO DETERMINE MANHOLE TOP SECTION REPLACEMENT.**

**XVI. FOR SUBMERSIBLE SWITCHES WITHIN SUBSTRUCTURES (MANHOLES AND HANDHOLES), THE PENDANT CONTROLLER SHOULD BE MOUNTED NEAR THE OPENING OF THE SUBSTRUCTURE. LOCKS WILL NOT BE REQUIRED ON SUBMERSIBLE SWITCH POSITIONS SO THAT USE OF THE PENDANT CONTROLLER CAN BE DONE FOR SECTIONALIZING/ISOLATING CAPABILITIES.**

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- a. CABLE IDENTIFICATION, SEE UNDERGROUND STANDARD 3202.
- b. ATTACHING STRUCTURE/EQUIPMENT IDENTIFICATION TAG, SEE UNDERGROUND STANDARD 3211.
- c. HIGH VOLTAGE DECAL, SEE UNDERGROUND STANDARD 3221.
- d. WIRE ENTRY PREVENTION, SEE UNDERGROUND STANDARD 3408.
- e. BARRIERS IF THE SWITCH IS SUBJECT TO VEHICULAR TRAFFIC, SEE UNDERGROUND STANDARD 3481.
- f. MINIMUM OPERATING CLEARANCE REQUIREMENTS, SEE UNDERGROUND STANDARD 3483.
- g. RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS, SEE UNDERGROUND STANDARD 3486.
- h. RETAINING WALLS, SEE UNDERGROUND STANDARD 3487.
- i. FAULT INDICATOR INSTALLATION, SEE UNDERGROUND STANDARD 4355.
- j. (PREFERRED 1) AND (ALTERNATE TRENCH GROUND WIRE), SEE UNDERGROUND STANDARD 4510.
- k. EQUIPMENT GROUNDING, SEE UNDERGROUND STANDARD 4520.
- l. GROUNDING PREMOLDED CONNECTORS, SEE UNDERGROUND STANDARD 4525.
- m. NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM, SEE UNDERGROUND STANDARD 4520.8 & 4520.9.
- n. SCADA INSTALLATION, SEE UNDERGROUND STANDARD 4640.4 & 4640.5.

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|                   |                   | INNOVATIVE SWITCHGEAR<br>SUBMERSIBLE AND VAULT MOUNT |                           |     |     |                    |     |          |    |                     |     |     |      |           |







3700 -  
TRANSFORMERS



3700 -  
TRANSFORMERS











**SCOPE:** THIS STANDARD IDENTIFIES 1Ø & 3Ø TRANSFORMERS BY PREFIX.

**NOTE:** DATA ON THIS PAGE WAS PREPARED TO AID IN UNDERSTANDING THE VOLTAGE RATINGS USED IN THE FOLLOWING "TRANSFORMER PREFIXES" STANDARDS PAGES.

SINGLE PHASE AND THREE PHASE TRANSFORMERS HAVE HIGH VOLTAGE RATINGS AS FOLLOWS:

| VOLTAGE        | DEFINITION   |
|----------------|--|
| 4160GRDY/2400  | INDICATES A WINDING OF 2400 VOLTS SUITABLE FOR LINE-TO-LINE CONNECTION ON A 2400 VOLT SYSTEM OR LINE-TO-NEUTRAL CONNECTION ON A 4160 VOLT 4-WIRE WYE SYSTEM. |
| 12000GRDY/6930 | INDICATES A WINDING OF 6930 VOLTS SUITABLE FOR LINE-TO-NEUTRAL CONNECTION ONLY ON A 12,000 VOLT EFFECTIVELY GROUNDED SYSTEM.                                 |
| 2400           | INDICATES A WINDING OF 2400 VOLTS SUITABLE FOR LINE-TO-LINE CONNECTION ON A 2400 VOLT DELTA SYSTEM   |
| 4160           | INDICATES A WINDING OF 4160 VOLTS SUITABLE FOR A LINE-TO-LINE CONNECTION ON A 4160 4160 VOLT WYE SYSTEM.   |
| 12000          | INDICATES A WINDING OF 12000 VOLTS SUITABLE FOR A LINE-TO-LINE CONNECTION ON A 12000 VOLT DELTA SYSTEM.  |

SINGLE PHASE TRANSFORMERS HAVE LOW VOLTAGE RATINGS AS FOLLOWS:


| VOLTAGE | DEFINITION  |
|---------|---|
| 120/240 | INDICATES A SECONDARY WINDING SUITABLE FOR 240 VOLT SERIES OPERATION, THREE-WIRE OPERATION OR FOR 120 VOLT TWO-WIRE, MULTIPLE OPERATION.          |
| 480/240 | INDICATES A SECONDARY WINDING SUITABLE FOR 480 VOLT SERIES OPERATION, THREE- WIRE OPERATION, BUT NOT FOR 240 VOLT TWO-WIRE, MULTIPLE OPERATION.   |
| 240/120 | INDICATES A SECONDARY WINDING SUITABLE FOR 240 VOLTS SERIES OPERATION OR THREE-WIRE OPERATION, BUT NOT FOR 120 VOLT TWO-WIRE, MULTIPLE OPERATION. |

THREE PHASE TRANSFORMERS HAVE LOW VOLTAGE RATINGS AS FOLLOWS:

| VOLTAGE            | DEFINITION  |
|--------------------|---|
| 240/120            | INDICATES A SECONDARY WINDING SUITABLE FOR 240 VOLTS SERIES OPERATION OR THREE-WIRE OPERATION, BUT NOT FOR 120 VOLT TWO-WIRE, MULTIPLE OPERATION.                               |
| 208Y/120           | THIS INDICATES THE TRANSFORMER IS SUITABLE FOR FOUR-WIRE OPERATION ON 120/208Y VOLT SYSTEM ONLY.  |
| 480Y/277           | THIS INDICATES THAT THE TRANSFORMER IS SUITABLE FOR FOUR-WIRE OPERATION ON A 277/480Y VOLT SYSTEM OR THREE-WIRE OPERATION ON A 480 VOLT SYSTEM.                                 |
| 4160Y/2400         | THIS INDICATES THAT THE TRANSFORMER IS SUITABLE FOR FOUR-WIRE OPERATION ON A 2400/4160Y VOLT SYSTEM OR THREE-WIRE OPERATION ON A 4160 VOLT SYSTEM.                              |
| 12470GRDY/6930     | THIS INDICATES THAT THE TRANSFORMER IS SUITABLE FOR FOUR WIRE OPERATION ON A 7200/12470Y VOLT SYSTEM OR THREE-WIRE OPERATION ON A 12470 VOLT SYSTEM.                            |
| 480                | THIS INDICATES THAT THE TRANSFORMER IS SUITABLE FOR THREE-WIRE DELTA OPERATION AT ITS RATED VOLTAGE.  |
| 240X480            | INDICATES A WINDING SUITABLE FOR THREE-WIRE SERIES OPERATION AT 480 VOLT DELTA OR FOR THREE-WIRE PARALLEL OPERATION AT 240 VOLT DELTA BUT NOT FOR BOTH VOLTAGES SIMULTANEOUSLY. |
| 2400/4160Y/2400    | INDICATES A WINDING SUITABLE FOR THREE-WIRE DELTA OPERATION AT 2400 VOLTS OR FOUR-WIRE OPERATION ON A 4160 VOLT WYE SYSTEM WITH FULLY INSULATED NEUTRAL AVAILABLE.              |
| 2400/4160GRDY/2400 | INDICATES A WINDING HAVING REDUCED INSULATION FOR WYE CONNECTION ON A 4160 VOLT SYSTEM WITH THE TRANSFORMER NEUTRAL GROUNDED, OR FOR DELTA CONNECTIONS ON A 2400 VOLT SYSTEM.   |

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|                 | TRANSFORMER PREFIXES<br>VOLTAGE DESCRIPTIONS  |                           |                    |          |                     |           |



| PREFIX     | VOLTAGE                                  |           | DESCRIPTION  | KVA | TAPS | STOCK NO.   | ASSEMBLY UNITS |
|------------|--|-----------|--|-----|------|-------------|----------------|
|            | PRIMARY                                  | SECONDARY |  |     |      |             |                |
| XD         | 240/480                                  | 120/240   | SINGLE-PHASE SECONDARY<br>DRY TYPE - WALL MOUNTED                        | 2   | --   | S757888 (F) | XD-002         |
|            |  |           |  | 3   | --   | S757920 (F) | XD-003         |
| WDS        | 2400 DELTA Δ                             | 240 / 120 | BAY-O-NET FUSE ASSEMBLY WITH<br>ISOLATION LINK<br>STAINLESS STEEL (b)    | 25  | (A)  | S755210     | WDS-25         |
|            |  |           |  | 50  | (A)  | S755212     | WDS-50         |
|            |  |           |  | 75  | (A)  | S755214     | WDS-75         |
| (C)<br>SDS | 4160 GRDY/2400X<br>1200GRDY<br>GRDY/6930 | 240/120   | BAY-O-NET FUSE ASSEMBLY WITH<br>ISOLATION LINK<br>STAINLESS STEEL (D)(b) | 25  | --   | S761520     | SDS-25         |
|            |  |           |  | 50  | --   | S761522     | SDS-50         |
|            |  |           |  | 75  | --   | S761524     | SDS-75         |
| N          | 12000 GRDY/6930                          | 120       | SINGLE-PHASE SECONDARY<br>DRY TYPE - WALL MOUNTED                        | 1.5 | --   | S757880 (F) | N-1.5          |
| (C)<br>NCS | 12000 GRDY/6930                          | 240/120   | BAY-O-NET FUSE ASSEMBLY WITH<br>ISOLATION LINK<br>STAINLESS STEEL (b)    | 25  | (A)  | S750312     | NCS-25         |
|            |  |           |  | 50  | (A)  | S750350     | NCS-50         |
|            |  |           |  | 100 | (A)  | S750352     | NCS100         |
| (C)<br>NTS | 12000 GRDY/6930                          | 240/120   | BAY-O-NET FUSE ASSEMBLY WITH<br>ISOLATION LINK<br>STAINLESS STEEL (b)    | 25  | (A)  | S764230     | NTS-25         |
|            |  |           |  | 50  | (A)  | S764232     | NTS-50         |
|            |  |           |  | 75  | (A)  | S764234     | NTS-75         |
|            |  |           |  | 100 | (A)  | S764236     | NTS100         |
| NGD        | 12000 GRDY/6930                          | 0         | CURRENT LIMITING   | 1.0 | --   | S758302 (F) | NGD-10         |
| HCS        | 12000                                    | 240/120   | BAY-O-NET FUSE ASSEMBLY WITH<br>ISOLATION LINK<br>STAINLESS STEEL (b)    | 25  | (A)  | S751300     | HCS-25         |
|            |  |           |  | 50  | (A)  | S751302     | HCS-50         |
|            |  |           |  | 100 | (A)  | S751304     | HCS100         |
|            |  |           |  | 167 | (A)  | S751306     | HCS167         |
| (C)<br>HTS | 12000                                    | 240/120   | BAY-O-NET FUSE ASSEMBLY WITH<br>ISOLATION LINK<br>STAINLESS STEEL (b)    | 25  | (A)  | S765106     | HTS25          |
|            |  |           |  | 50  | (A)  | S761108     | HTS50          |
|            |  |           |  | 75  | (A)  | S765108     | HTS75          |
|            |  |           |  | 100 | (A)  | S765110     | HTS100         |
|            |  |           |  | 167 | (A)  | S761110     | HTS167         |
|            |  |           |  | 250 | (A)  | S765104     | HTS250         |
| HJS        | 12000                                    | 480/240   | BAY-O-NET FUSE ASSEMBLY WITH<br>ISOLATION LINK<br>STAINLESS STEEL (b)    | 25  | --   | S760262     | HJS-25         |
|            |  |           |  | 50  | --   | S760264     | HJS-50         |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

TRANSFORMER PREFIXES  
PAD - MOUNTED DEAD FRONT/SINGLE - PHASE

**UG 3702.2**



**SINGLE-PHASE TRANSFORMER CON'T:****DEVIATION REQUEST IS REQUIRED FOR HST INSTALLATIONS**

(SEE STANDARD 3005 FOR DEVIATION REQUEST FORM AND PROCEDURE)

**SINGLE-PHASE SUBSURFACE**

| PREFIX        | VOLTAGE |                     | DESCRIPTION   | KVA | TAPS | STOCK NUMBER | ASSEMBLY UNITS |
|---------------|---------|---------------------|---|-----|------|--------------|----------------|
|               | PRIMARY | SECONDARY           |   |     |      |              |                |
| (B)(E)<br>HST | 12000   | 208Y/120<br>120/240 | CURRENT-LIMITING FUSES OR<br>SUBMERSIBLE BAY-O-NET<br>FUSE W/ ISOLATION LINK<br>STAINLESS STEEL (b) | 50  | (A)  | S764215      | HST-50         |
|               |         |                     |   | 100 | (A)  | S764219      | HST100         |

**INSTALLATION:**

- (A) TWO 2-1/2% TAPS ABOVE AND BELOW.
- (B) THE HST TRANSFORMERS COME WITH FOUR SECONDARY TERMINALS (WIRES) WHICH ALLOW EXTERNAL WIRING FOR 240/120 OR 208Y/120 VOLT.
- (C) HTS, HJS, HCS, NCS, WDS SINGLE-PHASE TRANSFORMERS ARE FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING PLUGS OR FEED-THRU INSERTS (SEE STANDARDS 3712, 3713, 3751 AND 3755). BUSHINGS PLUGS OR FEED-THRU INSERTS ARE NOT SUPPLIED WITH TRANSFORMER. NTS IS SUPPLIED WITH ONE INSERT PRE-INSTALLED, AND SDS IS SUPPLIED WITH TWO INSERTS PRE-INSTALLED.
- (D) BAY-O-NET FUSES MUST BE RESIZED WHEN TRANSFORMER IS CUT FROM 4 TO 12KV.
- (E) REQUIRES DEVIATION.
- (F) SPECIAL ORDER (MAY REQUIRE 20 WEEKS LEAD TIME TO RECEIVE ITEMS)

**REFERENCE:**

- a. FOR SINGLE AND THREE-PHASE POLE-MOUNTED, STREETLIGHT AND SUBSTATION TRANSFORMERS, SEE OVERHEAD STANDARDS BOOK.
- b. SEE STANDARD 4311 FOR FUSING.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

TRANSFORMER PREFIXES  
SUBSURFACE, SINGLE-PHASE

**UG 3702.3**




### THREE-PHASE PAD-MOUNTED STAINLESS STEEL DEAD FRONT:

| PREFIX  | VOLTAGE                     |   | DESCRIPTION  |  |   | KVA                                   | TAPS         | STOCK NUMBER         | ASSEMBLY UNITS |        |
|---|-----------------------------|---|--|--|---|---------------------------------------|--------------|----------------------|----------------|--------|
|   | PRIMARY                     | SECONDARY   |  |  |   |                                       |              |                      |                |        |
| <div>Ⓒ</div> <div>PZS</div>                         | 4160X12000                  | 208Y/120<br>THREE-PHASE<br>4 WIRE                               | RADIAL/LOOP<br>PROTECTIVE<br>LINKS   | BAY-O-NET<br>FUSES<br><div>ⒹⒷ</div>                    | D.E.W.L.<br><br>FAULT<br>SENSING                    | 75                                    | --           | S761347              | PZS-75         |        |
|   |                             |   |  |  |   | 150                                   | --           | S761300              | PZS150         |        |
|   |                             |   |  |  |   | 300                                   | --           | S765096              | PZS300         |        |
|   |                             |   |  |  |   | 500                                   | --           | S761332              | PZS500         |        |
| <div>Ⓒ</div> <div>PXS</div>                         | 4160X12000                  | 240x480<br>THREE-PHASE<br>3 WIRE                                | D.E.W.L. BAY-O-NET FUSES AND<br>PROTECTIVE LINKS, RADIAL/LOOP <div>ⒹⒷ</div>                          |  |   | SEE NOTE<br><div>Ⓓ</div>              | 75           | --                   | S764252        | PXS-75 |
|   |                             |   |  |  |   |                                       | 225          | --                   | S764260        | PXS225 |
| HBSC  | <div>Ⓒ</div> <div>HBS</div> | 208Y/120<br>THREE-PHASE<br>4 WIRE                               | RADIAL ONLY, COMPACT, BAY-O-NET FUSES  |  |   | 75                                    | <div>Ⓐ</div> | S765102              | HBSC75         |        |
|   |                             |   | D.E.W.L. BAY-O-NET FUSES AND<br>PROTECTIVE LINKS, RADIAL/LOOP <div>Ⓑ</div>                           | 75   | <div>Ⓐ</div>  | S761360                               | HBS-75       |                      |                |        |
|   |                             |   |  | 150  | <div>Ⓐ</div>  | S761362                               | HBS150       |                      |                |        |
|   |                             |   |  | 300  | <div>Ⓐ</div>  | S761320                               | HBS300       |                      |                |        |
|   |                             |   |  | 500  | <div>Ⓐ</div>  | S761326                               | HBS500       |                      |                |        |
|   |                             |   |  | 750  | <div>Ⓐ</div>  | S761334                               | HBS750       |                      |                |        |
|   |                             |   |  | 1000   | <div>Ⓐ</div>  | S761282                               | HBS1.0       |                      |                |        |
|   |                             |   |  | 1500   | <div>Ⓐ</div>  | S761288                               | HBS1.5       |                      |                |        |
| <div>Ⓒ</div> <div>HKS</div>                         | 12000                       | 240/120<br>THREE-PHASE<br>4 WIRE                                | D.E.W.L. BAY-O-NET FUSES AND<br>PROTECTIVE LINKS, RADIAL/LOOP <div>Ⓑ</div>                           |  |   | 75                                    | --           | S761340              | HKS-75         |        |
|   |                             |   |  |  |   | 225                                   | --           | S761306              | HKS225         |        |
| <div>Ⓒ</div> <div>HNS</div>                         | 12000                       | 480Y/277<br>THREE-PHASE<br>3 OR 4 WIRE                          | RADIAL/LOOP<br>PROTECTIVE<br>LINKS   | BAY-O-NET<br>FUSES <div>Ⓑ</div>                        | D.E.W.L.<br><br>FAULT<br>SENSING<br><br>HIGH AMPERE | 150                                   | <div>Ⓐ</div> | S761354              | HNS150         |        |
|   |                             |   |  |  |   | 300                                   | <div>Ⓐ</div> | S761356              | HNS300         |        |
|   |                             |   |  |  |   | 500                                   | <div>Ⓐ</div> | S761328              | HNS500         |        |
|   |                             |   |  |  |   | 750                                   | <div>Ⓐ</div> | S761336              | HNS750         |        |
|   |                             |   |  | RADIAL/LOOP<br>PROTECTIVE<br>LINKS                     | HIGH AMPERE<br>BAY-O-NET<br>FUSES                   | 1000                                  | <div>Ⓐ</div> | S761284              | HNS1.0         |        |
|   |                             |   |  |  |   | 1500                                  | <div>Ⓐ</div> | S761290              | HNS1.5         |        |
|   |                             |   |  |  |   | 2000                                  | <div>Ⓐ</div> | S761302              | HNS2.0         |        |
|   |                             |   |  |  |   | 2500                                  | <div>Ⓐ</div> | S761314              | HNS2.5         |        |
| <div>Ⓒ</div> <div>HPS</div>                         | 12000                       | 2400/4160Y/<br>2400 OR<br>2400/4160GRDY/<br>2400<br>3 OR 4 WIRE | RADIAL/LOOP<br>PROTECTIVE<br>LINKS <div>Ⓑ</div><br>BAY-O-NET<br>FUSES                                | D.E.W.L.<br><br>FAULT<br>SENSING<br><br>HIGH<br>AMPERE | 200AMP LOADBREAK<br>SECONDARY BUSHING               | 225                                   | <div>Ⓐ</div> | S761310              | HPS225         |        |
|   |                             |   |  |  |   | 600AMP DEADBREAK<br>SECONDARY BUSHING | 500          | <div>Ⓐ</div>         | S761330        | HPS500 |
|   |                             |   |  |  |   |                                       | 750          | <div>Ⓐ</div>         | S761338        | HPS750 |
|   |                             |   |  | 1000   | <div>Ⓐ</div>  |                                       | S761286      | HPS1.0               |                |        |
|   |                             |   |  | 1500   | <div>Ⓐ</div>  |                                       | S761292      | HPS1.5               |                |        |
|   |                             |   |  | 2000   | <div>Ⓐ</div>  | S761304                               | HPS2.0       |                      |                |        |
|   |                             |   |  | 2500   | <div>Ⓐ</div>  | S761316                               | HPS2.5       |                      |                |        |
| HHS   | 12000GRDY/<br>6930          | 12470GRDY/7200  | THREE-PHASE AUTO TRANSFORMER, RADIAL<br>(BOOSTER) 600AMP DEADBREAK PRIMARY AND<br>SECONDARY BUSHINGS |  |   | 3750                                  | --           | S761324              | HS3750         |        |
| <div>Ⓒ</div> <div>HYS<br/>SEE<br/>NOTE<br/>IV</div> | 12000GRDY/<br>6930          | 480<br>THREE-PHASE<br>3 WIRE                                    | BAY-O-NET FUSES AND CL FUSES, RADIAL ONLY <div>Ⓑ</div>   |  |   | 300                                   | <div>Ⓐ</div> | <div>Ⓔ</div> S765130 | HYS30          |        |
|   |                             |   |  |  |   | 1000                                  | <div>Ⓐ</div> | <div>Ⓔ</div> S765132 | HYS100         |        |
|   |                             |   |  |  |   | 2000                                  | <div>Ⓐ</div> | <div>Ⓔ</div> S765134 | HYS200         |        |
|   |                             |   |  |  |   | 3000                                  | <div>Ⓐ</div> | <div>Ⓔ</div> S765120 | HYS300         |        |

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |                    |          |                     |
| TRANSFORMER PREFIXES  |                           |                    |          |                     |
| PAD - MOUNTED DEAD FRONT/THREE - PHASE  |                           |                    |          |                     |

UG 3702.4







**SCOPE:** THIS STANDARD IS A GUIDE FOR SELECTING TRANSFORMER(S), BY PREFIX, FOR REPLACEMENT OF EXISTING UNITS IN FIELD, AND DETERMINING THOSE THAT ARE OBSOLETE.

| SINGLE-PHASE INSTALLATIONS (PADMOUNT)   |             |  |                              |   |
|---|-------------|--|------------------------------|---|
| VOLTAGE                                 |             | EXISTING<br>FIELD UNITS  | REPLACEMENT<br>UNITS (C)     | NOT TO BE USED<br>OR REORDERED  |
| PRIMARY                                 | SECONDARY   |  |                              |   |
| 240/480                                 | 120/240     | XD   | XD                           | --  |
| 2400                                    | 240/120     | SDD, SDS, SID, WDD, WEP, WEQ   | SDS, WEP                     | SDD, SID, WEP, WDD, WEQ   |
| 6930                                    | 240/120     | NDD, NDL, NDP, NDS, NEP, NSD,<br>NSL, SDD, SDS, SID, WDD                   | NTS, NCS (B)                 | NDD, NDL, NDP, NEP, NSD,<br>NSL, SDD, SID, WDD, NDS                   |
| 6930<br>W/SECONDARY TAPS                | 240/120     | NEP, NTD, NTP, NTQ, NTS  | NTS, NCS (B)                 | NTD, NTP, NTQ, NEP  |
| 7200                                    | 240/120     | YDP, YDQ, YEP, YTP   | NTS, NCS (B)                 | YDP, YDQ, YEP, YTP, YP, NEP   |
| 12000                                   | 240/120     | HDD, HDL, HDS, HEP, HSL, HP, HQ  | HTS, HCS                     | HDD, HDL, HP, HSL, HP, HQ,<br>HEP                                     |
| 12000<br>W/SECONDARY TAPS               | 240/120     | HEP, HEQ, HP, HTD, HTL, HTS  | HTS, HCS                     | HEQ, HP, HTD, HTL, HEP  |
| 12000                                   | 480/240     | HJD, HJL, HJP, HJS   | HJS                          | HJD, HJL, HJP   |
| SINGLE-PHASE INSTALLATIONS (SUBSURFACE) |             |  |                              |   |
| 2400                                    | 240/120     | WS, WSV, WUS   | WUS                          | WSV, WS   |
| 6930                                    | 240/120     | NES  | NES (B)                      | --  |
| 7200                                    | 240/120     | YES, YIS, YSV  | NES (B)                      | YES, YIS, YSV   |
| 12000                                   | 120/240     | HSS  | HST (E)                      | HSS   |
| 12000<br>W/SECONDARY TAPS               | 120/240     | HST  | HST (E)                      | --  |
| THREE-PHASE INSTALLATIONS (PADMOUNT)    |             |  |                              |   |
| 4160                                    | 208Y/120    | PZB, PZR, PZS, WGP, WZP, WZR   | PZS                          | PZB, PZR, WGP, WZP, WZR   |
| 4160                                    | 240X480 (A) | WXP, PXB   | PXS                          | WXP, PXB  |
| 12000                                   | 208Y/120    | HAB, HAL, HAP, HAQ, HBP, HBS,<br>HGP, HHP, HZB, HZL, HZP, HZQ,<br>HZR, HZS | HBS                          | HAB, HAL, HAP, HAQ, HBP,<br>HGP, HHP, HZB, HZL, HZP,<br>HZQ, HZR, HZS |
| 12000                                   | 240/120     | HKB, HKR, HKS<br>-----<br>1ø BANK: HDD, HDL, HDS, HEP,<br>HSL, HP, HQ, HTD | HKS<br>-----<br>1ø BANK: HTS | HKB, HKR<br>-----<br>1ø BANK: HDD, HDL, HSL, HP,<br>HQ, HTD, HDS, HEP |
| 12000                                   | 480/240     | HDP, HFP   | 1ø BANK: HJS                 | HDP, HFP  |
| 12000                                   | 240X480 (A) | HLP, HXP wired 240V<br>HLP, HXP wired 480V                                 | HKS 240/120<br>HNS 480/277   | HLP, HXP<br>HLP, HXP, HMS   |

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                    |     |          |    |                     |      | UG3703.1 |
|                 |                   | DISTRIBUTION TRANSFORMER APPLICATIONS            |                           |      |                    |     |          |    |                     |      |          |



| THREE-PHASE INSTALLATIONS (PADMOUNT) (CONT'D) |             |  |                                      |   |
|---|-------------|--|--------------------------------------|---|
| 12000   | 480Y/277    | HMB, HML, HMP, HMS, HNB, HNL,<br>HNR, HNS, HUP | HNS                                  | HMB, HML, HMP, HMS,<br>HNB, HNL, HNR, HUP |
| 12000   | 4160Y/2400  | HOP, HPB, HPR, HPP, HPS, HSV                   | HPS                                  | HOP, HPB, HPP, HPR, HSV                   |
| 12000   | 12470Y/7200 | HHR, HSV, HHS                                  | HHS (D)                              | HHR, HSV                                  |
| THREE-PHASE INSTALLATIONS (SUBSURFACE)        |             |  |                                      |   |
| 12000   | 208Y/120    | HAS<br>-----<br>1∅ BANK: HSS, HST              | HAS (D)<br>-----<br>1∅ BANK: HST (E) | 1∅ BANK: HSS                              |
| 12000   | 240/120     | 1∅ BANK: HSS, HST                              | 1∅ BANK: HST (E)                     | 1∅ BANK: HSS                              |

## INSTALLATION:

- A) 240X480 INDICATES A WINDING SUITABLE FOR THREE-WIRE SERIES OPERATION AT 480 VOLT DELTA OR FOR THREE-WIRE PARALLEL OPERATION AT 240 VOLTS DELTA BUT NOT FOR BOTH VOLTAGES SIMULTANEOUSLY.
- B) 6930V 'N' TYPE SINGLE-PHASE TRANSFORMERS, WITH SECONDARY TAPS, CAN BE USED TO REPLACE 7200V 'Y' TYPE SINGLE-PHASE TRANSFORMERS ON 7200V SYSTEMS. WE STILL HAVE A FEW 7200V BRANCH LINES IN THE SYSTEM. 7200V SYSTEMS CAN BE IDENTIFIED BY THE UPSTREAM BOOSTER STATION. BOOSTER STATIONS ARE CODED WITH A 'B' SUFFIX, I.E. 275-472B. 'Y' TYPE 7200V TRANSFORMERS (YEP, YDP, ETC.) WERE THE PREFERRED TRANSFORMER FOR 7200V SYSTEMS. HOWEVER, WE NO LONGER STOCK, OR INSTALL, 'Y' TYPE SINGLE-PHASE TRANSFORMERS. WHEN REPLACING SINGLE-PHASE 'Y' TRANSFORMERS FIRST DETERMINE IF YOU'RE ON A 7200V SYSTEM OR A 6930V SYSTEM. IF YOU'RE ON A 7200V SYSTEM, INSTALL AN 'N' TYPE TRANSFORMER WITH SECONDARY TAPS (NTS, NCS). THE FIELD CREW CAN TAP DOWN THE SECONDARY VOLTAGE, AS NEEDED, TO COMPENSATE FOR ANY SECONDARY VOLTAGE BOOST. IF YOU'RE ON A 6930V SYSTEM (NO BOOSTER STATION) REPLACE A 'Y' TRANSFORMER WITH AN 'N' TYPE TRANSFORMER (NTS) - SECONDARY TAPS ARE NOT NEEDED.
- C) WHEN REPLACING LIVE FRONT TRANSFORMERS EVERY EFFORT SHOULD BE MADE TO UPGRADE TO DEADFRONT. EACH SITUATION SHOULD BE EVALUATED INDEPENDENTLY. WHEN IN DOUBT CONTACT YOUR LOCAL ELECTRIC CONSTRUCTION SUPERVISOR (ECS) IN THE DISTRICT. THE ECS WILL LET YOU KNOW IF CONVERTING IS FEASIBLE AND TELL YOU PRECISELY WHAT ADDITIONAL AND/OR SPECIAL MATERIAL WILL BE NEEDED.
- D) SPECIAL ORDER ITEM: CONTACT STANDARDS FOR INFORMATION AND LEAD TIMES. TRANSFORMER TABLES FOR THESE UNITS CAN BE FOUND IN THE UG FIELD MAINTENANCE ONLY MANUAL.
- E) DEVIATION REQUIRED TO INSTALL THIS TRANSFORMER.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |           |                    |        |    |          |      |      |                     |  |          |
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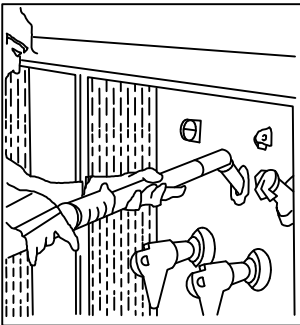
PURPOSE:

OVERLOAD AND FAULT PROTECTION FOR THREE-PHASE AND SINGLE-PHASE DEADFRONT PAD-MOUNTED TRANSFORMERS.

FOR USE WITH:

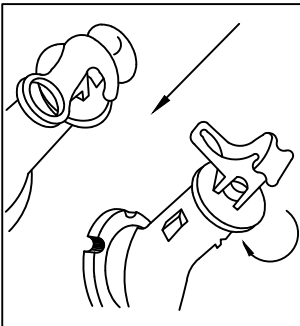
4KV AND 12KV - THREE-PHASE AND SINGLE-PHASE RADIAL OR LOOP FEED DEADFRONT PAD-MOUNTED TRANSFORMERS THROUGH 2500 KVA.

FOR BAYONET FUSE OPERATION: SEE ELECTRIC STANDARD PRACTICE 213 AND 214.



**NOTE:** OPERATE VENT BEFORE OPERATING BAYONET FUSES.

1. ATTACH UNIVERSAL HOT STICK TOOL, OR HOOK STICK TO FUSE HANDLE EYE - STAND TO ONE SIDE - UNLOCK HANDLE.



2. PUSH DOWN AND ROTATE THE HANDLE 90° IN THE TUBE. DURING THIS PROCEDURE INTERNAL TANK PRESSURE ESCAPES AND INSIDE AND OUTSIDE PRESSURES ARE EQUALIZED. THE 90° ROTATION OF THE FUSE HOLDER BREAKS ANY ADHESION BETWEEN THE SEAL GASKET AND THE OUTER TUBE ASSEMBLY.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

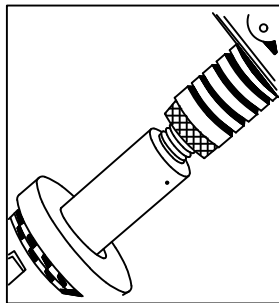
"BAY-O-NET" FUSE OPERATING INSTRUCTIONS FOR THREE-PHASE  
AND SINGLE-PHASE DEADFRONT PADMOUNTED TRANSFORMERS

UG3704.1



## DE-ENERGIZED PADMOUNTED TRANSFORMERS:

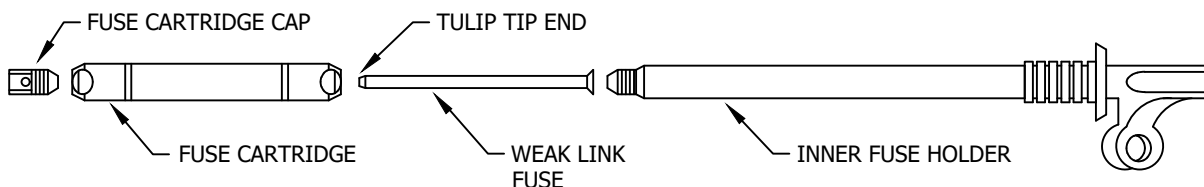
CONTINUED FROM PAGE 3704.01



3. PULL OUT THE FUSE HOLDER THREE INCHES AND STOP! WAIT A FEW SECONDS FOR THE OIL TO DRAIN INTO THE TANK. THE INNER FUSE HOLDER ASSEMBLY CAN NOW BE REMOVED WITHOUT DRIPPING EXCESS OIL BY KEEPING THE FUSE HOLDER RUBBING AGAINST THE TOP OF THE CUTOUT, AS SHOWN, AND EXTRACTING IT VERY SLOWLY. THE TOTAL LENGTH OF THE INNER FUSE HOLDER ASSEMBLY, INCLUDING FUSE CARTRIDGE, IS FOURTEEN INCHES.

### BAY-O-NET FUSE REPLACEMENT (ALL STEPS MUST BE DONE IN THE SEQUENCE DESCRIBED BELOW)

1. UNSCREW FUSE CARTRIDGE FROM INNER FUSE HOLDER.
2. UNSCREW FUSE CARTRIDGE CAP.
3. REMOVE FUSE LINK (IT MAY BE NECESSARY TO STRAIGHTEN THE TULIP TIP END THAT WAS BENT BY THE FUSE CARTRIDGE CAP BEFORE FUSE LINK CAN BE REMOVED FROM FUSE CARTRIDGE).
4. INSPECT FUSE CARTRIDGE BORE TO MAKE SURE IT IS CLEAR.
5. INSERT NEW FUSE LINK INTO CARTRIDGE FROM EITHER END.
6. TIGHTEN FUSE CARTRIDGE ONTO INNER FUSE HOLDER WITH TULIP TIP AT OPPOSITE END OF INNER FUSE HOLDER.
7. SCREW CARTRIDGE CAP INTO OTHER END OF CARTRIDGE (IMPORTANT THAT THIS STEP BE LAST).
8. WHEN THE INNER FUSE HOLDER ASSEMBLY IS INSERTED AS FAR AS POSSIBLE, PUSH DOWN, AND ROTATE THE LOCKING HANDLE, HOOKING IT OVER THE SHOULDER OF THE OUTER TUBE ASSEMBLY. WHEN HANDLE IS IN LOCKED POSITION, MAKE SURE THE STAINLESS STEEL COVER WASHER IS SEATED AGAINST THE SHOULDER OF THE OUTER TUBE ASSEMBLY.



SEE STANDARDS PAGE 4311.5 FOR FUSE SIZE AND STOCK NUMBER.

#### REPLACEMENT FUSE HOLDER, FUSE CARTRIDGE AND FUSE CARTRIDGE CAP

STOCK NUMBER

412685

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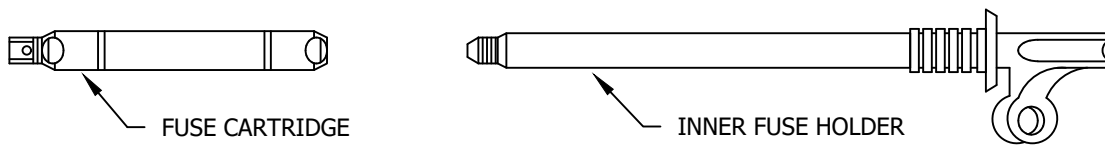
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

"BAY-O-NET" FUSE OPERATING INSTRUCTIONS FOR THREE-PHASE  
AND SINGLE-PHASE DEADFRONT PADMOUNTED TRANSFORMERS

UG3704.2



## HIGH AMPERE BAY-O-NET FUSES



| STOCK NUMBER |        |
|--------------|--------|
| 100 AMP      | 366140 |
| 125 AMP      | 366142 |

HIGH AMPERE BAY-O-NET FUSE CARTRIDGE REPLACEMENT PROCEDURE FOLLOW THE STEPS IN THE SEQUENCE LISTED BELOW:

1. UNSCREW THE FUSE CARTRIDGE FROM INNER FUSE HOLDER.
2. DISCARD THE FUSE CARTRIDGE. DO NOT ATTEMPT TO REPLACE THE FUSE IN THE CARTRIDGE.
3. TIGHTEN A NEW FUSE CARTRIDGE ONTO THE INNER FUSE HOLDER.
4. PLACE IT INTO THE "BAY-O-NET" OUTER TUBE ASSEMBLY AND SLAM HOME.
5. WHEN THE INNER FUSE HOLDER ASSEMBLY IS INSERTED AS FAR AS POSSIBLE, PUSH DOWN, AND ROTATE THE LOCKING HANDLE, HOOKING IT OVER THE SHOULDER OF THE OUTER TUBE ASSEMBLY. WHEN HANDLE IS IN LOCKED POSITION, MAKE SURE THE STAINLESS STEEL COVER WASHER IS SEATED AGAINST THE SHOULDER OF THE OUTER TUBE ASSEMBLY.

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| REV | CHANGE            | BY | DSGN | APPV  | DATE     | REV | CHANGE | BY | DSGN | APPV | DATE |
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| C   |                   |    |      |       |          | F   |        |    |      |      |      |
| B   | EDITORIAL CHANGES | AW | JS   | CZH   | 7/3/2018 | E   |        |    |      |      |      |
| A   | REVISION          |    |      | TR/JW | 7/8/2004 | D   |        |    |      |      |      |

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| SHEET<br>3 OF 3 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3704.3 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD   |                           |                    |          |                     |          |
|                 | "BAY-O-NET" FUSE OPERATING INSTRUCTIONS FOR THREE-PHASE AND SINGLE-PHASE DEADFRONT PADMOUNTED TRANSFORMERS |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD LISTS THE ALLOWABLE LOAD CURRENT IN AMPERES FOR SINGLE-PHASE AND THREE-PHASE COMMERCIAL TRANSFORMERS. IF TRANSFORMER LOAD EXCEEDS VALUE SHOWN IN TABLE, REPLACE THE TRANSFORMER.

### **SINGLE-PHASE TRANSFORMERS**

| KVA RATING | COMMERCIAL ALLOWABLE LOAD CURRENT (IN AMPERES) AT THE LINE-TO-LINE VOLTAGES LISTED BELOW |      |       |       |
|------------|--|------|-------|-------|
|            | 240V   | 480V | 2400V | 4160V |
| 10         | 61   | 31   | 6     | 4     |
| 15         | 92   | 46   | 9     | 5     |
| 25         | 153  | 77   | 15    | 9     |
| 37.5       | 230  | 115  | 23    | 13    |
| 50         | 306  | 153  | 31    | 18    |
| 75         | 459  | 230  | 46    | 27    |
| 100        | 613  | 306  | 61    | 35    |
| 167        | 1,023  | 511  | 102   | 59    |

### **THREE-PHASE TRANSFORMERS**

| KVA RATING | COMMERCIAL ALLOWABLE LOAD CURRENT (IN AMPERES) AT THE LINE-TO-LINE VOLTAGES LISTED BELOW |        |       |       |       |
|------------|--|--------|-------|-------|-------|
|            | 208V   | 240V   | 480V  | 2400V | 4160V |
| 45         | 184  | 159    | 80    | 16    | 9     |
| 75         | 306  | 265    | 133   | 27    | 15    |
| 112.5      | 459  | 398    | 199   | 40    | 23    |
| 150        | 612  | 530    | 265   | 53    | 35    |
| 225        | 918  | 796    | 398   | 80    | 52    |
| 300        | 1,224  | 1,061  | 530   | 106   | 61    |
| 500        | 2,040  | 1,768  | 884   | 177   | 102   |
| 750        | 3,060  | 2,652  | 1,326 | 265   | 153   |
| 1,000      | 4,080  | 3,536  | 1,768 | 354   | 204   |
| 1,500      | 6,120  | 5,304  | 2,652 | 530   | 306   |
| 2,000      | 8,161  | 7,073  | 3,536 | 707   | 466   |
| 2,500      | 10,201   | 8,841  | 4,420 | 884   | 510   |
| 3,000      | 12,241   | 10,609 | 6,062 | 1,061 | 612   |

### **NOTES:**

- LOAD VALUES IN THE TABLE ABOVE DO NOT CONSIDER VOLTAGE PROBLEMS THAT MAY OCCUR AT THOSE VALUES. VOLTAGE PROBLEMS SHOULD BE REFERRED TO THE C & O ENGINEER.

LOAD VALUES BASED ON ANSI/IEEE C57.91-1981

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| B   | EDITORIAL CHANGES | AW | JS   | CZH  | 7/3/2018 | E   |        |    |      |      |      |
| A   | REVISION          |    |      |      | 1/1/1996 | D   |        |    |      |      |      |

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| SHEET<br>1 OF 2 | <div><div>X</div><div>Indicates Latest Revision</div></div>                    | Completely Revised | New Page | Information Removed | UG3706.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                               |                    |          |                     |          |
|                 | ALLOWABLE LOAD CURRENT SINGLE-PHASE AND<br>THREE-PHASE COMMERCIAL TRANSFORMERS |                    |          |                     |          |



**SCOPE:** THIS STANDARD PROVIDES THE DIVISION OF SINGLE-PHASE LOAD CURRENT OF A THREE-PHASE STATION WHEN IT IS COMPOSED OF SINGLE-PHASE PAD-MOUNT TRANSFORMERS.

## A: CLOSED-DELTA BANKS

| SINGLE-PHASE LOAD CURRENT IN EACH TRANSFORMER OF AN UG DELTA-DELTA BANK |     |                           |     |
|---|-----|---------------------------|-----|
| SIZE OF TRANSFORMERS IN BANK (KVA)                                      |     | % OF SINGLE-PHASE CURRENT |     |
| 1   | 2&3 | 1                         | 2&3 |
| 15  | 15  | 67                        | 33  |
| 25  | 15  | 78                        | 22  |
| 50  | 15  | 87                        | 13  |
| 75  | 15  | 91                        | 9   |
| 100   | 15  | 93                        | 7   |
| 25  | 25  | 67                        | 33  |
| 50  | 25  | 79                        | 21  |
| 75  | 25  | 86                        | 14  |
| 100   | 25  | 88                        | 12  |
| 50  | 50  | 67                        | 33  |
| 75  | 50  | 76                        | 24  |
| 100   | 50  | 79                        | 21  |
| 75  | 75  | 67                        | 33  |
| 100   | 75  | 71                        | 29  |
| 100   | 100 | 67                        | 33  |

## B: OPEN-DELTA BANKS

SINCE BOTH TRANSFORMERS CARRY THE THREE-PHASE LOAD, AND ONE CARRIES THE SINGLE-PHASE LOAD IN ADDITION, THE LATTER TRANSFORMER MUST BE THE LARGER UNIT. IT MUST CARRY THE VECTORIAL SUM OF THE SINGLE-PHASE LOAD PLUS 58 PERCENT OF THE THREE-PHASE LOAD. FOR EXAMPLE, IF IT IS DESIRED TO CARRY A SINGLE-PHASE LOAD OF 30 KVA AND A THREE-PHASE LOAD OF 12 KVA, WITH THE SAME POWER FACTOR, THE TRANSFORMER LOADS CAN BE DETERMINED AS FOLLOWS:

|                              | LARGE TRANSFORMER LOAD | SMALL TRANSFORMER LOAD |
|------------------------------|------------------------|------------------------|
| SINGLE-PHASE LOAD            | 30 KVA                 | -                      |
| THREE-PHASE LOAD (0.58 X 12) | 7                      | 7                      |
| TOTAL LOAD                   | 37 KVA                 | 7 KVA                  |

## NOTES:

II. FOR A MORE COMPLETE DESCRIPTION OF THE DIVISION OF CURRENTS IN A THREE-PHASE STATION, CONSULT OVERHEAD STANDARD 1105.

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| B   | EDITORIAL CHANGES | AW | JS   | CZH  | 7/3/2018 | E   |        |    |      |      |      |
| A   | REVISION          |    |      |      | 1/1/1996 | D   |        |    |      |      |      |

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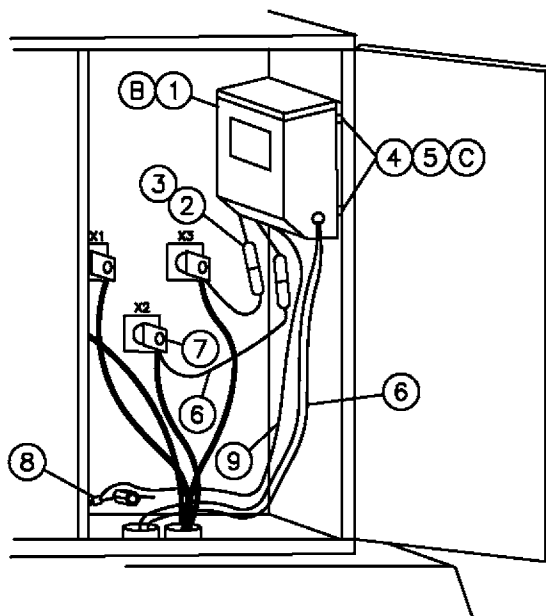
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

TRANSFORMER LOADING GUIDE FOR THREE-PHASE  
STATIONS WITH SINGLE-PHASE TRANSFORMERS

UG3706.2



**SCOPE:** THIS STANDARD SHOWS THE METHOD OF INSTALLING AN 'XD' DRY TYPE TRANSFORMER IN THE 480V SECONDARY COMPARTMENT OF A PAD-MOUNTED, THREE-PHASE TRANSFORMER.






#### BILL OF MATERIAL:

| ITEM | DESCRIPTION                                 | QUANTITY |      | CONSTR. STD. | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|----------|------|--------------|--------------|----------------|
|      |   | 2KVA     | 3KVA |              |              |                |
| 1    | TRANSFORMER, 'XD', DRY TYPE                 | 1        | —    | 3702         | 757888       | XD-002         |
|      |   | —        | 1    |              | 757920       | XD-003         |
| 2    | KIT, CONNECTOR, FUSED                       | 2        | 2    | —            | 443392       | —              |
| 3    | FUSE, MIDGET TYPE, SINGLE ELEMENT, 500 VOLT | 5 AMP    | 2    | —            | 368170       | —              |
|      |   | 7 AMP    | —    | —            | 368172       | —              |
| 4    | BOLT, CARRIAGE, 5/16" X 1 1/2" (C)          | 4        | 4    | —            | 149664       | —              |
| 5    | NUT, HEX, 5/16", 1 ROUND AND 1 LOCK WASHER  | 4        | 4    | —            | 506688       | —              |
| 6    | WIRE, #8, 600V, AL INSULATED                | 6'       | 6'   | 4002         | 196176       | —              |
| 7    | SECONDARY CONNECTIONS                       | 2        | 2    | 4168, 4171   | —            | —              |
| 8    | CONNECTOR, COMPRESSION (SIZE AS REQ'D)      | AS REQ'D |      | 4172         | —            | —              |
| 9    | WIRE, BARE STRANDED CU, #2 (D)              | AS REQ'D |      | —            | 812816       | —              |

#### INSTALLATION:

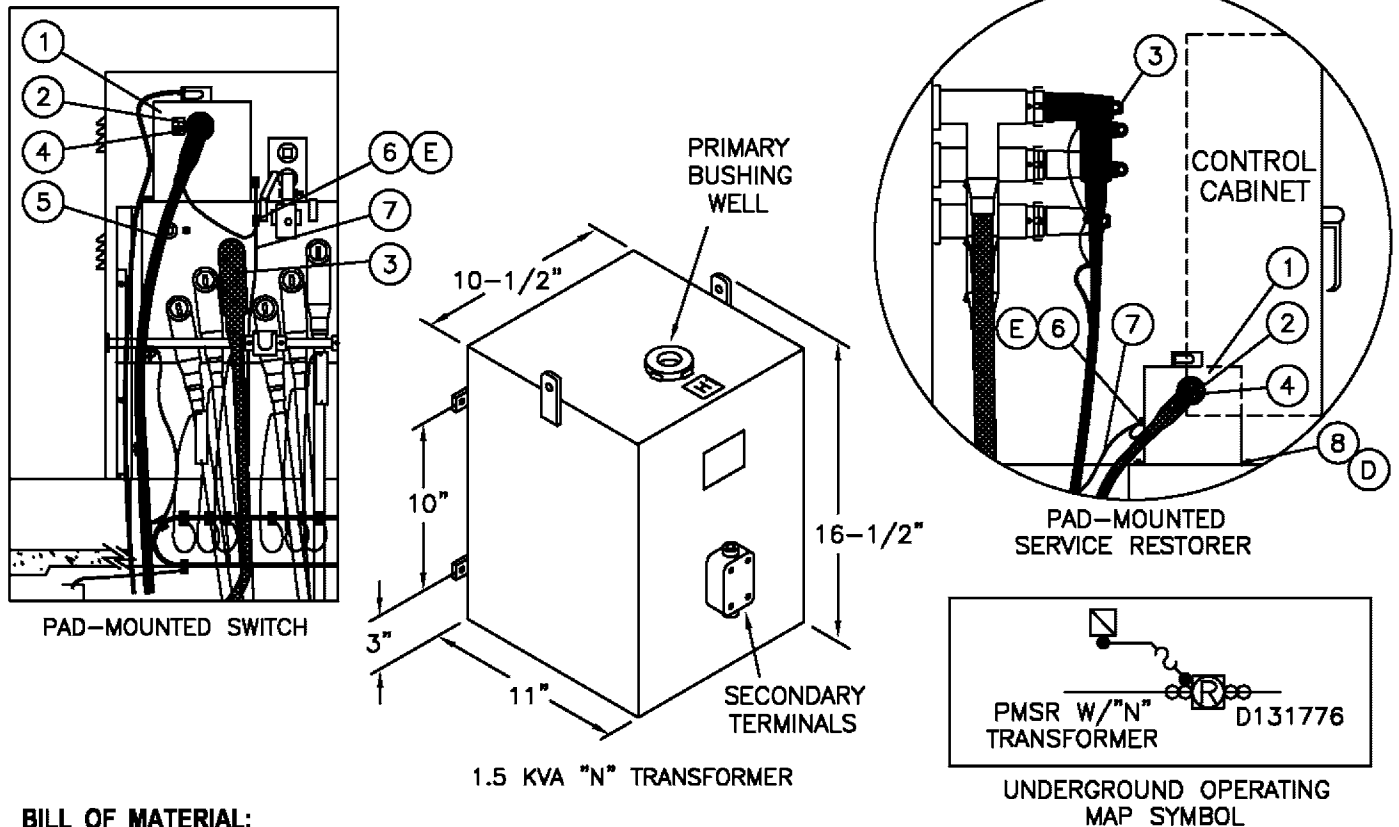
- A. USE THIS CONSTRUCTION TO AVOID SETTING AN ADDITIONAL TRANSFORMER FOR SMALL 240/120V METERED OR UNMETERED LOADS. DO NOT EXCEED THE NAME PLATE RATING OF TRANSFORMER.
- (B) MOUNT 'XD' TRANSFORMER TO ENCLOSURE WALL IN UPPER SECONDARY COMPARTMENT SO AS NOT TO CROWD SECONDARY TERMINALS OR CONDUCTORS. MAINTAIN 1-1/2 INCH MINIMUM CLEARANCE FROM 'XD' TRANSFORMER TO 480V SECONDARY TERMINALS.
- (C) TO MOUNT 'XD' TRANSFORMER, DRILL FOUR 3/8 INCH HOLES IN OUTSIDE CABINET WALL. APPLY RUST INHIBITOR AND SAME COLOR PAINT AS TRANSFORMER CABINET ON ALL HOLES DRILLED IN CABINET. FOR TAMPER RESISTANCE, INSTALL CARRIAGE BOLTS WITH HEADS ON OUTSIDE OF TRANSFORMER CABINET WALL.
- (D) GROUND 'XD' TRANSFORMER CASE TO PAD GROUND WIRE IF GROUND LUG IS PROVIDED INSIDE 'XD' TRANSFORMER ACCESS PLATE.

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| 3708 | SDG&E ELECTRIC STANDARDS  |                           |                    |          |                     | REVISION   |
|      | SINGLE-PHASE, TYPE 'XD', 480V TO 240/120V,<br>WALL MOUNTED TRANSFORMER INSTALLATION |                           |                    |          |                     | DATE 1-1-98  |
|      |   |                           |                    |          |                     | APPD  /  |
|      |   |                           |                    |          |                     |  |



**SCOPE:** THIS STANDARD SHOWS THE N-1.5 KVA TRANSFORMER AND THE METHODS OF INSTALLATION FOR CONTROL POWER IN AN EQUIPMENT CABINET.



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                                     | QUANTITY | CONSTR. STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|----------|-------------------------|--------------|----------------|
| 1    | TRANSFORMER "N" DRY TYPE                        | 1        | 3502                    | 757880       | N-1.5          |
| 2    | BUSHING PLUG 200A LB (INCLUDED IN AU)           | 1        | 4180                    | 544676       | -              |
| 3    | FUSED ELBOW LOADBREAK #2 AL                     | 1        | 4191.3                  | 443850       | FE-2AL         |
| 4    | ELBOW LOADBREAK #2 AL                           | 1        | 4191.1                  | 443838       | LBE-2A         |
| 5    | WHIP CABLE AL PECN-PEJ 1/C #2                   | 10 FT.   | 4002.2                  | 197600       | WIP-#2         |
| 6    | CONNECTOR, COMPRESSION SIZE AS REQUIRED         | AS REQ'D | 4172                    | -            | -              |
| 7    | WIRE, BARE STRANDED CU, #2                      | AS REQ'D | -                       | 812816       | -              |
| 8    | ANCHOR, CONCRETE STAINLESS STEEL, 1/4" X 2-1/4" | 4        | -                       | 107660       | -              |

**INSTALLATION:**

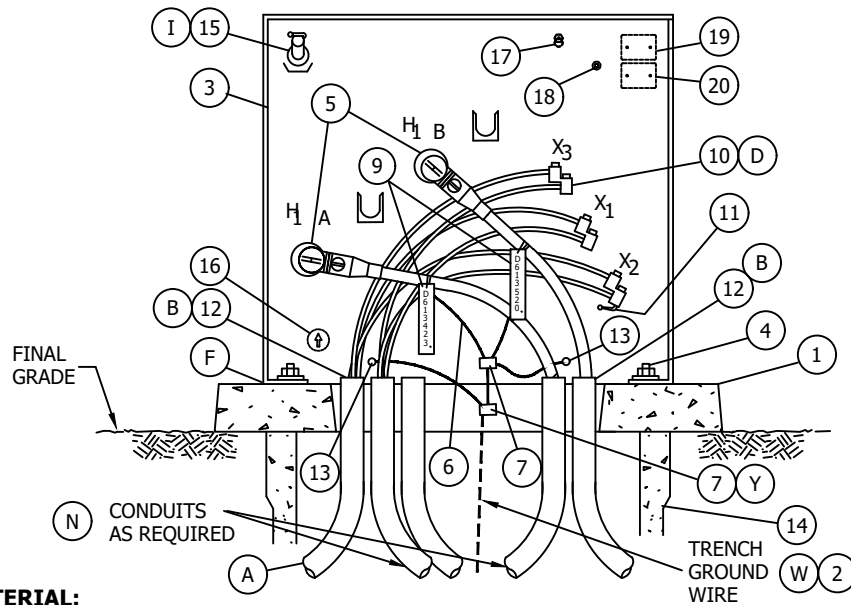
- THE N-1.5 TRANSFORMER IS NOT TO BE INSTALLED IN A MANHOLE OR HANDHOLE.
- USE THIS TRANSFORMER TO AVOID SETTING AN ADDITIONAL PAD-MOUNT TRANSFORMER FOR SMALL 120V NON-REVENUE LOADS.
- "N" TRANSFORMERS HAVE NO INTERNAL PROTECTION, THE FEED POINT SHOULD INCLUDE A 30 AMP FUSED ELBOW.
- WHEN INSTALLING THE "N" TRANSFORMER ON THE PAD INSIDE OF A PAD-MOUNTED SERVICE RESTORER, PLACE ONE OR TWO EXTRA 1/4 INCH ROUND WASHERS ON THE ANCHOR BOLTS BEFORE INSTALLING THE CONCRETE PAD AND THE TRANSFORMER.
- GROUND THE "N" TRANSFORMER CASE TO THE EQUIPMENT AND CABLE GROUND SYSTEM.
- INSTALL "N" TRANSFORMER ON LINE SIDE OF PMSR.

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| REVISION |                    | SDG&E ELECTRIC STANDARDS  |                    |          |                     |
| DATE     | 3-1-02             | SINGLE-PHASE TYPE "N"     |                    |          |                     |
| APPD     | <i>[Signature]</i> | 6930 TO 120V 1.5 KVA      |                    |          |                     |
|          |                    | 3709                      |                    |          |                     |



**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION THAT SHALL BE USED FOR INSTALLING SINGLE-PHASE, DUAL VOLTAGE LOW PROFILE PAD-MOUNT TRANSFORMER TYPES "SDS".



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION   | KVA | TAPS | QUANTITY | CONST STD OR PG NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|-----|------|----------|---------------------|--------------|----------------|
| 1    | PAD, TRANSFORMER, SINGLE-PHASE  | -   | -    | 1        | 3421                | S514240      |                |
| 2    | TRENCH GROUND WIRE (W)  | -   | -    | AS REQ'D | 4510                | -            |                |
| 3    | TRANSFORMER, (SDS)  | -   | -    | 1        | 3702.2              | -            |                |
|      |   | 25  | -    | -        | -                   | S761520      | SDS-25         |
|      |   | 50  | -    | -        | -                   | S761522      | SDS-50         |
|      |   | 75  | -    | -        | -                   | S761524      | SDS-75         |
| 4    | HOLD DOWN DEVICE - (SUPPLIED WITH CABINET)                              | -   | -    | 2        | -                   | -            |                |
| 5    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND W/BUSHING PLUG) (C) | -   | -    | 2        | 4191                | -            |                |
|      |   |     |      | 2        | 4192.1              | S544676      |                |
| 6    | CONCENTRIC NEUTRAL TAILS  | -   | -    | 2        | -                   | -            |                |
| 7    | CONNECTOR, COMPRESSION  | -   | -    | AS REQ'D | 4172                | -            |                |
| 8    | KEYLESS LOCK, (NOT SHOWN ABOVE) (H)                                     | -   | -    | 1        | -                   | S468010      |                |
| 9    | CABLE IDENTIFICATION TAGS   | -   | -    | AS REQ'D | 3202                | -            |                |
| 10   | SECONDARY CONNECTIONS (D)   | -   | -    | AS REQ'D | 4167                | -            |                |
| 11   | NEUTRAL GROUND STRAP (ON TRANSFORMER)                                   | -   | -    | 1        | -                   | -            |                |
| 12   | SEALING COMPOUND  | -   | -    | AS REQ'D | -                   | S442976      |                |
| 13   | SERVICE POST CONNECTOR  | -   | -    | 2        | -                   | S262560      |                |
| 14   | 3312 BOX USE AS NEEDED  | -   | -    | AS REQ'D | 3312                | S162462      |                |
| 15   | BAY-O-NET FUSE SEE FUSE TABLE 4311.5                                    | -   | -    | AS REQ'D | 4311.5              |              |                |
| 16   | DUAL VOLTAGE SWITCH   |     |      |          |                     |              |                |
| 17   | PRESSURE RELIEF VALVE   |     |      |          |                     |              |                |
| 18   | OIL LEVEL PLUG  |     |      |          |                     |              |                |
| 19   | DIAGRAM NAME PLATE  |     |      |          |                     |              |                |
| 20   | BAR CODE STOCK NUMBER PLATE   |     |      |          |                     |              |                |

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| A   | EDITORIAL CHANGES |    | TR   | DW   | 9/26/2013 | D   |        |    |      |      |      |

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**SHEET  
1 OF 5**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD  
SINGLE-PHASE, DUAL VOLTAGE SDS  
4160GRDY/2400 X 12000GRDY/6930  
LOW PROFILE PAD-MOUNT TRANSFORMER INSTALLATION

**UG3711.1**



**INSTALLATION:**

- (A) THIS INSTALLATION IS LIMITED TO 2 SINGLE-PHASE #2 PRIMARY CABLES, ONE IN AND ONE OUT.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6.).
- (C) WHEN INSTALLATION IS AT END OF CIRCUIT, CHANGE QUANTITY TO ONE ELBOW (STANDARD 4191 AND ONE ONE RECEPTACLE (STOCK NUMBER S204304).
- (D) SET SCREW CONNECTORS ARE NOT PROVIDED WITH TRANSFORMER, SEE STANDARD 4167 FOR INSTALLATION AND STOCK NUMBERS. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER.
- (F) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (STANDARD 3408).
- (H) KEYLESS LOCK (ITEM 8) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AND PENTAHEAD BOLT THREADED IN COMPLETELY.
- (I) WHEN CHANGING SDS FROM 2.4KV TO 6.9KV FOLLOW BAY-O-NET FUSE CHART LISTED:

| SDS   | 2.4KV  | 6.9KV  |
|-------|--------|--------|
| 25KVA | 15 AMP | 6 AMP  |
| 50KVA | 40 AMP | 12 AMP |
| 75KVA | 50 AMP | 15 AMP |

SERIES/MULTIPLE PRIMARY TRANSFORMERS ARE SUPPLIED WITH 2.4KV FUSE.

**REFERENCE:**

- J. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (N) SEE STANDARD 3421 FOR PAD AND CONDUIT PLACEMENT.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S. SEE STANDARD 3487 FOR RETAINING WALL.
- T. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- U. SEE STANDARD 3703 FOR TRANSFORMER APPLICATIONS.
- (V) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (W) SEE STANDARD 4510 FOR (PREFERRED I ) AND (ALTERNATE) TRENCH GROUND WIRE.
- X. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II ) EQUIPMENT GROUNDING INSTALLATION.
- (Y) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Z. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PADMOUNTED EQUIPMENT.

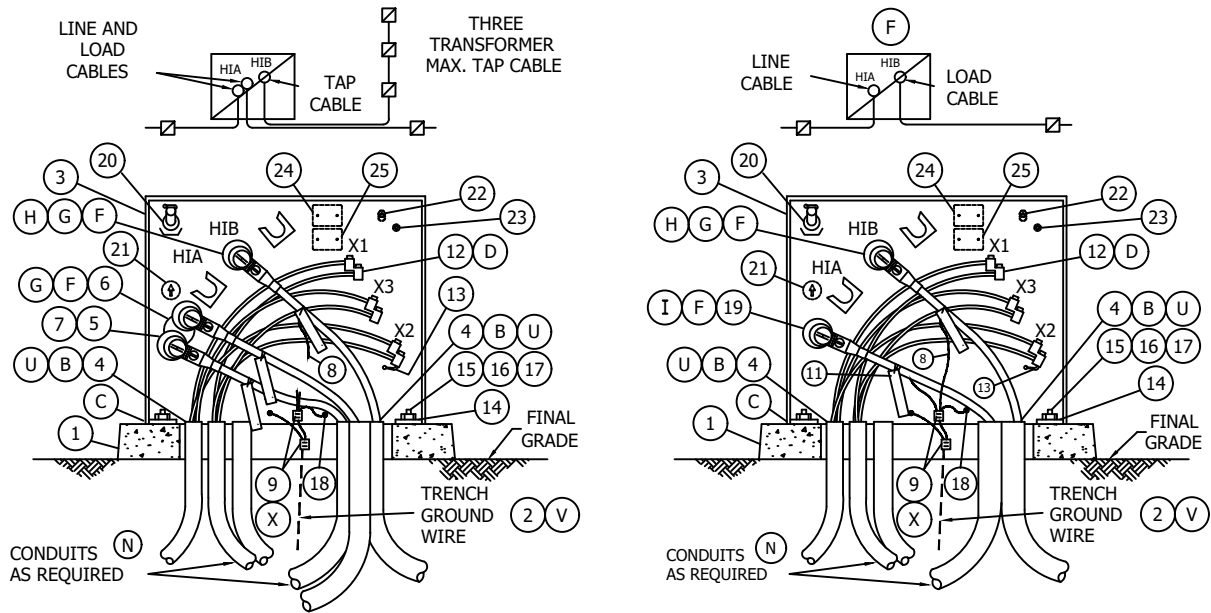
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| A   | EDITORIAL CHANGES |    | TR   | DW   | 9/26/2013 | D   |        |    |      |      |      |

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| SHEET<br>2 OF 5 | <div>X</div>   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3711.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD   |                           |                    |          |                     |          |
|                 | SINGLE-PHASE, DUAL VOLTAGE SDS<br>4160GRDY/2400 X 12000GRDY/6930<br>LOW PROFILE PAD-MOUNT TRANSFORMER INSTALLATION |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION THAT SHALL BE USED FOR INSTALLING SINGLE-PHASE, 6930 VOLT LOW PROFILE PAD-MOUNT TRANSFORMERS TYPE "NTS", **WITH VOLTAGE TAP CHANGER.**



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | KVA | TAPS | QUANTITY | CONST STD. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|-----|------|----------|------------|--------------|----------------|
| 1    | PAD, TRANSFORMER SINGLE-PHASE                            | -   | -    | 1        | 3421       | S514240      | 3421-1         |
| 2    | TRENCH GROUND WIRE (V)                                   | -   | -    | AS REQ'D | 4510       | -            | -              |
| 3    | TRANSFORMER, (NTS) (G F)                                 | -   | -    | 1        | 3702.2     | -            | -              |
|      |  | 25  | (B)  | -        | -          | S764230      | NTS-25         |
|      |  | 50  | (B)  | -        | -          | S764232      | NTS-50         |
|      |  | 75  | (B)  | -        | -          | S764234      | NTS-75         |
|      |  | 100 | (B)  | -        | -          | S764236      | NTS100         |
| 4    | SEALING COMPOUND (B U)                                   | -   | -    | AS REQ'D | -          | S442976      | -              |
| 5    | CAP, INSULATING RECEPTACLE (H)                           | -   | -    | AS REQ'D | 4192       | S204304      | INSREC         |
| 6    | FEED-THRU INSERT (H G F)                                 | -   | -    | 1        | 4192       | S544678      | FEED-I         |
| 7    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) (H) | -   | -    | 3        | 4191       | -            | -              |
| 8    | CONCENTRIC NEUTRAL TAILS                                 | -   | -    | AS REQ'D | 4172.1     | -            | -              |
| 9    | CONNECTOR, COMPRESSION                                   | -   | -    | AS REQ'D | 4172       | -            | -              |
| 10   | KEYLESS LOCK, (NOT SHOWN ABOVE) (A)                      | -   | -    | 1        | -          | S468010      | -              |
| 11   | CABLE IDENTIFICATION TAGS                                | -   | -    | AS REQ'D | 3202       | -            | -              |
| 12   | CONNECTIONS, SECONDARY (D)                               | -   | -    | AS REQ'D | 4167       | -            | -              |
| 13   | NEUTRAL GROUND STRAP (ON TRANSFORMER)                    | -   | -    | 1        | -          | -            | -              |
| 14   | HOLD DOWN DEVICE (SUPPLIED WITH TRANSFORMER)             | -   | -    | 2        | -          | -            | -              |
| 15   | NUT, CLAMPING CHANNEL                                    | -   | -    | 2        | -          | S503520      | -              |

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   |                   |    |      |      |           | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES |    | TR   | DW   | 9/26/2013 | D   |        |    |      |      |      |

SHEET  
3 OF 5

**X** Indicates Latest Revision Completely Revised New Page Information Removed

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

SINGLE-PHASE, 6930 VOLT, TYPE "NTS"  
LOW PROFILE PAD-MOUNT TRANSFORMER INSTALLATION

UG3711.3



**BILL OF MATERIAL: (CON'T)**

| ITEM | DESCRIPTION                                | KVA | TAPS | QUANTITY | CONST STD. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|-----|------|----------|------------|--------------|----------------|
| 16   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2" | -   | -    | 2        | -          | S616192      | -              |
| 17   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"  | -   | -    | 2        | -          | S799488      | -              |
| 18   | SERVICE POST CONNECTOR                     | -   | -    | 2        | -          | S262560      | -              |
| 19   | BUSHING PLUG                               | -   | -    | 1        | 4192       | S544676      | BSHPLG         |
| 20   | BAY-O-NET FUSE SEE FUSE TABLE 4311.5       | -   | -    | AS REQ'D | 4311.5     | -            | -              |
| 21   | NO LOAD TAP CHANGER                        | -   | -    | 1        | -          | -            | -              |
| 22   | PRESSURE RELIEF VALVE                      | -   | -    | 1        | -          | -            | -              |
| 23   | OIL LEVEL PLUG                             | -   | -    | 1        | -          | -            | -              |
| 24   | DIAGRAM NAME PLATE                         | -   | -    | 1        | -          | -            | -              |
| 25   | BAR CODE STOCK NUMBER PLATE                | -   | -    | 1        | -          | -            | -              |

**INSTALLATION:**

- (A) KEYLESS LOCK, ITEM 10, TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AND PENTAHEAD BOLT THREADED IN COMPLETELY.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND OR EQUIVALENT. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (C) BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (STANDARD 3408).
- (D) SET SCREW CONNECTORS ARE NOT PROVIDED WITH TRANSFORMER. SEE STANDARD 4167 FOR INSTALLATION AND STOCK NUMBERS. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER.
- (F) THIS INSTALLATION ALLOWS UP TO THREE SINGLE-PHASE PRIMARY CABLES. THE "NTS" TRANSFORMER IS FITTED WITH ONE BUSHING WELL ON BUSHING "HIA" AND ONE INTEGRAL BUSHING ON BUSHING "HIB". A FEED-THRU INSERT IS REQUIRED ON BUSHING "HIA", ITEM 6 IN THE BILL OF MATERIAL.
- (G) INSTALL THE LINE AND LOAD CABLES ON THE FEED THRU BUSHING "HIA". INSTALL THE TAP CABLE ON THE INTEGRAL BUSHING "HIB". THE TAP CABLE MAY FEED UP TO THREE TRANSFORMERS MAXIMUM.
- (H) REDUCE LOADBREAK ELBOW QUANTITY AND INSTALL INSULATING RECEPTACLE IF ALL THREE CABLES ARE NOT INSTALLED SIMULTANEOUSLY.
- (I) INSTALL A BUSHING PLUG ON "HIA" BUSHING WELL WHEN THE TRANSFORMER USES ONE PRIMARY LINE CABLE IN AND ONE PRIMARY LOAD CABLE OUT.

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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   |                   |    |      |      |           | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES |    | TR   | DW   | 9/26/2013 | D   |        |    |      |      |      |

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| SHEET<br>4 OF 5 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3711.4 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                      |                           |                    |          |                     |          |
|                 | SINGLE-PHASE, 6930 VOLT, TYPE "NTS"<br>LOW PROFILE PAD-MOUNT TRANSFORMER INSTALLATION |                           |                    |          |                     |          |




**REFERENCE:**

- J. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (N) SEE STANDARD 3421 FOR PAD AND CONDUIT REQUIREMENTS.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALL.
- S. SEE STANDARD 3487 FOR RETAINING WALLS.
- (T) SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- (U) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (V) SEE STANDARD 4510 FOR (PREFERRED I ) AND (ALTERNATE) TRENCH GROUND WIRE.
- W. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II ) EQUIPMENT GROUNDING INSTALLATION.
- (X) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Y. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

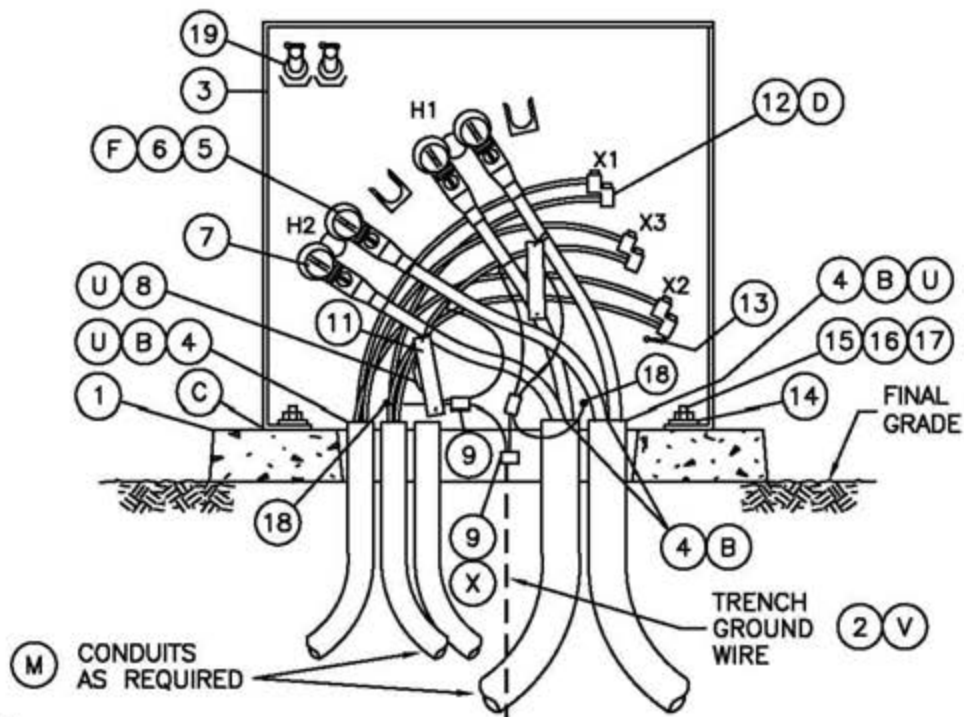
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| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|-------------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   |                   |    |      |      |           | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES |    | TR   | DW   | 9/26/2013 | D   |        |    |      |      |      |

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| SHEET<br>5 OF 5 |    | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG3711.5 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                      |                           |                    |          |                     |          |
|                 | SINGLE-PHASE, 6930 VOLT, TYPE "NTS"<br>LOW PROFILE PAD-MOUNT TRANSFORMER INSTALLATION |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION THAT SHALL BE USED FOR INSTALLING SINGLE-PHASE, 12KV, DEAD FRONT, PAD-MOUNT TRANSFORMER, TYPES "HDS", "HJS", "HTS".



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD OR PG NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------------|--------------|----------------|
| 1    | PAD, TRANSFORMER, SINGLE-PHASE                       | 1        | 3421                | 514240       | 3421-1         |
| 2    | TRENCH GROUND WIRE (V)                               | AS REQ'D | 4510                | -            | -              |
| 3    | TRANSFORMER, (HDL, HTL, HJD OR HSL) (G F)            | 1        | 3702                | -            | -              |
| 4    | SEALING COMPOUND (B 4)                               | AS REQ'D | -                   | 442976       | -              |
| 5    | BUSHING PLUG (RADIAL FEED) (F)                       | AS REQ'D | 4192                | 544676       | BSHPLG         |
| 6    | FEED-THRU INSERT (LOOP FEED) (F)                     | AS REQ'D | 4192                | 544678       | FEED-I         |
| 7    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | AS REQ'D | 4191                | -            | -              |
| 8    | CONCENTRIC NEUTRAL TAILS                             | AS REQ'D | -                   | -            | -              |
| 9    | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172                | -            | -              |
| 10   | KEYLESS LOCK, (NOT SHOWN ABOVE) (A)                  | 1        | -                   | 468010       | -              |
| 11   | CABLE IDENTIFICATION TAGS                            | AS REQ'D | 3202                | -            | -              |
| 12   | CONNECTIONS, SECONDARY (D)                           | AS REQ'D | 4167                | -            | -              |
| 13   | NEUTRAL GROUND STRAP (ON TRANSFORMER)                | 1        | -                   | -            | -              |
| 14   | HOLD DOWN DEVICE - (SUPPLIED WITH TRANSFORMER)       | 2        | -                   | -            | -              |
| 15   | NUT, CLAMPING CHANNEL                                | 2        | -                   | 503520       | -              |
| 16   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"           | 2        | -                   | 616192       | -              |
| 17   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"            | 2        | -                   | 799488       | -              |
| 18   | SERVICE POST CONNECTOR                               | 2        | -                   | 262560       | -              |
| 19   | BAY-O-NET FUSES                                      | 2        | -                   | -            | -              |

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SDG&E ELECTRIC STANDARDS

3712.1

SINGLE-PHASE, 12KV, TYPE "HDS", "HJS", "HTS"  
DEAD FRONT PAD-MOUNT TRANSFORMER INSTALLATION

REVISION

DATE 5-24-04

APPD *[Signature]*



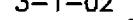
### INSTALLATION:

- (A) KEYLESS LOCK (ITEM 10) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AND PENTAHEAD BOLT THREADED IN COMPLETELY.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (C) BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (STANDARD 3408).
- (D) SET SCREW CONNECTORS ARE NOT PROVIDED WITH TRANSFORMER, SEE STANDARD 4167 FOR INSTALLATION AND STOCK NUMBERS. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER.
- (F) THESE INSTALLATIONS USE EITHER TWO OR FOUR SINGLE-PHASE #2 PRIMARY CABLES. THE TRANSFORMERS ARE FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING INSERTS. FOR THE RADIAL FEED APPLICATION, TWO BUSHING PLUGS ARE REQUIRED, ITEM 5 IN THE BILL OF MATERIAL. FOR THE LOOP FEED APPLICATION, FEED-THRU INSERTS ARE REQUIRED, ITEM 6 IN THE BILL OF MATERIAL.

### REFERENCE:

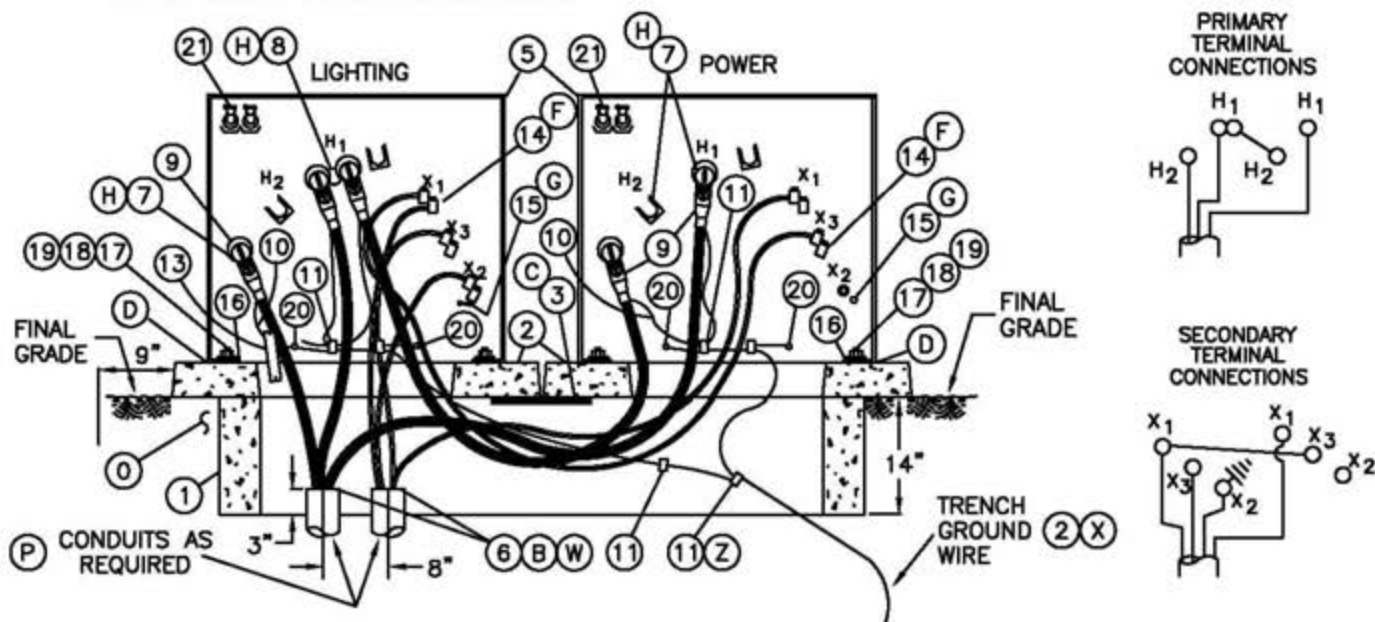
- I. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- J. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- K. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- L. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (M) SEE STANDARD 3421 FOR PAD AND CONDUIT REQUIREMENTS.
- N. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- O. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- P. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- Q. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- R. SEE STANDARD 3487 FOR RETAINING WALLS.
- S. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- T. SEE STANDARD 3703 FOR TRANSFORMER APPLICATIONS.
- (U) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (V) SEE STANDARD 4510 FOR (PREFERRED I ) AND (ALTERNATE) TRENCH GROUND WIRE.
- W. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II ) EQUIPMENT GROUNDING INSTALLATION.
- (X) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Y. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PADMOUNTED EQUIPMENT.

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| REVISION   | SDG&E ELECTRIC STANDARDS                      |                           |                    |          |                     | 3712.2 |
| DATE 3-1-02  | SINGLE-PHASE, 12KV, TYPE "HDS", "HJS", "HTS"  |                           |                    |          |                     |        |
| APPD  | DEAD FRONT PAD-MOUNT TRANSFORMER INSTALLATION |                           |                    |          |                     |        |



**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION THAT SHALL BE USED FOR INSTALLING TWO SINGLE-PHASE, DEAD FRONT TYPE "HDS", OR "HTS" TRANSFORMERS FOR AN OPEN DELTA BANK THREE-PHASE INSTALLATION.



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD OR PG NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------------|--------------|----------------|
| 1    | HANDHOLE, 14" X 66" X 14"                            | 1        | 3311                | 162660       | —              |
| 2    | PAD TRANSFORMER                                      | 2        | 3421                | 514240       | 3421-1         |
| 3    | PLATE, FLOOR, 3/8" GALV, 12" X 24"                   | 1        | —                   | MACHINE SHOP | —              |
| 4    | TRENCH GROUND WIRE (X)                               | AS REQ'D | 4510                | —            | —              |
| 5    | TRANSFORMERS, (HDL, HTL OR HSL) (H)                  | 2        | 3702                | —            | —              |
| 6    | SEALING COMPOUND (B W)                               | AS REQ'D | —                   | 442976       | —              |
| 7    | BUSHING PLUG   | 3        | 4192                | 544676       | BSHPLG         |
| 8    | FEED-THRU INSERT                                     | 1        | 4192                | 544678       | FEED-I         |
| 9    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | 5        | 4191                | —            | —              |
| 10   | CONCENTRIC NEUTRAL TAILS                             | AS REQ'D | 4172.1              | —            | —              |
| 11   | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172                | —            | —              |
| 12   | KEYLESS LOCK, (NOT SHOWN ABOVE) (A)                  | 2        | —                   | 468010       | —              |
| 13   | CABLE IDENTIFICATION                                 | AS REQ'D | 3202                | —            | —              |
| 14   | CONNECTIONS, SECONDARY (F)                           | AS REQ'D | 4167                | —            | —              |
| 15   | NEUTRAL GROUND STRAP (ON TRANSFORMER) (G)            | 2        | —                   | —            | —              |
| 16   | HOLD DOWN DEVICE - (SUPPLIED WITH TRANSFORMER)       | 4        | —                   | —            | —              |
| 17   | NUT, CLAMPING CHANNEL                                | 4        | —                   | 503520       | —              |
| 18   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"           | 4        | —                   | 616192       | —              |
| 19   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"            | 4        | —                   | 799488       | —              |
| 20   | SERVICE POST CONNECTOR                               | 4        | —                   | 262560       | —              |
| 21   | BAY-0-NET FUSE                                       | 2        | —                   | —            | —              |

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**SDG&E ELECTRIC STANDARDS**

3713.1

TWO SINGLE-PHASE, TYPE "HDS", OR "HTS" DEAD FRONT  
PAD-MOUNT TRANSFORMERS FOR OPEN DELTA BANK INSTALLATION

REVISION

DATE 5-27-04

APPD *[Signature]*




**INSTALLATION:**

- (A) KEYLESS LOCK, ITEM 12, TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMERS AND PENTAHEAD BOLTS THREADED IN COMPLETELY.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS AS SHOWN ON PAGE 3713.1. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND OR EQUIVALENT. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (C) INSERT ITEM 3 (FLOOR PLATE), PRIOR TO SETTING PADS.
- (D) BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (SEE STANDARD 3408).
- (F) SLIP-FIT CONNECTORS ARE NOT PROVIDED WITH TRANSFORMERS. SEE STANDARD 4167 FOR INSTALLATIONS AND STOCK NUMBERS. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER.
- (G) ON THE POWER TRANSFORMER, REMOVE SECONDARY GROUND STRAP, MAKE SURE GROUND STRAP IS ATTACHED TO THE TANK ON THE LIGHTING TRANSFORMER.
- (H) THIS INSTALLATION USES THREE-PHASE #2 OR #2/0 PRIMARY CABLES. THE "HDS" AND "HTS" TRANSFORMERS ARE FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING INSERTS.

**REFERENCE:**

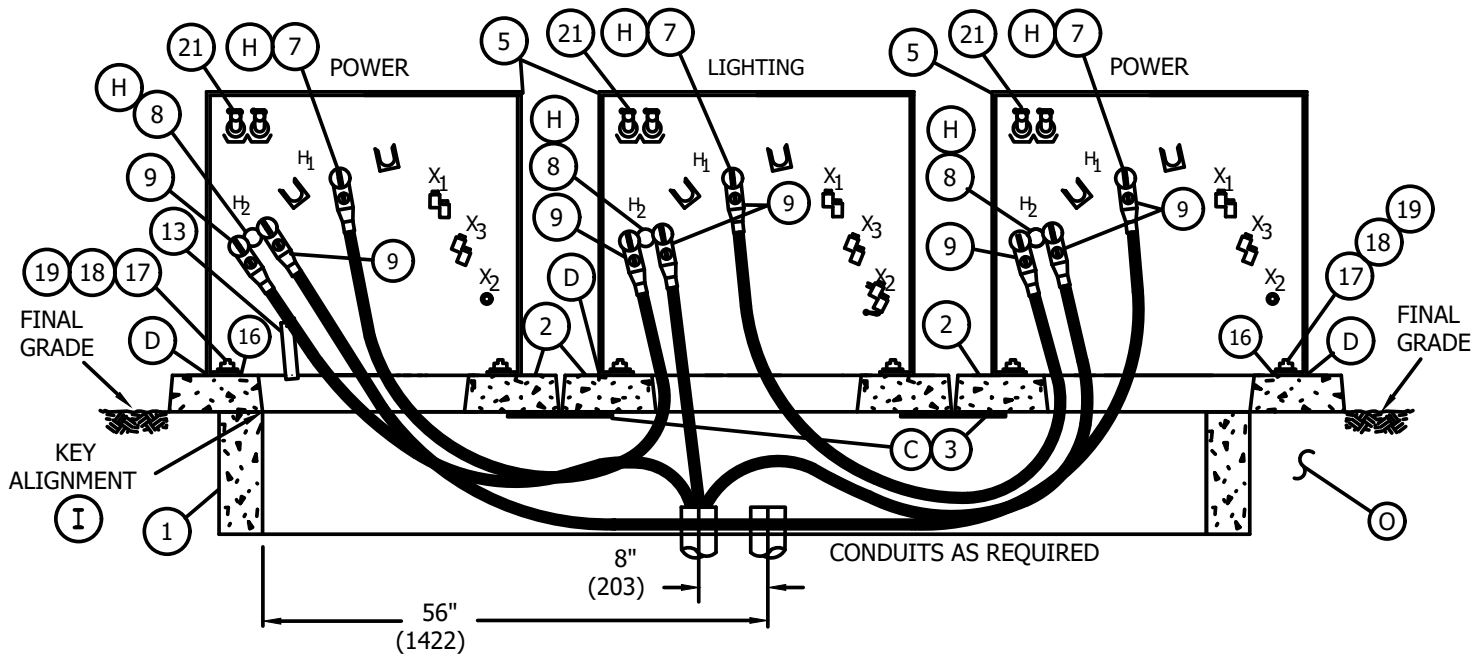
- M. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- N. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- (O) SEE STANDARD 3365 FOR SLURRY BACKFILL.
- (P) SEE STANDARD 3421 FOR PAD AND CONDUIT REQUIREMENTS.
- Q. SEE STANDARD 3481 FOR TRANSFORMER BARRIER PROTECTION.
- R. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- S. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- T. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- U. SEE STANDARD 3487 FOR RETAINING WALLS.
- V. SEE STANDARD 3702 FOR TRANSFORMER RATING AND SIZE. SEE THE WORK ORDER FOR TRANSFORMER PREFIXES.
- (W) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (X) SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- Y. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (Z) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- AA SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

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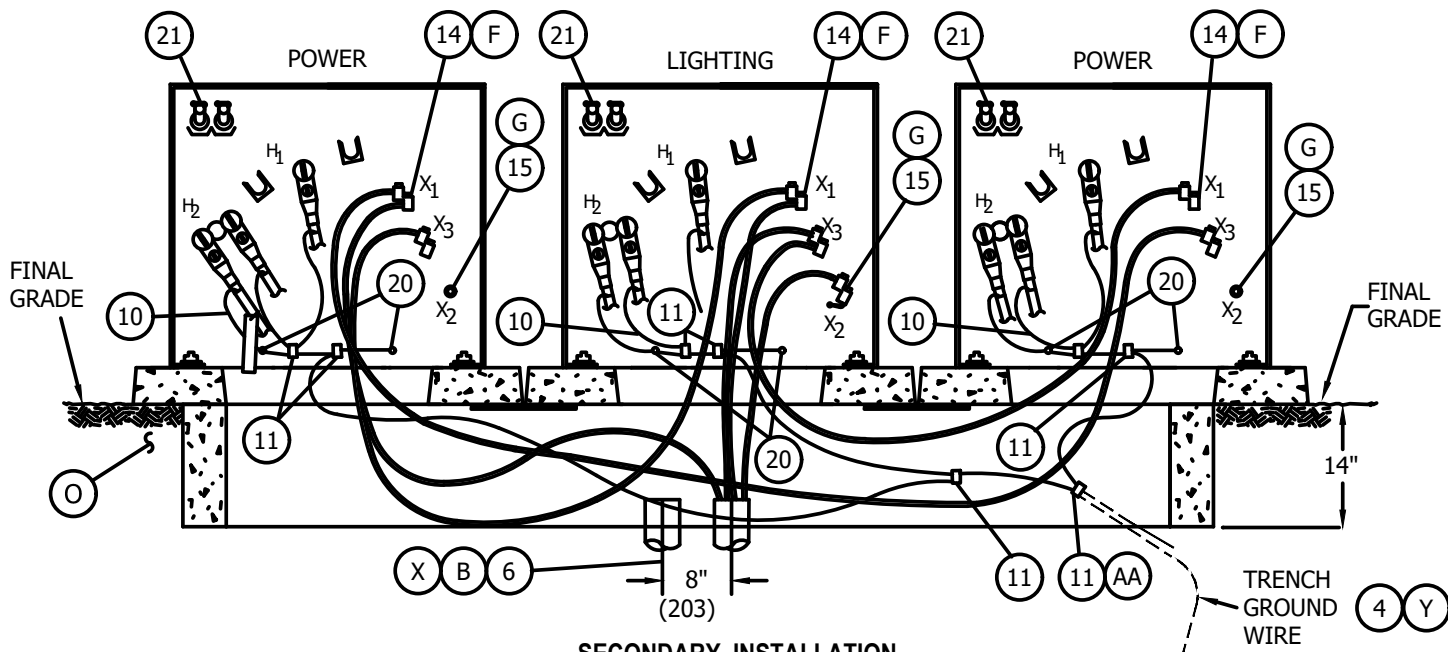
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| REVISION   |  | SDG&E ELECTRIC STANDARDS                                |                    |          |                     | 3713.2 |
| DATE 3-1-02  |  | TWO SINGLE-PHASE, TYPE "HDS", OR "HTS" DEAD FRONT       |                    |          |                     |        |
| APPD  |  | PAD-MOUNT TRANSFORMERS FOR OPEN DELTA BANK INSTALLATION |                    |          |                     |        |



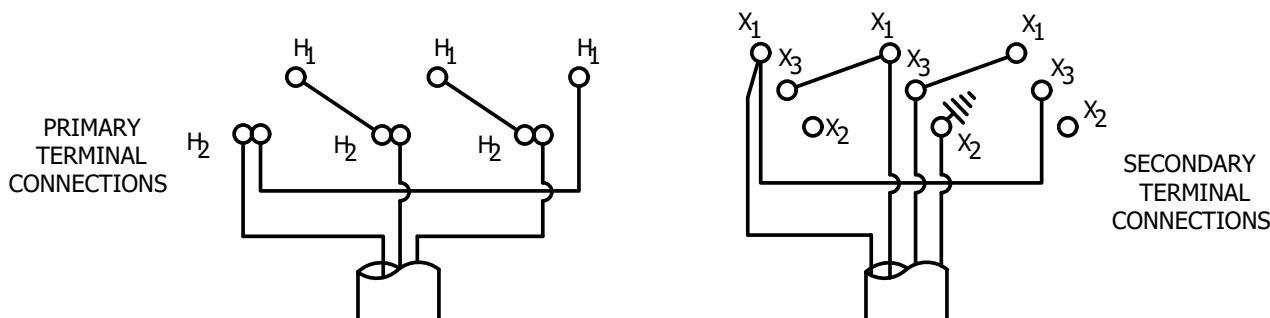
**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION THAT SHALL BE USED FOR INSTALLING THREE SINGLE-PHASE, DEAD FRONT TYPE "HDS" OR "HTS" TRANSFORMERS FOR A CLOSED DELTA BANK THREE-PHASE INSTALLATION.



### PRIMARY INSTALLATION



### SECONDARY INSTALLATION



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### SDG&E ELECTRIC STANDARDS

3714.1

THREE SINGLE-PHASE, TYPE "HDS" OR "HTS"  
DEAD FRONT PAD-MOUNT TRANSFORMERS FOR  
CLOSED DELTA BANK INSTALLATION

### REVISION

DATE 5-28-04

APPD *[Signature]*



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD.<br>OR PAGE NO. | STOCK<br>NUMBER | ASSEMBLY<br>UNITS |
|------|--|----------|---------------------------|-----------------|-------------------|
| 1    | HANDHOLE, 14" X 108" X 14"                           | 1        | 3311                      | 162662          | -                 |
| 2    | PAD, TRANSFORMER                                     | 3        | 3421                      | 514240          | 3421-1            |
| 3    | PLATE, FLOOR, 3/8" GALV, 12" X 24"                   | 2        | -                         | MACHINE SHOP    | -                 |
| 4    | TRENCH GROUND WIRE (Y)                               | AS REQ'D | 4510                      | -               | -                 |
| 5    | TRANSFORMERS, (HDL, HTL OR HSL) (H)                  | 3        | 3702                      | -               | -                 |
| 6    | SEALING COMPOUND (B)(X)                              | AS REQ'D | -                         | 442976          | -                 |
| 7    | BUSHING PLUG   | 3        | 4192                      | 544676          | BSHPLG            |
| 8    | FEED-THRU INSERT                                     | 3        | 4192                      | 544678          | FEED-I            |
| 9    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | 9        | 4191                      | -               | -                 |
| 10   | CONCENTRIC NEUTRAL TAILS                             | AS REQ'D | -                         | -               | -                 |
| 11   | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172                      | -               | -                 |
| 12   | KEYLESS LOCK (NOT SHOWN ABOVE) (A)                   | 3        | -                         | 468101          | -                 |
| 13   | CABLE IDENTIFICATION                                 | AS REQ'D | 3202                      | -               | -                 |
| 14   | CONNECTIONS, SECONDARY (F)                           | AS REQ'D | 4167                      | -               | -                 |
| 15   | NEUTRAL GROUND STRAP (SUPPLIED WITH TRANSFORMER) (G) | 3        | -                         | -               | -                 |
| 16   | HOLD DOWN DEVICE (SUPPLIED WITH TRANSFORMER)         | 6        | -                         | -               | -                 |
| 17   | NUT, CLAMPING CHANNEL                                | 6        | -                         | 503520          | -                 |
| 18   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"           | 6        | -                         | 616192          | -                 |
| 19   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"            | 6        | -                         | 799488          | -                 |
| 20   | SERVICE POST CONNECTOR                               | 6        | -                         | 262560          | -                 |
| 21   | BAY-O-NET FUSE                                       | 2        | -                         | -               | -                 |

**INSTALLATION:**

- (A) KEYLESS LOCK, ITEM 12, TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMERS AND PENTAHEAD BOLTS THREADED IN COMPLETELY.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS AS SHOWN ON PAGE 3714.1. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND OR EQUIVALENT. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (C) INSERT ITEM 3 (FLOOR PLATES), PRIOR TO SETTING PADS.
- (D) BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (SEE STANDARD 3408).
- (F) SLIP-FIT CONNECTORS ARE NOT PROVIDED WITH TRANSFORMERS, SEE STANDARD 4167 FOR INSTALLATION AND STOCK NUMBERS. ALWAYS MAKE CERTAIN ALL CONNECTIONS ARE TIGHT BEFORE ENERGIZED TRANSFORMER.
- (G) ON THE POWER TRANSFORMERS, REMOVE SECONDARY GROUND STRAPS, MAKE SURE GROUND STRAP IS ATTACHED TO THE TANK ON THE LIGHTING TRANSFORMER.
- (H) THIS INSTALLATION USES THREE-PHASE #2 OR #2/0 PRIMARY CABLES. THE "HDL", "HTL", "HDS AND HTS" TRANSFORMERS ARE FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING INSERTS.
- (I) MAKE SURE THE INSIDE WINDOW OPENING ON THE LEFT POWER TRANSFORMER IS STRAIGHT IN LINE WITH THE INSIDE OF THE HANDHOLE OPENING TO ALLOW ROOM FOR CABLE PULLING & TRAINING.

**REFERENCE:**

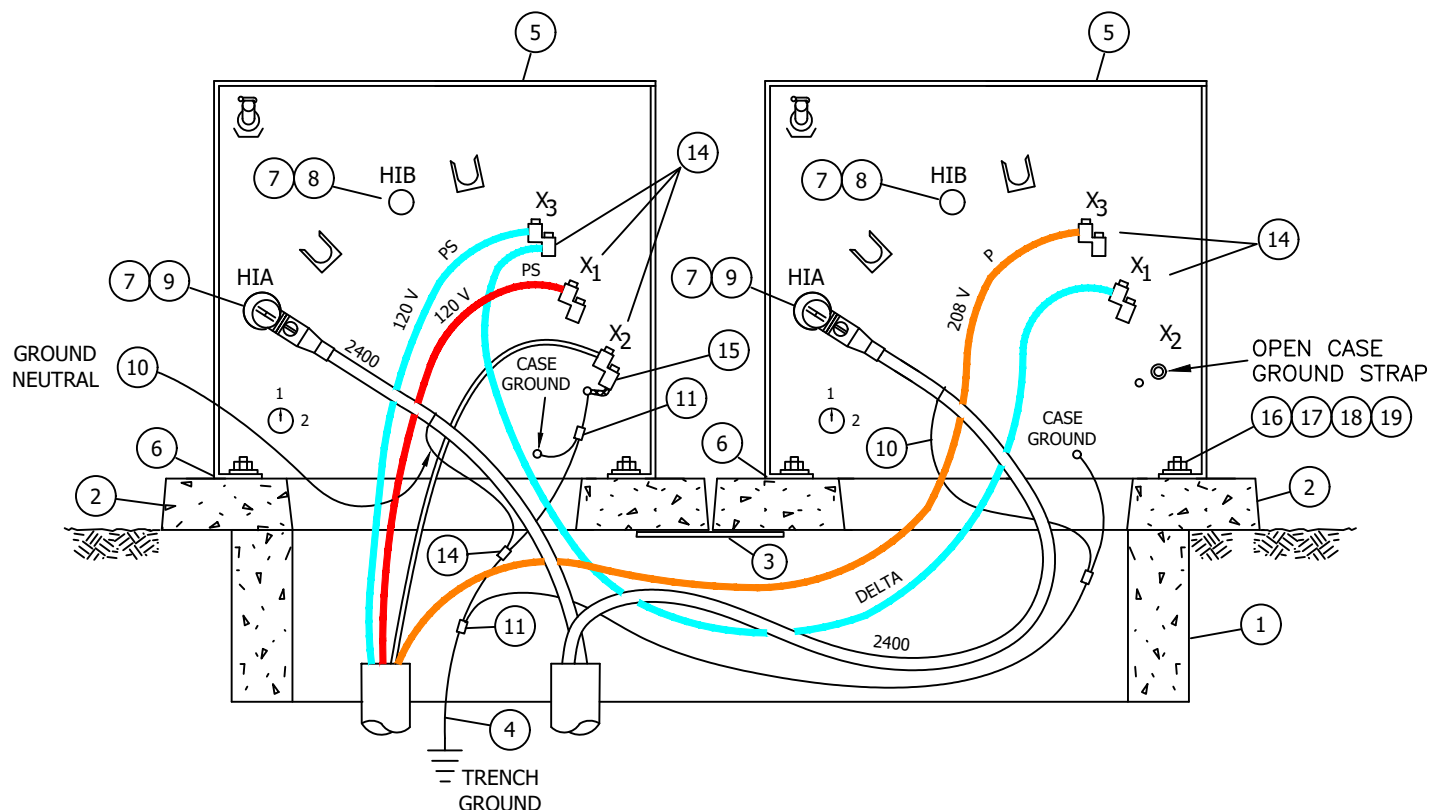
- M. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- N. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- (O) SEE STANDARD 3365 FOR SLURRY BACKFILL.
- (P) SEE STANDARD 3421 FOR PAD AND CONDUIT REQUIREMENTS.
- Q. SEE STANDARD 3481 FOR TRANSFORMER BARRIER PROTECTION.
- R. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- S. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- T. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- U. SEE STANDARD 3487 FOR RETAINING WALLS.
- V. SEE STANDARD 3702 FOR TRANSFORMER RATING AND SIZE. SEE THE WORK ORDER FOR TRANSFORMER PREFIXES.
- W. SEE STANDARD 3703 FOR TRANSFORMER APPLICATIONS.
- (X) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (Y) SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- Z. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (AA) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- B.B.SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

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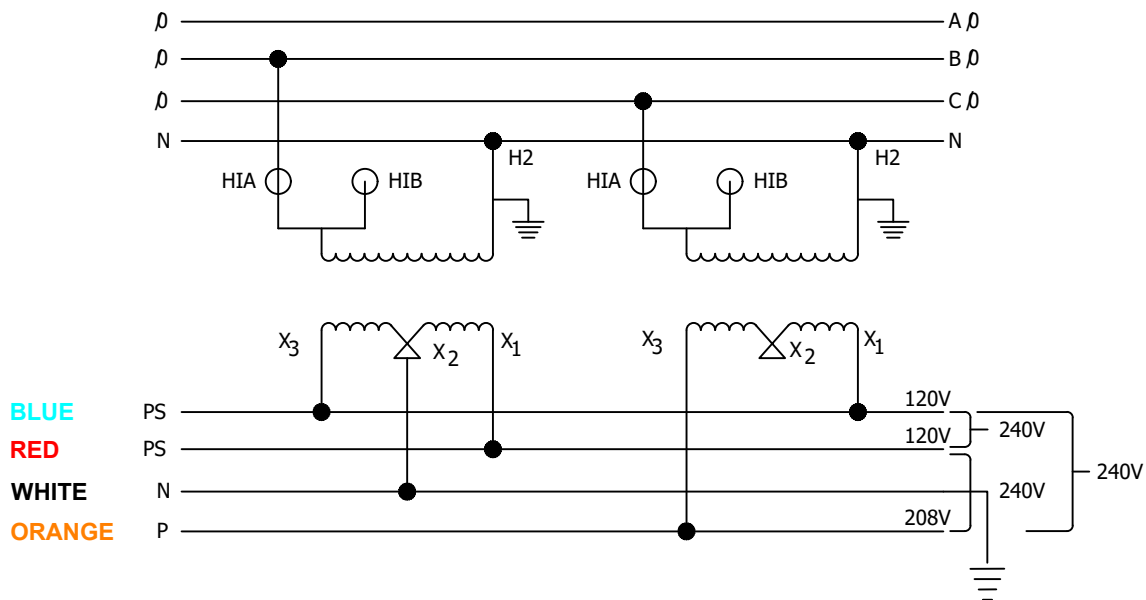
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| REVISION           |  | SDG&E ELECTRIC STANDARDS  |                    |          |                     |
| DATE 3-1-02        |  | THREE SINGLE-PHASE, TYPE "HDS" OR HTS"                                  |                    |          |                     |
| APPD <i>PD/164</i> |  | DEAD FRONT PAD-MOUNT TRANSFORMERS FOR<br>CLOSED DELTA BANK INSTALLATION |                    |          |                     |
|                    |  | 3714.2  |                    |          |                     |



**SCOPE:** THIS STANDARD SHOWS THE SDS TRANSFORMER FOR THREE-PHASE INSTALLATION.



### SDS OPEN Y OPEN DELTA XFMR ADDITIVE POLARITY



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3715.1

SDG&E ELECTRIC STANDARDS  
TWO SINGLE-PHASE, Y TYPE SDS DEAD FRONT  
PAD-MOUNT TRANSFORMERS FOR  
OPEN DELTA BANK INSTALLATION

REVISION

DATE 3-18-05

APPD TR / JJ



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD OR PG NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------------|--------------|----------------|
| 1    | HANDHOLE, 14" X 66" X 14"                            | 1        | 3311                | 162660       | -              |
| 2    | PAD TRANSFORMER                                      | 2        | 3421                | 514240       | 3421-1         |
| 3    | PLATE, FLOOR, 3/8" GALV, 12" X 24"                   | 1        | -                   | MACHINE SHOP | -              |
| 4    | TRENCH GROUND WIRE (X)                               | AS REQ'D | 4510                | -            | -              |
| 5    | TRANSFORMERS, (SDS) (H)                              | 2        | 3702.2              | -            | -              |
| 6    | SEALING COMPOUND (B) (W)                             | AS REQ'D | -                   | 442976       | -              |
| 7    | BUSHING PLUG   | 2        | 4192                | 544676       | BSHPLG         |
| 8    | INSULATING CAP                                       | 2        | 4192                | 204304       | -              |
| 9    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | 2        | 4191                | -            | -              |
| 10   | CONCENTRIC NEUTRAL TAILS                             | AS REQ'D | 4172.1              | -            | -              |
| 11   | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172                | -            | -              |
| 12   | KEYLESS LOCK, (NOT SHOWN ABOVE) (A)                  | 2        | -                   | 468010       | -              |
| 13   | CABLE IDENTIFICATION                                 | AS REQ'D | 3202                | -            | -              |
| 14   | CONNECTIONS, SECONDARY (F)                           | AS REQ'D | 4167                | -            | -              |
| 15   | NEUTRAL GROUND STRAP (ON TRANSFORMER) (G)            | 2        | -                   | -            | -              |
| 16   | HOLD DOWN DEVICE - (SUPPLIED WITH TRANSFORMER)       | 4        | -                   | -            | -              |
| 17   | NUT, CLAMPING CHANNEL                                | 4        | -                   | 503520       | -              |
| 18   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"           | 4        | -                   | 616192       | -              |
| 19   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"            | 4        | -                   | 799488       | -              |
| 20   | SERVICE POST CONNECTOR                               | 4        | -                   | 262560       | -              |
| 21   | BAY-0-NET FUSE                                       | 2        | -                   | -            | -              |

**INSTALLATION:**

- (A) KEYLESS LOCK, ITEM 12, TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMERS AND PENTAHEAD BOLTS THREADED IN COMPLETELY.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS AS SHOWN ON PAGE 3713.1. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND OR EQUIVALENT. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (C) INSERT ITEM 3 (FLOOR PLATE), PRIOR TO SETTING PADS.
- (D) BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (SEE STANDARD 3408).
- (F) SLIP-FIT CONNECTORS ARE NOT PROVIDED WITH TRANSFORMERS. SEE STANDARD 4167 FOR INSTALLATIONS AND STOCK NUMBERS. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER.
- (G) ON THE POWER TRANSFORMER, REMOVE SECONDARY GROUND STRAP, NO Z BAR IS REQUIRED. MAKE SURE GROUND STRAP IS ATTACHED TO THE TANK ON THE LIGHTING TRANSFORMER.
- (H) THIS INSTALLATION USES TWO-PHASE #2 OR #2/0 PRIMARY CABLES.
- (I) CHECK TRANSFORMER NAME PLATE FOR POLARITY.
- (J) CHECK HIGH VOLTAGE SWITCH FOR CORRECT SYSTEM VOLTAGE.

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|          |         | Indicates Latest Revision                                  | Completely Revised | X | New Page | Information Removed |
| REVISION |         | SDG&E ELECTRIC STANDARDS                                   |                    |   |          | 3715.2              |
| DATE     | 2-18-05 | TWO SINGLE-PHASE, Y TYPE SDS DEAD FRONT                    |                    |   |          |                     |
| APPD     | TR / JJ | PAD-MOUNT TRANSFORMERS FOR<br>OPEN DELTA BANK INSTALLATION |                    |   |          |                     |



**REFERENCE:**

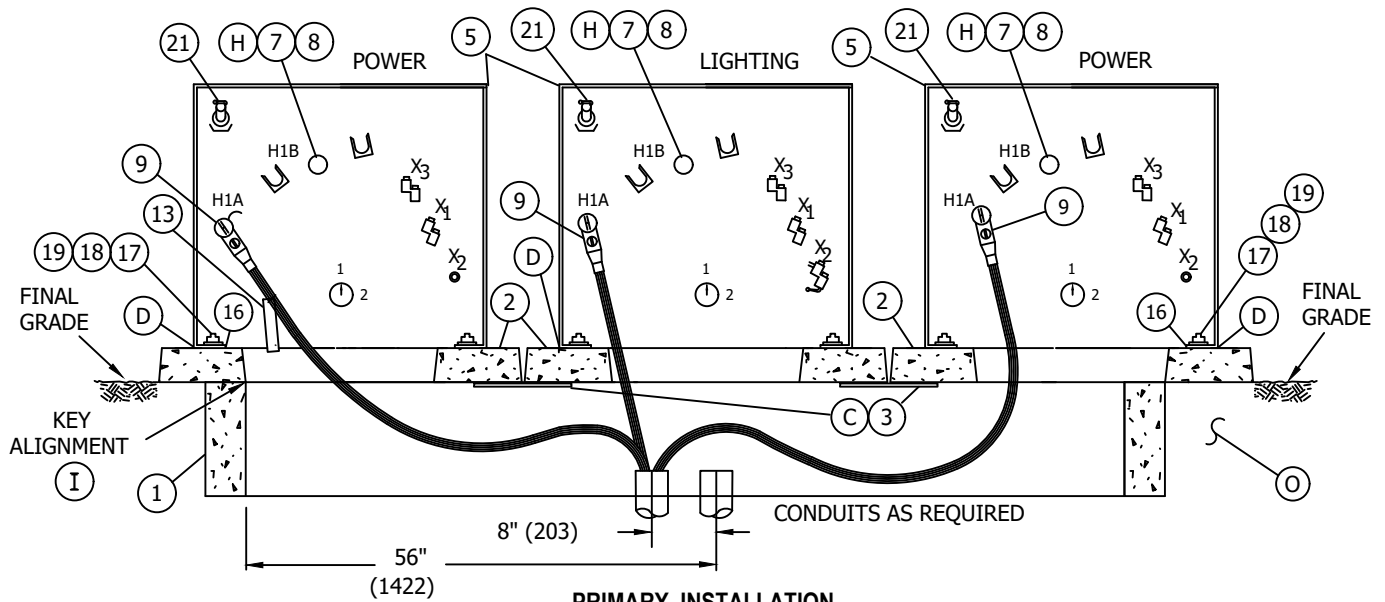
- M. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- N. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- SEE STANDARD 3365 FOR SLURRY BACKFILL.
- SEE STANDARD 3421 FOR PAD AND CONDUIT REQUIREMENTS.
- Q. SEE STANDARD 3481 FOR TRANSFORMER BARRIER PROTECTION.
- R. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- S. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- T. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- U. SEE STANDARD 3487 FOR RETAINING WALLS.
- V. SEE STANDARD 3702 FOR TRANSFORMER RATING AND SIZE. SEE THE WORK ORDER FOR TRANSFORMER PREFIXES.
- SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- Y. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.

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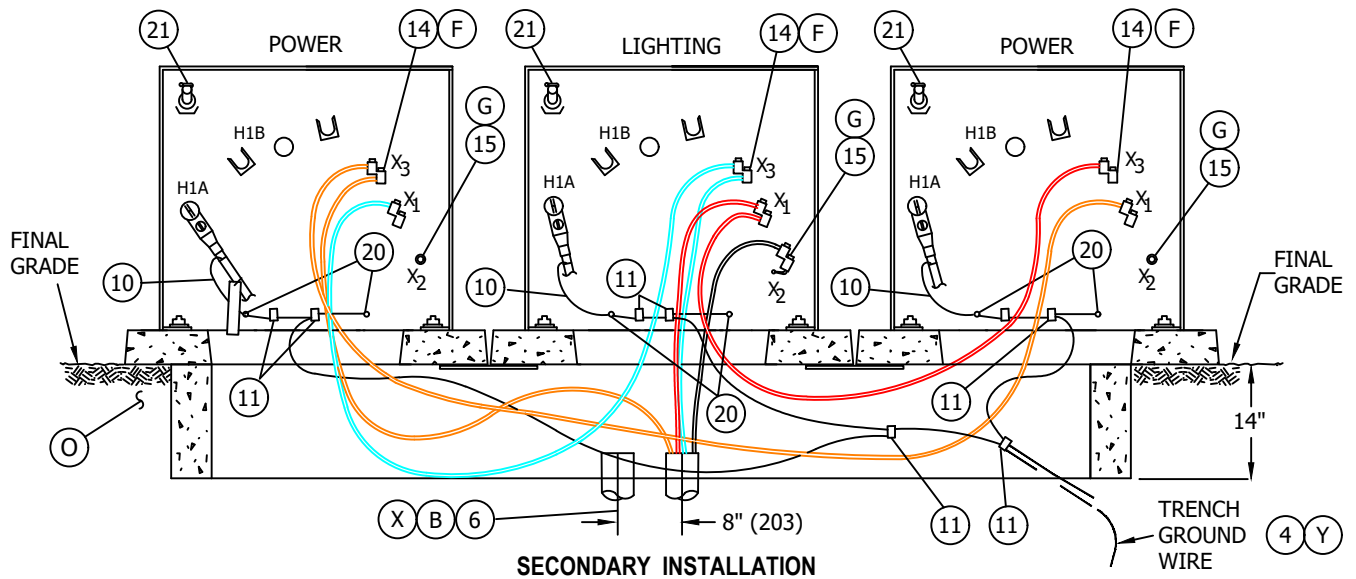
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| 3715.3 | SDG&E ELECTRIC STANDARDS  |                    |   |          | REVISION                     |
|        | TWO SINGLE-PHASE, Y TYPE SDS DEAD FRONT<br>PAD-MOUNT TRANSFORMERS FOR<br>OPEN DELTA BANK INSTALLATION |                    |   |          | DATE 2-18-05<br>APPD TR / JJ |



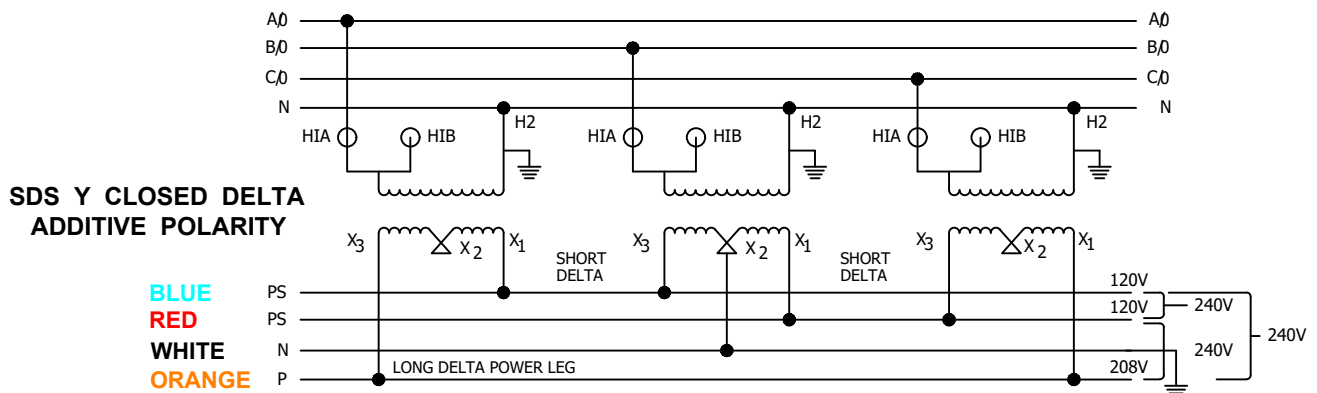
**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION THAT SHALL BE USED FOR INSTALLING THREE SINGLE-PHASE, DEAD FRONT Y TYPE SDS TRANSFORMERS FOR A CLOSED DELTA BANK THREE-PHASE INSTALLATION.



**PRIMARY INSTALLATION**



**SECONDARY INSTALLATION**



**SDS Y CLOSED DELTA  
ADDITIVE POLARITY**

BLUE  
RED  
WHITE  
ORANGE

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REVISION

DATE 2-24-05

APPD TR / JJ

SDG&E ELECTRIC STANDARDS

THREE SINGLE-PHASE, Y TYPE SDS  
DEAD FRONT PAD-MOUNT TRANSFORMERS FOR  
CLOSED DELTA BANK INSTALLATION

3715.4



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION   | QUANTITY | CONST STD.<br>OR PAGE NO. | STOCK<br>NUMBER | ASSEMBLY<br>UNITS |
|------|---|----------|---------------------------|-----------------|-------------------|
| 1    | HANDHOLE, 14" X 108" X 14"                              | 1        | 3311                      | 162662          | -                 |
| 2    | PAD, TRANSFORMER  | 3        | 3421                      | 514240          | 3421-1            |
| 3    | PLATE, FLOOR, 3/8" GALV, 12" X 24"                      | 2        | -                         | MACHINE SHOP    | -                 |
| 4    | TRENCH GROUND WIRE (Y)                                  | AS REQ'D | 4510                      | -               | -                 |
| 5    | TRANSFORMERS, SDS (H)                                   | 3        | 3702                      | -               | -                 |
| 6    | SEALING COMPOUND (B)(X)                                 | AS REQ'D | -                         | 442976          | -                 |
| 7    | BUSHING PLUG  | 3        | 4192                      | 544676          | BSHPLG            |
| 8    | CAP INSULATING  | 3        | 4192                      | 204304          | FEED-I            |
| 9    | ELBOW, LOADBREAK, 12KV<br>(WITH WHITE-BLACK-WHITE BAND) | 3        | 4191                      | -               | -                 |
| 10   | CONCENTRIC NEUTRAL TAILS                                | AS REQ'D | -                         | -               | -                 |
| 11   | CONNECTOR, COMPRESSION                                  | AS REQ'D | 4172                      | -               | -                 |
| 12   | KEYLESS LOCK (NOT SHOWN ABOVE) (A)                      | 3        | -                         | 468101          | -                 |
| 13   | CABLE IDENTIFICATION                                    | AS REQ'D | 3202                      | -               | -                 |
| 14   | CONNECTIONS, SECONDARY (F)                              | AS REQ'D | 4167                      | -               | -                 |
| 15   | NEUTRAL GROUND STRAP<br>(SUPPLIED WITH TRANSFORMER) (G) | 3        | -                         | -               | -                 |
| 16   | HOLD DOWN DEVICE (SUPPLIED WITH TRANSFORMER)            | 6        | -                         | -               | -                 |
| 17   | NUT, CLAMPING CHANNEL                                   | 6        | -                         | 503520          | -                 |
| 18   | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1-1/2"              | 6        | -                         | 616192          | -                 |
| 19   | WASHER, STANDARD FLAT ROUND, BRONZE, 1/2"               | 6        | -                         | 799488          | -                 |
| 20   | SERVICE POST CONNECTOR                                  | 6        | -                         | 262560          | -                 |
| 21   | BAY-O-NET FUSE  | 3        | -                         | -               | -                 |

**INSTALLATION:**

- (A) KEYLESS LOCK, ITEM 12, TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMERS AND PENTAHEAD BOLTS THREADED IN COMPLETELY.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS AS SHOWN ON PAGE 3714.1. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND OR EQUIVALENT. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (C) INSERT ITEM 3 (FLOOR PLATES), PRIOR TO SETTING PADS.
- (D) BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (SEE STANDARD 3408).
- (F) SLIP-FIT CONNECTORS ARE NOT PROVIDED WITH TRANSFORMERS, SEE STANDARD 4167 FOR INSTALLATION AND STOCK NUMBERS. ALWAYS MAKE CERTAIN ALL CONNECTIONS ARE TIGHT BEFORE ENERGIZED TRANSFORMER.
- (G) ON THE POWER TRANSFORMERS, REMOVE SECONDARY GROUND STRAPS, NO Z BAR IS REQUIRED. MAKE SURE GROUND STRAP IS ATTACHED TO THE TANK ON THE LIGHTING TRANSFORMER.
- (H) THIS INSTALLATION USES THREE-PHASE #2 OR #2/0 PRIMARY CABLES.
- (I) MAKE SURE THE INSIDE WINDOW OPENING ON THE LEFT POWER TRANSFORMER IS STRAIGHT IN LINE WITH THE INSIDE OF THE HANDHOLE OPENING TO ALLOW ROOM FOR CABLE PULLING & TRAINING.
- (J) CHECK TRANSFORMER NAME PLATE FOR POLARITY.
- (K) CHECK HIGH VOLTAGE SWITCH FOR CORRECT SYSTEM VOLTAGE.

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| 3715.5 | SDG&E ELECTRIC STANDARDS  |                           |                    |          | REVISION                       |
|        | THREE SINGLE-PHASE, TYPE Y SDS<br>DEAD FRONT PAD-MOUNT TRANSFORMERS FOR<br>CLOSED DELTA BANK INSTALLATION |                           |                    |          | DATE 5-12-2014<br>APPD TR / DW |



**REFERENCE:**

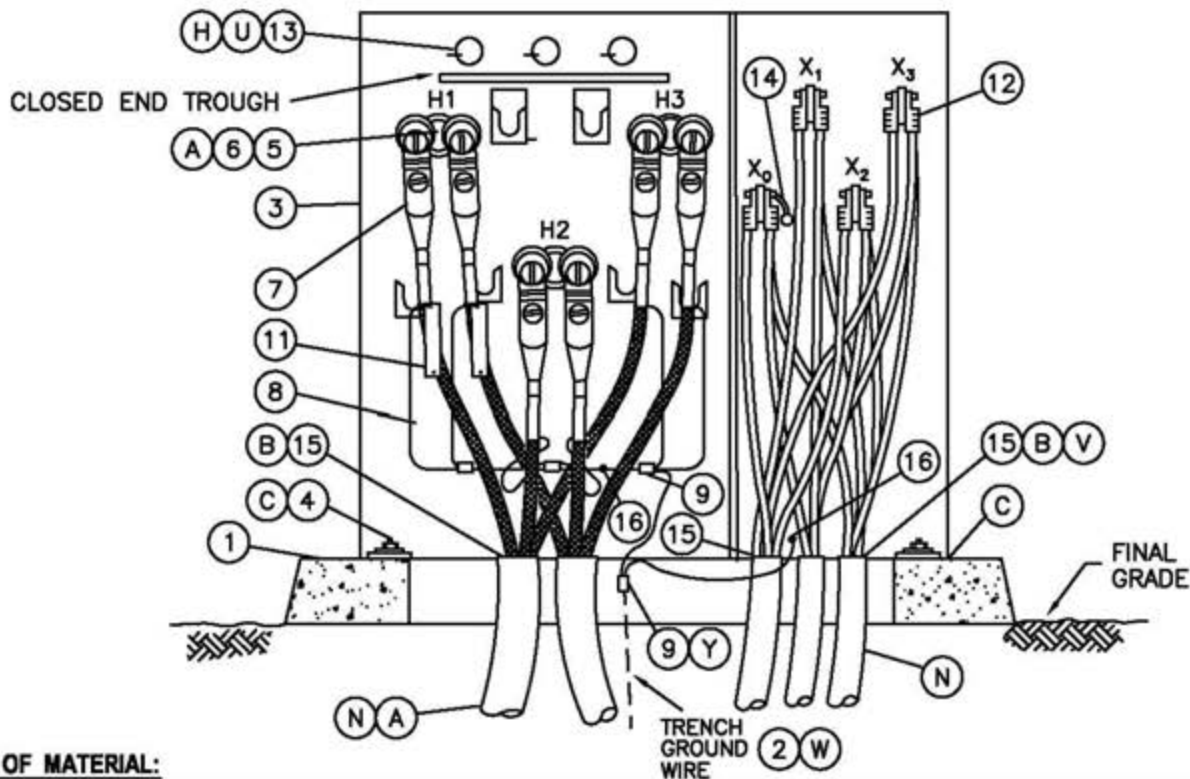
- M. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- N. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- SEE STANDARD 3365 FOR SLURRY BACKFILL.
- SEE STANDARD 3421 FOR PAD AND CONDUIT REQUIREMENTS.
- Q. SEE STANDARD 3481 FOR TRANSFORMER BARRIER PROTECTION.
- R. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS.
- S. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- T. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- U. SEE STANDARD 3487 FOR RETAINING WALLS.
- V. SEE STANDARD 3702 FOR TRANSFORMER RATING AND SIZE. SEE THE WORK ORDER FOR TRANSFORMER PREFIXES.
- W. SEE STANDARD 3703 FOR TRANSFORMER APPLICATIONS.
- SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- Z. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.

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| REVISION |         | SDG&E ELECTRIC STANDARDS  |                    |   |          | 3715.6              |
| DATE     | 5-11-05 | THREE SINGLE-PHASE, TYPE Y SDS  |                    |   |          |                     |
| APPD     | TR / JJ | DEAD FRONT PAD-MOUNT TRANSFORMERS FOR<br>CLOSED DELTA BANK INSTALLATION |                    |   |          |                     |



**SCOPE:** THIS STANDARD SHOWS THE CONNECTION USED FOR INSTALLING THREE-PHASE, 12KV RADIAL/LOOP FEED DEAD FRONT PAD-MOUNTED TRANSFORMERS.



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST. STD. OR PG. NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|------------------------|--------------|----------------|
| 1    | PAD, TRANSFORMER, THREE-PHASE                        | 1        | 3425,3426,3427         | -            | -              |
| 2    | TRENCH GROUND WIRE (W)                               | AS REQ'D | 4510                   | -            | -              |
| 3    | TRANSFORMER, (THRU 1500 KVA) (F)                     | 1        | 3702                   | -            | -              |
| 4    | HOLD DOWN DEVICE - (SUPPLIED WITH CABINET)           | 2        | -                      | -            | -              |
| 5    | BUSHING PLUG (RADIAL FEED) (A)                       | 3        | 4192                   | 544676       | BSHPLG         |
| 6    | FEED-THRU INSERT (LOOP FEED) (A)                     | 3        | 4192                   | 544678       | FEED-I         |
| 7    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | AS REQ'D | 4191                   | -            | -              |
| 8    | CONCENTRIC NEUTRAL TAILS                             | -        | 4172.1                 | -            | -              |
| 9    | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172                   | -            | -              |
| 10   | KEYLESS LOCK, (NOT SHOWN ABOVE) (G)                  | 1        | -                      | 468010       | -              |
| 11   | CABLE IDENTIFICATION TAGS                            | AS REQ'D | 3202                   | -            | -              |
| 12   | SECONDARY CONNECTIONS                                | AS REQ'D | 4168, 4171             | -            | -              |
| 13   | FUSE, "BAY-O-NET" (U)                                | 3        | 4311                   | -            | -              |
| 14   | NEUTRAL GROUND STRAP (ON TRANSFORMER)                | 1        | -                      | -            | -              |
| 15   | SEALING COMPOUND (B)(V)                              | AS REQ'D | -                      | 442976       | -              |
| 16   | SERVICE POST CONNECTOR                               | 2        | -                      | 262560       | -              |

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3751.1

**SDG&E ELECTRIC STANDARDS**

THREE-PHASE 12KV, TYPE "HZS", "HBS", "PZS", "HMS",  
"HNS", OR "HKS" RADIAL/LOOP, DEAD FRONT,  
PAD-MOUNTED TRANSFORMER INSTALLATION

REVISION

DATE 5-10-05

APPD MF/JJ



## INSTALLATION:

- (A) THIS INSTALLATION USES FROM 3 TO 6 SINGLE-PHASE CONDUCTOR #2 OR 2/0 PRIMARY CABLES. THE TRANSFORMER IS FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING INSERTS. FOR THE RADIAL APPLICATION, THREE BUSHING PLUGS ARE REQUIRED, ITEM 5 IN THE BILL OF MATERIAL. FOR THE LOOP FEED APPLICATION, THREE FEED-THRU INSERTS ARE REQUIRED, ITEM 6 IN THE BILL OF MATERIAL.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O 128 RULE 31.6).
- (C) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (F) TRANSFORMER RATING AND SIZE PER WORK ORDER.
- (G) KEYLESS LOCK (ITEM 10) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AFTER PENTAHEAD BOLT IS THREADED IN COMPLETELY.
- (H) WHEN CHANGING PZS FROM 4KV TO 12KV FOLLOW BAY-O-NET FUSE CHART LISTED:

| PZS    | 4KV     | 12KV   |
|--------|---------|--------|
| 75KVA  | 25 AMP  | 6 AMP  |
| 150KVA | 30 AMP  | 12 AMP |
| 500KVA | 100 AMP | 40 AMP |

SERIES/MULTIPLE PRIMARY TRANSFORMERS ARE SUPPLIED WITH 4160 VOLT FUSE.

## REFERENCE:

- J. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (N) SEE STANDARD 3425, 3426 OR 3427 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S. SEE STANDARD 3487 FOR RETAINING WALLS.
- T. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- (U) SEE STANDARD 3704 FOR "BAY-O-NET" FUSE OPERATING INSTRUCTIONS.
- (V) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (W) SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- X. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (Y) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Z. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

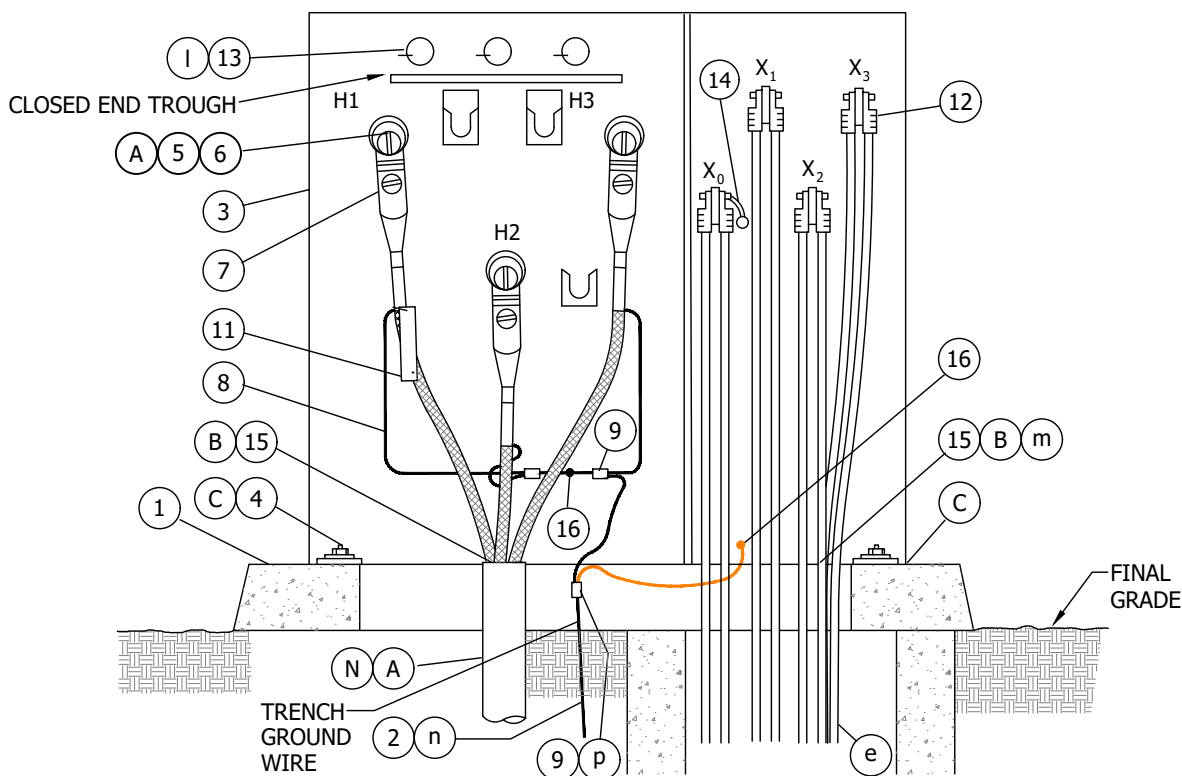
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|----------|---------|--|---|-----------------------------------|--|
| REVISION |         | SDG&E ELECTRIC STANDARDS   |   |                                   |  |
| DATE     | 5-11-05 | THREE-PHASE 12KV, TYPE "HZS", "HBS", "PZS", "HMS",<br>"HNS", OR "HKS" RADIAL/LOOP, DEAD FRONT,<br>PAD-MOUNTED TRANSFORMER INSTALLATION |   |                                   |  |
| APPD     | MF/JJ   |  |   |                                   |  |

3751.2



**SCOPE:** THIS STANDARD SHOWS THE CONNECTION USED FOR INSTALLING THREE-PHASE, 12KV RADIAL FEED DEAD FRONT PAD-MOUNTED TRANSFORMER.



**FIGURE 1**

## INSTALLATION:

- (A) THIS INSTALLATION USES THREE-PHASE PRIMARY CABLE IN EITHER RADIAL OR LOOP CONFIGURATION. THE TRANSFORMER IS FITTED WITH 3 BUSHINGS WELLS. INSTALL BUSHING PLUGS FOR RADIAL OR FEED-THRU INSERTS FOR LOOP CONFIGURATION.
- (B) TERMINATE PRIMARY CONDUIT FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (C) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (D) TRANSFORMER RATING AND SIZE PER WORK ORDER.
- (E) KEYLESS LOCK (ITEM 10) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AFTER PENTAHEAD BOLT IS THREADED IN COMPLETELY.

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| REV | CHANGE        | BY  | DSGN | APPV  | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|---------------|-----|------|-------|------------|-----|--------|----|------|------|------|
| C   |               |     |      |       |            | F   |        |    |      |      |      |
| B   | FIGURE UPDATE | ADW | JES  | CZH   | 11/11/2019 | E   |        |    |      |      |      |
| A   | TABLE UPDATE  | -   | -    | JJ/MF | 10/05/2005 | D   |        |    |      |      |      |

|                 |   |                           |  |                    |  |          |  |                     |          |
|-----------------|---|---------------------------|--|--------------------|--|----------|--|---------------------|----------|
| SHEET<br>1 OF 2 | X   | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed | UG3752.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |  |                    |  |          |  |                     |          |
|                 | THREE-PHASE 12KV, TYPE "HNS"<br>RADIAL, DEAD FRONT,<br>PAD-MOUNTED TRANSFORMER INSTALLATION |                           |  |                    |  |          |  |                     |          |



| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------|--------------|----------------|
| 1    | PAD, TRANSFORMER, THREE-PHASE                        | 1        | 3427          | -            | -              |
| 2    | TRENCH GROUND WIRE (n)                               | AS REQ'D | 4510          | -            | -              |
| 3    | TRANSFORMER, (500-2,500 KVA) (D)                     | 1        | 3702          | -            | -              |
| 4    | HOLD DOWN DEVICE - (SUPPLIED WITH CABINET)           | 2        | -             | -            | -              |
| 5    | BUSHING PLUG (RADIAL FEED)                           | AS REQ'D | 4192.1        | S544676      | BSHPLG         |
| 6    | FEED-THRU INSERT (LOOP FEED)                         | AS REQ'D | 4192.1        | S544678      | FEED-I         |
| 7    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | AS REQ'D | 4191          | -            | -              |
| 8    | CONCENTRIC NEUTRAL TAILS                             | -        | 4172.1        | -            | -              |
| 9    | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172          | -            | -              |
| 10   | KEYLESS LOCK, (NOT SHOWN ABOVE) (E)                  | 1        | -             | S468010      | -              |
| 11   | CABLE IDENTIFICATION TAGS                            | AS REQ'D | 3202          | -            | -              |
| 12   | SECONDARY CONNECTIONS                                | AS REQ'D | 4168, 4171    | -            | -              |
| 13   | FUSE, "BAY-O-NET" (I)                                | 3        | 4311          | -            | -              |
| 14   | NEUTRAL GROUND STRAP (ON TRANSFORMER)                | 1        | -             | -            | -              |
| 15   | SEALING COMPOUND (B)(m)                              | AS REQ'D | -             | S442976      | -              |
| 16   | SERVICE POST CONNECTOR                               | 2        | -             | S262560      | -              |

**REFERENCE:**

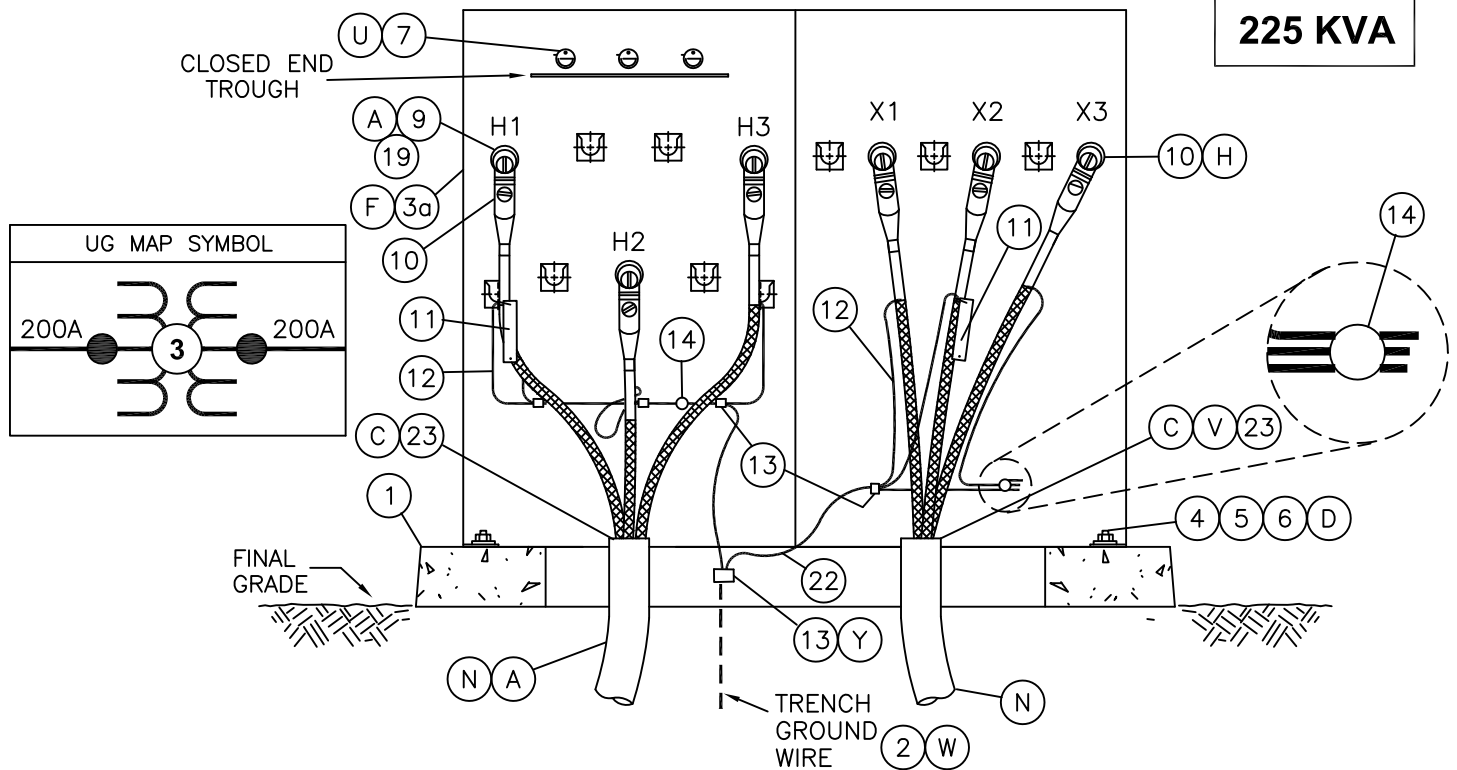
- a. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- b. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- c. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- d. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- e. SEE STANDARD 3425, 3426 OR 3427 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- f. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- g. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- h. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- i. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- j. SEE STANDARD 3487 FOR RETAINING WALLS.
- k. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- l. SEE STANDARD 3704 FOR "BAY-O-NET" FUSE OPERATING INSTRUCTIONS.
- m. SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- n. SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- o. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- p. SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- q. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

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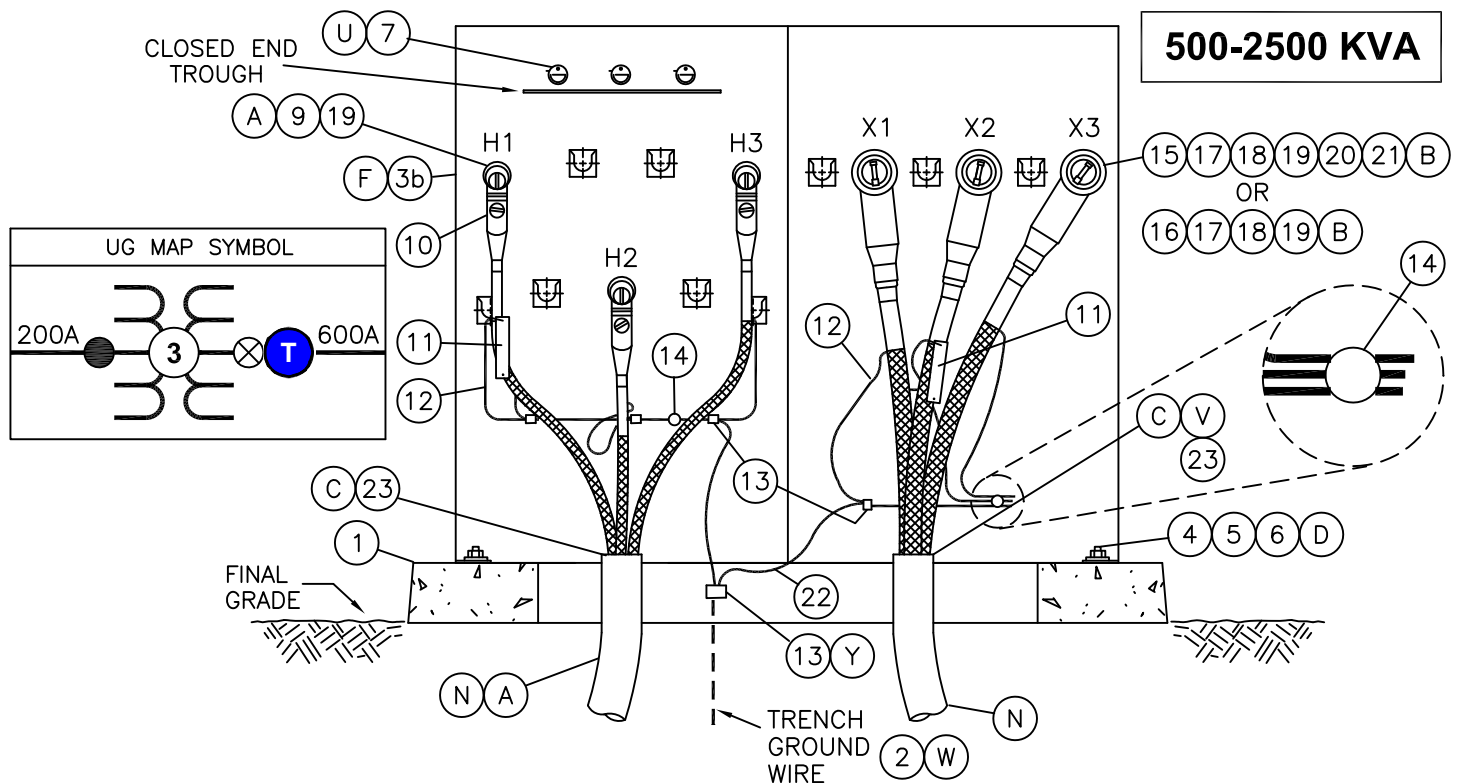
| REV             | CHANGE        | BY  | DSGN  | APPV  | DATE               | REV      | CHANGE              | BY | DSGN     | APPV | DATE |
|-----------------|---------------|-----|---|-------|--------------------|----------|---------------------|----|----------|------|------|
| C               |               |     |   |       |                    | F        |                     |    |          |      |      |
| B               | FIGURE UPDATE | ADW | JES   | CZH   | 11/11/2019         | E        |                     |    |          |      |      |
| A               | TABLE UPDATE  | -   | -   | JJ/MF | 10/05/2005         | D        |                     |    |          |      |      |
| SHEET<br>2 OF 2 |               | X   | Indicates Latest Revision                                   |       | Completely Revised | New Page | Information Removed |    | UG3752.2 |      |      |
|                 |               |     | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS           |       |                    |          |                     |    |          |      |      |
|                 |               |     | THREE-PHASE 12KV, TYPE "HNS"                                |       |                    |          |                     |    |          |      |      |
|                 |               |     | RADIAL, DEAD FRONT,<br>PAD-MOUNTED TRANSFORMER INSTALLATION |       |                    |          |                     |    |          |      |      |



**SCOPE:** THIS STANDARD SHOWS THE METHOD OF INSTALLATING A THREE-PHASE, STEP-DOWN TYPE "HPS" RADIAL/LOOP FEED DEAD FRONT PAD-MOUNTED TRANSFORMER.



**SCOPE:** THIS STANDARD SHOWS THE METHOD OF INSTALLATING A THREE-PHASE, STEP-DOWN TYPE "HPS" RADIAL/LOOP FEED DEAD FRONT PAD-MOUNTED TRANSFORMER.



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SDG&E ELECTRIC STANDARDS

3753.1

THREE-PHASE STEP-DOWN, TYPE "HPS", RADIAL, DEAD FRONT, PAD-MOUNTED TRANSFORMER INSTALLATION

REVISION

DATE 11-8-2011

APPD TR/MJC



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION   |             | QUANTITY    |           |             | STANDARD<br>OR<br>STOCK<br>NUMBER | ASSEMBLY<br>UNITS |
|------|---|-------------|-------------|-----------|-------------|-----------------------------------|-------------------|
|      |   |             | PRIMARY     | SECONDARY |             |                                   |                   |
|      |   |             |             | 200A      | 600A        |                                   |                   |
| 1    | PAD, TRANSFORMER, THREE-PHASE   |             | 1           | —         | —           | 3427                              | —                 |
| 2    | TRENCH GROUND WIRE (W)  |             | AS REQ'D    | —         | —           | 4510                              | —                 |
| 3a   | TRANSFORMER, 225 KVA (H) (F)  |             | 1           | —         | —           | 3702                              | —                 |
| 3b   | TRANSFORMER, 500–2500 KVA (B) (F)   |             | 1           | —         | —           | 3702                              | —                 |
| 4    | NUT, CLAMPING CHANEL  |             | 2           | —         | —           | 503520                            | —                 |
| 5    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2"                                  |             | 2           | —         | —           | 616192                            | —                 |
| 6    | WASHER, FLAT, ROUND, BRONZE, 1/2"   |             | 2           | —         | —           | 799488                            | —                 |
| 7    | FUSE, "BAY-O-NET" (SUPPLIED WITH TRANSFORMER) (U)                           |             | 3           | —         | —           | 4311                              | —                 |
| 8    | KEYLESS LOCK (NOT SHOWN) (G)  |             | 1           | —         | —           | 468010                            | —                 |
| 9    | BUSHING WELL & BUSHING (RADIAL ONLY) (A)                                    |             | 3           | —         | —           | —                                 | —                 |
| 10   | ELBOW, LOADBREAK, 12KV<br>(WITH WHITE-BLACK-WHITE BAND) (A) (B)             | RADIAL FEED | 3           | 3         | AS<br>REQ'D | 4191                              | —                 |
| 11   | CABLE IDENTIFICATION TAGS   |             | AS REQ'D    |           |             | 3202                              | —                 |
| 12   | CONCENTRIC NEUTRAL TAILS (OR EQUIVALENT WIRE SIZE)                          |             | —           | —         | —           | 4172.1                            | —                 |
| 13   | CONNECTOR, COMPRESSION (SIZE AS REQ'D)                                      |             | AS REQ'D    |           |             | 4172.2                            | —                 |
| 14   | SERVICE POST CONNECTOR (AND 1/2"<br>STAINLESS STEEL SPRING WASHER AS REQ'D) |             | 1           | —         | —           | 262560                            | —                 |
|      |   |             | —           | 1         | 1           | 262656                            | —                 |
| 15   | ELBOW, TEE, 600A (B)  |             | —           | —         | AS<br>REQ'D | 326578                            | ELBO-T            |
| 16   | BUSHING EXTENSION (B)   |             | —           | —         | AS<br>REQ'D | 336204                            | BUSH-X            |
| 17   | 600/200 AMP REDUCING TAP WELL (B)   |             | —           | —         | 3           | 719600                            | REDTAP            |
| 18   | LOADBREAK BUSHING PLUG (B)  |             | —           | —         | 3           | 544676                            | BSHPLG            |
| 19   | 200 AMP INSULATING RECEPTICAL (A) (B)                                       |             | AS<br>REQ'D | —         | AS<br>REQ'D | 204304                            | INSREC            |
| 20   | CONDUCTOR CONNECTOR (B)   | 350 AL      | —           | —         | AS<br>REQ'D | 258698                            | SPD350            |
|      |   | 750 AL      | —           | —         | AS<br>REQ'D | 258704                            | SPD750            |
|      |   | 1000 AL     | —           | —         | AS<br>REQ'D | 258702                            | SP1000            |
| 21   | CABLE ADAPTER (B)   | 350 AL      | —           | —         | AS<br>REQ'D | 102027                            | ADP350            |
|      |   | 750 AL      | —           | —         | AS<br>REQ'D | 102034                            | APD750            |
|      |   | 1000 AL     | —           | —         | AS<br>REQ'D | 102050                            | AD1MIL            |
| 22   | WIRE, BARE STRANDED COPPER, #2  |             | AS REQ'D    |           |             | 812816                            | GDWIRE            |
| 23   | SEALING COMPOUND (C) (V)  |             | AS REQ'D    |           |             | 442976                            | —                 |

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| REVISION     |  | SDG&E ELECTRIC STANDARDS   |                    |                                  |                     |
| DATE 5-11-05 |  | THREE-PHASE STEP-DOWN, TYPE "HPS", RADIAL,<br>DEAD FRONT, PAD-MOUNTED TRANSFORMER INSTALLATION |                    |                                  |                     |
| APPD MF/JJ   |  |  |                    |                                  |                     |
|              |  | 3753.2   |                    |                                  |                     |



## INSTALLATION:

- (A) PRIMARY SIDE OF TRANSFORMER USES 3 CONDUCTOR #2 OR 2/0 PRIMARY CABLES. THE TRANSFORMER IS FITTED WITH BUSHING WELLS AND BUSHING INSERTS. THIS TRANSFORMER IS TO BE USED IN RADIAL APPLICATIONS ONLY.
- (B) 500 THRU 2500 KVA TRANSFORMER HAVE 600 AMP DEADBREAK BUSHINGS ON THE SECONDARY SIDE. THESE BUSHINGS WILL ACCEPT EITHER 600 OR 200 AMP CONNECTIONS, DEPENDING ON ON THE SIZE OF CABLE BEING INSTALLED.
- (C) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (D) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (F) TRANSFORMER RATING AND SIZE PER WORK ORDER.
- (G) KEYLESS LOCK (ITEM 8) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AFTER PENTAHEAD BOLT IS THREADED IN COMPLETELY. PENTAHEAD BOLTS MAY NOT BE AVAILABLE ON SOME RE-FURBISHED TRANSFORMERS.
- H. 225 KVA TRANSFORMERS HAVE 200 AMP LOAD BREAK BUSHINGS ON THE SECONDARY SIDE. THESE BUSHINGS ACCEPT LOAD BREAK ELBOWS APPROPRIATE FOR THE SIZE OF CABLE BEING INSTALLED.

## REFERENCE:

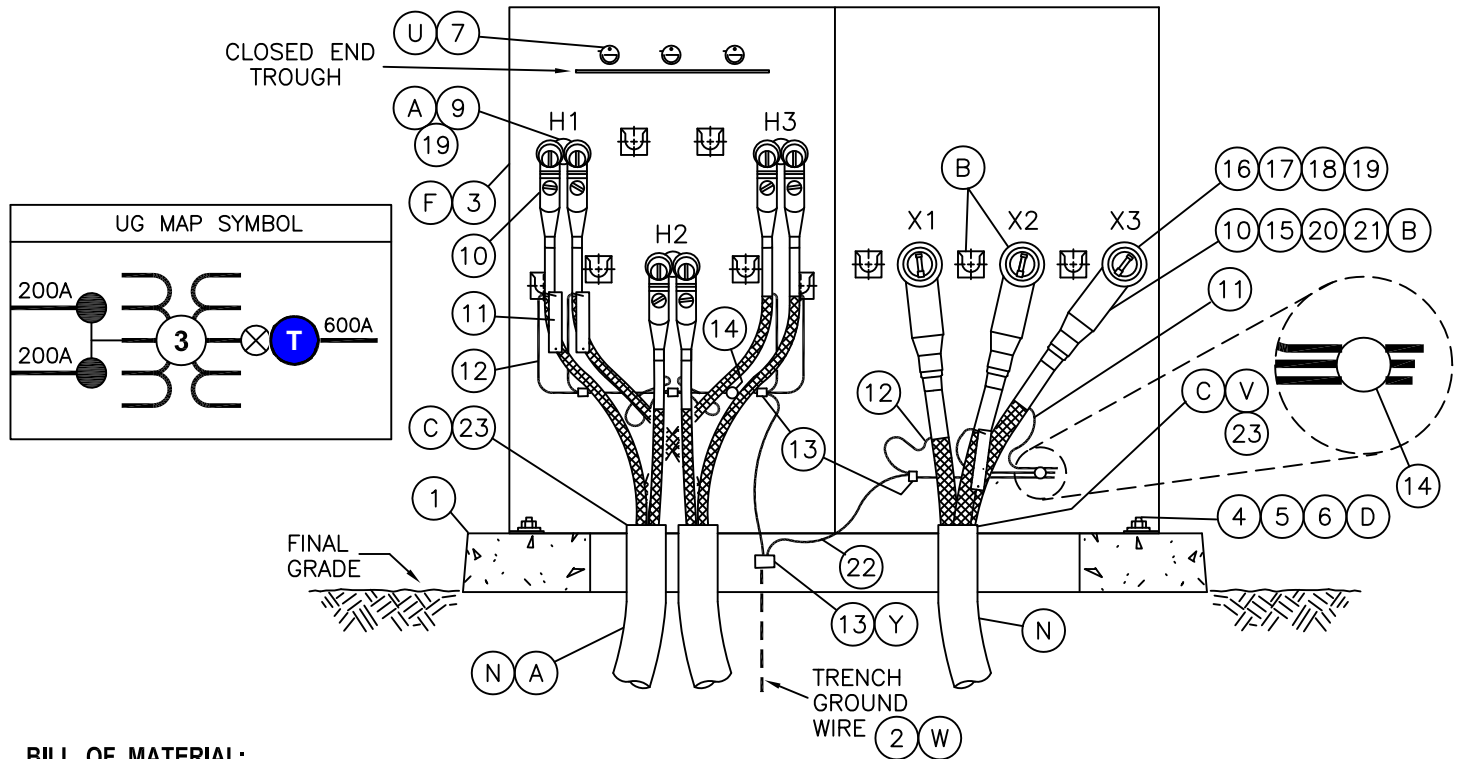
- J. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (N) SEE STANDARD 3425 OR 3426 FOR PAD AND CONDUIT PLACEMENT.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S. SEE STANDARD 3487 FOR RETAINING WALLS.
- T. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- (U) SEE STANDARD 3704 FOR HIGH AMPERE "BAY-O-NET" FUSE OPERATING INSTRUCTIONS.
- (V) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (W) SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- X. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (Y) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Z. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

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| 3753.3 | SDG&E ELECTRIC STANDARDS  |   |  | REVISION                                     |
|        | THREE-PHASE STEPDOWN, TYPE "HPS", RADIAL,<br>DEAD FRONT, PAD-MOUNTED TRANSFORMER INSTALLATION |   |  | DATE 5-11-05                                 |
|        |   |   |  | APPD MF/JJ                                   |



**SCOPE:** THIS STANDARD SHOWS THE METHOD OF INSTALLATING A THREE-PHASE, STEP-DOWN TYPE "HPB" RADIAL/LOOP FEED DEAD FRONT PAD-MOUNTED TRANSFORMER.



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION   |             | QUANTITY |           |             | STANDARD<br>OR<br>STOCK<br>NUMBER |
|------|---|-------------|----------|-----------|-------------|-----------------------------------|
|      |   |             | PRIMARY  | SECONDARY |             |                                   |
|      |   |             |          | 200A      | 600A        |                                   |
| 1    | PAD, TRANSFORMER, THREE-PHASE   |             | 1        | —         | —           | 3425, 3426                        |
| 2    | TRENCH GROUND WIRE (W)  |             | AS REQ'D | —         | —           | 4510                              |
| 3    | TRANSFORMER, INCLUDING HOLDDOWN DEVICE (F)                                  |             | 1        | —         | —           | 3702                              |
| 4    | NUT, CLAMPING CHANEL  |             | 2        | —         | —           | 503520                            |
| 5    | SCREW, HEX HEAD CAP, BRONZE, 1/2" X 1 1/2"                                  |             | 2        | —         | —           | 616192                            |
| 6    | WASHER, FLAT, ROUND, BRONZE, 1/2"   |             | 2        | —         | —           | 799488                            |
| 7    | FUSE, "BAY-O-NET" (SUPPLIED WITH TRANSFORMER) (U)                           |             | 3        | —         | —           | 4311                              |
| 8    | KEYLESS LOCK (NOT SHOWN) (G)  |             | 1        | —         | —           | 468010                            |
| 9    | FEED-THRU INSERT (RADIAL OR LOOP FEED) (A)                                  |             | 3        | —         | —           | 544678                            |
| 10   | ELBOW, LOADBREAK, 12KV<br>(WITH WHITE-BLACK-WHITE BAND) (A)(B)              | RADIAL FEED | 3        | 3         | AS<br>REQ'D | 4191                              |
|      |   | LOOP FEED   | 6        | 3         | AS<br>REQ'D |                                   |
| 11   | CABLE IDENTIFICATION TAGS   |             | AS REQ'D |           |             | 3202                              |
| 12   | CONCENTRIC NEUTRAL TAILS (OR EQUIVALENT WIRE SIZE)                          |             | —        | —         | —           | 4172.1                            |
| 13   | CONNECTOR, COMPRESSION (SIZE AS REQ'D)                                      |             | AS REQ'D |           |             | 4172.2                            |
| 14   | SERVICE POST CONNECTOR (AND 1/2" STAINLESS STEEL<br>SPRING WASHER AS REQ'D) |             | 1        | —         | —           | 262560                            |
|      |   |             | —        | 1         | 1           | 262656                            |

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| SDG&E ELECTRIC STANDARDS |  |  |   |                                   |  |
| 3755.1                   |  | THREE-PHASE STEP-DOWN, TYPE "HPB", RADIAL/LOOP, DEAD FRONT, PAD-MOUNTED TRANSFORMER INSTALLATION |   |                                   | REVISION<br>DATE 11-8-2011<br>APPD TR/MJC    |




**BILL OF MATERIAL: (CONT'D)**

| ITEM | DESCRIPTION                    |        | QUANTITY    |           |             | STANDARD<br>OR<br>STOCK<br>NUMBER | ASSEMBLY<br>UNITS |        |
|------|--------------------------------|--------|-------------|-----------|-------------|-----------------------------------|-------------------|--------|
|      |                                |        | PRIMARY     | SECONDARY |             |                                   |                   |        |
|      |                                |        |             | 200A      | 600A        |                                   |                   |        |
| 15   | ELBOW, TEE, 600A               | (B)    | —           | —         | AS<br>REQ'D | 326578                            | ELBO—T            |        |
| 16   | BUSHING EXTENSION              | (B)    | —           | —         | AS<br>REQ'D | 336204                            | BUSH—X            |        |
| 17   | 600/200 AMP REDUCING TAP WELL  | (B)    | —           | —         | 3           | 719600                            | REDTAP            |        |
| 18   | LOADBREAK BUSHING PLUG         | (B)    | —           | —         | 3           | 544676                            | BSHPLG            |        |
| 19   | 200 AMP INSULATING RECEPTICAL  | (A)(B) | AS<br>REQ'D | —         | AS<br>REQ'D | 204304                            | INSREC            |        |
| 20   | CONDUCTOR CONNECTOR            | (B)    | 350 AL      | —         | —           | AS<br>REQ'D                       | 258698            | SPD350 |
|      |                                |        | 750 AL      | —         | —           | AS<br>REQ'D                       | 258704            | SPD750 |
|      |                                |        | 1000 AL     | —         | —           | AS<br>REQ'D                       | 258702            | SP1000 |
| 21   | CABLE ADAPTER                  | (B)    | 350 AL      | —         | —           | AS<br>REQ'D                       | 102027            | ADP350 |
|      |                                |        | 750 AL      | —         | —           | AS<br>REQ'D                       | 102034            | APD750 |
|      |                                |        | 1000 AL     | —         | —           | AS<br>REQ'D                       | 102050            | AD1MIL |
| 22   | WIRE, BARE STRANDED COPPER, #2 |        | AS REQ'D    |           |             | 812816                            | GDWIRE            |        |
| 23   | SEALING COMPOUND               |        | (C)(V)      | AS REQ'D  |             |                                   | 442976            | —      |

**INSTALLATION:**

- (A) PRIMARY SIDE OF TRANSFORMER USES FROM 3 TO 6 SINGLE CONDUCTOR #2 OR 2/0 PRIMARY CABLES. THE TRANSFORMER IF FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING INSERTS. FOR THE RADIAL OR LOOP FEED APPLICATION, THREE FEED—THRU INSERTS ARE REQUIRED. FOR RADIAL APPLICATION USE 200 AMP INSULATING RECEPTACLES ON SPARE POSITIONS.
- (B) SECONDARY SIDE OF TRANSFORMER HAVE 600 AMP BUSHINGS ON TRANSFORMERS RATED 500 KVA AND ABOVE. THE 600 AMP BUSHINGS MAY REQUIRE EITHER 200 OR 600 AMP CONNECTIONS DEPENDING ON LOAD REQUIREMENTS. THE 200 AMP CONNECTIONS INSTALLED ON 600 AMP BUSHINGS REQUIRE BUSHING EXTENSIONS, REDUCING TAP WELLS, LOADBREAK BUSHING PLUGS AND LOADBREAK ELBOWS. THE 600 AMP CONNECTIONS REQUIRE 600 AMP TEES, REDUCING TAP WELLS, LOADBREAK BUSHING PLUGS AND INSULATING RECEPTACLES. TRANSFORMERS RATED LESS THAN 500 KVA HAVE 200 AMP LOADBREAK BUSHINGS. THESE INSTALLATIONS REQUIRE 200 AMP LOADBREAK ELBOWS. 200 AMP BUSHING PARKING STANDS ARE PROVIDED ON ALL TRANSFORMERS.
- (C) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6).
- (D) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (F) TRANSFORMER RATING AND SIZE PER WORK ORDER.
- (G) KEYLESS LOCK (ITEM 8) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AFTER PENTAHEAD BOLT IS THREADED IN COMPLETELY. PENTAHEAD BOLTS MAY NOT BE AVAILABLE ON SOME RE—FURNISHED TRANSFORMERS.

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|  |  Indicates Latest Revision | Completely Revised | New Page | Information Removed |
| REVISION                                 | SDG&E ELECTRIC STANDARDS  |                    |          |                     |
| DATE 1-1-2000<br>APPD <i>[Signature]</i> | THREE—PHASE STEP—DOWN, TYPE "HPB", RADIAL/LOOP,<br>DEAD FRONT, PAD—MOUNTED TRANSFORMER INSTALLATION           |                    |          |                     |
|  | 3755.2  |                    |          |                     |



**REFERENCE:**

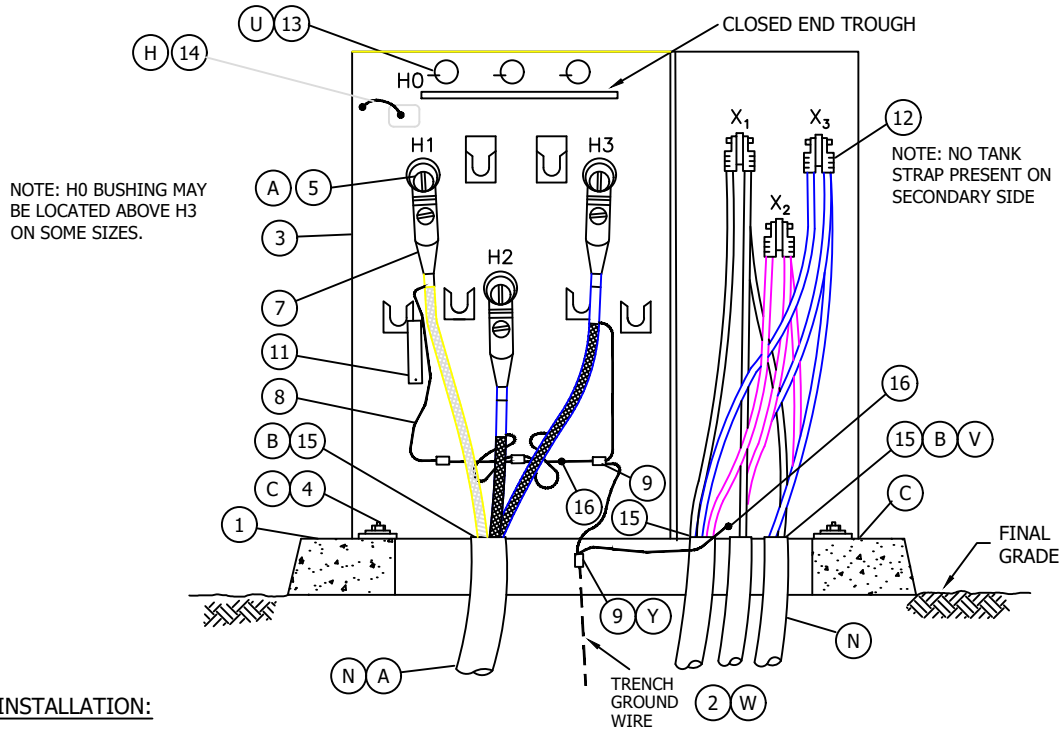
- J. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (N) SEE STANDARD 3425 OR 3426 FOR PAD AND CONDUIT PLACEMENT.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S. SEE STANDARD 3487 FOR RETAINING WALLS.
- T. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- (U) SEE STANDARD 3704 FOR "BAY-O-NET" FUSE OPERATING INSTRUCTIONS.
- (V) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (W) SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- X. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (Y) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Z. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

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|--------|---|--|--|---|
| 3755.3 | SDG&E ELECTRIC STANDARDS  |  |  |   |
|        | THREE-PHASE STEPDOWN, TYPE "HPB", RADIAL/LOOP,<br>DEAD FRONT, PAD-MOUNTED TRANSFORMER INSTALLATION            |  |  |   |
|        |   |  |  | REVISION<br>DATE 1-1-91<br>APPD <i>JLB/ROJ</i>  |



**SCOPE:** THIS STANDARD SHOWS THE CONNECTION USED FOR INSTALLING THREE-PHASE, 12KV RADIAL DEAD FRONT PAD-MOUNTED TRANSFORMERS, TYPE "HYS".



**INSTALLATION:**

- (A) THIS INSTALLATION USES FROM 3 TO 6 SINGLE-PHASE CONDUCTOR #2 OR 2/0 PRIMARY CABLES. THE TRANSFORMER IS FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING INSERTS. FOR THE RADIAL APPLICATION, THREE BUSHING PLUGS ARE REQUIRED, ITEM 5 IN THE BILL OF MATERIAL. FOR THE LOOP FEED APPLICATION, THREE FEED-THRU INSERTS ARE REQUIRED, ITEM 6 IN THE BILL OF MATERIAL.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O 128 RULE 31.6).
- (C) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (D) TRANSFORMER RATING AND SIZE PER WORK ORDER.
- (E) KEYLESS LOCK (ITEM 10) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AFTER PENTAHEAD BOLT IS THREADED IN COMPLETELY.
- (F) PARTIAL RANGE CURRENT LIMITING FUSES ARE UNDER OIL IN THE TANK IN LIEU OF ISOLATION SEE TABLE BELOW FOR SIZES. KEARNY TO RE-FUSE AT THE KEARNY SHOP.

| KVA  | AMPS | PART NUMBER    | STOCK NUMBER |
|------|------|----------------|--------------|
| 300  | 65   | HTSS242065     | S365770      |
| 1000 | 150  | HTSS242150     | S365774      |
| 2000 | 250  | {2} HTSS242125 | S365772      |

- (H) DO NOT OPEN PRIMARY GROUND WHILE TRANSFORMER IS ENERGIZED.

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| C   |                |    |      |      |           | F   |        |    |      |      |      |
| B   |                |    |      |      |           | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE | PS | JS   | MDJ  | 3/13/2017 | D   |        |    |      |      |      |

**SHEET  
1 OF 2**

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

THREE-PHASE 12KV, TYPE "HYS" RADIAL, DEAD FRONT,  
PAD-MOUNTED TRANSFORMER INSTALLATION

**UG 3756.1**



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD.<br>OR PAGE NO | STOCK<br>NUMBER | ASSEMBLY<br>UNITS |
|------|--|----------|--------------------------|-----------------|-------------------|
| 1    | PAD, TRANSFORMER, THREE-PHASE                        | 1        | 3425,3426,3427           | --              | --                |
| 2    | TRENCH GROUND WIRE (W)                               | AS REQ'D | 4510                     | --              | --                |
| 3    | TRANSFORMER (D)                                      | 1        | 3702                     | --              | --                |
| 4    | HOLD DOWN DEVICE - (SUPPLIED WITH CABINET)           | 2        | --                       | --              | --                |
| 5    | BUSHING PLUG (RADIAL FEED) (A)                       | 3        | 4192                     | 544678          | FEED-I            |
| 7    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | AS REQ'D | 4191                     | --              | --                |
| 8    | CONCENTRIC NEUTRAL TAILS                             | --       | 4172.1                   | --              | --                |
| 9    | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172                     | --              | --                |
| 10   | KEYLESS LOCK, (NOT SHOWN ABOVE) (E)                  | 1        | --                       | 468010          | --                |
| 11   | CABLE IDENTIFICATION TAGS                            | AS REQ'D | 3202                     | --              | --                |
| 12   | SECONDARY CONNECTIONS                                | AS REQ'D | 4168, 4171               | --              | --                |
| 13   | FUSE, "BAY-O-NET" (U)                                | 3        | 4311                     | --              | --                |
| 14   | NEUTRAL GROUND STRAP (ON TRANSFORMER)                | 1        | --                       | --              | --                |
| 15   | SEALING COMPOUND (B)(V)                              | AS REQ'D | --                       | 442976          | --                |
| 16   | SERVICE POST CONNECTOR                               | 2        | --                       | 262560          | --                |

**REFERENCE:**

- J. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- I. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (N)** SEE STANDARD 3425. 3426 OR 3427 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S. SEE STANDARD 3487 FOR RETAINING WALLS.
- T. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- (U)** SEE STANDARD 3704 FOR "BAY-O-NET" FUSE OPERATING INSTRUCTIONS.
- (V)** SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (W)** SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- X. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (Y)** SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Z. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

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| REV             | CHANGE         | BY   | DSGN | APPV               | DATE                   | REV      | CHANGE | BY                  | DSGN      | APPV | DATE |
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| C               |                |  |      |                    |                        | F        |        |                     |           |      |      |
| B               |                |  |      |                    |                        | E        |        |                     |           |      |      |
| A               | ORIGINAL ISSUE | PS   | JS   | MDJ                | 3/13/2017              | D        |        |                     |           |      |      |
| SHEET<br>2 OF 2 |                | <div><div></div>Indicates Latest Revision</div>  |      | Completely Revised | <div><div></div></div> | New Page |        | Information Removed | UG 3756.2 |      |      |
|                 |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD   |      |                    |                        |          |        |                     |           |      |      |
|                 |                | THREE-PHASE 12KV, TYPE "HYS" RADIAL, DEAD FRONT,<br>PAD-MOUNTED TRANSFORMER INSTALLATION |      |                    |                        |          |        |                     |           |      |      |
|                 |                |  |      |                    |                        |          |        |                     |           |      |      |



- (A) THIS INSTALLATION USES FROM 3 TO 6 SINGLE-PHASE CONDUCTOR #2 OR 2/0 PRIMARY CABLES. THE TRANSFORMER IS FITTED WITH BUSHING WELLS THAT REQUIRE SEPARATELY INSTALLED BUSHING INSERTS. FOR THE RADIAL APPLICATION, THREE BUSHING PLUGS ARE REQUIRED, ITEM 5 IN THE BILL OF MATERIAL.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O 128 RULE 31.6).
- (C) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (D) KEYLESS LOCK (ITEM 10) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AFTER PENTAHEAD BOLT IS THREADED IN COMPLETELY.
- (E) THIS TRANSFORMER IS INSTALLED ON A 3421 SINGLE PHASE PAD.

| REV | CHANGE         | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|----------------|----|------|------|-----------|-----|--------|----|------|------|------|
| C   |                |    |      |      |           | F   |        |    |      |      |      |
| B   |                |    |      |      |           | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE | KR | JS   | MDJ  | 3/31/2017 | D   |        |    |      |      |      |

SHEET  
1 OF 2

THREE-PHASE 12KV, TYPE 75KVA "HBSC" COMPACT RADIAL,  
DEAD FRONT, PAD MOUNTED TRANSFORMER INSTALLATION

UG 3757.1





**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD.<br>OR PG NO. | STOCK<br>NUMBER | ASSEMBLY<br>UNITS |
|------|--|----------|-------------------------|-----------------|-------------------|
| 1    | PAD, TRANSFORMER, SINGLE-PHASE                       | 1        | 3421                    | S514240         | 3421-1            |
| 2    | TRANSFORMER GROUND WIRE (w)                          | AS REQ'D | 4510                    | --              | --                |
| 3    | TRANSFORMER (75kVA)                                  | 1        | 3702                    | S765102         | HBSC75            |
| 4    | HOLD DOWN DEVICE - (SUPPLIED WITH CABINET)           | 2        | --                      | --              | --                |
| 5    | BUSHING PLUG (RADIAL FEED) (A)                       | 3        | 4192                    | S544676         | BSHPLG            |
| 7    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) | AS REQ'D | 4191                    | --              | --                |
| 8    | CONCENTRIC NEUTRAL TAILS                             | --       | 4172.1                  | --              | --                |
| 9    | CONNECTOR, COMPRESSION                               | AS REQ'D | 4172                    | --              | --                |
| 10   | KEYLESS LOCK, (NOT SHOWN ABOVE) (g)                  | 1        | --                      | S468010         | --                |
| 11   | CABLE IDENTIFICATION TAGS                            | AS REQ'D | 3202                    | --              | --                |
| 12   | SECONDARY CONNECTIONS                                | AS REQ'D | 4168, 4171              | --              | --                |
| 13   | FUSE, "BAY-O-NET" (u)                                | 3        | 4311                    | --              | --                |
| 14   | NEUTRAL GROUND STRAP (ON TRANSFORMER)                | 1        | --                      | --              | --                |
| 15   | SEALING COMPOUND (B) (v)                             | AS REQ'D | --                      | S442976         | --                |
| 16   | SERVICE POST CONNECTOR                               | 2        | --                      | S262560         | --                |

**REFERENCE:**

- j. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- k. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- l. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- m. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- (n)** SEE STANDARD 3421 FOR PAD, HANDHOLE AND CONDUIT PLACEMENT.
- o. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- p. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- r. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- s. SEE STANDARD 3487 FOR RETAINING WALLS.
- t. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- (u)** SEE STANDARD 3704 FOR "BAY-O-NET" FUSE OPERATING INSTRUCTIONS.
- (v)** SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (w)** SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- x. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- (y)** SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- z. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

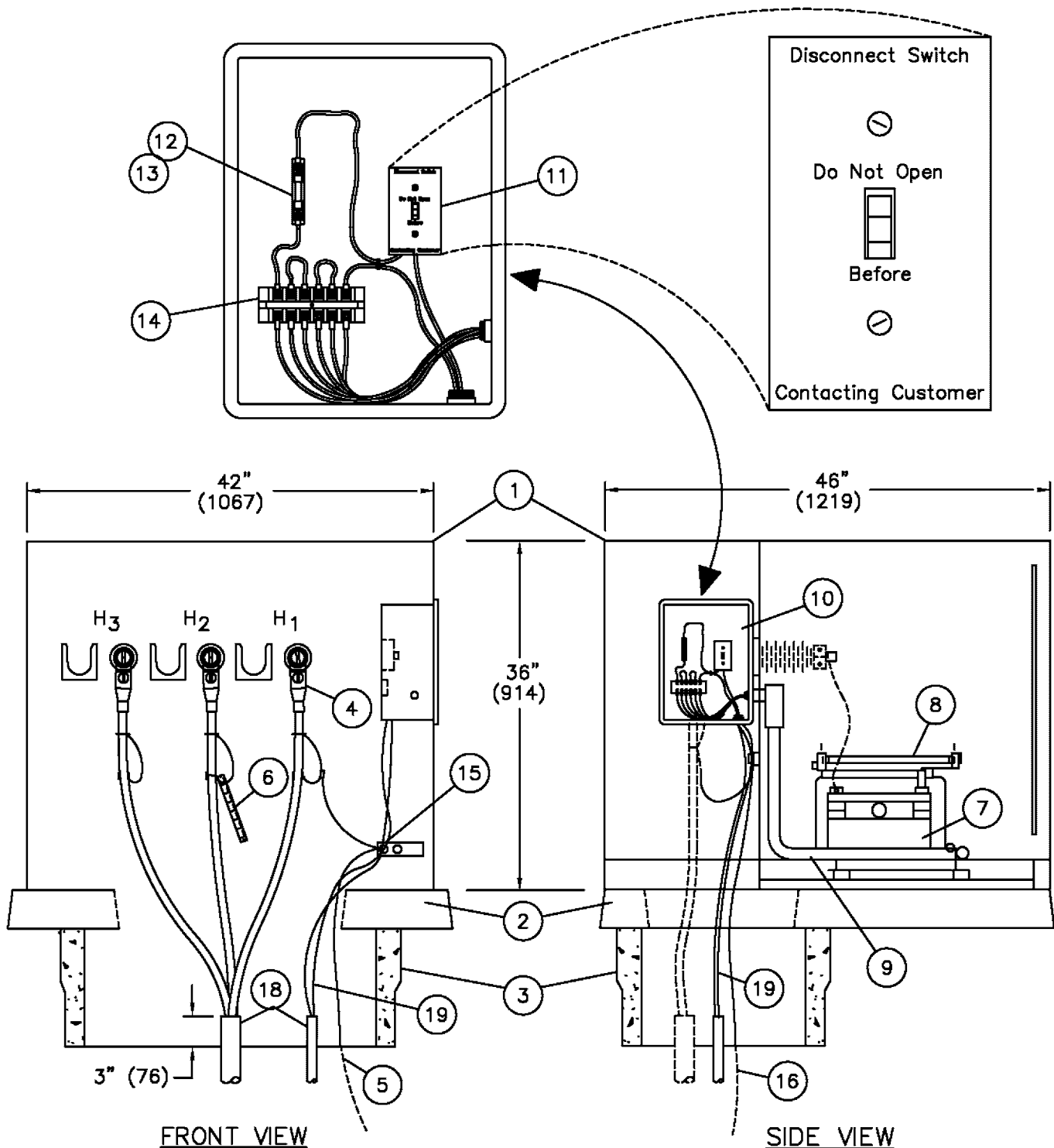
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| REV             | CHANGE         | BY  | DSGN                      | APPV | DATE      | REV                | CHANGE | BY  | DSGN     | APPV | DATE |                     |  |           |
|-----------------|----------------|---|---------------------------|------|-----------|--------------------|--------|---|----------|------|------|---------------------|--|-----------|
| C               |                |   |                           |      |           | F                  |        |   |          |      |      |                     |  |           |
| B               |                |   |                           |      |           | E                  |        |   |          |      |      |                     |  |           |
| A               | ORIGINAL ISSUE | KR  | JS                        | MDJ  | 3/31/2017 | D                  |        |   |          |      |      |                     |  |           |
| SHEET<br>2 OF 2 |                |                      | Indicates Latest Revision |      |           | Completely Revised |        |  | New Page |      |      | Information Removed |  | UG 3757.2 |
|                 |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |      |           |                    |        |   |          |      |      |                     |  |           |
|                 |                | THREE-PHASE 12KV, TYPE 75KVA "HBSC" COMPACT RADIAL,<br>DEAD FRONT, PAD MOUNTED TRANSFORMER INSTALLATION |                           |      |           |                    |        |   |          |      |      |                     |  |           |



**SCOPE:** THIS STANDARD SHOWS THE NGD TRANSFORMER. THIS TRANSFORMER SHALL BE USED WHEN THE CUSTOMER REQUIRES GROUND FAULT INFORMATION.

**NOTE:** THIS TRANSFORMER PROVIDES NO USABLE VOLTAGE.



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3760.1

SDG&E ELECTRIC STANDARDS  
GROUND FAULT DETECTION  
TRANSFORMER (NGD)

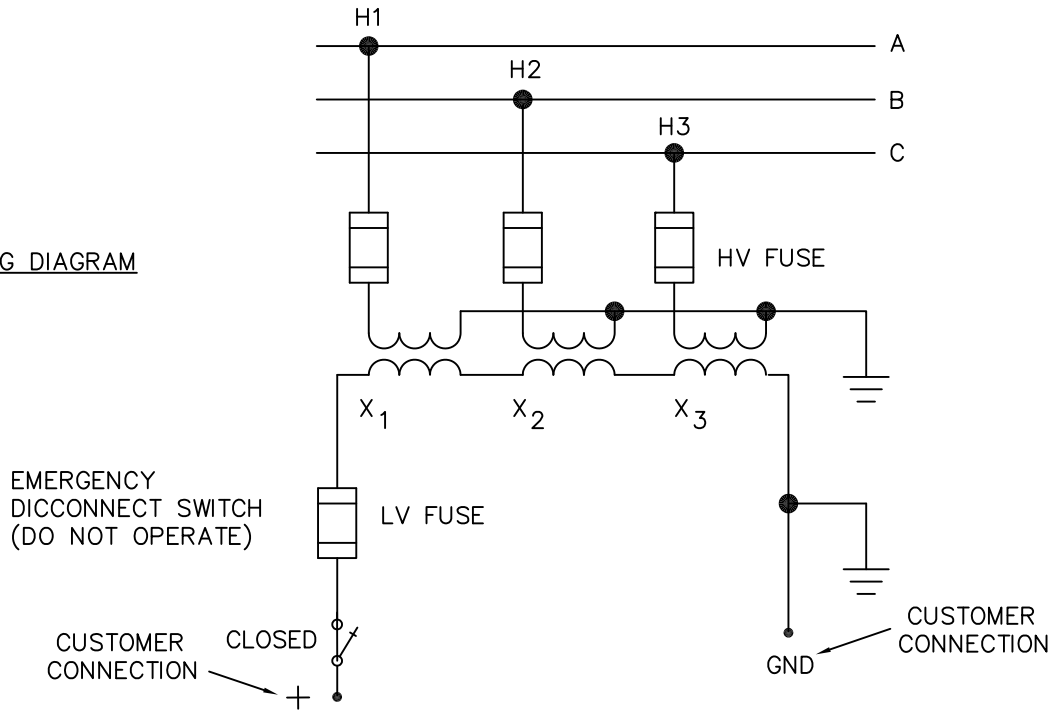
REVISION

DATE 3-1-02

APPD *[Signature]*



# WIRING DIAGRAM



## BILL OF MATERIAL:

| ITEM | DESCRIPTION              | QUANTITY | CONSTR. STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--------------------------|----------|-------------------------|--------------|----------------|
| 1    | TRANSFORMER              | 1        | 3760.1                  | S758302      | NGD-01         |
| 2    | EQUIPMENT PAD            | 1        | 3421.3                  | S51420       | FC3PAD         |
| 3    | HANDHOLE 17430           | 1        | 3312                    | S16426       | -              |
| 4    | ELBOW LOADBREAK          | 3        | 4191                    | -            | -              |
| 5    | TRENCH GROUND            | 1        | 4510.1                  | -            | TG-TW          |
| 6    | CABLE IDENTIFICATION TAG | AS REQ'D | 3202                    | -            | -              |
| 7    | POTENTIAL TRANSFORMER    | 3        | -                       | -            | -              |
| 8    | CURRENT LIMITING FUSE    |          |                         |              | -              |
| 9    | SECONDARY CONDUIT        | 1        | -                       | -            | -              |
| 10   | SECONDARY COMPARTMENT    | 1        | -                       | -            | -              |
| 11   | DICCONNECT SWITCH        | 1        | -                       | -            | -              |
| 12   | FUSE HOLDER              |          | -                       | -            | -              |
| 13   | FUSE 10 AMP              | 1        | -                       | S363968      | -              |
| 14   | SECONDARY TERMINATION    | 1        | -                       | -            | -              |
| 15   | SERVICE POST CONNECTOR   | 1        | -                       | S262656      | -              |
| 16   | CUSTOM CONDUIT           | 1        | -                       | -            | -              |
| 17   | KEYLESS LOCK             | 2        | -                       | S468010      | -              |
| 18   | SEALING COMPOUND         | AS REQ'D |                         | S442976      | -              |
| 19   | SERVICE CONDUCTORS       | AS REQ'D | BY CUSTOMER             | -            | -              |

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| REVISION                | SDG&E ELECTRIC STANDARDS                 |                    |          |                     |
| DATE 3-1-02             | GROUND FAULT DETECTION TRANSFORMER (NGD) |                    |          |                     |
| APPD <i>[Signature]</i> | 3760.2                                   |                    |          |                     |



## INSTALLATION:

- (A) PRIMARY SIDE OF TRANSFORMER USES 3 CONDUCTOR #2 PRIMARY CABLES. THE TRANSFORMER IS FITTED WITH BUSHING WELLS AND BUSHING INSERTS. THIS TRANSFORMER IS TO BE USED IN RADIAL APPLICATIONS ONLY.
- (B) SECONDARY CONNECTIONS ARE MADE IN THE SECONDARY COMPARTMENT ACCESSED FROM THE SIDE OF THE TRANSFORMER. REFER TO THE WIRING DIAGRAM.
- (C) TERMINATE PRIMARY AND SECONDARY CONDUITS 3 INCHES ABOVE THE BOTTOM OF THE 3312. SEAL SECONDARY AND PRIMARY CONDUITS WITH SEALING COMPOUND.
- (D) THE TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (E) SECURE THE TRANSFORMER WITH PENTAHEAD BOLTS AND KEYLESS LOCKS AS NECESSARY.

NOTE: GROUND THE CUSTOMERS GROUND CONDUCTOR (GREEN WIRE) TO THE SERVICE POST CONNECTOR IN THE PRIMARY COMPARTMENT.

WARNING: NEVER OPERATE THE DISCONNECT SWITCH IN THE SECONDARY COMPARTMENT WITHOUT CONTACTING THE CUSTOMER FIRST.

## REFERENCE:

- J. SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- N. SEE STANDARD 3421 FOR PAD, HANDHOLE PLACEMENT.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S. SEE STANDARD 3487 FOR RETAINING WALLS.
- T. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- (U) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (V) SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- (W) SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- X. SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- (Y) SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.

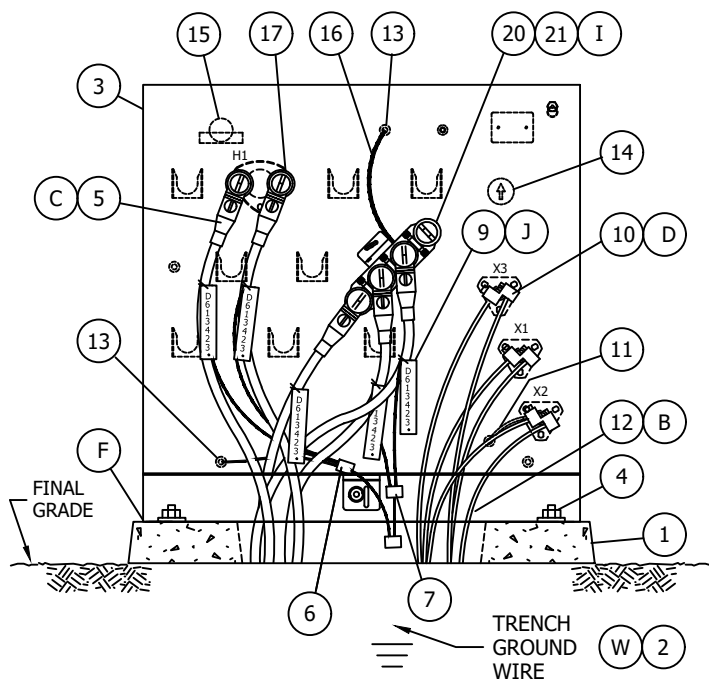
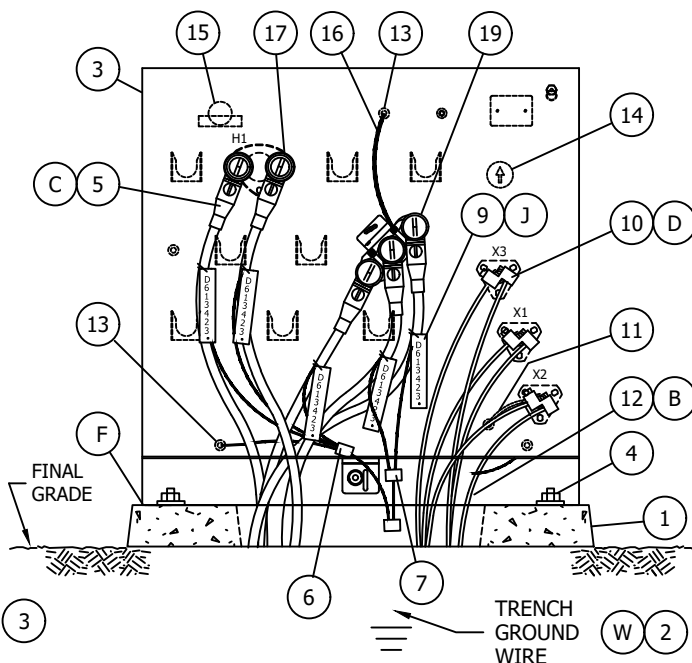
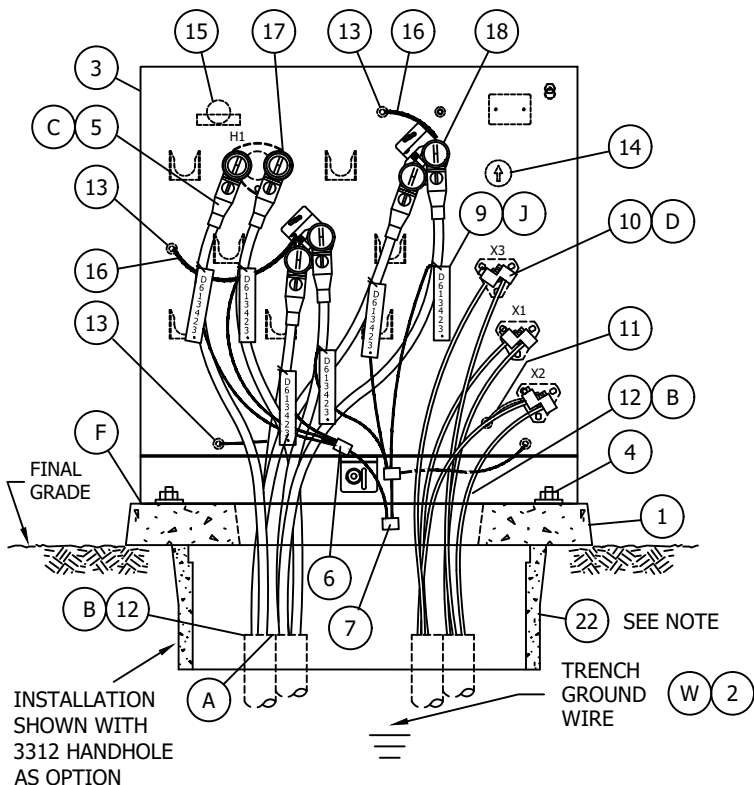
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|--------|---|---------------------------|--------------------|----------|--|
| 3760.3 | SDG&E ELECTRIC STANDARDS                    |                           |                    |          | REVISION                               |
|        | GROUND FAULT DETECTION<br>TRANSFORMER (NGD) |                           |                    |          | DATE 3-1-02<br>APPD <i>[Signature]</i> |



**SCOPE:** THIS TRANSFORMER SHOULD BE RESTRICTED TO THE REPLACEMENT OF EXISTING LIVE-FRONT TRANSFORMERS WITH MORE THAN TWO PHASES OR MORE THAN TWO CONDUCTORS PER PHASE PASSING THROUGH. A DEVIATION IS REQUIRED FOR ALL OTHER INSTALLATIONS. SOME APPLICATIONS MAY REQUIRE A 3523 TERMINATOR TO BE INSTALLED.

THIS STANDARD SHOWS SOME TYPICAL CONFIGURATIONS USING THE NCS TRANSFORMER AND THE ELASTIMOLD ADJUSTABLE JUNCTION TAPS.



ACTUAL FIELD INSTALLATION OF SKETCH IN THE DEPICTION ON THE LEFT.

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REVISION

SDG&E ELECTRIC STANDARDS

DATE 11-18-08

SINGLE-PHASE, 6930 VOLT, TYPE "NCS"  
PAD-MOUNT TRANSFORMER INSTALLATION

3770.1

APPD TR / MC



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD OR PG NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------------|--------------|----------------|
| 1    | PAD, TRANSFORMER, SINGLE-PHASE                           | 1        | 3421                | 514240       | 3421.1         |
| 2    | TRENCH GROUND WIRE (W)                                   | AS REQ'D | 4510                | --           |                |
| 3    | TRANSFORMER, (NCS)                                       | 1        | 3702                | S750312      | NCS-25         |
|      |  |          |                     | S750350      | NCS-50         |
|      |  |          |                     | S750352      | NCS-100        |
| 4    | HOLD DOWN DEVICE - (SUPPLIED WITH CABINET)               | 2        | --                  | --           |                |
| 5    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) (C) | AS REQ'D | 4191                | --           |                |
| 6    | CONCENTRIC NEUTRAL TAILS                                 | AS REQ'D | --                  | --           |                |
| 7    | CONNECTOR, COMPRESSION                                   | AS REQ'D | 4172                | --           |                |
| 8    | KEYLESS LOCK, (NOT SHOWN ABOVE) (H)                      | 1        | --                  | 468010       |                |
| 9    | CABLE IDENTIFICATION TAGS (J)                            | AS REQ'D | 3202                | --           |                |
| 10   | SECONDARY CONNECTIONS (D)                                | AS REQ'D | 4167                | --           |                |
| 11   | NEUTRAL GROUND STRAP (SUPPLIED WITH TRANSFORMER)         | 1        | --                  | --           |                |
| 12   | CONDUIT SEALING SYSTEM (B)                               | AS REQ'D | --                  | 442976       |                |
| 13   | SERVICE POST CONNECTOR                                   | 4        | --                  | 262560       |                |
| 14   | VOLTAGE TAP CHANGER SWITCH                               | 1        | --                  | --           |                |
| 15   | BAYONET FUSE   | 1        | --                  | --           |                |
| 16   | GROUND WIRE  | AS REQ'D | --                  | --           |                |
| 17   | FEED-THRU INSERT BUSHING                                 | 1        | 4192                | 544678       | FEED-I         |
| 18   | 2-WAY ADJUSTABLE JUNCTION TAP                            | AS REQ'D | --                  | 182002       | 2WYAFT         |
| 19   | 3-WAY ADJUSTABLE JUNCTION TAP                            | AS REQ'D | --                  | 305710       | 3WYAFT         |
| 20   | 4-WAY ADJUSTABLE JUNCTION TAP                            | AS REQ'D | --                  | 305712       | 4WYAFT         |
| 21   | CAP, INSULATING RECEPTACLE (I)                           | AS REQ'D | 3202                | 204304       | INSREC         |
| 22   | 3312 HANHOLE   | AS REQ'D | 3421.1, .2          | 162462       | FC3PAD         |
| 23   |  | 1        |                     |              |                |
| 24   |  | 1        |                     |              |                |
| 25   |  | 1        |                     |              |                |

**NOTES:**

1. EXISTING CABLES CAN BE SPLICED TO FACILITATE THE LOADBREAK ELBOWS FOR THIS INSTALLATION.
2. REPLACE EXISTING PAD, IF EXISTING PAD IS NOT CURRENT 44" X 46" 3421 PAD.
3. INSTALL A 3312 HANDHOLE TO FACILITATE CABLE TRAINING IF NEEDED, LOWER CONDUITS AS NEEDED FOR CABLE TRAINING.

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| 3770.2 | SDG&E ELECTRIC STANDARDS  |                    |          | REVISION                     |
|        | SINGLE-PHASE, 6930 VOLT, TYPE "NCS"<br>PAD-MOUNT TRANSFORMER INSTALLATION |                    |          | DATE 5-25-10<br>APPD TR / MC |



## **INSTALLATION:**

- Ⓐ MAXIMUM NUMBER OF PRIMARY CABLES SHOULD NOT EXCEED 8 CONDUCTORS.
- Ⓑ TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH EITHER CONDUIT BREAK-OUT BOOTS OR RAYFLATE. INFLATABLE DUCT SEAL PACKAGE AS DESCRIBED IN 3948. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6.).
- Ⓒ PROVIDE AS MANY LOADBREAK ELBOWS AS REQUIRED TO TERMINATE ALL PRIMARY CONNECTORS.
- Ⓓ SET SCREW CONNECTORS ARE NOT PROVIDED WITH TRANSFORMER, SEE STANDARD 4167 FOR INSTALLATION AND STOCK NUMBERS. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER.
- Ⓕ TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (STANDARD 3408).
- Ⓖ KEYLESS LOCK (ITEM 8) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AND PENTAHEAD BOLT THREADED IN COMPLETELY.
- Ⓘ REDUCE LOADBREAK ELBOW QUANTITY AND INSTALL INSULATING RECEPTACLE IF CABLES ARE NOT INSTALLED SIMULTANEOUSLY.

## **REFERENCE:**

- Ⓙ SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- N SEE STANDARD 3421 FOR PAD AND CONDUIT PLACEMENT.
- O SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S SEE STANDARD 3487 FOR RETAINING WALL.
- T SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- U SEE STANDARD 3703 FOR TRANSFORMER APPLICATIONS.
- Ⓥ SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- Ⓦ SEE STANDARD 4510 FOR (PREFERRED I ) AND (ALTERNATE) TRENCH GROUND WIRE.
- X SEE STANDARD PAGE 4512.1 FOR (PREFERRED II ) EQUIPMENT GROUNDING INSTALLATION.
- Ⓨ SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Z SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PADMOUNTED EQUIPMENT.

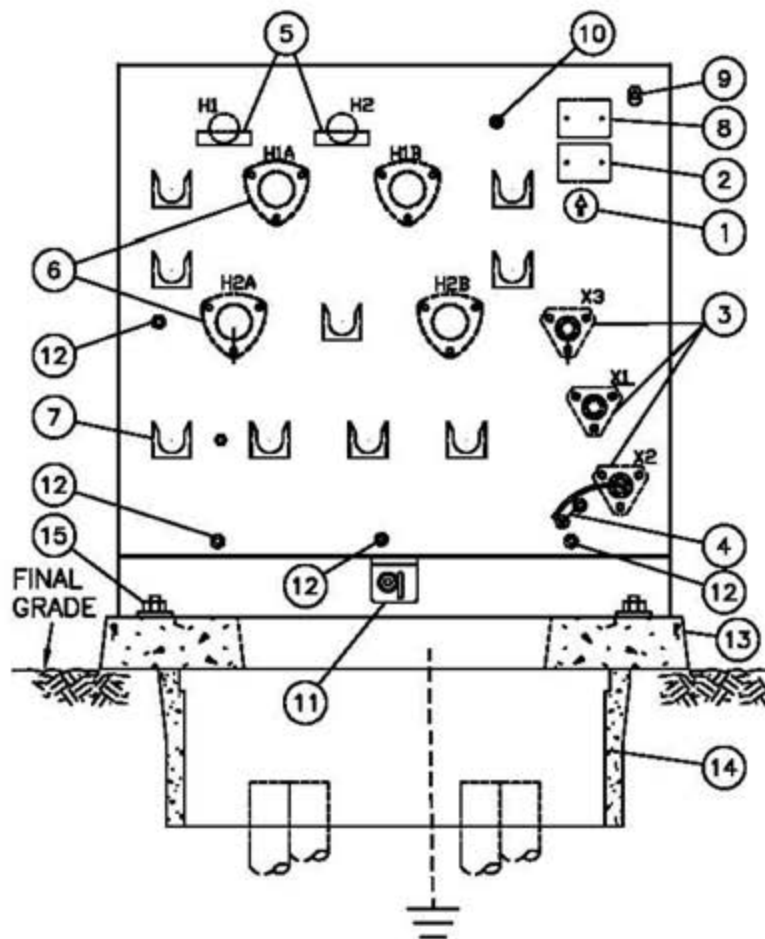
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| REVISION |         | SDG&E ELECTRIC STANDARDS            |                    |  |                     |
| DATE     | 11-6-08 | SINGLE-PHASE, 6930 VOLT, TYPE "NCS" |                    |  |                     |
| APPD     | TR / MC | PAD-MOUNT TRANSFORMER INSTALLATION  |                    |  |                     |
|          |         | 3770.3                              |                    |  |                     |



**SCOPE:** THIS TRANSFORMER SHOULD BE RESTRICTED TO THE REPLACEMENT OF EXISTING LIVE-FRONT TRANSFORMERS WITH MORE THAN TWO PHASES OR MORE THAN TWO CONDUCTORS PER PHASE PASSING THROUGH. A DEVIATION IS REQUIRED FOR ALL OTHER INSTALLATIONS. SOME APPLICATIONS MAY REQUIRE A 3523 TERMINATOR TO BE INSTALLED.

THIS STANDARD SHOWS SOME TYPICAL CONFIGURATIONS USING THE HCS TRANSFORMER AND THE ELASTIMOLD ADJUSTABLE JUNCTION TAPS.



1. No-load Tap changer
2. Stock number plate
3. Secondary stud bushings
4. Tank ground strap
5. Bayonet fuses
6. Bushing wells H1A, H1B and H2A, H2B
7. Standoff support brackets
8. Diagram Nameplate
9. Pressure Relief Valve
10. Fill plug
11. Compartment lift tab and penta bolt and lock provision
12. Ground nut points
13. 3421 pad
14. 3312 handhole
15. Transformer tie down unistrut stud, 1/2" nut & washer



ACTUAL FIELD INSTALLATION OF SKETCH IN THE DEPICTION ON THE TOP.

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| REVISION       | SDG&E ELECTRIC STANDARDS                   |                    |                       |                     |
| DATE 9-25-2013 | SINGLE-PHASE DELTA, 12000 VOLT, TYPE "HCS" |                    |                       |                     |
| APPD TR /DW    | PAD-MOUNT TRANSFORMER INSTALLATION         |                    |                       |                     |
|                | 3771.1                                     |                    |                       |                     |



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST STD OR PG NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|---------------------|--------------|----------------|
| 1    | PAD, TRANSFORMER, SINGLE-PHASE                           | 1        | 3421                | S514240      | 3421.1         |
| 2    | TRENCH GROUND WIRE (W)                                   | AS REQ'D | 4510                | --           |                |
| 3    | TRANSFORMER, (HCS)                                       | 1        | 3702 & 3771         | S751300      | HCS-25         |
|      |  |          |                     | S751302      | HCS-50         |
|      |  |          |                     | S751304      | HCS100         |
|      |  |          |                     | S751306      | HCS167         |
| 4    | HOLD DOWN DEVICE - (SUPPLIED WITH CABINET)               | 2        | --                  | --           |                |
| 5    | ELBOW, LOADBREAK, 12KV (WITH WHITE-BLACK-WHITE BAND) (C) | AS REQ'D | 4191                | --           |                |
| 6    | CONCENTRIC NEUTRAL TAILS                                 | AS REQ'D | --                  | --           |                |
| 7    | CONNECTOR, COMPRESSION                                   | AS REQ'D | 4172                | --           |                |
| 8    | KEYLESS LOCK, (NOT SHOWN ABOVE) (H)                      | 1        | --                  | S468010      |                |
| 9    | CABLE IDENTIFICATION TAGS (J)                            | AS REQ'D | 3202                | --           |                |
| 10   | SECONDARY CONNECTIONS (D)                                | AS REQ'D | 4167                | --           |                |
| 11   | NEUTRAL GROUND STRAP (SUPPLIED WITH TRANSFORMER)         | 1        | --                  | --           |                |
| 12   | CONDUIT SEALING SYSTEM (B)                               | AS REQ'D | --                  | S442976      |                |
| 13   | SERVICE POST CONNECTOR                                   | 3        | --                  | S262560      |                |
| 14   | NO-LOAD TAP CHANGER                                      | 1        | --                  | --           |                |
| 15   | BAYONET FUSE SEE STD. 4311.5                             | AS REQ'D | 4311.5              | --           |                |
| 16   | GROUND WIRE  | AS REQ'D | --                  | --           |                |
| 17   | FEED-THRU INSERT BUSHING                                 | AS REQ'D | 4192                | S544678      | FEED-I         |
| 18   | 2-WAY ADJUSTABLE JUNCTION TAP                            | AS REQ'D | --                  | S182002      | 2WYAFT         |
| 19   | 3-WAY ADJUSTABLE JUNCTION TAP                            | AS REQ'D | --                  | S305710      | 3WYAFT         |
| 20   | BUSHING PLUG   | AS REQ'D | 4192                | S544676      | BSHPL6         |
| 21   | CAP, INSULATING RECEPTACLE (I)                           | AS REQ'D | 3202                | S204304      | INSREC         |
| 22   | 3312 HANHOLE   | AS REQ'D | 3421.1, .2          | S162462      | FC3PAD         |
| 23   |  | 1        |                     |              |                |
| 24   |  | 1        |                     |              |                |
| 25   |  | 1        |                     |              |                |

**NOTES:**

- EXISTING CABLES CAN BE SPLICED TO FACILITATE THE LOADBREAK ELBOWS FOR THIS INSTALLATION.
- REPLACE EXISTING PAD, IF EXISTING PAD IS NOT CURRENT 44" X 46" 3421 PAD.
- INSTALL A 3312 HANDHOLE TO FACILITATE CABLE TRAINING IF NEEDED, LOWER CONDUITS AS NEEDED FOR CABLE TRAINING.

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3771.2

## SDG&amp;E ELECTRIC STANDARDS

SINGLE-PHASE DELTA, 12000 VOLT, TYPE "HCS"  
PAD-MOUNT TRANSFORMER INSTALLATION

## REVISION

DATE 9-25-2013  
APPD TR / DW



**INSTALLATION:**

- (A) MAXIMUM NUMBER OF PRIMARY CABLES SHOULD NOT EXCEED 9 CONDUCTORS.
- (B) TERMINATE PRIMARY AND SECONDARY CONDUITS FLUSH WITH TOP OF PAD. SEAL SECONDARY AND PRIMARY CONDUITS WITH EITHER CONDUIT BREAK-OUT BOOTS OR RAYFLATE. INFLATABLE DUCT SEAL PACKAGE AS DESCRIBED IN 3948. SEAL SERVICE LATERAL CONDUITS PER STANDARD 3948 (G.O. 128 RULE 31.6.).
- (C) PROVIDE AS MANY LOADBREAK ELBOWS AS REQUIRED TO TERMINATE ALL PRIMARY CONNECTORS.
- (D) SET SCREW CONNECTORS ARE NOT PROVIDED WITH TRANSFORMER, SEE STANDARD 4167 FOR INSTALLATION AND STOCK NUMBERS. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER.
- (F) TRANSFORMER SHALL BE SOLIDLY SECURED TO PAD TO PREVENT UNAUTHORIZED MOVEMENT OR ENTRY. THE BASE SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY (STANDARD 3408).
- (H) KEYLESS LOCK (ITEM 8) TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AND PENTAHEAD BOLT THREADED IN COMPLETELY.
- (I) REDUCE LOADBREAK ELBOW QUANTITY AND INSTALL INSULATING RECEPTACLE IF CABLES ARE NOT INSTALLED SIMULTANEOUSLY.

**REFERENCE:**

- (J) SEE STANDARD 3202 FOR CABLE IDENTIFICATION.
- K. SEE STANDARD 3212 FOR TRANSFORMER IDENTIFICATION.
- L. SEE STANDARD 3221 FOR HIGH VOLTAGE DECAL.
- M. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- N. SEE STANDARD 3421 FOR PAD AND CONDUIT PLACEMENT.
- O. SEE STANDARD 3481 FOR BARRIER PROTECTION.
- P. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- Q. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- R. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- S. SEE STANDARD 3487 FOR RETAINING WALL.
- T. SEE STANDARD 3702 FOR TRANSFORMER PREFIXES.
- U. SEE STANDARD 3703 FOR TRANSFORMER APPLICATIONS.
- (V) SEE STANDARD 3948 FOR SEALING SERVICE LATERAL CONDUITS.
- (W) SEE STANDARD 4510 FOR (PREFERRED I ) AND (ALTERNATE) TRENCH GROUND WIRE.
- X. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II ) EQUIPMENT GROUNDING INSTALLATION.
- (Y) SEE STANDARD 4512.2 FOR EQUIPMENT GROUNDING.
- Z. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PADMOUNTED EQUIPMENT.

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| REVISION       |  | SDG&E ELECTRIC STANDARDS                   |                    |  |                     |
| DATE 9-18-2013 |  | SINGLE-PHASE DELTA, 12000 VOLT, TYPE "HCS" |                    |  |                     |
| APPD TR /DW    |  | PAD-MOUNT TRANSFORMER INSTALLATION         |                    |  |                     |
|                |  | 3771.3                                     |                    |  |                     |



3800 - CAPACITORS



3800 - CAPACITORS



**SUBJECT**

## INSTALLATION OF SCADA 4KV PAD-MOUNTED CAPACITOR

## INSTALLATION OF SCADA 600 & 1200 KVAR PAD-MOUNTED CAPACITOR

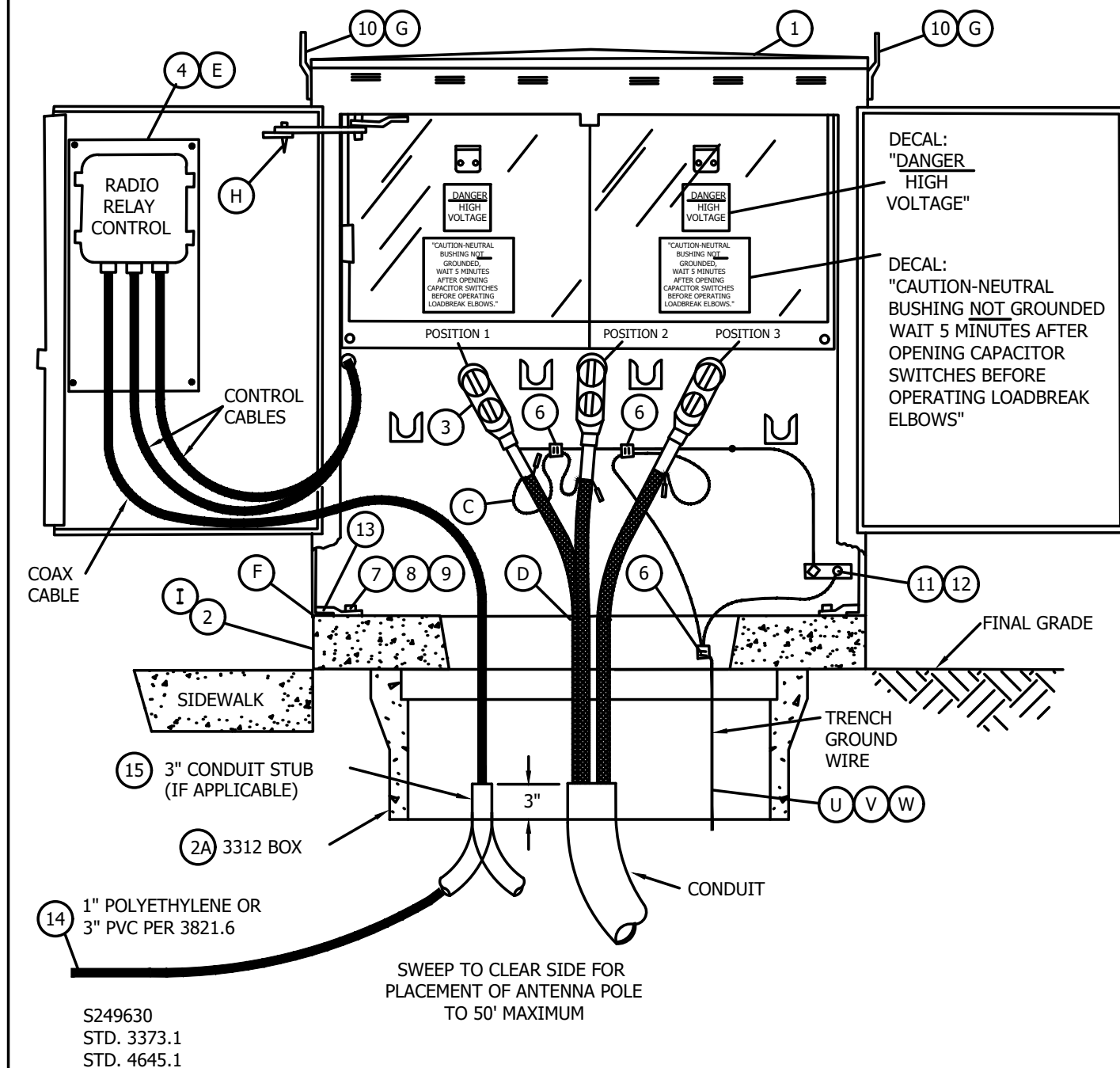
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| C               |                   |  |                           |      |                    | F   |          |    |                     |      |        |
| B               |                   |  |                           |      |                    | E   |          |    |                     |      |        |
| A               | EDITORIAL CHANGES | JK   | JS                        | CZH  | 5/18/2018          | D   |          |    |                     |      |        |
| SHEET<br>1 OF 1 |                   | X  | Indicates Latest Revision |      | Completely Revised |     | New Page |    | Information Removed |      | UG3801 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                    |     |          |    |                     |      |        |
|                 |                   | CAPACITORS<br>TABLE OF CONTENTS                  |                           |      |                    |     |          |    |                     |      |        |







**SCOPE:** THIS STANDARD SHOWS THE EQUIPMENT AND INSTALLATION REQUIREMENTS FOR THE PAD-MOUNTED 4KV CAPACITOR, WITH SCADA, 150 & 300 KVAR.



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| 3815.1 | SDG&E ELECTRIC STANDARDS                           |                    |   |          |                     |
|        | INSTALLATION OF SCADA<br>4KV PAD-MOUNTED CAPACITOR |                    |   |          |                     |
|        | REVISION<br>DATE 4-29-2014<br>APPD TR / DW         |                    |   |          |                     |



**NOTE:**

- ALL NEW PAD MOUNTED CAPACITORS PURCHASED AFTER 5/14/12 WILL BE SCADA ENABLED UNITS, EQUIPPED WITH THREE VACUUM SWITCHES, LINE VOLTAGE SENSORS AND A NEUTRAL VOLTAGE SENSOR. THE CONTROL UNIT REQUIRES AN ANTENNA. ALL UNITS SHALL HAVE THE SUFFIX "CW" TO THE STATION ID AS ALL WILL BE SCADA/SWITCHED PAD-MOUNTED CAPACITOR STATIONS. THE INSTALLATION OF THE 3312 HAND HOLE UNDER THE PAD SHALL BE REQUIRED FOR ALL NEW CONSTRUCTION OF SCADA CAPACITORS.
- THE LOADBREAK ELBOWS ARE LOCATED ON THE SIDE OF THE CAPACITOR CABINET WITH THE SIGN "CONTROL INSIDE" ON THE DOOR.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION   | QUANTITY  | CONSTR STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|-----------|-----------------------|--------------|----------------|
| 1    | CAPACITOR, PAD-MOUNTED SCADA                            | 150KVAR   | 3815                  | S206236      | CAP415         |
|      |   | 300KVAR   |                       | S206240      | CAP430         |
| 2    | PAD, CAPACITOR (IF NEW) (I)                             | 1         | 3414                  | S514280      | CAP-PD         |
| 2A   | 3312 BOX UNDER PAD (REQUIRED FOR NEW CONSTRUCTION)      | 1         | 3312.1                | S162426      | 3312-0         |
| 3    | ELBOW, LOADBREAK (IF NEW)                               | 3         | 4191.2                | --           | --             |
| 4    | SCADA, CAPACITOR CONTROL (PROGRAMMABLE) KEARNY ONLY (E) | 1         | --                    | S274880      | SEL-UC         |
| 5    | KEYLESS LOCKS (NOT SHOWN)                               | 2         | --                    | S468010      | --             |
| 6    | CONNECTOR, COMPRESSION COPPER                           | 3         | 4172                  | S257760      |                |
| 7    | NUT, CLAMPING CHANNEL                                   | 2         | --                    | S503520      | --             |
| 8    | SCREW, HEX HEAD CAP, BRONZE 1/2" X 1-1/2"               | 2         | --                    | S616192      | --             |
| 9    | WASHER, STANDARD FLAT ROUND, BRONZE 1/2"                | 2         | --                    | S799488      | --             |
| 10   | LIFTING EYES (REMOVABLE) (G)                            | 2         | --                    | --           | --             |
| 11   | CONNECTOR, SERVICE POST                                 | 1         | --                    | S262560      | --             |
| 12   | NUT, STANDARD HEX, BRONZE 1/2"                          | 1         | --                    | S506112      | --             |
| 13   | HOLD DOWN (SUPPLIED WITH CABINET)                       | 2         | --                    | --           | --             |
| 14   | 1" POLYETHYLENE PIPE                                    | AS NEEDED | 4645.1                | S249630      | 1"PE           |
| 15   | 3" FOR STUB ONLY INSTALLATION OR ALTERNATIVE LOCATION   | 1         | 3373.2                | S322048      | 1DB3-B         |
| 16   | SCADA ANTENNA KEARNY ONLY (E)                           |           | 4645.1                | S109570      | ANTENA         |
| 17   | ANTENNA ADAPTER KEARNY ONLY (E)                         | 1         | 4645.1                | S102017      |                |
| 18   | COAX CABLE KEARNY ONLY (E)                              | AS NEEDED |                       | S191906      | CABANT         |
| 19   | COAX CABLE CONNECTS KEARNY ONLY (E)                     | AS NEEDED |                       | S254170      | CABCON         |
| 20   | MDS RADIO KEARNY ONLY (E)                               | 1         | 4640.25               | S749500      | MDSRAD         |
| 21   | MDS RADIO SPREAD SPECT. KEARNY ONLY (E)                 | 1         | 4640.2                | S749504      | SPREAD         |

**NOTE:** PHASE IDENTIFICATION MUST BE MARKED USING THE AP 20 OR 30 AT ALL LOCATIONS. POSITION ONE SHALL BE CONNECTED TO A PHASE, POSITION 2 SHALL BE CONNECTED TO B PHASE AND POSITION 3 MUST BE CONNECTED TO C PHASE.

**INSTALLATION:**

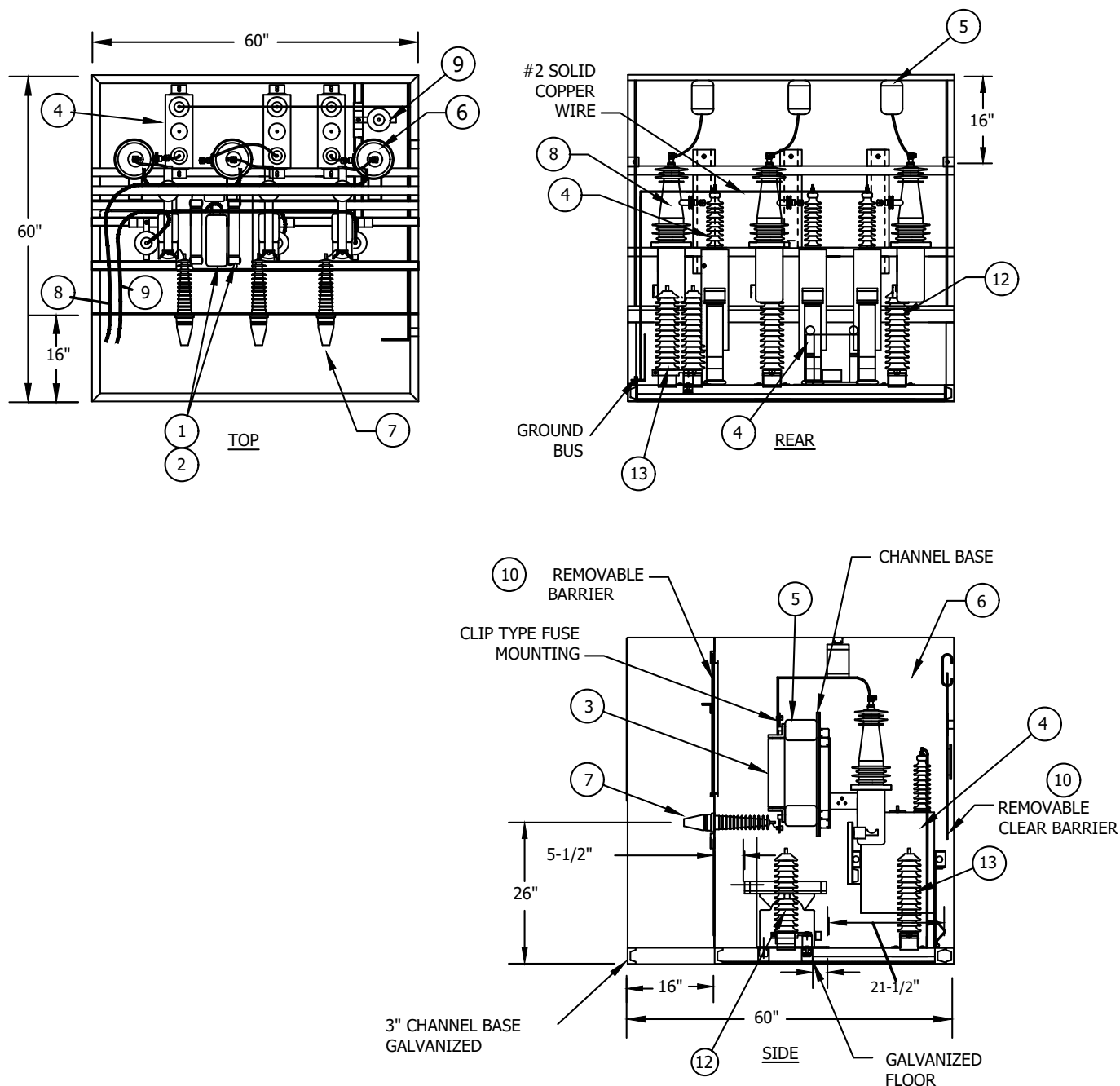
- CHECK AND TIGHTEN ALL CONNECTIONS ON CAPACITOR BEFORE INSTALLATION.
- INSTALL PAD TO FINAL GRADE.
- WHEN A SYSTEM NEUTRAL OR GROUNDING BANK NEUTRAL IS PRESENT, FOR UNDERGROUND OR CABLE POLE APPLICATIONS, THE CONCENTRIC NEUTRALS SHALL BE CONNECTED TO THE NEUTRAL. SEE U.G. STD 4510.1 FOR TRENCH GROUNDING AND O.H. STD 1002.1 FOR CABLE POLE GROUNDING.
- TERMINATE CONDUIT 3" ABOVE GROUND LEVEL IN BOX.
- SCADA CONTROL AND RADIO; INSTALLED BY KEARNY CREWS.
- BASE OF CABINET SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- REMOVE LIFTING EYES AND STORE INSIDE THE CABINET ON THE CONTROL SIDE. IF EYES ARE NOT REMOVED, THEY MAY ENCROACH ON PRIVATE PROPERTY RIGHT-OF-WAY OR CAUSE HAZARD TO THE PUBLIC.
- WHEN OPERATING CAPACITOR CONTROL SWITCH, REMOVE THE PIN IN THE DOOR ASSEMBLY SO IT WILL OPEN AT 180° ANGLE (ALLOWING OPERATION OF THE SWITCH WITHOUT STANDING IN FRONT OF THE CAPACITOR).
- THE 3426 PAD MAY BE SUBSTITUTED FOR THE 3414 PAD IF RIGHT-OF-WAY PERMITS.

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| REVISION       | SDG&E ELECTRIC STANDARDS  |                    |            |                     |
| DATE 5-29-2014 | INSTALLATION OF SCADA     |                    |            |                     |
| APPD TR / DW   | 4KV PAD-MOUNTED CAPACITOR |                    |            |                     |
|                | 3815.2                    |                    |            |                     |



**SCOPE:** SHOWS SCADA CAPACITOR INTERIOR AND LOCATION OF EQUIPMENT IN THE UNIT. LINE SENSORS, NEUTRAL SENSOR, X-LIMITER FUSES, VACUUM SWITCHES, CONTROL, CONTROL WIRING HARNESS, 120 VOLT POTENTIAL TRANSFORMER AND 50 & 100 KVAR CAPACITOR CELLS.

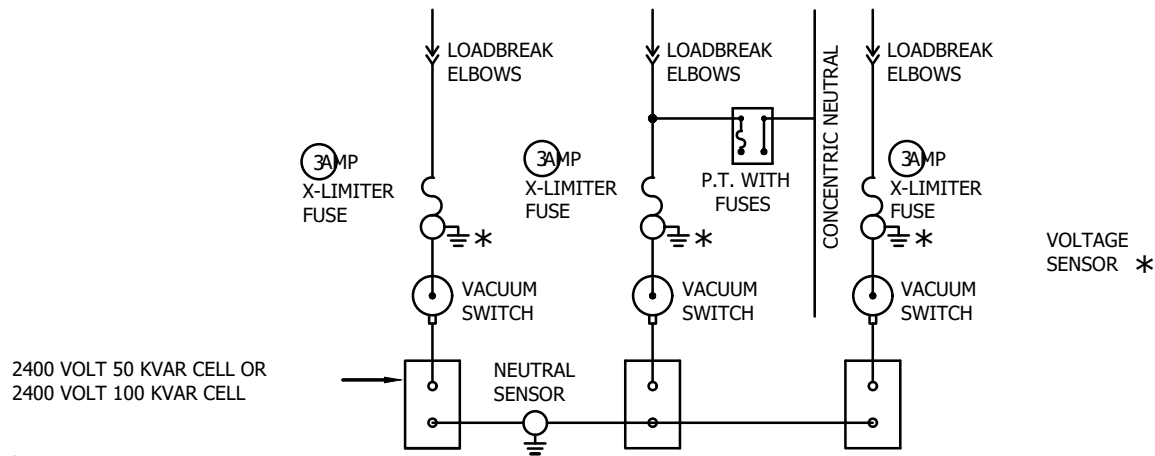


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| REVISION<br>DATE 5-29-2014<br>APPD TR / DW | SDG&E ELECTRIC STANDARDS<br>INSTALLATION OF SCADA<br>4KV PAD-MOUNTED CAPACITOR |                    |  | 3815.3              |



### CAPACITOR DIAGRAM



#### NOTES:

- PAD-MOUNTED SCADA CAPACITOR 150 KVAR (STOCK NUMBER S206236) 300 KVAR (STOCK NUMBER S206240) IS DELIVERED FROM THE SUPPLIER WITH ALL THE PARTS LISTED IN THE PARTS LIST, INCLUDING FUSES, EXCEPT CONTROL AND RADIO.

#### CAPACITOR PARTS LIST

| ITEM | DESCRIPTION  |                 | QUANTITY | CONSTR STD OR PAGE NO. | STOCK NUMBER |
|------|--|-----------------|----------|------------------------|--------------|
| 1    | TRANSFORMER (P.T.), 2400/4160 Y                      |                 | 1        | --                     |              |
| 2    | FUSE, CURRENT-LIMITING 0.5 AMP, 14.4KV - GE TYPE J-1 |                 | 1        | --                     | S366456      |
| 3    | FUSE, COMBINED TECHNOLOGIES,                         | 150 KVAR 30 AMP | 3        | 4309                   |              |
|      |  | 300 KVAR 60 AMP | 3        |                        |              |
| 4    | CAPACITOR CELLS, 2400V                               | 50 KVAR         | 3        | --                     |              |
|      |  | 100 KVAR        | 3        |                        |              |
| 5    | POST INSULATOR, 110 KV BIL                           |                 | 9        | --                     | --           |
| 6    | VACUUM SWITCH, CAPACITOR 15KV, 200 AMP               |                 | 3        | --                     | S708420      |
| 7    | PLUG, BUSHING, 14.4KV, 200 AMP                       |                 | 3        | 4192.01                | S544676      |
| 8    | VACUUM SWITCH/P.T. WIRING HARNESS                    |                 | 1        | --                     | --           |
| 9    | VOLTAGE/NEUTRAL SENSOR WIRING HARNESS                |                 | 1        | --                     | --           |
| 10   | 1/4" CLEAR ACRYLIC BARRIER (REMOVABLE)               |                 | 4        | --                     | --           |
| 11   | 3/8" COPPER ROD 9" LONG                              |                 | 1        | --                     | --           |
| 12   | LINE VOLTAGE SENSOR                                  |                 | 3        | --                     | --           |
| 13   | NEUTRAL VOLTAGE SENSOR                               |                 | 1        | --                     | --           |
| 14   | CONTROL  |                 | 1        | --                     | --           |
| 15   | #2 STR. COPPER WIRE                                  |                 | --       | --                     | --           |
| 16   | GROUND NUTS 1/2" - 13                                |                 | 3        | --                     | --           |

#### REFERENCE:

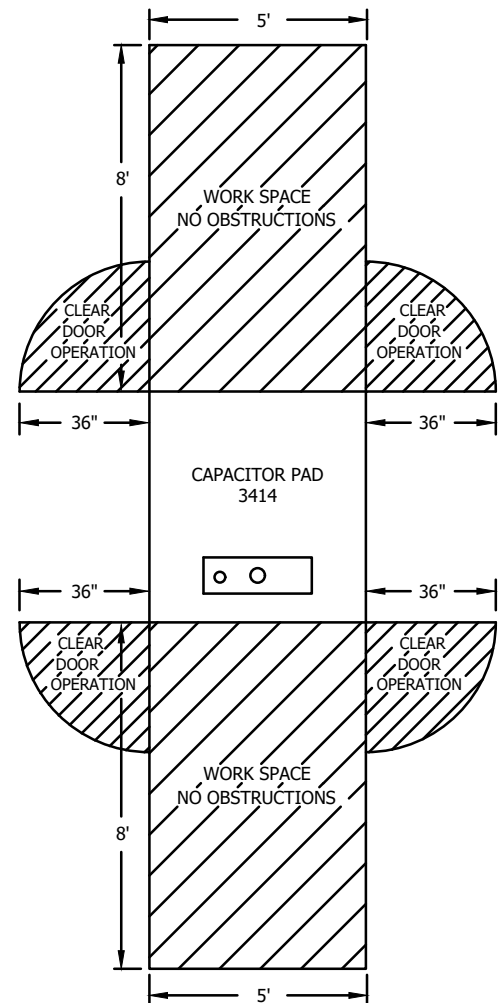
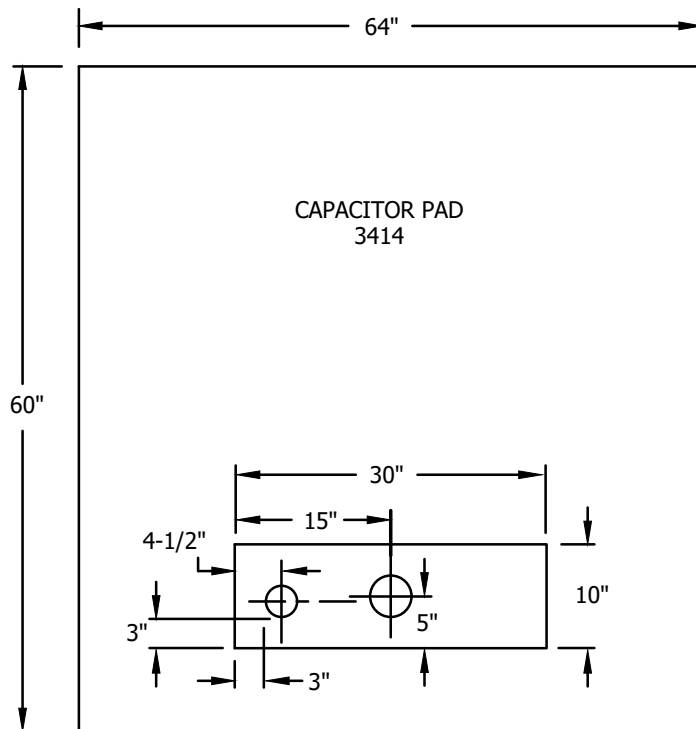
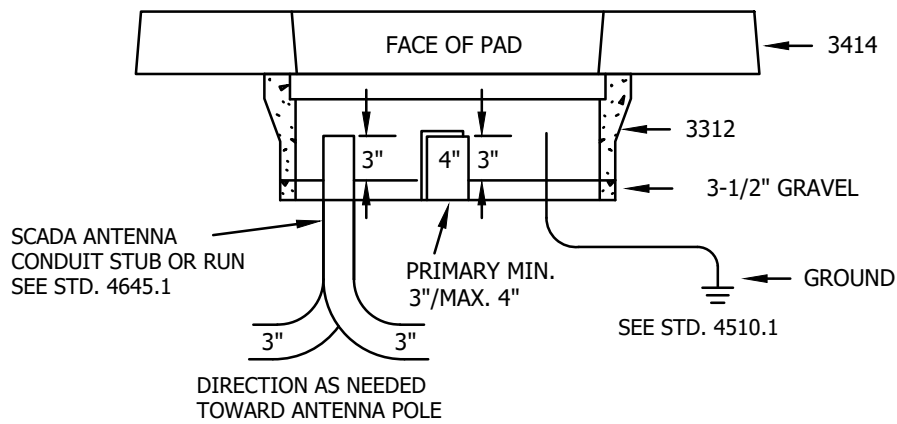
- J. SEE STANDARD 3821 FOR THE INSTALLATION INSTRUCTIONS.
- K. SEE STANDARDS 4302 AND 4309 FOR FUSING.
- L. SEE DESIGN MANUAL 5811.5 FOR CONNECTING CAPACITOR TO SYSTEM.
- M. VACUUM SWITCH CAN BE OPENED MANUALLY OR ELECTRICALLY. VACUUM SWITCH CAN ONLY BE CLOSED ELECTRICALLY.

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| REVISION       | SDG&E ELECTRIC STANDARDS  |                    |  |                     |
| DATE 5-28-2014 | INSTALLATION OF SCADA     |                    |  |                     |
| APPD TR / DW   | 4KV PAD-MOUNTED CAPACITOR |                    |  |                     |
|                | 3815.4                    |                    |  |                     |



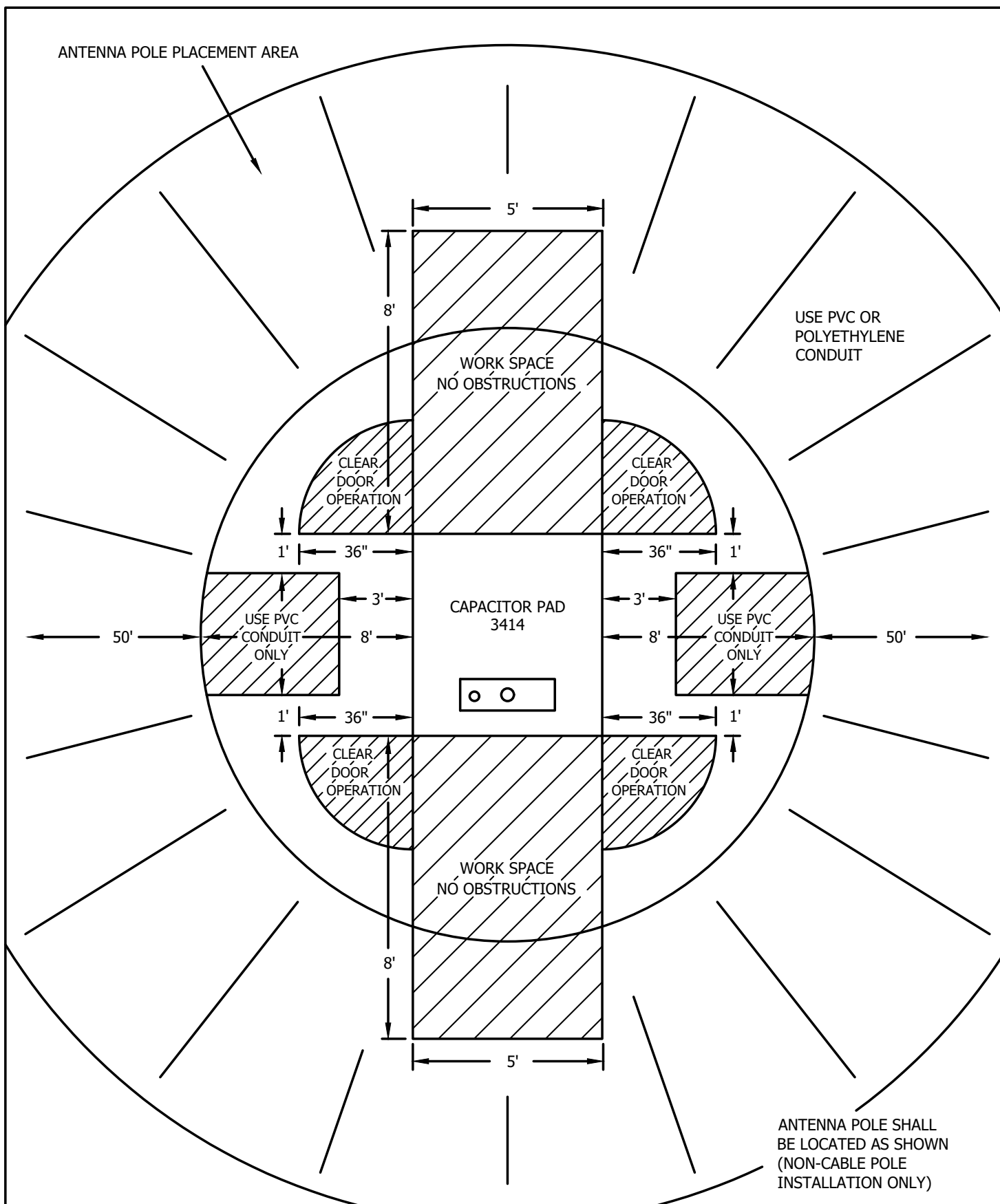
# PAD INSTALLATION, UNDER PAD BOX, WORK SPACE



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| REVISION<br>DATE 4-29-2014<br>APPD TR / DW | SDG&E ELECTRIC STANDARDS<br><br>INSTALLATION OF SCADA<br>4KV PAD-MOUNTED CAPACITOR |                    |  | 3815.5              |





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SDG&E ELECTRIC STANDARDS

DATE 4-29-2014

INSTALLATION OF SCADA

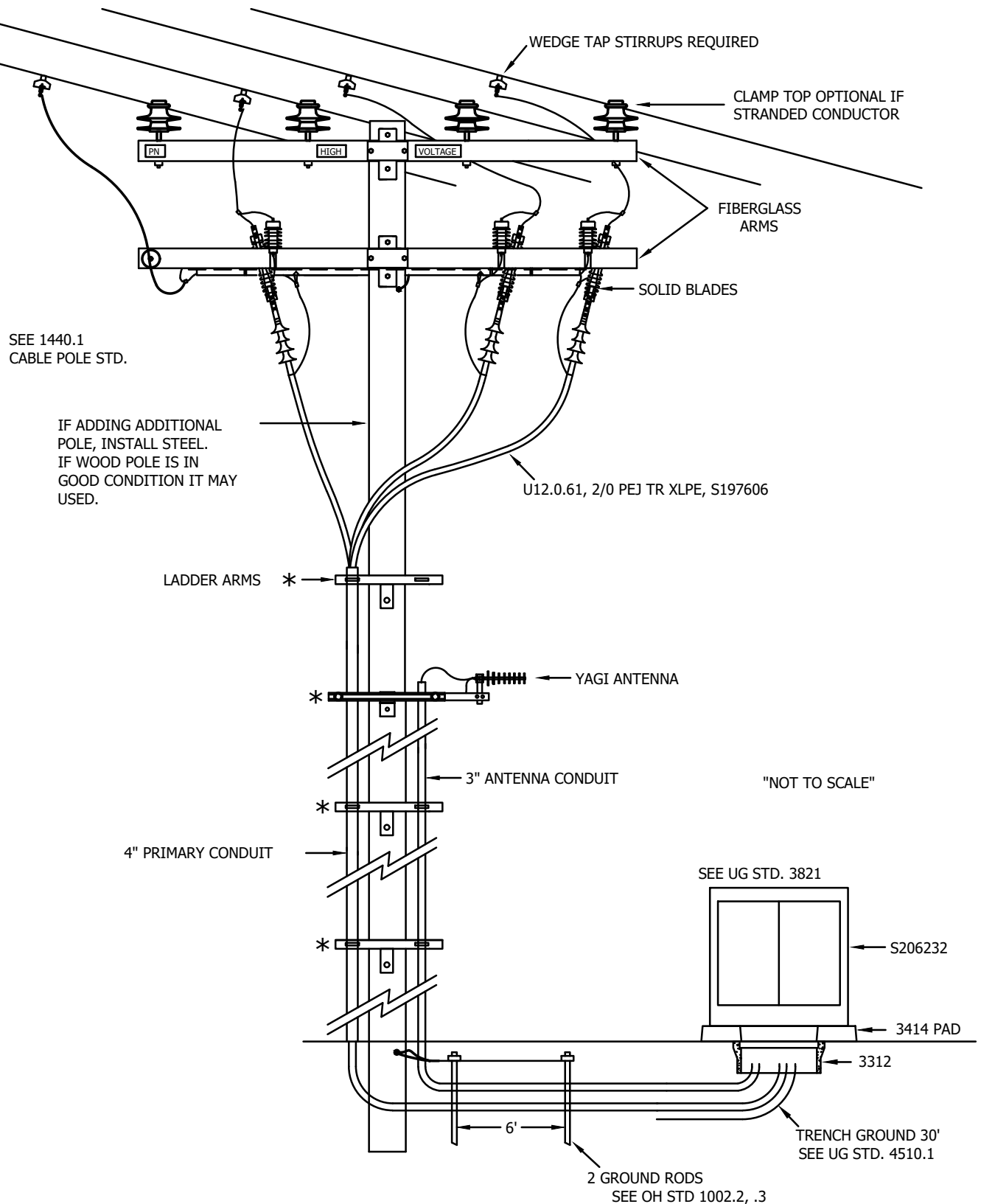
3815.6

APPD TR / DW

4KV PAD-MOUNTED CAPACITOR, PAD AND ANTENNA POLE



**SCOPE:** THIS PAGE COVERS CAPACITOR POLE TO PADMOUNT DESIGN OPTION FOR USE IN THE HRFA. ALL AVIAN PROTECTION REQUIRED SHALL BE INSTALLED AS NEEDED.



