# 2025
# OVERHEAD FIELD MAINTENANCE ONLY

Historical Record: 8/22/2025
External Version

SDGE™


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# ATTENTION:

- The contents held within this book are for field maintenance only. Every effort should be made, when possible, to upgrade to current standards.

- Due to the age of the documentation, this book is not a 100% search-able currently. This may be resolved later.

IF YOU HAVE ANY QUESTIONS REGARDING THE CONTENT OF THESE MANUALS, PLEASE EMAIL CONSTRUCTIONSTANDARDSADMINISTRATORS@SEMPRAUTILITIES.COM OR CONTACT:

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

DISTRIBUTION STATION NUMBERING

FMO OH 203

I. STATION NUMBERS GIVE A UNIQUE NUMBER TO, AND BRIEFLY DESCRIBE, DISTRIBUTION STATIONS. ALL STATION NUMBERS ARE ASSIGNED BY THE TRANSFORMER CLERK (EXT 1217 OR MICROWAVE 02167).

II. THE STATION NUMBER IS BROKEN UP INTO THREE PARTS: CIRCUIT; NUMBER; AND SUFFIX. [40 – 118 – MRO (CIRCUIT NUMBER SUFFIX)]

CIRCUIT – THE CIRCUIT DESIGNATION DESCRIBES THE VOLTAGE THAT FEEDS THE STATION. IF IT IS ONLY NUMERIC CHARACTERS, THEN THE CIRCUIT ORIGINATING AT THE SUBSTATION IS 12KV. IF IT HAS ALPHABETIC CHARACTERS IN IT, THEN THE CIRCUIT VOLTAGE IS 4 OR 2.4KV. (SEE NOTE F).

EXAMPLES:

40 – CIRCUIT 40 IS 12KV

NO1 – NORTH OTAY ONE IS 4KV

NUMBER – CONTAINS ONLY NUMERIC CHARACTERS. THIS PART IS ARBITRARY.

EXAMPLES:

118 – NUMBER SELECTED BY TRANSFORMER CLERK

908 – NUMBER SELECTED BY TRANSFORMER CLERK

SUFFIX – THE SUFFIX IS DESCRIPTIVE OF THE STATION, (SEE NOTE C) HIERARCHY (ARRANGEMENT IN SERIES) FOR COMBINING SUFFIXES IS:

I. NUMERIC CHARACTERS (1–99) (SEE NOTE D)
II. M, V, B, BU, G, R, L, SW, UP, N
III. RO, RC, SL
IV. Y, X, C
V. S

FOR FIELD MAINTENANCE ONLY

EXAMPLES:

C – CAPACITOR STATION
M – 12KV PRIMARY METERED STATION
MRO – METERED STREET LIGHT STATION
D – 4 OR 2.4KV STATION THAT IS FED FROM A STEPDOWN STATION SERVING ONLY 1 CUSTOMER OR ONLY PRIMARY METERED CUSTOMER(S)
1M – 4 OR 2.4KV PRIMARY METERED STATION FED FROM A STEPDOWN STATION

III. THESE PARTS ARE BROUGHT TOGETHER AS FOLLOWS:

A. WHEN WRITING THE STATION NUMBERS ON OTHER THAN FORMS FOR KEYPUNCH USE, EACH PART OF THE STATION NUMBER IS SEPARATED BY A DASH.

EXAMPLES:

| | |
|---|---|
| 40–118 | 12KV TRANSFORMER STATION |
| 40–216–C | 12KV CAPACITOR STATION |
| NO1–118 | 4 OR 2.4KV TRANSFORMER STATION |
| NO1–216–MRO | 4 OR 2.4KV METERED STREET LIGHT STATION |
| 40–908–D | 12 TO 4KV OR 12 TO 2.4KV STEPDOWN STATION (INDICATED BY D) (SEE NOTES A, B & F) |
| 40–118–2G | 12KV REGULATOR STATION, 2ND POLE OF 3–1Ø REGULATORS ON 3 POLES. |

B. THE FOLLOWING FORMS WILL BE USED FOR KEYPUNCHING AND THE STATION NUMBER IS REQUIRED ON THEM:

| | | | |
|---|---|---|---|
| 1. APARTMENT LIST | 101–4145A | 7. NEW SERVICE INPUT DOCUMENT | 124–10152 |
| 2. CIS MASTER STATION UPDATE | 124–13152 | 8. STATION FILE CUTOVERS | 111–391 |
| 3. CUSTOMER NEW SERVICE REQUEST | 124–6201 | 9. TRANSFORMER TAG | 120–5240A |
| 4. ELECTRIC CONSTRUCTION ORDER | (NO FILE NUMBER) | 10. TRANSFORMER STATION FILE PUNCH FORM | 110–591/21A |
| 5. ELECTRIC SERVICE ORDER | 107–212L | 11. TAG NOTICE TO ELECTRIC TROUBLEMAN | (TEMPORARY FORM) |
| 6. GAS/ELECTRIC SET ORDER | 124–610 | 12. CURRENT STATION/CUSTOMER TIE | (COMPUTER LISTING) |

| | [X] Indicates Latest Revision | Completely Revised | New Page | Information Removed |
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| ISSUE 1993<br>DATE 1–1–89<br>APPD / | SDG&E ELECTRIC STANDARDS<br>DISTRIBUTION STATION NUMBERING | | | OH 299.001<br>~~UG 3199.001~~<br>SUPERCEDES 203.1 (1–1–93) |

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C. THE RULES FOR FILLING IN THE STATION NUMBER ON THESE FORMS ARE AS FOLLOWS:

1. ALL ALPHABETIC CHARACTER O'S ARE TO BE WRITTEN WITH A SLANT MARK; i.e., Ø. THIS IS TO AVOID CONFUSION WITH THE NUMERIC CHARACTER ZERO.

2. INSTRUCTIONS FOR FILLING IN FORMS.

   a. THE CIRCUIT FIELD (COLUMN). SEE TABLE 1 BELOW.
   ALPHABETIC CHARACTERS ARE TO BE LEFT JUSTIFIED AND THE NUMERIC CHARACTERS RIGHT JUSTIFIED (SEE NOTE E). IN MOST CASES, THERE WILL BE BLANK COLUMNS IN THIS FIELD.

   b. THE NUMBER FIELD (COLUMN). SEE TABLE 1 BELOW.
   THE NUMERIC CHARACTERS ARE RIGHT JUSTIFIED AND ZEROS ARE ADDED TO COMPLETE FIELD.

   c. THE SUFFIX FIELD (COLUMN). SEE TABLE 1 BELOW.
   IF STATION NUMBER HAS NO SUFFIX, LEAVE THIS BLANK.
   THE ENTIRE PROPERLY FORMED SUFFIX IS LEFT JUSTIFIED AND ZEROS ARE ADDED TO COMPLETE FIELD.

EXAMPLES OF STATION NUMBERS WRITTEN ON FORMS:

TABLE 1

| | CIRCUIT | NUMBER | SUFFIX | |
|---|---|---|---|---|
| | 0040 | 0118 | | |
| | 0040 | 0216 | C00 | 0 |
| * | NØ01 | 0118 | | |
| * | NØ01 | 0216 | MRØ0 | * |
| | 0040 | 0908 | D00 | 0 |
| | 0040 | 0908 | 3100 | |

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NOTES:

Ⓐ REFER TO THE DISTRIBUTION ENGINEER BEFORE ADDING LOAD TO THESE AREAS TO ENSURE THAT THE STEPDOWN STATION IS NOT OVERLOADED.

Ⓑ INDICATES A 2.4 OR 4KV STEPDOWN STATION SERVING ONLY ONE CUSTOMER OR ONLY PRIMARY METERED CUSTOMER(S).

Ⓒ SEE PAGE 299.126 OVERHEAD OR 3199.126 UNDERGROUND – ABBREVIATIONS & CODES, STATION SUFFIX FOR SUFFIX MEANINGS.

Ⓓ NUMERIC CHARACTERS 1 – 9 ARE RESERVED FOR STATIONS WITH ADDITIONAL SUFFIXES.

Ⓔ RIGHT AND LEFT JUSTIFICATION MAY BE A NEW TERM FOR MOST PEOPLE. RIGHT JUSTIFIED MEANS TO START WITH THE RIGHT MOST CHARACTER OF THE GROUP AND PUT IT INTO THE RIGHT MOST COLUMN, WORKING LEFT UNTIL ALL CHARACTERS ARE USED UP AND IN ALL REMAINING BLOCKS AND ZEROS. SIMILARLY FOR LEFT JUSTIFIED, ONLY WORK FROM LEFT TO RIGHT AND ADD ZEROS TO FILL UNUSED BLOCKS.

EXAMPLE: RIGHT JUSTIFY: 198

| | | | | | |
|---|---|---|---|---|---|
| STEP 1 | | | | 8 | |
| STEP 2 | | | 9 | 8 | |
| STEP 3 | | 1 | 9 | 8 | |
| FINAL STEP 4 | 0 | 1 | 9 | 8 | ADD ZERO IN REMAINING BLOCK(S) |

LEFT JUSTIFY ALPHABETIC CHARACTERS, RIGHT JUSTIFY NUMERIC CHARACTERS: NO1

| | | | | | |
|---|---|---|---|---|---|
| STEP 1 | | N | | | |
| STEP 2 | * | NØ | | | ALPHABETIC CHARACTERS LEFT JUSTIFIED |
| STEP 3 | * | NØ | | 1 | NUMERIC CHARACTER RIGHT JUSTIFIED |
| FINAL STEP 4 | | NØ | 0 | 1 | ADD ZERO IN REMAINING BLOCK(S) |

Ⓕ STEPDOWN STATIONS WILL BE GIVEN NAME EXCEPT FOR THOSE SERVING ONLY ONE CUSTOMER OR ONLY PRIMARY METERED CUSTOMER(S)

* SEE III, C, 1.



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**REVISION HISTORY:**

**8/16/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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SDG&E ELECTRIC OVERHEAD STANDARD

OVERHEAD DISTRIBUTION SWITCH NUMBERING

FMO OH 204

**SCOPE:** THIS STANDARD EXPLAINS THE METHOD OF OVERHEAD DISTRIBUTION SWITCH NUMBERING.

1. EACH SWITCH IS IDENTIFIED BY A UNIQUE NUMBER THAT INDICATES THE CIRCUIT(S) ON WHICH IT OPERATES.

2. THERE ARE TWO TYPES OF SWITCH NUMBERS: **LINE** AND **TIE**

2.1 **LINE SWITCH NUMBERS** ARE BROKEN UP INTO TWO PARTS:

CIRCUIT AND NUMBER $\frac{\text{375}}{\text{CIRCUIT}} - \frac{\text{40–L}}{\text{NUMBER}}$

CIRCUIT – DESCRIBES THE VOLTAGE AND CIRCUIT NUMBER TO WHICH THE LINE SWITCH IS CONNECTED. IF THE CIRCUIT CONTAINS ONLY NUMERIC CHARACTERS, THEN THE CIRCUIT VOLTAGE IS 12KV. IF IT CONTAINS ALPHABETIC CHARACTERS (e.g. CD10), THEN THE CIRCUIT VOLTAGE IS 4 OR 2.4KV.

NUMBER – CONTAINS ONLY NUMERIC CHARACTERS, OR, NUMERIC CHARACTERS FOLLOWED BY AN "L". THE "L" INDICATES THAT THIS IS A LOADBREAK SWITCH. THE NUMERIC PORTION IS ARBITRARY AND EACH NUMBER SHALL NOT BE ASSIGNED TO MORE THAN ONE SWITCH FOR EACH CIRCUIT.

EXAMPLES:

375–40–L INDICATES A LINE SWITCH ON 12KV CIRCUIT 375 WITH AN ARBITRARY NUMBER 40, AND LOADBREAK CAPABILITY.

GA1–2 INDICATES A LINE SWITCH ON 4KV OR 2.4KV CIRCUIT GA 1 WITH AN ARBITRARY NUMBER 2, AND NO LOADBREAK CAPABILITY.

2.2 **TIE SWITCH NUMBERS** ARE BROKEN UP INTO THREE PARTS:

CIRCUIT; ALPHA NUMERIC; AND CIRCUIT $\frac{\text{375}}{\text{CIRCUIT}} - \frac{\text{T1}}{\text{ALPHA/NUMERIC}} - \frac{\text{376}}{\text{CIRCUIT}}$

CIRCUIT – DESCRIBES THE VOLTAGE AND CIRCUIT NUMBERS THE TIE SWITCH CONNECTS **AS STATED ABOVE.**

ALPHA/NUMERIC – ALWAYS CONTAINS THE ALPHA CHARACTER "T" AND IS FOLLOWED BY A BY A NUMBER (1,2,3, ETC.) WHICH IS CONSECUTIVELY ASSIGNED FOR TIE SWITCHES BETWEEN THE SAME TWO CIRCUITS. EACH ALPHA/NUMERIC IDENTIFICATION SHALL NOT BE ASSIGNED TO MORE THAN ONE TIE SWITCH BETWEEN THE SAME TWO CIRCUITS. TIE SWITCHES WITH THE NUMBER FOLLOWED BY AN "L" HAVE LOADBREAK CAPABILITY.

EXAMPLES:

85–T1–380 INDICATES THE FIRST TIE SWITCH BETWEEN CIRCUITS 85 & 380.

86–T2–87–L INDICATES THE SECOND TIE SWITCH, WITH LOADBREAK CAPABILITY, BETWEEN CIRCUITS 86 & 87.

88–T–89 INDICATES THE ONLY TIE SWITCH INSTALLED BEFORE 4–1–77, BETWEEN CIRCUITS 88 & 89. IF INSTALLED AFTER 4–1–77, THIS TIE SWITCH SHALL BE NUMBERED 88–T1–89.

3. WHERE SWITCHES IN PARALLEL ARE INSTALLED AS LINE OR TIE SWITCHES, EACH SWITCH WILL BE ASSIGNED AN INDIVIDUAL NUMBER AS DESCRIBED IN PARAGRAPH 2.

4. SWITCH NUMBERS WILL NOT BE ASSIGNED TO NORMALLY OPEN, BRIDGED, OR FUSED CUTOUTS, UNLESS THEY ARE USED FOR TIE PURPOSES.

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**OH208 FIELD MAINTENANCE ONLY**

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL

**REVISION HISTORY:**

**07/07/2025:** S648024 MOVED TO FMO

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| A | ORIGINAL ISSUE | NV5 | SPC | MRF | MRF | 07/07/2025 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**POLE MARKING**

SCALE: NOT TO SCALE

DRAWING NO: FMO OH208.1

SHEET: 1 OF 1

Indicates Latest Revision | Completely Revised | X New Page | Information Removed

**SCOPE:** THIS STANDARD ILLUSTRATES AND DESCRIBES POLE MARKING REQUIREMENTS, MATERIALS AND METHODS.

**TABLE 1**

| VARIOUS POLE MARKING TAGS | | | | |
|---|---|---|---|---|
| **SIGN/TAG** | **EXAMPLE** | **QTY** | **STOCK #** | **DU #** |
| DO NOT WASH |   (G)(N) | 1 IF REQ'D | S648024 | NOWASH |

## INSTALLATION:

(G) "DO NOT WASH" SIGN SHALL BE INSTALLED TO ALERT WASHING CREWS NOT TO WASH INSULATORS BECAUSE THE POLE IS EITHER INVOLVED IN A TRIAL INSTALLATION OR THE PRIMARY VOLTAGE PORCELAIN INSULATORS DO NOT NEED TO BE WASHED.

1. SIGN MUST BE VISIBLE TO TRAFFIC APPROACHING FROM EITHER SIDE OF POLE. IF THIS IS NOT POSSIBLE DUE TO LARGE POLE CIRCUMFERENCE, THE SIGN SHALL BE SPLIT INTO TWO SECTIONS AND SEPARATED ENOUGH TO MEET THE REQUIREMENT.
2. SIGN SHALL BE INSTALLED NO LOWER THAN 15 FEET ABOVE GROUND, BELOW THE LOWEST UTILITY, FACING THE ROAD AND OUT OF THE AREA SUSCEPTIBLE TO CLIMBING DAMAGE.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:** NONE

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| E | NOTES UPDATE | ARC | MRF | GLW | CZH | 02/16/2023 |
| D | NOTES UPDATE | EDM | MRF | GLW | CZH | 10/01/2021 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**POLE MARKING**

SCALE: NOT TO SCALE

DRAWING NO: FMO OH208.1

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# OH212 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/22/2019:** FORMATTING UPDATE

**07/13/2016:** MOVED TO FMO.

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

GFMS
SUMMARY OPERATING MAP SYMBOL TABLE

FMO OH212

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BOOST/BUCK (OH)

123 342B
100HR
P377016

FUSE BRIDGED (UG)

3 BRGD

PRIMARY METERING STATION (OH)

123-234M
P77675

SWITCH (OH) GANG OPERATED

123 412
P77576

OPEN TO ADJACENT CIRCUIT (UG)

CIRCUIT 251 OPEN

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INLINE SWITCH AND FUSE

3 80A
241 3
P23769

TIE FUSE

AM1-T1-RO3
P123456

CABLE POLE

P233679

FUSE WITH BY-PASS (OH)

123-45 (OPEN)
3 80A
P67700

PRIMARY METERING STATION (UG) W/CUS OWNED STRUCTURE

123 345M
C12345 CO

SWITCH (OH) GANG OPERATED (SCADA)

SCADA 95
123 17
P67778

PAD MOUNTED SWITCH AND FUSE

3 80A
483 11

FUSE D&W

3 80A D&W
P234673

CABLE POLE (FUSED)

3 150A
P227692

SWITCH ON/OFF (UG)

123-324

GROUNDING BANK (OH)

123-2540B

SERVICE RESTORER WITH BY-PASS (OH)

123-25 (OPEN)
123 24R
P75678

SWITCH HOOK STICK (OH)

123-234
P76455

NEUTRAL

FUSE (OH)

10A
P17723

ELECTRONIC SECTIONALIZER (OH)

3-100A
P5896*

FAULT INDICATOR

100A

CAPACITOR (OH)
CW - FIXED
CW - SWITCHED
CW - SWITCHED, N MANUAL MODE

123 435CW
*200KVAR
P78707

GROUNDING BANK (UG)

123 365GB

REGULATOR BYPASS WITH DISCONNECTS (OH)

123-123G
100A
P44487

FUSE-BRIDGED (O.H.)

3 BRGD
P57064

CUSTOMER GENERATION

CG1C3023

CG1C3023
EF
939 COAST BLVD
250 KW

SIREN (FOR SAN ONOFRE)

DCCS
D6954127

CAPACITOR (UG)
CW SWITCHED
CW SWITCHED, N MANUAL MODE

123-234CW
*200KVAR

REGULATOR (OH) UN BYPASSED

123-123G
100A
P67423

REGULATOR INDUCTION (OH)

123-123G
P87219

OPEN TO ADJACENT CIRCUIT (OH)

CIRCUIT 123 OPEN

PAD MOUNTED SUB

JOHNSON
STEP DOWN
12/4 KV
2000 KVA
HIGH FUSING: 150A
LOW FUSING: NONE
FEED: CIR.552
C104329

POLE MOUNTED SUB

MISSION BEACH
STEP DOWN
12/4 KV
300 KVA
HIGH FUSING: 3-30A
LOW FUSING: NONE
FEED: CIR. 5R
P2321269883

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| B | FORMATTING UPDATE | PEI | - | - | 04/22/2019 | E | | | | | |
| A | ORIGINAL ISSUE | - | TR | MF | 10/31/2006 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SHEET
1 OF 9

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

GFMS
SUMMARY OPERATING MAP SYMBOL TABLE

FMO
OH212.1
UG3112.1

TABLE OF CONTENTS

OPEN TO SAME CIRCUIT

OPEN
P577/69

STEP UP/DN (OH)

144–190SD
12000/4160
P470649

FUSE (UG)

3 30A CL

WITH BY-PASS
3–30A CL BP

PRIMARY WIRE & CALLOUT (OH)

3 3/0 ACSR

(U.G.)
750 XLPE AL 30N

FUSED ON/OFF SWITCHING CABINET

3 600A
287 5

PRIMARY JUMP

OH GROUP SW'TCH SCADA MA L

SCADA 95
715–16
715–1
P79699

PMH5 SW'TCH

790–13
3 600A

PADMOUNT SERVICE RESTORER

SCADA 98
57–42

PMF3 SWITCH

SCADA 99
226–7

OH DPOV

107–1
107 DPOM
P123456

FLYING TAP

LOADBREAK GANG OPERATED SWITCH

715–23–
P234567

FOR FIELD MAINTENANCE ONLY

OH SCADA RTU POLE

SCADA 62
P123456A

SUBSTATION EL CAJON SUB
69/12KV

SPRING VALLEY SUB
12/4KV

BOOST (UG)

280–124B
3750 KVA

THROWOVER AT A SUBSTATION

AUTO
206–VS PREF
206–VS ALT
VISTA
SUB
12/4KV

THROWOVER W/BUS BAR

109 —11M

180 —CUST1 PREF

110 —CUST1 ALT

109 CUST1
PREF: SWI
GEAR B LEVEL –
SIDE OF
BLDG: 24 HR
ACCESS PHONE –
LOADING DOCK
N/E CORNER OF
BLDG:

AUTO
CITY OF SD
CUST OWNED
U100311

THROWOVER W/O BUS BAR

426 —8 ALT

426 —18 PREF

428 —18 PREF:
E ST W/O 15TH
BASEMENT "B"

MAN
CITY OF SD POLICE DEPT
SDGE OWNED
0201372340

PADMOUNT THROWOVER SWITCH PM —6 STYLE

930 —470 PREF:
NORTHWEST
CORNER
OF FACILITY, NEXT
TO OUTDOOR
CUSTOMER
SWITCHGEAR

930 —470 PREF

934 —230 ALT

3 —150A C

AUTO
U.S. POSTAL SERVICE
SDG&E OWNED
Y100012

5–WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION

SCADA 987
WAY–1 321–12 AE
WAY–2 321–13 F
WAY–3 321–TI–432
WAY–4 321–14
WAY–5 321–15 AE

4 WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION

SCADA 987
WAY–1 321–12 AE
WAY–2 321–13 F
WAY–3 321–TI–432
WAY–4 321–14

4 WAY TRAYER, MANUAL

WAY–1 456–12
WAY–2 456–13
WAY–3 456–TI–458
WAY–4 456–15

SCHEMATIC DETAIL OF A TYPICAL 4 WAY SWITCH

123–8
123–9
123–10
123–11

M2346788654

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

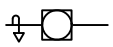
GFMS
SUMMARY OPERATING MAP SYMBOL TABLE



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UG3112.2

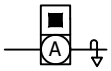
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PME-3



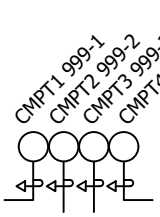
712-19 1000A
D130145

PME-3 WITH SCADA



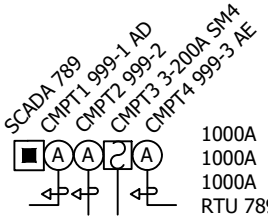
1000A
RTU 178
SCADA 178
435-21 1000A
D131755

PME-10



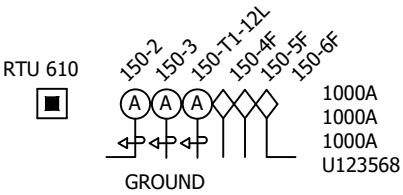

1000A
1000A
1000A
1000A
D123456

PME-11 WITH SCADA
W/AUTOSECTIONALIZING



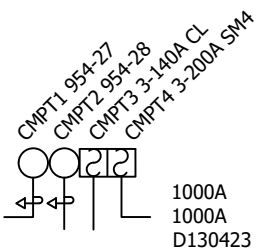

1000A
1000A
1000A
RTU 789
D169065

6-WAY SWITCH W/3 FAULT
INTERUPTERS & SCADA



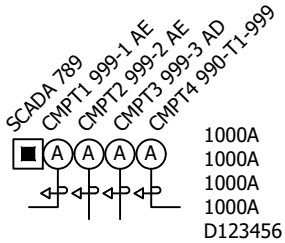

1000A
1000A
1000A
U123568

PME-9



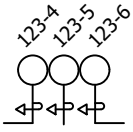

1000A
1000A
D130423

PME-10 WITH SCADA
W/AUTOSECTIONALIZING



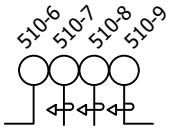

1000A
1000A
1000A
1000A
D123456

3-WAY PADMOUNT SWITCH
W/GROUND




1000A
1000A
1000A
D123477

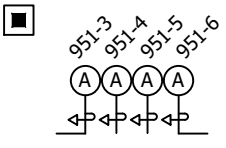
4-WAY SWITCH W/GROUND




1000A
1000A
1000A
H775837

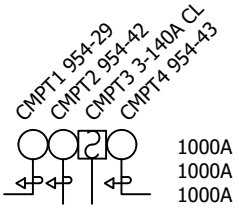
4-WAY SWITCH W/GROUND SCADA

RTU 780
D659321




1000A
1000A
1000A
1000A
H785477

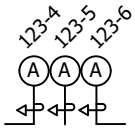
PME-11




1000A
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1000A
D130489

3-WAY PADMOUNT SWITCH
W/GROUND SCADA

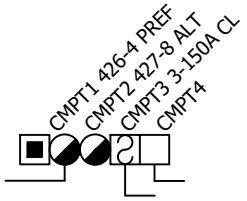
RTU 611
D678901




1000A
1000A
1000A
D123477

FOR FIELD MAINTENANCE ONLY

PME SOURCE TRANSFER SCADA




SCADA 56
MAN
SDGE OWNED
D100896

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

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GFMS
SUMMARY OPERATING MAP SYMBOL TABLE

FMO
OH212.3
UG3112.3

TABLE OF CONTENTS

BOOST STATION
155-76B
3750 HHR
D2791269123

600 AMP EXTENSION SPLICE
M123456
3-ES

CAPACITOR STATION
CW - SWITCHED
CM - SWITCHED, IN MANUAL MODE
124-61CW
900 KVAR
D2617473210

CIRCUIT (CABLE)
30/#2PECN CU 100.

CONNECTORS LD. BREAK ELBOWS
395-76
D2617673212

CABLE TAPS (LD. BREAK ELBOWS)
H2617673212
3314 .3-4

PIGGY BACK ELBOWS
224-73
1-25 HDD
D3127573322
2-PB

"T" CONNECTOR W/200 AMP LBE
H3217573424
3316 3-T
W/200A LB CAPABILITY
H225678
3316

HAND SPLICE
T SPLICE
H321773326
3314 .1-HS
1-TS

STRAIGHT CONNECTOR TRANSITION MODULE
M3217773326
3326 .1-SC
1-TM

"T" CONNECTOR
H3217773326
3314 .3-T

"Y" CONNECTOR
H3217833734
3314 .1-Y

PAD MOUNTED SUB
JOHNSON
STEP-DOWN
12/4 KV
2000 HPP
HIGH FUSING: 1-150A
LOW FUSING: -NONE
FEED: CIR. 552
D104329

OPEN/SAME CIRCUIT
OPEN
44-68
1-500HAL
D3112559335

600A JUNCTION BAR W/GROUNDING POINT
3-TG

PASS THROUGH
H3227233832
3314 .3-PT

MANHOLE
M2468176543
3324

(LIVE FRONT) CONNECTIONS
270-77
1-50 NEP
D3237333832

PRIMARY METERING STATION (UG)
CUSTOMER OWNED STATION (UG)
D123456 CO
123-345M
(STRESS CONE)

(LIVE FRONT)
D3237433835

OPEN/DIFFERENT CIRCUIT
CIR 50 OPEN
H5470873521
3314 3-4

PAD D3407672348

PRIMARY TERMINALS
SECONDARY

PRIMARY HANDHOLE
H2735784212
3315

GROUNDING BANK
800-632GB
D2175075201

SDGE OWNED
D346678
123-456M
(600A TEE)
(200A LB ELBOW)

STEP DOWNSTATION
125-201 SD
12000/2400/4160Y
D2185271210

STEP UP STATION
521-102SU
12000/2400/4160Y
D1581210217

SUBSTATION
EL CAJON SUB
69/12KV

SUBSTATION
SPRING VALLEY
12/4 KV

SUBSURFACE ENCLOSURE
S2345678690
3399

SUBSURFACE SWITCH ON/OFF
800-13
M3120560124
3322

FUSED ON/OFF SWITCH PAD MOUNTED
200-10
3-80A
D2335479573

HOOKSTICK SWITCH ON A CABLE POLE
122-8
P13064

GANG OPERATED SWITCH ON A CABLE POLE
113-10
P323040

FOR FIELD MAINTENANCE ONLY

FUSED ELBOWS
1-18A F.E.
900-75
1-25 NDD
D2918276127
3-30A F.E.
H2617673222
3314 .3-4

CONNECTOR (DEAD FRONT)
155-62
1-75YES
S3217773324
3399

CUSTOMER GENERATION
CG
CG01-310-599

FUSE CABINET
3-80A
D3124476143
WITH BY-PASS
3-30A CL BP
D1234567890

CABLE POLE
1-30A C.L.
P767412

BRIDGED FUSE
1-BRGD
D2454576262
3-BRGD
P10450

REGULATOR STATION BYPASS
715-117G
200A
D1404575271
3324
UNBYPASS
BY1-110G
100A
D2147536087
3322

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

GFMS
OPERATING MAP SYMBOL TABLE



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UG3112.4

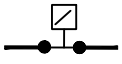
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1Ø PAD MOUNTED (DEAD FRONT) RADIAL



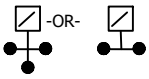
159-253
1-75 HDD
D1479273159

1Ø PAD MOUNTED (DEAD FRONT) LOOP



561-173
1-25 NDD
D106009

1Ø PAD MOUNTED (DEAD FRONT) LOOP W/TAP




561-173
1-25 NDL
D107077

1Ø PAD MOUNTED (LIVE FRONT)



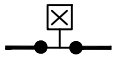
561-139
1-50 NEP
D5114055518

3Ø PAD MOUNTED (DEAD FRONT) RADIAL



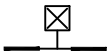
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1-75 HZB
D118892

3Ø PAD MONTED (DEAD FRONT) LOOP



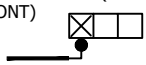
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1-750 HNB
D118893

3Ø PAD MOUNTED (LIVE FRONT)



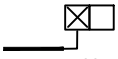
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1-1000 HAP
D5109955539

CLOSED DELTA (DEAD FRONT)



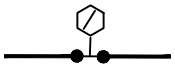
100-55
1-25 HDD
2-75 NDD
D2125576655

OPEN DELTA (LIVE FRONT)



100-54
1-50 HEP
1-75 HEP
D2125576655

1Ø SUBSURFACE



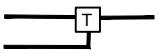
165-65
1-15 WS
S3240064800
3399

3Ø PAD MOUNTED OPEN DELTA (DEAD FRONT)



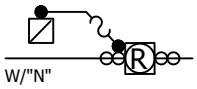
900-75
2-75 HDL
D3123560390

3Ø TERMINATOR (LIVE FRONT)




D3108560114

PADMOUNT SERVICE RESTORER




PMSR W/"N" TRANSFORMER

SCADA 98
57-4R
D123456
3-C
3-C

SIREN (FOR SAN ONOFRE)



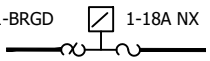
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D2461767

UG SCADA RTU



RTU 88
D116890

1Ø PAD MOUNTED "YP" TRANSFORMER (LIVE FRONT)



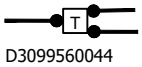

220-66
D3125676082

DEAD FRONT TERMINATOR




D123456
3-4

1Ø TERMINATOR WITH .1-4




D3099560044

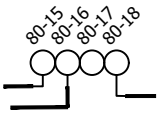
1-4

PME5 SWITCH



790-13
3-150A
D126194

4-WAY SWITCH

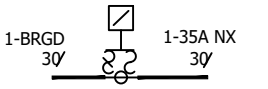



THROWOVER AT A SUBSTATION



VISTA SUB
12/4KV
AUTO
206-VS PREF
208-VS ALT

10 PAD MOUNTED "YP" (LIVE FRONT)



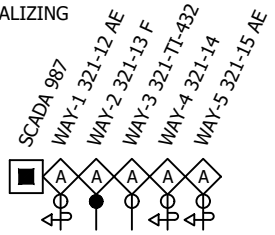

700-357 YØ
D3215457342
2-SC

PME3 SWITCH




SCADA 99
228-7
D135790

5-WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION

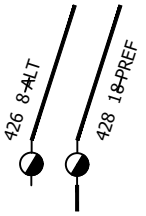



FAULT INDICATOR




VAULT U2743171342

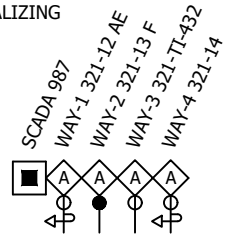
THROWOVER W/O BUS BAR



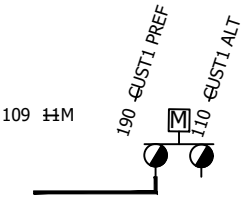

MAN
CITY OF SD -
POLICE DEPT
SDGE OWNED
D2013772340

428 ~~10~~ PREF:
E ST W/O 15TH
BASEMENT "B"

4-WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION



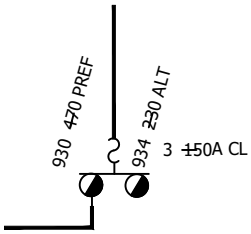

THROWOVER W/BUS BAR




AUTO
CITY OF SD
CUST OWNED
U100311

109 CUST1 PREF: SWI GEAR B LEVEL - SIDE OF BLDG: 24 HR ACCESS PHONE - LOADING DOCK N/E CORNER OF BLDG:

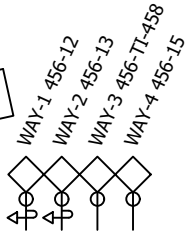
PADMOUNT THROWOVER SWITCH PMH 6 STYLE




AUTO
U.S. POSTAL SERVICE
SDG&E OWNED
Y100012

930-470 PREF:
NORTHWEST CORNER OF FACILITY, NEXT TO OUTDOOR CUSTOMER SWITCHGEAR

4-WAY TRAYER, MANUAL




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| C | | | | | | F | | | | | |
| B | FORMATTING UPDATE | PEI | - | - | 04/22/2019 | E | | | | | |
| A | ORIGINAL ISSUE | - | TR | MF | 10/31/2006 | D | | | | | |

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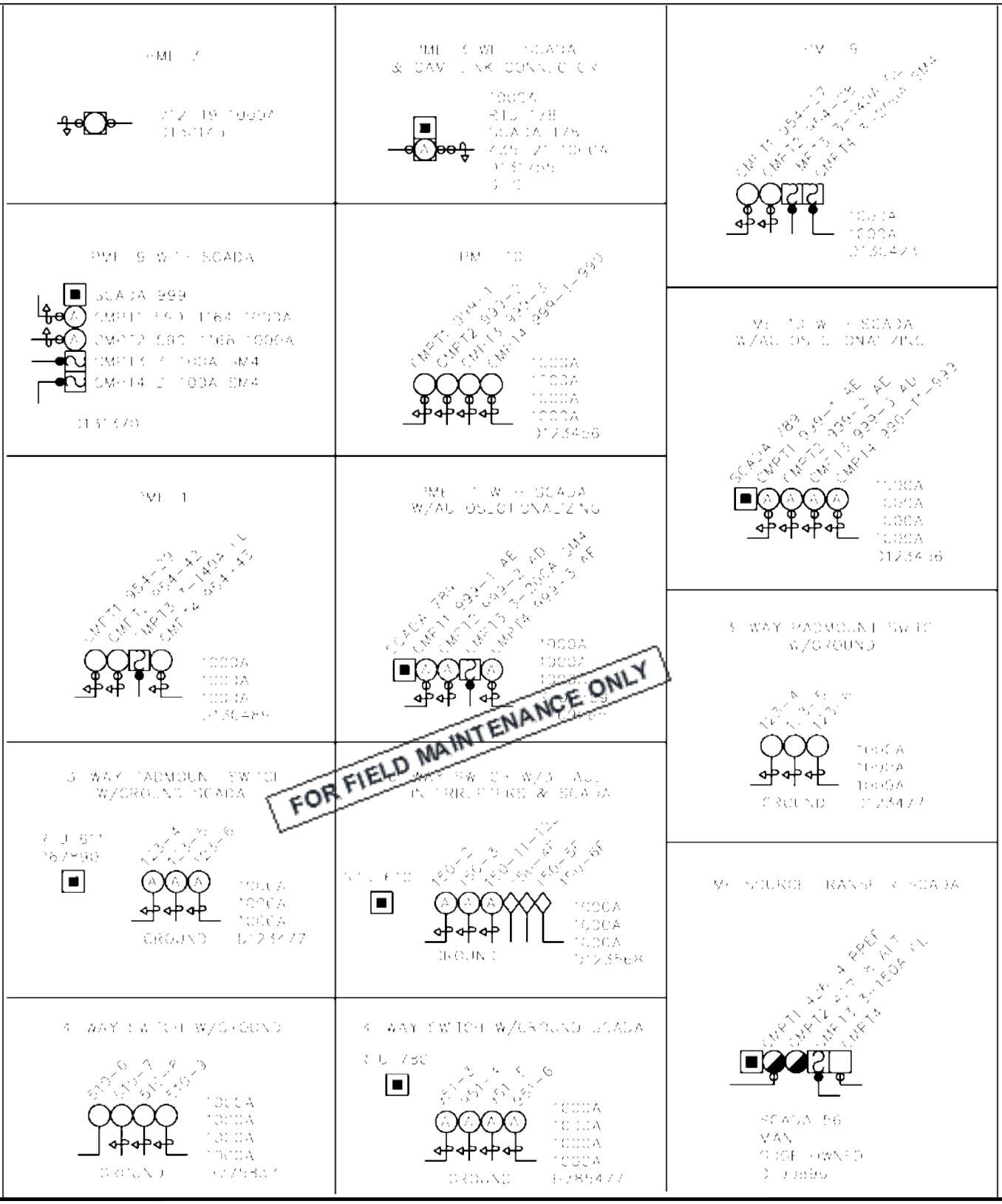
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

GFMS
OPERATING MAP SYMBOL TABLE



FMO
OH212.5
UG3112.5

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| A | ORIGINAL ISSUE | - | TR | MF | 05/22/2006 | D | | | | | |

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND STANDARDS

GFMS
SUMMARY OPERATING MAP SYMBOL TABLE

FMO
OH212.6
UG3112.6

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CW - SWITCHED
CM - SWITCHED, IN MANUAL MODE
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OH SCADA CABLE
SCADA 45

POLE MOUNTED SUB
MISSION BEACH STEP-DOWN 12/4 KV P2321269883

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STREET LIGHT TRANSFORMER STATION
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POWAY SUB 12/4

OVERHEAD STREET LIGHT
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CUSTOMER GENERATION STATION
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STUB POLE
P116740S

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SWITCH (HOOKSTICK)
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AVIAN PROTECTION PLAN (APP) WILDLIFE SYMBOL
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1-25 HE
P123456

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P123456A

OH SCADA RTU POLE
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107-2 107-DPQM P123456

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FT 58
FLYING TAP

PRIMARY DEAD END (MULTIPLE CIRCUITS SINGLE CIRCUIT OPEN)
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PRIMARY DEAD END (MULTIPLE CIRCUITS)
CIR 169 OPEN CIR 242 OPEN P89000

THREE PHASE TRANSFORMER STATION (DBL POLE)
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AUTO
206-VT PREF
208-VT ALT
VISTA SUB 12/4KV

SCADA MATE OH GROUP SWITCH
SCADA 96 715-16 715-1 P79699

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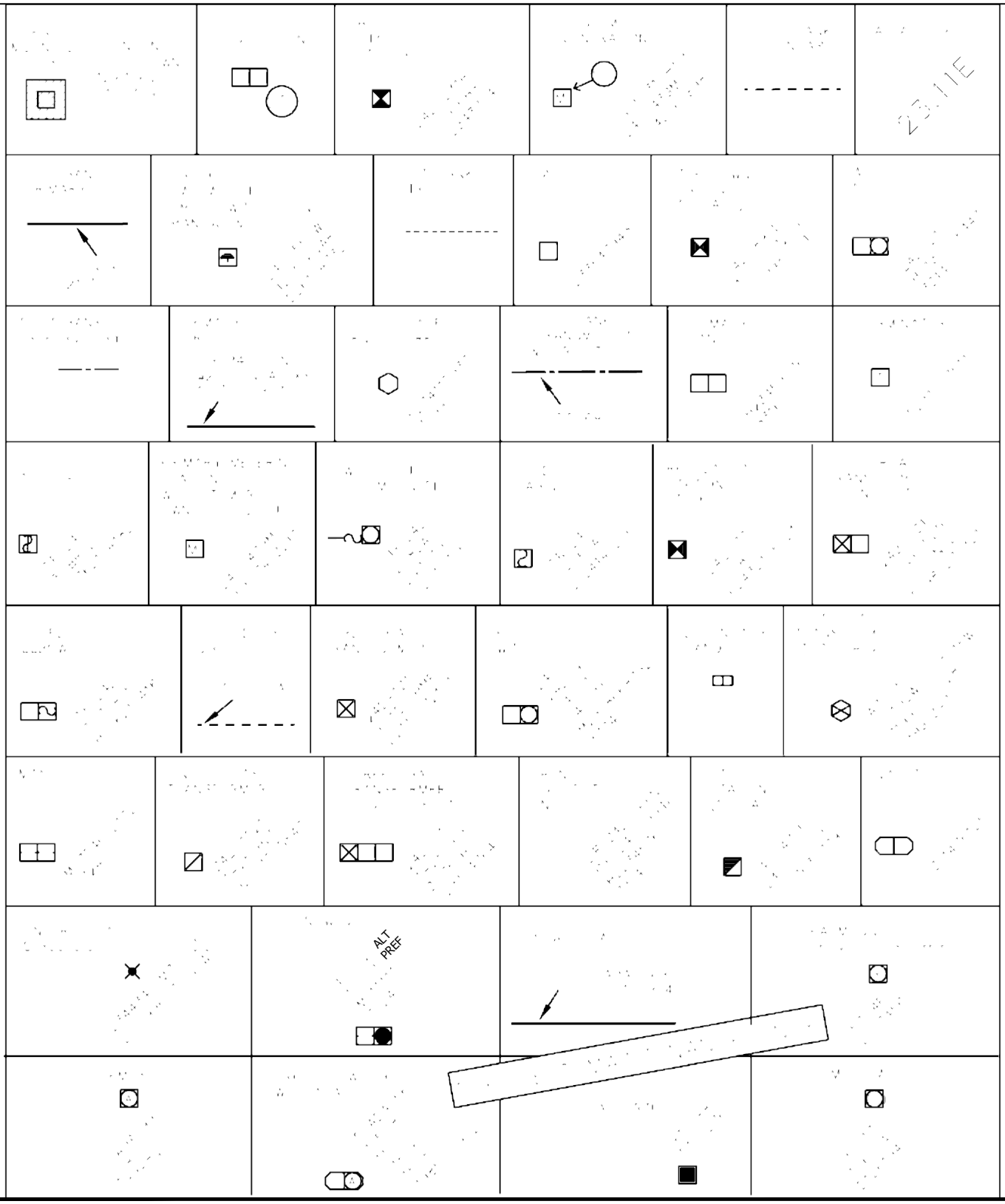
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FMO
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UG3112.7

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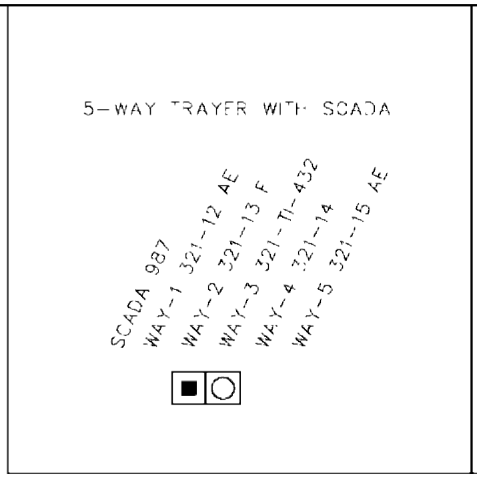
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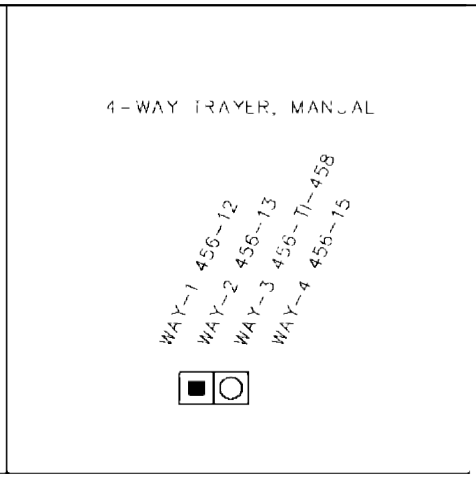


FMO
OH212.8
UG3112.8










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FMO
OH212.9
UG3112.9

# OH218 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/22/2019:** FORMATTING UPDATE

**07/13/2016:** MOVED TO FMO.

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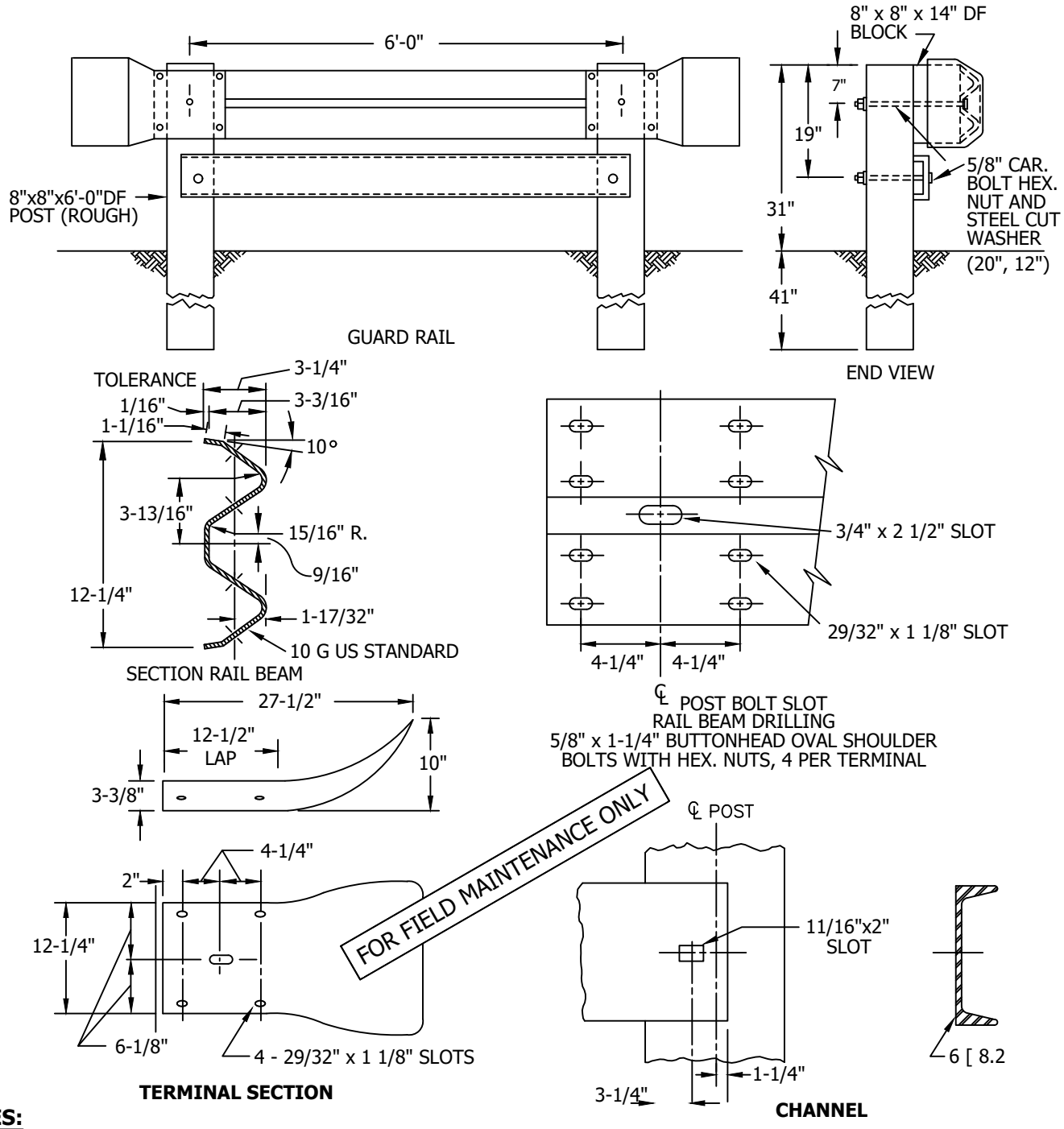
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

POLE GUARD RAIL

FMO OH218

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF A POLE GUARD RAIL.




**NOTES:**

I. POLE GUARD RAILS ARE DESIGNED TO BE INSTALLED IN PUBLIC R/W'S, NOT PRIVATE PROPERTY, MAINLY TO MAKE A POLE MORE VISIBLE. THEY HAVE LITTLE VALUE IN STOPPING A VEHICLE, AND SHOULD HAVE LIMITED USE.

II. THE DISTRIBUTION OR TRANSMISSION ENGINEER SHALL SPECIFY OR APPROVE EACH INSTALLATION.

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

POLE GUARD RAIL

FMO OH218.1

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# OH220 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/22/2019:** MOVED TO FMO - VERSION WITH WOOD CROSSARMS

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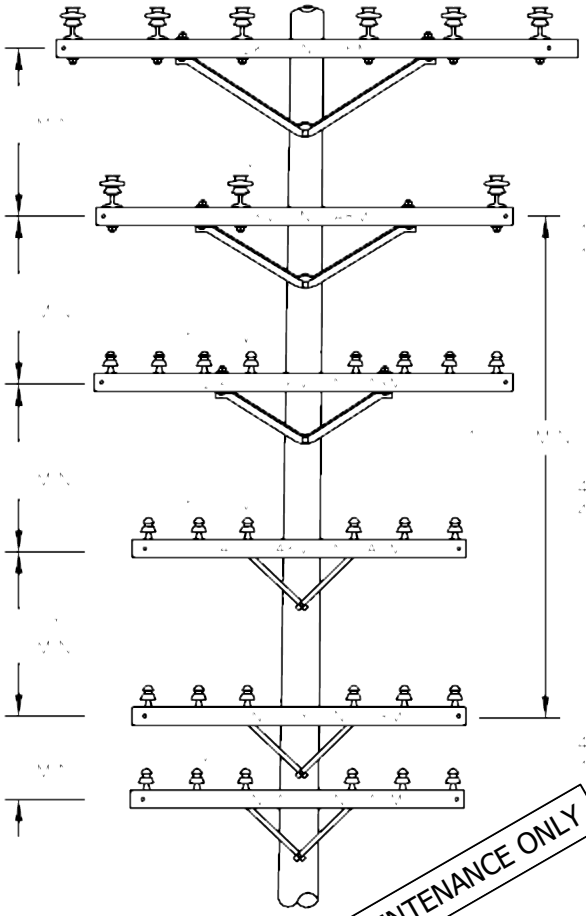
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

VERTICAL SEPARATION OF CROSSARMS ON THE SAME POLE

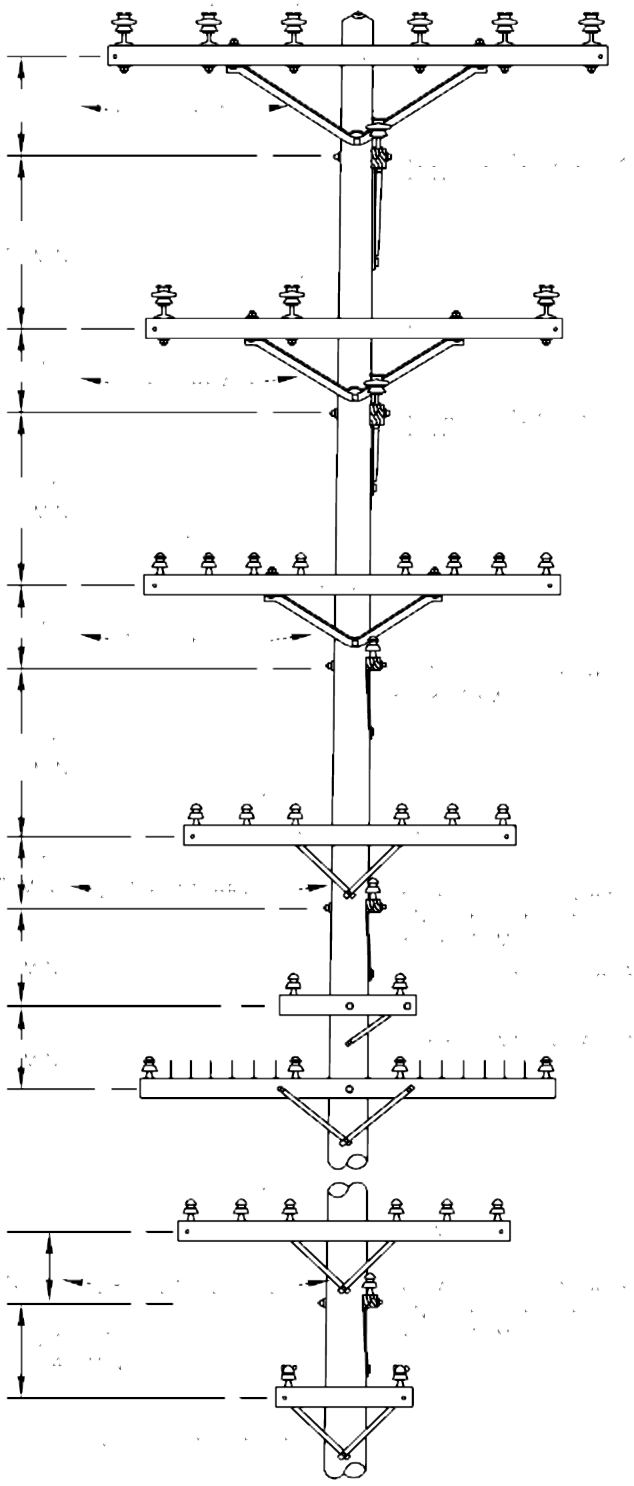
FMO OH220

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LINE ARMS



BUCK ARMS



FOR FIELD MAINTENANCE ONLY

**NOTES:**

A. STANDARD OR MINIMUM CLEARANCES, AS SHOWN, BETWEEN RELATED CONDUCTORS ON LINE AND BUCK ARMS SHALL NOT BE APPLIED CONSECUTIVELY BOTH ABOVE AND BELOW THE SAME CONDUCTORS.

B. MINIMUM CLEARANCES SHOWN ARE THOSE SPECIFIED IN G.O. 95, RULE 38, TABLE 2, CASES 8 TO 14 INCLUSIVE. THESE ARE MINIMUM CONDUCTOR RADIAL SEPARATIONS WHICH MUST BE MAINTAINED AT THE POINT OF CONDUCTOR CROSSINGS.

C. FOR CLIMBING AND WORKING SPACE REQUIREMENTS, SEE OTHER PAGES IN PRACTICES SECTION.

D. FOR VERTICAL SEPARATION REQUIREMENTS ON VERTICAL CONSTRUCTION, SEE OTHER PAGES IN PRACTICES SECTION.

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

VERTICAL SEPARATION OF CROSSARMS ON THE SAME POLE

FMO OH220.1

# OH221 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/22/2019:** MOVED TO FMO - VERSION WITH WOOD CROSSARMS

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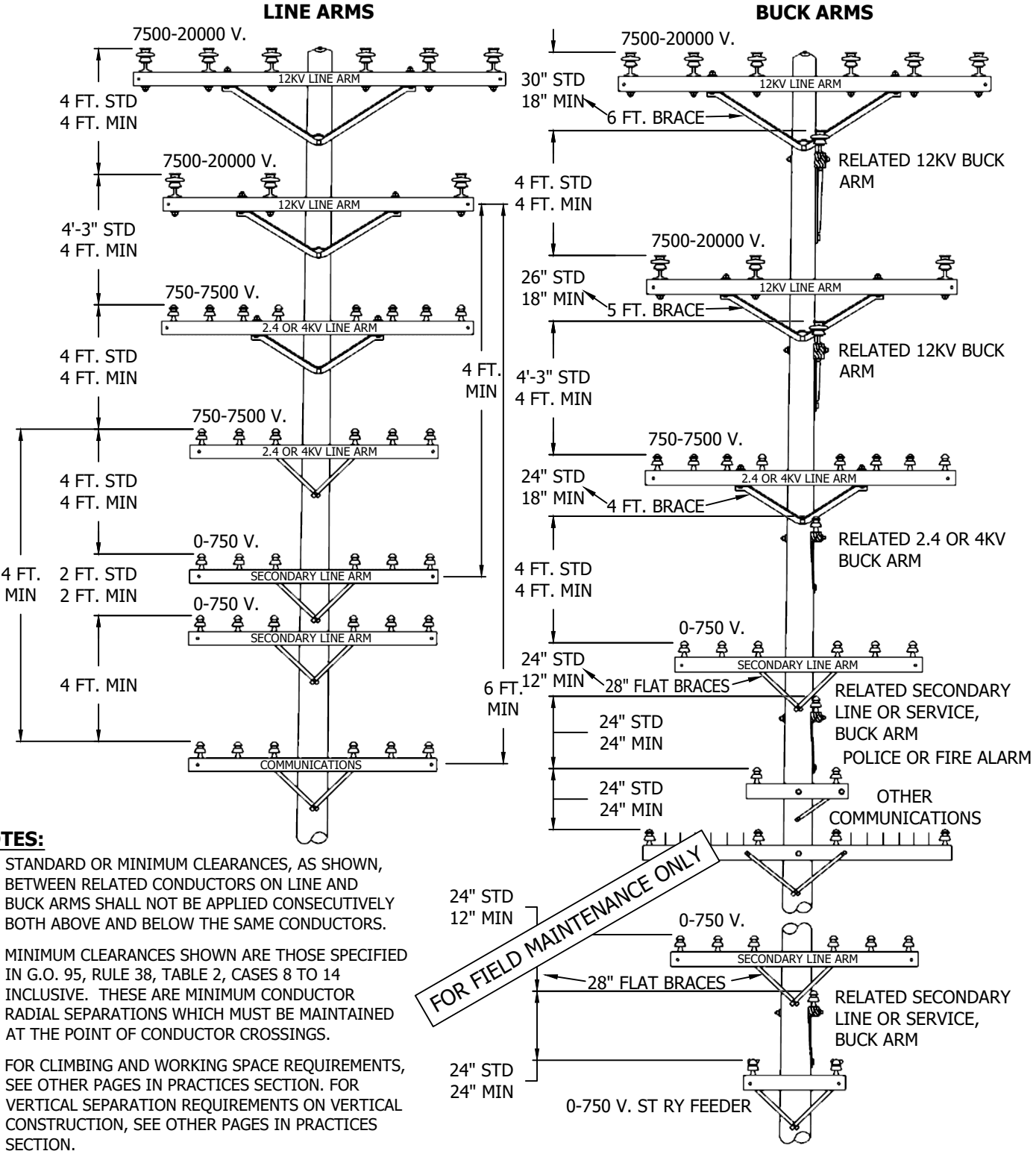
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

VERTICAL SEPARATION OF DIFFERENT CIRCUITS ON THE SAME POLE - CROSSARM CONSTRUCTION

FMO OH221

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**NOTES:**

I. STANDARD OR MINIMUM CLEARANCES, AS SHOWN, BETWEEN RELATED CONDUCTORS ON LINE AND BUCK ARMS SHALL NOT BE APPLIED CONSECUTIVELY BOTH ABOVE AND BELOW THE SAME CONDUCTORS.

II. MINIMUM CLEARANCES SHOWN ARE THOSE SPECIFIED IN G.O. 95, RULE 38, TABLE 2, CASES 8 TO 14 INCLUSIVE. THESE ARE MINIMUM CONDUCTOR RADIAL SEPARATIONS WHICH MUST BE MAINTAINED AT THE POINT OF CONDUCTOR CROSSINGS.

III. FOR CLIMBING AND WORKING SPACE REQUIREMENTS, SEE OTHER PAGES IN PRACTICES SECTION. FOR VERTICAL SEPARATION REQUIREMENTS ON VERTICAL CONSTRUCTION, SEE OTHER PAGES IN PRACTICES SECTION.

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

VERTICAL SEPARATION OF DIFFERENT CIRCUITS ON THE SAME POLE - CROSSARM CONSTRUCTION

FMO OH221.1

# OH223 FIELD MAINTENANCE ONLY

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**REVISION HISTORY:**

**04/22/2019:** A NEWER VERSION MOVED TO FMO

**07/13/2016:** MOVED TO FMO

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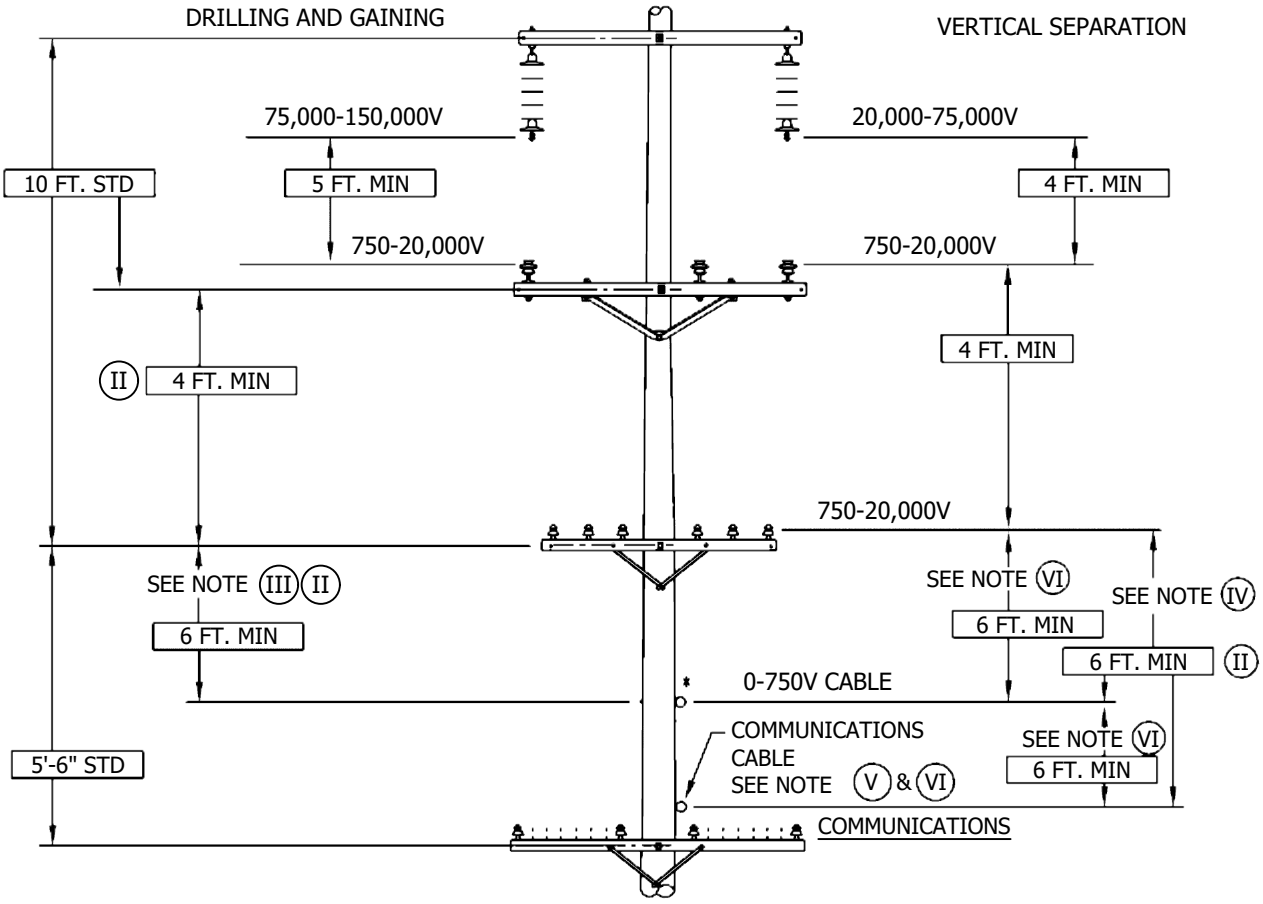
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

AERIAL CABLE, VERTICAL CLEARANCE FROM OPEN WIRE CONDUCTORS ON SAME POLE

FMO OH223

**SCOPE:** THIS STANDARD SHOWS THE VERTICAL CLEARANCES BETWEEN OPEN WIRE CONDUCTORS AND CABLE AS REQUIRED BY THE G.O. 95. TYPICAL DRILLING AND GAINING DIMENSIONS ARE INCLUDED.




**NOTES:**

(I) DIFFERENCES DUE TO SAG OF DIFFERENT SIZE CONDUCTORS MUST BE COMPENSATED FOR AT POINTS OF SUPPORT.

(II) THIS CLEARANCE MAY INCREASE TO 7 FT. FOR BUCKET TRUCK ACCESS-SEE DESIGN MANUAL PAGE 5122, A.2.

(III) INSTALLATION OF GUARD ARMS PERMITS A REDUCTION OF 2 FT. (* REPRESENTS GUARD ARM PLACEMENT). (G.O.95, RULE 54.10-C)

(IV) VERTICAL SEPARATION MAY BE REDUCED 2 FT. IF OPEN WIRE IS 0-750V E.

(V) 6 FT MINIMUM CLEARANCE IS REQUIRED TO POWER CONDUCTORS IN EXCESS OF 750V.

(VI) GUARD ARMS MAY BE USED TO REDUCE REQUIRED CLEARANCE BY 2 FT. FOR CABLES OF 0-750V (* REPRESENTS GUARD ARM PLACEMENT). (G.O.95, RULE 54.10-C)

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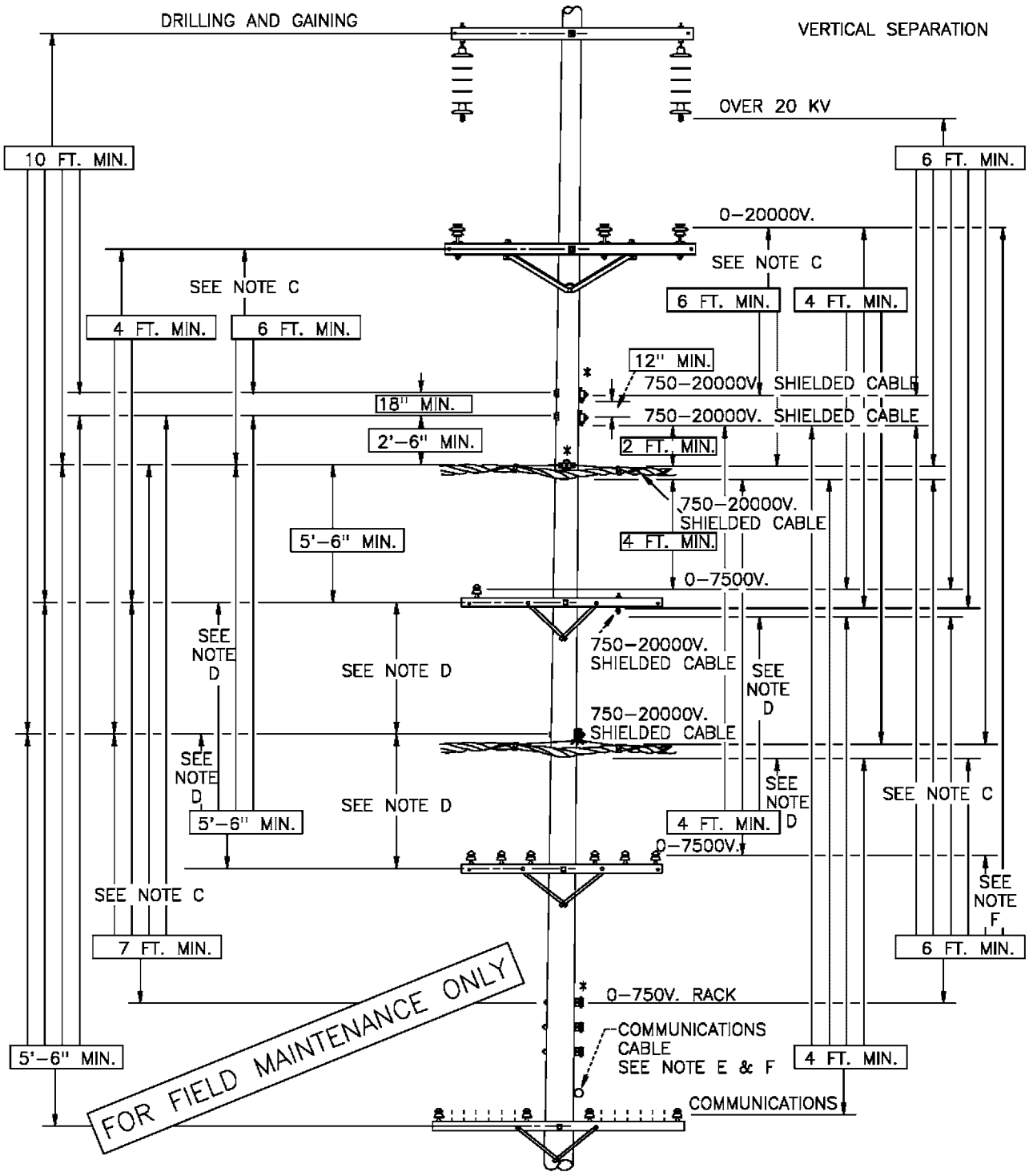
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

VERTICAL CLEARANCE FROM OPEN WIRE CONDUCTORS AND CABLE ON SAME POLE

FMO OH223.1

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A. DIFFERENCES DUE TO SAG OF DIFFERENT SIZE CONDUCTORS MUST BE COMPENSATED FOR AT POINTS OF SUPPORT.

B. VERTICAL SEPARATION OF UNPROTECTED SUPPLY CONDUCTORS FROM 750–7500V SHIELDED AERIAL CABLE WHICH HAS BEEN BONDED AND EFFECTIVELY GROUNDED AS PER GENERAL ORDER 95, RULE 57.8

(C) INSTALLATION OF GUARD ARMS PERMITS A REDUCTION OF 2 FT. (* REPRESENTS GUARD ARM PLACEMENT). (G.O. 95, RULE 57.4–F)

(D) VERTICAL SEPARATION MAY BE REDUCED 2 FT. IF OPEN WIRE IS 0–750V

(E) 6 FT MINIMUM CLEARANCE IS REQUIRED TO POWER CONDUCTORS.

(F) GUARD ARMS MAY BE USED TO REDUCE REQUIRED CLEARANCE BY 2 FT FOR CONDUCTORS OR CABLES OF 0–750V.

| | | |
|---|---|---|
| DATE 2–18–74<br>APPD PBA/BDG | SDG&E ELECTRIC STANDARDS<br>AERIAL CABLE, VERTICAL CLEARANCE FROM OPEN WIRE CONDUCTORS ON SAME POLE | 299.201<br>SUPERCEDES 223<br>(1–1–98) |

# OH264 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARDS MANUAL.

**REVISION HISTORY:**

**08/30/2023:** MOVED TO FMO

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| SHEET 1 OF 1 | X | Indicates Latest Revision | | Completely Revised | X | New Page | Information Removed |
| | SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS | | | | | | |
| | TRANSFORMER STATION CLEARANCES | | | | | | |
| FMO OH264 | | | | | | | |

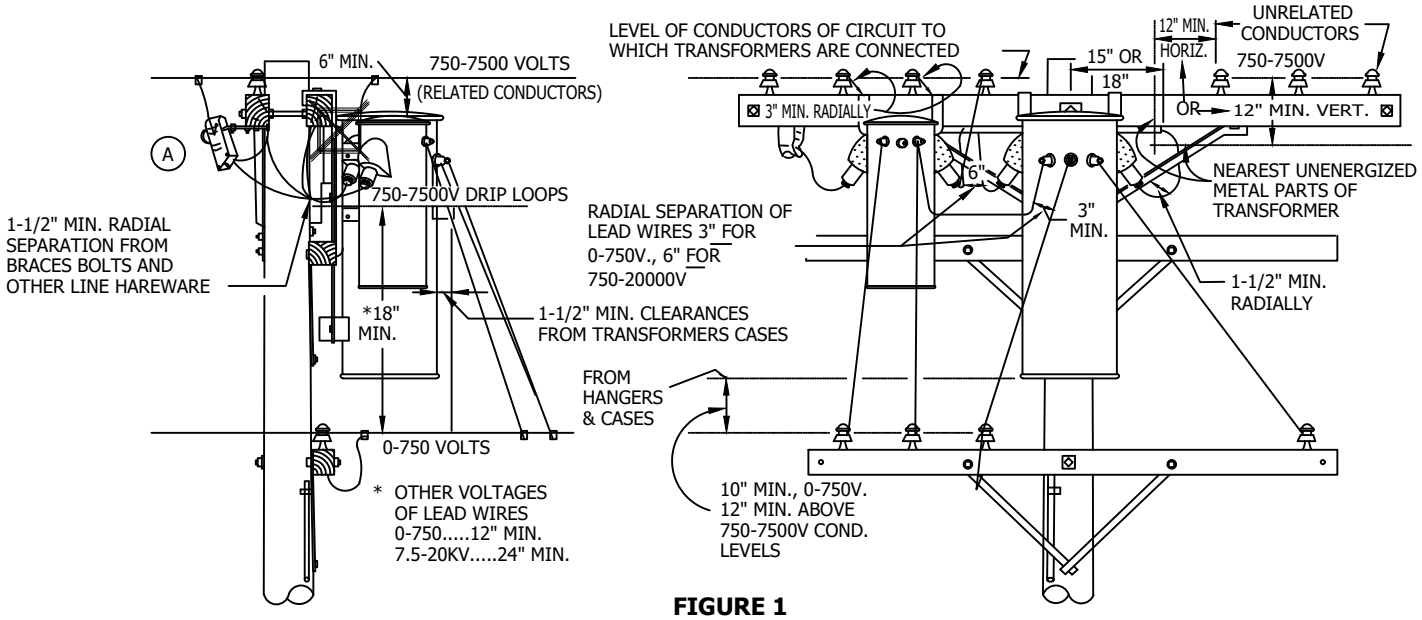



**FIGURE 1**

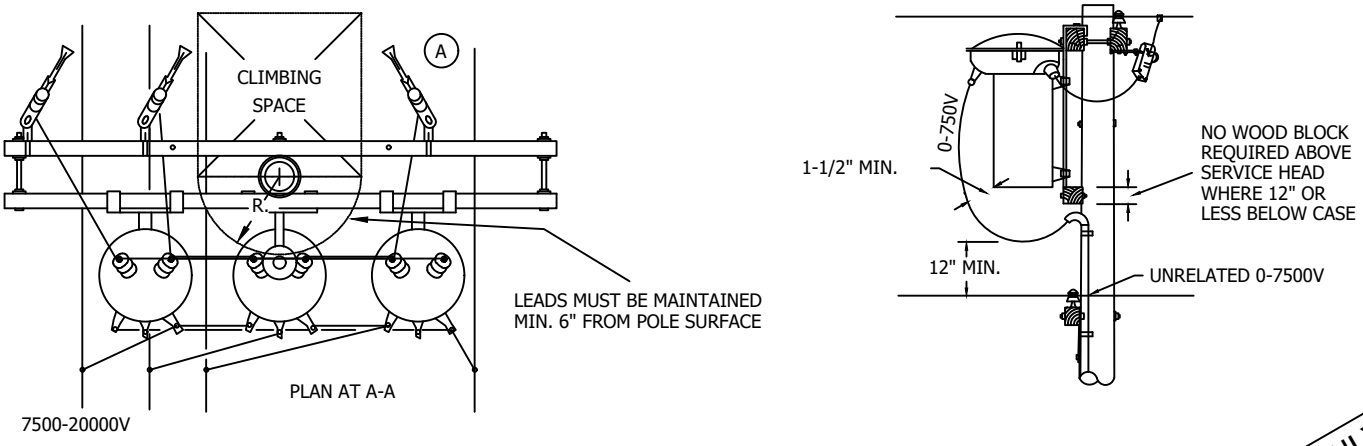



**FIGURE 2**

FIELD MAINTENANCE ONLY

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| B | DRAWING UPDATE | - | JIK | JES | CZH | 02/10/2020 | E | | | | | | |
| A | ORIGINAL ISSUE | - | PTA | PTA | CAK | 01/01/1998 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 1 OF 2

TRANSFORMER STATION CLEARANCES

FMO OH264.1

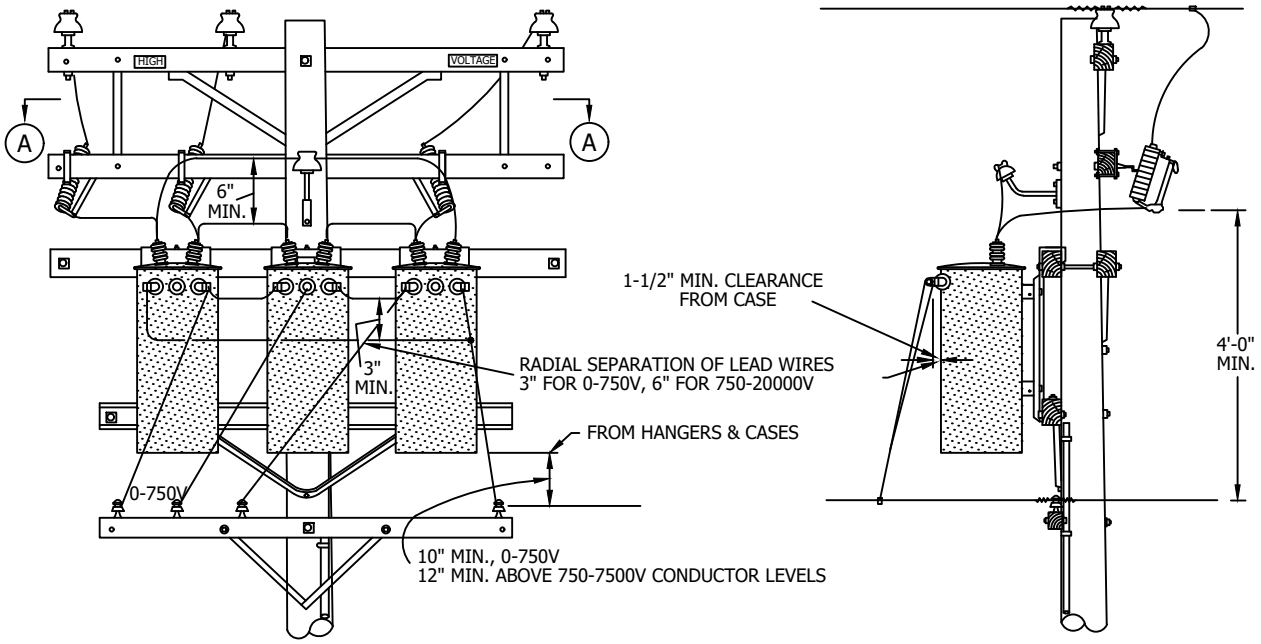



**FIGURE 3**

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## INSTALLATION:

(A) INSTALL CUTOUTS OUTSIDE THE CLIMBING SPACE.

**BILL OF MATERIALS:** NONE

## NOTES:

I. ALL TRANSFORMER CASES AND HANGERS MUST CLEAR CROSSARM BRACES AND THRU-BOLTS BY 1 1/2" CREEPAGE AND 1" AIR GAP DISTANCE.

**REFERENCE:** NONE

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| A | ORIGINAL ISSUE | - | PTA | PTA | CAK | 01/01/1998 | D | | | | | | |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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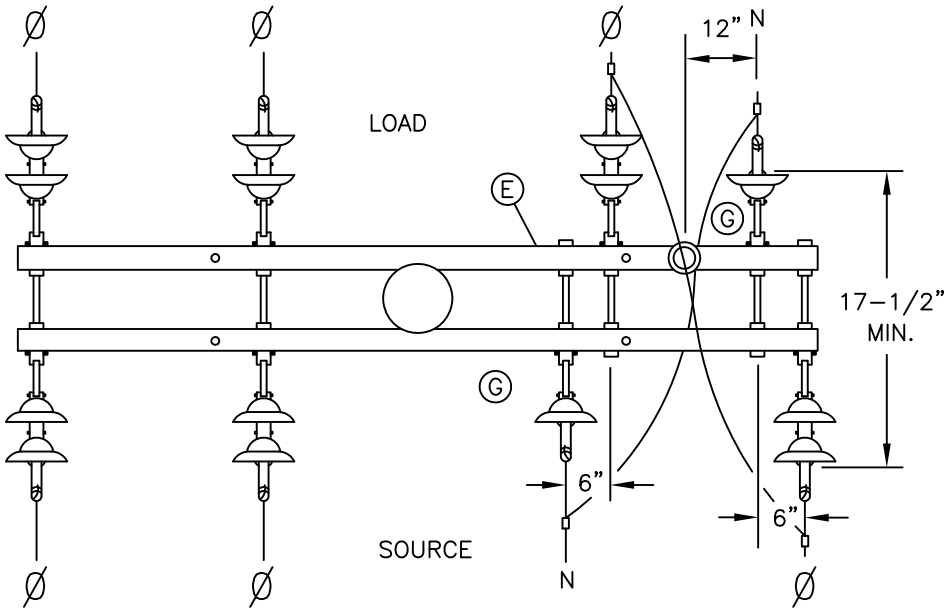
SHEET 1 OF 1

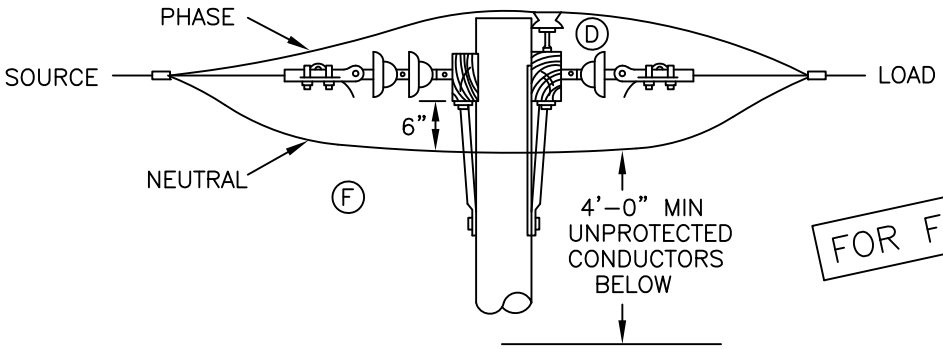
SDG&E ELECTRIC OVERHEAD STANDARD

12KV SINGLE CIRCUIT TRANSPOSITION

FMO OH 269

**SCOPE:** THIS STANDARD ILLUSTRATES VARIOUS METHODS OF 12KV, SINGLE CIRCUIT TRANSPOSITION.



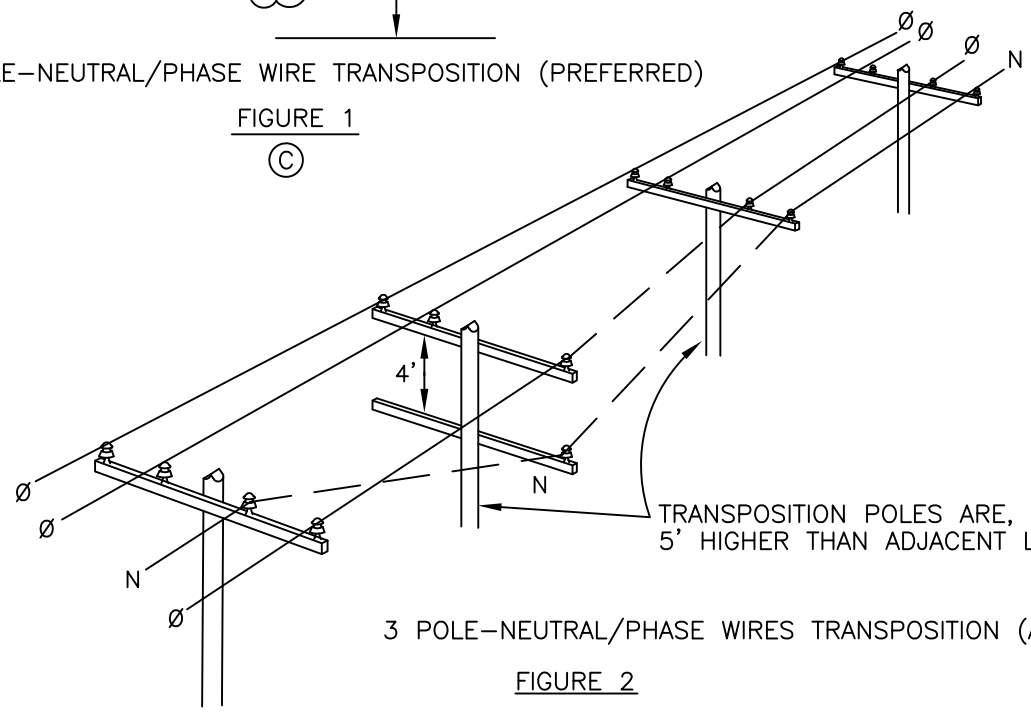




FOR FIELD MAINTENANCE ONLY

SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (PREFERRED)

FIGURE 1

Ⓒ




TRANSPOSITION POLES ARE, NORMALLY,
5' HIGHER THAN ADJACENT LINE POLES

3 POLE–NEUTRAL/PHASE WIRES TRANSPOSITION (ALTERNATE)

FIGURE 2

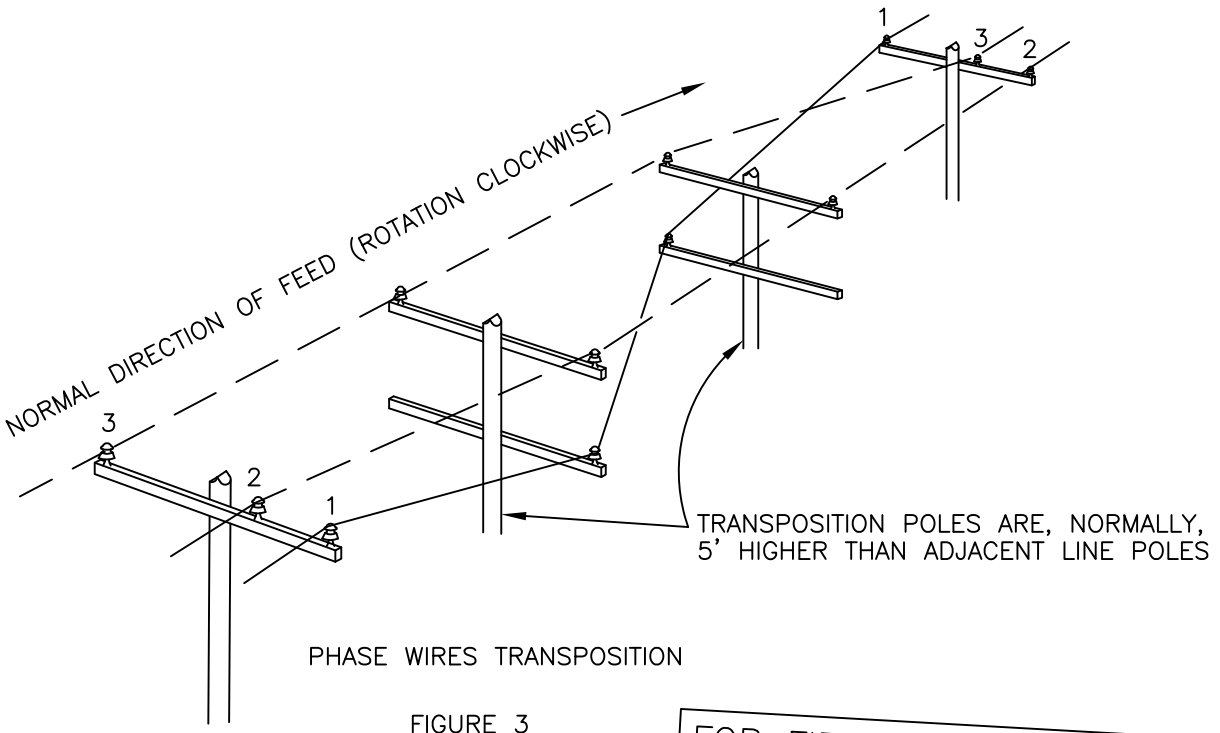
Ⓒ

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| REVISION<br>DATE 8–29–2013<br>APPD TQ / DW | SDG&E ELECTRIC STANDARDS<br>12KV SINGLE CIRCUIT TRANSPOSITION | 269.1 |
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PHASE WIRES TRANSPOSITION

FIGURE 3
(B)

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. ALL PROPOSED 12KV LINE EXTENSIONS CREATING PARALLELS WITH EXISTING OPEN WIRE COMMUNICATION LEADS SHALL BE REFERRED TO THE TELEPHONE COMPANY FOR COORDINATION OF TRANSPOSITIONS IN THE SUPPLY AND COMMUNICATION LINES.

(B) BUILDING FOUR WIRE, "PHASE WIRE ONLY" TRANSPOSITION, (FIG. 3), OR ADDING FOURTH WIRE (NEUTRAL) TO EXISTING TRANSPOSITION, REQUIRES NO DEVIATION.

(C) SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1) IS PREFFERED OVER THREE POLE NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 2).

(D) ON SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1), ALWAYS JUMPER PHASE WIRE OVER TOP OF ARM AND TIE INTO PIN AND INSULATOR.

(E) SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1) REQUIRES CROSSARM MINIMUM OF 10' IN LENGTH. IF TRANSPOSITION IS EXTENSION FROM EXISTING 8' CROSSARMS, CHANGE OUT TO 10' CROSSARMS.

(F) IN SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1), INSTALL NEUTRAL JUMPER NO LESS THAN 6" FROM BOTTOM OF CROSSARM.

(G) ON ALL TRANSPOSITIONS, MARK CROSSARM NEUTRAL POSITION WITH "PN" SIGN, EVEN THOUGH SIGN IS NOT REQUIRED BY STANDARD 208.

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| 269.2 | SDG&E ELECTRIC STANDARDS<br>12KV SINGLE CIRCUIT TRANSPOSITION | REVISION<br>DATE 1-1-93<br>APPD PSA 1/2009 |

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| 390 | HARDWARE |
| 392 | LINE MATERIALS, BOLT, LAG SCREW |
| 396 | INSULATORS, PINS, AND SPACERS |
| 397 | CROSSARM MOUNTING BRACKETS |


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| F | REMOVED OH388 | EDM | GLW | JES | CZH | 04/13/2021 | I | OH380 & OH396 MOVED TO FMO | EDM | MRF | MRF | FRC | 06/16/2023 |
| E | EDITORIAL CHANGES | EDM | JAC | JES | CZH | 07/01/2020 | H | OH397 MOVED TO FMO | EDM | RSL | GLW | KRG | 11/09/2022 |
| D | ADDED 388 | - | SL | JS | CZH | 07/10/2019 | G | EDITORIAL CHANGES | EDM | JAC | GLW | FRC | 03/01/2022 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

POLES, ARMS & HARDWARE
FMO TABLE OF CONTENTS

# OH363 UG4205 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**07/1/2020:** MOVED TO FMO

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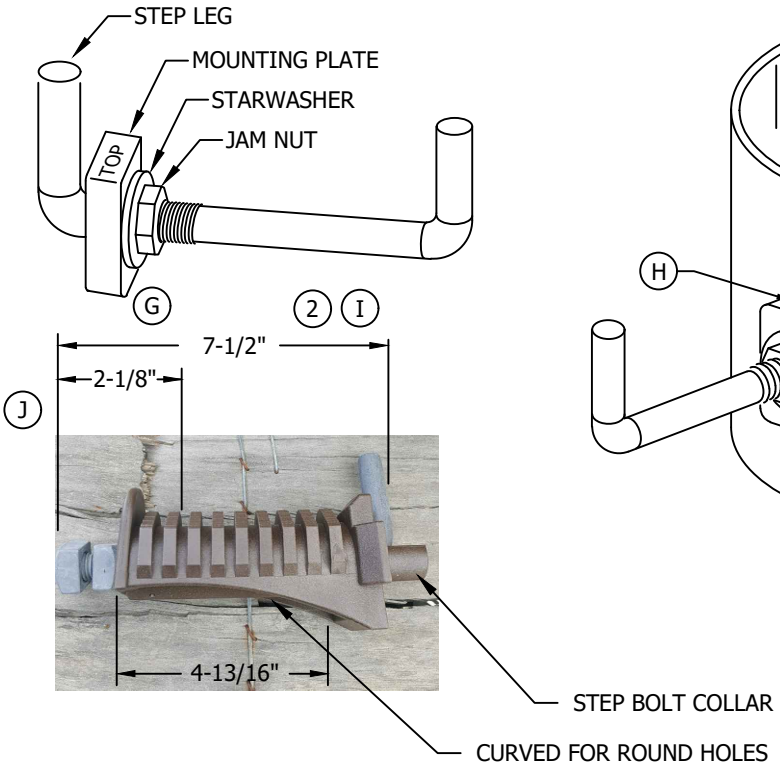
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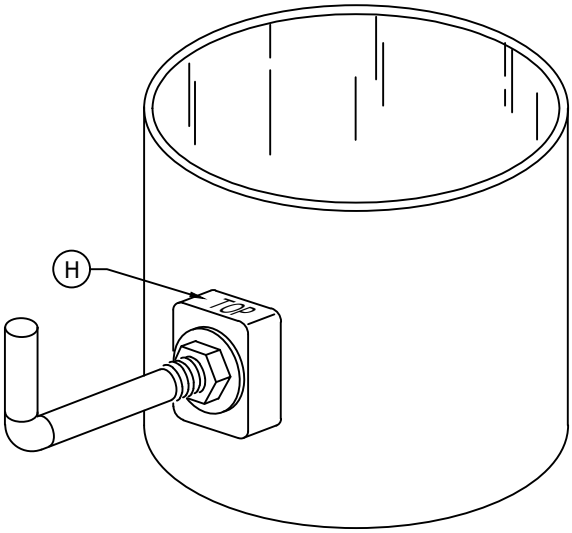
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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

INSTALLATION OF PERMANENT POLE STEPS

FMO OH363 UG4205




FIELD MAINTENANCE ONLY

TABLE OF CONTENTS

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION | STOCK NUMBER | A.U |
|---|---|---|---|
| 1 | STEP, POLE, DRIVING TYPE (WOOD) | S692992 | STEP |
| 2 | STEP, POLE, BOLTED (STEEL OR FIBERGLASS) | S692300 | STEP-S |
| 3 | STEP, POLE, COMPOSITE, BROWN, (STEEL OR FIBERGLASS) | S692990 | STEP-C |

**INSTALLATION:** (Cont'd)

(H) ENSURE THAT STEP MOUNTING PLATE IS POSITIONED WITH THE SIDE STAMPED "TOP" FACING UP.

(I) INSTALL STEP BY INSERTING LEG OF STEP INTO POLE STEP HOLE. SLIDE MOUNTING PLATE OVER SQUARE KEY AT BASE OF STEP UNTIL FLUSH AGAINST POLE. SLIDE STAR WASHER OVER STEP THREADS AND FLUSH AGAINST MOUNTING PLATE. RUN JAM NUT DOWN OVER THREADS BY HAND UNTIL FLUSH AGAINST STAR WASHER AND HAND TIGHTEN. USING WRENCH, SNUG JAM NUT AN ADDITIONAL 1/4 TURN ONLY.

(J) INSTALL COMPOSITE STEP BY REMOVING THE OUTER NUT AND SPIN THE INNER NUT OUT TO THE END OF THE THREADED BOLT. INSERT THE LEG OF STEP INTO THE POLE STEP HOLE. DO NOT BREAK OFF THE STEP BOLT COLLAR. SPIN THE INNER NUT AGAINST THE STEP AND HAND TIGHTEN. USING WRENCH, SNUG JAM NUT AN ADDITIONAL 1/4 TURN ONLY.

**NOTE:**

II. POLE STEP MOUNTING HOLE DIAMETER 13/16 INCHES TO 1-1/8 INCHES.

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| C | EDITORIAL CHANGES | - | JS | JS | MDJ | 6/26/2017 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | IL | MDJ | 6/23/2016 | E | MOVED TO FMO | EDM | JAC | GLW | CZH | 7/1/2020 |
| A | UPDATED INSTALLATION NOTES | - | JC | - | - | 12/16/2014 | D | NOTES UPDATE | - | JC | JS | MDJ | 1/17/2018 |

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

INSTALLATION OF PERMANENT POLE STEPS

SHEET 1 OF 1

FMO
OH363.1
UG4205.1

# OH380 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

## REVISION HISTORY:

05/30/2024: 10-FT SECONDARY LINE ARM 8-PIN MOVED TO FMO

06/12/2023: MOVED TO FMO

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

WOOD CROSSARM

FMO OH380

SCOPE: THIS STANDARD SHOWS VARIOUS TYPES OF WOOD CROSSARMS FOR USE ON THE DISTRIBUTION SYSTEM.

10-FT SECONDARY LINE ARM
8-PIN

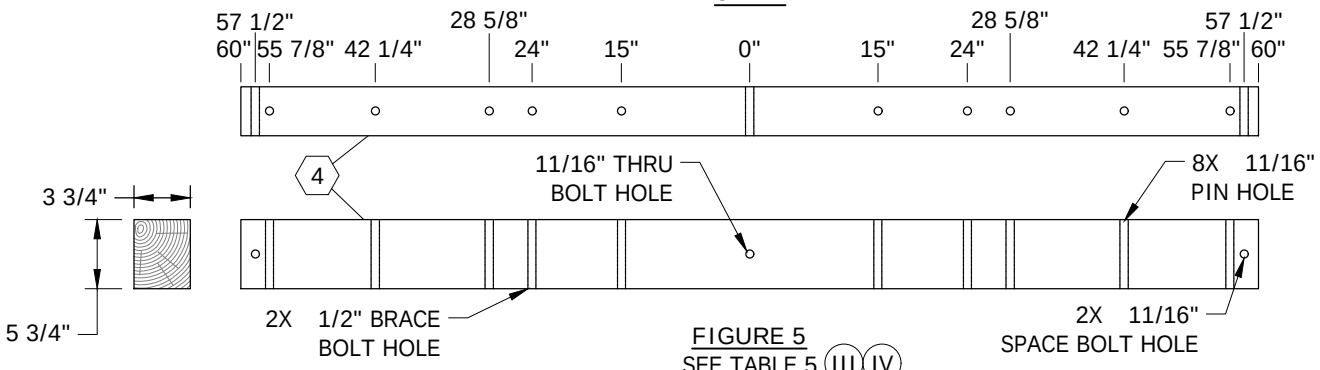



FIGURE 5
SEE TABLE 5 (III) (IV)

TABLE 5

| FIGURE 5 INFORMATION | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | QUANTITY | STOCK NUMBER | DESIGN UNITS | MACRO UNIT |
| 4 | CROSSARM, 8-PIN, 3 3/4" X 5 3/4" X 10'-0" | 1 | S293696 | 8P- | 8P |
| -- | BRACE, CROSSARM, ANGLE, 4'-0" | 1 | S164032 | 4HUB | |

NOTES:

(III) TABLE SHOWS MACRO UNIT QUANTITIES.

(IV) TABLE 18

| MAXIMUM PERMISSIBLE TRANSVERSE CROSSARM LOADING (WOOD ARMS ON WOOD POLES) (LBS) | | | |
|---|---|---|---|
| THRU BOLT SIZE (IN) | BOLT ONLY | BOLT AND THRUST PLATE | BOLT, SPLIT RINGS AND THRUST PLATE |
| 5/8 | 1,700 | -- | -- |
| 3/4 | 2,400 | 8,500 | 12,000 |

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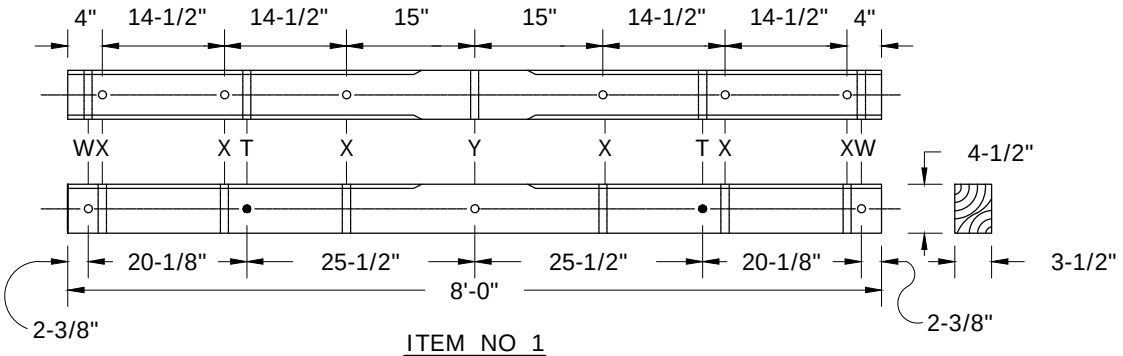
FIELD MAINTENANCE ONLY

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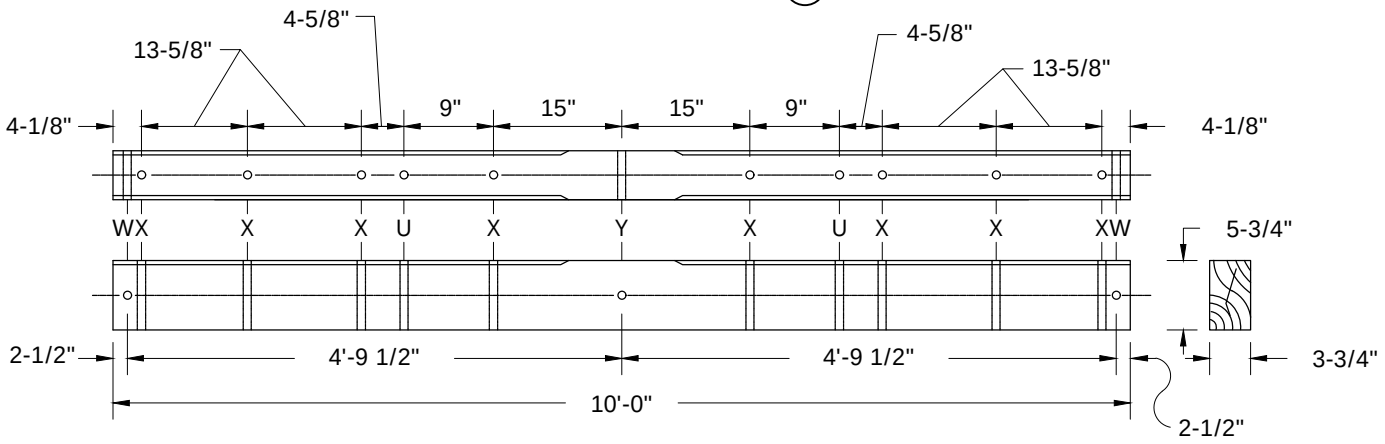
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SCOPE: THIS STANDARD SHOWS VARIOUS TYPES OF CROSSARMS FOR USE IN DISTRIBUTION 4KV & SECONDARY SYSTEMS.




ITEM NO 1

(36" FLAT BRACES #164224) (A)




ITEM NO 2

(4' BRACE #164032)

## INSTALLATION:

(A) THIS ARM SUPPLIED TO DISTRICT WITH 2-36" FLAT BRACES ATTACHED.

B.

HOLE LEGEND:

T - BRACE BOLT HOLE 3/8" DIA.
U - BRACE BOLT HOLE 1/2" DIA.
W - SPACE BOLT HOLE 11/16" DIA.
X - PIN HOLE 11/16" DIA.
Y - THRU BOLT HOLE 11/16" DIA.

FIELD MAINTENANCE ONLY

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | STOCK NUMBER |
|---|---|---|
| 1 | CROSSARM, 6 PIN, TREATED, 3-1/2" X 4-1/2" X 8' | S293680 |
| 2 | CROSSARM, 8 PIN, TREATED, 3-3/4" X 5-3/4" X 10' | S293696 |

## NOTES:

1. 1/4" BEVELED OR ROUNDED EDGES ON TOP SIDE OF ALL ARMS.

REFERENCE: NONE

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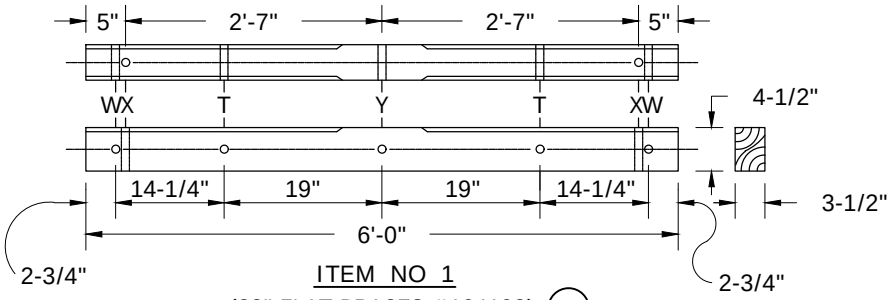
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

DISTRIBUTION LINE ARMS - 4KV & SECONDARY

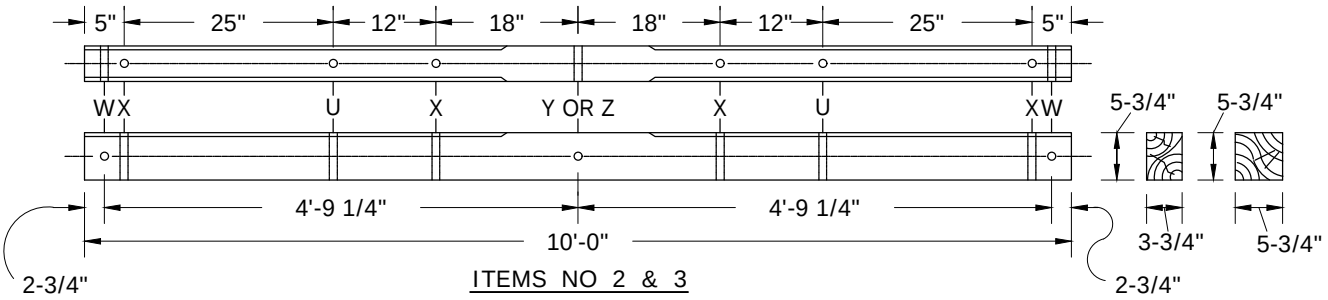


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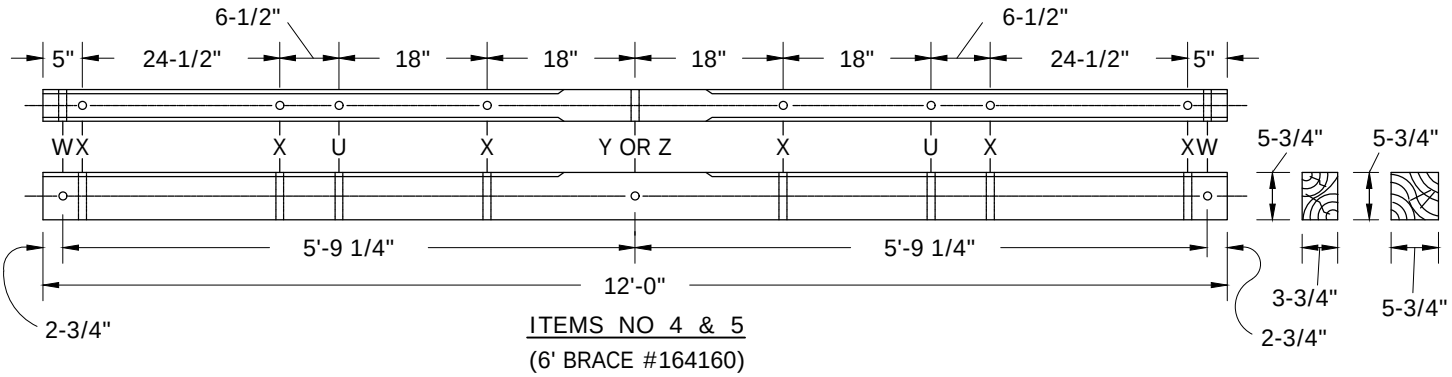
SCOPE: THIS STANDARD SHOWS VARIOUS TYPES OF CROSSARMS FOR USE IN DISTRIBUTION 12KV SYSTEMS.




ITEM NO 1
(28" FLAT BRACES #164192) (B)




ITEMS NO 2 & 3
(5' BRACE #164128)




ITEMS NO 4 & 5
(6' BRACE #164160)

## INSTALLATION:

A. HOLE LEGEND:

T - BRACE BOLT HOLE 3/8" DIA.
U - BRACE BOLT HOLE 1/2" DIA.
W - SPACE BOLT HOLE 11/16" DIA.
X - PIN HOLE 11/16" DIA.
Y - THRU BOLT HOLE 11/16" DIA. - 3-3/4" X 5-3/4" ARMS
Z - THRU BOLT HOLE 13/16" DIA. - 5-3/4" X 5-3/4" ARMS

(B) THIS ARM SUPPLIED TO DISTRICT WITH 2-28" FLAT BRACES ATTACHED.

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| ITEM | DESCRIPTION | STOCK NUMBER |
|---|---|---|
| 1 | CROSSARM, 2 PIN, TREATED, 3-1/2" X 4-1/2" X 6' | S294112 |
| 2 | CROSSARM, 4 PIN, TREATED, 3-3/4" X 5-3/4" X 10' | S294128 |
| 3 | CROSSARM, 4 PIN, TREATED, 5-3/4" X 5-3/4" X 10' | S294144 |
| 4 | CROSSARM, 6 PIN, TREATED, 3-3/4" X 5-3/4" X 12' | S294160 |
| 5 | CROSSARM, 6 PIN, TREATED, 5-3/4" X 5-3/4" X 12' | S294176 |

## NOTES:

1. 1/4" BEVELED OR ROUNDED EDGES ON TOP SIDE OF ALL ARMS.

REFERENCE: NONE

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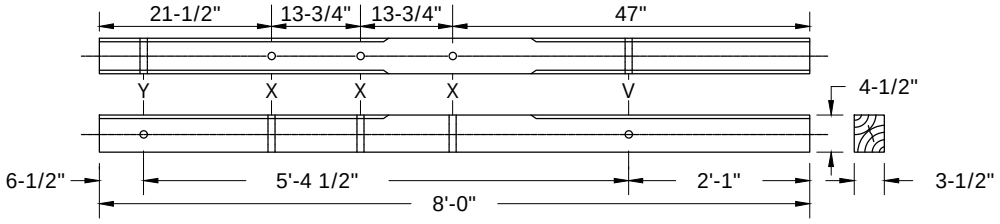
FIELD MAINTENANCE ONLY

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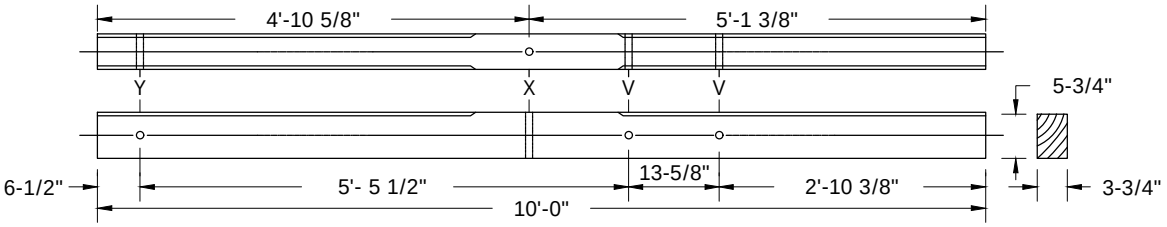
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | MOVED TO FMO | EDM | MRF | MRF | FRC | 06/12/2023 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1994 | D | | | | | | |

SCOPE: THIS STANDARD SHOWS VARIOUS TYPES OF CROSSARMS FOR USE IN DISTRIBUTION ALLEY ARM CONSTRUCTION FOR 4KV AND SECONDARY SYSTEMS.

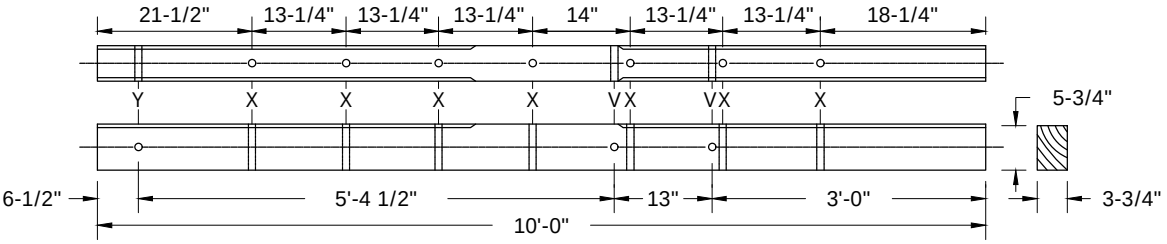
ITEM #1
7'
ALLEY BRACE
#164352



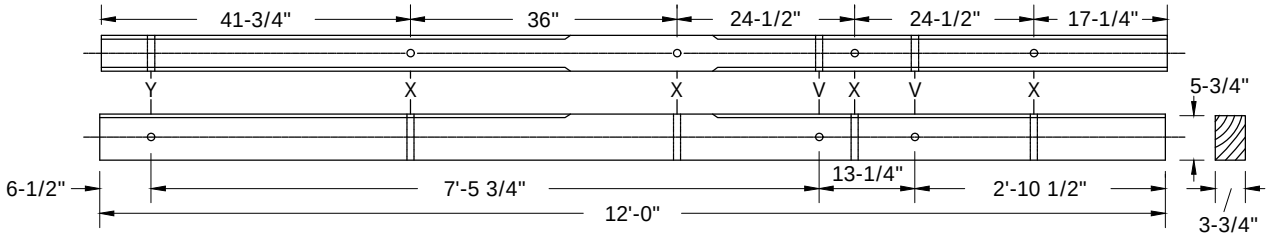

ITEM #2
7'
ALLEY BRACE
#164352



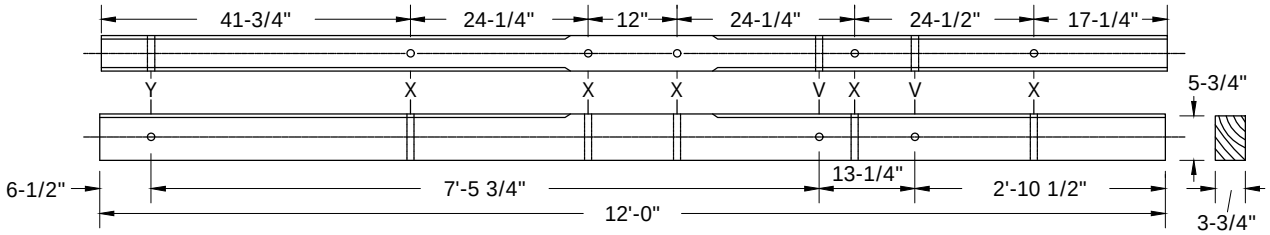

ITEM #3
7'
ALLEY BRACE
#164352




ITEM #4
10'
ALLEY BRACE
#164288




ITEM #5
10'
ALLEY BRACE
#164288




## INSTALLATION:

A. HOLE LEGEND:

V - BRACE BOLT HOLE 5/8" DIA.
X - PIN HOLE 11/16" DIA.
Y - THRU BOLT HOLE 11/16" DIA.

FIELD MAINTENANCE ONLY

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| B | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1994 | D | | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | STOCK NUMBER |
|---|---|---|
| 1 | ITEM 1 PG 380.1 DRILLED FOR 6 PIN TREATED ALLEY ARM | S293680 |
| 2 | ITEM 2 PG 380.1 DRILLED FOR 7 PIN TREATED ALLEY ARM | S293696 |
| 3 | ITEM 2 PG 380.2 DRILLED FOR 8 PIN TREATED ALLEY ARM | S294128 |
| 4 | ITEM 4 PG 380.2 DRILLED FOR 9 PIN TREATED ALLEY ARM | S294160 |
| 5 | ITEM 4 PG 380.2 DRILLED FOR 10 PIN TREATED ALLEY ARM | S294160 |

NOTES: NONE

REFERENCE: NONE

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
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| C | MOVED TO FMO | EDM | MRF | MRF | FRC | 06/12/2023 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1994 | D | | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

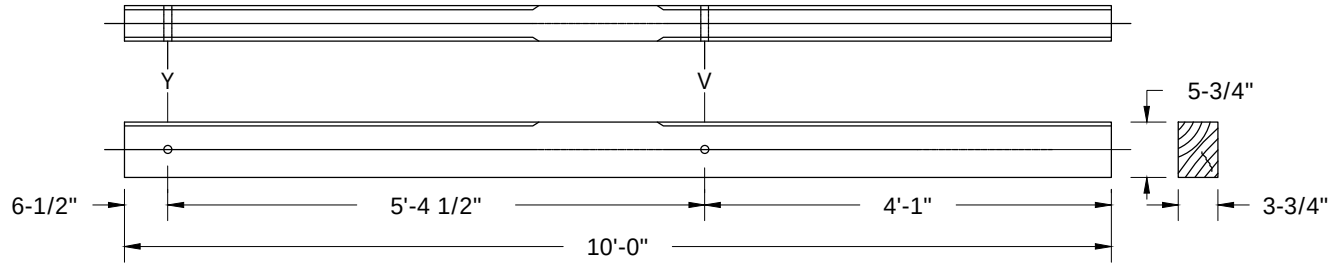


SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

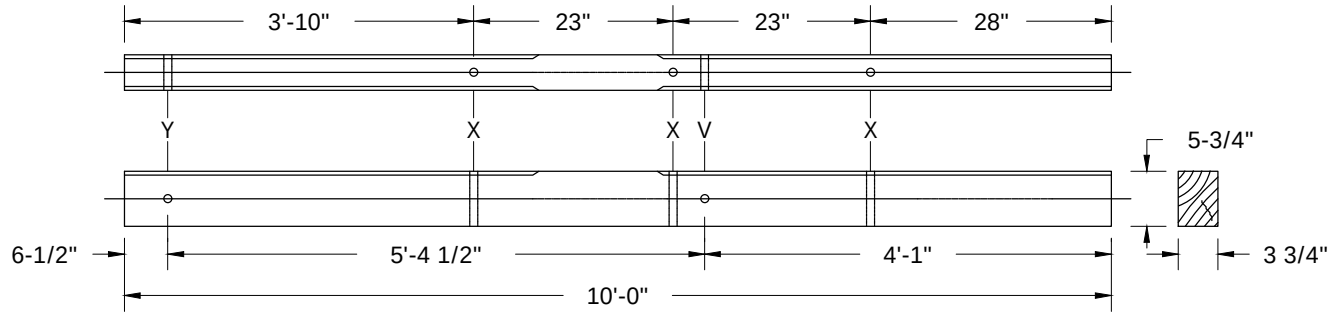
DISTRIBUTION ALLEY ARMS - 4 KV & SECONDARY

FMO OH380.5

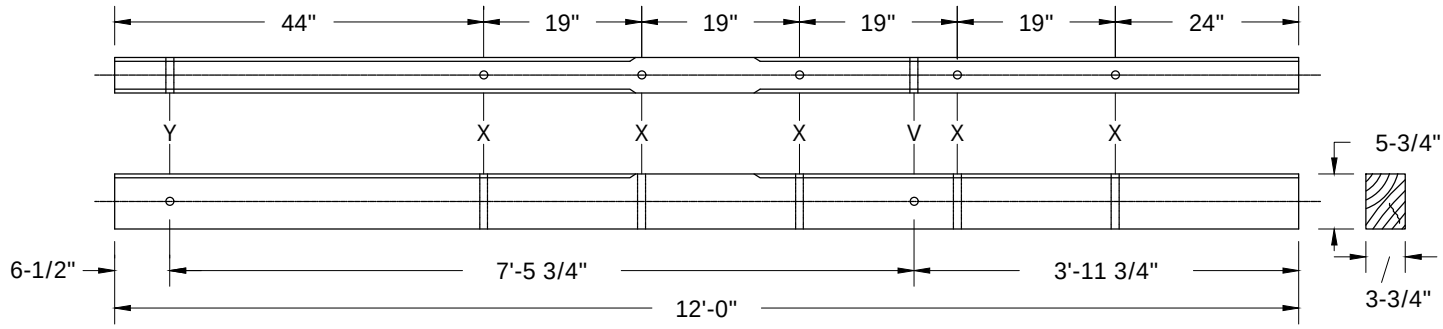
SCOPE: THIS STANDARD SHOWS VARIOUS TYPES OF CROSSARMS FOR USE IN DISTRIBUTION ALLEY ARM CONSTRUCTION ALLEY ARM CONSTRUCTION FOR 12KV SYSTEMS.




ITEM #1
(7' ALLEY BRACE #164352)




ITEM #2
(7' ALLEY BRACE #164352)




ITEM #3
(10' ALLEY BRACE #164288)

## INSTALLATION:

A. HOLE LEGEND:
V - BRACE BOLT HOLE 5/8" DIA.
X - PIN HOLE 11/16" DIA.
Y - THRU BOLT HOLE 11/16" DIA.

FIELD MAINTENANCE ONLY

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | MOVED TO FMO | EDM | MRF | MRF | FRC | 06/12/2023 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1994 | D | | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | STOCK NUMBER |
|---|---|---|
| 1 | ITEM 2 PG 380.2 DRILLED FOR 3 PIN TREATED ALLEY ARM | S294128 |
| 2 | ITEM 2 PG 380.2 DRILLED FOR 3 PIN TREATED ALLEY ARM | S294128 |
| 3 | ITEM 4 PG 380.2 DRILLED FOR 6 PIN TREATED ALLEY ARM | S294160 |

NOTES: NONE

REFERENCE: NONE

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
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| B | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | E | | | | | | |
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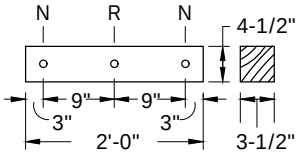


SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

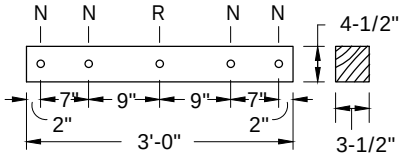
DISTRIBUTION ALLEY ARMS - 12 KV PRIMARY

FMO OH380.7

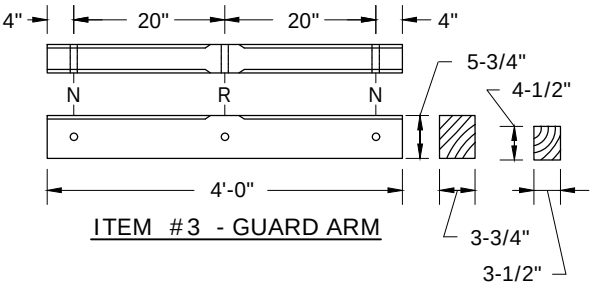
SCOPE: THIS STANDARD SHOWS VARIOUS TYPES OF CROSSARMS FOR SPECIAL PURPOSE CONSTRUCTION IN THE DISTRIBUTION SYSTEM.



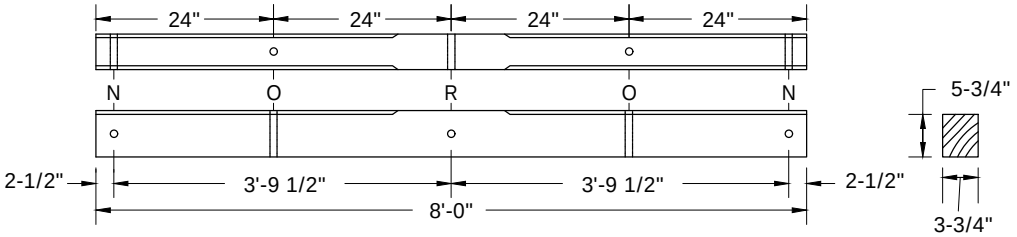

ITEM #1 - KICK ARM
(28" FLAT BRACES #164192)



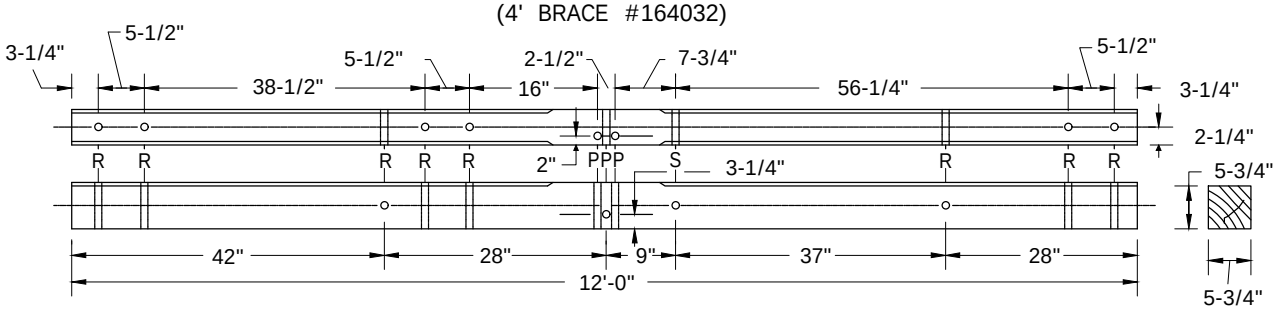

ITEM #2 - KICK ARM
(28" FLAT BRACES #164192)



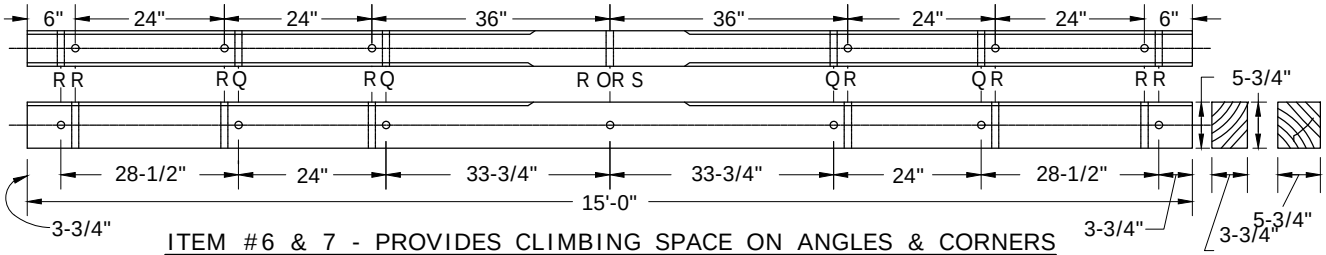

ITEM #3 - GUARD ARM




ITEM #4 - TRANSFORMER OR KICK ARM
(4' BRACE #164032)




**ITEM #5 - POLETOP SWITCH ARM**
(4' SPECIAL BRACE #163808)




ITEM #6 & 7 - PROVIDES CLIMBING SPACE ON ANGLES & CORNERS

(4' SPECIAL BRACE #163808, OR
6' SPECIAL BRACE #163840)

FIELD MAINTENANCE ONLY

INSTALLATION:

**A. HOLE LEGEND:**

N - 3/8" DIA. P - 9/16" DIA. R - 11/16" DIA. - 3-3/4" X 5-3/4" ARMS
O - 1/2" DIA. Q - 5/8" DIA. S - 13/16" DIA. - 5-3/4" X 5-3/4" ARMS

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1994 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

DISTRIBUTION SPECIAL PURPOSE ARMS



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## BILL OF MATERIALS:

| ITEM | DESCRIPTION | STOCK NUMBER |
|---|---|---|
| 1 | 3-1/2" X 4-1/2" X 2', TREATED | S293968 |
| 2 | 3-1/2" X 4-1/2" X 3', TREATED | S293744 |
| 3 | 3-1/2" X 4-1/2" OR 3-3/4" X 5-3/4", TREATED | S294000 |
| 4 | 3-3/4" X 5-3/4" X 8', TREATED | S294960 |
| 5 | ADDITIONAL DRILLING TO CONVERT ITEM 5 PG 380.2 TO POLETOP SWITCH | - |
| 6 | 3-3/4" X 5-3/4" X 15', TREATED | S293712 |
| 7 | 5-3/4" X 5-3/4" X 15', TREATED | S293728 |

## NOTES:

I. ITEMS 1 THRU 3 ARE NO LONGER PURCHASED. OBTAIN THESE FROM SALVAGE.
II. ITEMS 6 & 7: 1/4", BEVELED OR ROUNDED EDGES ON TOP SIDE OF ARMS.

REFERENCE: NONE

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
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| B | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1994 | D | | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed



SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

DISTRIBUTION SPECIAL PURPOSE ARMS

SCOPE: THIS STANDARD PROVIDES VARIOUS ASSEMBLY UNITS FOR DISTRIBUTION CROSSARMS.

| 12KV DISTRIBUTION LINEARMS | | |
|---|---|---|
| DESCRIPTION | ASSEMBLY UNITS | SAP CU |
| 1-2 PIN STD ARM W/STD BRACE | 2 | 2PIN |
| 1-2 PIN STD ARM W/O BRACE | 2- | 2- |
| 1-2 PIN STD ARM W/STD BRACE-BUCK | 2B | 2-PIN |
| 2-2 PIN STD ARM W/STD BRACE | D2 | D2 |
| 2-2 PIN STD ARM W/STD BRACE-BUCK | D2B | D2 |
| 1-4 PIN STD ARM W/STD BRACE | 4 | 4PIN |
| 1-4 PIN STD ARM W/O BRACE | 4- | 4- |
| 1-4 PIN STD ARM W/STD BRACE-BUCK | 4B | 4PIN |
| 1-4 PIN HVY ARM W/STD BRACE | 4H | 4H |
| 1-4 PIN HVY ARM W/O BRACE | 4H- | 4H- |
| 1-4 PIN HVY ARM W/STD BRACE-BUCK | 4BH | 4H |
| 2-4 PIN STD ARM W/STD BRACE | D4 | D4 |
| 2-4 PIN STD ARM W/STD BRACE-BUCK | D4B | D4 |
| 2-4 PIN HVY ARM W/STD BRACE | D4H | D4H |
| 2-4 PIN HVY ARM W/STD BRACE-BUCK | D4BH | D4H |
| 1-6 PIN STD ARM W/STD BRACE | 6 | 6PIN |
| 1-6 PIN STD ARM W/O BRACE | 6- | 6- |
| 1-6 PIN STD ARM W/STD BRACE-BUCK | 6B | 6PIN |
| 1-6 PIN HVY ARM W/STD BRACE | 6H | 6H |
| 1-6 PIN HVY ARM W/O BRACE | 6H- | 6H- |
| 1-6 PIN HVY ARM W/STD BRACE-BUCK | 6BH | 6H |
| 2-6 PIN STD ARM W/STD BRACE | D6 | D6 |
| 2-6 PIN STD ARM W/STD BRACE-BUCK | D6B | D6 |
| 2-6 PIN HVY ARM W/STD BRACE | D6H | D6H |
| 2-6 PIN HVY ARM W/STD BRACE-BUCK | D6BH | D6H |
| 1-6 PIN 15' STD ARM W/SPEC BRACE | 6L | 6L |
| 1-6 PIN 15' STD ARM W/O BRACE | 6L- | 6L- |
| 1-6 PIN 15' STD ARM W/SPEC BRACE-BUCK | 6BL | 6L |
| 1-6 PIN 15' HVY ARM W/SPEC BRACE | 6HL | 6HL |
| 1-6 PIN 15' HVY ARM W/O BRACE | 6HL- | 6HL- |
| 1-6 PIN 15' HVY ARM W/SPEC BRACE-BUCK | 6BHL | 6HL |
| 2-6 PIN 15' STD ARM W/SPEC BRACE | D6L | D6L |
| 2-6 PIN 15' STD ARM W/SPEC BRACE-BUCK | D6BL | D6L |
| 2-6 PIN 15' HVY ARM W/SPEC BRACE | D6HL | D6HL |
| 2-6 PIN 15' HVY ARM W/SPEC BRACE-BUCK | D6HL | D6HL |

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INSTALLATION: NONE

BILL OF MATERIALS: NONE

NOTES: NONE

REFERENCE: NONE

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| B | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1994 | D | | | | | | |

# OH390 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**02/16/2023:** NEWER VERSION OF OH390.12 MOVED TO FMO.

**03/01/2022:** OH390.12 MOVED TO FMO BECAUSE BARE GROUND WIRE HAS BEEN REPLACED WITH #4 CU SOLID GROUND WIRE, COVERED.

**09/28/2016:** OH390.2 MOVED TO FMO

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | OH390.12 MOVED TO FMO | ARC | MRF | GLW | KRG | 02/16/2023 | F | | | | | | |
| B | ADDED OH390.12 | EDM | JAC | GLW | FRC | 03/01/2022 | E | | | | | | |
| A | ORGINAL ISSUE | - | JS | JS | MDJ | 09/28/2016 | D | | | | | | |

**SCOPE:** THIS STANDARD SHOWS TYPES OF INSULATOR BRACKETS USED IN THE DISTRIBUTION SYSTEM.

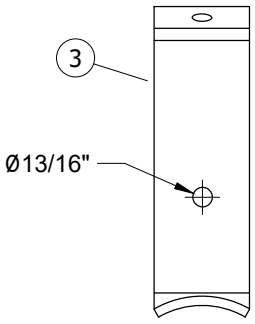



**FIGURE 2**
FRONT VIEW

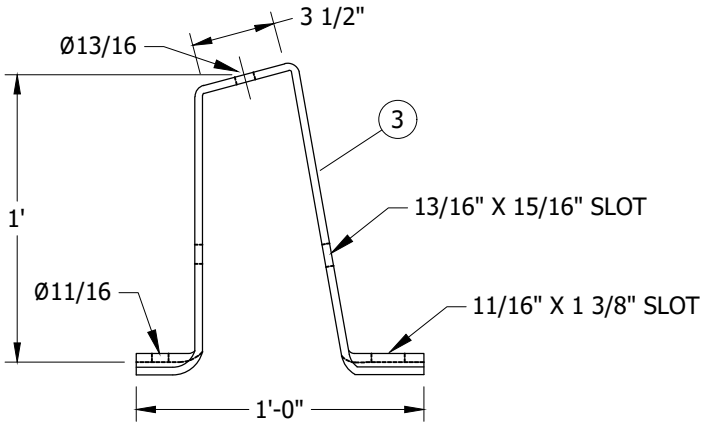



**FIGURE 2**
SIDE VIEW

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION | FIG | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS | SAP CU |
|---|---|---|---|---|---|---|---|
| 3 | BRACKET, INSULATOR, STANDOFF, HORIZONTAL | 2 | AS REQ'D | -- | S166848 | PIB | -- |

**NOTES:** NONE

**REFERENCE:** NONE

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | EDITORIAL CHANGES | - | JIK | JES | CZH | 10/15/2019 | F | MOVED TO FMO | ARC | MRF | GLW | KRG | 02/16/2023 |
| B | UPDATED DIMENSION | - | JC | JH | DW | 09/20/2014 | E | OH390.12 MOVED TO FMO | EDM | JAC | GLW | FRC | 03/01/2022 |
| A | REVISION | - | - | - | PEA/VCR | 01/01/2000 | D | FIGURE UPDATE | EDM | JIK | JES | CZH | 10/12/2020 |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed



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**SCOPE:** THIS STANDARD SHOWS HARDWOOD MOULDING AND STAPLES, USED AS PROTECTIVE COVERING FOR GROUND WIRES UNDER CROSSARMS AND ON POLES.

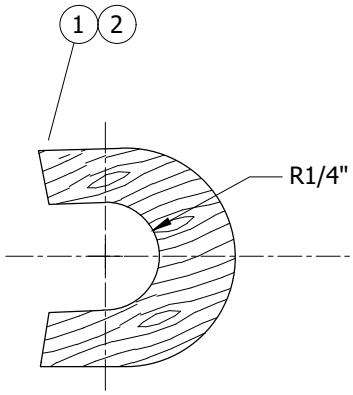



**FIGURE 1**
HARDWOOD MOULDING

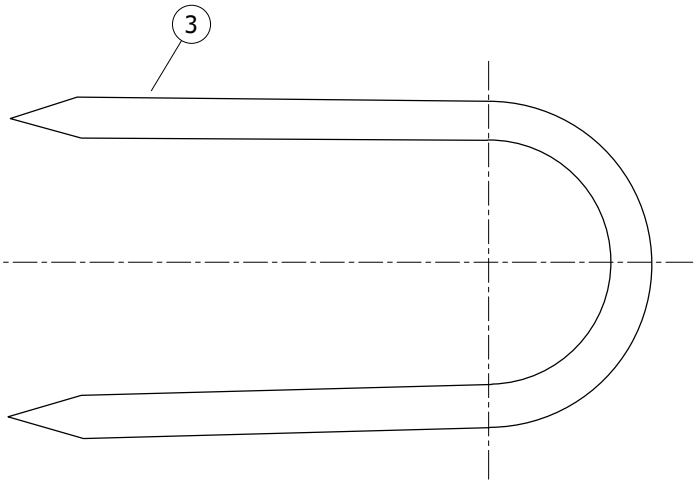



**FIGURE 2**
GALVANIZED STAPLES

## INSTALLATION:

A. STAPLES ARE USED TO ATTACH MOULDING TO POLES AND CROSSARMS.

B. STAPLES ARE TO BE ATTACHED NO MORE THAN 3 FEET APART.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | MOULDING, OAK HARDWOOD 1" X 8'-0" (PLAIN) | 5 | - | S487200 | MLDG |
| 2 | MOULDING, OAK HARDWOOD 1" X 8'-0" (GRAY) | 5 | - | S487184 | - |
| 3 | STAPLES, MOULDING GALVANIZED 3" X 1 1/16" X 1/4" | AS REQ'D | - | S678560 | - |

**NOTES:** NONE

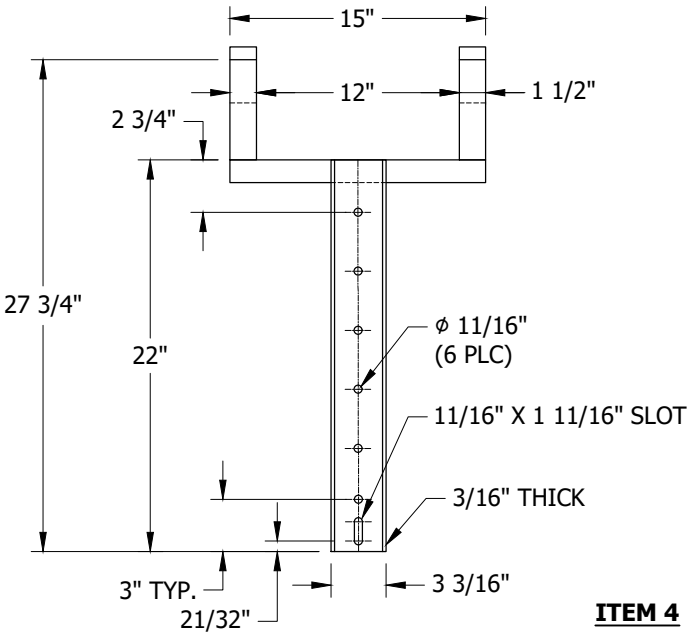
**REFERENCE:** NONE

FIELD MAINTENANCE ONLY

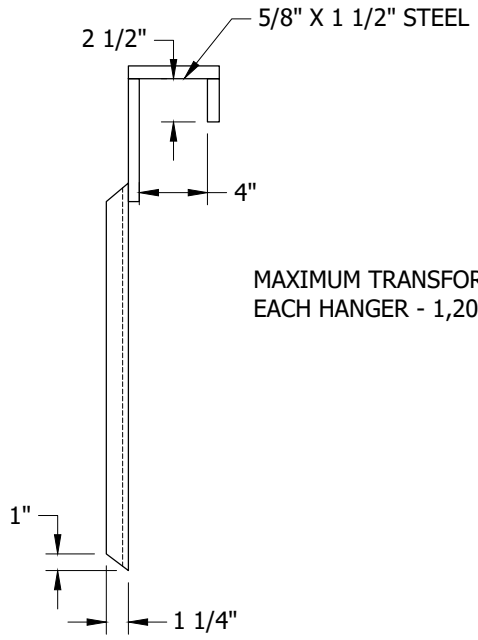
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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | EDITORIAL CHANGES | - | JIK | JES | CZH | 10/15/2019 | F | | | | | | |
| B | UPDATED DIMENSION | - | JC | JH | DW | 09/20/2014 | E | MOVED TO FMO | EDM | JAC | GLW | FRC | 03/01/2022 |
| A | REVISION | - | - | - | PEA/VCR | 01/01/2000 | D | FIGURE UPDATE | EDM | JIK | JES | CZH | 10/12/2020 |

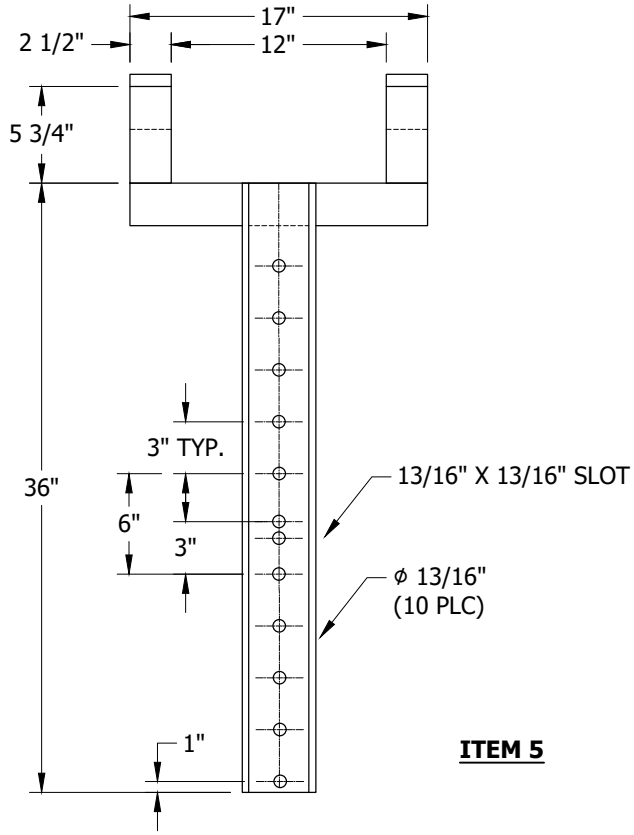
X Indicates Latest Revision | Completely Revised | New Page | Information Removed



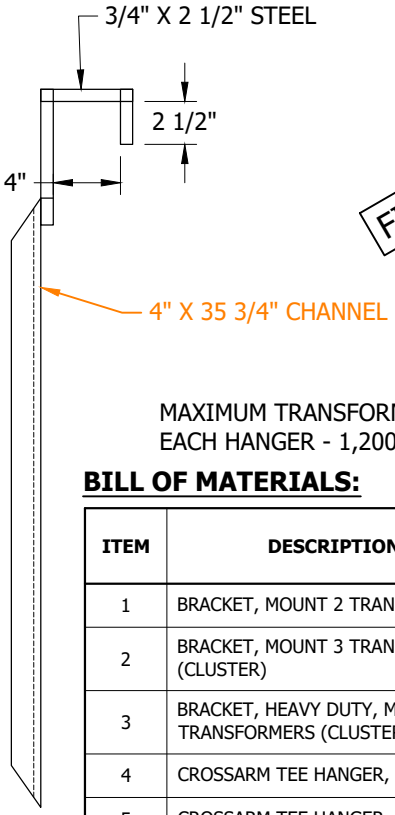

**ITEM 4**




MAXIMUM TRANSFORMER WEIGHT
EACH HANGER - 1,200 LBS




**ITEM 5**




FIELD MAINTENANCE ONLY

MAXIMUM TRANSFORMER WEIGHT
EACH HANGER - 1,200 LBS

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|
| 1 | BRACKET, MOUNT 2 TRANSFORMERS | S407976 | UMB |
| 2 | BRACKET, MOUNT 3 TRANSFORMERS (CLUSTER) | S403008 | CMB |
| 3 | BRACKET, HEAVY DUTY, MOUNT 3 TRANSFORMERS (CLUSTER) | S402920 | CMBHD |
| 4 | CROSSARM TEE HANGER, 22" | S402912 | T1HANG |
| 5 | CROSSARM TEE HANGER, 36" | S402944 | T2HANG |

TABLE OF CONTENTS

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | | F | | | | | | |
| B | MOVED TO FMO | - | JS | JS | MDJ | 09/28/2016 | E | | | | | | |
| A | UPDATED DIMENSION | - | JC | JH | DW | 09/02/2014 | D | | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

TRANSFORMER MOUNTING BRACKETS



FMO OH390.2

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**9/1/2018:** All versions prior to 2018 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| REV | CHANGE | BY | DSGN | APPV | DATE | REV | CHANGE | BY | DSGN | APPV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | GW | JS | CZH | 9/1/2018 | D | | | | | |

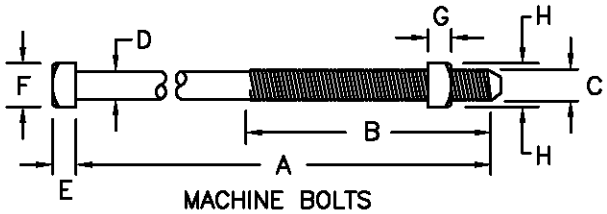
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| | Indicates Latest Revision | | Completely Revised | X | New Page | Information Removed |

SHEET
1 OF 1

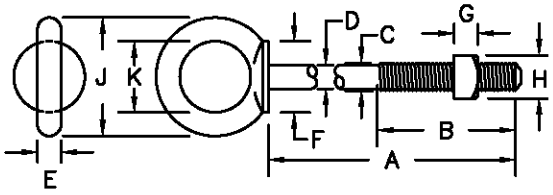
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

LINE MATERIALS
BOLT, LAG SCREW

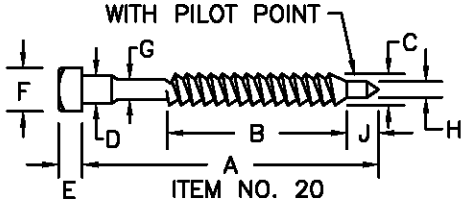
FMO
OH 392



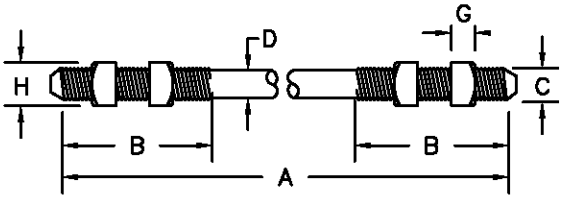

MACHINE BOLTS
ITEMS 1–10



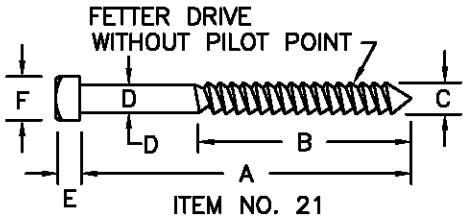

SHOULDER EYE BOLTS
ITEMS 15–18




ITEM NO. 20




SPACE BOLTS
ITEMS 11–14




ITEM NO. 21
LAG SCREWS

| | ITEM | LENGTH. A | B. MIN | C | D | E | F | G | H | J | K | ULT. STRGTH | STOCK NUMBERS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BOLTS AND LAG SCREWS (DIMENSIONS IN INCHES) | | | | | | | | | | | |
| MACHINE BOLTS | 1 | 4–1/2 | 1–1/2 | 3/8 | 11/32 | 9/32 | 9/16 | 5/16 | 5/8 | -- | -- | 5000 LBS. | 158528, WASHERHEAD |
| | 2 | 5 TO 8 | 1–1/2 | 1/2 | 29/64 | 3/8 | 3/4 | 3/8 | 13/16 | -- | -- | 10500 LBS. | 153024 – 153152 |
| | 3 | 8 TO 10 | 4 | | | | | | | | | | 153152–153184 & 152736 |
| | 4 | 5 TO 8 | 3 | 5/8 | 9/16 | 1/2 | 15/16 | 5/8 | 1–1/16 | -- | -- | 15500 LBS. | 155488–155584 |
| | 5 | 8 TO 14 | 4 | | | | | | | | | | 155584 & 155616, 154816 – 154880 |
| | 6 | 16 TO 36 | 6 | | | | | | | | | | 154912, 154944, 155072 – 155200 |
| | 7 | 8 TO 14 | 4 | 3/4 | 11/16 | 3/4 | 1–1/8 | 3/4 | 1–1/4 | -- | -- | 23000 LBS. | 154080, 154112, 153408, 153440 |
| | | 14 TO 30 | 6 | | | | | | | | | | 153440, 153472, 153504, 153632 – 153760 & 153824 |
| | 8 | 32 TO 40 | 6 | | | | | | | | | | 153856, 153888, 153984 |
| | 9 | 14 TO 18 | 2–1/2 | 7/8 | 13/16 | 7/8 | 1–5/16 | 7/8 | 1–7/16 | -- | -- | 33500 LBS. | 155712, 155744, 155776 |
| | 10 | 18 TO 30 | 4 | | | | | | | | | | 155776 THRU 155904 |
| SPACE | 11 | 16 | 7 | 5/8 | 9/16 | -- | -- | 5/8 | 1–1/16 | -- | -- | 15500 LBS. | 156512 |
| | 12 | 18 TO 30 | 8 | | | | | | | | | | 156544 THRU 156736 |
| | 13 | 16 TO 30 | Ⓑ | 5/8 | -- | -- | -- | 5/8 | 1–1/16 | -- | -- | 15500 LBS | -- |
| | | | | 3/4 | -- | -- | -- | 3/4 | 1–1/4 | -- | -- | 26000 LBS. | -- |
| | 14 | 36 TO 40 | Ⓑ | 3/4 | -- | -- | -- | 3/4 | 1–1/4 | -- | -- | 26000 LBS. | 156360, 156370 |
| EYE | 15 | 6 | 4 | 5/8 | 5/8 | 9/16 | 1–3/4 | 5/8 | 1–1/16 | 2–7/8 | 1–3/4 | 12500 LBS. | -- |
| | 16 | 8 TO 20 | 6 | | | | | | | | | | 150784, 150816 |
| | 17 | 6 | 4 | 3/4 | 3/4 | 11/16 | 1–3/4 | 3/4 | 1–1/4 | 3–1/8 | 1–3/4 | 21500 LBS. | -- |
| | 18 | 8 TO 20 | 6 | | | | | | | | | | -- |
| LAG | 20 | 4" | 2–1/8 | 1/2 | 9/16 | 5/16 | 3/4 | 29/64 | 7/32 | 5/8 | -- | -- | 621568 |
| | 21 | 5" | 4 | 5/8 | 9/16 | 1/2 | 7/8 | -- | -- | -- | -- | -- | 621600 |

**INSTALLATION:**

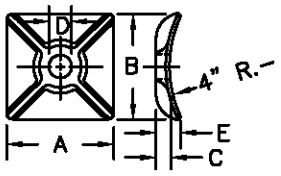
A. ITEMS 1 THRU 21 GALVANIZED PER A.S.T.M. SPECS. A153–53.

Ⓑ COMPLETELY THREADED.

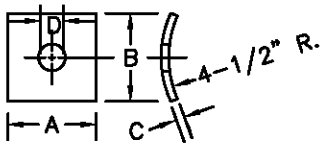
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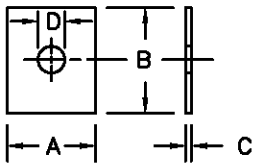
| 392.1 | SDG&E ELECTRIC STANDARDS<br>LINE MATERIALS<br>BOLT, LAG SCREW | REVISION<br>DATE 7–29–83<br>APPD PSA 1/2009 |
|---|---|---|



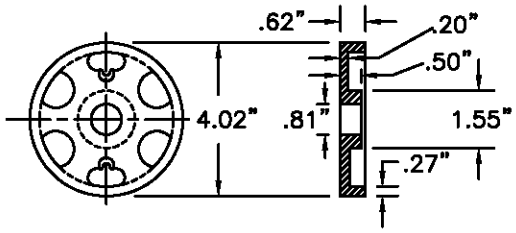

ITEM 30 – 31



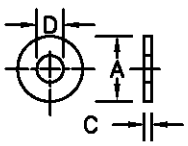

ITEM 32



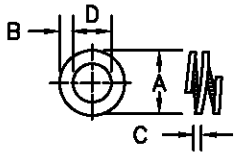

ITEM 35 – 37



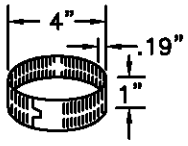

ITEM 52 (C)



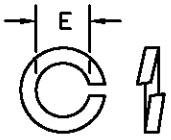

ITEM 41 – 44



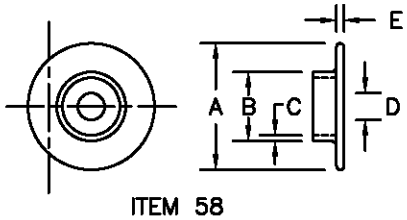

ITEM 47 – 49 (B)




ITEM 53




ITEM 54 – 57




ITEM 58

**BILL OF MATERIAL:**

| SQUARE CURVED WASHERS | | | | | | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| ITEM NO. | A | B | C | D | E | | |
| 30 | 3" | 3" | 5/16" | 11/16" | 5/8" | 797792 | -- |
| 31 | 4" | 4" | 7/16" | 13/16" | 1" | 797760 | RIBWSH |
| 32 | 3" | 3" | 1/4" | 13/16" | -- | 798912 | -- |
| SQUARE FLAT WASHERS | | | | | | | |
| 35 | 3 1/2" | 3 1/2" | 3/8" | 15/16" | -- | 799136 | -- |
| 36 | 3" | 3" | 1/4" | 13/16" | -- | 799104 | SQ-WSH |
| 37 | 2 1/4" | 2 1/4" | 3/16" | 11/16" | -- | 799040 | 5/8SQ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ROUND WASHERS | | | | | | | |
| 41 | 2" | – | 9/64" | 13/16" | – | 800256 | RD-WSH |
| 42 | 1-3/4" | – | 1/8" | 11/16" | – | 800320 | 5/8R |
| 43 | 1-3/8" | – | 7/64" | 9/16" | – | 800192 | 1/2R |
| 44 | 1" | – | 5/64" | 7/16" | – | 800288 | 3/8R |

| DOUBLE COIL SPRING WASHERS (B) | | | | | | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| ITEM NO. | A | B | C | D | E | | |
| 47 | 1-1/4" | 7/32" | 11/64" | 13/16" | -- | 798496 | SP-WSH |
| 48 | 1-1/16 | 3/16" | 9/64" | 11/16" | -- | 798560 | 5/8S |
| 49 | 27/32" | 5/32" | 7/64" | 17/32" | -- | 798464 | 1/2S |
| MISCELLANEOUS | | | | | | | |
| 52 | SHEAR PLATE NO. 2 (C) | | | | | 262240 | SHRPLT |
| 53 | SPLIT RING | | | | | 599584 | SPLT-R |
| 54 | SPRING LOCK WASHER | | | | 3/8" | 796832 | -- |
| 55 | SPRING LOCK WASHER | | | | 1/2" | 796768 | |
| 56 | SPRING LOCK WASHER | | | | 5/8" | 796864 | |
| 57 | SPRING LOCK WASHER | | | | 3/4" | 796800 | LK-WSH |
| CENTERING WASHER | | | | | | | |
| 58 | 2-3/4" | 1-7/16" | 1/8" | 5/8" | 3/16" | 795520 | CTRWSH |

**INSTALLATION:**

A. ITEMS 30 THRU 44 GALVANIZED PER A.S.T.M. SPECS. A153-53.

(B) BACK OFF ONE-QUARTER TURN AFTER WASHER HAS BEEN FULLY COMPRESSED.

(C) THIS ITEM IS NOT EXEMPT.

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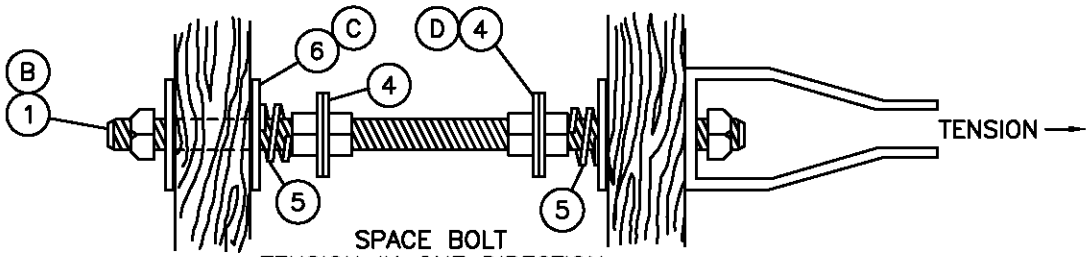
REVISION
DATE 1-1-94
APPD PA / BOB

SDG&E ELECTRIC STANDARDS

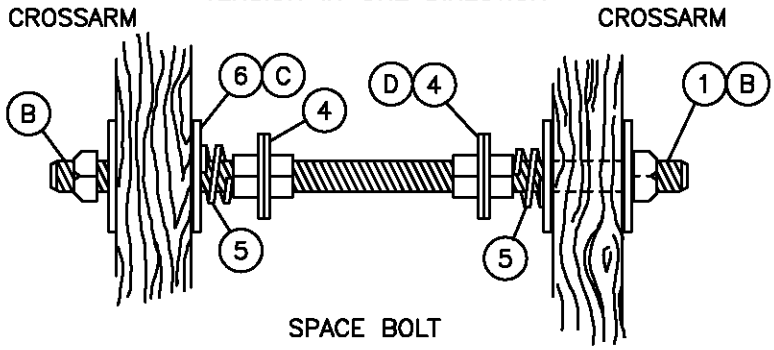
LINE MATERIALS
WASHER

392.2

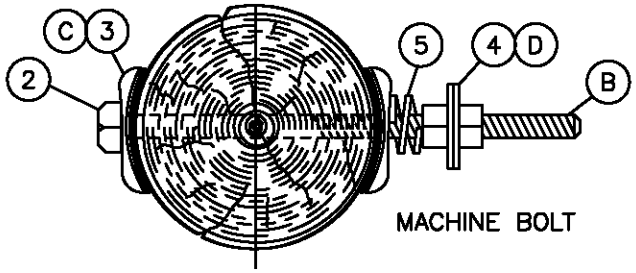
**SCOPE:** THIS STANDARD SHOWS TYPICAL INSTALLATION OF BOLT AND WASHER ASSEMBLIES ON CROSSARMS AND POLES.




SPACE BOLT
TENSION IN ONE DIRECTION




SPACE BOLT
NO TENSION OR TENSION IN EITHER DIRECTION




MACHINE BOLT

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO. | STOCK NUMBER |
|---|---|---|---|---|
| 1 | BOLT, SPACE, GALV, & 6 NUTS (SIZE AS REQ'D) | 1 | 392.1 | – |
| 2 | BOLT, MACH, GALV, & 2 NUTS (SIZE AS REQ'D) | 1 | 392.1 | – |
| 3 | WASHER, SQUARE, CURVED, GALV (SIZE AS REQ'D) | 2 | 392.2 | – |
| 4 | WASHER, ROUND, GALV (SIZE AS REQ'D) | AS REQ'D | 392.2 | – |
| 5 | WASHER, DOUBLE COIL SPRING, GALV (SIZE AS REQ'D) | AS REQ'D | 392.2 | – |
| 6 | WASHER, SQUARE, FLAT, GALV (SIZE AS REQ'D) | 4 | 392.2 | – |

**INSTALLATION:**

A. DOUBLE COIL SPRING LOCK WASHER INSTALLATION.
1. PLACE SQUARE FLAT WASHER AGAINST WOOD.
2. INSTALL DOUBLE COIL WASHER OF PROPER SIZE ON BOLT
3. INSTALL NUT AND TIGHTEN UNTIL COIL IS FULLY COMPRESSED.
4. BACK–OFF NUT APPROXIMATELY 1/4 TURN.

(B) CUT OFF END OF BOLT WHEN IT PROTRUDES MORE THAN 1 INCH BEYOND NUT IN CLIMBING SPACE.

(C) USE FLAT SQUARE WASHERS FOR FLAT SURFACES AND FOR BOLTING TRANSFORMERS TO POLES. USE CURVED SQUARE WASHERS ON CURVED SURFACES WHEN HOLDING GUYS OR CONDUCTORS.

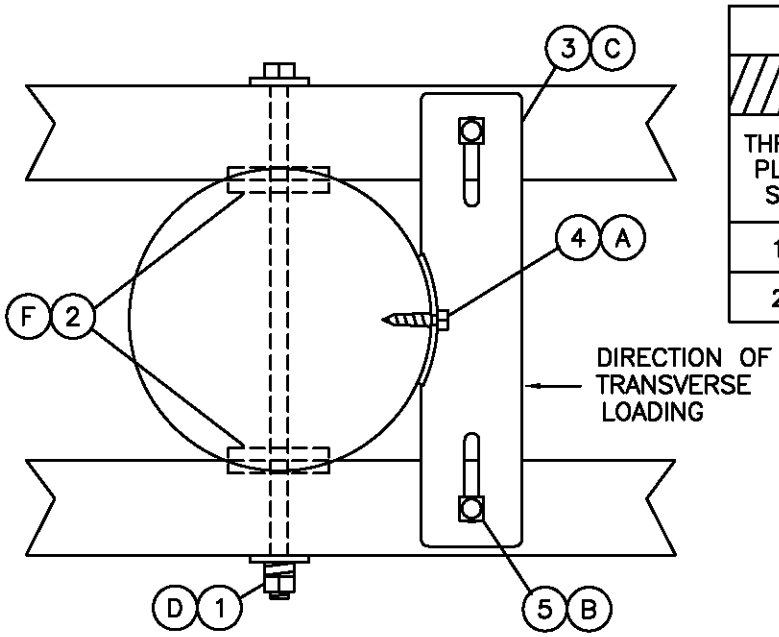
(D) DOUBLE ROUND WASHERS FOR BONDING AND FUTURE BONDING.

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|---|---|---|---|

| 392.3 | SDG&E ELECTRIC STANDARDS<br>TYPICAL BOLT AND WASHER ASSEMBLY | REVISION<br>DATE 1–1–86<br>APPD PSA/ 2009 |
|---|---|---|

**SCOPE:** THIS STANDARD SHOWS TYPICAL INSTALLATION OF SPLIT RINGS AND STEEL THRUST PLATE ON DOUBLE CROSSARMS.




| THRUST PLATE APPLICATION | | | | |
|---|---|---|---|---|
| THRUST PLATE SIZE | DIAMETER OF POLE AT CROSSARM THRU-BOLT (G) | | | |
| | STANDARD CROSSARMS | | HEAVY CROSSARMS | |
| | MIN. | MAX. | MIN. | MAX. |
| 18" | 7-3/4" | 11-3/4" | 5-3/4" | 9-3/4" |
| 22" | 11-3/4" | 15-3/4" | 9-3/4" | 13-3/4" |

**NOTE:** SPLIT RINGS MAY NOT BE REQUIRED. FOR APPLICATION OF THRUST PLATE AND SPLIT RINGS, SEE CONSTRUCTION STANDARD 433.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 1 | STD 392 | – | – |
| 2 | SPLIT RING, GALV, 4" | 2 | – | 599584 | SPLT-R |
| 3 | PLATE, THRUST, GALV, 18" X 4", OR, | 1 | – | 541210 | TPLT18 |
| | 22" X 5" | 1 | – | 541208 | TPLT22 |
| 4 | SCREW, LAG, GALV, 5/8" X 5" | 1 | – | 621600 | – |
| 5 | BOLT, MACH, GALV, 3/4" X 9", 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 2 | – | 154080 | – |

**INSTALLATION:**

(A) BEFORE DRILLING CROSSARMS FOR BOLTING THRUST PLATE TO CROSSARMS, ENSURE THAT THRUST PLATE IS DRIVEN TIGHT AGAINST POLE WITH LAG SCREW.

(B) DRILL THRUST PLATE MOUNTING BOLT HOLES ON CROSSARMS CENTERLINE.

(C) DO NOT BOND STEEL THRUST PLATE OR HARDWARE.

(D) SEE STANDARD 392.3 FOR TYPICAL BOLT AND WASHER ASSEMBLY.

(F) CUT POLE GAIN ON BOTH SIDES WHEN SPLIT RINGS ARE INSTALLED.

(G) ADD 1/2" TO THESE DIMENSIONS IF SPLIT RINGS ARE INSTALLED.

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| REVISION DATE 1-1-94 APPD PA/RDG | SDG&E ELECTRIC STANDARDS | 392.4 |
|---|---|---|
| | TYPICAL SPLIT RING AND STEEL THRUST PLATE ASSEMBLY | |

# OH396 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**06/16/2023:** MOVED TO FMO

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

INSULATOR PINS AND SPACERS

FMO OH396

**SCOPE:** THIS STANDARD SHOWS VARIOUS TYPES OF INSULATOR PINS, POST TOP INSULATOR STUDS, AND FIBERGLASS CONDUCTOR SPACER.

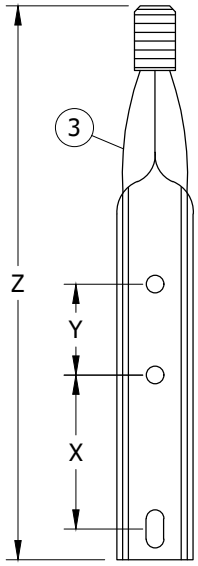



**FIGURE 3**

**INSTALLATION:** NONE

**TABLE 1**

| INSULATOR PIN AND SPACER SPECIFICATIONS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **MAX. ALLOWABLE LOAD (LBS)** | | **Z** | **Y** | **X** | **W** | **STOCK NUMBER** | **DESIGN UNITS** |
| 3 | PIN, POLETOP, FOR STEEL POLE | 600 | 1 3/8" | 2'-0" | 5" | 8" | -- | -- | -- |
| | | | 1" | | | | | S532480 | PTP1 |

**BILL OF MATERIALS:** NONE

**NOTES:**

II. DOUBLE COIL HELICAL SPRING LOCK WASHERS ARE TYPICALLY USED ON WOODEN POLE LINE ASSEMBLIES THAT ARE SUBJECT TO CONSIDERABLE EXPANSION AND CONTRACTION. THE DOUBLE COIL PROVIDES THE TRAVEL NECESSARY TO MAINTAIN EFFECTIVE CLAMPING FORCE IN SUCH ASSEMBLIES. IT CAN BE USED ON STEEL POLE AND FIBERGLASS ASSEMBLIES AS WELL.

**REFERENCE:** NONE

FIELD MAINTENANCE ONLY

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| C | EDITORIAL CHANGES | - | JIK | JES | CZH | 04/20/2019 | F | TABLE UPDATE | EDM | RSL | JES | CZH | 10/12/2020 |
| B | EDITORIAL CHANGES | - | GW | JS | MDJ | 08/29/2017 | E | INFORMATION REMOVED | - | JIK | JES | CZH | 11/12/2019 |

# OH397 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSARM MOUNTING BRACKETS

**SCOPE:** THIS STANDARD SHOWS VARIOUS BRACKETS FOR THE CROSSARM MOUNTING OF EQUIPMENT.

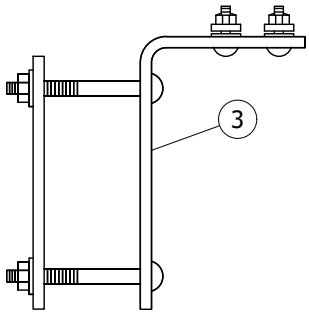



**FIGURE 3**
CROSSARM TERMINAL (A)
MOUNTING BRACKET

## INSTALLATION:

(A) WHEN INSTALLING ON A 6 INCH WIDE CROSSARM, REPLACE BRACKET SUPPLIED CARRIAGE BOLTS WITH 8-INCH CARRIAGE BOLTS.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 3 | BRACKET, TERMINAL CROSSARM MOUNTING | - | - | S166060 | 2/0BKT |
| 4 | BOLT, CARRIAGE, 3/8" X 8" W/SQ NUT (A) (I) | - | - | S150144 | - |

## NOTES:

(I) ITEM NOT SHOWN ON FIGURES.

**REFERENCE**: NONE

FIELD MAINTENANCE ONLY

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| B | TABLE UPDATE | EDM | JIK | JES | CZH | 05/11/2020 | E | | | | | | |
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSARM MOUNTING BRACKETS

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| 420 | VERTICAL CONSTRUCTION 30° TO 60° ANGLES, 12 AND 12.47KV |
| 421 | VERTICAL CONSTRUCTION 60° TO 90° ANGLES, 12 AND 12.47KV |
| 422 | POST INSULATOR AND BRACKET CONSTRUCTION, "4 WAY AND 'T' CORNERS", 12 AND 12.47KV |
| 433 | LINE ANGLES ON CROSSARMS |
| 434 | 750 - 7500 VOLT BUCKARM CORNERS |
| 436 | PRIMARY, SINGLE-PHASE TRANSFORMER INSTALLATION, EXISTING LINE AND BUCK |
| 438 | NEUTRAL INSTALLATION PIN-TYPE OR DEAD-END, 12KV AND BELOW |
| 439 | CROSSARM EXTENSION BRACKET |
| 475 | WOOD POLE TOP EXTENSIONS FOR LINE ARMS OR SERVICE CLEARANCE ARMS - LIGHT DUTY |
| 476 | POLE TOP EXTENSIONS FOR SERVICE CLEARANCE ARMS |


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| C | ADDED 438 | - | JS | IL | MDJ | 8/11/2016 | F | OH433 MOVED TO FMO | EPI | JES | JES | CZH | 10/9/2020 |
| B | ADDED 436 | - | JS | IL | MDJ | 8/11/2016 | E | ADDED 475 | - | JS | IL | MDJ | 8/11/2016 |
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

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SDG&E ELECTRIC OVERHEAD STANDARD

FIBERGLASS SUPPORT CONSTRUCTION, 12KV AND BELOW

FMO OH 413

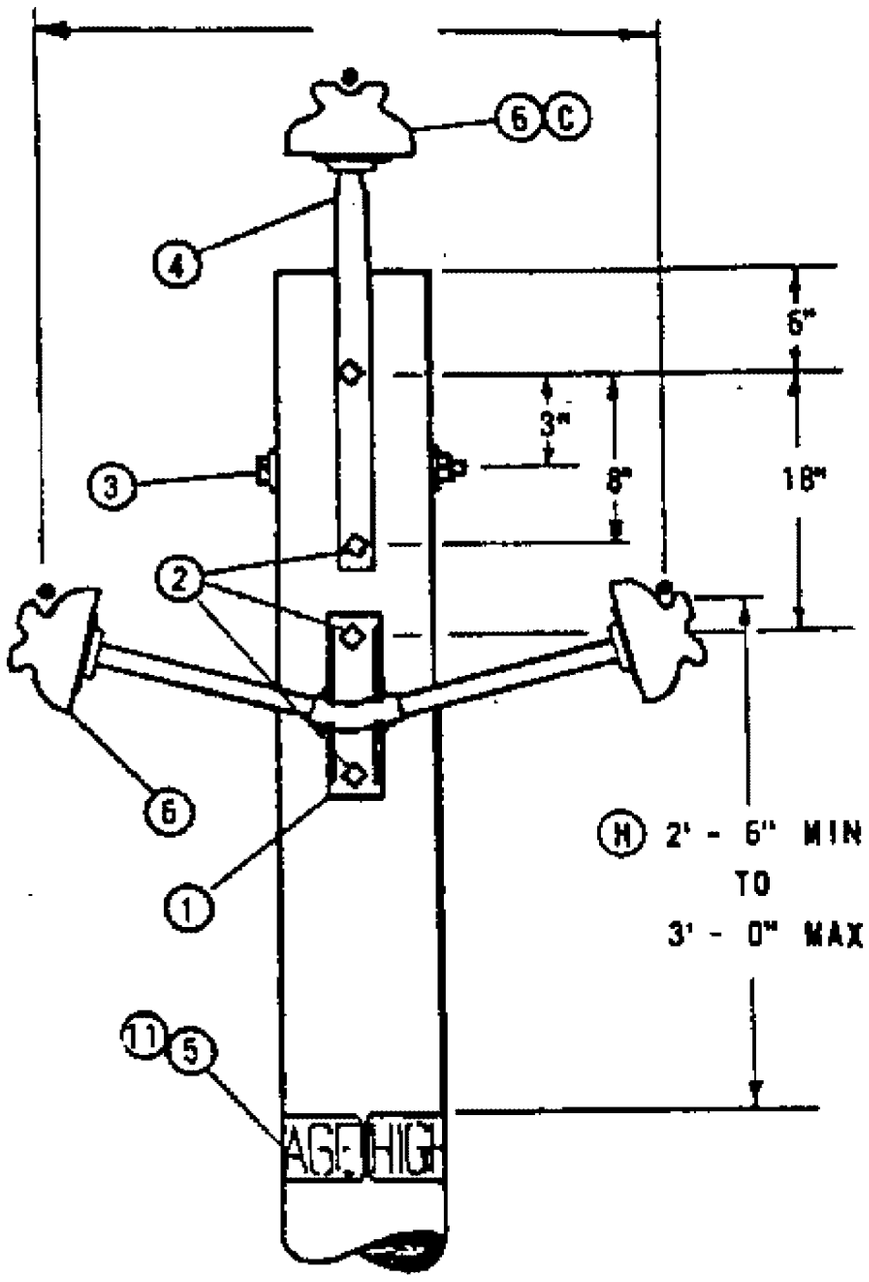



FIGURE 1
WORK ORDER DESIGNATION
"FGS AND PTP"

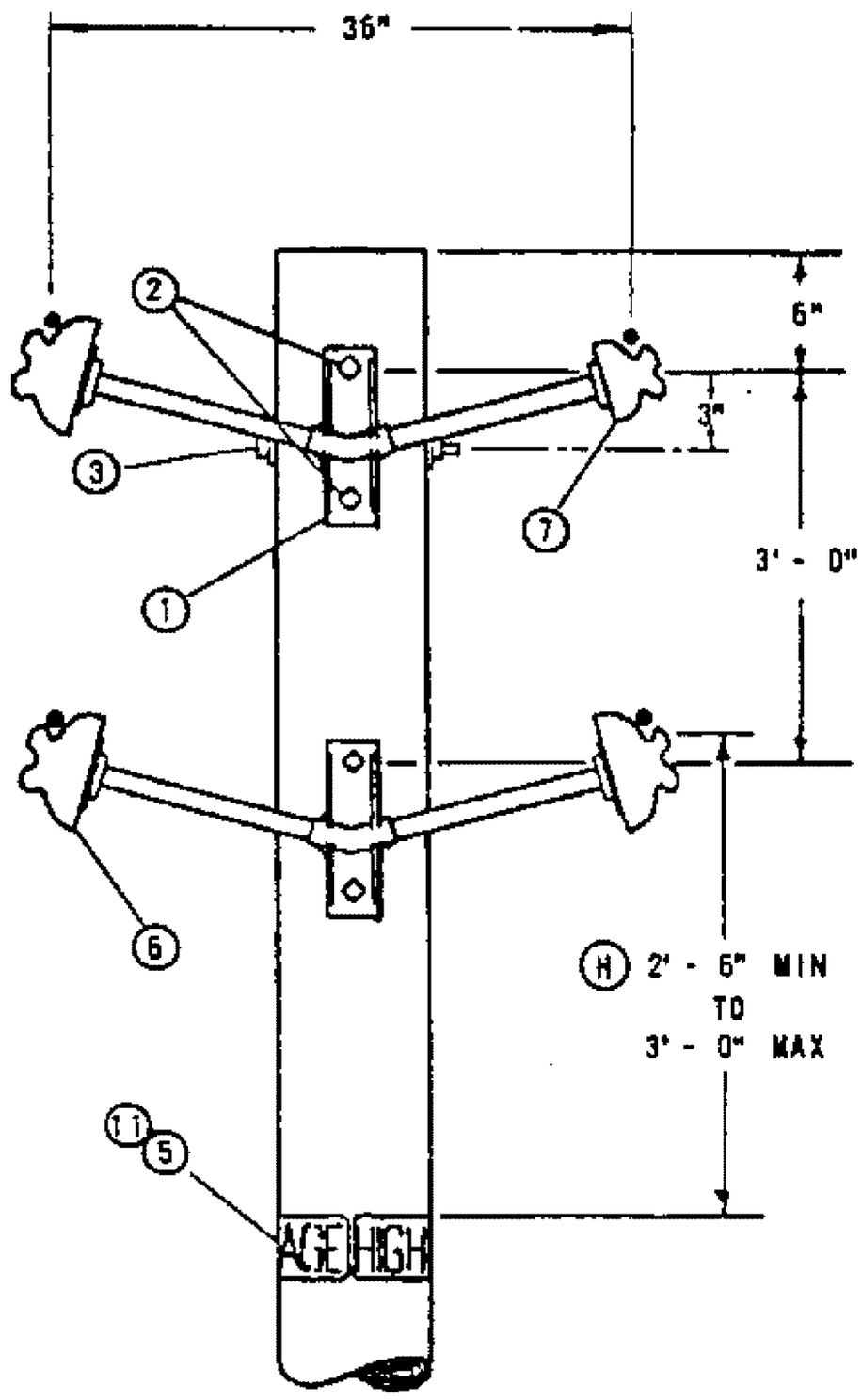



FIGURE 2
WORK ORDER DESIGNATION
"FGS"

NOTES:

A. USE MAXIMUM ANGLE OF DEVIATION OF 2.25°, BASED ON CLIMBING SPACE REQUIREMENTS (G.O. 95, RULE 54.7A2).

B. USE IN CONTAMINATION DISTRICTS 2 AND 3 AS DEFINED ON STANDARDS PAGE 287.

(C) SUBSTITUTE ONE 55-3 FOR ONE 55-5 INSULATOR AND CORRESPONDING PREFORMED TYPE TIE ON NEUTRAL WIRE FOR IDENTIFICATION.

(E) EXEMPT MATERIALS.

(F) ITEM 10 IS PREFERRED OVER ITEMS 8 & 9.

(G) 636 KCM AND 1033.5 KCM CONDUCTORS CANNOT BE USED SINCE NO CLAMP INSULATORS OF THIS TYPE ARE AVAILABLE.

(H) THESE DIMENSIONS ARE IN ACCORDANCE WITH G.O. 95.

I MAXIMUM SPAN LENGTH FOR THIS CONSTRUCTION IS 200'. IF SPAN LENGTH IS GREATER, PLEASE CONTACT SYSTEM STANDARDS.

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY FIG. 1 1Ø | QUANTITY FIG. 1 3Ø | QUANTITY FIG. 2 4 WIRE | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|---|---|
| 1 | | BRACKET, 2 PHASE PIN | 1 | 1 | 2 | 166912 |
| 2 | | BOLT, MACH 5/8 X ___", 1-2 1/4" FLAT WASH., 1 DBL COIL SPR. WASH. (E) | 2 | 4 | 4 | PGS 139, 140 |
| 3 | | BOLT, MACH 5/8" X ___", 2-2 1/4" FLAT WASH., 1 DBL COIL SPR WASH. (E) | 1 | 1 | 1 | PGS 139, 140 |
| 4 | | PIN, POLE TOP, 24", 1" LEAD THREADS | - | 1 | - | 532480 |
| 5 | | SIGN, HIGH VOLTAGE (E) | 2 | 2 | 2 | 647615 |
| | 6 | INSULATOR, PIN TYPE, CLASS 55-5 | 2 | 3 | 3 | 429056 |
| | 7 | INSULATOR, PIN TYPE, CLASS 55-3 | (C) | (C) | 1 | 429216 |
| | 8 | WIRE TIE, (F) | IF REQ'D. | | | 700 SECTION |
| | 9 | GUARD, LINE, ALUM CONDUCTOR (F) | IF REQ'D. | | | 700 SECTION |
| | 10 | TIE, PREFORMED, ALUMINUM CONDUCTORS, (F) | 2 | 3 | 4 | PG 760 |
| 11 | | NAILS, 1 3/4" GALV (E) | 16 | 16 | 16 | 492192 |

APP'D JLWK
SYS STDS ENGR

SDG&E ELECTRIC STANDARDS

FIBERGLASS SUPPORT CONSTRUCTION, 12KV AND BELOW

499.101
SUPERCEDES
413 (1-1-92)

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SDG&E ELECTRIC OVERHEAD STANDARD

POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 0° TO 5°, 12 AND 12.47KV

FMO OH 414

**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 AND 12.47 KV LINES WITH A LINE ANGLE NOT EXCEEDING 5°, USING ARMLESS VERTICAL CONSTRUCTION.

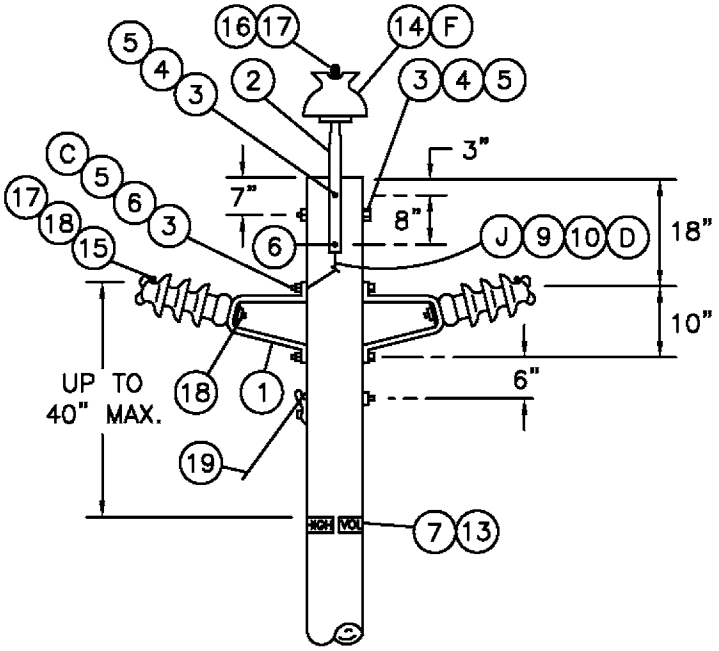



FIGURE 1

POLE TOP POSITION 3 WIRE CIRCUIT,
WORK ORDER DESIGNATION PTP, PIB, & TPI

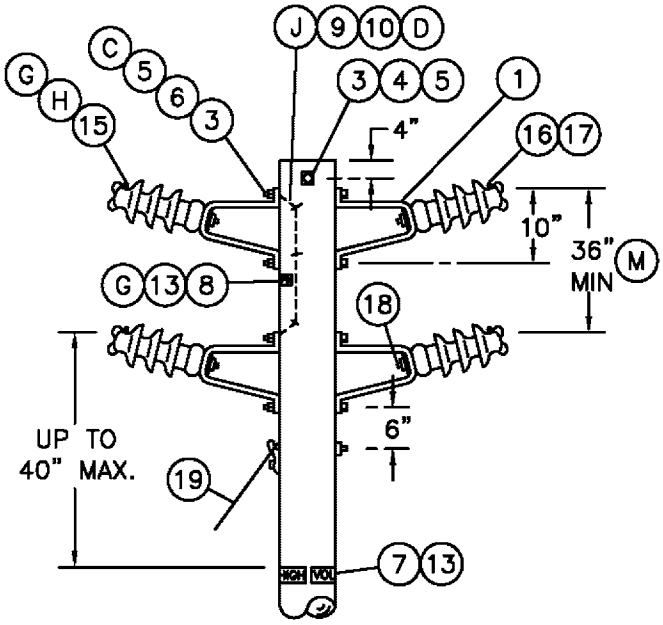



FIGURE 2

POLE TOP POSITION 2, 3, OR 4 WIRE CIRCUIT,
WORK ORDER DESIGNATION PIB & TPI

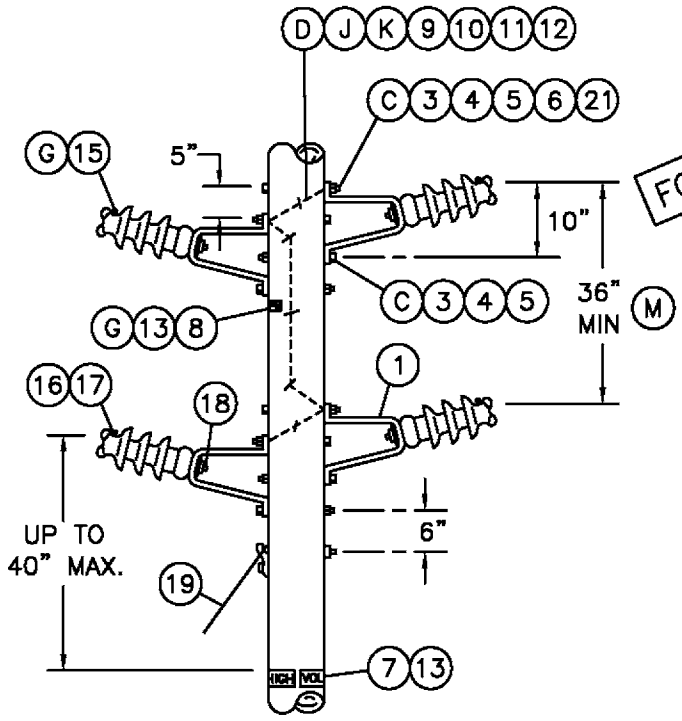



FIGURE 3

BELOW POLE TOP POSITION 2, 3, OR 4 WIRE CIRCUIT
WORK ORDER DESIGNATION PIB & TPI

FOR FIELD MAINTENANCE ONLY

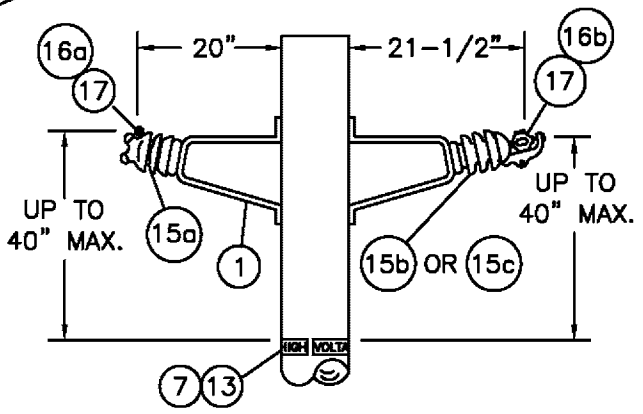



FIGURE 4

HORIZONTAL POST INSULATOR
WORK ORDER DESIGNATION PIB, TPI, & HPI

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| DATE 1-1-96<br>APPD PA/BOG | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION,<br>ANGLES 0° TO 5°, 12 AND 12.47KV | 499.102<br>SUPERSEDES<br>414.1 (1-1-96) |

**INSTALLATION:**

A. CLIMBING SPACE MUST BE PROVIDED PER STANDARDS PAGE 252.

B. USE CLAMP TOP LINE POST INSULATORS AND CLAMPS FOR 1033 KCMIL ACSR.

(C) INSTALL DOUBLE COIL SPRING WASHER SO IT CONTACTS BRACKET.

(D) BONDING OF THE BRACKETS IS ONLY REQUIRED WITHIN HEAVY CONTAMINATION AREA, DISTRICT 1 ON PAGE 287. USE BONDING PROVISIONS ON BRACKETS, IF THEY ARE FURNISHED.

(F) SUBSTITUTE A CLASS 55-3 INSULATOR (STOCK NO. 429216) FOR NEUTRAL IDENTIFICATION.

(G) IF A SMALLER LINE POST INSULATOR IS NOT AVAILABLE FOR NEUTRAL AS COMPARED TO THOSE ON THE PHASE POSITION, THE "PN" SIGN SHALL BE USED TO IDENTIFY THE NEUTRAL.

(H) RESISTANCE GLAZE (RG) CLAMP TOP POST INSULATORS (STOCK NO 428952) SHALL BE USED WHEN AVAILABLE ON TRIAL APPLICATIONS ON PHASE CONDUCTORS IN HEAVY CONTAMINATION AREAS AS DEFINED ON PAGE 287 AND ONLY USING FIGURE 2 CONSTRUCTION. CONDUCTOR CLAMPS ARE REQUIRED WITH "RG" INSULATORS. INSTALL A "DO NOT WASH" SIGN ABOVE THE POLE TAGS IN SIGHT OF ON-COMING TRAFFIC.

I. USE FIGURES 2 OR 3 WHERE NEUTRAL MAY BE REQUIRED IN THE FUTURE. CONSULT WITH DISTRICT ENGINEER.

(J) TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.), DO NOT LOCATE BOND WIRE STAPLES WITHIN 1" OF BOLTS.

(L) ORDER (ITEM 18) FOR HPI ONLY.

(M) FOR SPAN LENGTHS GREATER THAN 250', THE CONDUCTOR SPACING IS DETERMINED BY THE FORMULA:

$$\text{SPACING} = 3' + \left[\frac{\text{SPAN LENGTH} - 250'}{50}\right]$$

IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

N. AN INSULATOR MOUNTED DIRECTLY ON THE SIDE OF A POLE SHALL BE CONSIDERED AS IN A HORIZONTAL POSITION (SEE FIG. 4). AN INSULATOR MOUNTED DIRECTLY AT THE TOP OF THE POLE IN A VERTICAL POSITION SHALL BE CONSIDERED AS IN A VERTICAL POSITION (SEE G.O. 95 RULE 54.11 A).

**BILL OF MATERIAL:**

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY FIG. 1 | QUANTITY FIG. 2 2 WIRE | QUANTITY FIG. 2 3 WIRE | QUANTITY FIG. 2 4 WIRE | QUANTITY FIG. 3 2 WIRE | QUANTITY FIG. 3 3 WIRE | QUANTITY FIG. 3 4 WIRE | STOCK NO. OR CONSTR STDS | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BRACKET, POST INSULATOR (PIB) | 2 | 2 | 3 | 4 | 2 | 3 | 4 | 166848 | PIB |
| 2 | PIN, POLE TOP 24", 1" OR 1 3/8" LEAD THREAD AS REQ'D | 1 | – | – | – | – | – | – | 532480 | PTP1 |
| 3 | BOLT, MACH, 5/8" X ___" | 5 | 3 | 5 | 5 | 4 | 6 | 8 | STD 392 | – |
| 4 | WASHER, 2 1/4" SQ FLAT | 4 | 2 | 4 | 2 | 4 | 6 | 8 | STD 392 | – |
| 5 | WASHER, 5/8" DOUBLE COIL SPRING | 5 | 3 | 5 | 5 | 4 | 6 | 8 | STD 392 | – |
| 6 | WASHER, 5/8" ROUND (WHERE BONDING IS REQ'D (D)) | 4 | – | 4 | 4 | 4 | 6 | 8 | STD 392 | – |
| 7 | SIGN, HIGH VOLTAGE | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 647648 | HV |
| 8 | SIGN, PN (PRIMARY NEUTRAL) IF REQ'D | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 648000 | PN |
| 9 | WIRE, BARE SOLID ANNEALED COPPER #8 (WHERE BONDING IS REQ'D) | 3' | – | 6' | 6' | 2' | 6' | 8' | 812928 | BOND8 |
| 10 | STAPLES, GALV FENCE 1 1/4" (WHERE BONDING IS REQ'D) | 2 | – | 4 | 4 | 1 | 4 | 5 | 678528 | – |
| 11 | MOULDING, 1" HARDWOOD | – | – | – | – | – | 2.5 | 2.5 | 487200 | MLDG |
| 12 | STAPLES, MOULDING GALV 3" X 1 1/16" X 1/4" | – | – | – | – | – | 2 | 2 | 678560 | – |
| 13 | NAILS, 1 3/4" GALV | AS REQ'D | | | | | | | 492192 | – |
| 14 | INSULATOR, PIN TYPE, CLASS AS REQ'D | 1 | – | – | – | – | – | – | 700 SECTION | – |
| 15 | INSULATOR, POST a TIE TOP (TPI) | 2 | 2 | 3 | 4 | 2 | 3 | 4 | 700 SECTION | – |
| | INSULATOR, POST b HORIZONTAL CLAMP TOP (HPI) | | | | | | | | | |
| | INSULATOR, POST c HORIZONTAL CLAMP TOP RG (HPI) (H) | – | | | | – | – | – | | |
| 16 | TIE a FORMED OR WIRE | 3 | 2 | 3 | 4 | 2 | 3 | 4 | 700 SECTION | – |
| | TIE b CLAMP, HORIZONTAL POST INSULATOR | | | | | | | | | |
| 17 | GUARD, LINE, ALUMINUM, IF REQ'D | 3 | 2 | 3 | 4 | 2 | 3 | 4 | PG 759 | – |
| 18 | STUD, LINE POST, 5/8" X 1 3/4" (L) | 2 | 2 | 3 | 4 | 2 | 3 | 4 | 701728 | STUD-S |
| 19 | GUY | AS REQ'D | | | | | | | 900 SECTION | |
| 20 | SIGN, "DO NOT WASH" (H) | IF REQ'D | | | | | | | 648024 | NOWASH |
| 21 | NUT, 5/8" GALV | AS REQ'D | | | | | | | 506880 | – |

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**REVISION HISTORY:**

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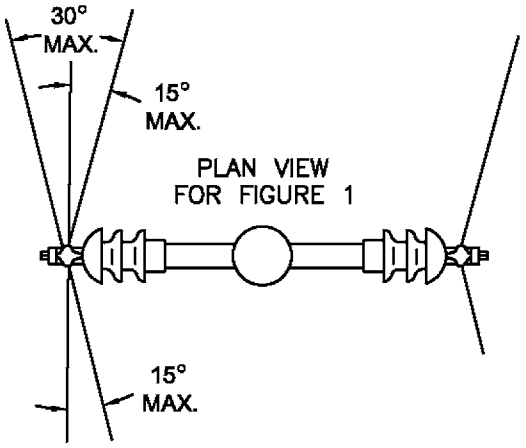
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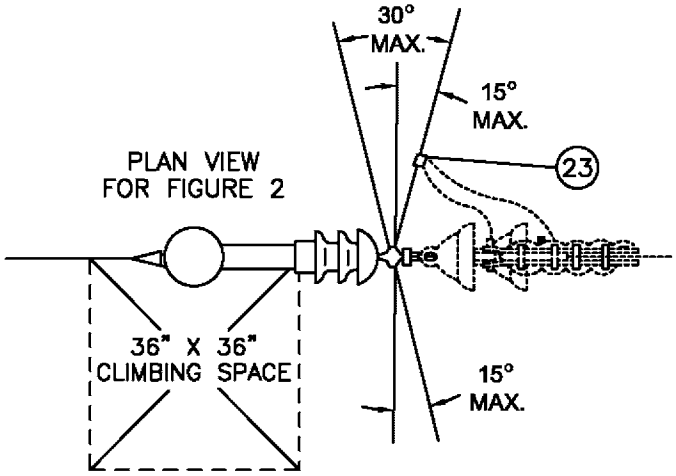
SDG&E ELECTRIC OVERHEAD STANDARD

POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 5° TO 30°, 12 AND 12.47KV

FMO OH 415

**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 AND 12.47KV LINES WITH A LINE ANGLE GREATER THAN 5°, BUT NOT EXCEEDING 30°, USING ARMLESS VERTICAL CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

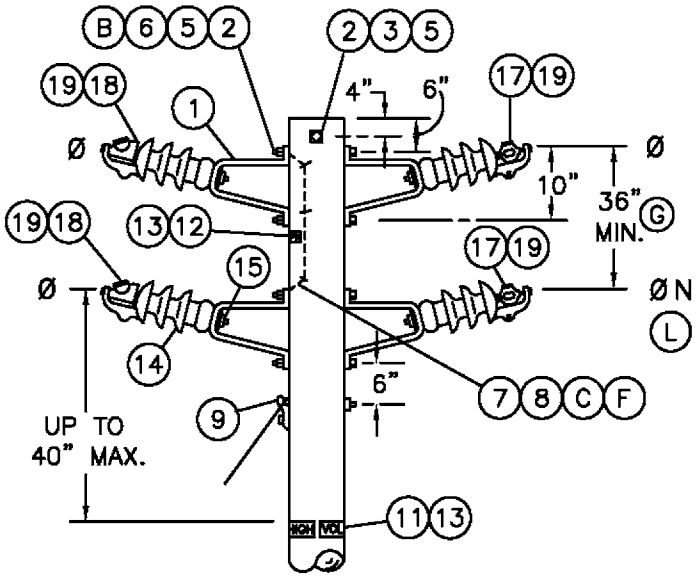



FIGURE 1 (J)

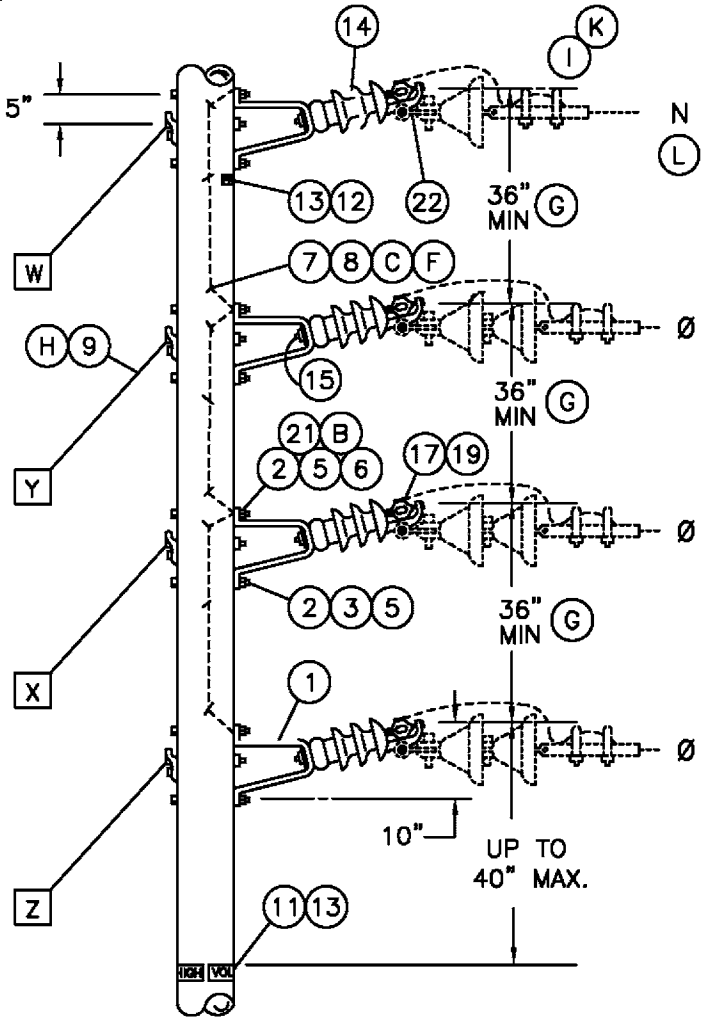



FIGURE 2

2, 3, OR 4 WIRE CIRCUIT,
ANGLES TO 30° BELOW POLE TOP
WORK ORDER DESIGNATION PIB & HPI

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| 499.104<br>SUPERSEDES<br>415.1 (9–13–05) | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION,<br>ANGLES 5° TO 30°, 12 AND 12.47KV | DATE 9–13–05<br>APPD PBA / JJ |

**INSTALLATION:**

A. CLIMBING SPACE MUST BE MAINTAINED PER STANDARD 252.

(B) INSTALL DOUBLE COIL SPRING WASHER SO IT CONTACTS BRACKET.

(C) BONDING OF THE BRACKETS IS ONLY REQUIRED WITHIN HEAVY CONTAMINATION AREA, DISTRICT 1, AS SHOWN ON STANDARD 287. USE BONDING PROVISIONS ON BRACKETS, IF THEY ARE FURNISHED.

(D) RESISTANCE GLAZE (RG) CLAMP TOP POST INSULATORS SHALL BE USED ONLY ON FIGURE 1 CONSTRUCTION WHEN AVAILABLE ON TRIAL APPLICATION ON PHASE CONDUCTORS IN HEAVY CONTAMINATION AREA. INSTALL A "DO NOT WASH" SIGN ABOVE THE POLE TAGS IN SIGHT OF ON-COMING TRAFFIC.

(F) TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.) DO NOT LOCATE BOND WIRE STAPLES WITHIN 1" OF BOLTS.

(G) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA:

$$\text{SPACING} = 3' + \left[\frac{\text{SPAN LENGTH} - 250'}{50}\right]$$

IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

(H) ADD THE GUYS IN ORDER INDICATED (W,X,Y,Z) AS REQUIRED IN THE GUYING SECTION.

(I) WHERE REQUIRED TO ADD A TAP TO THIS CONSTRUCTION, ATTACH DEADEND ASSEMBLY ON PAGE 422.1 AND 422.2 TO HPIs WITH DEADEND CLEVIS. IF PAGE 756 REQUIRES THIS ASSEMBLY TO BE BONDED, CONTACT DISTRIBUTION STANDARDS.

(J) WHERE REQUIRED TO ADD A TAP TO THIS CONSTRUCTION, USE FIG. 2.

(K) PER G.O.-95 RULE 54.4-C4 (b), ONLY TWO CONDUCTORS ARE ALLOWED TO BE DEAD ENDED FOR 4 KV OPERATION.

**REFERENCE:**

(L) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

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**BILL OF MATERIAL:**

FOR FIELD MAINTENANCE ONLY

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY FIGURE 1 2 WIRE | FIGURE 1 3 WIRE | FIGURE 1 4 WIRE | FIGURE 2 2 WIRE | FIGURE 2 3 WIRE | FIGURE 2 4 WIRE | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | BRACKET, POST INSULATOR (PIB) | 2 | 3 | 4 | 2 | 3 | 4 | 166848 |
| 2 | | BOLT, MACH, 5/8" X __" | 2 | 4 | 4 | 4 | 6 | 8 | STD.139 |
| 3 | | WASHER, 2 1/4" FLAT SQ WASH. | – | 2 | – | 2 | 2 | 4 | 799040 |
| 4 | | WASHER, 3" CURVED SQ WASH. | – | – | – | 2 | 4 | 4 | 797792 |
| 5 | | WASHER, 5/8" DBL COIL SPRING | 2 | 4 | 4 | 4 | 6 | 8 | 798560 |
| 6 | | WASHER, 5/8" ROUND | – | 4 | 4 | 4 | 6 | 8 | 800320 |
| 7 | | WIRE, #8 SOLID BARE ANNEALED COPPER | – | 5' | 5' | 2' | 8' | 8' | 812928 |
| 8 | | STAPLES, 1 1/4" FENCE | – | 3 | 3 | 1 | 4 | 5 | 678528 |
| 9 | | GUY | AS REQ'D | | | | | | 900 SECTION |
| 10 | | | | | | | | | |
| 11 | | SIGN, HIGH VOLTAGE | 2 | 2 | 2 | 2 | 2 | 2 | 647648 |
| 12 | | SIGN, PRIMARY NEUTRAL, (PN) | 2 IF REQ'D | 2 IF REQ'D | 2 | 2 IF REQ'D | 2 IF REQ'D | 2 | 648000 |
| 13 | | NAILS, 1 3/4" | 24 | 24 | 24 | 24 | 24 | 24 | 492192 |
| | 14 | INSULATOR CLAMP TOP POST a HORIZONTAL | | | | 2 | 3 | 4 | 700 SECTION |
| | | INSULATOR CLAMP TOP POST b HORIZONTAL RG (D) | 2 | 3 | 4 | – | – | – | |
| | 15 | STUD, LINE POST, 5/8" X 1 3/4" | 2 | 3 | 4 | 2 | 3 | 4 | 701728 |
| | 16 | | | | | | | | |
| | 17 | CLAMP, POST INSULATOR, STANDARD | 1 | 2 | 2 | 1 | 2 | 2 | STD. 773 |
| | 18 | CLAMP, POST INSULATOR, ANGLE | 1 | 1 | 2 | 1 | 1 | 2 | STD. 773 |
| | 19 | GUARD, LINE, ALUMINUM, IF REQ'D | 2 | 3 | 4 | 2 | 3 | 4 | STD. 759 |
| 20 | | SIGN "DO NOT WASH" & 8 NAILS (IF REQ'D)(D) | 1 | 1 | 1 | 1 | 1 | 1 | 648024/492192 |
| 21 | | NUT, 5/8" GALV | AS REQ'D | | | | | | 506880 |
| | 22 | CLEVIS, DEADEND (I) | 2 | 3 | 4 | 2 | 3 | 4 | 235776 |
| | 23 | CONNECTOR, WIRE | – | – | – | 4 | 6 | 8 | STD. 783-787 |

DATE 9-20-05
APPD PBA / JJ

SDG&E ELECTRIC STANDARDS

POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 5° TO 30°, 12 AND 12.47KV

499.105
SUPERSEDES
415.2 (9-20-05)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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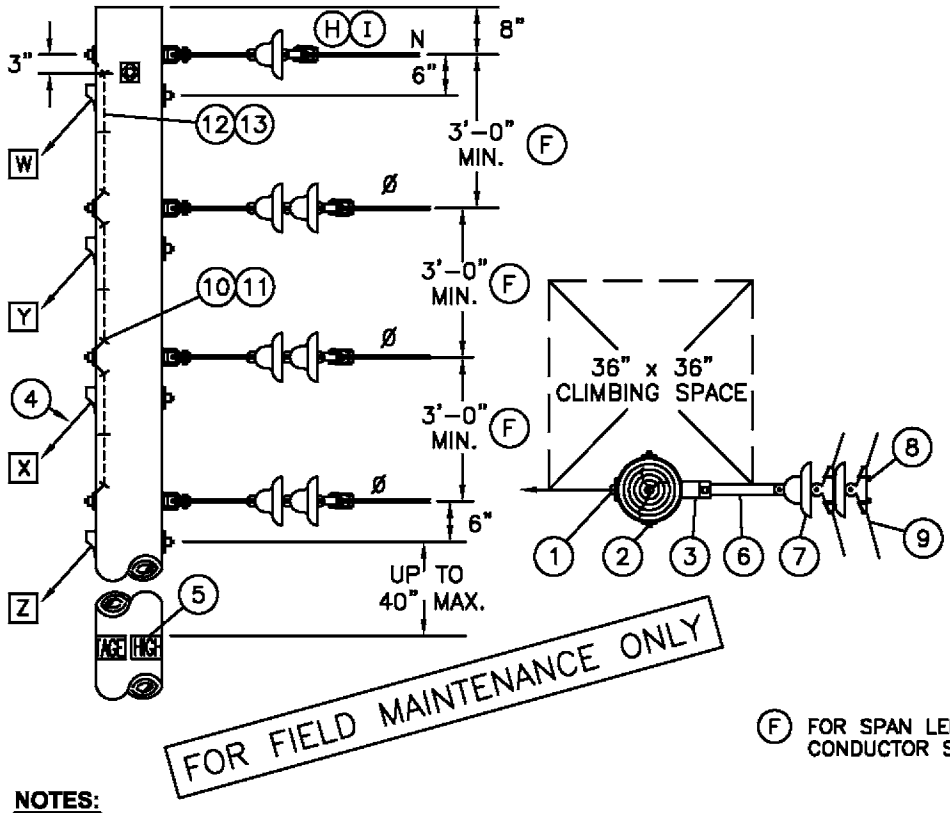
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

VERTICAL CONSTRUCTION 30° TO 60° ANGLES, 12 AND 12.47KV

FMO OH 420

**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 & 12.47 KV LINES WITH A LINE ANGLE GREATER THAN 30°, BUT NOT EXCEEDING 60°, USING ARMLESS VERTICAL CONSTRUCTION.




| 12KV VERTICAL CONSTRUCTION ASSEMBLY – MACRO UNITS | | | |
|---|---|---|---|
| TYPE | QUANTITY 12KV DE | QUANTITY NDE | MU ID |
| 1/2 Y | 1 | 1 | HY1N |
| 1/2 Y | 2 | – | HY2 |
| 1/2 Y | 2 | 1 | HY2N |
| 1/2 Y | 3 | – | HY3 |
| 1/2 Y | 3 | 1 | HY3N |
| Y | 2 | 2 | Y1N |
| Y | 4 | – | Y2 |
| Y | 4 | 2 | Y2N |
| Y | 6 | – | Y3 |
| Y | 6 | 2 | Y3N |
| Z | 1 | 1 | Z1N |
| Z | 2 | – | Z2 |
| Z | 2 | 1 | Z2N |
| Z | 3 | – | Z3 |
| Z | 3 | 1 | Z3N |

**NOTES:**

A. MINIMUM VERTICAL PHASE TO PHASE SPACING OF TWO FEET MAY BE USED TO ELIMINATE POLE CHANGEOUTS ON FULL TENSION SPANS 100 FEET AND SHORTER.

B. INSTALL GUYS IN ORDER INDICATED ABOVE (W,X,Y,Z) AS REQUIRED BY THE "GUYING SECTION".

C. USE BONDING INSULATORS OR INSTALL NON STATIC CLIPS (237648) ON UNBONDED SUSPENSION INSULATORS WHEN THE RESULTANT MAXIMUM GUYING TENSION PER PHASE AT THESE ANGLES IS LESS THAN 1500 POUNDS.

D. TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.), DO NOT LOCATE STAPLES WITHIN 1" OF BOLTS.

(F) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA: SPACING=3'+ $\left[\frac{\text{SPAN LENGTH}-250'}{50}\right]$

IF SPAN IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

G. THE WORK ORDER DESIGNATION FOR THIS CONSTRUCTION IS "Z–CORNER".

(H) PER G.O. 95 RULE 54.4 – C4 (b), ONLY TWO CONDUCTORS ARE ALLOWED TO BE DEAD ENDED FOR 4 KV OPERATION.

(I) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY 1Ø | QUANTITY 3Ø | QUANTITY 3Ø & N | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| 1 | BOLT, MACH, GALV 5/8" X ___", 1–3" SQ CURV WASH., 1 DBL COIL WASHER, 2–5/8" RD WASH. & 1 NUT | 2 | 3 | 4 | STD.392 |
| 2 | BOLT, MACH, GALV 5/8" X ___", 2–2 1/4" SQ WASH., 1 DBL COIL WASH., 2–5/8" RD WASH. | 1 | 1 | 1 | STD.392 |
| 3 | CLEVIS, DEADEND 5/8" BOLT STEEL (OPEN TYPE) | 2 | 3 | 4 | 235618 |
| 4 | GUY | AS REQ'D | | | 900 SECTION |
| 5 | SIGN, HIGH VOLTAGE & 9 NAILS | 2 | 2 | 2 | 647648, 492192 |
| 6 | LINK, EXTENSION, 12KV, 1/2" X 2" X 12" | 2 | 3 | 4 | 466240 |
| 7 | INSULATOR, SUSPENSION | 4 | 6 | 7 | PG 750 |
| 8 | CLAMP, SUSPENSION | 2 | 3 | 4 | STD. 776 |
| 9 | GUARD, LINE, ALUMINUM | 2 | 3 | 4 | STD. 759 |
| 10 | WIRE, BOND, BARE SOLID ANNEALED, COPPER, #8 | 4' | 6' | 8' | 812928 |
| 11 | STAPLE, FENCE | 3 | 6 | 9 | 678528 |
| 12 | MOULDING, HARDWOOD, 1" (OTHER THAN TOP CIRCUIT ON POLE) | 3'–6" | 5'–6" | 7'–6" | 487200 |
| 13 | STAPLES, MOULDING, GALV, 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) | 2 | 4 | 6 | 678560 |

| 499.201 SUPERSEDES 420 (9–12–05) | SDG&E ELECTRIC STANDARDS | DATE 9–12–05 |
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| | VERTICAL CONSTRUCTION 30° TO 60° ANGLES, 12 AND 12.47KV | APPD PSA / JJ |

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**REVISION HISTORY:**

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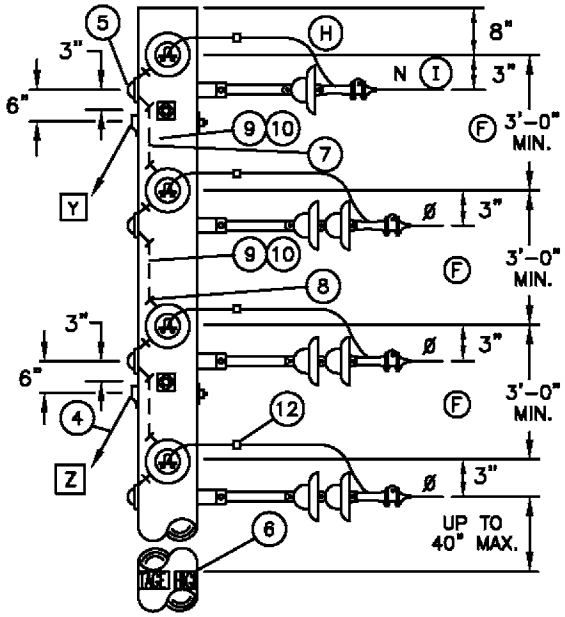
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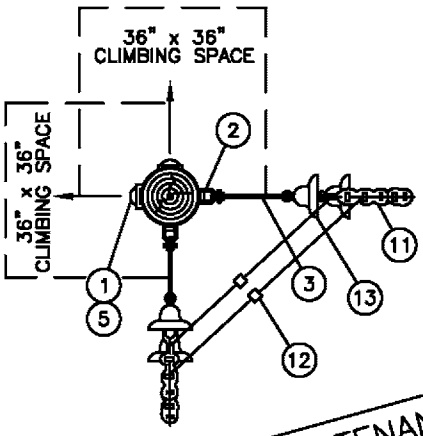
SDG&E ELECTRIC OVERHEAD STANDARD

VERTICAL CONSTRUCTION 60° TO 90° ANGLES, 12 AND 12.47KV

FMO OH 421

**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 & 12.47 KV LINES WITH A LINE ANGLE GREATER THAN 60°, BUT NOT EXCEEDING 90°, USING ARMLESS VERTICAL CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. MINIMUM VERTICAL PHASE TO PHASE SPACING OF TWO FEET MAY BE USED TO ELIMINATE POLE CHANGEOUTS ON FULL TENSION SPANS 100 FEET AND SHORTER.

B. INSTALL GUYS IN ORDER INDICATED ABOVE (Y,Z) AS REQUIRED BY THE "GUYING SECTION" AND IN COMPLIANCE WITH G.O. 95 RULE 54.7A4.

C. USE BONDED INSULATORS WHEN THE MAXIMUM GUYING TENSION IS LESS THAN 1000 POUNDS PER CONDUCTOR.

D. TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.), DO NOT LOCATE STAPLES WITHIN 1" OF BOLT.

(F) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA: SPACING=3'+ $\frac{\text{SPAN LENGTH}-250'}{50}$ IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

G. THE WORK ORDER DESIGNATION FOR THIS CONSTRUCTION IS "Y-CORNER".

(H) PER G.O. 95 RULE 54.4-C4 (b), ONLY TWO CONDUCTORS ARE ALLOWED TO BE DEAD ENDED FOR 4 KV OPERATION.

**REFERENCE:**

(I) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | | | STOCK NUMBER OR CONSTR. STD. |
|---|---|---|---|---|---|
| | | 1Ø | 3Ø | 3Ø & N | |
| 1 | BOLT, MACH, GALV 5/8" X ___", 1-3" SQ CURV WASH., 1 DBL COIL WASHER, 2-5/8"RD WASH. & 1 NUT | 4 | 6 | 8 | STD 392 |
| 2 | CLEVIS, DEADEND 5/8" BOLT STEEL (OPEN TYPE) | 4 | 6 | 8 | 235618 |
| 3 | LINK, EXTENSION, 12KV, 1/2" X 2" X 12" | 4 | 6 | 8 | 466240 |
| 4 | GUY | AS REQ'D | | | 900 SECTION |
| 5 | COVER, BOLT, PLASTIC, & 6-10 D NAILS | 4 | 6 | 8 | 285696, 492192 |
| 6 | SIGN, HIGH VOLTAGE & 9-10 D NAILS | 2 | 2 | 2 | 647648, 492192 |
| 7 | WIRE, BOND, BARE SOLID ANNEALED, COPPER, #8 | 4' | 7' | 8' | 812928 |
| 8 | STAPLES, FENCE, GALV, 1 1/4" | 4 | 7 | 10 | 678528 |
| 9 | MOULDING, HARDWOOD, 1" (OTHER THAN TOP CIRCUIT ON POLE) | 2'-6" | 4'-6" | 6'-6" | 487200 |
| 10 | STAPLES, MOULDING, GALV, 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) | 2 | 4 | 6 | 678560 |
| 11 | CLAMP, DEADEND | 4 | 6 | 8 | STDS 741, 743 |
| 12 | CONNECTOR | 2 | 3 | 4 | 700 SECTION |
| 13 | INSULATOR, SUSPENSION | 8 | 12 | 14 | PG. 750.4 |

| | | |
|---|---|---|
| DATE 9-20-05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>VERTICAL CONSTRUCTION 60° TO 90° ANGLES, 12 AND 12.47KV | 499.202<br>SUPERSEDES<br>421 (9-20-05) |

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**REVISION HISTORY:**

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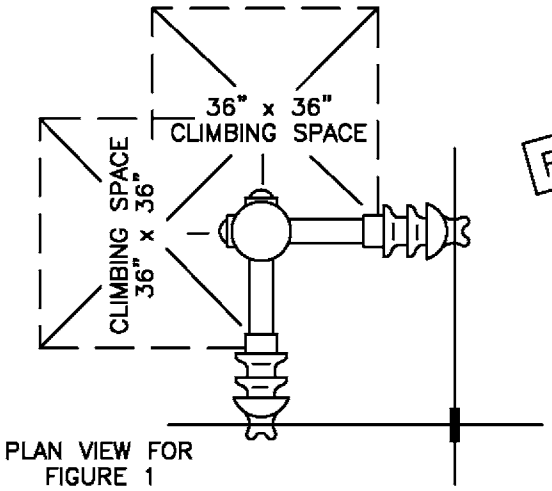
SDG&E ELECTRIC OVERHEAD STANDARD

POST INSULATOR AND BRACKET CONSTRUCTION,
"4 WAY AND 'T' CORNERS", 12 AND 12.47KV

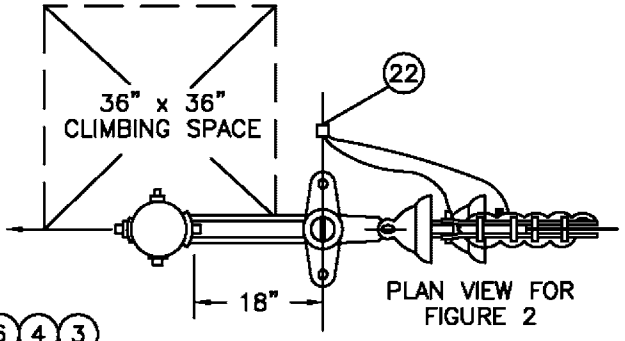
FMO
OH 422

**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 & 12.47KV LINES OF THE "4 WAY AND 'T' CORNERS" USING ARMLESS VERTICAL CONSTRUCTION.

FOR FIELD MAINTENANCE ONLY




PLAN VIEW FOR FIGURE 1




PLAN VIEW FOR FIGURE 2

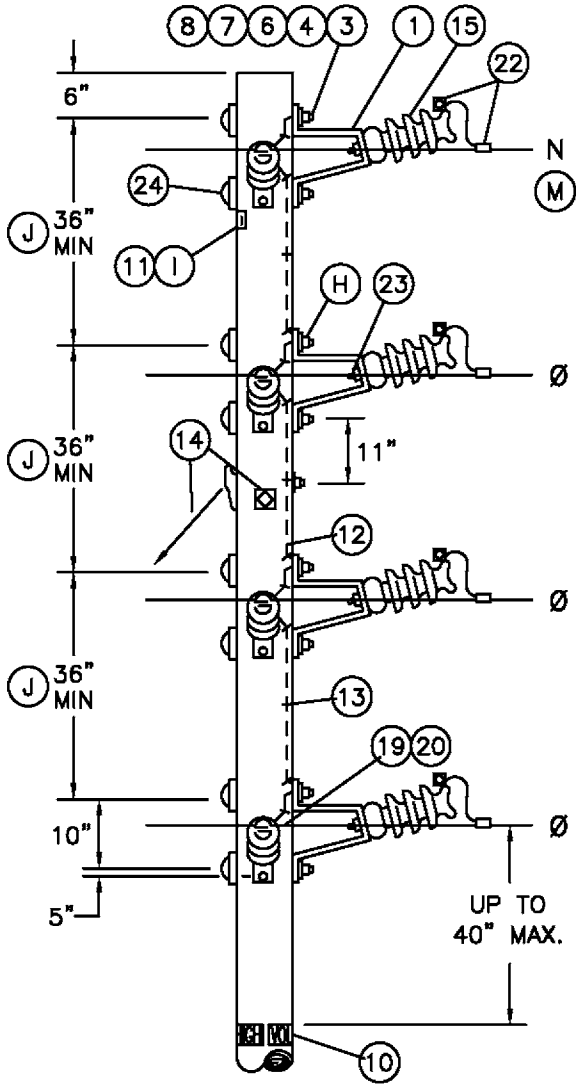



FIGURE 1
4 WAY CORNER

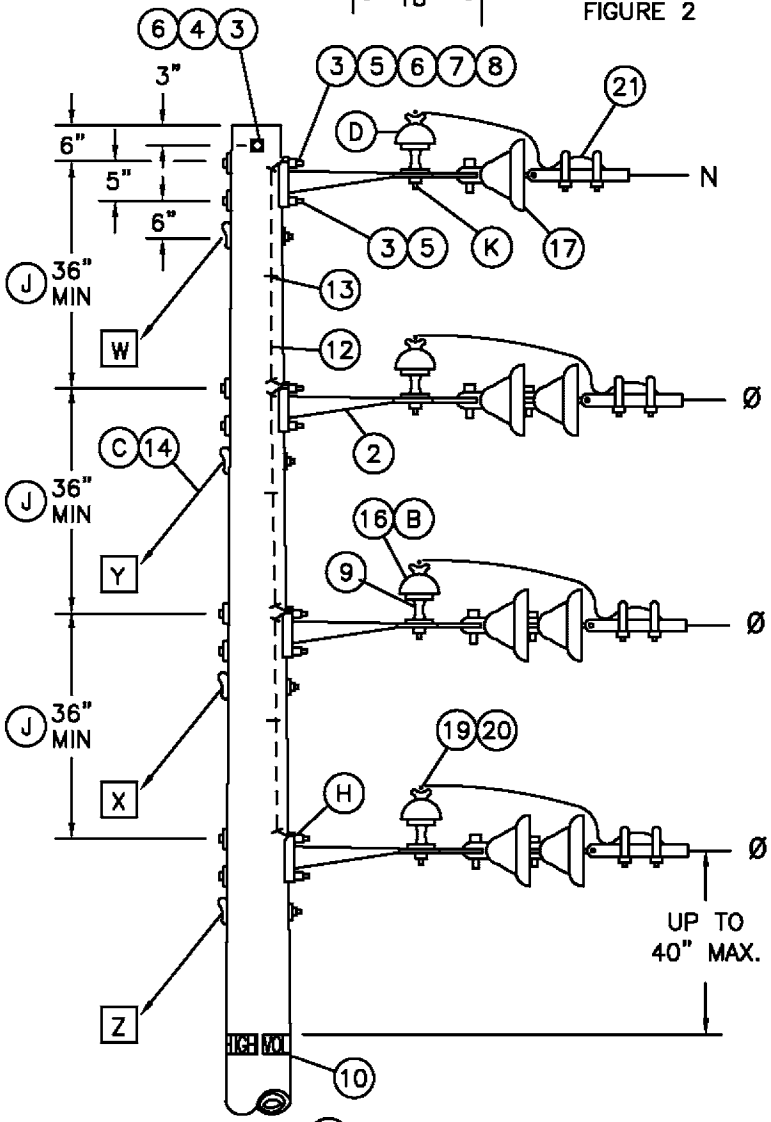



FIGURE 2 (L)
THROUGH CIRCUIT WITH SIDE TAP
"T" CORNER

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| 499.203<br>SUPERSEDES<br>422.1 (9-13-05) | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION,<br>"4 WAY AND 'T' CORNERS", 12 AND 12.47KV | DATE 9-13-05<br>APPD PSA / JJ |

**INSTALLATION:**

A. TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.) DO NOT LOCATE BOND WIRE STAPLES WITHIN 1" OF BOLTS.

(B) USE CLAMP TOP LINE POST INSULATORS AND CLAMPS FOR 1033 KCMIL ACSR.

(C) ADD THE GUYS IN ORDER INDICATED (W,X,Y,Z) AS REQUIRED IN THE GUYING SECTION.

(D) SUBSTITUTE A CLASS 55-3 INSULATOR (STOCK NO. 429216) FOR NEUTRAL IDENTIFICATION.

F. BONDING IS REQUIRED WITHIN HEAVY CONTAMINATION AREA, DISTRICT 1 ON STD. 287. USE BONDING PROVISIONS ON BRACKETS, IF THEY ARE FURNISHED.

(H) INSTALL DOUBLE COIL SPRING WASHER SO IT CONTACTS BRACKET.

(I) IF A SMALLER LINE POST INSULATOR IS NOT AVAILABLE FOR NEUTRAL AS COMPARED TO THOSE IN THE PHASE POSITIONS, THE "PN" SIGN SHALL BE USED TO IDENTIFY THE NEUTRAL.

(J) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA:

$$\text{SPACING} = 3' + \left[\frac{\text{SPAN LENGTH} - 250'}{50}\right]$$

IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

FOR FIELD MAINTENANCE ONLY

(K) IF BONDING IS REQUIRED, ATTACH BOND WIRE TO INSULATOR PIN WITH ADDITIONAL NUT.

L TO BE USED FOR NEW CONSTRUCTION ONLY, FOR SIDE TAPS FROM EXISTING CONSTRUCTION, USE PGS. 415.1 & 415.2.

**REFERENCE:**

(M) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

| 12KV VERTICAL CONSTRUCTION ASSEMBLY – TYPE YT MACRO UNITS | | | |
|---|---|---|---|
| QUANTITY | | | MU ID |
| 12KV DE | NDE | P & I | |
| 1 | 1 | 2/55-5 | YT1N |
| 2 | – | 2/55-5 | YT2 |
| 2 | 1 | 2/55-5<br>1/55-3 | YT2N |
| 3 | – | 3/55-5 | YT3 |
| 3 | 1 | 3/55-5<br>1/55-3 | YT3N |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | FIGURE 1 | | | | FIGURE 2 | | | | STOCK NO. OR CONSTR STD | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NEUTRAL WIRE | Ø WIRES | | | NEUTRAL WIRE | Ø WIRES | | | | |
| | | | 1 | 2 | 3 | | 1 | 2 | 3 | | |
| 1 | BRACKET, POST INSULATOR (PIB) | 2 | 2 | 4 | 6 | – | – | – | – | 166848 | PIB |
| 2 | BRACKET, 4 HOLE MOUNTING | – | – | – | – | 1 | 1 | 2 | 3 | 166240 | 4H-BKT |
| 3 | BOLT, 5/8" X __", GALV MACH | 4 | 4 | 8 | 12 | 2 | 3 | 5 | 7 | STD392 | – |
| 4 | WASHER, 2 1/2" SQ FLAT | 4 | 4 | 8 | 12 | – | 2 | 2 | 2 | STD392 | – |
| 5 | WASHER, 3" SQ CURVED | – | – | – | – | 2 | 2 | 4 | 6 | STD392 | – |
| 6 | WASHER, 5/8" DBL COIL SPRING | 4 | 4 | 8 | 12 | 1 | 2 | 3 | 4 | 798560 | – |
| 7 | WASHER, 5/8" ROUND (F) | 4 | 4 | 8 | 12 | 2 | 2 | 4 | 6 | 800320 | – |
| 8 | NUT, 5/8" (F) | 2 | 2 | 4 | 6 | 2 | 2 | 4 | 6 | 506880 | – |
| 9 | PIN, SHORT SHANK INSULATOR,1" OR 1 3/8" LEAD THREADS (B) | – | – | – | – | 1 | 1 | 2 | 3 | 532426/532434 | PSS1 |
| 10 | SIGN, HIGH VOLTAGE AND 9-10D NAILS | – | 2 | 2 | 2 | – | 2 | 2 | 2 | 647648/492192 | HV |
| 11 | SIGN, PRIMARY NEUTRAL (PN) AND 4-10D NAILS (I) | 2 | – | – | – | – | – | – | – | 648000/492192 | PN |
| 12 | WIRE, BARE SOLID ANNEALED #8 COPPER, | 5' | 2' | 6' | 10' | 4' | – | 4' | 8' | 812928 | BOND8 |
| 13 | STAPLES, FENCE 1 1/4" | 4 | 1 | 5 | 9 | 3 | – | 3 | 6 | 678528 | – |
| 14 | GUY (C) | – | IF REQ'D | | | AS REQ'D | | | | 900 SECTION | – |
| 15 | INSULATOR, POST a TIE TOP; b HORIZONTAL CLAMP TOP | 2 | 2 | 4 | 6 | – | – | – | – | 700 SECTION | – |
| 16 | INSULATOR, PIN TYPE, CLASS AS REQ'D (B) | – | – | – | – | 1 | 1 | 2 | 3 | 700 SECTION | – |
| 17 | INSULATOR, SUSPENSION CLEVIS | – | – | – | – | 1 | 2 | 4 | 6 | STD750, 756 | – |
| 18 | | | | | | | | | | | |
| 19 | GUARD, ALUMINUM IF REQ'D | 2 | 2 | 4 | 6 | 1 | 1 | 2 | 3 | STD759 | – |
| 20 | TIE a FORMED OR WIRE; b CLAMP,HORIZONTAL POST INSULATOR (B) | 2 | 2 | 4 | 6 | 1 | 1 | 2 | 3 | 700 SECTION | – |
| 21 | CLAMP, DEAD END | – | – | – | – | 1 | 1 | 2 | 3 | STD 741-743 | – |
| 22 | CONNECTOR, WIRE | 2 | 2 | 4 | 6 | 1 | 1 | 2 | 3 | STD783-787 | – |
| 23 | STUD, LINE POST, 5/8" X 1 3/4" | 2 | 2 | 4 | 6 | – | – | – | – | 701728 | STUD-S |
| 24 | BOLT, COVER PLASTIC & 6-1 3/4" NAILS | 4 | 4 | 8 | 12 | – | – | – | – | 285696/42919 | BCS |

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|---|---|---|
| DATE 9-20-05<br>APPD PSA / JJ | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION, "4 WAY AND 'T' CORNERS", 12 AND 12.47KV | 499.204<br>SUPERSEDES<br>422.2 (9-20-05) |

# OH433 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**10/09/2021:** MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | EPI | JES | JES | CZH | 10/9/2020 | D | | | | | | |

**SCOPE:** THIS STANDARD SHOWS THE LIMITING ANGLES IN LINES WHERE STANDARD 1", 1-3/8" AND ANGLE PINS ARE USED. TABLES ARE FOR SINGLE ARM AND DOUBLE ARMS.

FIELD MAINTENANCE ONLY

**ALUMINIM:**

**ALUMINUM: MAXIMUM PERMISSIBLE LINE ANGLE ON PINS** (A)(B)(C)(D)

| CONDUCTOR SIZE | STRANDING AL/ST (AW/AL) | DESIGN ALLOWABLE MAX. TENSION LBS | ANGLE OF DEVIATION (NEAREST 5°) (RS<250 FT) | | | | | | CONTROLLING LOADING DISTRICT (INCL 85 MPH) |
|---|---|---|---|---|---|---|---|---|---|
| | | | SINGLE ARM | | | DOUBLE ARM | | | |
| | | | 1" PIN | 1-3/8" PIN | ANGLE PIN | 1" PIN | 1-3/8" PIN | ANGLE PIN | |
| #2 ACSR/AW | 6/1 SPARROW | 850 | 15° | 40° | 55° | 40° | 60° | 60° | GO 95 LIGHT |
| 1/0 ACSR/AW | 6/1 RAVEN | 1240 | 10° | 25° | 35° | 25° | 60° | 60° | GO 95 LIGHT |
| 3/0 ACSR/AW | 6/1 PIGEON | 1850 | 5° | 15° | 20° | 15° | 40° | 55° | GO 95 LIGHT |
| 4/0 ACSR/AW | 6/1 PENGUIN | 2400 | USE 1-3/8" PIN | 10° | 15° | 10° | 30° | 40° | GO 95 LIGHT |
| 336.4 ACSR/AW | 26/7 LINNET | 3000 | USE 1-3/8" PIN | 10° | 10° | 10° | 25° | 30° | GO 95 LIGHT |
| | | | USE 1-3/8" PIN | 10° | 15° | 10° | 25° | 30° | GO 95 HEAVY |
| 397.5 ACSR/AW | 26/7 IBIS | 3000 | USE 1-3/8" PIN | 5° | 10° | 5° | 20° | 30° | GO 95 LIGHT |
| | | | USE 1-3/8" PIN | 5° | 10° | 10° | 25° | 30° | GO 95 HEAVY |
| 636 ACSR/AW | 24/7 ROOK | 3000 | USE ANGLE PIN | 5° | 10° | 5° | 20° | 25° | GO 95 LIGHT |
| | | | USE 1-3/8" PIN | 10° | 10° | 10° | 25° | 30° | GO 95 HEAVY |
| 1033.5 ACSR/AW | 45/7 ORTOLAN | 3000 | USE ANGLE PIN | USE ANGLE PIN | 5° | USE 1-3/8" PIN | 15° | 20° | GO 95 LIGHT |
| | | | USE ANGLE PIN | 5° | 10° | 5° | 25° | 30° | GO 95 HEAVY |
| #2 AWAC 5/2 | 5 AW / 2 AL | 1800 | 5° | 15° | 20° | 15° | 45° | 55° | GO 95 HEAVY |
| | | 1200 | 10° | 30° | 40° | 30° | 60° | 60° | GO 95 LIGHT |
| #2 AWAC 3/4 | 3 AW / 4 AL | 3000 | USE 1-3/8" PIN | 10° | 10° | 10° | 25° | 30° | GO 95 HEAVY |
| | | | 5° | 10° | 15° | 10° | 25° | 35° | GO 95 LIGHT |
| 1/0 AWAC 4/3 | 4 AW / 3 AL | 3000 | USE 1-3/8" PIN | 10° | 15° | 10° | 25° | 35° | GO 95 HEAVY |
| | | | USE 1-3/8" PIN | 10° | 15° | 10° | 25° | 35° | GO 95 LIGHT |

**ALUMINUM: MAXIMUM PERMISSIBLE LINE ANGLE ON PINS** (A)(B)(C)(D)

| CONDUCTOR SIZE | STRANDING AL/ST (AW/AL) | DESIGN ALLOWABLE MAX. TENSION LBS | ANGLE OF DEVIATION (NEAREST 5°) (250 FT < RS < 500 FT) | | | | | | CONTROLLING LOADING DISTRICT (INCL 85 MPH ) |
|---|---|---|---|---|---|---|---|---|---|
| | | | SINGLE ARM | | | DOUBLE ARM | | | |
| | | | 1" PIN | 1-3/8" PIN | ANGLE PIN | 1" PIN | 1-3/8" PIN | ANGLE PIN | |
| #2 ACSR/AW | 6/1 SPARROW | 850 | 5° | 25° | 35° | 25° | 60° | 60° | GO 95 LIGHT |
| 1/0 ACSR/AW | 6/1 RAVEN | 1240 | USE 1-3/8" PIN | 15° | 250° | 15° | 45° | 60° | GO 95 LIGHT |
| 3/0 ACSR/AW | 6/1 PIGEON | 1850 | USE 1-3/8" PIN | 10° | 15° | 10° | 30° | 40° | GO 95 LIGHT |
| 4/0 ACSR/AW | 6/1 PENGUIN | 2400 | USE 1-3/8" PIN | 5° | 10° | 5° | 20° | 30° | GO 95 LIGHT |
| 336.4 ACSR/AW | 26/7 LINNET | 3000 | USE ANGLE PIN | USE ANGLE PIN | 5° | USE 1-3/8" PIN | 15° | 20° | GO 95 LIGHT |
| | | | USE 1-3/8" PIN | 5° | 10° | 5° | 20° | 30° | GO 95 HEAVY |
| 397.5 ACSR/AW | 26/7 IBIS | 3000 | USE ANGLE PIN | USE ANGLE PIN | 5° | USE 1-3/8" PIN | 10° | 20° | GO 95 LIGHT |
| | | | USE ANGLE PIN | USE ANGLE PIN | 5° | USE 1-3/8" PIN | 20° | 30° | GO 95 HEAVY |
| 636 ACSR/AW | 24/7 ROOK | 3000 | USE DBL ARM | USE DBL ARM | USE DBL ARM | USE 1-3/8" PIN | 10° | 15° | GO 95 LIGHT |
| | | | USE ANGLE PIN | USE ANGLE PIN | 5° | USE 1-3/8" PIN | 15° | 25° | GO 95 HEAVY |
| 1033.5 ACSR/AW | 45/7 ORTOLAN | 3000 | USE DBL ARM | USE DBL ARM | USE DBL ARM | USE 1-3/8" PIN | 5° | 10° | GO 95 LIGHT |
| | | | USE DBL ARM | USE DBL ARM | USE DBL ARM | USE 1-3/8" PIN | 10° | 20° | GO 95 HEAVY |
| #2 AWAC 5/2 | 5 AW / 2 AL | 1800 | USE 1-3/8" PIN | 10° | 15° | 10° | 35° | 50° | GO 95 HEAVY |
| | | 1200 | 5° | 20° | 25° | 20° | 50° | 60° | GO 95 LIGHT |
| #2 AWAC 3/4 | 3 AW / 4 AL | 3000 | USE 1-3/8" PIN | 5° | 5° | 2° | 20° | 25° | GO 95 HEAVY |
| | | | USE 1-3/8" PIN | 5° | 10° | 5° | 20° | 30° | GO 95 LIGHT |
| 1/0 AWAC 4/3 | 4 AW / 3 AL | 3000 | USE 1-3/8" PIN | 5° | 10° | 5° | 20° | 30° | GO 95 HEAVY |
| | | | USE 1-3/8" PIN | 5° | 10° | 5° | 20° | 25° | GO 95 LIGHT |

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X Indicates Latest Revision | Completely Revised | New Page | Information Removed



SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LINE ANGLES ON CROSSARMS, 0-20KV LINES

## COPPER:

| MAXIMUM PERMISSIBLE LINE ANGLE ON PINS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIRE SIZE AWG OR KCMIL | ANGLE OF DEVIATION | | | | | | | | | | | | | |
| | HARD DRAWN COPPER | | | | | | | MEDIUM HARD DRAWN (W.P.) | | | | | | |
| | ALLOWABLE WIRE TENSION LBS | SINGLE ARM | | | DOUBLE ARM | | | ALLOWABLE WIRE TENSION LBS | SINGLE ARM | | | DOUBLE ARM | | |
| | | STD PIN | | ANGLE PIN | STD PIN | | ANGLE PIN | | STD PIN | | ANGLE PIN | STD PIN | | ANGLE PIN |
| | | 1" | 1-3/8" | | 1" | 1-3/8" | | | 1" | 1-3/8" | | 1" | 1-3/8" | |
| 6 | 482 | 20° | 60° | 60° | 45° | 60° | 60° | 419 | 18° | 60° | 60° | 44° | 60° | 60° |
| 4 | 752 | 12° | 42° | 60° | 29° | 60° | 60° | 658 | 11° | 40° | 60° | 28° | 60° | 60° |
| 2 | 1196 | 6° | 24° | 47° | 16° | 54° | 60° | 1000 | 6° | 24° | 47° | 17° | 54° | 60° |
| 1/0 | 1900 | 3° | 15° | 29° | 10° | 33° | 60° | 1580 | 3° | 15° | 29° | 10° | 33° | 60° |
| 4/0 | 2424 | 2° | 11° | 24° | 7° | 25° | 49° | 2120 | 1° | 9° | 23° | 6° | 23° | 48° |

| MAXIMUM PERMISSIBLE TRANSVERSE CROSSARM LOADING (WOOD ARMS ON WOOD POLES) (LBS). | | | |
|---|---|---|---|
| THRU BOLT SIZE | BOLT ONLY (E) | BOLT AND THRUST PLATE | BOLT, SPLIT RINGS AND THRUST PLATE |
| 5/8" | 1,700 | - | - |
| 3/4" | 2,400 | 8,500 | 12,000 |

## INSTALLATION:

(A) ANGLES INDICATED ARE BASED ON ALLOWABLE SHEAR LOAD ON PINS.

(B) USE STANDARD DEADENDS WHEN PERMISSIBLE ANGLE IS EXCEEDED IN THE ABOVE TABLES. LINE AND BUCK CONSTRUCTION IS REQUIRED FOR ALL LINE ANGLES IN EXCESS OF 60 DEGREES. MUST BE INSTALLED TO BISECT THE ANGLE.

(C) LINE AND BUCK CONSTRUCTION IS REQUIRED FOR ALL LINE ANGLES GREATER THAN 60 DEGREES.

(D) ALL ANGLES NOTED IN THE TABLES ABOVE ARE BASED ON SDG&E'S MAXIMUM DESIGN TENSIONS AND LIMITED TO PIN STRENGTHS. IF THE MAXIMUM DESIGN TENSIONS ARE REDUCED BELOW SDG&E'S LIMITS THAN THE LINE ANGLES CAN BE INCREASED UP TO THE ALLOWABLE LIMIT OF THE PINS BEING USED.

(E) FOR SINGLE CROSSARMS, USE 1/2 OF THE VALUES.

## REFERENCE:

a. FOR WOOD POLE INSTALLATIONS, SEE STANDARD 392 FOR THRU BOLT, STEEL THRUST PLATE AND SPLIT RING ASSEMBLY DETAIL.

b. REFER TO OH 800 FOR LOADING DISTRICT APPLICATION LIMITS PER CONDUCTOR SIZE.

c. REFER TO OH 379 FOR FIBERGLASS CROSSARM ALLOWABLE LOADS.

d. REFER TO OH 396 FOR PIN STRENGTHS.

e. REFER TO SDG&E DRAWING 12100 FOR KNOWN LOCAL WIND CONDITIONS (SDG&E)

f. REFER TO GO 95 APPENDIX C FOR TENSION LIMITATIONS IN LIGHT AND HEAVY DISTRICTS.

g. REFER TO OH 392 FOR THRU BOLT, STEEL THRUST PLATE AND SPLIT RING ASSEMBLY DETAIL.

FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LINE ANGLES ON CROSSARMS, 0-20KV LINES



FMO OH433.2

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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SDG&E ELECTRIC OVERHEAD STANDARD

750 - 7500 VOLT BUCKARM CORNERS

FMO OH 434

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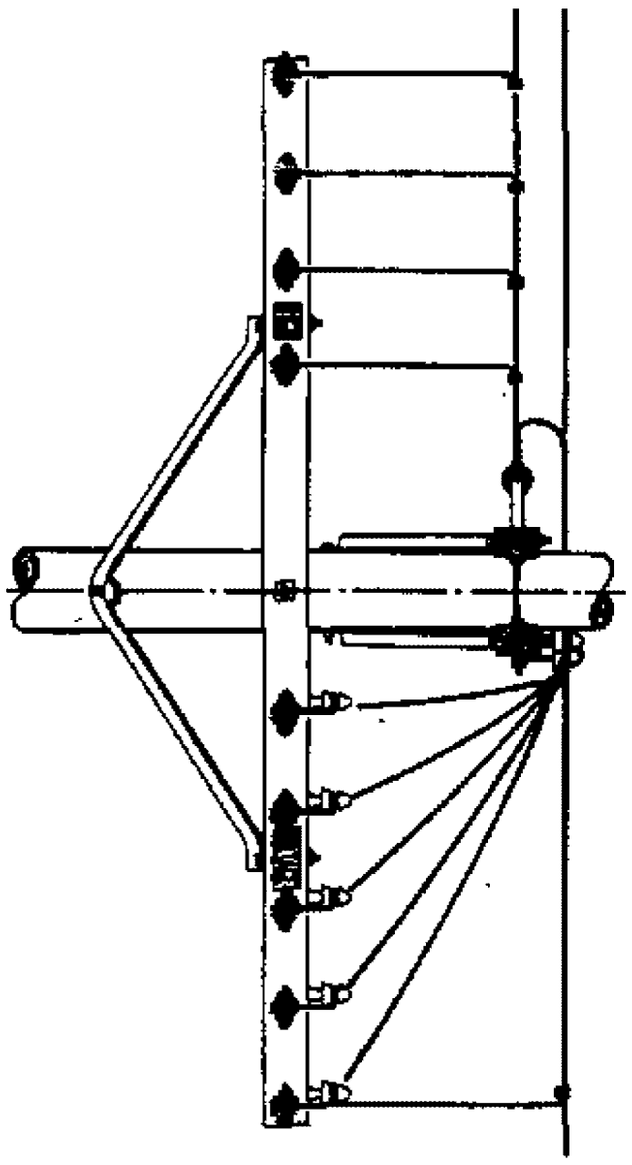
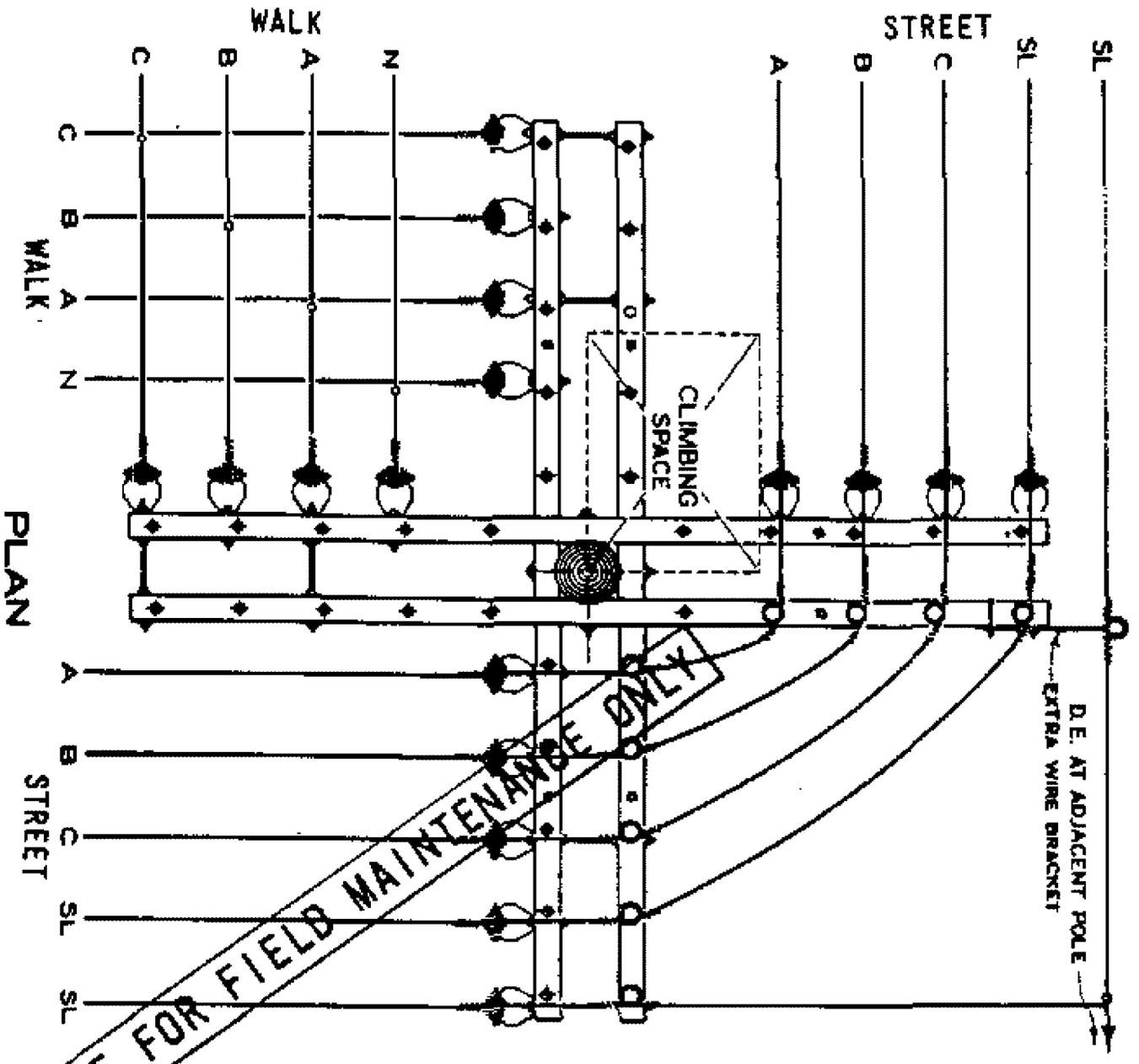


FIGURE 1




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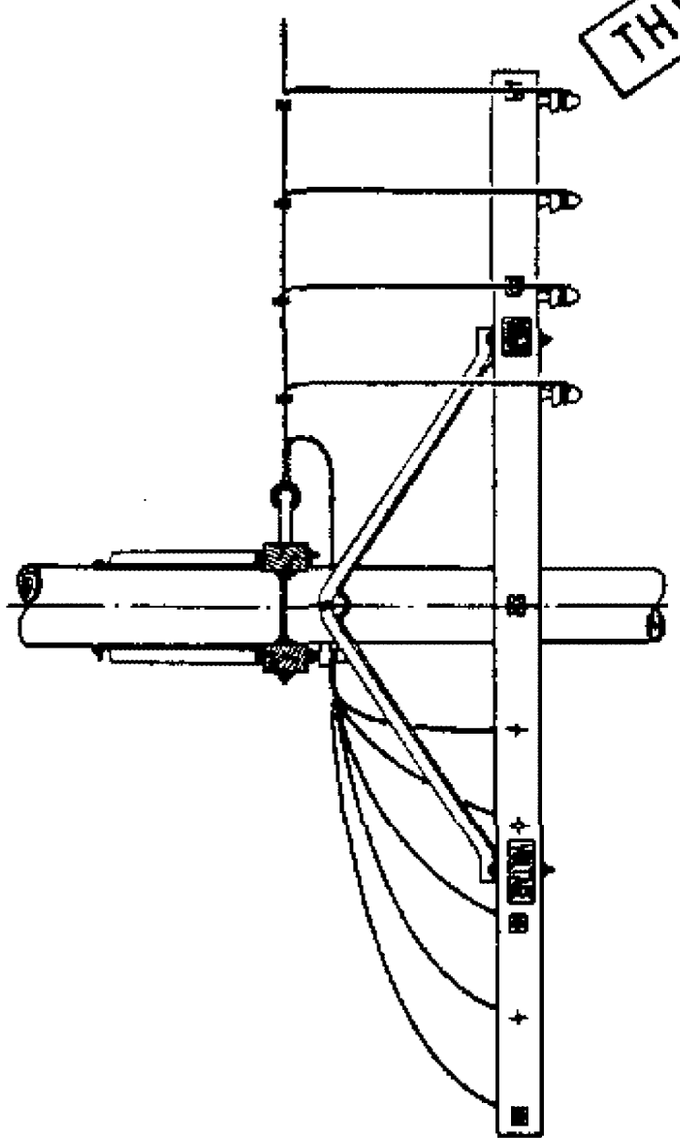
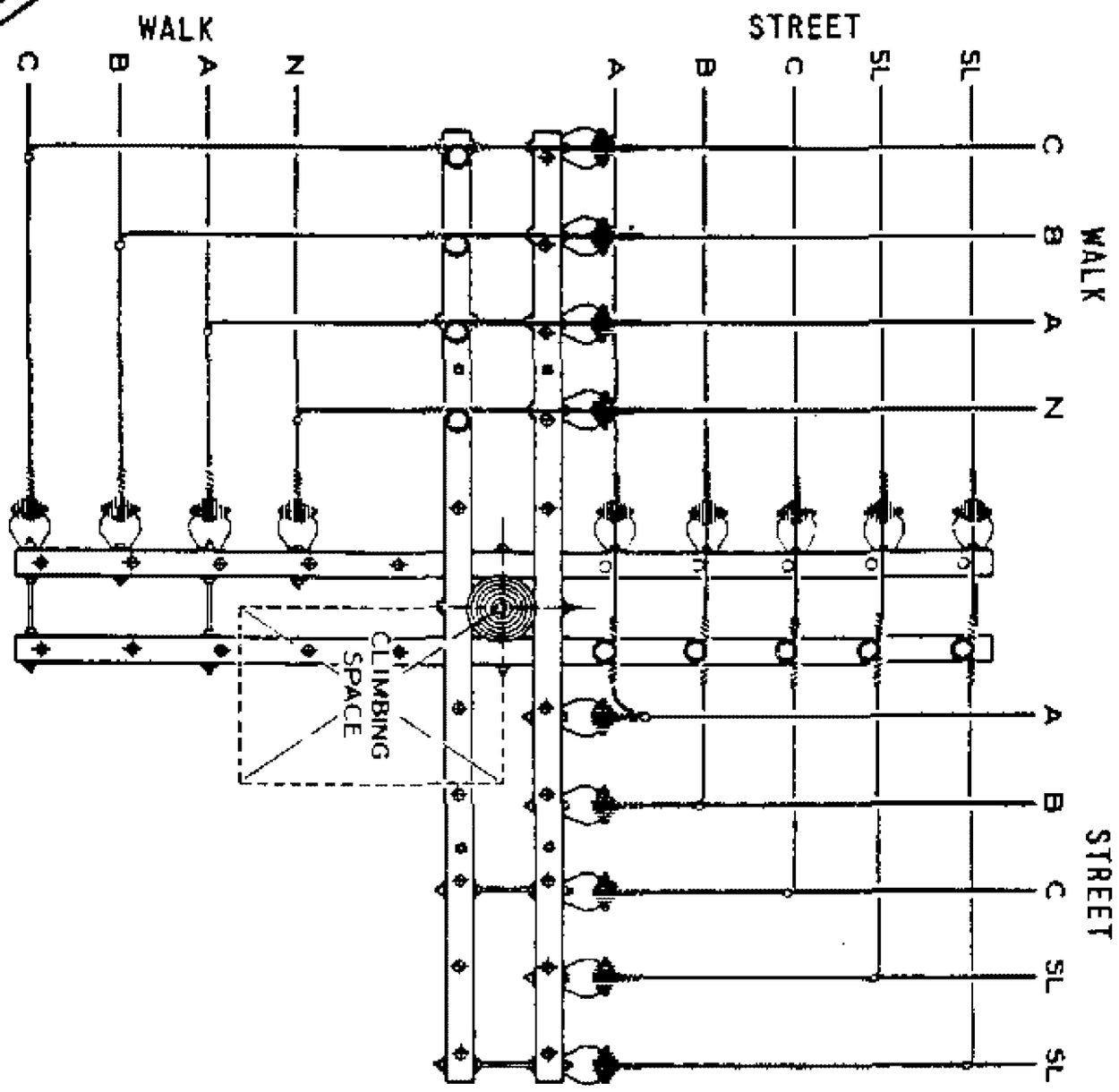


FIGURE 2




| | | |
|---|---|---|
| APPD<br>SYS STDS ENGR | SDG&E ELECTRIC STANDARDS<br>750 - 7500 VOLT BUCKARM CORNERS | 499.301<br>SUPERSEDES<br>434 (6-4-82) |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**5/23/16:** SDG&E is no longer hanging transformers on a line and buck pole framing. However, this standard needs to be retained in FMO in event that there are no other options available.

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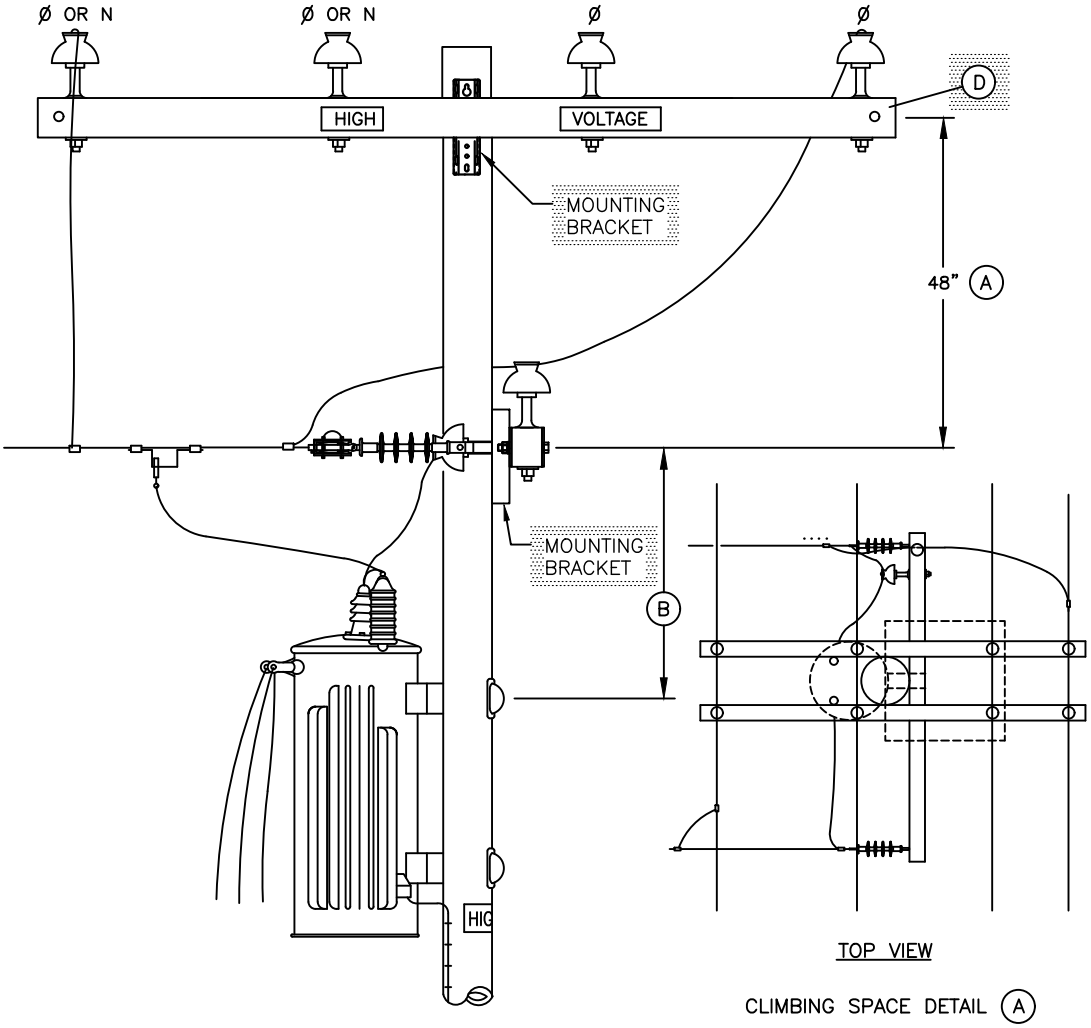
SDG&E ELECTRIC OVERHEAD STANDARD

PRIMARY, SINGLE-PHASE TRANSFORMER INSTALLATION
EXISTING LINE AND BUCK

SHEET
1 OF 1

FMO
OH 436

**SCOPE:** THIS STANDARD TO INSTALL A SINGLE PHASE STATION ON AN EXISTING LINE AND BUCK POLE IS TO BE USED ONLY WHEN NECESSARY TO AVOID THE SETTING OF AN ADDITIONAL POLE. **NOTE:** THREE–PHASE INSTALLATIONS REQUIRE A DEVIATION REQUEST.




**INSTALLATION:**

(A) WHILE IT IS DESIRABLE TO MAINTAIN A MINIMUM OF 48" BETWEEN THE LINE ARM AND BUCK ARM TO MAINTAIN A ONE HALF POLE OF CLIMBING SPACE THROUGH THE BUCK ARM LEVEL AND UP TO THE LINE ARM LEVEL, LESS THAN 48" AND A QUADRANT CLIMBING SPACE IS ALLOWED. (SEE O.H. STANDARD 251).

(B) FOR TRANSFORMER THRU–BOLT DRILLING DIMENSION, SEE APPROPRIATE CONSTRUCTION STANDARD.

C. SECTIONALIZING FUSES *AND* A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

(D) FIBERGLASS CROSSARMS, SEE STANDARD 379.

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| | | |
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| SHEET 1 OF 1 | SDG&E ELECTRIC OVERHEAD STANDARD<br>PRIMARY, SINGLE-PHASE TRANSFORMER INSTALLATION<br>EXISTING LINE AND BUCK | FMO<br>OH 436 |

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**5/23/16:** Distribution Design Manual 5124 has been rewritten, and has rendered this Overhead Standard obsolete. Also changed scope to include all primary distribution instead of 12KV only.

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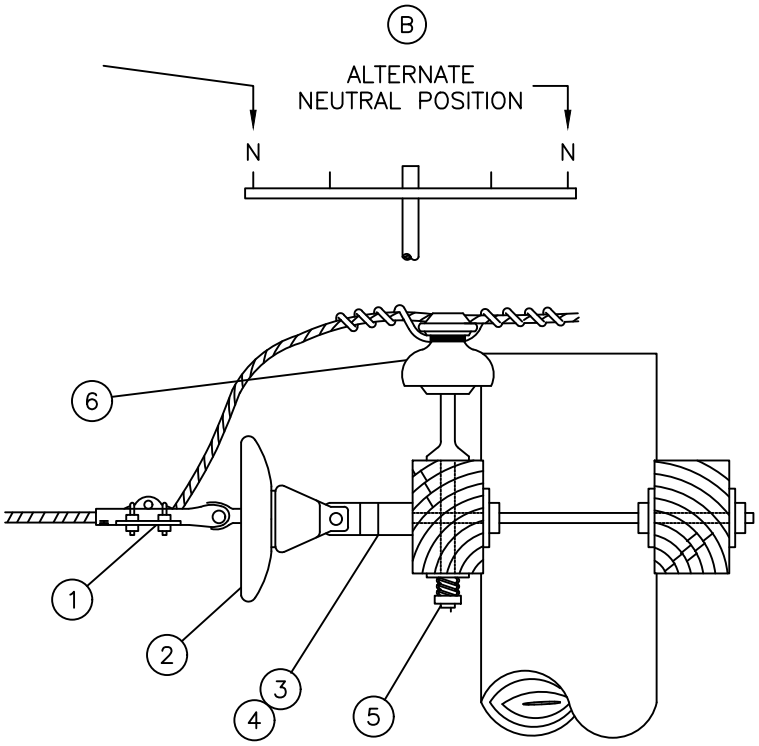
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SDG&E ELECTRIC OVERHEAD STANDARD

NEUTRAL INSTALLATION PIN-TYPE OR DEAD-END, 12KV AND BELOW

FMO OH 438

**SCOPE:** THIS STANDARD SHOWS THE METHOD OF PRIMARY DISTRIBUTION AND BELOW NEUTRAL INSTALLATION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STD | ASSEMBLY UNITS |
|---|---|---|---|---|
| 1 | CLAMP, STRAIGHT LINE | 1 | STD 741,743 | – |
| 2 | INSULATOR, 9", NEMA CLASS 52–2 OR EQUAL | 1 | 431648 | 52–2 |
| 3 | CLEVIS, DEAD END, CLOSED TYPE, 5/8" MOUNTING | 1 | 235712 | – |
| | 3/4" MOUNTING | | 235620 | DE–C/C |
| 4 | CLEVIS, DEAD END, OPEN TYPE, 5/8" MOUNTING | 1 | 235618 | – |
| | 3/4" MOUNTING | | 235616 | DE–O/C |
| 5 | PIN, 1" | 1 | 532704 | PS1 |
| 6 | INSULATOR, WHITE, NEMA CLASS 55–3 OR EQUAL | 1 | 429216 | 55–3/I |

**INSTALLATION:**

A. NEUTRAL SIZE WILL NOT NECESSARILY BE ONE WIRE SIZE SMALLER THAN THE PHASE WIRES.

**REFERENCE:**

(B) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE INSTALLED IN OUTSIDE PIN POSITION PER DESIGN MANUAL PAGE 5124.2.

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REVISION
DATE 9–12–05
APPD PA / JJ

SDG&E ELECTRIC STANDARDS

NEUTRAL INSTALLATION PIN–TYPE
OR DEAD–END, 12KV AND BELOW

FMO
OH 438

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**5/23/16:** Crossarm Extension Brackets are no longer allowed as an option for adding additional conductors on an arm.

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SDG&E ELECTRIC OVERHEAD STANDARD

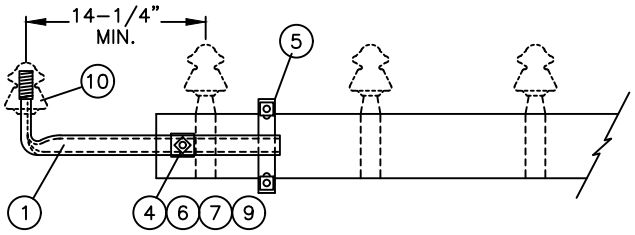
CROSSARM EXTENSION BRACKET

SHEET 1 OF 1

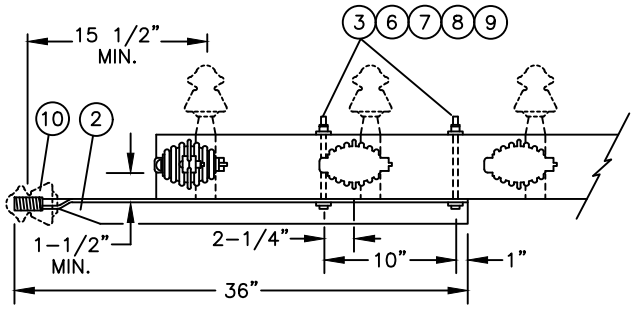
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Ⓒ FIGURE 1




Ⓓ FIGURE 2




**NOTES:**

A. TO AVOID CROSSARM REPLACEMENT, CROSSARM EXTENSIONS SHOULD BE USED WHENEVER PRACTICAL TO SUPPORT EXTENSION OF A SINGLE SERIES CIRCUIT CONDUCTOR OR 0–7500 VOLT LINE CONDUCTOR ON EXISTING CROSSARMS WHERE PIN POSITIONS ARE FILLED OR WHERE CLIMBING SPACE MUST BE MAINTAINED.

B. CONDUCTOR SIZE IS LIMITED TO #4 COPPER OR #2 5005 ALUMINUM.

Ⓒ USE CONSTRUCTION SHOWN IN FIGURE 1, WHERE LINE CONDUCTORS ON EXISTING ARMS ARE ON PINS.

Ⓓ USE CONSTRUCTION SHOWN IN FIGURE 2, TO PROVIDE 1 1/2" HARDWARE CLEARANCE WHERE LINE CONDUCTORS ON EXISTING ARMS ARE DEAD ENDED.

E. DO NOT USE CROSSARM EXTENSION CONSTRUCTION IN GRADE "A" OR "B" CROSSINGS OVER MAJOR OR MINOR RAILWAYS.

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | | QUANTITY FIG.1 | QUANTITY FIG.2 | STOCK NO. OR CONSTR STD | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| 1 | BRACKET, CROSSARM EXTENSION | | 1 | – | 166048 | XAEXT |
| 2 | PIN, POLETOP 36" WITH 1" LEAD THREADS | | – | 1 | 531648 OR 232512 | PTP |
| 3 | BOLT, MACH 5/8" X 8" | | – | 2 | 155584 | – |
| 4 | BOLT, MACH 5/8" X 5" | | 1 | – | 155488 | – |
| 5 | BOLT, U | FOR 3–1/2" X 4–1/2" CROSSARM | 1 | – | 158368 | – |
| | | FOR 3–3/4" X 5–3/4" CROSSARM | 1 | – | 158400 | – |
| 6 | WASHER, 5/8" ROUND | | 1 | 2 | 800320 | – |
| 7 | WASHER, 2 1/4" SQUARE | | 1 | 2 | 799040 | – |
| 8 | WASHER, 5/8" DBL COIL SPRING | | – | 2 | 798560 | – |
| 9 | NUT, 5/8" | | 1 | 2 | 506880 | – |
| 10 | INSULATOR, PIN TYPE | | 1 | 1 | 429184 | – |

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| A | ORIGINAL ISSUE | | | PA/RJ | 1/1/1994 | D | | | | | |

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

CROSSARM EXTENSION BRACKET

FMO OH 439

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**5/23/16:** Wood Pole Top Extensions are no longer allowed as an option for adding an additional conductors on an arm.

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| A | COMPLIANCE CHANGE | MM | IL | MDJ | 5/23/16 | D | | | | | |

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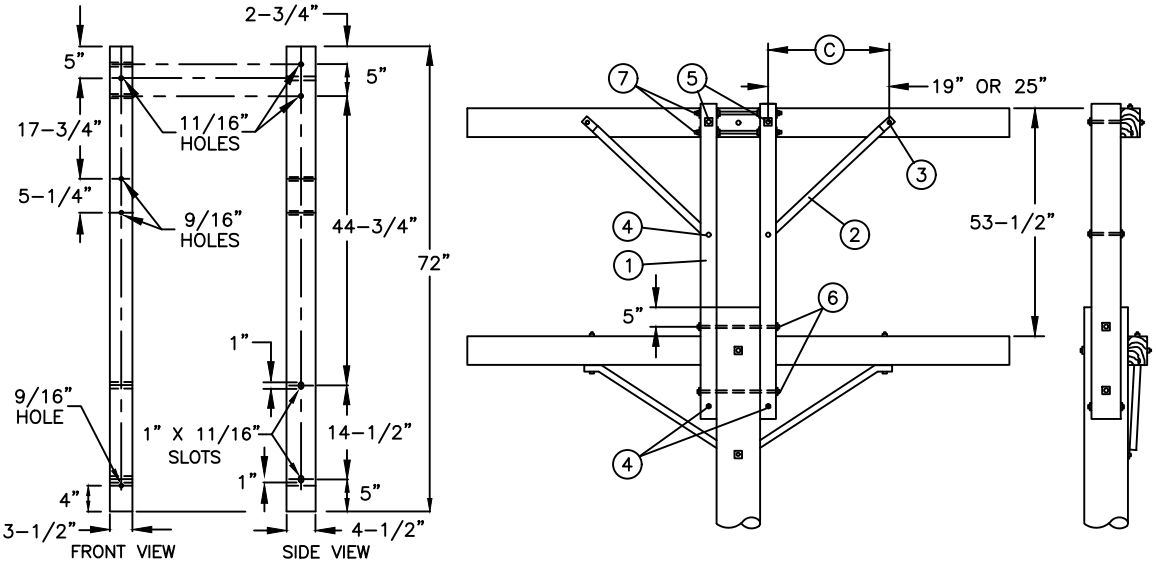
SDG&E ELECTRIC OVERHEAD STANDARD

# WOOD POLE TOP EXTENSIONS FOR LINE ARMS OR SERVICE CLEARANCE ARMS-LIGHT DUTY

SHEET 1 OF 1

FMO OH 475

**SCOPE:** THIS STANDARD SHOWS POLE TOP EXTENSION FOR LINE ARMS OR SERVICE CLEARANCE ARMS AND IS USED ON EXISTING POLES WHEN ADDITIONAL HEIGHT IS REQUIRED IN LIGHT AND MEDIUM LOADING DISTRICTS TO SAVE THE COST OF REPLACING A POLE WHEN FIELD CONDITIONS PERMIT.




| TYPE OF CONDUCTORS | Ⓑ MAXIMUM LINE ANGLE OF DEVIATION ALLOWED FOR 4 CONDUCTORS AVERAGE SPAN (FT) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 100 | | 200 | | 300 | | 400 | | 500 | |
| LOADING DISTRICT | LIGHT | MEDIUM | LIGHT | MEDIUM | LIGHT | MEDIUM | LIGHT | MEDIUM | LIGHT | MEDIUM |
| #6 COPPER | 20° | 16° | 18° | 10° | 17° | 5° | 15° | 0° | 13° | 0° |
| #4 COPPER | 12° | 10° | 11° | 6° | 10° | 2° | 8° | 0° | 7° | 0° |
| #2 COPPER | 7° | 6° | 6° | 3° | 5° | 1° | 4° | 0° | 3° | 0° |
| 1/0 COPPER | 4° | 3° | 4° | 2° | 3° | 0° | 2° | 0° | 1° | 0° |
| #2 ACSR | 11° | 8° | 9° | 5° | 8° | 1° | 6° | 0° | 5° | 0° |
| #1/0 ACSR | 7° | 5° | 6° | 2° | 4° | 0° | 3° | 0° | 2° | 0° |
| #3/0 ACSR | 4° | 3° | 3° | 1° | 2° | 0° | 1° | 0° | 0° | 0° |
| #336.4 26/7 ACSR | 2° | 1° | 1° | 0° | 0° | 0° | 0° | 0° | 0° | 0° |
| 636 ACSR Ⓕ | 2° | 1° | 1° | 0° | 0° | 0° | 0° | 0° | 0° | 0° |
| #2 5/2 AWAC | 4° | 3° | 3° | 1° | 2° | 0° | 1° | 0° | 0° | 0° |

EXAMPLE ANGLE OF DEVIATION

PROBLEM: DETERMINE AVERAGE SPAN LENGTH AND LINE ANGLE OF DEVIATION ON POLE "A" FOR 4 # 6 BARE COPPER WIRE

ASSUME: LIGHT LOADING DISTRICT
SPAN "BA" = 180 FEET AND SPAN "AC" = 230 FEET

SOLUTION: AVERAGE SPAN ON POLE "A" IS $\frac{180 \text{ FT} + 230 \text{ FT}}{2} = 205$ FEET

AND THE LINE ANGLE OF DEVIATION $\alpha = 20°$ (USING AN ANGLE FINDER)




CONCLUSION: FOR AN AVERAGE SPAN LENGTH OF 200 FT. (SEE TABLE) THE MAXIMUM LINE ANGLE OF DEVIATION IS 18°, THEREFORE, THE GIVEN ANGLE OF 20° IS TOO LARGE, AND THIS CONSTRUCTION CAN NOT BE USED. HOWEVER, 3 #6 CU. WIRE WITH A LINE ANGLE DEVIATION OF 23.994° (18° X 1.333) IS ALLOWED.

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SDG&E ELECTRIC OVERHEAD STANDARD

# WOOD POLE TOP EXTENSIONS FOR LINE ARMS OR SERVICE CLEARANCE ARMS-LIGHT DUTY

SHEET 1 OF 2

FMO
OH 475.1

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONSTRUCTION STANDARD | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | DOUGLAS FIR EXTENSION STRUTS, TWO PER SET, 3 1/2" X 4 1/2" X 72" S4S | 1 | – | 336320 | WPTX |
| 2 | FLAT CROSSARM BRACE, 28" FOR 8 FT. ARM, | 2 | – | 164192 | 28FLAT |
| | 36" FOR 10 FT. ARM | 2 | – | 164224 | 36FLAT |
| 3 | MACHINE BOLT, GALV, 3/8" X 4 1/2", AND 1 ROUND WASHER | 2 | STD 392 | – | – |
| 4 | MACHINE BOLT, GALV, 1/2 X 5", AND 2 ROUND WASHERS | 2 | STD 392 | – | – |
| 5 | MACHINE BOLT, GALV, 5/8" X 9", AND 2 SQ WASHERS | 2 | STD 392 | – | – |
| 6 | MACHINE BOLT, GALV, 5/8" X 18", AND 2 SQ WASHERS | 2 | STD 392 | – | – |
| 7 | SPACE BOLT, GALV, 5/8" X 18", AND 4 SQ WASHERS | 2 | STD 392 | – | – |

**INSTALLATION:**

A. NO DEAD–END CONSTRUCTION OR GUY ATTACHMENTS ARE PERMITTED ON THIS LIGHT DUTY WOOD POLE TOP EXTENSION.

(B) FOR MAXIMUM ALLOWABLE LINE ANGLE OF DEVIATION FOR 2 CONDUCTORS, MULTIPLY TABLE BY 2, AND FOR 3 CONDUCTORS MULTIPLY TABLE BY 1.333.

(C) 19" FOR 28" BRACES OR 25" FOR 36" BRACES.

D. TO BE USED IN LIGHT AND MEDIUM LOADING DISTRICTS ONLY.

(F) 636 ACSR IS NOT TO BE STRUNG ON THIS LIGHT DUTY WOOD POLE TOP EXTENSION. IT IS PERMISSIBLE TO RAISE 636 ACSR WITH THIS LIGHT DUTY WOOD POLE TOP EXTENSION WITH THE APPROVAL OF CONSTRUCTION.

**REFERENCE:**

G. INCREASING POLE LENGTH BY USE OF A POLE TOP EXTENSION INCREASES THE BENDING MOMENT AT THE GROUND LINE. POLE MUST HAVE ADEQUATE USABLE STRENGTH TO WITHSTAND THE INCREASED BENDING MOMENT IMPOSED BY THE POLE TOP EXTENSION (SEE STANDARD 344 – 354).

H. DO NOT USE IN GRADE 'A' CROSSING – G.O. 95 RULE 49.1.

I. TRANSFORMERS, CAPACITORS AND REGULATORS SHALL NOT BE SUPPORTED ON THIS LIGHT DUTY POLE TOP EXTENSION BECAUSE IT DOES NOT MEET G.O. 95 REQUIREMENTS. SEE RULE 58.1A.

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SHEET 2 OF 2

SDG&E ELECTRIC OVERHEAD STANDARD

WOOD POLE TOP EXTENSIONS FOR LINE ARMS OR SERVICE CLEARANCE ARMS-LIGHT DUTY

FMO
OH 475.2

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

POLE TOP EXTENSIONS
FOR SERVICE CLEARANCE ARMS

FMO
OH 476

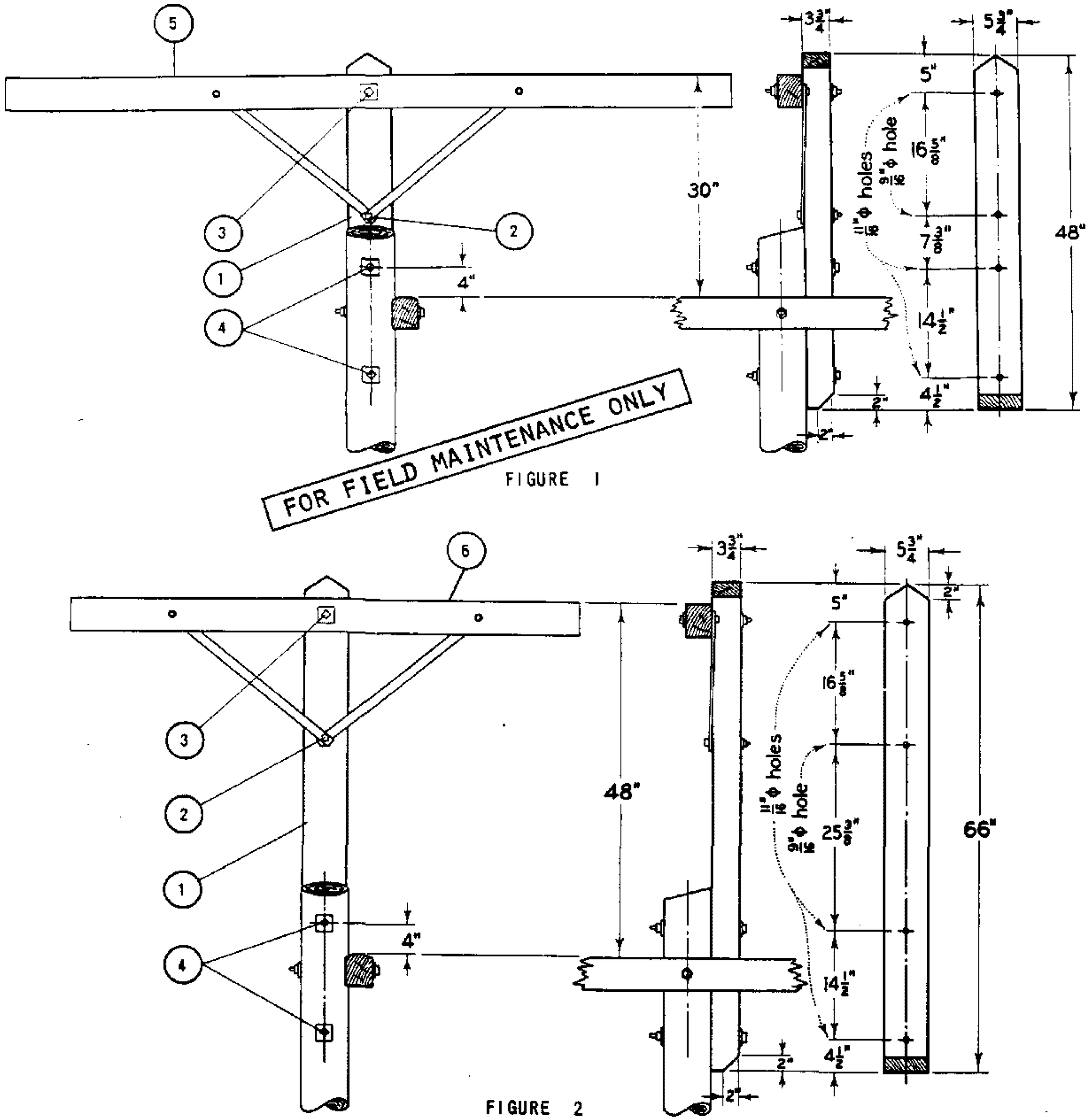



FIGURE 1




FIGURE 2

INSTALLATION :

A. DO NOT FLATTEN SURFACE OF POLE TO RECEIVE EXTENSION. HOWEVER, SHARP HUMPS OR KNOTS SHOULD BE REMOVED.

(E) EXEMPT MATERIAL.

BILL OF MATERIAL :

| ITEM | | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| PT | 1 | EXTENSION, 3 3/4" X 5 3/4" DOUGLAS FIR POLE TOP, 48" OR 66" LONG | | 1 | 336288, 336352 |
| | 2 | BOLT, MACHINE 1/2" X 5" GALV, 1 RD WASHER | (E) | 1 | STD 139, 140 |
| | 3 | BOLT, MACHINE 5/8" X 10" GALV, 2 SQ WASHERS | (E) | 1 | STD 139, 140 |
| | 4 | BOLT, MACHINE 5/8" X 16" GALV, 2 SQ WASHERS | (E) | 2 | STD 139, 140 |
| F | 5 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | | 1 | SECTION 300 |
| | 6 | CROSSARM, 3 1/2" X 4 1/2" X 5' - 7" | | 1 | SECTION 300 |

499.701
SUPERSEDES
476 (9-17-82)

SDG&E ELECTRIC STANDARDS

# POLE TOP EXTENSIONS FOR SERVICE CLEARANCE ARMS

DATE 9-17-82
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| 530 | OVERHEAD SCADA SWITCH, 12KV, UPRIGHT MOUNTING CONFIGURATION |
| 535 | OVERHEAD SCADA SWITCH, 12KV, HORIZONTAL LOADBREAK TYPE, SINGLE CIRCUIT, MOTOR OPERATED |
| 540 | SCADA LOAD MONITOR |

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| 604 | OVERHEAD IN-LINE POWER REGULATOR TRANSFORMER UNIVERSAL TRANSFORMER BRACKET |
| 613 | OPEN WIRE SECONDARY CROSSARM CONSTRUCTION |
| 616 | SECONDARY RACK CONSTRUCTION |
| 618 | MID - SPAN SERVICES FROM VERTICAL RACK SECONDARY |
| 629 | SECONDARY RACKS |
| 631 | SERVICE INSULATOR BRACKETS, SINGLE |
| 632 | HEAVY DUTY SERVICE INSULATOR BRACKET |
| 635.4 | MINI WEDGE CONNECTOR |
| 642 | SERVICE DROP ATTACHMENTS TO CONDUIT RISERS |
| 652 | CUSTOMER OWNED - 1 & 2 BOX TV AMPLIFIER & 120V, METER INSTALLATION |

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| C | ADDED 613 | NV5 | MRF | MRF | 07/07/2025 | F | | | | | |
| B | ADDED 604 & 635.4 | JS | JS | CZH | 9/4/2018 | E | | | | | |
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

CONNECTORS, MINI WEDGES



FMO OH604

**SCOPE:** THIS STANDARD SHOWS THE VARIOUS MINI WEDGE CONNECTORS THAT ARE TO BE USED TO CONNECT DIFFERENT TYPES AND SIZES OF JUMPER AND LINE WIRE FOR SECONDARY AND SERVICE CONDUCTORS FOR THE OVERHEAD.

| SDG&E | | | 4/0 | 2/0 | 1/0, 1 | #2 | #4 | #6 | #8 |
|---|---|---|---|---|---|---|---|---|---|
| STANDARD TRIPLEX FULL ACSR, AAAC OR AAC NEAUTRAL FULL AAC HOT WIRES | | | 4/0 ACSR,AAAC AAC,CU STR | 2/0 ACSR,AAAC AAC,CU STR 3/0 AAC CMPT | 1/0 #1 ACSR,AAAC AAC,CU STR | #2 ACSR,AAAC AAC,CU STR | #4 ACSR,AAAC AAC,CU STR CMPT AAC,CU #2 SOL | #6 ACSR,AAAC AAC,CU STR CMPT AAC,CU SOL #2 SOL | #8 AAC,CU STR & SOL #6 AL/CU SOL |
| #8 | #8 AAC/CU STR & SOL #6 AL/CU SOL | STOCK # | S269494 | S269460 | S269448 | S269484 | S269476 | S269470 | S269466 |
| #6 | #6 ACSR, AAAC #6 AAC, CU STR #6 CMPT AAC,CU #6 SOL, #4 SOL | STOCK # | S269492 | S269458 | S269446 | S269482 | S269474 | S269468 | - |
| #4 | #4 ACSR, AAAC #4 AAC, CU STR #4 CMPT AAC,CU #2 SOL | STOCK # | S269490 | S269456 | S269444 | S269480 | S269472 | - | - |
| #2 | #2 ACSR, AAAC #2 AAC, CU STR | STOCK # | S269488 | S269454 | S269442 | S269478 | - | - | - |
| 1/0, 1 | 1/0 ACSR, AAAC 1/0 AAC,CU STR #1 ACSR | STOCK # | S269464 | S269452 | S269486 | - | - | - | - |
| 2/0 | 2/0 ACSR, AAAC 2/0 AAC,CU STR 3/0 AAC CMPT | STOCK # | S269462 | S269450 | - | - | - | - | - |

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

CONNECTORS, MINI WEDGES

OH 604

# OH613 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**07/07/2025:** ORIGINAL ISSUE

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| B | | | | | | | E | | | | | | |
| A | OH613 ADDED | NV5 | MRF | MRF | MRF | 07/07/2025 | D | | | | | | |

**SCOPE:** THIS STANDARD SHOWS SERVICES ON OPEN WIRE SECONDARY SINGLE CROSSARM CONSTRUCTION.

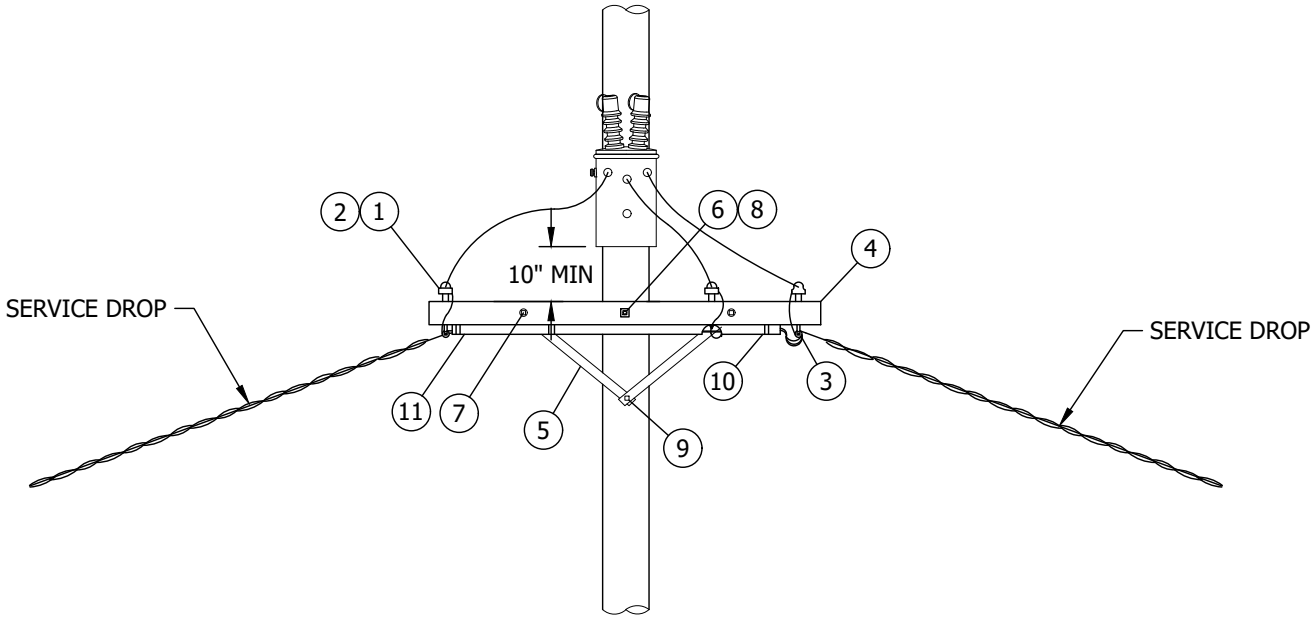



**FIGURE 1**

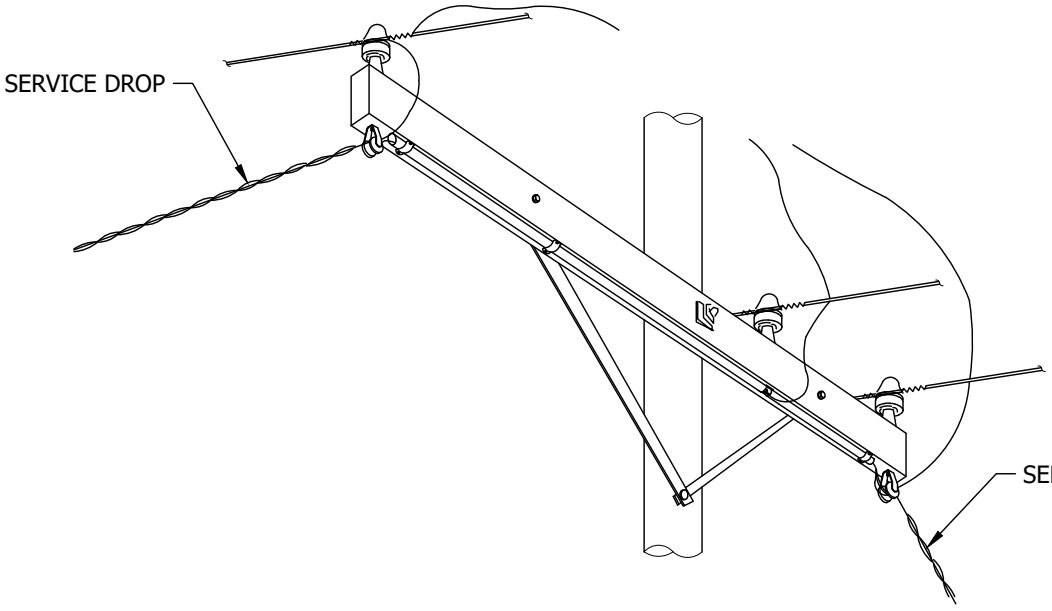



**FIGURE 1**
ISOMETRIC VIEW

FIELD MAINTENANCE ONLY

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| A | OH613 ADDED | NV5 | MRF | MRF | MRF | 07/07/2025 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

OPEN WIRE SECONDARY SINGLE TANGENT CROSSARM CONSTRUCTION

FMO OH613.1

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNIT |
|---|---|---|---|---|---|
| 1 | INSULATOR, PIN TOP, PORC, C-NECK, 55-2 | 3 | 750 | S429024 | 55-2/I |
| 2 | PIN, INSULATOR, GLV, 1", 4KV/SECONDARY | 3 | 396.1 | S532608 | -- |
| 3 | CLEVIS, DEAD END, INSULATOR, SPOOL | 2 | 612 | S235488 | SDE |
| 4 | CROSSARM, WD, 6-PIN, 8' | 1 | -- | S293680 | -- |
| 5 | BRACE, FLAT, GLV, 36" | 2 | -- | S164224 | -- |
| 6 | BOLT, MACHINE, 5/8", GALV W/ NUT | 1 | 390 | -- | -- |
| 7 | BOLT, WASHER HEAD, STEEL GALVANIZED 3/8" | 2 | 390 | S158528 | 3/8X5B |
| 8 | WASHER, SQUARE, 2 1/4" X 13/16" HOLE, GALV | 6 | 390 | S799050 | -- |
| 9 | SCREW, LAG, GLV, 4-3/8" X 1/2" | 1 | -- | S621602 | -- |
| 10 | CLAMP, UNISTRUT, GLV, FOR 2" CONDUIT | 3 | -- | S229536 | -- |
| 11 | CONDUIT, PVC, SCH 40, 2" X 10' | 1 | -- | S251296 | -- |

**NOTES:** NONE

**REFERENCE:** NONE

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| A | OH613 ADDED | NV5 | MRF | MRF | MRF | 07/07/2025 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

OPEN WIRE SECONDARY SINGLE TANGENT CROSSARM CONSTRUCTION

**SCOPE:** THIS STANDARD SHOWS SERVICES ON OPEN WIRE SECONDARY DOUBLE DEADEND CROSSARM CONSTRUCTION.

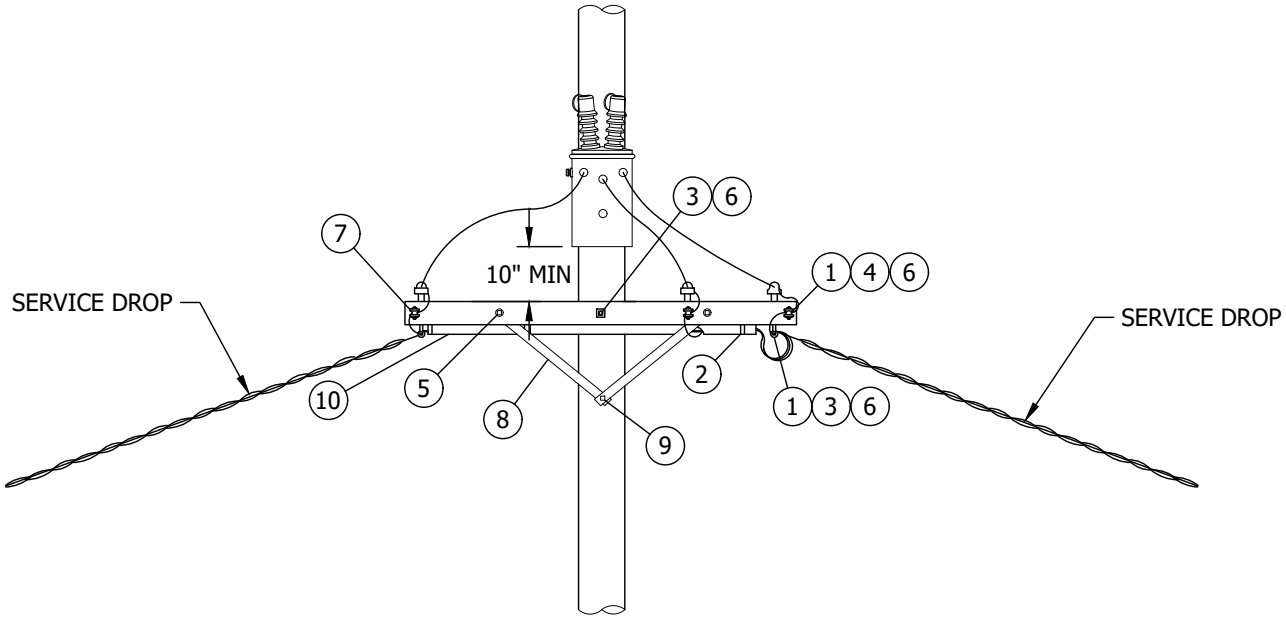



**FIGURE 1**

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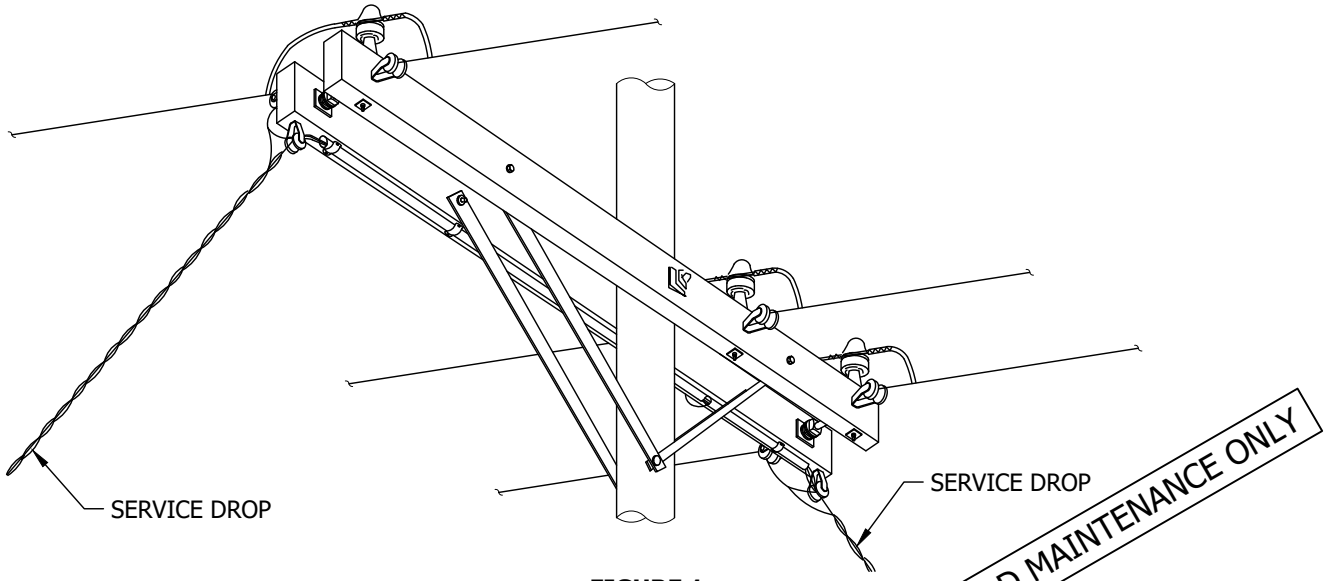



**FIGURE 1**
ISOMETRIC VIEW

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

OPEN WIRE SECONDARY DOUBLE DEADEND CROSSARM CONSTRUCTION

FMO OH613.3

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNIT |
|---|---|---|---|---|---|
| 1 | CLEVIS, DEAD END, INSULATOR, SPOOL | 8 | 612 | S235488 | SDE |
| 2 | CLAMP, UNISTRUT, GLV, FOR 2" CONDUIT | 3 | -- | S229536 | -- |
| 3 | BOLT, MACHINE, 5/8", GALV W/ NUT | 1 | 390 | -- | -- |
| 4 | BOLT, SPACE, 3/4", GALV W/ 4 NUTS | 2 | 390 | -- | -- |
| 5 | BOLT, WASHER HEAD, STEEL GALVANIZED 3/8" | 4 | -- | S158528 | 3/8X5B |
| 6 | WASHER, SQUARE, GLV, 2-1/4" X 2-1/4" | 14 | 390 | S799040 | -- |
| 7 | CROSSARM, WD, 6-PIN, 8' | 2 | -- | S293680 | -- |
| 8 | BRACE, FLAT, GLV, 36" | 4 | 396.1 | S164224 | -- |
| 9 | SCREW, LAG, GLV, 4-3/8" X 1/2" | 2 | -- | S621602 | -- |
| 10 | CONDUIT, PVC, SCH 40, 2" X 10' | 1 | -- | S251296 | -- |

**NOTES:** NONE

**REFERENCE:** NONE

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

OPEN WIRE SECONDARY DOUBLE DEADEND CROSSARM CONSTRUCTION

**FIELD MAINTENANCE ONLY**

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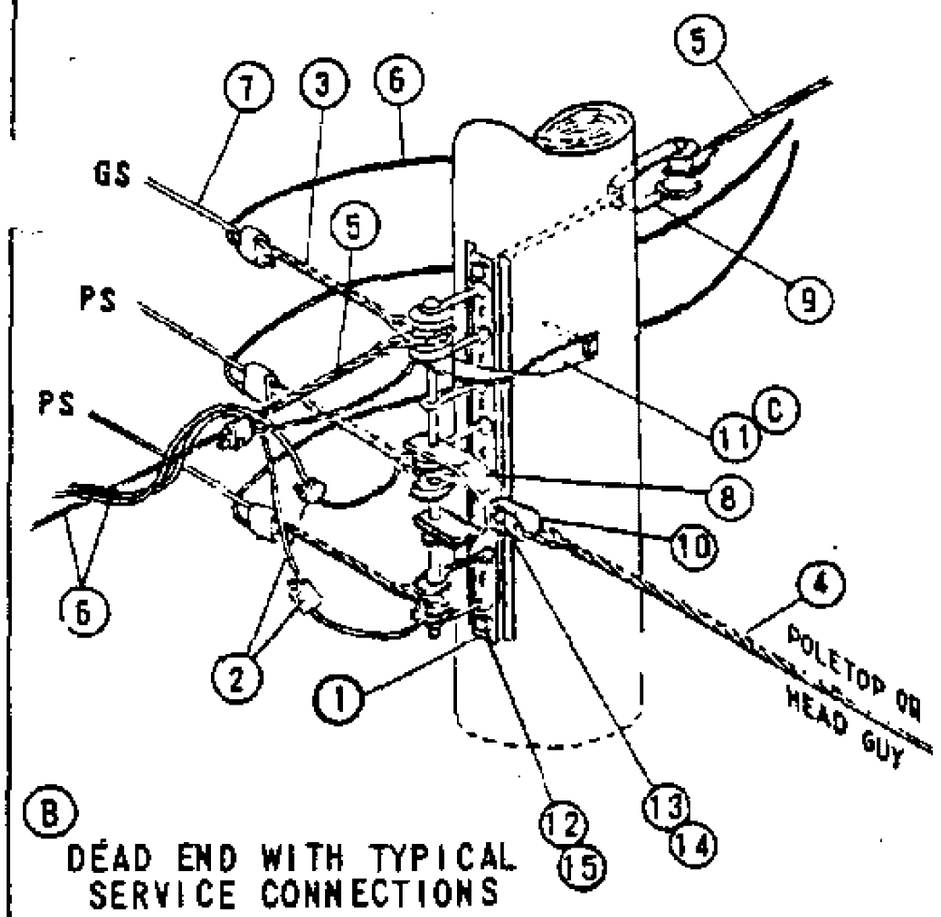
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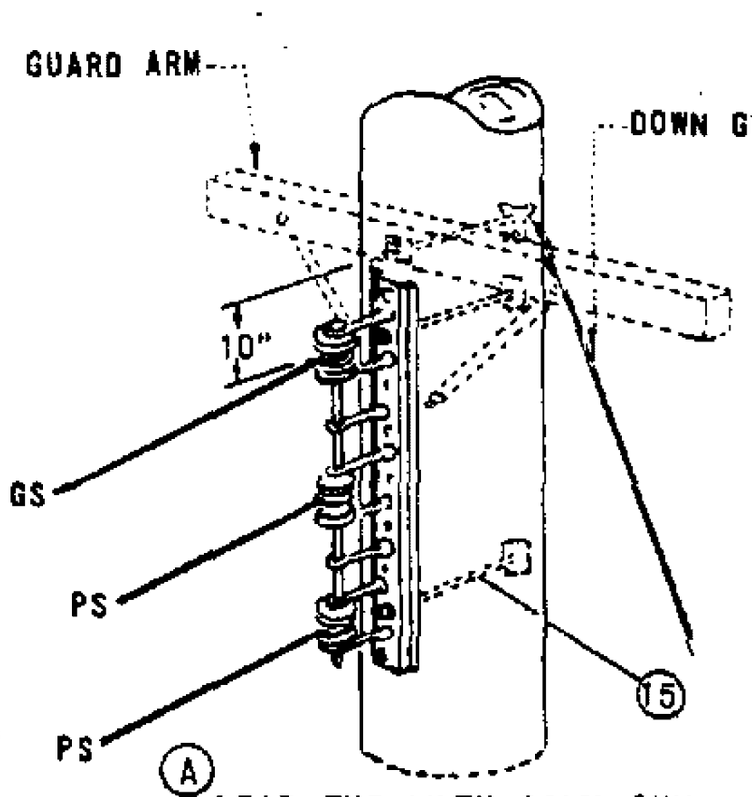
SDG&E ELECTRIC OVERHEAD STANDARD

SECONDARY RACK CONSTRUCTION

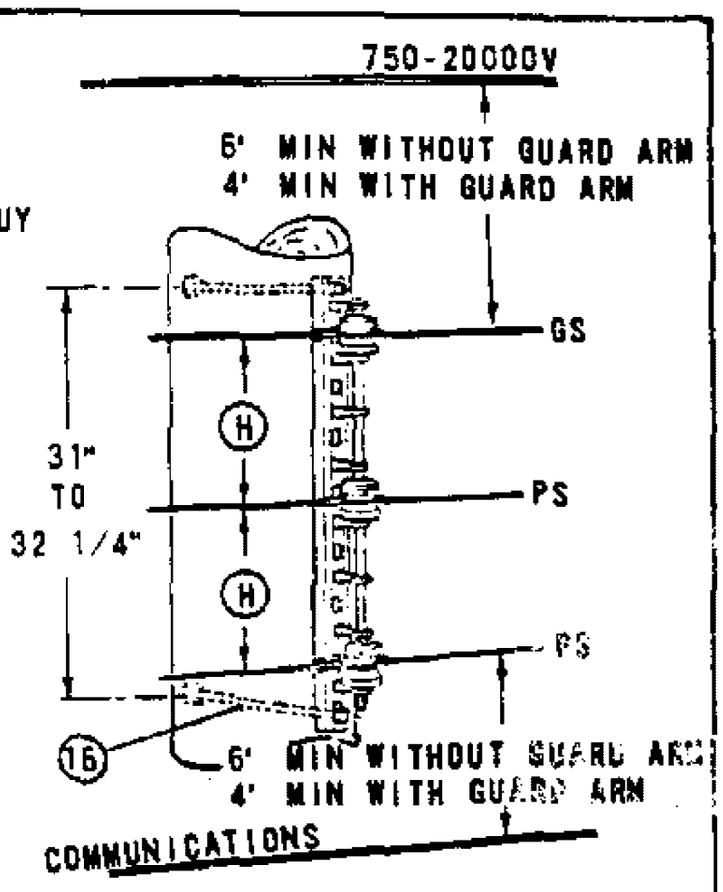
FMO OH 616



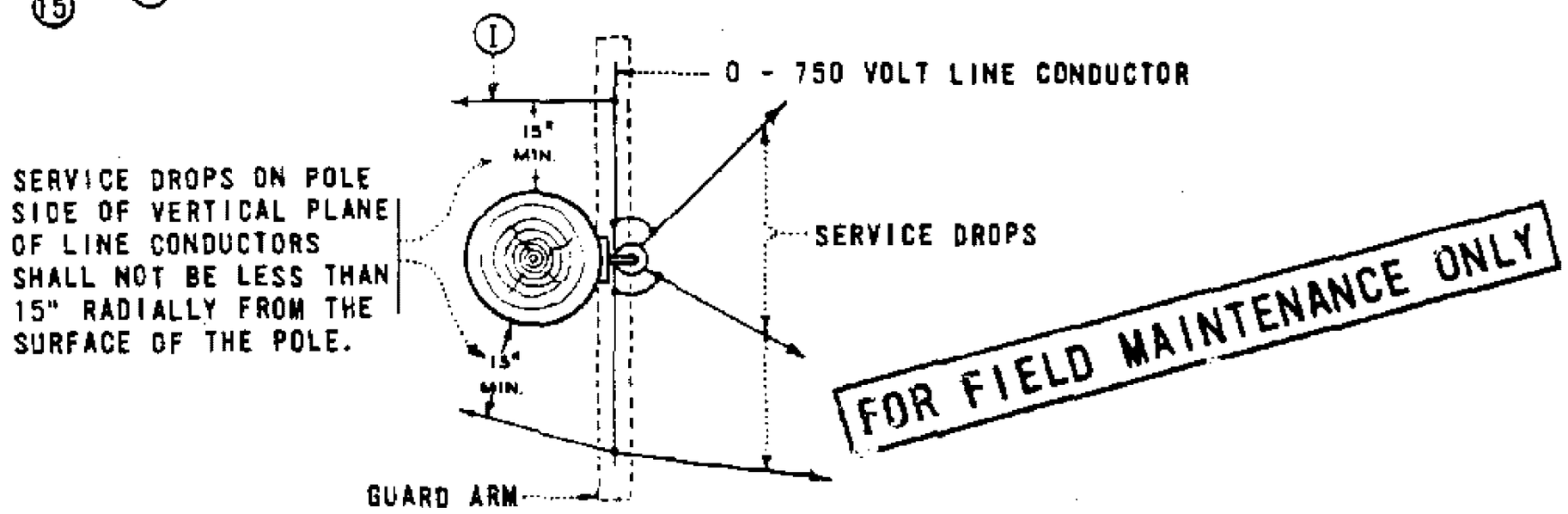

(B) DEAD END WITH TYPICAL SERVICE CONNECTIONS




(A) DEAD END WITH DOWN GUY




TANGENT OR ANGLE




FOR FIELD MAINTENANCE ONLY

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NOTES:

(A) DEAD END WITH DOWN GUY IS PREFERRED CONSTRUCTION WHERE THERE IS NO FUTURE EXTENSION OF SECONDARY.