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| REVISION<br>DATE 5-28-2014<br>APPD TR / DW | SDG&E ELECTRIC STANDARDS<br><br>INSTALLATION OF SCADA PAD-MOUNTED<br>4KV CAPACITOR FOR HRFA APPLICATIONS |                    |  | 3815.7              |



**REFERENCE:**

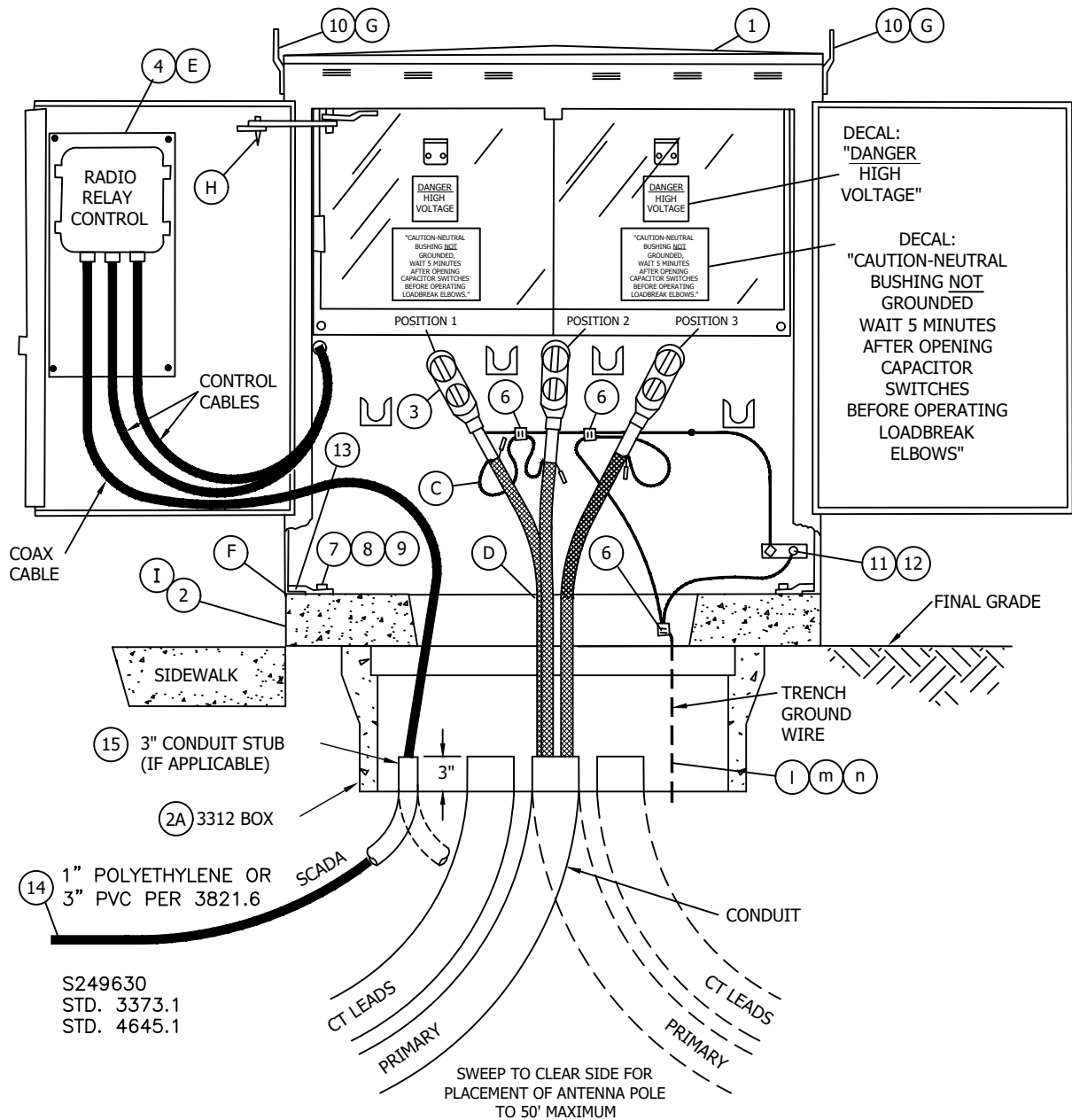
- N. SEE STANDARD 3211 FOR TAGGING PAD.
- O. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- P. SEE STANDARD 3414 FOR CAPACITOR PAD AND CONDUIT PLACEMENT.
- Q. SEE STANDARD 3481 FOR EQUIPMENT BARRIER PROTECTION AND CLEARANCE.
- R. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- S. SEE STANDARD 3821 FOR PADMOUNTED CAPACITOR.
- T. SEE STANDARDS 4302 AND 4309 FOR FUSING, INCLUDING LEGACY DESIGNS.
- U SEE STANDARD 4510 FOR (PREFERRED) AND (ALTERNATE) TRENCH GROUND WIRE.
- V SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- W SEE STANDARD 4512 FOR EQUIPMENT GROUNDING.
- X. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.
- Y. SEE DESIGN MANUAL 5811.5 FOR CONNECTING CAPACITOR TO SYSTEM.
- Z. SEE DESIGN MANUAL 6115.3 FOR SCADA PROJECT CHECKLIST.

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| 3815.8 | SDG&E ELECTRIC STANDARDS                                    |                    |   |          | REVISION                       |
|        | INSTALLATION OF SCADA<br>4KV PAD-MOUNTED SWITCHED CAPACITOR |                    |   |          | DATE 5-29-2014<br>APPD TR / DW |



**SCOPE:** THIS STANDARD SHOWS THE EQUIPMENT AND INSTALLATION REQUIREMENTS FOR THE PAD-MOUNTED 600 & 1200 KVAR 12KV CAPACITOR, WITH SCADA.



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SDG&E ELECTRIC UNDERGROUND STANDARD

INSTALLATION OF SCADA  
600 & 1200 KVAR 12KV PAD - MOUNTED CAPACITOR

UG 3821.1



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION   | QUANTITY | CONSTR STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS  |
|------|---|----------|-----------------------|--------------|-----------------|
| 1    | CAPACITOR, 1200 KVAR PAD-MOUNTED SCADA                | 600KVAR  | 1                     | 38201.1      | S206226 CAP-4SD |
|      |   | 1200KVAR | 1                     | --           | S206224 CAP-SD  |
| 2    | PAD, CAPACITOR (IF NEW)                               | (I)      | 1                     | 3414         | S514280 CAP-PD  |
| 2A   | 3312 BOX UNDER PAD (REQUIRED FOR NEW CONSTRUCTION)    |          | 1                     | 3312.1       | S162426 3312-0  |
| 3    | ELBOW, LOADBREAK (IF NEW)                             |          | 3                     | 4191.2       | --              |
| 4    | SCADA, CAPACITOR CONTROL (PROGRAMMABLE) KEARNY ONLY   | (E)      | 1                     | --           | S274880 SEL-UC  |
| 5    | KEYLESS LOCKS (NOT SHOWN)                             |          | 2                     | --           | S468010 --      |
| 6    | CONNECTOR, COMPRESSION COPPER                         |          | 3                     | 4172         | S257760         |
| 7    | NUT, CLAMPING CHANNEL                                 |          | 2                     | --           | S503520 --      |
| 8    | SCREW, HEX HEAD CAP, BRONZE 1/2" X 1-1/2"             |          | 2                     | --           | S616192 --      |
| 9    | WASHER, STANDARD FLAT ROUND, BRONZE 1/2"              |          | 2                     | --           | S799488 --      |
| 10   | LIFTING EYES (REMOVABLE)                              | (G)      | 2                     | --           | --              |
| 11   | CONNECTOR, SERVICE POST                               |          | 1                     | --           | S262560 --      |
| 12   | NUT, STANDARD HEX, BRONZE 1/2"                        |          | 1                     | --           | S506112 --      |
| 13   | HOLD DOWN (SUPPLIED WITH CABINET)                     |          | 2                     | --           | --              |
| 14   | 1" POLYETHYLENE PIPE                                  |          | AS NEEDED             | 4645.1       | S249630 1"PE    |
| 15   | 3" FOR STUB ONLY INSTALLATION OR ALTERNATIVE LOCATION |          | 1                     | 3373.2       | S322048 1DB3-B  |
| 16   | SCADA ANTENNA KEARNY ONLY                             | (E)      |                       | 4645.1       | S109570 ANTENA  |
| 17   | ANTENNA ADAPTER KEARNY ONLY                           | (E)      | 1                     | 4645.1       | S102017 --      |
| 18   | COAX CABLE KEARNY ONLY                                | (E)      | AS NEEDED             | --           | S191906 CABANT  |
| 19   | COAX CABLE CONNECTS KEARNY ONLY                       | (E)      | AS NEEDED             | --           | S254170 CABCON  |
| 20   | MDS RADIO KEARNY ONLY                                 | (E)      | 1                     | 4640.25      | S749500 MDSRAD  |
| 21   | MDS RADIO SPREAD SPECT. KEARNY ONLY                   | (E)      | 1                     | 4640.2       | S749504 SPREAD  |
| 22   | LYNDESEY 600A UG T BODY CT'S WITH 100' LEADS          |          | 3                     | --           | --              |

**NOTE:**

- I. PHASE IDENTIFICATION MUST BE MARKED USING THE AP 20 OR 30 AT ALL LOCATIONS. POSITION ONE SHALL BE CONNECTED TO A PHASE, POSITION 2 SHALL BE CONNECTED TO B PHASE AND POSITION 3 MUST BE CONNECTED TO C PHASE.
- II. ALL NEW PAD MOUNTED CAPACITORS PURCHASED AFTER 5/14/12 WILL BE SCADA ENABLED UNITS, EQUIPPED WITH THREE VACUUM SWITCHES, LINE VOLTAGE SENSORS, CURRENT SENSORS AND A NEUTRAL VOLTAGE SENSOR. THE CONTROL UNIT REQUIRES AN ANTENNA. ALL UNITS SHALL HAVE THE SUFFIX "CW" TO THE STATION ID AS ALL WILL BE SCADA/SWITCHED PAD-MOUNTED CAPACITOR STATIONS. THE INSTALLATION OF THE 3312 HAND HOLE UNDER THE PAD SHALL BE REQUIRED FOR ALL NEW CONSTRUCTION OF SCADA CAPACITORS.
- III. THE LOADBREAK ELBOWS ARE LOCATED ON THE SIDE OF THE CAPACITOR CABINET WITH THE SIGN "CONTROL INSIDE" ON THE DOOR.

**INSTALLATION:**

- A. CHECK AND TIGHTEN ALL CONNECTIONS ON CAPACITOR BEFORE INSTALLATION.
- B. INSTALL PAD TO FINAL GRADE.
- (C) WHEN A SYSTEM NEUTRAL OR GROUNDING BANK NEUTRAL IS PRESENT, FOR UNDERGROUND OR CABLE POLE APPLICATIONS, THE CONCENTRIC NEUTRALS SHALL BE CONNECTED TO THE NEUTRAL. SEE U.G. STD 4510.1 FOR TRENCH GROUNDING AND O.H. STD 1002.1 FOR CABLE POLE GROUNDING.
- (D) TERMINATE CONDUIT 3" ABOVE GROUND LEVEL IN BOX.
- (E) SCADA CONTROL AND RADIO; INSTALLED BY KEARNY CREWS.
- (F) BASE OF CABINET SHALL BE CAULKED WHEN NECESSARY TO PREVENT WIRE ENTRY.
- (G) REMOVE LIFTING EYES AND STORE INSIDE THE CABINET ON THE CONTROL SIDE. IF EYES ARE NOT REMOVED, THEY MAY ENCROACH ON PRIVATE PROPERTY RIGHT-OF-WAY OR CAUSE HAZARD TO THE PUBLIC.
- (H) WHEN OPERATING CAPACITOR CONTROL SWITCH, REMOVE THE PIN IN THE DOOR ASSEMBLY SO IT WILL OPEN AT 180° ANGLE (ALLOWING OPERATION OF THE SWITCH WITHOUT STANDING IN FRONT OF THE CAPACITOR).
- (I) THE 3426 PAD MAY BE SUBSTITUTED FOR THE 3414 PAD IF RIGHT-OF-WAY PERMITS.

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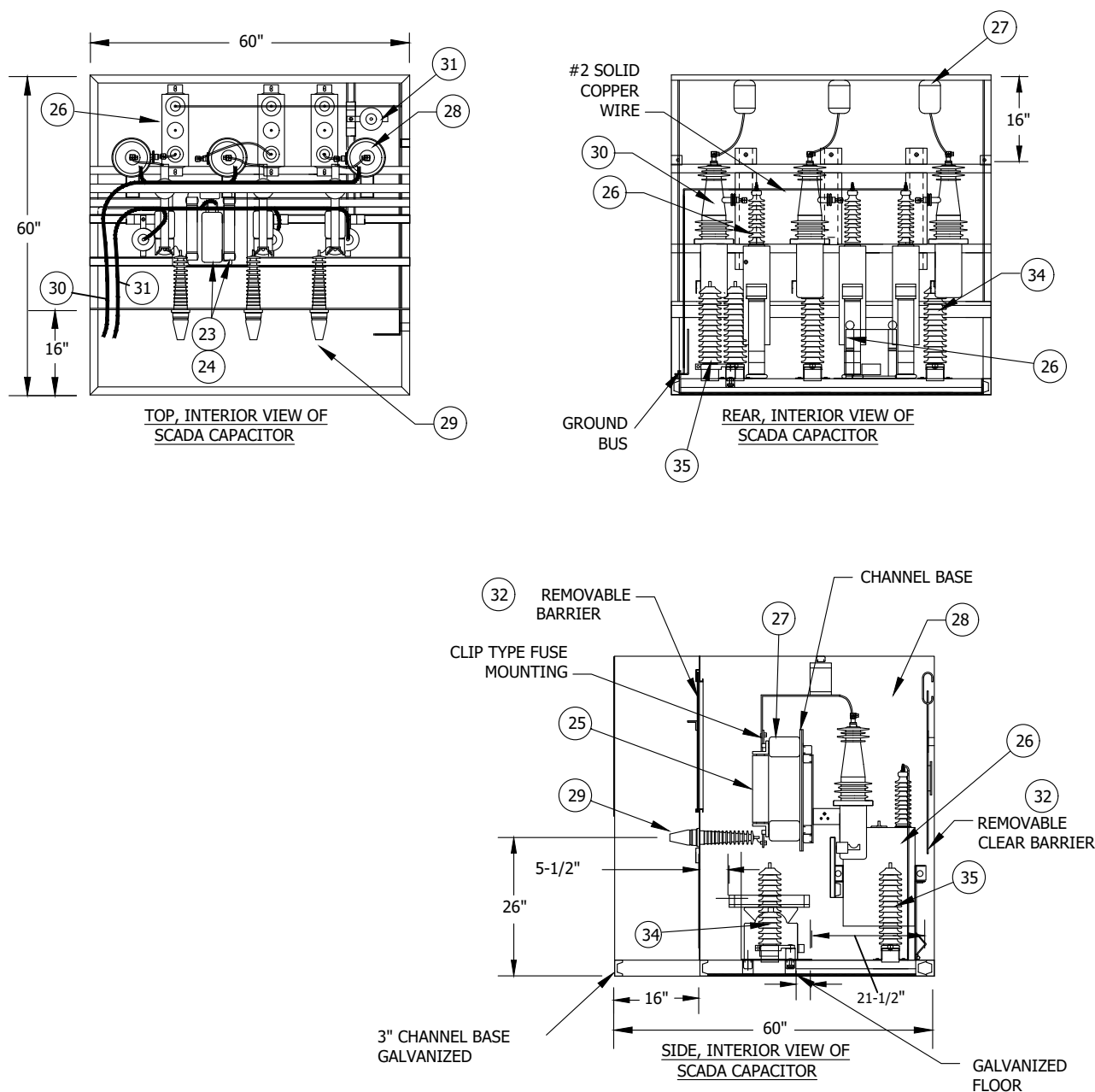
SDG&E ELECTRIC UNDERGROUND STANDARD

INSTALLATION OF SCADA  
600 & 1200 KVAR 12KV PAD - MOUNTED CAPACITOR

**UG 3821.2**



**SCOPE:** SHOWS SCADA CAPACITOR INTERIOR AND LOCATION OF EQUIPMENT IN THE UNIT. LINE SENSORS, NEUTRAL SENSOR, X-LIMITER FUSES, VACUUM SWITCHES, CONTROL, CONTROL WIRING HARNESS, 120 VOLT POTENTIAL TRANSFORMER AND 400 KVAR CAPACITOR CELLS.



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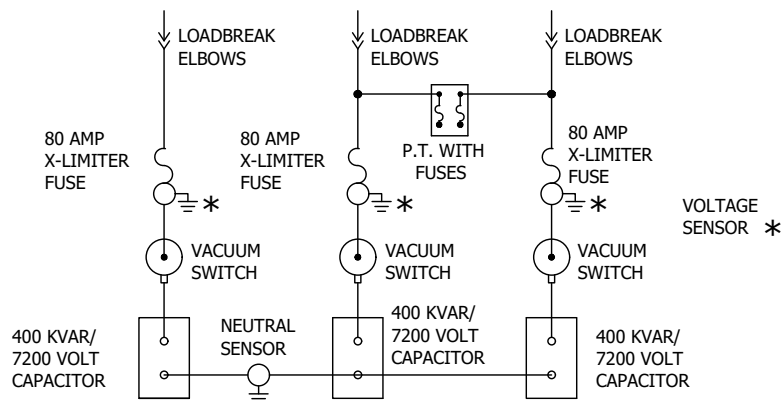
SDG&amp;E ELECTRIC UNDERGROUND STANDARD

## INSTALLATION OF SCADA 600 & 1200 KVAR 12KV PAD - MOUNTED CAPACITOR

UG 3821.3



### CAPACITOR DIAGRAM



### NOTES:

**IV. PAD-MOUNTED SCADA CAPACITOR**  
(STOCK NUMBER S206232) IS  
DELIVERED FROM THE SUPPLIER  
WITH ALL THE PARTS LISTED IN THE  
PARTS LIST, INCLUDING FUSES,  
EXCEPT CONTROL AND RADIO.

### CAPACITOR PARTS LIST

| ITEM | DESCRIPTION   | QUANTITY | CONSTR STD<br>OR PAGE NO. | STOCK<br>NUMBER |
|------|---|----------|---------------------------|-----------------|
| 23   | TRANSFORMER (P.T.), 12KV/120V   | 1        | --                        | S762714         |
| 24   | FUSE, CURRENT-LIMITING 0.5 AMP, 14.4KV - GE TYPE J-1                      | 2        | --                        | S366456         |
| 25   | FUSE, COMBINED TECHNOLOGIES,<br>15.5KV, TYPE X-LIMITER (CURRENT LIMITING) | 80 AMP   | 4309                      | S365695         |
|      |   | 40 AMP   | 4309                      |                 |
| 26   | CAPACITOR, 400 KVAR, 7200V, SINGLE-PHASE                                  | 3        | --                        | S207348         |
| 27   | POST INSULATOR, 110 KV BIL  | 9        | --                        | --              |
| 28   | VACUUM SWITCH, CAPACITOR 15KV, 200 AMP                                    | 3        | --                        | S708420         |
| 29   | PLUG, BUSHING, 14.4KV, 200 AMP  | 3        | 4192.01                   | S544676         |
| 30   | VACUUM SWITCH/P.T. WIRING HARNESS   | 1        | --                        | --              |
| 31   | VOLTAGE/NEUTRAL SENSOR WIRING HARNESS                                     | 1        | --                        | --              |
| 32   | 1/4" CLEAR ACRYLIC BARRIER (REMOVABLE)                                    | 4        | --                        | --              |
| 33   | 3/8" COPPER ROD 9" LONG   | 1        | --                        | --              |
| 34   | LINE VOLTAGE SENSOR   | 3        | --                        | --              |
| 35   | NEUTRAL VOLTAGE SENSOR  | 1        | --                        | --              |
| 36   | CONTROL   | 1        | --                        | --              |
| 37   | #2 STR. COPPER WIRE   | --       | --                        | --              |
| 38   | GROUND NUTS 1/2" - 13   | 3        | --                        | --              |

### REFERENCE:

- SEE STANDARD 3821 FOR THE INSTALLATION INSTRUCTIONS.
- SEE STANDARDS 4302 AND 4309 FOR FUSING.
- SEE DESIGN MANUAL 5811.5 FOR CONNECTING CAPACITOR TO SYSTEM.
- VACUUM SWITCH CAN BE OPENED MANUALLY OR ELECTRICALLY. VACUUM SWITCH CAN ONLY BE CLOSED ELECTRICALLY.

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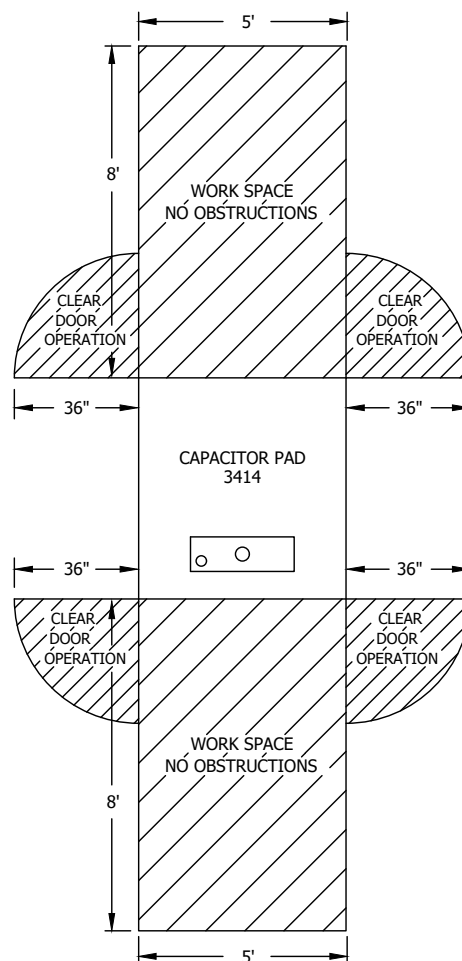
SDG&E ELECTRIC UNDERGROUND STANDARD

INSTALLATION OF SCADA  
600 & 1200 KVAR 12KV PAD - MOUNTED CAPACITOR

**UG 3821.4**



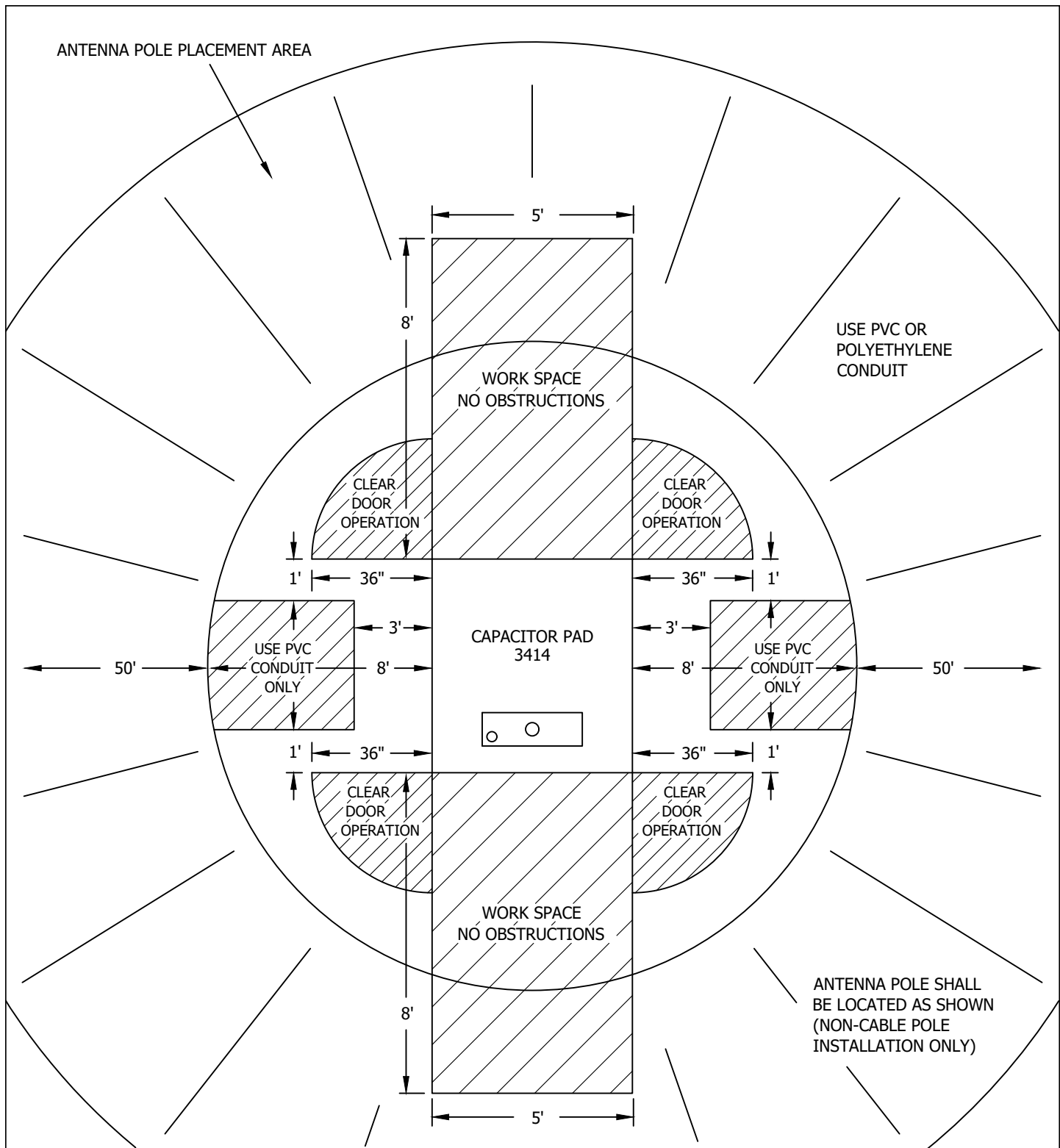
Diagram illustrating the installation of a SCADA antenna stub or run. The diagram shows a cross-section of the antenna assembly. The top layer is the "FACE OF PAD" (3414). Below the pad is a layer of "3-1/2\" GRVEL" (3312). The antenna stub or run is shown as a vertical conduit (3415) with a "PRIMARY MIN. 3\"/MAX. 4\" diameter. The stub is surrounded by a "3\" layer of gravel. The stub is connected to a "GROUND" (3416) via a "SEE STD. 4510.1" connection. The stub is labeled "SCADA ANTENNA CONDUIT STUB OR RUN SEE STD. 4645.1". The diagram also indicates the "DIRECTION AS NEEDED TOWARD ANTENNA POLE" with arrows pointing left.

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UG 3821.5





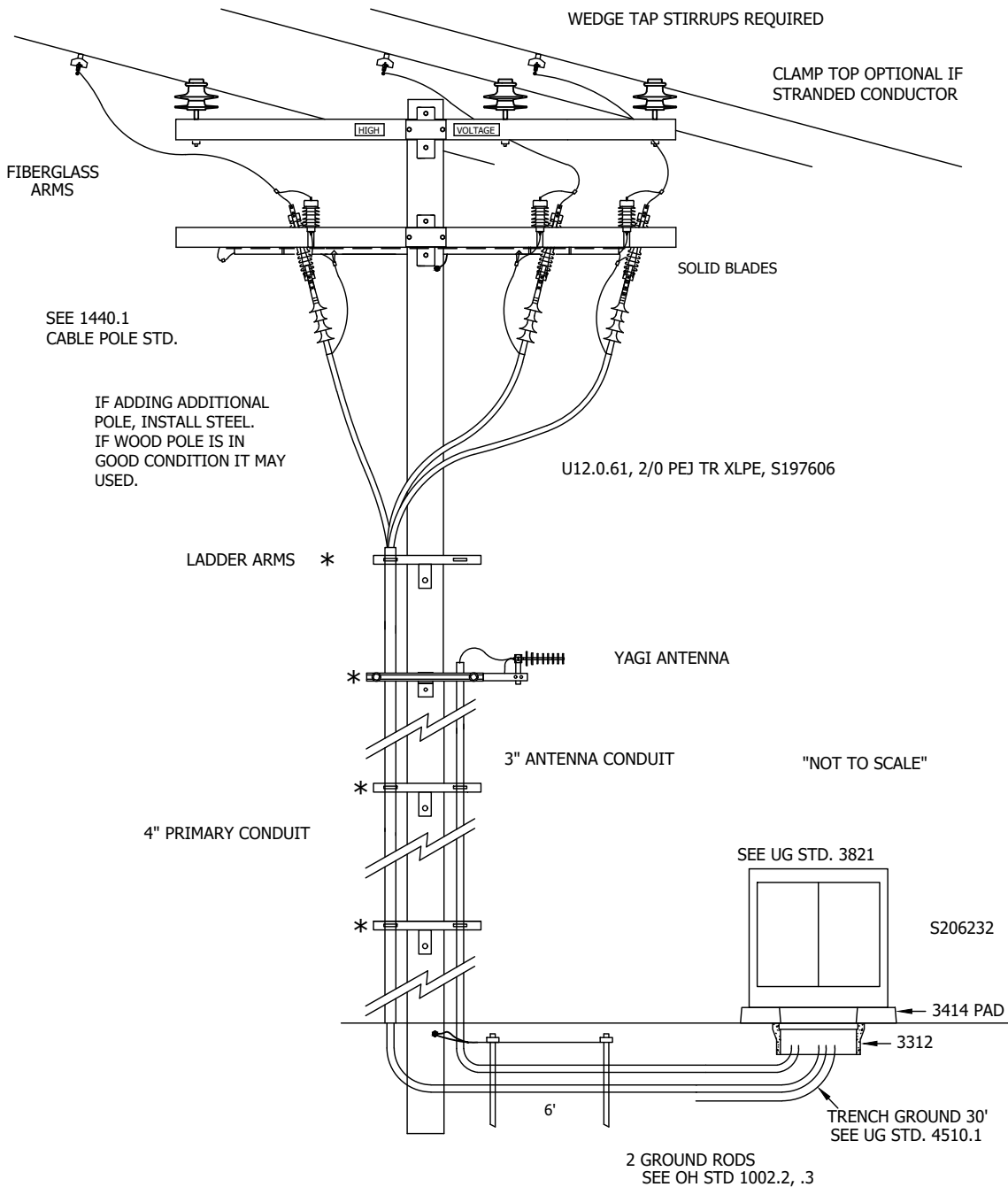
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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD                                   |                    |          |                     |           |
|                 | INSTALLATION OF SCADA<br>600 & 1200 KVAR 12KV PAD - MOUNTED CAPACITOR |                    |          |                     |           |



**SCOPE:** THIS PAGE COVERS CAPACITOR POLE TO PADMOUNT DESIGN OPTION FOR FTZ/HRFA. ALL AVIAN PROTECTION REQUIRED SHALL BE INSTALLED AS NEEDED.



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SDG&E ELECTRIC UNDERGROUND STANDARD

INSTALLATION OF SCADA PAD - MOUNTED  
600 & 1200 KVAR 12KV CAPACITOR FOR HFA APPLICATIONS

**UG 3821.7**



**REFERENCE:**

- e. SEE STANDARD 3211 FOR TAGGING PAD.
- f. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION.
- g. SEE STANDARD 3414 FOR CAPACITOR PAD AND CONDUIT PLACEMENT.
- h. SEE STANDARD 3481 FOR EQUIPMENT BARRIER PROTECTION AND CLEARANCE.
- i. SEE STANDARD 3483 FOR MINIMUM OPERATING AND CLEARANCE REQUIREMENTS.
- j. SEE STANDARD 3820 FOR PADMOUNTED CAPACITOR.
- k. SEE STANDARDS 4302 AND 4309 FOR FUSING, INCLUDING LEGACY DESIGNS.
- l. SEE STANDARD 4510 FOR (PREFERRED) AND (ALTERNATE) TRENCH GROUND WIRE.
- m. SEE STANDARD PAGE 4512.1 FOR (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION.
- n. SEE STANDARD 4512 FOR EQUIPMENT GROUNDING.
- o. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.
- p. SEE DESIGN MANUAL 5811.5 FOR CONNECTING CAPACITOR TO SYSTEM.
- q. SEE DESIGN MANUAL 6115.3 FOR SCADA PROJECT CHECKLIST.

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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   | EDITORIAL CHANGES | JC | TR   | MDJ  | 9/23/2015 | E   |        |    |      |      |      |
| A   | REVISED           |    | TR   | DW   | 6/12/2014 | D   |        |    |      |      |      |

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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD  |                    |          |                     |           |
|                 | INSTALLATION OF SCADA 600 & 1200 KVAR<br>12KV PAD - MOUNTED SWITCHED CAPACITOR |                    |          |                     |           |



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SDG&E ELECTRIC STANDARDS

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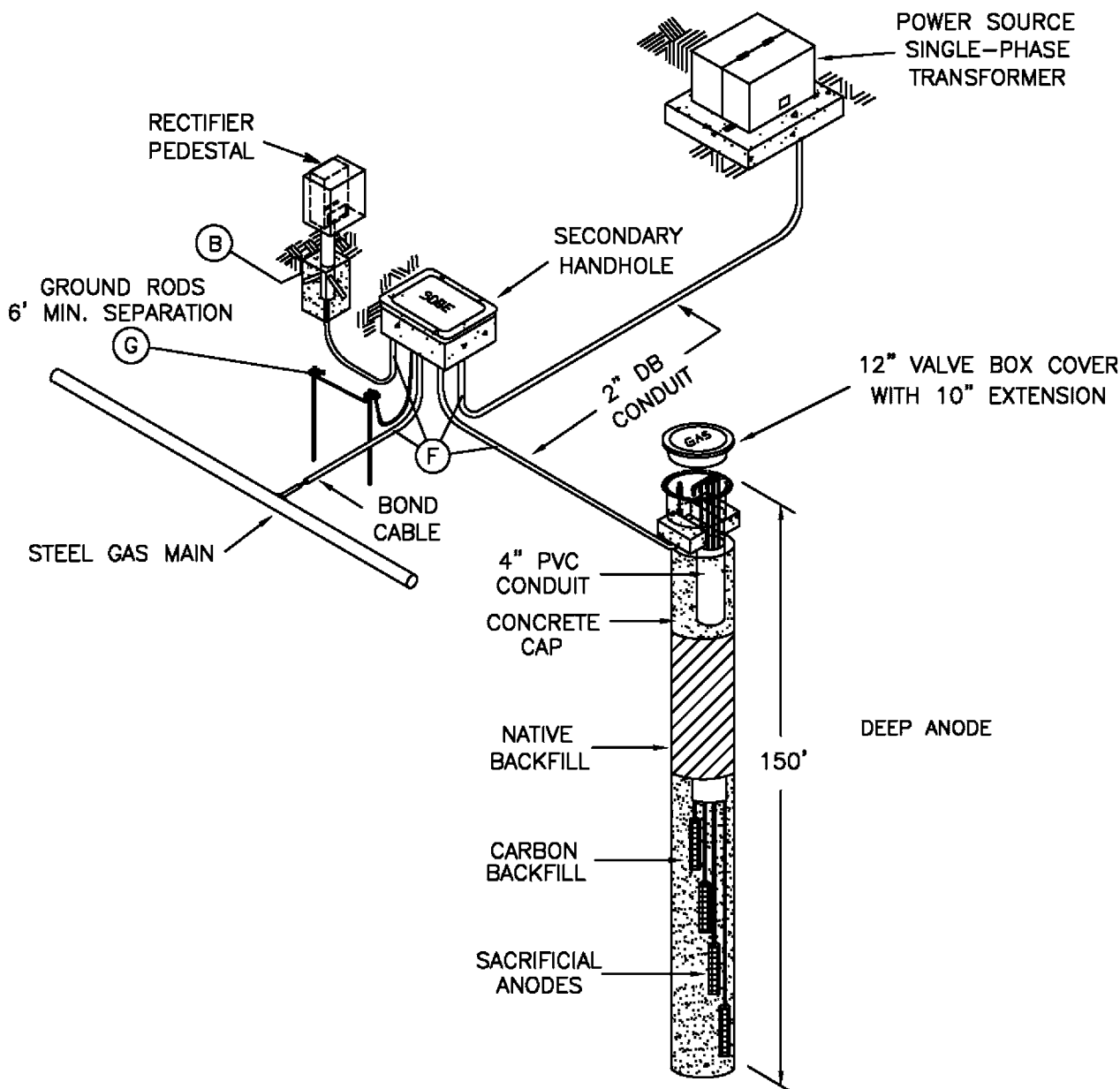
3901









**SCOPE:** THIS STANDARD SHOWS THE PLACEMENT AND INSTALLATION OF AN SDG&E CATHODIC PROTECTION STATION (UNDERGROUND).



**INSTALLATION:**

- A. PLACE PEDESTAL AS INDICATED IN LOCATION PLAN ABOVE AND AS CLOSE AS PRACTICAL (NO CLOSER THAN 2 FEET TO EDGE OF PAD-MOUNT TRANSFORMER PAD.)
- (B) THE CONCRETE BASE SHALL BE READYCRETE OR EQUIPMENT. THE TOP OF CONCRETE SHALL BE AT GRADE LEVEL (NOT ABOVE GRADE). THE DEPTH OF THE CONCRETE MAY VARY.
- D. GROUND 120V NEUTRAL TO GROUND LUG IN BOTTOM OF RECTIFIER ENCLOSURE.
- (F) USE CONDUIT AS REQUIRED (NO LARGER THAN 2 INCH).
- (G) ROD AND WIRE DEPTH SHALL BE 6 INCHES MINIMUM UNDER CONCRETE OR FINISHED GRADE, 12 INCHES FOR OPEN GROUND AND 18 INCHES MINIMUM IN AREAS SUBJECT TO PLOWING.
- H. PRIME AND PAINT INSTALLATION TO MATCH TRANSFORMER.

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| REVISION   | SDG&E ELECTRIC STANDARDS  |                           |                    |          |                     | 3903 |
| DATE 1-1-96  | CATHODIC PROTECTION STATION   |                           |                    |          |                     |      |
| APPD  | UNDERGROUND INSTALLATION  |                           |                    |          |                     |      |



THE FOLLOWING METHOD SHALL BE USED WHEN CONNECTING SECONDARY CONDUCTORS TO AN ENERGIZED SOURCE.


1. INSPECT CONDITION OF CONDUCTORS ON LOAD END. ENSURE NO LOAD CONDITION AND PROPER INSTALLATION. NEUTRAL SHALL BE GROUNDED ON LOAD END.
2. APPLY CONNECTOR TERMINALS TO CONDUCTORS THAT ARE TO BE ENERGIZED.
3. WITH THE USE OF VOLTAGE TESTER (M & S 733600), CHECK POTENTIAL FROM ENERGIZED SOURCE TO ALL SECONDARY CONDUCTORS TO BE ENERGIZED.

CORRECT METER READS:

- A. ENERGIZED SOURCE TO ALL P. S. LEGS, ZERO "0" VOLTAGE READS.
  - B. ENERGIZED SOURCE TO NEUTRAL CONDUCTOR, RATED PHASE TO GROUND VOLTAGE, e.g., 120V, 240V, 277V.
4. AFTER CORRECT TEST READS ARE ATTAINED, CONNECT SECONDARY IN THE FOLLOWING MANNER:
    - A. CONNECT SECONDARY NEUTRAL.
    - B. CONNECT ONE P. S. LEG.
    - C. TEST EACH REMAINING P. S. LEG TO CORRESPONDING ENERGIZED TERMINAL FOR ZERO "0" VOLTAGE READS BEFORE CONNECTING CONDUCTOR TO THAT TERMINAL.

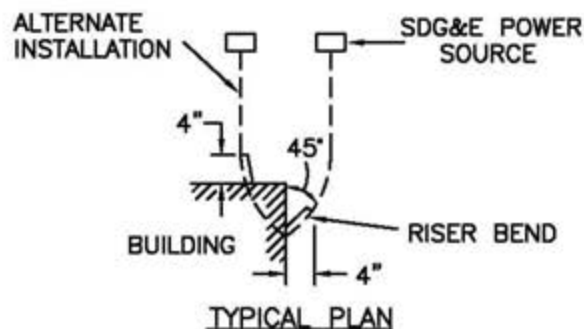
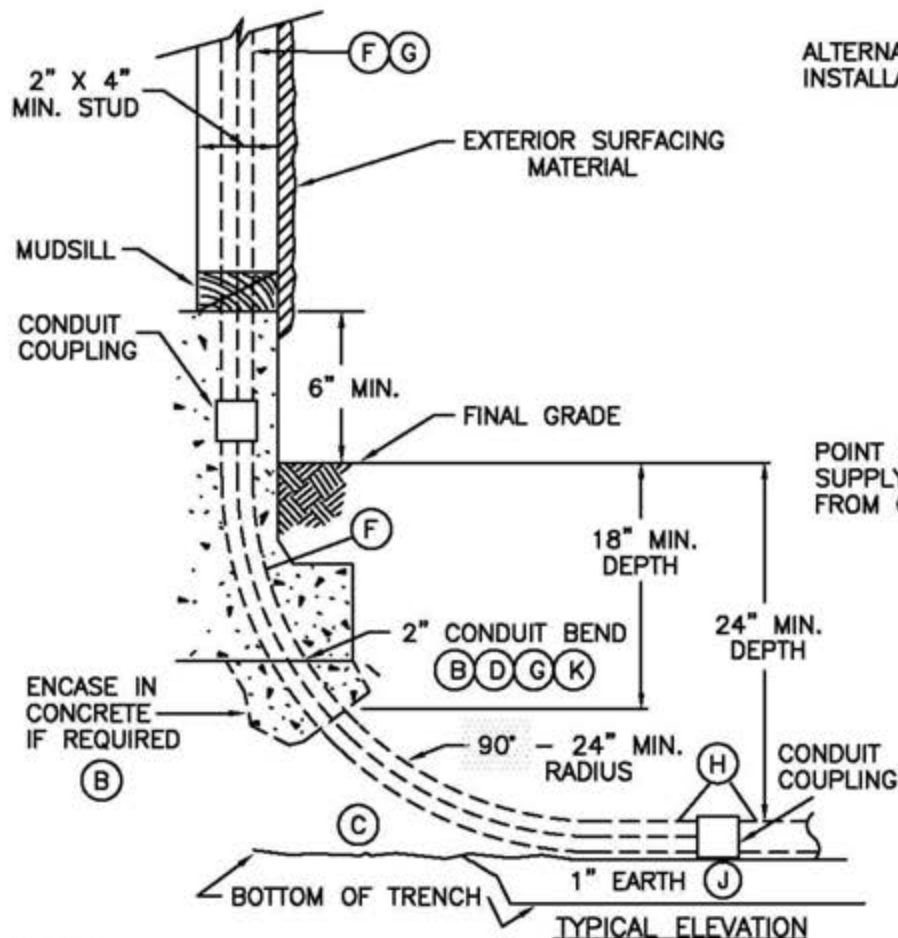
AFTER ABOVE STEPS ARE COMPLETED, TEST FOR CORRECT VOLTAGE AT LOAD END OF SECONDARY CONDUCTORS.

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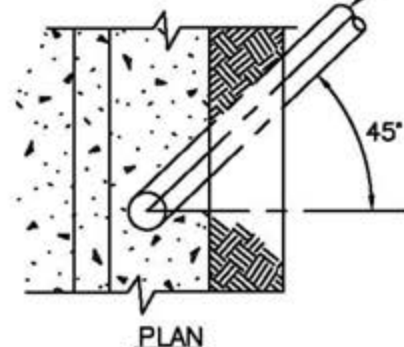
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| 3904 | SDG&E ELECTRIC STANDARDS  |                           |                    |          | REVISION                 |
|      | SECONDARY TEST PROCEDURE  |                           |                    |          | DATE 1-1-91<br>APPD JWK/ |



**SCOPE:** THIS STANDARD SHOWS 2 INCH CONDUIT TERMINATION AT THE CUSTOMERS CONDUIT RISER.



POINT CONDUIT STUB IN DIRECTION OF SUPPLY SOURCE NORMALLY AT 45° ANGLE FROM OUTER FACE OF BUILDING WALL



**NOTES:**

- A STRAIGHT PIECE OF 2 INCH CONDUIT AND A 90° - 24 INCH MINIMUM RADIUS IS REQUIRED.

**INSTALLATION:**

- A. VERIFY METER AND SERVICE LOCATION WITH SDG&E BEFORE INSTALLATION.
- (B) G.O. 128 RULE 33.4D REQUIRES ONE OF THE FOLLOWING DOWN TO AN 18 INCH DEPTH ON PRIVATE PROPERTY: (A) STEEL CONDUIT, OR (B) SCHEDULE 40 PVC OR SCHEDULE 80 PVC CONDUIT WITH A MINIMUM WALL THICKNESS OF 0.15 INCHES, OR (C) AT LEAST A 3 INCH LAYER OF CONCRETE ABOVE AND 2 INCHES ON EACH SIDE OF THE CONDUIT.
- (C) WHEN THE TRENCH IS BUTTED AGAINST THE BUILDING, THE END OF THE TRENCH SHALL BE EXCAVATED AT A ONE-TO-ONE SLOPE IF UNDERMINING IS SUSPECTED AT THE BUILDING.
- (D) THE 90° BEND MUST BE INSTALLED DEEP ENOUGH TO CONNECT TO THE CONDUIT ON THE BOTTOM OF THE TRENCH.
- (F) TYPE AND SCHEDULE OF CONDUIT AS PER BUILDING INSPECTORS REQUIREMENTS. FLEX CONDUIT IS NOT PERMITTED.
- (G) SIZE AND NUMBER OF CONDUIT RUNS TO BE DESIGNATED BY SDG&E.
- (H) CONDUIT MANUFACTURER MUST BE SDG&E APPROVED.

**REFERENCE:**

- I SEE STANDARD 3367 FOR TRENCH PARALLELING FOUNDATIONS.
- (J) SEE STANDARD 3370 OR 3371 FOR TRENCH DEPTHS, SHADING AND BACKFILL REQUIREMENTS.
- (K) SEE STANDARD 3942 FOR MINIMUM BENDING RADIUS.
- L. SEE STANDARD 3948 FOR SEALING CONDUITS.
- M. SEE STANDARD 3950 FOR FIELD HEATING SERVICE LATERAL CONDUITS.

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| REVISION                 | SDG&E ELECTRIC STANDARDS                                      |   |                                   |  |
| DATE 12-10-02            | RESIDENTIAL RISER AND CONDUIT                                 |   |                                   |  |
| APPD <i>SM/AFB</i>       | 3941  |   |                                   |  |



**SCOPE:** THIS STANDARD SHOWS CUSTOMER INSTALLED CONDUIT FOR A RESIDENTIAL OR COMMERCIAL SERVICE LATERAL. \*1 AMPACITY RANGE BASED ON 75° C ALUMINUM WIRE.

| CUSTOMER INSTALLED SERVICE EQUIPMENT OR BUS AMPACITY *1 | CUSTOMER INSTALLED SERVICE RISER BEND AND SERVICE LATERAL CONDUIT SIZE FOR 3 OR 4-WIRE RUN |                            |
|---|--|----------------------------|
|   | RESIDENTIAL & MULTI-FAMILY *2  | COMMERCIAL & INDUSTRIAL *2 |
| 0-200 AMPS *  | 1 - 3" Ⓢ   | 1 - 3" Ⓢ                   |
| 201-400 AMPS 1 ϕ  | 1 - 3" *3  | 1 - 3"                     |
| 201-400 AMPS 3 ϕ  | 1 - 4"   | 1 - 4"                     |
| 401-800 AMPS  | 2 - 4" *5, *6  | 2 - 4"                     |
| 801-1200 AMPS   | 3 - 4"   | 3 - 5"                     |
| 1201-1600 AMPS  | 3 - 4"   | 4 - 5"                     |
| 1601-2000 AMPS  | 4 - 4"   | 5 - 5"                     |
| 2001-2500 AMPS  | 5 - 4"   | 6 - 5"                     |
| 2501-3000 AMPS  | 4 - 5"   | 7 - 5"                     |
| 3001-3500 AMPS  | 5 - 5"   | 8 - 5"                     |
| 3501-4000 AMPS  | 7 - 5"   | 10 - 5"                    |

\* 225 AMPS RESIDENTIAL

\*\* DEPTH OF TRENCH IS DETERMINED BY TYPE OF SUBSTRUCTURE AT SOURCE. VERIFY WITH SDG&E INSPECTOR PRIOR TO EXCAVATION.

SDG&E UNDERGROUND DISTRIBUTION SYSTEM:

① SOURCE: MANHOLE, HANDHOLE OR PAD-MOUNT TRANSFORMER.

SDG&E WILL FURNISH, INSTALL, OWN AND MAINTAIN - (SUBJECT TO INSTALLATION CHARGES CONSULT SDG&E PLANNER):

② SERVICE LATERAL CONDUCTORS AND CONNECTORS FROM SDG&E UNDERGROUND DISTRIBUTION SYSTEM, ITEM 1, TO CUSTOMER'S SERVICE TERMINATING FACILITY, ITEM 8. SDG&E WILL MAKE CONNECTIONS.

CUSTOMER SHALL FURNISH, INSTALL, OWN AND MAINTAIN AT THEIR EXPENSE:

③ A CLEAR ROUTE ON ANY PRIVATE PROPERTY, THAT IS CLEAR OF OBSTRUCTIONS WHICH WOULD INHIBIT THE CONSTRUCTION OF SERVICE FACILITIES. SERVICE LATERAL CONDUIT FROM SOURCE (ITEM 1) TO TERMINATING FACILITY (ITEM 8). CONDUIT SIZE SHALL BE BASED ON AMPERE CAPACITY OF BUS OR SERVICE EQUIPMENT, WHICHEVER IS GREATER AND DISTANCE FROM TRANSFORMER TO TERMINATING FACILITY (ITEM 8). CONDUIT MATERIAL FROM ITEM 1 TO ITEM 8 SHALL BE APPROVED NONMETALLIC CONDUIT IN ACCORDANCE WITH SDG&E STANDARD 3373. BETWEEN ITEM 6 AND ITEM 8 THE CONDUIT INSTALLER MUST PROVIDE A 3/4" PULLING AND MEASURING TAPE IN EACH CONDUIT. THE PULLING TAPE MUST BE APPROVED BY SDG&E AND HAVE A MINIMUM AVERAGE TENSILE STRENGTH OF 2500 LBS, AND BE WOVEN POLYESTER HIGH STRENGTH, CONTINUOUS FILAMENT, PRE-LUBRICATED WITH FOOTAGE MARKING. PULLING TAPE TAILS OF 24 INCHES SHALL BE SECURED AT EACH END OF THE CONDUIT. THE PULLING TAPE SHALL BE PULLED IN BEHIND THE MANDREL. WHEN THE PULLING AND MEASURING TAPE IS INSTALLED IT SHALL BE ONE CONTINUOUS LENGTH WITHOUT KNOTS FOR THE ACCURATE MEASUREMENT FOR CONDUCTOR INSTALLATION AND THE PULLING OF CONDUCTORS OR WINCH LINES. LEAVE AT LEAST 2 FEET BEYOND EACH END OF CONDUIT RUN. FLEX CONDUIT IS NOT PERMITTED.

④ TRENCH, BACKFILL, PAVEMENT REPAIR, AND STRUCTURES SHALL BE IN ACCORDANCE WITH SDG&E AND LOCAL GOVERNMENTAL AUTHORITY REQUIREMENTS. CUSTOMER TO OBTAIN EXCAVATION PERMIT FOR TRENCHING IN STREET RIGHT-OF-WAY AS REQUIRED BY LOCAL GOVERNMENTAL AUTHORITY. **SDG&E INSPECTION IS REQUIRED PRIOR TO BACKFILLING TRENCH.**

⑤ ADAPTER COUPLINGS FOR CONNECTING BENDS TO STRAIGHT CONDUIT.

⑥ CONDUIT RISER BEND.

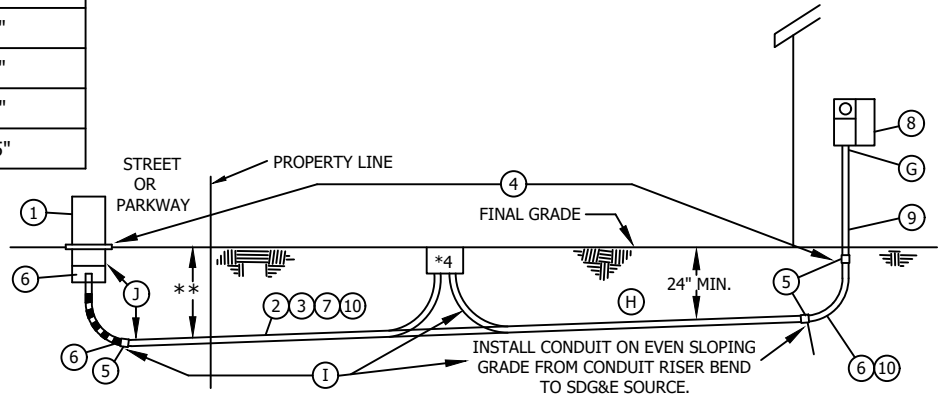
⑦ SIZE AND NUMBER OF CONDUIT RUNS TO BE DESIGNATED BY SDG&E.

⑧ SERVICE TERMINATING ENCLOSURE PER SDG&E SERVICE STANDARDS PAGES 701-708.

⑨ TYPE AND SCHEDULE OF CONDUIT ON OR WITHIN A BUILDING OR STRUCTURE TO BE INSTALLED PER BUILDING INSPECTORS REQUIREMENTS AND MUST BE LISTED AND LABELED. NORMALLY SCHEDULE 40 PVC IS ALLOWED INSIDE A BUILDING WALL AND SCHEDULE 80 PVC IS REQUIRED WHEN EXPOSED ON AN EXTERIOR WALL. CONSULT WITH APPROPRIATE **INSPECTION AUTHORITY**. FLEX CONDUIT IS NOT PERMITTED.

⑩ CONDUIT MANUFACTURER MUST BE SDG&E APPROVED.

| CONDUIT RISER BEND SIZE | MINIMUM BENDING RADIUS Ⓢ ⑦ |
|-------------------------|----------------------------|
| 2" C                    | 24"                        |
| 3"                      | 36"                        |
| 4"                      | 36"                        |
| 5"                      | 36"                        |



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**SHEET  
1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
UNDERGROUND ELECTRIC SERVICE LATERAL  
CUSTOMER INSTALLED CONDUIT, RESIDENTIAL OR COMMERCIAL

**UG3942.1**



## INSTALLATION:

- A. CONTACT PROJECT MANAGEMENT AT THE NEAREST SDG&E REGIONAL OFFICE FOR A SERVICE AND METER LOCATION PRIOR TO START OF CONSTRUCTION.
- B. SERVICE LATERAL CONDUIT SPECIFIED IN THE CONDUIT TABLE IS LIMITED TO A 150 FOOT MAXIMUM LENGTH, WITH NOT MORE THAN 3-90 DEGREE HORIZONTAL OR VERTICAL BENDS OR 270 DEGREES TOTAL DEFLECTION THROUGH THE SERVICE RUN. IF GREATER THAN 150 FEET, REFER TO STANDARD 4003. PLANNER AND ELECTRIC CONSTRUCTION APPROVAL IS REQUIRED IF LIMITATIONS ARE EXCEEDED.
- C. A 3-WIRE, 100 AMPERE, SINGLE-PHASE MAIN CAN BE SERVED BY A 2-INCH CONDUIT. A 3-WIRE, 200 AMPERE, OR LESS, SINGLE-PHASE MAIN FOR TEMPORARY CONSTRUCTION POWER CAN BE SERVED BY A 2-INCH CONDUIT. ITEM 3 SHALL BE THE SAME SIZE AND TYPE MATERIAL STOCKED BY SDG&E AS SHOWN ON PAGE 3373.2.
- D. ENGINEERS AND ARCHITECTS PROPOSALS FOR ALL SWITCHBOARDS 1000 AMPERES, OR LARGER, SHALL BE SUBMITTED TO THE NEAREST PROJECT MANAGEMENT OFFICE FOR STUDY AND APPROVAL BY SDG&E'S DISTRIBUTION PLANNING AND **SERVICE STANDARDS** SECTIONS.
- F. REPLACEMENT OR ENLARGEMENT OF SERVICE LATERAL CONDUITS DUE TO RELOCATION OR INCREASED LOAD WILL BE ACCOMPLISHED BY THE CUSTOMER UNDER THE PROVISIONS OF ITEMS 3 THROUGH 10 ON PAGE 305. MAINTENANCE OF THE CUSTOMER'S SERVICE LATERAL CONDUITS OUTSIDE THE BUILDING WALL WILL BE UNDERTAKEN BY SDG&E UNDER EMERGENCY CONDITIONS AND MAY BE DONE AT THE CUSTOMER'S EXPENSE. CONSULT THE NEAREST SDG&E REGIONAL OFFICE.
- G. CONDUITS SHALL BE SEALED PER STANDARD 3948 (G.O. 128, RULE 31.6).
- H. A 24-INCH MINIMUM COVER OVER THE CONDUIT IS REQUIRED FOR ALL NORMAL INSTALLATIONS ON PRIVATE PROPERTY AND 30 INCH MINIMUM COVER IN RIGHT-OF-WAY OR PUBLIC PROPERTY. IN ALL INSTALLATIONS WHERE THE MINIMUM COVER CANNOT BE MET G.O. 128 REQUIRES ONE OF THE FOLLOWING: 1) STEEL CONDUIT, 2) SCHEDULE 40 PVC OR SCHEDULE 80 PVC CONDUIT WITH A MINIMUM WALL THICKNESS OF 0.15 INCHES , OR 3) AT LEAST A 3-INCH LAYER OF CONCRETE ABOVE AND 2 INCHES ON EACH SIDE OF THE CONDUIT. REDUCED DEPTHS MUST BE APPROVED BY THE CUSTOMER PROJECT PLANNER AND SDG&E INSPECTOR.
- I. THE TRENCH MUST HAVE AN EVEN SLOPING GRADE TO ALLOW ROOM FOR A 90 DEGREE BEND INTO THE BOTTOM OF ANY CUSTOMER OWNED OR SDG&E FACILITY. **DO NOT CUT BENDS.** THE TRENCH DEPTH IS TO BE DETERMINED AT THE"PRECONSTRUCTION MEETING".
- J. WHEN TRENCHING TO AN EXISTING FACILITY, THE APPLICANT/CONTRACTOR SHALL COMPLETE THE TRENCH AND INSTALLATION OF CONDUIT UP TO THE EXISTING FACILITY UNLESS IT IS DETERMINED BY AN AUTHORIZED SDG&E EMPLOYEE THAT SUCH AN INSTALLATION PERFORMED BY THE APPLICANT/CONTRACTOR WOULD EXPOSE WORKERS TO OR CREATE A HAZARD. IN THIS CASE, SDG&E WOULD PERFORM TRENCHING AS INDICATED ON WORK ORDER. DIGGING UNDER PADMOUNTED EQUIPMENT AND INSTALLATION OF CONDUIT INTO PADMOUNTED EQUIPMENT WILL ALWAYS BE THE RESPONSIBILITY OF SDG&E.
- K. SERVICE CONDUIT WILL ONLY BE ALLOWED UNDERNEATH THE BUILDING BEING SERVED BY THE CABLE IN THE CONDUIT. NO CONDUIT IS ALLOWED UNDER ONE BUILDING TO SERVE ANOTHER BUILDING.

**REFERENCE:**

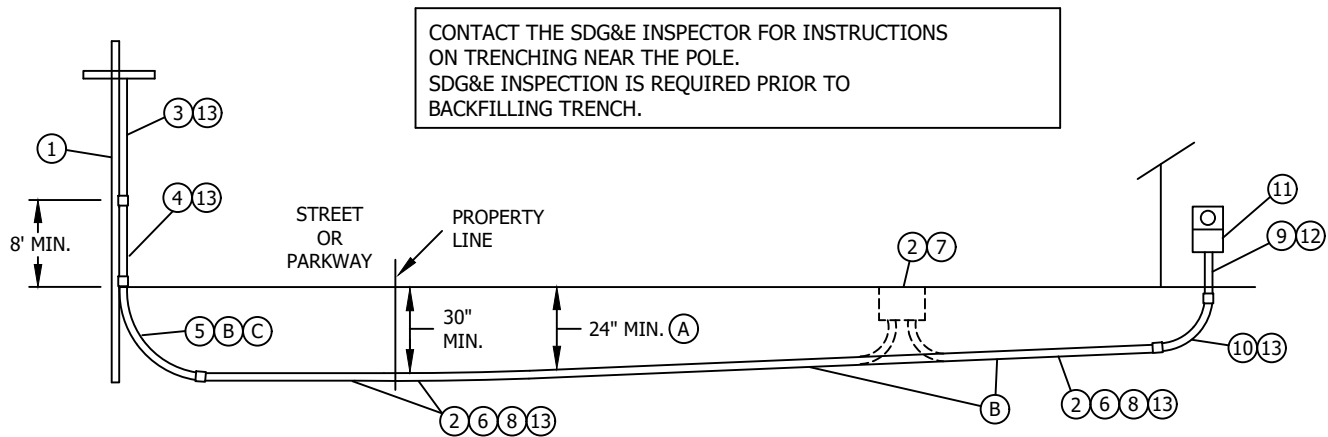
- M. SEE STANDARD 3367 FOR TRENCH PARALLELING FOUNDATIONS.
- N. SEE STANDARD 3372 FOR CONDUIT SIZING.
- Q. SEE STANDARD 3373 FOR SDG&E CONDUIT AND FITTINGS.
- P. SEE STANDARD 3376 FOR CONCRETE SLURRY REQUIREMENTS.
- Q. SEE STANDARDS 3421, 3425, 3426 AND 3427 FOR CONDUIT PLACEMENT.
- R. SEE STANDARD 3941 FOR RESIDENTIAL RISER AND CONDUIT.
- S. SEE STANDARD 3944 FOR MATERIAL REQUIREMENTS OF AN U.G. SERVICE FROM O.H. FACILITIES.
- T. SEE STANDARD 3948 FOR SEALING CONDUITS.
- U. SEE STANDARD ON OH PAGE 1404.2/U.G. PAGE 4204.2 FOR CABLE POLE CONDUIT REQUIREMENTS.
- V. SEE STANDARD 3950 FOR FIELD HEATING SERVICE LATERAL CONDUIT.

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|                 |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |      |            |                    |        |    |          |      |      |                     |  |          |
|                 |          | UNDERGROUND ELECTRIC SERVICE LATERAL<br>CUSTOMER INSTALLED CONDUIT, RESIDENTIAL OR COMMERCIAL |                           |      |            |                    |        |    |          |      |      |                     |  |          |



**SCOPE:** THIS STANDARD SHOWS WHO PROVIDES, INSTALLS, OWNS AND MAINTAINS MATERIAL AND LABOR REQUIRED FOR A SINGLE LOW VOLTAGE SERVICE FED FROM OVERHEAD FACILITIES.



### SDG&E OVERHEAD DISTRIBUTION SYSTEM:

- ① SOURCE POLE AS DESIGNATED BY SDG&E PLANNER.

SDG&E TO FURNISH, INSTALL, OWN AND MAINTAIN - (SUBJECT TO INSTALLATION CHARGES CONSULT SDG&E PLANNER):

- ② SERVICE LATERAL CONDUCTOR AND CONNECTORS. SDG&E TO FURNISH MATERIAL AT CUSTOMERS EXPENSE INSTALL, OWN AND MAINTAIN:

\* CUSTOMER TO PROVIDE, SDG&E TO INSTALL, OWN AND MAINTAIN:

- ③ PVC CONDUIT SCHEDULE 40.
- ④ PVC CONDUIT SCHEDULE 80.

CUSTOMER SHALL FURNISH, INSTALL, OWN AND MAINTAIN AT THEIR EXPENSE:

- ⑤ PVC CONDUIT BEND - SCHEDULE 80. MINIMUM RADIUS OF BEND: 3 INCH = 36 INCH RADIUS.  
4 INCH AND 5 INCH = 48 INCH RADIUS.

THE LARGER RADIUS AT THE POLE IS NECESSARY TO ALLOW FOR VERTICAL CABLE PULLING TENSION.

- ⑥ A CLEAR ROUTE ON ANY PRIVATE PROPERTY, THAT IS CLEAR OF OBSTRUCTIONS WHICH WOULD INHIBIT THE CONSTRUCTION OF SERVICE FACILITIES. SERVICE LATERAL CONDUIT FROM SOURCE (ITEM I) TO TERMINATING FACILITY (ITEM II). CONDUIT SIZE SHALL BE BASED ON AMPERE CAPACITY OF BUS OR SERVICE EQUIPMENT, WHICHEVER IS GREATER AND DISTANCE FROM TRANSFORMER TO TERMINATING FACILITY (ITEM II).
  - ⑦ SECONDARY HANDHOLE. VERIFY IF REQUIRED WITH SDG&E PLANNER. IF HANDHOLE IS REQUIRED, THE LID SHALL BE MARKED "SDG&E".
  - ⑧ TRENCH, BACKFILL, PAVEMENT REPAIR AND PROTECTIVE STRUCTURES SHALL BE IN ACCORDANCE WITH SDG&E AND LOCAL GOVERNMENTAL AUTHORITY REQUIREMENTS. CUSTOMER TO OBTAIN EXCAVATION PERMIT FOR TRENCHING IN STREET RIGHT-OF-WAY AS REQUIRED BY LOCAL GOVERNMENTAL AUTHORITY.
  - ⑨ ITEMS 3, 4, 5, & 6 SHALL BE NONMETALLIC PER PAGE 3373 AND 4204.2. BETWEEN FROM ITEM 5 AND ITEM 9. THE CONDUIT INSTALLER MUST PROVIDE A 3/4" PULLING AND MEASURING TAPE IN EACH CONDUIT. THE PULLING TAPE MUST BE APPROVED BY SDG&E AND HAVE A MINIMUM AVERAGE TENSILE STRENGTH OF 2500 LBS, AND BE WOVEN POLYESTER HIGH STRENGTH, CONTINUOUS FILAMENT, PRE-LUBRICATED WITH FOOTAGE MARKING. PULLING TAPE TAILS OF 24 INCHES SHALL BE SECURED AT EACH END OF THE CONDUIT. THE PULLING TAPE TAILS OF 24 INCHES SHALL BE SECURED AT EACH END OF THE CONDUIT. THE PULLING TAPE SHALL BE PULLED IN BEHIND THE MANDREL. WHEN THE PULLING AND MEASURING TAPE IS INSTALLED IT SHALL BE ONE CONTINUOUS LENGTH WITHOUT KNOTS FOR THE ACCURATE MEASUREMENT FOR CONDUCTOR INSTALLATION AND THE PULLING OF CONDUCTORS OR WINCH LINES. LEAVE AT LEAST 2 FEET BEYOND EACH END OF CONDUIT RUN. FLEX CONDUIT IS NOT PERMITTED.
  - ⑩ CONDUIT RISER BEND. MINIMUM BENDING RADIUS PER SERVICE GUIDE PAGE 305.
  - ⑪ SERVICE TERMINATING ENCLOSURE PER SDG&E SERVICE STANDARDS PAGES 701-708.
  - ⑫ TYPE AND SCHEDULE OF CONDUIT ON OR WITHIN THE BUILDING TO BE INSTALLED PER BUILDING INSPECTORS REQUIREMENTS AND MUST BE LISTED AND LABELED. NORMALLY SCHEDULE 40 PVC IS ALLOWED INSIDE A BUILDING WALL AND SCHEDULE 80 PVC IS REQUIRED WHEN EXPOSED ON AN EXTERIOR WALL. CONSULT WITH APPROPRIATE BUILDING INSPECTOR. FLEX CONDUIT IS NOT PERMITTED.
  - ⑬ CONDUIT MANUFACTURER MUST BE SDG&E APPROVED.
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| SHEET<br>1 OF 2 |          | X  | Indicates Latest Revision |      | Completely Revised |     | New Page |    | Information Removed |      |          |
|                 |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                    |                           |      |                    |     |          |    |                     |      | UG3944.1 |
|                 |          | UNDERGROUND SERVICE FROM OVERHEAD FACILITIES<br>(LOW VOLTAGE), MATERIAL REQUIREMENTS |                           |      |                    |     |          |    |                     |      |          |



### INSTALLATION:

- A A 24 INCH MINIMUM COVER OVER THE CONDUIT SHALL BE FOLLOWED FOR ALL NORMAL INSTALLATIONS ON PRIVATE PROPERTY, 30 IN MINIMUM COVER IN RIGHT-OF-WAY OR PUBLIC PROPERTY. SEE SERVICE GUIDE UG3370 FOR ALL OTHER APPLICATIONS. IN ALL INSTALLATIONS WHERE THE MINIMUM COVER CANNOT BE MET, G.O. 128 REQUIRES ONE OF THE FOLLOWING: (1) STEEL, OR (2) SCHEDULE 40 PVC OR SCHEDULE 80 PVC CONDUIT WITH A MINIMUM WALL THICKNESS OF 0.15 INCHES, OR (3) A 3 INCH LAYER OF CONCRETE (2 SACK 3/8" ROCK) ABOVE AND 2 INCHES ON EACH SIDE OF THE CONDUIT. REDUCED DEPTHS MUST BE APPROVED BY BOTH THE CUSTOMER PROJECT PLANNER AND SDG&E INSPECTOR.
- B THE TRENCH MUST HAVE AN EVEN SLOPING GRADE TO ALLOW FOR A 90 DEGREE BEND INTO THE BOTTOM OF ANY CUSTOMER OWNED OR SDG&E FACILITY, **DO NOT CUT BENDS.** THE TRENCH DEPTH IS TO BE DETERMINED AT THE "PRECONSTRUCTION MEETING".
- C WHEN TRENCHING TO AN EXISTING FACILITY, THE APPLICANT/CONTRACTOR SHALL COMPLETE THE TRENCH AND INSTALLATION OF CONDUIT UP TO THE EXISTING FACILITY UNLESS IT IS DETERMINED BY ANY AUTHORIZED SDG&E EMPLOYEE THAT SUCH AN INSTALLATION PERFORMED BY THE APPLICANT/CONTRACTOR WOULD EXPOSE WORKERS TO OR CREATE A HAZARD. IN THIS CASE, SDG&E WOULD PERFORM TRENCHING AS INDICATED ON WORK ORDER. DIGGING UNDER ENERGIZED PADMOUNTED EQUIPMENT AND INSTALLATION OF CONDUIT INTO ENERGIZED PADMOUNTED EQUIPMENT WILL ALWAYS BE THE RESPONSIBILITY OF SDG&E.

**REFERENCE:**

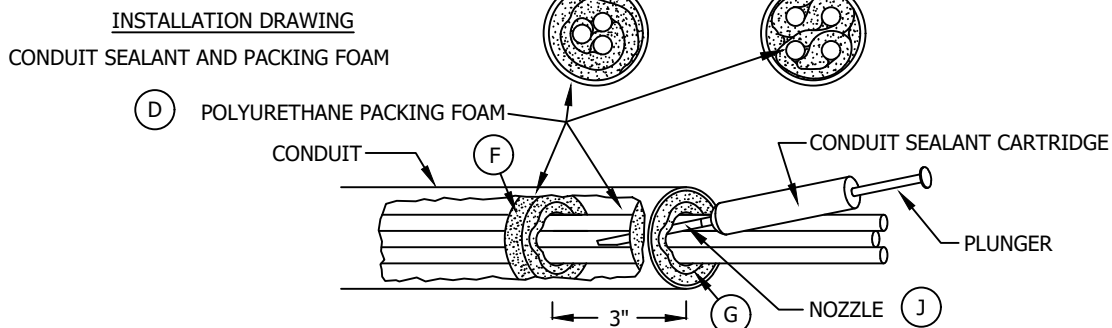
- D. SEE STANDARD 3367 FOR TRENCH PARALLELING FOUNDATIONS.
- F. SEE STANDARD 3373 FOR SDG&E CONDUIT AND FITTINGS.
- G. SEE STANDARD 3376 FOR CONCRETE SLURRY REQUIREMENTS.
- H. SEE STANDARDS 3421, 3425, 3426 AND 3427 FOR CONDUIT PLACEMENT.
- I. SEE STANDARD 3941 FOR RESIDENTIAL RISER AND CONDUIT.
- J. SEE STANDARD 3942 FOR MATERIAL REQUIREMENTS OF A U.G. SERVICE FROM U.G. FACILITIES.
- K. SEE STANDARD 3948 FOR SEALING CONDUITS.
- L. SEE ON PAGE 1404.2/UG PAGE 4204.2 FOR CABLE POLE CONDUIT REQUIREMENTS.
- M. SEE STANDARD 3950 FOR FIELD HEATING SERVICE LATERAL CONDUITS.

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|                 |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                    |                           |      |            |                    |        |    |          |      |      |                     |  |          |
|                 |          | UNDERGROUND SERVICE FROM OVERHEAD FACILITIES<br>(LOW VOLTAGE), MATERIAL REQUIREMENTS |                           |      |            |                    |        |    |          |      |      |                     |  |          |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND MATERIAL REQUIREMENTS FOR SEALING SERVICE LATERAL CONDUITS (G.O. 128 RULE 31.6).



**NOTES:**

- SHELF LIFE/EXPIRATION DATE: SHELF LIFE IS 12 MONTHS WHEN STORED IN ORIGINAL, UNOPENED CONTAINERS BELOW 80° F. PROLONGED STORAGE AT TEMPERATURES ABOVE 100° f MAY ALTER THE EXPANSION RATIO OF THE FOAM.
  - DO NOT USE SEALANT AFTER EXPIRATION DATE.**
  - THE CONDUIT SEALANT IS A TWO-PART POLYURETHANE WHICH WHEN MIXED EXPANDS TO 8 TIMES ITS LIQUID STATE TO FORM A DENSE, TOUGH FOAM. FOAM CURES TO 60% OF ITS FULL STRENGTH IN 8-10 MINUTES AND TO FULL STRENGTH IN 12 HOURS.
  - CONDUIT SEALANT MAY ALSO BE USED ON SECONDARY AND JACKETED PRIMARY CABLES WHERE THERE MAY BE A WATER PROBLEM.
  - WHENEVER A PAD OR SUBSTRUCTURE IS HIGHER IN ELEVATION THAN ELECTRIC VAULTS, BASEMENTS, ETC., CONDUITS MUST BE SEALED, WHETHER THEY ARE PRIMARY, SECONDARY OR SERVICE LATERALS.
  - A HANDHOLE SHALL BE INSTALLED AT THE BASE OF THE METER PANEL FOR CONDITIONS DESCRIBED IN EXAMPLES #1 AND #3 BELOW.
  - SEAL CONDUITS WITH MATERIAL AS SPECIFIED BY THE FOLLOWING CRITERIA.
- 1) USE CONDUIT SEALANT AND PACKING FOAM - WHEN FIELD CONDITIONS INDICATE THAT WATER MAY ENTER THE SERVICE LATERAL CONDUIT (WITH CABLE) AT THE CABLE ENTRANCE AND SUBSEQUENTLY INTO THE CUSTOMER'S SERVICE PANEL. **EXAMPLE:** THE SERVICE PANEL IS AT AN APPRECIABLY LOWER ELEVATION THAN THE SUB-STRUCTURE OR TRANSFORMER. CONDUIT(S) SHALL BE SEALED IN THE HANDHOLE AT THE BASE OF THE SERVICE PANEL, IN THE SERVICE PANEL AND AT THE SOURCE SUBSTRUCTURE OR TRANSFORMER BY THE CONNECTION CREW.
  - 2) USE SEALING COMPOUND - ON SERVICE LATERAL CONDUIT (WITH CABLE) WHERE NO WATER ENTRY PROBLEMS ARE SUSPECTED. CONDUIT(S) SHALL BE SEALED ONLY AT THE SUBSTRUCTURE OR TRANSFORMER BY THE CONNECTION CREW.
  - 3) USE SEALING COMPOUND AND GRAY TAPE - WHEN FIELD CONDITIONS INDICATE THAT WATER MAY ENTER THE SERVICE LATERAL CONDUIT (WITHOUT CABLE) AT THE CONDUIT ENTRANCE AND SUBSEQUENTLY INTO THE CUSTOMER'S SERVICE PANEL. **EXAMPLE:** THE SERVICE PANEL IS AT AN APPRECIABLY LOWER ELEVATION THAT THE SUBSTRUCTURE OR TRANSFORMER. CONDUIT(S) SHALL BE SEALED IN THE HANDHOLE AT THE BASE OF THE SERVICE PANEL, IN THE SERVICE PANEL AND AT THE SOURCE SUBSTRUCTURE OR TRANSFORMER BY THE CONNECTION CREW.
  - 4) USE THE SEALING COMPOUND AND GRAY TAPE - ON SERVICE LATERAL CONDUIT (WITHOUT CABLE) WHERE NO WATER PROBLEMS ARE SUSPECTED. CONDUIT(S) SHALL BE SEALED ONLY AT THE SUBSTRUCTURE OR TRANSFORMER BY THE CONNECTION CREW.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                           | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|------|---------------------------------------|----------|--------------|----------------|
| 1    | SEALANT, CONDUIT SEMCO PR-821, (2 OZ) | AS REQ'D | 631892       | SEAL-2         |
| 2    | SEALANT, CONDUIT SEMCO PR-821, (6 OZ) | AS REQ'D | 631890       | SEAL-6         |
| 3    | FOAM, POLYURETHANE PACKING            | AS REQ'D | 511680       | --             |
| 4    | SEALING COMPOUND                      | AS REQ'D | 442976       | --             |
| 5    | GRAY TAPE                             | AS REQ'D | 721120       | --             |
| 6    | SAFETY GLASSES                        | AS REQ'D | 383800       | --             |
| 7    | GLOVES, DISPOSABLE                    | AS REQ'D | 385300       | --             |

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**1 OF 4**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SEALING SERVICE LATERAL CONDUIT, INSTRUCTIONS

**UG3948.1**



### **INSTALLATION - SEALING COMPOUND:**

- A. BEFORE APPLYING SEALING COMPOUND THE INSIDE AND OUTSIDE SHOULD BE AS CLEAN AND DRY AS POSSIBLE. DRY OUT ANY WATER WITH COMPRESSOR, RAGS, HAND PUMP, ETC.
- B. IN CONDUITS WHERE CABLES ARE PRESENT, WRAP A STRIP OF SEALING COMPOUND AROUND CONDUIT WHERE CABLES ENTER. OVERLAP THE SEALING COMPOUND ENDS 1/4" AND PRESS EDGES FIRMLY TOGETHER.
- C. IN CONDUITS THAT ARE EMPTY FOR FUTURE CABLE PULLING AND WATER ENTRY MAY OCCUR, SECURE PULL ROPE AND INSTALL SEALING COMPOUND AND GRAY TAPE SECURELY TO PREVENT WATER ENTRY. SEAL AT THE SUBSTRUCTURE END OF THE CONDUIT.

### **INSTALLATION - CONDUIT SEALANT AND PACKING FOAM:**

- A. BEFORE INSTALLATION OF SEALANT AND FOAM, CABLES SHOULD BE TERMINATED IF POSSIBLE TO AVOID ANY MOVEMENT THAT MAY CAUSE CRACKING OF SEALANT AND SUBSEQUENT WATER LEAKAGE.
- B. CLEAN AND DRY THE INSIDE OF THE CONDUIT AT THE CABLE ENTRANCE AS MUCH AS POSSIBLE WITH COMPRESSOR, RAGS, HAND PUMP, ETC.
- C. ON EXISTING 3/4" SIDA AND 1 INCH CONDUIT, SKIP NOTES "D" THRU "G". PACKING FOAM IS NOT REQUIRED - SEALANT WILL EXPAND ENOUGH TO MAKE A GOOD SEAL.
- (D.) WRAP PACKING FOAM AROUND CABLES AT THE CONDUIT ENTRANCE AS SHOWN IN THE INSTALLATION DRAWING. USE AS MANY FOAM STRIPS AS NEEDED TO ASSURE THERE ARE NO GAPS BETWEEN FOAM, CABLES AND CONDUIT.
- F. WITH A BLUNT OBJECT PUSH THE PACKING FOAM BACK INSIDE THE CONDUIT 3 INCHES.
- (G.) WRAP ANOTHER LAYER OF PACKING FOAM AROUND THE CABLES AT THE CONDUIT ENTRANCE THE SAME WAY AS THE FIRST LAYER. THIS FORMS A VOID INSIDE THE CONDUIT WHICH WILL BE FILLED WITH SEALANT.
- (H.) CONDUIT IS NOW READY FOR INSTALLATION OF CONDUIT SEALANT. READ CAREFULLY THE INSTRUCTIONS ON THE SEALANT PACKAGE BEFORE USING. SAFETY GLASSES AND PROTECTIVE GLOVES SHALL BE WORN DURING INSTALLATION OF SEALANT.
- I. CAUTION - AS NOTED ON SEALANT PACKAGE, CARTRIDGE WILL DEVELOP INTERNAL PRESSURE AFTER MIXING. THIS OCCURS IN 20-30 SECONDS AT WHICH POINT THE SEALANT BEGINS EXPANDING SO WORK QUICKLY WHEN SCREWING ON NOZZLE TO CARTRIDGE.
- (J.) AFTER SEALANT IS MIXED AND NOZZLE IS ATTACHED, PUSH NOZZLE OF CARTRIDGE THROUGH TOP LAYER OF PACKING FOAM AND DEPRESS PLUNGER TO FORCE MIXED SEALANT FROM CARTRIDGE. LEAVE CARTRIDGE AND NOZZLE IN CONDUIT A FEW MINUTES TO ASSURE ALL SEALANT HAS EVACUATED TUBE.
- K. CAUTION - DO NOT LEAVE ANY UNUSED SEALANT INSIDE OF CARTRIDGE - CONTENTS MAY STILL BE UNDER PRESSURE AND COULD RUPTURE CARTRIDGE.
- L. REMOVE NOZZLE OF CARTRIDGE AND ALLOW SEALANT TO CURE. AFTER SEALANT HAS CURED, CHECK AROUND THE EDGE OF THE TOP LAYER OF PACKING FOAM TO SEE IF SEALANT HAS PROPERLY EXPANDED AND SEALED CONDUIT.

### **REFERENCE:**

- M. SEE G.O. 128, RULE 31.6 ON SEALING SERVICE LATERALS.

### **MAINTENANCE:**

- N. IF CABLE IS TO BE REPLACED, SEALANT CAN BE REMOVED BY CHIPPING OUT OF CONDUIT WITH A LONG SCREWDRIVER OR OTHER BLUNT OBJECT.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

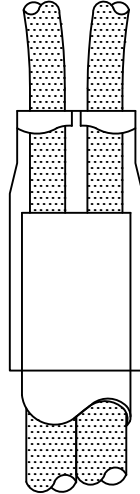
SEALING SERVICE LATERAL CONDUIT, INSTRUCTIONS

UG3948.2



**SCOPE:** THIS STANDARD COVERS CONDUIT SEALING WITH TYCO RAYFLATE AND CONDUCTOR BREAK OUT BOOTS. THE APPLICATION OF THESE PRODUCTS IS DESIGNED TO PREVENT WATER ENTRY INTO CUSTOMER AND SDG&E FACILITIES, WHEN THE SDG&E SERVICE POINT IS A HIGHER ELEVATION THAN THE CUSTOMERS SERVICE POINT OF ENTRY.

**APPLICATION: CABLE BREAKOUTS (CBR)** THE CABLE BREAKOUT BOOTS ARE DESIGNED TO KEEP WATER OUT ONLY AND SHOULD ALWAYS BE USED AT THE HIGHER ELEVATION IN TRANSFORMERS AND SECONDARY HAND HOLES.



| TYCO NUMBER | CONDUIT SIZE | CONDUCTOR NUMBER AND SIZE | STOCK NUMBER |
|-------------|--------------|---------------------------|--------------|
| CBR-3-3-A   | 2" AND 3"    | 3 - NO. 2 TO 350          | S160650      |
| CBR-4-3-A   | 3" AND 4"    | 4 - NO. 3/0 TO 350        | S160652      |
| CBR-4-4-A   | 4"           | 4 - NO. 350 TO 500        | S160654      |
| CRB-4-4-A   | 5"           | 4 - NO. 750, 1000         | S160654      |

### **INSTALLATION:**

SELECT SIZE OF CBR TO SEAL CABLE AND CONDUIT, ONCE CABLE IS INSTALLED CLEAN CABLE AND CONDUIT SURFACES. FOLLOW MANUFACTURES INSTRUCTIONS FOR INSTALLATION. CAUTION APPLY HEAT SLOW AND EVENLY TO PREVENT DISTORTION OF CONDUIT.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SEALING SERVICE LATERAL CONDUIT, INSTRUCTIONS

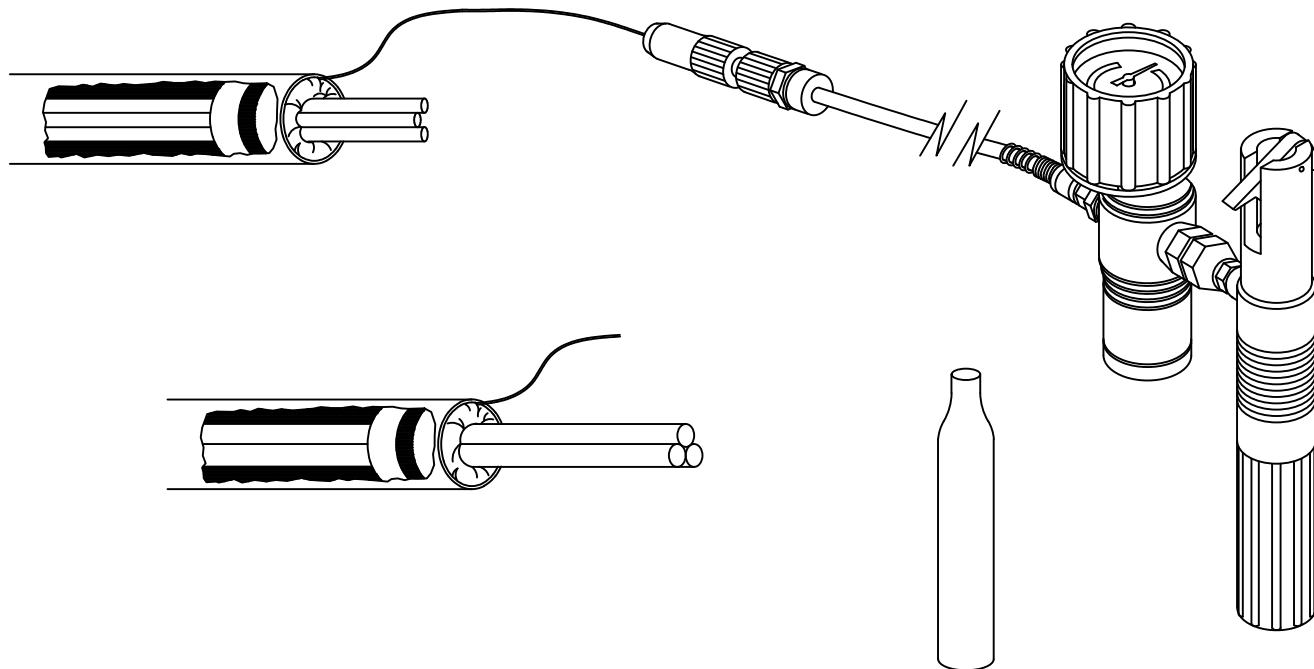
**UG3948.3**



**SCOPE:** THE RAYFLATE DUCT SEALING SYSTEM HAS BEEN DESIGNED FOR USE IN CONJUNCTION WITH PLASTIC, CONCRETE, OR STEEL DUCTS WITH SINGLE OR MULTIPLE CONDUCTORS. THE RDSS SEALING SYSTEM SHOULD PREVENT WATER ENTRY INTO CUSTOMER VAULTS, METER ROOMS, MANHOLES, AND HAND HOLES. THE RAYFLATE BLADDER IS A FLEXIBLE METALLIC LAMINATED HIGH TEMPERATURE SEALANT.

**APPLICATION:**

FOLLOW MANUFACTURES INSTRUCTION FOR INSTALLATION OF THE RDSS BLADDER. CLEAN ALL SURFACES OF CABLE AND CONDUITS TO BE SEALED. THE SEALING SYSTEM CAN SEAL SINGLE CONDUCTOR UNJACKETED CONCENTRIC OR JACKETED CABLE, DUPLEX, TRIPLEX AND QUAD CONDUCTORS, PRIMARY AND SECONDARY. FOR MULTIPLE CONDUCTORS USE THE CORRECT RDSS-CLIP TO SEAL BETWEEN THE CONDUCTORS TO MAKE A POSITIVE SEAL WHEN APPLYING RDSS INFLATABLE BLADDER. SEE TABLE 1 THE RDSS-IT-16 INFLATION TOOL IS USED TO INFLATABLE THE BLADDER, THE TOOL IS POWERED BY A CO2 CARTRIDGE. THE BLADDER IS INFLATED TO 45 PSI IN THE GREEN ZONE ON THE GAUGE. CO2 REPLACEMENT STOCK NUMBER #S209412



**TABLE 1**

| CONDUIT SIZE, WITH 1 CONDUCTOR | RAYFLATE DUCT SEAL | STOCK NUMBER | ADD-CLIP FOR MULTIPLE CONDUCTORS | STOCK NUMBER |
|--------------------------------|--------------------|--------------|----------------------------------|--------------|
| 2"                             | RDSS-60            | S632070      | RDSS-CLIP-75                     | S477542      |
| 3"                             | RDSS-75            | S632072      | RDSS-CLIP-75                     | S477542      |
| 4"                             | RDSS-100           | S632074      | RDSS-CLIP-100                    | S477544      |
| 5"                             | RDSS-125           | S632076      | RDSS-CLIP-125                    | S477546      |
| CO <sup>2</sup> CARTRIDGE      | E7515-0160         | S209412      | --                               | --           |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

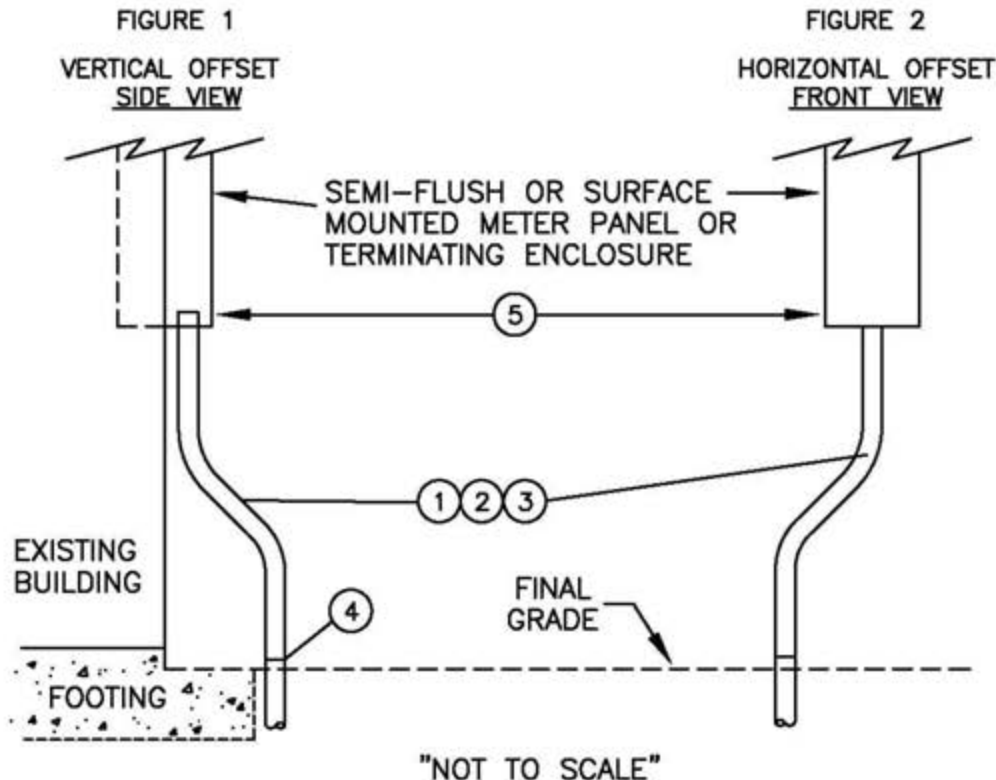
SEALING SERVICE LATERAL CONDUIT, INSTRUCTIONS

**UG3948.4**



**SCOPE:** THIS STANDARD PROVIDES THE REQUIREMENTS AND CONDITIONS ALLOWING FIELD HEATING OF SERVICE LATERAL CONDUITS INSTALLED ABOVE GRADE ONLY.

**NOTE:** THIS STANDARD PROVIDES A MEANS TO AVOID EXCAVATING INTO AN EXISTING BUILDING FOOTING WHEN CONVERTING EXISTING OVERHEAD SERVICES TO UNDERGROUND (SEE FIGURE 1). UNDERGROUND (SEE FIGURE 1). IT ALSO APPLIES TO EXISTING OR NEW SERVICES WHEN A HORIZONTAL OFFSET IS REQUIRED DUE TO FIELD CONDITIONS (SEE FIGURE 2). THIS STANDARD IS NOT INTENDED TO CORRECT POOR WORKMANSHIP. CARE SHOULD BE TAKEN TO INSTALL SERVICE EQUIPMENT IN A MANNER ALLOWING THE SERVICE LATERAL CONDUIT RISER TO EXIT THE GROUND AND RUN STRAIGHT UP INTO THE TERMINATING ENCLOSURE EXCEPT WHERE PRE-EXISTING FIELD CONDITIONS EXIST.



**INSTALLATION:**

- ① THIS STANDARD APPLIES TO 2-INCH, 3-INCH AND 4-INCH CONDUIT SIZES ONLY.
- ② ONLY MANUFACTURER'S RECOGNIZED FIELD CONDUIT HEATING EQUIPMENT SHALL BE USED. DEGRADATION OF THE CONDUIT'S SHAPE, WRINKLES, DISCOLORATION, BURN MARKS, OR PAINT IS NOT ALLOWED. SDG&E'S INSPECTOR WILL DETERMINE IF THE HEATED CONDUIT IS ACCEPTABLE.
- ③ 45 DEGREES MAXIMUM ALLOWABLE DEFLECTION ON RISER. THE DEFLECTION IN RISER IS INCLUDED IN THE MAXIMUM 270 DEGREE TOTAL DEFLECTION IN THE SERVICE LATERAL CONDUIT RUN. REFER TO STANDARD 305.1, INSTALLATION NOTE B. FOR ADDITIONAL INFORMATION.
- ④ WHEN CONVERTING AN EXISTING SERVICE TO UNDERGROUND, MANDREL NEW CONDUIT TO THE TOP OF THE ELBOW EXTENDING TO GRADE PRIOR TO CONNECTING THE RISER CONDUIT. ALLOW ENOUGH PULL ROPE TO EXTEND THROUGH RISER, WITH A MINIMUM 12-INCH TAIL TO BE LEFT IN THE TERMINATING ENCLOSURE.
- ⑤ NEW SERVICES REQUIRE MANDRELING OF ALL NEW CONDUIT, INCLUDING THE CONDUIT RISER.

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| REVISION              | SDG&E ELECTRIC STANDARDS               |                    |          |                     |
| DATE 12-21-02         | FIELD HEATING SERVICE LATERAL CONDUITS |                    |          |                     |
| APPD <i>SM/AFB</i>    | 3950                                   |                    |          |                     |



**SCOPE:** THIS STANDARD COVERS THE ELEVATION OF CUSTOMER PRIMARY AND SECONDARY SERVICE LATERALS WHEN THEY ARE LOWER THAN THAT OF THE SDG&E FACILITY THAT SERVES THEM AND **PREVENTING WATER ENTRY, OPTIONS ARE LISTED BELOW:**

**RESIDENTIAL AND LIGHT COMMERCIAL:** WHEN THE ELEVATION OF THE SDG&E FACILITY SERVING THE CUSTOMER PANEL IS GREATER THAN 10 FEET ABOVE, AN ADDITIONAL SECONDARY HAND HOLE SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE CUSTOMER PANEL AND THE SERVICE LATERAL TO THE CUSTOMER PANEL IS TO BE SEALED. THIS WILL PREVENT WATER ENTRY DUE TO WATER HEAD PRESSURE IN THE CONDUIT CREATED BY THE ELEVATION OF THE HIGHER FACILITY. SEE STANDARD 3605.1 IN THE UNDERGROUND CONSTRUCTION STANDARDS FOR CORRECT BOX SIZE. SEE FIGURE 1. STD. PAGE 3960.1.

**EXTERIOR WALL FLUSH, SEMIFLUSH OR SURFACE MOUNTED SERVICE EQUIPMENT:** WHEN THE ELEVATION CHANGE IS GREATER THAN 10 FEET AND WATER ENTRY IS AN ISSUE A SAFETY OVER FLOW FITTING MAY BE INSTALLED IN THE CUSTOMER RISER BELOW THE PANEL. SEE STANDARD 304 IN THE SERVICE STANDARDS & GUIDE MANUAL FOR INSTALLATION INSTRUCTIONS.

**NOTE:** THIS INSTALLATION IS FOR EXTERIOR WALL MOUNTED PANEL USE ONLY. IT IS THE INSTALLER'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE STATE AND LOCAL ELECTRICAL CODES. SEE FIGURE 2. STD. PAGE 3960.1.

**LARGER THREE-PHASE CUSTOMERS USING CABLE:** WHEN THE ELEVATION CHANGE IS GREATER THAN 10 FEET OR THE PANEL IS LOCATED IN THE CUSTOMER SUB-STRUCTURE, A SECONDARY OUTDOOR PULL SECTION OR TERMINATOR MAY BE LOCATED NEXT TO THE POINT OF ELEVATION TRANSITION TO PREVENT WATER ENTRY. SEE FIGURE 3. STD. PAGE 3960.1.

**TRANSFORMER WITH BUS DUCT:** IF THE TRANSFORMER IS WITHIN 3 FEET OF THE BUILDING STRUCTURE, USE WEATHER PROOF BUS DUCT TO MAKE A TRANSITION THROUGH THE WALL AND DOWN IN TO THE SUB-STRUCTURE TO PREVENT WATER ENTRY. SEE FIGURE 4. STD. PAGE 3690.1.

TO PREVENT WATER ENTRY, WHEN THE CONDUIT IS INSTALLED ALL JOINTS SHALL BE FULLY GLUED 360 DEGREES FOR STRENGTH AND A WATER TIGHT SEAL. CONDUITS SHALL BE PROTECTED DURING BACK FILLING WITH SOIL TO PREVENT ROCK DAMAGE, CRUSHING/COMPRESSING, CRACKING, KINKING OR PULLING OUT OF THE FORMS AND STRUCTURES. CEMENT SLURRY CONDUITS SHALL HAVE DUCT SEPARATORS AND BE SECURED IN THE TRENCH TO PREVENT THE CONDUIT PACKAGE FROM FLOATING DURING THE BACK FILL PROCESS THAT CAN DAMAGE THE CONDUIT AND CREATE POTENTIAL FUTURE LEAKS.

WHEN THE WATER TABLE RISES, WE KNOW WATER WILL MIGRATE IN TRENCHES AND DISTURBED SOIL. LARGE BUILDINGS WITH SURROUNDING DISTURBED SOIL WILL ALLOW WATER TO ACCUMULATE AROUND THE SUB-STRUCTURE AND ANY COLD/CASTING JOINT, CRACKS, SAW CUTS, OR PVC CONDUIT TRANSITIONS THROUGH CEMENT, WILL CAUSE LEAKS. SEE STD. PAGE 3960.2.

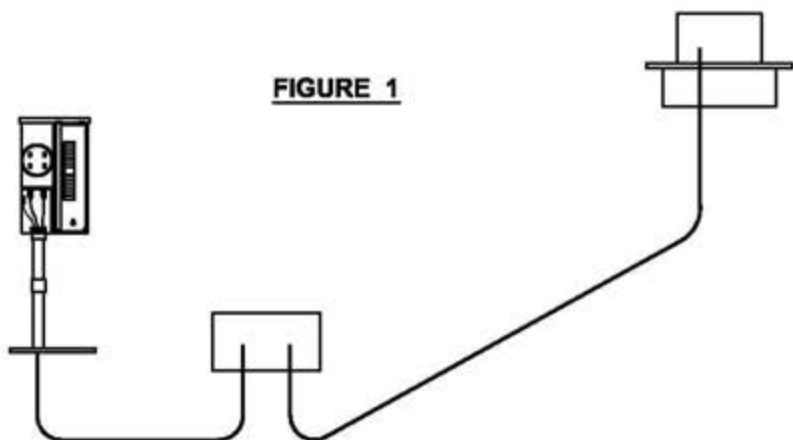
UNOCCUPIED CONDUITS TRANSITIONING FROM ONE SUB-STRUCTURE TO ANOTHER MAY BE PLUGGED AT BOTH ENDS WITH EXPANDABLE DUCT PLUGS. CONDUITS WITH CONDUCTORS CAN USE THE TYCO SEALING SYSTEM, APPLICATION AND INSTALLATION INSTRUCTIONS ARE LOCATED ON STANDARDS PAGE 3948.3,4.

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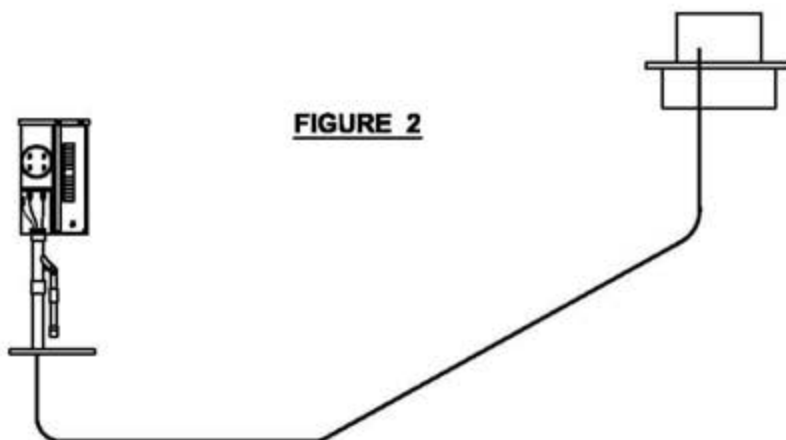
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| REVISION     |  | SDG&E ELECTRIC STANDARDS              |                    |                      | 3960                |
| DATE 3-30-07 |  | ELEVATION OF CUSTOMER FACILITIES      |                    |                      |                     |
| APPD TR /JDJ |  | PREVENTING WATER ENTRY                |                    |                      |                     |



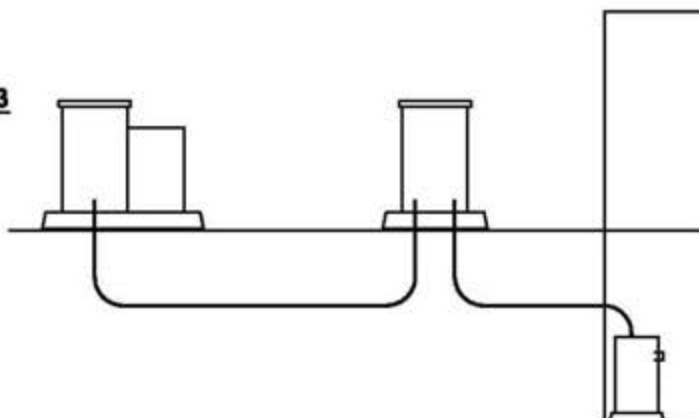
**FIGURE 1**



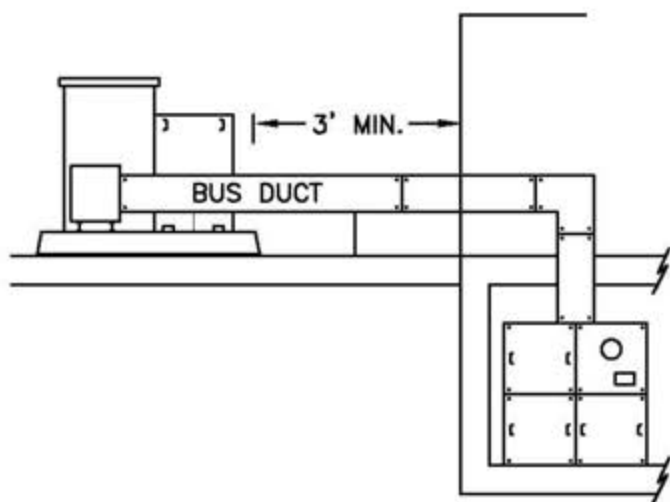
**FIGURE 2**



**FIGURE 3**



**FIGURE 4**



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3960.1

SDG&E ELECTRIC STANDARDS

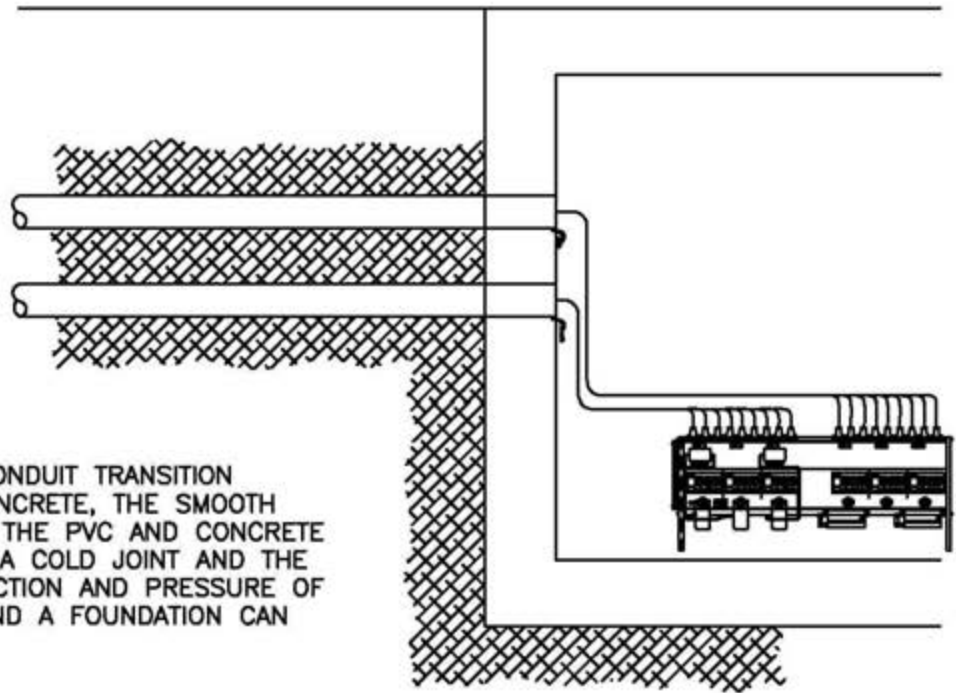
ELEVATION OF CUSTOMER FACILITIES  
PREVENTING WATER ENTRY

REVISION

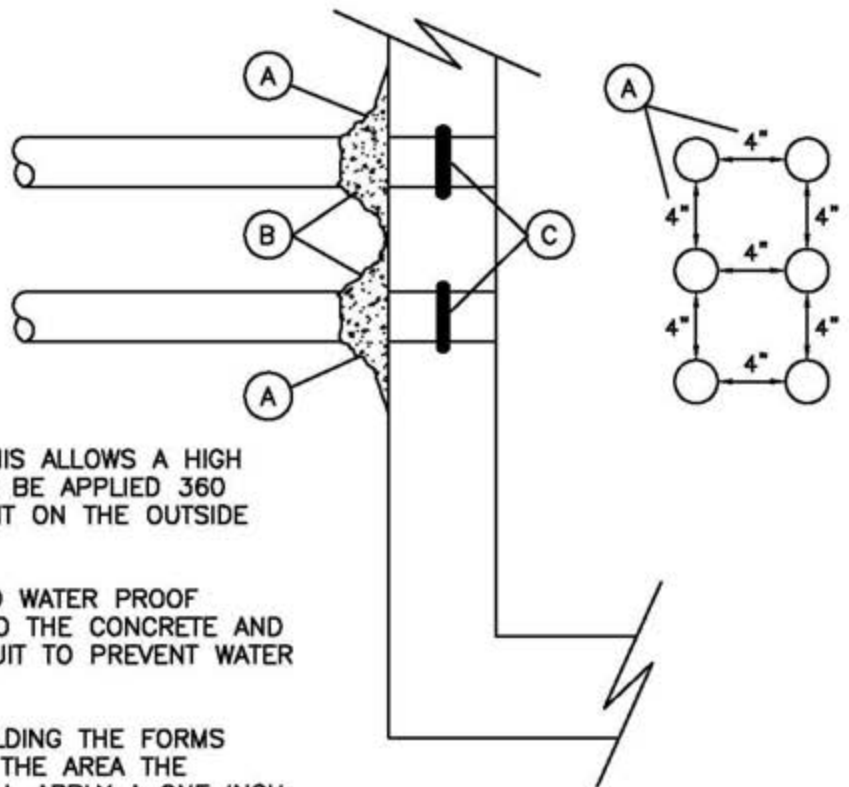
DATE 3-30-07

APPD TR /JDJ





**NOTE:** WHEN PVC CONDUIT TRANSITION THROUGH CONCRETE, THE SMOOTH SURFACE OF THE PVC AND CONCRETE CAN CREATE A COLD JOINT AND THE HYDRAULIC ACTION AND PRESSURE OF WATER AROUND A FOUNDATION CAN LEAK.



- (A) NOTE CONDUIT SEPARATION, THIS ALLOWS A HIGH QUALITY POLYMER SEALANT TO BE APPLIED 360 DEGREES AROUND THE CONDUIT ON THE OUTSIDE OF THE FOUNDATION.
- (B) AFTER THE CONDUIT IS SEALED WATER PROOF MASTIC SEALANT IS APPLIED TO THE CONCRETE AND THE AREA AROUND THE CONDUIT TO PREVENT WATER ENTRY.
- (C) DURING THE PROCESS OF BUILDING THE FORMS FOR THE FOUNDATION, INSIDE THE AREA THE CONDUIT TRANSITIONS THROUGH, APPLY A ONE INCH THICK AND ONE INCH WIDE LAYER OF SEALANT MASTIC AROUND THE CONDUIT IN THE CENTER OF THE FORM BEFORE THE CONCRETE IS POURED.

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| REVISION     | SDG&E ELECTRIC STANDARDS                                      |   |  |  |
| DATE 3-30-07 | ELEVATION OF CUSTOMER FACILITIES                              |   |  |  |
| APPD TR /JDJ | PREVENTING WATER ENTRY  |   |  |  |
|              |   |   |  | 3960.2                                       |







4000 - CABLES



4000 - CABLES



PAGE(S)

SUBJECT

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| 4002.2          | 600 VOLT COPPER CABLE SIZES                            |
| 4002.3          | 12KV CABLE SIZES                                       |
| 4003.1 - 4003.6 | CABLE PULLING TENSIONS, PRIMARY AND SECONDARY          |
| 4003.7          | CABLE PULLING GRIPS, PRIMARY AND SECONDARY             |
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |        |
|                 | CABLES<br>TABLE OF CONTENTS                       |                           |                    |          |                     |        |







**SCOPE:** THIS STANDARD LISTS LOW VOLTAGE CABLES.

## 600 VOLT ALUMINUM CROSS-LINKED POLYETHYLENE

| WIRE SIZE                    | CONDUIT<br>MIN SIZE  | REEL<br>FOOTAGE | REEL<br>CODE<br>(FD IT DD) | REEL<br>MAT'L | STOCK<br>NUMBER | U-NUMBER<br>REFERENCE | SECONDARY<br>WORK |        | SERVICE WORK      |          |
|------------------------------|----------------------|-----------------|----------------------------|---------------|-----------------|-----------------------|-------------------|--------|-------------------|----------|
|                              |                      |                 |                            |               |                 |                       | ASSEMBLY<br>UNITS | SAP CU | ASSEMBLY<br>UNITS | SAP CU   |
| 2-#8 (B)(F)(J)               | 1"<br>(POLYETHYLENE) | 2000            | 30 18 10                   | WOOD          | S196176         | U-10.011              | U/2-#8            | U/2-#8 | U/2-#8            | U/2#8SV  |
| 2-#2, 1-#4                   | 2"                   | 2000            | 35 28 18                   | COIL          | S197504         | U-10.02               | U1P-#2            | U1P-#2 | U1P-#2            | U1P#2SV  |
| 2-1/0, 1-#2                  | 2"                   | 2000            | 40 28 18                   | COIL          | S197472         | U-10.04               | U1P1/0            | U1P1/0 | U1P1/0            | U1P1/0SV |
| 2-3/0, 1-1/0                 | 2"                   | 1300            | 40 28 18                   | COIL          | S197536         | U-10.06               | U1P3/0            | U1P3/0 | U1P3/0            | U1P3/0SV |
| 3-3/0, 1-1/0                 | 3"                   | 2000            | 58 32 21                   | WOOD          | S197592         | U-10.06               | U3P3/0            | U3P3/0 | U3P3/0            | U3P3/0SV |
| 2-350KCMIL, 1-3/0            | 3"                   | 1200            | 58 32 24                   | WOOD          | S197568         | U10.08                | U1P350            | U1P350 | U1P350            | U10350SV |
| 3-350KCMIL, 1-3/0            | 3"                   | 1000            | 58 32 28                   | WOOD          | S197594         | U-10.082              | U3P350            | U3P350 | U3P350            | U3P350SV |
| 2-500KCMIL (A)<br>1-350KCMIL | 3"                   | 2000            | 84 45 42                   | STEEL         | S197450         | U-10.09               | U1P500            | U1P500 | U1P500            | U1P500   |
| 3-500KCMIL<br>1-350KCMIL     | 4"                   | 2000            | 84 45 42                   | STEEL         | S197596         | U-10.092              | U3P500            | U3P500 | U3P500            | U3P500SV |
| 3-1000KCMIL<br>1-750KCMIL    | 5"                   | 1000            | 84 36 42                   | STEEL         | S197598         | U-10.095              | 3P1000            | 3P1000 | 3P1000            | 3P1000   |

### ABBREVIATION DEFINITIONS

KCMIL = THOUSAND CIRCULAR MILLS

REEL CODE: FD = FLANGE DIAMETER  
IT = INSIDE TRAVERSE WIDTH  
DD = DRUM DIAMETER

DIMENSIONS ARE IN INCHES

### INSTALLATION:

- (A.) 2-500 KCMIL AND 1-350 KCMIL REQUIRE 3-INCH CONDUIT MIN.
- (B.) 2-#8 WIRE USED FOR STREET LIGHTING SHALL BE INSTALLED IN 1-INCH POLYETHYLENE (PE) CONDUIT.  
2-#8 WIRE FROM A RISER POLE TO THE FIRST LOCATION SHALL BE INSTALLED IN 2-INCH CONDUIT.
- C. CABLE ENDS SHALL BE SEALED WITH SEALING COMPOUND AND VINYL PLASTIC TAPE TO PREVENT MOISTURE ENTRY.

### REFERENCE:

- D. SEE STANDARD 3373.2 FOR SDG&E CONDUIT AND CONDUIT FITTINGS.
- (F.) SEE STANDARD 3383 FOR SPLICING OR REPAIRING FLEXIBLE CONDUIT.
- G. SEE STANDARD 3942 FOR SERVICE LATERAL CONDUIT REQUIREMENTS.
- H. SEE OH PAGE 1404.2/UG PAGE 4204.2 FOR CABLE POLE CONDUIT REQUIREMENTS.
- I. SEE STANDARD 4003 FOR CABLE PULLING LIMITATIONS.
- (J.) SEE STANDARD 4204 FOR CABLE POLE RISER INSTALLATION.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | 600 VOLT CABLE SIZES                              |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD LISTS LOW VOLTAGE COPPER CABLES. THIS CABLE IS NOT TO BE USED NEW INSTALLATIONS OR WHEN A CUSTOMER INCREASES THEIR PANEL SIZE AND THE ALUMINUM CABLE REQUIRED TO SERVE THE PANEL WILL NOT FIT IN THE EXISTING CONDUIT. THE AVAILABILITY OF THIS CABLE DOES NOT ELIMINATE THE REQUIREMENT FOR A CONDUIT UPGRADE TO MEET THE REQUIREMENT OF THE NEW PANEL. THIS CABLE IS ONLY TO BE USED TO REPLACE EXISTING ALUMINUM CABLE IN SIDA CONDUITS WHEN LARGER ALUMINUM CABLE IS REQUIRED TO CORRECT SDG&E LOW VOLTAGE PROBLEMS AND THE LARGER CABLE WILL NOT FIT IN THE EXISTING CONDUITS.

### 600 VOLT COMPACT COPPER CROSS-LINKED POLYETHYLENE

| WIRE SIZE     | CONDUIT MIN SIZE | REEL FOOTAGE | REEL CODE (FD IT DD) | REEL MAT'L | WEIGHT LBS/1000 FT | STOCK NUMBER | AMPACITY | U-NUMBER REFERENCE | ASSEMBLY UNITS |
|---------------|------------------|--------------|----------------------|------------|--------------------|--------------|----------|--------------------|----------------|
| 2-1/0, 1-#2   | 1-1/4" SIDA      | 2000         | 45 28 21             | WOOD       | S870               | S197510      | 170 AMPS | --                 | TCU1/0         |
| 2-250, 1-#4/0 | 2" SIDA          | 1000         | 48 28 24             | WOOD       | S2240              | S197512      | 315 AMPS | --                 | TCU250         |

### ABBREVIATION DEFINITIONS

KCMIL = THOUSAND CIRCULAR MILLS

REEL CODE: FD = FLANGE DIAMETER  
IT = INSIDE TRAVERSE WIDTH  
DD = DRUM DIAMETER

DIMENSIONS ARE IN INCHES

### INSTALLATION:

- (A). CABLE ENDS SHALL BE SEALED WITH SEALING COMPOUND AND VINYL PLASTIC TAPE TO PREVENT MOISTURE ENTRY.

### REFERENCE:

- D. SEE STANDARD 3373.2 FOR SDG&E CONDUIT AND CONDUIT FITTINGS.  
(F). SEE STANDARD 3383 FOR SPLICING OR REPAIRING FLEXIBLE CONDUIT.  
G. SEE STANDARD 3942 FOR SERVICE LATERAL CONDUIT REQUIREMENTS.  
I. SEE STANDARD 4204 FOR CABLE POLE RISER INSTALLATION.

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2 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600 VOLT CABLE SIZES

UG4002.2



**SCOPE:** THIS STANDARD LISTS HIGH VOLTAGE CABLES.

| ALUMINUM                             |                  |                   |                         |            |              |                |                    |  |
|--------------------------------------|------------------|-------------------|-------------------------|------------|--------------|----------------|--------------------|--|
| WIRE SIZE                            | CONDUIT MIN SIZE | REEL FOOTAGE      | REEL CODE<br>(FD IT DD) | REEL MAT'L | STOCK NUMBER | ASSEMBLY UNITS | U-NUMBER REFERENCE |  |
| 1/C #2 SOL TRXLPECN-PEJ              | 2"               | 4300'             | 58 32 28                | WOOD       | S197600      | PJN1#2         | U-12.041           |  |
| 2-1/C #2 SOL TRXLPECN-PEJ            | 3"               | 2150'             | 58 32 28                | WOOD       | S197602      | PJN2#2         | U-12.042           |  |
| 3-1/C #2 SOL TRXLPECN-PEJ (C)        | 4"               | 2000'             | 84 45 42                | STEEL      | S197622      | PJN3/2         | U-12.043           |  |
| 3-1/C #2/0 STR TRXLPECN-PEJ (C)      | 4"               | 2000'             | 84 45 42                | STEEL      | S197606      | PJN2/0         | U-12.061           |  |
| 3-1/C 350 KCMIL STR TRXLPECN-PEJ (B) | 5"               | (A) 600'<br>1200" | 90 45 42                | STEEL      | S197608      | PJN350         | U-12.08            |  |
| 3-1/C 750 KCMIL COMP EPR-PEJ         | 4"               | 1200"             | 96 45 42                | STEEL      | S195010      | CPJ750         | U13.1              |  |
| 3-1/C 1000 KCMIL STR TRXLPECN-PEJ    | 5"               | (A) 600'<br>1100' | 96 60 42                | STEEL      | S197618      | PJ1000         | U-12.096           |  |
| COPPER                               |                  |                   |                         |            |              |                |                    |  |
| WIRE SIZE                            | CONDUIT MIN SIZE | REEL FOOTAGE      | REEL CODE<br>(FD IT DD) | REEL MAT'L | STOCK NUMBER | ASSEMBLY UNITS | U-NUMBER REFERENCE |  |
| 3-1/C 750 KCMIL COMP EPR-PEJ         | 4"               | 1100'             | 96 45 42                | STEEL      | S195028      | CPC750         | U-13.2             |  |
| 3-1/C 1000 KCMIL STR TRXLPECN-PEJ    | 5"               | 780'              | 96 60 42                | STEEL      | S197610      | 1000CU         | U-13.5             |  |
| BARE COPPER                          |                  |                   |                         |            |              |                |                    |  |
| WIRE SIZE                            | FT. PER LB.      |                   | WT/LBS. PER 1000 FT.    |            | STOCK NUMBER | ASSEMBLY UNITS | U/M                |  |
| #2, 7 STR SOFT DRAWN                 | 4.7'             |                   | 212                     |            | S812816      | GDWIRE         | LB.                |  |
| 1/0 STR SOFT DRAWN                   | 3.0'             |                   | 333                     |            | S812852      | --             | LB.                |  |
| 4/0 STR SOFT DRAWN                   | 1.0'             |                   | 1000                    |            | S812764      | --             | LB.                |  |

## ABBREVIATION DEFINITIONS

1/C = ONE CONDUCTOR

3/C = THREE CONDUCTORS

PECN-PEJ = POLYETHYLENE INSULATION, CONCENTRIC NEUTRAL, POLYETHYLENE JACKET

TRXLPECN-PEJ = TREE RETARDANT CROSSLINKED POLYETHYLENE INSULATION, CONCENTRIC NEUTRAL POLYETHYLENE JACKET

EPR-PEJ = ETHYLENE PROPYLENE RUBBER INSULATION, FLAT STRAP NEUTRAL, POLYETHYLENE JACKET

SOL = SOLID

STR = STRANDED

COMP = COMPACT STRANDED

KCMIL = THOUSAND CIRCULAR MILLS

U/M = UNIT OF MEASURE

REEL CODE: FD = FLANGE DIAMETER

IT = INSIDE TRAVERSE WIDTH

DD = DRUM DIAMETER

DIMENSIONS ARE IN INCHES

## INSTALLATION:

- (A). FOR SPECIAL PURCHASE ONLY.
- (B). MAY BE INSTALLED EXISTING 4 INCH CONDUITS (SEE STANDARD 3372).
- (C). MAY BE INSTALLED IN EXISTING 3 INCH CONDUITS (SEE STANDARD 3372). WHEN 2/0 CABLE IS PULLED INTO EXISTING 3 INCH CONDUITS. REMOVE THE CABLE JACKET WHERE THE CABLE PULLING GRIP IS INSTALLED (APPROX 3 FEET).
- (D). THESE CABLES TO BE INSTALLED THREE IN PARALLEL ONLY.

**REFERENCE:**

- G. SEE PAGE 4099.001 (FIELD MAINTENANCE ONLY) FOR CABLES NO LONGER PURCHASED.  
H. SEE STANDARD 4003 FOR CABLE PULLING LIMITATIONS.  
I. SEE STANDARD 4109 FOR CABLE END SEALS.

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|                 |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |      |            |                    |        |          |      |                     |      |          |
|                 |          | 12KV CABLE SIZES                                  |                           |      |            |                    |        |          |      |                     |      |          |



**SCOPE:** THIS STANDARD SHOWS MAXIMUM CABLE PULLINGS TENSIONS AND CONDUCTORS CHARACTERISTICS.

| MAXIMUM PULLING TENSIONS UNDERGROUND ELECTRICAL CABLES |            |                   |                 |                       |                        |         |                                     |
|--|------------|-------------------|-----------------|-----------------------|------------------------|---------|-------------------------------------|
| CONDUCTOR SIZE<br>AWG/KCMIL                            | CABLE TYPE | CONDUCTOR<br>TYPE | STOCK<br>NUMBER | WT/LBS PER<br>1000 FT | MAX<br>TENSION/LBS (A) |         | AREA PHASE<br>CONDUCTOR<br>CIRC MIL |
|  |            |                   |                 |                       | GRIP                   | EYE (B) |                                     |
| PRIMARY CABLES   |            |                   |                 |                       |                        |         |                                     |
| 1/C #2 SOL   | XLPECN-PEJ | AL                | S197600         | 440                   | 530                    | --      | 66,360                              |
| 2 - 1/C #2 SOL   | XLPECN-PEJ |                   | S197602         | 880                   | 1000                   | --      | 66,360                              |
| 3 - 1/C #2 SOL   | XLPECN-PEJ |                   | S197622         | 1320                  | 1000                   | --      | 66,360                              |
| 3 - 1/C 2/0  | XLPECN-PEJ |                   | S197606         | 1670                  | 1000                   | --      | 133,100                             |
| 3 - 1/C 350  | XLPECN-PEJ |                   | S197608         | 3335                  | 1000                   | 5600    | 350,000                             |
| 3 - 1/C 750 COMP                                       | EPR-PEJ    |                   | S195010         | 4600                  | 1000                   | 7000    | 750,000                             |
| 1/C 1000   | XLPECN-PEJ |                   | S197628         | 2140                  | --                     | 7000    | 1,000,000                           |
| 3 - 1/C 1000   | XLPECN-PEJ |                   | S197618         | 7320                  | 1000                   | 7000    | 1,000,000                           |
| 3 - 1/C 750 COMP                                       | EPR-PEJ    | CU                | S195028         | 9640                  | 1000                   | 7000    | 750,000                             |
| 3 - 1/C 1000   | XLPECN-PEJ | CU                | S197610         | 13,600                | 1000                   | 7000    | 1,000,000                           |
| SECONDARY CABLES                                       |            |                   |                 |                       |                        |         |                                     |
| 2 - #8   | XLPE       | AL                | S196176         | 69                    | 364                    | --      | 16,510                              |
| 2 - #2 & 1 - #4  | XLPE       |                   | S197504         | 256                   | 1000                   | --      | 66,360                              |
| 2 - 1/0 & 1 - #2                                       | XLPE       |                   | S197472         | 395                   | 1000                   | --      | 105,600                             |
| 2 - 3/0 & 1 - 1/0                                      | XLPE       |                   | S197536         | 588                   | 1000                   | --      | 167,800                             |
| 3 - 3/0 & 1 / 1/0                                      | XLPE       |                   | S197592         | 810                   | 1000                   | --      | 167,800                             |
| 2 - 350 & 1 - 3/0                                      | XLPE       |                   | S197568         | 1090                  | 1000                   | --      | 350,000                             |
| 3 - 350 & 1 - 3/0                                      | XLPE       |                   | S197594         | 1520                  | 1000                   | --      | 350,000                             |
| 2 - 500 & 1 - 350                                      | XLPE       |                   | S197450         | 1621                  | 1000                   | --      | 500,000                             |
| 3 - 500 & 1 - 350                                      | XLPE       |                   | S197596         | 2215                  | 1000                   | --      | 500,000                             |
| 3 - 1000 & 1 - 750                                     | XLPE       |                   | S197598         | 4300                  | 1000                   | --      | 1,000,000                           |
| 2 - 1/0 & 1 - #2                                       | XLPE       | CU                | S197510         | 870                   | 1000                   | --      | 105,600                             |
| 2 - 250 & 1 - 4/0                                      | XLPE       | CU                | S197512         | 2240                  | 1000                   | --      | 250,000                             |

**INSTALLATION:**

- (A) WHEN CALCULATING PULLING TENSION, DO NOT EXCEED MAXIMUM TENSION LIMITS.
- (B) CABLE PULLING EYES ARE ONLY AVAILABLE FOR 350, 750, AND 1000 KCMIL ALUMINUM (XLPE-PEJ) AND 750 AND 1000 KCMIL COPPER (XLPE-PEJ) PRIMARY CABLES. ALL OTHER CABLES SHALL BE LIMITED TO GRIP TENSION SPECIFIED.
- C THE MAXIMUM PULLING TENSION OF THE PULLING EQUIPMENT IS 7000 LBS.
- D SINGLE CONDUCTOR 1000 KCMIL AL CABLES ARE TO BE INSTALLED THREE IN PARALLEL ONLY USING NON-CRIMP PULLING EYES AND WIRE BRIDLE.
- E MAXIMUM COMBINED WORKING LOAD FOR WIRE BRIDLE FOR ATTACHING THREE-PHASE SINGLE CONDUCTOR PULLING EYES IS 9000 LBS.

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**1 OF 8**

SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE PULLING TENSIONS, PRIMARY AND SECONDARY

UG4003.1



**SCOPE:** THIS STANDARD DESCRIBES THE METHOD TO BE USED WHEN CALCULATING PRIMARY CABLE PULLING TENSIONS USING A SET OF FORMULAS MANUALLY.

**FOR ALL CALCULATIONS, A COEFFICIENT OF FRICTION SHOULD BE .70 AND THE USE OF CABLE PULLING LUBRICANT IS REQUIRED FOR JACKETED CABLE.**

### CABLE PULLING TENSIONS

CABLE PULLING TENSION IS THE FORCE REQUIRED (IN POUNDS) TO PULL A CABLE THROUGH A CONDUIT. A MAXIMUM CABLE TENSIONS HAVE BEEN SET TO PROTECT THE CABLE FROM DAMAGE DUE TO EXCESSIVE PULLING FORCE.

1. CABLE SIDEWALL PRESSURE - SWBP IS THE PRESSURE EXERTED BY THE CABLE ON THE SIDEWALL OF THE CONDUIT WHEN GOING THROUGH ITS BENDS. THIS PRESSURE IS CAUSED BY THE TENSION AND WEIGHT OF THE CABLE WHICH TENDS TO FORCE IT AGAINST THE CONDUIT WALL. THIS SWBP CAN BE ESTIMATED USING THE TENSION IN CABLE AT BEND EXIT, DIVIDED BY THE INSIDE RADIUS OF BEND (FT).

THE NOMINAL (CENTERLINE) RADIUS OF THE BEND MAY BE USED TO CALCULATE SIDEWALL BEARING PRESSURE.

MAXIMUM ALLOWABLE SIDEWALL BEARING PRESSURE:

|   |             |
|---|-------------|
| CONCRETE ENCASED CONDUITS, JACKETED CABLE   | 1250 LBS/FT |
| CONCRETE ENCASED CONDUITS, UNJACKETED CABLE | 750 LBS/FT  |
| DIRECT BURIED CONDUITS                      | 300 LBS/FT  |

2. MAXIMUM PULLING TENSIONS WHEN PULLING CABLES USE CASKET GRIP: (SEE PG. UG4003.1)

3. MAXIMUM PULLING TENSIONS WHEN PULLING CABLES USING PULLING EYE: (SEE PG. UG4003.1)

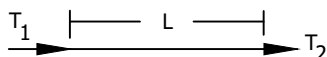
### PULLING TENSION CALCULATIONS

THE INTENT OF THE FOLLOWING EQUATIONS IS TO HELP YOU TO DETERMINE TENSIONS FOR A TYPICAL CABLE INSTALLATION. IN ORDER TO USE THESE FORMULAS, THE CABLE PULL SHOULD BE DIVIDED INTO SPECIFIC SECTIONS. PLEASE TAKE NOTE THAT THE TENSION OBTAINED WHEN PULLING IN ONE DIRECTION OFTEN DIFFERS FROM THE TENSION OBTAINED WHEN PULLING IN THE OPPOSITE DIRECTION, THIS IS DUE TO THE SLOPE OF THE PULL AND THE LOCATION OF THE BENDS.

#### STRAIGHT SECTIONS

CASE 1: HORIZONTAL

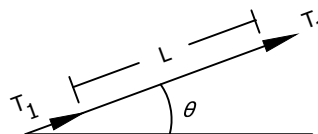
$$T_2 = T_1 + L W C$$



CASE 2: INCLINE UPWARD

$$T_2 = T_1 + L W [ \sin \theta + \cos \theta ]$$

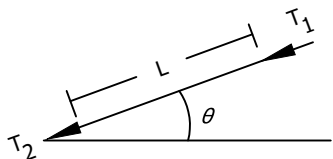
NOTE: ANGLE  $\theta$  (IN DEGREES MEASURED FOR THE HORIZONTAL AXIS.



CASE 3: INCLINE DOWNWARD

$$T_2 = T_1 + L W [ \sin \theta - \cos \theta ]$$

NOTE: ANGLE  $\theta$  (IN DEGREES MEASURED FOR THE HORIZONTAL AXIS.

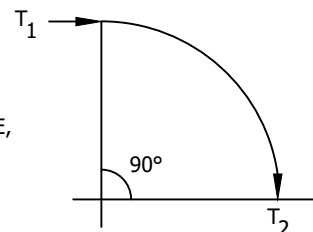


#### CURVE SECTIONS

$$T_{OUT} = T_{IN} K,$$

WHERE THE VALUE OF K (THE CURVE CONSTANT) IS DETERMINED BY THE ANGLE, IN DEGREES, OF THE CURVE SECTION.

E.G.  $T_2 = T_1 K$



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE PULLING TENSIONS, PRIMARY AND SECONDARY

UG4003.2



THE COMPLETE PULLING EQUATIONS ARE MORE COMPLEX THAN THOSE ON PG. 4003.2 AND INCLUDE WEIGHT CORRECTION FACTORS FOR STRAIGHT AND INCLINED PULLS, USE OF THESE EQUATIONS IS TOO TIME CONSUMING FOR EVERY PULL. IF MORE COMPLEX CALCULATION IS NEEDED, USE THE INTELICADD PROGRAM FOR CABLE PULLING. THIS PROGRAM MAKES FAST AND CONVENIENT CALCULATIONS ON A PC.

## LEGEND

|          |   |
|----------|---|
| T        | PULLING TENSION AT A POINT 'X'<br>( T = TENSION AT POINT NUMBER 1 )   |
| L        | LENGTH OF STRAIGHT SECTION 'X'<br>( L = LENGTH OF STRAIGHT SECTION NUMBER 1 )   |
| W        | WEIGHT OF CABLE IN LBS PER FOOT (LBS/FT)<br>UG4003.1 LISTS CABLE WEIGHT IN LBS/1000 FT<br>TO FIND LBS/FT DIVIDE BY 1000, E.G.<br>$W ( 1/C \#2 \text{ SOL XLPECN-PEJ AL } ) = \frac{440}{1000} = .44 \text{ (LBS/FT)}$ |
| C        | .70 ( COEFFICIENT OF FRICTION )   |
| $\theta$ | GREEK ALPHABET LETTER USED TO IDENTIFY OR NAME AN<br>ANGLE. PRONOUNCED 'THETA'.   |
| K        | CURVE CONSTANT  |
| SIN      | ABBREVIATION FOR SINE, A TRIGONOMETRY RATIO RELATED TO<br>ANGLES. ( $\sin \theta$ = SINE OF THE ANGLE THETA )   |
| COS      | ABBREVIATION FOR COSINE, A TRIGONOMETRY RATIO RELATED<br>TO ANGLES. ( $\cos \theta$ = COSINE OF THE ANGLE THETA )   |

### CURVE CONSTANTS TABLE

| ANGLE $\theta$ | SIN $\theta$ | COS $\theta$ |
|----------------|--------------|--------------|
| 2°             | .035         | .999         |
| 3°             | .052         | .999         |
| 4°             | .070         | .998         |
| 5°             | .087         | .996         |
| 6°             | .105         | .995         |
| 7°             | .129         | .993         |
| 8°             | .139         | .990         |
| 9°             | .156         | .988         |
| 10°            | .174         | .985         |
| 11°            | .191         | .982         |
| 12°            | .208         | .978         |
| 13°            | .225         | .974         |
| 14°            | .242         | .970         |
| 15°            | .259         | .966         |

### INITIAL TENSION

ASSUME 50 LBS REEL TENSION AT THE BEGINNING OF ALL PULLS.

I.E.

...BOTTOM OF FIRST ELBOW OF  
PAD-MOUNT EQUIPMENT

## ...FEED-IN POINT OF SUBSTRUCTURES

## INSTALLATION:

- |    |   |        |      |
|----|---|--------|------|
| A. | DO NOT EXCEED MAXIMUM LIMITS FOR PULLING EYE OR GRIP, OR SIDEWALL PRESSURE WHEN CALCULATING PULLING TENSION. (SEE PG. UG4003.1) | 67.5°  | 1.34 |
| B. | SIDEWALL PRESSURE IS CALCULATED AT THE EXIT OF THE BEND.  | 78.75° | 1.41 |
| C. | TO OBTAIN LOWEST TENSION, USE AS FEW CURVED SECTIONS AS POSSIBLE WITH MAXIMUM POSSIBLE RADIUS OF CURVATURE.                     | 90°    | 1.48 |
- D. PULLING TENSIONS SHALL BE CALCULATED FOR PULLING FROM EACH END OF THE CONDUIT RUN. THE CUSTOMER PROJECT PLANNER SHALL SPECIFY THE DIRECTION OF PULL, NOT TO EXCEED THE CABLE OR CONDUIT LIMITS. THE DIRECTION USUALLY RESULTING IN THE MINIMUM TENSION IS WHEN FEED-IN END IS NEAREST THE CURED SECTIONS.
- ASSUME CABLE WILL BE PULLED UP THE CABLE POLE WHEN CONDUIT RISER IS USED.**
- E. FOR PRIMARY OR SECONDARY CABLE WHERE PULLING TENSIONS ARE CALCULATED FOR BOTH DIRECTIONS. OCCASIONALLY THE CALCULATIONS FROM ONE DIRECTION APPLIES TO A PARTICULAR SITUATION WHILE THE OTHER DIRECTION CALCS ARE TOO STRINGENT. WHEN THIS HAPPENS, THE DIRECTION WITH THE LOWEST TENSION WOULD APPLY AND MUST BE NOTED ON THE JOB PRINT. CARE SHOULD BE TAKEN TO ENSURE NO OBSTACLES EXIST FOR PULLING IN THIS DIRECTION. NOTE VEHICLE ACCESS, WALLS, TRAFFIC, ETC.

### CURVE CONSTANTS TABLE

| ANGLE IN DEGREES | K VALUE |
|------------------|---------|
| 11.25°           | 1.05    |
| 22.5°            | 1.10    |
| 33.75°           | 1.16    |
| 45°              | 1.22    |
| 56.25°           | 1.28    |
| 67.5°            | 1.34    |
| 78.75°           | 1.41    |
| 90°              | 1.48    |

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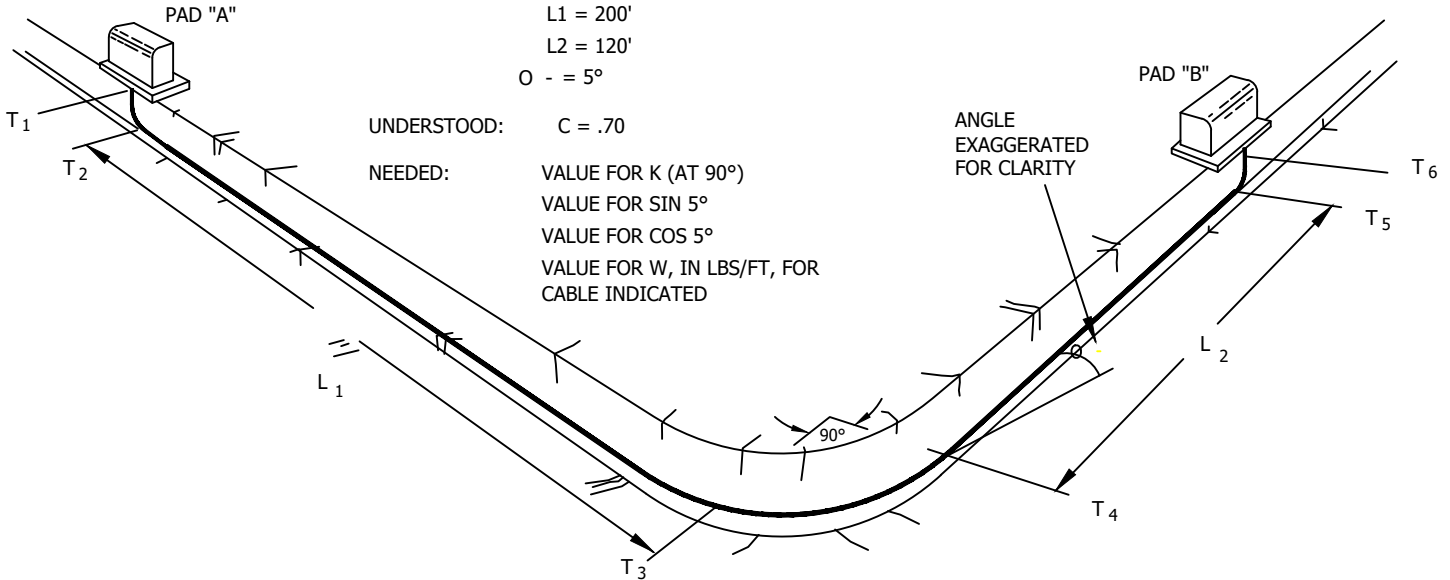
## CABLE PULLING TENSIONS, PRIMARY AND SECONDARY

# UG4003.3



# SAMPLE CALCULATION TO DETERMINE PULLING TENSION AND DIRECTION OF FEED

GIVEN: 1/C #2 SOL AL (XPLECN-PEJ) CABLE  
1DB2" CONDUIT  
90° = ANGULAR CHANGE IN DIRECTION BETWEEN T3 & T4  
L1 = 200'  
L2 = 120'  
O - = 5°



UNDERSTOOD: C = .70  
NEEDED: VALUE FOR K (AT 90°)  
VALUE FOR SIN 5°  
VALUE FOR COS 5°  
VALUE FOR W, IN LBS/FT, FOR CABLE INDICATED

## FEED CABLE FROM PAD "A"

$$\begin{aligned} T_2 &= 50, \text{ ASSUMES 50 LBS REEL TENSION} \\ T_3 &= T_2 + L_1 W C = 50 + (200 \times .44 \times .70) \\ &= 50 + 61.6 \\ T_3 &= 111.6 \\ T_4 &= T_3 K (\text{FOR } 90^\circ) = 111.6 \times 1.48 = 165.17 \\ T_5 &= T_4 + L_2 W [\sin O - + C \cos O -] = 165.17 + (120 \times .44 [ .087 + (.70 \times .996)]) \\ &= 165.17 + ( 52.8 [ .087 + .697 ]) \\ &= 165.17 + ( 52.8 [ .784 ]) \\ &= 165.17 + ( 52.8 \times .784 ) \\ &= 165.17 + 41.39 \\ T_5 &= 206.6 \\ T_6 &= T_5 K (\text{FOR } 90^\circ) = 206.6 \times 1.48 = 305.7 \\ T_{\text{TOTAL}} &= T_6 = 306 \text{ LBS} \end{aligned}$$

## FEED CABLE FROM PAD "B"

$$\begin{aligned} T_5 &= 50, \text{ ASSUMES 50 LBS REEL TENSION} \\ T_4 &= T_5 - L_2 W [\sin O - - C \cos O -] = 50 - ( 120 \times .44 [ .87 - (.70 \times .996)]) \\ &= 50 - ( 52.8 [ .087 - (.697 )]) \\ &= 50 - ( 52.8 [ -.610 ]) \\ &= 50 - ( 52.8 \times -.610 ) \\ &= 50 - ( - 32.208 ) \\ &= 50 + 32.208 \\ T_4 &= 82.208 = 82.21 \\ T_3 &= T_4 K = 82.21 \times 1.48 = 121.67 \\ T_2 &= T_3 + L_1 W C = 121.67 + (200 \times .44 \times .70) \\ &= 121.67 + 61.6 \\ T_2 &= 183.27 \\ T_1 &= T_2 K = 183.27 \times 1.48 = 271.2 \\ T_{\text{TOTAL}} &= T_1 = 271 \text{ LBS} \end{aligned}$$

RESULTS: TENSION IS WITHIN ACCEPTABLE LIMITS USING PULLING GRIP (OR EYE) AND PULLING FROM EITHER DIRECTION. SWBP AT ELBOWS IS ALSO WITHIN ACCEPTABLE LIMITS FOR DB2" CONDUIT.

CONCLUSION: OKAY TO MAKE THE PULL. SINCE TENSION PULLING FROM PAD "B" IS LOWER, THAT IS THE PREFERRED DIRECTION OF PULL.

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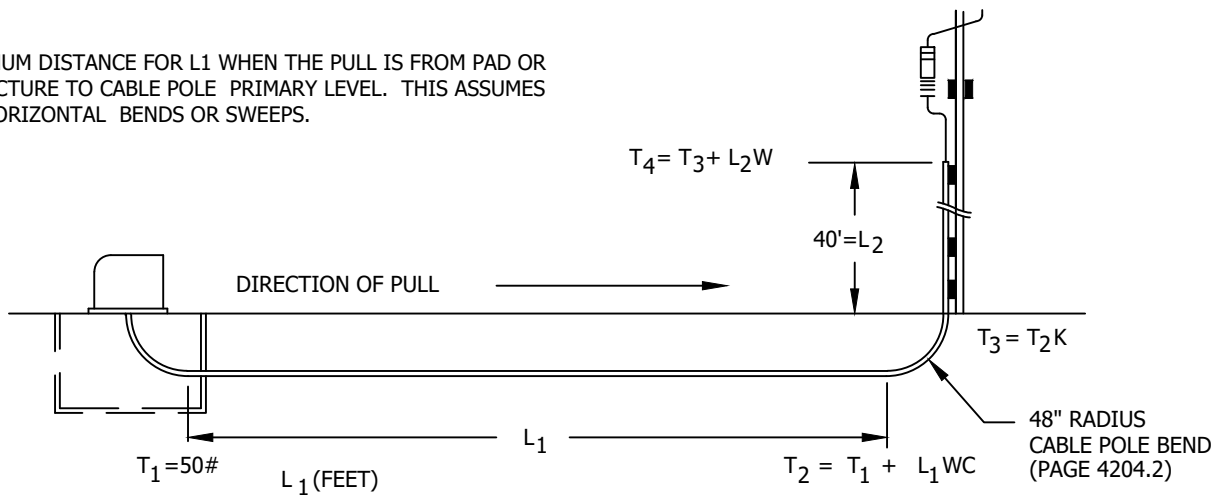
CABLE PULLING TENSIONS, PRIMARY AND SECONDARY

UG4003.4



EXAMPLE:

1. MAXIMUM DISTANCE FOR L1 WHEN THE PULL IS FROM PAD OR STRUCTURE TO CABLE POLE PRIMARY LEVEL. THIS ASSUMES NO HORIZONTAL BENDS OR SWEEPS.



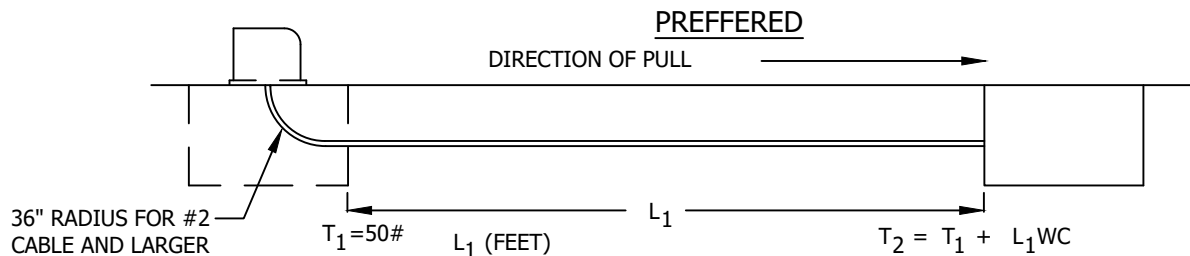
| SIZE OF CABLE                         | 3-1/C #2 SOL TRXLPECN-PEJ 197622 | 2/0 TRXLPECN-PEJ 197606 | 350 TRXLPECN-PEJ 197608 | 750 COMP EPR-PEJ 195010 | 750 COMP EPR-PEJ COPPER 195028 | 1000 TRXLPECN-PEJ 197618 | 1000 TRXLPECN-PEJ COPPER 197610 |
|---------------------------------------|----------------------------------|-------------------------|-------------------------|-------------------------|--------------------------------|--------------------------|---------------------------------|
| MAX DISTANCE USING GRIP (1000 LBS) *  | 639                              | 497                     | 229                     | 156                     | 50                             | 83                       | 25                              |
| MAX DISTANCE USING EYE (1200 LBS) **  | --                               | --                      | 287                     | 198                     | 110                            | 110                      | 75                              |
| MAX DISTANCE USING EYE (5000 LBS) *** | --                               | --                      | 808                     | 575                     | 250                            | 375                      | 180                             |

\* MAXIMUM ALLOWABLE PULLING TENSION OF THE GRIP THAT WILL NOT DAMAGE THE CABLE.

\*\* MAXIMUM SIDEWALL PRESSURE OF DB 4' RADIUS BEND (300 X 4=1200).

\*\*\* MAXIMUM SIDEWALL PRESSURE OF EB 4' RADIUS BEND (1250 X 4=5000).  $L_1$  LIMITED BY VERTICAL PULLING FORCE UP CABLE POLE

2. MAXIMUM DISTANCE FOR L1 WHEN THE PULL IS FROM STRUCTURE TO STRUCTURE OR PAD TO STRUCTURE. THIS ASSUMES NO HORIZONTAL BENDS OR SWEEPS.



| SIZE OF CABLE                        | 3-1/C #2 SOL TRXLPECN-PEJ 197622 | 2/0 TRXLPECN-PEJ 197606 | 350 TRXLPECN-PEJ 197608 | 750 COMP EPR-PEJ 195010 | 750 COMP EPR-PEJ COPPER 195028 | 1000 TRXLPECN-PEJ 197618 | 1000 TRXLPECN-PEJ COPPER 197610 |
|--------------------------------------|----------------------------------|-------------------------|-------------------------|-------------------------|--------------------------------|--------------------------|---------------------------------|
| MAX DISTANCE USING GRIP (1000 LBS) * | 1028                             | 813                     | 407                     | 295                     | 135                            | 185                      | 95                              |
| MAX DISTANCE USING EYE               | --                               | --                      | 1200**                  | 1200                    | 1020                           | 1200                     | 725                             |

\* MAXIMUM ALLOWABLE PULLING TENSION OF THE GRIP THAT WILL NOT DAMAGE THE CABLE

\*\* MAXIMUM ALLOWABLE PULLING TENSION IS 5600 LBS.

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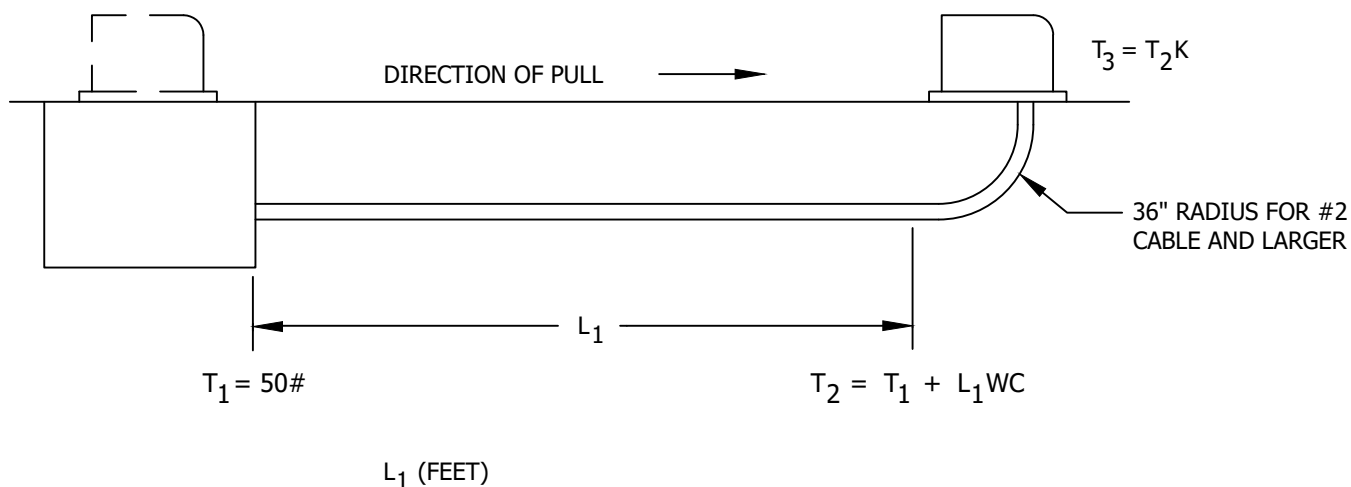
PRIMARY CABLE PULLING TENSIONS

UG4003.5



3. MAXIMUM DISTANCE FOR  $L_1$  WHEN THE PULL IS FROM STRUCTURE TO PAD, OR PAD TO PAD.  
THIS ASSUMES NO HORIZONTAL BENDS OR SWEEPS.  
NOTE: NOT PREFERRED DIRECTION, SEE EXAMPLE 2 FOR PREFERRED.

### ALTERNATE



| SIZE OF CABLE                         | 3-1/C #2 SOL TRXLPECN-PEJ 197622 | 2/0 TRXLPECN-PEJ 197606 | 350 TRXLPECN-PEJ 197608 | 750 COMP EPR-PEJ 195010 | 750 COMP EPR-PEJ COPPER 195028 | 1000 TRXLPECN-PEJ 197618 | 1000 TRXLPECN-PEJ COPPER 197610 |
|---------------------------------------|----------------------------------|-------------------------|-------------------------|-------------------------|--------------------------------|--------------------------|---------------------------------|
| MAX DISTANCE USING GRIP (900 LBS) *   | 604                              | 477                     | 239                     | 173                     | 80                             | 108                      | 55                              |
| MAX DISTANCE USING GRIP (1000 LBS) ** | 677                              | 535                     | 268                     | 194                     | 90                             | 122                      | 65                              |
| MAX DISTANCE USING EYE (3750 LBS) *** | --                               | --                      | 1060                    | 770                     | 360                            | 480                      | 260                             |

\* MAXIMUM SIDEWALL PRESSURE OF DB 3' RADIUS BEND ( 300 X 3 ) = 900.

\*\* MAXIMUM ALLOWABLE PULLING TENSION OF THE GRIP THAT WILL NOT DAMAGE THE CABLE.

\*\*\* MAXIMUM SIDEWALL PRESSURE OF EB 3' RADIUS BEND ( 1250 X 3 ) = 3750.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

PRIMARY CABLE PULLING TENSIONS

UG4003.6



**SCOPE:** THIS STANDARD LISTS PROPER CABLE PULLING GRIPS AND CABLE PULLING EYES TO BE USED FOR PULLING UNDERGROUND CABLE.



### CABLE PULLING GRIPS

|           | CABLE TYPE                       | U-NO. "REF." | GRIP RANGE      | GRIP STYLE | KELLUMS PART NUMBER | STOCK NUMBER |
|-----------|----------------------------------|--------------|-----------------|------------|---------------------|--------------|
| SECONDARY | 2 - #8                           | U10.011      | 1/2" - 5/8"     | SHORT      | 033-03-001          | 393370       |
|           | 2 - #2 & 1 - #4                  | U10.02       | 3/4" - 1"       | SHORT      | 033-03-003          | 393371       |
|           | 2 - 1/0 & 1 - #2                 | U10.04       | 1" - 1 1/4"     | SHORT      | 033-03-004          | 393372       |
|           | 2 - 3/0 & 1 - 1/0                | U10.06       | 1" - 1 1/4"     | SHORT      | 033-03-004          | 393372       |
|           | 2 - 3/0 & 1 - 1/0                | U10.062      | 1 1/4" - 1 1/2" | SHORT      | 033-03-005          | 393373       |
|           | 2 - 350KCMIL & 1 - 3/0           | U10.08       | 1 1/2" - 2"     | STD        | 003-03-024          | 393472       |
|           | 3 - 350KCMIL & 1 - 3/0           | U10.082      | 1 1/2" - 2"     | STD        | 033-03-024          | 393472       |
|           | 2 - 500KCMIL & 1 - 350KCMIL      | U10.092      | 2" - 2 1/2"     | STD        | 033-03-025          | 393504       |
|           | 3 - 1000KCMIL & 1 - 750KCMIL     | U10.095      | 3 1/2" - 4"     | STD        | 033-03-028          | 393552       |
| PRIMARY   | ALUMINUM                         |              |                 |            |                     |              |
|           | 1/C #2 SOL XLPECN-PEJ            | U12.041      | 3/4" - 1"       | SHORT      | 033-03-033          | 393371       |
|           | 2 - 1/C #2 SOL XLPECN-PEJ        | U12.042      | 3/4" - 1"       | STD        |                     |              |
|           | 3 - 1/C #2 SOL XLPECN-PEJ        | U12.043      | 2" - 2 1/2"     | STD        | 033-03-025          | 393504       |
|           | 3 - 1/C #2/0 STR XLPECN-PEJ      | U12.061      | 2" - 2 1/2"     | STD        | 033-03-025          | 393504       |
|           | 3 - 1/C 350KCMIL STR XLPECN-PEJ  | U12.08       | 2 1/2" - 3"     | STD        | 033-03-026          | 393536       |
|           | 3 - 1/C 750KCMIL STR EPR-PEJ     | U13.1        | 3 1/2" - 4"     | STD        | 033-03-028          | 393552       |
|           | 3 - 1/C 1000KCMIL STR XLPECN-PEJ | U12.096      | 3 1/2" - 4"     | STD        | 033-03-028          | 393552       |
|           | COPPER                           |              |                 |            |                     |              |
|           | 3 - 1/C 1000KCMIL STR XLPECN-PEJ | U13.5        | 3 1/2" - 4"     | STD        | 033-03-026          | 393552       |

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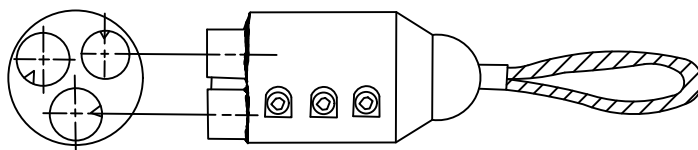
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE PULLING GRIPS, PRIMARY AND SECONDARY

**UG4003.7**



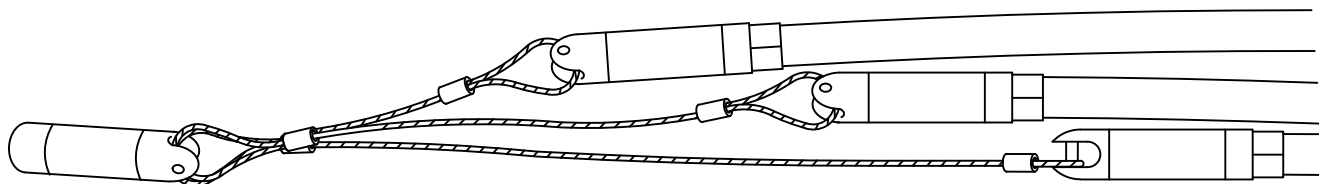


CABLE PULLING EYES

| PRIMARY | CABLE TYPE ©                      | U-NO.<br>"REF"<br>U12.08 | * ENSLEY<br>PART<br>NUMBER |
|---------|-----------------------------------|--------------------------|----------------------------|
|         | 3-350KCMIL XLPECN-PEJ             |                          | 14-E11                     |
|         | 3-1-C 1000KCMIL STR<br>XLPECN-PEJ | U12.096<br>U13.5         | 14-E7                      |

**INSTALLATION:**

- A. FOR PROPER APPLICATION OF CABLE PULLING EYE, SEE PAGES UG4003.1 THROUGH UG4003.6.
  - B. FOR INSTALLATION PRACTICES FOR THE PULLING EYE, SEE CONSTRUCTION MANAGEMENT STANDARD PRACTICES MANUAL, PRACTICE NUMBER 215.
  - ©. CABLE PULLING EYES SHALL NOT BE USED TO PULL SECONDARY CABLE.
- \* ENSLEY 3 CONDUCTOR PULLING EYE NO LONGER COMMERCIALY AVAILABLE.



| CABLE TYPE                        | U-NO.<br>"REF" | PART NUMBER                             |
|-----------------------------------|----------------|---|
| 3-1/C 1000KCMIL STR<br>XLPECN-PEJ | U12.097        | CONTACT<br>STANDARDS FOR<br>INFORMATION |

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CABLE PULLING EYES, PRIMARY

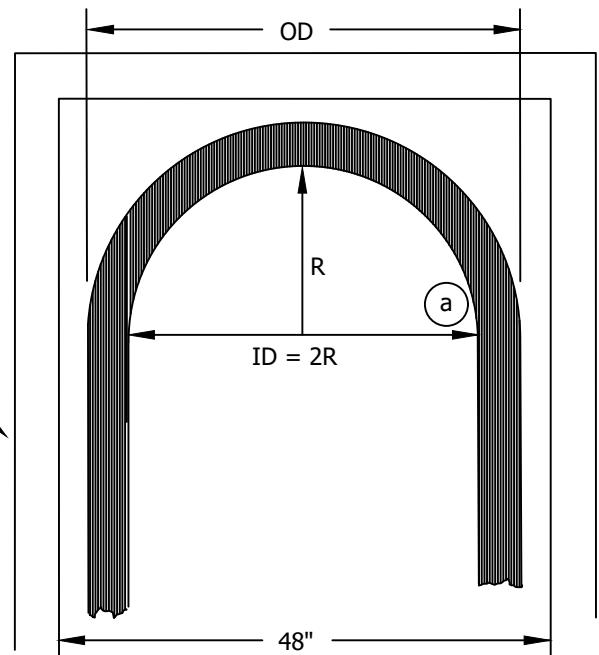
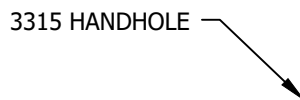
UG4003.8



## INSTALLATION:

|             | MINIMUM BENDING RADIUS (A)<br>R (INCHES) |         |
|-------------|--|---------|
| CABLE SIZE  | ONE CONDUCTOR (B)                        | TRIPLEX |
| 2 AL        | 6 1/4"                                   | 15 1/4" |
| 2/0 AL      | 7"                                       | 17 1/2" |
| 350 AL      | 8 3/4"                                   | 21 3/4" |
| 750 AL      | 11"                                      | 27 3/4" |
| 1000 AL     | 12"                                      | 30 1/4" |
| 750 COMP AL | 9 3/4"                                   | 24 1/4" |
| 750 COMP CU | 9 3/4"                                   | 24 1/4" |
| 1000 CU     | 16"                                      | 30 1/4" |

| CABLE SIZE        | 1/C CABLE DIAMETER |       |       |          |       |       | TRIPLEXED CABLE DIAMETER |       |       |          |       |       |
|-------------------|--------------------|-------|-------|----------|-------|-------|--------------------------|-------|-------|----------|-------|-------|
| JACKETED DIAMETER | #2                 | #2/0  | 350   | 750 COMP | 750   | 1000  | #2                       | #2/0  | 350   | 750 COMP | 750   | 1000  |
|                   | 1.008              | 1.153 | 1.438 | 1.600    | 1.832 | 1.997 | 2.172                    | 2.485 | 3.099 | 3.448    | 3.948 | 4.304 |

$$= 39.97$$


⑧ ONE CONDUCTOR ALSO APPLIES TO INDIVIDUAL TRIPLEXED CABLES WHEN THEY ARE UNTRIPLEXED

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| C   |          |    |      |      |            | F   |        |    |      |      |      |
| B   |          |    |      |      |            | E   |        |    |      |      |      |
| A   | REVISION | -- | JE   | MJC  | 09/07/2010 | D   |        |    |      |      |      |

|                 |  |                           |                    |          |                     |        |
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| SHEET<br>1 OF 1 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG4004 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                |                           |                    |          |                     |        |
|                 | MINIMUM BENDING RADIUS FOR<br>U.G. ALUMINUM CABLES/COPPER CABLES |                           |                    |          |                     |        |



MOISTURE IN AN XLPE OR PE CABLE IS SOMETIMES DIFFICULT TO DETECT. AN ACCEPTABLE METHOD IS TO REMOVE THE END SEAL, POINT THE CABLE DOWNWARD, AND VISUALLY INSPECT FOR MOISTURE. WHERE MOISTURE IS DETECTED OR SUSPECTED, THE CABLE SHOULD BE PURGED OF WATER UNTIL IT IS DRY.



**SCOPE:** THIS STANDARD SHOWS CABLE PULLING COMPOUND USED WHEN PULLING SECONDARY AND PRIMARY CABLES INTO CONDUIT.





**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | STOCK NUMBER |
|------|--|----------|--------------|
| 1    | COMPOUND, CABLE PULLING – 1 CASE OF<br>6 – 1/2 GAL FRONT END PACKS | AS REQ'D | 247380       |
| 2    | COMPOUND, CABLE PULLING – 5 GAL                                    | AS REQ'D | 247384       |

**INSTALLATION:**

- A. ALWAYS USE COMPOUND ON PRIMARY **JACKETED** OR SECONDARY CABLE DURING CABLE PULLING FOR THE PROTECTION OF THE CABLE JACKETING AND TO REDUCE FRICTION.
- B. COMPOUND IS NOT TO BE CONSIDERED DURING DESIGN PROCESS TO ALLOW A LONGER PULL THAN PERMITTED OTHERWISE.
- C. APPLY COMPOUND DIRECTLY ONTO CABLE(S) AS IT IS ENTERING CONDUIT. FRONT END PACKS (LUBRICANT IN PLASTIC BAGS) ARE TO BE PLACED IN THE CONDUIT DIRECTLY IN FRONT OF THE CABLE PRIOR TO CABLE PULLING. FOLLOW THE INSTRUCTIONS ON THE PACKAGE.

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|      |   |                           |   |                    |   |          |   |                                    |
|------|---|---------------------------|---|--------------------|---|----------|---|------------------------------------|
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| 4006 | SDG&E ELECTRIC STANDARDS  |                           |   |                    |   |          |   | REVISION                           |
|      | CABLE PULLING COMPOUND  |                           |   |                    |   |          |   | DATE 1-1-93<br>APPD <i>JLB/ROJ</i> |



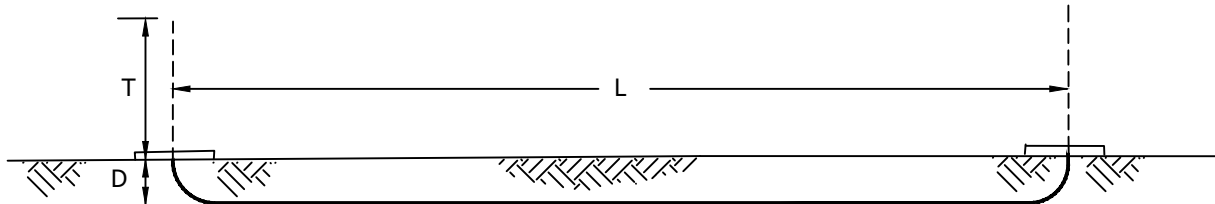
**SCOPE:** THIS STANDARD ESTABLISHES THE CABLE TAIL LENGTH REQUIRED TO LOCATE AND TERMINATE UNDERGROUND CABLE IN EQUIPMENT OR ON CABLE POLES.

**PURPOSE:** THE PURPOSE OF THIS STANDARD IS TO PROVIDE THE NECESSARY ADDITIONAL CABLE FOOTAGE (CABLE TAIL LENGTH) TO THE TOTAL CABLE REQUIREMENTS.

**DEFINITIONS:**

LATERAL DISTANCE - THE HORIZONTAL SEPARATION (L) BETWEEN POINTS OF CABLE ENTRY INTO UNDERGROUND EQUIPMENT. THIS IS NORMALLY REPRESENTED AS THE TRENCH LENGTH BETWEEN ADJACENT PIECES OF EQUIPMENT.

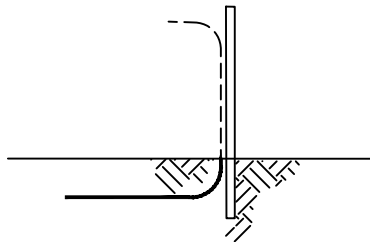
CABLE TAIL LENGTH - THE ADDITIONAL CABLE FOOTAGE REQUIRED BEYOND THE LATERAL DISTANCE T ALLOW FOR THE TRENCH DEPTH (D) AND CABLE TERMINATION (T).



**APPLICATIONS:** THE FOLLOWING ILLUSTRATIONS SHOW STANDARD CABLE TAIL LENGTHS FOR A VARIETY OF DESIGN CONFIGURATIONS.

#### ILLUSTRATIONS

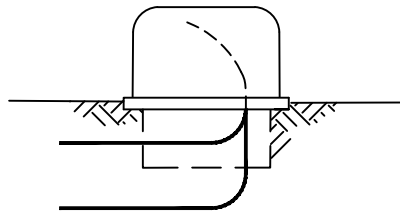
- A. CABLES POLES  
FOR PRIMARY CABLE  
FOR SECONDARY CABLE



#### CABLE TAIL LENGTHS

CALCULATION OF CABLE TAIL LENGTHS FOR CABLE POLES IS BASED ON THE MEASUREMENT FROM THE GROUND LINE TO THE TOP OF THE CONDUIT PLUS 8 FEET OF CABLE.

- B. PAD MOUNTS  
WITH SINGLE-PHASE  
TERMINATOR  
(3522)



6 FEET  
7 FEET  
WITH HANDHOLE

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| C   |          |    |      |      |            | F   |        |    |      |      |      |
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE TAIL LENGTH REQUIREMENTS

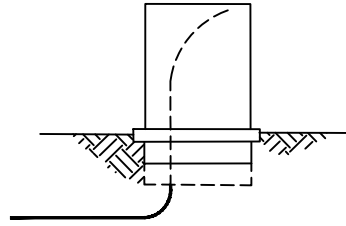
UG4008.1



# ILLUSTRATIONS

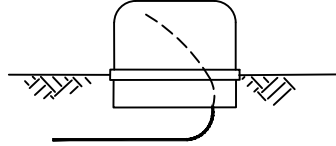
# CABLE TAIL LENGTHS

WITH THREE-PHASE  
TERMINATOR  
(3520 OR 3521)



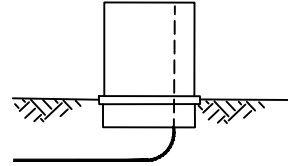
8 FEET

WITH SINGLE-PHASE  
FUSE CABINET  
(3512)



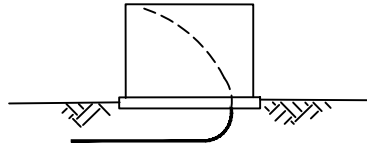
6 FEET

WITH THREE-PHASE  
FUSE CABINET  
(3513)



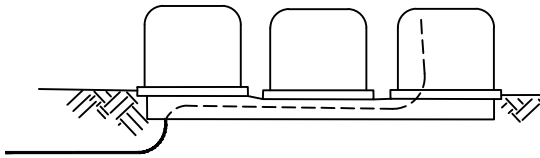
8 FEET

WITH SINGLE-PHASE  
LIVEFRONT OR DEADFRONT  
TRANSFORMER  
(3711 OR 3712)



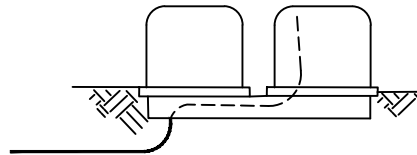
6 FEET

WITH SINGLE-PHASE  
DEADFRONT, CLOSED DELTA  
TRANSFORMER BANK AND  
HANDHOLE. (3714)



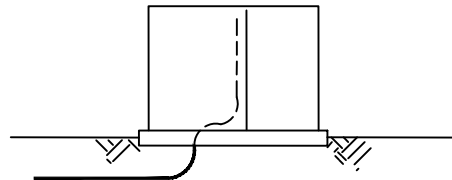
14 FEET

WITH SINGLE-PHASE  
DEADFRONT, OPEN DELTA  
TRANSFORMER WITH HANDHOLE  
(3713)



11 FEET

WITH THREE-PHASE  
DEADFRONT TRANSFORMER



7 FEET

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE TAIL LENGTH REQUIREMENTS

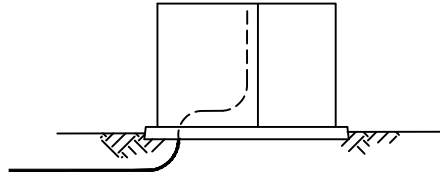
UG4008.2



# ILLUSTRATIONS

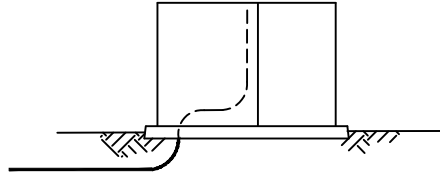
# CABLE TAIL LENGTHS

WITH THREE-PHASE  
LIVEFRONT TRANSFORMER  
(225 TO 1000 KVA)



10 FEET

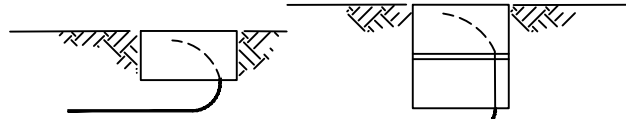
WITH THREE-PHASE  
LIVEFRONT TRANSFORMER  
(1500 TO 2500 KVA)



13 FEET

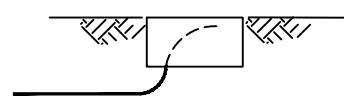
## C. HANDHOLES

3312



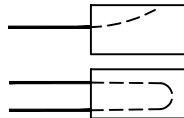
6 FEET

3312



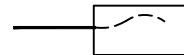
7 FEET  
(DOUBLE BODY)  
7 FEET

3314



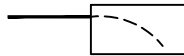
8 FEET

3314  
WITH CABLE TAPS



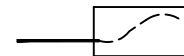
19 FEET  
9 FEET

3315



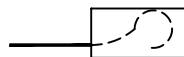
8 FEET

3315  
WITH CABLE TAPS



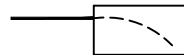
10 FEET

3315  
WITH PAD-MOUNTED SWITCH  
(3549)

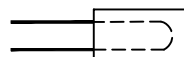


12 FEET

3316



13 FEET



25 FEET

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| B   |          |    |      |      |            | E   |        |    |      |      |      |
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE TAIL LENGTH REQUIREMENTS

UG4008.3



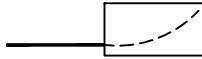




# ILLUSTRATIONS

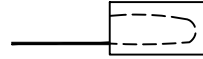
# CABLE TAIL LENGTHS

3324 - 20'



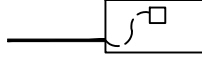
22 FEET

3324 - 20'  
FOR 350 KCMIL & ABOVE  
(EXISTING)



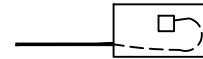
50 FEET

3324 - 14'  
WITH ONE SWITCH  
(EXISTING)



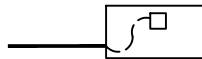
16 FEET

3324 - 14'  
WITH ONE SWITCH  
(EXISTING)



19 FEET

3324 - 20'  
WITH ONE SWITCH  
(EXISTING)



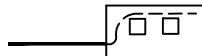
22 FEET

3324 - 20'  
WITH ONE SWITCH  
(EXISTING)



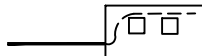
40 FEET

3324 - 20'  
WITH TWO SWITCHES



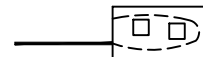
34 FEET

3324 - 26'  
WITH TWO SWITCHES  
(EXISTING)



40 FEET

3324 - 26'  
WITH TWO SWITCHES  
(EXISTING)



65 FEET

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE TAIL LENGTH REQUIREMENTS

UG4008.5



**SCOPE:** THIS STANDARD LISTS THE AMPACITY LIMITATIONS FOR UNDERGROUND CABLES IN NORMAL LOADING SITUATIONS.

**NOTES:** THE FOLLOWING TABLES PROVIDE THE ALLOWED CABLE AMPACITY ASSUMING ALL CABLES ARE EQUALLY LOADED, ARE THE SAME SIZE AND ARE SPACED 7-1/2 INCHES APART UNLESS OTHERWISE STATED. FOR A MORE ACCURATE DESIGN RATING OR EMERGENCY OVERLOAD RATING, CONTACT DISTRICT ENGINEERING OR DESIGN PLANNING.

#### ALUMINUM CABLES

15KV ALUMINUM CABLE, EB CONDUIT (CONCRETE ENCASED)  
AMPACITIES ARE PER RUN (FOR EACH PHASE)

| CABLE<br>SIZE | CONDUIT<br>SIZE | NUMBER OF<br>CONDUCTORS | NUMBER OF RUNS, XLPE |     |     |     |     |     | NUMBER OF RUNS, HMWPE |     |     |     |     |
|---------------|-----------------|-------------------------|----------------------|-----|-----|-----|-----|-----|-----------------------|-----|-----|-----|-----|
|               |                 |                         | 1                    | 2   | 3   | 4   | 5   | 6   | 2                     | 3   | 4   | 5   | 6   |
| 1000          | 5"EB            | 3-1/C                   | NA                   | 580 | 530 | 490 | 460 | 430 |                       |     |     |     |     |
| 750           | 5"EB            | 3-1/C                   | NA                   | 500 | 455 | 425 | 395 | 375 |                       |     |     |     |     |
| 350           | 5"EB            | 3-1/C                   | NA                   | 320 | 300 | 280 | 260 | 250 |                       |     |     |     |     |
| 2/0           | 5"EB            | 3-1/C                   | NA                   | 175 | 160 | 155 | 145 | 140 | 155                   | 145 | 140 | 130 | 125 |
| #2            | 5"EB            | 3-1/C                   | NA                   | 130 | 120 | 110 | 105 | 100 | 115                   | 105 | 100 | 95  | 90  |
| #2            | 5"EB            | 1/C                     | NA                   | 135 | 130 | 125 | 120 | 115 | 120                   | 115 | 110 | 105 | 100 |

15KV ALUMINUM CABLE, DB CONDUIT (DIRECT BURIED)  
AMPACITIES ARE PER RUN (FOR EACH PHASE)

| CABLE SIZE | CONDUIT SIZE | NUMBER OF CONDUCTORS | NUMBER OF RUNS, XLPE |         |         |     |     |     | NUMBER OF RUNS, HMWPE |     |     |     |     |     |
|------------|--------------|----------------------|----------------------|---------|---------|-----|-----|-----|-----------------------|-----|-----|-----|-----|-----|
|            |              |                      | 1                    | 2       | 3       | 4   | 5   | 6   | 1                     | 2   | 3   | 4   | 5   | 6   |
| 1000       | 5"DB         | 3-1/C                | 620                  | NA      | NA      | NA  | NA  | NA  |                       |     |     |     |     |     |
| 750        | 5"DB         | 3-1/C                | 530                  | NA      | NA      | NA  | NA  | NA  |                       |     |     |     |     |     |
| 350        | 5"DB         | 3-1/C                | 340                  | NA      | NA      | NA  | NA  | NA  |                       |     |     |     |     |     |
| 2/0        | 4"DB         | 3-1/C                | 170                  | 160 (B) | 150 (B) | 145 | 140 | 130 | 155                   | 140 | 135 | 130 | 125 | 120 |
| #2         | 4"DB         | 3-1/C                | 125                  | 115 (B) | 110 (B) | 100 | 95  | 90  | 110                   | 100 | 95  | 90  | 90  | 85  |
| #2         | 2"DB         | 1/C                  | 130                  | 120 (B) | 115 (B) | 115 | 110 | 105 | 115                   | 110 | 105 | 105 | 100 | 95  |

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| REVISION            |  | SDG&E ELECTRIC STANDARDS  |                    |          |                     |
| DATE 1-1-92         |  | CABLE AMPACITIES          |                    |          |                     |
| APPD <i>JLB/ROJ</i> |  | 4011.1                    |                    |          |                     |





600 VOLT SECONDARY ALUMINUM CABLE, DB CONDUIT (DIRECT BURIED)  
 TOTAL AMPACITY FOR EACH PHASE  
 (WITH 7-1/2 INCHES CENTERLINE TO CENTERLINE SPACING BETWEEN CONDUITS)

| CABLE SIZE | CONDUIT SIZE | NUMBER OF CONDUCTORS | NUMBER OF RUNS |      |      |      |      |      |      |      |      |      |      |      |
|------------|--------------|----------------------|----------------|------|------|------|------|------|------|------|------|------|------|------|
|            |              |                      | 1              | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   |
| 1000       | 5"DB         | 3-1/C                | 605            | 1104 | 1527 | 1892 | 2335 | 2526 | 2821 | 3080 | 3339 | 3550 | 3707 | 3828 |
| 500        | 4"DB         | 3-1/C                | 397            | 736  | 1029 | 1288 | 1595 | 1746 | 1953 | 2144 | 2313 | 2470 | 2607 | 2712 |
| 350        | 3"DB         | 2-1/C                | 318            | 600  | 852  | 1076 | 1285 | 1482 | 1673 | 1840 | 2016 | 2160 | 2266 | 2376 |
| 350        | 3"DB         | 3-1/C                | 313            | 586  | 822  | 1036 | 1230 | 1416 | 1589 | 1760 | 1908 | 2040 | 2145 | 2232 |
| 3/0        | 2"DB         | 2-1/C                | 202            | 386  | 552  | 704  | 875  | 984  | 1113 | 1232 | 1250 | 1440 | 1518 | 1608 |
| 3/0        | 3"DB         | 3-1/C                | 199            | 376  | 534  | 676  | 810  | 936  | 1057 | 1160 | 1269 | 1350 | 1419 | 1500 |
| 1/0        | 2"DB         | 2-1/C                | 152            | 292  | 420  | 536  | 645  | 750  | 854  | 944  | 1044 | 1130 | 1188 | 1248 |
| #2         | 2"DB         | 2-1/C                | 113            | 218  | 315  | 404  | 490  | 570  | 651  | 720  | 792  | 860  | 913  | 960  |
| #8         | 1"DB         | 1/C                  | 47             | 92   | 135  | 176  | 215  | 252  | 287  | 320  | 306  | 380  | 407  | 432  |

600 VOLT SECONDARY ALUMINUM CABLE, DB CONDUIT (DIRECT BURIED)  
 TOTAL AMPACITY FOR EACH PHASE  
 (WITHOUT 7-1/2 INCHES CENTERLINE TO CENTERLINE SPACING BETWEEN CONDUITS)

| CABLE SIZE | CONDUIT SIZE | NUMBER OF CONDUCTORS | NUMBER OF RUNS |      |      |      |
|------------|--------------|----------------------|----------------|------|------|------|
|            |              |                      | 1              | 2    | 3    | 4    |
| 1000       | 5"DB         | 3-1/C                | NA             | 1092 | 1476 | 1848 |
| 500        | 4"DB         | 3-1/C                | NA             | 724  | 996  | 1244 |
| 350        | 3"DB         | 2-1/C                | NA             | 588  | 816  | 1036 |
| 350        | 3"DB         | 3-1/C                | NA             | 572  | 789  | 992  |
| 3/0        | 2"DB         | 2-1/C                | NA             | 376  | 531  | 664  |
| 3/0        | 3"DB         | 3-1/C                | NA             | 370  | 516  | 644  |
| 1/0        | 2"DB         | 2-1/C                | NA             | 287  | 405  | 506  |
| #2         | 2"DB         | 2-1/C                | NA             | 214  | 303  | 384  |
| #8         | 1"DB         | 1/C                  | NA             | 92   | 132  | 168  |

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| 4011.2 | SDG&E ELECTRIC STANDARDS  |                           |                    |          |                     | REVISION   |
|        | CABLE AMPACITIES  |                           |                    |          |                     | DATE 1-1-92  |
|        |   |                           |                    |          |                     | APPD  |
|        |   |                           |                    |          |                     |  |



### COPPER CABLES

15KV COPPER CABLE, EB CONDUIT (CONCRETE ENCASED)  
AMPACITIES ARE PER RUN (FOR EACH PHASE)

| CABLE SIZE     | CONDUIT SIZE | NUMBER OF CONDUCTORS | NUMBER OF RUNS |     |     |     |     |     |
|----------------|--------------|----------------------|----------------|-----|-----|-----|-----|-----|
|                |              |                      | 1              | 2   | 3   | 4   | 5   | 6   |
| 1000 (PILC)    | 4"EB         | 3/C                  | NA             | 580 | 535 | 495 | 455 | 435 |
| 500 (PILC)     | 3"EB         | 3/C                  | NA             | 395 | 370 | 345 | 325 | 310 |
| 500 (PECN) (A) | 5"EB         | 3-1/C                | NA             | 450 | 410 | 390 | 365 | 340 |
| 4/0 (A)        | 5"EB         | 3-1/C                | NA             | 275 | 255 | 240 | 225 | 220 |
| #2 (A)         | 4"EB         | 3-1/C                | NA             | 130 | 125 | 120 | 115 | 110 |
| #2 (A)         | 4"EB         | 1/C                  | NA             | 155 | 150 | 145 | 140 | 135 |

15KV COPPER CABLE, DB CONDUIT (DIRECT BURIED)  
AMPACITIES ARE PER RUN (FOR EACH PHASE)

| CABLE SIZE     | CONDUIT SIZE | NUMBER OF CONDUCTORS | NUMBER OF RUNS |        |        |     |     |     |
|----------------|--------------|----------------------|----------------|--------|--------|-----|-----|-----|
|                |              |                      | 1              | 2      | 3      | 4   | 5   | 6   |
| 1000 (PILC)    | 4"DB         | 3/C                  | 615            | NA     | NA     | NA  | NA  | NA  |
| 500 (PILC)     | 3"DB         | 3/C                  | 420            | NA     | NA     | NA  | NA  | NA  |
| 500 (PECN) (A) | 5"DB         | 3-1/C                | 470            | NA     | NA     | NA  | NA  | NA  |
| 4/0 (A)        | 5"DB         | 3-1/C                | 285            | NA     | NA     | NA  | NA  | NA  |
| #2 (A)         | 3"DB         | 3-1/C                | 145            | 135(B) | 125(B) | 120 | 115 | 105 |
| #2 (A)         | 3"DB         | 1/C                  | 175            | 165(B) | 155(B) | 145 | 140 | 130 |

#### INSTALLATION:

- (A) NO LONGER PURCHASED.
- (B) CABLE AMPACITY WITHOUT 7-1/2 CENTERLINE TO CENTERLINE SPACING BETWEEN CONDUITS.

#### REFERENCE:

1. Design Standard 5521, "Feeder Cable Ampacities Based on Thermal Loading Limits".
2. Design Standard 5522, "Cable Ampacity Program".

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| DATE 1-1-92        | CABLE AMPACITIES         |                           |                    |          |                     |        |
| APPD <i>JLB/BJ</i> |                          |                           |                    |          |                     |        |



4100 - TERMINATIONS,  
SPlicing,  
CONNECTIONS



4100 - TERMINATIONS,  
SPlicing,  
CONNECTIONS



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| 4177 | CABLE HANGERS AND ACCESSORIES  |
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**UG4101.2**



**SCOPE:** THIS STANDARD DESCRIBES INSTRUCTIONS FOR INSTALLING ALUMINUM CONNECTORS.

**ATTENTION:**

- \* DO NOT POSITION ALUMINUM CONDUCTOR BELOW COPPER TO PREVENT COPPER SALTS FROM RUNNING ONTO ALUMINUM CONDUCTOR.

**INSTALLATION:**

- A. COMPRESSION CONNECTION - WHERE A CONNECTOR IS COMPRESSED ONTO A CONDUCTOR. (a)
1. WIRE BRUSH THE CONDUCTOR(S) TO CLEAN OFF THE OXIDATION.
  2. USE CONNECTOR PREFILLED WITH INHIBITOR BY MANUFACTURER.
  3. CRIMP WITH POWER TOOL (IN CORRECT ADJUSTMENT), PROPER DIE, AND PROPER NUMBER OF INDENTS.
- B. BOLTED CONNECTION - WHERE A CONNECTOR IS BOLTED TO A CONDUCTOR OR FLAT TERMINAL PAD. A BOLTED CONNECTOR REQUIRES CARE WHEN INSTALLING FOR RELIABILITY: (b)
1. WIRE BRUSH THE CONDUCTOR(S), BOLTED CONNECTOR (UNLESS PREINHIBITED) AND FLAT PADS WITH INHIBITOR (STOCK NUMBER S247200). THE INTENT IS TO WIRE BRUSH/INHIBIT ALL MATING SURFACES, ALUMINUM AND COPPER, TO PREVENT DAMAGE TO ALUMINUM FROM CORROSION IN BOLTED JOINT.
  2. BOLT WITH PROPER HARDWARE SILICON BRONZE STAINLESS STEEL FASTENERS FROM SDG&E STOCK (FLAT ROUND WASHERS, HEX HEAD NUTS, CAP SCREWS) AND BELLEVILLE WASHERS. TORQUE STAINLESS STEEL FASTENERS AS FOLLOWS:  
3/8" = 25 FT. LB.  
1/2" = 40 FT. LB.
- C. USE TRANSITION PLATE IF BOLTED TO UNTINNED COPPER FLAT PAD. (c)

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. **COMPRESSED AND BOLTED ALUMINUM CONNECTORS:**
- a. THE INSTALLATION OF ALUMINUM CONDUCTORS HAS ALWAYS REQUIRED MORE CARE THAN COPPER, DUE TO THE OXIDIZING AND COLD FLOW CHARACTERISTICS OF ALUMINUM WHICH CAN CAUSE PREMATURE CONNECTOR FAILURE IF NOT PROPERLY INSTALLED.
  - B. FAILED CONNECTORS RECEIVED BY THE MATERIALS TEST LAB ARE ANALYZED FOR CAUSE OF FAILURE. AS A RESULT OF THESE OBSERVATIONS, STANDARDIZED UNDERGROUND INSTRUCTIONS ARE WRITTEN FOR YOUR REFERENCE WHEN INSTALLING ALUMINUM CONNECTORS.

**REFERENCE:**

- (a) REFER TO UG4121, UG4171, UG4172, UG4173, UG4182, UG4190, UG4196.
- (b) REFER TO UG4121, UG4168, UG4171.
- (c) REFER TO UG4168.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

ALUMINUM CONDUCTOR PREPARATION FOR TERMINATIONS

UG 4106.1



**SCOPE:** THIS STANDARD SHOWS METHODS OF SEALING JACKETED CONCENTRIC NEUTRAL TYPE CABLES WHEN TERMINATING FOR SUBSURFACE OR ABOVE GROUND INSTALLATION APPLICATIONS. ALSO SHOWN ARE MEASUREMENTS OF CONCENTRIC NEUTRAL TERMINATIONS FROM PREMOLDED COMPONENTS/COLD SHRINK OR PORCELAIN POTHEADS.

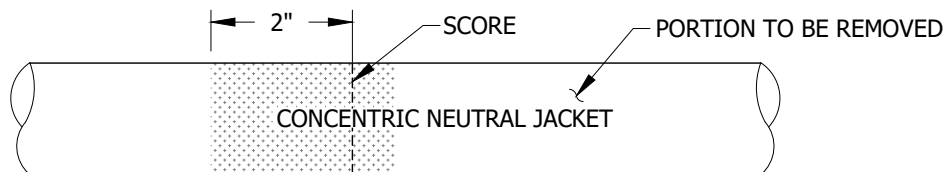
**TABLE 1**

| ITEM | DESCRIPTION                           | QUANTITY | STOCK NUMBER |
|------|---------------------------------------|----------|--------------|
| 1    | ELEC-TRO CUT OR EQUIVALENT (80 GRIT)  | AS REQ'D | S239682      |
| 2    | ELEC-TRO CUT OR EQUIVALENT (180 GRIT) | AS REQ'D | S239684      |
| 3    | AQUA-SEAL OR EQUIVALENT               | AS REQ'D | S442976      |
| 4    | GLASS TAPE, 1/2"                      | AS REQ'D | S720256      |
| 5    | VINYL PLASTIC TAPE, 3/4"              | AS REQ'D | S720580      |
| 6    | SLEEVES, HEAT SHRINK (4-2/0 SIZE)     | AS REQ'D | S777984      |
| 7    | SLEEVES, HEAT SHRINK (350 SIZE)       | AS REQ'D | S778016      |
| 8    | SLEEVES, HEAT SHRINK (750-1000 SIZE)  | AS REQ'D | S778020      |

**INSTALLATION:**

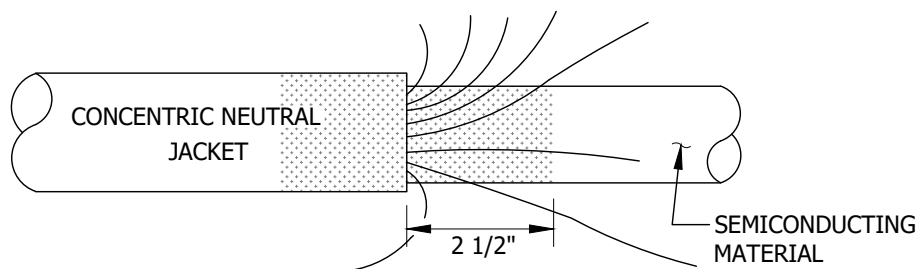
**SUBSURFACE INSTALLATION:**

- (A) SCORE AND CLEAN A MINIMUM OF 2 INCHES, THE CONCENTRIC NEUTRAL JACKET WITH ELEC-TRO CUT CLOTH BEFORE REMOVING THE JACKETING.



**FIGURE 1** (A)

- (B) REMOVE CONCENTRIC NEUTRAL JACKET AS REQUIRED.  
 (C) PULL THE CONCENTRIC NEUTRAL WIRES BACK AND AWAY FROM THE SEMICONDUCTING INSULATION SHIELD.  
 (D) CLEAN THE SEMICONDUCTING MATERIAL FOR A MINIMUM OF 2 1/2 INCHES NEXT TO THE CONCENTRIC NEUTRAL JACKET WITH ELEC-TRO CUT CLOTH. **DO NOT USE SOLVENT IN THIS AREA.**



**FIGURE 2** (B) (C) (D)

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SDG&E ELECTRIC UNDEGROUND CONSTRUCTION STANDARDS

INSTRUCTIONS FOR SEALING JACKETED CABLE

UG4108.1



## INSTALLATION (CONT'D):

- (E) APPLY A 2 INCH WIDE STRIP OF SEALING COMPOUND OVER THE SEMICONDUCTING MATERIAL NEXT TO THE CONCENTRIC NEUTRAL JACKET.

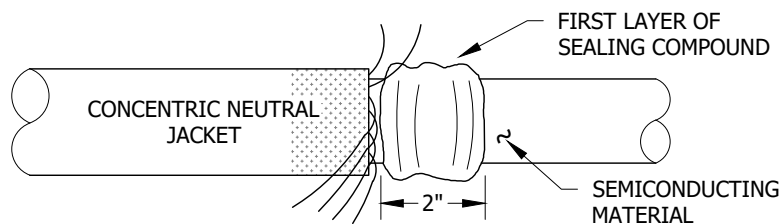


FIGURE 3 (E)

- (F) BEND CONCENTRIC NEUTRAL WIRES BACK INTO PLACE AROUND THE CABLE AND PRESS THEM INTO THE SEALING COMPOUND.
- (G) APPLY A SECOND 2 INCH WIDE LAYER OF SEALING COMPOUND. 1 INCH OF THIS STRIP WILL GO OVER THE CONCENTRIC NEUTRAL JACKET AND 1 INCH OVER THE CONCENTRIC NEUTRAL WIRES & A PORTION OF THE FIRST LAYER OF SEALING COMPOUND.
- (H) AT THE EDGE OF THE FIRST LAYER OF SEALING COMPOUND TOWARD THE CUT END OF THE CABLE, APPLY 3 LAYERS OF 1/2 INCH GLASS TAPE OVER THE SEALING COMPOUND. APPLY 3 LAYERS OF 3/4 INCH VINYL PLASTIC TAPE OVER THE GLASS TAPE. DO NOT LEAVE ANY POCKETS UNDER THE TAPE FOR WATER TO COLLECT.

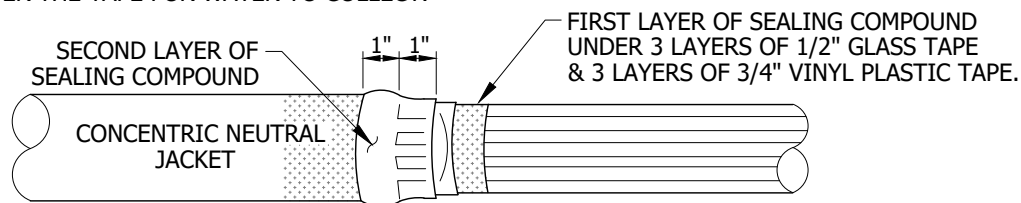


FIGURE 4 (F, G, H)

### J. APPLY HEAT SHRINK TUBE OR VINYL PLASTIC TAPE AS DESCRIBED IN J1 AND J2.

- (1) APPLY A HEAT SHRINK TUBE OVER THE SEALING COMPOUND, GLASS TAPE, VINYL PLASTIC TAPE & CONCENTRIC NEUTRAL JACKET. APPLY HEAT ALLOWING THE EDGE OF THE HEAT SHRINK TUBE TO BE CENTERED ON THE 3/4 INCH VINYL PLASTIC TAPE. DO NOT APPLY HEAT TO SEMI-CONDUCTING MATERIAL. DO NOT ALLOW HEAT SHRINK MATERIAL TO COME IN CONTACT WITH SEMI-CONDUCTING MATERIAL.

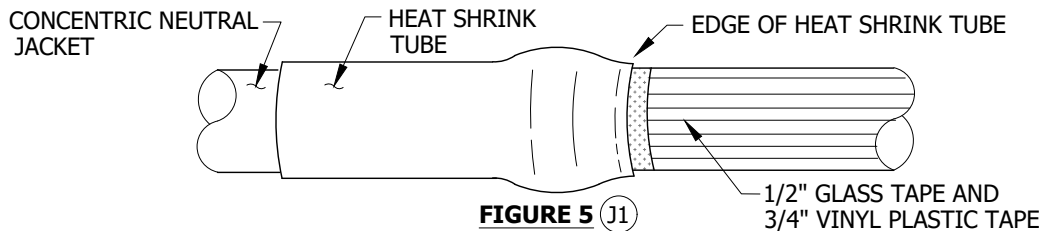


FIGURE 5 (J1)

- (2) VINYL PLASTIC TAPE MAY BE USED INSTEAD OF A HEAT SHRINK TUBE DESCRIBED IN STEP (J1). APPLY 3 LAYERS OF VINYL PLASTIC TAPE COVERING AT LEAST HALF THE CONCENTRIC NEUTRAL BINDING TAPE AND EXTEND AT LEAST 2 INCHES OVER THE CONCENTRIC NEUTRAL JACKET.

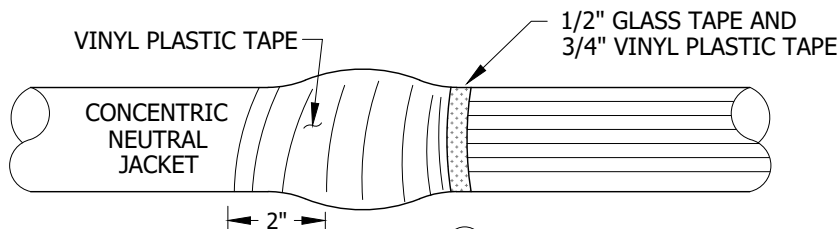


FIGURE 6 (J2)

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INSTRUCTIONS FOR SEALING JACKETED CABLE

UG4108.2



## INSTALLATION (CONT'D):

### ABOVE GROUND INSTALLATION:

- (K) SCORE AND CLEAN A MINIMUM OF 2 INCHES, THE CONCENTRIC NEUTRAL JACKET WITH ELEC-TRO CUT CLOTH BEFORE REMOVING THE JACKETING.

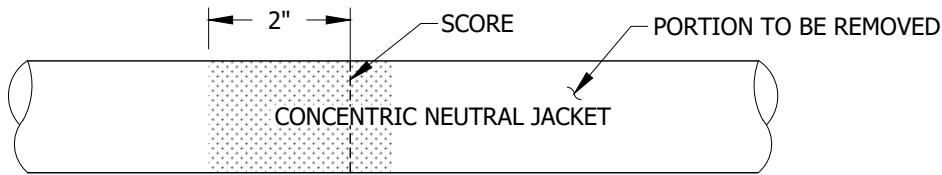


FIGURE 7 (K)

- (L) REMOVE THE CONCENTRIC NEUTRAL JACKET AS REQUIRED.
- (M) APPLY 3 LAYERS OF 1/2 INCH GLASS TAPE OVER THE CONCENTRIC NEUTRAL 1 INCH AWAY FROM THE CONCENTRIC NEUTRAL JACKET AND APPLY 3 LAYERS OF VINYL PLASTIC TAPE OVER THE GLASS TAPE FORMING A PERMANENT BINDING.
- (N) BEND THE CONCENTRIC NEUTRAL OVER THE GLASS & VINYL TAPE AND TWIST TOGETHER.

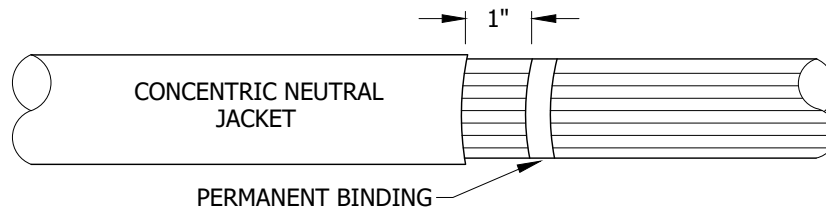


FIGURE 8 (L M N)

- (O) APPLY A 2 INCH WIDE STRIP OF SEALING COMPOUND, 1 INCH OVER THE CONCENTRIC NEUTRAL JACKET AND 1 INCH OVER THE SEMICONDUCTING MATERIAL AND CONCENTRIC NEUTRALS. TIGHTLY PUSH THE SEALING COMPOUND AROUND THE CONCENTRIC NEUTRAL WIRES.

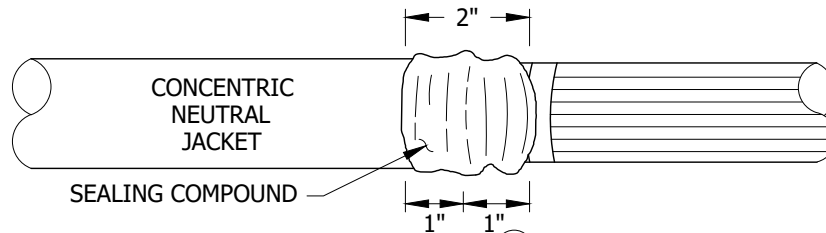


FIGURE 9 (O)

- P. APPLY HEAT SHRINK TUBE OR VINYL PLASTIC TAPE AS DESCRIBED IN P1 AND P2.

- (1) PRESS THE AQUA SEAL IN TO THE CONCENTRIC NEUTRAL WIRES TO THE EDGE OF THE CLOTH TAPE. PLACE THE EDGE OF THE HEAT SHRINK TUBE ON THE CLOTH TAPE, APPLY EVEN HEAT TO THE EDGE OF THE TUBE SO IT SHRINKS DOWN ON THE CLOTH TAPE. **AVOID** EXCESS HEAT ON THE SEMI CONDUCTING MATERIAL, AVOID HEAT SHRINK MATERIAL CONTACTING THE SEMI CONDUCTING MATERIAL. CONTINUE TO APPLY EVEN HEAT ON SHRINK TUBE MOVING TOWARD THE JACKET AND MAKE SURE THE TUBE SHRINKS ONTO THE SEALING COMPOUND AND THE OUTER CABLE JACKETING.

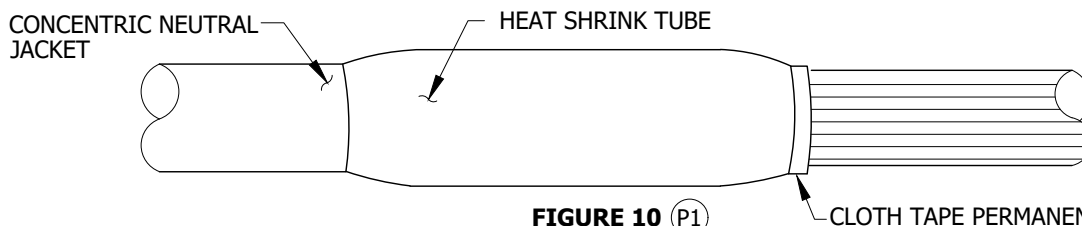


FIGURE 10 (P1)

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INSTRUCTIONS FOR SEALING JACKETED CABLE

UG4108.3



## INSTALLATION (CONT'D):

- ② VINYL PLASTIC TAPE MAY BE USED INSTEAD OF A HEAT SHRINK TUBE DESCRIBED IN STEP (P1). APPLY 3 LAYERS OF VINYL PLASTIC TAPE COVERING THE SEALING COMPOUND AND EXTENDING AT LEAST 2 INCHES OVER THE CONCENTRIC NEUTRAL JACKET.

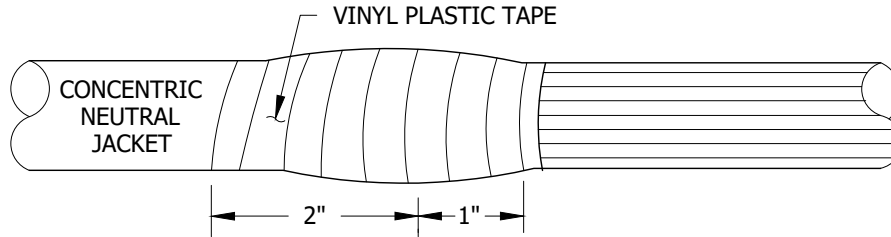


FIGURE 11 (P2)

**BILL OF MATERIALS:** NONE

### NOTES:

- ① DUE TO THE FACT THAT OVERHEAD FAULT INDICATORS ARE REQUIRED ON CABLE POLES, THE 5 INCH SPACE BELOW THE TERMINAL (POTHEAD) IS NOT REQUIRED. FOLLOW THE MANUFACTURERS INSTRUCTIONS WHICH SEALS THE CABLE JACKET FROM MOISTURE.

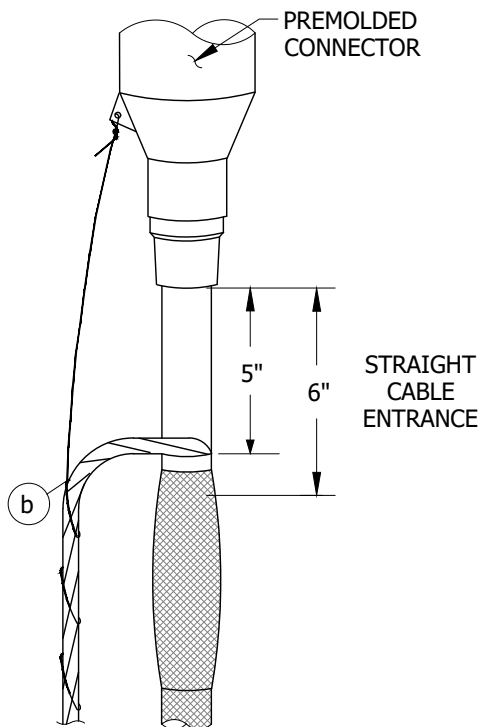


FIGURE 12

200 AMP & 600 AMP CABLE

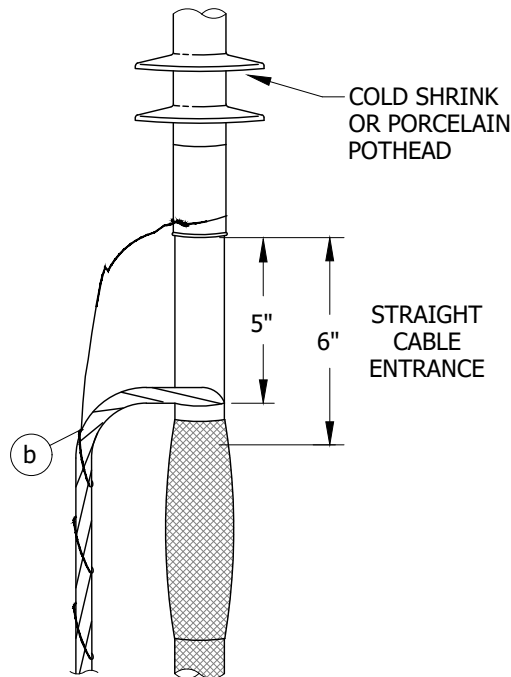


FIGURE 13

200 AMP & 600 AMP CABLE

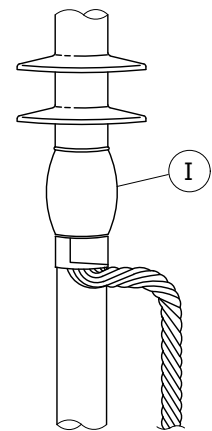


FIGURE 14

CABLE POLE APPLICATION  
200 AMP & 600 AMP CABLE

### REFERENCE:

- a. SEE UG4176 FOR CONCENTRIC NEUTRAL WIRE SIZE CHART.  
b. SEE UG4525 FOR GROUNDING PREMOLDED CONNECTORS.  
c. SEE UG4174 FOR COPPER COMPRESSION CONNECTORS.

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| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   |            |     |     |     |       |            |
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| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1992 | D   | REVISION   | -   | -   | -   | TR/MC | 8/26/2008  |



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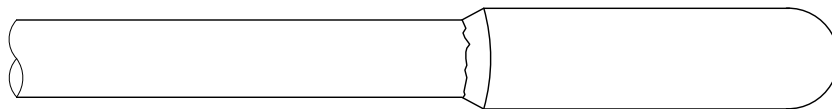
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTRUCTIONS FOR SEALING JACKETED CABLE

UG4108.4



**SCOPE:** THIS STANDARD SHOWS THE APPROVED METHOD FOR SEALING CABLE ENDS TO PREVENT THE ENTRY OF WATER INTO 12KV CABLES.



**FIGURE 1**  
CABLE END SEAL

**TABLE 1**

| CABLE END SEAL |            |
|----------------|------------|
| STOCK NUMBER   | CABLE SIZE |
| S627240 (X)    | #2, #2/0   |
| S627242 (X)    | 350, 750   |
| S627246 (X)    | 1000 KCMIL |

### INSTALLATION:

- A. SEAL ENDS OF ALL PRIMARY CABLES IMMEDIATELY AFTER PULLING UNLESS YOU ARE GOING TO CONNECT CABLES RIGHT AWAY. THIS APPLIES TO CABLE ON REELS AND TO CABLE IN SUBSTRUCTURES. AS AN ADDITIONAL PRECAUTION, AFTER CABLES IN SUBSTRUCTURES HAVE BEEN SEALED, TIE THE ENDS UP AS HIGH AS POSSIBLE ABOVE THE FLOOR.
- B. FOR CABLE POLE RUNS OF 1000 KCMIL CABLE AND FOR OTHER RUNS OF 1000 KCMIL CABLE, WHEN A FEEDER TUBE IS USED IT IS NECESSARY TO REMOVE THE CABLE JACKET BEYOND THE END OF THE PULLING GRIP (SEE FIGURE 2). IF THE ENSLEY CABLE EYE IS USED REFER TO STANDARD PRACTICE #215.
- C. WHEN USING END CAPS OVER CONCENTRIC NEUTRALS, IT IS NECESSARY TO APPLY A PAD OF SEALING COMPOUND OVER THE END OF THE CABLE AND AT THE JACKET CUTBACK TO ENSURE AN ADEQUATE WATER SEAL (SEE FIGURES 3 AND 4).
- D. PREPARE CABLE
  1. SQUARE CUT CABLE.
  2. THOROUGHLY CLEAN CABLE END FOR APPROXIMATELY SIX INCHES.
- E. APPLY COLD SHRINK END CAP
  1. SLIP END CAP OVER CABLE END AS FAR AS POSSIBLE.
  2. PULL CORE COMPLETELY OUT OF END CAP. THE CAP WILL SHRINK AROUND THE CABLE.
- F. REMOVAL
  1. LIFT THE EDGE OF THE CAP AND SLICE THE MATERIAL ALONG THE LENGTH OF THE CAP.
  2. PULL THE CAP OFF THE CABLE.

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| A   | REVISION   | --  | --  | --  | JLB/RDJ | 1/1/1993   | D   |        |    |    |     |     |      |



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE END SEALS

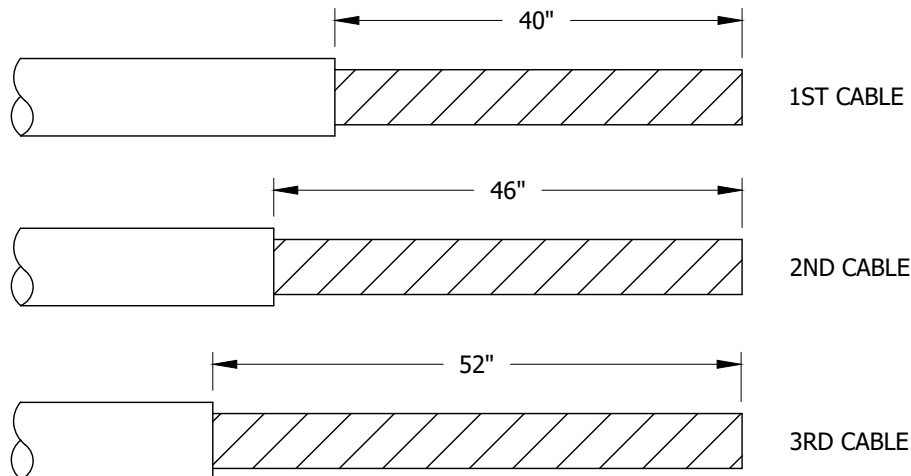
UG4109.1



## INSTALLATION (CONT'D):

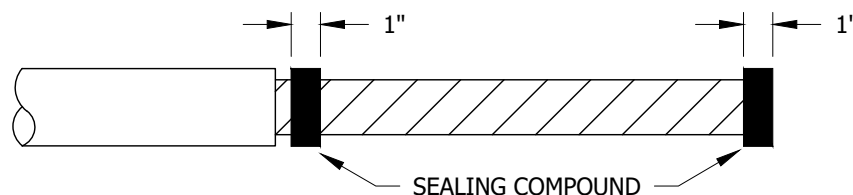
### INSTALLATION INSTRUCTIONS FOR CABLE POLE RUNS AND WHEN FEEDER TUBE IS USED:

- (G) PREPARE CABLES WITH STAGGERED JACKET CUTBACK.



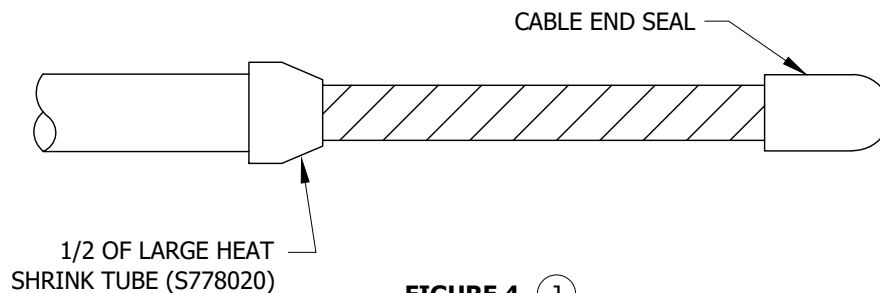
**FIGURE 2** (G)  
JACKET CUTBACK DIMENSIONS

- (H) PLACE PAD OF SEALING COMPOUND OVER AND BACK ONE INCH ONTO END OF CABLE AND PLACE A ONE INCH BAND OF SEALING COMPOUND JUST AHEAD OF JACKET CUTOFF.



**FIGURE 3** (H)

- (J) INSTALL CABLE END SEAL OVER CABLE END AND ONE-HALF OF LARGE HEAT SHRINK TUBE (S778020) TO SEAL JACKET.



**FIGURE 4** (J)

**BILL OF MATERIALS:** NONE

### NOTES:

- (X) THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

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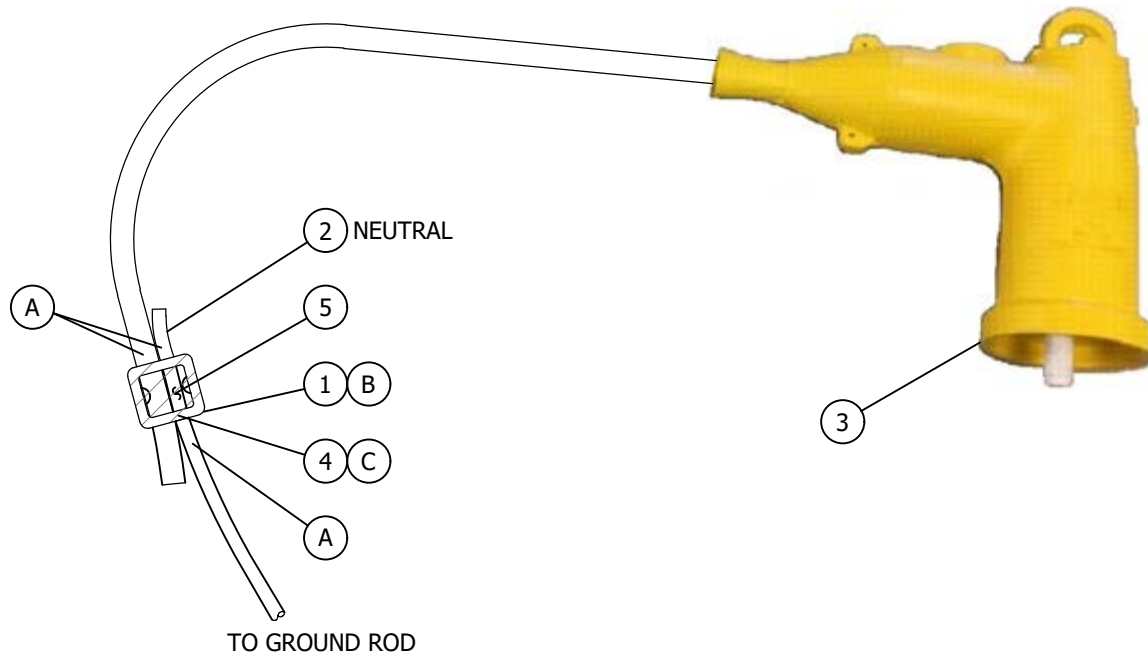
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE END SEALS

UG4109.2



**SCOPE:** THIS STANDARD SHOWS THE PRIMARY NEUTRAL INSTALLATION FOR SUBSURFACE TRANSFORMERS FITTED WITH LOADBREAK ELBOWS.



**FIGURE 1**

### INSTALLATION:

- (A) CLEAN SURFACE WITH SOLVENT
- (B) TWO HALF LAP LAYERS
- (C) THREE HALF LAP LAYERS

### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|----------------------------|----------|---------------|--------------|--------------|
| 1    | VINYL PLASTIC TAPE, 3/4"   | AS REQ'D | -             | S720580      | -            |
| 2    | #2 CU THW WIRE             | AS REQ'D | -             | S808162 (X)  | -            |
| 3    | LOADBREAK ELBOW, #2 SOL    | 1        | 4191          | S443838      | -            |
| 4    | H.V. INSULATING TAPE, 3/4" | AS REQ'D | -             | S720480      | -            |
| 5    | COMPRESSION CONNECTOR      | 1        | 4172          | S257760      | -            |

**NOTES:**

☒ THIS ITEM IS EXEMPT.

**REFERENCE:**

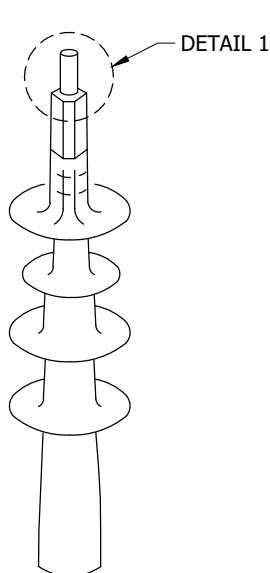
- a. SEE STANDARD PAGES 3799.205 & 206 FOR SUBSURFACE TRANSFORMERS.

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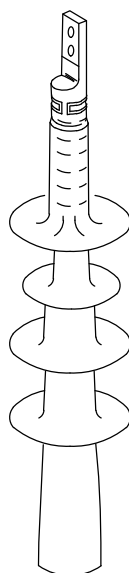
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| C               |               |     |   |     |         |                    | F   |          |    |                     |     |     |          |
| B               | FIGURE UPDATE | EDM | EJA   | GLW | CZH     | 6/2/2020           | E   |          |    |                     |     |     |          |
| A               | REVISION      | -   | -   | -   | DLB/RDJ | 1/1/1993           | D   |          |    |                     |     |     |          |
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|                 |               |     | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |     |         |                    |     |          |    |                     |     |     |          |
|                 |               |     | LOADBREAK ELBOW - PRIMARY NEUTRAL TERMINATION     |     |         |                    |     |          |    |                     |     |     |          |



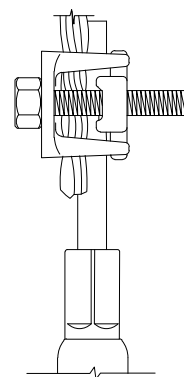
**SCOPE:** THIS STANDARD SHOWS CABLE TERMINALS USED FOR OUTDOOR PRIMARY CABLE TERMINATIONS.



**FIGURE 1**  
3M, JOSLYN, RAYCHEM



**FIGURE 2**  
3M, JOSLYN, RAYCHEM



**DETAIL 1**

**TABLE 1**

| CABLE<br>POLYETHYLENE | TERMINAL          |                 | FIGURE<br>NUMBER | AERIAL LUG<br>CATALOG<br>NUMBER/ STOCK<br>NUMBER | COMPRESSION CONNECTOR |                 | COMPRESSION<br>DIE | DESIGN<br>UNITS |
|-----------------------|-------------------|-----------------|------------------|--|-----------------------|-----------------|--------------------|-----------------|
|                       | CATALOG<br>NUMBER | STOCK<br>NUMBER |                  |  | CATALOG<br>NUMBER     | STOCK<br>NUMBER |                    |                 |
| 2 SOL AL              | 5641              | 732918 (D)      | 6                | - (E)  | 8898-6                | S729930         | BG                 | CP-#2N          |
|                       | JPT15J1           |                 |                  |  |                       |                 |                    |                 |
|                       | TFT151E           |                 |                  |  |                       |                 |                    |                 |
| 2/0 AL                | 5641              | 732918 (D)      | 6                | - (E)  | X5U20-6               | S729934         | 840                | CP/0N           |
|                       | JPT15J1           |                 |                  |  |                       |                 |                    |                 |
|                       | TFT151E           |                 |                  |  |                       |                 |                    |                 |
| 350 KCMIL AL          | 5642              | 727140 (D)      | 6                | S262336  | PTB-350-2.5           | S729938         | 316                | CP350N          |
|                       | TFT-152E          |                 |                  |  |                       |                 |                    |                 |
|                       | 5642              | 727140 (D)      | 7                | -  | AHL350                | S728864         | 317                | T350L           |
|                       | TFT-152E          |                 |                  |  |                       |                 |                    |                 |
| 750 KCMIL COMP<br>AL  | 5642              | 727140 (D)      | 6                | S262432  | PTL-750-2.5           | S729940         | 301                | CP750C          |
|                       | TFT-152E          |                 |                  |  |                       |                 |                    |                 |
|                       | 5642              | 727140 (D)      | 7                | -  | CAL750NLP             | S729280         | 301                | T750L           |
|                       | TFT-152E          |                 |                  |  |                       |                 |                    |                 |
| 1000 KCMIL AL         | PATR 1873 CH      | 727002 (C)      | 5                | A5076-191 (A)                                    | A5088-19              | - (A)           | P44ART             | C1000A          |
|                       | 5644              | 727138 (D)      | 6                | S262370 (X)                                      | PTL-1000-2.5          | S729944         | 301                | C1000N          |
|                       | JPT15J4           |                 |                  |  |                       |                 |                    |                 |
|                       | 5644              | 727138 (D)      | 7                | -  | CAL1000NLP            | S729282         | 301                | T1000L          |
|                       | TFT-154E          |                 |                  |  |                       |                 |                    |                 |
| 1000 KCMIL CU         | 5644              | 727138 (D)      | 7                | -  | -                     | S265850         | P44ART             | T1KLCU          |

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| A   | REVISION | -  | -  | -   | JCE/VCR | 03/01/2002 | D   | FIGURE UPDATE | EDM | EJA | GLW | CZH | 10/9/2020 |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | OUTDOOR CABLE TERMINALS FOR POLYETHYLENE CABLES   |                           |                    |          |                     |          |



**INSTALLATION:**

- (A) SUPPLIED WITH CABLE TERMINAL KIT.
- (B) FOR 350, 750 AND 1000 KCMIL CABLE POLE TERMINALS, INSTALL TOP PORTION OF COMPRESSION CONNECTOR IN BOTTOM POSITION OF THE 2-BOLT CONNECTOR (AERIAL LUG).
- (C) DO NOT USE ON UPSWEEP BRACKETS.
- (D) NON-PORCELAIN TERMINALS ARE REQUIRED IN ALL DISTRICTS. FOR SUBSTATION APPLICATION SEE FIGURE 2.
- (E) AERIAL LUG NOT REQUIRED.

**BILL OF MATERIALS:** NONE**NOTES:**

- (X) THIS ITEM IS EXEMPT.

**REFERENCE:**

- a. FOR CONTAMINATION DISTRICTS SEE OH287UG3140.
- b. SEE OH1407UG4207 FOR CABLE TERMINAL MOUNTING INFORMATION.

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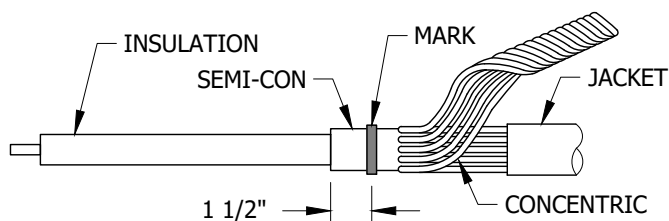
SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

OUTDOOR CABLE TERMINALS FOR POLYETHYLENE CABLES

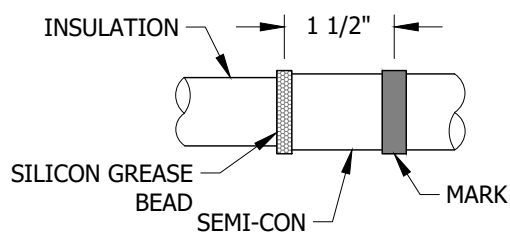
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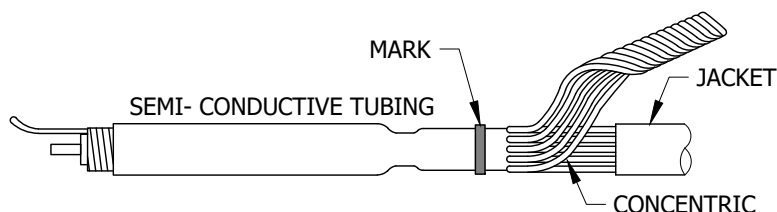
**SCOPE:** THIS STANDARD SHOWS THE APPLICATION OF SEMI CONDUCTIVE SHIELDING ON 15KV XLPE PECN, OR XLPE-PEJ CABLES FOR THE PURPOSE OF CONVERTING LIVEFRONT CONNECTIONS TO LOADBREAK ELBOWS.



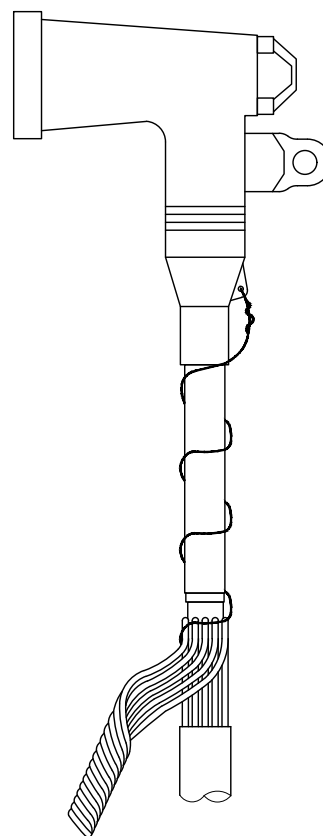
**FIGURE 1** (C)



**FIGURE 2** (D)



**FIGURE 3**



**FIGURE 4** (H)

## INSTALLATION:

- REMOVE LIVE FRONT CONNECTION AND CUT CABLE TO TERMINATION LENGTH. INSTALL ELBOW LUG AND COMPRESS CONNECTION.
- INSPECT INSULATION FOR DEGRADATION OR DAMAGE; MINOR IMPERFECTIONS CAN BE REMOVED WITH A FINE GRADE EMERY CLOTH. CLEAN INSULATION AND SEMI-CONDUCTIVE COVER WITH APPROVED CLEANER.
- PLACE A MARK 1 1/2" FROM THE END OF THE SEMI-CONDUCTIVE COVER.
- APPLY A BEAD OF SILICON GREASE AT THE END OF THE SEMI-CONDUCTIVE COVER TO FILL THE VOID WHERE THE INSULATION STARTS.
- INSTALL SEMI-CONDUCTIVE TUBE OVER CABLE WITH THE PULL RIBBON TOWARD THE END OF THE CABLE.
- PULL THE RIBBON AND ADJUST THE SEMI-CONDUCTIVE TUBING TO THE 1 1/2 INCH MARK ON CABLE SEMI-CONDUCTIVE COVER. UN-WIND RIBBON HOLDING THE END OF THE SEMI-CONDUCTIVE TUBING IN PLACE.
- AFTER THE SEMI-CONDUCTIVE TUBING IS APPLIED TO THE CABLE, FOLLOW ELBOW MANUFACTURERS INSTRUCTIONS AND TRIM SEMI-CONDUCTIVE COVERING TO LENGTH AND APPLY ELBOW.
- SPIRAL WRAP A CONCENTRIC NEUTRAL WIRE FROM THE TURN BACK UP TO THE ELBOW AND ATTACH TO THE DRAIN/BLEED CONNECTION POINT ON THE ELBOW.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

LIVE FRONT TO LOAD BREAK ELBOW CONVERSION  
RE-SHIELDING OF CABLE

UG4113.1



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION               | QUANTITY | STANDARD<br>PAGE | STOCK NUMBER | DESIGN<br>UNITS |
|------|---------------------------|----------|------------------|--------------|-----------------|
| 1    | 3M SEMI-CONDUCTIVE TUBING | AS REQ'D | -                | S776660      | -               |

**NOTES:**

- I. INSPECT QUALITY OF CABLE TO BE RE-SHIELDED. IF CONCENTRIC NEUTRALS SHOW SIGNS OF SEVERE CORROSION OR THE CABLE HAS DEGRADED INSULATION, THE CABLE SHOULD BE REPLACED AND NOT RE-SHIELDED.
- II. SEMI CONDUCTIVE TUBING CAN RE-SHIELD 22 INCHES OF CABLE INSULATION AND CABLE SIZES FROM # 4 COPPER TO 2/0 ALUMINUM.

**REFERENCE:**

- a. RE-TEST CABLE ACCORDING TO THE ELECTRIC STANDARD PRACTICE 107, 229 OR 200 CABLE TESTING STANDARDS.

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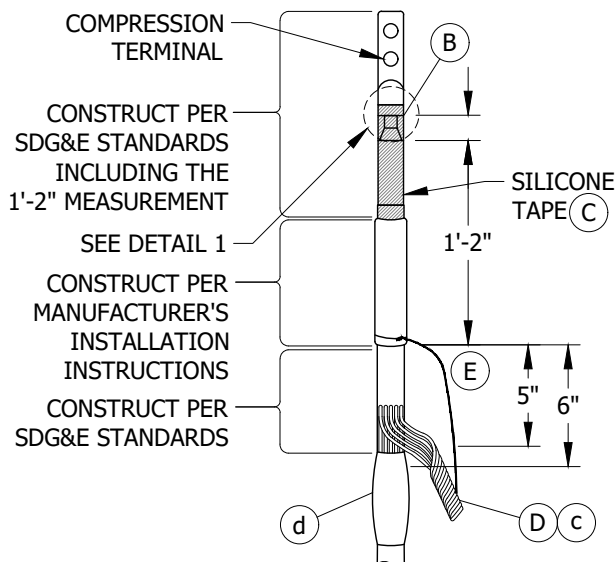
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

LIVE FRONT TO LOAD BREAK ELBOW CONVERSION  
RE-SHIELDING OF CABLE

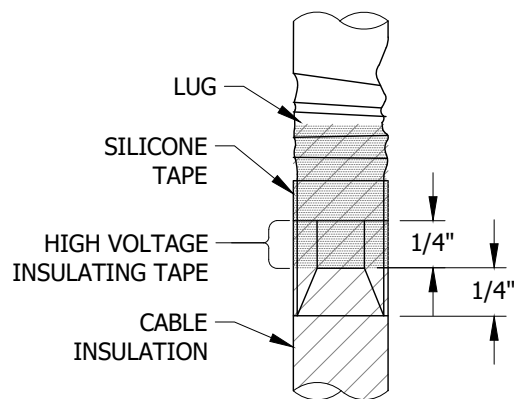
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**SCOPE:** THIS STANDARD SHOWS LIVEFRONT TERMINATION ON HIGH VOLTAGE CABLE FOR EXISTING FACILITIES.



**FIGURE 1**



**DETAIL 1**

**TABLE 1**

| AL 175 MIL XLPE CABLES  |                      |              |                   |              |
|-------------------------|----------------------|--------------|-------------------|--------------|
| CONDUCTOR SIZE/MATERIAL | COMPRESSION TERMINAL |              | STRESS RELIEF KIT |              |
|                         | STOCK NUMBER         | DESIGN UNITS | CATALOG NUMBER    | STOCK NUMBER |
| #2 SOL AL               | S728688              | SC-#02       | 5671              | S732978      |
| #2/0 AL                 | S728696              | SC-2/0       |                   |              |
| 350 KCMIL AL            | S728864              | SC-350       | 5672              | S732972      |
| 750 KCMIL AL            | S72980               | SC-750       |                   |              |
| 1000 KCMIL AL           | S729282              | SC1000       |                   |              |

**TABLE 2**

| CU 220 MIL HMWPE CABLES |                      |              |                   |              |
|-------------------------|----------------------|--------------|-------------------|--------------|
| CONDUCTOR SIZE/MATERIAL | COMPRESSION TERMINAL |              | STRESS RELIEF KIT |              |
|                         | STOCK NUMBER         | DESIGN UNITS | CATALOG NUMBER    | STOCK NUMBER |
| #4 CU                   | S259040              | SC-#4C       | 5671              | S732978      |
| #2 CU                   | S259008              | SC-#2C       |                   |              |
| #4/0 CU                 | S729792              | SC4/0C       | 5672              | S732972      |
| 50 KCMIL CU             | S729856              | SC500C       |                   |              |
| 1000 KCMIL CU           | S265850              | SC-1KC       |                   |              |

**INSTALLATION:**

- CONSTRUCT STRESS RELIEF KIT INSTALLATION AS SHOWN IN SKETCH. DESIGN UNIT INCLUDES COMPRESSION TERMINAL AND STRESS RELIEF KIT.
- BEVEL TOP EDGE OF CABLE INSULATION BACK 1/4". FOR ALUMINUM CABLES LEAVE 1/4" BARE CONDUCTOR BELOW COMPRESSION TERMINAL AND SEAL THE CABLE INSULATION TO THE TERMINAL WITH A MINIMUM OF THREE HALF-LAP LAYERS OF HIGH VOLTAGE INSULATING TAPE (STOCK NUMBER S720480). FOR COPPER CABLES LEAVE 1/2" GAP.
- USE MODERATE OR SLIGHT TENSION TO APPLY SILICONE TAPE (STOCK NUMBER S720384). HALF-LAP TAPE STARTING ABOUT 1/2" BELOW TOP OF STRESS RELIEF KIT AND ENDING 1/4" WAY UP THE LUG. DO NOT END TAPE INSIDE THE CRIMP OF THE COMPRESSION TERMINAL, BECAUSE IT MAY COLLECT MOISTURE.
- GROUND STRESS RELIEF KIT. USE A PIECE OF NO. 14 SOLID COPPER WIRE (STOCK NO. S812934) OR A SURPLUS PIECE OF CONCENTRIC NEUTRAL TAIL THAT IS LONG ENOUGH TO REACH THE NEAREST COMPRESSION CONNECTOR. DO NOT USE ANY CONCENTRIC NEUTRAL ATTACHED TO THE CABLE UNLESS THE CABLE IS 2/0 OR 2 SOLID TRIPLEX.

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1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

LIVE FRONT CABLE TERMINATIONS,  
POLYETHYLENE CABLES (NEW CABLES)

**UG4121.1**



**INSTALLATION (CONT'D):**

- (E) FOR INSTALLATIONS IN EXISTING LIVE FRONT EQUIPMENT, INSTALL THE CONCENTRIC NEUTRAL AT THE SAME HEIGHT AS EXISTING CABLES AND DELETE THE 5 INCH MEASUREMENT.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- a. SEE UG4111 FOR OUTDOOR TERMINATIONS.
- b. SEE UG4122 FOR INDOOR CABLE TERMINATIONS FOR EXISTING CABLES.
- (C) SEE UG4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMODELED CONNECTORS.
- (d) SEE UG4108 FOR INSTRUCTIONS ON SEALING JACKETED CABLE AND CONCENTRIC NEUTRAL MEASUREMENTS FROM CONNECTORS.
- e. SEE UG4199.203/UG4199.204 FOR LIVE FRONT CABLE TERMINATIONS ON "FIELD MAINTENANCE ONLY" CABLES.

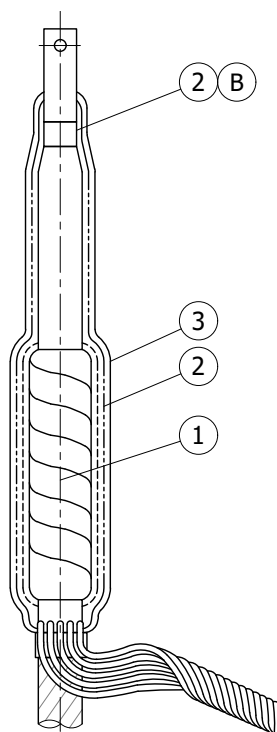
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                  |                           |                    |          |                     |          |
|                 | LIVE FRONT CABLE TERMINATIONS,<br>POLYETHYLENE CABLES (NEW CABLES) |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS STRESS WRAP USED ON EXISTING INSTALLATIONS FOR THE REPLACEMENT OF DAMAGED STRESS CONES.



**FIGURE 1**

**INSTALLATION:**

A. FOLLOW MANUFACTURERS INSTRUCTIONS FOR THE APPLICATION OF STRESS WRAP, HIGH VOLTAGE INSULATING TAPE AND SILICONE TAPE. THE TAPES IN THE BILL OF MATERIAL SHALL BE USED INSTEAD OF TAPES IN MANUFACTURERS INSTRUCTIONS.

(B) ON COPPER CABLE, DO NOT TAPE OVER THE EXPOSED BARE COPPER WIRE BETWEEN THE LUG AND THE CABLE INSULATION.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|----------|---------------|--------------|--------------|
| 1    | STRESS WRAP                   | 1        | -             | S247736      | -            |
| 2    | TAPE, HIGH VOLTAGE INSULATING | AS REQ'D | -             | S720480      | -            |
| 3    | TAPE, SILICONE                | AS REQ'D | -             | S720384      | -            |

**NOTES:**

I. USE STRESS WRAP WHERE IT IS NOT POSSIBLE TO SLIDE A NEW STRESS CONE OVER THE EXISTING LUG, OR TO HELP MAINTAIN CLEARANCES BETWEEN STRESS CONES AND/OR EQUIPMENT BARRIERS.

**REFERENCE:**

a. SEE UG4108 OR UG4121 FOR LIVEFRONT CABLE TERMINATIONS USED ON NEW CONSTRUCTION.