(B) DEAD END WITH POLETOP OR HEAD GUY IS PREFERRED CONSTRUCTION WHERE FUTURE EXTENSION OF SECONDARY IS EXPECTED.

(C) USE DEAD ENDING STRAPS BEHIND EACH CONDUCTOR WHERE RACK GUY CANNOT BE USED, SEE PAGE 629.

D. TO OBTAIN RADIAL CLEARANCE BETWEEN SUPPLY CONDUCTORS, OVERHEAD GUYS, AND CLIMBING SPACE USE EXTENSION BRACKET. SEE PAGE 629.

E. SEE PAGE 255 FOR CLIMBING SPACE REQUIREMENTS.

F. GUARD ARMS ARE REQUIRED WHEN REDUCING CLEARANCE FROM THE NORMAL 6 FT MINIMUM TO A 4 FT MINIMUM BETWEEN THE SECONDARY CABLE AND THE CONDUCTORS ABOVE.

G. WHEN USING GUARD ARMS, ADDITIONAL CLEVISES CANNOT BE ADDED TO THE POLE. REPLACE WITH MID-SPAN SERVICES SEE PAGE 618.

(H) MINIMUM VERTICAL SEPARATION FOR SPAN LENGTHS 200 FT OR LESS SHALL BE 8 IN. 200 FT THROUGH 330 FT MINIMUM SEPARATION SHALL BE 12 IN.

(I) WHEN USING GUARD ARMS, SERVICE DROPS ARE NOT PERMITTED TO PASS ABOVE OR BELOW THE GUARD ARM ON THE POLE SIDE OF THE RACK SECONDARY.

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| | 1 | RACK, 3 OR 4 WIRE SECONDARY | 1 | PG 629 |
| | 2 | CONNECTORS | AS REQ'D | PGS 783, 787 |
| | 3 | GRIPS, DEAD END FOR COATED SEC CONDUCTORS | AS REQ'D | PGS 745, 747 |
| | 4 | GRIPS, GUY | AS REQ'D | PGS 745, 747 |
| | 5 | GRIPS, TRIPLEX NEUTRALS SERVICE | AS REQ'D | PGS 745, 747 |
| | 6 | WIRE, TRIPLEX SERVICE | AS REQ'D | PGS 711, 715, 716 |
| | 7 | WIRE, W.P. SECONDARY | AS REQ'D | PGS 711, 715, 716 |
| | | CLEVIS, 4KV DEAD END | 1 | 235520 |
| | 9 | CLEVIS, SECONDARY DEAD END | 1 | 235488 |
| 10 | | EYELET, THIMBLE | 1 | 338176 |
| | 11 | STRAP, DEAD ENDING, CURVED | AS REQ'D | PG 629 |
| | 12 | BOLT, MCH, 5/8" X LENGTH AS REQ'D | 2 | PG 139 |
| | 13 | BOLT, MACH, 5/8" X 2" | 1 | 155040 |
| | 14 | WASHER 5/8" LOCK SPRING | 1 | 796864 |
| | 15 | WASHER, 3" SQ CURVED | AS REQ'D | 797792 |
| | 16 | WASHER, 2 1/4" SQ FLAT | AS REQ'D | 799040 |

DATE 6-4-82
APPD

SDG&E ELECTRIC STANDARDS

SECONDARY RACK CONSTRUCTION

699.101
SUPERSEDES
616 (6-4-82)

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**REVISION HISTORY:**

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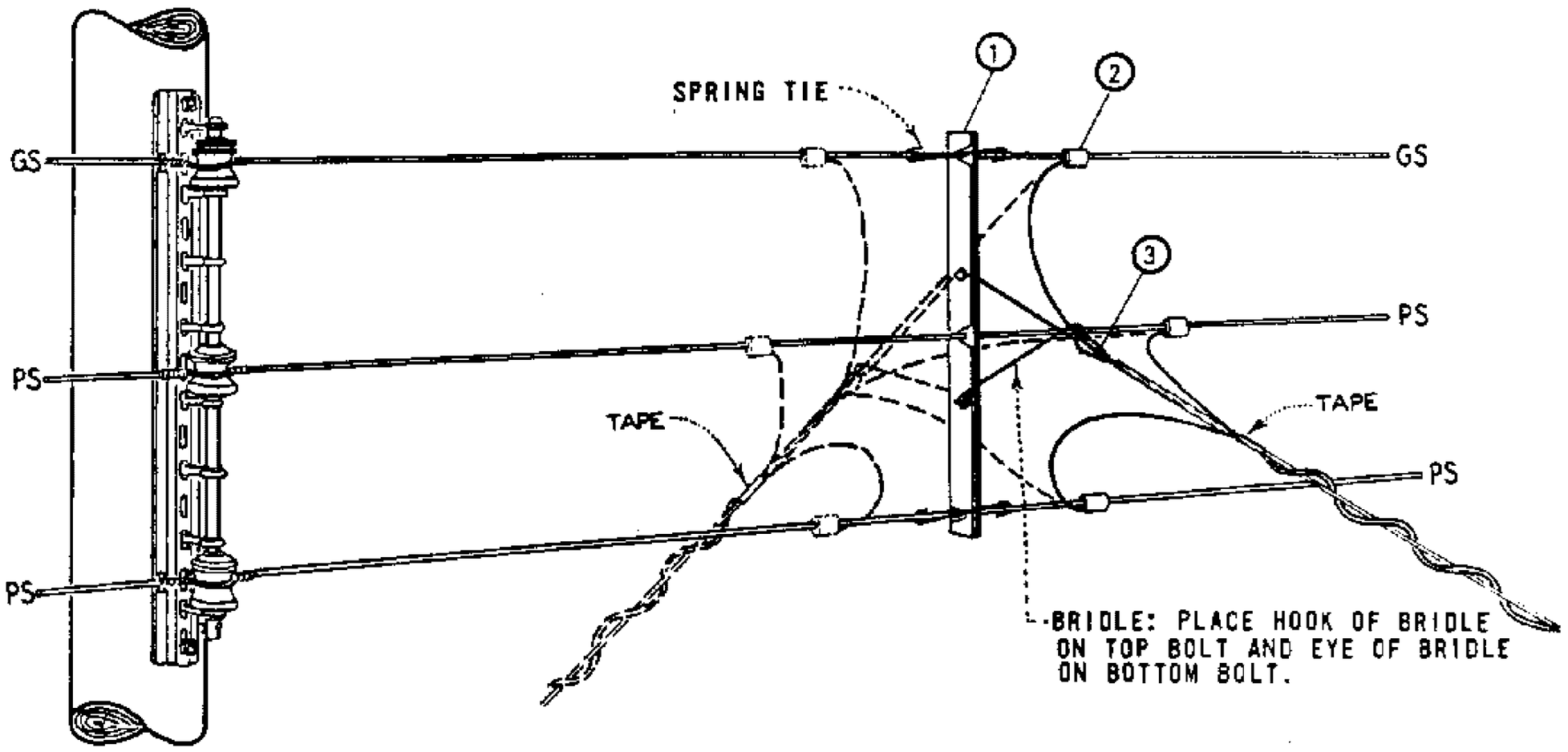
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SDG&E ELECTRIC OVERHEAD STANDARD

MID - SPAN SERVICES FROM VERTICAL RACK SECONDARY

FMO OH 618




FOR FIELD MAINTENANCE ONLY

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## SECONDARY CONDUCTOR SPREADER

| NO. WIRES | SPACING (IN) | WIRE SLOT (IN) | | | | | | MATERIAL THICKNESS (IN) | MANUFACTURER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TOP | | MIDDLE | | BOTTOM | | | | | | |
| | | DIA. | MAX. WIRE SIZE | DIA. | MAX. WIRE SIZE | DIA. | MAX. WIRE SIZE | | NAME | CATALOG NUMBER | NAME | CATALOG NUMBER |
| 3 | 12 | 1/2 | .500 | 19/32 | .594 | 19/32 | .594 | 1/4 | A.T. FLOWER | AF332-93 | JOSLYN | 32312 |
| | | | | | | | | | | | | |

NOTES.

A. FOR USE ON SERVICE DROPS 100 FEET OR LESS IN LENGTH.

B. WHERE TWO TO FOUR TRIPLEX SERVICE DROPS ARE INSTALLED ON ONE SECONDARY CONDUCTOR SPREADER, CONNECT RESPECTIVE SERVICE CONDUCTORS TO LINE CONDUCTOR WITH ONE COMPRESSION CONNECTOR AS PERMITTED BY STOCKED CONNECTOR SIZES.

C. SEE OTHER PAGES IN 'SECONDARIES, SERVICES' SECTION FOR RACK CONSTRUCTION DETAILS.

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|
| 1 | SECONDARY CONDUCTOR SPREADER, COMPLETE WITH 1-SPREADER, BRIDLES AND SPRING TIES | 1 | 670592 |
| 2 | CONNECTOR, COMPRESSION | AS REQ'D | PGS 783, 7 |
| 3 | GRIPS, SERVICE | AS REQ'D | PGS 746, 747 |

699.102
SUPERSEDES
618 (3-25-83)

SDG&E ELECTRIC STANDARDS

# MID-SPAN SERVICES FROM VERTICAL RACK SECONDARY

DATE 4-5-83
APPD JWF/424

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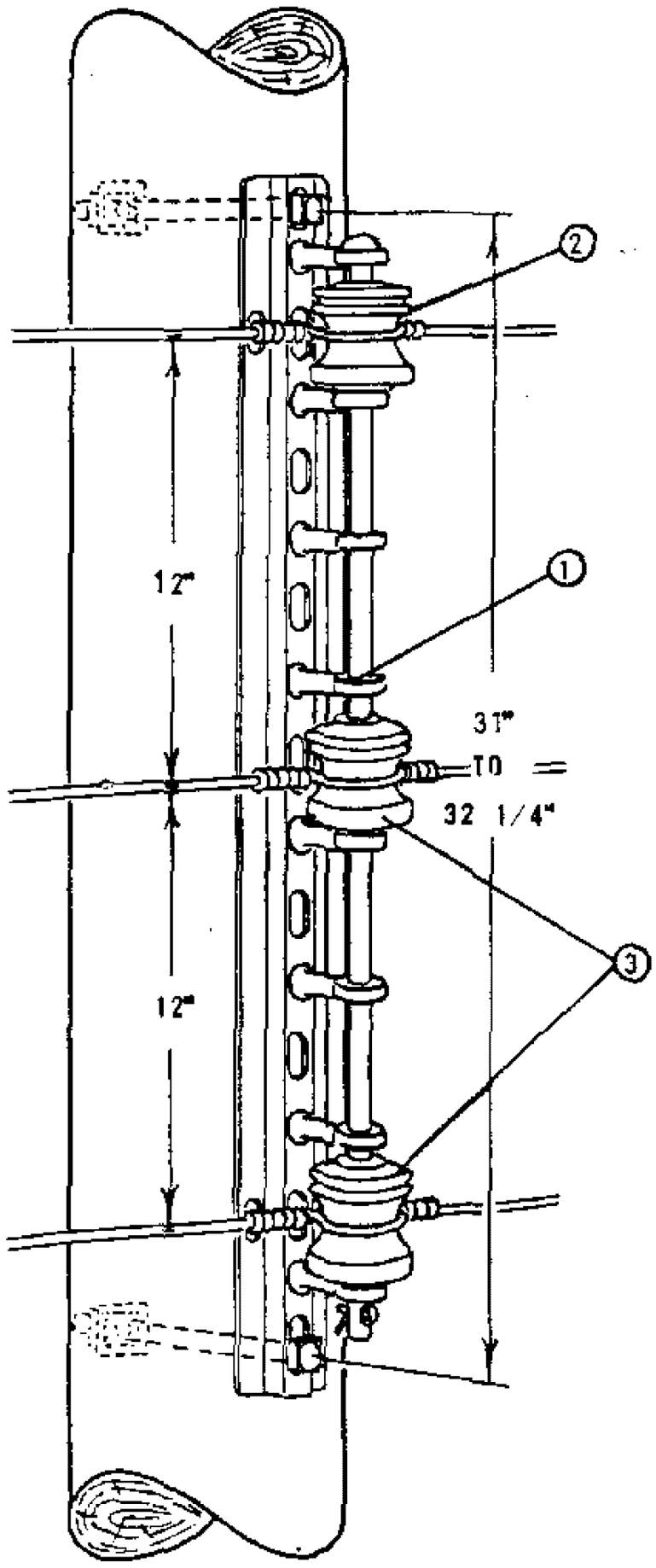
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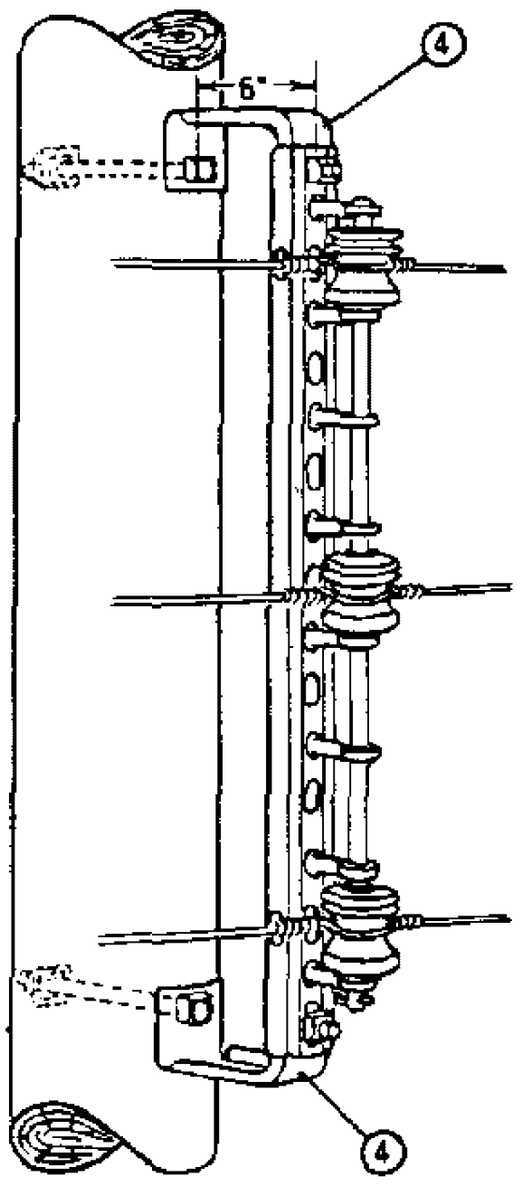
SDG&E ELECTRIC OVERHEAD STANDARD

SECONDARY RACKS

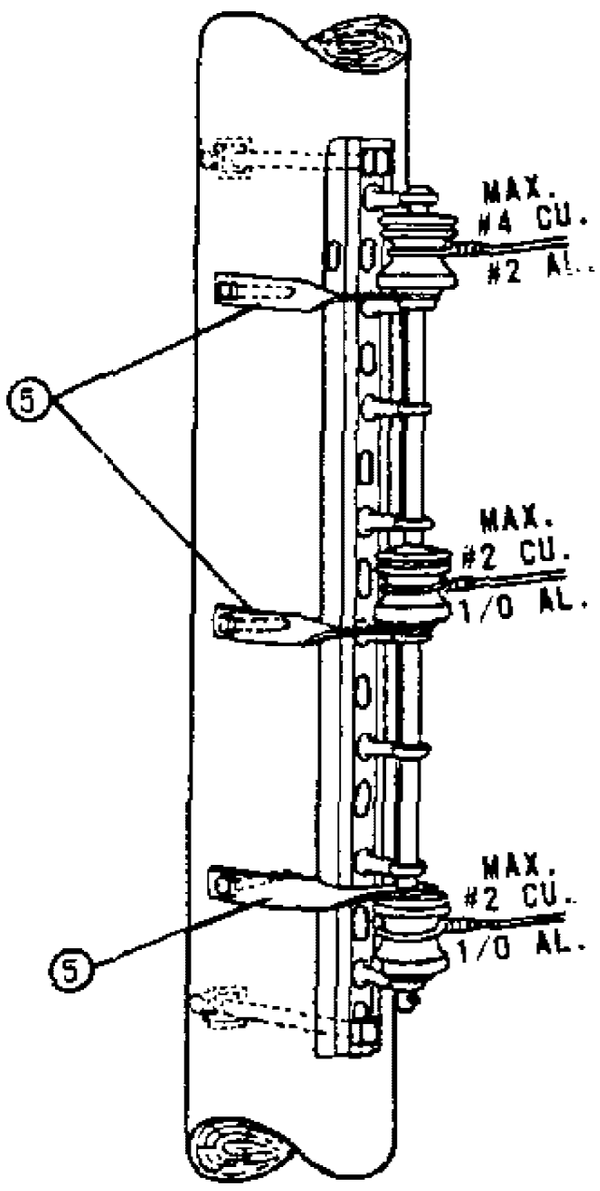
FMO OH 629




TANGENT OR ANGLE




TANGENT OR ANGLE
EXTENSION BRACKET
(A)




DEAD END ON
SIDE OF POLE
(B)

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) USED TO OBTAIN RADIAL CLEARANCE BETWEEN SUPPLY CONDUCTORS AND OVERHEAD GUYS, ALSO TO OBTAIN CLIMBING SPACE.

(B) TO BE USED FOR TANGENT, ANGLE, OR CORNER CONSTRUCTION WHERE SECONDARY MAY BE EXTENDED AND WHERE RACK GUY CANNOT BE USED.

| ITEM | DESCRIPTION | CATALOG NUMBER | | | | | | | STOCK NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| | | CHANCE | HUBBARD | JOSLYN | KORTICK | McGRW ED | OLIVER | | |
| 1 | SECONDARY RACK | - | 1478 | - | K-6748 | - | 8348 | | 564864 |
| 2 | SPOOL INSULATOR, (WHITE) | 256W | 455W | - | - | - | - | | 430816 |
| 3 | SPOOL INSULATOR, (BROWN) | - | - | - | - | - | - | | 430656 |
| 4 | EXTENSION BRACKET | - | 3355 | J-2355 | K-4830 | - | - | | 166016 |
| 5 | DEAD ENDING STRAP, CURVED, 1/4" X 1 1/4" | - | 1000 | J-3120 | K-4833 | OR4MI | - | | 696832 |
| | | | | | | | | | |

DATE 6-4-82
APPD

SDG&E ELECTRIC STANDARDS

SECONDARY RACKS

699.201
SUPERSEDES
629 (6-4-82)

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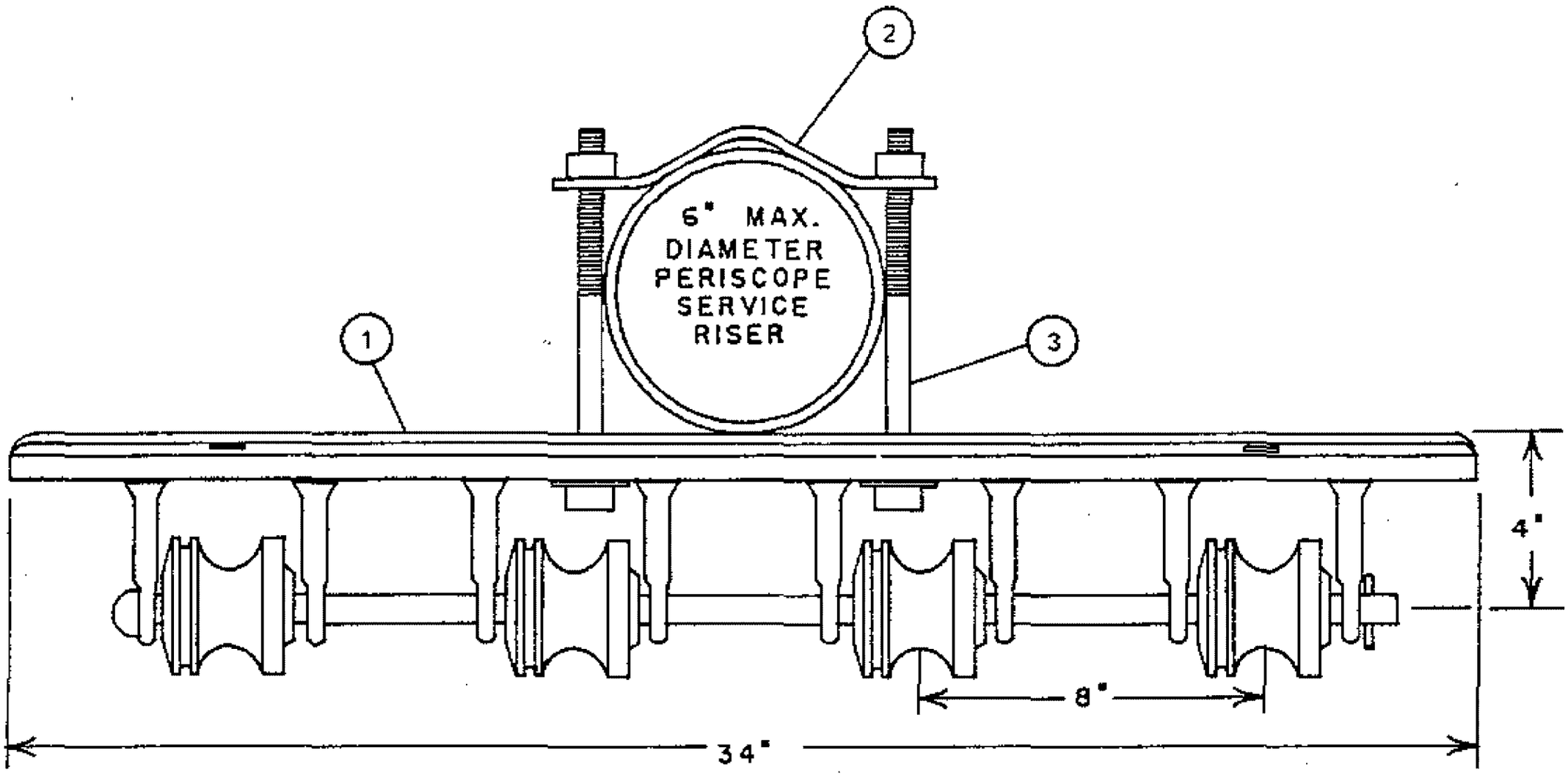
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SDG&E ELECTRIC OVERHEAD STANDARD

SERVICE INSULATOR BRACKETS, SINGLE

FMO OH 631




FOUR SPOOL SERVICE INSULATOR BRACKET-ITEMS 1,2,3

FOR FIELD MAINTENANCE ONLY

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| ITEM | DESCRIPTION | CATALOG NUMBER | QUANTITY | STOCK NO. OR CONST. STD. |
|---|---|---|---|---|
| 1 | RACK, FOUR SPOOL SERVICE INSULATOR | HUBBARD 1478<br>KORTICK K-6748<br>OLIVER 8348 | 1 | 564864 |
| 2 | STRAP, CURVED BACK | - | 1 | 698016 |
| 3 | BOLT, MACH., GALV., 1/2" X [LENGTH AS REQ'D.] | - | 2 | PG. 139 |

DATE 9-17-82
APPD

SDG&E ELECTRIC STANDARDS

SERVICE INSULATOR BRACKETS, SINGLE

699.301
SUPERSEDES
631 (9-17-82)

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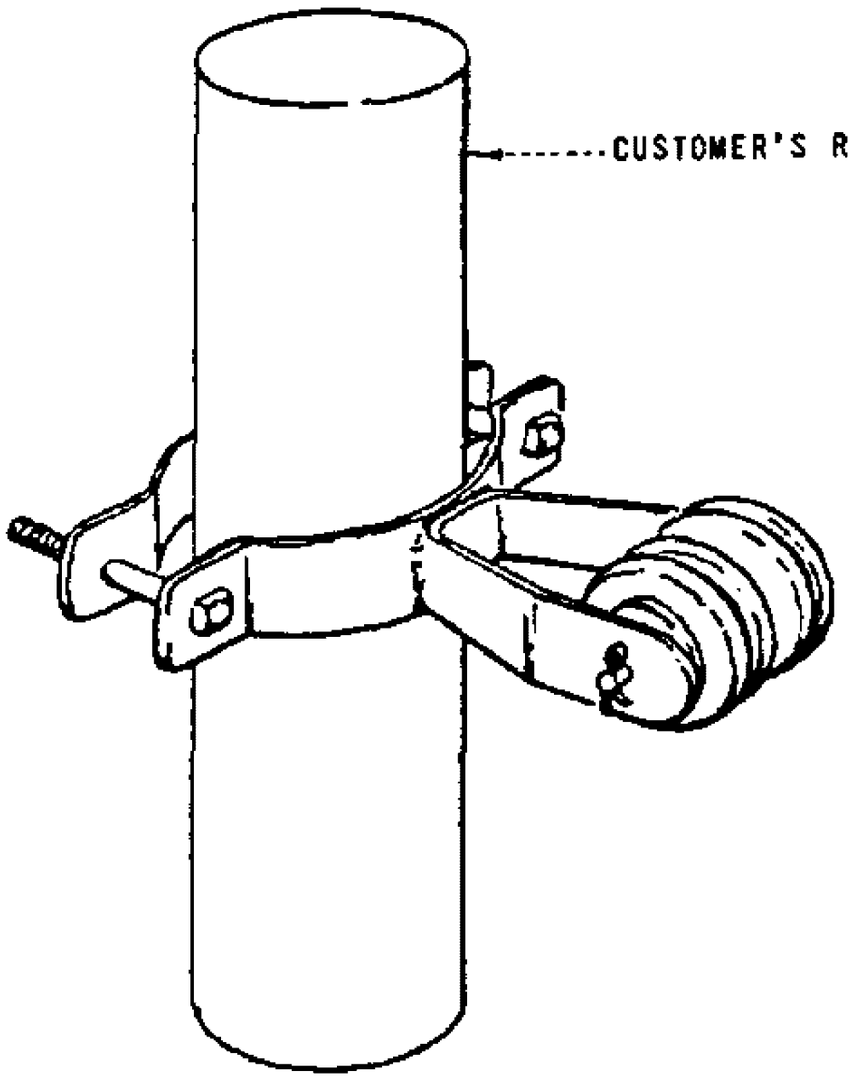
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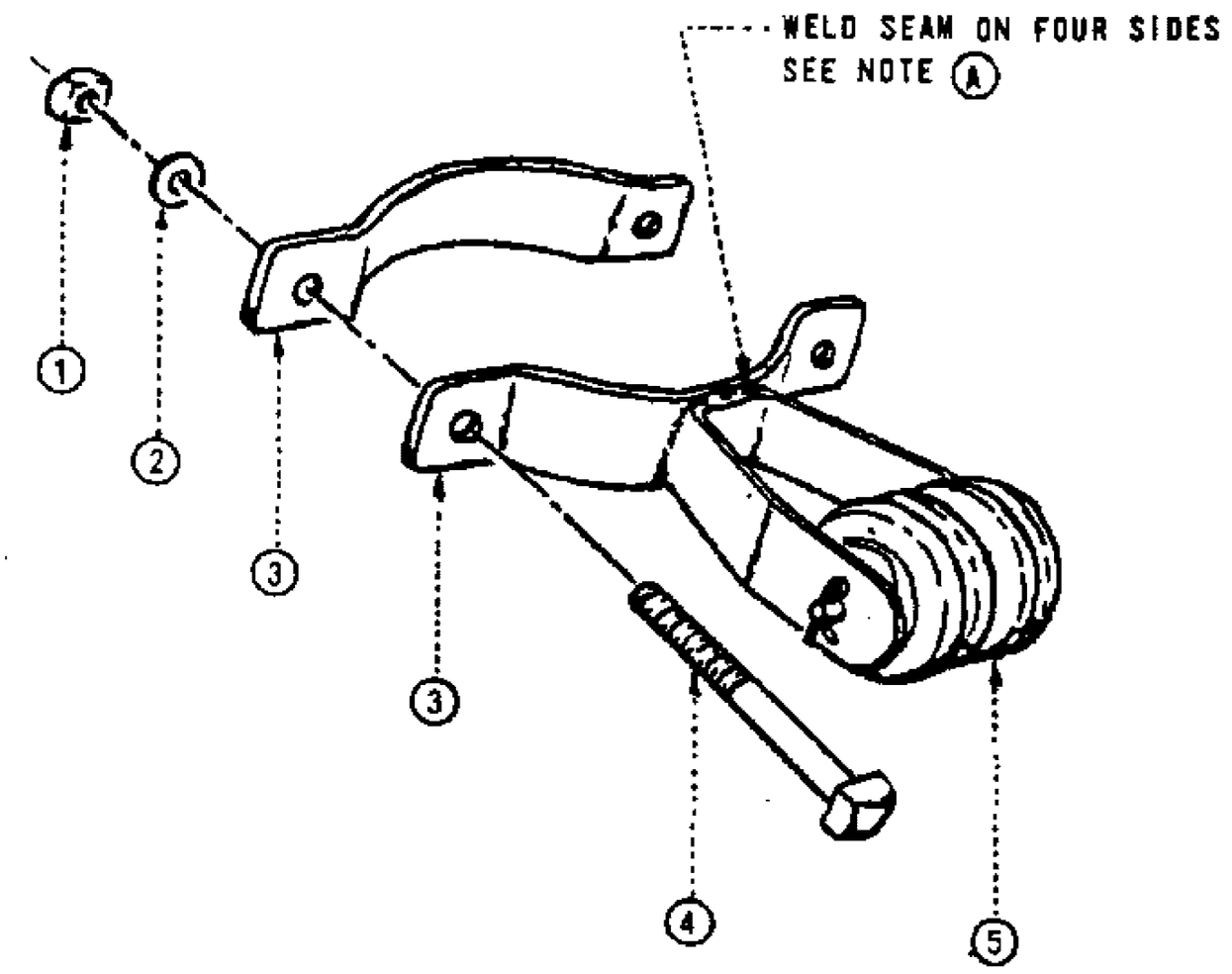
SDG&E ELECTRIC OVERHEAD STANDARD

HEAVY DUTY SERVICE INSULATOR BRACKET

FMO OH 632




BRACKET ASSEMBLED




BRACKET EXPLODED

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FOR FIELD MAINTENANCE ONLY

NOTES:

(A) ITEM TO BE GALVALLOY ZINC AT WELDED JOINT OR HOT DIP GALVANIZED AFTER FABRICATION.

(B) ASSEMBLY WILL ACCOMODATE CUSTOMER'S RISER FROM 3" MINIMUM TO 6" MAXIMUM.

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|
| 1 | NUT, GALV., 1/2" X 13 COURSE THREAD | 2 | 504736 |
| 2 | WASHER, FLAT, GALV., 1/2" DIAMETER | 2 | 800192 |
| 3 | STRAP, BACK, CURVED, GALV. | 2 | 698016 |
| 4 | BOLT, MACH., GALV., 1/2" X (LENGTH AS REQ'D) | 2 | PG. 139 |
| 5 | 4KV DEADEND ASSEMBLY | 1 | 166128 |
| | | | |

699.302
SUPERSEDES
632 (9-17-82)

SOG&E ELECTRIC STANDARDS

# HEAVY DUTY SERVICE INSULATOR BRACKET

DATE 9-17-82
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**SCOPE:** THIS STANDARD SHOWS THE VARIOUS MINI WEDGE CONNECTORS THAT ARE TO BE USED TO CONNECT DIFFERENT TYPES AND SIZES OF JUMPER AND LINE WIRE FOR SECONDARY AND SERVICE CONDUCTORS FOR THE OVERHEAD.

| SDG&E FULL ACSR,AAAC OR AAC NEUTRAL FULL AAC HOT WIRES STANDARD TRIPLEX | | 4/0 ACSR,AAAC AAC,CU STR | 2/0 ACSR,AAAC AAC,CU STR 3/0 AAC CMPT | 1/0 #1 ACSR,AAAC AAC,CU STR | #2 ACSR,AAAC AAC,CU STR | #4 ACSR,AAAC AAC,CU STR CMPT AAC,CU #2 SOL | #6 ACSR,AAAC AAC,CU STR CMPT AAC,CU SOL #4 SOL | #8 AAC,CU STR & SOL #6 AL/CU SOL |
|---|---|---|---|---|---|---|---|---|
| #8 AAC/CU STR & SOL #6 AL/CU SOL | AU | MW4/08 | MW2/08 | MW1/08 | MW28 | MW48 | MW68 | MW88 |
| | STOCK # | S269494 | S269460 | S269448 | S269484 | S269476 | S269470 | S269466 |
| #6 ACSR,AAAC #6 AAC,CU STR #6 CMPT AAC,CU #6 SOL,#4 SOL | AU | MW4/06 | MW2/06 | MW1/06 | MW26 | MW46 | MW66 | |
| | STOCK # | S269492 | S269458 | S269446 | S269482 | S269474 | S269468 | |
| #4 ACSR,AAAC #4 AAC,CU STR #4 CMPT AAC,CU #2 SOL | AU | MW4/04 | MW2/04 | MW1/04 | MW24 | MW44 | | |
| | STOCK # | S269490 | S269456 | S269444 | S269480 | S269472 | | |
| #2 ACSR,AAAC #2 AAC,CU STR | AU | MW4/02 | MW2/02 | MW1/02 | MW22 | | | |
| | STOCK # | S269488 | S269454 | S269442 | S269478 | | | |
| 1/0 ACSR,AAAC 1/0 AAC,CU STR #1 ACSR | AU | MW4010 | MW2010 | MW1/0 | | | | |
| | STOCK # | S269464 | S269452 | S269486 | | | | |
| 2/0 ACSR,AAAC 2/0 AAC,CU STR 3/0 AAC CMPT | AU | MW4020 | MW2020 | | | | | |
| | STOCK # | S269462 | S269450 | | | | | |

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APPD TQ/DW

SDG&E ELECTRIC STANDARDS

MINI WEDGE CONNECTOR

635.4

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**REVISION HISTORY:**

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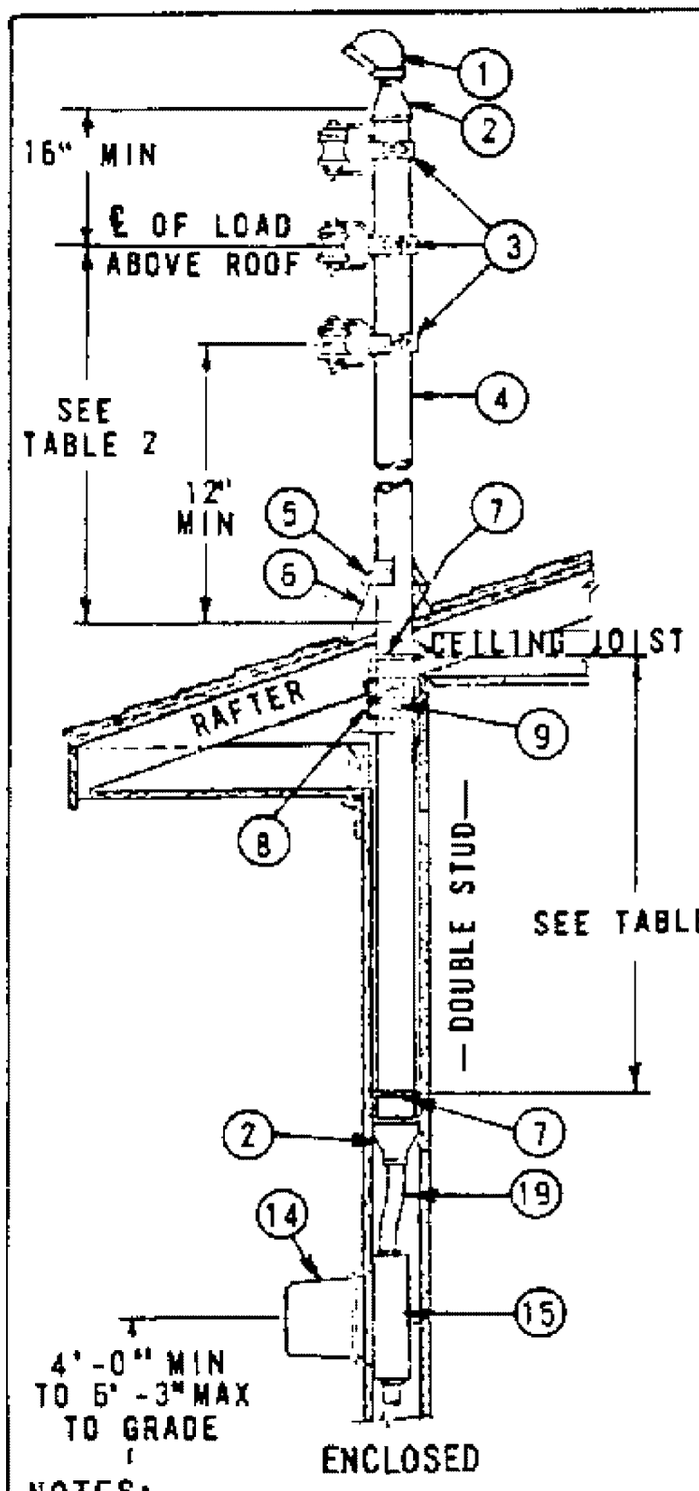
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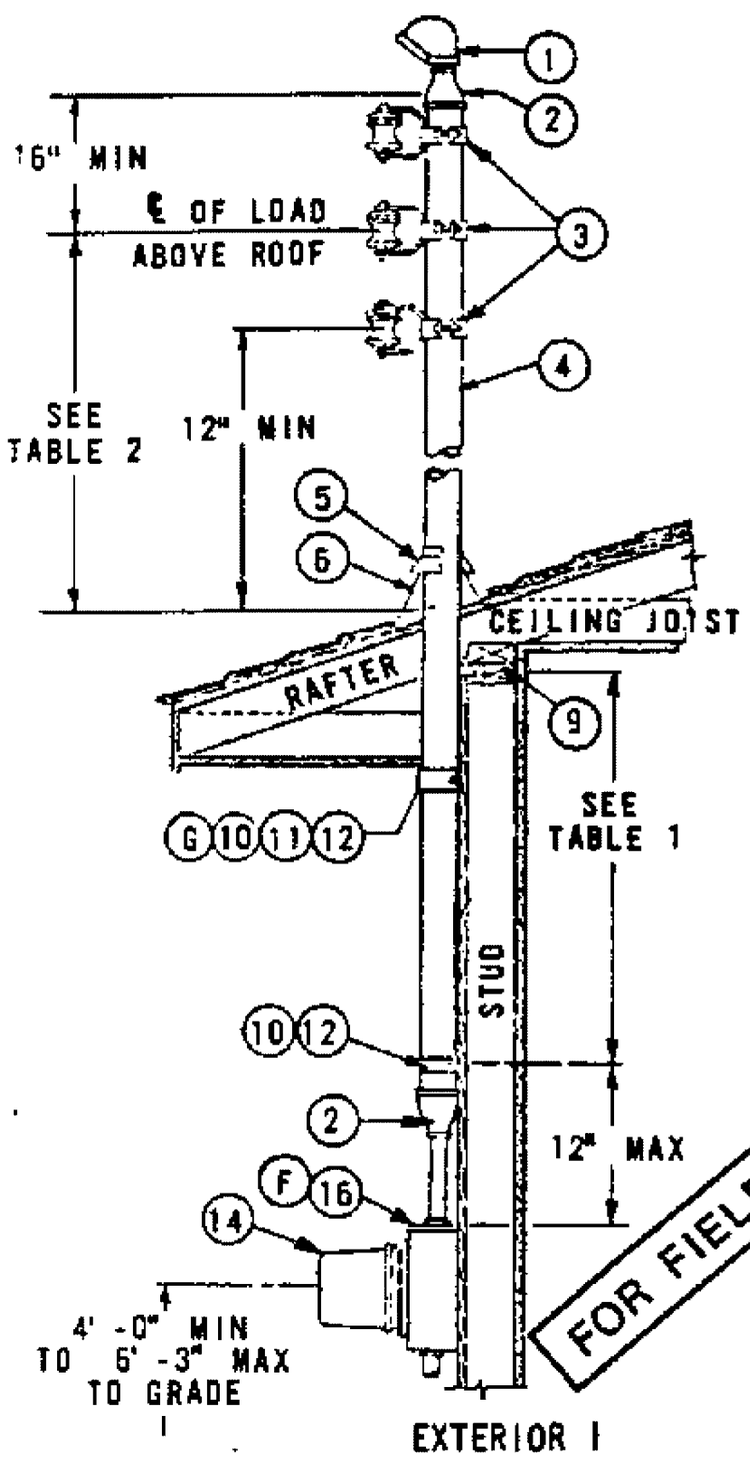
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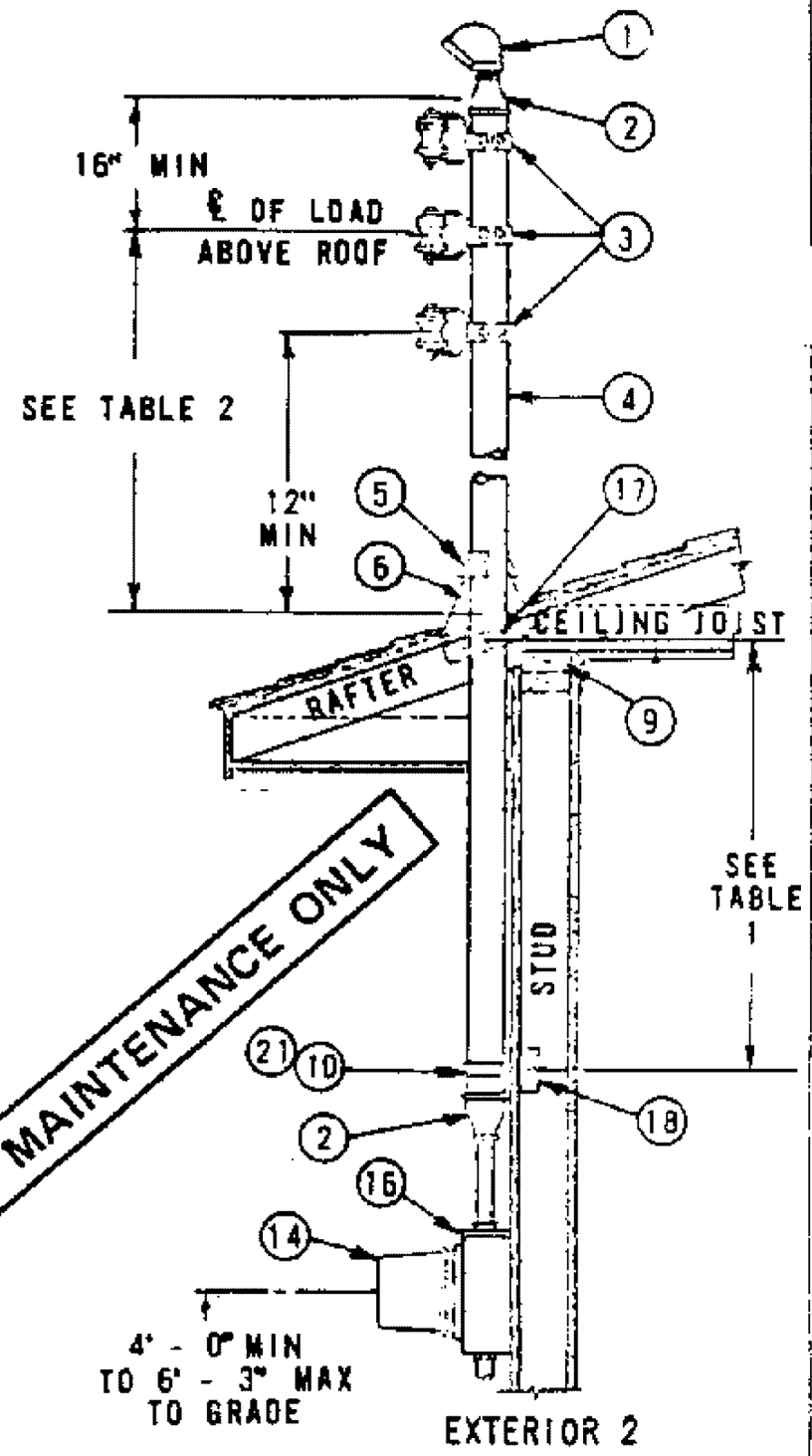
SERVICE DROP ATTACHMENTS CONDUIT RISERS

FMO OH 642

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FOR FIELD MAINTENANCE ONLY

NOTES:

A. SDG&E WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO THE BUILDING CAUSED BY RAIN OR STRUCTURAL FAILURE.

B. THESE METHODS ARE SUGGESTED TO OBTAIN THE REQUIRED GROUND AND ROOF CLEARANCES AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. WHEN THIS METHOD IS USED IT WILL BE ACCEPTABLE TO SDG&E PROVIDED THE DIMENSIONS AND CONSTRUCTION DETAILS ARE COMPLIED WITH.

C. THE DIMENSIONS SHOWN ARE BASED ON A "SLACK SPAN" SERVICE DROP LENGTH OF NOT MORE THAN 100 FEET. FOR SERVICE LENGTH GREATER THAN 100 FEET, SEE STANDARD 644.

D. NO COUPLINGS WILL BE PERMITTED BETWEEN THE TOP OF THE RISER AND THE LOWEST POINT OF SUPPORT FOR CONDUIT SIZES 1 1/4" TO 2" INCLUSIVE. IF A COUPLING IS NECESSARY IN THE 2 1/2" SIZE CONDUIT TO SECURE THE MAXIMUM HEIGHT, THE COUPLING SHALL BE INSTALLED AT THE UPPER END NEAR THE SERVICE CAP.

E. THESE CONDUIT RISERS SHALL BE USED FOR ATTACHMENT OF #2 OR LARGER SERVICE DROPS.

(F) METER SOCKET BOX MUST HAVE MINIMUM WIDTH OF 14".

(G) WHEN ROOF CONSTRUCTION HAS NO SOFFIT, MOVE STRAP UP AND LAG INTO PLATE 9. HEAVY DUTY ONE HOLE PIPE STRAP IS ACCEPTABLE IF USED WITH 1/4" X 3 1/2" LAG SCREW INTO WALL STUD.

| ITEM | DESCRIPTION | QUANTITY | | |
|---|---|---|---|---|
| | | ENCLOSED | EXTERIOR 1 | EXTERIOR 2 |
| 1 | CAP, SERVICE | 1 | 1 | 1 |
| 2 | REDUCER, PIPE, GALV IRON, IF REQ'D | 1 | 1 | 1 |
| 3 | INSULATOR AND CLAMPS, FURNISHED & INSTALLED BY SDG&E | 3 | 3 | 3 |
| 4 | CONDUIT, GALV RIGID IRON, OR INTERMEDIATE METAL CONDUIT | 1 | 1 | 1 |
| 5 | COLLAR, METAL OR NEOPRENE RAINSHED | 1 | 1 | 1 |
| 6 | FLASHING | 1 | 1 | 1 |
| 7 | BOLT, "U", 3/8" | 2 | - | - |
| 8 | STRAPS ON PLATES | AS REQ'D | - | - |
| 9 | PLATES | - | - | - |
| 10 | STRAP, PIPE, HEAVY DUTY, TWO HOLE (G) | - | 2 | - |
| 11 | SCREW, LAG, 1/4" X 3 1/2" | - | 2 | - |
| 12 | BOLT, TOGGLE, 1/4" | - | 2 | - |
| 13 | | | | |
| 14 | METER | 1 | 1 | 1 |
| 15 | BOX, METER SOCKET, FLUSH TYPE | 1 | - | - |
| 16 | BOX, METER SOCKET, SURFACE MOUNTED TYPE | - | 1 | 1 |
| 17 | BLOCKING, 2" X 4", BETWEEN RAFTERS (SOLIDLY INSTALLED) | - | - | AS REQ'D |
| 18 | BLOCKING, 2" X 4", BETWEEN STUDS | - | - | AS REQ'D |
| 19 | NIPPLE, CONDUIT, OFFSET | 1 | - | - |
| 20 | | | | |
| 21 | SCREW, LAG, 1/4" X 3" | - | - | AS REQ'D |

TABLE 1

| MIN. DISTANCE BETWEEN SUPPORTS SHOWN | |
|---|---|
| CONDUIT SIZE | DISTANCE |
| 1 1/4" | 12" |
| 1 1/2" | 15" |
| 2" | 22" |
| 2 1/2" | 30" |

TABLE 2

| MAX DISTANCE OF ℄ OF LOAD ABOVE ROOF | |
|---|---|
| CONDUIT SIZE | DISTANCE |
| 1 1/4" | 30" |
| 1 1/2" | 40" |
| 2" | 5'-0" |
| 2 1/2" | 8'-0" |

699.202
SUPERCEDES
642 (1-1-90)

SDG&E ELECTRIC STANDARDS

# SERVICE DROP ATTACHMENTS TO CONDUIT RISERS

DATE 1-1-90
APPD

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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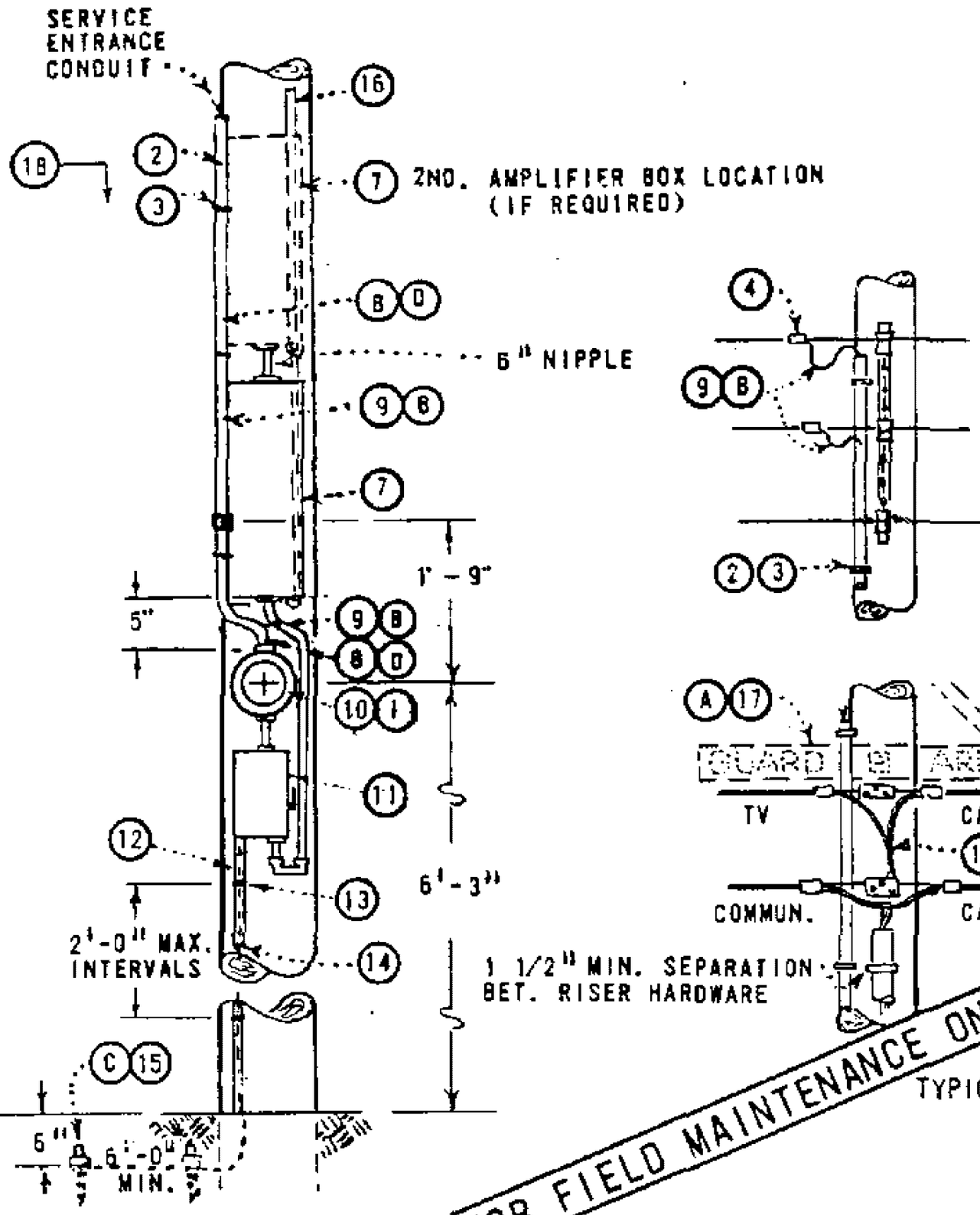
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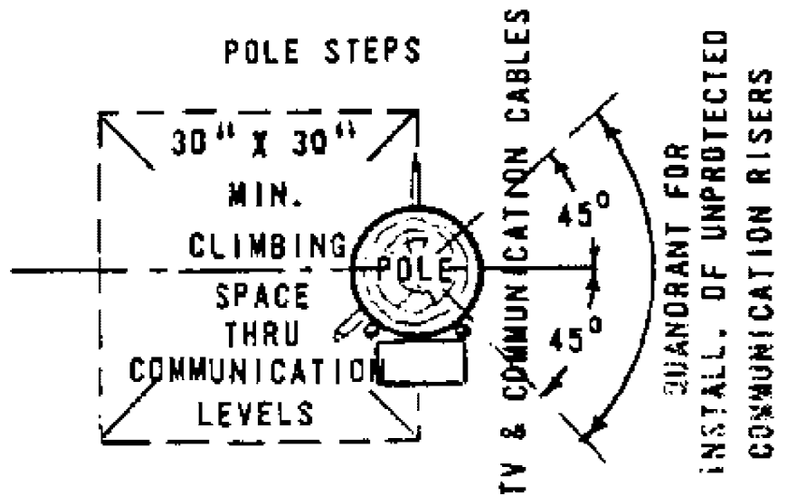
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SDG&E ELECTRIC OVERHEAD STANDARD

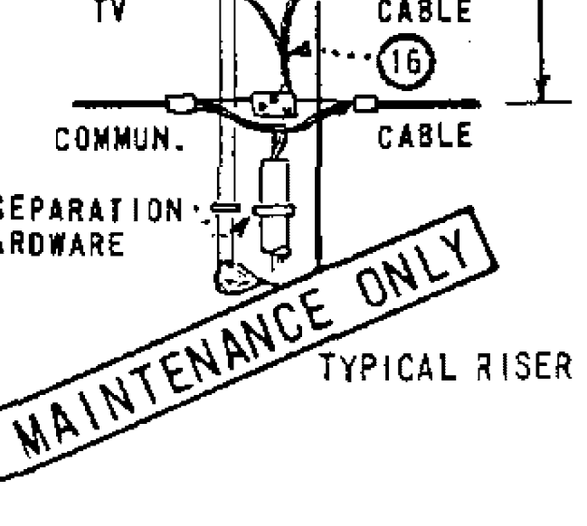
CUSTOMER OWNED - 1 & 2 BOX TV AMPLIFIER
& 120V, METER INSTALLATION

FMO
OH 652




PLAN OF CLIMBING SPACE




TYPICAL RISER TERMINATION



NOTES:

(A) SEPARATION BETWEEN SECONDARY LINE AND TV CABLE MAY BE REDUCED TO NOT LESS THAN 4'-0" WHERE A GUARD ARM HAS BEEN INSTALLED IMMEDIATELY ABOVE TV CABLE.

(B) CUSTOMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM METER SOCKET TERMINALS TO OVERHEAD SECONDARY LINE AND SHALL BE OF A LENGTH SUFFICIENT TO FORM LOOPS AT TOP OF THE RISER.

(C) USE TWO GROUND RODS WHERE AN IMPEDANCE OF LESS THAN 25 OHMS CANNOT BE OBTAINED WITH ONE GROUND ROD.

(D) IF PVC CONDUIT IS USED, ALL EQUIPMENT MOUNTED ON POLE BELOW 8' LEVEL TO BE EFFECTIVELY GROUNDED AND CONDUIT GROUND OMITTED.

E. THE EQUIPMENT ON LOADSIDE OF THE METER IS SUBJECT TO APPROVAL BY THE LOCAL INSPECTION AUTHORITIES.

F. ATTACH ONE SET OF LEADS FROM METER TO EXO SWITCH ONLY. LOWER AMPLIFIER MAY BE USED AS A JUNCTION BOX WHEN SECOND AMPLIFIER BOX IS REQUIRED.

G. THIS INSTALLATION SHALL BE LIMITED TO UTILITY POLES WHICH CONTAIN NO OTHER VERTICAL RUNS.

MATERIAL FURNISHED AND INSTALLED BY SDG&E

| ITEM | DESCRIPTION | QUANTITY | STOCK NO./ STD. PAGE |
|---|---|---|---|
| 1 | METER | 1 | 481840 |
| 2 | CONDUIT 3/4" DIAM., PVC, TYPE II, SCH. 80 (E) | AS REQ'D. | 251520 |
| 3 | STRAPS, PIPE, GALV., 3/4", 2-10d. NAILS (E) | AS REQ'D. | 697888 |
| 4 | CONNECTORS, WIRE (SIZE AS REQ'D.) | 2 | 783 OR 786 |
| 5 | COUPLING, PLASTIC, (SIZE AS REQ'D) | 1 | |
| | | | |

MATERIAL FURNISHED AND INSTALLED BY CUSTOMER

| | | DESCRIPTION |
|---|---|---|
| | 7 | TV AMPLIFIER EQUIPMENT(1 OR 2 BOX INSTALLATION) |
| (D) | 8 | G.I. RIGID OR PVC CONDUIT SCH. 80, WITH FITTINGS (TO 8'-0" LEVEL) |
| (B) | 9 | WIRE, 600V, #12, TYPE THW, (SERVICE CONDUCTORS) |
| | 10 | APPROVED METER SOCKET |
| | 11 | EXO SWITCH, COMPLETE WITH PROTECTION |
| | 12 | HARDWOOD MOULDING, 1" |
| | 13 | PIPE STRAPS, GALV., 1" & 2-10d. NAILS, GALV. |
| | 14 | WIRE, BARE STRANDED COPPER, #6 |
| (C) | 15 | GROUND ROD AND CLAMP, 5/8" X 8'-0" |
| | 16 | CO-AXIAL TV CABLES |
| (A) | 17 | GUARD ARM, 3" X 4 1/4" X 4'-0" (IF REQ'D.) WITH BRACE |
| | 18 | POLE STEPS (AS REQ'D) PAGE 363 |

DATE 8-31-81
APPD

SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS

CUSTOMER OWNED - 1 & 2 BOX TV AMPLIFIER & 120V. METER INSTALLATION

699.500
SUPERSEDES
652 (8-31-81)

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| 717 | COPPER TREE WIRE |
| 720 | AUTOMATIC SLEEVES FOR COPPER AND COPPERWELD CONDUCTORS |
| 741 | 12KV ALUMINUM STRAIGHT STRAIN CLAMP FOR ACSR & 5005 ALUMINUM ALLOY CONDUCTORS |
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| C | OH783 MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | F | | | | | | |
| B | OH789 MOVED TO FMO | EDM | MRF | GLW | KRG | 11/09/2022 | E | | | | | | |
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

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CONDUCTOR DATA & ACCESSORIES FMO
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FMO
OH701.1

# OH711 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARDS MANUAL.

**REVISION HISTORY:**

**06/30/2025:** MOVED TO FMO

**05/30/2024:** TABLE 3 5005 BARE STRANDED ALUMINUM ALLOY MOVED TO FMO

**05/22/2023:** MOVED TO FMO

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| F | NOTES UPDATE | EDM | MRF | JES | CZH | 12/01/2021 | I | MOVED TO FMO | EDM | MPC | JAS | JJJP | 06/18/2025 |
| E | TABLE UPDATE | - | RSL | JES | CZH | 11/12/2019 | H | MOVED TO FMO | GLC | JIK | MRF | JAS | 05/30/2024 |
| D | TABLE UPDATE | - | JCE | JES | CZH | 06/14/2019 | G | MOVED TO FMO | GLC | MRF | MRF | KRG | 05/22/2023 |

**SCOPE:** THIS STANDARD LISTS VARIOUS TYPES OF ALUMINUM CONDUCTORS USED FOR DISTRIBUTION INSTALLATIONS.

## TABLE 1:

| ACSR/AW BARE | | | | | |
|---|---|---|---|---|---|
| SIZE OF WIRE | AWG OR KCM | 4 (V) | 4/0 (V) | 336.4 (V) | 397.5 (V) |
| | CODE WORD | SWAN/ GA | PENGUIN/ GA | MERLIN/ AW | IBIS/ GA |
| STOCK NUMBER | | S812096 | S812064 | S811840 | S811936 |
| DESIGN UNITS | | A4 | - | - | A397 |
| CU. EQUIV. AWG OR KCM | | 6 | 2/0 | 4/0 | 250 |
| STRANDING AL/STEEL | | 6/1 | 6/1 | 18/1 | 26/7 |
| DIAMETER - INCHES | | .250 | .563 | .684 | .783 |
| WEIGHT - LBS PER 1,000 FT | | 57.35 | 290.8 | 356.7 | 544.9 |
| MAXIMUM DESIGN TENSION - LBS | | 540 | 2,400 | 3,000 | 3,000 |
| ULTIMATE TENSILE STRENGTH - LBS | | 1,860 | 8,350 | 8,540 | 16,300 |
| AMPACITY-AMPERES (PER CONDUCTOR AT 75°C) | | 140 | 365 | 520 | 590 |
| RESISTANCE OHMS PER 1,000 FT | CONDUCTOR AT 75°C | .53 | .12 | .06 | .052 |

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FIELD MAINTENANCE ONLY

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| A | MOVED TO FMO | EDM | MPC | JAS | JJP | 06/18/2025 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

ACSR, 5005, AND AWAC WIRE TABLES

FMO OH711.1

**SCOPE:** THIS STANDARD LISTS VARIOUS TYPES OF ALUMINUM CONDUCTORS USED FOR DISTRIBUTION INSTALLATIONS.

## TABLE 3:

| 5005 BARE STRANDED ALUMINUM ALLOY (FOR FIELD MAINTENANCE ONLY) | | | | | | |
|---|---|---|---|---|---|---|
| **SIZE OF WIRE** | **AWG OR KCM** | **4** | **2** | **1/0** | **3/0** | **394.5** |
| | **CODE WORD** | **KAKI** | **KENCH** | **KIBE** | **KOPECK** | **RADIAN** |
| **STOCK NUMBER** | | - | S813952 | S813920 | S813984 | S813888 |
| **DESIGN UNITS** | | - | 5A2 | 5A1/0 | 5A3/0 | 5A394 |
| **CU. EQUIV. AWG OR KCM** | | 6 | 4 | 2 | 1/0 | 4/0 |
| **STRANDING ALUMINUM ALLOY** | | 7 | 7 | 7 | 7 | 19 |
| **DIAMETER - INCHES** | | .250 | .316 | .398 | .502 | .721 |
| **WEIGHT - LBS PER 1,000 FT** | | 45.7 | 72.7 | 115.7 | 183.7 | 370.3 |
| **ULTIMATE TENS. STRENGTH - LBS** | | 1,415 | 2,195 | 3,405 | 4,965 | 10,190 |
| **AMPACITY-AMPERES (PER CONDUCTOR AT 75°C)** | | 140 | 185 | 255 | 345 | 540 |
| **RESISTANCE OHMS PER 1,000 FT** | **CONDUCTOR AT 75°C** | .48 | .30 | .19 | .12 | .06 |

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| A | MOVED TO FMO | GLC | JIK | MRF | JAS | 05/30/2024 | D | | | | | | |

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**SCOPE:** THIS STANDARD LISTS THE TYPE OF COVERED ALUMINUM LINE WIRE JUMPERS USED THROUGHOUT THE DISTRIBUTION SYSTEM. THESE WIRES ARE NOT TO BE USED FOR STRINGING.

## TABLE 1

| WIRE DETAILS | | ALUMINUM |
|---|---|---|
| | | #2 (I) |
| STOCK NUMBER | | S812100 |
| DESIGN UNITS | | CWA2 |
| STRANDING | | 7 |
| DIAMETER - INCHES | BARE | 0.282 |
| | TOTAL | 0.372 |
| WEIGHT - LBS PER 1,000 FT | | 83.9 |
| AMPACITY (A) - PER CONDUCTOR AT 75°C | | 185 |

## INSTALLATION:

A. THESE COVERED WIRES DO NOT HAVE INSULATION RATINGS AND ARE INTENDED FOR INCIDENTAL CONTACT ONLY. THEY ARE TO BE TREATED LIKE BARE WIRE.

**BILL OF MATERIALS:** NONE

**NOTES:**

(I) THIS WIRE IS FOR LINE JUMPERS ONLY.

**REFERENCE:** NONE

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| D | TABLE UPDATE | - | JCE | JES | CZH | 06/14/2019 | G | MOVED TO FMO | GLC | MRF | MRF | KRG | 05/22/2023 |
| C | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | F | NOTES UPDATE | EDM | MRF | JES | CZH | 12/01/2021 |
| B | EDITORIAL CHANGES | - | GW | JS | CZH | 10/07/2018 | E | TABLE UPDATE | - | RSL | JES | CZH | 11/12/2019 |

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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SDG&E ELECTRIC OVERHEAD STANDARD

COPPER AND COPPERWELD WIRE TABLE

FMO OH 715

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COPPER WIRE (FOR FIELD MAINTENANCE ONLY)

| SIZE OF WIRE | AWG | 6 | 1 | – | – |
|---|---|---|---|---|---|
| | CIRC MILS (CU EQUIV) | 26250 | 83690 | 250K | 400K |
| STOCK NUMBER | | S813536 | S812352 | S813696 | S812416 |
| NUMBER OF STRANDS | | 3 | 7 | 19 | 19 |
| DIAMETER (INCHES) | | .201 | .328 | .574 | .726 |
| WEIGHT (LBS/1000 FT) | | 82.5 | 258.4 | 771.9 | 1235 |
| ULTIMATE TENSILE STRENGTH (LBS) | | 1204 | 3154 | 9366 | 13850 |
| AMPACITY (AMPERES) AT 75° C | | 130 | 270 | 540 | 730 |
| RESISTANCE AT 75° C OHMS/1000 FT | | .49 | .15 | .052 | .033 |

FOR FIELD MAINTENANCE ONLY

COPPERWELD WIRE (FOR FIELD MAINTENANCE ONLY)

| SIZE OF WIRE | AWG | 6 | 4 | | | – | – | – |
|---|---|---|---|---|---|---|---|---|
| | CIRC MILS (CU EQUIV) | 26250 | 47140 | | | 47124 | 92667 | 370100 |
| STOCK NUMBER | | S813120 | S813088 | S813152 | S813216 | S813280 | S813312 | S813184 |
| CW. CONDUCTOR TYPE NO. | | 6A | 4A | 4D | 4N | 3/8 (7 #8) | 9/16 (7 #5) | .810E |
| NUMBER OF STRANDS CW/CU | | 1/2 | 1/2 | 2/1 | 5/2 | 40% 7-HS | 40% 7-HS | 7/12 |
| DIAMETER (INCHES) | | .230 | .290 | .348 | .328 | .385 | .546 | .810 |
| WEIGHT (LBS/1000 FT) | | 101.6 | 161.5 | 225.5 | 240.0 | 323.9 | 649.4 | 1484 |
| ULTIMATE TENSILE STRENGTH (LBS) | | 2585 | 3938 | 7340 | 8460 | 10460 | 18510 | 34290 |
| AMPACITY (AMPERES) AT 75° C | | 140 | 180 | 190 | 180 | 200 | 305 | 660 |
| RESISTANCE AT 75° C OHMS/1000 FT | | .50 | .32 | .32 | .32 | .28 | .14 | .035 |

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| 799.101 SUPERSEDES 715 (5-6-83) | SDG&E ELECTRIC STANDARDS | DATE 3-23-2011 APPD PJA/MJC |
|---|---|---|
| | COPPER AND COPPERWELD WIRE TABLE | |

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**REVISION HISTORY:**

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SDG&E ELECTRIC OVERHEAD STANDARD

COPPER TREE WIRE

FMO OH 717

| SIZE OF WIRE | | | | | | |
|---|---|---|---|---|---|---|
| | A.W.G. | 4 | 2 | 1/0 | 3/0 | 4/0 |
| | CIRCULAR MILS. | 41740 | 66370 | 105500 | 167800 | 211600 |
| STOCK NUMBER | | 815456 | 815520 | 815488 | 815552 | – |
| NUMBER OF STRANDS | | 3 | 7 | 7 | 7 | 7 |
| CONDUCTOR AREA SQUARE INCHES | | .0328 | .0521 | .0829 | .1318 | .1662 |
| NOMINAL O.D. INCHES | | .566 | .604 | .680 | .766 | .839 |
| APPROX. WEIGHT LBS. PER M FT. | | 215 | 300 | 440 | 650 | 800 |
| ULTIMATE TENSILE STRENGTH – LBS. | | 1564 | 2517 | 3953 | 6204 | 7772 |
| CAPACITY AMPERES AT 75° C | | 125 | 166 | 222 | 294 | 343 |
| RESISTANCE AT 75° C OHMS M FEET | | .32 | .20 | .12 | .079 | .062 |
| ASSEMBLY UNITS | | TR4 | TR2 | TR1/0 | TR3/0 | – |

FOR FIELD MAINTENANCE ONLY

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| DATE 1–1–96<br>APPD PA / RDG | SDG&E ELECTRIC STANDARDS<br>COPPER TREE WIRE | 799.102<br>SUPERSEDES<br>717 (1–1–96) |

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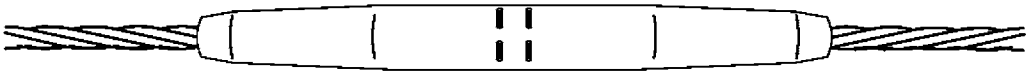
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SDG&E ELECTRIC OVERHEAD STANDARD

AUTOMATIC SLEEVES FOR
COPPER AND COPPERWELD CONDUCTORS

FMO
OH 720



**AUTOMATIC COPPER SLEEVE**

**NOTES:**

- SLEEVES SHALL NOT BE INSTALLED IN GRADE A CROSSING SPANS OR IN TRANSMISSION CONSTRUCTION.
- AUTOMATIC SLEEVES DEPEND ON LINE TENSION FOR THEIR OPERATION. THEY SHALL NOT BE USED IN TAPS, JUMPERS, OR REDUCED TENSION.

| AUTOMATIC SLEEVES FOR COPPER CONDUCTORS | | |
|---|---|---|
| WIRE | | STOCK NUMBER |
| SIZE | STRAND | |
| 6 | SOLID | S653318 |
| 6 | 3 | S653320 |
| 4 | SOLID | S653320 |

| AUTOMATIC SLEEVES FOR COPPERWELD CONDUCTORS | | |
|---|---|---|
| WIRE | | STOCK NUMBER |
| SIZE | STRAND | |
| 8A | 1/2 | S653320 |
| 6A | 1/2 | S653342 |

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| | | |
|---|---|---|
| DATE 9–16–2014<br>APPD IL / DW | SDG&E ELECTRIC STANDARDS<br>AUTOMATIC SLEEVES FOR COPPER AND COPPERWELD CONDUCTORS | 799.103<br>SUPERSEDES<br>720.8 (2–11–2014) |

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SDG&E ELECTRIC OVERHEAD STANDARD

12KV ALUMINUM STRAIGHT STRAIN CLAMP
FOR ACSR & 5005 ALUMINUM ALLOY CONDUCTORS

FMO
OH 741

**SCOPE:** THIS STANDARD SHOWS STRAIGHT STRAIN CLAMPS USED TO ATTACH ACSR AND 5005 ALUMINUM ALLOY CONDUCTORS TO DEAD END INSULATORS.

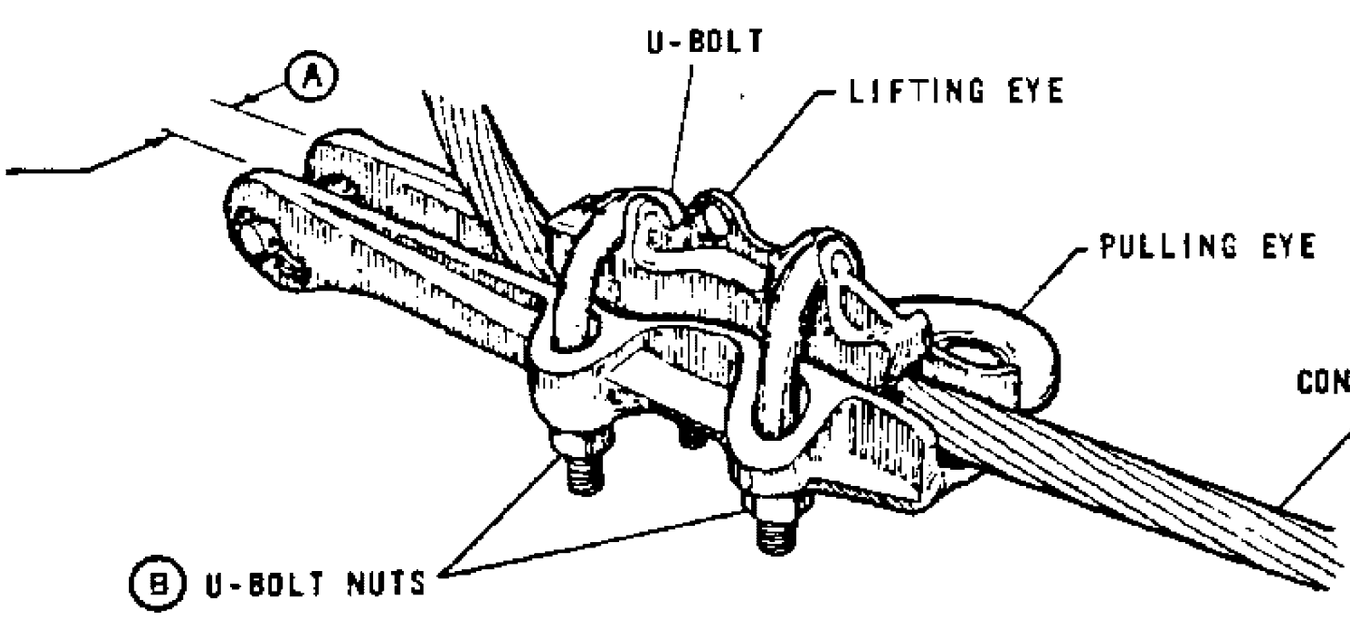
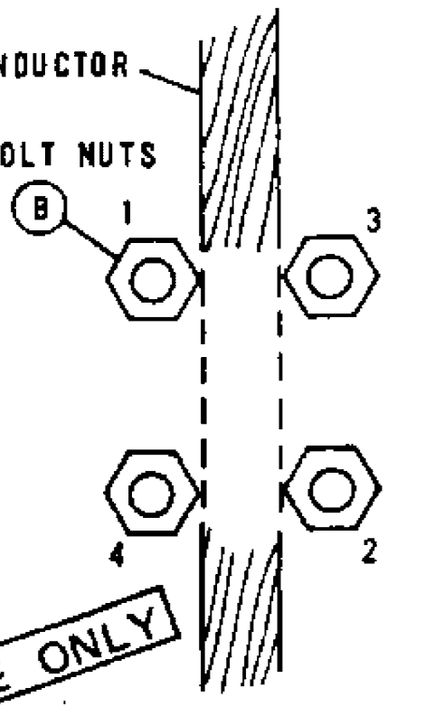



FIG. 1




TORQUING SEQUENCE
FIG. 2

FOR FIELD MAINTENANCE ONLY

**NOTES:**

- DO NOT USE STRAIGHT STRAIN CLAMP ON AWAC CONDUCTORS.
- THIS CLAMP MAY BE USED IN ALL LOADING DISTRICTS.

BILL OF MATERIAL:

| WIRE SIZE | | | | | | | | CLAMP RANGE (INCHES) | | CLAMP DATA | | MFG | CATALOG NUMBER | STOCK NO OR CONSTR STD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACSR OR 5005 (AWG) | | | ACSR | | | | 5005 | | | | | | | |
| 2 6/1 | 1/0 6/1 | 3/0 6/1 | 336.4 KCMIL 18/1 | 336.4 KCMIL 26/7 | 636 KCMIL 24/7 | 1033.5 KCMIL 45/7 | 394.5 KCMIL 19 | MIN | MAX | TORQUE (FT-LBS) | CLEVIS WIDTH (A) | | | |
| X | X | X | - | - | - | - | - | .184 | .563 | 35 | 5/8 | ALCOA | E221.2 | 230432 (E) |
| X | X | X | X | X | - | - | X | .316 | .814 | 40 | 13/16 | | E222.3 | 230512 |
| - | - | - | X | X | X | - | X | .522 | 1.153 | 40 | 3/4 | | E223.4 | - (C) |
| - | - | - | - | - | - | X | - | 1.022 | 1.454 | 40 | 3/4 | | 225 | - (C) |
| X | X | - | - | - | - | - | - | .19 | .47 | 25 | 11/16 | BETHEA | ASD-2-N | 230432 (E) |
| - | - | X | X | X | - | - | X | .46 | .75 | 45 | 3/4 | | ASD-37-N | 230464 (E) |
| X | X | - | - | - | - | - | - | .191 | .447 | 20 | 3/4 | FARGO | GD-971A | 230432 (E) |
| X | X | X | X | - | - | - | X | .25 | .724 | 45 | 3/4 | | GD-972A | 230512 |
| X | - | - | - | - | - | - | - | .15 | .37 | 50 | 11/16 | OHIO BRASS | 87650 | - (C) |
| X | X | X | - | - | - | - | - | .30 | .60 | 50 | 3/4 | | 91560 | - (C) |
| - | - | X | X | X | - | - | X | .46 | .88 | 50 | 7/8 | | 91570 | 230464 (E) |
| - | - | - | - | - | X | X | - | .86 | 1.30 | 40 | 1-1/16 | ANDERSON | ADE-130-N | 230496 |

**INSTALLATION:**

(A) SEE CLAMP DATA COLUMN FOR CLEVIS WIDTH.
(B) HAND TIGHTEN U-BOLT NUTS AND THEN TORQUE BOLTS AS SHOWN IN FIG. 2 TO THE VALUES IN CLAMP DATA COLUMN.
(C) SPECIAL ORDER.
(E) EXEMPT MATERIAL

| | | |
|---|---|---|
| 799,402<br>SUPERCEDES<br>741 (1986) | SDG&E ELECTRIC STANDARDS<br>12KV ALUMINUM STRAIGHT STRAIN CLAMP<br>FOR ACSR & 5005 ALUMINUM ALLOY CONDUCTORS | DATE 1-1-86<br>APPD AK/RDS |

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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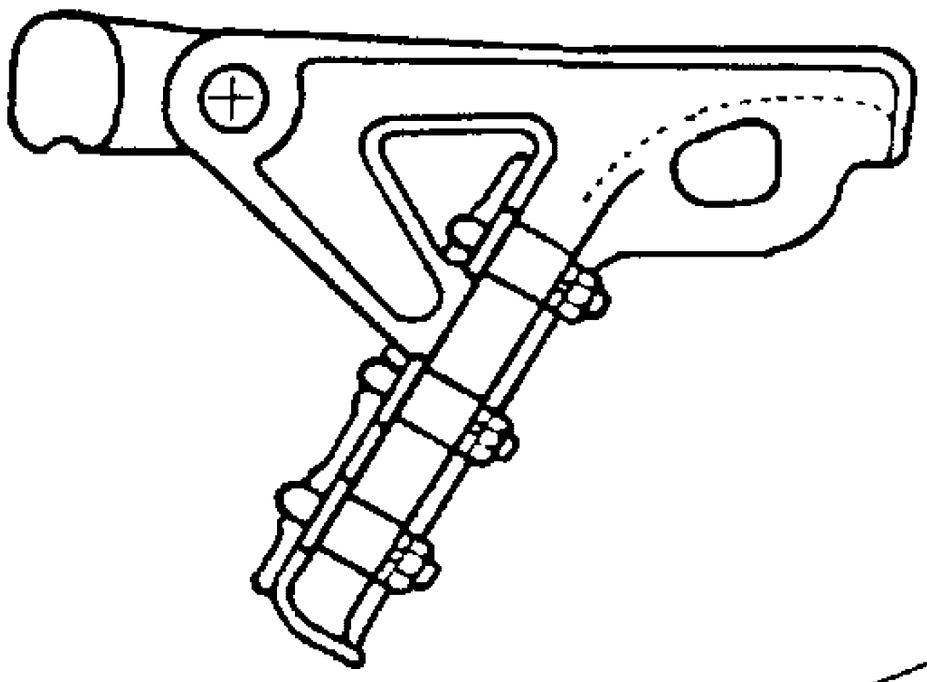
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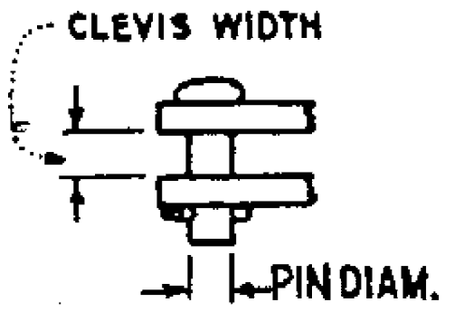
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

GALVANIZED DEAD END STRAIN CLAMPS FOR COPPER CONDUCTORS

FMO OH 744






THIS PAGE FOR FIELD MAINTENANCE ONLY

RECOMMENDED U-BOLT NUT TORQUE

1/2" = 50 FT. LBS.

9/16"= 67 FT. LBS.

5/8" = 83 FT. LBS.

NOTES:

A. REFER TO PAGE 777 FOR CLAMP CONNECTORS.

B. HAND TIGHTEN U BOLT NUTS AND THEN ALTERNATELY APPLY WRENCH UNTIL DESIRED TORQUE IS ACHIEVED.

(C) NO LONGER PURCHASED, BUT WILL BE SALVAGED.

(D) ITEM 231488 IS BRONZE

| COPPER WIRE SIZE AND DIAMETER (INCHES) | | | | | | | | | CLAMP RANGE | | CONNECTION | CLEVIS WIDTH | PIN DIAM. | STOCK NO OR CONST STD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 .254 | 2 .320 | 1/0 .368 | 4/0 .527 | 250MCM .574 | 400MCM .726 | 500MCM .813 | 750MCM .997 | 1000MCM 1.151 | MIN. | MAX. | | | | |
| X | X | X | X | - | - | - | - | - | .20 | .55 | SOCKET | 11/16" | 5/8" | 231264 |
| - | - | X | X | X | - | - | - | - | .30 | .68 | SOCKET | 13/16" | 5/8" | 231328 |
| - | - | - | X | X | X | - | - | - | .48 | .84 | SOCKET | 7/8" | 5/8" | 231392 (C) |
| - | - | - | X | X | X | X | - | - | .50 | .96 | SOCKET | 1" | 5/8" | 231456 (C) |
| - | - | - | - | - | X | X | X | X | .71 | 1.30 | SOCKET | 1 7/16" | 3/4" | 231488 (D) |
| | | | | | | | | | | | | | | |
| - | X | X | X | X | - | - | - | - | .30 | .68 | NONE | 13/16" | 5/8" | 231136 |
| | - | - | X | X | X | X | - | - | .48 | .84 | NONE | 7/8" | 5/8" | 231200 (C) |

DATE 1-1-88

APPD RBL/DRH

SDG&E ELECTRIC STANDARDS

# GALVANIZED DEAD END STRAIN CLAMPS FOR COPPER CONDUCTORS

799.401

SUPERSEDES 744 (8-31-81)

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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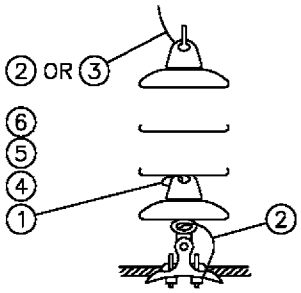
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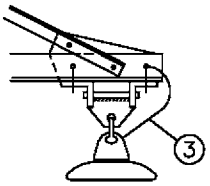
SDG&E ELECTRIC OVERHEAD STANDARD

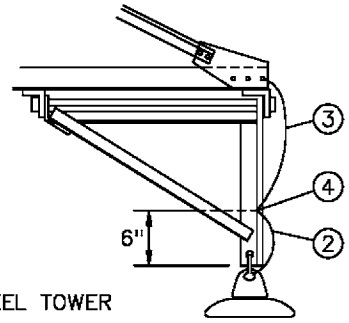
PORCELAIN SUSPENSION INSULATOR BONDING

FMO OH 756

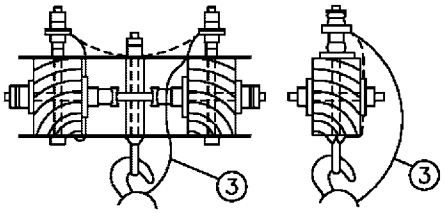



SUSPENSION

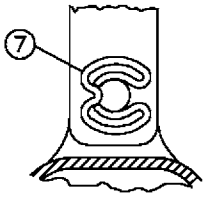


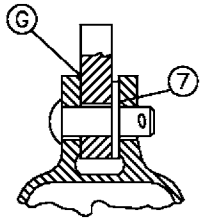

STEEL TOWER



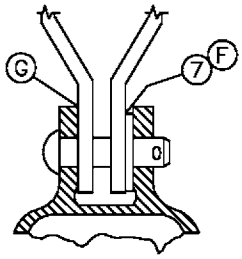

DOUBLE & SINGLE ARM



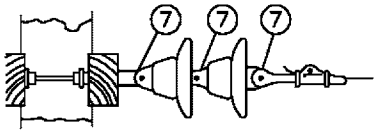

SIDE VIEW




LOCATION BETWEEN EXTENSION LINK OR INSULATOR EYE AND OPEN CLEVIS

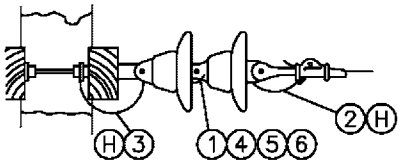



LOCATION BETWEEN CLOSED CLEVIS AND INSULATOR CLEVIS




12KV DEAD END USING RIV CLIPS
SEE NOTE "B2b"

RIV CLIP INFORMATION – SEE NOTE "B2b"




12KV DEAD END USING BOND WIRES
SEE NOTE "B1 AND B2a"

NOTES:

A. USE BONDED INSULATORS ON 138 AND 69KV WHERE: 1) MAXIMUM GUYING TENSION PER CONDUCTOR IS BELOW 1000 POUNDS, OR 2) THROUGH RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL AREAS. ALSO, WHERE FUTURE DEVELOPMENT OF SIMILAR AREAS ADJACENT TO TRANSMISSION LINES ARE ANTICIPATED.

(B) USE THE FOLLOWING TO DETERMINE WHEN TO USE BONDED OR UNBONDED INSULATORS, AND WHEN RIV CLIPS ARE TO BE ADDED TO UNBONDED INSULATORS ON 12KV AND 12.47KV SYSTEMS IN CONTAMINATION DISTRICTS DESCRIBED ON PAGE 287.

1) SLACK SPANS (SPANS INSTALLED AT MORE THAN NORMAL SAG): IN ALL CONTAMINATION DISTRICTS: USE BONDED INSULATORS.

2) FULL TENSION INSTALLATIONS WHERE MAXIMUM GUYING TENSION PER CONDUCTOR IS 1000 POUNDS OR LESS:
   a) CONTAMINATION DISTRICT 1, USE BONDED INSULATORS.
   b) CONTAMINATION DISTRICTS 2 AND 3, USE UNBONDED INSULATORS WITH RIV CLIPS

3) FULL TENSION INSTALLATIONS WHERE MAXIMUM GUYING TENSION PER CONDUCTOR IS OVER 1000 POUNDS: ALL CONTAMINATION DISTRICTS: USE UNBONDED INSULATORS.

C. INSULATORS BONDED PER SDG&E SPECIFICATION 138 INCLUDE ITEMS 1 THROUGH 6 LISTED BELOW.

D. SEE STANDARDS PAGE 750.4 FOR SUSPENSION INSULATOR INFORMATION.

(F) INSTALL RIV CLIP BETWEEN CLEVIS AND INSULATOR CAP AS SHOWN.

(G) ADD SECOND RIV CLIP IF ONLY ONE CLIP DOES NOT MAKE TIGHT CONNECTION BETWEEN HARDWARE. NEVER USE MORE THAN 2 RIV CLIPS AT ONE CONNECTION, OR, ON ONE PIN.

(H) ATTACH BOND WIRES LEAVING SHORT LOOPS AS SHOWN. CUT OFF EXCESS BOND WIRE.

BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS | ASSEMBLY UNITS |
|---|---|---|---|---|
| 1 | WIRE ROPE, 3" STAINLESS STEEL, MACWYTE, 1/16" OD, 7x7 PREFORMED, AIFI TYPE 304 | AS REQ'D | 606720 | 12BOND |
| 2 | WIRE ROPE, 12" STAINLESS STEEL, MACWYTE, 1/16" OD, 7x7 PREFORMED, AIFI TYPE 304 | AS REQ'D | | |
| 3 | WIRE ROPE, 24" STAINLESS STEEL, MACWYTE, 1/16" OD, 7x7 PREFORMED, AIFI TYPE 304 | AS REQ'D | | |
| 4 | SCREW, 8–32, STAINLESS STEEL, PHILLIPS HEAD | AS REQ'D | 622464 | – |
| 5 | TERMINAL, AMP 322334, #8 STUD, STAINLESS STEEL OR NICKEL | AS REQ'D | 732064 | – |
| 6 | LOCKWASHER, EXTERNAL TOOTH, #8 STUD, STAINLESS STEEL | AS REQ'D | 796352 | – |
| 7 | CLIP, INSULATOR NON STATIC (RIV) | AS REQ'D | 237648 | RIVCLP |

DATE 1–1–94
APPD PA 1/1/94

SDG&E ELECTRIC STANDARDS

PORCELAIN SUSPENSION INSULATOR BONDING

799.501
SUPERSEDES
756 (1–1–98)

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**REVISION HISTORY:**

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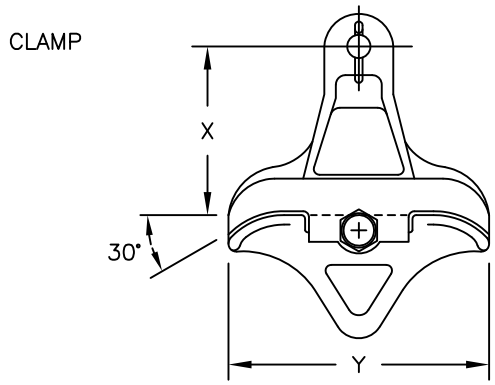
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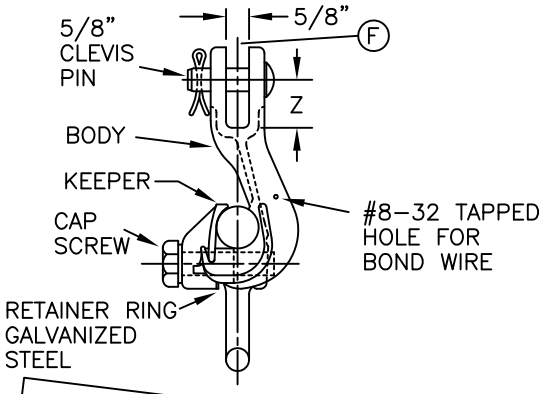
SDG&E ELECTRIC OVERHEAD STANDARD

ANGLE SUSPENSION CLAMPS

FMO OH 776

**SCOPE:** THIS PAGE SHOWS THE DIMENSIONS AND ULTIMATE VERTICAL LOADING STRENGTH OF THE ANGLE SUSPENSION CLAMP. THE CLAMP IS TO BE USED IN CONJUNCTION WITH THE CLEVIS OR SOCKET EYE CONNECTORS FOR SUPPORTING CONDUCTORS ON VERTICAL CONSTRUCTION. MAXIMUM ANGLE FOR CONSTRUCTION USING THIS CLAMP IS 30° .




**FOR FIELD MAINTENANCE ONLY**

**INSTALLATION:**

(A) LINE GUARDS ARE TO BE USED WITH CLAMPS.

B. BONDING IS REQUIRED IN CONTAMINATION DISTRICT 1. (SEE STANDARD 287)

**REFERENCE:**

C. TABLE 1 IS TO BE USED TO DETERMINE PHYSICAL DIMENSIONS AND STRENGTHS OF SUSPENSION CLAMPS.

D. TABLE 2 SHOWS THE PROPER SIZING OF SUSPENSION CLAMPS FOR CONDUCTORS.

(F) SEE STANDARD 777 FOR USE OF CLEVIS AND SOCKET EYES.

**TABLE 1**

| MANUFACTURER | | CLAMP RANGE DIA. (INCHES) | | DIMENSIONS (INCHES) | | | ULTIMATE STRENGTH VERT.LOAD | MATERIAL | STOCK NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| CAT.NO. | NAME | MIN. | MAX. | X | Y | Z | | | |
| 1301 | LINDSEY | .160 | .430 | 3–7/16 | 5–1/2 | 1–1/2 | 18,000 | DUCTILE IRON | 226662 |
| 1305 | LINDSEY | .300 | .650 | 4–1/4 | 6–1/2 | 1–1/2 | 18,000 | DUCTILE IRON | 226664 |
| 1308 | LINDSEY | .50 | .70 | 4–1/4 | 7 | 1–1/4 | 12,000 | ALUM. | 232004 |
| 1312 | LINDSEY | .68 | 1.00 | 4–1/4 | 6–7/8 | 1 | 12,000 | ALUM. | 232008 |
| 1316 | LINDSEY | 1.00 | 1.313 | 5–3/8 | 6–7/8 | 1–1/4 | 12,000 | ALUM. | 232012 |
| 1320 | LINDSEY | 1.24 | 1.500 | 5–5/8 | 7 | 1–1/4 | 15,000 | ALUM. | 226660 |

**TABLE 2**

| COPPER | | | | | | | | | | | | COPPERWELD | | | | | | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 4 | 3 SOL. | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 250 KCM | | | 8A | 6 | 4 | | | | | |
| X | X | X | X | X | X | X | | | | | | X | X | X | | | | 226662 | SCACS |
| | | | | | | | X | X | X | | | | | | | | | 226664 | SCACL |

| AWAC (A) | | | ACSR (A) | | | | | | | | | 5005 (A) | | | | | | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1/0 | | 4 | 2 | 1/0 | 3/0 | 4/0 | 336 18/1 | 336 26/7 | 397 | 636 | 4 | 2 | 1/0 | 3/0 | 394.5 | | | |
| X | X | | X | X | X | | | | | | | X | X | X | | | | 232004 | SC4<br>SC1/0 |
| | | | | | | X | X | X | | | | | | | X | | | 232008 | – |
| | | | | | | | | | X | X | | | | | | X | | 232012 | SC397 |
| | | | | | | | | | | | X | | | | | | | 226660 | SC636 |

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ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/06/2023:** MOVED TO FMO

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

WEDGE CONNECTORS
GELPACT COVERS

**SCOPE:** THIS STANDARD SHOWS THE GELPACT APPLICATION TABLE.

**ATTENTION:**

* ALL WEDGE TAPS IN CONTAMINATION DISTRICT 1 WILL HAVE A GELPACT INSTALLED.

** ALL WEDGE TAPS WHERE AN ALUMINUM AND COPPER CONDUCTOR ARE CONNECTED WITHIN A WEDGE WILL HAVE A GELPACT.

*** A GELPACT WILL BE INSTALLED WHEN CONDUCTOR AND WEDGE METALS ARE MIXED.

a. EXAMPLE: COPPER CONDUCTOR IN AN ALUMINUM OR BI-METAL WEDGE.

b. EXAMPLE: ALUMINUM CONDUCTOR IN A BRONZE OR COPPER WEDGE.

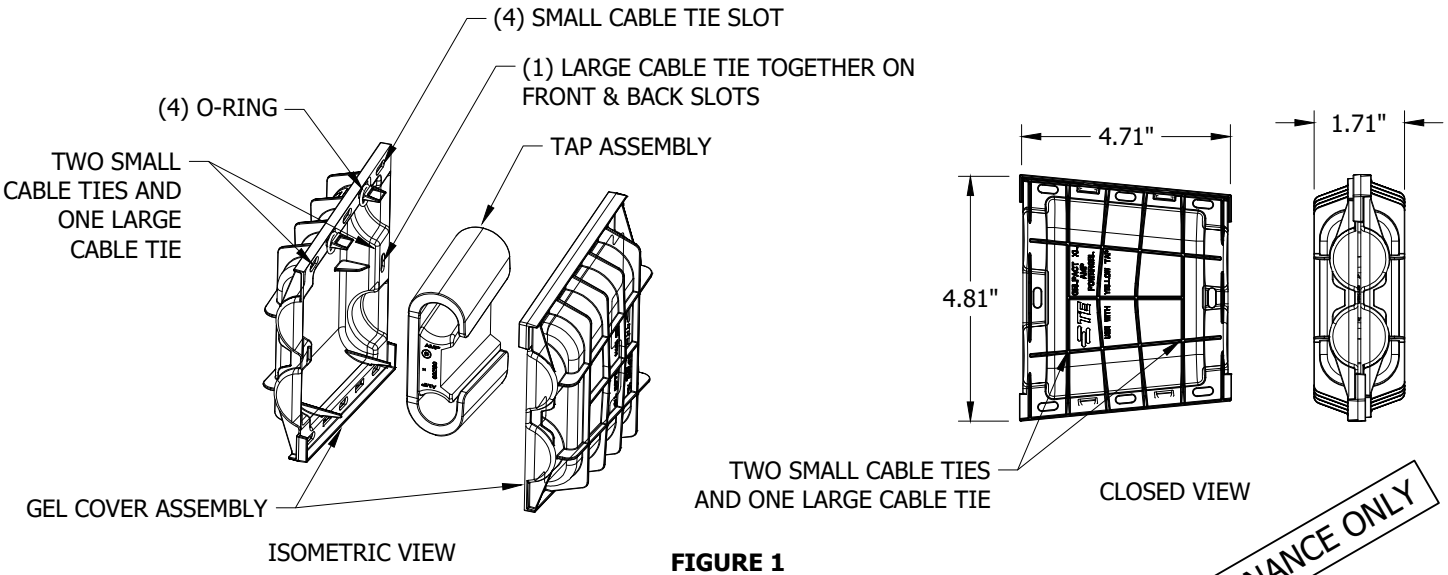



**FIGURE 1**
GELPACT

FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. GELPACT INSTALLATION:

1. REMOVE O-RINGS BEFORE ASSEMBLING COVERS AT SNAP FIT.
2. SMALL CABLE TIES MUST BE INDIVIDUALLY ASSEMBLED ON TO EACH INDICATED SLOT OF ASSEMBLED COVERS.
3. LARGE CABLE TIE MUST BE WRAPPED AND TIGHTENED AROUND THE ASSEMBLED COVERS THROUGH FRONT AND BACK SLOTS AS INDICATED.
4. RUBBER GLOVE INSTALLATION ONLY. NOT LIVE LINE TOOL APPLICABLE.

**TABLE 1**

| GELPACT APPLICATION TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| WIRE TYPE | | CLAMP RANGE (IN) | | CLAMP DATA | | | STOCK NUMBER | DESIGN UNITS |
| | | MIN. | MAX. | CLEVIS WIDTH (IN) | PIN DIA. (IN) | TORQUE (FT-LBS) | | |
| 1033.5 MCM | 45/7 | .20 | .57 | 3/4 | 5/8 | 40 | S286934 (X) | -- |
| 636 MCM | 24/7 | | | | | | S286936 (X) | |
| 397.5 MCM | 26/7 | .46 | .94 | 1 1/16 | | | S286940 (X) | |
| 336.4 MCM | 26/7 | | | | | | | |
| 336.4 MCM | 18/1 | | | | | | | |
| 4/0 | 6/1 | .71 | 1.318 | 1 7/16 | 3/4 | 60 | S286942 (X) | |

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| C | SCOPE UPDATE | - | GW | JS | CZH | 02/21/2019 | F | MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 |
| B | TABLE UPDATE | - | GW | JS | MDH | 09/28/2017 | E | TABLE UPDATE | EDM | JIK | JES | CZH | 02/08/2021 |
| A | COMPLETELY REVISED | - | GW | JS | MDJ | 05/17/2017 | D | REFERENCE UPDATE | - | MRF | JES | CZH | 02/27/2020 |



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## TABLE 1 (CONT'D)

| GELPACT APPLICATION TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| WIRE TYPE | | CLAMP RANGE (IN) | | CLAMP DATA | | | STOCK NUMBER | DESIGN UNITS |
| | | MIN. | MAX. | CLEVIS WIDTH (IN) | PIN DIA. (IN) | TORQUE (FT-LBS) | | |
| 3/0 | 6/1 | .71 | 1.318 | 1 7/16 | 3/4 | 60 | S286942 (X) | -- |
| 1/0 | 6/1 | .30 | .75 | 15/16 | 5/8 | 40 | S286938 (X) | |
| | | .71 | 1.318 | 1 7/16 | 3/4 | 60 | S286942 (X) | |
| #6 | SOL | .30 | .75 | 15/16 | 5/8 | 40 | S286938 (X) | |
| | | .71 | 1.318 | 1 7/16 | 3/4 | 60 | S286942 (X) | |
| #2 | 3/4 | .30 | .75 | 15/16 | 5/8 | 40 | S286938 (X) | |
| | | .71 | 1.318 | 1 7/16 | 3/4 | 60 | S286942 (X) | |
| #2 | 5/2 | .30 | .75 | 15/16 | 5/8 | 40 | S286938 (X) | |
| | | .71 | 1.318 | 1 7/16 | 3/4 | 60 | S286942 (X) | |

**BILL OF MATERIALS:** NONE

**NOTES:**

I. INSTALLATION OF GELPACTS REQUIRED FOR ALL NEW CONSTRUCTION OR REBUILDS ADHERING TO THE ATTENTION SECTION.

II. GELPACTS ARE NOT HOTSTICK INSTALLABLE.

III. IF WEDGE TAP IS NOT BUCKET TRUCK ACCESSIBLE, GELPACT NOT REQUIRED.

(X) THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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SDG&E ELECTRIC OVERHEAD STANDARD

ALUMINUM PARALLEL GROOVE CLAMPS

FMO OH 785

**NOTES:** (A) TO CHOOSE THE PROPER GROOVE CLAMP, LOCATE THE TWO WIRE SIZES ON THE CHART, DRAW A HORIZONTAL LINE FROM THE LARGER CONDUCTOR SIZE AND A VERTICAL LINE FROM THE SMALLER SO THAT THEY INTERSECT. THE AREA CONTAINING THE INTERSECTION INDICATES THE CORRECT STOCK NUMBER.

EXAMPLE: FOR CONDUCTOR SIZES 3/0 ACSR AND #2 ACSR, THE CORRECT GROOVE CLAMP STOCK NUMBER IS 277968.

B. THE ADJACENT TABLE CAN BE USED TO DETERMINE THE SPECIFIC MANUFACTURER'S CATALOG NUMBER FOUND UNDER A STOCK NUMBER.

C. BE SURE TO CLEAN CONDUCTOR WHICH WILL BE UNDER CLAMP, CLEAN CONDUCTOR GROOVES OF CLAMP IF NECESSARY, AND FILL THE GROOVES WITH INHIBITOR (247200) BEFORE INSTALLING THE CLAMP.

D. FOR USE WHEN MAKING AL. TO AL. AND AL. TO CU. PERMANENT CONNECTIONS AND WHERE CONNECTIONS MAY BE OPENED OCCASIONALLY FOR OPERATING CONVENIENCE.

F. WHEN MAKING AL. TO CU. CONNECTIONS, LOCATE THE CU. AT THE SAME LEVEL OR BELOW THE AL. CONDUCTOR.

| CONDUCTOR DIA. IN. | AWG OR KCM | DESCRIPTION |
|---|---|---|
| .162 | 6 | SOLID |
| .184 | 6 | 7 STR. |
| .198 | 6 | ACSR 6/1 |
| .198 | 6 | 5005 7W |
| .199 | 8A | CUWLD 3 STR. |
| .202 | 6 | 3 STR. |
| .204 | 4 | SOLID |
| .229 | 3 | SOLID |
| .230 | 6A | CUWLD 3 STR. |
| .232 | 4 | 7 STR. |
| .250 | 4 | ACSR 6/1 |
| .250 | 4 | 5005 7W |
| .254 | 4 | 3 STR. |
| .258 | 2 | SOLID |
| .276 | 6D | CUWLD 3 STR. |
| .289 | 1 | SOLID |
| .290 | 4A | CUWLD 3 STR. |
| .292 | 2 | 7 STR. |
| .316 | 2 | ACSR 6/1 |
| .316 | 2 | 5005 7W |
| .320 | 2 | 3 STR. |
| .324 | 1/0 | SOLID |
| .325 | 2 | ACSR 7/1 |
| .328 | 4N | CUWLD 7 STR. |
| .330 | 2 | AWAC 5/2 |
| .338 | 1/0 | 7 STR. COMP. |
| .348 | 4D | CUWLD 3 STR. |
| .360 | 1 | 3 STR. |
| .368 | 1/0 | 7 STR. |
| .373 | 1/0 | 19 STR. |
| .386 | 2 | AWAC 3/4 |
| .398 | 1/0 | ACSR 6/1 |
| .398 | 1/0 | 5005 7W |
| .409 | 3/0 | SOLID |
| .414 | 2/0 | 7 STR. |
| .426 | 3/0 | 7 STR. COMP. |
| .447 | 1/0 | AWAC 4/3 |
| .460 | 4/0 | SOLID |
| .464 | 3/0 | 7 STR. |
| .470 | 3/0 | 19 STR. |
| .502 | 3/0 | ACSR 6/1 |
| .502 | 3/0 | 5005 7W |
| .522 | 4/0 | 7 STR. |
| .528 | 4/0 | 19 STR. |
| .533 | 4/0 | 37 STR. |
| .563 | 4/0 | ACSR 6/1 |
| .575 | 250 | 19-37 STR. |
| .629 | 300 | 19-37 STR. |
| .666 | 336 | 19 STR. |
| .680 | 350 | 19-37 STR. |
| .684 | 336 | ACSR 18/1 |
| .721 | 336 | ACSR 26/7 |
| .721 | 394 | 5005 19W |
| .727 | 400 | 19-37 STR. |
| .743 | 397 | ACSR 18/1 |
| .783 | 397 | ACSR 26/7 |
| .811 | 500 | 19 STR. |
| .977 | 636 | ACSR 24/7 |
| .998 | 750 | 37-61 STR. |
| 1.152 | 1000 | 61-91 STR. |

EXAMPLE (A)

227936

| ASSEMBLY UNITS |
|---|
| PG6C |
| PG4C |
| PG2A |
| PG2C |
| PG1/0A |
| PG1/0C |

227968

| ASSEMBLY UNITS |
|---|
| PG3/0A |
| PG4/0C |

NO CONNECTOR AVAILABLE

228000

| ASSEMBLY UNITS |
|---|
| PG336 |
| PG394 |
| PG400 |

228032

| ASSEMBLY UNITS |
|---|
| PG500– |

228064 (G)

| ASSEMBLY UNITS STK No. 228064 |
|---|
| PG397 |
| PG500 |
| PG636 |
| PG750 |
| PG1000 |

| STOCK NUMBER | BOLTS NO. | BOLTS SIZE IN. | BOLTS TORQUE LB.-FT | ALCOA CATALOG NUMBER |
|---|---|---|---|---|
| 227936 | 1 | 3/8 | 13 | 396.6 |
| 227968 | 2 | 1/2 | 25 | 482.1 |
| 228000 | 3 | 1/2 | 25 | 482.2 |
| 228032 | 2 | 5/8 | 40 | 483.2 |
| 228064 | 3 | 5/8 | 40 | 483.3 |
| | | | | |
| | | | | |

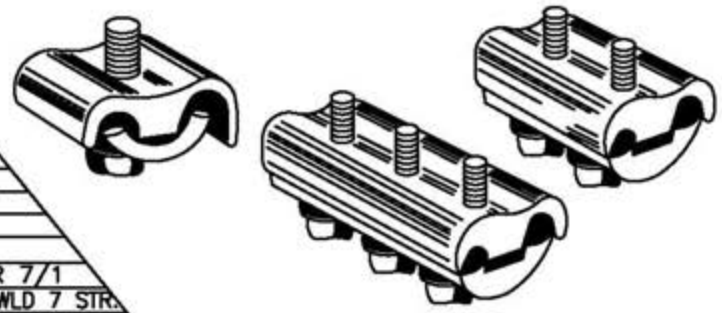


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APPD PA 1/20/94

SDG&E ELECTRIC STANDARDS

# ALUMINUM PARALLEL GROOVE CLAMPS

799.801
SUPERSEDES
785 (1-20-06)

# OH789 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**11/09/2022:** MOVED TO FMO

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

VIBRATION DAMPERS FOR
BARE COPPER CONDUCTOR
SPIRAL



FMO
OH789

## TABLE 1 (SEE FIGURES 4 AND 5 IN OH789)

| SPIRAL DAMPERS FOR COPPER | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COPPER CONDUCTOR | | | | | | DAMPER WEIGHT (LBS) | SPAN LENGTH (FT) | QUANTITY OF DAMPERS REQUIRED PER SPAN | | | STOCK NUMBER | DESIGN UNITS |
| 5005 | | ACSR/AW | | AWAC | | | | STANDARD APPLICATION | STANDARD APPLICATION WITH FINAL TENSIONS ≥ 20% OF RBS/UTS OR CROSSING SPAN APPLICATION (A)(I) | CROSSING SPAN APPLICATION WITH FINAL TENSIONS ≥ 20% OF RBS/UTS (A) | | |
| SIZE | STRAND | SIZE | STRAND | SIZE | STRAND | | | | | | | |
| -- | -- | -- | -- | 2 | 3 | 0.62 | 101-800 | 2 | 4 | 6 | S300452 (X) | DMP2 |
| | | | | | | | 800-1,600 | 4 | 6 | 10 | | |
| -- | -- | -- | -- | 1/0 | 7 | 0.68 | 101-800 | 2 | 4 | 6 | S300454 | DMP2A |
| | | | | | | | 800-1,600 | 4 | 6 | 10 | | |
| -- | -- | -- | -- | 2/0 | 7 | | 101-800 | 2 | 4 | 6 | | |
| | | | | | | | 800-1,600 | 4 | 6 | 10 | | |
| -- | -- | -- | -- | 4/0 | 7 | 0.72 | 101-800 | 2 | 4 | 6 | S300456 | DMP3/0 |
| | | | | | | | 800-1,600 | 4 | 6 | 10 | | |

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| D | DRAWING UPDATE | EDM | EJA | JES | CZH | 08/07/2020 | G | MOVED COPPER TABLE TO FMO | EDM | MRF | GLW | KRG | 11/09/2022 |
| C | DRAWING UPDATE | PEI | - | - | - | 03/18/2019 | F | TABLE UPDATE | EDM | JIK | JES | CZH | 02/08/2021 |
| B | REVISION | - | - | - | PIA/RDJ | 01/01/1994 | E | EDITORIAL CHANGES | GLC | JAC | GLW | CZH | 11/09/2020 |

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| 819 | HORIZONTAL CONDUCTOR SPACING GENERAL INFORMATION |
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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

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## SAG AND TENSION TABLES

**CLICK ON BUTTON**

| Conductor Type | Sag and Tension Tables | Design Stringing Tables | Max.Hor. Tension, lbs | Ruling Span, ft | G.O.95 Light | G.O.95 Heavy | G.O.95 Extra Heavy | NESC 250C Extreme Wind |
|---|---|---|---|---|---|---|---|---|
| #2 ACSR Sparrow | ● | ● | 850 lbs. | 100 ft. to 500 ft. | ✓ | | | ✓ |
| 1/0 ACSR Raven | ● | ● | 1240 lbs. | 100 ft. to 500 ft. | ✓ | | | ✓ |
| 3/0 ACSR Pigeon | ● | ● | 1850 lbs. | 100 ft. to 500 ft. | ✓ | | | ✓ |
| 4/0 ACSR Penguin | ● | ● | 1000 lbs. to 2400 lbs. | 100 ft. to 500 ft. | ✓ | | | ✓ |
| #2 AWAC 5/2 | ● | ● | 1600 lbs. | 100 ft. to 500 ft. | | ✓ | ✓ | ✓ |
| #2 AWAC ¾ | ● | ● | 1000 lbs.to 3500 lbs. | 100 ft. to 500 ft. | | ✓ | ✓ | ✓ |
| 336.4 ACSR | ● | ● | 1000 lbs. to 3000 lbs. | 100 ft. to 500 ft. | ✓ | ✓ | ✓ | ✓ |
| 397 ACSR IBIS | ● | ● | 1000 lbs. to 3000 lbs. | 100 ft. to 500 ft. | ✓ | ✓ | ✓ | ✓ |
| 636 ACSR Rook | ● | ● | 1000 lbs. to 3000 lbs. | 100 ft. to 500 ft. | ✓ | ✓ | ✓ | ✓ |
| 1033 ACSR Ortolan | ● | ● | 1000 lbs. to 3000 lbs. | 100 ft. to 500 ft. | ✓ | | | ✓ |
| | | | | | | | | |

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MAXIMUM SAFE SPAN LENGTHS IN FEET,
PRIMARY AND SECONDARY CROSSARMS, LIGHT LOADING

FMO
OH815

PRIMARY AND SECONDARY CROSSARMS,
SINGLE AND DOUBLE MAXIMUM
SAFE SPAN LENGTHS IN FEET,
VERTICAL LOADING

AS LIMITED BY

SAG/PIN SPACING RATIOS 123
CROSSARM STRENGTH (123)

LIGHT LOADING

| | | WIRE TYPE | BARE STRANDED HARD DRAWN COPPER | | | | | | | COPPERWELD | | | D.B. WEATHERPROOF M.H.D. COPPER | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WIRE SIZE | #6 | #4 | #2 | #1 | 1/0 | 2/0 | 4/0 | #6A | #4A | 7/16 EHS 30% | #6 | #4 | #2 | 1/0 | 2/0 | 4/0 |
| | | WT WIRE LBS/1000FT | 82.5 | 127.6 | 202.9 | 258.4 | 326.8 | 410.9 | 653.3 | 101.6 | 161.5 | 408.4 | 103.0 | 153.5 | 246.0 | 388.0 | 482.9 | 745.0 |
| | | K FACTOR | 2.7 | 3.3 | 3.5 | 3.6 | 3.7 | 4.3 | 6.0 | 3.3 | 3.4 | 7.2 | 2.8 | 3.0 | 3.3 | 3.4 | 3.7 | 6.8 |
| | | SAG TABLE NO. | L-312 | L-311 | L-321 | L-313 | L-324 | L-326 | L-356 | L-445 | L-444 | L-449 | L-316 | L-317 | L-320 | L-323 | L-478 | L-477 |
| 6 PIN 8 FT PG 111 IT. 2 | PIN SPACING 88" | SINGLE ARM | 680 | 790 | 850 | 890 | (806) | (638) | (402) | 1040 | 1100 | (642) | 540 | 620 | 680 | (677) | (544) | (353) |
| | | DOUBLE ARM | | | | | 940 | (1276) | (804) | | | (1284) | | | | 720 | 780 | (706) |
| | 29" 30" 29" | SINGLE ARM | 360 | 440 | 450 | 490 | 500 | (475) | (301) | 590 | 620 | (477) | 300 | 340 | 370 | 380 | (405) | (262) |
| | | DOUBLE ARM | | | | | | 540 | (596) | | | (954) | | | | | 430 | (524) |
| | PIN SPACING 14-1/2" 30" | SINGLE ARM | 250 | 290 | 300 | 310 | 330 | (314) | (197) | 420 | 430 | (316) | 220 | 230 | 250 | 270 | (268) | (173) |
| | | DOUBLE ARM | | | | | | 350 | (394) | | | (632) | | | | | 280 | (346) |
| 6 PIN 10 FT PG 112 IT. 1 | 112" | SINGLE ARM | 760 | 890 | 960 | 1010 | 1080 | (1064) | (669) | 1160 | 1240 | (1070) | 610 | 700 | 770 | 820 | 880 | (587) |
| | | DOUBLE ARM | | | | | | 1160 | (1338) | | | (2140) | | | | | | (1174) |
| | 35" 42" 35" | SINGLE ARM | 400 | 490 | 510 | 540 | 570 | 610 | (485) | 650 | 680 | (776) | 340 | 380 | 420 | 430 | 480 | (426) |
| | | DOUBLE ARM | | | | | | | 590 | | | 1020 | | | | | | 550 |
| | PIN SPACING 17-1/2" 42" | SINGLE ARM | 280 | 330 | 340 | 360 | 370 | 400 | (323) | 460 | 470 | (517) | 230 | 260 | 280 | 290 | 320 | (283) |
| | | DOUBLE ARM | | | | | | | 400 | | | 720 | | | | | | 370 |
| 8 PIN 10 FT PG 111 IT. 3 | 112" | SINGLE ARM | 760 | 890 | 970 | 1010 | 1080 | (1064) | (669) | 1160 | 1210 | (1070) | 610 | 700 | 770 | 820 | 880 | (587) |
| | | DOUBLE ARM | | | | | | 1160 | (1338) | | | (2140) | | | | | | (1174) |
| | 41" 30" 41" | SINGLE ARM | 370 | 440 | 460 | 490 | 520 | 560 | (527) | 600 | 620 | (842) | 310 | 350 | 380 | 400 | 440 | (462) |
| | | DOUBLE ARM | | | | | | | 550 | | | 950 | | | | | | 500 |
| | PIN SPACING 13-5/8" 30" | SINGLE ARM | 230 | 280 | 290 | 300 | 320 | 350 | (262) | 400 | 420 | (419) | 200 | 230 | 240 | 250 | 270 | (230) |
| | | DOUBLE ARM | | | | | | | 350 | | | (838) | | | | | | 320 |
| 8 PIN 13 FT PG 112 IT. 2 | 147" | SINGLE ARM | 870 | 1030 | 1110 | (1103) | (875) | (694) | (436) | 1330 | 1420 | (698) | 700 | 800 | 890 | (735) | (591) | (383) |
| | | DOUBLE ARM | | | | 1170 | 1240 | (1388) | (872) | | | (1396) | | | | 950 | (1182) | (766) |
| | 52-1/2" 42" 52-1/2" | SINGLE ARM | 450 | 540 | 560 | 600 | 630 | (538) | (338) | 710 | 750 | (541) | 370 | 420 | 460 | 490 | (459) | (297) |
| | | DOUBLE ARM | | | | | | 670 | (676) | | | (1082) | | | | | 530 | (594) |
| | PIN SPACING 17-1/2" 42" | SINGLE ARM | 280 | 330 | 340 | 360 | (338) | (268) | (168) | 460 | 470 | (269) | 330 | 260 | 280 | (284) | (228) | (148) |
| | | DOUBLE ARM | | | | | 370 | (536) | (336) | | | 290 | | | | 290 | 320 | (296) |
| 10 PIN 12 FT PG 111 IT. 4 | 136" | SINGLE ARM | 840 | 1000 | 1060 | 1130 | (991) | (789) | (496) | 1280 | 1370 | (793) | 680 | 770 | 850 | (835) | (672) | (435) |
| | | DOUBLE ARM | | | | | 1190 | (1578) | (992) | | | (1586) | | | | 910 | 960 | (870) |
| | PIN SPACING 26-1/2" 30" | SINGLE ARM | 350 | 410 | 430 | 460 | 480 | (428) | (269) | 560 | 590 | (431) | 290 | 330 | 350 | 380 | (365) | (236) |
| | | DOUBLE ARM | | | | | | 510 | (538) | | | (862) | | | | | 400 | (472) |
| | PIN SPACING 13-1/4" 30" | SINGLE ARM | 230 | 280 | 280 | 300 | 320 | (256) | (161) | 400 | 410 | (257) | 200 | 220 | 240 | 250 | (218) | (141) |
| | | DOUBLE ARM | | | | | | 340 | (322) | | | (514) | | | | | 260 | (282) |

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SDG&E ELECTRIC STANDARDS

SHEET 1 OF 1

MAXIMUM SAFE SPAN LENGTHS IN FEET,
PRIMARY AND SECONDARY CROSSARMS, LIGHT LOADING

815

**FIELD MAINTENANCE ONLY**

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

SHEET 1 OF 1

MAXIMUM SAFE SPAN LENGTHS IN FEET,
PRIMARY AND SECONDARY CROSSARMS, MEDIUM LOADING

FMO
OH816

PRIMARY AND SECONDARY CROSSARMS,

SINGLE AND DOUBLE MAXIMUM SAFE SPAN LENGTHS IN FEET VERTICAL LOADING

AS LIMITED BY

SAG/PIN SPACING RATIOS 132
CROSSARM STRENGTH (123)

MEDIUM LOADING

| | | WIRE TYPE | BARE STRANDED HARD DRAWN COPPER | | | | | | | COPPERWELD | | | D.B. WEATHER PROOF M.H.D. COPPER | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WIRE SIZE | #6 | #4 | #2 | #1 | 1/0 | 2/0 | 4/0 | #6A | #4A | 7/16 EHS 30% | #6 | #4 | #2 | 1/0 | 2/0 | 4/0 |
| | | WT WIRE LBS/1000FT | 222.8 | 284.3 | 380.2 | 438.2 | 527.3 | 617.4 | 895.0 | 250.9 | 329.0 | 620.8 | 270.9 | 336.1 | 452.8 | 635.6 | 733.9 | 1035.8 |
| | | K FACTOR | 2.5 | 2.7 | 3.0 | 3.3 | 3.4 | 3.4 | 4.1 | 2.6 | 2.9 | – | 2.4 | 2.6 | 2.9 | 3.2 | 4.0 | 4.1 |
| | | SAG TABLE NO. | L–331 | L–333 | L–337 | L–335 | L–341 | L–343 | L–363 | L–435 | L–443 | L–452 | L–332 | L–334 | L–339 | L–342 | L–345 | L–382 |
| 6 PIN 8 FT PG 111 IT. 2 | PIN SPACING 88" | SINGLE ARM | 340 | 430 | 550 | 600 | (506) | (424) | (293) | 580 | 680 | – | 310 | 380 | 460 | (412) | (357) | (253) |
| | | DOUBLE ARM | | | | | 650 | 610 | (586) | | | | | | | 500 | (714) | (506) |
| | 29" 30" 29" | SINGLE ARM | 200 | 250 | 310 | 340 | 360 | (316) | (218) | 350 | 400 | – | 180 | 220 | 260 | 280 | (266) | (188) |
| | | DOUBLE ARM | | | | | | 340 | (436) | | | | | | | | 310 | (376) |
| | PIN SPACING 14–1/2" 30" | SINGLE ARM | 140 | 170 | 220 | 230 | 250 | (209) | (144) | 260 | 300 | – | 130 | 150 | 180 | 190 | (176) | (125) |
| | | DOUBLE ARM | | | | | | 230 | (288) | | | | | | | | 210 | (250) |
| 6 PIN 10 FT PG 112 IT. 1 | 112" | SINGLE ARM | 380 | 480 | 620 | 680 | 740 | 690 | (488) | 640 | 760 | – | 350 | 430 | 520 | 570 | (595) | (422) |
| | | DOUBLE ARM | | | | | | | (976) | | | | | | | | 630 | (844) |
| | 35" 42" 35" | SINGLE ARM | 220 | 270 | 340 | 370 | 400 | 370 | (354) | 380 | 440 | – | 200 | 240 | 280 | 310 | 340 | (306) |
| | | DOUBLE ARM | | | | | | | 430 | | | | | | | | | 390 |
| | PIN SPACING 17–1/2" 42" | SINGLE ARM | 150 | 190 | 240 | 250 | 280 | 260 | (236) | 280 | 330 | – | 140 | 170 | 200 | 220 | 230 | (204) |
| | | DOUBLE ARM | | | | | | | 300 | | | | | | | | | 270 |
| 8 PIN 10 FT PG 111 IT. 3 | 112" | SINGLE ARM | 380 | 480 | 620 | 680 | 740 | 690 | (488) | 640 | 760 | – | 350 | 430 | 520 | (688) | (595) | (422) |
| | | DOUBLE ARM | | | | | | | (976) | | | | | | | 570 | 630 | (844) |
| | 41" 30" 41" | SINGLE ARM | 210 | 250 | 320 | 340 | 370 | 340 | (384) | 350 | 410 | – | 185 | 220 | 260 | 290 | 320 | (332) |
| | | DOUBLE ARM | | | | | | | 400 | | | | | | | | | 370 |
| | PIN SPACING 13–5/8" 30" | SINGLE ARM | 130 | 170 | 210 | 220 | 240 | 220 | (191) | 250 | 300 | – | 120 | 150 | 170 | 190 | 200 | (165) |
| | | DOUBLE ARM | | | | | | | 260 | | | | | | | | | 230 |
| 8 PIN 13 FT PG 112 IT. 2 | 147" | SINGLE ARM | 430 | 550 | 710 | 770 | (550) | (462) | (318) | 730 | (865) | – | 400 | 490 | 590 | (448) | (388) | (275) |
| | | DOUBLE ARM | | | | | (825) | (924) | (636) | | 870 | | | | | 650 | (776) | (550) |
| | 52–1/2" 42" 52–1/2" | SINGLE ARM | 250 | 300 | 380 | 410 | (427) | (358) | (247) | 410 | 480 | – | 220 | 270 | 310 | 350 | (301) | (213) |
| | | DOUBLE ARM | | | | | 440 | 420 | (494) | | | | | | | | 380 | (426) |
| | PIN SPACING 17–1/2" 42" | SINGLE ARM | 150 | 190 | 240 | 250 | (212) | (178) | (123) | 280 | 330 | – | 140 | 170 | 200 | (173) | (150) | (106) |
| | | DOUBLE ARM | | | | | 280 | 260 | (246) | | | | | | | 220 | (300) | (212) |
| 10 PIN 12 FT PG 111 IT. 4 | 136" | SINGLE ARM | 410 | 530 | 680 | 740 | (625) | (525) | (362) | 700 | 834 | – | 390 | 470 | 570 | (510) | (441) | (313) |
| | | DOUBLE ARM | | | | | 810 | 760 | (724) | | | | | | | 620 | (882) | (626) |
| | PIN SPACING 26–1/2" 30" | SINGLE ARM | 210 | 240 | 300 | 320 | (340) | (285) | (197) | 340 | 390 | – | 170 | 210 | 250 | 270 | (240) | (170) |
| | | DOUBLE ARM | | | | | 350 | 320 | (394) | | | | | | | | 290 | (340) |
| | PIN SPACING 13–1/4" 30" | SINGLE ARM | 130 | 170 | 210 | 220 | (203) | (170) | (117) | 240 | 290 | – | 120 | 150 | 170 | (165) | (143) | (101) |
| | | DOUBLE ARM | | | | | 230 | 220 | (234) | | | | | | | 190 | 200 | (202) |

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SDG&E ELECTRIC STANDARDS

816

MAXIMUM SAFE SPAN LENGTHS IN FEET,
PRIMARY AND SECONDARY CROSSARMS, MEDIUM LOADING

REVISION
DATE 1–1–91
APPD PSA / DSJ

**FIELD MAINTENANCE ONLY**

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

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MAXIMUM SAFE SPAN LENGTHS IN FEET,
12KV CROSSARMS, LIGHT LOADING

FMO
OH817

12KV CROSSARMS SINGLE AND DOUBLE MAXIMUM SAFE SPAN LENGTHS IN FEET VERTICAL LOADING

AS LIMITED BY

SAG/PIN SPACING RATIOS 123
CROSSARM STRENGTH (123)

LIGHT LOADING

THIS PAGE FOR FIELD MAINTENANCE ONLY

| | | | | WIRE TYPE | COPPER | | | | | | | | COPPERWELD | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | WIRE SIZE | #6 | #4 | #2 | #1 | 1/0 | 2/0 | 4/0 | 250 KCM | #6A | #4A | 7/16 EHS 30% |
| | | | | WT WIRE LBS/1000 | 82.5 | 127.6 | 202.9 | 258.4 | 325.8 | 410.9 | 653.3 | 771.9 | 101.6 | 161.5 | 408.4 |
| | | | | K FACTOR | 2.7 | 3.3 | 3.5 | 3.6 | 3.7 | 4.3 | 6.0 | 6.3 | 3.3 | 3.4 | 7.2 |
| | | | | SAG CURVE NUMBER | L-312 | L-311 | L-321 | L-313 | L-324 | L-326 | L-356 | L-436 | L-445 | L-444 | L-449 |
| 4 PIN RURAL FMO | | 88" | 4 1/2"X3 1/4" STD. LT. ARM | SINGLE | 670 | 790 | 850 | 890 | (777) | (616) | (388) | (328) | 1030 | 1100 | (620) |
| | | | | DOUBLE | | | | | 950 | (1232) | (776) | (656) | | | (1240) |
| 4 PIN 10 FT FMO | HEAVY 5 3/4"X 5 3/4" | 110" | STD. LT. ARM | SINGLE | 760 | 890 | 950 | 1010 | 1070 | 1150 | (672) | (568) | 1150 | 1230 | (1074) |
| | | | | DOUBLE | | | | | | | 1080 | (1136) | | | 1830 |
| | | | STD. HVY. ARM | SINGLE | | | | | | | | (1017) | | | |
| | | | | DOUBLE | | | | | | | | (2034) | | | |
| | LIGHT 5 3/4"X 3 3/4" | 18" 37" | STD. LT. ARM | SINGLE | 420 | 500 | 520 | 560 | 590 | 630 | (502) | (425) | 670 | 700 | (807) |
| | | | | DOUBLE | | | | | | | 610 | (850) | | | 970 |
| | | | STD. HVY. ARM | SINGLE | | | | | | | | (763) | | | |
| | | | | DOUBLE | | | | | | | | 900 | | | |
| | | 55" 55" | STD. LT. ARM | SINGLE | 520 | 620 | 650 | 690 | 730 | 790 | 760 | (586) | 820 | 870 | (1074) |
| | | | | DOUBLE | | | | | | | | 1150 | | | 1290 |
| | | | STD. HVY. ARM | SINGLE | | | | | | | | | | | |
| | | | | DOUBLE | | | | | | | | | | | |
| 12 FT 6 PIN FMO | HEAVY 5 3/4"X 5 3/4" | 134" | STD. LT. ARM | SINGLE | 830 | 980 | 1060 | 1120 | (990) | (785) | (494) | (418) | 1270 | 1360 | (790) |
| | | | | DOUBLE | | | | | 1190 | 1270 | (988) | (836) | | | (1580) |
| | | | STD. HVY. ARM | SINGLE | | | | | | | (929) | (786) | | | (1486) |
| | | | | DOUBLE | | | | | | | 1190 | (1572) | | | 2020 |
| | LIGHT 5 3/4"X 3 3/4" | 18" 49" | STD. LT. ARM | SINGLE | 490 | 590 | 610 | 650 | 680 | (614) | (386) | (327) | 770 | 810 | (617) |
| | | | | DOUBLE | | | | | | 740 | 710 | (654) | | | (1210) |
| | | | STD. HVY. ARM | SINGLE | | | | | | | | (617) | | | (1166) |
| | | | | DOUBLE | | | | | | | | (1234) | | | 1210 |
| | | 67" 67" | STD. LT. ARM | SINGLE | 580 | 690 | 730 | 770 | 820 | (785) | (494) | (418) | 900 | 960 | (790) |
| | | | | DOUBLE | | | | | | 880 | 840 | (836) | | | 1440 |
| | | | STD. HVY. ARM | SINGLE | | | | | | | | (786) | | | |
| | | | | DOUBLE | | | | | | | | (1572) | | | |
| | | 24-1/2" SPACING 18" | STD. LT. ARM | SINGLE | 330 | 400 | 410 | 440 | 450 | (401) | (252) | (213) | 543 | 560 | (403) |
| | | | | DOUBLE | | | | | | 490 | 490 | (426) | | | (806) |
| | | | STD. HVY. ARM | SINGLE | | | | | | | | (407) | | | (769) |
| | | | | DOUBLE | | | | | | | | (814) | | | 840 |
| 6 PIN 15 FT FMO | HEAVY 5 3/4"X 5 3/4" | 168" | STD. HVY. ARM | SINGLE | 930 | 1110 | 1190 | 1260 | 1340 | (1074) | (676) | (572) | 1420 | 1520 | (1081) |
| | | | | DOUBLE | | | | | | 1420 | (1352) | (1144) | | | (2162) |
| | | 18" 66" | STD. HVY. ARM Spcl. Drilling | SINGLE | 580 | 680 | 730 | 770 | 800 | 870 | (554) | (469) | 890 | 950 | (886) |
| | | | | DOUBLE | | | | | | | (1108) | (938) | | | (1772) |
| | | 84" 84" | STD. HVY. ARM | SINGLE | 660 | 770 | 830 | 870 | 920 | 990 | (676) | (572) | 1010 | 1070 | (1081) |
| | | | | DOUBLE | | | | | | | 921 | (1144) | | | 1590 |
| | | 18" 33" 33" | STD. HVY. ARM Spcl. Drilling | SINGLE | 390 | 470 | 490 | 530 | 550 | 580 | (364) | (308) | 630 | 660 | (583) |
| | | | | DOUBLE | | | | | | | (728) | (616) | | | (1166) |
| | | 36" 24" 24" | STD. HVY. ARM | SINGLE | 330 | 390 | 410 | 440 | 450 | 480 | (325) | (259) | 540 | 560 | (490) |
| | | | | DOUBLE | | | | | | | 490 | (518) | | | (980) |

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SDG&E ELECTRIC STANDARDS

MAXIMUM SAFE SPAN LENGTHS IN FEET,
12KV CROSSARMS, LIGHT LOADING

817

**FIELD MAINTENANCE ONLY**

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

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MAXIMUM SAFE SPAN LENGTHS IN FEET,
12KV CROSSARMS, MEDIUM LOADING

FMO
OH818

12KV CROSSARMS SINGLE AND DOUBLE MAXIMUM SAFE SPAN LENGTHS IN FEET VERTICAL LOADING

AS LIMITED BY

SAG/PIN SPACING RATIOS 123
CROSSARM STRENGTH (123)

MEDIUM LOADING

THIS PAGE FOR FIELD MAINTENANCE ONLY

| | | | | WIRE TYPE | COPPER | | | | | | | | COPPERWELD | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | WIRE SIZE | #6 | #4 | #2 | #1 | 1/0 | 2/0 | 4/0 | 250 KCM | #6A | #4A | 7/16 EHS 30% |
| | | | | WT WIRE LBS/1000FT | 222.8 | 284.3 | 380.2 | 438.2 | 518.0 | 617.4 | 895.0 | 1028.2 | 250.9 | 329.4 | 620.8 |
| | | | | K FACTOR | 2.5 | 2.7 | 3.0 | 3.3 | 3.4 | 3.4 | 4.1 | | 2.6 | 2.9 | |
| | | | | SAG CURVE NUMBER | L–331 | L–333 | L–337 | L–335 | L–341 | L–344 | L–363 | | L–435 | L–443 | |
| 4 PIN RURAL FMO | 88" | 4 1/2"X3 1/4" STD. LT. ARM | SINGLE | | 340 | 430 | 550 | (578) | (489) | (410) | (283) | (246) | 580 | 680 | (408) |
| | | | DOUBLE | | | | | 600 | 650 | (820) | (566) | (492) | | | (816) |
| 4 PIN 10 FT FMO HEAVY 5 3/4"X 5 3/4" | 110" | STD. LT. ARM | SINGLE | | 380 | 480 | 610 | 670 | 730 | (711) | (490) | (427) | 640 | 760 | (707) |
| | | | DOUBLE | | | | | | | 790 | 780 | (854) | | | (1414) |
| | | STD. HVY. ARM | SINGLE | | | | | | | | | (763) | | | – |
| | | | DOUBLE | | | | | | | | | – | | | – |
| | 18" 37" | STD. LT. ARM | SINGLE | | 230 | 280 | 350 | 380 | 420 | 460 | (367) | (319) | 390 | 450 | – |
| | | | DOUBLE | | | | | | | | 440 | – | | | – |
| | | STD. HVY. ARM | SINGLE | | | | | | | | | (573) | | | – |
| | | | DOUBLE | | | | | | | | | – | | | – |
| LIGHT 5 3/4"X 3 3/4" | 55" 55" | STD. LT. ARM | SINGLE | | 280 | 340 | 430 | 470 | 510 | 560 | (490) | (427) | 460 | 540 | – |
| | | | DOUBLE | | | | | | | | 550 | – | | | – |
| | | STD. HVY. ARM | SINGLE | | | | | | | | | – | | | – |
| | | | DOUBLE | | | | | | | | | (763) | | | – |
| 6 PIN 12 FT FMO HEAVY 5 3/4"X 5 3/4" | 134" | STD. LT. ARM | SINGLE | | 410 | 530 | 680 | 740 | (623) | (522) | (360) | (314) | 700 | 830 | (519) |
| | | | DOUBLE | | | | | | 810 | 880 | (720) | (628) | | | (1038) |
| | | STD. HVY. ARM | SINGLE | | | | | | | | (678) | (591) | | | – |
| | | | DOUBLE | | | | | | | | 860 | – | | | – |
| | 18" 49" | STD. LT. ARM | SINGLE | | 270 | 320 | 410 | 440 | 480 | (408) | (282) | (245) | 440 | 510 | (406) |
| | | | DOUBLE | | | | | | | 530 | 520 | (490) | | | – |
| | | STD. HVY. ARM | SINGLE | | | | | | | | | (463) | | | – |
| | | | DOUBLE | | | | | | | | | – | | | – |
| LIGHT 5 3/4"X 3 3/4" | 67" 67" | STD. LT. ARM | SINGLE | | 310 | 370 | 480 | 522 | 560 | (522) | (360) | (314) | 510 | 590 | – |
| | | | DOUBLE | | | | | | | 620 | 610 | (628) | | | – |
| | | STD. HVY. ARM | SINGLE | | | | | | | | | (591) | | | – |
| | | | DOUBLE | | | | | | | | | – | | | – |
| | 24–1/2" SPACING 18" | STD. LT. ARM | SINGLE | | 190 | 330 | 290 | 310 | (318) | (267) | (184) | (160) | 330 | 380 | (265) |
| | | | DOUBLE | | | | | | 330 | 370 | (360) | (320) | | | – |
| | | STD. HVY. ARM | SINGLE | | | | | | | | (351) | (306) | | | – |
| | | | DOUBLE | | | | | | | | 360 | – | | | – |
| 6 PIN 15 FT FMO HEAVY 5 3/4"X 5 3/4" | 168" | STD. HVY. ARM | SINGLE | | 450 | 590 | 750 | 820 | (852) | (715) | (493) | (429) | 770 | 920 | – |
| | | | DOUBLE | | | | | | 900 | 970 | (610) | (859) | | | – |
| | 18" 66" | STD. HVY. ARM Spcl. Drilling | SINGLE | | 305 | 370 | 480 | 520 | 560 | (586) | (404) | (352) | 510 | 590 | (583) |
| | | | DOUBLE | | | | | | | 620 | 610 | (704) | | | – |
| | 84" 84" | STD. HVY. ARM | SINGLE | | 340 | 420 | 540 | 590 | 640 | 690 | (493) | (429) | 560 | 660 | – |
| | | | DOUBLE | | | | | | | | 690 | – | | | – |
| | 18" 33" 33" | STD. HVY. ARM Spcl. Drilling | SINGLE | | 220 | 260 | 340 | 360 | 390 | (385) | (266) | (231) | 370 | 430 | – |
| | | | DOUBLE | | | | | | | 430 | (532) | (462) | | | – |
| | 36" 24" 24" | STD. HVY. ARM | SINGLE | | 190 | 220 | 290 | 300 | 330 | (324) | (223) | (194) | 320 | 370 | (322) |
| | | | DOUBLE | | | | | | | 370 | (446) | (388) | | | – |

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MAXIMUM SAFE SPAN LENGTHS IN FEET, 12KV CROSSARMS, MEDIUM LOADING

REVISION

DATE 1–1–91

APPD PA / BDJ

**FIELD MAINTENANCE ONLY**

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

HORIZONTAL CONDUCTOR SPACING
GENERAL INFORMATION

FMO
OH819

**SCOPE:** THIS STANDARD DESCRIBES HOW TO DETERMINE HORIZONTAL CONDUCTOR SPACING FOR ALUMINUM AND COPPER CONDUCTORS.

THE FOLLOWING PROCEDURES ARE REQUIRED TO DETERMINE HORIZONTAL CONDUCTOR SPACING:

STEP 1: DETERMINE THE CONDUCTOR SIZE AND TYPE TO BE INSTALLED (SEE SECTION 700).

STEP 2: DETERMINE THE RULING SPAN, LOADING DISTRICT AND DESIGN TENSION.

STEP 3: USING APPROVED SOFTWARE, ACQUIRE THE RULING SPAN SAG AT 212° F.

STEP 4: DETERMINE SAG IN LONGEST SPAN.

$$\text{LONG SPAN SAG} = (\text{RULING SPAN SAG}) * \left(\frac{\text{LONGEST SPAN}}{\text{RULING SPAN}}\right)^2$$

STEP 5: DETERMINE THE REQUIRED HORIZONTAL SPACING USING THE FOLLOWING FORMULA:

$$\textit{PIN SPACING} = 3.6 + 8 * \sqrt{\textit{LONG SPAN SAG}}$$

STEP 6: SELECT THE CROSSARM FROM STANDARD SECTION 300 WHICH WILL PROVIDE EQUAL OR GREATER CONDUCTOR SPACING THAN DETERMINED IN STEP 5.

NOTE: PROVIDE MINIMUM PIN SPACING AS CALCULATED ON WORK ORDER.

STEP 7: DETERMINE IF THE CROSSARM SELECTED IS STRONG ENOUGH TO SUPPORT THE CONDUCTORS (SEE STANDARD SECTION 300).

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DRAFT

EXAMPLE: (SEE FIGURE 1)

PROBLEM: DETERMINE THE REQUIRED HORIZONTAL CONDUCTOR SPACING AT A POLE (D) WITH THE LONGEST ADJACENT SPAN (400').

ASSUMPTIONS: LIGHT LOADING DISTRICT
WIRE TO BE STRUNG = 4 CONDUCTORS, #336.4 ACSR (LINNET) @ 3,000 LB DESIGN TENSION SPAN LENGTHS ARE 300', 250', 350', AND 400'

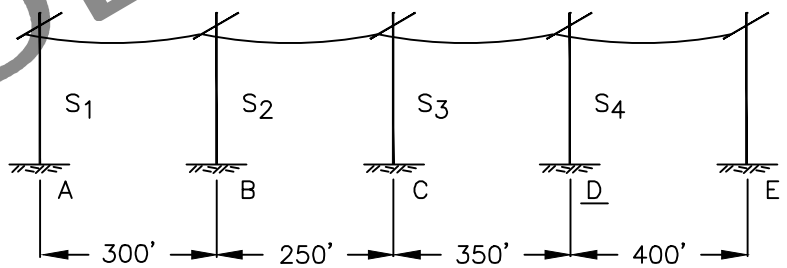



FIGURE 1

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SOLUTION: 1)

CALCULATE THE RULING SPAN USING THE FORMULA

$$RS = \sqrt{\frac{S_1^3 + S_2^3 + S_3^3 + S_4^3 --- S_N^3}{S_1 + S_2 + S_3 + S_4 --- S_N}}$$

$$\text{WHERE RS} = \sqrt{\frac{300^3 + 250^3 + 350^3 + 400^3}{300 + 250 + 350 + 400}} = 339$$

USE THE 300' RULING SPAN "FINAL SAG" TABLE.

USING THE SAG AND TENSION STANDARD ACQUIRE THE RULING SPAN SAG ON THE LINE AT 167° F.

RULING SPAN SAG = 5.41

2) DETERMINE SAG IN THE LONGEST SPAN USING THE FORMULA

$$LONGSPANSAG = RULINGSPANSAG * \left(\frac{LONGESTSPAN}{RULINGSPAN}\right)^2$$

$$Feet = 5.41 * \left(\frac{400}{339}\right)^2 = 7.53'$$

3) DETERMINE THE REQUIRED HORIZONTAL SPACING USING THE FOLLOWING FORMULA:

$$PINSPACING = 3.6 + 8 * \sqrt{LONGSPANSAG}$$

$$PIN\ SPACING = 3.6 + 8 * \sqrt{7.53}$$

$$PIN\ SPACING = 25.6"$$

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

SHEET
1 OF 1

SLACK SPAN CONSTRUCTION
SINGLE/DOUBLE CROSSARMS

FMO
OH820

**SCOPE:** THIS STANDARD DESCRIBES THE METHOD IN DETERMINING MAXIMUM SPAN UP TO 120 FEET, NUMBER OF CROSSARMS AND CLASS OF POLE IN "SLACK SPAN" CONSTRUCTION, ALLOWED IN LIGHT LOADING DISTRICTS ONLY.

STEP 1: DETERMINE THE FOLLOWING DESIGN CONSTRAINTS:
A. DETERMINE WHICH CONDUCTOR IS TO BE USED

| COPPER | TABLE |
|---|---|
| #6 BARE STRANDED | 1 |
| #4 BARE STRANDED | 2 |
| #2 BARE STRANDED | 3 |
| #1/0 BARE STRANDED | 4 |

| ALUMINUM | TABLE |
|---|---|
| #2 ACSR 6/1 | 5 |
| #3/0 ACSR 6/1 | 6 |

B. DETERMINE NUMBER OF CONDUCTORS TO BE INSTALLED IN THE STUDY SPAN.

C. DETERMINE MINIMUM GROUND CLEARANCE REQUIRED FOR VOLTAGE – PER G.O. 95, RULE 37.

D. DETERMINE LOADING ZONE.

STEP 2: OBTAIN A PROFILE OF THE STUDY SPAN AND DRAW A LINE PARALLEL TO THE GROUND LINE AT THE MINIMUM CLEARANCE ELEVATION (SEE DRAWING ON PAGE 820.2).

STEP 3: DETERMINE AVAILABILITY OF POLES AND SELECT A TRIAL POLE HEIGHT AND A TRIAL SPAN LENGTH BETWEEN 50 FEET AND MAXIMUM 120 FEET.

STEP 4: PLOT SELECTED POLE HEIGHT ON PROFILE OF STUDY SPAN AND LOCATE THE CONDUCTOR ATTACHMENT POINTS. DRAW A STRAIGHT LINE BETWEEN THE ATTACHMENT POINTS ON THE TWO POLES AND MEASURE THE MINIMUM VERTICAL DISTANCE TO THE NEAREST HALF–FOOT BETWEEN THE MINIMUM CLEARANCE LINE FROM STEP 2 AND THE CONDUCTOR ATTACHMENT LINE. THIS DISTANCE IS THE MAXIMUM ALLOWABLE SAG FOR THE SPAN.

STEP 5: ON THE SINGLE CONDUCTOR MAXIMUM TENSION TABLE FOR THE SELECTED CONDUCTOR AND LOADING CONDITION FROM STEP 1, READ ACROSS FROM THE SPAN LENGTH, AS SELECTED IN STEP 3, TO THE COLUMN FROM MAXIMUM SAG AS CALCULATED IN STEP 4. THE VALUE SHOWN IS THE MAXIMUM SINGLE CONDUCTOR TENSION THAT WILL OCCUR IN THE STUDY SPAN.

**NOTE:**
- IF MAXIMUM TENSION EXCEEDS 300 LBS. PER CONDUCTOR (NON–BOLD TENSIONS ON TABLES), OR, MAXIMUM TENSION EXCEEDS THE LONGITUDINAL LOADING PER PIN POSITION ON A SINGLE CROSSARM, DOUBLE CROSSARMS WITH DOUBLE STEEL PINS AND INSULATORS WILL BE USED. GRADES A AND B CONSTRUCTION DO NOT REQUIRE DOUBLE CROSSARMS, (G.O. 95 49.2C2, 49.3C2). TO CALCULATE SINGLE CROSSARM LOADING (REFER TO STD. 383.2), DIVIDE THE LONGITUDINAL LOADING FOR DOUBLE CROSSARMS BY 2 AND AGAIN BY 1.3 (G.O. 95 APP. F–8).
- INSURE THAT MINIMUM HORIZONTAL CONDUCTOR SPACING IS ACHIEVED, PER OH STD. 819.

STEP 6: MULTIPLY THE MAXIMUM SINGLE CONDUCTOR TENSION AS DETERMINED IN STEP 5 BY THE NUMBER OF CONDUCTORS TO BE INSTALLED IN THE STUDY SPAN. THIS VALUE BECOMES THE MAXIMUM TENSION ON POLE FOR THE STUDY SPAN.

STEP 7: ON TABLE 7 (MAXIMUM ALLOWABLE TENSION ON POLES) READ DOWN THE COLUMN UNDER THE SELECTED POLE HEIGHT (FROM STEP 3) UNTIL A TENSION VALUE GREATER THAN OR EQUAL TO THE MAXIMUM TENSION VALUE DETERMINED IN STEP 6 IS ENCOUNTERED. THEN, READ TO THE LEFT TO DETERMINE THE CLASS OF POLE REQUIRED FOR THE HEIGHT SELECTED.

STEP 8: IF LOADS OR TENSIONS EXCEED THE CAPACITIES OF THE POLES OR ARE BEYOND THE LIMITS OF THE TABLES, RETURN TO STEP 3, ADJUST SPAN LENGTH OR POLE HEIGHT AND RECALCULATE TO DETERMINE POLE CLASS.

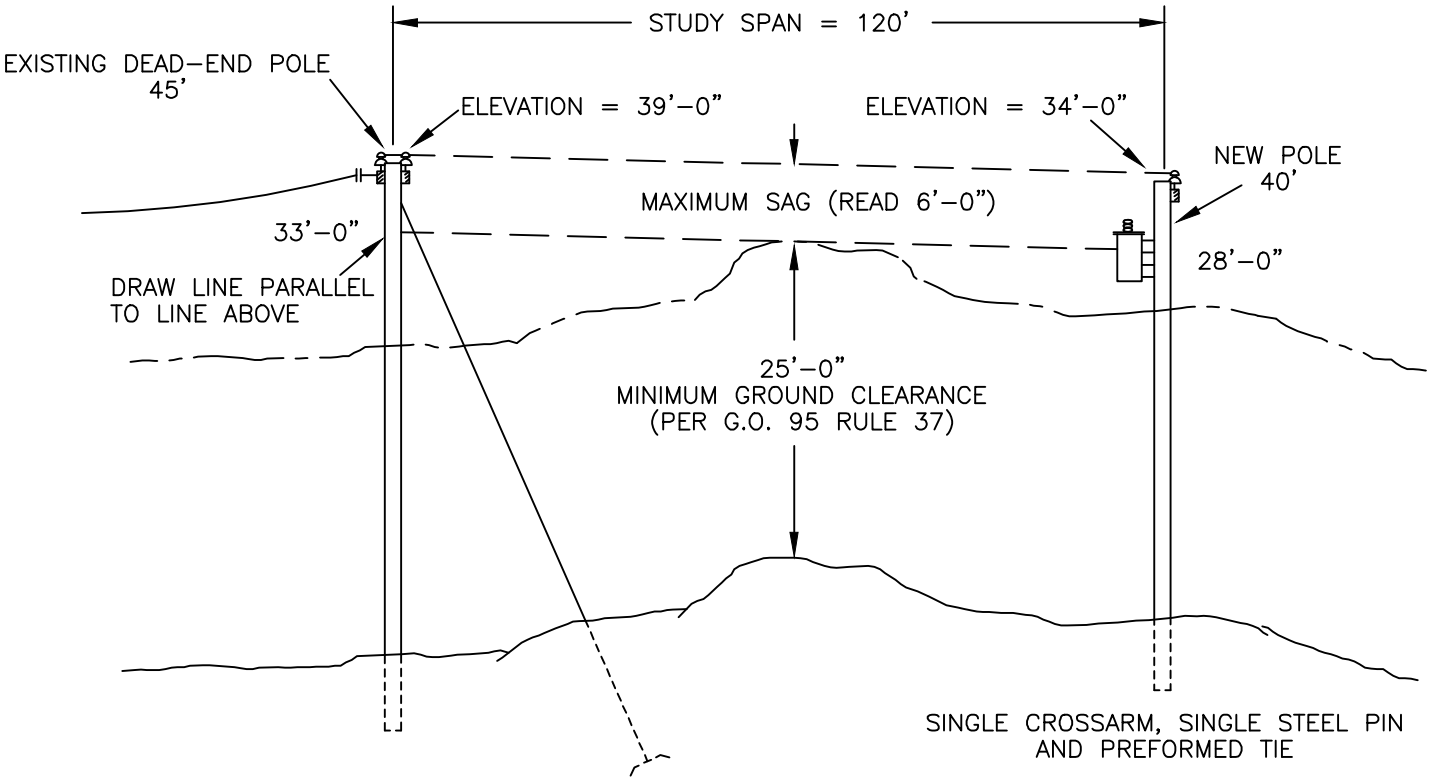
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**EXAMPLE:**

PROBLEM: DETERMINE CLASS AND HEIGHT OF POLE WHICH WILL SUPPORT MAXIMUM ALLOWABLE "SLACK SPAN".

ASSUME:
- LIGHT LOADING DISTRICT
- WIRE TO BE STRUNG = 3 CONDUCTORS, #2 ACSR
- VOLTAGE = 12KV
- NEW POLE HEIGHT = 40 FT
- STUDY SPAN = 120 FT. (SEE DRAWING)

SOLUTION:

1) ASSURE THAT MINIMUM GROUND CLEARANCE IS MET (PER G.O. 95, RULE 37, TABLE 1).

2) DETERMINE MAXIMUM ALLOWABLE SAG FROM DRAWING (READ = 6' – 0"), THEN SELECT ACTUAL SAG TO BE USED, LESS THAN OR EQUAL TO MAXIMUM ALLOWABLE SAG (E.G. 3' – 0").

3) SEE TABLE 5 FOR #2 ACSR, LIGHT LOADING, FIND 120 FT SPAN AND READ ACROSS TO 3' – 0" SAG COLUMN. READ MAXIMUM TENSION IS 184 LBS.

4) TOTAL TENSION IS 184 X 3 CONDUCTORS = 552 LBS.

5) SEE TABLE 7, FIND 40' POLE HEIGHT AND READ DOWN. FIND TENSION 752 LBS, WHICH IS GREATER THAN 552 LBS. READING TO THE LEFT SHOWS A CLASS 3 POLE.

CONCLUSION: **A 40 FT., CLASS 3 POLE, A SINGLE CROSSARM, SINGLE STEEL PIN AND PREFORMED OR PREFABRICATED TIE MEET THE REQUIREMENTS FOR A "SLACK SPAN" OF 120 FT. WITH A SAG OF 3' - 0" FOR 3 CONDUCTORS, #2 ACSR.**

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**TABLE 1**

#6 COPPER – 3 STRAND
SINGLE CONDUCTOR MAXIMUM TENSION TABLE
LIGHT LOADING CONDITIONS---25° INITIAL WITH NO ICE (A)(G)
NOTE: FOR BOLD TENSIONS USE SINGLE CROSSARM CONSTRUCTION.

| SPAN (FEET) | SAG AT 130° F -- FINAL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1' – 0" | 1' – 6" | 2' – 0" | 2' – 6" | 3' – 0" | 3' – 6" | 4' – 0" | 4' – 6" | 5' – 0" | 5' – 6" |
| 60 | **188** | **88** | **56** | – | – | – | – | – | – | – |
| 70 | **252** | **130** | **81** | **59** | **50** | – | – | – | – | – |
| 80 | 310 | **182** | **113** | **80** | **63** | **52** | – | – | – | – |
| 90 | 354 | **233** | **149** | **107** | **82** | **68** | **58** | **51** | – | – |
| 100 | 398 | **281** | **193** | **137** | **106** | **86** | **73** | **63** | **56** | **51** |
| 110 | 434 | 327 | **236** | **171** | **132** | **107** | **90** | **78** | **69** | **62** |
| 120 | 473 | 367 | **277** | **208** | **161** | **130** | **109** | **94** | **83** | **74** |

**TABLE 2**

#4 COPPER – 3 STRAND
SINGLE CONDUCTOR MAXIMUM TENSION TABLE
LIGHT LOADING CONDITIONS---25° INITIAL WITH NO ICE (B)(G)
NOTE: FOR BOLD TENSIONS USE SINGLE CROSSARM CONSTRUCTION.

| SPAN (FEET) | SAG AT 130° F -- FINAL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1' – 0" | 1' – 6" | 2' – 0" | 2' – 6" | 3' – 0" | 3' – 6" | 4' – 0" | 4' – 6" | 5' – 0" | 5' – 6" |
| 60 | **273** | **111** | **71** | **53** | – | – | – | – | – | – |
| 70 | 376 | **175** | **103** | **75** | **60** | **50** | – | – | – | – |
| 80 | 464 | **251** | **147** | **103** | **81** | **67** | **57** | **50** | – | – |
| 90 | 534 | 333 | **201** | **137** | **105** | **86** | **74** | **64** | **57** | **52** |
| 100 | 598 | 412 | **263** | **179** | **135** | **109** | **93** | **80** | **71** | **64** |
| 110 | 659 | 482 | 330 | **228** | **171** | **137** | **114** | **99** | **87** | **78** |
| 120 | 719 | 546 | 397 | **283** | **212** | **168** | **140** | **120** | **105** | **94** |

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**TABLE 3**

#2 COPPER – 3 STRAND
SINGLE CONDUCTOR MAXIMUM TENSION TABLE
LIGHT LOADING CONDITIONS---25° INITIAL WITH NO ICE (C)(G)
NOTE: FOR BOLD TENSIONS USE SINGLE CROSSARM CONSTRUCTION.

| SPAN (FEET) | SAG AT 130° F -- FINAL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1' – 0" | 1' – 6" | 2' – 0" | 2' – 6" | 3' – 0" | 3' – 6" | 4' – 0" | 4' – 6" | 5' – 0" | 5' – 6" |
| 60 | 400 | **152** | – | – | – | – | – | – | – | – |
| 70 | 575 | **243** | **138** | **100** | – | – | – | – | – | – |
| 80 | 717 | 362 | **196** | **137** | **107** | – | – | – | – | – |
| 90 | 830 | 489 | **276** | **184** | **140** | **115** | **100** | – | – | – |
| 100 | 932 | 622 | 370 | **244** | **181** | **146** | **123** | **107** | – | – |
| 110 | 1029 | 731 | 472 | 316 | **231** | **182** | **152** | **131** | **116** | **104** |
| 120 | – | 829 | 581 | 399 | **287** | **226** | **186** | **159** | **140** | **125** |

**TABLE 4**

1/0 COPPER – 7 STRAND
SINGLE CONDUCTOR MAXIMUM TENSION TABLE
LIGHT LOADING CONDITIONS---25° INITIAL WITH NO ICE (D)(G)
NOTE: FOR BOLD TENSIONS USE SINGLE CROSSARM CONSTRUCTION.

| SPAN (FEET) | SAG AT 130° F -- FINAL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1' – 6" | 2' – 0" | 2' – 6" | 3' – 0" | 3' – 6" | 4' – 0" | 4' – 6" | 5' – 0" | 5' – 6" | 6' – 0" |
| 60 | **198** | **121** | – | – | – | – | – | – | – | – |
| 70 | 323 | **179** | **128** | **101** | – | – | – | – | – | – |
| 80 | 530 | **260** | **177** | **137** | **113** | **100** | – | – | – | – |
| 90 | 746 | 378 | **240** | **181** | **147** | **125** | **109** | **100** | – | – |
| 100 | 956 | 528 | 321 | **235** | **188** | **158** | **136** | **121** | **109** | **100** |
| 110 | 1152 | 699 | 428 | 301 | **236** | **196** | **166** | **148** | **133** | **120** |
| 120 | – | 879 | 556 | 385 | **293** | **241** | **205** | **180** | **160** | **145** |

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**TABLE 5**

#2 ACSR/AW 6/1 – SPARROW
SINGLE CONDUCTOR MAXIMUM TENSION TABLE
LIGHT LOADING CONDITIONS---25° INITIAL WITH NO ICE (F)
NOTE: FOR BOLD TENSIONS USE SINGLE CROSSARM CONSTRUCTION.

| SPAN (FEET) | SAG AT 130° F -- FINAL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0' – 6" | 1' – 0" | 1' – 6" | 2' – 0" | 2' – 6" | 3' – 0" | 3' – 6" | 4' – 0" | 4' – 6" | 5' – 0" |
| 60 | 580 | **226** | – | – | – | – | – | – | – | – |
| 70 | 665 | 348 | **144** | – | – | – | – | – | – | – |
| 80 | 756 | 449 | **221** | **123** | – | – | – | – | – | – |
| 90 | 850 | 537 | 306 | **173** | **117** | – | – | – | – | – |
| 100 | – | 618 | 397 | **232** | **155** | **116** | – | – | – | – |
| 110 | – | 695 | 475 | 300 | **199** | **147** | **117** | – | – | – |
| 120 | – | 771 | 546 | 377 | **251** | **184** | **145** | **120** | **103** | – |

**TABLE 6**

3/0 ACSR/AW 6/1 – PIGEON
SINGLE CONDUCTOR MAXIMUM TENSION TABLE
LIGHT LOADING CONDITIONS---25° INITIAL WITH NO ICE (D)(G)
NOTE: FOR BOLD TENSIONS USE SINGLE CROSSARM CONSTRUCTION.

| SPAN (FEET) | SAG AT 130° F -- FINAL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1' – 0" | 1' – 6" | 2' – 0" | 2' – 6" | 3' – 0" | 3' – 6" | 4' – 0" | 4' – 6" | 5' – 0" | 5' – 6" |
| 60 | 493 | **169** | **107** | – | – | – | – | – | – | – |
| 70 | 825 | **271** | **157** | **114** | – | – | – | – | – | – |
| 80 | 1091 | 452 | **223** | **156** | **122** | **101** | – | – | – | – |
| 90 | – | 675 | 326 | **209** | **160** | **131** | **112** | **100** | – | – |
| 100 | – | 923 | 461 | **283** | **207** | **167** | **141** | **122** | **109** | **100** |
| 110 | – | 1130 | 632 | 376 | **267** | **209** | **175** | **151** | **133** | **119** |
| 120 | – | – | 837 | 494 | 339 | **261** | **213** | **183** | **161** | **144** |

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|---|---|---|

**TABLE 7**

| MAXIMUM ALLOWABLE TENSION ON POLES (LBS) | | | | | | | |
|---|---|---|---|---|---|---|---|
| POLE CLASS | WOOD POLE HEIGHT | | | | | | |
| | 35' | 40' | 45' | 50' | 55' | 60' | 65' |
| 5 | 455 | 472 | 453 | 453 | 440 | 425 | 425 |
| 3 | 751 | 752 | 714 | 703 | 703 | 700 | 688 |
| 1 | 1142 | 1123 | 1111 | 1103 | 1081 | 1070 | 1063 |

**NOTE:** ALL TENSION CALCULATIONS INCLUDE A SAFETY FACTOR OF 4.0 AND A 500 LB TRANSFORMER INSTALLED ON THE STUDY POLE.

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**INSTALLATION:**

(A) DO NOT USE A CONDUCTOR TENSION LESS THAN 50 LBS OR GREATER THAN 480 LBS.

(B) DO NOT USE A CONDUCTOR TENSION LESS THAN 50 LBS OR GREATER THAN 750 LBS.

(C) DO NOT USE A CONDUCTOR TENSION LESS THAN 100 LBS OR GREATER THAN 1100 LBS.

(D) DO NOT USE A CONDUCTOR TENSION LESS THAN 100 LBS OR GREATER THAN 1150 LBS.

(F) DO NOT USE A CONDUCTOR TENSION LESS THAN 100 LBS OR GREATER THAN 850 LBS.

(G) USE TENSIONS IN BOLD AREA OF TABLES FOR SINGLE CROSSARM DEADEND CONSTRUCTION.

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| 969 | CROSSPLATE ANCHORS AND RODS |
| 972 | SIDEWALK ANCHOR POLE CLASS SELECTION |
| 974 | STEEL GUY POLE |


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| B | ADDED 967-968 | - | JK | JS | MDJ | 05/01/2018 | E | OH972 MOVED TO FMO | GLC | SPC | MRF | MRF | 04/09/2024 |
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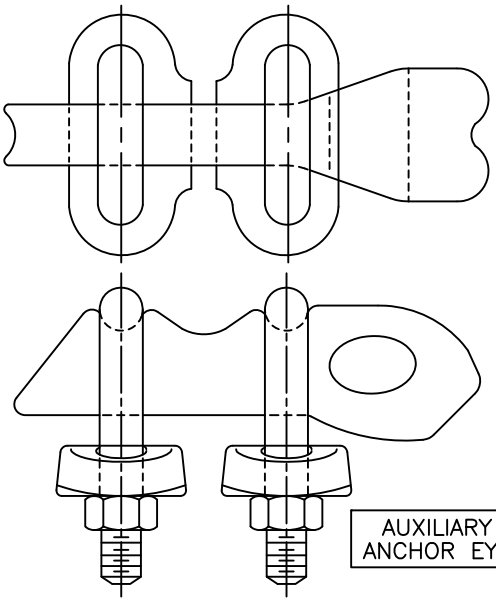
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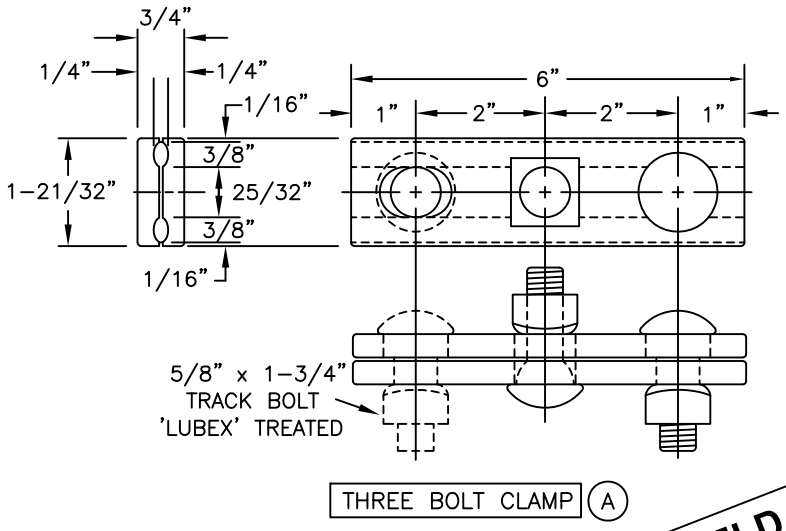
SDG&E ELECTRIC OVERHEAD STANDARD

GUY HARDWARE

FMO OH 962

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THREE BOLT CLAMP (A)

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(A) NO LONGER PURCHASED. USE FACTORY GUY GRIP WHEN PRACTICAL. SALVAGE THREE BOLT CLAMP AND USE ONLY WHEN A GUY GRIP CANNOT BE USED.

| DESCRIPTION | MOUNTING BOLT SIZE | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|
| CLAMP, THREE BOLT | – | 227296 | – |
| EYE, AUX ANCHOR | – | 337536 | AUXEYE |
| THIMBLE, 1/2", OPEN | – | 736600 | OPTHMB |

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| B | | | | | | E | | | | | |
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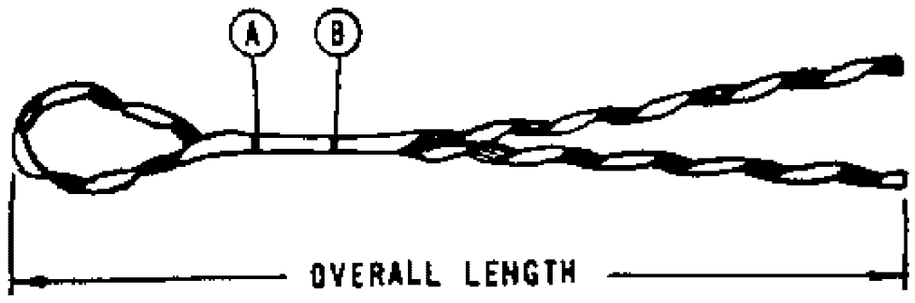
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SDG&E ELECTRIC OVERHEAD STANDARD

COPPER & COPPERWELD GUY GRIPS

FMO OH 965




COPPERWELD (M SERIES)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4M | 3 WIRE | .209" | WHITE | CDE-8106 | 18 | — | — | (E) 393056 |
| 6M | 7 WIRE | .237" | YELLOW | CDE-3103 | 21 | — | — | (E) 393088 |
| 10M | 7 WIRE | .303" | RED | CDE-3109 | 25 | — | — | (E) 392992 |
| 16M | 7 WIRE | .386" | WHITE | CDE-3115 | 31 | — | — | (E) 393024 |
| | | | | | | | | |
| COPPERWELD - COPPER & COPPERWELD | | | | | | | | |
| #8C | 1CW/2CU | .179" | RED | CDE-8102 | 17 | — | — | (E) 393120 |
| #6A | 1CW/2CU | .230" | YELLOW | CDE-3103 | 21 | — | — | (E) 393088 |
| #6C | 1CW/2CU | .225" | YELLOW | CDE-3103 | 21 | — | — | (E) 393088 |
| #4A | 1CW/2CU | .290" | RED | CDE-3109 | 25 | — | — | (E) 392992 |
| | | | | | | | | |
| #2F | 1CW/6CU | .308" | RED | CDE-3109 | 25 | — | — | (E) 392992 |
| — | — | — | — | — | — | — | — | — |

FOR FIELD MAINTENANCE ONLY

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INSTALLATION:

(A) COLORED MARK INDICATES CROSSOVER POINT FOR SMALL INSULATORS OR THIMBLEYES.

(B) COLORED MARK INDICATES CROSSOVER POINT FOR LARGE INSULATORS.

(E) EXEMPT MATERIAL

DATE 9-17-82
APPD

SDG&E ELECTRIC STANDARDS

# COPPER & COPPERWELD GUY GRIPS

999.602
SUPERSEDES
965 (9-17-82)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY**

**5/1/2018:** All versions prior to 2018 are superseded by their current version found inside the Overhead Construction Standard Manual

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| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JK | JS | MDJ | 5/1/2018 | D | | | | | |

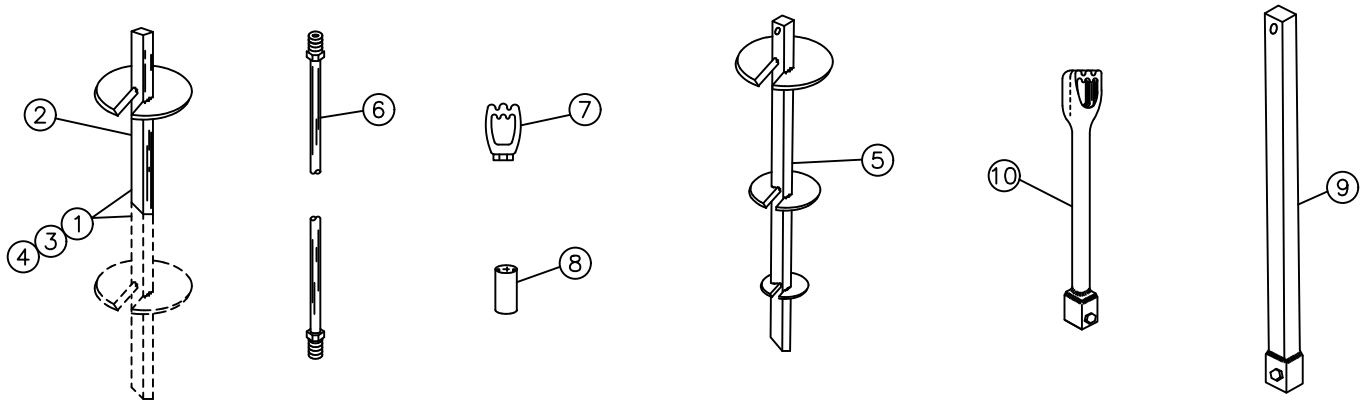
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SDG&E ELECTRIC OVERHEAD CONSTRCUTION STANDARD

SHEET 1 OF 1

POWER INSTALLED SCREW ANCHORS

FMO OH 967-968




| POWER INSTALLED SCREW ANCHORS (PISA) | | | | | | | |
|---|---|---|---|---|---|---|---|
| ITEM | DESCRIPTION | TYPE OF SOIL | HOLDING POWER RANGE (G) (C) | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER | ASSEMBLY UNITS |
| 1 | TWO 4 INCH HELIXES (B) | EXTREMELY HARD GROUND ONLY, DECOMPOSED GRANITE, CALECHI (AREAS NOW UTILIZING BACKHOE) | 12,500 – 18,000 LBS | A. B. CHANCE | V102–1428 | 108262 | SA2–4 |
| 2 | ONE 8 INCH HELIX | SAND, FILL, LOOSE SOIL WET CLAYS, SILT | 1,000 – 3,500 LBS | A. B. CHANCE | E102–1223 | 108248 | SA1–8 |
| | | MEDIUM FIRM, COMPACT GRAVEL, CLAYPAN, ROCK AND GRAVEL AND ALL MEDIUM SOILS. | 5,000 – 10,000 LBS | | | | |
| | | HARD GROUND, DENSE CLAY, LAMINATED ROCK, SLATE, SCHIST, SANDSTONE, ROCK AND GRAVEL COMBINATION, ALL ROCK AND HARD GROUND SOILS | 11,000 – 18,000 LBS (D) | | | | |
| | | EXTREMELY HARD GROUND, DECOMPOSED GRANITE, CALECHI, ETC. (IF CAN BE INSTALLED) | 18,000 LBS (D) | | | | |
| 3 | TWO 8 INCH HELIXES | SAND, FILL, LOOSE SOIL, WET CLAYS, SILT | 4,000 – 7,500 LBS | A. B. CHANCE | E102–1219 | 108250 | SA2–8 |
| | | MEDIUM FIRM, COMPACT GRAVEL, CLAYPAN, ROCK AND GRAVEL AND ALL MEDIUM SOILS | 10,000 – 15,000 LBS | | | | |
| | | HARD GROUND, DENSE CLAY, LAMINATED ROCK, SLATE, SCHIST, SANDSTONE ROCK AND CLAY COMBINATION AND ALL ROCK AND HARD GROUND SOILS. (IF CAN BE INSTALLED) | 18,000 LBS (D) | | | | |
| 4 | TWO 10 INCH HELIXES | SAND, FILL, LOOSE SOIL, WET CLAY, SILT | 7,500 – 12,500 LBS | A. B. CHANCE | E102–0823 | 108272 | SA2–10 |
| | | MEDIUM FIRM (IF CAN BE INSTALLED) | 18,000 LBS (D) | | | | |
| 5 | (F) TRIPLE 10 INCH 10" X 11 5/6" X 13 1/2" | SAND, MEDIUM TO SOFT SOIL | 6000 – 35,000 LBS. | A. B. CHANCE | 012642 EJN | 108296 | SA3–10 |

| POWER INSTALLED SCREW ANCHOR RODS AND ACCESSORIES | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER | ASSEMBLY UNITS |
| 6 | 1" BY 3–1/2' ROD EXTENSION | A. B. CHANCE | 12338 P | 601776 | EXT3– |
| | 1" BY 7' ROD EXTENSION | A. B. CHANCE | 12334 P | 601792 | EXT7– |
| 7 | 1" TRIPLEYE EYE NUT | A. B. CHANCE | 12585 | 504016 | – |
| | | DIXIE ELEC | D–6567 | | |
| | | JOSLYN | J–6375 | | |
| | | KORTICK | K3127 | | |
| 8 | 1" ROD COUPLING | A. B. CHANCE | 12247 P | 279272 | RODCPL |
| 9 | 1–1/2" X 5' ROD EXTENSION WITH COUPLING | A. B. CHANCE | 12656 | 639284 | SA5EXT |
| 10 | TRIPLEYE STUD WITH SQ. COUPLING | A. B. CHANCE | C 1020025 | 701550 | SA3EYE |

**INSTALLATION:**

A. PISA ANCHORS ARE NOT TO BE INSTALLED IN CORROSIVE AREAS AS DEFINED ON STD 929. SEE STD. 969 FOR HOLDING POWERS OF PROTECTED CROSSPLATE ANCHORS.

(B) UNDER NO CIRCUMSTANCES SHOULD THIS ANCHOR BE USED IN ANY SOILS OTHER THAN EXTREMELY HARD GROUND AS NOTED.

(C) HOLDING POWER RANGES ARE GIVEN AS A GUIDE FOR SELECTING THE REQUIRED ANCHOR. THESE VALUES ARE ESTIMATES. FOR ACTUAL DETERMINATION OF HOLDING POWER, SEE STANDARD 968.

(D) MAXIMUM RATING OF 1" ANCHOR ROD IS 18,000 LBS.

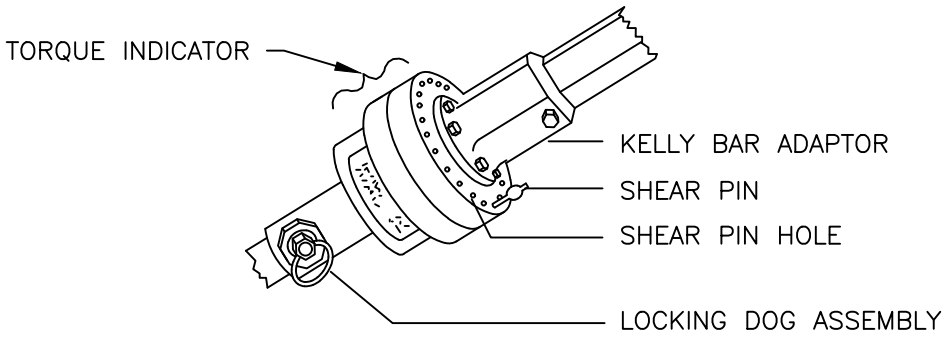
(F) THIS ANCHOR REQUIRES A 1–1/2" ROD, M&S 639284.

(G) A FACTOR OF SAFETY OF TWO HAS BEEN USED.

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TORQUE INDICATOR ASSEMBLY

| ANCHOR HOLDING POWER (POUNDS)(F) | | | | | |
|---|---|---|---|---|---|
| NUMBER OF SHEAR PINS | TWO 4 INCH HELIXES 7000 FT–LBS MAX TORQUE | ONE 8 INCH HELIX 7000 FT–LBS MAX TORQUE | TWO 8 INCH HELIXES 7000 FT–LBS MAX TORQUE | TWO 10 INCH HELIXES 5000 FT–LBS MAX TORQUE | TRIPLE HELIX 10"–11 5/16"–13 1/2" 6500 FT–LBS MAX TORQUE |
| 1 | (C) | (C) | (C) | (C) | (C) |
| 2 | (C) | (C) | (C) | (C) | (C) |
| 3 | (C) | (C) | 8,500 | 9,500 | 7,000 |
| 4 | (C) | 7,000 | 9,500 | 10,500 | 10,000 |
| 5 | (C) | 8,500 | 10,500 | 11,500 | 12,500 |
| 6 | (C) | 9,000 | 12,000 | 13,000 | 15,000 |
| 7 | (C) | 10,500 | 14,000 | 15,000 | 17,500 |
| 8 | (C) | 13,500 | 15,000 | 17,000 | 18,000 |
| 9 | (C) | 15,000 | 17,000 | 18,000 (D) | 20,500 |
| 10 | 18,000 (D) | 16,500 | 18,000 (D) | 18,000 (D) | 24,000 |
| 11 | 18,000 (D) | 17,500 | 18,000 (D) | (G) | 27,000 |
| 12 | 18,000 (D) | 18,000 (D) | 18,000 (D) | (G) | 30,500 |
| 13 | 18,000 (D) | 18,000 (D) | 18,000 (D) | (G) | 34,500 |
| 14 | 18,000 (D) | 18,000 (D) | 18,000 (D) | (G) | (G) |

**NOTES:**

A. USE ONLY SHEAR PINS (STOCK NUMBER 532152) IN TORQUE INDICATOR. EACH SHEAR PIN CAN WITHSTAND 500 FT.LBS. OF TORQUE.

B. LOAD TORQUE INDICATOR WITH MAXIMUM NUMBER OF SHEAR PINS WHILE DRIVING ANCHOR (THAT IS 14 PINS FOR A 7,000 FT–LB ANCHOR. 13 PINS FOR A 6,500 FT–LB ANCHOR, OR 10 PINS FOR A 5,000 FT–LB ANCHOR). WHEN INDICATOR IS APPROXIMATELY TWO FEET ABOVE GROUND, LEAVE REQUIRED NUMBER OF PINS IN TORQUE INDICATOR AND CONTINUE TO DRIVE ANCHOR. IF PINS SHEAR, THEN YOU HAVE THE HOLDING POWER INDICATED BY THE ABOVE TABLE. IF PINS DO NOT SHEAR, ADD AN EXTENSION, REPLACE THE SHEAR PINS JUST REMOVED, AND CONTINUE DRIVING. DISCARD ANY USED PINS THAT WERE NOT SHEARED DURING INSTALLATION.

(C) ANCHOR IS NOT CONSIDERED A GOOD INSTALLATION.

(D) LIMITED BY 1" ROD WHICH HAS A MAXIMUM RATING OF 18,000 LBS.

(F) A FACTOR OF SAFETY OF TWO HAS BEEN USED ON ALL HOLDING POWER VALUES. MAXIMUM TORQUE VALUES ARE RATINGS FROM MANUFACTURER.

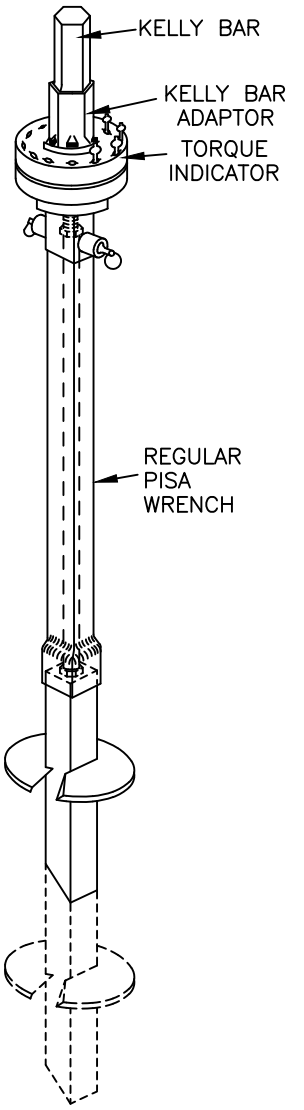
(G) THIS ANCHOR IS NOT TO BE INSTALLED WITH THIS MANY SHEAR PINS.

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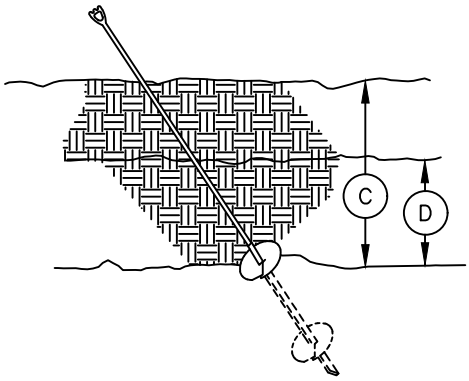
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| | SDG&E ELECTRIC STANDARDS | REVISION |
|---|---|---|
| 968.1 | INSTALLATION INSTRUCTIONS FOR POWER INSTALLED SCREW ANCHORS | DATE 6–1–79<br>APPD PA/209 |

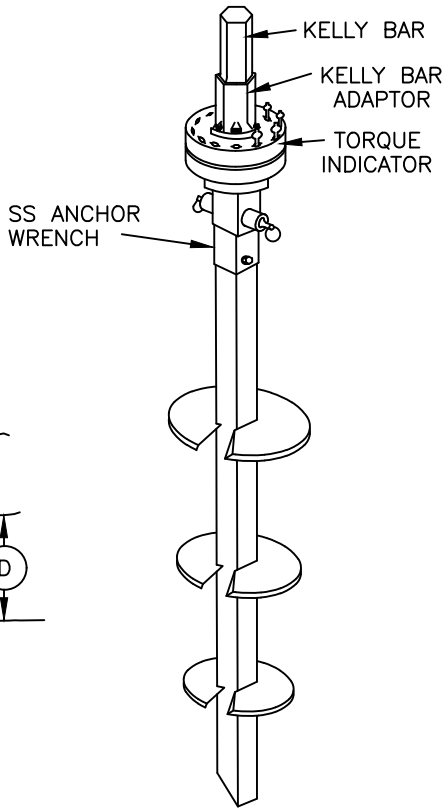
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REGULAR PISA
ASSEMBLY INSTALLATION




INSTALLED PISA ANCHOR




SS ANCHOR
ASSEMBLY INSTALLATION

**NOTE:**

A. SINGLE AND DOUBLE HELIX ANCHORS ARE INSTALLED WITH A WRENCH. INSTALLATION TORQUE IS TRANSMITTED DIRECTLY TO THE ANCHOR HUB. NO TORQUE IS TRANSFERRED BY THE ROD. NO MORE THAN 14 FEET OF WRENCH IS TO BE USED DUE TO THE EXCESSIVE FORCE REQUIRED TO REMOVE A WRENCH LONGER THAN 14 FEET. THE TRIPLE HELIX ANCHOR REQUIRES A SHORT WRENCH WHICH DOES NOT ENTER THE GROUND. ANCHOR EXTENSIONS MAY BE ADDED UNTIL THE DESIRED TORQUE IS REACHED. THE TRIPLE HELIX ANCHOR ROD WILL WRAP AS IT IS BEING INSTALLED. THIS IS NORMAL FOR THIS ANCHOR. THE ROD MAY WRAP 1 TO 1 1/2 TIMES FOR EVERY FIVE FEET OF LENGTH.

B. IN EXTREMELY HARD GROUND, TRY TO INSTALL ONE 8 INCH HELIX–TYPE ANCHOR FIRST. IF THE ONE 8 INCH HELIX–TYPE ANCHOR CANNOT BE INSTALLED. TRY A TWO 4 INCH HELIX–TYPE ANCHOR.

(C) THE UPPER HELIX OF A POWER INSTALLED, SCREW ANCHOR MUST BE BELOW GROUND AT LEAST 5 FEET.

(D) THE UPPER HELIX MUST BE COVERED BY AT LEAST TWO FEET OF GOOD ANCHORING SOIL. SOIL WHICH HAS BEEN DISTURBED BY A PREVIOUS ANCHOR INSTALLATION ATTEMPT IS NOT GOOD ANCHORING SOIL.

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| DATE 5–12–78<br>APPD PJA / RDJ | INSTALLATION INSTRUCTIONS FOR POWER INSTALLED SCREW ANCHORS | 968.2 |

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**SCOPE:** THIS STANDARD PROVIDES A LIST OF TYPES AND SIZES OF GUY CROSSPLATE ANCHORS & RODS.

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| TYPE OF ANCHOR | NOMINAL SQUARE INCHES | ROD SIZE | HOLDING POWER (LB) (IV)(VII) | | | STOCK NUMBER |
|---|---|---|---|---|---|---|
| | | | HARD GROUND (I) | MEDIUM GROUND (I) | SOFT GROUND (I) | |
| 16" CROSS PLATE GALV | 150 | 3/4" X 8' | 12,500 | 10,000 | 5,000 | S108128 |

| ANCHOR RODS | |
|---|---|
| DESCRIPTION | STOCK NUMBER |
| 3/4" X 8' GALV WITH DOUBLE EYE | S601920 |

| O.H. MACRO UNITS ANCHOR ROD, PLATE & GUY ASSEMBLIES | | | | |
|---|---|---|---|---|
| GUY WIRE SIZE (IN) | PLATE SIZE | ROD SIZE | MU ID | |
| | | | STD | WRAPPED |
| 5/16 | 16" | 3/4" | 5/16SA | - |
| 5/16 | 20" | 1" | 5/16LA | - |
| 5/16 | 20" | 1" | - | 5/16LW |

**NOTES:**

(I) SOIL CLASSIFICATION DEFINITIONS:
HARD GROUND: ROCK, HARDPAN, SHALE OR SANDSTONE.
MEDIUM GROUND: CLAY OR MOIST GROUND WHICH CAN BE FIRMLY TAMPED.
SOFT GROUND: LOOSE SAND OR LOAM WITH LITTLE BOND.

(II) ROD STRENGTH AT SAFETY FACTOR OF 2 LIMITS THIS VALUE.

III. FOR JOINT USE ANCHORAGE ISSUES, FOLLOW THE DIRECTION OF COMPLIANCE MANAGEMENT AND JOINT FACILITIES.

(IV) A FACTOR OF SAFETY OF TWO WAS APPLIED TO THESE HOLDING POWER VALUES.

VI. IF MORE THAN 18,000 LBS. HOLDING POWER IS NECESSARY AND SOIL IS NON-CORROSIVE. INSTALL TWO ANCHORS. CONCRETE USED AS A BACKFILL IN SOFT UNSTABLE SOIL SUPPLIES 1900 LBS PER CUBIC FOOT.

(VII) IN CORROSIVE AREAS, PROTECTED ANCHORS, PAGE 929.1, SHALL BE INSTALLED.

**REFERENCE:** NONE

FIELD MAINTENANCE ONLY

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| C | ITEMS MOVED TO FMO | EDM | JAC | MRF | FRC | 07/07/2023 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 02/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | MF | 01/10/2008 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSPLATE ANCHORS AND RODS



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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 1 OF 1

SIDEWALK ANCHOR POLE CLASS SELECTION

FMO OH972

SCOPE: THIS STANDARD DESCRIBES POLE CLASS SELECTION FOR SIDEWALK ANCHORS.

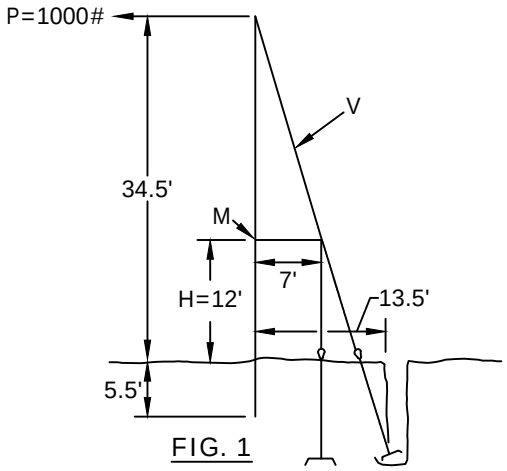


FIG. 1

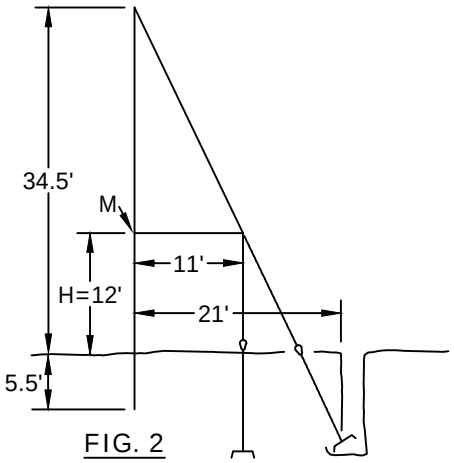


FIG. 2

EXAMPLE:

PROBLEM: DETERMINE THE CLASS OF POLE TO BE SET FOR A GIVEN HORIZONTAL PULL ON A SIDEWALK ANCHOR.

ASSUME: HORIZONTAL PULL (P) = 1,000 LBS
LENGTH OF POLE = 40 FEET
NO EQUIPMENT ON POLE
7 FT STRUT, 12 FT ABOVE GROUND LEVEL (H)

SOLUTION: FIND BENDING MOMENT (M), AND VERTICAL LOADING (V)

BENDING MOMENT
M = P X H = 1,000 LBS X 12 FT = 12,000 FT-LB

VERTICAL LOADING
USING GUY COMPUTER, FIND THE GUY TENSION OF 1,000 LBS HORIZONTAL PULL ON 40 FT POLE AND 13.5 FT ANCHOR (SEE FIG.1)
VERTICAL LOADING V = 3400 LBS

TRY A 40 FT CLASS 3 POLE WITH SF=4 (SEE STD. 354) FOR WIND LOADING AND VERTICAL LOADING USABLE STRENGTH

INTERACTION EQUATION: $\frac{M}{\text{WIND LOADING USEABLE STRENGTH}} + \frac{V}{\text{VERTICAL LOADING USEABLE STRENGTH}} \leq 1.0$

$$\frac{12{,}000 \text{ FT-LB}}{21{,}827 \text{ FT-LB}} + \frac{3{,}400 \text{ LB}}{7{,}768 \text{ LB}} = .549 + .437 = .986 \leq 1.0$$

CONCLUSION: A 40 FT CLASS 3 POLE IS ADEQUATE FOR THE HORIZONTAL PULL OF 1,000 LBS.

INSTALLATION: NONE

BILL OF MATERIALS: NONE

FIELD MAINTENANCE ONLY

NOTES:
1. USE THE DIMENSIONS SHOWN IN FIG. 2 WHEN CONSTRUCTING SIDEWALK ANCHOR USING 11 FT. STRUT.

REFERENCE: NONE

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 1 OF 1

SIDEWALK ANCHOR POLE CLASS SELECTION

FMO OH972.1

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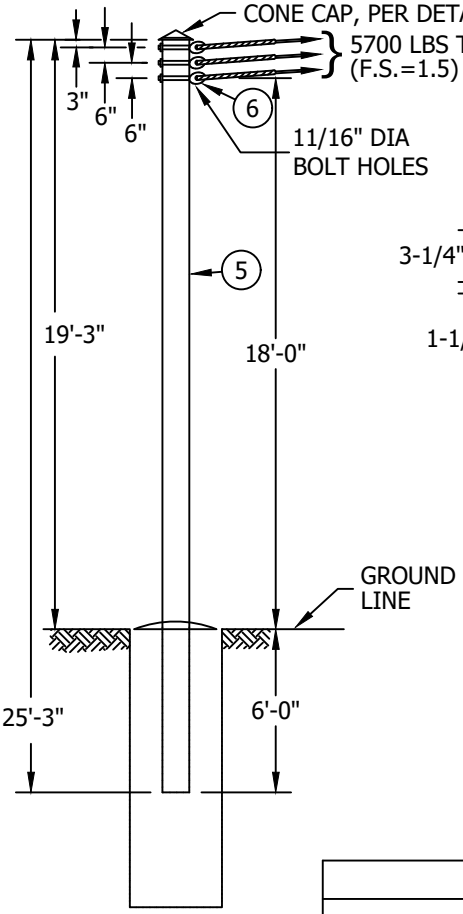
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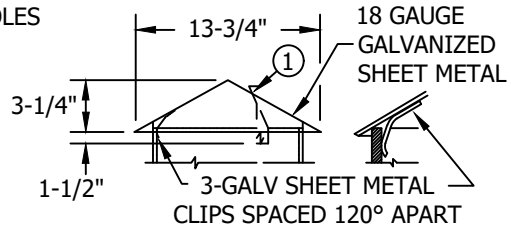
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**SCOPE:** THIS STANDARD SHOWS A STEEL GUY POLE, DESIGNED FOR A MAXIMUM GUYING TENSION OF 5700 POUNDS, TO BE USED WHEN GUYING HEAVY LOADS. BY DEVIATION ONLY, CONTACT EDE.



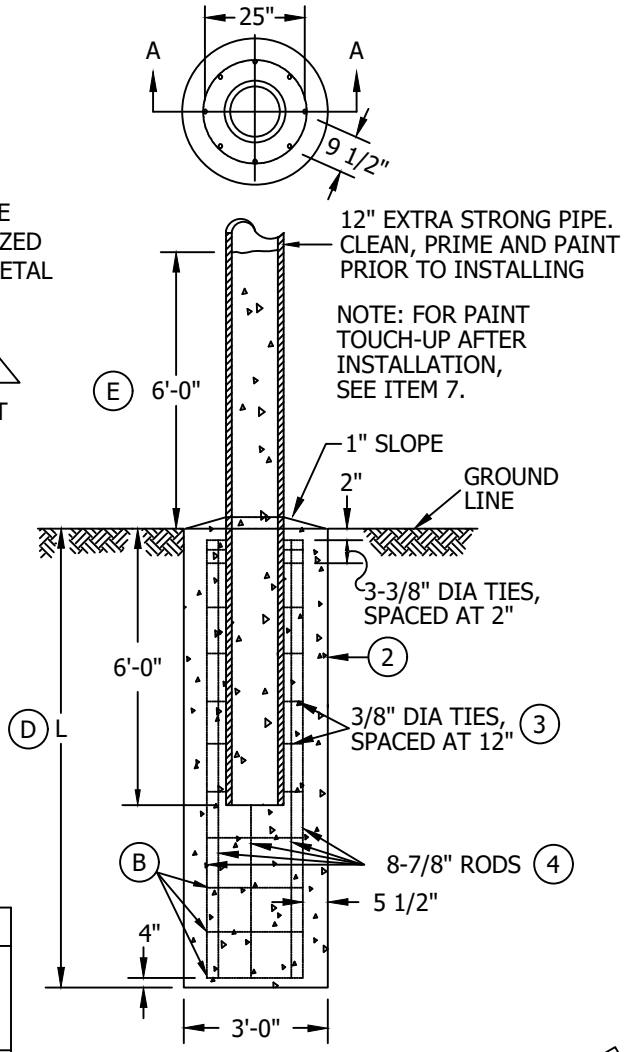

**STEEL GUY POLE**




**CONE CAP FOR GUY POLE**

| TABLE 1 | |
|---|---|
| **SOIL TYPE** | **ASSEMBLY UNITS** |
| HARD | SS-HRD |
| MEDIUM | SS-MED |
| SOFT | SS-SFT |

| TABLE 2 | | |
|---|---|---|
| **SOIL TYPE** (a) | **L (IN FEET)** | **CONCRETE ITEM 2 (CU YDS)** |
| HARD | 8 | 2.3 |
| MEDIUM | 11 | 3.1 |
| SOFT | 16 | 4.4 |




**SECTION A-A**
**CONCRETE DETAIL**

FIELD MAINTENANCE ONLY

## INSTALLATION:

(A) CONCRETE IS TO HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 PSI.

(B) REINFORCING RODS ARE TO BE TIED, NOT WELDED.

(C) TIME REQUIRED BEFORE POLE IS SELF SUPPORTING MAY BE CUT IN HALF BY USING HIGH EARLY STRENGTH CONCRETE WITH CHLORIDE-FREE ACCELERATING ADMIXTURE.

(D) REBAR CAGE DIAMETER IS 25" AND LENGTH IS 'L' LESS 6"

(E) AFTER POLE HOLE IS FILLED WITH CONCRETE TO GROUNDLINE, BACKFILL STEEL STUB TO A LEVEL 6'-0" ABOVE GROUNDLINE FROM TOP OF PIPE.

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| C | MOVED TO FMO | GLC | RSL | JAS | KRG | 04/06/2023 | F | | | | | | |
| B | DRAWING UPDATE | PEI | PEI | - | - | 02/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | MC | 06/18/2007 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STEEL GUY POLE



FMO OH974.1

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## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNIT |
|---|---|---|---|---|---|
| 1 | CONE CAP, PER DETAIL | 1 | - | S552416 | SEE TABLE 1 |
| 2 | CONCRETE (3000 LBS) (A)(C) | SEE TABLE 2 | - | - | |
| 3 | RODS, REINFORCED, 3/8" DIAMETER X 7' - 6" (c) | VARIES | - | S552416 | |
| 4 | RODS, REINFORCED, 7/8" DIAMETER X (L MINUS 6") (c) | 8 | - | S552416 | |
| 5 | PIPE, EXTRA STRONG, 12" DIAMETER (b) | 25'-3" | - | S552416 | |
| 6 | GUY EYELET, 5/8" | 3 | 962 | S338176 | DELINK |
| 7 | PAINT, GRAY, SPRAY, FOR TOUCH UP | AS REQ'D | - | S514150 | FG78 |

**NOTES:** NONE

## REFERENCE:

(a) IF SOIL TYPE IS IN QUESTION, CONTACT CIVIL/STRUCTURAL ENGINEERING.

(b) SEE ASTM A53 GRADE B, TYPE E OR S FOR 12" DIAMETER PIPE SPECIFICATIONS.

(c) SEE ASTM A615 FOR GRADE 60 REBAR SPECIFICATIONS.

d. STEEL GUY POLES OF THIS TYPE INSTALLED PRIOR TO 1975 WERE DESIGNED FOR 5000 LBS MAXIMUM GUYING TENSION.

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| B | DRAWING UPDATE | PEI | PEI | - | - | 02/18/2019 | E | | | | | | |
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| PAGE | SUBJECT |
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| 1002 | GROUNDING GENERAL INFORMATION |


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GROUNDING & BONDING
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# OH1002 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | EDM | MRF | GLW | FRC | 03/01/2022 | D | | | | | | |

**NOTES (CONT'D):**

V. WHAT SHOULD BE GROUNDED:
WHERE POLE GROUNDS OR GROUNDED CONDUCTORS ARE AVAILABLE, CONNECTIONS SHALL BE MADE TO THE FOLLOWING CONDUCTORS, APPARATUS OR COMPONENT PARTS OF THE OVERHEAD DISTRIBUTION SYSTEM.

c. **SWITCHES:**
BASES OF GANG-OPERATED SWITCHES SHALL BE GROUNDED, WITH THE EXCEPTION OF SWITCHES MOUNTED ON A FIBERGLASS CROSSARM.

e. **TRIPLE TERMINATOR BRACKET:**
INTERCONNECT TRIPLE TERMINATOR BRACKET, SURGE ARRESTOR GROUND, UNDERGROUND CABLE CONCENTRIC NEUTRAL, AND OVERHEAD NEUTRAL AS SHOWN IN OVERHEAD CONSTRUCTION STANDARDS SECTION 1400.

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| C | EDITORIAL CHANGES | - | GW | JS | MDJ | 04/01/2018 | F | MOVED TO FMO | EDM | MRF | GLW | FRC | 03/01/2022 |
| B | UPDATE DRAWING & NOTES | - | GW | GW | MDJ | 06/16/2016 | E | EDITORIAL CHANGES | EDM | JAC | JES | CZH | 03/09/2020 |
| A | EDITORIAL CHANGES | - | JC | IL | JS | 02/19/2015 | D | EDITORIAL CHANGES | - | GW | JS | CZH | 09/01/2018 |

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| 1129 | 2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION 100KVA MAXIMUM, ARMLESS DEAD END CONST |
| 1131 | 2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER INSTALLATION, 25KVA MAX., SECONDARY RACK CONSTRUCTION |
| 1132 | 2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER INSTALLATION, 25KVA MAX., SECONDARY LINE ARM CONSTRUCTION |
| 1133 | 2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION 100KVA MAXIMUM, C.O. ARM, SECONDARY RACK CONSTRUCTION |
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| 1138 | 2.4KV OR 4KV, SINGLE PHASE PARALLELED TRANSFORMER INSTALLATION |
| 1141 | 7.2 OR 12KV SINGLE PHASE YE, YJ, HE, OR HJ TRANSFORMER INSTALLATION 100KVA MAXIMUM ARMLESS TANGENT CONSTRUCTION |
| 1142 | 7.2 OR 12KV SINGLE PHASE YE, YJ, HE, OR HJ TRANSFORMER INSTALLATION 100KVA MAXIMUM ARMLESS DEAD END CONSTRUCTION |
| 1145 | 7.2 OR 12KV SINGLE PHASE YE, YJ, HE OR HJ TRANSFORMER INSTALLATION, SECONDARY RACK CONSTRUCTION |
| 1147 | 12KV, SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION, C.O. ARM, SECONDARY RACK CONSTRUCTION |
| 1149 | 12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION 100KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY RACK CONSTRUCTION |
| 1150 | 12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION, 100KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY LINE ARM CONSTRUCTION |
| 1154 | 4KV OPEN WYE OR 2.4KV OPEN DELTA TYPE "W" TRANSFORMER INSTALLATION 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION |
| 1156 | 4KV OPEN WYE TYPE "W" TRANSFORMER INSTALLATION, SECONDARY LINE ARM CONSTRUCTION |


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| E | OH1190 MOVED TO FMO | EDM | MRF | GLW | KRG | 10/21/2022 | H | OH1174 MOVED TO FMO | ARC | MRF | GLW | FRC | 06/23/2023 |
| D | OH1192 MOVED TO FMO | EDM | MRF | GLW | CZH | 07/27/2021 | G | OH1188 MOVED TO FMO | EDM | MRF | MRF | KRG | 05/09/2023 |

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| 1172 | 4KV, THREE PHASE, TYPE "WE" OR "WJ" TRANSFORMER INSTALLATION, 3-25KVA MAX., SECONDARY LINE ARM CONSTRUCTION |
| 1174 | 7.2 AND 12KV THREE-PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION<br>12KV THREE-PHASE, TYPE "H" OR "HF" TRANSFORMER INSTALLATION 500 KVA MAXIMUM, TWO POLE, 7 FT SPACING |
| 1181 | 12KV, THREE PHASE, TYPE "H" OR "HF" TRANSFORMER INSTALLATION, THREE 75KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION |
| 1184 | 12KV, THREE PHASE, TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, THREE 75KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION |
| 1188 | SINGLE-PHASE VOLTAGE BOOSTING INSTALLATION |
| 1190 | VOLTAGE BOOSTING TRANSFORMER STATION, 12-12.47KV, THREE-PHASE INSTALLATION |
| 1192 | VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE USING NON-PORCELAIN TERMINALS, 12-12.47KV THREE-PHASE INSTALLATION |
| 1194 | 12KV GROUNDING BANK INSTALLATION |


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| F | OH1170 MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | I | OH1168 MOVED TO FMO | ARC | PAS | RSL | KRG | 05/10/2023 |
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**REVISION HISTORY:**

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARD

TRANSFORMER PREFIXES, POLE-MOUNTED
SINGLE PHASE



FMO
OH 1121

**NOTES:**

TRANSFORMERS LISTED IN THIS STANDARD ARE FOR EITHER NEW INSTALLATIONS OR FIELD REPLACEMENTS FOR EXISTING UNITS. TRANSFORMERS LISTED IN STANDARDS BEGINNING WITH 1199.201 ARE CLASSIFIED INTO TWO CATEGORIES:

1) THOSE THAT ARE FIELD REPLACEMENT FOR EXISTING UNITS (NOT TO BE USED FOR NEW INSTALLATIONS) AND,

2) THOSE THAT ARE NO LONGER PURCHASED (INDICATED BY A FOOTNOTE).

**TRANSFORMER PREFIXES, POLEMOUNTED, SINGLE PHASE:**

| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION | KVA | (D)(F) TAPS | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | | | | | |
| X | 480 | 120/240 | 1Ø SECONDARY | 1.5 | – | S757712 (G) | X1.5 |
| W | 2400/4160Y | 120/240 | 1Ø SECONDARY (K)<br>3Ø SECONDARY | 10 | – | S754880 | W10 |
| | | | | 15 | – | S755008 | W15 |
| | | | | 50 | – | S755472 | W50 |
| | | | | 75 | – | S755584 | W75 |
| WJ | 2400/4160Y | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER, & LIGHTNING ARRESTERS 1Ø SECONDARY | 10 | – | S756832 | WJ10 |
| | | | | 15 | – | S756864 | WJ15 |
| WF | 2400/4160Y | 240/480 | 1Ø SECONDARY (K)<br>3Ø SECONDARY | 10 | (B) | S755872 | WF10T |
| | | | | 15 | (B) | S756000 | WF15T |
| | | | | 75 | (B) | S756352 | WF75T |
| Y | 7200/12470Y | 120/240 | 1Ø SECONDARY (K)<br>3Ø SECONDARY | 10 | – | S757946 | Y10 |
| | | | | 15 | – | S757952 | Y15 |
| | | | | 75 | – | S757970 | Y75 |

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**TRANSFORMER PREFIXES, POLEMOUNTED, SINGLE-PHASE:** (CONT'D)

| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION | KVA | (D)(F) TAPS | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | | | | | |
| YJ | 7200/12470Y | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER & LIGHTNING ARRESTERS 1Ø SECONDARY | 10 | – | 757994 | YJ10 |
| | | | | 15 | – | 757998 | YJ15 |
| | | | | 75 | – | 758010 | YJ75 |
| YF | 7200/12470Y | 240/480 | 1Ø SECONDARY 3Ø SECONDARY (K) | 10 | – | 757929 (G) | YF10 |
| | | | | 15 | – | 757927 (G) | YF15 |
| | | | | 25 | – | 757930 | YF25 |
| | | | | 50 | – | 757928 | YF50 |
| H | 12000 | 120/240 | 1Ø SECONDARY 3Ø SECONDARY (K) | 10 | – | 750464 | H10 |
| | | | | 15 | – | 750624 | H15 |
| | | | | 25 | – | 750816 | H25 |
| | | | | 50 | – | 751104 | H50 |
| | | | | 75 | – | 751232 | H75 |
| | | | | 100 | – | 750528 | H100 |
| | | | | 167 | – | 750688 | H167 |
| HE | 12000 | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER 1Ø SECONDARY | 10 | – | 751904 | HE10 |
| | | | | 10 | (B) | 751920 (G) | HE10T |
| | | | | 15 | – | 752032 | HE15 |
| | | | | 25 | – | 752096 | HE25 |
| | | | | 50 | – | 752352 | HE50 |
| | | | | 75 | – | 752416 | HE75 |
| HJ | 12000 | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER & LIGHTNING ARRESTERS 1Ø SECONDARY | 10 | – | 753280 | HJ10 |
| | | | | 10 | (B) | 753296 (G) | HJ10T |
| | | | | 15 | – | 753344 | HJ15 |
| | | | | 25 | – | 753440 | HJ25 |
| | | | | 100 | | 753320 | HJ100 |
| HF | 12000 | 240/480 | SINGLE PHASE TRANSFORMER 1Ø SECONDARY 3Ø SECONDARY (K) | 15 | – | 752688 | HF15T |
| | | | | 15 | | 752704 | HF15 |
| | | | | 25 | – | 752752 | HF25 |
| | | | | 50 | – | 752896 | HF50 |
| | | | | 100 | – | 752656 | HF100 |
| | | | | 167 | – | 752720 | HF167 |

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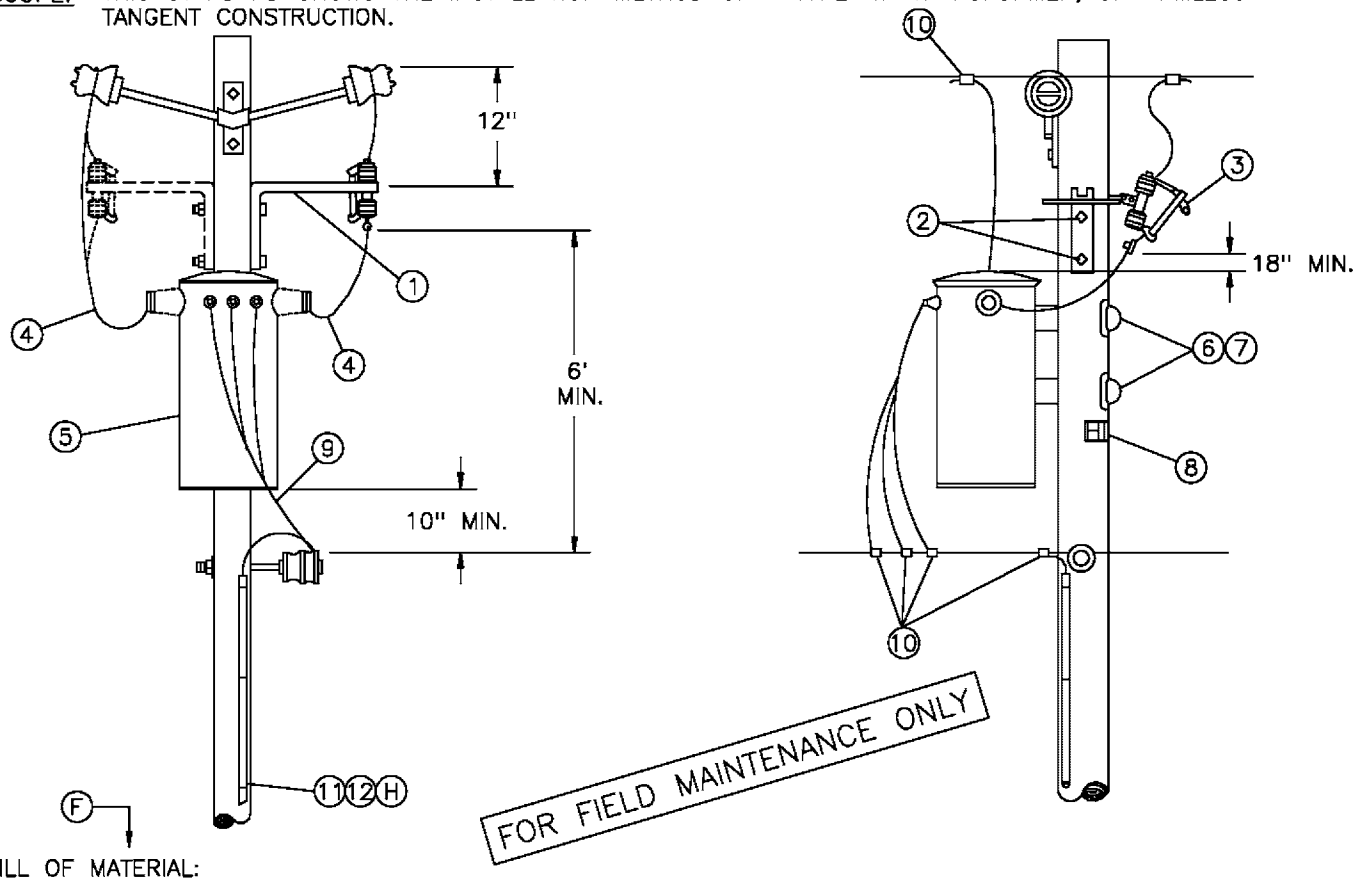
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

2.4 OR 4KV SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION
100 KVA MAXIMUM, ARMLESS TANGENT CONST

FMO OH 1128

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON ARMLESS TANGENT CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| | | 2.4KV | 4KV | |
| 1 | BRACKET, CUTOUT MOUNTING | 2 | 1 | 166448 |
| 2 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 SQ CURVED WASHER | 2 | 2 | STD 392 |
| 3 | CUTOUT, 12KV | 2 | 1 | STD 1212 |
| 4 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 8' | 10' | 194304 |
| 5 | TRANSFORMER, SINGLE PHASE, TYPE W | 1 | 1 | STD 1121 |
| 6 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURV & 1 DBL COIL SPRING WASHER | 2 | 2 | STD 392 |
| 7 | COVER, BOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 2<br>– | 285696<br>491392 |
| 8 | SIGN, HIGH VOLTAGE &<br>9 ROOFING NAILS, GALV | 1<br>– | 1<br>– | 647648<br>492224 |
| 9 | WIRE, W.P. (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 10 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | | 783–787 |
| 11 | WIRE, BARE STRANDED, COPPER, #6 | 42' | 42' | 813536 |
| 12 | UNIT GROUND, COMPLETE | 1 | 1 | 603136 |

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

(H) GROUNDING METHODS – SEE STANDARD 1002.

I. FOR POLE TOP MATERIAL – SEE DISTRIBUTION POLE TOPS (SECTION 400).

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1–1–86<br>APPD / | 2.4 OR 4KV SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION<br>100 KVA MAXIMUM, ARMLESS TANGENT CONST | 1199.208<br>SUPERSEDES<br>1128 (1–1–93) |

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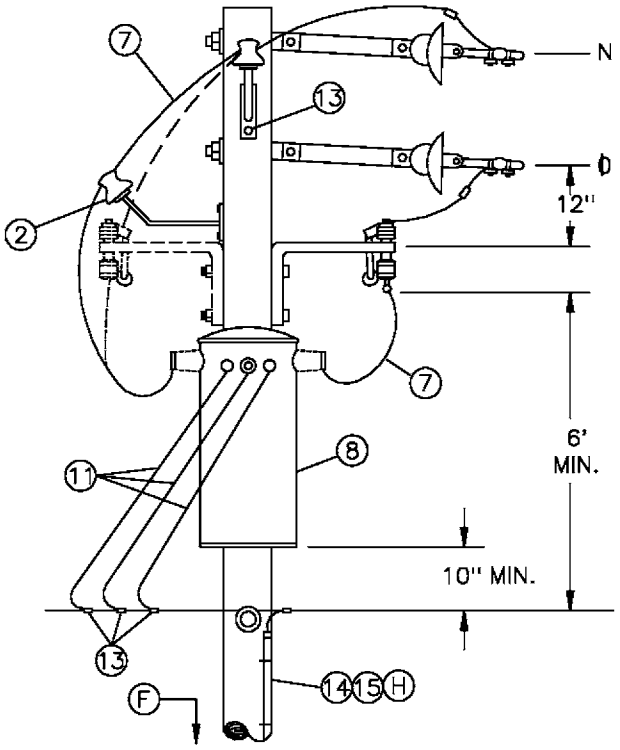
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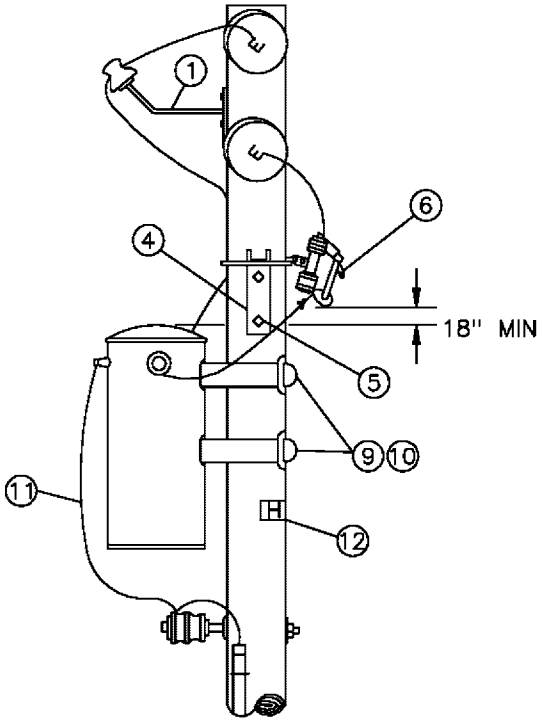
SDG&E ELECTRIC OVERHEAD STANDARD

2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION
100KVA MAXIMUM, ARMLESS DEAD END CONST

FMO
OH 1129

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON ARMLESS DEADEND CONSTRUCTION.




| ITEM | DESCRIPTION | QUANTITY | | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| | | 2.4KV | 4KV | |
| 1 | BRACKET, INSULATOR, 1" LEAD THREAD | 2 | 2 | 166134 |
| 2 | INSULATOR, CLASS AS REQUIRED | 1 | 2 | STD 750 |
| 3 | SCREW, LAG, GALV. 1/2" X 4" | 2 | 2 | 621568 |
| 4 | BRACKET, CUTOUT MOUNTING | 2 | 1 | 166448 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 SQ CURVED WASHER | 2 | 2 | STD 392 |
| 6 | CUTOUT, 12KV | 2 | 1 | STD 1212 |
| 7 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 10' | 12' | 194304 |
| 8 | TRANSFORMER, SINGLE PHASE, TYPE W | 1 | 1 | STD 1211 |
| 9 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | 2 | STD 392 |
| 10 | COVER, BOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 2<br>– | 285696<br>491392 |
| 11 | WIRE, W.P. (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 12 | SIGN, HIGH VOLTAGE &<br>9 ROOFING NAILS, GALV | 1<br>– | 1<br>– | 647648<br>492224 |
| 13 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | | 783–787 |
| 14 | WIRE, BARE STRANDED, COPPER, #6 | 42' | 42' | 813536 |
| 15 | UNIT GROUND, COMPLETE | 1 | 1 | 603136 |

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

(H) GROUNDING METHODS – SEE STANDARD 1002.

I. FOR POLE TOP MATERIAL – SEE DISTRIBUTION POLE TOPS (SECTION 400).

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1–1–86<br>APPD / | 2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION<br>100KVA MAXIMUM, ARMLESS DEAD END CONST | 1199.209<br>SUPERSEDES<br>1129 (1–1–93) |

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**REVISION HISTORY:**

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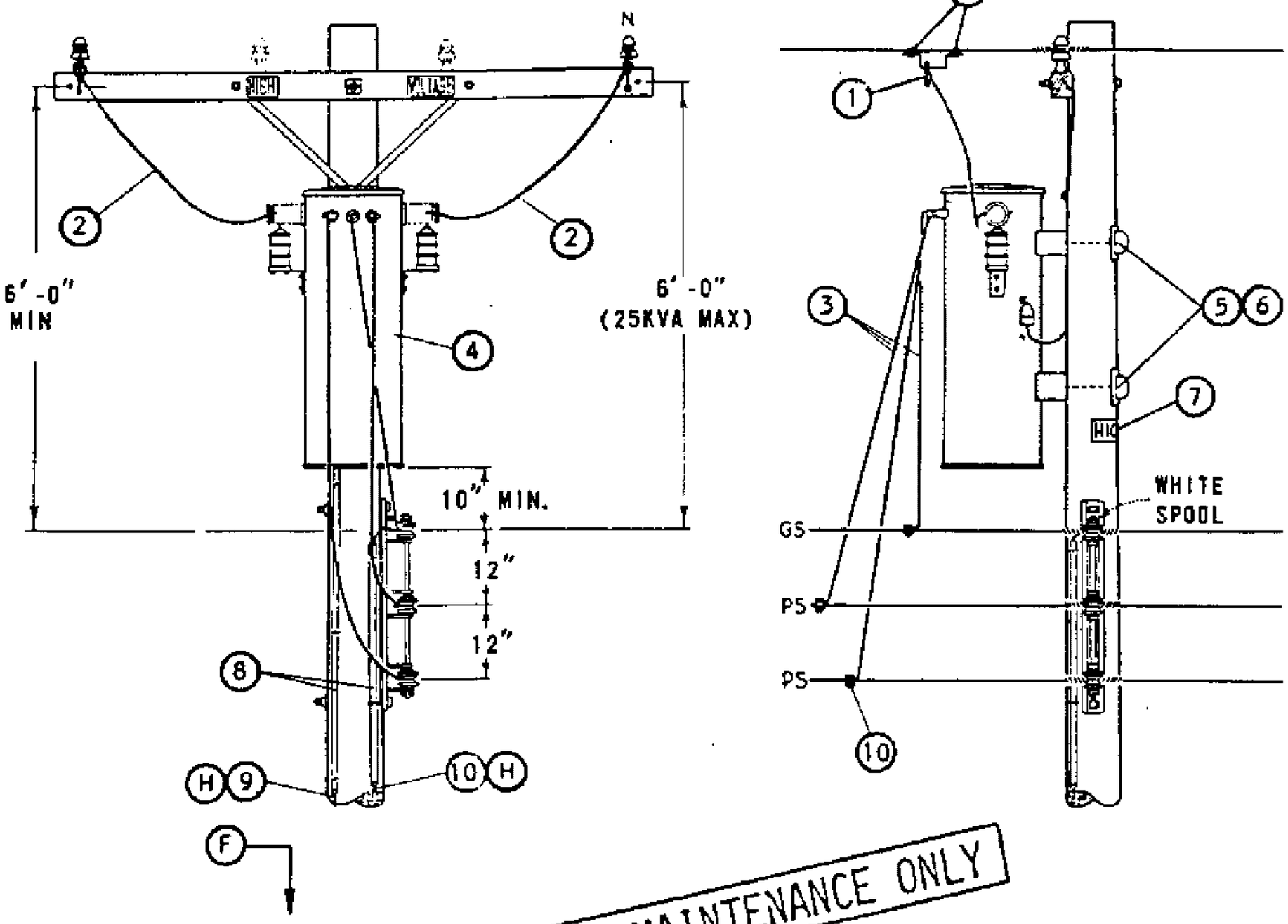
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SDG&E ELECTRIC OVERHEAD STANDARD

2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER
INSTALLATION, 25 KVA MAX, SECONDARY RACK CONSTRUCTION

FMO
OH 1131

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'WE' TRANSFORMER, ON SECONDARY RACK CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | STD 788 |
| 2 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 3 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 4 | TRANSFORMER, SINGLE PHASE (TYPE 'WE' OR 'WJ') | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 285696<br>491392 |
| 7 | SIGN, HIGH VOLTAGE & (E)<br>9 ROOFING NAILS, GALV (E) | 1<br>- | 647648<br>492224 |
| 8 | UNIT GROUND, COMPLETE (A) | 2 | 603136 |
| 9 | WIRE, #4 BARE STRANDED COPPER (A) | 42' | 813760 |
| 10 | WIRE, #6 BARE STRANDED COPPER | 42' | 813536 |
| 11 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | 783-787 |

**INSTALLATION:**

(A) OMIT LIGHTNING ARRESTER GROUND ON TYPE 'WE' TRANSFORMER INSTALLATION.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

G. WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE TYPE 'WJ' TRANSFORMER.

(H) GROUNDING METHODS - SEE STANDARD 1002.

DATE 1-1-86
APPD AK/RAS

SDG&E ELECTRIC STANDARDS

2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER INSTALLATION, 25 KVA MAX, SECONDARY RACK CONSTRUCTION

1199.302
SUPERSEDES
1131 (1-1-93)

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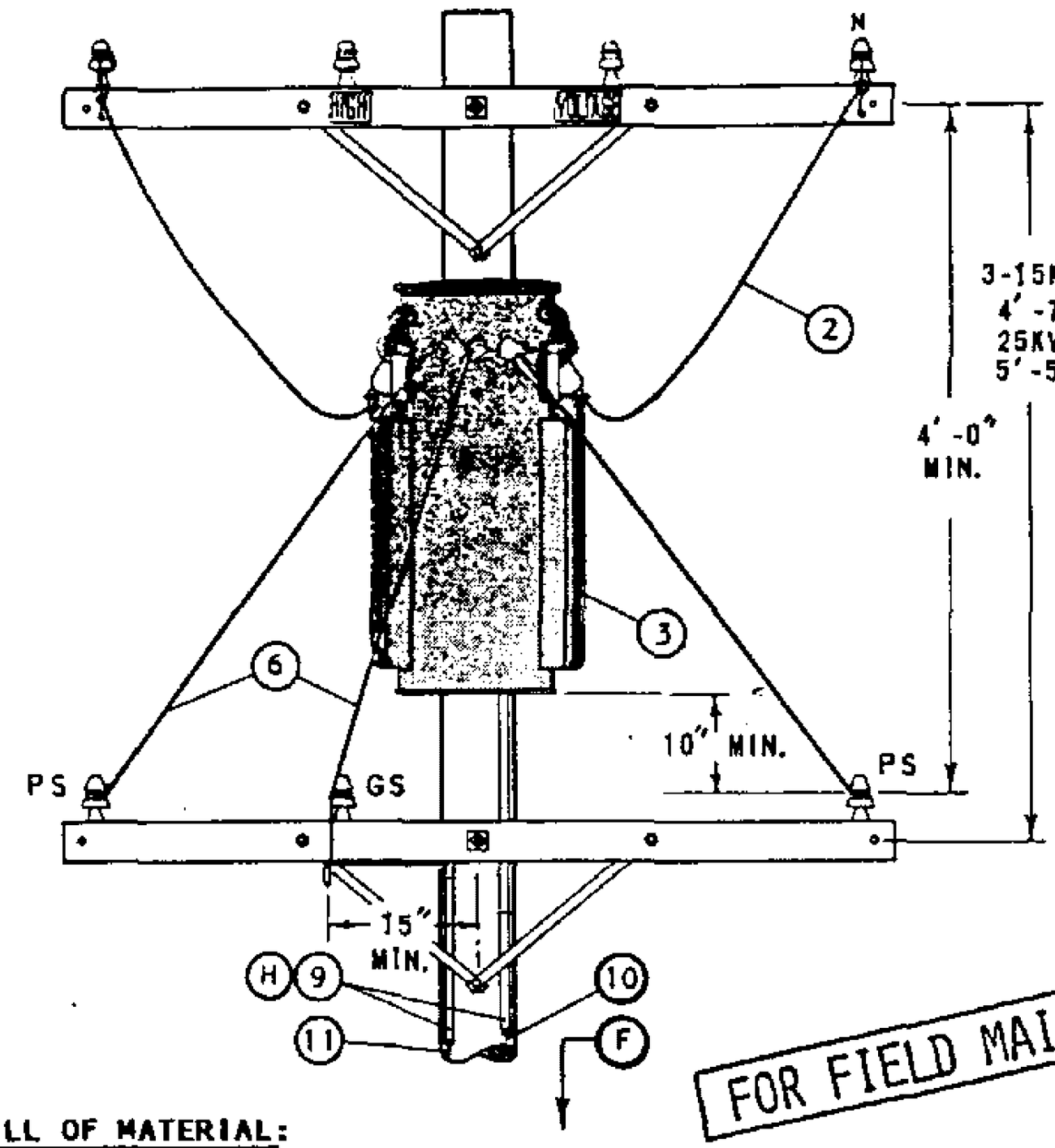
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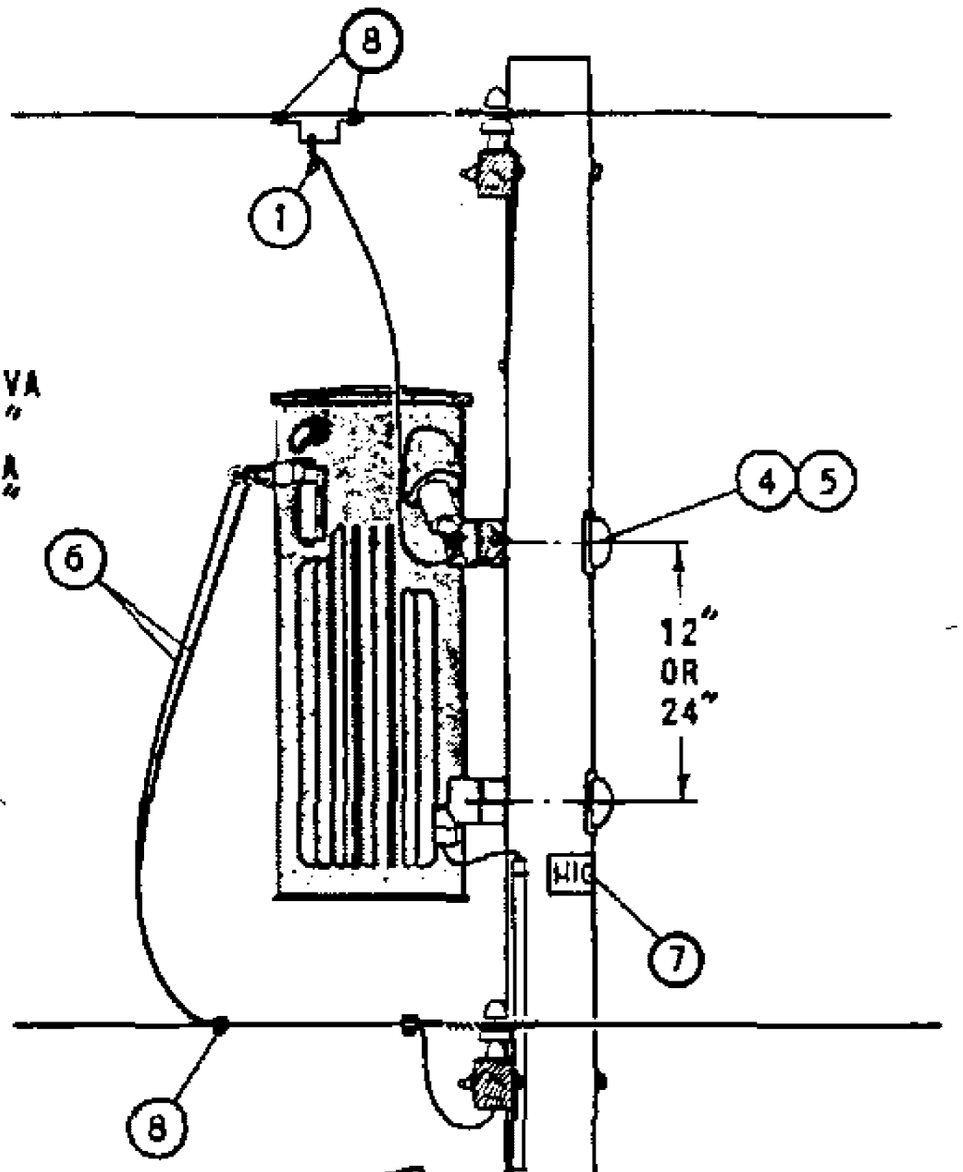
SDG&E ELECTRIC OVERHEAD STANDARD

2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER
INSTALLATION, 25 KVA MAX, SECONDARY LINE ARM CONSTRUCTION

FMO
OH 1132

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'WE' TRANSFORMER, ON SECONDARY LINE ARM CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | STD 788 |
| 2 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 3 | TRANSFORMER, SINGLE PHASE (TYPE 'WE' OR 'WJ') | 1 | STD 1121 |
| 4 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | STD 392 |
| 5 | COVER, BOLT, PLASTIC & (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 285696<br>491392 |
| 6 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 7 | SIGN, HIGH VOLTAGE & (E)<br>9 ROOFING NAILS, GALV (E) | 1<br>- | 647648<br>492224 |
| 8 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | 783-787 |
| 9 | UNIT GROUND, COMPLETE (A) | 2 | 603136 |
| 10 | WIRE, #4 BARE STRANDED COPPER (A) | 41' | 813760 |
| 11 | WIRE, #6 BARE STRANDED COPPER | 42' | 813536 |

**INSTALLATION:**

(A) OMIT LIGHTNING ARRESTER GROUND ON TYPE 'WE' TRANSFORMER INSTALLATION.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

G. WHEN LIGHTNING ARRESTERS ARE REQUIRED, PER STANDARD 1247, USE TYPE 'WJ' TRANSFORMER.

(H) GROUNDING METHODS - SEE STANDARD 1002.

| | | |
|---|---|---|
| 1199.303<br>SUPERSEDES<br>1132 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER INSTALLATION, 25 KVA MAX, SECONDARY LINE ARM CONSTRUCTION | DATE 1-1-86<br>APPD AK/RSB |

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**REVISION HISTORY:**

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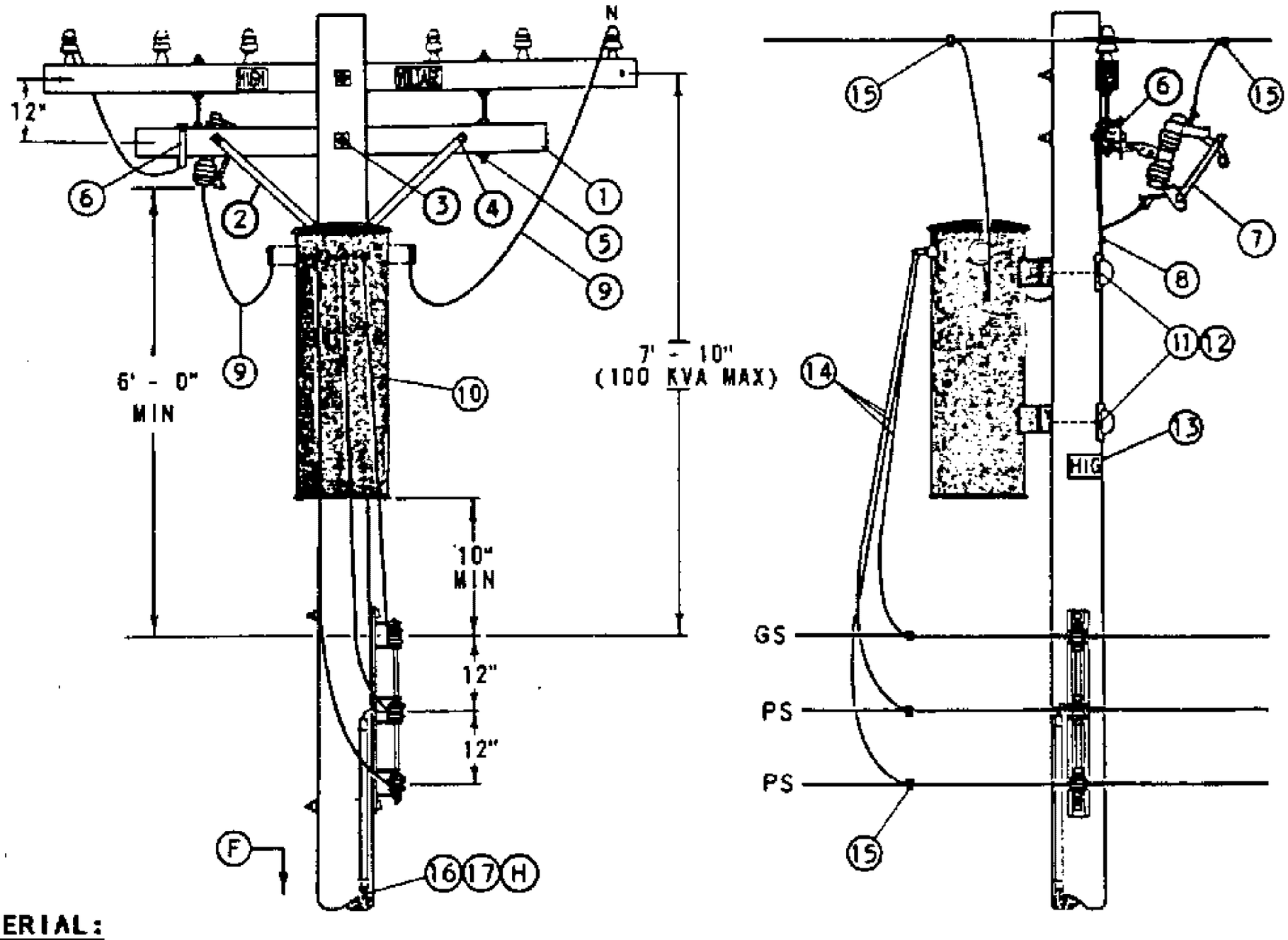
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SDG&E ELECTRIC OVERHEAD STANDARD

2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER
INSTALLATION, 25 KVA MAX, SECONDARY LINE ARM CONSTRUCTION

FMO
OH 1133

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON SECONDARY RACK CONSTRUCTION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 1/2" X 4 1/2" X 6' - 0" | | 1 | 294112 |
| 2 | BRACE, FLAT, CROSSARM, 28" | (E) | 1 | 164192 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 4 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 RD & 1 SPRING LOCK WASHER | (E) | 2 | STD 392 |
| 5 | BOLT, SPACE, GALV, 5/8" X 20", 4 SQ & 2 DBL COIL SPR WASHERS | (E) | 2 | STD 392 |
| 6 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | (E) | 1 | 166070 |
| 7 | CUTOUT, 12KV | (A) | 1 | STD 1212 |
| 8 | BOLT, MACH, GALV, 1/2" X (LENGTH AS REQ'D), 1 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 9 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | | 12' | 194304 |
| 10 | TRANSFORMER, SINGLE PHASE, TYPE 'W' | | 1 | STD 1121 |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | (E) | 2 | STD 392 |
| 12 | COVER, BOLT, PLASTIC & 6 - 10D NAILS, GALV | (E)<br>(E) | 2<br>- | 285696<br>491392 |
| 13 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | (E)<br>(E) | 1<br>- | 647648<br>492224 |
| 14 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | 21' | STD 1125 |
| 15 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | (E) | AS REQ'D | 783-787 |
| 16 | WIRE, BARE STRANDED COPPER, #6 | | 42' | 813536 |
| 17 | UNIT GROUND, COMPLETE | | 1 | 603136 |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(A) 2.4KV SINGLE PHASE INSTALLATIONS REQUIRE TWO CUTOUTS.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS - SEE STANDARD 1247.

(H) GROUNDING METHODS - SEE STANDARD 1002.

DATE 1-1-86
APPD AK/RDS

SDG&E ELECTRIC STANDARDS

2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM, C.O. ARM, SECONDARY RACK CONSTRUCTION

1199.304
SUPERSEDES
1133 (1-1-93)

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**REVISION HISTORY:**

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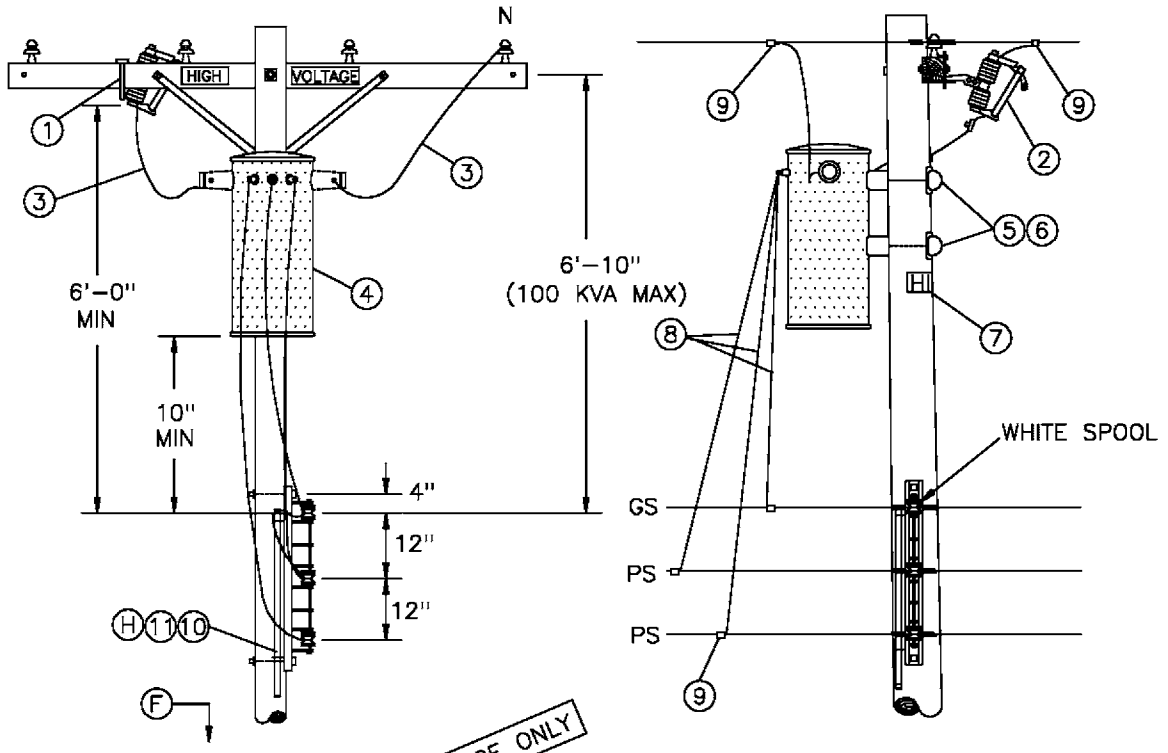
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SDG&E ELECTRIC OVERHEAD STANDARD

2.4 OR 4KV, SINGLE PHASE, TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM LINE ARM MOUNTED C.O., SECONDARY RACK CONSTRUCTION

FMO OH 1135

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON SECONDARY RACK CONSTRUCTION WITH CUTOUT ON LINE ARM.




BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 1 | 166070 |
| 2 | CUTOUT, 12KV (A) | 1 | STD 1212 |
| 3 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'W' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 285696<br>491392 |
| 7 | SIGN, HIGH VOLTAGE &<br>9 ROOFING NAILS, GALV | 1<br>– | 647648<br>492224 |
| 8 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR A, AS REQ'D | AS REQ'D | 783–787 |
| 10 | WIRE, BARE STRANDED COPPER, #6 | 42' | 813536 |
| 11 | UNIT GROUND, COMPLETE | 1 | 603136 |

INSTALLATION:

(A) 2.4KV SINGLE PHASE INSTALLATIONS REQUIRE TWO CUTOUTS.

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

(H) GROUNDING METHODS – SEE STANDARD 1002.

| | | |
|---|---|---|
| 1199.305<br>SUPERSEDES<br>1135 (1–1–93) | SDG&E ELECTRIC STANDARDS<br>2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM LINE ARM MOUNTED C.O., SECONDARY RACK CONSTRUCION | DATE 1–1–86<br>APPD / |

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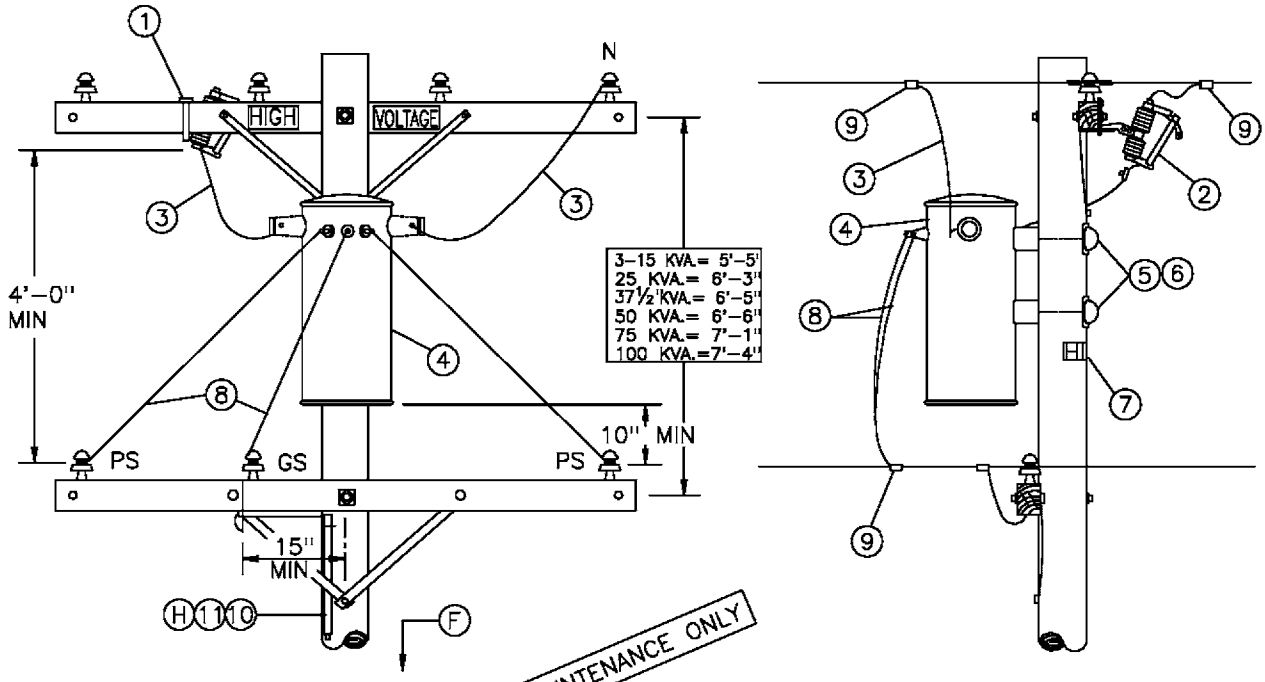
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SDG&E ELECTRIC OVERHEAD STANDARD

2.4 OR 4KV, SINGLE PHASE, TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM LINE ARM MOUNTED C.O., SECONDARY LINE ARM CONSTRUCTION

FMO OH 1136

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, WITH SECONDARY LINE ARM CONSTRUCTION AND CUTOUT MOUNTED ON LINE ARM.




BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 1 | 166070 |
| 2 | CUTOUT, 12KV (A) | 1 | STD 1212 |
| 3 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'W' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & 6 – 10D NAILS, GALV | 2 – | 285696 491392 |
| 7 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | 1 – | 647648 492224 |
| 8 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–787 |
| 10 | WIRE, BARE STRANDED COPPER, #6 | 42' | 813536 |
| 11 | UNIT GROUND, COMPLETE | 1 | 603136 |

INSTALLATION:

(A) 2.4KV SINGLE PHASE INSTALLATIONS REQUIRE TWO CUTOUTS.

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

(H) GROUNDING METHODS – SEE STANDARD 1002.

| | | |
|---|---|---|
| DATE 1–1–86<br>APPD / | SDG&E ELECTRIC STANDARDS<br>2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM<br>LINE ARM MOUNTED C.O., SECONDARY LINE ARM CONSTRUCTION | 1199.306<br>SUPERSEDES<br>1136 (1–1–93) |

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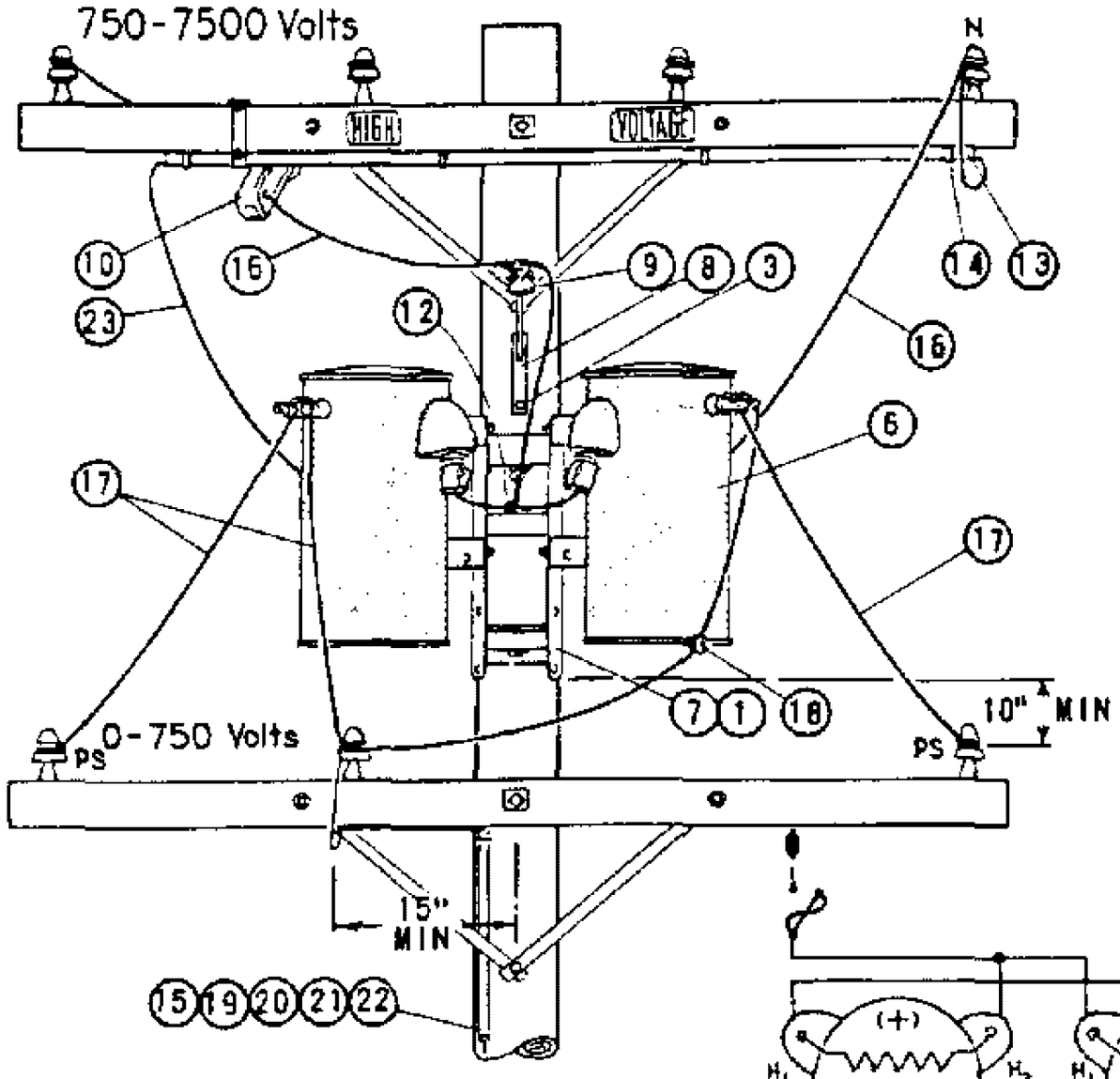
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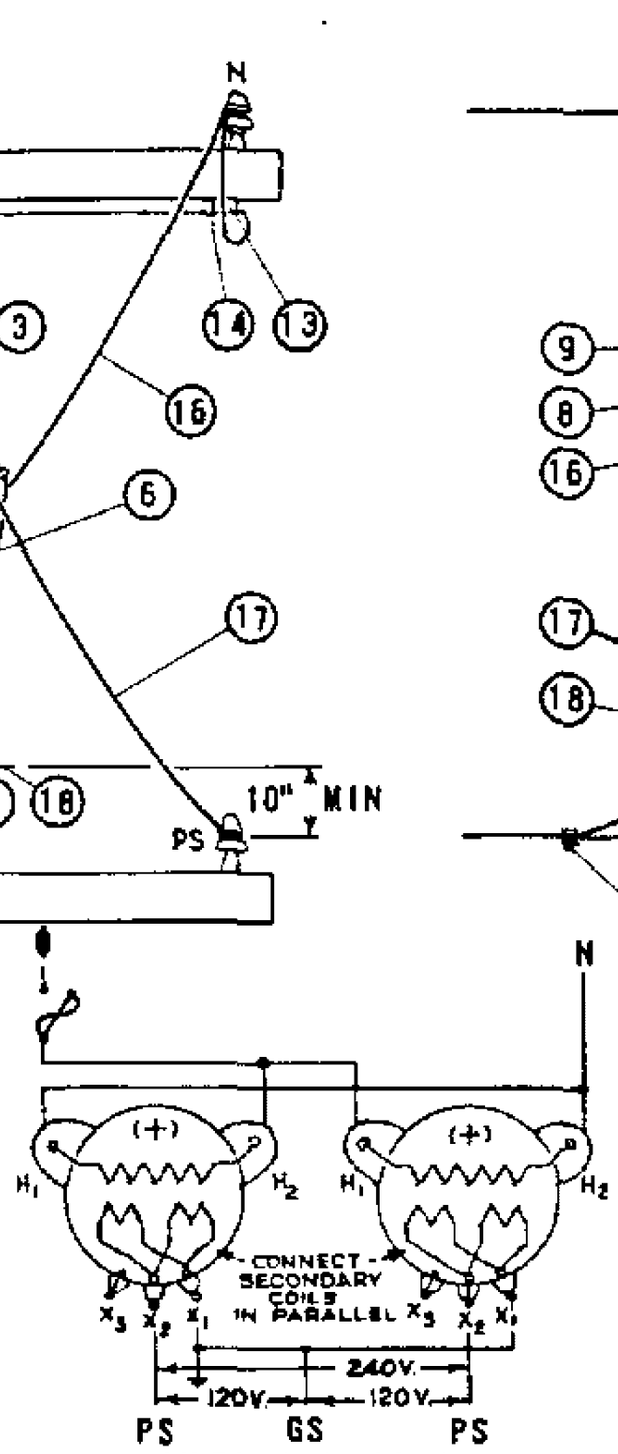
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SDG&E ELECTRIC OVERHEAD STANDARD

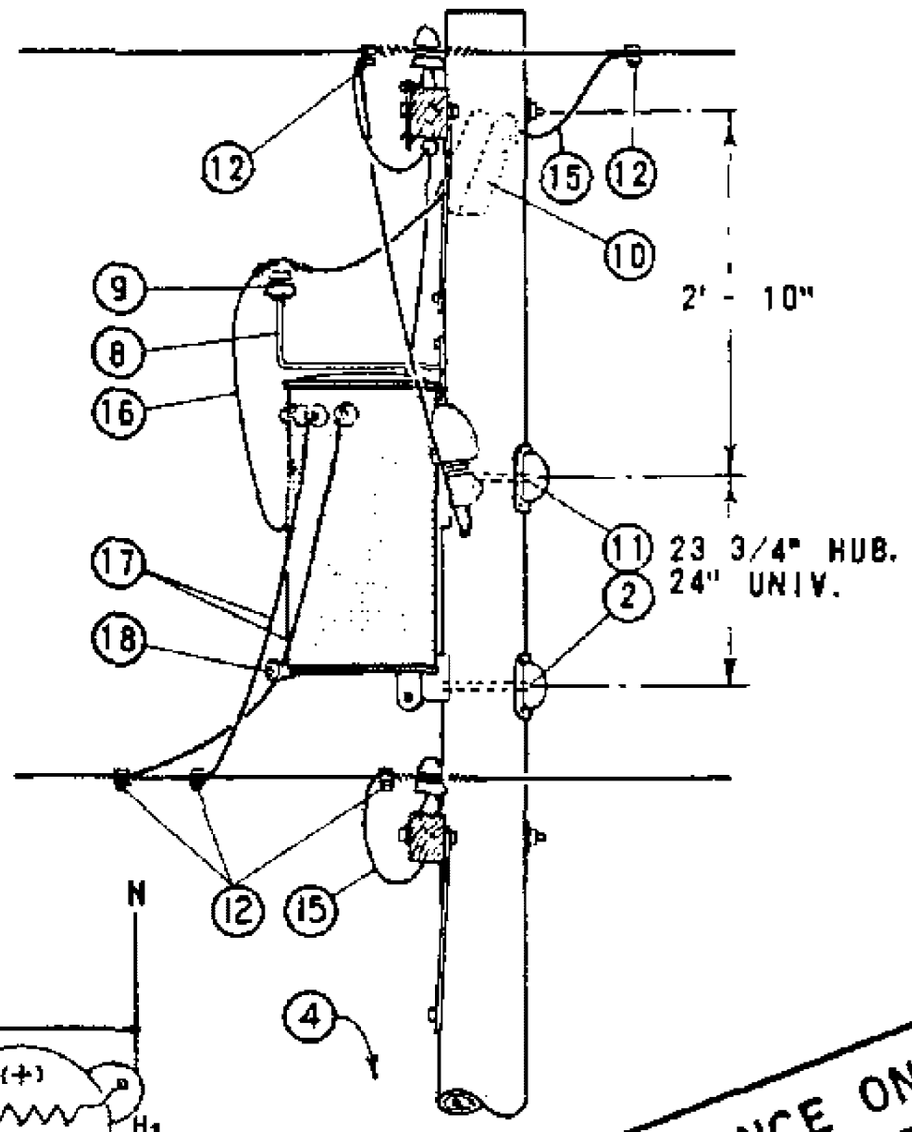
2.4 OR 4KV, SINGLE PHASE PARALLELED
TRANSFORMER INSTALLATION

FMO
OH 1138




WIRING DIAGRAM




FOR FIELD MAINTENANCE ONLY

NOTES:

(A) LIMITED TO TWO 15 KVA TRANSFORMERS.

(B) USE TWO GROUND RODS SPACED A MINIMUM OF 6 FEET APART FOR EACH GROUND UNIT.

(C) PHASE TO PHASE CONNECTIONS ON 2.4 KV DELTA AND 4 KV WYE SYSTEMS REQUIRE TWO CUTOUTS.

D. FUSE FOR COMBINED KVA OF PARALLELED TRANSFORMERS.

(E) EXEMPT MATERIALS.

(F) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| 1 | | BOLT, MACH GALV, 5/8" (E) OR 3/4" X 2", 2 WASH & 1 NUT. | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH GALV, 3/4" X 10", 1 SQ CURV WASH. & 1 NUT. | 2 | PGS 139, 140 |
| 3 | | SCREW, LAG GALV, 1/2" X 4" (E) | 2 | 621568 |
| 4 | | STEP, POLE (E) | 16 | 692992 |
| 5 | | | | |
| | 6 | TRANSFORMER, SINGLE PHASE TYPE W OR OY (A) | 2 | PGS 1121.01-1121.12 |
| | 7 | BRACKET, TRANSFORMER MTG | 1 | 402976 |
| | 8 | BRACKET, INSULATOR, 1" OR 1 3/8" THREAD, AS REQ'D | 1 | 166144 / 166176 |
| | 9 | INSULATOR, 12KV | 1 | 700 SECTION |
| | 10 | CUTOUT, 5KV (C) | 2 | PG 1211 |
| | 11 | COVER, THRU BOLT & 6-10D NAILS GALV | 2 | 285696, 491392 |
| | 12 | CONNECTOR, WIRE, AS REQ'D | 7 | PGS 783-787 |
| | 13 | CONDUIT, PLASTIC PVC, 3/4" SCHEDULE 40, TYPE II (E) | 5' | 251328 |
| | 14 | STRAP, PIPE 3/4" & 2-6D NAILS, GALV (E) | 3 | 697888, 491552 |
| | 15 | WIRE, BARE STRANDED COPPER, #6 | 48' | 813536 |
| | 16 | WIRE, #4 SOLID WP COPPER | 8' | 814112 |
| | 17 | WIRE, WP COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 24' | PG 1125 |
| | 18 | BRACKET, INSULATOR | 1 | 167520 |
| | 19 | ROD & CLAMP, GROUND (B) (F) | 2 | 603072, 230016 (E) |
| | 20 | MOULDING, HARDWOOD 1" (F) | 27' | 487200 |
| | 21 | STAPLES, MOULDING, GALV 3" X 1 1/16" X 1/4" (F) (E) | 18 | 678560 |
| | 22 | STAPLES, FENCE, GALV 1 1/4" (F) (E) | 16 | 678528 |
| | 23 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 16' | 194304 |

| | | |
|---|---|---|
| 1199.301<br>SUPERSEDES<br>1138 (1-1-86) | SDG&E ELECTRIC STANDARDS<br>2.4KV OR 4KV, SINGLE PHASE PARALLELED TRANSFORMER INSTALLATION | DATE 1-1-86<br>APPD AK |

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# OH1141 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**08/03/2023:** A NEWER VERSION MOVED TO FMO

**07/13/2016:** MOVED TO FMO

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| C | | | | | | | F | | | | | | |
| B | EDITORIAL CHANGES | ARC | MRF | GLW | KRG | 08/03/2023 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JS | IL | MDJ | 07/13/2016 | D | | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

7.2 OR 12KV
SINGLE-PHASE TRANSFORMER INSTALLATION

FMO
OH1141

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE-PHASE TYPE 'YE', 'YJ', 'HE', OR 'HJ' TRANSFORMER WITH SECONDARY CABLE CONSTRUCTION. NOT TO BE CONSTRUCTED IN THE HIGH FIRE THREAT DISTRICT.

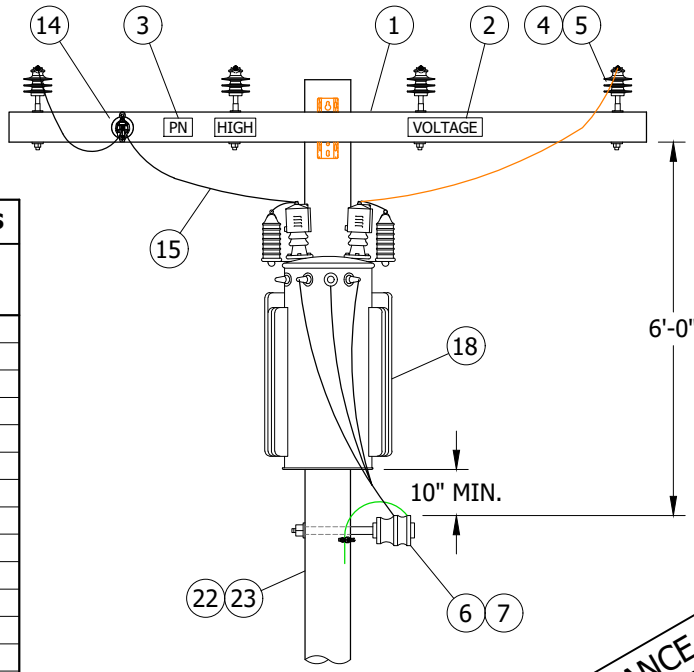



**FIGURE 1**
FRONT VIEW

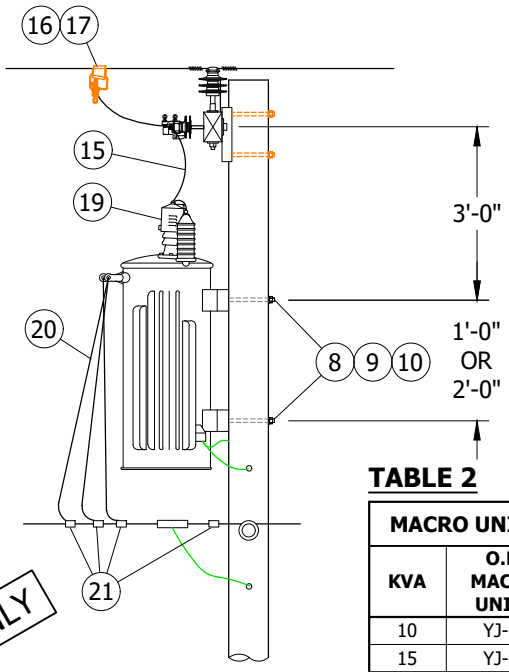



**FIGURE 1**
SIDE VIEW

FIELD MAINTENANCE ONLY

**TABLE 1**

| MACRO UNITS | |
|---|---|
| KVA | O.H. MACRO UNITS |
| 5 | HE-5 |
| 5 | HE-5L |
| 10 | HE-10 |
| 10 | HE-10L |
| 15 | HE-15 |
| 15 | HE-15L |
| 25 | HE-25 |
| 25 | HE-25L |
| 50 | HE-50 |
| 50 | HE-50L |
| 75 | HE-75 |
| 75 | HE-75L |
| 10 | HJ-10 |
| 15 | HJ-15 |
| 25 | HJ-25 |
| 50 | HJ-50 |

**TABLE 2**

| MACRO UNITS | |
|---|---|
| KVA | O.H. MACRO UNITS |
| 10 | YJ-10 |
| 15 | YJ-15 |
| 25 | YJ-25 |
| 50 | YJ-50 |
| 75 | YJ-75 |

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, TANGENT, (SIZE AS REQ'D) | | 1 | 379 | -- | -- |
| 2 | SIGN, HIGH VOLTAGE, DECAL | | AS REQ'D | 208 | S647650 | HV/D |
| 3 | SIGN, PN, DECAL | | AS REQ'D | 208 | S648004 (X) | PN/D |
| 4 | PIN, INSULATOR (SIZE AS REQ'D) | | AS REQ'D | 396 | -- | -- |
| 5 | INSULATOR, POLY, TIE-TOP (SIZE REQ'D) | | AS REQ'D | 750 | -- | -- |
| 6 | INSULATOR, SPOOL, 3" X 3" | | AS REQ'D | -- | S403752 | J105 |
| 7 | BOLT, DOUBLE UPSET, 5/8" X (SIZE AS REQ'D) | 9" | AS REQ'D | 612 | S150370 (X) | UP9 |
| | | 12" | AS REQ'D | | S150338 (X) | UP12 |
| 8 | BOLT, MACHINE, 3/4" (SIZE AS REQ'D) | | AS REQ'D | 390 | -- | -- |
| 9 | WASHER, SPRING LOCK, 3/4" | | AS REQ'D | | S796802 (X) | LK-WSH |
| 10 | WASHERS, SQUARE CURVED | | AS REQ'D | | S797760 | RIBWSH |
| 11 | WIRE, #8, BARE, SOLID ANEALED COPPER (I) | | AS REQ'D | 711 | S812928 | BOND8 |
| 12 | STRAP, PIPE, GALV., 1/4", ONE HOLE (I) | | AS REQ'D | 1002 | S697302 | -- |
| 13 | SCREW, SELF TAPPING, 1 1/4", #12, 24 THREAD (I) | | AS REQ'D | | S618086 (X) | -- |
| 14 | PIN, TRANSFORMER, 1" | | 1 | 396 | S529248 | PS/01 |
| 15 | WIRE, #4-7, POLY COVERED, STRANDED COPPER | | AS REQ'D | 711 | S815044 | POLY4J |

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| C | COMPLETELY REVISED | - | JBH | JBH | MDJ | 07/21/2016 | F | TABLE UPDATE | EDM | JCE | JES | CZH | 02/08/2021 |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed



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## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 16 | CLAMP, HOTLINE | | 2 | 788 | -- | -- |
| 17 | CONNECTOR, WEDGE, STIRRUP | | 2 | | -- | -- |
| 18 | TRANSFORMER, SINGLE-PHASE, (TYPE AS REQ'D) | | 1 | 1121 | -- | -- |
| 19 | BUSHING COVER, TRANSFORMER | | 2 | 1630 | -- | -- |
| 20 | WIRE, THW, COPPER, (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | AS REQ'D | 711 | -- | -- |
| 21 | CONNECTORS, WIRE COMPRESSION, CU OR AL | | AS REQ'D | 783, 785 | -- | -- |
| 22 | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTORS | STEEL POLE | 1 | 1002 | -- | GNDPSP |
| | | WOOD/FG POLE | | | -- | GNDPVC |
| 23 | BLIND NUT, 1/2" | | AS REQ'D | -- | S503460 (X) | -- |

## NOTES:

(I) NOT SHOWN ON FIGURES

(X) THIS ITEM IS EXEMPT.

**REFERENCE:** NONE

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| C | COMPLETELY REVISED | - | JBH | JBH | MDJ | 07/21/2016 | F | TABLE UPDATE | EDM | JCE | JES | CZH | 02/08/2021 |

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE-PHASE TRANSFORMER, WITH SECONDARY LINE ARM CONSTRUCTION.

## TABLE 1

| MACRO UNITS | |
|---|---|
| KVA | OH MACRO UNITS |
| 5 | HE-5 |
| 5 | HE-5L |
| 10 | HE-10 |
| 10 | HE-10L |
| 15 | HE-15 |
| 15 | HE-15L |
| 25 | HE-25 |
| 25 | HE-25L |
| 50 | HE-50 |
| 50 | HE-50L |
| 75 | HE-75 |
| 75 | HE-75L |
| 10 | HJ-10 |
| 15 | HJ-15 |
| 25 | HJ-25 |
| 50 | HJ-50 |

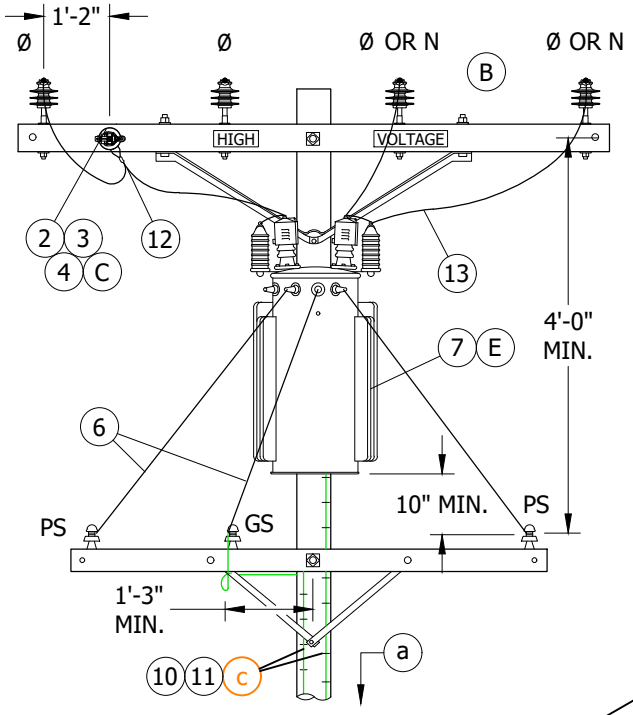



**FIGURE 1**
FRONT VIEW

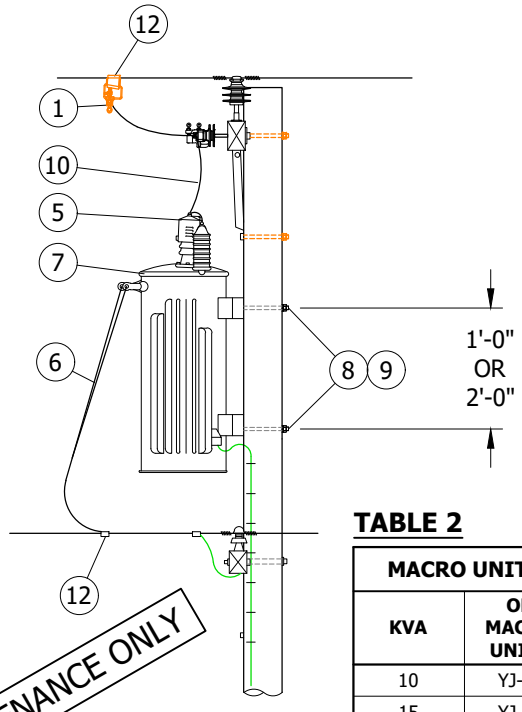



**FIGURE 1**
SIDE VIEW

FIELD MAINTENANCE ONLY

## TABLE 2

| MACRO UNITS | |
|---|---|
| KVA | OH MACRO UNITS |
| 10 | YJ-10 |
| 15 | YJ-15 |
| 25 | YJ-25 |
| 50 | YJ-50 |
| 75 | YJ-75 |

## INSTALLATION:

A. WHEN INSTALLING A NEW STATION ON THE 7.2/12.47KV SYSTEM IN MEOD, IF NO PRIMARY NEUTRAL GROUND EXISTS ON THE POLE, INCLUDE THE NECESSARY MATERIALS TO INSTALL THE REQUIRED PRIMARY NEUTRAL GROUND. CONNECT TO TRANSFORMER TANK GAP GROUND.

(B) 'YE' & 'YJ' TRANSFORMERS ARE TO BE CONNECTED PHASE TO NEUTRAL.

(C) INSTALLATION OF A STAND-OFF PIN/INSULATOR REQUIRES MINIMUM OF A 4 PIN ARM TO MAINTAIN HARDWARE CLEARANCE. ON EXISTING 2 PIN ARMS, THE STRAP BRACE ON THE STAND-OFF PIN SIDE MAY BE REMOVED TO MAINTAIN HARDWARE CLEARANCE.

D. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

(E) WHEN LIGHTNING ARRESTERS ARE REQUIRED, USE 'HJ' OR 'YJ' TYPE TRANSFORMER WITH TANK GAP GROUND. (b)

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | | QUANTITY HE, YE | QUANTITY HJ, YJ | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP | | 2 | 2 | 788 | -- | -- |
| 2 | BOLT, MACH, GALV. 5/8" X (LENGTH AS REQ'D), 2 SQ WASHERS & 1 DBL COIL SPRING WASHER | | 1 | 1 | 390 | -- | -- |
| 3 | PIN, TRANSFORMER LEAD ADAPTER | 1" | 1 | 1 | -- | S529248 | -- |
| | | 1 3/8" | | | -- | S529214 (X) | -- |

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## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | | QUANTITY HE, YE | QUANTITY HJ, YJ | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|---|
| 4 | INSULATOR, 12KV, VISE-TOP, 1" OR 1 3/8" PIN | | 1 | 1 | 750 | -- | -- |
| 5 | BUSHING COVER, TRANSFORMER | | 2 | 2 | -- | -- | -- |
| 6 | WIRE, THW, COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | 21'-0" | 21'-0" | 1125 | -- | -- |
| 7 | TRANSFORMER, SINGLE-PHASE (TYPE HE, HJ, OR YJ, YE) | | 1 | 1 | 1121 | -- | -- |
| 8 | BOLT, MACH, GALV. 5/8" X 8'-0" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | | 2 | 2 | 390 | -- | -- |
| 9 | COVER, BOLT, PLASTIC | | 2 | 2 | -- | S285696 | -- |
| | NAIL, 10 D, COMMON WIRE | | | | -- | S491392 | -- |
| 10 | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTORS | STEEL POLE | 1 | 1 | 1002 | -- | GNDPSP |
| | | WOOD/FG POLE | | | | -- | GNDPVC |
| 11 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | | AS REQ'D | | -- | S678564 (X) | -- |
| 12 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | | AS REQ'D | | 783, 785 | -- | -- |
| 13 | #4/7 STR CU. WIRE | | AS REQ'D | | -- | S815044 | POLY4J |

## NOTES:

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) FOR POLE STEPPING, SEE OH363.

(b) SEE OH1247: SURGE (LIGHTNING) ARRESTERS APPLICATION.

(c) FOR GROUNDING METHODS, SEE OH1002.

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'H' TRANSFORMER, WITH CUTOUT ARM AND SECONDARY CROSSARM CONSTRUCTION.

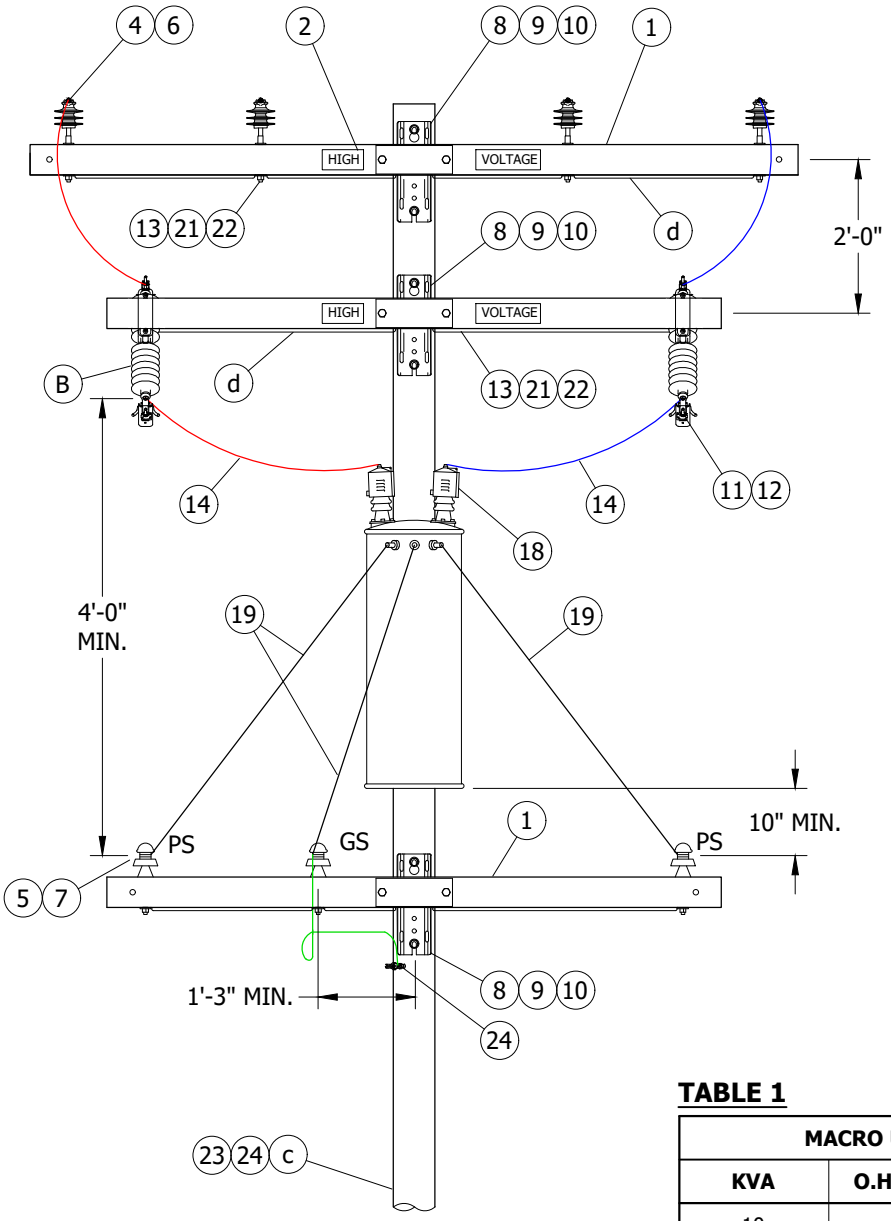



**FIGURE 1**
FRONT VIEW

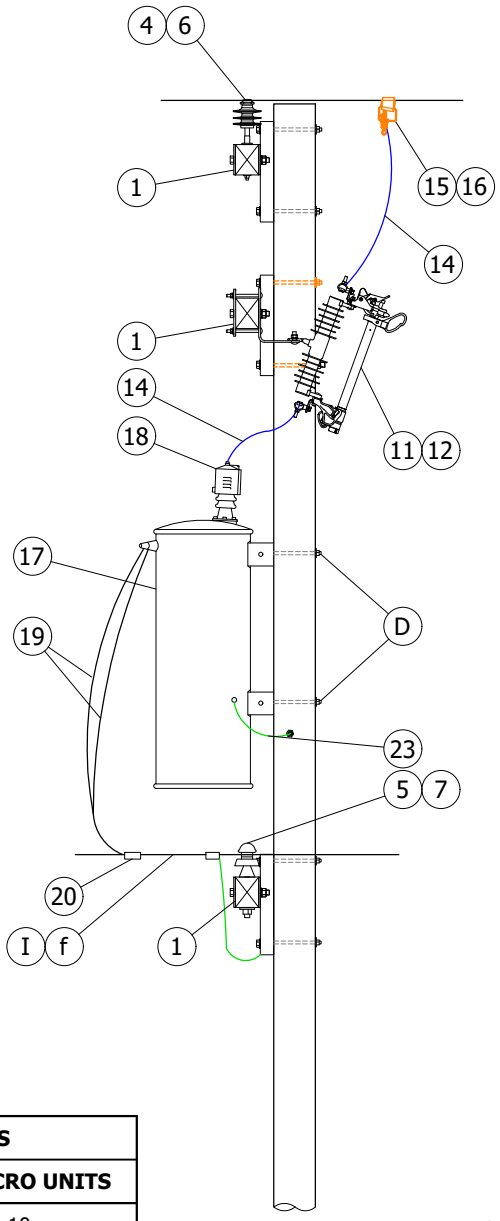



**FIGURE 1**
SIDE VIEW

**TABLE 1**

| MACRO UNITS | |
|---|---|
| **KVA** | **O.H. MACRO UNITS** |
| 10 | H-10 |
| 15 | H-15 |
| 25 | H-25 |
| 50 | H-50 |
| 75 | H-75 |

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| C | COMPLETELY REVISED | - | JBH | JBH | MDJ | 07/21/2016 | F | TABLE UPDATE | EDM | JCE | JES | CZH | 02/08/2021 |

## INSTALLATION:

A. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

(B) ONLY CMU OR SMU FUSES ARE TO BE USED IN THE FIRE THREAT ZONE. 'H' TYPE TRANSFORMERS REQUIRE 2 CUTOUTS AND 'Y' TYPE TRANSFORMERS REQUIRE ONLY 1 CUTOUT.

C. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT. (d)

(D) 75KVA TRANSFORMERS AND ABOVE, USE 3/4-INCH HARDWARE.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, TANGENT (SIZE AS REQ'D) | | 3 | 379 | -- | -- |
| 2 | SIGN, HIGH VOLTAGE STICKER | | AS REQ'D | 208 | S647650 | HV/D |
| 3 | SIGN, PN, ADHESIVE (II) | | AS REQ'D | | S648004 (X) | PN-D |
| 4 | PIN, INSULATOR (SIZE AS REQ'D) | | AS REQ'D | 396 | -- | -- |
| 5 | PIN, INSULATOR, 4KV/SEC 1" | | AS REQ'D | | S532608 | PS1S |
| 6 | INSULATOR, POLY, TIE-TOP (SIZE AS REQ'D) | | AS REQ'D | 750 | -- | -- |
| 7 | INSULATOR, PIN TYPE, SECONDARY | | AS REQ'D | | S429024 | 55-2/I |
| 8 | BOLT, MACHINE, 3/4" (SIZE AS REQ'D) | | AS REQ'D | 390 | - | - |
| 9 | WASHER, SPRING LOCK, 3/4" | | AS REQ'D | | S796802 (X) | LK-WSH |
| 10 | WASHERS, SQUARE CURVED | | AS REQ'D | | S797760 | RIBWSH |
| 11 | CUTOUT, 12KV | | 2 | 1212 | -- | -- |
| 12 | FUSE HOLDER | | 2 | | -- | -- |
| 13 | WIRE, #8, BARE, SOLID ANNEALED COPPER | | AS REQ'D | 711 | S812928 | BOND8 |
| 14 | WIRE, #4-7, POLY COVERED, STRANDED COPPER | | AS REQ'D | 711 | S815044 | POLY4J |
| 15 | CLAMP, HOTLINE | | 2 | 788 | -- | -- |
| 16 | CONNECTOR, WEDGE, STIRRUP | | 2 | | -- | -- |
| 17 | TRANSFORMER, SINGLE-PHASE, TYPE 'H' | | 1 | 1121 | -- | -- |
| 18 | BUSHING COVER, TRANSFORMER | | 2 | 1630 | -- | -- |
| 19 | WIRE, THW, COPPER, (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | AS REQ'D | 711 | -- | -- |
| 20 | CONNECTORS, WIRE COMPRESSION, CU OR AL | | AS REQ'D | 783, 785 | -- | -- |
| 21 | STRAP, PIPE, GALV., 1/4", ONE HOLE | | AS REQ'D | 1002 | S697302 | -- |
| 22 | SCREW, SELF TAPPING, 1 1/4", #12, 24 THREAD | | AS REQ'D | | S618086 (X) | -- |
| 23 | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTORS | STEEL POLE | 1 | 1002 | -- | GNDPSP |
| | | WOOD/FG POLE | | | -- | GNDPVC |
| 24 | BLIND NUT, 1/2" | | AS REQ'D | -- | S503460 (X) | -- |

## NOTES:

(I) NEW CONSTRUCTION SHALL USE AERIAL CABLE CONSTRUCTION FOR SECONDARY APPLICATIONS. EXISTING CONSTRUCTION, CAN USE CROSSARMS FOR OPEN WIRE SECONDARY CONSTRUCTION. (f)

(II) NOT SHOWN ON FIGURES.

(X) THIS ITEM IS EXEMPT.

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| C | COMPLETELY REVISED | - | JBH | JBH | MDJ | 07/21/2016 | F | TABLE UPDATE | EDM | JCE | JES | CZH | 02/08/2021 |

**REFERENCE:**

a. FOR POLE STEPPING, SEE OH363.
b. FOR FOR LIGHTNING ARRESTER REQUIREMENTS, SEE OH1247.
(c) FOR GROUNDING METHOD, SEE OH1002.
(d) FOR BONDING, SEE OH287 & OH1002.
e. FOR TRANSFORMER FUSING, SEE OH1109.
(f) FOR SECONDARY CABLE CONSTRUCTION, SEE OH612 .
g. FOR NEUTRAL GROUNDING, SEE OH1004.