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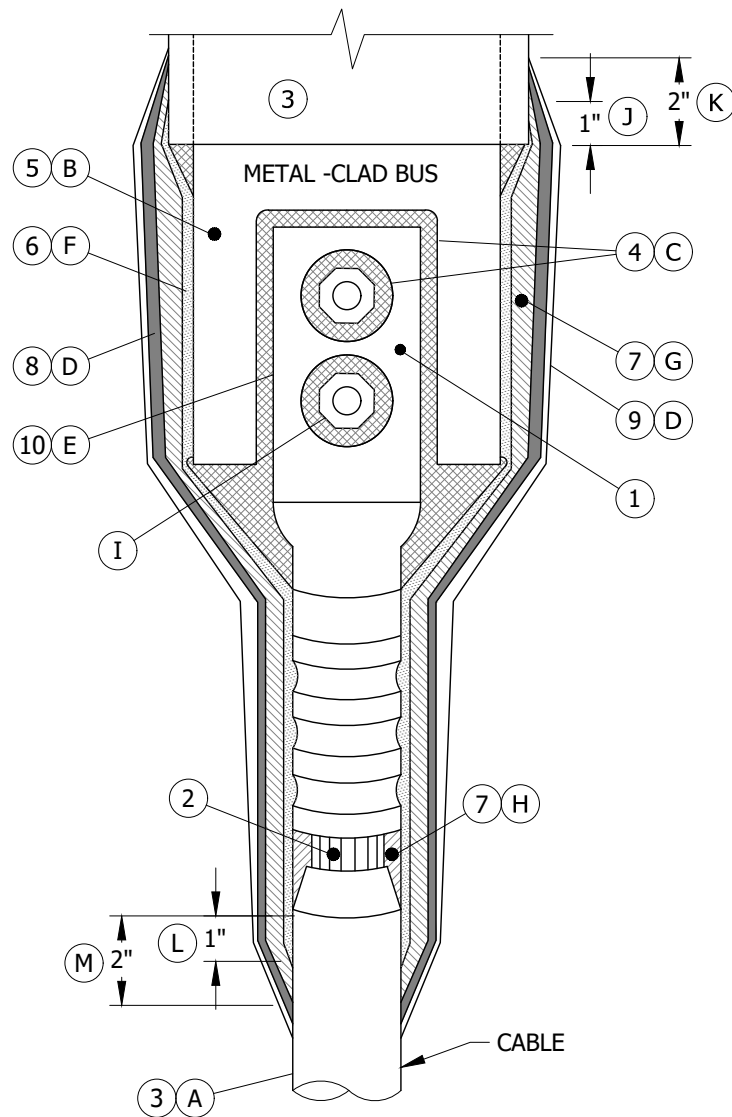
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
INDOOR CABLE TERMINATIONS, POLYETHYLENE CABLES  
(EXISTING CABLES)

UG4122.1



**SCOPE:** THIS STANDARD SHOWS LIVEFRONT TERMINATION FOR SUBSTATION METAL-CLAD SWITCHGEAR.



**FIGURE 1**

**INSTALLATION:**

- (A) CLEAN SURFACE WITH SOLVENT.
- (B) ONE LOOSELY APPLIED HALF-LAPPED LAYER.
- (C) APPLY TO SHARP CORNERS.
- (D) TWO HALF-LAPPED LAYERS.
- (E) TRANSITION PLATE IS REQUIRED FOR ALL ALUMINUM INSTALLATIONS.
- (F) FOUR HALF-LAPPED LAYERS.
- (G) FOURTEEN HALF-LAPPED LAYERS.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

15 KV CABLE PREPARATION FOR SUBSTATION  
METAL-CLAD SWITCHGEAR

UG4127.1



- (H) AS REQUIRED TO FILL VOID.
- (J) TERMINATE 3/4" VARNISH CAMBRIC TAPE 1" UP ONTO FACTORY INSULATION.
- (K) TERMINATE HIGH VOLTAGE INSULATING TAPE 2" UP ONTO FACTORY INSULATION.
- (L) TERMINATE 3/4" VARNISH CAMBRIC TAPE 1" BELOW BEVEL ON CABLE.
- (M) TERMINATE HIGH VOLTAGE INSULATING TAPE 2" BELOW BEVEL ON CABLE.

| ITEM | DESCRIPTION                          | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--------------------------------------|----------|---------------|--------------|--------------|
| 1    | COMPRESSION TERMINAL                 | -        | 4121          | -            | -            |
| 2    | CONDUCTOR                            | -        | -             | -            | -            |
| 3    | FACTORY XLPE INSULATION              | -        | -             | -            | -            |
| 4    | DUCT SIL                             | -        | -             | S247490 (X)  | -            |
| 5    | VARNISH CAMBRIC TAPE, 1 1/2"         | -        | -             | S721056      | -            |
| 6    | VARNISH CAMBRIC TAPE, 3/4"           | -        | -             | S721024      | -            |
| 7    | HIGH VOLTAGE INSULATING TAPE         | -        | -             | S720480      | -            |
| 8    | VINYL PLASTIC TAPE                   | -        | -             | S720580      | -            |
| 9    | SILICONE TAPE, 1"                    | -        | -             | S720384      | -            |
| 10   | TRANSITION PLATE, ALUMINUM TO COPPER | -        | 4168          | S543208      | -            |

☐ ALL NUTS AND BOLTS INSTALLED IN SUBSTATIONS SHALL BE GALVANIZED.

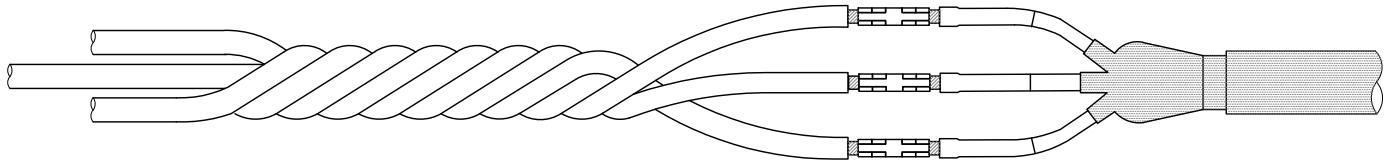
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|                 |            | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS               |                           |     |         |                    |     |          |    |                     |     |     |      |          |
|                 |            | 15 KV CABLE PREPARATION FOR SUBSTATION<br>METAL-CLAD SWITCHGEAR |                           |     |         |                    |     |          |    |                     |     |     |      |          |



**SCOPE:** THIS STANDARD COVERS CONDUCTORS TO SPLICING OF 750 COMPACT EPR TO 500 PILC 15KV CONDUCTORS.



**FIGURE 1**  
750C/500 SLEEVE  
DIE 936 YRB 390304

**TABLE 1**

| FIGURE 1                 |              |              |
|--------------------------|--------------|--------------|
| MANUFACTURER TYCO NUMBER | STOCK NUMBER | DESIGN UNITS |
| HVS-T-15835S             | -            | 750CSL       |
| SLEEVE                   | SXXXXXX      | 750          |

**INSTALLATION:**

- A. CUT CABLES TO CORRECT LENGTH, INSTALL CABLE SUPPORTS, PREPARE CABLES FOR TERMINATION AND FOLLOW MANUFACTURER'S INSTRUCTIONS FOR APPLICATION.

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. IF THE FACILITY IS TOO SMALL FOR TERMINATION PULL THE PILC CABLE OUT TO THE NEXT LARGEST STRUCTURE.

**REFERENCE:** NONE

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

750 COMPACT EPR TO 500 PILC SPLICE

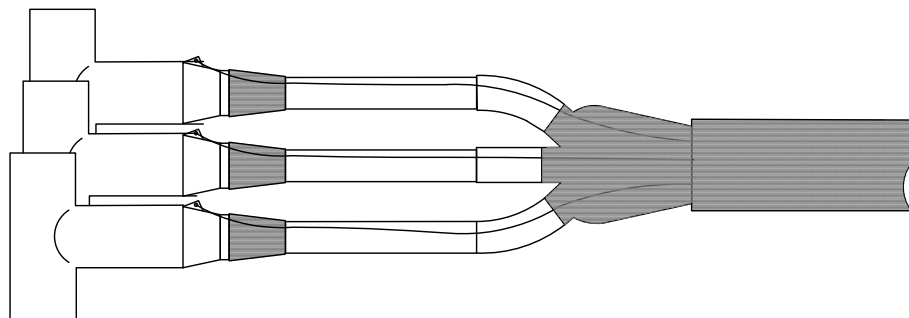
UG4147.1



**SCOPE:** THIS STANDARD COVERS THE RE-TERMINATION OF 3 CONDUCTOR PILC TO 600 AMP ELBOW TEE CONNECTIONS. THIS TERMINATION IS DESIGNED FOR THE LIMITED SPACE TRANSITION FROM 500 KCMIL PILC CABLE TO MOLDED CONNECTIONS ON EPR-PEJ OR XLPECN-PEJ CABLES.

**ATTENTION:**

- \* SDG&E HAS NOT PURCHASED OR INSTALLED PAPER INSULATED LEAD COVERED CONDUCTORS IN THE PAST 10 YEARS. LEAD COVERED CONDUCTORS HAVE HAD A SUPERIOR LIFE SPAN BUT ENVIRONMENTAL ISSUES WITH LEAD AND SAFETY ISSUES HANDLING HOT COMPOUND FILLING AND HOT METAL HAVE CHANGED THE UTILITY INDUSTRY'S FOCUS TO POLYMER CABLES. THE LEAD COVERING CREATES OPERATIONAL AND GROUNDING PROBLEMS, AS WELL AS INCREASED TIME REQUIREMENTS FOR INSTALLATION AND TERMINATION. AS LOADS INCREASE AND RECONSTRUCTION OF THE AREAS THAT HAVE LEAD COVERED CONDUCTORS DECREASES, ALL RE-TERMINATION OF LEAD CABLES SHALL BE WITH COLD OR HEAT SHRINK PRODUCTS DETERMINED BY DISTRIBUTION ENGINEERING AND STANDARDS.



**FIGURE 1**

**TABLE 1**

| FIGURE 1                 |              |              |
|--------------------------|--------------|--------------|
| MANUFACTURER TYCO NUMBER | STOCK NUMBER | DESIGN UNITS |
| HVE-3-1593-SDG&E         | S445870      | 500TRC       |
| 500 MCM LUG              | S258700      | SPD500       |

**INSTALLATION:**

- A. CUT CABLES TO CORRECT LENGTH, INSTALL CABLE SUPPORTS, PREPARE CABLES FOR TERMINATION AND FOLLOW MANUFACTURER'S INSTRUCTIONS FOR APPLICATION.

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. IF THE FACILITY IS TOO SMALL FOR TERMINATION PULL THE PILC CABLE OUT TO THE NEXT LARGEST STRUCTURE.

**REFERENCE:**

- a. CONNECTION APPLICATION STANDARDS: UG4181, UG4183, UG4184 COVER CONNECTIONS THAT MAY BE USED WITH THIS CABLE TERMINATION KIT.

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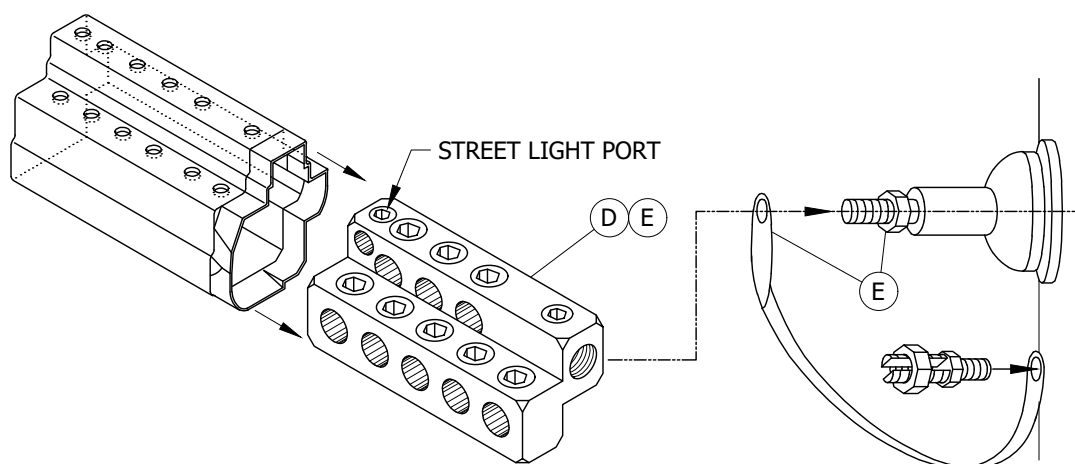
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

3 CONDUCTOR PILC ADAPTER FOR USE WITH  
600 AMP ELBOW TEE'S

UG4148.1



**SCOPE:** THIS STANDARD SHOWS SLIP-FIT CONNECTORS THAT ARE REQUIRED ON ALL NEW SINGLE-PHASE DEADFRONT TRANSFORMER LOW VOLTAGE SECONDARY INSTALLATIONS.



**FIGURE 1**  
SLIP-FIT CONNECTORS

**DETAIL A**

**TABLE 1**

| SLIP-FIT CONNECTORS   |                                  |              |                                  |                 |
|-----------------------|----------------------------------|--------------|----------------------------------|-----------------|
| CABLE SIZE            | SINGLE-PHASE<br>TRANSFORMER SIZE | DESIGN UNITS | SINGLE-PHASE<br>TRANSFORMER SIZE | DESIGN<br>UNITS |
|                       | 25 THRU 75 KVA (5/8" STUD)       |              | 100 THRU 167 KVA (1" STUD)       |                 |
| #8 THRU 350 KCMIL     | 270290 - 8 PORT                  | 350-8S       | 270294 - 8 PORT                  | 350-8L          |
| #6 THRU 500 KCMIL (I) | 270296 - 8 PORT                  | 500-8S       | 270296 - 8 PORT                  | 500-8S          |

**INSTALLATION:**

- A. CONNECTORS MAY BE USED FOR ALUMINUM OR COPPER CONDUCTORS BUT NEVER COMBINE COPPER AND ALUMINUM IN THE SAME PORT.
- B. WHEN NECESSARY MULTIPLE CONDUCTORS PER PORT ARE ALLOWED.
- C. CONNECTOR IS A SLIP FIT CONNECTION EVEN THOUGH THE TERMINAL IS THREADED.
- (D) ON "PS" CONNECTORS, SLIDE CONNECTOR ONTO THE TRANSFORMER STUD, ANGLE CONNECTOR TO ALLOW A STRAIGHT, SMOOTH CABLE ENTRY AND TIGHTEN SET SCREW TO LOCK THE CONNECTOR IN PLACE. TIGHTEN THE JAM NUT AGAINST CONNECTOR.
- (E) ON THE NEUTRAL CONNECTOR, SLIDE THE GROUNDING STRAP ONTO THE TRANSFORMER STUD, THEN SLIDE THE CONNECTOR ALL THE WAY ONTO THE STUD, ANGLE CONNECTOR TO ALLOW A STRAIGHT, SMOOTH CABLE ENTRY, AND TIGHTEN THE SET SCREW CONNECTOR. TIGHTEN JAM NUT AGAINST CONNECTOR. (SEE DETAIL A).
- F. TO PREPARE CABLE, REMOVE INSULATION BY PENCILING, WIRE BRUSH CONDUCTOR AND APPLY INHIBITOR.
- G. INSERT THE CONDUCTOR IN THE PORT AND TIGHTEN SET SCREW. CAUTION SHOULD BE EXERCISED TO ENSURE THAT NO STRANDS ARE EITHER SEVERED OR FORCED BACK OUT OF THE PORT WHEN TIGHTENING FIRMLY.
- H. AFTER COMPLETING WORK ON THE SECONDARY CONNECTORS, MAKE SURE ALL CONNECTIONS ARE TIGHTENED FIRMLY.

**BILL OF MATERIALS:** NONE

**NOTES:**

- (I) USE ONLY WHEN 500 KCMIL CABLES ARE BEING INSTALLED.

**REFERENCE:** NONE

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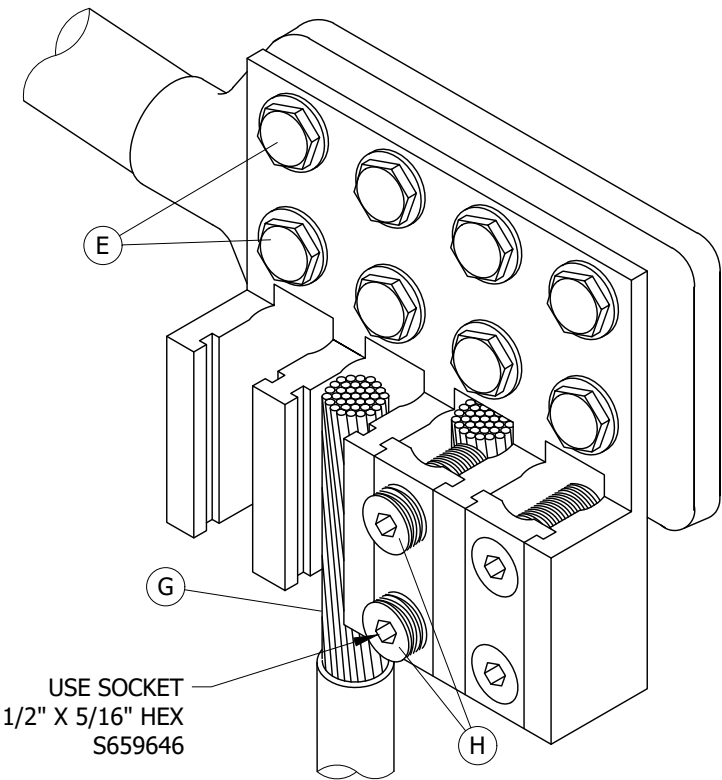
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SLIP-FIT CONNECTORS

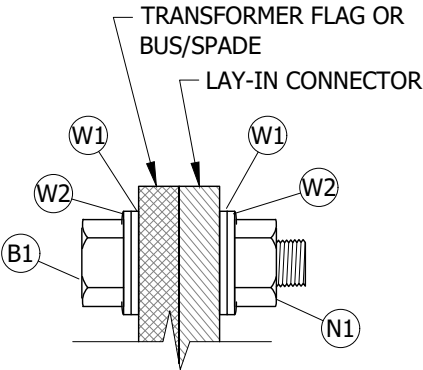
UG4167.1



**SCOPE:** THIS STANDARD COVERS THE INSTALLATION OF LAY-IN SECONDARY TRANSFORMER CABLE CONNECTIONS FOR THREE PHASE TRANSFORMERS. THE LAY-IN CONNECTOR REPLACES THE STANDARD SECONDARY LUG APPLICATION FOR TRANSFORMERS. THE LAY-IN CONNECTOR CONDUCTOR RANGE IS 1/0 TO 1000 KCMIL FOR ALUMINUM AND COPPER CABLES.



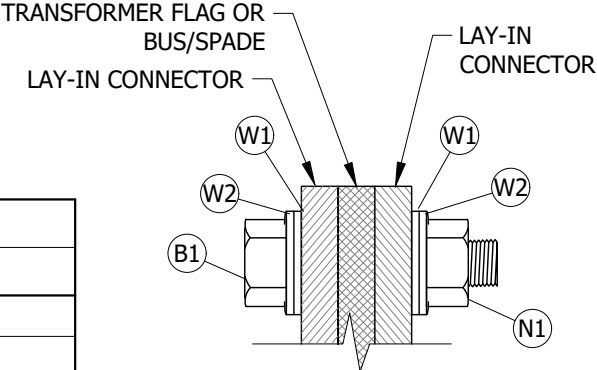
**FIGURE 1**  
LAY-IN CONNECTOR (F)



**FIGURE 2**  
SINGLE CONNECTOR (D)

**TABLE 1**

| HARDWARE |                              |
|----------|------------------------------|
| ITEM     | DESCRIPTION                  |
| B1       | BOLT, 1/2" X , S.S.          |
| N1       | NUT, 1/2" BRONZE             |
| W1       | WASHER, 1/2", FLAT, S.S.     |
| W2       | WASHER, 1/2" BELLVILLE, S.S. |



**FIGURE 3**  
DOUBLE CONNECTOR (D)

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

LAY-IN SECONDARY CONNECTORS

UG4168.1



**TABLE 2** (H)

| CONDUCTOR SIZE AND TORQUE VALUE |                             |
|---------------------------------|-----------------------------|
| CABLE SIZE                      | TORQUE VALUE IN INCH-POUNDS |
| 1/0                             | 200                         |
| 3/0                             | 250                         |
| 350                             | 350                         |
| 500                             | 450                         |
| 750                             | 500                         |
| 1000                            | 500                         |

**TABLE 3**

| CONNECTORS         |            |              |              |
|--------------------|------------|--------------|--------------|
| CONNECTION POINTS  | BOLT HOLES | STOCK NUMBER | DESIGN UNITS |
| 1 CONNECTION PORT  | 2-HOLES    | S256370      | 1CNPOR       |
| 2 CONNECTION PORTS | 4-HOLES    | S256372      | 2CNPOR       |
| 3 CONNECTION PORTS | 6-HOLES    | S256374      | 3CNPOR       |
| 4 CONNECTION PORTS | 8-HOLES    | S256376      | 4CNPOR       |
| 6 CONNECTION PORTS | 12-HOLES   | S256378      | 6CNPOR       |
| 8 CONNECTION PORTS | 16-HOLES   | S256380      | 8CNPOR       |

**TABLE 4**

| PARTS LIST |  |          |
|------------|--|----------|
| ITEM       | DESCRIPTION  | QUANTITY |
| 1          | LAY-IN CONNECTOR                                   | AS REQ'D |
| 2          | PENATROX OXIDE INHIBITOR                           | AS REQ'D |
| 3          | STAINLESS STEEL BOLT SET UP WITH BELLEVILLE WASHER | AS REQ'D |
| 4          | 3M SCOTCH BRIGHT PAD                               | AS REQ'D |

**INSTALLATION:**

- A. SELECT THE CORRECT LAY-IN CONNECTOR FOR THE NUMBER OF CABLE RUNS. THEY MAY BE ARRANGED IN COMBINATIONS TO CONNECT MULTIPLE RUNS.
- B. USE A 3M SCOTCH BRIGHT PAD TO CLEAN ALL CONNECTION SURFACES, INCLUDING THE CABLE LAY-IN CONNECTION AREA.
- C. APPLY A THIN COAT OF OXIDE INHIBITOR ON ALL CONNECTION SURFACES. THIS WILL ENSURE GOOD CONTACT, LOW RESISTANCE, IMPROVE CONDUCTIVITY AND SEAL OUT CONTAMINATES.
- (D) SELECT THE CORRECT STAINLESS STEEL BOLT LENGTH. THE BELLEVILLE WASHER SHALL BE LOCATED BETWEEN SILICON BRONZE NUT AND THE HEAVY DUTY FLAT WASHER. THIS ALSO REQUIRES A FLAT WASHER UNDER THE BOLT HEAD. WHEN TWO LAY-IN CONNECTORS ARE USED, A BELLEVILLE WASHER SHALL BE ADDED BETWEEN THE BOLT HEAD AND THE WASHER.
- (E) INSTALL ALL NECESSARY BOLTS AND TIGHTEN DOWN IN A CROSS PATTERN. ALL 1/2" BOLTS SHOULD BE TORQUED TO 44 FT-LBS IN THE SAME PATTERN. MAKE SURE THE BELLEVILLE WASHERS ARE FLAT.
- (F) INSTALL CABLE AND CUT TO CORRECT LENGTH TO FIT INTO MILLED OUT AREA ON BODY OF LAY-IN PLATE.
- (G) STRIP 3" OF INSULATION FROM THE END OF CONDUCTOR AND INSTALL IN LAY UP POSITION, INSTALL COVER PLATE WITH HEX SCREWS.
- (H) THE 5/16" HEX SCREWS SHALL BE TIGHTENED DOWN EVENLY, TIGHTEN THE BOTTOM SET SCREW FIRST.

**BILL OF MATERIALS:** NONE**NOTES:**

- I. LAY-IN CONNECTORS MAY BE APPLIED ON BOTH SIDES OF THE TRANSFORMER FLAG FOR MULTIPLE CONDUCTOR INSTALLATIONS. THE TORQUE SCREW REQUIRES A 5/16" HEX DRIVE SOCKET TO TORQUE CABLE CONDUCTOR HEX SCREWS.
- II. LAY-IN CONNECTORS MAY BE ARRANGED BY THE NUMBER OF LAY-IN POSITIONS TO FILL THE NUMBER OF CABLES REQUIRED ON EACH TRANSFORMER FLAG. THE LAY-IN CONNECTORS MAY ONLY EXTEND ONE POSITION MORE THAN THE TRANSFORMER BUSHING; IT MUST HAVE SAFE CLEARANCE FROM THE CLOSED AIR CABINET DOOR WHEN THIS IS DONE.
- III. DUE TO CLEARANCE ISSUES IN SOME ERMCO THREE-PHASE TRANSFORMERS, LAY-IN CONNECTORS MAY NOT BE USED.

**REFERENCE:** NONE

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|-----|----------|----|----|-----|--------|------------|-----|-------------------|-----|-----|-----|-----|------------|
| C   | REVISION | -  | -  | -   | TR/MJC | 12/13/2011 | F   |                   |     |     |     |     |            |
| B   | REVISION | -  | -  | -   | MC/TR  | 04/29/2008 | E   |                   |     |     |     |     |            |
| A   | REVISION | -  | -  | -   | JJ/TR  | 10/26/2006 | D   | MOVED FROM UG4167 | EDM | JKI | -   | -   | 06/02/2020 |



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2 OF 2

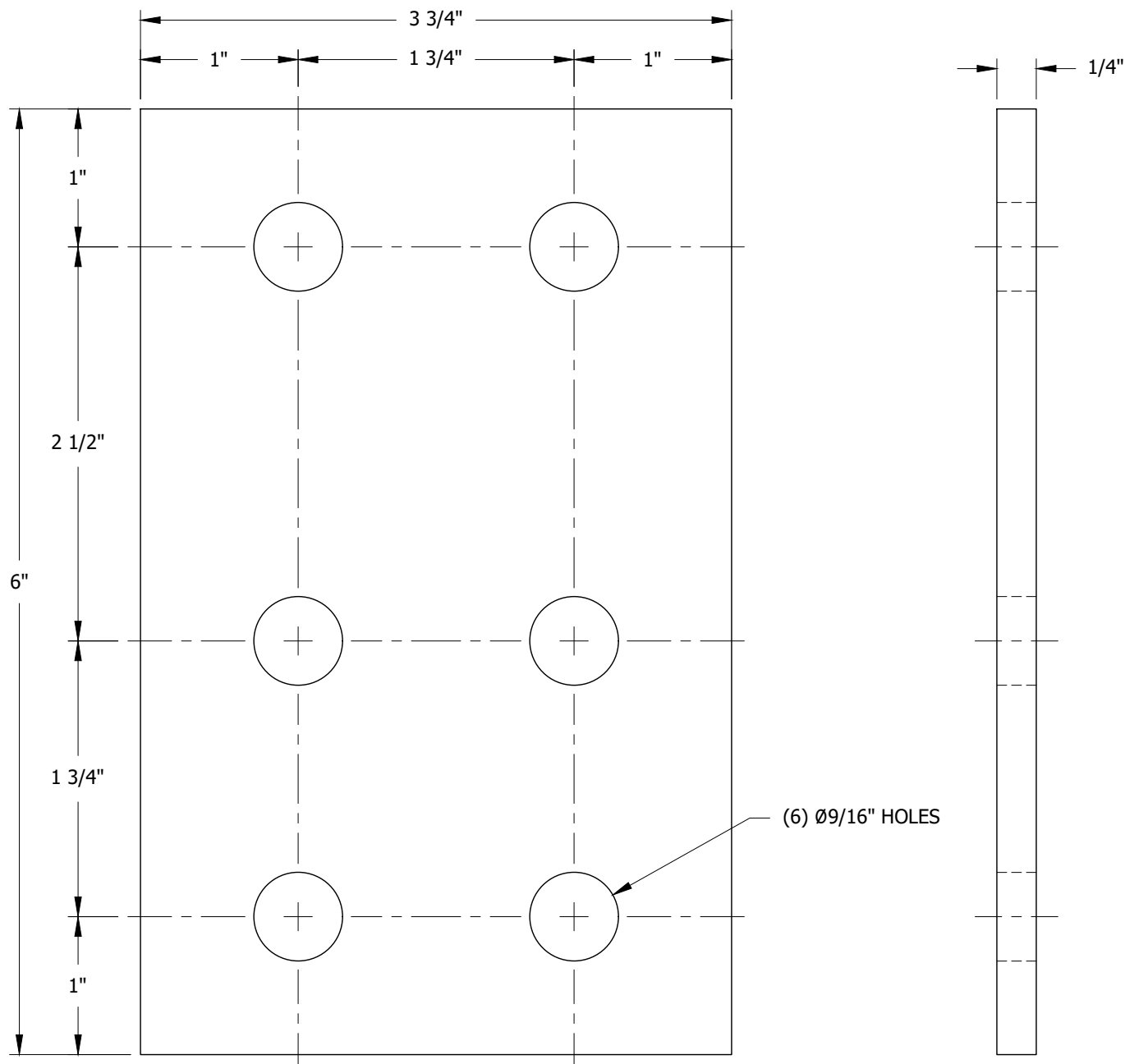
SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

LAY-IN SECONDARY CONNECTORS

UG4168.2



**SCOPE:** THIS STANDARD SHOWS THE EXTENSION PLATE USED TO CONNECT MULTIPLE SECONDARY CABLES TO TRANSFORMERS.



**FIGURE 1**  
FRONT VIEW

**FIGURE 1**  
SIDE VIEW

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. ADAPTER PLATE TO BE TINNED COPPER.

**REFERENCE:** NONE

**TABLE 1**

| STOCK NUMBER |
|--------------|
| S542372      |

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| C   |            |     |    |     |         |          | F   |        |    |    |     |     |      |
| B   | FORMATTING | EDM | JK | --  | --      | 6/2/2020 | E   |        |    |    |     |     |      |
| A   | REVISION   | --  | -- | --  | JLB/RDJ | 1/1/1989 | D   |        |    |    |     |     |      |



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**1 OF 1**

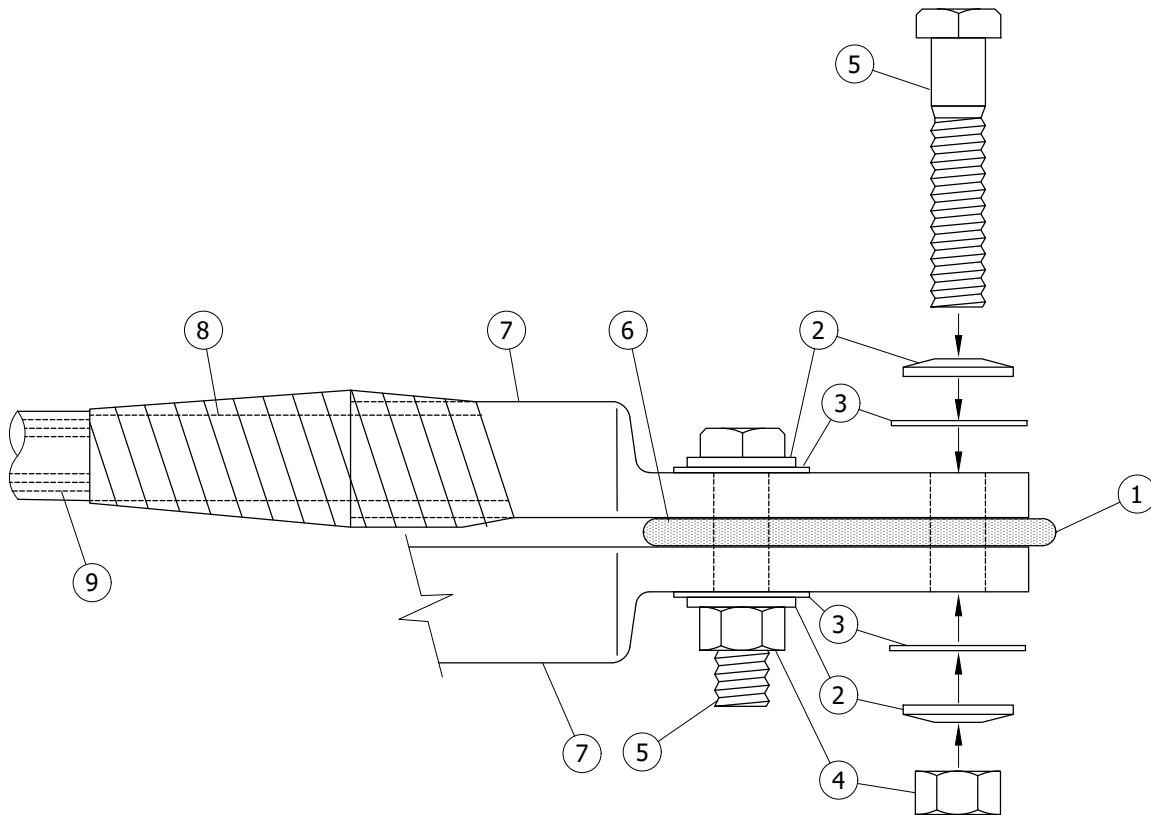
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

SECONDARY EXTENSION PLATE FOR PAD-MOUNT TRANSFORMER

**UG4169.1**



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF A LUG CONNECTOR TO A SECONDARY 600V TRANSFORMER OR BUS.



**FIGURE 1**

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | TRANSFORMER TERMINAL OR BUS                | -        | -             | -            | -            |
| 2    | WASHER, 1/2", BELLEVILLE SS                | AS REQ'D | -             | S798970      | -            |
| 3    | WASHER, 1/2", FLAT, SS                     | AS REQ'D | -             | S799680      | -            |
| 4    | NUT, 1/2", HEX HEAD MACHINE THREAD, BRONZE | AS REQ'D | -             | S506112      | -            |
| 5    | BOLT, 1/2", HEX HEAD MACHINE THREAD, SS    | AS REQ'D | -             | S247200      | -            |
| 6    | INHIBITOR (a)                              | AS REQ'D | 4106          | -            | -            |
| 7    | LUG, ALUMINUM                              | AS REQ'D | 4171          | -            | -            |
| 8    | TAPE, PVC                                  | AS REQ'D | -             | -            | -            |
| 9    | CABLE, ALUMINUM                            | AS REQ'D | 4002          | -            | -            |

**NOTES:** NONE

**REFERENCE:**

(a) REFER TO UG4106 FOR INSTALLATION INSTRUCTIONS.

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| B   | FORMATTING | EDM | JK | -   | -       | 6/2/2020   | E   |        |    |    |     |     |      |
| A   | REVISION   | -   | -  | -   | RSW/VCR | 10/23/2000 | D   |        |    |    |     |     |      |

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1 OF 1

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600V SECONDARY BOLTED CONNECTION AT TRANSFORMER OR BUS

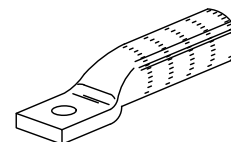
UG4170.1



**SCOPE:** THIS STANDARD SHOWS CONNECTORS TO TERMINATE PRIMARY AND/OR SECONDARY CONDUCTORS ON TRANSFORMER TERMINATING PLATES OR FLAT BUS CONNECTIONS.

**TABLE 1**

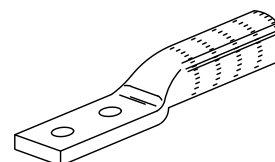
| COMPRESSION TERMINALS - 1 - HOLE FOR 3/8" BOLT - SECONDARY SERVICE |                 |              |                |        |              |          |
|--|-----------------|--------------|----------------|--------|--------------|----------|
| AL WIRE SIZE   | BURNDY DIE SIZE | STOCK NUMBER | SECONDARY WORK |        | SEVICE WORK  |          |
|  |                 |              | DESIGN UNITS   | SAP CU | DESIGN UNITS | SAP CU   |
| 4  | 840             | S729216      | 1LG-04         | 1LG-04 | 1LG-04       | 1LG-04   |
| 2  |                 | S728800      | 1LG-02         | 1LG-02 | 1LG-02       | 1LG-02   |
| 1/0  |                 | S728640      | 1LG1/0         | 1LG1/0 | 1LG1/0       | 1LG1/0   |
| 3/0  |                 | S728960      | 1LG3/0         | 1LG3/0 | 1LG3/0       | 1LG3/0SV |
| 350  |                 | S470464      | 1LG350         | 1LG350 | 1LG350       | 1LG350   |
| 500  | 316             | S729252      | 1LG500         | 1LG500 | 1LG500       | 1LG500   |



**FIGURE 1**  
1 HOLE FOR 3/8" BOLTS

**TABLE 2**

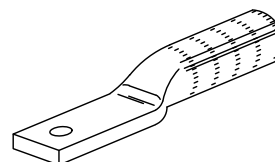
| COMPRESSION TERMINALS - 2 - HOLE FOR 1/2" BOLT - SECONDARY SERVICE |                 |              |                |         |              |          |
|--|-----------------|--------------|----------------|---------|--------------|----------|
| AL WIRE SIZE   | BURNDY DIE SIZE | STOCK NUMBER | SECONDARY WORK |         | SEVICE WORK  |          |
|  |                 |              | DESIGN UNITS   | SAP CU  | DESIGN UNITS | SAP CU   |
| 4  | 840             | S729172      | -              | -       | -            | -        |
| 2  |                 | S728672      | 2LG-02         | 2LG-02  | 2LG-02       | 2LG-02   |
| 1/0  |                 | S728608      | 2LG1/0         | 2LG1/0  | 2LG1/0       | 2LG1/0   |
| 3/0  |                 | S728896      | 2LG3/0         | 2LG3/0  | 2LG3/0       | 2LG3/0   |
| 350  |                 | S729024      | 2LG350         | 2LG350  | 2LG350       | 2LG350SV |
| 500  | 316             | S729256      | 2LG500         | 2LG500  | 2LG500       | 2LG500   |
| 750  | 301             | S729280      | 2LG750         | 2LG750  | 2LG750       | 2LG750SV |
| 1000   |                 | S256420      | 2LG1000        | 2LG1000 | 2LG1000      | 2LG1000  |



**FIGURE 2**  
2 HOLE FOR 1/2" BOLTS

**TABLE 3**

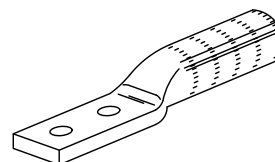
| COMPRESSION TERMINALS - 1 - HOLE FOR 3/8" BOLT - INDOOR PRIMARY TERMINATIONS |                 |              |
|--|-----------------|--------------|
| AL WIRE SIZE   | BURNDY DIE SIZE | STOCK NUMBER |
| 2 SOL  | BG              | S728688      |
| 2/0  | 840             | S728696      |



**FIGURE 3**  
1 HOLE FOR 3/8" BOLTS

**TABLE 4**

| COMPRESSION TERMINALS - 2 - HOLE FOR 1/2" BOLT - INDOOR PRIMARY TERMINATIONS |                 |              |
|--|-----------------|--------------|
| AL WIRE SIZE   | BURNDY DIE SIZE | STOCK NUMBER |
| 350  | 317             | S728864      |
| 750 MCM<br>750 COMP.   | 301             | S729280      |
| 1000 AL  | 302             | S729282      |
| 1000 CU  | P44RT           | S265850      |



**FIGURE 4**  
2 HOLE FOR 1/2" BOLTS

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:** NONE

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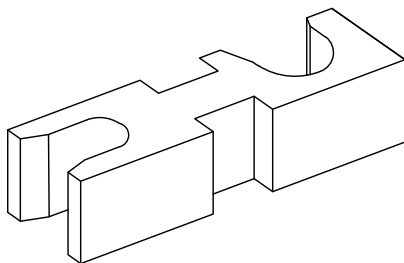
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1 OF 1

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
TRANSFORMER TERMINAL & BUS COMPRESSION TERMINALS  
FOR ALUMINUM CONDUCTORS

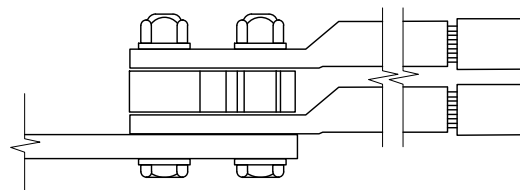
UG4171.1



**SCOPE:** THIS STANDARD SHOWS STACKING ADAPTERS WHICH ARE TO BE USED FOR FLAT BUS CONNECTIONS IN PULL CANS WHERE THERE ARE LESS POSITIONS ON THE LANDING TERMINAL THAN THERE ARE CABLES.



**FIGURE 1**



**FIGURE 2**

**TABLE 1**

| STACKING ADAPTER |                             |              |              |              |
|------------------|-----------------------------|--------------|--------------|--------------|
| AL WIRE SIZE     | MANUFACTURER/CATALOG NUMBER |              | STOCK NUMBER | DESIGN UNITS |
|                  | BURNDY                      | UTILCO/ILSCO |              |              |
| 3/0              | ASA-250U                    | ASL-250      | S102860      | 3/0STA       |
| 350              | ASA-800U                    | ASL-750      | S102862      | 350STA       |
| 500              | ASA-800U                    | ASL-750      | S102862      | 500STA       |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- USE APPROPRIATE STACKING ADAPTER FROM TABLE ABOVE WITH STANDARD 3/0, 350, AND 500 KCMIL 2-HOLE COMPRESSION TERMINALS AS SHOWN ON UG4171.
- STACKING LUGS SHOWN ON FMO UG4171 ARE NO LONGER AVAILABLE.

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| B   | REVISION | -  | -  | -   | KN/DW   | 1/10/2014 | E   |                 |     |    |     |     |            |
| A   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996  | D   | MOVED FROM 4171 | EDM | JK | JES | CZH | 06/02/2020 |



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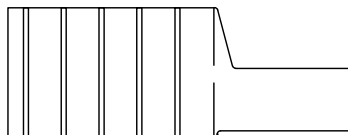
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

STACKING ADAPTERS

UG4172.1



**SCOPE:** THIS STANDARD SHOWS PIN ADAPTERS WHICH ARE TO BE USED WHEN SERVICE LATERAL CONDUCTORS ARE LARGER THAN THE LISTED RATING OF THE TERMINALS SUPPLIED IN SAFETY SOCKET CANS OR RESIDENTIAL COMBINATION PULL SECTION AND METER CANS.



**FIGURE 1**  
PIN ADAPTER

**TABLE 1**

| PIN ADAPTERS |                 |                             |              |            |              |                |        |              |          |
|--------------|-----------------|-----------------------------|--------------|------------|--------------|----------------|--------|--------------|----------|
| AL WIRE SIZE | BURNDY DIE SIZE | MANUFACTURER/CATALOG NUMBER |              |            | STOCK NUMBER | SECONDARY WORK |        | SERVICE WORK |          |
|              |                 | BURNDY                      | UTILCO/ILSCO | PENN-UNION |              | DESIGN UNITS   | SAP CU | DESIGN UNITS | SAP CU   |
| 3/0          | 298             | AYPO3/0                     | ACO-3/0      | TPO-3/0    | S102864      | 3/0PIN         | 3/0PIN | 3/0PIN       | 3/0PIN2M |
| 350          | 299             | AYPO350                     | ACO-350      | TPO-350    | S102866      | 350PIN         | 350PIN | 350PIN       | 350PIN2M |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. 3/0 PIN ADAPTER FOR USE IN STANDARD DUTY CANS (100 AMP) WITH LISTED TERMINAL SIZE RATED NOT TO EXCEED #1/0 AWG CU-AL WIRE. IN THIS CASE, 350 MCM CONDUCTORS CANNOT BE INSTALLED.
- II. EXCEPTION: SOME MANUFACTURERS INSTALL 250 MCM CU-AL TERMINALS IN 100 AMP CANS. IN THIS CASE, #3/0 AWG CONDUCTORS MAY BE INSTALLED WITHOUT THE NEED FOR PIN ADAPTERS. THIS ALSO ALLOWS THE USE OF 350 MCM CONDUCTORS USING 350 ADAPTERS.
- III. 350 PIN ADAPTER FOR USE IN HEAVY DUTY CANS (200 AMP) WITH LISTED TERMINAL SIZE RATED NOT TO EXCEED 250 MCM CU-AL WIRE.

**REFERENCE:** NONE

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| B   | REVISION | -  | -  | -   | KN/DW   | 1/10/2014 | E   |                 |     |     |     |     |            |
| A   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996  | D   | MOVED FROM 4171 | EDM | JKI | JES | CZH | 06/02/2020 |

|                 |   |                           |                    |          |                     |          |
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| SHEET<br>1 OF 1 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG4173.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | PIN ADAPTERS                                      |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS COPPER COMPRESSION FOR COPPER TO COPPER JUMPER AND TAP.



**FIGURE 1**

DOUBLE TAB SQUEEZONS

**TABLE 1**

| LINE SIDE             | TAP SIDE |     |     |     |     |     |     |     |      |      |      | TOOL & INDEX DIE |      | STOCK NUMBER |
|-----------------------|----------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------------------|------|--------------|
|                       | #8       | #6  |     | #4  |     | #2  |     | #1  | #1/0 | #2/0 | #4/0 | NO. INDENTS      |      |              |
|                       | SOL      | SOL | STR | SOL | STR | SOL | STR | STR | STR  | STR  | STR  | MD-6             | Y-35 |              |
|                       |          |     |     |     |     |     |     |     |      |      |      | 3                | 1    |              |
| #6 SOL #4 SOL STR     | X        | X   | X   | X   | -   | -   | -   | -   | -    | -    | -    | WKT              | N/A  | S257952      |
| #4 SOL #2 SOL STR     | -        | -   | -   | X   | X   | X   | -   | -   | -    | -    | -    | WKK              | N/A  | S257920      |
| #2, 1 - 1/0 (ALL STR) | -        | X   | X   | X   | X   | X   | -   | -   | -    | -    | -    | N/A              | 0    | S257792      |
|                       | -        | -   | -   | -   | -   | -   | X   | X   | X    | -    | -    | N/A              | 0    | S257760      |
| #2/0 - 4/0 STR        | -        | -   | -   | X   | X   | X   | -   | -   | -    | -    | -    | N/A              | U-D3 | S257888      |
|                       | -        | -   | -   | -   | -   | -   | X   | X   | X    | -    | -    | N/A              | U-D3 | S257856      |
|                       | -        | -   | -   | -   | -   | -   | -   | -   | -    | X    | X    | N/A              | U-D3 | S257824      |



**FIGURE 2**

CRIMPITS - OVERHEAD USE ONLY

**TABLE 2**

| LINE SIDE                     | TAP SIDE |     |     |     |     |       |       |     |     |     |     | DIE Y 35 | STOCK NUMBER |
|-------------------------------|----------|-----|-----|-----|-----|-------|-------|-----|-----|-----|-----|----------|--------------|
|                               | 6        |     | 4   |     | 2   |       |       | 1   | 1/0 | 2/0 | 4/0 |          |              |
|                               | SOL      | STR | SOL | STR | SOL | 3-STR | 7-STR | STR | STR | STR | STR |          |              |
|                               |          |     |     |     |     |       |       |     |     |     |     |          |              |
| 6-4-2 SOL OR STR              | X        | X   | X   | X   | X   | -     | X     | -   | -   | -   | -   | 0        | S257736      |
| 1/0-2/0-4/0 250 KCM (ALL STR) | -        | -   | -   | X   | X   | X     | X     | X   | X   | X   | -   | U-D3     | S257752      |

**INSTALLATION:**

- A. UNDERGROUND CONCENTRIC NEUTRAL CONNECTIONS SHOULD BE SQUEEZED WITH COMPRESSION CONNECTORS UNLESS OTHERWISE SPECIFIED IN THE UNDERGROUND CONSTRUCTION STANDARDS BOOK.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:** NONE

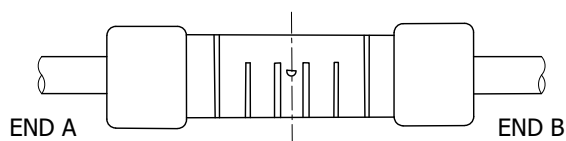
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| C   | EDITORIAL CHANGES  | -  | JC  | JES | CZH | 06/13/2019 | F   | MOVED FROM 4172   | EDM | JKI | -   | -   | 06/02/2020 |
| B   | FIGURE UPDATE      | -  | JAC | JES | CZH | 04/20/2019 | E   | EDITORIAL CHANGES | EDM | JKI | JES | CZH | 04/13/2020 |
| A   | COMPLETELY REVISED | -  | GW  | JS  | MDJ | 07/25/2017 | D   | TABLE UPDATE      | -   | JKI | JES | CZH | 11/12/2019 |

|                 |  |                           |                    |          |                     |                     |
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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                     |
|                 | COPPER COMPRESSION CONNECTORS                                  |                           |                    |          |                     |                     |



**SCOPE:** THIS STANDARD SHOWS CONNECTORS USED FOR SPLICING SECONDARY OR SERVICE CONDUCTORS.



**FIGURE 1**  
SECONDARY OR SERVICE CONDUCTORS

**TABLE 1**

| INSULINK COMPRESSION-SECONDARY OR SERVICE CONNECTORS (NON-TENSION) |                          |                        |     |     |     |     |     |     |     |     |     |                            |        |                    |                |         |                     |                 |               |
|--|--------------------------|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------------------------|--------|--------------------|----------------|---------|---------------------|-----------------|---------------|
| END A  |                          | END B                  |     |     |     |     |     |     |     |     |     | END CAP<br>COLOR CODE<br>C |        | CATALOG NUMBERS    |                |         |                     | STOCK<br>NUMBER |               |
| ACSR<br>OR<br>5005   | ALL<br>ALUM OR<br>COPPER | ALL ALUMINUM OR COPPER |     |     |     |     |     |     |     |     |     |                            |        | ACSR<br>OR<br>5005 | BLACK-B<br>URN | BURNDY  | HOMAC<br>(SOMERSET) |                 | PENN<br>UNION |
|  |                          | 8                      |     | 6   |     | 4   |     | 2   |     | 1/0 |     |                            |        |                    |                |         |                     |                 |               |
|  |                          | SOL                    | STR | SOL | STR | SOL | STR | SOL | STR | STR |     | END A                      | END B  |                    |                |         |                     |                 |               |
| -  | 8 STR<br>&<br>6 SOL      | X                      | -   | -   | -   | -   | -   | -   | -   | -   | -   | GREEN                      | BROWN  | ICS60              | ES6W8W         | U1N81   | -                   | -               |               |
|  |                          | -                      | X   | X   | -   | -   | -   | -   | -   | -   | -   | -                          | GREEN  | GREEN              | ICS61          | ES6W6W  | U1N88               | -               | S258496       |
| 6  | 6 STR<br>&<br>4 SOL      | X                      | -   | -   | -   | -   | -   | -   | -   | -   | -   | BLUE                       | BROWN  | ICS62              | ES4W8W         | U1N61   | -                   | -               |               |
|  |                          | -                      | X   | X   | -   | -   | -   | -   | -   | -   | -   | BLUE                       | GREEN  | ICS63              | ES4W6W         | U1N68   | PIK 46              | S258464         |               |
|  |                          | -                      | -   | -   | X   | X   | -   | -   | -   | -   | 6   | BLUE                       | BLUE   | ICS64              | ES4W4W         | U1N66   | -                   | S258336         |               |
| 4  | 4 STR<br>&<br>2 SOL      | X                      | -   | -   | -   | -   | -   | -   | -   | -   | -   | ORANGE                     | BROWN  | ICS65              | ES2W8W         | U1N41   | PIK 28              | S258384         |               |
|  |                          | -                      | X   | X   | -   | -   | -   | -   | -   | -   | -   | ORANGE                     | GREEN  | ICS66              | ES2W6W         | U1N48   | PIK 26              | S258432         |               |
|  |                          | -                      | -   | -   | X   | X   | -   | -   | -   | -   | 6   | ORANGE                     | BLUE   | ICS67              | ES2W4W         | U1N46   | -                   | S258272         |               |
|  |                          | -                      | -   | -   | -   | -   | X   | X   | -   | -   | 4   | ORANGE                     | ORANGE | ICS68              | ES2W2W         | U1N44   | -                   | S258562 (X)     |               |
| 2  | 2 STR                    | X                      | -   | -   | -   | -   | -   | -   | -   | -   | -   | RED                        | BROWN  | ICS69              | ES2R8W         | U1N21   | -                   | S258368         |               |
|  |                          | -                      | X   | X   | -   | -   | -   | -   | -   | -   | -   | RED                        | GREEN  | ICS70              | ES2R6W         | U1N28   | -                   | S258400         |               |
|  |                          | -                      | -   | -   | X   | X   | -   | -   | -   | -   | 6   | RED                        | BLUE   | ICS71              | ES2R4W         | U1N26   | -                   | S258240         |               |
|  |                          | -                      | -   | -   | -   | -   | X   | X   | -   | -   | 4   | RED                        | ORANGE | ICS72              | ES2R2W         | U1N24   | PIK 12              | S258528         |               |
|  |                          | -                      | -   | -   | -   | -   | -   | -   | X   | -   | 2   | RED                        | RED    | ICS73              | ES2R2R         | U1N22   | -                   | S258624         |               |
| 1/0  | 1/0 STR                  | -                      | X   | X   | -   | -   | -   | -   | -   | -   | -   | YELLOW                     | GREEN  | ICS74              | ES25R6W        | U1N108  | -                   | S258692         |               |
|  |                          | -                      | -   | -   | X   | X   | -   | -   | -   | -   | 6   | YELLOW                     | BLUE   | ICS75              | ES25R4W        | U1N106  | -                   | S258304         |               |
|  |                          | -                      | -   | -   | -   | -   | X   | X   | -   | -   | 4   | YELLOW                     | ORANGE | ICS76              | ES25R2W        | U1N104  | -                   | S258592         |               |
|  |                          | -                      | -   | -   | -   | -   | -   | -   | X   | -   | 2   | YELLOW                     | RED    | ICS77              | ES25R2R        | U1N102  | -                   | S258656         |               |
|  |                          | -                      | -   | -   | -   | -   | -   | -   | -   | X   | 1/0 | YELLOW                     | YELLOW | ICS78              | ES25R25R       | U1N1010 | -                   | S258688         |               |

**TABLE 2**

| COMPRESSION SLEEVE SECONDARY OR SERVICE CONNECTORS (NON TENSION) |                        |                             |            |                                    |
|--|------------------------|-----------------------------|------------|------------------------------------|
| AL WIRE<br>SIZE  | INSTALLING DIE<br>SIZE | MANUFACTURER/CATALOG NUMBER |            | COMPRESSION SPLICE STOCK<br>NUMBER |
|  |                        | HOMAC                       | PENN UNION |                                    |
| 3/0  | 247                    | ASC 3/0                     | BCUA-3/0   | S668420                            |
| 350  | U31ART                 | ASC 350                     | BCUA-350   | S668418 (X)                        |
| 500  | 317                    | ASC 500                     | BCUA-500   | S668424                            |
| 750  | 301                    | ASC 750                     | BCUA-750   | S668426                            |
| 1000   | 302                    | ASC 1000                    | BCUA-1000  | S668428                            |

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| B   | FIGURE UPDATE      | -  | JAC | JES | CZH | 04/20/2019 | E   | EDITORIAL CHANGES | EDM | JKI | JES | CZH | 04/13/2020 |
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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

COMPRESSION CONNECTORS FOR SERVICE CONDUCTORS

OH784.2  
UG4174.2



TABLE 3

| TRIPLEX NEUTRAL SLEEVES (TENSION) |            |                  |                 |                 |              |
|-----------------------------------|------------|------------------|-----------------|-----------------|--------------|
| NEUTRAL SIZE                      | COLOR CODE | INDENTS EACH END | LENGTH - INCHES | CATALOG NUMBERS | STOCK NUMBER |
|                                   |            | MD-6             | KEARNEY         | KEARNEY         |              |
| 6                                 | BLUE       | 6                | 3 1/4           | 30008           | S652690 (X)  |
| 4                                 | ORANGE     | 6                | 3 1/4           | 30009           | S652640      |
| 2                                 | RED        | 6                | 3 1/4           | 30010           | S652576      |
| 1/0                               | CLEAR      | 14 (B)           | 7 1/2           | OHR-1/0-61AJ    | S650274 (X)  |

**INSTALLATION:**

- A. WIRE BRUSH THE CONDUCTORS BEFORE INSTALLING CONNECTOR.
- (B) USE THE WK. 737 DIE IN THE MD-6 TOOL OR U-247 DIE IN THE Y35 TOOL OR KEARNEY INSULINK TOOL.
- (C) MAKE **THREE INDENTS IN EACH END** OF THE COMPRESSION CONNECTOR STARTING FROM THE CENTER AND WORK OUTWARD USING THE FIXED NOSE DIE (5/8) OR W-BG DIE OF THE MD-6 TOOL.
- D. USE NEUTRAL SLEEVES AS TENSION SPLICE ON 5005 AND ACSR SERVICE CABLE NEUTRAL.
- E. USE HEAT SHRINK TUBES OVER CONNECTORS WHEN PLACED IN ANY BELOW GRADE INSTALLATION.

**BILL OF MATERIALS:** NONE**NOTES:**

- I. CONNECTORS WILL ACCEPT EITHER ALUMINUM OR COPPER CONDUCTORS.
- (X) THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

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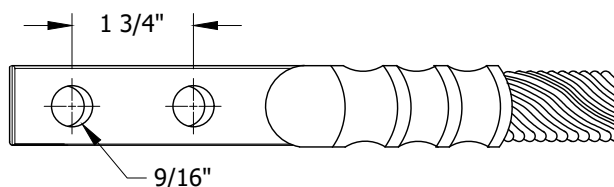
SDG&amp;E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

COMPRESSION CONNECTORS FOR SERVICE CONDUCTORS

OH784.3  
UG4174.3



**SCOPE:** THIS STANDARD SHOWS A 2-HOLE ALUMINUM COMPRESSION TERMINAL, USED FOR TERMINATING ALUMINUM CONDUCTORS ON POLE TOP SWITCH TABS AND TRANSFORMER FLAG CONNECTORS.



**FIGURE 1**

**TABLE 1**

| CAST ALUMINUM ALLOY TERMINALS |        |              |            |            |            |              |                     |                     |                |                  |                  |                   |                  |                  |                    |              |              |
|-------------------------------|--------|--------------|------------|------------|------------|--------------|---------------------|---------------------|----------------|------------------|------------------|-------------------|------------------|------------------|--------------------|--------------|--------------|
| WIRE                          |        |              |            |            |            | TOOL AND DIE |                     |                     | CATALOG NUMBER |                  |                  |                   |                  |                  |                    | STOCK NUMBER | DESIGN UNITS |
| 5005                          |        | ACSR         |            | ALUMINUM   |            | BURNDY       |                     |                     |                |                  |                  |                   |                  |                  |                    |              |              |
| SIZE                          | STRAND | SIZE         | STRAND     | SIZE       | STRAND     | MD6          | Y-35                | Y-46                | HOMAC          | BURNDY           | FRANKEL          | KEARNEY           | PENN-UNION       | ANDERSON         |                    |              |              |
| 2                             | 7      | 2            | 6/1        | 2          | 7          | -            | W-BG<br>5<br>CRIMPS | -                   | -              | -                | -                | -                 | 36918            | -                | -                  | S728672      | CT2A         |
| 1/0                           |        | 1/0          |            | 1/0        |            |              | -                   | U840<br>5<br>CRIMPS | -              | SAK<br>1/0-N     | -                | -                 | 104741-2         | -                | -                  | S728608      | CT1/0A       |
| 3/0                           |        | 3/0          |            | 3/0        |            |              | -                   | U317<br>5<br>CRIMPS | -              | -                | YCAK27R-<br>2G2  | GTN-3/0-<br>2NE16 | -                | -                | VAUD<br>3/0-12BN-S | S728928      | CT3/0A       |
| -                             | -      | 336.4<br>KCM | 18/1       | 350<br>KCM | 19         | 37           | -                   |                     | -              | YCAK31A-<br>2G1  | GTM-35-<br>2NE16 | 36364-2           | KBLUA-<br>035-D2 | VAUD<br>350-12BN | S729024            | -            |              |
| 394.5<br>KCM                  | 19     |              | 26/7       | 400<br>KCM |            |              | -                   |                     | -              | -                | -                | 36364-3           | -                | -                | S729120            | CT336A       |              |
| -                             | -      | 397.5<br>KCM |            | 24/7       | 500<br>KCM | 37           | 61                  | -                   | -              | YCAK361R-<br>2G2 | -                | -                 | -                | -                | -                  | -            | -            |
|                               |        | 636<br>KCM   | 750<br>KCM |            | -          |              |                     | -                   | 342            | SAL<br>750 NTN   | -                | -                 | -                | -                | S729266ⓧ           | CT636A       |              |

**INSTALLATION:**

- THOROUGHLY CLEAN CONDUCTOR WITH WIRE BRUSH BEFORE INSERTING INTO BARREL.
- MAKE OVERLAPPING CRIMPS FROM CONDUCTOR TO PAD.
- USE 1/2" STAINLESS STEEL BOLTS FOR ALUMINUM TO COPPER CONNECTIONS.
- WHEN USING TERMINALS, APPLY INHIBITOR (S247200) AT EACH ALUMINUM CONNECTION.

**BILL OF MATERIALS:** NONE

**NOTES:**

- ALUMINUM COMPRESSION TERMINALS ARE FACTORY FILLED WITH INHIBITOR.

(X) THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

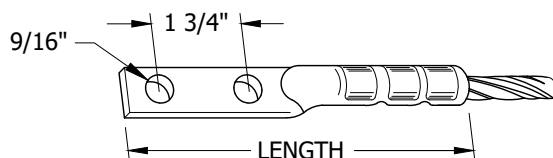
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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                     |
|                 | ALUMINUM COMPRESSION TERMINALS 2-HOLE                          |                           |                    |          |                     |                     |



**SCOPE:** THIS STANDARD SHOWS A 2-HOLE COPPER COMPRESSION TERMINAL, USED FOR TERMINATING COPPER CONDUCTORS ON POLE TOP SWITCH TABS AND TRANSFORMER FLAG CONNECTORS.



**FIGURE 1**

**TABLE 1**

| TINNED COPPER TUBULAR COMPRESSION TERMINALS |           |    |                                  |       |           |          |                  |                |          |             |         |                 |              |              |
|---|-----------|----|----------------------------------|-------|-----------|----------|------------------|----------------|----------|-------------|---------|-----------------|--------------|--------------|
| WIRE  |           |    | TOOL AND DIE SET CATALOG NUMBERS |       |           |          | NUMBER OF CRIMPS | CATALOG NUMBER |          |             |         | LENGTH (INCHES) | STOCK NUMBER | DESIGN UNITS |
|   |           |    | BURNDY                           |       |           | ALCOA    |                  |                |          |             |         |                 |              |              |
| SIZE  | STRANDING |    | MD6                              | Y-35  | Y-45      | 60A      |                  | BURNDY         | DOSSERT  | PENN- UNION | HOMAC   |                 |              |              |
| 1/0   | 7         | 19 | W163                             | -     | -         | -        | 4                | YA25-2N        | DPL10-2N | BBLU 1/0 D3 | L 1/0-N | 3 7/16          | S729664      | CT1/0C       |
|   |           |    | -                                | U25RT | U25RT (D) | -        | 2                |                |          |             |         |                 |              |              |
|   |           |    |                                  | U163  | U163 (D)  | -        | 2                |                |          |             |         |                 |              |              |
| 4/0   | 7         | 19 | W243                             | -     | -         | -        | 3                | YA28-2N        | DPL21-2N | BBLU 4/0 D  | L 4/0-N | 5 9/32          | S729792      | CT4/0C       |
|   |           |    | W BG                             | U28RT | U28RT (D) | -        | 2                |                |          |             |         |                 |              |              |
|   |           |    |                                  |       | U243      | U243 (D) | -                |                |          |             |         |                 |              |              |
| 350 KCM                                     | 19        | 37 | -                                | U267  | U267 (D)  | -        | 6                | YCA31-2N       | -        | -           | -       | 6 1/2           | S729744      | CT350C       |
| 400 KCM                                     | 19        | 37 | -                                | U32RT | U32RT (D) | -        | 4                | YA32-2N        | DPL40-2N | BBLU 040 D  | L 400-N | 5 31/32         | S729824      | CT400C       |
|   |           |    |                                  | U169  | U169 (D)  | -        | 5                |                |          |             |         |                 |              |              |
| 500 KCM                                     | 19        | 37 | -                                | U34RT | U34RT (D) | -        | 4                | YA34-2N        | DPL50-2N | BBLU 050 D  | L 500-N | 6 3/16          | S729856      | CT500C       |
|   |           |    |                                  | U251  | U251 (D)  | -        | 3                |                |          |             |         |                 |              |              |
| 750 KCM                                     | 37        | 61 | -                                | -     | S39RT     | -        | 6                | YA39-2N        | DPL75-2N | BBLU 075 D  | L 750-N | 7               | S729920      | CT750C       |
|   |           |    |                                  |       | -         | L39RT    | 2                |                |          |             |         |                 |              |              |

**INSTALLATION:**

- A. USE 1/2 INCH EVERDUR BOLTS FOR COPPER TO COPPER CONNECTIONS.
- B. USE 1/2 INCH STAINLESS STEEL BOLTS FOR ALUMINUM TO COPPER CONNECTIONS.
- C. USE FOR TERMINATING COPPER CONDUCTORS ON:
  1. TRANSFORMER FLAG CONNECTORS, OH793.
  2. MULTIPLE SERVICE CONNECTOR, OH793.
  3. POLE TOP SWITCH TABS.
- (D) USE ADAPTER DIE 6515 WITH BURNDY Y45 TOOL.
- E. MAKE OVERLAPPING INDENTS FROM CONDUCTOR TO PAD.
- F. WIRE BRUSH THE CONDUCTOR BEFORE INSTALLING TERMINAL.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:** NONE

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

COPPER COMPRESSION TERMINALS 2-HOLE

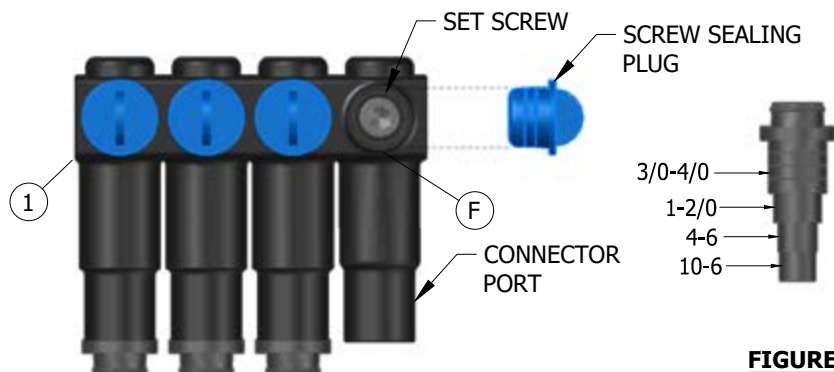
OH784.5  
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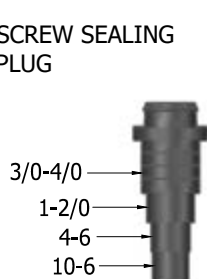
**SCOPE:** THIS STANDARD SHOWS THE EQUIPMENT AND INSTALLATION OF 600 VOLT **TYPE 1** CONNECTORS TO CONNECT SECONDARY AND SERVICE CABLE IN SUBSTRUCTURES.

**ATTENTION:**

- \* SLEEVES FROM DIFFERENT SUPPLIERS ARE NOT INTERCHANGEABLE.



**FIGURE 1**  
TYPE 1 CONNECTOR



**FIGURE 2**  
SLEEVE (D)



**FIGURE 3**  
WIRE STRIPPING (E)

**TABLE 1**

| FIGURE 1 |                                     |                    |                 |              |
|----------|-------------------------------------|--------------------|-----------------|--------------|
| ITEM     | DESCRIPTION                         |                    | STOCK NUMBER    | DESIGN UNITS |
| 1        | CONNECTOR WITH SLEEVES #8 THRU #350 | 4 TERMINALS, AL-CU | S256132 (B)     | SEC-4W       |
|          |                                     | 5 TERMINALS, AL-CU | S256134 (B)     | SEC-5W       |
|          |                                     | 6 TERMINALS, AL-CU | S256136 (B)     | SEC-6W       |
|          |                                     | 7 TERMINALS, AL-CU | S256138 (B)     | SEC6SL       |
|          | CONNECTOR WITH SLEEVES #8 THRU #500 | 4 TERMINALS, AL-CU | S256146 (X) (B) | 500-4W       |
|          |                                     | 5 TERMINALS, AL-CU | S484514 (X) (a) | 500-5W       |
|          |                                     | 6 TERMINALS, AL-CU | S256148 (X) (B) | 500-6W       |
|          |                                     | 8 TERMINALS, AL-CU | S484516 (X) (a) | 500-8W       |
| 2        | INHIBITOR (USE AS REQUIRED)         |                    | -               | -            |

**INSTALLATION:**

- INSTALL THE SOURCE IN A MIDDLE TERMINAL AND LOAD CABLES IN THE REMAINING TERMINALS.
- (B) THIS CONNECTOR UNIT ONLY ALLOWS ONE CONDUCTOR PER TERMINAL THE MINIMUM CABLE SIZE FOR A STREET LIGHT TERMINAL POSITION SHALL BE #8 AL OR CU AND SHALL OCCUPY ONE TERMINAL BY ITSELF.
- C. PREPARE CABLE BY REMOVING ALL DIRT AND/OR MOISTURE FROM THE CABLE ENDS FOR A DISTANCE OF 12 TO 18 INCHES. LIBERALLY APPLY LUBRICANT (SILICONE GREASE) ON CABLE INSULATION AND INTERIOR SURFACES OF INSULATING SLEEVE WITH SUPPLIED LUBRICANT IN PREPARATION OF SLEEVE INSTALLATION.
- (D) CUT THE SLEEVE STRAIGHT ACROSS THE PROPER STEP ACCORDING TO THE CONDUCTOR SIZE BEING INSTALLED. SEE FIGURE 2. FOR THE #8 THRU 350 CONNECTOR THE SLEEVE IS NOT USED FOR 350 KCMIL CABLE. INSERT THE 350 KCMIL DIRECTLY INTO THE CONNECTOR. FOR THE #8 THRU 500 CONNECTOR INSERT THE 500 KCMIL DIRECTLY INTO THE CONNECTOR AND CUT THE SLEEVE FOR 350 KCMIL AND BELOW.

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| B   | FORMATTING | EDM | JKI | -   | -     | 06/02/2020 | E   |        |    |    |     |     |      |
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                    |                           |                    |          |                     |          |
|                 | 0 - 600 VOLT CONNECTORS<br>FOR #8 THRU 500 KCMIL AL OR CU CONDUCTORS |                           |                    |          |                     |          |



## INSTALLATION (CONT'D):

- (E) WIRE STRIPPING
1. SLIDE CONDUCTOR THROUGH SLEEVE UNTIL APPROXIMATELY 4 INCHES OF INSULATION IS SHOWING.
  2. STRIP INSULATION FROM THE END OF THE CONDUCTOR ACCORDING TO THE STRIP GAUGE ON THE CONNECTOR (1 1/8" OR 1 1/4" DEPENDING ON MANUFACTURER). SEE FIGURE 3.
- (F) PULL SCREW SEALING PLUG AND BACK OFF THE SET SCREW.
- G. WIRE BRUSH CONDUCTOR WITH INHIBITOR AND INSERT CONDUCTOR INTO TERMINAL UNTIL IT STOPS AGAINST THE BACK OF THE CONNECTOR. (b)
- H. TIGHTEN SCREW SECURELY AGAINST THE CONDUCTOR.
- J. AFTER THE INITIAL CONNECTIONS HAVE BEEN MADE, VERIFY THAT THE PROPER TORQUE VALUES HAVE BEEN APPLIED, IT IS EXTREMELY IMPORTANT THAT SET SCREWS MEET THE FOLLOWING TORQUE VALUES:
1. #8 THRU #4: 8.5 FT-LBS TORQUE
  2. #2 THRU 350 KCMIL: 25 FT-LBS TORQUE
  3. 500 KCMIL: 35 FT-LBS TORQUE
- K. RE-INSTALL SCREW SEALING PLUG. DO NOT LUBRICATE OR GREASE THE SCREW SEALING PLUG OR ITS PORT.
- L. SLIDE INSULATING SLEEVES UP OVER CABLE SO THAT SLEEVES BUTT AGAINST THE TERMINAL.
- M. USE UNCUT SLEEVES ON SPARE TERMINALS.

**BILL OF MATERIALS:** NONE

## NOTES:

- (X) THIS ITEM IS EXEMPT.

## REFERENCE:

- (a) REFER TO SHEET 3 THIS DOCUMENT.
- (b) SEE UG4106, ALUMINUM CONDUCTOR PREPARATION FOR TERMINATIONS.

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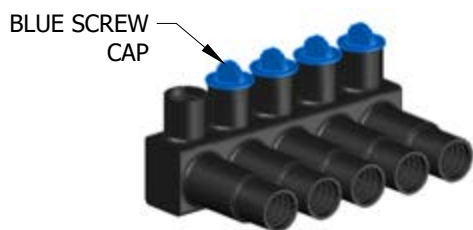
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

0 - 600 VOLT CONNECTORS  
FOR #8 THRU 500 KCMIL AL OR CU CONDUCTORS

UG4175.2



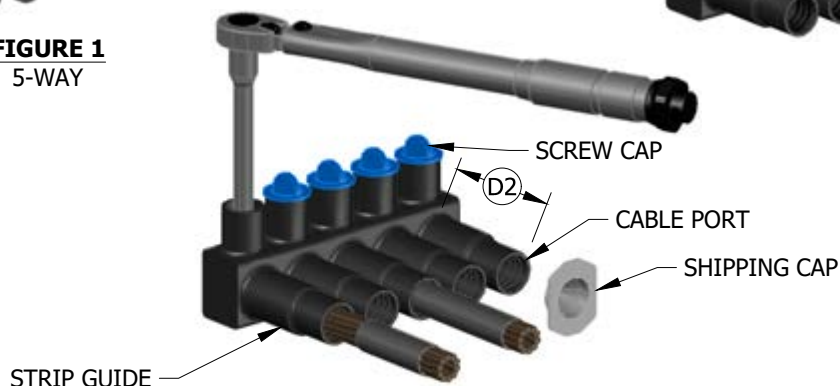
**SCOPE:** THIS STANDARD SHOWS THE EQUIPMENT AND INSTALLATION OF 600 VOLT **GEL PORT TYCO SECONDARY MOLD** CONNECTORS TO CONNECT SECONDARY AND SERVICE CABLE IN SUBSTRUCTURES.



**FIGURE 1**  
5-WAY



**FIGURE 2**  
8-WAY



**FIGURE 3**  
5-WAY INSTALLATION

**INSTALLATION:**

- A. REMOVE SHIPPING CAPS, IDENTIFY CABLE SIZE AND CABLE PORT SIZE.
  1. BLACK CAP FOR #14-350 KCMIL CABLE
  2. BLUE CAP FOR #2-500KCMIL CABLE
- B. CLEAN 6" OF CABLE JACKET.
- C. MARK CABLE 3 3/4" FROM END OF CABLE WITH TAPE OR WHITE MARKER.
- D. CABLE STRIPPING
  1. REMOVE 1 3/4" OF INSULATION FROM END OF CABLE. CHECK STRIP LENGTH WITH THE GUIDE ON THE END OF THE MOLD.
  - ② STRIP LENGTH EQUALS CABLE PORT LENGTH.
- E. SNAP OPEN SCREW CAP USING A 5/16" HEX WRENCH. BACK OFF HEX SCREW COUNTER CLOCKWISE ABOUT 3/4".
- F. INSERT CABLE INTO CABLE PORT. CABLE SHOULD BOTTOM OUT AND THE MARK SHOULD BE FLUSH WITH END OF CABLE PORT. CHECK HEX SCREW IS BACKED OFF WHEN CABLE IS INSTALLED.
- G. TIGHTEN HEX SCREW PER TORQUE GUIDE:
  1. NO. #14-6      175 INCH-LBS
  2. NO. #4-1/0    275 INCH-LBS
  3. NO. #2/0-500   350 INCH-LBS
- H. MAKE SURE CABLE REMAINS SEATED AND DOES NOT BACK OUT WHEN TORQUE IS APPLIED.
- J. CLOSE CAP WHEN COMPLETED MAKING SURE LATCH SNAPS FULLY CLOSED.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:** NONE

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

0-600 VOLT CONNECTIONS AND HANDHOLE INSTALLATION  
FOR #8 THROUGH 500 KCMIL CONDUCTORS

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## UG4175.4

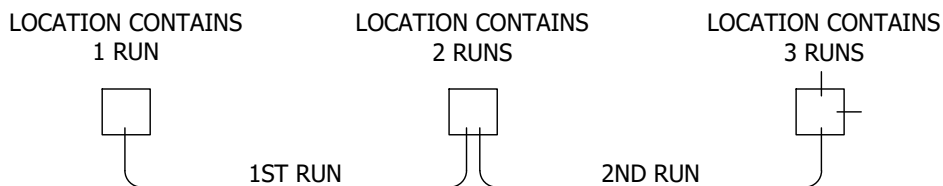


**INSTALLATION:**

- (A) CUT THE CONDUIT (NOT THE NINETY DEGREES). IF A CONDUIT IS (OTHER THAN SERVICE LATERAL CONDUIT) EMPTY FOR FUTURE CABLE PULLING. SECURE THE MEASURING AND PULLING TAPE AND INSTALL AQUA-SEAL (STOCK NUMBER S442976) AND GRAY TAPE (STOCK NUMBER S721120) SECURELY TO PREVENT WATER ENTRY. CONDUITS MUST ENTER HANDHOLE AT ONE END FOR MAXIMUM TRAINING ROOM. SET HANDHOLE(S). COMPACT SOIL TO 90% AROUND HANDHOLE AREA. DO NOT BACKFILL WITH LARGE ROCKS THAT COULD BREAK HANDHOLE WHEN TAMPED. (C) (d)
- B. CUT AND PREPARE CABLE.
- (C) FINAL CONNECTOR POSITION MUST ENSURE THAT CONNECTOR WILL NOT TOUCH CONCRETE OR ABRASION DAMAGE WILL CAUSE PREMATURE FAILURE. PROVIDE PROPER CABLE LENGTHS AND CABLE TRAINING TO PREVENT ABRASION.
- (D) MINIMUM CONDUCTOR BENDING RADIUS IS FIVE TIMES CABLE DIAMETER.
- E. BOLT DOWN LID. (e)
- (F) IF RIGHT OF WAY OR OBSTRUCTIONS CAUSE A PROBLEM THE HANDHOLE MAY BE TURNED TO WHERE LONG SIDE OF THE HANDHOLE PARALLELS THE SIDEWALK OR PROPERTY LINE.

**BILL OF MATERIALS:** NONE**NOTES:**

- I. 3309.1 HANDHOLE SINGLE-PHASE ALLOWS A MAXIMUM OF THREE CONNECTORS WITH EIGHT TERMINAL POSITIONS EACH. THE EIGHT RUNS SHALL NOT EXCEED ONE RUN 500 KCMIL, THREE RUNS 350 KCMIL, TWO RUNS 3/0 AND ONE STREET LIGHT RUN.
- II. 3309.2 HANDHOLE SINGLE-PHASE ALLOWS A MAXIMUM THREE CONNECTORS WITH SEVEN TERMINAL POSITIONS EACH. THE SEVEN RUNS SHALL NOT EXCEED TWO RUNS 500 KCMIL, TWO RUNS 350 KCMIL, AND TWO RUNS 3/0 AND ONE STREET LIGHT RUN.
- III. 3309.2 HANDHOLE THREE-PHASE ALLOWS A MAXIMUM OF FOUR CONNECTORS WITH SEVEN TERMINAL POSITIONS EACH. THIS SHALL NOT EXCEED FIVE RUNS THREE-PHASE CONSISTING OF ONE RUN 350 KCMIL AND FOUR RUNS 3/0 AND ONE SINGLE-PHASE STREET LIGHT RUN.

**EXAMPLE****REFERENCE:**

- a. SEE UG3312 FOR THE HANDHOLE MEASUREMENTS.
- b. SEE UG3370 FOR TRENCH DEPTHS, BASE SHADING AND BACKFILL REQUIREMENTS.
- (C) SEE UG3948 FOR SEALING SERVICE LATERAL CONDUITS AND FOR CONDUIT SEALANT TO USE FOR EXCESSIVE WATER ENTRY PROBLEMS.
- (d) SEE UG3305 FOR SETTING TO FINAL GRADE IF SLOPED.
- (e) SEE G.O. 128.32.7; COVERS.

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

0-600 VOLT CONNECTIONS AND HANDHOLE INSTALLATION  
FOR #8 THROUGH 500 KCMIL CONDUCTORS

UG4175.5



**SCOPE:** THIS STANDARD SHOWS THE EQUIVALENT CONDUCTOR SIZE (PER PHASE) OF THE CONCENTRIC NEUTRAL WIRES FOR UNDERGROUND CABLES. USE THE CHART BELOW IN SELECTING PROPER COMPRESSION CONNECTORS (SQUEEZONS).

**INSTALLATION:**

- A. WIRE #14 AWG SOLID BARE SOFT DRAWN COPPER (STOCK NO. S812934) ON A 10LB. SPOOL IS AVAILABLE FOR GROUNDING PREMOLDED CONNECTORS.

**TABLE 1**

| CONCENTRIC NEUTRAL INFORMATION - UNDERGROUND CABLES |  |  |  |  |
|---|--|--|--|--|
| CABLE   | APPROX<br>EQUIVALENT CONDUCTOR<br>(PER PHASE)<br>AWG | APPROX<br>EQUIVALENT CONDUCTOR<br>(PER PHASE)<br>CIRC MILS | NO. OF<br>CONCENTRIC<br>NEUTRAL WIRES<br>(PER PHASE) | AWG SIZE<br>(PER EACH<br>CONCENTRIC<br>NEUTRAL WIRE) |
| 2 CU 1/C  | #2 - 7 STRAND  | 66,360   | 16   | 14   |
| 2 CU 3-1/C  | #6 - 7 STRAND  | 26,240   | 6  | 14   |
| 2 SOLID AL 1/C                                      | #4 - 7 STRAND  | 41,740   | 10   | 14   |
| 2 SOLID AL 3-1/C                                    | #6 - 7 STRAND  | 26,240   | 6  | 14   |
| 2/0 AL 3-1/C  | #6 - 7 STRAND  | 26,240   | 7  | 14   |
| 4/0 CU 3-1/C  | #2 - 7 STRAND  | 66,360   | 11   | 12   |
| 350 AL 3-1/C NEW                                    | #4 - 7 STRAND  | 41,740   | 9  | 14   |
| 350 AL 3-1/C OLD                                    | #2 - 7 STRAND  | 66,360   | 11   | 12   |
| 500 CU 3-1/C  | #3/0 - 19 STRAND                                     | 167,800  | 17   | 10   |
| 750 AL 3-1/C NEW                                    | #1 - 19 STRAND                                       | 83,690   | 12   | 12   |
| 750 AL 3-1/C OLD                                    | #3/0 - 19 STRAND                                     | 167,800  | 16   | 10   |
| 1000 AL 3-1/C NEW                                   | #1/0 - 19 STRAND                                     | 105,600  | 16   | 12   |
| 1000 AL 3-1/C OLD                                   | #4/0 - 19 STRAND                                     | 211,600  | 20   | 10   |

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- a. SEE OH4174 FOR COPPER COMPRESSION CONNECTORS (SQUEEZONS).

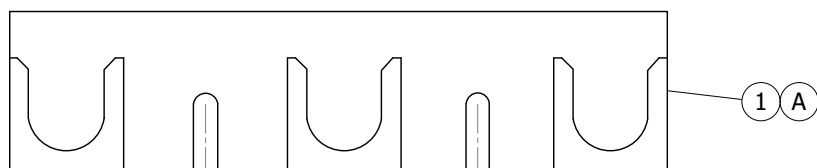
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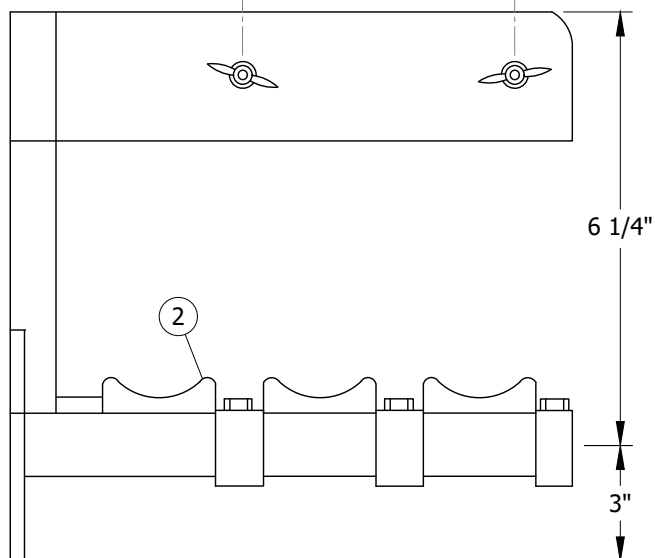
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS             |                           |                    |          |                     |          |
|                 | CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR<br>APPLICATION CHART |                           |                    |          |                     |          |



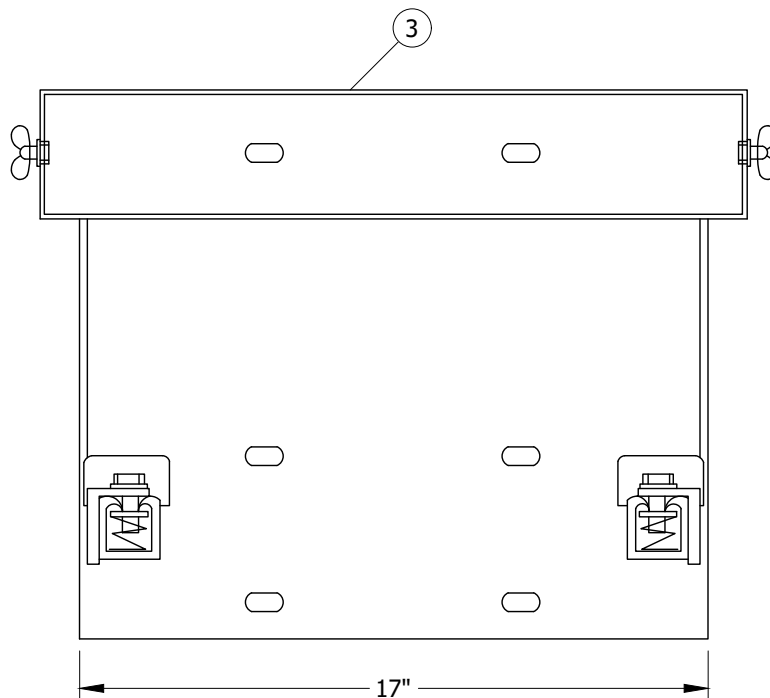
**SCOPE:** THIS STANDARD SHOWS THE TEE BRACKET USED TO INSTALL 600 AMP TEE CONNECTORS AT AN ANGLE IN HANDHOLES AND THE STAND OFF BAR USED TO FASTEN TO THE TEE BRACKET ALLOWING A PLACE TO PARK LOADBREAK ELBOWS.



**FIGURE 1**  
STAND OFF BAR  
FRONT VIEW



**FIGURE 2**  
TEE BRACKET  
SIDE VIEW



**FIGURE 2**  
TEE BRACKET  
FRONT VIEW

## INSTALLATION:

- (A) THE STAND OFF BAR IS TO BE USED AS A TOOL AND SHOULD NOT BE PERMANENTLY INSTALLED WITH THE TEE BRACKET.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION                            | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | BAR, STAND OFF                         | AS REQ'D | --            | S677240      | --           |
| 2    | INSULATOR, UNISTRUT (REPLACEMENT ITEM) | AS REQ'D | --            | S430560      | --           |
| 3    | BRACKET, TEE                           | AS REQ'D | --            | S166675      | T/BRKT       |

## NOTES:

- I. TEE BRACKET COMES WITH ACCESSORIES SHOWN.

**REFERENCE:** NONE

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CABLE HANGERS AND ACCESSORIES

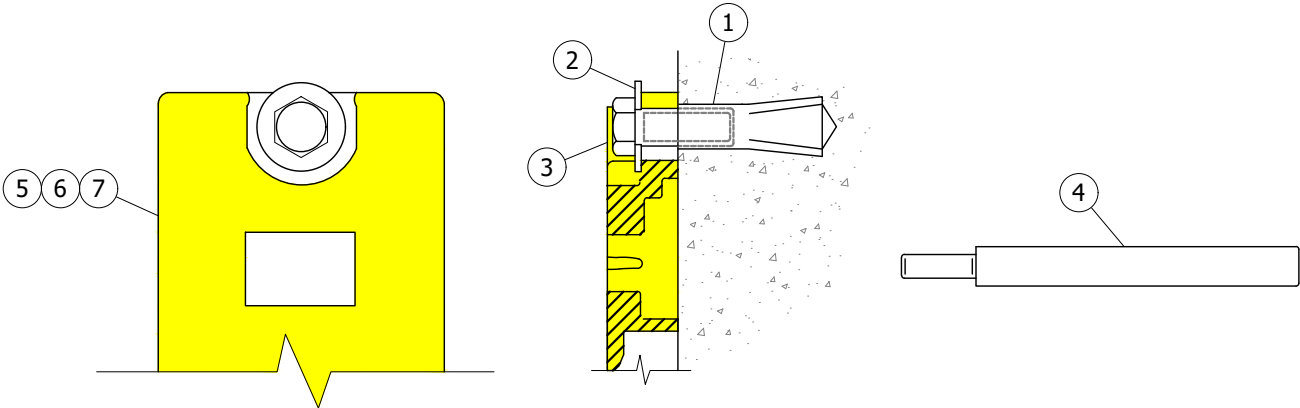
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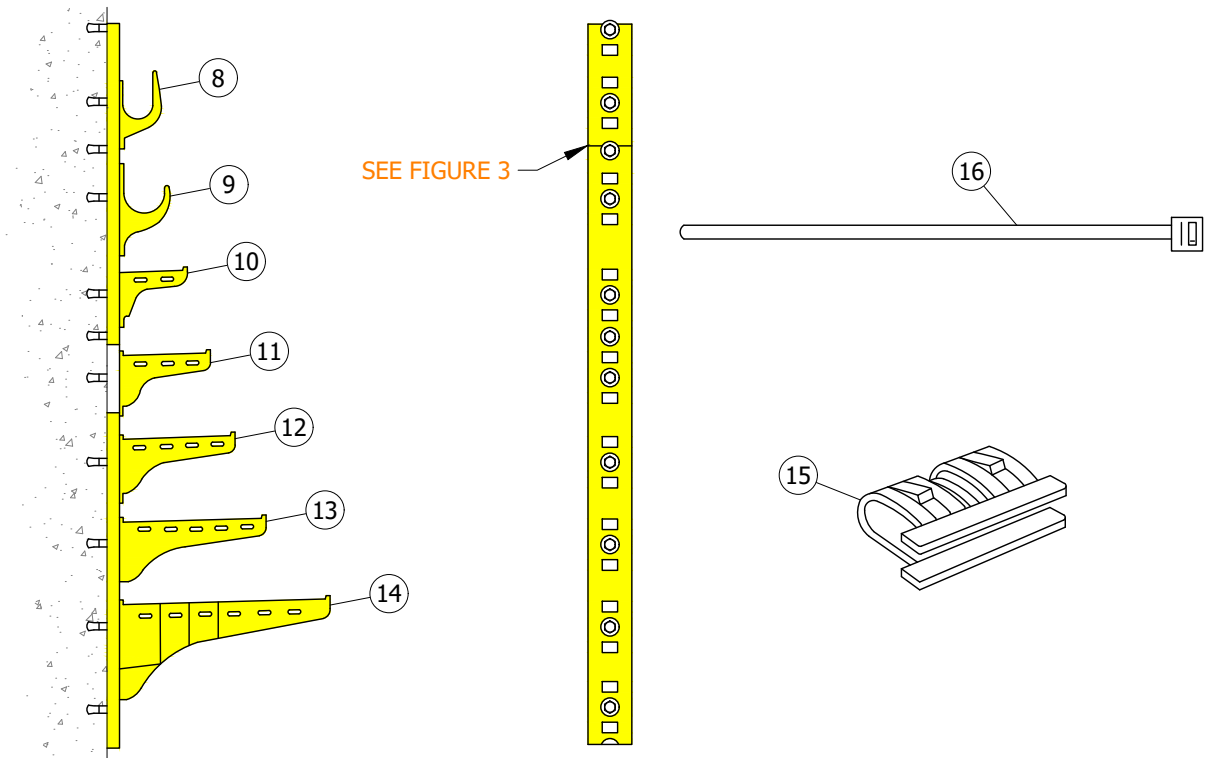
**SCOPE:** THIS STANDARD SHOWS THE APPLICATION AND INSTALLATION OF THE HEAVY DUTY NON-METALLIC CABLE RACK.

**ATTENTION:**

\* IT IS REQUIRED THAT THIS ANCHOR SYSTEM **NOT** BE INSTALLED IN BRICK, BLOCK OR CONCRETE GROUT. THE RACKING SYSTEM CAN SUPPORT 250 LBS TO 450 LBS DEPENDING ON THE LENGTH OF THE CABLE ARM. THIS PRODUCT IS DESIGNED TO SUPPORT CABLE AND CONNECTING LOAD AND IS NOT TO BE USED AS A STEP OR LADDER AT ANY TIME.



**FIGURE 1**  
ANCHOR SYSTEM INSTALLATION (A)



**FIGURE 2**  
STANCHION, CABLE ARMS AND HOOKS (B)

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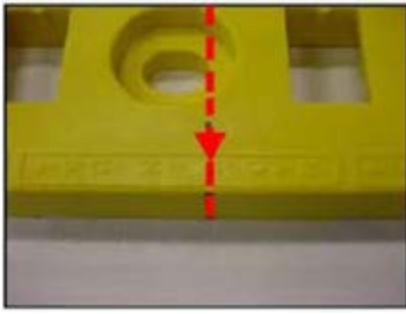
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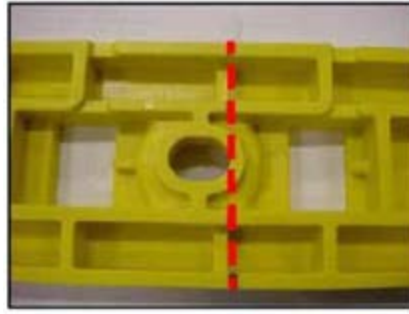
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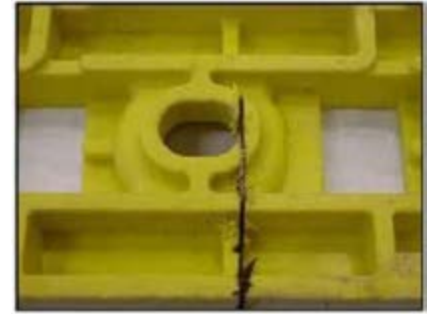




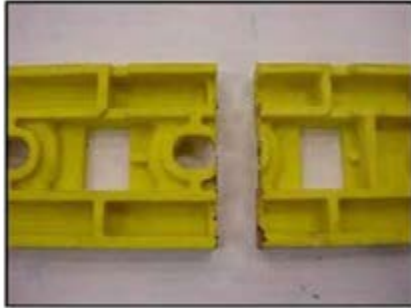
STEP 1



STEP 2 - CUT ABOVE BAR



STEP 3



STEP 4



STEP 5

**FIGURE 3**  
CUTTING STANCHIONS FOR CUSTOM FIT (B3)

## INSTALLATION:

### (A) ANCHOR SYSTEM INSTALLATION

1. DRILL AND INSTALL ANCHOR FOR EACH STANCHION HOLE, **THIS IS REQUIRED.**
2. USE A PLUMB LINE TO MARK DRILL POINTS. THIS WILL INSURE STRAIGHT VERTICAL STANCHION INSTALLATION.
3. DRILL 5/8" DIAMETER HOLE 2" DEEP.
4. BLOW OUT HOLE. IT MUST BE CLEAN TO SET ANCHOR CORRECTLY.
5. DRIVE ANCHOR FLUSH TO 1/16" BELOW SURFACE OF CONCRETE.
6. EXPAND ANCHOR WITH FRT-112 SETTING TOOL. ANCHOR IS PROPERLY SET WHEN SHOULDER OF SETTING TOOL IS FLUSH WITH THE TOP OF THE ANCHOR.

### (B) STANCHIONS, CABLE ARMS AND HOOKS INSTALLATION

1. SELECT STANCHION SIZE AS NEEDED. INSTALL A WASHER AND BOLT INTO EACH BOLT SLOT. TIGHTEN BOLT TO ATTAIN A SNUG FIT. DO NOT OVER TIGHTEN.
2. STANCHIONS SHOULD BE PLACED TO PROVIDE SUPPORT TO CABLE AND CONNECTION AS NEEDED.
3. STANCHIONS MAY BE CUT FOR CUSTOM FIT IN SOME APPLICATIONS. SEE FIGURE 3 FOR CUTTING AT THE CORRECT POINT.
4. ASSEMBLE ARMS AND CABLE HOOKS INTO STANCHION. TAP THE ARMS AND HOOKS DOWN LIGHTLY UNTIL SEATED.
5. INSTALL LOCKING CLIP. PLACE THE LOCKING CLIP INTO RECTANGULAR SLOT ABOVE ARM OR HOOK WITH LOCKING BARBS UP. PUSH LOCK IN UNTIL THE FLANGES ON THE LOCKING CLIP HIT THE STANCHION. THE LOCK WILL CLICK INTO PLACE.
6. USE LARGE BLACK TIE STRAPS TO SECURE CABLE AND CONNECTIONS AS NEEDED.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

HEAVY DUTY NON-METALLIC CABLE RACK

OH4178.2



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                              | MANUFACTURE NUMBER | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|--------------------|----------|---------------|--------------|--------------|
| 1    | ANCHOR, DROP-IN 1/2-13TH, 303 STAINLESS  | FSRM-12            | 1/SLOT   | --            | S108864 (X)  | --           |
| 2    | WASHER, FLAT, STAINLESS STEEL, 1/2"      | --                 | 1/SLOT   | --            | S799680      | --           |
| 3    | BOLT, STAINLESS STEEL, 1/2 - 13 X 1 3/8" | FHC316-16-044      | AS REQ'D | --            | S148810 (X)  | --           |
| 4    | SETTING TOOL                             | FRT-112            | AS REQ'D | --            | S746758      | --           |
| 5    | STANCHION, 12"                           | CR12-B             | AS REQ'D | --            | S677288 (X)  | --           |
| 6    | STANCHION, 24"                           | CR24-B             | AS REQ'D | --            | S677290 (X)  | --           |
| 7    | STANCHION, 36"                           | CR36-B             | AS REQ'D | --            | S677292 (X)  | --           |
| 8    | HOOK, CABLE, 3"                          | 3HDS               | AS REQ'D | --            | S415432 (X)  | --           |
| 9    | HOOK, CABLE, 4.9"                        | 4.9HDS             | AS REQ'D | --            | S610948 (X)  | --           |
| 10   | ARM, CABLE, 6"                           | RA06               | AS REQ'D | --            | S110564 (X)  | --           |
| 11   | ARM, CABLE, 8"                           | RA08               | AS REQ'D | --            | S110570 (X)  | --           |
| 12   | ARM, CABLE, 11"                          | RA11               | AS REQ'D | --            | S110576 (X)  | --           |
| 13   | ARM, CABLE, 14"                          | RA14               | AS REQ'D | --            | S110582 (X)  | --           |
| 14   | ARM, CABLE, 20"                          | RA20               | AS REQ'D | --            | S110590 (X)  | --           |
| 15   | CLIP, LOCKING, BLACK                     | HDL                | AS REQ'D | --            | S237512 (X)  | --           |
| 16   | STRAP, LARGE, BLACK                      | --                 | AS REQ'D | --            | S738440      | --           |

**NOTES:**

- I. NON METALLIC CABLE RACKING STANDARD: UNDERGROUND DEVICES RACKING SYSTEM IS A FIBERGLASS REINFORCED NYLON OF EQUAL STRENGTH TO CURRENT GALVANIZED STEEL. IT IS THERMAL RESISTANT, WITH HIGH DIELECTRIC STRENGTH. IT IS CORROSION AND CHEMICAL RESISTANT AND WILL REDUCE CONTAMINATION AND WATER DISCOLORATION IN SUB-STRUCTURES. CABLE HOOKS AND ARMS HAVE SLOTS TO INSTALL CABLE TIES FOR CONDUCTOR AND CONNECTION TIE DOWN.
- II. CABLE RACKING SYSTEM MAY BE INSTALLED IN ALL WALK-IN VAULTS AND MANHOLES. THIS SYSTEM MAY BE USED IN HAND HOLE APPLICATION WITH ATTENTION TO CABLE ARM LENGTH AS NOT TO ENCROACH IN THE WORKING SPACE.
- III. BEFORE DRILLING AND INSTALLING ANCHORS AND STANCHIONS, CHECK THE GENERAL CONDITION OF THE CONCRETE THAT WILL HOLD THE ANCHOR. THE SURFACE SHOULD BE FLAT FOR A QUALITY INSTALLATION.

(X) THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

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|-----|----------|----|----|-----|-------|-----------|-----|------------|-----|-----|-----|-----|------------|
| C   | REVISION | -- | -- | --  | JJ/TR | 3/20/2008 | F   |            |     |     |     |     |            |
| B   | REVISION | -- | -- | --  | JJ/TR | 3/7/2008  | E   |            |     |     |     |     |            |
| A   | REVISION | -- | -- | --  | JJ/TR | 1/9/1992  | D   | FORMATTING | EDM | JKI | --  | --  | 06/02/2020 |



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SHEET  
3 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

HEAVY DUTY NON-METALLIC CABLE RACK

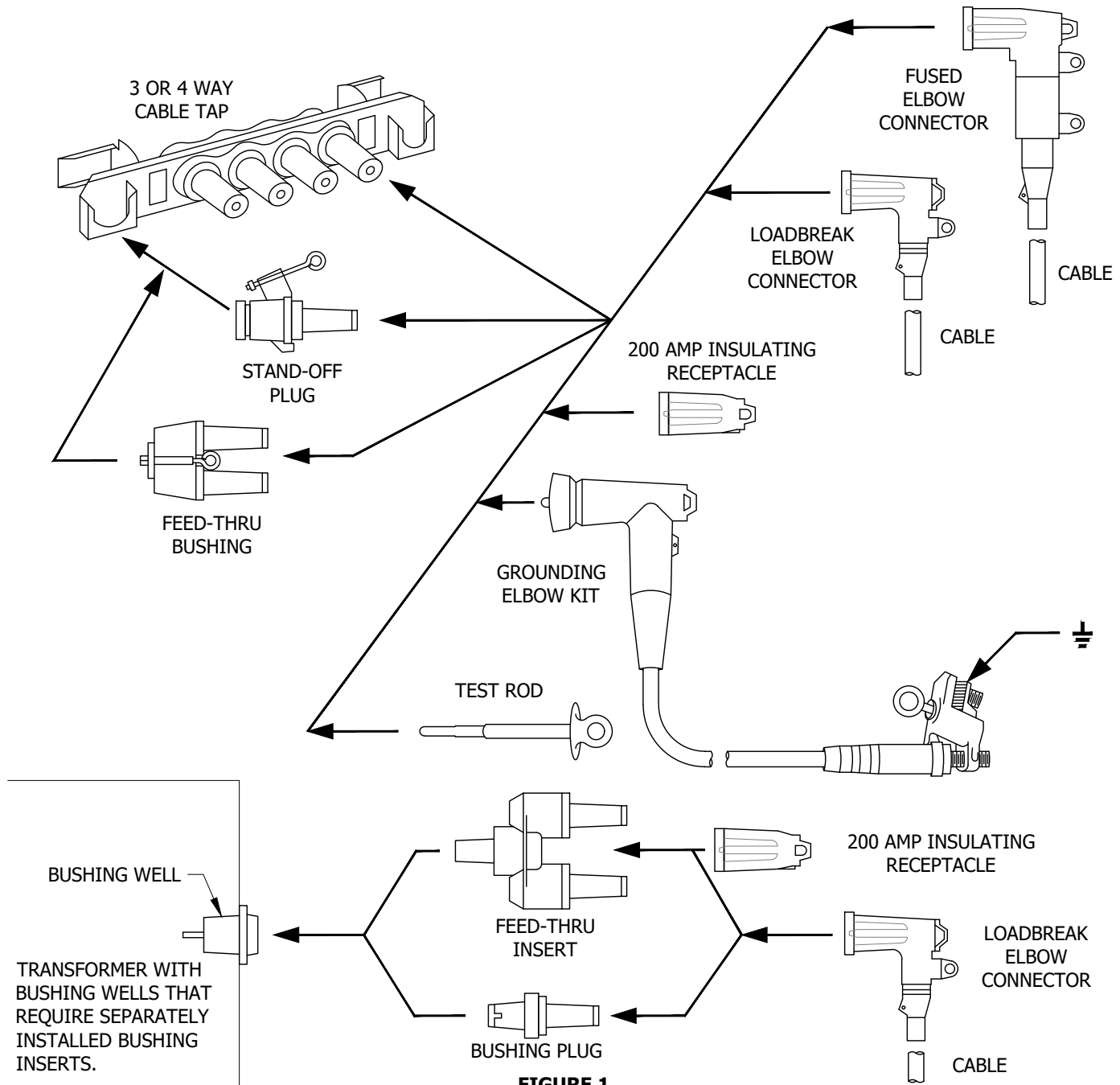
OH4178.3



**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 200 AMP SPLICE AND CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION ORDERS.

**ATTENTION:**

- \* THIS CHART SHOWS HOW 200 AMP LOADBREAK CONNECTORS ARE ASSEMBLED TO FORM SOME OF THE COMBINATIONS SHOWN ON THIS STANDARD.



**FIGURE 1**  
PAD-MOUNTED AND SUBSURFACE CONNECTOR APPLICATION CHART  
200 AMP LOADBREAK

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| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | MOVED FROM UG4180 | EDM | JKI | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION          | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION          | -   | -   | -   | TR/MJC | 11/8/2011 |



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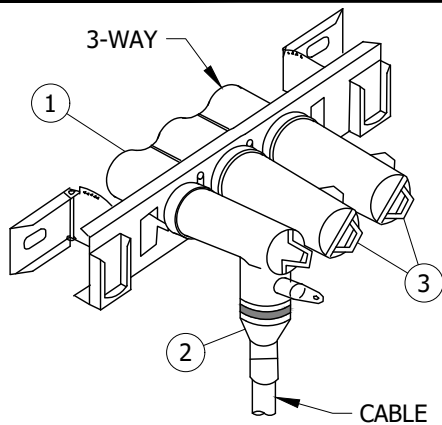
SHEET  
1 OF 6

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 200 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

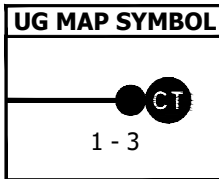
UG4179.1





**FIGURE 2**

PAD-MOUNTED AND SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK

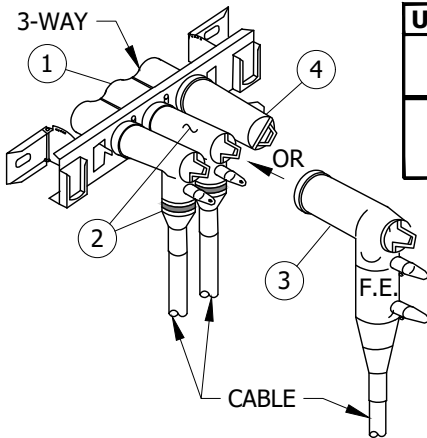


**TABLE 1**

| TYPICAL COMBINATIONS |        |        |
|----------------------|--------|--------|
| CODE                 | 300    | 500    |
| CABLE SIZE           | #2 AL  | 2/0 AL |
| MACRO UNITS          | CC-300 | CC-500 |

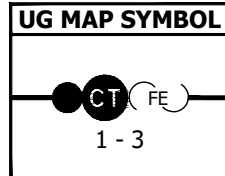
**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION                 | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | TAP, CABLE, 3-WAY           | -         | 1        | -             | S718312      | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL     | 1        | -             | S443838      | -            |
|      |                             | 2/0 AL    |          | -             | S443840      | -            |
| 3    | RECEPTACLE, INSULATING      | -         | 2        | -             | S204304      | -            |



**FIGURE 3**

PAD-MOUNTED AND SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK



**TABLE 2**

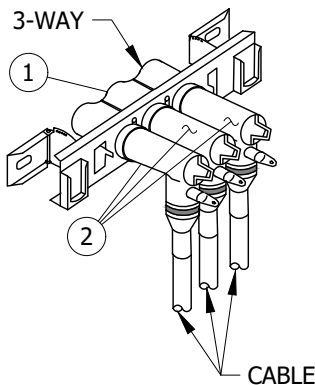
| ADDITIONAL MACRO UNITS |        |        |        |        |        |
|------------------------|--------|--------|--------|--------|--------|
| CC-3BB                 | CC-3BC | CC-3B0 | CC-5BB | CC-5BC | CC-5CC |

**TABLE 3**

| TYPICAL COMBINATIONS |             |               |              |                   |                    |
|----------------------|-------------|---------------|--------------|-------------------|--------------------|
| CODE                 | 330         | 550           | 530          | 5B0               | 5C0                |
| CABLE SIZE           | #2 AL-#2 AL | 2/0 AL-2/0 AL | 2/0 AL-#2 AL | 2/0 AL-#2 AL F.E. | 2/0 AL-2/0 AL F.E. |
| MACRO UNITS          | CC-330      | CC-550        | CC-530       | CC-5B0            | CC-5C0             |

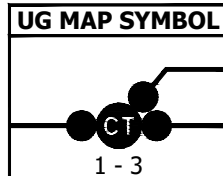
**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION                 | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | TAP, CABLE, 3-WAY           | -         | 1        | -             | S718312      | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL     | 1 OR 2   | -             | S443838      | -            |
|      |                             | 2/0 AL    |          | -             | S443840      | -            |
| 3    | CONNECTOR, ELBOW, FUSED (a) | #2 AL     | 0 OR 1   | -             | S443850      | -            |
|      |                             | 2/0 AL    |          | -             | S443882      | -            |
| 4    | ELBOW, INSULATING           | -         | 1        | -             | S204304      | -            |



**FIGURE 4**

PAD-MOUNTED AND SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK



**TABLE 4**

| TYPICAL COMBINATIONS |             |               |              |               |
|----------------------|-------------|---------------|--------------|---------------|
| CODE                 | 333         | 555           | 533          | 553           |
| CABLE SIZE           | #2 AL-#2 AL | 2/0 AL-2/0 AL | 2/0 AL-#2 AL | 2/0 AL-2/0 AL |
| MACRO UNITS          | CC-333      | CC-555        | CC-533       | CC-553        |

**BILL OF MATERIALS (FIGURE 4):**

| ITEM | DESCRIPTION                 | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | TAP, CABLE, 3-WAY           | -         | 1        | -             | S718312      | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL     | 3        | -             | S443838      | -            |
|      |                             | 2/0 AL    |          | -             | S443840      | -            |

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| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | MOVED FROM UG4180 | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION          | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION          | -   | -   | -   | TR/MJC | 11/8/2011 |

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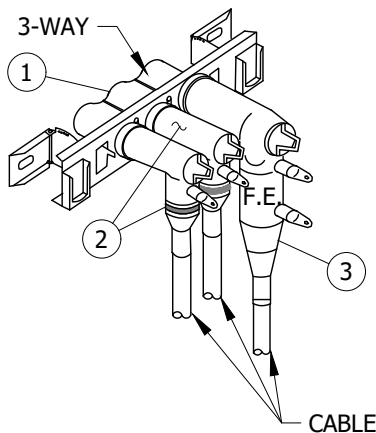
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12KV 200 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

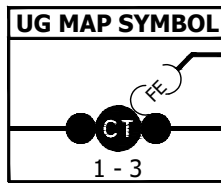
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**FIGURE 5**

PAD-MOUNTED AND SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK

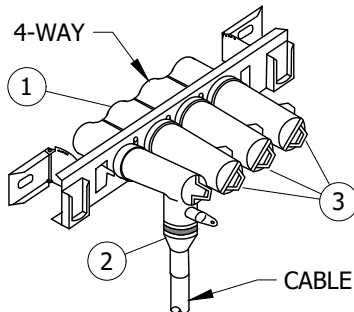


**TABLE 5**

| TYPICAL COMBINATIONS |                           |                              |                            |                             |
|----------------------|---------------------------|------------------------------|----------------------------|-----------------------------|
| CODE                 | 33B                       | 55C                          | 33C                        | 55B                         |
| CABLE SIZE           | #2 AL-#2 AL<br>#2 AL F.E. | 2/0 AL-2/0 AL<br>2/0 AL F.E. | #2 AL-#2 AL<br>2/0 AL F.E. | 2/0 AL-2/0 AL<br>#2 AL F.E. |
| MACRO UNITS          | CC-33B                    | CC-55C                       | CC-33C                     | CC-55B                      |

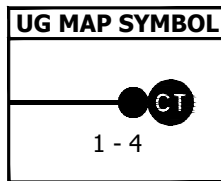
**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                 | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|-----------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 3-WAY           | -               | 1        | -             | S718312            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL<br>2/0 AL | 2        | -             | S443838<br>S443840 | -            |
| 3    | CONNECTOR, ELBOW, FUSED (a) | #2 AL<br>2/0 AL | 1        | -             | S443850<br>S443882 | -            |



**FIGURE 6**

PAD-MOUNTED AND SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK

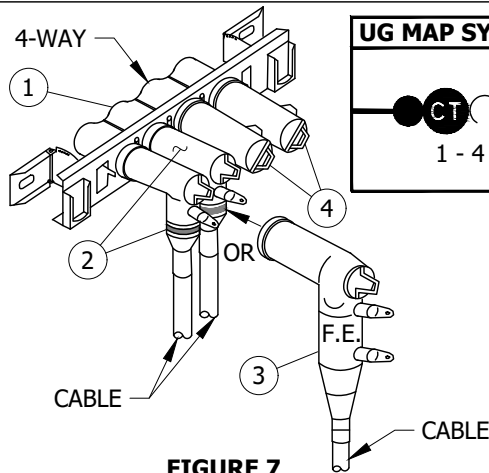


**TABLE 6**

| TYPICAL COMBINATIONS |        |        |
|----------------------|--------|--------|
| CODE                 | 3000   | 5000   |
| CABLE SIZE           | #2 AL  | 2/0 AL |
| MACRO UNITS          | CC3000 | CC5000 |

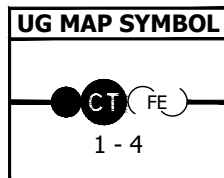
**BILL OF MATERIALS (FIGURE 6):**

| ITEM | DESCRIPTION                 | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|-----------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY           | -               | 1        | -             | S718328            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL<br>2/0 AL | 1        | -             | S443838<br>S443840 | -            |
| 3    | RECEPTACLE, INSULATING      | -               | 3        | -             | S204304            | -            |



**FIGURE 7**

PAD-MOUNTED AND SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK



**TABLE 7**

| ADDITIONAL MACRO UNITS |        |        |        |        |        |        |        |        |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| CC3BB0                 | CC3BC0 | CC3B00 | CC3C00 | CC3CC0 | CC5BBC | CC5BB0 | CC5BC0 | CC5CC0 |

**TABLE 8**

| TYPICAL COMBINATIONS |             |               |              |                   |                    |
|----------------------|-------------|---------------|--------------|-------------------|--------------------|
| CODE                 | 3300        | 5500          | 5300         | 5B00              | 5C00               |
| CABLE SIZE           | #2 AL-#2 AL | 2/0 AL-2/0 AL | 2/0 AL-#2 AL | 2/0 AL-#2 AL F.E. | 2/0 AL-2/0 AL F.E. |
| MACRO UNITS          | CC3300      | CC5500        | CC5300       | CC5B00            | CC5C00             |

**BILL OF MATERIALS (FIGURE 7):**

| ITEM | DESCRIPTION                 | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|-----------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY           | -               | 1        | -             | S718328            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL<br>2/0 AL | 1 OR 2   | -             | S443838<br>S443840 | -            |
| 3    | CONNECTOR, ELBOW, FUSED (a) | #2 AL<br>2/0 AL | 0 OR 2   | -             | S443850<br>S443882 | -            |
| 4    | RECEPTACLE, INSULATING      | -               | 2        | -             | S204304            | -            |

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| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | MOVED FROM UG4180 | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION          | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION          | -   | -   | -   | TR/MJC | 11/8/2011 |

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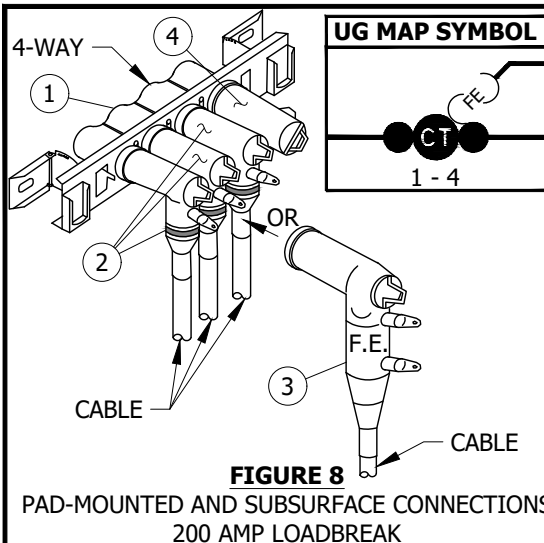
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3 OF 6**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 200 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

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**TABLE 9**

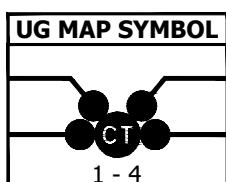
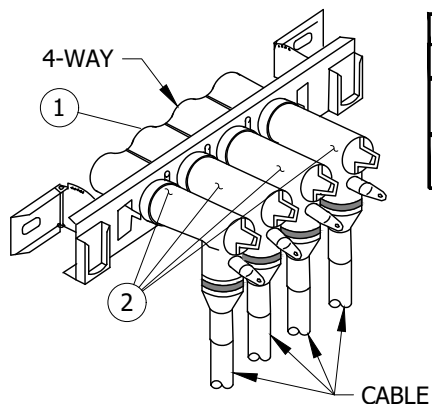
| ADDITIONAL MACRO UNITS |        |        |        |        |        |        |        |        |        |        |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| CC55CC                 | CC53BC | CC53B0 | CC53CC | CC55BB | CC55BC | CC33BB | CC33BC | CC33B0 | CC33CC | CC53BB |

**TABLE 10**

| TYPICAL COMBINATIONS |                       |                          |                        |                         |                             |                              |
|----------------------|-----------------------|--------------------------|------------------------|-------------------------|-----------------------------|------------------------------|
| CODE                 | 3330                  | 5550                     | 5330                   | 5530                    | 55B0                        | 55C0                         |
| CABLE SIZE           | #2 AL-#2 AL<br>-#2 AL | 2/0 AL-2/0 AL<br>-2/0 AL | 2/0 AL-#2 AL<br>-#2 AL | 2/0 AL-2/0 AL<br>-#2 AL | 2/0 AL-2/0 AL<br>#2 AL F.E. | 2/0 AL-2/0 AL<br>2/0 AL F.E. |
| MACRO UNITS          | CC3330                | CC5550                   | CC5330                 | CC5B00                  | CC55B0                      | CC55C0                       |

**BILL OF MATERIALS (FIGURE 8):**

| ITEM | DESCRIPTION                 | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|-----------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY           | -               | 1        | -             | S718328            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL<br>2/0 AL | 2 OR 3   | -             | S443838            | -            |
| 3    | CONNECTOR, ELBOW, FUSED (a) | #2 AL<br>2/0 AL | 0 OR 1   | -             | S443850<br>S443882 | -            |
| 4    | RECEPTACLE, INSULATING      | -               | 1        | -             | S204304            | -            |

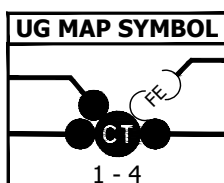
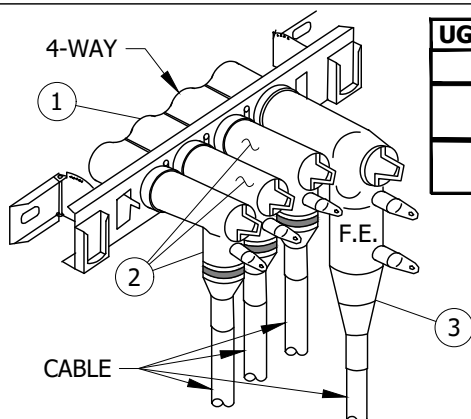


**TABLE 11**

| TYPICAL COMBINATIONS |                             |                                 |                                |                               |                              |
|----------------------|-----------------------------|---------------------------------|--------------------------------|-------------------------------|------------------------------|
| CODE                 | 3333                        | 5555                            | 5533                           | 5533                          | 5333                         |
| CABLE SIZE           | #2 AL-#2 AL-<br>#2 AL-#2 AL | 2/0 AL-2/0 AL-<br>2/0 AL-2/0 AL | 2/0 AL-2/0 AL-<br>2/0 AL-#2 AL | 2/0 AL-2/0 AL-<br>#2 AL-#2 AL | 2/0 AL-#2 AL-<br>#2 AL-#2 AL |
| MACRO UNITS          | CC3333                      | CC5555                          | CC5533                         | CC5533                        | CC5333                       |

**BILL OF MATERIALS (FIGURE 9):**

| ITEM | DESCRIPTION                 | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|-----------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY           | -               | 1        | -             | S718328            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL<br>2/0 AL | 4        | -             | S443838<br>S443840 | -            |



**TABLE 12**

| ADDITIONAL MACRO UNITS |        |
|------------------------|--------|
| CC533B                 | CC533C |

**TABLE 13**

| TYPICAL COMBINATIONS |                                      |  |                                       |   |  |
|----------------------|--------------------------------------|--|---------------------------------------|---|--|
| CODE                 | 333B                                 | 555C                                     | 333C                                  | 555B                                    | 553B                                   |
| CABLE SIZE           | #2 AL-#2 AL<br>-#2 AL<br>-#2 AL F.E. | 2/0 AL-2/0 AL<br>-2/0 AL<br>-2/0 AL F.E. | #2 AL-#2 AL<br>-#2 AL<br>-2/0 AL F.E. | 2/0 AL-2/0 AL<br>-2/0 AL<br>-#2 AL F.E. | 2/0 AL-2/0 AL<br>-#2 AL<br>-#2 AL F.E. |
| MACRO UNITS          | CC333B                               | CC555C                                   | CC333C                                | CC555B                                  | CC553B                                 |

**BILL OF MATERIALS (FIGURE 10):**

| ITEM | DESCRIPTION                 | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|-----------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY           | -               | 1        | -             | S718328            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK | #2 AL<br>2/0 AL | 3        | -             | S443838<br>S443840 | -            |
| 3    | CONNECTOR, ELBOW, FUSED (a) | #2 AL<br>2/0 AL | 1        | -             | S443850<br>S443882 | -            |

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|-----|----------|----|----|-----|---------|----------|-----|-------------------|-----|-----|-----|--------|-----------|
| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | MOVED FROM UG4180 | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION          | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION          | -   | -   | -   | TR/MJC | 11/8/2011 |

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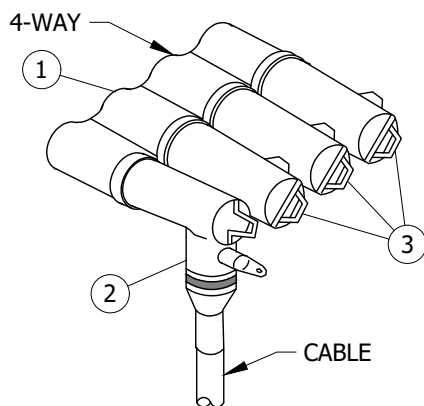
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**4 OF 6**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

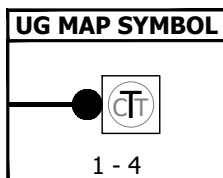
12KV 200 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

**UG4179.4**





**FIGURE 11**  
PAD-MOUNTED  
200 AMP LOADBREAK



**TABLE 14**

| TYPICAL COMBINATIONS |        |        |
|----------------------|--------|--------|
| CODE                 | 3000NB | 5000NB |
| CABLE SIZE           | #2 AL  | 2/0 AL |
| MACRO UNITS          | C-3000 | C-5000 |

**BILL OF MATERIALS (FIGURE 11):**

| ITEM | DESCRIPTION                    | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|--------------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY (NO BRACKET) | -               | 1        | -             | S718338            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK    | #2 AL<br>2/0 AL | 1        | -             | S443838<br>S443840 | -            |
| 3    | RECEPTACLE, INSULATING         | -               | 3        | -             | S204304            | -            |

**TABLE 15**

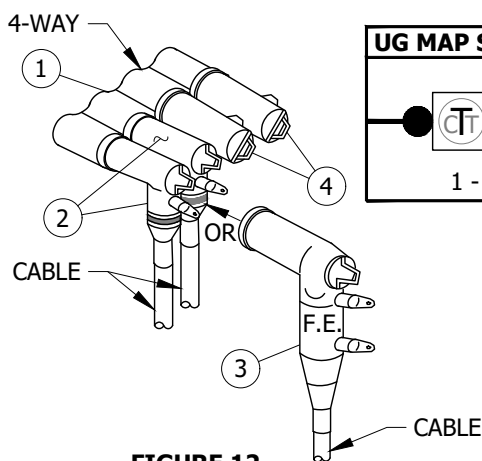
| ADDITIONAL MACRO UNITS |        |        |        |        |        |        |        |        |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| C-3BB0                 | C-3BC0 | C-3B00 | C-3C00 | C-3CC0 | C-5BBC | C-5BB0 | C-5BC0 | C-5CC0 |

**TABLE 16**

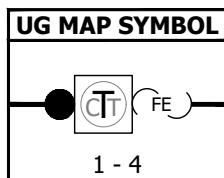
| TYPICAL COMBINATIONS |             |               |              |                   |                    |
|----------------------|-------------|---------------|--------------|-------------------|--------------------|
| CODE                 | 3300NB      | 5500NB        | 5300NB       | 5B00NB            | 5C00NB             |
| CABLE SIZE           | #2 AL-#2 AL | 2/0 AL-2/0 AL | 2/0 AL-#2 AL | 2/0 AL-#2 AL F.E. | 2/0 AL-2/0 AL F.E. |
| MACRO UNITS          | C-3300      | C-5500        | C-5300       | C-5B00            | C-5C00             |

**BILL OF MATERIALS (FIGURE 12):**

| ITEM | DESCRIPTION                    | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|--------------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY (NO BRACKET) | -               | 1        | -             | S718338            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK    | #2 AL<br>2/0 AL | 1 OR 2   | -             | S443838<br>S443840 | -            |
| 3    | CONNECTOR, ELBOW, FUSED        | #2 AL<br>2/0 AL | 0 OR 1   | -             | S443850<br>S443882 | -            |
| 4    | RECEPTACLE, INSULATING         | -               | 2        | -             | S204304            | -            |



**FIGURE 12**  
PAD-MOUNTED  
200 AMP LOADBREAK



**TABLE 17**

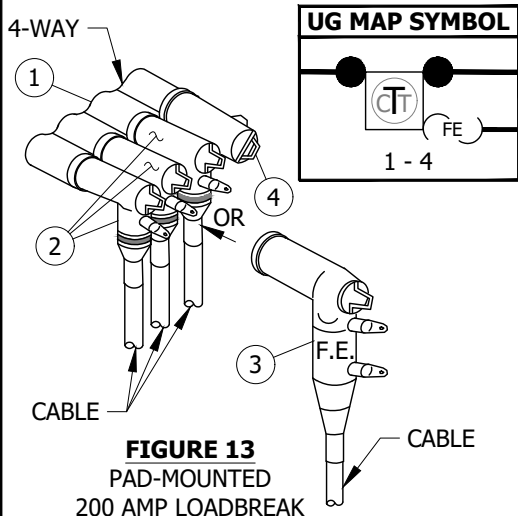
| ADDITIONAL MACRO UNITS |        |        |        |        |        |        |        |        |        |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| C-55CC                 | C-53BC | C-53B0 | C-53CC | C-55BB | C-55BC | C-33BB | C-33BC | C-33B0 | C-33CC |

**TABLE 18**

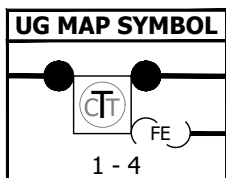
| TYPICAL COMBINATIONS |             |               |              |               |               |               |
|----------------------|-------------|---------------|--------------|---------------|---------------|---------------|
| CODE                 | 3330NB      | 5550NB        | 5330NB       | 530NB         | 55B0NB        | 55C0NB        |
| CABLE SIZE           | #2 AL-#2 AL | 2/0 AL-2/0 AL | 2/0 AL-#2 AL | 2/0 AL-2/0 AL | 2/0 AL-2/0 AL | 2/0 AL-2/0 AL |
| MACRO UNITS          | C-3330      | C-5550        | C-5330       | C-5530        | C-55B0        | C-55C0        |

**BILL OF MATERIALS (FIGURE 13):**

| ITEM | DESCRIPTION                    | WIRE SIZE       | QUANTITY | STANDARD PAGE | STOCK NUMBER       | DESIGN UNITS |
|------|--------------------------------|-----------------|----------|---------------|--------------------|--------------|
| 1    | TAP, CABLE, 4-WAY (NO BRACKET) | -               | 1        | -             | S718338            | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK    | #2 AL<br>2/0 AL | 2 OR 3   | -             | S443838<br>S443840 | -            |
| 3    | CONNECTOR, ELBOW, FUSED        | #2 AL<br>2/0 AL | 0 OR 1   | -             | S443850<br>S443882 | -            |
| 4    | RECEPTACLE, INSULATING         | -               | 1        | -             | S204304            | -            |



**FIGURE 13**  
PAD-MOUNTED  
200 AMP LOADBREAK



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|-----|----------|----|----|-----|---------|----------|-----|-------------------|-----|-----|-----|--------|-----------|
| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | MOVED FROM UG4180 | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION          | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION          | -   | -   | -   | TR/MJC | 11/8/2011 |

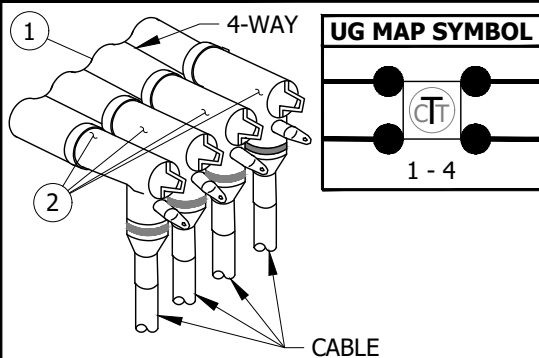
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**5 OF 6**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART FOR  
200A DEADFRONT TERMINATORS

**UG4179.5**





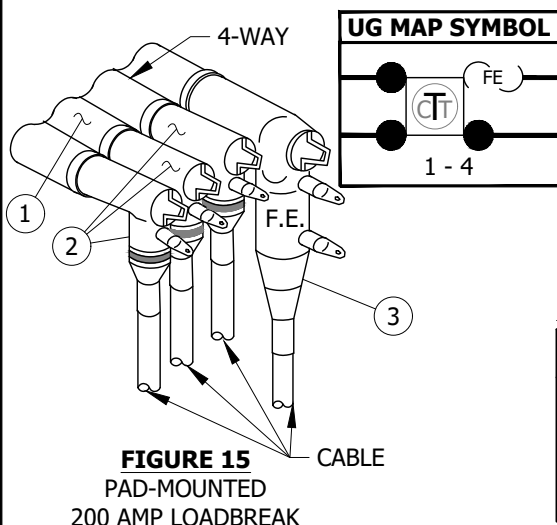
**FIGURE 14**  
PAD-MOUNTED  
200 AMP LOADBREAK

**TABLE 19**

| TYPICAL COMBINATIONS |                             |                                 |                                |                               |                              |
|----------------------|-----------------------------|---------------------------------|--------------------------------|-------------------------------|------------------------------|
| CODE                 | 3333NB                      | 5555NB                          | 5553NB                         | 5533NB                        | 5333NB                       |
| CABLE SIZE           | #2 AL-#2 AL-<br>#2 AL-#2 AL | 2/0 AL-2/0 AL-<br>2/0 AL-2/0 AL | 2/0 AL-2/0 AL-<br>2/0 AL-#2 AL | 2/0 AL-2/0 AL-<br>#2 AL-#2 AL | 2/0 AL-#2 AL-<br>#2 AL-#2 AL |
| MACRO UNITS          | C-3333                      | C-5555                          | C-5553                         | C-5533                        | C-5333                       |

**BILL OF MATERIALS (FIGURE 14):**

| ITEM | DESCRIPTION                    | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--------------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | TAP, CABLE, 4-WAY (NO BRACKET) | -         | 1        | -             | S718338      | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK    | #2 AL     | 4        | -             | S443838      | -            |
|      |                                | 2/0 AL    |          | -             | S443840      | -            |



**FIGURE 15**  
PAD-MOUNTED  
200 AMP LOADBREAK

**TABLE 20**

| ADDITIONAL<br>MACRO UNITS |        |
|---------------------------|--------|
| C-533B                    | C-533C |

**TABLE 21**

| TYPICAL COMBINATIONS |                                  |                                      |                                   |                                     |                                    |
|----------------------|----------------------------------|--------------------------------------|-----------------------------------|-------------------------------------|------------------------------------|
| CODE                 | 333BNB                           | 555CNB                               | 333CNB                            | 555BNB                              | 553BNB                             |
| CABLE SIZE           | #2 AL-#2 AL-<br>#2 AL-#2 AL F.E. | 2/0 AL-2/0 AL-<br>2/0 AL-2/0 AL F.E. | #2 AL-#2 AL-<br>#2 AL-2/0 AL F.E. | 2/0 AL-2/0 AL-<br>2/0 AL-#2 AL F.E. | 2/0 AL-2/0 AL-<br>#2 AL-#2 AL F.E. |
| MACRO UNITS          | C-333B                           | C-555C                               | C-333C                            | C-555B                              | C-553B                             |

**BILL OF MATERIALS (FIGURE 15):**

| ITEM | DESCRIPTION                    | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--------------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | TAP, CABLE, 4-WAY (NO BRACKET) | -         | 1        | -             | S718338      | -            |
| 2    | CONNECTOR, ELBOW, LOADBREAK    | #2 AL     | 3        | -             | S443838      | -            |
|      |                                | 2/0 AL    |          | -             | S443840      | -            |
| 3    | CONNECTOR, ELBOW, FUSED        | #2 AL     | 1        | -             | S443850      | -            |
|      |                                | 2/0 AL    |          | -             | S443882      | -            |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES.

**NOTES:**

I. **TABLE 22**

| CODES USED IN THE TABLES ON THIS STANDARD |                               |
|---|-------------------------------|
| CODE                                      | TYPE                          |
| CABLE                                     |                               |
| 3   | #2 AL                         |
| 5   | 2/0 AL                        |
| COMPONENT                                 |                               |
| B   | #2 AL FUSED ELBOWS            |
| C   | 2/0 AL FUSED ELBOW            |
| O   | 200 AMP INSULATING RECEPTACLE |

II. OTHER COMBINATIONS MAY BE CODED USING THE ABOVE CODES FOR THE SAME TYPE CONNECTIONS SHOWN.

**REFERENCE:**

- a. SEE UG3649 FOR "EQUIPMENT COMBINATION GUIDELINES" FOR FUSED ELBOWS.
- b. FOR SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, REFER TO UG4191 AND UG4195.

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|-----|----------|----|----|-----|---------|----------|-----|-------------------|-----|-----|-----|--------|-----------|
| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | MOVED FROM UG4180 | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION          | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION          | -   | -   | -   | TR/MJC | 11/8/2011 |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 200 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART FOR  
200A DEADFRONT TERMINATORS

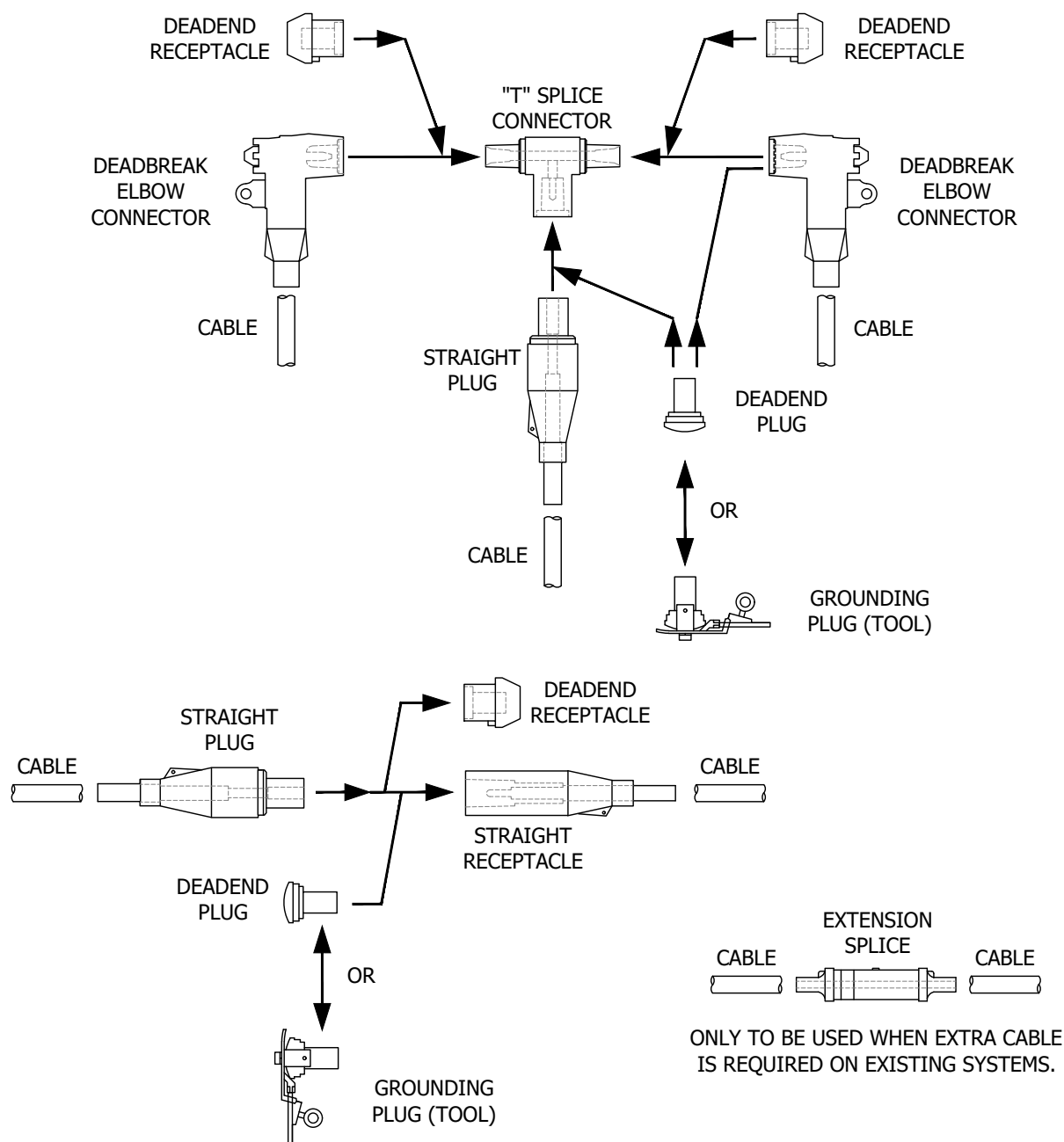
**UG4179.6**



**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 200 AMP PREMOLDED SPLICE AND CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION ORDERS.

**ATTENTION:**

\* THIS CHART SHOWS HOW 200 AMP SPLICE CONNECTORS ARE ASSEMBLED.



**FIGURE 1**  
SUBSURFACE SPLICE CONNECTOR APPLICATION CHART  
200 AMP DEADBREAK

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|-----|----------|----|----|-----|---------|----------|-----|------------|-----|-----|-----|--------|-----------|
| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | FORMATTING | EDM | JKI | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION   | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION   | -   | -   | -   | TR/MJC | 11/8/2011 |

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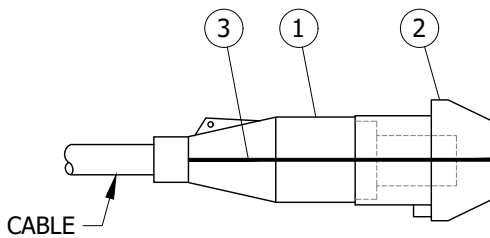
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**1 OF 5**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

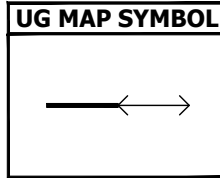
12KV 200 AMP PREMOLDED SPLICE AND  
CONNECTOR ASSEMBLIES - IDENTIFICATION CHART

**UG4180.1**





**FIGURE 2**  
SUBSURFACE SPLICE CONNECTIONS  
200 AMP DEADBREAK

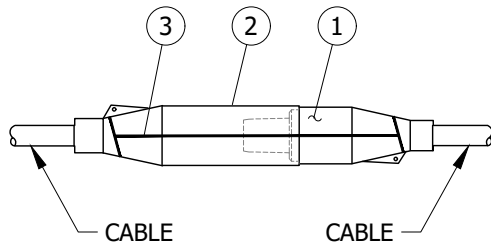


**TABLE 1**

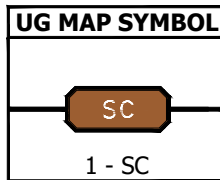
| TYPICAL COMBINATIONS |                  |                  |
|----------------------|------------------|------------------|
| CODE                 | S3               | S5               |
| CABLE SIZE           | #2 AL            | 2/0 AL           |
| MACRO UNITS          | CC--S3<br>CC--S3 | CC--S5<br>CC--S5 |

**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION                                  | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|-----------|----------|---------------|--------------|--------------|
| 1    | STRAIGHT PLUG                                | #2 AL     | 1        | -             | S547314      | -            |
|      |  | 2/0 AL    |          | -             | S547316      | -            |
| 2    | DEADEND RECEPTACLE                           | -         | 1        | -             | S570304      | -            |
| 3    | BAIL ASSEMBLY<br>(2 RINGS & 2 STRAPS IN KIT) | -         | 1        | -             | S120384      | -            |



**FIGURE 3**  
SUBSURFACE SPLICE CONNECTIONS  
200 AMP DEADBREAK

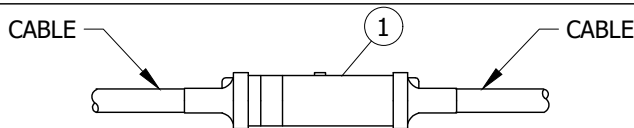


**TABLE 2**

| TYPICAL COMBINATIONS |             |              |               |
|----------------------|-------------|--------------|---------------|
| CODE                 | S33         | S53          | S55           |
| CABLE SIZE           | #2 AL-#2 AL | #2 AL-2/0 AL | 2/0 AL-2/0 AL |
| MACRO UNITS          | CC-S33      | CC-S53       | CC-S55        |

**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION                                  | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|-----------|----------|---------------|--------------|--------------|
| 1    | STRAIGHT PLUG                                | #2 AL     | 1        | -             | S547314      | -            |
|      |  | 2/0 AL    |          | -             | S547316      | -            |
| 2    | STRAIGHT RECEPTACLE                          | #2 AL     | 1        | -             | S570816      | -            |
|      |  | 2/0 AL    |          | -             | S570848      | -            |
| 3    | BAIL ASSEMBLY<br>(2 RINGS & 2 STRAPS IN KIT) | -         | 1        | -             | S120384      | -            |



**FIGURE 4**  
SUBSURFACE SPLICE CONNECTIONS (III)  
200 AMP DEADBREAK

**TABLE 3**

| TYPICAL COMBINATIONS |                 |                 |                  |                 |                   |
|----------------------|-----------------|-----------------|------------------|-----------------|-------------------|
| CODE                 | Q11             | Q13             | Q15              | Q33             | Q55               |
| CABLE SIZE           | #2 CU-<br>#2 CU | #2 CU-<br>#2 AL | #2 CU-<br>2/0 AL | #2 AL-<br>#2 AL | 2/0 AL-<br>2/0 AL |
| DESIGN UNITS         | NB-Q11          | NB-Q13          | NB-Q15           | NB-Q33          | NB-Q55            |

**BILL OF MATERIALS (FIGURE 4):**

| ITEM | DESCRIPTION                           | WIRE SIZE    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------------------|--------------|----------|---------------|--------------|--------------|
| 1    | EXTENSION SPLICE<br>200 AMP DEADBREAK | #2 CU        | 1        | -             | S668400      | -            |
|      |                                       | #2 AL        |          | -             | S668402      | -            |
|      |                                       | 2/0 AL       |          | -             | S668404      | -            |
|      |                                       | #2 CU-#2 AL  |          | -             | S668406      | -            |
|      |                                       | #2 CU-2/0 AL |          | -             | S668408      | -            |

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|-----|----------|----|----|-----|---------|----------|-----|------------|-----|-----|-----|--------|-----------|
| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | FORMATTING | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION   | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION   | -   | -   | -   | TR/MJC | 11/8/2011 |

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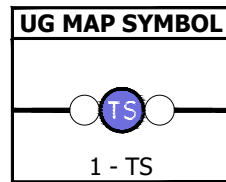
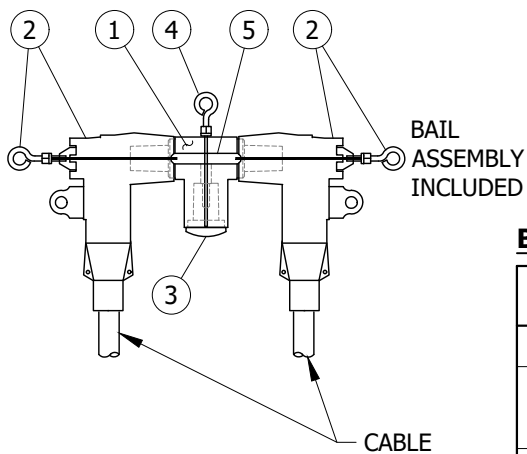
12KV 200 AMP PREMOLDED SPLICE AND  
CONNECTOR ASSEMBLIES - IDENTIFICATION CHART

UG4180.2



**TABLE 4**

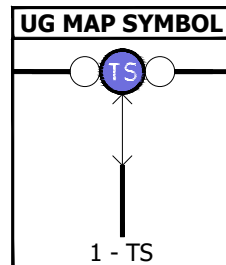
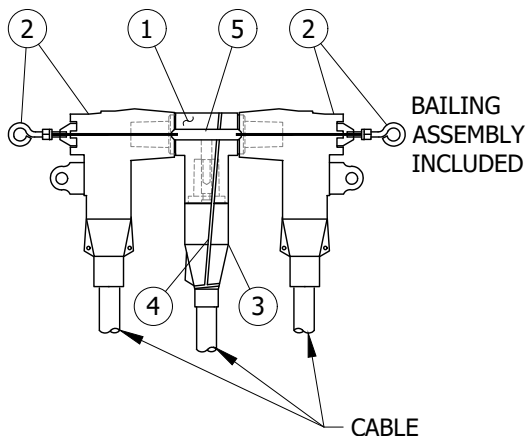
| TYPICAL COMBINATIONS |                 |                  |                   |
|----------------------|-----------------|------------------|-------------------|
| CODE                 | D33             | D53              | D55               |
| CABLE SIZE           | #2 AL-<br>#2 AL | #2 AL-<br>2/0 AL | 2/0 AL-<br>2/0 AL |
| MACRO UNITS          | CC-D33          | CC-D53           | CC-D55            |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                                       | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|-----------|----------|---------------|--------------|--------------|
| 1    | "T" SPLICE CONNECTOR                              | -         | 1        | -             | S256112      | -            |
| 2    | DEADBREAK ELBOW CONNECTOR                         | #2 AL     | 2        | -             | S443842      | -            |
|      |   | 2/0 AL    |          | -             | S443844      | -            |
| 3    | DEADEND PLUG                                      | -         | 1        | -             | S544864      | -            |
| 4    | BAIL ASSEMBLY<br>(HOLD-DOWN BAIL & FLANGE IN KIT) | -         | 1        | -             | S120352      | -            |
| 5    | BAIL ASSEMBLY<br>(2 IN KIT)                       | -         | 1        | -             | S120448      | -            |

**FIGURE 5**  
SUBSURFACE SPLICE CONNECTIONS  
200 AMP DEADBREAK**TABLE 5**

| TYPICAL COMBINATIONS |                           |                            |                             |                              |
|----------------------|---------------------------|----------------------------|-----------------------------|------------------------------|
| CODE                 | D333                      | D353                       | D535                        | D555                         |
| CABLE SIZE           | #2 AL-<br>#2 AL-<br>#2 AL | #2 AL-<br>2/0 AL-<br>#2 AL | 2/0 AL-<br>#2 AL-<br>2/0 AL | 2/0 AL-<br>2/0 AL-<br>2/0 AL |
| MACRO UNITS          | CCD333                    | CCD353                     | CCD535                      | CCD555                       |

**BILL OF MATERIALS (FIGURE 6):**

| ITEM | DESCRIPTION                                  | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|-----------|----------|---------------|--------------|--------------|
| 1    | "T" SPLICE CONNECTOR                         | -         | 1        | -             | S256112      | -            |
| 2    | DEADBREAK ELBOW CONNECTOR                    | #2 AL     | 2        | -             | S443842      | -            |
|      |  | 2/0 AL    |          | -             | S443844      | -            |
| 3    | STRAIGHT PLUG                                | #2 AL     | 1        | -             | S547314      | -            |
|      |  | 2/0 AL    |          | -             | S547316      | -            |
| 4    | BAIL ASSEMBLY<br>(2 RINGS & 2 STRAPS IN KIT) | -         | 1        | -             | S120384      | -            |
| 5    | BAIL ASSEMBLY<br>(2 IN KIT)                  | -         | 1        | -             | S120448      | -            |

**FIGURE 6**  
SUBSURFACE SPLICE CONNECTIONS  
200 AMP DEADBREAK

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|-----|----------|----|----|-----|---------|----------|-----|------------|-----|-----|-----|--------|-----------|
| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | FORMATTING | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION   | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION   | -   | -   | -   | TR/MJC | 11/8/2011 |

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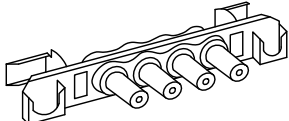
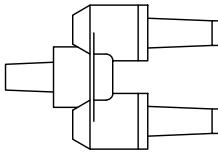
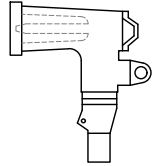
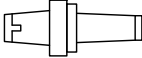
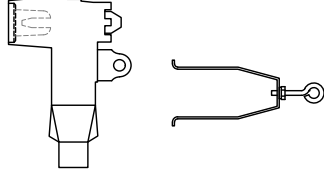
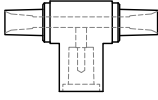

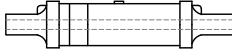

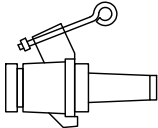
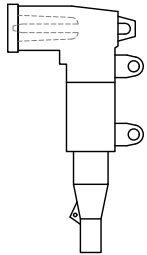
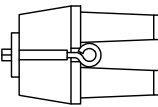


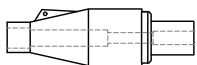
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 200 AMP PREMOLDED SPLICE AND  
CONNECTOR ASSEMBLIES - IDENTIFICATION CHART

UG4180.3



**TABLE 6**

| PARTS IDENTIFICATION CHART   |              |              |              |  |              |              |
|--|--------------|--------------|--------------|--|--------------|--------------|
| PART   | WIRE SIZE    | STOCK NUMBER | DESIGN UNITS | PART   | STOCK NUMBER | DESIGN UNITS |
| <br>3 OR 4 WAY CABLE TAP      | 3-WAY        | S718312      | TAP-3W       | <br>FEED-THRU INSERT                 | S544678      | FEED-I       |
|  | 4-WAY        | S718328      | TAP-4W       |  |              |              |
| <br>LOADBREAK ELBOW           | #2 CU        | S443837      | LBE-2C       |  |              |              |
|  | #2 AL        | S443838      | LBE-2A       | <br>BUSHING PLUG                     | S544676      | BSHPLG       |
|  | #2/0 AL      | S443840      | LBE2/0       |  |              |              |
| <br>DEADBREAK ELBOW      BAIL | #2 CU        | S443456      | NBE-2C       | <br>"T" SPLICE                       | S256112      | NLBTee       |
|  | #2 AL        | S443842      | NBE-2A       |  |              |              |
|  | #2/0 AL      | S443844      | NBE2/0       | <br>DEADEND RECEPTACLE              | S570304      | DE-REC       |
| <br>EXTENSION SPLICE          | #2 CU        | S668400      | NB-Q11       |  |              |              |
|  | #2 AL        | S668402      | NB-Q33       | <br>DEADEND PLUG                  | S544864      | NLB-DE       |
|  | #2/0 AL      | S668404      | NB-Q55       |  |              |              |
|  | #2 CU- #2 AL | S668406      | NB-Q13       | <br>STAND-OFF PLUG                 | S547312      | S/0PLG       |
| <br>FUSED ELBOW              | #2 CU        | S443864      | FE-2CU       |  |              |              |
|  | #2 AL        | S443850      | FE-2AL       | <br>FEED-THRU BUSHING              | S182016      | FEED-B       |
|  | 2/0 AL       | S443882      | FE-2/0       |  |              |              |
| <br>STRAIGHT RECEPTACLE     | #4 CU        | S570768      | REC-4C       | <br>200 AMP INSULATING RECEPTACLE | S204304      | INSREC       |
|  | #2 CU        | S570256      | REC-2C       |  |              |              |
|  | #2 AL        | S570816      | REC-2A       |  |              |              |
| <br>STRAIGHT PLUG           | 2/0 AL       | S570848      | REC2/0       |  |              |              |
|  | #4 CU        | S544694      | PLG-4C       |  |              |              |
|  | #2 CU        | S544688      | PLG-2C       |  |              |              |
|  | #2 AL        | S547314      | PLG-2A       |  |              |              |
|  | 2/0 AL       | S547316      | PLG 2/0      |  |              |              |

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|-----|----------|----|----|-----|---------|----------|-----|------------|-----|-----|-----|--------|-----------|
| C   | REVISION | -  | -  | -   | RSW/RDJ | 1/1/1996 | F   | FORMATTING | EDM | JIK | -   | -      | 6/2/2020  |
| B   | REVISION | -  | -  | -   | SLC/DTE | 1/1/1990 | E   | REVISION   | -   | -   | -   | TR/MJC | 7/9/2012  |
| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1989 | D   | REVISION   | -   | -   | -   | TR/MJC | 11/8/2011 |

|                 |   |                           |                    |          |                     |          |
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS           |                           |                    |          |                     |          |
|                 | 200 AMP CONNECTORS AND DESIGN UNITS<br>IDENTIFICATION CHART |                           |                    |          |                     |          |



**INSTALLATION:** NONE

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES.

**NOTES:**

I. **TABLE 7**

| CODES USED IN THE TABLES ON THIS STANDARD |                          |
|---|--------------------------|
| CODE                                      | TYPE                     |
| CABLE                                     |                          |
| 1   | #2 CU                    |
| 3   | #2 AL                    |
| 5   | 2/0 AL                   |
| COMPONENT                                 |                          |
| D   | 200 AMP TEE SPLICE       |
| Q   | 200 AMP EXTENSION SPLICE |
| S   | 200 AMP SPLICE           |

II. OTHER COMBINATIONS MAY BE CODED USING THE ABOVE CODES FOR THE SAME TYPE CONNECTIONS SHOWN.

Ⓐ THIS SPLICE ONLY TO BE USED FOR SPLICING WHEN EXTRA CABLE IS REQUIRED ON EXISTING SYSTEMS. EXAMPLE (TRANSFORMER OR OTHER PAD-MOUNTED EQUIPMENT REPLACEMENT, CABLE TAPS BEING RAISED IN HANDHOLES, ETC.) THIS SPLICE IS NOT TO BE USED FOR ANY OTHER TYPE OF SPLICING. SEE PAGE UG4196.4 FOR EXTENSION SPLICE APPLICATIONS.

**REFERENCE:**

a. FOR SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, REFER TO UG4191 AND [UG4195](#).

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12KV 200 AMP PREMOLDED SPLICE AND  
CONNECTOR ASSEMBLIES - IDENTIFICATION CHART

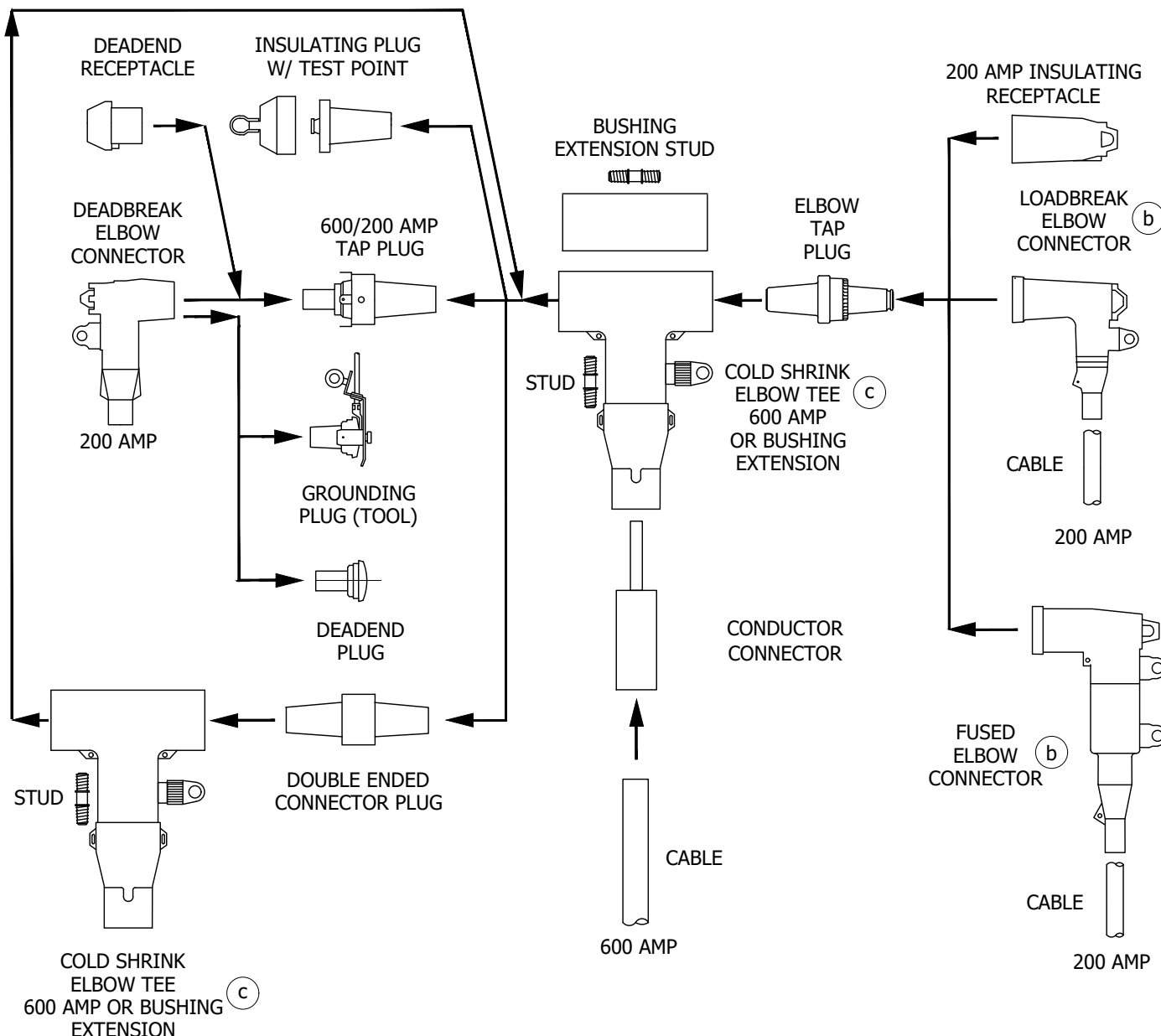
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**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 200 AND 600 AMP CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION WORK ORDERS FOR HANDHOLE INSTALLATIONS.

**ATTENTION:**

- \* THIS FIGURE SHOWS HOW 200 AMP AND 600 AMP CONNECTORS ARE ASSEMBLED.
- \*\* ALWAYS USE THE MANUFACTURERS RECOMMENDED TORQUE SETTINGS WHEN ASSEMBLING CONNECTORS.



**FIGURE 1**  
SUBSURFACE CONNECTOR APPLICATION CHART  
3315 & 3316 HANDHOLE INSTALLATION ONLY  
200 AMP LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK

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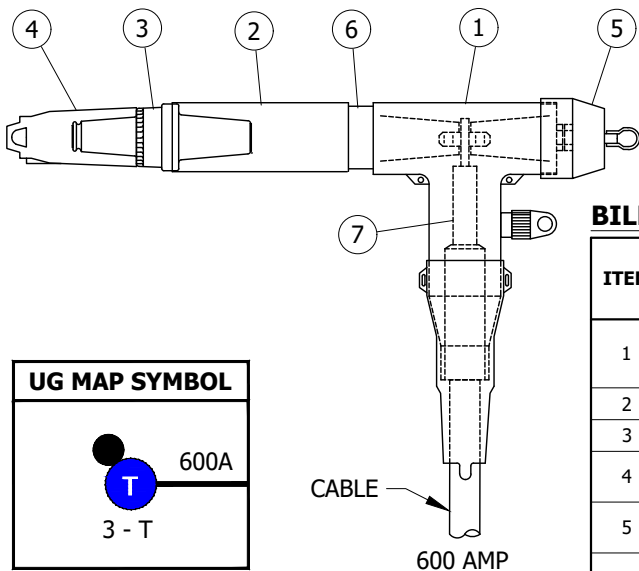
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12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
HANDHOLE INSTALLATIONS

UG4181.1





**FIGURE 2**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK

**TABLE 1**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | O7     | O8     | O9      |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | CC-07  | CC-08  | CC-09   |

**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION                   | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE         | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                               | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | BUSHING EXTENSION             | -                | 1        | -             | S336204      | -            |
| 3    | ELBOW TAP PLUG                | -                | 1        | -             | S547328      | -            |
| 4    | 200 AMP INSULATING RECEPTACLE | -                | 1        | -             | S204304      | -            |
| 5    | INSULATED PLUG W/ TEST POINT  | -                | 1        | -             | S544848      | -            |
| 6    | DOUBLE-ENDED CONNECTOR PLUG   | -                | 1        | -             | S544832      | -            |
| 7    | CONDUCTOR CONNECTOR           | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                               | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**TABLE 2**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | L37    | L57    | L38    | L58    | L39     | L59     |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | CC-L37 | CC-L57 | CC-L38 | CC-L58 | CC-L39  | CC-L59  |

**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | BUSHING EXTENSION            | -                | 1        | -             | S336204      | -            |
| 3    | ELBOW TAP PLUG               | -                | 1        | -             | S547328      | -            |
| 4    | LOADBREAK ELBOW CONNECTOR    | #2 AL            | 1        | -             | S443838      | -            |
|      |                              | 2/0 AL           |          | -             | S443840      | -            |
| 5    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 6    | DOUBLE-ENDED CONNECTOR PLUG  | -                | 1        | -             | S544832      | -            |
| 7    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**FIGURE 3**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK

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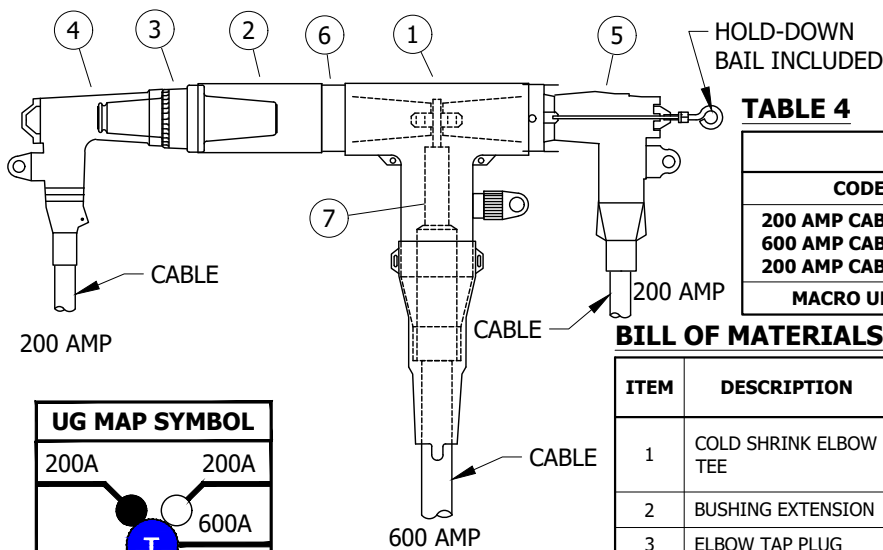
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12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
HANDHOLE INSTALLATIONS

UG4181.2





**FIGURE 4**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK  
AND 600 AMP DEADBREAK

**TABLE 3**

| ADDITIONAL MACRO UNITS |        |        |
|------------------------|--------|--------|
| C-07D5                 | C-08D5 | C-09D5 |

**TABLE 4**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | L37D5  | L57D5  | L38D5  | L58D5  | L39D5   | L59D5   |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL  | 2/0 AL  |
| MACRO UNITS          | CL37D5 | CL57D5 | CL38D5 | CL58D5 | CL39D5  | CL59D5  |

**BILL OF MATERIALS (FIGURE 4):**

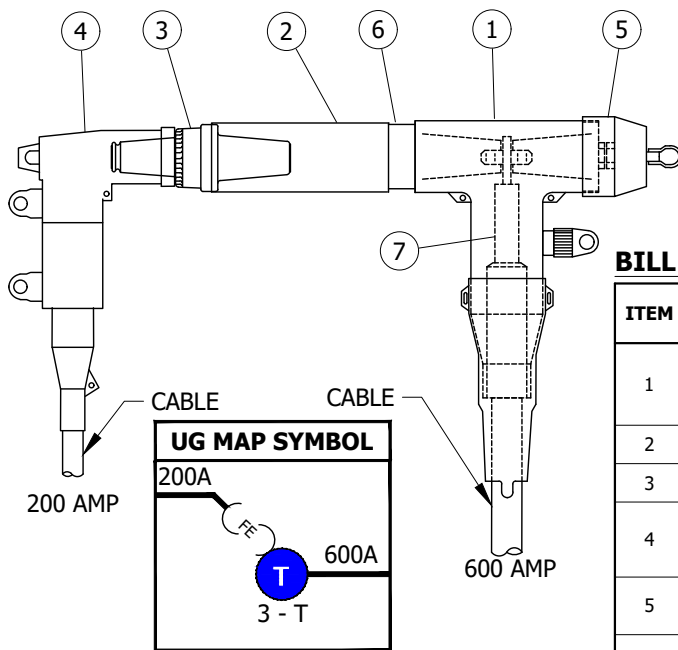
| ITEM | DESCRIPTION                 | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE       | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                             | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | BUSHING EXTENSION           | -                | 1        | -             | S336204      | -            |
| 3    | ELBOW TAP PLUG              | -                | 1        | -             | S547328      | -            |
| 4    | LOAD BREAK ELBOW CONNECTOR  | #2 AL            | 1        | -             | S443838      | -            |
|      |                             | 2/0 AL           |          | -             | S443840      |              |
| 5    | DEADBREAK ELBOW CONNECTOR   | #2 AL            | 1        | -             | S443842      | -            |
|      |                             | 2/0 AL           |          | -             | S443844      |              |
| 6    | DOUBLE-ENDED CONNECTOR PLUG | -                | 1        | -             | S544832      | -            |
| 7    | CONDUCTOR CONNECTOR         | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                             | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**TABLE 5**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | B7     | C7     | B8     | C8     | B9      | C9      |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | #2 AL  | 2/0 AL  | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | CC-B7  | CC-C7  | CC-B8  | CC-C8  | CC-B9   | CC-C9   |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | BUSHING EXTENSION            | -                | 1        | -             | S336204      | -            |
| 3    | ELBOW TAP PLUG               | -                | 1        | -             | S547328      | -            |
| 4    | FUSED ELBOW CONNECTOR        | #2 AL            | 1        | -             | S443850      | -            |
|      |                              | 2/0 AL           |          | -             | S443882      |              |
| 5    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 6    | DOUBLE-ENDED CONNECTOR PLUG  | -                | 1        | -             | S544832      | -            |
| 7    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 5**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK  
AND 600 AMP DEADBREAK

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| A   | REVISION | -  | -  | -   | TR/MJC | 11/08/2011 | D   | REVISION      | -   | -   | -   | TR/MJC | 10/30/2012 |

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12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

HANDHOLE INSTALLATIONS

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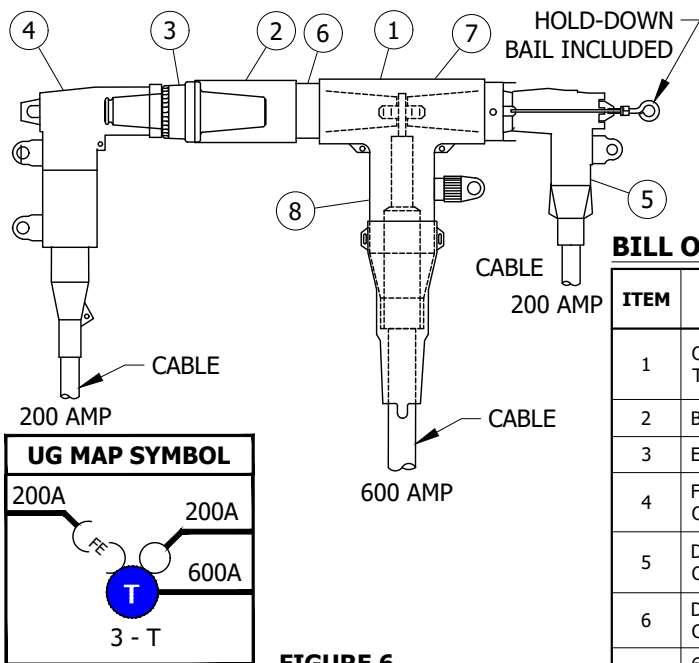


**TABLE 6**

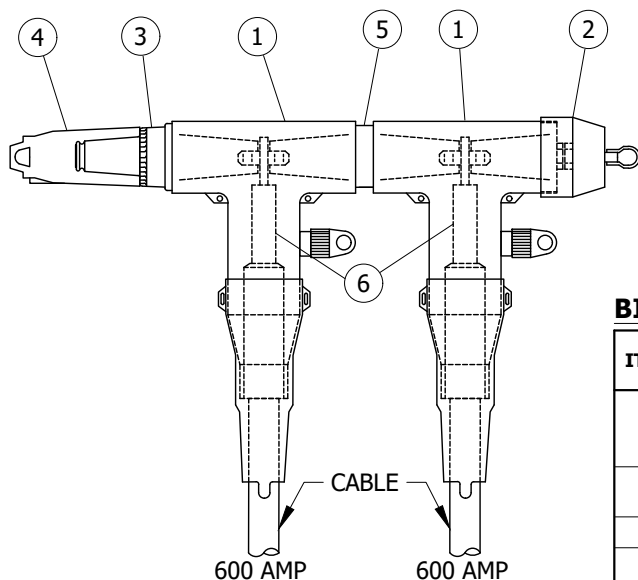
| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | B7D5   | C7D5   | B8D5   | C8D5   | B9D5    | C9D5    |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL  | 2/0 AL  |
| MACRO UNITS          | C-B7D5 | C-C7D5 | C-B8D5 | C-C8D5 | C-B9D5  | C-C9D5  |

**BILL OF MATERIALS (FIGURE 6):**

| ITEM | DESCRIPTION                 | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE       | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                             | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | BUSHING EXTENSION           | -                | 1        | -             | S336204      | -            |
| 3    | ELBOW TAP PLUG              | -                | 1        | -             | S547328      | -            |
| 4    | FUSED ELBOW CONNECTOR       | #2 AL            | 1        | -             | S443850      | -            |
|      |                             | 2/0 AL           |          | -             | S443882      | -            |
| 5    | DEADBREAK ELBOW CONNECTOR   | #2 AL            | 1        | -             | S443842      | -            |
|      |                             | 2/0 AL           |          | -             | S544832      | -            |
| 6    | DOUBLE-ENDED CONNECTOR PLUG | -                | 1        | -             | S544832      | -            |
| 7    | 600/200 AMP TAP PLUG        | -                | 1        | -             | S547324      | -            |
| 8    | CONDUCTOR CONNECTOR         | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                             | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**FIGURE 6**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK  
AND 600 AMP DEADBREAK

**FIGURE 7**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK

**TABLE 7**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | O77    | O88    | O99     |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | CC-077 | CC-088 | CC-099  |

**BILL OF MATERIALS (FIGURE 7):**

| ITEM | DESCRIPTION                   | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE         | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                               | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT  | -                | 1        | -             | S544848      | -            |
| 3    | ELBOW TAP PLUG                | -                | 1        | -             | S547328      | -            |
| 4    | 200 AMP INSULATING RECEPTACLE | -                | 1        | -             | S204304      | -            |
| 5    | DOUBLE-ENDED CONNECTOR PLUG   | -                | 1        | -             | S544832      | -            |
| 6    | CONDUCTOR CONNECTOR           | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                               | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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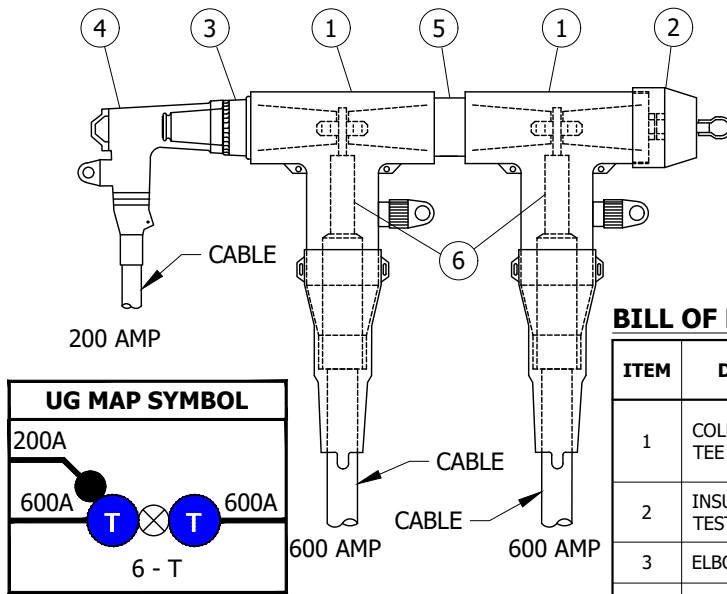
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
HANDHOLE INSTALLATIONS

UG4181.4





**FIGURE 8**

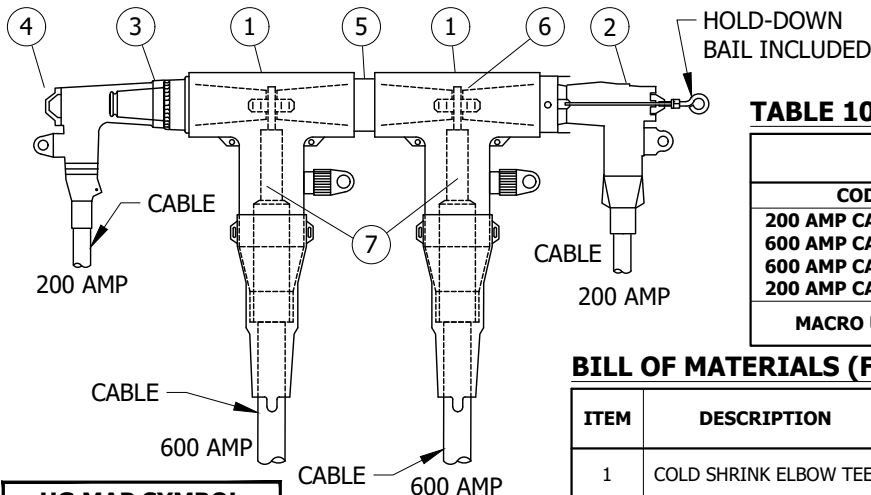
3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK  
AND 600 AMP DEADBREAK

**TABLE 8**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | L377   | L577   | L388   | L588   | L399    | L599    |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | C-L377 | C-L577 | C-L388 | C-L588 | C-L399  | C-L599  |

**BILL OF MATERIALS (FIGURE 8):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 3    | ELBOW TAP PLUG               | -                | 1        | -             | S547328      | -            |
| 4    | LOADBREAK ELBOW CONNECTOR    | #2 AL            | 1        | -             | S443838      | -            |
|      |                              | 2/0 AL           |          | -             | S443840      |              |
| 5    | DOUBLE-ENDED CONNECTOR PLUG  | -                | 1        | -             | S544832      | -            |
| 6    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 9**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK  
AND 600 AMP DEADBREAK

**TABLE 9**

| ADDITIONAL MACRO UNITS |        |        |
|------------------------|--------|--------|
| CO77D5                 | CO88D5 | CO99D5 |
| CO77D3                 | CO88D3 | CO99D3 |

**TABLE 10**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | L377D5 | L577D5 | L388D5 | L588D5 | L399D5  | L599D5  |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL  | 2/0 AL  |
| MACRO UNITS          | L377D3 | L577D3 | L388D3 | L588D5 | L399D5  | L599D5  |
|                      | L377D5 | L577D5 | L388D5 |        |         |         |

**BILL OF MATERIALS (FIGURE 9):**

| ITEM | DESCRIPTION                 | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE       | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                             | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | DEADBREAK ELBOW CONNECTOR   | #2 AL            | 1        | -             | S443842      | -            |
|      |                             | 2/0 AL           |          | -             | S443844      |              |
| 3    | ELBOW TAP PLUG              | -                | 1        | -             | S547328      | -            |
| 4    | LOADBREAK ELBOW CONNECTOR   | #2 AL            | 1        | -             | S443838      | -            |
|      |                             | 2/0 AL           |          | -             | S443840      |              |
| 5    | DOUBLE-ENDED CONNECTOR PLUG | -                | 1        | -             | S544832      | -            |
| 6    | 600/200 AMP TAP PLUG        | -                | 1        | -             | S547324      | -            |
| 7    | CONDUCTOR CONNECTOR         | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                             | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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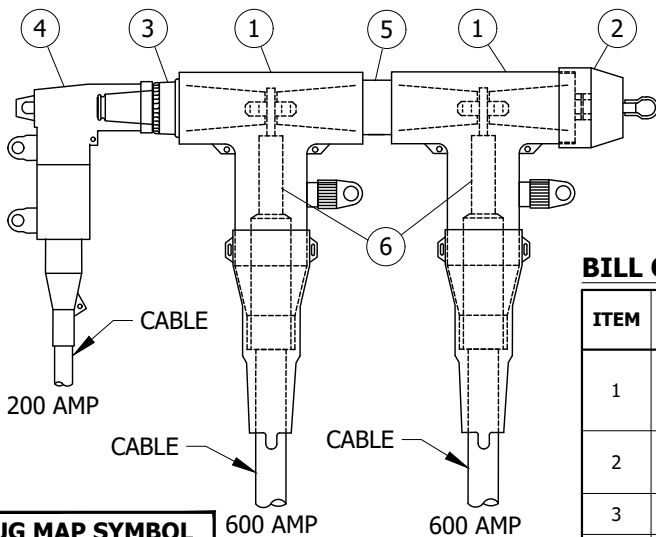
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
HANDHOLE INSTALLATIONS

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**FIGURE 10**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS

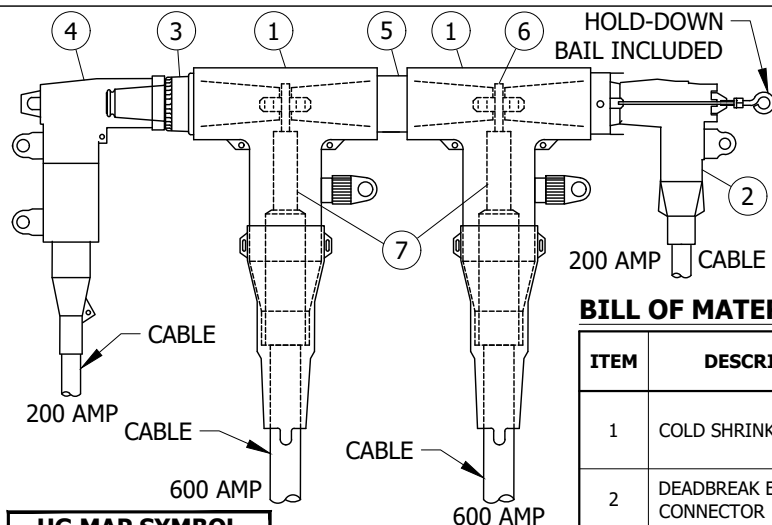
200 AMP LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK

**TABLE 11**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | B77    | C77    | B88    | C88    | B99     | C99     |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | CC-B77 | CC-C77 | CC-B88 | CC-C88 | CC-B99  | CC-C99  |

**BILL OF MATERIALS (FIGURE 10):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544832      | -            |
| 3    | ELBOW TAP PLUG               | -                | 1        | -             | S547328      | -            |
| 4    | FUSED ELBOW CONNECTOR        | #2 AL            | 1        | -             | S443850      | -            |
|      |                              | 2/0 AL           |          | -             | S443882      |              |
| 5    | DOUBLE-ENDED CONNECTOR PLUG  | -                | 1        | -             | S544832      | -            |
| 6    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 11**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS - 200 AMP

LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK

**TABLE 12**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | B77D5  | C77D5  | B88D5  | C88D5  | B99D5   | C99D5   |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL  | 2/0 AL  |
| MACRO UNITS          | CB77D5 | CC77D5 | CB88D5 | CC88D5 | CB99D5  | CC99D5  |

**BILL OF MATERIALS (FIGURE 11):**

| ITEM | DESCRIPTION                 | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE       | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                             | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | DEADBREAK ELBOW CONNECTOR   | #2 AL            | 1        | -             | S443842      | -            |
|      |                             | 2/0 AL           |          | -             | S443844      |              |
| 3    | ELBOW TAP PLUG              | -                | 1        | -             | S547328      | -            |
| 4    | FUSED ELBOW CONNECTOR       | #2 AL            | 1        | -             | S443850      | -            |
|      |                             | 2/0 AL           |          | -             | S443882      |              |
| 5    | DOUBLE-ENDED CONNECTOR PLUG | -                | 1        | -             | S544832      | -            |
| 6    | 600/200 AMP TAP PLUG        | -                | 1        | -             | S547324      | -            |
| 7    | CONDUCTOR CONNECTOR         | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                             | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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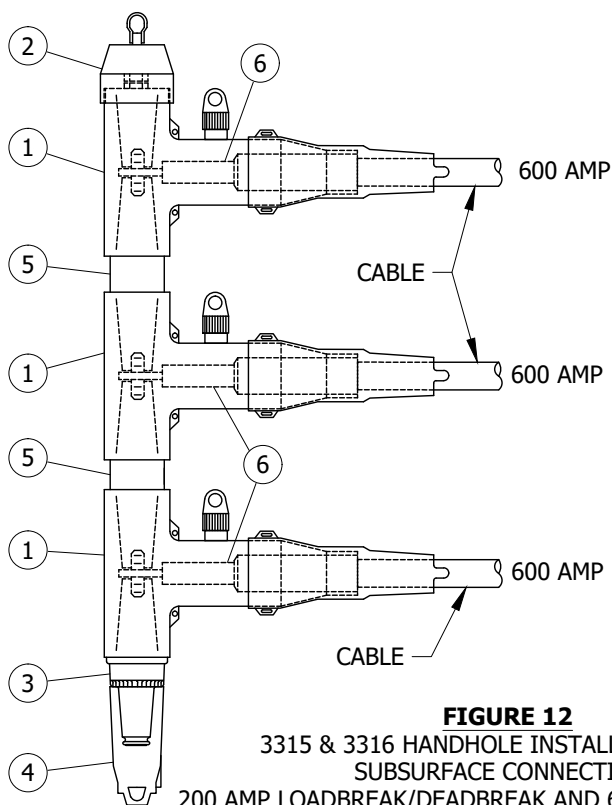
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IDENTIFICATION CHART

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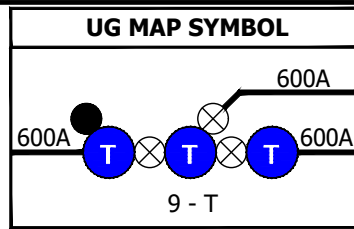
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**FIGURE 12**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK

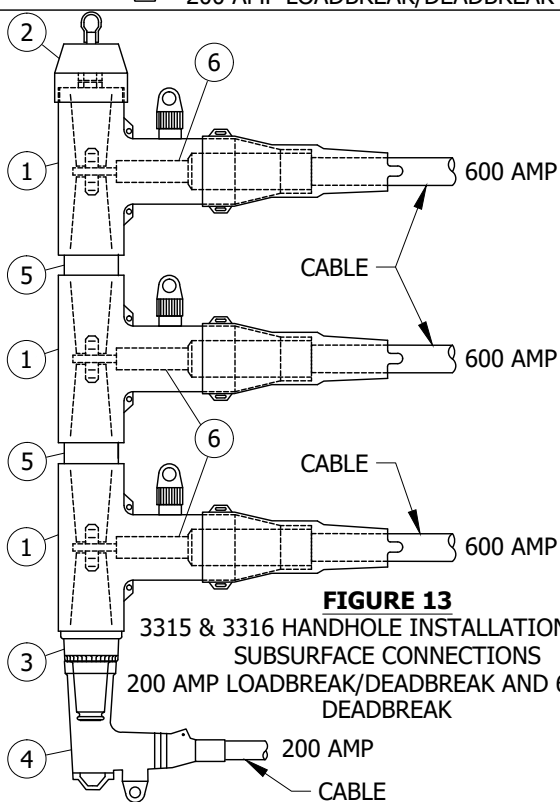


**TABLE 13**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | O777   | O888   | O999    |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | C-0777 | C-0888 | C-0999  |

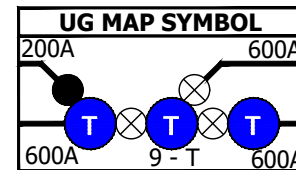
**BILL OF MATERIALS (FIGURE 12):**

| ITEM | DESCRIPTION                   | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE         | 4/0, 350 AND 500 | 3        | -             | S326572      | 600AT        |
|      |                               | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT  | -                | 1        | -             | S544848      | -            |
| 3    | ELBOW TAP PLUG                | -                | 1        | -             | S547328      | -            |
| 4    | 200 AMP INSULATING RECEPTACLE | -                | 1        | -             | S204304      | -            |
| 5    | DOUBLE-ENDED CONNECTOR PLUG   | -                | 2        | -             | S544832      | -            |
| 6    | CONDUCTOR CONNECTOR           | 4/0, 350 AND 500 | 3        | -             | S471314      | P6ALR3       |
|      |                               | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 13**

3315 & 3316 HANDHOLE INSTALLATION ONLY  
SUBSURFACE CONNECTIONS  
200 AMP LOADBREAK/DEADBREAK AND 600 AMP DEADBREAK



**TABLE 14**

| ADDITIONAL MACRO UNIT |
|-----------------------|
| CL5889                |

**TABLE 15**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | L3777  | L5777  | L3888  | L5888  | L3999   | L5999   |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | CL3777 | CL5777 | CL3888 | CL5888 | CL3999  | CL5999  |

**BILL OF MATERIALS (FIGURE 13):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 3        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 3    | ELBOW TAP PLUG               | -                | 1        | -             | S547328      | -            |
| 4    | LOADBREAK ELBOW CONNECTOR    | #2 AL            | 1        | -             | S443838      | -            |
|      |                              | 2/0 AL           |          | -             | S443840      |              |
| 5    | DOUBLE-ENDED CONNECTOR PLUG  | -                | 2        | -             | S544832      | -            |
| 6    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 3        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
HANDHOLE INSTALLATIONS

**UG4181.7**



**INSTALLATION:**

A. THREE TEE COMBINATIONS SHOWN IN THIS STANDARD SHALL ONLY BE USED TO FEED A SWITCHED TIE POSITION.

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES**NOTES:**I. **TABLE 16**

| CODES USED IN TABLES 1-15 (HANDHOLE INSTALLATIONS) |                               |
|--|-------------------------------|
| CODE   | TYPE                          |
| <b>CABLE</b>                                       |                               |
| 7  | 350 AL                        |
| 8  | 750 AL                        |
| 9  | 1000 AL                       |
| <b>COMPONENT</b>                                   |                               |
| D3   | DEADBREAK ELBOW #2 AL         |
| D5   | DEADBREAK ELBOW 2/0           |
| L3   | LOADBREAK ELBOW #2 AL         |
| L5   | LOADBREAK ELBOW 2/0 AL        |
| B  | #2 AL FUSED ELBOW             |
| C  | 2/0 AL FUSED ELBOW            |
| O  | 200 AMP INSULATING RECEPTACLE |

II. OTHER COMBINATIONS MAY BE CODED USING THE ABOVE CODES FOR THE SAME TYPE COMBINATIONS SHOWN.

III. EXCEPTION FOR COMBINATIONS NOT SHOWN:

- a. FOR ANTICIPATED 200 AMP LOAD IN THE NEAR FUTURE, INSTALL DEADBREAK ELBOWS (PRESENT LOAD) ON THE BOTTOM OF THE 600 AMP TEES AND 200 AMP INSULATING RECEPTACLES ON THE TOP.

**REFERENCE:**

a. FOR SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, REFER TO UG4182, UG4190, UG4191 AND UG4196.

b. FOR GROUNDING ELBOW KIT, REFER TO UG4179.1.

c. FOR INFORMATION ON COLD SHRINK ELBOW TEE, REFER TO UG4189 (FUTURE).

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 200 & 600 AMP CONNECTOR ASSEMBLIES

IDENTIFICATION CHART

HANDHOLE INSTALLATIONS

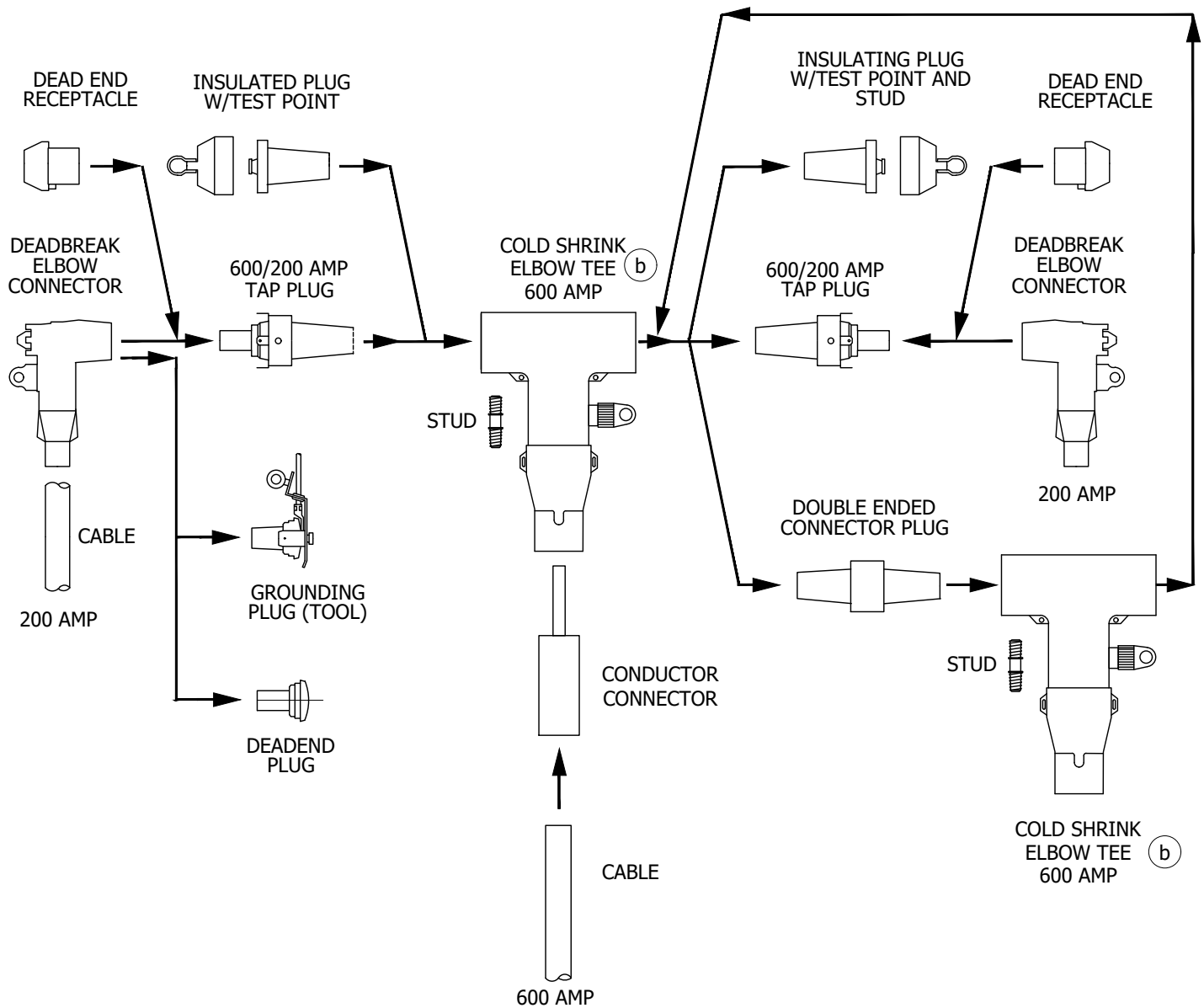
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**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 200 AND 600 AMP CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION WORK ORDERS FOR MANHOLE INSTALLATIONS.

**ATTENTION:**

- \* THIS FIGURE SHOWS HOW 200 AMP AND 600 AMP CONNECTORS ARE ASSEMBLED.
- \*\* ALWAYS USE THE MANUFACTURERS RECOMMENDED TORQUE SETTINGS WHEN ASSEMBLING CONNECTORS.



**FIGURE 1**  
SUBSURFACE CONNECTOR APPLICATION CHART  
200 AND 600 AMP DEADBREAK MANHOLE INSTALLATION

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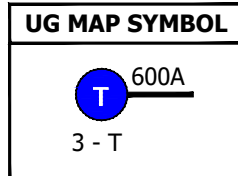
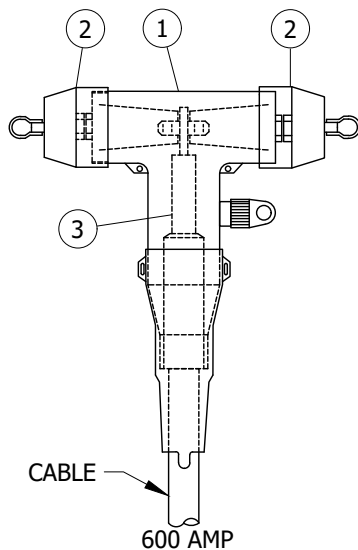
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| 12KV 200 & 600 AMP CONNECTOR ASSEMBLIES           |                           |                    |          |                     |
| IDENTIFICATION CHART                              |                           |                    |          |                     |
| MANHOLE INSTALLATIONS                             |                           |                    |          |                     |

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UG4181.9





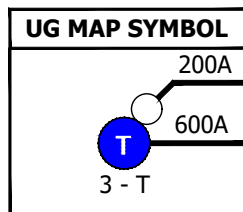
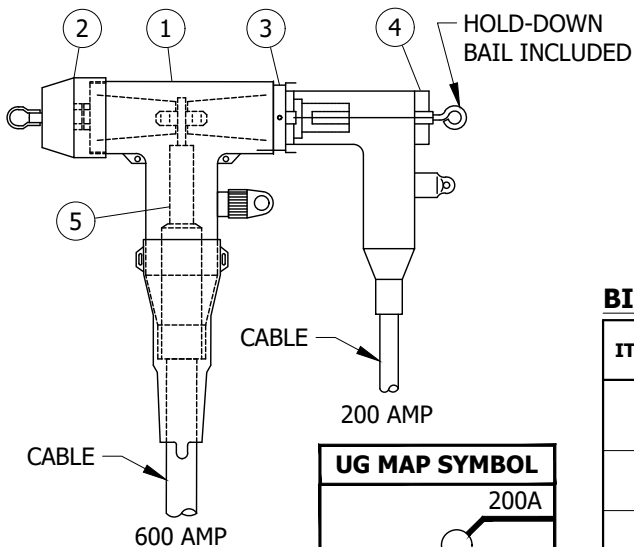
**TABLE 1**

| TYPICAL COMBINATIONS      |        |        |         |
|---------------------------|--------|--------|---------|
| CODE                      | 7      | 8      | 9       |
| <b>600 AMP CABLE SIZE</b> | 350 AL | 750 AL | 1000 AL |
| <b>MACRO UNITS</b>        | CC---7 | CC---8 | CC---9  |

**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 2        | -             | S544848      | -            |
| 3    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**FIGURE 2**  
MANHOLE INSTALLATION SUBSURFACE CONNECTIONS  
200 AND 600 AMP DEADBREAK



**TABLE 2**

| TYPICAL COMBINATIONS      |        |        |        |        |         |         |
|---------------------------|--------|--------|--------|--------|---------|---------|
| CODE                      | 73     | 75     | 83     | 85     | 93      | 95      |
| <b>600 AMP CABLE SIZE</b> | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| <b>200 AMP CABLE SIZE</b> | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| <b>MACRO UNITS</b>        | CC--73 | CC--75 | CC--83 | CC--85 | CC--93  | CC--95  |

**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 3    | 600/200 AMP TAP PLUG         | -                | 1        | -             | S547324      | -            |
| 4    | DEADBREAK ELBOW CONNECTOR    | #2 AL            | 1        | -             | S443842      | -            |
|      |                              | 2/0 AL           |          | -             | S443844      |              |
| 5    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**FIGURE 3**  
MANHOLE INSTALLATION SUBSURFACE CONNECTIONS  
200 AND 600 AMP DEADBREAK

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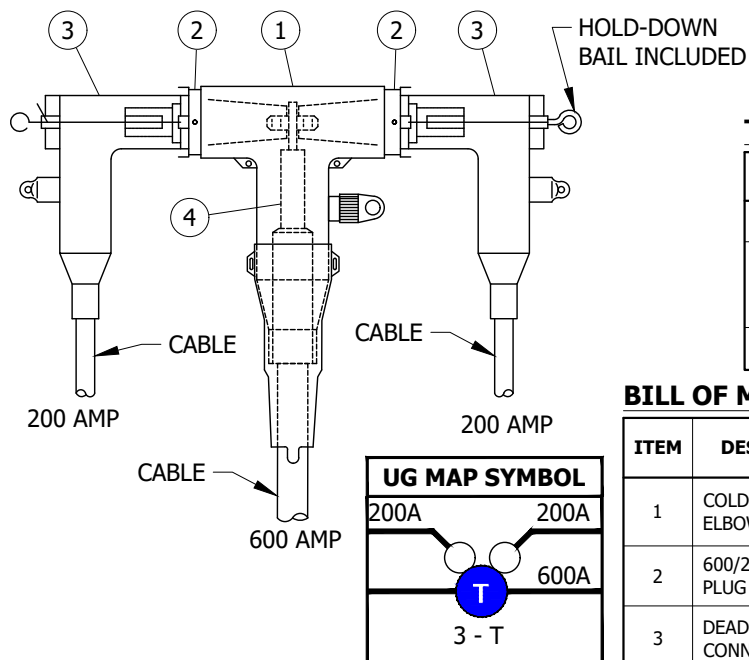
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
**MANHOLE INSTALLATIONS**

**UG4181.10**





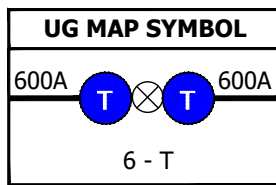
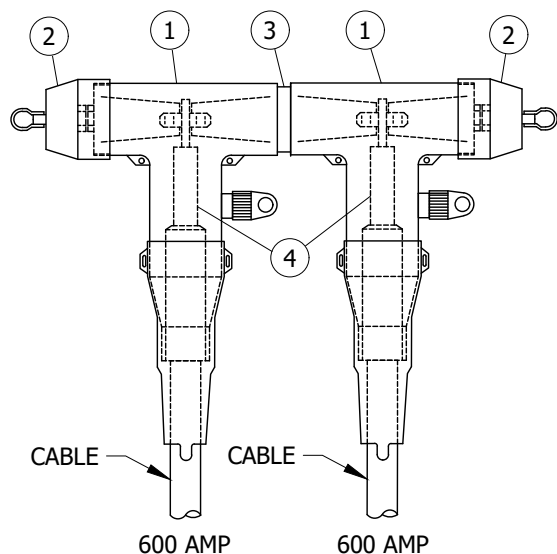
**TABLE 3**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | 375    | 575    | 583    | 585    | 593     | 595     |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL  | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | 2/0 AL | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| <b>MACRO UNITS</b>   | CC-375 | CC-575 | CC-583 | CC-585 | CC-593  | CC-595  |

**BILL OF MATERIALS (FIGURE 4):**

| ITEM | DESCRIPTION               | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE     | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                           | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | 600/200 AMP TAP PLUG      | -                | 1        | -             | S547324      | -            |
| 3    | DEADBREAK ELBOW CONNECTOR | #2 AL            | 2        | -             | S443842      | -            |
|      |                           | 2/0 AL           |          | -             | S443844      |              |
| 4    | CONDUCTOR CONNECTOR       | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                           | 750 AN 1000      |          | -             | S471316      | P6ALR5       |

**FIGURE 4**  
MANHOLE INSTALLATION SUBSURFACE CONNECTIONS  
200 AND 600 AMP DEADBREAK



**TABLE 4**

| TYPICAL COMBINATIONS |        |        |        |         |         |         |
|----------------------|--------|--------|--------|---------|---------|---------|
| CODE                 | 77     | 87     | 88     | 97      | 98      | 99      |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 350 AL  | 750 AL  | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL | 1000 AL |
| <b>MACRO UNITS</b>   | CC--77 | CC--87 | CC--88 | CC--97  | CC--98  | CC--99  |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                 | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE       | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                             | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | 600/200 AMP TAP PLUG        | -                | 2        | -             | S547324      | -            |
| 3    | DOUBLE ENDED CONNECTOR PLUG | -                | 1        | -             | S544832      | -            |
| 4    | CONDUCTOR CONNECTOR         | 4/0, 350 TO 500  | 2        | -             | S471314      | P6ALR3       |
|      |                             | 750 TO 1000      |          | -             | S471316      | P6ALR5       |

**FIGURE 5**  
MANHOLE INSTALLATION SUBSURFACE CONNECTIONS  
200 AND 600 AMP DEADBREAK

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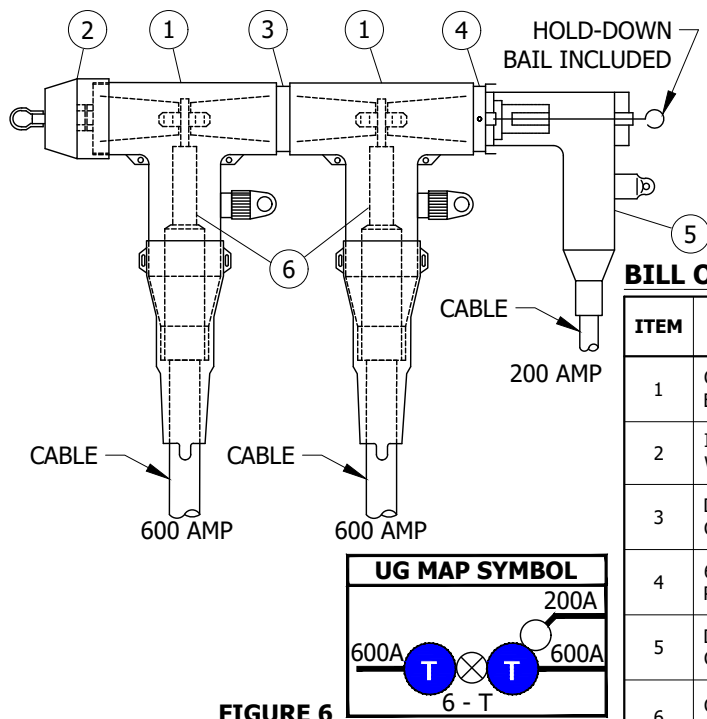
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
**MANHOLE INSTALLATIONS**

**UG4181.11**





**TABLE 5**

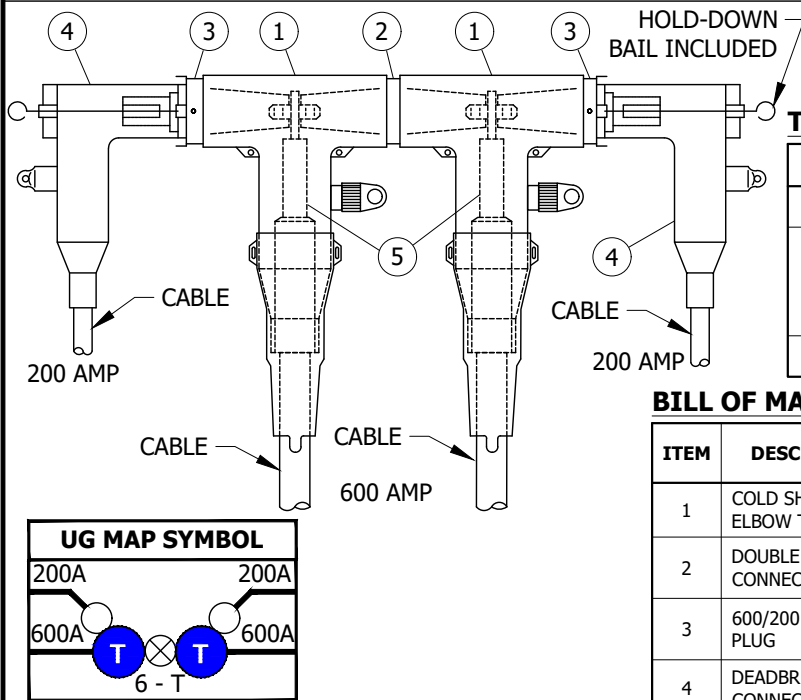
| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | 773    | 775    | 883    | 885    | 993     | 995     |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| MACRO UNITS          | CC-773 | CC-775 | CC-883 | CC-885 | CC-993  | CC-995  |

**BILL OF MATERIALS (FIGURE 6):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 3    | DOUBLE ENDED CONNECTOR PLUG  | -                | 1        | -             | S544832      | -            |
| 4    | 600/200 AMP TAP PLUG         | -                | 1        | -             | S547324      | -            |
| 5    | DEADBREAK ELBOW CONNECTOR    | #2 AL            | 1        | -             | S443842      | -            |
|      |                              | 2/0 AL           |          | -             | S443844      |              |
| 6    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**FIGURE 6**

MANHOLE INSTALLATION SUBSURFACE CONNECTIONS - 200 AND 600 AMP DEADBREAK



**TABLE 6**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | 5773   | 5775   | 5883   | 5885   | 5993    | 5995    |
| 200 AMP CABLE SIZE   | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL | 2/0 AL  | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| MACRO UNITS          | CC5773 | CC5775 | CC5883 | CC5885 | CC5993  | CC5995  |

**BILL OF MATERIALS (FIGURE 7):**

| ITEM | DESCRIPTION                 | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE       | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                             | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | DOUBLE ENDED CONNECTOR PLUG | -                | 1        | -             | S544832      | -            |
| 3    | 600/200 AMP TAP PLUG        | -                | 2        | -             | S547324      | -            |
| 4    | DEADBREAK ELBOW CONNECTOR   | #2 AL            | 2        | -             | S443842      | -            |
|      |                             | 2/0 AL           |          | -             | S443844      |              |
| 5    | CONDUCTOR CONNECTOR         | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                             | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**FIGURE 7**

MANHOLE INSTALLATION SUBSURFACE CONNECTIONS 200 AND 600 AMP DEADBREAK

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| A   | REVISION | -  | -  | -   | TR/MJC | 11/08/2011 | D   | REVISION      | -   | -   | -   | TR/MJC | 10/30/2012 |

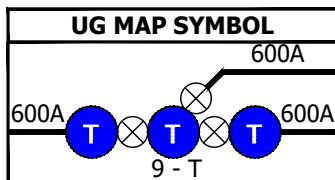
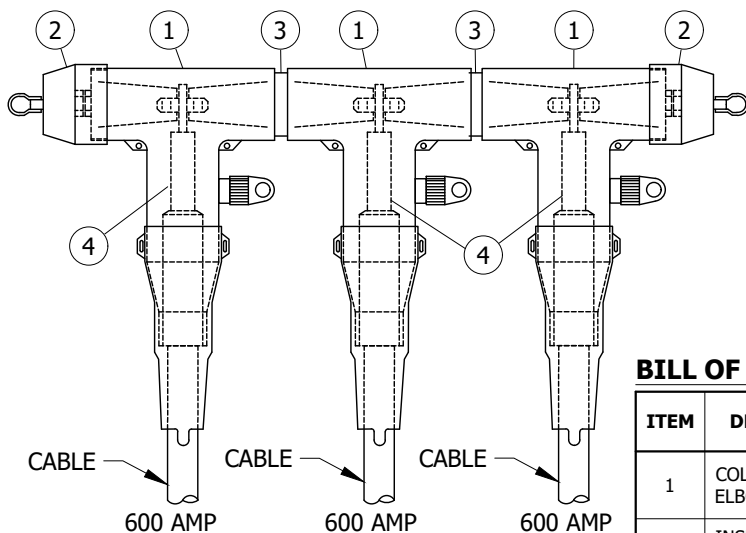
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
MANHOLE INSTALLATIONS

UG4181.12





**FIGURE 8**

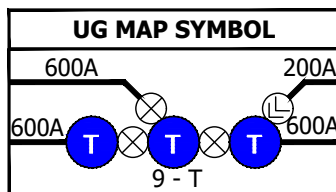
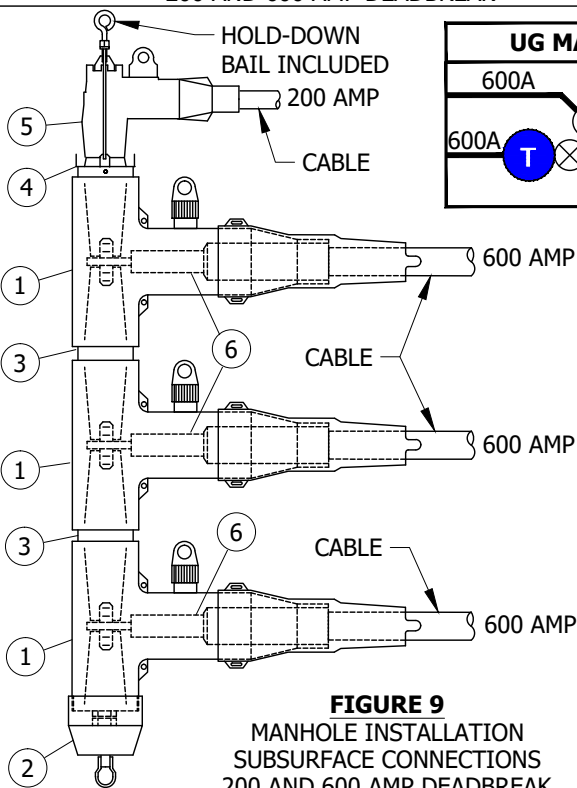
MANHOLE INSTALLATION SUBSURFACE CONNECTIONS  
200 AND 600 AMP DEADBREAK

**TABLE 7**

| TYPICAL COMBINATIONS |        |        |         |         |
|----------------------|--------|--------|---------|---------|
| CODE                 | 777    | 888    | 889     | 999     |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 750 AL  | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 750 AL  | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | CC-777 | CC-888 | CC-889  | CC-999  |

**BILL OF MATERIALS (FIGURE 8):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 3        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 2        | -             | S544848      | -            |
| 3    | DOUBLE ENDED CONNECTOR PLUG  | -                | 2        | -             | S544832      | -            |
| 4    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 3        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 9**

MANHOLE INSTALLATION SUBSURFACE CONNECTIONS  
200 AND 600 AMP DEADBREAK

**TABLE 8**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | 7773   | 7775   | 8883   | 8885   | 9993    | 9995    |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| MACRO UNITS          | CC7773 | CC7775 | CC8883 | CC8885 | CC9993  | CC9995  |

**BILL OF MATERIALS (FIGURE 9):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 3        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 3    | DOUBLE ENDED CONNECTOR PLUG  | -                | 2        | -             | S544832      | -            |
| 4    | 600/200 AMP TAP PLUG         | -                | 1        | -             | S547324      | -            |
| 5    | DEADBREAK ELBOW CONNECTOR    | #2 AL            | 1        | -             | S443842      | -            |
|      |                              | 2/0 AL           |          | -             | S443844      |              |
| 6    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 3        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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| B   | REVISION | -  | -  | -   | TR/MJC | 11/14/2011 | E   | FIGURE UPDATE | -   | EJA | GLW | CZH    | 12/09/2019 |
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
MANHOLE INSTALLATIONS

UG4181.13



**INSTALLATION:**

A. THREE TEE COMBINATIONS SHOWN IN THIS STANDARD SHALL ONLY BE USED TO FEED A SWITCHED TIE POSITION.

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES**NOTES:**I. **TABLE 9**

| CODES USED IN TABLES 1-8 |         |
|--------------------------|---------|
| CODE                     | TYPE    |
| CABLE                    |         |
| 3                        | #2 AL   |
| 5                        | 2/0 AL  |
| 6                        | 4/0 AL  |
| 7                        | 350 AL  |
| 8                        | 750 AL  |
| 9                        | 1000 AL |

II. OTHER COMBINATIONS MAY BE CODED USING THE ABOVE CODES FOR THE SAME TYPE COMBINATIONS SHOWN.

**REFERENCE:**

a. FOR SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, REFER TO UG4182 AND UG4196.

b. FOR INFORMATION ON COLD SHRINK ELBOW TEE, REFER TO UG4189 (FUTURE).

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 200 & 600 AMP CONNECTOR ASSEMBLIES

IDENTIFICATION CHART

MANHOLE INSTALLATIONS

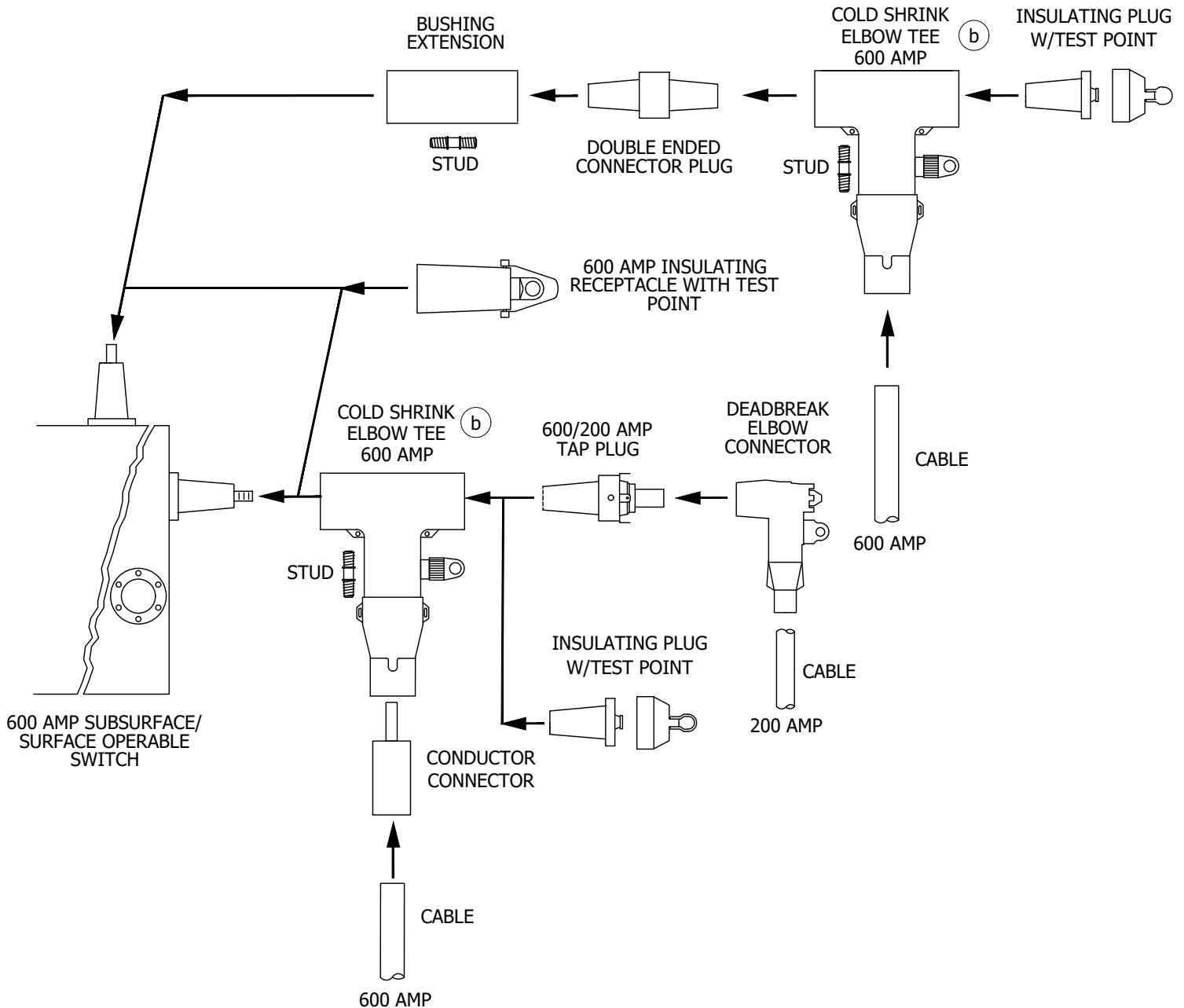
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**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 200 AND 600 AMP CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION WORK ORDERS FOR SUBSURFACE/SURFACE OPERABLE SWITCH CONNECTIONS.

**ATTENTION:**

- \* THIS FIGURE SHOWS HOW 200 AMP AND 600 AMP CONNECTORS ARE ASSEMBLED.
- \*\* ALWAYS USE THE MANUFACTURERS RECOMMENDED TORQUE SETTINGS WHEN ASSEMBLING CONNECTORS.



**FIGURE 1**  
SUBSURFACE/SURFACE OPERABLE SWITCH CONNECTOR APPLICATION CHART  
200 AND 600 AMP DEADBREAK

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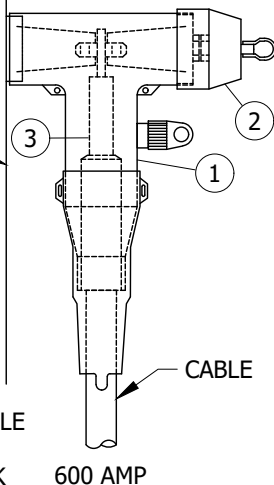
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
SUBSURFACE/SURFACE OPERABLE SWITCH CONNECTIONS

**UG4181.15**



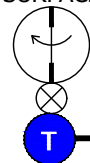
SWITCH  
CABINET



**FIGURE 2**  
SUBSURFACE/SURFACE OPERABLE  
SWITCH CONNECTIONS  
200 AND 600 AMP DEADBREAK

#### UG MAP SYMBOL

SURFACE

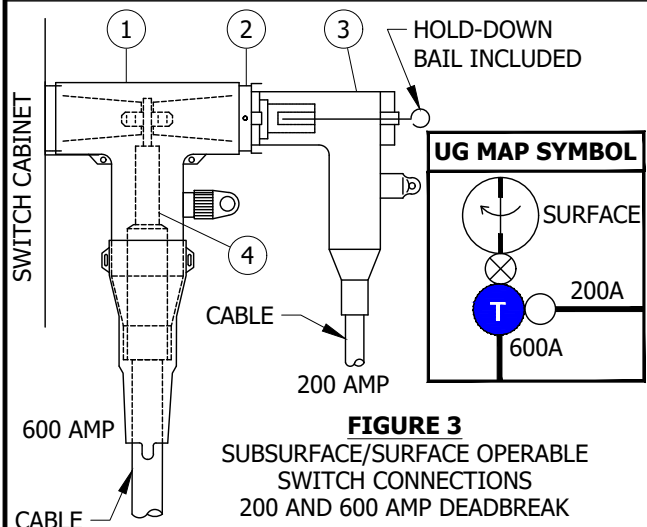


**TABLE 1**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | T7     | T8     | T9      |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | CC-T7  | CC-T8  | CC-T9   |

#### BILL OF MATERIALS (FIGURE 2):

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 3    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 3**  
SUBSURFACE/SURFACE OPERABLE  
SWITCH CONNECTIONS  
200 AND 600 AMP DEADBREAK

**TABLE 2**

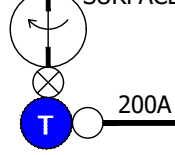
| TYPICAL COMBINATIONS                     |                 |                  |                 |                  |                 |                   |
|--|-----------------|------------------|-----------------|------------------|-----------------|-------------------|
| CODE                                     | T73             | T75              | T83             | T85              | T93             | T95               |
| 600 AMP CABLE SIZE<br>200 AMP CABLE SIZE | 350 AL<br>#2 AL | 350 AL<br>2/0 AL | 750 AL<br>#2 AL | 750 AL<br>2/0 AL | 1000<br>AL#2 AL | 1000 AL<br>2/0 AL |
| MACRO UNITS                              | CC-T73          | CC-T75           | CC-T83          | CC-T85           | CC-T93          | CC-T95            |

#### BILL OF MATERIALS (FIGURE 3):

| ITEM | DESCRIPTION               | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE     | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                           | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | 600/200 AMP TAP PLUG      | -                | 1        | -             | S547324      | -            |
| 3    | DEADBREAK ELBOW CONNECTOR | #2 AL            | 1        | -             | S443842      | -            |
|      |                           | 2/0 AL           |          | -             | S443844      | -            |
| 4    | CONDUCTOR CONNECTOR       | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                           | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

#### UG MAP SYMBOL

SURFACE



**TABLE 3**

| TYPICAL COMBINATIONS |       |        |
|----------------------|-------|--------|
| CODE                 | F3    | F5     |
| 200 AMP CABLE SIZE   | #2 AL | 2/0 AL |
| MACRO UNITS          | CC-F3 | CC-F5  |

#### BILL OF MATERIALS (FIGURE 4):

| ITEM | DESCRIPTION               | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | BUSHING EXTENSION         | -         | 1        | -             | S336204      | -            |
| 2    | 600/200 AMP TAP PLUG      | -         | 1        | -             | S547324      | -            |
| 3    | DEADBREAK ELBOW CONNECTOR | #2 AL     | 1        | -             | S443842      | -            |
|      |                           | 2/0 AL    |          | -             | S443844      | -            |

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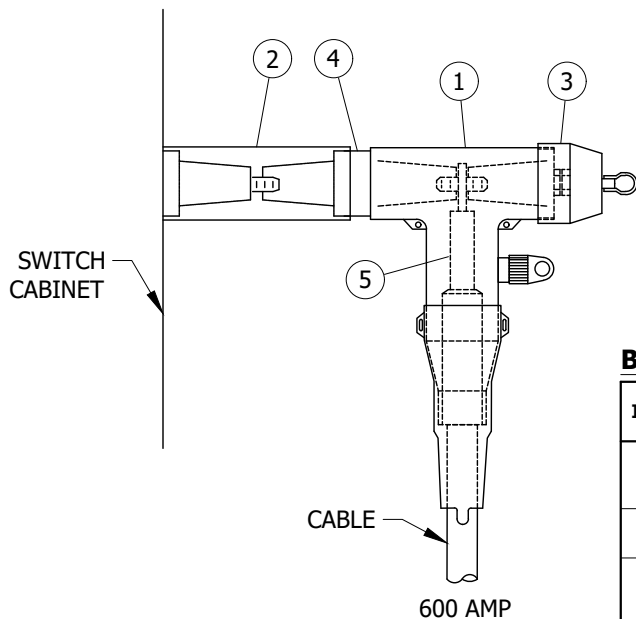
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16 OF 28

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

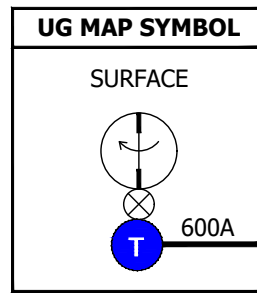
SUBSURFACE/SURFACE OPERABLE SWITCH CONNECTIONS

UG4181.16





**FIGURE 5**  
SUBSURFACE/SURFACE OPERABLE  
SWITCH CONNECTIONS  
200 AND 600 AMP DEADBREAK

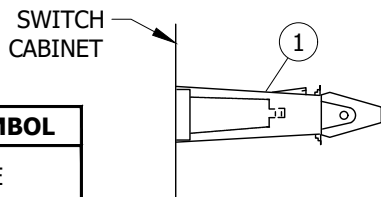


**TABLE 4**

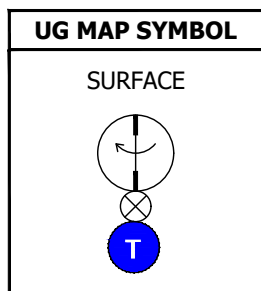
| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | F7     | F8     | F9      |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | CC--F7 | CC--F8 | CC--F9  |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                  | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE        | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                              | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | BUSHING EXTENSION            | -                | 1        | -             | S336204      | -            |
| 3    | INSULATED PLUG W/ TEST POINT | -                | 1        | -             | S544848      | -            |
| 4    | DOUBLE ENDED CONNECTOR PLUG  | -                | 1        | -             | S544832      | -            |
| 5    | CONDUCTOR CONNECTOR          | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                              | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 6**  
SUBSURFACE/SURFACE OPERABLE  
SWITCH CONNECTIONS  
200 AND 600 AMP DEADBREAK



**TABLE 5**

| TYPICAL COMBINATIONS |        |
|----------------------|--------|
| CODE                 | H      |
| MACRO UNITS          | CC---H |

**BILL OF MATERIALS (FIGURE 6):**

| ITEM | DESCRIPTION                   | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | 600 AMP INSULATING RECEPTACLE | -         | 1        | -             | S570608      | -            |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

SUBSURFACE/SURFACE OPERABLE SWITCH CONNECTIONS

UG4181.17



**INSTALLATION:**

A. DO NOT "PIGGYBACK" 600 AMP TEES ON TOP OF EACH OTHER AT ANY TIME ON THE SWITCH BUSHING.

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES

**NOTES:**I. **TABLE 6**

| CODES USED IN TABLES 1-5 (SUBSURFACE/SURFACE OPERABLE SWITCH CONNECTIONS) |  |
|---|--|
| CODES   | TYPE   |
| CABLE   |  |
| 3   | #2 AL  |
| 5   | 2/0 AL   |
| 7   | 350 AL   |
| 8   | 750 AL   |
| 9   | 1000 AL  |
| COMPONENT   |  |
| F   | 600 AMP SUBSURFACE/SURFACE OPERABLE SWITCH BUSHING EXTENSION     |
| H   | 600 AMP SUBSURFACE/SURFACE OPERABLE SWITCH INSULATING RECEPTACLE |
| T   | 600 AMP SUBSURFACE/SURFACE OPERABLE SWITCH TEE                   |

II. OTHER COMBINATIONS MAY BE CODED USING THE ABOVE CODES FOR THE SAME TYPE COMBINATIONS SHOWN.

**REFERENCE:**

- a. FOR SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, REFER TO UG4182 AND UG4196.
- ⓑ FOR INFORMATION ON COLD SHRINK ELBOW TEE, REFER TO UG4189 (FUTURE).

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
SUBSURFACE/SURFACE OPERABLE SWITCH CONNECTIONS

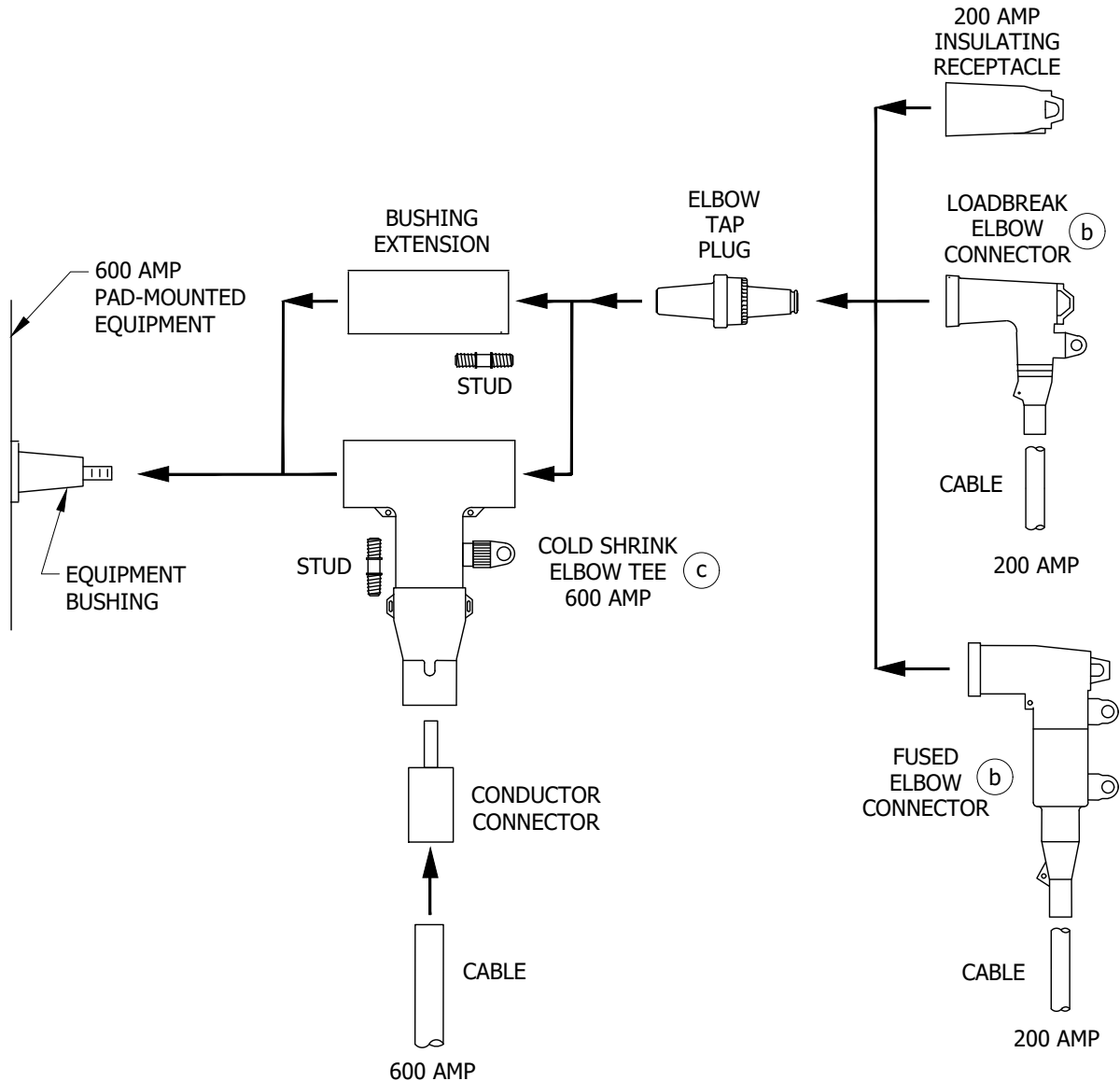
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**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 200 AND 600 AMP CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION WORK ORDERS FOR PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTOR APPLICATIONS.

**ATTENTION:**

\* THIS FIGURE SHOWS HOW 200 AMP AND 600 AMP CONNECTORS ARE ASSEMBLED.



**FIGURE 1**  
PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTOR APPLICATION CHART  
200 AMP LOADBREAK AND 600 AMP DEADBREAK

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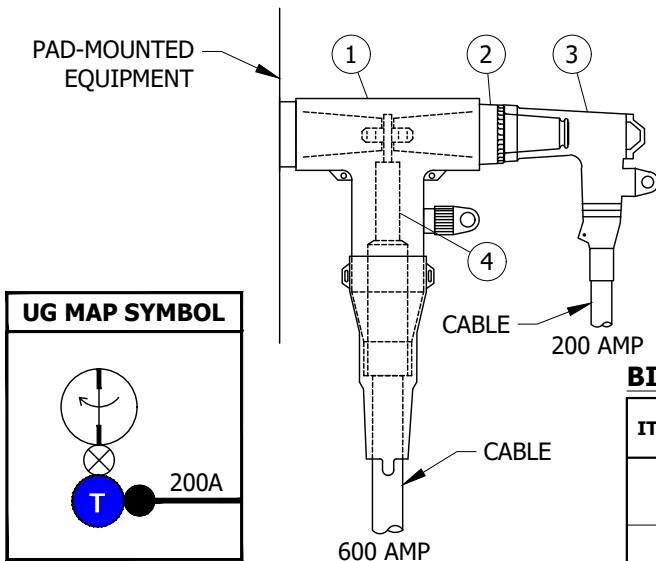
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| 12KV 200 & 600 AMP CONNECTOR ASSEMBLIES           |                           |                    |          |                     |
| IDENTIFICATION CHART                              |                           |                    |          |                     |
| PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTORS      |                           |                    |          |                     |

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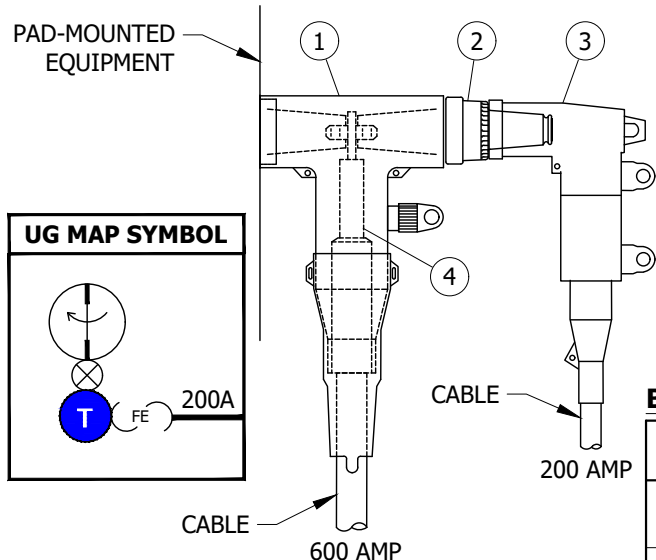
**FIGURE 2**  
PAD-MOUNTED 200/600 AMP  
EQUIPMENT CONNECTIONS  
200 AMP LOADBREAK

**TABLE 1**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | P73    | P75    | P83    | P85    | P93     | P95     |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | CC-P73 | CC-P75 | CC-P83 | CC-P85 | CC-P93  | CC-P95  |

**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION               | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE     | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                           | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | ELBOW TAP PLUG            | -                | 1        | -             | S547328      | -            |
| 3    | LOADBREAK ELBOW CONNECTOR | #2 AL            | 1        | -             | S443838      | -            |
|      |                           | 2/0 AL           |          | -             | S443840      |              |
| 4    | CONDUCTOR CONNECTOR       | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                           | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 3**  
PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTIONS  
200 AMP LOADBREAK

**TABLE 2**

| TYPICAL COMBINATIONS |        |        |        |        |         |         |
|----------------------|--------|--------|--------|--------|---------|---------|
| CODE                 | P7B    | P7C    | P8B    | P8C    | P9B     | P9C     |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL | #2 AL  | 2/0 AL | #2 AL   | 2/0 AL  |
| 600 AMP CABLE SIZE   | 350 AL | 350 AL | 750 AL | 750 AL | 1000 AL | 1000 AL |
| MACRO UNITS          | CC-P7B | CC-P7C | CC-P8B | CC-P8C | CC-P9B  | CC-P9C  |

**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION           | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                       | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | ELBOW TAP PLUG        | -                | 1        | -             | S547328      | -            |
| 3    | FUSED ELBOW CONNECTOR | #2 AL            | 1        | -             | S443850      | -            |
|      |                       | 2/0 AL           |          | -             | S443882      |              |
| 4    | CONDUCTOR CONNECTOR   | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                       | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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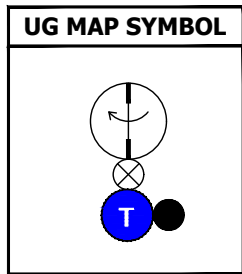
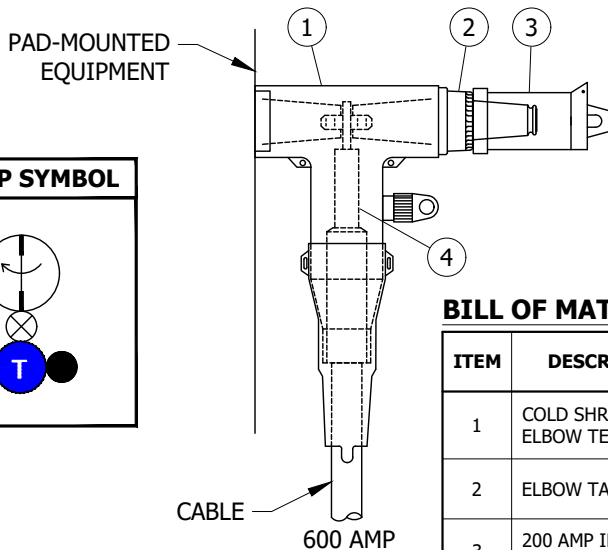
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTORS

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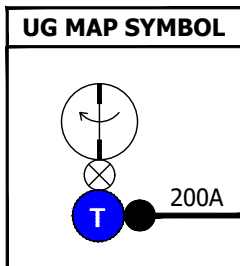
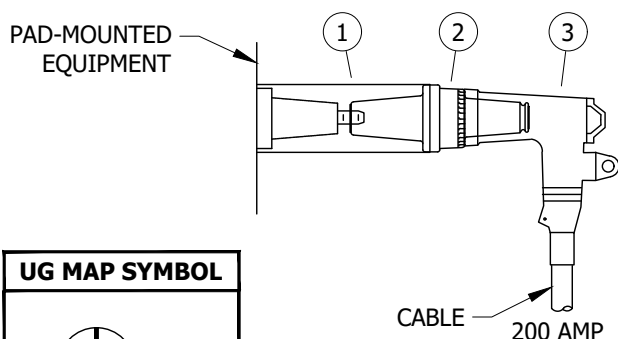
**TABLE 3**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | P70    | P80    | P90     |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | CC-P70 | CC-P80 | CC-P90  |

**BILL OF MATERIALS (FIGURE 4):**

| ITEM | DESCRIPTION                   | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE         | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                               | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | ELBOW TAP PLUG                | -                | 1        | -             | S547328      | -            |
| 3    | 200 AMP INSULATING RECEPTACLE | -                | 1        | -             | S204304      | -            |
| 4    | CONDUCTOR CONNECTOR           | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                               | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

**FIGURE 4**  
PAD-MOUNTED 200/600 AMP  
EQUIPMENT CONNECTIONS  
200 AMP LOADBREAK



**TABLE 4**

| TYPICAL COMBINATIONS |        |        |
|----------------------|--------|--------|
| CODE                 | E3     | E5     |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL |
| MACRO UNITS          | CC--E3 | CC--E5 |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION               | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | BUSHING EXTENSION         | -         | 1        | -             | S336204      | -            |
| 2    | ELBOW TAP PLUG            | -         | 1        | -             | S547328      | -            |
| 3    | LOADBREAK ELBOW CONNECTOR | #2 AL     | 1        | -             | S443838      | -            |
|      |                           | 2/0 AL    |          | -             | S443840      |              |

**FIGURE 5**  
PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTIONS  
200 AMP LOADBREAK

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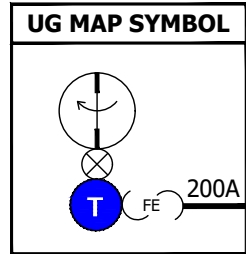
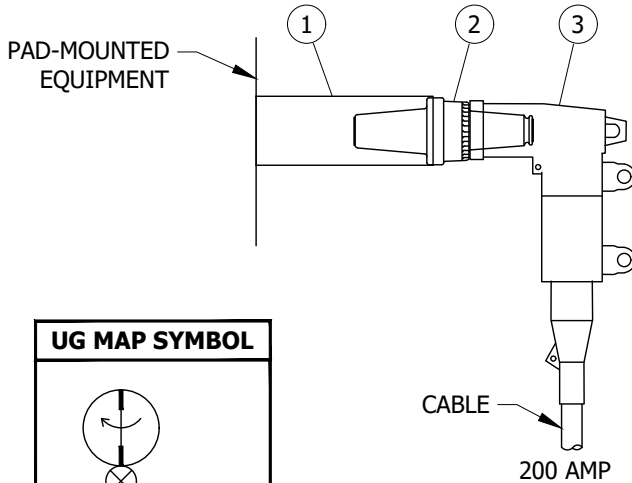
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12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTORS

UG4181.21





**FIGURE 6**

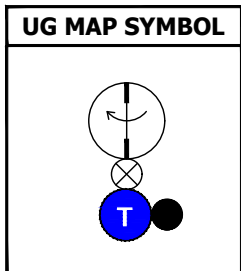
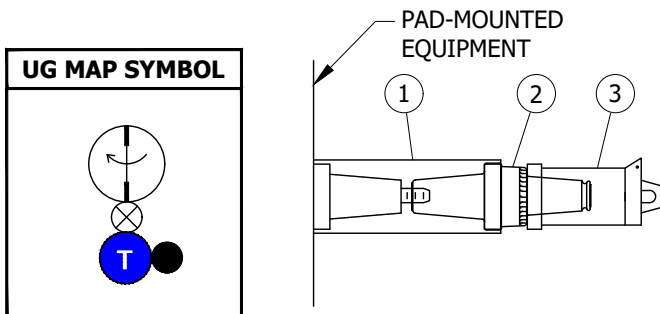
PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTIONS  
200 AMP LOADBREAK

**TABLE 5**

| TYPICAL COMBINATIONS |        |        |
|----------------------|--------|--------|
| CODE                 | EB     | EC     |
| 200 AMP CABLE SIZE   | #2 AL  | 2/0 AL |
| MACRO UNITS          | CC--EB | CC--EC |

**BILL OF MATERIALS (FIGURE 6):**

| ITEM | DESCRIPTION           | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------|-----------|----------|---------------|--------------|--------------|
| 1    | BUSHING EXTENSION     | -         | 1        | -             | S336204      | -            |
| 2    | ELBOW TAP PLUG        | -         | 1        | -             | S547328      | -            |
| 3    | FUSED ELBOW CONNECTOR | #2 AL     | 1        | -             | S443850      | -            |
|      |                       | 2/0 AL    |          | -             | S443882      |              |



**FIGURE 7**

PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTIONS  
200 AMP LOADBREAK

**TABLE 6**

| TYPICAL COMBINATIONS |        |
|----------------------|--------|
| CODE                 | EO     |
| MACRO UNITS          | CC--E0 |

**BILL OF MATERIALS (FIGURE 7):**

| ITEM | DESCRIPTION        | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--------------------|-----------|----------|---------------|--------------|--------------|
| 1    | BUSHING EXTENSION  | -         | 1        | -             | S336204      | -            |
| 2    | ELBOW TAP PLUG     | -         | 1        | -             | S547328      | -            |
| 3    | 200 AMP INSULATING | -         | 1        | -             | S204304      | -            |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTORS

UG4181.22



**INSTALLATION:**

- A. DO NOT "PIGGYBACK" 600 AMP TEES ON TOP OF EACH OTHER AT ANY TIME ON THE EQUIPMENT BUSHING.
- B. THE 200 AMP/600 AMP LOADBREAK CONFIGURATIONS ON THESE PAGES ARE ONLY TO BE USED ON PAD-MOUNTED EQUIPMENT INSTALLATIONS

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES

**NOTES:**I. **TABLE 7**

| CODES USED IN TABLES 1-6 (PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTOR) |   |
|--|---|
| CODE   | TYPE  |
| CABLE  |   |
| 3  | #2 AL   |
| 5  | 2/0 AL  |
| 7  | 350 AL  |
| 8  | 750 AL  |
| 9  | 1000 AL   |
| COMPONENT  |   |
| B  | #2 AL FUSED ELBOW                               |
| C  | 2/0 AL FUSED ELBOW                              |
| E  | 600 AMP PAD-MOUNTED EQUIPMENT BUSHING EXTENSION |
| P  | 600 AMP PAD-MOUNTED EQUIPMENT TEE               |
| O  | 200 AMP INSULATING RECEPTACLE                   |

II. OTHER COMBINATIONS MAY BE CODED USING THE ABOVE CODES FOR THE SAME TYPE COMBINATIONS SHOWN.

**REFERENCE:**

- a. FOR SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, REFER TO UG4182, UG4190, UG4191 AND UG4192.
- (b) FOR GROUNDING ELBOW KIT, REFER TO UG4179.1.
- (c) FOR INFORMATION ON COLD SHRINK ELBOW TEE, REFER TO UG4189 (FUTURE).