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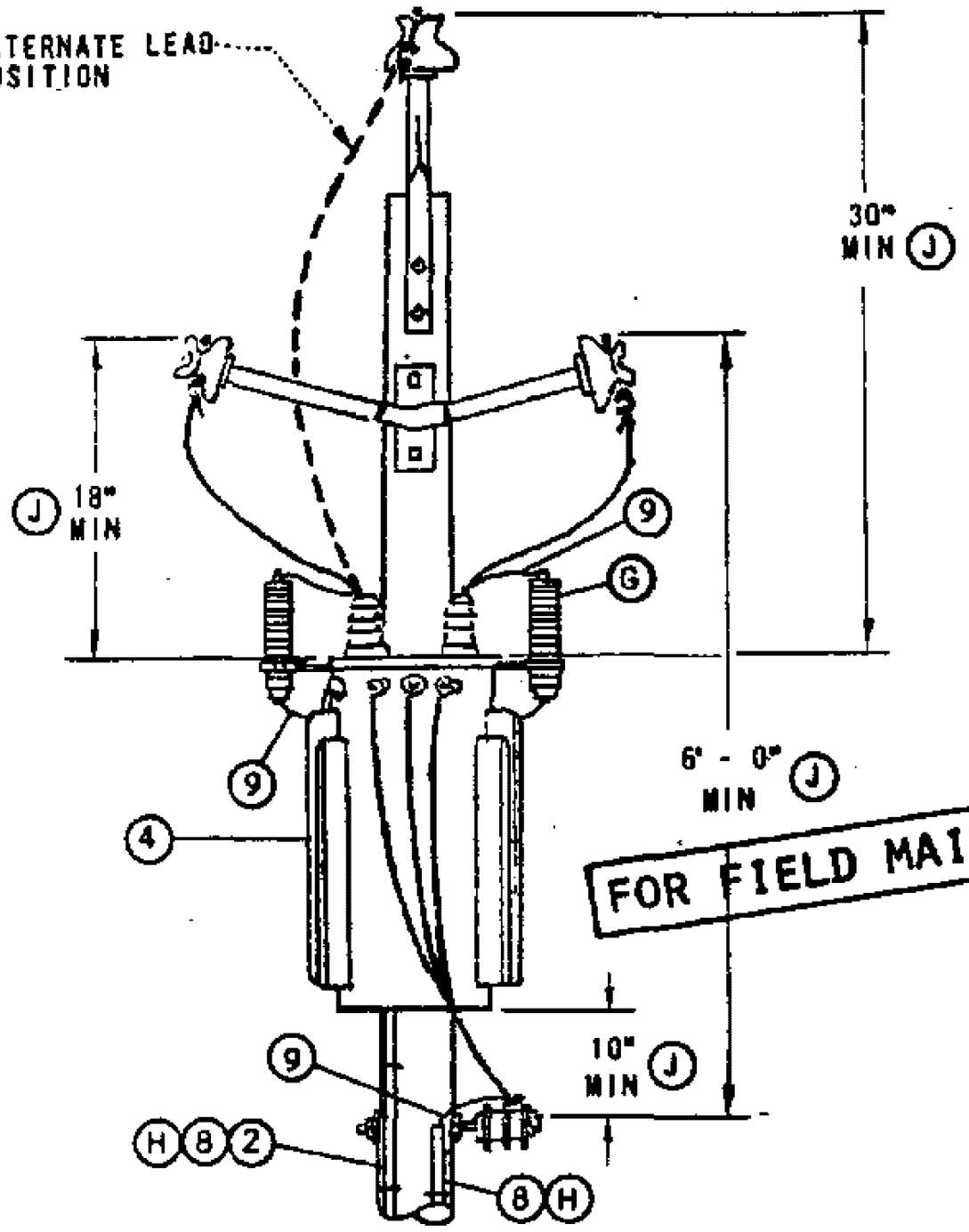
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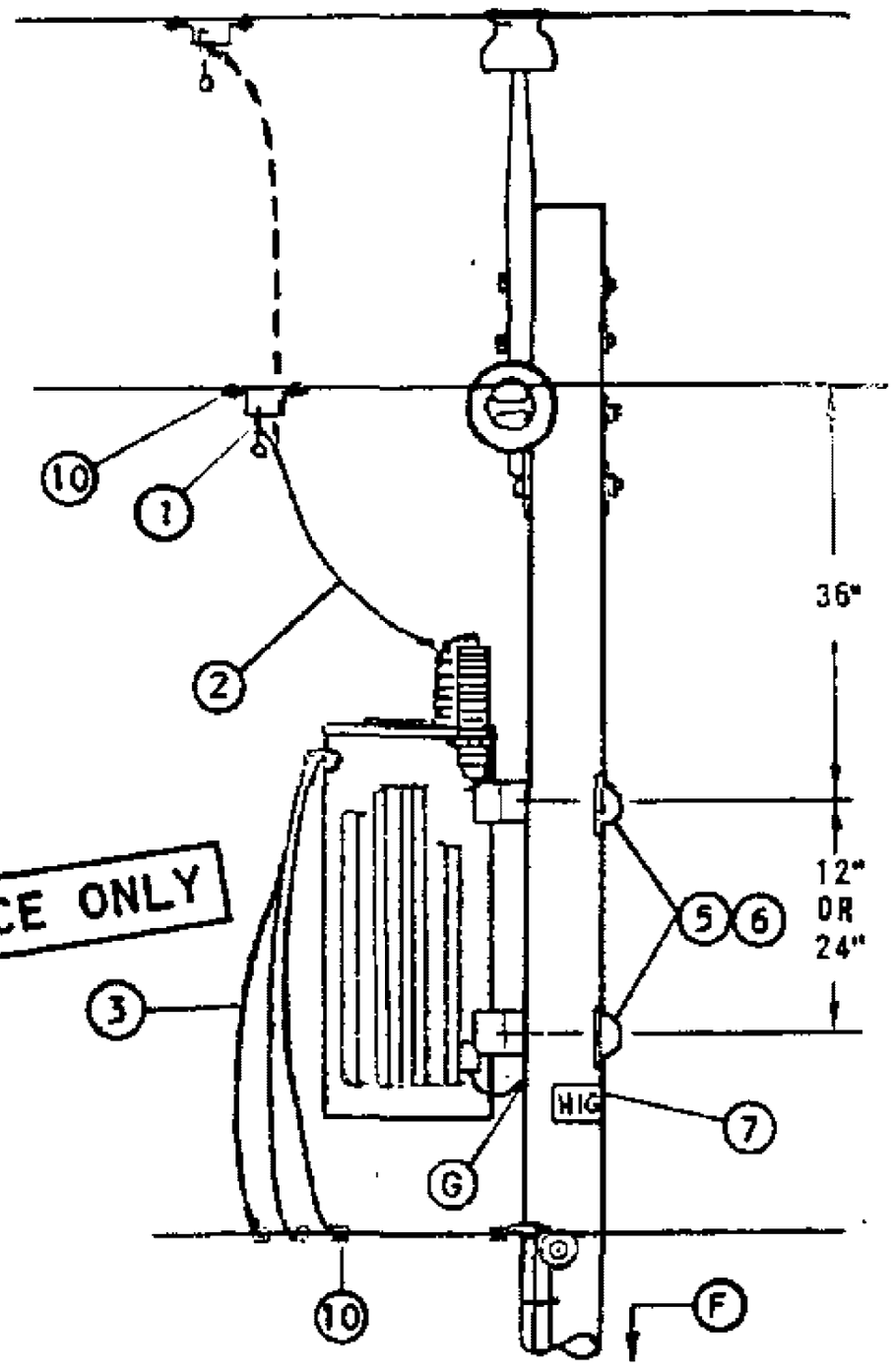
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

12KV, SINGLE-PHASE TYPE 'H' TRANSFORMER INSTALLATION, 100KVA MAXIMUM, CUTOUT ARM

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE PHASE TRANSFORMER, ON ARMLESS TANGENT CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY HE, YE | QUANTITY HJ, YJ | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | 2 | STD 788 |
| 2 | WIRE, #4, BARE STRANDED COPPER | 7' | 55' | 813760 |
| 3 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 4 | TRANSFORMER, SINGLE PHASE (TYPE 'HE', 'HJ', 'YE' OR 'YJ') | 1 | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 2<br>- | 285696<br>491392 |
| 7 | SIGN, HIGH VOLTAGE & (E)<br>8 ROOFING NAILS, GALV (E) | 1<br>- | 1<br>- | 647648<br>492224 |
| 8 | UNIT GROUND, COMPLETE (H) | 1 | 2 | 603136 |
| 9 | WIRE, #6 BARE STRANDED COPPER | 42' | 50' | 813536 |
| 10 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | | 783-787 |

**INSTALLATION:**

A. WHEN INSTALLING A NEW STATION ON THE 7.2/12.47KV SYSTEM IN MEOD, IF NO PRIMARY NEUTRAL GROUND EXISTS ON THE POLE, INCLUDE THE NECESSARY MATERIALS TO INSTALL THE REQUIRED PRIMARY NEUTRAL GROUND. CONNECT TO TRANSFORMER TANK GAP GROUND.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE TYPE 'HJ' OR 'YJ' TRANSFORMERS, AND GROUND TANK GAP.

(H) GROUNDING METHODS - SEE STANDARD 1002.

I. FOR POLE TOP MATERIAL - SEE DISTRIBUTION POLE TOPS (SECTION 400). FGS AND PTP ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

(J) G.O. 95 MINIMUM REQUIREMENTS.

K. FOR AERIAL CABLE CONSTRUCTION - SEE SECTION 600.

DATE 1-1-86
APPD AK/RDS

SDG&E ELECTRIC STANDARDS

**7.2 OR 12KV SINGLE PHASE YE, YJ, HE, OR HJ TRANSFORMER INSTALLATION 100 KVA MAXIUM ARMLESS TANGENT CONSTRUCTION**

1199.401
SUPERSEDES
1141 (1-1-86)

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**REVISION HISTORY:**

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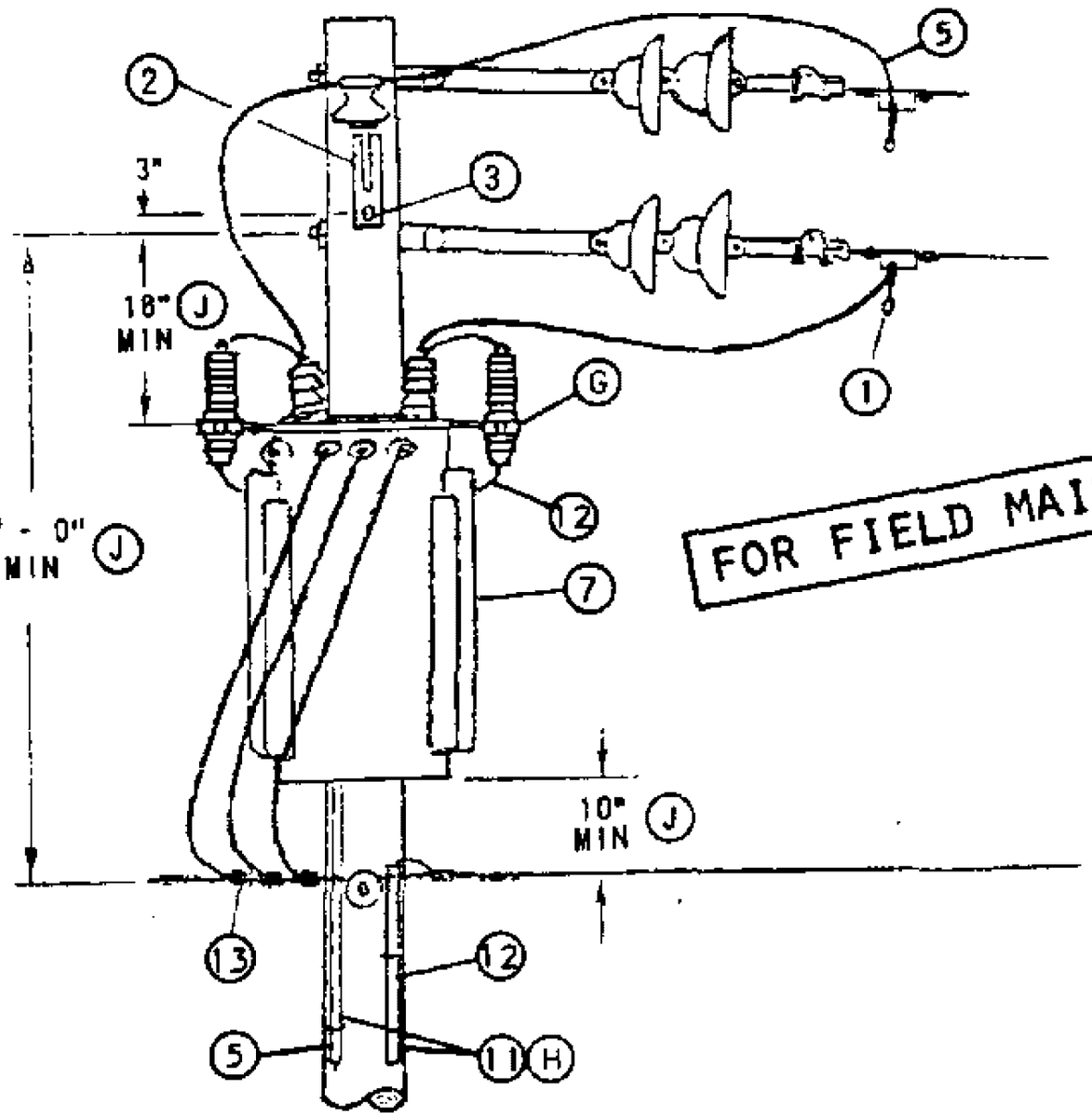
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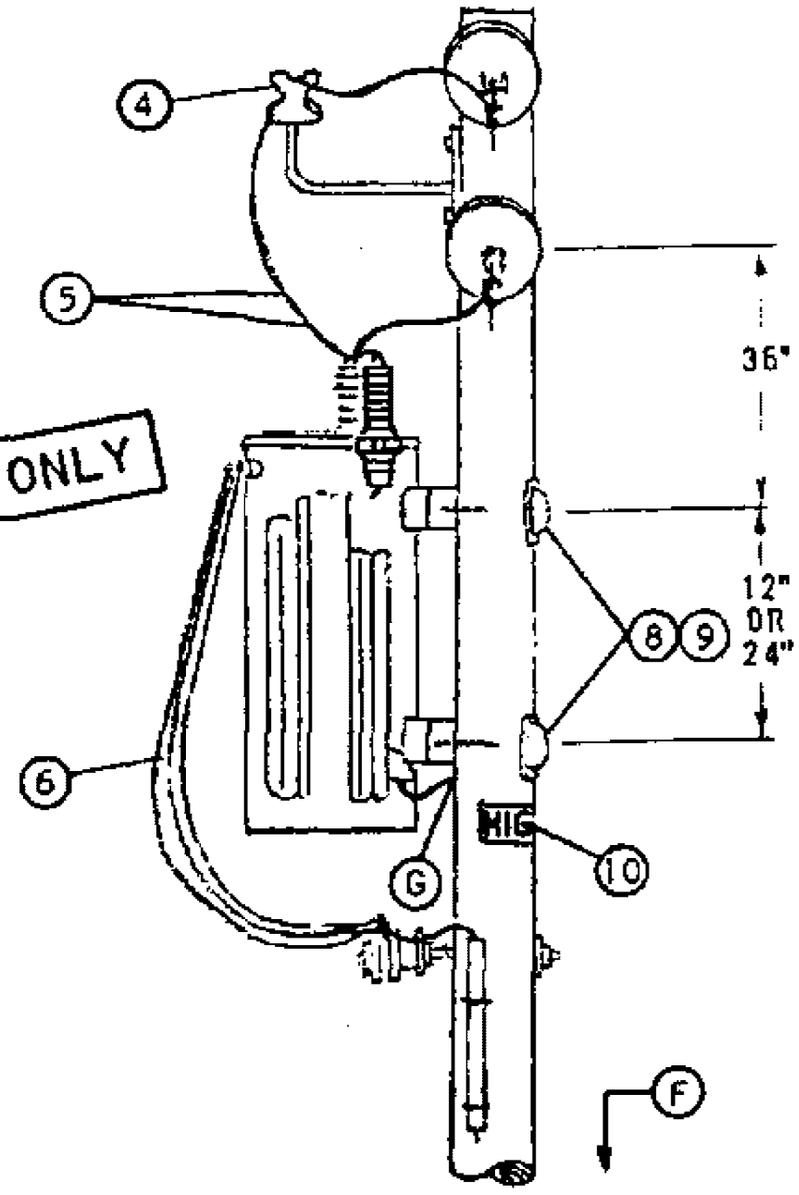
SDG&E ELECTRIC OVERHEAD STANDARD

7.2 OR 12KV SINGLE PHASE YE, YJ, HE, OR HJ TRANSFORMER
INSTALLATION 100 KVA MAXIMUM ARMLESS DEAD END CONSTRUCTION

FMO
OH 1142

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE PHASE TRANSFORMER, ON ARMLESS DEADEND CONSTRUCTION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY HE, YE | QUANTITY HJ, YJ | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | 2 | STD 788 |
| 2 | BRACKET, INSULATOR, 1", LEAD THREAD | 1 | 1 | 166144 |
| 3 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | 2 | 621568 |
| 4 | INSULATOR, 12KV, CLASS 55-5 | 1 | 1 | 429056 |
| 5 | WIRE, #4, BARE STRANDED COPPER | 12' | 55' | 813760 |
| 6 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 7 | TRANSFORMER, SINGLE PHASE (TYPE 'HE', 'HJ', 'YE' OR 'YJ') | 1 | 1 | STD 1121 |
| 8 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD 392 |
| 9 | COVER, BOLT, PLASTIC & (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 2<br>- | 285696<br>491392 |
| 10 | SIGN, HIGH VOLTAGE & (E)<br>8 ROOFING NAILS, GALV (E) | 1<br>- | 1<br>- | 647648<br>492224 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 2 | 603136 |
| 12 | WIRE, #6 BARE STRANDED COPPER | 42' | 50' | 813536 |
| 13 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | | 783-787 |

**INSTALLATION:**

A. WHEN INSTALLING A NEW STATION ON THE 7.2/12.47KV SYSTEM IN MEOD, AND IF NO PRIMARY NEUTRAL GROUND EXIST ON THE POLE, INCLUDE THE NECESSARY MATERIALS TO INSTALL THE REQUIRED PRIMARY NEUTRAL GROUND. CONNECT TO TRANSFORMER TANK GAP GROUND.

B. FOR USE ONLY WHERE FUTURE EXTENSION IS UNLIKELY, SUCH AS CUL-DE-SACS.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE TYPE 'HJ' OR 'YJ' TRANSFORMERS, AND GROUND TANK GAP.

(H) GROUNDING METHODS - SEE STANDARD 1002.

I. FOR POLE TOP MATERIAL - SEE DISTRIBUTION POLE TOPS (SECTION 400).

(J) G.O. 95 MINIMUM REQUIREMENTS.

K. FOR AERIAL CABLE CONSTRUCTION - SEE SECTION 600.

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

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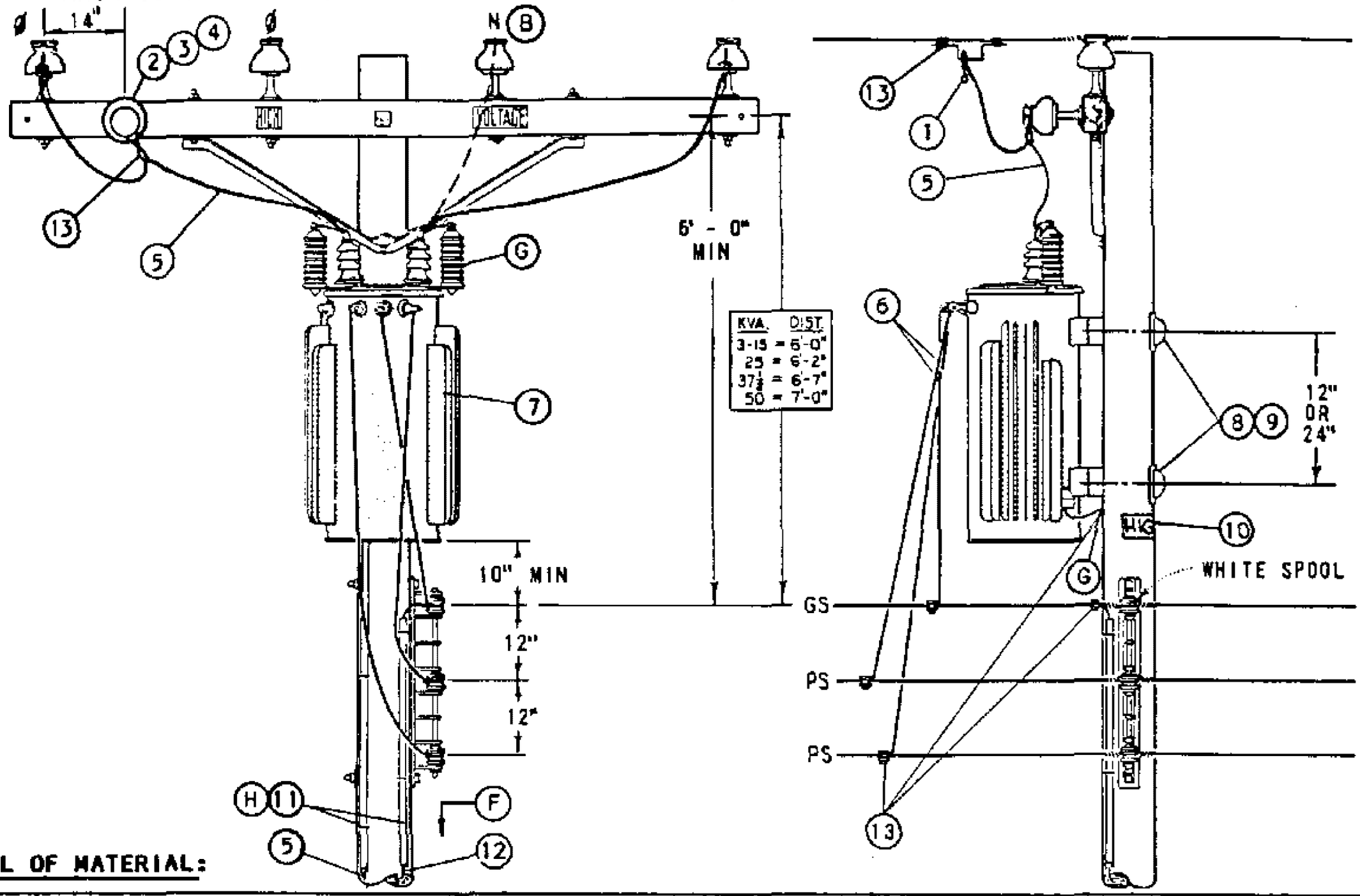
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SDG&E ELECTRIC OVERHEAD STANDARD

7.2 OR 12KV SINGLE PHASE YE, YJ, HE, OR HJ TRANSFORMER INSTALLATION, SECONDARY RACK CONSTRUCTION

FMO OH 1145

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE PHASE TRANSFORMER, WITH SECONDARY RACK CONSTRUCTION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY HE, YE | QUANTITY HJ, YJ | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | 2 | STD 788 |
| 2 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ WASHERS & 1 DBL COIL SPRING WASHER (E) | 1 | 1 | STD 392 |
| 3 | PIN, TRANSFORMER LEAD ADAPTER 1" OR (E) | 1 | 1 | 529248 |
| | 1 3/8" (E) | 1 | 1 | 529216 |
| 4 | INSULATOR, 12KV, 1" OR 1 3/8" PIN | 1 | 1 | STD 750 |
| 5 | WIRE, #4, BARE STRANDED COPPER | 14' | 55' | 813760 |
| 6 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 7 | TRANSFORMER, SINGLE PHASE (TYPE HE, HJ, OR YJ, YE) | 1 | 1 | STD 1121 |
| 8 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD 392 |
| 9 | COVER, BOLT, PLASTIC & (E) | 2 | 2 | 285696 |
| | 6 - 10D NAILS, GALV (E) | - | - | 491392 |
| 10 | SIGN, HIGH VOLTAGE & (E) | 1 | 1 | 647648 |
| | 9 ROOFING NAILS, GALV (E) | - | - | 492224 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 2 | 603136 |
| 12 | WIRE, #6 BARE STRANDED COPPER | 42' | 50' | 813536 |
| 13 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | | 783-787 |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. WHEN INSTALLING A NEW STATION ON THE 7.2/12.47KV SYSTEM IN MEOD IF NO PRIMARY NEUTRAL GROUND EXISTS ON THE POLE, INCLUDE THE NECESSARY MATERIALS TO INSTALL THE REQUIRED PRIMARY NEUTRAL GROUND. CONNECT TO TRANSFORMER TANK GAP GROUND.

(B) YE & YJ TRANSFORMERS ARE TO BE CONNECTED PHASE TO NEUTRAL.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE 'HJ' OR 'YJ' TYPE TRANSFORMER WITH TANK GAP GROUND.

(H) GROUNDING METHODS - SEE STANDARD 1002.

SDG&E ELECTRIC STANDARDS

DATE 1-1-86
APPD AK/RBB

# 7.2 OR 12KV SINGLE Ø YE, YJ, HE OR HJ TRANSFORMER INSTALLATION, SECONDARY RACK CONSTRUCTION

1199.403
SUPERSEDES
1145 (1-1-93)

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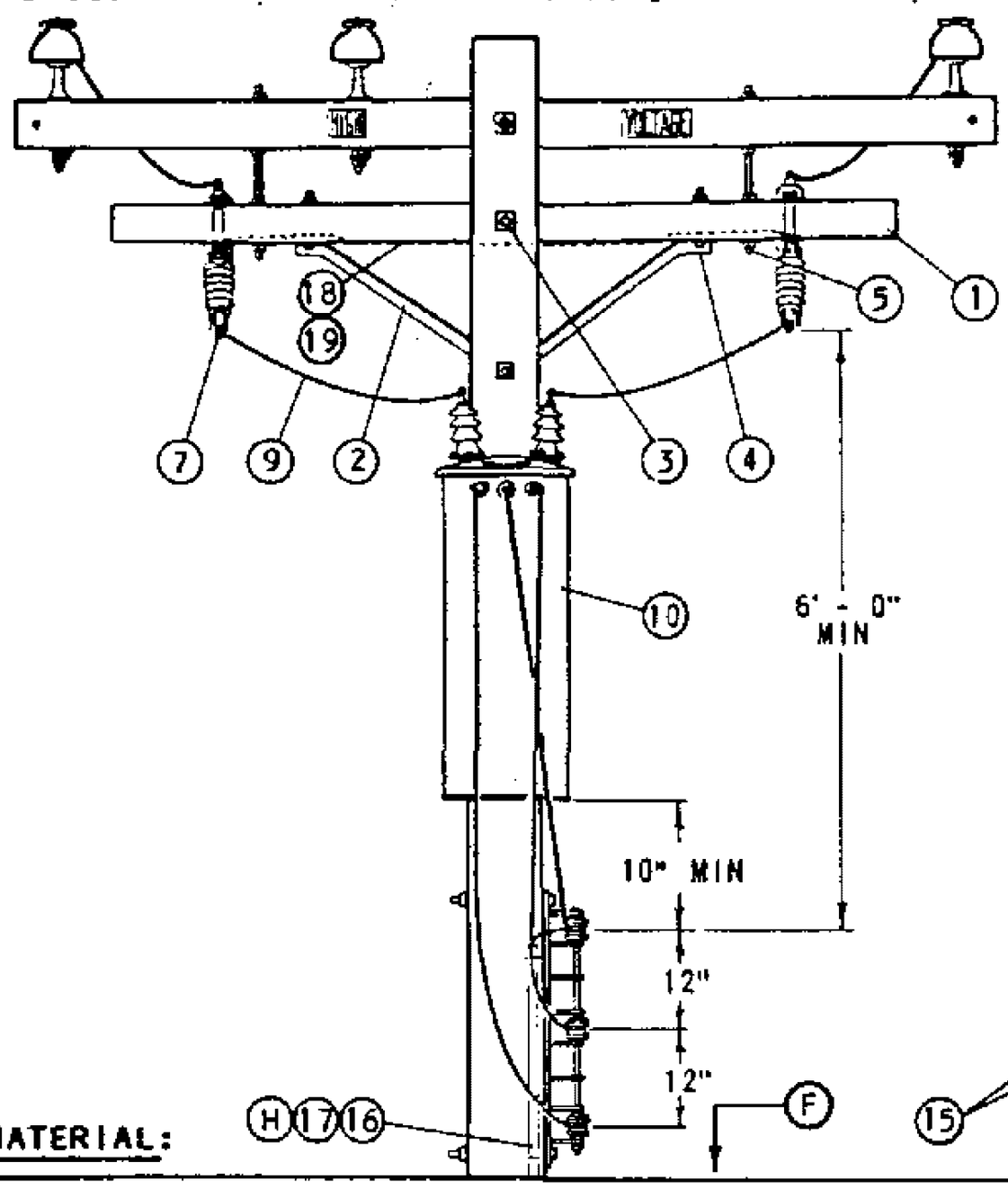
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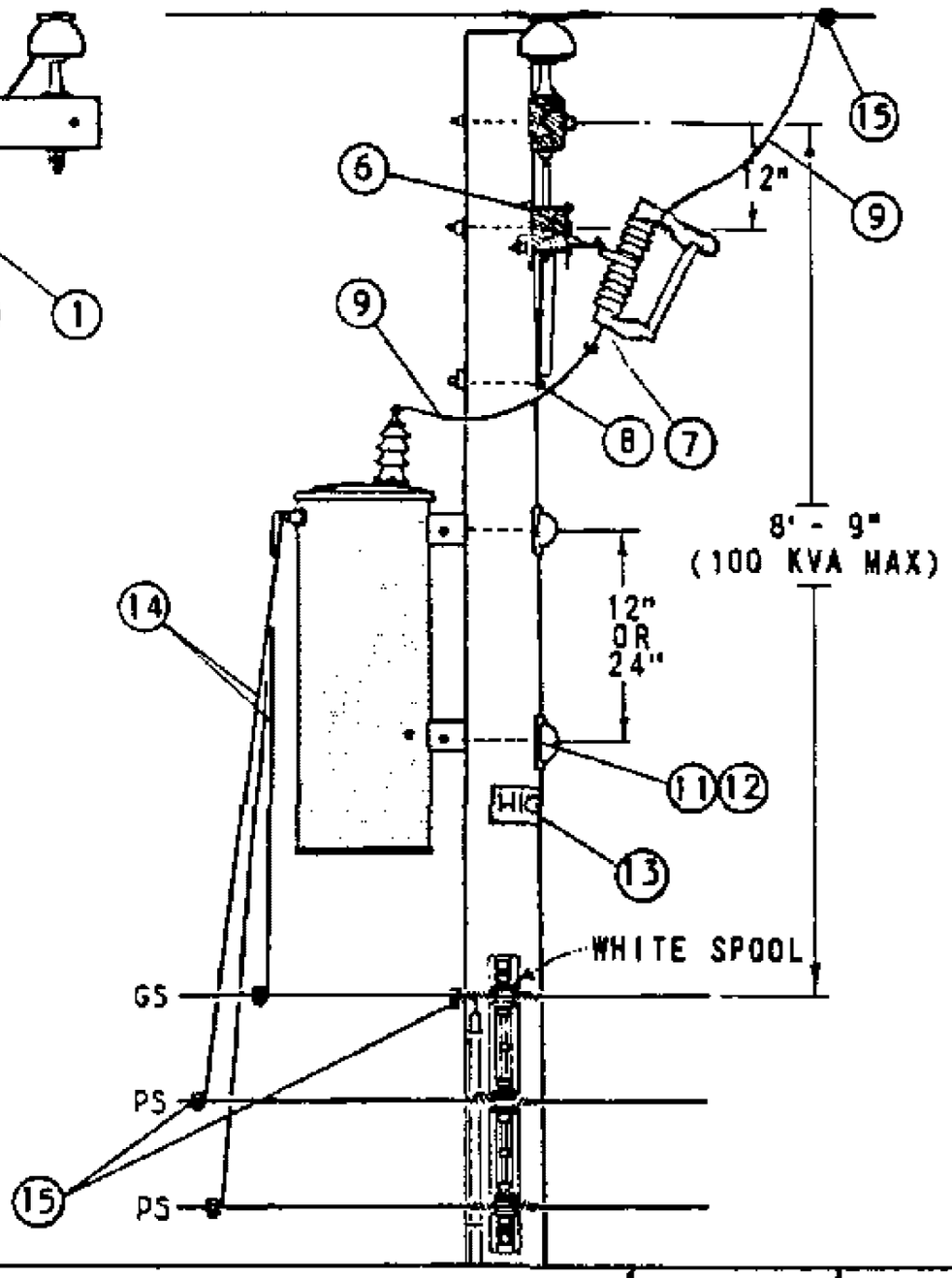
SDG&E ELECTRIC OVERHEAD STANDARD

12KV, SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION,
C.O. ARM, SECONDARY RACK CONSTRUCTION

FMO
OH 1147

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'H' TRANSFORMER, WITH CUTOUT ARM AND SECONDARY RACK CONSTRUCTION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | | 1 | 293680 |
| 2 | BRACE, ANGLE, CROSSARM, 4' - 0" | | 1 | 164032 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 SPRING LOCK WASHER | (E) | 2 | STD 392 |
| 5 | BOLT, SPACE, GALV, 5/8" X 20", 4 SQ & 2 DBL COIL SPR WASHERS | (E) | 2 | STD 392 |
| 6 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | (E) | 2 | 166070 |
| 7 | CUTOUT, 12KV | | 2 | STD 1212 |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 9 | WIRE, #4 BARE STRANDED COPPER | | 14' | 813760 |
| 10 | TRANSFORMER, SINGLE PHASE, TYPE 'H' | | 1 | STD 1121 |
| 11 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | (E) | 2 | STD 392 |
| 12 | COVER, BOLT, PLASTIC & | (E) | 2 | 285696 |
| | 6 - 10D NAILS, GALV | (E) | - | 491392 |
| 13 | SIGN, HIGH VOLTAGE & | (E) | 1 | 647648 |
| | 9 ROOFING NAILS, GALV | (E) | - | 492224 |
| 14 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | 21' | STD 1125 |
| 15 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | (E) | AS REQ'D | 783-787 |
| 16 | WIRE, #6 BARE STRANDED COPPER | | 40' | 813536 |
| 17 | UNIT GROUND, COMPLETE | (H) | 1 | 603136 |
| 18 | WIRE, #8 BARE SOLID ANNEALED COPPER | (I) | 8' | 812928 |
| 19 | STAPLES, FENCE, GALV, 1 1/4" | (I) (E) | AS REQ'D | 678528 |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) FOR LIGHTNING ARRESTER REQUIREMENTS - SEE STANDARD 1247.

(H) GROUNDING METHODS - SEE STANDARD 1002.

(I) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287. IF BONDING IS REQUIRED, ORDER ADDITIONAL ITEMS 18 & 19.

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1199.404
SUPERSEDES
1147 (1-1-93)

SDG&E ELECTRIC STANDARDS

# 12KV, SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION, C.O. ARM, SECONDARY RACK CONSTRUCTION

DATE 1-1-86
APPD AK/RBF

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**REVISION HISTORY:**

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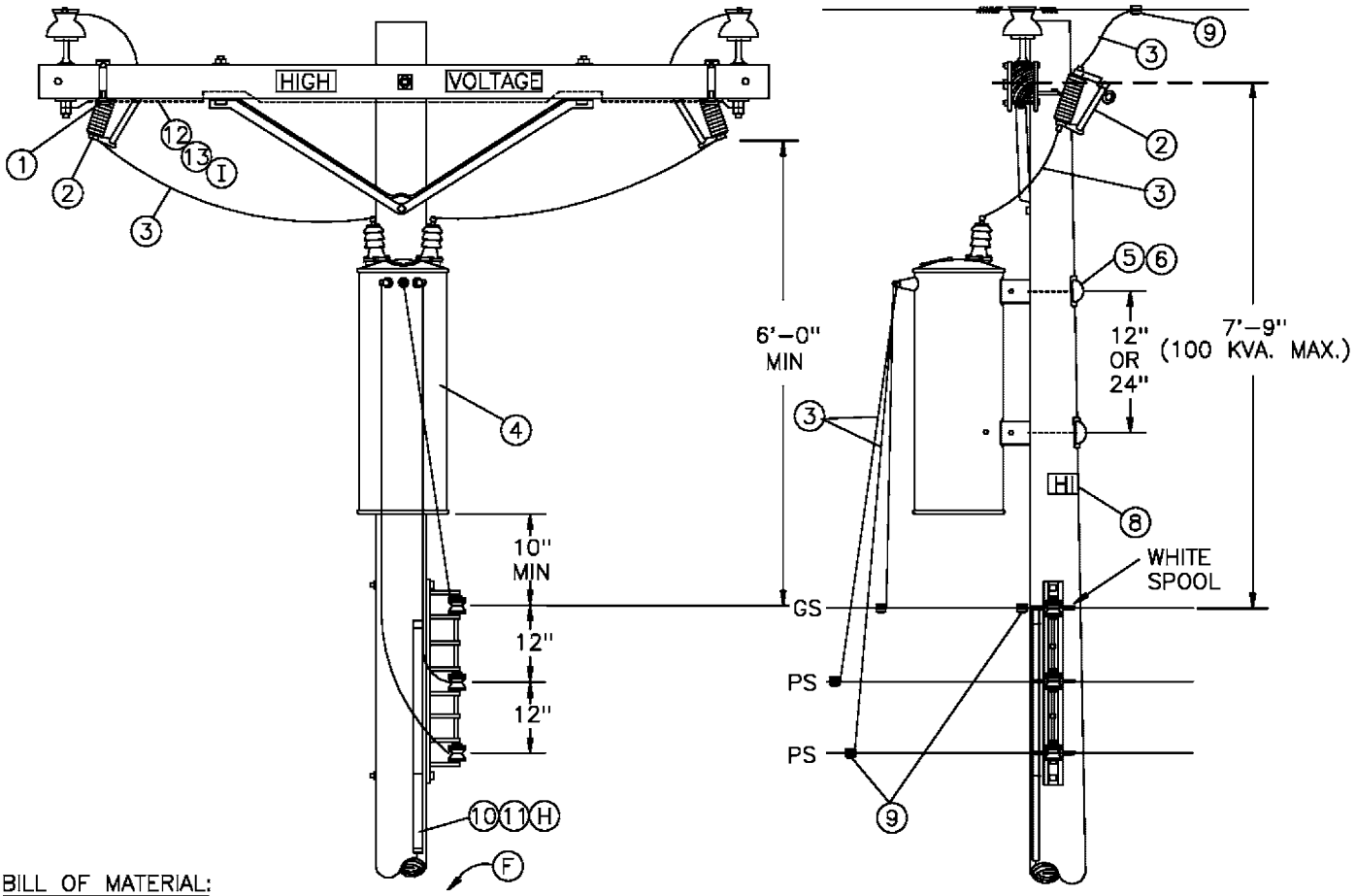
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SDG&E ELECTRIC OVERHEAD STANDARD

12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION 100 KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY RACK CONSTRUCTION

FMO OH 1149

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'H' TRANSFORMER, WITH THE CUTOUTS MOUNTED ON THE LINE ARM AND SECONDARY RACK CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 2 | 166070 |
| 2 | CUTOUT, 12KV | 2 | STD 1212 |
| 3 | WIRE, #4 BARE STRANDED COPPER | 14' | 813760 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'H' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & 6 – 10D NAILS, GALV | 2 – | 285696 491392 |
| 7 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 8 1 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV | 1 – | 647648 492224 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–787 |
| 10 | WIRE, #6 BARE STRANDED COPPER | 40' | 813536 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 603136 |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (I) | 10' | 812928 |
| 13 | STAPLES, FENCE, GALV, 1 1/4" (I) | AS REQ'D | 678528 |

FOR FIELD MAINTENANCE ONLY

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.
G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.
(H) GROUNDING METHODS – SEE STANDARD 1002.
BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 827.
(I) IF BONDING IS REQUIRED, ORDER ADDITIONAL ITEMS 12 & 13.

| | | |
|---|---|---|
| DATE 1–1–86<br>APPD / | SDG&E ELECTRIC STANDARDS<br>12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION<br>100KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY RACK CONSTRUCTION | 1199.405<br>SUPERSEDES<br>1149 (1–1–93) |

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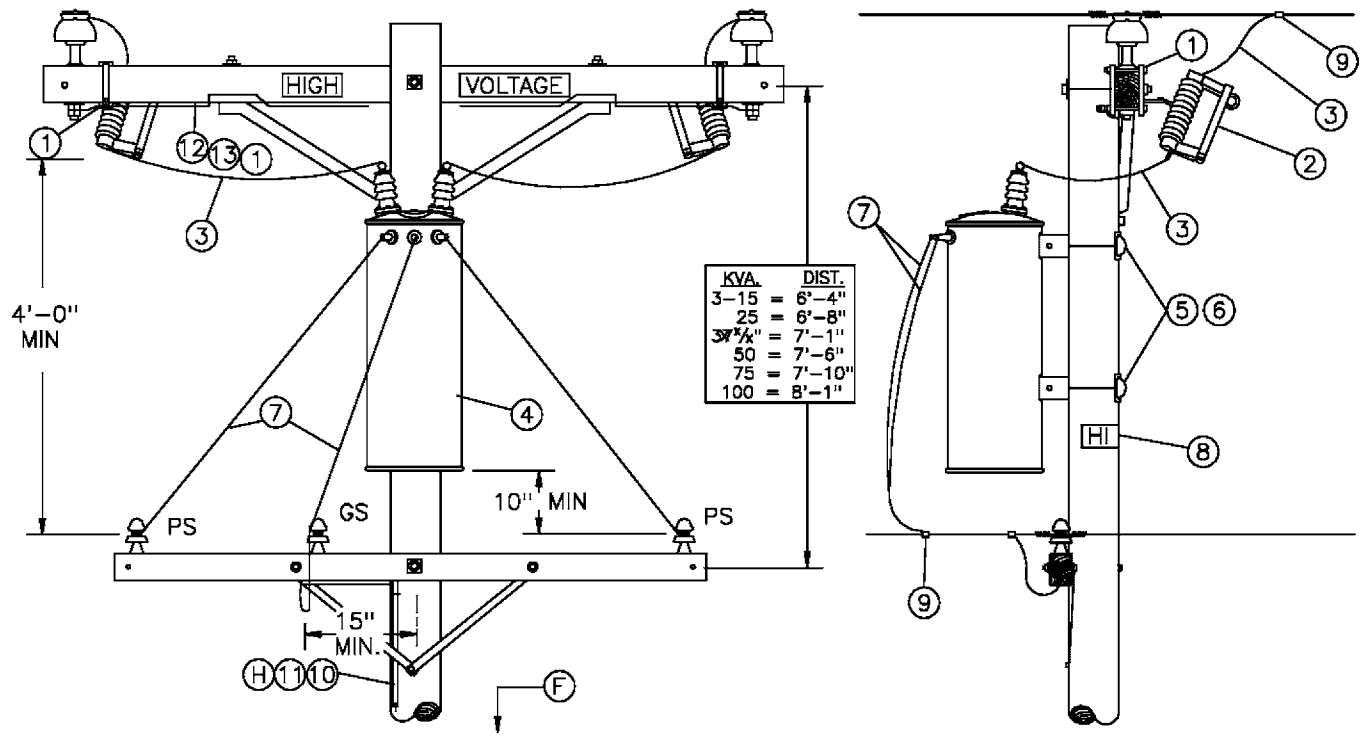
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SDG&E ELECTRIC OVERHEAD STANDARD

12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION, 100 KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY LINE ARM CONSTRUCTION

FMO OH 1150

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'H' TRANSFORMER, WITH THE CUTOUTS MOUNTED ON THE LINE ARM AND SECONDARY CROSSARM CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 2 | 166070 |
| 2 | CUTOUT, 12KV | 2 | STD 1212 |
| 3 | WIRE, #4 BARE STRANDED COPPER | 14' | 813536 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'H' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 285696<br>491392 |
| 7 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 8 | SIGN, HIGH VOLTAGE &<br>8 ROOFING NAILS, GALV | 1<br>– | 647648<br>492224 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783-787 |
| 10 | WIRE, #6 BARE STRANDED COPPER | 40' | 813536 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 603136 |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (I) | 10' | 812928 |
| 13 | STAPLES, FENCE, GALV, 1 1/4" (I) | AS REQ'D | 678528 |

FOR FIELD MAINTENANCE ONLY

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

(H) GROUNDING METHODS – SEE STANDARD 1002.

(I) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287. IF BONDING IS REQUIRED, ORDER ADDITIONAL ITEMS 12 & 13.

| | | |
|---|---|---|
| DATE 1-1-86<br>APPD / | SDG&E ELECTRIC STANDARDS<br>12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION, 100 KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY LINE ARM CONSTRUCTION | 1199.503<br>SUPERSEDES<br>1150 (1-1-93) |

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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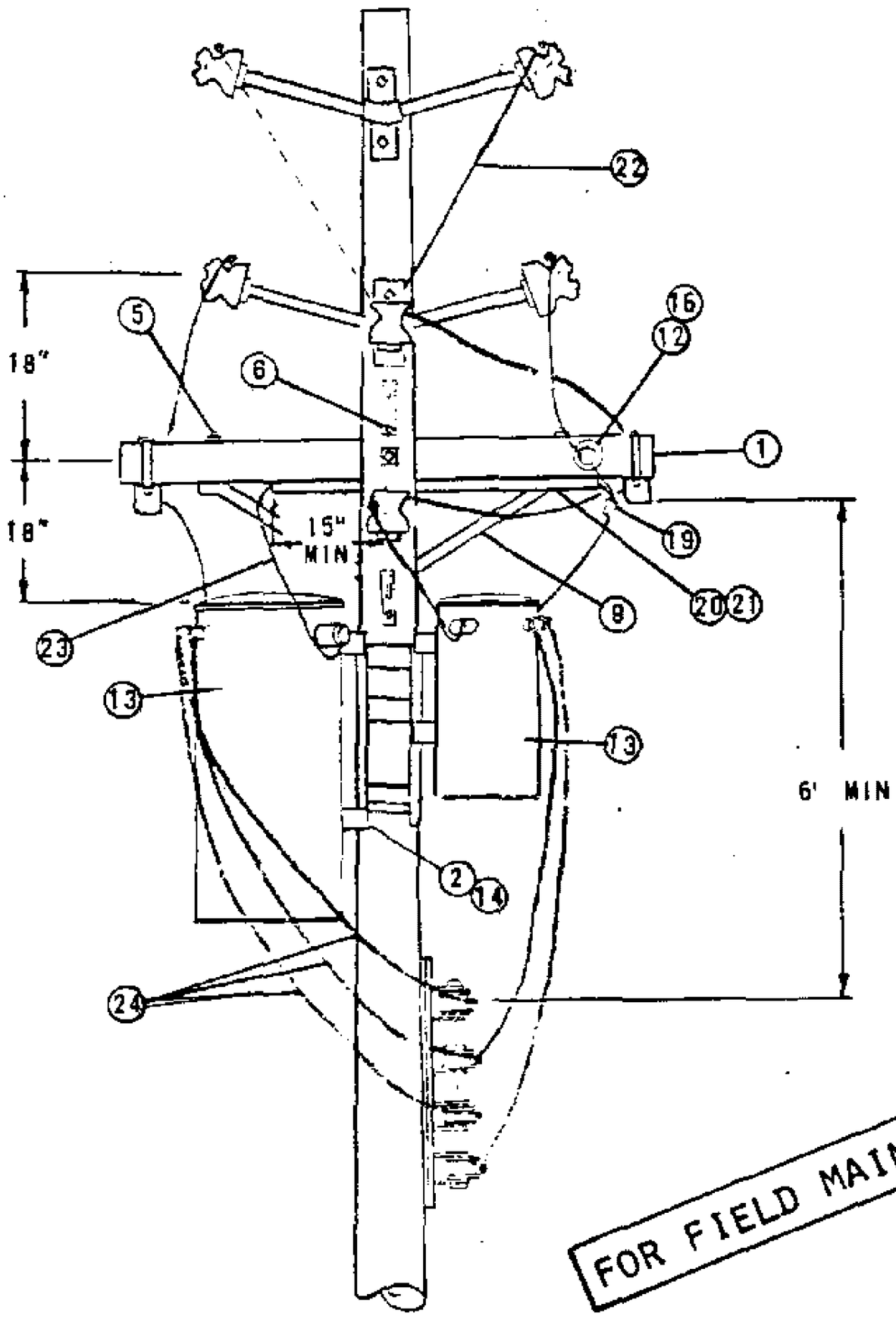
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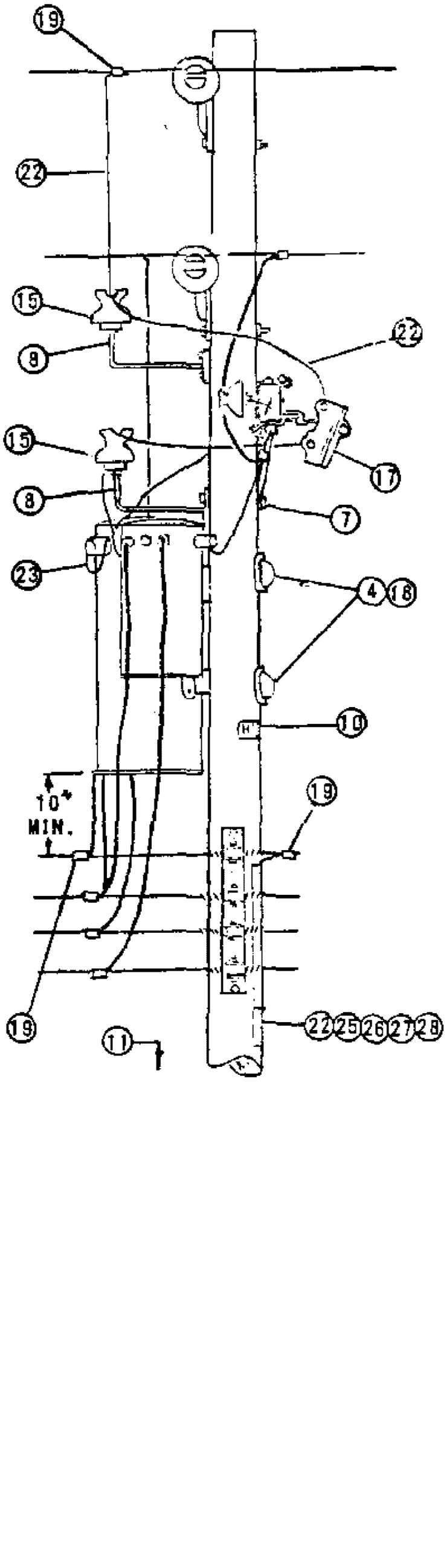
SHEET
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SDG&E ELECTRIC OVERHEAD STANDARD

4KV OPEN WYE OR 2.4KV OPEN DELTA TYPE "W" TRANSFORMER
INSTALLATION 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION

FMO
OH 1154




FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| DATE 1-1-86<br>APPD AE/KDB | SDG&E ELECTRIC STANDARDS<br>4KV OPEN WYE OR 2.4KV OPEN DELTA TYPE "W" TRANSFORMER INSTALLATION 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION | 1199.501<br>SUPERSEDES<br>1154.1 (1-1-86) |

NOTES:

(A) LIMITED TO TWO 50KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.
(B) USE TWO GROUND RODS SPACED A MINIMUM OF 6 FEET APART FOR EACH GROUND UNIT.
(C) 2.4KV 3ϕ OPEN DELTA INSTALLATIONS REQUIRE THREE CUTOUTS. FOR CONNECTIONS SEE PAGES 1117 AND 1118.
D. DO NOT USE OPEN DELTA OR OPEN WYE CONSTRUCTION WHERE SIZE OF A SINGLE 3ϕ MOTOR IS 15 HP OR LARGER.
(E) EXEMPT MATERIAL.
F. SEE DISTRIBUTION POLE TOPS SECTION FOR POLE TOP MATERIAL.
(G) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.
H. SEE ARRESTER SECTION FOR ARRESTER REQUIREMENTS.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD. |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2"X 4 1/2"X 6'-0" | 1 | PG |
| 2 | | BOLT, MACH., GALV., 5/8" (E) OR 3/4"X 2", 1 LOCK SPR WASH. | 4 | PGS 139, 140 |
| 3 | | BOLT, MACH., GALV., 5/8"X___", 2 SQ WASH. 1 DBL. COIL SPR. WASH. (E) | 1 | PGS 139, 140 |
| 4 | | BOLT, MACH., GALV., 3/4"X___", 1 SQ. CURV. WASH. WASH & 1 DBL COIL SPR. WASH. | 2 | PGS 139, 140 |
| 5 | | BOLT, MACH., GALV., 1/2"X 6", 1 RD WASH., 1 DBL.COIL SPR.WASH. (E) | 2 | 153088 |
| 6 | | SCREW, LAG. GALV., 1/2"X 4" (E) | 4 | 621568 |
| 7 | | SCREW, LAG. GALV., 5/8"X 5" (E) | 1 | 621600 |
| 8 | | BRACKET, INSULATOR, 1" | 2 | 166144 |
| 9 | | BRACE, CROSSARM, ANGLE 4'-0" | 1 | 164032 |
| 10 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV. (E) | 1 | 647648, 492224 |
| 11 | | STEPS, POLE (E) | 16 | 692992 |
| | 12 | BOLT, MACH. 5/8" X 5" (E) | 1 | 155488 |
| | 13 | TRANSFORMER, SINGLE PHASE | 2 | PGS 1121.1-1121.12 |
| | 14 | BRACKET, TRANSFORMER MOUNTING | 1 | 402976 |
| | 15 | INSULATOR (E) | 2 | 429024, 429216 |
| | 16 | PIN ADAPTER, 1 INCH THREAD | 1 | 529248 |
| | 17 | CUTOUT, 5KV (C) | 2 | PG 1211 |
| | 18 | COVER, PLASTIC THRU BOLT & 2-20D NAILS, GALV. (E) | 2 | 285696, 491392 |
| | 19 | CONNECTORS, WIRE COMPRESSION | 9 | PGS 783-787 |
| | 20 | CONDUIT, PVC, 3/4", SCHEDULE 40, TYPE 11 (E) | 4'-0" | 251328 |
| | 21 | STRAPS, PIPE, 3/4", 2-6D NAILS, GALV. (E) | 3 | 697888 |
| | 22 | WIRE, BARE STRANDED COPPER #6 | 41' | 813536 |
| | 23 | WIRE, INSULATED, XLP, STRANDED COPPER, 5KV, #6 | 30' | 194304 |
| | 24 | WIRE, W.P., COPPER, (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 30' | PG 1125 |
| | 25 | ROD, GROUND & CLAMP (B) (G) | 2 | 603072, 230016 (E) |
| | 26 | MOULDING, HARDWOOD, 1" (G) | 27' | 487200 |
| | 27 | STAPLES, MOULDING, GALV., 3"X 1 1/16"x 1/4" (G) (E) | 18 | 678560 |
| | 28 | STAPLES, FENCE, GALV., 1 1/4" (G) (E) | 20 | 678528 |
| | 29 | | | |

FOR FIELD MAINTENANCE ONLY

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1199.502
SUPERSEDES
1154.2 (1-1-86)

SDG&E ELECTRIC STANDARDS

4KV OPEN WYE OR 2.4KV OPEN DELTA TYPE "W" TRANSFORMER INSTALLATION 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION

DATE 1-1-86
APPD AK/RDS

# OH1156 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**02/16/2023:** A NEWER VERSION MOVED TO FMO

**07/13/2016:** MOVED TO FMO

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| | SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS | | | |
| | OPEN WYE OR OPEN DELTA INSTALLATIONS | | | |
| | | | | FMO OH1156 |

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 4KV OPEN WYE WITH TYPE 'W' TRANSFORMERS, CUTOUT ARM AND SECONDARY LINE ARM CONSTRUCTION.

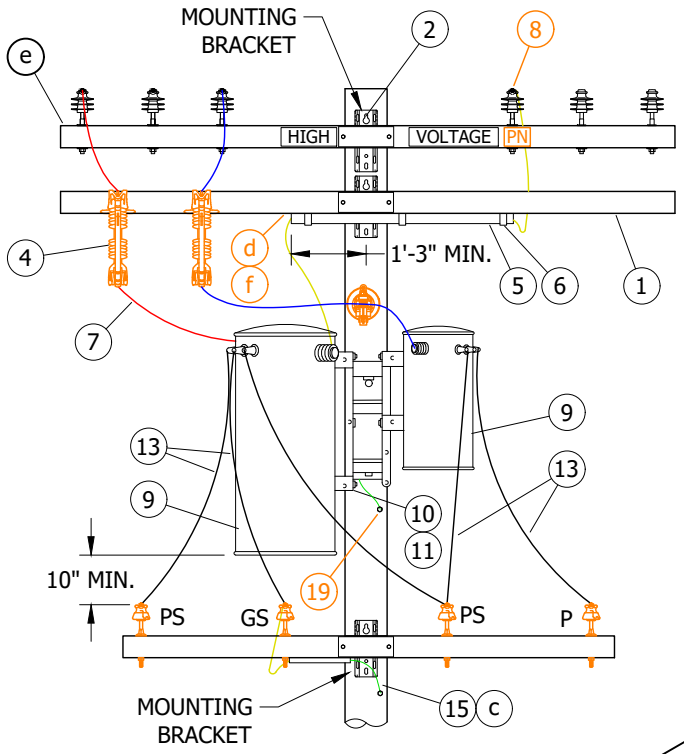



**FIGURE 1**
FRONT VIEW

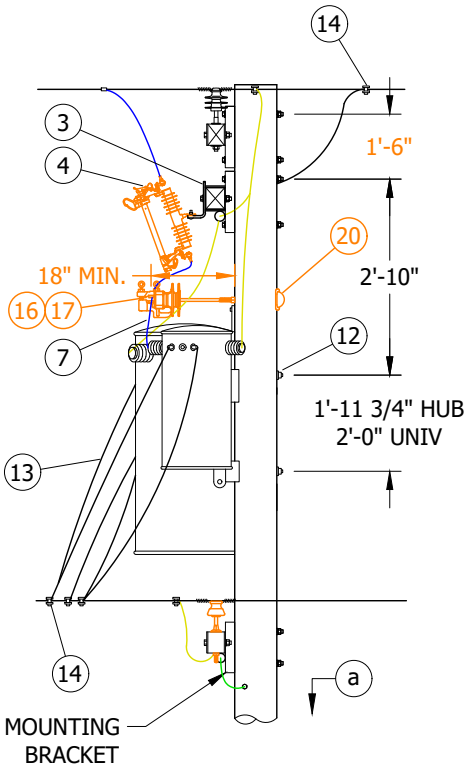



**FIGURE 1**
SIDE VIEW

FIELD MAINTENANCE ONLY

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## INSTALLATION:

(A) LIMITED TO 50 KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.

(B) 2.4KV THREE-PHASE OPEN DELTA INSTALLATIONS REQUIRE THREE CUTOUTS. FOR CONNECTIONS, SEE PAGE 1117.

C. DO NOT USE OPEN DELTA OR OPEN WYE CONSTRUCTION WHERE SIZE OF A SINGLE THREE-PHASE MOTOR IS 15 HP OR LARGER.

D. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10'-0" | 2 | 379 | S294378 | 4TF |
| 2 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ. & 1 DBL COIL SPRING WASHER | 4 | 390 | -- | -- |
| 3 | BRACKET, CUTOUT/ARRESTER, CROSSARM MOUNTING | 2 | 397 | S165452 (X) | COBKT |
| 4 | CUTOUT, 12KV (B) | 2 | 1212 | -- | -- |

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| C | TABLE UPDATE | - | JAC | JES | CZH | 11/12/2019 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | JS | DW | 06/12/2013 | D | UPDATED AND MOVED TO FMO | ARC | MRF | GLW | KRG | 02/16/2023 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

4KV, OPEN WYE TYPE "W" TRANSFORMER
INSTALLATION, CUTOUT ARM, SECONDARY LINE ARM CONSTRUCTION

FMO OH1156.1

## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|---|
| 5 | CONDUIT, PVC, 3/4" X 4'-0", SCH 40, TYPE 2 | | | 1 | -- | S251328 | -- |
| 6 | STRAP, CONDUIT, 3/4", GALV (I) | | | 3 | -- | S697888 | -- |
| 7 | WIRE, HENDRIX, TAP | | | 25'-0" | 711 | -- | -- |
| 8 | INSULATOR, 12KV NEUTRAL | | | 1 | 750 | S429216 | -- |
| 9 | TRANSFORMER, SINGLE-PHASE, TYPE W (A) | | | 1 | 1121 | -- | -- |
| 10 | BRACKET, TRANSFORMER MOUNTING | | | 1 | -- | S402976 | -- |
| 11 | BOLT, MACH, GALV, 5/8" OR 3/4" X 2", 2 RD & 1 LOCK WASHER | | | 4 | 390 | -- | -- |
| 12 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV & 1 DBL COIL SPRING WASHER | | | 2 | 390 | -- | -- |
| 13 | WIRE, THW (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | | 35'-0" | 1125 | -- | -- |
| 14 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | | | AS REQ'D | 783, 785 | -- | -- |
| 15 | GROUNDING, #4 GROUND WIRE, RODS AND CONNECTORS | | STEEL POLE | 1 | 1002 | -- | GNDPSP |
| | | | WOOD/FG POLE | | | | GNDPVC |
| 16 | INSULATOR, VISE-TOP | | | 1 | 750 | -- | -- |
| 17 | BRACKET, INSULATOR, STANDOFF | 30" | 1" THREAD | 1 | 390 | S166144 | KBKT30 |
| | | 28" | 1 3/8" THREAD | | | S166176 | KBKT28 |
| 18 | SCREW (I) | | | AS REQ'D | -- | S618086 (X) | -- |
| 19 | BLIND NUT, 1/2" | | | AS REQ'D | -- | S503460 (X) | -- |
| 20 | COVER, BOLT | | | 1 | 390 | S285696 | -- |

## NOTES:

(I) NOT SHOWN ON FIGURES.

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) FOR POLE STEPPING, SEE OH363.

b. FOR LIGHTNING ARRESTER REQUIREMENTS, SEE OH1247.

(c) FOR GROUNDING METHODS, SEE OH1002.

(d) SEE OH287: CONTAMINATION DISTRICTS.

(e) FOR FIBERGLASS CROSSARMS, SEE OH379.

(f) FOR BONDING, SEE OH1003.

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

4KV, OPEN WYE TYPE "W" TRANSFORMER
INSTALLATION, CUTOUT ARM, SECONDARY LINE ARM CONSTRUCTION



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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 12KV, THREE-PHASE, OPEN DELTA TYPE "H" OR "HF" TRANSFORMER.

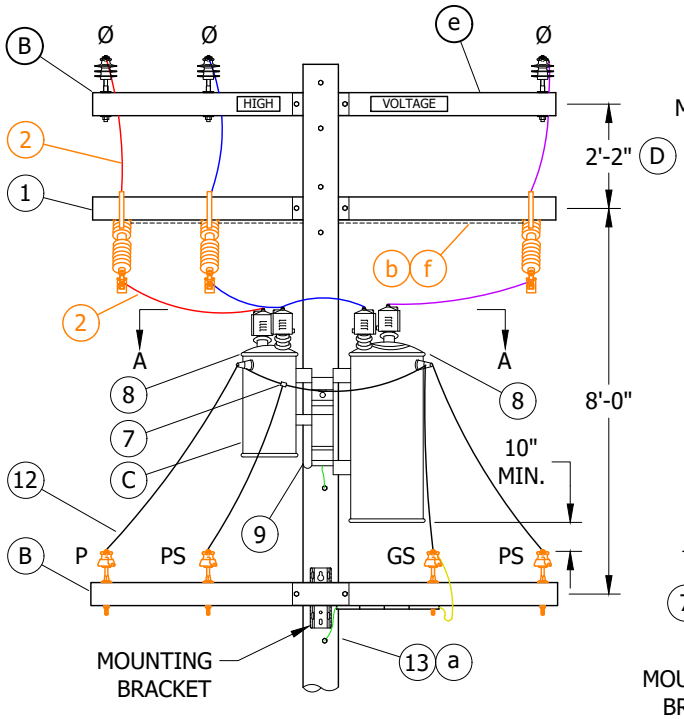



**FIGURE 1**
FRONT VIEW

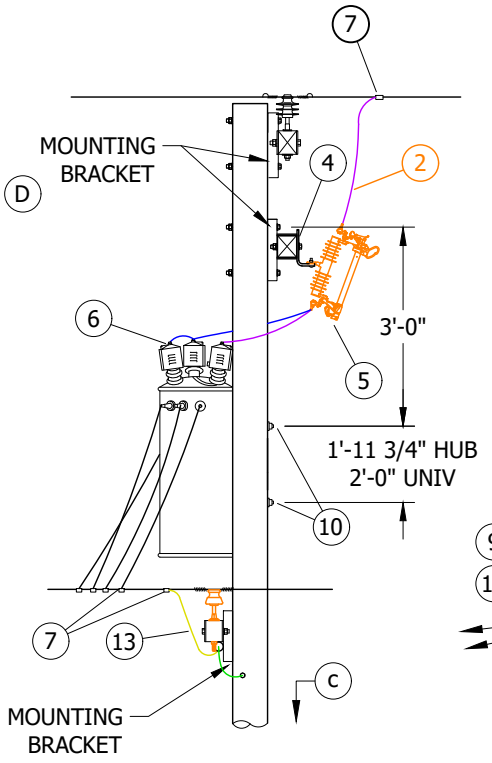



**FIGURE 1**
SIDE VIEW

**TABLE 1**

| MACRO UNITS | |
|---|---|
| **KVA** | **OVERHEAD MACRO UNITS** |
| 25 | 25H120 |
| 50 | 50H120 |
| 75 | 75H120 |

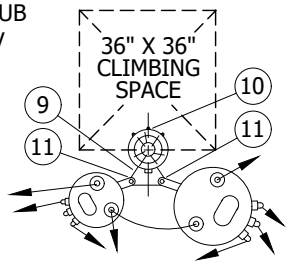



**FIGURE 1**
VIEW A-A

FIELD MAINTENANCE ONLY

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## INSTALLATION:

(A) LIMITED TO TWO 50 KVA MAXIMUM TRANSFORMERS BECAUSE OF ENCROACHMENT ON CLIMBING SPACE. 75KVA TRANSFORMERS MAY BE USED IF THEY HAVE SMALL CASES.

(B) PRIMARY AND SECONDARY CONSTRUCTION SHOWN ARE TYPICAL, AND THEIR MATERIALS ARE NOT INCLUDED. MAY BE INSTALLED WITH ARMLESS PRIMARY OR CABLE SECONDARY.

(C) POWER TRANSFORMER TO BE HUNG ON SAME SIDE OF POLE AS 2-PHASE WIRES TO PREVENT PHASING PROBLEMS WHEN CLOSING DELTA.

(D) IF ADDITIONAL SPACE IS REQUIRED BELOW THE CUTOUT ARM, THE SEPARATION BETWEEN THE LINE ARM AND CUTOUT ARM MAY BE REDUCED TO 12-INCH WITH THE USE OF A SPACE BOLT, SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

E. OPEN DELTA INSTALLATIONS ARE NOT TO BE USED IF SERVICE TO ANY THREE-PHASE MOTOR LARGER THAN 10 HP IS REQUIRED. GENERALLY, OPEN DELTA INSTALLATIONS SHOULD NOT BE USED TO SERVE SUBMERSIBLE PUMPS OF ANY SIZE. SEE DESIGN MANUAL PAGE 5413.4.

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

12KV, THREE-PHASE, OPEN DELTA TYPE "H" OR "HF" TRANSFORMER INSTALLATION

FMO OH1156.3

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, 3 3/4" X 5 3/4" X 10'-0" | | 2 | 379 | S294378 | 4TF |
| 2 | WIRE, MEDIUM HARD-DRAWN COPPER, POLYETHYLENE COVERED, #4/7 STRAND | | AS REQ'D | 711 | S815044 | POLY4J |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ & 1 DBL COIL SPRING WASHER (I) | | 1 | 390 | -- | -- |
| 4 | BRACKET, CUTOUT/ARRESTER, CROSSARM MOUNTING | | 3 | 397 | S165452 (X) | COBKT |
| 5 | CUTOUT, 12KV | | 3 | 1240 | -- | -- |
| 6 | BUSHING COVER, TRANSFORMER | | 4 | -- | S289188 (X) | BSHCOV |
| 7 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, AS REQ'D | | AS REQ'D | 783, 785 | -- | -- |
| 8 | TRANSFORMER, SINGLE-PHASE, TYPE H OR HF (A) | | 2 | 1121 | -- | -- |
| 9 | BRACKET, TRANSFORMER MOUNTING | | 1 | -- | S402976 | -- |
| 10 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D) 1 SQ CURV WASHER & 1 DBL COIL SPR WASH | | 2 | 390 | -- | -- |
| 11 | BOLT, MACH, GALV, 5/8" OR 3/4" X 2", 1 RD WASHER & 1 DBL COIL SPRING WASH | | 4 | 390 | -- | -- |
| 12 | WIRE, THW COPPER, (SIZE DETERMINED BY TRANSFORMER CAPACITY) | | 28'-0" | 1125 | -- | -- |
| 13 | GROUNDING, #4 PVC GROUND WIRE, RODS AND CONNECTORS | STEEL POLE | 1 | 1002 | -- | GNDPSP |
| | | WOOD/FG POLE | | | | GNDPVC |

## NOTES:

(I) NOT SHOWN ON FIGURES.

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) FOR GROUNDING METHODS, SEE OH1002.

(b) SEE OH287: CONTAMINATION DISTRICTS.

(c) FOR POLE STEPPING, SEE OH363.

d. FOR LIGHTNING ARRESTER REQUIREMENTS, SEE OH1247.

(e) SEE OH379: FIBERGLASS CROSSARMS.

(f) FOR BONDING, SEE OH1003.

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| C | TABLE UPDATE | - | JAC | JES | CZH | 11/12/2019 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | JS | DW | 06/12/2013 | D | UPDATED AND MOVED TO FMO | ARC | MRF | GLW | KRG | 02/16/2023 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

12KV, THREE-PHASE, OPEN DELTA TYPE "H" OR "HF" TRANSFORMER INSTALLATION

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 7.2KV, THREE-PHASE, OPEN WYE TYPE "Y" OR "YF" TRANSFORMERS FOR 120/240V OR 240/480V OPEN DELTA SECONDARIES.

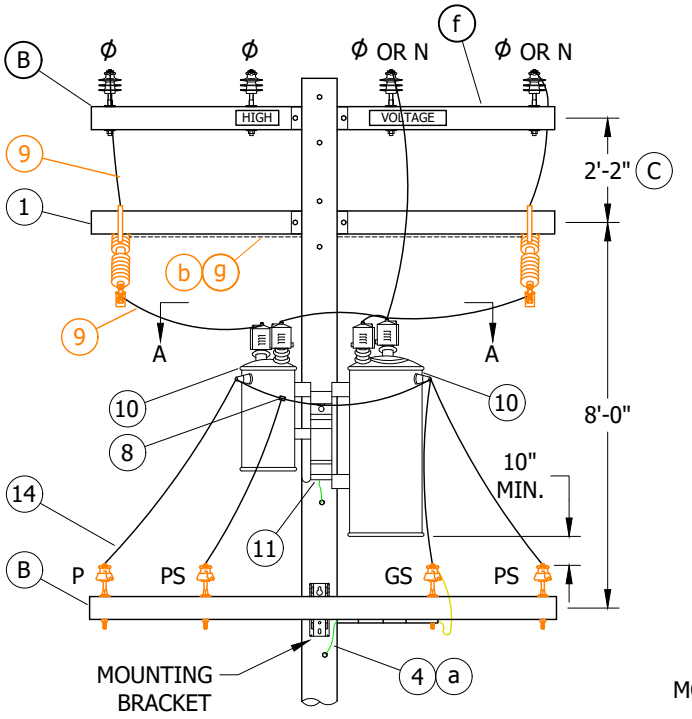



**FIGURE 1**
FRONT VIEW

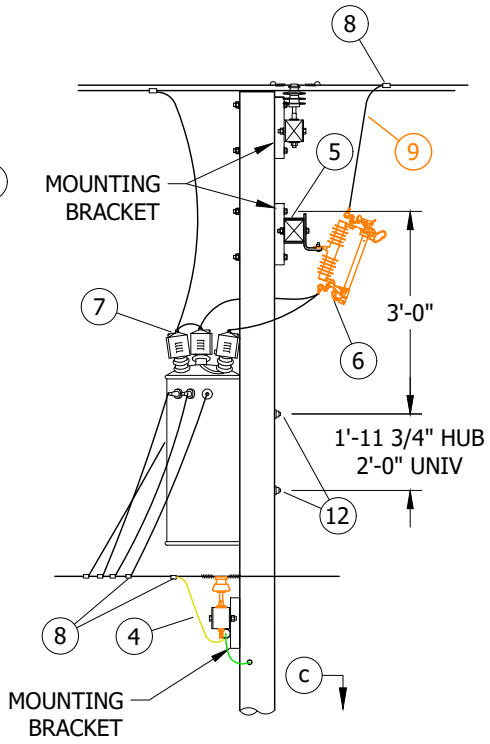



**FIGURE 1**
SIDE VIEW

**TABLE 1**

| MACRO UNITS | |
|---|---|
| KVA | OVERHEAD MACRO UNITS |
| 25 | 25Y120 |

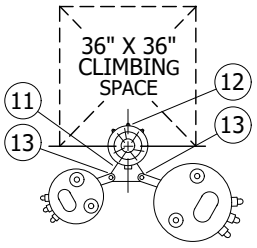



**FIGURE 1**
VIEW A-A

FIELD MAINTENANCE ONLY

## INSTALLATION:

(A) LIMITED TO TWO TRANSFORMERS OF 50 KVA MAXIMUM CAPACITY BECAUSE OF ENCROACHMENT ON CLIMBING SPACE. 75KVA TRANSFORMERS MAY BE USED IF THEY DO NOT ENCROACH IN CLIMBING SPACE.

(B) PRIMARY AND SECONDARY CONSTRUCTION SHOWN ARE TYPICAL, AND THEIR MATERIALS ARE NOT INCLUDED. MAY BE INSTALLED WITH ARMLESS PRIMARY OR CABLE SECONDARY.

(C) IF ADDITIONAL SPACE IS REQUIRED BELOW THE CUTOUT ARM, THE SEPARATION BETWEEN THE LINE ARM AND CUTOUT ARM MAY BE REDUCED TO 12 INCHES WITH THE USE OF A SPACE BOLT. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

D. INSTALLATION FURTHER THAN FIVE MILES FROM SUBSTATION REQUIRES ELECTRIC DISTRIBUTION STANDARDS APPROVAL (SEE DM6212).

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| C | TABLE UPDATE | - | JAC | JES | CZH | 11/12/2019 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | JS | DW | 06/12/2013 | D | UPDATED AND MOVED TO FMO | ARC | MRF | GLW | KRG | 02/16/2023 |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed



SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

7.2KV, THREE-PHASE, OPEN WYE TYPE "Y" OR "YF" TRANSFORMER INSTALLATION

FMO OH1156.5

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## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, 3 3/4" X 5 3/4" X 10'-0" | 1 | 379 | S294378 | 4TF |
| 2 | BLIND NUT, 1/2" (I) | AS REQ'D | 1002 | S503460 (X) | -- |
| 3 | SCREWS (I) | AS REQ'D | -- | S618086 (X) | -- |
| 4 | GROUNDING, #4 PVC GROUND WIRE, RODS AND CONNECTORS — STEEL POLE | 1 | 1002 | -- | GNDPSP |
| | GROUNDING, #4 PVC GROUND WIRE, RODS AND CONNECTORS — WOOD/FG POLE | | | | GNDPVC |
| 5 | BRACKET, CUTOUT/ARRESTER, CROSSARM MOUNTING | 2 | 397 | S165452 (X) | COBKT |
| 6 | CUTOUT, 12KV | 2 | 1240 | -- | -- |
| 7 | BUSHING COVER, TRANSFORMER | 4 | -- | S289188 (X) | BSHCOV |
| 8 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783, 785 | -- | -- |
| 9 | WIRE, MEDIUM HARD-DRAWN COPPER, POLYETHYLENE COVERED, #4/7 STRAND (II) | 12'-0" | 711 | S815044 | POLY4J |
| 10 | TRANSFORMER, SINGLE-PHASE, TYPE "Y" OR "YF" (A) | 2 | 1121 | -- | -- |
| 11 | BRACKET, TRANSFORMER MOUNTING | 1 | -- | S402976 | -- |
| 12 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D) 1 SQ CURV WASHER & 1 DBL COIL SPR WASH | 2 | 390 | -- | -- |
| 13 | BOLT, MACH, GALV, 5/8" OR 3/4" X 2", 1 RD WASHER & 1 DBL COIL SPRING WASH | 4 | 390 | -- | -- |
| 14 | WIRE, THW COPPER, (SIZE DETERMINED BY TRANSFORMER CAPACITY) | 28'-0" | 1125 | -- | -- |
| 15 | STAPLES, FENCE, GALV., 1 1/4" (II) | AS REQ'D | -- | -- | -- |

## NOTES:

(I) NOT SHOWN ON FIGURES.
(II) IF BONDING IS REQUIRED, ORDER ADDITIONAL ITEMS.
(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) FOR GROUNDING METHODS, SEE OH1002.
(b) SEE OH287: CONTAMINATION DISTRICTS.
(c) FOR POLE STEPPING, SEE OH363.
d. FOR LIGHTNING ARRESTER REQUIREMENTS, SEE OH1247.
e. FOR TRANSFORMER CONNECTION DIAGRAMS, SEE OH1116.
(f) SEE OH379: FIBERGLASS CROSSARMS.
(g) FOR BONDING, SEE OH1003.

FIELD MAINTENANCE ONLY

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| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
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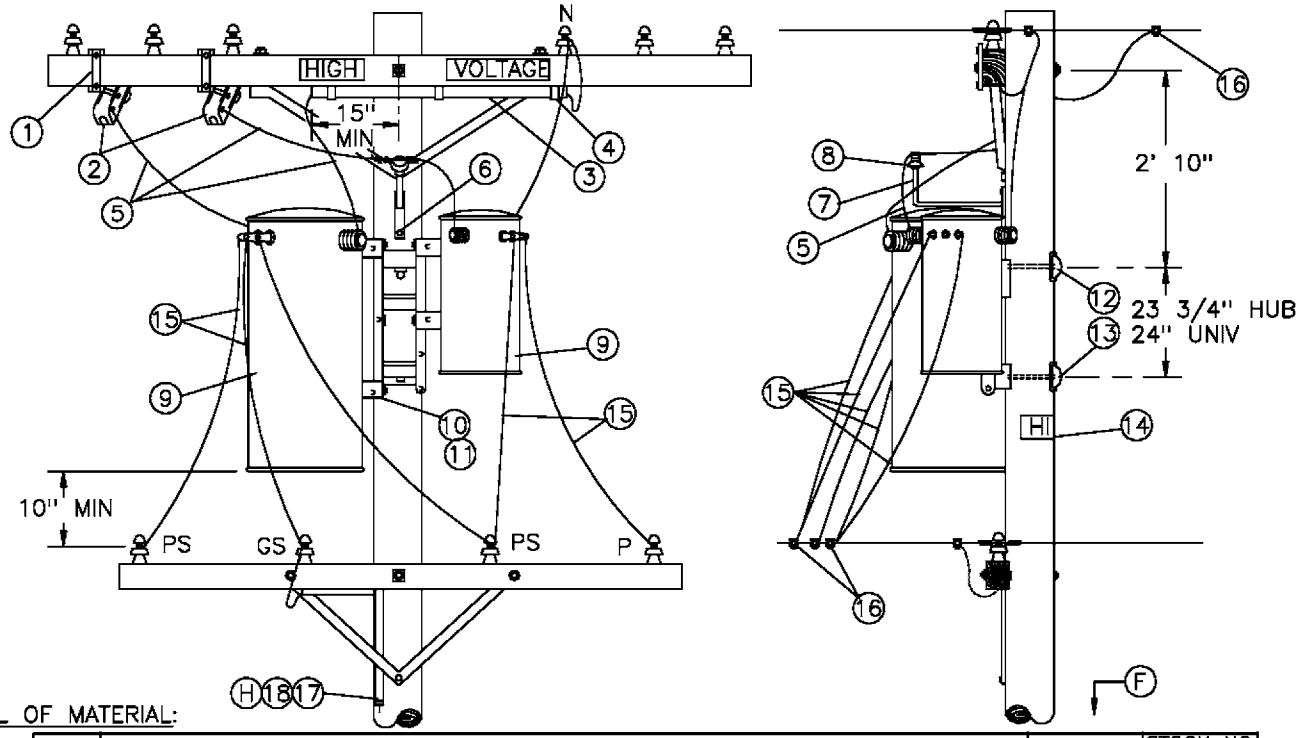
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

7.2KV, THREE-PHASE, OPEN WYE TYPE "Y" OR "YF" TRANSFORMER INSTALLATION

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 4KV OPEN WYE WITH TYPE 'W' TRANSFORMERS, AND SECONDARY LINE ARM CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 2 | 166070 |
| 2 | CUTOUT, 12KV (B) | 2 | STD 1212 |
| 3 | CONDUIT, PVC, 3/4" X 4', SCHED 40, TYPE 2 | 1 | 251328 |
| 4 | STRAP, CONDUIT, 3/4", GALV & 2 – 6D NAILS, GALV | 3<br>– | 697888<br>491552 |
| 5 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 25' | 194304 |
| 6 | SCREW, LAG, 1/2" X 4" | 2 | 621568 |
| 7 | BRACKET, INSULATOR, 1" LEAD THREAD | 1 | 166134 |
| 8 | INSULATOR, 12KV NEUTRAL | 1 | 429216 |
| 9 | TRANSFORMER, SINGLE PHASE, TYPE W (A) | 1 | STD 1121 |
| 10 | BRACKET, TRANSFORMER MOUNTING | 1 | 402976 |
| 11 | BOLT, MACH, GALV, 5/8" OR 3/4" X 2", 2 RD & 1 LOCK WASHER | 4 | STD 392 |
| 12 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 13 | COVER, VOLT, PLASTIC & 6 – 10D NAILS, GALV | 2<br>– | 285696<br>491392 |
| 14 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV | 1<br>– | 647648<br>492224 |
| 15 | WIRE, W.P. (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 35' | STD 1125 |
| 16 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–787 |
| 17 | WIRE, BARE STRANDED, COPPER, #6 | 40' | 813536 |
| 18 | UNIT GROUND, COMPLETE (H) | 1 | 603136 |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

(A) LIMITED TO 50 KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.
(B) 2.4KV 3Ø OPEN DELTA INSTALLATIONS REQUIRE THREE CUTOUTS. FOR CONNECTIONS SEE PAGE 1117.
C. DO NOT USE OPEN DELTA OR OPEN WYE CONSTRUCTION WHERE SIZE OF A SINGLE 3Ø MOTOR IS 15 HP OR LARGER.

REFERENCE:

(F) POLE–STEPPING – SEE STANDARD 363.
G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.
(H) GROUNDING METHODS – SEE STANDARD 1002.
I. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON STANDARD 287.

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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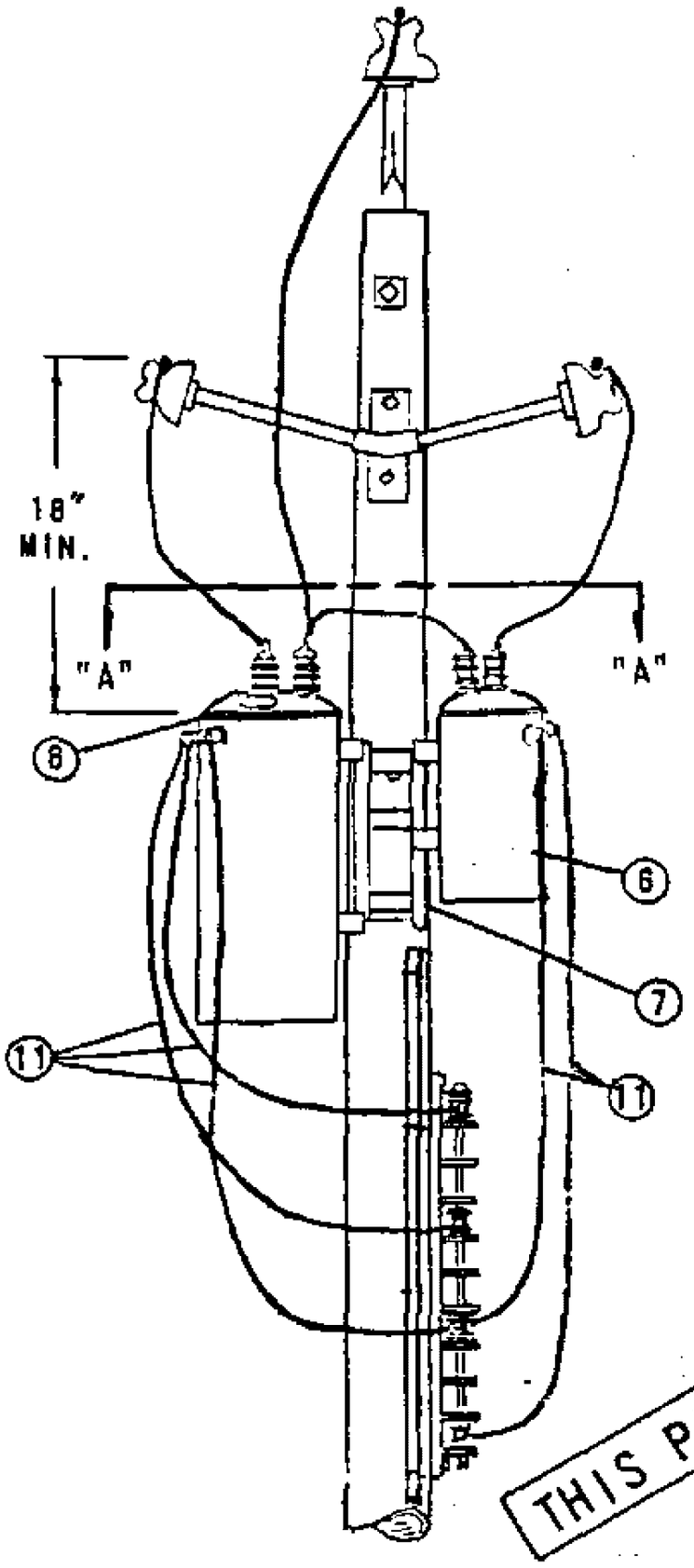
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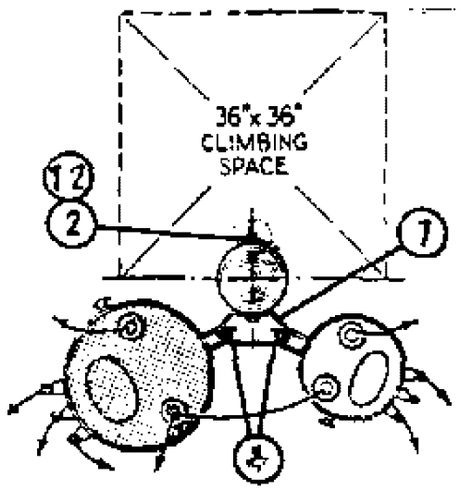
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SDG&E ELECTRIC OVERHEAD STANDARD

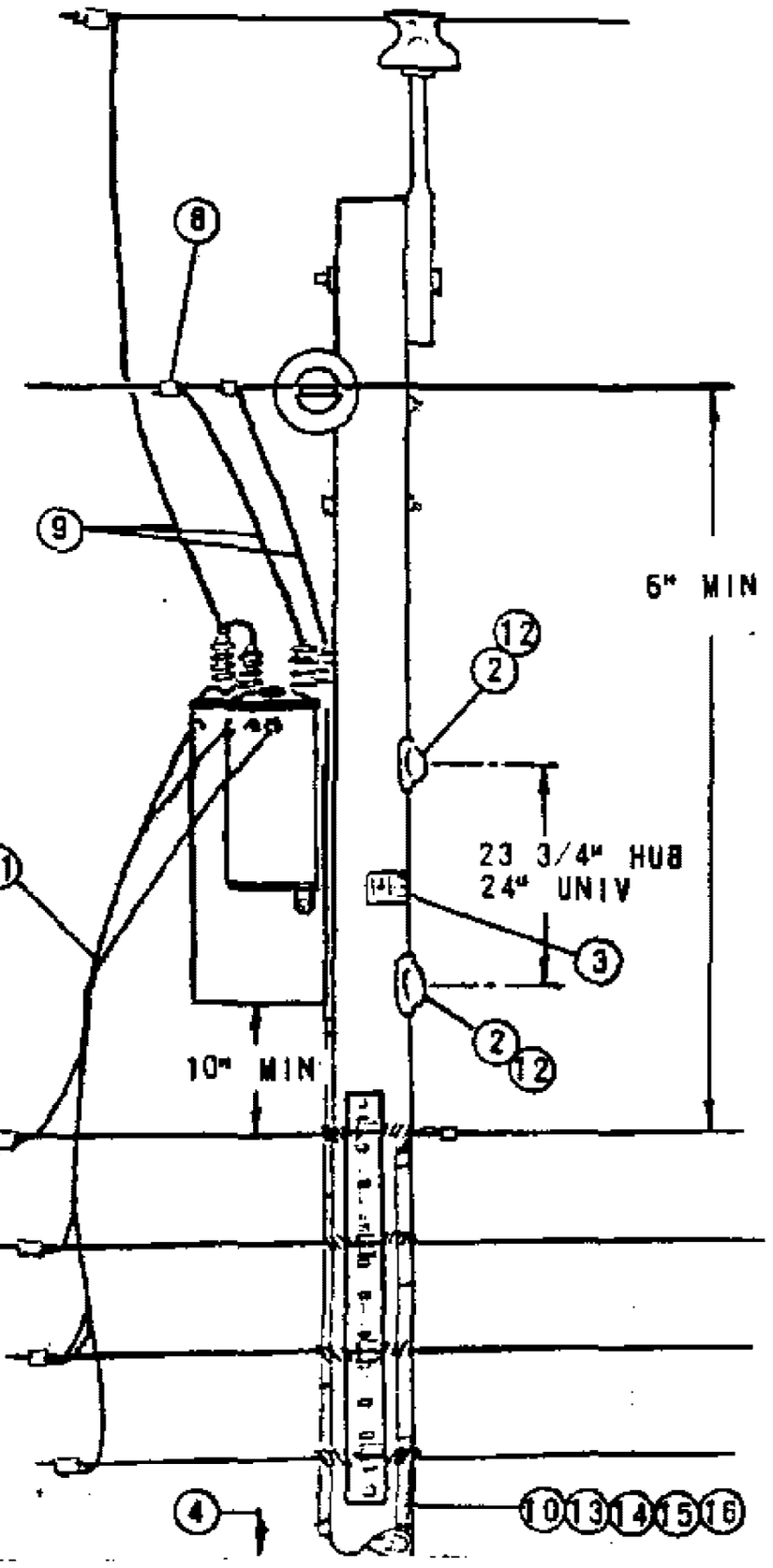
12KV OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER
INSTALLATION, 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION

FMO
OH 1161




SECTION "A" - "A"




THIS PAGE FIELD MAINTENANCE ONLY

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NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

(B) USE TWO ROD GROUND.

C. SEE DISTRIBUTION POLE TOP SECTION FOR POLE TOP MATERIAL.

D. LIMITED TO TWO 50KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.

(E) EXEMPT MATERIAL.

F. WHEN ARRESTERS ARE REQUIRED PER STANDARDS PAGE 1247, USE TYPE "HJ" TRANSFORMERS.

| ITEM PTF | ITEM LTI | DESCRIPTION | | QUANTITY HE | QUANTITY HJ | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|---|
| | | BOLT, MACH., GALV., 5/8" (E) OR 3/4" X 2", 1 SQ. CURV WASH., 1 LOCK SPR WASH. | | 4 | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH., GALV., 3/4"X___" 1 SQ. CURV. WASH, 1 DBL COIL SPR WASH. | | 2 | 2 | PGS 139,140 |
| 3 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV | (E) | 1 | 1 | 647648, 492192 |
| 4 | | STEPS, POLE | (E) | 16 | 16 | 592992 |
| 5 | | | | | | |
| | 6 | TRANSFORMER, SELF PROTECTED TYPE, SINGLE PHASE (HE or HJ) | | 2 | 2 | PGS 1121.01-1121.12 |
| | 7 | BRACKET, TRANSFORMER MOUNTING | | 1 | 1 | 402976 |
| | 8 | CONNECTORS, WIRE, COMPRESSION | | 10 | 11 | PGS 783 - 787 |
| | 9 | WIRE, BARE STRANDED, COPPER, #6 | | 70' | 70' | 813536 |
| | 10 | WIRE, BARE STRANDED, COPPER, #2 | | — | 40' | 813664 |
| | 11 | WIRE, W.P. COPPER, (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | 30' | 30' | PG 1125 |
| | 12 | COVER, PVC THRU BOLT & 6-100, NAILS, GALV. | (E) | 2 | 2 | 285696, 491392 |
| | 13 | ROD, GROUND & CLAMP (B) | (A) | 2 | 4 | 603072, 230016 (E) |
| | 14 | MOULDING, HARDWOOD, 1" | (A) | 27' | 57' | 487200 |
| | 15 | STAPLES, MOULDING, GALV., 3"X 1 1/16"X 1/4" | (A) (E) | 20 | 38 | 678560 |
| | 16 | STAPLES, FENCE, GALV., 1 1/4" | (A) (E) | 25 | 50 | 678528 |
| | 17 | | | | | |

DATE 1-1-86
APPD AE/RDS

SDG&E ELECTRIC STANDARDS

# 12KV OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION

1199.601
SUPERSEDES
1161 (1-1-86)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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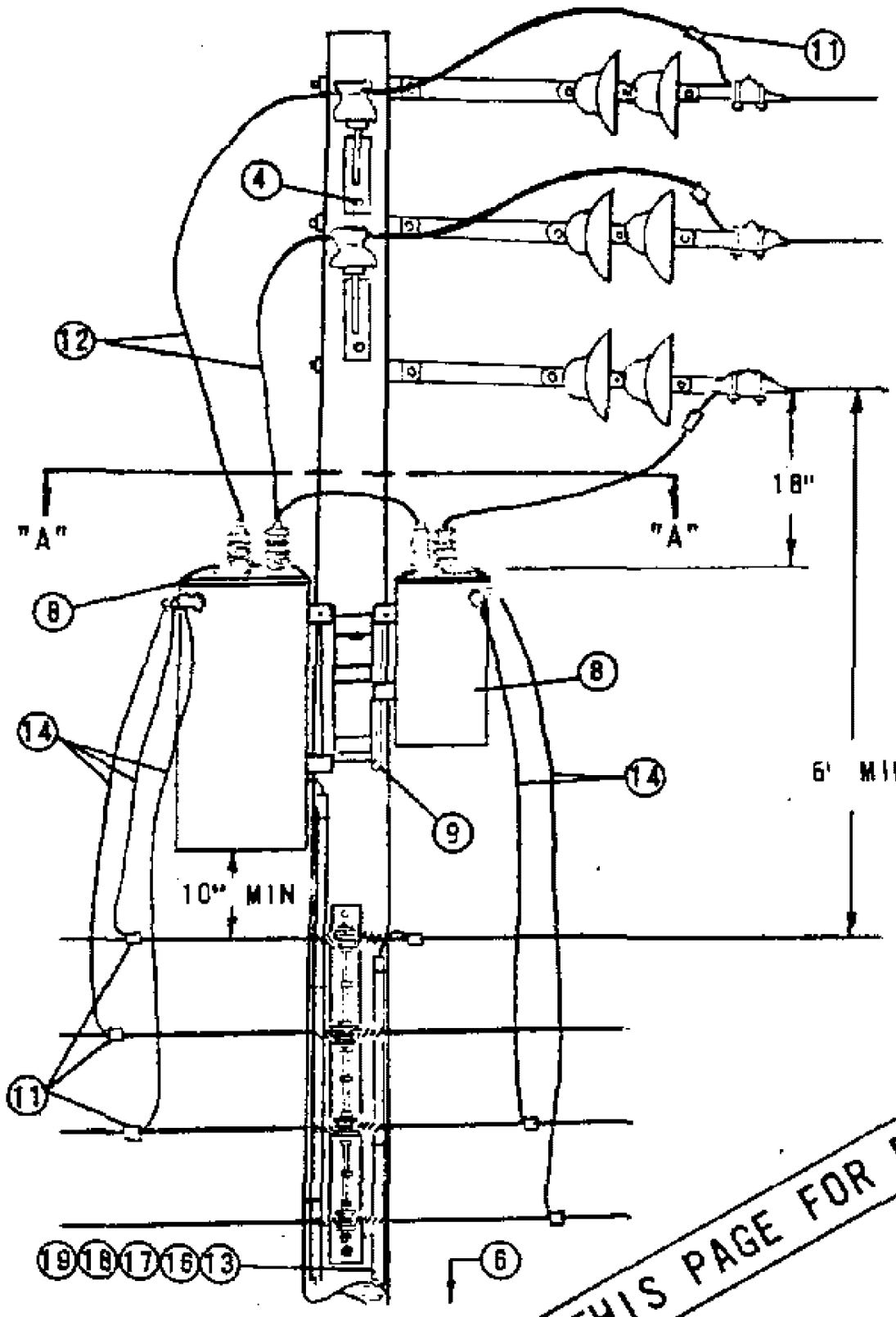
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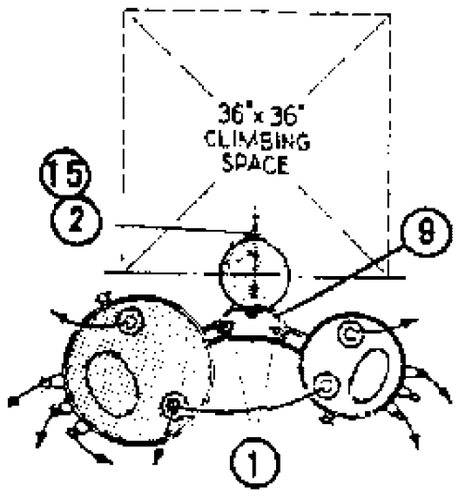
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SDG&E ELECTRIC OVERHEAD STANDARD

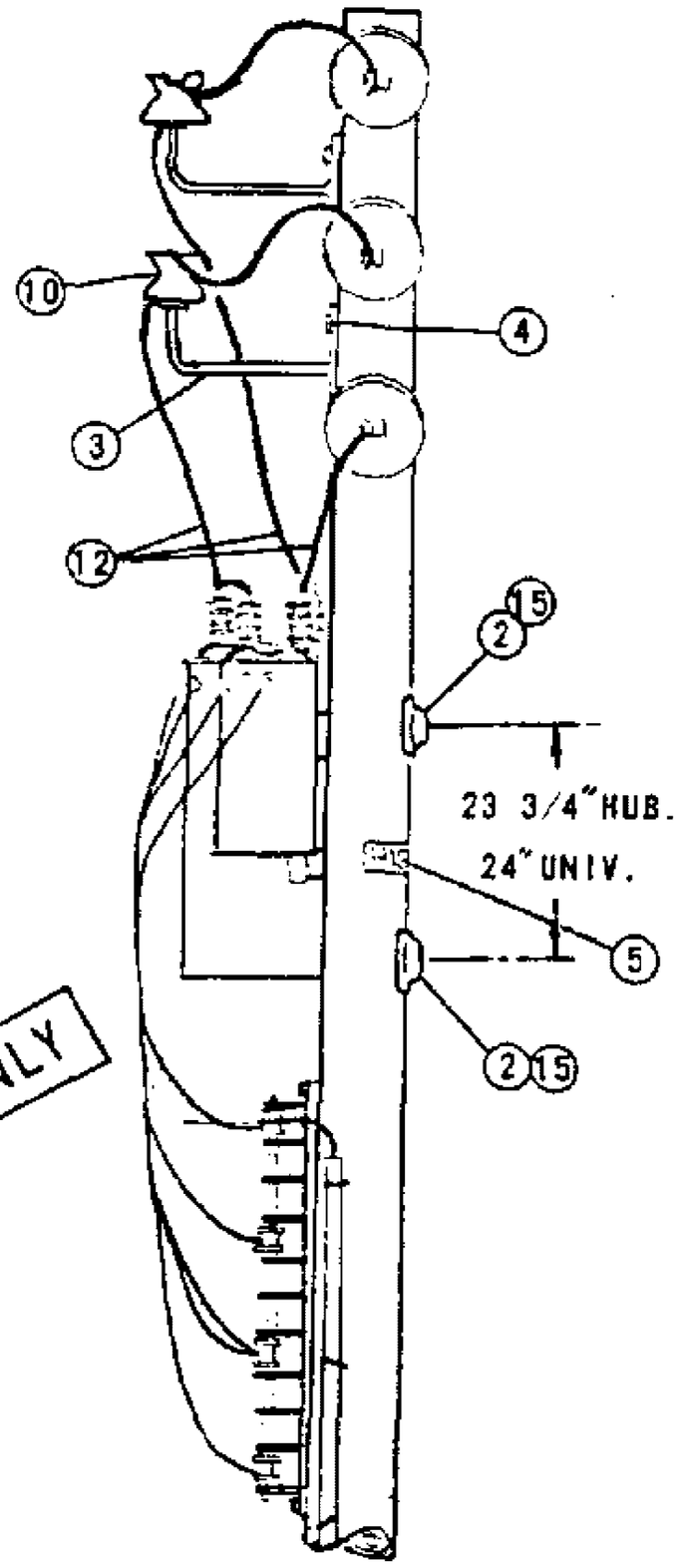
12KV OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION
2-50KVA MAX., ARMLESS DEAD END CONSTRUCTION

FMO
OH 1162




SECTION "A" - "A"




THIS PAGE FOR FIELD MAINTENANCE ONLY

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.
(B) USE TWO ROD GROUND.
C. SEE DISTRIBUTION POLE TOP SECTION FOR POLE TOP MATERIAL.
D. LIMITED TO TWO 50KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.
(E) EXEMPT MATERIAL.
F. WHEN ARRESTERS ARE REQUIRED PER STANDARDS PAGE 1247, USE TYPE 'HJ' TRANSFORMERS.

| ITEM PTF | ITEM LTI | DESCRIPTION | | | QUANTITY HE | QUANTITY HJ | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|---|---|
| 1 | | BOLT, MACH., GALV., 5/8" (E) OR 3/4"X 2", 1 SQ. CURV WASH., 1 LOCK SPR WASH. | | | 4 | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH., GALV., 3/4"X__" 1 SQ. CURV WASH., 1 DBL. COIL SPR. WASH. | | | 2 | 2 | PGS 139, 140 |
| 3 | | BRACKET, INSULATOR, 1" OR 1 3/8" LEAD THREAD | | | 2 | 2 | 166144-166176 |
| 4 | | SCREW, LAG, GALV., 1/2"X 4" | | (E) | 4 | 4 | 621568 |
| 5 | | SIGN, HIGH VOLTAGE, & 6 ROOFING NAILS, GALV. | | (E) | 1 | 1 | 647648, 492192 |
| 6 | | STEPS, POLE | | (E) | 16 | 16 | 692992 |
| 7 | | | | | | | |
| | 8 | TRANSFORMER, SELF PROTECTED TYPE, SINGLE PHASE, (HE or HJ) | | | 2 | 2 | PGS 1121.01-1121.12 |
| | 9 | BRACKET, TRANSFORMER MOUNTING | | | 1 | 1 | 402976 |
| | 10 | INSULATOR, 12KV, (CLASS 55-5 OR 56-1) | | | 2 | 2 | PG 750 |
| | 11 | CONNECTORS, WIRE COMPRESSION | | | 9 | 9 | PGS 783-787 |
| | 12 | WIRE, BARE STRANDED, COPPER #6 | | | 70' | 70' | 813536 |
| | 13 | WIRE, BARE STRANDED, COPPER #2 | | | — | 40' | 813664 |
| | 14 | WIRE, W.P. COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | | 30' | 30' | PG 1125 |
| | 15 | COVER, PVC THRU BOLT & 6-10D NAILS, GALV. | | | 2 | 2 | 285696, 451392 |
| | 16 | ROD, GROUND & CLAMP (B) | (A) | | 2 | 4 | 603072, 230016 (E) |
| | 17 | MOULDING, HARDWOOD, 1" | (A) | | 27' | 57' | 487200 |
| | 18 | STAPLES, MOULDING GALV., 3"X 1 1/16"X 1/4" | (A) | (E) | 20 | 38 | 678560 |
| | 19 | STAPLES, FENCE, GALV., 1 1/4" | (A) | (E) | 25 | 50 | 678528 |

1199.602
SUPERSEDES
1162 (1-1-86)

SDG&E ELECTRIC STANDARDS

12KV OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION
2-50KVA MAX., ARMLESS DEAD END CONSTRUCTION

DATE 1-1-86
APPD AK/RPS

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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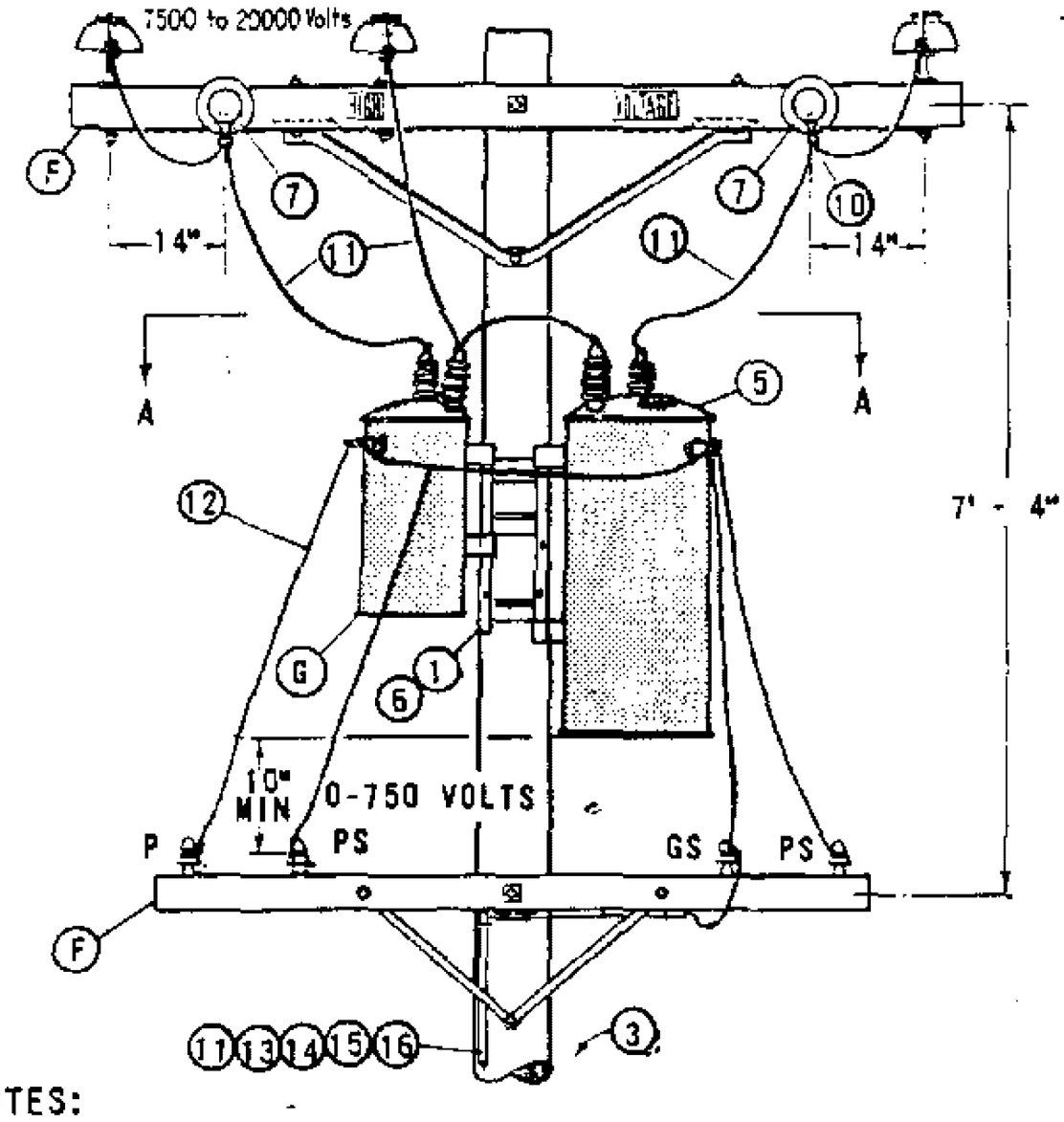
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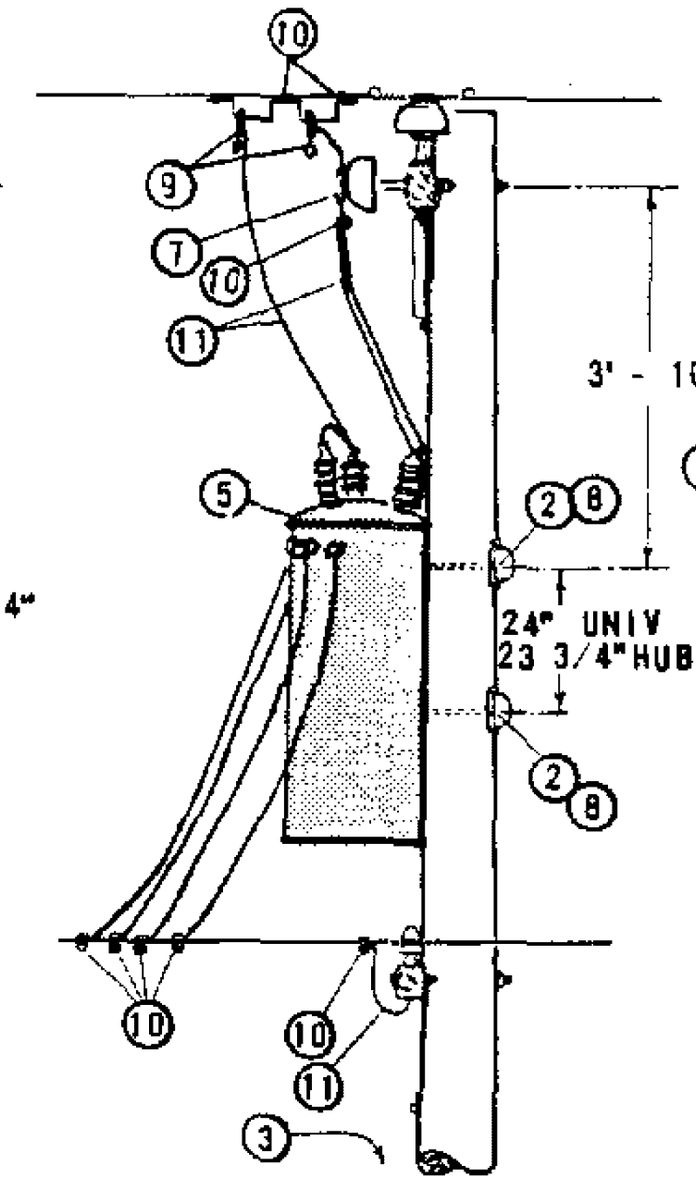
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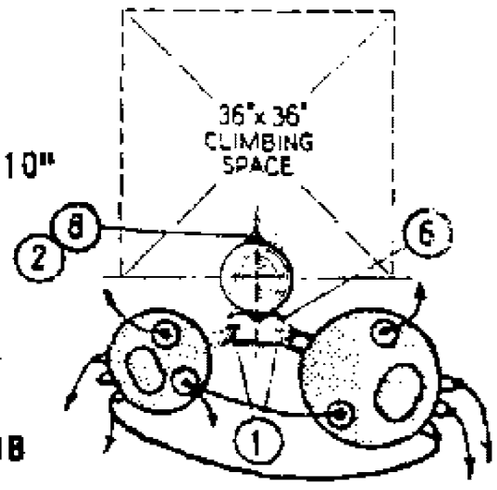
SDG&E ELECTRIC OVERHEAD STANDARD

12KV OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION
2-50KVA MAX., SECONDARY ARM CONSTRUCTION

FMO
OH 1167




PLAN AT A - A

NOTES:

A. USE PAGE 1165 FOR NEW CONSTRUCTION. THIS CONSTRUCTION MAY BE USED TO ELIMINATE POLE CHANGEOUTS ON EXISTING POLES WITH THE PRIMARY ALREADY ON ARMS.

(B) LIMITED TO TWO 50 KVA MAXIMUM TRANSFORMERS BECAUSE OF ENCROACHMENT ON CLIMBING SPACE. 75 KVA TRANSFORMERS MAY BE USED IF THEY HAVE SMALL CASES.

(C) USE TWO GROUND RODS SPACED NOT LESS THAN 6 FEET APART.

(D) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

(E) EXEMPT MATERIAL.

(F) PRIMARY AND SECONDARY CONSTRUCTION SHOWN ARE TYPICAL, AND THEIR MATERIALS ARE NOT INCLUDED. MAY BE INSTALLED WITH ARMLESS PRIMARY, RACK SECONDARY, ETC.

(G) POWER TRANSFORMER TO BE HUNG ON THE SAME SIDE OF POLE AS 2 PHASE WIRES TO PREVENT PHASING PROBLEMS WHEN CLOSING DELTA.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STDS |
|---|---|---|---|---|
| 1 | | BOLT, MACH GALV, 5/8" (E) OR 3/4" X 2", 1 RD WASH. & 1 NUT, 1 DBL COIL SPR WASH. | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH GALV, 3/4" X 10", 1" SQ CURVE WASH., 1 NUT & 1 DBL COIL SPR WASH. | 2 | PGS 139, 140 |
| 3 | | STEP, POLE (E) | 19 | 592992 |
| 4 | | | | |
| | 5 | TRANSFORMER, SELF PROTECTED TYPE, SINGLE PHASE (HE, HJ) (B) | 2 | PGS 1121.01-1121.12 |
| | 6 | BRACKET, TRANSFORMER MTG | 1 | 402976 |
| | 7 | INSULATOR & PIN, 12KV | 2 | 700 SECTION |
| | 8 | COVER, PVC THRU BOLT & 6-10D NAILS, GALV (E) | 2 | 285696, 491392 |
| | 9 | CLAMP, HOT LINE (E) & STIRRUP | 3 | PG 788 |
| | 10 | CONNECTORS, WIRE, COPPER, AS REQ'D | 13 | PGS 783-787 |
| | 11 | WIRE, STRANDED #6 COPPER | 70' | 813536 |
| | 12 | WIRE, WP COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 30' | PG 1125 |
| | 13 | ROD & CLAMP, GROUND (D) (C) | 2 | 603072, 230016(E) |
| | 14 | MOULDING, HARDWOOD 1" (D) | 30' | 487200 |
| | 15 | STAPLES, MOULDING GALV, 3" X 1 1/16" X 1/4" (D) (E) | 20 | 678560 |
| | 16 | STAPLES, FENCE GALV, 1 1/4" (D) (E) | 25 | 678528 |

FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-86<br>APPD AE/BSS | SDG&E ELECTRIC STANDARDS<br>12KV, OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, 2-50 KVA MAX, SECONDARY ARM CONSTRUCTION | 1199.603<br>SUPERSEDES<br>1167 (1-1-86) |

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# OH1168 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**05/10/2023:** MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | ARC | PAS | RSL | KRG | 05/10/2023 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

2.4KV, THREE-PHASE, DELTA TYPE "W" TRANSFORMER INSTALLATION, THREE 37.5 KVA MAXIMUM SECONDARY LINE ARM CONSTRUCTION

FMO OH1168

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 3Ø, 2.4KV DELTA, TYPE 'W' TRANSFORMER WITH SECONDARY CROSSARM CONSTRUCTION.

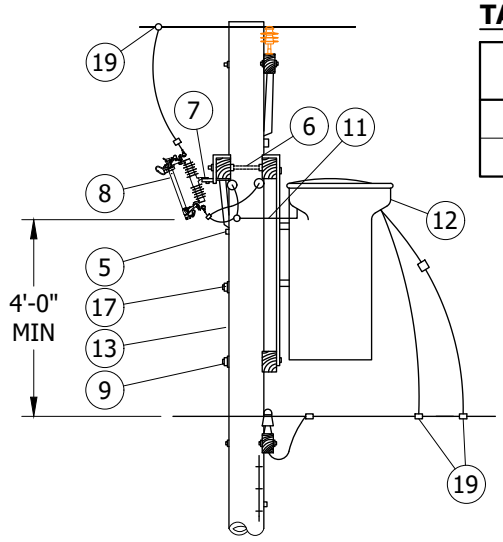



**FIGURE 1**
STEEL POLE CONSTRUCTION
SIDE VIEW

**TABLE 1**

| KVA | OVERHEAD MACRO UNITS |
|---|---|
| 50 | 50W240 |
| 75 | 75W240 |

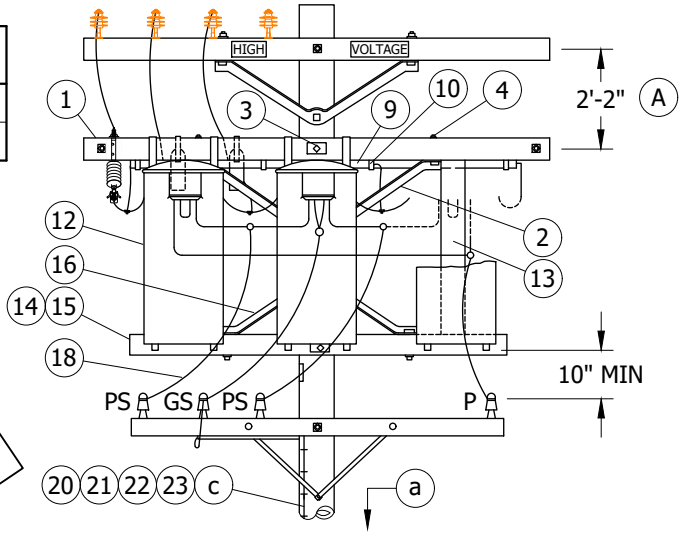



**FIGURE 1**
STEEL POLE CONSTRUCTION
FRONT VIEW

FIELD MAINTENANCE ONLY

## INSTALLATION:

(A) IF ADDITIONAL SPACE IS REQUIRED BELOW THE CUTOUT ARM THE SEPARATION BETWEEN THE LINE ARM AND CUTOUT ARM MAY BE REDUCED TO 12" WITH THE USE OF SPACE BOLTS.

B. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY 7.5 - 25KVA | QUANTITY 37.5 KVA | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, TRANSFORMER, 3 3/4" X 5 3/4" X 10' - 0" | 2 | 2 | - | S294128 | 4TF |
| 2 | ANGLE, CROSSARM, 5' - 0" | 2 | 2 | - | S164128 | - |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQ & 1 DBL COIL SPRING WASHER | 2 | 2 | 392 | - | - |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPRING WASHER | 4 | 6 | 392 | - | - |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 DBL COIL SPR WASH | 1 | 1 | 392 | - | - |
| 6 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D) & 4 SQ WASHERS & 2 DBL COIL SPRING WASHERS | 2 | 2 | 392 | - | - |
| 7 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | 3 | - | S166070 | - |
| 8 | CUTOUT, 12KV | 3 | 3 | 1212 | - | - |
| 9 | CONDUIT, PVC, 1", SCHEDULE 40, TYPE 2 | 16' | 16' | - | S251202 (X) | - |
| 10 | STRAP, CONDUIT, GALV & 2 - 6D NAILS, GALV | 8 | 8 | - | S697792 | - |
| | | - | - | - | S491552 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | TABLE UPDATE | - | GLW | JES | CZH | 05/11/2020 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | JS | DW | 06/13/2013 | D | MOVED TO FMO | ARC | PAS | RSL | KRG | 05/10/2023 |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed



SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

2.4KV, THREE-PHASE, DELTA TYPE "W" TRANSFORMER INSTALLATION,
THREE 37.5 KVA MAXIMUM SECONDARY LINE ARM CONSTRUCTION

FMO
OH1168.1

## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | QUANTITY | | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| | | 7.5 - 25KVA | 37.5 KVA | | | |
| 11 | CABLE, 5KV, XLP INSULATED, #6 STRANDED COPPER | 40' | 40' | - | S194304 | - |
| 12 | TRANSFORMER, SINGLE PHASE, TYPE W | 3 | 3 | 1121 | - | - |
| 13 | STRUT, 3 3/4" X 5 3/4" X 10' VERTICAL (CUT INTO 2 PIECES TO FIT) | - | 1 | - | S294128 | - |
| 14 | CROSSARM, KICK, 3 1/2" X 4 1/2" X 8' - 0" | 1 | - | - | S293680 | - |
| 15 | CROSSARM, KICK, 3 3/4" X 5 3/4" X 8' - 0" | - | 1 | - | S294960 | - |
| 16 | BRACE, ANGLE, CROSSARM, 4' - 0" | - | 1 | - | S164032 | - |
| 17 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ & 1 DBL COIL SPRING WASHER | - | 1 | 392 | - | - |
| 18 | WIRE, THW COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 48' | 48' | 1125 | - | - |
| 19 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | | 783-787 | - | - |
| 20 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | 50' | - | S812490 | GNDPVC |
| 21 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | 1 | - | S603074 (X) | |
| 22 | COPPER BONDED GROUND CONNECTOR | 1 | 1 | - | S259010 | - |
| 23 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | | - | S678564 (X) | - |

## NOTES:

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) POLE STEPPING - SEE OH363.

b. FOR LIGHTNING ARRESTER REQUIREMENTS - SEE OH1247.

(c) GROUNDING METHODS - SEE OH1002.

d. SEE OH1117 FOR TRANSFORMER CONNECTION DIAGRAMS. CONNECTION SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

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FIELD MAINTENANCE ONLY

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | TABLE UPDATE | - | GLW | JES | CZH | 05/11/2020 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | JS | DW | 06/13/2013 | D | MOVED TO FMO | ARC | PAS | RSL | KRG | 05/10/2023 |

# OH1170 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/06/2023:** MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | EDM | MRF | MRF | KRG | 04/06/2023 | D | | | | | | |

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

4KV, THREE-PHASE, TYPE "W" OR "WF" TRANSFORMER INSTALLATION
THREE 25KVA MAXIMUM, SECONDARY CABLE CONSTRUCTION

FMO
OH1170

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A THREE-PHASE, 4KV, TYPE 'W' OR "WF" TRANSFORMER, WITH SECONDARY CROSSARM CONSTRUCTION.

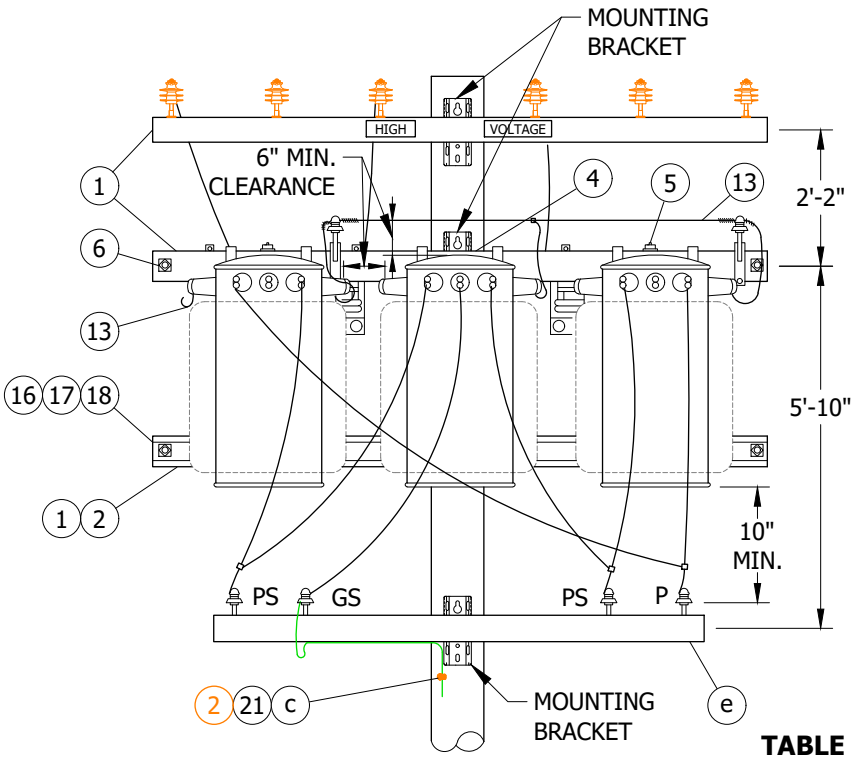



**FIGURE 1**
FRONT VIEW

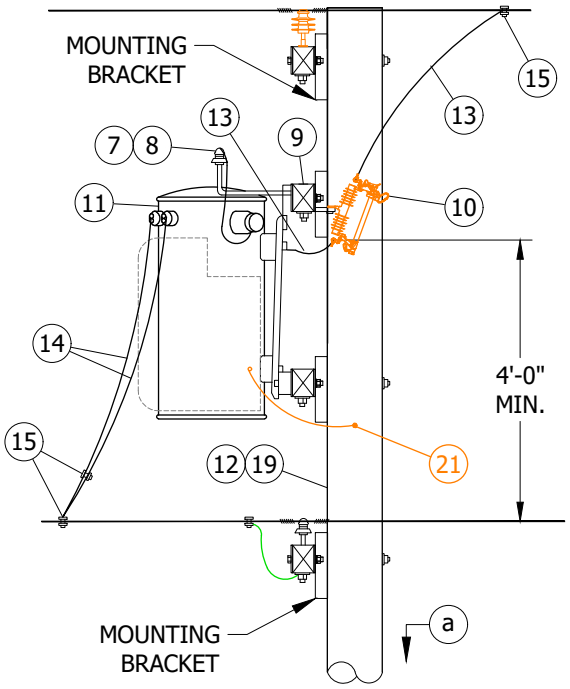
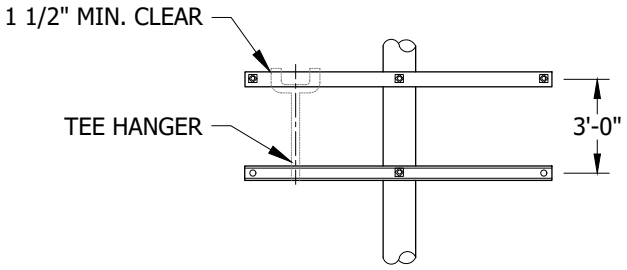



**FIGURE 1**
SIDE VIEW

**TABLE 1**

| KVA | DESIGN UNITS |
|---|---|
| 25 | 25WF-P |
| 25 | 25W120 |
| 25 | 25W208 |
| 25 | 25W240 |
| 50 | 50WF-P |
| 50 | 50WHVY |
| 50 | 50W120 |
| 50 | 50W208 |
| 75 | 75WF-P |
| 75 | 75WHVY |
| 75 | 75W208 |




**DETAIL 1**
FRAMING FOR 3 - 37.5KVA TO
3 - 75KVA INSTALLATIONS

FIELD MAINTENANCE ONLY

## INSTALLATION:

(A) LIMITED TO TRANSFORMER WEIGHING 1,200 POUNDS OR LESS EACH.

(B) SPACING OF TRANSFORMERS TO BE AS CLOSE AS PRACTICABLE BUT NOT TO EXCEED 39 1/2" CENTER TO CENTER.

C. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

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| C | MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | F | | | | | | |
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

4KV, THREE-PHASE, TYPE "W" OR "WF" TRANSFORMER INSTALLATION
THREE 25KVA MAXIMUM, SECONDARY CABLE CONSTRUCTION

FMO
OH1170.3

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## BILL OF MATERIALS:

| ITEM | DESCRIPTION | | QUANTITY 5 TO 25KVA | QUANTITY 37.5 TO 75KVA | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, 3 3/4" X 5 3/4" X 10'-0" | | 3 | 4 | - | S294378 | 4TF |
| 2 | BLIND NUT, 1/2" | | AS REQ'D | | - | S503460 (X) | - |
| 3 | SCREW (I) | | 2 | - | - | S618086 (X) | - |
| 4 | BOLT, MACH, GALV, (LENGTH AS REQ'D), 2 SQ & 1 DBL COIL SPRING WASHER | 5/8" | 2 | - | 390 | - | - |
| | | 3/4" | - | 2 | 390 | - | |
| 5 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPRING WASHER | | 4 | 8 | 390 | - | - |
| 6 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D) & 4 SQ & 2 DBL COIL SPRING WASHERS | | 2 | 4 | 390 | - | - |
| 7 | BRACKET, INSULATOR | | 2 | 2 | - | S166134 | - |
| 8 | INSULATOR, 12KV, CLASS 55-3 | | 2 | 2 | - | S429216 | - |
| 9 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | | 3 | 3 | - | S166070 | - |
| 10 | CUTOUT, 12KV | | 3 | 3 | 1212 | - | - |
| 11 | TRANSFORMER, SINGLE PHASE, TYPE W (A)(B) | | 3 | 3 | 1121 | - | - |
| 12 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DBL COIL SPR WASH | | 1 | 2 | 390 | - | - |
| 13 | WIRE, 5KV, INSULATED, XLP, #6 STRANDED COPPER | | 36'-0" | 36'-0" | - | S194304 | - |
| 14 | WIRE, THW COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | | 50'-0" | 50'-0" | 1125 | - | - |
| 15 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | | AS REQ'D | | 783-785 | - | - |
| 16 | COVER STRIP, 1 5/8" X 3 5/8" X 8'-0" (2X4S4S) | | 1 | - | - | S699328 | - |
| 17 | COVER STRIP, 1 5/8" X 3 5/8" X 10'-0" (2X4S4S) | | - | 1 | - | S699360 | - |
| 18 | BOLT, MACH, GALV, 3/8" X 6", 2 RD & 1 SPRING WASHER | | 2 | - | 390 | - | - |
| 19 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ & 1 DBL COIL SPR WASH | | 1 | - | - | S621568 | - |
| 20 | BOLT, MACH, GALV, 5/8" X 5", 1 RD & 1 DBL COIL SPRING WASHER (I) | | - | 4 | 390 | - | - |
| 21 | WIRE, GROUND, #4 CU SOLID, PVC COVERED | STEEL | 1 | 1 | 1002 | - | GNDPSP |
| | | WOOD | | | | - | GNDPVC |

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## NOTES:

(I) NOT SHOWN ON FIGURES

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) SEE OH363 FOR POLE STEPPING.

b. SEE OH1247 FOR LIGHTNING ARRESTER REQUIREMENTS.

(c) SEE OH1002 FOR GROUNDING METHODS.

d. SEE OH1111 FOR TRANSFORMER CONNECTION DIAGRAMS. CONNECTION SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

(e) SEE OH379 FOR FIBERGLASS CROSSARMS.

FIELD MAINTENANCE ONLY

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| C | MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | F | | | | | | |
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| A | ORIGINAL ISSUE | - | - | JS | DW | 06/13/2013 | D | | | | | | |

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A THREE-PHASE, 4KV TYPE 'W' OR 'WF' TRANSFORMERS WITH ALLEY ARM CONSTRUCTION.

**ATTENTION:**

* THIS CONSTRUCTION CAN NOT BE USED ON UNDER BUILD.

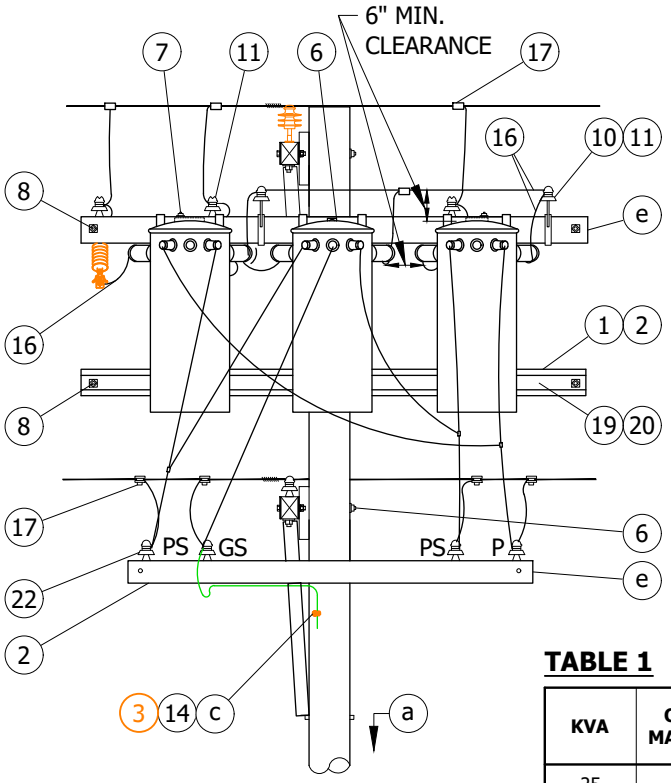



**FIGURE 1**
FRONT VIEW

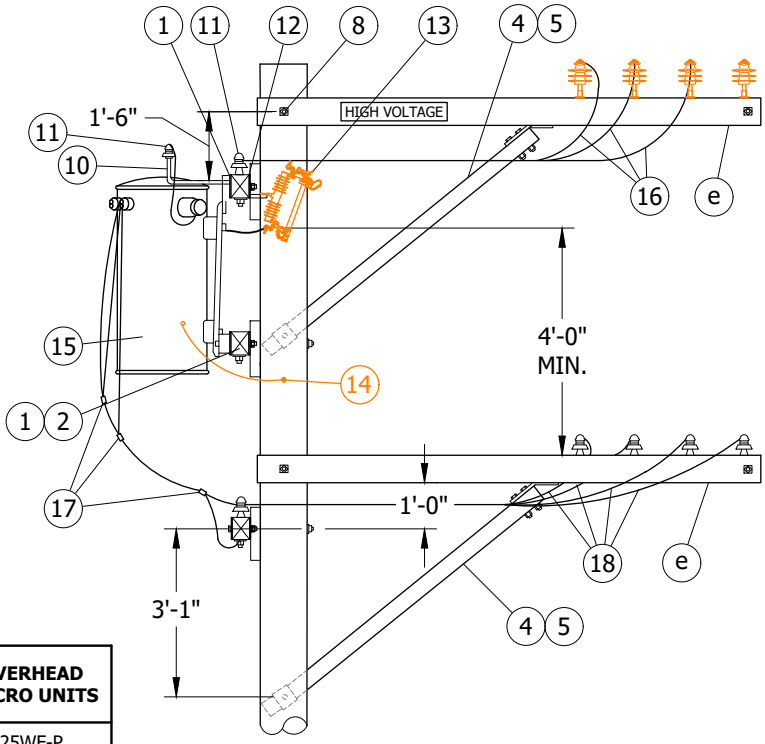
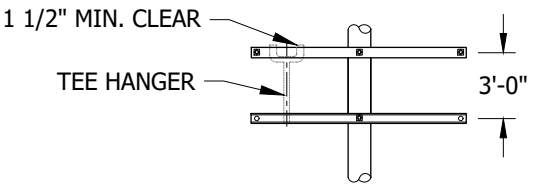



**FIGURE 1**
SIDE VIEW

**TABLE 1**

| KVA | OVERHEAD MACRO UNITS |
|---|---|
| 25 | 25WF-P |
| 25 | 25W120 |
| 25 | 25W208 |
| 25 | 25W240 |
| 50 | 50WF-P |
| 50 | 50WHVY |
| 50 | 50W120 |
| 50 | 50W208 |
| 75 | 75WF-P |
| 75 | 75WHVY |
| 75 | 75W208 |

FIELD MAINTENANCE ONLY




**DETAIL 1**
FRAMING FOR 3 - 37.5KVA TO
3 - 75KVA INSTALLATIONS

**INSTALLATION:**

A. LIMITED TO TRANSFORMERS WEIGHING 1,200 POUNDS OR LESS EACH.

B. SPACING OF TRANSFORMERS TO BE AS CLOSE AS PRACTICABLE BUT NOT TO EXCEED 39 1/2" CENTER TO CENTER.

C. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THIS CONSTRUCTION.

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| C | MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

4KV, THREE-PHASE, TYPE "W" OR "WF" TRANSFORMER INSTALLATION
THREE 25KVA MAXIMUM, SECONDARY CABLE CONSTRUCTION

FMO
OH1170.5

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## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY 5 TO 25KVA | QUANTITY 37.5 TO 75KVA | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, 3 3/4" X 5 3/4" X 10'-0" | 2 | 4 | - | S294378 | 4TF |
| 2 | CROSSARM, 3 1/2" X 4 1/2" X 8'-0" | 2 | 1 | - | S293680 | - |
| 3 | BLIND NUT, 1/2" | AS REQ'D | | - | S503460 (X) | - |
| 4 | SCREW | - | 4 | - | S618086 (X) | - |
| 5 | BRACE, VERTICAL, 36" | - | 2 | - | S164256 | - |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ WASHERS & 1 DBL COIL SPRING WASHER | 3 | 1 | 390 | - | - |
| | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 2 SQ WASHERS & 1 DBL COIL SPRING WASHER | - | 2 | 390 | - | - |
| 7 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPR WASHER | 4 | 8 | 390 | - | - |
| 8 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 4 SQ & 2 DBL COIL SPRING WASHERS | 2 | 4 | 390 | - | - |
| 9 | BOLT, MACH, GALV, 5/8" X 5", 1 RD & 1 DBL COIL SPR WASHER (I) | - | 4 | 390 | - | - |
| 10 | BRACKET, INSULATOR | 2 | 2 | - | S166134 | - |
| 11 | INSULATOR, 55-2 | 5 | 5 | - | S429024 | - |
| 12 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | 3 | - | S166070 | - |
| 13 | CUTOUT, 12KV | 3 | 3 | 1212 | - | - |
| 14 | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTORS — STEEL | 1 | 1 | 1002 | - | GNDPSP |
| | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTORS — WOOD | | | | | GNDPVC |
| 15 | TRANSFORMER, SINGLE PHASE, TYPE W OR WF | 3 | 3 | 1121 | - | - |
| 16 | WIRE, 5KV, INSULATED, XLP, #6 STRANDED COPPER | 50'-0" | 50'-0" | - | S194304 | - |
| 17 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | | 783-785 | - | - |
| 18 | WIRE, THW COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 80'-0" | 80'-0" | 1125 | - | - |
| 19 | COVER STRIP, 1 5/8" X 3 5/8" X 8'-0" (2X4S4S) | 1 | - | - | S699328 | - |
| 20 | COVER STRIP, 1 5/8" X 3 5/8" X 10'-0" (2X4S4S) | - | 1 | - | S699360 | - |
| 21 | BOLT, MACH, GALV, 3/8" X 6", 1 RD & 1 SPRING WASHER (I) | 2 | 2 | 390 | - | - |
| 22 | INSULATOR | 4 | 4 | - | S428960 | - |
| 23 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 1 RD & 1 DBL SPR WASHER (I) | 2 | 1 | - | S621568 | - |

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## NOTES:

(I) NOT SHOWN ON FIGURES

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) SEE OH363 FOR POLE STEPPING.

b. SEE OH1247 FOR LIGHTNING ARRESTER REQUIREMENTS.

(c) SEE OH1002 FOR GROUNDING METHODS.

d. SEE OH1111 FOR TRANSFORMER CONNECTION DIAGRAMS. CONNECTION SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

(e) SEE OH379 FOR FIBERGLASS CROSSARMS.

FIELD MAINTENANCE ONLY

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| C | MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | F | | | | | | |
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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

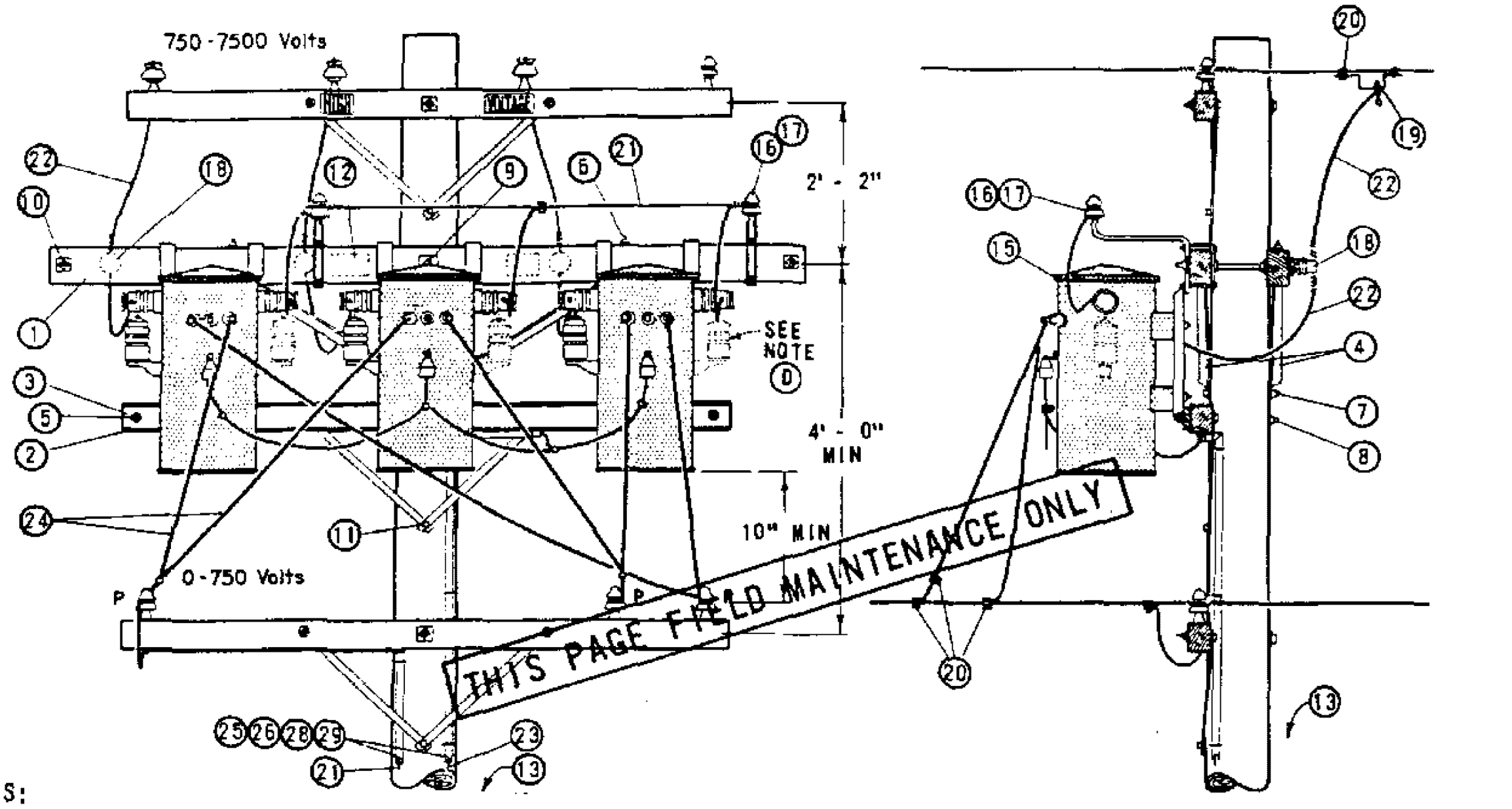
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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

4KV, THREE PHASE, TYPE "WE" OR "WJ" TRANSFORMER INSTALLATION, 3-25 KVA MAX SECONDARY LINE ARM CONSTRUCTION

FMO OH 1172




NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

B. SEE DISTRIBUTION POLE TOP SECTION FOR POLE TOP MATERIALS.

(C) USE TWO ROD GROUND

(D) REMOVE RIGHT HAND LIGHTNING ARRESTERS BEFORE INSTALLING TRANSFORMERS.

(E) EXEMPT MATERIAL.

F. WHEN ARRESTERS ARE REQUIRED PER STANDARDS PAGE 1247, USE TYPE "WJ" TRANSFORMERS.

G. SEE STANDARDS PAGE 1118 FOR TRANSFORMER CONNECTION DIAGRAMS. CONNECTION SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/4" X 5 3/4" X 10' - 0" | 2 | PG 111 IT. 2 |
| 2 | | CROSSARM, KICK 3 3/4" X 5 3/4" X 8' - 0" | 1 | PG 116 IT. 1 |
| 3 | | COVER STRIP, 1 5/8" X 4 1/2" X 8' - 0" (2X4 S4S) | 1 | 699328 |
| 4 | | BRACE, ANGLE CROSSARM | 2 | 164128 |
| 5 | | BOLT, MACH GALV 3/8" X 6", 2 RD WASH. & 1 NUT (E) | 2 | PGS 139, 140 |
| 6 | | BOLT, MACH GALV 1/2" X 7", 1 RD WASH. & 1 NUT (E) | 4 | PGS 139, 140 |
| 7 | | BOLT, MACH GALV 5/8" X 10" (E) | 1 | PGS 139, 140 |
| 8 | | BOLT, MACH GALV 5/8" X 14", 2 SQ WASH. & 1 NUT (E) | 1 | PGS 139, 140 |
| 9 | | BOLT, MACH GALV 5/8" X 18", 2 - 3 SQ WASH & 1 NUT (E) | 1 | PGS 139, 140 |
| 10 | | BOLT, SPACE GALV 5/8" X 20", 4 WASH. & 4 NUTS (E) | 2 | PGS 139, 140 |
| 11 | | SCREW, LAG GALV 1/2" X 4" (E) | 1 | 621568 |
| 12 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV (E) | 1 | 647648, 492224 |
| 13 | | STEPS, POLE (E) | 16 | 692992 |
| 14 | | | | |
| | 15 | TRANSFORMER, SINGLE PHASE TYPE WE OR WJ, #1 TEE HANGER | 3 | PGS 1121.01-1121.12 |
| | 16 | BRACKET, INSULATOR, 1" | 2 | 166208 |
| | 17 | INSULATOR, 5KV | 2 | 428960 |
| | 18 | HOLDER, WIRE | 3 | 413792 |
| | 19 | CLAMP, HOT LINE (E) & STIRRUP | 3 | PG 788 |
| | 20 | CONNECTOR, WIRE, AS REQ'D | 12 | PGS 783-787 |
| | 21 | WIRE, #6 BARE STRANDED COPPER | 60' | 813536 |
| | 22 | CABLE, 5KV, 1/C #6 STRANDED COPPER | 34' | 194304 |
| | 23 | WIRE #2 BARE STRANDED COPPER, TANK GROUND | 50' | 813664 |
| | 24 | WIRE, W.P. COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 45' | PG 1125 |
| | 25 | ROD & CLAMP, GROUND (A) (C) | 4 | 603072, 230016 (E) |
| | 26 | MOULDING, HARDWOOD, 1" (A) | 64' | 487200 |
| | 27 | | | |
| | 28 | STAPLES, 3" X 1 1/16" X 1/4" MOULDING, GALV (A) (E) | 40 | 678560 |
| | 29 | STAPLES, 1 1/4" FENCE, GALV (A) (E) | 36 | 678528 |

| | | |
|---|---|---|
| 1199,701 SUPERSEDES 1172 (1-1-86) | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>4KV, THREE PHASE, TYPE "WE" OR "WJ" TRANSFORMER INSTALLATION,<br>3-25 KVA MAX SECONDARY LINE ARM CONSTRUCTION | DATE 1-1-86<br>APPD AK/BSS |

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# OH1174 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**06/23/2023:** 12KV THREE-PHASE, TYPE "H" OR "HF" TRANSFORMER INSTALLATION 500 KVA MAXIMUM, TWO POLE, 7 FT SPACING MOVED TO FMO

**07/13/2016:** 7.2 AND 12KV THREE-PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION MOVED TO FMO.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | | F | | | | | | |
| B | MOVED TO FMO | ARC | MRF | GLW | FRC | 06/23/2023 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JS | IL | MDJ | 07/13/2016 | D | | | | | | |

| | | | | |
|---|---|---|---|---|
| X Indicates Latest Revision | Completely Revised | New Page | Information Removed | |



SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

7.2 OR 12KV THREE-PHASE INSTALLATION, SINGLE-PHASE TRANSFORMER

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF THREE-PHASE, 12KV TYPE 'H' OR 'HF' TRANSFORMERS, WITH TWO POLE STRUCTURE.