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART  
PAD-MOUNTED 200/600 AMP EQUIPMENT CONNECTORS

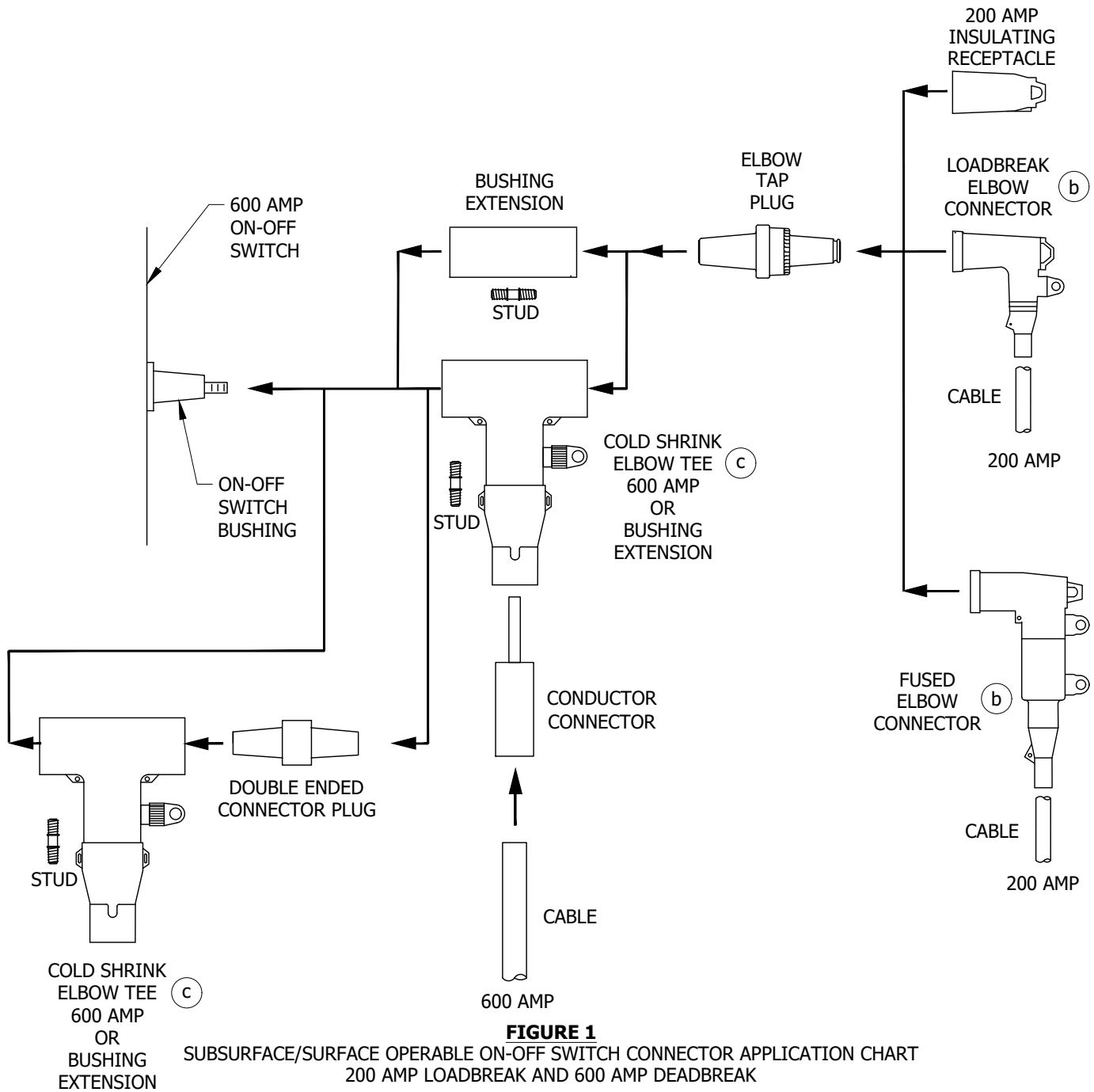
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**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 200 AND 600 AMP CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION WORK ORDERS FOR SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH CONNECTIONS.

**ATTENTION:**

- \* THIS FIGURE SHOWS HOW 200 AMP AND 600 AMP CONNECTORS ARE ASSEMBLED.
- \*\* ALWAYS USE THE MANUFACTURERS RECOMMENDED TORQUE SETTINGS WHEN ASSEMBLING CONNECTORS.



**FIGURE 1**  
SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH CONNECTOR APPLICATION CHART  
200 AMP LOADBREAK AND 600 AMP DEADBREAK

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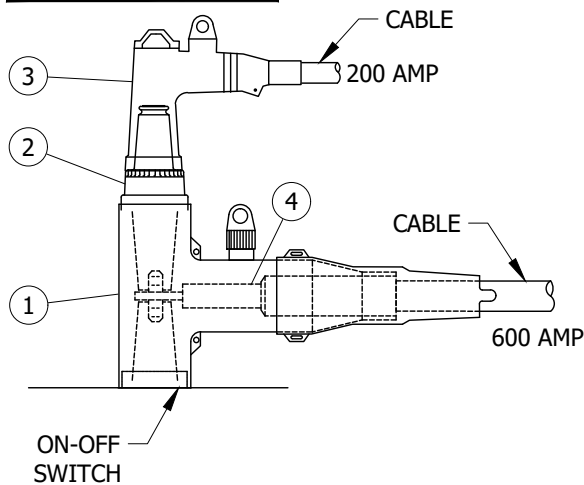
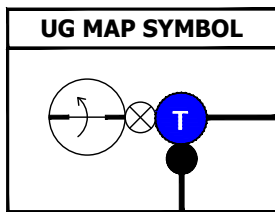
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|   |                           |                          |                    |                          |          |                          |                     |
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS     |                           |                          |                    |                          |          |                          |                     |
| 12KV 200 & 600 AMP CONNECTOR ASSEMBLIES               |                           |                          |                    |                          |          |                          |                     |
| IDENTIFICATION CHART                                  |                           |                          |                    |                          |          |                          |                     |
| SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH CONNECTIONS |                           |                          |                    |                          |          |                          |                     |

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UG4181.24





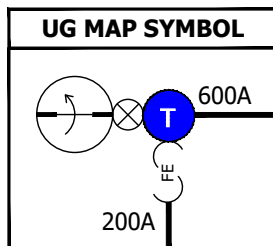
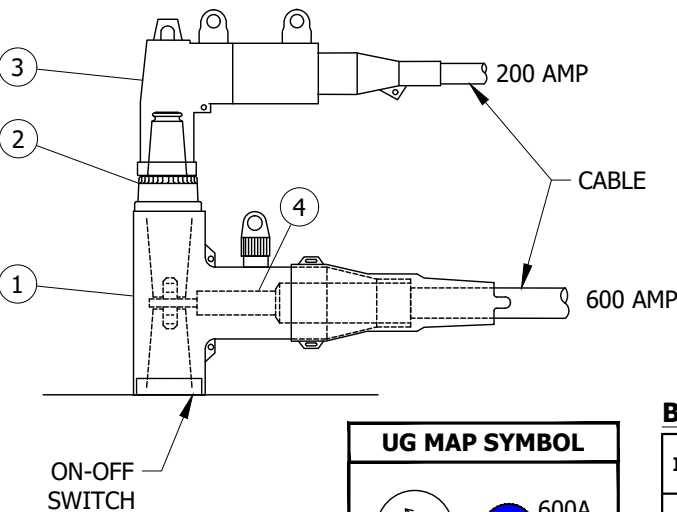
**FIGURE 2**  
SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH  
200 AMP LOADBREAK CONNECTIONS

**TABLE 1**

| TYPICAL COMBINATIONS      |         |         |         |         |         |         |
|---------------------------|---------|---------|---------|---------|---------|---------|
| CODE                      | T73     | T75     | T83     | T85     | T93     | T95     |
| <b>600 AMP CABLE SIZE</b> | 350 AL  | 350 AL  | 750 AL  | 750 AL  | 1000 AL | 1000 AL |
| <b>200 AMP CABLE SIZE</b> | #2 AL   | 2/0 AL  | #2 AL   | 2/0 AL  | #2 AL   | 2/0 AL  |
| <b>MACRO UNITS</b>        | CC--T73 | CC--T75 | CC--T83 | CC--T85 | CC--T93 | CC--T95 |

**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION               | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE     | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                           | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | ELBOW TAP PLUG            | -                | 1        | -             | S547328      | -            |
| 3    | LOADBREAK ELBOW CONNECTOR | #2 AL            | 1        | -             | S443838      | -            |
|      |                           | 2/0 AL           |          | -             | S443840      |              |
| 4    | CONDUCTOR CONNECTOR       | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                           | 750 AND 1000     |          | -             | S471316      | P6ALR5       |



**FIGURE 3**  
SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH  
200 AMP LOADBREAK CONNECTIONS

**TABLE 2**

| TYPICAL COMBINATIONS      |         |         |         |         |         |         |
|---------------------------|---------|---------|---------|---------|---------|---------|
| CODE                      | 7B      | 7C      | 8B      | 8C      | 9B      | 9C      |
| <b>600 AMP CABLE SIZE</b> | 350 AL  | 350 AL  | 750 AL  | 750 AL  | 1000 AL | 1000 AL |
| <b>200 AMP CABLE SIZE</b> | #2 AL   | 2/0 AL  | #2 AL   | 2/0 AL  | #2 AL   | 2/0 AL  |
| <b>MACRO UNITS</b>        | CC--T7B | CC--T7C | CC--T8B | CC--T8C | CC--T9B | CC--T9C |

**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION           | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE | 4/0, 350 AND 500 | 1        | -             | S326572      | 600AT        |
|      |                       | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | ELBOW TAP PLUG        | -                | 1        | -             | S547328      | -            |
| 3    | FUSED ELBOW CONNECTOR | #2 AL            | 1        | -             | S443850      | -            |
|      |                       | 2/0 AL           |          | -             | S443882      |              |
| 4    | CONDUCTOR CONNECTOR   | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                       | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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**SHEET**  
**25 OF 28**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

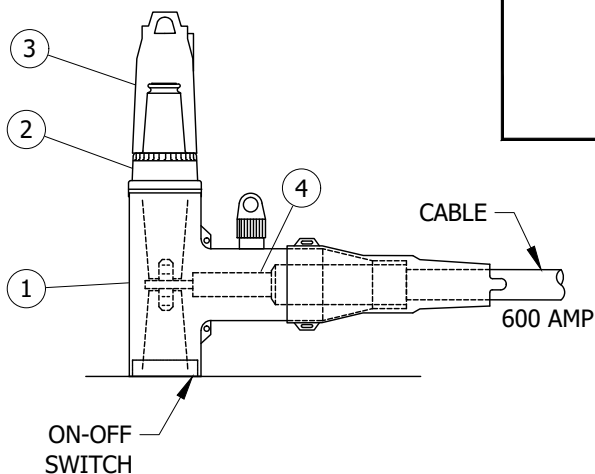
**SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH CONNECTIONS**

**UG4181.25**



# UG MAP SYMBOL

600A



**FIGURE 4**  
SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH  
200 AMP LOADBREAK CONNECTIONS

**TABLE 3**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | T70    | T80    | T90     |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | CC-T70 | CC-T80 | CC-T90  |

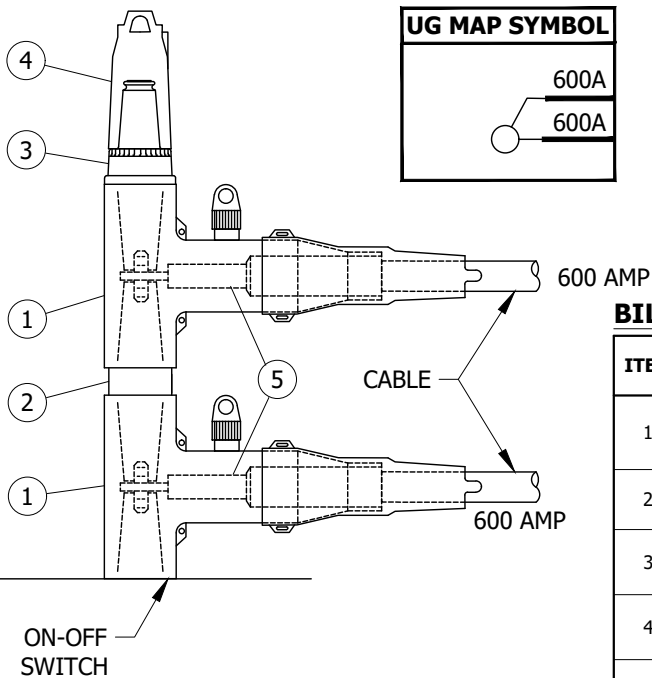
**BILL OF MATERIALS (FIGURE 4):**

| ITEM | DESCRIPTION                   | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE         | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                               | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | ELBOW TAP PLUG                | -                | 1        | -             | S547328      | -            |
| 3    | 200 AMP INSULATING RECEPTACLE | -                | 1        | -             | S204304      | -            |
| 4    | CONDUCTOR CONNECTOR           | 4/0, 350 AND 500 | 1        | -             | S471314      | P6ALR3       |
|      |                               | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

# UG MAP SYMBOL

600A

600A



**FIGURE 5**  
SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH  
200 AMP LOADBREAK CONNECTIONS

**TABLE 4**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CODE                 | TT70   | TT80   | TT90    |
| 600 AMP CABLE SIZE   | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | C-TT70 | C-TT80 | C-TT90  |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                   | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|------------------|----------|---------------|--------------|--------------|
| 1    | COLD SHRINK ELBOW TEE         | 4/0, 350 AND 500 | 2        | -             | S326572      | 600AT        |
|      |                               | 750 AND 1000     |          | -             | S326574      | 600ATL       |
| 2    | DOUBLE ENDED CONNECTOR PLUG   | -                | 1        | -             | S544832      | -            |
| 3    | ELBOW TAP PLUG                | -                | 1        | -             | S547328      | -            |
| 4    | 200 AMP INSULATING RECEPTACLE | -                | 1        | -             | S204304      | -            |
| 5    | CONDUCTOR CONNECTOR           | 4/0, 350 AND 500 | 2        | -             | S471314      | P6ALR3       |
|      |                               | 750 AND 1000     |          | -             | S471316      | P6ALR5       |

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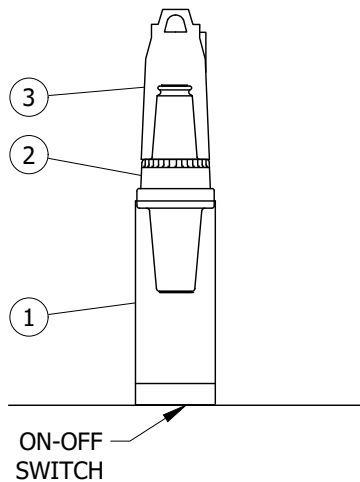
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH CONNECTIONS

UG4181.26





**FIGURE 6**  
SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH  
200 AMP LOADBREAK CONNECTIONS

**TABLE 5**

| TYPICAL COMBINATIONS |         |
|----------------------|---------|
| CODE                 | FO      |
| MACRO UNITS          | CC---FO |

**BILL OF MATERIALS (FIGURE 6):**

| ITEM | DESCRIPTION                   | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | BUSHING EXTENSION             | -         | 1        | -             | S336204      | -            |
| 2    | ELBOW TAP PLUG                | -         | 1        | -             | S547328      | -            |
| 3    | 200 AMP INSULATING RECEPTACLE | -         | 1        | -             | S204304      | -            |

**INSTALLATION:**

- A. "PIGGYBACK" TEES SHOWN IN THIS STANDARD SHALL ONLY BE USED TO FEED A SWITCH TIE POSITION.
- B. DO NOT INSTALL LOADBREAK ELBOWS ON SWITCHES INSTALLED IN MANHOLES.
- C. DO NOT INSTALL LOADBREAK ELBOWS ON "PIGGYBACK" TEES.

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES

**NOTES:**

**I. TABLE 6**

| CODES USED IN TABLES 1-5 |  |
|--------------------------|--|
| CODE                     | TYPE   |
| <b>CABLE</b>             |  |
| 3                        | #2 AL  |
| 5                        | 2/0 AL   |
| 7                        | 350 AL   |
| 8                        | 750 AL   |
| 9                        | 1000 AL  |
| <b>COMPONENT</b>         |  |
| B                        | #2 AL FUSED ELBOW  |
| C                        | 2/0 AL FUSED ELBOW   |
| T                        | 600 AMP SUBSURFACE/SURFACE OPERABLE TEE                      |
| F                        | 600 AMP SUBSURFACE/SURFACE OPERABLE SWITCH BUSHING EXTENSION |

II. OTHER COMBINATIONS MAY BE CODED USING THE ABOVE CODES FOR THE SAME TYPE COMBINATIONS SHOWN.

**REFERENCE:**

- a. FOR SPECIFICATIONS AND INSTALLATION INSTRUCTIONS, REFER TO UG4182, UG4190, UG4191 AND UG4192.
- b. FOR GROUNDING ELBOW KIT, REFER TO UG4179.1.
- c. FOR INFORMATION ON COLD SHRINK ELBOW TEE, REFER TO UG4189 (FUTURE).

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  
12KV 200 & 600 AMP CONNECTOR ASSEMBLIES  
IDENTIFICATION CHART

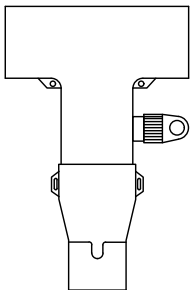
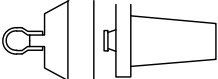
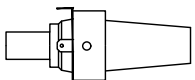

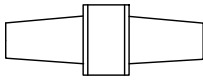
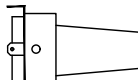
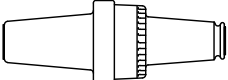

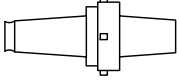
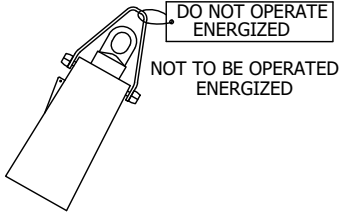

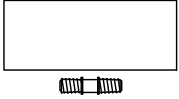
**SUBSURFACE/SURFACE OPERABLE ON-OFF SWITCH CONNECTIONS**

**UG4181.27**



**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 600 AMP SPLICE AND CONNECTOR ASSEMBLIES ON ELECTRIC CONSTRUCTION ORDERS.

**TABLE 1**

| PARTS IDENTIFICATION CHART   |                    |              |              |  |              |              |
|--|--------------------|--------------|--------------|--|--------------|--------------|
| PART   | WIRE SIZE          | STOCK NUMBER | DESIGN UNITS | PART   | STOCK NUMBER | DESIGN UNITS |
| <br>COLD SHRINK ELBOW TEE (a)               | 4/0, 350 AND 500   | S326572      | 600AT        | <br>INSULATED PLUG W/TEST POINT      | S544848      | PLUG-F       |
|  | 750 AND 1000       | S326574      | 600ATL       | <br>600/200 AMP TAP PLUG             | S547324      | TAP-FE       |
| <br>EXTENSION SPLICE                        | 350 AL             | S668434      | SS-350       | <br>DOUBLE-ENDED CONNECTOR PLUG      | S544832      | PLUG-C       |
|  | 750 AL             | S668436      | SS-750       |  |              |              |
|  | 750 AL COMP        | S668442      | SS750C       | <br>600/200 AMP REDUCING TAP WELL    | S719600      | REDTAP       |
|  | 750 AL-750 AL COMP | S668444      | SS750B       |  |              |              |
|  | 1000 AL            | S668438      | SS1000       |  |              |              |
|  | #4/0 CU            | S668430      | SS-4/0       |  |              |              |
|  | 500 CU             | S668432      | SS-500       | <br>ELBOW TAP PLUG                   | S547328      | ETP650       |
|  | 1000 KCML CU ONLY  | S668460      | SS1KCU       |  |              |              |
| <br>CONDUCTOR CONNECTOR                    | 4/0, 350 AND 500   | S471314      | P6ALR3       | <br>200 AMP LOADBREAK BUSHING PLUG | S544676      | BSHPLG       |
|  | 750 AND 1000       | S471316      | P6ALR5       |  |              |              |
| <br>INSULATING RECEPTACLE WITH TEST POINT |                    | S570608      | IN-REC       | <br>STUD                          | S701100      | STUD         |
|  |                    |              |              | <br>BUSHING EXTENSION AND STUD     | S336204      | BUSH-X       |
|  |                    |              |              |  |              |              |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

(a) FOR INFORMATION ON COLD SHRINK ELBOW TEE, REFER TO UG4189 (FUTURE).

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|-----|----------|----|----|-----|--------|------------|-----|---------------|-----|-----|-----|--------|------------|
| C   | REVISION | -  | -  | -   | TR/MJC | 07/24/2012 | F   | FORMATTING    | EDM | JKI | -   | -      | 06/02/2020 |
| B   | REVISION | -  | -  | -   | TR/MJC | 11/14/2011 | E   | FIGURE UPDATE | -   | EJA | GLW | CZH    | 12/09/2019 |
| A   | REVISION | -  | -  | -   | TR/MJC | 11/08/2011 | D   | REVISION      | -   | -   | -   | TR/MJC | 10/30/2012 |



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SHEET  
28 OF 28

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 200 & 600 AMP SPLICES, CONNECTORS  
AND DESIGN UNITS IDENTIFICATION CHART

UG4181.28

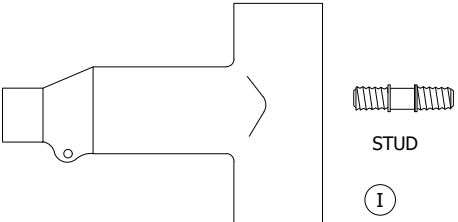
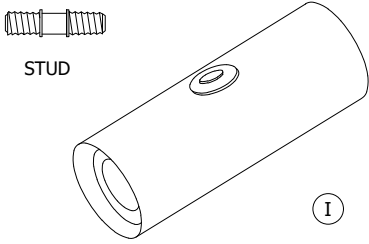

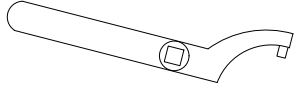
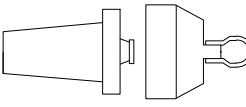


**SCOPE:** THIS STANDARD SHOWS 600 AMP CONNECTORS AND ACCESSORIES USED TO TERMINATE 12KV, 200 AND 600 AMP CABLES.

**ATTENTION:**

- \* ALWAYS USE THE MANUFACTURERS RECOMMENDED TORQUE SETTINGS WHEN ASSEMBLING CONNECTORS.

**TABLE 1**

| PART IDENTIFICATION CHART   |  |        |             |              |
|---|--|--------|-------------|--------------|
| PART  | MAJOR USE  | SERIES | WIRE SIZE   | STOCK NUMBER |
|  <p>ELBOW TEE</p>                       | ELBOW-TEE FOR SPLICING AND 600/200 AMP TAPS  | 650    | --          | S326578      |
|  <p>BUSHING EXTENSION</p>              | <p><b>ON SUBSURFACE SWITCH:</b> USED IN CENTER POSITION FOR ADDITIONAL CABLE TRAINING OR FOR THE INSTALLATION OF 200 AMP DEADBREAK ELBOWS WHERE 600 AMP TEES ARE NOT INSTALLED</p> <p><b>ON PAD-MOUNTED SWITCH:</b> USED FOR THE INSTALLATION OF 200 AMP LOADBREAK ELBOWS OR INSULATING RECEPTACLES WHERE 600 AMP TEES ARE NOT INSTALLED</p> | --     | --          | S336204      |
|  <p>CABLE ADAPTER</p>                | TO ADAPT CABLE TO ELBOW-TEE  | 650    | 4/0 CU      | S102026      |
|   |  |        | 350 AL      | S102027      |
|   |  |        | 500 CU      | S102028      |
|   |  |        | 750 COMP AL | S102051      |
|   |  |        | 750 AL      | S102034      |
|   |  | 1000   | 1000 AL     | S102050      |
|  <p>SPANNER WRENCH</p>               | TOOL USED FOR TIGHTENING ELBOW-TEE COMPONENT PARTS   | --     | --          | S818616      |
|  <p>INSULATED PLUG W/ TEXT POINT</p> | FOR DEAD ENDING END OF ELBOW-TEE   | --     | --          | S544848      |

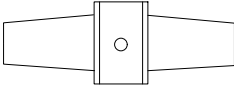
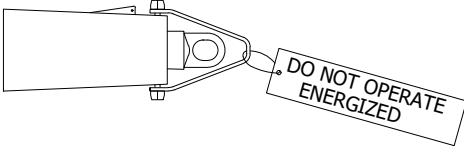
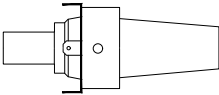
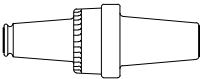

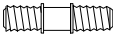
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| C   | FORMATTING | EDM | JK | -   | -       | 06/02/2020 | F   |        |    |    |     |     |      |
| B   | REVISION   | -   | -  | -   | TR/MJC  | 7/24/2012  | E   |        |    |    |     |     |      |
| A   | REVISION   | -   | -  | -   | RSW/VCR | 1/1/2000   | D   |        |    |    |     |     |      |

|                 |  |                           |                    |          |                     |          |
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| SHEET<br>1 OF 3 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG4182.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |                           |                    |          |                     |          |
|                 | 12KV 600/200 AMP SPLICES, CONNECTORS AND ACCESSORIES |                           |                    |          |                     |          |



TABLE 1 (CONT'D)

| PART IDENTIFICATION CHART   |  |        |           |              |
|---|--|--------|-----------|--------------|
| PART  | MAJOR USE  | SERIES | WIRE SIZE | STOCK NUMBER |
| <br>DOUBLE-ENDED CONNECTOR PLUG  | USED FOR MULTIPLE ELBOW-TEE SPLICE   | --     | --        | S544832      |
| <br>INSULATING RECEPTACLE WITH TEST POINT<br>(NOT TO BE OPERATED ENERGIZED) | INSULATES, SHIELDS AND WATERSEALS OPEN 600 AMP BUSHINGS                                    | --     | --        | S570608      |
| <br>600/200 AMP TAP PLUG   | FEMALE END USE TO ATTACH TO ELBOW-TEE OR BUSHING EXTENSION AND CONNECT 200 DEADBREAK ELBOW | --     | --        | S547324      |
| <br>ELBOW TAP PLUG  |  | --     | --        | S547328      |
| <br>1/2" DRIVE X 3/8" HEX WRENCH  |  | --     | --        | S818726      |
| <br>STUD   |  | --     | --        | S701100      |

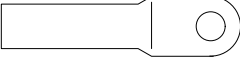
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|                 |  |                           |  |                    |  |          |  |                     |          |
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |                           |  |                    |  |          |  |                     |          |
|                 | 12KV 600/200 AMP SPLICES, CONNECTORS AND ACCESSORIES |                           |  |                    |  |          |  |                     |          |



TABLE 2

| SPADE COMPRESSION CONNECTOR   |             |             |                |              |                       |                         |
|---|-------------|-------------|----------------|--------------|-----------------------|-------------------------|
| FIGURE  | CONNECTOR   |             | DIE INDEX      | TOOL AND DIE |                       |                         |
|   | WIRE SIZE   | STOCK NO.   |                | Y35          | Y45                   | Y46                     |
|  | 4/0         | S258694 (X) | 299 COOPER/RTE | U31ART       | U31ART W/6515 ADAPTER | U31ART W/PU-ADP ADAPTER |
|   |             |             | 298 ELASTIMOLD | U28ART       | U28ART W/6515 ADAPTER | U28ART W/PU-ADP ADAPTER |
|   | 350 AL      | S258698     | 299            | U31ART       | U31ART W/6515 ADAPTER | U31ART W/PU-ADP ADAPTER |
|   | 500 CU      | S258700     | 300            | U34ART       | U34ART W/6515 ADAPTER | U34ART W/PU-ADP ADAPTER |
|   | 750 COMP AL | S258708     |                |              |                       |                         |
|   | 750 AL      | S258704     | 301            | --           | S39ART                | P39ART                  |
|   | 1000 AL     | S258702     | 302            | --           | S44ART                | P44ART                  |

**INSTALLATION:** NONE**BILL OF MATERIALS:** NONE**NOTES:**

(I) SUPPLIED WITH A STUD. IF STUD IS NOT REQUIRED IN ASSEMBLY, SUCH AS ON SWITCH TERMINATIONS, DO NOT THROW AWAY. RETURN TO STOREROOM.

(X) THIS ITEM IS EXEMPT

**REFERENCE:** NONE

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3 OF 3

SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

12KV 600/200 AMP SPLICES, CONNECTORS AND ACCESSORIES

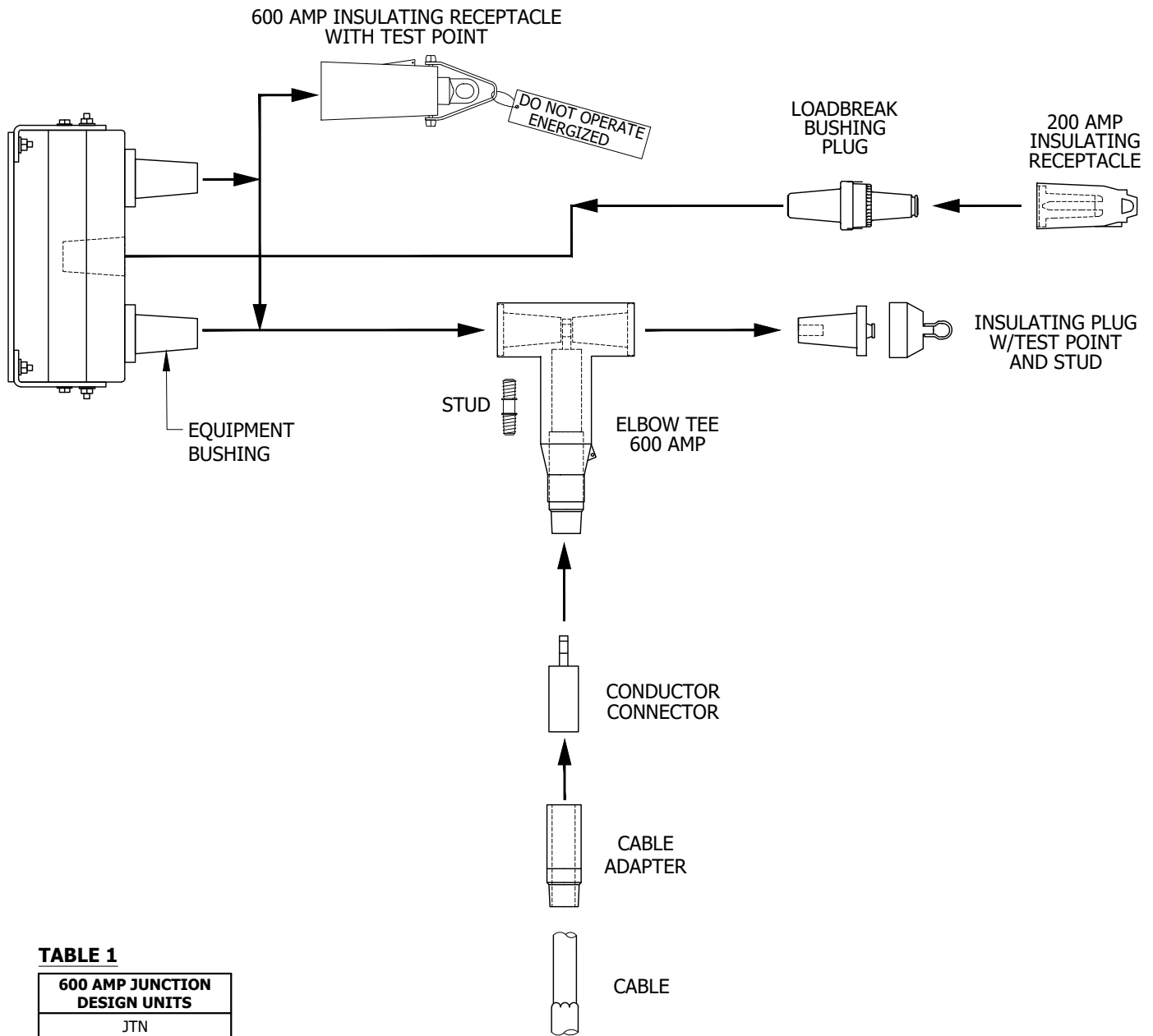
UG4182.3



**SCOPE:** THIS STANDARD SHOWS THE IDENTIFICATION CHARTS FOR 600 AMP JUNCTION CONNECTOR ASSEMBLIES WITH TEST AND GROUNDING POINTS.

**ATTENTION:**

- \* THIS CHART SHOWS HOW 200 AND 600 AMP CONNECTORS ARE ASSEMBLED.



**TABLE 1**

| 600 AMP JUNCTION DESIGN UNITS |
|-------------------------------|
| JTN                           |

**FIGURE 1**

VAULT AND MANHOLE INSTALLATION ONLY  
600 AMP JUNCTION SUBSURFACE CONNECTOR APPLICATION CHART  
200 AND 600 AMP DEADBREAK

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600 AMP JUNCTION CONNECTOR WITH  
TEST AND GROUNDING POINT

UG4183.1

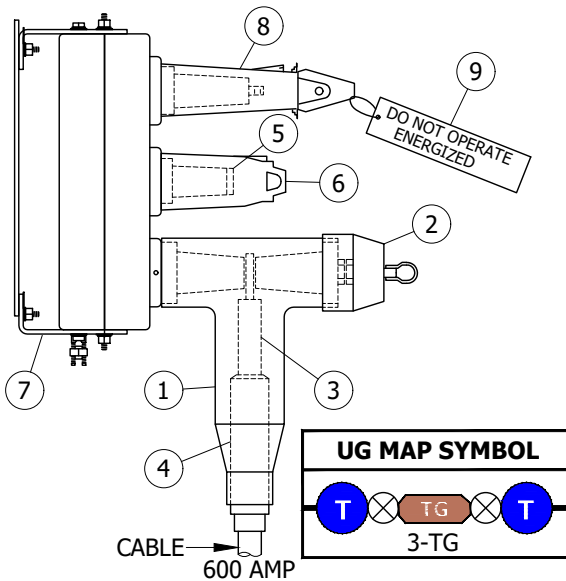


TABLE 2

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CABLE SIZE           | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | JTN07  | JTN08  | JTN09   |

BILL OF MATERIALS (FIGURE 2):

| ITEM | DESCRIPTION                     | WIRE SIZE  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---------------------------------|------------|----------|---------------|--------------|--------------|
| 1    | TEE, ELBOW                      | -          | 1        | -             | S326578      | -            |
| 2    | PLUG, INSULATED W/ TEST POINT   | -          | 1        | -             | S544848      | -            |
| 3    | CONNECTOR, CONDUCTOR            | 350 AL     | 1        | -             | S258698      | -            |
|      |                                 | 750 AL     |          | -             | S258704      | -            |
|      |                                 | 750C AL    |          | -             | S258708      | -            |
|      |                                 | 1000 AL/CU |          | -             | S258702      | -            |
| 4    | ADAPTER, CABLE                  | 350 AL     | 1        | -             | S102027      | -            |
|      |                                 | 750 AL     |          | -             | S102034      | -            |
|      |                                 | 750C AL    |          | -             | S102051      | -            |
|      |                                 | 1000 AL/CU |          | -             | S102050      | -            |
| 5    | PLUG, LOADBREAK BUSHING         | -          | 1        | -             | S544676      | -            |
| 6    | RECEPTACLE, 200 AMP INSULATING  | -          | 1        | -             | S204304      | -            |
| 7    | JUNCTION BAR                    | -          | 1        | -             | S484390      | -            |
| 8    | RECEPTACLE, 600A INSULATING     | -          | 1        | -             | S570608      | -            |
| 9    | TAG, "DO NOT OPERATE ENERGIZED" | -          | 1        | -             | S647966      | -            |



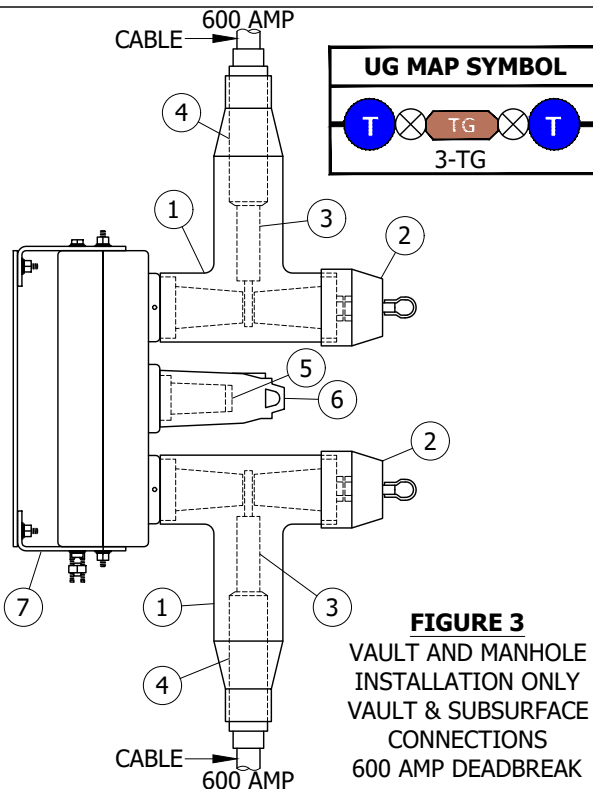
**FIGURE 2**  
VAULT AND MANHOLE INSTALLATION ONLY  
VAULT & SUBSURFACE CONNECTIONS  
600 AMP DEADBREAK

TABLE 3

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CABLE SIZE           | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | JTN707 | JTN808 | JTN909  |

BILL OF MATERIALS (FIGURE 3):

| ITEM | DESCRIPTION                    | WIRE SIZE  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--------------------------------|------------|----------|---------------|--------------|--------------|
| 1    | TEE, ELBOW                     | -          | 2        | -             | S326578      | -            |
| 2    | PLUG, INSULATED W/ TEST POINT  | -          | 2        | -             | S544848      | -            |
| 3    | CONNECTOR, CONDUCTOR           | 350 AL     | 2        | -             | S258698      | -            |
|      |                                | 750 AL     |          | -             | S258704      | -            |
|      |                                | 750C AL    |          | -             | S258708      | -            |
|      |                                | 1000 AL/CU |          | -             | S258702      | -            |
| 4    | ADAPTER, CABLE                 | 350 AL     | 2        | -             | S102027      | -            |
|      |                                | 750 AL     |          | -             | S102034      | -            |
|      |                                | 750C AL    |          | -             | S102051      | -            |
|      |                                | 1000 AL/CU |          | -             | S102050      | -            |
| 5    | PLUG, LOADBREAK BUSHING        | -          | 1        | -             | S544676      | -            |
| 6    | RECEPTACLE, 200 AMP INSULATING | -          | 1        | -             | S204304      | -            |
| 7    | JUNCTION BAR                   | -          | 1        | -             | S484390      | -            |



**FIGURE 3**  
VAULT AND MANHOLE INSTALLATION ONLY  
VAULT & SUBSURFACE CONNECTIONS  
600 AMP DEADBREAK

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SHEET  
2 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600 AMP JUNCTION CONNECTOR WITH  
TEST AND GROUNDING POINT

UG4183.2



**INSTALLATION:**

A. ALWAYS USE THE MANUFACTURERS RECOMMENDED TORQUE SETTINGS WHEN ASSEMBLING CONNECTORS.

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES

**NOTES:**

I. **TABLE 4**

| CODES USED IN<br>TABLES 2 & 3 |         |
|-------------------------------|---------|
| CODE                          | ITEM    |
| CABLE                         |         |
| 7                             | 350 AL  |
| 8                             | 750 AL  |
| 9                             | 1000 AL |

**REFERENCE:** NONE

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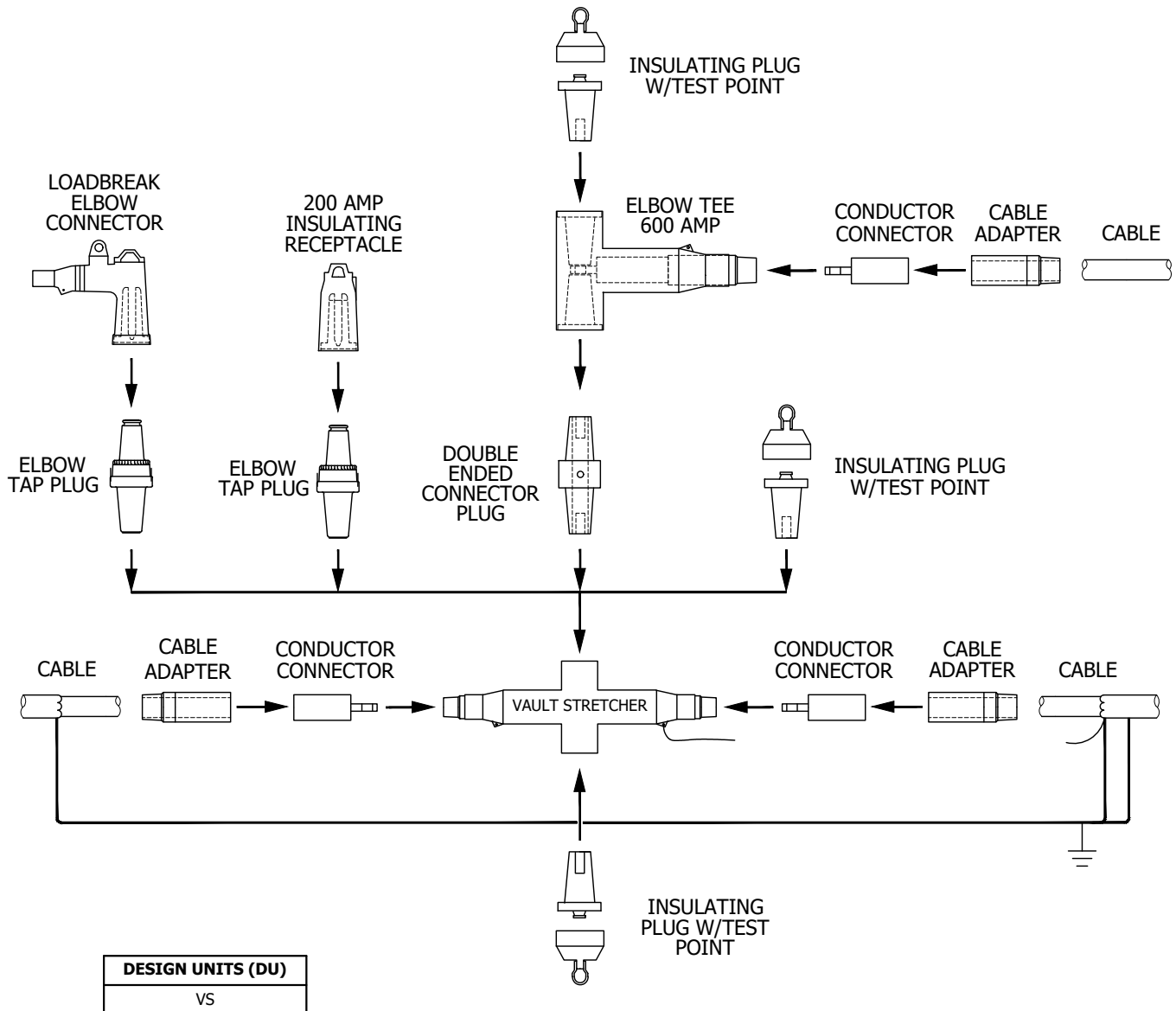
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS           |                           |  |                    |  |          |  |                     |          |
|                 | 600 AMP JUNCTION CONNECTOR WITH<br>TEST AND GROUNDING POINT |                           |  |                    |  |          |  |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE VAULT STRETCHER. THIS IS A 600-AMP DEAD BREAK CONNECTION USED ON FEEDER CABLE. THE VAULT STRETCHER IS A SPACE SAVING CONNECTION FOR NEW AND EXISTING CONSTRUCTION WHEN SPACE IS LIMITED.

**ATTENTION:**

\* THREE TEE COMBINATIONS SHOWN IN THIS STANDARD SHALL ONLY BE USED TO FEED A SWITCH TIE POSITION..



**FIGURE 1**  
VAULT STRETCHER ASSEMBLY (A) (I)

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**SHEET**  
**1 OF 4**



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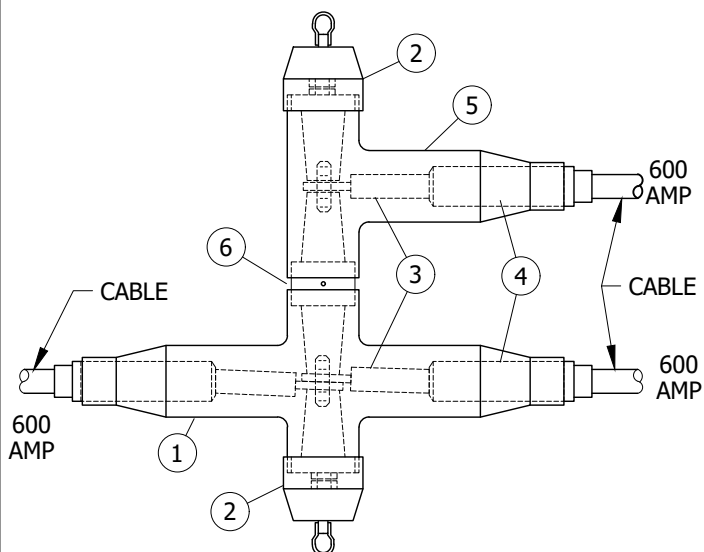
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

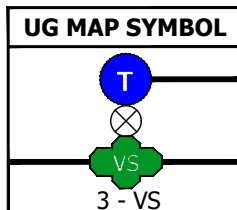
VAULT STRETCHER CONNECTOR, DEADBREAK

UG4184.1





**FIGURE 2**  
VAULT AND MANHOLE INSTALLATION ONLY  
VAULT & SUBSURFACE CONNECTIONS  
600 AMP DEADBREAK

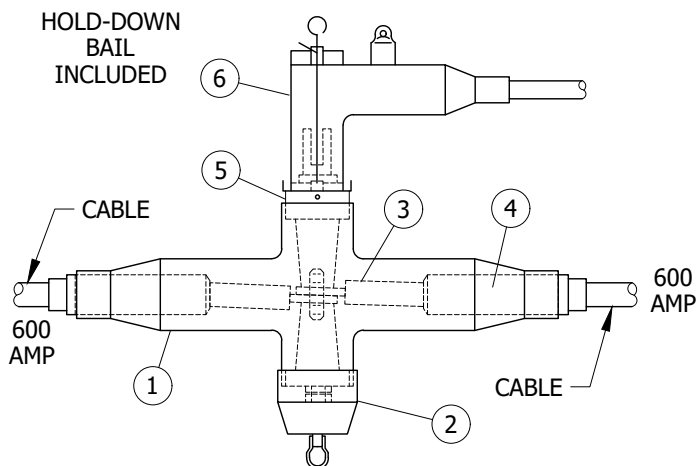


**TABLE 1**

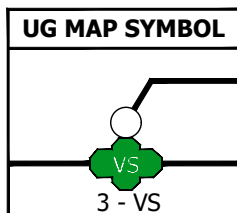
| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CABLE SIZE           | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | VS777  | VS888  | VS999   |

**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION                  | WIRE SIZE    | QUANTITY | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|--------------|----------|--------------|--------------|
| 1    | VAULT STRETCHER              | -            | 1        | S790456      | -            |
| 2    | INSULATED PLUG W/ TEST POINT | -            | 2        | S544848      | -            |
| 3    | CONDUCTOR CONNECTOR          | (350 AL)     | 3        | S258698      | -            |
|      |                              | (750 AL)     |          | S258704      | -            |
|      |                              | (750C AL)    |          | S258708      | -            |
|      |                              | (1000 AL)    |          | S258702      | -            |
| 4    | CABLE ADAPTER                | (350 AL)     | 3        | S102027      | -            |
|      |                              | (750 AL)     |          | S102034      | -            |
|      |                              | (750C AL)    |          | S102051      | -            |
|      |                              | (1000 AL/CU) |          | S102050      | -            |
| 5    | ELBOW TEE                    | -            | 1        | S326578      | -            |
| 6    | DOUBLE ENDED CONNECTOR PLUG  | -            | 1        | S544832      | -            |



**FIGURE 3**  
VAULT AND MANHOLE INSTALLATION ONLY  
VAULT & SUBSURFACE CONNECTIONS  
600 AMP DEADBREAK



**TABLE 2**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CABLE SIZE           | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | VS773  | VS883  | VS993   |
|                      | VS775  | VS885  | VS995   |

**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION                  | WIRE SIZE    | QUANTITY | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|--------------|----------|--------------|--------------|
| 1    | VAULT STRETCHER              | -            | 1        | S790456      | -            |
| 2    | INSULATED PLUG W/ TEST POINT | -            | 1        | S544848      | -            |
| 3    | CONDUCTOR CONNECTOR          | (350 AL)     | 2        | S258698      | -            |
|      |                              | (750 AL)     |          | S258704      | -            |
|      |                              | (750C AL)    |          | S258708      | -            |
|      |                              | (1000 AL)    |          | S258702      | -            |
| 4    | CABLE ADAPTER                | (350 AL)     | 2        | S102027      | -            |
|      |                              | (750 AL)     |          | S102034      | -            |
|      |                              | (750C AL)    |          | S102051      | -            |
|      |                              | (1000 AL/CU) |          | S102050      | -            |
| 5    | 600/200 AMP TAP PLUG         | -            | 1        | S547324      | -            |
| 6    | DEADBREAK ELBOW CONNECTOR    | (#2 AL)      | 1        | S443842      | -            |
|      |                              | (2/0 AL)     |          | S443844      | -            |

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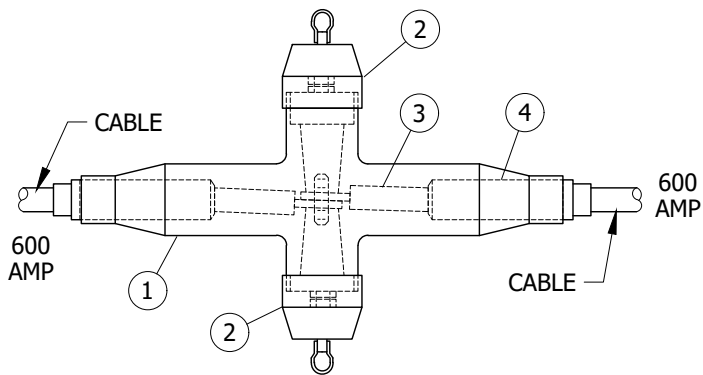
SHEET  
2 OF 4

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

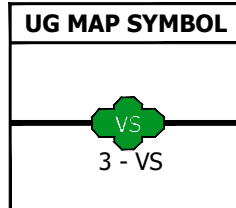
VAULT STRETCHER CONNECTOR, DEADBREAK

UG4184.2





**FIGURE 4**  
VAULT AND MANHOLE INSTALLATION ONLY  
VAULT & SUBSURFACE CONNECTIONS  
600 AMP DEADBREAK

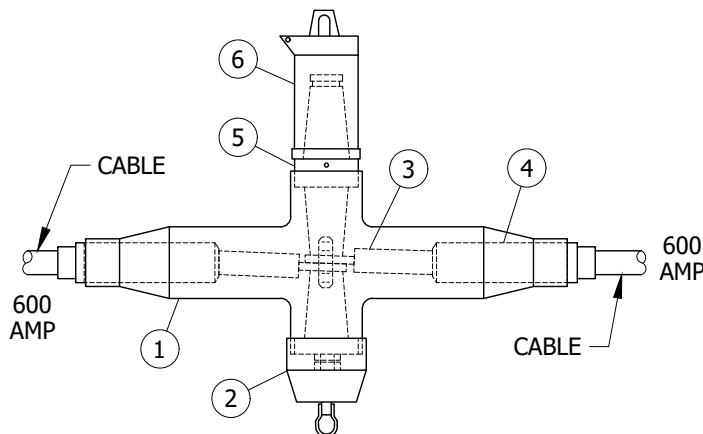


**TABLE 3**

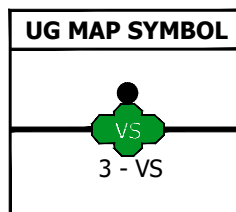
| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CABLE SIZE           | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | VS77   | VS88   | VS99    |

**BILL OF MATERIALS (FIGURE 4):**

| ITEM | DESCRIPTION                  | WIRE SIZE    | QUANTITY | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|--------------|----------|--------------|--------------|
| 1    | VAULT STRETCHER              | -            | 1        | S790456      | -            |
| 2    | INSULATED PLUG W/ TEST POINT | -            | 2        | S544848      | -            |
| 3    | CONDUCTOR CONNECTOR          | (350 AL)     | 2        | S258698      | -            |
|      |                              | (750 AL)     |          | S258704      | -            |
|      |                              | (750C AL)    |          | S258708      | -            |
|      |                              | (1000 AL/CU) |          | S258702      | -            |
| 4    | CABLE ADAPTER                | (350 AL)     | 2        | S102027      | -            |
|      |                              | (750 AL)     |          | S102034      | -            |
|      |                              | (750C AL)    |          | S102051      | -            |
|      |                              | (1000 AL/CU) |          | S102050      | -            |



**FIGURE 5**  
VAULT AND MANHOLE INSTALLATION ONLY  
VAULT & SUBSURFACE CONNECTIONS  
600 AMP DEADBREAK



**TABLE 4**

| TYPICAL COMBINATIONS |        |        |         |
|----------------------|--------|--------|---------|
| CABLE SIZE           | 350 AL | 750 AL | 1000 AL |
| MACRO UNITS          | VS770  | VS880  | VS990   |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                   | WIRE SIZE    | QUANTITY | STOCK NUMBER | DESIGN UNITS |
|------|-------------------------------|--------------|----------|--------------|--------------|
| 1    | VAULT STRETCHER               | -            | 1        | S790456      | -            |
| 2    | INSULATED PLUG W/ TEST POINT  | -            | 1        | S544848      | -            |
| 3    | CONDUCTOR CONNECTOR           | (350 AL)     | 2        | S258698      | -            |
|      |                               | (750 AL)     |          | S258704      | -            |
|      |                               | (750C AL)    |          | S258708      | -            |
|      |                               | (1000 AL/CU) |          | S258702      | -            |
| 4    | CABLE ADAPTER                 | (350 AL)     | 2        | S102027      | -            |
|      |                               | (750 AL)     |          | S102034      | -            |
|      |                               | (750C AL)    |          | S102051      | -            |
|      |                               | (1000 AL/CU) |          | S102050      | -            |
| 5    | ELBOW TAP PLUG                | -            | 1        | S547328      | -            |
| 6    | 200 AMP INSULATING RECEPTACLE | -            | 1        | S204304      | -            |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

VAULT STRETCHER CONNECTOR, DEADBREAK

UG4184.3



**TABLE 5**

| CODES USED IN TABLES 1-4 |                               |
|--------------------------|-------------------------------|
| CABLE                    |                               |
| CODE                     | TYPE                          |
| 3                        | #2 AL                         |
| 5                        | 2/0 AL                        |
| 7                        | 350 AL                        |
| 8                        | 750 AL                        |
| 9                        | 1000 AL                       |
| COMPONENT                |                               |
| 0                        | 200 AMP INSULATING RECEPTACLE |

**INSTALLATION:**

- (A) FOLLOW MANUFACTURERS MAKE UP INSTRUCTIONS FOR INSTALLATION. THE LONGER LUG SUPPLIED WITH THE VAULT STRETCHERS IS SPECIFICALLY DESIGNED FOR THIS EQUIPMENT ONLY AND SHALL NOT BE USED FOR ANY OTHER APPLICATION.

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES

**NOTES:**(I) **MAJOR USE:**

- NEW & RE-CABLING IN VAULTS AND MANHOLES WITH MULTIPLE CIRCUITS WHEN FEEDER CABLE REQUIRES CONNECTIONS.
- LOAD TAP INSTALLATIONS WITH LIMITED SPACE, CAN BE INSTALLED WHERE A FUTURE DISTRIBUTION TAP MAY BE REQUIRED.

**REFERENCE:** NONE

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4 OF 4

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

VAULT STRETCHER CONNECTOR, DEADBREAK

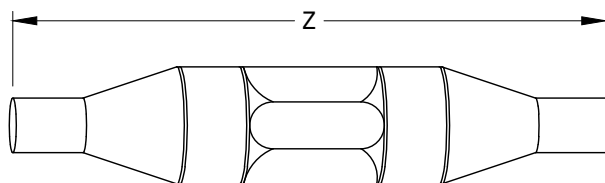
UG4184.4



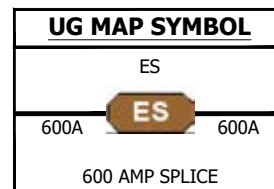
**SCOPE:** THIS STANDARD SHOWS 600 AMP EXTENSION SPLICES FOR USE ON FEEDER CABLES.

**CAUTION:**

- \* THE SILICONE GREASE PROVIDED WITH THESE SPLICES IS INTENDED FOR USE WITH SPLICES ONLY AND MUST NOT BE USED WITH ANY OTHER SEPARABLE CONNECTOR PRODUCTS SUCH AS LOADBREAK ELBOWS, ETC.



**FIGURE 1**



**TABLE 1**

| SPLICE LENGTH  |                      |
|----------------|----------------------|
| CONDUCTOR SIZE | Z (IN) SPLICE LENGTH |
| 350            | 14                   |
| 750            | 15                   |
| 1000           | 15 3/4               |

**TABLE 2**

| EXTENSION SPLICE       |                |              |              |
|------------------------|----------------|--------------|--------------|
| CONDUCTOR              | INSTALLING DIE | STOCK NUMBER | DESIGN UNITS |
| 350 KCMIL AL           | U31ART/299     | S668434      | SS-350       |
| 350 AL - 4/0 CU        |                | S668500      | SS-3540      |
| 750 KCMIL AL           | P39ART/301     | S668436      | SS-750       |
| 750 KCMIL AL COMP (1a) |                | S668442      | SS750C       |
| 750 AL-750-AL COMP     |                | S668444      | SS750B       |
| 1000 KCMIL AL (1a)     | P40ART/474     | S668438      | SS1000       |
| #4/0 CU                | U28RT/15       | S668430      | SS-4/0       |
| 500 KCMIL CU           | U34RT/20       | S668432      | SS-500       |
| 750 KCMIL CU COMP      | U36RT          | S668464      | SS75CU       |
| 750 CU COMP-1000 CU    | U36RT & 44RT   | S668466      | SS71CU       |
| 750 CU COMP-1000 AL    | P44ART/302     | S668470      | SS71CA       |
| 1000 KCMIL CU ONLY     | P44RT/27       | S668460      | SS1KCU       |

**INSTALLATION:**

- FOR EXTENSION SPLICE INSTALLATION PROCEDURE, CONSULT INDIVIDUAL MANUFACTURER'S CURRENT INSTRUCTIONS.
- DO NOT INSTALL WHERE A FUTURE DISTRIBUTION TAP IS LIKELY TO BE REQUIRED.

**BILL OF MATERIALS:** NONE

**NOTES:**

- SPLICE IS COMPLETELY SEALED AND MAY BE INSTALLED IN SUBSURFACE EQUIPMENT.
  - THIS SPLICE CAN CONNECT ALUMINUM TO COPPER CONDUCTORS.
- MAJOR USE:
  - RELOCATION OF EQUIPMENT WITHIN A SUBSTRUCTURE.
  - RELOCATION OF SWITCH FROM MANHOLE TO PAD-MOUNT.
  - REPLACEMENT OF EXOTHERMIC (CADWELD) SPLICES.
  - SPLICING OF SUBSTATION GETAWAY AND EXPRESS RUNS FOR LOCATIONS WITHIN A SUBSTRUCTURE WHERE LOCAL DISTRIBUTION TAP WILL NOT BE REQUIRED.

**REFERENCE:** NONE

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| B   | EDITORIAL CHANGES | --  | JS | JS  | CZH | 06/01/2018 | E   |        |    |    |     |     |      |
| A   | TABLE UPDATE      | --  | JS | TR  | MDJ | 10/31/2016 | D   |        |    |    |     |     |      |

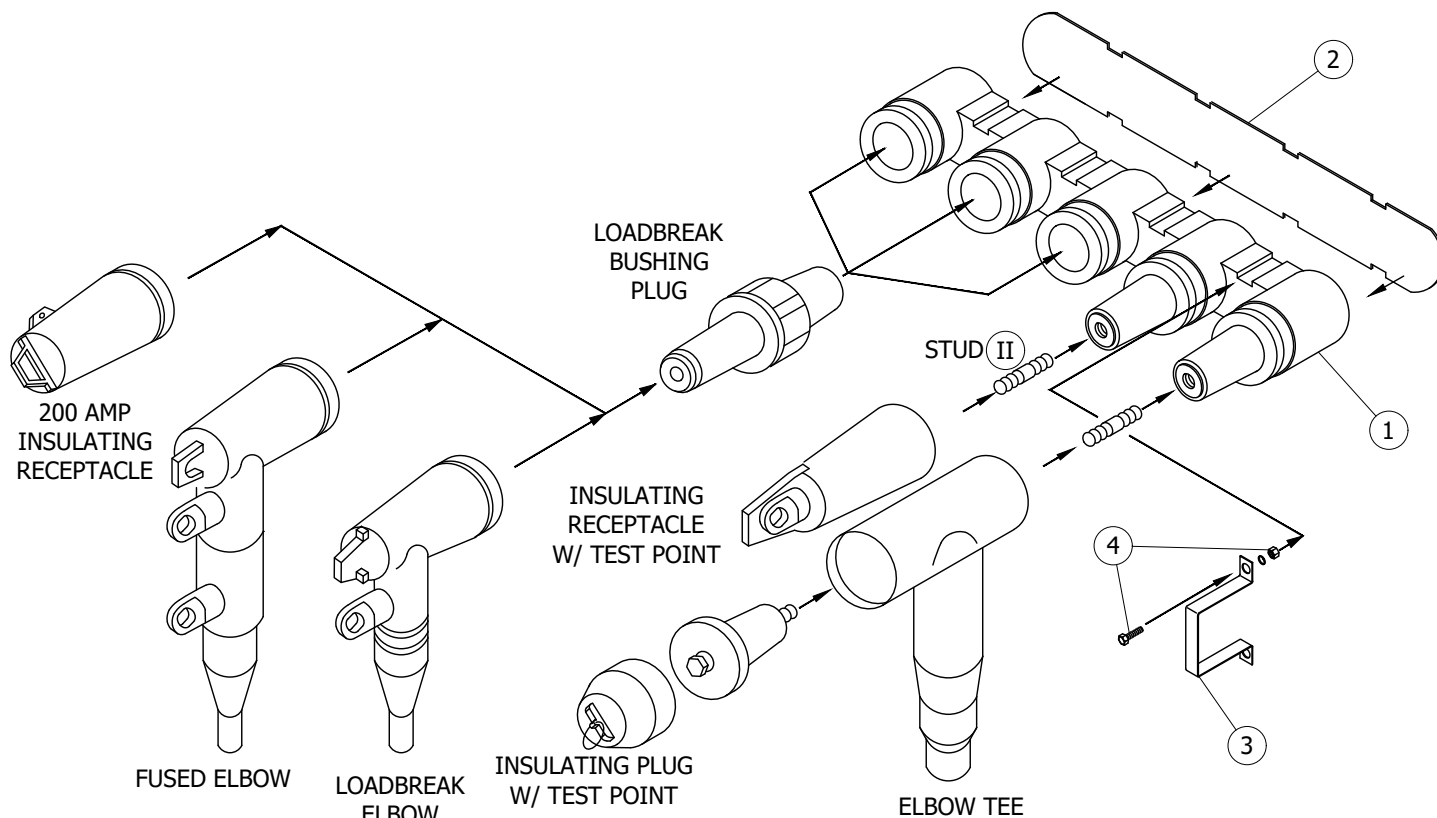
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| SHEET<br>1 OF 1 | X   | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed | UG4185.1 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | 600 AMP EXTENSION SPLICE                          |                           |  |                    |  |          |  |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE CONNECTIONS AND ASSEMBLY CODES USED FOR CALLING OUT 600 AMP TO 200 AMP JUNCTION ASSEMBLIES.

**ATTENTION:**

- \* SURFACE CONNECTOR APPLICATION CHART 600 AMP TO 200 AMP DEAD FRONT TERMINATOR.
- \*\* THIS CHART SHOWS HOW 600A AND 200A CONNECTORS ARE ASSEMBLED TO FORM SOME OF THE COMBINATIONS SHOWN ON SHEET 2.



**FIGURE 1**  
600 AMP TO 200 AMP JUNCTION  
ASSEMBLY CHART

**BILL OF MATERIALS (FIGURE 1):**

| ITEM | DESCRIPTION     | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------|----------|---------------|--------------|--------------|
| 1    | JUNCTION        | 1        | -             | S439860      | JUN6/2       |
| 2    | SPACER PLATE    | 1        | -             | -            | -            |
| 3    | MOUNTING STRAPS | 4        | -             | -            | -            |
| 4    | FASTENERS       | 8        | -             | -            | -            |

**TABLE 1**

| CODES USED IN TABLES ON SHEETS 2 & 3 |         |            |                            |  |
|--------------------------------------|---------|------------|----------------------------|--|
| CODE                                 | TYPE    | CODE       | TYPE                       |  |
| CABLE                                |         | COMPONENTS |                            |  |
| 3                                    | #2 AL   | B          | #2 AL FUSED ELBOW          |  |
| 5                                    | 2/0 AL  | C          | 2/0 AL FUSED ELBOW         |  |
| 7                                    | 350 AL  | H          | 600A INSULATING RECEPTACLE |  |
| 8                                    | 750C AL | O          | 200A INSULATING RECEPTACLE |  |
| 9                                    | 1000 AL | -          | -                          |  |

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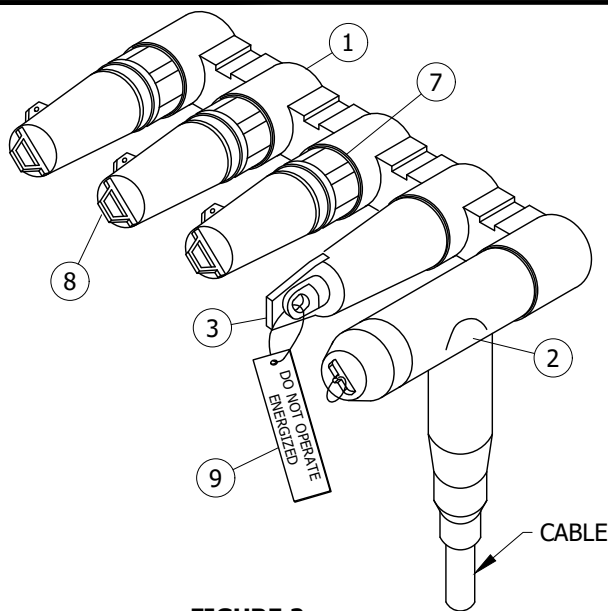
**SHEET**  
**1 OF 4**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

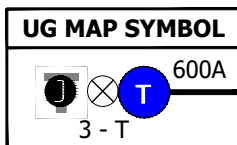
600 AMP TO 200 AMP JUNCTION  
ASSEMBLY CHART

**UG4186.1**





**FIGURE 2**  
600 AMP JUNCTION ASSEMBLY

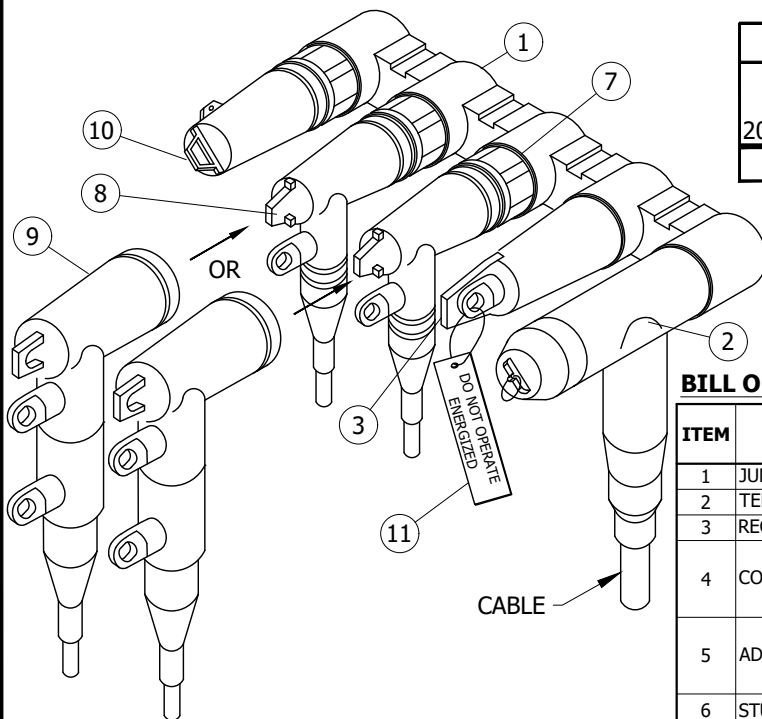


**TABLE 2**

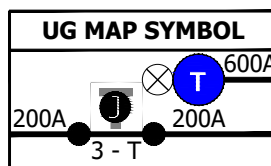
| TYPICAL COMBINATIONS |        |         |         |
|----------------------|--------|---------|---------|
| CODE                 | 7H000  | 8H000   | 9H000   |
| CABLE SIZE           | 350 AL | 750C AL | 1000 AL |
| MACRO UNITS          | J7H000 | J8H000  | J9H000  |

**BILL OF MATERIALS (FIGURE 2):**

| ITEM | DESCRIPTION                     | WIRE SIZE                    | QUANTITY | STANDARD PAGE | STOCK NUMBER                  | DESIGN UNITS |
|------|---------------------------------|------------------------------|----------|---------------|-------------------------------|--------------|
| 1    | JUNCTION, 600A - 200A           | -                            | 1        | -             | S439860                       | JUN6/2       |
| 2    | TEE, ELBOW                      | -                            | 1        | -             | S326578                       | -            |
| 3    | RECEPTACLE, INSULATING, 600A    | -                            | 1        | -             | S570608                       | -            |
| 4    | CONNECTOR, CONDUCTOR (III)      | 350 AL<br>750C AL<br>1000 AL | 1        | -             | S258698<br>S258708<br>S258702 | -<br>-<br>-  |
| 5    | ADAPTER, CABLE (III)            | 350 AL<br>750C AL<br>1000 AL | 1        | -             | S102027<br>S102051<br>S102050 | -<br>-<br>-  |
| 6    | STUD (III)                      | -                            | 1        | -             | S701100                       | -            |
| 7    | PLUG, BUSHING, LOADBREAK        | -                            | 3        | -             | S544676                       | -            |
| 8    | RECEPTACLE, INSULATING, 200A    | -                            | 3        | -             | S204304                       | -            |
| 9    | TAG, "DO NOT OPERATE ENERGIZED" | -                            | 1        | -             | S647966                       | -            |



**FIGURE 3**  
600 AMP TO 200 AMP JUNCTION ASSEMBLY



**TABLE 3**

| ADDITIONAL MACRO UNITS |        |        |
|------------------------|--------|--------|
| J7H330                 | J8H330 | J9H330 |
| J7H550                 | J8H550 | J9H550 |
| J7HBB0                 | J8HBB0 | J9HBB0 |
| J7HCC0                 | J8HCC0 | J9HCC0 |

**TABLE 4**

| TYPICAL COMBINATIONS |        |         |         |
|----------------------|--------|---------|---------|
| CODE                 | 7H350  | 8H350   | 9H350   |
| CABLE SIZE           | 350 AL | 750C AL | 1000 AL |
| MACRO UNITS          | J7H350 | J8H350  | J9H350  |

**BILL OF MATERIALS (FIGURE 3):**

| ITEM | DESCRIPTION                     | WIRE SIZE                    | QUANTITY | STANDARD PAGE | STOCK NUMBER                  | DESIGN UNITS |
|------|---------------------------------|------------------------------|----------|---------------|-------------------------------|--------------|
| 1    | JUNCTION, 600A - 200A           | -                            | 1        | -             | S439860                       | JUN6/2       |
| 2    | TEE, ELBOW                      | -                            | 1        | -             | S326578                       | -            |
| 3    | RECEPTACLE, INSULATING, 600A    | -                            | 1        | -             | S570608                       | -            |
| 4    | CONNECTOR, CONDUCTOR (III)      | 350 AL<br>750C AL<br>1000 AL | 1        | -             | S258698<br>S258708<br>S258702 | -<br>-<br>-  |
| 5    | ADAPTER, CABLE (III)            | 350 AL<br>750C AL<br>1000 AL | 1        | -             | S102027<br>S102051<br>S102050 | -<br>-<br>-  |
| 6    | STUD (III)                      | -                            | 1        | -             | S701100                       | -            |
| 7    | PLUG, BUSHING, LOADBREAK        | -                            | 3        | -             | S544676                       | -            |
| 8    | CONNECTOR, ELBOW, LOADBREAK     | #2 AL<br>2/0 AL              | 2        | -             | S443838<br>S443840            | -<br>-       |
| 9    | CONNECTOR, ELBOW, FUSED         | #2 AL<br>2/0 AL              | 2        | -             | S443850<br>S443882            | -<br>-       |
| 10   | RECEPTACLE, INSULATING, 200A    | -                            | 3        | -             | S204304                       | -            |
| 11   | TAG, "DO NOT OPERATE ENERGIZED" | -                            | 1        | -             | S647966                       | -            |

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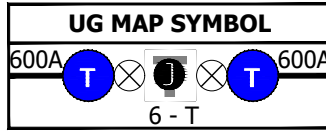
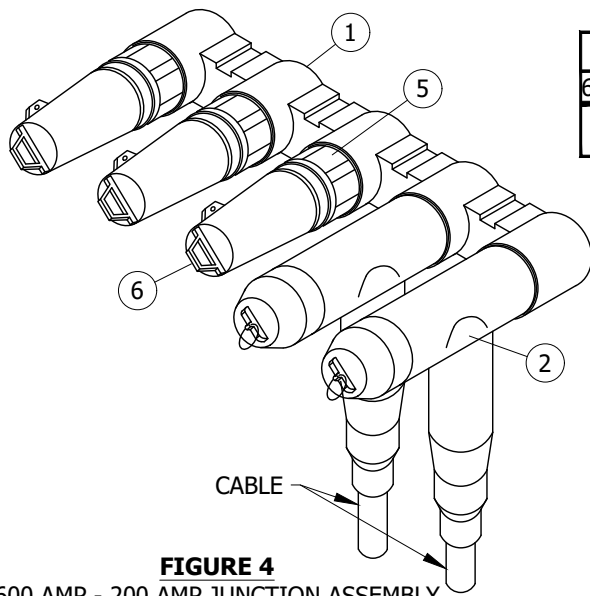
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600 AMP TO 200 AMP JUNCTION  
ASSEMBLY CHART

UG4186.2

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**TABLE 5**

| ADDITIONAL MACRO UNITS |        |        |
|------------------------|--------|--------|
| J78000                 | J79000 | J89000 |

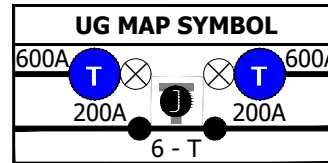
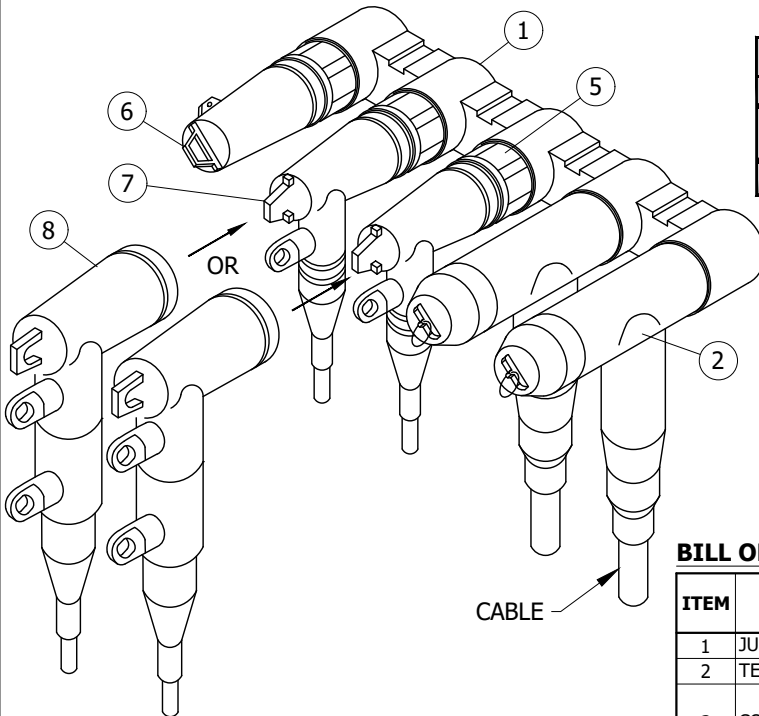
**TABLE 6**

| TYPICAL COMBINATIONS |        |         |         |
|----------------------|--------|---------|---------|
| CODE                 | 77000  | 88000   | 99000   |
| CABLE SIZE           | 350 AL | 750C AL | 1000 AL |
| MACRO UNITS          | J77000 | J88000  | J99000  |

**BILL OF MATERIALS (FIGURE 4):**

| ITEM | DESCRIPTION                  | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | JUNCTION, 600A - 200A        | -         | 1        | -             | S439860      | JUN6/2       |
| 2    | TEE, ELBOW                   | -         | 2        | -             | S326578      | -            |
| 3    | CONNECTOR, CONDUCTOR (III)   | 350 AL    | 2        | -             | S258698      | -            |
|      |                              | 750C AL   |          |               | S258708      | -            |
|      |                              | 1000 AL   |          |               | S258702      | -            |
|      |                              | 350 AL    |          |               | S102027      | -            |
| 4    | ADAPTER, CABLE (III)         | 750C AL   | 2        | -             | S102051      | -            |
|      |                              | 1000 AL   |          |               | S102050      | -            |
|      |                              | 350 AL    |          |               | S544676      | -            |
| 5    | PLUG, BUSHING, LOADBREAK     | -         | 3        | -             | S544676      | -            |
| 6    | RECEPTACLE, INSULATING, 200A | -         | 3        | -             | S204304      | -            |

**FIGURE 4**  
600 AMP - 200 AMP JUNCTION ASSEMBLY



**TABLE 7**

| ADDITIONAL MACRO UNITS |        |        |
|------------------------|--------|--------|
| J78350                 | J79350 | J89350 |
| J77330                 | J88330 | J99330 |
| J77550                 | J88550 | J99550 |
| J77BB0                 | J88BB0 | J99BB0 |
| J77CC0                 | J88CC0 | J99CC0 |
| J77BBB                 | J88BBB | J99BBB |

**TABLE 8**

| TYPICAL COMBINATIONS |        |         |         |
|----------------------|--------|---------|---------|
| CODE                 | 77350  | 88350   | 99350   |
| CABLE SIZE           | 350 AL | 750C AL | 1000 AL |
| MACRO UNITS          | J77350 | J88350  | J99350  |

**BILL OF MATERIALS (FIGURE 5):**

| ITEM | DESCRIPTION                  | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|-----------|----------|---------------|--------------|--------------|
| 1    | JUNCTION, 600A - 200A        | -         | 1        | -             | S439860      | JUN6/2       |
| 2    | TEE, ELBOW                   | -         | 2        | -             | S326578      | -            |
| 3    | CONNECTOR, CONDUCTOR (III)   | 350 AL    | 2        | -             | S258698      | -            |
|      |                              | 750C AL   |          |               | S258708      | -            |
|      |                              | 1000 AL   |          |               | S258702      | -            |
|      |                              | 350 AL    |          |               | S102027      | -            |
| 4    | ADAPTER, CABLE (III)         | 750C AL   | 2        | -             | S102051      | -            |
|      |                              | 1000 AL   |          |               | S102050      | -            |
|      |                              | 350 AL    |          |               | S544676      | -            |
| 5    | PLUG, BUSHING, LOADBREAK     | -         | 3        | -             | S544676      | -            |
| 6    | RECEPTACLE, INSULATING, 200A | -         | 1        | -             | S204304      | -            |
| 7    | CONNECTOR, ELBOW, LOADBREAK  | #2 AL     | 2        | -             | S443838      | -            |
|      |                              | 2/0 AL    |          |               | S443840      | -            |
| 8    | CONNECTOR, ELBOW, FUSED      | #2 AL     | 2        | -             | S443850      | -            |
|      |                              | 2/0 AL    |          |               | S443882      | -            |

**FIGURE 5**  
600 AMP - 200 AMP JUNCTION ASSEMBLY

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| C   | FORMATTING | EDM | JKI | -   | -       | 06/02/2020 | F   |        |    |    |     |     |      |
| B   | REVISION   | -   | -   | -   | TR/MJC  | 11/8/2011  | E   |        |    |    |     |     |      |
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3 OF 4

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600 AMP TO 200 AMP JUNCTION  
ASSEMBLY CHART

UG4186.3



**INSTALLATION:** NONE

**BILL OF MATERIALS:** INDIVIDUALLY INCLUDED WITH FIGURES

**NOTES:**

- I. JUNCTION SHIPPED WITH SPACER PLATE, MOUNTING STRAPS AND FASTENERS.
- II. STUD NOT SUPPLIED WITH JUNCTION.
- III. ITEM NOT SHOWN IN FIGURE.

**REFERENCE:** NONE

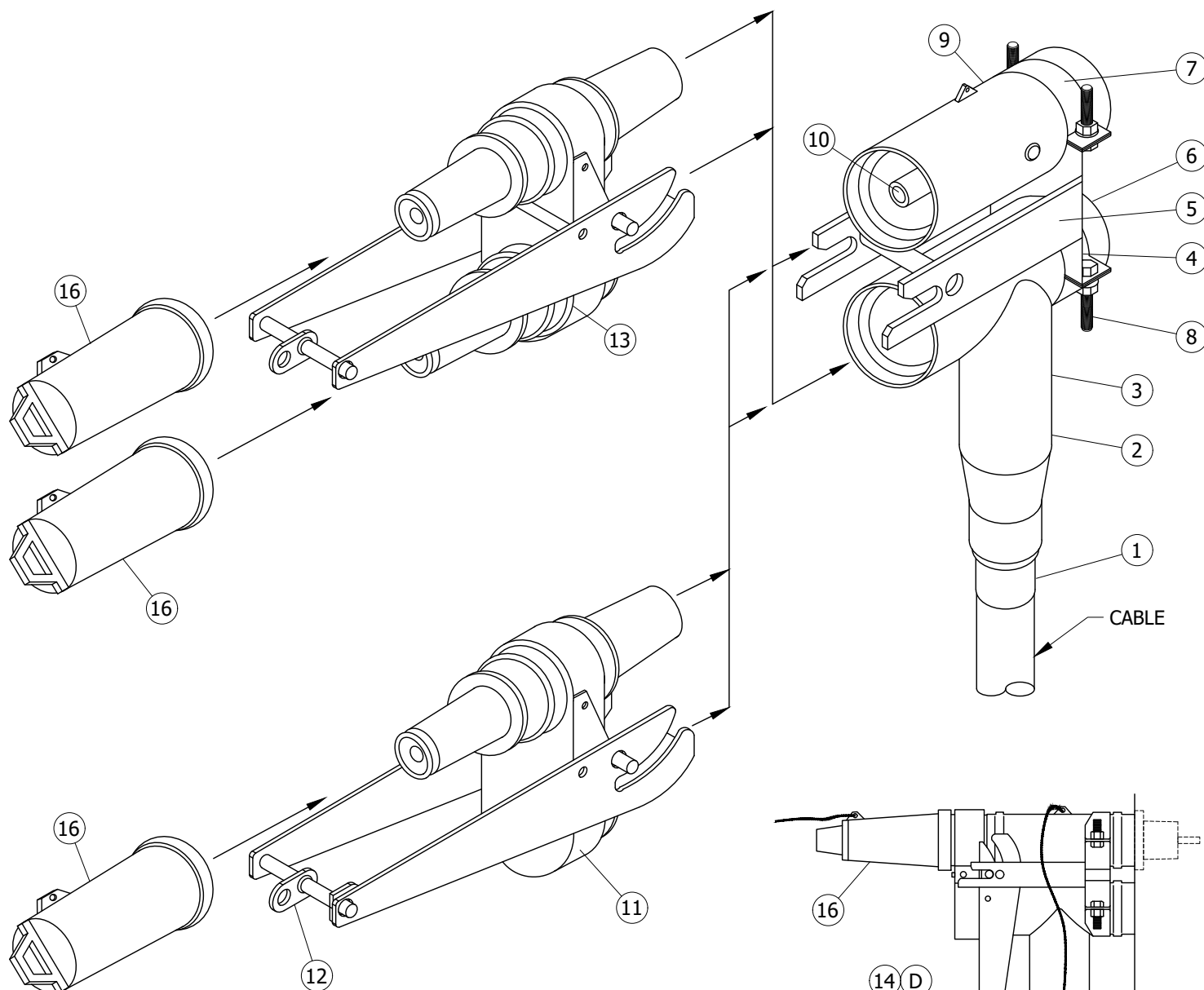
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| C   | FORMATTING | EDM | JK | -   | -       | 06/02/2020 | F   |        |    |    |     |     |      |
| B   | REVISION   | -   | -  | -   | TR/MJC  | 11/8/2011  | E   |        |    |    |     |     |      |
| A   | REVISION   | -   | -  | -   | RSW/CAK | 1/1/2000   | D   |        |    |    |     |     |      |

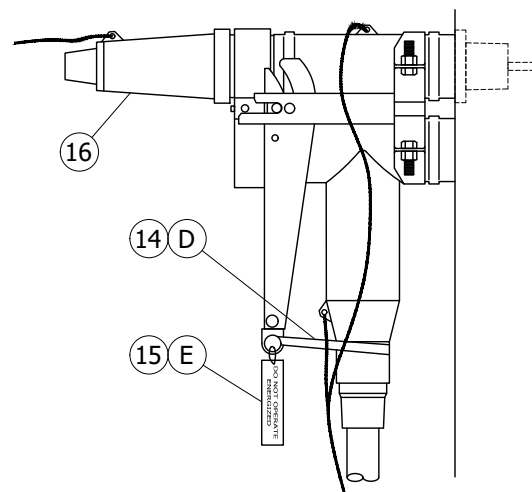
|                 |   |                           |  |                    |  |          |  |                     |          |
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | 600 AMP TO 200 AMP JUNCTION<br>ASSEMBLY CHART     |                           |  |                    |  |          |  |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE CAM LINK. OPERABLE DEADBREAK CONNECTOR SYSTEM.



**FIGURE 1**



**FIGURE 2**

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1 OF 2**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**CAM LINK OPERABLE 600 AMP CONNECTOR**

**UG4187.1**



**INSTALLATION:**

- A. THE CAM LINK IS TO BE INSTALLED ON THE NON-SWITCHED SIDE OF THE PME-3 SCADA SWITCH.
- B. THE CAM LINK SHALL ALSO BE INSTALLED ON ALL SIX POSITIONS OF THE PAD-MOUNTED SERVICE RESTORER.
- C. FOLLOW THE MANUFACTURERS INSTALLATION INSTRUCTIONS.
- Ⓓ SECURE THE HOTSTICK EYE TO THE 600 AMP ELBOW TEE WITH LARGE CABLE TIE STRAP.
- Ⓔ ATTACH A "DO NOT OPERATE ENERGIZED" TAG TO THE HOT STICK EYE.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                   | QUANTITY | STANDARD PAGE | STOCK NUMBER            | DESIGN UNITS |
|------|-------------------------------|----------|---------------|-------------------------|--------------|
| 1    | ADAPTER, CABLE                | 1        | -             | COMPLETE KIT<br>S270240 | C-LINK       |
| 2    | TEE, ELBOW                    | 1        | -             |                         |              |
| 3    | CONNECTOR, CONDUCTOR Ⓥ        | 1        | -             |                         |              |
| 4    | CLAMP, ELBOW                  | 1        | -             |                         |              |
| 5    | BRACKET, ALIGNMENT            | 1        | -             |                         |              |
| 6    | PLUG, STAND OFF Ⓥ             | 1        | -             |                         |              |
| 7    | CLAMP, BUSHING EXTENSION      | 1        | -             |                         |              |
| 8    | HEX BOLT, NUT AND WASHER      | 4        | -             |                         |              |
| 9    | EXTENSION, BUSHING            | 1        | -             |                         |              |
| 10   | CONTACT, RETAINER             | 1        | -             |                         |              |
| 11   | LINK                          | 1        | -             |                         |              |
| 12   | EYE, HOT STICK                | 1        | -             |                         |              |
| 13   | VISIBLE LINK ⓓ                | 1        | -             | S270242                 | V-LINK       |
| 14   | CABLE TIE, LARGE              | 1        | -             | S738440                 | -            |
| 15   | TAG, DO NOT OPERATE ENERGIZED | 1        | -             | S647966                 | -            |
| 16   | RECEPTACLE, INSULATING, 200A  | 3        | -             | S204304                 | -            |

**NOTES:**

- I. ONE KIT CONTAINS ENOUGH MATERIAL TO CONNECT ONE 1000 KCM PHASE TO THE APPARATUS. FOR SMALLER CONDUCTORS ORDER CABLE ADAPTERS AND COMPRESSION CONNECTORS SEPARATELY.
- II. THE DU "C-LINK" ORDERS 3 KITS OR ENOUGH MATERIAL TO CONNECT THREE-PHASES.
- ⓓ THE VISIBLE LINK IS NOT INCLUDED IN KIT AND IS ORDERED SEPARATELY.
- IV. THE DU "V-LINK" ORDERS 3 VISIBLE LINKS.
- Ⓥ ITEM NOT SHOWN ON THE FIGURES.

**REFERENCE:**

- a. REFERENCE UG4525 CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PRE-MOLDED CONNECTORS.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CAM LINK OPERABLE 600 AMP CONNECTOR

UG4187.2





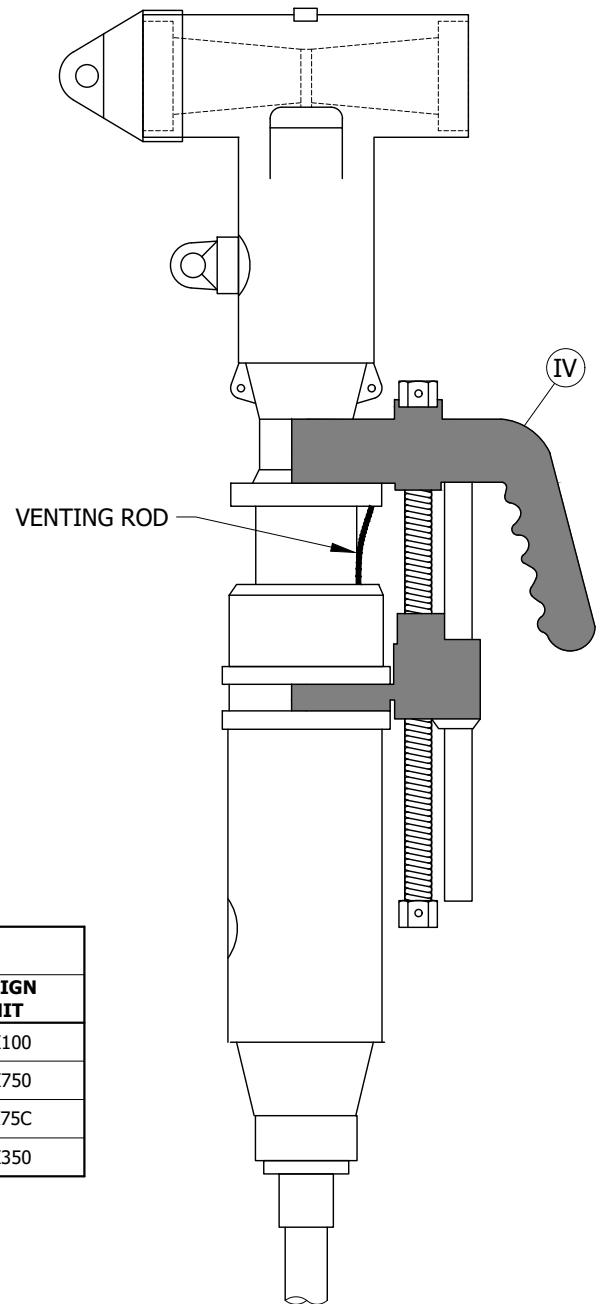




**FIGURE 2**

**TABLE 1**

| TEE EXTENSION KITS         |               |              |             |
|----------------------------|---------------|--------------|-------------|
| CABLE                      | KIT           | STOCK NUMBER | DESIGN UNIT |
| 1000KCMIL PEJ-XLPE         | K656RLR-N0410 | S445216      | TEX100      |
| 750KCMIL PEJ-XLPE          | K656RLR-L0380 | S445214      | TEX750      |
| 750 KCMIL PEJ-XLPE COMPACT | K656RLR-L0360 | S445212      | TEX75C      |
| 350KCMIL PEJ-XLPE          | K656RLR-J0300 | S445210      | TEX350      |



**FIGURE 3**

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A T EXTENSION

UG4188.2



**INSTALLATION:**

- A. FOLLOW MANUFACTURER'S INSTRUCTIONS TO RE-TERMINATE CABLE AND TEE CONNECTIONS.
- B. KEEP COMPONENTS CLEAN WHEN ASSEMBLING TEE EXTENSION.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                      | QUANTITY | STANDARD PAGE | STOCK NUMBER                           | DESIGN UNITS                           |
|------|--|----------|---------------|--|--|
| 1    | INSULATING END CAP & BIP (BASIC INSULATING PLUG) | AS REQ'D | --            | SUPPLIED IN KIT<br>(REFERENCE TABLE 1) | SUPPLIED IN KIT<br>(REFERENCE TABLE 1) |
| 2    | STUD, 1/2"                                       |          | --            |  |  |
| 3    | TEE, ELBOW WITH TEST POINT                       |          | --            |  |  |
| 4    | ADAPTER, ONE INCH                                |          | --            |  |  |
| 5    | BOLT, STAINLESS STEEL, 1/2"                      |          | --            |  |  |
| 6    | WASHER, FLAT, STAINLESS STEEL, 1 /2"             |          | --            |  |  |
| 7    | WASHER, BELLEVILLE, 1 /2"                        |          | --            |  |  |
| 8    | LUG, COMPRESSION                                 |          | --            |  |  |
| 9    | RING, RETAINING, SUPPLIED IN KIT                 |          | --            |  |  |
| 10   | ADAPTER, CABLE                                   |          | --            |  |  |
| 11   | EXTENSION HOUSING                                |          | --            |  |  |
| 12   | CONDUCTOR  |          | --            |  |  |
| 13   | SEMI CON   |          | --            |  |  |
| 14   | CONCENTRIC NEUTRAL                               |          | --            |  |  |
| 15   | JACKET, CABLE                                    |          | --            |  |  |
| 16   | ROD, VENTING                                     |          | --            |  |  |
| 17   | PLUG, END, ETP650                                | AS REQ'D | --            | S547328                                | --                                     |
| 18   | CAP, INSULATING                                  | AS REQ'D | --            | S204304                                | --                                     |

**NOTES:**

- I. THE ELASTIMOLD TEE EXTENSION 600 AMP CONNECTOR IS DESIGNED TO PROVIDE ADDITIONAL LENGTH WHEN CABLE OR CONVENTIONAL ELBOWS DO NOT REACH. WHEN CABLE IS RE-TERMINATED A TEE EXTENSION CAN PROVIDE 13" OF ADDITIONAL LENGTH.
- II. THIS CONNECTION CAN BE USED FOR SWITCH REPLACEMENTS, REMOVAL OF ON/OFF SWITCHES, REPAIRING FAILED TEE CONNECTIONS AND ANY TIME ADDITIONAL LENGTH IS NECESSARY.
- III. ELASTIMOLD TEE EXTENSION SPECIFICATIONS:
- 15KV CLASS
  - 8.3KV PHASE TO GROUND
  - 14.4KV MAXIMUM PHASE TO PHASE
  - 95KV BIL
- IV 600 RRT TOOL SUPPLIED BY STANDARDS

**REFERENCE:** NONE

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| C   |            |     |    |     |       |            | F   |        |    |    |     |     |      |
| B   | FORMATTING | EDM | JK | --  | --    | 06/02/2020 | E   |        |    |    |     |     |      |
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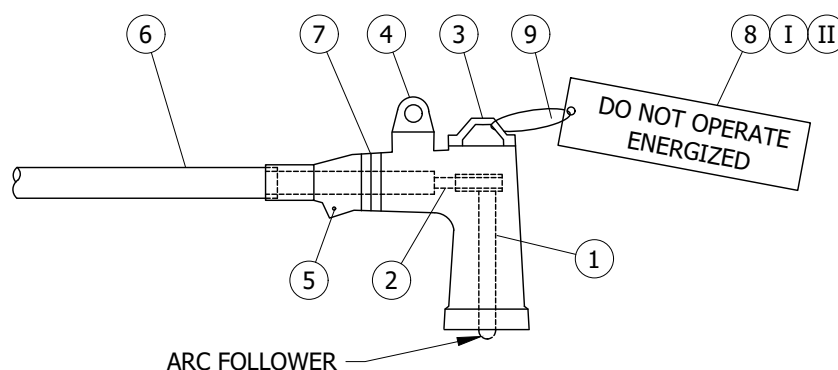
SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

600A T EXTENSION

UG4188.3



**SCOPE:** THIS STANDARD SHOWS 200 AMP 14KV LOADBREAK ELBOW CONNECTOR (LOADBREAK AT 12KV, 6.9 KV, 4.16KV AND 2.4KV) USED ON SUBSURFACE, PAD-MOUNTED TRANSFORMERS AND SECTIONALIZING EQUIPMENTS.



**FIGURE 1**

**TABLE 1**

| ITEM | SPARE PARTS                   | STOCK NUMBER |
|------|-------------------------------|--------------|
| 1    | MALE CONTACT                  | S444434      |
| 2    | 2 SOL AL COMPRESSION TERMINAL | S730200      |
|      | 2/O AL COMPRESSION TERMINAL   | S730210      |
| -    | SILICON GREASE                | S391424      |

**TABLE 2**

| RATINGS                               |                                 |
|---------------------------------------|---------------------------------|
| KV                                    | 14.0                            |
| AMPERES                               | 200                             |
| KV-BIL                                | 95                              |
| LOAD BREAK OR LOAD MAKE-10 OPERATIONS | 200 AMPS AT 70-80% POWER FACTOR |
| FAULT CLOSE RMS SYMMETRICAL AMPERES   | 10,000                          |

## INSTALLATION:

- FOR INSTALLATION PROCEDURES CONSULT INDIVIDUAL MANUFACTURER'S CONTAINERS FOR CURRENT INSTRUCTIONS.
- ENSURE THAT THE ARC FOLLOWER MATERIAL IS NOT CONTAMINATED WITH SOLVENT, SILICONE, OIL OR ANY OTHER FOREIGN SUBSTANCE. WIPE THE ARC FOLLOWER MATERIAL WITH A CLEAN, DRY, WHITE CLOTH IF CONTAMINATION IS SUSPECTED. CONTAMINATION (SOLVENT, SILICONE, ETC.,) CAN CAUSE DETERIORATION OF THE ARC FOLLOWER MATERIAL.
- SILICONE LUBRICANT SHALL BE APPLIED TO 100% OF THE BUSHING/ELBOW INSULATION INTERFACE TO ENSURE FUTURE OPERABILITY. FOLLOW MANUFACTURERS INSTRUCTIONS PRECISELY (DO NOT SILICONE WRONG AREAS) FOR THE APPLICATION OF SILICONE. SILICONE THAT IS CONTAMINATED BY DIRT, WATER, OR OTHER MATTER SHALL BE REMOVED AND NEW SILICONE GREASE (STOCK NUMBER S391424) SHALL BE PROPERLY APPLIED. AVOID GETTING SILICONE ON THE ARC FOLLOWER MATERIAL AND CONDUCTIVE PARTS WHICH BECOME ENERGIZED.
- REMOVE THE VOLTAGE TEST POINT COVER (ITEM 4). LUBE THE INSIDE OF THE COVER AND TEST POINT WITH A LIGHT COATING OF SILICONE GREASE. INSTALL THE COVER AND ROTATE IT 5 TIMES CLOCKWISE. THIS WILL ALLOW EASIER REMOVAL OF THE COVER AND PREVENT CORROSION OF THE TEST POINT.
- ORIENT ADJACENT ELBOWS VERTICALLY OR PERPENDICULAR TO FEED-THRU BUSHINGS AND 3 OR 4-WAY CABLE TAPS IN ORDER TO GIVE MAXIMUM PHASE TO GROUND CLEARANCES FOR ENERGIZED SWITCHING. INSTALL CABLE STRAIGHT FOR AT LEAST 6 INCHES BELOW ENTRANCE TO ELBOW TO PREVENT VOIDS AND WATER ENTRY INTO ELBOW.
- TO PREVENT BREAKAGE OF THE ARC FOLLOWER MATERIAL, CABLING MUST BE CAREFULLY INSTALLED TO PROVIDE FOR STRAIGHT IN INSERTION OF THE ELBOW INTO THE BUSHING. ALWAYS USE THE HOT STICK WHEN INSERTING THE ELBOW INTO THE BUSHING. (DO NOT OPERATE BY HAND, EVEN ON A DE-ENERGIZED CIRCUIT, AS THIS CAN LEAD TO ARC FOLLOWER DAMAGE SINCE STRAIGHT AXIAL MOVEMENT IS NOT ASSURED AND BENDING OF COMPRESSION LUG MAY OCCUR.) A FIVE FOOT MINIMUM CLEARANCE IS REQUIRED IN FRONT OR SIDES OF THE SUBSTRUCTURES WITH LOADBREAK EQUIPMENT AND EIGHT FOOT MINIMUM CLEARANCE IN FRONT OF PAD-MOUNTED EQUIPMENT FOR HOT STICK OPERATION.
- AFTER INSTALLATION, WHILE SYSTEM IS DE-ENERGIZED, THE ELBOWS SHOULD BE MECHANICALLY OPERATED WITH HOT STICK TO VERIFY THAT CABLES ARE TRAINED FOR GOOD OPERABILITY. RE-INSPECT THE ARC FOLLOWERS BEFORE PUTTING THEM INTO SERVICE.

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|-----|--------------------|----|-----|-----|---------|------------|-----|-------------------|-----|-----|-----|-----|------------|
| C   | COMPLETELY REVISED | -  | JBH | TR  | MDJ     | 03/22/2001 | F   |                   |     |     |     |     |            |
| B   | REVISION           | -  | -   | -   | JLB/RDJ | 1/1/1990   | E   | MOVED FROM UG4191 | EDM | JKI | -   | -   | 06/02/2020 |
| A   | REVISION           | -  | -   | -   | JLB/RDJ | 1/1/1988   | D   | EDITORIAL CHANGES | -   | JS  | JS  | MDJ | 12/20/2016 |



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

LOADBREAK ELBOW CONNECTOR, 12,000 VOLTS AND BELOW

UG4190.1



**INSTALLATION (CONT'D):**

- H. CHANGE 12KV ELBOW MALE CONTACT (ITEM 1 - STOCK NUMBER S444434) WHEN:
1. ELBOW HAS BEEN INADVERTENTLY FAULT CLOSED. THE BUSHING SHOULD NOT BE USED AGAIN AND SHOULD BE REPLACED.  
NOTE: THOROUGHLY CLEAN USING A CLEAN, DRY RAG. INSPECT AND RE-LUBRICATE ELBOW AND BUSHING LOADBREAK INTERFACES. IF FURTHER DAMAGE IS NOTED AT SAME TIME, THEN ELBOW REPLACEMENT IS ALSO NECESSARY.
  2. ELBOW CONTACT OR BUSHING CONTACT SHOW ANY EVIDENCE OF MECHANICAL DAMAGE (CHANGEOUT SHOULD NOT BE NECESSARY UNDER NORMAL FIELD OPERATING CONDITIONS).
- J. ALWAYS SMOOTH OFF CRIMPS (FILE SHARP EDGES AND CLEAN OFF FILINGS) ON COMPRESSION SOCKET TERMINAL TO PREVENT DAMAGE TO ELBOW INSULATION WHEN INSERTING CABLE.
- K. ALL SINGLE AND THREE PHASE DEADFRONT TRANSFORMERS, LOW PROFILE FUSED SWITCHING CABINETS WITH GE TYPE EJO FUSE CLIPS, AND THREE-PHASE FUSED SWITCHING CABINETS HAVE 12KV LOADBREAK RATED BUSHINGS INSTALLED BY MANUFACTURERS EVEN THOUGH THEY MAY NOT HAVE WHITE-BLACK-WHITE BAND. (b) (c) (d)

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                           | QUANTITY | STANDARD PAGE | STOCK NUMBER |          |         | DESIGN UNITS |
|------|---------------------------------------|----------|---------------|--------------|----------|---------|--------------|
|      |                                       |          |               | 2CU          | 2 SOL AU | 2/0 AL  |              |
| 1    | MALE CONTACT                          | AS REQ'D | --            | S443837      | S443838  | S443840 | --           |
| 2    | TERMINAL, COMPRESSION                 | AS REQ'D | --            |              |          |         | --           |
| 3    | ELBOW PULLING EYE                     | AS REQ'D | --            |              |          |         | --           |
| 4    | VOLTAGE TEST POINT AND COVER          | AS REQ'D | --            |              |          |         | --           |
| 5    | GROUNDING POINT                       | AS REQ'D | --            |              |          |         | --           |
| 6    | CABLE                                 | AS REQ'D | --            |              |          |         | --           |
| 7    | BAND, ID, WHITE - BLACK - WHITE (III) | AS REQ'D | --            |              |          |         | --           |
| 8    | TAG, "DO NOT OPERATE ENERGIZED"       | AS REQ'D | --            | S647966      |          |         | --           |
| 9    | STRAP, TIE, 6"                        | AS REQ'D | --            | S698224      |          |         | --           |

**NOTES:**

- (I) THIS ELBOW IS DESIGNED FOR OPERATION AS A LOADBREAK DEVICE ON 12.0, 6.9 & 4.16KV SYSTEMS. HOWEVER, IF IT IS INSTALLED ON A 12KV SYSTEM WITHOUT A 12KV RATED BUSHING OR IN A MANHOLE, A TAG (3232) "DO NOT OPERATE ENERGIZED" IS THEN ATTACHED.
- (II) UNDER PROPER SUPERVISION THIS ELBOW MAY BE USED AS A LOADBREAK DEVICE AT 12KV AND BELOW. HOWEVER THIS DOES NOT APPLY ON ELBOWS INSTALLED IN MANHOLES. UNDER NO CIRCUMSTANCES ARE ELBOWS TO BE OPERATED ENERGIZED IN MANHOLES.
- (III) WHITE - BLACK - WHITE BAND IDENTIFIES ELBOW THAT CAN BE USED FOR 12KV (2 OR 3-PHASE) SWITCHING WITH 12KV RATED BUSHING AND 6930 VOLT (SINGLE-PHASE) SWITCHING.

**REFERENCE:**

- a. REFER TO ELECTRIC STANDARD PRACTICE 212 FOR CAPACITOR TEST POINT CLEANING AND LUBRICATING.
- (b) REFER TO UG3711, UG3712, UG3751, AND UG3752 FOR SINGLE AND THREE-PHASE TRANSFORMERS.
- (c) REFER TO 3512 FOR LOW PROFILE FUSED SWITCHING CABINETS.
- (d) REFER TO 3514 FOR THREE-PHASE FUSED SWITCHING CABINETS.

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| B   | REVISION           | -  | -   | -   | JLB/RDJ | 1/1/1990   | E   | MOVED FROM UG4191 | EDM | JKI | -   | -   | 06/02/2020 |
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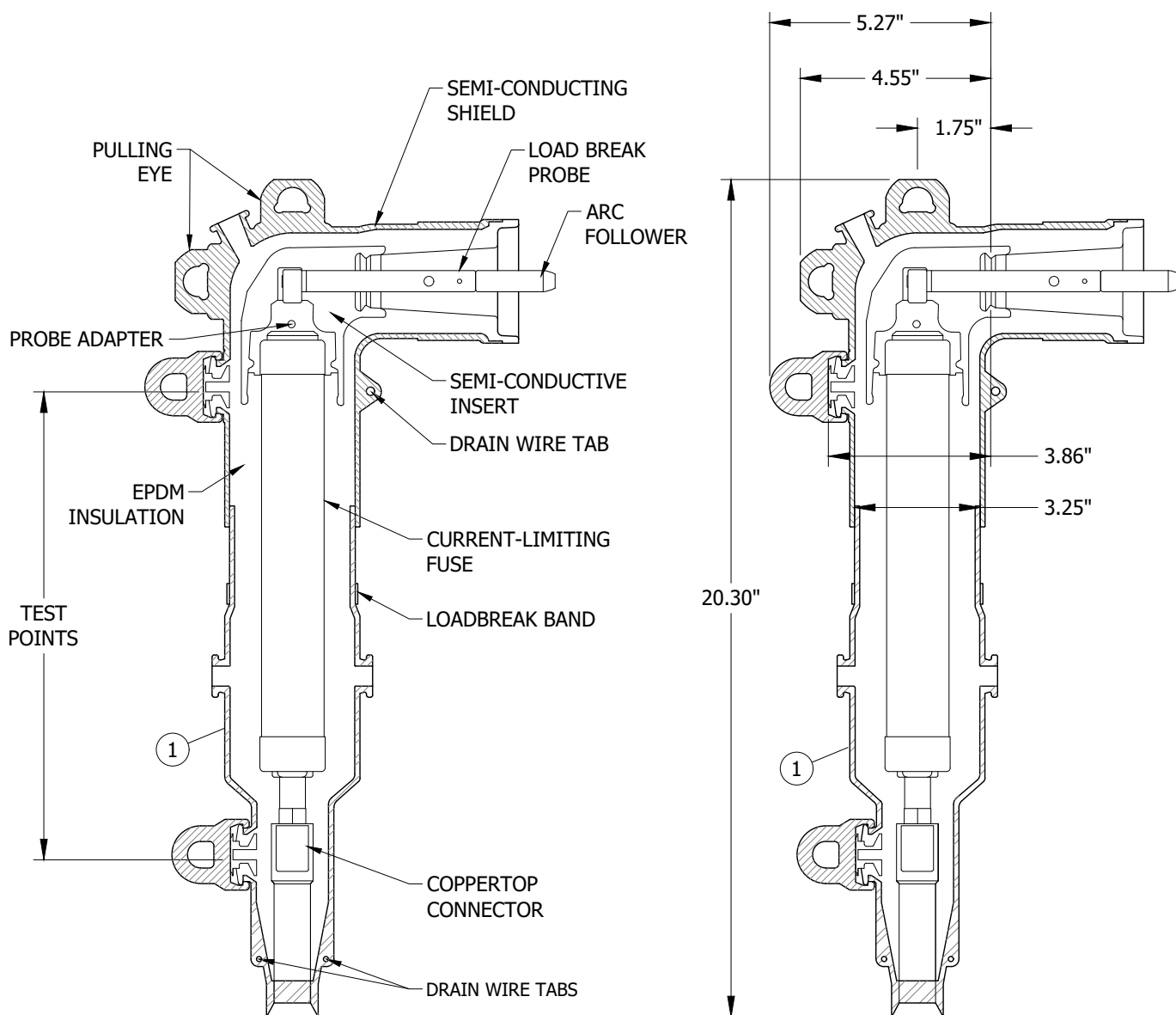
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

LOADBREAK ELBOW CONNECTOR, 12,000 VOLTS AND BELOW

UG4190.2



**SCOPE:** THIS STANDARD ILLUSTRATES THE 200 AMP, 6,930 VOLT LOADBREAK FUSED ELBOW CONNECTOR USED ON A 6.9KV, 7.2KV OR 12KV SYSTEM.



**FIGURE 1**

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200 AMP 6,930 VOLT LOADBEAK 6.9KV, 7.2KV OR 12KV  
FUSED ELBOW CONNECTOR

**UG4191.1**



**TABLE 1**

| VOLTAGE RATING AND CHARACTERISTICS |     |
|------------------------------------|-----|
| DESCRIPTION                        | KV  |
| STANDARD VOLTAGE                   | 15  |
| MAXIMUM RATING PHASE TO PHASE      | 8.3 |
| MAXIMUM RATING PHASE TO GROUND     | 8.3 |
| AC 60HZ 1 MINUTE WITHSTAND         | 34  |
| DC 15 MINUTE WITHSTAND             | 53  |
| BIL AND FULL WAVE CREST            | 95  |
| MINIMUM CORONA VOLTAGE LEVEL       | 11  |

**TABLE 2**

| CURRENT RATING AND CHARACTERISTICS |   |
|------------------------------------|---|
| DESCRIPTION                        | AMPERES   |
| CONTINUOUS                         | FUSE RATING   |
| SWITCHING                          | 10 OPERATIONS AT FUSE CURRENT RATING AT 8.3KV                   |
| FAULT CLOSURE                      | 10,000 A RMS SYMMETRICAL AT 8.3KV AFTER 10 SWITCHING OPERATIONS |

**INSTALLATION:**

- A. THIS ELBOW MAY BE USED AS A LOADBREAK DEVICE FOR 6930 VOLT SINGLE-PHASE TRANSFORMERS. IF IT IS INSTALLED FUSING A PHASE TO PHASE CONNECTED LOAD WITH EXPULSION FUSING (EXAMPLE: HDL, HZB TRANSFORMERS) OR A 12KV SYSTEM, A TAG "DO NOT OPERATE UNDER LOAD" IS TO BE ATTACHED. ELBOW SHALL NEVER BE INSTALLED TO SERVE UN-FUSED 12KV TRANSFORMERS. (a)
- B. FOR INSTALLATION PROCEDURE, CONSULT MANUFACTURERS CONTAINERS FOR INSTRUCTIONS.
- C. WHEN USING THE TEST POINT TO DETERMINE WHETHER OR NOT THE FUSED ELBOW IS ENERGIZED, FOLLOW THESE STEPS:
1. REMOVE THE TEST POINT COVER WITH THE HOT STICK.
  2. THE TEST POINT IS A CAPACITIVE DEVICE WHICH WILL INDICATE A READING OF ABOUT 10 PERCENT OF THE VOLTAGE THE CONDUCTOR IS CARRYING. USE THE VOLTAGE DETECTOR AND PHASING TESTER (MANUFACTURED BY SAFETYLINE OR STB), FOR OBTAINING AN ACCURATE VOLTAGE INDICATION.
  3. REMOVE EACH VOLTAGE TEST POINT COVER. LUBE THE INSIDE OF THE COVERS AND TEST POINTS WITH A LIGHT COATING OF SILICONE GREASE. INSTALL THE COVERS AND ROTATE THEM FIVE (5) TIMES CLOCKWISE. THIS WILL ALLOW EASIER REMOVAL OF THE COVERS AND PREVENT CORROSION OF THE TEST POINTS.
- D. THE TEST POINTS CAN ALSO BE USED TO LOCATE AN OPEN FUSE AS FOLLOWS:
1. REMOVE THE TEST POINT COVERS WITH THE HOT STICK.
  2. WITH THE VOLTAGE DETECTOR AND PHASING TESTER, CHECK THE VOLTAGE ON EACH TEST POINT. A VOLTAGE DIFFERENCE OF 50 PERCENT OR MORE INDICATES AN OPEN FUSE.
  3. AFTER REPLACEMENT OF THE FUSE (SEE REPLACING CLEARED FUSE), RECHECK THE VOLTAGE ON THE TEST POINTS.
  4. A VOLTAGE DIFFERENCE OF LESS THAN 20 PERCENT INDICATES A GOOD FUSE. LUBE THE INSIDE OF THE COVERS WITH A LIGHT COATING OF SILICONE GREASE. INSTALL THE COVERS AND ROTATE THEM FIVE (5) TIMES CLOCKWISE. THIS WILL ALLOW EASIER REMOVAL OF THE COVERS AND PREVENT CORROSION OF THE TEST POINTS.
- E. REPLACING CLEARED FUSE:
1. DE-ENERGIZE AND GROUND CABLE AT THE SOURCE.
  2. WITH THE VOLTAGE DETECTOR AND PHASING TESTER, CHECK THE VOLTAGE ON EACH TEST POINT TO ASSURE IT IS DE-ENERGIZED.
  3. REMOVE THE PROBE FROM THE FUSED ELBOW WITH THE TORQUE LIMITING WRENCH OR SDG&E APPROVED TOOL.
  4. INSERT BLEEDER STRAP BETWEEN THE ELBOW HOUSING AND THE CABLE HOUSING AND SLIDE STRAP AROUND THE ENTIRE CIRCUMFERENCE TO VENT INTERFACES. REMOVE THE ELBOW HOUSING USING A TWIST AND PULL MOTION.
  5. REMOVE THE PROBE ADAPTER BY LOOSENING THE SET SCREW WITH A 1/8-INCH HEX WRENCH.
  6. UNSCREW THE CLEARED FUSE FROM THE CABLE HOUSING USING A 3/16-INCH HEX WRENCH.
  7. REPLACE CLEARED FUSE IN REVERSE ORDER.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200 AMP 6,930 VOLT LOADBEAK 6.9KV, 7.2KV OR 12KV  
FUSED ELBOW CONNECTOR

UG4191.2



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                 | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|-----------|----------|---------------|--------------|--------------|
| 1    | ELBOW, FUSED, 30 AMP (FUSE INCLUDED)        | #2 SOLID  | AS-REQ'D | -             | S321680      | CFE2SL       |
|      |   | 2/0       |          |               | S321682      | CFE2/0       |
| 2    | FUSE CURRENT LIMITING, 30 AMP (REPLACEMENT) | -         | AS-REQ'D | -             | S365694      | CFE30A       |

**NOTES:**

- I. MAY NOT BE USED ON 4KV SYSTEMS. DURING FUSE OPERATION THE FUSE MAY CAUSE AN "OVER VOLTAGE CONDITION" ON EQUIPMENT.
- II. MAY NOT BE APPLIED TO SYSTEMS CAPABLE OF IMPRESSING 12KV ACROSS FUSE SUCH AS TRANSFORMERS NOT EQUIPPED WITH FUSING.
- III. ELBOWS SHALL NOT BE INSTALLED IN MANHOLES.
- IV. TO LOCATE AN OPEN FUSE, ONLY THE VOLTAGE DETECTOR AND PHASING TESTER CAN BE USED.
- V. DO NOT OPERATE ON KNOWN FAULTS.
- VI. IF A FAULT IS EXPERIENCED, THE FUSED LOADBREAK ELBOW AND PROBE SHALL BE REPLACED.
- VII. SPECIAL OPERATING INSTRUCTIONS:
- IN ADDITION TO NORMAL OPERATING INSTRUCTIONS FOR ELBOWS, THE FOLLOWING APPLICATIONS SHALL BE MAINTAINED FOR FUSED ELBOWS:
- WHEN USED TO FUSE 6,930 VOLT, SINGLE-PHASE TRANSFORMERS, THE ELBOW MAY BE OPERATED LOADBREAK FOR UP TO TEN LOADMAKE AND LOADBREAK OPERATIONS. (VIIb)
  - IF VISUAL EVIDENCE OF CARBON DEPOSITS ARE PRESENT, MALE CONTACT PROBE AND BUSHING CHANGEOUT PLUS CLEANING ELBOW/BUSHING COMBINATION SHOULD BE DONE BEFORE TEN OPERATIONS.
  - DO NOT USE FUSED ELBOW FOR FAULT LOCATING CLOSE-INS. BUT IF ELBOW IS CLOSED IN ON A FAULT, THEN THE MALE CONTACT PROBE AND FUSE SHOULD BE REPLACED.

**REFERENCE:**

- SIGNS AND TAGGING, SEE UG3232.
- DESIGN FUSED ELBOW APPLICATION CRITERIA, SEE ELECTRIC DISTRIBUTION DESIGN MANUAL 6121.4-6121.5.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200 AMP 6,930 VOLT LOADBEAK 6.9KV, 7.2KV OR 12KV  
FUSED ELBOW CONNECTOR

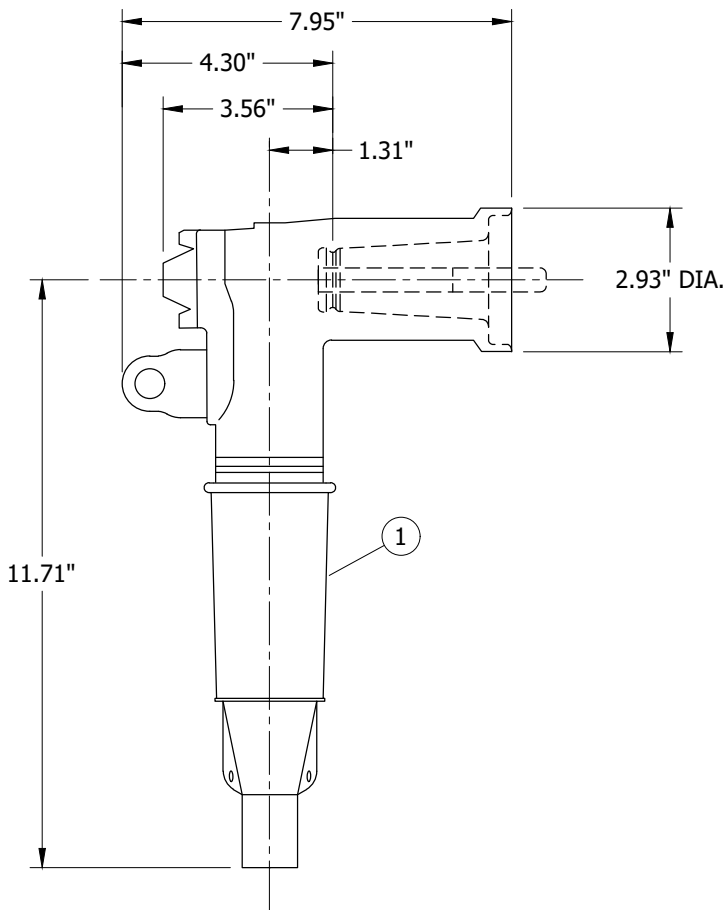
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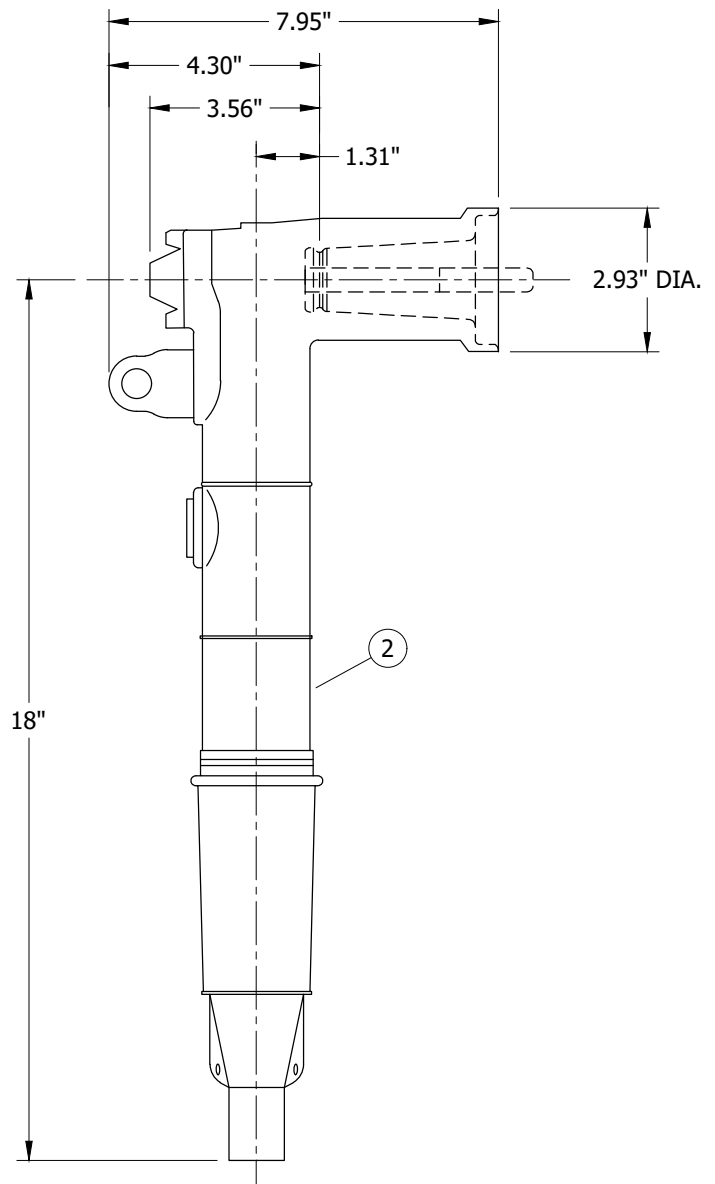
**SCOPE:** THIS STANDARD ILLUSTRATES THE 200A, 15KV LOADBREAK ELBOW EXTENSIONS.

**ATTENTION:**

- \* FOR REPAIR OR REPLACEMENT OF A FAILED ELBOW CONNECTION WHERE THE CABLE MUST BE STRIPPED BACK AND A NEW COMPRESSION LUG APPLIED.
- \*\* TO GAIN EXTRA LENGTH WHEN CABLES HAVE BEEN ACCIDENTALLY TRIMMED TOO SHORT OR TO CONNECT NEW APPARATUS TO EXISTING CABLES.



**FIGURE 1**  
200A REPAIR LOADBREAK ELBOW



**FIGURE 2**  
200A REPLACEMENT LOADBREAK ELBOW

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200A 15KV LOADBEAK ELBOW EXTENSION

UG4192.1



| VOLTAGE RATING AND CHARACTERISTICS  |      |
|-------------------------------------|------|
| DESCRIPTION                         | KV   |
| STANDARD VOLTAGE                    | 15   |
| MAXIMUM RATING PHASE TO PHASE       | 14.4 |
| MAXIMUM RATING PHASE TO GROUND      | 8.3  |
| AC 60HZ 1 MINUTE WITHSTAND          | 34   |
| DC 15 MINUTE WITHSTAND              | 53   |
| BIL IMPULSE WITHSTAND               | 95   |
| CORONA EXTINCTION @ 3pC SENSITIVITY | 11   |

| CURRENT RATING AND CHARACTERISTICS |         |
|------------------------------------|---------|
| DESCRIPTION                        | AMPERES |
| CONTINUOUS AND LOADBREAK           | 200     |
| 10 CYCLES MOMENTARY & FAULT CLOSE  | 10K     |

- A. FOR INSTALLATION PROCEDURE, CONSULT MANUFACTURERS INSTRUCTIONS.
- B. WHEN USING TEST POINT TO DETERMINE WHETHER OR NOT ELBOW IS ENERGIZED, FOLLOW THESE STEPS:
  1. REMOVE TEST POINT COVER WITH THE HOT STICK. PEEL OFF AT AN ANGLE RATHER THAN PULLING DIRECTLY IN LINE WITH TEST POINT ASSEMBLY.
  2. THE TEST POINT IS A CAPACITIVE DEVICE WHICH WILL INDICATE A READING OF ABOUT 10 PERCENT OF THE VOLTAGE THE CONDUCTOR IS CARRYING. USE THE VOLTAGE DETECTOR AND PHASING TESTER (MANUFACTURED BY SAFETYLINE OR STB), TO OBTAIN AN ACCURATE VOLTAGE INDICATION.
  3. REMOVE EACH VOLTAGE TEST POINT COVER. LUBE THE INSIDE OF THE COVERS AND TEST POINTS WITH A LIGHT COATING OF SILICONE GREASE. INSTALL THE COVERS AND ROTATE THEM FIVE (5) TIMES CLOCKWISE. THIS WILL ALLOW EASIER REMOVAL OF THE COVERS AND PREVENT CORROSION OF THE TEST POINTS.

| ITEM | DESCRIPTION  | WIRE SIZE    | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|--------------|----------|---------------|--------------|--------------|
| 1    | ELBOW, REPAIR, EXTENDED LENGTH, W/ TEST POINT      | #2 SOLID     | -        | -             | S321684      | 2 SOLES      |
|      |  | 2/0 STRANDED | -        | -             | S321686      | 2/0-ES       |
| 2    | ELBOW, REPLACEMENT, EXTENDED LENGTH, W/ TEST POINT | #2 SOLID     | -        | -             | S321688      | 2/0-SL       |
|      |  | 2/0 STRANDED | -        | -             | S321690      | 2/0-EL       |

- I. ELBOWS SHALL NOT BE INSTALLED IN MANHOLES.
- II. DO NOT OPERATE ON KNOWN FAULTS.
- III. IF A FAULT IS EXPERIENCED, THE LOADBREAK ELBOW AND BUSHING SHALL BE REPLACED.

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|                 |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |     |     |                    |           |     |          |    |                     |     |     |          |  |  |
|                 |                | 200A 15KV LOADBEAK ELBOW EXTENSION                |     |     |                    |           |     |          |    |                     |     |     |          |  |  |



**SCOPE:** THIS STANDARD SHOWS THE LOADBREAK ACCESSORIES AND THE INSTALLATION PROCEDURES FOR THE ACCESSORIES USED ON A 12KV AND/OR 6.9KV SYSTEM.

**TABLE 1**

| PART IDENTIFICATION CHART  |  |              |              |
|--|--|--------------|--------------|
| PART   | MAJOR USE  | STOCK NUMBER | DESIGN UNITS |
|  <p>INSULATING RECEPTACLE (CAP)</p> | USED AS INSULATING CAP FOR LOADBREAK BUSHING   | S204304      | -            |
|  <p>STAND-OFF PLUG</p>              | USED AS LOADBREAK STAND-OFF PLUG<br>ELECTRICALLY ISOLATES AND WATERSEALS A LOADBREAK CONNECTOR                         | S547312      | -            |
|  <p>BUSHING PLUG (A)</p>            | USED IN BUSHING WELL OR REDUCING TAP WELL FOR ELBOW CONNECTION POINT   | S544676      | -            |
|  <p>FEED-THRU INSERT (A) (B)</p>    | USED ON TRANSFORMERS AND THREE-PHASE FUSE CABINETS FITTED WITH BUSHING WELLS TO ALLOW LOOP-FEED CAPABILITY WITH ELBOWS | S544678      | -            |
|  <p>FEED-THRU BUSHING (A)</p>     | USED AS TEMPORARY TOOL TO ISOLATE LOW PROFILE TRANSFORMER  | S182016      | -            |
|  <p>GROUNDING ELBOW</p>           |  | S603000      | -            |
|  <p>TEST ROD</p>                  | USED WITH FEED-THRU BUSHING TO PROVIDE TEST POINT  | S603428 (X)  | -            |



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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | 200 AMP LOADBREAK ACCESSORIES, 12KV               |                           |                    |          |                     |          |



**TABLE 1 (CONT'D)**

| PART IDENTIFICATION CHART   |   |              |              |
|---|---|--------------|--------------|
| PART  | MAJOR USE   | STOCK NUMBER | DESIGN UNITS |
|  <p>4-WAY CABLE TAP WITH BRACKET</p>        | USED TO ESTABLISH TWO LATERAL TAPS OR LOOP FROM CIRCUIT | S718328      | TAP-4W       |
|  <p>4-WAY CABLE TAP WITHOUT BRACKET (I)</p> | USED TO ESTABLISH TWO LATERAL TAPS OR LOOP FROM CIRCUIT | S718338      | TAP4NB       |

**INSTALLATION:**

- (A) INSTALL WHITE-BLACK-WHITE BAND, STOCK NUMBER S122495, TO IDENTIFY 12KV SWITCHING CAPABILITY.
- (B) INSTALLATION OF INSULATING RECEPTACLE PROCEDURE:
1. REMOVE PROTECTIVE CAP.
  2. CONNECT ONE CONCENTRIC NEUTRAL WIRE FROM INSULATING RECEPTACLE TO GROUNDING POINT. ALLOW ENOUGH WIRE FOR HOT STICK OPERATION.
  3. LUBRICATE INTERNAL SURFACES WITH SILICONE GREASE.
  4. ATTACH HOT STICK TO RECEPTACLE PULLING RING.
  5. INSERT THE PROBE OF THE RECEPTACLE INTO THE BUSHING UNTIL IN PLACE AND LOCKING RING IS SEATED.
  6. WHEN REMOVING, ATTACH HOT STICK TO THE PULLING RING, ROTATE RECEPTACLE ON BUSHING TO BREAK FRICTION AND PULL.
- (C) INSTALLATION OF STAND-OFF PLUG PROCEDURE:
1. AFTER REMOVING INSULATING CAP, LUBRICATE PLUG SURFACE WITH SILICONE GREASE.
  2. ATTACH STAND-OFF PLUG EYE FIRMLY TO HOT STICK.
  3. SLIDE STAND-OFF PLUG ONTO PARKING STAND AND TIGHTEN UNTIL SNUG BY TURNING EYE CLOCKWISE.
  4. MAKE CAPACITANCE TEST ON ELBOW CONNECTOR BEFORE REMOVING FROM BUSHING.
  5. AFTER PLACING STAND-OFF PLUG ON PARKING STAND, REMOVE ELBOW CONNECTOR FROM BUSHING AND PLACE ON THE STAND-OFF PLUG.
  6. IF ENTIRE ASSEMBLY (ELBOW AND STAND-OFF PLUG) IS TO BE REMOVED FROM PARKING STAND, ATTACH TOOL TO EYE OF THE STAND-OFF PLUG. REMOVE FROM PARKING STAND, AND PLACE WHERE DESIRED.
  7. WHEN RETURNING ELBOW CONNECTOR TO THE EQUIPMENT BUSHING, REVERSE THE PROCEDURE.
- (D) INSTALLATION OF BUSHING PLUG PROCEDURE -- (DE-ENERGIZED OPERATION ONLY):
1. CHECK BUSHING WELL FOR CLEANLINESS.
  2. LUBRICATE BASE WITH SILICONE GREASE. PLACE LUBRICATED PORTION OF THE BUSHING PLUG IN THE BUSHING WELL (FLOWER POT).

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|              | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                    |          |                     |          |
|              | 200 AMP LOADBREAK ACCESSORIES, 12KV               |                    |          |                     |          |



## INSTALLATION (CONT'D):

3. ROTATE THE BUSHING PLUG IN A CLOCKWISE DIRECTION UNTIL IT BOTTOMS ON THE BUSHING WELL STUD.
4. WIPE BUSHING PLUG SURFACE CLEAN BEFORE INSTALLING ELBOW CONNECTOR OR INSULATING RECEPTACLE.

### (E) INSTALLATION OF FEED-THRU INSERT -- (DE-ENERGIZED OPERATION ONLY):

1. CHECK BUSHING WELL FOR CLEANLINESS.
2. LUBRICATE BASE WITH SILICONE GREASE. PLACE LUBRICATED PORTION OF THE FEED-THRU INSERT INTO THE BUSHING WELL (FLOWER POT).
3. ROTATE THE INSERT IN A CLOCKWISE DIRECTION UNTIL IT BOTTOMS ON THE BUSHING WELL STUD.
4. IF THE INSERT DOES NOT LINE UP WITH THE ELBOWS IT MAY BE TURNED COUNTERCLOCKWISE 180 DEGREES. THIS WILL NOT AFFECT THE DIELECTRIC OR CURRENT CARRYING CAPABILITY.
5. INSTALL THE SUPPLIED BAILING ASSEMBLY OVER THE INSERT. THIS WILL FIRMLY SUPPORT THE INSERT AT THE DESIRED LOCATION.
6. WIPE THE INSERT CLEAN BEFORE INSTALLING ELBOWS OR INSULATING RECEPTACLES.

### (F) INSTALLATION OF FEED-THRU BUSHING PROCEDURE:

(USE 182832 ONLY ON ENERGIZED SINGLE-PHASE 6930 VOLT CIRCUITS. 182016 IS GOOD FOR ALL ENERGIZED CIRCUITS.)

1. AFTER REMOVING INSULATING CAP, LUBRICATE FEED-THRU BUSHING WITH SILICONE GREASE.
2. ATTACH FEED-THRU EYE FIRMLY TO HOT STICK.
3. SLIDE FEED-THRU ONTO PARKING STAND. TIGHTEN DOWN EYE BY TURNING CLOCKWISE UNTIL SNUG.
4. MAKE CAPACITANCE TEST ON ONE ELBOW TO ESTABLISH CONDITION OF CIRCUIT. REMOVE ELBOW FROM THE BUSHING AND PLACE ON NEAREST BUSHING OF THE FEED-THRU. INSERT THE PROBE AND LOADBREAK ELBOW INTO THE BUSHING AND PUSH UNTIL IT IS FIRMLY IN PLACE AND THE LOCKING RING IS SEATED.
5. MAKE CAPACITANCE TEST ON OTHER ELBOW.
6. AFTER CIRCUIT HAS BEEN TESTED, TO ESTABLISH CONDITION OF CIRCUIT, REMOVE THE LOAD-BREAK ELBOW FROM THE BUSHING AND PLACE ON REMAINING BUSHING OF THE FEED-THRU.
7. TO RETURN THE LOADBREAK ELBOW TO THE EQUIPMENT BUSHING, REVERSE THE PROCEDURE.

### (G) INSTALLATION OF GROUNDING ELBOW KIT PROCEDURE -- (DE-ENERGIZED OPERATION ONLY):

1. RECEIVE CLEARANCE FROM SWITCHING CENTER, WHEN NEEDED.
2. ATTACH THE GROUNDING ELBOW CABLE CLAMP TO THE EQUIPMENT GROUND. LAY GROUNDING ELBOW ON EQUIPMENT PAD, TO BE USED LATER.
3. INSTALL CLEAN FEED-THRU BUSHING ONTO PARKING STAND OF THE EQUIPMENT AND TIGHTEN UNTIL SNUG BY TURNING EYE CLOCKWISE.
4. USING HOT STICK, REMOVE THE LOADBREAK ELBOW THAT IS TO BE GROUNDED FROM SOURCE OF FEED.
5. PARK THIS ELBOW ON FEED-THRU BUSHING.
6. TEST ELBOW BY APPROVED MEANS, TO INSURE THAT CABLE IS DE-ENERGIZED. (SEE TEST ROD INSTALLATION PROCEDURE.)
7. AFTER TESTING IS COMPLETED AND IT HAS BEEN DETERMINED THAT THE CABLE IS DE-ENERGIZED, USE A HOT STICK TO INSTALL THE GROUNDING ELBOW ONTO FEED-THRU BUSHING. PROCEDURE IS NOW COMPLETED.
8. TO REMOVE GROUND ALWAYS REMOVE THE GROUNDING ELBOW FROM THE FEED-THRU BUSHING PRIOR TO REMOVING FROM THE EQUIPMENT GROUND.

### (H) INSTALLATION OF TEST ROD PROCEDURE:

1. INSTALL CLEAN FEED-THRU BUSHING IN PARKING STAND ON EQUIPMENT AND TIGHTEN UNTIL SNUG BY TURNING EYE CLOCKWISE.
2. USING HOT STICK, REMOVE THE LOADBREAK ELBOW THAT IS TO BE TESTED FROM SOURCE OF FEED.

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200 AMP LOADBREAK ACCESSORIES, 12KV

UG4195.3



**INSTALLATION (CONT'D):**

- 3. PARK THIS ELBOW ON FEED-THRU BUSHING.
- 4. USING HOT STICK, INSTALL TEST ROD INTO FEED-THRU BUSHING.
- 5. TEST.

**BILL OF MATERIALS:** NONE

**NOTES:**

I USED IN THE 200 AMP, THREE-PHASE LOW PROFILE CABLE TERMINATING CABINET.

**REFERENCE:** NONE

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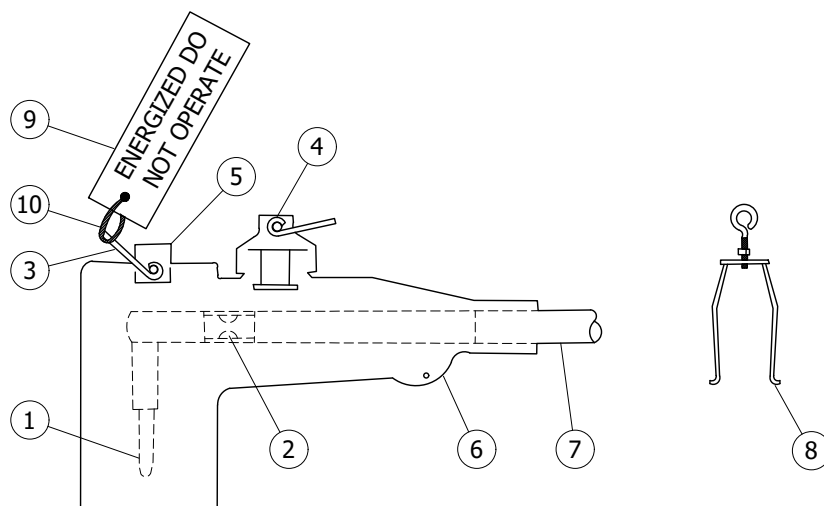
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | 200 AMP LOADBREAK ACCESSORIES, 12KV               |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS 200 AMP DEADBREAK CONNECTORS USED ON A 12KV AND BELOW SYSTEMS.

**CAUTION:**

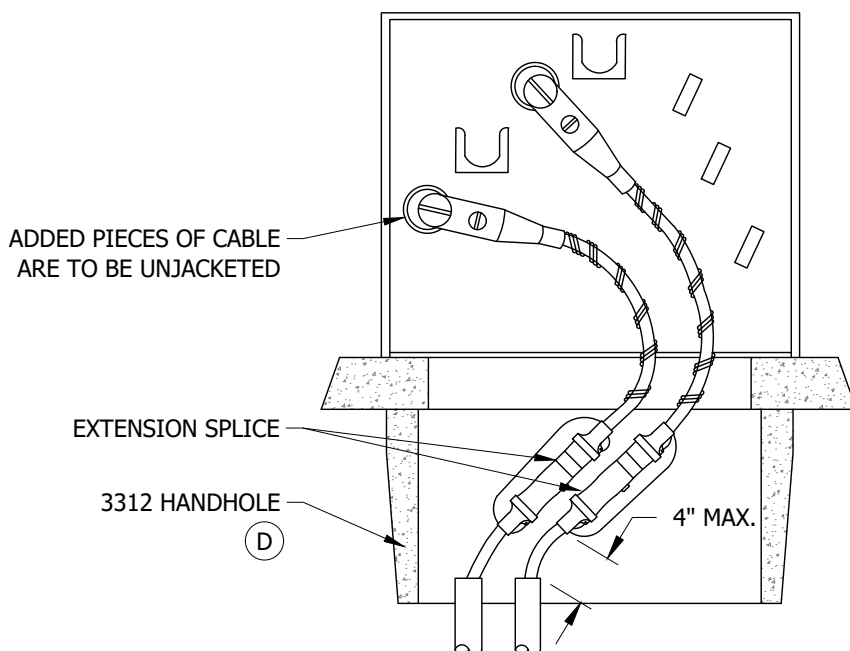
- \* THIS ELBOW CONNECTOR MUST BE OPERATED DE-ENERGIZED ONLY. TAG, (ITEM 9) "DO NOT OPERATE ENERGIZED", MUST BE ATTACHED THRU ITEM 3.



**TABLE 1**

| RATINGS           |     |
|-------------------|-----|
| KV LINE TO GROUND | 8.3 |
| AMPERES           | 200 |
| KV-BIL            | 95  |

**FIGURE 1**  
200 AMP DEADBREAK ELBOW



**FIGURE 2**  
INSTALLATION EXAMPLE 1  
SINGLE-PHASE LIVE FRONT TO DEAD FRONT

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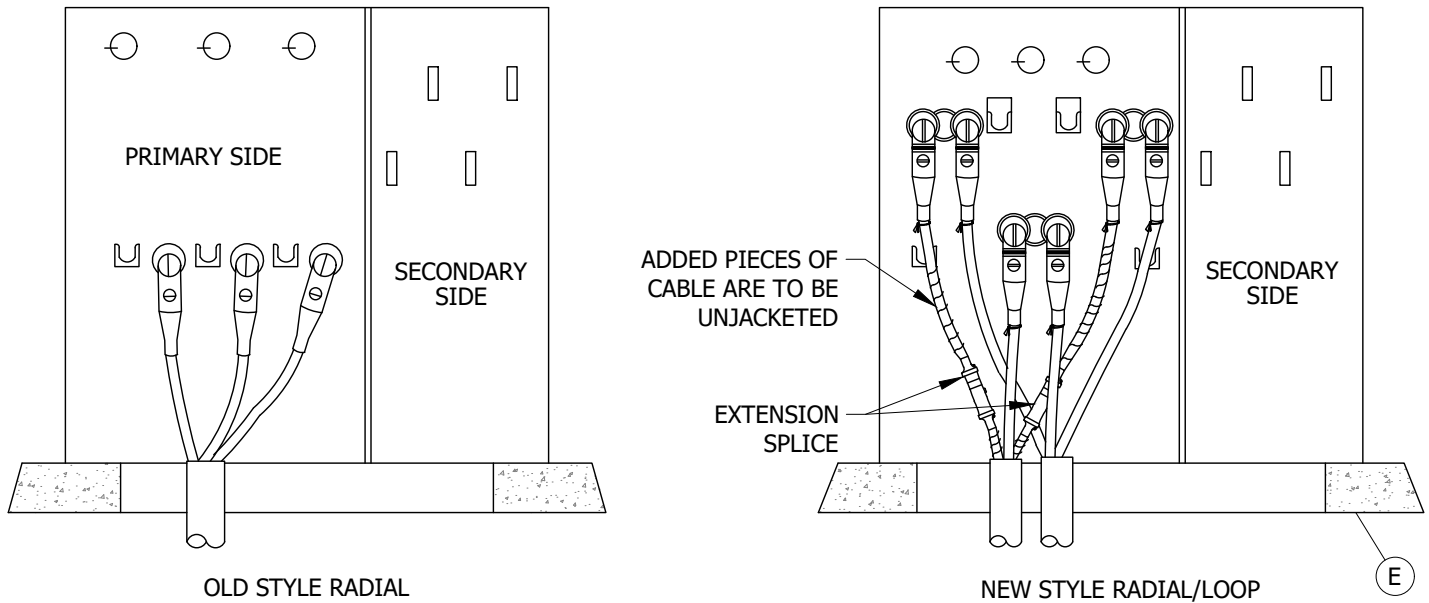
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200 AMP DEADBREAK CONNECTORS, 12KV

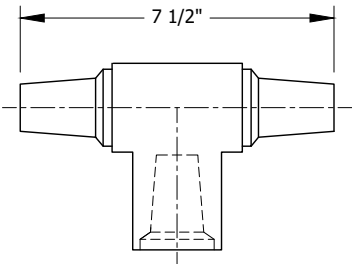
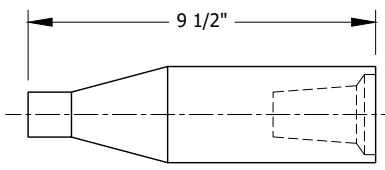
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**FIGURE 3**  
 INSTALLATION EXAMPLE 2  
 OLD STYLE RADIAL TO NEW STYLE RADIAL/LOOP TRANSFORMER REPLACEMENT

**TABLE 2**

| PART IDENTIFICATION CHART  |   |            |              |
|--|---|------------|--------------|
| PART   | MAJOR USE   | CABLE SIZE | STOCK NUMBER |
| <br>"T" CONNECTOR              | USED TO JOIN THREE CABLES<br>(TWO DEADBREAK ELBOWS & ONE STRAIGHT PLUG)<br>USE WITH BAIL ASSEMBLIES | --         | S256112      |
| <br>STRAIGHT RECEPTACLE (III) | USED TO JOIN A STRAIGHT PLUG<br>USE WITH BAIL ASSEMBLY  | #2 CU      | S570256      |
|  |   | #4 CU      | S570768      |
|  |   | 2/0 AL     | S570848      |
|  |   | #2 SOL AL  | S570816      |

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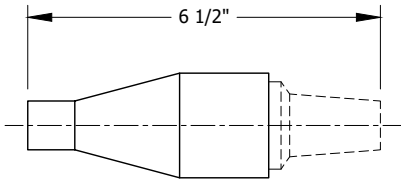
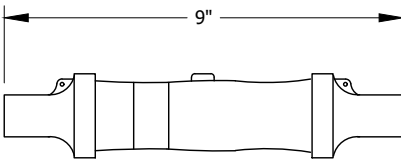
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |
| 200 AMP DEADBREAK CONNECTORS, 12KV                |                           |                    |          |                     |

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**TABLE 2 (CONT'D)**

| PART IDENTIFICATION CHART  |  |                   |              |
|--|--|-------------------|--------------|
| PART   | MAJOR USE  | CABLE SIZE        | STOCK NUMBER |
|  <p>STRAIGHT PLUG (III)</p>     | USED TO JOIN A STRAIGHT RECEPTACLE OR "T" CONNECTOR<br>USE WITH BAIL ASSEMBLY  | #2 CU             | S544688      |
|  |  | #4 CU             | S544694      |
|  |  | 2/0 AL            | S547316      |
|  |  | #2 SOL AL         | S547314      |
|  <p>EXTENSION SPLICE (C II)</p> | THIS SPLICE TO BE USED WHEN EXTRA CABLE IS REQUIRED ON EXISTING SYSTEMS WITHIN THE SAME STRUCTURE OR SUBSTRUCTURE<br><br>EXAMPLES ARE:<br>- CABLE TO EXISTING EQUIPMENT LOCATED DIRECTLY ON TOP OF SUBSTRUCTURE<br>- CABLE TAPS OR OTHER EQUIPMENT BEING RAISED OR RELOCATED IN SUBSTRUCTURES<br>- TRANSFORMER OR OTHER PAD-MOUNTED EQUIPMENT REPLACEMENT.<br>- SPLICING OF CABLE WHERE 200 AMP TEES ARE NOT REQUIRED. | #2 CU             | S668400      |
|  |  | #2 SOL AL         | S668402      |
|  |  | 2/0 AL            | S668404      |
|  |  | #2 CU - #2 SOL AL | S668406      |
|  |  | #2 CU - 2/0 AL    | S668408      |

**INSTALLATION:**

- A. FOR INSTALLATION PROCEDURES, CONSULT INDIVIDUAL MANUFACTURERS CONTAINERS FOR INSTRUCTIONS.
- B. BAILING PROCEDURES FOR DEADBREAK ELBOW AND INSERT.
1. OPERATION OF EXISTING ASSEMBLY - REBAIL TO EXISTING STOP NUT POSITION. (THIS WILL PRODUCE THE LEAST AMOUNT OF CHANGE TO AN INTERFACE CONDITION THAT IS WORKING. REDUCING OR INCREASING THE TURNS MAY RESULT IN CREATING PROBLEMS WHERE NONE EXIST.)
  2. INSTALLATION OF NEW ASSEMBLY (ELBOW AND/OR INSERT) - WITH THE ELBOW FULLY SEATED ON THE BUSHING, PULL HOLD-DOWN BAIL UP OVER THE TOP OF ELBOW SO THAT THE EYE BOLT ON THE BAIL IS DIRECTLY OVER THE HOLD DOWN BAIL PRESSURE PLATE. TURN THE EYE BOLT IN A CLOCKWISE DIRECTION UNTIL INITIAL CONTACT IS MADE WITH THE HOLD DOWN BAIL PRESSURE PLATE; THEN TIGHTEN THE EYE BOLT TWO FULL (360°) TURNS MAXIMUM, 1 1/2 TURNS MINIMUM. WITH THE EYE BOLT IN ITS ASSEMBLED POSITION, ADJUST THE STOP NUT BY BRINGING THE NUT DOWN TO THE TOP PLATE OF THE BAIL. THE NUT SHOULD ACT AS A STOP TO PREVENT THE EYE BOLT FROM APPLYING EXCESSIVE FORCE ON THE ELBOW FOR FUTURE OPERATION WITH A HOT STICK.
- (C) FOR EXTENSION SPLICE INSTALLATION PROCEDURE, CONSULT INDIVIDUAL MANUFACTURERS CURRENT INSTRUCTIONS.
- (D) 3312 HANDHOLE IS REQUIRED ON REPLACEMENT OF SINGLE-PHASE LIVE FRONT TRANSFORMERS.
- (E) 3312 HANDHOLE IS NOT REQUIRED ON REPLACEMENT OF THREE-PHASE LIVE FRONT OR DEAD FRONT TRANSFORMERS.

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| A   | REVISION | -  | -  | -   | JLB/RDJ | 1/1/1985 | D   | REVISION   | -   | -   | -   | RSW/RDJ | 1/1/1996   |



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200 AMP DEADBREAK CONNECTORS, 12KV

UG4196.3



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                       |                                       | QUANTITY | STANDARD PAGE | STOCK NUMBER |          |         | DESIGN UNITS |
|------|-----------------------------------|---------------------------------------|----------|---------------|--------------|----------|---------|--------------|
|      |                                   |                                       |          |               | 2 CU         | 2 SOL AL | 2/0 AL  |              |
| 1    | ELECTRICAL MALE CONTACT           | PART OF DEADBREAK ELBOW CONNECTOR KIT | --       | --            | S443456      | S443842  | S443844 | --           |
| 2    | COMPRESSION SOCKET TERMINAL       |                                       | --       | --            |              |          |         |              |
| 3    | ELBOW PULLING EYE                 |                                       | --       | --            |              |          |         |              |
| 4    | VOLTAGE TEST POINT AND COVER      |                                       | --       | --            |              |          |         |              |
| 5    | PRESSURE PLATE FOR HOLD DOWN BAIL |                                       | --       | --            |              |          |         |              |
| 6    | GROUNDING POINT                   |                                       | --       | --            |              |          |         |              |
| 7    | CABLE                             |                                       | --       | --            |              |          |         |              |
| 8    | HOLD DOWN BAIL (I)                | --                                    | --       | --            | S120416 (IV) |          |         | --           |
| 9    | TAG, "DO NOT OPERATE ENERGIZED"   |                                       | --       | 3232          | S647966      |          |         | --           |
| 10   | TIE STRAP - 6 IN                  |                                       | --       | 3232          | S698224      |          |         | --           |

**NOTES:**

- (I) ELBOW COMES COMPLETE WITH HOLD DOWN BAIL.
- (II) SPLICE IS COMPLETELY SEALED AND MAY BE INSTALLED IN SUBSURFACE EQUIPMENT.
- (III) **DO NOT** USE A STRAIGHT RECEPTACLE AND STRAIGHT PLUG WHEN EXTRA CABLE IS REQUIRED ON EXISTING SYSTEMS WITHIN THE SAME STRUCTURE OR SUBSTRUCTURE. INSTEAD OF THE STRAIGHT RECEPTACLE AND STRAIGHT PLUG, USE EXTENSION SPLICE SHOWN ON TABLE 2. NON USE EXAMPLES ARE:
- CABLE TO EXISTING EQUIPMENT LOCATED DIRECTLY ON TOP OF SUBSTRUCTURE.
  - CABLE TAPS OR OTHER EQUIPMENT BEING RAISED OR RELOCATED IN SUBSTRUCTURES.
  - TRANSFORMER OR OTHER PAD-MOUNTED EQUIPMENT REPLACEMENT.
- (IV) SPARE PART NUMBER.

**REFERENCE:** NONE

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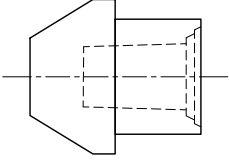
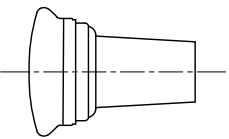
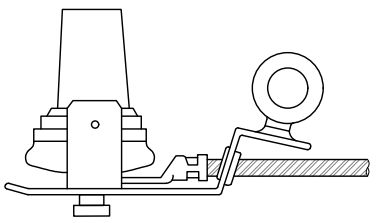
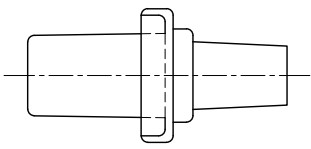
200 AMP DEADBREAK CONNECTORS, 12KV

UG4196.4



**SCOPE:** THIS STANDARD SHOWS 200 AMP ACCESSORIES USED ON 12KV AND BELOW SYSTEM.

**TABLE 1**

| PART IDENTIFICATION CHART  |   |              |
|--|---|--------------|
| PART   | MAJOR USE   | STOCK NUMBER |
| <br>DEADEND RECEPTACLE (C)    | USED TO CAP DEADBREAK TRANSFORMER BUSHING, "TEE" CONNECTOR OR STRAIGHT PLUG   | S570304      |
| <br>DEADEND PLUG (D)          | USED FOR DEADBREAK TO CAP "TEE" CONNECTOR, DEADBREAK ELBOW OR STRAIGHT RECEPTACLE<br><br>TO BE USED WITH ASSEMBLY BAIL (STOCK NUMBER S120352) | S544864      |
| <br>GROUNDING PLUG (TOOL) (E) | USED FOR GROUNDING ELBOW RECEPTACLES  | S544844      |
| <br>BUSHING PLUG (F)        | USED IN DEADBREAK TRANSFORMER "FLOWER POT" BUSHING WELLS, AND FORMS THE MATING BUSHING FOR THE DEADBREAK ELBOWS                               | S544684      |

**INSTALLATION:**

- A. BEFORE ASSEMBLING BUSHING PLUG, MAKE SURE THE "FLOWER POT" BUSHING WELL IS CLEAR OF ALL CONTAMINANTS.
- B. IF THE ELBOW CONNECTOR IS NOT TO BE IMMEDIATELY ASSEMBLED, REPLACE RED PROTECTIVE SHIPPING CAP. NOTE: THIS IS A PROTECTIVE CAP ONLY, NOT AN INSULATING RECEPTACLE.
- (C) DEADEND RECEPTACLE PROCEDURE:
  1. LUBRICATE PLUG NOSE WITH SILICONE GREASE, (STOCK NUMBER S391424).
  2. REMOVE PROTECTIVE CAP ON RECEPTACLE AND INSERT NYLON ROD.
  3. INSERT PLUG INTO RECEPTACLE.
  4. REMOVE NYLON STRING OR ROD.

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|                 | 200 AMP DEADBREAK ACCESSORIES, 12KV                        |                    |          |                     |          |



**INSTALLATION (CONT'D):****(D) DEADEND PLUG PROCEDURE:**

1. REMOVE PROTECTIVE CAP AND LUBRICATE NOSE OF PLUG WITH SILICONE GREASE, (STOCK NUMBER S391424).
2. PLACE NYLON ROD INTO RECEPTACLE.
3. INSERT PLUG INTO RECEPTACLE.
4. REMOVE NYLON STRING OR ROD.

**(E) GROUNDING PLUG PROCEDURE:**

1. AFTER REMOVING PROTECTIVE CAP AND CLEANING PLUG, LUBRICATE SURFACE WITH SILICONE GREASE, (STOCK NUMBER S391424). ALWAYS REPLACE PROTECTIVE CAP WHEN PLUG IS NOT IN USE.
2. CONNECT SYSTEM GROUND TO CONDUCTOR PROVIDED ON PLUG CARRIAGE ASSEMBLY.
3. ATTACH PLUG CARRIAGE EYE TO HOT STICK.
4. SLIDE CARRIAGE ASSEMBLY ONTO PARKING STAND. THE CARRIAGE CAN BE PUSHED OR PULLED ONTO PARKING STAND DEPENDING ON POSITION OF ELBOWS AND WORK SPACE AVAILABLE.
5. MAKE CAPACITANCE TEST BEFORE REMOVING FROM APPARATUS BUSHING.
6. AFTER PLACING CARRIAGE ON PARKING STAND, REMOVE ELBOW CONNECTOR FROM BUSHING OF THE APPARATUS AND PLACE ON PLUG.
7. APPLY PLUG HOLD DOWN BAIL TO ELBOW BY TURNING BAIL EYE CLOCKWISE WITH HOT STICK.
8. IF ENTIRE ASSEMBLY IS TO BE REMOVED FROM PARKING STAND, ATTACH HOT STICK TO EYE OF CARRIAGE ASSEMBLY, REMOVE FROM PARKING STAND AND PLACE WHERE DESIRED.
9. TO RETURN ELBOW CONNECTOR TO THE APPARATUS BUSHING, SIMPLY REVERSE THE OPERATIONAL SEQUENCE.

**(F) BUSHING PLUG PROCEDURE:**

1. LUBRICATE BASE OF BUSHING WITH LUBRICANT SUPPLIED. (DO NOT SUBSTITUTE.) PLACE THE LUBRICATED PORTION OF THE BUSHING IN THE "FLOWER POT".
2. ROTATE THE BUSHING IN A CLOCKWISE DIRECTION UNTIL THE BUSHING CONTACT BOTTOMS ON THE "FLOWER POT" STUD. (THE CONDUCTIVE LIP ON THE BUSHING SHOULD TOUCH OR BE APPROXIMATELY 1/16" FROM THE "FLOWER POT" FLANGE.)
3. WIPE BUSHING SURFACE CLEAN BEFORE ASSEMBLY WITH ELBOW CONNECTOR.

**BILL OF MATERIALS:** NONE**NOTES:** NONE**REFERENCE:**

- a. STANDARD PRACTICES IN THE CONSTRUCTION MANAGEMENT STANDARD PRACTICE MANUAL MUST BE FOLLOWED IN THESE INSTALLATION PROCEDURES.

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| B   | REVISION   | -   | -  | -   | JLB/RDJ | 1/1/1987   | E   |        |    |    |     |     |      |
| A   | REVISION   | -   | -  | -   | JLB/RDJ | 1/1/1976   | D   |        |    |    |     |     |      |



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**SHEET  
2 OF 2**

SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

200 AMP DEADBREAK ACCESSORIES, 12KV

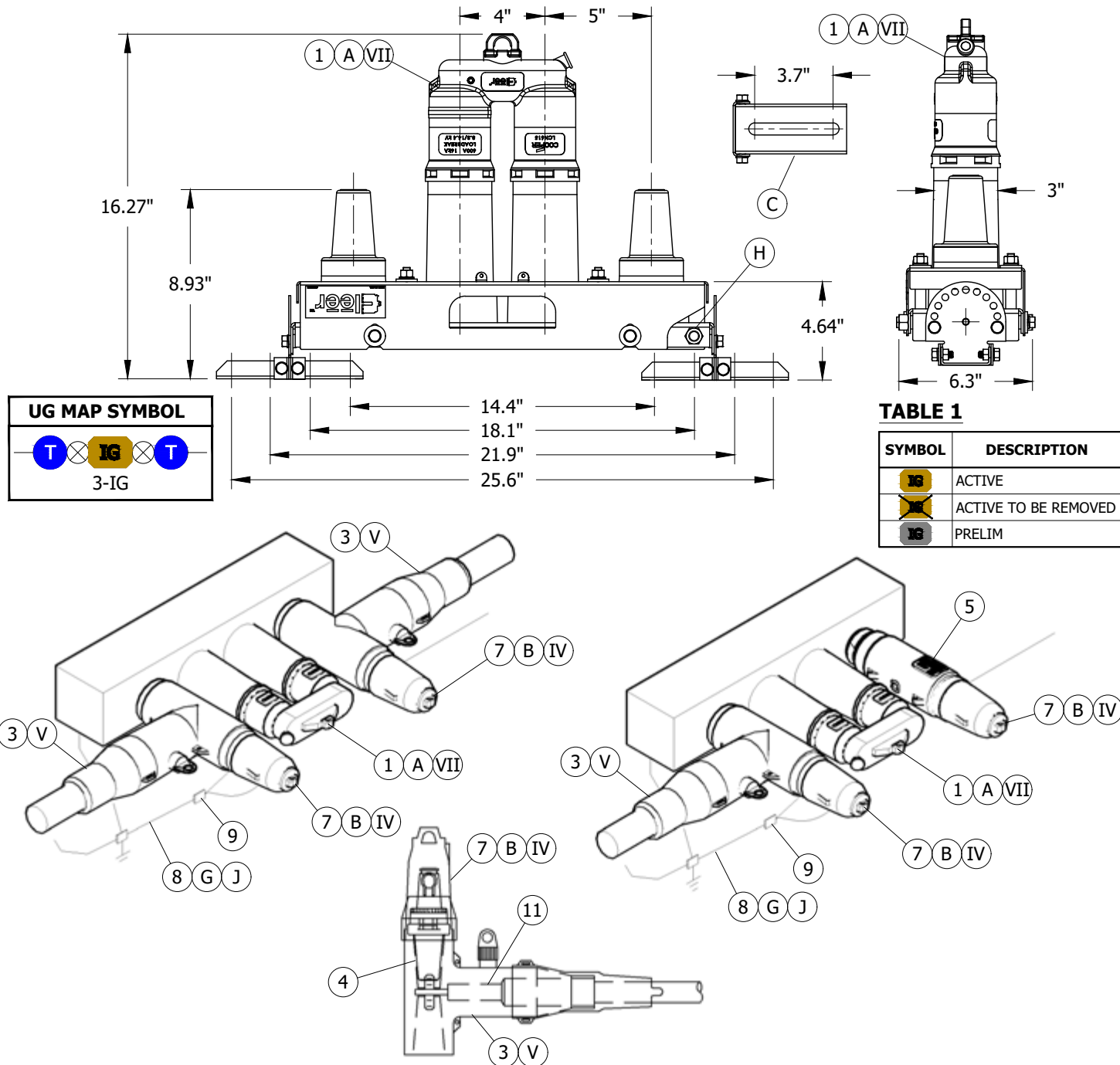
**UG4197.2**



**SCOPE:** THIS STANDARD COVERS THE CLEER, 600 AMP, LIVE LINE TOOL OPERATED, SEPARABLE CONNECTOR.

**CAUTION:**

- \* FEEDER MUST BE DE-ENERGIZED DURING ANY CONSTRUCTION AND INTERCONNECTION WITH THE COOPER CLEER.



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| A   | EDITORIAL CHANGES | -- | DG | JS  | MDJ | 6/27/2017  | D   | COMPLETELY REVISED | --  | DG  | JS  | CZH | 3/18/2019  |

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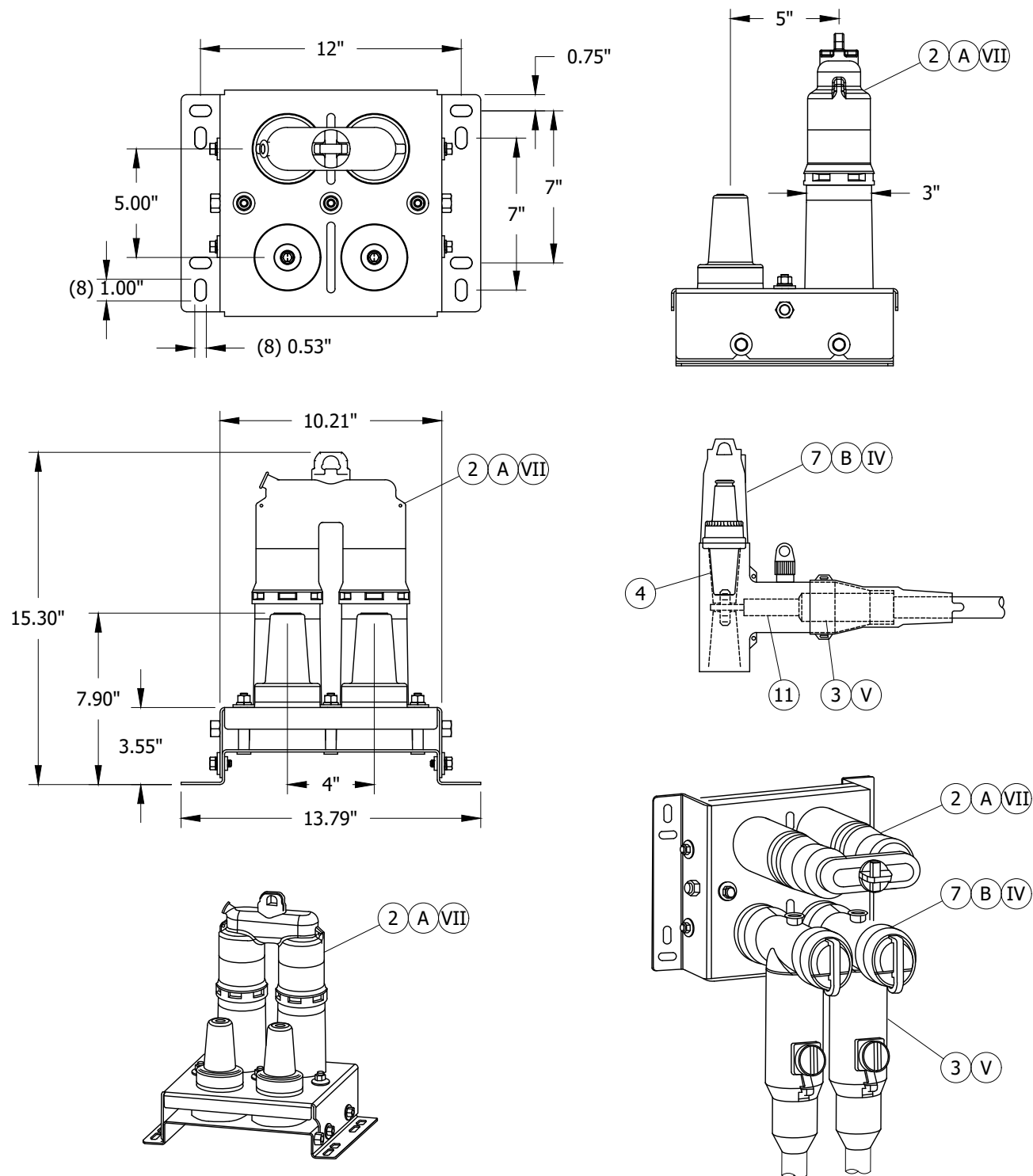
**SHEET**  
**1 OF 5**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

N-JUNCTION CLEER 600A & 25KV SQUARE CLEER 600A 25KV

**UG4198.1**





**FIGURE 2**  
**SQUARE BRACKET**

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

N-JUNCTION CLEER 600A & 25KV SQUARE CLEER 600A 25KV

**UG4198.2**

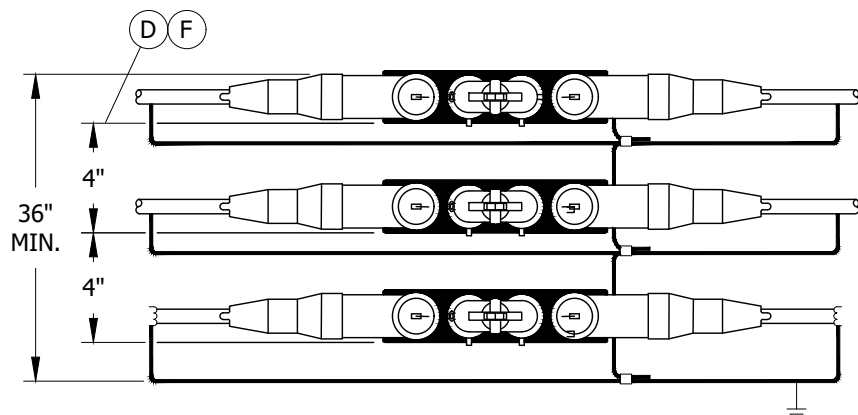




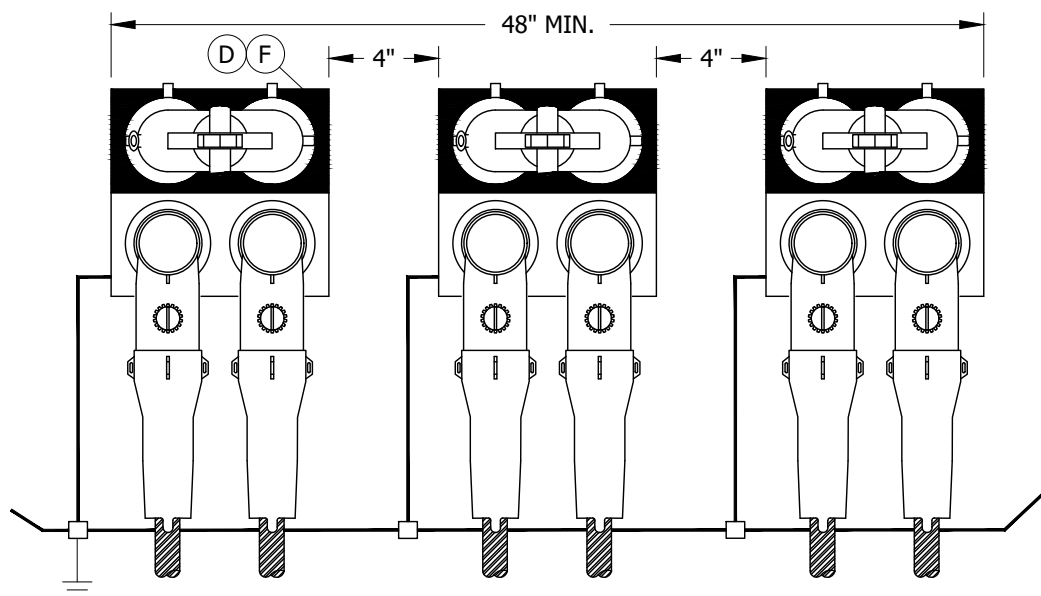
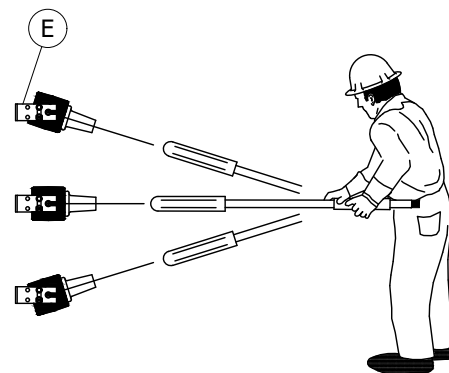
**FIGURE 3**  
INSULATED PROTECTIVE CAP (5) III



**FIGURE 4**  
GROUNDING  
ELBOW  
(10) I



**FIGURE 5**  
IN-LINE BRACKET



**FIGURE 6**  
SQUARE BRACKET

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

N-JUNCTION CLEER 600A & 25KV SQUARE CLEER 600A 25KV

**UG4198.3**



**INSTALLATION:**

- (A) N-JUNCTION CLEER PROVIDES A TEST, GROUND, AND ISOLATION POINT FOR 600 AMP TEE CONNECTIONS.
- (B) N-JUNCTION CLEER INSTALLED WITH THE TEE BODY, ELBOW TAP PLUG, 200 AMP INSULATION RECEPTACLE.
- (C) N-JUNCTION CLEER CAN BE MOUNTED ON A CONCRETE WALL OR UNISTRUT.
- (D) MOUNT UNITS AWAY FROM THE MANHOLE ENTRY AREA.
- (E) N-JUNCTION CLEER CAN BE SET AT A DESIRED ANGLE FOR LIVE LINE TOOL OPERATION.
- (F) MINIMUM HEIGHT NEEDED FOR STACKED 3 IN-LINE CLEER INSTALLATION IS 36 INCHES. MINIMUM VERTICAL SPACING BETWEEN ADJACENT IN-LINE CLEER BRACKET IS 4 INCHES.
- (G) EACH N-JUNCTION CLEER UNIT IS TO BE CONNECTED TO THE SYSTEM GROUND.
- (H) N-JUNCTION CLEER HAS GROUND ATTACHMENT POINTS AND COMES WITH TWO (2) GROUND LUGS (#8 SOL TO 2/0 STRANDED).
- (J) BOND THE LOAD BREAK "C" CONNECTOR TO GROUND.
- K. TORQUE TEE BODY TO MANUFACTURER'S SPECIFICATION OF 50-60 FOOT-POUNDS.
- L. ALL EXISTING CABLE(S) MUST BE RETERMINATED & RECRIMPED TO LAND LUG(S) PROPERLY TO PREVENT UNNECESSARY STRESS TO CABLE(S) WHICH WILL CAUSE PREMATURE FAILURE.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | WIRE SIZE        | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|------------------|----------|---------------|--------------|--------------|
| 1    | JUNCTION BAR, 600A CLEER, 15KV, LOAD BREAK - INLINE | --               | 3        | --            | S439870      | CCL-JB       |
| 2    | JUNCTION BAR, 600A CLEER, 15KV, LOAD BREAK - SQUARE | --               | 3        | --            | S439872      | CCL-SQ       |
| 3    | ELBOW TEE, COLD SHRINK (XII) b                      | 4/0, 350, 500    | 6        | 4189 (FUTURE) | S326572      | 600AT        |
|      |   | 750, 1000        |          |               | S326574      | 600ATL       |
| 4    | ELBOW TAP PLUG                                      | --               | 6        | 4182          | S547328      | L RTP        |
| 5    | CAP, ISOLATION FOR JUNCTION BAR "C" MEMBER (VIII)   | --               | AS REQ'D | --            | S204300      | CL6CAP       |
| 6    | EXTENSION BUSHING, 600 AMP WITH LOAD TAP PLUG       | --               | AS REQ'D | 4182          | S336198      | EXLRTP       |
| 7    | INSULATION RECEPTACLE, 200 AMP                      | --               | 6        | 4180          | S204304      | INSREC       |
| 8    | WIRE, BARE COPPER, #2, 7 STRANDED, SOFT DRAWN       | --               | AS REQ'D | 4002.3        | S812818 (X)  | GDWIRE       |
| 9    | CONNECTOR, COPPER, COMPRESSION                      | --               | AS REQ'D | 4172          | --           | --           |
| 10   | JUMPER GROUNDING FOR JUNCTION BAR "C" MEMBER (VIII) | --               | AS REQ'D | --            | --           | --           |
| 11   | CONDUCTOR CONNECTOR                                 | 4/0, 350 AND 500 | AS REQ'D | --            | S471314      | P6ALR3       |
|      |   | 750 AND 1000     |          |               | S471316      | P6ALR5       |

**NOTES:**

- (I) GROUNDING WITH THE N-JUNCTION CLEER REQUIRES A 600 AMP LOAD BREAK GROUNDING ELBOW (S493780).
- II. N-JUNCTION CLEER IS FULLY SHIELDED AND FULLY SUBMERSIBLE.
- (III) THE N-JUNCTION CLEER CAN BE FULLY ISOLATED USING THE 600 AMP LOAD BREAK PROTECTIVE CAP (S204300). ALL BUSHINGS OF THE CONNECTOR SYSTEM ARE THEN INSULATED AND DEADFRONT.
- (IV) NO LOAD SHALL BE CONNECTED TO THE 200 AMP TEST POINT.
- (V) NO STACKING OF TEES ALLOWED ON THE N-JUNCTION CLEER UNITS.
- VI. BATTERY-OPERATED EQUIPMENT IS NOT TO BE USED WHEN TORQUING REQUIREMENTS EXIST.
- (VII) ALTHOUGH THIS DEVICE IS RATED AS A 600amp LOAD BREAK DEVICE, SDG&E WILL ONLY PERFORM OPERATIONS WHEN DE-ENERGIZED.

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**4 OF 5**

SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

N-JUNCTION CLEER 600A &amp; 25KV SQUARE CLEER 600A 25KV

UG4198.4



**NOTES (CONT'D):**

- (VIII) WILL NEED SIX (6) GROUNDING JUMPERS (S439780) AND SIX (6) ISOLATION CAPS (S204300) FOR EACH INSTALLATION. AS THESE ARE REUSABLE (CHECKED IN/OUT) WILL MONITOR FOR MIN/MAX NEEDS AS NEEDED.
- IX. FEEDER MUST BE DE-ENERGIZED DURING ANY CONSTRUCTION AND INTERCONNECTION WITH THE COOPER CLEER. THIS CONNECTION MAY BE PLACED IN WALK-IN VAULTS AND MANHOLES TO CREATE A VISIBLE OPEN IN THE 600 AMP UNDERGROUND SYSTEM. IT CAN BE INSTALLED DURING OUTAGES TO RESTORE PARTIAL SERVICE BY OPENING TEE'S; SEPARATING TEE'S DURING OUTAGES CAN BE FOUND IN ELECTRIC STANDARD PRACTICE 222 SECTION 4.5.3 FOR PARTIAL RESTORATION. IN THE PLANNING AND DESIGN PHASE, THE CONNECTION MAY BE PLACED IN MANHOLES ON LONG, CONTINUOUS RUNS TO SUPPLY A MANUAL, STICK-OPERABLE, DISCONNECT POINT. PLACEMENT WILL ALSO INCLUDE EVERY OTHER MANHOLE AND VAULT BETWEEN SECTIONALIZING DEVICES.
- (X) THIS ITEM IS EXEMPT.
- XI. DESIGN SCOPE SHOULD INCLUDE VAULTS AND MANHOLES THAT HAVE SUFFICIENT SPACE AND LENGTH TO OPERATE WITHIN THE STRUCTURE. 3325, 3326, AND 3327 (TRANSMISSION SUBSTRUCTURE NEAR SUBSTATIONS GENERALLY) MANHOLES SHOULD HAVE SUFFICIENT SPACE (4198.4). 3322, 3324 (BOTH TYPES), AND 3399 MANHOLES WILL REQUIRE APPROVAL FROM EDE DEPENDING ON THE LAYOUT OF THE SUBSTRUCTURE.
- (XII) ELBOW TEE S326589 IS FMO ONLY.

**REFERENCE:**

- a. PARTIAL RESTORATION, SEE ELECTRIC STANDARD PRACTICE 222.
- (b) SEE UG4189 (FUTURE) FOR COLD SHRINK ELBOW TEE WITH INTEGRATED CABLE ADAPTER.

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS   |                           |                    |          |                     |          |
|                 | N-JUNCTION CLEER 600A & 25KV SQUARE CLEER 600A 25KV |                           |                    |          |                     |          |







4200 - CABLE POLES



4200 - CABLE POLES



**PAGE****SUBJECT**

|      |  |
|------|--|
| 4201 | TABLE OF CONTENTS  |
| 4202 | STANDARD JOINT CABLE POLE RISER POSITIONS USING LADDER ARM BRACKETS AND RISER(S)                               |
| 4203 | POLE QUADRANT AND RISER IDENTIFICATION   |
| 4204 | CABLE POLE RISER INSTALLATION  |
| 4205 | INSTALLATION OF PERMANENT POLE STEPS   |
| 4206 | GENERAL INFORMATION - 12.47KV & BELOW CABLE POLES  |
| 4214 | 0-750V UNDERGROUND SERVICE FROM AN OVERHEAD LINE   |
| 4218 | 12.47KV AND BELOW CROSSARM CABLE POLE, THREE-PHASE NON-PORCELAIN TERMINALS, LINE AND BUCK                      |
| 4230 | VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE 12-12.47KV, THREE PHASE INSTALLATION                           |
| 4235 | CABLE POLE MVI / MVS 200 / 600 AMP CABLE POLE APPLICATION  |
| 4240 | 12.47KV AND BELOW CROSSARM CABLE POLE, THREE-PHASE, I/C PER PHASE, NON-PORCELAIN TERMINATION                   |
| 4242 | THREE-PHASE, CABLE POLE, 12KV, NON-PORCELAIN 900 AMP DISCONNECT  |
| 4244 | POLE TOP SWITCH 12KV RISER LOADBREAKER TYPE SINGLE CIRCUIT   |
| 4247 | 12.47KV AND BELOW CABLE POLE, THREE-PHASE, 1/C PER PHASE, ALLEY ARM CONSTRUCTION                               |
| 4251 | 12.47KV AND BELOW DEADEND CABLE POLE, 6 OR 7 OH CONDUCTORS, 1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED |
| 4252 | ELASTIMOLD MVR SWITCH AND SCADA 651R2 CONTROLLER CABLE POLE  |

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| C   | 4232 MOVED TO FMO | -  | JK | JS  | CZH | 03/18/2019 | F   | EDITORIAL CHANGES | GLC | JK  | JES | CZH | 10/12/2020 |
| B   | UPDATES TO 4205   | -  | JS | JS  | MDJ | 06/27/2017 | E   | EDITORIAL CHANGES | EDM | DWC | JES | CZH | 03/09/2020 |
| A   | UPDATES TO 4240   | -  | GW | JS  | MDJ | 10/25/2016 | D   | EDITORIAL CHANGES | -   | MRF | JES | CZH | 07/16/2019 |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

**CABLE POLES  
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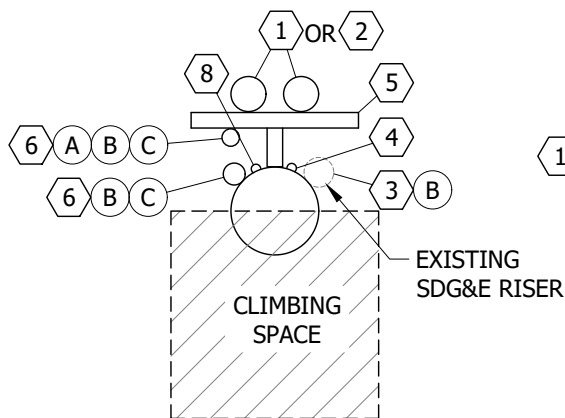
**UG4201.1**



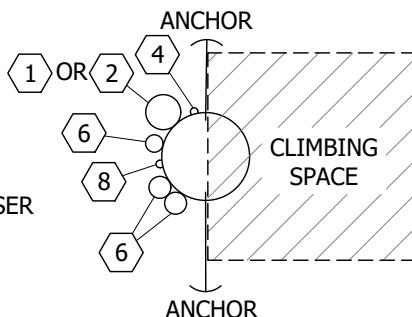




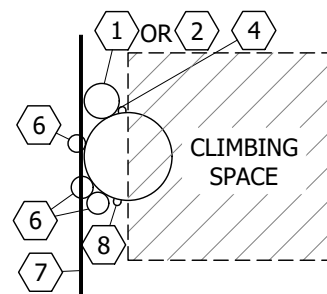
**SCOPE:** THIS STANDARD SHOWS NORMAL CABLE POLE RISER POSITIONS FOR SDG&E, AND COMMUNICATIONS COMPANIES.



**FIGURE 1**  
DEAD END OR  
(V) THROUGH CONSTRUCTION  
MULTIPLE RISER



**FIGURE 2**  
DEAD END CONSTRUCTION  
SINGLE POWER RISER



**FIGURE 3**  
THROUGH CONSTRUCTION  
SINGLE POWER RISER

**TABLE 1**

| TITLE |                                     |
|-------|-------------------------------------|
| ITEM  | DESCRIPTION                         |
| 1     | SDG&E PRIMARY RISER                 |
| 2     | SDG&E SECONDARY RISER               |
| 3     | SDG&E EXISTING RISER                |
| 4     | SDG&E ELECTRIC GROUND               |
| 5     | BRACKET, LADDER ARM ASSEMBLY        |
| 6     | COMMUNICATION RISER STATION         |
| 7     | COMMUNICATION TANGENT THRU POSITION |
| 8     | COMMUNICATION GROUND                |

### INSTALLATION:

- (A) COMMUNICATIONS ONLY POINT OF ATTACHMENT FOR LADDER ARM BRACKET CONSTRUCTION SHALL BE ON THE BACKSIDE OF LADDER ARM BRACKET ASSEMBLY. GALVANIZED UNISTRUT PIPE CLAMPS SHALL BE USED TO SECURE THE CONDUIT. COMMUNICATIONS MAY ATTACH ON THE BACK OF THE LADDER ARM ASSEMBLY ALONGSIDE SDG&E'S RISER. LADDER ARMS MAYBE INSTALLED BY COMMUNICATIONS COMPANY PROVIDED THEY ARE INSTALLED PER SDG&E CONSTRUCTION STANDARDS AND MEET SDG&E MATERIAL SPECIFICATIONS.
- (B) FOR NEW CONSTRUCTION WITH AN EXISTING SDG&E RISER ON THE POLE (FIGURE 3), ONE THREE-INCH RISER MAX. ON THE POLE AND ONE THREE-INCH RISER MAX. ON THE BACKSIDE OF THE LADDER ARM BRACKET ARE PERMITTED BACK TO BACK.
- (C) WHEN A LADDER ARM IS EXISTING, AND THE BACK OF LADDER ARM POSITIONS AND POLE POSITIONS ON COMMUNICATIONS SIDE OF POLE ARE OCCUPIED, ADDITIONAL COMMUNICATIONS RISERS MUST BE PLACED ON ANOTHER POLE.

**BILL OF MATERIALS:** NONE

### NOTES:

- I. 1/2 POLE CLIMBING SPACE APPLIES TO A LEVEL 4 FEET BELOW THE LOWEST LEVEL OF FACILITIES. COMMUNICATIONS, SECONDARY, PRIMARY, ETC., SEE OVERHEAD STANDARD SECTION 200 FOR CLIMBING SPACE REQUIREMENTS.
- II. CHANGES TO THESE STANDARD RISER POSITIONS MUST NOT REDUCE THE CLIMBING SPACE TO LESS THAN 1/2 POLE.
- III. CONDUIT RISER AT BASE OF POLE NOT TO INFRINGE ON CURB OR SIDEWALK POSITIONS.
- IV. SPARE CONDUITS ARE NOT CONSIDERED AS RISERS.
- (V) NEW CONSTRUCTION WITH EXISTING SDG&E RISER.

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| C   | DRAWING UPDATE | EDM | JAC | GLW | CZH | 02/10/2021 | F   |        |    |    |     |     |      |
| B   | DRAWING UPDATE | PEI | -   | -   | -   | 02/18/2019 | E   |        |    |    |     |     |      |
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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

STANDARD JOINT CABLE POLE RISER POSITIONS  
USING LADDER ARM BRACKETS AND SINGLE RISER

OH1402.1  
UG4202.1



**REFERENCE:**

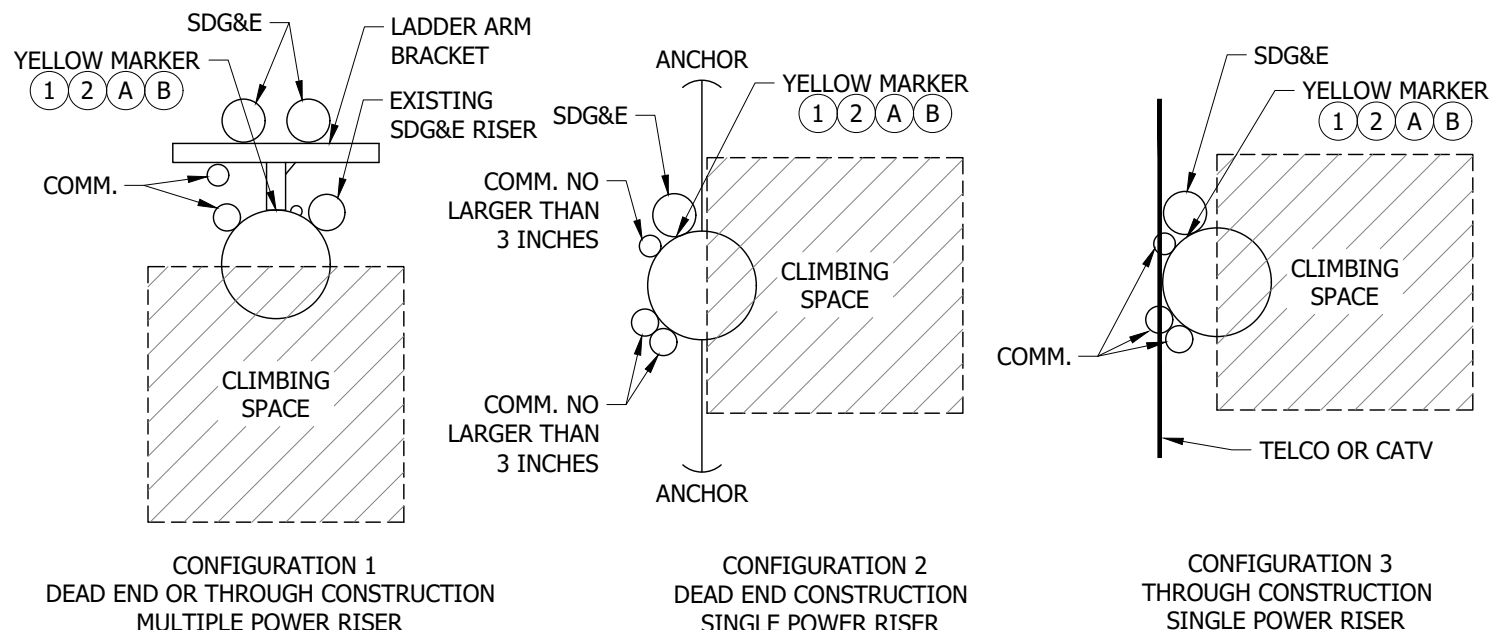
- a. PVC RISERS ARE NOT PERMITTED WITHIN THE CLIMBING SPACE PER G.O. 95 RULE 22.2C.
- b. NO C.A.T.V. OR TELCO JUMPERS ALLOWED IN CLIMBING SPACE PER G.O. 95 RULE 84.7.
- c. SEE OVERHEAD STANDARDS SECTION 200 FOR ALLOWABLE G.O. 95 CLIMBING SPACE OBSTRUCTIONS.
- d. SEE OH363UG4205 FOR INSTALLATION OF POLE STEPS.
- e. SEE OH1403UG4203 FOR POLE QUADRANT AND RISER IDENTIFICATION.
- f. SEE STANDARD OH1404UG4204 WHEN INSTALLING A SINGLE RISER, MODIFYING EXISTING CABLE POLE TO INCLUDE SECOND RISER OR FOR MULTIPLE CONDUIT RUNS AND JOINT POLE INSTALLATION.
- g. SEE UG4620 FOR TELECOMMUNICATION INSTALLATION.

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| C               | DRAWING UPDATE | EDM   | JAC                       | GLW | CZH | 02/10/2021         | F   |          |    |                     |     |     |      |                      |
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| A               | ORIGINAL ISSUE | -   | -                         | PTA | RDG | 01/01/1996         | D   |          |    |                     |     |     |      |                      |
| SHEET<br>2 OF 2 |                | X   | Indicates Latest Revision |     |     | Completely Revised |     | New Page |    | Information Removed |     |     |      | OH1402.2<br>UG4202.2 |
|                 |                | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS                          |                           |     |     |                    |     |          |    |                     |     |     |      |                      |
|                 |                | STANDARD JOINT CABLE POLE RISER POSITIONS<br>USING LADDER ARM BRACKETS AND SINGLE RISER |                           |     |     |                    |     |          |    |                     |     |     |      |                      |



**SCOPE:** THIS STANDARD SHOWS CABLE POLE RISER LOCATIONS, SDG&E QUADRANT AND SIGNS FOR MARKING POLE RISER INSTALLATIONS.



**FIGURE 1**  
IDENTIFYING CABLE POLE RISER LOCATION

**INSTALLATION:**

- (A) NAIL THE SIGN TO THE RISER POLE APPROXIMATELY 5 FEET ABOVE GROUND WITH THE PROPER SIDE SHOWING.
- (B) USE ONE MARKER TO SHOW SDG&E RISER LOCATION.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                 | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|-----------------------------|----------|---------------|--------------|--------------|
| 1    | MARKER, YELLOW PLASTIC SIGN | 1        | 1403/4203     | S476312      | --           |
| 2    | NAILS, GALV., 1 3/4"        | AS REQ'D | --            | S492192      | --           |

**NOTES:** NONE

**REFERENCE:**

- a. SEE OH1402UG4202 FOR STANDARD JOINT CABLE POLE RISER POSITIONS.
- b. SEE OH1404UG4204 FOR CABLE POLE RISER INSTALLATION.

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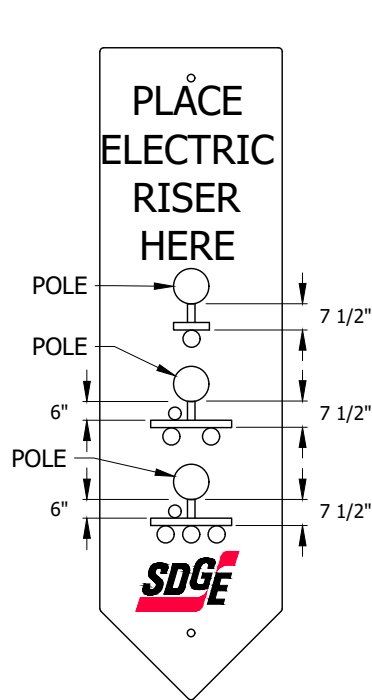
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

POLE QUADRANT AND RISER IDENTIFICATION

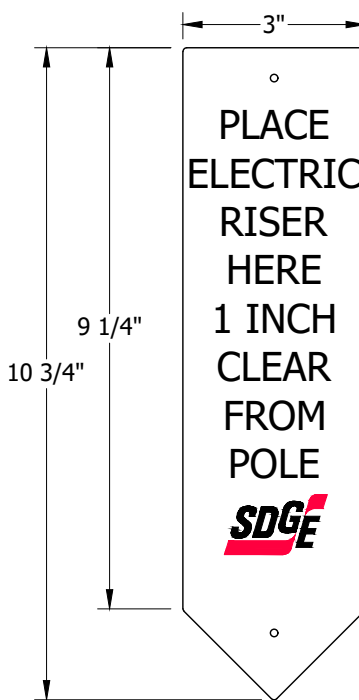
OH1403.1  
UG4203.1



**SCOPE:** THIS STANDARD SHOWS THE SIGN USED FOR MARKING POLE RISER INSTALLATIONS.



**FIGURE 1**  
PREFERRED CONSTRUCTION (A)  
FRONT



**FIGURE 1**  
ALTERNATE CONSTRUCTION (B)  
REVERSE

**INSTALLATION:**

- (A) USE THE SIDE OF THE SIGN STATING "PLACE ELECTRIC RISER HERE" (FRONT), WHEN LADDER ARM BRACKETS ARE INSTALLED.
- (B) FOR ALTERNATE CONSTRUCTION USE THE SIDE OF THE SIGN STATING "PLACE ELECTRIC RISER HERE 1-INCH CLEAR FROM POLE" REVERSE, WHEN A SINGLE CONDUIT IS INSTALLED.
- C. REMOVE SIGN WHEN POLE RISER(S) IS INSTALLED.

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. SIGN IS AVAILABLE TO MARK SDG&E RISER LOCATIONS ON CABLE. THE SIGN STOCK NUMBER S476312 IS MADE OF FLEXIBLE PLASTIC, WITH RAISED LETTERING ON EACH SIDE. SIGNS ARE TO BE ATTACHED TO POLES WITH 1 3/4 INCH NAILS STOCK NUMBER S492192.
- II. "PLACE ELECTRIC RISER HERE SHOWING 3 POLE RISER POSITIONS, SDG&E" IS PRINTED ON FRONT SIDE.
- III. "PLACE ELECTRIC RISER HERE 1-INCH CLEAR FROM POLE, SDG&E" ON THE REVERSE SIDE.
- IV. WHEN THE RISER LOCATION HAS BEEN DETERMINED, THE SIGNS ARE TO BE PLACED ON THE POLE, APPROXIMATELY 5 FEET ABOVE GROUND LEVEL BY THE CUSTOMER PROJECT PLANNER, PROJECT COORDINATOR, GENERAL FOREMAN, INSPECTOR OR WORKING FOREMAN SETTING THE POLE. RISER LOCATIONS ARE SHOWN ON OH1402UG4202.

**REFERENCE:**

- a. SEE OH1403UG4203 FOR POLE QUADRANT AND RISER IDENTIFICATION
- b. SEE OH1404/UG4204 FOR CABLE POLE RISER INSTALLATION.

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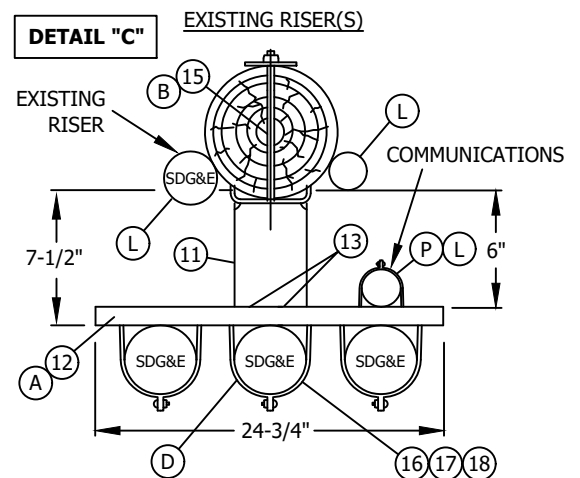
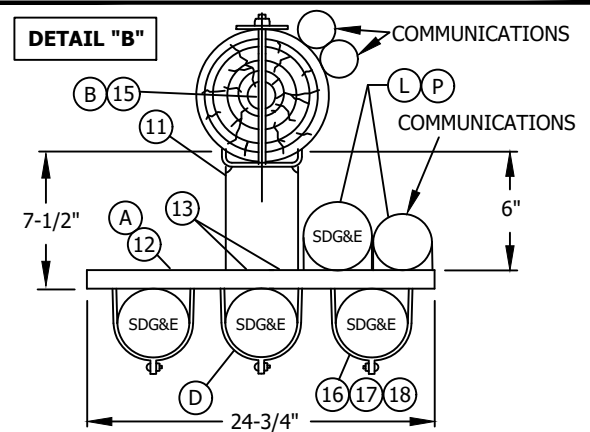
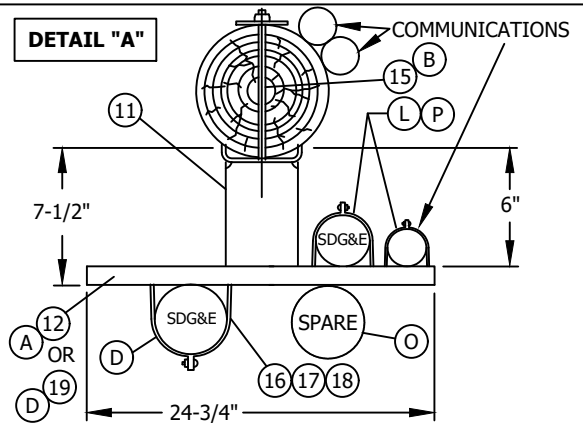
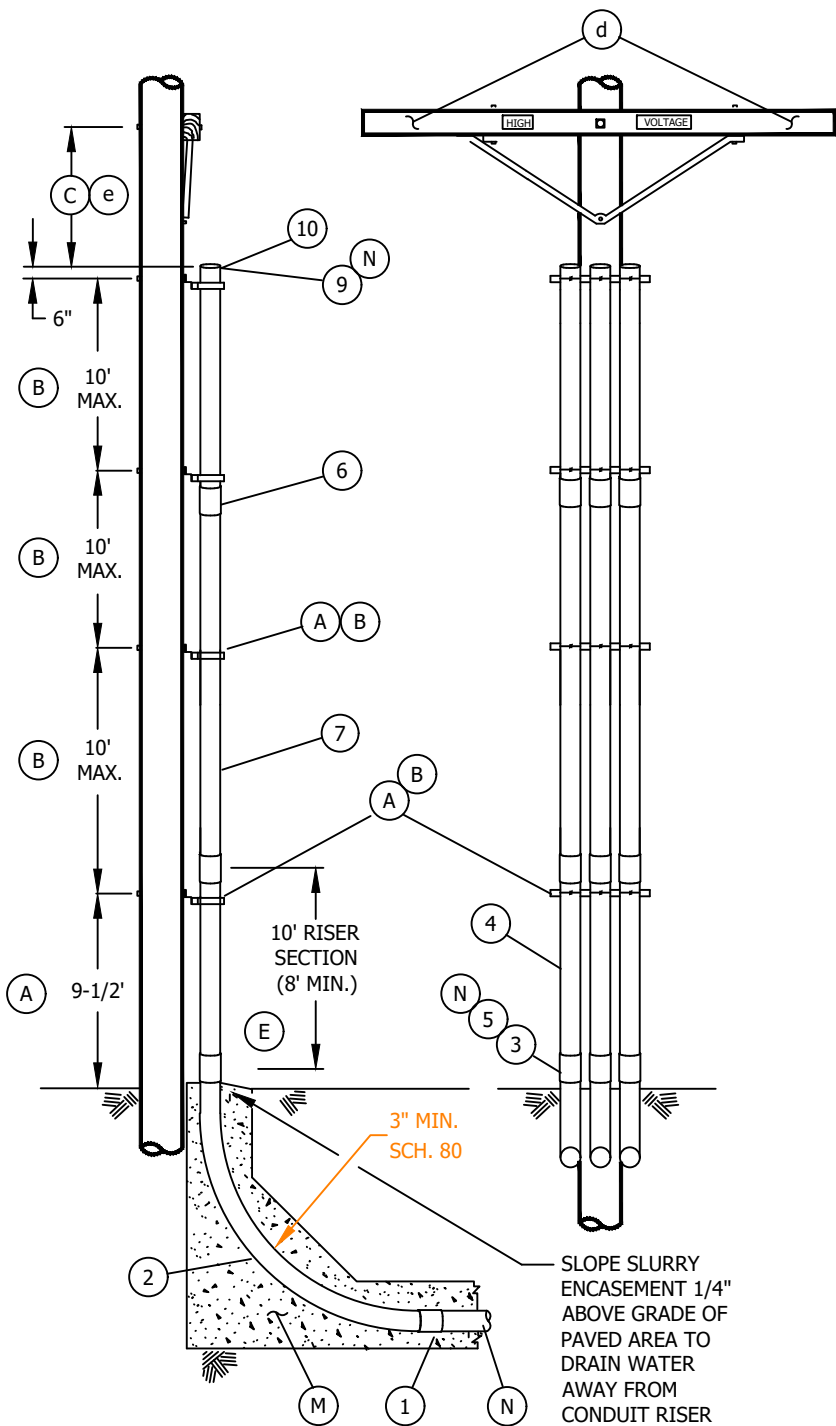
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

POLE QUADRANT AND RISER IDENTIFICATION

OH1403.2  
UG4203.2



**SCOPE:** THIS STANDARD SHOWS NEW CONSTRUCTION FOR SINGLE AND MULTIPLE CONDUIT RISERS.



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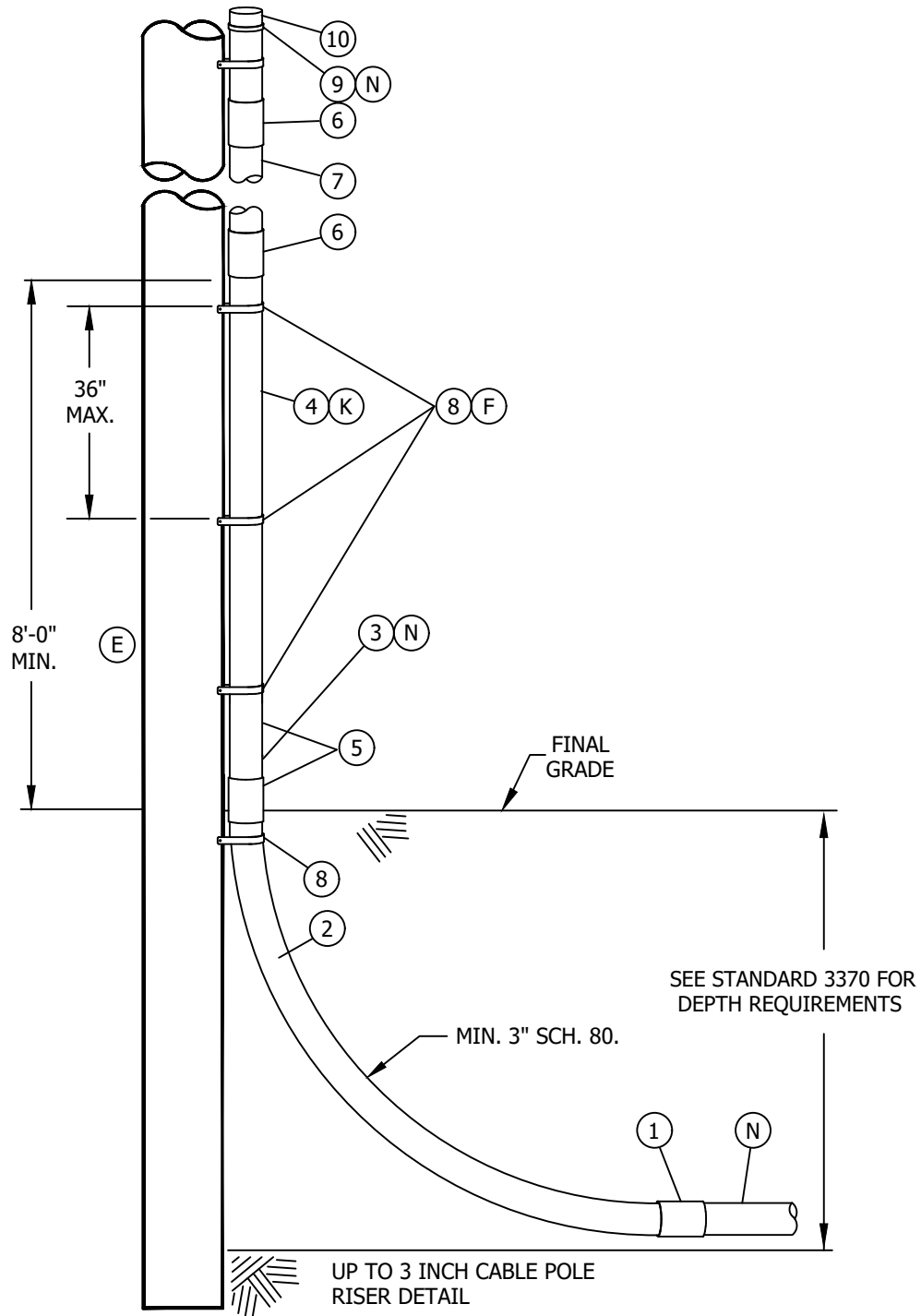
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

CABLE POLE RISER INSTALLATION

OH1404.1  
UG4204.1



**DETAIL "D"**



**ALTERNATE NEW CONSTRUCTION  
FOR ONE RISER (SEE NOTE (K) )**

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

CABLE POLE RISER INSTALLATION

**OH1404.2  
UG4204.2**



(A) **MOUNT FIRST BRACKET LADDER ARM NO LOWER THAN 9'-1/2 FEET.** IF THE FIRST BRACKET EXTENDS TOWARD A STREET OR DRIVEWAY, OFFSET THE UNISTRUT CHANNEL TO CLEAR LARGE VEHICLES.

(B) INSTALL AT LEAST ONE LADDER ARM BRACKET FOR EACH COUPLING JOINT OF CONDUIT - 10' MAX. DISTANCE BETWEEN BRACKETS. **ALL LADDER ARM BRACKETS ARE TO BE ATTACHED TO THE POLE WITH BOLTS, NOT LAG SCREWS.**

(C) REFER TO INDIVIDUAL CABLE POLE STANDARD FOR CORRECT MEASUREMENT.

(D) CENTER CONDUIT POSITION SHALL BE USED FOR MULTIPLE SDG&E SECONDARY RUNS OR SDG&E TELECOMMUNICATION CONDUIT. OTHER CONDUIT POSITIONS ON THE FRONT OF THE BRACKET SHALL BE USED FOR A SINGLE OR DOUBLE CONDUIT. THE 8 INCH UNISTRUT CHANNEL (ITEM 19) MAY BE INSTALLED FOR A SINGLE RISER WHERE NO COMMUNICATIONS IS ANTICIPATED.

(E) RISERS OF PLASTIC CONDUIT SHALL BE EPC-80 PVC SCHEDULE 80, FROM THE GROUND LINE TO A LEVEL NOT LESS THAN 8 FEET ABOVE THE GROUND LINE PER G.O. 95 RULE 54.6-E AND SDG&E CONDUIT SIZING REQUIREMENTS.

(F) FOR SINGLE RISER CONSTRUCTION, SEPARATION OF PIPE STRAPS (ITEM 8) SHALL BE 3 FEET MAXIMUM.

(G) USE DETAIL "A" ON PAGE 1404.1/4204.1: **(PREFERRED CONSTRUCTION FOR A SINGLE RISER)**

1. WHEN INSTALLING A SINGLE RISER.
2. WHEN ADDING A SINGLE RISER TO AN EXISTING RISER POLE. AN EXISTING SINGLE SDG&E RISER WOULD REMAIN ON THE POLE UNLESS IT IS CREATING A G.O. 95 INFRACTION. IF AN INFRACTION EXISTS, MOVE THE EXISTING RISER TO THE LADDER ARM BRACKET ALONG WITH THE NEW RISER SHOWN IN DETAIL "B".

(H) USE DETAIL "B" ON PAGE 1404.1/4204.1:

- WHEN INSTALLING MORE THAN ONE RISER.

(J) USE DETAIL "C" ON PAGES 1404.1/4204.1:

- WHEN ADDING A RISER(S) TO AN EXISTING SDG&E RISER POLE. AN EXISTING SINGLE SDG&E RISER WOULD REMAIN ON THE POLE UNLESS IT IS CREATING A G.O. INFRACTION. IF AN INFRACTION EXISTS, MOVE THE EXISTING RISER TO THE LADDER ARM BRACKET..

(K) USE DETAIL "D" ON PAGE 1404.2/4204.2: **(ALTERNATE CONSTRUCTION FOR A SINGLE RISER)**

1. FIELD CONDITIONS DO NOT ALLOW ROOM FOR LADDER ARM BRACKETS, (I.E. CONDUIT WOULD EXTEND INTO THE STREET, SIDEWALK, DRIVEWAY, ETC.). THIS INSTALLATION WOULD BE LIMITED TO ONE SDG&E RISER, UP TO 3" (NO OTHER RISER(S) LARGER THAN 3 INCH WOULD BE ON THE POLE). ONE HALF OF THE POLE MUST REMAIN CLEAR FOR CLIMBING SPACE AND G.O. REQUIREMENTS MUST BE FOLLOWED.
2. WHEN AN EXISTING RISER IS ALREADY ON THE POLE AND IT MAY BE RE-USED. (I.E. REMOVING A STREET LIGHT FUSE BOX FROM A POLE AND NEW CONDUIT WILL CONNECT TO THE EXISTING CONDUIT WHERE THE FUSE BOX WAS LOCATED, CUSTOMER RE-WIRE JOB, ETC.).

(L) ONE RISER ON THE POLE 3 INCH MAX. AND ONE RISER ON THE BACK SIDE OF THE LADDER ARM BRACKET 3 INCH MAX. ARE PERMITTED BACK-TO-BACK. A MAXIMUM OF TWO 4 INCH COMMUNICATIONS RISERS ARE PERMITTED ON THE BACK SIDE OF A LADDER ARM ASSEMBLY. **THE ADJACENT POLE QUADRANT MUST BE VACANT TO INSTALL ANY 4 INCH RISER ON THE BACK OF THE LADDER ARM BRACKET, AND MUST REMAIN VACANT AFTER INSTALLATION.**

(M) SLURRY ENCASEMENT IS REQUIRED AROUND THE ELBOW(S) FOR 5 INCH PRIMARY CONDUIT(S).

(N) EACH CONDUIT RUN BETWEEN SUBSTRUCTURES, PADS, CUSTOMER SERVICE RISERS, ETC., SHALL BE ONE SIZE CONDUIT CONTINUOUSLY, I.E. NO REDUCERS ARE ALLOWED WITHIN A CONDUIT RUN EXCEPT WHERE THE CONDUIT ENTERS A SUBSTRUCTURE OR ABOVE GROUND LEVEL ON A RISER POLE. IF A 3 INCH RISER IS ALREADY INSTALLED AND THE GRIP SIZE REQUIRES A 2 INCH RISER, A 2" TO 3" REDUCER MAY BE USED TO ACCOMMODATE THE GRIP. THE SAME WOULD APPLY TO OTHER SIZE CONDUITS AS HAS BEEN DESCRIBED. GRIPS ARE NOT REQUIRED ON SECONDARY RISERS.

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS |                           |                    |          |                     |                      |
|                 | CABLE POLE RISER INSTALLATION                     |                           |                    |          |                     |                      |



## ① SPARE CONDUITS

1. WHEN REQUESTED BY A CUSTOMER AT HIS OWN EXPENSE, BUT NOT TO EXCEED CONDUIT LIMITATIONS IN THIS STANDARD.
2. WHEN IT IS ECONOMICAL TO INSTALL CONDUIT IN LIEU OF CONCRETE, BUT NOT TO EXCEED
3. BASED ON FUTURE CONSTRUCTION LIMITATIONS SUCH AS BENEATH BRIDGES, ROADWAYS AND RAILROAD TRACKS, BUT NOT TO EXCEED CONDUIT LIMITATIONS IN THIS STANDARD.
4. IN CONVERSION OR NEW BUSINESS PROJECTS TO ALLOW EASY BYPASS OF THE POLE DURING REMOVAL. CONDUITS INSTALLED FOR THIS PURPOSE SHALL NOT GO UP THE POLE BUT, RATHER, SHALL EXTEND PAST THE POLE A MINIMUM OF 6 FEET.

THE TERM "FUTURE SPARE CONDUIT" REFERS TO AN EMPTY CONDUIT SPECIFIED BY EITHER THE PLANNER OR DISTRIBUTION PLANNING FOR AREAS WITH GROWTH POTENTIAL. FUTURE FEEDER CONDUIT SPECIFIED BY DISTRIBUTION PLANNING MUST BE SUPPORTED BY THE LONG TERM FEEDER ARRANGEMENT PLAN.

(P) COMMUNICATIONS ONLY POINT OF ATTACHMENT FOR LADDER ARM BRACKET CONSTRUCTION SHALL BE ON **THE BACK SIDE OF THE ARM BRACKET ASSEMBLY**, (GALVANIZED UNISTRUT PIPE CLAMPS SHALL BE USED TO SECURE THE CONDUIT). COMMUNICATIONS MAY ATTACH ON THE BACK OF THE ASSEMBLY ALONGSIDE SDG&E'S RISER.

| ITEM | DESCRIPTION  | QUANTITY | STOCK NUMBER   | ASSEMBLY UNITS             |
|------|--|----------|--|----------------------------|
| 1    | COUPLING, (SIZE AS REQUIRED)   | AS REQ'D | 3"__279904<br>4"__279936<br>5"__280032                   | -<br>-<br>-                |
| 2    | CONDUIT RISER BEND, SCHEDULE 80 (SIZE AS REQUIRED)   | AS REQ'D | 3"__36" R_322472<br>4"__48" R_322480<br>5"__48" R_322488 | 3"CP-B<br>4"CP-B<br>5"CP-B |
| 3    | REDUCER, PVC, SCHEDULE 80, (SIZE AS REQUIRED)  | AS REQ'D | 4"__TO 3" 573408<br>5"__TO 4" 573424                     | 4-3RED<br>5-4RED           |
| 4    | CONDUIT RISER, PVC, SCHEDULE 80, (SIZE AS REQUIRED)  | AS REQ'D | 3"__251552<br>4"__251584<br>5"__251592                   | S80-3"<br>S80-4"<br>S80-5" |
| 5    | COUPLING, PVC, SCHEDULE 80   | AS REQ'D | 3"__280544<br>4"__280576<br>5"__280592                   | -<br>-<br>-                |
| 6    | COUPLING, PVC, SCHEDULE 40, (SIZE AS REQUIRED)   | AS REQ'D | 3"__280448<br>4"__280480<br>5"__280496                   | -<br>-<br>-                |
| 7    | CONDUIT, PVC, SCHEDULE 40, (SIZE AS REQUIRED)  | AS REQ'D | 3"__251360<br>4"__251392<br>5"__251408                   | S40-3"<br>S40-4"<br>S40-5" |
| 8    | STRAP, PIPE, GALVANIZED, 2-16d NAILS, GALVANIZED (SINGLE RISER CONSTRUCTION, 4" AND SMALLER) | AS REQ'D | 3"__697920<br>4"__697952<br>5"__697984                   | -<br>-<br>-                |

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS |                           |                    |          |                     |                      |
|                 | CABLE POLE RISER INSTALLATION                     |                           |                    |          |                     |                      |



**BILL OF MATERIALS (CONT'D):**


| ITEM | DESCRIPTION  | QUANTITY | STOCK NUMBER      |             |                | ASSEMBLY UNITS |
|------|--|----------|-------------------|-------------|----------------|----------------|
| 9    | GRIP, CABLE SIZE AS REQUIRED FOR PRIMARY RISERS ONLY. (GRIPS ARE NOT REQUIRED ON SECONDARY RISERS) (N) | AS REQ'D | CONDUIT           | AL CABLE    | GRIP STOCK NO. |                |
|      |  |          | 3"                | 1/C#2 SOL   | 393984         | 2G1#2A         |
|      |  |          | 3"                | 2-1/C#2 SOL | 394048         | 3G2#2A         |
|      |  |          | 3"                | 3-1/C#2 SOL | 394048         | 3G3#2A         |
|      |  |          | 4"                | 3-1/C#2 SOL | 394104         | 4G3#2A         |
|      |  |          | 4"                | 3-1/C#2 SOL | 394080         | 4G#2/0         |
|      |  |          | 4"                | 350KCMIL    | 394100         | 4G-350         |
|      |  |          | 5"                | 350KCMIL    | 394102         | 5G-350         |
|      |  |          | 5"                | 750 KCMIL   | 394096         | 5G-750         |
|      |  |          | 5"                | 1000 KCMIL  | 394098         | 5G1000         |
|      |  |          | CONDUIT           | AL CABLE    | GRIP STOCK NO. |                |
|      |  |          | 4"                | 4/0         | 394080         | 4G4/0C         |
|      |  |          | 5"                | 500 KCMIL   | 394096         | 5G500C         |
| 10   | PROTECTOR, NYLON CABLE   | AS REQ'D | S558720           |             |                | -              |
| 11   | BRACKET, LADDER ARM (B)  | AS REQ'D | S167184           |             |                | LA-ARM         |
| 12   | CHANNEL, DOUBLE, GALV. 24-3/4" x 7/8" x 2-3/4" (B)   | AS REQ'D | S216700           |             |                |                |
| 13   | NUT, CLAMPING CHANNEL, W/SPRING, 1/2"  | AS REQ'D | S503488           |             |                | -              |
| 14   | CLAMP, PIPE, STEEL, GALV., UNISTRUT, 2"  | AS REQ'D | S229536           |             |                | CL-2IN         |
| 15   | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D), 1-SQUARE WASHER & DOUBLE COIL SPRING WASHER (B)            | AS REQ'D | OVERHEAD STD. 392 |             |                | -              |
| 16   | CLAMP, PIPE, STEEL, GALV., UNISTRUT, 4"  | AS REQ'D | S229664           |             |                | CL-4IN         |
| 17   | CLAMP, PIPE, STEEL, GALV., UNISTRUT, 5"  | AS REQ'D | S229668           |             |                | CL-5IN         |
| 18   | CLAMP, PIPE, STEEL, GALV., UNISTRUT, 3"  | AS REQ'D | S229632           |             |                | CL-3IN         |
| 19   | CHANNEL, GALV., 8" (D)   | AS REQ'D | S216840           |             |                | -              |

**NOTES:**

- I. ALL CABLE POLE RISERS, PRIMARY AND SECONDARY SHALL BE 3 IN MINIMUM CONDUIT.
- II. THIS CONSTRUCTION IS LIMITED TO A MAXIMUM OF FOUR SDG&E RISERS (NO MORE THAN TWO PRIMARY RISER).
- III. WHEN POSSIBLE, RISER SHOULD BE INSTALLED ON THE SIDE OF THE POLE OPPOSITE TRAFFIC FLOW.
- IV. SPARE CONDUITS SHALL BE CAPPED **JUST ABOVE GROUND LEVEL** TO PREVENT MOISTURE OR WIRE ENTRY AND KEEP DEBRIS OUT, SPARES ARE NOT TO BE CONSIDERED AS A RISER.
- V. WHENEVER POSSIBLE, SINGLE RISES SHOULD BE INSTALLED AWAY FROM THE TRAFFIC TOWARD THE SIDEWALK.

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS                                   |                           |                    |          |                     |                      |
|                 | CABLE POLE RISER INSTALLATION   |                           |                    |          |                     |                      |

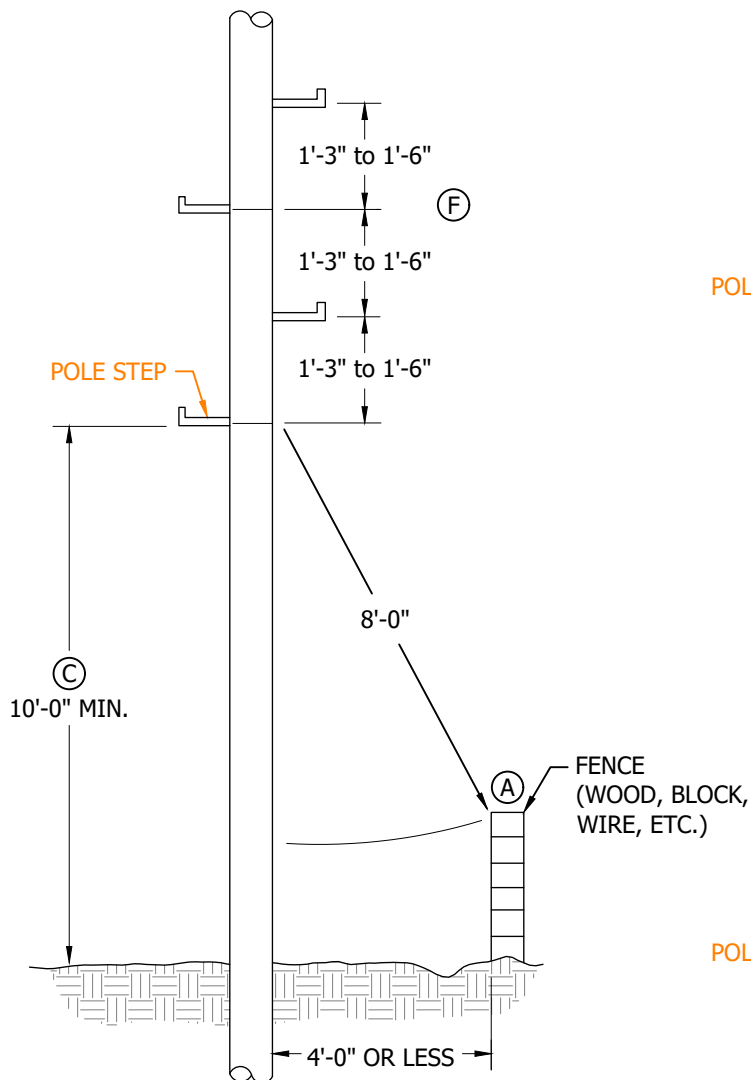


- a. SEE STANDARD 363/4205 FOR POLE STEPS.
- b. SEE STANDARD 3944 FOR U.G. SERVICE FROM O.H. FACILITIES, MATERIAL REQUIREMENTS, ETC.
- c. SEE STANDARD 1402/4202 FOR POSITIONING OF RISERS INVOLVING MORE THAN ONE UTILITY.
- (d)** SEE STANDARD 1407/4207 FOR NON-PORCELAIN TERMINAL MOUNTING BRACKET INSTALLATION AND MATERIALS.
- (e)** SEE STANDARD 1414/4214 FOR 0 - 750V UNDERGROUND SERVICE FROM AN OVERHEAD LINE.
- f. SEE STANDARD 4620 FOR TELECOMMUNICATION INSTALLATION.
- g. PVC RISERS ARE NOT PERMITTED WITHIN THE CLIMBING SPACE PER G.O. 95 RULE 22.2C.

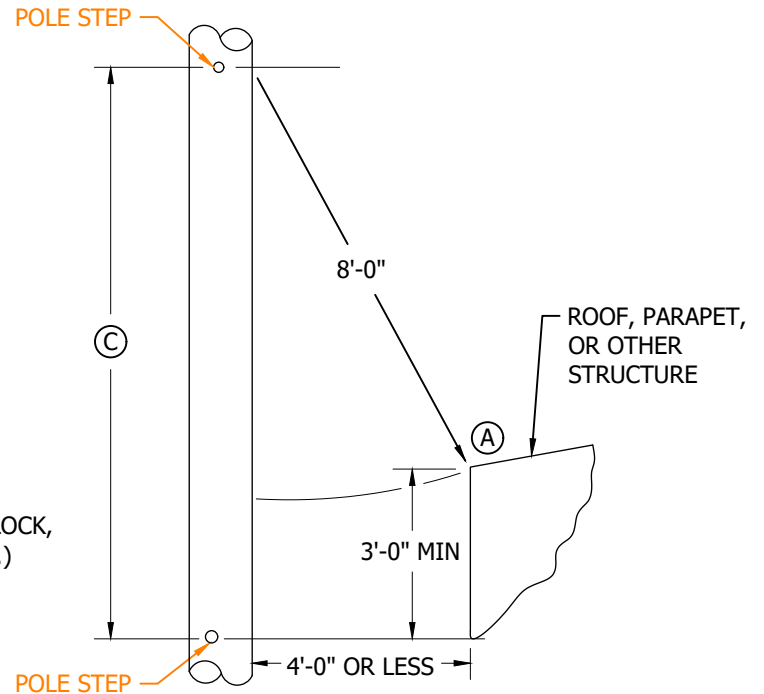
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|  |                | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS |                           |      |            |                    |        |    |          |      |      | OH1404.6<br>UG4204.6 |  |
|  |                | CABLE POLE RISER INSTALLATION                     |                           |      |            |                    |        |    |          |      |      |                      |  |



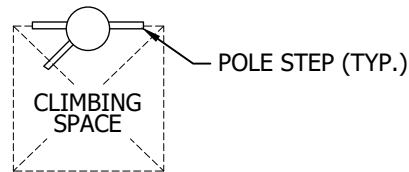
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF POLE STEPS IN ACCORDANCE WITH SDG&E REQUIREMENTS.



**FIGURE 1**



**FIGURE 2**  
POLE-ROOF, PARAPET, STRUCTURE CONFLICT



**FIGURE 3**  
CLIMBING SPACE CONSIDERATIONS (B)

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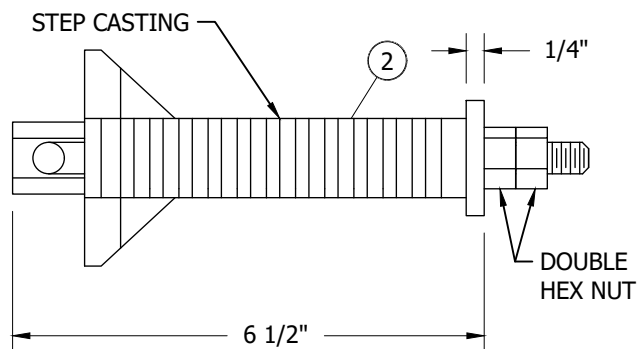
**SHEET**  
**1 OF 3**

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

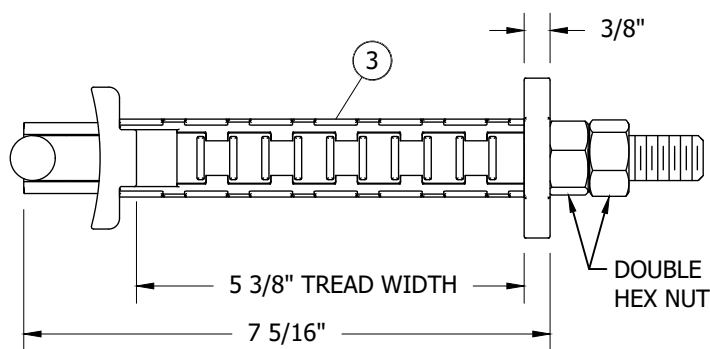
INSTALLATION OF PERMANENT POLE STEPS

**OH363.1**  
**UG4205.1**

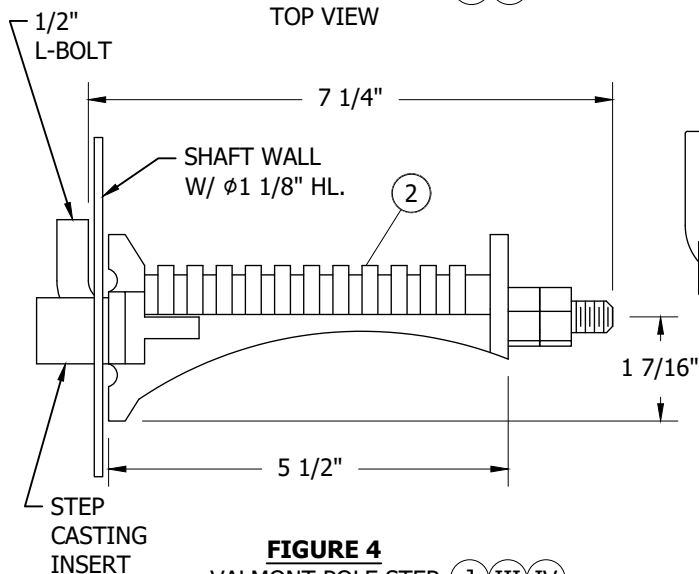




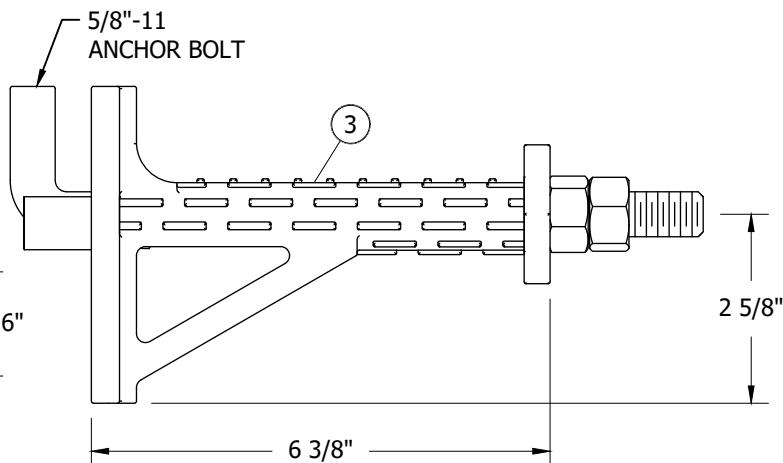
**FIGURE 4**  
VALMONT POLE STEP (J) (III)  
TOP VIEW



**FIGURE 5**  
VAF POLE STEP (H)  
TOP VIEW



**FIGURE 4**  
VALMONT POLE STEP (J) (III) (IV)  
SIDE VIEW



**FIGURE 5**  
VAF POLE STEP (H) (IV)  
SIDE VIEW

## INSTALLATION:

- (A) EIGHT FOOT MINIMUM RADIAL CLEARANCE IS REQUIRED FROM THE FIRST POLE STEP TO THE TOP OF ANY OBSTACLE WHEN THE POLE IS SET FOUR FEET OR LESS FROM THE OBSTACLE. IF THE POLE IS SET MORE THAN FOUR FEET AWAY FROM THE OBSTACLE, THIS REQUIREMENT DOES NOT APPLY.
- (B) POLE STEPS SHOULD BE LOCATED NEAR THE EDGES OF THE CLIMBING SPACE BUT MUST BE LOCATED SO THEY ARE ALWAYS USABLE. FOR INSTANCE, IF VERTICAL RISERS WOULD INTERFERE WITH NORMALLY LOCATED POLE STEPS, INSTALL THE STEPS WITHIN THE CLIMBING SPACE AS SHOWN. APPLIES ONLY TO WOOD POLES.
- (C) NO STEPS ALLOWED IN THIS AREA.
- D. THE FOLLOWING WOOD POLES SHALL BE STEPPED:
  1. POLES THAT ARE DIFFICULT TO CLIMB (E.G. SHELL ROT, LARGE CRACKS).
  2. POLES THAT ARE FREQUENTLY CLIMBED BY TROUBLESHOOTER FOR MAINTENANCE OR OPERATING PURPOSES, OR, AS REQUESTED.

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF PERMANENT POLE STEPS

OH363.2  
UG4205.2



**INSTALLATION CONTINUED:**

- E. FIBERGLASS AND STEEL POLES THAT ARE INACCESSIBLE SHALL EITHER BE PERMANENTLY STEPPED OR HAVE PROVISIONS TO BE STEPPED CONSISTENT WITH SDG&E CONSTRUCTION STANDARDS. THE FIRST POLE STEP SHALL BE INSTALLED AT TEN FEET ABOVE THE GROUND LEVEL.
- F. POLE STEPS ON ALL POLES ARE TO BE SPACED A MINIMUM OF 15" TO 18", TEN FEET ABOVE GROUND LEVEL. THE FIRST TEN FEET OF THE POLE, STEPS ARE TO BE SPACED A MAX. OF 18".
- G. TRANSMISSION POLES WITH DISTRIBUTION UNDER BUILD SHALL BE STEPPED TEN FEET FROM GROUND LEVEL AND MAY EXTEND UP TO AND ABOVE PRIMARY.
- H. POLESTEP INSTALLATION (VAF):
1. UNSCREW THE HEX NUTS AT THE END OF THE "J" BOLT TO THE END OF THE THREADS. DO NOT REMOVE THE HEX NUTS FROM THE BOLT.
  2. PUSH "J" BOLT BACK INTO THE STEP TO ALLOW THE "ELBOW" TO EXTEND OUT PAST THE SLOT OPENING.
  3. FEED "J" BOLT THROUGH THE PROPER STEP OPENING IN THE UTILITY POLE AND PLACE THE BACKING PLATE AGAINST THE OUTSIDE WALL OF THE POLE. MAKE SURE THE RADIUS SIDE OF THE PLATE FACES THE POLE.
  4. USING THE HEX NUT, PULL THE "J" BOLT BACK OUT MAKING SURE THAT THE "ELBOW" SLIDES THROUGH THE SLOT AND FITS SNUG AGAINST THE INSIDE POLE WALL.
  5. TIGHTEN FIRST HEX NUT AGAINST THE OUTSIDE OF THE STEP. DO NOT OVER TIGHTEN.
  6. TIGHTEN SECOND HEX NUT TIGHTLY AGAINST THE FIRST HEX NUT.
  7. VISUALLY CHECK STEP TO VERIFY IT IS INSTALLED PROPERLY.
- J. POLESTEP INSTALLATION (VALMONT):
1. INSERT L-BOLT THROUGH STEP CASTING WITH "L" ON THE INSERT SIDE OF THE CASTING.
  2. INSERT "L" BOLT AND STEP CASTING INSERT INTO POLESTEP HOLE IN POLE WALL.
  3. HAND TIGHTEN INSIDE HEX-NUT TO A SNUG FIT. A GENTLE WIGGLE ON THE STEP ASSEMBLY WILL ALLOW THIS.
  4. USING A STANDARD WRENCH, TIGHTEN INSIDE NUT ONE TO ONE AND A HALF (1-1.5) TURNS PAST THE HAND SNUG CONDITION.
  5. INSTALL SECOND HEX-NUT TO LOCK THE FIRST IN PLACE.
  6. REMOVAL OF THE STEP ASSEMBLY FROM THE POLE IS ACCOMPLISHED BY REVERSING THE STEPS OUTLINED ABOVE.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                | COLOR  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|--------|----------|---------------|--------------|--------------|
| 1    | STEP, POLE, DRIVING TYPE (FOR WOOD POLE) ② | --     | --       | --            | S692992      | STEP         |
| 2    | STEP, POLE, VALMONT                        | --     | --       | --            | S693000      | --           |
| 3    | STEP, POLE, VAF                            | BROWN  | --       | --            | S692018      | VAF-B        |
|      |  | SILVER | --       | --            | S693012      | VAF-S        |

**NOTES:**

- I. JOINT POLE WHERE ANOTHER PARTY OWNS THE POLE, G.O. 95 WILL BE MAINTAINED.
- ② NOT SHOWN IN FIGURES.
- ③ STEP PARTS SHALL NOT BE ALTERED IN ANY MANNER. HANDLE STEP CASTINGS WITH CARE. DO NOT DROP, STRIKE OR IMPACT.
- ④ MAXIMUM ALLOWABLE LOAD OF 500LBS. A SAFETY FACTOR OF 2.5 IS INCLUDED IN THIS VALUE.

**REFERENCE:**

- a. POLE STEPPING JOINT USE POLES, SEE G.O. 95 RULE 91.3A.

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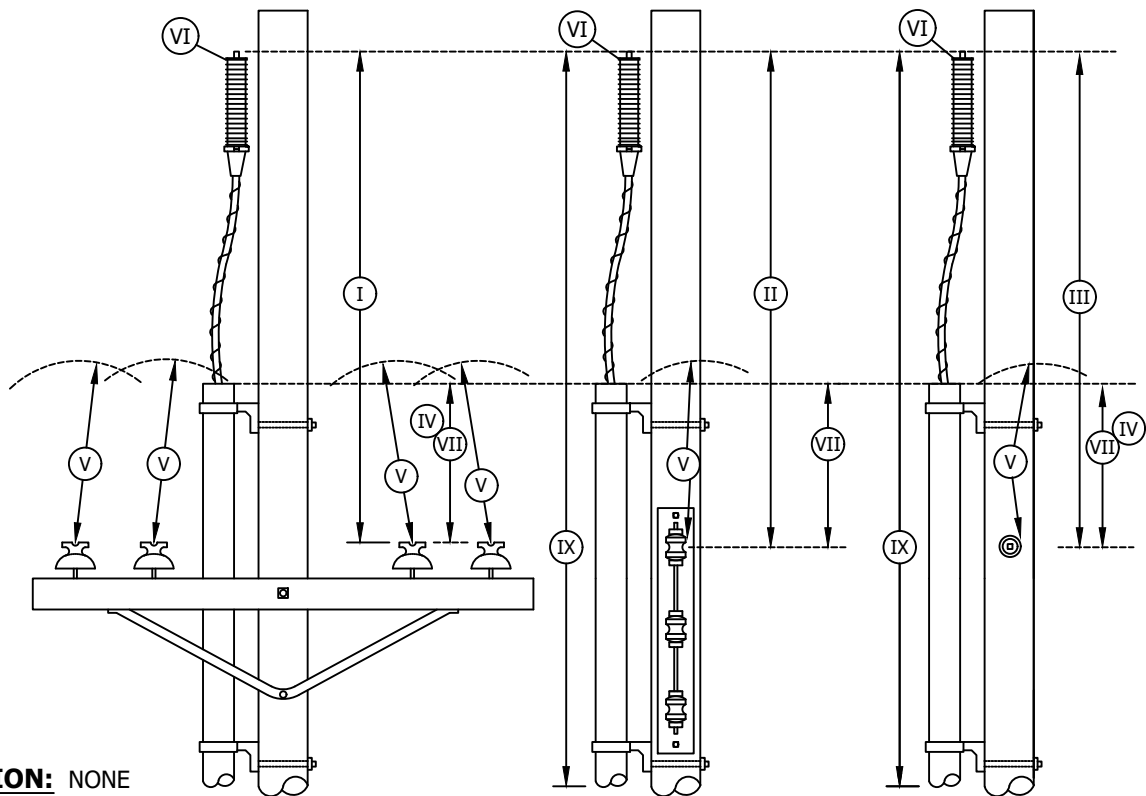
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF PERMANENT POLE STEPS

OH363.3  
UG4205.3



**SCOPE:** THIS STANDARD SHOWS GENERAL INFORMATION FOR CABLE POLES AT 12.47KV & BELOW.



**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

| (VI)<br><b>VOLTAGE OF LEAD WIRES CONNECTED TO TERMINALS</b><br><b>TERMINALS MAY BE BRACKET OR CROSSARM MOUNTED.</b> | MINIMUM SEPARATION TO CONDUCTORS BELOW                           |                |                   |   |  |   |
|---|--|----------------|-------------------|---|--|---|
|   | (I)<br>SUPPLY ON CROSSARMS-RULE 54.6F & TABLE 2, CASES 9, 10, 11 |                |                   | (II)<br>RACK CONSTRUCTION 0-750 VOLTS, RULE 54.9E | (III)<br>CABLE 0-750 VOLTS RULE 54.10E | (IV)<br>COMMUNICATIONS CROSSARMS- AND CABLE RULE 92.1F3 |
|   | 0-750 VOLTS  | 750-7500 VOLTS | 7500-20,000 VOLTS |   |  |   |
| 0-750   | 24"  | -              | -                 | 72" UNGUARDED OR 48" WITH GUARD ARM               | 72"                                    | 36"   |
| 750-7500  | 48"  | 48"            | -                 |   |  | 48"   |
| 7500-20,000   | 48"  | 48"            | 48"               |   |  | 60"   |

(V) 24" MINIMUM RADIAL DIMENSION. RULE 54.6-F.

(VII) 18" MINIMUM VERTICAL DIMENSION FROM CONDUIT EDGE OR LOWEST POINT OF CONDUCTOR LOOP. RULE 54.6-F.

VIII. USE THIS PAGE ONLY TO OBTAIN MINIMUM SEPARATIONS BETWEEN CONDUCTORS. DO NOT USE FOR CONSTRUCTION.

(IX) 22-1/2 FEET MINIMUM TO GROUND.

**REFERENCE:** NONE

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| B   | DRAWING UPDATE | PEI | -    | -    | 02/18/2019 | E   |        |    |      |      |      |
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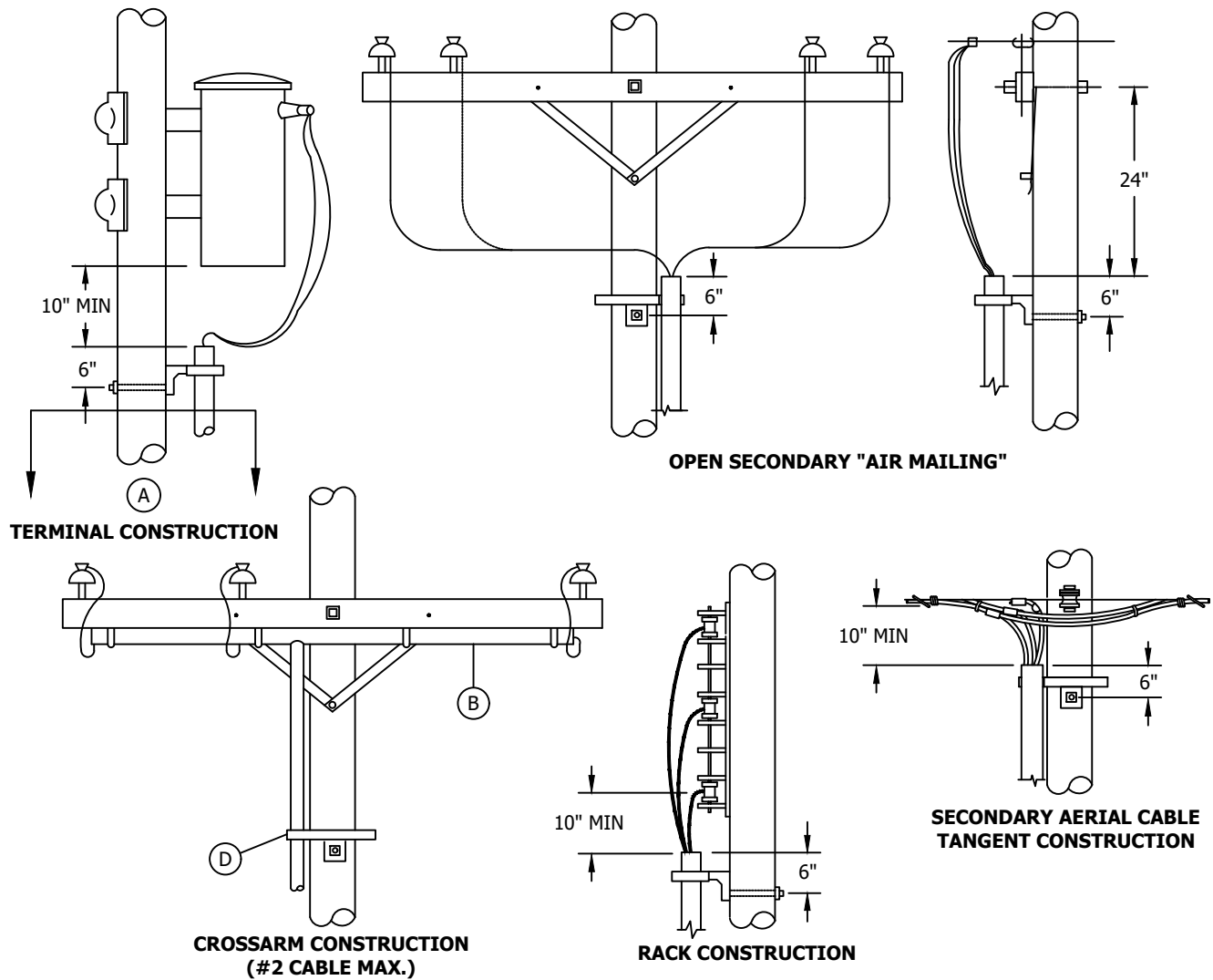
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

GENERAL INFORMATION - 12.47KV & BELOW CABLE POLES

OH1406.1  
UG4206.1



**SCOPE:** THIS STANDARD SHOWS THE VARIOUS METHODS OF SECONDARY CONSTRUCTION WHEN UNDERGROUND CUSTOMERS ARE SERVED FROM OVERHEAD SECONDARY.



## INSTALLATION:

- (A) SEE PAGE 1404/4204 FOR RISER CONSTRUCTION.
- (B) INSTALL CABLE IN SCHEDULE 40 PVC UNDER ARM.
- C. PVC RISER SHALL NOT BE INSTALLED IN THE CLIMBING SPACE (G.O. 95, RULE 22.2 (C)).
- (D) INSTALL CONDUIT ON THE BACK SIDE OF THE LADDER ARM BRACKET.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:** NONE

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS   |                           |                    |          |                     |                      |
|                 | 0-750V UNDERGROUND SERVICE<br>FROM AN OVERHEAD LINE |                           |                    |          |                     |                      |



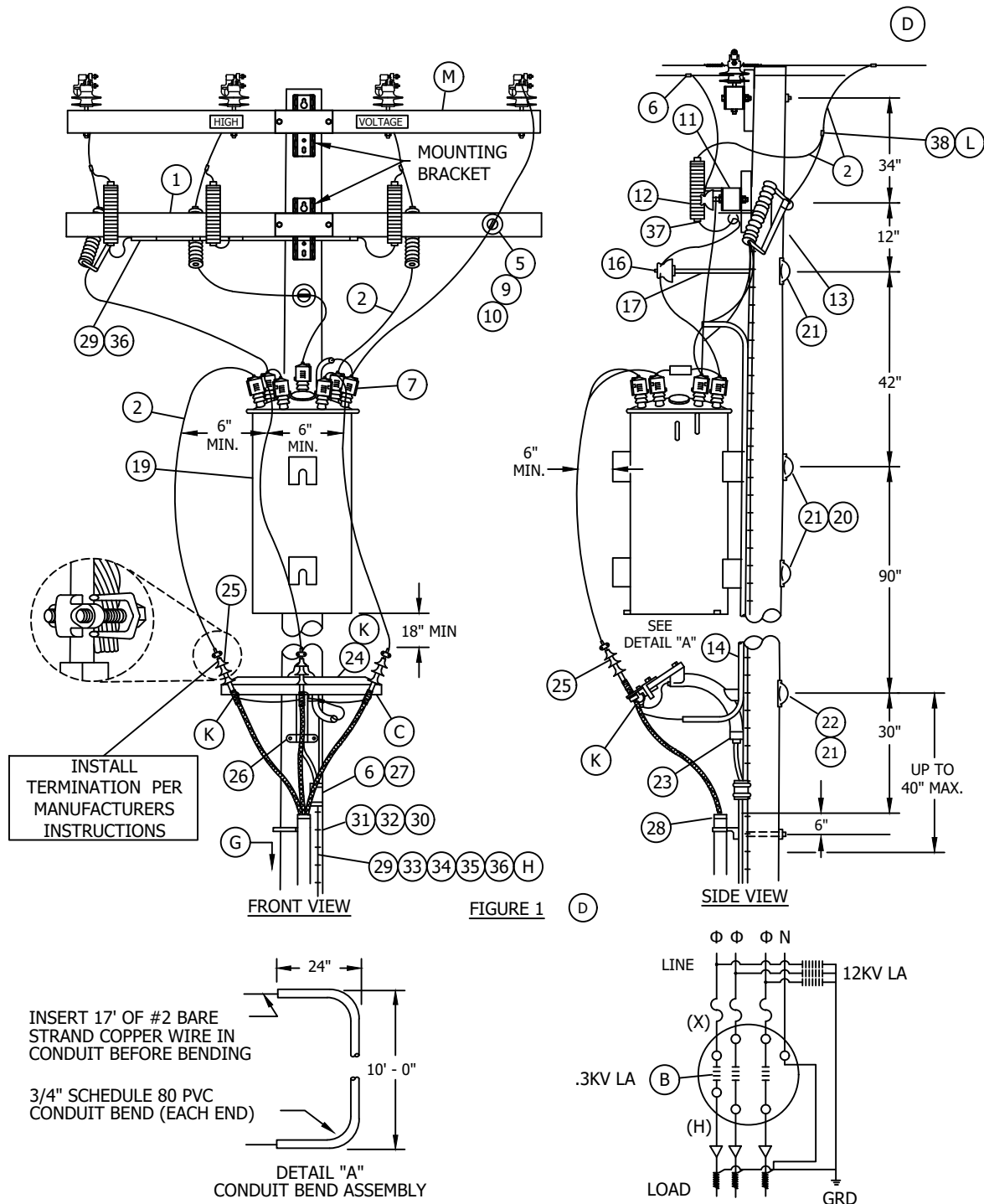
- A. THE CONSTRUCTION SHOWN BELOW THE BUCK ARM IS TYPICAL AND IS FOR ILLUSTRATION ONLY. FOR PROPER RISER, POTHEAD AND POTHEAD ARM CONSTRUCTION, SEE APPROPRIATE CABLE POLE STANDARDS IN THIS SECTION.
- B TO MAINTAIN CLIMBING SPACE, BUCK ARM MINIMUM FOR THREE-PHASE CABLE POLE IS 12'. BUCK ARM MINIMUM FOR SINGLE-PHASE CABLE POLE IS 10'.
- C A MINIMUM OF 48" MUST EXIST BETWEEN THE LINE ARM AND BUCK ARM TO MAINTAIN CLIMBING SPACE THROUGH THE BUCK ARM LEVEL AND UP TO THE LINE ARM LEVEL (SEE O.H. STANDARD 251).

a) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE INSTALLED IN OUTSIDE PIN POSITION PER DESIGN MANUAL PAGE 5124.2.

| REV             | CHANGE         | BY  | DSGN                      | APPV | DATE       | REV                | CHANGE | BY | DSGN     | APPV | DATE |                     |  |                      |
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|                 |                | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS   |                           |      |            |                    |        |    |          |      |      |                     |  |                      |
|                 |                | 12.47KV AND BELOW CROSSARM CABLE POLE,<br>THREE-PHASE NON-PORCELAIN TERMINALS,<br>LINE AND BUCK |                           |      |            |                    |        |    |          |      |      |                     |  |                      |



**SCOPE:** THIS STANDARD SHOWS THE METHOD OF INSTALLING A 12-12.47KV VOLTAGE BOOSTING TRANSFORMER STATION ON A CABLE POLE USING NON-PORCELAIN TERMINALS.



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| B   | EDITORIAL CHANGES | JS | JS   | CZH  | 10/1/2018  | E   |        |    |      |      |      |
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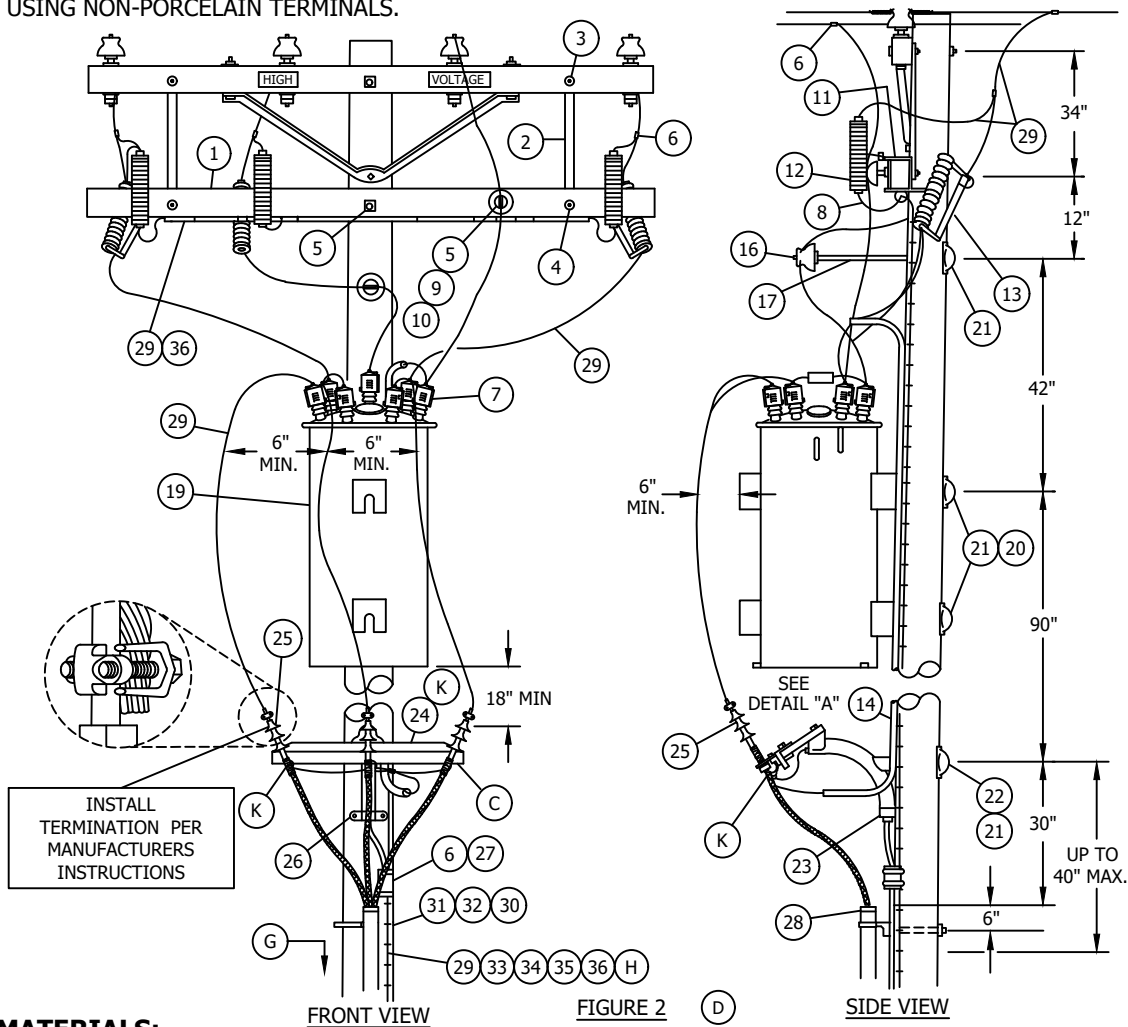
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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS  
VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE  
USING NON-PORCELAIN TERMINALS,  
12-12.47KV THREE-PHASE INSTALLATION

OH1192.1  
UG4230.1



**SCOPE:** THIS STANDARD SHOWS THE METHOD OF INSTALLING A 12-12.47KV VOLTAGE BOOSTING TRANSFORMER STATION ON A CABLE POLE USING NON-PORCELAIN TERMINALS.



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY | STOCK NUMBER |
|------|--|----------|--------------|
| 1    | CROSSARM, 3-3/4" X 5-3/4" X 10' - 0"   | 1        | S294128      |
| 2    | BRACE, FLAT, GALV, 36"   | 2        | S164224      |
| 3    | BOLT, MACH, GALV, 3/8" X 5", 1 ROUND & 1 SPRING WASHER                             | 2        | STD 392      |
| 4    | BOLT, MACH, GALV, 1/2" X 5", 1 RD & 1 DBL COIL SPR WASHER                          | 2        | STD 392      |
| 5    | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER | 2        | STD 392      |
| 6    | CONNECTOR, WIRE, COMPRESSION, CU OR AL, (SIZE AS REQ'D)                            | AS REQ'D | STD 783-786  |
| 7    | BUSHING COVER, TRANSFORMER   | 7        | S558898      |
| 8    | -  | -        | -            |
| 9    | PIN, TRANSFORMER LEAD ADAPTER, 1"  | 1        | S529248      |
| 10   | INSULATOR, 12KV, NEUTRAL   | 1        | S429216      |

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS  |                           |                    |          |                     |                      |
|                 | VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE<br>USING NON-PORCELAIN TERMINALS,<br>12-12.47KV THREE-PHASE INSTALLATION |                           |                    |          |                     |                      |



**INSTALLATION:**

- A. **CAUTION:** CONTINUITY OF NEUTRAL FROM OVERHEAD THROUGH BOOSTER TO UNDERGROUND SYSTEM MUST BE UNINTERRUPTED WHILE BOOSTER IS IN SERVICE.
- (B) THE 3KV LIGHTNING ARRESTERS SHOWN ON THE HHT COME AS PART OF THE TRANSFORMER. IF THEY ARE NOT VISIBLE, CHECK THE NAME PLATE TO SEE IF THEY ARE INTERNALLY INSTALLED.
- (C) CONNECT ONE STRAND OF CONCENTRIC NEUTRAL TO TERMINAL MOUNTING BOLT WITH DOUBLE NUT.  
- USE FIGURE ONE FOR ALL **NEW** CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH
- (D) NEUTRAL ON OUTSIDE PIN POSITION.  
- USE FIGURE TWO ON EXISTING CONSTRUCTION WITH NEUTRAL ON INSIDE PIN POSITION.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | QUANTITY | CONSTR STD OR STOCK NUMBER | ASSEMBLY UNIT |
|------|---|----------|----------------------------|---------------|
| 11   | BRACKET, CUTOUT/ARRESTER, CROSSARM MOUNTING   | 6        | S166070                    | 1             |
| 12   | ARRESTER, LIGHTNING, 12KV W/ 48 #6 COVERED LEAD WIRE  | 3        | S113256                    | 10KVTA        |
| 13   | CUTOUT, 12KV, WITH LOADBUSTER HOOKS, KEARNY TYPE "HX"   | 3        | S297952                    | -             |
| 14   | CONDUIT, PVC, SCHEDULE 80, 3/4"   | 24       | S251520                    | -             |
| 15   | STRAPS, PIPE, GALV, 3/4" & 2 - 6D NAILS, GALV   | AS REQ'D | S697888                    | -             |
|      |   | -        | S491552                    | -             |
| 16   | INSULATOR, 12KV (CLASS AS REQ'D)  | 1        | STD 750                    | -             |
| 17   | BRACKET, INSULATOR, 1" OR 1-3/8" LEAD THREAD  | 1        | S166176                    | -             |
|      |   | 1        | S166176                    | -             |
| 18   | -   | -        | -                          | -             |
| 19   | AUTOTRANSFORMER, TYPE 'HHT', 3 PHASE, 12 - 12.47KV, (COMPLETE WITH 3 - 3KV LIGHTNING ARRESTERS)   | 1        | -                          | -             |
|      |   | 1        | STD 1121                   | -             |
| 20   | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 DOUBLE COIL SPRING, WASHER | -        | -                          | -             |
|      |   | 2        | STD 392                    | -             |
| 21   | COVER, BOLT, PLASTIC & 6-10D NAILS, GALV  | 4        | S285696                    | -             |
|      |   | -        | S491456                    | -             |
| 22   | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D); 1 SQUARE CURVED RIB & 1 DBL COIL SPRING WASHER        | -        | -                          | -             |
|      |   | 1        | STD 392                    | -             |
| 23   | BRACKET, POTHEAD UPSWEEP WITH PVC LINER   | 1        | S166856                    | -             |
| 24   | BRACKET, TRIPLE TERMINATOR  | 1        | S166676                    | -             |
| 25   | TERMINALS, UNDERGROUND CABLE (k)  | 1        | STD 4111                   | -             |
| 26   | SCREW, LAG, GALV, 5/8" X 5"   | 3        | S621600                    | -             |
| 27   | CONDUIT, PLASTIC, PVC, 2"   | 2        | S251296                    | -             |
| 28   | CABLE RISER PROTECTION  | 12"      | 1404/4204                  | -             |
| 29   | #4 CU SOLID GROUND WIRE, PVC COVERED  | 110'     | S812490                    | -             |
| 30   | BRACKET, LADDER ARM   | AS REQ'D | S167184                    | GNDPVC        |
| 31   | NUT, CLAMPING CHANNEL, W/SPRING, 1/2"   | AS REQ'D | S503488                    | -             |
| 32   | CHANNEL, DOUBLE GALV, 24"   | AS REQ'D | S216700                    | -             |

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| B   | EDITORIAL CHANGES | JS | JS   | CZH  | 10/1/2018  | E   |        |    |      |      |      |
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| SHEET<br>3 OF 4 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1192.3<br>UG4230.3 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS  |                           |                    |          |                     |                      |
|                 | VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE<br>USING NON-PORCELAIN TERMINALS,<br>12-12.47KV THREE-PHASE INSTALLATION |                           |                    |          |                     |                      |



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION                                    | QUANTITY | CONSTR STD OR STOCK NUMBER | ASSEMBLY UNIT |
|------|--|----------|----------------------------|---------------|
| 33   | GROUND ROD, 5/8" X 8', COPPERWELD              | 1        | S603072                    | GNDPVC        |
| 34   | COPPER BONDED GROUND CONNECTOR                 | 1        | S259010                    | -             |
| 35   | GROUND ENHANCING POWER SOLUTION (GEM)          | AS REQ'D | S424390                    | -             |
| 36   | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | S678562                    | -             |
| 37   | FLEXIBLE ARRESTER GROUND STRAP                 | AS REQ'D | S698754                    | -             |
| 38   | HOT LINE CLAMP                                 | 3        | S227680                    | -             |

| CABLE SIZE | UG MACRO UNITS |             |                 |             |
|------------|----------------|-------------|-----------------|-------------|
|            | W/LADDER ARMS  |             | W/O LADDER ARMS |             |
|            | PORCELAIN      | N/PORCELAIN | PORCELAIN       | N/PORCELAIN |
| 3C #2/0 AL | CP2/0L         | NP2/0L      | CP#2/0          | NP-2/0      |
| 3C-3#2 AL  | CP3#2L         | NP3#2L      | CP-3#2          | NP-3#2      |

**REFERENCE:**

- f. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON STANDARD 287.
- g) POLE STEPPING - SEE STANDARD 363/4205.
- h) GROUNDING METHODS - SEE STANDARD 1002.
- i. SEE STANDARD SECTION 1200/4300 FOR FUSING.
- j. FOR LIGHTNING ARRESTER REQUIREMENTS - SEE STANDARD 1247.
- k) SEE STANDARD 1407/4207 FOR NON-PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.
- l) FOR HOT LINE CLAMP CONNECTION, SEE STANDARD 788.
- m) FIBERGLASS CROSSARMS - SEE STANDARD 379.

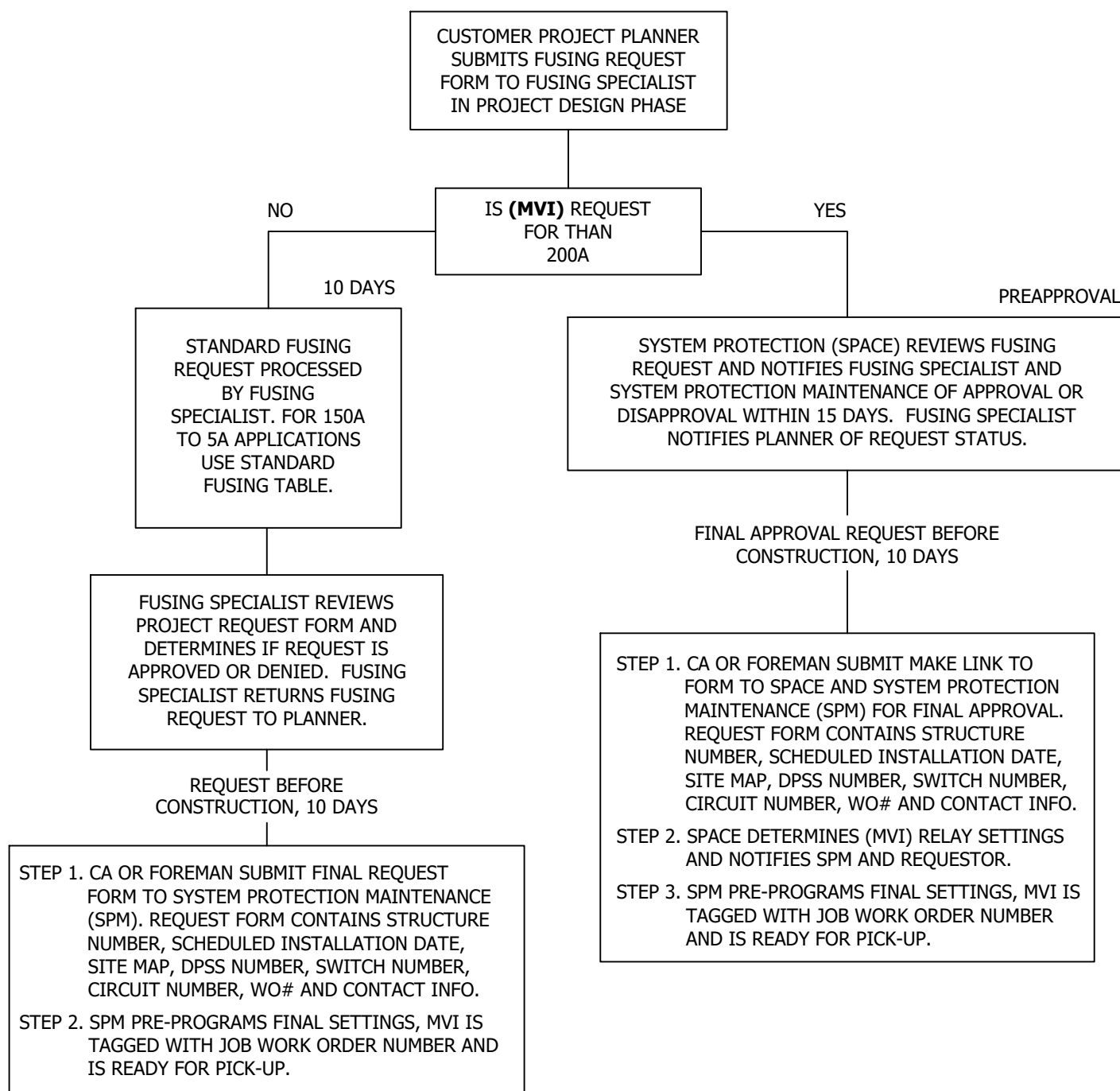
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| C   |                   |    |      |      |            | F   |        |    |      |      |      |
| B   | EDITORIAL CHANGES | JS | JS   | CZH  | 10/1/2018  | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE    | -  | TQ   | DW   | 03/20/2014 | D   |        |    |      |      |      |

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| SHEET<br>4 OF 4 | <div>X</div> Indicates Latest Revision   | Completely Revised | New Page | Information Removed | OH1192.4<br>UG4230.4 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS  |                    |          |                     |                      |
|                 | VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE<br>USING NON-PORCELAIN TERMINALS,<br>12-12.47KV THREE-PHASE INSTALLATION |                    |          |                     |                      |



**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION OF A THREE-PHASE MOLDED VACUUM INTERRUPTER (MVI) ON A CABLE POLE. DEADEND OR TANGENT CONSTRUCTION 200A OR 600A CABLE.



**FIGURE 1**  
FUSING WORKFLOW CHART

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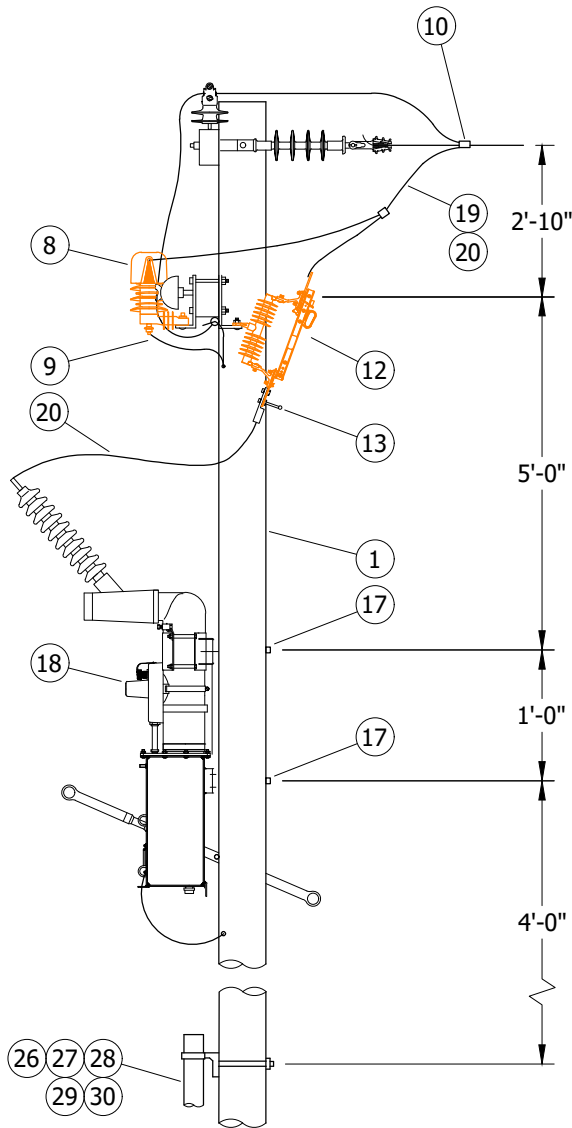
**SHEET**  
**1 OF 5**

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

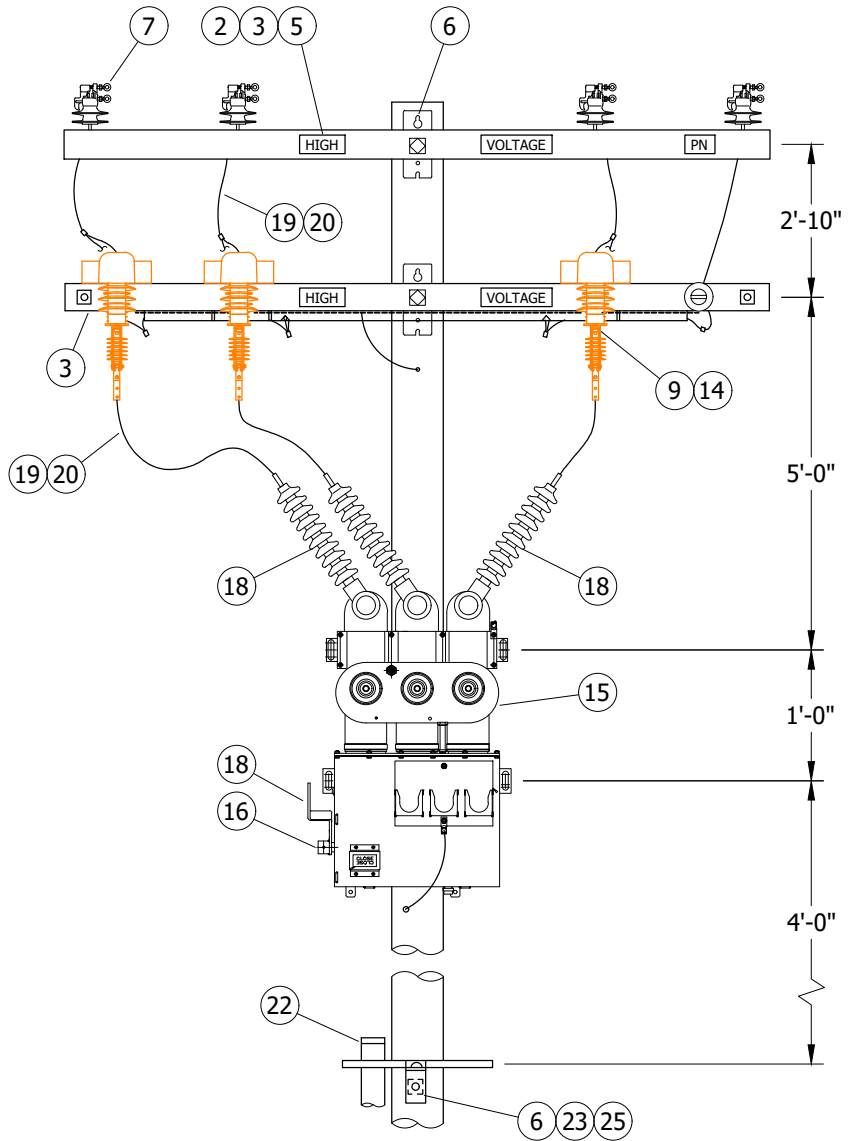
CABLE POLE MVI / MV200 / 600A  
CABLE POLE APPLICATION

**OH1435.1**  
**UG4235.1**





**FIGURE 2**  
SIDE VIEW



**FIGURE 2**  
FRONT VIEW

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

CABLE POLE MVI / MV200 / 600A  
CABLE POLE APPLICATION

**OH1435.2**  
**UG4235.2**







**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | WIRE SIZE  | QUANTITY | STANDARD PAGE | STOCK NUMBER  | DESIGN UNITS |
|------|---|------------|----------|---------------|---------------|--------------|
| 1    | POLE MIN. 50-1 STEEL OR WOOD                              | -          | 1        | 303           | -             | -            |
| 2    | 10'-0" DEADEND LINE ARM IF REQUIRED                       | -          | 1        | 379           | S294380       | 4DF          |
| 3    | 10'-0" TANGENT LINE ARM AS NEEDED                         | -          | 1        | 379           | S294378       | 4TF          |
| 4    | 10'-0" FIBERGLASS CUTOUT/ARRESTOR ARM AS NEEDED (V)       | -          | 1        | 379           | S294378       | 4TF          |
| 5    | SIGN HIGH VOLTAGE 8 NAILS/SCREWS                          | -          | 4        | -             | S647648       | HV           |
| 6    | BOLT, MACH, 5/8" X LENGTH AS REQUIRED                     | -          | 4        | 390           | -             | -            |
| 7    | PIN & INSULATORS-HENDRIX                                  | -          | 3 EACH   | 750           | -             | -            |
| 8    | ARRESTORS, 12KV   | -          | 3        | 1247          | S113248       | LA12         |
| 9    | FLEXIBLE ARRESTOR GROUND STRAP                            | -          | AS REQ'D | 1002.1        | S698754       | -            |
| 10   | WEDGE TAP CONNECTIONS                                     | -          | 3        | 784.1         | -             | -            |
| 11   | BLIND NUT, 1/2" (V)                                       | -          | AS REQ'D | 1002          | S503460 (X)   | -            |
| 12   | SWITCH, DISCONNECT, 27KV, 900A                            | -          | 3        | -             | S706670 (III) | PS900        |
|      |   |            |          | -             | S707004 (IV)  | PS900DC      |
|      | BRACKET, MOUNTING, CUTOUT                                 |            |          | 397           | S166070       | CO/B         |
| 13   | GROUNDING BALL STUD                                       | -          | 3        | -             | S700100       | GDSTUD       |
| 14   | CUTOUT/ARRESTOR BRACKETS                                  | -          | 3        | -             | S165446 (X)   | -            |
| 15   | MVI 600A TO 200A  | -          | SELECT   | 3675          | S708416       | S63PFI       |
|      | MVI 600A TO 600A  |            |          |               | S708418       | S66PFI       |
| 16   | LOCK FOR SWITCH POSITION, KEYLESS                         | -          | 2        | -             | S468010       | -            |
| 17   | 5/8" MACH X LENGTH AS REQUIRED                            | -          | 2        | 390           | -             | -            |
| 18   | AERIAL BUSHING KIT FOR MVI                                | -          | 1        | -             | S442500       | AKMV13       |
| 19   | LEAD WIRE, 200A, THW                                      | 1/0        | 30'-0"   | -             | S808034 (X)   | -            |
| 20   | LEAD WIRE, 600A, THW                                      | 500 KCMIL  | 30'-0"   | -             | S808928       | -            |
| 21   | SOLID GROUND WIRE PVC COVERED FOR USE WITH WOOD POLES (V) | #4 CU      | 50'-0"   | -             | S812490       | GNDPVC       |
| 22   | CABLE GRIP FOR PRIMARY CABLE                              | -          | 1        | 4204          | -             | -            |
| 23   | LADDER ARM BRACKET  | -          | AS REQ'D | 4204          | -             | LA-ARM       |
| 24   | BOLT MACH 5/8" X LENGTH AS REQUIRED (V)                   | -          | AS REQ'D | 390           | -             | -            |
| 25   | UNISTRUT, 24"   | -          | AS REQ'D | -             | S216702 (X)   | -            |
| 26   | UNISTRUT NUT 1/2" WITH SPRING                             | -          | AS REQ'D | 4204          | S229536       | -            |
| 27   | UNISTRUT NUT-STUD, 1/2" X 1 3/8"                          | -          | 4        | 390           | -             | -            |
| 28   | CONDUIT 4", 5"  | -          | AS REQ'D | 4204          | S507000       | -            |
| 29   | UNISTRUT CLAMP, 4"  | -          | AS REQ'D | 4204          | S229664       | CL-4IN       |
| 30   | UNISTRUT CLAMP, 5"  | -          | AS REQ'D | 4204          | S229668       | CL-5IN       |
| 31   | POLE GROUNDING & BONDING WOOD OR STEEL POLES (V)          | -          | AS REQ'D | 1002          | -             | -            |
| 32   | TRXLPECN-PEJ, STR, 3-1/C (V)                              | 350 KCMIL  | -        | -             | S197608       | PJN350       |
| 33   | EPR-PEJ, COMP, 3-1/C (V)                                  | 750 KCMIL  | -        | -             | S195010       | CPJ750       |
| 34   | TRXLPECN-PEJ, STR, 3-1/C (V)                              | 1000 KCMIL | -        | -             | S197618       | PJI000       |
| 35   | TRXLPECN-PEJ, SOL, 3-1/C (V)                              | #2         | -        | -             | S197622       | PJN3/2       |
| 36   | TRXLPECN-PEJ, STR, 3-1/C (V)                              | #2/0       | -        | -             | S197606       | PJN2/0       |

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

CABLE POLE MVI / MV200 / 600A  
CABLE POLE APPLICATION

OH1435.4  
UG4235.4



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION                  | WIRE SIZE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|------------------------------|-----------|----------|---------------|--------------|--------------|
| 37   | ELBOW TEE                    | -         | 3        | -             | S326578      | -            |
| 38   | ELBOW TAP PLUG               | -         | 3        | -             | S547328      | -            |
| 39   | RECEPTACLE, INSULATING, 200A | -         | 3        | -             | S204304      | -            |
| 40   | CONDUCTOR CONNECTOR          | 350 AL    | 3        | -             | S258698      | -            |
|      |                              | 750 AL    |          |               | S258704      |              |
|      |                              | 750 AL    |          |               | S258708      |              |
|      |                              | 1000 AL   |          |               | S258702      |              |
| 41   | CABLE ADAPTER                | 350 AL    | 3        | -             | S102027      | -            |
|      |                              | 750 AL    |          |               | S102034      |              |
|      |                              | 750 AL    |          |               | S102051      |              |
|      |                              | 1000 AL   |          |               | S102050      |              |
| 42   | BUSHING PLUG                 | -         | 3        | -             | S544676      | -            |
| 43   | LOADBREAK ELBOW CONNECTOR    | #2 AL     | 3        | -             | S443838      | -            |
|      |                              | 2/0 AL    |          |               | S443840      |              |

**NOTES:**

- I. THIS APPLICATION OFFERS THE ABILITY TO PROGRAM AN INTERRUPTION CURRENT CURVE AND A THREE-PHASE SWITCH FOR HIGHER LOAD AND RELIABILITY ISSUES FOR NEW AND EXISTING FACILITIES. THE THREE-PHASE SWITCH WILL ALSO REDUCE THE POSSIBILITY OF FERRO-RESONANCE DURING SERVICE RESTORATION.
- II. USING THE MVS FOR THE CABLE POLE CONSTRUCTION OFFERS THREE-PHASE ON/OFF OPERATIONS ONLY.
- III REQUIRED IN CONTAMINATION DISTRICT 1 AND PREFERRED IN COASTAL DISTRICTS (OC, NC, BC, CM). (m)
- IV PREFERRED FOR INLAND DISTRICTS (NE, RA, EA, ME).
- V NOT SHOWN OF FIGURES.
- X THIS ITEM IS EXEMPT.

**REFERENCE:**

- a. SEE UG3202 FOR CABLE IDENTIFICATION.
- b. SEE UG3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION.
- c. SEE UG3221 FOR HIGH VOLTAGE DECAL.
- d. SEE UG3675 FOR MVI SPECIFICATIONS.
- e. SEE OH1002 FOR POLE GROUNDING.
- f. SEE UG4108 FOR SEALING JACKETED CABLE.
- g. SEE UG4510 FOR (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE.
- h. SEE UG4512 FOR EQUIPMENT GROUNDING.
- i. SEE UG4520 FOR GROUNDING PAD MOUNTED EQUIPMENT.
- j. SEE UG4505 FOR GROUNDING HARDWARE AND CONNECTIONS.
- k. SEE UG4204 CABLE POLE RISERS.
- l. SEE OH1610 TO OH1660 FOR AVIAN PROTECTION/COVER-UP.

(m) SEE OH287 FOR CONTAMINATION DISTRICTS.

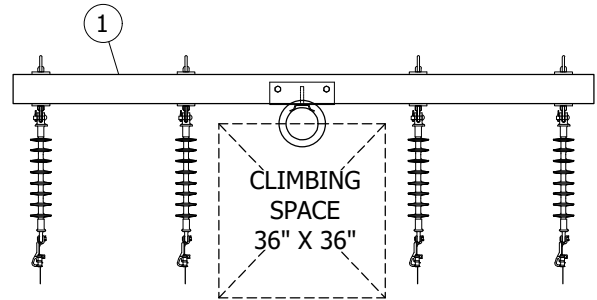
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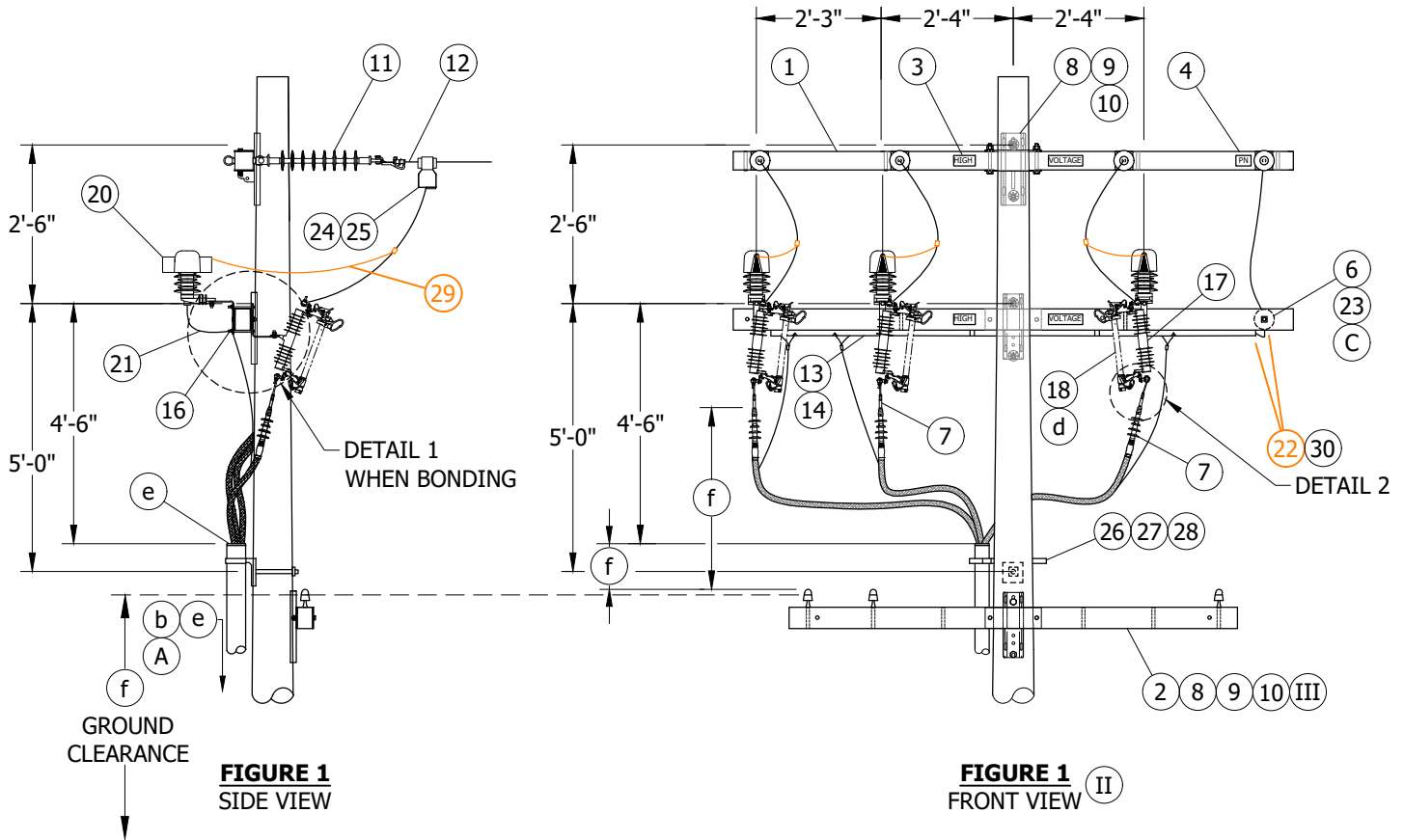
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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                      |
|                 | CABLE POLE MVI / MV200 / 600A<br>CABLE POLE APPLICATION        |                           |                    |          |                     |                      |



**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION METHOD FOR THREE-PHASE UNDERGROUND CABLE, UNDER 15KV WITH LESS THAN 200A CAPACITY.



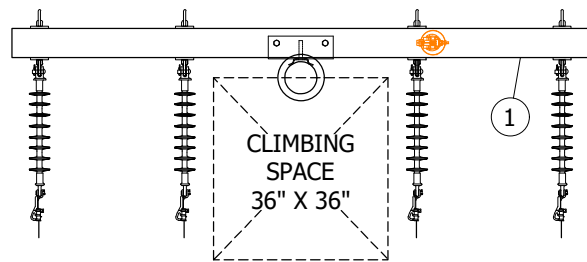
**FIGURE 1** (a)  
TOP VIEW



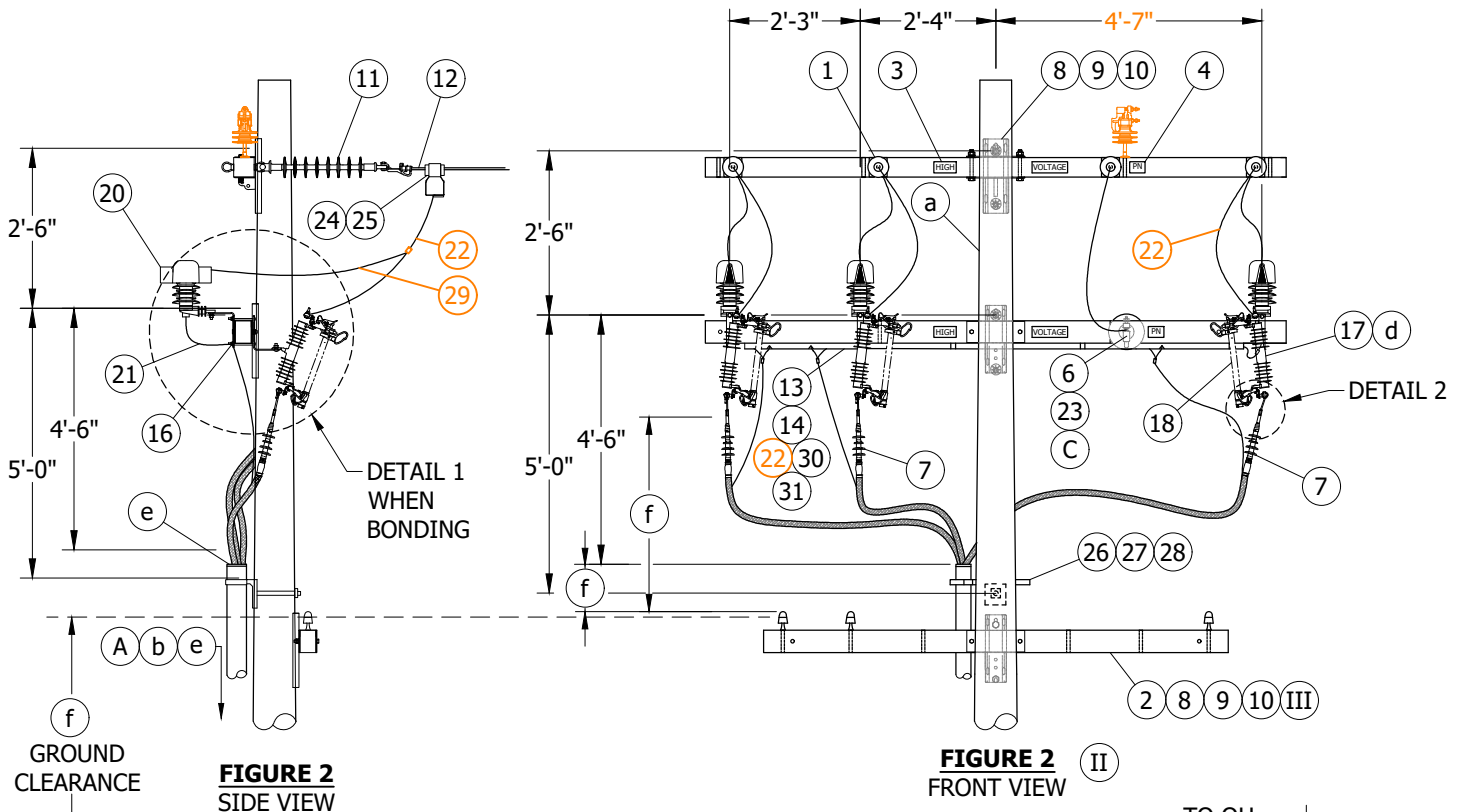
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| C               | TABLE UPDATES      | EDM   | JCE                       | JES | CZH | 11/9/2020          | F   |          |    |                     |     |     |      |                      |
| B               | COMPLETELY REVISED | -   | JBH                       | IL  | MDJ | 10/25/2016         | E   |          |    |                     |     |     |      |                      |
| A               | COMPLETELY REVISED | -   | JBH                       | IL  | MDJ | 9/8/2016           | D   |          |    |                     |     |     |      |                      |
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|                 |                    | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  |                           |     |     |                    |     |          |    |                     |     |     |      |                      |
|                 |                    | 12.47KV AND BELOW CROSSARM CABLE POLE,<br>SINGLE-PHASE AND THREE-PHASE, 1/C PER PHASE,<br>NON-PORCELAIN TERMINALS |                           |     |     |                    |     |          |    |                     |     |     |      |                      |



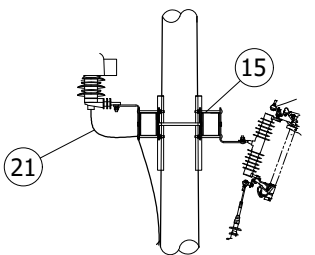


**FIGURE 2**  
TOP VIEW (a)

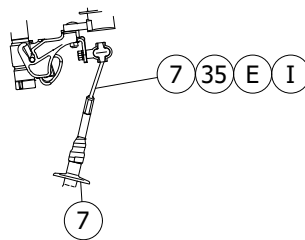


**FIGURE 2**  
SIDE VIEW

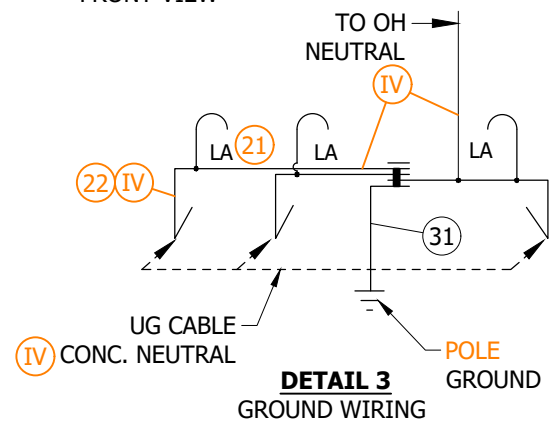
**FIGURE 2**  
FRONT VIEW (II)



**DETAIL 1** (D) C



**DETAIL 2**



**DETAIL 3**  
GROUND WIRING

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12.47KV AND BELOW CROSSARM CABLE POLE,  
SINGLE-PHASE AND THREE-PHASE, 1/C PER PHASE,  
NON-PORCELAIN TERMINALS

**OH1440.2**  
**UG4240.2**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   |                                      | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|--------------------------------------|----------|---------------|--------------|--------------|
| 1    | CROSSARM, FIBERGLASS, DEADEND (SIZE AS REQ'D)               |                                      | 1        | 379           | -            | -            |
| 2    | CROSSARM, FIBERGLASS, TANGENT (SIZE AS REQ'D)               |                                      | 1        | 379           | -            | -            |
| 3    | SIGN, "HIGH VOLTAGE" STICKER                                |                                      | AS REQ'D | 208           | S647650      | HV/D         |
| 4    | SIGN, "PN", ADHESIVE  |                                      | AS REQ'D | 208           | S648004 (X)  | PN-D         |
| 5    | PIN, INSULATOR (SIZE AS REQ'D) (V)                          |                                      | AS REQ'D | 396           | -            | -            |
| 6    | INSULATOR, POLY, VISE-TOP (SIZE AS REQ'D)                   |                                      | AS REQ'D | 750           | -            | -            |
| 7    | A   | TERMINATIONS, OUTDOOR, #2 SOLID      | 3        | 4111          | S732918      | CP-#2N       |
|      |   | CONNECTOR, COMPRESSION, #2 SOLID     |          |               | S729930      |              |
|      | B   | TERMINATIONS, OUTDOOR, 2/0 ALUMINUM  | 3        |               | S732918      | CP2/0N       |
|      |   | CONNECTOR, COMPRESSION, 2/0 ALUMINUM |          |               | S729934      |              |
| 8    | BOLT, MACHINE, 3/4" (SIZE AS REQ'D)                         |                                      | AS REQ'D | 390           | -            | -            |
| 9    | WASHER, SPRING LOCK, 3/4"                                   |                                      | AS REQ'D | 390           | S796802 (X)  | LK-WSH       |
| 10   | WASHER, SQUARE CURVED                                       |                                      | AS REQ'D |               | S797760      | RIBWSH       |
| 11   | INSULATOR, SUSPENSION, CLEVIS, 35KV                         |                                      | AS REQ'D | 750           | S428958      | LONGDE       |
| 12   | CLAMP, STRAIGHT LINE, DEADEND                               |                                      | AS REQ'D | 739-744       | -            | -            |
| 13   | STRAP, PIPE, GALV., 1/4", ONE HOLE                          |                                      | AS REQ'D | 1002          | S697302      | BOND8        |
| 14   | SCREW, SELF-TAPPING, 1 1/4", #12, 24 THREAD                 |                                      | AS REQ'D | 1002          | S618086 (X)  | -            |
| 15   | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING             |                                      | AS REQ'D | 397           | S166070      | CO/B         |
| 16   | BRACKET, DOUBLE, CUTOUT/ARRESTER FOR CROSSARM MOUNTING      |                                      | 3        |               | S165446 (X)  | DBLBKT       |
| 17   | CUTOUT, 12KV, (AS NEEDED PER FUSING REQUEST)                |                                      | 3        | 1212          | -            | -            |
| 18   | FUSE HOLDER, (AS NEEDED PER FUSING REQUEST)                 |                                      | 3        | 1212          | -            | -            |
| 19   | COVER, CUTOUT   |                                      | 3        | 1640          | S289626      | CCOVSL       |
| 20   | ARRESTER, LIGHTNING, 12KV                                   |                                      | 3        | 1247          | S113248      | LA12         |
| 21   | STRAP, ARRESTER GROUND                                      |                                      | AS REQ'D | 1002          | S698754      | LAGND        |
| 22   | WIRE, COPPER, AWG 2 (CONCENTRIC BUS WIRE)                   |                                      | 50'-0"   | 711           | S812122      | HEND2        |
| 23   | PIN, TRANSFORMER ADAPTER, LEAD THREAD, 1"                   |                                      | 1        | 396           | S529248      | PS/01        |
| 24   | CLAMP, HOTLINE  |                                      | AS REQ'D | 788           | S227680      | -            |
| 25   | CONNECTOR, WEDGE, STIRRUP                                   |                                      | 3        |               | -            | -            |
| 26   | BRACKET, LADDER ARM   |                                      | AS REQ'D | 1404/4204     | S167186 (X)  | RSARM        |
| 27   | NUT STUD 1/2" X 1 3/8" CLAMPING CHANNEL WITH SPRING         |                                      | AS REQ'D |               | S507000      |              |
| 28   | CHANNEL, DOUBLE, GALVANIZED, 24" X 1 5/8" X 1 5/8"          |                                      | AS REQ'D |               | S216702 (X)  |              |
| 29   | WIRE, #4-7, POLY COVERED, STRANDED COPPER (ARRESTER JUMPER) |                                      | 20'-0"   | 718           | S8115044     | POLY4J       |
| 30   | CONNECTORS, WIRE COMPRESSION, CU OR AL                      |                                      | AS REQ'D | 783-785       | -            | -            |
| 31   | GROUNDING, #4 PVC GRND WIRE, RODS, CONN-STEEL POLE          |                                      | 1        | 1002          | -            | GNDPSP       |
|      | GROUNDING, WIRE, #4 PVC, RODS & CONNECTORS (FOR WOOD POLES) |                                      | AS REQ'D |               | -            | GNDPVC       |
| 32   | TAPE, SILICONE (V)  |                                      | AS REQ'D | -             | S720384      | -            |

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| C   | TABLE UPDATES      | EDM | JCE | JES | CZH | 11/9/2020  | F   |        |    |    |     |     |      |
| B   | COMPLETELY REVISED | -   | JBH | IL  | MDJ | 10/25/2016 | E   |        |    |    |     |     |      |
| A   | COMPLETELY REVISED | -   | JBH | IL  | MDJ | 9/8/2016   | D   |        |    |    |     |     |      |

|                 |   |                           |                    |          |                     |                      |
|-----------------|---|---------------------------|--------------------|----------|---------------------|----------------------|
| SHEET<br>3 OF 4 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1440.3<br>UG4240.3 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  |                           |                    |          |                     |                      |
|                 | 12.47KV AND BELOW CROSSARM CABLE POLE,<br>SINGLE-PHASE AND THREE-PHASE, 1/C PER PHASE,<br>NON-PORCELAIN TERMINALS |                           |                    |          |                     |                      |



- (A) NEW CABLE POLES SHALL HAVE A STANDARD DEPTH OF NINE FEET. IN MOST CASES, THIS WILL REQUIRE A FIVE-FOOT TALLER POLE.
- B. REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL OR WHEN CONSTRUCTING SINGLE-PHASE.
- (C) INTERCONNECT OVERHEAD NEUTRAL AND CONCENTRIC CABLE NEUTRAL CONDUCTORS TO LIGHTNING ARRESTER GROUND. **INSTALL NEUTRAL JUMPER FROM LINE TO CONCENTRIC ON ARRESTER SIDE OF POLE.**
- (D) BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS. IN AREAS WHERE BONDING IS REQUIRED, TO AVOID BONDWIRE AND LIGHTNING ARRESTER GROUNDWIRE ON THE SAME CROSSARM, USE TWO CROSSARMS: ONE FOR CUTOUTS AND ONE FOR LIGHTNING ARRESTERS. (i)
- (E) WRAP HALF OF EXPOSED ALUMINUM PORTION OF PIN CONNECTOR WITH SILICONE TAPE TO PREVENT CORROSION. INSERT PIN INTO BOTTOM OF CUTOUT CLAMP.

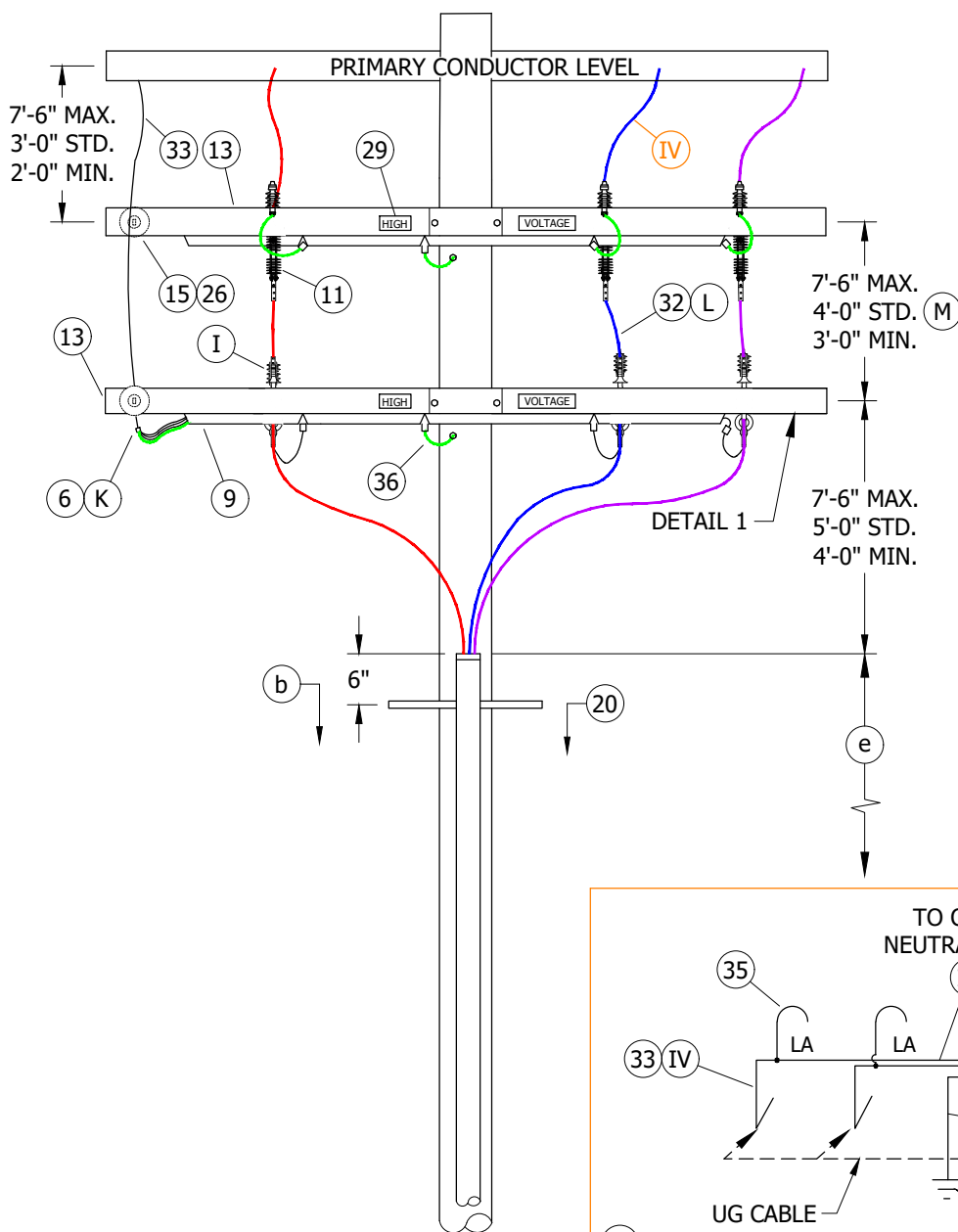
- I INSTALL TERMINATION BY FOLLOWING MANUFACTURER'S INSTRUCTIONS INCLUDED IN KIT.
- II USE FIGURE 1 FOR ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH NEUTRAL ON OUTSIDE PIN POSITION. (j)
- III NEW CONSTRUCTION SHALL USE AERIAL CABLE CONSTRUCTION FOR SECONDARY APPLICATIONS. EXISTING CONSTRUCTION CAN USE CROSSARMS FOR OPEN WIRE SECONDARY CONSTRUCTION. (h)
- IV MINIMUM 230A COPPER WIRE REQUIRED (OPTION FOR USE OF COVERED WIRE).
- V NOT SHOWN ON FIGURES.
- X THIS ITEM IS EXEMPT.

- a ALLOWABLE WORKING AND CLIMBING SPACE, SEE OH251.
- b POLE STEPPING, SEE OH363.
- c GROUNDING METHODS, SEE OH1002.
- d FOR FUSING, SEE OH SECTION 1200 AND UG SECTION 4300.
- e RISER POSITIONS, SEE OH1402UG4202.
- f MINIMUM VERTICAL SEPARATION PER G.O. 95, SEE OH1406UG4206.
- g VISE-TOP INSULATORS, SEE OH750.
- h SECONDARY CABLE CONSTRUCTION, SEE OH612.
- i FOR BONDING, SEE **CONTAMINATION DISTRICTS** OH287.
- j SEE DM5124.2.

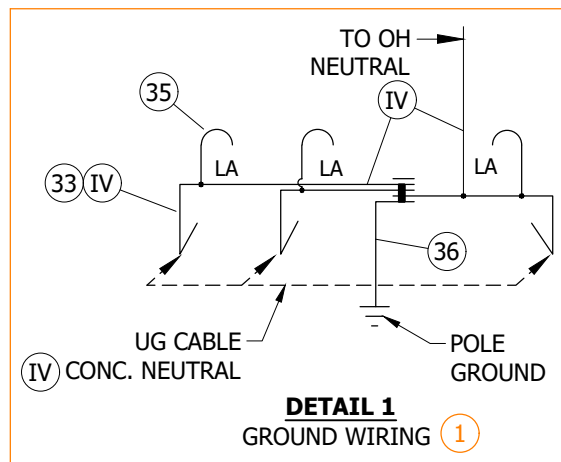
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|-----------------|--------------------|---|---------------------------|-----|-----|--------------------|-----|----------|----|---------------------|-----|-----|------|----------------------|
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| A               | COMPLETELY REVISED | -   | JBH                       | IL  | MDJ | 9/8/2016           | D   |          |    |                     |     |     |      |                      |
| SHEET<br>4 OF 4 |                    | X   | Indicates Latest Revision |     |     | Completely Revised |     | New Page |    | Information Removed |     |     |      | OH1440.4<br>UG4240.4 |
|                 |                    | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  |                           |     |     |                    |     |          |    |                     |     |     |      |                      |
|                 |                    | 12.47KV AND BELOW CROSSARM CABLE POLE,<br>SINGLE-PHASE AND THREE-PHASE, 1/C PER PHASE,<br>NON-PORCELAIN TERMINALS |                           |     |     |                    |     |          |    |                     |     |     |      |                      |



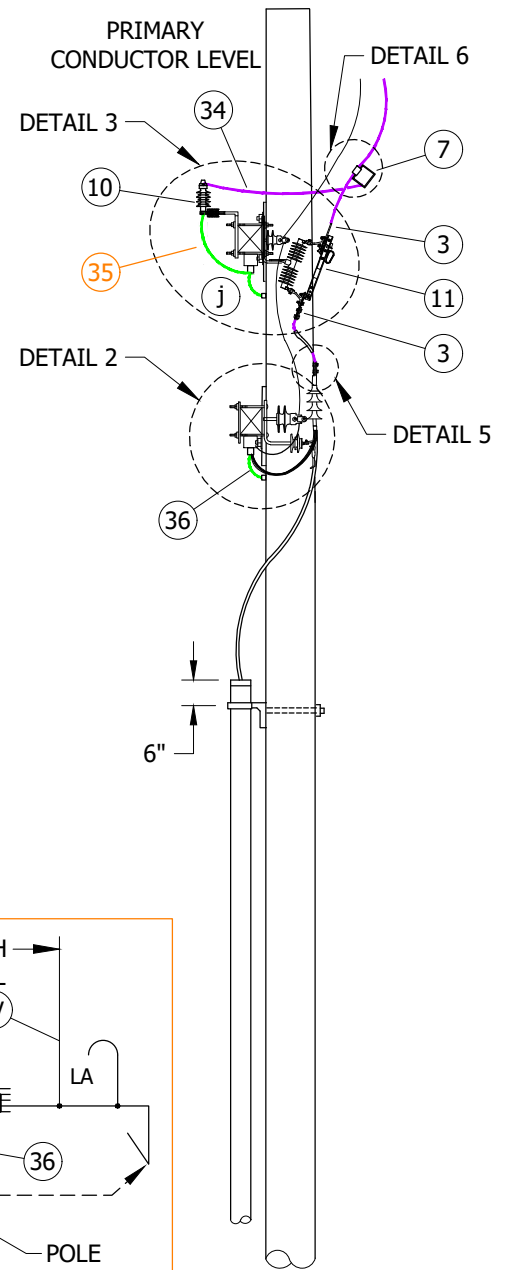
**SCOPE:** THIS STANDARD ILLUSTRATES THE CONSTRUCTION METHODS FOR 3-PHASE 12KV 350-1000KCM UNDERGROUND CABLE USING 900A DISCONNECTS.



**FIGURE 1**  
BACK VIEW OF ARM



**DETAIL 1**  
GROUND WIRING ①



**FIGURE 1**  
SIDE VIEW

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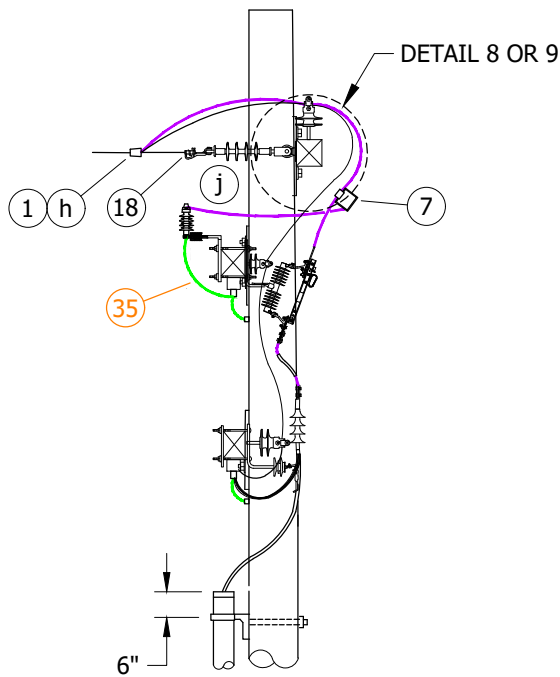
**SHEET**  
**1 OF 6**

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

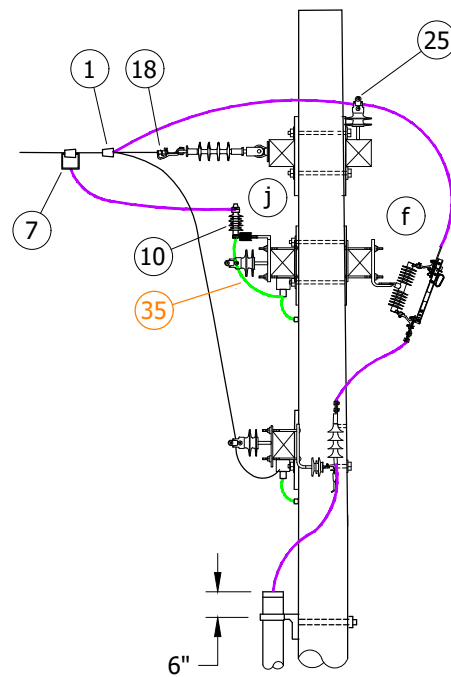
THREE PHASE, CABLE-POLE-12KV,  
NON-PORCELAIN 900 AMP DISCONNECT  
PREFERRED METHOD

OH1442.1  
UG4242.1



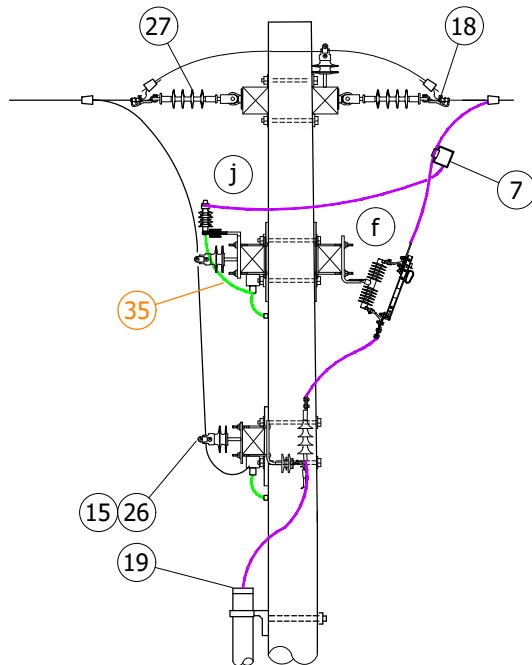


**FIGURE 2**  
SIDE VIEW

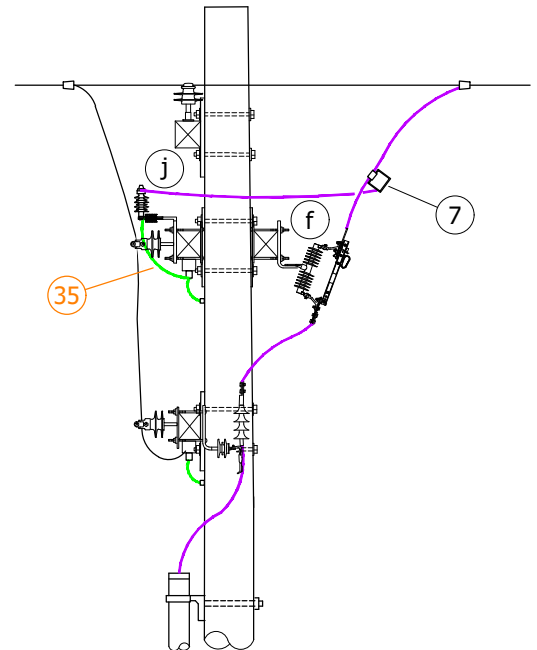


**FIGURE 3**  
SIDE VIEW

ILLUSTRATES SECOND ARM FOR BONDING



**FIGURE 4**  
SIDE VIEW



**FIGURE 5**  
SIDE VIEW

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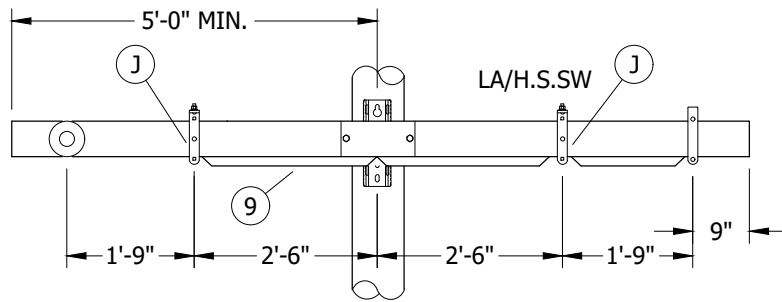
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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

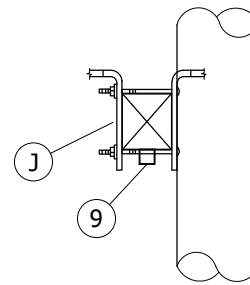
THREE PHASE, CABLE-POLE-12KV,  
NON-PORCELAIN 900 AMP DISCONNECT  
OPTIONAL METHOD

OH1442.2  
UG4242.2

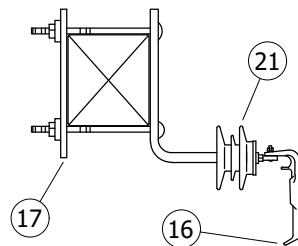




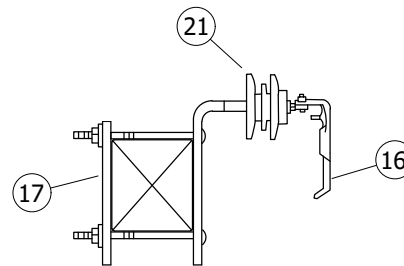
**DETAIL 1**  
FRONT VIEW  
CONDUIT WITH CABLE SUPPORT BRACKETS



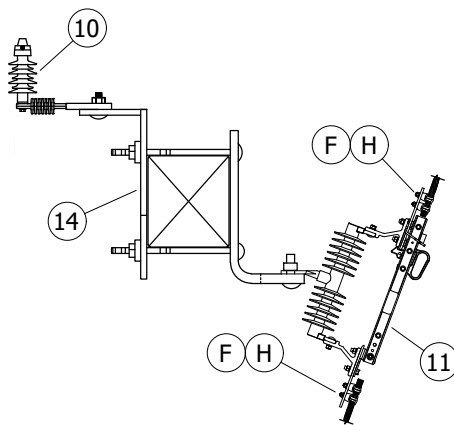
**DETAIL 1**  
SIDE VIEW, ENLARGED  
CONDUIT WITH CABLE SUPPORT BRACKETS



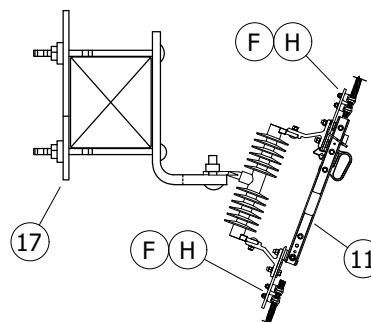
**DETAIL 2**  
PREFERRED BRACKET  
CONFIGURATION



**DETAIL 2**  
OPTIONAL BRACKET  
CONFIGURATION  
(NOT SHOWN)



**DETAIL 3**  
DOUBLE BRACKET



**DETAIL 4**  
SINGLE BRACKET

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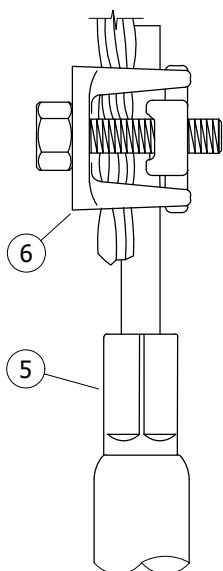
SHEET  
3 OF 6

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

THREE PHASE, CABLE-POLE-12KV,  
NON-PORCELAIN 900 AMP DISCONNECT

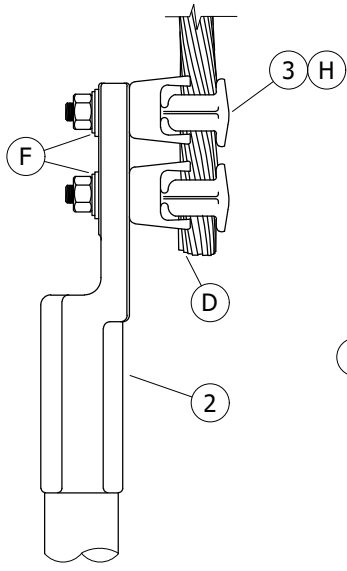
OH1442.3  
UG4242.3



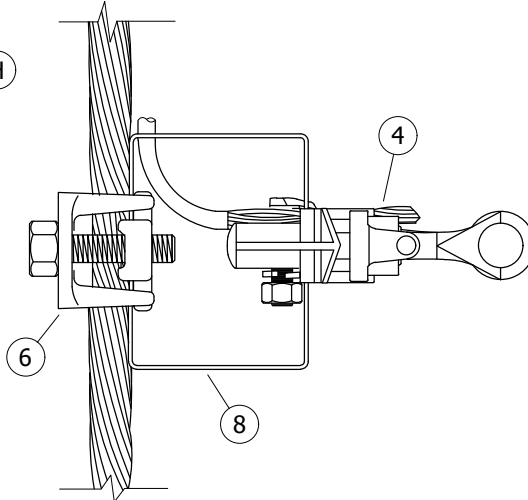


**DETAIL 5**  
OPTION 1

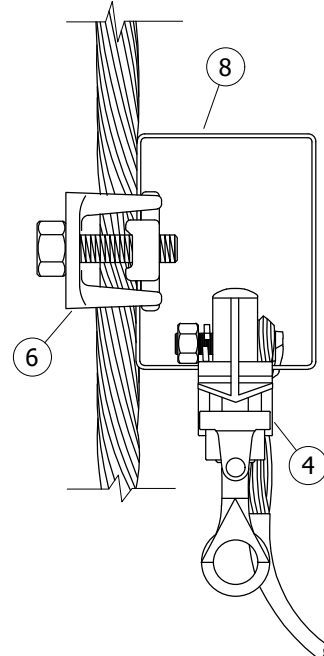
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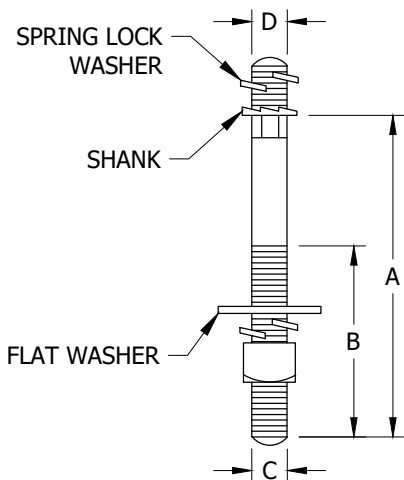
**DETAIL 5**  
OPTION 2



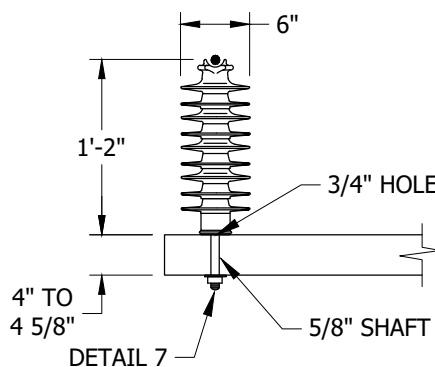
**DETAIL 6**  
OPTION 1



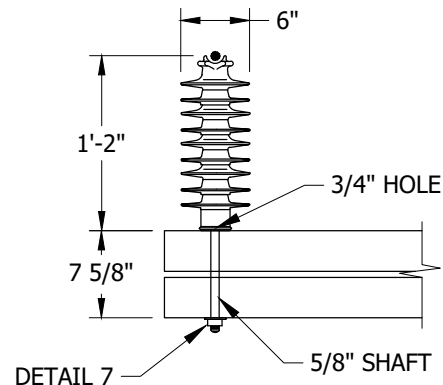
**DETAIL 6**  
OPTION 2



**DETAIL 7**  
INSULATOR PIN FOR  
35KV INSULATORS



**DETAIL 8**  
35KV F-NECK INSULATOR  
TANGENT OR SINGLE DEADEND ARM



**DETAIL 9**  
35KV F-NECK INSULATOR  
STACKED ARM

**TABLE 1**

| DESCRIPTION                                   | A      | B      | C      | D      | STOCK NUMBER | DESIGN UNITS |
|---|--------|--------|--------|--------|--------------|--------------|
| HARDWARE POST INSULATOR STUD, FIBERGLASS,WOOD | 7 1/2" | 3 1/2" | 4 1/2" | 3/4"   | S701760      | STUD-W       |
|   | 10"    | 4"     | 5/8"   | 1 3/4" | S701762      | STUD-L       |

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

THREE PHASE, CABLE-POLE-12KV,  
NON-PORCELAIN 900 AMP DISCONNECT

OH1442.4  
UG4242.4



**INSTALLATION:**

- A. NEW CABLE POLES SHALL HAVE A STANDARD DEPTH OF 9 FEET. IN MOST CASES, THIS WILL REQUIRE A 5-FOOT TALLER POLE.
- B. THIS CONSTRUCTION TO BE USED WITH 350 AND LARGER UNDERGROUND CABLE.
- C. INTERCONNECT OVERHEAD NEUTRAL, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.
- (D) INSTALLATION OF WIRE CAN BE MADE ON EITHER SIDE OF TERMINAL COMPRESSION LUG.
- (E) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.
- (F) BRUSH WIRE, INSTALL PENETROX "INHIBITOR" AND BELLEVILLE WASHER.
- G. DIMENSIONS CAN VARY BASED ON CROSSARM SIZE AND/OR CONFIGURATION.
- (H) REQUIRES TWO TAP LUGS PER CONNECTION.
- (J) **ARM MAY BE DRILLED** TO REPOSITION BOTTOM BOLT ALLOWING CONDUIT TO SET FLUSH ON BOTTOM OF CROSSARM.
- (K) CONCENTRIC WITH POLE GROUND, CONNECTION AREA.
- (L) MAINTAIN SIX INCHES OF BARE WIRE BELOW DISCONNECT FOR PROPER GROUNDING OF UNDERGROUND CABLE.
- (M) CENTER OF CUTOUT ARM SHALL NOT BE MOUNTED HIGHER THAN THIRTY-FIVE FEET FROM GROUND.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | WIRE RANGE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | SAP CU  |
|------|--|------------|----------|---------------|--------------|--------------|---------|
| 1    | CONNECTOR, WEDGE (PREFERRED)                                     | --         | AS REQ'D | 783           | --           | --           | --      |
| 2    | CONNECTOR, TERMINAL COMPRESSION LUG                              | --         | AS REQ'D | 4174.2        | --           | --           | --      |
| 3    | CONNECTOR, TAP LUG, 1/0 TO 500MCM CU TAP LUG - BRONZE            | --         | 12 TO 18 | --            | S471232      | TL1/0        | TL1/0   |
| 4    | CONNECTOR, CLAMP, HOT LINE                                       | --         | 3        | 788           | S227680 (X)  | --           | --      |
| 5    | CONNECTOR PIN (PREFERRED) UNDERGROUND STANDARD                   | --         | AS REQ'D | UG4111.2      | --           | --           | --      |
| 6    | CONNECTOR, BRONZE, 2 BOLT, CONNECTOR, COPPER TAP 3/0-1000        | --         | --       | --            | S262370 (X)  | CN1000       | CN1000  |
| 7    | CONNECTOR, WEDGE, STIRRUP OR BAIL, #2 SOLID CU                   | --         | 3        | 783           | --           | --           | --      |
| 8    | CONNECTOR, STIRRUP, BAIL, #2 TIN PLATED CU                       | --         | AS REQ'D | --            | S227650      | BAIL         | BAIL    |
| 9    | CONDUIT, SQ. 2" X 2" X 10'-0" PVC (SQUARE)                       | --         | AS REQ'D | --            | S251534      | SQC-2        | SQC-2   |
|      | CONDUIT, SCH 40, 2" X 10'-0" PVC (ROUND)                         | --         | AS REQ'D | --            | S251296      | PVC2         | PVC2    |
| 10   | EQUIPMENT, ARRESTER, LIGHTNING                                   | --         | 3        | 1247.2        | S113248      | LA12         | LA12    |
| 11   | EQUIPMENT, POLYMER, SINGLE-DISC, 900A, SWITCH, CABLE POLE        | --         | 3        | --            | S707004 (VI) | P900DC       | P900DC  |
|      |  |            |          |               | S706670 (V)  | PS900        | --      |
| 12   | GROUNDING, #4 PVC GRND WIRE, RODS, CONN-STEEL POLE (II)          | --         | 1        | 1002          | --           | GNDPSP       | GNDPSP  |
|      | GROUNDING, WIRE, #4 PVC, RODS & CONNECTORS (FOR WOOD POLES) (II) | --         | --       | --            | --           | GNDPVC       | GNDPVC  |
| 13   | HARDWARE, CROSSARM, FIBERGLASS, 10'-0", 4 PIN TANGENT (MINIMUM)  | --         | AS REQ'D | 379           | S294378      | 4TF          | 4TF     |
| 14   | HARDWARE, BRACKET, DOUBLE, CUTOUT, ARRESTER                      | --         | 3        | --            | S165454      | DBLBKT       | DBLBKT  |
| 15   | HARDWARE, STAND OFF PIN, 1 3/8" (E)                              | --         | 2        | 396           | S529214      | PS/O1+       | PS/O1LG |
| 16   | HARDWARE, BRACKET, CABLE SUPPORT, WITH POLY                      | --         | 3        | 4207          | S166064      | NP-BKT       | NP-BKT  |
| 17   | HARDWARE, BRACKET, CUTOUT/ARRESTER CROSSARM MOUNTING             | --         | 3        | 397           | S165452 (X)  | CO/B         | --      |
| 18   | HARDWARE, CLAMP, STRAIGHT LINE, D.E. (AS NEEDED) (II)            | --         | AS REQ'D | 739           | --           | --           | --      |
| 19   | HARDWARE, GRIP, RISER, 5-INCH, KELLEMS (1000 AL)                 | --         | AS REQ'D | 4204          | S394098      | 5G1000       | 5G1000  |
| 20   | HARDWARE, RISER ARM BRACKET & 24" CHANNEL (ASSEMBLY)             | --         | AS REQ'D | 1404/4204     | --           | RSRARM (I)   | RSRARM  |
| 21   | HARDWARE, STANDOFF (350MCM AND ABOVE) (OPTIONAL)                 | --         | AS REQ'D | --            | S429040 (X)  | --           | --      |
| 22   | HARDWARE, PIN, POST, STUD, FG/WOOD (STANDARD ARM) (II)           | --         | AS REQ'D | 396.2         | S701760      | STUD-W       | STUD-W  |
| 23   | HARDWARE, PIN, POST, STUD, FG/WOOD (STACKED DEADEND ARM) (II)    | --         | AS REQ'D | 396.2         | S701762      | STUD-L       | STUD-L  |

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| A   | REVISION          | -   | -   | PEA | JJ  | 10/20/2005 | D   | DRAWING UPDATE | EDM | DWC | JES | CZH | 12/11/2020 |

|                 |   |                           |                    |          |                     |                      |
|-----------------|---|---------------------------|--------------------|----------|---------------------|----------------------|
| SHEET<br>5 OF 6 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1442.5<br>UG4242.5 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS    |                           |                    |          |                     |                      |
|                 | THREE PHASE, CABLE-POLE-12KV,<br>NON-PORCELAIN 900 AMP DISCONNECT |                           |                    |          |                     |                      |



**BILL OF MATERIALS: (CONT'D)**

| ITEM | DESCRIPTION  | WIRE RANGE | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | SAP CU  |
|------|--|------------|----------|---------------|--------------|--------------|---------|
| 24   | HARDWARE,PIN, 1 3/8" COBB FORGED STEEL GALV. (II)            | --         | 2        | --            | S532448      | PS1+         | PS1LG   |
| 25   | INSULATOR, VICE TOP, PIN, 1 3/8", UNIVERSAL (9)              | --         | 3 TO 4   | 750.2         | S429272      | IPULG        | IPULG   |
| 26   | INSULATOR, WHITE, NEUTRAL, "F" NECK, 1 3/8" PIN (OPTIONAL)   | --         | 2        | --            | S432220      | IWN          | IWN     |
| 27   | INSULATOR, SUSPENSION, 35KV, POLYMER                         | --         | AS REQ'D | 750.3         | S428958      | LONGDE       | LONGDE  |
| 28   | INSULATOR, HENDRIX 35KV POLY LINE POST (II)                  | --         | AS REQ'D | 750           | S429144      | LP-14F       | LP-14F  |
| 29   | STICKER, "HIGH VOLTAGE", VINYL, ADHESIVE                     | --         | AS REQ'D | 208.3         | S647650 (X)  | --           | --      |
| 30   | STICKER, TAGS, SWITCH NUMBER                                 | --         | --       | 208           | --           | --           | --      |
| 31   | STICKER, "PN", VINYL, ADHESIVE                               | --         | AS REQ'D | --            | S648004 (X)  | --           | --      |
| 32   | WIRE, 500 STR. CU, BARE (III)                                | --         | AS REQ'D | 711           | S813792      | BS500        | BS500   |
| 33   | WIRE, 4/0 STR. CU, SOFT-DRAWN, COVERED (CONCENTRIC BUS WIRE) | --         | 30'-0"   | 711           | S812126      | HEND4/0      | HEND4/0 |
| 34   | WIRE, POLY COVERED 4/7 STRAND COPPER                         | --         | AS REQ'D | 711           | S815044      | POLY4J       | POLY4J  |
| 35   | STRAP, ARRESTER GROUND                                       | --         | AS REQ'D | 1002          | S698754      | LAGND        | LAGND   |
| 36   | WIRE, POLY COVERED, #4 SOLID COPPER (POLE GROUND)            | --         | AS REQ'D | 711           | S812490      | POLY4        | POLY4   |
| 37   | WILDLIFE, COVER, 900A DISCONNECT (AS REQ'D) (II)             | --         | 3        | 1620.7        | S286948      | 9COCVR       | 9COCVR  |

**NOTES:**

- (I) MINIMUM CROSSARM TEN-FOOT.
- (II) NOT SHOWN ON FIGURES.
- (III) WIRE SIZE IS APPLICABLE TO AMPERAGE OF PRIMARY SOURCE.
- (IV) MINIMUM 480A COPPER WIRE REQUIRED (OPTION FOR USE OF COVERED WIRE).
- (V) REQUIRED IN CONTAMINATION DISTRICT 1 AND PREFERRED IN COASTAL DISTRICTS (OC, NC, BC, CM).
- (VI) PREFERRED FOR INLAND DISTRICTS (NE, RA, EA, ME).
- (X) THIS ITEM IS EXEMPT.

**REFERENCE:**

- a. ALLOWABLE WORKING AND CLIMBING SPACE - SEE OH251.
- b. POLE STEPPING - SEE OH363.
- c. GROUNDING METHODS - SEE OH1002.
- d. RISER POSITION - SEE OH1404/UG4204.
- e. MINIMUM VERTICAL SEPARATION AS PER G.O. 95 - SEE OH1406/UG4206.
- f. FOR BONDING GENERAL INFORMATION - SEE OH1003.
- g. PER CONTAMINATION DISTRICT REQUIREMENTS - SEE OH287.
- h. REFERENCE GELPACT - SEE OH783.16.
- i. MINIMUM CROSSARM BOLT REQUIREMENT - SEE OH379.
- j. FIBERGLASS CROSSARM GROUNDING DETAIL OPTION, SEE OH1002.1. FIGURE 5 AND FIGURE 6.

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|-----|-------------------|-----|-----|-----|-----|------------|-----|----------------|-----|-----|-----|-----|------------|
| C   | FIGURE UPDATE     | EDM | DWC | JES | CZH | 3/9/2020   | F   |                |     |     |     |     |            |
| B   | EDITORIAL CHANGES | -   | GW  | JS  | MDJ | 4/1/2018   | E   |                |     |     |     |     |            |
| A   | REVISION          | -   | -   | PEA | JJ  | 10/20/2005 | D   | DRAWING UPDATE | EDM | DWC | JES | CZH | 12/11/2020 |

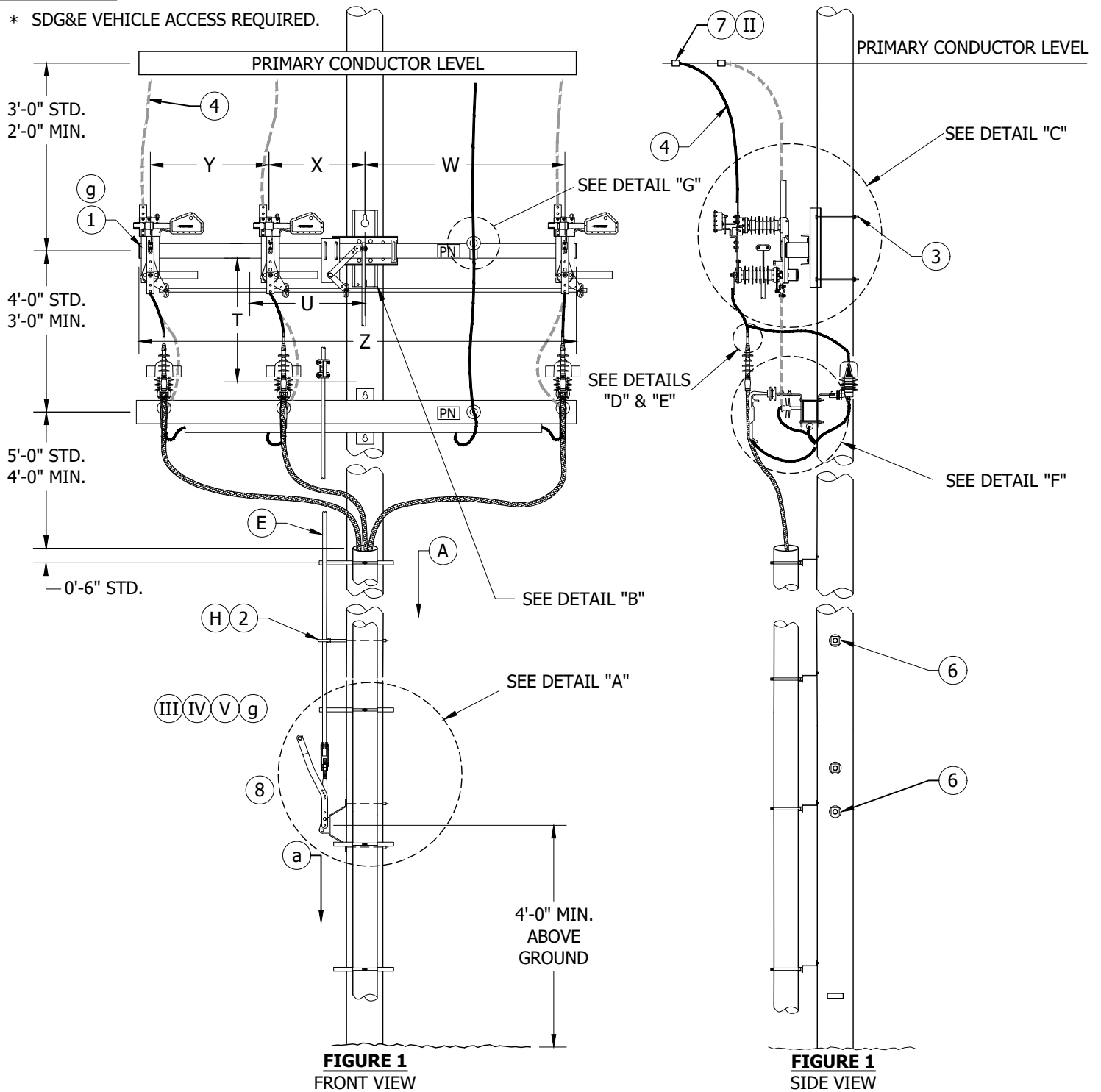
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|-----------------|---|---------------------------|--------------------|----------|---------------------|----------------------|
| SHEET<br>6 OF 6 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1442.6<br>UG4242.6 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS    |                           |                    |          |                     |                      |
|                 | THREE PHASE, CABLE-POLE-12KV,<br>NON-PORCELAIN 900 AMP DISCONNECT |                           |                    |          |                     |                      |



**SCOPE:** THIS STANDARD SHOWS A SIDE BREAK GANG OPERATED POLE TOP 900AMP RISER MOUNTING SWITCH FOR CIRCUIT TIES OR SECTIONALIZING PURPOSES.

**ATTENTION:**

\* SDG&E VEHICLE ACCESS REQUIRED.



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| B   | NOTES UPDATE       | MRF | JES  | CZH  | 04/13/2020 | E   |        |    |      |      |      |
| A   | COMPLETELY REVISED | MRF | JES  | CZH  | 7/16/2019  | D   |        |    |      |      |      |

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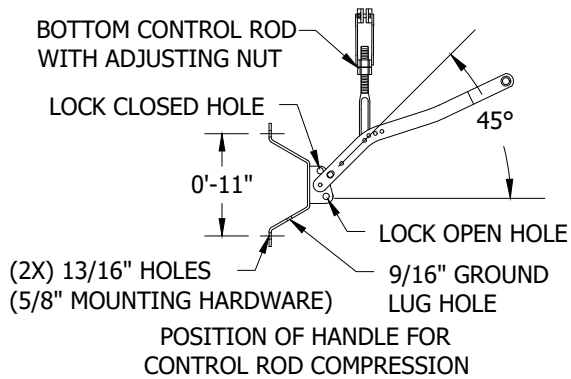
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

POLE TOP SWITCH 12KV  
RISER LOADBREAK TYPE SINGLE CIRCUIT

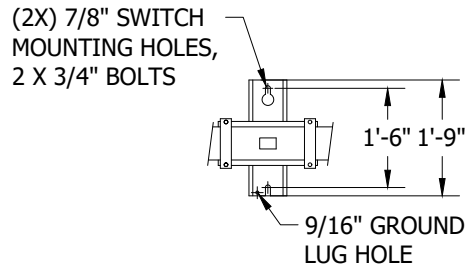
OH1444.1  
UG4244.1

SHEET  
1 OF 5

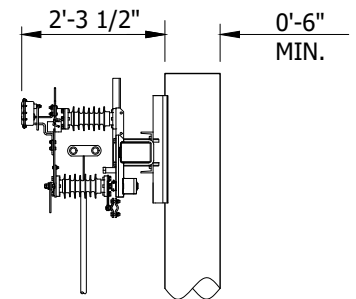




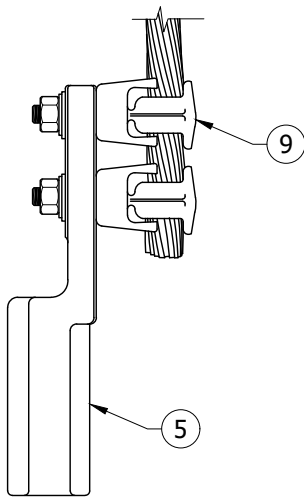
**DETAIL "A"**  
CONTROL HANDLE



**DETAIL "B"**  
MOUNTING BRACKET

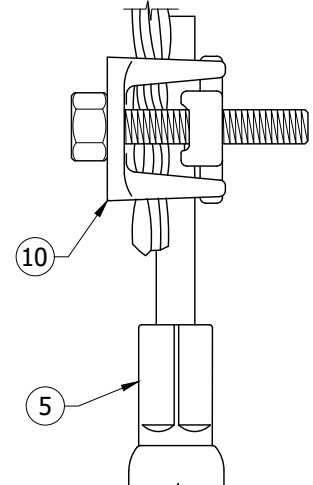
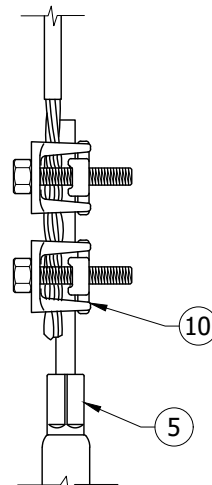


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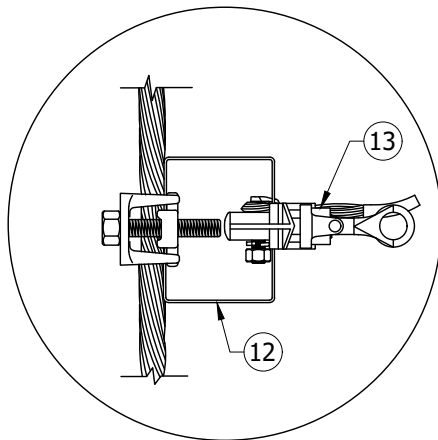


2/0 AND BELOW

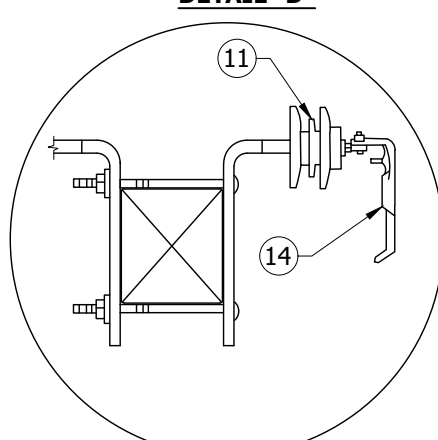
**DETAIL "D"**



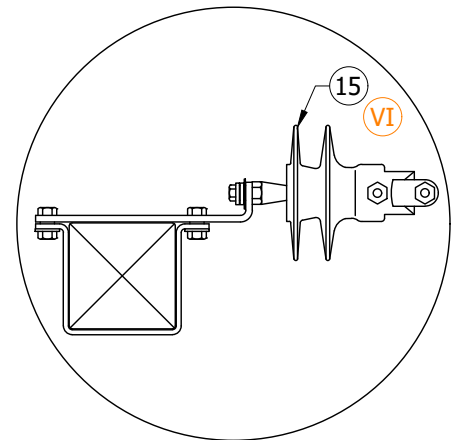
350 AND ABOVE



**DETAIL "E"**



**DETAIL "F"**



**DETAIL "G"**

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 SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  
 POLE TOP SWITCH 12KV  
 RISER LOADBREAK TYPE SINGLE CIRCUIT

OH1444.2  
UG4244.2



**TABLE 1**

| SWITCH CONFIGURATIONS |                      |        |        |        |        |                 |                 |                 |                        |
|-----------------------|----------------------|--------|--------|--------|--------|-----------------|-----------------|-----------------|------------------------|
| TYPE                  | SWITCH WEIGHT (LBS.) | Z (IN) | Y (IN) | X (IN) | W (IN) | U (IN)<br>BRACE | T (IN)<br>BRACE | STOCK<br>NUMBER | DESIGN UNITS<br>SAP CU |
| CENTER PH. LEFT       | 240                  | 120    | 33     | 26     | 55     | 31-5/8          | 34-1/8          | S709312         | RGS10L                 |
| CENTER PH. RIGHT      | 240                  | 120    | 33     | 24     | 57     | 31-5/8          | 34-1/8          | S709310         | RGS10R                 |
| CENTER PH. LEFT       | 250                  | 144    | 33     | 36     | 69     | 31-5/8          | 34-1/8          | S709316         | RGS12L                 |
| CENTER PH. RIGHT      | 250                  | 144    | 33     | 36     | 69     | 31-5/8          | 34-1/8          | S709314         | RGS12R                 |
| CENTER PH. LEFT       | 265                  | 180    | 33     | 54     | 87     | 44-7/8          | 47-5/8          | S709320         | RGS15L                 |
| CENTER PH. RIGHT      | 265                  | 180    | 33     | 54     | 87     | 44-7/8          | 47-5/8          | S709318         | RGS15R                 |

**INSTALLATION:**

- (A) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIE SWITCHES AND SERVICE RESTORER POLES. (d)
- (B) NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS OF WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES CIRCUIT TIES. (e)

**RECIPROCATING CONTROL ROD SWITCH INSTALLATION**

- C. THE SWITCH IS SUPPLIED WITH THE CONTACTS TIED IN THE CLOSED POSITION. DO NOT CUT THESE TIES UNTIL THE SWITCH AND CONTROL ROD INSTALLATION IS COMPLETE.
- D. PROVIDED V-BRACES ARE REQUIRED ON FIFTEEN FOOT SWITCHES.
- (E) VERIFY THE POLE QUADRANT WHERE THE CONTROL ROD WILL BE INSTALLED.
- F. THE OPERATING HANDLE SHOULD BE LOCATED 42" FROM GROUND GRADE, OR AT ANY INCREASED ELEVATION.
- G. DRILL 13/16" SWITCH MOUNTING HOLES ACCORDING TO THE DIMENSION GIVEN ON THE CONSTRUCTION DRAWING. INSTALL SWITCH WITH 3/4" BOLTS AND SHEAR PLATES AS REQUIRED BY CONSTRUCTION STANDARDS.
- (H) INSTALL CONTROL ROD, WORKING FROM THE SWITCH DOWN TO THE OPERATING HANDLE. INSTALL CONTROL ROD GUIDES AS SHOWN ON THE CONSTRUCTION DRAWING. MAKE CERTAIN THAT THE SWITCH IS IN THE CLOSED POSITION PRIOR TO DRILLING HOLES FOR THE CONTROL ROD GUIDES. SWING ARM STYLE GUIDES SHOULD POINT UPWARDS AT 45 DEGREES WHEN THE SWITCH IS CLOSED. CHECK THAT 17" MINIMUM SPACE IS AVAILABLE ABOVE EYEBOLT GUIDES FOR CONTROL ROD SPLICES WHEN EYE BOLT TYPE GUIDES ARE USED (1" FIBERGLASS AND 3/4" PIPE ONLY). MINIMUM TWO GUIDES PER TEN FOOT SECTION OF CONTROL ROD.
- J. DRILL CONTROL HANDLE MOUNTING BOLT HOLES AT THE DESIRED LOCATION (42" MINIMUM HEIGHT) ATTACH THE MANUAL OPERATING HANDLE ADJUSTING SCREW CLAMP, OR FITTING TO THE CONTROL ROD SECTION. PUT THE HANDLE IN THE "UP" POSITION. CONNECT THE CONTROL HANDLE ADJUSTING SCREW CLAMP OR FITTING TO THE CONTROL ROD. A COMPRESSIVE LOAD (20-30 LBS.) SHOULD BE FELT ON THE CONTROL AS THE CONTROL MOVES TO THE FULLY CLOSED/LOCKED POSITION. USE THE ADJUSTING SCREW TO ACHIEVE THE PROPER COMPRESSION LOAD.
- K. CHECK ALL BOLTS TO ENSURE THAT THEY HAVE BEEN ADEQUATELY TORQUED.
- L. CUT THE TIE WIRES ON THE SWITCH CONTACT BLADES.
- M. OPERATE THE SWITCH TO OPEN. VERIFY THAT THE PADLOCKING HOLES ON THE HANDLE AND THE HANDLE BASE ALIGN, SWITCH CONTACTS FULLY ENGAGED/CLOSED.

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| SHEET<br>3 OF 5 | <div><div>X</div><div>Indicates Latest Revision</div></div>    | Completely Revised | New Page | Information Removed | OH1444.3<br>UG4244.3 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                    |          |                     |                      |
|                 | POLE TOP SWITCH 12KV<br>RISER LOADBREAK TYPE SINGLE CIRCUIT    |                    |          |                     |                      |



- N. CLOSE THE SWITCH AND CHECK FOR COMPRESSION IN THE CONTROL ROD.
- ADJUSTING THE CONTROL ROD COMPRESSION.
1. PULL THE HANDLE DOWNWARD TO ABOUT 45° FROM THE VERTICAL CLOSED POSITION.
  2. EXTEND THE ADJUSTING SCREW SO THAT THE SLACK IS REMOVED FROM THE CONTROL ROD AND THE HANDLE REQUIRES 20 TO 30 POUNDS OF FORCE TO MAKE IT "TOGGLE" TO THE FULLY CLOSED POSITION.
  3. CHECK THAT THE CLOSE PADLOCK HOLE ON THE HANDLE AND THE HANDLE BASE ALIGN.
  4. TIGHTEN THE ADJUSTING NUT/LOCK-NUT.
- O. OPERATE THE SWITCH SEVERAL TIMES USING A RAPID MOTION THROUGHOUT THE HANDLE ROTATION. SWING THE HANDLE DOWN TO REMOVE THE TOGGLE LOAD AND OPERATE THE SWITCH IN ONE SWIFT MOTION WHEN OPENING THE SWITCH. CLOSE THE SWITCH USING A CONTINUOUS MOTION.
- P. VERIFY THAT THE SWITCH CONTACT BLADES ARE FULLY SEATED WHEN THE SWITCH IS CLOSED.
- Q. CHECK THE ARC-HORNS OR INTERRUPTERS ARE OPERATING PROPERLY. SEE THE APPROPRIATE INTERRUPTER INSTALLATION AND ADJUSTMENT INSTRUCTION SHEET INCLUDED IN THE SWITCH INSTALLATION DRAWING PACKAGE.

### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | WIRE RANGE  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|-------------|----------|---------------|--------------|--------------|
| 1    | SWITCH, GANG OPERATED, 15KV, 600 AMP WITH AMPRUPTER, INCLUDING 30' OF CONTROL ROD          |             | 1        | -             | SEE TABLE 1  | SEE TABLE 1  |
| 2    | ADDITIONAL 10' CONTROL ROD WITH 2 EYE NUTS AND COUPLING                                    |             | AS REQ'D | -             | TBD          | I-ROD        |
| 3    | BOLT, GALVANIZED, 3/4" X (LENGTH AS REQUIRED) 1 SQUARE CURVED AND 1 DBL COIL SPRING WASHER |             | 2        | 392           | -            | -            |
| 4    | WIRE, BARE STRAND OR POLY COVERED, (SIZE AS RQUIRED)                                       |             | AS REQ'D | 711-715       | -            | -            |
| 5    | TERMINAL, COMPRESSION LUG  |             | AS REQ'D | 794-795       | -            | -            |
|      | CONNECTOR PIN (PREFERRED) UNDERGROUND STANDARD   |             | AS REQ'D | 4111          | -            | -            |
| 6    | BOLT, GALVANIZED, 5/8" X (LENGTH AS REQUIRED) 1 SQUARE CURVED AND 1 DBL COIL SPRING WASHER |             | AS REQ'D | 392           | -            | -            |
| 7    | CONNECTOR, (SIZE AS REQUIRED)  |             | AS REQ'D | 783-786       | -            | -            |
| 8    | PADLOCK, SCHLAGE ELECTRIC SERIES   |             | 1        | -             | S514848      | -            |
| 9    | BRONZE EYE BOLT CLAMP  | 8 TO 2/0    | AS REQ'D | -             | S471312      | -            |
|      |  | 6 TO 250    | AS REQ'D | -             | S471296      | -            |
|      |  | 4/0 TO 500  | AS REQ'D | -             | S471232      | -            |
| 10   | COPPER TWO-BOLT CONNECTORS   | 2/0 & BELOW | AS REQ'D | -             | S262336      | CN4/0        |
|      |  | 350 & ABOVE | AS REQ'D | -             | S262370      | CN1000       |
| 11   | INSULATOR (OPTIONAL)   | -           | -        | -             | S429040      | -            |
| 12   | BAIL   | -           | AS REQ'D | -             | S227650      | BAIL         |
| 13   | HOTLINE CLAMP  | -           | AS REQ'D | 788           | -            | -            |
| 14   | BRACKET, CABLE SUPPORT, 350 AND ABOVE CABLE  | -           | -        | -             | S166064      | NP-BKT       |
| 15   | INSULATOR, VISE-TOP PIN, 1 INCH  | -           | -        | 750           | S429270      | IPU1         |
| 16   | ROD, CONTROL, FIBERGLASS 1" X 10' INERTIA SWITCH   | -           | AS REQ'D | -             | S602932      | I-ROD        |

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| C   |                    |     |      |      |            | F   |        |    |      |      |      |
| B   | NOTES UPDATE       | MRF | JES  | CZH  | 04/13/2020 | E   |        |    |      |      |      |
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|  |                           |                    |          |                     |
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| SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |
| POLE TOP SWITCH 12KV<br>RISER LOADBREAK TYPE SINGLE CIRCUIT    |                           |                    |          |                     |

**OH1444.4  
UG4244.4**



**NOTES:**

- I. SWITCH OPERATING RODS MAY EXTEND ONE-HALF THEIR DIAMETER INTO THE CLIMBING SPACE. (d)
- II. IN CONTAMINATION DISTRICT 1, COMPRESSION OR WEDGE CONNECTORS ARE PREFERRED. IN CONTAMINATION DISTRICTS 2 & 3, STIRRUP WEDGE CONNECTORS ARE PREFERRED FOR UG CABLE 2/0 AND BELOW, AND WEDGE CONNECTORS ARE PREFERRED FOR UG CABLE 350 AND ABOVE.
- III. CONTROL ROD IS SHOWN ROTATED 90 DEGREES TO THE LEFT TO ALLOW FOR EXTERNAL RISERS ALONG FACE OF POLE.
- IV. SWITCH HANDLE SHOWN IN CLOSED POSITION.
- V. SWITCH HANDLE CAN BE ROTATED UP TO 180 DEGREES FROM FACE OF POLE IN EITHER DIRECTION.
- VI. ORIENT SWITCH ARM BRACE BRACKET 180 DEGREES FROM NORMAL POSITION FOR USE AS MOUNTING BRACKET FOR THE NEUTRAL STANDOFF.

**REFERENCE:**

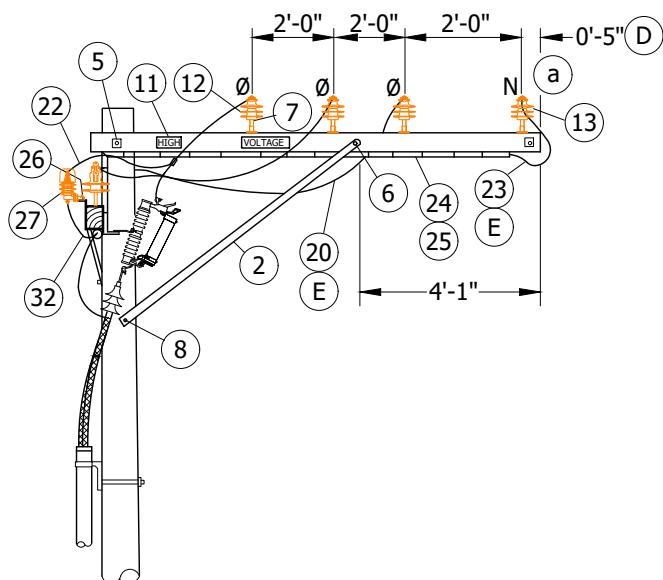
- a. POLE STEPPING - SEE OH363.
- b. SEE DESIGN MANUAL PAGE 6111 - FEEDER CIRCUIT SECTIONALIZING AND PROTECTION.
- c. FOR CONDUCTOR CLEARANCE REFER TO G.O. 95, 54.7-A3.
- d. SEE OH208.3 ITEM 12.
- e. NEUTRAL REQUIREMENT. SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3.
- f. SEE OH1003 FOR BONDING REQUIREMENTS.
- g. SEE TABLE 1 FOR SWITCH CONFIGURATIONS.

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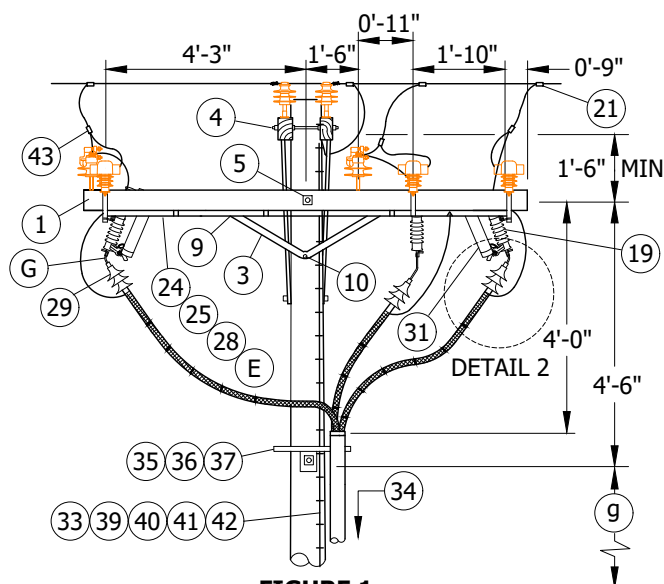
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|-----------------|--------------------|--|---------------------------|------|------------|--------------------|--------|----|----------|------|------|---------------------|--|----------------------|
| C               |                    |  |                           |      |            | F                  |        |    |          |      |      |                     |  |                      |
| B               | NOTES UPDATE       | MRF  | JES                       | CZH  | 04/13/2020 | E                  |        |    |          |      |      |                     |  |                      |
| A               | COMPLETELY REVISED | MRF  | JES                       | CZH  | 7/16/2019  | D                  |        |    |          |      |      |                     |  |                      |
| SHEET<br>5 OF 5 |                    | X  | Indicates Latest Revision |      |            | Completely Revised |        |    | New Page |      |      | Information Removed |  | OH1444.5<br>UG4244.5 |
|                 |                    | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |      |            |                    |        |    |          |      |      |                     |  |                      |
|                 |                    | POLE TOP SWITCH 12KV<br>RISER LOADBREAK TYPE SINGLE CIRCUIT    |                           |      |            |                    |        |    |          |      |      |                     |  |                      |



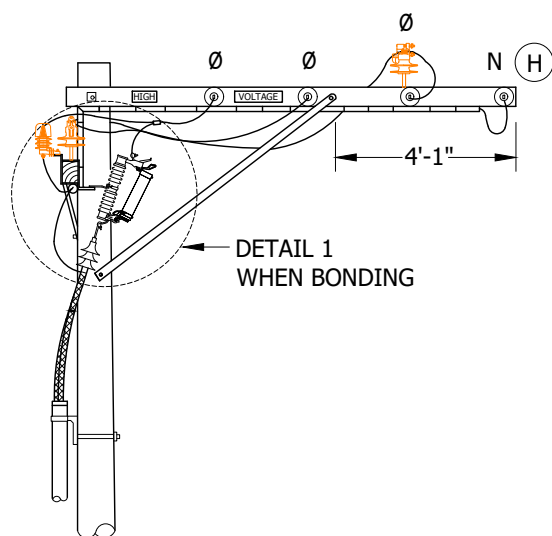
**SCOPE:** THIS STANDARD SHOWS ALLEY ARM CONSTRUCTION FOR 12.47KV AND BELOW, THREE-PHASE CABLE POLE USING NON-PORCELAIN TERMINALS WITH CROSSARM MOUNTED TERMINALS FOR #2/0 AND SMALLER U.G. CABLE. THIS CONSTRUCTION IS TO BE USED FOR ALL CONTAMINATION DISTRICTS.



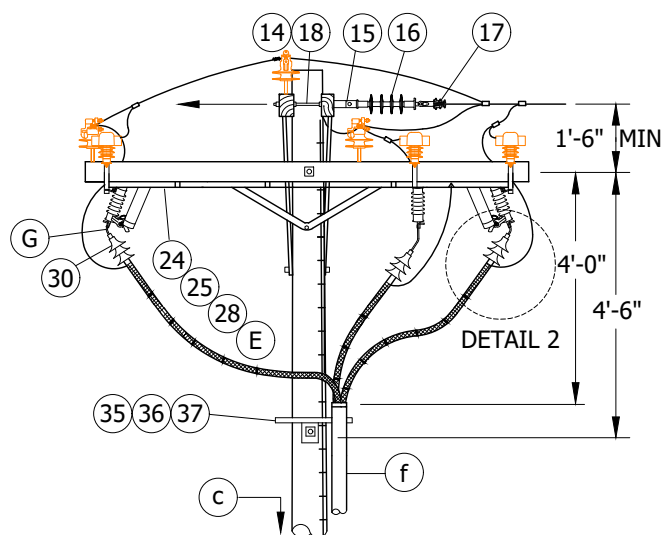
**FIGURE 1**  
TANGENT CONSTRUCTION  
SIDE VIEW



**FIGURE 1**  
TANGENT CONSTRUCTION  
FRONT VIEW



**FIGURE 2**  
DEADEND CONSTRUCTION  
SIDE VIEW



**FIGURE 2**  
DEADEND CONSTRUCTION  
FRONT VIEW

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| C   | TABLE UPDATE   | EDM | JK | JES | CZH | 4/13/2020  | F   |        |    |    |     |     |      |
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SHEET  
1 OF 5

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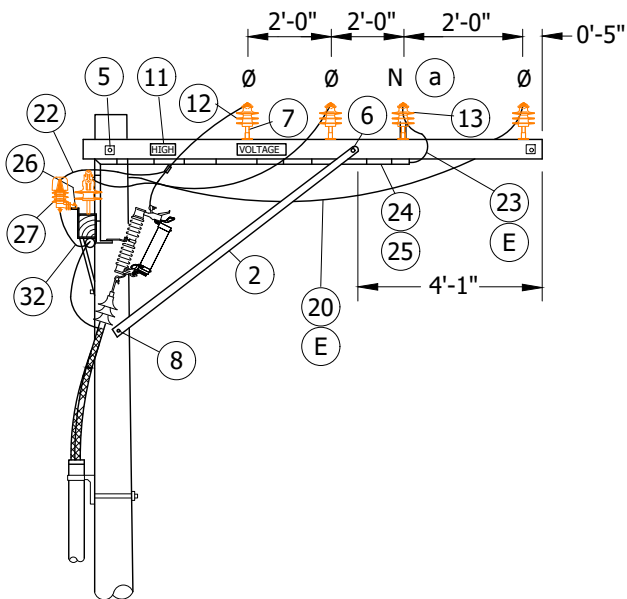
Information Removed

SDG&amp;E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

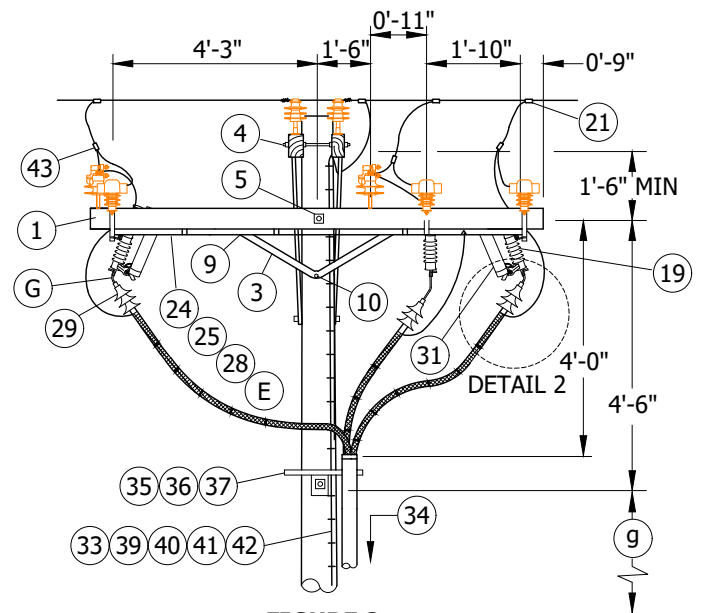
12.47KV AND BELOW CABLE POLE THREE-PHASE,  
1/C PER PHASE, ALLEY ARM CONSTRUCTION,  
NON-PORCELAIN TERMINALS

OH1447.1  
UG4247.1

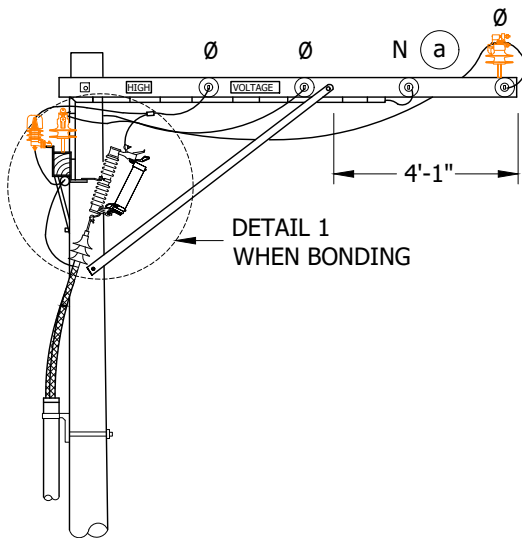




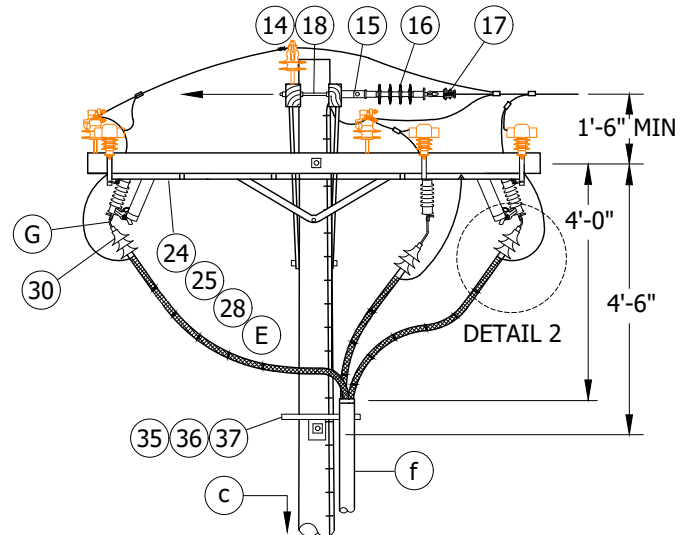
**FIGURE 3**  
TANGENT CONSTRUCTION  
SIDE VIEW



**FIGURE 3**  
TANGENT CONSTRUCTION  
FRONT VIEW



**FIGURE 4**  
DEADEND CONSTRUCTION  
SIDE VIEW



**FIGURE 4**  
DEADEND CONSTRUCTION  
FRONT VIEW

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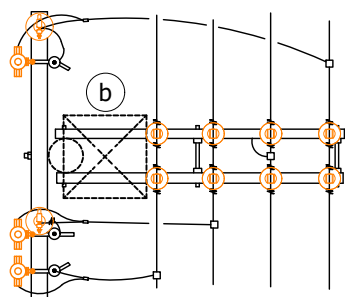
| REV | CHANGE         | DR  | BY | DSN | APV | DATE       | REV | CHANGE | DR | BY | DSN | APV | DATE |
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| SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  |                           |                    |          |                     |
| 12.47KV AND BELOW CABLE POLE THREE-PHASE,<br>1/C PER PHASE, ALLEY ARM CONSTRUCTION,<br>NON-PORCELAN TERMINALS |                           |                    |          |                     |

**SHEET**  
**2 OF 5**

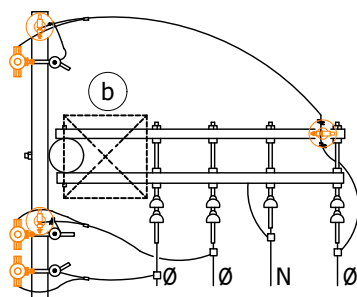
**OH1447.2**  
**UG4247.2**





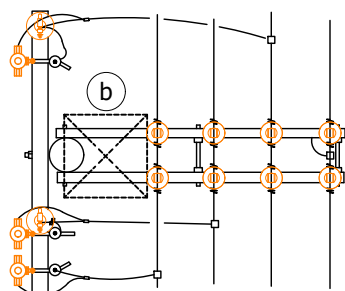
**FIGURE 5**

TANGENT CONSTRUCTION  
CLIMBING SPACE



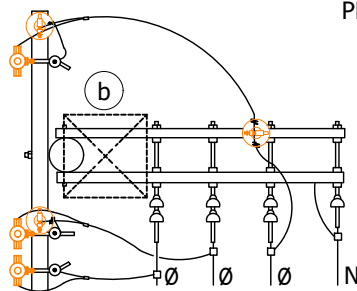
**FIGURE 6**

DEADEND CONSTRUCTION  
CLIMBING SPACE



**FIGURE 7**

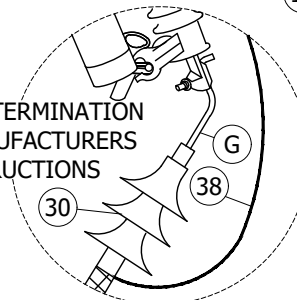
TANGENT CONSTRUCTION  
CLIMBING SPACE



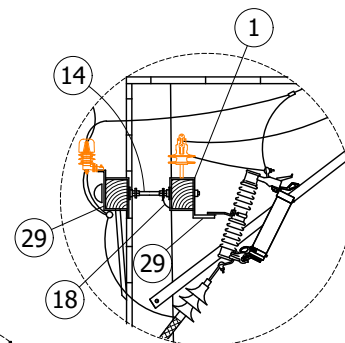
**FIGURE 8**

DEADEND CONSTRUCTION  
CLIMBING SPACE

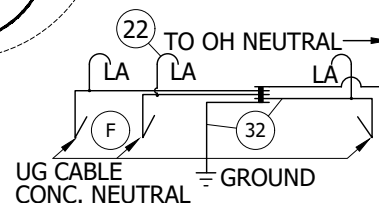
INSTALL TERMINATION  
PER MANUFACTURERS  
INSTRUCTIONS



**DETAIL 2**



**DETAIL 1** (D)



**DETAIL 3** (F)  
GROUND WIRING

## INSTALLATION:

- A. NEW CABLE POLES SHALL HAVE A STANDARD SETTING DEPTH OF 9'. IN MOST CASES THIS WILL REQUIRE A 5' TALLER POLE.
- B. THIS CONSTRUCTION TO BE USED WITH #2/0 AND SMALLER UNDERGROUND CABLE.
- (C) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.
- (D) BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS SHOWN ON STANDARD 287. IN AREAS WHERE BONDING IS REQUIRED, TO AVOID BONDWIRE AND LIGHTNING ARRESTER GROUNDWIRE ON THE SAME CROSSARM, USE TWO CROSSARMS; ONE FOR CUTOUTS AND ONE FOR LIGHTNING ARRESTERS. USE MATERIAL ITEMS (1), (14), (18) AND (29) WHEN ADDING CROSSARM.

**TABLE 1**

| (E) UG CABLE SIZE<br>AWG OR<br>KCMIL, AL | OH JUMPER COND<br>SIZE, AWG OR<br>KCMIL, CU | OH NEUT JUMPER SIZE |    |   | CABLE POLE NEUT SIZE (CU) UNDER<br>POTHEAD ARM<br>OR TRIPLE TERM BRKT |
|--|---|---------------------|----|---|---|
|  |   | CU                  | AL | - |   |
| 2  | 4   | 6                   | 2  | - | #6 PER PHASE  |
| 2/0                                      | 4   | 6                   | 2  | - | #6 PER PHASE  |

- (F) INTERCONNECT OVERHEAD NEUTRAL AND CONCENTRIC CABLE NEUTRAL CONDUCTORS TO LIGHTNING ARRESTER GROUND.
- (G) WRAP ONE HALF OF EXPOSED ALUMINUM PORTION OF PIN CONNECTOR WITH SILICONE TAPE (S/N 720384) TO PREVENT CORROSION. INSERT THE PIN INTO THE BOTTOM OF THE CUTOUT CLAMP. BEFORE TIGHTENING THE CLAMP, BEND THE TOP OF THE PIN (APPROX. 1-1/2") AT A 90° DEGREE ANGLE.

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| SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  |                           |                    |          |                     |
| 12.47KV AND BELOW CABLE POLE THREE-PHASE,<br>1/C PER PHASE, ALLEY ARM CONSTRUCTION,<br>NON-PORCELAN TERMINALS |                           |                    |          |                     |

**SHEET  
3 OF 5**

**OH1447.3  
UG4247.3**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY |        | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|--------|---------------|--------------|--------------|
|      |  | FIG. 1   | FIG. 2 |               |              |              |
| 1    | CROSSARM, 3-3/4" X 5-3/4" X 10'-0"   | 3        | 3      | 380.2         | -            | -            |
| 2    | BRACE, DIAGONAL ALLEY ARM, 7'  | 2        | 2      | -             | S164352      | -            |
| 3    | BRACE, ANGLE CROSSARM, 4'  | 1        | 1      | -             | S164032      | -            |
| 4    | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 4 SQ FLAT WASH, 1DBL COIL SPR WASH (C)                    | 1        | -      | 392.1 & .2    | -            | -            |
| 5    | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ FLAT WASH, 1 DBL COIL SPR WASH                        | 1        | 2      | 392.1 & .2    | -            | -            |
| 6    | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ WASH 2 DBL COIL SPR WASH                             | 1        | 1      | 392.1 & .2    | -            | -            |
| 7    | PIN, INSULATOR, STRAIGHT, 12KV, (C) OR   | 1"       | 10     | 3             | -            | S532706 (X)  |
|      |  | 1-3/8"   |        |               |              | S532448      |
| 8    | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 DBL COIL SPR WASH  | 1        | 1      | 392.1 & .2    | -            | -            |
| 9    | BOLT, MACH, GALV, 1/2" X 7", 1 RD WASH, 1 DBL COIL SPR WASH  | 2        | 2      | 392.1 & .2    | S678528      | -            |
| 10   | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ WASH, 1 DBL COIL SPR WASH                             | 1        | 1      | 392.1 & .2    | -            | -            |
| 11   | SIGN, HIGH VOLTAGE, & 8 ROOFING NAILS  | 2        | 2      | -             | S647648      | -            |
|      |  |          |        |               | S492224      | -            |
| 12   | INSULATOR, LINE, 12KV  | 8        | 3      | 750.3         | -            | -            |
| 13   | INSULATOR, LINE, 12KV, NEUTRAL (C)   | 2        | 2      | -             | S429216      | -            |
| 14   | BOLT SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQ FLAT WASH, 2 RD AND 2 DBL COIL SPRING WASHER & 2 NUTS | -        | 4      | 392.1 & .2    | -            | -            |
| 15   | CLEVIS, DEADEND, 5/8" BOLT, STEEL (C)  | -        | 4      | -             | S235712      | -            |
| 16   | INSULATOR, SUSPENSION, 12KV, CLEVIS (C)  | -        | 4      | 750.4         | S431650      | -            |
| 17   | CLAMP, STRAIGHT LINE, D.E. (C)   | -        | 4      | 739-743       | -            | -            |
| 18   | WIRE, #8, BARE SOLID ANNEALED COPPER   | FT       | -      | 10            | -            | S812928      |
|      |  | LB       | -      | 1             |              |              |
| 19   | CUTOUT, FOR CURRENT LIMITING FUSE  | 3        | 3      | 1206          | -            | -            |
| 20   | WIRE, BARE STRANDED COPPER, (OH JUMPERS)   | 36'      | 36'    | 715           | -            | -            |
| 21   | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D)  | AS REQ'D |        | 784-786       | -            | -            |
| 22   | WIRE, #6, BARE STRANDED COPPER   | 12'      | 12'    | -             | S813536      | -            |
| 23   | WIRE, BARE STRANDED COPPER OR ACSR/AW BARE, (OH NEUTRAL JUMPER) (F)                                    | 16'      | 16'    | 711/715       | -            | -            |
| 24   | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1"  | 22'      | 22'    | -             | S251202 (X)  | -            |
| 25   | STRAPS, PIPE, GALV, 1", & 6D NAILS, GALV   | AS REQ'D |        | -             | S697792      | -            |
| 26   | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING  | 3        | 3      | -             | S165446 (X)  | -            |
| 27   | ARRESTER, LIGHTNING W/48" COVERED LEAD WIRE  | 3        | 3      | 1247          | S113256      | 10KTVA       |
| 28   | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (E)   | 12'      | 12'    | 715           | -            | -            |
| 29   | BRACKET, ARRESTER OR CUTOUT  | AS REQ'D |        | -             | S166070      | -            |
| 30   | TERMINALS, UNDERGROUND CABLE   | 3        | 3      | 4111          | -            | -            |
| 31   | FUSE, CURRENT-LIMITING, SIZE AS SPECIFIED ON WORK ORDER  | 3        | 3      | 1207          | -            | -            |

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|                 |   |                           |                    |          |                     |                      |
|-----------------|---|---------------------------|--------------------|----------|---------------------|----------------------|
| SHEET<br>4 OF 5 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1447.4<br>UG4247.4 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  |                           |                    |          |                     |                      |
|                 | 12.47KV AND BELOW CABLE POLE THREE-PHASE,<br>1/C PER PHASE, ALLEY ARM CONSTRUCTION,<br>NON-PORCELAN TERMINALS |                           |                    |          |                     |                      |



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION                                    | QUANTITY |        | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|--------|---------------|--------------|--------------|
|      |  | FIG. 1   | FIG. 2 |               |              |              |
| 32   | FLEXIBLE ARRESTER GROUND STRAP                 | AS REQ'D |        | -             | S698754      | -            |
| 33   | #4 CU SOLID GROUND WIRE, PVC COVERED           | 50'      | 50'    | -             | S812490      | GNDPVC       |
| 34   | RISER CONSTRUCTION                             | -        | -      | 1400/4200     | -            | -            |
| 35   | BRACKET, LADDER ARM                            | AS REQ'D |        | 1404/4204     | S167186 (X)  | -            |
| 36   | NUT, CLAMPING CHANNEL, W/SPRING, 1/2"          | AS REQ'D |        | 1404/4204     | S503488      | -            |
| 37   | CHANNEL, DOUBLE GALV, 24"                      | AS REQ'D |        | 1404/4204     | S216702 (X)  | -            |
| 38   | WIRE #6 THW                                    | FT.      | 12'    | -             | S808288      | -            |
|      |  | LB.      | 3      |               |              |              |
| 39   | GROUND ROD, 5/8" X 8', COPPERWELD              | 1        | 1      | -             | S603074 (X)  | GNDPVC       |
| 40   | COPPER BONDED GROUND CONNECTOR                 | 1        | 1      | -             | S259010      | -            |
| 41   | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D |        | -             | S678564 (X)  | -            |
| 42   | HOT LINE CLAMP                                 | 3        | 3      | 788           | S227680      | -            |

**TABLE 2**

| UG MACRO UNITS |                |                 |
|----------------|----------------|-----------------|
| CABLE SIZE     | W/ LADDER ARMS | W/O LADDER ARMS |
| 3C-#2/0 AL     | CP2/0L         | CP#2/0          |
| 3C-3#2 AL      | CP3#2L         | CP-3#2          |

**NOTES:**

(X) THIS ITEM IS EXEMPT.

**REFERENCE:**

- a. ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE INSTALLED IN OUTSIDE PIN POSITION PER DESIGN MANUAL PAGE 5124.2.
- b. ALLOWABLE WORKING AND CLIMBING SPACE - SEE STANDARD. 251.
- c. POLE STEPPING - SEE STANDARD. 363/4205.
- d. GROUNDING METHODS - SEE PAGE 1002.5.
- e. SEE STANDARD SECTION 1200/4300 FOR FUSING.
- f. RISER POSITION - SEE STANDARD 1402/4202.
- g. MINIMUM VERTICAL SEPARATION AS PER G.O. 95 - SEE STANDARD. 1406/4206.

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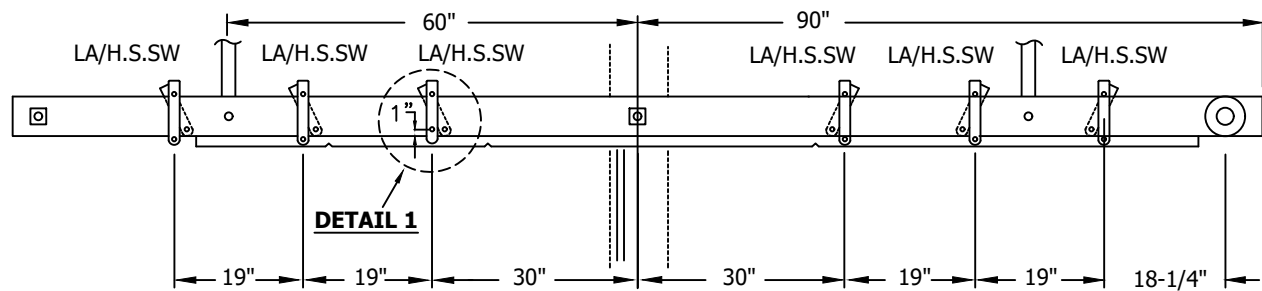
SHEET  
5 OF 5

SDG&amp;E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

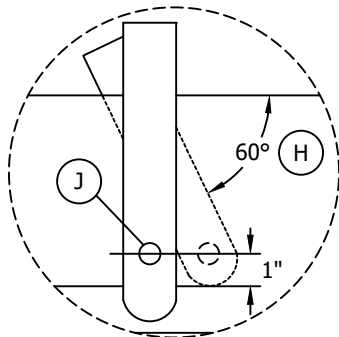
12.47KV AND BELOW CABLE POLE THREE-PHASE,  
1/C PER PHASE, ALLEY ARM CONSTRUCTION,  
NON-PORCELAN TERMINALSOH1447.5  
UG4247.5



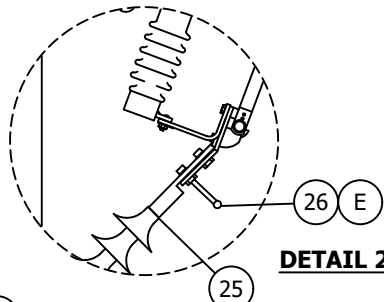
**SCOPE:** THIS STANDARD SHOWS 6 OR 7 CONDUCTOR DEAD END CABLE POLE WITH 900A HOOKSTICK SWITCHES FOR 350 KCMIL AND LARGER U.G. CABLE.



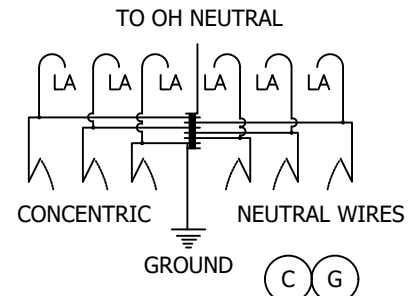
### 15' ARM 6 HOOKSTICK DISCONNECT SWITCHES AND LIGHTNING ARRESTER BRACKETS MOUNTING DETAIL



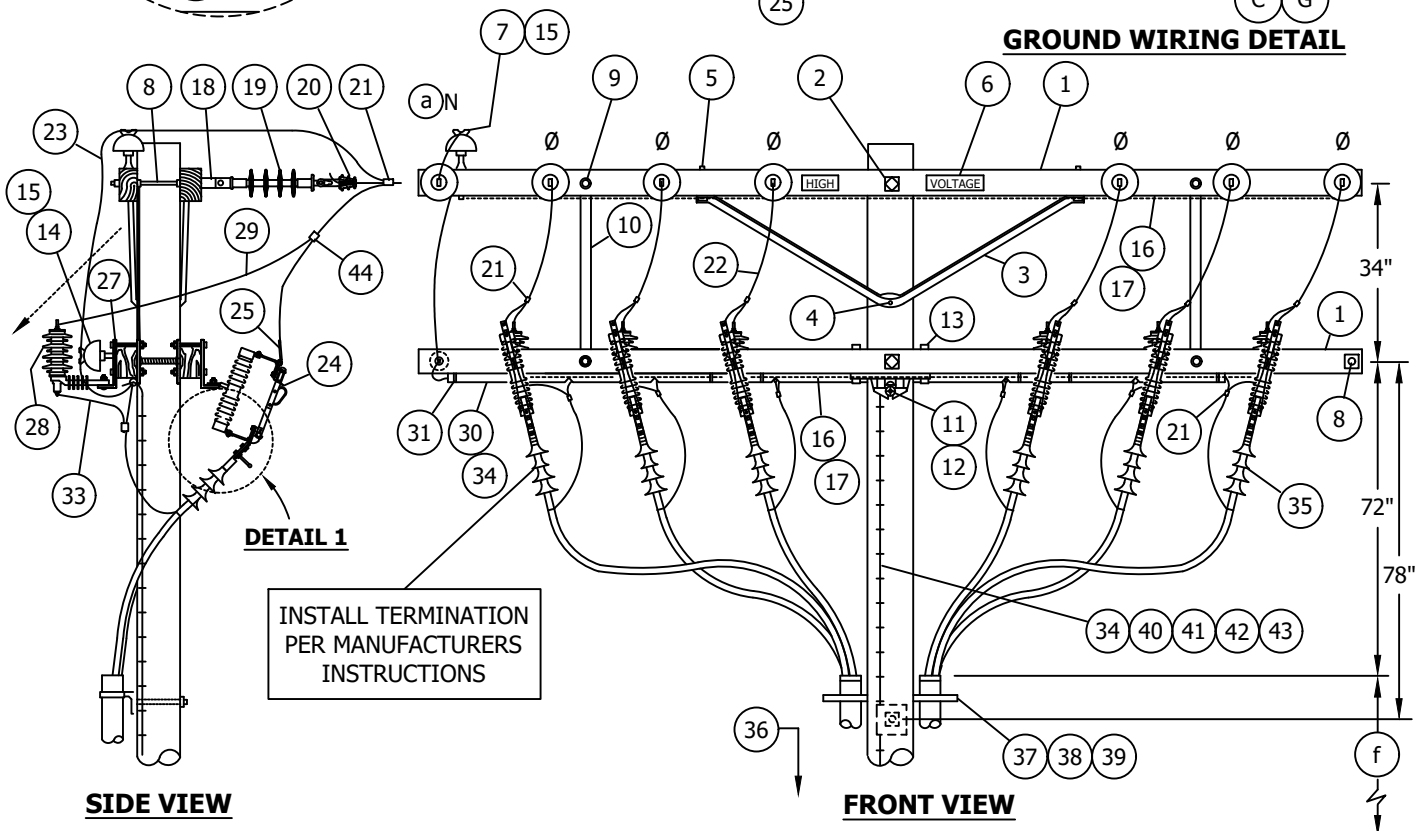
### DETAIL 1



## DETAIL 2



## GROUND WIRING DETAIL



### SIDE VIEW

### FRONT VIEW

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1 OF 3

|   |   |                    |          |                     |
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|   | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS |                    |          |                     |
| 12.47KV AND BELOW DEAD END CABLE POLE, 6 OR 7 OH CONDUCTORS, 1/C PER PHASE, HOOKSTICK SWITCHED, NON-PORCELAIN TERMINALS |   |                    |          |                     |

OH1451.1  
UG4251.1



**INSTALLATION:**

- A. NEW CABLE POLES SHALL HAVE A STANDARD DEPTH OF 9'. IN MOST CASES THIS WILL REQUIRE A 5' TALLER POLE.
- B. THIS CONSTRUCTION TO BE USED WITH 350 KCMIL AND LARGER UNDERGROUND CABLE.
- (C) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL
- (D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.
- (E) INSTALL GROUNDING BALL STUD (ITEM 26) IN PLACE OF ONE COMPRESSION TERMINAL CONDUCTOR TO BOLT ON CABLE TERMINATION SIDE OF SWITCH. THIS OFFERS AN EFFECTIVE POINT FOR GROUNDING UNDERGROUND CABLE RUN.
- (F) DO NOT CUT A GAIN IN THE POLE WHEN INSTALLING THE SECTIONALIZING SWITCH ARMS. THE GAIN HARDWARE USED HERE MAKE CUT GAINS UNNECESSARY.

| UG CABLE SIZE<br>AWG OR<br>KCMIL, AL | OH JUMPER COND<br>SIZE, AWG OR<br>KCMIL, CU | OH NEUTRAL<br>JUMPER SIZE<br>CU OR AL          | CABLE POLE NEUT SIZE (CU)<br>UNDER POTHEAD ARM OR<br>TRIPLE TERM BRKT |
|--------------------------------------|---|--|---|
| 350                                  | 4/0   | SAME SIZE<br><br>AS O.H. NEUT<br><br>CONDUCTOR | #2 PER PHASE  |
| 750                                  | 500   |  | 1/0 PER PHASE   |
| 1000                                 | 500   |  | 1/0 PER PHASE   |

- (H) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX. 60° ANGLE.
- (J) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | QUANTITY | CONSTR.<br>STD | STOCK<br>NUMBER | ASSEMBLY<br>UNIT |
|------|---|----------|----------------|-----------------|------------------|
| 1    | CROSSARM, 3-3/4" X 5-3/4" X 15'-0"  | 4        | -              | S294160         | 6L-              |
| 2    | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ FLAT WASH & 1 DBL COIL WASH                | 2        | 392.1&.2       | -               | 6L-              |
| 3    | BRACE, ANGLE, CROSSARM, 6'  | 2        | -              | S164160         | 6HUB             |
| 4    | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 DBL COIL WASH                                 | 1        | 392.1&.2       | -               | 6L-              |
| 5    | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL WASH   | 4        | 392.1&.2       | -               | 6L-              |
| 6    | SIGN, HIGH VOLTAGE, AND 8 ROOFING NAILS, GALV   | 2        | -              | S647648         | HV               |
|      |   | AS REQ'D | -              | S492224         | 6L-              |
| 7    | PIN, INSULATOR, STRAIGHT, 12KV, 1"  | 1        | -              | S532704         | PSL              |
| 8    | BOLT, SPACE, 5/8" X (LENGTH AS REQ'D), 3 OR 4 SQ WASH, 2 ROUND & 2 DBL COIL WASH            | 9        | 392.1&.2       | -               | 6L-              |
| 9    | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 RD WASH & 1 DBL COIL WASH                     | 8        | 392.1&.2       | -               | 6L-              |
| 10   | BRACE, VERTICAL, 36"  | 4        | -              | S164224         | 36FLAT           |
| 11   | GAIN, CROSSARM, BRACELESS (F)   | 1        | -              | S369598         | BCGAIN           |
| 12   | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 1        | 392            | -               | 6L-              |
| 13   | BOLT, MACH, GALV, 5/8" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER                          | 2        | 392            | -               | 6L-              |
| 14   | PIN, TRANSFORMER ADAPTER, 1" LEAD THREAD (D)  | 1        | -              | S529248         | PS/01            |
| 15   | INSULATOR, LINE, 12KV, NEUTRAL (D)  | 2        | -              | S429216         | 55-3/I           |
| 16   | WIRE, #8, BARE SOLID ANNEALED COPPER  | FT       | 30'            | 715             | S812928          |
|      |   | LB       | 1.5#           |                 |                  |
| 17   | STAPLES, FENCE, GALV, 1-1/4" (D)  | AS REQ'D | -              | S678528         | -                |
| 18   | STAPLES, FENCE, GALV, 1-1/4" (D)  | 7        | -              | S235712         | -                |
| 19   | INSULATOR, SUSPENSION, 12KV, CLEVIS, NON-PORC (D)   | 7        | 750            | S431650         | -                |

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| REV | CHANGE         | BY  | DSGN | APPV | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|----------------|-----|------|------|------------|-----|--------|----|------|------|------|
| C   |                |     |      |      |            | F   |        |    |      |      |      |
| B   | DRAWING UPDATE | PEI | -    | -    | 02/18/2019 | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE | -   | TQ   | DW   | 03/21/2014 | D   |        |    |      |      |      |

|                 |  |                           |                    |          |                     |                      |
|-----------------|--|---------------------------|--------------------|----------|---------------------|----------------------|
| SHEET<br>2 OF 3 | <div>X</div>   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1451.2<br>UG4251.2 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS  |                           |                    |          |                     |                      |
|                 | 12.47KV AND BELOW DEAD END CABLE POLE,<br>6 OR 7 OH CONDUCTORS 1/C PER PHASE, HOOKSTICK SWITCHED,<br>NON-PORCELAIN TERMINALS |                           |                    |          |                     |                      |



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION  | QUANTITY | CONSTR. STD | STOCK NUMBER | ASSEMBLY UNIT |
|------|--|----------|-------------|--------------|---------------|
| 20   | CLAMP, STRAIGHT LINE, D.E. (D)                       | 7        | 739-743     | -            | -             |
| 21   | CONNECTOR, WIRE, (SIZE & TYPE AS REQ'D)              | AS REQ'D | 783-787     | -            | -             |
| 22   | WIRE, BARE STRANDED COPPER, (OH JUMPER) (G)          | 30'      | 715-716     | -            | -             |
| 23   | WIRE, BARE STRANDED CU OR AL, (OH NEUT JUMPER) (G)   | 12'      | 711-716     | -            | -             |
| 24   | SWITCH, DISCONNECT, 14.4KV, 900 A W/MOUNTING BRACKET | 6        | -           | S707006      | D900C         |
| 25   | COMPRESSION TERMINALS, CU, 2 HOLE (SIZE AS REQ'D)    | 12       | 794-795     | -            | 6L-           |
| 26   | GROUNDING BALL STUD, 5/8" X 3" SHANK                 | 6        | -           | S700100      | GDSTUD        |
| 27   | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING      | 6        | -           | S166070      | CO/B          |
| 28   | ARRESTER, LIGHTNING W/48" COVERED LEAD WIRE          | 6        | 1247        | S113256      | 10KVTA        |
| 29   | WIRE, #6, BARE STRANDED COPPER                       | 30'      | -           | S813536      | BS6           |
| 30   | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1-1/2"            | 13'      | -           | S251232      | P11/2C        |
| 31   | STRAPS, PIPE, GALV, 1-1/2" & 6D NAILS, GALV          | AS REQ'D | -           | S697664      | -             |
|      |  | AS REQ'D | -           | S491552      | -             |
| 32   | WIRE, BARE STRANDED CU, (C.P. NEUTRAL SIZE) (G)      | 40'      | 715-716     | -            | -             |
| 33   | FLEXIBLE ARRESTER GROUND STRAP                       | AS REQ'D | -           | S698754      | -             |
| 34   | #4 CU SOLID GROUND WIRE, PVC COVERED                 | 50'      | -           | S812490      | GNDPVC        |
| 35   | TERMINALS, UNDERGROUND CABLE (9)                     | 6        | 4111        | -            | -             |
| 36   | RISER CONSTRUCTION                                   | AS REQ'D | 1400/4200   | -            | -             |
| 37   | BRACKET, LADDER ARM                                  | AS REQ'D | 1404/4204   | S167184      | RSRARM        |
| 38   | NUT, CLAMPING CHANNEL, W/SPRING, 1/2"                | AS REQ'D | 1404/4204   | S503488      | -             |
| 39   | CHANNEL, DOUBLE GALV, 24"                            | AS REQ'D | 1404/4204   | S216700      | -             |
| 40   | GROUND ROD, 5/8" X 8', COPPERWELD                    | 1        | -           | S603072      | GNDPVC        |
| 41   | COPPER BONDED GROUND CONNECTOR                       | 1        | -           | S259010      | -             |
| 42   | GROUND ENHANCING POWER SOLUTION (GEM)                | AS REQ'D | -           | S424390      | -             |
| 43   | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE       | AS REQ'D | -           | S678562      | -             |
| 44   | HOT LINE CLAMP                                       | 3        | 788         | S227680      | -             |

| CABLE SIZE           | UG MACRO UNIT<br>NON-PORCELAIN |
|----------------------|--------------------------------|
|                      | W/LADDER ARMS                  |
| 3C-#750 AL TWO RUNS  | 2N750L                         |
| 3C-#1000 AL TWO RUNS | 2N-1KL                         |

| OVERHEAD MACRO UNIT |
|---------------------|
| TC-SXN              |

**NOTES:** NONE**REFERENCE:**

- (a) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE INSTALLED IN OUTSIDE PIN POSITION PER DESIGN MANUAL PAGE 5124.2.
- b. ALLOWABLE WORKING AND CLIMBING SPACE - SEE STD. 251.
- c. POLE STEPPING - SEE STD. 363.
- d. GROUNDING METHODS - SEE PAGE 1002.5.
- e. RISER POSITIONS - SEE STANDARD 1402/4202.
- (f) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 - SEE STD. 1406/4206.
- (g) SEE STANDARD 1407/4207 FOR NON-PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.
- h. FIBERGLASS CROSSARMS - SEE STANDARD 379.

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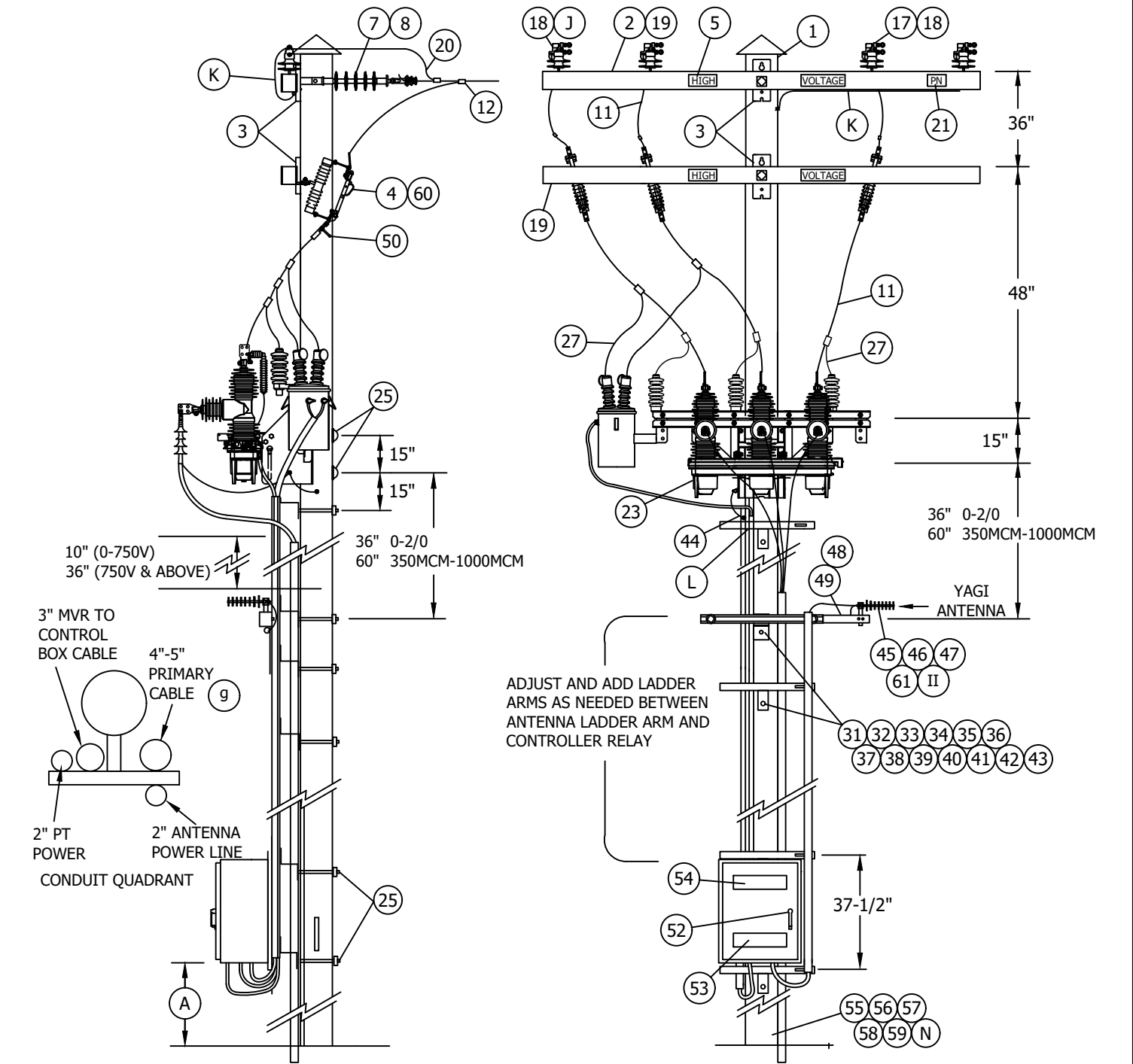
| REV | CHANGE         | BY  | DSGN | APPV | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|----------------|-----|------|------|------------|-----|--------|----|------|------|------|
| C   |                |     |      |      |            | F   |        |    |      |      |      |
| B   | DRAWING UPDATE | PEI | -    | -    | 02/18/2019 | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE | -   | TQ   | DW   | 08/28/2013 | D   |        |    |      |      |      |

|                 |  |                           |                    |          |                     |                      |
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| SHEET<br>3 OF 3 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1451.3<br>UG4251.3 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS  |                           |                    |          |                     |                      |
|                 | 12.47KV AND BELOW DEAD END CABLE POLE,<br>6 OR 7 OH CONDUCTORS 1/C PER PHASE, HOOKSTICK SWITCHED,<br>NON-PORCELAIN TERMINALS |                           |                    |          |                     |                      |



**SCOPE:** THIS STANDARD COVERS THE INSTALLATION OF THE MVR (MOLDED VACUUM RECLOSER) FOR CABLE POLE APPLICATIONS AS A LINE SWITCH, SERVICE RESTORER OR TIE SWITCH OR BRANCH LINE EQUIPMENT ISOLATION UNIT FOR NEW CONSTRUCTION. LINE SOURCE CAN BE CONSTRUCTED DEADEND OR TANGENT.

**ATTENTION:** THIS INSTALLATION REQUIRES 24/7, ALL WEATHER VEHICLE ACCESS. A TELECOM COORDINATION FORM MUST BE SUBMITTED BEFORE DESIGN BEGINS TO DETERMINE COMMUNICATION REQUIREMENTS.



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| C   | DRAWING UPDATE    | -  | PEI | -   | -   | 02/18/2019 | F   |                   |     |    |     |     |            |
| B   | EDITORIAL CHANGES | -  | GW  | JS  | MDJ | 03/01/2018 | E   |                   |     |    |     |     |            |
| A   | ORIGINAL ISSUE    | -  | JC  | TR  | MDJ | 10/25/2016 | D   | EDITORIAL CHANGES | PEI | JA | JES | CZH | 10/12/2020 |

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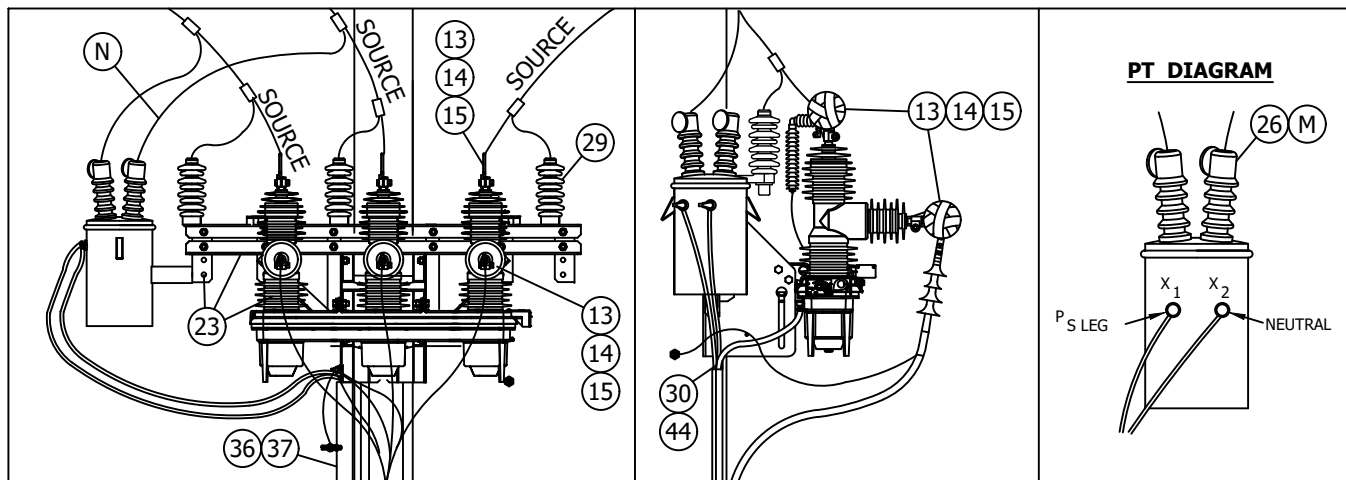
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

ELASTIMOLD MVR SWITCH AND SCADA 651R2 CONTROLLER CABLE POLE

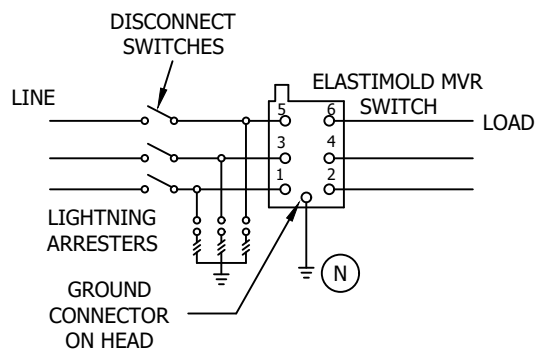
SHEET  
1 OF 10

OH1452.1  
UG4252.1

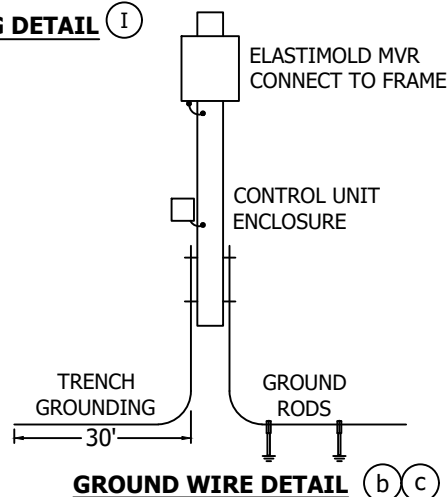




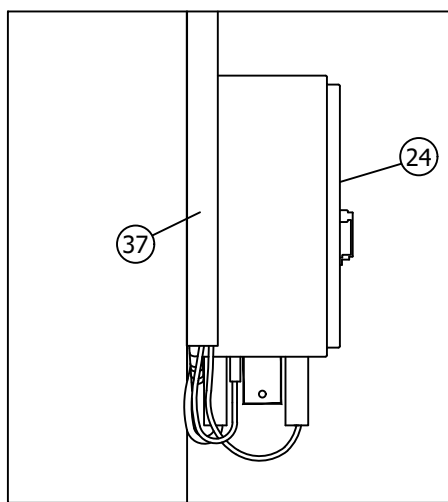
**ELASTIMOLD MVR SWITCH WIRING DETAIL** (I)



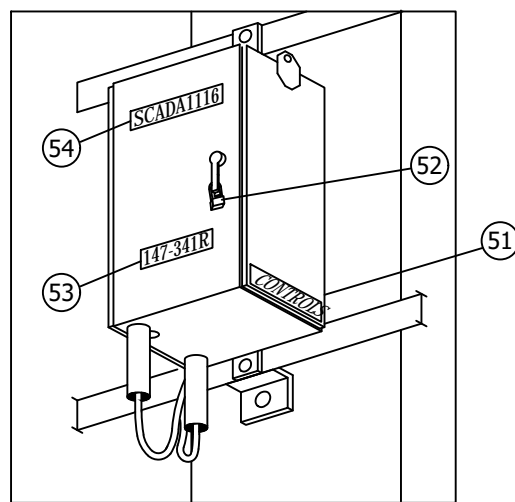
**SCHEMATIC DIAGRAM**



**GROUND WIRE DETAIL** (b) (c)



**SIDE VIEW**



**3/4 VIEW**

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS  
ELASTIMOLD MVR SWITCH AND SCADA 651R2 CONTROLLER CABLE POLE

**OH1452.2  
UG4252.2**



**INSTALLATION:**

- (A) RTU TO BE MOUNTED TEN FEET FROM GROUND LEVEL TO BOTTOM OF RTU CABINET WHEN NOT SUBJECT TO TRAFFIC CONTACT. IF VULNERABLE TO VEHICLE DAMAGE, MOUNT RTU 13' - 6" FROM GROUND LEVEL TO BOTTOM OF RTU CABINET.
- B. CONTROL, PT TERMINAL BLOCK-RELAY, AND ANTENNA CONNECTIONS ARE TO BE MADE BY KEARNY CREW. LINE CREW MOUNTS MVR SWITCH TO OLE AND LEAVES CONTROL CABLE AND VOLTAGE CABLE ON SITE OR WITH KEARNY CREW. IF THE CONTROL & VOLTAGE CABLES ARE LEFT ON SITE, DO NOT REMOVE THEM FROM PLASTIC BAG OR REMOVE CAPS. WATER ENTRY WILL DAMAGE THE CABLES.
- (C) DELINEATOR/REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (d)
- D. IN AVIAN PROTECTION AREAS, USE APPROPRIATE AVIAN COVER-UP. (e)
- E. ALL MVR SITES REQUIRE ALL WEATHER, 24/7 VEHICLE ACCESS FOR AERIAL LIFTS AND DERRICK TRUCKS.
- F. ONLY STEEL POLES ARE TO BE USED FOR THIS CONSTRUCTION, POLE LOADING CALCULATIONS SHALL BE COMPLETED AND ARCHIVED FOR ALL INSTALLATIONS FOR NEW AND EXISTING POLES.
- G. COIL ANY EXCESS CONTROL CABLE AND ATTACH TO MVR POLE MOUNT BRACKET WITH PLASTIC TIES.
- H. ALL MVR SITES SHALL BE PHASE IDENTIFIED WITH THE AP30. THE CROSSARM SHALL BE MARKED FOR "A", "B", AND "C" PHASES. BOTTOM OF THE MVR SHALL BE MARKED FOR "A", "B", AND "C" PHASES. CABLE SHALL BE MARKED AND MATCH "A/1", "B/2", AND "C/3" PHASE MARKING.
- (J) WHEN USING COVERED WIRE, A VISE-TOP WILL BE USED WITH NYLON JAWS. WHEN USING ALUMINUM WIRE, A VISE-TOP WILL BE USED WITH ALUMINUM JAWS. WHEN USING COPPER WIRE, A VISE-TOP WILL BE USED WITH BRONZE JAWS. THERE ARE NO EXCEPTIONS TO THESE RULES.
- (K) IF THE CIRCUIT IS A FOUR-WIRE SYSTEM, THE SYSTEM NEUTRAL SHALL BE CONNECTED TO THE POLE AND THE CONCENTRIC NEUTRAL IN THE UNDERGROUND SYSTEM.
- (L) THE LADDER ARM, LOCATED 15 INCHES BELOW THE MVR RACK, SHALL HAVE WIRING HARNESS AND POWER CONDUITS TERMINATED AT ONE INCH BELOW THE MVR RACK.
- (M) THE POTENTIAL TRANSFORMER (PT) SHALL BE CONNECTED TO THE 12KV CIRCUIT IN DELTA, DIRECTLY TO THE LINE, #4/7 COVERED WIRE AND AVIAN COVERS ARE REQUIRED ON THE PT.
- (N) GROUNDING OF THE ARRESTERS, MVR RACK, YAGI ANTENNA, AND THE MVR RELAY CONTROLLER BOX IS REQUIRED.
- (O) PLEASE REFERENCE JUNE 2020 NEWSLETTER; THE MVR SHALL NOT BE INSTALLED INSIDE HFTD TIER 2 OR 3 WITHOUT PRIOR APPROVAL OF EDE & SPACE.

**BILL OF MATERIALS:**

| ITEM  | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNIT |
|-------|---|----------|---------------|--------------|---------------|
| 1A, B | STEEL POLE REQUIRED IN THE TIER 2 & TIER 3 AREAS SELECT THE FINISH NEEDED BELOW | -        | -             | -            | -             |
| 1A    | POLE, STEEL GALVANIZED 50-1 (MINIMUM HEIGHT)                                    | 1        | 354.4         | S549604      | -             |
| 1B    | POLE, STEEL WEATHERING 50-1 (MINIMUM HEIGHT)                                    | 1        | 354.4         | S550420      | -             |





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| C   | DRAWING UPDATE    | -  | PEI | -   | -   | 02/18/2019 | F   |                   |     |    |     |     |            |
| B   | EDITORIAL CHANGES | -  | GW  | JS  | MDJ | 03/01/2018 | E   |                   |     |    |     |     |            |
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| SHEET<br>3 OF 10 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1452.3<br>UG4252.3 |
|                  | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                      |
|                  | ELASTIMOLD MVR SWITCH AND SCADA 651R2 CONTROLLER CABLE POLE    |                           |                    |          |                     |                      |




**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNIT        |
|------|--|----------|---------------|--------------|----------------------|
| 2    | FIBERGLASS CROSSARM, DEADEND, 10'  | AS REQ'D | -             | S294372      | 6DF                  |
| 3    | BOLT, SPACE, GALV, 3/4" X (LENGTH AS REQ'D) 2 SQUARE, CURVED & 2 COIL SPRING WASHERS   | AS REQ'D | 392           | -            | -                    |
| 4    | SWITCH, DISCONNECT, 14.4KV, 900A   | 3        | -             | S707006      | D900                 |
| 5    | SIGN, HIGH VOLTAGE STICKER   | AS REQ'D | -             | S647650      | -                    |
| 6    | SCREWS, SELF TAPPING, 1-1/4", #12, 24 THREADED   | AS REQ'D | -             | S618082      | -                    |
| 7    | INSULATOR, SUSPENSION, 12KV, LONG DEADEND  | AS REQ'D | -             | S428958      | LONGDE               |
| 8    | CLAMP, STRAIGHT LINE, D.E.   | AS REQ'D | 739-743       | -            | -                    |
| 9    | WIRE, #8, BARE SOLID ANNEALED COPPER   | 30'      | -             | S812928      | BOND8                |
| 10   | STRAP, PIPE, GALV. 1/4", ONE HOLE  | AS REQ'D | -             | S697302      | -                    |
| 11   | LEAD WIRE, 0-2/0, 200AMP 1/0 POLY  | 30'      | 4242.4        | S812108      | CW1/0                |
|      | LEAD WIRE, 350MCM, 600AMP 4/0 POLY   | 30'      | 4242.4        | S812106      | CW500                |
|      | LEAD WIRE, 750MCM-1000MCM, 600AMP 500MCM POLY  | 30'      | 4242.4        | S812102      | CW4/0                |
| 12   | CONNECTOR, WIRE, WEDGE (SIZE AS REQ'D)   | AS REQ'D | 784           | -            | -                    |
| 13   | TAPE, HIGH VOLTAGE, SELF FUSING, SCOTCH 70   | AS REQ'D | -             | S720384      | -                    |
| 14   | TAPE, HIGH VOLTAGE, LINELESS RUBBER, SCOTCH 130C   | AS REQ'D | 1272.8        | S720480      | -                    |
| 15   | TAPE, HIGH VOLTAGE, VINYL, SCOTCH SUPER 88   | AS REQ'D | -             | S720600      | -                    |
| 16   | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D)  | AS REQ'D | 794-795       | -            | -                    |
| 17   | PIN, INSULATOR, 12KV, 1"   | AS REQ'D | 396           | S532704      | PS1                  |
| 18   | INSULATOR, LINE 12KV TANGENT, VICE TOP   | AS REQ'D | 750           | -            | -                    |
| 19   | FIBERGLASS, CROSSARM, TANGENT, 10'   | AS REQ'D | -             | S294374      | 6TF                  |
| 20   | WIRE, POLY COPPER, (SIZE AS REQ'D WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY OR GREATER)   | 25'      | -             | -            | -                    |
| 21   | SIGN, PN DECAL   | 2        | 208           | S648002      | PN-D                 |
| 22   | GRIP, RISER, KELLEMS (SIZE AS REQUIRED)  | 1        | 4204.3        | -            | -                    |
| 23   | ELASTIMOLD RECLOSER/SWITCH SCADA COMPATIBLE, 800A, INCLUDES: MOUNTING BRACKET, INTERNAL VOLTAGE SENSOR, AND 12000/120 VOLT  | 1        | 3675.2        | S571970      | EM-SW<br>OR<br>EM-SR |
| 24   | CONTROLLER, SEL 651R2, COMPATIBLE WITH ELASTIMOLD SWITCH, INCLUDES: 40' FT. 32-PIN CONFIG. CONTROL CABLE                    | 1        | -             | S274578      | -                    |
|      | TRANSCEIVER, MDS RADIO    | AS REQ'D | -             | S749500      | SOTRAN               |
|      | TRANSCEIVER, MDS RADIO SPREADSPECTRUM   | AS REQ'D | -             | S749504      | SSTRAN               |

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| REV | CHANGE            | DR | BY  | DSN | APV | DATE       | REV | CHANGE            | DR  | BY | DSN | APV | DATE       |
|-----|-------------------|----|-----|-----|-----|------------|-----|-------------------|-----|----|-----|-----|------------|
| C   | DRAWING UPDATE    | -  | PEI | -   | -   | 02/18/2019 | F   |                   |     |    |     |     |            |
| B   | EDITORIAL CHANGES | -  | GW  | JS  | MDJ | 03/01/2018 | E   |                   |     |    |     |     |            |
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|                  |   |                           |  |                    |  |          |  |                     |                      |
|------------------|---|---------------------------|--|--------------------|--|----------|--|---------------------|----------------------|
| SHEET<br>4 OF 10 |  | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed | OH1452.4<br>UG4252.4 |
|                  | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS                      |                           |  |                    |  |          |  |                     |                      |
|                  | ELASTIMOLD MVR SWITCH AND SCADA 651R2 CONTROLLER CABLE POLE                         |                           |  |                    |  |          |  |                     |                      |



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNIT |
|------|---|----------|---------------|--------------|---------------|
| 25   | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 COIL SPRING WASHER | 4        | 392           | -            | -             |
| 26   | BUSHING COVER, TRANSFORMER  | 2        | 1630.1        | S289190      | BSHCOV        |
| 27   | POLY COVERED 4/7 STRAND COPPER  | AS REQ'D | -             | S815044      | POLY4J        |
| 28   | FLEXIBLE ARRESTER GROUND STRAP  | AS REQ'D | -             | S698754      | LAGND         |
| 29   | ARRESTER, LIGHTNING, 12KV   | 3        | 1247          | S113248      | LA12          |
| 30   | GRIP, CONTROL CABLE, MVR  | 1        | -             | S392408      | -             |
| 31   | LADDER ARM BRACKET  | -        | 1401.1        | S167184      | RARM/L        |
| 32   | 2' DOUBLE UNISTRUT ARM  | -        | 1401.1        | S216700      |               |
| 33   | 1/2" CLAMPING CHANNEL NUT W/SPRING  | -        | 1401.1        | S503488      |               |
| 34   | 5/8" GALVANIZED BOLTS (LENGTH AS REQUIRED)  | AS REQ'D | 392.1, .2     | -            | -             |
| 35   | NUT STUD 1/2" X 1-3/8", CLAMPING UNISTRUT   | AS REQ'D | 1401.1        | S507000      | -             |
| 36   | 2" SCHEDULE 40 PVC  | AS REQ'D | 4204.3        | S251296      | S40-2"        |
| 37   | 3" SCHEDULE 40 PVC  | AS REQ'D | 4204.3        | S251360      | S40-3"        |
| 38   | 4" SCHEDULE 40 PVC  | AS REQ'D | 4204.3        | S251392      | S40-4"        |
| 39   | 5" SCHEDULE 40 PVC  | AS REQ'D | 4204.3        | S251408      | S40-5"        |
| 40   | 2" UNISTRUT PIPE CLAMP  | AS REQ'D | 4204.3        | S229536      | CL-2IN        |
| 41   | 3" UNISTRUT PIPE CLAMP  | AS REQ'D | 4204.3        | S229632      | CL-3IN        |
| 42   | 4" UNISTRUT PIPE CLAMP  | AS REQ'D | 4204.3        | S229664      | CL-4IN        |
| 43   | 5" UNISTRUT PIPE CLAMP  | AS REQ'D | 4204.3        | S229668      | CL-5IN        |
| 44   | WEATHER HEAD 2"   | 1        | -             | S203290      | -             |
| 45   | NIPPLE, PIPE 2" X 7", ALUMINUM (IV)   | 1        | -             | -            | ANTXMB        |
| 46   | BOLT, MACH GALV, 5/8" X 14"   | 1        | -             | S154880      |               |
| 47   | CENTERING WASHER, GALV  | 2        | -             | S795520      |               |
| 48   | CABLE, FLEXIBLE, 1/2" COAXIAL SCADA ANTENNA (IV)  | AS REQ'D | -             | S191906      | ANTCAB        |
| 49   | CONNECTOR, COAXIAL, STRAIGHT (IV)   | 2        | -             | S254170      | -             |
| 50   | GROUNDING BALL STUD, 5/8" X 3" SHANK  | 3        | -             | S700100      | GDSTUD        |
| 51   | TAG "CONTROLS"  | 1        | 204           | -            | -             |
| 52   | PADLOCK, SCHLAGE ELECTRIC SERIES  | 2        | -             | S514848      | -             |

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| SHEET<br>5 OF 10 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1452.5<br>UG4252.5 |
|                  | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                      |
|                  | ELASTIMOLD MVR SWITCH AND SCADA 651R2 CONTROLLER CABLE POLE    |                           |                    |          |                     |                      |



**BILL OF MATERIALS (CONT'D):**

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNIT |
|------|---|----------|---------------|--------------|---------------|
| 53   | TAG, SWITCH NUMBER (IV)                               | 2        | 204           | -            | -             |
| 54   | DECAL "SCADA" "INFORM S.C.O. UPON ENTRY" (IV)         | 1        | 207           | S301934      | -             |
| 55   | VISIBILITY STRIP (C)                                  | 1        | 208           | S304064      | -             |
| 56   | #4 CU SOLID GROUND WIRE, PVC COVERED                  | 50'      | -             | S812490      | GNDPVC        |
| 57   | GROUND ROD, 5/8" X 8', COPPERWELD                     | 1        | -             | S603072      | GNDPVC        |
| 58   | COPPER BONDED GROUND CONNECTOR                        | 1        | -             | S259010      | GNDPVC        |
| 59   | GROUND ENHANCING POWER SOLUTION (GEM)                 | AS REQ'D | -             | S424390      | -             |
| 60   | BRACKET, LIGHTNING ARRESTER                           | 3        | 397           | S166070      | LA/BKT        |
| 61   | ANTENNA, SCADA, COMMUNICATION, BROADBAND & CONNECTORS | 1        | -             | S109570      | ANT           |

**NOTES:**

- I SEL 651R2 CONTROLLER REQUIRES 120-VOLT SUPPLY COMING FROM THE SOURCE SIDE USING A PT MOUNTED TO THE MVR SWITCH FRAME.
- II PLANNER TO SPECIFY QUADRANT OF POLE FOR ANTENNA MOUNT WITH DATA FROM THE "SCADA TELECOMMUNICATIONS COORDINATION" FORM. SEE PROJECT MANAGEMENT INTRANET SITE FOR FORMS.
- III. THE NEW MVR SWITCH COMES WITH INTERNAL AND SUPPLEMENTAL VOLTAGE SENSORS AND DO NOT NEED EXTERNAL LINDSEY SENSORS INSTALLED.
- IV ITEMS SUPPLIED BY KEARNY.

**REFERENCES:**

- a. POLE STEPPING, SEE STANDARD 363.
- b GROUNDING METHODS, SEE STANDARD 1002.
- c TRENCH GROUNDING, SEE STANDARD 4510.
- d DELINEATOR/REFLECTOR STRIPS, SEE STANDARD 208.
- e AVIAN PROTECTION, SEE STANDARD 1610.
- f. CABLE PULLING LIMITATIONS, SEE STANDARD 4003.
- g MINIMUM CONDUIT SIZES, SEE STANDARD 4002.3
- h. CABLE POLE RISER INSTALLATION, SEE STANDARD 4204.
- i. ALLOWABLE WORKING AND CLIMBING SPACE, SEE STANDARD 251.
- j. MINIMUM VERTICAL SEPARATION AS PER G.O. 95, SEE STANDARD 1406/4206.
- k. CABLE IDENTIFICATION, SEE STANDARD 3202.

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## Instructions for Applying Animal Guard Taping

1. To begin the coverup of the recloser bushings, first remove the three preinstalled supplemental voltage sensors attached to the vertical NEMA-4 pad terminals.



Once the supplemental sensors are removed, apply the Scotch 70 Self Fusing Tape (stock# S720384) to the base of each NEMA-4 vertical terminal with enough wraps to cover the entire metal surface.



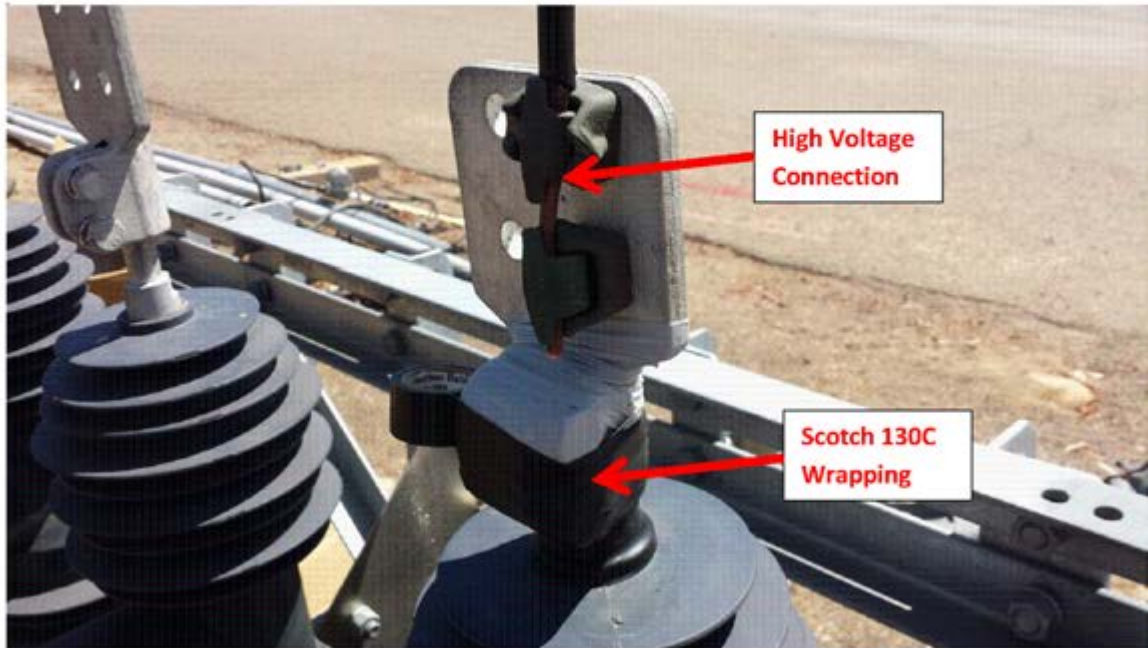
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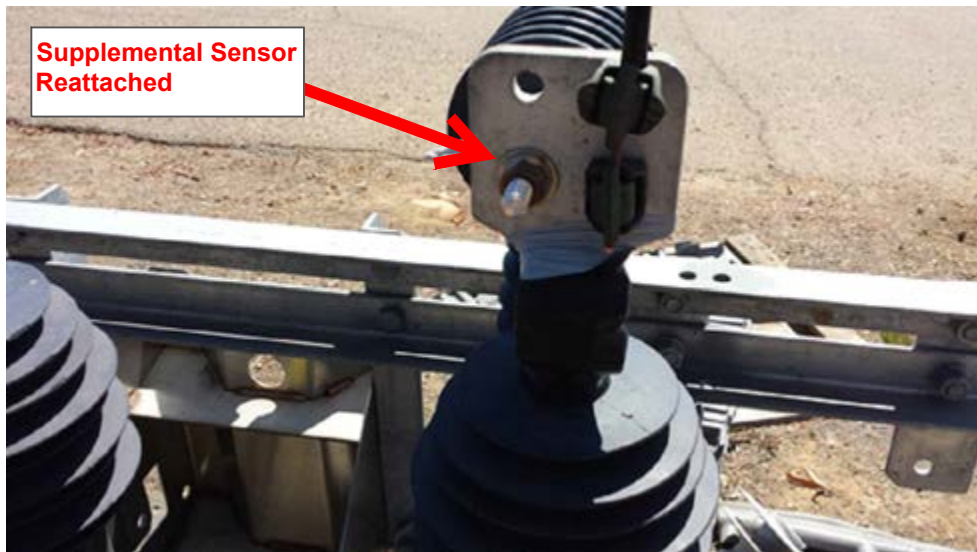
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|                  | ELASTIMOLD MVR SWITCH AND SCADA 651R2 CONTROLLER CABLE POLE    |                           |                    |          |                     |                      |



After applying the Scotch 70 tape to the NEMA-4 vertical terminal bases, make the high voltage connections to the terminal as required. Apply a layer of Scotch 130C Tape (**Stock #S720480**) over the area covered by the Scotch 70 tape until the Scotch 70 tape is no longer visible.



4. REATTACH THE SUPPLEMENTAL VOLTAGE SENSORS BACK TO THE VERTICAL NEMA-4 BUSHINGS USING A RATCHET WRENCH AT A TORQUE SETTING OF 25 FT-LBS. MAKE SURE TO RECONNECT THE SMALL CANNON PLUG FROM THE BOTTOM OF THE SUPPLEMENTAL SENSORS INTO THE RECEPTACLES FOUND ON THE FRAME OF THE RECLOSER FOR EACH PHASE.



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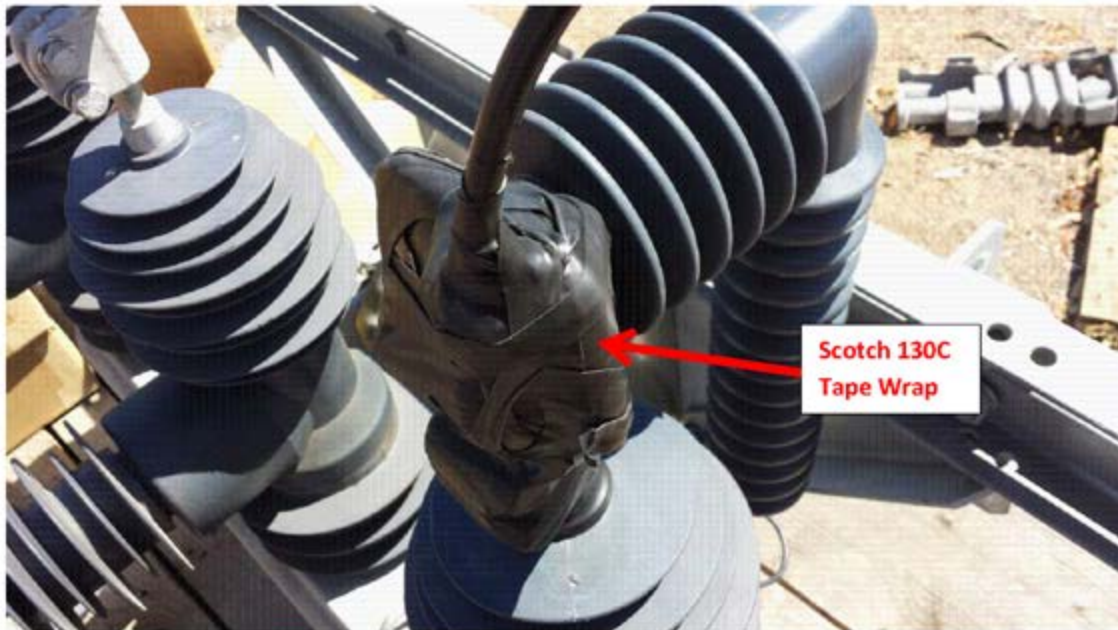
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5. Once the external sensors have been reattached, continue applying the Scotch 70 tape to the remaining exposed metal surface on the NEMA-4 vertical terminals until a complete coverup is made.



6. After applying the Scotch 70, apply the Scotch 130C to the rest of the area until the Scotch 130C covers up the entire section.



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| REV | CHANGE            | DR | BY  | DSN | APV | DATE       | REV | CHANGE            | DR  | BY | DSN | APV | DATE       |
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| C   | DRAWING UPDATE    | -  | PEI | -   | -   | 02/18/2019 | F   |                   |     |    |     |     |            |
| B   | EDITORIAL CHANGES | -  | GW  | JS  | MDJ | 03/01/2018 | E   |                   |     |    |     |     |            |
| A   | ORIGINAL ISSUE    | -  | JC  | TR  | MDJ | 10/25/2016 | D   | EDITORIAL CHANGES | PEI | JA | JES | CZH | 10/12/2020 |

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After applying coverup with the Scotch 70 and 130C tape, apply the Scotch Super 88 Tape (Stock #S720600) to the entire the NEMA-4 vertical terminals.



Repeat Steps 1-7 for each of the 3 NEMA-4 vertical bushing terminals.

Repeat Steps 2-3 and 5-7 for each of the 3 NEMA-4 horizontal bushing terminals. These terminations do not have any external voltage sensor devices.

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| REV | CHANGE            | DR | BY  | DSN | APV | DATE       | REV | CHANGE            | DR  | BY | DSN | APV | DATE       |
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| C   | DRAWING UPDATE    | -  | PEI | -   | -   | 02/18/2019 | F   |                   |     |    |     |     |            |
| B   | EDITORIAL CHANGES | -  | GW  | JS  | MDJ | 03/01/2018 | E   |                   |     |    |     |     |            |
| A   | ORIGINAL ISSUE    | -  | JC  | TR  | MDJ | 10/25/2016 | D   | EDITORIAL CHANGES | PEI | JA | JES | CZH | 10/12/2020 |

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4300 - FUSES, FAULT  
INDICATORS



4300 - FUSES, FAULT  
INDICATORS



**PAGE****SUBJECT****FUSES**

|      |   |
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| 4302 | FUSE APPLICATION GUIDE                                  |
| 4305 | CUTOUT ASSEMBLY-CMU, SMD20, INTERCHANGEABLE             |
| 4306 | OVERHEAD 12KV CURRENT-LIMITING FUSE INSTALLATION        |
| 4307 | FUSES USED IN OVERHEAD CONSTRUCTION                     |
| 4308 | ELECTRONIC SECTIONALIZER                                |
| 4309 | FUSES USED ON 1200 KVAR PAD-MOUNTED CAPACITOR           |
| 4310 | CURRENT-LIMITING TO SM-4 FUSE CONVERSION FOR PME SWITCH |
| 4311 | CURRENT-LIMITING FUSES                                  |
| 4312 | CURRENT-LIMITING AND SOLID BLADE FUSE TABLE             |
| 4313 | EXPULSION FUSE TABLE                                    |
| 4314 | TRANSFORMER FUSING TABLES                               |

**FAULT INDICATORS**

|      |  |
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| 4344 | SEL 8301 WIRELESS FAULT INDICATOR                            |
| 4352 | AUTOMATIC FAULT INDICATOR-SELF RESETTING, HOT STICK OPERABLE |
| 4354 | CAPACITIVE TEST POINT FAULTED INDICATOR                      |
| 4355 | AUTOMATIC FAULT INDICATOR INSTALLATION                       |
| 4359 | OVERHEAD FAULT INDICATOR-SELF RESETTING, HOT STICK OPERABLE  |

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| B   | EDITORIAL CHANGES | -   | JES | JES | CZH | 1/14/2020 | E   |        |    |    |     |     |      |
| A   | ADDED 4354        | -   | JS  | JS  | CZH | 7/10/2018 | D   |        |    |    |     |     |      |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

FUSES AND FAULT INDICATORS  
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UG4301.1







**SCOPE:** THIS STANDARD DESCRIBES A GENERAL GUIDE FOR EXPULSION AND CURRENT-LIMITING FUSE APPLICATIONS AND REFERENCE TO THE SPECIFIC STANDARDS PAGE.

**TABLE 1**

| FUSE TYPE   | DISTRIBUTION APPLICATION   | CONSTRUCTION STANDARD  |
|---|--|------------------------|
| BUSSMAN<br>TYPE MDS   | USED IN EKSTROM LIMITER ADAPTER TO LIMIT FAULT CURRENT TO CUSTOMER SERVICE PANEL   | FMO UG4303             |
| KEARNEY & RTE<br>TYPE B   | USED IN OVERHEAD CUTOUTS FOR CABLE POLE CONSTRUCTION   | OH1206UG4306           |
| VARIOUS TYPES   | VARIOUS TYPES OF FUSES USED ON THE OVERHEAD DISTRIBUTION SYSTEM  | OH1207UG4307           |
| GENERAL ELECTRIC<br>TYPE J-1  | USED TO FUSE 12KV (P.T) TRANSFORMER INSIDE CABINET OF PAD-MOUNTED CAPACITOR  | UG4309                 |
| COMBINED TECHNOLOGY<br>TYPE X LIMITER<br>MC-GRAW EDISON<br>TYPE NXC | USED TO FUSE CAPACITORS INSIDE CABINET OF PAD-MOUNTED CAPACITOR  | UG4309, UG4311, UG4312 |
| NELSON<br>TYPE E  | NOT APPROVED FOR USE   | --                     |
| GENERAL ELECTRIC<br>TYPE EJO-1<br>COMBINED TECHNOLOGY<br>TYPE EOD   | FUSING SINGLE- PHASE AND THREE-PHASE LATERALS FROM FUSE CABINETS. THREE-PHASE PORTABLE SWITCH (GREEN BOX) (a)  | UG4311 & UG4312        |
| MC-GRAW EDISON<br>TYPE NX   | FUSING SINGLE-PHASE AND THREE-PHASE LIVEFRONT TRANSFORMER (YP, HP, HQ, HAP, HAQ, HLP, HMP, HPP), SINGLE-PHASE GREEN BOX, G&W OIL FUSED CUTOUTS, OLD THREE-PHASE FUSE COMPARTMENT (b) | UG4311                 |
| KEARNEY<br>TYPE A   | FUSING SINGLE-PHASE LATERALS FROM LOW PROFILE FUSE CABINET FOR REPLACEMENT OF EXISTING UNITS ONLY (c)  | --                     |
| KEARNEY & RTE<br>TYPE B   | FUSING THREE-PHASE LATERALS FROM FUSED SWITCHING CABINET AND RETROFITTING S&C FUSE CABINETS (d)  | UG4311 & UG4312        |
| RTE/ELRP<br>KEARNEY/TYPER B<br>COMBINED TECHNOLOGY<br>TYPE BOI      | USED IN WALL MOUNTED AND SUBSURFACE FUSE CABINETS, ALSO IN PAD-MOUNTED PMH-9 & -11 SWITCHGEAR AND 1990 OR NEWER S&C MINI-RUPTER FUSE CABINET, ALSO FOUND ON VAULT WALLS              | UG4311 & UG4312        |
| X-LIMITER   | USED IN PME-9 AND 11 SWITCHGEAR AND PAD-MOUNTED CAPACITOR  | UG4311 & UG4312        |
| BURNDY<br>TYPE PF8  | USED IN LOADBREAK ELBOWS TO FUSE SINGLE-PHASE TRANSFORMERS AND SMALL LATERALS  | UG4312                 |
| ELASTIMOLD<br>TYPE EFX  | USED IN LOADBREAK ELBOWS TO FUSE SINGLE-PHASE TRANSFORMERS AND SMALL LATERALS, FUSED TEST CANISTER (FTC), AND VACUUM-SWITCH CIRCUIT TESTER (VCT)                                     | UG4312                 |
| GENERAL ELECTRIC  | USED IN D&W (G.E.) OIL FUSED CUTOUTS   | UG4313                 |
| S&C<br>TYPE SM-4  | USED IN SM-4 HOLDER (TRANSFORMER) 1000 KVA OLDER S&C MINI-RUPTER   | UG4313                 |
| S&C<br>TYPE SM-5  | USED IN SM-5 HOLDER SUBSTATION CAPACITORS, LIMITED DISTRIBUTION APPLICATION  | UG4313                 |
| --  | TRANSFORMER FUSING TABLES  | UG4314                 |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- (a) REFER TO UG3512, FMO UG3513.
- (b) REFER TO FMO UG3599.109.
- (c) REFER TO FMO UG3599.104.
- (d) REFER TO FMO UG3599.105-108, 111, 112.

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| A   | REVISION   | -   | -   | -   | JJ/MF | 8/21/2006 | D   |        |    |    |     |     |      |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | FUSE APPLICATION GUIDE                            |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS THE PREFERRED FUSE TO BE USED ON THE 4KV AND 12KV ELECTRIC SYSTEM IN TIER 2 & TIER 3 AREAS.



**FIGURE 1**  
ASSEMBLED CUTOUT BODY  
WITH FUSE AND FIREFLY

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |     |
|------|--|----------|---------------|--------------|--------------|-----|
|      |  |          |               |              | UG           | OH  |
| 1    | FUSEHOLDER, POLYMER BODY, WITH END FITTINGS FOR CMU FUSE BARREL, CMU, CURRENT RANGE UP TO 150A | --       | --            | S298018      | --           | CMU |
| 2    | FITTINGS, END, UPPER & LOWER FOR CMU FUSES (a)   | --       | --            | S368690      | --           | --  |
| 3    | FUSE, BARREL, REFER TO SIZES   | --       | 1207/4307     | --           | --           | --  |
| 4    | FIREFLY FOR 100 AMP AND SMALLER SMU/CMU FUSES (c)  | --       | --            | S423608      | --           | --  |

**NOTES:**

- I. KEARNY TYPE HX CUTOUTS ARE NO LONGER AVAILABLE. FOR APPLICATIONS IN TIER 2 & TIER 3 AREAS THE CMU CUTOUT BODY AND THE CMU FUSES WILL NOW BE USED.
  - II. THE PACKAGE CONTAINS THE CMU CUTOUT BODY AND UPPER AND LOWER END FITTINGS.
  - III. TROUBLESHOOTER: END FITTINGS CAN BE ORDERED SEPARATELY (SEE BILL OF MATERIALS PROVIDED ON PAGE 3). (a)
  - IV. DO NOT DISCARD END FITTING FROM AN ASSEMBLED USED OR BLOWN FUSE.
  - V. WHEN ASSEMBLING END FITTINGS TO THE FUSE BARREL, MAKE SURE NOT TO OVER TIGHTEN BOLTS. FINGER TIGHTEN AND HALF A TURN WITH A WRENCH WILL SUFFICE.
  - VI. USE ON 2.4KV - 12KV .
  - VII. CROSSARM MOUNTING BRACKETS ARE INCLUDED WITH THE MATERIALS SUPPLIED BY THE OH DESIGN UNITS (USED ON DESIGN BY LOCATION JOBS). BRACKETS MUST BE ORDERED SEPARATELY ON MANUALLY PREPARED FIELD MEMO JOBS. (b)
    - a. DOUBLE CUTOUT & ARRESTER MTG BKT = S165446 (X)
    - b. CUTOUT OR ARRESTER MTG BKT = S166070
- (X) THIS ITEM IS EXEMPT.

**REFERENCE:**

- (a) REFER TO OH1207UG4307.
- (b) REFER TO OH397.
- (c) REFER TO OH1208.

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| C   | DRAWING UPDATE | -  | RSL | JES | CZH | 03/09/2020 | F   |            |     |     |     |     |           |
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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

CUTOUT ASSEMBLY  
CMU

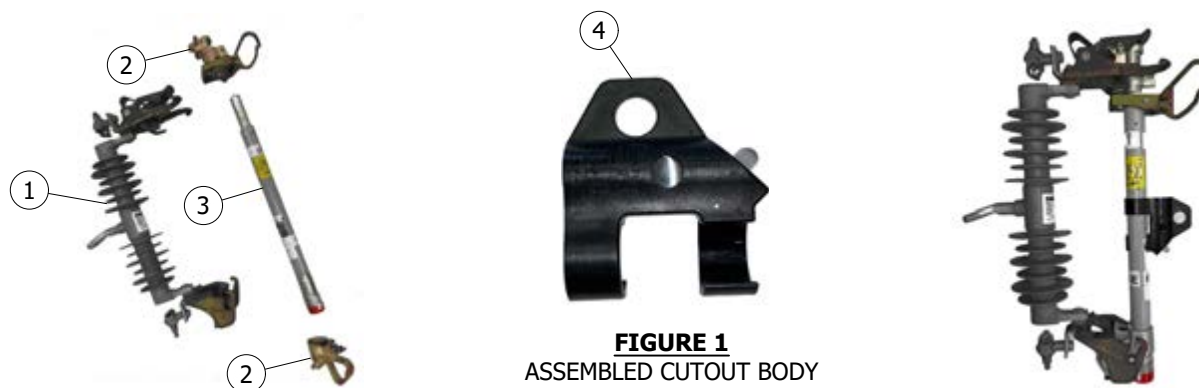
OH1212.1  
UG4305.1



**SCOPE:** THIS STANDARD SHOWS THE SECOND CHOICE FUSE TO BE USED ON THE 4KV AND 12KV ELECTRIC SYSTEM IN TIER 2 & TIER 3 AREAS.

**CAUTION:**

\* NOT FOR USE ON CABLE POLES DUE TO POSSIBILITY OF CONTACT WITH PHASE WIRES WHEN OPENED.



**FIGURE 1**  
ASSEMBLED CUTOUT BODY  
WITH FUSE AND FIREFLY

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |     |
|------|---|----------|---------------|--------------|--------------|-----|
|      |   |          |               |              | UG           | OH  |
| 1    | FUSEHOLDER, POLYMER BODY, WITH END FITTINGS FOR SMU FUSE BARREL SMD20, CURRENT RANGE UP TO 200A (VII) | --       | --            | S298022      | --           | CMU |
| 2    | FITTINGS, END, UPPER & LOWER END FOR SMU FUSES (a)  | --       | --            | S368690      | --           | --  |
| 3    | FUSE, BARREL, REFER TO SIZES  | --       | 1207/4307     | --           | --           | --  |
| 4    | FIREFLY FOR 100 AMP AND SMALLER SMU/CMU FUSES (c)   | --       | --            | S423608      | --           | --  |

**NOTES:**

- I. KEARNY TYPE HX CUTOUTS ARE NO LONGER AVAILABLE. FOR APPLICATIONS IN TIER 2 & TIER 3 AREAS THE SMD20 CUTOUT BODY AND THE SMU FUSES WILL NOW BE USED.
- II. THE PACKAGE CONTAINS THE SMD20 CUTOUT BODY AND UPPER AND LOWER END FITTINGS.
- III. TROUBLESHOOTER: END FITTINGS CAN BE ORDERED SEPARATELY (SEE BILL OF MATERIALS PROVIDED ON PAGE 3). (a)
- IV. DO NOT DISCARD END FITTING FROM AN ASSEMBLED USED OR BLOWN FUSE.
- V. WHEN ASSEMBLING END FITTINGS TO THE FUSE BARREL, MAKE SURE NOT TO OVER TIGHTEN BOLTS. FINGER TIGHTEN AND HALF A TURN WITH A WRENCH WILL SUFFICE.
- VI. USE ON 2.4KV - 12KV.
- (VII) CROSSARM MOUNTING BRACKETS ARE INCLUDED WITH THE MATERIALS SUPPLIED BY THE OH DESIGN UNITS (USED ON DESIGN BY LOCATION JOBS). BRACKETS MUST BE ORDERED SEPARATELY ON MANUALLY PREPARED FIELD MEMO JOBS. (b)
- DOUBLE CUTOUT & ARRESTER MTG BKT = S165446 (X)
- CUTOUT OR ARRESTER MTG BKT = S166070
- (X) THIS ITEM IS EXEMPT.

**REFERENCE:**

- (a) REFER TO OH1207UG4307.
- (b) REFER TO OH397.
- (c) REFER TO OH1208.

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                      |
|                 | CUTOUT ASSEMBLY<br>SMD20                                       |                           |                    |          |                     |                      |



**SCOPE:** THIS STANDARD SHOWS THE POLYMER INTERCHANGEABLE CUTOUT BODY.



**FIGURE 1**  
POLYMER INTERCHANGEABLE CUTOUT  
WITH FUSE AND FIREFLY

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | CURRENT RANGE      | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |        |
|------|--------------------|---|----------|---------------|--------------|--------------|--------|
|      |                    |   |          |               |              | UG           | OH     |
| 1    | 0-300A             | CUTOUT BODY, INTERCHANGEABLE WITHOUT FUSEHOLDER (IV)  | --       | --            | S298020      | --           | NPCO   |
|      |                    | CUTOUT BODY, INTERCHANGEABLE WITHOUT FUSEHOLDER (IV)  | --       | --            | S298026      | --           |        |
| 2    | FUSE 5 THRU 100A   | FUSEHOLDER, 100A, WITH SOLID CAP AND ARC SHORTENING ROD FOR USE IN CUTOUT BODY ITEM #4 (II III) | --       | --            | S413394      | --           | X100FH |
| 3    | FUSE 125 THRU 200A | FUSEHOLDER, 200A, WITH SOLID CAP FOR USE IN CUTOUT BODY ITEM #4 (II III)                        | --       | --            | S413396      | --           | X200FH |
| 4    | FUSE 5 THRU 100A   | FIREFLY FOR 100 AMP QA FUSE DOORS (C)   | --       | --            | S423606      | --           | --     |

**NOTES:**

- I. TO BE USED IN NON-TIER 2 & TIER 3 AREAS.
- (II) ITEMS 2, 3 AND 4 ARE INTERCHANGEABLE WITH CUTOUT BODY ITEM 1 REGARDLESS OF MANUFACTURER.
- (III) CUTOUTS SHALL BE BONDED IF INSTALLED IN CONTAMINATION DISTRICT 1. (d)
- (IV) CROSSARM MOUNTING BRACKETS ARE INCLUDED WITH THE MATERIALS SUPPLIED BY THE OH DESIGN UNITS (USED ON DESIGN BY LOCATION JOBS). BRACKETS MUST BE ORDERED SEPARATELY ON MANUALLY PREPARED FIELD MEMO JOBS. (a)
- a. DOUBLE CUTOUT & ARRESTER MTG BKT = S165446 (X)
- b. CUTOUT OR ARRESTER MTG BKT = S166070
- V. USE ON 2.4 - 12KV.
- (X) THIS ITEM IS EXEMPT.

**REFERENCE:**

- (a) REFER TO OH397.
- b. REFER TO OH1207UG4307 FOR FUSES.
- (C) REFER TO OH1208.
- (d) REFER TO OH287UG3140.

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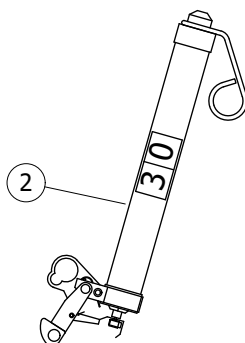
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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                      |
|                 | CUTOUT ASSEMBLY<br>POLYMER INTERCHANGEABLE                     |                           |                    |          |                     |                      |



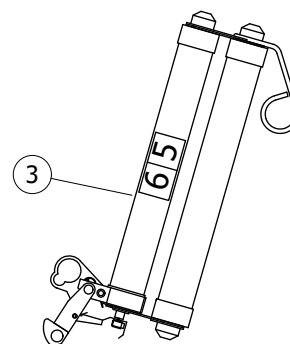
**SCOPE:** THIS STANDARD SHOWS CURRENT LIMITING FUSES USED FOR CABLE POLE CONSTRUCTION.



**FIGURE 1**  
POLYMER INTERCHANGEABLE CUTOUT



**FIGURE 2**  
SINGLE BARREL ELF FUSE



**FIGURE 3**  
DOUBLE BARREL ELF FUSE

### INSTALLATION:

- (A) THESE FUSES DROP WHEN THEY OPERATE, ARE TOTALLY EXPENDABLE AND HAVE NO SALVAGEABLE PARTS. DISCARD ENTIRE FUSE ASSEMBLY AFTER OPERATION.
- (B) INSTALL FUSE SIZE WITH DECALS ON EACH FUSE SO IT WILL BE VISIBLE AFTER INSTALLATION. (C)

### BILL OF MATERIALS:

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |        |
|------|--|----------|---------------|--------------|--------------|--------|
|      |  |          |               |              | OH           | UG     |
| 1    | INTERCHANGEABLE CUTOUT BODY, WITHOUT FUSEHOLDER (I)  | AS REQ'D | -             | S298020      | -            | NPCO   |
| 2    | FUSE, CURRENT-LIMITING, ELF™, 30 AMPERE, SINGLE BARREL FOR USE IN KEARNEY-TYPE HX CUT OUT (A)(B) | AS REQ'D | -             | S365654      | 30AELF       | ELF30A |
| 3    | FUSE, CURRENT-LIMITING, ELF™, 65 AMPERE, DOUBLE BARREL FOR USE IN INTERCHANGEABLE CUTOUT (A)(B)  | AS REQ'D | -             | S365656      | 65AELF       | ELF65A |

### NOTES:

- (I) CROSSARM BRACKETS ARE INCLUDED WITH THE MATERIALS SUPPLIED BY THE OH DESIGN UNITS (USED ON DESIGN BY LOCATION JOBS). BRACKETS MUST BE ORDERED SEPARATELY ON MANUALLY PREPARED FIELD MEMO JOBS. (b)
  - a. DOUBLE CUTOUT & ARRESTER MTG BKT: S165446 (X)
  - b. CUTOUT OR ARRESTER MTG BKT: S166070
- (X) THIS ITEM IS EXEMPT.

### REFERENCE:

- a. FOR APPLICATION OF THESE FUSES, SEE DESIGN STANDARDS MANUAL, 6100 SECTION.
- (b) REFER TO OH397.
- (c) REFER TO OH208 & UG3212

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SHEET  
1 OF 1

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

OVERHEAD 12KV CURRENT-LIMITING FUSE INSTALLATION

OH1206.1  
UG4306.1



**SCOPE:** THIS STANDARD SHOWS VARIOUS TYPES OF FUSES USED ON THE OVERHEAD DISTRIBUTION SYSTEM.

**TABLE 1**

| EXPULSION FUSES (a) |      |              |              |           |                  |
|---------------------|------|--------------|--------------|-----------|------------------|
| SIZE (AMPS)         | TYPE | STOCK NUMBER | DESIGN UNITS |           |                  |
|                     |      |              | OH ACCTS.    | UG ACCTS. | OVERHEAD (B) (C) |
| 5                   | 200  | S366016      | -            | EXP-05    | EX5 (D)          |
| 10                  | 200  | S365696      | -            | EXP-10    | EX10 (D)         |
| 15                  | QA   | S365792      | 015-QA       | QA-015    | QA15 (D)         |
| 20                  | QA   | S365856      | 020-QA       | QA-020    | QA20 (D)         |
| 25                  | QA   | S365920      | 025-QA       | QA-025    | QA25 (D)         |
| 30                  | QA   | S365952      | 030-QA       | QA-030    | QA30 (D)         |
| 40                  | QA   | S365984      | 040-QA       | QA-040    | QA40 (D)         |
| 50                  | QA   | S366048      | 050-QA       | QA-050    | QA50 (D)         |
| 60                  | QA   | S366080      | 060-QA       | QA-060    | QA60 (D)         |
| 75                  | QA   | S366112      | 075-QA       | QA-075    | QA75 (D)         |
| 100                 | QA   | S365728      | 100-QA       | QA-100    | QA100 (D)        |
| 125                 | QA   | S365760      | 125-QA       | QA-125    | QA125            |
| 150                 | QA   | S365824      | 150-QA       | QA-150    | QA150            |
| 200                 | 200  | S365888      | 200-QA       | QA-200    | QA200            |

**TABLE 2**

| CURRENT-LIMITING FUSES (II) (d) |                            |              |
|---------------------------------|----------------------------|--------------|
| SIZE (AMPS)                     | TYPE                       | STOCK NUMBER |
| 30                              | CURRENT-LIMITING (HXELF)   | S365732 (B)  |
| 30                              | CURRENT-LIMITING (ELF)     | S365654 (C)  |
| 65                              | CURRENT-LIMITING (ELF)     | S365656 (C)  |
| 65                              | CURRENT-LIMITING (HXELF)   | S365738 (B)  |
| 150                             | CURRENT-LIMITING (HX)      | S365689 (B)  |
| 12                              | CURRENT-LIMITING (BACK-UP) | S365634 (A)  |
| 40                              | CURRENT-LIMITING (BACK-UP) | S365636 (A)  |

**TABLE 3**

| 15.5 KV NX FUSES FOR CURRENT-LIMITING FUSE TOOL<br>(USED FOR TESTING DISTRIBUTION TRANSFORMERS) |                  |              |
|---|------------------|--------------|
| SIZE (AMPS)   | TYPE             | STOCK NUMBER |
| 8   | CURRENT-LIMITING | S368000      |
| 10  | CURRENT-LIMITING | S367552      |
| 12  | CURRENT-LIMITING | S367584      |
| 18  | CURRENT-LIMITING | S367648      |
| 21  | CURRENT-LIMITING | S367712      |
| 25  | CURRENT-LIMITING | S367744      |
| 30  | CURRENT-LIMITING | S367808      |
| 40  | CURRENT-LIMITING | S367872      |

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| A   | EDITORIAL CHANGES | -  | KN  | JS  | MDJ | 07/25/2017 | D   | EDITORIAL CHANGES | -   | JC  | JS  | CZH | 06/13/2019 |

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                      |
|                 | FUSES USED IN OVERHEAD CONSTRUCTION                            |                           |                    |          |                     |                      |



**TABLE 4**

| 15.5 KV ELF FUSES (USED FOR TESTING DISTRIBUTION TRANSFORMERS) |                  |              |              |
|--|------------------|--------------|--------------|
| SIZE (AMPS)  | TYPE             | STOCK NUMBER | DESIGN UNITS |
| 12   | CURRENT-LIMITING | S365664      | -            |
| 50   | CURRENT-LIMITING | S365666      | -            |

**TABLE 5**

| SECONDARY CURRENT-LIMITING FUSES FOR EKSTROM ADAPTER (b) |                  |              |              |
|--|------------------|--------------|--------------|
| SIZE (AMPS)  | TYPE             | STOCK NUMBER | DESIGN UNITS |
| 125  | CURRENT-LIMITING | S365643      | -            |

**TABLE 6**

| 15.5 KV CURRENT LIMITING FUSE, CAPACITOR POWER TRANSFORMER |                  |              |              |
|--|------------------|--------------|--------------|
| SIZE (AMPS)  | TYPE             | STOCK NUMBER | DESIGN UNITS |
| 3  | CURRENT-LIMITING | S365732      | -            |

**TABLE 7**

| CMU FUSES FOR CMU CUTOUT BODY (1) |         |              |              |            |
|-----------------------------------|---------|--------------|--------------|------------|
| SIZE (AMPS)                       | TYPE    | STOCK NUMBER | DESIGN UNITS |            |
|                                   |         |              | UG           | OH         |
| 5                                 | CMU-5   | S368692      | 5CMU         | CMU5 (D)   |
| 10                                | CMU-10  | S368694      | 10CMU        | CMU10 (D)  |
| 15                                | CMU-15  | S368696      | 15CMU        | CMU15 (D)  |
| 20                                | CMU-20  | S368698      | 20CMU        | CMU20 (D)  |
| 25                                | CMU-25  | S368700      | 25CMU        | CMU25 (D)  |
| 30                                | CMU-30  | S368702      | 30CMU        | CMU30 (D)  |
| 40                                | CMU-40  | S368704      | 40CMU        | CMU40 (D)  |
| 50                                | CMU-50  | S368706      | 50CMU        | CMU50 (D)  |
| 65                                | CMU-65  | S368708      | 65CMU        | CMU65 (D)  |
| 80                                | CMU-80  | S368710      | 80CMU        | CMU80 (D)  |
| 100                               | CMU-100 | S368712      | 100CMU       | CMU100 (D) |
| 125                               | CMU-125 | S368714      | 125CMU       | CMU125     |
| 150                               | CMU-150 | S368716      | 150CMU       | CMU150     |

**TABLE 8**

| END FITTINGS FOR CMU FUSES |              |
|----------------------------|--------------|
| DESCRIPTION                | STOCK NUMBER |
| FUSE END FITTINGS          | S368690      |

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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |                      |
|                 | FUSES USED IN OVERHEAD CONSTRUCTION                            |                           |                    |          |                     |                      |



**TABLE 9**

| SMU FUSES FOR SMD20 CUTOUT BODY (I)(III) |         |                 |              |            |
|--|---------|-----------------|--------------|------------|
| SIZE<br>(AMPS)                           | TYPE    | STOCK<br>NUMBER | DESIGN UNITS |            |
|  |         |                 | UG           | OH         |
| 5  | SMU-5   | S368550         | 5SMU         | SMU5 (D)   |
| 10                                       | SMU-10  | S368552         | 10SMU        | SMU10 (D)  |
| 15                                       | SMU-15  | S368554         | 15SMU        | SMU15 (D)  |
| 20                                       | SMU-20  | S368556         | 20SMU        | SMU20 (D)  |
| 25                                       | SMU-25  | S368662         | 25SMU        | SMU25 (D)  |
| 30                                       | SMU-30  | S368664         | 30SMU        | SMU30 (D)  |
| 40                                       | SMU-40  | S368666         | 40SMU        | SMU40 (D)  |
| 50                                       | SMU-50  | S368668         | 50SMU        | SMU50 (D)  |
| 65                                       | SMU-65  | S368670         | 65SMU        | SMU65 (D)  |
| 80                                       | SMU-80  | S368672         | 80SMU        | SMU80 (D)  |
| 100                                      | SMU-100 | S368674         | 100SMU       | SMU100 (D) |
| 125                                      | SMU-125 | S368676         | 125SMU       | SMU125     |
| 150                                      | SMU-150 | S368678         | 150SMU       | SMU150     |
| 200                                      | SMU-200 | S368680         | 200SMU       | SMU200     |

**TABLE 10**

| END FITTINGS FOR SMU FUSES |              |
|----------------------------|--------------|
| DESCRIPTION                | STOCK NUMBER |
| FUSE END FITTINGS          | S368660      |

**INSTALLATION:**

- (A) NO LONGER PURCHASED.
- (B) USE WITH KEARNEY CUTOUT. (c)(d)
- (C) USE WITH INTERCHANGEABLE CUTOUT. (c)(d)
- (D) CORRESPONDING FIREFLY SHOULD BE INSTALLED WITH APPLICABLE NEW FUSE INSTALLATION OR FUSE REPLACEMENT EXCEPT WHEN FUSING TRANSFORMERS. (e)

**BILL OF MATERIALS:** NONE**NOTES:**

- (I) THESE FUSES ARE CAL-FIRE EXEMPT. THEY WILL BE USED IN TIER 2 & TIER 3 AREAS.
- (II) THESE FUSES ARE ALLOWED IN THE ENTIRE SERVICE TERRITORY.
- (III) SMU FUSES ARE NOT TO BE LEFT HANGING IN THE OPEN POSITION. (f)

**REFERENCE:**

- (a) SEE DESIGN STANDARDS SECTION 6100.
- (b) SEE OH1204.
- (c) SEE OH1207UG4307 FOR EXPLOSION FUSE.
- (d) SEE OH1206UG4306 FOR CURRENT-LIMITING FUSE.
- (e) SEE OH1208 FOR FIREFLY FUSED CUTOUT INDICATOR.
- (f) SEE S&C INSTRUCTION SHEET 252-550.

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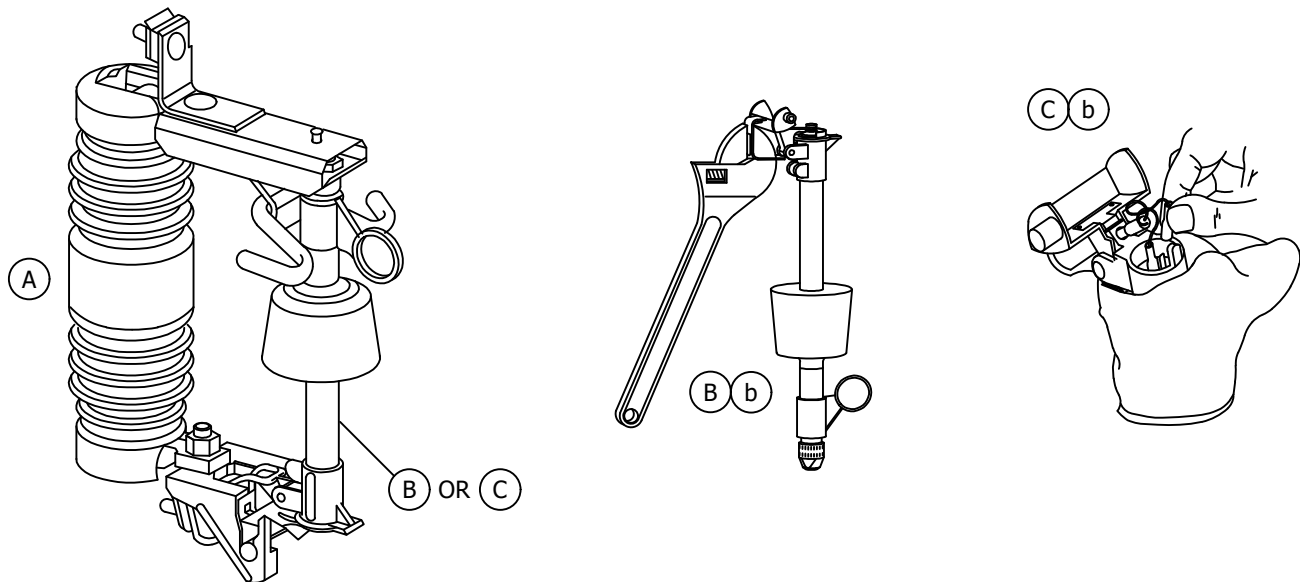
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| SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |
| FUSES USED IN OVERHEAD CONSTRUCTION                            |                           |                    |          |                     |

**SHEET**  
**3 OF 3**

**OH1207.3**  
**UG4307.3**



**SCOPE:** THIS STANDARD SHOWS VARIOUS ELECTRONIC SECTIONALIZERS AND THEIR GENERAL APPLICATION.



**INSTALLATION:**

- (A) THE ELECTRONIC SECTIONALIZERS ONLY FIT THE INTERCHANGEABLE CUTOUTS, EITHER STANDARD LEAKAGE OR HIGH LEAKAGE - SEE STANDARD 1212/4306.
- (B) THE RESETTABLE ELECTRONIC SECTIONALIZER IS THE ONLY TYPE CURRENTLY BEING PURCHASED. SEE TABLE 1 FOR DETAILS.
- (C) THE NON-RESETTABLE ELECTRONIC SECTIONALIZER IS NO LONGER PURCHASED. A REPLACEMENT ACTUATOR IS AVAILABLE FOR MAINTENANCE OF THOSE SECTIONALIZERS IN THE FIELD - SEE TABLE 2. IF A NON-RESETTABLE ELECTRONIC SECTIONALIZER BECOMES DAMAGED OR IS NO LONGER USABLE, IT SHOULD BE REPLACED WITH A RESETTABLE TYPE.

**TABLE 1 RESETTABLE ELECTRONIC SECTIONALIZER** (B) (a)

| SIZE (AMPS) | COUNTS | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER | ASSEMBLY UNITS OVERHEAD | ASSEMBLY UNITS UNDERGROUND |
|-------------|--------|--------------|----------------|--------------|-------------------------|----------------------------|
| 100         | 2      | A.B. CHANCE  | C740-272T      | 634100       | ES100                   | 100ES                      |
| 140         | 2      | A.B. CHANCE  | C740-282T      | 634102       | ES140                   | 140ES                      |
| 200         | 2      | A.B. CHANCE  | C740-292T      | 634104       | ES200                   | 200ES                      |

**TABLE 2 NON-RESETTABLE ELECTRIC SECTIONALIZER (REPLACEMENT ACTUATOR)** (C) (a)

| SIZE (AMPS) | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER |
|-------------|--------------|----------------|--------------|
| 100 - 200   | A.B. CHANCE  | C700-1729      | 101522       |

**NOTES:** NONE

**REFERENCE:**

- (a) FOR APPLICATION OF ELECTRONIC SECTIONALIZERS - SEE DESIGN MANUAL PAGE 6205.3.
- (b) FOR OPERATIONAL INFORMATION - SEE ELECTRIC STANDARD PRACTICE 318.

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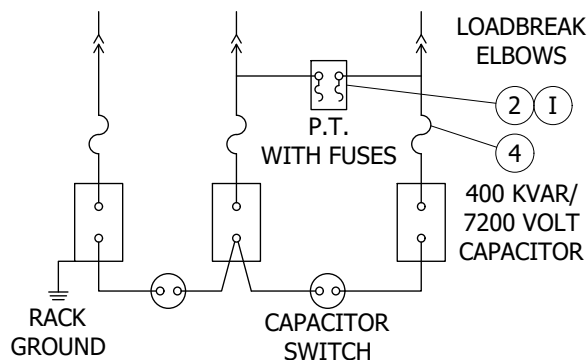
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|-----|----------------|-----|------|------|------------|-----|--------|----|------|------|------|
| C   |                |     |      |      |            | F   |        |    |      |      |      |
| B   | DRAWING UPDATE | PEI | -    | -    | 02/18/2019 | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE | -   | PTA  | MC   | 10/08/2010 | D   |        |    |      |      |      |

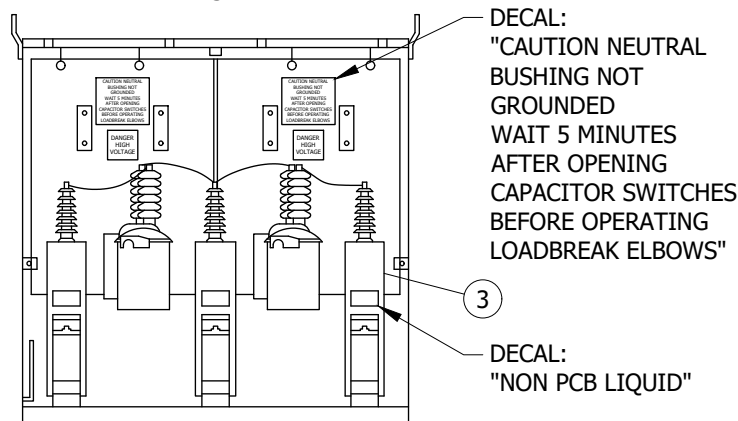
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|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS |                    |          |                     |                      |
|                 | ELECTRONIC SECTIONALIZER                          |                    |          |                     |                      |



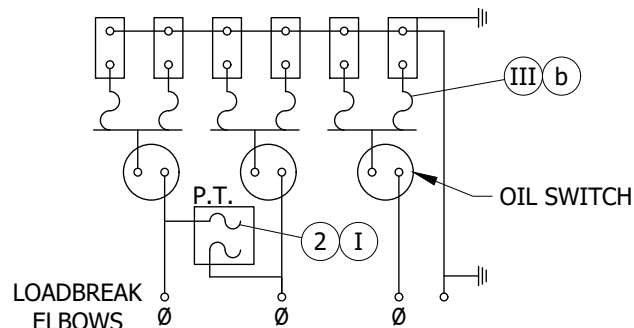
**SCOPE:** THIS STANDARD DESCRIBES THE 1200 KVAR PAD-MOUNTED CAPACITOR.



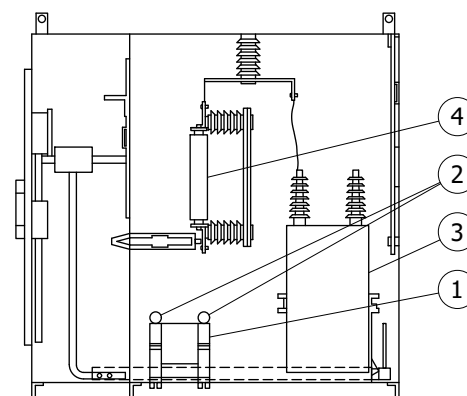
**FIGURE 1**  
SCHEMATIC DIAGRAM (II)  
NEW STYLE



**FIGURE 3**  
BACK VIEW  
EXPOSED



**FIGURE 2**  
SCHEMATIC DIAGRAM (III)  
OLD STYLE



**FIGURE 3**  
SIDE VIEW  
EXPOSED

**INSTALLATION:** NONE

### BILL OF MATERIALS:

| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | TRANSFORMER (P.T), 12KV   | 1        | 3821          | S762714      | --           |
| 2    | FUSE, CURRENT-LIMITING 0.5 AMP, 14.4 KV - GE TYPE J-1             | 2        | --            | S366456      | --           |
| 3    | CAPACITOR, 400 KVAR, 7200V, SINGLE-PHASE                          | 3        | 3821          | S207348      | --           |
| 4    | FUSE, COMBINED TECHNOLOGIES, 15.5 KV, 80 AMP, TYPE X-LIMITER (II) | 3        | 4311          | S365695      | --           |

**NOTES:**

- (I) P.T. TRANSFORMER FUSES, GE TYPE J-1 ARE THE SAME FOR NEW AND OLD STYLE CAPACITORS.  
 (II) NEW STYLE 3-80A, COMBINED TECHNOLOGY FUSES TYPE X LIMITER. (a)  
 (III) 6-45A, MCGRAW EDISON FUSES TYPE NXC: S365718. (b)

**REFERENCE:**

- (a) REFER TO UG3821.
- (b) REFER TO FMO UG3899.201-203.

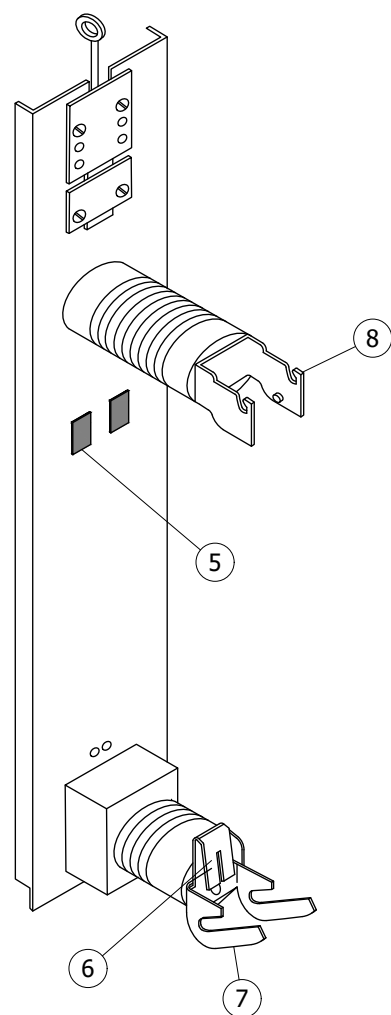
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| C   |            |     |    |     |         |           | F   |        |    |    |     |     |      |
| B   | FORMATTING | EDM | JK | -   | -       | 9/28/2020 | E   |        |    |    |     |     |      |
| A   | REVISION   | -   | -  | -   | RSW/RDJ | 1/1/1996  | D   |        |    |    |     |     |      |

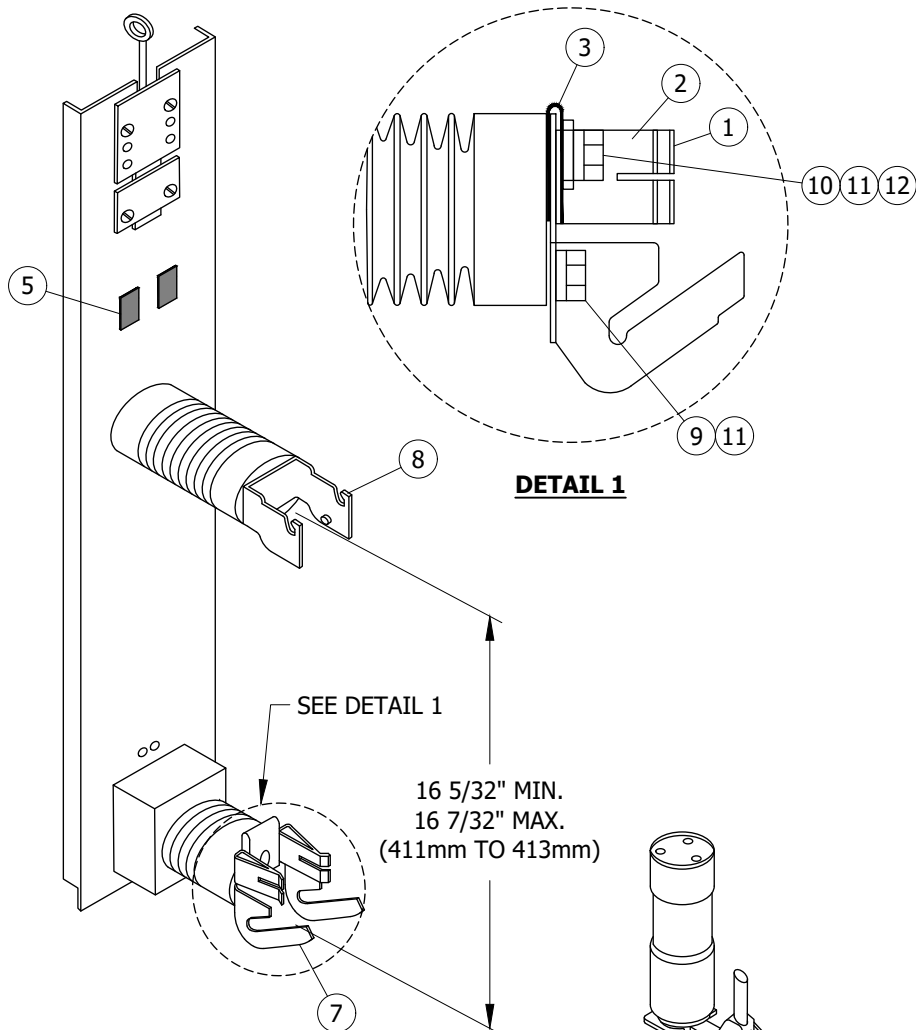
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | 1200 KVAR PAD-MOUNTED CAPACITOR                   |                           |                    |          |                     |          |



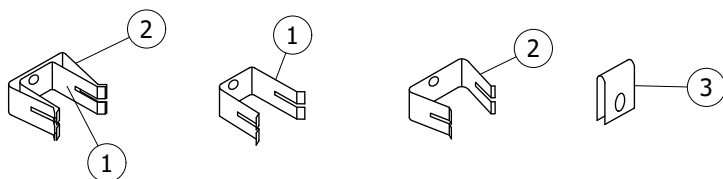
**SCOPE:** THIS STANDARD PROVIDES INSTALLATION INSTRUCTIONS FOR THE SML-4Z FUSE CONVERSION KIT FOR THE PME 9 AND 11 SWITCH TRANSFUSER DOOR.



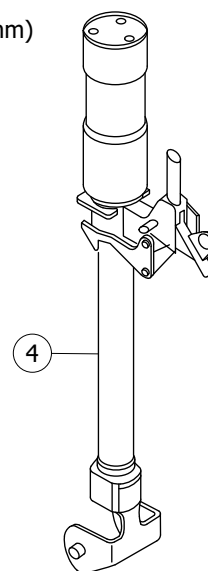
**FIGURE 1**  
CURRENT LIMITING



**FIGURE 2**  
SM-4



**FIGURE 3** (K)



**FIGURE 4**

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| C   |            |     |    |     |         |            | F   |        |    |    |     |     |      |
| B   | FORMATTING | EDM | JK | -   | -       | 9/28/2020  | E   |        |    |    |     |     |      |
| A   | REVISION   | -   | -  | -   | RSW/CAK | 01/01/2000 | D   |        |    |    |     |     |      |



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SHEET  
1 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CURRENT LIMITING TO SM-4  
FUSE CONVERSION FOR PME SWITCH

UG4310.1



**INSTALLATION:**

- A. IF THIS WORK IS TO BE DONE IN THE FIELD ON AN ENERGIZED SWITCH, IT MUST BE DE-ENERGIZED AND ALL CABLES GROUNDED.
- B. OPEN THE THREE TRANSFUSER DOORS TO BE CONVERTED.
- (C) REMOVE PLUGS FROM PRE-DRILLED HOLES IN TRANSFUSER DOOR.
- D. RELOCATE THE UPPER INSULATOR WITH LATCH BRACKET TO LOWER SET OF HOLES. REUSE EXISTING HARDWARE. TIGHTEN THE BOLTS.
- (E) REMOVE THE LOWER FUSE CONTACT AND INSTALL ITEMS 1, 2 & 3. MAKE SURE ITEM 3 IS INSTALLED WITH ONE LEG BEHIND THE HINGE BRACKET AND THE OTHER LEG OVER THE CONTACT AND CONTACT BACKUP.
- (F) REPLACE PLUGS.
- G. INSTALL THE FUSE HOLDER. MAKE SURE THAT THE FUSE MAKES GOOD CONTACT WITH THE CONTACT ASSEMBLY.
- H. CHECK THAT THE FUSE HOLDER LATCHES CORRECTLY. IT IS NORMAL FOR THE FUSE HOLDER TO MOVE SLIGHTLY AT THE LATCHING END.
- J. ONCE ADJUSTMENT IS ACHIEVED, TIGHTEN HARDWARE TO 35-40 FT/LBS.
- (K) SNAP THE CONTACT BACKUP ITEM 2 OVER THE CONTACT ITEM 1 PRIOR TO INSTALLING ON HINGE BRACKET.

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                      | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|----------------------------------|----------|---------------|--------------|--------------|
| 1    | CONTACT                          | 3        | --            | S442944      | CL-SM4 (I)   |
| 2    | CONTACT BACKUP                   | 3        | --            |              |              |
| 3    | SHUNT (E)                        | 3        | --            |              |              |
| 4    | HOLDER, FUSE                     | 3        | --            |              |              |
| 5    | PLUGS (C)(F)                     | AS REQ'D | --            | --           | --           |
| 6    | CONTACT, FUSE                    | AS REQ'D | --            | --           | --           |
| 7    | BRACKET, HINGE                   | AS REQ'D | --            | --           | --           |
| 8    | BRACKET, LATCH                   | AS REQ'D | --            | --           | --           |
| 9    | SCREW, HEX CAP, 3/8"-16 X 1"     | AS REQ'D | --            | --           | --           |
| 10   | SCREW, HEX CAP, 3/8"-16 X 1 1/4" | AS REQ'D | --            | --           | --           |
| 11   | WASHER, LOCK, STD., 3/8"         | AS REQ'D | --            | --           | --           |
| 12   | WASHER, FLAT, STD., 3/8"         | AS REQ'D | --            | --           | --           |

**NOTES:**

- (I) DESIGN UNIT CL-SM4 ORDERS ENOUGH MATERIAL FOR 3 FUSES OR ONE COMPARTMENT.