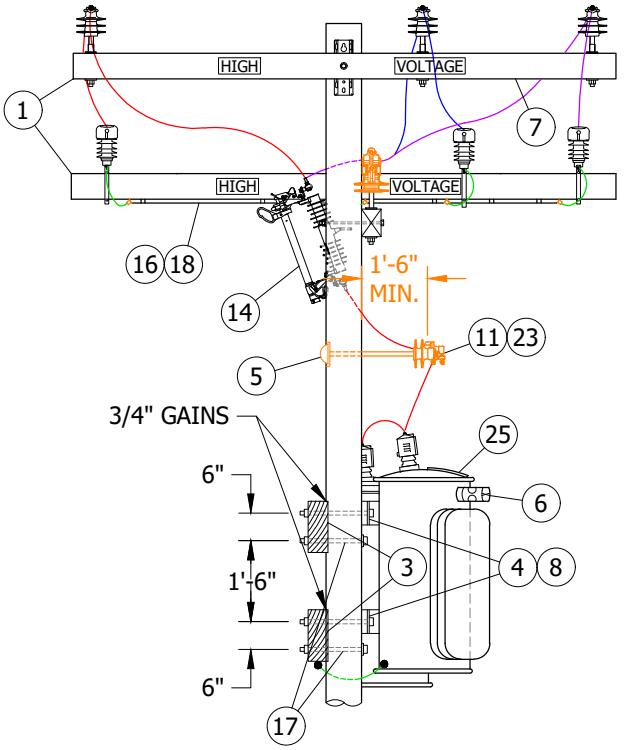



**FIGURE 1**
BUCK POSITION
FRONT VIEW

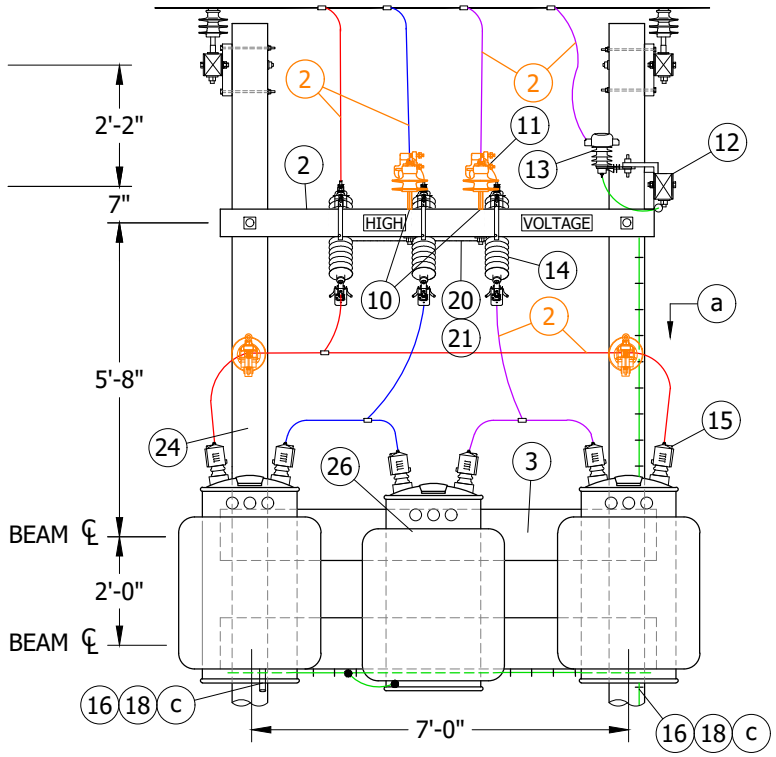



**FIGURE 1**
BUCK POSITION
SIDE VIEW

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | TABLE UPDATE | - | JAC | JES | CZH | 01/15/2020 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORINAL ISSUE | - | JS | JS | DW | 06/14/2013 | D | MOVED TO FMO | ARC | MRF | GLW | FRC | 06/23/2023 |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

12KV THREE-PHASE, TYPE "H" OR "HF" TRANSFORMER INSTALLATION
500KVA MAXIMUM, TWO POLE, 7 FT SPACING



FMO
OH1174.1

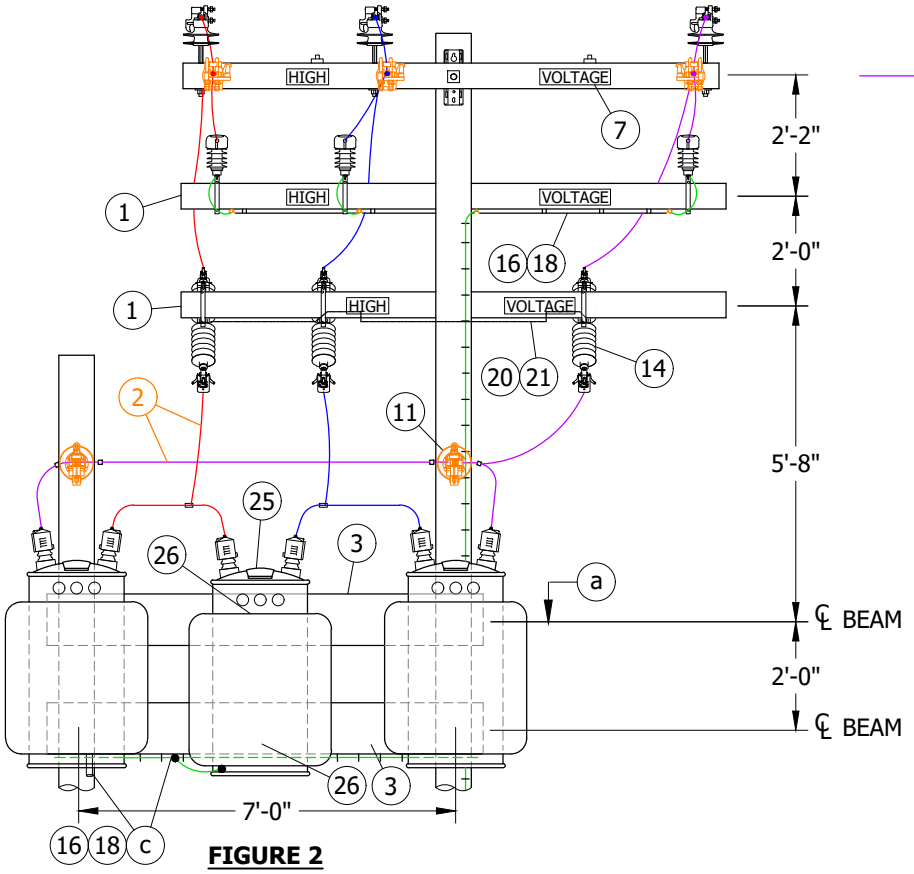



**FIGURE 2**
LINE POSITION
FRONT VIEW

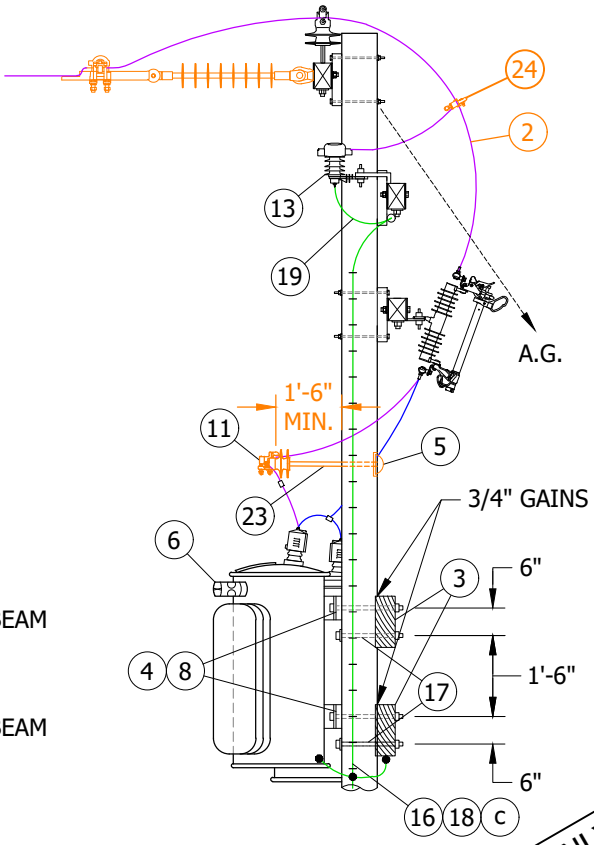



**FIGURE 2**
LINE POSITION
SIDE VIEW

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## INSTALLATION:

(A) POLE MOUNT OUTSIDE TRANSFORMERS ON TOP TRANSFORMER TIMBER BOLT.

(B) MIDDLE TRANSFORMER TO BE BOLTED DIRECTLY TO BEAMS.

C. TRANSFORMER STRUCTURE SHALL BE INSTALLED AS CLOSE TO CUSTOMER'S SERVICE HEAD AS POSSIBLE TO REDUCE HORIZONTAL SERVICE TENSION TO A MINIMUM. TRANSFORMERS SHOULD NORMALLY BE INSTALLED ON SIDE OF STRUCTURE OPPOSITE DIRECTION OF OVERHEAD SERVICES. STRUCTURE SHALL BE GUYED WHERE SERVICE TENSION OR MAINTENANCE OF GROUND CLEARANCE IS REQUIRED.

D. SECTIONALIZING FUSES AND A STATION ARE **NOT** ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THE THIS CONSTRUCTION.

E. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS. (e)

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| | | FIG 1 | FIG 2 | | | |
| 1 | CROSSARM, FIBERGLASS, 3 3/4" X 5 3/4" X 10'-0" | 2 | 3 | -- | S294378 | 4TF |
| 2 | WIRE, JUMPER, COVERED, #4/7 STRANDED | 1 | -- | 711 | S815044 | POLY4J |
| 3 | BEAM LUMBER, 4" X 12" X 8'-0", DOUGLAS FIR, S4S | 2 | 2 | -- | -- | -- |
| 4 | ADAPTER PLATES, TYPE C, FOR POLE BOLTING 167KVA TRANSFORMERS | 6 | 6 | -- | S102560 | -- |

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| C | TABLE UPDATE | - | JAC | JES | CZH | 01/15/2020 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORINAL ISSUE | - | JS | JS | DW | 06/14/2013 | D | MOVED TO FMO | ARC | MRF | GLW | FRC | 06/23/2023 |

## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | | QUANTITY FIG 1 | QUANTITY FIG 2 | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|---|
| 5 | COVER, BOLT, PLASTIC | WOOD/FG POLE | AS REQ'D | | -- | S285696 | -- |
| | 6 - 10D NAILS, GALV | WOOD POLE | | | -- | S491392 | -- |
| 6 | CONNECTORS, MULTIPLE TAP | | 6 | 6 | 793, 797 | -- | -- |
| 7 | BOLT, MACH, GALV, 1/2" X 5", 1 RD & 1 DBL COIL SPR WASHER | | 2 | 2 | 390 | -- | -- |
| 8 | BOLT, MACH, GALV, 3/4" X 16", 1 MALLEABLE IRON WASHER & 1 DBL COIL SPRING WASHER (A) | | 4 | 4 | 390 | -- | -- |
| 9 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPR WASHER (I) | | -- | 2 | 390 | -- | -- |
| 10 | PIN, INSULATOR 12KV | 1" | 1 | -- | -- | S532706 (X) | -- |
| | | 3/8" | 2 | -- | -- | S532448 | -- |
| 11 | INSULATOR, 12KV (CLASS AS REQ'D) | | 4 | 2 | 750 | -- | -- |
| 12 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | | 6 | 6 | -- | S166070 | -- |
| 13 | ARRESTER, LIGHTNING, 12KV | | 3 | 3 | -- | S113248 | -- |
| 14 | CUTOUT, 12KV | | 3 | 3 | 1212 | -- | -- |
| 15 | BUSHING COVER,TRANSFORMER | | 6 | 6 | -- | S289188 (X) | BSHCOV |
| 16 | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTIONS | STEEL POLE | 1 | | 1002 | -- | GNDPSP |
| | | WOOD/FG POLE | | | | -- | GNDPVC |
| 17 | BOLT, MACH, GALV, 3/4" X 16", 1 MALLEABLE IRON WASHER, 1 SQ CURVED RIBBED WASHER & 1 DBL COIL SPRING WASHER | | 4 | 4 | 390 | -- | -- |
| 18 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | | AS REQ'D | | -- | S678564 (X) | -- |
| 19 | FLEXIBLE ARRESTER GROUND STRAP | | AS REQ'D | | -- | S698754 | -- |
| 20 | WIRE, #8 BARE SOLID ANNEALED COPPER, BONDING | | 6'-0" | 10'-0" | -- | S812928 | -- |
| 21 | STAPLES, FENCE, GALV, 1 1/4" | | AS REQ'D | | -- | S678528 | -- |
| 22 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ & 1 DBL COIL SPRING WASHER (I) | | -- | 1 | 390 | -- | -- |
| 23 | BRACKET, INSULATOR, STANDOFF | 30" 1" THREAD | 2 | 2 | 390 | S166144 | KBKT30 |
| | | 28" 3/8" THREAD | 2 | 2 | | S166176 | KBKT28 |
| 24 | HOT LINE CLAMP | | 3 | 3 | -- | S227680 | -- |
| 25 | TRANSFORMER, 10, 12KV, 100-167KVA INCLUSIVE, TYPE H OR HF | | 3 | 3 | 1121 | -- | -- |
| 26 | BOLT, MACH, GALV, 3/4" X 6", 1 MALLEABLE IRON WASHER & 1 DBL COIL SPRING WASHER (B) | | 2 | 2 | 390 | -- | -- |

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## NOTES:

(I) NOT SHOWN ON FIGURES.

II. CONNECTION SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. (d)

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) FOR POLE STEPPING, SEE OH363.

b. FOR LIGHTNING ARRESTER REQUIREMENTS, SEE OH1247.

(c) GROUNDING METHODS, SEE OH1002.

(d) FOR TRANSFORMER CONNECTION DIAGRAMS, SEE OH1116.

(e) FOR CONTAMINATION DISTRICTS, SEE OH287.

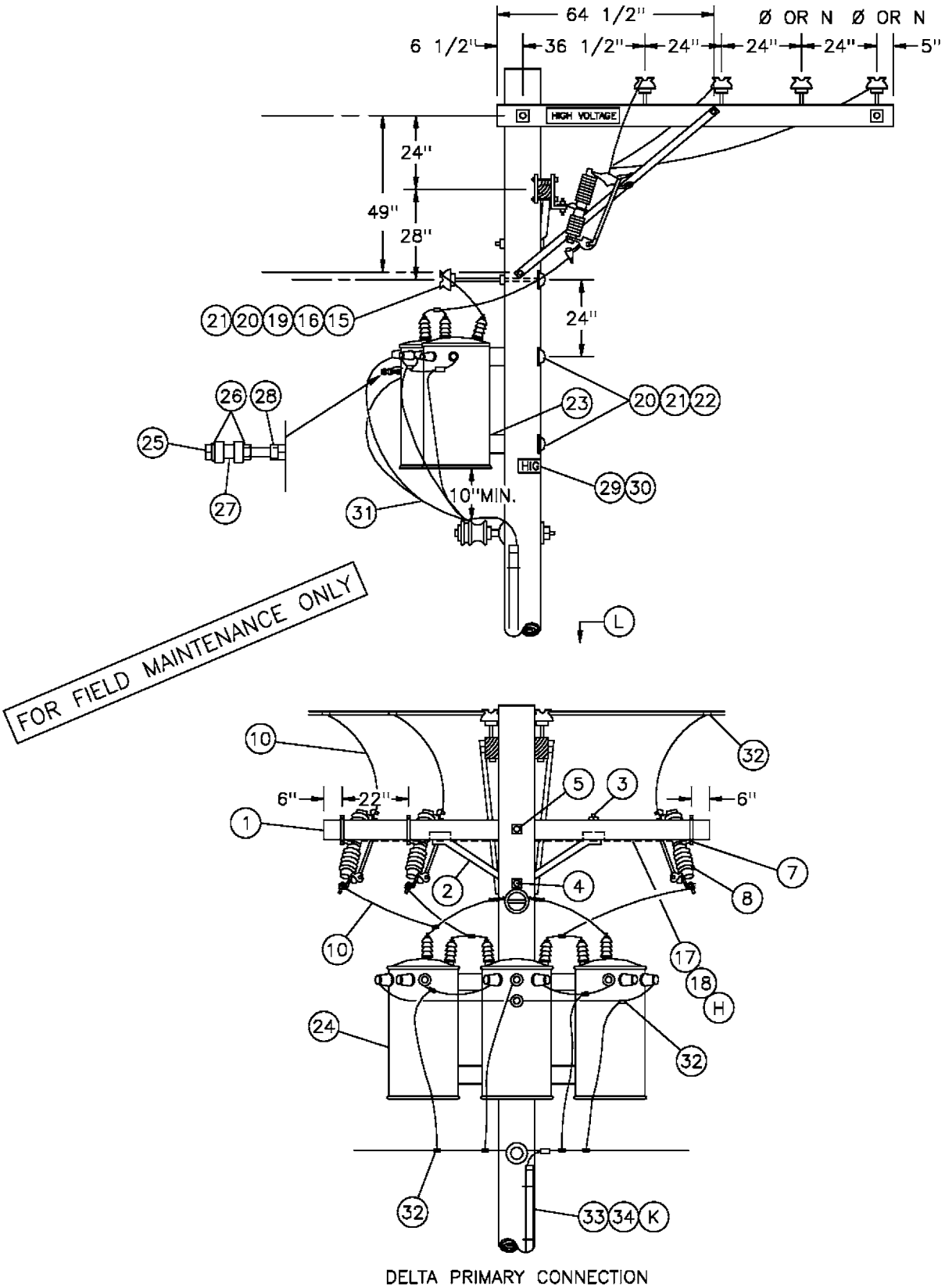
f. FOR FIBERGLASS CROSSARMS, SEE OH379.

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| A | ORINAL ISSUE | - | JS | JS | DW | 06/14/2013 | D | MOVED TO FMO | ARC | MRF | GLW | FRC | 06/23/2023 |

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF 7.2 AND 12KV, 3Ø TRANSFORMERS, ALLEY ARM CONSTRUCTION, WITH CLUSTER MOUNTING BRACKET AND SECONDARY RACK CONSTRUCTION.

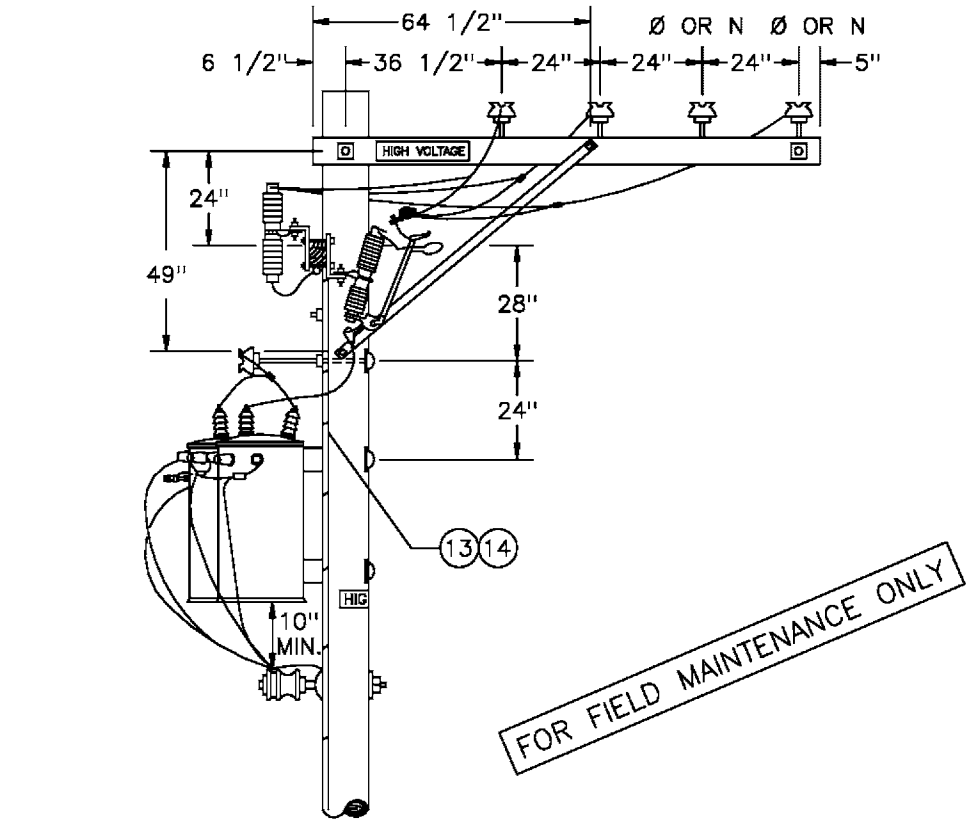


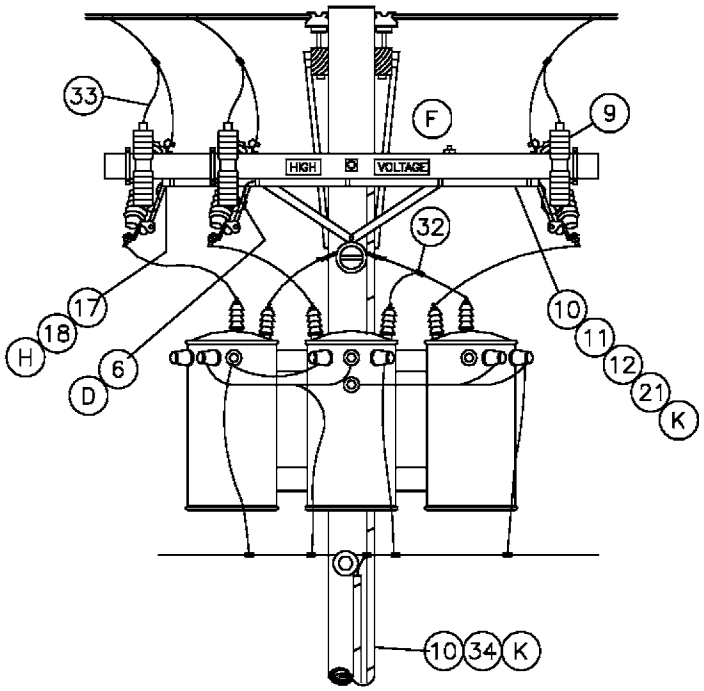

DELTA PRIMARY CONNECTION

| | | |
|---|---|---|
| DATE 1-1-89<br>APPD PSA / DTE | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE-PHASE TRANSFORMER<br>CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | 1199.704<br>SUPERSEDES<br>1174.1 (1-1-93) |

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WYE PRIMARY CONNECTION
WITH LIGHTNING ARRESTERS (J)

| | | |
|---|---|---|
| DATE 1-1-91<br>APPD PA/BG | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE-PHASE TRANSFORMER<br>CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | 1199.705<br>SUPERSEDES<br>1174.2 (1-1-93) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | | STOCK NUMBER OR CONSTR STANDARD |
|---|---|---|---|---|
| | | STATION WITH (J) ARRESTERS | STATION WITHOUT ARRESTERS | |
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | 1 | 1 | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 4' | 1 | 1 | 164032 |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 6 | BRACKET, DOUBLE, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 3 | – | 165442 |
| 7 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | – | 3 | 166070 |
| 8 | CUTOUT, 12KV, WITH LOADBUSTER HOOK | 3 | 3 | STD. 1212 |
| 9 | ARRESTER, LIGHTNING | 3 | – | 113248 |
| 10 | WIRE, #4 BARE STRANDED COPPER FT / LB | 100 / 13 | 40 / 5 | 813760 |
| 11 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" X 10' (E) | 1 | – | 251200 |
| 12 | STRAPS, PIPE, GALV, 1" (E) | AS REQ'D | – | 697792 |
| 13 | | | | |
| 14 | | | | |
| 15 | INSULATOR, PIN TYPE, CLASS AS REQ'D | 1 | 1 | STD. 750 |
| 16 | WIRE, TIE (E) | 1 | 1 | 815232 |
| 17 | WIRE, #8 BARE SOLID ANNEALED COPPER (G) FT / LB | 15 / 1 | 15 / 1 | 812928 |
| 18 | STAPLES, 1 1/4", FENCE, GALV (G)(E) | AS REQ'D | AS REQ'D | 678528 |
| 19 | BRACKET, INSULATOR, 1" OR 1 3/8" THREAD (AS REQ'D) | 1 / 1 | 1 / 1 | 166144 / 166176 |
| 20 | COVER, BOLT, PLASTIC (E) | 3 | 3 | 285696 |
| 21 | NAILS, GALV, 1 3/4" ROOFING (E) | AS REQ'D | AS REQ'D | 492192 |
| 22 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 23 | BRACKET, TRANSFORMER CLUSTER MOUNTING | 1 | 1 | 403008 |
| 24 | TRANSFORMER, SINGLE PHASE, TYPE 'Y', 'YF', 'H' OR 'HF' | 3 | 3 | STD. 1121 |
| 25 | BOLT, MACH, GALV, 1/2" X 5" (E) | 1 | 1 | 153024 |
| 26 | WASHER, GALV, 1/2", ROUND (E) | 2 | 2 | 800192 |
| 27 | INSULATOR, SECONDARY, SPOOL, PORCELAIN (E) | 1 | 1 | 430752 |
| 28 | NUT, GALV, 1/2" (E) | 1 | 1 | 504736 |
| 29 | SIGN, HIGH VOLTAGE (E) | 3 | 1 | 647648 |
| 30 | NAILS, GALV, 7/8" ROOFING (E) | 27 | 9 | 492224 |

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| 1199.706<br>SUPERSEDES<br>1174.3 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE-PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | DATE 1-1-91<br>APPD PA / BDG |

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

| ITEM | DESCRIPTION | | QUANTITY | | STOCK NUMBER OR CONSTR STANDARD |
|---|---|---|---|---|---|
| | | | STATION WITH (J) ARRESTERS | STATION WITHOUT ARRESTERS | |
| 31 | WIRE, THW COPPER, SIZED PER TRANSFORMER CAPACITY | | 35' | 35' | STD 1125 |
| 32 | CONNECTOR, WIRE, COMPRESSION, CU OR AL AS REQ'D (E) | | AS REQ'D | AS REQ'D | 783–786 |
| 33 | WIRE, #6, 3 STRAND, BARE COPPER | FT | 55 | 40 | 813536 |
| | | LB | 4 | 3 | |
| 34 | UNIT, GROUND, COMPLETE (K) | | 2 | 1 | 603136 |
| 35 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" (E) | | 10' | – | 251168 |
| 36 | STRAPS, PIPE, GALV. 1/2" AND 1–3/4" ROOFING NAILS (E) | | AS REQ'D | – | 697728 |

**INSTALLATION:**

A. USE THIS CONSTRUCTION FOR TRANSFORMERS RATED 12KV AND BELOW WHICH HAVE HIGH VOLTAGE BUSHINGS MOUNTED ON TOP OF COVER.

B. LIMITED TO TRANSFORMERS 100 KVA AND SMALLER, EACH WEIGHING 1200 POUNDS OR LESS.

C. WHEN PRACTICAL, BOLT TRANSFORMERS TO BRACKET ON THE GROUND AND INSTALL THEM AS A PREWIRED ASSEMBLY.

(D) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(E) EXEMPT MATERIAL.

(F) INSTALL LA/CO CROSSARM ON SAME SIDE OF POLE AS TRANSFORMERS.

(H) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT, AS IDENTIFIED ON STANDARD 287. IN AREAS WHERE BONDING IS REQUIRED, TO AVOID BONDWIRE AND LIGHTNING ARRESTER GROUNDWIRE ON THE ON THE SAME CROSSARM, USE TWO CROSSARMS; ONE FOR CUTOUTS AND ONE FOR LIGHTNING ARRESTERS

**REFERENCE:**

I. PRIMARY AND SECONDARY CONNECTIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES. SEE STANDARD 1118–1119 FOR SPECIFIC CONNECTION DIAGRAMS.

(J) LIGHTNING ARRESTER APPLICATION, SEE STANDARD 1247.

(K) GROUNDING METHOD AND APPLICATION, SEE STANDARD 1002.

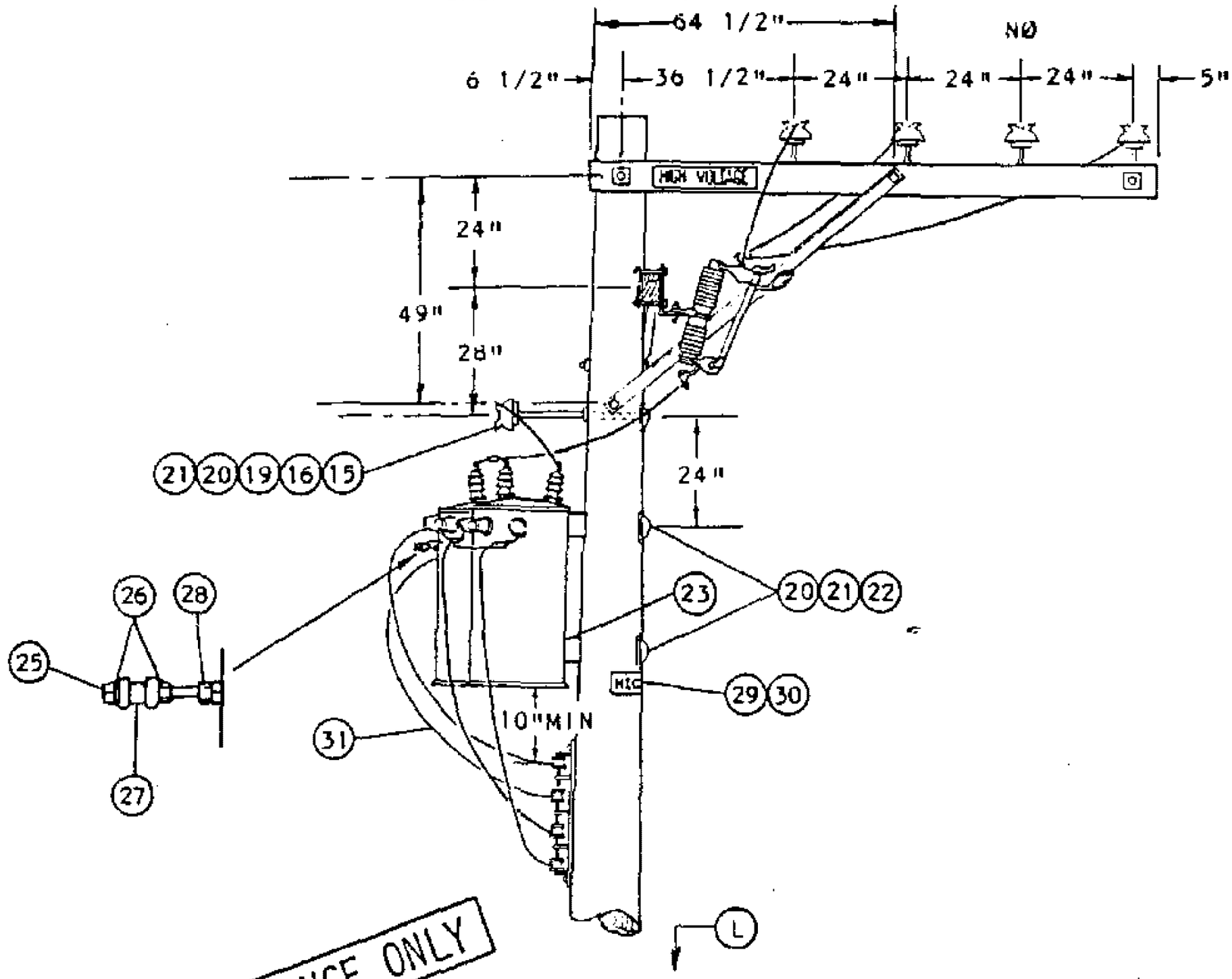
(L) POLE STEPPING, SEE STANDARD 363.

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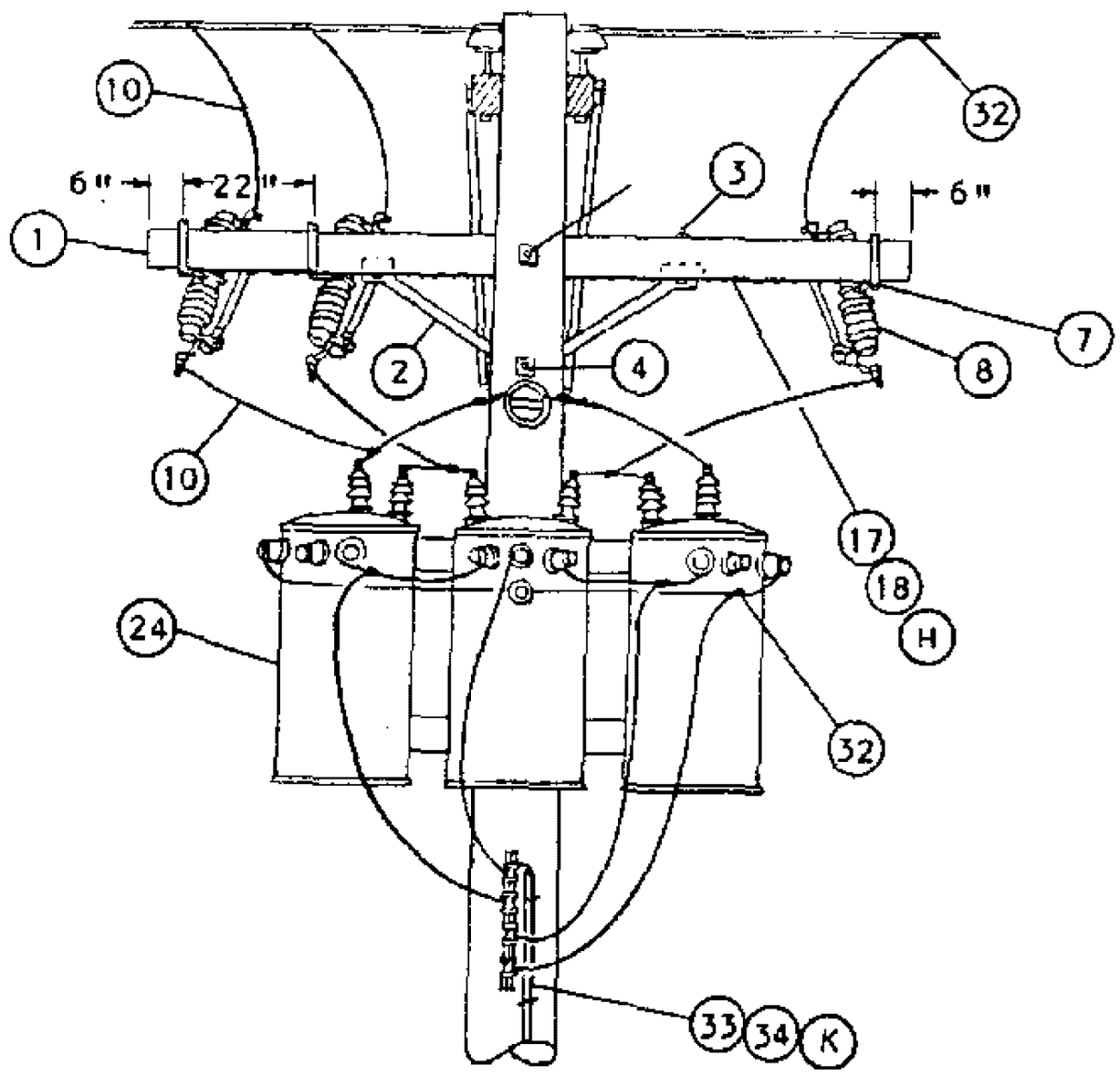
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| DATE 1–1–91<br>APPD PBA / DTE | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION–ALLEY ARM CONSTRUCTION | 1199.707<br>SUPERSEDES 1174.4 (1–1–93) |

SCOPE: THIS STANDARD SHOWS THE INSTALLATION OF 7.2 AND 12KV, 3Ø TRANSFORMERS, ALLEY ARM CONSTRUCTION, WITH CLUSTER MOUNTING BRACKET AND SECONDARY RACK CONSTRUCTION.




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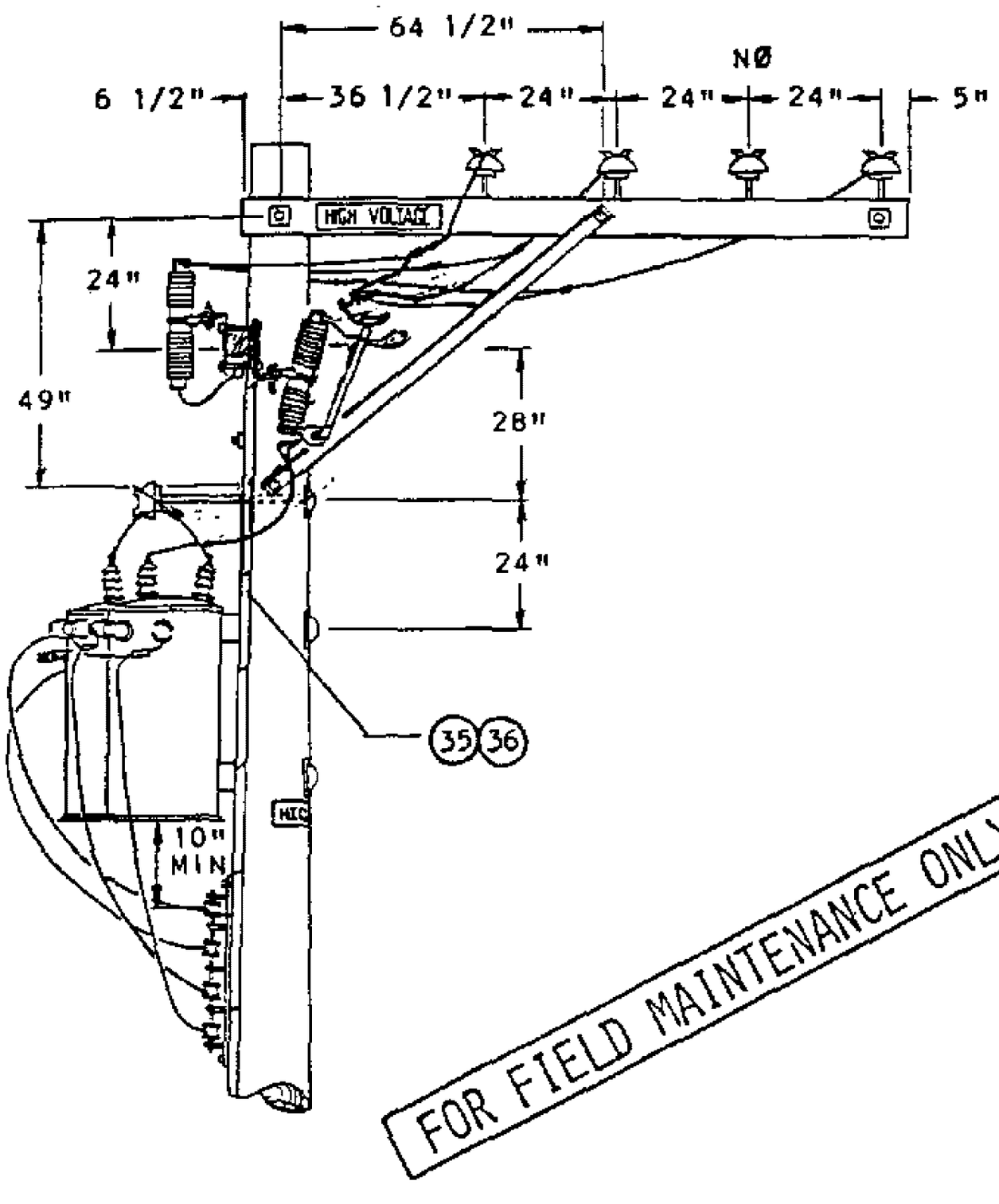


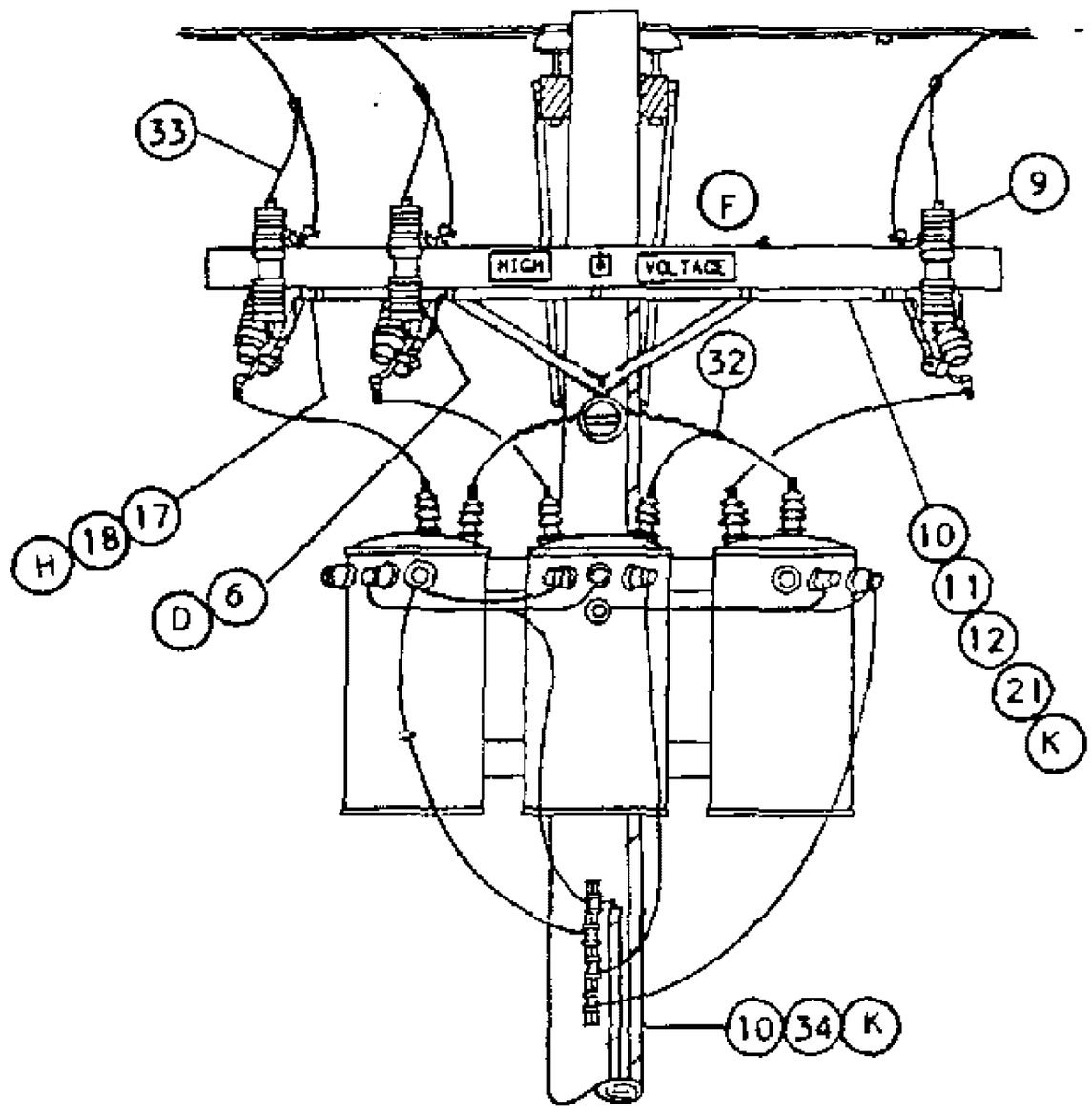

DELTA PRIMARY CONNECTION

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WYE PRIMARY CONNECTION
WITH LIGHTNING ARRESTERS (J)

| 1199.804<br>SUPERSEDES<br>1174.2 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE PHASE TRANSFORMER<br>CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | DATE 1-1-91<br>APPD |
|---|---|---|

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY: STATION (J) WITH ARRESTERS | QUANTITY: STATION WITHOUT ARRESTERS | STOCK NUMBER OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 1 | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 4' | 1 | 1 | 164032 |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 6 | BRACKET, DOUBLE, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 3 | - | 165442 |
| 7 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | - | 3 | 166070 |
| 8 | CUTOUT, 12KV, WITH LOADBUSTER HOOK | 3 | 3 | STD. 1212 |
| 9 | ARRESTER, LIGHTNING | 3 | - | 113248 |
| 10 | WIRE, #4 BARE STRANDED COPPER FT / LB | 100 / 13 | 40 / 5 | 813760 |
| 11 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" X 10' (E) | 1 | - | 251200 |
| 12 | STRAPS, PIPE, GALV, " (E) | AS REQ'D | - | 697792 |
| 13 | | | | |
| 14 | | | | |
| 15 | INSULATOR, PIN TYPE, CLASS AS REQ'D | 1 | 1 | STD. 750 |
| 16 | WIRE, TIE (E) | 1 | 1 | 815232 |
| 17 | WIRE, #8 BARE SOLID ANNEALED COPPER (G) FT / LB | 15 / 1 | 15 / 1 | 812928 |
| 18 | STAPLES, 1 1/4", FENCE, GALV (G) (E) | AS REQ'D | AS REQ'D | 678528 |
| 19 | BRACKET, INSULATOR, 1" OR 1 3/8" THREAD (AS REQ'D) | 1 / 1 | 1 / 1 | 166144 / 166176 |
| 20 | COVER, BOLT, PLASTIC (E) | 3 | 3 | 285696 |
| 21 | NAILS, GALV, 1 3/4" ROOFING (E) | AS REQ'D | AS REQ'D | 492192 |
| 22 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 23 | BRACKET, TRANSFORMER CLUSTER MOUNTING | 1 | 1 | 403008 |
| 24 | TRANSFORMER, SINGLE PHASE, TYPE 'Y', 'YF', 'H' OR 'HF' | 3 | 3 | STD 1121 |
| 25 | BOLT, MACH, GALV, 1/2" X 5" (E) | 1 | 1 | 153024 |
| 26 | WASHER, GALV, 1/2", ROUND (E) | 2 | 2 | 800192 |
| 27 | INSULATOR, SECONDARY, SPOOL, PORCELAIN (E) | 1 | 1 | 430752 |
| 28 | NUT, GALV, 1/2" (E) | 1 | 1 | 504736 |
| 29 | SIGN, HIGH VOLTAGE (E) | 3 | 1 | 647648 |
| 30 | NAILS, GALV, 7/8" ROOFING (E) | 27 | 9 | 492224 |

FOR FIELD MAINTENANCE ONLY

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DATE 1-1-91
APPD PLA/ESS

SDG&E ELECTRIC STANDARDS

# 7.2 AND 12KV THREE PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION

1199.805
SUPERSEDES
1174.3 (1-1-93)

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

| ITEM | DESCRIPTION | QUANTITY | | STOCK NUMBER OR CONSTR STANDAR |
|---|---|---|---|---|
| | | STATION (J) WITH ARRESTERS | STATION WITHOUT ARRESTERS | |
| 31 | WIRE, W.P. COPPER, SIZED PER TRANSFORMER CAPACITY | 35' | 35' | STD 1125 |
| 32 | CONNECTOR, WIRE, COMPRESSION, CU OR AL AS REQ'D (E) | AS REQ'D | AS REQ'D | 783-786 |
| 33 | WIRE, #6, 3 STRAND, BARE COPPER FT / LB | 55 / 4 | 40 / 3 | 813536 |
| 34 | UNIT, GROUND, COMPLETE (K) | 2 | 1 | 603136 |
| 35 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" (E) | 10' | — | 251168 |
| 36 | STRAPS, PIPE, GALV. 1/2" AND 1 3/4" ROOFING NAILS (E) | AS REQ'D. | — | 697728 |

**INSTALLATION:**

A. USE THIS CONSTRUCTION FOR TRANSFORMERS RATED 12KV AND BELOW WHICH HAVE HIGH VOLTAGE BUSHINGS MOUNTED ON TOP OF COVER.

B. LIMITED TO TRANSFORMERS 100 KVA AND SMALLER, EACH WEIGHING 1200 POUNDS OR LESS.

C. WHEN PRACTICAL, BOLT TRANSFORMERS TO BRACKET ON THE GROUND AND INSTALL THEM AS A PREWIRED ASSEMBLY.

(D) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(E) EXEMPT MATERIAL.

(F) INSTALL LA/CO CROSSARM ON SAME SIDE OF POLE AS TRANSFORMERS.

(H) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT, AS IDENTIFIED 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.

**REFERENCE:**

I. PRIMARY AND SECONDARY CONNECTIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES. SEE STANDARD 1118-1119 FOR SPECIFIC CONNECTION DIAGRAMS.

(J) LIGHTNING ARRESTER APPLICATION, SEE STANDARD 1247.

(K) GROUNDING METHOD AND APPLICATION, SEE STANDARD 1002.

(L) POLE STEPPING, SEE STANDARD 363.

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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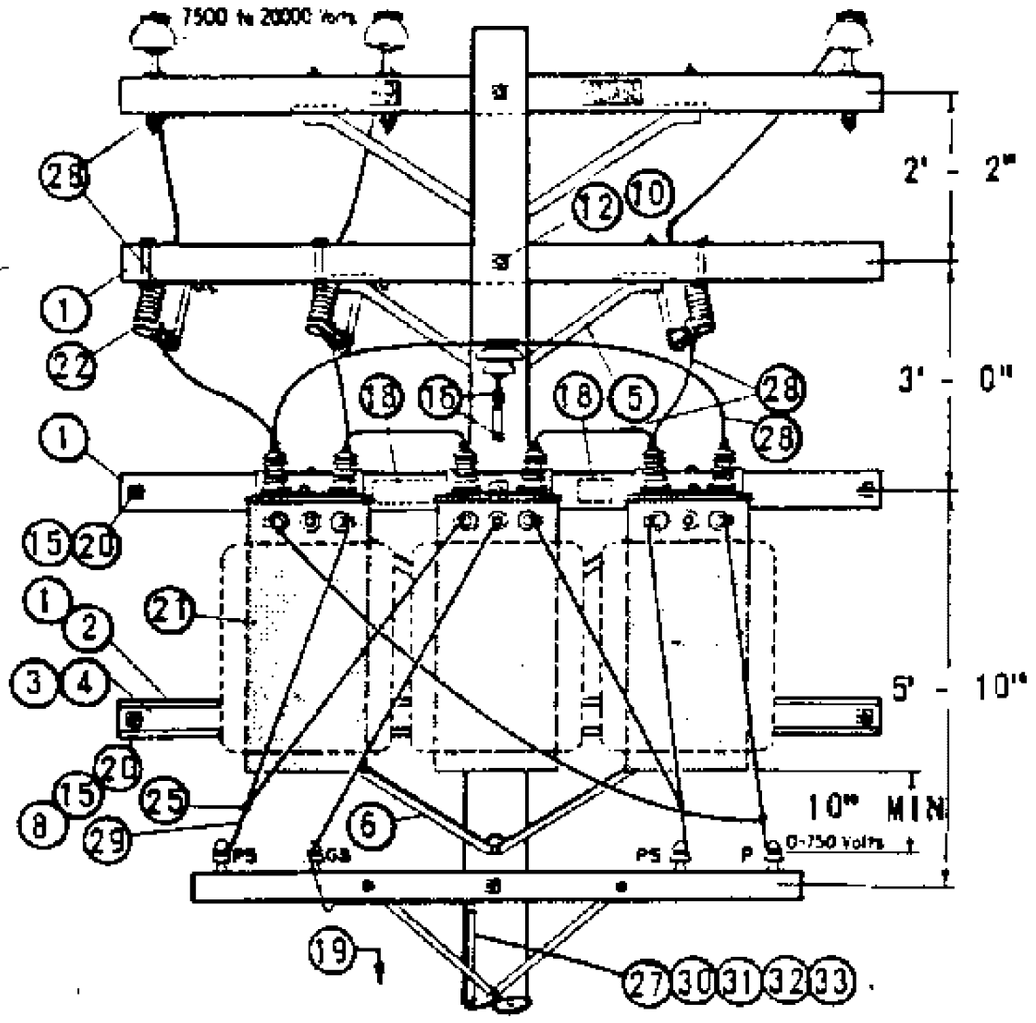
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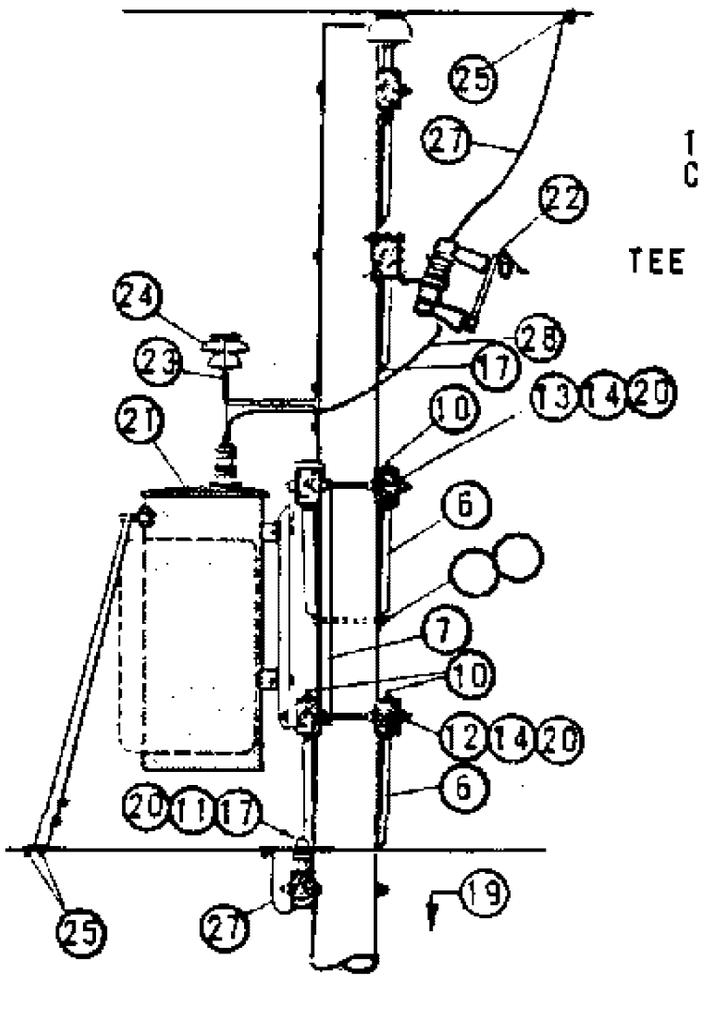
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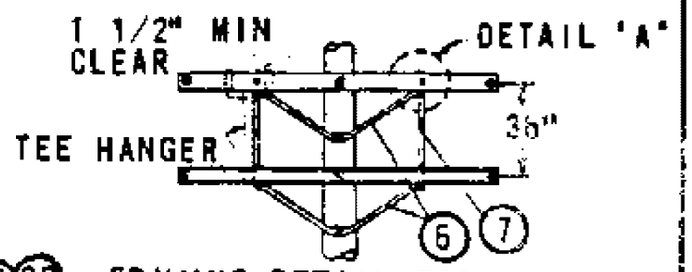
SDG&E ELECTRIC OVERHEAD STANDARD

12KV, THREE PHASE, TYPE "H" OR "HF" TRANSFORMER INSTALLATION, THREE 75 KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION

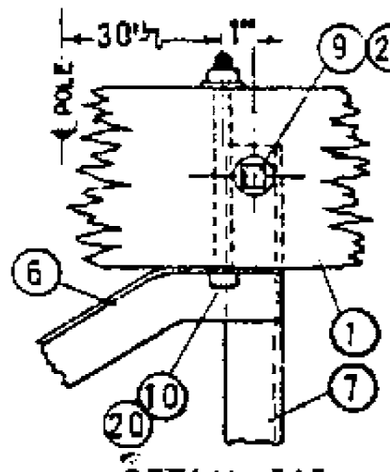
FMO OH 1181






FRAMING DETAIL FOR 3 - 37.5 TO 3 - 75 KVA INSTALLATIONS




DETAIL "A"

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603135 WITH PLAIN MOULDING.

B. SEE ARRESTER SECTION FOR ARRESTER REQUIREMENTS.

(C) USE TWO ROD GROUND.

D. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON STANDARDS PAGE 287.

(E) EXEMPT MATERIAL

F. USE EXTRA HEAVY CLASS ONE POLES WITH 10" MINIMUM TOP DIAMETER ON NEW CONSTRUCTION FOR 3 - 37.5 TO 3 - 75 KVA TRANSFORMER INSTALLATIONS.

G. LIMITED TO TRANSFORMERS WEIGHING 1200# OR LESS.

H. SPACING OF TRANSFORMERS TO BE AS CLOSE AS PRACTICABLE BUT NOT TO EXCEED 33.5" CENTER TO CENTER.

I. SEE STANDARDS PAGE 1119 FOR SPECIFIC TRANSFORMER CONNECTIONS. 240V, 4 WIRE DELTA IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

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| ITEM | MLT | DESCRIPTION | QUANTITY 5 TO 25 KVA | QUANTITY 37.5 TO 75 KVA | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| 1 | | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 3 | 5 | PG. 119 IT. 2 |
| 2 | | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 0 | PG. 116 IT. 1 |
| 3 | | COVER STRIP, 1 5/8" X 3 5/8" X 8' - 0" (2X4S4S) | 1 | 0 | 699328 |
| 4 | | COVER STRIP, 1 5/8" X 3 5/8" X 10' - 0" (2X4S4S) | 0 | 1 | 699360 |
| 5 | | BRACE, ANGLE CROSSARM, GALV, 4' - 0" | 1 | 1 | 164032 |
| 6 | | BRACE, ANGLE CROSSARM, GALV, 5' - 0" | 2 | 4 | 164128 |
| 7 | | BRACE, VERTICAL 36" | 0 | 2 | 164256 |
| 8 | | BOLT, MACH GALV, 3/8" X 6", 2 RD WASH & 1 NUT (E) | 2 | 0 | PGS 139, 140 |
| 9 | | BOLT, MACH GALV, 5/8" X 5", 1 RD WASH. & 1 NUT (E) | 0 | 4 | PGS 139, 140 |
| 10 | | BOLT, MACH GALV, 1/2" X 8", 1 RD WASH & 1 NUT (E) | 6 | 10 | PGS 139, 140 |
| 11 | | BOLT, MACH GALV, 5/8" X __", 1 NUT (E) | 1 | 2 | PGS 139, 140 |
| 12 | | BOLT, MACH GALV, 5/8" X 14", 2 SQ WASH & 1 NUT (E) | 2 | 1 | PGS 139, 140 |
| 13 | | BOLT, MACH GALV, 5/8" X 20", 2 - 3" SQ WASH & 1 NUT (E) | 1 | 0 | PGS 139, 140 |
| 14 | | BOLT, MACH GALV, 3/4" X 20", 2 - 3" SQ WASH & 1 NUT | 0 | 2 | PGS 139, 140 |
| 15 | | BOLT, SPACE GALV, 5/8" X __", 4 SQ WASH, & 4 NUTS (E) | 2 | 4 | PGS 139, 140 |
| 16 | | SCREW, LAG GALV, 1/2" X 4" (E) | 3 | 2 | 621568 |
| 17 | | SCREW, LAG GALV, 5/8" X 5" (E) | 1 | 1 | 621600 |
| 18 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV (E) | 1 | 1 | 647648, 492224 |
| 19 | | STEP, POLE (E) | 19 | 19 | 692992 |
| 20 | | WASHER, DOUBLE COIL SPRING, FOR ITEMS 8 THRU 15 | AS REQ'D | | PG 140 |
| | 21 | TRANSFORMER, SINGLE PHASE, TYPE H OR HF | 3 | 3 | PGS 1121.01-1121.12 |
| | 22 | CUTOUT, 12KV | 3 | 3 | PGS 1212, 1213 |
| | 23 | BRACKET, INSULATOR | 1 | 1 | 166176 |
| | 24 | INSULATOR, 12KV | 1 | 1 | 429152 |
| | 25 | CONNECTOR, WIRE | 11 | 11 | PGS 783-787 |
| | 26 | WIRE, BARE SOLID ANNEALED COPPER #8 | AS REQ'D | | 812928 |
| | 27 | WIRE, BARE STRANDED COPPER #6 | 70' | 70' | 813536 |
| | 28 | WIRE, SOLID W.P. COPPER #4 | 10' | 10' | 813536 |
| | 29 | WIRE, W.P. COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 60' | 60' | PG 1125 |
| | 30 | ROD & CLAMP (A) (C) | 2 | 2 | 603072, 230016 (E) |
| | 31 | MOULDING, HARDWOOD 1" (A) | 27' | 27' | 487200 |
| | 2 | STAPLES, MOULDING GALV, 3" X 1 1/16" X 1/4" (A) (E) | 18 | 18 | 678560 |
| | 33 | STAPLES, FENCE GALV, 1 1/4" (A) (E) | 17 | 17 | 678528 |

FOR FIELD MAINTENANCE ONLY

DATE 1-1-86
APPD AK/RDS

SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS

12KV, THREE PHASE, TYPE "H" OR "HF" TRANSFORMER INSTALLATION, THREE 75 KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION

1199.801
SUPERSEDES
1181 (1-1-86)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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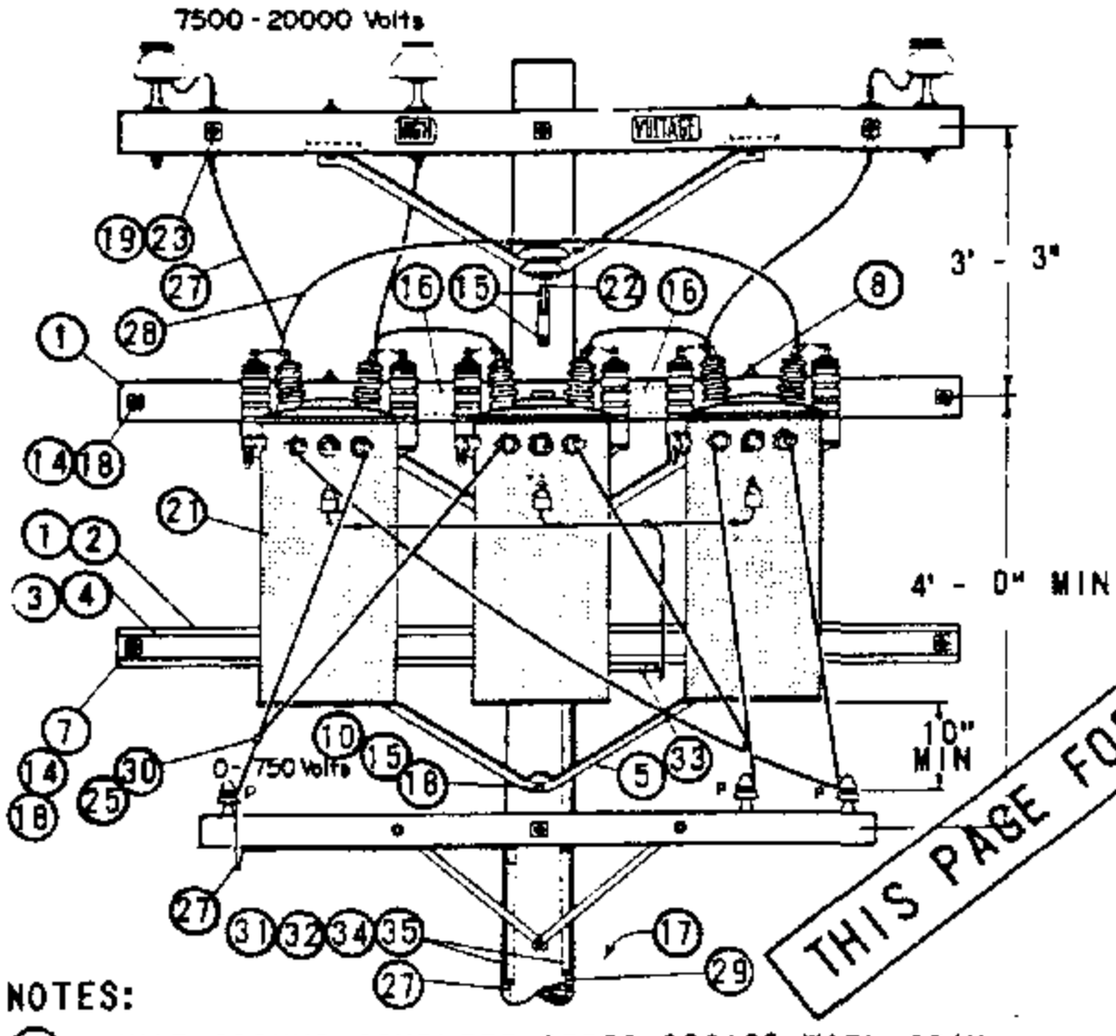
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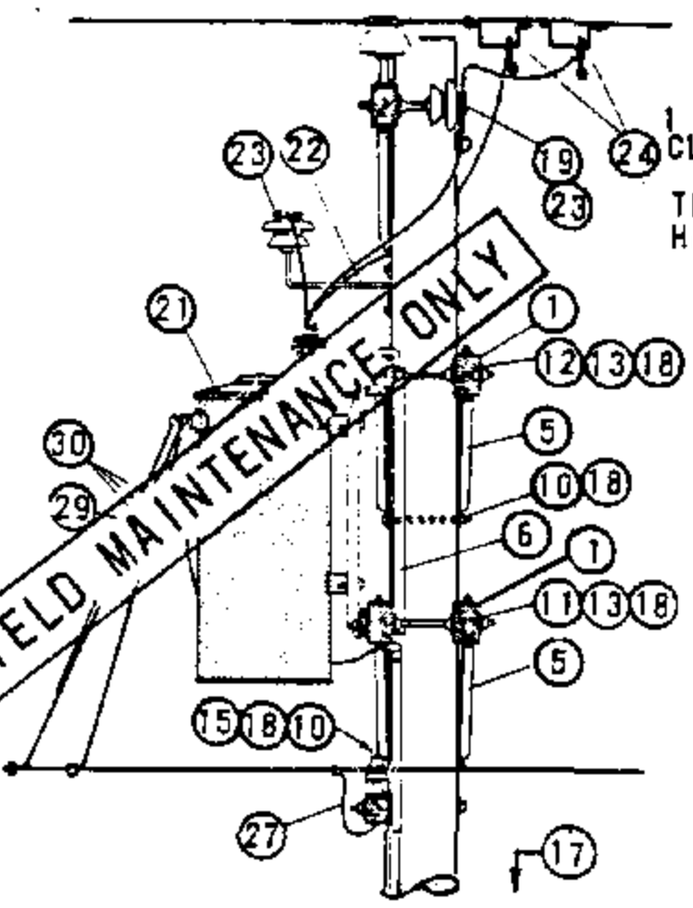
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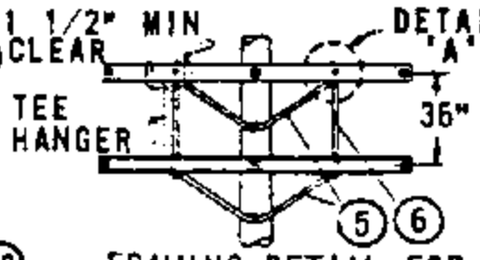
SDG&E ELECTRIC OVERHEAD STANDARD

12KV, THREE PHASE, TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, THREE 75 KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION

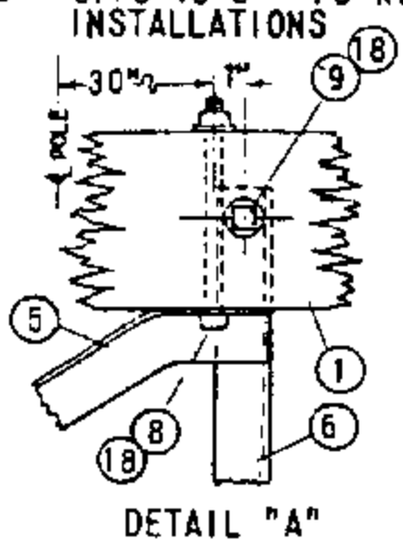
FMO OH 1184






FRAMING DETAIL FOR 3 - 37.5 TO 3 - 75 KVA INSTALLATIONS




DETAIL "A"

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

(B) USE TWO ROD GROUND.

C. THIS PAGE FOR FIELD MAINTENANCE ONLY. USE TYPE 'H' TRANSFORMERS ON NEW INSTALLATIONS.

D. USE EXTRA HEAVY CLASS ONE POLES WITH 10" MINIMUM TOP DIAMETER ON NEW CONSTRUCTION FOR 3 - 37.5 TO 3 - 75 KVA TRANSFORMER INSTALLATIONS.

(E) EXEMPT MATERIALS

F. LIMITED TO TRANSFORMERS WEIGHING 1200# OR LESS.

G. SPACING OF TRANSFORMERS TO BE AS CLOSE AS PRACTICABLE BUT NOT TO EXCEED 33.5" CENTER TO CENTER.

H. SEE DISTRIBUTION POLE TOPS SECTION FOR POLE TOP MATERIALS.

I. OMIT LIGHTNING ARRESTER TANK GAP GROUNDING MATERIAL WHERE INSTALLING TRANSFORMERS NOT EQUIPPED WITH ARRESTERS.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY 5 TO 25 KVA | QUANTITY 37.5 TO 75 KVA | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| 1 | | CROSSARMS, 3 3/4" X 5 3/4" X 10' - 0" | 2 | 4 | PG 119 LT 2 |
| 2 | | CROSSARMS, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 0 | PG 111 LT 2 |
| 3 | | COVER STRIP, 1 5/8" X 3 5/8" X 8' - 0" (2X4S4S) | 1 | 0 | 699328 |
| 4 | | COVER STRIP, 1 5/8" X 3 5/8" X 10' - 0" (2X4S4S) | 0 | 1 | 699360 |
| 5 | | BRACE, ANGLE CROSSARM 5' - 0" | 2 | 4 | 164128 |
| 6 | | BRACE, VERTICAL 36" | 0 | 2 | 164256 |
| 7 | | BOLT, MACH GALV, 3/8" X 6", 2 RD WASH. (E) | 2 | 0 | PGS 139, 140 |
| 8 | | BOLT, MACH GALV, 1/2" X 8", 1 RD WASH (E) | 4 | 8 | PGS 139, 140 |
| 9 | | BOLT, MACH GALV, 5/8" X 5", 1 RD WASH. (E) | 0 | 4 | PGS 139, 140 |
| 10 | | BOLT, MACH GALV, 5/8" X __", (E) | 1 | 2 | PGS 139, 140 |
| 11 | | BOLT, MACH GALV, 5/8" X 14", 2 SQ WASH. (E) | 1 | 0 | PGS 139, 140 |
| 12 | | BOLT, MACH GALV, 5/8" X 20", 2 - 3" SQ WASH. (E) | 1 | 0 | PGS 139, 140 |
| 13 | | BOLT, MACH GALV, 3/4" X 20", 2 - 3" SQ WASH. | 0 | 2 | PGS 139, 140 |
| 14 | | BOLT, SPACE GALV, 5/8" X __", 4 SQ WASH (E) | 2 | 4 | PGS 139, 140 |
| 15 | | SCREW, LAG GALV, 1/2" X 4" (E) | 3 | 2 | 621568 |
| 16 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV (E) | 1 | 1 | 647648, 492224 |
| 17 | | STEP, POLE (E) | 19 | 19 | 692992 |
| 18 | | WASHER, DOUBLE COIL SPRING FOR ITEMS 7 THRU 14 | AS REQ'D | | PG 140 |
| 19 | | PIN, INSULATOR 12KV, SIZE PER ITEM 23, 1 /1 3/8" | 2 | 2 | 531072/532448 |
| 20 | | | | | |
| | 21 | TRANSFORMER, SINGLE PHASE, TYPE HE OR HJ | 3 | 3 | PGS 1121.01-1121.12 |
| | 22 | BRACKET, INSULATOR, SIZE PER ITEM 23 | 1 | 1 | PG 152 |
| | 23 | INSULATOR, 12KV, CLASS AS REQ'D | 3 | 3 | PG 750 |
| | 24 | CLAMP, HOT LINE (E) AND STIRRUP | 7 | 7 | PG 788 |
| | 25 | CONNECTOR, WIRE | 7 | 7 | PGS 783-787 |
| | 26 | | | | |
| | 27 | WIRE, BARE STRANDED COPPER #6 | 76' | 76' | 813536 |
| | 28 | WIRE, BARE STRANDED COPPER #4 | 8' | 8' | 813760 |
| | 29 | WIRE, BARE STRANDED COPPER #2 | 50' | 50' | 813664 |
| | 30 | WIRE, W.P. COPPER, SIZE GOVERENED BY TRANSFORMER CAPACITY | 60' | 60' | PG 1125 |
| | 31 | ROD AND CLAMP, GROUND (A) (B) | 4 | 4 | 603072, 230016 (E) |
| | 32 | MOULDING, HARDWOOD 1" (A) | 64' | 64' | 487200 |
| | 33 | | | | |
| | 34 | STAPLES, MOULDING GALV 1 1/4" X 3 1/16" X 1/4" (A) (E) | 40 | 40 | 678560 |
| | 35 | STAPLES, FENCE GALV 1 1/4" (A) (E) | 36 | 36 | 678528 |

| | | |
|---|---|---|
| 1199.802 SUPERSEDES 1184 (1-1-86) | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>12KV, THREE PHASE, TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, THREE 75 KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION | DATE 1-1-86<br>APPD AE/RDS |

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ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**05/09/2023:** MOVED TO FMO

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION
6.9 7.2KV - SINGLE-PHASE INSTALLATION

FMO OH1188

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE-PHASE VOLTAGE BOOSTING TRANSFORMER.

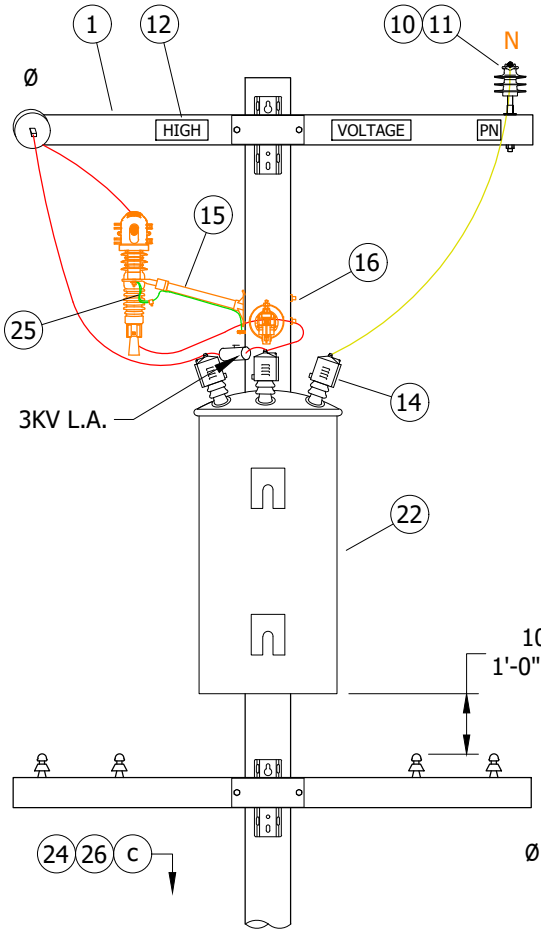
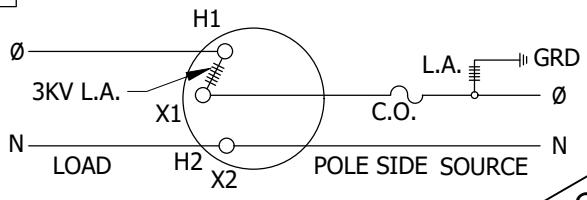



**FIGURE 1**
FRONT VIEW




**DETAIL 1**
CONNECTION DIAGRAM

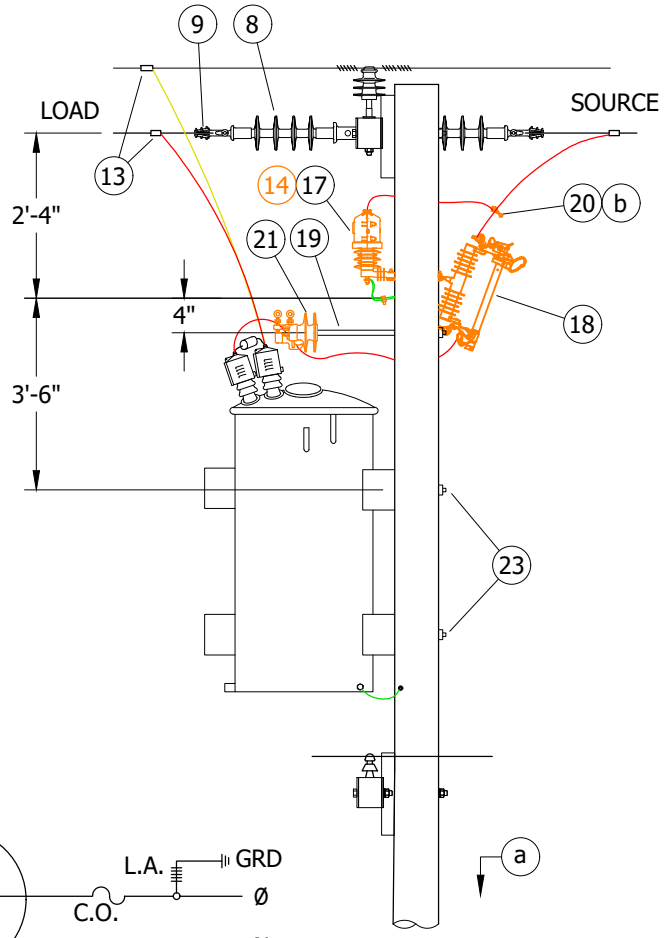



**FIGURE 1**
SIDE VIEW

FIELD MAINTENANCE ONLY

## INSTALLATION:

A. SPECIAL FUSING TO BE SPECIFIED BY DISTRICT ENGINEER.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM | | AS REQ'D | SEC 300 | - | - |
| 2 | BRACE, FLAT CROSSARM, 28" | (I) WOOD CROSSARM | 4 | - | S164192 | - |
| 3 | BOLT, MACH, GALV., 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER | (I) WOOD CROSSARM | 1 | 390 | - | - |
| 4 | BOLT, MACH, GALV., 3/8" X 4 1/2", 1 RD & 1 SPR LOCK WASHER | (I) WOOD CROSSARM | 4 | 390 | - | - |
| 5 | BOLT, MACH, GALV., 1/2" X (LENGTH AS REQ'D) & 1 DOUBLE COIL SPRING WASHER | (I) WOOD CROSSARM | 1 | 390 | - | - |
| 6 | BOLT, SPACE, GALV., 5/8" X (LENGTH AS REQ'D), 4 SQUARE & 2 DOUBLE COIL SPRING WASHERS | (I) WOOD CROSSARM | 2 | 390 | - | - |
| 7 | CLEVIS, DEADEND, 5/8" BOLT STEEL (CLOSED TYPE) | (I) WOOD CROSSARM | 2 | - | S235712 | - |

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| B | DRAWING UPDATE | - | GW | JS | MDJ | 04/01/2018 | E | BILL OF MATERIALS UPDATE | EDM | MRF | MRF | KRG | 05/09/2023 |
| A | ORIGINAL ISSUE | - | - | PIA | JJ | 12/03/2005 | D | TABLE UPDATE | EDM | JIK | JES | CZH | 10/09/2020 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION
6.9 7.2KV - SINGLE-PHASE INSTALLATION



FMO OH1188.1

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## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 8 | INSULATOR, SUSPENSION, 12KV, CLEVIS | | 2 | 750 | - | - |
| 9 | CLAMP, STRAIGHT LINE, D.E. | | 2 | 739 | - | - |
| 10 | PIN, INSULATOR, STRAIGHT, 12KV, 1" OR 1 3/8" LEAD THREAD | | 1 | 396 | - | - |
| 11 | INSULATOR, 12KV NEUTRAL | | 1 | 750 | - | - |
| 12 | SIGN, HIGH VOLTAGE | | 2 | 208 | - | - |
| | 9 ROOFING NAILS, GALV. | | - | | - | - |
| 13 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, AS REQ'D | WOOD CROSSARM | AS REQ'D | 783 | - | - |
| 14 | COVER, BUSHING/ARRESTER | | 3 | 1630 | - | - |
| 15 | BRACKET, MOUNTING, EQUIPMENT, FIBERGLASS, 24" | | 1 | - | S166450 | COLABS |
| 16 | BOLT, MACH, GALV., 5/8" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | | 2 | 390 | - | - |
| 17 | ARRESTER, LIGHTNING, 12KV W/48" #6 COVERED LEAD WIRE | | 1 | 1247 | - | - |
| 18 | CUTOUT, 12KV, WITH LOADBUSTER HOOKS, KEARNY TYPE HX | | 1 | 1206 | - | - |
| 19 | BRACKET, INSULATOR, 1" OR | | 1 | - | S166144 | - |
| | 1 3/8" LEAD THREAD | | 1 | - | S166176 | - |
| 20 | HOT LINE CLAMP | | 1 | - | S227680 | - |
| 21 | INSULATOR, 12KV, (CLASS AS REQ'D) | | 1 | 750 | - | - |
| 22 | AUTOTRANSFORMER, TYPE "HH", SINGLE PHASE, 6.9 - 7.2KV, 625KVA (COMPLETE WITH 1 - 3KV LIGHTNING ARRESTER) | | 1 | - | S753248 | - |
| 23 | BOLT, MACH, GALV., 3/4" X (LENGTH AS REQ'D) 1 SQ CURV WASHER & 1 DBL COIL SPR WASHER | | 2 | 390 | - | - |
| 24 | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTORS | STEEL POLE | 1 | 1002 | - | GNDPSP |
| | | WOOD POLE | | | - | GNDPVC |
| 25 | FLEXIBLE ARRESTER GROUND STRAP | | AS REQ'D | - | S698754 | - |
| 26 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | WOOD POLE | AS REQ'D | - | S678564 (X) | - |

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## NOTES:

(I) NOT SHOWN ON FIGURE.

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) FOR POLE STEPPING, SEE OH363.

(b) FOR HOT LINE CLAMP CONNECTION, SEE OH788.

(c) FOR GROUNDING METHODS, SEE OH1002.

FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION
6.9 7.2KV - SINGLE-PHASE INSTALLATION

# OH1190 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**10/21/2022:** MOVED TO FMO

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION
12 - 12.47 KV - THREE-PHASE INSTALLATION

FMO OH1190

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A THREE-PHASE VOLTAGE BOOSTING TRANSFORMER.

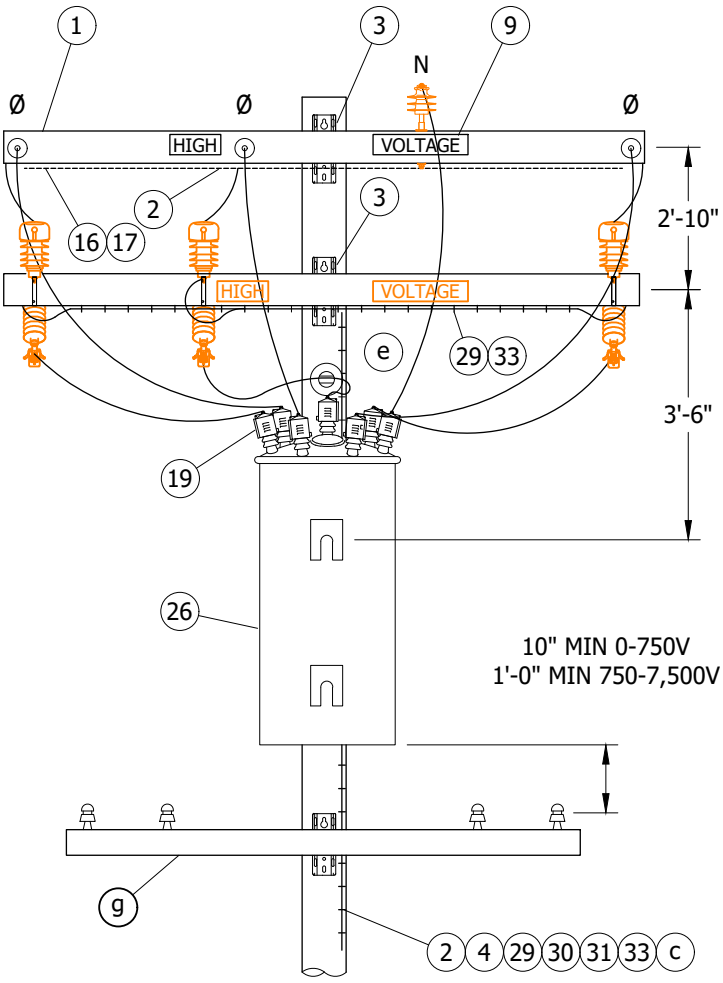



**FIGURE 1**
FRONT VIEW

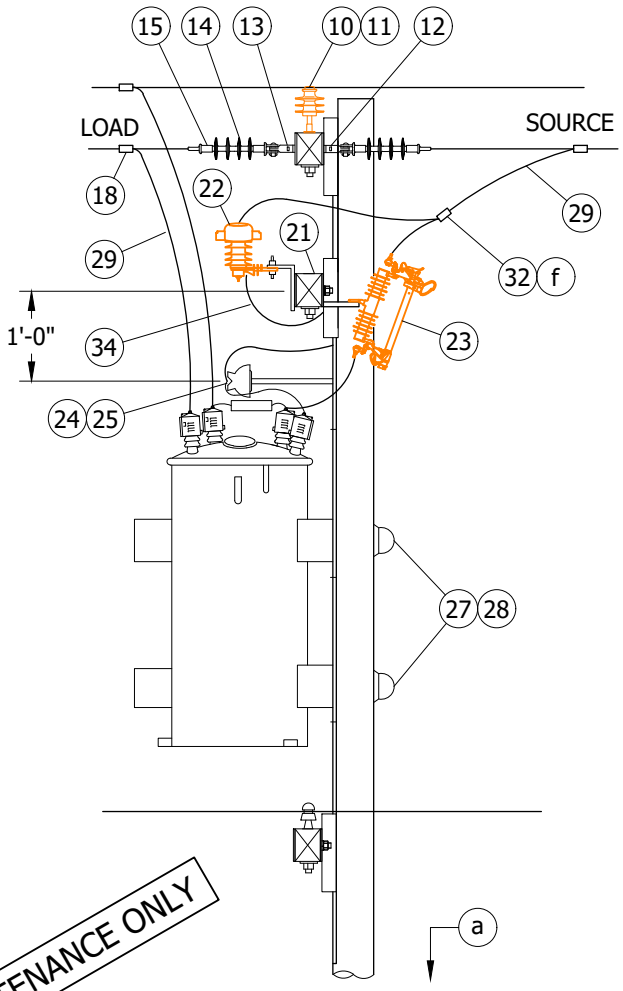



**FIGURE 1**
SIDE VIEW

FIELD MAINTENANCE ONLY

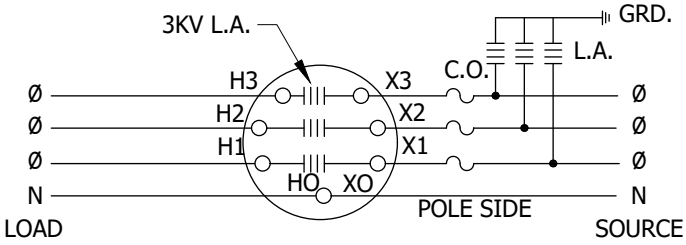



**FIGURE 2**
BOOSTING CONNECTION DIAGRAM

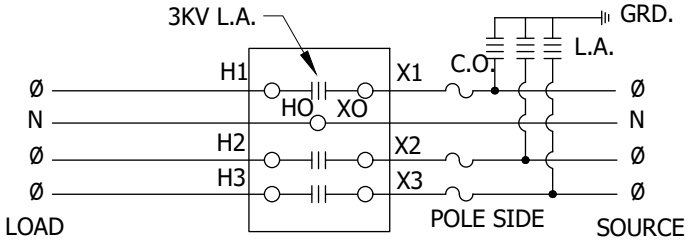



**FIGURE 3**
MCGRAW EDISON WITH ONE SET
OF MOUNTING BRACKETS

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION
12 - 12.47 KV - THREE-PHASE INSTALLATION



FMO
OH1190.1

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## INSTALLATION:

A. SPECIAL FUSING TO BE SPECIFIED BY DISTRICT ENGINEER.

B. TRANSFORMER IN ILLUSTRATION IS SHOWN IN THE BOOSTING POSITION. MOUNT TRANSFORMER BY HANGER BRACKETS ON 'H' BUSHING SIDE OF UNIT TO CHANGE TO BUCKING INSTALLATION. MOUNTING MCGRAW EDISON TRANSFORMER WITH HANGER BRACKETS ON ONE SIDE REQUIRES INTERNAL CHANGE FROM BOOSTING TO BUCKING CONNECTION.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10'-0" | 3 | - | S294128 | - |
| 2 | BRACE, ANGLE, CROSSARM, 5'-0" | 2 | - | S164128 | - |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | - | - |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPR WASHER | 4 | 392 | - | - |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | 1 | 392 | - | - |
| 6 | BRACE, FLAT, GALV, 36" | 2 | - | S164224 | - |
| 7 | BOLT, MACH, GALV, 3/8" X 5", 1 ROUND & 1 SPRING WASHER | 2 | 392 | - | - |
| 8 | BOLT, MACH, GALV, 1/2" X 5", 1 RD & 1 DBL COIL SPR WASHER | 2 | 392 | - | - |
| 9 | SIGN, HIGH VOLTAGE | 2 | - | S647648 | - |
| | 9 ROOFING NAILS, GALV | - | - | S492224 | - |
| 10 | PIN, INSULATOR, STRAIGHT, 12KV, 1" | 2 | - | S532706 (X) | - |
| 11 | INSULATOR, LINE, 12KV NEUTRAL | 2 | - | S429216 | - |
| 12 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE, 2 ROUND & 2 DBL COIL SPRING WASHERS | 3 | 392 | - | - |
| 13 | CLEVIS, DEADEND, 5/8" BOLT STEEL | 6 | - | S235712 | - |
| 14 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 12 | 750 | - | - |
| 15 | CLAMP, STRAIGHT LINE, D.E. | 6 | 741 | - | - |
| 16 | WIRE, #8 BARE SOLID ANNEALED COPPER | 10' | - | S812928 | - |
| 17 | STAPLES, FENCE, GALV, 1 1/4" | AS REQ'D | - | S678528 | - |
| 18 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, (SIZE AS REQ'D) | AS REQ'D | 783-786 | - | - |
| 19 | BUSHING COVER, TRANSFORMER | 7 | - | S298188 | BSHCOV |
| 21 | BRACKET, CUTOUT/ARRESTER, CROSSARM MOUNTING | 6 | - | S166070 | - |
| 22 | ARRESTER, LIGHTNING, 12KV W/48" COVERED LEAD WIRE | 3 | - | S113256 | 10KVTA |
| 23 | CUTOUT, 12KV, WITH LOADBUSTER HOOKS, ALUMAFORM | 3 | - | S298020 | - |
| 24 | BRACKET, INSULATOR, 1" | 1 | - | S166144 | - |
| | 1 3/8" LEAD THREAD | 1 | - | S166176 | - |
| 25 | INSULATOR, 12KV, (CLASS AS REQ'D) | 1 | 750 | - | - |
| 26 | AUTOTRANSFORMER, TYPE 'HHT', 3 PHASE, 12 - 12.47KV, (COMPLETE WITH 3 - 3KV LIGHTNING ARRESTERS) | 1 | 1121 | - | - |
| 27 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED & 1 DBL COIL SPRING WASHER | 2 | 392 | - | - |
| 28 | COVER, BOLT, PLASTIC | 3 | - | S285696 | - |
| | 6 - 10D NAILS, GALV | - | - | S491392 | - |

FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION
12 - 12.47 KV - THREE-PHASE INSTALLATION

## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 29 | #4 CU SOLID GROUND WIRE, PVC COVERED | 110'-0" | - | S812490 | GNDPVC |
| 30 | GROUND ROD, 5/8" X 8'-0", COPPERWELD | 1 | - | S603074 (X) | |
| 31 | COPPER BONDED GROUND CONNECTOR | 1 | - | S259010 | - |
| 32 | HOT LINE CLAMP | 3 | - | S227680 | - |
| 33 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | - | S678564 (X) | - |
| 34 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | - | S698754 | - |

## NOTES:

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) POLE STEPPING, SEE OH363.

b. FOR LIGHTNING ARRESTER REQUIREMENTS, SEE OH1247.

(c) GROUNDING METHODS, SEE OH1002.

d. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON OH287.

(e) SECTIONALIZING CUTOUT INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR, SEE OH1240.

(f) FOR HOT LINE CLAMP CONNECTIONS, SEE OH788.

(g) FIBERGLASS CROSSARMS, SEE OH379.

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# OH1192 UG4230 FIELD MAINTENANCE ONLY

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**REVISION HISTORY:**

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE
USING NON-PORCELAIN TERMINALS,
12-12.47KV THREE-PHASE INSTALLATION

FMO
OH1192
UG4230

**SCOPE:** THIS STANDARD SHOWS THE METHOD OF INSTALLING A 12-12.47KV VOLTAGE BOOSTING TRANSFORMER STATION ON A CABLE POLE USING NON-PORCELAIN TERMINALS.

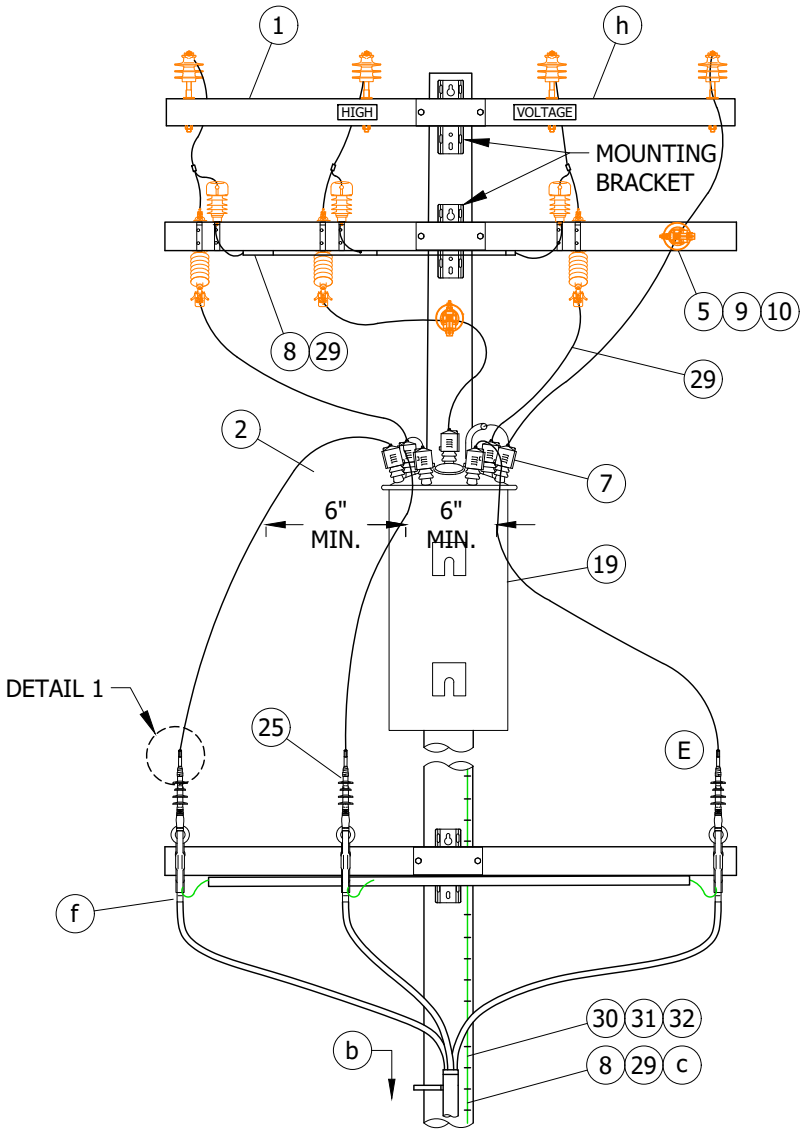



**FIGURE 1**
FRONT VIEW C

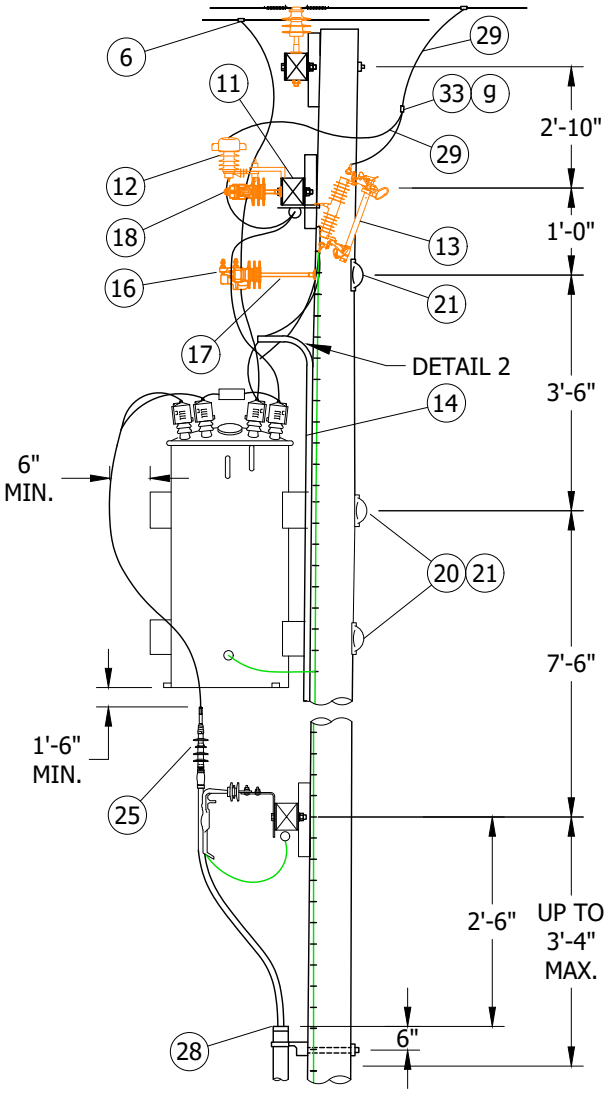



**FIGURE 1**
SIDE VIEW C

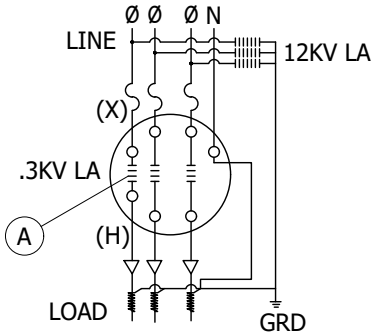



**FIGURE 2**

FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE USING NON-PORCELAIN TERMINALS, 12-12.47KV THREE-PHASE INSTALLATION



FMO
OH1192.1
UG4230.1

**CAUTION:**

* CONTINUITY OF NEUTRAL FROM OVERHEAD THROUGH BOOSTER TO UNDERGROUND SYSTEM MUST BE UNINTERRUPTED WHILE BOOSTER IS IN SERVICE.

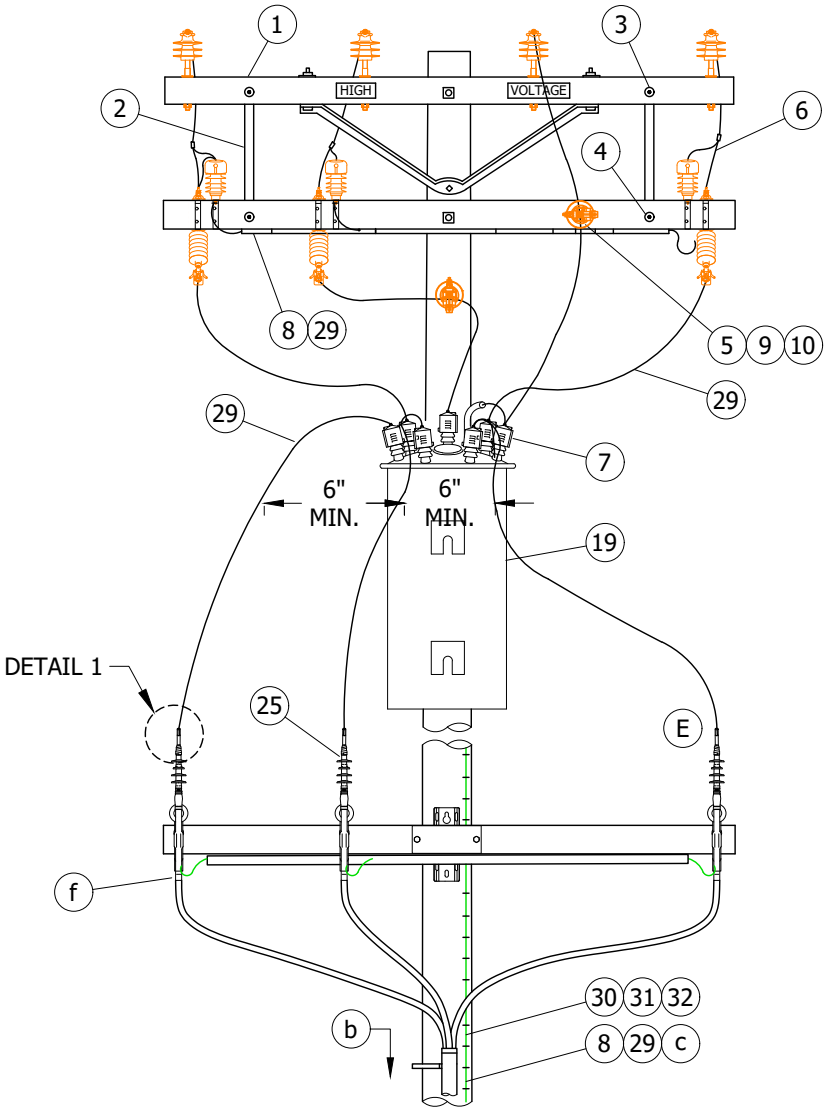



**FIGURE 3** (D)
FRONT VIEW

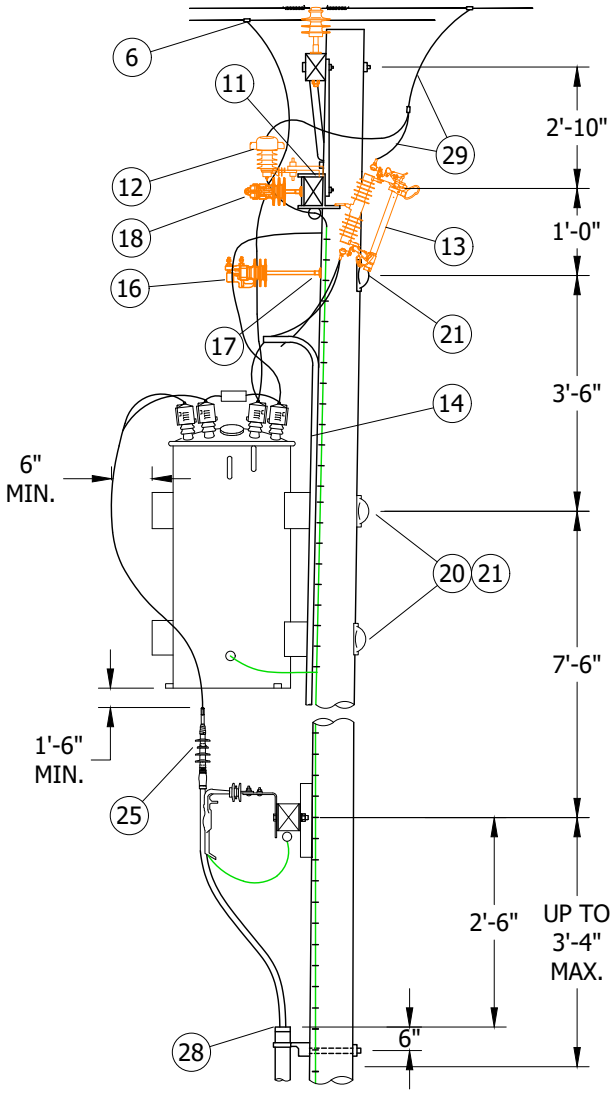
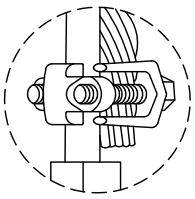
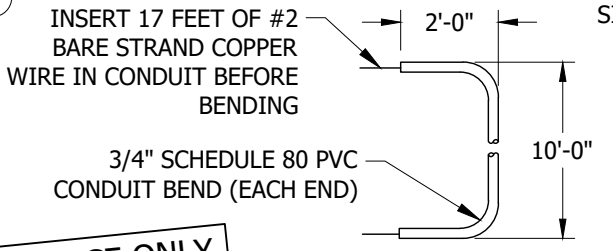



**FIGURE 3** (D)
SIDE VIEW



**DETAIL 1**

FIELD MAINTENANCE ONLY




**DETAIL 2** (D)
CONDUIT BEND ASSEMBLY

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE
USING NON-PORCELAIN TERMINALS,
12-12.47KV THREE-PHASE INSTALLATION

FMO
OH1192.2
UG4230.2

## INSTALLATION:

(A) 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.

(B) CONNECT ONE STRAND OF CONCENTRIC NEUTRAL TO TERMINAL MOUNTING BOLT WITH DOUBLE NUT.

(C) USE FIGURE 1 FOR ALL **NEW** CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH NEUTRAL ON OUTSIDE PIN POSITION.

(D) USE FIGURE 3 ON EXISTING CONSTRUCTION WITH NEUTRAL ON INSIDE PIN POSITION.

(E) INSTALL TERMINATION PER MANUFACTURERS INSTRUCTIONS.

FIELD MAINTENANCE ONLY

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10'-0" | 1 | - | S294128 | - |
| 2 | BRACE, FLAT, GALV., 3'-0" | 2 | - | S164224 | - |
| 3 | BOLT, MACH., GALV., 3/8" X 5", 1 ROUND & 1 SPRING WASHER | 2 | 390 | - | - |
| 4 | BOLT, MACH., GALV., 1/2" X 5", 1 RD & 1 DBL COIL SPRING WASHER | 2 | 390 | - | - |
| 5 | BOLT, MACH, GALV., 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER | 2 | 390 | - | - |
| 6 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, (SIZE AS REQ'D) | AS REQ'D | 784-785 | - | - |
| 7 | BUSHING COVER, TRANSFORMER | 7 | - | S289188 (X) | - |
| 8 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | - | S678564 (X) | - |
| 9 | PIN, TRANSFORMER LEAD ADAPTER, 1" | 1 | - | S529248 | - |
| 10 | INSULATOR, 12KV, NEUTRAL | 1 | - | S429216 | - |
| 11 | BRACKET, CUTOUT/ARRESTER, CROSSARM MOUNTING | 6 | - | S166070 | 1 |
| 12 | ARRESTER, LIGHTNING, 12KV W/ 48 #6 COVERED LEAD WIRE | 3 | - | S113256 | LA12 |
| 13 | CUTOUT, 12KV, WITH LOADBUSTER HOOKS, ALUMIFORM | 3 | - | S298020 | - |
| 14 | CONDUIT, PVC, SCHEDULE 80, 3/4" | 24 | - | S251520 | - |
| 15 | STRAPS, PIPE, GALV., 3/4" & 2 - 6D NAILS, GALV. (I) | AS REQ'D | - | S697888 | - |
| | | - | - | S491552 | - |
| 16 | INSULATOR, 12KV (CLASS AS REQ'D) | 1 | 750 | - | - |
| 17 | BRACKET, INSULATOR, 1" OR 1 3/8" LEAD THREAD | 1 | - | S166176 | - |
| | | 1 | - | S166176 | - |
| 18 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | - | S698754 | - |
| 19 | AUTOTRANSFORMER, TYPE 'HHT', 3-PHASE, 12-12.47KV, (COMPLETE WITH 3 - 3KV LIGHTNING ARRESTERS) | 1 | - | - | - |
| | | 1 | 1121 | - | - |
| 20 | BOLT, MACH, GALV., 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 DOUBLE COIL SPRING WASHER | - | - | - | - |
| | | 2 | 390 | - | - |
| 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 | 390 | - | - |
| 23 | BRACKET, POTHEAD UPSWEEP WITH PVC LINER | 1 | - | S166856 | - |
| 24 | XARM, LENGTH AS REQ'D | 1 | - | - | - |
| 25 | TERMINALS, UNDERGROUND CABLE | 1 | 4111 | - | - |

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| C | MOVED TO FMO | EDM | JIK | JES | CZH | 07/27/2021 | F | | | | | | |
| B | EDITORIAL CHANGES | - | JS | JS | CZH | 10/01/2018 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | TQ | DW | 07/10/2013 | D | | | | | | |



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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE
USING NON-PORCELAIN TERMINALS,
12-12.47KV THREE-PHASE INSTALLATION

FMO
OH1192.3
UG4230.3

## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 26 | SCREW, LAG, GALV., 5/8" X 5" | | 3 | - | S621602 (X) | - |
| 27 | CONDUIT, PLASTIC, PVC, 2" | | 2 | - | S251296 | - |
| 28 | CABLE RISER PROTECTION | | 1'-0" | 1404/4204 | - | - |
| 29 | GROUNDING, #4 PVC GROUND WIRE, RODS & CONNECTORS | STEEL POLE | 1 | 1002 | - | GNDPSP |
| | | WOOD POLE | | | - | GNDPVC |
| 30 | BRACKET, LADDER ARM | | AS REQ'D | - | S167186 | - |
| 31 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | | AS REQ'D | - | S503488 (X) | - |
| 32 | CHANNEL, DOUBLE GALV., 2'-0" | | AS REQ'D | - | S216702 | - |
| 33 | CLAMP, HOT LINE | | 3 | - | S227680 | - |

## TABLE 1

| CABLE SIZE | UG MACRO UNITS | | | |
|---|---|---|---|---|
| | WITH LADDER ARMS | | WITHOUT LADDER ARMS | |
| | PORCELAIN | NON-PORCELAIN | PORCELAIN | NON-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 |

## NOTES:

(I) NOT SHOWN ON FIGURES.

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

a. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON OH287.

(b) SEE OH363UG4205 FOR POLE STEPPING.

(c) SEE OH1002 FOR GROUNDING METHODS.

d. SEE OH1200UG4300 FOR FUSING.

e. SEE OH1247 FOR LIGHTNING ARRESTER REQUIREMENTS.

(f) SEE UG4207 FOR NON-PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

(g) SEE OH788 FOR HOT LINE CLAMP CONNECTION.

(h) SEE OH379 FOR FIBERGLASS CROSSARMS.

FIELD MAINTENANCE ONLY

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| A | ORIGINAL ISSUE | - | - | TQ | DW | 07/10/2013 | D | | | | | | |



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VOLTAGE BOOSTING TRANSFORMER STATION CABLE POLE
USING NON-PORCELAIN TERMINALS,
12-12.47KV THREE-PHASE INSTALLATION

FMO
OH1192.4
UG4230.4

# OH1194 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

02/08/2021: MOVED TO FMO

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| C | | | | | | | F | | | | | | |
| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | GLC | VMV | FRC | CZH | 02/08/2021 | D | | | | | | |

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF A 12KV GROUNDING BANK WITH CLUSTER MOUNTING BRACKET.

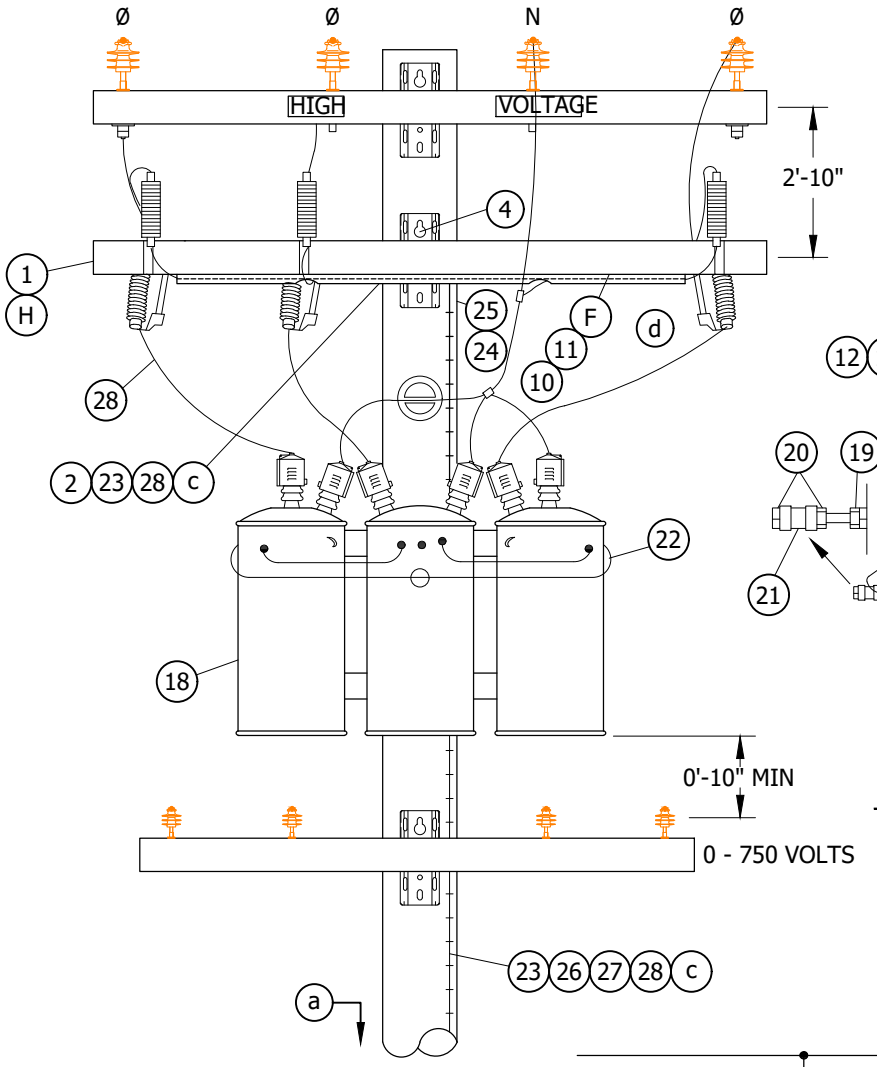



**FIGURE 1**
FRONT VIEW

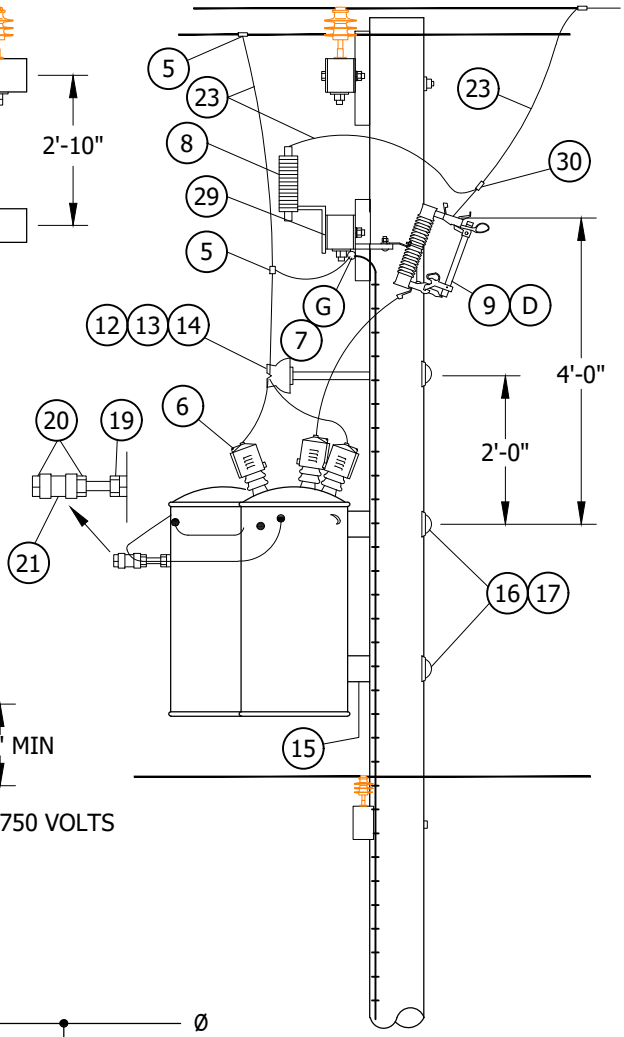



**FIGURE 1**
SIDE VIEW

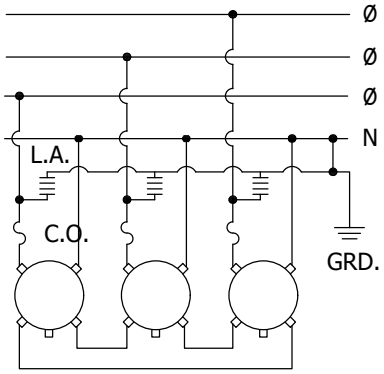



**FIGURE 2**
SCHEMATIC WIRING DIAGRAM

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| B | EDITORIAL CHANGES | - | GW | JS | CZH | 6/1/2018 | E | MOVED TO FMO | GLC | VMV | FRC | CZH | 02/08/2021 |
| A | REVISION | - | - | - | TQ/DW | 3/20/2014 | D | TABLE UPDATE | - | JAC | JES | CZH | 11/12/2019 |

Indicates Latest Revision | Completely Revised | New Page X | Information Removed

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

12KV GROUNDING BANK INSTALLATION



FMO OH1194.1

## INSTALLATION:

A. USE CLASS ONE POLE ON NEW CONSTRUCTION.

B. CONSTRUCT USING 3-50 OR 3-75 KVA TRANSFORMERS WEIGHING 1200 LBS OR LESS A PIECE.

C. WHEN PRACTICAL, BOLT TRANSFORMERS TO BRACKET ON THE GROUND AND INSTALL THEM AS A PREWIRED ASSEMBLY.

(D) FUSE ALL INSTALLATIONS AT 15 AMP.

E. DO NOT GROUND SECONDARY.

(F) 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.

(G) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(H) WHEN LA/CO CROSSARM AND TRANSFORMERS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2-36" FLAT BRACES. SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1 FOR DRILLING MEASUREMENTS).

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | FIBERGLASS CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" (F) | | 1 | | S294378 | 4TF |
| 2 | BLIND NUT, 1/2" | | AS REQ'D | | S503460 (X) | - |
| 3 | SCREW | | 2 | | S618086 (X) | - |
| 4 | BOLT, MACH, GALV, 5/8" (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER | | 5 | 390 | STD 392 | - |
| 5 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, (SIZE AS REQ'D) | | AS REQ'D | 783-786 | STD 783-786 | - |
| 6 | BUSHING COVER, TRANSFORMER | | 6 | | S289188 (X) | BSHCOV |
| 7 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | | 3 | | S165446 (X) | - |
| 8 | ARRESTER, LIGHTNING, 12KV W/48" COVERED LEAD WIRE | | 3 | | S113256 | 10KVTA |
| 9 | CUTOUT, 12KV, WITH LOADBUSTER HOOKS | | 3 | 1212 | STD 1212 | - |
| 10 | WIRE, #8, BARE SOLID ANNEALED COPPER (F) | FT | 15 | | S812928 | - |
| | | LB | 1 | | | |
| 11 | STAPLES, FENCE, GALV, 1 1/4" (F) | | AS REQ'D | | S678528 | - |
| 12 | BRACKET, INSULATOR, 1" | | 1 | | S166144 | - |
| 13 | INSULATOR, 12KV, NEUTRAL | | 1 | | S429216 | - |
| 14 | WIRE, TIE, CU, 6 SOL. | | 1 | | S815232 | - |

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| A | REVISION | - | - | - | TQ/DW | 3/20/2014 | D | TABLE UPDATE | - | JAC | JES | CZH | 11/12/2019 |

## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 15 | BRACKET, TRANSFORMER CLUSTER MOUNTING | | 1 | | S403008 | - |
| 16 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D) 1 SQUARE CURVED WASHER & 1 DBL COIL SPRING WASHER | | 2 | 390 | | - |
| 17 | COVER, BOLT, PLASTIC & 1 3/4" ROOFING NAILS, GALV. | | 2 | | S285696 | - |
| | | | 8 | | S492192 | - |
| 18 | TRANSFORMER, SINGLE PHASE, TYPE 'YF' OR 'HF' | | 3 | 1121 | | - |
| 19 | NUT, GALV, 1/2" | | 1 | | S504736 | - |
| 20 | WASHER, GALV, 1/2", ROUND | | 2 | | S800192 | - |
| 21 | INSULATOR, SECONDARY, SPOOL, PORCELAIN | | 1 | | S430752 | - |
| 22 | WIRE, W.P. COPPER | 3 - 50 KVA - 1/0 | 15' | | S812576 | - |
| | | 3 - 75 KVA - 4/0 | 15' | | S812640 | - |
| 23 | #4 CU SOLID GROUND WIRE, PVC COVERED | | 100' | | S812490 | GNDPVC |
| 24 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" | | 10' | | S251168 | - |
| 25 | STRAPS, PIPE, GALV. 1/2" AND 2 - 1 3/4" ROOFING NAILS | | AS REQ'D | | S697728 | - |
| 26 | GROUND ROD, 5/8" X 8' - COPPERWELD | | 1 | | S603074 (X) | GNDPVC |
| 27 | COPPER BONDED GROUND CONNECTOR | | 1 | | S259010 | - |
| 28 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | | AS REQ'D | | S678564 (X) | - |
| 29 | FLEXIBLE ARRESTER GROUND STRAP | | AS REQ'D | | S698754 | - |
| 30 | HOT LINE CLAMP | | 3 | | S227680 | - |

## NOTES:

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

(a) POLE STEPPING - SEE STANDARD 363.

b. FOR LIGHTNING ARRESTER REQUIREMENTS - SEE STANDARD 1247.

(c) GROUNDING METHOD AND APPLICATION, SEE STANDARD 1002.

(d) SECTIONALIZING CUTOUT INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR - SEE STANDARD 1240.

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| B | EDITORIAL CHANGES | - | GW | JS | CZH | 6/1/2018 | E | MOVED TO FMO | GLC | VMV | FRC | CZH | 02/08/2021 |
| A | REVISION | - | - | - | TQ/DW | 3/20/2014 | D | TABLE UPDATE | - | JAC | JES | CZH | 11/12/2019 |

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| 1206 | PRIMARY CURRENT-LIMITING FUSE INSTALLATION |
| 1207 | FUSES USED IN OVERHEAD CONSTRUCTION |
| 1212 | 4KV AND 12KV CUTOUT ASSEMBLY AND FUSE INSTALLATION |
| 1213 | 6.9, 7.2 & 12KV FAULT TAMER INSTALLATION |
| 1215 | ELECTRONIC SECTIONALIZER |
| 1220 | IN-LINE DISCONNECT SWITCHES WEDGE TAP CONNECTED-12K AND BELOW |
| 1221 | POLE TOP SWITCH INSTALLATION 4KV DISCONNECT SWITCH. HOOK STICK OPERATED |
| 1225 | LINE TENSION DISCONNECT SWITCH HOOK STICK OPERATED |
| 1226 | LINE TENSION DISCONNECT SWITCH HOOK STICK OPERATED ARMLESS |
| 1228 | POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION |
| 1229 | POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION - DOUBLE DEADEND |
| 1230 | POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT HORIZONTAL CONFIGURATION |
| 1231 | HOLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT VERTICAL CONFIGURATION |
| 1236 | POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT TRIANGULAR CONFIGURATION |
| 1240 | POLE TOP SWITCH INSTALLATION 4KV WESTINGHOUSE OIL SWITCH, TYPE F011 |
| 1242 | CROSSARM MOUNTED PARALLEL FUSE AND HOOKSTICK SWITCH INSTALLATION |
| 1243 | CROSSARM MOUNTED PARALLEL FUSE AND SOLID BLADE CUTOUT INSTALLATION |
| 1270 | SERVICE RESTORER WITH CUTOUT DISCONNECT |
| 1271 | SERVICE RESTORER WITH HOOK STICK SWITCH DISCONNECT |
| 1273 | INTELLIRUPTER PULSECLOSER SWITCH |
| 1276 | OVERHEAD AUTORANGING FAULT INDICATOR INSTALLATION OPERATION |


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| G | OH1243 MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | J | OH1276 MOVED TO FMO | GLC | FRC | JAS | MRF | 01/15/2025 |
| F | OH1215 MOVED TO FMO | GLC | RSL | JES | CZH | 12/12/2021 | I | OH1273 MOVED TO FMO | GLC | JIK | FRC | KRG | 09/01/2023 |
| E | REMOVED OH1208 FROM FMO | - | RSL | JES | CZH | 03/09/2020 | H | OH1204 AND OH1242 MOVED TO FMO | AMP | JA | MRF | FRC | 06/12/2023 |

# OH1204 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

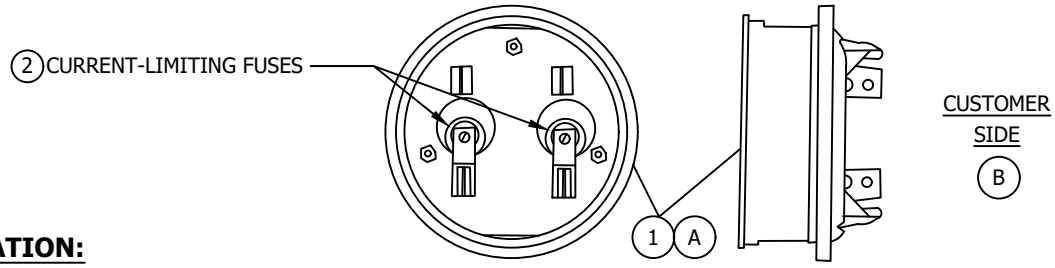
**04/11/2022:** MOVED TO FMO

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | MOVED OH1204 TO FMO | NV5 | RSL | JES | KRG | 04/11/2022 | F | | | | | | |
| B | DRAWING UPDATE | - | PEI | - | - | 02/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | RDJ | 09/01/1985 | D | | | | | | |

**SCOPE:** THIS STANDARD DESCRIBES THE USE OF SECONDARY CURRENT LIMITING FUSES.




## INSTALLATION:

(A) THE EKSTROM ADAPTER MAY BE INSTALLED ON 120/240 VOLT, SINGLE-PHASE SERVICES UP THROUGH 125 AMPERES.

(B) THIS ADAPTER PLUGS IN BETWEEN THE CUSTOMER'S METER SOCKET AND THE COMPANIES METER.

C. CONTACT THE DISTRICT ENGINEERING FOR LARGER SERVICES OR OTHER VOLTAGE REQUIREMENTS.

D. CHECK ALL ELECTRICAL CONNECTIONS ON ADAPTER FOR TIGHTNESS DURING INSTALLATION.

FIELD MAINTENANCE ONLY

E. THE FOLLOWING GUIDELINES APPLY TO CHANGEOUTS OF EXISTING TRANSFORMERS, BASED UPON CUSTOMER'S EQUIPMENT WHICH MAY HAVE A MAXIMUM INTERRUPTING CAPABILITY OF 5000 AMPS.
   1. SINGLE-FAMILY RESIDENTIAL AND DUPLEX APPLICATIONS:
      ALL SERVICES FED DIRECTLY FROM THE TRANSFORMER POLE SHALL HAVE CURRENT LIMITING FUSES APPLIED AT EACH METER SOCKET WHENEVER THE TRANSFORMER AT AN EXISTING INSTALLATION IS INCREASED IN SIZE TO 50, 75, OR 100 KVA. SEE NOTES.
   2. INDIVIDUALLY METERED MOBILE HOMES: WHENEVER THE TRANSFORMER SIZE AT AN EXISTING INSTALLATION IS INCREASED, THE APPLICATION IS TO BE REFERRED TO DISTRICT ENGINEERING FOR REVIEW.

F. THE FOLLOWING GUIDELINES APPLY TO NEW INSTALLATIONS, BASED UPON CUSTOMER'S EQUIPMENT WHICH SHOULD HAVE A MINIMUM INTERRUPTING CAPABILITY OF 10,000 AMPS. THE TABLE BELOW SPECIFIES THE MINIMUM CONDUCTOR LENGTH REQUIRED TO LIMIT THE SHORT CIRCUIT CURRENTS TO LESS THAN 10,000 AMPS FOR VARIOUS SINGLE-PHASE TRANSFORMERS. THE LIMITER ADAPTOR SHALL BE APPLIED TO THOSE SERVICES WHICH DO NOT MEET THIS REQUIREMENT.

| CONDUCTOR SIZE | MINIMUM CONDUCTOR LENGTH TO LIMIT ISC TO 10,000 AMPS | | | |
|---|---|---|---|---|
| | TRANSFORMER SIZE | | | |
| | 25 KVA | 50 KVA | 75 KVA | 100 KVA |
| OVERHEAD TRIPLEX #4 AL OR #6 CU | 0 | 8 | 15 | 19 |
| OVERHEAD TRIPLEX #2 AL OR #4 CU | 0 | 12 | 24 | 30 |
| OVERHEAD TRIPLEX 1/0 AL OR #2 CU | 0 | 19 | 36 | 45 |
| OVERHEAD TRIPLEX 3/0 AL | 0 | 28 | 54 | 67 |

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## BILL OF MATERIALS:

| ITEM | DESCRIPTION | STOCK NO |
|---|---|---|
| 1 | LIMITER, ADAPTER, INCLUDING 2 BUSS TYPE MSD LIMITERS | 463402 |
| 2 | FUSE, CURRENT LIMITING, REPLACEMENT, EKSTROM LIMITER ADAPTER, MSD 125A | 365643 |

## NOTES:

I. SECONDARY CURRENT LIMITING FUSES ARE TO BE APPLIED TO RESIDENTIAL TYPE SERVICES WHENEVER THE AVAILABLE FAULT CURRENT EXCEEDS THE INTERRUPTING RATING OF THE SERVICE ENTRANCE EQUIPMENT.

II. THESE SECONDARY CURRENT LIMITING FUSES ARE TO BE INSTALLED BY THE LINE CREWS ON SCHEDULED WORK. IF THE TRANSFORMER IS CHANGED OUT DUE TO TROUBLE, THE SECONDARY CURRENT LIMITING FUSES SHALL BE ADDED THE FOLLOWING WORK DAY.

III. INSTALLATIONS WHICH ARE DIFFICULT TO PROTECT SHOULD BE REFERRED TO DISTRICT ENGINEERING. CURRENT LIMITING FUSES MAY NOT BE REQUIRED IF SUFFICIENT SECONDARY CABLE LIMITS THE FAULT CURRENT TO SERVICE EQUIPMENT CAPABILITY.

**REFERENCE:** NONE

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | MOVED OH1204 TO FMO | NV5 | RSL | JES | KRG | 04/11/2022 | F | | | | | | |
| B | DRAWING UPDATE | - | PEI | - | - | 02/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | RDJ | 09/01/1985 | D | | | | | | |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

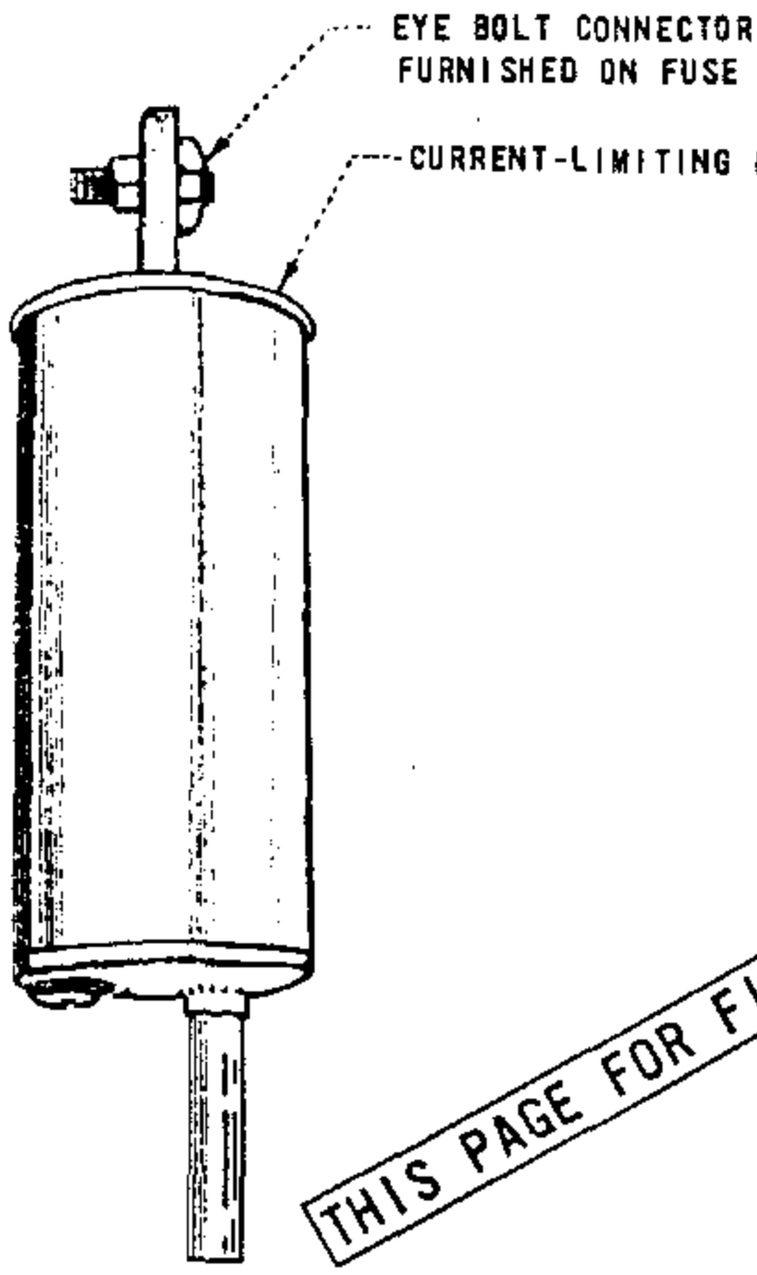
OVERHEAD 12KV CURRENT-LIMITING FUSE INSTALLATION

FMO
OH 1206

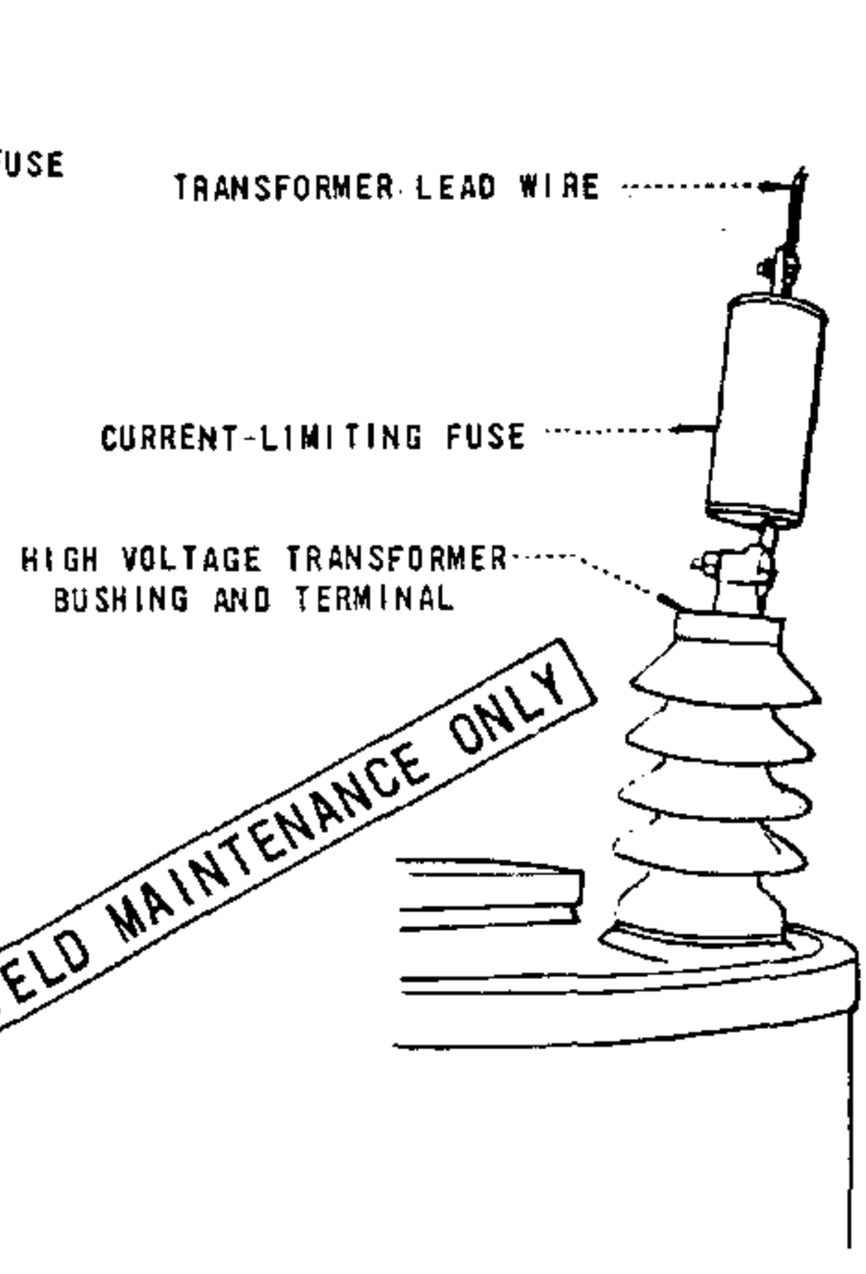
Back-up current-limiting fuses, such as the Chance K-Mate fuse, shall be permanently installed only at the direction of the Protection Engineer in conjunction with expulsion fuses. Current-limiting fuses have the ability to limit high values of fault current so it remains within the interrupting capability of some cutouts. Back-up type current-limiting fuses are used in series with expulsion fuses in order to clear both low and high values of fault current. The back-up current-limiting fuse insures clearing of high current and the expulsion fuse, low current faults.

If a small amount of fault current passes through the two fuses (expulsion fuse in the cutout and current-limiting fuse), only the expulsion fuse will operate and the fuse tube will drop out as normal. At higher fault currents, both fuses will operate, but only the expulsion fused cutout will give the visual indication that it has operated. If the expulsion fuse has operated, always check the current-limiting fuse. To do this, remove the current-limiting fuse, and check for continuity.

The recommended method of installing these current-limiting fuses (Stock No. 365634) is to insert the stud end into the transformer cover mounted high voltage bushing terminal and connect the transformer riser in the eye bolt connector furnished with the current-limiting fuse, as shown below.




FUSE DETAIL




METHOD OF MOUNTING

THIS PAGE FOR FIELD MAINTENANCE ONLY

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| DATE 4-5-83<br>APPD JMT/DCH | SDG&E ELECTRIC STANDARDS<br>OVERHEAD 12KV CURRENT-LIMITING FUSE INSTALLATION | 1299.001<br>SUPERSEDES<br>1206.1 (3-25-83) |

# OH1207 UG4307 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

## REVISION HISTORY:

03/04/2024: TABLE 6 AND 7 MOVED TO FMO.

12/12/2021: NUMBER CHANGE FROM UG4308 TO UG4307.

04/21/2020: MOVED TO FMO.

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| C | EDITORIAL CHANGES | GLC | MPC | JAS | KRG | 03/04/2024 | F | | | | | | |
| B | EDITORIAL CHANGES | GLC | RSL | JES | CZH | 12/12/2021 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JCE | JS | CZH | 04/21/2019 | D | | | | | | |

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

FUSES USED IN OVERHEAD CONSTRUCTION

FMO OH1207 UG4307

SCOPE: THIS STANDARD SHOWS VARIOUS TYPES OF FUSES USED ON THE OVERHEAD DISTRIBUTION SYSTEM.

TABLE 6:

| SMU FUSES FOR SMD20 CUTOUT BODY (I)(III) | | | | |
|---|---|---|---|---|
| SIZE (AMPS) | TYPE | STOCK 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 7:

| END FITTINGS FOR SMU FUSES | |
|---|---|
| DESCRIPTION | STOCK NUMBER |
| FUSE END FITTINGS | S368660 |

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## INSTALLATION:

(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.

(III) SMU FUSES ARE NOT TO BE LEFT HANGING IN THE OPEN POSITION. (f)

## REFERENCE:

(e) SEE OH1208 FOR FIREFLY FUSED CUTOUT INDICATOR.

(f) SEE S&C INSTRUCTION SHEET 252-550.

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| A | MOVED TO FMO | GLC | MPC | JAS | KRG | 03/04/2024 | D | | | | | | |

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| | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS | | | | | |
| | FUSES USED IN OVERHEAD CONSTRUCTION | | | | | |
| FMO OH1207.1 UG4307.1 | | | | | | |

TABLE 6

| FAULT TAMER FUSE LIMITERS TCC 123-8 | | | |
|---|---|---|---|
| SIZE (AMPS) | TYPE | STOCK NUMBER | ASSEMBLY UNIT |
| 5 | FAULT TAMER | S365810 | FT5 |
| 10 | FAULT TAMER | S365811 | FT10 |
| 15 | FAULT TAMER | S365812 | FT15 |
| 20 | FAULT TAMER | S365813 | FT20 |
| N/A | FAULT TAMER BACK-UP LIMITER | S365822 | FTBL |

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NOTES:

1. THESE FUSES ARE CAL-FIRE EXEMPT. THEY WILL BE USED IN TIER 2 & TIER 3 AREAS.

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| B | EDITORIAL CHANGES | - | KN | JS | MDJ | 07/25/2017 | E | | | | | | |
| A | UPDATED MATERIALS | - | DS | JS | MDJ | 01/25/2017 | D | EDITORIAL CHANGES | GLC | RSL | JES | CZH | 12/12/2021 |



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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

FUSES USED IN OVERHEAD CONSTRUCTION

FMO
OH1207.2
UG4307.2

# OH1212 UG4305 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

06/05/2025: MOVED S298024 AND NOTE VI FROM SHEET 2 TO FMO

06/05/2023: MOVED SHEET 2 "CUTOUT ASSEMBLY SMD20" TO FMO

12/12/2021: NUMBER CHANGE FROM UG4306 TO UG4305

04/21/2019: MOVED TO FMO

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| C | MOVED TO FMO | ARC | MPC | CWB | KRG | 06/05/2023 | F | | | | | | |
| B | EDITORIAL CHANGES | GLC | RSL | JES | CZH | 12/12/2021 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JCE | JS | CZH | 04/21/2019 | D | MOVED S298024 TO FMO | NV5 | DJB | FRC | JAS | 06/05/2025 |

**SCOPE:** THIS STANDARD SHOWS THE POLYMER BODY INTERCHANGEABLE CUTOUT ASSEMBLY.

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION | CURRENT RANGE | CALLOUTS | STANDARD PAGE | STOCK NUMBER | DESIGN UNIT |
|---|---|---|---|---|---|---|
| 1 | DEP CUTOUT, INTERCHANGEABLE, NON-COASTAL | 0 - 300A | (VI) | -- | S298024 | NPCO-1 |

**NOTES:**

(VI) FOR USE IN CONTAMINATION DISTRICTS II AND III ONLY.

**REFERENCE:** NONE

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| D | FORMATTING | EDM | JIK | - | - | 09/28/2020 | G | MOVED S298024 TO FMO | NV5 | DJB | FRC | JAS | 06/05/2025 |
| C | DRAWING UPDATE | - | RSL | JES | CAH | 03/09/2020 | F | MOVED TO FMO | ARC | MPC | CWB | KRG | 06/05/2023 |
| B | DRAWING UPDATE | - | JCE | JS | CAJ | 03/18/2019 | E | EDITORIAL CHANGES | EDM | CWB | JES | CZH | 09/30/2021 |

Indicates Latest Revision | Completely Revised | X New Page | Information Removed



SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

CUTOUT ASSEMBLY
POLYMER INTERCHANGEABLE

FMO
OH1212.1
UG4305.1

**SCOPE:** THIS STANDARD SHOWS THE SMD20 CUTOUT ASSEMBLY, SECOND CHOICE FOR USE 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.

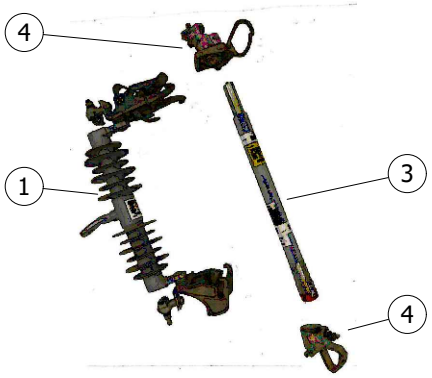



**FIGURE 1**
CUTOUT BODY WITH FUSE

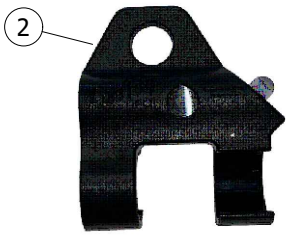



**FIGURE 2**
FIREFLY



**FIGURE 3**
ASSEMBLED CUTOUT BODY WITH FUSE AND FIREFLY

**INSTALLATION:** NONE

**BILL OF MATERIALS:**

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | FUSEHOLDER, POLYMER BODY, WITH END FITTINGS FOR SMU FUSE BARREL SMD20, CURRENT RANGE UP TO 200A (VII) | -- | -- | S298022 | SMD20 |
| 2 | FIREFLY FOR 100A AND SMALLER SMU/CMU FUSES (c) | -- | -- | S423608 | |
| 3 | FUSE, BARREL, REFER TO SIZES | -- | 1207/4307 | -- | -- |
| 4 | FITTINGS, END, UPPER & LOWER, END FOR SMU FUSES (III)(a) | -- | -- | S368660 | -- |

**NOTES:**

I. KEARNY TYPE HX CUTOUTS ARE NO LONGER AVAILABLE. FOR APPLICATIONS IN TIER 2 & TIER 3 AREAS, SMD20 CUTOUT BODY AND 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.

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 = S165454 (X)

b. CUTOUT OR ARRESTER = S165452 (X)

(X) THIS ITEM IS EXEMPT.

**REFERENCE:**

(a) SEE OH1207UG4307.

(b) SEE OH397.

(c) SEE OH1208.

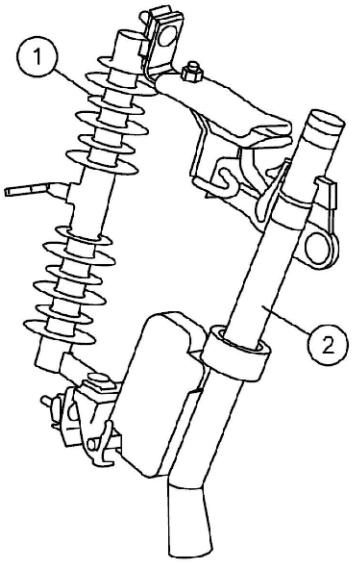
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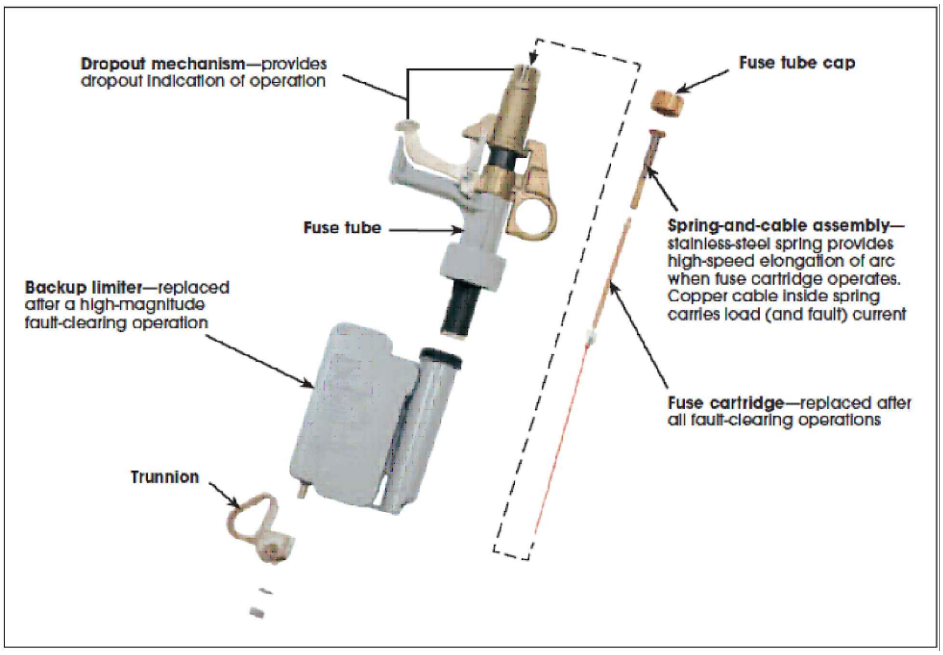
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| B | DRAWING UPDATE | - | JCE | JS | CAJ | 04/01/2018 | E | EDITORIAL CHANGES | EDM | CWB | JES | CZH | 09/30/2021 |

**SCOPE:** THIS STANDARD SHOWS THE FAULT TAMER FUSE TUBE AND BACK-UP LIMITER, AND IT'S APPLICATION .




## BILL OF MATERIALS:

| ITEM | CURRENT RANGE | DESCRIPTION | STOCK NUMBER | ASSEMBLY UNITS UG | ASSEMBLY UNITS OH |
|---|---|---|---|---|---|
| 1 | 0 - 300A | INTERCHANGEABLE CUTOUT BODY, WITHOUT FUSEHOLDER (III) | S298020 | -- | NPCO |
| 2 | FUSE 5 THRU 20A | FAULT TAMER, INCLUDES FUSE TUBE & BACK-UP LIMITER (I) | S365820 | -- | FTAMER |

## NOTES:

(I) SEE TABLE 1 FOR FUSES.

II. CUTOUTS SHALL BE BONDED IF INSTALLED IN CONTAMINATION DISTRICT 1 AS SHOWN IN OH STANDARD 287.

(III) CROSS ARM MOUNTING BRACKET ARE INCLUDED WITH THE MATERIALS SUPPLIED BY THE OH ASSEMBLY UNITS (USED ON "DESIGN BY LOCATION" JOBS). BRACKETS MUST BE ORDERED SEPARATELY ON MANUALLY PREPARED FIELD MEMO JOBS.

- DOUBLE CUTOUT & ARRESTER MOUNTING BRACKET, USE S165442.
- CUTOUT OR ARRESTER MOUNTING BRACKET, USE S166070.

IV. USE ON 6.9KV - 12KV ONLY.

## REFERENCE:

e. SEE ELECTRIC STANDARD PRACTICE 321 S&C FAULT TAMER® FUSE LIMITER.

f. SEE S&C FAULT TAMER INSTALLATION INSTRUCTIONS 451-500.

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**REVISION HISTORY:**

**9/19/2017:** All versions prior to 2017 are superseded by their current version found inside the Overhead Construction Standard Manual.

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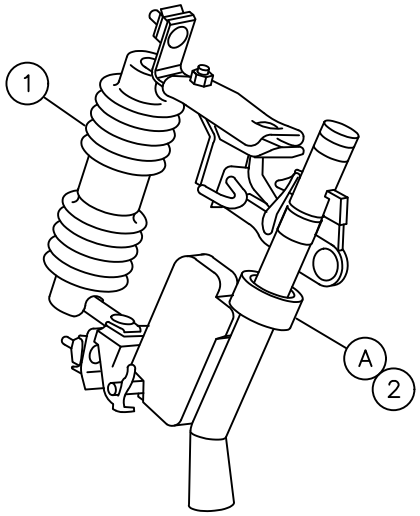
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

6.9, 7.2 & 12KV FAULT TAMER INSTALLATION

FMO
OH 1213

**SCOPE:** THIS STANDARD SHOWS THE FAULT TAMER FUSE TUBE AND BACK–UP LIMITER, AND IT'S APPLICATION.




## BILL OF MATERIAL:

| ITEM | CURRENT RANGE | DESCRIPTION | | STOCK NUMBER | ASSEMBLY UNITS UG | ASSEMBLY UNITS OH |
|---|---|---|---|---|---|---|
| 1 | 0 – 300A | INTERCHANGEABLE CUTOUT BODY, WITHOUT FUSEHOLDER | HIGH LEAKAGE, CONTAMINATION DISTRICTS 1 ONLY (C) | S297956 | – | X–CO |
| | | | STANDARD LEAKAGE, CONTAMINATION DISTRICTS 2 AND 3 (C) | S297960 | – | CO–X |
| 2 | FUSE 5A THRU 20A | FAULT TAMER, INCLUDES FUSE TUBE & BACK–UP LIMITER (A) | | S365820 | – | FTAMER |

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## TABLE 1 FAULT TAMER FUSE LIMITERS

| SIZE (AMPS) | TYPE | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 5 | FAULT TAMER | S&C ELECTRIC | 527005 | S365810 | FT5 |
| 10 | FAULT TAMER | S&C ELECTRIC | 527010 | S365811 | FT10 |
| 15 | FAULT TAMER | S&C ELECTRIC | 527015 | S365812 | FT15 |
| 20 | FAULT TAMER | S&C ELECTRIC | 527020 | S365813 | FT20 |
| N/A | FAULT TAMER BACK–UP LIMITER | S&C ELECTRIC | 98218 | S365822 | FTBL |

## INSTALLATION:

(A) SEE TABLE 1 FOR FUSES.

B. CUTOUTS SHALL BE BONDED IF INSTALLED IN CONTAMINATION DISTRICT 1 AS SHOWN ON STANDARD 287.

(C) CROSSARM MOUNTING BRACKETS ARE INCLUDED WITH THE MATERIALS SUPPLIED BY THE OH ASSEMBLY UNITS (USED ON "DESIGN BY LOCATION" JOBS). BRACKETS MUST BE ORDERED SEPARATELY ON MANUALLY PREPARED FIELD MEMO JOBS.

- DOUBLE CUTOUT & ARRESTER MOUNTING BRACKET, USE S165442
- CUTOUT OR ARRESTER MOUNTING BRACKET, USE S166070

## REFERENCE:

D. SEE ELECTRIC STANDARD PRACTICE 321 S & C FAULT TAMER® FUSE LIMITER.

E. SEE S&C FAULT TAMER INSTALLATION INSTRUCTIONS 451–500.

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| REVISION DATE 8–15–2013 APPD TQ / DW | SDG&E ELECTRIC STANDARDS | OH 1213 |
|---|---|---|
| | 6.9, 7.2 & 12KV FAULT TAMER INSTALLATION | |

# OH1215 UG4308 FIELD MAINTENANCE ONLY

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**REVISION HISTORY:**

12/12/2021: MOVED TO FMO

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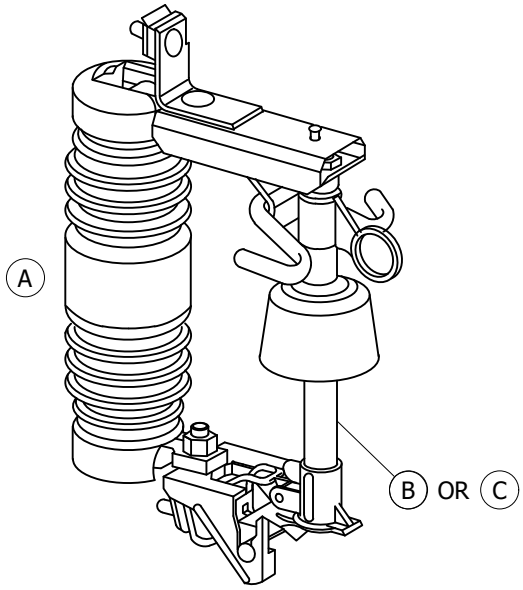
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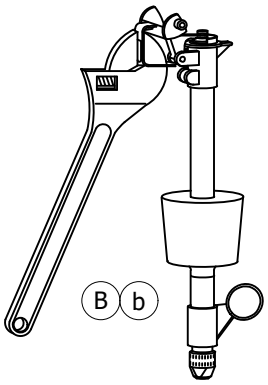
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

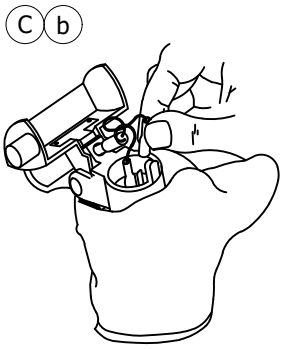
ELECTRONIC SECTIONALIZER

FMO OH1215 UG4308

**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.

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### 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 | S634100 | ES100 | 100ES |
| 140 | 2 | A.B. CHANCE | C740-282T | S634102 | ES140 | 140ES |
| 200 | 2 | A.B. CHANCE | C740-292T | S634104 | ES200 | 200ES |

### TABLE 2 NON-RESETTABLE ELECTRONIC SECTIONALIZER (REPLACEMENT ACTUATOR (C)(a)

| SIZE (AMPS) | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER |
|---|---|---|---|
| 100 - 200 | A.B. CHANCE | C700-1729 | S101522 |

**NOTES:** NONE

**REFERENCE:**

(a) FOR APPLICATION OF ELECTRONIC SECTIONALIZERS - SEE DESIGN MANUAL PAGE 6205.3.

(b) FOR OPERATIONAL INFORMATION - SEE ELECTRIC STANDARD PRACTICE 318.

FIELD MAINTENANCE ONLY

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | MOVED TO FMO | GLC | RSL | JES | CZH | 12/12/2021 | 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 FIELD MAINTENANCE ONLY STANDARDS

ELECTRONIC SECTIONALIZER

FMO
OH1215.1
UG4308.1

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

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| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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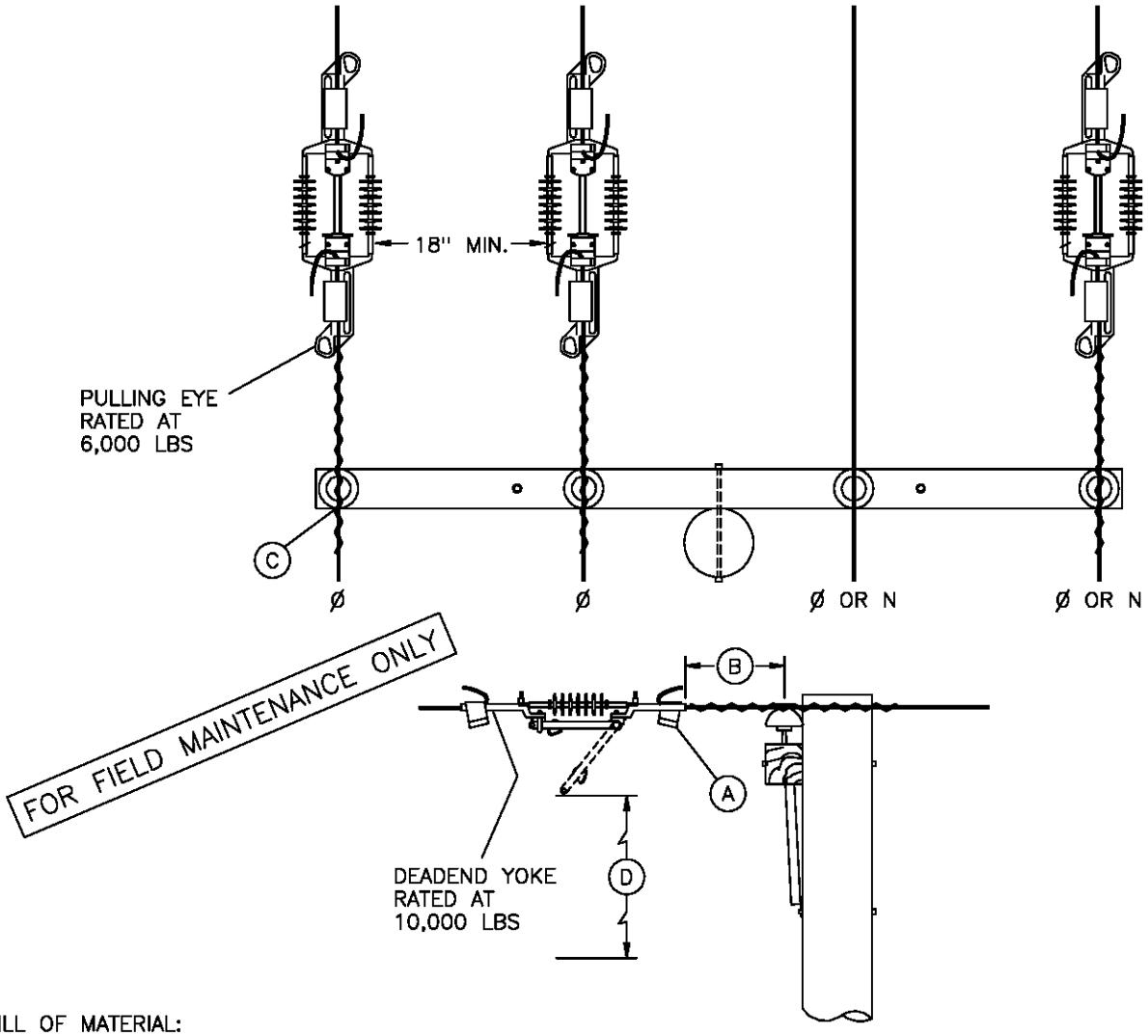
SDG&E ELECTRIC OVERHEAD STANDARD

IN-LINE DISCONNECT SWITCHES
WEDGE TAP CONNECTED-12K AND BELOW

FMO
OH 1220

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF PRIMARY IN-LINE HOOKSTICK DISCONNECTS, WEDGE TAP CONNECTED. THIS IS A PREFERRED METHOD FOR EXISTING PIN AND INSULATOR CONSTRUCTION. THESE SWITCHES CAN BE INSTALLED ON 336 AND 636 ACSR CONDUCTOR ONLY.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | SWITCH, DISCONNECT, IN-LINE, 900A INCLUDING 2 WEDGE TYPE TAP CONNECTORS | 336.4 ACSR | 3 | 707010 | ILD336 |
| | | 636 ACSR | 3 | 707012 | ILD636 |
| 2 | TAP CONNECTORS, WEDGE TYPE, (REPLACEMENT) (A) | 336.4 ACSR | AS REQ'D | 265940 | – |
| | | 636 ACSR | | 265942 | – |

INSTALLATION:

(A) WHEN INSTALLING SWITCH, USE ONLY WEDGE TYPE DEADEND TAP CONNECTORS SUPPLIED WITH SWITCH, OR EQUIVALENT REPLACEMENT ITEM. **DO NOT REUSE DEADEND TAP CONNECTORS.** IF REINSTALLING SWITCH, USE NEW DEADEND TAP CONNECTORS.

(B) WHEN INSTALLING, POSITION SWITCH ON CONDUCTOR 18 INCHES FROM INSULATOR PIN TO SWITCH PULLING EYE, OR, 18 INCHES FROM DEADEND CLAMP PULLING EYE TO SWITCH PULLING EYE.

(C) IF TIE WIRE EXISTING, REPLACE WITH PREFORMED TIE. DO NOT REPLACE EXISTING CLAMP TOP INSULATOR.

(D) 4'-0" MIN. CLEARANCE TO NEAREST CONDUCTOR BELOW WHEN SWITCH IS OPEN. WHERE CONSTRUCTION IS REQUIRED BELOW SWITCH, IT SHALL NOT INTERFERE WITH OPERATION OF ANY SWITCH FROM THE POLE.

| | | |
|---|---|---|
| DATE 1-1-98<br>APPD PSA/CMK | SDG&E ELECTRIC STANDARDS<br>IN-LINE DISCONNECT SWITCHES<br>WEDGE TAP CONNECTED-12K AND BELOW | 1299.207<br>SUPERSEDES<br>1220 (4-30-99) |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superceded by their current version found inside the Overhead Construction Standard Manual.

**2/20/2019:** Install S706680 in place of old style Disconnect Switch.

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| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

POLE TOP SWITCH INSTALLATION 4KV DISCONNECT SWITCH, HOOK STICK OPERATED

FMO OH 1221

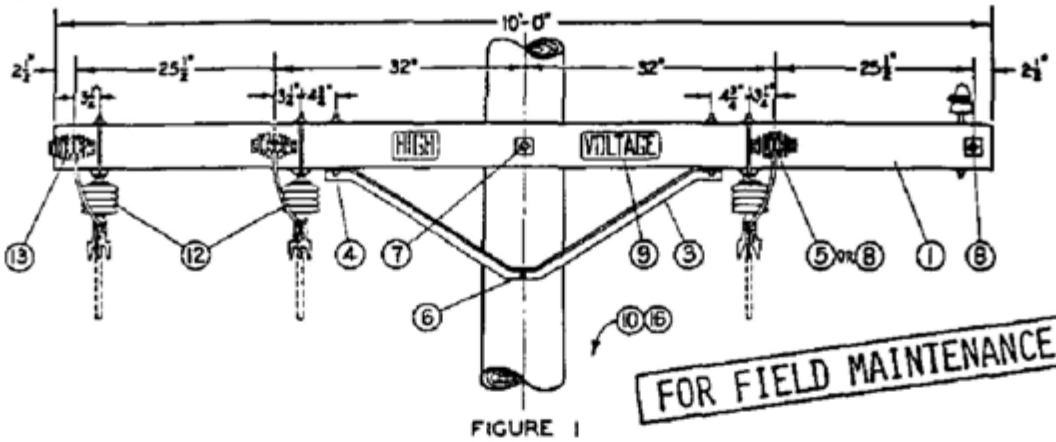



FIGURE 1
SPREAD CONSTRUCTION

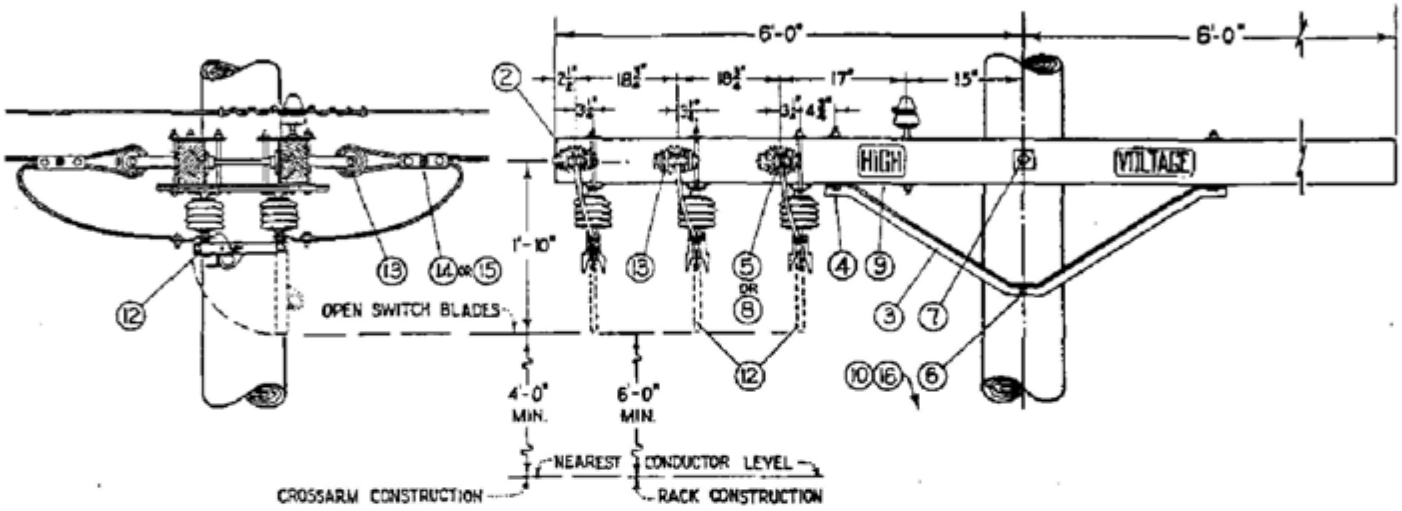



FIGURE 2
TWIN CIRCUIT CONSTRUCTION

NOTE:

A. FOR ARM-END CONSTRUCTION, REDRILL CROSSARMS IN FIELD AS SPECIFIED BY FIGURE 2

| | ITEM | DESCRIPTION | QUANTITY FIGURE 1 #4 or SMALLER | QUANTITY FIGURE 1 #1 or LARGER | QUANTITY FIGURE 2 #4 or SMALLER | QUANTITY FIGURE 2 #1 or LARGER | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|---|---|---|
| P T & F | 1 | Crossarm, 3 3/4" X 5 3/4" X 10'-0" | 2 | 2 | - | - | PG 119 IT 2 |
| | 2 | Crossarm, 3 3/4" X 5 3/4" X 12'-0" | - | - | 2 | 2 | PG 119 IT 4 |
| | 3 | Angle Crossarm Brace, 4'-0" | 2 | 2 | 2 | 2 | 164032 |
| | 4 | Mach. Bolt, Galv., 1/2" X 7", 1-rd. wash. & 1-nut | 4 | 4 | 4 | 4 | PGS 139, 140 |
| | 5 | Mach. Bolt, Galv., 5/8" X 5", 1-sq. wash. & 1-nut | 4 | - | 4 | - | PGS 139, 140 |
| | 6 | Mach. Bolt, Galv., 5/8" X 10", 1-nut | 1 | 1 | 1 | 1 | PGS 139, 140 |
| | 7 | Mach. Bolt, Galv., 5/8" X 18", 2-sq. wash. & 1-nut | 1 | 1 | 1 | 1 | PGS 139, 140 |
| | 8 | Space Bolt, Galv., 5/8" X 20", 4-sq. wash & 4-nuts | 2 | 4 | 2 | 4 | PGS 139, 140 |
| | 9 | High Voltage Sign & 8-Roofing Nails, Galv. | 2 | 2 | 2 | 2 | 647776, 492192 |
| | 10 | Pole Steps | 17 | 17 | 17 | 17 | 592992 |
| | 11 | | | | | | |
| D C & D | 12 | Disconnect Switch, 14.4 KV, 600 A, S.P.S.T., with Hanger Straps and Bolts | 3 | 3 | 3 | 3 | 707008 |
| | 13 | Insulator, D. E. | 6 | 6 | 6 | 6 | 235520 |
| | 14 | Wire Connector, Split Bolt | 12 | - | 12 | - | PGS 783, 786 |
| | 15 | Wire Connector, 3-Bolt Clamp | - | 6 | - | 6 | 227296 |
| | 16 | Switch Tag | 2 | 2 | 2 | 2 | — |

| | | |
|---|---|---|
| 1299.204<br>SUPERSEDES<br>1221 (1-1-67) | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH INSTALLATION<br>4KV DISCONNECT SWITCH, HOOK STICK OPERATED | DATE 1-1-87<br>APPD AK/RDS |

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superceded by their current version found inside the Overhead Construction Standard Manual.

**2/20/2019:** Install S706680 in place of old style Disconnect Switch.

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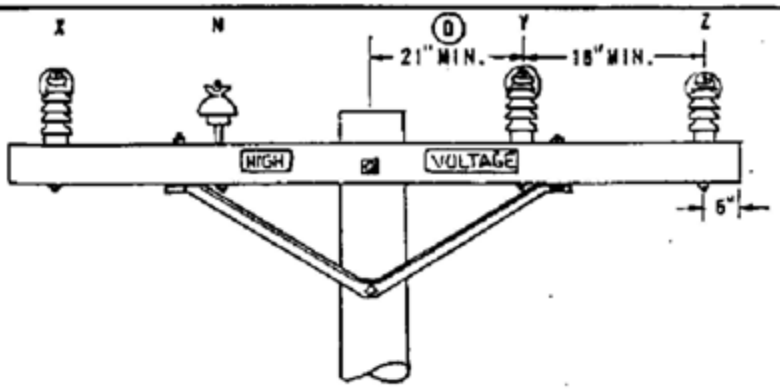
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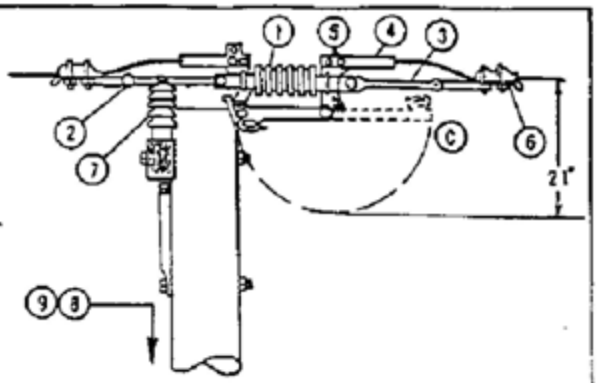
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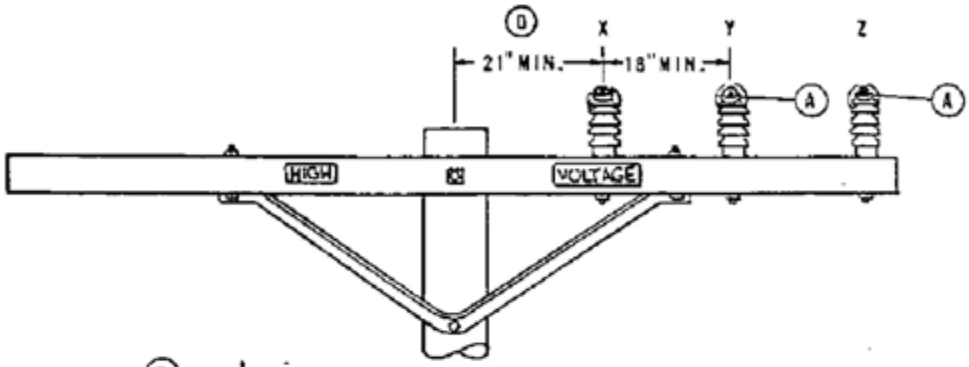
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

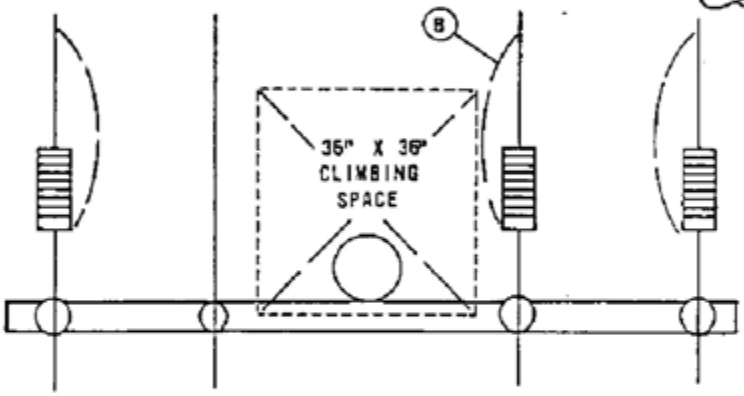
LINE TENSION DISCONNECT SWITCH HOOK STICK OPERATED

FMO OH 1225




FOR FIELD MAINTENANCE ONLY

NOTES:

(A) ROTATE DISCONNECTS TOWARD THE POLE USING ADJUSTABLE TRUNNION LINKS TO PERMIT EASE OF OPERATION.

(B) KEEP THIS DISCONNECT VERTICAL TO KEEP IT OUT OF THE CLIMBING SPACE.

(C) LOCK AS SHOWN WHEN LEFT IN THE OPEN POSITION.

(D) G.O. 95 MINIMUM SPACING REQUIREMENT. THIS DIMENSION WILL ALLOW A 35" CLIMBING SPACE ON THE SAME SIDE OF THE POLE AS THE SWITCHES.

(E) EXEMPT MATERIAL.

F. INSTALL ONLY IN FULL TENSION SPANS OF 3/0 ACSR, 3/0 SOOS, 1/0 COPPER, OR LARGER CONDUCTOR.

(G) SEE 400 SECTION FOR POLE TOP MATERIALS.

H. BOND INSULATOR STUDS IN CONTAMINATION DISTRICT 1.

| ITEM PTF | ITEM OCD | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| | 1 | SWITCH, LINE TENSION DISCONNECT, 15KV, 600 AMPS | | 3 | 707014 |
| | 2 | LINK, ADJUSTABLE TRUNNION, 12" | | 3 | 465550 |
| | 3 | LINK, EXTENSION, GALV., 1/2"X 1-3/4"X 12" | | 3 | 466272 |
| | 4 | TERMINAL, ALUMINUM COMPRESSION, 2-HOLE | | 6 | 700 SECTION |
| | 5 | BOLT, MACH, STAINLESS STEEL, ASSEMBLY, 1/2" X 1 1/2" | (E) | 12 | 148672 |
| | 6 | CLAMPS, DEAD-END | | 6 | 700 SECTION |
| | 7 | INSULATOR, VERTICAL POST CLAMP TYPE (ITEM 2 CONTAINS CLAMP) | | 3 | 700 SECTION |
| 8 | | STEPS, POLE | (E) | AS REQ'D. | 692992 |
| 9 | | TAG, SWITCH NUMBER | (E) | 2 | 300 SECTION |
| | 10 | STUD 7 1/2" | | 3 | 701760 |
| | 11 | WASHER, 5/8" DOUBLE COIL SPRING | (E) | 3 | 798560 |
| | 12 | WASHER, 2 1/4" X 2 1/4", FLAT | (E) | 3 | 799040 |

SOG&E ELECTRIC STANDARDS

DATE 2-3-78
APPD JAF

# LINE TENSION DISCONNECT SWITCH HOOK STICK OPERATED

1299.205
SUPERSEDES
1225 (1-1-92)

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superceded by their current version found inside the Overhead Construction Standard Manual.

**2/20/2019:** Install S706672 in place of old style Disconnect Switch.

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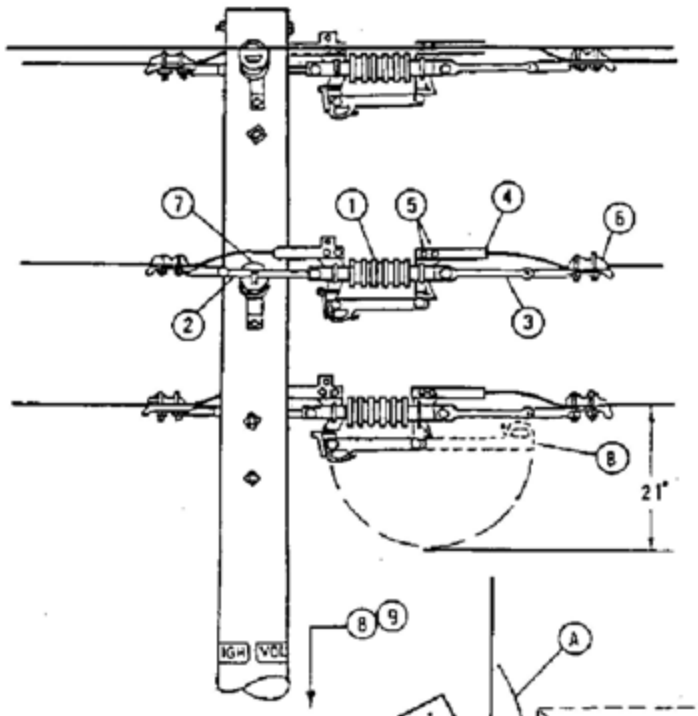
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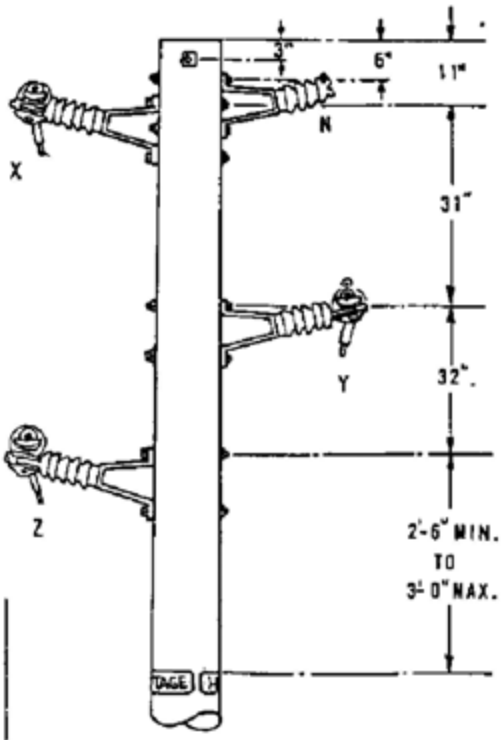
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

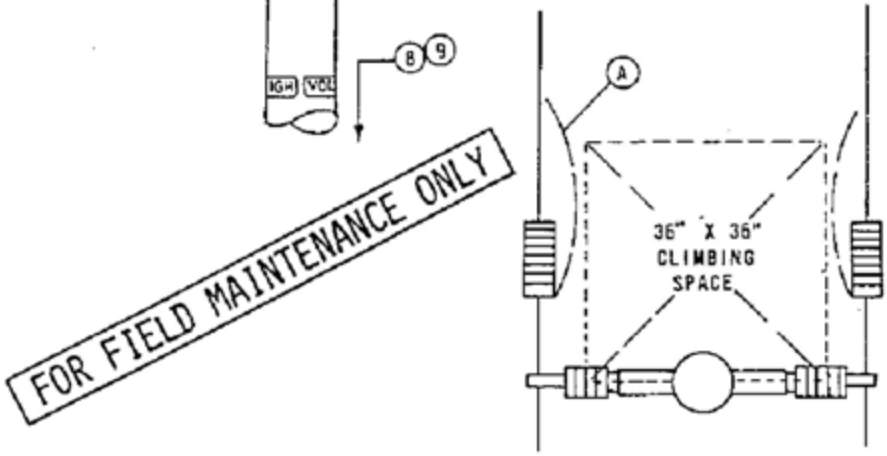
LINE TENSION DISCONNECT SWITCH HOOK OPERATED ARMLESS

FMO OH 1226

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NOTES:

(A) ROTATE DISCONNECTS AS SHOWN USING ADJUSTABLE TRUNNION LINK FOR EASE OF OPERATION, KEEPING BLADE OUT OF CLIMBING SPACE.

(B) LOCK AS SHOWN WHEN LEFT IN THE OPEN POSITION.

C. INSTALL ONLY IN FULL TENSION SPANS OF 3/0 ACSR, 3/0 5005, 1/0 COPPER OR LARGER CONDUCTOR.

D. SEE 400 SECTION FOR POLE TOP MATERIALS, SPAN LIMITATIONS AND OTHER REQUIREMENTS.

(E) EXEMPT MATERIAL.

F. BOND INSULATOR BRACKETS IN CONTAMINATION DISTRICT 1.

| ITEM PTF | ITEM OCD | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| | 1 | SWITCH, LINE TENSION DISCONNECT, 15KV, 600 AMPS | | 3 | 707014 |
| | 2 | LINK, ADJUSTABLE, TRUNNION, 12" | | 3 | 465550 |
| | 3 | LINK, EXTENSION, GALV., 1/2"X 1 3/4"X 12" | | 3 | 456272 |
| | 4 | TERMINAL, ALUMINUM COMPRESSION, 2-HOLE | | 6 | 700 SECTION |
| | 5 | BOLT, MACH, STAINLESS STEEL, ASSEMBLY, 1/2" X 1 1/2" | (E) | 12 | 148672 |
| | 6 | CLAMPS, DEAD END | | 6 | 700 SECTION |
| | 7 | INSULATOR, HORIZONTAL POST CLAMP TYPE (ITEM 2 CONTAINS CLAMP) | | 3 | 700 SECTION |
| 8 | | STEPS, POLE | (E) | AS REQ'D. | 692992 |
| 9 | | TAG, SWITCH NUMBER | (E) | 2 | 300 SECTION |

| 1299.206 SUPERSEDES 1226 (1-1-92) | SDG&E ELECTRIC STANDARDS<br>LINE TENSION DISCONNECT SWITCH HOOK OPERATED ARMLESS | DATE 2-3-78<br>APPD TAF |
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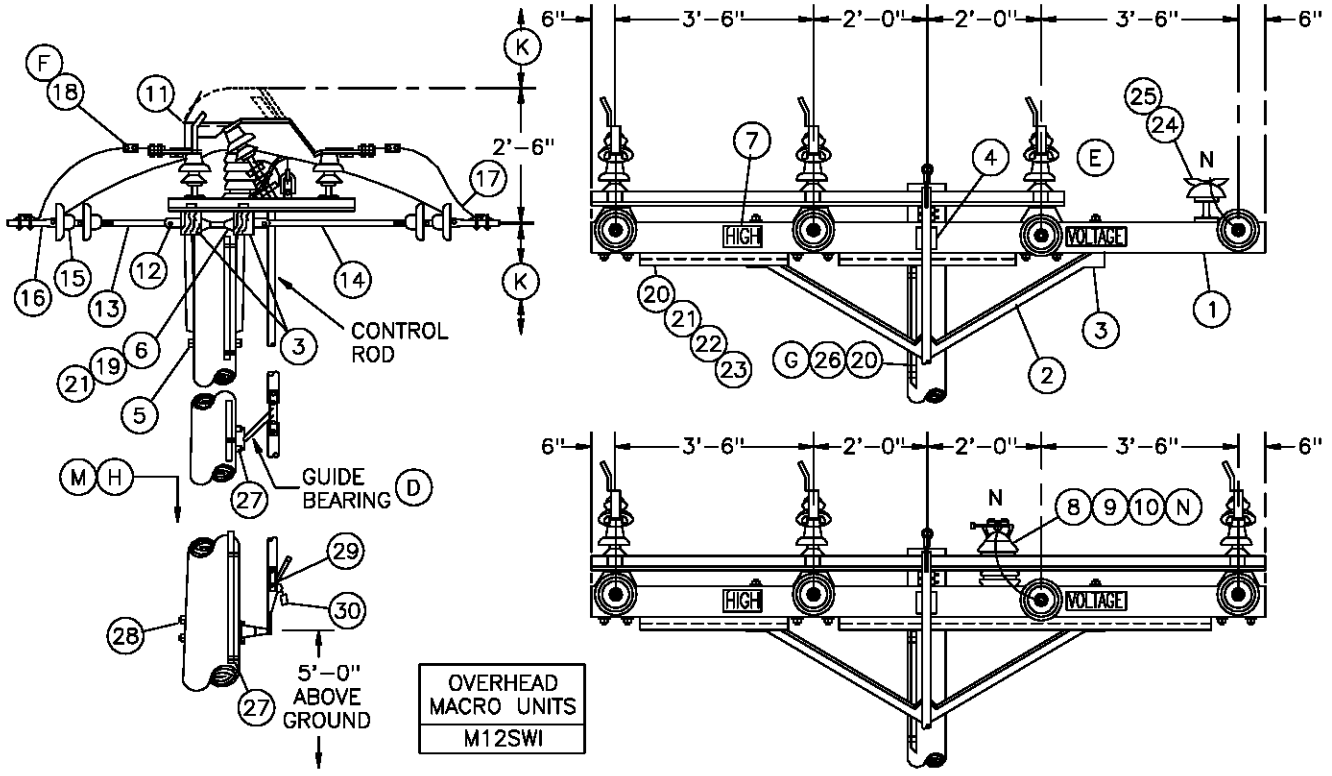
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SDG&E ELECTRIC OVERHEAD STANDARD

POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION

FMO
OH 1228

SCOPE: THIS STANDARD SHOWS A GANG OPERATED POLE TOP SWITCH FOR CIRCUIT TIES OR SECTIONALIZING PURPOSES AND IS TO BE USED FOR TANGENT AND DEAD-END CONFIGURATIONS.




BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNITS |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" x 5 3/4" x 12'-0" | 2 | 294160 | 6- |
| 2 | BRACE, ANGLE, 6'-0" | 2 | 164160 | 6HUB |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 16 | STD 392 | - |
| 4 | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 1 | STD 392 | - |
| 5 | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | 1 | STD 392 | - |
| 6 | BOLT, SPACE, GALV, 5/8" (LENGTH AS REQ'D), 2 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (C) | 4 | STD 392 | - |
| 7 | SIGN, HIGH VOLTAGE, AND | 2 | 647648 | HV |
| | 9 ROOFING NAILS, GALV | 18 | 492224 | - |
| 8 | STUD, 5/8" x 7 1/2" AND 1 DOUBLE COIL SPRING WASHER (C) | 1 | 701760 | STUD-W |
| | | 1 | 798560 | - |
| 9 | INSULATOR, VERTICAL POST (C) | 1 | 428608 | VPI |
| 10 | CLAMP, POST INSULATOR (L)(C) | 1 | STD 773 | - |
| 11 | SWITCH T.P.S.T. 600 AMP, INCLUDING 31' OF CONTROL ROD | 1 | 709254 | MEMCO |
| | ADDITIONAL INTERMEDIATE 10'-6" CONTROL ROD WITH GUIDE BEARING AND END FITTINGS | AS REQ'D | 604432 | FC-ROD |
| | REPLACEMENT UPPER CONTROL ROD WITH END FITTINGS | AS REQ'D | 604434 | - |
| | REPLACEMENT LOWER CONTROL ROD WITH END FITTINGS | AS REQ'D | 604436 | - |
| 12 | CLEVIS, DEAD END, 5/8" BOLT STEEL (OPEN TYPE) (C) | 8 | 235618 | - |



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**BILL OF MATERIAL:** (CON'T)

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNITS |
|---|---|---|---|---|
| 13 | LINK, EXTENSION, GALV, 1/2" X 2" X 12" (C) | 4 | 466240 | DEEXT |
| 14 | STRAP, EXTENSION, GALV, 1/2" X 1 1/2" x 28" (C) | 4 | 696864 | – |
| 15 | INSULATOR, SUSPENSION (C) | 14 | STD 750 | – |
| 16 | CLAMP, STRAIGHT LINE, D.E. (C) | 8 | 741–743 | – |
| 17 | CONNECTOR, WIRE COMPRESSION ( SIZE AS REQ'D ) | AS REQ'D | 783–786 | – |
| 18 | TERMINAL, COMPRESSION LUG (F) | 6 | 794–795 | – |
| 19 | WIRE, #8 BARE SOLID ANNEALED COPPER | 15' | 812928 | BOND8 |
| 20 | WIRE, BARE STRANDED, #4 | 65' | 813760 | BS4 |
| 21 | STAPLE, FENCE, GALV, 1 1/4" | AS REQ'D | 678528 | – |
| 22 | MOULDING, OAK HARDWOOD, 1" | 10' | 487200 | MLDG |
| 23 | STRAPS, GALV, 3/4" AND 2–1 3/4" ROOFING NAILS | AS REQ'D | 697888 | – |
| 24 | PIN, INSULATOR, STRAIGHT, 12KV, 1" | 1 | 532704 | PS1 |
| 25 | INSULATOR, LINE, 12KV, NEUTRAL | 1 | 429216 | 55–3/I |
| 26 | GROUND UNIT, COMPLETE | 1 | 603136 | GND4 |
| 27 | SCREW, LAG, GALV, 1/2" X 4" | 2 | 621568 | – |
| 28 | BOLT, MACH, GALV, 5/8" X ( LENGTH AS REQ'D ), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 2 | STD 392 | – |
| 29 | TAG, SWITCH NUMBER | 2 | STD 204 | – |
| 30 | PADLOCK, SCHLAGE ELECTRIC SERIES | 1 | 514848 | – |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

A. CONTROL ROD AND SWITCH HANDLE ARE NOT ALLOWED IN THE CLIMBING SPACE (G.O. 95, 54.7–A4).

B. ATTACH GROUND WIRE TO SWITCH MOUNTING BOLTS BY USING AN ADDITIONAL ROUND WASHER.

(C) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(D) GUIDE BEARING PIVOTS THROUGH 90°. IN THE OPENED AND CLOSED POSITIONS THE GUIDE BEARING MAKES A 45° ANGLE WITH THE POLE.

(E) CUT OFF EXCESS INTERPHASE SHAFT.

(F) WHEN ATTACHING 1/0 AND 4/0 COPPER CONDUCTORS TO A POLE TOP SWITCH, USE A BRONZE CABLE TAP LUG, STOCK NUMBER 471296. IF EXCESSIVE VIBRATION OR WHIPPING COULD OCCUR, USE TWO LUGS IN SERIES.

REFERENCES:

(G) GROUNDING METHODS – SEE STANDARD 1002.

(H) POLE STEPPING – SEE STANDARD 363.

I. SEE STANDARD 1443 FOR SINGLE DEADEND CONFIGURATION.

J. SEE DESIGN MANUAL PAGE 6111 – FEEDER CIRCUIT SECTIONALIZING AND PROTECTION.

(K) SEE SECTION 200 FOR MINIMUN VERTICAL SEPARATION.

(L) SEE STANDARD 759 FOR USE OF LINE GUARD.

(M) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12).

(N) NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES TIE SWITCHES TO CIRCUITS EMANATING FROM DIFFERENT SUBSTATIONS. (SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3).

| | | |
|---|---|---|
| DATE 1–1–93<br>APPD PA 1/2009 | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV VERTICAL BREAK TYPE<br>SINGLE CIRCUIT HORIZONTAL CONFIGURATION | 1299.209<br>SUPERSEDES<br>1228.2 (8–1–00) |

INSTALLATIONS:

A. CONTROL ROD AND SWITCH HANDLE ARE NOT ALLOWED IN THE CLIMBING SPACE. (G.O. 95 54.7-A4)

B. ATTACH GROUND WIRE TO SWITCH MOUNTING BOLTS BY USING AN ADDITIONAL ROUND WASHER.

(C) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(D) POSITION OF BELL CRANK ASSEMBLY WITH SWITCH IN OPEN POSITION.

(E) EXEMPT MATERIAL.

(F) POSITION OF BELL CRANK ASSEMBLY WITH SWITCH IN CLOSED POSITION.

(G) GUIDE BEARING PIVOTS THROUGH 90°. IN THE OPENED AND CLOSED POSITIONS THE GUIDE BEARING MAKES A 45° ANGLE WITH THE POLE.

(H) POLES ARE TO BE STEPPED PER STANDARD 363.

(I) USE TWO GROUND RODS SPACED A MINIMUM OF 6' APART PER G.O. 95 RULE 21.1.

REFERENCES:

J. SEE STANDARD 1443 FOR SINGLE DEADEND CONFIGURATION.

K. SEE STANDARD 1205 TO DETERMINE WHEN TO USE GANG OR HOOKSTICK SWITCHES.

L. SEE DESIGN MANUAL PAGE 5621 - CRITERIA AND GENERAL PRACTICES FOR SECTIONALIZING.

(M) SEE SECTIONS 200 AND 500 FOR MINIMUM VERTICAL SEPARATION.

(N) SEE STANDARD 759 FOR USE OF LINE GUARD.

FOR FIELD MAINTENANCE ONLY

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| ITEM | | DESCRIPTION | QUANTITY | | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|---|
| | 1 | CROSSARM, 3 3/4" X 5 3/4" X 12'-0" | | 2 | 300 SECTION |
| | 2 | BRACE, ANGLE, 6'-0" | | - | 164160 |
| | 3 | BRACE, 4' SPECIAL | | 4 | 163808 |
| | 4 | BOLT, MACH, GALV, 1/2" X 7", 1-RD WASH, & 1-DBL COIL WASH (E) | | - | 100 SECTION |
| | 5 | BOLT, MACH, GALV, 5/8" X__", & 1-DBL COIL WASH (E) | | 1 | 100 SECTION |
| | 6 | BOLT, MACH, GALV, 5/8" X__", 2-SQ WASH & 1-DBL COIL WASH (E) | | 1 | 100 SECTION |
| | 7 | BOLT, SPACE, GALV, 5/8" X__", 4-SQ WASH & 2- DBL COIL WASH (C) (E) | | 2 | 100 SECTION |
| | 8 | BOLT, MACH, GALV, 5/8" X__", 1-SQ WASH & 1-DBL COIL WASH (E) | | 16 | 100 SECTION |
| P | 9 | BOLT, MACH, GALV, 5/8" X 5", 1-RD WASH & 1-DBL COIL WASH (E) | | 4 | 100 SECTION |
| T | 10 | SCREW, LAG, GALV, 1/2" X 4" (E) | | 2 | 621568 |
| F | 11 | SIGN, HIGH VOLTAGE AND NAILS, 9 ROOFING, GALV (E) | | 2 | 647648, 492224 |
| | 12 | STEPS, POLE (H) (E) | | 16 | 692992 |
| | 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" & 1-DBL COIL WASH (C) | | 2 | 532704, 798560 (E) |
| | 14 | STUD, 7 1/2" & 1-DBL COIL WASH (C) | | - | 701760, 798560 (E) |
| | 15 | | | | |
| | 16 | CLEVIS, DEAD END, 5/8" BOLT STEEL (OPEN TYPE) (C) (E) | | - | 235618 |
| | 17 | LINK, EXTENSION GALV, 1/2" X 2" X 12" (C) | | - | 466240 |
| | 18 | STRAP, EXTENSION GALV, 1/2" X 1 1/2" X 28" (C) | | - | 696864 |
| | 19 | GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| | 20 | MOULDING, HARDWOOD 1" (GRAY OR PLAIN) | | 24' | 487184, 487200 |
| | 21 | STAPLE, FENCE, GALV, 1 1/4" (E) | | 30 | 678528 |
| | 22 | WIRE, BARE STRANDED, #6 | | 5 LBS | 813536 |
| | 23 | TERMINAL, COMPRESSION LUG | | 6 | 700 SECTION |
| | 24 | PADLOCK | | 1 | 514848 |
| | 25 | INSULATOR, LINE, 12KV NEUTRAL (C) (E) | | 2 | 429216 |
| O | 26 | TAG, SWITCH NUMBER | | 2 | 300 SECTION |
| C | 27 | CLAMP, STRAIGHT LINE, O.E. (C) | | 6 | 700 SECTION |
| O | 28 | CLAMP, POST INSULATOR (N) (C) | | - | 700 SECTION |
| | 29 | INSULATOR, VERTICAL POST (C) | | - | 428608 |
| | 30 | INSULATOR, SUSPENSION (C) | | - | 700 SECTION |
| | 31 | SWITCH, T.P.S.T., 600 AMP | | 1 | 709246 |
| | 32 | SWITCH, T.P.S.T., 600 AMP | | - | 709250 |
| | 33 | STAPLES, MOULDING, GALV, 3" X 1 1/16" X 1/4" (E) | | AS REQD | 678560 |
| | 34 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) (C) | | - | 700 SECTION |
| | | | | | |

SOG&E ELECTRIC STANDARDS

DATE 1-1-87
APPD AK/RD

# POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION

1299.203
SUPERSEDES
1228.3 (1-1-87)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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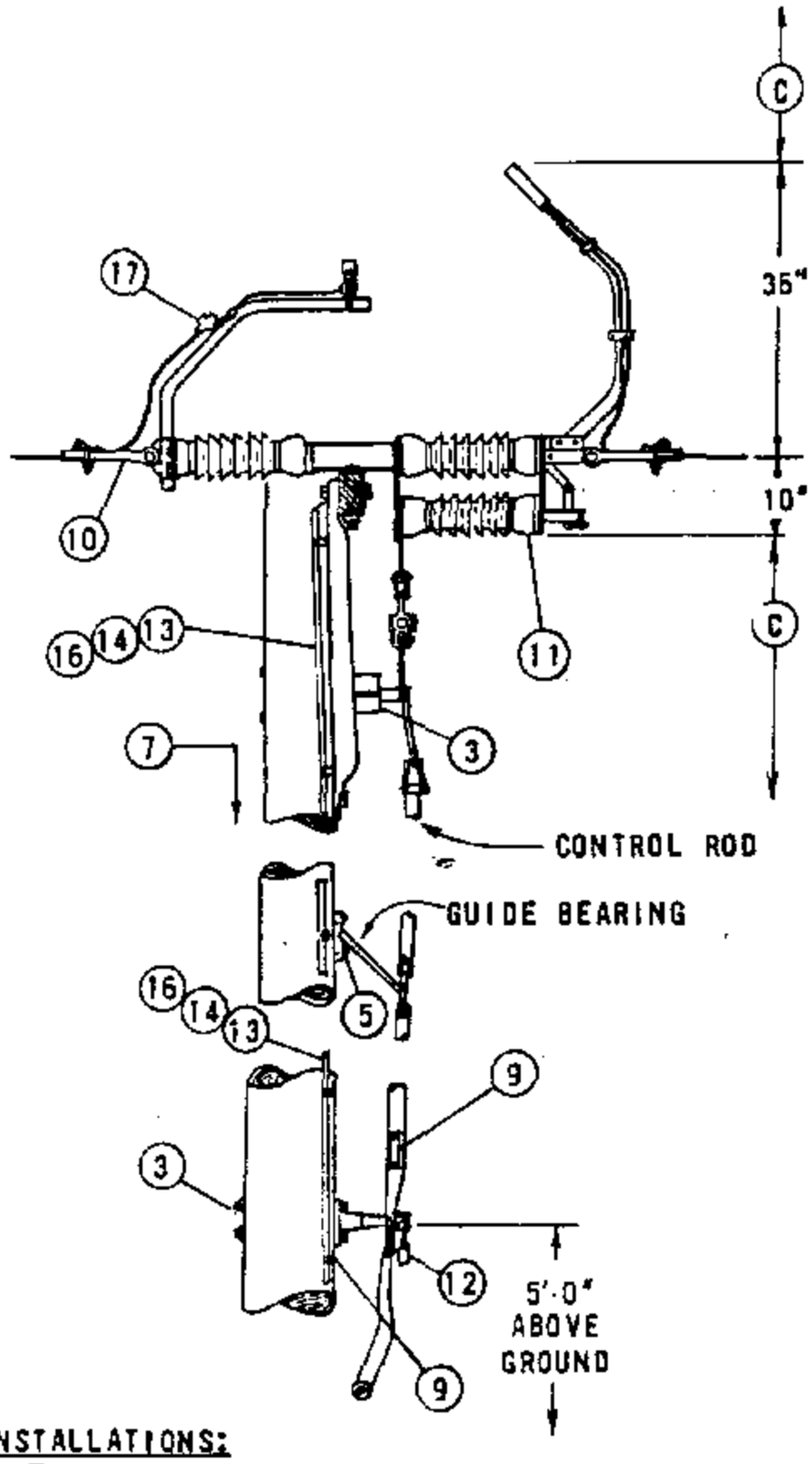
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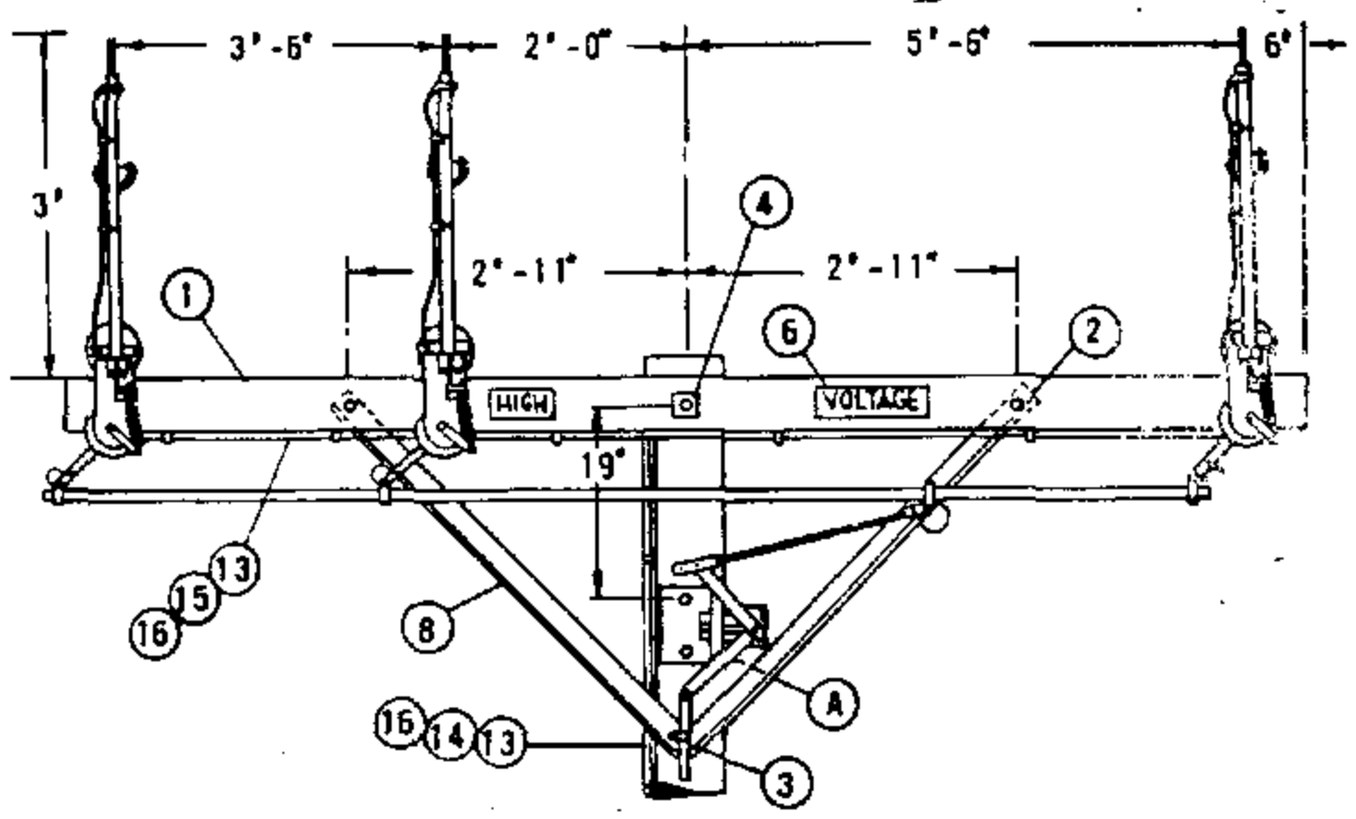
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SDG&E ELECTRIC OVERHEAD STANDARD

POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION - DOUBLE DEAD END

FMO
OH 1229




THIS PAGE FOR FIELD MAINTENANCE ONLY

INSTALLATIONS:

(A) POSITION OF BELL CRANK ASSEMBLY WITH SWITCH IN OPEN POSITION.

(E) EXEMPT MATERIAL

REFERENCES:

B. SEE PAGE 1230 TO DETERMINE WHEN THIS SWITCH SHALL BE USED.

(C) SEE SECTIONS 200 AND 500 FOR MINIMUM VERTICAL SEPARATION.

| | ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONST. STDS. |
|---|---|---|---|---|---|
| | 1 | CROSSARM, 3 3/4" X 5 3/4" X 12'-0" | | 1 | 300 SECTION |
| | 2 | BOLT, MACH, GALV, 5/8" X 5", 1-RD WASH, & 1-DBL COIL WASH | (E) | 2 | 100 SECTION |
| | 3 | BOLT, MACH, GALV, 5/8" X ___", 1-DBL COIL WASH & 1-SQ WASH | (E) | 5 | 100 SECTION |
| | 4 | BOLT, MACH, GALV, 5/8" X ___", 2-SQ WASH, & 1-DBL COIL WASH | (E) | 1 | 100 SECTION |
| P | 5 | SCREW, LAG, GALV, 1/2" X 4" | (E) | 2 | 621568 |
| | 6 | SIGN, HIGH VOLTAGE AND NAILS, 9 ROOFING, GALV | (E) | 2 | 647648, 492224 |
| T | 7 | STEPS, POLE | (E) | 16 | 692992 |
| F | 8 | BRACE, 4' SPECIAL | | 2 | 163808 |
| | 9 | TAG, SWITCH NUMBER | (E) | 2 | 300 SECTION |
| | | | | | |
| | | | | | |
| | 10 | CLAMP, STRAIGHT LINE, D.E. | | 6 | 700 SECTION |
| | 11 | SWITCH, T.P.S.T., 600 AMP | | 1 | 709248 |
| | 12 | PADLOCK | | 1 | 514848 |
| O | 13 | WIRE, BARE STRANDED, #6 | | 55' | 813536 |
| | 14 | GROUND UNIT, (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| C | 15 | MOULDING, HARDWOOD 1"(GRAY OR PLAIN) | | 24' | 487184, 487200 |
| O | 16 | STAPLE, FENCE, GALV, 1 1/4" | (E) | 30 | 678528 |
| | 17 | TERMINAL, COMPRESSION LUG | | 6 | 700 SECTION |
| | | | | | |
| | | | | | |
| | | | | | |

SDG&E ELECTRIC STANDARDS

DATE 6-4-82
APPD JRH

POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION - DOUBLE DEAD END

1299.201
SUPERSEDES
1229 (6-4-82)

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# OH1230 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**12/06/2021:** A NEWER VERSION MOVED TO FMO

**07/13/2016:** MOVED TO FMO

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| B | EDITORIAL CHANGES | EDM | RSL | JES | CZH | 12/06/2021 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JS | IL | MDJ | 7/13/2016 | D | | | | | | |

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT HORIZONTAL CONFIGURATION

FMO OH1230

**SCOPE**: THIS STANDARD SHOWS A HORIZONTAL BREAK GANG OPERATED POLE TOP SWITCH FOR CIRCUIT TIES OR SECTIONALIZING PURPOSES. THIS INSTALLATION IS PREFERRED OVER STANDARD 1228.

**ATTENTION**: SWITCH AND CONTROL ROD MAY BE INSTALLED ON EITHER SIDE OF POLE. IF INSTALLATION IS LIMITED TO ONE SIDE OF POLE ONLY, AND SWITCH DOES NOT MATCH EXISTING PHASE POSITIONS, SEE FIGURE 2 SWITCH.

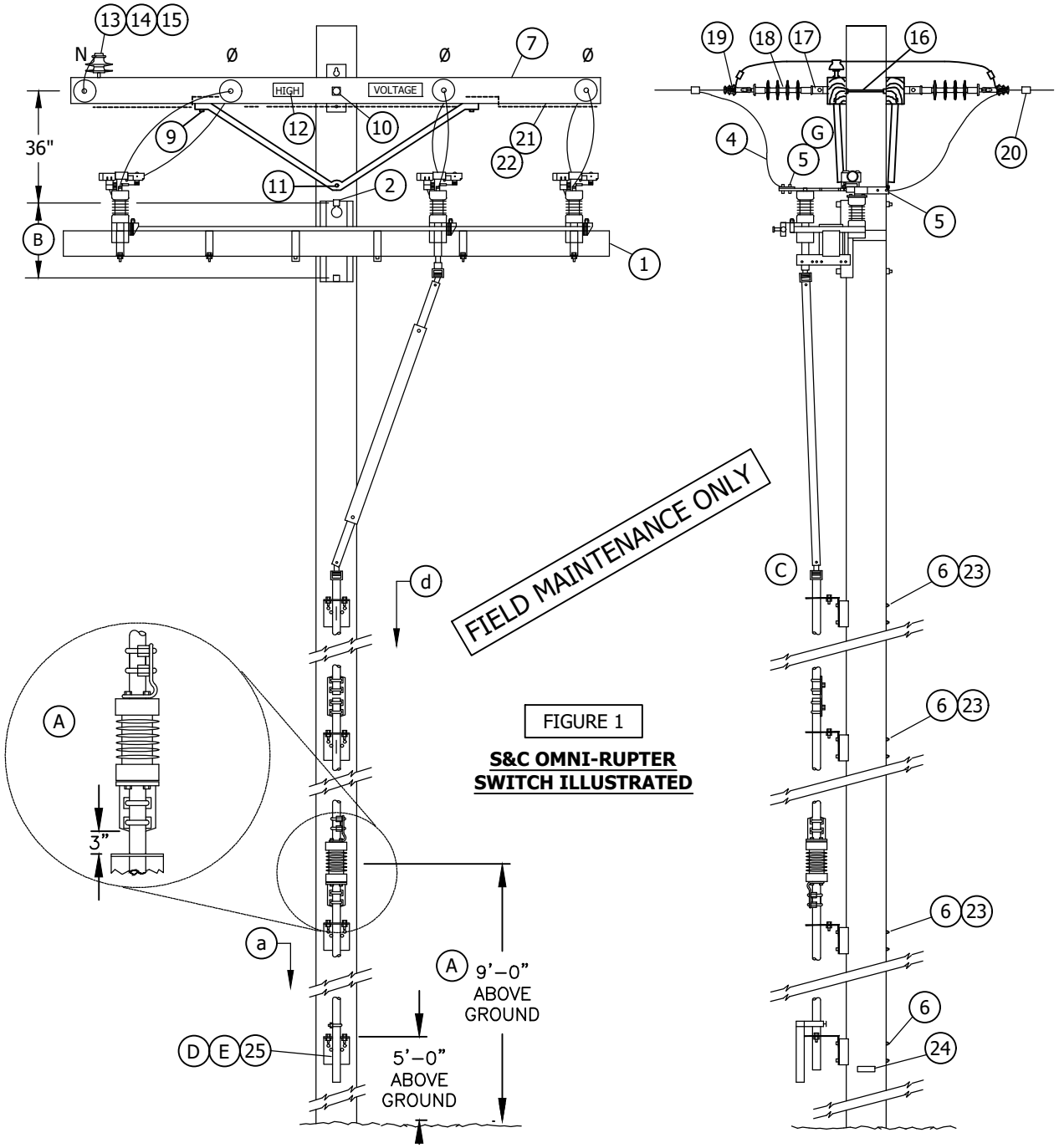



FIGURE 1

**S&C OMNI-RUPTER SWITCH ILLUSTRATED**

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

POLE TOP SWITCH 12KV
HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION



FMO OH1230.1

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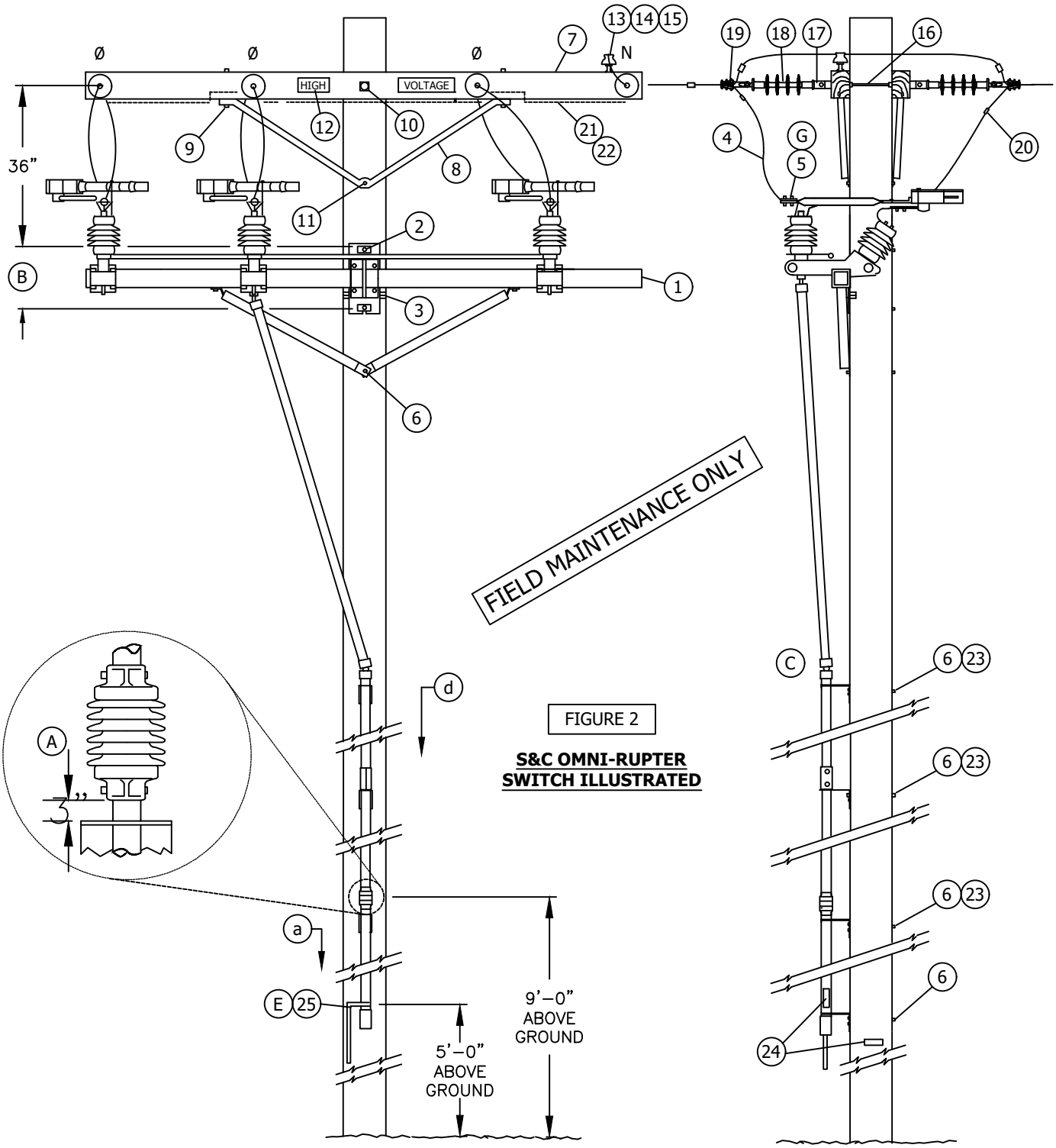



FIGURE 2

**S&C OMNI-RUPTER SWITCH ILLUSTRATED**

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| B | DRAWING UPDATE | PEI | - | - | - | 04/22/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | CAK | 01/01/2000 | D | MOVED TO FMO | EDM | RSL | JES | CZH | 12/06/2021 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

POLE TOP SWITCH 12KV
HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION



FMO OH1230.2

## INSTALLATION:

(A) INSTALL CONTROL PIPE INSULATOR THREE INCHES ABOVE GUIDE BEARING AND A MINIMUM OF 9'-0" ABOVE GROUND.

(B) USE THE FOLLOWING THROUGH-BOLT DRILLING DIMENSIONS: A.B. CHANCE = 13-1/4", S&C = 14"

(C) SWITCHES ARE FURNISHED WITH 40 FEET OF OPERATING CONTROL ROD. THE TOP SECTION OF THE CONTROL ROD IS MADE OF FIBER GLASS, THE LOWER SECTIONS ARE MADE OF GALVANIZED PIPE.

(D) DO NOT GROUND SWITCH CONTROL MECHANISM.

(E) THE SWITCH IS SHIPPED FACTORY ADJUSTED. HOWEVER, THE SWITCH HANDLE LOCK SEGMENTS WILL REQUIRE ADJUSTMENT. REFER TO INSTALLATION INSTRUCTIONS PROVIDED WITH SWITCH.

**ATTENTION: SUBSTANIAL PRESSURE MUST BE APPLIED TO THE SWITCH HANDLE IN THE CLOSING DIRECTION TO PLACE "WIND-UP" TENSION IN THE CONTROL ROD BEFORE DROPPING HANDLE INTO CLOSED - POSITION SLOT.**

(F) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(G) WHEN ATTACHING 1/O AND 4/O COPPER CONDUCTORS TO A POLE TOP SWITCH, USE A BRONZE CABLE TAP LUG, STOCK NUMBER 471296. IF EXCESSIVE VIBRATION OR WHIPPING COULD OCCUR, USE TWO LUGS IN SERIES. NOTE: THE PROPER TORQUE VALUE FOR THIS CONNECTOR IS 40 FT-LBS.

## BILL OF MATERIALS :

| ITEM | DESCRIPTION | | | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| 1 | SWITCH, GANG-OPERATED, 15KV, 600 AMP, WITH INTERRUPTERS, INCLUDING 40' OF CONTROL ROD | FIG. 1 | S&C | 1 | - | 709252 | GANG-S |
| | | FIG. 2 | CHANCE | 1 | - | 709258 | GANG-C |
| | ADDITIONAL 10'-6" CONTROL ROD WITH GUIDE BEARING AND COUPLING | | S&C | AS REQ'D | - | 602934 | S-ROD |
| | | | CHANCE | AS REQ'D | - | 604428 | C-ROD |
| | LOAD INTERRUPTER-A.B. CHANCE SWITCH ONLY IF RETRO-FITTING REQUIRED | | TYPE S | 3 | - | 433796 | LDBRKS |
| 2 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | | 2 | 392 | - | - |
| 3 | SCREW, LAG, GALV, 1/2" X 4" | | | 2 | - | 621568 | |
| 4 | WIRE, COVERED JUMPER CU OR AL (SIZE AS REQ'D) | | | 33' | 718 | - | |
| 5 | TERMINAL, COMPRESSION LUG (G) | | | 6 | 711-715 | | - |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | | AS REQ'D | 392 | - | - |
| 7 | CROSSARM, 3 3/4" X 5 3/4" X 10'-0" | | | 2 | | 294128 | 4- |
| 8 | BRACE, ANGLE, 5'-0" | | | 2 | - | 164128 | 5HUB |
| 9 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | | | 4 | 392 | - | - |
| 10 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | | 1 | 392 | - | - |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | | | 1 | 392 | - | - |
| 12 | SIGN, HIGH VOLTAGE, AND 9 ROOFING NAILS, GALV | | | 2 | - | 647648 | HV |
| | | | | - | - | 49224 | - |

FIELD MAINTENANCE ONLY

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| B | DRAWING UPDATE | PEI | - | - | - | 04/22/2019 | E | | | | | | |
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

POLE TOP SWITCH 12KV
HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION



FMO OH1230.3

## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" (F) | 2 | - | 532704 | PS1 |
| 14 | INSULATOR, 12KV NETURAL (F) | 2 | - | 429216 | 55-3/I |
| 15 | WIRE, TIE (DOUBLE) (F) | 1 | 760-764 | - | - |
| 16 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (F) | 4 | 392 | - | - |
| 17 | CLEVIS, DEAD END, 5/8" BOLT STEEL (CLOSED TYPE) (F) | 8 | - | 236620 | - |
| 18 | INSULATOR, SUSPENSION, 12KV, CLEVIS (F) | 8 | 750 | 431650 | - |
| 19 | CLAMP, STRAIGHT LINE, D.E. (F) | 8 | 741-743 | - | - |
| 20 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783-786 | - | - |
| 21 | WIRE, #8 BARE SOLID ANNEALED COPPER | 12' | - | 812928 | BOND8 |
| 22 | STAPLE, FENCE, GALV, 1 1/4" | AS REQ'D | - | 678528 | - |
| 23 | SCREW, LAG, GALV, 5/8" X 5" | 2 | - | 621600 | - |
| 24 | TAG, SWITCH NUMBER | 2 | 204 | - | - |
| 25 | PADLOCK, SCHLAGE ELECTRIC SERIES | 1 | - | 514848 | - |

| OVERHEAD MACRO UNITS | |
|---|---|
| FIG. 1 | S12SWI |
| FIG. 2 | C12SWI |

**NOTES:** NONE

**REFERENCE:**

(a) POLE STEPPING - SEE STANDARD 363.

b. SEE DESIGN MANUAL PAGE 6111 - FEEDER CIRCUIT SECTIONALIZING AND PROTECTION.

c. SWITCH OPERATING RODS MAY EXTEND ONE-HALF THEIR DIAMETER INTO THE CLIMBING SPACE (G.0. 95, 54.7-A3).

(d) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

e. NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES TIE SWITCHES TO CIRCUITS EMANATING FROM DIFFERENT SUBSTATIONS. (SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3).

FIELD MAINTENANCE ONLY

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| B | DRAWING UPDATE | PEI | - | - | - | 04/22/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | CAK | 01/01/2000 | D | MOVED TO FMO | EDM | RSL | JES | CZH | 12/06/2021 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

POLE TOP SWITCH 12KV
HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION



FMO OH1230.4

SCOPE: THIS STANDARD SHOWS A HORIZONTAL BREAK GANG OPERATED POLE TOP SWITCH FOR CIRCUIT TIES OR SECTIONALIZING PURPOSES. THIS INSTALLATION IS PREFERRED OVER STANDARD 1228.

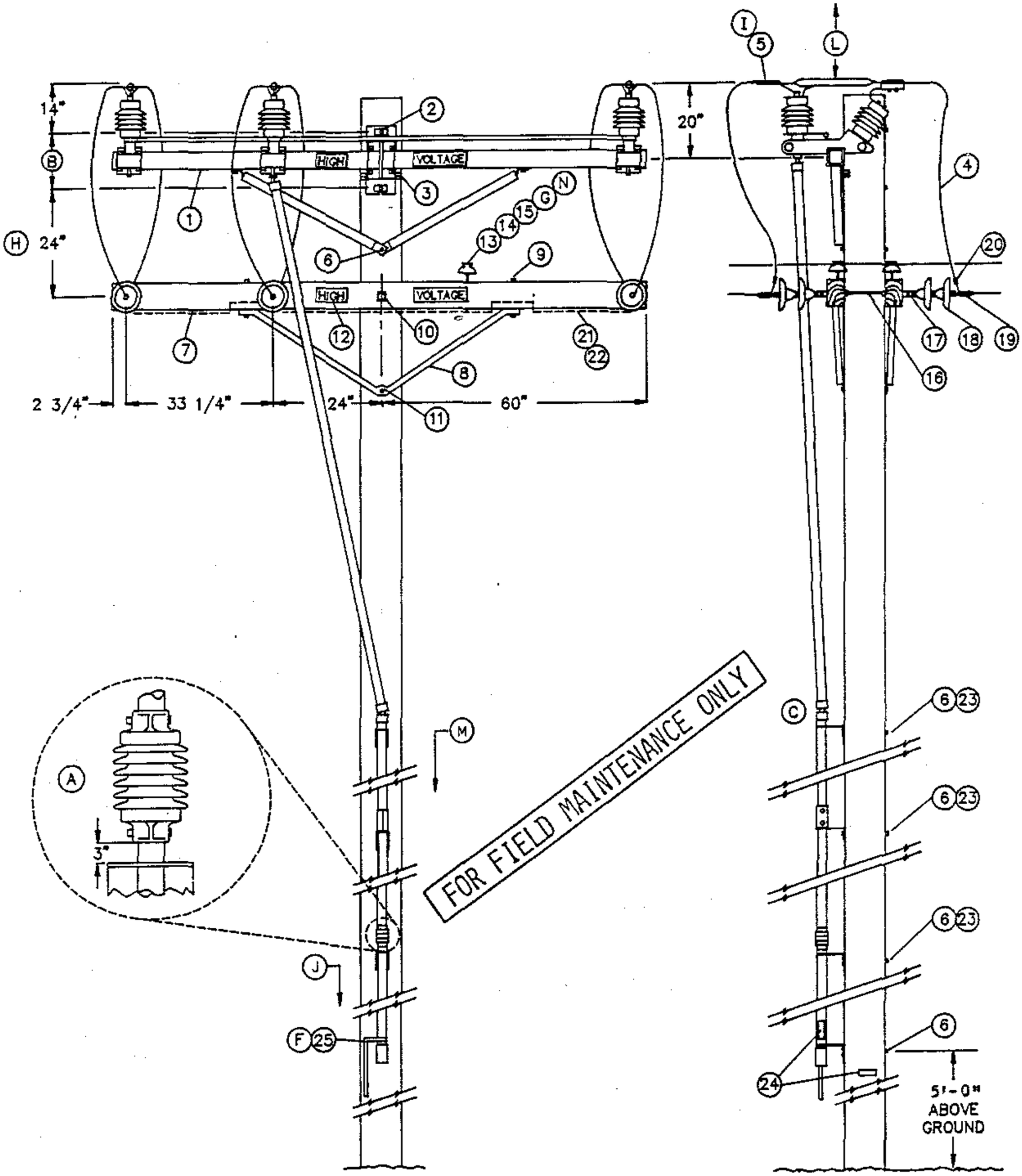



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| DATE 1-1-93<br>APPD PA/BOG | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV HORIZONTAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION | 1299.307<br>SUPERSEDES<br>1230.1 (1-1-92) |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD | STOCK NUMBER |
|---|---|---|---|---|
| 1 | SWITCH, T.P.S.T., 600 AMP, INCLUDING 40' OF CONTROL ROD (C) | 1 | - | 709250 |
| | ADDITIONAL 10'-6" CONTROL ROD WITH GUIDE BEARING AND COUPLING | AS REQ'D | - | 604428 |
| 2 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 2 | 392 | - |
| 3 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | - | 621568 |
| 4 | WIRE, BARE STRANDED CU OR AL (SIZE AS REQ'D) | 33' | 711-715 | - |
| 5 | TERMINAL, COMPRESSION LUG (I) (E) | 6 | 794-795 | - |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 5 | 392 | - |
| 7 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 2 | - | 294128 |
| 8 | BRACE, ANGLE, 5' - 0" | 2 | - | 164128 |
| 9 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 4 | 392 | - |
| 10 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 12 | SIGN, HIGH VOLTAGE, AND (E)<br>9 ROOFING NAILS, GALV (E) | 2<br>- | -<br>- | 647648<br>492224 |
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" (G) (E) | 2 | - | 532704 |
| 14 | INSULATOR, 12KV NEUTRAL (G) | 2 | - | 429216 |
| 15 | WIRE, TIE (DOUBLE) (G) (E) | 1 | 760-764 | - |
| 16 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (E) | 3 | 392 | - |
| 17 | CLEVIS, DEAD END, 5/8" BOLT STEEL (CLOSED TYPE) (E) | 6 | - | 235712 |
| 18 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 12 | 750 | - |
| 19 | CLAMP, STRAIGHT LINE, D.E. | 6 | 741-743 | - |
| 20 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-786 | - |
| 21 | WIRE, #8 BARE SOLID ANNEALED COPPER | 12' | - | 812928 |
| 22 | STAPLE, FENCE, GALV, 1 1/4" (E) | AS REQ'D | - | 678528 |
| 23 | SCREW, LAG, GALV, 5/8" X 5" (E) | 2 | - | 621600 |
| 24 | TAG, SWITCH NUMBER | 2 | 204 | - |
| 25 | PADLOCK , MEDECO | 1 | - | 514862 |

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| 1299.308<br>SUPERSEDES<br>230.2 (1-1-92) | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV HORIZONTAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION | DATE 11-1-93<br>APPD |

INSTALLATION:

Ⓐ INSTALL CONTROL PIPE INSULATOR THREE INCHES ABOVE THE NEXT GUIDE BEARING UP FROM THE SWITCH HANDLE.

Ⓑ USE THE FOLLOWING THROUGH–BOLT DRILLING DIMENSIONS: A.B. CHANCE = 13–1/4", S&C = 14".

Ⓒ SWITCHES ARE FURNISHED WITH 40 FEET OF OPERATING CONTROL ROD. THE TOP SECTION OF THE CONTROL ROD IS MADE OF FIBER GLASS, THE LOWER SECTIONS ARE MADE OF GALVANIZED PIPE.

D. SWITCH CONTROL MECHANISM DOES NOT REQUIRE GROUNDING.

Ⓔ EXEMPT MATERIAL.

Ⓕ THE SWITCH IS SHIPPED FACTORY ADJUSTED. HOWEVER, THE SWITCH HANDLE LOCK SEGMENTS WILL REQUIRE ADJUSTMENT. REFER TO INSTALLATION INSTRUCTIONS PROVIDED WITH SWITCH.

Ⓖ REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

Ⓗ SWITCH MAY BE INSTALLED BELOW LINEARM. DRILL SWITCH ARM UPPER MOUNTING BOLT HOLE 36" BELOW LINE ARM THRU BOLT (SEE STANDARD 1444).

Ⓘ WHEN ATTACHING 1/0 AND 4/0 COPPER CONDUCTORS TO A POLE TOP SWITCH, USE A BRONZE CABLE TAP LUG, STOCK NUMBER 471296. IF EXCESSIVE VIBRATION OR WHIPPING COULD OCCUR, USE TWO LUGS IN SERIES.

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REFERENCES:

Ⓙ POLE STEPPING – SEE STANDARD 363.

K. SEE DESIGN MANUAL PAGE 6111 – FEEDER CIRCUIT SECTIONALIZING AND PROTECTION.

Ⓛ SEE SECTION 200 FOR MINIMUM VERTICAL SEPARATION.

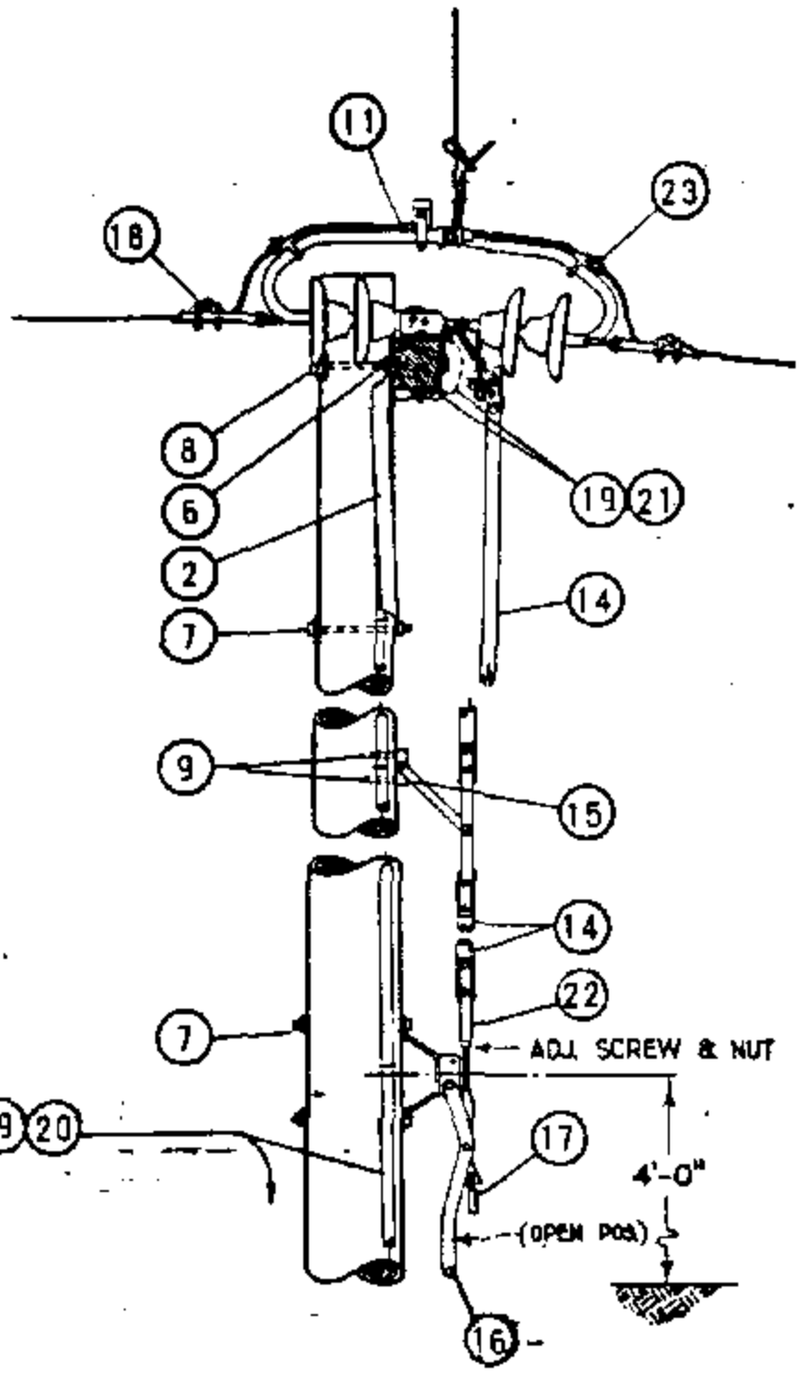
Ⓜ REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

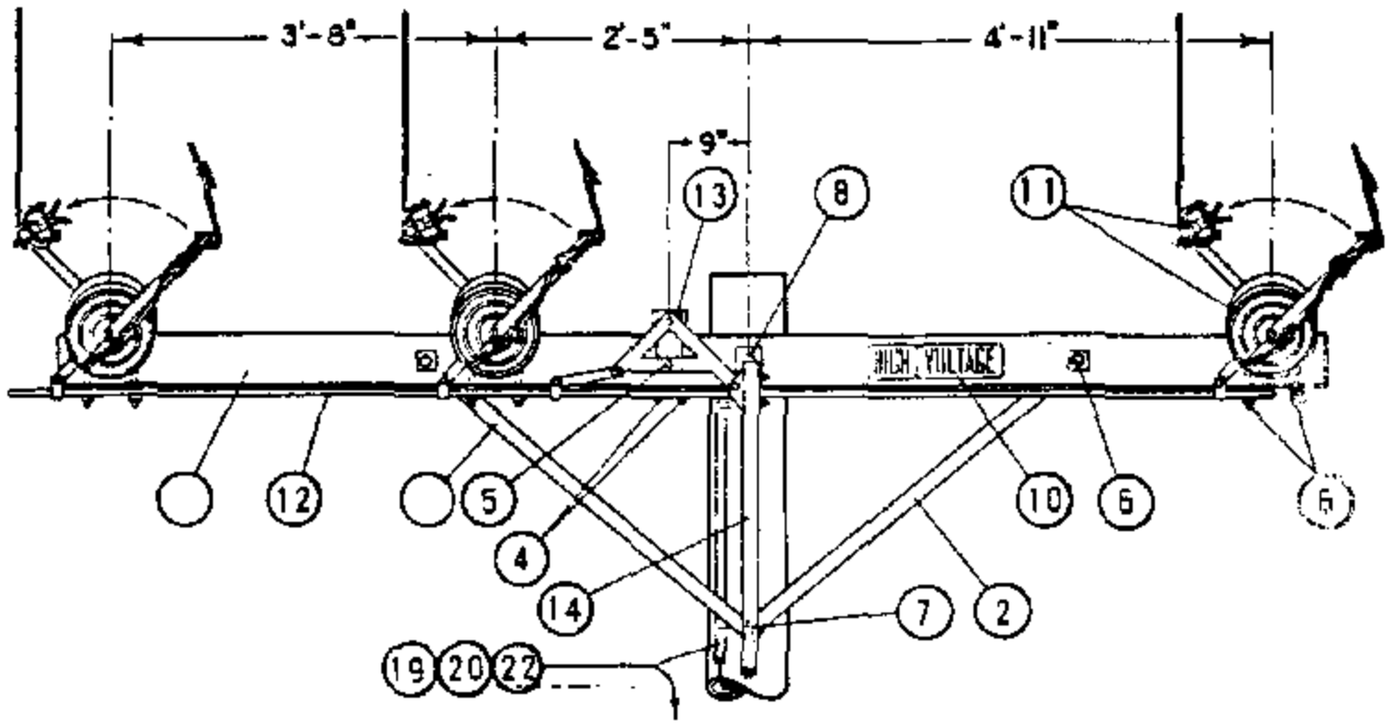
Ⓝ NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES TIE SWITCHES TO CIRCUITS EMANATING FROM DIFFERENT SUBSTATIONS. (SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3).

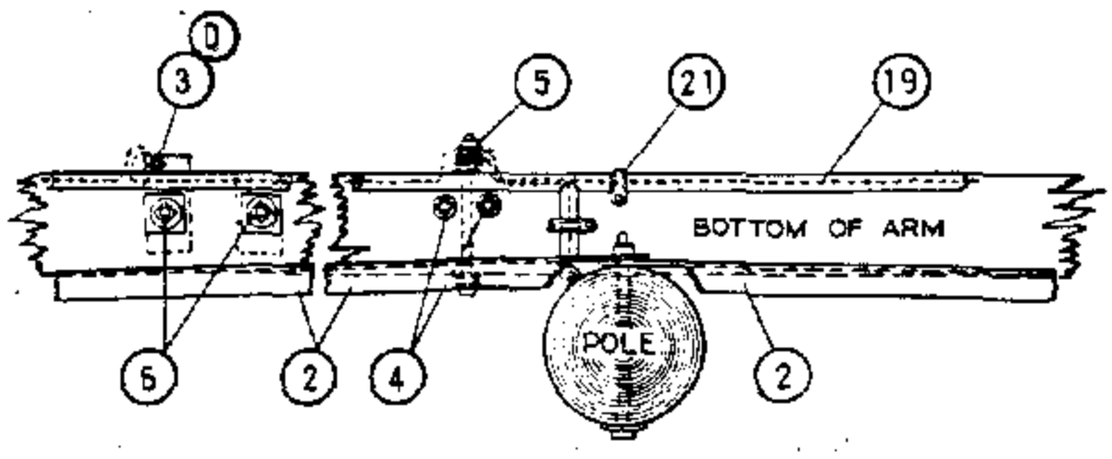
O. CONTROL PIPE AND SWITCH HANDLE ARE NOT ALLOWED IN THE CLIMBING SPACE (G.O. 95, 54.7–A4 ).

FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1–1–93<br>APPD P.A./2009 | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV HORIZONTAL BREAK TYPE<br>SINGLE CIRCUIT HORIZONTAL CONFIGURATION | 1299.309<br>SUPERSEDES<br>1230.3 (1–1–92) |




GROUNDING DETAIL

FOR FIELD MAINTENANCE ONLY

NOTES:

A. MAXIMUM VERTICAL ANGLE SHALL NOT EXCEED 7° FOR ANY CONDUCTOR SIZE.

B. WHERE THE VERTICAL ANGLE EXCEEDS 7° OR THE HORIZONTAL ANGLE EXCEEDS THE VALUE SHOWN IN THE TABLE BELOW, USE SWITCH CONSTRUCTION PG. 1229.

Ⓒ IF THE MAXIMUM DESIGN TENSION IS GREATER THAN 3000 LBS, THE ANGLE CAN BE CALCULATED BY:
THE SINE OF THE ANGLE $= \frac{200}{\text{TENSION}}$. THE ANGLE THEN CAN BE DETERMINED FROM TRIGONOMETRIC FUNCTION TABLES.

Ⓓ ITEM 3 IS A BOLT USED TO GROUND THE SWITCH MOUNTING HARDWARE.

MAXIMUM ALLOWABLE LINE ANGLE FOR SWITCHES

| CONDUCTOR SIZE AWG OR KCM | COPPER | | | | COPPERWELD COPPER | | 5005 | | | | ACSR | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 2 | 1/0 | 4/0 | 4A | 4N | 2 | 1/0 | 3/0 | 394.5 | 2 6/1 | 1/0 6/1 | 3/0 6/1 | 336.4 18/1 | 336.4 26/7 | 636 24/7 | 1033 45/7 |
| LINE ANGLE DEGREES | 15 | 9 | 6 | 5 | 7 | 3 | 16 | 11 | 8 | 4 | 13 | 9 | 6 | 5 | 4 | 4 | 4 |
| MAXIMUM DESIGN TENSION LBS/CONDUCTOR | 752 | 1218 | 1900 | 2424 | 1575 | 3384 | 717 | 1050 | 1480 | 2898 | 845 | 1300 | 1860 | 2450 | Ⓒ 3000 | Ⓒ 3000 | Ⓒ 3000 |

DATE 1-1-87
APPD AL/BDS

SDG&E ELECTRIC STANDARDS

POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT
HORIZONTAL CONFIGURATION

1299.301
SUPERSEDES
1230.1 (1-1-87)

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METHOD OF ADJUSTING SWITCH

A. FIRST CLOSE SWITCH AND TIGHTEN SWITCH UNIT CRANK CLAMPS TO INTERPHASE CONNECTING PIPE (12)

B. THEN OPEN SWITCH UNTIL SWITCH UNIT CRANK CLAMPS ARE PERPENDICULAR TO ARM.

C. WITH SHORT ARM BELL CRANK (13) ALSO PERPENDICULAR TO ARM, TIGHTEN BELL CRANK CLAMP.

D. WHILE CRANKS ARE PERPENDICULAR TO ARM, CONNECT WOODEN CONTROL ROD (14) TO LONG LEG OF BELL CRANK, CLAMP GUIDES (15) AND CONTOL HANDLE (16) SHOULD BE PERPENDICULAR TO POLE AND HOLD DOWN HOLES (9) DRILLED WHILE IN THIS POSITION

(E) EXEMPT MATERIAL

F. LUBRICATE MOVING PARTS WITH A THIN LAYER OF #89 MEDIUM SILICONE GREASE OR EQUIVALENT.

G. GIVE SWITCH A FEW TRAIL OPERATIONS AND MAKE ADJUSTMENTS ON ADJUSTING SCREW AS NECESSARY.

H. 400 AMP SWITCHES MAY BE USED WITH 336.4 KCMIL AND SMALLER CONDUCTORS. 600 AMP SWITCHES SHALL BE USED ON 636 KCMIL CONDUCTOR AND 1200 AMP SWITCHES SHALL BE USED ON 1033.5 KCMIL CONDUCTOR.

FOR FIELD MAINTENANCE ONLY

| ITEM | | DESCRIPTION | | QUAN. | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P | 1 | CROSSARM, 5 3/4" X 5 3/4" X 12'-0" | | 1 | 294016 |
| | 2 | BRACE, ALLEY ARM, 4'-0" | | 2 | 163808 |
| T | 3 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2-RD., 1-LOCK WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 4 | BOLT, MACH., GALV., 1/2" X 8", 1-RD., 1-DBL. COIL SPR. WASH & 1-NUT | (E) | 2 | 100 SECTION |
| | 5 | BOLT, MACH., GALV., 1/2" X 8", 3-RD., 1-DBL. COIL SPR. WASH. & 2-NUTS | (E) | 1 | 100 SECTION |
| & | 6 | BOLT, MACH., GALV., 5/8" X 8", 1-2 1/4" SQ., 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 8 | 100 SECTION |
| | 7 | BOLT, MACH., GALV., 5/8" X (LENGTH AS REQ'D), 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 8 | BOLT, MACH., GALV., 3/4" X 16", 1-3" SQ., 1-FLAT, 1-CURV., 1-DBL. COIL SPR. WASH & 1-NUT | | 1 | 100 SECTION |
| F | 9 | SCREW, LAG, GALV., 1/2" X 4" | (E) | 4 | 621568 |
| | 10 | SIGN, HIGH VOLTAGE, 8-ROOFING NAILS, GALV. | (E) | 2 | 647648, 492192 |
| | 11 | POLE TOP SWITCH, 15KV, T.P.S.T., HORIZONTALLY MOUNTED, RIGID DISC. INSULATORS ARCING HORNS & INCLUDING ITEMS #13 THRU #17. | | 1 | 709168 400A<br>709184 600A<br>709280 1200A |
| | 12 | PIPE, INTERPHASE CONNECTING, GALV., 1/2" X 11'-6" OR WOOD 1 3/4" X 1 3/4" X 11'-6" | | 1 | - |
| O | 13 | BELL CRANK ASSEMBLY | | 1 | 290624 |
| | 14 | ROD, CONTROL, 1 3/4" X 1 3/4" X 10'-0", LAMINATED WOOD | | 4 | 602938 |
| C | 15 | GUIDE BEARING, INTERMEDIATE | | 3 | 398688 |
| | 16 | OPERATING LEVER ASSEMBLY COMPLETE WITH ADJUSTING SCREW & NUT | | 1 | - |
| & | 17 | PADLOCK, ELECTRIC FF | | 1 | 514848 |
| | 18 | CLAMP, STRAIGHT LINE O.E. | | 6 | 700 SECTION |
| O | 19 | WIRE, BARE STRANDED COPPER, #6 BONDING & GROUNDING WIRE | | 60' | 813536 |
| | 20 | GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| | 21 | PIPE STRAP, 3/4" & 2-8D NAILS, GALV. | (E) | 9 | 697888, 491584 |
| | 22 | TAGS, SWITCH NUMBER | (E) | 2 | 720704 |
| | 23 | CONNECTOR, COPPER TO ALUMINUM #1/0-336.4 MCM ACSR OR 5005, WHERE REQ'D. | | 6 | 700 SECTION |
| | | | | | |
| | | | | | |
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SUPERSEDES
1230.2 (1-1-87)

SDG&E ELECTRIC STANDARDS

POLE TOP SWITCH INSTALLATION
12KV SINGLE CIRCUIT HORIZONTAL CONFIGURATION

DATE 1-1-87
APPD AK / [illegible]

**SCOPE:** THIS STANDARD SHOWS A HORIZONTAL BREAK GANG OPERATED POLE TOP SWITCH FOR CIRCUIT TIES OR SECTIONALIZING PURPOSES. THIS INSTALLATION IS PREFERRED OVER STANDARD 1228.

**NOTE:** SWITCH AND CONTROL ROD MAY BE INSTALLED ON EITHER SIDE OF POLE. IF INSTALLATION IS LIMITED TO ONE SIDE OF POLE ONLY, AND SWITCH DOES NOT MATCH EXISTING PHASE POSITIONS, SEE FIGURE 2 SWITCH.

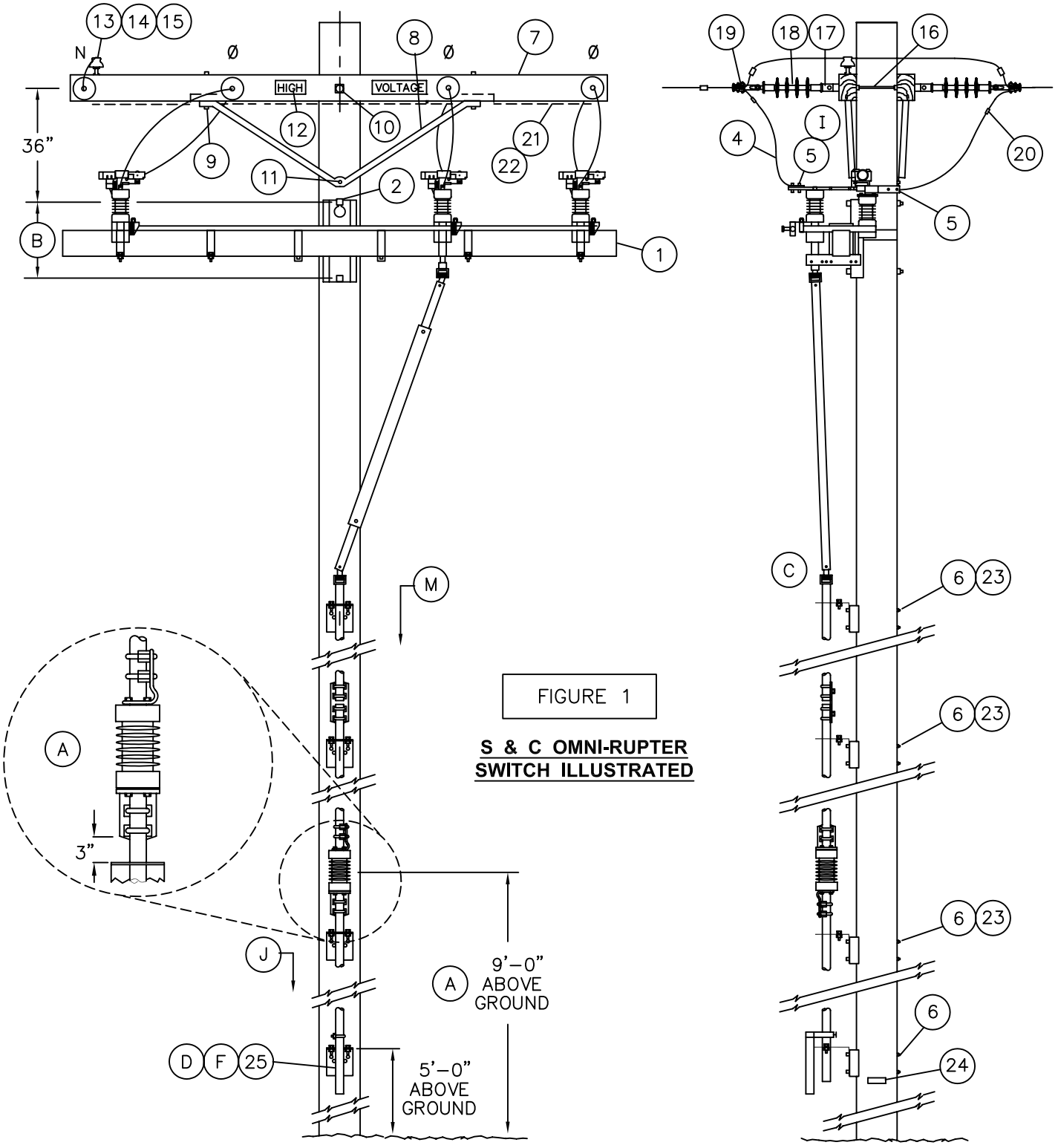



FIGURE 1

**S & C OMNI-RUPTER SWITCH ILLUSTRATED**

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|---|---|---|
| 1230.1 | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV<br>HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT<br>HORIZONTAL CONFIGURATION | REVISION<br>DATE 1–1–2000<br>APPD PSA / CMK |

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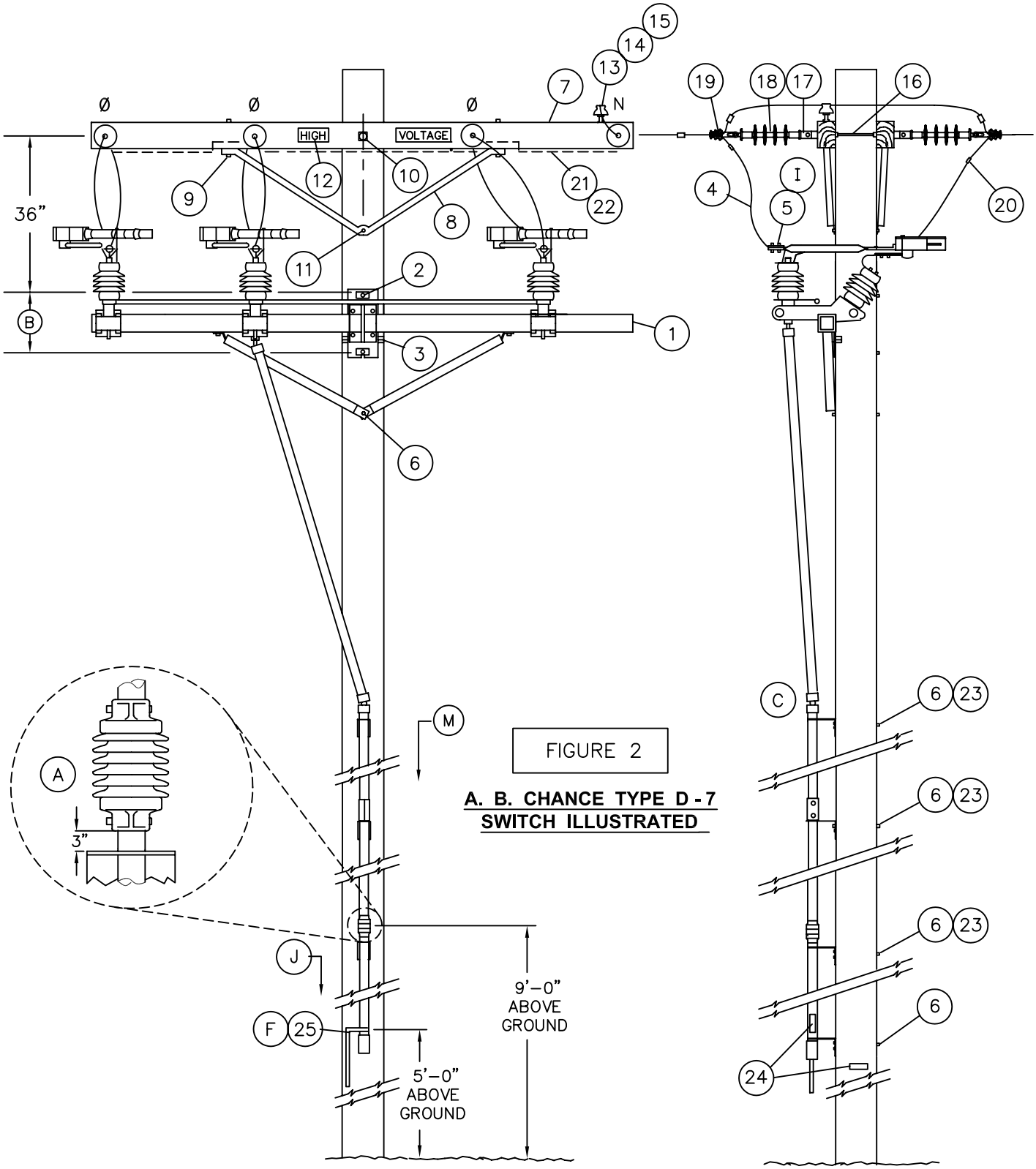



FIGURE 2

**A. B. CHANCE TYPE D - 7 SWITCH ILLUSTRATED**

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | | | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| 1 | SWITCH, GANG–OPERATED, 15KV, 600 AMP, WITH INTERRUPTERS, INCLUDING 40' OF CONTROL ROD | FIG. 1 | S&C | 1 | – | 709252 | GANG–S |
| | | FIG. 2 | CHANCE | 1 | – | 709258 | GANG–C |
| | ADDITIONAL 10'–6" CONTROL ROD WITH GUIDE BEARING AND COUPLING | | S&C | AS REQ'D | – | 602934 | S–ROD |
| | | | CHANCE | AS REQ'D | – | 604428 | C–ROD |
| | LOAD INTERRUPTER–A.B. CHANCE SWITCH ONLY IF RETRO–FITTING REQUIRED | | TYPE D | 3 | – | 433794 | LDBRKD |
| | | | TYPE S | 3 | – | 433796 | LDBRKS |
| 2 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | | 2 | 392 | – | – |
| 3 | SCREW, LAG, GALV, 1/2" X 4" | | | 2 | – | 621568 | – |
| 4 | WIRE, BARE STRANDED CU OR AL (SIZE AS REQ'D) | | | 33' | 711–715 | – | – |
| 5 | TERMINAL, COMPRESSION LUG (I) | | | 6 | 794–795 | – | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | | AS REQ'D | 392 | – | – |
| 7 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | | | 2 | – | 294128 | 4– |
| 8 | BRACE, ANGLE, 5' – 0" | | | 2 | – | 164128 | 5HUB |
| 9 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | | | 4 | 392 | – | – |
| 10 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | | 1 | 392 | – | – |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | | | 1 | 392 | – | – |
| 12 | SIGN, HIGH VOLTAGE, AND 9 ROOFING NAILS, GALV | | | 2 | – | 647648 | HV |
| | | | | – | – | 492224 | – |
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" (G) | | | 2 | – | 532704 | PS1 |
| 14 | INSULATOR, 12KV NEUTRAL (G) | | | 2 | – | 429216 | 55–3/I |
| 15 | WIRE, TIE (DOUBLE) (G) | | | 1 | 760–764 | – | – |
| 16 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (G) | | | 4 | 392 | – | – |
| 17 | CLEVIS, DEAD END, 5/8" BOLT STEEL (CLOSED TYPE) (G) | | | 8 | – | 235712 | – |
| 18 | INSULATOR, SUSPENSION, 12KV, CLEVIS (G) | | | 8 | 750 | 431650 | – |
| 19 | CLAMP, STRAIGHT LINE, D.E. (G) | | | 8 | 741–743 | – | – |
| 20 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) | | | AS REQ'D | 783–786 | – | – |
| 21 | WIRE, #8 BARE SOLID ANNEALED COPPER | | | 12' | – | 812928 | BOND8 |
| 22 | STAPLE, FENCE, GALV, 1 1/4" | | | AS REQ'D | – | 678528 | – |
| 23 | SCREW, LAG, GALV, 5/8" X 5" | | | 2 | – | 621600 | – |
| 24 | TAG, SWITCH NUMBER | | | 2 | 204 | – | – |
| 25 | PADLOCK, SCHLAGE ELECTRIC SERIES | | | 1 | – | 514848 | – |

| OVERHEAD MACRO UNITS | |
|---|---|
| FIG. 1 | S12SWI |
| FIG. 2 | C12SWI |

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| 1230.3 | POLE TOP SWITCH 12KV HORIZONTAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION | DATE 1–1–2000<br>APPD PEA / CMK |

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**INSTALLATION:**

(A) INSTALL CONTROL PIPE INSULATOR THREE INCHES ABOVE GUIDE BEARING AND A MINIMUM OF 9'–0" ABOVE GROUND.

(B) USE THE FOLLOWING THROUGH–BOLT DRILLING DIMENSIONS: A.B. CHANCE = 13–1/4", S&C = 14".

(C) SWITCHES ARE FURNISHED WITH 40 FEET OF OPERATING CONTROL ROD. THE TOP SECTION OF THE CONTROL ROD IS MADE OF FIBER GLASS, THE LOWER SECTIONS ARE MADE OF GALVANIZED PIPE.

(D) DO NOT GROUND SWITCH CONTROL MECHANISM.

(F) THE SWITCH IS SHIPPED FACTORY ADJUSTED. HOWEVER, THE SWITCH HANDLE LOCK SEGMENTS WILL REQUIRE ADJUSTMENT. REFER TO INSTALLATION INSTRUCTIONS PROVIDED WITH SWITCH. **NOTE: SUBSTANTIAL PRESSURE MUST BE APPLIED TO THE SWITCH HANDLE IN THE CLOSING DIRECTION TO PLACE "WIND - UP" TENSION IN THE CONTROL ROD BEFORE DROPPING HANDLE INTO CLOSED - POSITION SLOT.**

(G) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(I) WHEN ATTACHING 1/O AND 4/O COPPER CONDUCTORS TO A POLE TOP SWITCH, USE A BRONZE CABLE TAP LUG, STOCK NUMBER 471296. IF EXCESSIVE VIBRATION OR WHIPPING COULD OCCUR, USE TWO LUGS IN SERIES.

**REFERENCE:**

(J) POLE STEPPING – SEE STANDARD 363.

K. SEE DESIGN MANUAL PAGE 6111 – FEEDER CIRCUIT SECTIONALIZING AND PROTECTION.

L. SWITCH OPERATING RODS MAY EXTEND ONE–HALF THEIR DIAMETER INTO THE CLIMBING SPACE (G.O. 95, 54.7–A3).

(M) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

(N) NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES TIE SWITCHES TO CIRCUITS EMANATING FROM DIFFERENT SUBSTATIONS. (SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3).

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| REVISION<br>DATE 1–1–2000<br>APPD PSA / CAK | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV HORIZONTAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION | 1230.4 |
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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

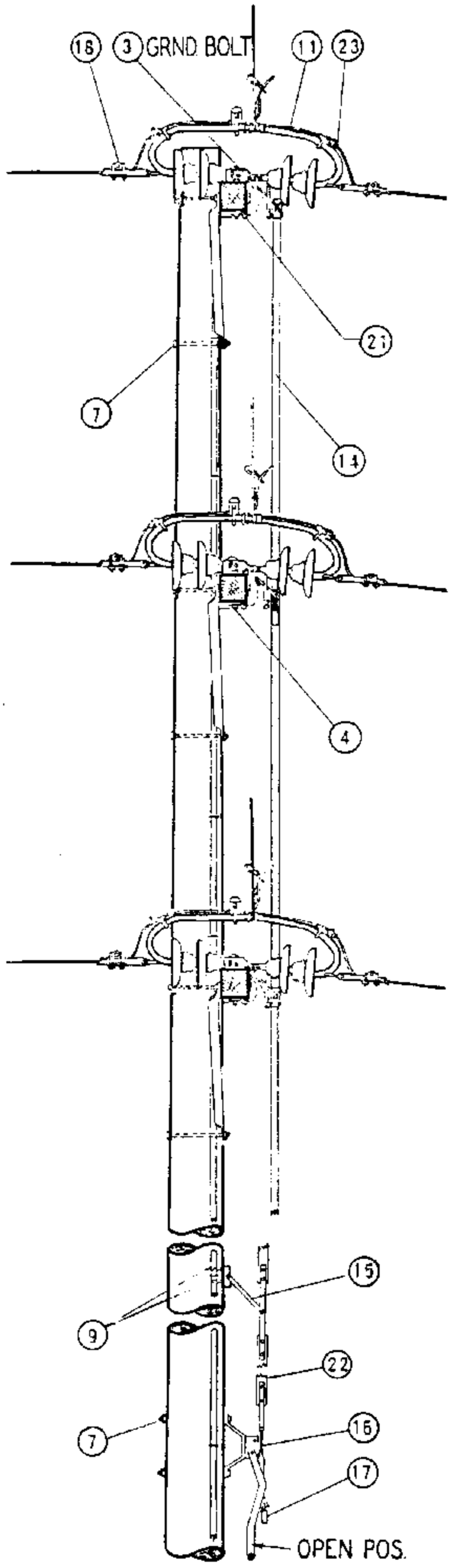
SHEET
1 OF 1

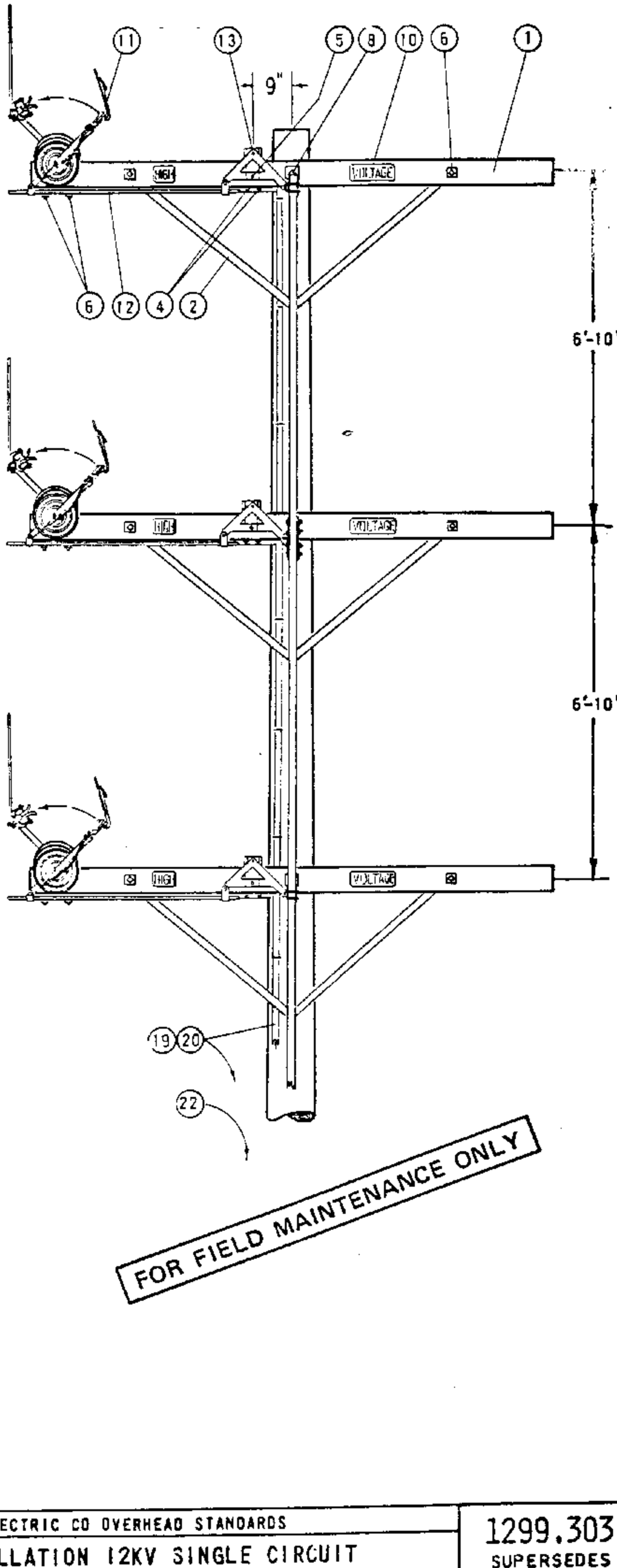
SDG&E ELECTRIC OVERHEAD STANDARD

POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT
VERTICAL CONFIGURATION

FMO
OH 1231

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|---|---|---|
| DATE 1-1-87<br>APD AK/RS | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT<br>VERTICAL CONFIGURATION | 1299.303<br>SUPERSEDES<br>1231.1 (1-1-87) |

FOR FIELD MAINTENANCE ONLY

NOTES:
A. FOR METHOD OF ADJUSTING SWITCH, SEE PAGE 1230.
(E) EXEMPT MATERIAL.

| ITEM | | DESCRIPTION | | QUAN. | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P T B F | 1 | CROSSARM, 5 3/4" X 5 3/4" X 10'-0" | | 3 | 294016 |
| | 2 | BRACE, ALLEY ARM, 4'-0" | | 6 | 163808 |
| | 3 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2-RD., 1-LOCK WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 4 | BOLT, MACH., GALV., 1/2" X 8", 1-RD., 1-DBL. COIL SPR. WASH & 1-NUT | (E) | 6 | 100 SECTION |
| | 5 | BOLT, MACH., GALV., 1/2" X 8", 3-RD., 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 6 | BOLT, MACH., GALV., 5/8" X 8", 1-2 1/4" SQ., 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 12 | 100 SECTION |
| | 7 | BOLT, MACH., GALV., 5/8" X (LENGTH AS REQ'D), 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 5 | 100 SECTION |
| | 8 | BOLT, MACH., GALV., 3/4" X 16", 1-3" SQ., 1-FLAT, 1-CURV., 1-DBL. COIL SPR. WASH & 1-NUT | | 3 | 100 SECTION |
| | 9 | SCREW, LAG, GALV., 1/2" X 4" | (E) | 6 | 621568 |
| | 10 | SIGN, HIGH VOLTAGE, 8-ROOFING NAILS, GALV. | (E) | 6 | 647648, 492192 |
| O C B D | 11 | POLE TOP SWITCH, 15KV, T.P.S.T., VERTICALLY MOUNTED, RIGID DISC. INSULATORS ARCING HORNS & INCLUDING ITEMS #13 THRU #17. | | 1 | 709168 400A<br>709184 600A |
| | 12 | PIPE, INTERPHASE CONNECTING, GALV., 1/2" X 4'-6" | | 3 | - |
| | 13 | BELL CRANK ASSEMBLY | | 3 | 290624 |
| | 14 | ROD, CONTROL, 1 3/4" X 1 3/4" X 10'-0", LAMINATED WOOD | | 6 | 602938 |
| | 15 | GUIDE BEARING, INTERMEDIATE | | 4 | 398688 |
| | 16 | OPERATING LEVER ASSEMBLY COMPLETE WITH ADJUSTING SCREW & NUT | | 1 | - |
| | 17 | PADLOCK, ELECTRIC FF | | 1 | 514848 |
| | 18 | CLAMP, STRAIGHT LINE D.E. | | 6 | 700 SECTION |
| | 19 | WIRE, BARE STRANDED COPPER, #6 | | 70' | 813536 |
| | 20 | GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| | 21 | PIPE STRAP, 3/4" & 2-8D NAILS, GALV. | (E) | 9 | 697888, 491584 |
| | 22 | TAGS, SWITCH NUMBER | (E) | 2 | 720704 |
| | 23 | CONNECTOR, COPPER TO ALUMINUM #1/0-336.4 MCM ACSR OR 5005, WHERE REQ'D. | | 6 | 700 SECTION |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

1299.304
SUPERSEDES
1231.2 (1-1-87)

SDGBE ELECTRIC STANDARDS

POLE TOP SWITCH INSTALLATION
12KV SINGLE CIRCUIT VERTICAL CONFIGURATION

DATE 1-1-87
APPD AK 1/89

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| C | | | | | | F | | | | | |
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| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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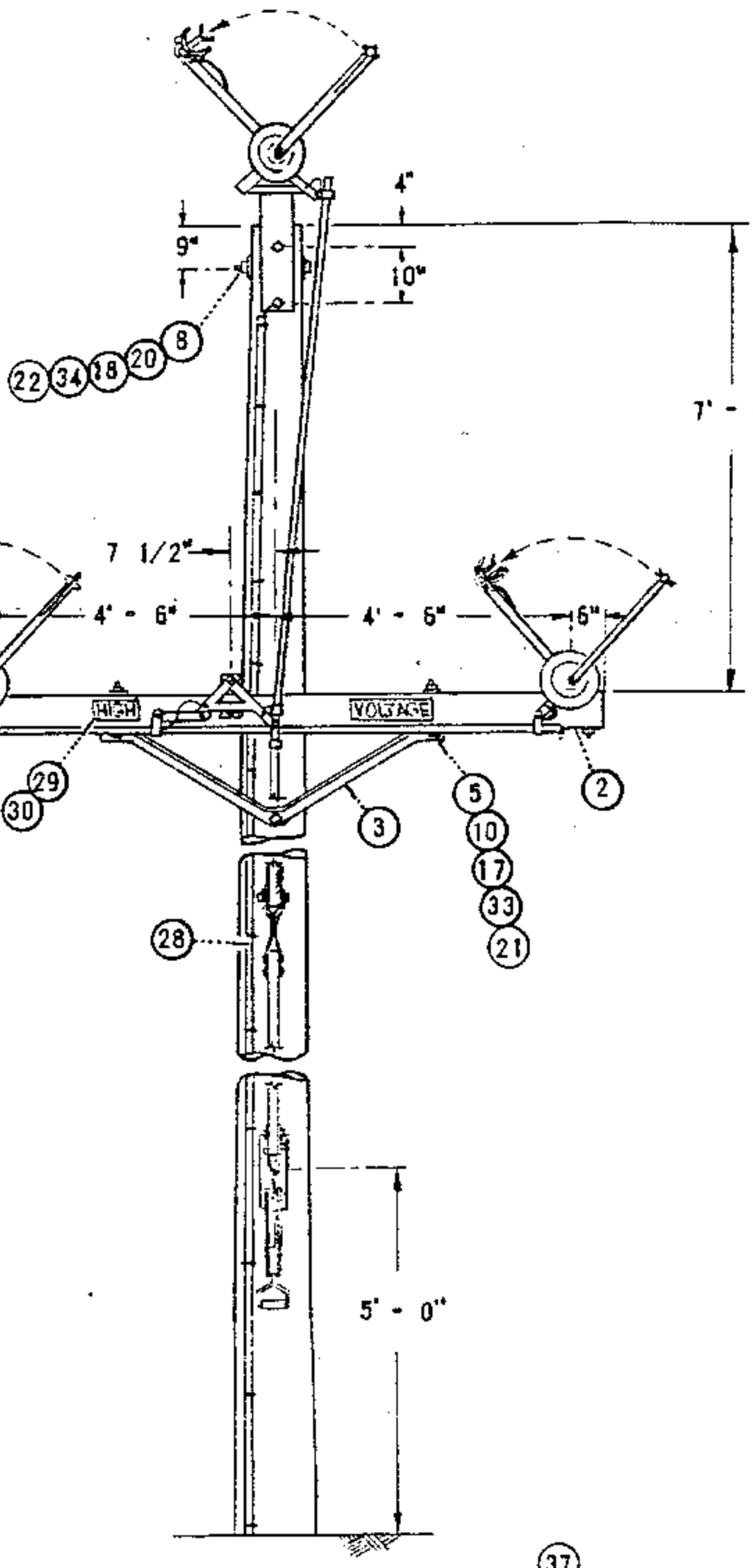
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1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

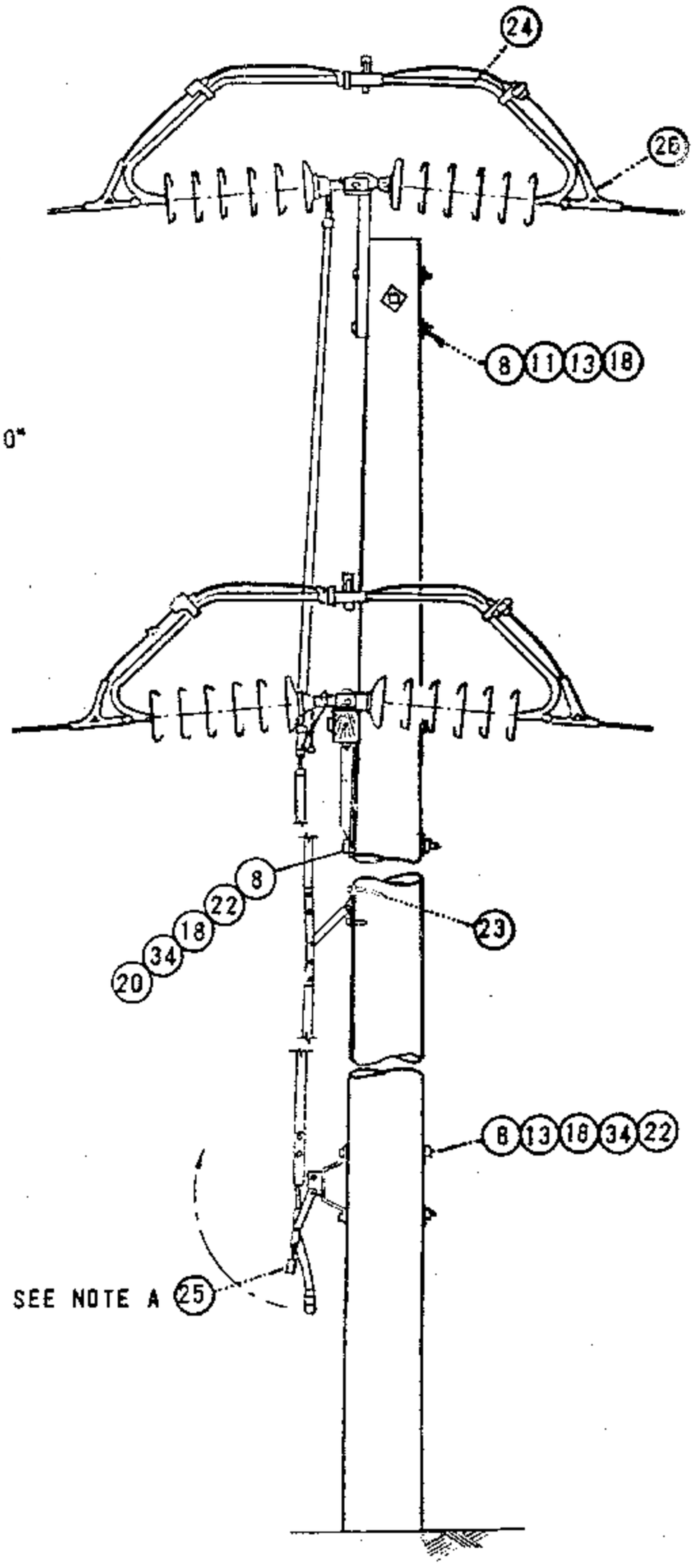
POLE TOP SWITCH INSTALLATION 69KV
SINGLE CIRCUIT TRIANGULAR CONFIGURATION

FMO
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BOTTOM OF ARM
GROUNDING DETAIL




FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-87<br>APPD AK/DSS | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>POLE TOP SWITCH INSTALLATION 69KV<br>SINGLE CIRCUIT TRIANGULAR CONFIGURATION | 1299.305<br>SUPERSEDES<br>1236.1 (1-1-87) |

FOR FIELD MAINTENANCE ONLY

NOTES:

A. SWITCH HANDLE SHOWN IN OPEN POSITION.

B. REFER TO PAGE 1230 FOR METHOD OF ADJUSTING SWITCH AND FOR DETERMINING MAXIMUM LINE ANGLE PERMITTED FOR SWITCH.

C. THE 600 AMP SWITCH MAY BE USED ON SINGLE CIRCUIT 636 KCMIL AND SMALLER CONDUCTORS.

(E) EXEMPT MATERIAL.

| ITEM PTF | ITEM TOC | MATERIAL | | QUANTITY | STOCK NO OR CONSTR STD. |
|---|---|---|---|---|---|
| 1 | | POLE, CLASS AND HEIGHT (AS REQ'D) | | 1 | 300 SECTION |
| 2 | | CROSSARM, 5 3/4" X 5 3/4" X 10' - 0" (CELLON OR GRAY) | | 1 | 294144 OR 294304 |
| 3 | | BRACE, CROSSARM 5' - 0" ANGLE STEEL | | 1 | 164128 |
| 4 | | BOLT, MACH. 1/2" X 1 1/2" | (E) | 3 | 152608 |
| 5 | | BOLT, MACH. 1/2" X 8" | (E) | 5 | 153152 |
| 6 | | | | | |
| 7 | | BOLT, MACH. 5/8" X 8" | (E) | 4 | 155584 |
| 8 | | BOLT, MACH. 5/8" X (LENGTH AS REQ'D) | (E) | 6 | 100 SECTION |
| 9 | | BOLT, MACH 3/4" X (LENGTH AS REQ'D) | | 1 | 100 SECTION |
| 10 | | WASHER, 1/2" ROUND | (E) | 11 | 800192 |
| 11 | | WASHER, 5/8" ROUND | (E) | 2 | 800320 |
| 12 | | WASHER, 1/2" LOCK | (E) | 3 | 796768 |
| 13 | | WASHER, 3" SQUARE CURVED RIB | (E) | 5 | 797792 |
| 14 | | WASHER, 4" SQUARE CURVED RIB | | 1 | 797760 |
| 15 | | | | | |
| 16 | | WASHER, 2 1/4" SQUARE FLAT | (E) | 7 | 799040 |
| 17 | | WASHER, SPRING DOUBLE COIL 1/2" | (E) | 5 | 798464 |
| 18 | | WASHER, SPRING DOUBLE COIL 5/8" | (E) | 12 | 798560 |
| 19 | | WASHER, SPRING DOUBLE COIL 3/4" | | 1 | 798496 |
| 20 | | WASHER, 3" SQUARE CURVED | | 2 | 798912 |
| 21 | | NUT, 1/2" | (E) | 8 | 504736 |
| 22 | | NUT 5/8" | (E) | 12 | 506880 |
| 23 | | SCREW, LAG 1/2" X 4" | (E) | 2 | 621568 |
| | 24 | POLE TOP SWITCH, 69KV, 600 AMP | | 1 | 709088 |
| | 25 | PAD LOCK, ELECTRIC FF | | 1 | 514848 |
| | 26 | CLAMPS, STRAIN | | 6 | 700 SECTION |
| 27 | | WIRE, BARE STRANDED COPPER, #6 | | 60' | 813536 |
| 28 | | ROD, GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| 29 | | SIGN, HIGH VOLTAGE | (E) | 2 | 647648 |
| 30 | | NAILS, ROOFING 8 GALV. | (E) | 28 | 492192 |
| 31 | | CONDUIT, SCH. 40, 1/2" | (E) | 9' | 251168 |
| 32 | | STRAP, 1/2" PIPE | (E) | 5 | 697728 |
| 33 | | LOCKNUT, M-F 1/2" | (E) | 5 | 504544 |
| 34 | | LOCKNUT, M-F 5/8" | (E) | 10 | 504608 |
| 35 | | LOCKNUT, M-F 3/4" | | 1 | 504576 |
| 36 | | WASHER, 3" SQUARE FLAT | | 1 | 799104 |
| 37 | | NUT, 3/4 | | 1 | 100 SECTION |
| 38 | | TAGS, SWITCH NUMBER | | 2 | 720704 |
| | | | | | |
| | | | | | |

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SUPERSEDES
1236.2 (1-1-87)

SDG&E ELECTRIC STANDARDS

POLE TOP SWITCH INSTALLATION 69KV
SINGLE CIRCUIT TRIANGULAR CONFIGURATION

DATE 1-1-87
APPD AK RDS

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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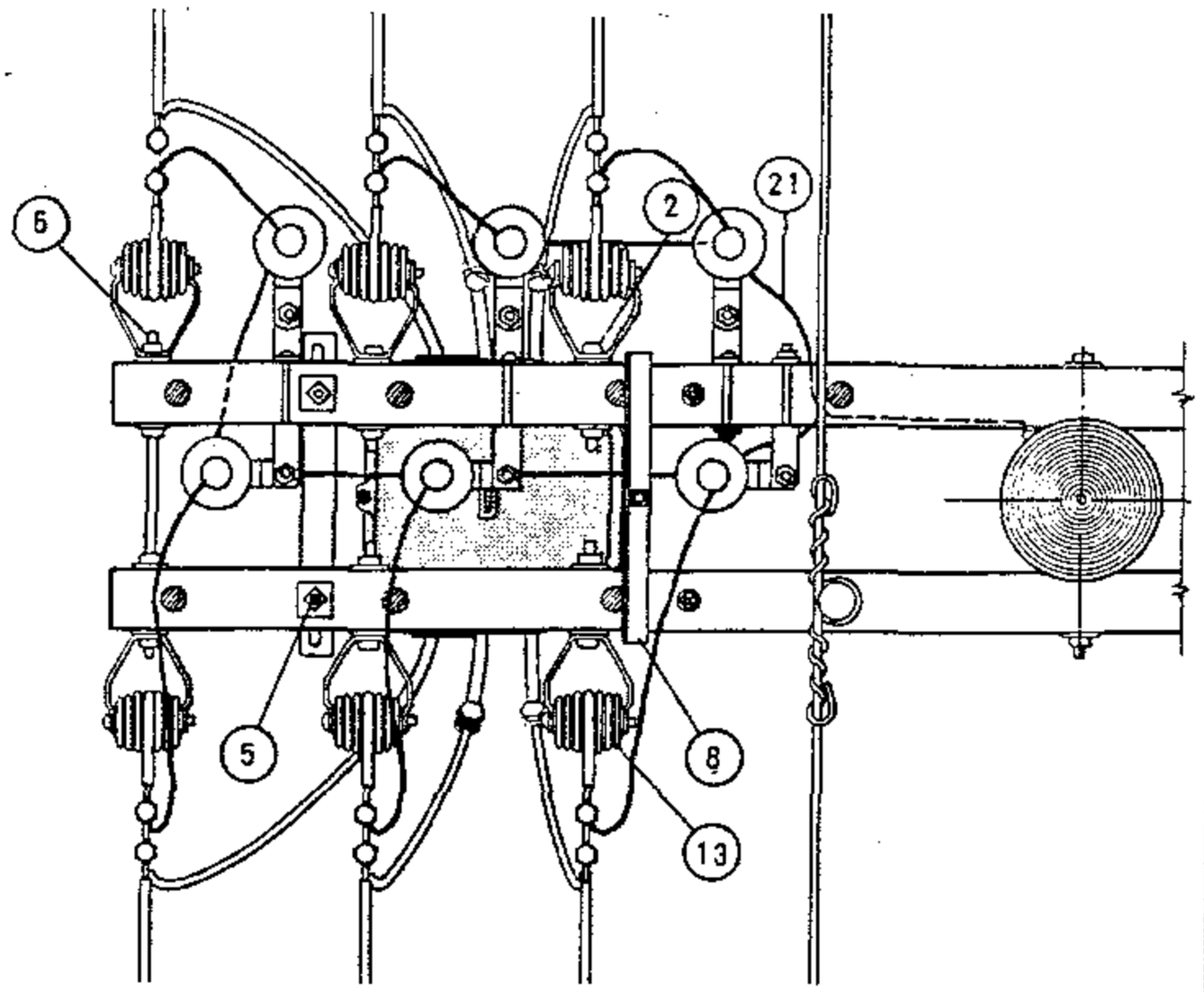
SDG&E ELECTRIC OVERHEAD STANDARD

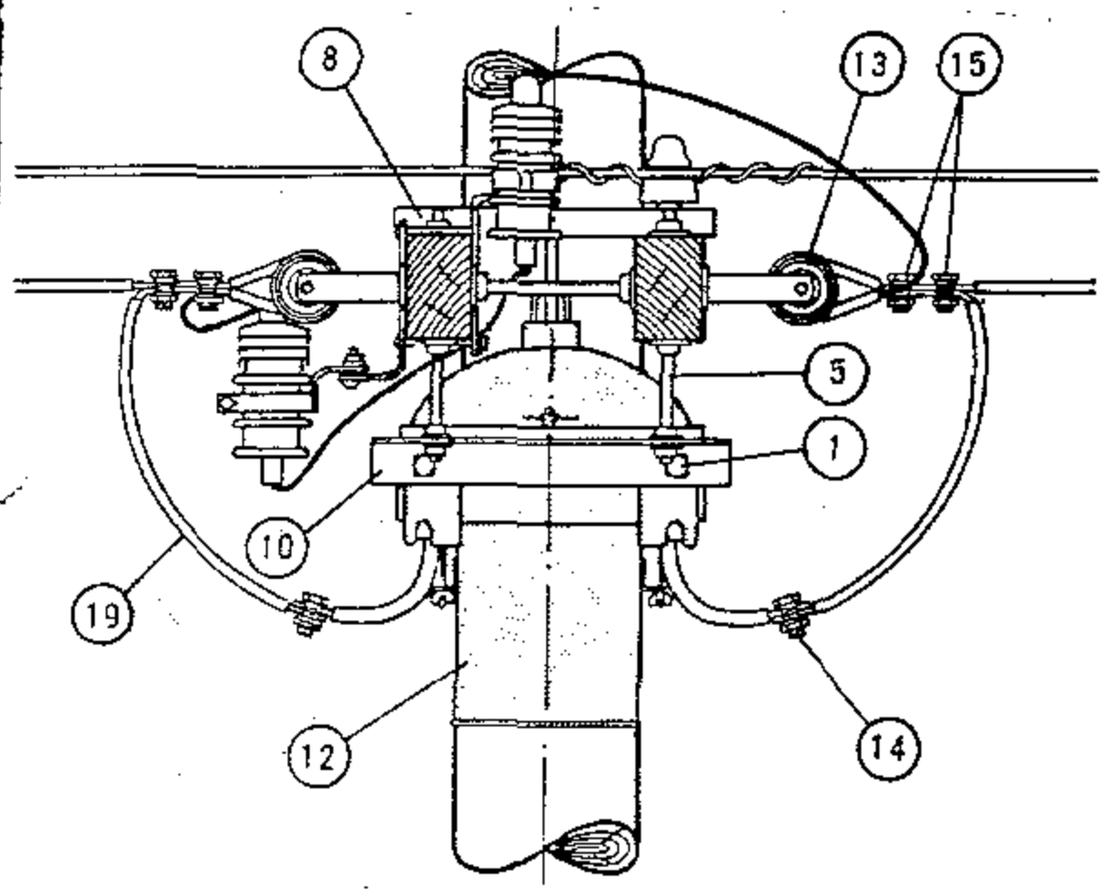
POLE TOP SWITCH INSTALLATION
4KV WESTINGHOUSE OIL SWITCH, TYPE F011

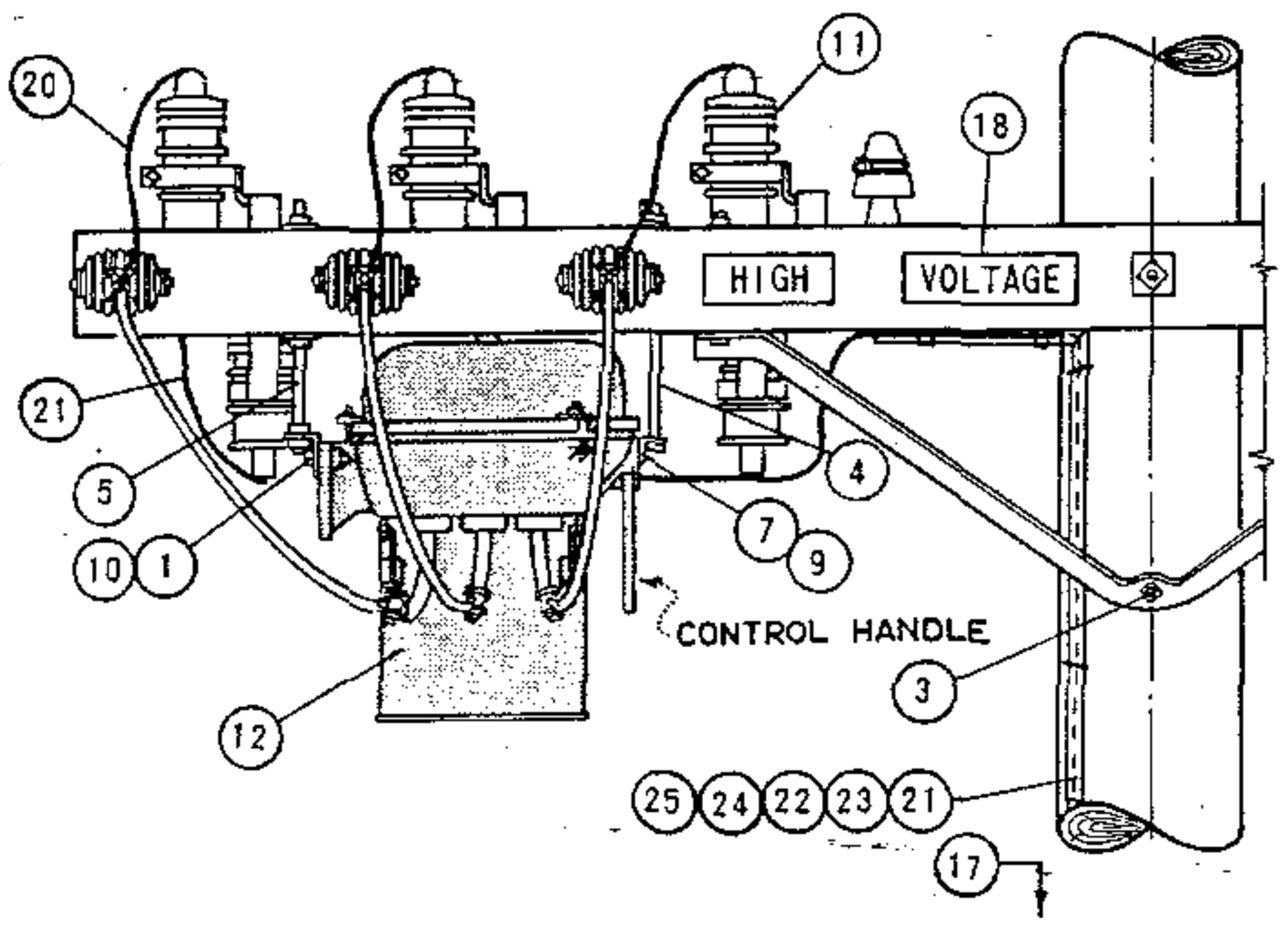
FMO
OH 1240

THIS PAGE FOR FIELD MAINTENANCE ONLY

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A. BETWEEN SWITCH CASE AND ARRESTER, 1 1/2 INCH CLEARANCE MUST BE MAINTAINED. USE LONGER BOLTS FOR SWITCH SUPPORTS IF REQUIRED.

(E) EXEMPT MATERIAL

| ITEM | DESCRIPTION | QUANTITY #6 #4 OR | QUANTITY #2 UP | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | MACH BOLT, GALV, 5/8" X 2" 1 RD WASHER & 1 NUT (E) | 2 | 2 | PGS 139, 140 |
| 2 | MACH BOLT, GALV, 5/8" X 5" 1-2 1/2" SQ WASHER & 1 NUT (E) | 4 | 0 | PGS 139, 140 |
| 3 | MACH BOLT, GALV, 5/8" X 10" TO 16", 1 NUT (E) | 1 | 1 | PGS 139, 140 |
| 4 | MACH BOLT, GALV, 5/8" X 14", 1 NUT (E) | 1 | 1 | PGS 139, 140 |
| 5 | SPACE BOLT, GALV, 5/8" X 16", 2 RD & 2 SQ WASH & 2 NUTS (E) | 2 | 2 | PGS 139, 140 |
| 6 | SPACE BOLT, GALV, 5/8" X 16" TO 24", 4 SQ WASHER & 4 NUTS (E) | 2 | 2 | PGS 139, 140 |
| 7 | CAP SCREW, GALV, 3/8" X 3/4" | 2 | 2 | 619328 |
| 8 | MOUNTING BRACKET, OIL SWITCH | 1 | 1 | 166464 |
| 9 | MOUNTING BRACKET, OIL SWITCH | 1 | 1 | 166464 |
| 9 | MOUNTING BRACKET, OIL SWITCH | 1 | 1 | 166464 |
| 11 | ARRESTER, 3 KV | 6 | 6 | PG 1247 |
| 12 | POLETOP SWITCH, WEST. TYPE FO 11, 5KV, 400 A | 1 | 1 | 171584 |
| 13 | INSULATOR, 4KV D.E. WITH CLEVIS (E) | 6 | 6 | 430848 |
| 14 | WIRE CONNECTOR, SPLIT BOLT, SIZE AS REQUIRED (E) | 19 | 7 | PG 783 |
| 15 | WIRE CLAMP OR D.E. | 0 | 6 | PGS 743, 787 |
| 16 | | | | |
| 17 | POLE STEPS (E) | 17 | 17 | 592992 |
| 18 | SIGN, HIGH VOLTAGE & ROOFING NAILS (E) | 2 | 2 | 647648, 492224 |
| 19 | WIRE SAME SIZE AS LINE | 15' | 15' | PGS 711 716 |
| 20 | WIRE, BARE COPPER #6 | 12 | 12 | 813536 |
| 21 | WIRE, BARE COPPER #2 | AS REQ'D | | 813664 |
| 22 | MOULDING, 1" HARDWOOD | AS REQ'D | | 487200 |
| 23 | STAPLES, FENCE GALV 1 1/4" (E) | AS REQ'D | | 678528 |
| 24 | STAPLES, 3" GALV (E) | AS REQ'D | | 678560 |
| 25 | ROD, GROUND & CLAMP | 2 | 2 | 603072, 230015 (E) |

DATE 6-4-82
APPD JRH

SDG&E ELECTRIC STANDARDS

# POLE TOP SWITCH INSTALLATION
## 4 KV WESTINGHOUSE OIL SWITCH, TYPE FO11

1299.401
SUPERSEDES
1240 (6-4-82)

**OH1242 FIELD MAINTENANCE ONLY**

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL

**REVISION HISTORY:**

**09/05/2023:** UPDATED WITH VERSION OF DRAWING REVISED TO 3D FORMAT

**06/12/2023:** MOVED TO FMO

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| B | REVISED TO 3D FORMAT | DV | JIK | - | - | 09/05/2023 |
| A | ORIGINAL ISSUE | AMP | JA | MRF | FRC | 6/12/2023 |

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**CROSSARM MOUNTED PARALLEL FUSE AND HOOKSTICK SWITCH**

SCALE: NOT TO SCALE

DRAWING NO: FMO OH1242.1

SHEET: 1 OF 4

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD FOR A FUSE AND SWITCH IN PARALLEL TO BE USED WITH #336.4 ACSR OR #4/0 COPPER AND LARGER CONDUCTORS.

**ATTENTION:**

* MATERIALS ORDERED ARE BASED ON AN EXISTING CONSTRUCTION WITH 10-FOOT LINEARMS.

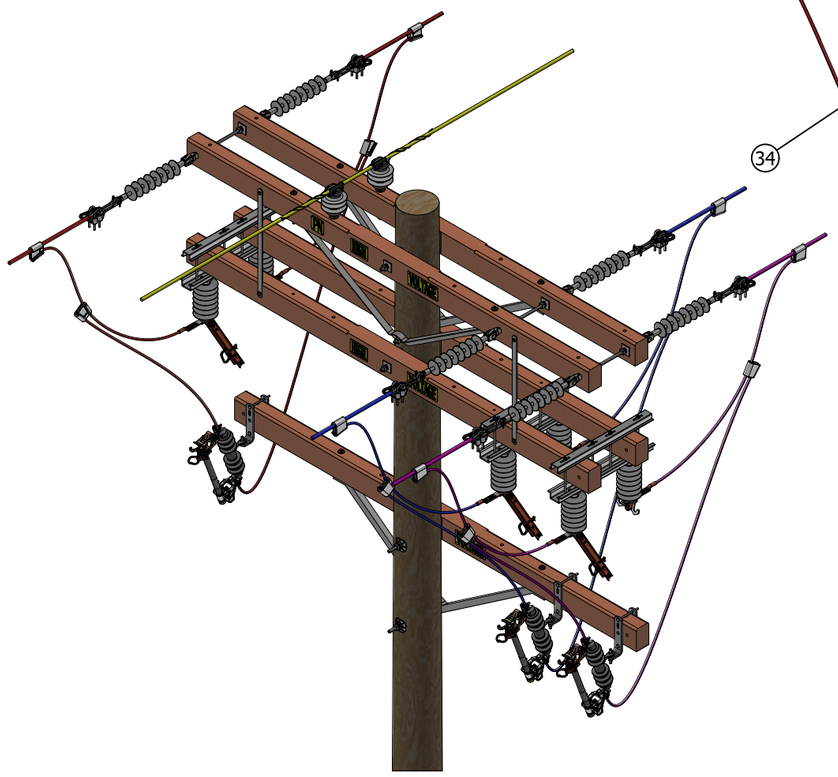



**FIGURE 1**
ISOMETRIC

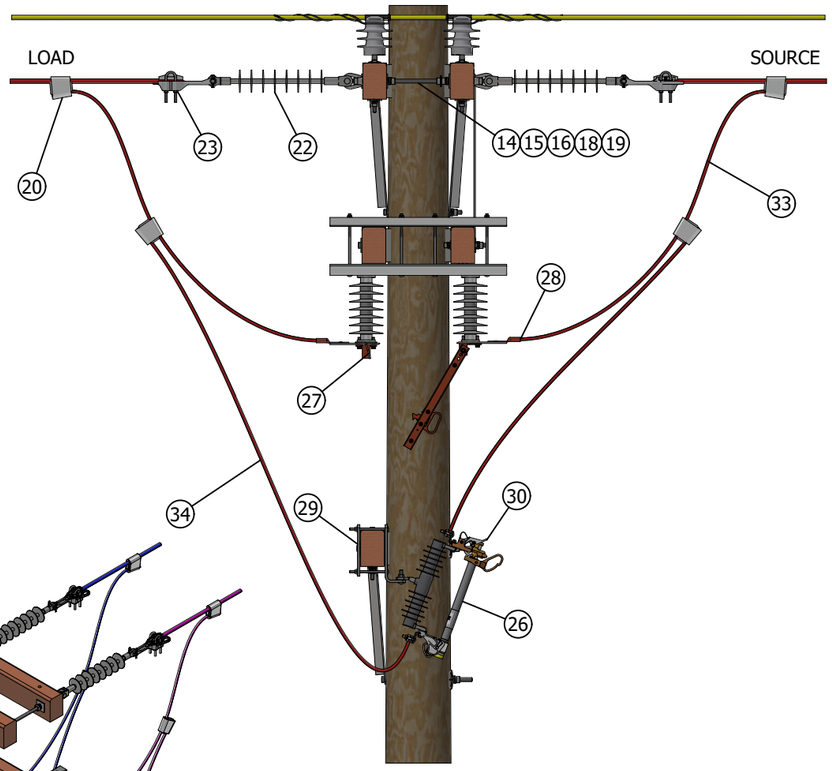



**FIGURE 1**
SIDE VIEW

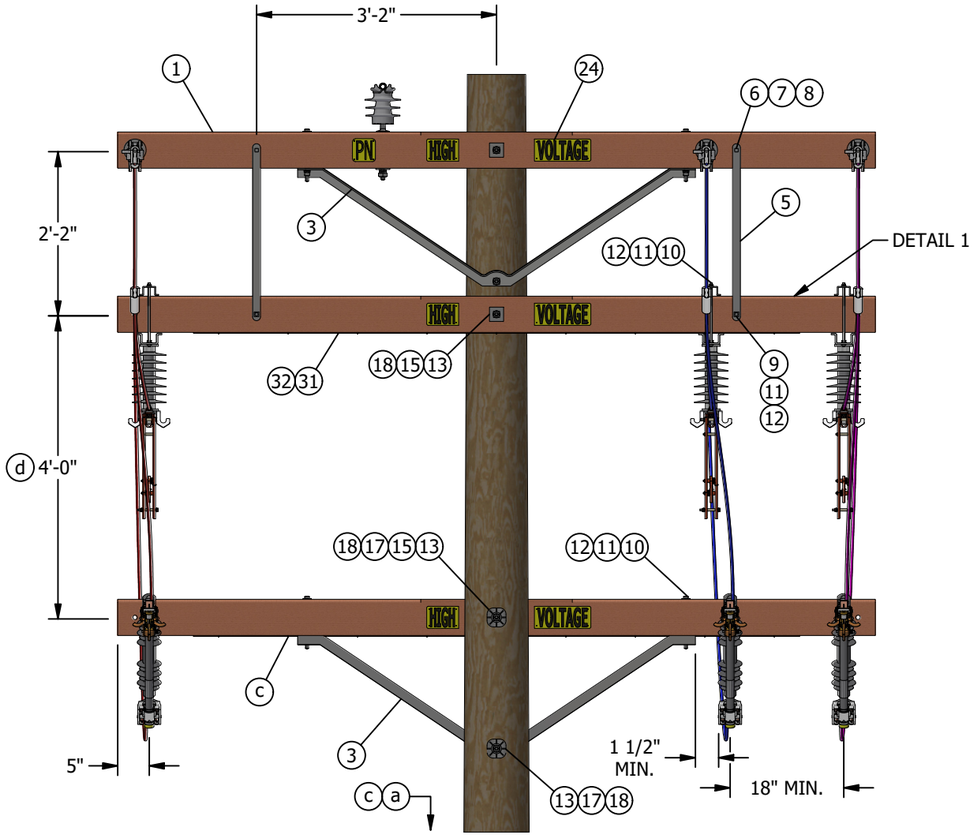



**FIGURE 1**
FRONT VIEW

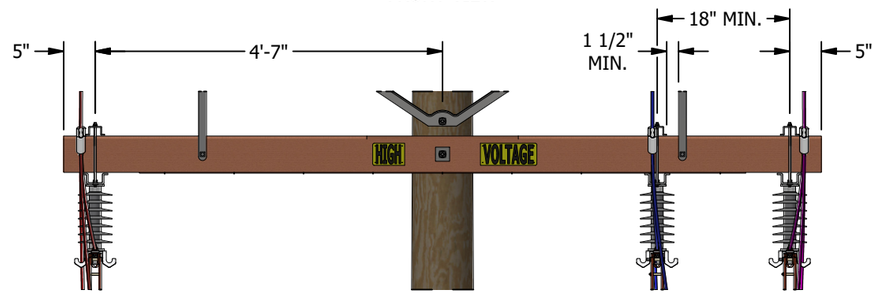



**FIGURE 1**
DETAIL 1
MIDDLE CROSSARM

**TABLE 1:**

| OVERHEAD MARCO UNITS |
|---|
| S/C2XA |

FIELD MAINTENANCE ONLY

| REV | CHANGE | DRWN | BY | CHKD | APVD | DATE |
|---|---|---|---|---|---|---|
| F | REVISED TO 3D FORMAT | DV | JIK | - | - | 09/05/2023 |
| E | MOVED TO FMO | AMP | JA | MRF | FRC | 6/12/2023 |
| D | TABLE UPDATE | EDM | DEC | JES | CZH | 12/12/2021 |

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**CROSSARM MOUNTED PARALLEL FUSE AND HOOKSTICK SWITCH**

SCALE: NOT TO SCALE

DRAWING NO: FMO OH1242.2

SHEET: 2 OF 4

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**ATTENTION:**

* MATERIALS ORDERED ARE BASED ON AN EXISTING CONSTRUCTION WITH 12-FOOT LINEARMS.