**REFERENCE:** NONE

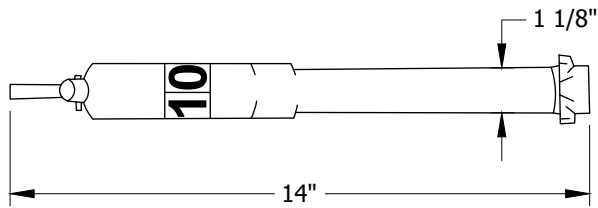
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| B   | FORMATTING | EDM | JK | -   | -       | 9/28/2020  | E   |        |    |    |     |     |      |
| A   | REVISION   | -   | -  | -   | RSW/CAK | 01/01/2000 | D   |        |    |    |     |     |      |

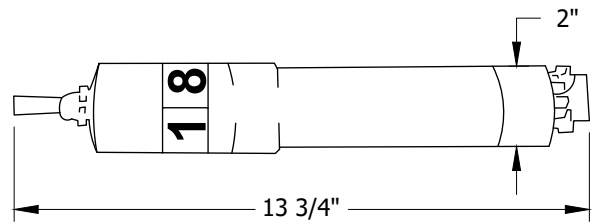
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS          |                           |                    |          |                     |          |
|                 | CURRENT LIMITING TO SM-4<br>FUSE CONVERSION FOR PME SWITCH |                           |                    |          |                     |          |



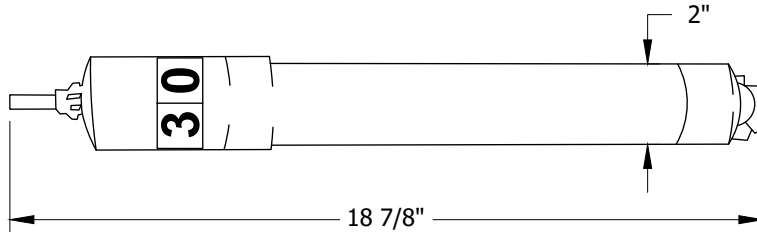
**SCOPE:** THIS STANDARD DESCRIBES THE VARIOUS TYPES OF FUSES USED ON THE UNDERGROUND DISTRIBUTION SYSTEM.



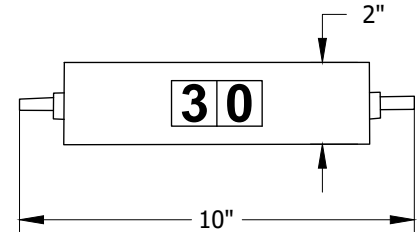
**FIGURE 1**  
COOPER POWER SYSTEMS/ MC-GRAW EDISON  
TYPE NX



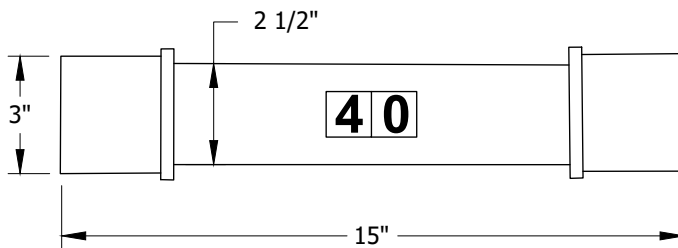
**FIGURE 2**  
COOPER POWER SYSTEMS/ MC-GRAW EDISON  
TYPE NX



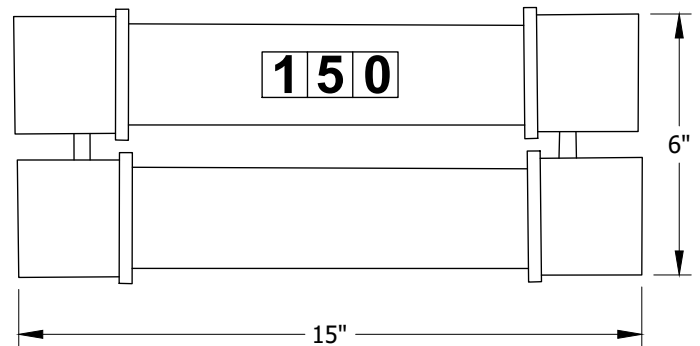
**FIGURE 3**  
COOPER POWER SYSTEMS/ MC-GRAW EDISON  
TYPE NX



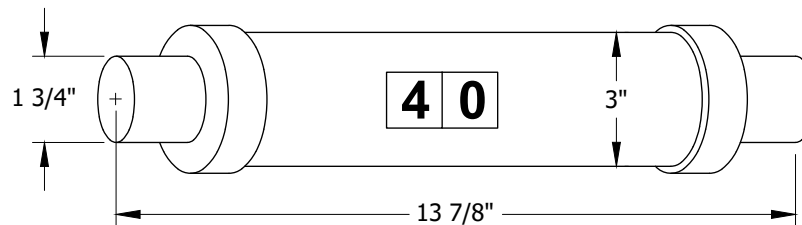
**FIGURE 4**  
COOPER POWER SYSTEMS/ MC-GRAW EDISON  
TYPE NX



**FIGURE 5**  
MERSEN/ GENERAL ELECTRIC  
TYPE EJO-1 & COMBINED TECHNOLOGIES TYPE EOD



**FIGURE 6**  
MERSEN/ GENERAL ELECTRIC  
TYPE EJO-1



**FIGURE 7**  
COOPER POWER SYSTEMS/ BUSSMANN

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| C   | TABLE UPDATES     | -  | KR  | JS  | MDJ | 1/25/2017 | F   |            |     |     |     |     |           |
| B   | EDITORIAL CHANGES | -  | JBH | JBH | MDJ | 8/11/2016 | E   |            |     |     |     |     |           |
| A   | TABLE UPDATE      | -  | JS  | TR  | MDJ | 5/24/2016 | D   | FORMATTING | EDM | JKI | -   | -   | 9/28/2020 |

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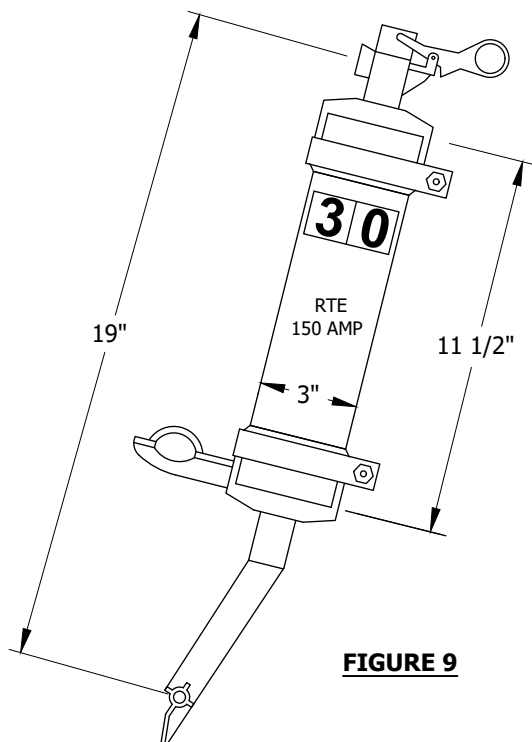
SHEET  
1 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

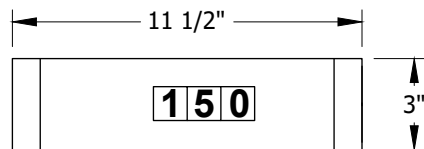
CURRENT - LIMITING FUSES AND ELECTRONIC FUSES

UG4311.1



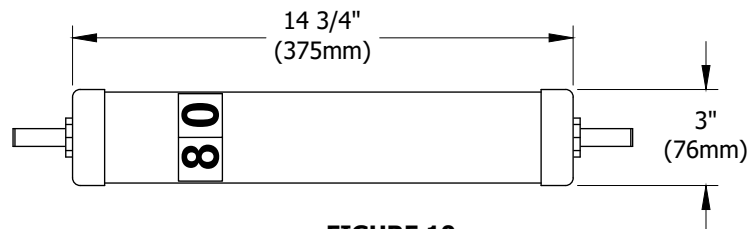


**FIGURE 9**



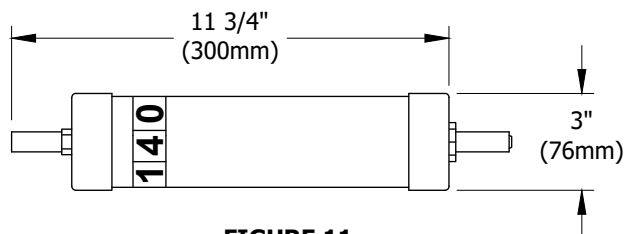
**FIGURE 8**

RTE TYPE B, COOPER POWER HX-XLIMITER, & COMBINED TECHNOLOGIES TYPE BOI, 150 AMP



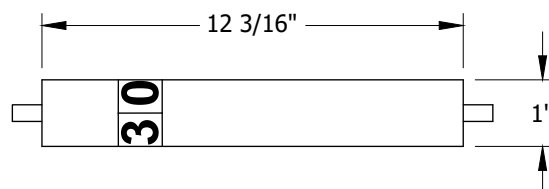
**FIGURE 10**

COOPER POWER SYSTEMS/ COMBINED TECHNOLOGIES 80 AMP X-LIMITER



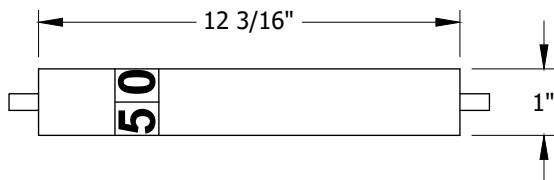
**FIGURE 11**

140 AMP X-LIMITER CURRENT LIMITING FUSE



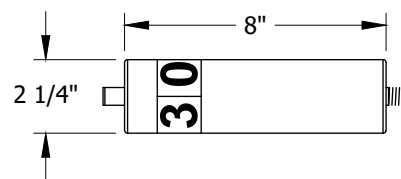
**FIGURE 12**

30 AMP FULL-RANGE CURRENT LIMITING FUSE USED WITH FUSE TEST CANISTER/FTC



**FIGURE 13**

50 AMP FULL-RANGE CURRENT LIMITING FUSE USED WITH VACUUM-SWITCH CIRCUIT TESTER/VCT



**FIGURE 14**

30 AMP FULL-RANGE CURRENT LIMITING FUSE USED WITH FUSED ELBOW

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:** NONE

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| A   | TABLE UPDATE      | -  | JS  | TR  | MDJ | 5/24/2016 | D   | FORMATTING | EDM | JKI | -   | -   | 9/28/2020 |



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2 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CURRENT - LIMITING FUSES AND ELECTRONIC FUSES

UG4311.2



**SCOPE:** THIS STANDARD PROVIDES A TABLE OF CURRENT-LIMITING FUSES AND SOLID BLADES.

**TABLE 1**

| CURRENT-LIMITING FUSE & SOLID BLADE TABLE |                      |                                 |              |              |              |  |                            |                |              |              |          |        |     |
|---|----------------------|---------------------------------|--------------|--------------|--------------|--|----------------------------|----------------|--------------|--------------|----------|--------|-----|
| MANUFACTURER                              | NOMINAL VOLTAGE (KV) | RATING CONTINUOUS CURRENT (AMP) |              |              |              | INTERRUPTING SYMMETRICAL CURRENT (AMP) | FIGURE NUMBER <div>a</div> | CATALOG NUMBER | STOCK NUMBER | DESIGN UNITS |          |        |     |
| COOPER POWER SYSTEMS/ TYPE NX             | 8.3                  | 8                               |              | <div>K</div> | --           | 50,000                                 | 1                          | FA3A8          | S367936      | --           |          |        |     |
|   |                      | 10                              |              |              | --           |  |                            | FA3A10         | S368032      | --           |          |        |     |
|   |                      | 12                              |              |              | --           |  |                            | FA3A12         | S367616      | --           |          |        |     |
|   |                      | 18                              |              |              | --           |  | 2                          | FA3A18         | S367680      | --           |          |        |     |
|   |                      | 25                              |              |              | --           |  |                            | FA3A25         | S367776      | --           |          |        |     |
|   |                      | 30                              |              |              | --           |  |                            | FA3A30         | S367840      | --           |          |        |     |
|   |                      | 40                              |              |              | --           |  |                            | FA3A40         | S367904      | --           |          |        |     |
|   | --                   | 200                             |              | --           | --           | --                                     | FA1B1                      | S139552        | SB200N       |              |          |        |     |
|   | 8.3                  | 25                              |              | <div>K</div> | --           | 50,000                                 | 4                          | FA3H25         | S365684      | --           |          |        |     |
|   |                      | 30                              |              |              | --           |  |                            | FA3H30         | S365688      | --           |          |        |     |
|   |                      | 40                              |              |              | --           |  |                            | FA3H40         | S365692      | --           |          |        |     |
|   |                      | 8                               |              |              | --           |  | --                         | FC11Y8         | S367968      | --           |          |        |     |
|   | 15.5                 | 8                               |              | <div>K</div> | --           | 50,000                                 | 3                          | FA4A8          | S368000      | --           |          |        |     |
|   |                      | 10                              |              |              | --           |  |                            | FA4A10         | S367552      | --           |          |        |     |
|   |                      | 12                              |              |              | --           |  |                            | FA4A12         | S367584      | --           |          |        |     |
|   |                      | 18                              |              |              | --           |  |                            | FA4A18         | S367648      | --           |          |        |     |
|   |                      | 20                              |              |              | --           |  |                            | FA4A20         | S367712      | --           |          |        |     |
|   |                      | 25                              |              |              | --           |  |                            | FA4A25         | S367744      | --           |          |        |     |
|   |                      | 30                              |              |              | --           |  |                            | FA4A30         | S367808      | --           |          |        |     |
|   |                      | 40                              |              |              | --           |  |                            | FA4A40         | S367872      | --           |          |        |     |
|   | --                   | 200                             |              | --           | --           | --                                     | --                         | FA3B1          | S139488      | --           |          |        |     |
| MERSEN/TYPE EJO-1                         | 8.3                  | 30                              | <div>G</div> | --           | <div>K</div> | <div>L</div>                           | 80,000                     | 5              | 9F60FJE030   | S365714      | EJO-30   |        |     |
|   |                      | 40                              |              | --           |              |  |                            |                | 9F60FJE040   | S365716      | EJO-40   |        |     |
|   |                      | 65                              |              | --           |              |  |                            |                | 9F60FJE065   | S365720      | EJO-65   |        |     |
|   |                      | 80                              |              | --           |              |  |                            |                | 9F60FJE080   | S365722      | EJO-80   |        |     |
|   |                      | 100                             |              | <div>H</div> |              |  |                            |                | 9F60FJE100   | S365724      | EJO100   |        |     |
|   |                      | 150                             |              | --           |              |  |                            | 6              | 9F60HJE150   | S365725      | EJO150   |        |     |
|   |                      | 200                             |              | --           |              |  |                            |                | 9F60HJE200   | S365726      | EJO200   |        |     |
|   | --                   | 200                             |              |              | --           | --                                     | --                         | --             | <div>C</div> | S368034      | SB200E   |        |     |
|   |                      |                                 |              |              |              |  |                            |                |              |              | 12/6.9KV |        | 4KV |
| COOPER POWER SYSTEMS/TYPE EOD             | 8.3                  | 40                              | <div>G</div> | --           | <div>K</div> | <div>L</div>                           | 80,000                     | 5              | 83F40-EOD    | S365716      | EJO-40   | 40CL4  |     |
|   |                      | 65                              |              | --           |              |  |                            |                | 83F65-EOD    | S365720      | EJO-65   | 65CL4  |     |
|   |                      | 80                              |              | --           |              |  |                            |                | 83F080-EOD   | S365722      | EJO-80   | 80CL4  |     |
|   |                      | 100                             |              | --           |              |  |                            |                | 83F100-EOD   | S365724      | EJO100   | 100CL4 |     |
|   |                      | 150                             |              |              |              |  |                            |                | 83F150-SD    | S365725      | EJO150   | 150CL4 |     |
|   |                      | 200                             |              |              |              |  |                            | 83F200-EOD     | S365726      | EJO200       | 200CL4   |        |     |
| TYPE BOI                                  |                      | 150                             |              | <div>K</div> | <div>A</div> | 40,000                                 | 8                          | 83F150-BO1     | S365687      | CL150W       |          |        |     |
| X-LIMITER                                 | 15                   | 80                              |              | <div>K</div> | <div>B</div> | 50,000                                 | 10                         | 155F80-I/I     | S365695      | --           |          |        |     |
|   | 8.3                  | 140                             |              | <div>K</div> | --           | 50,000                                 | 11                         | 83F140-I/I     | S365730      | XL-140       |          |        |     |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | CURRENT-LIMITING AND SOLID BLADE FUSE TABLE       |                           |                    |          |                     |          |



**TABLE 1 (CONT'D)**

| CURRENT-LIMITING FUSE & SOLID BLADE TABLE |                      |                                 |    |           |  |                            |                |              |              |
|---|----------------------|---------------------------------|----|-----------|--|----------------------------|----------------|--------------|--------------|
| MANUFACTURER                              | NOMINAL VOLTAGE (KV) | RATING CONTINUOUS CURRENT (AMP) |    |           | INTERRUPTING SYMMETRICAL CURRENT (AMP) | FIGURE NUMBER <div>a</div> | CATALOG NUMBER | STOCK NUMBER | DESIGN UNITS |
| BUSSMANN<br>TYPE SDL                      | 7.2                  | 40                              | Ⓚ  | --        | 40,000                                 | 7                          | SDL-S-L-40     | S365672      | CLF40A       |
|   |                      | 80                              |    | --        |  |                            | SDL-S-J-80     | S365680      | CLF80A       |
|   | --                   | 200                             | -- | --        | --                                     | --                         | Ⓒ              | S368036      | SB200A       |
| COOPER POWER SYSTEMS/<br>HX-X-LIMITER     | 8.3                  | 30                              | Ⓚ  | --        | 40,000                                 | 9                          | 83F030-HX      | S365670      | CLF30B       |
| 80  |                      | --                              |    | 83F080-HX |  |                            | S365681        | CLF80B       |              |
| COOPER POWER SYSTEMS/<br>RTE TYPE B       |                      | 150                             | -- | 9         |  | Ⓒ                          | S365691        | CL150S       |              |
|   |                      | 150                             |    | Ⓐ         |  | 8                          | 3575150M01M    | S365687      | CL150W       |
| BURNDY/T&B<br>TYPE PF8                    |                      | --                              | -- | --        | --                                     | --                         | --             | --           | --           |
|   |                      | 30                              |    | --        |  | PF8-30K                    | S365723        | PF8-30       |              |
| ELASTIMOLD<br>TYPE EFX                    |                      | 30                              | -- | --        | --                                     | 12                         | EFX155030      | S365740      | --           |
|   |                      | 50                              |    | --        |  | 13                         | EFX155050      | S365750      | --           |
|   |                      | 30                              |    | --        |  | 14                         | EFX083030      | S365698      | FE-30A       |

**INSTALLATION:**

- (A) 150 AMP RTE TYPE B FUSE AND THE 150 AMP COMBINED TECHNOLOGIES TYPE BOI HAVE THE SAME CHARACTERISTICS AND ARE INTERCHANGEABLE. THEY MAY BE COMBINED FOR THREE-PHASE LOAD IN A FUSING CABINET ETC.
- (B) THIS FUSE IS TO BE USED FOR REPLACEMENT OF THE NEW STYLE PAD-MOUNT CAPACITOR WITH (3) 400 KVAR CAPACITORS.
- (C) FABRICATED BY SDG&E.
- (D) S&C MINI-RUPTER FUSE CABINET, WHICH COMES WITH END FITTINGS. (FIGURE 9) a
- (E) WHEN KEARNEY TYPE "B" FUSE, WHICH COMES WITH END FITTINGS, IS REQUIRED IN WALL MOUNTED FUSE CABINET. SUBSURFACE FUSE CABINET, 1990 OR NEWER S&C MINI-RUPTER FUSE CABINET, OR PAD-MOUNTED PMH 9 & 11 SWITCHGEAR, REMOVE END FITTINGS AND SEND THEM TO KEARNEY SHOP FOR RE-USE. STOCK NUMBER: S351008
- (F) COMES WITHOUT END FITTINGS, USED IN WALL MOUNTED FUSE CABINETS, SUBSURFACE FUSE CABINETS, 1990 OR NEWER S&C MINI-RUPTER FUSE CABINET, OR PAD-MOUNTED PMH 9 & 11 SWITCHGEAR. (FIGURE 8) a
- (G) MAY NOT BE USED ON 4 KV SYSTEMS, AN 8.3 KV RATED G.E. TYPE EJO-1 AND COMBINED TECHNOLOGIES FUSES WILL GENERATE A MAXIMUM ARC PEAK VOLTAGE OF 25 KV. THE 12 KV SYSTEM CAN WITHSTAND THIS PEAK, WHEREAS THE 4 KV SYSTEM MAY NOT.
- (H) 100 AMP GENERAL ELECTRIC TYPE EJO-1 FUSE AND THE 150 & 200 AMP COMBINED TECHNOLOGIES TYPE EOD FUSES ARE THE MAXIMUM SIZE ALLOWED IN A SINGLE-PHASE FUSE CABINET DUE TO PHYSICAL CONSTRAINT OF CABINET.
- J. DOUBLE BARREL FUSES CAN ONLY BE USED WITH THREE-PHASE FUSE CABINETS.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

a SEE UG4311 FOR FIGURES

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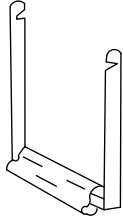
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| SHEET<br>2 OF 2 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG4312.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | CURRENT-LIMITING AND SOLID BLADE FUSE TABLE       |                           |                    |          |                     |          |



**SCOPE:** THIS STANDARD PROVIDES A TABLE OF EXPULSION FUSES.

**TABLE 1**

| EXPULSION FUSE TABLE   |                      |                                 |  |                |              |              |
|--|----------------------|---------------------------------|--|----------------|--------------|--------------|
| MANUFACTURER   | NOMINAL VOLTAGE (KV) | RATING CONTINUOUS CURRENT (AMP) | INTERRUPTING SYMMETRICAL CURRENT (AMP) | CATALOG NUMBER | STOCK NUMBER | DESIGN UNITS |
| GENERAL ELECTRIC<br><br>[FOR USE IN D&W (G.E.) OIL FUSED CUTOUTS]<br><br><br><br>FUSE | 5.2                  | 6                               | (B)                                    | 9F57CAA006     | S466752      | DW-006       |
|  |                      | 10                              |  | 9F57CAA010     | S466400      | DW-010       |
|  |                      | 15                              |  | 9F57CAA015     | S466496      | DW-015       |
|  |                      | 20                              |  | 9F57CAA020     | S466560      | DW-020       |
|  |                      | 25                              |  | 9F57CAA025     | S466624      | DW-025       |
|  |                      | 30                              |  | 9F57CAA030     | S466656      | DW-030       |
|  |                      | 40                              |  | 9F57CAA040     | S466720      | DW-040       |
|  |                      | 50                              |  | 9F57CAA050     | S466784      | DW-050       |
|  |                      | 65                              |  | 9F57CAA065     | S466816      | DW-065       |
|  |                      | 75                              |  | 9F57CAA075     | S466848      | DW-075       |
|  |                      | 100                             |  | 9F57CAA100     | S466432      | DW-100       |
|  |                      | 125                             |  | 9F57CAA125     | S466464      | DW-125       |
|  |                      | 150                             |  | 9F57CAA150     | S466528      | DW-150       |
|  |                      | 200                             |  | 9F57CAA200     | S466592      | DW-200       |
|  |                      | 300                             |  | 9F57BAA300     | S466688      | DW-300       |
| S&C<br><br>(FOR USE IN SM-4 HOLDER)  | 14.4                 | 10                              | 12,500<br>BASED ON X/R=15              | 122015R4       | S366976 (A)  | SM4-10       |
|  |                      | 15                              |  | 122025R4       | S367104 (A)  | SM4-15       |
|  |                      | 30                              |  | 122050R4       | S367232 (A)  | SM4-30       |
|  |                      | 40                              |  | 122060R4       | S367248 (A)  | SM4-40       |
|  |                      | 50                              |  | 122075R4       | S367296 (A)  | SM4-50       |
|  |                      | 65                              |  | 122100R4       | S367328 (A)  | SM4-65       |
|  |                      | 80                              |  | 122125R4       | S367392 (A)  | SM4-80       |
|  |                      | 100                             |  | 122150R4       | S367008 (A)  | SM4100       |
|  |                      | 125                             |  | 122200R4       | S367040 (A)  | SM4125       |
|  |                      | 150                             |  | 122250R4       | S367136 (A)  | SM4150       |
|  |                      | 200                             |  | 122300R4       | S367168 (A)  | SM4200       |
|  |                      | SNUFFLER                        |  | --             | S657408      | --           |
|  |                      | 200 (D)                         | --                                     | (E)            | S368060      | --           |
| SM-4 HOLDER  |                      | --                              | --                                     | 86632          | S413248      | --           |
| S&C<br>(FOR USE IN SM-5 HOLDER)  | 14.4                 | 100                             | 25,000<br>BASED ON X/R=15<br>(C)       | 132150R4       | S367424 (A)  | SM5100       |
|  |                      | 150                             |  | 132250R4       | S367456 (A)  | SM5150       |
|  |                      | 200                             |  | 132300R4       | S367488 (A)  | SM5200       |
| SM-5 HOLDER  |                      | --                              | --                                     | 86152RZ        | S413280      | --           |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | EXPULSION FUSE TABLE                              |                           |                    |          |                     |          |



**INSTALLATION:**

- (A) FOR FUSING AND REFUSING TRANSFORMERS, S&C THREE-PHASE FUSED SWITCHING CABINETS AND VAULT ASSEMBLIES. THE S&C THREE-PHASE FUSED SWITCHING CABINETS USE EITHER AN SM-4 OR SM-5 FUSE ASSEMBLY WHICH DIFFER IN OVERALL SIZE. THEY ARE NOT INTERCHANGEABLE.
- (B) INTERRUPTING SYMMETRICAL CURRENT (AMP) RATING FOR G.E. (D&W) OIL CUTOUTS ARE: 3,100 A FOR 100 A CUTOUT, 6,200 A FOR 200 A CUTOUT, AND 6,400 A FOR 300 A CUTOUT BASED ON X/R RATIO OF MORE THAN 4. FOR X/R RATIOS OF LESS THAN 4, THE SYMMETRICAL INTERRUPTION RATINGS ARE: 4,100 A FOR 100 A, 8,300 A FOR 200A AND 8,540 A FOR 300 A CUTOUTS.
- (C) SYMMETRICAL INTERRUPTION RATINGS OF S&C FUSES FOR X/R=10 IS 27,400 A AND FOR X/R=5 IS 32,000 A.
- (D) SOLID BLADE.
- (E) FABRICATED BY SDG&E.

**BILL OF MATERIALS:** NONE**NOTES:** NONE**REFERENCE:** NONE

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

EXPULSION FUSE TABLE

UG4313.2



**SCOPE:** THIS STANDARD PROVIDES A TABLE OF FUSES USED FOR TRANSFORMERS.

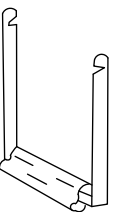
**TABLE 1**

| LIVE FRONT TRANSFORMER FUSING TABLE TYPE "NX"<br>FUSE UNITS |                  |      |                |
|---|------------------|------|----------------|
| TRANSFORMER<br>RATING<br>(KVA)                              | FUSE SIZE (AMPS) |      |                |
|   | SINGLE PHASE     |      | THREE<br>PHASE |
|   | 6.9KV            | 12KV | 12KV           |
| 15  | 8                | 8    | -              |
| 25  |                  |      | -              |
| 30  |                  |      | 8              |
| 37.5  |                  |      | -              |
| 45  |                  |      | 8              |
| 50  | 12               | 10   | -              |
| 75  | 18               |      | 8              |
| 100   | 25               |      | -              |
| 112.5   | -                |      | 12             |
| 150   | -                |      | 12             |
| 167   | 30               | 20   | -              |
| 225   | -                | -    | 18             |
| 250   | -                | 30   | -              |
| 300   | -                | -    | 25             |
| 333   | -                | 30   | -              |
| 500   | -                | -    | 40             |
| 750   | -                | -    | 2-25           |
| 1,000   | -                | -    | 2-30           |

**TABLE 2**

| LIVE FRONT TRANSFORMER FUSING TABLE<br>THREE-PHASE, 12KV TYPE SM-4 RATED 14.4KV |                     |
|---|---------------------|
| TRANSFORMER RATING<br>(KVA)   | FUSE SIZE<br>(AMPS) |
| 1,500   | 125                 |
| 2,000   | 150                 |
| 2,500, 3,000  | 200                 |

**TABLE 3**

| D & W (G.E.) CUTOUT FUSES<br>FOR 4KV-WS, WSV, WUS TRANSFORMER                       |                             |                     |
|---|-----------------------------|---------------------|
| FIGURE  | TRANSFORMER<br>RATING (KVA) | FUSE SIZE<br>(AMPS) |
|  | 5                           | 6                   |
|   | 7.5                         | 6                   |
|   | 10                          | 10                  |
|   | 15                          | 10                  |
|   | 25                          | 15                  |
|   | 30                          | 20                  |
|   | 37.5                        | 25                  |
|   | 50                          | 30                  |
|   | 75                          | 50                  |
|   | 100                         | 75                  |
|   | 167                         | 100                 |

**TABLE 4**

| REPLACEMENT FUSE FOR SUBSURFACE TRANSFORMER (HSS) (HTS)<br>(CURRENT LIMITING) |      |                      |                 |
|---|------|----------------------|-----------------|
| TRANSFORMER RATING<br>(KVA)   | AMPS | FUSE RATING<br>(KVA) | STOCK<br>NUMBER |
| 25  | 6    | 15.5                 | S365682         |
| 50  | 10   |                      | S365686         |
| 75  | 12   |                      | S365690         |
| 100   | 15   |                      | S365712         |

**TABLE 5**

| REPLACEMENT FUSE FOR BAY-O-NET |         |                     |      |              |      |                 |
|--------------------------------|---------|---------------------|------|--------------|------|-----------------|
| TRANSFORMER                    |         | FUSE CATALOG NUMBER |      |              |      | STOCK<br>NUMBER |
| KV                             | KVA     | KEARNY              | AMPS | CPS          | AMPS |                 |
| 2.4<br>1PH                     | 25      | 124080-15           | 15   | 4038108C07   | 15   | S363534         |
|                                | 50      | 124080-30           | 30   | -            | -    | S363538         |
|                                | 75      | -                   | -    | 4038108C12   | 50   | S366150         |
| 4.16<br>3PH                    | 75      | 124080-15           | 15   | 4038108C07   | 15   | S363534         |
|                                | 150     | 124080-30           | 30   | -            | -    | S363538         |
|                                | 225     | -                   | -    | 4000353C12   | 40   | S363540         |
|                                | 500     | -                   | -    | 4000353C16   | 100  | S363546         |
| 6.9<br>1PH<br>(A)              | 25      | 124080-6            | 6    | 4038108C04   | 6    | S363530         |
|                                | 50      | 124080-12           | 12   | 4038108C06   | 12   | S363532         |
|                                | 75      | 124080-15           | 15   | 4038108C07   | 15   | S363534         |
|                                | 100     | 124080-25           | 25   | 4038108C09   | 25   | S363536         |
| 12.0                           | 25      | 124080-5            | 5    | 4038108C03   | 5    | S363528         |
|                                | 45 3PH  | 124080-5            | 5    | 4038108C03   | 5    | S363528         |
|                                | 50      | 124080-8            | 8    | 4038108C05   | 8    | S366138         |
|                                | 75 1PH  | 124080-12           | 12   | 4038108C06   | 12   | S363532         |
|                                | 75 3PH  | 124080-6            | 6    | 4038108C04   | 6    | S363530         |
|                                | 100 1PH | 124080-15           | 15   | 4038108C07   | 15   | S363534         |
|                                | 167 1PH | 124080-12           | 12   | 4038108C09   | 25   | S363536         |
|                                | 225     | 124080-15           | 15   | 4038108C07   | 15   | S363534         |
|                                | 250 1PH | -                   | -    | 4000353C12   | 40   | S363540         |
|                                | 300     | 124080-25           | 25   | 4038108C09   | 25   | S363536         |
|                                | 500     | 124080-30           | 30   | 4000353C12   | 40   | S353540         |
|                                | 750     | -                   | -    | 4000353C14   | 65   | S363542         |
|                                | 1,000   | -                   | -    | 4000353C14   | 65   | S363542         |
|                                | 1,500   | -                   | -    | 4038361C04CB | 100  | S366140         |
|                                | 2,000   | -                   | -    | 4038361C05CB | 125  | S366142         |
|                                | 2,500   | -                   | -    | 4038361C05CB | 125  | S366142         |
| ALL                            | SLUG    | -                   | -    | -            | -    | S656300         |

**TABLE 6**

| CLT FUSES FOR WESTINGHOUSE (YP) TRANSFORMERS<br>(FOR REFUSING ONLY) |                     |                   |                 |
|---|---------------------|-------------------|-----------------|
| TRANSFORMER<br>RATING (KVA)   | FUSE SIZE<br>(AMPS) | CATALOG<br>NUMBER | STOCK<br>NUMBER |
| 15  | 5                   | 678C248G03        | S366848         |
| 25  | 5                   | 678C248G03        | S366848         |
| 37.5  | 8                   | 678C248G06        | S366912         |
| 50  | 12                  | 591C273G03        | S366624         |
| 75  | 18                  | 678C276G03        | S366688         |
| 100   | 25                  | 678C276G06        | S366752         |
| 167   | 30                  | 680C386G01        | S366800         |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

TRANSFORMER FUSING TABLES

UG4314.1



**INSTALLATION:**

(A) 6.9KV FUSE MAY ALSO BE USED FOR 7.2KV.

**BILL OF MATERIALS:** NONE**NOTES:** NONE**REFERENCE:**

- a. SEE DESIGN MANUAL PAGES 6131.1-7 FOR U.G. TRANSFORMER/FUSE COORDINATION TABLES.

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TRANSFORMER FUSING TABLES

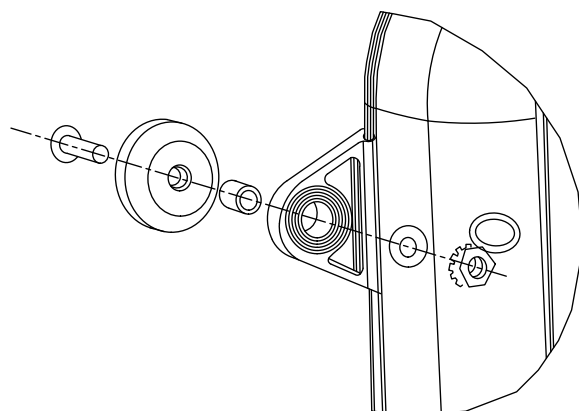
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**SCOPE:** THIS STANDARD PROVIDES INFORMATION ON THE MATERIAL AND INSTALLATION OF THE SCHWEITZER ENGINEERING LABORATORIES (SEL) 8301 UNDERGROUND WIRELESS FAULT INDICATOR ON THE ELECTRIC DISTRIBUTION SYSTEM.



**FIGURE 1**  
SEL 8301  
UNDERGROUND WIRELESS FAULT INDICATOR (A)



**FIGURE 2**  
MAGNETIC MOUNTING KIT ASSEMBLY (A)

**ATTENTION:**

- \* FOR INSTALLATION IN A MAGNETIC STEEL PAD-MOUNT ENCLOSURE, USE THE PROVIDED MAGNETIC MOUNTING KIT. FOR INSTALLATION TO A NONMAGNETIC SURFACE, SKIP TO SECTION 4.2.1.8, STEP 7 OF THE ESP 246.

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|                  |                  | SEL 8301 WIRELESS FAULT INDICATOR              |                           |     |     |                    |     |          |    |                     |     |     |          |













### FIGURE 7

#### REMOVE COVERS FROM ANTENNA CABLES (A)



**FIGURE 8**  
PLUG THE ANTENNA CABLE INTO THE FAULT INDICATORS (A)

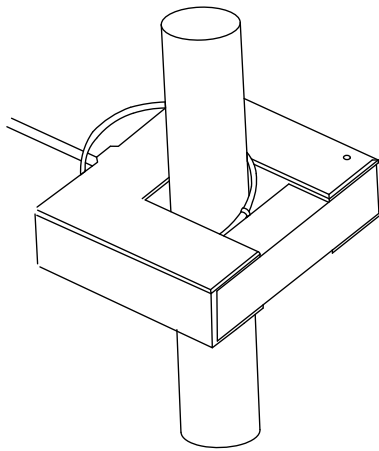
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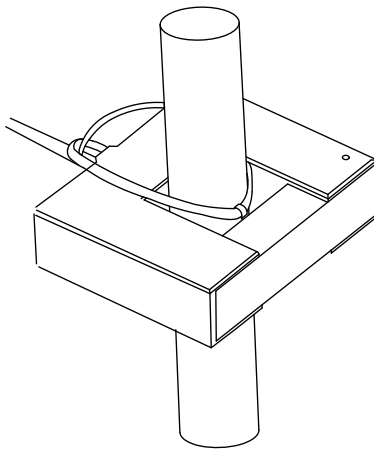








SINGLE CABLE TIE



DOUBLE CABLE TIE

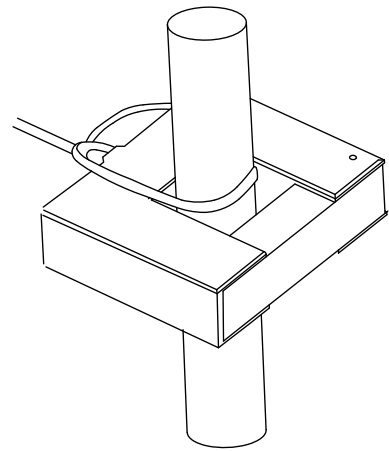
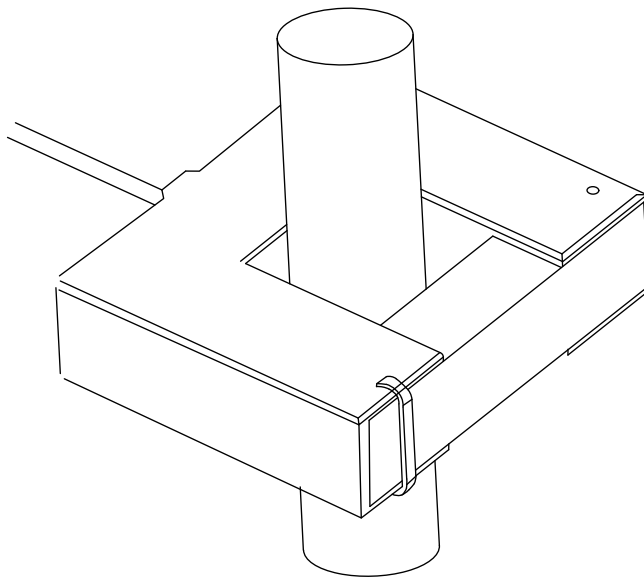


FIGURE-EIGHT CABLE TIE

**FIGURE 11**  
CLOSE AND SECURE THE CURRENT TRANSFORMER TO THE CABLE (A)



**FIGURE 12**  
LOCK CURRENT TRANSFORMER (A)

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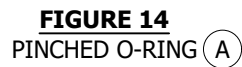
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

SEL 8301 WIRELESS FAULT INDICATOR

UG4344.6





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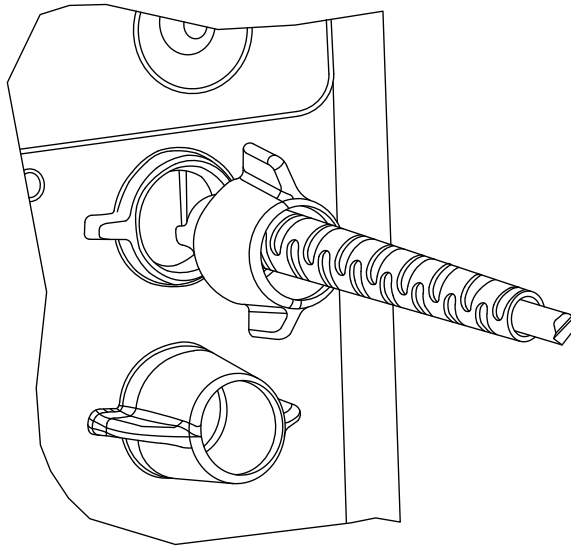




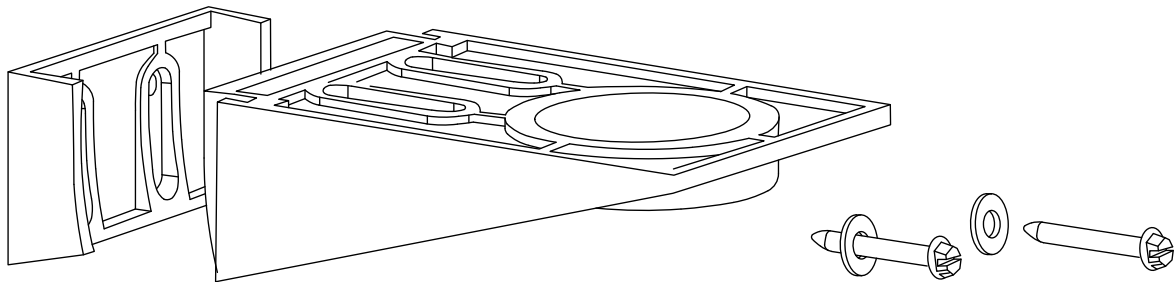
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**FIGURE 17**  
INSTALL THE CURRENT TRANSFORMER PLUG (A)



**FIGURE 18**  
WATER DEPTH SENSOR (A)

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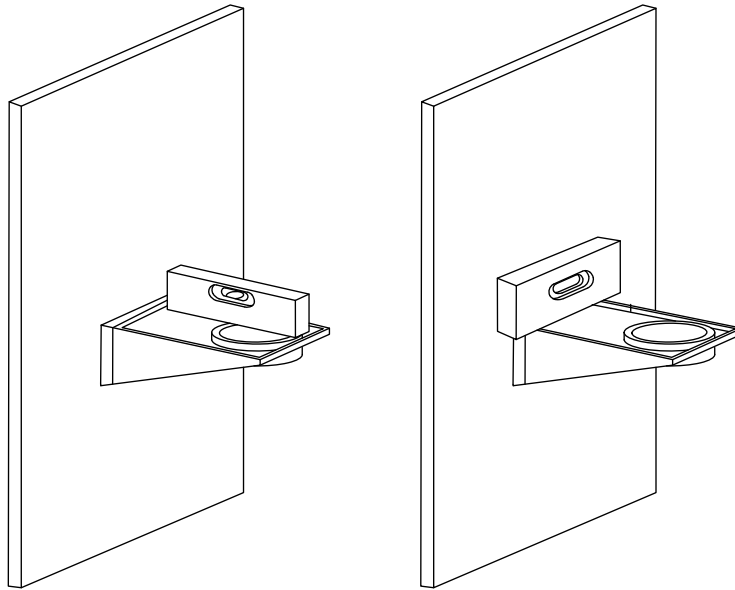
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

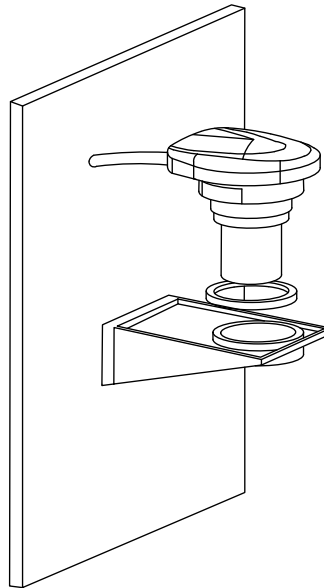
SEL 8301 WIRELESS FAULT INDICATOR

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**FIGURE 19**  
WATER DEPTH SENSOR MOUNTING BRACKET (A)



**FIGURE 20**  
INSTALL WDS IN THE MOUNTING BRACKET (A)

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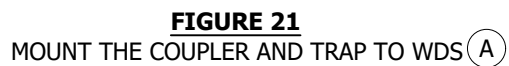
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

SEL 8301 WIRELESS FAULT INDICATOR

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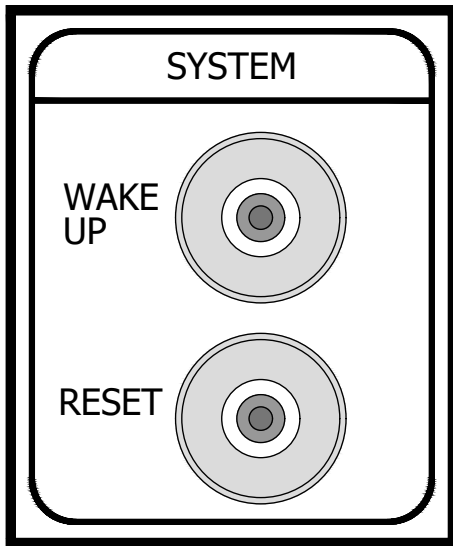
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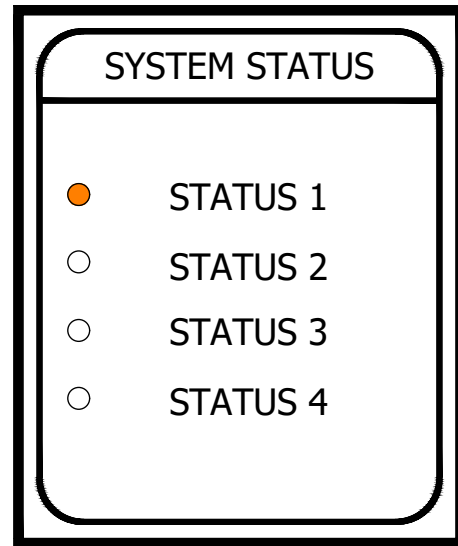




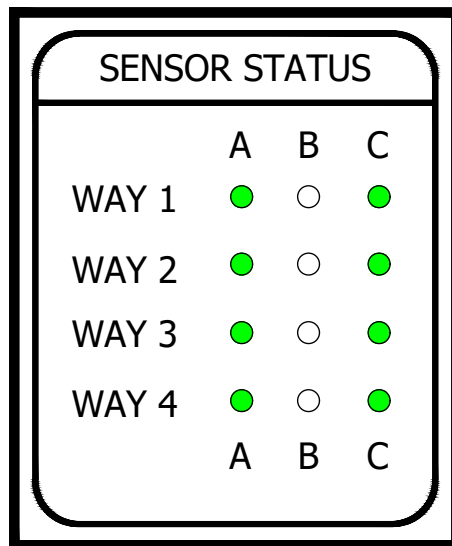




**FIGURE 25**  
ACTIVATION RADIO SYSTEM BUTTONS (A)



**FIGURE 26**  
RADIO STATUS (A)



**FIGURE 27**  
SUCCESSFUL CONNECTION TO THE LPCN NETWORK (A)

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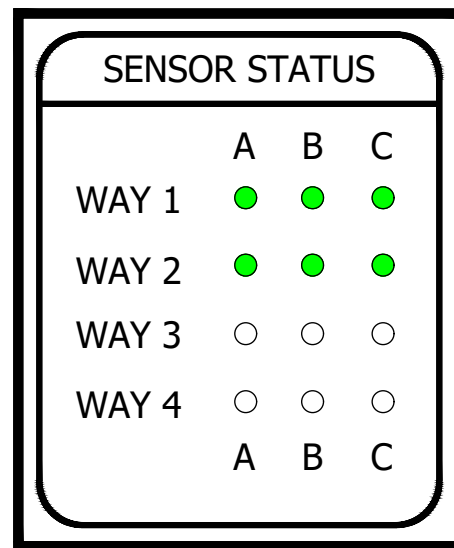
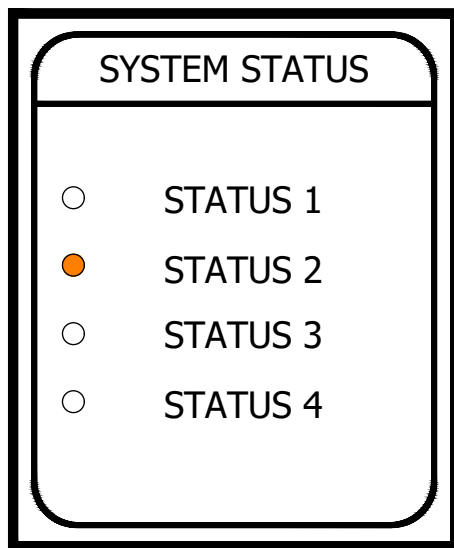
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

SEL 8301 WIRELESS FAULT INDICATOR

UG4344.13





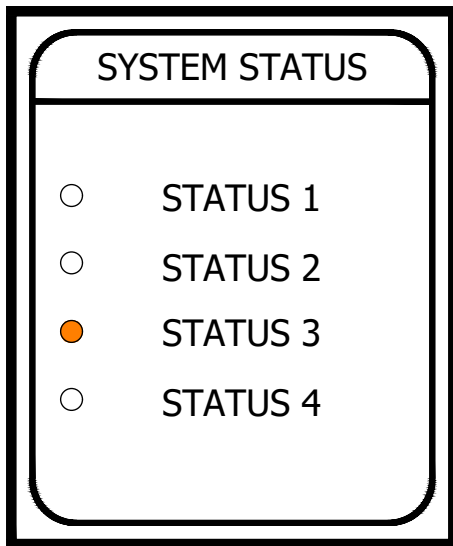
### TABLE 1

| Sensor Status LED Description |               |                                     |
|-------------------------------|---------------|-------------------------------------|
| LED State                     | Sensor Status | Description                         |
| Off                           | N/A           | Unpopulated                         |
| Flashing Green                | Unarmed       | System Detect or New Event Detected |
| Solid Green                   | Armed         | Ready to Detect Future Events       |
| Flashing Red                  | Unarmed       | Permanent Fault                     |
| Solid Red                     | Unarmed       | Permanent Loss of Current           |

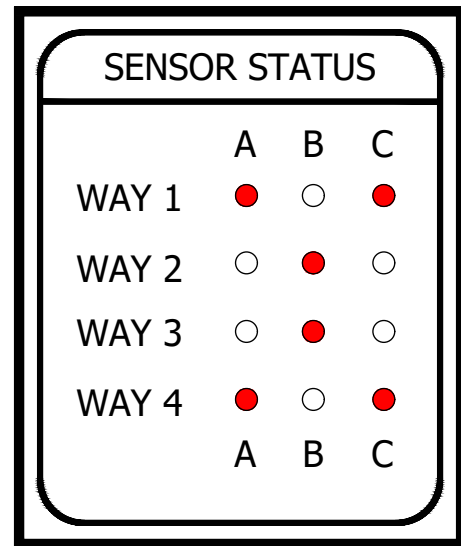
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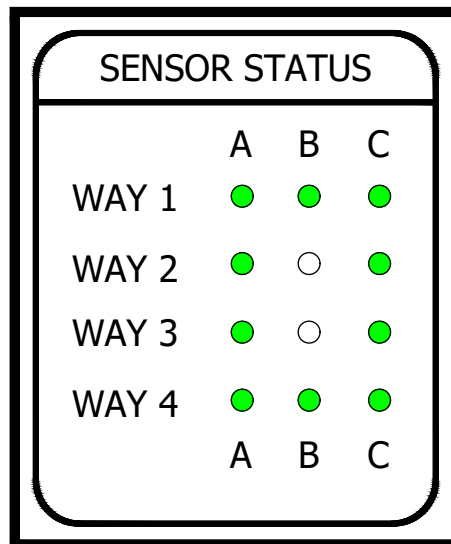




**FIGURE 30**  
WATER DEPTH SENSOR STATUS (A)



**FIGURE 31**  
WATER DEPTH SENSOR HAS NOT BEEN ZEROED (RED X) (A)



**FIGURE 32**  
WATER DEPTH SENSOR ZEROING COMPLETE (A)

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(A) REFERENCE ESP 246 FOR INSTALLATION AND OPERATING INSTRUCTIONS.

**NOTES:**

- REFERENCE:**

- SCHWEITZER ENGINEERING LABORATORIES DOCUMENT QUICK START GUIDE.
- SCHWEITZER ENGINEERING LABORATORIES DATA SHEET.

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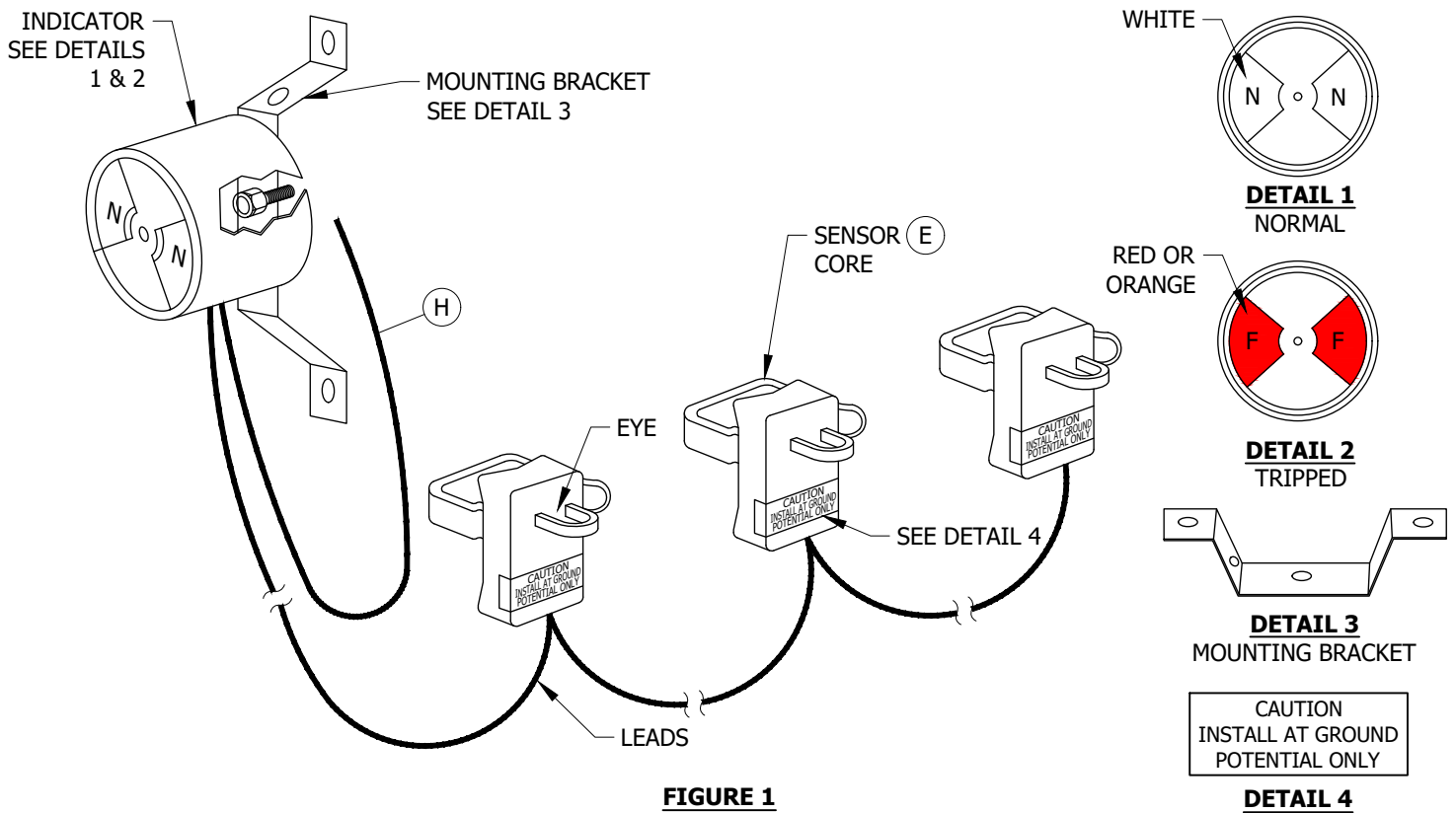
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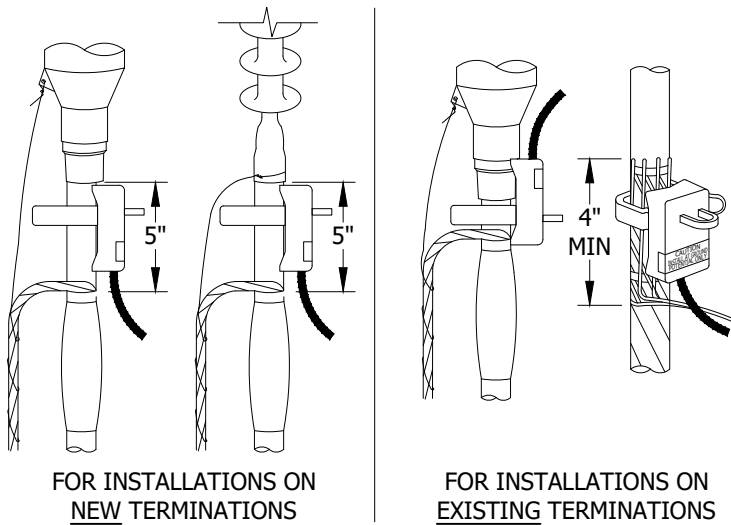
**SCOPE:** THIS STANDARD SHOWS AUTOMATIC SELF RESETTING, HOT STICK OPERABLE FAULT INDICATORS AND INSTALLATION REQUIREMENTS USED FOR INSTALLING AND LOCATING FAULTS IN THE UNDERGROUND SYSTEM.

**CAUTION:**

\* NOT FOR USE ON UNSHIELDED CABLE OR BARE CONDUCTORS.

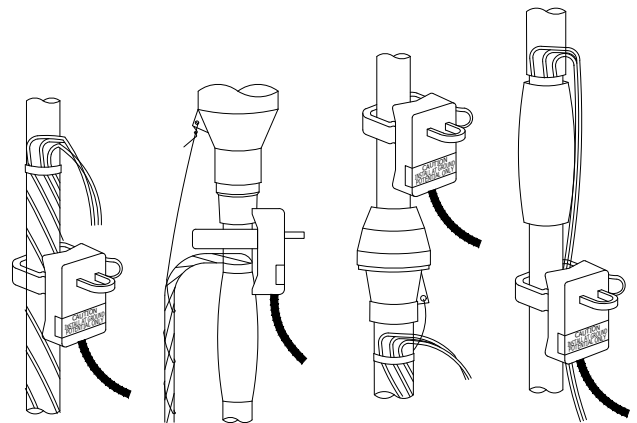


**FIGURE 1**



**FIGURE 2**

CORRECT SENSOR CORE INSTALLATION (J) (K)



**FIGURE 3**

INCORRECT SENSOR CORE INSTALLATION (K) (VI)

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

AUTOMATIC FAULT INDICATOR  
SELF RESETTING, HOT STICK OPERABLE

UG4352.1



- A. ATTACH THE EYE OF THE INDICATOR TO A HOT STICK.
- B. OPEN THE FLEXIBLE CURRENT SENSING ARM AND, USING THE CABLE AS A LEVERAGE POINT, STRETCH THE SPRING AROUND THE CABLE.
- C. GRASP THE EYE ON THE CURRENT SENSING ARM AND CLOSE THE LATCH USING A SECOND HOT STICK.
- D. UPON COMPLETION, TRIP TEST EACH SENSOR WITH TEST TOOL (STOCK NUMBER: S746754).
- E** THE THREE-PHASE INDICATORS HAVE THREE SENSOR CORES ATTACHED TO ONE INDICATOR. THE INDICATOR WILL SHOW AN ORANGE OR RED TARGET WHEN A FAULT CURRENT EXCEEDING A TRIP VALUE PASSES THROUGH ANY OF THE THREE SENSOR CORES. RESET WILL OCCUR WHEN A NORMAL LOAD CURRENT OF 5 AMPERES OR MORE FLOWS IN ALL THREE CABLES. ALL THREE SENSOR CORES MUST BE MOUNTED FACING THE SAME DIRECTION.
- F. FAULT INDICATORS ARE COMPLETELY SUBMERSIBLE AND WILL READ ACCURATELY MOUNTED IN CORRECT POSITION. DO NOT INSTALL INDICATORS IF THEY CANNOT BE MOUNTED PERMANENTLY.
- G. ALL NEW INSTALLATIONS OR REPLACEMENTS MUST BE APPROVED BY DISTRIBUTION PLANNING.
- H** AUXILIARY CONTACT, FOR SCADA USE ONLY.
- J** APPLY FAULT INDICATOR DIRECTLY OVER SEMI-CONDUCTING LAYER "INSULATION SHIELD".
- K** FOR CABLE WITH OR WITHOUT JACKETING.

**NOTES:**

- I. THE USE OF RUBBER GLOVES FOR APPLICATION OF A FAULT INDICATOR IN THE STRESS CONE AREA ON 12KV UNDERGROUND INSTALLATIONS IS PROHIBITED. ANY WORK ON CONDUCTORS OR EQUIPMENT ABOVE 7,500 VOLTS (4,350 VOLTS TO GROUND) MUST BE DONE WITH SUITABLE DEVICES, IE., HOT STICK TOOLS. THIS DOES NOT APPLY TO WORK ON DE-ENERGIZED COMPONENTS (NEW CONDUCTORS BEING PULLED, ETC.) PROVIDED ALL ENERGIZED PARTS WITHIN THE MINIMUM WORKING DISTANCES (2-FOOT RULE) ARE COVERED WITH SUITABLE PROTECTIVE DEVICES.
- II. ANY "OLD STYLE" FAULT INDICATORS REMAINING IN THE SYSTEM SHOULD BE REMOVED AND SCRAPPED. THESE ARE MADE BY EDISON CONTROL AND ARE MADE OF BLACK PLASTIC.
- III. THE LATEST APPROVED FAULT INDICATORS ARE THREE-PHASE, CURRENT RESET, WHITE PLASTIC UNITS WITH INRUSH RESTRAINT. THAT IS, THEY WILL RESET WITHIN A MINUTE AT 3 AMPS OF LOAD OR MORE AND WILL NOT TRIP ON INRUSH.
- IV. EXCESS LEAD LENGTH CAN BE COILED UP AND TAPED AWAY FROM 12KV CABLE AND TERMINATIONS.
- V. DUE TO LIMITED SPACE, FAULT INDICATOR SHALL NOT BE INSTALLED IN TERMINATORS.
- (VI) MAGNETIC FIELD DUE TO CURRENT IN CENTER CONDUCTOR WILL BE CANCELED BY CURRENT IN CONCENTRIC NEUTRAL.

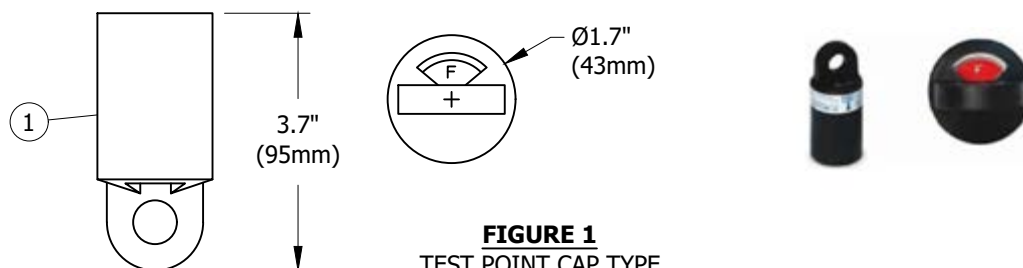
| CURRENT RESET (THREE-PHASE) FAULT INDICATORS    |                          |   |                        |                 |                 |
|---|--------------------------|---|------------------------|-----------------|-----------------|
| FOR APPLICATION<br>ON CONDUCTOR<br>SIZE (KCMIL) | TRIP<br>RATING<br>(AMPS) | CALBRATED<br>EXTERNAL<br>DIAMETER<br>(IN) | LEAD<br>LENGTH<br>(FT) | STOCK<br>NUMBER | DESIGN<br>UNITS |
| 350, 750, 1,000                                 | 800                      | 1.5                                       | 35                     | S423762         | FI8-35          |
| 350, 750, 1,000                                 | 1,000                    | 1.5                                       | 35                     | S423760         | FI1K35          |

- SEE DESIGN MANUAL 6113 FOR APPLICATION CRITERIA.
- SEE [UG3212.5](#) FOR FAULT INDICATOR LOCATION IDENTIFICATION TAGS.
- SEE UG4355 FOR INSTALLATION OF FAULT INDICATORS.
- SEE UG4359 FOR CABLE POLE APPLICATIONS.

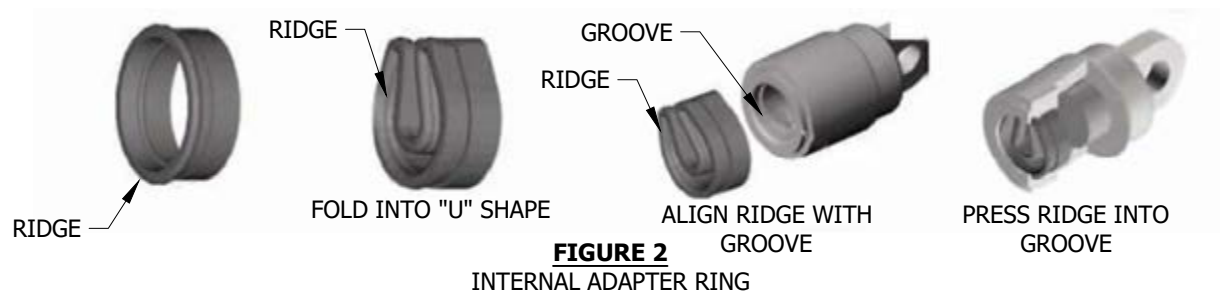
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|                 |            | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS               |                           |     |        |                    |     |          |    |                     |     |     |      |          |
|                 |            | AUTOMATIC FAULT INDICATOR<br>SELF RESETTING, HOT STICK OPERABLE |                           |     |        |                    |     |          |    |                     |     |     |      |          |



**SCOPE:** THIS STANDARD SHOWS AUTOMATIC SELF RESETTING, HOT STICK OPERABLE FAULT INDICATORS AND INSTALLATION REQUIREMENTS USED FOR INSTALLING AND LOCATING FAULTS IN THE UNDERGROUND SYSTEM.



**FIGURE 1**  
TEST POINT CAP TYPE



**FIGURE 2**  
INTERNAL ADAPTER RING



**FIGURE 3**  
PHASE SENSOR BOOT

## INSTALLATION:

### A. INSTALL THE INTERNAL ADAPTER RING (IF NEEDED).

1. FOR HUBBELL, CHARDON, RTE, OR GE-CHARDON ELBOWS WITH MOLDED IN TEST POINTS, SKIP INSTALLATION STEP B.
2. FOR ELASTIMOLD 15, 25, OR 35KV LBE ELBOWS HAVING MOLDED IN TEST POINTS, INSTALL INTERNAL ADAPTER RINGS AS SHOWN IN FIGURE 2. (OTHER ELBOW TYPES CONSULT FACTORY).

### B. INSTALL THE PHASE SENSOR BOOT.

1. REMOVE TEST POINT CAP. CLEAN & DRY TEST POINT. APPLY A LIGHT COAT OF SILICONE DIELECTRIC GREASE TO THE INSIDE OF THE BOOT.
2. USING A PUSHING AND ROTATING MOTION SEAT THE BOOT ONTO TEST POINT OF THE ELBOW.
3. ALIGN ARROW ON TEST POINT LABEL WITH ELBOW PULLING EYE.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION                                     | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | CAPACITIVE TEST POINT FAULTED CIRCUIT INDICATOR | --       | --            | S423770      | F11-TP       |

**NOTES:** NONE

**REFERENCE:** NONE

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| B   | TABLE UPDATE      | -  | JK  | JS  | CZH | 03/18/2019 | E   |            |     |    |     |     |           |
| A   | ORIGINAL ISSUE    | -  | AW  | JS  | CZH | 07/05/2018 | D   | FORMATTING | EDM | JK | -   | -   | 9/28/2020 |

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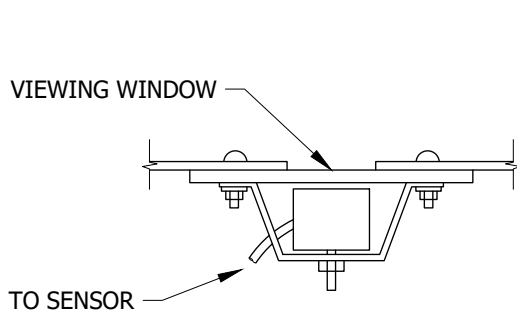
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CAPACITIVE TEST POINT FAULTED CIRCUIT INDICATOR

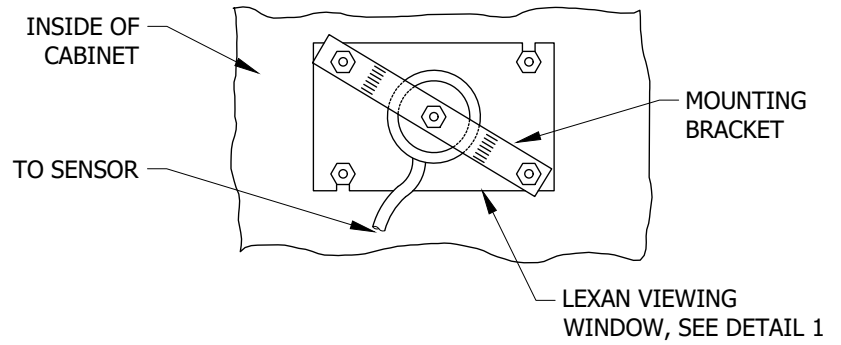
UG4354.1



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF FAULT INDICATORS IN PAD-MOUNTED AND SUBSURFACE EQUIPMENT.



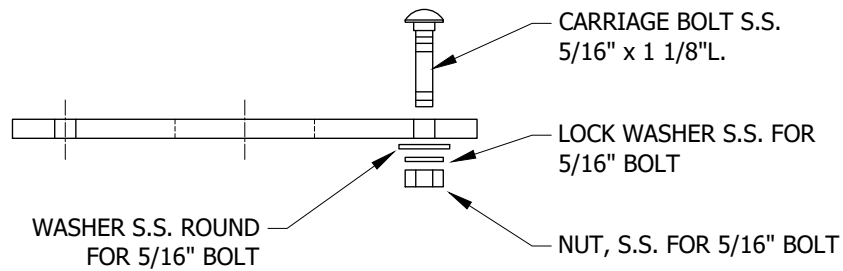
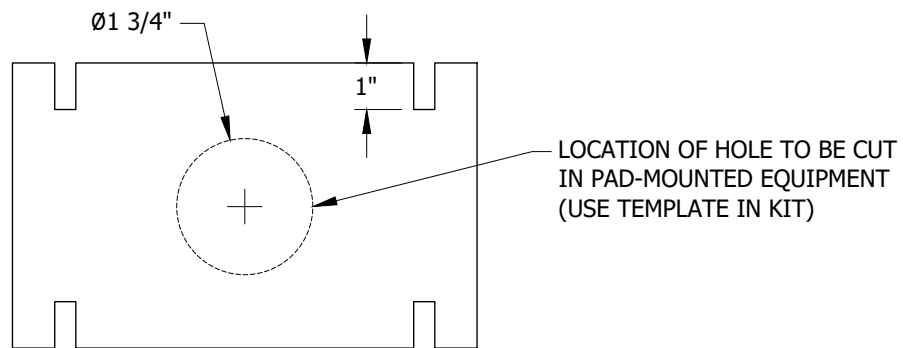
**FIGURE 1**



**FIGURE 2**

**TABLE 1**

| ITEM                 | STOCK NUMBER |
|----------------------|--------------|
| LEXAN VIEWING WINDOW | S443830      |



**DETAIL 1**  
LEXAN VIEWING WINDOW

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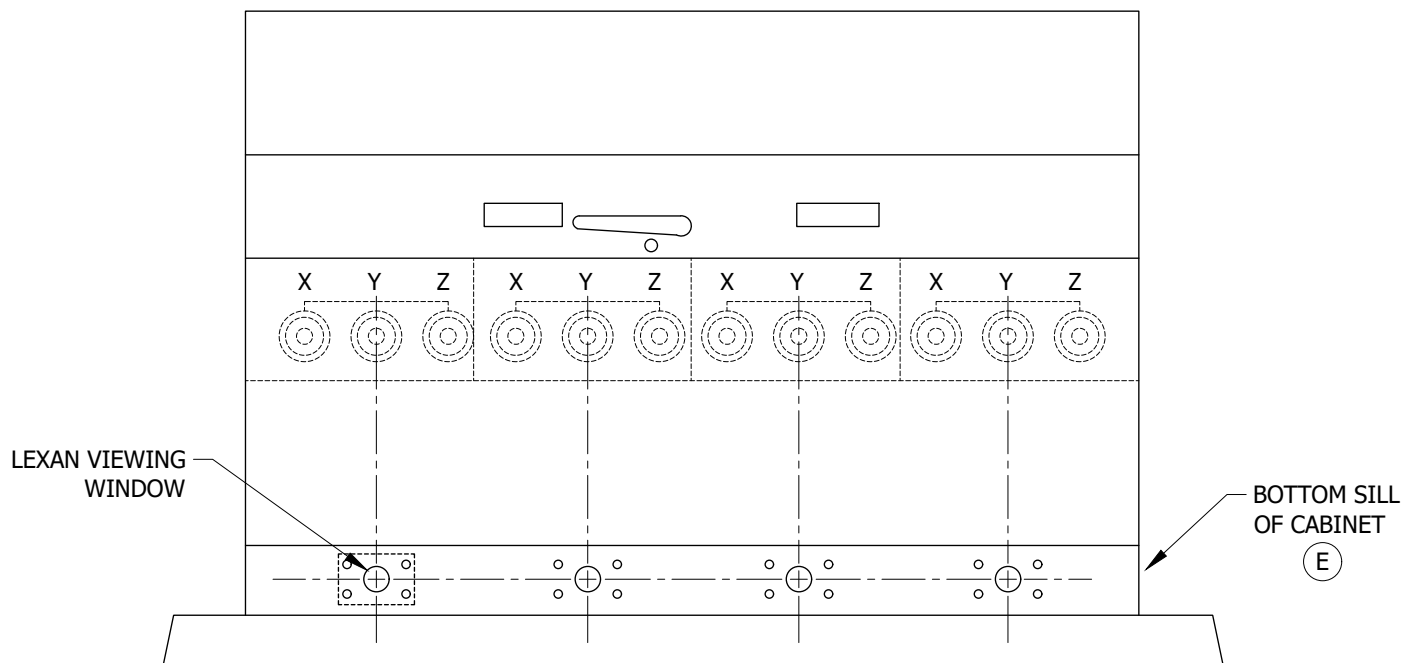
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|  |                           |                          |                    |                          |          |                          |                     |
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS        |                           |                          |                    |                          |          |                          |                     |
| FAULT INDICATOR INSTALLATION<br>PAD-MOUNTED INSTALLATION |                           |                          |                    |                          |          |                          |                     |

**SHEET**  
**1 OF 6**

**UG4355.1**





**FIGURE 3**  
THREE-PHASE PAD-MOUNTED SWITCH

**TABLE 2**

| THREE-PHASE PAD-MOUNTED SWITCH |              |              |
|--------------------------------|--------------|--------------|
| REPLACEMENT SWITCH SILL        | STOCK NUMBER | DESIGN UNITS |
| NELSON SWITCH SILL (E)         | S648502      | SILL-N       |
| ESCO SWITCH SILL (E)           | S648500      | SILL-E       |

**INSTALLATION:**

- FOLLOW INSTALLATION INSTRUCTIONS IN VIEWING WINDOW KIT.
  - FOR RETROFIT INSTALLATION OF VIEWING WINDOWS IN NON-STANDARD (OLD STYLE) PAD-MOUNTED SWITCHES, ABOVE TO SENSOR.
  - APPLY RUST INHIBITOR AND SAME COLOR PAINT AS CABINET ON ALL HOLES DRILLED OR PUNCHED IN CABINET.
  - STANDARD AND NON-STANDARD PAD-MOUNTED SWITCHES SHALL REQUIRE FAULT INDICATORS WITH 35-FOOT LEADS. TIE OFF EXCESS LEADS AS NEEDED.
- (E) FOR STANDARD PAD-MOUNTED SWITCHES, USE NELSON OR ESCO REPLACEMENT SILLS FOR RETROFIT INSTALLATION.
- ALL NEW SWITCHES COME WITH VIEWING WINDOWS INSTALLED IN FRONT BOTTOM SILL OF CABINET.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

- SEE UG3212.5 FOR FAULT INDICATOR IDENTIFICATION.
- SEE UG4352 FOR AUTOMATIC FAULT INDICATORS APPLICATION AND SELECTION.

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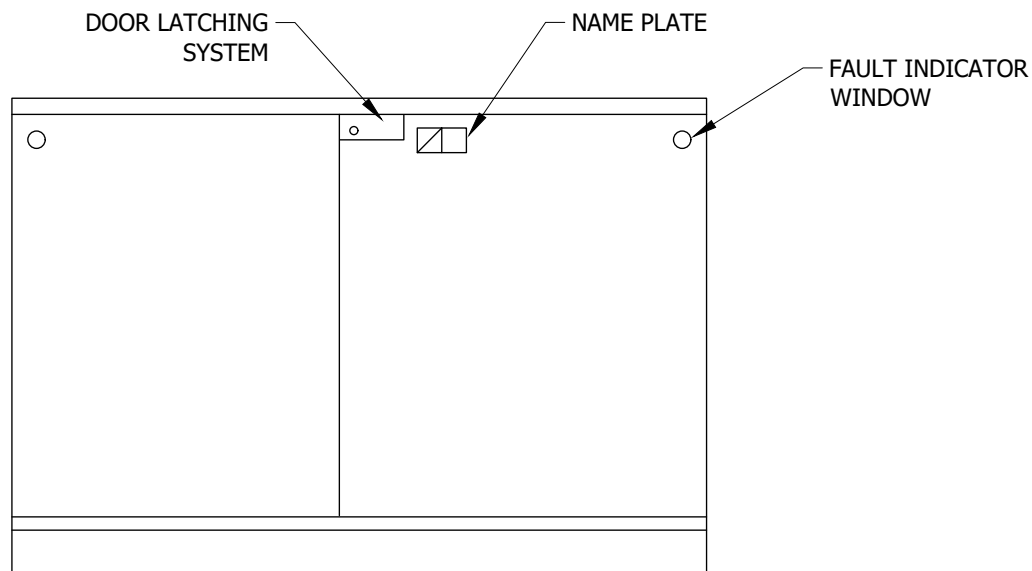
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FAULT INDICATOR INSTALLATION  
PAD-MOUNTED INSTALLATION

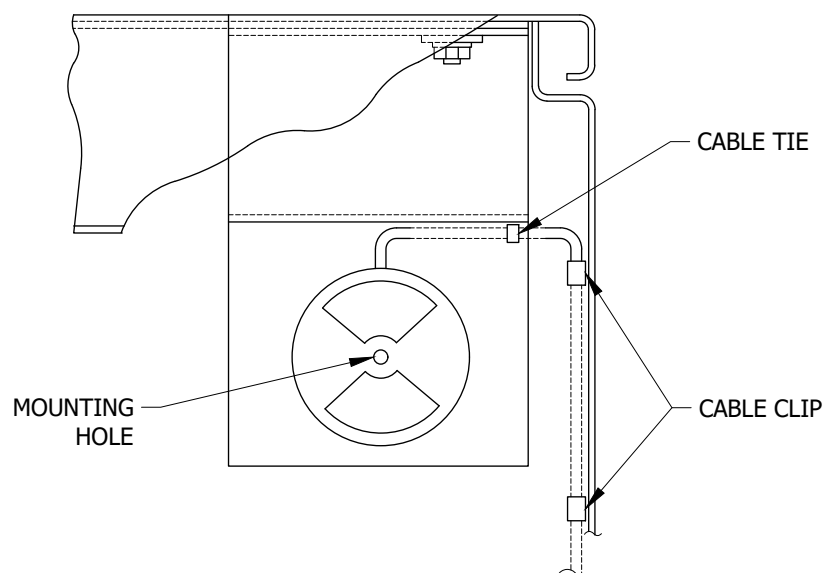
UG4355.2



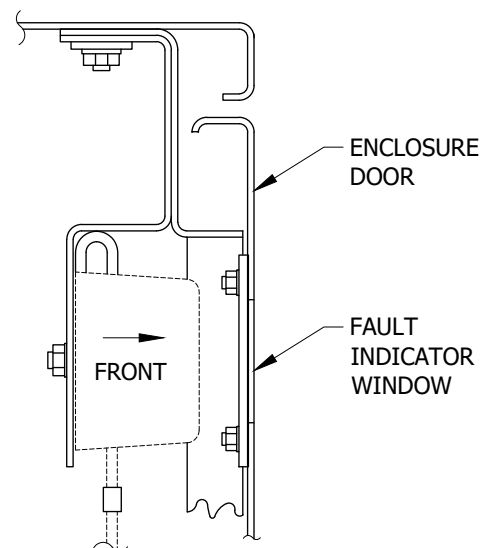
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF FAULT INDICTORS IN PME 9, 10 AND 11 AIR BREAK SECTIONALIZING SWITCHES.



**FIGURE 1**



**FIGURE 2**  
FRONT VIEW



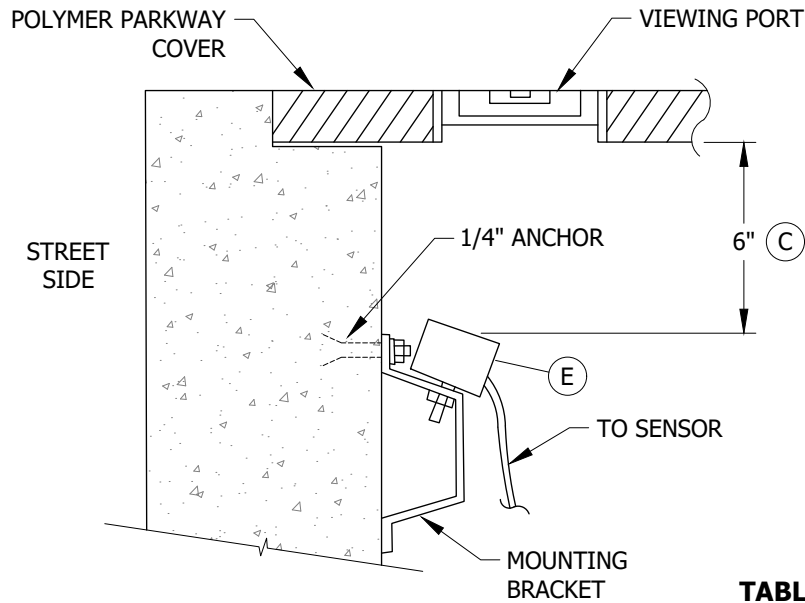
**FIGURE 2**  
**SIDE VIEW**

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|                 | FAULT INDICATOR INSTALLATION                      |                           |                    |          |                     |          |

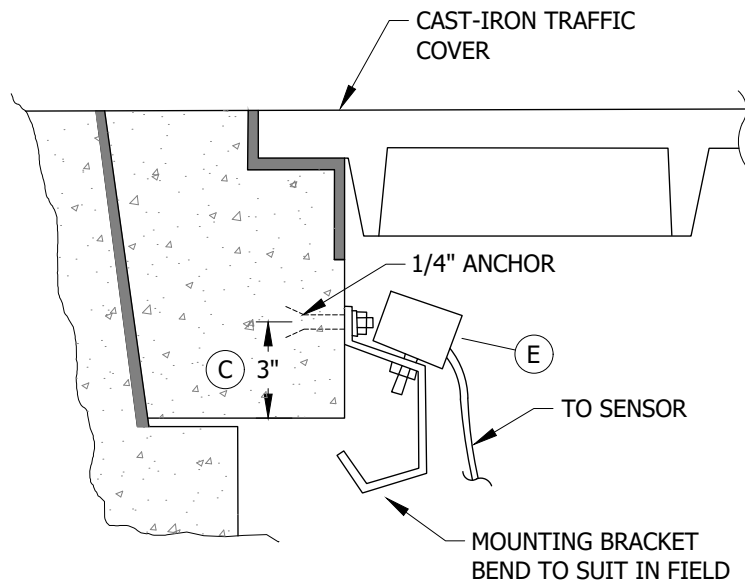




**FIGURE 3**  
HANDHOLE INSTALLATION

**TABLE 1**

| ITEM        | STOCK NUMBER |
|-------------|--------------|
| 1/4" ANCHOR | S107666      |



**FIGURE 4**  
HANDHOLE INSTALLATION

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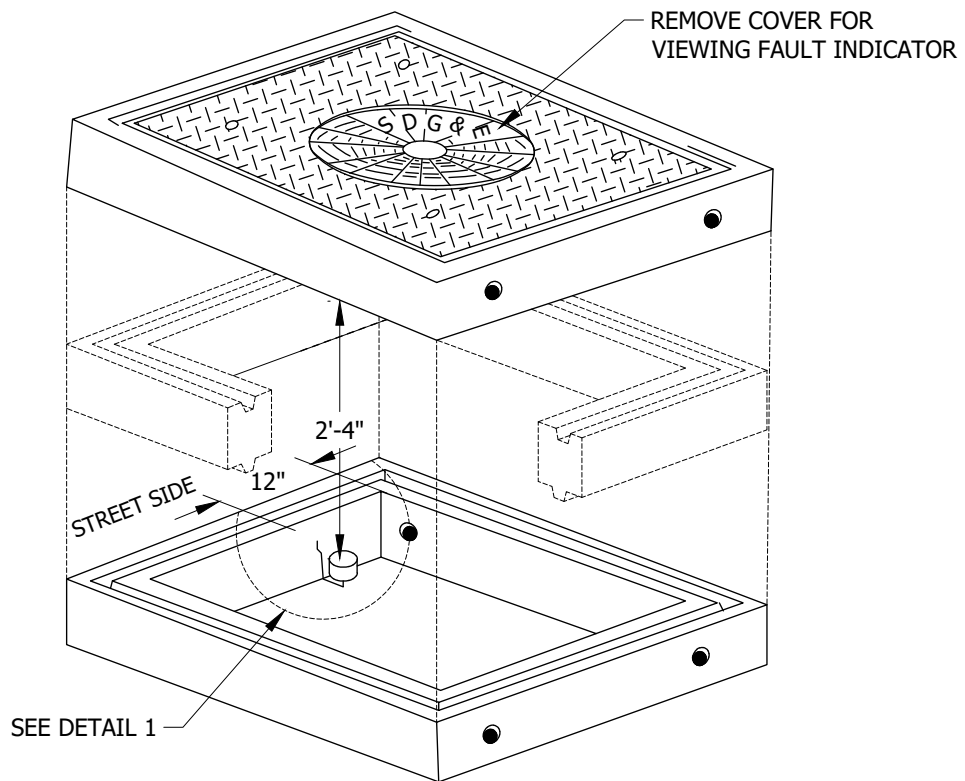
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| FAULT INDICATOR INSTALLATION                      |                           |                    |          |                     |

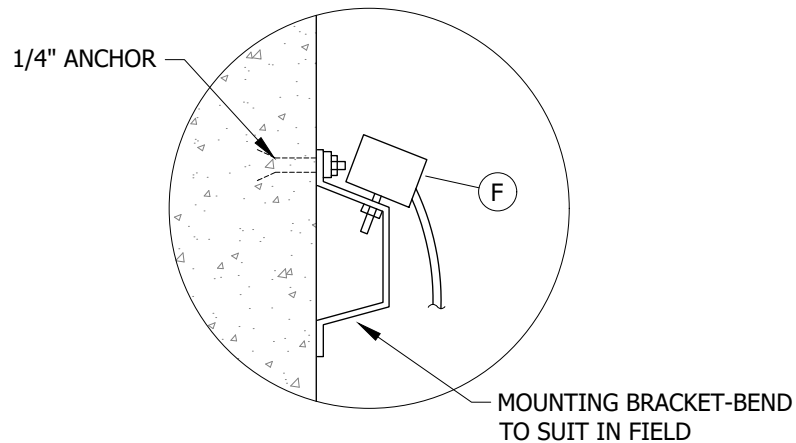
**SHEET**  
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**UG4355.4**





**FIGURE 5**  
MANHOLE INSTALLATION



**DETAIL 1**

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**SHEET**  
**5 OF 6**

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

FAULT INDICATOR INSTALLATION

**UG4355.5**



**INSTALLATION:**

- A. REMOVE THE STAINLESS STEEL BRACKET SUPPLIED BY THE FAULT INDICATOR MANUFACTURER.
- B. THE REMAINING STAINLESS STEEL NUT AND BOLT IS USED TO ATTACH THE FAULT INDICATOR TO MOUNTING PLATE SUPPLIED BY SWITCH MANUFACTURER.
- Ⓒ ALL MEASUREMENTS SHOWN ARE APPROXIMATE - EXACT PLACEMENT OF THE FAULT INDICATOR TARGET WILL HAVE TO BE DETERMINED INDIVIDUALLY, USING THE FRAME AND COVER INTENDED FOR THAT INSTALLATION.
- D. ATTACH LEADS TO HANDHOLE WALL.
- Ⓔ THREE FAULT INDICATORS MAY BE INSTALLED UNDER ONE VIEWING PORT.
- Ⓕ MOUNT FAULT INDICATORS SO THE TARGET IS VISIBLE WHEN MANHOLE COVER IS REMOVED.
- G. ATTACH LEADS TO MANHOLE WALL.

**BILL OF MATERIALS:** NONE**NOTES:** NONE**REFERENCE:**

- a. SEE UG3212.5 FOR FAULT INDICATOR IDENTIFICATION.
- b. SEE UG4352 FOR AUTOMATIC FAULT INDICATORS APPLICATION AND SELECTION.

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| FAULT INDICATOR INSTALLATION                      |                           |                    |          |                     |

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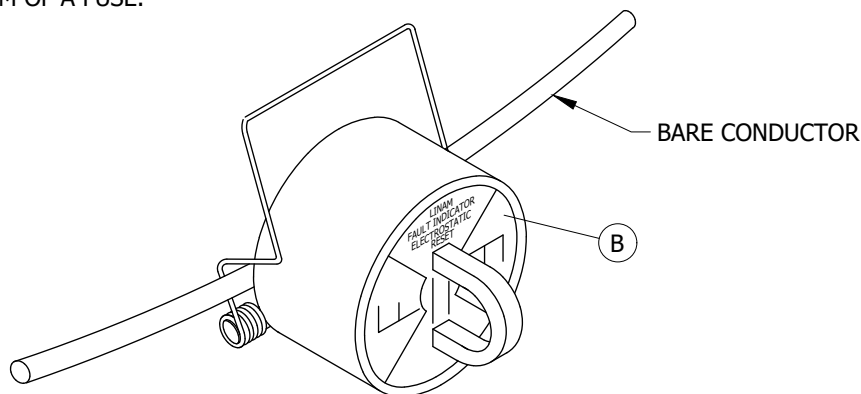
UG4355.6



**SCOPE:** THIS STANDARD SHOWS AND DESCRIBES THE INSTALLATION OF OVERHEAD FAULT INDICATORS WITH RATINGS OF 800 AND 1000 AMPS ON 3/0, 4/0, 336 AND 636 CONDUCTORS.

**CAUTION:**

- \* DO NOT INSTALL DOWNSTREAM OF A FUSE.



**FIGURE 1**

**TABLE 1**

| OVERHEAD FAULT INDICATORS         |                    |                                   |              |              |        |
|-----------------------------------|--------------------|-----------------------------------|--------------|--------------|--------|
| FOR APPLICATION ON CONDUCTOR SIZE | TRIP RATING (AMPS) | CALIBRATED EXTERNAL DIAMETER (IN) | STOCK NUMBER | DESIGN UNITS |        |
|                                   |                    |                                   |              | UG           | OH     |
| 3/0, 4/0, 336, 636                | 800                | 0.700                             | S423750      | FI800        | 800FI  |
| 3/0, 4/0, 336, 636                | 1,000              | 0.700                             | S423752      | FI1000       | 1000FI |

**INSTALLATION:**

- THESE ARE SINGLE PHASE, SELF-CONTAINED UNITS WITH ELECTROSTATIC RESET AND INRUSH RESTRAINT. THEY WILL RESET THEMSELVES AFTER SEVERAL MINUTES OF AT LEAST 5KV LINE-TO-GROUND POTENTIAL.
- THE INDICATOR WILL SHOW AN ORANGE OR RED TARGET WHEN A FAULT CURRENT EXCEEDING A TRIP VALUE PASSES THROUGH IT'S SENSOR CORE. RESET WILL OCCUR WITHIN SEVERAL MINUTES WHEN THE CONDUCTOR HAS A LINE TO GROUND VOLTAGE OF 5KV OR MORE.
- ALL NEW INSTALLATION OR REPLACEMENT OF FAULT INDICATORS MUST BE APPROVED BY DISTRIBUTION PLANNING.
- ANY "OLD STYLE" FAULT INDICATORS REMAINING IN THE SYSTEM SHOULD BE REMOVED AND SCRAPPED. THESE ARE SINGLE AND THREE PHASE UNITS WITH A REMOTE TARGET, BLACK IN COLOR, AND MANUFACTURED BY EDISON CONTROL.
- UPON COMPLETION OF INSTALLATION, TRIP TEST EACH FAULT INDICATOR WITH TEST TOOL (STOCK NO. S746756).

**BILL OF MATERIALS:** NONE

**NOTES:**

- TYPICAL APPLICATIONS ARE FEEDER CABLE POLES, LINE SWITCHES AND FEEDER SPLIT POINTS.
- INSTALL FAULT INDICATORS DIRECTLY ON OVERHEAD LINE CONDUCTORS UNLESS MONITORING A CABLE FED FROM A POLE WITH TANGENT OVERHEAD CONDUCTORS. IN THIS CASE, INSTALL FAULT INDICATORS ON JUMPERS FROM OVERHEAD CONDUCTOR TO SWITCH.
- THE INDICATOR IS PLACED ON AN OVERHEAD CONDUCTOR USING HOT LINE TOOLS. REFER TO INSTALLATION SHEET PROVIDED WITH EACH UNIT FOR DETAILS.

**REFERENCE:**

- SEE DESIGN MANUAL DM6113 FOR APPLICATION CRITERIA.

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS

OVERHEAD FAULT INDICATOR INSTALLATION AND OPERATION

OH1275.1  
UG4359.1



4400 - LIGHTING



4400 - LIGHTING



| <u>PAGE</u> | <u>SUBJECT</u>   |
|-------------|--|
| 4405        | FMO LUMINAIRE REPLACEMENT BALLASTS AND STARTERS  |
| 4410        | HIGH INTENSITY DISCHARGE LAMPS   |
| 4412        | PHOTOELECTRIC CONTROLS   |
| 4413        | NUMBERING ORNAMENTAL STREET LIGHT POLES  |
| 4414        | STREET LIGHT OWNERSHIP AND MAINTENANCE IDENTIFICATION DECAL                            |
| 4421        | HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND STARTER |
| 4422        | STANDARD AND DECORATIVE LUMINAIRES   |
| 4423        | POST TOP LUMINAIRES  |
| 4424        | DOMESTIC WALKWAY LIGHTING (DWL) LUMINAIRES   |
| 4430        | DIRECT BURIAL POLE INSTALLATION FOR VICTORIAN LUMINAIRES                               |
| 4431        | DIRECT BURIAL POLE INSTALLATION FOR CONVENTIONAL LUMINAIRES                            |
| 4432        | DIRECT BURIAL POLE INSTALLATION FOR MISSION BELL LUMINAIRES                            |
| 4433        | DIRECT BURIAL POLE INSTALLATION FOR DECORATIVE LUMINAIRES                              |
| 4434        | DIRECT BURIAL POLE INSTALLATION FOR DOMESTIC WALKWAY LIGHTING AND POST TOP LUMINAIRES  |
| 4435        | HANDHOLE (INSIDE DIMENSIONS - 10-1/4" X 15-3/8")                                       |
| 4470        | ROADWAY LED LIGHTING INSTALLATION  |
| 4471        | GE EVOLVE LED ROADWAY LIGHTING FIXTURES  |
| 4472        | CREE LED ROADWAY LIGHTING FIXTURES   |
| 4480        | LED DECORATIVE LIGHTING FIXTURES (RESERVED)  |

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|-----------------|------------------------|----|---|-----|-----|--------------------|-----|---------------------------------|-----|---------------------|-----|----------|----------|
| C               | ADDED 4470, 4471, 4480 | -  | JKI   | JES | CZH | 8/20/2019          | F   |                                 |     |                     |     |          |          |
| B               | UPDATES TO 4412        | -  | GW  | TR  | MDJ | 10/25/2016         | E   | ADDED 4472 TO TABLE OF CONTENTS | AMP | RSL                 | JES | CZH      | 04/28/21 |
| A               | UPDATES TO 4414        | -  | GW  | TR  | MDJ | 9/27/2016          | D   | EDITORIAL CHANGES               | GLC | JKI                 | GLW | CZH      | 6/8/2020 |
| SHEET<br>1 OF 1 |                        | X  | Indicates Latest Revision                         |     |     | Completely Revised |     | New Page                        |     | Information Removed |     | UG4401.1 |          |
|                 |                        |    | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |     |     |                    |     |                                 |     |                     |     |          |          |
|                 |                        |    | LIGHTING SECTION<br>TABLE OF CONTENTS             |     |     |                    |     |                                 |     |                     |     |          |          |







**SCOPE:** THIS STANDARD PROVIDES ALL THE NECESSARY ORDERING INFORMATION FOR REPLACEMENT BALLASTS AND STARTERS FOR LUMINAIRES IN FMO SECTION.

**BILL OF MATERIAL:**

**TABLE 1. REPLACEMENT BALLASTS FOR LUMINAIRES IN FMO PAGES OH 1599.203/ UG 4499.203**

| BALLAST     |                | LAMP SIZE (WATTS) | MANUFACTURER     |             | STOCK CODE | KIT/ ASSEMBLY |
|-------------|----------------|-------------------|------------------|-------------|------------|---------------|
| TYPE        | SOURCE VOLTAGE |                   | MANUFACTURER     | TYPE/SERIES |            |               |
| REACTOR-NPF | 120            | 150               | GENERAL ELECTRIC | M250A2      | 121108     | ASSEMBLY      |
| REACTOR-NPF | 120            | 100               | GENERAL ELECTRIC | M250A       | 121142     | ASSEMBLY      |
| REACTOR-NPF | 120            | 150               | GENERAL ELECTRIC | M250A       | 121108     | ASSEMBLY      |
| REACTOR-NPF | 120            | 150               | GENERAL ELECTRIC | M400A       | 121146     | ASSEMBLY      |
| REACTOR-NPF | 120            | 250               | GENERAL ELECTRIC | M400A2      | 121148     | ASSEMBLY      |
| REACTOR-NPF | 120            | 400               | GENERAL ELECTRIC | M250A2      | 121150     | ASSEMBLY      |

**TABLE 2. REPLACEMENT STARTERS FOR LUMINAIRES IN FMO PAGES OH 1599.203/ UG 4499.203**

| MANUFACTURER      | TYPE       | LAMP SIZE (WATTS) | SOURCE VOLTAGE | STOCK NUMBER |
|-------------------|------------|-------------------|----------------|--------------|
| AMERICAN ELECTRIC | SERIES 113 | 35-400            | 120            | S679130      |
| GENERAL ELECTRIC  | M250R2     | 50-150            | 120            | S679132      |
| GENERAL ELECTRIC  | M400R2     | 250-400           | 120            | S679134      |

**TABLE 3. REPLACEMENT BALLASTS FOR LUMINAIRES IN FMO PAGES UG 4499.220**

| BALLAST     |                | LAMP SIZE (WATTS) | MANUFACTURER     |              | STOCK CODE | KIT/ ASSEMBLY |
|-------------|----------------|-------------------|------------------|--------------|------------|---------------|
| TYPE        | SOURCE VOLTAGE |                   | MANUFACTURER     | TYPE/SERIES  |            |               |
| REACTOR-NPF | 120            | 150               | GENERAL ELECTRIC | MISSION BELL | 121171     | ASSEMBLY      |
| REACTOR-NPF | 120            | 100               | GENERAL ELECTRIC | MISSION BELL | 121170     | ASSEMBLY      |
| REACTOR-NPF | 120            | 150               | GENERAL ELECTRIC | MISSION BELL | 121168     | ASSEMBLY      |

**TABLE 4. REPLACEMENT STARTERS FOR LUMINAIRES IN FMO PAGES UG 4499.220**

| MANUFACTURER     | TYPE         | LAMP SIZE (WATTS) | SOURCE VOLTAGE | STOCK NUMBER |
|------------------|--------------|-------------------|----------------|--------------|
| GENERAL ELECTRIC | MISSION BELL | 50-150            | 120            | S679132      |

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DATE 12-13-2011

APPD PJA / MJC

SDG&E ELECTRIC STANDARDS

FMO LUMINAIRE REPLACEMENT BALLASTS AND STARTERS

4405.1



**BILL OF MATERIAL:****TABLE 5. REPLACEMENT BALLASTS FOR LUMINAIRES IN FMO PAGES UG 4499.230**

| BALLAST     |                   | LAMP<br>SIZE<br>(WATTS) | MANUFACTURER  |               | STOCK CODE | KIT/<br>ASSEMBLY |
|-------------|-------------------|-------------------------|---------------|---------------|------------|------------------|
| TYPE        | SOURCE<br>VOLTAGE |                         | MANUFACTURER  | TYPE/SERIES   |            |                  |
| REACTOR-NPF | 120               | 50                      | McGRAW EDISON | TRADITIONAIRE | 442934     | KIT              |
| REACTOR-NPF | 120               | 70                      | McGRAW EDISON | TRADITIONAIRE | 442921     | KIT              |
| REACTOR-NPF | 120               | 100                     | McGRAW EDISON | TRADITIONAIRE | 442922     | KIT              |
| REACTOR-NPF | 120               | 150                     | McGRAW EDISON | TRADITIONAIRE | 442924     | KIT              |

**TABLE 6. REPLACEMENT STARTERS FOR LUMINAIRES IN FMO PAGES UG 4499.230**

| MANUFACTURER            | TYPE          | LAMP SIZE<br>(WATTS) | SOURCE<br>VOLTAGE | STOCK<br>NUMBER |
|-------------------------|---------------|----------------------|-------------------|-----------------|
| ADVANCE TRANSFORMER CO. | TRADITIONAIRE | 50-150               | 120               | 422612          |
| GENERAL ELECTRIC        | TRADITIONAIRE | 50-150               | 120               | 679136          |
| COOPER LIGHTING         | TRADITIONAIRE | 35-150               | 120               | 679138          |

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4405.2

SDG&amp;E ELECTRIC STANDARDS

FMO LUMINAIRE REPLACEMENT BALLASTS AND STARTERS

REVISION

DATE 2-13-07

APPD *PLA* / JJ



|                 |   |                           |                    |          |                     |                      |
|-----------------|---|---------------------------|--------------------|----------|---------------------|----------------------|
| SHEET<br>1 OF 2 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1510.1<br>UG4410.1 |
|                 | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS |                           |                    |          |                     |                      |
|                 | HIGH INTENSITY DISCHARGE LAMPS                    |                           |                    |          |                     |                      |



**BILL OF MATERIALS (CONT'D):****MERCURY VAPOR (MV) ① (NO LONGER USED IN NEW INSTALLATION)**

| LAMP SIZE (WATTS) | MANUFACTURER      |   | ANSI LAMP DESIGNATION | LENGTH (IN INCHES) | APPROXIMATE LUMENS |        | STOCK NUMBER |
|-------------------|-------------------|---|-----------------------|--------------------|--------------------|--------|--------------|
|                   | GE CATALOG NUMBER | SYLVANIA & N.A. PHILIPS CATALOG NUMBERS |                       |                    | INITIAL            | MEAN ② |              |
| 175               | H175A39-22        | H39KB-175                               | H39KB-175             | 8-1/4              | 7,950              | 7,470  | Ⓐ S452352    |
|                   | H175DX39-22       | H39KC-175/DX                            | H39KC-175/DX          |                    | 8,600              | 7,650  | Ⓑ S452580    |
| 250               | H250A37-5         | H37KB-250                               | H37KB-250             | 8-1/4              | 11,200             | 10,300 | Ⓐ S452384    |
|                   | H250DX37-5        | H37KC-250/DX                            | H37KC-250/DX          |                    | 12,100             | 10,400 | Ⓑ S452400    |
| 400               | H400A33-1         | H33CD-400                               | H33CD-400             | 11-5/16            | 21,000             | 19,100 | Ⓐ S452416    |
|                   | H400DX33-1        | H33GL-400/DX                            | H33GL-400/DX          |                    | 22,500             | 19,100 | Ⓑ S452448    |
| 700               | H700DX35-18       | H35ND-700/DX                            | H35ND-700/DX          | 14-5/16            | 42,000             | 33,600 | Ⓑ S452576    |

**LOW PRESSURE SODIUM VAPOR (LPSV) ③**

| LAMP SIZE (WATTS) | ANSI LAMP DESIGNATION | LENGTH (IN INCHES) | APPROXIMATE LUMENS | STOCK NUMBER | ASSEMBLY UNITS |
|-------------------|-----------------------|--------------------|--------------------|--------------|----------------|
| 35                | L70RB-35              | 12.2               | 4,800              | S452270      | LL35           |
| 55                | L71RC-55              | 16.7               | 8,000              | S452280      | LL55           |
| 90                | L72RD-90              | 20.8               | 13,500             | S452282      | L90            |
| 135               | L73RE-135             | 30.5               | 22,500             | S452284      | LL135          |
| 180               | L74RF-180             | 44.1               | 33,000             | S452286      | LL180          |

**NOTES:**

- I. ALL LAMPS MUST BE DATE CODED WHEN INSTALLED. SCRIBE A VERTICAL LINE BELOW THE MONTH AND YEAR LOCATED ON THE BASE OF LAMPS. SINCE LAMPS ARE GROUP REPLACED, ONLY THE LAST DIGIT OF THE YEAR IS USED. THEY SHOULD NEVER BE OLDER THAN TEN YEARS. THE FOLLOWING EXAMPLE INDICATES A JUNE 1985 INSTALLATION:

J F M A M J J A S O N D      1 2 3 4 5 6 7 8 9 0


└─── (VERTICAL LINE) ───┘

**REFERENCE:**

- a. SEE STANDARD 1509 FOR G.O. 95 MINIMUM CLEARANCE.

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| REV | CHANGE         | BY  | DSGN | APPV | DATE       | REV | CHANGE | BY | DSGN | APPV | DATE |
|-----|----------------|-----|------|------|------------|-----|--------|----|------|------|------|
| C   |                |     |      |      |            | F   |        |    |      |      |      |
| B   | DRAWING UPDATE | PEI | -    | -    | 02/04/2019 | E   |        |    |      |      |      |
| A   | ORIGINAL ISSUE | -   | PTA  | RDG  | 01/01/1994 | D   |        |    |      |      |      |

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SHEET  
2 OF 2

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

HIGH INTENSITY DISCHARGE LAMPS

OH1510.2  
UG4410.2



**SCOPE:** THIS STANDARD SHOWS SEVERAL TYPES OF PHOTOELECTRIC CONTROLS THAT CAN BE USED FOR STREET LIGHT LUMINAIRES.



**INSTALLATION:**

- A. PHOTOELECTRIC CONTROL SHOULD BE MOUNTED WITH THE PHOTO CELL FACING NORTH.
- B. FOR USE ON AUXILIARY HOLIDAY LIGHTING.
- C USED ON AMERON VICTORIAN LUMINAIRE, LAWNLAIRE, LOMALITER.
- D WHEN INSTALLING AND REMOVING PHOTO-ELECTRIC CONTROLS, INSTALLER IS TO SCRIBE A VERTICAL LINE UNDER THE CURRENT MONTH AND YEAR OR ENTER THE CURRENT DATE IN THE SPACE PROVIDED.
- E. USED ON AMERON VICTORIAN LUMINAIRES.

**BILL OF MATERIALS:**

| TABLE 1. PHOTOELECTRIC CONTROLS |            |       |                       |              |                |
|---------------------------------|------------|-------|-----------------------|--------------|----------------|
| ITEM                            | RATING     |       | NEMA<br>COLOR<br>CODE | STOCK NUMBER | ASSEMBLY UNITS |
|                                 | VOLTS      | WATTS |                       |              |                |
| 1                               | 120 TO 277 | 1000  | GRAY                  | S273884 I    | PC-TL          |
| 2                               | 185 to 305 | 1000  | RED                   | S273890      | PCTL           |
| 3                               | 120        | 1000  | GRAY                  | S273886      | PC-AUX         |
| 4                               | 105 TO 130 | 1000  | GRAY                  | S273700 C    | PC-MGE         |
| 5                               | 105 TO 130 | 1000  | GRAY                  | S273700 C    | PC-AM          |

**NOTES:**

- I S273884 HAS A TEN YEAR WARRANTY. PHOTO-CELL FAILURE RETURN TO ELECTRIC DISTRIBUTION ENGINEERING.

**REFERENCE:** NONE

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| C   |                    |     |      |      |            | F   |        |    |      |      |      |
| B   | DRAWING UPDATE     | PEI | -    | -    | 02/04/2019 | E   |        |    |      |      |      |
| A   | COMPLETELY REVISED | GW  | IL   | MDJ  | 10/03/2016 | D   |        |    |      |      |      |

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SHEET

1 OF 1

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

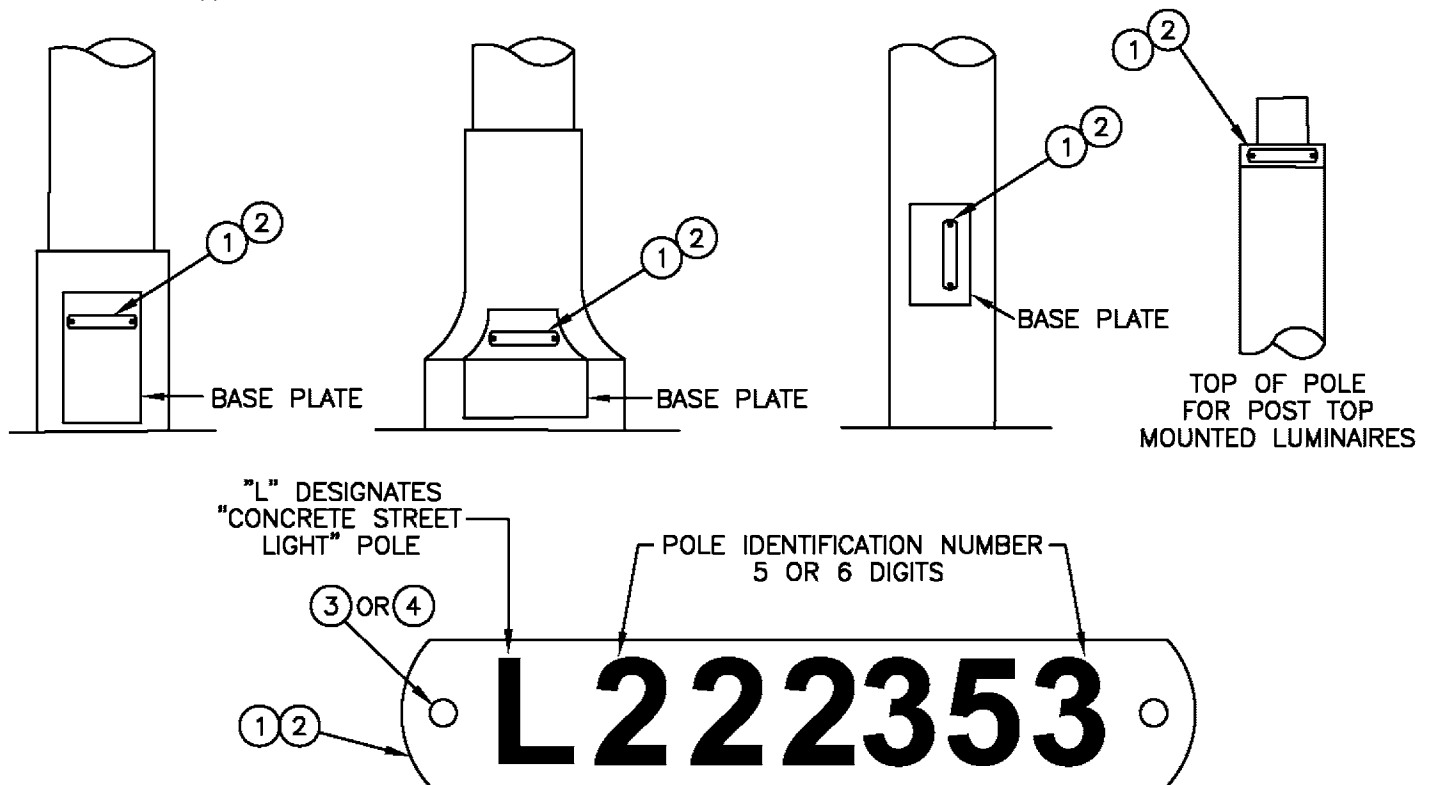
PHOTOELECTRIC CONTROLS

OH1512.1

UG4412.1



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND REQUIREMENTS FOR TAGGING SDG&E OWNED ORNAMENTAL STREET LIGHT POLES.



**NOTES:**

- TAG SDG&E OWNED POLES ONLY-DO NOT TAG POLES OWNED BY OTHERS.
- **DO NOT RETAG (WITH NEW IDENTIFICATION NUMBERS). EXISTING POLES THAT HAVE OLD CAL-GRID OR POLE DISTRICT NUMBERS. THE OLD NUMBER STILL APPLIES FOR IDENTIFICATION PURPOSES.**

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | STOCK NO.  |
|------|--|----------|------------|
| 1    | ALUMINUM EMBOSSING TAPE 7/8" ROLL                  | AS REQ'D | 720704     |
| 2    | BRASS EMBOSSING TAPE 7/8" ROLL                     | AS REQ'D | 720736 (C) |
| 3    | STAINLESS STEEL SELF TAPPING DRIVE SCREW #4 - 1/4" | 2        | 621344     |
| 4    | EPOXY PASTE  | AS REQ'D | 213244     |

**INSTALLATION:**

- ALL TAGS TO BE ATTACHED BY DRILLING TWO HOLES AS SHOWN ABOVE USING SELF TAPPING SCREWS OR EPOXY PASTE.
  - WORK ORDER SKETCHES, TEXT AND MATERIAL LISTS WILL SPECIFY NUMBERS TO BE ATTACHED TO POLES.
- (C) FOR USE IN CORROSIVE AREAS.

**REFERENCE:**

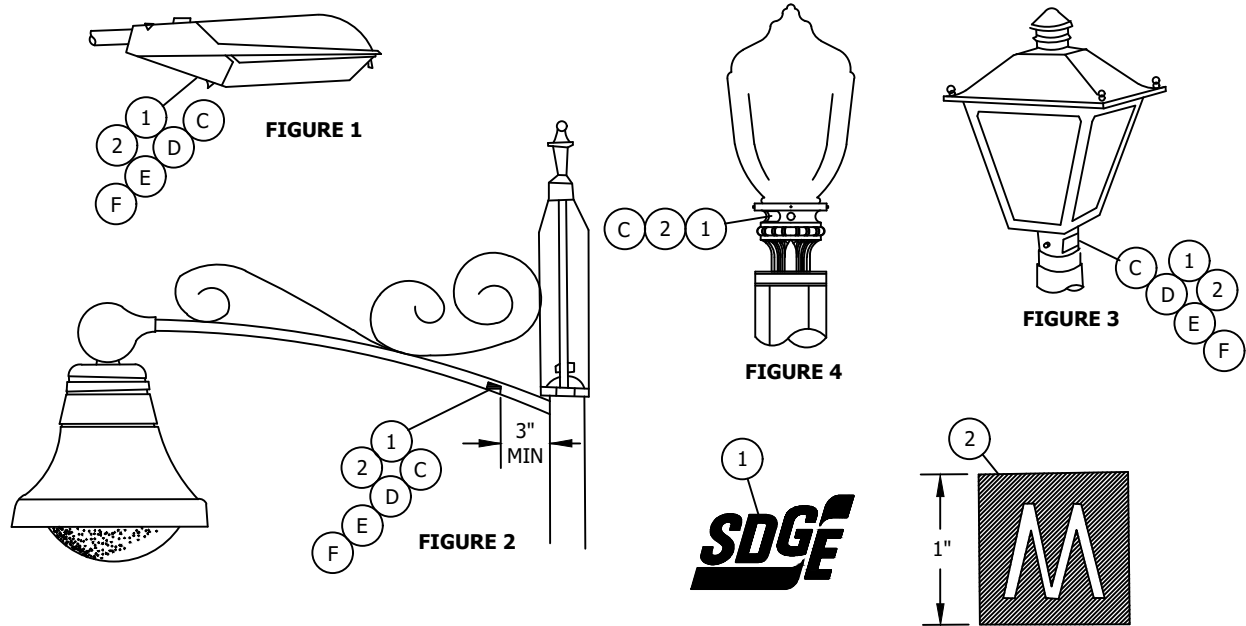
- (F) SEE FIELD MAINTENANCE ONLY STANDARD 4499.101 FOR EXISTING CAL-GRID OR POLE NUMBERING DISTRICT TAGS.

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| REVISION                                     |  | Indicates Latest Revision               | Completely Revised | New Page | Information Removed |
|--|--|---|--------------------|----------|---------------------|
| DATE 1-1-98                                  |  | SDG&E ELECTRIC STANDARDS                |                    |          |                     |
| APPD <i>[Signature]</i> / <i>[Signature]</i> |  | NUMBERING ORNAMENTAL STREET LIGHT POLES |                    |          |                     |
|  |  | 4413                                    |                    |          |                     |



**SCOPE:** THIS STANDARD SHOWS A UNIFORM METHOD FOR IDENTIFYING SDG&E OWNED AND/OR MAINTAINED STREET LIGHTS. DECALS WILL BE ADDED TO ALL APPLICABLE NEW STREET LIGHTS WHEN INSTALLED, OR ON EXISTING LIGHTS WHEN MAINTAINED.



## INSTALLATION:

- A. CLEAN SURFACE WITH SOLVENT BEFORE APPLYING DECAL. (DECAL HAS A PRESSURE SENSITIVE ADHESIVE BACKING).
- B. THE DECAL SHALL BE LOCATED ON THE STREET SIDE OF ALL LUMINAIRES.
- C. THE DECAL SHALL BE LOCATED SO IT IS VISIBLE FROM THE GROUND. DO NOT PLACE DECAL ON THE REFRACTOR OR OBSTRUCT EXISTING DECALS OR VENT HOLES. IF VARIATIONS FROM THESE LOCATION ARE REQUIRED, CONTACT DISTRIBUTION STANDARDS.
- D. DECAL SHALL BE SECURED TO THE UNDERSIDE OF THE MAST ARM, 3 INCHES MINIMUM FROM POLE.
- E. FOR DUAL LUMINAIRE INSTALLATIONS, TWO (2) DECALS ARE REQUIRED.
- F. IF DURING MAINTENANCE, A YELLOW LETTER "O" OR A BLUE LETTER "M" DECAL EXISTS, REMOVE THE OLD DECAL AND REPLACE WITH "SDG&E" OR YELLOW "M" DECAL.

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                    | SCHEDULE      | STOCK NUMBER |
|------|--------------------------------|---------------|--------------|
| 1    | "SDG&E" DECAL, 2-5/8" X 1-7/8" | LSI, OL1, DWL | S332850      |
| 2    | YELLOW "M" DECAL, 1" X 1"      | LS2B          | S302112      |

**NOTES:**

- I. FIGURES 1 THROUGH 4 ARE SHOWN AS TYPICAL STREET LIGHT LUMINAIRES ONLY. SEE O.H. PAGE 1521.1 AND U.G. PAGES 4421.1 THROUGH 4424 FOR SPECIFIC DETAILS.
- II. THE "SDG&E" DECAL INDICATES THE STREET LIGHT IS OWNED AND MAINTAINED BY SDG&E.
- III. THE YELLOW "M" DECAL INDICATES THE STREET LIGHT IS MAINTAINED BY SDG&E AND OWNED BY OTHERS.

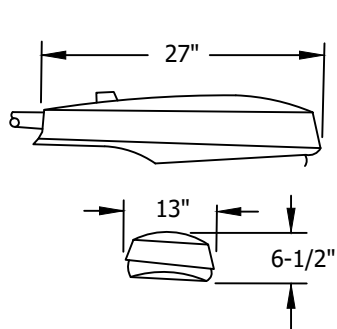
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| REV             | CHANGE            | BY   | DSGN                      | APPV | DATE               | REV | CHANGE   | BY | DSGN                | APPV | DATE                 |
|-----------------|-------------------|--|---------------------------|------|--------------------|-----|----------|----|---------------------|------|----------------------|
| C               |                   |  |                           |      |                    | F   |          |    |                     |      |                      |
| B               | DRAWING UPDATE    | PEI  | -                         | -    | 02/04/2019         | E   |          |    |                     |      |                      |
| A               | EDITORIAL CHANGES | JS   | GW                        | MDJ  | 09/15/2016         | D   |          |    |                     |      |                      |
| SHEET<br>1 OF 1 |                   | X  | Indicates Latest Revision |      | Completely Revised |     | New Page |    | Information Removed |      | OH1514.1<br>UG4414.1 |
|                 |                   | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS                |                           |      |                    |     |          |    |                     |      |                      |
|                 |                   | STREET LIGHT OWNERSHIP AND MAINTENANCE<br>IDENTIFICATION - DECAL |                           |      |                    |     |          |    |                     |      |                      |

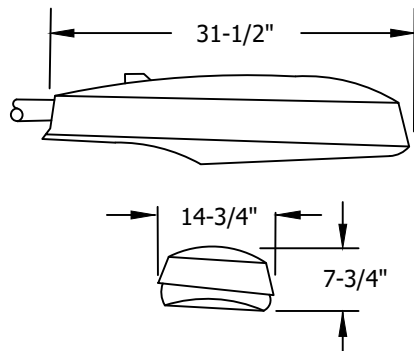


**SCOPE:** THIS STANDARD SHOWS HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRES USED TO PROVIDE ROADWAY AND DUSK TO DAWN LIGHTING, AND STARTER.



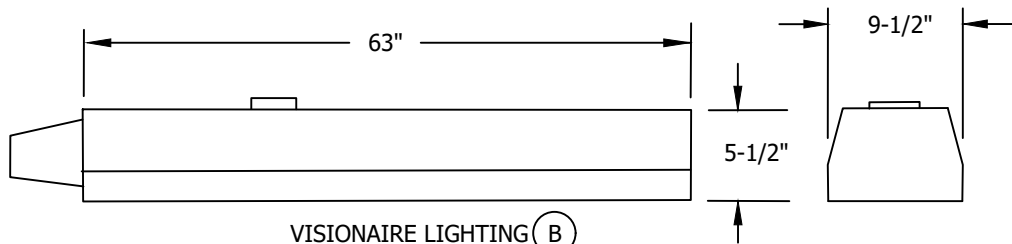
AMERICAN ELECTRIC  
SERIES 115 CUTOFF  
NON-POWER/PAD

FIGURE 1



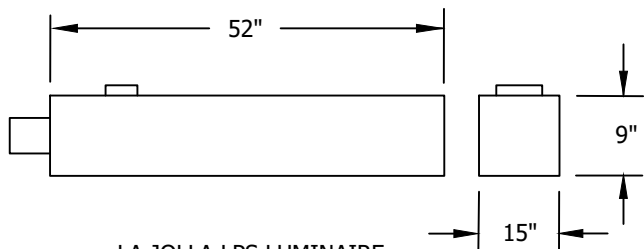
AMERICAN ELECTRIC  
SERIES 125

FIGURE 2



VISIONAIRE LIGHTING (B)  
ROADWAY RDW-3 (135, 180W SHOWN)

FIGURE 3



LA JOLLA LPS LUMINAIRE  
(180W SHOWN)

FIGURE 4

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|                        |  |   |                      |          |                       |
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|                        |  | SDG&E ELECTRIC STANDARDS  |                      |          |                       |
| OH 1521.1<br>UG 4421.1 |  | HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR<br>LUMINAIRE, REPLACEMENT BALLAST AND STARTER |                      |          |                       |
|                        |  | REVISION  |                      |          |                       |
|                        |  | DATE 2-3-06   |                      |          |                       |
|                        |  | APPD PJA / JJ   |                      |          |                       |



D

**TABLE 1. HIGH PRESSURE SODIUM VAPOR (HPSV) LUMINAIRES - COMPLETE ASSEMBLY (EXCLUDING LAMP)**

| FIG. NO. | MANUFACTURER      | TYPE       | LAMP SIZE WATTS | BALLAST            |                | STOCK NUMBER |
|----------|-------------------|------------|-----------------|--------------------|----------------|--------------|
|          |                   |            |                 | TYPE               | SOURCE VOLTAGE |              |
| 1        | AMERICAN ELECTRIC | SERIES 115 | 70              | REACTOR-NPF        | 120            | 473400       |
|          | AMERICAN ELECTRIC | SERIES 115 | 100             |                    |                | 473402       |
|          | AMERICAN ELECTRIC | SERIES 115 | 150             |                    |                | 473404       |
| 2        | AMERICAN ELECTRIC | SERIES 125 | 200             | HIGH REACTANCE-NPF | 120            | 473406       |
|          |                   |            | 250             | HIGH REACTANCE-NPF |                | 473408       |
|          |                   |            | 400             | CWA                |                | 473410       |

**TABLE 2. REPLACEMENT STARTER ONLY FOR HIGH PRESSURE SODIUM VAPOR (HPSV) LUMINAIRES**

| FIGURE NUMBER | MANUFACTURER      | TYPE       | LAMP SIZE WATTS | SOURCE VOLTAGE | STOCK NUMBER |
|---------------|-------------------|------------|-----------------|----------------|--------------|
| 1             | AMERICAN ELECTRIC | SERIES 115 | 50-150          | 120            | 679142       |
| 2             | AMERICAN ELECTRIC | SERIES 125 | 200-400         | 120            | 679144       |

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SDG&E ELECTRIC STANDARDS

DATE 1-22-07

APPD PJA / JJ

HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR  
LUMINAIRE, REPLACEMENT BALLAST AND STARTER

OH 1521.2  
UG 4421.2



**D** **TABLE 3. LOW PRESSURE SODIUM VAPOR (LPSV) LUMINAIRES - COMPLETE ASSEMBLY (EXCLUDING LAMP)**

| FIG. NO. | MAX. LENGTH (IN INCHES) | LAMP SIZE (WATTS) | BALLAST       |                | STOCK NUMBER |
|----------|-------------------------|-------------------|---------------|----------------|--------------|
|          |                         |                   | TYPE          | SOURCE VOLTAGE |              |
| 3 & 4    | 34                      | 55                | H P F REACTOR | 120            | 473800       |
|          | 39                      | 90                | H P F REACTOR | 120            | 473802       |
|          | 63                      | 135               | H P F REACTOR | 120            | 473804       |
|          | 63                      | 180               | H P F REACTOR | 120            | 473806       |

**INSTALLATION:**

- A. ALL LUMINAIRES ARE TO BE WIRED FOR 120 VOLTS ONLY. APPLICATION OF 240 VOLTS TO THESE UNITS WILL CAUSE SEVERE BALLAST DAMAGE.
- B** THE **VISIONAIRE** LUMINAIRE WILL ACCEPT BOTH 35 WATT AND 55 WATT LAMPS.
- C. CUTOFF LUMINAIRES SHALL BE INSTALLED WITH THE OPTICAL ASSEMBLY (GLASSWARE) HORIZONTAL.
- D** STOCK NUMBERS IN TABLES **1 AND 3** ARE FOR COMPLETE LUMINAIRE UNITS.

**REFERENCE:**

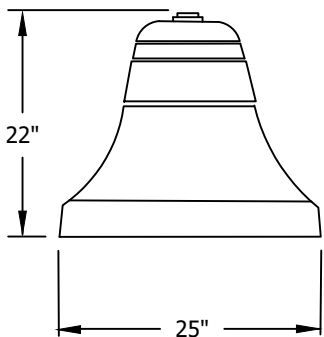
- J. SEE STANDARD 1512/4412 FOR PHOTOELECTRIC CONTROL.
- K. SEE PAGE 1511.1/4411.1 FOR REPLACEMENT REFRACTORS.
- L. SEE STANDARD 1514/4414 FOR IDENTIFICATION DECAL.

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| REVISION                             | SDG&E ELECTRIC STANDARDS   |                    |          |                              |
| DATE 2-13-07<br>APPD <i>PIA</i> / JJ | HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND STARTER |                    |          |                              |
|                                      | OH 1521.3<br>UG 4421.3   |                    |          |                              |

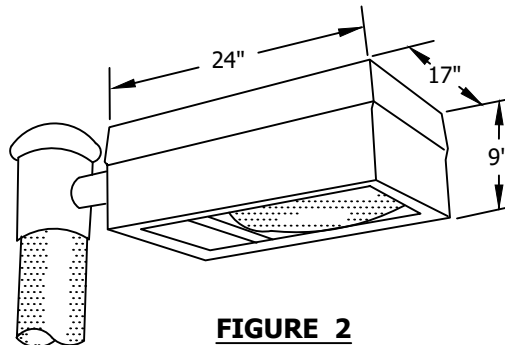


**SCOPE:** THIS STANDARD SHOWS STANDARD AND DECORATIVE LUMINAIRES USED FOR ROADWAY AND AREA LIGHTING.



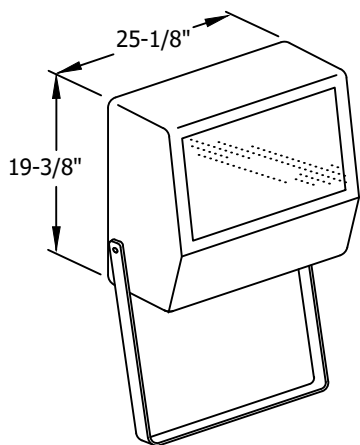
### FIGURE 1

SIERRA LIGHTING  
MISSION BELL LUMINAIRE  
(70, 100, 150 & 250W HPSV SHOWN)



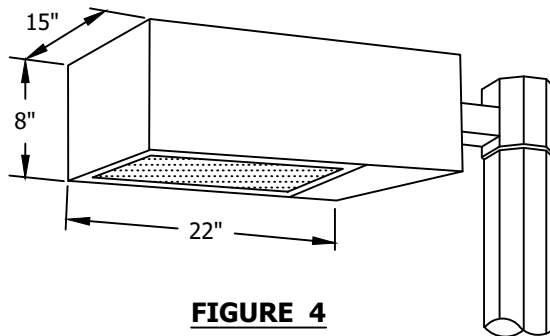
## FIGURE 2

GENERAL ELECTRIC  
DECASHIELD LUMINAIRE  
D-400  
(250W SHOWN)



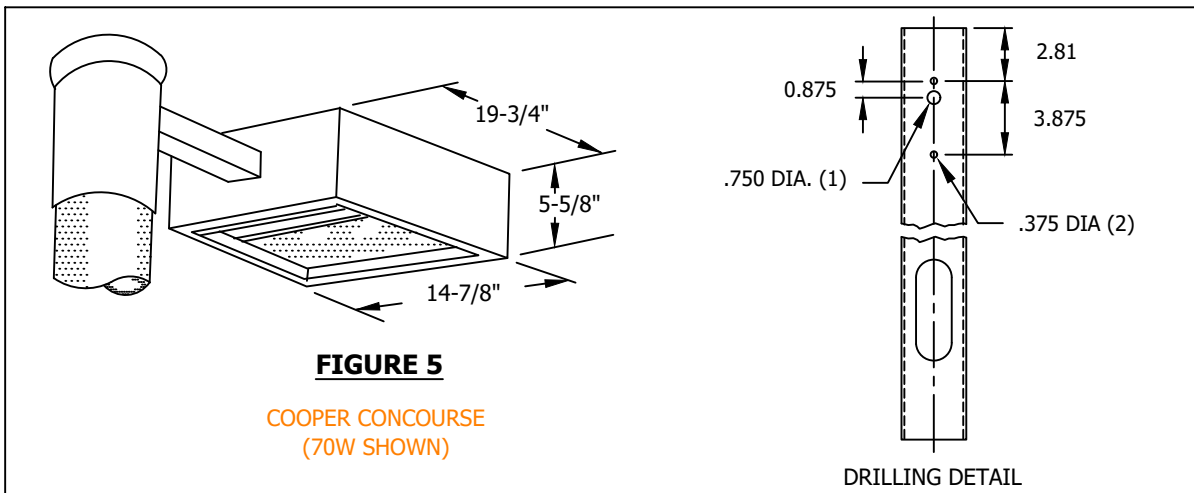
### FIGURE 3

GENERAL ELECTRIC  
POWER FLOOD  
(1000W SHOWN)



### FIGURE 4

BIEBER  
PARK LANE LUMINAIRE  
(70W SHOWN)



### **FIGURE 5**

COOPER CONCOURSE  
(70W SHOWN)

## DRILLING DETAIL

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| C   |          |    |      |      |            | F   |        |    |      |      |      |
| B   | REVISION | -- | PIA  | JJ   | 03/24/2008 | E   |        |    |      |      |      |
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|   |                           |                    |          |   |                     |
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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## STANDARD AND DECORATIVE LUMINAIRES

4422.1



**BILL OF MATERIALS:**

| STANDARD AND DECORATIVE LUMINAIRES |                  |            |           |              |                     |           |
|------------------------------------|------------------|------------|-----------|--------------|---------------------|-----------|
| FIG. NO.                           | BALLAST          |            |           |              | LUMINAIRE           |           |
|                                    | TYPE             | LAMP WATTS | LAMP TYPE | SOURCE VOLTS | MANUFACTURER        | STOCK NO. |
| 1                                  | REACTOR - NPF    | 70         | HPSV      | 120          | SIERRA LIGHTING     | 474662    |
|                                    | REACTOR - NPF    | 100        | HPSV      | 120          | SIERRA LIGHTING     | 474620    |
|                                    | REACTOR - NPF    | 150        | HPSV      | 120          | SIERRA LIGHTING     | 474624    |
|                                    | REGULATOR        | 250        | HPSV      | 120          | SIERRA LIGHTING     | 474660    |
| 2                                  | AUTO - REGULATOR | 250        | HPSV      | 120          | GENERAL ELECTRIC CO | 474426    |
| 3                                  | REGULATOR        | 250        | HPSV      | 120          | GENERAL ELECTRIC CO | 474452    |
|                                    | REGULATOR        | 400        | HPSV      | 120          | GENERAL ELECTRIC CO | 474454    |
|                                    | AUTO REGULATOR   | 1000       | HPSV      | 120          | GENERAL ELECTRIC CO | 474456    |
| 4                                  | REACTOR - NPF    | 70         | HPSV      | 120          | BIEBER LIGHTING     | 473384    |
| 5                                  | REACTOR - NPF    | 70         | HPSV      | 120          | COOPER              | 473220    |

**INSTALLATION:**

- A. ALL PHOTO ELECTRIC RECEPTACLES ARE WIRED FOR 120 VOLTS.
- B. DUAL VOLTAGE BALLASTS RATED 120 X 240 VOLTS ARE FACTORY WIRED FOR 120 VOLT OPERATION.
- C. THESE LUMINAIRES ARE INSTALLED ON AN 8 INCH LONG, 2 INCH DIAMETER MAST ARM.

**REFERENCE:**

- F. SEE STANDARD 4410 FOR REPLACEMENT LAMPS.
- G. SEE STANDARD 4411 FOR REPLACEMENT REFRACTORS.
- H. SEE STANDARD 4432 FOR "DIRECT BURIAL POLE INSTALLATION FOR MISSION BELL LUMINAIRES."
- I. SEE STANDARD 4433 FOR "DIRECT BURIAL POLE INSTALLATION FOR DECORATIVE LUMINAIRES."

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |   |                    |          |                     |        |
|                 | STANDARD AND DECORATIVE LUMINAIRES                |   |                    |          |                     |        |



**SCOPE:** THIS STANDARD SHOWS POST TOP LUMINAIRES FOR ROADWAY LIGHTING.

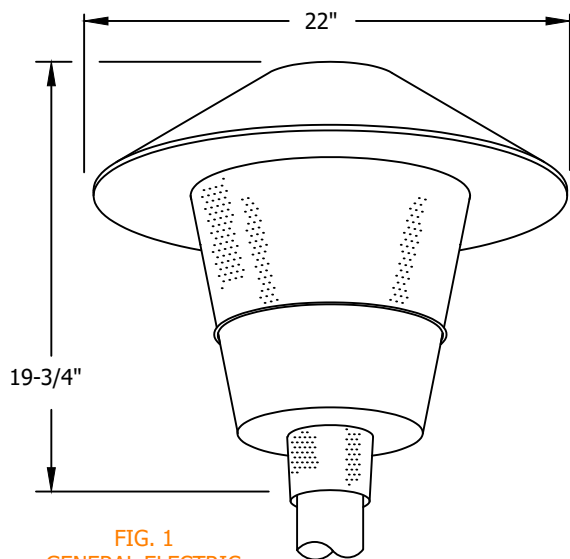


FIG. 1  
GENERAL ELECTRIC  
POST-TOP  
(LAWNIRE  
REPLACEMENT)

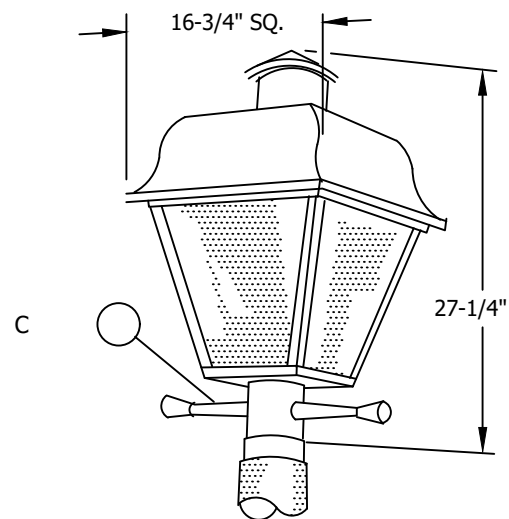


FIG. 2  
GENERAL ELECTRIC  
SALEM POST TOP  
(REPLACES TRADITIONAIRE)

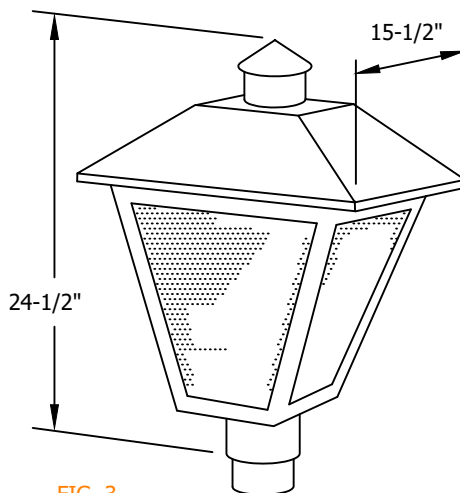


FIG. 3  
GENERAL ELECTRIC  
TOWN & COUNTRY

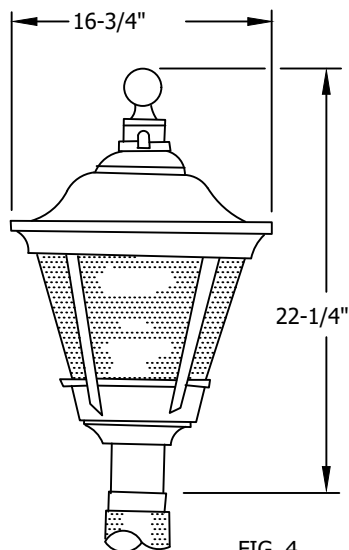


FIG. 4  
HOLOPHANE  
RSL 350

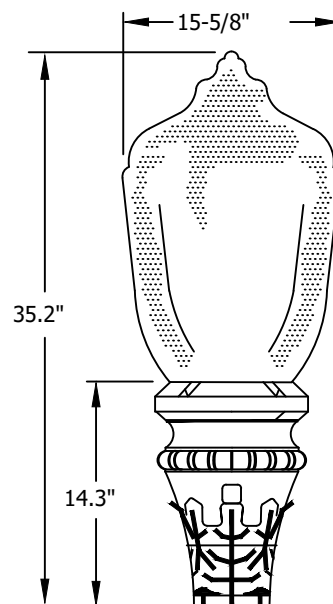


FIG. 5  
GENERAL ELECTRIC  
STREET ORNAMENT COLONIAL 2

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4423.1

SDG&E ELECTRIC STANDARDS

POST TOP LUMINAIRES

REVISION

DATE 2-13-07

APPD *PA* / JJ



# POST TOP LUMINAIRE

| FIG. NO. | BALLAST     |            |           |              | LUMINAIRE           |              |
|----------|-------------|------------|-----------|--------------|---------------------|--------------|
|          | TYPE        | LAMP WATTS | LAMP TYPE | SOURCE VOLTS | MANUFACTURER        | STOCK NUMBER |
| 1        | REACTOR-NPF | 70         | HPSV      | 120          | GENERAL ELECTRIC CO | 473212       |
| 1        | REACTOR-NPF | 100        | HPSV      | 120          | GENERAL ELECTRIC CO | 473232       |
| 2        | REACTOR-NPF | 70         | HPSV      | 120          | GENERAL ELECTRIC CO | 473216 (C)   |
| 2        | REACTOR-NPF | 100        | HPSV      | 120          | GENERAL ELECTRIC CO | 474688 (C)   |
| 2        | REACTOR-NPF | 150        | HPSV      | 120          | GENERAL ELECTRIC CO | 474696 (C)   |
| 3        | REACTOR-NPF | 70         | HPSV      | 120          | GENERAL ELECTRIC CO | 473226       |
| 3        | REACTOR-NPF | 100        | HPSV      | 120          | GENERAL ELECTRIC CO | 474590       |
| 4        | REACTOR-NPF | 100        | HPSV      | 120          | HOLOPHANE           | 474594       |
| 5        | REACTOR     | 70         | HPSV      | 120          | GENERAL ELECTRIC CO | 473210       |

## INSTALLATION:

- A. ALL P.E. RECEPTACLES ARE WIRED FOR THE SOURCE VOLTAGE SHOWN.
- B. FIGURES 1, 2, 3, 5 ARE EQUIPPED WITH ACRYLIC REFRACTORS. FIGURE 4 IS EQUIPPED WITH GLASS REFRACTORS.
- (C) THIS LUMINAIRE SHALL BE INSTALLED SO THAT THE LADDER ARM IS PARALLEL TO THE CURB.
- E. THE MOUNTING HEIGHT FOR THESE LUMINAIRES IS 17 FEET.

## REFERENCE:

- G. SEE STANDARD 4410 FOR REPLACEMENT LAMPS.
- H. SEE STANDARD 4411 FOR REPLACEMENT REFRACTORS.
- I. SEE STANDARD 4412 FOR REPLACEMENT PHOTO ELECTRIC CONTROLS.
- J. SEE STANDARD 4434 FOR DIRECT BURIAL POLE INSTALLATION FOR DOMESTIC WALKWAY LIGHTING.

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| REVISION      | SDG&E ELECTRIC STANDARDS    |                    |          |                       |
| DATE 1-22-07  | POST TOP LUMINAIRES         |                    |          |                       |
| APPD PJA / JJ | 4423.2                      |                    |          |                       |



**SCOPE:** THIS STANDARD SHOWS POST TOP LUMINAIRES FOR WALKWAY LIGHTING.

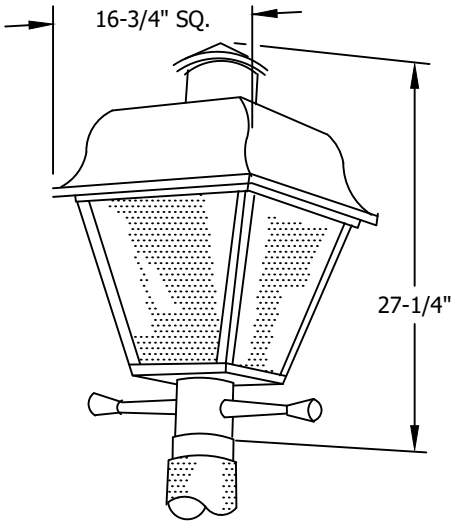


FIG. 2  
GENERAL ELECTRIC  
SALEM POST TOP  
(REPLACES TRADITIONAIRE)

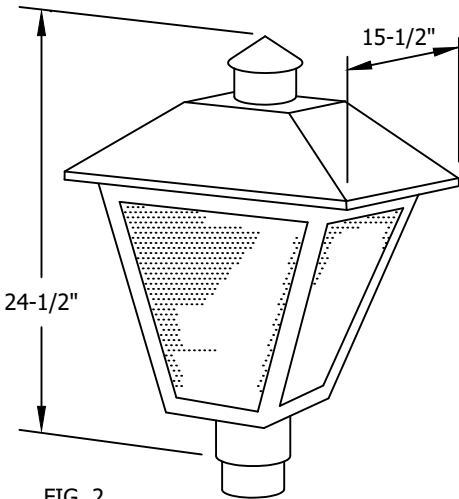


FIG. 2  
GENERAL ELECTRIC  
TOWN & COUNTRY

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |        |
|                 | DOMESTIC WALKWAY LIGHTING (DWL) LUMINAIRES        |                           |                    |          |                     |        |



## BILL OF MATERIALS:

| DOMESTIC WALKWAY LIGHTING (DWL) LUMINAIRES |               |            |           |              |                      |           |
|--|---------------|------------|-----------|--------------|----------------------|-----------|
| FIG NO.                                    | BALLAST       |            |           |              | LUMINAIRE            |           |
|  | TYPE          | LAMP WATTS | LAMP TYPE | SOURCE VOLTS | MANUFACTURER         | STOCK NO. |
| 1  | REACTOR - NPF | 50         | HPSV      | 120          | GENERAL ELECTRIC CO. | 474678    |
| 2  | REACTOR - NPF | 50         | HPSV      | 120          | GENERAL ELECTRIC CO. | 474516    |

## INSTALLATION:

- B NORMALLY USED WITH AN IES TYPE V SYMMETRIC LIGHT PATTERN.
- C ALL P.E. RECEPTACLES ARE WIRED FOR 120 VOLTS.
- D DUAL VOLTAGE BALLASTS RATED 120x240 VOLTS ARE FACTORY WIRED FOR 120 VOLT OPERATION.
- F THE MOUNTING HEIGHT FOR THE LUMINAIRES IS 9 FEET.

**REFERENCE:**

- L SEE STANDARD 4410 FOR REPLACEMENT LAMPS.
- M SEE STANDARD 4411 FOR REPLACEMENT REFRACTORS.
- N SEE STANDARD 4412 FOR REPLACEMENT PHOTO ELECTRIC CONTROLS.
- O SEE STANDARD 4434 FOR "DIRECT BURIAL POLE INSTALLATION FOR DECORATIVE LUMINAIRES.

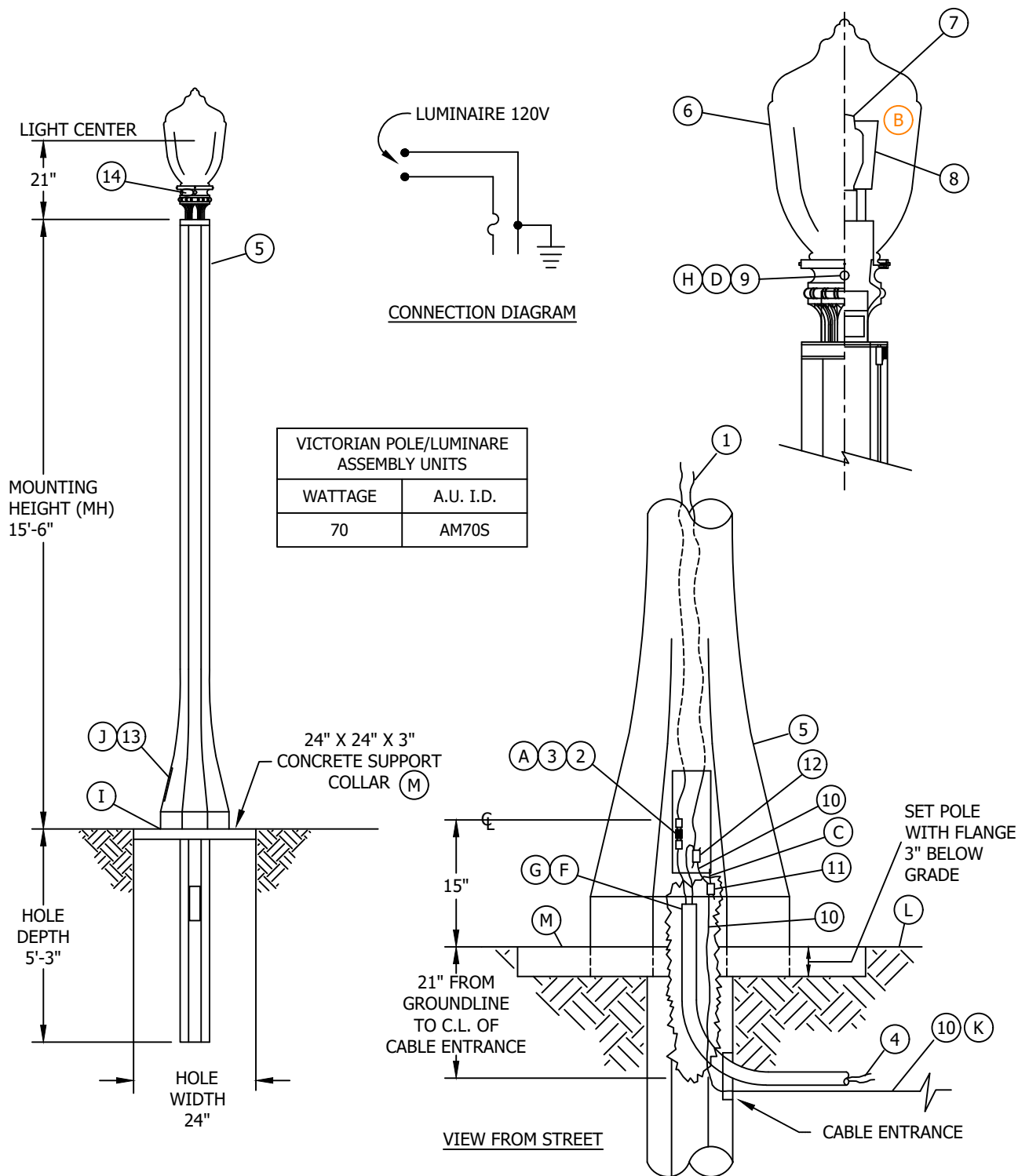
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |   |                     |        |
|                 | DOMESTIC WALKWAY LIGHTING (DWL) LUMINAIRES        |                           |                    |          |   |                     |        |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF DIRECT BURIAL VICTORIAN STYLE OCTAGONAL POLE WITH LUMINAIRE FOR ROADWAY LIGHTING.



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

DIRECT BURIAL POLE INSTALLATION  
FOR VICTORIAN LUM

4430.1



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY    | STOCK NO.<br>OR<br>CONST. STD. |
|------|--|-------------|--------------------------------|
| 1    | WIRE, 2 #8, 600V, ALUMINUM   | 16'         | 196176                         |
| 2    | KIT, CONNECTOR FUSED   | 1           | 443392                         |
| 3    | CARTRIDGE, FUSE, DUAL ELEMENT, 10A, 250V                                 | 1           | 363936                         |
| 4    | WIRE, 2 #8, 600V.  | AS REQUIRED | 196176                         |
| 5    | POLE, PRESTRESSED CONCRETE, DIRECT BURIAL,<br>VICTORIAN STYLE, OCTAGONAL | 1           | 678112                         |
| 6    | LUMINAIRE, VICTORIAN   | 1           | STD 4423                       |
| 7    | LAMP, HPSV   | 1           | STD 4410                       |
| 8    |  |             |                                |
| 9    | CONTROL, PHOTO ELECTIC, MODEL A-105                                      | 1           | 273700                         |
| 10   | WIRE, BARE COPPER, #2, 7 STR. SOFT DRAW                                  | 33'         | 812816                         |
| 11   | CONNECTOR, COPPER COMPRESSION  | 1           | 257792                         |
| 12   | CONNECTOR, COMPRESSION   | 1           | 256432                         |
| 13   | TAG, POLE  | 1           | STD 4413                       |
| 14   | DECAL, STREET LIGHT OWNERSHIP/MAINTENANCE IDENTIFICATION                 | 1           | STD 4414                       |

**INSTALLATION:**

- (A) ALL LUMINAIRES ARE TO BE WIRED FOR 120 VOLTS.
- (B) REFRACTOR DIRECTION SHOULD BE PROPERLY PLACED.
- (C) POLE TO CONTAIN ONE OF THREE GROUNDING METHODS:
- 1) A #8 COPPER WIRE.
  - 2) STAINLESS STEEL BOLT TO CONNECT #6 COPPER WIRE.
  - 3) COPPER GROUND STRAP.
- (D) PHOTO ELECTRIC CONTROL FOR AMERON VICTORIAN UNIT IS LOCATED INSIDE THE LUMINAIRE.
- (F) WHEN CONDUIT IS INITIALLY INSTALLED, CONDUIT SHALL EXTEND 2 FEET ABOVE FINAL GRADE.
- (G) CUT CONDUIT NO MORE THAN 6 INCHES BELOW HANDHOLE OPENING IN THE POLE FOR FINAL INSTALLATION.
- (H) FACE PHOTO CELL TO THE NORTH.
- (I) PLACE POLE DIRECTLY BEHIND SIDEWALK IF CURB AND SIDEWALK IS 5 FEET WIDE OR LESS. ALLOW ROOM FOR CONCRETE SUPPORT COLLAR. OTHERWISE PLACE POLE DIRECTLY BEHIND CURB LEAVING ROOM FOR COLLAR. MAKE A JOINTER MARK BETWEEN THE CURB OR SIDEWALK AND THE COLLAR.
- (J) ROTATE THE POLE TO LINE UP CABLE ENTRANCE WITH CONDUIT. HANDHOLE OPENING IN POLE SHALL FACE THE SIDEWALK.
- (K) INSTALL 30 FEET OF GROUND WIRE IN THE TRENCH AS SHOWN IN "FIGURE 2", ON PAGE 4510.1. THE ALTERNATE METHOD OF GROUNDING IS TO INSTALL 2-8 FOOT GROUND RODS 6 FEET MINIMUM APART. USE #6 BARE STRAND SOFT DRAWN COPPER WIRE TO ATTACH TO THE RODS AND POLE.
- (L) NATURAL SPOIL WITH 3/4 INCH MAXIMUM AGGREGATE, SAND, DECOMPOSED GRANITE, 3/4 INCH MAXIMUM AGGREGATE, OR POLESET (LISTED IN ORDER OF LEAST EXPENSE) MAY BE USED AS BACKFILL. TAMP THE BACKFILL (EXCEPT POLESET) THOROUGHLY.
- (M) CONCRETE SUPPORT COLLAR TO BE POURED IN PLACE.

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| SHEET<br>2 OF 2 | X   | Indicates Latest Revision | Completely Revised | New Page | X | Information Removed | 4430.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS           |                           |                    |          |   |                     |        |
|                 | DIRECT BURIAL POLE INSTALLATION<br>FOR VICTORIAN LUMINAIRES |                           |                    |          |   |                     |        |







### TABLE 1

## LUMINAIRE

### **BILL OF MATERIALS:**

ITEM

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REV



## **INSTALLATION:**

- (A) ALL LUMINAIRES ARE TO BE WIRED FOR 120 VOLTS.
- (B) STOCK NUMBERS ARE FOR POLES WITH MAST ARMS AND REPLACEMENT MAST ARMS.
- (C) POLE TO CONTAIN ONE OF THREE GROUNDING METHODS:
  - 1) A #8 COPPER WIRE.
  - 2) STAINLESS STEEL BOLT TO CONNECT #6 COPPER WIRE.
  - 3) COPPER GROUND STRAP.
- (D) PHOTO ELECTRIC CONTROL FOR GENERAL ELECTRIC ASTRODOME UNIT IS LOCATED INSIDE.
- (F) WHEN CONDUIT IS INITIALLY INSTALLED, CONDUIT SHALL EXTEND 2 FEET ABOVE FINAL GRADE.
- (G) CUT CONDUIT NO MORE THAN 6 INCHES BELOW HANDHOLE OPENING IN THE POLE FOR FINAL INSTALLATION.
- (H) FACE PHOTO CELL TO THE NORTH.
- (I) PLACE POLE DIRECTLY BEHIND SIDEWALK IF CURB AND SIDEWALK IS 5 FEET WIDE OR LESS. ALLOW ROOM FOR CONCRETE SUPPORT COLLAR. OTHERWISE PLACE POLE DIRECTLY BEHIND CURB LEAVING ROOM FOR COLLAR. MAKE A JOINTER MARK BETWEEN THE CURB OR SIDEWALK AND THE COLLAR.
- (J) ROTATE THE POLE TO LINE UP CABLE ENTRANCE WITH CONDUIT. HANDHOLE OPENING IN POLE SHALL FACE THE SIDEWALK.
- (K) INSTALL 30 FEET OF GROUND WIRE IN THE TRENCH AS SHOWN IN "FIGURE 2", ON PAGE 4510.1. THE ALTERNATE METHOD OF GROUNDING IS TO INSTALL 2-8 FOOT GROUND RODS 6 FEET MINIMUM APART. USE #6 BARE STR. SOFT DRAWN COPPER WIRE TO ATTACH TO THE RODS AND POLE.
- (L) NATURAL SPOIL WITH 3/4 INCH MAXIMUM AGGREGATE, SAND, DECOMPOSED GRANITE, 3/4 INCH MAXIMUM AGGREGATE, OR POLESET (LISTED IN ORDER OF LEAST EXPENSE) MAY BE USED AS BACKFILL. TAMP THE BACKFILL (EXCEPT POLESET) THOROUGHLY.
- (M) CONCRETE SUPPORT COLLAR TO BE POURED IN PLACE.

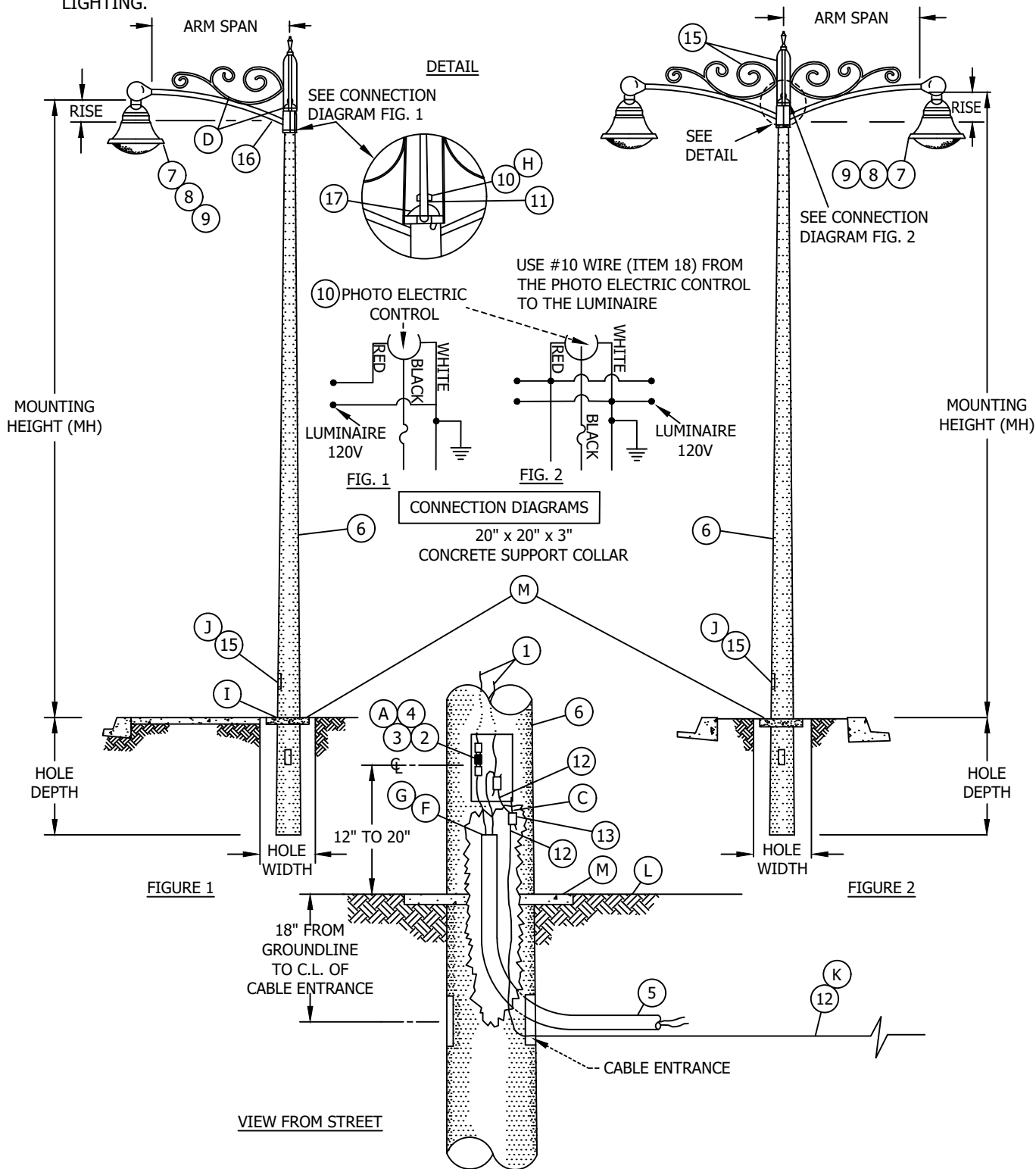
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS              |                           |                    |          |                     |        |
|                 | DIRECT BURIAL POLE INSTALLATION<br>FOR CONVENTIONAL LUMINAIRES |                           |                    |          |                     |        |



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF DIRECT BURIAL POLES WITH MISSION BELL LUMINAIRES FOR ROADWAY LIGHTING.



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1 OF 3

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

DIRECT BURIAL POLE INSTALLATION  
FOR MISSION BELL LUMINAIRES

4432.1



TABLE 1 PRESTRESSED CONCRETE DIRECT BURIAL POLE

| MISSION<br>BELL<br>LUMINAIRE | NOMINAL<br>MOUNTING<br>HEIGHT | MAST ARM |       | OVERALL<br>POLE<br>LENGTH | HOLE<br>DEPTH | HOLE<br>WIDTH | ACTUAL<br>MOUNTING<br>HEIGHT | STOCK NUMBER ⑧    |                     |            |                     |
|------------------------------|-------------------------------|----------|-------|---------------------------|---------------|---------------|------------------------------|-------------------|---------------------|------------|---------------------|
|                              |                               | SPAN     | RISE  |                           |               |               |                              | NATURAL AGGREGATE |                     |            |                     |
|                              |                               |          |       |                           |               |               |                              | SINGLE ARM        | REPL.<br>SINGLE ARM | DOUBLE ARM | REPL.<br>DOUBLE ARM |
| 70W, 100W,<br>150W HPSV      | 26'                           | 4'-0"    | 1'-9" | 29'-6"                    | 5'-0"         | 18"           | 26'-3"                       | 678288            | 110820              | 678306     | --                  |
| 200W, 250W,<br>HPSV          | 30'                           | 4'-0"    | 1'-9" | 32'-10"                   | 5'-0"         | 18"           | 29'-7"                       | 378324            | 110820              | --         | --                  |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION   | QUANTITY |        |        |          |        |        | STOCK NO<br>OR<br>CONSTR STD |
|------|---|----------|--------|--------|----------|--------|--------|------------------------------|
|      |   | FIG. 1   |        |        | FIG. 2   |        |        |                              |
|      |   | 26' MH   | 30' MH | 35' MH | 26' MH   | 30' MH | 35' MH |                              |
| 1    | WIRE, #8 THW, 600 V, ALUMINUM                                 | 31'      | 35'    | 40'    | 43'      | 47'    | 52'    | 196176                       |
| 2    | KIT, CONNECTOR FUSED  | 1        |        |        | 1        |        |        | 443392                       |
| 3    | CARTRIDGE, FUSE, DUAL ELEMENT, 10A. 250V.                     | 1        |        |        | --       |        |        | 363936                       |
| 4    | FUSE, LIMITRON, 20A. 600V.                                    | --       |        |        | 1        |        |        | 366128                       |
| 5    | WIRE, #8 THW, 600V., ALUMINUM INSULATED CABLE                 | AS REQ'D |        |        | AS REQ'D |        |        | 196176                       |
| 6    | POLE, PRESTRESSED CONCRETE, DIRECT BURIAL INCLUDING MAST ARMS | 1        |        |        | 1        |        |        | (SEE TABLE)                  |
| 7    | LUMINAIRE, MISSION BELL                                       | 1        |        |        | 2        |        |        | STD 4422                     |
| 8    | LAMP, HPSV  | 1        |        |        | 2        |        |        | STD 4410                     |
| 9    | REFRACTOR, REPLACEMENT  | 1        |        |        | 2        |        |        | STD 4411                     |
| 10   | CONTROL, PHOTO ELECTRIC, 105-285 VOLT, 1000 WATT              | 1        |        |        | 1        |        |        | 273888                       |
| 11   | ADAPTER, P. E. RECEPTACLE                                     | 1        |        |        | 1        |        |        | 102544                       |
| 12   | WIRE, BARE COPPER, #2, 7 STR. SOFT DRAWN                      | 33'      |        |        | 33'      |        |        | 812816                       |
| 13   | CONNECTOR, COPPER COMPRESSION                                 | 1        |        |        | 1        |        |        | 257792                       |
| 14   | CONNECTOR, COMPRESSION  | 1        |        |        | 1        |        |        | 256432                       |
| 15   | TAG, POLE   | 1        |        |        | 1        |        |        | STD 4413                     |
| 16   | DECAL, STREET LIGHT MAINTENANCE IDENTIFICATION                | 1        |        |        | 2        |        |        | STD 4414                     |
| 17   | CAP, BONNET   | 1        |        |        | 1        |        |        | 203902                       |
| 18   | WIRE, #10 THW 600V COPPER                                     | AS REQ'D |        |        | AS REQ'D |        |        | 808064                       |

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| C   |          |    |      |      |            | F   |        |    |      |      |      |
| B   | REVISION | -- | PIA  | JJ   | 02/13/2007 | E   |        |    |      |      |      |
| A   | REVISION | -- | JLB  | RDJ  | 01/01/1987 | D   |        |    |      |      |      |

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|-----------------|---|---------------------------|--------------------|----------|---------------------|--------|
| SHEET<br>2 OF 3 | X   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | 4432.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS               |                           |                    |          |                     |        |
|                 | DIRECT BURIAL POLE INSTALLATIONS<br>FOR MISSION BELL LUMINAIRES |                           |                    |          |                     |        |




**INSTALLATION:**

- (A) ALL LUMINAIRES ARE TO BE WIRED FOR 120 VOLTS.
- (B) STOCK NUMBERS ARE FOR POLES AND MAST ARMS ONLY.
- (C) POLE TO CONTAIN ONE OF THREE GROUNDING METHODS.
  - 1) A #8 COPPER WIRE.
  - 2) STAINLESS STEEL BOLT TO CONNECT #6 COPPER WIRE.
  - 3) COPPER GROUND STRAP.
- (D) BIRDCAGE AND DECORATIVE SCROLLS ARE NOT A STANDARD INSTALLATION. BIRDCAGE AND DECORATIVE SCROLLS TO BE PROVIDED BY CUSTOMER OR BY GOVERNMENTAL AGENCY. SDG&E WILL INSTALL THE BIRDCAGE AND DECORATIVE SCROLL AT THE TIME THE POLE IS INSTALLED.
- (F) WHEN CONDUIT IS INITIALLY INSTALLED, IT SHALL EXTEND 2 FEET ABOVE FINAL GRADE.
- (G) CUT CONDUIT NO MORE THAN 6 INCHES BELOW HANDHOLE OPENING IN THE POLE FOR FINAL INSTALLATION.
- (H) FACE PHOTO CELL TO THE NORTH.
- (I) PLACE POLE DIRECTLY BEHIND SIDEWALK IF CURB AND SIDEWALK IS 5 FEET WIDE OR LESS. ALLOW ROOM FOR CONCRETE FOR CONCRETE SUPPORT COLLAR. OTHERWISE PLACE POLE DIRECTLY BEHIND CURB LEAVING ROOM FOR COLLAR. MAKE A JOINTER MARK BETWEEN THE CURB OR SIDEWALK AND THE COLLAR.
- (J) ROTATE THE POLE TO LINE UP CABLE ENTRANCE WITH CONDUIT. HANDHOLE OPENING IN POLE SHALL FACE THE SIDEWALK.
- (K) INSTALL 30 FEET OF GROUND WIRE IN THE TRENCH AS SHOWN IN "FIGURE 2", ON PAGE 4510.1. THE ALTERNATE METHOD OF GROUNDING IS TO INSTALL 2-8 FOOT GROUND RODS 6 FEET MINIMUM APART. USE #6 BARE STR. SOFT DRAWN COPPER WIRE TO ATTACH TO THE RODS AND POLE.
- (L) NATURAL SPOIL WITH 3/4 INCH MAXIMUM AGGREGATE, SAND, DECOMPOSED GRANITE, 3/4 INCH MAXIMUM AGGREGATE, OR POLESET (LISTED IN ORDER OF LEAST EXPENSE) MAY BE USED AS BACKFILL. TAMP THE BACKFILL (EXCEPT POLESET) THOROUGHLY.
- (M) CONCRETE SUPPORT COLLAR TO BE POURED IN PLACE.

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| A   | REVISION | -- | JLB  | RDJ  | 01/01/1987 | D   |        |    |      |      |      |

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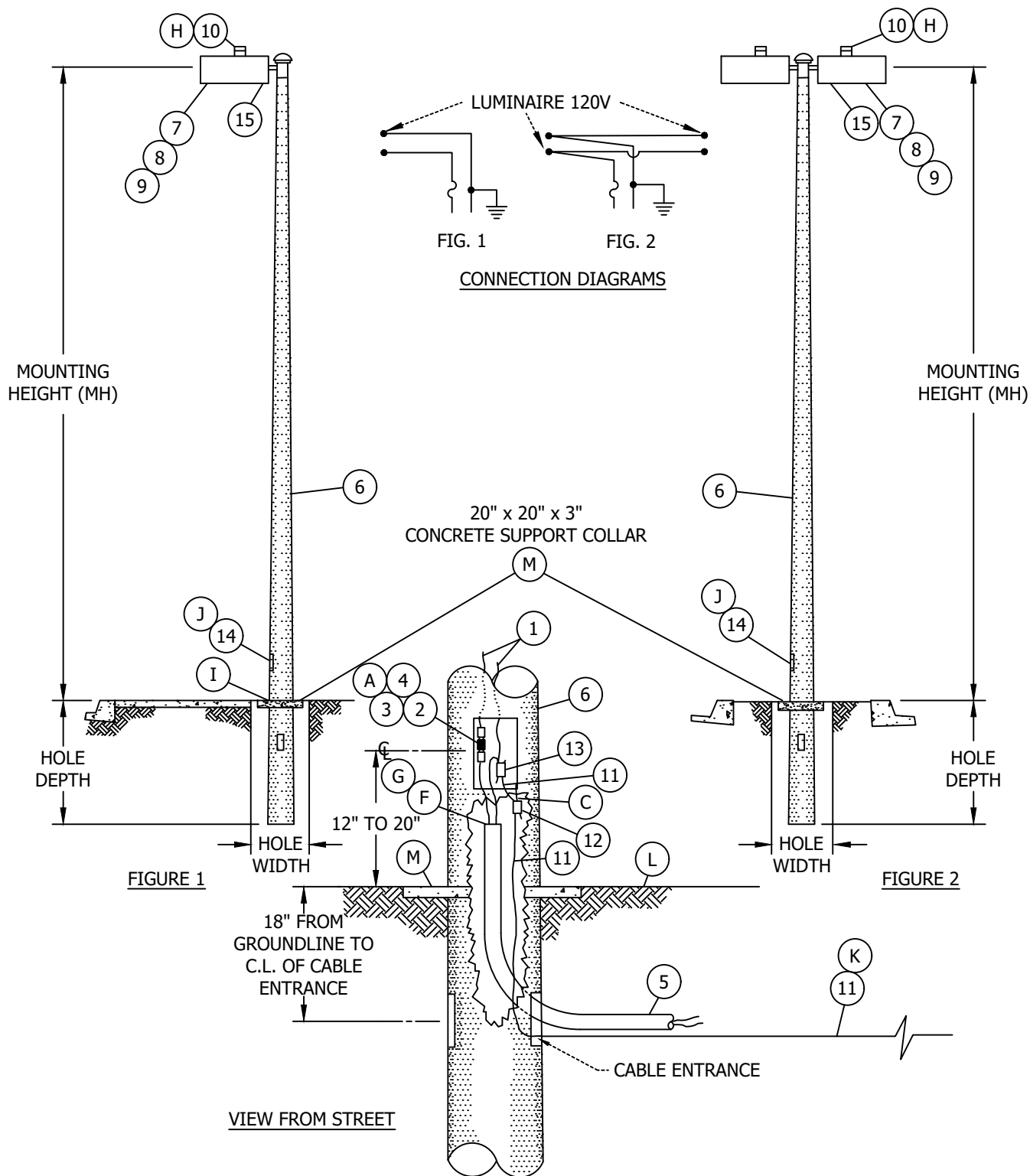
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

DIRECT BURIAL POLE INSTALLATION  
FOR MISSION BELL LUMINAIRES

4432.3



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF DIRECT BURIAL POLES WITH DECORATIVE LUMINAIRES FOR ROADWAY LIGHTING.



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

DIRECT BURIAL POLE INSTALLATION  
FOR DECORATIVE LUMINAIRES

UG4433.1



**TABLE 1**  
PRESTRESSED  
CONCRETE  
DIRECT  
BURIAL  
POLE

| DECORATIVE LUMINAIRE  | NOMINAL MOUNTING HEIGHT | OVERALL POLE LENGTH | HOLE DEPTH | HOLE WIDTH | ACTUAL MOUNTING HEIGHT | STOCK NUMBER<br>® | POLE SHAPE |
|-----------------------|-------------------------|---------------------|------------|------------|------------------------|-------------------|------------|
| 70W HPSV              | 24'                     | 27'-7"              | 4'-7"      | 18"        | 23'                    | 677900            | OCTAGONAL  |
| 70W, 100W, 150W HPSV  | 26'                     | 29'-6"              | 5'-0"      | 18"        | 24'-6"                 | 678000            | ROUND      |
| 100W, 150W, 175W HPSV | 28'                     | 32'-10"             | 4'-11"     | 18"        | 27'-11"                | 677902            | OCTAGONAL  |
| 200W, 250W HPSV       | 30'                     | 32'-10"             | 5'-0"      | 18"        | 27'-10"                | 678036            | ROUND      |
| 400W HPSV             | 35'                     | 38'-5"              | 5'-6"      | 18"        | 32'-11"                | 678072            | ROUND      |

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY |       |       |          |       |       | STOCK NO OR<br>CONSTR STD |
|------|--|----------|-------|-------|----------|-------|-------|---------------------------|
|      |  | FIGURE 1 |       |       | FIGURE 2 |       |       |                           |
|      |  | 26'MH    | 30'MH | 35'MH | 26'MH    | 30'MH | 35'MH |                           |
| 1    | WIRE, #8 THW, 600V, ALUMINUM                                   | 27'      | 31'   | 36'   | 25'      | 32'   | 37'   | 196176                    |
| 2    | KIT, CONNECTOR FUSED   | 1        |       |       | 1        |       |       | 443392                    |
| 3    | CARTRIDGE, FUSE, DUAL ELEMENT, 10A, 250V                       | 1        |       |       | --       |       |       | 363936                    |
| 4    | FUSE, LIMITRON, 20A, 600V                                      | --       |       |       | 1        |       |       | 366128                    |
| 5    | WIRE, #8 THW, 600V, ALUMINUM INSULATED CABLE                   | AS REQ'D |       |       | AS REQ'D |       |       | 196176                    |
| 6    | POLE, PRESTRESSED CONCRETE, DIRECT BURIAL, INCLUDING MAST ARMS | 1        |       |       | 1        |       |       | (SEE TABLE 1)             |
| 7    | LUMINAIRE, DECORATIVE  | 1        |       |       | 2        |       |       | STD 4422                  |
| 8    | LAMP, HPSV   | 1        |       |       | 2        |       |       | STD 4410                  |
| 9    | REFRACTOR, REPLACEMENT   | 1        |       |       | 2        |       |       | STD 4411                  |
| 10   | CONTROL, PHOTO ELECTRIC, 105-285 VOLT, 1000 WATT               | 1        |       |       | 2        |       |       | 273888                    |
| 11   | WIRE, BARE COPPER, #2, 7 STR SOFT DRAWN                        | 33'      |       |       | 33'      |       |       | 812816                    |
| 12   | CONNECTOR, COPPER COMPRESSION                                  | 1        |       |       | 1        |       |       | 257792                    |
| 13   | CONNECTOR, COMPRESSION   | 1        |       |       | 1        |       |       | 256432                    |
| 14   | TAG, POLE  | 1        |       |       | 1        |       |       | STD 4413                  |
| 15   | DECAL, STREET LIGHT MAINTENANCE IDENTIFICATION                 | 1        |       |       | 2        |       |       | STD 4414                  |

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| SHEET<br>2 OF 3 | <div>X</div>   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | UG4433.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS            |                           |                    |          |                     |          |
|                 | DIRECT BURIAL POLE INSTALLATION<br>FOR DECORATIVE LUMINARIES |                           |                    |          |                     |          |



## INSTALLATION:

- (A) ALL LUMINAIRES ARE TO BE WIRED FOR 120 VOLT.
- (B) STOCK NUMBERS ARE FOR POLES ONLY.
- (C) POLE TO CONTAIN ONE OF THREE GROUNDING METHODS.
  - 1) A #8 COPPER WIRE.
  - 2) STAINLESS STEEL BOLT TO CONNECT #6 COPPER WIRE.
  - 3) COPPER GROUND STRAP.
- (F) WHEN CONDUIT IS INITIALLY INSTALLED, IT SHALL EXTEND 2 FEET ABOVE FINAL GRADE.
- (G) CUT CONDUIT NO MORE THAN 6 INCHES BELOW HANDHOLE OPENING IN THE POLE FOR FINAL INSTALLATION.
- (H) FACE PHOTO CELL TO THE NORTH.
- (I) PLACE POLE DIRECTLY BEHIND SIDEWALK IF CURB AND SIDEWALK IS 5 FEET WIDE OR LESS. ALLOW ROOM FOR CONCRETE SUPPORT COLLAR. OTHERWISE PLACE POLE DIRECTLY BEHIND CURB LEAVING ROOM FOR COLLAR. MAKE A JOINTER MARK BETWEEN THE CURB OR SIDEWALK AND THE COLLAR.
- (J) ROTATE THE POLE TO LINE UP CABLE ENTRANCE WITH CONDUIT. HANDHOLE OPENING IN POLE SHALL FACE THE SIDEWALK.
- (K) INSTALL 30 FEET OF GROUND WIRE IN THE TRENCH AS SHOWN IN "FIGURE 2" ON PAGE 4510.1. THE ALTERNATE METHOD OF GROUNDING IS TO INSTALL 2-8 FOOT GROUND RODS 6 FEET MINIMUM APART. USE #6 BARE STR. SOFT DRAWN COPPER WIRE TO ATTACH TO THE RODS AND POLE.
- (L) NATURAL SPOIL WITH 3/4 INCH MAXIMUM AGGREGATE, SAND, DECOMPOSED GRANITE, 3/4 INCH MAXIMUM AGGREGATE, OR POLESET (LISTED I ORDER OF LEAST EXPENSE) MAY BE USED AS BACKFILL. TAMP THE BACKFILL (EXCEPT POLESET) THOROUGHLY.
- (M) CONCRETE SUPPORT COLLAR TO BE POURED IN PLACE.

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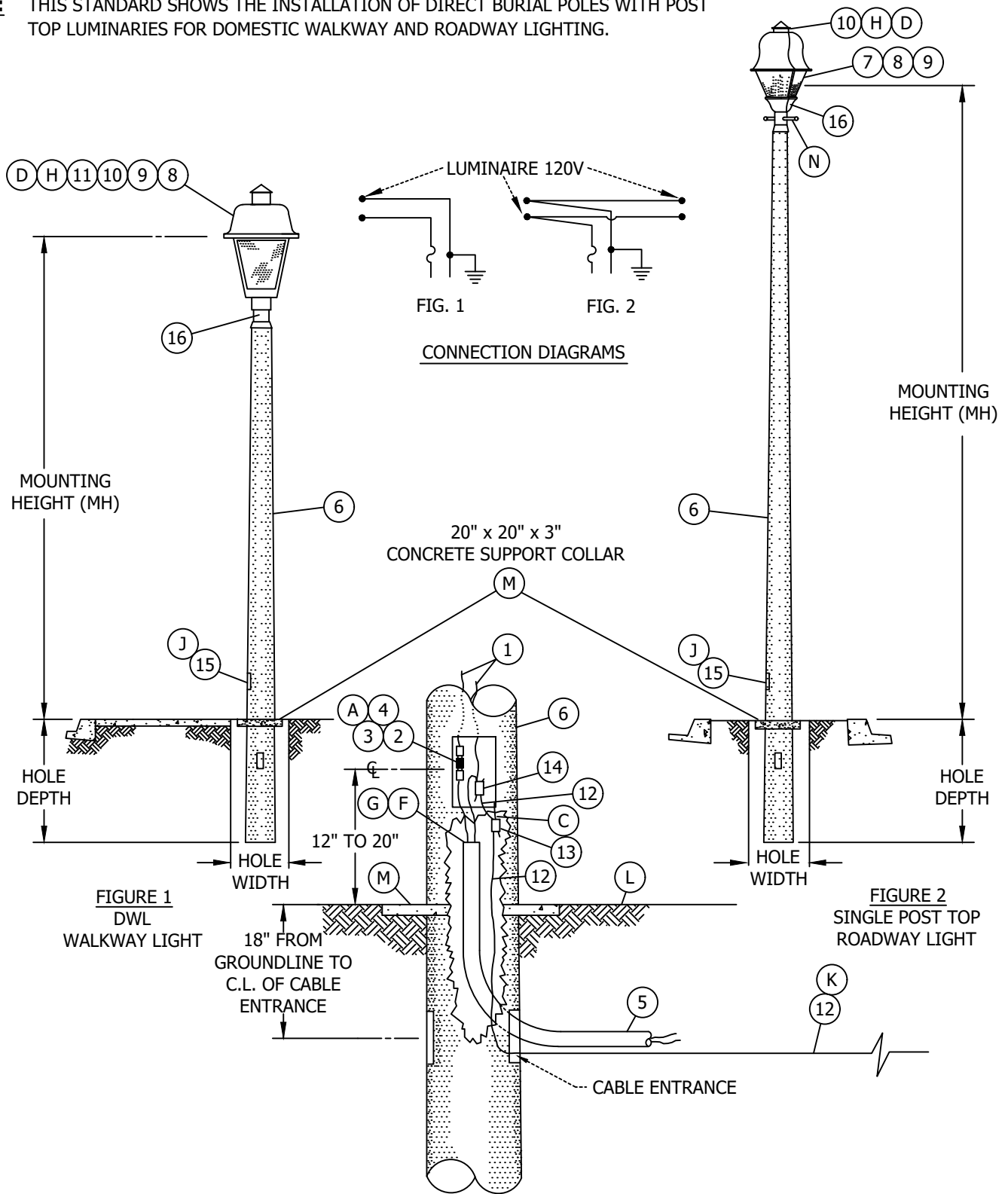
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

DIRECT BURIAL POLE INSTALLATION  
FOR DECORATIVE LUMINAIRES

UG4433.3



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF DIRECT BURIAL POLES WITH POST TOP LUMINARIES FOR DOMESTIC WALKWAY AND ROADWAY LIGHTING.



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

DIRECT BURIAL POLE INSTALLATION FOR DOMESTIC  
WALKWAY LIGHTING & POST TOP LUMINARIES

UG4434.1



TABLE 1:

| FIGURE | LUMINAIRE                | OVERALL<br>POLE<br>LENGTH | HOLE<br>DEPTH | HOLE<br>WIDTH | ACTUAL<br>MOUNTING | STOCK<br>NUMBER |
|--------|--------------------------|---------------------------|---------------|---------------|--------------------|-----------------|
| 1      | 50W HPSV                 | 11'-0"                    | 3'-0"         | 18"           | 10'-0"             | 678108          |
| 2      | 70W, 100W &<br>150W HPSV | 20'-0"                    | 4'-0"         | 18"           | 17'-0"             | 678126          |

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION                                      | QUANTITY |          |          | STOCK NO OR<br>CONST STD |
|------|--|----------|----------|----------|--------------------------|
|      |  | FIG. 1   | FIG. 2   |          |                          |
|      |  |          | SINGLE   | DOUBLE   |                          |
| 1    | WIRE. 2 #8, 600-V ALUMINUM                       | 9'       | 16'      | 16' (2)  | 196176                   |
| 2    | HOLDER, FUSE                                     | 1        | 1        | 1        | 443392                   |
| 3    | CARTRIDGE, FUSE, DUAL ELEMENT, 10A, 250V         | 1        | 1        | 1        | 363936                   |
| 4    | FUSE, LIMITRON, 20A, 600V                        | --       | --       | 1        | 366128                   |
| 5    | WIRE, 2 #8, 600V, ALUMINUM INSULATED CABLE       | AS REQ'D | AS REQ'D | AS REQ'D | 196176                   |
| 6    | POLE, DIRECT BURIAL                              | 1        | 1        | 1        | (SEE TABLE 1)            |
| 7    | LUMINAIRE, POST TOP                              | --       | 1        | 1        | STD 4423                 |
| 8    | LAMP, HPSV                                       | 1        | 1        | 2        | STD 4410                 |
| 9    | REFRACTOR, REPLACEMENT                           | 1        | 1        | 2        | STD 4411                 |
| 10   | CONTROL, PHOTO ELECTRIC, 105-285 VOLT, 1000 WATT | AS REQ'D | AS REQ'D | AS REQ'D | 473888                   |
| 11   | LUMINAIRE, DWL                                   | 1        | 1        | 1        | STD 4424                 |
| 12   | WIRE, BARE COPPER #2, 7 STR SOFT DRAWN (K)       | 33'      | 33'      | 33'      | 812816                   |
| 13   | CONNECTOR, COPPER COMPRESSION                    | 1        | 1        | 1        | 257792                   |
| 14   | CONNECTOR, COMPRESSION                           | 1        | 1        | 1        | 256432                   |
| 15   | TAG, POLE  | 1        | 1        | 1        | STD 4413                 |
| 16   | DECAL, STREET LIGHT MAINTENANCE IDENTIFICATION   | 1        | 1        | 2        | STD 4414                 |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                      |                           |                    |          |                     |          |
|                 | DIRECT BURIAL POLE INSTALLATION FOR DOMESTIC<br>WALKWAY LIGHTING & POST TOP LUMINARIES |                           |                    |          |                     |          |



**INSTALLATION:**

- Ⓐ ALL LUMINARIES ARE TO BE WIRED FOR 120 VOLTS.
- Ⓒ PRESTRESSED CONCRETE POLE TO CONTAIN ONE OF THREE GROUNDING METHODS.
  - 1) A #8 COPPER WIRE.
  - 2) STAINLESS STEEL BOLT TO CONNECT #6 COPPER WIRE.
  - 3) COPPER GROUND STRAP.
- Ⓓ PHOTOELECTRIC CONTROL FOR GE SALEM POST TOP UNIT IS LOCATED INSIDE THE LUMINAIRE.
- Ⓔ WHEN CONDUIT IS INITIALLY INSTALLED, IT SHALL EXTEND 2 FEET ABOVE FINAL GRADE.
- Ⓖ CUT CONDUIT NO MORE THAN 6 INCHES BELOW HANDHOLE OPENING IN THE POLE FOR FINAL INSTALLATION.
- Ⓗ FACE PHOTO CELL TO THE NORTH.
- Ⓙ ROTATE THE POLE TO LINE UP CABLE ENTRANCE WITH CONDUIT. HANDHOLE OPENING IN POLE SHALL FACE THE SIDEWALK.
- Ⓚ GROUND PRESTRESSED CONCRETE POLE ONLY BY INSTALLING 30 FEET OF GROUND WIRE IN THE TRENCH AS SHOWN IN "FIGURE 2" ON PAGE 4510.1. THE ALTERNATE METHOD OF GROUNDING IS TO INSTALL TWO 8 FOOT GROUNDRODS 6 FEET APART MINIMUM. USE #6 BARE STRANDED SOFT DRAWN COPPER WIRE TO ATTACH THE RODS TO POLE.
- Ⓛ NATURAL SPOIL WITH  $\frac{3}{4}$  INCH MAXIMUM AGGREGATE, SAND, DECOMPOSED GRANITE,  $\frac{3}{4}$  INCH MAXIMUM AGGREGATE, OR POLESET (LISTED IN ORDER OF LEAST EXPENSE) MAYBE BE USED AS BACKFILL.
- Ⓜ CONCRETE SUPPORT COLLAR TO BE POURED IN PLACE.
- Ⓝ THIS LUMINAIRE SHALL BE INSTALLED SO THAT THE LADDER ARM IS PARALLEL TO THE CURB.

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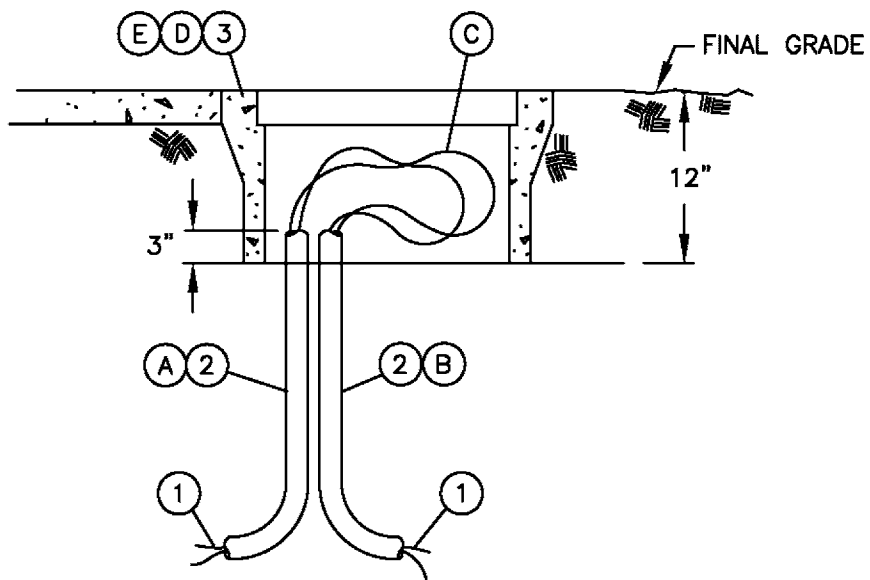
DIRECT BURIAL POLE INSTALLATION FOR DOMESTIC  
WALKWAY LIGHTING & POST TOP LUMINARIES

**UG4434.3**



**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION AND CONNECTIONS FOR THE NO. 3-1/2 HANDHOLE USED WHEN INSTALLING STREET LIGHTS OWNED BY THE CITY OF SAN DIEGO.

NO. 3-1/2 HANDHOLE  
INSTALLATION



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                       | QUANTITY | STOCK NO. | ASSEMBLY UNITS |
|------|-----------------------------------|----------|-----------|----------------|
| 1    | WIRE, #8XLPE, 600V ALUMINUM CABLE | AS REQ'D | 196176    | U/2-#8         |
| 2    | 1" POLYETHYLENE CONDUIT           | AS REQ'D | 249630    | 1" PE          |
| 3    | NO. 3-1/2 HANDHOLE                | 1        | *         | 31/2PB         |

**INSTALLATION:**

- (A) 1" POLYETHYLENE CONDUIT FROM SERVICE POINT.
- (B) 1" POLYETHYLENE CONDUIT TO STREET LIGHT.
- (C) NO CONNECTIONS ARE REQUIRED IF ONLY ONE STREET LIGHT IS CONNECTED TO SERVICE POINT. LOOP CABLE THROUGH HANDHOLE TO SERVICE POINT.

**REFERENCE:**

- (D) SEE STANDARD 3308 FOR HANDHOLE DIMENSIONS.
- (E) SEE STANDARD 3308.1 FOR EXCAVATION DIMENSIONS.

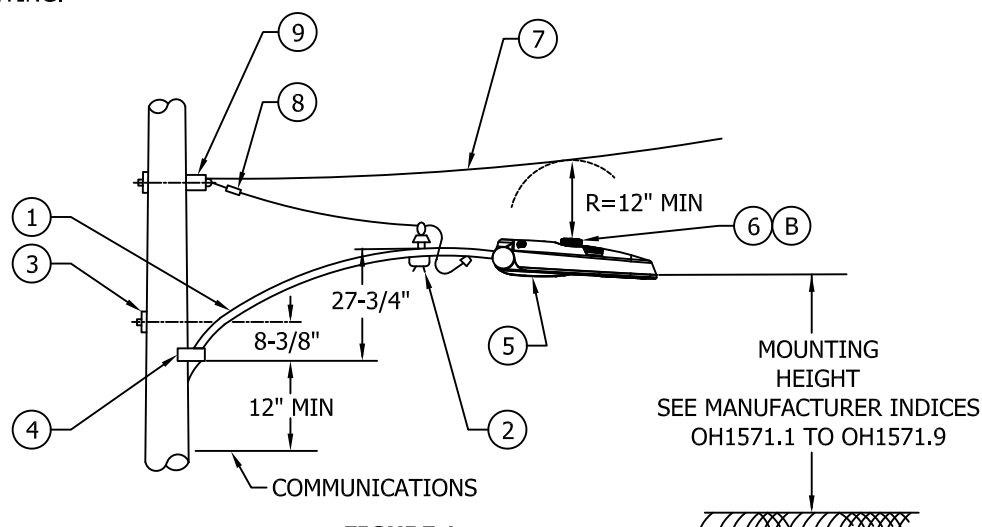
\* HANDHOLE SUPPLIED BY CITY OF SAN DIEGO.

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|---------------|---|--------------------|----------|--|
| 4435          | SDG&E ELECTRIC STANDARDS                            |                    |          | REVISION                               |
|               | HANDHOLE<br>(INSIDE DIMENSIONS - 10-1/4" X 15-3/8") |                    |          | DATE 1-1-98<br>APPD <i>[Signature]</i> |



**SCOPE:** THIS STANDARD SHOWS TYPICAL LED STREET LIGHT CONSTRUCTION INSTALLED ON WOOD, STEEL, OR FIBERGLASS POLES TO PROVIDE ROADWAY LIGHTING.



**FIGURE 1**  
6'-0" ARM INSTALLATION

**TABLE 1**

| LED FIXTURES             |              |                  |                                       |
|--------------------------|--------------|------------------|---------------------------------------|
| LUMENS<br>(IN THOUSANDS) | MANUFACTURER | STANDARD<br>PAGE | STOCK NUMBER                          |
| 0-5L                     | GE           | 1571             | S473100, S473102, S473104             |
|                          | CREE         | TBD              | S473132, S473136, S473138,<br>S473140 |
|                          | ACCUITY      | TBD              | TBD                                   |
| 6-10L                    | GE           | 1571             | S473106, S473108                      |
|                          | CREE         | TBD              | S473130, S473134, S473142             |
|                          | ACCUITY      | TBD              | TBD                                   |
| 11-15L                   | GE           | 1571             | S473112, S473114                      |
|                          | CREE         | TBD              | S473144                               |
|                          | ACCUITY      | TBD              | TBD                                   |
| 20-25L                   | GE           | 1571             | S473110                               |
|                          | CREE         | TBD              | S473146                               |
|                          | ACCUITY      | TBD              | TBD                                   |

## INSTALLATION:


- A. ITEMS REQUIRED FOR SECONDARY LINE ARM CONSTRUCTION.

(B) FACE PHOTO CELL TO THE NORTH.

- C. UTILIZE LEVELING FEATURE WITHIN FIXTURE PER MANUFACTURER'S SPECIFICATIONS BEFORE ENERGIZING.

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| SHEET<br>1 OF 2 | Indicates Latest Revision                      | Completely Revised |  | New Page | Information Removed | OH1570.1<br>UG4470.1 |
|                 | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                    |   |          |                     |                      |
|                 | ROADWAY LED LIGHTING<br>INSTALLATION           |                    |   |          |                     |                      |



### BILL OF MATERIALS:

| ITEM | DESCRIPTION   |   | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|---|----------|---------------|--------------|--------------|
| 1    | BRACKET, UPSWEEP, 2" DIA, 6'-0"   |   | 1        | -             | S167264      | TBD          |
| 2    | BRACKET, SERVICE INSULATOR  |   | 1        | OH631         | S166880      | TBD          |
| 3    | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ.), 2 SQ. WASHERS & 1 DOUBLE COIL SPRING WASHER. |   | 1        | OH392         | -            | -            |
| 4    | A   | SCREW, LAG, 1/2" X 4" (WOOD POLES ONLY) (I) | 2        | -             | S621568 (X)  | -            |
|      | B   | BLIND NUT, 1/2" (STEEL POLES ONLY) (I)      | 2        | OH392         | S503460 (X)  | -            |
| 5    | LIGHTING FIXTURE  |   | 1        | (b)           | -            | -            |
| 6    | CONTROL, PHOTOELECTRIC, TWISTLOCK BASE 105-285 VOLT                                     |   | 1        | OH1512        | S273884      | TBD          |
| 7    | WIRE, COPPER #8 600V, FLEXIBLE POLYETHYLENE INSULATED DUPLEX                            |   | 10'-0"   | -             | S811776      | TBD          |
| 8    | CONNECTOR, WIRE   |   | 2        | OH783-787     | -            | -            |
| 9    | CLEVIS, SECONDARY, DEADEND  |   | 1        | -             | S235488      | TBD          |

**NOTES:**

- ☐ THE BLIND NUT AND LAG SCREW ARE OPTIONAL FOR ATTACHING SUPPORT BRACE TO POLE.  
☒ THIS ITEM IS EXEMPT.

**REFERENCE:**

- a. SEE OVERHEAD CONSTRUCTION STANDARD 1509 FOR G.O. 95 MINIMUM CLEARANCE REQUIRED FOR STREET LIGHT INSTALLATIONS.
- b. SEE OVERHEAD CONSTRUCTION STANDARD 1571.1 FOR CREE PRODUCT INDEX, 1571.2 FOR GENERAL ELECTRICAL (GE) PRODUCT INDEX, AND 1571.3 FOR ACCUITY PRODUCT INDEX.
- c. UNDERGROUND INSTALLATIONS SHOULD REFER TO UNDERGROUND CONSTRUCTION STANDARD 4431.

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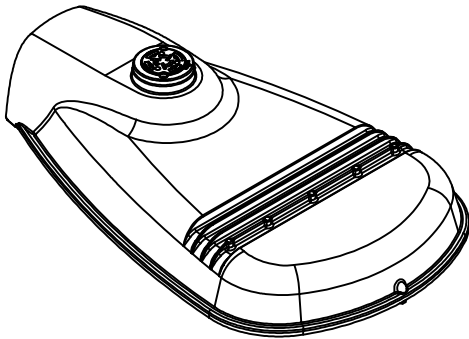
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| A               | ORIGINAL ISSUE | JKL  | JES                       | CZH  | 8/20/2019 | D                  |        |          |      |                     |      |                      |
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|                 |                | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                           |      |           |                    |        |          |      |                     |      |                      |
|                 |                | ROADWAY LED LIGHTING<br>INSTALLATION           |                           |      |           |                    |        |          |      |                     |      |                      |



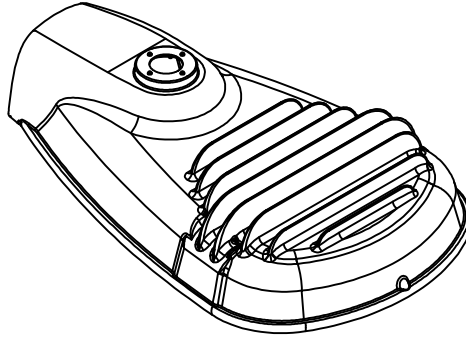
**SCOPE:** THIS STANDARD SHOWS GE LED FIXTURES USED TO PROVIDE ROADWAY LIGHTING.

**TABLE 1**

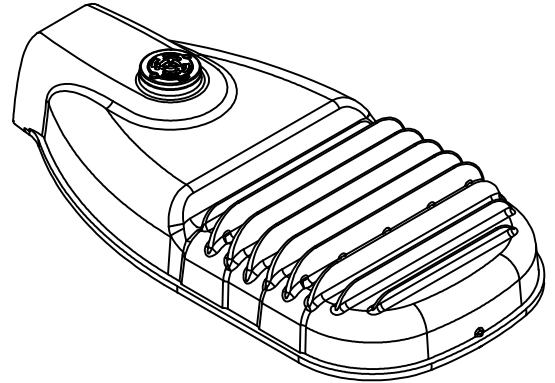
| GE LED FIXTURE INDEX  |             |                 |         |                      |              |               |   |
|-----------------------|-------------|-----------------|---------|----------------------|--------------|---------------|---|
| DESCRIPTION           | DESIGN UNIT | MOUNTING HEIGHT | WATTAGE | STANDARD PAGE        | STOCK NUMBER | FIGURE DETAIL | HPSV/LPSV EQUIVALENT STOCK NUMBERS<br>a b |
| 2KL ERL1 TYPE II WIDE | LC14GE      | 26'             | 14      | OH 1571 SHEETS 4-5   | S473100      | 1             | S473800                                   |
| 4KL ERL1 TYPE II WIDE | LC31GE      | 26'             | 31      | OH 1571 SHEETS 6-7   | S473102      | 1             | S473400                                   |
| 5KL ERL1 TYPE II WIDE | LC39GE      | 26'             | 39      | OH 1571 SHEETS 8-9   | S473104      | 1             | S473802<br>S473402                        |
| 8KL ERL1 TYPE II WIDE | LC78GE      | 30'             | 71      | OH 1571 SHEETS 10-11 | S473106      | 1             | S473404<br>S473804                        |
| 10KL ERL1 TYPE III    | LC99GE      | 30'             | 97      | OH 1571 SHEETS 12-13 | S473108      | 1             | S473406                                   |
| 20KL ERL2 TYPE III    | LC174G      | 35'             | 174     | OH 1571 SHEETS 14-15 | S473110      | 3             | S473410                                   |
| 11KL ERLH TYPE IV     | LC96GE      | 30'             | 98      | OH 1571 SHEETS 16-17 | S473112      | 2             | S473806                                   |
| 15KL ERLH TYPE III    | LC136G      | 30'             | 136     | OH 1571 SHEETS 18-19 | S473114      | 2             | S473408                                   |



**FIGURE 1**  
ERL1



**FIGURE 2**  
ERLH



**FIGURE 3**  
ERL2

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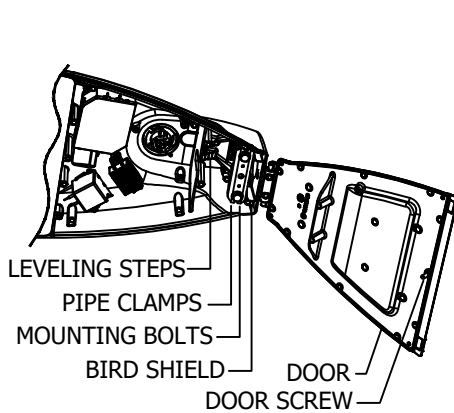
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|-----|----------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
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| SHEET<br>1 OF 21 | <div>X</div>   | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1571.1<br>UG4471.1 |
|                  | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS         |                           |                    |          |                     |                      |
|                  | ROADWAY LED LIGHTING FIXTURES<br>GE MANUFACTURER INDEX |                           |                    |          |                     |                      |

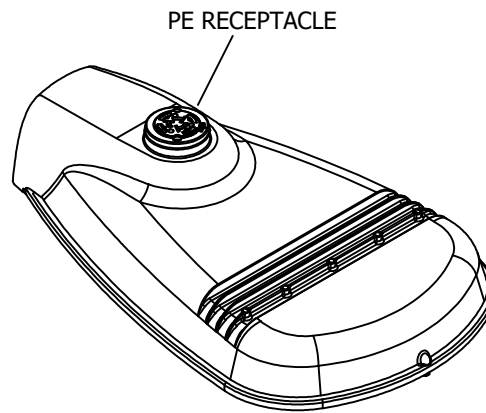


## INSTALLATION:

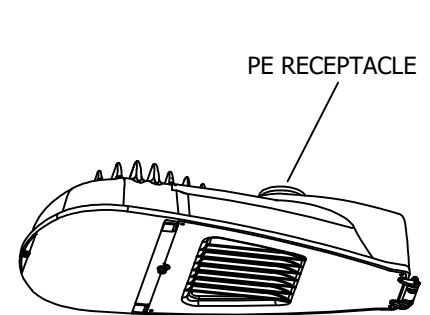
- A. **HPSV/LPSV CONVERSION TO LED:** REMOVE AND REPLACE ENTIRE HPSV OR LPSV STREET LIGHTING FIXTURE AND BALLAST AND REPLACE WITH EQUIVALENT LED FIXTURE SHOWN IN TABLE 1.
- B. **MECHANICAL INSTALLATION OF FIXTURE**
- 1. BIRD SHIELDS:** THE BIRD SHIELD BEHIND THE PIPE CLAMP HAS A 1 1/4" (1.660 OD) OPENING. REMOVE SHIELD IF LARGER PIPE IS USED. SEE **FIGURE 4**.
  - 2. MOUNTING ARM:** UNFASTEN, OPEN AND REMOVE DOOR FROM HINGE CRADLE. ADJUST PIPE CLAMP OPENING SLIGHTLY LARGER THAN PIPE SIZE. INSERT MOUNTING ARM THROUGH BIRD-SHIELD (IF USED) AND INTO THE LUMINAIRE UNTIL IT HITS THE LEVELING-STEPS EXTENDING FROM TOP OF HOUSING. SEE **FIGURE 4**.
  - 3. LEVELING:** TILT THE LUMINAIRE UP OR DOWN USING LEVELING-STEPS. TO LEVEL, HOLD LUMINAIRE APPROXIMATELY LEVEL AND SNUG UP BOLTS. ONCE LEVEL, TIGHTEN EACH MOUNTING BOLT ALTERNATING BETWEEN BOLTS. REFER TO INSTALLATION INSTRUCTIONS FOR BOLT TORQUES. DO NOT OVERTIGHTEN BOLTS.
    - IF UPWARD TILT IS NEEDED, LOOSEN BOLTS SLIGHTLY, LIFT LUMINAIRE AND INSERT IT TO THE NEXT SET OF STEPS.
    - IF DOWNWARD TILT IS NEEDED, EXTRACT THE MOUNTING ARM FROM LUMINAIRE TO SIT ON THE REARWARD STEPS. SEE **FIGURE 4**.
  - 4. REFERENCE ELECTRICAL CONNECTIONS** SECTION FOR COMPLETING ELECTRICAL CONNECTIONS.
  - 5. PHOTOELECTRIC CONTROL:** ORIENT THE PHOTOELECTRIC (PE) RECEPTACLE SO THAT THE WORD "NORTH" IS DIRECTED TRUE NORTH. SEAT AND LOCK THE PE CONTROL/RECEPTACLE AND ROTATE CLOCKWISE UNTIL WORD "NORTH" IS TRUE NORTH. LOWER PE RECEPTACLE INTO POSITION SEE **FIGURE 5 & 6**.
  - 6. FINAL ASSEMBLY:** DOOR INTERLOCKS WITH TOP HOUSING IN ALL POSITIONS EXCEPT IN VICINITY OF REMOVAL LOCATION. DOORS ARE DESIGNED TO BE ASSEMBLED TO TOP HOUSING WHILE IN UPRIGHT POSITION. TO REPLACE DOOR, HOLD SLIGHTLY PAST VERTICAL AND TOWARD POLE-SIDE OF HINGE. INSERT HINGE PIN INTO HINGE CRADLE AND LOWER DOOR TO HANG FREE.



**FIGURE 4**  
INTERNAL VIEW



**FIGURE 5**  
TOP VIEW



**FIGURE 6**  
BOTTOM VIEW

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

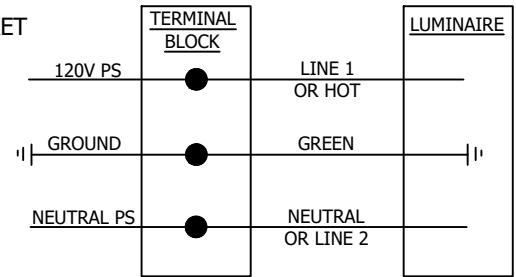
ROADWAY LED LIGHTING FIXTURES  
INSTALLATION

OH1571.2  
UG4471.2



### C. ELECTRICAL CONNECTIONS OF FIXTURE

1. MAKE ALL CONNECTIONS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL CODE REQUIREMENTS INCLUDING GROUNDING. VERIFY SUPPLY VOLTAGE MATCHES NAMEPLATE RATING. USE #6 THRU #16 AWG SERVICE LEADS AND MATCH THE NAMEPLATE'S SERVICE LEAD TEMPERATURE RATING. EXTEND SERVICE LEADS APPROXIMATELY 7 INCHES PAST PIPE/MOUNTING BRACKET END.
2. ATTACH SERVICE LEADS TO TERMINAL BLOCK AS SHOWN ON THE WIRING SCHEMATIC. SEE DIAGRAM **DIAGRAM 1**.
3. DIMMING CONTROL INSTRUCTIONS ARE FOR REFERENCE SINCE LUMENS SETTINGS ARE PRESET BY MANUFACTURER FOR ALL STOCK FIXTURES. FOR WIRED DIMMING CONTROLS, ATTACH DIMMING LEADS PER WIRING SCHEMATIC. REFER TO INSTALLATION INSTRUCTIONS FOR BOLT TORQUES. DO NOT OVER TIGHTEN BOLT. SEE **DIAGRAM 2**.



**DIAGRAM 1**  
WIRING SCHEMATIC

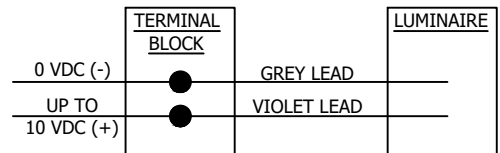
**BILL OF MATERIALS:** NONE

### NOTES:

- ① THIS IS A REPRODUCTION OF MANUFACTURER DATA; SEE SHEET 21 NOTE ③.

### REFERENCES:

- a SEE OVERHEAD FIELD MAINTENANCE ONLY SECTION 1500 FOR HPSV AND LPSV FIXTURE DETAILS.
- b SOME FIXTURES ARE NO LONGER AVAILABLE.



**DIAGRAM 2**  
DIMMING CONTROL SCHEMATIC

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

ROADWAY LED LIGHTING  
INSTALLATION

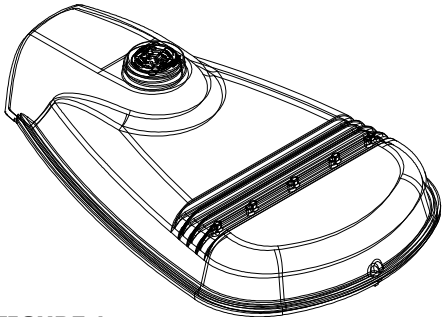
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OH1571.3  
UG4471.3

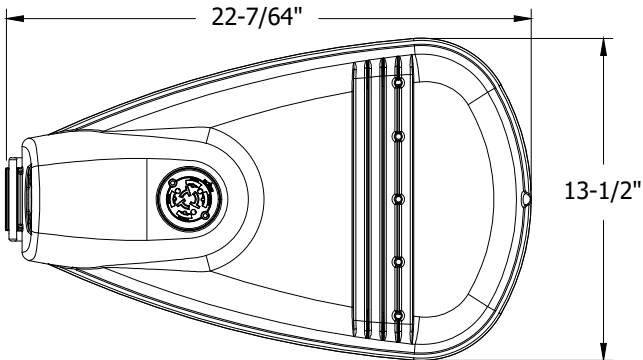


**SCOPE:** THIS STANDARD SHOWS VARIOUS GE EVOLVE LED ROADWAY LIGHTING FIXTURES

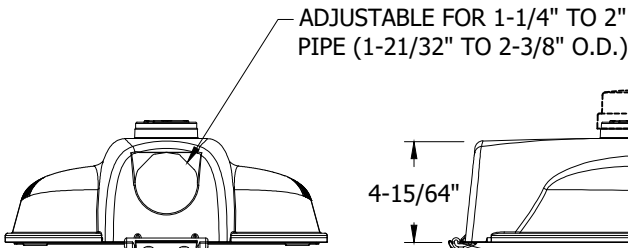
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1571.21



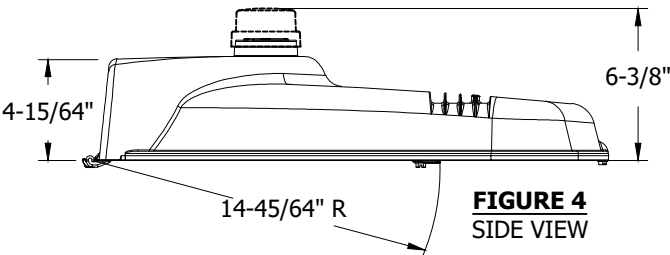
**FIGURE 1**  
ISOMETRIC



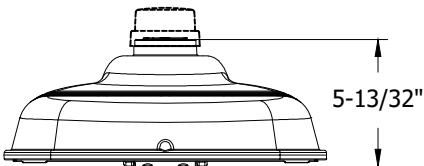
**FIGURE 2**  
TOP VIEW



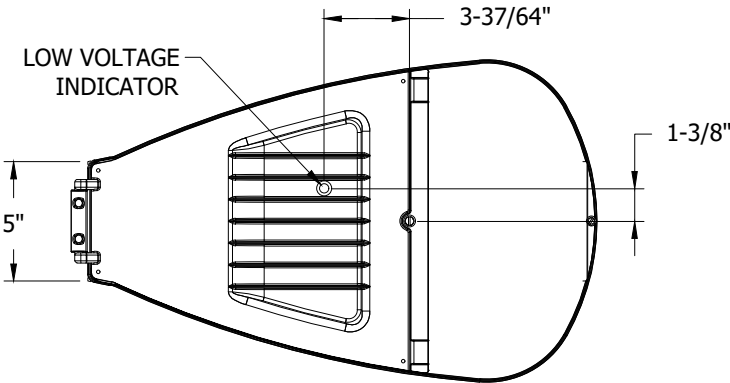
**FIGURE 3**  
BACK VIEW



**FIGURE 4**  
SIDE VIEW



**FIGURE 5**  
FRONT VIEW



**FIGURE 6**  
BOTTOM VIEW

**TABLE 1**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473100      | GE/ERL1                 | 1900L          | 3000K             | 15.5 LBS    | SEE LUMINAIRE EPA TABLE | TYPE II WIDE      | LC14GE       |

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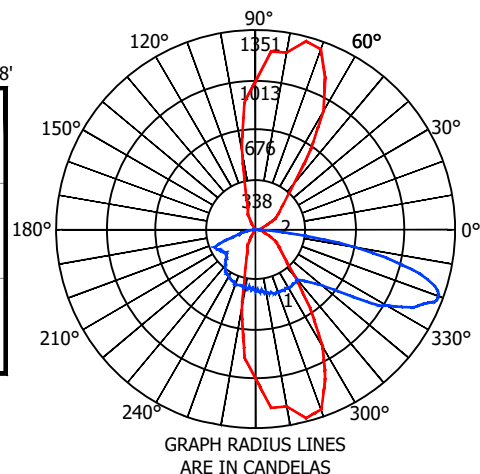
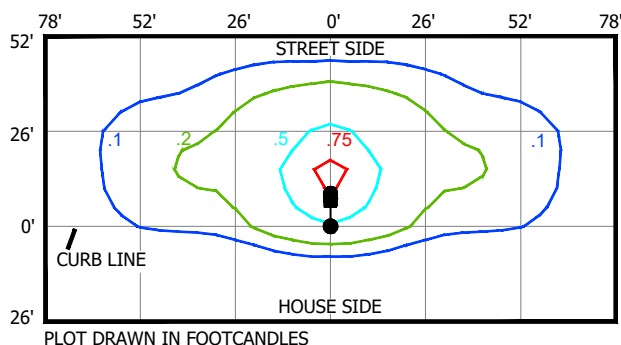
|                  |   |   |   |  |                      |
|------------------|---|---|---|--|----------------------|
| SHEET<br>4 OF 21 | <div><div>X</div><div>Indicates Latest Revision</div></div> | <div><div></div><div>Completely Revised</div></div> | <div><div></div><div>New Page</div></div> | <div><div></div><div>Information Removed</div></div> | OH1571.4<br>UG4471.4 |
|                  | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS              |   |   |  |                      |
|                  | GE EVOLVE ROADWAY LIGHTING<br>2KL FIXTURE                   |   |   |  |                      |



## PHOTOMETRIC DIAGRAMS

### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

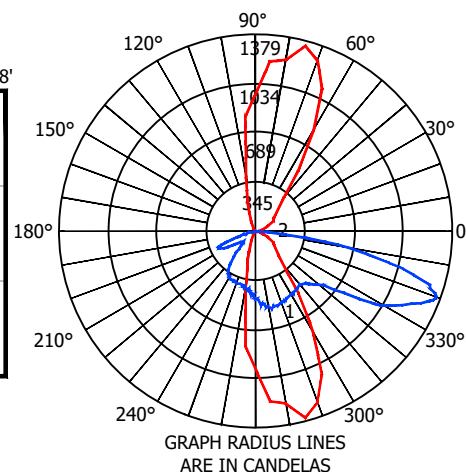
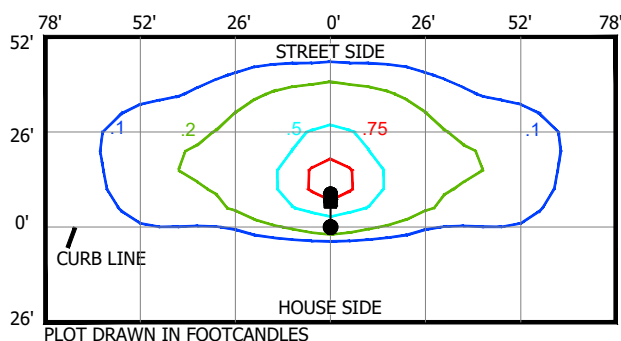
LUMENS: 1900  
WATTS: 14  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_02B330\_\_\_\_-120V.IES



### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 1800  
WATTS: 14  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_02B330\_\_\_\_-120V-ELSHS-  
ERL1-BLCK.IES

SEE SHEET OH151.27 FOR BACK LIGHT SHIELD AND INSTALLATION DETAILS.



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.50   | 1.0     | 1.0      |

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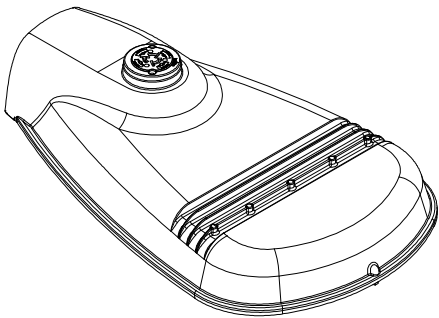
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

GE EVOLVE ROADWAY LIGHTING  
2KL FIXTURE

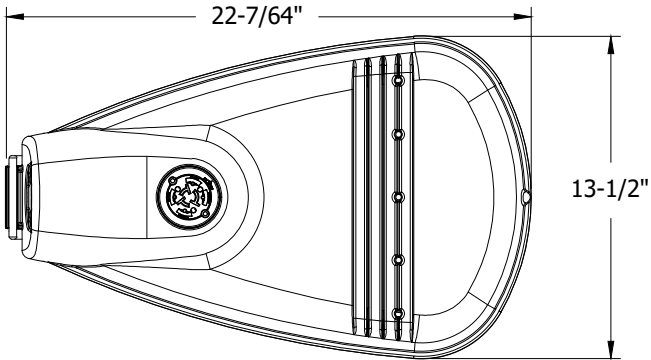
OH1571.5  
UG4471.5



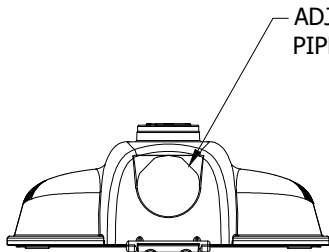
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1571.21



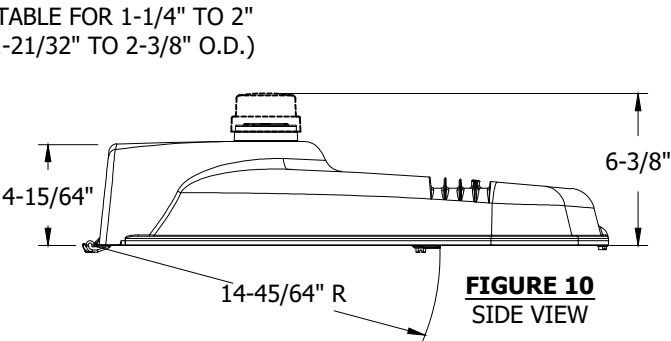
**FIGURE 7**  
ISOMETRIC



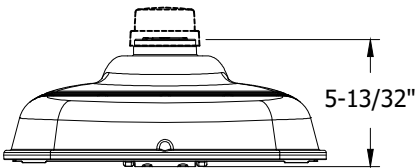
**FIGURE 8**  
TOP VIEW



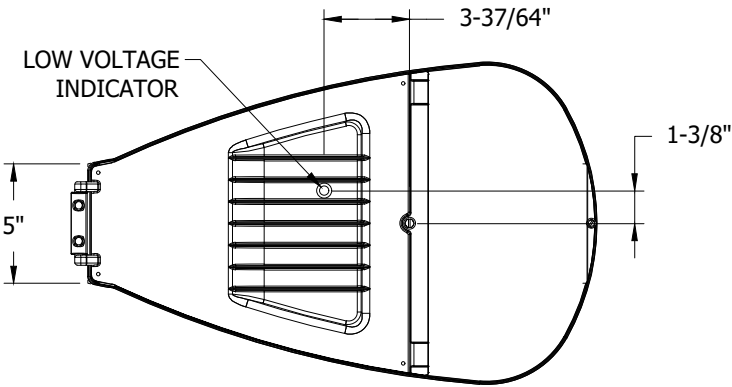
**FIGURE 9**  
BACK VIEW



**FIGURE 10**  
SIDE VIEW



**FIGURE 11**  
FRONT VIEW



**FIGURE 12**  
BOTTOM VIEW

**TABLE 2**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473102      | GE/ERL1                 | 3900L          | 3000K             | 15.5 LBS    | SEE LUMINAIRE EPA TABLE | TYPE II WIDE      | LC31GE       |

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| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

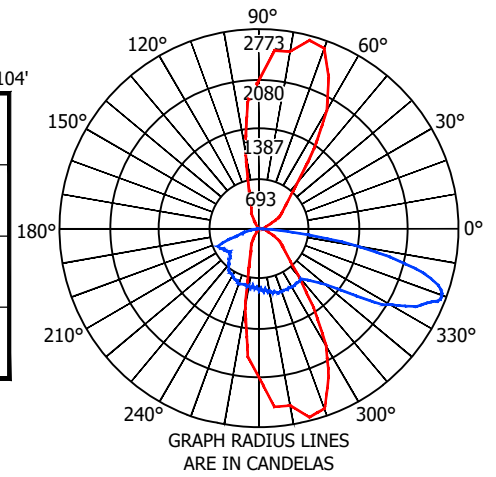
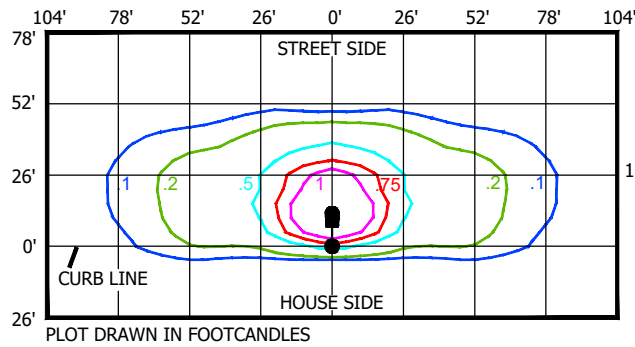
|                  |   |  |                    |  |          |  |                     |                      |
|------------------|---|--|--------------------|--|----------|--|---------------------|----------------------|
| SHEET<br>6 OF 21 | <div><div>X</div><div>Indicates Latest Revision</div></div> |  | Completely Revised |  | New Page |  | Information Removed | OH1571.6<br>UG4471.6 |
|                  | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS              |  |                    |  |          |  |                     |                      |
|                  | GE EVOLVE LED ROADWAY LIGHTING<br>4KL FIXTURE               |  |                    |  |          |  |                     |                      |



## PHOTOMETRIC DIAGRAMS

### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

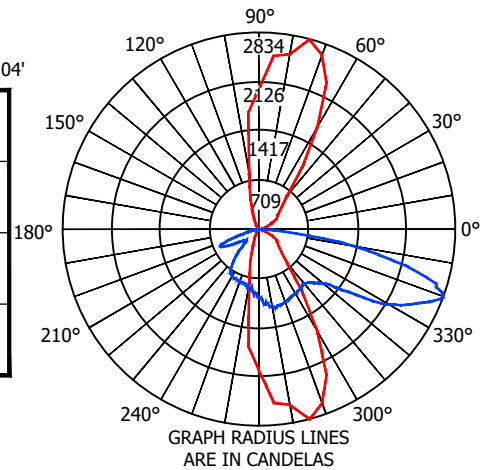
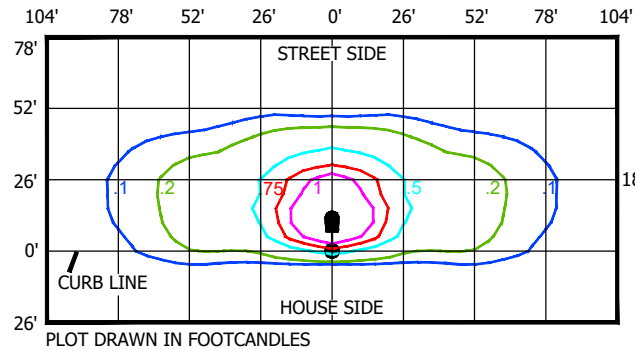
LUMENS: 3900  
WATTS: 31  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_04B330\_\_\_\_-120-277V.IES



### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 3700  
WATTS: 31  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_4B330\_\_\_\_-120-277V-ELSHS  
-ERL1-BLCK.IES

SEE SHEET OH1571.27 FOR BACK LIGHT SHIELD AND INSTALLATION DETAILS



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.50   | 1.0     | 1.0      |

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| B   | EDITORIAL CHANGES | AMP | JKI | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
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Information Removed

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

GE EVOLVE LED ROADWAY LIGHTING  
4KL FIXTURE

OH1571.7  
UG4471.7



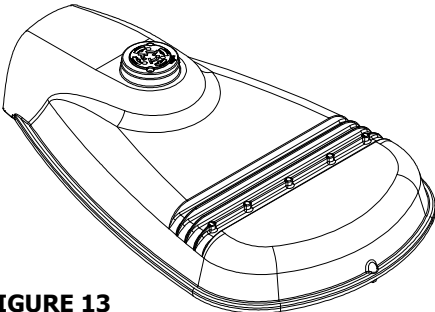


FIGURE 13  
ISOMETRIC

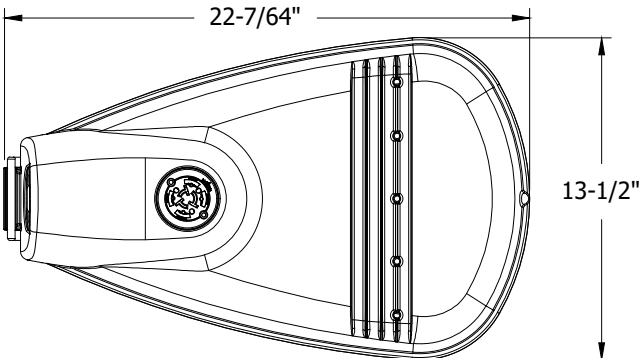


FIGURE 14  
TOP VIEW

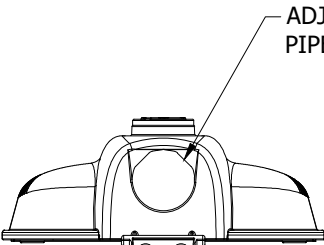


FIGURE 15  
BACK VIEW

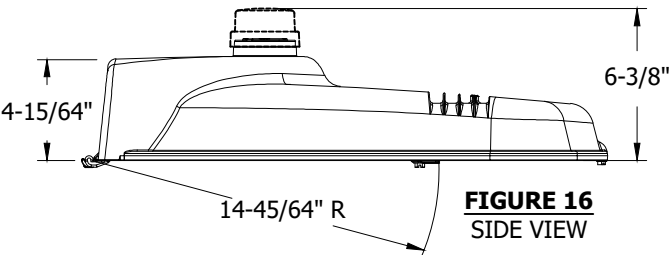


FIGURE 16  
SIDE VIEW

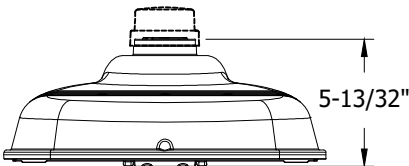


FIGURE 17  
FRONT VIEW

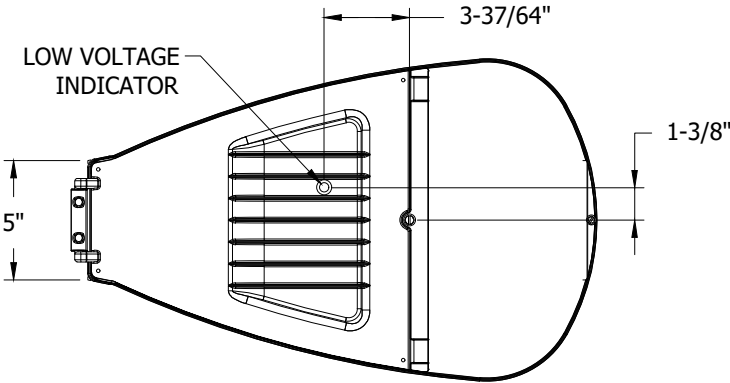


FIGURE 18  
BOTTOM VIEW

TABLE 3

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473104      | GE/ERL1                 | 4900L          | 3000K             | 15.5 LBS    | SEE LUMINAIRE EPA TABLE | TYPE II WIDE      | LC39GE       |

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| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

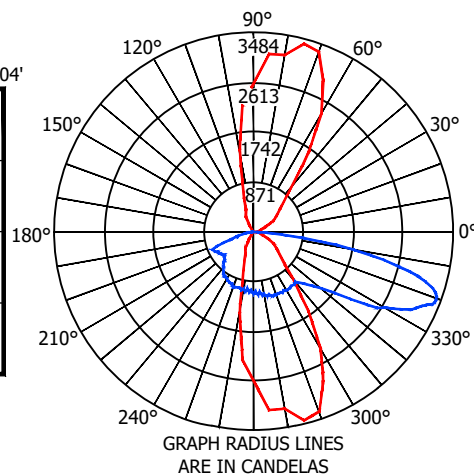
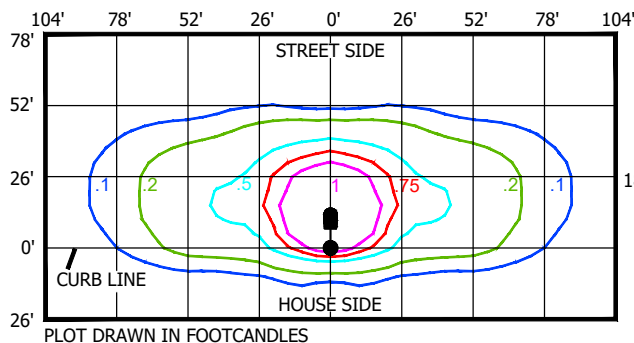
|                  |   |  |                    |  |          |  |                     |                      |
|------------------|---|--|--------------------|--|----------|--|---------------------|----------------------|
| SHEET<br>8 OF 21 | <div><div>X</div><div>Indicates Latest Revision</div></div> |  | Completely Revised |  | New Page |  | Information Removed | OH1571.8<br>UG4471.8 |
|                  | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS              |  |                    |  |          |  |                     |                      |
|                  | GE EVOLVE LED ROADWAY LIGHTING<br>5KL FIXTURE               |  |                    |  |          |  |                     |                      |



## PHOTOMETRIC DIAGRAMS

### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

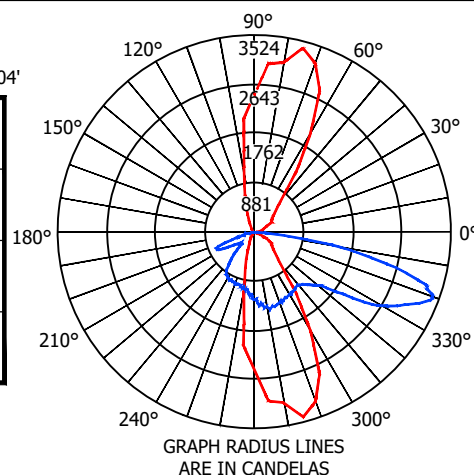
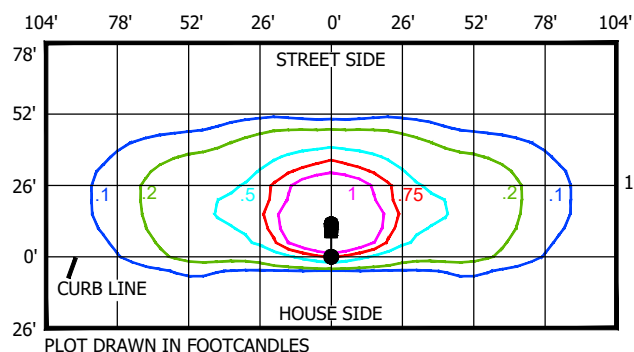
LUMENS: 4900  
WATTS: 39  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_05B330\_\_\_\_-120-277V.IES



### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 4600  
WATTS: 39  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_05B330\_\_\_\_-120-277V-ELSHS  
-ERL1-BLCK.IES

SEE SHEET OH1571.27 FOR BACK LIGHT SHIELD AND INSTALLATION DETAILS



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.50   | 1.0     | 1.0      |

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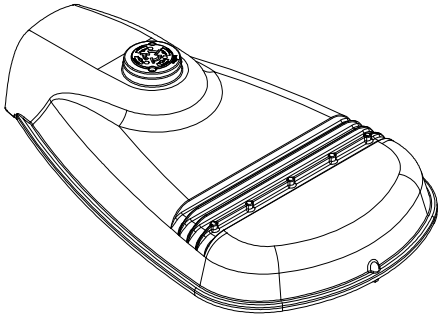
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

GE EVOLVE LED ROADWAY LIGHTING  
5KL FIXTURE

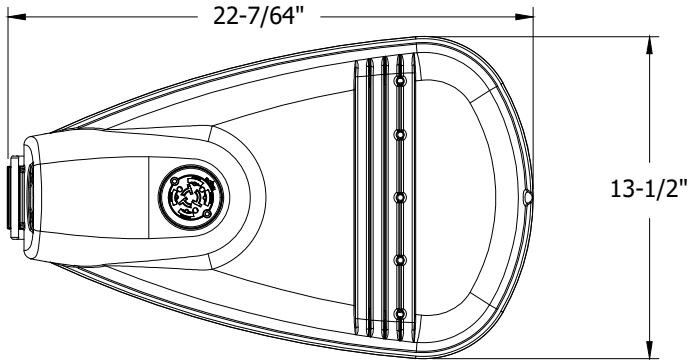
OH1571.9  
UG4471.9



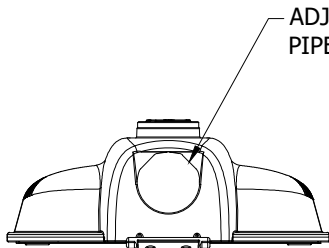
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1571.21



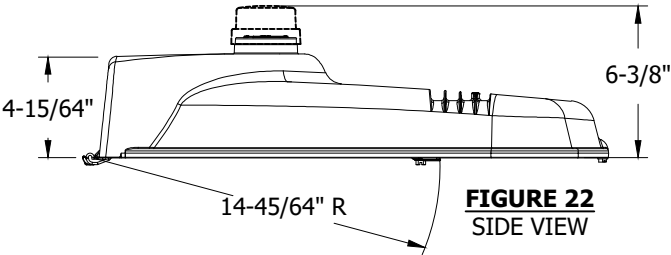
**FIGURE 19**  
ISOMETRIC



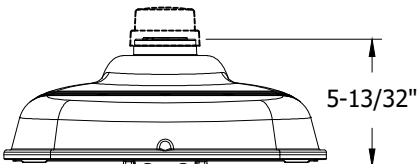
**FIGURE 20**  
TOP VIEW



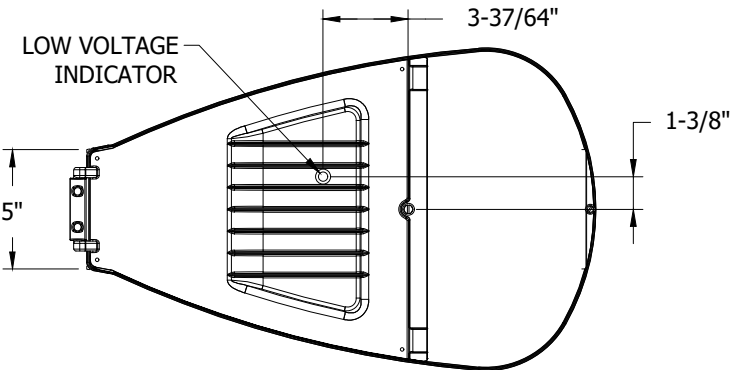
**FIGURE 21**  
BACK VIEW



**FIGURE 22**  
SIDE VIEW



**FIGURE 23**  
FRONT VIEW



**FIGURE 24**  
BOTTOM VIEW

**TABLE 4**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473106      | GE/ERL1                 | 7800L          | 3000K             | 15.5 LBS    | SEE LUMINAIRE EPA TABLE | TYPE II WIDE      | LC78GE       |

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| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

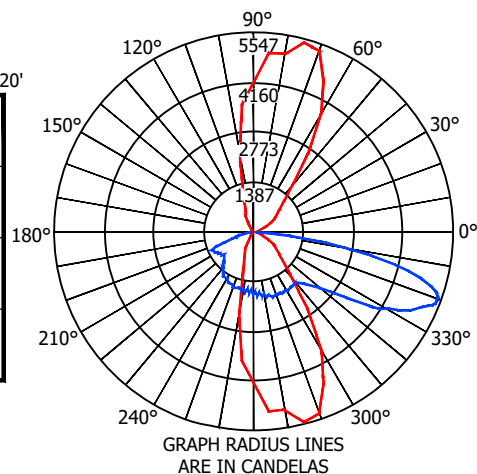
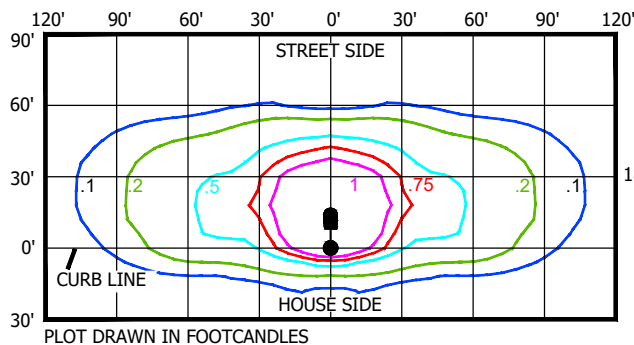
|                   |   |   |   |  |                        |
|-------------------|---|---|---|--|------------------------|
| SHEET<br>10 OF 21 | <div><div>X</div><div>Indicates Latest Revision</div></div> | <div><div></div><div>Completely Revised</div></div> | <div><div></div><div>New Page</div></div> | <div><div></div><div>Information Removed</div></div> | OH1571.10<br>UG4471.10 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS              |   |   |  |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>8KL FIXTURE               |   |   |  |                        |



## PHOTOMETRIC DIAGRAMS

### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

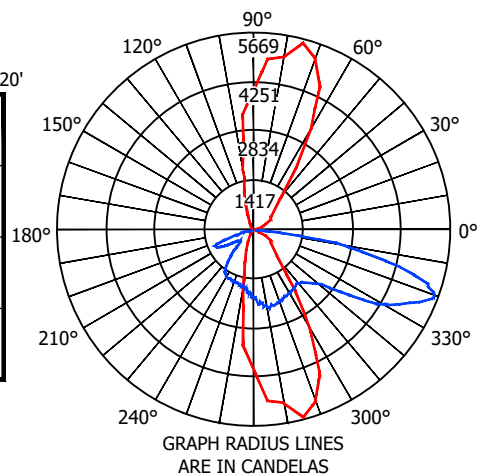
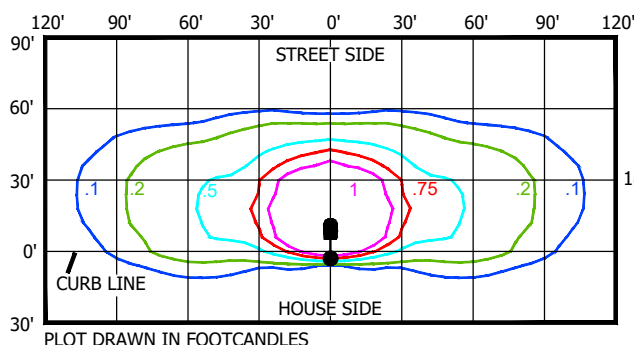
LUMENS: 7800  
WATTS: 71  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_08B330\_\_\_\_.IES



### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 7400  
WATTS: 71  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_08B330\_\_\_\_-ELSHS-ERL1-BLCK.IES

SEE SHEET OH1571.27 FOR BACK LIGHT SHIELD AND INSTALLATION DETAILS.



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.50   | 1.0     | 1.0      |

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| REV | CHANGE            | DR  | BY | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                   |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | AMP | JK | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

|                   |  |                    |          |                     |                        |
|-------------------|--|--------------------|----------|---------------------|------------------------|
| SHEET<br>11 OF 21 | Indicates Latest Revision                      | Completely Revised | New Page | Information Removed | OH1571.11<br>UG4471.11 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                    |          |                     |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>8KL FIXTURE  |                    |          |                     |                        |



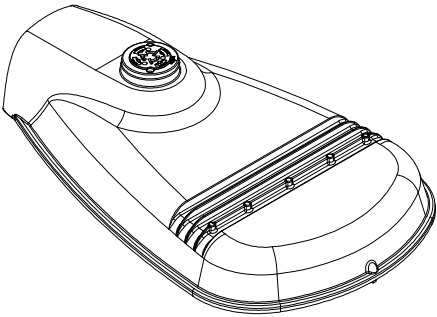


FIGURE 25  
ISOMETRIC

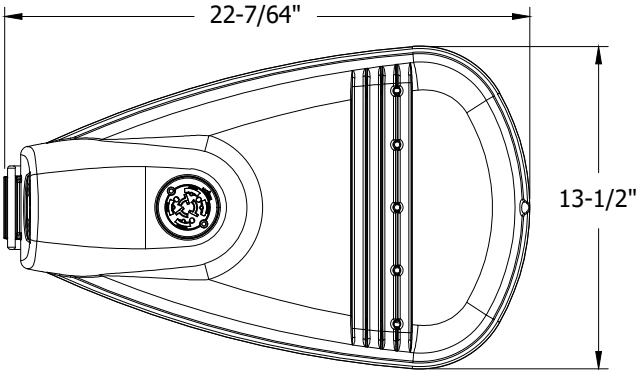


FIGURE 26  
TOP VIEW

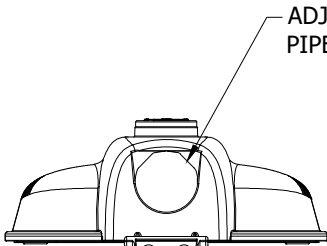


FIGURE 27  
BACK VIEW

ADJUSTABLE FOR 1-1/4" TO 2"  
PIPE (1-21/32" TO 2-3/8" O.D.)

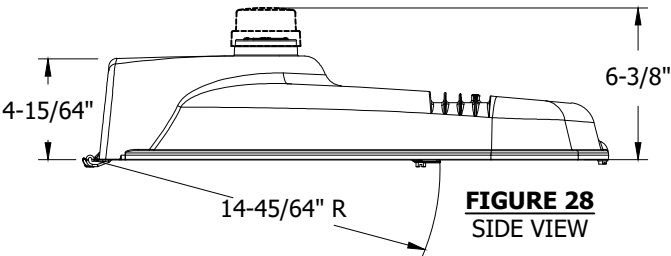


FIGURE 28  
SIDE VIEW

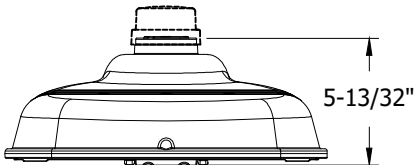


FIGURE 29  
FRONT VIEW

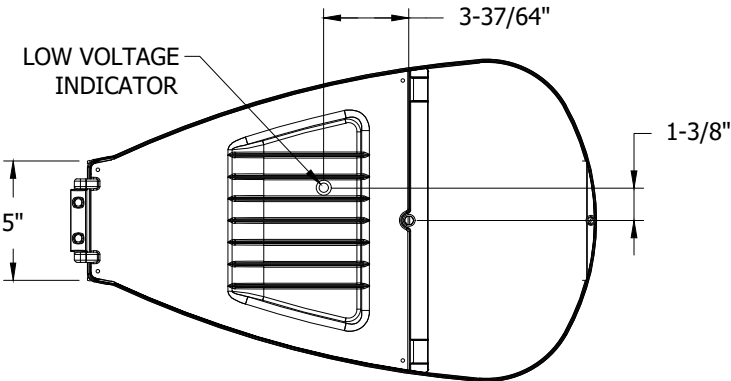


FIGURE 30  
BOTTOM VIEW

TABLE 5

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473108      | GE/ERL1                 | 9600L          | 3000K             | 15.5 LBS    | SEE LUMINAIRE EPA TABLE | TYPE III          | LC99GE       |

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| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

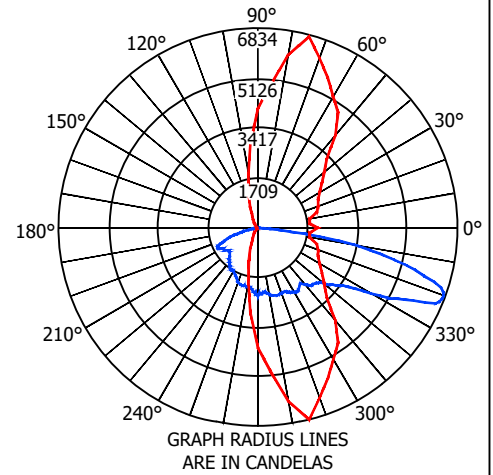
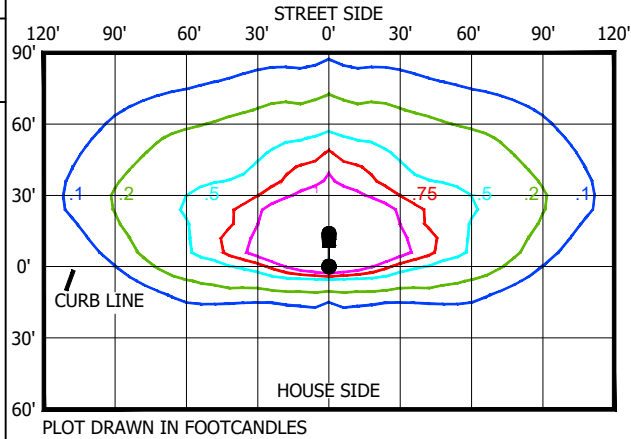
|                   |   |   |   |  |                        |
|-------------------|---|---|---|--|------------------------|
| SHEET<br>12 OF 21 | <div><div>X</div><div>Indicates Latest Revision</div></div> | <div><div></div><div>Completely Revised</div></div> | <div><div></div><div>New Page</div></div> | <div><div></div><div>Information Removed</div></div> | OH1571.12<br>UG4471.12 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS              |   |   |  |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>10KL FIXTURE              |   |   |  |                        |



## PHOTOMETRIC DIAGRAMS

### FIXTURE WITHOUT BACKLIGHT SHIELD

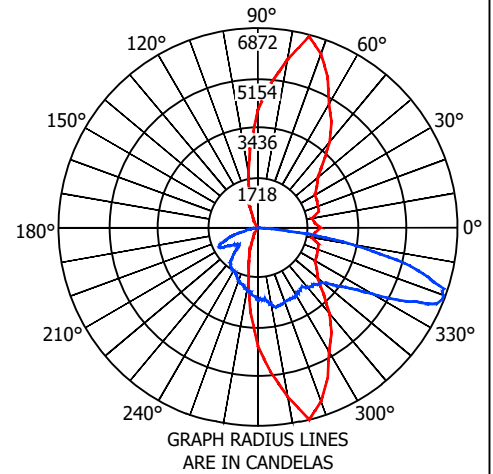
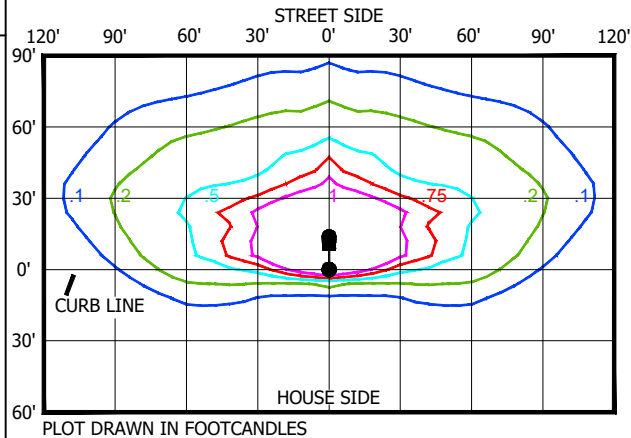
LUMENS: 9600  
WATTS: 97  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_10C330\_\_\_\_\_.IES



### FIXTURE WITH BACKLIGHT SHIELD

LUMENS: 9400  
WATTS: 97  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL1\_10C330\_\_\_\_\_-ELSHS-ERL1-  
BLCK.IES

SEE SHEET OH1571.27 FOR  
BACK LIGHT SHIELD DETAILS  
AND INSTALLATION



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL<br>TENON. CONFIG.                                      | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.50   | 1.0     | 1.0      |

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| REV | CHANGE            | DR  | BY | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                   |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | AMP | JK | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

|                   |  |                    |          |                     |                        |
|-------------------|--|--------------------|----------|---------------------|------------------------|
| SHEET<br>13 OF 21 | Indicates Latest Revision                      | Completely Revised | New Page | Information Removed | OH1571.13<br>UG4471.13 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                    |          |                     |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>10KL FIXTURE |                    |          |                     |                        |



ATTENTION: SEE NOTES & REFERENCES PAGE OH1571.21

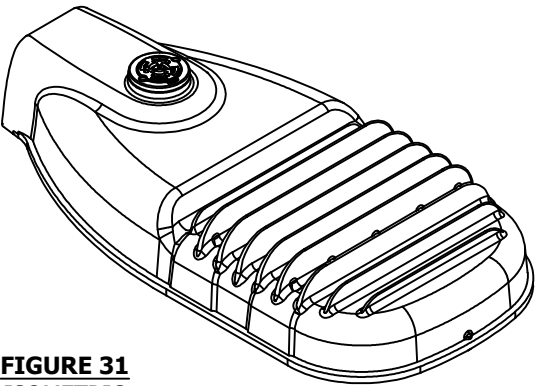


FIGURE 31  
ISOMETRIC

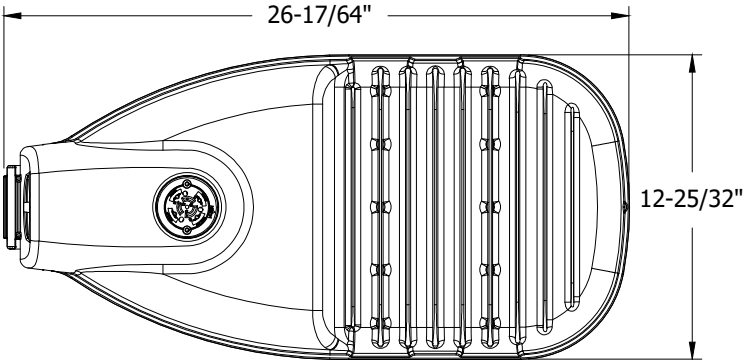


FIGURE 32  
TOP VIEW

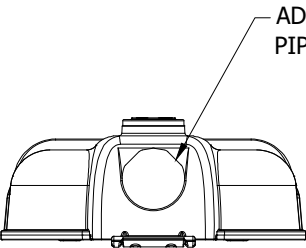


FIGURE 33  
BACK VIEW

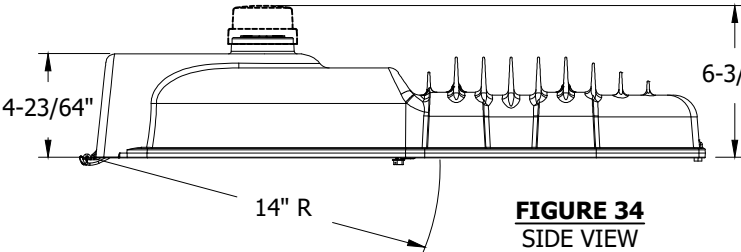


FIGURE 34  
SIDE VIEW

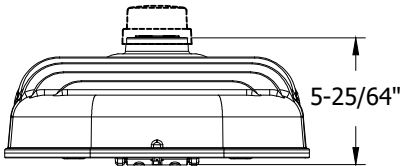


FIGURE 35  
FRONT VIEW

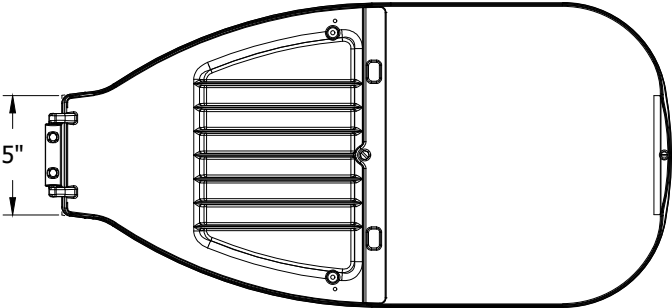


FIGURE 36  
BOTTOM VIEW

TABLE 6

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473110      | GE/ERL2                 | 20100L         | 3000K             | 24.0 LBS    | SEE LUMINAIRE EPA TABLE | TYPE III          | LC174G       |

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|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                   |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | AMP | JK | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

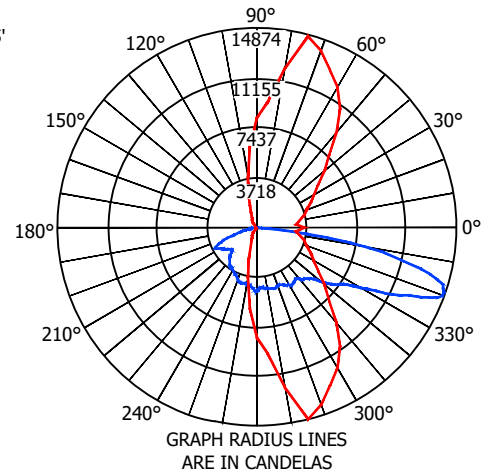
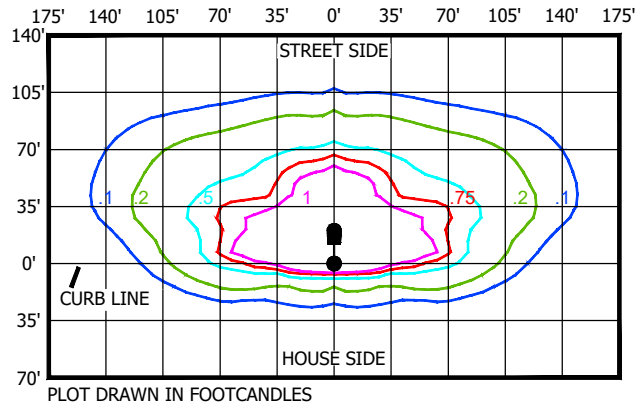
|                   |   |   |   |  |                        |
|-------------------|---|---|---|--|------------------------|
| SHEET<br>14 OF 21 | <div><div>X</div><div>Indicates Latest Revision</div></div> | <div><div></div><div>Completely Revised</div></div> | <div><div></div><div>New Page</div></div> | <div><div></div><div>Information Removed</div></div> | OH1571.14<br>UG4471.14 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS              |   |   |  |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>20KL FIXTURE              |   |   |  |                        |



## PHOTOMETRIC DIAGRAMS

### FIXTURE WITHOUT BACKLIGHT SHIELD

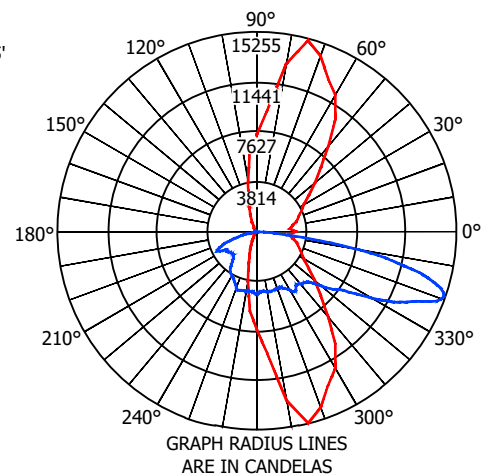
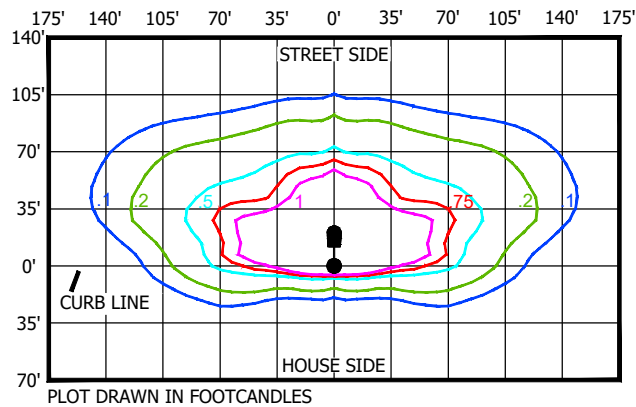
LUMENS: 20100  
WATTS: 174  
MOUNTING HEIGHT: 35'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL2\_21C330\_\_\_\_-120-277V.IES



### FIXTURE WITH BACKLIGHT SHIELD

LUMENS: 19700  
WATTS: 174  
MOUNTING HEIGHT: 35'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERL2\_21C330\_\_\_\_-120-277V-ELSHS  
-ERL2-BLCK.IES

SEE SHEET OH1571.27 FOR  
BACK LIGHT SHIELD DETAILS  
AND INSTALLATION



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL<br>TENON. CONFIG.                                      | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.57   | 1.14    | 1.14     |

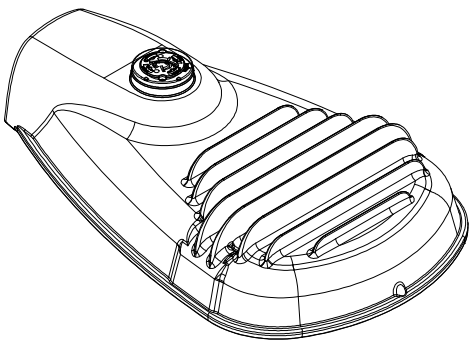
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| REV | CHANGE            | DR  | BY  | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
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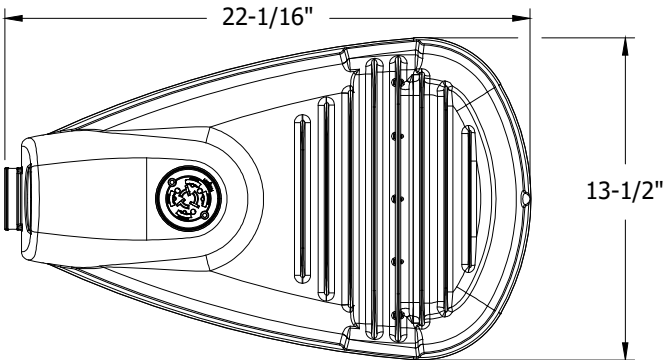
|                   |  |                    |          |                     |                        |
|-------------------|--|--------------------|----------|---------------------|------------------------|
| SHEET<br>15 OF 21 | Indicates Latest Revision                      | Completely Revised | New Page | Information Removed | OH1571.15<br>UG4471.15 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                    |          |                     |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>20KL FIXTURE |                    |          |                     |                        |



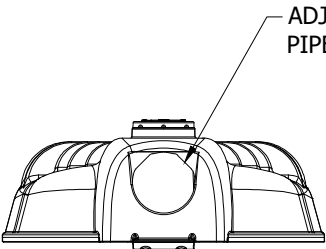
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1571.21



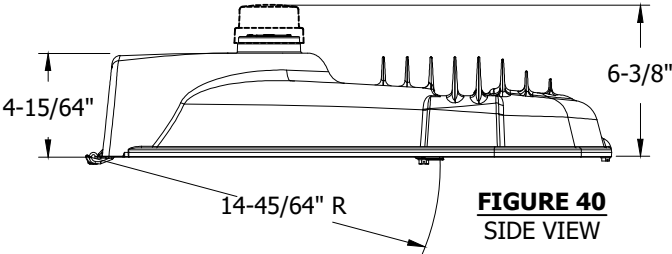
**FIGURE 37**  
ISOMETRIC



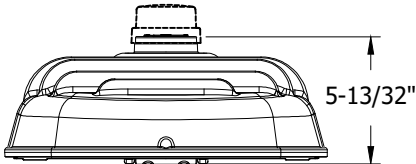
**FIGURE 38**  
TOP VIEW



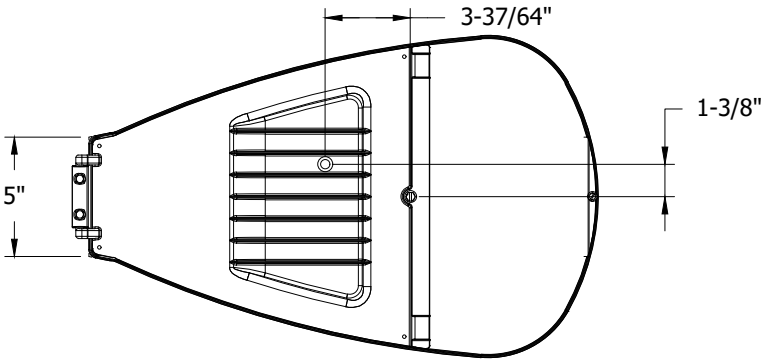
**FIGURE 39**  
BACK VIEW



**FIGURE 40**  
SIDE VIEW



**FIGURE 41**  
FRONT VIEW



**FIGURE 42**  
BOTTOM VIEW

**TABLE 7**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473112      | GE/ERLH                 | 11000L         | 3000K             | 15.15 LBS   | SEE LUMINAIRE EPA TABLE | TYPE IV           | LC96GE       |

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| REV | CHANGE            | DR  | BY | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                   |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | AMP | JK | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

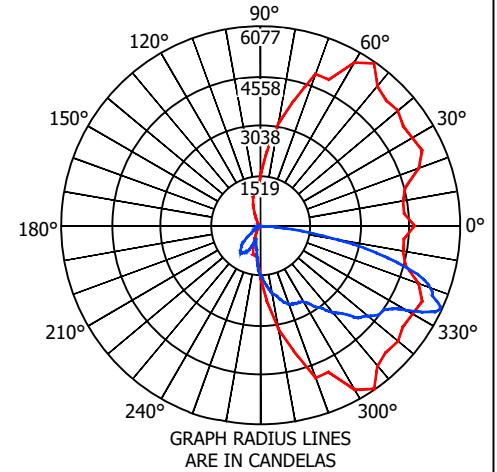
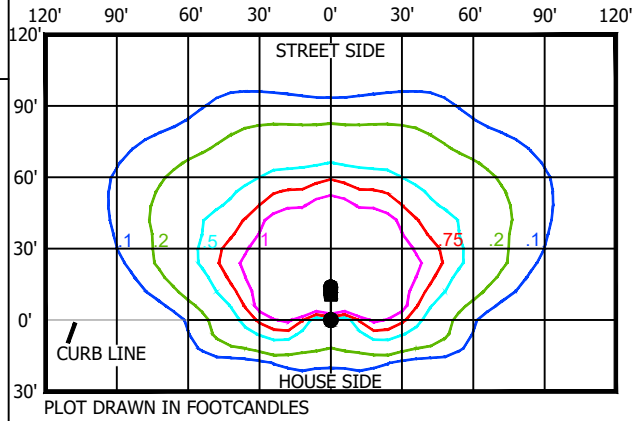
|                   |  |                           |  |                    |  |          |  |                     |                         |
|-------------------|--|---------------------------|--|--------------------|--|----------|--|---------------------|-------------------------|
| SHEET<br>16 OF 21 | X  | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed | OH 1571.16<br>UG4471.16 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |                         |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>11KL FIXTURE |                           |  |                    |  |          |  |                     |                         |



## PHOTOMETRIC DIAGRAMS

### FIXTURE WITHOUT BACKLIGHT SHIELD

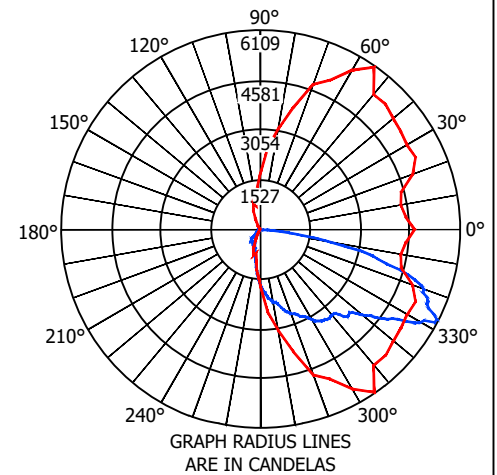
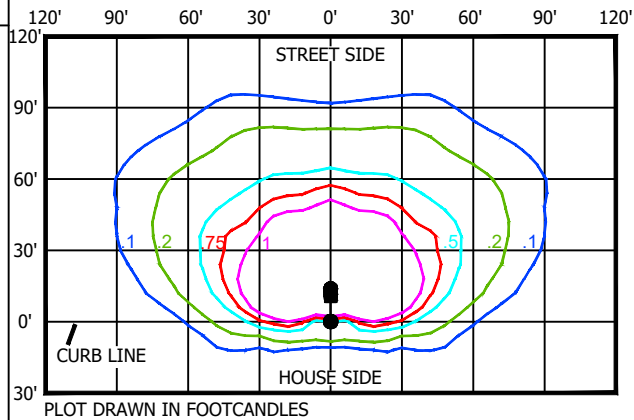
LUMENS: 11000  
WATTS: 98  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERLH\_11D330\_\_\_\_.IES



### FIXTURE WITH BACKLIGHT SHIELD

LUMENS: 10700  
WATTS: 98  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERLH\_11D330\_\_\_\_ELSHS-ERL1-  
BLCK.IES

SEE SHEET OH1571.27 FOR  
BACK LIGHT SHIELD DETAILS  
AND INSTALLATION



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL<br>TENON. CONFIG.                                      | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.50   | 1.0     | 1.0      |

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| REV | CHANGE            | DR  | BY | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                   |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | AMP | JK | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
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|                   |  |                    |          |                     |                        |
|-------------------|--|--------------------|----------|---------------------|------------------------|
| SHEET<br>17 OF 21 | Indicates Latest Revision                      | Completely Revised | New Page | Information Removed | OH1571.17<br>UG4471.17 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                    |          |                     |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>11KL FIXTURE |                    |          |                     |                        |



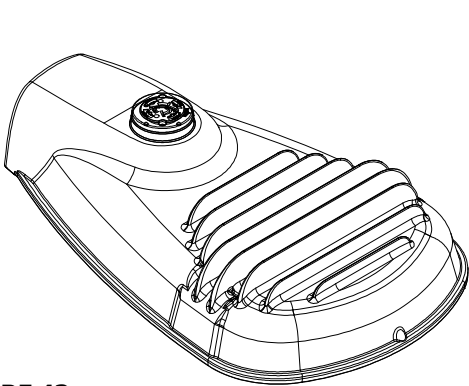


FIGURE 43  
ISOMETRIC

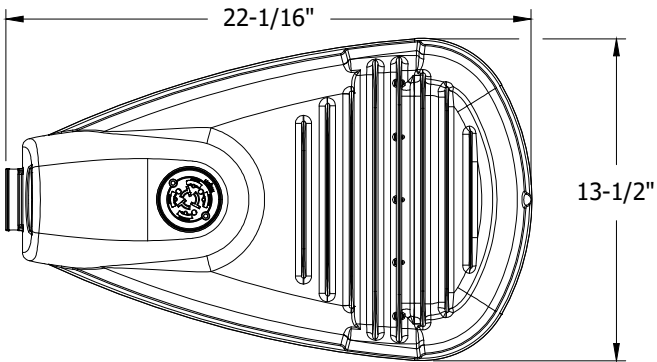


FIGURE 44  
TOP VIEW

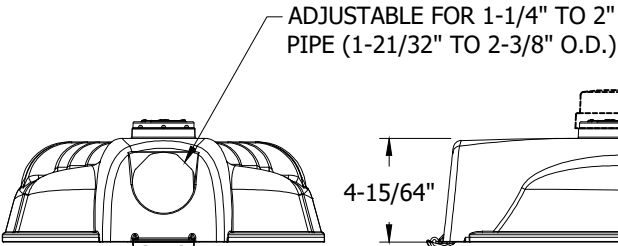


FIGURE 45  
BACK VIEW

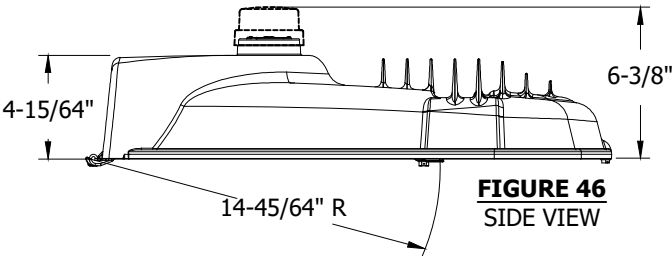


FIGURE 46  
SIDE VIEW

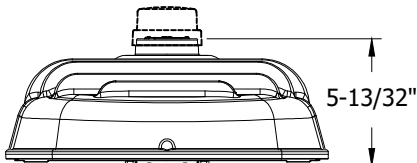


FIGURE 47  
FRONT VIEW

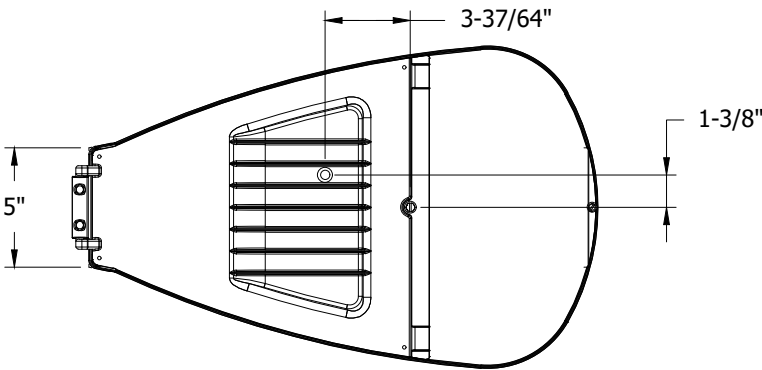


FIGURE 48  
BOTTOM VIEW

TABLE 8

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473114      | GE/ERLH                 | 14400L         | 3000K             | 15.15 LBS   | SEE LUMINAIRE EPA TABLE | TYPE III          | LC136G       |

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| C   |                   |     |    |     |     |           | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | AMP | JK | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE    | AMP | JK | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

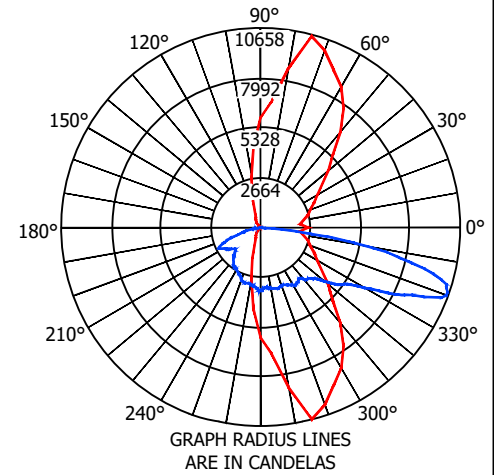
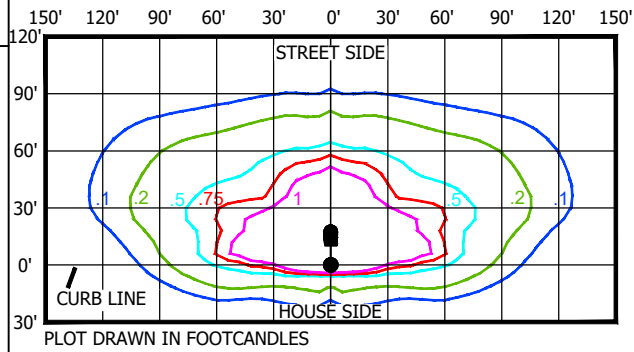
|                   |   |   |   |  |                        |
|-------------------|---|---|---|--|------------------------|
| SHEET<br>18 OF 21 | <div><div>X</div><div>Indicates Latest Revision</div></div> | <div><div></div><div>Completely Revised</div></div> | <div><div></div><div>New Page</div></div> | <div><div></div><div>Information Removed</div></div> | OH1571.18<br>UG4471.18 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS              |   |   |  |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>15KL FIXTURE              |   |   |  |                        |



## PHOTOMETRIC DIAGRAMS

### FIXTURE WITHOUT BACKLIGHT SHIELD

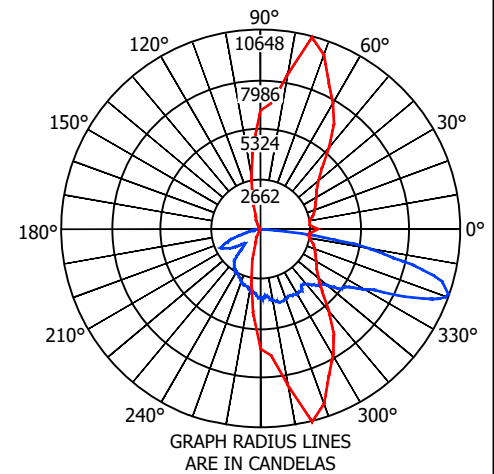
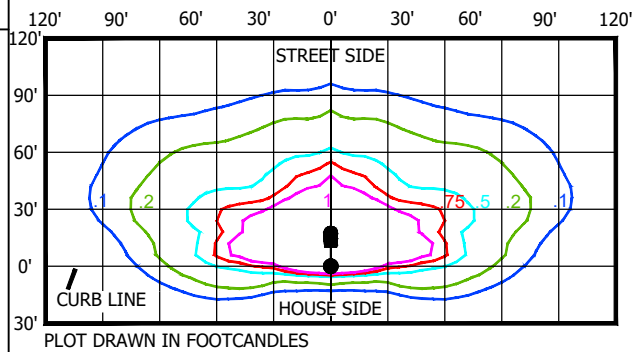
LUMENS: 14400  
WATTS: 136  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERLH\_15C330\_\_\_\_.IES



### FIXTURE WITH BACKLIGHT SHIELD

LUMENS: 14000  
WATTS: 136  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
ERLH\_15C330\_\_\_\_ELSHS-ERL1-  
BLCK.IES

SEE SHEET OH1571.27 FOR  
BACK LIGHT SHIELD DETAILS  
AND INSTALLATION



## LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL<br>TENON. CONFIG.                                      | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.50   | 1.0     | 1.0      |

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| REV | CHANGE            | DR  | BY  | DSN | APV | DATE      | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|-------------------|-----|-----|-----|-----|-----------|-----|--------|----|----|-----|-----|------|
| C   |                   |     |     |     |     |           | F   |        |    |    |     |     |      |
| B   | EDITORIAL CHANGES | AMP | JKI | JES | CZH | 2/12/2020 | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE    | AMP | JKI | JES | CZH | 8/20/2019 | D   |        |    |    |     |     |      |

|                   |  |                    |          |                     |                        |
|-------------------|--|--------------------|----------|---------------------|------------------------|
| SHEET<br>19 OF 21 | Indicates Latest Revision                      | Completely Revised | New Page | Information Removed | OH1571.19<br>UG4471.19 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS |                    |          |                     |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>15KL FIXTURE |                    |          |                     |                        |





|                   |  |                           |                    |          |                     |                        |
|-------------------|--|---------------------------|--------------------|----------|---------------------|------------------------|
| SHEET<br>20 OF 21 | X  | Indicates Latest Revision | Completely Revised | New Page | Information Removed | OH1571.20<br>UG4471.20 |
|                   | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS                 |                           |                    |          |                     |                        |
|                   | GE EVOLVE LED ROADWAY LIGHTING<br>FIXTURES - BACK LIGHT SHIELD |                           |                    |          |                     |                        |



- A. REMOVE DOOR FROM LUMINAIRE BEFORE INSTALLING SCREWS TO PREVENT INTERNAL DAMAGE. UNFASTEN DOOR LATCH SCREW, OPEN DOOR, AND REMOVE DOOR FROM HINGE CRADLE.
- B. FASTEN SHIELD TO DOOR BY SECURING THE INCLUDED THREAD CUTTING SCREWS INTO THE TWO 3/16" HOLES ON THE SHIELD (SHOWN ON FIGURES 50 AND 52).
- C. MAKE SURE THE SHIELD IS ORIENTED CORRECTLY BY VERIFYING THE 1" HOLE IN THE CENTER OF THE SHIELD LINES UP WITH THE LATCH SCREW ON THE DOOR (SHOWN ON FIGURES 49 & 51). FOR THE ERL2 SHIELD, THE SQUARE CUTOUTS ON THE SHIELD SHOULD LINE UP WITH THE SQUARE BUMPS ON THE DOOR (SHOWN ON FIGURE 51).
- D. TO REPLACE DOOR INTO LUMINAIRE, HOLD SLIGHTLY PAST VERTICAL TOWARD THE POLE-SIDE OF THE HINGE. INSERT HINGE PIN INTO HINGE CRADLE AND LOWER DOOR TO VERIFY DOOR CAN HANG FREE. CLOSE DOOR AND SECURE LATCH SCREW.

**NOTES:**

- ## REFERENCES:

- a. SEE OVERHEAD CONSTRUCTION STANDARD 1570 FOR OVERHEAD LIGHTING INSTALLATION.
- b. SEE UNDERGROUND CONSTRUCTION STANDARD 4431 FOR UNDERGROUND LIGHTING INSTALLATION.

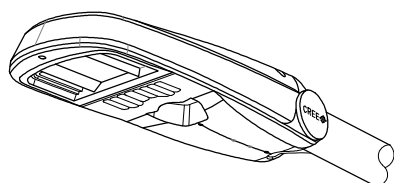
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|--|-------------------|-----|---|-----|-----|--------------------|-----|----------|----|---------------------|-----|------------------------|------|--|
| REV  | CHANGE            | DR  | BY  | DSN | APV | DATE               | REV | CHANGE   | DR | BY                  | DSN | APV                    | DATE |  |
| C  |                   |     |   |     |     |                    | F   |          |    |                     |     |                        |      |  |
| B  | EDITORIAL CHANGES | AMP | JKI   | JES | CZH | 2/12/2020          | E   |          |    |                     |     |                        |      |  |
| A  | ORIGINAL ISSUE    | AMP | JKI   | JES | CZH | 8/20/2019          | D   |          |    |                     |     |                        |      |  |
| SHEET<br>21 OF 21  |                   | X   | Indicates Latest Revision   |     |     | Completely Revised |     | New Page |    | Information Removed |     | OH1571.21<br>UG4471.21 |      |  |
|  |                   |     | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS                    |     |     |                    |     |          |    |                     |     |                        |      |  |
|  |                   |     | GE EVOLVE LED ROADWAY LIGHTING<br>FIXTURES - NOTES AND REFERENCES |     |     |                    |     |          |    |                     |     |                        |      |  |



**SCOPE:** THIS STANDARD SHOWS CREE RSW & TRAVEYO TYPE LED FIXTURES USED TO PROVIDE ROADWAY LIGHTING.

**TABLE 1**

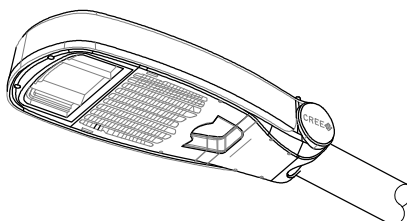
| CREE LED FIXTURE INDEX |                         |                             |                              |               |              |               |   |
|------------------------|-------------------------|-----------------------------|------------------------------|---------------|--------------|---------------|---|
| DESCRIPTION            | DESIGN UNITS            | MOUNTING HEIGHT<br>II III A | MAXIMUM<br>SYSTEM<br>WATTAGE | STANDARD PAGE | STOCK NUMBER | FIGURE DETAIL | HPSV/LPSV<br>EQUIVALENT STOCK<br>NUMBERS<br>a b |
| 5KL RSW TYPE 3         | RWS3                    | 26'                         | 45                           | OH 1572.6     | S473138      | 1             | S473800, S473400,<br>S473802, S473402           |
| 5KL RSW TYPE 2         | RWS2                    | 26'                         | 45                           | OH 1572.8     | S473140      | 1             | S473800, S473400,<br>S473802, S473402           |
| 9KL RSW TYPE 3         | RWM3                    | 30'                         | 83                           | OH 1572.10    | S473142      | 2             | S473406, S473806,<br>S473404, S473804           |
| 9KL RSW TYPE 2         | RWM2                    | 30'                         | 83                           | OH 1572.12    | S473150      | 2             | S473406, S473806,<br>S473404, S473804           |
| 14KL RSW TYPE 3        | RWL3                    | 30'                         | 136                          | OH 1572.14    | S473144      | 3             | S473408   |
| 24KL RSW TYPE 3        | RWX3                    | 35'                         | 223                          | OH 1572.16    | S473146      | 3             | S473410   |
| 5KL TRV TYPE 3         | RESERVED FOR FUTURE USE |                             |                              |               |              |               |   |
| 5KL TRV TYPE 2         |                         |                             |                              |               |              |               |   |
| 10KL TRV TYPE 3        |                         |                             |                              |               |              |               |   |
| 10KL TRV TYPE 2        |                         |                             |                              |               |              |               |   |
| 25KL TRV TYPE 3        |                         |                             |                              |               |              |               |   |



**FIGURE 1**  
RSW SMALL

**FUTURE  
FIGURE**

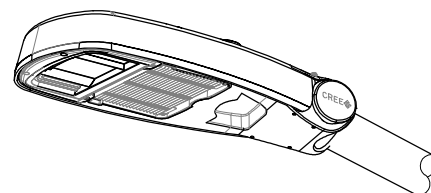
**FIGURE 4**  
TRV SMALL



**FIGURE 2**  
RSW MEDIUM

**FUTURE  
FIGURE**

**FIGURE 5**  
TRV MEDIUM



**FIGURE 3**  
RSW LARGE/XL

**FUTURE  
FIGURE**

**FIGURE 6**  
TRV LARGE

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**SHEET  
1 OF 20**

SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

ROADWAY LED LIGHTING FIXTURES  
CREE - MANUFACTURER INDEX

OH1572.1  
UG4472.1



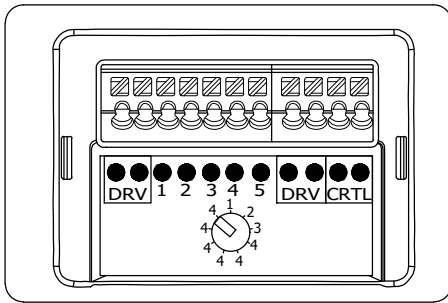
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|                  | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS               |                    |   |          |                     |                      |
|                  | ROADWAY LED LIGHTING FIXTURES<br>INSTALLATION FOR RSW SERIES |                    |   |          |                     |                      |

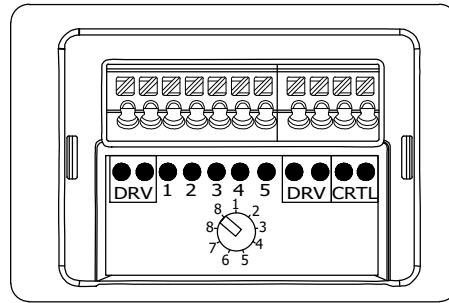


#### D. MODIFYING FIELD ADJUSTABLE OUTPUT (FAO) SETTINGS OF FIXTURE

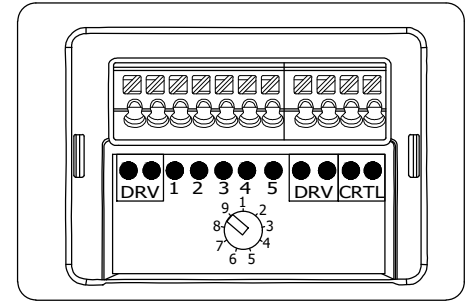
1. THE FIELD ADJUSTABLE OUTPUT MODULE ENABLES THE RSW FIXTURE TO BE DIMMED AS NEEDED FOR A PARTICULAR INSTALLATION. ALL FIXTURES WILL BE SHIPPED FROM THE FACTORY AT THE MAXIMUM LUMEN OUTPUT AND CAN BE MANUALLY ADJUSTED TO LOWER OUTPUTS FOR PROJECT SPECIFIC NEEDS DURING INSTALLATION.
2. THE FIELD ADJUSTABLE OUTPUT MODULE IS LOCATED INSIDE THE FIXTURE. OPEN THE COVER BY HOLDING FIXTURE AND PULLING THE HANDLE. ALLOW THE COVER TO SWING OPEN.
3. ESTABLISH THE DESIRED POWER OR LUMEN SETTING BY TURNING THE MODULE SWITCH TO THE POSITION DEFINED BY THE AU/CU POWER LEVEL INCLUDED WITH THE DESIGN PACKAGE. REFER TO THE MANUFACTURER SPECIFICATIONS AND FIELD ADJUSTABLE SETTINGS TABLES INCLUDED WITHIN THIS STANDARD FOR EACH FIXTURE. SEE FIGURE 11, 12, AND 13 ADJUSTMENT SWITCH DETAILS FOR EACH FIXTURE SIZE.
4. CLOSE THE COVER ENSURING NO WIRES ARE PINCHED. APPLY A WATTAGE LABEL THAT INDICATES THE ADJUSTED FIXTURE POWER SETTING.



**FIGURE 11**  
SMALL RSW  
FAO SWITCH



**FIGURE 12**  
MEDIUM RSW  
FAO SWITCH



**FIGURE 13**  
LARGE/XL RSW  
FAO SWITCH

#### **BILL OF MATERIALS:** NONE

#### **NOTES:**

- I. THIS IS A REPRODUCTION OR ADAPTATION OF MANUFACTURER DATA. REFER TO SPECIFIC PRODUCT INSTALLATION MANUALS PROVIDED WITH STOCK MATERIALS FOR COMPLETE SAFETY AND INSTALLATION INSTRUCTIONS.
- II MOUNTING HEIGHTS PROVIDED ON PAGE OH1572.1 ARE SPECIFIC TO NEW UNDERGROUND FEED INSTALLATIONS DUE TO STANDARD CONCRETE POLE SIZES AVAILABLE. NEW LED STREETLIGHT INSTALLATIONS OR HPSV-TO-LED UPGRADE INSTALLATIONS MAY BE MOUNTED WITHIN 2 FEET OF THESE REFERENCE MOUNTING HEIGHTS AS LONG AS THE REQUIRED CLEARANCES TO OTHER FACILITIES ARE MAINTAINED PER OH1509.
- III FOR NEW SDG&E OWNED STREETLIGHT INSTALLATION (NOT EXISTING CONVERSIONS), A LIGHTING DESIGN ANALYSIS MAY BE REQUIRED TO DETERMINE THE MOUNTING HEIGHT IF THE REFERENCE MOUNTING HEIGHT PROVIDED HERE ARE NOT FEASIBLE. CONTACT THE STREET LIGHTING GROUP IN THIS SCENARIO FOR GUIDANCE.

#### **REFERENCE:**

- a SEE OVERHEAD FIELD MAINTENANCE ONLY SECTION 1500 FOR HPSV AND LPSV FIXTURE DETAILS.
- b SOME FIXTURES ARE NO LONGER AVAILABLE.
- c. SEE OH1570 FOR OVERHEAD LIGHTING INSTALLATION.
- d. SEE UG4431 FOR UNDERGROUND LIGHTING INSTALLATION.
- e. SEE OH1512 FOR PHOTOELECTRIC CONTROLS AVAILABLE.

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|  |                | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS  |     |     |     |          |     |        |    |    |     |                      |      |
| ROADWAY LED LIGHTING FIXTURES<br>INSTALLATION FOR RSW SERIES |                |   |     |     |     |          |     |        |    |    |     | OH1572.3<br>UG4472.3 |      |



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|                  |                | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS                   |     |     |                    |          |     |          |    |                     |     |     |                      |
|                  |                | ROADWAY LED LIGHTING FIXTURES<br>INSTALLATION FOR TRAVEYO SERIES |     |     |                    |          |     |          |    |                     |     |     |                      |

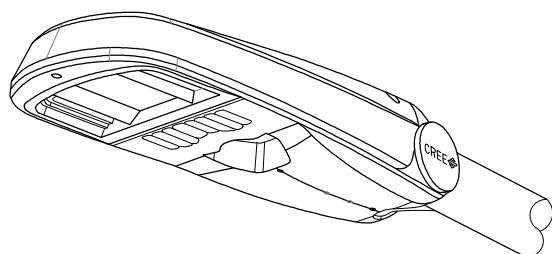


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|  |                | ROADWAY LED LIGHTING FIXTURES<br>INSTALLATION FOR TRAVEYO SERIES |     |                    |     |            |     |                     |    |                      |     |     |      |

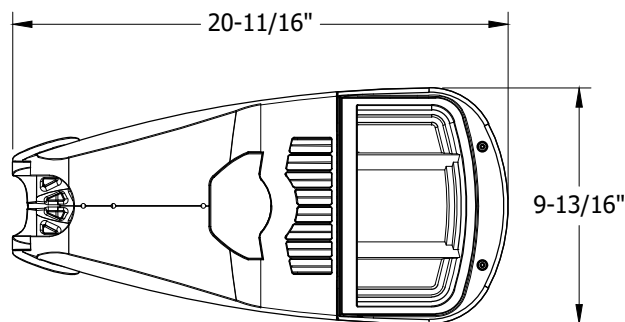


**SCOPE:** THIS STANDARD SHOWS VARIOUS CREE LED ROADWAY LIGHTING FIXTURES.

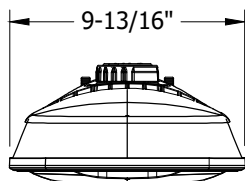
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1572.19. LUMEN OUTPUT SETTING MUST BE IDENTIFIED FOR THIS FIXTURE INSTALLATION USING TABLE 2 ON NEXT SHEET.



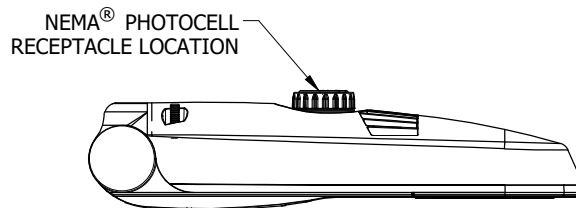
**FIGURE 1**  
ISOMETRIC



**FIGURE 2**  
BOTTOM



**FIGURE 3**  
FRONT



**FIGURE 4**  
SIDE

**TABLE 1**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473138      | CREE / RSW SMALL        | 5000L          | 3000K             | 8.45 LBS    | SEE LUMINAIRE EPA TABLE | TYPE III MEDIUM   | RWS3         |

**LUMINAIRE ESTIMATED PROJECTED AREA (EPA)**

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.61   | 0.89    | 1.22     |

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
5KL FIXTURE

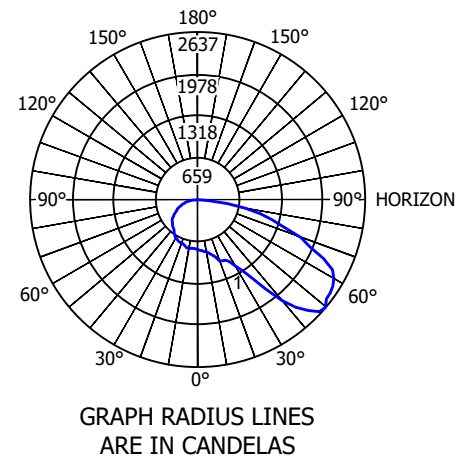
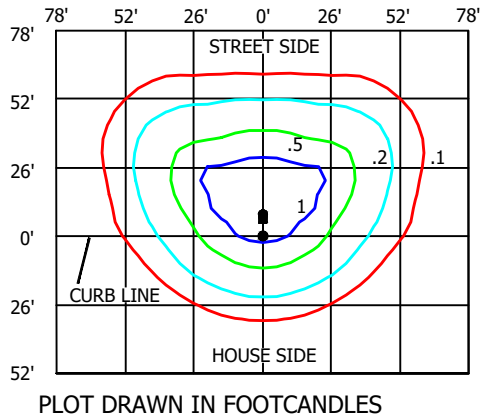
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UG4472.6



## PHOTOMETRIC DIAGRAMS

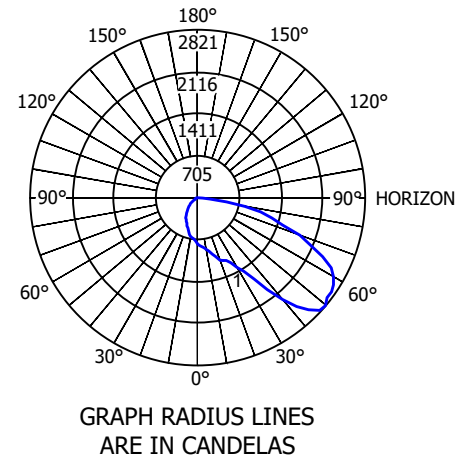
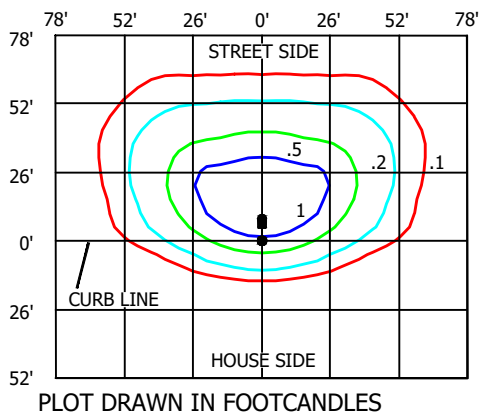
### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

LUMENS: 5000  
WATTS: 45  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWS-A-HT-3ME-5L-30K7-UL\_  
CONFIGURED.IES



### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 4630  
WATTS: 45  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWS-A-HT-3ME-3L-30K7-UL W-  
RSW-BLSS\_11675461.01.IES



**ATTENTION:** LUMEN OUTPUT "Q" SETTING MUST BE INCLUDED FOR EACH FIXTURE WITHIN THE CONSTRUCTION NOTES FOR EACH LOCATION IN THE JOB PACKAGE.

**TABLE 2**

| Q OPTION SETTING | ACTUAL SYSTEM WATTS | NOMINAL LABEL WATTAGE | LUMEN OUTPUT | LUMEN OUTPUT WITH BACKLIGHT SHIELD | HPSV EQUIVALENT WATTAGE |
|------------------|---------------------|-----------------------|--------------|------------------------------------|-------------------------|
| Q4 (FULL POWER)  | 45                  | 50                    | 5,000        | 4,630                              | 100                     |
| Q3               | 41                  | 40                    | 4,654        | 4,310                              | 70                      |
| Q2               | 36                  | 40                    | 4,105        | 3,801                              | 50-70                   |
| Q1               | 30                  | 30                    | 3,617        | 3,350                              | 50-70                   |

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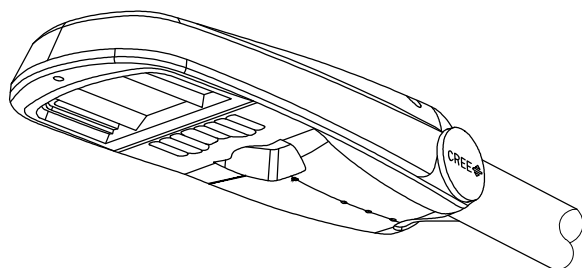
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
5KL FIXTURE

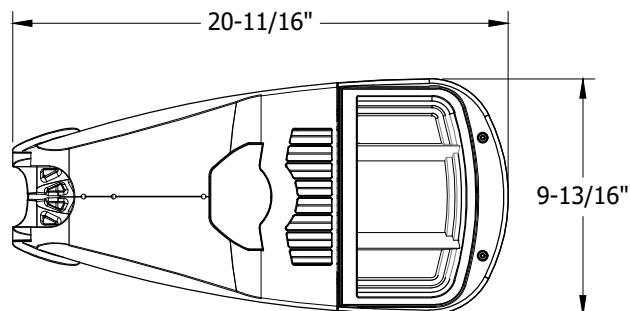
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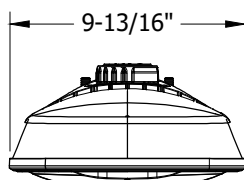
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1572.19. LUMEN OUTPUT SETTING MUST BE IDENTIFIED FOR THIS FIXTURE INSTALLATION USING TABLE 4 ON NEXT SHEET.



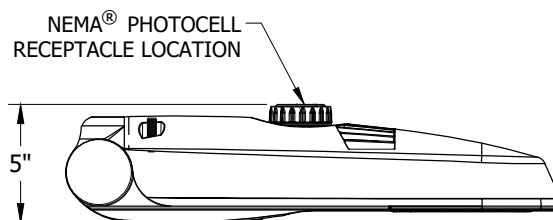
**FIGURE 5**  
ISOMETRIC



**FIGURE 6**  
BOTTOM



**FIGURE 7**  
FRONT



**FIGURE 8**  
SIDE

**TABLE 3**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473140      | CREE / RSW SMALL        | 5000L          | 3000K             | 8.45 LBS    | SEE LUMINAIRE EPA TABLE | TYPE II MEDIUM    | RWS2         |

**LUMINAIRE ESTIMATED PROJECTED AREA (EPA)**

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.61   | 0.89    | 1.22     |

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
5KL FIXTURE

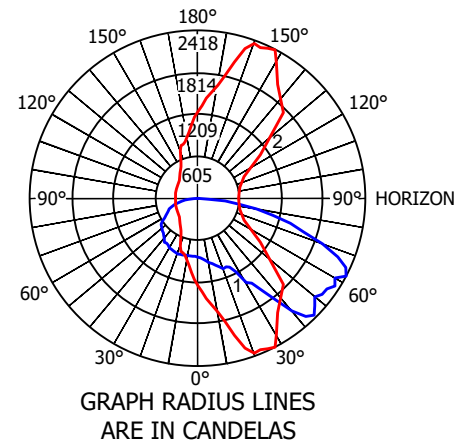
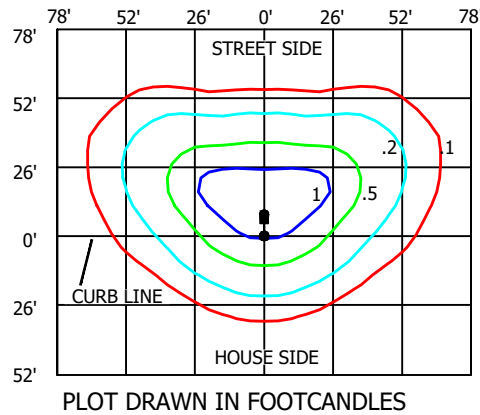
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## PHOTOMETRIC DIAGRAMS

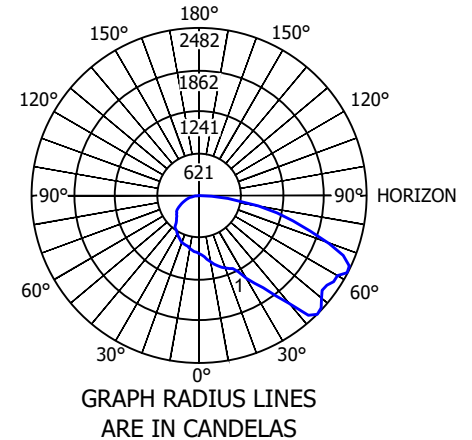
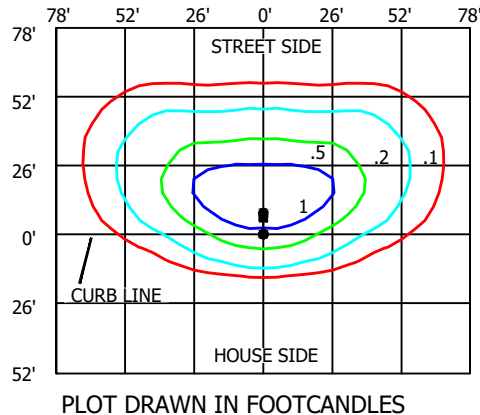
### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

LUMENS: 5000  
WATTS: 45  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWS-A-HT-2ME-5L-30K7-UL\_  
11644102.07.IES



### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 4630  
WATTS: 45  
MOUNTING HEIGHT: 26'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWS-A-HT-2ME-5L-30K7-UL W-  
RSW-BLSS\_11675461.01.IES



**ATTENTION:** LUMEN OUTPUT "Q" SETTING MUST BE INCLUDED FOR EACH FIXTURE WITHIN THE CONSTRUCTION NOTES FOR EACH LOCATION IN THE JOB PACKAGE.

**TABLE 4**

| Q OPTION SETTING | ACTUAL SYSTEM WATTS | NOMINAL LABEL WATTAGE | LUMEN OUTPUT | LUMEN OUTPUT WITH BACKLIGHT SHIELD | HPSV EQUIVALENT WATTAGE |
|------------------|---------------------|-----------------------|--------------|------------------------------------|-------------------------|
| Q4 (FULL POWER)  | 45                  | 50                    | 5,000        | 4,630                              | 100                     |
| Q3               | 41                  | 40                    | 4,654        | 4,310                              | 70                      |
| Q2               | 36                  | 40                    | 4,105        | 3,801                              | 50-70                   |
| Q1               | 30                  | 30                    | 3,617        | 3,350                              | 50-70                   |

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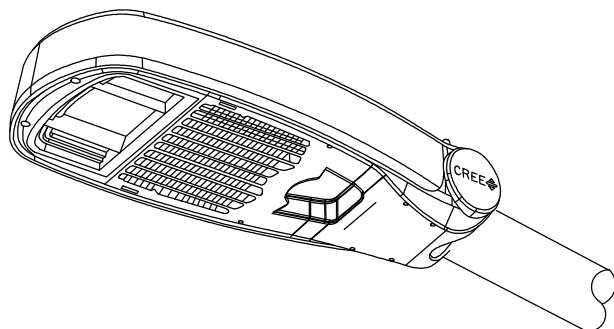
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CREE RSW ROADWAY LIGHTING  
5KL FIXTURE

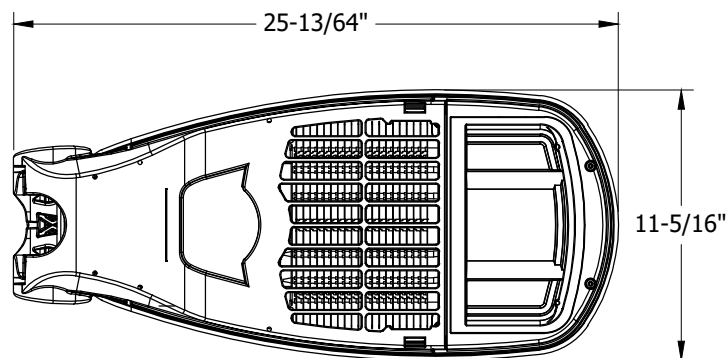
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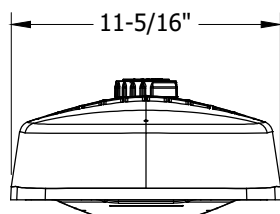
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1572.19. LUMEN OUTPUT SETTING MUST BE IDENTIFIED FOR THIS FIXTURE INSTALLATION USING TABLE 6 ON NEXT SHEET.



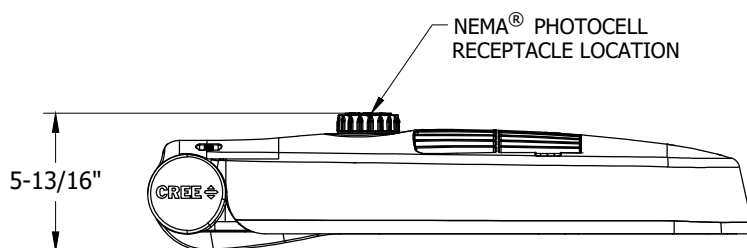
**FIGURE 9**  
ISOMETRIC



**FIGURE 10**  
BOTTOM



**FIGURE 11**  
FRONT



**FIGURE 12**  
SIDE

**TABLE 5**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473142      | CREE / RSW MEDIUM       | 9000L          | 3000K             | 15.6 LBS    | SEE LUMINAIRE EPA TABLE | TYPE III MEDIUM   | RWM3         |

**LUMINAIRE ESTIMATED PROJECTED AREA (EPA)**

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.86   | 1.24    | 1.71     |

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| REV | CHANGE         | DR  | BY  | DSN | APV | DATE     | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|----------------|-----|-----|-----|-----|----------|-----|--------|----|----|-----|-----|------|
| C   |                |     |     |     |     |          | F   |        |    |    |     |     |      |
| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
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**SHEET**  
**10 OF 20**

SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
9KL FIXTURE

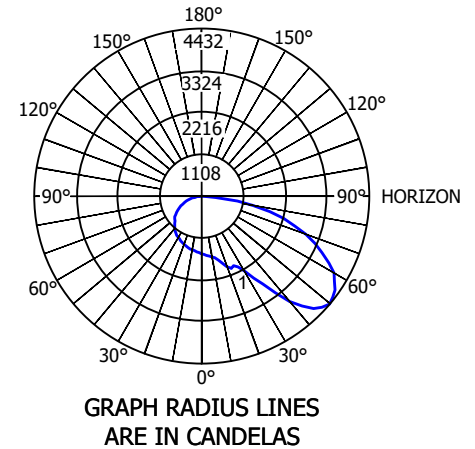
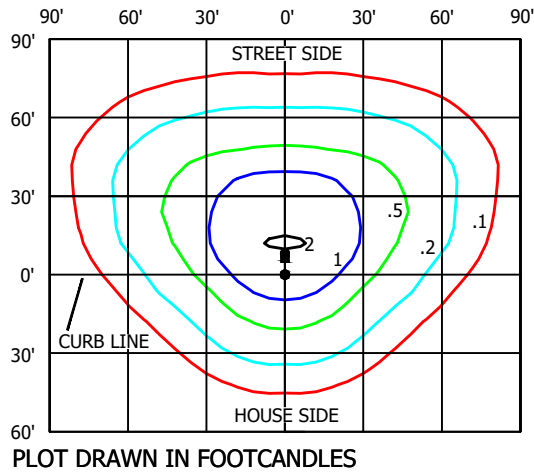
OH1572.10  
UG4472.10



## PHOTOMETRIC DIAGRAMS

### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

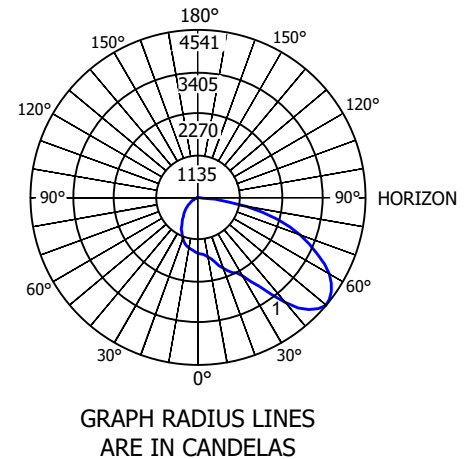
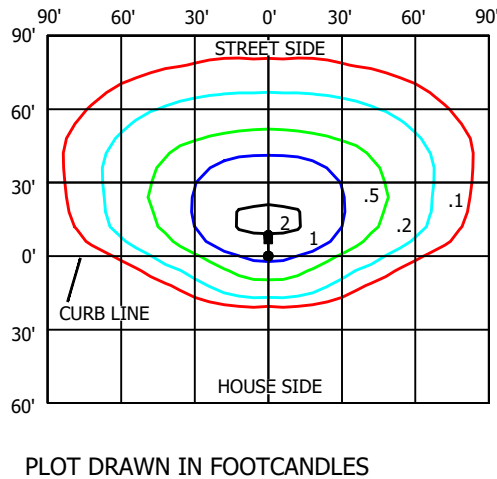
LUMENS: 9325  
WATTS: 83  
HT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWM-A-HT-3ME-9L-30K7-UL-  
GY-N\_12311460.02A.IES



### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 8550  
WATTS: 83  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWM-A-HT-3ME-9L-30K7-UL  
W\_RSW-BLSM\_11705478.03.IES

SEE SHEET OH1572.18 FOR  
BACKLIGHT SHIELD DETAILS  
AND INSTALLATION



**ATTENTION:** LUMEN OUTPUT "Q" SETTING MUST BE INCLUDED FOR EACH FIXTURE WITHIN THE CONSTRUCTION NOTES FOR EACH LOCATION IN THE JOB PACKAGE.

**TABLE 6**

| Q OPTION SETTING | ACTUAL SYSTEM WATTS | NOMINAL LABEL WATTAGE | LUMEN OUTPUT | HPSV EQUIVALENT WATTAGE |
|------------------|---------------------|-----------------------|--------------|-------------------------|
| Q8 (FULL POWER)  | 83                  | 80                    | 9,325        | 150                     |
| Q7               | 81                  | 80                    | 9,100        | 150                     |
| Q6               | 75                  | 80                    | 8,975        | 150                     |
| Q5               | 69                  | 70                    | 8,325        | 150                     |
| Q4               | 65                  | 70                    | 7,750        | 100-150                 |
| Q3               | 61                  | 60                    | 7,300        | 100                     |
| Q2               | 60                  | 60                    | 7,000        | 100                     |
| Q1               | 50                  | 50                    | 6,500        | 100                     |

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| REV | CHANGE         | DR  | BY  | DSN | APV | DATE     | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|----------------|-----|-----|-----|-----|----------|-----|--------|----|----|-----|-----|------|
| C   |                |     |     |     |     |          | F   |        |    |    |     |     |      |
| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE | AMP | RSL | JES | CZH | 04/28/21 | D   |        |    |    |     |     |      |

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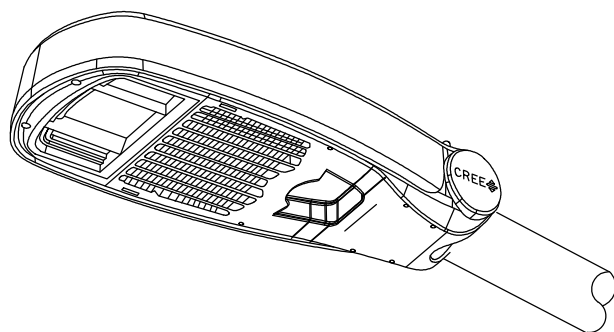
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
9KL FIXTURE

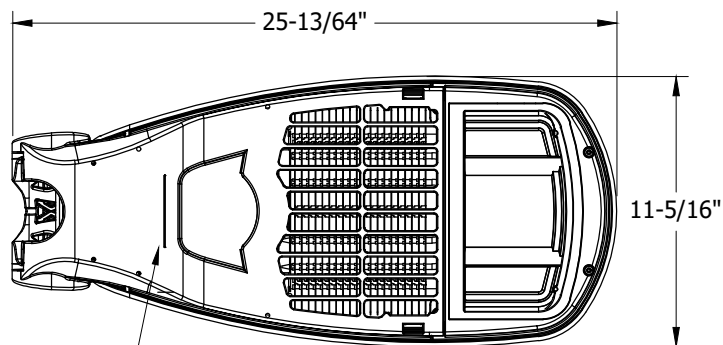
OH1572.11  
UG4472.11



**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1572.19. LUMEN OUTPUT SETTING MUST BE IDENTIFIED FOR THIS FIXTURE INSTALLATION USING TABLE 8 ON NEXT SHEET.

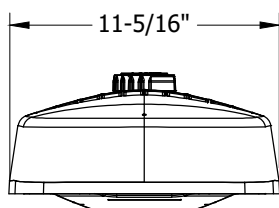


**FIGURE 13**  
ISOMETRIC

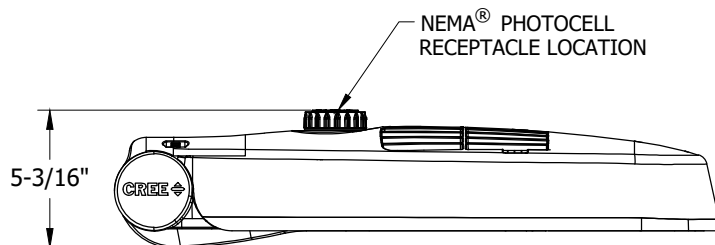


**FIGURE 14**  
BOTTOM

UTILITY LABEL LOCATION



**FIGURE 15**  
FRONT



**FIGURE 16**  
SIDE

**TABLE 7**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473150      | CREE / RSW MEDIUM       | 9000L          | 3000K             | 15.6 LBS    | SEE LUMINAIRE EPA TABLE | TYPE II MEDIUM    | RWM2         |

### LUMINAIRE ESTIMATED PROJECTED AREA (EPA)

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 0.86   | 1.24    | 1.71     |

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|-----|----------------|-----|-----|-----|-----|----------|-----|--------|----|----|-----|-----|------|
| C   |                |     |     |     |     |          | F   |        |    |    |     |     |      |
| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
9KL FIXTURE

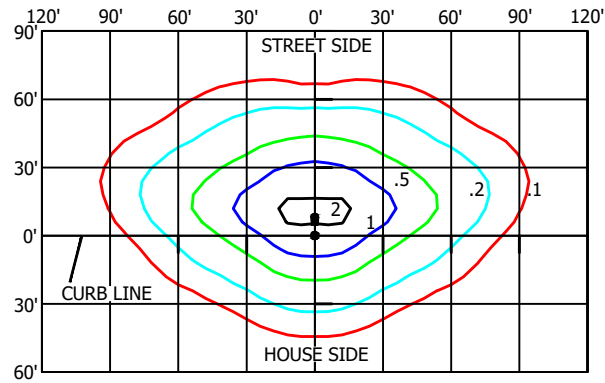
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UG4472.12



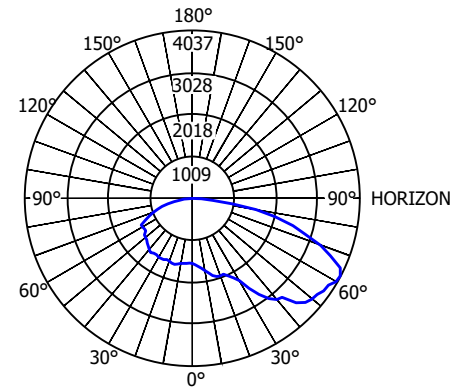
## PHOTOMETRIC DIAGRAMS

### FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

LUMENS: 9325  
WATTS: 83  
HT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWM-A-HT-2ME-9L-30K7-UL-  
GY-N\_12311460.05A.IES



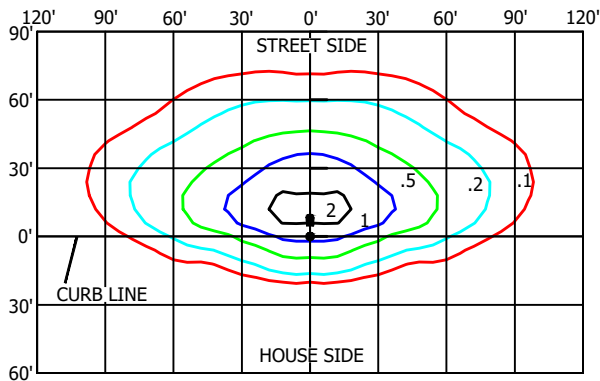
PLOT DRAWN IN FOOTCANDLES



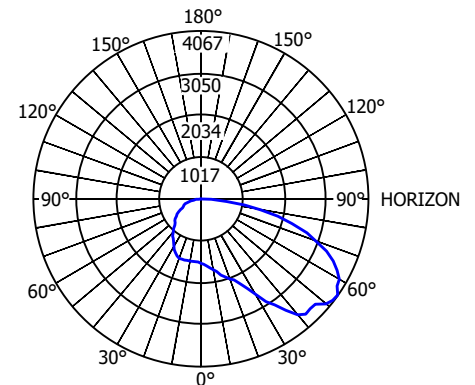
GRAPH RADIUS LINES ARE IN CANDELAS

### FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 8550  
WATTS: 83  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWM-A-HT-2ME-9L-30K7-UL W-  
RSW-BLSM\_11705478.01.IES



PLOT DRAWN IN FOOTCANDLES



GRAPH RADIUS LINES ARE IN CANDELAS

**ATTENTION:** LUMEN OUTPUT "Q" SETTING MUST BE INCLUDED FOR EACH FIXTURE WITHIN THE CONSTRUCTION NOTES FOR EACH LOCATION IN THE JOB PACKAGE.

**TABLE 8**

| Q OPTION SETTING | ACTUAL SYSTEM WATTS | NOMINAL LABEL WATTAGE | LUMEN OUTPUT | LUMEN OUTPUT WITH BACKLIGHT SHIELD | HPSV EQUIVALENT WATTAGE |
|------------------|---------------------|-----------------------|--------------|------------------------------------|-------------------------|
| Q8 (FULL POWER)  | 83                  | 80                    | 9,325        | 8,550                              | 150                     |
| Q7               | 81                  | 80                    | 9,100        | 8,350                              | 150                     |
| Q6               | 75                  | 80                    | 8,975        | 8,250                              | 150                     |
| Q5               | 69                  | 70                    | 8,325        | 7,650                              | 150                     |
| Q4               | 65                  | 70                    | 7,750        | 7,125                              | 100-150                 |
| Q3               | 61                  | 60                    | 7,300        | 6,700                              | 100                     |
| Q2               | 60                  | 60                    | 7,000        | 6,425                              | 100                     |
| Q1               | 50                  | 50                    | 6,500        | 5,975                              | 100                     |

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|-----|----------------|-----|-----|-----|-----|----------|-----|--------|----|----|-----|-----|------|
| C   |                |     |     |     |     |          | F   |        |    |    |     |     |      |
| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
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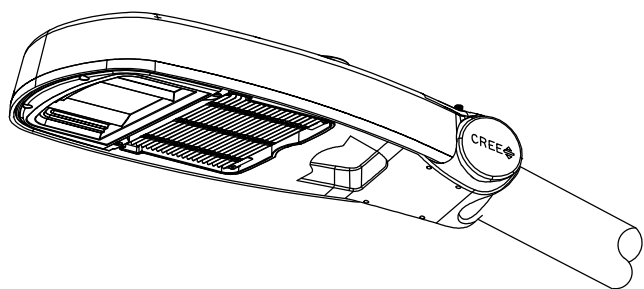
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
9KL FIXTURE

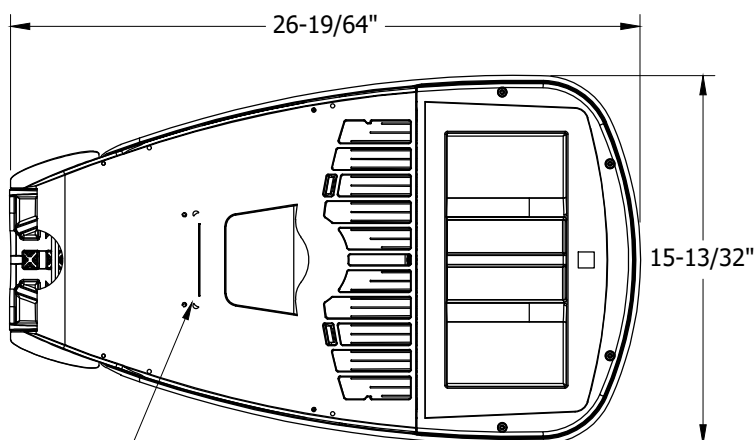
OH1572.13  
UG4472.13



**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1572.19. LUMEN OUTPUT SETTING MUST BE IDENTIFIED FOR THIS FIXTURE INSTALLATION USING TABLE 10 ON NEXT SHEET.

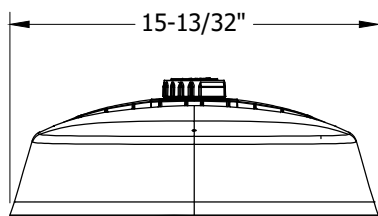


**FIGURE 17**  
ISOMETRIC

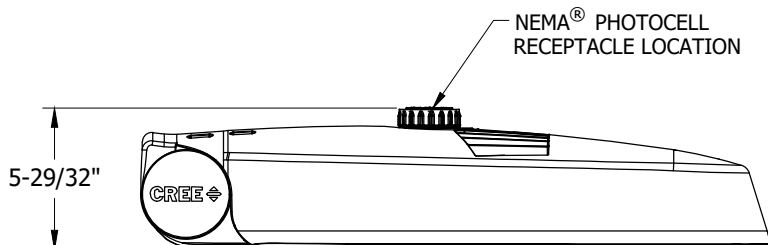


**FIGURE 18**  
SIDE

UTILITY LABEL LOCATION



**FIGURE 19**  
FRONT



**FIGURE 20**  
BOTTOM

**TABLE 9**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473144      | CREE / RSW LARGE        | 14000L         | 3000K             | 20.2 LBS    | SEE LUMINAIRE EPA TABLE | TYPE III MEDIUM   | RWL3         |

**LUMINAIRE ESTIMATED PROJECTED AREA (EPA)**

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 1.00   | 1.55    | 2.00     |

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|-----|----------------|-----|-----|-----|-----|----------|-----|--------|----|----|-----|-----|------|
| C   |                |     |     |     |     |          | F   |        |    |    |     |     |      |
| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE | AMP | RSL | JES | CZH | 04/28/21 | D   |        |    |    |     |     |      |

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**SHEET**  
**14 OF 20**

SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
14KL FIXTURE

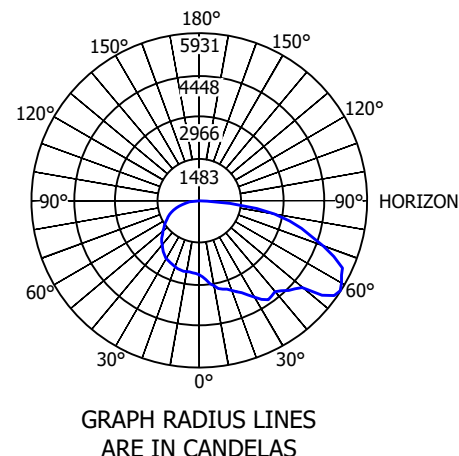
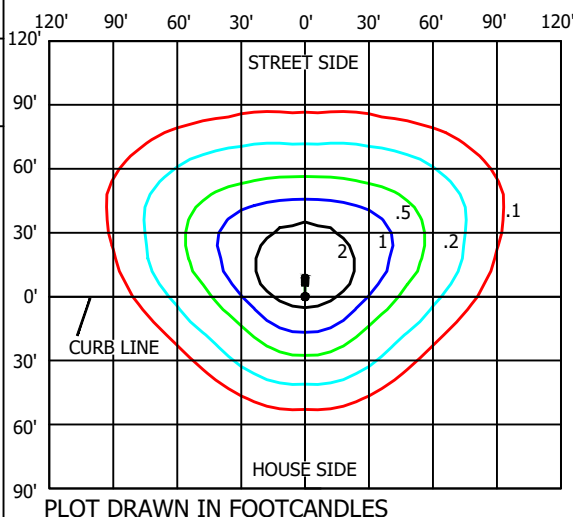
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UG4472.14



# PHOTOMETRIC DIAGRAMS

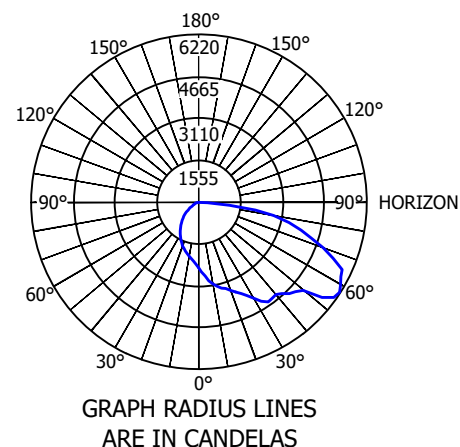
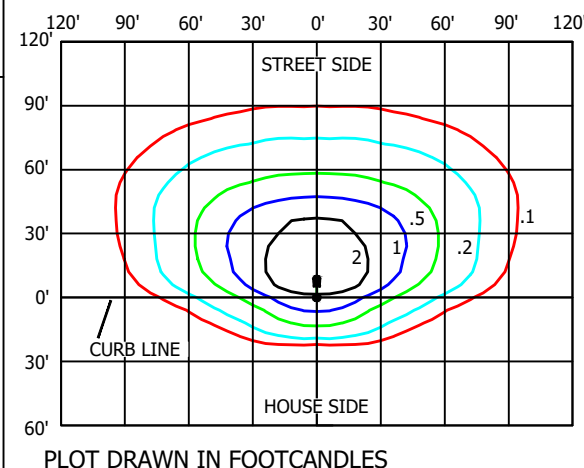
## FIXTURE DESIGN WITHOUT BACKLIGHT SHIELD

LUMENS: 14575  
WATTS: 136  
HT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWL-A-H-T-3ME-14L-30K7-UL-  
GY-N\_12081584.04A.IES



## FIXTURE DESIGN WITH BACKLIGHT SHIELD

LUMENS: 12875  
WATTS: 136  
MOUNTING HEIGHT: 30'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWL-A-HT-3ME-14L-30K7-UL-GY-  
N W RSW-BLSL\_12081584.07A.IES



**ATTENTION:** LUMEN OUTPUT "Q" SETTING MUST BE INCLUDED FOR EACH FIXTURE WITHIN THE CONSTRUCTION NOTES FOR EACH LOCATION IN THE JOB PACKAGE.

**TABLE 10**

| Q OPTION SETTING | ACTUAL SYSTEM WATTS | NOMINAL LABEL WATTAGE | LUMEN OUTPUT | LUMEN OUTPUT WITH BACKLIGHT SHIELD | HPSV EQUIVALENT WATTAGE |
|------------------|---------------------|-----------------------|--------------|------------------------------------|-------------------------|
| Q9 (FULL POWER)  | 136                 | 140                   | 14,575       | 12,875                             | 250                     |
| Q8               | 133                 | 130                   | 14,425       | 12,725                             | 250                     |
| Q7               | 126                 | 130                   | 13,850       | 12,225                             | 250                     |
| Q6               | 120                 | 120                   | 13,400       | 11,825                             | 150-250                 |
| Q5               | 110                 | 110                   | 12,375       | 10,925                             | 150-250                 |
| Q4               | 102                 | 100                   | 11,575       | 10,225                             | 150                     |
| Q3               | 90                  | 90                    | 10,500       | 9,275                              | 150                     |
| Q2               | 81                  | 80                    | 9,250        | 8,175                              | 100-150                 |
| Q1               | 70                  | 70                    | 8,350        | 7,375                              | 100-150                 |

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| REV | CHANGE         | DR  | BY  | DSN | APV | DATE     | REV | CHANGE | DR | BY | DSN | APV | DATE |
|-----|----------------|-----|-----|-----|-----|----------|-----|--------|----|----|-----|-----|------|
| C   |                |     |     |     |     |          | F   |        |    |    |     |     |      |
| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
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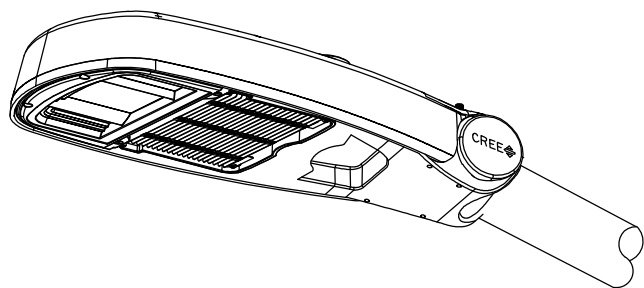
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
14KL FIXTURE

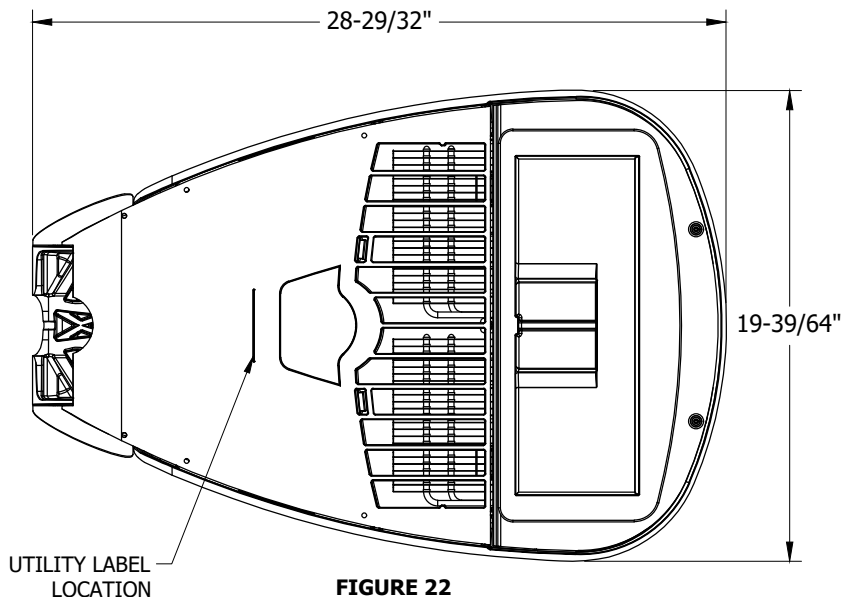
OH1572.15  
UG4472.15



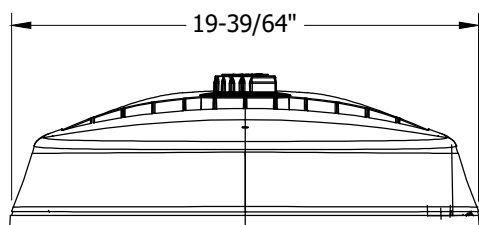
**ATTENTION:** SEE NOTES & REFERENCES PAGE OH1572.19. LUMEN OUTPUT SETTING MUST BE IDENTIFIED FOR THIS FIXTURE INSTALLATION USING TABLE 12 ON NEXT SHEET.



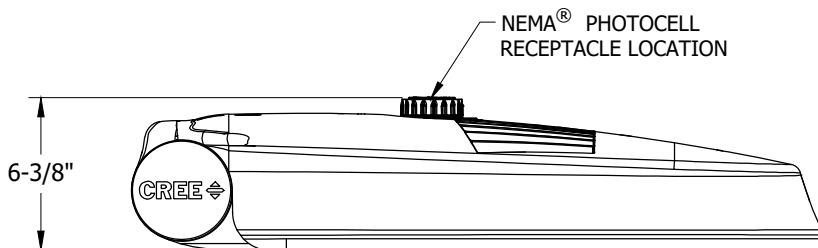
**FIGURE 21**  
ISOMETRIC



**FIGURE 22**  
BOTTOM



**FIGURE 23**  
FRONT



**FIGURE 24**  
SIDE

**TABLE 11**

| STOCK NUMBER | MANUFACTURER NAME/STYLE | LUMENS PACKAGE | COLOR TEMPERATURE | UNIT WEIGHT | PROJECTED AREA          | DISTRIBUTION TYPE | DESIGN UNITS |
|--------------|-------------------------|----------------|-------------------|-------------|-------------------------|-------------------|--------------|
| S473146      | CREE / RSW EXTRA LARGE  | 24000L         | 3000K             | 28.8 LBS    | SEE LUMINAIRE EPA TABLE | TYPE III MEDIUM   | RWX3         |

**LUMINAIRE ESTIMATED PROJECTED AREA (EPA)**

| HORIZONTAL TENON. CONFIG.   | SINGLE | 2 @ 90° | 2 @ 180° |
|---|--------|---------|----------|
|   |        |         |          |
| STANDARD LUMINAIRE (FT <sup>2</sup> )<br>(TENON EPA NOT INCLUDED) | 1.17   | 1.93    | 2.33     |

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|-----|----------------|-----|-----|-----|-----|----------|-----|--------|----|----|-----|-----|------|
| C   |                |     |     |     |     |          | F   |        |    |    |     |     |      |
| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
| A   | ORIGINAL ISSUE | AMP | RSL | JES | CZH | 04/28/21 | D   |        |    |    |     |     |      |

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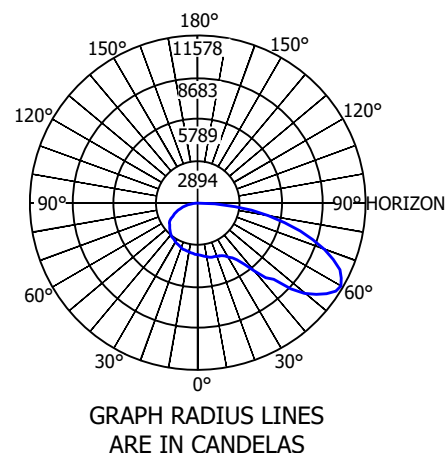
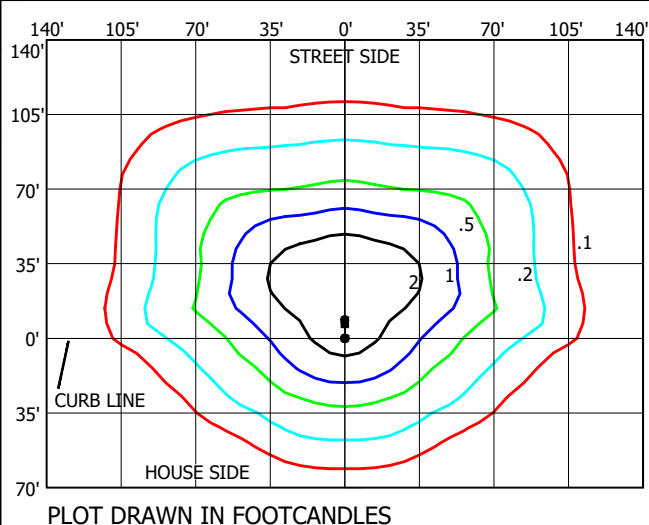
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
24KL FIXTURE

OH1572.16  
UG4472.16



LUMENS: 23800  
WATTS: 223  
HT: 35'  
ARM LENGTH: 6'  
ARRANGEMENT: SINGLE  
.IES FILE NAME:  
RSWX-A-HT-3ME-24L-30K7-UL-  
GY-N 11983868.04.IES



THIS SPACE INTENTIONALLY LEFT BLANK - NO  
BACKLIGHT SHIELD AVAILABLE FOR THIS  
FIXTURE

**ATTENTION:** LUMEN OUTPUT "Q" SETTING MUST BE INCLUDED FOR EACH FIXTURE WITHIN THE CONSTRUCTION NOTES FOR EACH LOCATION IN THE JOB PACKAGE.

**TABLE 12**

| Q OPTION SETTING | ACTUAL SYSTEM WATTS | NOMINAL LABEL WATTAGE | LUMEN OUTPUT | LUMEN OUTPUT WITH BACKLIGHT SHIELD | HPSV EQUIVALENT WATTAGE |
|------------------|---------------------|-----------------------|--------------|------------------------------------|-------------------------|
| Q9 (FULL POWER)  | 223                 | 220                   | 23,800       | 22,800                             | 400                     |
| Q8               | 212                 | 210                   | 22,800       | 21,800                             | 400                     |
| Q7               | 200                 | 200                   | 21,700       | 20,800                             | 400                     |
| Q6               | 191                 | 190                   | 20,900       | 20,000                             | 250-400                 |
| Q5               | 172                 | 170                   | 19,100       | 18,300                             | 250-400                 |
| Q4               | 156                 | 160                   | 17,800       | 17,100                             | 250-400                 |
| Q3               | 138                 | 140                   | 15,900       | 15,300                             | 250                     |
| Q2               | 121                 | 120                   | 14,350       | 13,725                             | 250                     |
| Q1               | 107                 | 110                   | 12,875       | 12,325                             | 150-250                 |

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| B   |                |     |     |     |     |          | E   |        |    |    |     |     |      |
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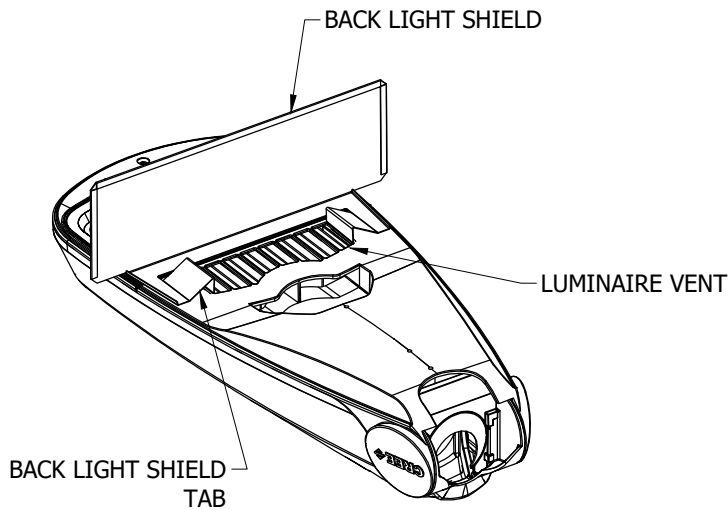
SHEET  
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SDG&amp;E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

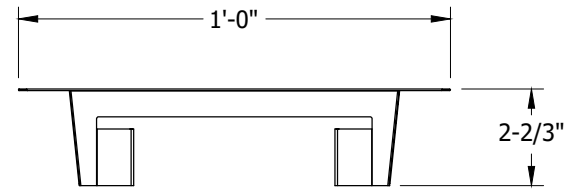
CREE RSW ROADWAY LIGHTING  
24KL FIXTURE

OH1572.17  
UG4472.17

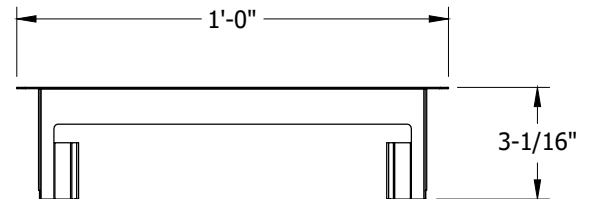




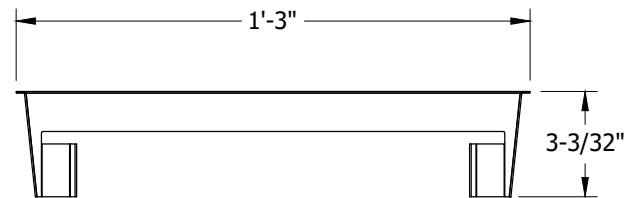
**FIGURE 25**  
ISOMETRIC



**FIGURE 26**  
TOP VIEW



**FIGURE 27**  
TOP VIEW



**FIGURE 28**  
TOP VIEW

**TABLE 13**

| RSW LED BACK LIGHT SHIELD |                                |        |  |              |
|---------------------------|--------------------------------|--------|--|--------------|
| STOCK NUMBERS             | DESCRIPTION                    | FIGURE | FIXTURE TYPE COMPATIBILITY BY STOCK NUMBER | DESIGN UNITS |
| S643018                   | RSW, BACK LIGHT SHIELD, SMALL  | 26     | S473138, S472140                           | RWBSS        |
| S643020                   | RSW, BACK LIGHT SHIELD, MEDIUM | 27     | S473142, S473150                           | RWBSM        |
| S643022                   | RSW, BACK LIGHT SHIELD, LARGE  | 28     | S473144                                    | RWBSL        |

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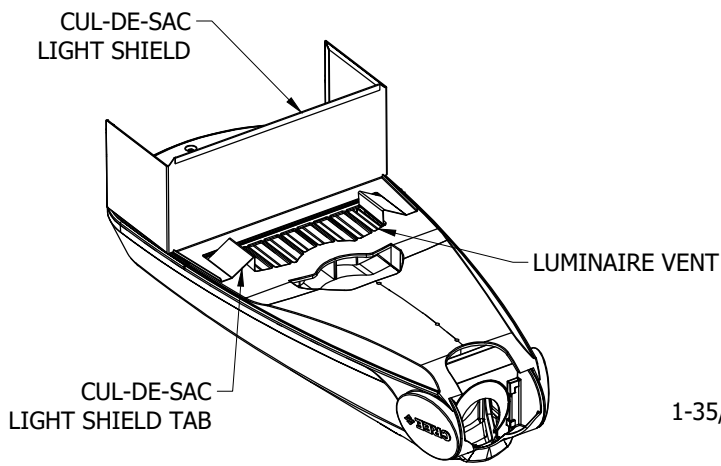
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

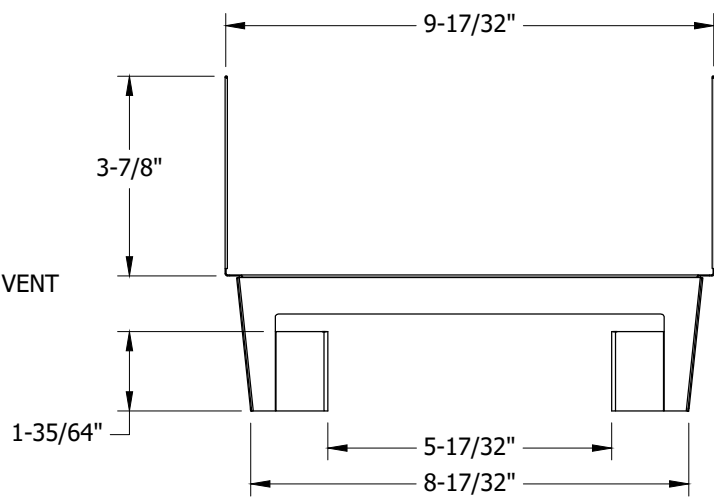
CREE RSW ROADWAY LIGHTING  
FIXTURES - LIGHT SHIELDS

OH1572.18  
UG4472.18

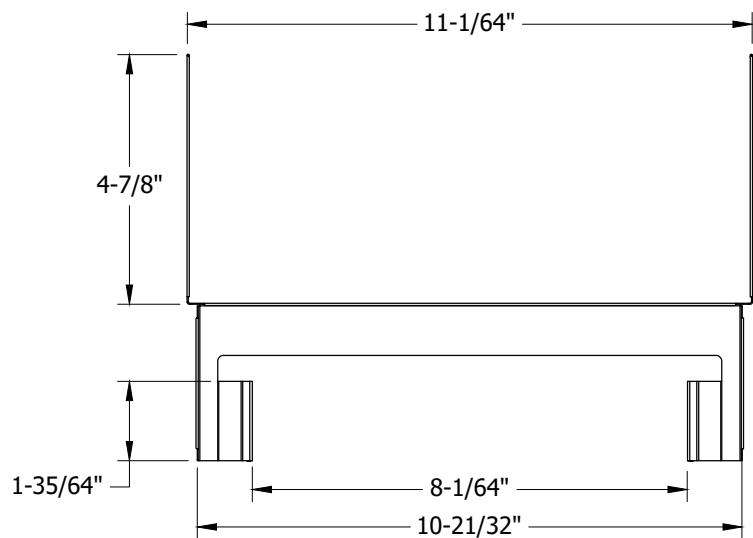




**FIGURE 29**  
ISOMETRIC



**FIGURE 30**  
TOP VIEW



**FIGURE 31**  
TOP VIEW

**TABLE 14**

| RSW CUL-DE-SAC LIGHT SHIELD |                                      |        |  |              |
|-----------------------------|--------------------------------------|--------|--|--------------|
| STOCK NUMBERS               | DESCRIPTION                          | FIGURE | FIXTURE TYPE COMPATIBILITY BY STOCK NUMBER | DESIGN UNITS |
| S643024                     | RSW, CUL-DE-SAC LIGHT SHIELD, SMALL  | 30     | S473138, S472140                           | RWCSS        |
| S643026                     | RSW, CUL-DE-SAC LIGHT SHIELD, MEDIUM | 31     | S473142, S473150                           | RWCSM        |

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

CREE RSW ROADWAY LIGHTING  
FIXTURES - LIGHT SHIELDS

OH1572.19  
UG4472.19



## INTSALLATION

### A. CUL-DE-SAC AND BACK LIGHT SHIELDS

1. INSERT ONE OF THE TABS ON THE LIGHT SHIELD INTO THE FIRST SLOT IN THE LUMINAIRE VENT BY PRESSING THE TAB DOWN INTO THE SLOT. SEE FIGURES 25 AND 29 FOR BACK LIGHT OR CUL-DE-SAC LIGHT SHIELD VARIATIONS RESPECTIVELY.
2. INSERT THE OTHER LIGHT SHIELD TAB INTO THE LAST SLOT ON THE LUMINAIRE VENT BY PRESSING THE TAB DOWN INTO THE SLOT. SEE FIGURES 25 AND 29 FOR BACK LIGHT OR CUL-DE-SAC LIGHT SHIELD VARIATIONS RESPECTIVELY.

**BILL OF MATERIALS:** NONE

**NOTES:**

- I. REFER TO SPECIFIC PRODUCT INSTALLATION MANUALS PROVIDED WITH ITEM FOR COMPLETE SAFETY AND INSTALLATION INSTRUCTIONS.

## REFERENCES:

- a. SEE OVERHEAD CONSTRUCTION STANDARD 1570 FOR OVERHEAD LIGHTING INSTALLATION.
- b. SEE UNDERGROUND CONSTRUCTION STANDARD 4431 FOR UNDERGROUND LIGHTING INSTALLATION.
- c. SEE OVERHEAD CONSTRUCTION STANDARD 1512 FOR PHOTOELECTRIC CONTROLS AVAILABLE.

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|                   |                | SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS       |     |                    |     |          |          |        |                     |    |                        |     |      |  |
|                   |                | CREE RSW ROADWAY LIGHTING<br>FIXTURE - LIGHT SHIELDS |     |                    |     |          |          |        |                     |    |                        |     |      |  |



4500 - GROUNDING



4500 - GROUNDING







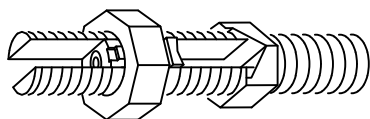




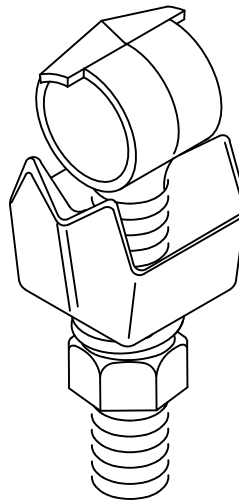
**SCOPE:** THIS STANDARD COVERS THE HARDWARE USE IN GROUNDING PAD MOUNTED AND SUB-SURFACE EQUIPMENT AND FACILITIES.

**NOTES:**

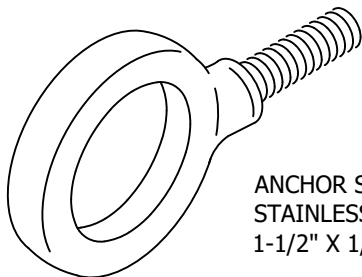
- I. ALL NEW CONNECTIONS AND HARDWARE USE IN THE CONNECTION AND MOUNTING OF GROUNDS SHALL BE COPPER, SILICON BRONZE, AND STAINLESS STEEL. **GALVANIZED MOUNT HARDWARE FOR GROUNDING SHALL NO LONGER BE USED.** THE STAINLESS STEEL EYE BOLTS AND BRACKETS WILL PREVENT CORROSION AND LIMIT RUST IN THE WATER, **ALLOWING THE PRACTICE OF PUMPING WATER TO CONTINUE.** USE THE 2" x 3" STAINLESS STEEL MOUNTING BRACKET TO ATTACH THE STAINLESS STEEL SHOULDER EYE BOLT FOR DEAD-ENDING AND PASSING THE GROUND WIRE AROUND A CORNER. THIS WILL ELIMINATE CUTTING AND DAMAGING THE GROUND WIRE. THE 1/2" X 6" EYE BOLT IS USED FOR PULL THE GROUND WIRE TAUGHT.



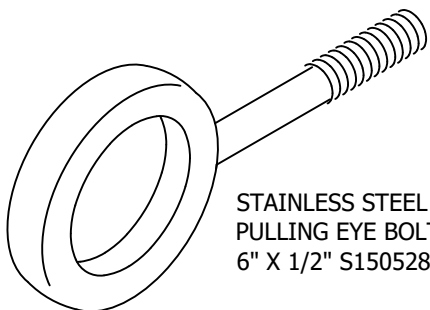
SPLIT BOLT STUD BRONZE  
3/8" X 16 S262624  
1/2" X 13 S262560



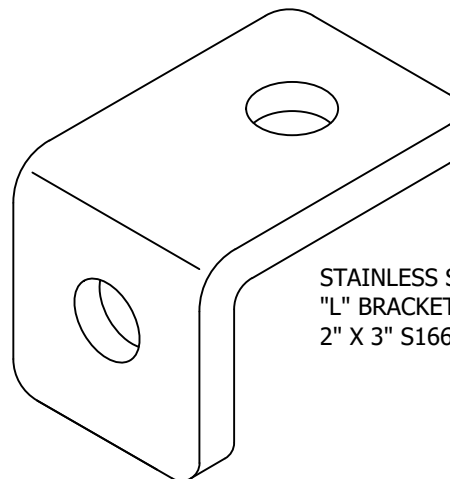
BRONZE EYE BOLT CLAMP  
8 TO 2/0 S471312  
6 TO 250 S471296  
4/0 TO 500 S471232



ANCHOR SHOULDER EYE BOLT  
STAINLESS STEEL  
1-1/2" X 1/2" S152710



STAINLESS STEEL  
PULLING EYE BOLT  
6" X 1/2" S150528



STAINLESS STEEL  
"L" BRACKET  
2" X 3" S166072

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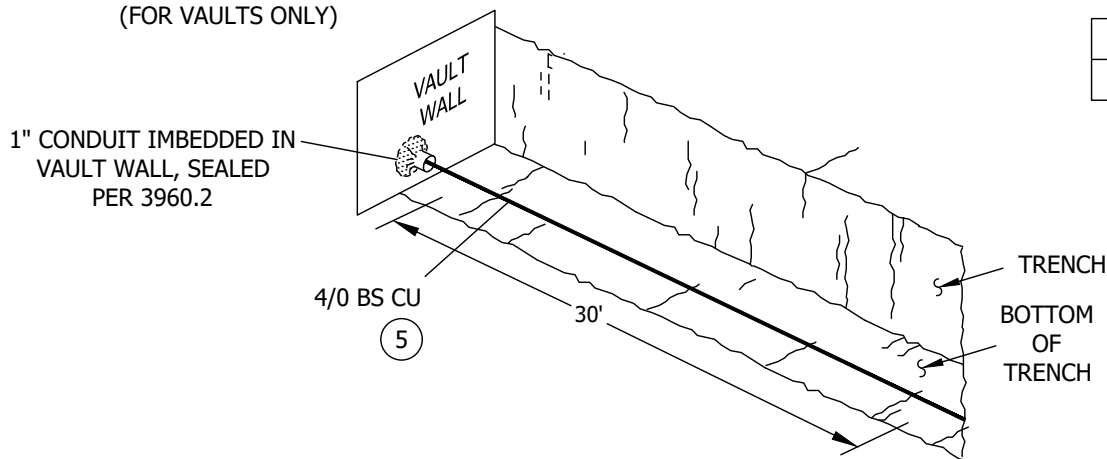
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

GROUNDING HARDWARE

UG4505



THIS STANDARD SHOWS THE STANDARD TRENCH GROUND WIRE INSTALLATIONS AND EQUIPMENT GROUNDS FOR ALL NEW CONSTRUCTION FOR ALL PARTIES USED TO PROVIDE GROUNDING, CONDUIT, AND PAD INSTALLATIONS. THIS INCLUDES ALL NEUTRALS SUPPLIED FROM THE SUBSTATION BANK AND NEUTRALS SUPPLIED BY A GROUNDING BANK AND TRENCH GROUNDS FOR DELTA UNDERGROUND SYSTEMS.



|                |
|----------------|
| ASSEMBLY UNITS |
| TG-T-W         |

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |
| TRENCH GROUND WIRE (STANDARD METHOD)              |                           |                    |          |                     |

SHEET  
1 OF 3

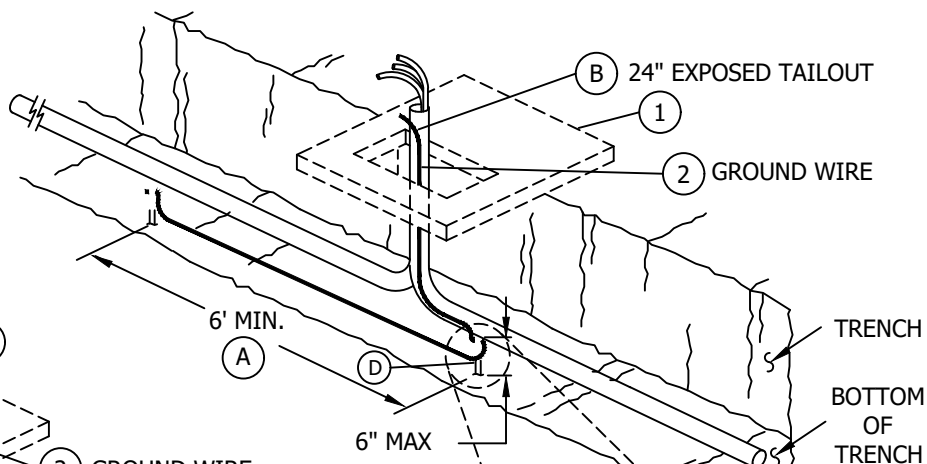
UG4510.1



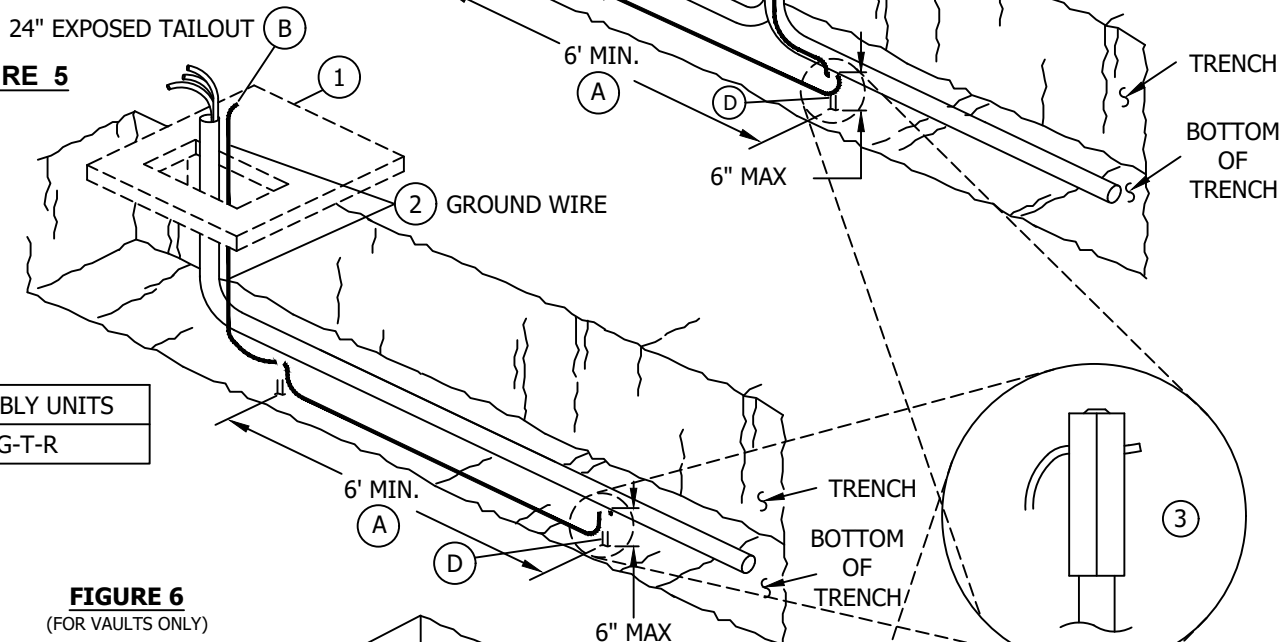
### SCOPE:

THIS STANDARD SHOWS THE ALTERNATE TRENCH GROUND WIRE INSTALLATIONS AND EQUIPMENT GROUNDS FOR ALL NEW CONSTRUCTION. WHEN THE TRENCH IS SHORT AND CAN NOT MEET STD. 4510.1, AS OUTLINED BELOW, FOR CONDUIT AND PAD INSTALLATIONS. THIS INCLUDES ALL NEUTRALS SUPPLIED FROM THE SUBSTATION BANK AND NEUTRALS SUPPLIED BY A GROUNDING BANK AND TRENCH GROUNDS FOR DELTA UNDERGROUND SYSTEMS.

**FIGURE 4**



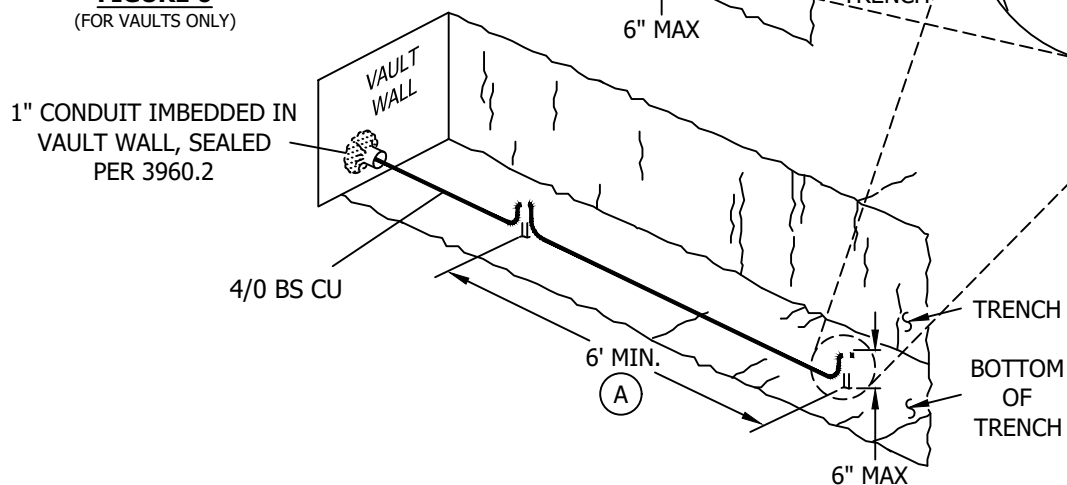
**FIGURE 5**



## ASSEMBLY UNITS

TG-T-R

**FIGURE 6**  
(FOR VAULTS ONLY)



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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## TRENCH GROUND WIRE (STANDARD METHOD)

UG4510.2



### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION                              | QUANTITY | STOCK NUMBER        | ASSEMBLY UNITS |
|------|--|----------|---------------------|----------------|
| 1    | PAD                                      | 1        | REFER TO WORK ORDER | --             |
| 2    | WIRE, BARE COPPER, #2, 7 STR. SOFT DRAWN | AS REQ'D | S812816 (b)         | GDWIRE         |
| 3    | GROUND ROD, 5/8" X 8'-0", COPPERWELD     | AS REQ'D | S603072             | --             |
| 4    | COPPER BONDED GROUND CONNECTORS          | AS REQ'D | S259010             | --             |
| 5    | 4/0 BARE STRAND CU                       | AS REQ'D | --                  | --             |

**NOTES:**

CUSTOMER PRIMARY SERVICE TRENCHES, CUSTOMER PRIMARY METERING, CUSTOMER PRIMARY EQUIPMENT INSTALLATIONS, APPLICANT INSTALLED, SDG&E INSTALLED TRENCH GROUNDS AND ALL PRIMARY EQUIPMENT.

ALL PARTIES THAT ARE INVOLVED IN THE INSTALLATION OF ABOVE TRENCH GROUND OR EQUIPMENT GROUNDS SHALL USE THE SDG&E STANDARD TRENCH AND EQUIPMENT STANDARD GROUND METHOD THAT INCORPORATES THE GEM (GROUND ENHANCEMENT MATERIAL) COVERING THE GROUND WIRE IN THE TRENCH IN UNDERGROUND STANDARD (4510.1 AND 4510.2). THIS GROUND METHOD USING THE GEM MATERIAL PRODUCES THE LOWEST GROUND RESISTANCE FOR ALL SOIL CONDITION. INSPECTORS AND CONTRACT ADMINISTRATORS SHALL VERIFY THE USE OF THE GEM MATERIAL AND THIS IS THE ONLY TRENCH GROUND METHOD SDG&E APPROVES.

## INSTALLATION:

- Ⓐ GROUND RODS TO HAVE A SIX-FOOT MINIMUM SEPARATION.
- Ⓑ LEAVE 24 INCHES OF WIRE (EXPOSED TAILOUT) ABOVE THE TOP OF FINAL GRADE.
- Ⓒ LOCATE GROUND RODS SO THE DO NOT TOUCH CONDUITS. GENERAL ORDER 128 REQUIRES GROUND RODS TO BE DRIVEN. THEY MAY BE DRIVEN AT AN ANGLES IF IT IS DIFFICULT IF NOT IMPOSSIBLE TO DRIVE STRAIGHT DOWN.

**REFERENCE:**

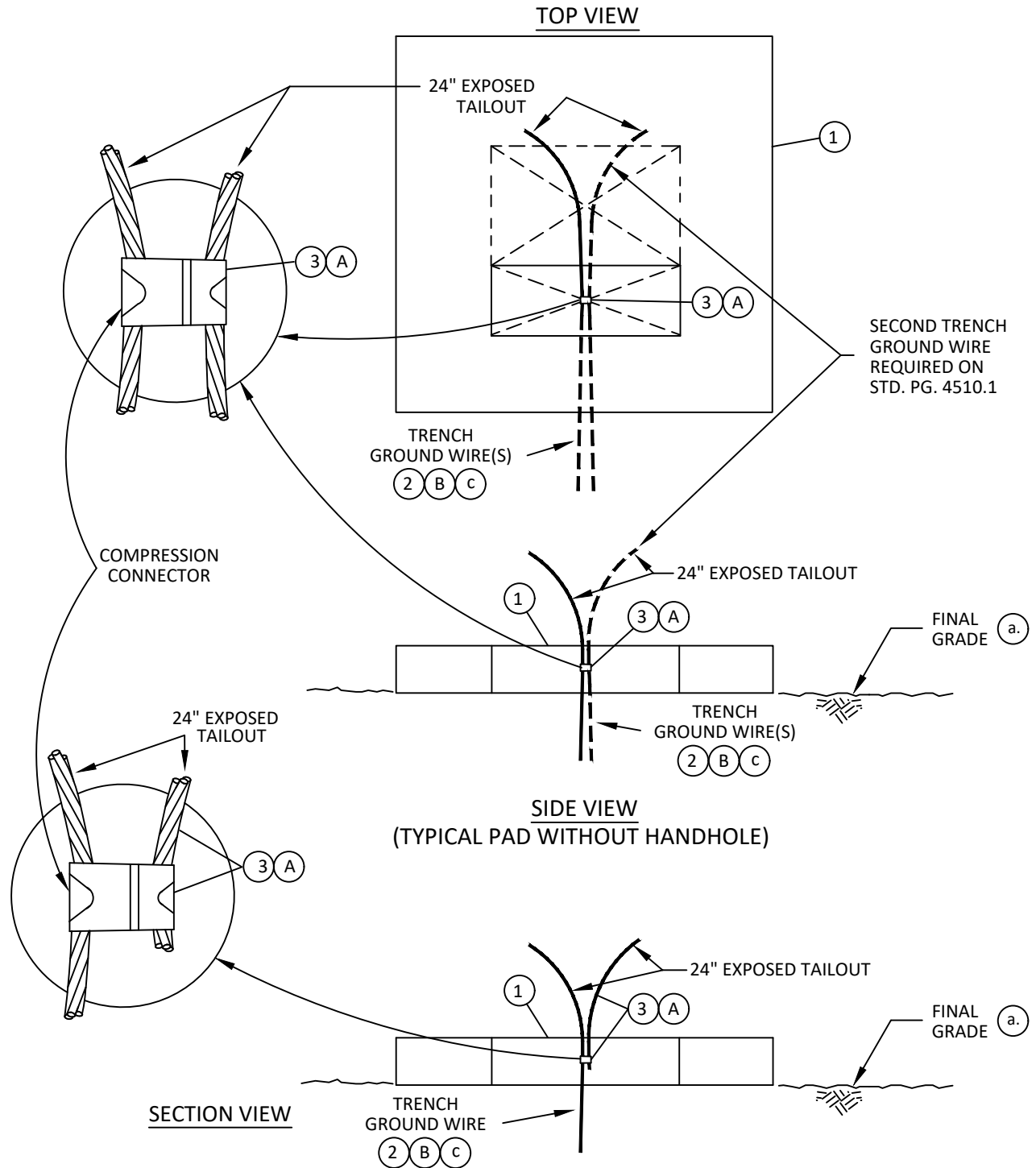
- a SEE STANDARD 3483.1 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- (b) SEE STANDARD 4002.2 FOR WIRE INFORMATION.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |        |          |                    |        |    |          |      |      |                     |  |          |
|                 |                   | TRENCH GROUND WIRE (STANDARD OR ALTERNATE)        |                           |        |          |                    |        |    |          |      |      |                     |  |          |



**SCOPE:** THIS STANDARD SHOWS SINGLE-PHASE EQUIPMENT GROUNDING INSTALLATION USED WITH STANDARD OR ALTERNATE TRENCH GROUND WIRE, AS INSTALLED PER STANDARD 4510.



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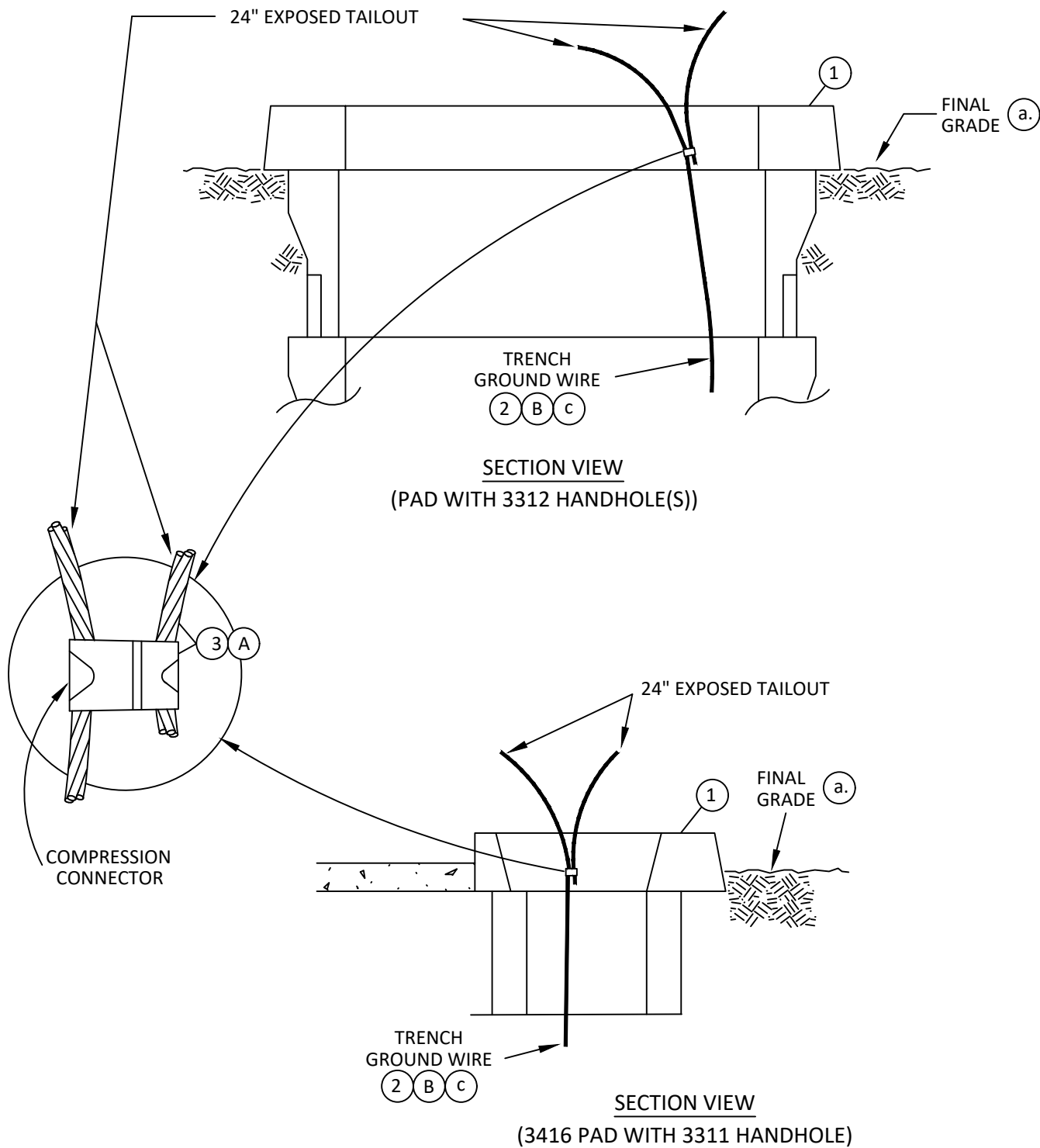
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

EQUIPMENT GROUNDING INSTALLATION

UG 4512.1


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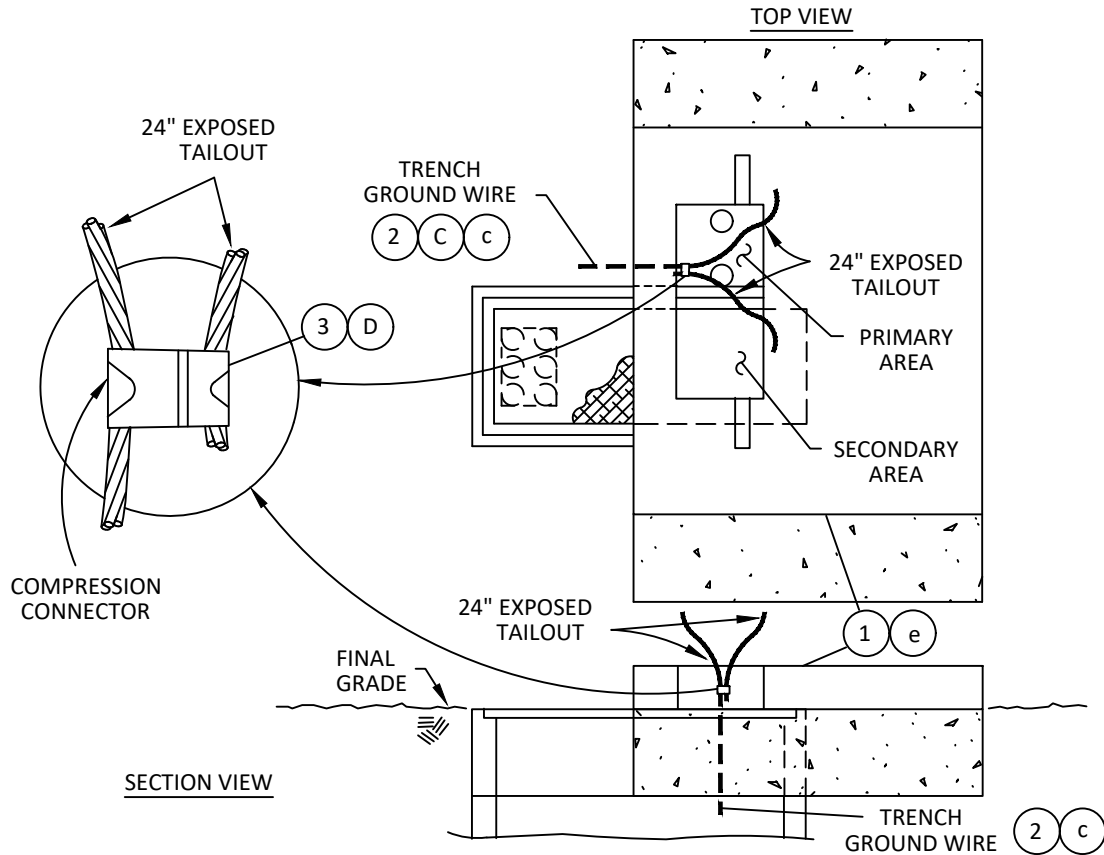
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| SHEET<br>2 OF 4 |  | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed | UG 4512.2 |
|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |  |                    |  |          |  |                     |           |
|                 | EQUIPMENT GROUNDING INSTALLATION  |                           |  |                    |  |          |  |                     |           |



**SCOPE:** THIS STANDARD SHOWS THREE-PHASE EQUIPMENT GROUNDING INSTALLATION USED WHEN TRENCH GROUND WIRE (STANDARD AND ALTERNATE) IS INSTALLED, STANDARD 4510.



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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                    |          |                                 |           |
|                 | EQUIPMENT GROUNDING INSTALLATION                 |                    |          |                                 |           |



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                              | QUANTITY | STOCK NUMBER        | ASSEMBLY UNITS |
|------|--|----------|---------------------|----------------|
| 1    | PAD                                      | 1        | REFER TO WORK ORDER | -              |
| 2    | WIRE, BARE COPPER, #2, 7 STR. SOFT DRAWN | AS REQ'D | S812816 (D)         | GDWIRE         |
| 3    | CONNECTOR, COMPRESSION                   | AS REQ'D | S257760 (A)         | -              |
| 4    |  |          |                     |                |

**INSTALLATION:**



- (A) IN CASES WHERE THERE ARE TWO GROUND WIRES, SQUEEZE THE GROUND WIRES TOGETHER WITH A COMPRESSION CONNECTOR. WHERE THERE IS ONLY ONE TRENCH GROUND WIRE, ADD THE SECOND 24" TAILOUT WIRE. SDG&E SHALL FURNISH AND INSTALL THE COMPRESSION CONNECTOR AND THE SECOND 24" TAILOUT WIRE.
- (B) (STANDARD) OR (ALTERNATE) TRENCH GROUND WIRE IS REQUIRED, FOR ALL EQUIPMENT AND TRENCH GROUNDS.
- (C) BUTT TRENCH GROUND WIRE AGAINST 3314 HANDHOLE.
- (D) IN CASES WHERE THERE ARE TWO GROUND WIRES, SQUEEZE THE GROUND WIRES TOGETHER WITH A COMPRESSION CONNECTOR. WHERE THERE IS ONLY ONE TRENCH GROUND WIRE, ADD THE SECOND 24" TAILOUT WIRE. SDG&E SHALL FURNISH AND INSTALL THE COMPRESSION CONNECTOR AND THE SECOND 24" TAILOUT WIRE.

**REFERENCE:**

- (a) SEE STANDARD 3484.1 FOR PAD INSTALLATION USED FOR MOUNTING PAD-MOUNTED EQUIPMENT.
- (b) SEE STANDARD 4002.2 FOR WIRE INFORMATION.
- (c) SEE STANDARD 4510 FOR (STANDARD) AND (ALTERNATE) TRENCH GROUND WIRE INSTALLATION.
- (d) SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.
- (e) SEE STANDARD PAGES 3426.4 & 3427.4 FOR THREE-PHASE TRANSFORMER PAD INSTALLATION.
- f. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL

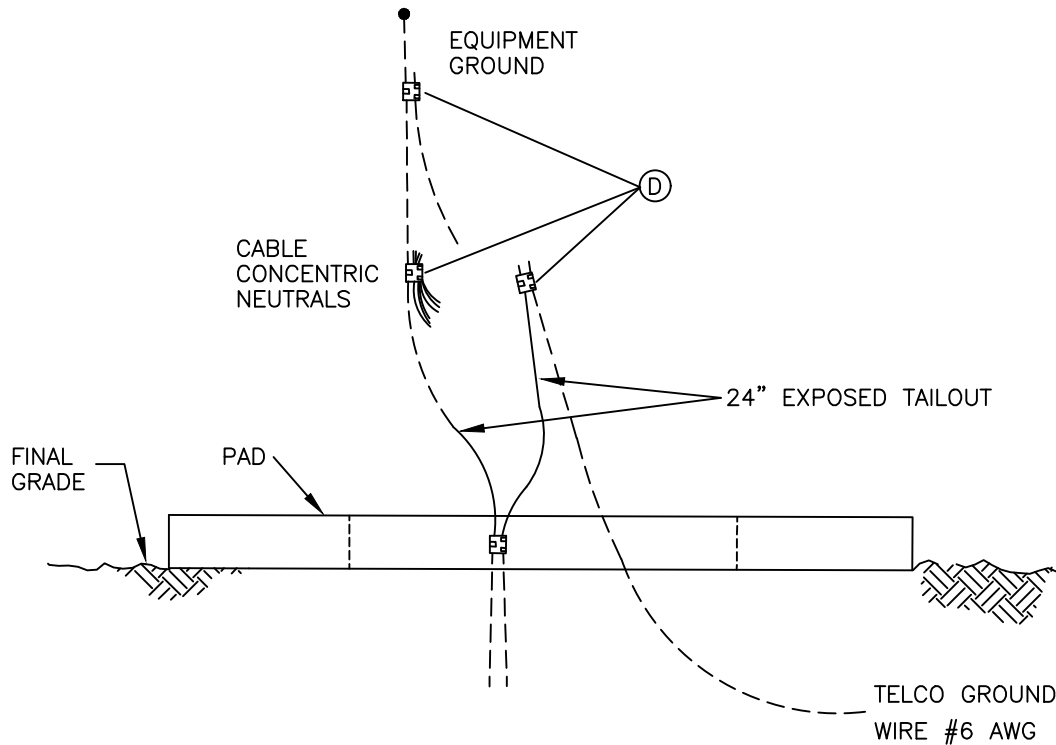
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| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 5/24/2016 | D   |        |    |      |      |      |

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |  |                    |  |          |   |                     |           |
|                 | EQUIPMENT GROUNDING INSTALLATION  |                           |  |                    |  |          |   |                     |           |



**SCOPE:** THIS STANDARD SHOWS GROUND WIRE INSTALLATION AT PAD-MOUNTED EQUIPMENT.



**INSTALLATION:**


- A. SDG&E HAS AGREED TO CONNECT TELCO #6 AWG COPPER GROUND WIRE TO SDG&E'S GROUNDING SYSTEM AT SDG&E'S PAD-MOUNTED EQUIPMENT. TELCO PERSONNEL WILL RUN THIS TO SDG&E'S PAD LOCATION BEFORE THE PAD IS SET.
  - B. IN SOME CASES, TELCO MAY INSTALL THEIR GROUND WIRE IN AN IDENTIFIED GROUND WIRE CONDUIT. IF THE CONDUIT IS PRESENT, ONE OF THE FOLLOWING CONDITIONS MUST BE MET:
    1. THE TELCO GROUND WIRE MUST BE PRESENT,
    2. IF THE TELCO GROUND WIRE IS NOT PRESENT, TELCO SHOULD HAVE IDENTIFIED THE CONDUIT AND SEALED IT WITH A PERMANENT CAP OR,
    3. IF THE TELCO GROUND WIRE IS NOT PRESENT AND THE TELCO CONDUIT IS NOT SEALED, THEN SDG&E SHOULD CUT OFF THE CONDUIT BELOW GRADE LEVEL TO PREVENT FUTURE UNAUTHORIZED WIRE ENTRY. (SDG&E NEED NOT CAP THE TELCO CONDUIT.)
  - C. WHEN COMPLETING THE SDG&E EQUIPMENT GROUNDING CONNECTIONS, SKIN THE TELCO WIRE AND CONNECT IT TO ONE OF OUR GROUND GRID TAILOUTS AS SHOWN IN THE ABOVE DIAGRAM.
- Ⓓ USE COMPRESSION CONNECTORS, SEE STANDARD 4172.2 FOR COMPRESSION CONNECTORS.

**REFERENCE:**

- a. SEE STANDARD 4512 FOR EQUIPMENT GROUNDING.
- b. AVAILABLE IN SERVICE STANDARDS AND GUIDE MANUAL

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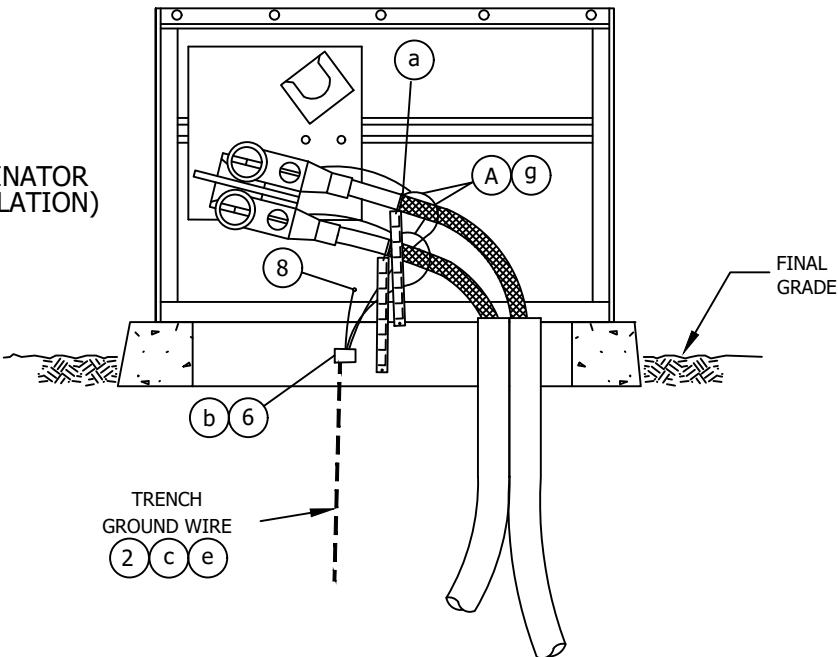
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| A   | NO CHANGES - REAFFIRMED | JS | TR   | MDJ  | 5/23/2016 | D   |        |    |      |      |      |

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|                 | SDG&E ELECTRIC UNDERGROUND STANDARD   |                           |                    |          |                     |         |
|                 | GROUNDING TELCO CONDUCTOR<br>IN PAD-MOUNTED EQUIPMENT                               |                           |                    |          |                     |         |

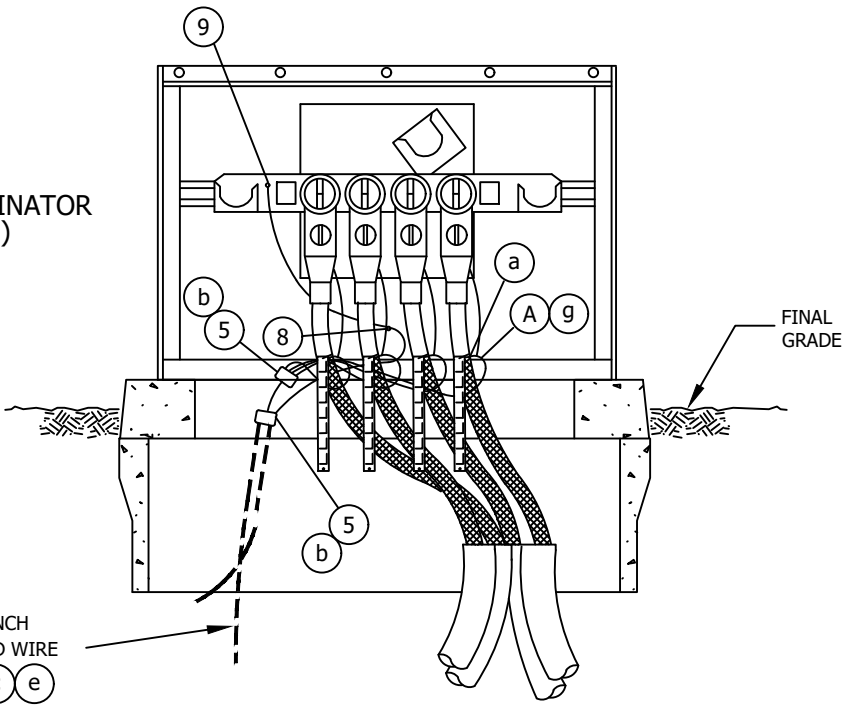


**SCOPE:** THIS STANDARD SHOWS GROUNDING INSTALLATIONS USED TO PROVIDE PAD-MOUNTED EQUIPMENT GROUNDING.

3522 SINGLE-PHASE CABLE TERMINATOR  
(FEED THROUGH BUSHING INSTALLATION)



3522 SINGLE-PHASE CABLE TERMINATOR  
(CABLE TAP INSTALLATION)



(NEW TAGS)

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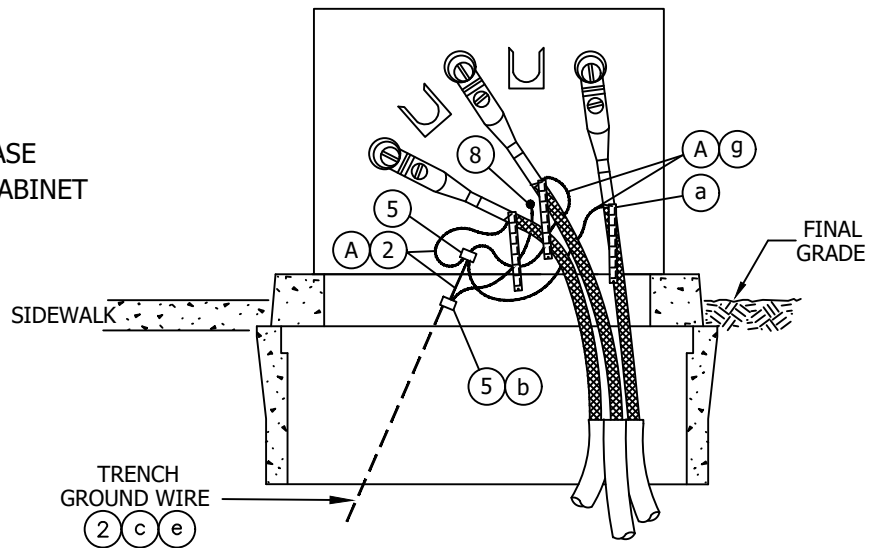
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING PAD-MOUNTED EQUIPMENT

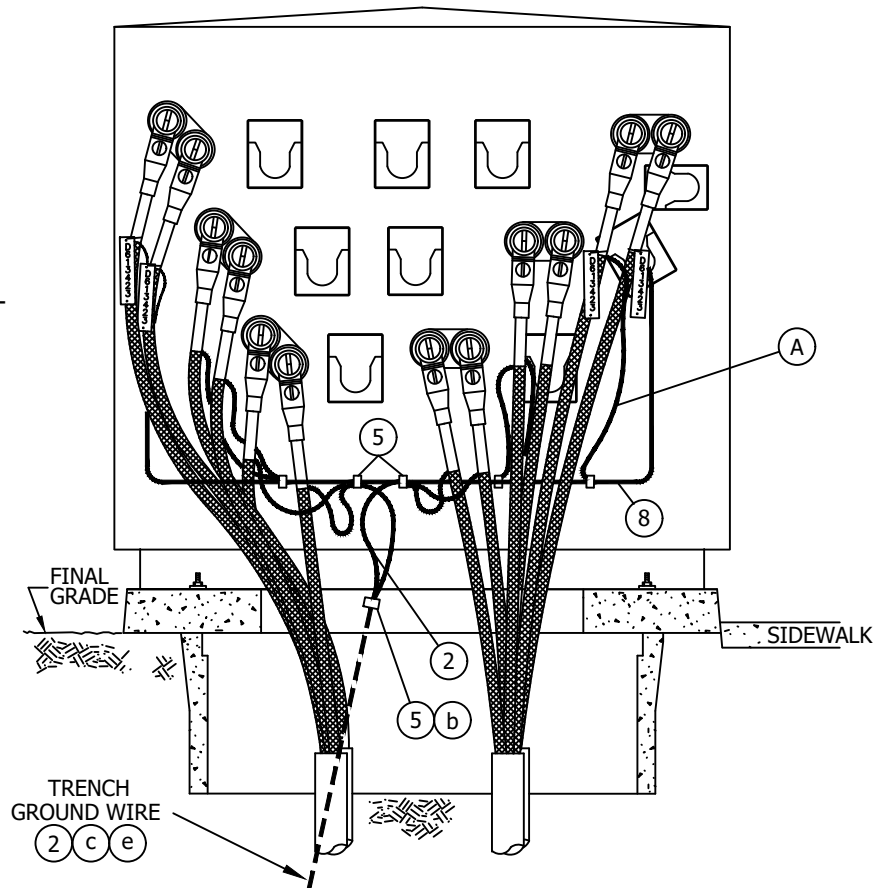
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3512 SINGLE-PHASE  
FUSED SWITCHING CABINET



3514 THREE-PHASE  
FUSED SWITCHING CABINET



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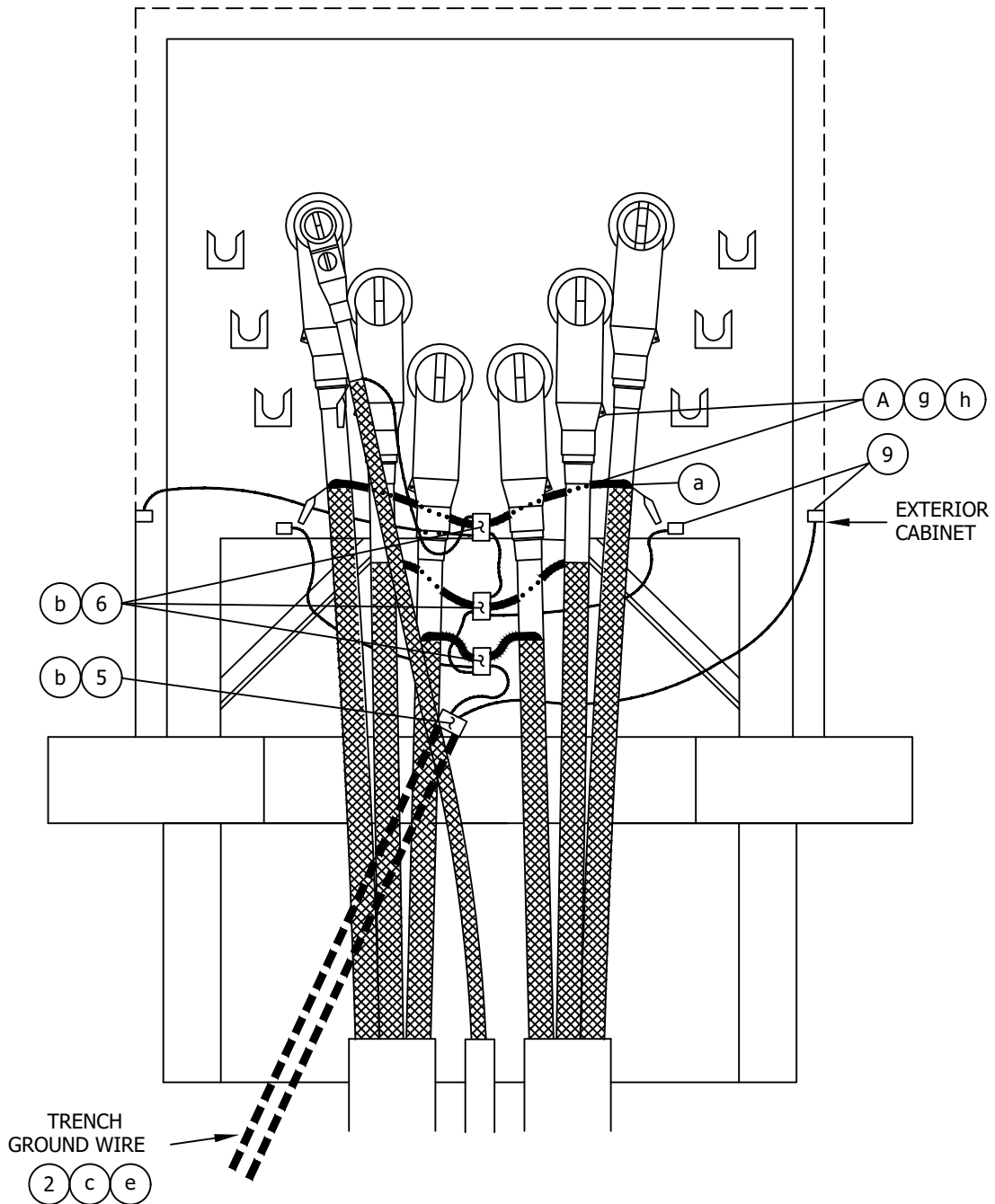
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING PAD-MOUNTED EQUIPMENT

UG4520.2





### 3575/3576 THREE-PHASE SERVICE RESTORER

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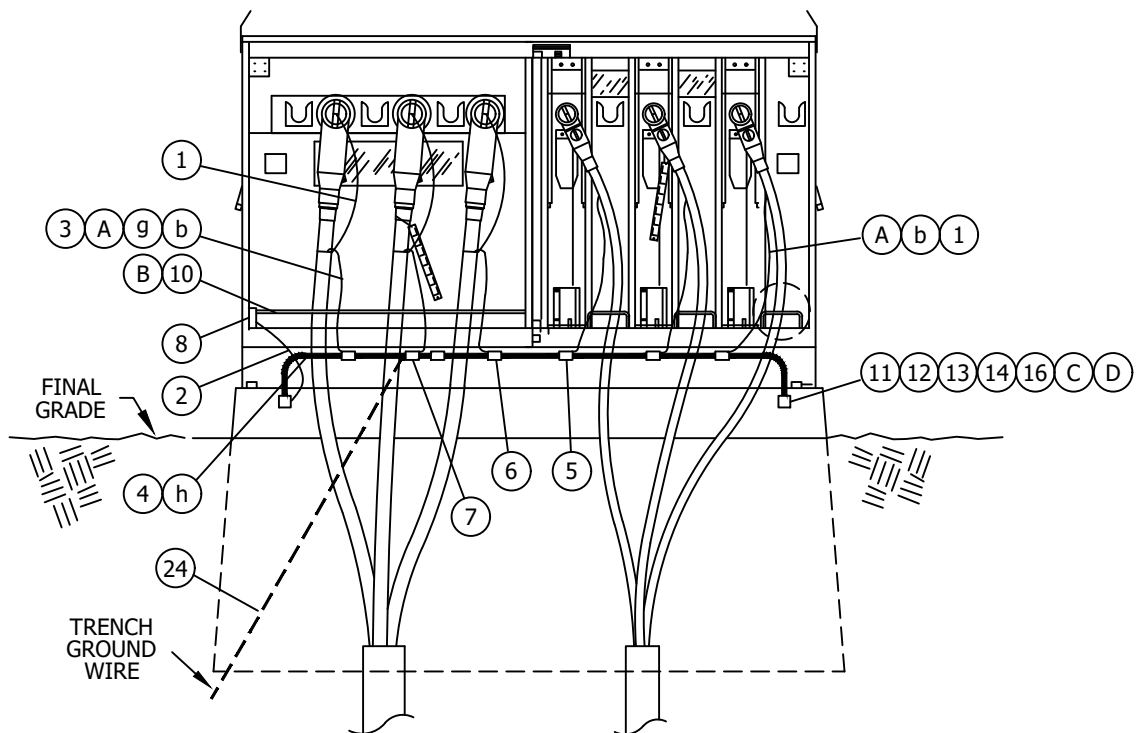
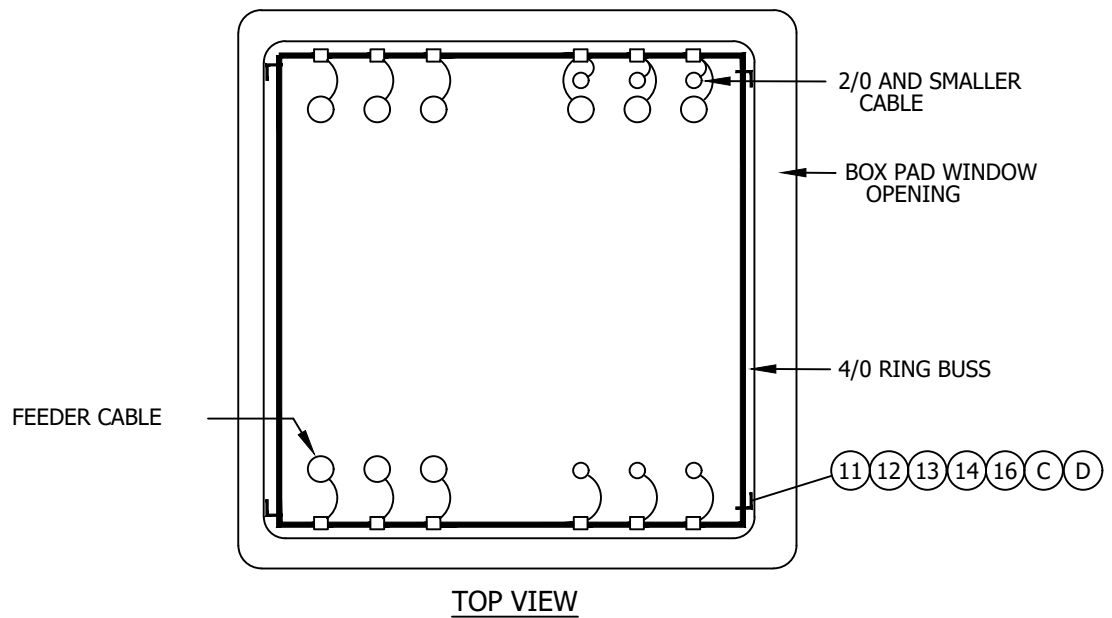
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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING PAD-MOUNTED EQUIPMENT

UG4520.3





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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING PAD-MOUNTED EQUIPMENT

**UG4520.4**



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY           | STOCK<br>NUMBER | ASSEMBLY<br>UNITS |
|------|--|--------------------|-----------------|-------------------|
| 1    | #14 SOLID CU OR A SURPLUS STRAND OF CONCENTRIC NEUTRAL | AS REQ'D           | --              | --                |
| 2    | WIRE, BARE COPPER, #2, 7 STR. SOFT DRAWN               | AS REQ'D           | 812816 M        | GDWIRE            |
| 3    | WIRE, BARE COPPER 1/0 STR. SOFT DRAWN                  | AS REQ'D           | 812752 M        | --                |
| 4    | WIRE, BARE COPPER 4/0 STR. SOFT DRAWN                  | AS REQ'D           | 812764 M        | 4/0-SD            |
| 5    | CONNECTOR, COMPRESSION 4/0 - #4                        | AS REQ'D           | 257888          | --                |
| 6    | CONNECTOR, COMPRESSION 4/0 - 1/0                       | AS REQ'D           | 257856          | --                |
| 7    | CONNECTOR, COMPRESSION 4/0 - 4/0                       | AS REQ'D           | 257824          | --                |
| 8    | SERVICE POST CONNECTOR                                 | AS REQ'D           | 262560          | --                |
| 9    | GROUND CONNECTOR PROVIDED WITH EQUIPMENT               | --                 | --              | --                |
| 10   | GROUNDING ROD  | BY<br>MANUFACTURER | 230016          | --                |
| 11   | BRACKET STAINLESS STEEL 2" C 3"                        | AS REQ'D           | S166072         | --                |
| 12   | SCREW, HEX HEAD CAP, BRONZE 1/2" X 1-1/2"              | 4                  | 616692          | --                |
| 13   | NUT, HEXAGON BRONZE, 1/2"                              | 4                  | 506112          | --                |
| 14   | WASHER, STANDARD FLAT ROUND, BRONZE 1/2"               | 8                  | 799488          | --                |
| 15   | TRENCH GROUND WIRE                                     | AS REQ'D           | --              | --                |
| 16   | WASHER, LOCK SILICONE BRONZE 1/2"                      | 4                  | 796416          | --                |

## INSTALLATION:

- (A) CONCENTRIC NEUTRAL TAILS OR EQUIVALENT WIRE SIZE PER PHASE (SEE STANDARD 4172 FOR EQUIVALENT WIRE SIZE).
- (B) GROUNDING RODS ARE FOR PERSONAL GROUNDS ONLY. MAKE NO PERMANENT CONNECTIONS ON THIS DEVICE.
- (C) INSTALL ONE UNISTRUT CHANNEL FITTING IN EACH CORNER OF THE BOX PAD. MOUNT THE FITTING ON THE VERTICAL SURFACE. INSIDE OF THE WINDOW.
- (D) INSTALL THE 4/0 COPPER WIRE IN THE CHANNEL FITTINGS. "DO NOT INSTALL EYE BOLT TO TIGHTEN RING BUSS"

**NOTE:** GEM (GROUND ENHANCEMENT MATERIAL) IS REQUIRED FOR ALL TRENCH GROUNDS AND EQUIPMENT. SEE STD. 4510

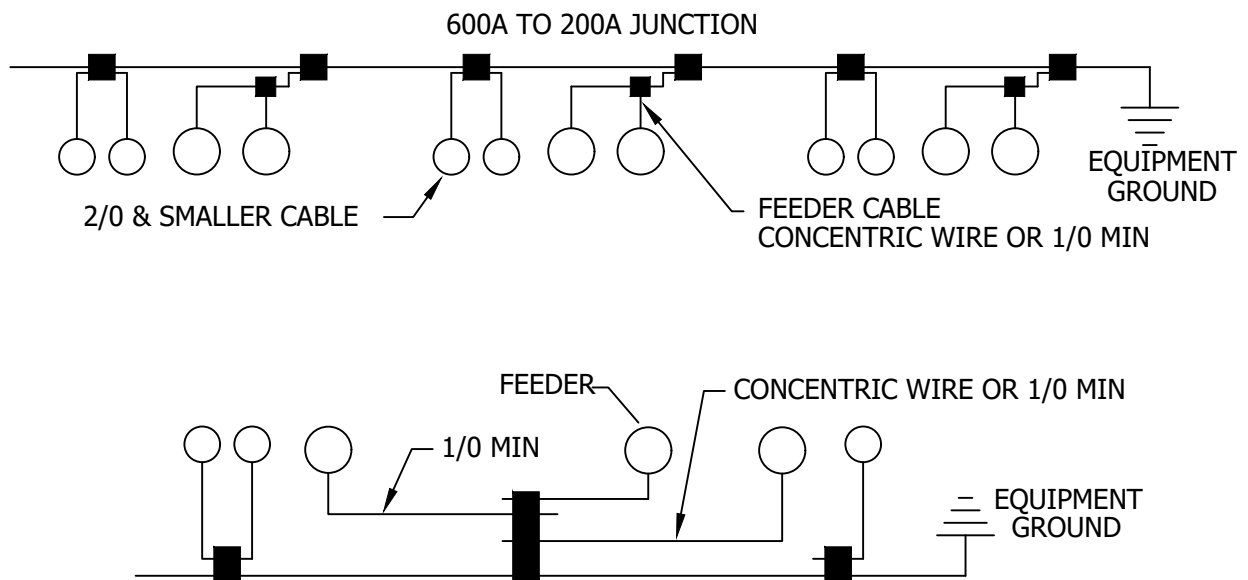
**REFERENCE:**

- (E) SEE STANDARD 4108 FOR SEALING JACKETED CABLE.
- (F) SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART AND COPPER COMPRESSION CONNECTORS.
- (G) SEE STANDARD 4510 FOR (STANDARD) AND (ALTERNATE) TRENCH GROUND WIRE INSTALLATION.
  - H. SEE STANDARD PAGE 4512.1 FOR EQUIPMENT GROUNDING INSTALLATION.
- (I) SEE STANDARD 4510 FOR EQUIPMENT GROUNDING INSTALLATION.
- J. SEE STANDARD 4514 FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT.
- (K) SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- (L) STANDARD 4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- (M) SEE STANDARD 4002.2 FOR WIRE INFORMATION.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                    |     |          |    |                     |      | UG4520.5 |
|                 |                   | GROUNDING PAD-MOUNTED EQUIPMENT                  |                           |      |                    |     |          |    |                     |      |          |





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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |                    |          |                     |          |
|                 | GROUNDING PAD-MOUNTED EQUIPMENT                  |                           |                    |          |                     |          |



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                            | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|--------------|----------------|
| 17   | JUNCTION PLATE                         | 3        | --           | --             |
| 18   | WIRE, BARE COPPER, #2, STR. SOFT DRAWN | AS REQ'D | S812816      | GDWIRE         |
| 19   | CONNECTOR, COPPER, SIZE                | AS REQ'D | --           | --             |
| 20   | SERVICE POST CONNECTOR                 | AS REQ'D | S262560      | --             |

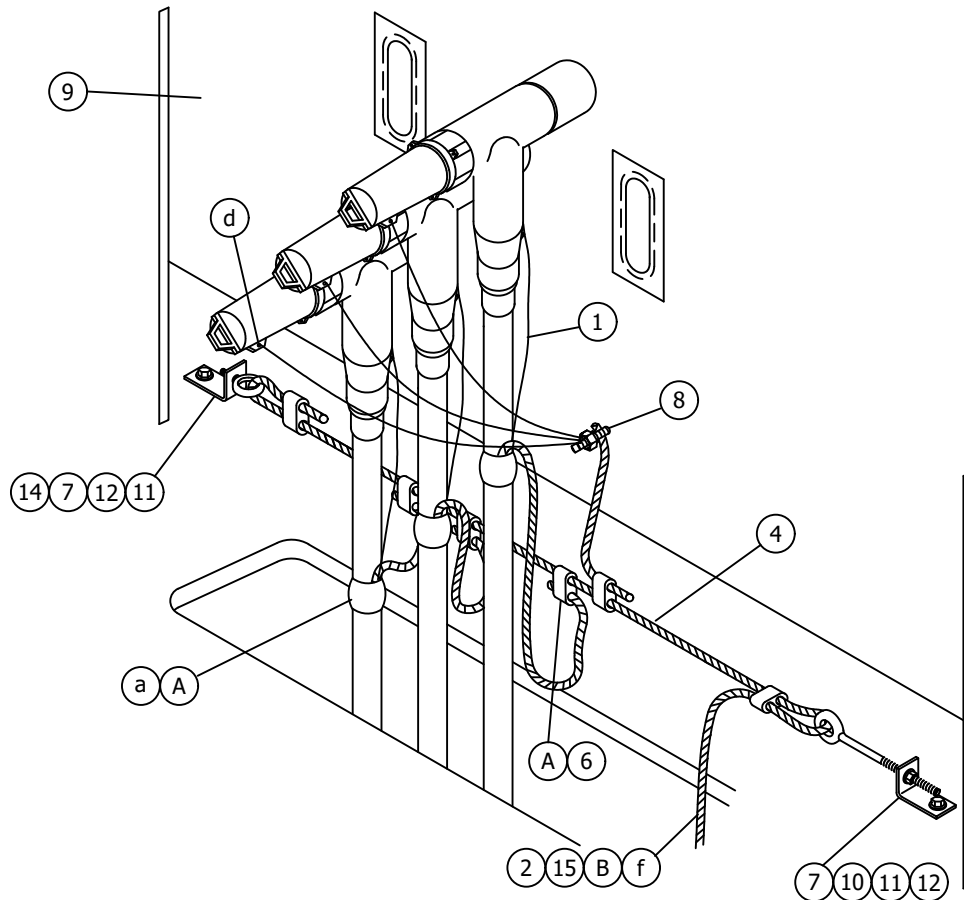
## INSTALLATION:

- (E) GROUND EACH PREMOLDED CONNECTOR ON OR IN THE GROUNDING POINT PROVIDED ON CONNECTOR. LOOP WIRE THRU THE GROUNDING EYE AND TWIST THE WIRE TIGHTLY AROUND ITSELF TAKING CARE NOT TO DAMAGE THE EYE.
- (F) GROUND BUSHING PLUGS TO EQUIPMENT GROUND.
- (G) CONNECT LIKE PHASE CONCENTRIC NEUTRALS OF FEEDER CABLES TOGETHER. CONNECT CONCENTRIC NEUTRALS TO EQUIPMENT GROUND.
- (H) CONNECT THE EQUIPMENT GROUND TO THE EXISTING GROUND RODS IN THE 3314 HANDHOLE.

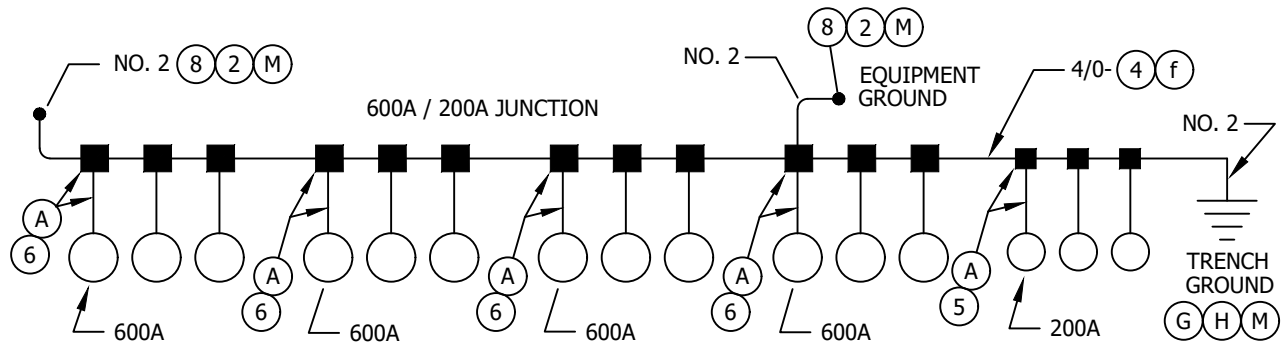
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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                    |          |                     |          |      |      |      |
|                 |                   | GROUNDING PAD-MOUNTED EQUIPMENT                  |                           |      |                    |          |                     |          |      |      |      |





**NEUTRAL AND GROUND SCHEMATIC FOR 4-WAY MANUAL, 4-WAY SCADA, AND 5-WAY SCADA TRAYER PAD-MOUNTED SWITCHES.**



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING PAD-MOUNTED EQUIPMENT

**UG4520.8**



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|--------------|----------------|
| 1    | #14 SOLID CU OR A SURPLUS STRAND OF CONCENTRIC NEUTRAL | AS REQ'D | --           | --             |
| 2    | WIRE, BARE COPPER, #2, 7 STR. SOFT DRAWN               | AS REQ'D | S812816 f    | GDWIRE         |
| 3    | WIRE, BARE COPPER 1/0 STR. SOFT DRAWN                  | AS REQ'D | S812752 f    | --             |
| 4    | WIRE, BARE COPPER 4/0 STR. SOFT DRAWN                  | AS REQ'D | S812764 f    | 4/0-SD         |
| 5    | CONNECTOR, COMPRESSION 4/0 - #4                        | AS REQ'D | S257888      | --             |
| 6    | CONNECTOR, COMPRESSION 4/0 - 1/0                       | AS REQ'D | S257856      | --             |
| 7    | CONNECTOR, COMPRESSION 4/0 - 4/0                       | AS REQ'D | S257824      | --             |
| 8    | SERVICE POST CONNECTOR                                 | AS REQ'D | S262560      | --             |
| 9    | TRAYER SWITCH  | AS REQ'D | --           | --             |
| 10   | EYE BOLT 6" X 1/2" STAINLESS STEEL                     | 1        | S150528      | --             |
| 11   | BRACKET STAINLESS STEEL 2" X 3"                        | 2        | S166072      | --             |
| 12   | BOLT 3-1/2" X 1/2" STAINLESS                           | 4        | S148804      | --             |
| 13   | TRENCH GROUND WIRE                                     | AS REQ'D | --           | --             |
| 14   | EYE BOLT, STAINLESS STEEL 1-1/2" X 1/2"                | 1        | S152710      | --             |

### INSTALLATION:

- (A) CONCENTRIC NEUTRAL TAILS OR EQUIVALENT WIRE SIZE PER PHASE (SEE STANDARD 4172 FOR EQUIVALENT WIRE SIZE).
- (B) GROUND SOURCE MAY BE TRENCH GROUND OR GROUND FROM SUB-STRUCTURE.

**NOTE:**

I. GEM (GROUND ENHANCEMENT MATERIAL) IS REQUIRED FOR ALL TRENCH GROUNDS AND EQUIPMENT. SEE STD. 4510

**REFERENCE:**

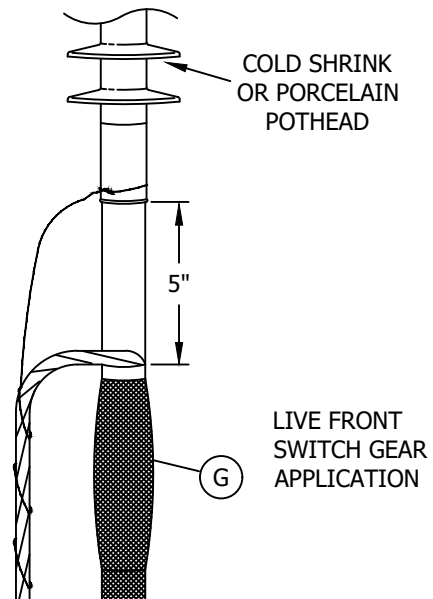
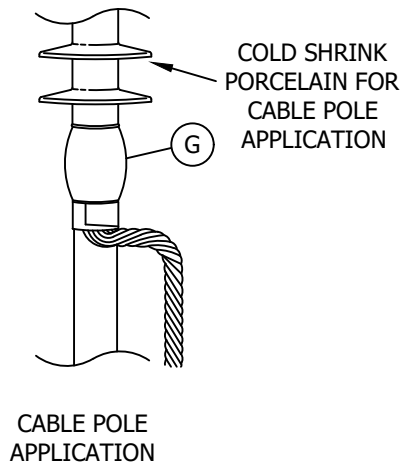
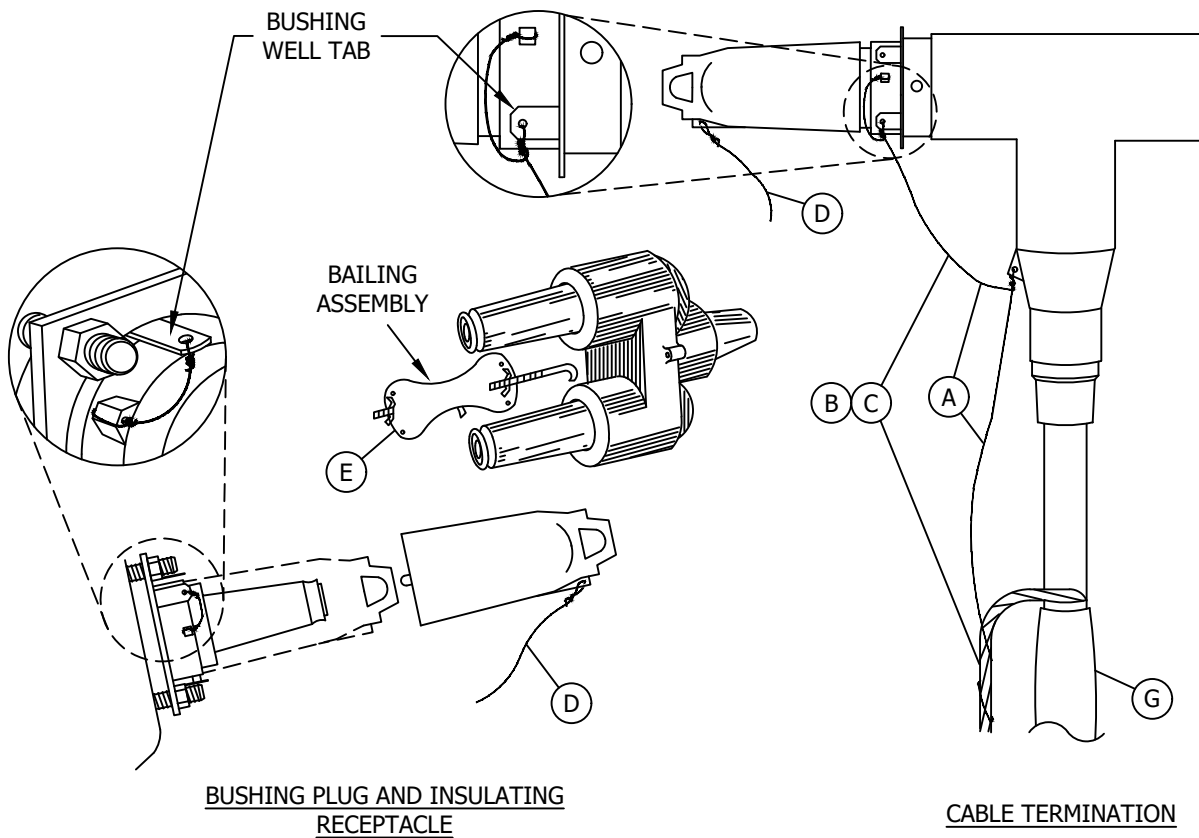
- a. SEE STANDARD 4108 FOR SEALING JACKETED CABLE.
- b. SEE STANDARD 4510 FOR (STANDARD) AND (ALTERNATE) TRENCH GROUND WIRE INSTALLATION.
- c. SEE STANDARD PAGE 4510 FOR EQUIPMENT GROUNDING INSTALLATION.
- d. SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- e. SEE STANDARD 4520.8 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.
- f. SEE STANDARD 4002.2 FOR WIRE INFORMATION.

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|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                    |     |          |    |                     |      |          |
|                 |                   | GROUNDING PAD-MOUNTED EQUIPMENT                  |                           |      |                    |     |          |    |                     |      |          |



**SCOPE:** THIS STANDARD SHOWS THE CONCENTRIC NEUTRAL TERMINATION AND THE GROUNDING OF PREMOLDED AND STRESS RELIEF CONNECTORS.



200 AMP & 600 AMP CABLE

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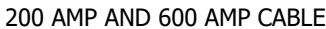
SHEET  
1 OF 2

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

CONCENTRIC NEUTRAL TERMINATIONS AND  
GROUNDING PREMOLDED CONNECTORS

UG4525.1



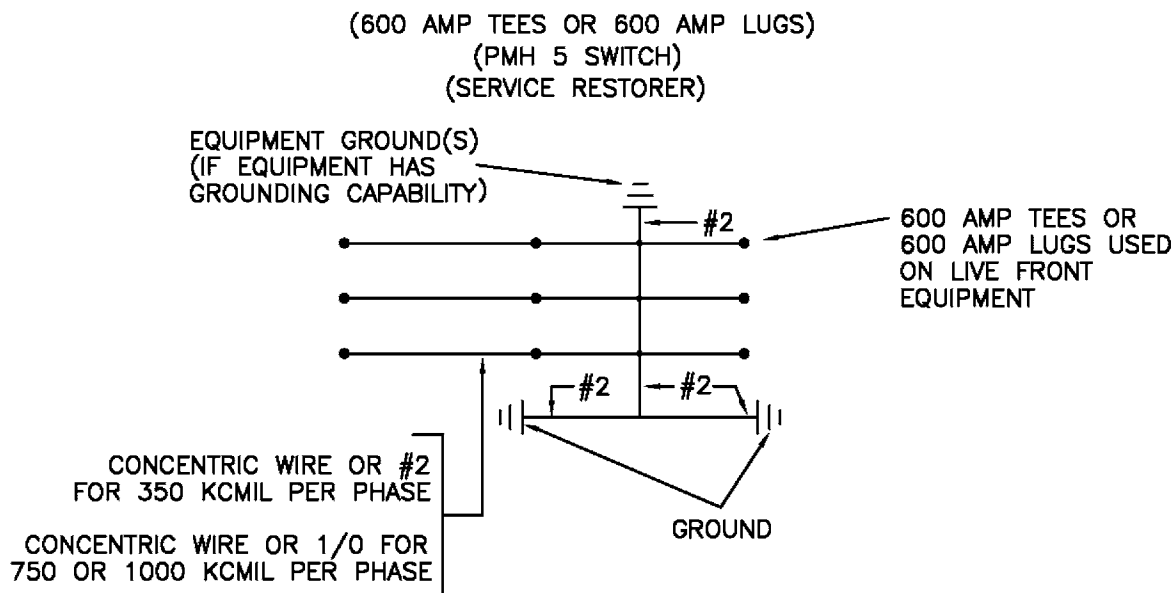


| REV             | CHANGE   | BY  | DSGN                      | APPV | DATE     | REV                | CHANGE | BY | DSGN     | APPV | DATE |                     |  |          |
|-----------------|----------|---|---------------------------|------|----------|--------------------|--------|----|----------|------|------|---------------------|--|----------|
| C               |          |   |                           |      |          | F                  |        |    |          |      |      |                     |  |          |
| B               |          |   |                           |      |          | E                  |        |    |          |      |      |                     |  |          |
| A               | REVISION | --  | RSW                       | RDG  | 01/01/96 | D                  |        |    |          |      |      |                     |  |          |
| SHEET<br>2 OF 2 |          | X   | Indicates Latest Revision |      |          | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG4525.2 |
|                 |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                     |                           |      |          |                    |        |    |          |      |      |                     |  |          |
|                 |          | CONCENTRIC NEUTRAL TERMINATIONS AND<br>GROUNDING PREMOLDED CONNECTORS |                           |      |          |                    |        |    |          |      |      |                     |  |          |



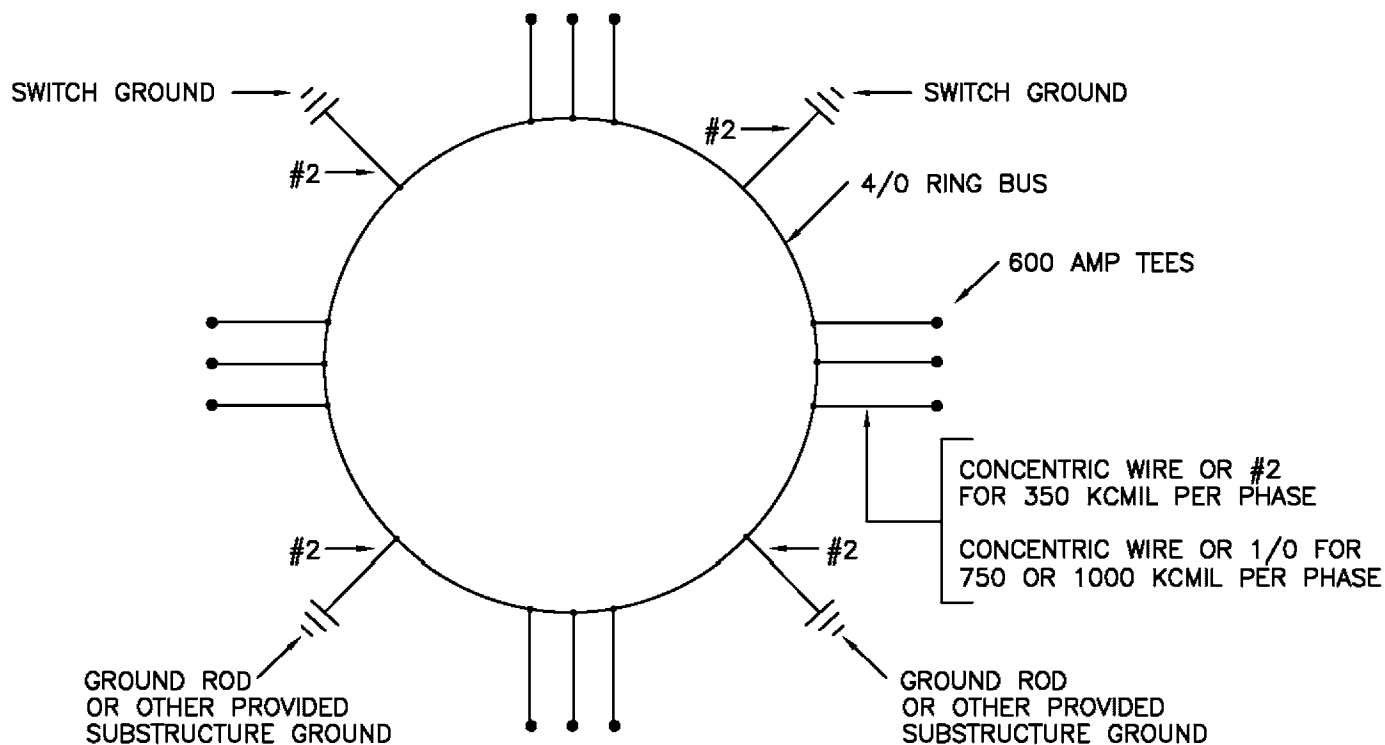
**SCOPE:** THIS STANDARD SHOWS SCHEMATIC DIAGRAMS FOR THE NEUTRAL AND GROUND WIRE USED FOR UNDERGROUND TERMINATIONS.

### SCHEMATIC DIAGRAM FOR NEUTRAL AND GROUND WIRE








### SCHEMATIC DIAGRAM FOR NEUTRAL AND GROUND WIRE

(600 AMP 4-WAY SWITCH, SUBSURFACE OR PAD-MOUNTED)  
(600 AMP PMH OR PME 3, 5, 9, 10, 11 SWITCH, PAD-MOUNTED)  
(600 AMP 3, 4, & 6 WAY VISTA)



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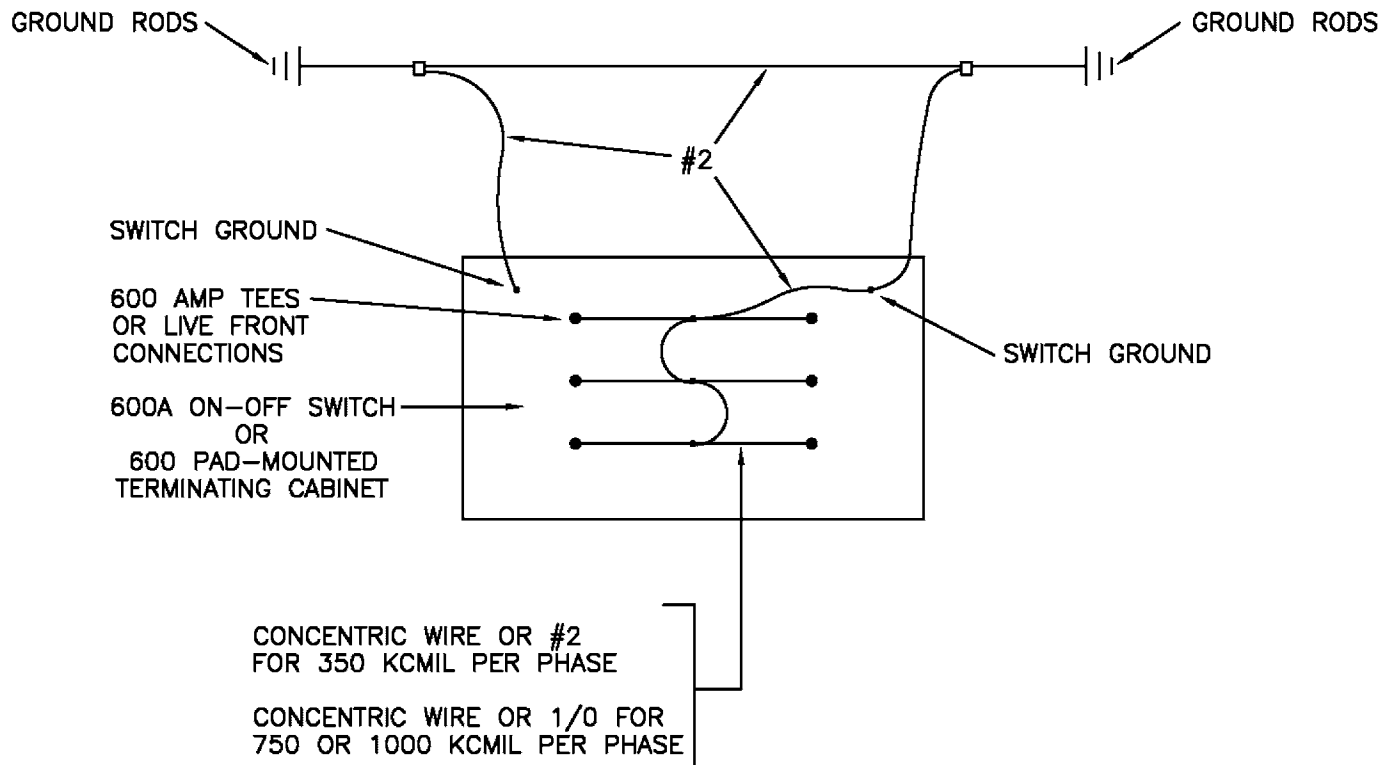
|  |   |                           |   |                    |  |          |   |                     |
|--|---|---------------------------|---|--------------------|--|----------|---|---------------------|
|  |  | Indicates Latest Revision |  | Completely Revised |  | New Page |  | Information Removed |
| REVISION   | SDG&E ELECTRIC STANDARDS  |                           |   |                    |  |          |   | 4530.1              |
| DATE 3-1-02  | NEUTRAL AND GROUND WIRE   |                           |   |                    |  |          |   |                     |
| APPD  | SCHEMATIC DIAGRAM   |                           |   |                    |  |          |   |                     |



## SCHEMATIC DIAGRAM FOR NEUTRAL AND GROUND WIRE

(600 AMP ON-OFF SWITCH, SUBSURFACE)

(600 AMP PAD-MOUNTED PMH 5 AIR BREAK SECTIONALIZING SWITCH)



### INSTALLATION:

- A. WHEN THREE SETS OF TEES ARE REQUIRED FOR THE ON/OFF SWITCH, USE THE SCHEMATIC DIAGRAM FOR A 4-WAY SWITCH SHOWN ON PAGE 4530.1.

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4530.2

SDG&E ELECTRIC STANDARDS

NEUTRAL AND GROUND WIRE  
SCHEMATIC DIAGRAM

REVISION

DATE 1-1-91

APPD *JLB/ROJ*







**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                                 | QUANTITY | CONST STD.<br>OR PAGE NO. | STOCK<br>NUMBER | ASSEMBLY<br>UNITS |                                    |
|------|---|----------|---------------------------|-----------------|-------------------|------------------------------------|
| 1    | WIRE, BARE COPPER, #2, 7 STR.<br>SOFT DRAWN | AS REQ'D | 4002.2                    | S812816         | GDWIRE            | COMPLETE<br><br>UNIT<br><br>G3313R |
| 2    | GROUND ROD, 5/8" X 8'-0",<br>COPPERWELD     | 2        | -                         | S603072         | -                 |                                    |
| 3    | COPPER BONDED GROUND CONNECTED              | 2        | -                         | S259010         | -                 |                                    |
| 4    | CONNECTOR, COMPRESSION                      | AS REQ'D | 4172.2                    | S257856         | -                 |                                    |
| 5    | GROUND CONNECTOR PROVIDED WITH<br>CABLE TAP | -        | -                         | -               | -                 |                                    |
| 6    | GROUND ENHANCEMENT MATERIAL (GEM)           | AS REQ'D | 4510.1, .2                | S424390         | -                 |                                    |

## INSTALLATION:

- (A) LEAVE 24 INCHES OF WIRE (EXPOSED TAILOUT) ABOVE THE TOP OF FINAL GRADE.
- (B) INSTALL HANDHOLE GROUND AS SHOWN IN SKETCH.
- (C) INSTALL STANDARD OR ALTERNATE TRENCH GROUND WIRE SHOWN IN STANDARD 4510 WHEN THE SAME PARTY IS RESPONSIBLE FOR THE CONDUIT AND HANDHOLE INSTALLATION.

**REFERENCE:**

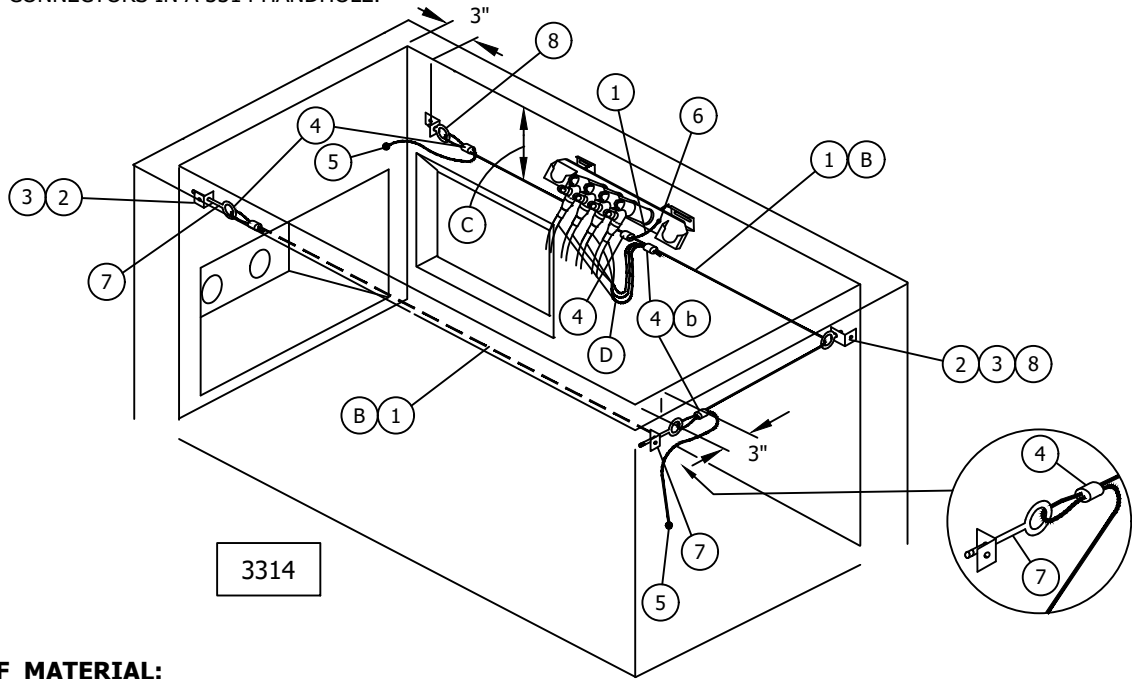
- a. SEE STANDARD 4510 FOR STANDARD AND ALTERNATE TRENCH GROUND WIRE.
- b. SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- c. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART AND COPPER COMPRESSION CONNECTORS.

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| REV             | CHANGE            | BY   | DSGN                      | APPV | DATE                     | REV                | CHANGE | BY                       | DSGN     | APPV | DATE                                |                     |  |           |
|-----------------|-------------------|--|---------------------------|------|--------------------------|--------------------|--------|--------------------------|----------|------|-------------------------------------|---------------------|--|-----------|
| C               |                   |  |                           |      |                          | F                  |        |                          |          |      |                                     |                     |  |           |
| B               |                   |  |                           |      |                          | E                  |        |                          |          |      |                                     |                     |  |           |
| A               | EDITORIAL CHANGES | JS   | TR                        | MDJ  | 6/14/2016                | D                  |        |                          |          |      |                                     |                     |  |           |
| SHEET<br>2 OF 9 |                   | <input checked="" type="checkbox"/>              | Indicates Latest Revision |      | <input type="checkbox"/> | Completely Revised |        | <input type="checkbox"/> | New Page |      | <input checked="" type="checkbox"/> | Information Removed |  | UG 4540.2 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |                          |                    |        |                          |          |      |                                     |                     |  |           |
|                 |                   | GROUNDING SUBSTRUCTURES AND EQUIPMENT            |                           |      |                          |                    |        |                          |          |      |                                     |                     |  |           |



THIS STANDARD SHOWS GROUNDING INSTALLATION USED TO PROVIDE GROUNDING FOR ALL 200 AMP CONNECTORS IN A 3314 HANDHOLE.



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                                     | QUANTITY | CONST. STD OR PAGE NO. | STOCK NUMBER |
|------|---|----------|------------------------|--------------|
| 1    | WIRE, BARE COPPER, #2 7 STR SOFT DRAWN          | AS REQ'D | 4002.2                 | S812816      |
| 2    | BRACKET STAINLESS STEEL 2" X 3"                 | AS REQ'D | -                      | S166072      |
| 3    | ANCHOR, CONCRETE STAINLESS STEEL, 1/2" X 3-3/4" | AS REQ'D | 4178                   | S107654      |
| 4    | CONNECTOR, COMPRESSION                          | AS REQ'D | 4172.2                 | S257760      |
| 5    | SERVICE POST CONNECTOR                          | 2        | -                      | S262560      |
| 6    | GROUND CONNECTOR PROVIDED WITH CABLE TAP        | -        | -                      | -            |
| 7    | EYE BOLT, STAINLESS STEEL, 1/2" X 6"            | AS REQ'D | -                      | S150528      |
| 8    | EYE BOLT, STAINLESS STEEL, 1-1/2" X 1/2"        | AS REQ'D | -                      | S152710      |

## INSTALLATION:

- A. INSTALL HANDHOLE GROUND AS SHOWN IN SKETCH.
- B. WHEN EQUIPMENT ON OPPOSITE WALL REQUIRES GROUNDING, INSTALL ONE CONTINUOUS WIRE AROUND THE HANDHOLE AND CONNECT THE GROUND WIRE AS SHOWN IN THE SKETCH, OTHERWISE ONLY INSTALL THE GROUND WIRE SHOWN AS A SOLID LINE IN THE SKETCH.**
- C. INSTALL THE GROUND WIRE AT THE SAME LEVEL AS THE CONCENTRIC NEUTRAL TERMINATIONS ON THE CABLE.
- D. CONCENTRIC NEUTRAL TAILS OR EQUIVALENT WIRE SIZE PER PHASE (SEE STANDARD 4172 FOR EQUIVALENT WIRE SIZE).

**REFERENCE:**

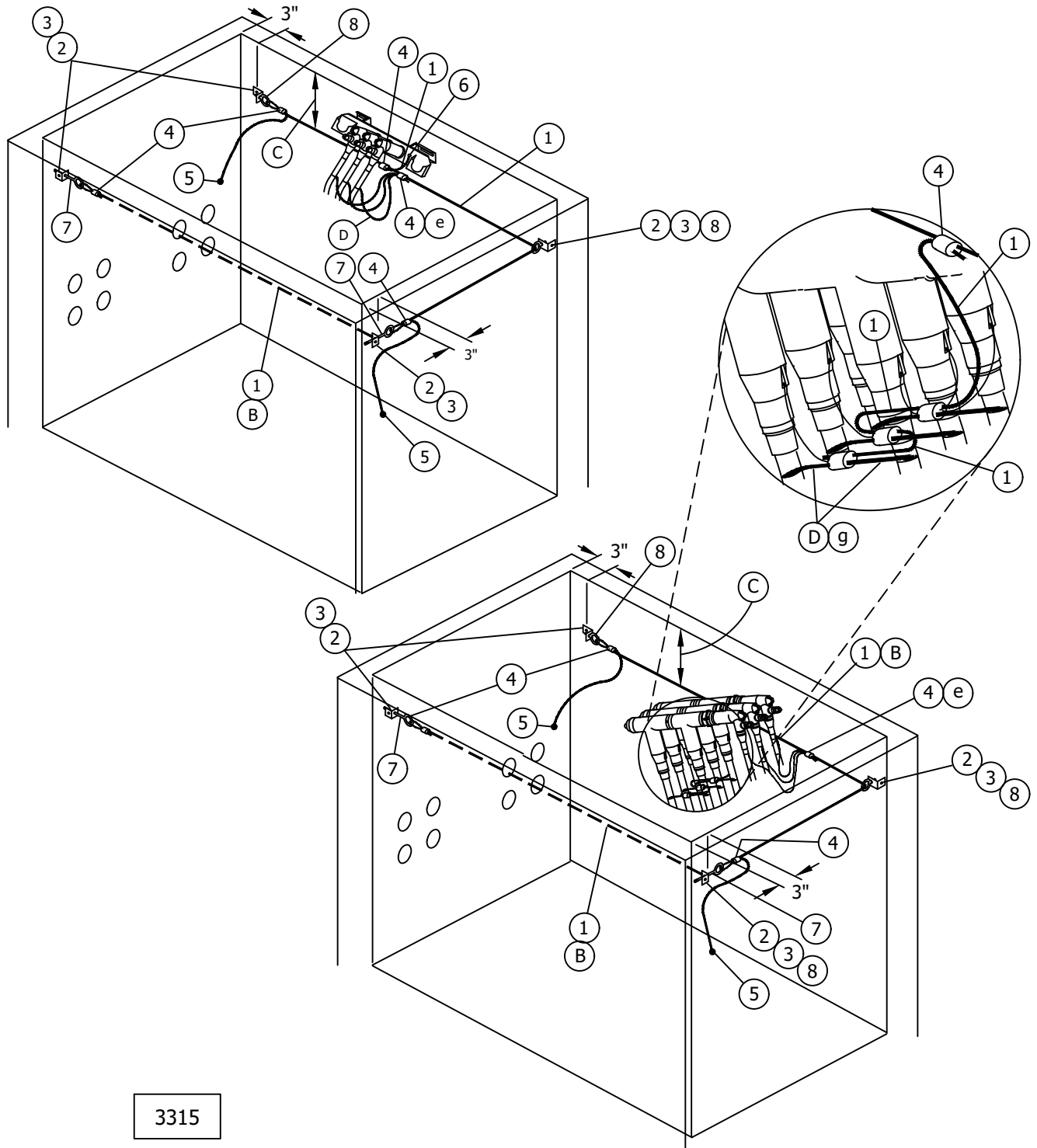
- a. SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- b. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART AND COPPER COMPRESSION CONNECTORS.

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| REV             | CHANGE            | BY   | DSGN                      | APPV | DATE      | REV                | CHANGE | BY | DSGN     | APPV                   | DATE                |  |           |
|-----------------|-------------------|--|---------------------------|------|-----------|--------------------|--------|----|----------|------------------------|---------------------|--|-----------|
| C               |                   |  |                           |      |           | F                  |        |    |          |                        |                     |  |           |
| B               |                   |  |                           |      |           | E                  |        |    |          |                        |                     |  |           |
| A               | EDITORIAL CHANGES | JS   | TR                        | MDJ  | 6/14/2016 | D                  |        |    |          |                        |                     |  |           |
| SHEET<br>3 OF 9 |                   | <div><div></div></div>                           | Indicates Latest Revision |      |           | Completely Revised |        |    | New Page | <div><div></div></div> | Information Removed |  | UG 4540.3 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |           |                    |        |    |          |                        |                     |  |           |
|                 |                   | GROUNDING SUBSTRUCTURES AND EQUIPMENT            |                           |      |           |                    |        |    |          |                        |                     |  |           |



**SCOPE:** THIS STANDARD SHOWS GROUNDING INSTALLATION USED TO PROVIDE GROUNDING FOR ALL 200 AND 600 AMP CONNECTORS IN A 3315 HANDHOLE.



3315

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| B   |                   |    |      |      |           | E   |        |    |      |      |      |
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SHEET  
4 OF 9

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING SUBSTRUCTURES AND EQUIPMENT

UG 4540.4



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST. STD<br>OR PAGE NO. | STOCK<br>NUMBER |
|------|--|----------|---------------------------|-----------------|
| 1    | WIRE, BARE COPPER, #2 7 STR SOFT DRAWN             | AS REQ'D | 4002.2                    | S812816         |
| 2    | BRACKET STAINLESS STEEL 2" X 3"                    | AS REQ'D | -                         | S166072         |
| 3    | ANCHOR, CONCRETE STAINLESS STEEL,<br>1/2" X 3-3/4" | AS REQ'D | 4178                      | S107654         |
| 4    | CONNECTOR, COMPRESSION                             | AS REQ'D | 4172.2                    | S257760         |
| 5    | SERVICE POST CONNECTOR                             | 2        | -                         | S262560         |
| 6    | GROUND CONNECTOR PROVIDED WITH CABLE TAP           |          | -                         |                 |
| 7    | EYE BOLT, STAINLESS STEEL, 1/2" X 6"               | AS REQ'D | -                         | S150528         |
| 8    | EYE BOLT, STAINLESS STEEL, 1/2" X 1-1/2"           | AS REQ'D | -                         | S152710         |


## INSTALLATION:

- A. INSTALL HANDHOLE GROUND AS SHOWN IN SKETCH.
- B. WHEN EQUIPMENT ON OPPOSITE WALL REQUIRES GROUNDING, INSTALL ONE CONTINUOUS WIRE AROUND THE HANDHOLE AND CONNECT THE GROUND WIRE AS SHOWN IN THE SKETCH, OTHERWISE ONLY INSTALL THE GROUND WIRE SHOWN AS A SOLID LINE IN THE SKETCH.
- C. INSTALL THE GROUND WIRE AT THE SAME LEVEL AS THE CONCENTRIC NEUTRAL TERMINATIONS ON THE CABLE.
- D. CONCENTRIC NEUTRAL TAILS OR EQUIVALENT WIRE SIZE PER PHASE (SEE STANDARD 4172 FOR CHART AND EQUIVALENT WIRE SIZE).

**REFERENCE:**

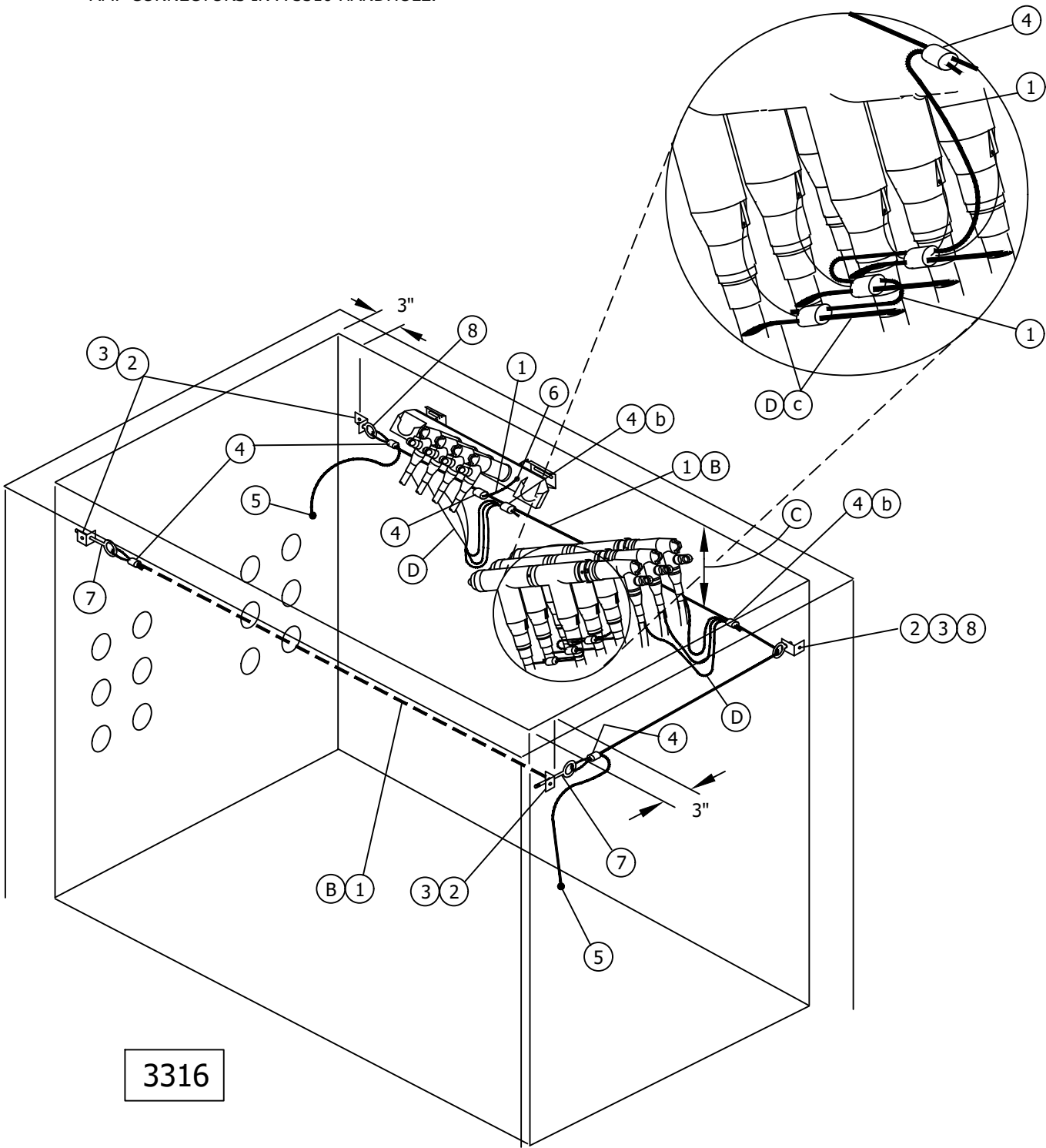
- e. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION COPPER COMPRESSION CONNECTORS.
- f. SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- g. SEE STANDARD 4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.

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|-----------------|-------------------|---|---------------------------|------|-----------|-----|--------------------|----|------|------|----------|--|--|--|---------------------|--|-----------|--|
| C               |                   |   |                           |      |           | F   |                    |    |      |      |          |  |  |  |                     |  |           |  |
| B               |                   |   |                           |      |           | E   |                    |    |      |      |          |  |  |  |                     |  |           |  |
| A               | EDITORIAL CHANGES | JS  | TR                        | MDJ  | 6/14/2016 | D   |                    |    |      |      |          |  |  |  |                     |  |           |  |
| SHEET<br>5 OF 9 |                   |  | Indicates Latest Revision |      |           |     | Completely Revised |    |      |      | New Page |  |  |  | Information Removed |  | UG 4540.5 |  |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |      |           |     |                    |    |      |      |          |  |  |  |                     |  |           |  |
|                 |                   | GROUNDING SUBSTRUCTURES AND EQUIPMENT   |                           |      |           |     |                    |    |      |      |          |  |  |  |                     |  |           |  |



**SCOPE:** THIS STANDARD SHOWS GROUNDING INSTALLATION USED TO PROVIDE GROUNDING FOR ALL 200 AMP AND 600 AMP CONNECTORS IN A 3316 HANDHOLE.



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| B   |                   |    |      |      |           | E   |        |    |      |      |      |
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6 OF 9

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING SUBSTRUCTURES AND EQUIPMENT

UG 4540.6



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION  | QUANTITY | CONST. STD<br>OR PAGE NO. | STOCK<br>NUMBER |
|------|--|----------|---------------------------|-----------------|
| 1    | WIRE, BARE COPPER, #2 7 STR SOFT DRAWN             | AS REQ'D | 4002.2                    | S812816         |
| 2    | BRACKET STAINLESS STEEL 2" X 3"                    | AS REQ'D | 4172.2                    | S166072         |
| 3    | ANCHOR, CONCRETE STAINLESS STEEL,<br>1/2" X 3-3/4" | AS REQ'D | 4178                      | S107654         |
| 4    | CONNECTOR, COMPRESSION                             | AS REQ'D | 4172.2                    | S257760         |
| 5    | SERVICE POST CONNECTOR                             | 2        | -                         | S262560         |
| 6    | GROUND CONNECTOR PROVIDED WITH CABLE TAP           |          | -                         | -               |
| 7    | EYE BOLT, STAINLESS STEEL, 1/2" X 6"               | AS REQ'D | -                         | S150528         |
| 8    | EYE BOLT, STAINLESS STEEL, 1/2" X 1-1/2"           | AS REQ'D | -                         | S152710         |


## INSTALLATION:

- A. INSTALL HANDHOLE GROUND AS SHOWN IN SKETCH.
- B. WHEN EQUIPMENT ON OPPOSITE WALL REQUIRES GROUNDING, INSTALL ONE CONTINUOUS WIRE AROUND THE HANDHOLE AND CONNECT THE GROUND WIRE AS SHOWN IN THE SKETCH, OTHERWISE ONLY INSTALL THE GROUND WIRE SHOWN AS A SOLID LINE IN THE SKETCH.
- C. INSTALL THE GROUND WIRE AT THE SAME LEVEL AS THE CONCENTRIC NEUTRAL TERMINATIONS ON THE CABLE.
- D. CONCENTRIC NEUTRAL TAILS OR EQUIVALENT WIRE SIZE PER PHASE (SEE STANDARD 4172 FOR EQUIVALENT WIRE SIZE).

**REFERENCE:**

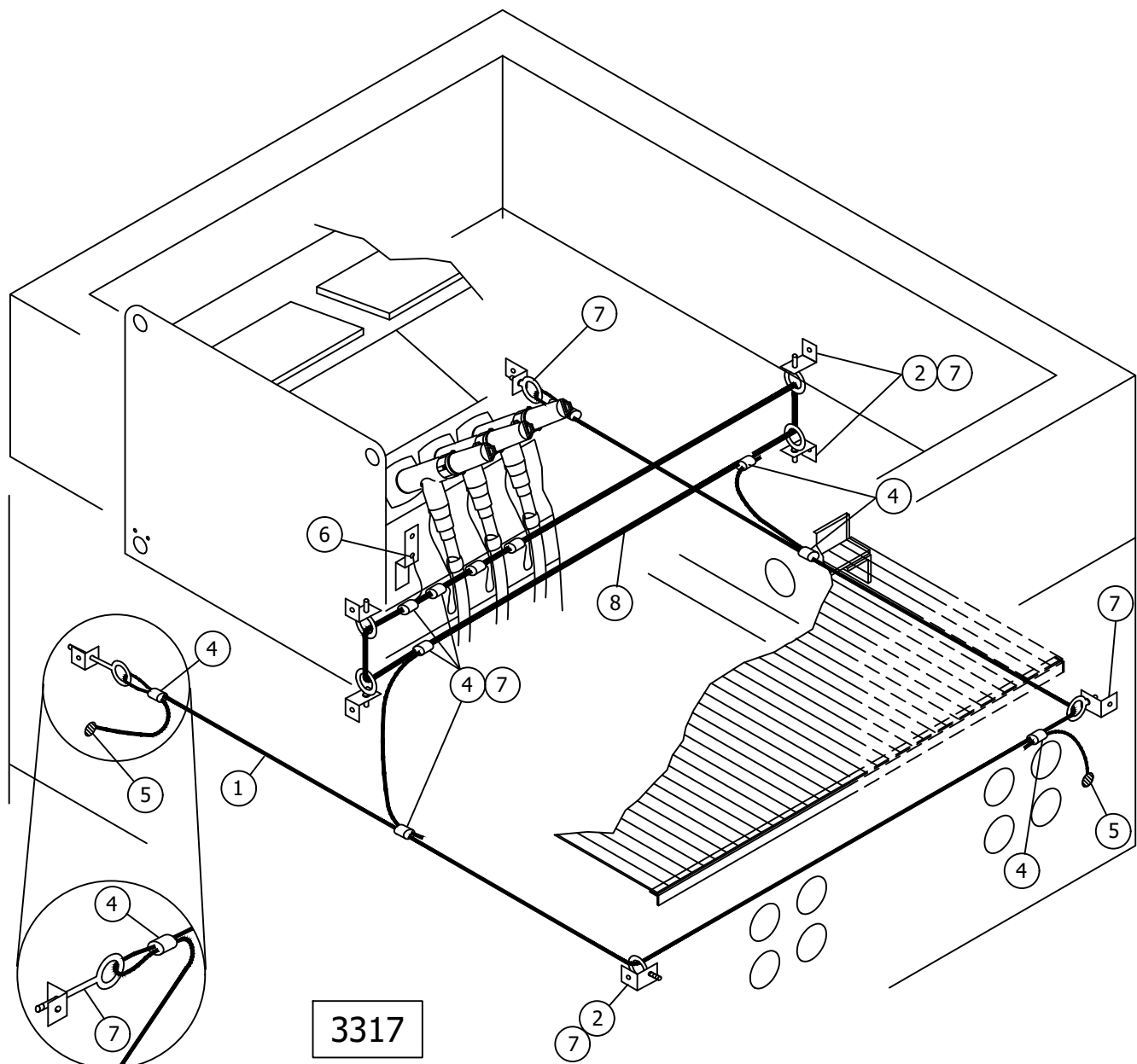
- a. SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- b. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART AND COPPER COMPRESSION CONNECTORS.
- c. SEE STANDARD 4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.

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|-----------------|-------------------|---|---------------------------|------|-----------|--------------------|--------|----|----------|------|------|---------------------|--|-----------|
| C               |                   |   |                           |      |           | F                  |        |    |          |      |      |                     |  |           |
| B               |                   |   |                           |      |           | E                  |        |    |          |      |      |                     |  |           |
| A               | EDITORIAL CHANGES | JS  | TR                        | MDJ  | 6/14/2016 | D                  |        |    |          |      |      |                     |  |           |
| SHEET<br>7 OF 9 |                   |  | Indicates Latest Revision |      |           | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG 4540.7 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |      |           |                    |        |    |          |      |      |                     |  |           |
|                 |                   | GROUNDING SUBSTRUCTURES AND EQUIPMENT   |                           |      |           |                    |        |    |          |      |      |                     |  |           |




**SCOPE:** THIS STANDARD SHOWS GROUNDING INSTALLATION USED TO PROVIDE GROUNDING FOR THE SWITCH AND CONNECTORS IN THE 3317 HANDHOLE.



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| C   |                   |    |      |      |           | F   |        |    |      |      |      |
| B   |                   |    |      |      |           | E   |        |    |      |      |      |
| A   | EDITORIAL CHANGES | JS | TR   | MDJ  | 6/14/2016 | D   |        |    |      |      |      |

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8 OF 9

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

GROUNDING SUBSTRUCTURES AND EQUIPMENT

UG 4540.8



### BILL OF MATERIAL:

| ITEM | DESCRIPTION                                     | QUANTITY | CONST. STD<br>OR PAGE NO. | STOCK<br>NUMBER |
|------|---|----------|---------------------------|-----------------|
| 1    | WIRE, BARE COPPER, #2 7 STR SOFT DRAWN          | AS REQ'D | 4002.2                    | S812816         |
| 2    | BRACKET STAINLESS STEEL 2" X 3"                 | AS REQ'D | -                         | S166072         |
| 3    | ANCHOR, CONCRETE STAINLESS STEEL, 1/2" X 3-3/4" | AS REQ'D | 4178                      | S107654         |
| 4    | CONNECTOR, COMPRESSION                          | AS REQ'D | 4172.2                    | S257760         |
| 5    | SERVICE POST CONNECTOR                          | 2        | -                         | S262560         |
| 6    | GROUND LUG PROVIDED BY SWITCH MANUFACTURER      | -        | -                         | -               |
| 7    | EYE BOLT, STAINLESS STEEL, 1/2" X 6"            | AS REQ'D | -                         | S150528         |
| 8    | WIRE BARE COPPER 4/0 STRAND                     | AS REQ'D | -                         | S812764         |
| 9    | EYE BOLT, STAINLESS STEEL 1/2" X 1-1/2"         | AS REQ'D | -                         | S152710         |

## INSTALLATION:

- A. INSTALL HANDHOLE GROUND AS SHOWN IN SKETCH.
- B. INSTALL THE GROUND WIRE BELOW STEEL GRATING - ELBOW 1-1/2" (38) CLEARANCE FROM SUPPORT HARDWARE.
- C. CONCENTRIC NEUTRAL TAILS OR EQUIVALENT WIRE SIZE PER PHASE (SEE STANDARD 4172 FOR EQUIVALENT WIRE SIZE).

**REFERENCE:**

- a. SEE STANDARD 4525 FOR CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.
- b. SEE STANDARD 4172 FOR CONCENTRIC NEUTRAL/COMPRESSION CONNECTOR APPLICATION CHART AND COPPER COMPRESSION CONNECTORS.
- c. SEE STANDARD 4530 FOR NEUTRAL AND GROUND WIRE SCHEMATIC DIAGRAM.

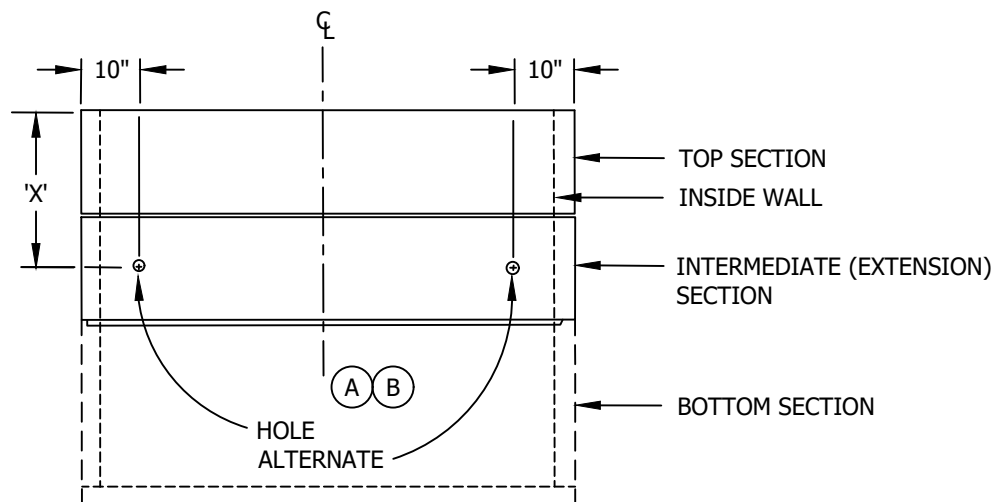
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| REV             | CHANGE            | BY   | DSGN                      | APPV | DATE      | REV                | CHANGE | BY | DSGN     | APPV | DATE |                     |  |           |
|-----------------|-------------------|--|---------------------------|------|-----------|--------------------|--------|----|----------|------|------|---------------------|--|-----------|
| C               |                   |  |                           |      |           | F                  |        |    |          |      |      |                     |  |           |
| B               |                   |  |                           |      |           | E                  |        |    |          |      |      |                     |  |           |
| A               | EDITORIAL CHANGES | JS   | TR                        | MDJ  | 6/14/2016 | D                  |        |    |          |      |      |                     |  |           |
| SHEET<br>9 OF 9 |                   | <div><div></div></div>                           | Indicates Latest Revision |      |           | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG 4540.9 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |      |           |                    |        |    |          |      |      |                     |  |           |
|                 |                   | GROUNDING SUBSTRUCTURES AND EQUIPMENT            |                           |      |           |                    |        |    |          |      |      |                     |  |           |



**SCOPE:** THIS STANDARD DESCRIBES CONNECTION TO TELCO GROUND, IF PRESENT

| HANDHOLE | 'X' |
|----------|-----|
| 3314     | 18" |
| 3315     | 16" |
| 3316     | 16" |



END VIEW OF HANDHOLE  
FIGURE 1

## BILL OF MATERIALS:

| DESCRIPTION      | STOCK NUMBER |
|------------------|--------------|
| SEALING COMPOUND | S442976      |

**NOTES:**

- I. IF TELCO GROUND WIRE IS PRESENT AT THE TIME OF INSTALLATION OF THE HANDHOLE, INSERT GROUND WIRE TAIL BETWEEN PAD AND TOP SECTION OR HANDHOLE SECTIONS THROUGH THE GROUT OR PLASTIC MASTIC SEALANT.
- II. GROUNDING OF TELCO CONDUCTORS MUST BE AUTHORIZED ON INDIVIDUAL CONSTRUCTION ORDERS FOR BOTH NEW AND EXISTING HANDHOLES.

## INSTALLATION:

- (A). OPEN HANDHOLE AND MAKE SURE THERE IS NO EQUIPMENT AT THE DRILLING LOCATION.
- (B). DRILL A 1/2" HOLE IN THE END AT ONE OF THE LOCATIONS SHOWN IN FIG. 1 TO AVOID REBAR.
- C. TAKE THE #6 AWG INSULATED COPPER GROUND WIRE FURNISHED BY PT&T AND PUT THROUGH THE HOLE AND INTO THE HANDHOLE.
- D. FILL THE DRILLED HOLE WITH EPOXY PUTTY (STOCK NUMBER S442976).
- E. SKIN THE INSULATION AND CONNECT TO THE GROUND OR NEUTRAL WIRE IN THE HANDHOLE WITH A COOPER COMPRESSION CONNECTOR. IF NOT GROUND WIRE IS AVAILABLE, ATTACH TO GROUND ROD.

**REFERENCE:**

- a. SEE STANDARD PAGE 4172.1 FOR COPPER COMPRESSION CONNECTORS.

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| B               |                   |  |                           |        |           | E                  |        |    |          |      |      |                     |  |        |
| A               | EDITORIAL CHANGES | JC   | TR                        | JS/MDJ | 7/28/2015 | D                  |        |    |          |      |      |                     |  |        |
| SHEET<br>1 OF 1 |                   | X  | Indicates Latest Revision |        |           | Completely Revised |        |    | New Page |      |      | Information Removed |  | UG4550 |
|                 |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS              |                           |        |           |                    |        |    |          |      |      |                     |  |        |
|                 |                   | GROUNDING TELCO CONDUCTOR IN HANDHOLE<br>(3314, 3315, OR 3316) |                           |        |           |                    |        |    |          |      |      |                     |  |        |



4600 - TELECOM,  
SCADA



4600 - TELECOM,  
SCADA



**PAGE****SUBJECT**

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**THIS SECTION HAS BEEN REMOVED FROM THE EXTERNAL VERSION. DUE TO CONFIDENTIAL INFORMATION.**

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|-----|-------------------|----|----|-----|-----|-----------|-----|-------------------|-----|-----|-----|-----|-----------|
| D   | ADDED 4649        | -  | JK | JS  | CZH | 6/9/2019  | G   | ADDED UG4630      | EDM | GLW | JES | CZH | 2/8/2021  |
| C   | EDITORIAL CHANGES | -  | JK | JS  | CZH | 5/18/2018 | F   | EDITORIAL CHANGES | EDM | JK  | JES | CZH | 3/5/2020  |
| B   | TEXT UPDATE       | -  | JS | JS  | MDJ | 9/13/2017 | E   | EDITORIAL CHANGES | -   | ADW | JES | CZH | 12/9/2019 |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

TELECOMMUNICATIONS  
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UG4601.1







4700 - PRIMARY  
METER/ REGULATOR/  
BOOSTER STATION



4700 - PRIMARY  
METER/ REGULATOR/  
BOOSTER STATION



**PAGE****SUBJECT**

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| C   | EDITORIAL CHANGES           | JK  | JS   | CZH  | 05/18/2018 | F   |                   |    |      |      |            |
| B   | ADDED 4712.1-6 & 4712.7-.12 | KR  | JS   | MDJ  | 12/01/2017 | E   |                   |    |      |      |            |
| A   | ADDED SECTION 4712          | JBH | TR   | MDJ  | 04/15/16   | D   | EDITORIAL CHANGES | KR | JES  | CZH  | 04/22/2019 |

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD |                           |                    |          |                     |
| MISCELLANEOUS EQUIPMENT<br>TABLE OF CONTENTS     |                           |                    |          |                     |

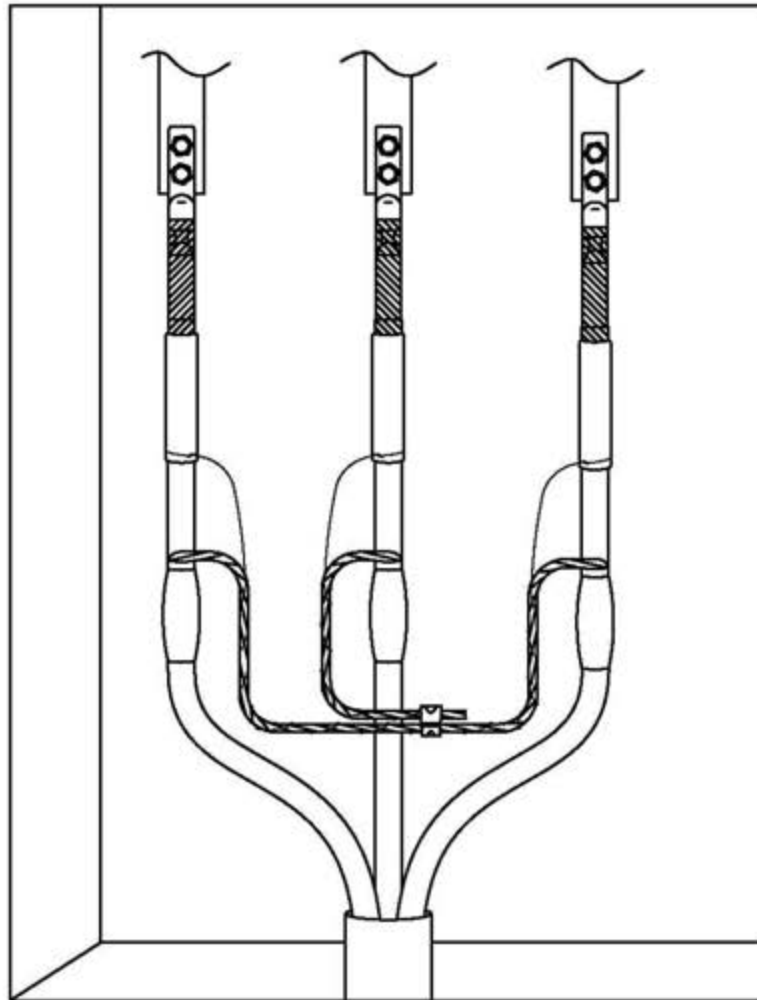
**UG4701.1**







**SCOPE:** THIS DESIGN STANDARD PROVIDES GUIDELINES FOR THE CONNECTION OF SDG&E'S 12KV DISTRIBUTION SYSTEM TO A PRIMARY METERED SERVICE POINT FOR THE 600 VOLT DC TROLLEY SYSTEM.



THE FOLLOWING REQUIREMENTS SHALL BE MET WHEN MAKING THIS CONNECTION:

**NOTES:**

1. SDG&E SHALL LOCATE IT'S SUBSTRUCTURE AS CLOSE AS PRACTICABLE TO THE CUSTOMER'S GROUND GRID BUT IN NO CASE SHALL THE SUBSTRUCTURE BE IN CONTACT WITH THE CUSTOMER'S GROUND GRID (GROUNDING ELECTRODE SYSTEM).
2. THE CONCENTRIC NEUTRALS FROM SDG&E'S CABLE SHALL NOT BE CONNECTED TO THE CUSTOMER'S EQUIPMENT.
3. THE CABLE TERMINATION IN THE CUSTOMER'S SWITCHGEAR CABINET SHALL BE A LIVEFRONT DELTA CONNECTION.

**REFERENCE:**

1. SERVICE STANDARDS & GUIDE 685.
2. SERVICE PLANNING MANUAL 254.
3. UNDERGROUND STANDARDS 4705.

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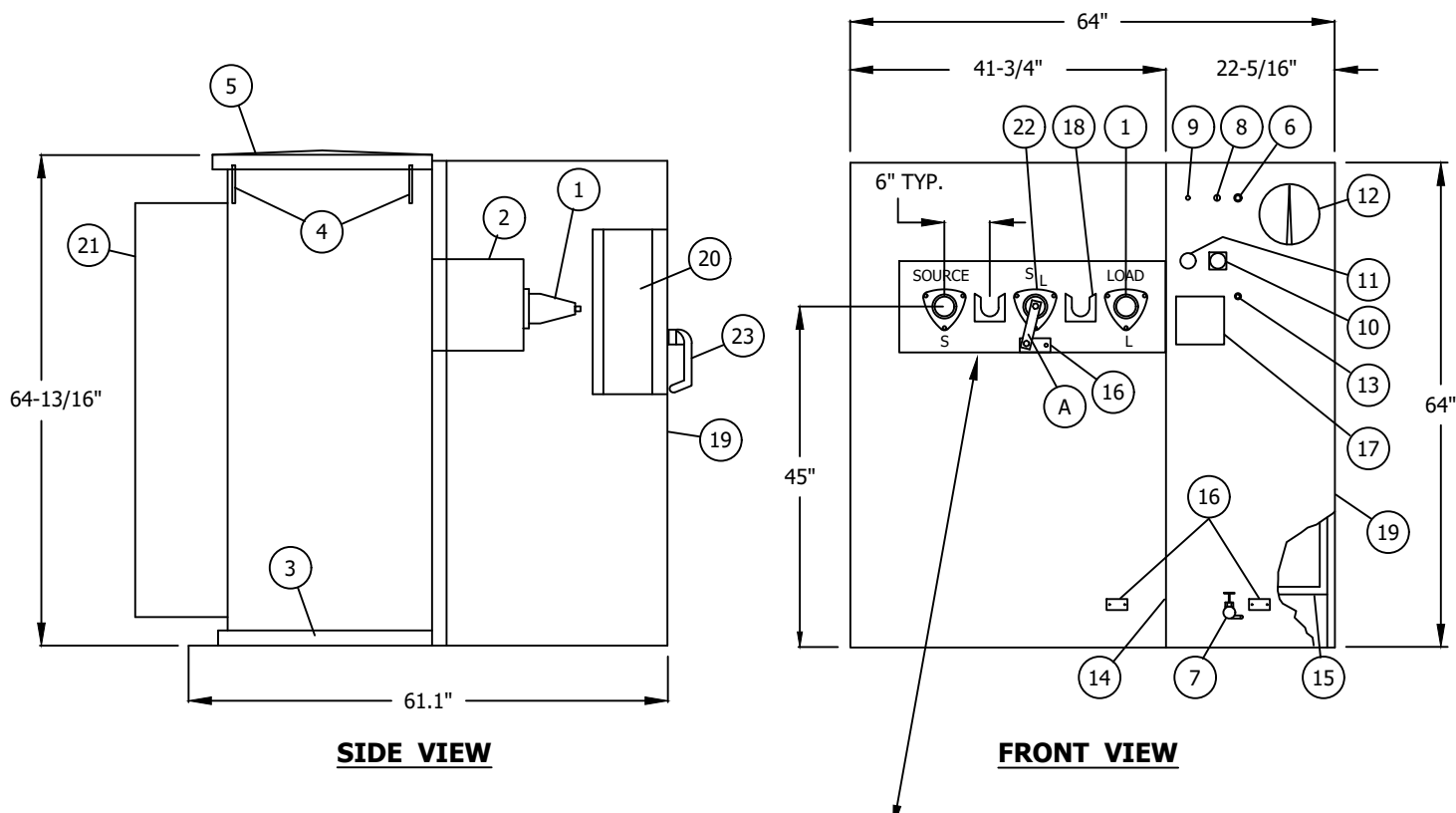
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| REVISION      | SDG&E ELECTRIC STANDARDS          |                    |          |                     |
| DATE 2-8-10   | 12KV SERVICE POINT CONNECTION FOR |                    |          |                     |
| APPD WT/ MC   | TROLLY TRACTION STATION           |                    |          |                     |
|               |                                   |                    |          | 4705                |



**SCOPE:** THIS STANDARD COVERS THE INSTALLATION OF THE 600 AMP PAD MOUNTED REGULATORS.

THE PAD MOUNTED REGULATORS MAY BE INSTALLED IN TWO APPLICATIONS

1. OVERHEAD CONSTRUCTION REQUIRING 600 AMP VOLTAGE REGULATION.  
SEE PAGE 4710.6
2. FULL UNDERGROUND CIRCUITS REQUIRING 600 AMP VOLTAGE REGULATION.  
SEE PAGE 4710.4



SUB-STRUCTURE AND CONDUIT INSTALLATION. SEE PAGES 4710.2,3

SEE DESCRIPTION LIST PAGE 4710.1

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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |          |
|                 | INSTALLATION OF<br>PAD-MOUNTED REGULATOR          |                           |                    |          |                     |          |



**PAD-MOUNTED REGULATOR DESCRIPTION LIST:**

| ITEM | DESCRIPTION   |
|------|---|
| 1    | HIGH VOLTAGE INTEGRAL APPARATUS BUSHING   |
| 2    | TANK BOXOUT FOR HV BUSHINGS   |
| 3    | REGULATOR TANK BASE W/ JACKING AND ROLLING FACILITIES                           |
| 4    | LIFTING LUGS  |
| 5    | BOLTED COVER W/ NUT GUARD   |
| 6    | 1, 0" UPPER FILTER PRESS CONN. & FILL PLUG                                      |
| 7    | 1, 0" DRAIN VALVE W/ SAMPLER  |
| 8    | AUTO PRESS RELIEF DEVICE  |
| 9    | PRESSURE VACUUM GAUGE PROVISION   |
| 10   | MAGNETIC OIL LEVEL GAUGE  |
| 11   | OIL SIGHT GAUGE   |
| 12   | TAP CHANGER POSITION INDICATOR W/ DRAGHANDS AND REGULATION RANGE LIMIT SWITCHES |
| 13   | THERMOMETER PROVISION   |
| 14   | STEEL DIVIDER PLATE   |
| 15   | REMOVABLE SILL  |
| 16   | GROUND PAD W/ 2 - 1/2-13 UNC TAPPED HOLES 7/16 DEEP                             |
| A    | CONCENTRIC NEUTRAL/NEUTRAL GROUND STRAP   |
| 17   | NAMEPLATE   |
| 18   | PARKING STAND   |
| 19   | BOLTED HIGH SECURITY CABINET W/ PENTAHEAD DOOR BOLTS                            |
| 20   | CONTROL ENCLOSURE - LOCKABLE - ON INSIDE OF CABINET DOOR                        |
| 21   | COOLING CORRUGATION WHEN REQUIRED   |
| 22   | NEUTRAL/CONCENTRIC GROUND BUSHING   |
| 23   | DOOR HANDLE   |

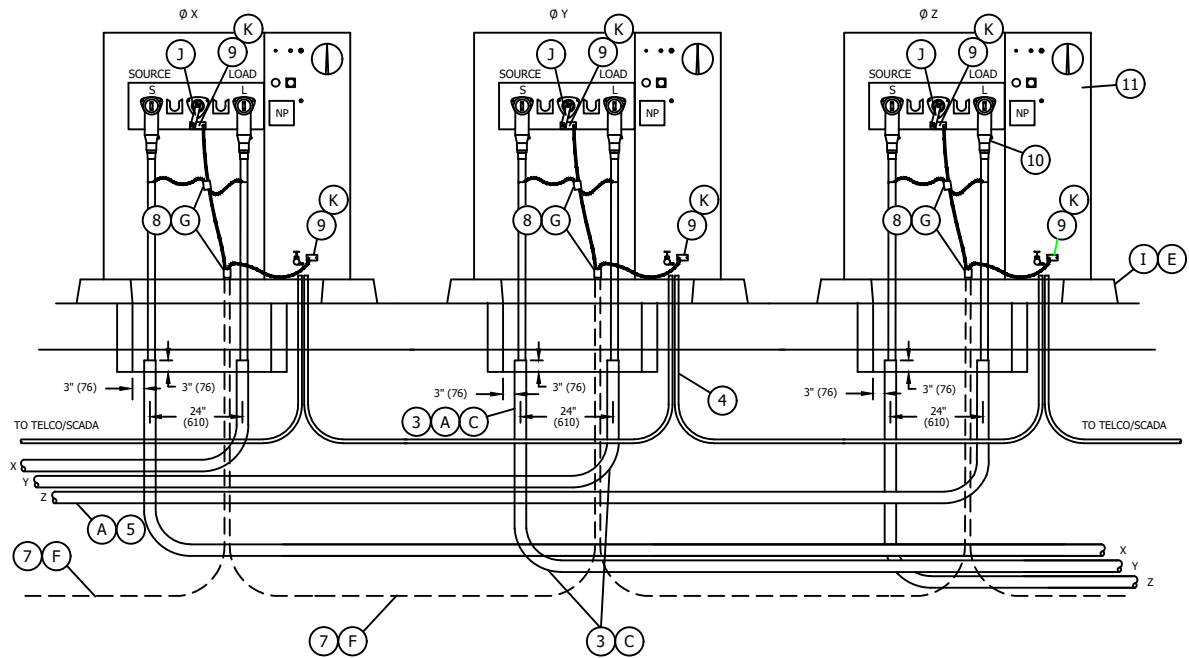
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|                 | INSTALLATION OF<br>PAD-MOUNTED REGULATOR          |                           |  |                    |  |          |  |                     |          |



# **CABLE CONNECTION DIAGRAM:**



SEE BILL OF MATERIAL PAGE 4710.5

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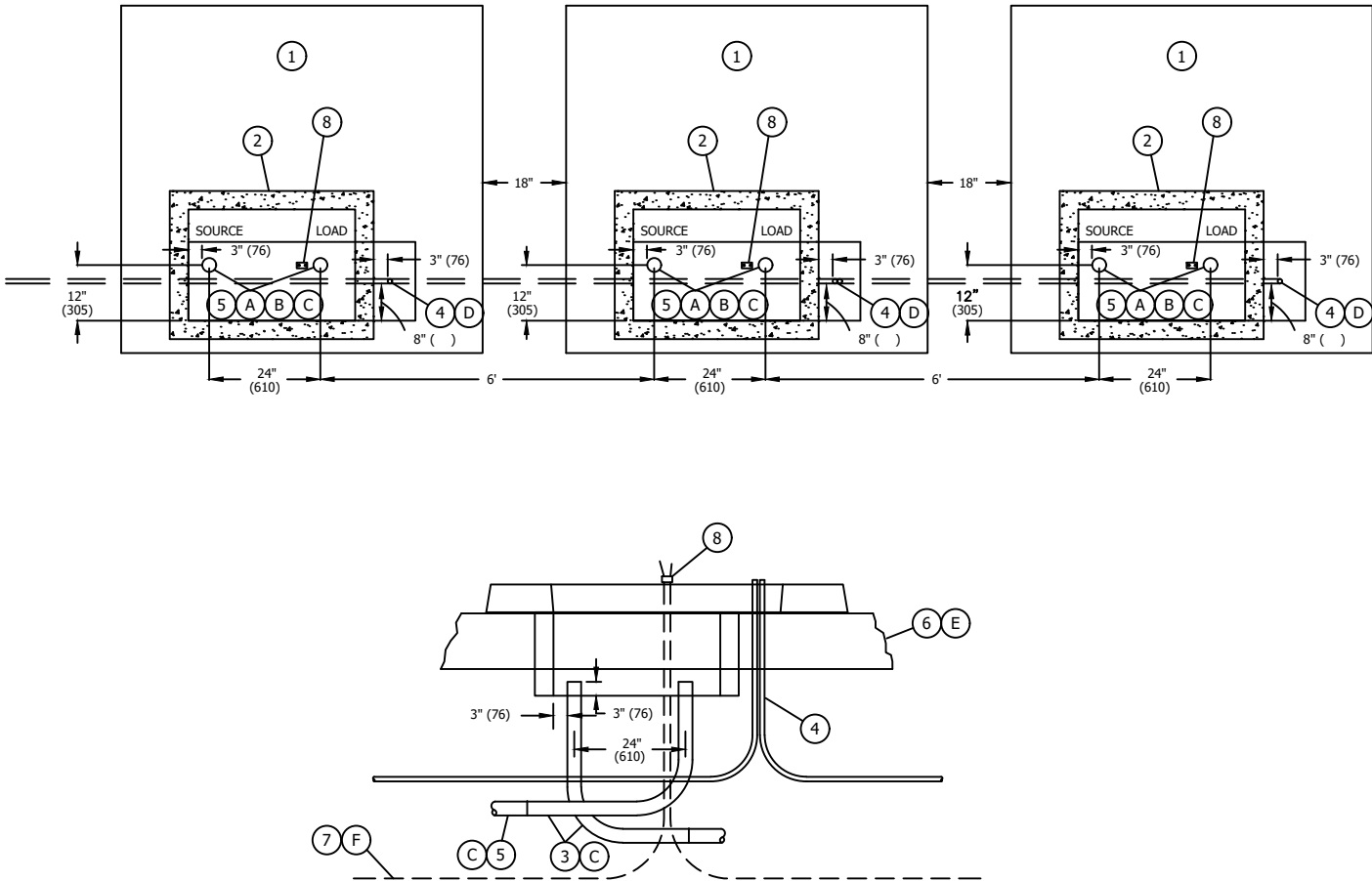
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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |
| INSTALLATION OF<br>PAD-MOUNTED REGULATOR          |                           |                    |          |                     |

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**UG4710.3**



CONDUIT / SUBSTRUCTURE / PAD / COMMUNICATION / GROUND INSTALLATION DIAGRAM:



SEE BILL OF MATERIAL PAGE 4710.5

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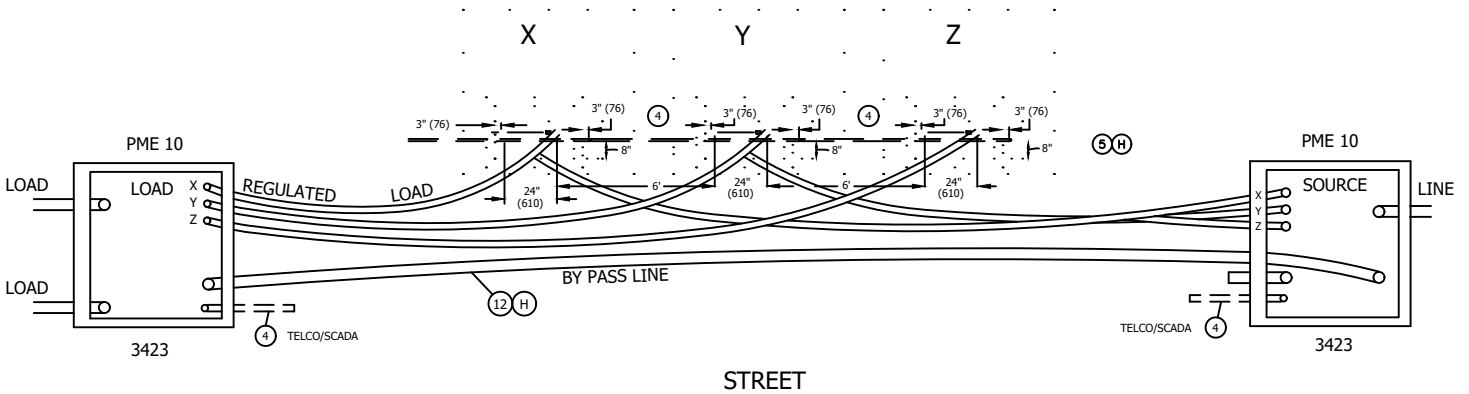
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |  |                    |  |          |  |                     |          |
|                 | INSTALLATION OF<br>PAD-MOUNTED REGULATOR          |                           |  |                    |  |          |  |                     |          |

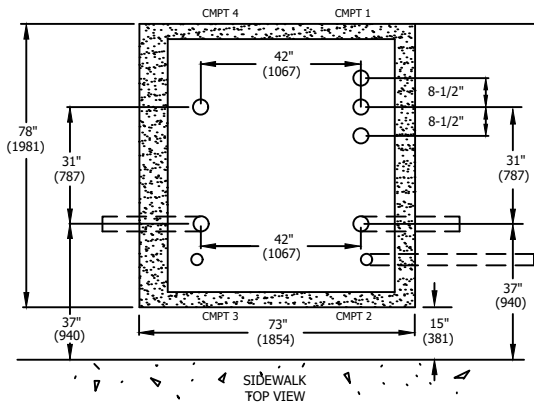


**CONDUIT DIAGRAM FOR PME AND PADMOUNTED REGULATORS:**

PARK

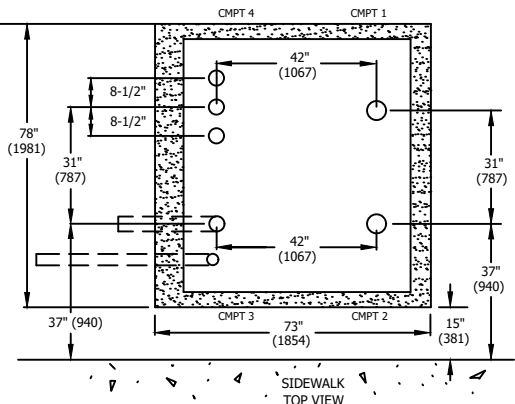


**BOX & CONDUIT PLACEMENT**



SEE STD. 3423 FOR INSTRUCTIONS  
ON INSTALLATION OF BOX PAD

**BOX & CONDUIT PLACEMENT**



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF  
PAD-MOUNTED REGULATOR

SHEET  
5 OF 8

UG4710.5



### INSTALLATION:

- (A) SLURRY ENCASE ALL 3 INCH CONDUITS.
- (B) SLURRY ENCASE ALL 3 INCH 90 DEGREE BENDS TO WITHIN 6 INCHES OF THE FINAL CUT.
- (C) DO NOT CUT THE 90 DEGREE BENDS.
- (D) LOOP A 1 INCH POLYETHYLENE CONDUIT TO EACH PAD. STUB THE CONDUIT FOUR FEET FROM THE EDGE OF PAD, CLOSEST TO TELCO. (WHEN REQUIRED)
- (E) IN SOFT SOILS A CONCRETE BACKFILL (1 SACK MIX.) IS REQUIRED UNDER THE PAD 12 INCHES BEYOND THE SIDE EDGES OF PAD AND 12 INCHES DEEP.
- (F) INSTALL A TRENCH GROUND WIRE FOR EACH PAD. INSTALL A SEPARATE GROUND WIRE BETWEEN THE CENTER PAD AND EACH END PAD.
- (G) SEE STANDARD 4520.3 FOR EQUIPMENT GROUNDING.
- (H) ALL HORIZONTAL BENDS WILL BE MADE WITH ONLY LONG SWEEPS OF 25' RADIUS OR LONGER.
- (I) SET 3313 ON 4" OF COMPACTED 1/2 GRAVEL.
- (J) NEUTRAL/GROUND STRAP FROM NEUTRAL BUSHING TO GROUND PAD.
- (K) ATTACH TRENCH GROUND TO GROUND PADS AND CONCENTRIC NEUTRAL.

### BILL OF MATERIALS:

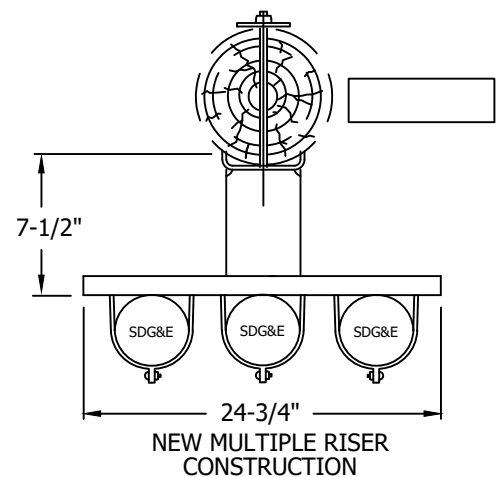
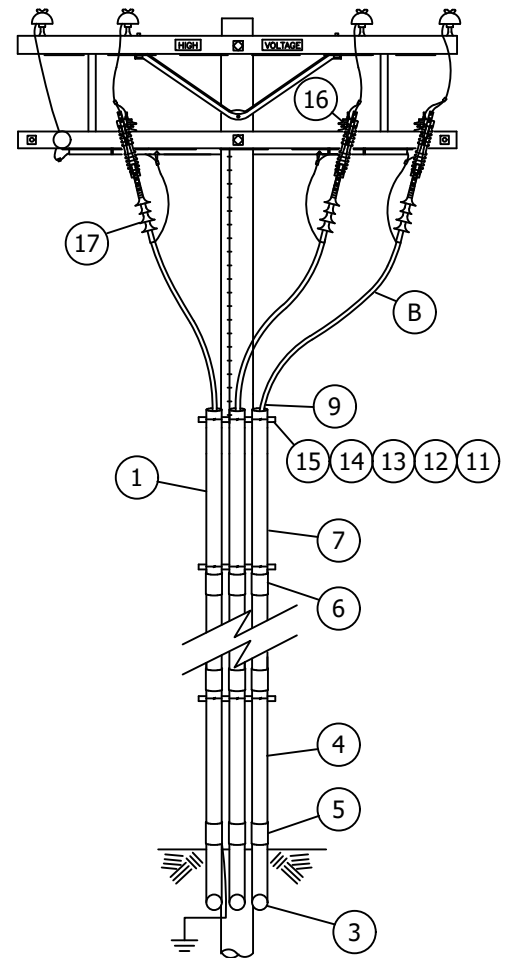
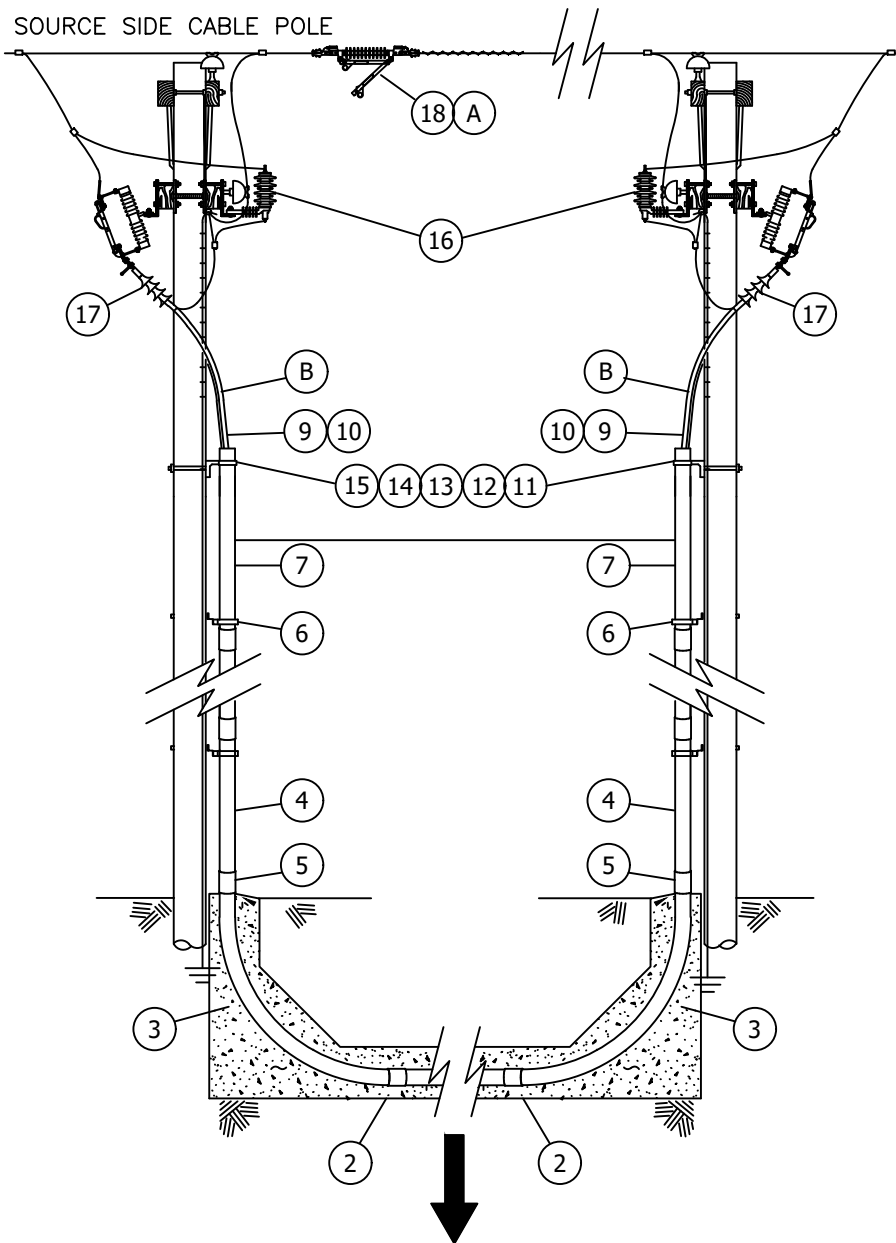
| ITEM | DESCRIPTION   | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|----------|---------------|--------------|----------------|
| 1    | PAD TRANSFORMER 3426                                | 3        | 3426          | 514005       | 3426B0         |
| 2    | BASE SECTION 3313                                   | 3        | 3313          | 162664       | 3313B          |
| 3    | 3" 90 DEGREE BEND                                   | 6        | 3373.2        | 322048       | S80-3"         |
| 4    | CONDUIT POLY 1 INCH                                 | AS REQ'D | 3373.1        | 249630       | 1"PE           |
| 5    | CONDUIT 3" INCH DB                                  | AS REQ'D | 3373.1        | 249664       | 1DB3-P         |
| 6    | SLURRY 1-SACK                                       | AS REQ'D | 3376.1        | 656400       | --             |
| 7    | TRENCH GROUND WIRE                                  | 3        | 4510          | --           | --             |
| 8    | CONNECTOR COMPRESSION                               | AS REQ'D | 4172          | --           | --             |
| 9    | GROUND PAD W/ 2 - 1/2-13 UNC TAPPED HOLES 7/16 DEEP | AS REQ'D | --            | 262560       | --             |
| 10   | 600 AMP CONNECTOR "T" TYPE                          | 6        | 4181.16       | --           | --             |
| 11   | SINGLE-PHASE PAD-MOUNT VOLTAGE REGULATOR            | 3        | --            | S581490      | REG600         |
| 12   | CONDUIT 5 INCH FOR UNDERGROUND BY-PASS              | AS REQ'D | 3373.1        | 249728       | 1DB5SL         |
| 13   | 5" 90° BEND FOR UNDERGROUND BY-PASS                 | AS REQ'D | 3373.2        | 322112       | 1-5SLB         |
| 14   | ENCASE/SLURRY/CONDUITS                              | AS REQ'D | 3373.1        |              | 1EB3IN         |

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|                 |          | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |      |          |                    |        |    |          |      |      |                     |  |          |
|                 |          | INSTALLATION OF<br>PAD-MOUNTED REGULATORS         |                           |      |          |                    |        |    |          |      |      |                     |  |          |



**SCOPE:** THIS STANDARD SHOWS NEW CONSTRUCTION FOR MULTIPLE CONDUIT RISERS, USED WITH PAD-MOUNTED REGULATOR.



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF  
PAD-MOUNTED REGULATOR

**UG4710.7**



**BILL OF MATERIALS:**

| ITEM | DESCRIPTION   | QUANTITY | STOCK NUMBER      |          |                | ASSEMBLY UNITS |
|------|---|----------|-------------------|----------|----------------|----------------|
| 1    | SEE STD. 4204.1 DETAIL "B"  |          |                   |          |                |                |
| 2    | COUPLING, (SIZE AS REQUIRED)  | AS REQ'D | 3"__279904        |          |                | --             |
| 3    | CONDUIT RISER BEND, SCHEDULE 80 (SIZE AS REQUIRED)  | AS REQ'D | 3"__36" R_322472  |          |                | 3"CP-B         |
| 4    | CONDUIT RISER, PVC, SCHEDULE 80 (SIZE AS REQUIRED)  | AS REQ'D | 3"__251552        |          |                | S80-3"         |
| 5    | COUPLING, PVC, SCHEDULE 80  | AS REQ'D | 3"__280544        |          |                | --             |
| 6    | COUPLING, PVC, SCHEDULE 4 (SIZE AS REQUIRED)  | AS REQ'D | 3"__280448        |          |                | --             |
| 7    | CONDUIT, PVC, SCHEDULE 40 (SIZE AS REQUIRED)  | AS REQ'D | 3"251360          |          |                | S40-3"         |
| 9    | GRIP, CABLE SIZE AS REQUIRED FOR PRIMARY RISERS   | AS REQ'D | CONDUIT           | AL CABLE | GRIP STOCK NO. | 3G2#2A         |
|      |   |          | 3"                | 1/C-1000 | 394048         |                |
| 10   | PROTECTOR, NYLON CABLE  | AS REQ'D | 558720            |          |                | --             |
| 11   | BRACKET, LADDER ARM (B)   | AS REQ'D | 167184            |          |                | LA-ARM         |
| 12   | CHANNEL, DOUBLE, GALV. 24-3/4" x 7/8" x 2-3/4" (B)  | AS REQ'D | 216700            |          |                |                |
| 13   | NUT STUD 1/2" x 1-3/8" CLAMPING CHANNEL, W/SPRING   | AS REQ'D | 507000            |          |                |                |
| 14   | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D), 1-SQUARE WASHER & DOUBLE COIL SPRING WASHER (B) | AS REQ'D | OVERHEAD STD. 392 |          |                | --             |
| 15   | CLAMP, PIPE, STEEL, GALV., UNISTRUT, 3"   | AS REQ'D | 229632            |          |                | CL-3IN         |
| 16   | CABLE POLE SEE STD. 4242.1  |          | --                |          |                | --             |
| 17   | CABLE POLE CONNECTION SEE STD. 4111.1 FIGURE 7  | --       | --                |          |                | --             |
| 18   | IN LINE BY-PASS SEE OH STD. 1218  | 3        | 707020            |          |                | ILD5W          |

(A) LOCATE INLINE SWITCH NEXT TO SOURCE CABLE.

(B) CABLE FOR POLES AND PAD-MOUNT USE 1C-1000AL 197628.

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| B   |          |    |      |      |          | E   |        |    |      |      |      |
| A   | REVISION | -- | TR   | JDJ  | 01/19/07 | D   |        |    |      |      |      |



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SHEET  
8 OF 8

SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF  
PAD-MOUNTED REGULATOR

UG4710.8



**SCOPE:** THIS STANDARD COVERS THE INSTALLATION OF THE HHS THREE PHASE PAD MOUNTED AUTO TRANSFORMER OR BOOSTER FOR 12,000/6900 TO 12470/7200 VOLTS. MANUFACTURED BY PARTNER TECHNOLOGIES INC. THEY ARE AVAILABLE IN TWO SIZES:

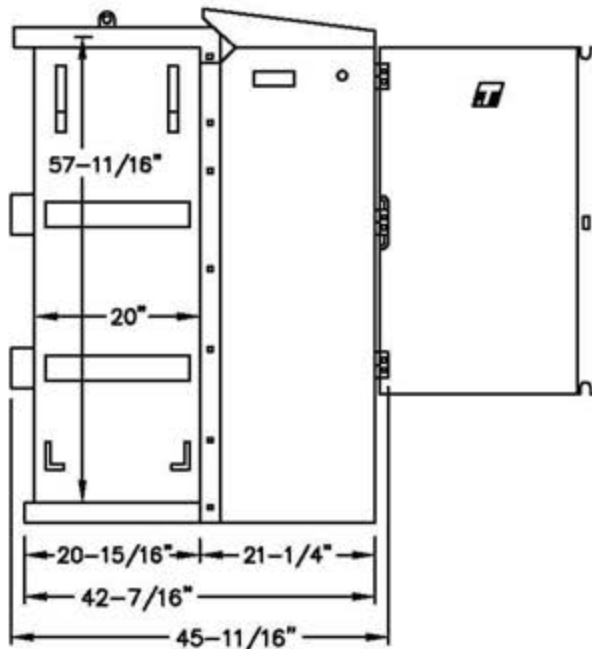
**3750 KVA** 600 AMP WITH DEAD BREAK CONNECTORS.

**1875 KVA** 200 AMP WITH LOAD BREAK CONNECTORS.

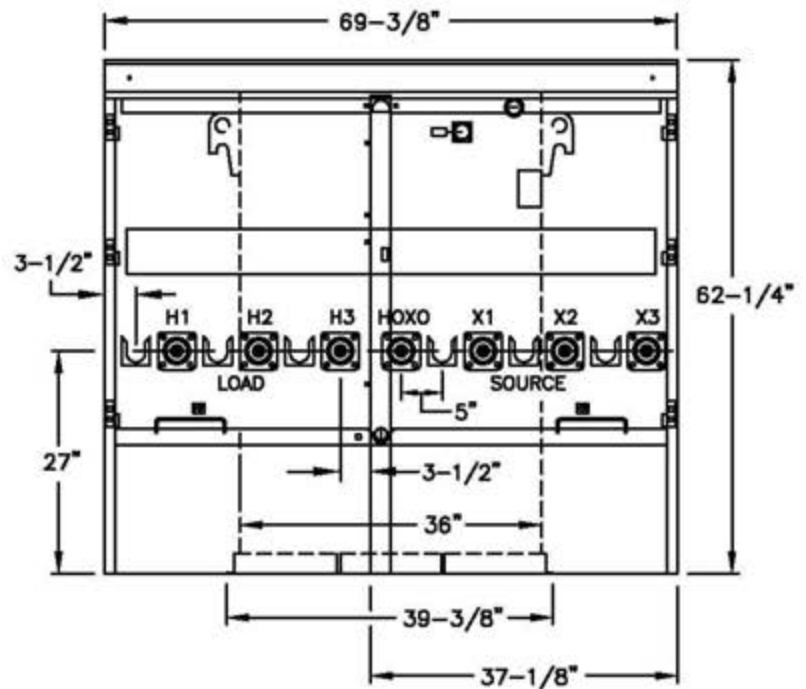
PAY CLOSE ATTENTION IN CONDUIT INSTALLATION AND CABLE MAKE UP TO THE CORRECT CONNECTIONS WHEN INSTALLING THE AUTO TRANSFORMER. THE AUTO TRANSFORMER WILL BUCK OR BOOST 12KV SYSTEM VOLTAGE. SDG&E CURRENTLY USES THE BOOST FUNCTION OF THE TRANSFORMER.

THE TRANSFORMER IS A Y-TO-Y CONNECTION, FOR THE BOOST FUNCTION THE X1, X2, X3 BUSHINGS ARE THE SOURCE SUPPLY SIDE OF THE TRANSFORMER AND THE H1, H2, H3, BUSHINGS ARE THE LOAD SIDE AND HOXO BUSHING IS THE NEUTRAL CONNECTION FOR BOTH SOURCE AND LOAD SIDE OF THE TRANSFORMER.

THE BOOSTED APPLICATION FEEDS AREAS WITH 12470/7200 Y, YES, YIS, YSV, YP, YEP, YDP, YTP AND YDQ TRANSFORMERS.



**SIDE VIEW:**



**FRONT VIEW:**

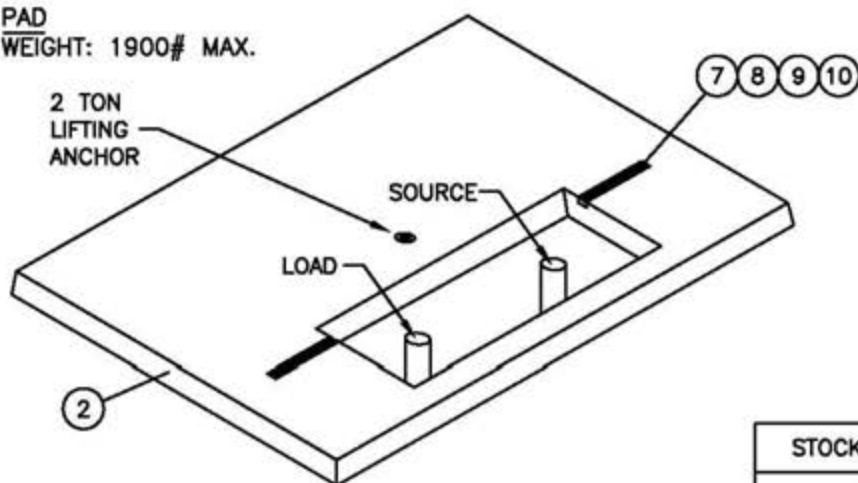
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| REVISION |          | SDG&E ELECTRIC STANDARDS                |                    |  |                     |
| DATE     | 2-7-07   | PAD-MOUNTED AUTO TRANSFORMER OR BOOSTER |                    |  |                     |
| APPD     | TR / JDJ |   |                    |  |                     |
|          |          | 4711                                    |                    |  |                     |



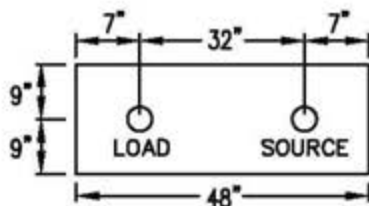
**SCOPE:** THIS STANDARD SHOWS REQUIREMENTS FOR INSTALLING A 3425 THREE-PHASE PAD FOR 3750, 1875 KVA HHR DEAD FRONT BOOSTER TRANSFORMER.

PAD  
WEIGHT: 1900# MAX.

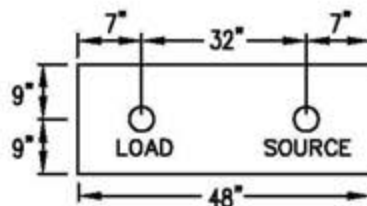


| STOCK NUMBER  | ASSEMBLY UNIT |
|---------------|---------------|
| PAD<br>513998 | 3425-3        |

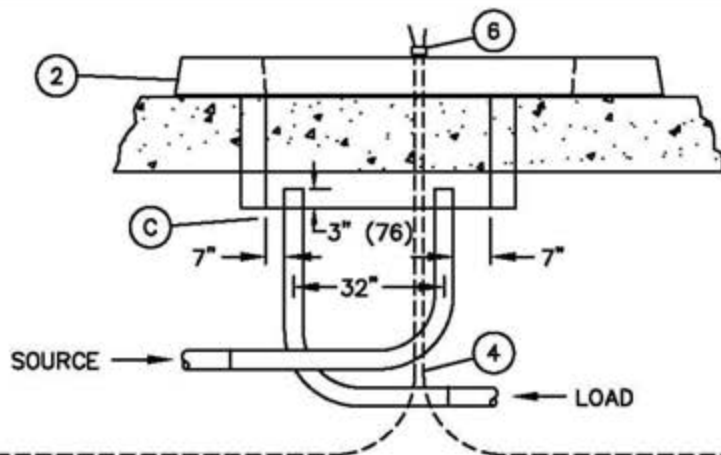
2-4" (200A CABLE)



2-5" (600A CABLE)



| STOCK NUMBER | DESCRIPTION | ASSEMBLY UNIT | MACRO UNIT |
|--------------|-------------|---------------|------------|
| 513998       | PAD         | 3425-3        | 3425-M     |
| 162660       | 3311 HH     | 3311-S        |            |



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| DATE 1-22-07 |  | PAD-MOUNTED AUTO TRANSFORMER OR BOOSTER |                    |  |                     |
| APPD TR/ JDJ |  |   |                    |  |                     |
|              |  | 4711.1                                  |                    |  |                     |



**BILL OF MATERIAL:**

| ITEM | DESCRIPTION                               | QUANTITY | CONSTR. STD.<br>OR PAGE NO. | STOCK<br>NUMBER | ASSEMBLY/MACRO<br>UNITS  |
|------|---|----------|-----------------------------|-----------------|--------------------------|
| 1    | HHR BOOSTER 1875 KVA                      | 1 (E)    | —                           | XXXX            | 200BST                   |
|      | HHR BOOSTER 3750 KVA                      |          |                             | S761324         | HS3750                   |
| 2    | PAD, 3425                                 | 1        | —                           | —               | 3425.3                   |
| 3    | 3311 HANDHOLE, 75" X 23" X 14"            | 1        | 3311                        | 162660          | 3311-S                   |
| 4    | TRENCH GROUND WIRE (R)                    | AS REQ'D | 4510                        | —               | —                        |
| 5A   | 600A CONNECTORS                           | AS REQ'D | 4181.20                     | —               | CC-P70, CC-P80<br>CC-P90 |
| 5B   | 200A CONNECTORS                           | AS REQ'D | 4181.20                     | —               | CC--E3<br>CC--E5         |
| 6    | GROUNDING PAD-MOUNTED EQUIPMENT           |          | 4520.6<br>4530.1 - .2       | —               | —                        |
| 7    | NUT, CLAMPING CHANNEL, W/SPRING, 1/2"     | 2        | —                           | 505520          | —                        |
| 8    | SCREW, HEX HEAD CAP, BRONZE 1/2" X 1-1/2" | 2        | —                           | 616192          | —                        |
| 9    | WASHER, STANDARD FLAT ROUND, BRONZE 1/2"  | 2        | —                           | 799488          | —                        |
| 10   | HOLD DOWN (SUPPLIED WITH CABINET)         | 2        | —                           | —               | —                        |
| 11   | SEALING COMPOUND (A)                      | AS REQ'D | —                           | 442976          | —                        |
| 12   | KEYLESS LOCK (NOT SHOWN) (D)              | 1        | —                           | 468010          | —                        |
| 13   | CABLE IDENTIFICATION TAGS                 | AS REQ'D | 3202                        | —               | —                        |


**INSTALLATION:**

- (A) SEAL CONDUITS WITH SEALING COMPOUND.
- (B) BASE OF CABINET SHALL BE CAULKED ONLY TO PREVENT POSSIBLE WIRE ENTRY.
- (C) SET 3311 ON 4" OF COMPACTED 1/2 GRAVEL.
- (D) KEYLESS LOCK TO BE ATTACHED TO LATCHING MECHANISM ON CABINET AND PENTAHEAD BOLT TO BE THREADED IN COMPLETELY.
- (E) PLAN AND ORDER EARLY, MAY REQUIRE 20 WEEK LEAD TIME.

**REFERENCE:**

- J. SEE STANDARD 3211 FOR STRUCTURE/EQUIPMENT IDENTIFICATION TAG.
- K. SEE STANDARD 3408 FOR WIRE ENTRY PREVENTION AND MOISTURE ENTRY.
- L. SEE STANDARD 3425 FOR PAD AND HANDHOLE INSTALLATION.
- M. SEE STANDARD 3481 FOR BARRIERS IF THE PAD IS SUBJECT TO VEHICULAR TRAFFIC.
- N. SEE STANDARD 3483 FOR MINIMUM OPERATING CLEARANCE REQUIREMENTS (PAD PLACEMENT).
- O. SEE STANDARD 3484 FOR PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT.
- P. SEE STANDARD 3486 FOR RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALLS.
- Q. SEE STANDARD 3487 FOR RETAINING WALLS.
- (R) SEE STANDARD 4510 FOR (PREFERRED I) AND (ALTERNATE TRENCH GROUND WIRE).
- (S) SEE STANDARD PAGE 4512 FOR EQUIPMENT GROUNDING INSTALLATION.
- (T) SEE STANDARD 4520 FOR GROUNDING PAD-MOUNTED EQUIPMENT.
- (U) SEE STANDARD 4525 FOR GROUNDING CONCENTRIC NEUTRAL TERMINATIONS AND GROUNDING PREMOLDED CONNECTORS.

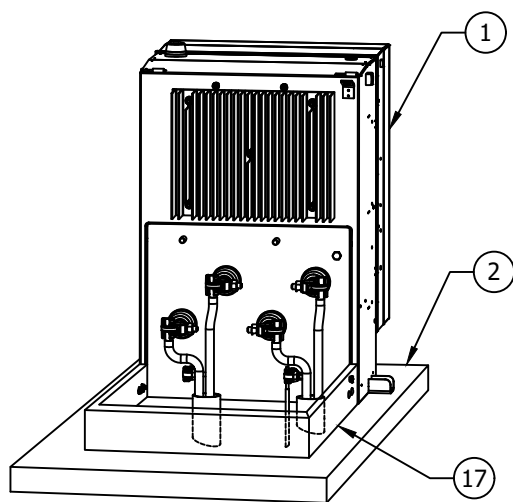
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| 4711.2 | SDG&E ELECTRIC STANDARDS                |   |  |                    |  |          |  | REVISION            |
|        | PAD-MOUNTED AUTO TRANSFORMER OR BOOSTER |   |  |                    |  |          |  | DATE 10-23-2012     |
|        |   |   |  |                    |  |          |  | APPD TR/MJC         |



THE IPR-50 CAN BE APPLIED TO TRANSFORMERS WHERE PV (SOLAR PLANTS) AND EV (ELECTRIC VEHICLE CHARGING) IS PRESENT, TO HELP MAINTAIN VOLTAGE AND POWER FACTOR LEVELS. THE IPR 50 IS WIRED TO THE SECONDARY SIDE OF A SINGLE PHASE TRANSFORMER 120/240 VOLTS.

- A. THE IPR IS DESIGNED TO CONNECT TO THE SECONDARY SIDE OF A DISTRIBUTION TRANSFORMER RATED FOR 50KVA OR LESS. THE MAXIMUM CURRENT LIMIT OF THE IPR IS 250 AMPS. IF THE CURRENT EXCEEDS 250 AMPS, THE IPR WILL AUTOMATICALLY GO TO BYPASS. WHEN THE CURRENT RETURNS BELOW 250 AMPS, THE UNIT WILL AUTOMATICALLY TRANSITION OUT OF BYPASS AND RETURN TO ACTIVE STATE.
- B. WEIGHT APPROXIMATELY 355 POUNDS.
- C. THE IPR UNIT MUST BE PROPERLY GROUNDED BEFORE ENERGIZING THE SYSTEM.
- D. DE-ENERGIZE THE TRANSFORMER BEFORE CONNECTING THE IPR.
- E. SOURCE BUSHINGS ARE LOCATED TO THE LEFT SIDE OF THE IPR DESIGNATED AS S1 AND S3. THE LOAD BUSHINGS ARE LOCATED ON THE RIGHT DESIGNATED AS L1 AND L3. FITS CONDUCTORS SIZED #4AWG TO 500MCM.
- F. PRIOR TO ENERGIZING THE UNIT, THE BYPASS SWITCH SHOULD BE IN THE BYPASS POSITION. ONCE THE TRANSFORMER IS ENERGIZED, CHECK VOLTAGE ON THE SECONDARY SIDE. TURN BYPASS SWITCH TO "ON" AND CHECK SECONDARY VOLTAGE AGAIN AFTER GIVING THE POWER ELECTRONICS A MINUTE TO BECOME OPERATIONAL. THE SECONDARY VOLTAGE SHOULD BE REGULATED PER THE FACTORY PROGRAM CONFIGURATION, 240 VOLTS.



The diagram illustrates a test system setup. A vertical rack contains several horizontal slots. A central unit is connected to various components labeled S1, S3, SL, L1, L3, and GND. Callouts 10, 11, and 12 point to specific components or connections.

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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |           |
|                  | IPR50 - GRIDCO PAD-MOUNTED POWER REGULATOR        |                           |                    |          |                     |           |



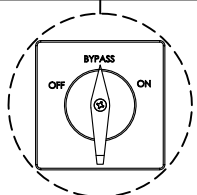
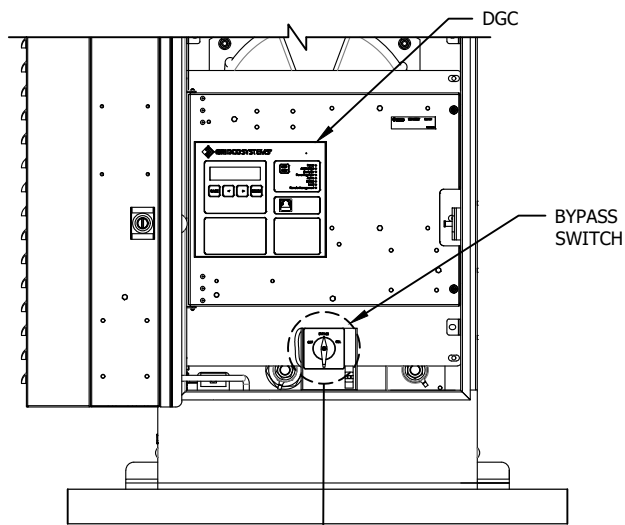


FIGURE 1C  
(REAR VIEW)

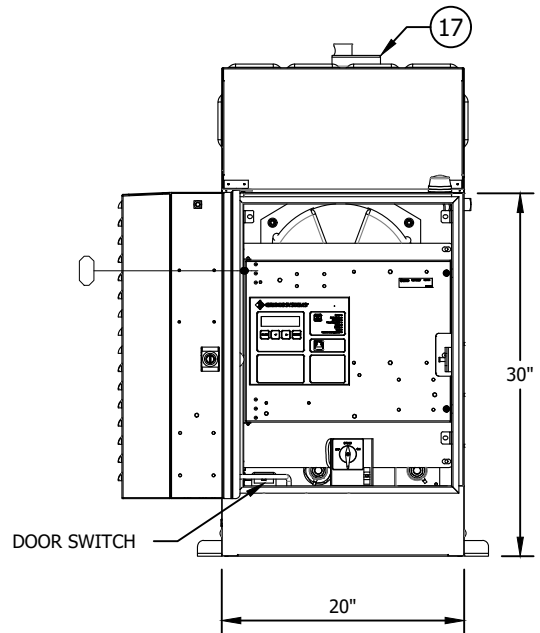


FIGURE 1D  
(REAR VIEW)

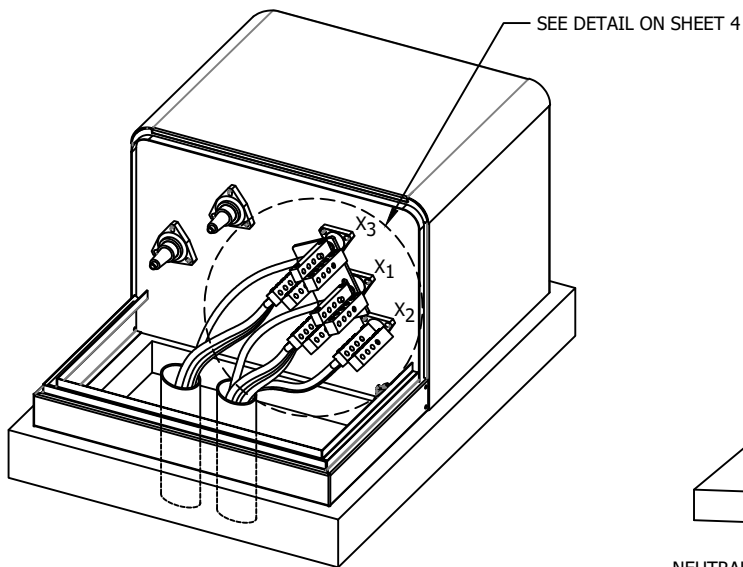


FIGURE 2B  
(XFMR VIEW)

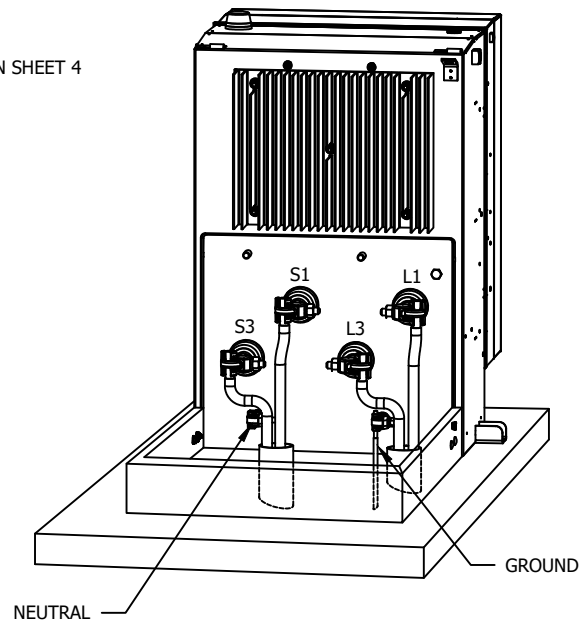



FIGURE 2C  
(GRIDCO IPR50 VIEW)

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                   |                           |                    |          |                     |
| IPR50 - GRIDCO PAD-MOUNTED POWER REGULATOR  |                           |                    |          |                     |

UG 4712.2



# INSTALLATION OF IPR CONNECTED TO SECONDARY OF XFMR:

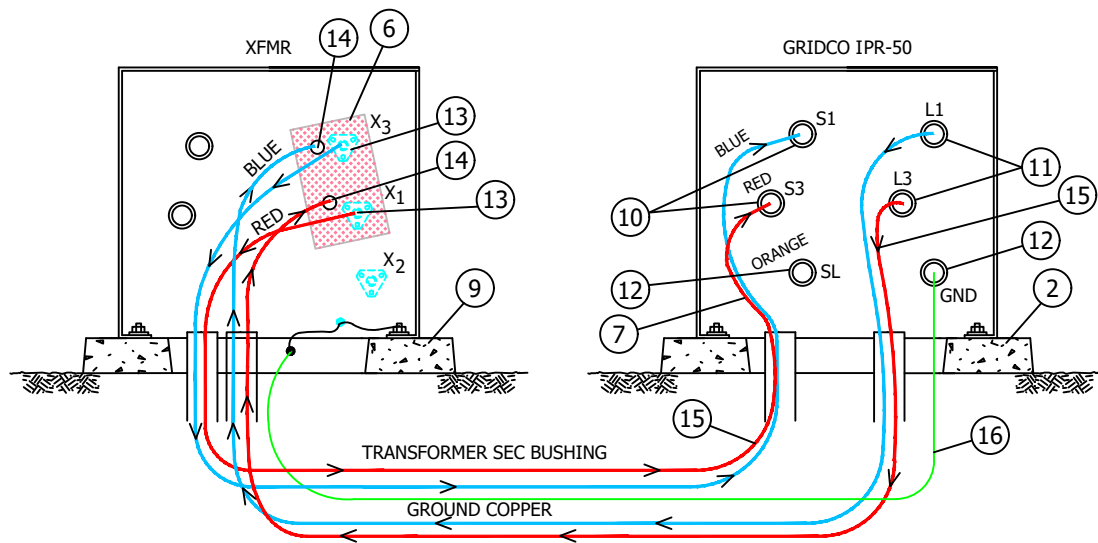


FIGURE 2A

# INSTALLATION OF IPR CONNECTED IN SERIES OF SECONDARY:

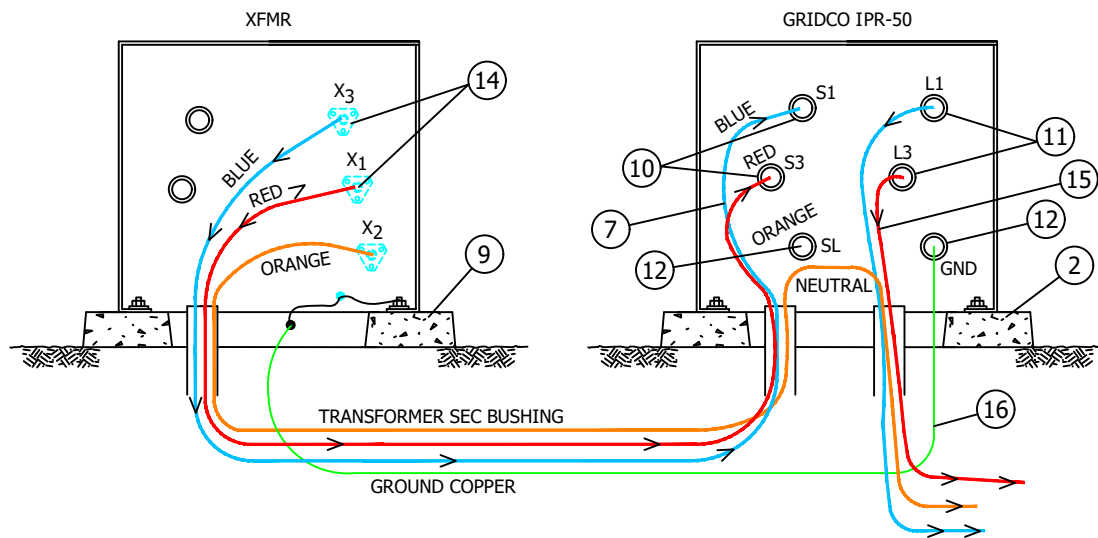


FIGURE 3

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| SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                    |          |                     |
| IPR50 - GRIDCO PAD-MOUNTED POWER REGULATOR        |                    |          |                     |

UG 4712.3



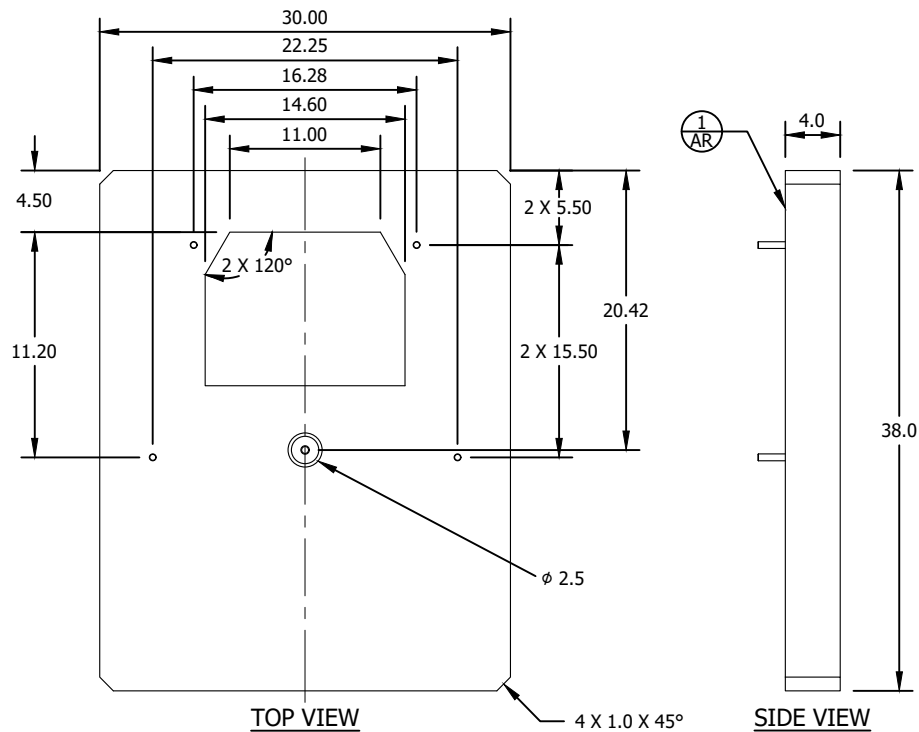


1. INSTALL RED ISOLATION BOARD WITH BACKING NUTS TO X1/X3 BUSHINGS.
2. LAND 350MCM ON RIGHT SIDE SECONDARY Z BARS (SHOWN AS S1/S3). RUN BACK TO IPR IN CONDUIT. L1/L3 (350MCM FROM IPR) WILL LAND ON LEFT SIDE SECONDARY Z BARS. THIS WILL BE REGULATED VOLTAGE Z BARS.
3. RUN SECONDARY TO CUSTOMERS (SIZE AND QTY AS NEEDED) OFF LEFT SIDE (REGULATED) Z BARS.

| REV | CHANGE            | BY | DSGN | APPV | DATE      | REV | CHANGE | BY | DSGN | APPV | DATE |
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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |           |
|                  | IPR50 - GRIDCO PAD-MOUNTED POWER REGULATOR        |                           |                    |          |                     |           |





### **BILL OF MATERIALS:**

| ITEM | DESCRIPTION  | QUANTITY | CONSTR. STD.<br>OR PAGE NO. | STOCK NO. | ASSEMBLY<br>UNITS |
|------|--|----------|-----------------------------|-----------|-------------------|
| 1    | REGULATOR, IPR-50  | 1        | 4712                        | S581252   | UIPR50            |
| 2    | PAD, IPR-50 PAD  | 1        | 4712                        | S514244   | IPRPAD            |
| 6    | RED ISOLATION BOARD  | 1        | -                           | -         | -                 |
| 7    | SOURCE CABLE TO IPR-50                                       | AR       | -                           | -         | -                 |
| 8    | NUT, CLAMPING CHANNEL  | AR       | 3711.3                      | S503520   | -                 |
| 9    | PAD, TRANSFORMER, 3421                                       | 1        | 3421                        | S514240   | 3421-1            |
| 10   | SOURCE BUSHING, IPR-50 EYEBOLT                               | 2        | -                           | -         | -                 |
| 11   | LOAD BUSHING, IPR-50 EYEBOLT                                 | 2        | -                           | -         | -                 |
| 12   | SL NEUTRAL AND GROUND BUSHINGS, IPR-50                       | -        | -                           | -         | -                 |
| 13   | CONNECTIONS, SECONDARY, LINE TO IPR                          | AR       | 4167                        | -         | -                 |
| 14   | CONNECTIONS, SECONDARY, IPR-50 LOAD &<br>LOAD TO CUSTOMER(S) | AR       | -                           | -         | -                 |
| 15   | LOAD CABLE FROM IPR-50 TO SECONDARY                          | AR       | -                           | -         | -                 |
| 16   | GROUND WIRE  | AR       | 4510.3                      | S812816   | GDWIRE            |
| 17   | LOCK, KEYLESS  | 1        | 3711.3                      | S468010   | -                 |
| 18   | SEALANT, CAULKING  | AR       | -                           | S631800   | -                 |

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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |                    |          |                     |           |
|                  | IPR50 - GRIDCO PAD-MOUNTED POWER REGULATOR        |                           |                    |          |                     |           |



**NOTES:**

- I. VOLTAGE REGULATION UP TO  $\pm 10\%$  CONTINUOUS OF NOMINAL  $\pm 24$  VOLTS.
- II. SOURCE VOLTAGE RANGE  $-55\%$  TO  $+25\%$  OF NOMINAL.
- III. THE IPR IS A SERIES COMPONENT, THEREFORE IN BYPASS, UNREGULATED POWER WILL CONTINUE TO FLOW.
- IV. THE IPR WILL PROTECT ITSELF FROM OVER CURRENT BY GOING INTO BYPASS. THERE IS A STATUS LIGHT LABELED "ACTIVE" LOCATED ON THE FRONT PANEL OF THE CONTROLLER. WHEN THE "ACTIVE" STATUS LIGHT IS ON, THE UNIT IS ACTIVELY REGULATING. WHEN THE STATUS LIGHT IS OFF, THE UNIT IS IN BYPASS.
- V. THE UNIT IS AIR COOLED AND THE SURFACES OF THE IPR CAN EXCEED  $100^{\circ}\text{C}$ . BE SURE TO TAKE APPROPRIATE PRECAUTIONS WHEN HANDLING THE DEVICE.

**REFERENCE:**

- (a). WIRE ENTRY PREVENTION. SEE UNDERGROUND STANDARD 3408.
- (b). CONDUIT SEALING, SEE UNDERGROUND STANDARD 3948 (G.O. 128 RULE 31.6).
- (c). SLIP-FIT CONNECTORS SEE UNDERGROUND STANDARD 4167.
- d. INSTALLATION OF SINGLE PHASE "NTS" TRANSFORMER, SEE UNDERGROUND STANDARD 3711.3.
- e. CABLE IDENTIFICATION, SEE UNDERGROUND STANDARD 3202.
- f. TRANSFORMER IDENTIFICATION, SEE UNDERGROUND STANDARD 3212.
- g. PAD AND CONDUIT REQUIREMENTS, SEE UNDERGROUND STANDARD 3421.
- h. MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT), SEE UNDERGROUND STANDARD 3483.
- i. PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT, SEE UNDERGROUND STANDARD 3484.
- j. RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALL, SEE UNDERGROUND STANDARD 3486.
- k. RETAINING WALLS, SEE UNDERGROUND STANDARD 3487.
- l. SEALING SERVICE LATERAL CONDUITS, SEE UNDERGROUND STANDARD 4510.
- m. (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE, SEE UNDERGROUND STANDARD 4510.
- n. (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION, SEE UNDERGROUND STANDARD 4512.2.
- o. EQUIPMENT GROUNDING, SEE UNDERGROUND STANDARD 4512.2.
- p. FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT, SEE UNDERGROUND STANDARD 4514.

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|                  |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |      |                    |     |          |    |                     |      |           |
|                  |                   | IPR50 - GRIDCO PAD-MOUNTED POWER REGULATOR        |                           |      |                    |     |          |    |                     |      |           |

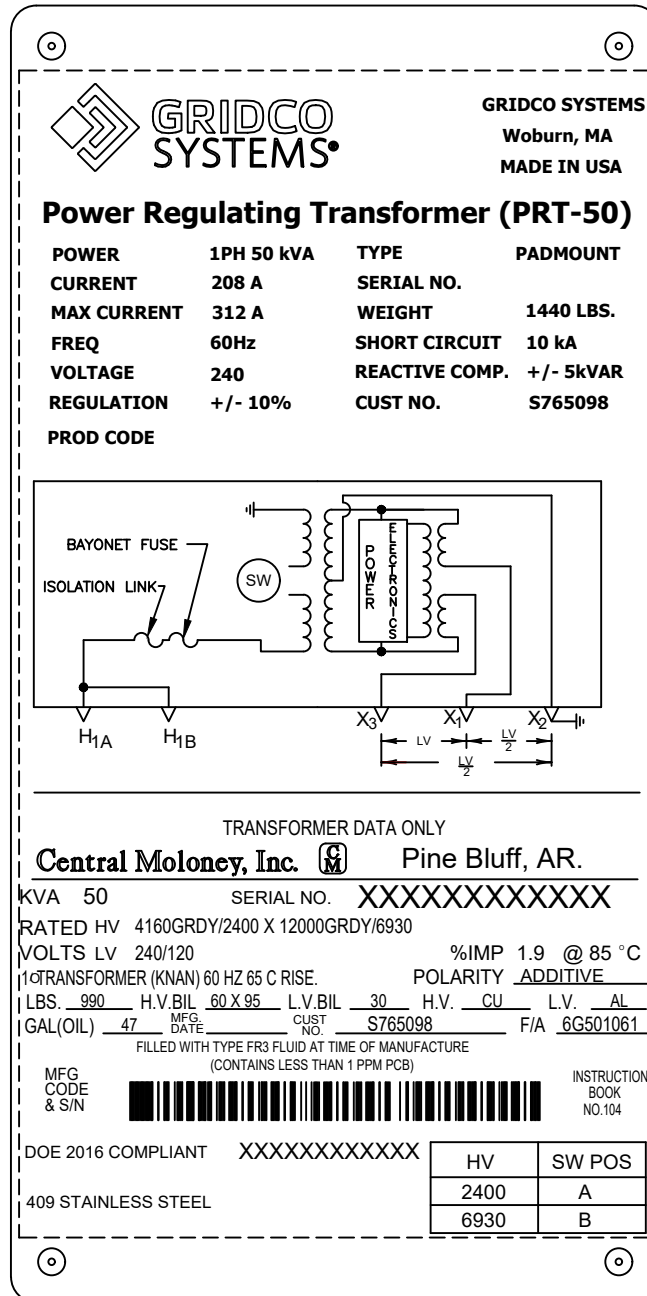


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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD   |           |  |
|                  | PAD-MOUNTED SINGLE PHASE TRANSFORMER,<br>REGULATING, 50KVA, 6930/2400 VOLT   |           |  |



## INSTALLATIONS:

- A. LOAD VOLTAGE REGULATION RANGE IS +/- 10 PERCENT AT 208 AMPS AT 100 PERCENT CAPACITY. SEE FIGURE 1.



**FIGURE 1**

- B. CLEARANCE TO ACCESS THE POWER ELECTRONICS REQUIRES A MINIMUM OF 20.5 TO 24.5 INCHES FROM BASE OF UNIT TO FULLY OPEN, DEPENDING ON ALIGNMENT ON THE PAD. SEE FIGURE 2A SHOWN CENTERED ON PAD.



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|                  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                           |  |                                   |  |           |
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|                  |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                                    |                           |      |   |                    |        |    |          |      |                     |           |
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E. BYPASS SWITCH CONTAINS THE FOLLOWING SETTINGS:

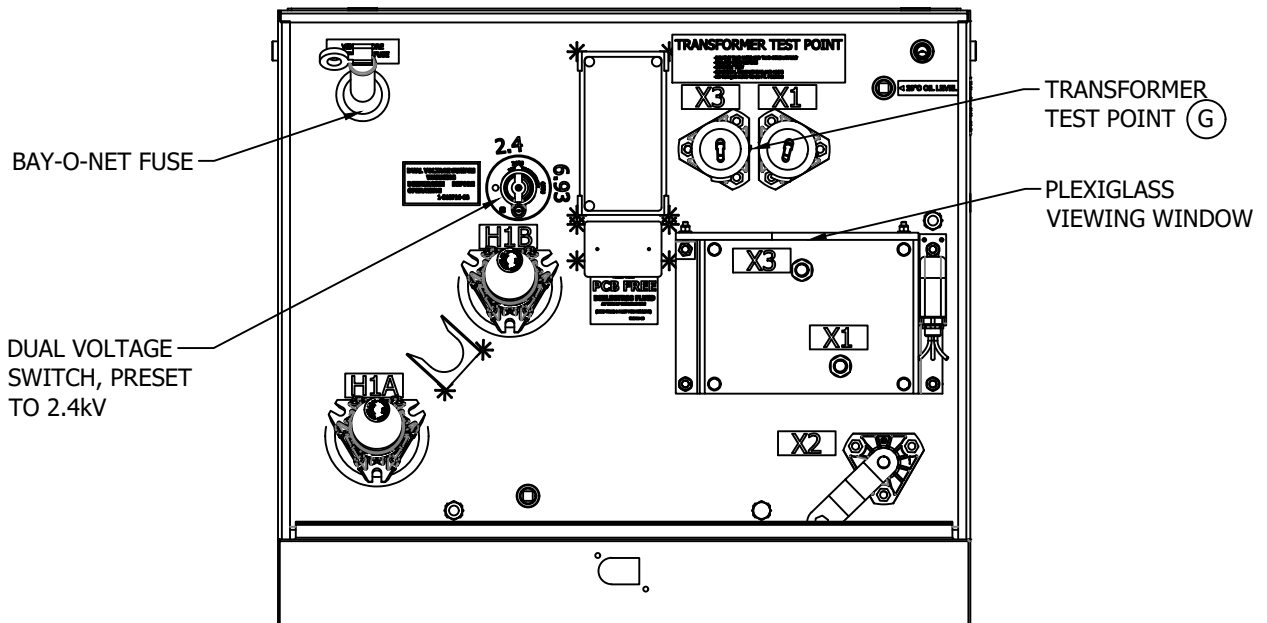
- **ON:** THE INTEGRATED INLINE POWER REGULATOR IS ACTIVELY REGULATING GRID POWER FLOW.
- **OFF:** POWER TO DOOR AND INTEGRATED POWER ELECTRONICS IS OFF DURING WHICH TIME THE SYSTEM IS IN PASS-THROUGH MODE ALLOWING GRID POWER TO PASS THROUGH WITHOUT REGULATING.
- **BYPASS:** THE INTEGRATED INLINE POWER REGULATOR IS POWERED ALLOWING MANAGEMENT OF THE DEVICE HOWEVER GRID POWER IS DETOURED AROUND THE ELECTRONICS AND THE UNIT IS NOT REGULATING. SEE FIGURE 4.



**BYPASS SWITCH**

**FIGURE 4**

F. PRIOR TO CONNECTING SECONDARIES, CHECK THAT TORQUE MARKS ON SENCONDARY BOLTS ARE ALIGNED THROUGH THE PLEXIGLAS VIEWING WINDOW. SEE FIGURE 5.



**FIGURE 5**

- (G) TO PERFORM TRANSFORMER PRE-TEST, DISCONNECT AND ISOLATE X3/X1 CONDUCTORS SHOWN IN FIG. 5. PERFORM TEST, THEN RE-INSTALL X3/X1 CONDUCTORS, AND TORQUE TO 50 FT. LBS. DO NO OVER/UNDER TIGHTEN.

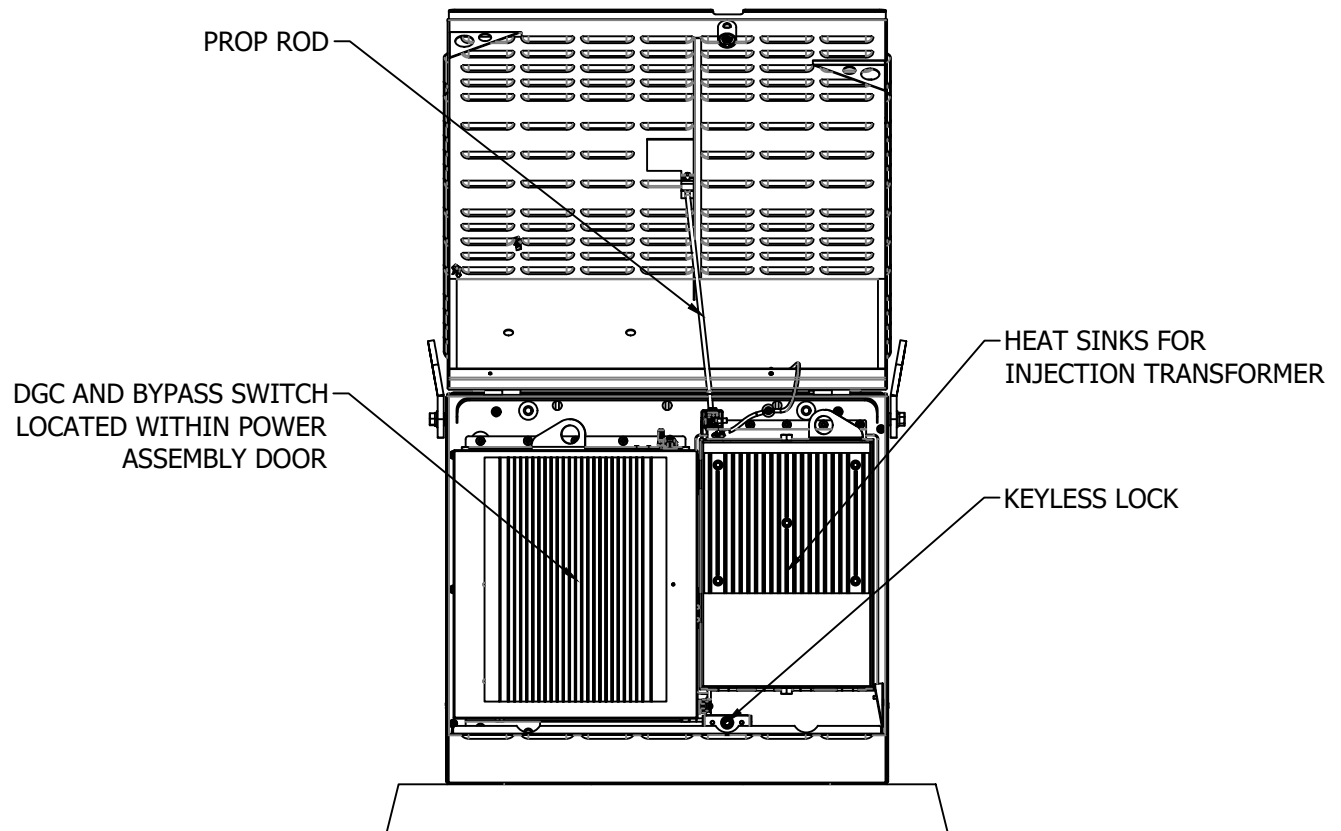
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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD                           |  |                                   |  |            |
|                   | PAD-MOUNTED SINGLE PHASE TRANSFORMER,<br>REGULATING, 50KVA, 6930/2400 VOLT |  |                                   |  |            |





**FIGURE 6**

- H. PRIOR TO ENERGIZING THE UNIT, THE BYPASS SWITCH SHOULD BE IN THE BYPASS POSITION. ONCE THE TRANSFORMER IS ENERGIZED, CHECK VOLTAGE ON THE SECONDARY SIDE. IF VOLTAGE IS ACCEPTABLE, TURN BYPASS SWITCH TO "ON" AND CHECK SECONDARY VOLTAGE AGAIN. SEE FIGURE 6.
- I. BASE WILL BE CAULKED TO PREVENT WIRE ENTRY. (a)
- J. KEYLESS LOCK TO BE ATTACHED TO LATCHING MECHANISM ON TRANSFORMER AND IPR CABINET WITH PENTAHEAD BOLT THREADED IN COMPLETELY.

**NOTES:**

- I. PRT-50 WEIGHS APPROXIMATELY 1,440 POUNDS.
- II. THE HEAT SINKS MOUNTED ON THE OUTSIDE OF THE PRT CAN GET EXTREMELY HOT. BE SURE TO TAKE APPROPRIATE PRECAUTIONS WHEN HANDLING OR SERVICING THE DEVICE.
- III. WHEN INSTALLING OR CHANGING SPRT50 FROM 2.4KV TO 6.9KV, CHANGE BAY-O-NET FUSE FROM 40A TO 12A (AND VICE VERSA). SPRT50 IS SUPPLIED WITH 40A 2.4KV FUSE.
- IV. SET SCREW CONNECTORS ARE NOT PROVIDED WITH TRANSFORMER. ALWAYS MAKE CERTAIN SECONDARY CONNECTIONS ARE TIGHT BEFORE ENERGIZING TRANSFORMER. (c)

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|                                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD   |                   |
|                                 | PAD-MOUNTED SINGLE PHASE TRANSFORMER,<br>REGULATING, 50KVA, 6930/2400 VOLT   |                   |



## REFERENCES:

- (a) WIRE ENTRY PREVENTION. SEE UNDERGROUND STANDARD 3408.
- (b) CONDUIT SEALING, SEE UNDERGROUND STANDARD 3948 (G.O. 128 RULE 31.6).
- (c) SLIP-FIT CONNECTORS, SEE UNDERGROUND STANDARD 4167.
- d. INSTALLATION OF SINGLE PHASE "SDS" TRANSFORMER, SEE UNDERGROUND STANDARD 3711.1.
- e. CABLE IDENTIFICATION, SEE UNDERGROUND STANDARD 3202.
- f. TRANSFORMER IDENTIFICATION, SEE UNDERGROUND STANDARD 3212.
- g. PAD AND CONDUIT REQUIREMENTS, SEE UNDERGROUND STANDARDS 3421.
- h. MINIMUM OPERATING AND CLEARANCE REQUIREMENTS (PAD PLACEMENT),. SEE UNDERGROUND STANDARDS 3483.
- i. PAD INSTALLATION OF PAD-MOUNTED EQUIPMENT, SEE UNDERGROUND STANDARD 3484.
- j. RETAINING WALL REQUIREMENTS AND CLEARANCES FROM REVERSE SUBGRADE RETAINING WALL, SEE UNDERGROUND STANDARD 3486.
- k. RETAINING WALLS, SEE UNDERGROUND STANDARDS 3487.
- l. SEALING SERVICE LATERAL CONDUITS, SEE UNDERGROUND STANDARDS 3948.
- m. (PREFERRED I) AND (ALTERNATE) TRENCH GROUND WIRE, SEE UNDERGROUND STANDARDS 4510.
- n. (PREFERRED II) EQUIPMENT GROUNDING INSTALLATION, SEE UNDERGROUND STANDARD 4512.2.
- o. EQUIPMENT GROUNDING, SEE UNDERGROUND STANDARD 4512.2.
- p. FOR GROUNDING TELCO CONDUCTOR IN PAD-MOUNTED EQUIPMENT, SEE UNDERGROUND STANDARD 4514.

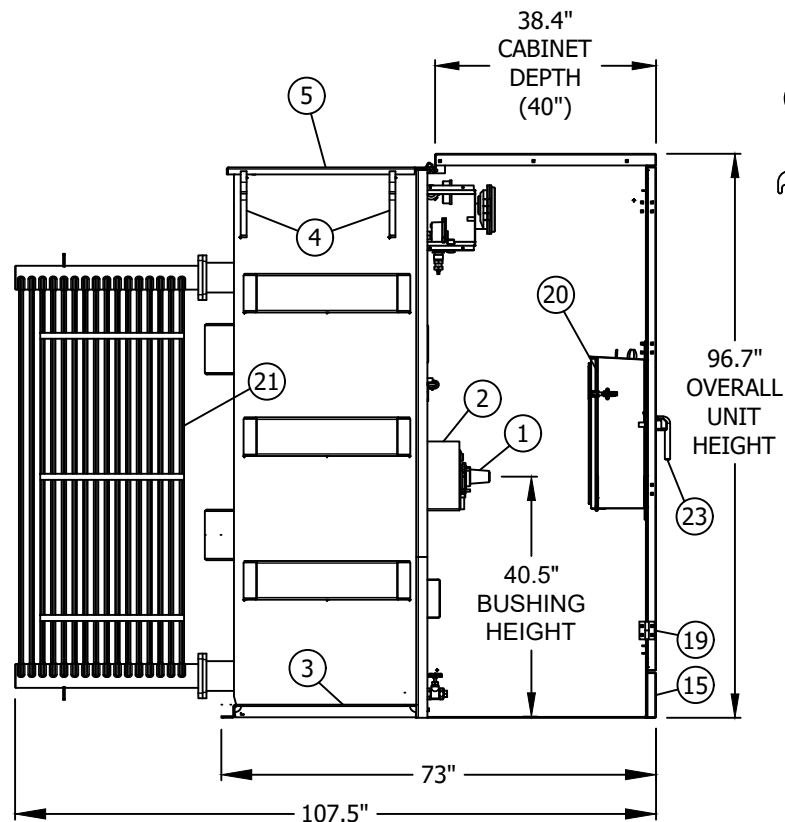
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|                   |                | PAD-MOUNTED SINGLE PHASE TRANSFORMER,<br>REGULATING, 50KVA, 6930/2400 VOLT          |                           |      |   |                    |        |   |          |      |   |                     |  |            |

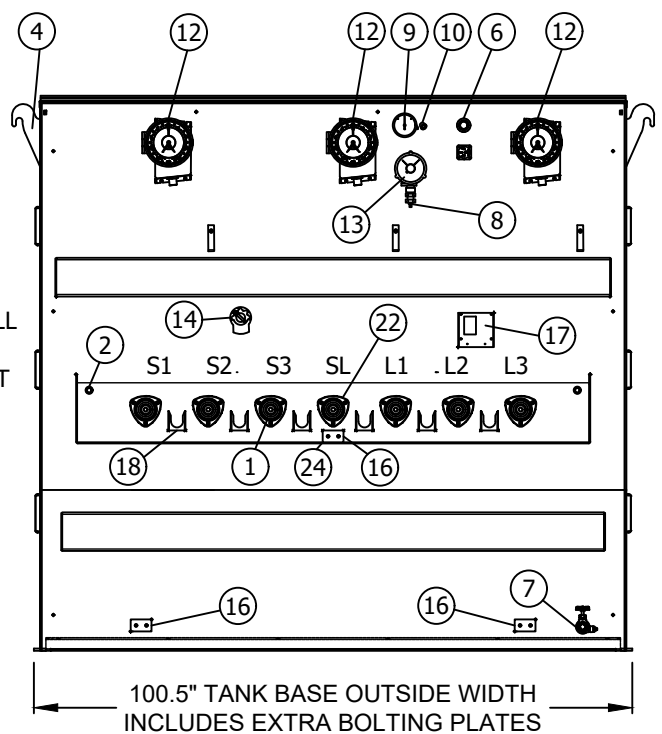


**ATTENTION:** SEE DESCRIPTION LIST ON 4713.3 FOR IDENTIFICATION OF COMPONENTS.

**WYE CONNECTED REGULATOR**      (a)(b)(c)



**SIDE VIEW**  
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**FRONT VIEW**  
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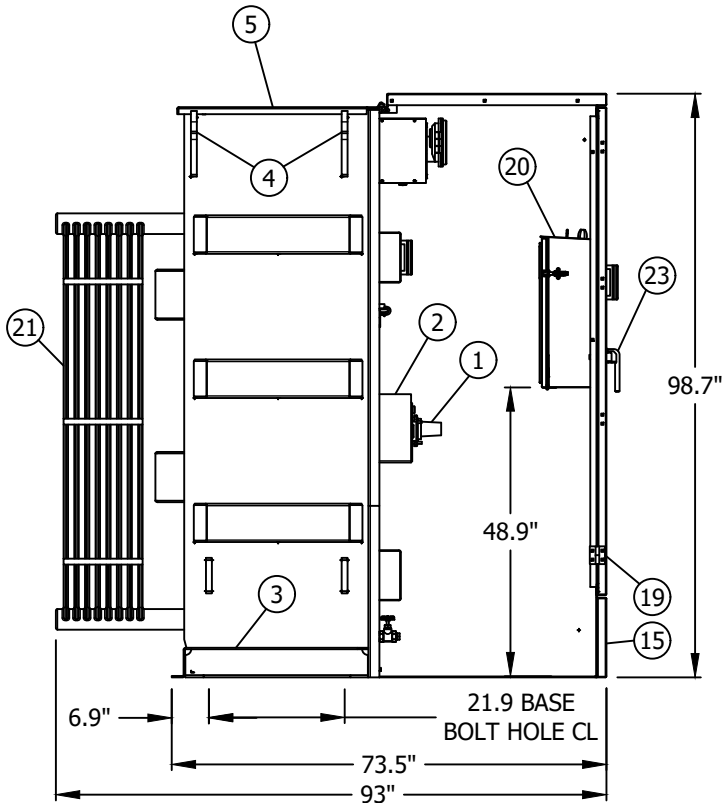
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|                  | INSTALLATION OF<br>PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1" |                    |  |                     |          |

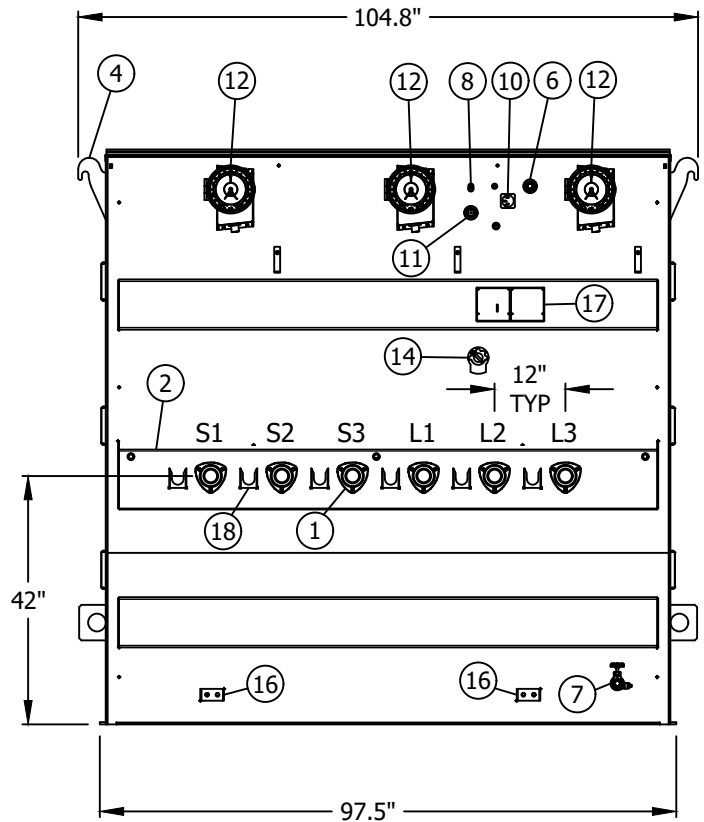


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## DELTA CONNECTED REGULATOR (a)(b)(c)



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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INSTALLATION OF PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1"

UG4713.2



| PADMOUNTED REGULATOR DESCRIPTION LIST |   |
|---------------------------------------|---|
| ITEM                                  | DESCRIPTION   |
| 1                                     | HIGH VOLTAGE INTEGRAL APPARATUS BUSHING   |
| 2                                     | TANK BOXOUT FOR HV BUSHINGS   |
| 3                                     | REGULATOR TANK BASE WITH JACKING AND ROLLING FACILITIES                         |
| 4                                     | LIFTING LUGS  |
| 5                                     | BOLTED COVER WITH NUT GUARD   |
| 6                                     | 1, 0" UPPER FILTER PRESS CONN. AND FILL PLUG                                    |
| 7                                     | 1, 0" DRAIN VALVE WITH SAMPLER  |
| 8                                     | AUTO PRESS RELIEF DEVICE  |
| 9                                     | PRESSURE VACUUM GAUGE PROVISION   |
| 10                                    | MAGNETIC OIL LEVEL GAUGE  |
| 11                                    | OIL SIGHT GAUGE   |
| 12                                    | TAP CHANGER POSITION INDICATOR W/DRA GHANDS AND REGULATION RANGE LIMIT SWITCHES |
| 13                                    | THERMOMETER PROVISION   |
| 14                                    | EXTERNAL NON-LOAD TAP SWITCH FOR CONTROL TAPS                                   |
| 15                                    | REMOVABLE SILL  |
| 16                                    | GROUND PAD WITH 2 - 1/2-13 UNC TAPPED HOLES 7/16" DEEP                          |
| 17                                    | NAMEPLATE   |
| 18                                    | PARKING STAND   |
| 19                                    | BOLTED HIGH SECURITY CABINET WITH PENTAHEAD DOOR BOLTS                          |
| 20                                    | CONTROL ENCLOSURE - LOCKABLE - ON INSIDE OF CABINET DOOR                        |
| 21                                    | COOLING CORRUGATION WHEN REQUIRED   |
| 22                                    | NEUTRAL/CONCENTRIC GROUND BUSHING   |
| 23                                    | DOOR HANDLE   |
| 24                                    | CONCENTRIC NEUTRAL/NEUTRAL GROUND STRAP   |

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|                  | INSTALLATION OF<br>PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1" |                    |  |                     |          |

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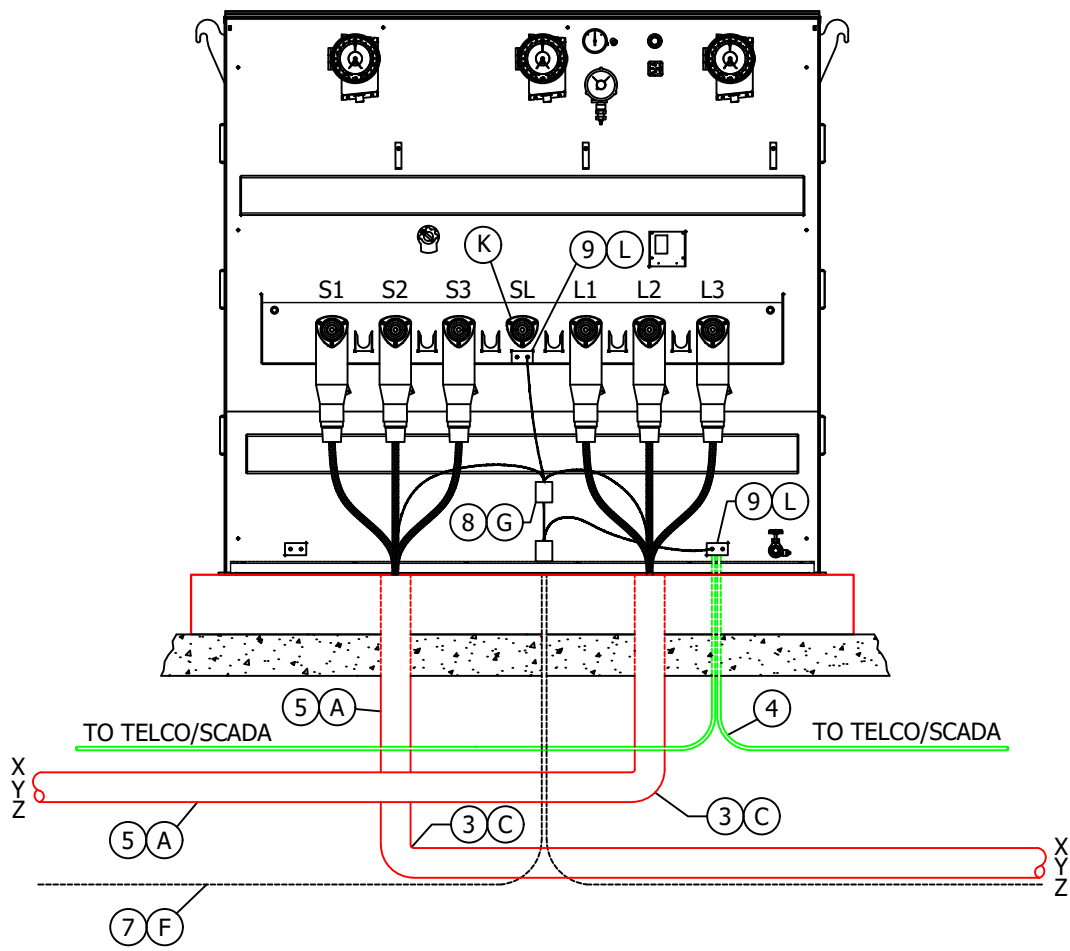
SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INSTALLATION OF PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1"

UG4713.3



**CABLE CONNECTION DIAGRAM**  
**WYE CONNECTED REGULATOR**



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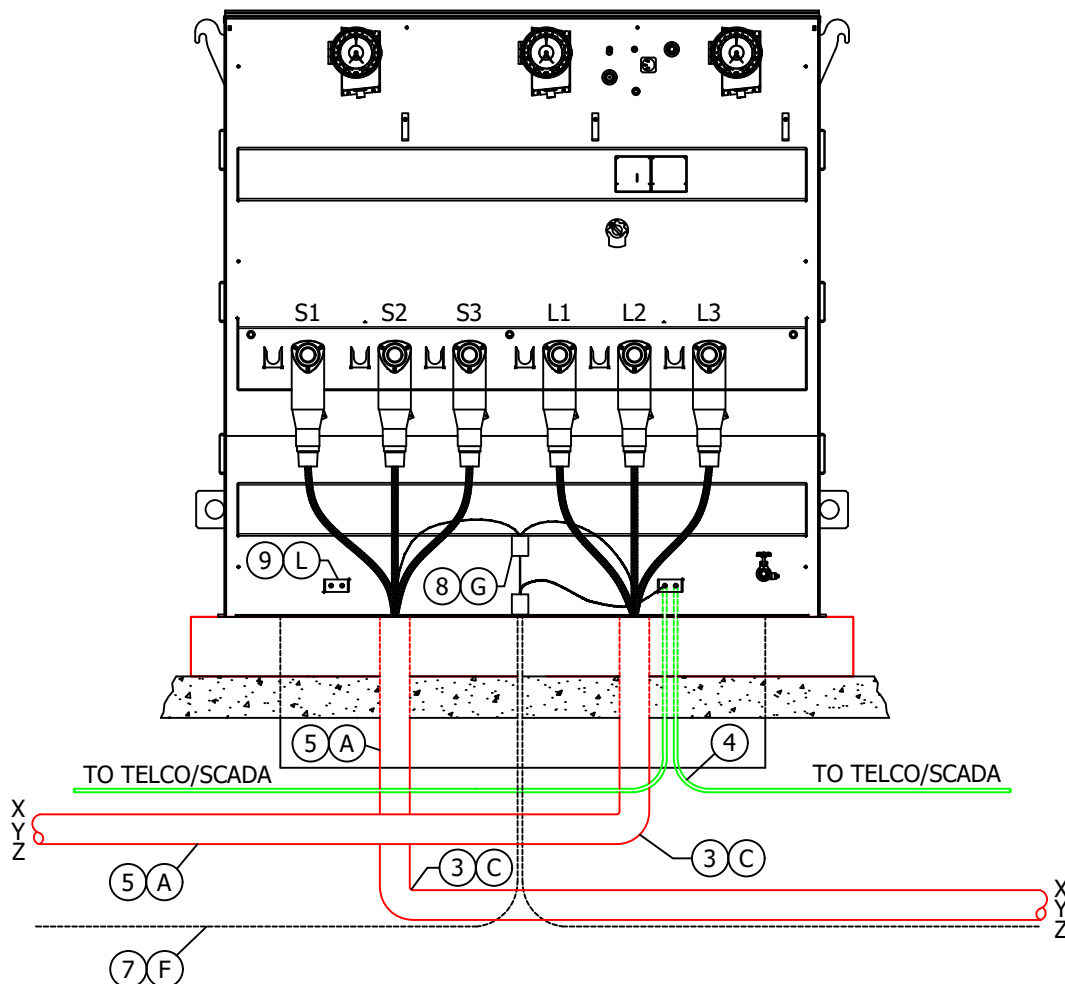
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|                                     | <div>SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS</div>  |  |  |                     |
|                                     | <div>INSTALLATION OF<br/>PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1"</div>   |  |  |                     |



## **CABLE CONNECTION DIAGRAM**

### **DELTA CONNECTED REGULATOR**



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## INSTALLATION OF PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1"

UG4713.5



The diagram illustrates a cable tray system with the following components and labels:

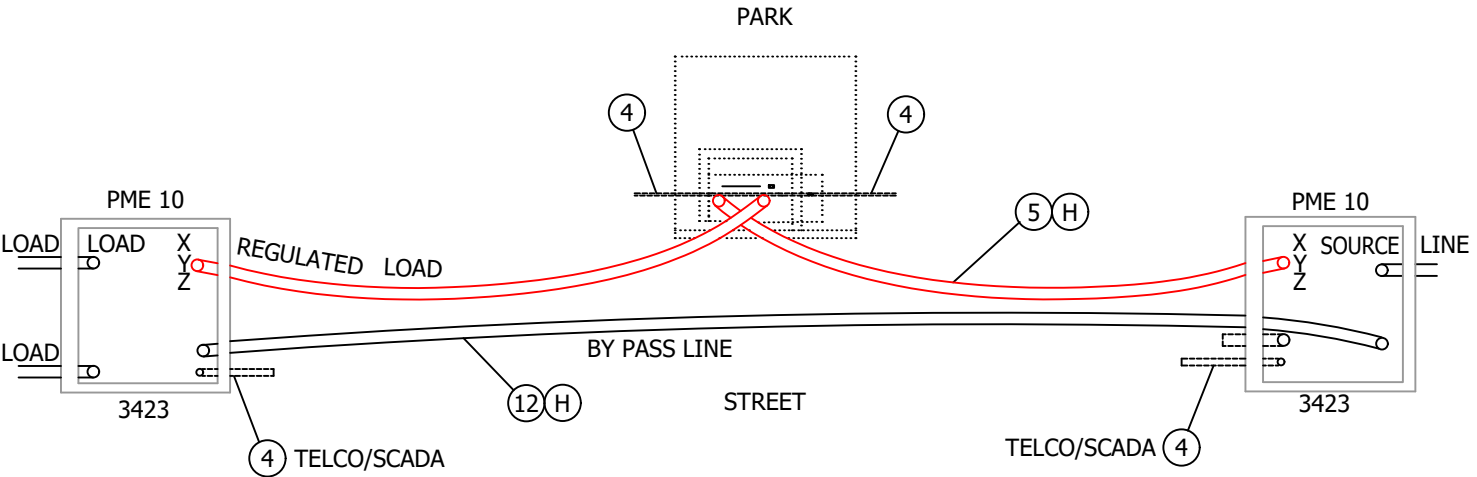
- 1**: Main cable tray enclosure.
- 2**: Inner cable tray enclosure.
- 3 C**: Cable labeled 'C' (red line).
- 4 D**: Cable labeled 'D' (green line).
- 5 A**: Cable labeled 'A' (red line).
- 5 B**: Cable labeled 'B' (red line).
- 5 C**: Cable labeled 'C' (red line).
- 6 E**: Cable labeled 'E' (green line).
- 7 F**: Cable labeled 'F' (red line).
- 8**: Cable labeled '8' (red line).
- SOURCE**: Label for the starting point of the red cable bundle.
- LOAD**: Label for the destination of the red cable bundle.
- TO TELCO/SCADA**: Destination label for the green cables.
- X Y Z**: Coordinate system labels for the red and green cable bundles.

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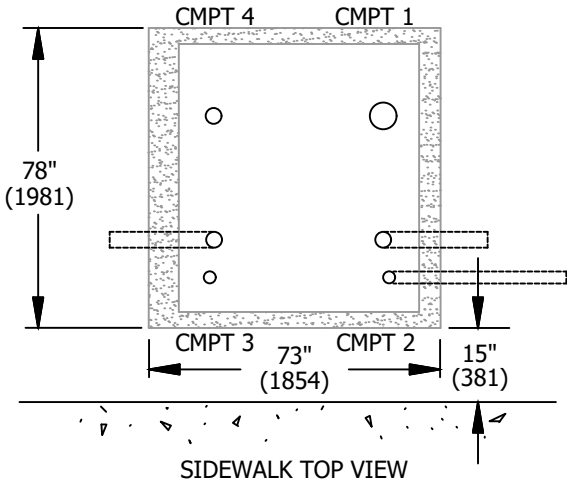
UG4713.6



CONDUIT DIAGRAM FOR PME AND PADMOUNTED REGULATORS

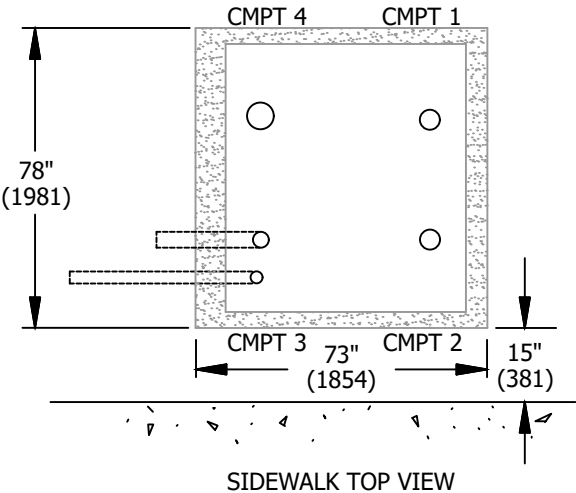


BOX & CONDUIT PLACEMENT



SEE STD. 3423 FOR INSTRUCTIONS  
ON INSTALLATION OF BOX PAD

BOX & CONDUIT PLACEMENT



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF  
PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1"

UG4713.7



- (A) SLURRY ENCASE ALL 5 INCH CONDUITS.
- (B) SLURRY ENCASE ALL 5 INCH 90 DEGREE BENDS TO WITHIN 6 INCHES OF THE FINAL CUT.
- (C) DO NOT CUT THE 90 DEGREE BENDS.
- (D) LOOP A 1 INCH POLYETHYLENE CONDUIT TO EACH PAD. STUB THE CONDUIT FOUR FEET FROM THE EDGE OF PAD, CLOSEST TO TELCO. (WHEN REQUIRED)
- (E) IN SOFT SOILS A CONCRETE BACKFILL (1 SACK MIX.) IS REQUIRED UNDER THE PAD 12 INCHES BEYOND THE SIDE EDGES OF PAD AND 12 INCHES DEEP.
- (F) INSTALL A TRENCH GROUND WIRE FOR EACH PAD. INSTALL A SEPARATE GROUND WIRE BETWEEN THE CENTER PAD AND EACH END PAD.
- (G) SEE STANDARD 4520.3 FOR EQUIPMENT GROUNDING.
- (H) ALL HORIZONTAL BENDS WILL BE MADE WITH ONLY LONG SWEEPS OF 25' RADIUS OR LONGER.
- J. SET 3313 ON 4" OF COMPACTED 1/2 GRAVEL.
- (K) NEUTRAL/GROUND STRAP FROM NEUTRAL BUSHING TO GROUND PAD.
- (L) ATTACH TRENCH GROUND TO GROUND PADS AND CONCENTRIC NEUTRAL.

| ITEM | DESCRIPTION   | QUANTITY | CONSTR. STD. OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|---|----------|--------------------------|--------------|----------------|
| 1    | PAD, REGULATOR, THREE PHASE                         | 1        | -                        | -            | -              |
| 2    | BASE SECTION 3313                                   | 3        | 3313                     | 162664       | 3313B          |
| 3    | 5" 90 DEGREE BEND                                   | 2        | 3373.2                   | -            | -              |
| 4    | CONDUIT POLY 1 INCH                                 | AS REQ'D | 3373.1                   | 249630       | 1"PE           |
| 5    | CONDUIT 5" INCH DB                                  | AS REQ'D | 3373.1                   | 249728       | 1DB5SL         |
| 6    | SLURRY 1-SACK                                       | AS REQ'D | 3376.1                   | 656400       | -              |
| 7    | TRENCH GROUND WIRE                                  | 3        | 4510                     | -            | -              |
| 8    | CONNECTOR COMPRESSION                               | AS REQ'D | 4172                     | -            | -              |
| 9    | GROUND PAD W/ 2 - 1/2-13 UNC TAPPED HOLES 7/16 DEEP | AS REQ'D | -                        | 262560       | -              |
| 10   | 600 AMP CONNECTOR "T" TYPE                          | 6        | 4181.16                  | -            | -              |
| 11   | THREE PHASE PAD-MOUNT VOLTAGE REGULATOR, WYE        | 1        | -                        | S581254      | GY656          |
| 11   | THREE PHASE PAD-MOUNT VOLTAGE REGULATOR, DELTA      | 1        | -                        | S581256      | GDP578         |
| 12   | CONDUIT 5 INCH FOR UNDERGROUND BY-PASS              | AS REQ'D | 3373.1                   | 249728       | 1DB5SL         |
| 13   | 5" 90° BEND FOR UNDERGROUND BY-PASS                 | AS REQ'D | 3373.2                   | 322112       | 1-5SLB         |
| 14   | ENCASE/SLURRY/CONDUITS                              | AS REQ'D | 3373.1                   | -            | 1EB3IN         |

**REFERENCE:**

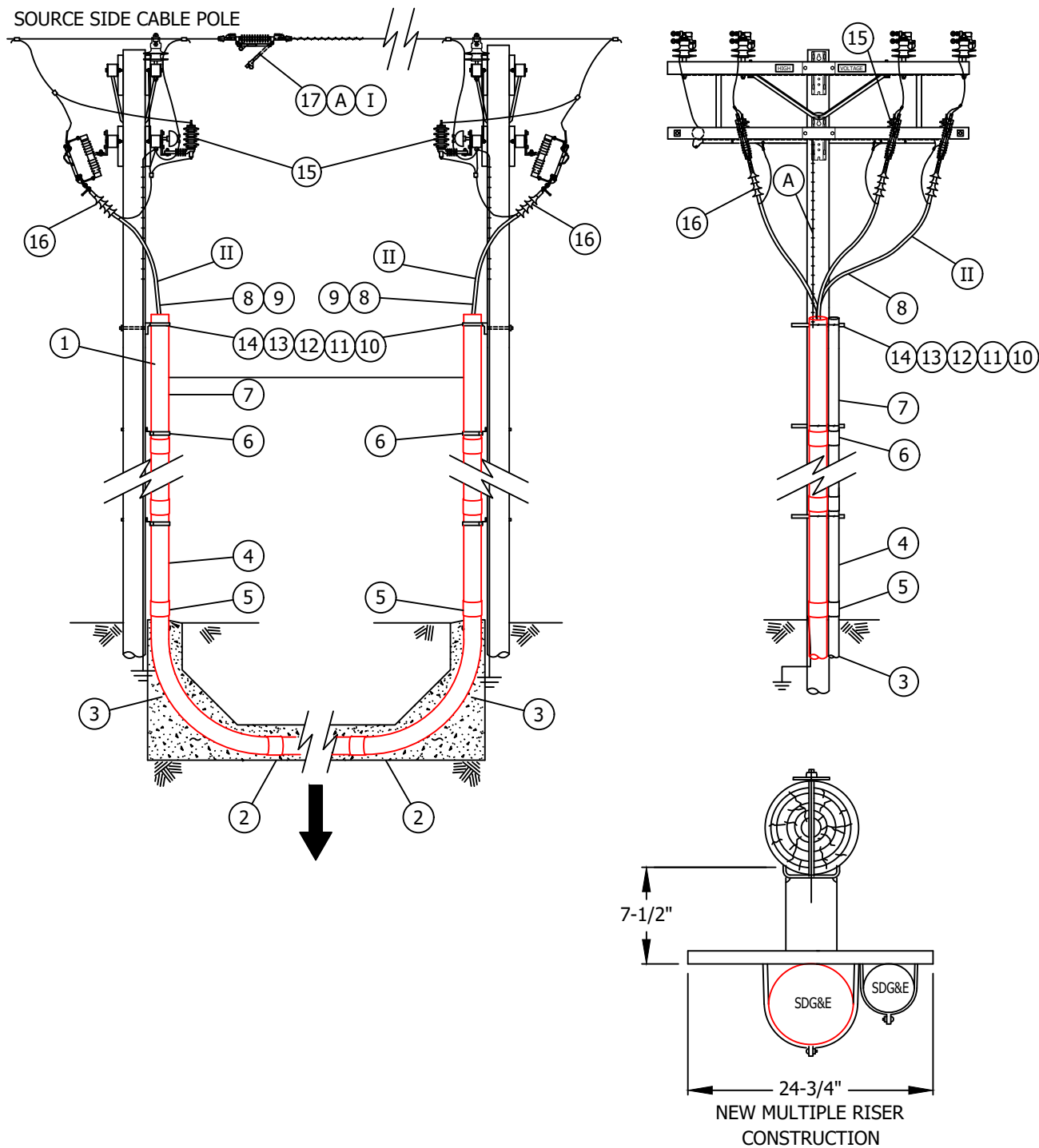
- (a) SUB-STRUCTURE AND CONDUIT INSTALLATION. SEE PAGES 4713.4, 5, & 6
- (b) OVERHEAD CONSTRUCTION REQUIRING 600 AMP VOLTAGE REGULATION. SEE PAGE 4710.8
- (c) FULL UNDERGROUND CIRCUITS REQUIRING 600 AMP VOLTAGE REGULATION. SEE PAGE 4710.6

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|                  |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS             |      |                    |            |     |          |                     |      |          |      |
|                  |                | INSTALLATION OF<br>PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1" |      |                    |            |     |          |                     |      |          |      |



**SCOPE:** THIS STANDARD SHOWS NEW CONSTRUCTION FOR MULTIPLE CONDUIT RISERS, USED WITH PAD-MOUNTED REGULATOR.



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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INSTALLATION OF PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1"

UG4713.9



(A) STAPLES AND COVERED GROUND WIRE NOT NEEDED ON STEEL POLE. SEE 1000 GROUNDING.

| ITEM    | DESCRIPTION   | QUANTITY       | STOCK NUMBER   | ASSEMBLY UNITS |          |                |    |            |        |        |
|---------|---|----------------|--|----------------|----------|----------------|----|------------|--------|--------|
| 1       | SEE STD. 4204.1 DETAIL "B"  |                |  |                |          |                |    |            |        |        |
| 2       | COUPLING, (SIZE AS REQUIRED)  | AS REQ'D       | 5"__280032   | -              |          |                |    |            |        |        |
| 3       | CONDUIT RISER BEND, SCHEDULE 80 (SIZE AS REQUIRED)                                      | AS REQ'D       | 5"__48" R_322488   | 5"CP-B         |          |                |    |            |        |        |
| 4       | CONDUIT RISER, PVC, SCHEDULE 80, (SIZE AS REQUIRED)                                     | AS REQ'D       | 5"__251592   | S80-5"         |          |                |    |            |        |        |
| 5       | COUPLING, PVC, SCHEDULE 80  | AS REQ'D       | 5"__280592   | -              |          |                |    |            |        |        |
| 6       | COUPLING, PVC, SCHEDULE 40, (SIZE AS REQUIRED)  | AS REQ'D       | 5"__280496   | -              |          |                |    |            |        |        |
| 7       | CONDUIT, PVC, SCHEDULE 40, (SIZE AS REQUIRED)   | AS REQ'D       | 5"__251408   | S40-5"         |          |                |    |            |        |        |
| 8       | GRIP, CABLE SIZE AS REQUIRED FOR PRIMARY RISERS.  | AS REQ'D       | <table border="1"> <tr> <td>CONDUIT</td><td>AL CABLE</td><td>GRIP STOCK NO.</td></tr> <tr> <td>5"</td><td>1000 KCMIL</td><td>394098</td></tr> </table> | CONDUIT        | AL CABLE | GRIP STOCK NO. | 5" | 1000 KCMIL | 394098 | 5G1000 |
| CONDUIT | AL CABLE  | GRIP STOCK NO. |  |                |          |                |    |            |        |        |
| 5"      | 1000 KCMIL  | 394098         |  |                |          |                |    |            |        |        |
| 9       | PROTECTOR, NYLON CABLE  | AS REQ'D       | 558720   | -              |          |                |    |            |        |        |
| 10      | BRACKET, LADDER ARM   | AS REQ'D       | 167184   | LA-ARM         |          |                |    |            |        |        |
| 11      | CHANNEL, DOUBLE, GALV. 24-3/4" x 7/8" x 2-3/4"  | AS REQ'D       | 216700   |                |          |                |    |            |        |        |
| 12      | NUT STUD 1/2" X 1-3/8" CLAMPING CHANNEL, W/SPRING                                       | AS REQ'D       | 507000   |                |          |                |    |            |        |        |
| 13      | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D), 1-SQUARE WASHER & DOUBLE COIL SPRING WASHER | AS REQ'D       | OVERHEAD STD. 392  | -              |          |                |    |            |        |        |
| 14      | CLAMP, PIPE, STEEL, GALV., UNISTRUT, 5"   | AS REQ'D       | 229668   | CL-5IN         |          |                |    |            |        |        |
| 15      | CABLE POLE SEE STD. 4242.1  | -              | -  | -              |          |                |    |            |        |        |
| 16      | CABLE POLE CONNECTION SEE STD. 4111.1 FIGURE 7  | -              | -  | -              |          |                |    |            |        |        |
| 17      | IN LINE BY-PASS SEE OH STD. 1218  | 3              | 707020   | ILD5W          |          |                |    |            |        |        |

- ① LOCATE INLINE SWITCH NEXT TO SOURCE CABLE.
- ② CABLE FOR POLES AND PAD-MOUNT USE 1000KCMIL

**REFERENCE:** NONE

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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS             |                    |   |          |                     |           |
|                   | INSTALLATION OF<br>PAD-MOUNTED THREE PHASE REGULATOR "3 IN 1" |                    |   |          |                     |           |

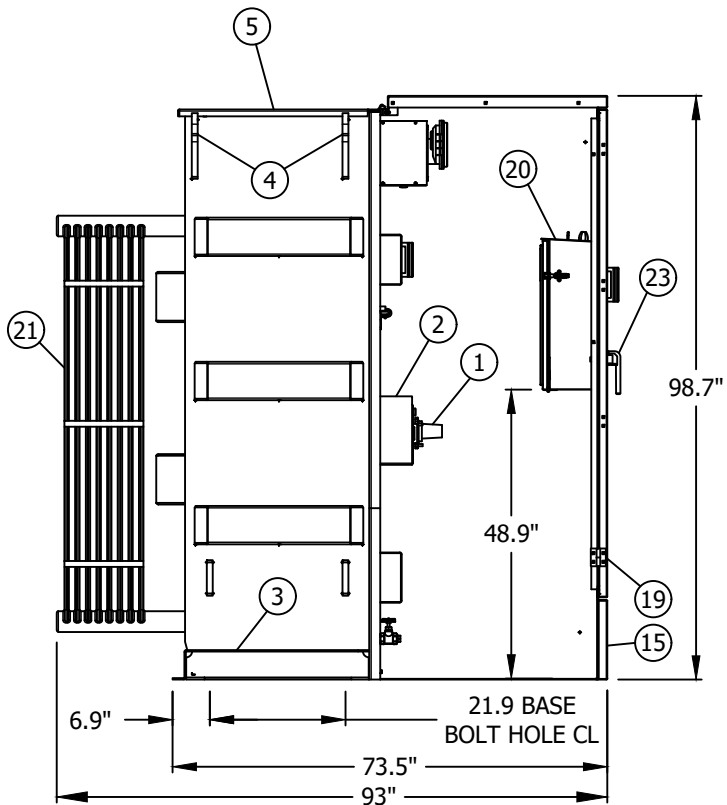


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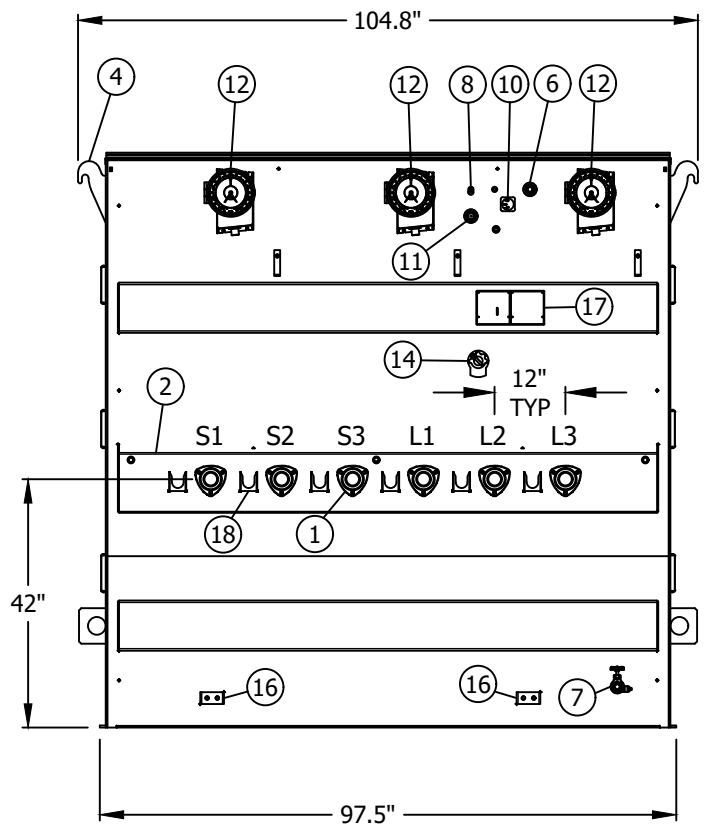


**ATTENTION:** SEE DESCRIPTION LIST ON 4714.3 FOR IDENTIFICATION OF COMPONENTS.

## DELTA CONNECTED REGULATOR (a)(b)(c)



**SIDE VIEW**  
(CABINET SIDE REMOVED)



**FRONT VIEW**  
(CABINET REMOVED)

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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INSTALLATION OF PAD-MOUNTED THREE PHASE REGULATOR

UG4714.2



| PADMOUNTED REGULATOR DESCRIPTION LIST |   |
|---------------------------------------|---|
| ITEM                                  | DESCRIPTION   |
| 1                                     | HIGH VOLTAGE INTEGRAL APPARATUS BUSHING                                       |
| 2                                     | TANK BOXOUT FOR HV BUSHINGS   |
| 3                                     | REGULATOR TANK BASE WITH JACKING AND ROLLING FACILITIES                       |
| 4                                     | LIFTING LUGS  |
| 5                                     | BOLTED COVER WITH NUT GUARD   |
| 6                                     | 1, 0" UPPER FILTER PRESS CONN. AND FILL PLUG                                  |
| 7                                     | 1, 0" DRAIN VALVE WITH SAMPLER  |
| 8                                     | AUTO PRESS RELIEF DEVICE  |
| 9                                     | PRESSURE VACUUM GAUGE PROVISION   |
| 10                                    | MAGNETIC OIL LEVEL GAUGE  |
| 11                                    | OIL SIGHT GAUGE   |
| 12                                    | TAP CHANGER POSITION INDICATOR W/DRAHANDS AND REGULATION RANGE LIMIT SWITCHES |
| 13                                    | THERMOMETER PROVISION   |
| 14                                    | EXTERNAL NON-LOAD TAP SWITCH FOR CONTROL TAPS                                 |
| 15                                    | REMOVABLE SILL  |
| 16                                    | GROUND PAD WITH 2 - 1/2-13 UNC TAPPED HOLES 7/16" DEEP                        |
| 17                                    | NAMEPLATE   |
| 18                                    | PARKING STAND   |
| 19                                    | BOLTED HIGH SECURITY CABINET WITH PENTAHEAD DOOR BOLTS                        |
| 20                                    | CONTROL ENCLOSURE - LOCKABLE - ON INSIDE OF CABINET DOOR                      |
| 21                                    | COOLING CORRUGATION WHEN REQUIRED   |
| 22                                    | NEUTRAL/CONCENTRIC GROUND BUSHING   |
| 23                                    | DOOR HANDLE   |
| 24                                    | CONCENTRIC NEUTRAL/NEUTRAL GROUND STRAP                                       |

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| <div style="text-align: center;"> <p><b>SHEET</b></p> <p><b>3 OF 10</b></p> </div> | Indicates Latest Revision  |  | Completely Revised | <div style="border: 1px solid red; padding: 2px;">X</div> | New Page | Information Removed | <div style="text-align: center;"> <p><b>UG4714.3</b></p> </div> |
|  | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS  |  |                    |   |          |                     |   |
|  | <div style="text-align: center;"> <p>INSTALLATION OF</p> <p>PAD-MOUNTED THREE PHASE REGULATOR</p> </div> |  |                    |   |          |                     |   |

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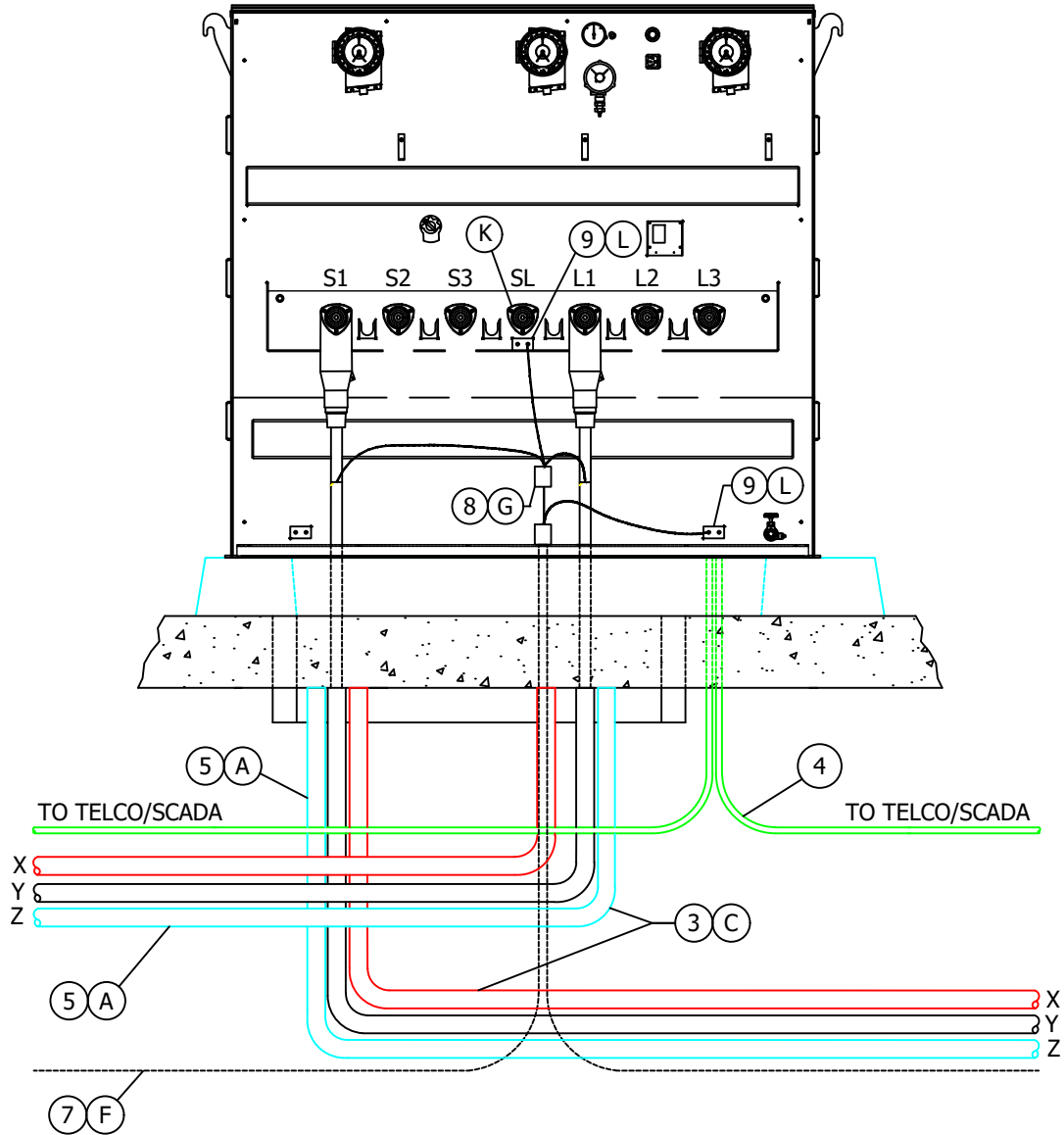
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## INSTALLATION OF PAD-MOUNTED THREE PHASE REGULATOR

UG4714.3



**CABLE CONNECTION DIAGRAM  
WYE CONNECTED REGULATOR**



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF  
PAD-MOUNTED THREE PHASE REGULATOR

**UG4714.4**



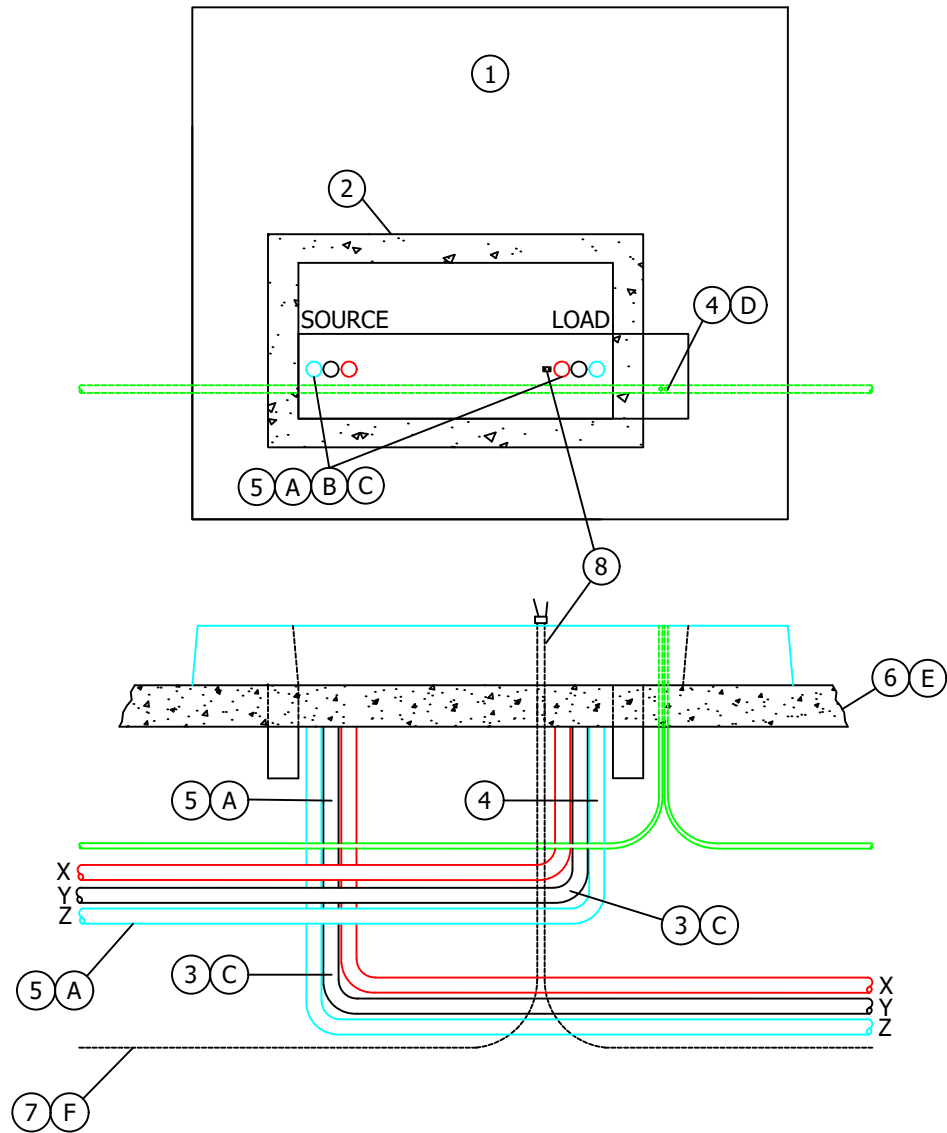


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UG4714.5



**CONDUIT / SUBSTRUCTURE / PAD / COMMUNICATION / GROUND INSTALLATION DIAGRAM**



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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

INSTALLATION OF  
PAD-MOUNTED THREE PHASE REGULATOR

UG4714.6



The diagram illustrates a 34.5 kV distribution system. On the left, a 'PME 10' (Primary Metering Equipment) is connected to a 'LOAD' and a 'REGULATED LOAD'. The regulated load is connected to a 'BY PASS LINE' which runs horizontally across the diagram. A 'STREET' is shown crossing the bypass line. On the right, another 'PME 10' is connected to a 'SOURCE' and a 'LINE'. The bypass line is labeled 'BY PASS LINE' and 'STREET'. Various components are labeled with circled numbers: '4' for the regulated load, '4' for the street crossing, '5' for the bypass line, and '12' for the street crossing. The diagram also shows 'TELCO/SCADA' connections and '3423' labels for the PME 10 units.

Figure 1 is a plan view of the test specimen, showing its dimensions and instrumentation. The specimen is a square with a central core and a surrounding concrete layer. The overall dimensions are 78 inches (1981 mm) by 73 inches (1854 mm). The central core is 15 inches (381 mm) wide. The instrumentation points are marked with circles and labeled CMPT 1 through CMPT 4. CMPT 1 is at the top right corner of the core. CMPT 2 is at the bottom right corner of the core. CMPT 3 is at the bottom left corner of the core. CMPT 4 is at the top left corner of the core. A vertical arrow on the right side indicates a load of 15 inches (381 mm) applied to the right side.

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- (A) SLURRY ENCASE ALL 3 INCH CONDUITS.
- (B) SLURRY ENCASE ALL 3 INCH 90 DEGREE BENDS TO WITHIN 6 INCHES OF THE FINAL CUT.
- (C) DO NOT CUT THE 90 DEGREE BENDS.
- (D) LOOP A 1 INCH POLYETHYLENE CONDUIT TO EACH PAD. STUB THE CONDUIT FOUR FEET FROM THE EDGE OF PAD, CLOSEST TO TELCO. (WHEN REQUIRED)
- (E) IN SOFT SOILS A CONCRETE BACKFILL (1 SACK MIX.) IS REQUIRED UNDER THE PAD 12 INCHES BEYOND THE SIDE EDGES OF PAD AND 12 INCHES DEEP.
- (F) INSTALL A TRENCH GROUND WIRE FOR EACH PAD. INSTALL A SEPARATE GROUND WIRE BETWEEN THE CENTER PAD AND EACH END PAD.
- (G) SEE STANDARD 4520.3 FOR EQUIPMENT GROUNDING.
- (H) ALL HORIZONTAL BENDS WILL BE MADE WITH ONLY LONG SWEEPS OF 25' RADIUS OR LONGER.
- J. SET 3313 ON 4" OF COMPACTED 1/2 GRAVEL.
- (K) NEUTRAL/GROUND STRAP FROM NEUTRAL BUSHING TO GROUND PAD.
- (L) ATTACH TRENCH GROUND TO GROUND PADS AND CONCENTRIC NEUTRAL.

| ITEM | DESCRIPTION  | QUANTITY | CONSTR. STD. OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|------|--|----------|--------------------------|--------------|----------------|
| 1    | PAD TRANSFORMER 3426                                   | 3        | 3426                     | 514005       | 3426BO         |
| 2    | BASE SECTION 3313                                      | 3        | 3313                     | 162664       | 3313B          |
| 3    | 3" 90 DEGREE BEND                                      | 6        | 3373.2                   | 322048       | S80-3"         |
| 4    | CONDUIT POLY 1 INCH                                    | AS REQ'D | 3373.1                   | 249630       | 1"PE           |
| 5    | CONDUIT 3" INCH DB                                     | AS REQ'D | 3373.1                   | 249664       | 1DB3-P         |
| 6    | SLURRY 1-SACK  | AS REQ'D | 3376.1                   | 656400       | -              |
| 7    | TRENCH GROUND WIRE                                     | 3        | 4510                     | -            | -              |
| 8    | CONNECTOR COMPRESSION                                  | AS REQ'D | 4172                     | -            | -              |
| 9    | GROUND PAD W/ 2 - 1/2-13 UNC<br>TAPPED HOLES 7/16 DEEP | AS REQ'D | -                        | 262560       | -              |
| 10   | 600 AMP CONNECTOR "T" TYPE                             | 6        | 4181.16                  | -            | -              |
| 11   | SINGLE-PHASE PAD-MOUNT VOLTAGE REGULATOR               | 3        | -                        | S581490      | REG600         |
| 12   | CONDUIT 5 INCH FOR UNDERGROUND BY-PASS                 | AS REQ'D | 3373.1                   | 249728       | 1DB5SL         |
| 13   | 5" 90° BEND FOR UNDERGROUND BY-PASS                    | AS REQ'D | 3373.2                   | 322112       | 1-5SLB         |
| 14   | ENCASE/SLURRY/CONDUITS                                 | AS REQ'D | 3373.1                   |              | 1EB3IN         |

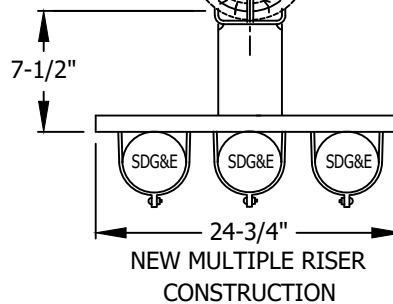
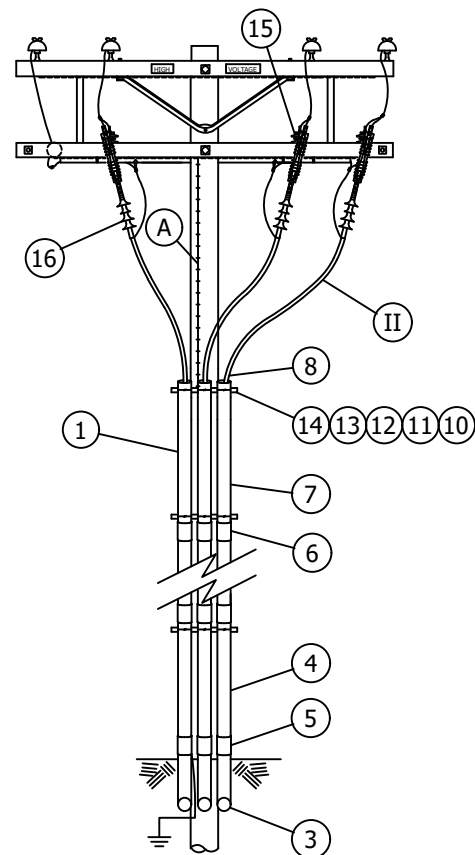
**REFERENCE:**

- (a) SUB-STRUCTURE AND CONDUIT INSTALLATION. SEE PAGES 4710.4, 5, & 6
- (b) OVERHEAD CONSTRUCTION REQUIRING 600 AMP VOLTAGE REGULATION. SEE PAGE 4710.8
- (c) FULL UNDERGROUND CIRCUITS REQUIRING 600 AMP VOLTAGE REGULATION. SEE PAGE 4710.6

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|                  |                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |      |                    |            |     |          |                     |      |          |      |
|                  |                   | INSTALLATION OF<br>PAD-MOUNTED THREE PHASE REGULATOR |      |                    |            |     |          |                     |      |          |      |



**SCOPE:** THIS STANDARD SHOWS NEW CONSTRUCTION FOR MULTIPLE CONDUIT RISERS, USED WITH PAD-MOUNTED REGULATOR.



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| B   | EDITORIAL CHANGES | KR | JES  | CZH    | 04/22/2019 | E   |        |    |      |      |      |
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SDG&amp;E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

## INSTALLATION OF PAD-MOUNTED THREE PHASE REGULATOR

UG4714.9



**INSTALLATION:**

(A) STAPLES AND COVERED GROUND WIRE NOT NEEDED ON STEEL POLE. SEE 1000 GROUNDING.

**BILL OF MATERIALS:**

| ITEM    | DESCRIPTION   | QUANTITY       | STOCK NUMBER   |  |  | ASSEMBLY UNITS |          |                |    |          |        |        |
|---------|---|----------------|--|--|--|----------------|----------|----------------|----|----------|--------|--------|
| 1       | SEE STD. 4204.1 DETAIL "B"  |                |  |  |  |                |          |                |    |          |        |        |
| 2       | COUPLING, (SIZE AS REQUIRED)  | AS REQ'D       | 3"__279904   |  |  | -              |          |                |    |          |        |        |
| 3       | CONDUIT RISER BEND, SCHEDULE 80 (SIZE AS REQUIRED)                                      | AS REQ'D       | 3"__36" R_322472   |  |  | 3"CP-B         |          |                |    |          |        |        |
| 4       | CONDUIT RISER, PVC, SCHEDULE 80, (SIZE AS REQUIRED)                                     | AS REQ'D       | 3"__251552   |  |  | S80-3"         |          |                |    |          |        |        |
| 5       | COUPLING, PVC, SCHEDULE 80  | AS REQ'D       | 3"__280544   |  |  | -              |          |                |    |          |        |        |
| 6       | COUPLING, PVC, SCHEDULE 40, (SIZE AS REQUIRED)  | AS REQ'D       | 3"__280448   |  |  | -              |          |                |    |          |        |        |
| 7       | CONDUIT, PVC, SCHEDULE 40, (SIZE AS REQUIRED)   | AS REQ'D       | 3"__251360   |  |  | S40-3"         |          |                |    |          |        |        |
| 8       | GRIP, CABLE SIZE AS REQUIRED FOR PRIMARY RISERS.  | AS REQ'D       | <table><tr><td>CONDUIT</td><td>AL CABLE</td><td>GRIP STOCK NO.</td></tr><tr><td>3"</td><td>1/C-1000</td><td>394048</td></tr></table> |  |  | CONDUIT        | AL CABLE | GRIP STOCK NO. | 3" | 1/C-1000 | 394048 | 3G2#2A |
| CONDUIT | AL CABLE  | GRIP STOCK NO. |  |  |  |                |          |                |    |          |        |        |
| 3"      | 1/C-1000  | 394048         |  |  |  |                |          |                |    |          |        |        |
| 9       | PROTECTOR, NYLON CABLE  | AS REQ'D       | 558720   |  |  | -              |          |                |    |          |        |        |
| 10      | BRACKET, LADDER ARM   | AS REQ'D       | 167184   |  |  | LA-ARM         |          |                |    |          |        |        |
| 11      | CHANNEL, DOUBLE, GALV. 24-3/4" x 7/8" x 2-3/4"  | AS REQ'D       | 216700   |  |  |                |          |                |    |          |        |        |
| 12      | NUT STUD 1/2" X 1-3/8" CLAMPING CHANNEL, W/SPRING                                       | AS REQ'D       | 507000   |  |  |                |          |                |    |          |        |        |
| 13      | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D), 1-SQUARE WASHER & DOUBLE COIL SPRING WASHER | AS REQ'D       | OVERHEAD STD. 392  |  |  | -              |          |                |    |          |        |        |
| 14      | CLAMP, PIPE, STEEL, GALV., UNISTRUT, 3"   | AS REQ'D       | 229632   |  |  | CL-3IN         |          |                |    |          |        |        |
| 15      | CABLE POLE SEE STD. 4242.1  | -              | -  |  |  | -              |          |                |    |          |        |        |
| 16      | CABLE POLE CONNECTION SEE STD. 4111.1 FIGURE 7  | -              | -  |  |  | -              |          |                |    |          |        |        |
| 17      | IN LINE BY-PASS SEE OH STD. 1218  | 3              | 707020   |  |  | ILD5W          |          |                |    |          |        |        |

**NOTES:**

- (I) LOCATE INLINE SWITCH NEXT TO SOURCE CABLE.
- (II) CABLE FOR POLES AND PAD-MOUNT USE 1C-1000AL 197628.



**REFERENCE:** NONE

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|                   | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS    |                    |   |          |                     |           |
|                   | INSTALLATION OF<br>PAD-MOUNTED THREE PHASE REGULATOR |                    |   |          |                     |           |



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|                         | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS                                   |                           |      |      |                    |   |          |    |                     |      |                                |
|                         | ENERGY STORAGE INTERCONNECTION  |                           |      |      |                    |   |          |    |                     |      |                                |



- I. PRIMARY METERED SWITCHGEAR INTERCONNECTIONS: 12.0kv (DELTA) OR 12.47kv (WYE) NOMINAL
- II. NON-PRIMARY METERED SWITCHGEAR INTERCONNECTIONS: 480VAC BETWEEN INVERTER OUTPUT AND UTILITY HYS TRANSFORMER.
- III. LESS THAN 12KV NOMINAL INTERCONNECTIONS: INTERCONNECTION STUDY TO BE PERFORMED TO DETERMINE EQUIPMENT/CIRCUIT UPGRADING.

I. ONLY SDG&E APPROVED CONDUITS AND CONDUCTORS WILL BE UTILIZED IN ANY ENERGY STORAGE PROJECT.

**AUXILIARY POWER:** (REFER TO COMPANY POLICY FOR DETAILED AUXILIARY PROCEDURES/PROCESSES)

- I. FIRE SUPPRESSION/PROTECTION
- II. DETERMINE CONNECTIONS/PLACEMENT (WAYS FOR SWITCH)
- III. UPS (INTERCONNECTION)
- IV. NETWORKING/TELECOMMUNICATIONS/METERING POWERED BY DC AND/OR AC VOLTAGE
- V. STATION LIGHT AND POWER



## GIS MAPPING:

- ## I. INDIVIDUAL TECH DEVICES WILL BE IDENTIFIED BY PAD STRUCTURES

**COMMUNICATIONS:** (REFER TO COMPANY POLICY FOR DETAILED COMMUNICATION PROTOCOLS/PROCEDURES)

- I. CAL ISO:
  - METERING (REVENUE)
  - REMOTE INTELLIGENT GATEWAY (RIG)
  - AUTOMATED DISPATCH SYSTEM (ADS)
  - APPROVED COMMUNICATIONS
  
- II. SDG&E:
  - VENDOR
  - IT
  - SERIAL
  - TCP/IP
  - INTERNET
  - GRID OPS TELEMETRY
  - METERING (REVENUE)
  - ELECTRIC METERING
  - INFORMATION SECURITY (IS)



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|                 |                | ENERGY STORAGE INTERCONNECTION  |                           |      |          |                    |        |   |          |      |      |                     |  |                        |







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|                 |                | ENERGY STORAGE INTERCONNECTION  |                           |      |          |                    |        |   |          |      |      |                     |  |                        |



- I. TRAYER 4 WAY SCADA HIGH SPEED CLOSE COIL SWITCH (S) SPECIFICALLY DESIGNED FOR BLACKSTARTING AND ISLANDING CAPABILITIES.
- II. FOR OVERHEAD SECTIONALIZING APPLICATIONS, USE ANY APPROVED SCADA RECLOSERS.
- III. HYS TRANSFORMER(S) WILL BE REQUIRED FOR ALL NON-PRIMARY METERED INTERCONNECTIONS.

- a. ELECTRIC DISTRIBUTION OVERHEAD CONSTRUCTION STANDARDS  
[HTTP://INFOWEB2.SDGE.COM/DEPARTMENTS/PROJMGMT/DOCS/OH/OH2006/INDEX.HTML](http://infoweb2.sdge.com/departments/projmgmt/docs/oh/oh2006/index.html)
- b. ELECTRIC DISTRIBUTION UNDERGROUND CONSTRUCTION STANDARDS  
[HTTP://INFOWEB2.SDGE.COM/DEPARTMENTS/PROJMGMT/DOCS/UG/2001/INDEX.HTML](http://infoweb2.sdge.com/departments/projmgmt/docs/ug/2001/index.html)
- c. ELECTRIC DISTRIBUTION DESIGN MANUAL (INTERNAL SDG&E ONLY)  
[HTTP://INFOWEB2.SDGE.COM/DEPARTMENTS/PROJMGMT/DOCS/DM/DM2002/INDEX.HTM](http://infoweb2.sdge.com/departments/projmgmt/docs/dm/dm2002/index.htm)
- d. ELECTRIC SERVICE STANDARDS  
[HTTP://INFOWEB2.SDGE.COM/DEPARTMENTS/PROJMGMT/DOCS/SG/2003/SERVICE%20STANDARDS%20AND%20GUIDE.HTM](http://infoweb2.sdge.com/departments/projmgmt/docs/sg/2003/service%20standards%20and%20guide.htm)
- e. ELECTRIC STANDARD PRACTICES (INTERNAL SDG&E ONLY)  
[HTTP://INFOWEB2.SDGE.COM/DEPARTMENTS/PROJMGMT/DOCS/ESP/ESP\\_INDEX.HTM](http://infoweb2.sdge.com/departments/projmgmt/docs/esp/esp_index.htm)
- f. GO 95 LINK  
[HTTP://WWW.CPUC.CA.GOV/GOS/GO95/GO\\_95\\_STARTUP\\_PAGE.HTML](http://www.cpuc.ca.gov/gos/go95/go_95_startup_page.html)
- g. GO 128 LINK  
[HTTP://WWW.CPUC.CA.GOV/GOS/GO128/GO\\_128\\_STARTUP\\_PAGE.HTML](http://www.cpuc.ca.gov/gos/go128/go_128_startup_page.html)
- h. CAL ISO LINK - RESOURCE INTERCONNECTION GUIDE  
[HTTP://WWW.CAISO.COM/PARTICIPATE/PAGES/RESOURCEINTERCONNECTIONGUIDE/DEFAULT.ASPX](http://www.caiso.com/participate/pages/resourceinterconnectionguide/default.aspx)
- i. CAL ISO LINK - NEW RESOURCE INTERCONNECTION GUIDE  
[HTTP://WWW.CAISO.COM/PARTICIPATE/PAGES/NEWRESOURCEIMPLEMENTATION/DEFAULT.ASPX](http://www.caiso.com/participate/pages/newresourceimplementation/default.aspx)

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| <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">SHEET<br/>5 OF 5</div> <div> <div style="display: flex; align-items: center;"> <div style="width: 20px; height: 20px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); border: 1px solid black; margin-right: 5px;"></div> <div>Indicates Latest Revision</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 40px; height: 20px; background-color: #e0e0e0; border: 1px solid black; margin-right: 5px;"></div> <div>Completely Revised</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 20px; height: 20px; background-color: #ffcccc; border: 1px solid black; margin-right: 5px; text-align: center; line-height: 20px;">X</div> <div>New Page</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 40px; height: 20px; background-color: #d3d3d3; border: 1px solid black; margin-right: 5px;"></div> <div>Information Removed</div> </div> </div> </div> |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |      |      |          |     |        |    |      | OH 1920.5<br>UG 4720.5 |      |
|  |                | ENERGY STORAGE INTERCONNECTION                    |      |      |          |     |        |    |      |                        |      |







4800 -  
VAULT STANDARDS



4800 -  
VAULT STANDARDS





Issue  
Revision Date  
  
11/20/2018

**SDG&E  
ELECTRIC VAULT  
REQUIREMENTS AND SPECIFICATIONS**

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**SDG&E  
ELECTRIC VAULT  
REQUIREMENTS AND SPECIFICATIONS**

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The following specifications have been compiled for the installation of SDG&E distribution facilities in a customer-owned vault. The information provides requirements to be followed for the construction of the vault and installation of electrical equipment per SDG&E standards. Consult the appropriate regional Project Management Office/service center for approval whenever any alteration to or deviation from these plans and specifications are contemplated. See service center and phone number listed below.

This installation must comply with all applicable rules of the Electrical Safety Orders of the Division of Industrial Safety, Department of Industrial Relations, State of California, National Electric Code, California Code of Regulations Title 8, CPUC General Order 128 and other governing codes and ordinances.

PROJECT TITLE: ^ \_\_\_\_\_

PROJECT LOCATION: ^ \_\_\_\_\_

PROJECT NUMBER: ^ \_\_\_\_\_

SERVICE CENTER: ^ \_\_\_\_\_

PHONE NUMBER: ^ \_\_\_\_\_

PLANNER: ^ \_\_\_\_\_ DATE: ^ \_\_\_\_\_ APPROVAL: \_\_\_\_\_



**CUSTOMER SHALL FURNISH, INSTALL, OWN, AND MAINTAIN:**

**1. TRANSFORMER VAULT:**

- 1.1. Walls, roof, and floor shall be of assemblies of materials approved for three-hour non-combustible fire resistive construction (California Code of Regulations, Title 8, section 2806). All walls to be solid or solid filled. All concrete block or brick joints to be solid mortared. All floor-to-wall joints, wall-to-wall joints and wall-to-ceiling joints to be sealed water-tight with water and oil resistant materials. Street grade vaults only require seam sealing of floor-to-wall joints and wall-to wall joints to a height of 6 inches above floor, with water and oil resistant materials.
- 1.2. A 6 inch threshold for oil retention shall be provided at all vertical access openings into vault. See section 22.
- 1.3. Vault size \_\_\_\_\_ (inside dimensions). See section 24 for dimension table.
- 1.4. Whenever a vault is constructed over sublevels of a structure, the customer is to provide SDG&E with a certificate from a civil engineer registered in the State of California verifying the structural adequacy of the building to support the transformers and the fire withstanding capabilities of the structure's floor, ceiling and walls. Vault floor to be capable of supporting combined equipment weight of \_\_\_\_\_ pounds.
- 1.5. Any vault construction below finished grade is to be considered a dry vault. The exterior surfaces of a dry vault which are exposed to surrounding earth conditions shall be sealed water-tight with an impermeable seal so as to prevent water entry through any portion of the vault. See section 1.1 above for sealing requirement for wall, floor and ceiling joints.
- 1.6. No ducts, pipes or conduits, except those which are a part of the electrical installation shall be installed in or through the vault. Sprinklers and smoke detectors shall not be installed in the vault room.
- 1.7. Any and all conduits passing through vault floor or walls (see section 1.6 above) shall be sealed water-tight with water and oil resistant materials on exterior surface. In addition, customer must apply a one inch thick and one inch wide layer of sealant mastic around the conduit in the center of the form before concrete is poured. See **SDG&E Underground Construction Standard page 3960** for illustration of required technique, recommended materials and required spacing between conduits. Contact SDG&E inspector at least one (1) day in advance of concrete pour to schedule inspection of construction of vault walls through which electric conduit pass.
- 1.8. Any and all spare conduits between the vault and a substructure located outside the vault shall be plugged at both ends with expandable duct plugs.
- 1.9. Customer shall inform SDG&E when any pre stressed concrete portions of vault are proposed for construction.

**2. PERSONNEL ACCESS DOOR (WALK-THROUGH DOOR):**

- 2.1. Developer / customer is to provide a 3ft x 6ft-8in, three-hour fire-rated self-closing personnel access door equipped with panic hardware, and should be located as shown in section 22 or 23.



- 2.2. Developer / customer to provide light switch, with lighted switch plate, inside vault and adjacent to door.
- 2.3. Developer / customer to install **weather strips on all door edges** to prevent excessive air intake around door edges when vault ventilation is operating, and to limit fresh air intake in case of fire.
- 2.4. Developer / customer shall provide and install a Schlage VTQP section MA series key section in a storeroom function (self locking) Rhodes series lever action lockset. SDG&E will replace the MA series cylinder with an electric series cylinder prior to energizing the service. The developer is required to notify SDG&E's inspector when the lockset is installed.
- 2.5. Personnel access door shall open into a clear area that will allow manual carry-in of small tools and equipment. Personnel access doors in garage areas shall open into a designated no-parking zone and have permanent unobstructed access to door.
- 2.6. Door threshold to be 6 inches above vault floor for oil retention. All threshold seams, if any, to be sealed with water and oil resistant materials. See "Equipment Openings in Vault Wall" illustration in section 22.
- 2.7. Developer/customer to attach sign/placard to door stating the following:  
  
"SDG&E Electric Vault", "Danger – High Voltage – Keep Out."
- 2.8. Developer to provide SDG&E with an approved route with 24 hour access easement to the personnel access door in the vault. If an electrically operated gate is installed restricting SDG&E vehicle access to the walk-through door, developer shall install a Schlage VTQP quad section cylinder in a key switch wired to the gate controller. A list of locksmiths authorized to sell SDG&E approved locks is available on request. The developer will install a means of opening the gate from the inside without the use of a vehicle to activate the controller. This will require the installation of an additional key switch inside the gate if there is no unsecured switch available. Door to have 24-hour direct ingress and egress for SDG&E personnel.

### 3. EQUIPMENT OPENINGS:

#### 3.1. Below Grade Vaults

3.1.1. 10 ft. X 10 ft. Equipment opening through vault ceilings. Customer / developer shall provide removable three-hour fire rated 3 part concrete cover with wheel load factor HS-20 (per AASHTO). Customer to submit drawings approved by civil engineer registered in the State of California verifying HS-20 wheel loading for each equipment opening cover. No section of covers to exceed 4,800 lbs. Both opening and cover/s shall have matching beveled edges, with 30° vertical deflection. Four lifting coil inserts to be provided for removal of each section of cover. Lifting inserts shall be 1-inch threaded coil inserts with 4,500 lbs safe working load tension. See **SDG&E Underground Construction Standards** for illustrative details for equipment opening three piece cover. The equipment opening must be kept clear and unobstructed by customer-installed equipment both above and below the opening. A minimum vertical clearance of 30ft - for operation of heavy equipment including cranes - must be provided above the equipment opening – see illustration in section 23. Customer shall seal the cover to prevent water entry following installation of equipment. Repair, maintenance or replacement of any old or new, damaged covers is the responsibility of the customer / developer. SDG&E to determine when replacement is necessary.

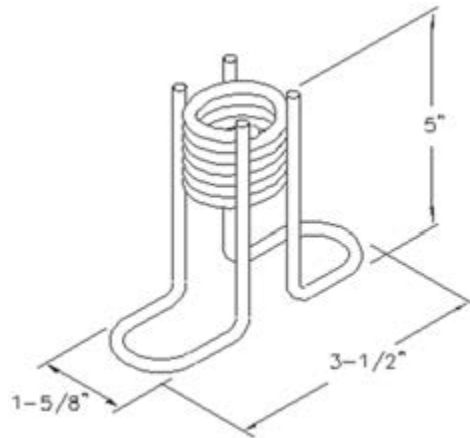


- 3.1.2. Customer to provide personnel access opening with 30-inch cast-in-frame ring and a 34-inch cast iron cover. Opening to be adjacent to equipment opening and at final grade. No coverings are permitted over this opening. Locate opening as shown in Sections 22.2 & 25. See SDG&E Underground Standards page 3332.
- 3.2. **At Grade Vaults:**
- 3.2.1. 10 ft. X 10 ft. Equipment opening through exterior vault wall. Equipment access door shall be Three-hour fire rated and have 24-hour direct access for SDG&E personnel. Developer shall provide and install a Schlage VTQP quad section MA series key section. SDG&E will replace the MA series cylinder with an electric series cylinder prior to energizing the service. A permanent and level six-foot clear working area, at least as wide as the door, is required outside of the equipment access door and at the same grade as the vault floor.
- 3.2.2. Customer to install removable 6-inch oil retention sill at equipment opening floor level when there is no other access for installing or removing transformers or other vault equipment. Sill construction to be 6-inch steel box beam. Bolts to pass through beam and align with inserts embedded in base of equipment opening. The beam must align with floor base and vertical edge to provide close fit for sealant compression to retain oil inside vault. Sealant to be oil and water resistant. See section 22.
- 3.3. Truck Access on Private Property: If both the equipment opening and access route to equipment opening is located on private property, customer will provide permanent “all weather” drivable access route to equipment opening. This permanent access route shall be of sufficient strength to support truck weight class HS20 (20 tons per axel), be a minimum of 16ft wide and 13ft-6in high, with permanent turnaround having 20ft minimum turning radius – as measured from inside radius edge. Customer may provide permanent drive through access route in lieu of turnaround if so desired. Customer to install “Permanent SDG&E Truck Access Route” placard along access route with a minimum of one placard every 25ft. If heavier duty equipment is used to install facilities, such as a large crane, permanent access shall be maintained.
- 3.4. Truck Work Area on Private Property: If equipment opening is located on private property and area in immediate vicinity of equipment opening is also located on private property, customer will provide clear and permanent truck work area at least 50ft long x 16ft wide, centered on equipment opening.
- 3.5. Truck Access in Public Right-of-Way: If equipment opening is adjacent to public right-of-way, or in public right-of-way, it shall be located such that it provides the same truck access as for private property.
- 3.6. Truck Work Area in Public-Right-of-Way: If equipment opening is adjacent to public right-of-way, or in public right-of-way, it shall be located such that it provides the same truck work area as for private property.
- 3.7. Boom Clearance: Customer will provide permanent overhead boom clearance at equipment access opening as shown in “Electric Vault Location and Accessibility” illustration in section 23.
- 3.8. Restrictions: customer is not permitted to install tables, chairs, partitions, posts, signs, screens, walls, fences, railings, or barriers of any nature above or in front of SDG&E equipment opening or personnel access opening into electric vault.



#### 4. PULLING INSERT REQUIREMENTS

- 4.1. Transformer/switch/equipment moving inserts (A) – \_\_\_\_ (no.) 1-inch diameter galvanized pulling irons located 48-inch up from vault floor, per attached SDG&E sketch. The coil insert strength shall be 10,000 pounds minimum with a working load safety factor 3. The concrete vault shall have a safety factor of 2 for these loads.
- 4.2. Cable pulling insert (B) (below grade vaults) – One (1) 7/8 inch diameter galvanized pulling iron(s) located in the opposite wall and at same height as incoming conduits. Pulling iron(s) to be designed to provide a minimum pulling tension of 12,000 lbs. The concrete vault to have a safety factor of 2 for these loads. A clear and unobstructed path must be provided and maintained between the conduit opening (into the vault) and the pulling eye on the opposite wall.
- 4.3. Cable pulling insert (C) (below grade vaults) – One 1-inch diameter galvanized pulling iron in same wall as cable pulling insert required in section 4.2 above, located directly opposite equipment opening, 48-inch above the vault floor. Pulling iron to provide a minimum pulling tension of 12,000 lbs. The concrete vault to have a safety factor of 2 for these loads. A clear and unobstructed path must be provided and maintained between cable pulling insert in section 4.2 and this cable pulling insert.
- 4.4. Cable pulling insert (E) (on grade vaults) – One 1-inch diameter galvanized pulling iron located in vault ceiling directly above incoming conduits in vault floor. Pulling iron to provide a minimum pulling tension of 12,000 lbs. The concrete vault to have a safety factor of 2 for these loads.
- 4.5. Optional cable and/or transformer insert – may be located in the vault floor a minimum of 9-inch from any wall face, and located per attached work order sketch.



**Figure 1 - Typical coil insert for use into thin slabs or small sections.**



## 5. VENTILATION SYSTEM:

- 5.1. Ventilation openings shall be located as far away as practicable from building doors, windows, fire escapes and combustible material. (California Code of Regulations, Title 8, section 2806). Openings inside the vault shall be located so as to direct the air stream over and around the transformer/s.
- 5.2. Supply Air (Intake) Opening for supply air shall be provided from a source of clean outside air or garage air. Intake louver(s) shall be provided on the outside of the building or in the garage, located a minimum of 18 inches above grade and per local codes. Intake louver(s) shall be sized per the louver manufacturer's recommendations to minimize entrainment of water into the air stream. Intake louver(s) shall be provided with bird screens. Three hour fire-rated ductwork shall connect the intake louver(s) to the vault. Ductwork shall be sized and designed per SMACNA, ASHRAE, and industry standards. Ductwork sizing shall consider pressure drop, air velocity and noise. Supply air opening(s) shall be located away from exhaust louver(s) and at least 18 ft above the floor of the vault and positioned to promote good cross ventilation/distribution of supply air across the entire vault. Supply air openings shall be constructed with a ½ inch mesh hardware cloth and sized for a maximum face velocity of 800 feet per minute. In addition, the foregoing installation is to comply with all local codes and ordinances.
- 5.3. Exhaust Air (Discharge): Ventilation and cooling air from the vault shall be discharged to the outside of the building or garage through exhaust louver(s). Exhaust louver(s) shall be located a minimum of 18 inches above street grade, away from intake louver(s) and building openings and per local codes. Exhaust louver(s) shall be sized per the louver manufacturer's recommendations. Exhaust louver(s) shall be provided with bird screens. Three hour fire-rated ductwork shall connect the exhaust louver(s) to the vault. Ductwork shall be sized and designed per SMACNA, ASHRAE, and industry standards. Ductwork sizing shall consider pressure drop, air velocity and noise. Exhaust opening(s) shall be located near the ceiling of the vault and positioned to promote good cross ventilation and/or distribution of supply air across the entire vault. Exhaust openings shall be constructed with a ½in mesh hardware cloth and sized for a maximum face velocity of 800 feet per minute. In addition, the foregoing installation is to comply with all local codes and ordinances.
- 5.4. Ventilation fan motor may be located inside or outside transformer vault. Coordinate with SDG&E to determine acceptable location prior to purchase of equipment. Ventilation fan motor installation is to comply with all local codes and ordinances.
- 5.5. Ventilation fan motor inside transformer vault shall have a disconnect device located (and marked) inside the vault adjacent to personnel access door. Customer to provide thermostat control, with a range of 70°F to 140°F located inside the vault mounted away from intake and exhaust vents in easily accessible location ("Minneapolis – Honeywell thermostat model or equivalent"). **Customer to provide regular scheduled maintenance for ventilation fan motor. Coordinate with SDG&E for access to transformer vault.**
- 5.6. Ventilation fan motor outside transformer vault shall have a lockable disconnect located outside the vault in the immediate vicinity of fan motor. Appropriate permanent signage is to be posted adjacent to outside lockable disconnect warning against tampering or disconnecting the vault ventilation. Customer to provide thermostat control, with a range of 70°F to 140°F located inside the vault mounted away from intake and exhaust vents in easily accessible location ("Minneapolis – Honeywell thermostat model or equivalent"). Thermostat shall have alarm monitoring and temperature reset controls and 2-way communication or remote control capability. **Customer to**



**provide regular scheduled maintenance for ventilation fan motor. Coordinate with SDG&E for access to transformer vault.**

- 5.7. Fire dampers shall be installed as required by local and State governing agencies having jurisdiction for the Occupancy type for the building. Any required fire dampers are to be located within vault. Provide adequate clearance for fire damper installation on supply & exhaust vent openings if dampers are required.
- 5.8. One continuous\_\_\_\_\_CFM (minimum) exhaust fan direct driven by a\_\_\_\_\_3-phase, sealed ball bearing motor. Fan to be mounted as close to the ceiling as practicable when located inside vault.
- 5.9. Vents, Ducts and flues shall not be connected with any other ventilation or air distribution system and must be for exclusive use of electric (transformer) vault.
- 5.10. See Section 21 for Internal Vault Wiring Diagrams.
  - 5.10.1. Note - No gas meter set assemblies are allowed within 10ft of intake or discharge vents.

## **6. VAULT LIGHTING SYSTEM:**

- 6.1. Vault light switch and 120v power receptacle. A 277V vault lighting system may be installed if available.
- 6.2. EXO switch complete with protection. Ventilation blower motor and vault lighting system to be separately protected. See attached detail\_\_\_\_for diagram schematic.
- 6.3. Customer to wire out per authority having jurisdiction (AHJ) from point adjacent to secondary side of transformer to EXO switch and interconnect vault lights, switch and receptacle, exhaust fan and thermostat control as required.
- 6.4. Four-foot double fluorescent lamp fixture with minimum 40-watt bi-fin lamps to be mounted on ceiling or maximum height of 9 feet above floor level, at locations as specified on SDG&E drawing.
- 6.5. See Section 21 for Internal Vault Wiring diagrams.

## **7. ENERGIZING VAULT VENTILATION AND LIGHTING SYSTEM**

- 7.1. When initially energizing the vault ventilation and lighting system a joint meeting with the customer electrician and SDG&E crews shall be scheduled to ensure wiring is correct and all motors/lighting are working properly. For services using three-phase motors, proper rotation should be confirmed.

## **8. VAULT DRAINAGE SYSTEM: (CHECK WITH CITY IF REQUIRED)**

- 8.1. When Governmental or Municipal authority requires a vault drainage system, the customer is to install a standard floor drain connected to a dry sump located outside of the vault. Slope the floor gently to this drain and cover with standard grating. Customer will be responsible for maintaining all components of drainage system in good working condition.
- 8.2. The design and installation of vault drainage system (provided by the customer) must be approved by the appropriate inspection authority and must meet all local, state and federal environment requirements for all components.



- 8.3. Customer is responsible for proper environmental disposal of any and all liquids recovered by vault drainage system.
- 8.4. Waste collection container must be capable of containing the total volume of oil for projected maximum size transformer/s (based on panel size/s) that can be used in vault. Contact SDG&E for volume requirement.
- 8.5. Regardless of whether Governmental or Municipal authorities require a vault drainage system, customer will install a sump hole directly below street level personnel access opening - in below grade vaults only.

## **9. VAULT GROUNDING SYSTEM:**

- 9.1. Trench grounding is the preferred method for providing grounds for all vaults. Customer to install 30 ft of 4/0 bare stranded copper wire in the primary trench closest to building and encase the 4/0 bare copper wire in the base of the trench using Ground Enhancement Material (GEM). See SDG&E UG Standard 4510. Customer to insert 4/0 ground wire into 1 inch PVC conduit for transition through vault/building wall. See SDG&E UG Standard 3960.2 for required technique and materials to transition PVC conduit through concrete. Ground wire inside vault to reach vault floor + 24 inch additional length.
- 9.2. As an alternative method, only when the approaching primary trench is less than 30 ft in length, customer to install 2 - 5/8 in X 10 ft long copper clad steel ground rods at minimum 6 ft interval in the primary trench. Install 4/0 bare stranded copper wire ground wire. Rods to be interconnected with 4/0 bare strand copper wire. See SDG&E UG Standard 4510. Customer to insert 4/0 ground wire into 1 inch PVC conduit for transition through vault/building wall. See SDG&E UG Standard 3960.2 for required technique and materials to transition PVC conduit through concrete. Ground wire inside vault to reach vault floor + 24 inch additional length.
- 9.3. Customer to provide individual equipment grounds within the vault for all transformers, capacitors, cable taps and fuse cabinets as specified by SDG&E. Customer to install/embed 1-#2/7 bare strand copper wire into vault floor for each transformer, capacitor, fuse cabinet and set of cable taps. Equipment ground wire to run from primary side of each transformer or capacitor, from below middle cable tap, and from below fuse cabinet, to a position just below entry point where 4/0 bare stranded copper trench ground wire transitions through vault wall – see 9.1 or 9.2 above. Customer to provide 24 inch (minimum) tail at each end of (each) equipment ground wire embedded in the floor of the vault.
- 9.4. Contact SDG&E inspector at least one (1) day in advance to schedule inspection of installation of trench ground outside vault (prior to backfill) and/or equipment ground embedded in vault floor. Customer to provide ladder access and a safe temporary access path (plywood or planks) within the vault for SDG&E inspector to make the inspection.
- 9.5. SDG&E will install required interior grounding for switches inside the vault.

## **10. PRIMARY CONDUIT, EXTERIOR and INTERIOR:**

- 10.1. Primary exterior conduit trench shall be slurry backfilled, concrete encased or as specified by SDG&E.



- 10.2. Primary exterior conduits shall terminate in corner of vault as specified by SDG&E Project Management Dept. Top of conduit package shall terminate no less than 60 inch below interior surface of vault ceiling.
- 10.3. Any and all conduits passing through vault exterior wall (see section 1.6 & 1.7 above) shall be water-tight with water and oil resistant materials. Conduit must be sealed on vault exterior surface. In addition customer must apply a one inch thick and one inch wide layer of sealant mastic around each conduit in the center of the form before concrete is poured. See SDG&E Underground Construction Standard page 3960 for illustration of required technique, recommended materials and required spacing between conduits. Contact SDG&E inspector at least one (1) day in advance to schedule inspection of vault floor through which conduits pass.
- 10.4. Any and all conduits passing through vault floor (see section 1.6 & 1.7 above) shall be sealed water-tight with water and oil resistant materials. If possible, conduit may be sealed on vault interior surface. In addition, customer must apply a one inch thick and one inch wide layer of sealant mastic around the conduit in the center of the form before concrete is poured. See SDG&E Underground Construction Standard page 3960.2 for illustration of required technique, recommended materials and required spacing between conduits. Contact SDG&E inspector at least one (1) day in advance to schedule inspection of construction of vault floor through which conduits pass.
- 10.5. All primary exterior conduits shall be installed such that they are free and clear of dirt, rocks, or other obstructions. Customer/developer shall install  $\frac{3}{4}$ in pulling and measuring tape rated at 2,500 pound tensile strength in all conduit runs over 10ft. Each conduit will have at least a two-foot measuring tape coil securely tied at each terminating end of conduit run. Horizontal conduit bends shall be 25ft radius of curvature.
- 10.6. Contact SDG&E inspector at least one (1) day in advance to schedule inspection of installation of primary exterior conduit system (prior to backfill) Note: service conduits not included in this section
- 10.6.1. \_\_\_\_ (#. Conduits), \_\_\_\_ In. Size, \_\_\_\_ Type
- 10.6.2. \_\_\_\_ (#. Conduits), \_\_\_\_ In. Size, \_\_\_\_ Type
- 10.6.3. \_\_\_\_ (#. Conduits), \_\_\_\_ In. Size, \_\_\_\_ Type
- 10.6.4. \_\_\_\_ (#. Conduits), \_\_\_\_ In. Size, \_\_\_\_ Type
- 10.7. Primary interior conduit may be installed beneath the vault floor provided vault floor is located at street level and is completely resting on earth.
- 10.8. Cable troughs may be installed in vault floor as substitute for primary interior conduits. Customer to submit specification to SDG&E for approval prior to fabrication. Allow 6 inches of width for each set of distribution cables and 7in of width for each set of feeder cables. The maximum width of any trough will be 30in.
- 10.9. Trough covers will be designed to withstand a minimum of 20,600 lbs traffic loading capacity (AASHTO H20 and ASTM C 857). Trough cover surfaces must be smooth textured to allow easy pass-over by small roller wheels. Trough covers will be flush mounted and have flush mounted



lifting handles on each end, or 1in lifting hole on both ends. Trough cover sections will be limited to a maximum weight of 80 lbs.

- 10.10. Cable troughs may not pass beneath floor mounted electric equipment. Troughs may terminate beneath floor mounted electric equipment.
- 10.11. Cable trays may be installed as substitute for primary interior conduits. See section 15.

## **11. CUSTOMER SERVICE CONDUIT:**

- 11.1. Service conduits are only permitted when transformer vault is located at street level and vault floor is resting on earth. Combinations of 3 or 4 inch service conduits may be used provided they do not exceed 6 conduits total. A maximum of 5 - 5 inch service conduits may serve commercial & industrial boards up to 2,000 Amps. A maximum of 5 - 5 inch service conduits may serve residential & multifamily boards up to 3,500 Amps.
- 11.2. In addition to truck access required in section 3 above, line truck access is to be provided as indicated in SDG&E Service Standards & Guide, pg 16, when service conduits will be installed.
- 11.3. Service conduit requirements exceeding quantities stated above will require bus duct, rather than conduit, between secondary side of transformer and customer service equipment. When transformer vault is not on street level, and is not resting on earth, bus duct is required between secondary side of transformer and customer service equipment.
- 11.4. Install \_\_\_\_\_ conduits from secondary side of transformer to customers pull section as indicated on sheet **XX** of **YY**. Terminate primary and service conduits at least 2in above floor to permit sealing (see section 1.6 & 1.7 above)
- 11.5. When more than one pull-section is served by the same transformer and the total number of conduits exceeds those listed above, bus duct will be required.
- 11.6. Any and all electric service conduits passing through vault floor shall be sealed water-tight with water and oil resistant materials. See SDGE Underground Standard 3960 for required spacing and specifications to be provided between conduits to allow use of sealing tools. See section 1.9 above for additional requirements

## **12. SERVICE ENTRANCE, BUS DUCT:**

- 12.1. Service bus way from customer's service equipment to transformer. The design and location must be approved by SDG&E prior to fabrication. Refer to attached enclosure for straight bus section and bus entrance box. For attachment to transformer housing, bus bar configuration and transformer housing see illustrations in section 18 for details/specifications. Bus and entrance box to be permanently supported as required. Horizontal bus sections within vault to maintain 7ft-6in vertical clearance above vault floor. Where bus enters vault room, opening to be sealed following bus installation. Bus ampacity to match or exceed panel rating.
- 12.2. Customer service entrance installation to comply with all local codes and ordinances.



### **13. CUSTOMER'S METERING FACILITIES:**

- 13.1. Customer's meter board shall be constructed in accordance with SDG&E's service guide requirements. Manufacturer shall submit drawings to SDG&E Service Standards group for approval prior to fabrication.

### **14. COMMUNICATIONS CONDUIT:**

- 14.1. SCADA (Supervisory Control and Data Acquisition): One 4 inch communications conduit shall be extended from customer vault to closest SDG&E substructure (for supervisory cable). Or one 4 inch conduit shall be extended to anticipated/future SCADA antenna location (for coax cable). And one 1 inch conduit shall be extended from customer vault to project telephone equipment area (telephone line). Coordinate with SDG&E Project Management department to determine specific requirement.

### **15. CABLE TRAY:**

- 15.1. Cable trays are **not** preferred; however, the installation of cable trays may be necessary when circumstances prevent the installation of either (primary) conduit or trough, such as structurally thin floors. Customer to submit specifications to SDG&E for approval prior to fabrication.
- 15.2. Refer to Article 392 of the National Electric Code (NEC) for guidelines in selecting the proper cable tray type. (The type of cable to be installed in the tray will dictate the type of cable tray needed).
- 15.3. Refer to Article 392 of the National Electric Code (NEC) for guidelines in calculating the cable tray depth and width. (The type and number of cables to be installed will dictate the depth and width).
- 15.4. Cable tray side rail height should be at least 1in higher than the load depth (the depth of the largest cable).
- 15.5. Cable tray radius: The nominal (inside) bending radius for curved sections of cable trays shall not be less than the minimum allowable bending radius for the largest (triplexed) cable to be installed in the tray. Refer to SDG&E Underground Standard pg. 4004 for a listing of minimum cable bending radius.
- 15.6. Cable tray load/span classification describes the cable tray's load carrying capability for a specific support span. A classification should be selected that reflects the actual working load for each application. Refer to SDG&E Underground Standard pg. 4003.1 for a listing of SDG&E cable weights.
- 15.7. Cable trays shall hang not less than 7 ft-6 in above the vault floor.

### **16. UNISTRUT HANGERS:**

- 16.1. Unistrut hangers shall be used to support cable trays and shall be suspended from ceiling of vault. Each unistrut hanger shall be capable of supporting 500 lbs. Unistruts will be spaced such that the maximum load at each unistrut hanger is no more than 250 lbs.
- 16.2. Sufficient unistrut hangers shall be installed such that not more than one cable tray splice plate connection is located between hangers. Curved sections shall have at least one unistrut hanger at the center of the curved section.



## **17. SDG&E WILL FURNISH AND INSTALL:**

### **17.1. Transformers**

- 17.1.1. \_\_\_\_ Transformer(s) \_\_\_\_ kV. \_\_\_\_ / \_\_\_\_ volt connected for three-phase 4-wire service (weight \_\_\_\_ lbs)
- 17.1.2. \_\_\_\_ Transformer(s) \_\_\_\_ kV. \_\_\_\_ / \_\_\_\_ volt connected for three-phase 4-wire service (weight \_\_\_\_ lbs)
- 17.1.3. \_\_\_\_ Transformer(s) \_\_\_\_ kV. 120/240 volt connected for 1-phase 3-wire service (weight \_\_\_\_ lbs)

### **17.2. 12KV Distribution Cable and Connectors**

- 17.2.1. **Distribution Equipment:** SDG&E will furnish and install in vault (a) cable taps, (b) transformers, (c) \_\_\_\_-way switch (\_\_\_\_ lbs), (d) wall-mounted fuse cabinet/s and fuses, (e) capacitor (2,000 lbs), (f) SCADA and communication equipment.

#### **17.2.1.1. Equipment Dimensions**

##### **17.2.1.1.1. Cable Taps**

##### **17.2.1.1.2. Transformers**

##### **17.2.1.1.3. Switches**

##### **17.2.1.1.4. Fuse Cabinets**

##### **17.2.1.1.5. Capacitors**

##### **17.2.1.1.6. SCADA and Communication Equipment**

- 17.2.2. **Service Conductors:** SDG&E will furnish and install service entrance conductors from transformer secondary terminals to customer's service pull section only when criteria in section 10.1 (above) are satisfied. Otherwise customer will install bus duct.

**NOTE** - CUSTOMER SERVICE ENTRANCE DESIGN AND LOCATION TO BE APPROVED BY SDG&E PRIOR TO FABRICATION



## 18. 18. BUS DUCT INTO PAD-MOUNTED TRANSFORMER:

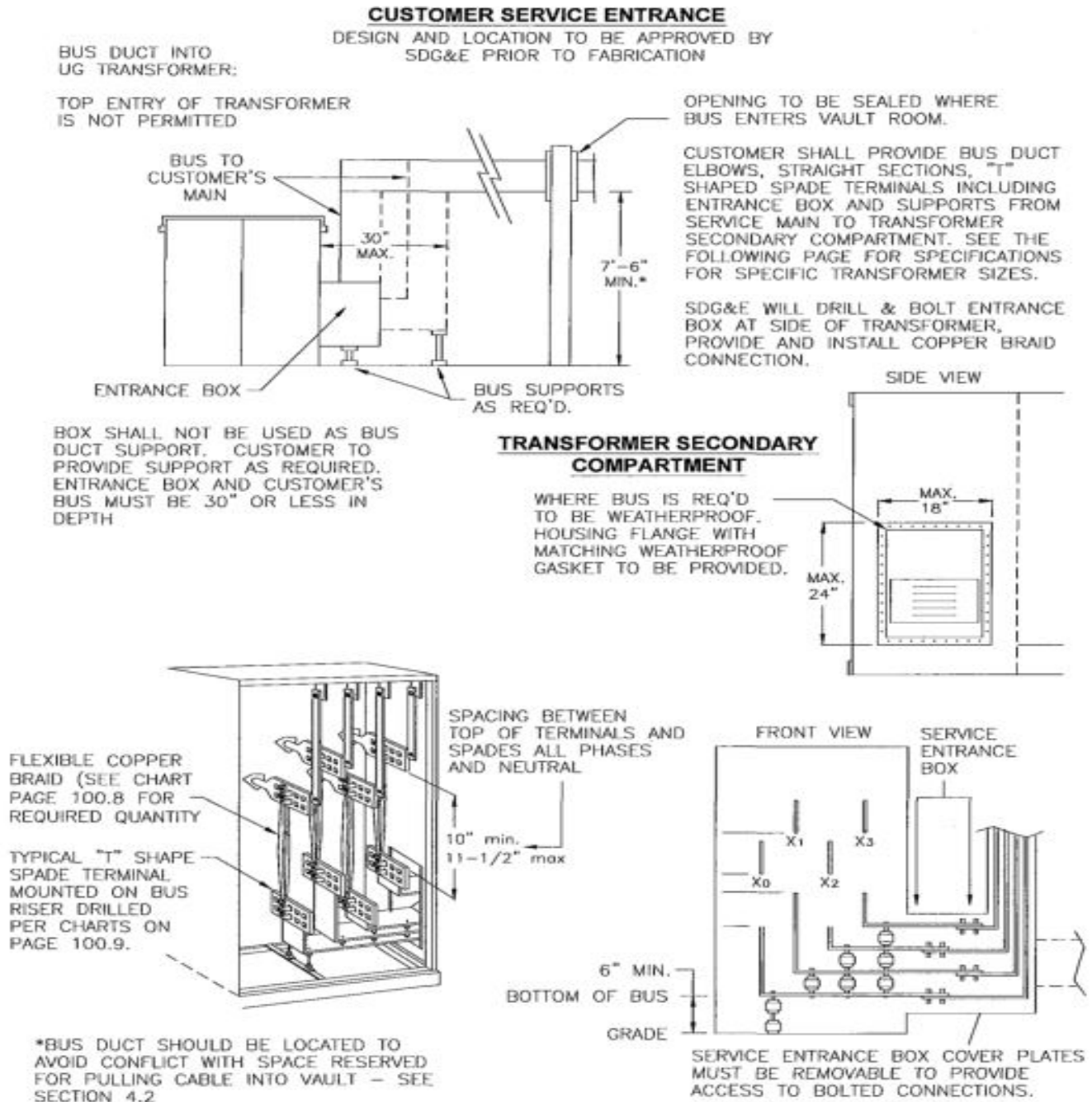
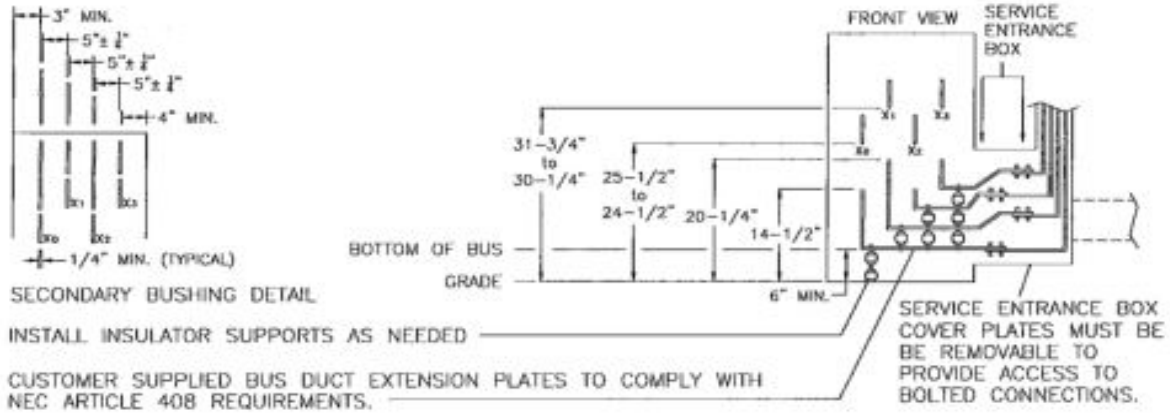


Figure 2 - Typical bus duct configuration for pad-mounted transformer.



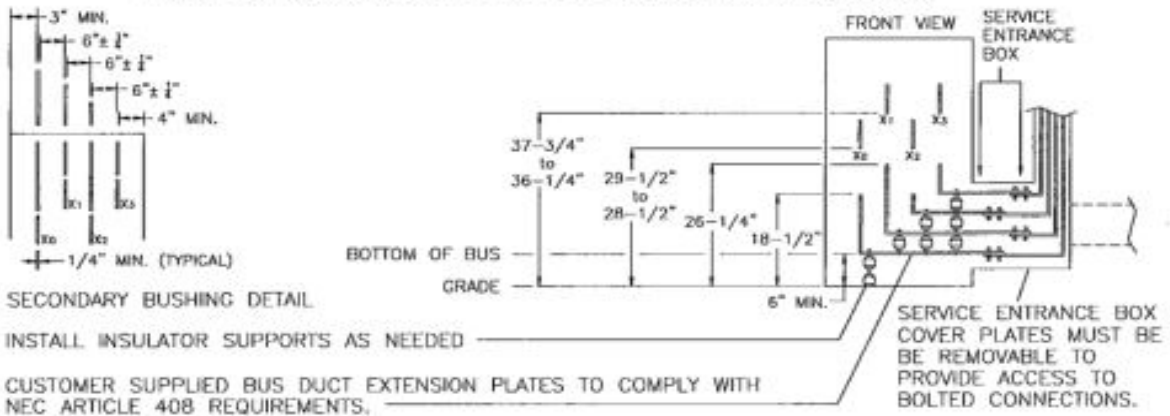
### **CUSTOMER SERVICE ENTRANCE BOX FOR 75 KVA TRANSFORMER**

DESIGN AND LOCATION TO BE APPROVED BY SDG&E PRIOR TO FABRICATION



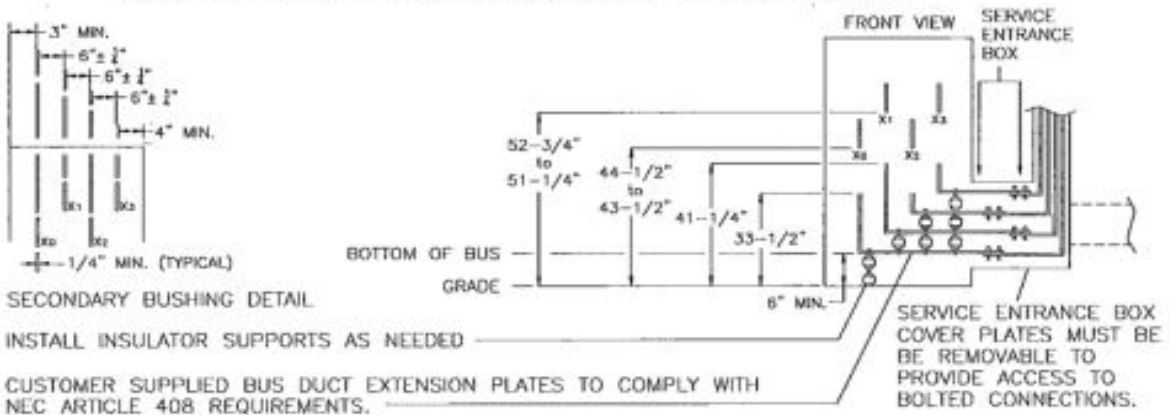
### **CUSTOMER SERVICE ENTRANCE BOX FOR 225 KVA, 300 KVA & 500 KVA TRANSFORMER**

DESIGN AND LOCATION TO BE APPROVED BY SDG&E PRIOR TO FABRICATION



### **CUSTOMER SERVICE ENTRANCE BOX FOR 750 KVA, or LARGER, TRANSFORMER**

DESIGN AND LOCATION TO BE APPROVED BY SDG&E PRIOR TO FABRICATION



**Figure 3 - Typical service entrance configuration for various sizes of transformers.**



## 19. COPPER BRAID SIZING CHART:

- 19.1. Three-phase padmount transformers (number of 600 amp secondary braided jumpers per phase to be used)

### SECONDARY VOLTAGE

| <u>KVA</u> | <u>208Y/120</u> | <u>240 DELTA</u> | <u>480Y/277</u> |
|------------|-----------------|------------------|-----------------|
| 75         | 1               | 1                | 1               |
| 150        | 1               | 1                | 1               |
| 225        | 2               | 2                | 1               |
| 300        | 2               | 2                | 1               |
| 500        | 4               | 3                | 2               |
| 750        | 6               | —                | 3               |
| 1000       | 7               | —                | 3               |
| 1500       | 11              | —                | 5               |
| 2000       | —               | —                | 6               |
| 2500       | —               | —                | 8               |
| 3000       | —               | —                | 9               |

**Table 1** - Number of 600A secondary braided jumpers based on transformer kVA size and secondary voltage.

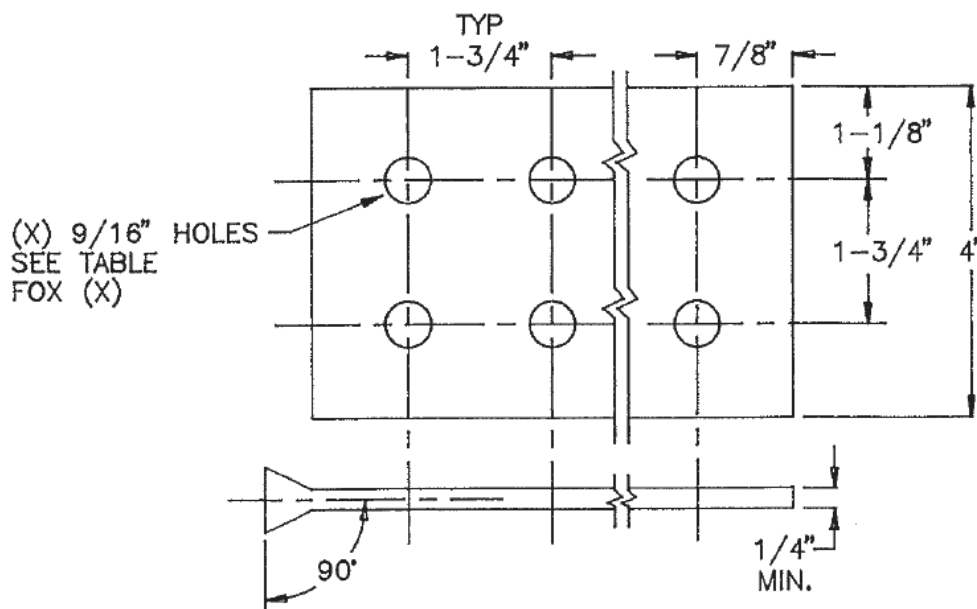


## 20. LOW VOLTAGE TERMINALS:

### LOW VOLTAGE TERMINALS

| KVA<br>X -6<br>HOLES | KVA<br>X -6<br>HOLES | KVA<br>X -6<br>HOLES | KVA<br>X -6<br>HOLES | VOLTAGE  |
|----------------------|----------------------|----------------------|----------------------|----------|
|                      | 500                  | 750                  | 1000                 | 208Y/120 |
| 750                  | 1000                 | 1500                 | 2000 –<br>3000       | 480Y/277 |

**Table 2** - Number of "T" spade terminal holes based on transformer kVA size and secondary terminal voltages.

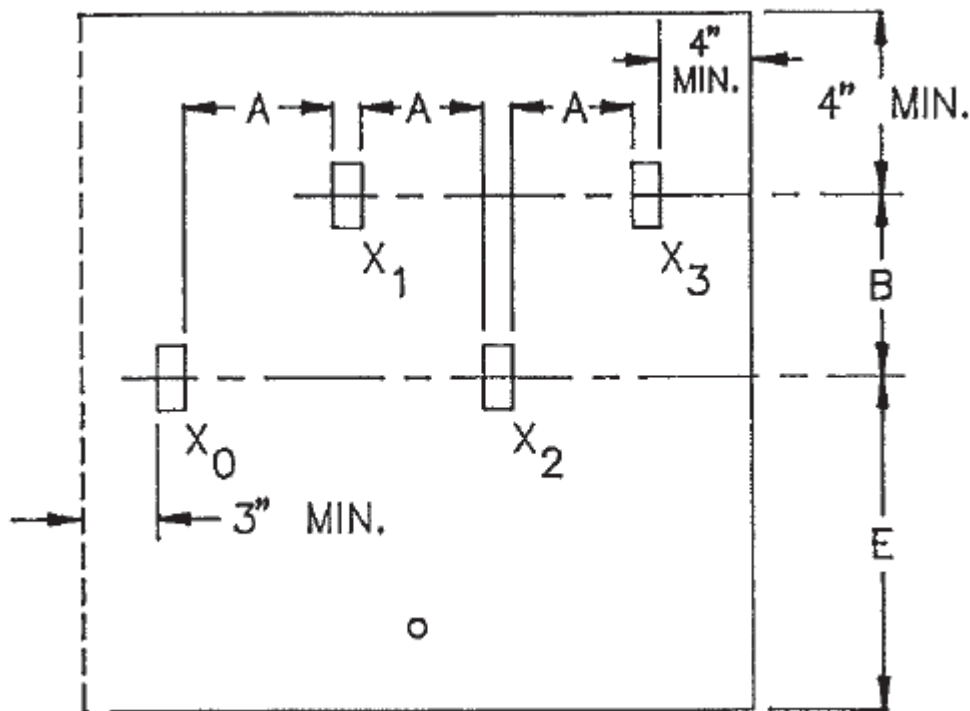


**Figure 4** - "T" Spade terminal dimensions.



| A<br>MIN. | KVA            | B<br>MIN. | E       |
|-----------|----------------|-----------|---------|
| 5±1/4"    | 75             | 6±1/4"    | 27±1/2" |
| 5±1/4"    | 150            | 6±1/4"    | 27±1/2" |
| 6±1/4"    | 225            | 8±1/4"    | 31±1/2" |
| 6±1/4"    | 300            | 8±1/4"    | 31±1/2" |
| 6±1/4"    | 500            | 8±1/4"    | 31±1/2" |
| 6±1/4"    | 750            | 8±1/4"    | 46±1/2" |
| 6±1/4"    | 1000 -<br>3000 | 8±1/4"    | 46±1/2" |

**Table 3** - Secondary bushing spatial dimensions.

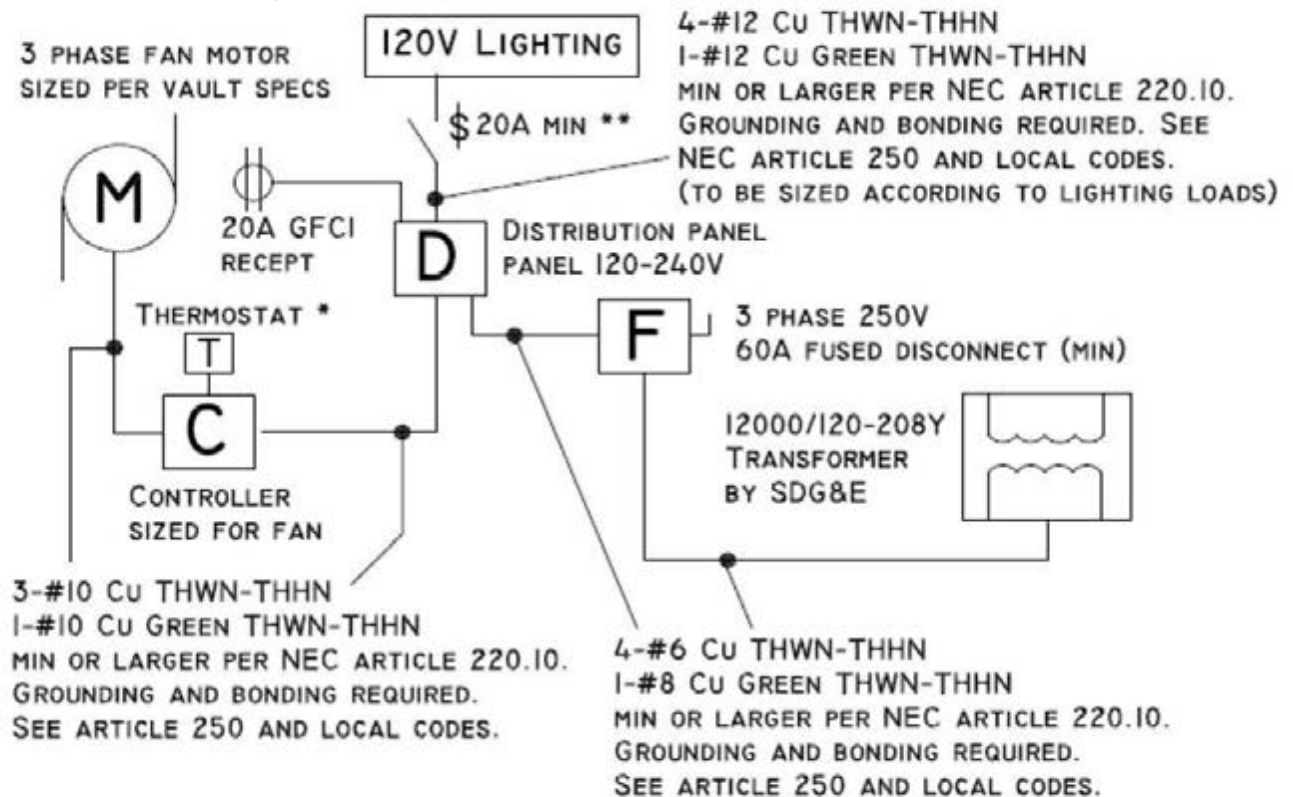


**Figure 5** - Secondary bushing spatial diagram.



## 21. INTERNAL VAULT WIRING

21.1. **120 – 208V Vault** (Alternate, only use if 277-480V not present)



## 120-208V Vault

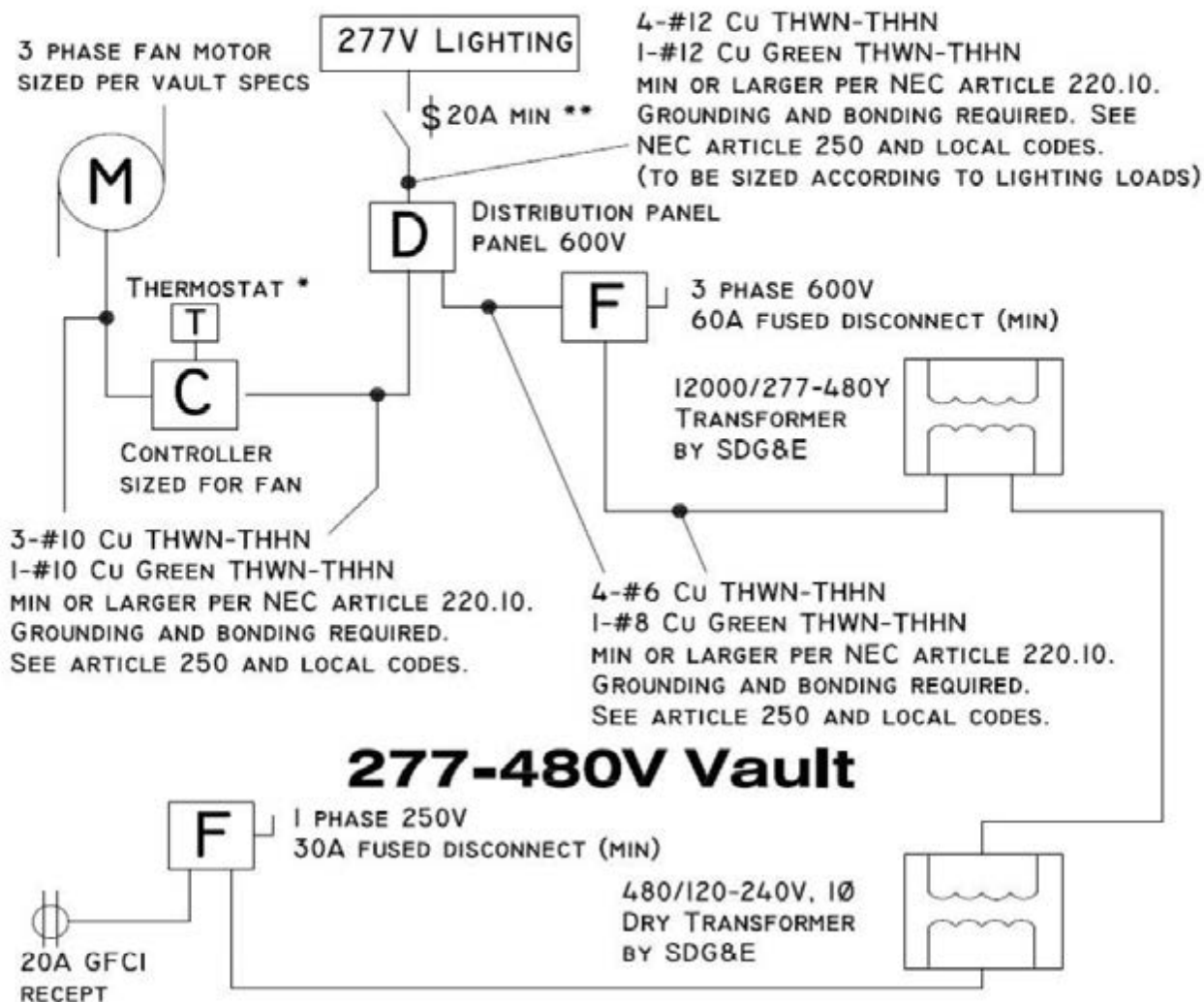
\* THERMOSTAT TO BE MOUNTED AWAY FROM INTAKE AND EXHAUST VENTS IN ANY EASILY ACCESSIBLE LOCATION.

\*\* LIGHT SWITCH WITH LIGHTED SWITCH PLATE REQUIRED INSIDE VAULT (A) ADJACENT TO PERSONNEL ACCESS DOOR AND (B) BELOW 34" CAST IRON COVER/PERSONNEL ACCESS OPENING, 48" ABOVE THE FLOOR.

NOTE: ANY MODIFICATIONS OR ADDITIONS TO THESE SPECIFICATIONS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.



21.2. **277 – 480V Vault (Preferred)**



**120V Vault Power from 277-480 Y Transformer**

\* THERMOSTAT TO BE MOUNTED AWAY FROM INTAKE AND EXHAUST VENTS IN ANY EASILY ACCESSIBLE LOCATION.

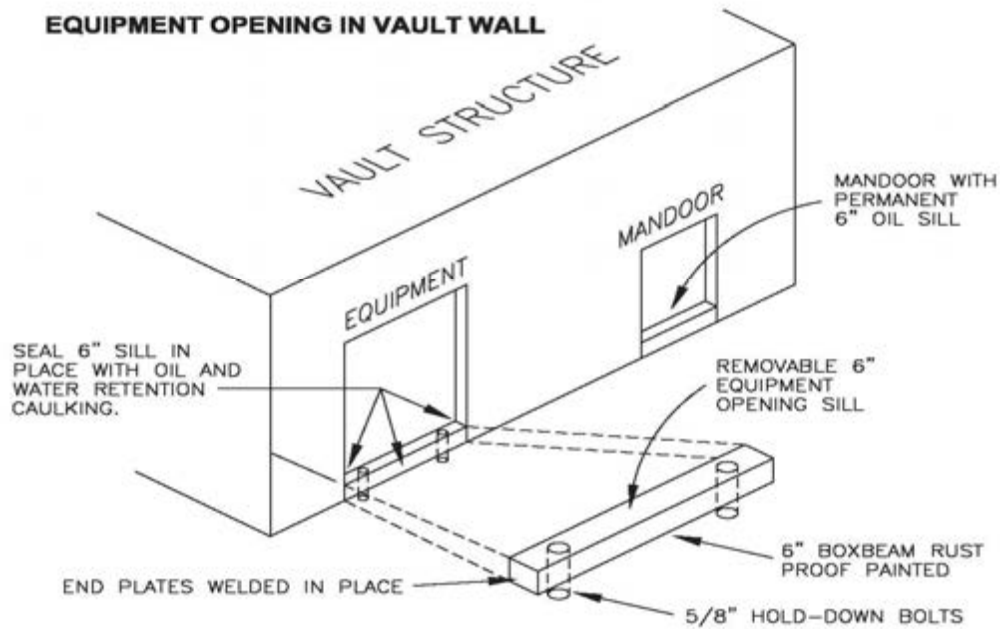
\*\* LIGHT SWITCH WITH LIGHTED SWITCH PLATE REQUIRED INSIDE VAULT (A) ADJACENT TO PERSONNEL ACCESS DOOR AND (B) BELOW 34" CAST IRON COVER/PERSONNEL ACCESS OPENING, 48" ABOVE THE FLOOR.

NOTE: ANY MODIFICATIONS OR ADDITIONS TO THESE SPECIFICATIONS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.



## 22. EQUIPMENT OPENINGS IN VAULT WALL:

- 22.1. 10ft X 10ft Door required for equipment opening. May be a roll-up door or conventional.
- 22.2. Either style door must be Three-Hour Fire Rated. See section 3.1 and 3.2.

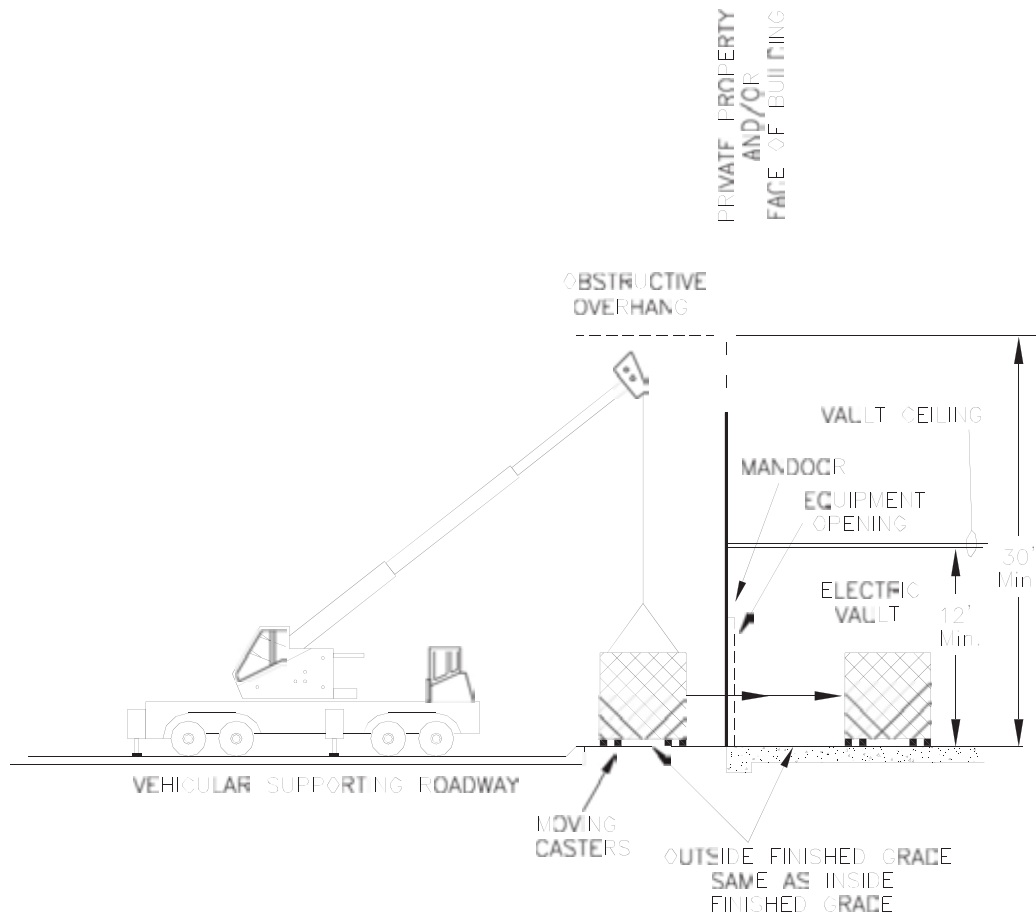


**Figure 6 - At Grade vault equipment and personnel access door.**



## 23. ELECTRIC VAULT LOCATION & ACCESSIBILITY:

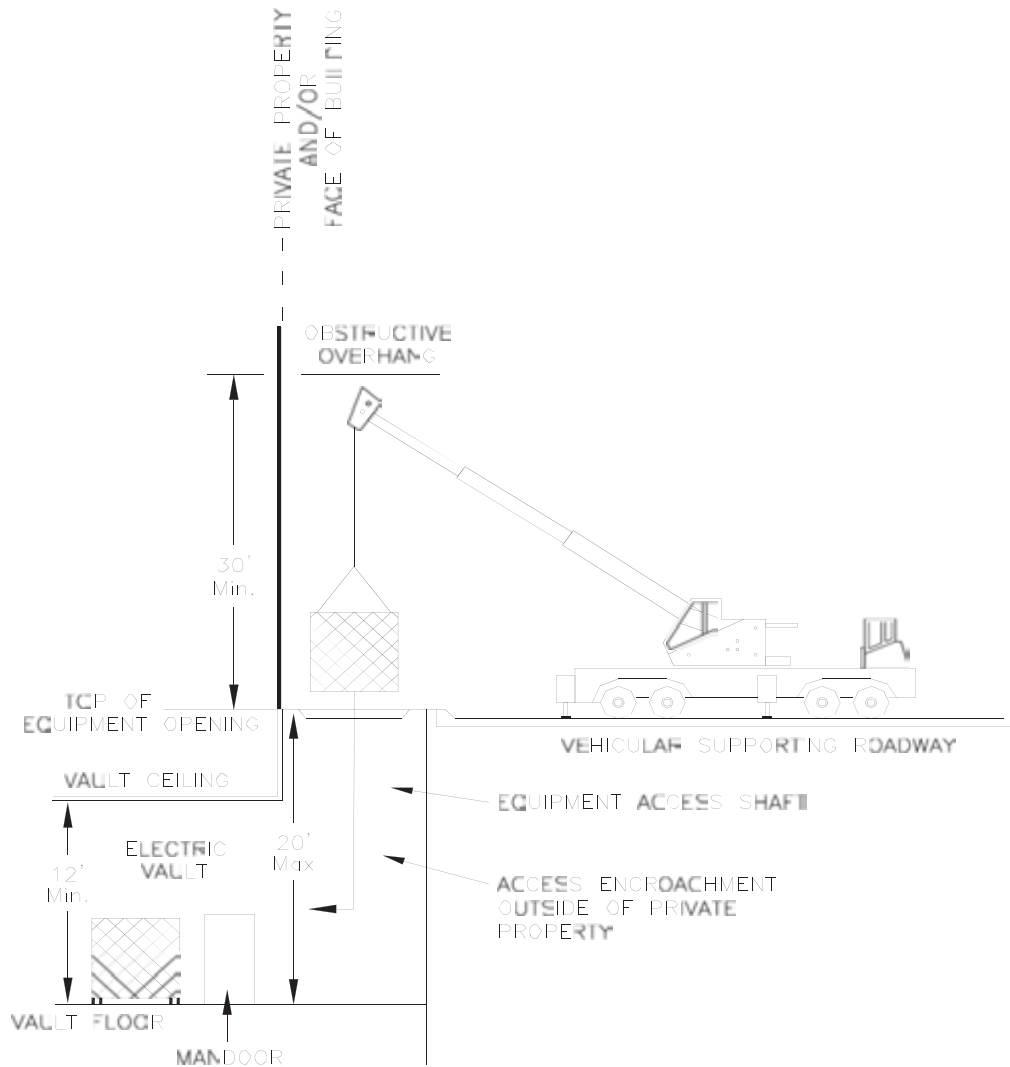
### 23.1. At Grade Vault (Preferred):



**Figure 7 - Access to equipment openings for At Grade Vaults.**



23.2. Below Grade Vault (Alternate):



**Figure 7 - Access to equipment for Below Grade vaults.**



## 24. VAULT INTERNAL DIMENSIONS: BELOW GRADE & STREET LEVEL VAULTS

| Customer Type                                   | Number of Transformers<br>(26.1) |    | Clear and unobstructed space<br>(26.1/2 /3 /5) | Equipment opening & personnel access opening |
|---|----------------------------------|----|--|--|
|   | 1Ø                               | 3Ø |  |  |
| <b>Residential Only</b>                         | 1                                | 1  | 18' X 16' (at grade)                           | (not required at grade)                      |
|   | 1                                | 1  | 18' X 16' (below grade)                        | 17' X 12' (min)                              |
| <b>Commercial or Combination w/ Residential</b> |                                  | 1  | 20' X 44' (26.4)                               | 17' X 12' (min)<br>(not required at grade)   |
|   |                                  | 2  | 36½' X 29' or 20' x 57'                        | 17' X 12' (min)<br>(not required at grade)   |
|   |                                  | 3  | 20' x 70'                                      | 17' X 12' (min)<br>(not required at grade)   |

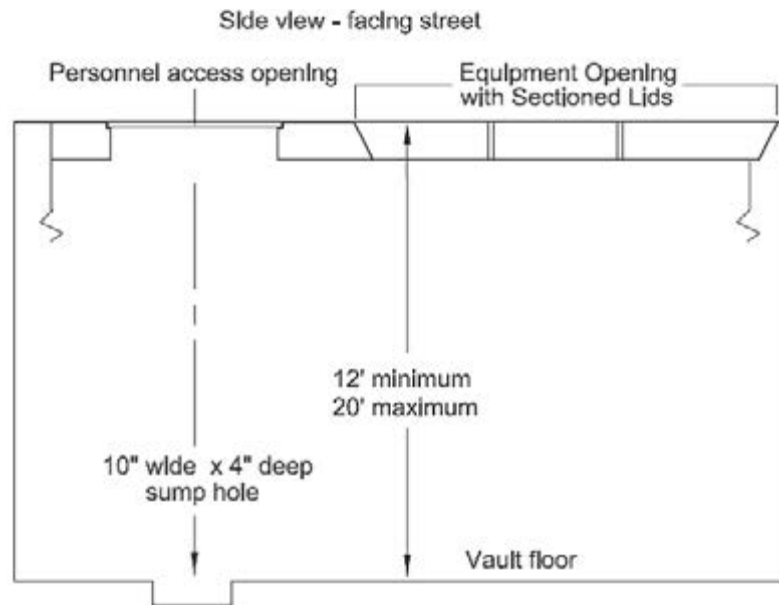
**Table 4** – Vault dimensions based on type of service and equipment needs.

- 24.1. Customer must contact SDG&E Project Management department to determine dimensions for transformer combinations not listed. Contact SDG&E prior to submitting architectural building plans for Municipal approval.
- 24.2. Customer desiring deviation from standard vault dimensions must make formal written request to SDG&E Project Management department for consideration. Requests must be submitted to SDG&E prior to submitting architectural building plans for Municipal approval.
- 24.3. If customer is not able to provide clear & unobstructed space (no columns) in the dimensions specified above, please contact SDG&E Project Management department to determine acceptable alternative to prescribed dimensions above. Customer must coordinate with SDG&E prior to submitting architectural building plans for Municipal approval.
- 24.4. Customer may use 36½ft x 29ft dimensions if convenient.
- 24.5. Customer may provide larger vault than minimum dimensions listed above.



## 25. LADDER INSTALLATION FOR VAULTS GREATER THAN 12ft (Below Grade)

- 25.1. Minimum Vault Depth 12ft, Maximum Vault Depth 20ft.
- 25.2. Sump hole required, centered directly below personnel access opening
- 25.3. Installation of permanent ladder not required in personnel access opening. SDG&E will supply ladder when needed.



**Figure 8** - Ladder installation details.

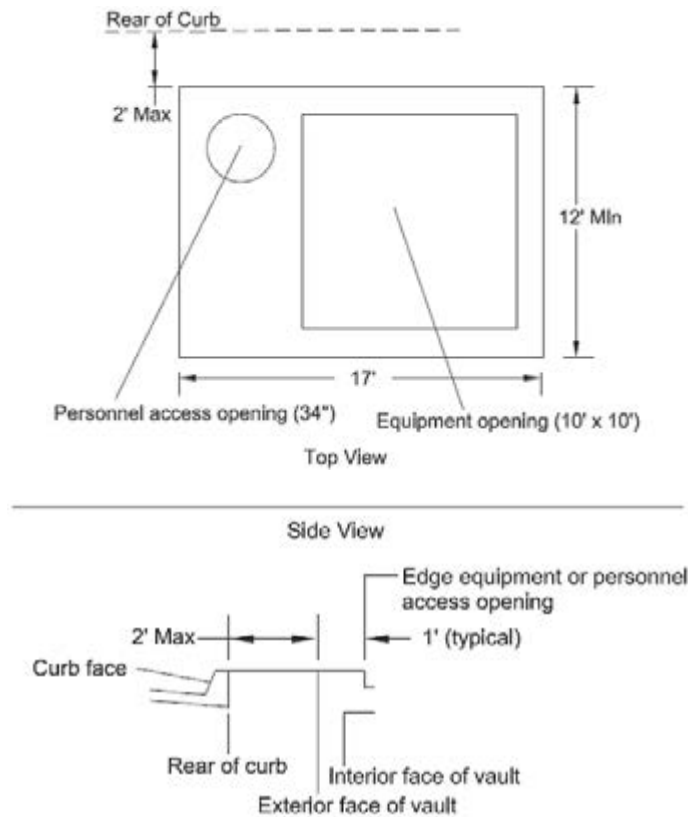


## **26. VAULT EQUIPMENT COVER and PERSONNEL ACCESS OPENING (Below Grade)**

- 26.1. Inside dimension of equipment opening shall measure 10ft x 10ft. Customer shall provide removable three-hour fire rated three-part concrete equipment opening covers. No coverings or facades are permitted over these covers unless an integral part of the covers themselves. Maximum weight of each section is not to exceed 4,800 lbs.
- 26.2. Customer to provide 4 lifting inserts with removable plugs (to keep out debris) near each corner of each equipment opening cover/section. Lifting inserts shall be 1in threaded coil inserts with 4,500 lbs safe working load tension – see section 3 & 4.
- 26.3. Personnel access opening (manhole) shall measure 30 inches in diameter with 34 inch diameter cast iron cover and recessed stainless steel penta-head bolts (4 total). See SDG&E Underground Standards page 3332. Personnel access opening to be at final grade. No coverings are permitted over this opening.
- 26.4. Customer to submit plans approved by a civil engineer registered in the State of California verifying the structural integrity of equipment opening covers and personnel access opening cover to withstand (AASHTO) HS-20 loading. Equipment opening cover shall be designed in accordance with SDG&E Underground Construction Standards. Plans to be submitted to SDG&E prior to construction/manufacture of vault roof and sectioned equipment opening.
- 26.5. Café fences, railings, partitions, enclosures, screens, barriers, walls, tables, chairs, umbrellas, podiums, or any other miscellaneous structures or furniture are not permitted above equipment opening cover or personnel access opening cover, temporarily or otherwise. Twenty four hour access for emergency and/or routine removal of covers is to be maintained at all times.
- 26.6. Equipment opening covers and personnel access open cover to sit flush with and at same grade as surrounding sidewalk.
- 26.7. Customer shall install felt insulation between concrete equipment opening covers and metal side rails/struts - to prevent surface vacuum buildup between covers and side rails. Install felt insulation such that top horizontal surface of insulation is ½ inch – 1inch below top surface of covers. Customer to seal perimeter of equipment opening covers with removable ultraviolet/water/oil resistant caulking.



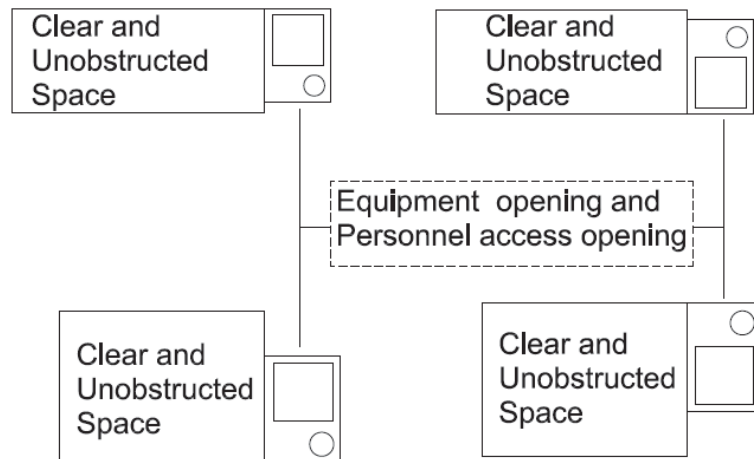
26.8. Equipment Opening & Personnel Access Opening shall be no more than 2 ft from edge of curb\*.



**Figure 9** - Proximity of Below Grade Vault equipment and personnel access opening to street.

\*Note: Customer is not permitted to install tables, chairs, partitions, posts, signs, screens, walls, fences, railings or barriers of any nature above or in front of SDG&E equipment opening or personnel access opening.

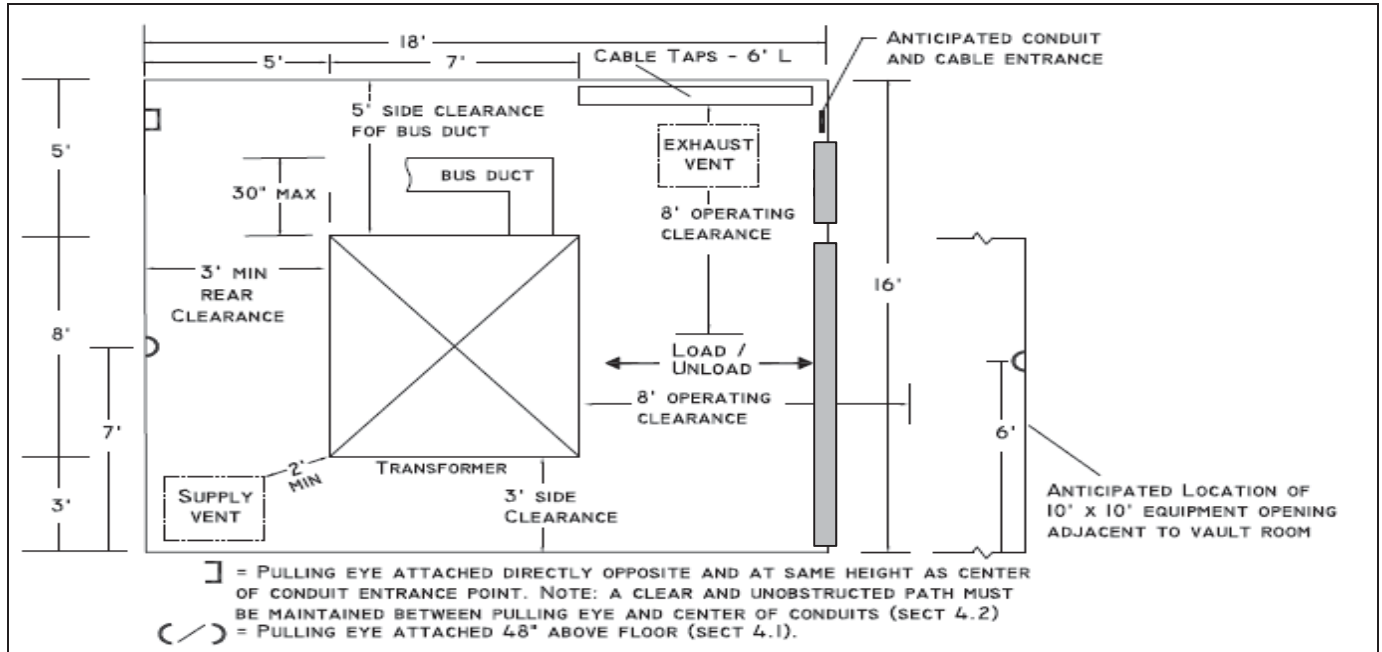
26.9. The following depiction shows typical arrangements of the "Clear & Unobstructed Space" (vault space for equipment) to the "Equipment and Personnel Access Opening".



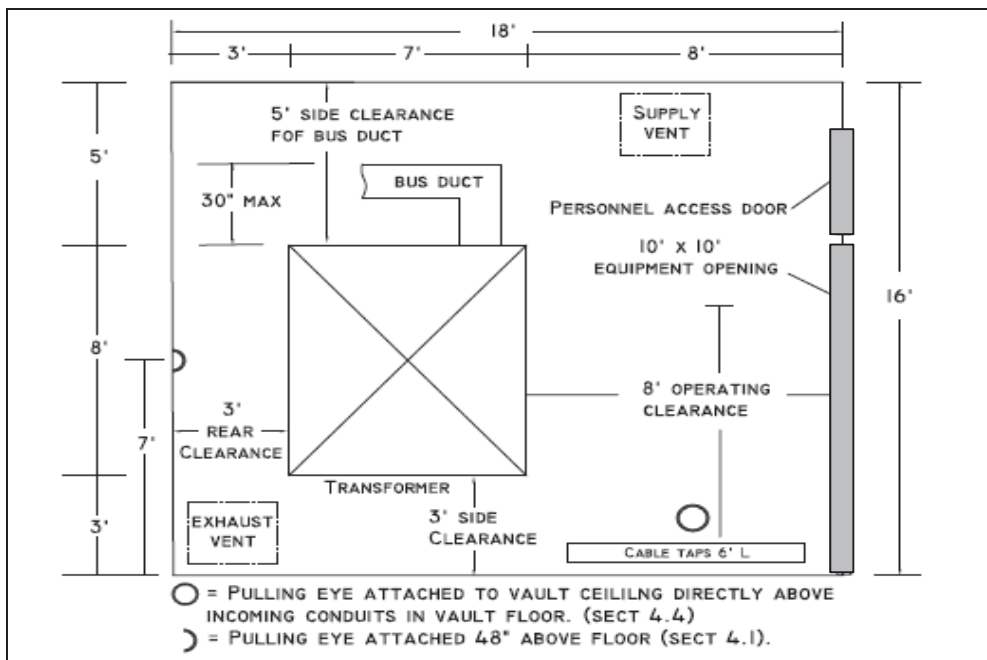
**Figure 10** - Typical arrangement of vault room in relation to equipment and personnel access opening.



## 27. TYPICAL VAULT CONFIGURATIONS (AT & BELOW GRADE)

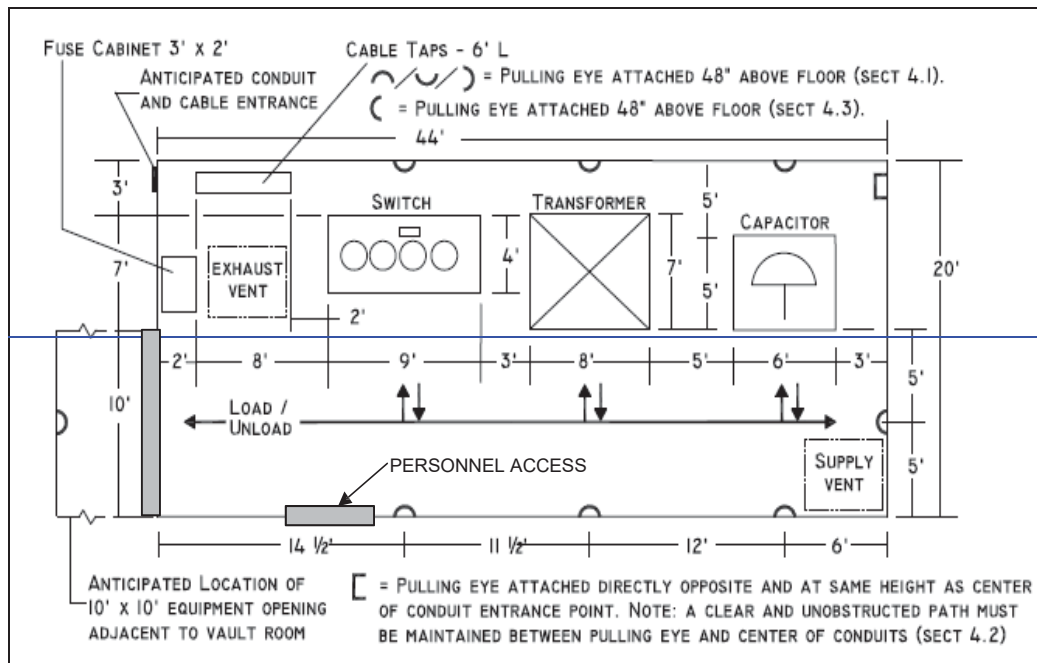


**Figure 11** - Typical below grade residential vault configuration for one transformer.

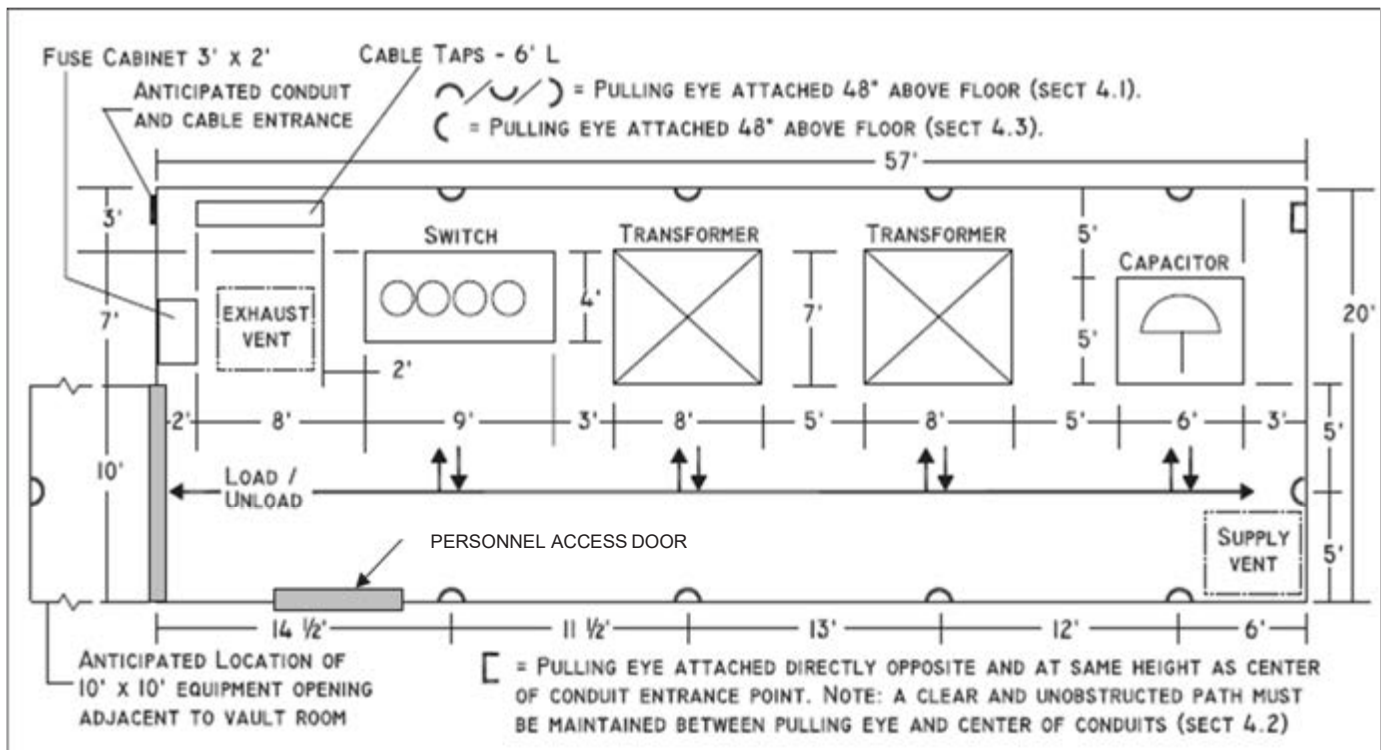


**Figure 12** - Typical at grade residential vault configuration for one transformer



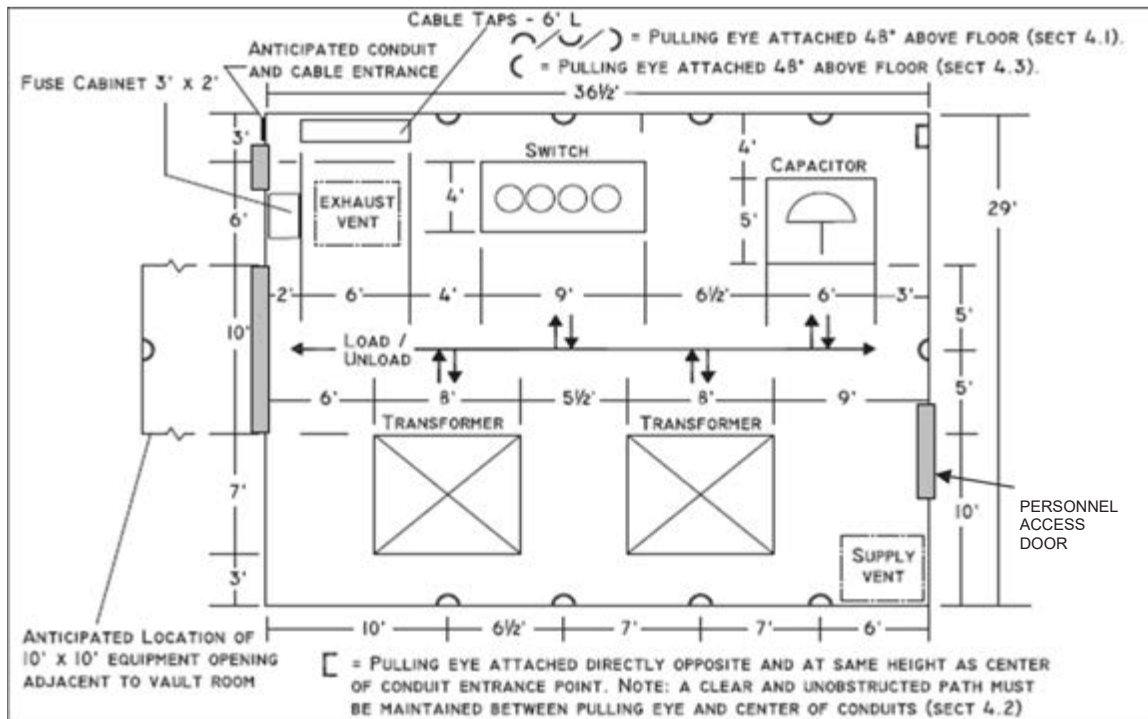


**Figure 13 - Typical below grade commercial vault configuration for one transformer.**



**Figure 14 - Typical below grade commercial vault configuration for two transformers.**









Issue  
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11/20/2018

**SDG&E  
ELECTRIC VAULT  
REQUIREMENTS AND SPECIFICATIONS**

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**28. CONSTRUCTION & MAINTENANCE RESPONSIBILITIES:**

The customer / owner shall furnish, construct and own the transformer vault facilities as specified. The customer / owner will be responsible for the maintenance of the vault facilities installed for the duration of service. This includes any portion of the vault structure extending into the public right-of-way, or outside of the project boundary.

The customer, owner or authorized representative agrees to provide, construct and maintain permanent truck & equipment access, and boom clearance for SDG&E's use at any equipment access opening located within the customer /owner's land. See sections 3.3 - 3.8 for specific requirements. Customer, owner or authorized representative also agrees to position equipment access opening that is adjacent to public right-of-way or in public right-of-way such that it provides the same access as when located within customer / owner's land. Access route shall be capable of supporting truck weight class H20 (20 tons per axel).

SDG&E will be represented in the field by an inspector and all work and material shall be subject at all times to inspection. Our inspector may be contacted prior to the start of your construction to answer any question you may have concerning your project. Final acceptance by SDG&E will be made when you have completed all work to the satisfaction of our inspector. The meters can only be set after final acceptance of your work, completion of our work, application for service, and receipt of final building inspection clearance.

All materials, work and work areas shall comply with the CAL-OSHA, Federal OSHA, and all other applicable federal, state, or local safety laws or rules that are necessary to protect applicant's and utility's employees, the public, and workers during the time of construction.

By proceeding with this installation, it is understood that you agree to all the stipulations set forth in these specifications and drawings indicated herein.

Customer / Owner \_\_\_\_\_ Date \_\_\_\_\_

Customer (print name) \_\_\_\_\_

Authorized customer representative \_\_\_\_\_ Date \_\_\_\_\_

Authorized customer representative (print name) \_\_\_\_\_

SDG&E representative \_\_\_\_\_ Date \_\_\_\_\_

SDG&E representative (print name) \_\_\_\_\_



**5000- TRENCHLESS  
CONSTRUCTION**



**5000- TRENCHLESS  
CONSTRUCTION**



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#### IV. ABBREVIATIONS:

## V. GEOTECHNICAL INVESTIGATION:

- ## VI. GROUNDWATER ELEVATION:

- ## VII. PERMITTING:

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## **VIII. INSPECTION REQUIREMENTS:**

- IX.
- WELDING:

- ## XI. MANDREL TESTING:

- ## XII. CASING PIPE MATERIAL:

- #### XIV. BORING UNIT:

- #### XV. GROUT:

- ## XVI. SUBMITTALS:

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**NOTES (CONT.):**

- e. CONTRACTOR SHALL SUBMIT SCHEDULE OF ACTIVITY FOR REVIEW 15 DAYS PRIOR TO COMMENCEMENT OF WORK.
  1. BORING ACTIVITIES WITHIN BNSF ROW SHALL CONTINUE 24 HOURS A DAY UNTIL THE WORK WITHIN ROW IS COMPLETED.
- f. DETAILED AS-BUILT DRAWINGS INCLUDING THE MATERIAL, SIZE AND DEPTH OF THE PIPE ALONG THE ENTIRE TUNNEL SHALL BE RECORDED AND SUBMITTED BY THE CONTRACTOR TO SDG&E.

## XVI. SETTLEMENT MONITORING:

- a. SETTLEMENT SHALL MONITORED DURING TUNNELING PROCEDURES FOR THE PIPE ALIGNMENT AS WELL AS NEARBY STRUCTURES. SETTLEMENT MONITORING READINGS SHALL BE TAKEN PRIOR TO THE ZONE OF ACTIVE EXCAVATION, WHEN THE TUNNEL FACE REACHES THE MONITORING POINT, AND WHEN THE ZONE OF ACTIVE EXCAVATION HAS PASSED AND NO FURTHER MOVEMENT IS DETECTED.
- b. IF SETTLEMENT IS DETECTED, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, AND THE TUNNELING ACTIVITY SHALL BE HALTED UNTIL THE CAUSE OF THE SETTLEMENT CAN BE IDENTIFIED AND ADDRESSED.

### **XVIII. UTILITY CROSSINGS:**

- a. CONTACT DIG ALERT TWO (2) WORKING DAYS PRIOR TO BEGINNING INSTALLATION.
- b. THE CONTRACTOR SHALL CHECK THE ENTIRE AREA OF THE INTENDED BORE BY SWEEPING AND/OR DIRECT CONNECTION WITH A PIPE LOCATOR TO VERIFY KNOWN SUBSTRUCTURES AND DETECT ANY UNKNOWN FACILITIES.
  1. IDENTIFIED UTILITY CROSSINGS SHALL BE POTHOLED TO CONFIRM LOCATION, DEPTH AND PIPE SIZE.

## XIX. CLEANUP:

- a. THE CONTRACTOR SHALL REMOVE ALL TEMPORARY FACILITIES CONSTRUCTED ON PUBLIC ROW IN ADDITION TO DEBRIS, TRASH AND OTHER DELETERIOUS MATERIAL. CONTRACTOR SHALL NOTIFY THE GOVERNING AGENCY WITHIN 24 HOURS THAT ALL CONSTRUCTION HAS BEEN COMPLETED.
- b. ENSURE THAT ALL DRILLING FLUIDS ARE DISPOSED OF IN A MANNER ACCEPTABLE TO THE GOVERNING AGENCIES.

**REFERENCE:**

- a. BNSF UTILITY ACCOMMODATION POLICY
- b. MTS JACK AND BORE DESIGN CRITERIA, STANDARD CONSTRUCTION NOTES
- c. ASTM A53, A716, F1962
- d. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
- e. ASCE MANUAL NO. 27, MANUAL NO. 108
- f. AWWA M11 STEEL PIPE DESIGN & INSTALLATION GUIDE
- g. AWS WELDING STANDARDS D1.1, QC7
- h. PLASTIC PIPE INSTITUTE: CH. 12 HDD
- i. SDG&E EMPLOYEE HANDBOOK FOR PERSONAL PROTECTIVE EQUIPMENT
- j. REFER TO GAS STANDARD D7255 FOR RAILWAY CROSSING REQUIREMENTS.

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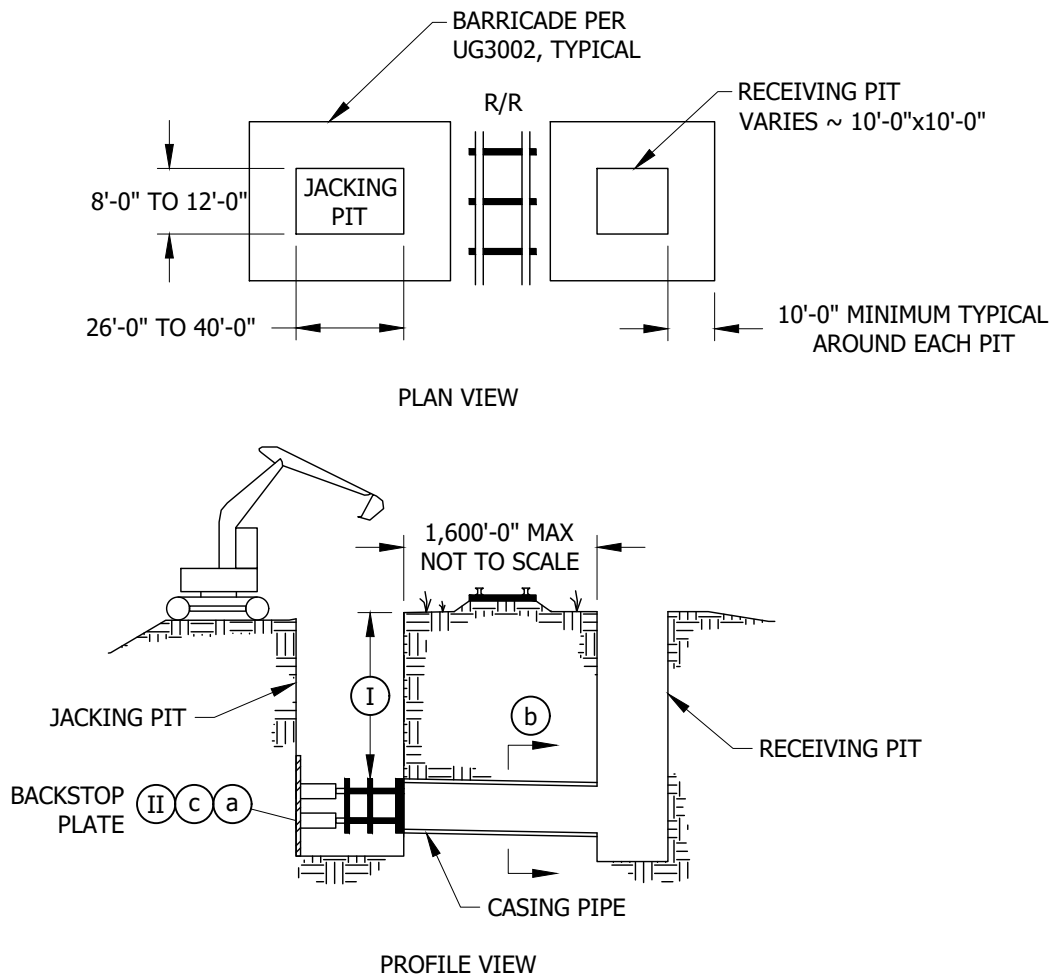
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**SCOPE:** THIS STANDARD SHOWS THE HORIZONTAL AND VERTICAL LAYOUT OF JACK & BORE CONSTRUCTION.



**FIGURE 1**

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- (I) MINIMUM COVER SHALL BE 3' UNLESS THERE IS A CONFLICT WITH OTHER REQUIREMENTS. (a)
- (II) ALTERNATIVE BACKSTOP MATERIALS MAY BE SELECTED AT THE DISCRETION OF THE ENGINEER AND PENDING SDG&E APPROVAL.

**REFERENCE:**

- (a) SEE REFERENCES ON UG5010.5
- (b) SEE UG5060 FOR CASING BORE SECTION VIEWS.
- (c) SEE DETAIL ON UG5030.2 FOR STANDARD BACKSTOP PLATE DIMENSIONS.
- (d) REFER TO UG5020.5 FOR DESIGN ASSUMPTIONS.

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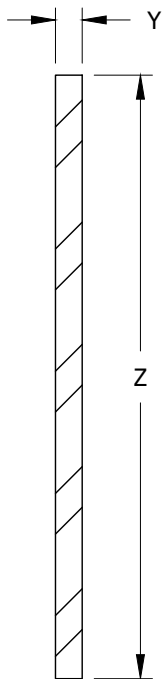
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JACK & BORE - LAYOUT

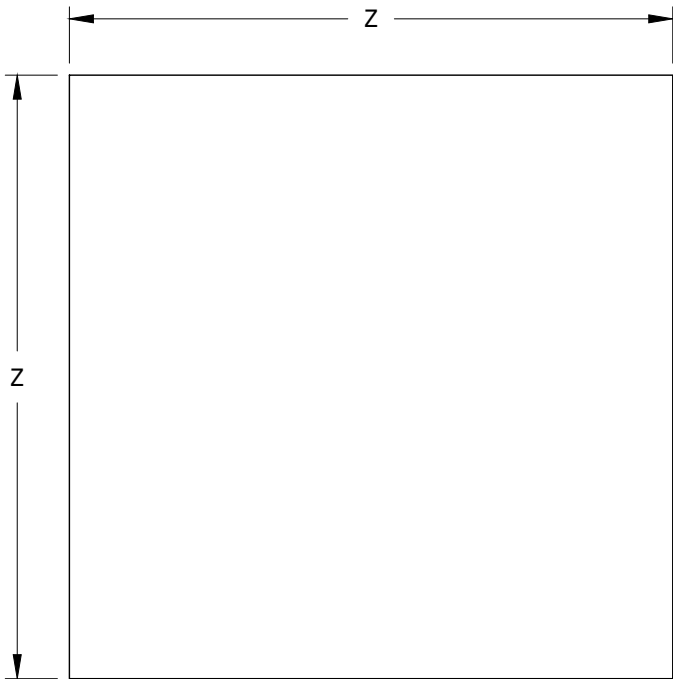
UG5030.1



**SCOPE:** THIS STANDARD SHOWS TYPICAL BACKSTOP PLATE DIMENSIONS.



**FIGURE 1**  
SIDE VIEW  
BACKSTOP PLATE



**FIGURE 1**  
TOP VIEW  
BACKSTOP PLATE

**TABLE 1**

| BACKSTOP PLATE DIMENSIONS |                     |                          |
|---------------------------|---------------------|--------------------------|
| CASING NOMINAL DIAMETER   | PLATE THICKNESS "Y" | PLATE HEIGHT & WIDTH "Z" |
| 12"                       | 1 1/4"              | 6'-0"                    |
| 16"                       | 1 3/8"              | 6'-6"                    |
| 18"                       | 1 1/2"              | 7'-0"                    |
| 20"                       | 1 5/8"              | 7'-6"                    |
| 24"                       | 1 3/4"              | 7'-9"                    |

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

a. REFER TO UG5020 FOR UNDERLYING ASSUMPTIONS.

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|                 |                | TRENCHLESS CONSTRUCTION<br>HDD - REQUIREMENTS     |     |                    |     |           |          |                     |    |          |     |     |      |



**NOTES (CONT.):****V. HDD PIPE MATERIALS AND CHARACTERISTICS:**

- a. CSE IS RESPONSIBLE FOR DESIGNING THE PIPE TO WITHSTAND PULLBACK LOADS WHICH INCLUDE TENSILE PULL FORCES, EXTERNAL HYDROSTATIC PRESSURE, TENSILE BENDING STRESSES, EXTERNAL SERVICE LOADS (POST-INSTALLATION SOIL, GROUNDWATER, AND SURCHARGE LOADS OCCURRING OVER THE LIFE OF THE PIPELINE).
- b. SEE TABLE 1 FOR VALUES OF A716 DUCTILE IRON AND DR11 HDPE.
1. THE ALLOWABLE TENSILE FORCES FOR HDPE IN TABLE 1 ARE BASED ON DR11, 3XXX PE MATERIAL. THE VALUES ARE GIVEN FOR A DURATION OF CONTINUOUS LOADING OVER 12 HOURS AND FOR A PIPE TEMPERATURE OF 73°F. FOR OTHER TEMPERATURES, A TEMPERATURE COMPENSATING MULTIPLIER WILL BE REQUIRED. OTHER PE PIPE DESIGNATIONS AND MATERIALS MAY BE SELECTED BY THE CSE DURING THE PIPE DESIGN PROCESS.

**TABLE 1**

| DUCTILE IRON AND HDPE ALLOWABLE TENSILE FORCES |  |  |
|--|--|--|
| NOMINAL<br>PIPE SIZE<br>(INCHES)               | ALLOWABLE TENSILE FORCE                      |  |
|  | DUCTILE IRON<br>A716,<br>Fy=42kips<br>(KIPS) | HDPE (VI)<br>DR11 12 HOUR PULL<br>(KIPS) |
| 12   | N/A  | 46                                       |
| 16   | 550  | 73                                       |
| 18   | 640  | 92                                       |
| 20   | 733  | 114                                      |
| 24   | 930  | 164                                      |
| 26   | N/A  | 193                                      |

(VI) PE 3XXX STANDARD PE CODE DESIGNATION.

**REFERENCE:** NONE

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2 OF 2

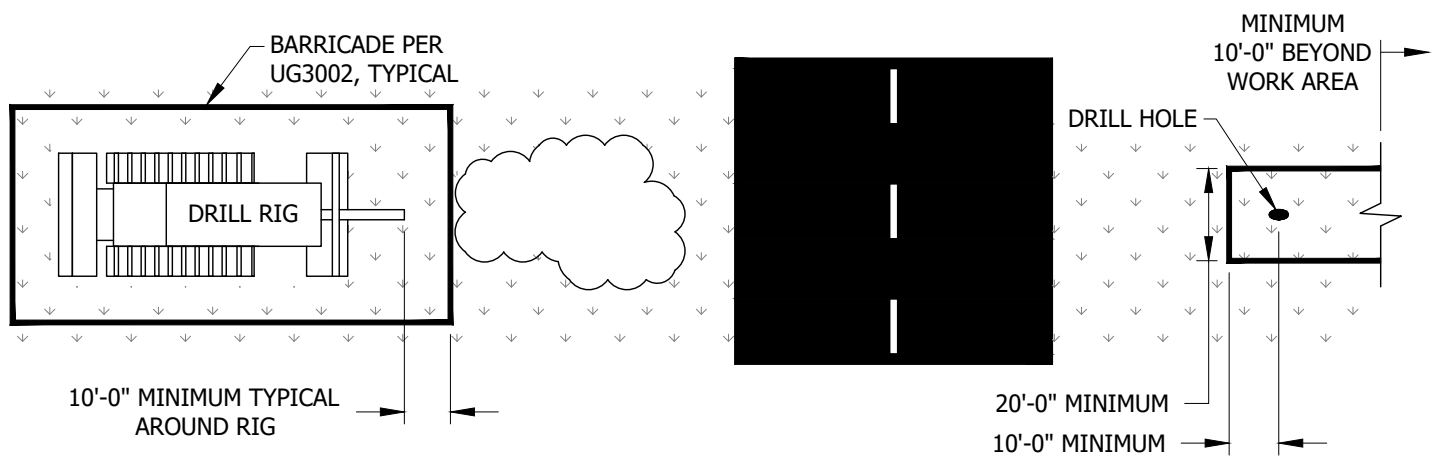
SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS

TRENCHLESS CONSTRUCTION  
HDD - REQUIREMENTS

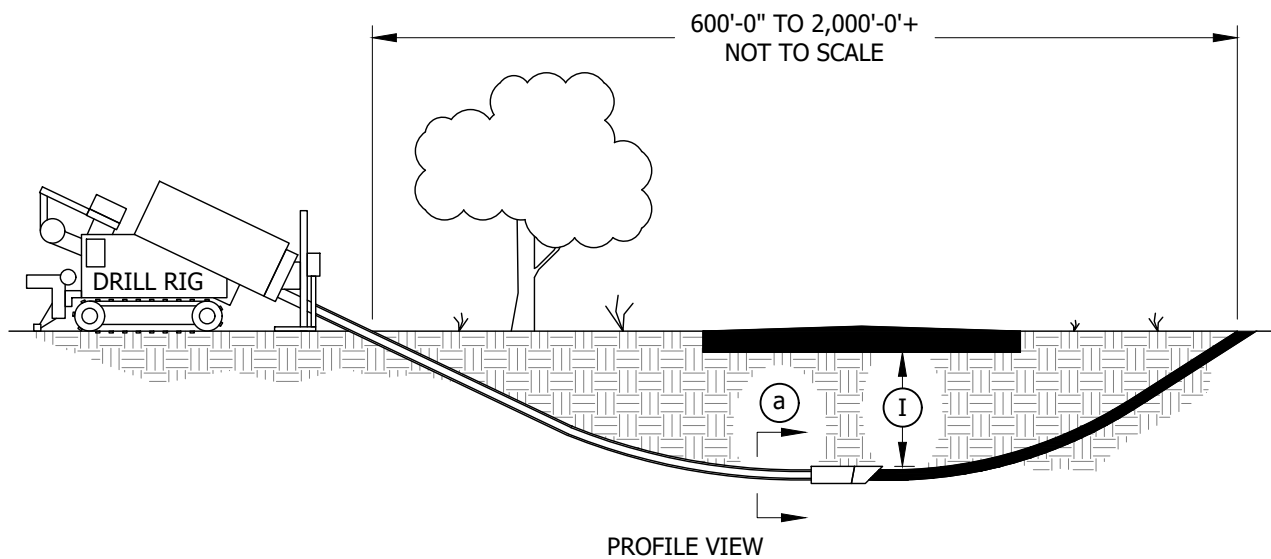
UG5040.2



**SCOPE:** THIS STANDARD SHOWS THE HORIZONTAL AND VERTICAL LAYOUT OF HORIZONTAL DIRECTIONAL DRILLING (HDD) CONSTRUCTION.



### PLAN VIEW



### PROFILE VIEW

### FIGURE 1

**INSTALLATION:** NONE

**BILL OF MATERIALS:** NONE

**NOTES:**

- ① MINIMUM COVER SHALL BE 3' BELOW BASE OF PAVEMENT UNLESS THERE IS A CONFLICT WITH OTHER REQUIREMENTS. ②

**REFERENCE:**

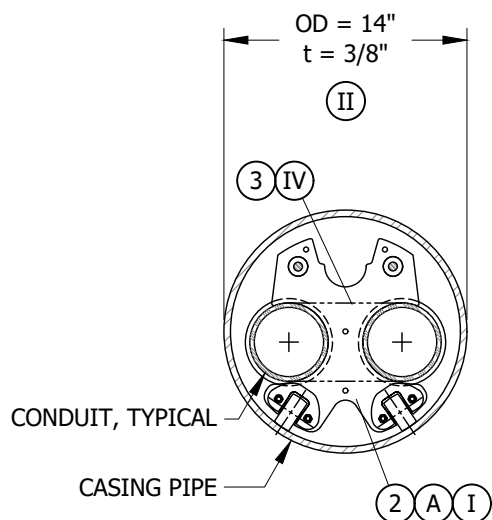
- (a) FOR SECTION VIEWS, SEE UG5060 FOR CASING BORES OR UG5070 FOR EARTH BORES.
- (b) SEE REFERENCES ON UG5010.5.

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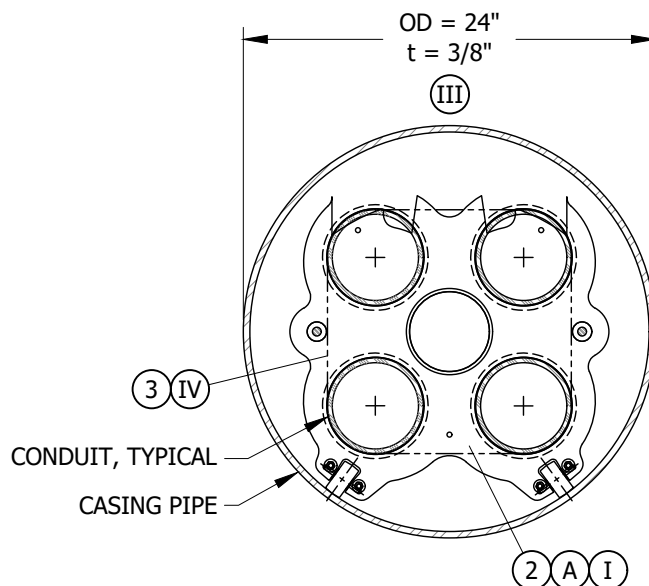
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|                 |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS |                           |     |     |           |                    |        |          |    |                     |     |      |          |
|                 |                | TRENCHLESS CONSTRUCTION<br>HDD - LAYOUT           |                           |     |     |           |                    |        |          |    |                     |     |      |          |



**SCOPE:** THIS STANDARD SHOWS EXAMPLES OF CONDUIT CONFIGURATIONS THAT ARE ACCEPTABLE FOR CASING BORES.



**FIGURE 1**



**FIGURE 2**

## INSTALLATION:

- (A) INSTALL PER SPACER MANUFACTURER'S REQUIREMENTS.
- (B) INSTALL ONE SPACER EVERY FIVE FEET OF TRENCHLESS ALIGNMENT.
- (C) INSTALL TWO BANDS FOR EVERY SPACER (ONE ON EACH SIDE).

### BILL OF MATERIALS:

| ITEM | DESCRIPTION  | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|--|----------|---------------|--------------|--------------|
| 1    | BORE SPACER, UNDERGROUND DEVICES CAT. NO. BS3509W2 | (B)      | -             | -            | -            |
| 2    | BORE SPACER, UNDERGROUND DEVICES CAT. NO. BS3926W2 | (B)      | -             | -            | -            |
| 3    | 5/8" WIDE X 0.03" THICK BANDS & BUCKLES            | (C)      | -             | -            | -            |


**NOTES:**

- I MATERIAL SHALL BE MANUFACTURED BY UNDERGROUND DEVICES OR APPROVED EQUAL.
- II CASING PIPE DIMENSIONS APPLY TO A 2- 4" CONDUIT CONFIGURATION.
- III CASING PIPE DIMENSIONS APPLY TO A 4- 5" CONDUIT CONFIGURATION.
- IV BANDS & BUCKLES SHALL BE 201 STAINLESS STEEL WITH ALUMINUM BREAKING STRENGTH = 1,875 POUNDS.

**REFERENCE:** NONE

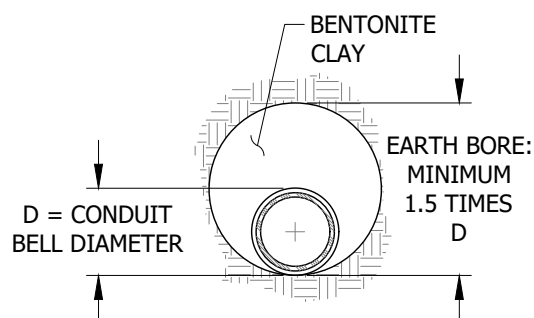
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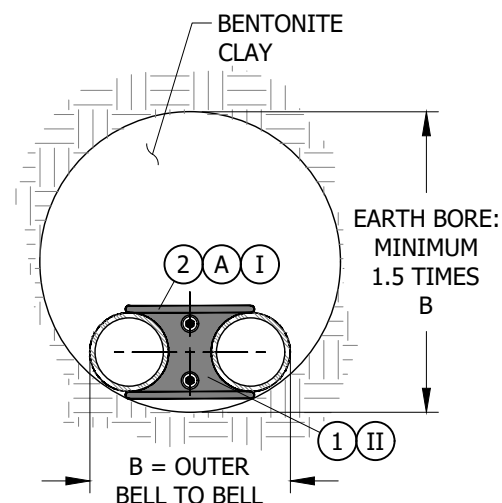
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|                 | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS       |                    |   |          |                     |          |
|                 | TRENCHLESS CONSTRUCTION<br>SECTION VIEWS - CASING BORES |                    |   |          |                     |          |



**SCOPE:** THIS STANDARD SHOWS EXAMPLES OF CONDUIT CONFIGURATIONS THAT ARE ACCEPTABLE FOR EARTH BORES (NO CASING PIPE).



**FIGURE 1**  
1 CONDUIT



**FIGURE 2**  
2 CONDUITS

## INSTALLATION:

- (A) INSTALL PER SPACER MANUFACTURER'S REQUIREMENTS.
- (B) INSTALL ONE SPACER EVERY FIVE FEET OF TRENCHLESS ALIGNMENT.
- (C) INSTALL TWO BANDS FOR EVERY SPACER (ONE ON EACH SIDE).

### BILL OF MATERIALS:

| ITEM | DESCRIPTION                             | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|------|---|----------|---------------|--------------|--------------|
| 1    | CONDUIT SPACER (EARTH BORE)             | (B)      | -             | -            | -            |
| 2    | 5/8" WIDE X 0.03" THICK BANDS & BUCKLES | (C)      | -             | -            | -            |

**NOTES:**

- (I) MATERIAL SHALL BE MANUFACTURED BY UNDERGROUND DEVICES OR APPROVED EQUAL.
- (II) BANDS & BUCKLES SHALL BE 201 STAINLESS STEEL WITH ALUMINUM BREAKING STRENGTH = 1,875 POUNDS.

**REFERENCE:** NONE

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| C               |                |  |                           |     |     |           | F                  |        |    |          |     |     |                     |  |          |
| B               |                |  |                           |     |     |           | E                  |        |    |          |     |     |                     |  |          |
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|                 |                | SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARDS      |                           |     |     |           |                    |        |    |          |     |     |                     |  |          |
|                 |                | TRENCHLESS CONSTRUCTION<br>SECTION VIEWS - EARTH BORES |                           |     |     |           |                    |        |    |          |     |     |                     |  |          |