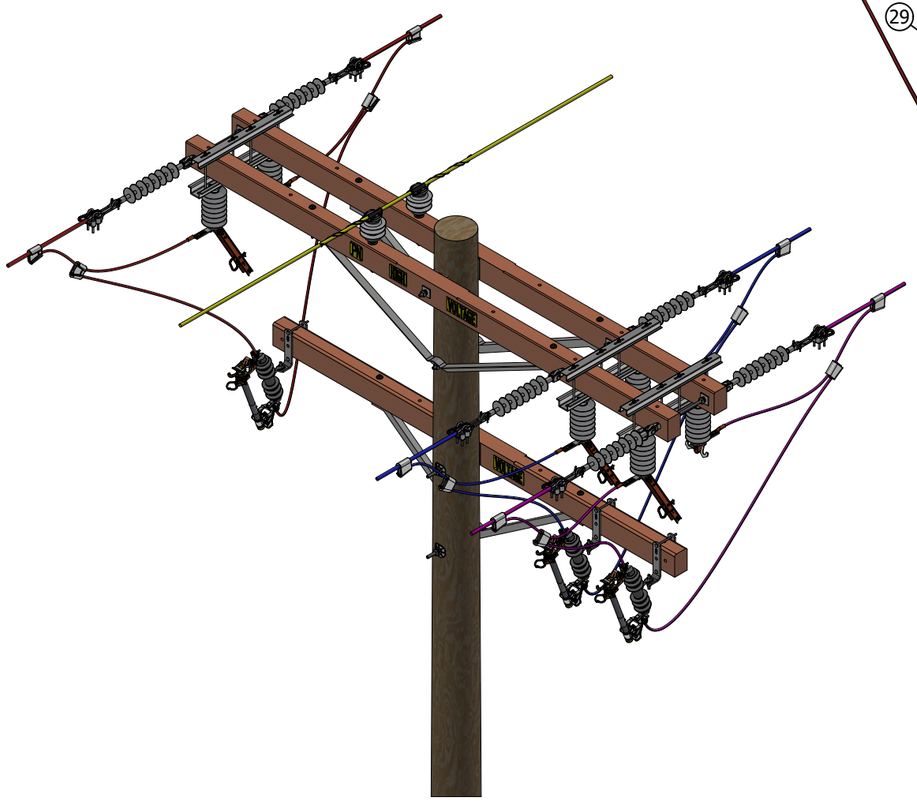



**FIGURE 2**
ISOMETRIC

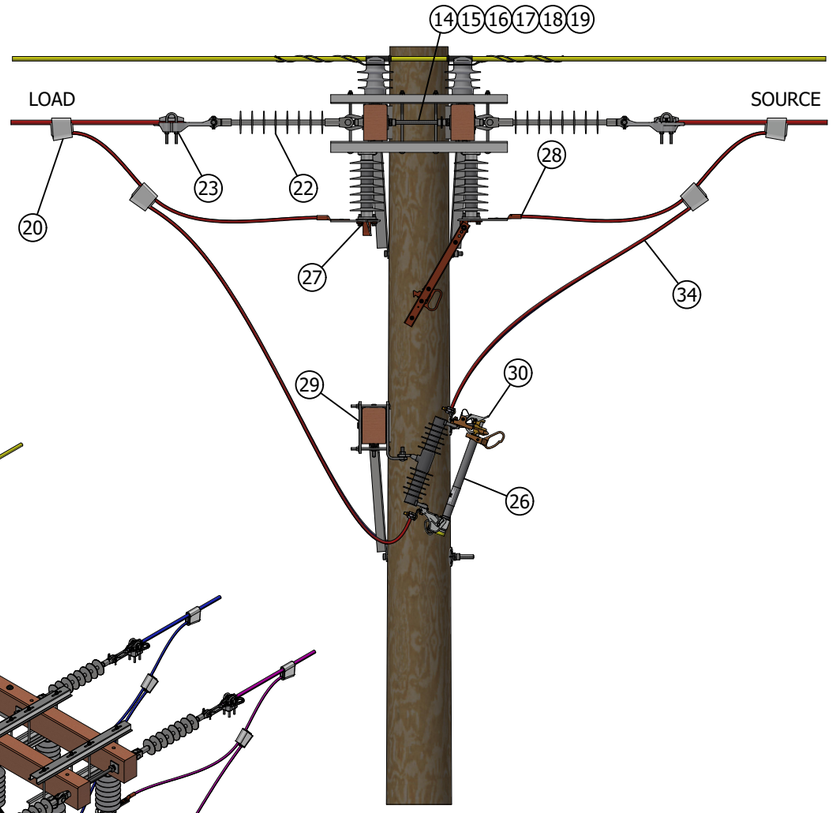



**FIGURE 2**
SIDE VIEW

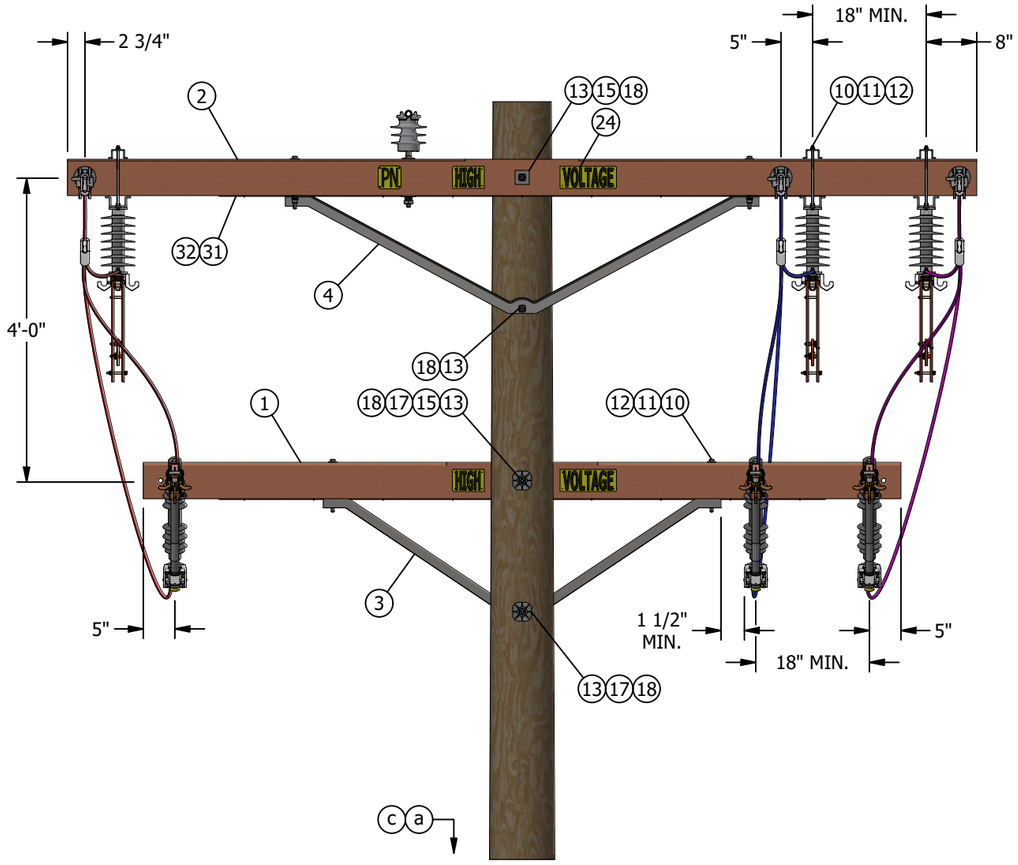



**FIGURE 2**
FRONT VIEW

**TABLE 2:**

| OVERHEAD MARCO UNITS |
|---|
| S/C1XA |

FIELD MAINTENANCE ONLY

| REV | CHANGE | DRWN | BY | CHKD | APVD | DATE |
|---|---|---|---|---|---|---|
| F | REVISED TO 3D FORMAT | DV | JIK | - | - | 09/05/2023 |
| E | MOVED TO FMO | AMP | JA | MRF | FRC | 6/12/2023 |
| D | TABLE UPDATE | EDM | DEC | JES | CZH | 12/12/2021 |

SDGE™

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**CROSSARM MOUNTED PARALLEL FUSE AND HOOKSTICK SWITCH**

SCALE: NOT TO SCALE

DRAWING NO: FMO OH1242.3

SHEET: 3 OF 4

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## INSTALLATION:

A. SECTIONALIZING FUSES AND A STATION ARE NOT ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THE THIS CONSTRUCTION.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | FIGURE 1 QUANTITY | FIGURE 2 QUANTITY | CALLOUTS | STANDARD PAGE | STOCK NUMBER | DESIGN UNIT |
|---|---|---|---|---|---|---|---|
| 1 | CROSSARM 4 PIN 3 3/4" X 5 3/4" X 10 FT | 5 | 1 | - | 380 | S294128 | - |
| 2 | CROSSARM, 6 PIN, TREATED, 3-3/4" X 5 -3/4" x 12' | 0 | 2 | - | 380 | S294160 | - |
| 3 | BRACE, CROSSARM, ANGLE, 5FT, 1 1/2" X 3/16", STEEL, GALVANIZED | 3 | 1 | - | 390 | S164128 | 5HUB |
| 4 | BRACE, CROSSARM, ANGLE, 6FT, 1 3/4" X 3/16", STEEL, GALVANIZED | 0 | 2 | - | 390 | S164160 | 6HUB |
| 5 | BRACE, FLAT CROSSARM 28" | 2 | 0 | - | 390 | S164192 | - |
| 6 | BOLT 3/8" X 5" HOT DIPPED GALVANIZED | 2 | 0 | - | 390 | S154366 | - |
| 7 | WASHER, FLAT, ROUND, 3/8" X 1", GALV | 2 | 0 | - | 390 | S800288 | - |
| 8 | WASHER, SPRING LOCK, 3/8", GALV | 2 | 0 | - | 390 | S796834 | - |
| 9 | BOLT, MACHINE, 1/2" X 5", GALV W/ NUT | 2 | 0 | - | 390 | S153024 | - |
| 10 | BOLT, MACHINE, 1/2" X 8", GALV W/ NUT | 6 | 6 | - | 390 | S153150 | - |
| 11 | WASHER, FLAT, ROUND, 1/2" X 1 3/8", GALV | 8 | 6 | - | 390 | S800192 | - |
| 12 | WASHER, 1/2", DOUBLE COIL SPRING, TYPE M-W, STEEL, TIN/ZINC COAT | 8 | 6 | - | 390 | S798464 | - |
| 13 | BOLT, MACHINE, 5/8", GALV W/ NUT | 5 | 4 | - | 390 | - | - |
| 14 | BOLT, SPACE, 5/8", GALV W/ 4 NUTS | 3 | 3 | - | 390 | - | - |
| 15 | WASHER, FLAT, SQUARE, 2-1/4" X 2-1/4" X 3/8", 11/16" HOLE, STEEL GALV | 13 | 11 | - | 390 | S799040 | - |
| 16 | WASHER, FLAT, ROUND, 5/8" X 1 3/4", GALV | 6 | 6 | - | 390 | S800320 | - |
| 17 | WASHER, CURVED, RIB, 3" X 3" X 5/16", 11/16" HOLE, FOR 5/8" BOLT, GALV | 2 | 2 | - | 390 | S797792 | - |
| 18 | WASHER, 5/8", DOUBLE COIL SPRING, TYPE M-W, STEEL, TIN/ZINC COAT | 13 | 12 | - | 390 | S798560 | - |
| 19 | NUT, SQUARE, 5/8", GALV | 3 | 3 | - | 390 | S506880 | - |
| 20 | CONNECTOR, WIRE, WEDGE (SIZE AS REQ'D) | 12 | 12 | - | 784 | - | - |
| 21 | NUT,EYE, 5/8" BOLT, EYE OPENING 1-1/2" WIDE X 1-3/4" LONG, HOT DIP GALVANIZED | 6 | 6 | - | 739 | S503822 | - |
| 22 | INSULATOR, DEAD-END, 35KV, GALV, SALISBURY | 6 | 6 | - | 750 | S428958 | - |
| 23 | CLAMP, STRAIGHT LINE, DEADEND | 6 | 6 | - | 739 | - | - |
| 24 | SIGN, PRINTED "HIGH VOLTAGE" | 6 | 4 | - | 208 | S647648 | - |
| 25 | NAIL, ROOFING, 1-3/4", #11, 1/2" HEAD | AS REQ'D | AS REQ'D | - | - | S492224 | - |
| 26 | FUSE, CUTOUT, 12KV | 3 | 3 | - | 1207 | - | - |
| 27 | SWITCH, DISCONNECT, UNDERARM, 900A | 0 | 3 | (I)(II) | - | S706680 | D900UA |
| 27 | SWITCH, DISCONNECT, UNDERARM, 900A | 3 | 0 | (I)(III) | - | S706682 | E900UA |
| 28 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) | 6 | 6 | - | 795 | - | - |
| 29 | BRACKET, CUTOUT / ARRESTER CROSSARM MOUNTING | 3 | 3 | - | 397 | S165452 | - |
| 30 | FUSEHOLDER, POLYMER BODY, WITH END FITTINGS, CURRENT RANGE UP TO 200A | 3 | 3 | - | 1212 | - | - |
| 31 | WIRE, #8 AWG SOLID BARE ANNEALED COPPER, | 2 | 2 | - | 711 | S812928 | BOND8 |
| 32 | STAPLES, 1 1/4" (LBS) | AS REQ'D | AS REQ'D | - | - | S678528 | - |
| 33 | WIRE, JUMPER, COVERED STRANDED CU OR AL (SIZE AS REQ'D) | 28'-0" | 0 | - | 711 | - | - |
| 34 | WIRE, JUMPER, COVERED STRANDED CU, #6 OR #2 | 30'-0" | 36'-0" | - | 711 | - | - |
| 35 | PIN, 1", NYLON THREAD, INSULATOR, HOT | 2 | 2 | - | 396 | S532706 | - |
| 36 | INSULATOR, 25KV, "F" NECK, PIN TYPE | 2 | 2 | - | 750 | - | - |
| 37 | TIE, DOUBLE SUPPORT, WITH PAD | 1 | 1 | - | 760 | - | - |
| 38 | SIGN, PRINTED "PN", IN 3" HIGH | 1 | 1 | - | 208 | S648000 | - |

FIELD MAINTENANCE ONLY

## NOTES:

(I) SWITCH, DISCONNECT, 14.4KV, 600A, (S707008, DU: D600) MOVED TO FMO.
(II) REQUIRED IN CONTAMINATION DISTRICT 1 AND PREFERRED IN COASTAL DISTRICTS (OC, NC, BC, CM). (e)
(III) PREFERRED FOR INLAND DISTRICTS (NE, RA, EA, ME).

## REFERENCE:

(a) POLE STEPPING, SEE OH363.
(b) BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED IN OH287.
(c) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES, SEE OH208.
(d) DISCONNECT SWITCH INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR, SEE OH1222.
(e) CONTAMINATION DISTRICTS, SEE OH287.

| REV | CHANGE | DRWN | BY | CHKD | APVD | DATE |
|---|---|---|---|---|---|---|
| F | REVISED TO 3D FORMAT | DV | JIK | - | - | 09/05/2023 |
| E | MOVED TO FMO | AMP | JA | MRF | FRC | 6/12/2023 |
| D | TABLE UPDATE | EDM | DEC | JES | CZH | 12/12/2021 |

SDGE™

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**CROSSARM MOUNTED PARALLEL FUSE AND HOOKSTICK SWITCH**

SCALE: NOT TO SCALE

DRAWING NO: FMO OH1242.4

SHEET: 4 OF 4

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD FOR A FUSE AND SWITCH IN PARALLEL TO BE USED WITH #336.4 ACSR OR #4/0 COPPER AND LARGER CONDUCTORS.

**ATTENTION:**

* MATERIALS ORDERED ARE BASED ON AN EXISTING CONSTRUCTION WITH 10-FOOT LINEARMS.

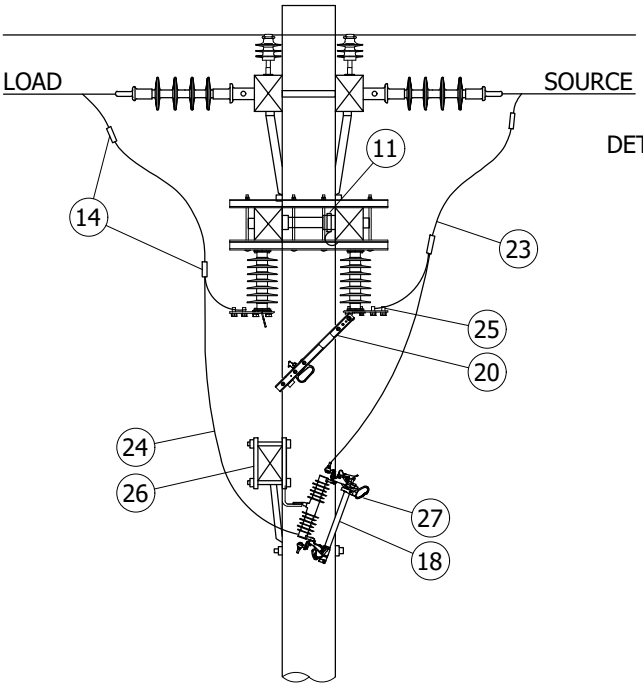



**FIGURE 1**
SIDE VIEW

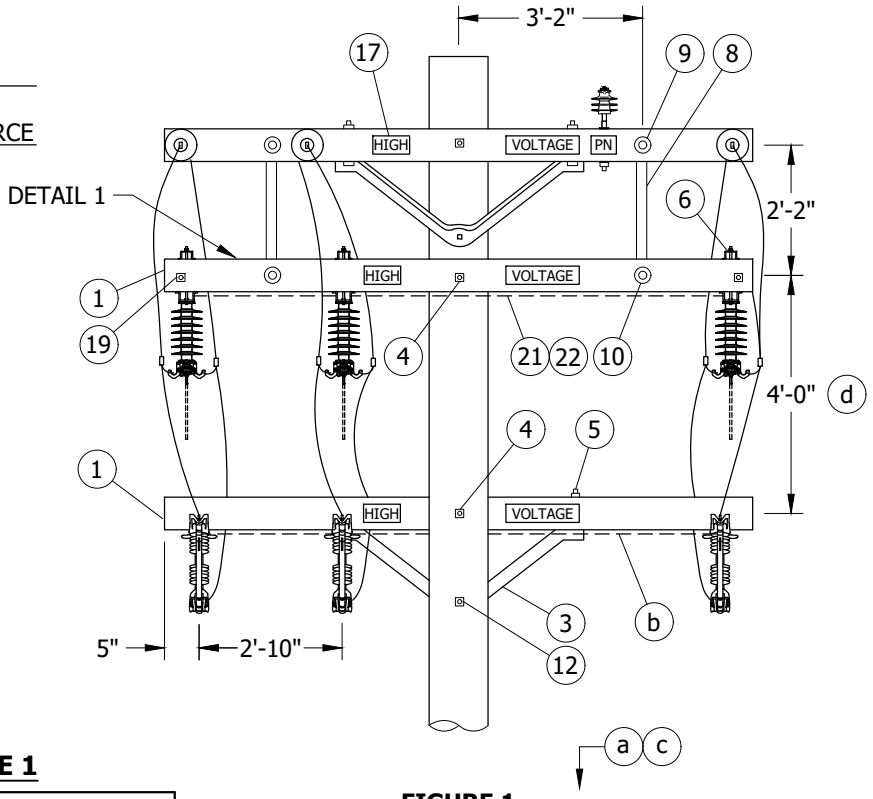
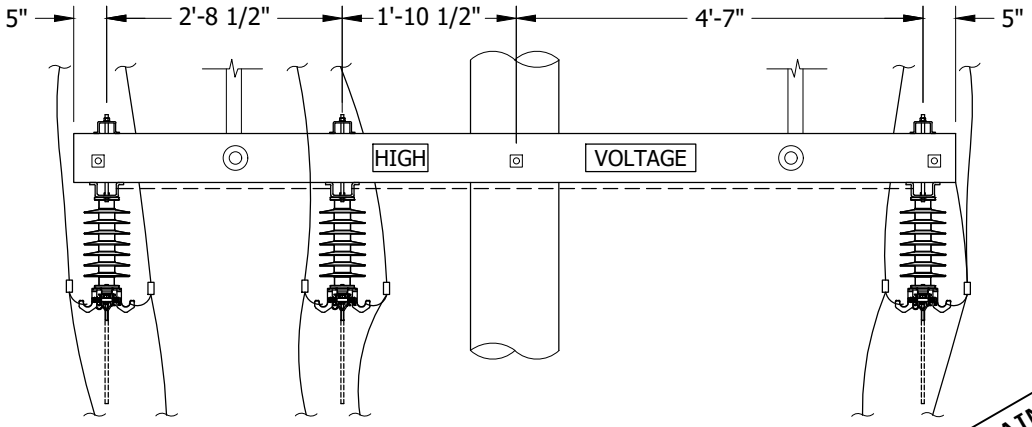



**FIGURE 1**
FRONT VIEW

**TABLE 1**

| OVERHEAD MACRO UNITS |
|---|
| S/C2XA |




**DETAIL 1**

FIELD MAINTENANCE ONLY

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| C | TABLE UPDATE | - | DEC | JS | CZH | 01/14/2020 | F | | | | | | |
| B | REVISION | - | - | PIA | VCR | 03/01/2002 | E | MOVED TO FMO | AMP | JA | MRF | FRC | 06/12/2023 |
| A | REVISION | - | - | PIA | CMK | 01/01/1998 | D | TABLE UPDATE | EDM | DEC | JES | CZH | 12/12/2021 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 1 OF 4

CROSSARM MOUNTED PARALLEL FUSE AND HOOKSTICK SWITCH

FMO OH1242.1

**ATTENTION:**

* MATERIALS ORDERED ARE BASED ON AN EXISTING CONSTRUCTION WITH 12-FOOT LINEARMS.

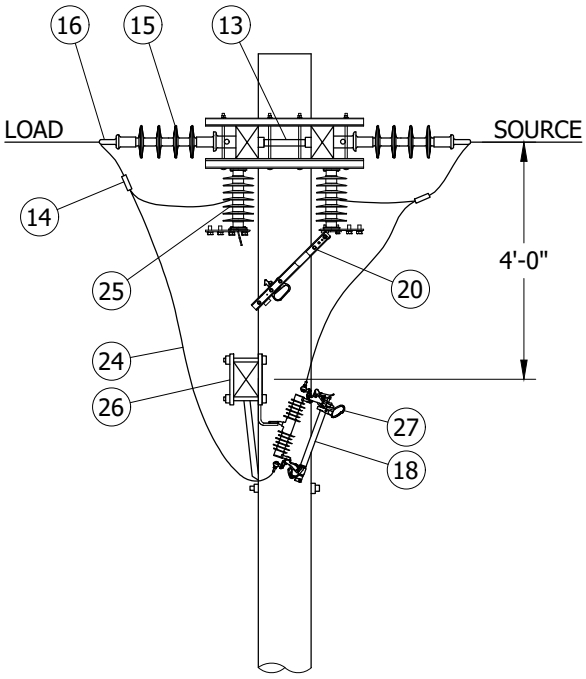



**FIGURE 2**
SIDE VIEW

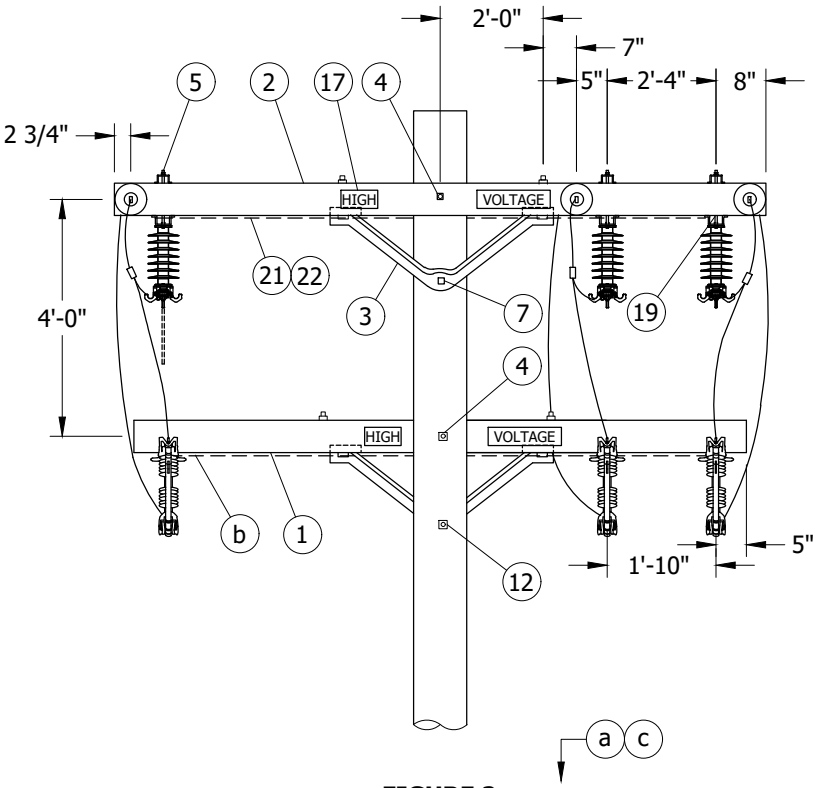



**FIGURE 2**
FRONT VIEW

**TABLE 2**

| OVERHEAD MACRO UNITS |
|---|
| S/C1XA |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | TABLE UPDATE | - | DEC | JS | CZH | 01/14/2020 | F | | | | | | |
| B | REVISION | - | - | PIA | VCR | 03/01/2002 | E | MOVED TO FMO | AMP | JA | MRF | FRC | 06/12/2023 |
| A | REVISION | - | - | PIA | CMK | 01/01/1998 | D | TABLE UPDATE | EDM | DEC | JES | CZH | 12/12/2021 |



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## INSTALLATION:

A. SECTIONALIZING FUSES AND A STATION ARE NOT ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THE THIS CONSTRUCTION.

## 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 | 1 | - | S294128 | - |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 12'-0" | - | 2 | - | S294160 | - |
| 3 | BRACE, 4'-0", ANGLE, GALV. | 1 | 3 | - | S164032 | - |
| 4 | BOLT, MACH, GALV., 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 2 | 2 | 390 | - | - |
| 5 | BOLT, MACH, GALV., 1/2"X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 10 | 14 | 390 | - | - |
| 6 | BOLT, MACH, GALV., 1/2" X 8", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 2 | 390 | - | - |
| 7 | BOLT, MACH, GALV., 5/8" X (LENGTH AS REQ'D), 1 DOUBLE COIL SPRING WASHER | - | 1 | 390 | - | - |
| 8 | BRACE, FLAT, CROSSARM, 28" | 2 | - | - | S164192 | - |
| 9 | BOLT, MACH, GALV., 3/8" X 4 1/2", 1 RD & 1 SPRING WASHER | 2 | - | 390 | - | - |
| 10 | BOLT, MACH, GALV., 1/2" X 5", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | - | 390 | - | - |
| 11 | BOLT, SPACE, GALV., 5/8" X (LENGTH AS REQ'D), 2 ROUND, 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS & 1 NUT | 2 | - | 390 | - | - |
| 12 | BOLT, MACH, GALV., 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER | 1 | 1 | 390 | - | - |
| 13 | BOLT, SPACE, GALV., 5/8" X (LENGTH AS REQ'D), 2 ROUND, 2 SQUARE, 2 DOUBLE COIL SPRING WASHERS & 1 NUT | - | 3 | 390 | - | - |
| 14 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | | 783-785 | - | - |
| 15 | SUSPENSION, CLEVIS, 12KV | 6 | 6 | 750 | - | - |
| 16 | CLAMP, STRAIGHT LINE, DEADEND | 6 | 6 | 739 | - | - |
| 17 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV. | 2 | 2 | - | S647648 | - |
| | | - | - | - | S492224 | - |
| 18 | FUSE | 3 | 3 | 1207 | - | - |
| 19 | BOLT, MACH, GALV., 3/8" X 2", 2 ROUND & 1 LOCK WASHER | 4 | 4 | 390 | - | - |
| 20 | SWITCH, DISCONNECT, UNDERARM, 27KV, 900A (I) | 3 | 3 | - | S706680 (II) | D900UA |
| | | - | - | - | S706682 (III) | E900UA |
| 21 | WIRE, BARE SOLID ANNEALED COPPER, #8 | 24" | 26" | - | S812928 | - |
| 22 | STAPLES, FENCE, GALV., 1 1/4" | AS REQ'D | | - | S678528 | - |
| 23 | WIRE, JUMPER, COVERED STRANDED CU OR AL, (SIZE AS REQ'D) | 28'-0" | - | 711 | - | - |
| 24 | WIRE, JUMPER, COVERED STRANDED CU, #6 OR #2 | 30'-0" | 36'-0" | - | - | - |
| | | 30'-0" | 36'-0" | - | - | - |
| 25 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) | 6 | 6 | 784 | - | - |
| 26 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | 3 | - | S166070 | - |
| 27 | CUTOUT BODY, 12KV, AND FUSE HOLDER (100A OR 200A) | 3 | 3 | 1212 | - | - |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | TABLE UPDATE | - | DEC | JS | CZH | 01/14/2020 | F | | | | | | |
| B | REVISION | - | - | PIA | VCR | 03/01/2002 | E | MOVED TO FMO | AMP | JA | MRF | FRC | 06/12/2023 |
| A | REVISION | - | - | PIA | CMK | 01/01/1998 | D | TABLE UPDATE | EDM | DEC | JES | CZH | 12/12/2021 |

**NOTES:**

(I) SWITCH, DISCONNECT, 14.4KV, 600A, (S707008, DU: D600) MOVED TO FMO.

(II) REQUIRED IN CONTAMINATION DISTRICT 1 AND PREFERRED IN COASTAL DISTRICTS (OC, NC, BC, CM). (e)

(III) PREFERRED FOR INLAND DISTRICTS (NE, RA, EA, ME).

**REFERENCE:**

(a) POLE STEPPING, SEE OH363.

(b) BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED IN OH287.

(c) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES, SEE OH208.

(d) DISCONNECT SWITCH INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR, SEE OH1222.

(e) CONTAMINATION DISTRICTS, SEE OH287.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | TABLE UPDATE | - | DEC | JS | CZH | 01/14/2020 | F | | | | | | |
| B | REVISION | - | - | PIA | VCR | 03/01/2002 | E | MOVED TO FMO | AMP | JA | MRF | FRC | 06/12/2023 |
| A | REVISION | - | - | PIA | CMK | 01/01/1998 | D | TABLE UPDATE | EDM | DEC | JES | CZH | 12/12/2021 |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SHEET 4 OF 4

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM MOUNTED PARALLEL FUSE AND HOOKSTICK SWITCH

FMO OH1242.4

# OH1243 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/06/2023:** MOVED TO FMO

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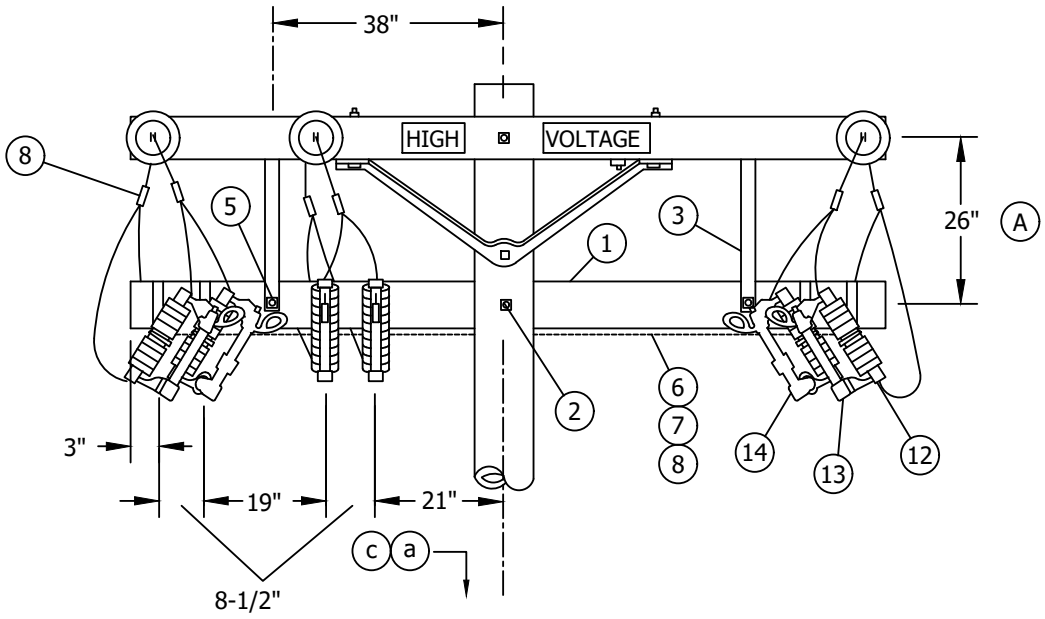
| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | | F | | | | | | |
| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | EDM | MRF | MRF | KRG | 04/06/2023 | D | | | | | | |

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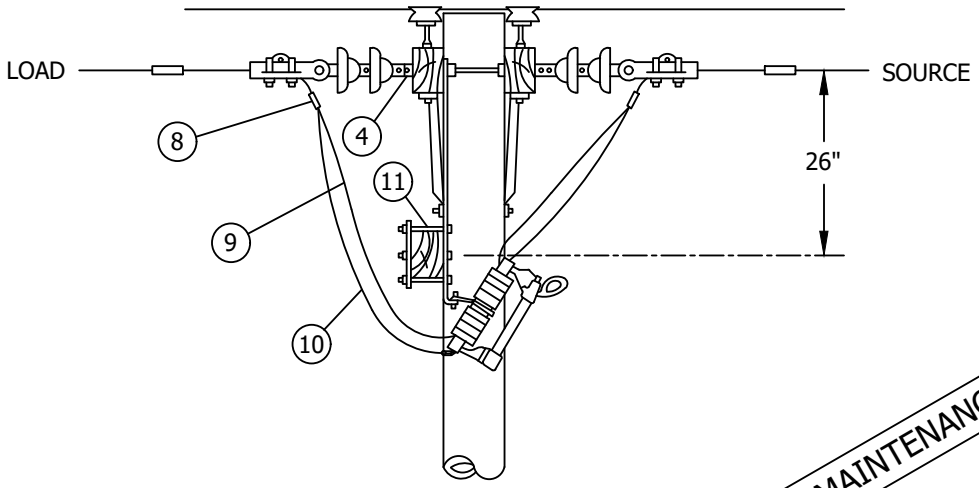
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM MOUNTED PARALLEL FUSED AND SOILD BLADE CUTOUTS

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD FOR A FUSED AND SOLID BLADE CUTOUT IN PARALLEL TO BE USED WITH #3/0 ACSR OR #1/0 COPPER AND SMALLER CONDUCTORS.




| OVERHEAD MACRO UNITS |
|---|
| 6C0-XA |




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| C | MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 02/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | RDJ | 01/01/1993 | D | | | | | | |

## INSTALLATION:

(A) IF ADDITIONAL SPACE IS REQUIRED BELOW THE CUTOUT ARM, THE SEPARATION BETWEEN THE LINE ARM AND CUTOUT ARM MAY BE REDUCED TO 12" WITH THE USE OF SPACE BOLTS.

B. SECTIONALIZING FUSES AND A STATION ARE NOT ALLOWED ON THE SAME POLE. A DEVIATION REQUEST WILL NOT BE APPROVED FOR THE THIS CONSTRUCTION.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | FIBERGLASS CROSSARM, 3 3/4" X 5 3/4" X 10'-0" | 1 | - | S294128 |
| 2 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 1 | 392 | - |
| 3 | - | - | - | |
| 4 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND AND 1 SPRING WASHER | 2 | 392 | - |
| 5 | BOLT, MACH, GALV, 1/2"X 5", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | - |
| 6 | WIRE, BARE SOLID ANNEALED COPPER, #8 | 12' | - | S812928 |
| 7 | STAPLES, FENCE, GALV, 1 1/4" | AS REQ'D | - | S678528 |
| 8 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783-787 | - |
| 9 | WIRE, JUMPER, BARE STRANDED CU, #1/0 (TO SOLID BLADE CUTOUT) | 24' | - | S813568 |
| 10 | WIRE, JUMPER, BARE STRANDED CU, #6 OR #2 (TO FUSED CUTOUT) | 18' | - | S813536 |
| | | 18' | - | S813664 |
| 11 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 6 | - | S166070 |
| 12 | CUTOUT BODY, 12KV, AND FUSE HOLDER (100A OR 200A) | 3 | 1212 | - |
| 13 | FUSE | 3 | 1207 | - |
| 14 | CUTOUT BODY, 12KV, WITH SOLID BLADE, 300A | 3 | 1212 | - |

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## NOTES:

I. DURING NORMAL OPERATION, SOLID BLADES MUST BE REMOVED FROM CUTOUTS AND SECURELY ATTACHED TO POLE.

## REFERENCE:

(a) POLE STEPPING - SEE STANDARD 363.

b. BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON STANDARD 287.

(c) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE. RESTORER POLES. (SEE STD. 208.3 ITEM 12)

d. FIBERGLASS CROSSARM - SEE STANDARD 379

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | MOVED TO FMO | EDM | MRF | MRF | KRG | 04/06/2023 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 02/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | RDJ | 01/01/1993 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM MOUNTED PARALLEL FUSED AND SOILD BLADE CUTOUTS

FMO OH1243.2

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superceded by their current version found inside the Overhead Construction Standard Manual.

**2/20/2019:** Install S706670 in place of old style Cut Out.

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|---|---|---|---|---|---|---|---|---|---|---|---|
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| B | EDITORIAL CHANGES | GLW | JES | CZH | 2/20/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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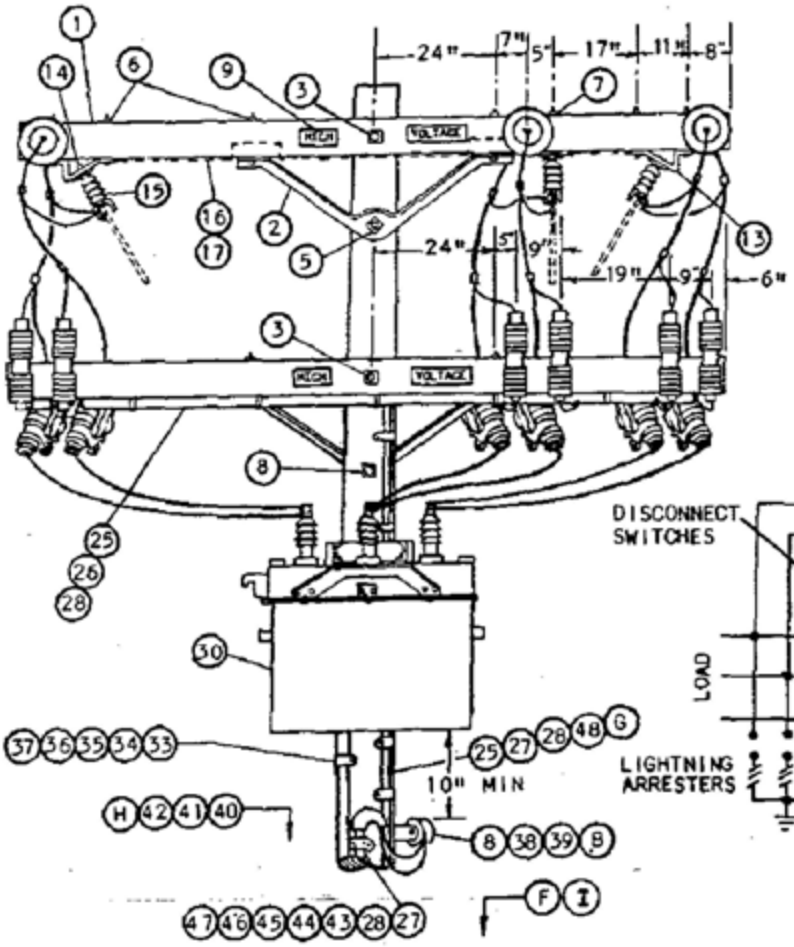
SHEET 1 OF 1

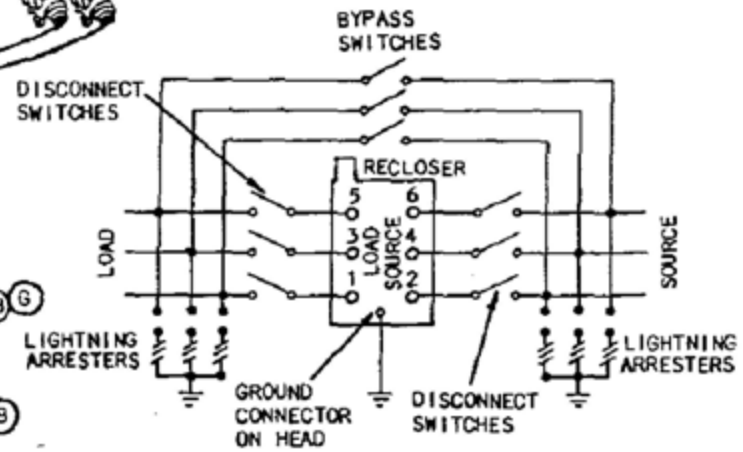
SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

SERVICE RESTORER WITH CUTOUT DISCONNECT

FMO OH 1270

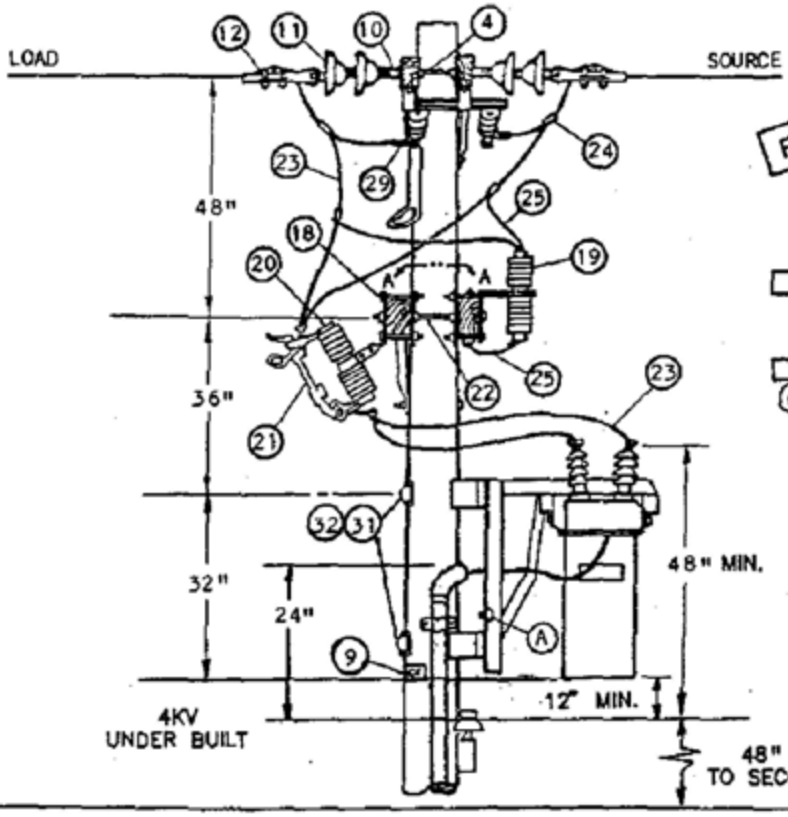
**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A DISTRIBUTION SERVICE RESTORER WHICH MAY BE USED WITH #3/0 ACSR OR #1/0 COPPER AND SMALLER CONDUCTORS.

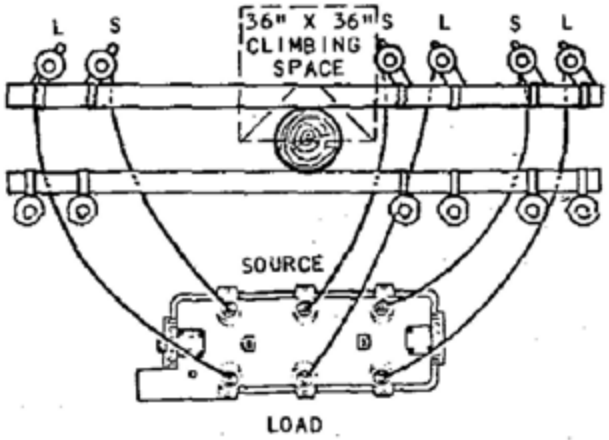



SCHEMATIC DIAGRAM

FOR FIELD MAINTENANCE ONLY




SECTION VIEW A-A

| | | |
|---|---|---|
| 1299.701<br>SUPERSEDES<br>1270.1 (1-1-90) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER WITH CUTOUT DISCONNECT | DATE 1-1-90<br>APPD PHA / DTC |

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 12' - 0" | 4 | - | 294160 |
| 2 | BRACE, 4', ANGLE, GALV | 3 | - | 164032 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHERS (E) | 2 | 392 | - |
| 4 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 2 SQUARE, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (E) | 3 | 392 | - |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 6 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 14 | 392 | - |
| 7 | BOLT, MACH, GALV, 1/2" X 8", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 2 | 392 | - |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 2 | 392 | - |
| 9 | SIGN, HIGH VOLTAGE & (E)<br>9 ROOFING NAILS, GALV (E) | 5<br>- | -<br>- | 647648<br>492224 |
| 10 | CLEVIS, DEAD-END, 5/8", BOLT STEEL (CLOSED TYPE) | 6 | - | 235712 |
| 11 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 12 | - | 431616 |
| 12 | CLAMP, STRAIGHT LINE, D.E. | 6 | 741-743 | - |
| 13 | BRACKET, DISCONNECT, ANGLE MOUNTING | 4 | - | 166542 |
| 14 | BOLT, MACH, GALV, 3/8" X 2", 2 ROUND & 1 LOCK WASHER (E) | 4 | 392 | - |
| 15 | SWITCH, DISCONNECT, 14.4KV, 600A | 3 | - | 707008 |
| 16 | WIRE, BARE SOLID ANNEALED COPPER, #8 | 30' | - | 812928 |
| 17 | STAPLES, FENCE, GALV, 1 1/4" (E) | AS REQ'D | - | 678528 |
| 18 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 12 | - | 166070 |
| 19 | ARRESTER, LIGHTNING, 12KV | 6 | - | 113248 |
| 20 | CUTOUT BODY, 12KV | 6 | 1212 | 297956 |
| 21 | SOLID BLADE, 300A, 12KV CUTOUT | 6 | 1212 | 138850 |
| 22 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (E) | 2 | 392 | - |
| 23 | WIRE, BARE STRANDED COPPER, 1/0 | 75' | - | 813568 |
| 24 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-787 | - |
| 25 | WIRE, BARE STRANDED COPPER, #4 | 105' | - | 813760 |
| 26 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" X 10', AND (E)<br>STRAPS, PIPE, GALV, 1" AND 2-1 3/4" ROOFING NAILS (E) | 1<br>AS REQ'D | -<br>- | 251200<br>697792 |
| 27 | CONDUIT, PVC, TYPE 2, SCHEDULE 80, 3/4" X 10' (E) | 3 | - | 251520 |
| 28 | STRAPS, PIPE, GALV, 3/4" AND (E)<br>2 - 6D NAILS, GALV (E) | AS REQ'D<br>AS REQ'D | -<br>- | 697888<br>491552 |
| 29 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) (E) | 6 | 794/795 | - |
| 30 | RECLOSER, MCGRAW-EDISON, 560A, TYPE WE (INCLUDING BRACKET) (C) | 1 | - | 572110 |

FOR FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC STANDARDS

DATE 1-1-90
APPD PA/DTG

# SERVICE RESTORER WITH CUTOUT DISCONNECT

1299.702
SUPERSEDES
1270.2 (1-1-90)

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 31 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVE RIBBED AND 1 DOUBLE COIL SPRING WASHER (E) | 2 | 392 | - |
| 32 | COVER, BOLT, PLASTIC AND (E)<br>6 10-D NAILS, GALV (E) | 2<br>- | -<br>- | 285696<br>491392 |
| 33 | CONTROL CABLE FOR McGRAW-EDISON RECLOSER (H) | 1 | - | 192010 |
| 34 | CONDUIT, PVC, SCHEDULE 40, 2" X 10' (E) | 2 | - | 251296 |
| 35 | ELBOW, PVC, SCHEDULE 40, 2" (E) | 2 | - | 321792 |
| 36 | ELBOW, PVC, SCHEDULE 40, 2", 12" RADIUS (E) | 1 | - | 321816 |
| 37 | STRAP, PIPE, GALV, 2" AND (E)<br>2 - 10D NAILS, GALV, (E) | AS REQ'D<br>AS REQ'D | -<br>- | 697856<br>491392 |
| 38 | BRACKET, SERVICE INSULATOR | 1 | - | 166128 |
| 39 | WIRE, COPPER #8, 600 VOLT, DUPLEX (B) | AS REQ'D | - | 196432 |
| 40 | CONTROLLER, RECLOSER, McGRAW-EDISON (H) | 1 | - | 273928 |
| 41 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | - | 621568 |
| 42 | PADLOCK, CORBIN #27 (FF KEY) (E) | 1 | - | 514848 |
| 43 | COVER, PVC, DRIP LOOP, 3/4" (E) | 1 | - | 287248 |
| 44 | COUPLING, PVC, 3/4" (E) | 2 | - | 280416 |
| 45 | TERMINAL, ADAPTOR, PVC, 3/4" | 1 | - | 102754 |
| 46 | ELBOW, 90 , PULLING, PVC, 3/4" (E) | 2 | - | - |
| 47 | NIPPLE, PIPE SCREW, GALV, 3/4" X 1" | 1 | - | - |
| 48 | UNIT, GROUND, COMPLETE | 1 | - | 603136 |

INSTALLATION:

(A) CONNECT RECLOSER RACK GROUND LEAD TO LIGHTNING ARRESTER GROUND.

(B) RECLOSER CONTROL REQUIRES 120 VOLT SUPPLY, PREFERABLY COMING FROM THE SOURCE SIDE.

(C) THE 400A, TYPE RXE RECLOSER (S/N 572100) IS NO LONGER PURCHASED.

(E) EXEMPT MATERIAL.

FOR FIELD MAINTENANCE ONLY

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

(G) GROUNDING METHODS – SEE STANDARD 1002. (INSTALL GROUND MOULDING IN SUCH A MANNER AS NOT TO INTERFERE WITH A LADDER WHEN PLACED AGAINST THE POLE).

(H) CONTROL INSTALLATION TO BE DONE BY SUBSTATION CONSTRUCTION AND MAINTENANCE AND IS TO BE INSTALLED A MINIMUM OF 13'-6" ABOVE GROUND LEVEL.

(I) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

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| 1299.703<br>SUPERSEDES<br>1270.3 (1-1-90) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER WITH CUTOUT DISCONNECT | DATE 1-1-90<br>APPD PJA/DTS |
|---|---|---|

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| REV | CHANGE | BY | DSGN | APPV | DATE | REV | CHANGE | BY | DSGN | APPV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

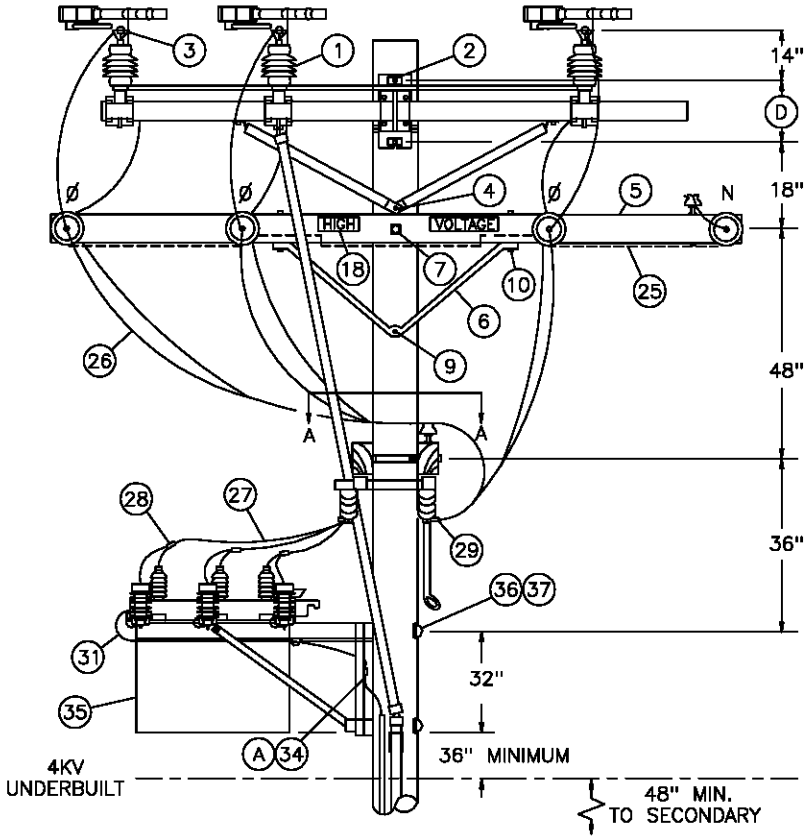
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

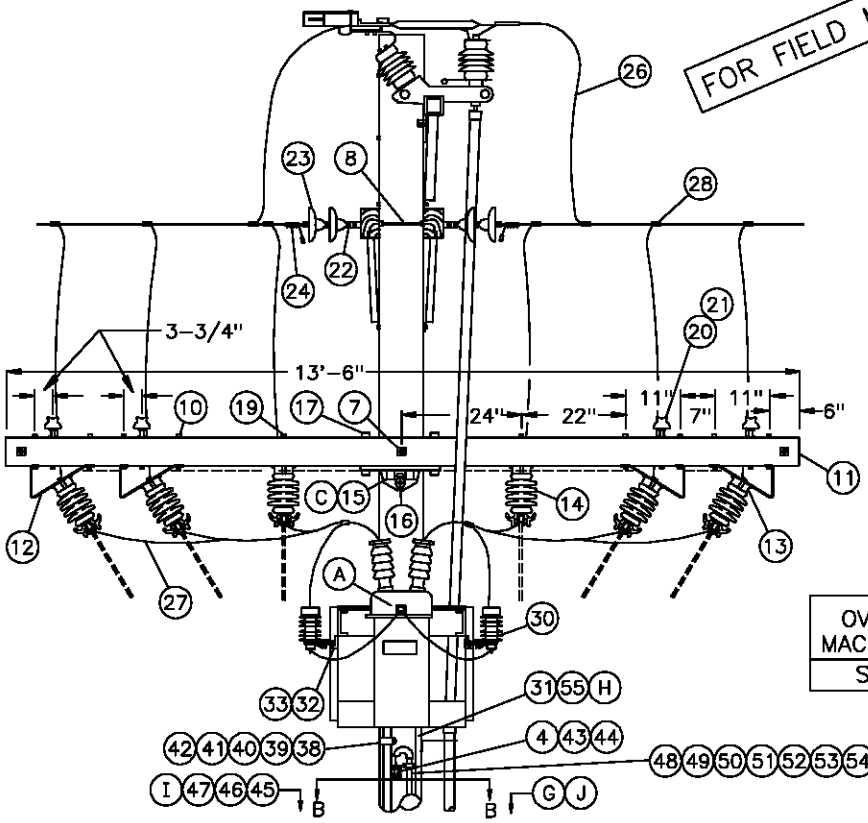
SERVICE RESTORER
WITH HOOK STICK SWITCH DISCONNECT

FMO
OH 1271

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A DISTRIBUTION SERVICE RESTORER TO BE USED WITH ALL CONDUCTOR SIZES.




FOR FIELD MAINTENANCE ONLY

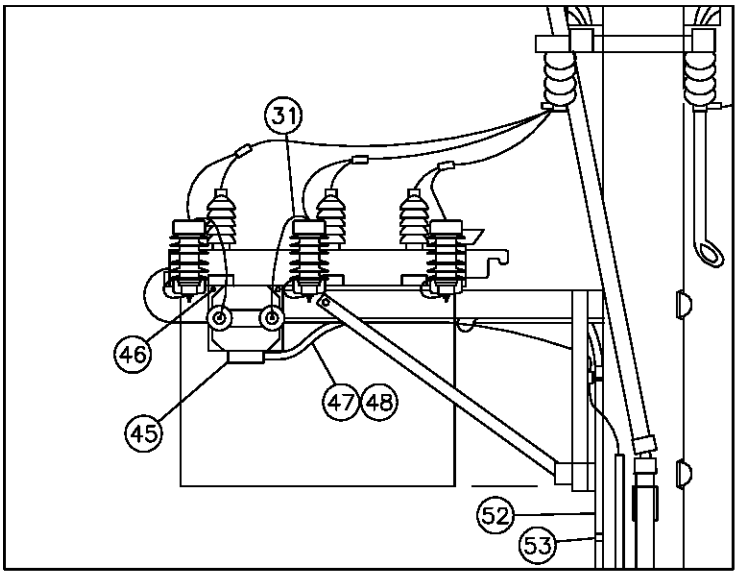



| OVERHEAD MACRO UNITS |
| --- |
| SR560S |

| 1299.707<br>SUPERSEDES<br>1271.1 (1-1-98) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER-BUCK POSITION<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY-PASS | DATE 1-1-98<br>APPD PSA / CMK |
| --- | --- | --- |

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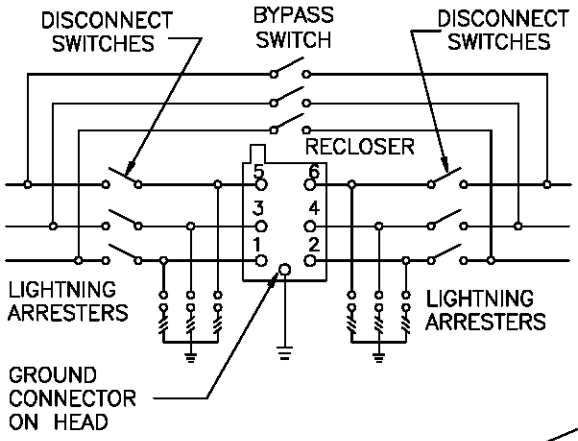
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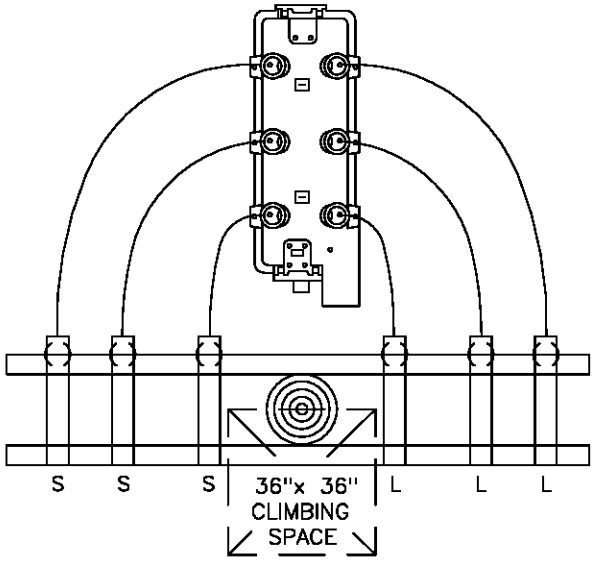

OVERHEAD MACRO UNIT
SRSEC

POTENTIAL TRANSFORMER–SECONDARY POWER SOURCE (B)

STREET SIDE (PREFERRED)

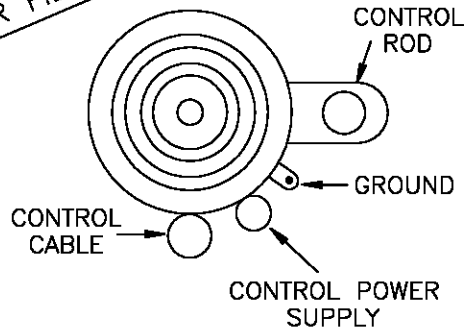



SCHEMATIC DIAGRAM




SECTION VIEW A–A

FOR FIELD MAINTENANCE ONLY




SECTION VIEW B–B

| | | |
|---|---|---|
| DATE 1–1–98<br>APPD PSA / CMK | SDG&E ELECTRIC STANDARDS<br>BUCK POSITION SERVICE RESTORER<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY–PASS | 1299.708<br>SUPERSEDES<br>1271.2 (1–1–98) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STANDARD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | SWITCH, GANG–OPERATED, 15KV, 600AMP,WITH DUOGAP INTERRUPTERS, INCLUDING 40' OF CONTROL ROD | 1 | – | 709250 | CHANCE |
| 2 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 3 | LUG, EYEBOLT TERMINAL, BRONZE | 12 | – | 471296 | – |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 2 | 392 | – | – |
| 5 | CROSSARM, 3 3/4" X 5 3/4" X 12' – 0" | 2 | – | 294160 | 6– |
| 6 | BRACE, ANGLE, CROSSARM, 4' – 0" | 2 | 392 | 164032 | 4HUB |
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 2 | 392 | – | – |
| 8 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE, 2 ROUND & 2 DOUBLE COIL SPRING WASHERS | 6 | 392 | – | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DOUBLE COIL SPRING WASHERS | 1 | 392 | – | – |
| 10 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 20 | 392 | – | – |
| 11 | CROSSARM 3–3/4" X 5–3/4" X 13'–6" | 2 | – | 294368 | 13SWI– |
| 12 | BRACKET, DISCONNECT, ANGLE MOUNTING | 8 | – | 166542 | ABRKT |
| 13 | BOLT, MACH, GALV, 3/8" X 2", 2 ROUND & 1 LOCK WASHER | 8 | 392 | – | – |
| 14 | SWITCH, DISCONNECT, 14.4KV, 600A | 6 | – | 707008 | D600 |
| 15 | GAIN, CROSSARM, BRACELESS Ⓒ | 1 | – | 369598 | BCGAIN |
| 16 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 1 | 392 | – | – |
| 17 | BOLT, MACH, GALV, 5/8" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 18 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | 2 | – | 647648 | HV |
| | | AS REQ'D | – | 492224 | – |
| 19 | BOLT, MACH, 1/2" X 9", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 4 | 392 | – | – |
| 20 | PIN, INSULATOR, STRAIGHT, 12KV 1" OR 1–3/8" THREAD | 5 | 396 | – | – |
| 21 | INSULATOR, LINE, 12KV | 5 | 750 | – | – |
| 22 | CLEVIS, DEAD–END, 5/8", BOLT STEEL (CLOSED TYPE) | 8 | – | 235712 | – |
| 23 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 14 | – | 431616 | 6DE |
| 24 | CLAMP, STRAIGHT LINE, D.E. | 8 | 739–743 | – | – |
| 25 | WIRE, #8, BARE SOLID ANNEALED COPPER, AND | 30' 1.5# | – | 812928 | BOND8 |
| | STAPLES, FENCE, GALV, 1 1/4" | AS REQ'D | – | 678528 | – |
| 26 | WIRE, BARE STRANDED CU OR AL (SIZE AS REQ'D) | 90' | 711–715 | – | – |
| 27 | WIRE, BARE STRANDED COPPER, (SIZE AS REQ'D WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY, OR GREATER) | 25' | 715 | – | – |
| 28 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – | – |
| 29 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) | 12 | 794–795 | – | – |
| 30 | ARRESTER, LIGHTNING, 12KV | 6 | – | 113248 | LA12 |
| 31 | WIRE, #4, BARE STRANDED COPPER | 100' 13# | – | 813760 | Ⓔ |

FOR FIELD MAINTENANCE ONLY

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| 1299.709 SUPERSEDES 1271.3 (1–1–98) | SDG&E ELECTRIC STANDARDS<br>BUCK POSITION SERVICE RESTORER<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY–PASS | DATE 1–1–98<br>APPD PSA / CMC |
|---|---|---|

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 32 | Z–BRACKET, GALV, 1–5/8" | 6 | – | 703168 | – |
| 33 | BOLT, MACH, GALV, 1/2" X 2", 1 ROUND & 1 LOCK WASHER | 12 | 392 | – | – |
| 34 | CONNECTOR, SPLIT BOLT, #2 | 2 | – | 269536 | – |
| 35 | RECLOSER, MCGRAW–EDISON, 560A, TYPE WE (INCLUDING BRACKET) | 1 | – | 572110 | SR560 |
| 36 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 37 | COVER, BOLT, PLASTIC & 6 – 10D NAILS, GALV | 2 | – | 285696 | – |
| | | AS REQ'D | – | 491392 | – |
| 38 | CONTROL CABLE, FOR MCGRAW–EDISON RECLOSER, 35' (I) | 1 | – | 192010 | (E) |
| 39 | CONDUIT, PVC, SCHED 40, 2" X 10' (I) | 2 | – | 251296 | (E) |
| 40 | ELBOW, PVC, SCHED 40, 2", 12" RADIUS (I) | 1 | – | 321816 | (E) |
| 41 | ELBOW, PVC, SCHED 40, 2" (I) | 2 | – | – | – |
| 42 | STRAPS, PIPE, GALV, 2" & 2 – 10 D NAILS, GALV (I) | AS REQ'D | – | 697856 | – |
| | | AS REQ'D | – | 491392 | – |
| 43 | BRACKET, SERVICE INSULATOR | 1 | – | 166128 | – |
| 44 | WIRE, COPPER, #8, 600 VOLT, DUPLEX (B) | AS REQ'D | – | 196432 | DX8C |
| 45 | POTENTIAL TRANSFORMER, 12000/120 VOLTS (B) | 1 | – | 762722 | SRPT |
| 46 | BOLT, MACH, GALV, 3/8" X 1–1/2", AND 1 LOCK WASHER (B) | 2 | – | 154144 | – |
| 47 | CONDUIT, 3/4", FLEXABLE STEEL (B) | 6' | – | 250112 | – |
| 48 | WIRE, THHN, #12, WHITE (B) | 40' | – | 808704 | THW12W |
| | WIRE, THHN, #12, BLACK (B) | 40' | – | 808096 | THW12 |
| 49 | CONTROLLER, RECLOSER, COOPER, MODEL KME5 (I) | 1 | – | 273930 | C/RSTR |
| 50 | SCREW, LAG, GALV, 1/2" X 4" | 2 | – | 621568 | – |
| 51 | PADLOCK, SCHLAGE ELECTRIC SERIES | 1 | – | 514848 | (E) |
| 52 | CONDUIT, PVC, TYPE 2, SCHEDULE 80, 3/4" X 10' | 3 | – | 251520 | (E) |
| 53 | STRAPS, PIPE, GALV, 3/4" & 2 – 6D NAILS, GALV | AS REQ'D | – | 697888 | – |
| | | AS REQ'D | – | 491552 | – |
| 54 | COVER, PVC, DRIPLOOP, 3/4" | 1 | – | 287248 | (E) |
| 55 | COUPLING, PVC, 3/4" | 2 | – | 280416 | (E) |
| 56 | TERMINAL, ADAPTOR, PVC, 3/4" | 1 | – | 102754 | (E) |
| 57 | ELBOW, 90°, PULLING, PVC, 3/4" | 2 | – | – | – |
| 58 | NIPPLE, PIPE SCREW, GALV, 3/4" X 1" | 1 | – | – | – |
| 59 | UNIT, GROUND, COMPLETE | 1 | – | 603136 | (E) |

FOR FIELD MAINTENANCE ONLY

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| DATE 1–1–2000<br>APPD PSA/VCL | SDG&E ELECTRIC STANDARDS<br>BUCK POSITION SERVICE RESTORER<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY–PASS | 1299.710<br>SUPERSEDES<br>1271.4 (1–1–2000) |

INSTALLATION:

Ⓐ CONNECT GROUND LEAD TO RECLOSER MOUNTING FRAME. CONNECT LIGHTNING ARRESTER GROUND LEADS AND GROUND CONNECTOR ON HEAD TO RECLOSER MOUNTING FRAME.

Ⓑ RECLOSER CONTROL REQUIRES 120 VOLT SUPPLY, PREFERABLY COMING FROM THE SOURCE SIDE. IF IMPRACTICAL, POWER MAY ORIGINATE FROM THE LOAD SIDE.

NOTE: IF SECONDARY POWER SOURCE NOT AVAILABLE, OR WOULD BE DIFFICULT TO INSTALL, POWER MAY BE SUPPLIED BY MOUNTING POTENTIAL TRANSFORMER ON SERVICE RESTORER FRAME.

Ⓒ DO NOT CUT GAINS IN THE POLE WHEN INSTALLING THE HORIZONTALLY MOUNTED SECTIONALIZING SWITCH ARMS. THE GAIN HARDWARE USED HERE MAKE CUT GAINS UNNECESSARY.

Ⓓ USE THE FOLLOWING THRU-BOLT DRILLING DIMENSIONS: A.B. CHANCE=13-1/4", S&C=14".

Ⓔ THESE MATERIAL ITEMS INCLUDED WITH CONTROLLER ASSEMBLY UNIT "C/RSTR".

REFERENCE:

F. DETERMINE MIMIMUM POLE CLASS DUE TO SERVICE RESTORER MOUNTED IN THE BUCK POSITION-SEE STANDARD 347.

Ⓖ POLE STEPPING - SEE STANDARD 363.

Ⓗ GROUNDING METHODS - SEE STANDARD 1002.

Ⓘ CONTROL INSTALLATION TO BE DONE BY SUBSTATION CONSTRUCTION AND MAINTENANCE, AND, IS TO BE INSTALLED 14'-0" FROM GROUND LEVEL TO BOTTOM OF CONTROLLER WHEN LOCATED ON STREET SIDE OF POLE. CONTROLLER LOCATED ON PROPERTY SIDE OF POLE WILL BE MOUNTED NO MORE THAN 9' FROM GROUND LEVEL TO BOTTOM OF CONTROLLER. STANDARD CONTROL CABLE LENGTH IS 35'. HOWEVER, LONGER CABLE LENGTHS ARE AVAILABLE IF REQUIRED. INSTALLER WILL SUPPLY CONDUIT ITEMS 39 THROUGH 42.

Ⓙ REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

K. POLE TOP SWITCH INSTALLATION-SEE STANDARD 1230.

FOR FIELD MAINTENANCE ONLY

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| 1299.711<br>SUPERSEDES<br>1271.5 (1-1-98) | SDG&E ELECTRIC STANDARDS<br>BUCK POSITION SERVICE RESTORER<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY-PASS | DATE 1-1-98<br>APPD PSA / CMK |

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A DISTRIBUTION SERVICE RESTORER TO BE USED WITH ALL CONDUCTOR SIZES

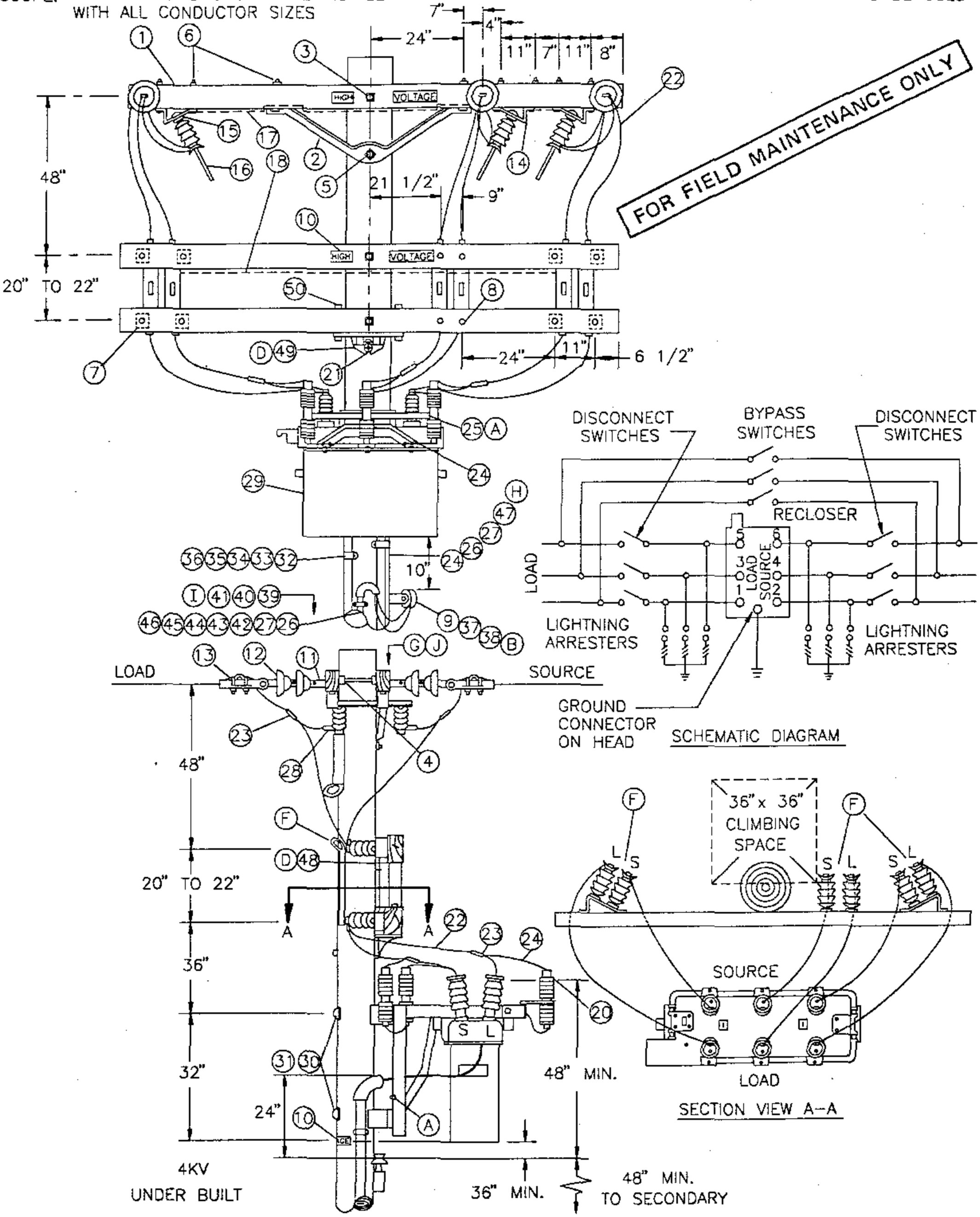



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| DATE 1-1-93<br>APPD PMA/BDG | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER<br>WITH HOOK STICK SWITCH DISCONNECT | 1299.704<br>SUPERSEDES<br>1271.1 (1-1-94) |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STANDARD OR PAGE NO. | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 12' – 0" | 5 | – | 294160 |
| 2 | BRACE, ANGLE, CROSSARM, 4' – 0" | 2 | – | 164032 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 3 | 392 | – |
| 4 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE, 2 ROUND & 2 DOUBLE COIL SPRING WASHERS | 3 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DOUBLE COIL SPRING WASHERS | 1 | 392 | – |
| 6 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 16 | 392 | – |
| 7 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 8 | 392 | – |
| 8 | BOLT, MACH, GALV, 3/8" X 6", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 4 | 392 | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 1 | 392 | – |
| 10 | SIGN, HIGH VOLTAGE & | 5 | – | 647648 |
| | 9 ROOFING NAILS, GALV | AS REQ'D | – | 492224 |
| 11 | CLEVIS, DEAD–END, 5/8", BOLT STEEL (CLOSED TYPE) | 6 | – | 235712 |
| 12 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 12 | – | 431616 |
| 13 | CLAMP, STRAIGHT LINE, D.E. | 6 | 741–743 | – |
| 14 | BRACKET, DISCONNECT, ANGLE MOUNTING | 10 | – | 166542 |
| 15 | BOLT, MACH, GALV, 3/8" X 2", 2 ROUND & 1 LOCK WASHER | 14 | 392 | – |
| 16 | SWITCH, DISCONNECT, 14.4KV, 600A | 9 | – | 707008 |
| 17 | WIRE, #8, BARE SOLID ANNEALED COPPER | 30' | – | 812928 |
| 18 | STAPLES, FENCE, GALV, 1 1/4" | AS REQ'D | – | 678528 |
| 19 | | | | |
| 20 | ARRESTER, LIGHTNING, 12KV | 6 | – | 113248 |
| 21 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 1 | 392 | – |
| 22 | WIRE, BARE STRANDED COPPER, (SIZE AS REQ'D WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY, OR GREATER) Ⓒ | 75' | 715 | – |
| 23 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – |
| 24 | WIRE, #4, BARE STRANDED COPPER | 100' | – | 813760 |
| 25 | CONNECTOR, SPLIT BOLT, #2 | 2 | – | 269536 |
| 26 | CONDUIT, PVC, TYPE 2, SCHEDULE 80, 3/4" X 10' | 3 | – | 251520 |
| 27 | STRAPS, PIPE, GALV, 3/4" & | AS REQ'D | – | 697888 |
| | 2 – 6D NAILS, GALV | AS REQ'D | – | 491552 |
| 28 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) | 6 | 794/795 | – |
| 29 | RECLOSER, MCGRAW–EDISON, 560A, TYPE WE (INCLUDING BRACKET) Ⓒ | 1 | – | 572110 |

FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| 1299.705<br>SUPERSEDES<br>1271.2 (1–1–94) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER<br>WITH HOOK STICK SWITCH DISCONNECT | DATE 1–1–90<br>APPD |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 30 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |
| 31 | COVER, BOLT, PLASTIC & | 2 | – | 285696 |
| | 6 – 10D NAILS, GALV | AS REQ'D | – | 491392 |
| 32 | CONTROL CABLE, FOR MCGRAW–EDISON RECLOSER (I) | 1 | – | 192010 |
| 33 | CONDUIT, PVC, SCHED 40, 2" X 10' (I) | 2 | – | 251296 |
| 34 | ELBOW, PVC, SCHED 40, 2", 12" RADIUS (I) | 1 | – | 321816 |
| 35 | ELBOW, PVC, SCHED 40, 2" (I) | 2 | – | – |
| 36 | STRAPS, PIPE, GALV, 2" & (I) | AS REQ'D | – | 697856 |
| | 2 – 10 D NAILS, GALV | AS REQ'D | – | 491392 |
| 37 | BRACKET, SERVICE INSULATOR | 1 | – | 166128 |
| 38 | WIRE, COPPER, #8, 600 VOLT, DUPLEX (B) | AS REQ'D | – | 196432 |
| 39 | CONTROLLER, RECLOSER, MCGRAW–EDISON (I) | 1 | – | 273928 |
| 40 | SCREW, LAG, GALV, 1/2" X 4" | 2 | – | 621568 |
| 41 | PADLOCK, CORBIN #27 (FF KEY) | 1 | – | 514848 |
| 42 | COVER, PVC, DRIPLOOP, 3/4" | 1 | – | 287248 |
| 43 | COUPLING, PVC, 3/4" | 2 | – | 280416 |
| 44 | TERMINAL, ADAPTOR, PVC, 3/4" | 1 | – | 102754 |
| 45 | ELBOW, 90°, PULLING, PVC, 3/4" | 2 | – | – |
| 46 | NIPPLE, PIPE SCREW, GALV, 3/4" X 1" | 1 | – | – |
| 47 | UNIT, GROUND, COMPLETE | 1 | – | 603136 |
| 48 | GAIN, CROSSARM (D) | 1 | – | 369596 |
| 49 | GAIN, CROSSARM, BRACELESS (D) | 1 | – | 369598 |
| 50 | BOLT, MACH, GALV, 5/8" X 7" 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |

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**INSTALLATION:**

(A) CONNECT GROUND LEAD TO RECLOSER MOUNTING FRAME. CONNECT LIGHTNING ARRESTER GROUND LEADS TO LIGHTNING ARRESTER MOUNTING BRACKETS. CONNECT GROUND CONNECTOR ON HEAD TO RECLOSER MOUNTING FRAME.

(B) RECLOSER CONTROL REQUIRES 120 VOLT SUPPLY, PREFERABLY COMING FROM THE SOURCE SIDE.

(C) THE 400A, TYPE RXE RECLOSER (S/N 572100) IS NO LONGER PURCHASED.

(D) DO NOT CUT GAINS IN THE POLE WHEN INSTALLING THE VERTICALLY MOUNTED SECTIONALIZING SWITCH ARMS. THE GAIN HARDWARE USED HERE MAKE CUT GAINS UNNECESSARY.

(F) IT IS NECESSARY TO CUT OFF INSIDE LOAD BREAK EARS ON EACH PAIR OF VERTICALLY MOUNTED DISCONNECT SWITCHES TO PREVENT PHYSICAL CONTACT.

**REFERENCE:**

(G) POLE STEPPING – SEE STANDARD 363.

(H) GROUNDING METHODS – SEE STANDARD 1002.

(I) CONTROL INSTALLATION TO BE DONE BY SUBSTATION CONSTRUCTION AND MAINTENANCE AND IS TO BE INSTALLED A MINIMUM OF 13'–6" ABOVE GROUND LEVEL. INSTALLER WILL SUPPLY CONDUIT ITEMS 33 THRU 36.

(J) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1–1–93<br>APPD | SERVICE RESTORER<br>WITH HOOK STICK SWITCH DISCONNECT | 1299.706<br>SUPERSEDES<br>1271.3 (1–1–94) |

# OH1273 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARDS MANUAL.

**REVISION HISTORY:**

**09/01/2023:** MOVED TO FMO

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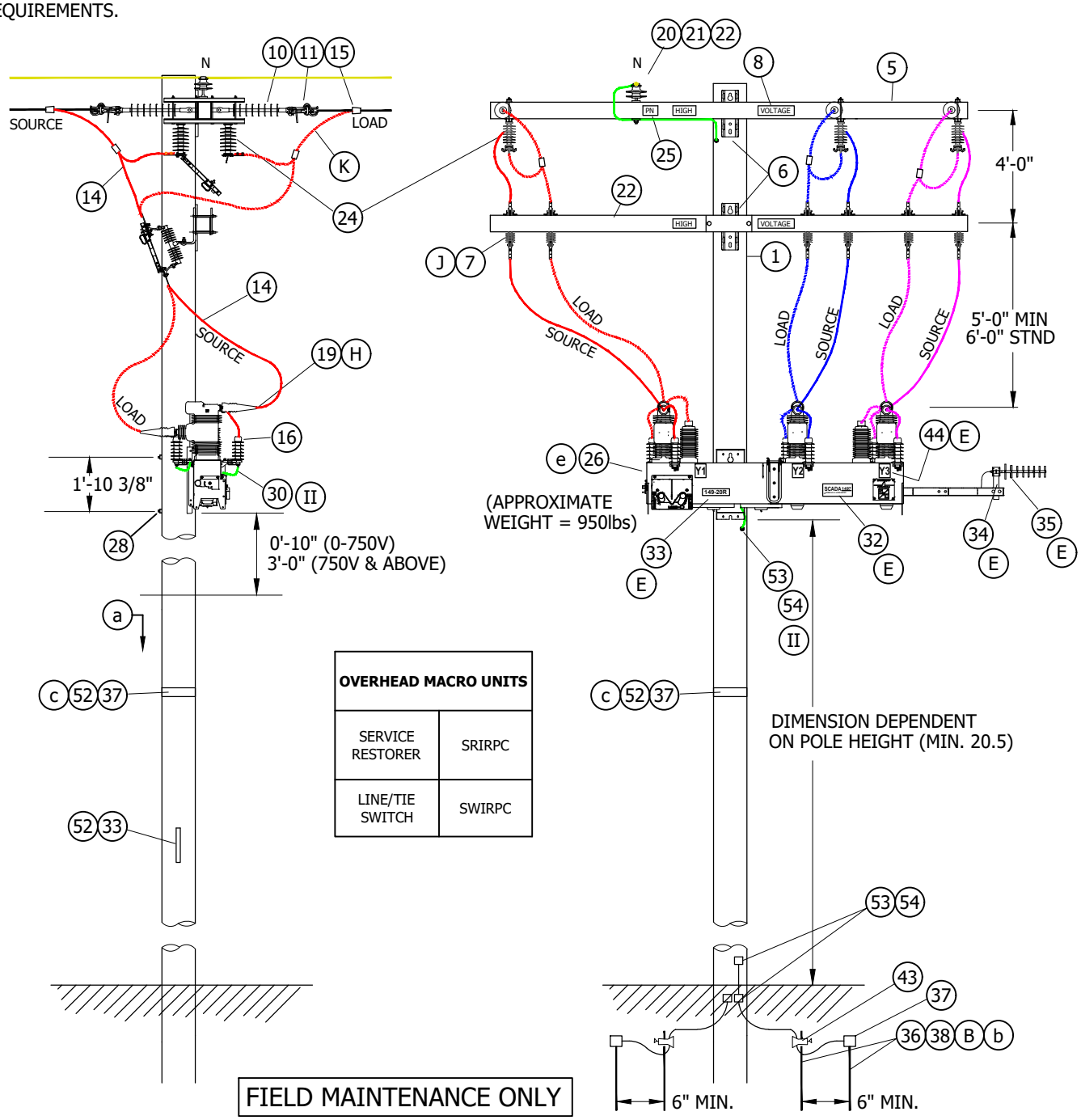
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| C | | | | | | | F | | | | | | |
| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | GLC | JIK | FRC | KRG | 09/01/2023 | D | | | | | | |

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF AN INTELLIRUPTER PULSECLOSER FROM S&C. IT CAN BE USED IN APPLICATIONS FOR A LINE, TIE, OR SERVICE RESTORER SWITCH.

**ATTENTION:**

* THIS INSTALLATION REQUIRES VEHICLE ACCESS.

** SUBMIT "SCADA TELECOMMUNICATION COORDINATION" FORM BEFORE DESIGN BEGINS TO DETERMINE COMMUNICATION REQUIREMENTS.




| OVERHEAD MACRO UNITS | |
|---|---|
| SERVICE RESTORER | SRIRPC |
| LINE/TIE SWITCH | SWIRPC |

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| B | DRAWING UPDATE | - | GW | JS | MDJ | 4/1/2018 | E | | | | | | |
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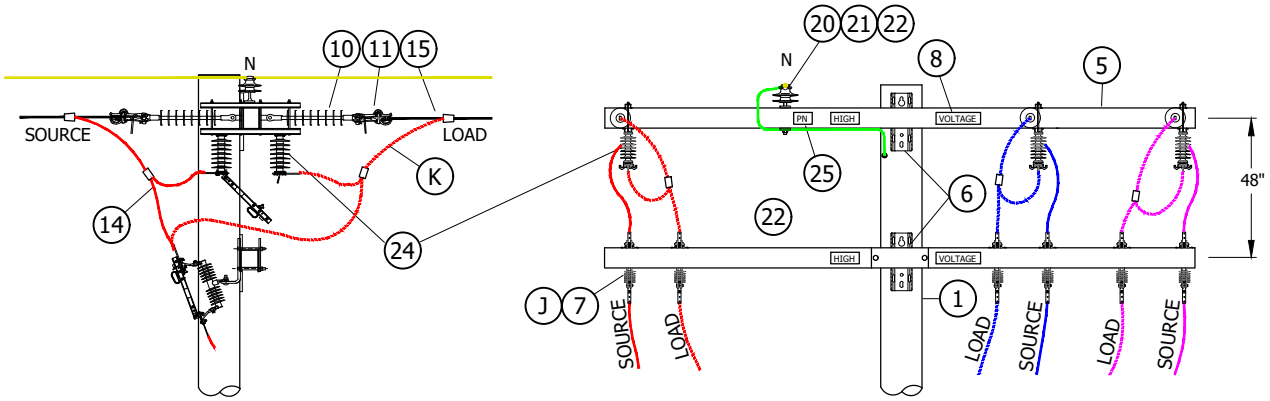
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS



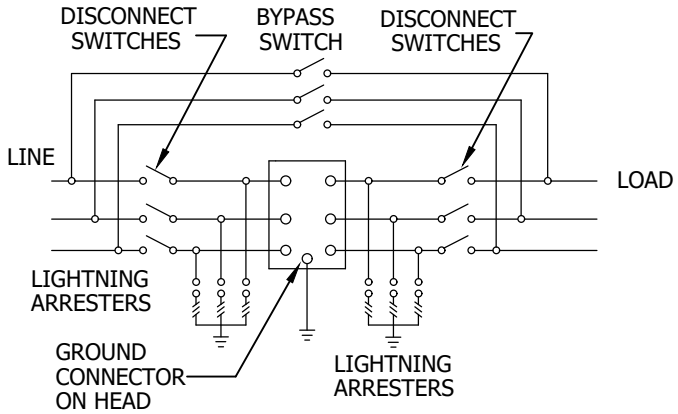
INTELLIRUPTER PULSECLOSER SWITCH

FMO OH1273.1

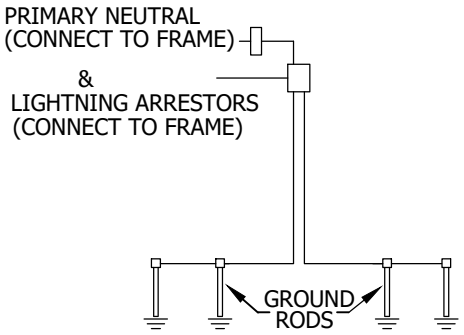
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**DETAIL 1**
DEADEND WIRE BYPASS SWITCH (F)
(WIRE SIZE 1/0 AND LARGER)




**DETAIL 2** (H)
SCHEMATIC DIAGRAM




**DETAIL 3**
GROUND WIRING DETAIL (A) (B)

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## INSTALLATION:

(A) CONNECT GROUND LEADS TO INTELLIRUPTER. CONNECT LIGHTNING ARRESTER GROUND LEADS TO GROUND CONNECTOR ON MOUNTING FRAME.

(B) GROUNDING NOTE 1 (FOR WOOD POLES): GROUND SWITCH MOUNTING BRACKET TO POLE GROUND. CONNECT PRIMARY NEUTRAL TO POLE GROUND IF PRESENT.
GROUND NOTE 2 (FOR STEEL POLES): INSTALL TWO SEPARATE GROUND RUNS FROM BASE OF SWITCH TO BASE OF POLE, IN ADJACENT POLE QUADRANTS. CONNECT EACH RUN TO SEPARATE GROUND RODS.

C. BUCK POSITIONS ALLOWED BY DEVIATION REQUEST ONLY.

D. SIX FOOT CLEARANCE TO SECONDARY OR COMMUNICATIONS PREFERRED FOR OPERATIONAL PURPOSES. FORTY-EIGHT MINIMUM REQUIRED PER G.O. 95.

(E) TO BE MADE BY KEARNY SCADA CREW.

(F) BY-PASS SWITCHES SHALL ALWAYS BE INSTALLED. THEY WILL ALLOW CREWS TO BY-PASS THE SWITCH FOR MAINTENANCE OR FAILURES. THIS IS TRUE FOR APPLICATIONS AS A SERVICE RESTORER (SR), LINE SWITCH, OR TIE SWITCH.

DETAIL 2 - FOR WIRE SIZE LESS THAN 1/0, USE UNDER THE ARM DISCONNECTS. MORE DISTANCE WILL BE REQUIRED BETWEEN THE LINE ARM AND SOURCE/LOAD DISCONNECT ARM. 12FT FIBERGLASS CROSS-ARMS SHALL BE USED IN THIS CONSTRUCTION TO AVOID THE NEED FOR METAL BRACING.

G. THE INTELLIRUPTER COMES WITH INTERNAL VOLTAGE SENSORS ON THE SOURCE AND LOAD SIDE.

(H) ORIENTATION OF THE SWITCH SHOULD BE SUCH THAT THE SOURCE FEEDS INTO THE UPPER BUSHING AND LOAD FEEDS OUT THE LOWER BUSHING.

(J) NEW INSTALLATIONS - LINE CREWS TO LEAVE INTELLIRUPTER BY-PASSED AND DE-ENERGIZED, WITH THE SOURCE & LOAD DISCONNECTS OPEN AND THE BY-PASS DISCONNECTS CLOSED. WHEN KEARNY HAS COMMISSIONED THE SITE FOR SERVICE THE SITE WILL BE PLACED IN ITS NORMAL CONFIGURATION.

(K) TAPPING OPTIONS: TAIL TAP, STIRRUP AND HOTLINE CLAMP, OR LINE TAP.

## BILL OF MATERIALS:

FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | POLE AS REQ'D IN TIER 2 & 3 | - | 354 | - | - |
| 5 | FIBERGLASS CROSSARM, DEADEND | AS REQ'D | - | - | - |
| 6 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D) 2 SQUARE, CURVED & 2 COIL SPRING WASHERS | AS REQ'D | 392 | - | - |
| 7 | SWITCH, DISCONNECT, 27KVA 900A | 6 | - | S706670 | PS900 |
| | BRACKET, MOUNTING, CUTOUT | 6 | 397 | S166070 | CO/B |
| 8 | SIGN, HIGH VOLTAGE STICKER | AS REQ'D | - | S647650 | - |
| 10 | INSULATOR, SUSPENSION, 35KV, LONG DEADEND | AS REQ'D | - | S428958 | LONGDE |
| 11 | CLAMP, STRAIGHT LINE, D.E. | AS REQ'D | 739-743 | - | - |
| 14 | WIRE, POLY INSULATED COPPER, (SIZE AS REQ'D WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY, OR GREATER | AS REQ'D | 716 | - | - |
| 15 | CONNECTOR, WIRE, WEDGE (SIZE AS REQ'D) | AS REQ'D | 784 | - | - |
| 16 | TAPE, SELF-FUSING, 1 IN X 36 FT, GRAY | AS REQ'D | 1274.8 | S721736 (X) | - |
| | TAPE, SELF-FUSING, 2 IN X 36 FT, GRAY | | | S721738 (X) | - |

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## BILL OF MATERIALS (CONT'D):

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 19 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) | AS REQ'D | 794-795 | - | - |
| 20 | INSULATOR, PIN, 12KV, (SIZE AS REQ'D) | AS REQ'D | 396 | - | - |
| 21 | INSULATOR, LINE 12KV | AS REQ'D | 750 | - | - |
| 22 | FIBERGLASS, CROSSARM, TANGENT | AS REQ'D | 379 | - | - |
| 23 | #4 4/7 COVERED CU STRANDED | 25FT | - | S815044 | POLY4J |
| 24 | SWITCH, DISCONNECT, UNDERARM, 900A (F) | 3 | - | S706680 | D900UA |
| 25 | SIGN, PN DECAL | 2 | 208 | S648002 | PN-D |
| 26 | 15.5KV, 630A, W/BRACKET, LIGHTNING ARRESTERS, WILDLIFE (E) (e) | 1 | - | S709010 | IRPCSW IRPSCR |
| | TRANSCEIVER, MDS RADIO (9710) | AS REQ'D | - | S749500 | SOTRAN |
| | TRANSCEIVER, MDS RADIO SPREADSPECTRUM (9810) | AS REQ'D | - | S749504 | SSTRAN |
| 28 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 COIL SPRING WASHER | 4 | 392 | - | - |
| 30 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | - | S698754 | LAGND |
| 31 | POLY COVERED 4/7 STRAND COPPER | AS REQ'D | - | S815044 | POLY4J |
| 32 | DECAL "SCADA" "INFORM S.C.O. UPON ENTRY" | 1 | 207 | S301934 | - |
| 33 | TAG, SWITCH NUMBER (J) | 2 | 204 | - | - |
| 34 | NIPPLE, PIPE, 2" X 7", ALUMINUM | 1 | - | - | - |
| 35 | YAGI, ANTENNA, SCADA, COMMUNICATION, BROADBAND AND CONNECTORS | 1 | - | S109570 | ANT |
| 36 | GROUND ROD, 5/8" X 8', COPPERWELD | 4 | - | S603074 (X) | - |
| 37 | VISIBILITY STRIP (c) | 1 | 208 | S304064 | - |
| 43 | GROUND ROD, CLAMP | 2 | - | S230018 (X) | - |
| 44 | DECALS, "X", WHITE ON BLACK REFLECTIVE | 12 | - | - | - |
| 52 | SCREW, SELF-TAPPING, #10-16 X 3/4" | AS REQ'D | - | S618086 (X) | - |
| 53 | BLIND NUT, 1/2" | AS REQ'D | - | S503460 (X) | - |
| 54 | CONNECTOR, SPLIT BOLT, BRONZE | AS REQ'D | 4505 | S262560 | - |

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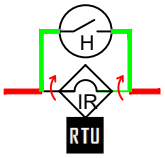
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| A | REVISION | - | - | PIA | MC | 5/29/2009 | D | MOVED TO FMO | GLC | JIK | FRC | KRG | 09/01/2023 |

**NOTES:**

I. THE INTELLIRUPTER MACRO UNITS, "SRIRPC" AND "SWIRPC", WILL GENERATE TWO SWITCH NUMBERS. THE HIGHER NUMBER SHALL BE ASSIGNED TO THE INTELLIRUPTER AND THE LOWER NUMBER TO THE BY-PASS DISCONNECT. WHEN INSTALLED AS A SERVICE RESTORER (MACRO UNIT "SRIRPC"), THE "R" DESIGNATION WILL BE ASSIGNED TO THE HIGHER NUMBER. BE SURE THE MAPS ARE COMPOSED IN THIS MANNER AND THE SITE IS PROPERLY IDENTIFIED.

FOR EXAMPLE:

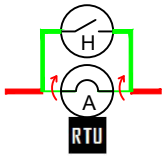
SERVICE RESTORER (SRIRPC)




SCADA 1000
123-45R
123-44 OPEN

(INTELLIRUPTER)
(BY-PASS DISCONNECTS)

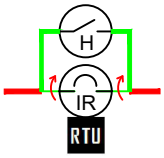
TIE SWITCH (SWIRPC)




SCADA 1000
123-T2-456
123-T1-456 OPEN

(INTELLIRUPTER)
(BY-PASS DISCONNECTS)

LINE SWITCH (SWIRPC)




SCADA 1000
123-45
123-44 OPEN

(INTELLIRUPTER)
(BY-PASS DISCONNECTS)

(II) INSTALL GROUND FROM BOTTOM BOLT OF LIGHTNING ARRESTER TO ARRESTER MOUNTING BOLT. ALL GROUND FROM LIGHTNING ARRESTER ARE TO BE INTENTIONALLY GROUNDED TO POLE.

(X) THIS ITEM IS EXEMPT.

**REFERENCES:**

(a) POLE STEPPING - SEE STANDARD 363.

(b) GROUNDING METHODS, SEE STANDARD 1002.

(c) DELINEATOR/REFLECTOR, SEE STANDARD 208.

d. AVIAN PROTECTION, SEE STANDARD 1600.

(e) FOR OPERATION OF INTELLIRUPTER SWITCH - SEE ELECTRIC STANDARD PRACTICE 151.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | DRAWING UPDATE | EDM | MRF | JES | CZH | 11/12/2019 | F | | | | | | |
| B | DRAWING UPDATE | - | GW | JS | MDJ | 4/1/2018 | E | | | | | | |
| A | REVISION | - | - | PIA | MC | 5/29/2009 | D | MOVED TO FMO | GLC | JIK | FRC | KRG | 09/01/2023 |

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**OH1276 FIELD MAINTENANCE ONLY**

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**01/15/2025:** MOVED TO FMO

| REV | CHANGE | DRWN | BY | CHKD | APVD | DATE |
|---|---|---|---|---|---|---|
| C | - | - | - | - | - | - |
| B | - | - | - | - | - | - |
| A | ORIGINAL ISSUE | GLC/DV | FRC | JAS | MRF | 01/15/2025 |

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**OVERHEAD AUTORANGING FAULT INDICATOR INSTALLATION AND OPERATION**

SCALE: NOT TO SCALE

| DRAWING NO: | SHEET: |
|---|---|
| FMO OH1276 | 1 OF 1 |

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**SCOPE:** THIS STANDARD SHOWS AND DESCRIBES THE INSTALLATION OF OVERHEAD AUTORANGING FAULT INDICATORS, BOTH ILLUMINATED AND WIRELESS.

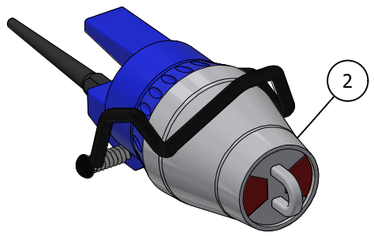



**FIGURE 2**

**TABLE 1:**

| FAULT INDICATOR | | | |
|---|---|---|---|
| **ITEM** | **DESCRIPTION** | **STOCK NUMBER** | **DESIGN UNIT** |
| 2 | INDICATOR, FAULTED, CIRCUIT, OVERHEAD | S423710 | WFI |

**TABLE 3:** WIRELESS WSO TRIP VALUES (2)

| LOAD CURRENT RANGE (AMPS) | TRIP VALUE (AMPS) |
|---|---|
| 10<I<25 | 25 |
| 25<I<50 | 100 |
| 50<I<100 | 200 |
| 100<I<200 | 400 |
| 200<I<300 | 600 |
| 300<I<400 | 800 |
| 400<I<500 | 1000 |
| 500<I | 1200 |

**INSTALLATION:**

D. ANNOTATE NODE ID AND PHASE FOR EACH UNIT ON JOB PACKAGE, IN NOTE SECTION, OR ON A SEPARATE PIECE OF PAPER. TURN IN PAPERWORK TO DISTRICT ENGINEER OR ASSIGNED ENGINEER AFTER INSTALLATION. (2)

E. CRSRTT RESET TOOL CAN BE USED TO ACTIVATE THE AUTORANGER AND WIRELESS FAULT INDICATORS. (2)

G. THE WIRELESS FAULT INDICATOR UNITS NEED TO BE ACTIVATED WITH CRSRTT RESET TOOL. (2)

1. REMOVE SHORTING BAR AND PLACE EXPOSED MAGNET DIRECTLY AGAINST THE ACTIVATE STICKER AND HOLD FOR 3 TO 5 SECONDS.
2. THE FRONT PANEL WILL ROLL TO RED.
3. ONCE THIS IS SEEN THE DEVICE IS READY TO BE PLACED INTO SERVICE.
4. IF NOT, USE NEW UNIT AND SEND BACK THE MALFUNCTIONING UNIT TO ELECTRIC DISTRIBUTION ENGINEERING.
5. PLACE ACTIVATED UNIT ON AN ENERGIZED LINE USING HOTSTICK TO GRASP THE HOOKEYE ON THE FACE OF THE INDICATOR. FOR MORE DETAILS ON PROPER INSTALLATION SEE ESP 322.

**BILL OF MATERIALS:** NONE

**NOTES:**

VI. WIRELESS FI INFORMATION MUST BE ENTERED INTO THE ONRAMP TOTAL VIEW (OTV) SYSTEM AFTER INSTALLATION BY THE DISTRICT ENGINEER OR ASSIGNED ENGINEER. PROVIDE COMPLETED INSTALLATION PAPERWORK TO THE DISTRICT ENGINEER OR ASSIGNED ENGINEER.

**REFERENCE:** NONE

FIELD MAINTENANCE ONLY

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| E | MOVED TO FMO | GLC/DV | FRC | JAS | MRF | 01/15/2025 |
| D | REVISED TO 3D FORMAT | ARC | JIK | - | - | 06/12/2023 |
| C | EDITORIAL CHANGES | JS | JS | - | CZH | 03/18/2019 |

SDGE™

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

**OVERHEAD AUTORANGING FAULT INDICATOR INSTALLATION AND OPERATION**

SCALE: NOT TO SCALE

DRAWING NO: FMO OH1276.1

SHEET: 1 OF 1

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| 1360 | 4KV/12KV SINGLE PHASE PRIMARY METERING STATION |


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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | UPDATES TO 1312 | - | JS | JS | MDJ | 01/25/2017 | F | | | | | | |
| B | ADDED 1312 | - | KR | JS | MDJ | 12/02/2016 | E | OH1360 MOVED TO FMO | GLC | RSL | JAS | KRG | 03/10/2023 |
| A | ORIGINAL ISSUE | - | JS | IL | MDJ | 07/13/2016 | D | EDITORIAL CHANGES | EDM | JIK | JES | KRG | 04/08/2022 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

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**FIELD MAINTENANCE ONLY**

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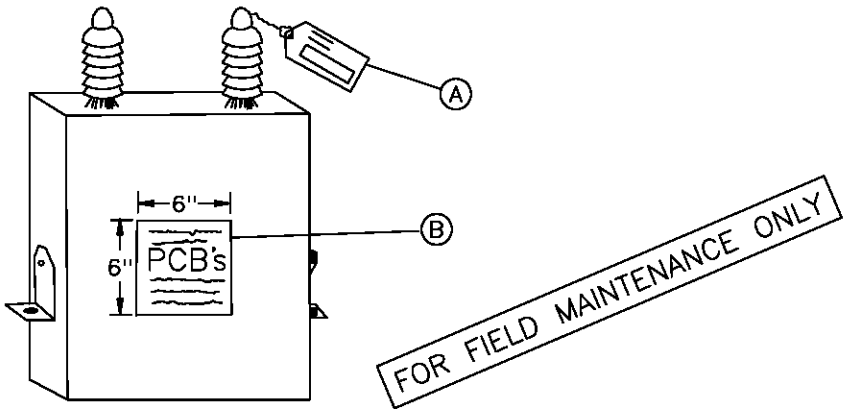
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SDG&E ELECTRIC OVERHEAD STANDARD

CAPACITOR MARKING INSTRUCTIONS
DECALS AND TAGS

FMO
OH 1302

SCOPE: THIS STANDARD DESCRIBES CAPACITOR MARKING AND HANDLING PROCEDURES.




## (A) CAPACITOR TAGS

THIS IDENTIFICATION TAG (SDG&E FORM 120-7240, STK. NO. 043450) IS USED FOR TRACKING THE CAPACITOR DURING REMOVAL/RETIREMENT AND INSTALLATION. IT SHALL BE USED ON ALL CAPACITORS, PCB UNITS AND NON-PCB UNITS.

EACH CAPACITOR UNIT IN STOCK WILL BE AFFIXED WITH A CAPACITOR IDENTIFICATION TAG BEFORE IT IS REMOVED FROM STOCK. THIS TAG IS TO BE COMPLETED BY THE FIELD PERSONNEL WHO EITHER REMOVES OR INSTALLS A CAPACITOR UNIT. ONE SIDE OF THIS TAG IS USED FOR REMOVAL AND THE OTHER FOR INSTALLATION.

1. INSTALLATION

   THE DISTRICT STOCKKEEPER SHALL COMPLETE AS MUCH OF THE CAPACITOR TAG(S) AS POSSIBLE ON THE INSTALLATION SIDE OF THE TAG AND ATTACH TO THE SPECIFIC UNIT. WHEN THE INSTALLATION IS COMPLETED, THE CREW FOREMAN SHALL REMOVE THE TAG AND COMPLETE THE REQUESTED INFORMATION.

2. REPLACEMENT

   WHEN A CAPACITOR UNIT IS REPLACING ONE THAT IS BEING REMOVED, THE FOREMAN SHALL FILL OUT BOTH SIDES OF THE TAG.

   IF REMOVAL AND REPLACEMENT IS NOT COMPLETED WITHIN TWO CONSECUTIVE WORKDAYS, TWO FORMS ARE TO BE COMPLETED, ONE FOR A REMOVAL, AND ANOTHER FOR INSTALLATION.

   IF REPLACEMENT IS DUE TO FAILURE OF ONE OR MORE UNITS, AN EQUIPMENT FAILURE REPORT IS REQUIRED.

3. REMOVAL

   WHEN A CAPACITOR UNIT IS REMOVED, THE CREW FOREMAN SHALL COMPLETE THE REMOVAL PORTION ONLY. IF TAGS ARE NOT STORED ON THE TRUCKS, THE DISPATCHER SHALL PROVIDE THE CREW WITH SUFFICENT TAGS FOR EACH CAPACITOR UNIT TO BE REMOVED.



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4. RETIREMENT

WHEN A CAPACITOR UNIT IS RETIRED, THE RETIRED PORTION OF THE CAPACITOR TAG MUST BE FILLED OUT BY THE PERSONNEL RETIRING THE UNIT.

5. DISPOSITION

IT SHALL BE THE DISPATCHER'S RESPONSIBILITY TO SEE THAT THE COMPLETED TAGS ARE SENT TO THE DISTRICT'S RECORDS SECTION, ATTENTION OF THE ENGINEERING CLERK, WITHIN ONE WORKING DAY AFTER THE CAPACITOR UNITS HAVE BEEN INSTALLED OR REMOVED.

Ⓑ DECAL

THIS DECAL (STOCK NO. 301880) IS TO BE PLACED ON ALL CAPACITOR UNITS WHICH CONTAIN PCB'S.

FIELD PERSONNEL AND STOCKKEEPERS SHOULD MAKE EVERY EFFORT TO INSURE THAT ALL PCB UNITS HAVE A DECAL, AND THAT ALL WORN, WEATHERED DECALS BE REPLACED WITH NEW DECALS. THE DECAL IS BLACK PRINT ON EITHER YELLOW OR WHITE BACKGROUND.

1. MARKING

EVERY CAPACITOR IN SERVICE OR IN STORAGE, WHICH USES AN INSULATING FLUID CONTAINING PCB'S, SHALL BE LABELED WITH THE DECAL (STOCK NO. 301880).

EVERY PCB CAPACITOR WHICH IS REMOVED FROM SERVICE AND DOES NOT HAVE THE DECAL (STOCK NO. 301880) SHALL HAVE THE DECAL PUT ON IT AT THE TIME IT IS REMOVED FROM SERVICE. THIS SHALL BE DONE BY THE WORK CREW THAT REMOVES THE UNIT. IF A PCB UNIT ARRIVES AT A STOREYARD WITH NO PCB DECAL, THE STOCKKEEPER SHALL PUT A DECAL ON.

NOTE: ALL CAPACITOR UNITS PURCHASED BEFORE 1977 USED AN INSULATING FLUID WHICH CONTAINED PCB'S. THE UNITS WITH THE PCB FLUIDS CAN BE IDENTIFIED BY THE WORDS "NON-FLAMMABLE LIQUID" ON NAMEPLATE OR BY THE MANUFACTURER'S TRADE NAMES WHICH ARE:

G.E. – PYRANOL
WESTINGHOUSE – INERTEEN
MCGRAW-EDISON – ELEMEX
CORNEL DUBILIER OR FEDERAL PACIFIC – DYKANOL
SANGAMO – DIACHLOR
ALLIS CHALMERS – CHLOREXTOL

FOR FIELD MAINTENANCE ONLY

ALL OF THE CAPACITOR UNITS RECEIVED THAT DO NOT CONTAIN PCB INSULATING FLUIDS HAVE THE WORDS "CONTAINS A NON-PCB INSULATING FLUID" ON THE NAMEPLATE OR ON A BLUE TANK DECAL.

2. HANDLING CAPACITORS CONTAINING POLYCHLORINATED BIPHENYLS (PCB)

CAPACITORS CONTAINING PCB SHALL BE HANDLED AS SPECIFIED IN THE PCB HANDLING AND PERSONAL SAFETY PROCEDURES. (SEE CONSTRUCTION MANAGEMENT STANDARD PRACTICE 107).

3. RETIRING RUPTURED OR DAMAGED UNITS

WHENEVER TRANSPORTATION OR KEARNY MAINTENANCE RETIRES A CAPACITOR AND DISPOSES OF IT, SPECIFIC DATA (I.E. SERIAL NUMBER, PCB OR NON-PCB, MANUFACTURER, SIZE, ETC.) MUST BE RECORDED ON THE CAPACITOR TAG AND SENT TO THE DISTRICT'S RECORDS SECTION, ATTENTION OF THE ENGINEERING CLERK.



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C. PRECAUTIONARY MEASURES – DAMAGED CAPACITOR UNITS

DAMAGED CAPACITOR UNITS WITH BULGED CASES MAY HAVE EXCESSIVE PRESSURE INSIDE. THE UNITS MAY RUPTURE WHEN HANDLED OR BUMPED. SINCE THE INSULATING LIQUID IN THE UNITS IS TOXIC, CARE SHALL BE EXERCISED WHEN WORKING WITH BULGED OR OTHERWISE DAMAGED UNITS. UNITS WITH BULGED OR DAMAGED CASES SHALL NOT BE RE–ENERGIZED.

D. CAPACITOR NAMEPLATES

THE CAPACITOR NAMEPLATE AND UNIT SHALL REMAIN INTACT. UNDER NO CIRCUMSTANCES SHALL THE NAMEPLATE BE REMOVED FROM THE CAPACITOR UNIT.

F. SERIES STREET LIGHTING TRANSFORMERS

THE TROUBLEMAN AND/OR CREW SHALL CHECK THE NAMEPLATE OF ANY RUPTURED 2400 VOLT, CONSTANT CURRENT STREET LIGHTING TRANSFORMER TO DETERMINE IF IT CONTAINS AN INTERNAL CAPACITOR. IF NO CAPACITOR IS SHOWN ON THE NAMEPLATE, THE TRANSFORMER IS TO BE TREATED AS ANY OTHER TRANSFORMER ON THE SYSTEM, NO SPECIAL HANDLING OR DISPOSAL IS REQUIRED. IF IT DOES, IT SHALL BE TREATED AS ANY PCB CONTAINING DEVICE UNTIL IT REACHES KEARNY MAINTENANCE. (SEE CONSTRUCTION MANAGEMENT STANDARD PRACTICE 107).

KEARNY SHALL REMOVE THE INTERNAL CAPACITOR IMMEDIATELY AND CHECK TO SEE IF IT HAS LEAKED. IF IT HAS NOT LEAKED, THE CAPACITOR SHALL BE DISPOSED OF IN ACCORDANCE WITH THE EPA REGULATIONS. THE TRANSFORMER MAY THEN RE–ENTER THE SYSTEM AS AN RO UNIT OR BE SCRAPPED.

IF PCB CONTAMINATION OF THE TRANSFORMER OIL IS SUSPECTED, KEARNY MAINTENANCE SHALL HAVE THE BEST LAB VERIFY THE LEVEL OF CONTAMINATION. IF IT IS 500PPM OR GREATER, THE OIL AND THE TRANSFORMER SHALL BE DISPOSED OF ACCORDING TO EPA REGULATIONS.

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SDG&E ELECTRIC OVERHEAD STANDARD

CAPACITOR INFORMATION

FMO OH 1311

SCOPE: THIS STANDARD LISTS THE INFORMATION NEEDED TO DETERMINE PROPER CAPACITOR APPLICATIONS.

| PREFIX | PHASE | VOLTAGE | DESCRIPTION | | KVAR | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| C | 1 | 2400/4160Y | CAPACITOR UNITS | | 100 | Ⓐ 207330 | – |
| CT | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3 100KVAR 1Ø UNITS, 4 WIRE CONNECTED WYE. | | 300 | 564772 | CT3F |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 3–100KVAR 1Ø UNITS AND 3 OIL SWITCHES WITH 2.4KV POTENTIAL TRANSFORMER. | | 300 | 564773 | CT3S |
| CTD | 3 | 4160 △ | SWITCHED CAPACITOR RACK CONSISTING OF 3–200 KVAR, 7200V UNITS DELTA CONNECTED AND A POTENTIAL TRANSFORMER RATED AT 2400–120V FOR USE ON 4KV SYSTEM. | 2 – OIL SWITCHES | Ⓑ 200 | 564758 | CTD2S |
| | | | FIXED CAPACITOR RACK CONSISTING OF 3–200 KVAR, 7200V UNITS DELTA CONNECTED FOR USE ON 4KV SYSTEM. | | Ⓑ 200 | 564759 | CTD2F |
| YC | 1 | 7200/12470Y | CAPACITOR UNITS | | 150 | Ⓐ 207344 | YC150 |
| HC | 3 | 7200/12470Y | CAPACITOR UNITS | | 300 | Ⓐ 207336 | – |
| HCT | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3–400 KVAR, 7200V UNITS WYE CONNECTED FOR USE ON 4KV SYSTEM. | | 130 | 564776 | HCT1F |
| | 3 | 7200/12470Y | SWITCHED CAPACITOR RACK CONSISTING OF 6–150KVAR 1Ø UNITS WITH 7.2KV POTENTIAL TRANSFORMER | 3 – OIL SWITCHES | 900 | Ⓐ564706 | – |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 6–150KVAR 1Ø UNITS WITH 12KV POTENTIAL TRANSFORMER | 2 – OIL SWITCHES | 900 | Ⓐ564708 | – |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 6–150KVAR 1Ø UNITS WITH 12KV POTENTIAL TRANSFORMER | 3 – OIL SWITCHES | 900 | Ⓐ564704 | – |
| | | | FIXED CAPACITOR RACK CONSISTING OF 6–150 KVAR 1Ø UNITS | | 900 | Ⓐ564680 | 900F |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 9–150KVAR 1Ø UNITS WITH 7.2KV POTENTIAL TRANSFORMER | 3 – OIL SWITCHES | 1350 | Ⓐ564754 | – |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 9–150KVAR 1Ø UNITS WITH 12KV POTENTIAL TRANSFORMER | 2 – OIL SWITCHES | 1350 | Ⓐ564756 | – |
| | | | | 3 – OIL SWITCHES | 1350 | Ⓐ564752 | – |
| | | | FIXED CAPACITOR RACK CONSISTING OF 9–150KVAR 1Ø UNITS | | 1350 | Ⓐ564744 | 1350F |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

Ⓐ NO LONGER PURCHASED.

Ⓑ THE KVAR RATING OF 7200 VOLT CAPACITORS IS REDUCED BY A FACTOR OF THREE WHEN WIRED IN DELTA AND CONNECTED TO THE 4160 VOLT SYSTEM.



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**SCOPE:** THIS STANDARD LISTS THE INFORMATION NEEDED TO DETERMINE PROPER CAPACITOR APPLICATIONS.

| PREFIX | PHASE | VOLTAGE | DESCRIPTION | KVAR | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| YC | 1 | 7200/12470Y | CAPACITOR UNITS | 200 | 207350 | YC200 |
| | | | | 400 | 207348 | – |
| HCT | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3–400 KVAR, 7200V UNITS WYE CONNECTED FOR USE ON 4KV SYSTEM. | 130 | 564776 | HCT1F |
| | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3–200 KVAR, 7200V UNITS WYE CONNECTED FOR USE ON 4KV SYSTEM. | 65 | 564759 | HCT6F |
| | 3 | 7200/12470Y | SWITCHED CAPACITOR RACK CONSISTING OF 3–200 KVAR SINGLE–PHASE UNITS WITH 12KV POTENTIAL TRANSFORMER | 600 | 564761 | 600S |
| | 3 | 7200/12470Y | FIXED CAPACITOR RACK CONSISTING OF 3–200 KVAR SINGLE–PHASE UNITS. | 600 | 564763 | 600F |
| | 3 | 7200/12470Y | SWITCHED CAPACITOR RACK CONSISTING OF 3–400KVAR SINGLE–PHASE UNITS WITH 12KV POTENTIAL TRANSFORMER — 2 – OIL SWITCHES | 1200 | 564770 | 1200S |
| | | | FIXED CAPACITOR RACK CONSISTING OF 3–400 KVAR SINGLE–PHASE UNITS | 1200 | 564764 | 1200F |

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**SCOPE:** THIS STANDARD SHOWS THE PREFIXES, PURCHASING STATUS, STOCK NUMBERS, AND BUCK OR BOOST CAPABILITIES OF VOLTAGE REGULATORS.

VOLTAGE REGULATORS

| PREFIX | PHASE | VOLTAGE | DESCRIPTION | KVA | AMPS | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| G | 1 | 2400/4160Y | FEEDER VOLTAGE REGULATOR | 24 | – | (A) S581248 | – |
| | | | | 36 | 150 | (A) S581312 | – |
| | | | | 37.5 | 150 | (A) S581344 | – |
| | | | | 48 | – | (A) S581375 | – |
| | | | | 72 | 300 | (A) S581440 | – |
| GT | 3 | 4160/2400 | FEEDER VOLTAGE REGULATOR | 34.6 | 90 | (A) S581856 | – |
| | | | | 36 | 90 | (A) S581888 | – |
| | | | | 72 | 60 | (A) S581920 | – |
| | | | | 100 | 250 | (A) S581728 | – |
| | | | | 108 | 250 | (A) S581760 | – |
| | | | | 125 | 300 | (A) S581792 | – |
| | | | | 144 | – | (A) S581824 | – |
| | | | | 375 | 900 | (A) S581904 | – |
| GH | 1 | 12,000 | FEEDER VOLTAGE REGULATOR | 72 | 100 | (A) (B) S581488 | – |
| | | | | 60 | 50 | (A) (D) S581504 | – |
| GHT | 3 | 12,000 | FEEDER VOLTAGE REGULATOR | 50 | 40 | (A) S581632 | – |
| | | | | 160 | 130 | (A) S581536 | – |
| | | | | 239 | 200 | (A) S581568 | – |
| | | | | 312 | 260 | (A) S581600 | – |
| | | | | 600 | 500 | (A) S581664 | – |
| | | | | 750 | 625 | (A) S581696 | – |
| GU | 1 | 120/240 | UNIREG, SEC. VOLTAGE REG. | – | – | (A) – | – |
| GY | 1 | 7200/12,470Y | FEEDER VOLTAGE REGULATOR | 19 | 25 | (D) (A) – | – |
| | | | | 57.2 | 75 | (D) S581936 | GY57 |
| GR | 1 | 7200/12,470Y | FEEDER VOLTAGE REGULATOR REVERSIBLE FEED | 72 | 100 | (D) (A) S581714 | GR100A |
| GS | 1 | 7200/12,470Y | FEEDER VOLTAGE REGULATOR | 72 | 100 | (D) S581715 | GS100A |
| GC | 1 | 12,000 | FEEDER VOLTAGE REGULATOR REVERSIBLE FEED | 120 | 100 | (D) (A) S581476 | GC100A |
| | | | | 240 | 200 | (D) (A) S581478 | GC200A |

**INSTALLATION:**

(A) NO LONGER PURCHASED.

(B) 4 – 1 1/2% STEPS BELOW OR ABOVE NEUTRAL.

(D) 16 – 5/8% STEPS BELOW AND ABOVE NEUTRAL.

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SDG&E ELECTRIC OVERHEAD STANDARD

CAPACITOR CONNECTION 4KV WYE

FMO OH 1314

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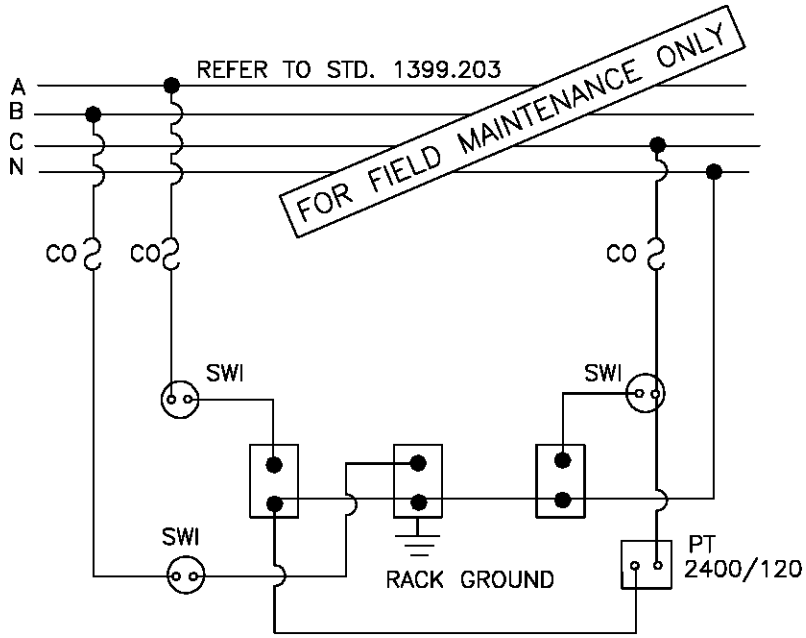
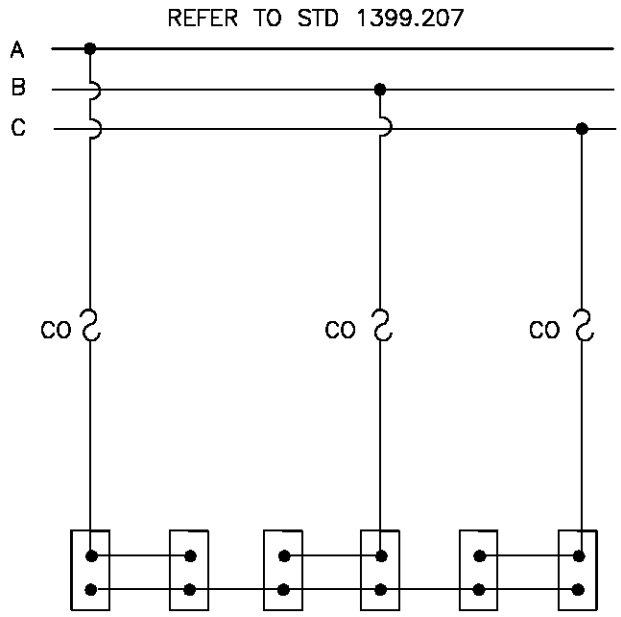



DIAGRAM OF 4KV WYE CONNECTED
SWITCHED 300KVAR (3–100KVAR UNITS)

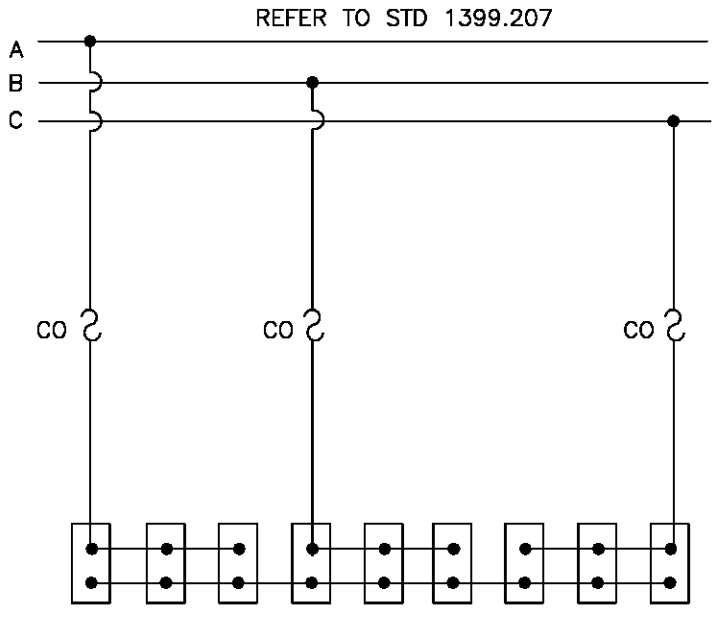
NOTE:

– DO NOT GROUND THE CAPACITOR NEUTRAL BUS. IT IS ALREADY GROUNDED THROUGH THE 4KV NEUTRAL SYSTEM.




SCHEMATIC DIAGRAM

600 KVAR (6–100 KVAR UNITS)
300 KVAR (6–50 KVAR UNITS)
150 KVAR (6–25 KVAR UNITS)

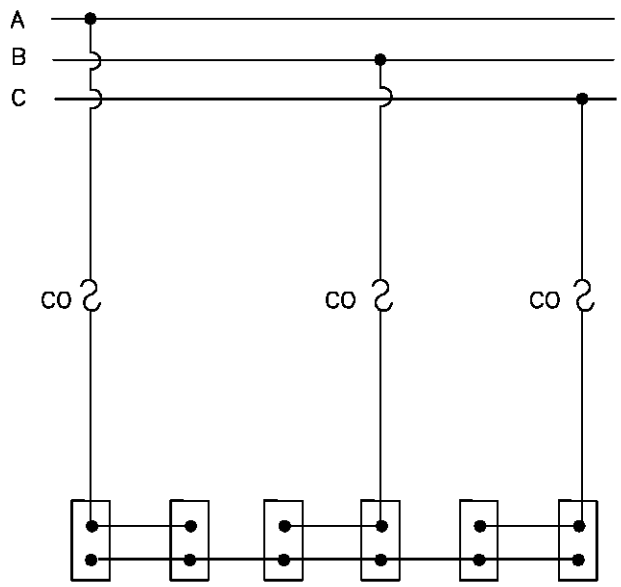



SCHEMATIC DIAGRAM

900 KVAR (9–100 KVAR UNITS)
450 KVAR (9–50 KVAR UNITS)
225 KVAR (9–25 KVAR UNITS)

| | | |
|---|---|---|
| DATE 12–1–98<br>APPD PA 12/98 | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONNECTION 4KV WYE | 1399.104<br>SUPERSEDES<br>1314.3 (12–1–98) |

REFER TO STD 1399.207



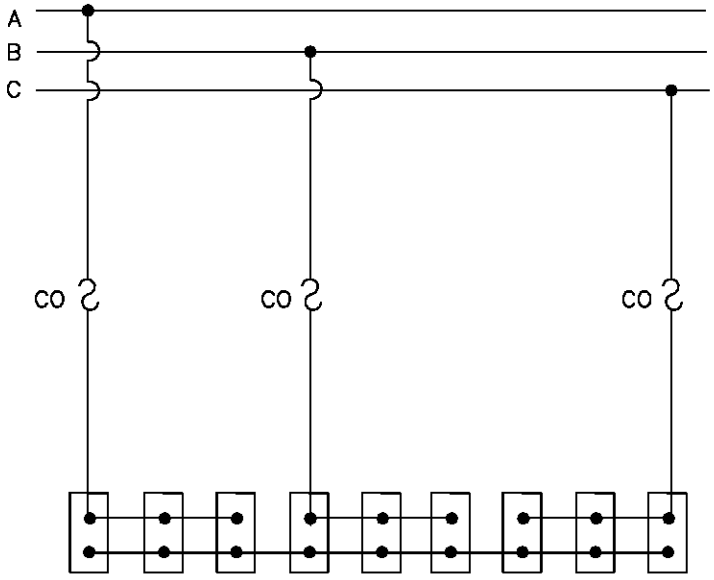

SCHEMATIC DIAGRAM

600 KVAR (6–100 KVAR UNITS)
300 KVAR (6–50 KVAR UNITS)
150 KVAR (6–25 KVAR UNITS)

FOR FIELD MAINTENANCE ONLY

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REFER TO STD 1399.207




SCHEMATIC DIAGRAM

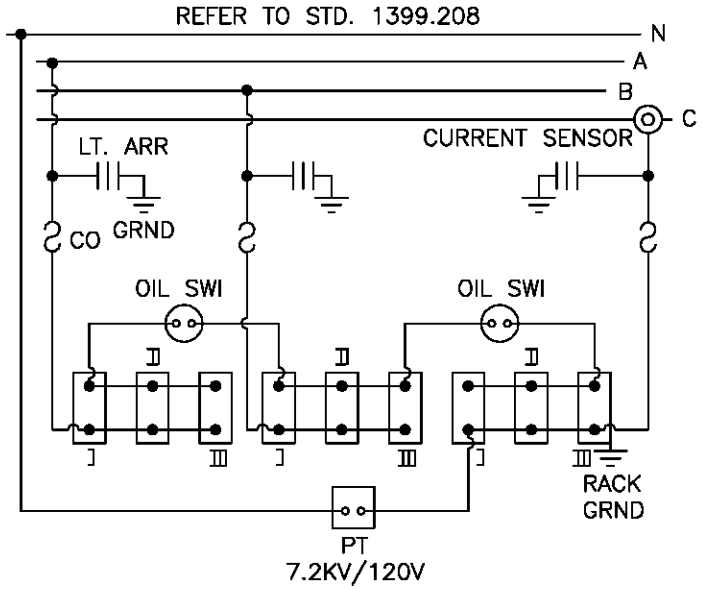
900 KVAR (9–100 KVAR UNITS)
450 KVAR (9–50 KVAR UNITS)
225 KVAR (9–25 KVAR UNITS)

NOTE:

–SEE STD. 1309 FOR CAPACITOR FUSING.

| 1399.105<br>SUPERSEDES<br>1314.4 (12–1–98) | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONNECTION 12KV–WYE (FIXED) | DATE 12–1–98<br>APPD PSA/BSG |
|---|---|---|

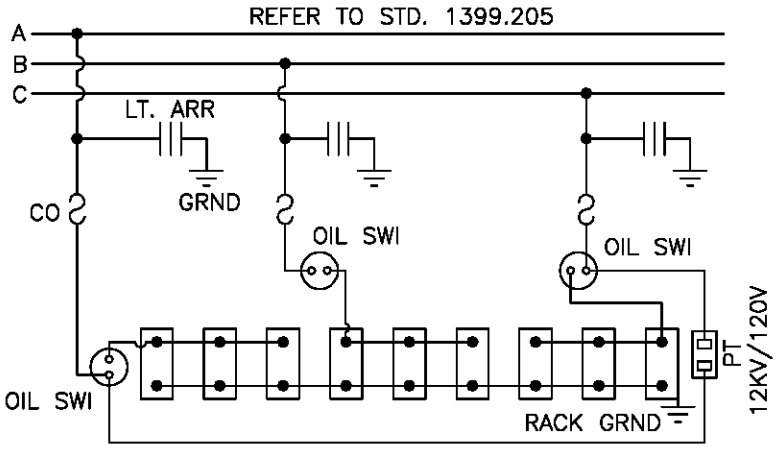
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SCHEMATIC DIAGRAM

1350 KVAR (9–150 KVAR UNITS) I, II, III
1200 KVAR (6–200 KVAR UNITS) I & III
900 KVAR (6–150 KVAR UNITS) I & III
600 KVAR (3–200 KVAR UNITS) II

FOR FIELD MAINTENANCE ONLY




SCHEMATIC DIAGRAM
1350 KVAR (9–150 KVAR UNITS)
WITH 3 OIL SWITCHES

NOTE:

–SEE STD. 1309 FOR CAPACITOR FUSING.

| | | |
|---|---|---|
| DATE 12–1–98<br>APPD PA / RDG | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONNECTION 12 & 12.47KV–WYE (SWITCHED) | 1399.106<br>SUPERSEDES<br>1314.5 (12–1–98) |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

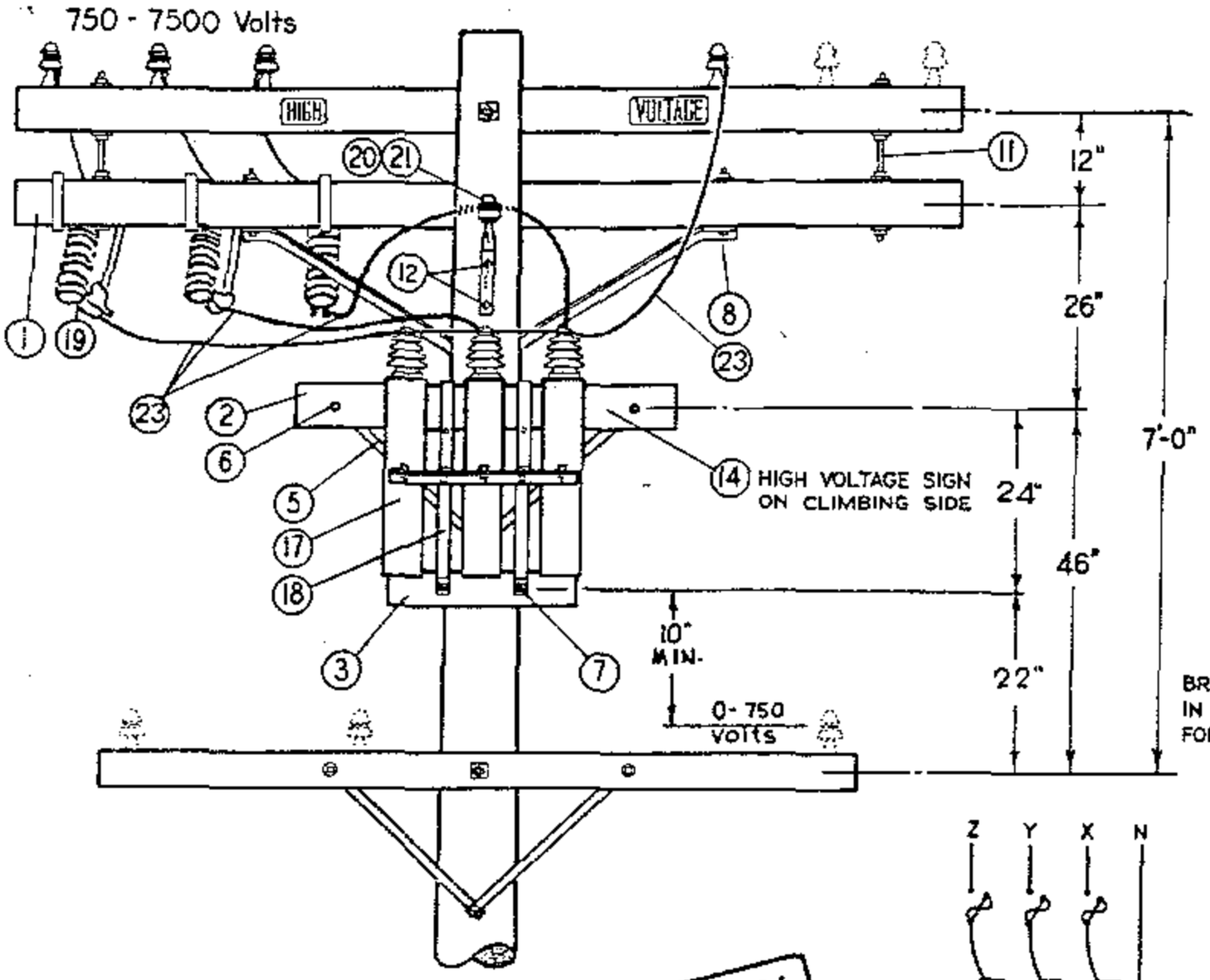
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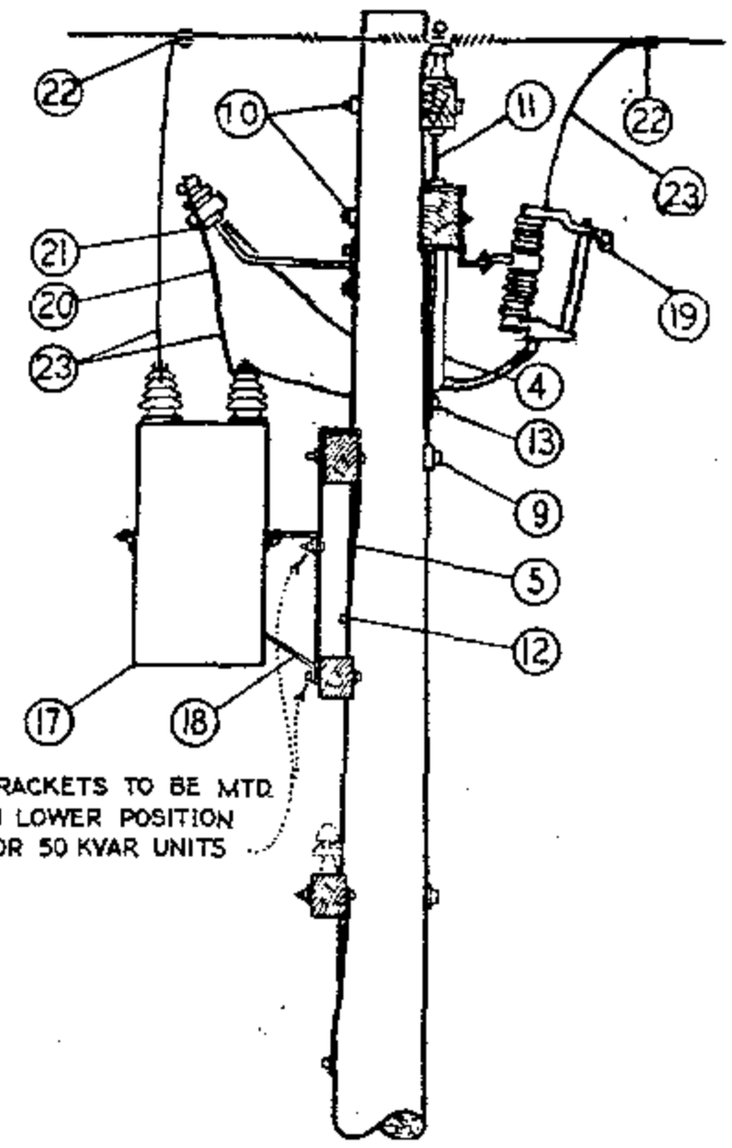
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

CAPACITOR INSTALLATION 4KV-WYE-150 KVAR MAXIMUM

FMO OH 1315




FOR FIELD MAINTENANCE ONLY

DIAGRAM OF 4 KV. WYE CONNECTIONS
150 KVAR (3-50 KVAR UNITS)
75 KVAR (3-25 KVAR UNITS)
45 KVAR (3-15 KVAR UNITS)

INSTALLATION:

A. CAPACITOR RACK TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | PG 380.01 IT. 2 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 4' - 0" | 1 | PG 380.05 IT. 3 |
| 3 | CROSSARM, 3 1/2" X 4 1/2" X 2' - 0" | 1 | PG 380.05 IT. 1 |
| 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| 5 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| 6 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| 7 | BOLT, MACH., GALV., 1/2" X 5", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| 8 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| 9 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH, 1 FLAT, 1 CURV & 1 NUT | 1 | STD 139, 140 (E) |
| 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4" SQ WASH & 1 NUT | 2 | STD 139, 140 (E) |
| 11 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140 (E) |
| 12 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| 13 | LAG SCREW, GALV., 5/8" X 5" | 1 | 621600 (E) |
| 14 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS | 1 | 647648-492224 (E) |
| 15 | | | |
| 16 | | | |
| 17 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 3 | 207200 |
| 18 | RACK, CAPACITOR | 1 | 402624 |
| 19 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297688 |
| 20 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| 21 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG 750.3 |
| 22 | CONNECTOR, COMPRESSION | 4 | PGS 786, 783 (E) |
| 23 | WIRE, BARE STRANDED, #6 | 30' | 813536 |

SDG&E ELECTRIC STANDARDS

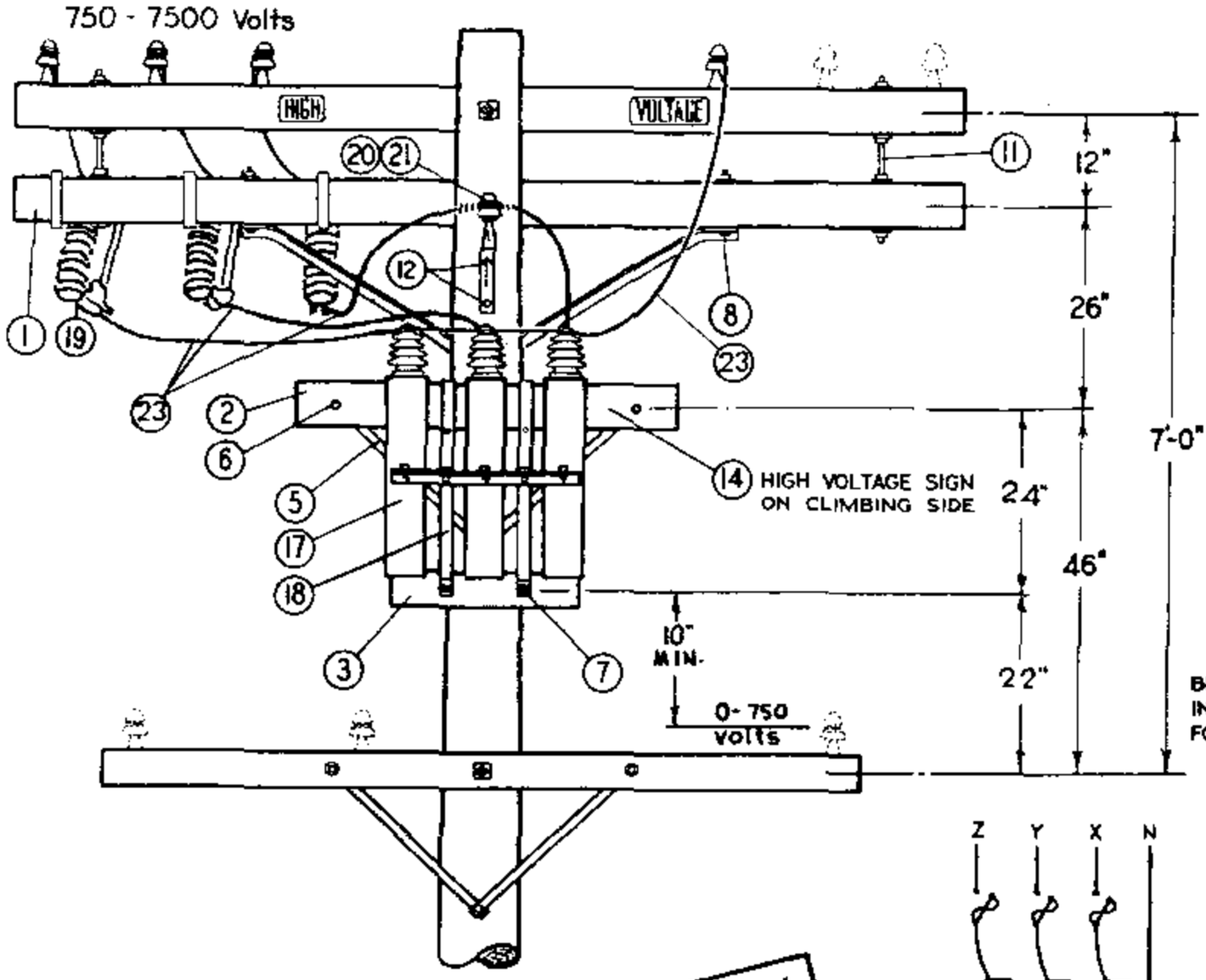
1399.101
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1315 (1-1-87)

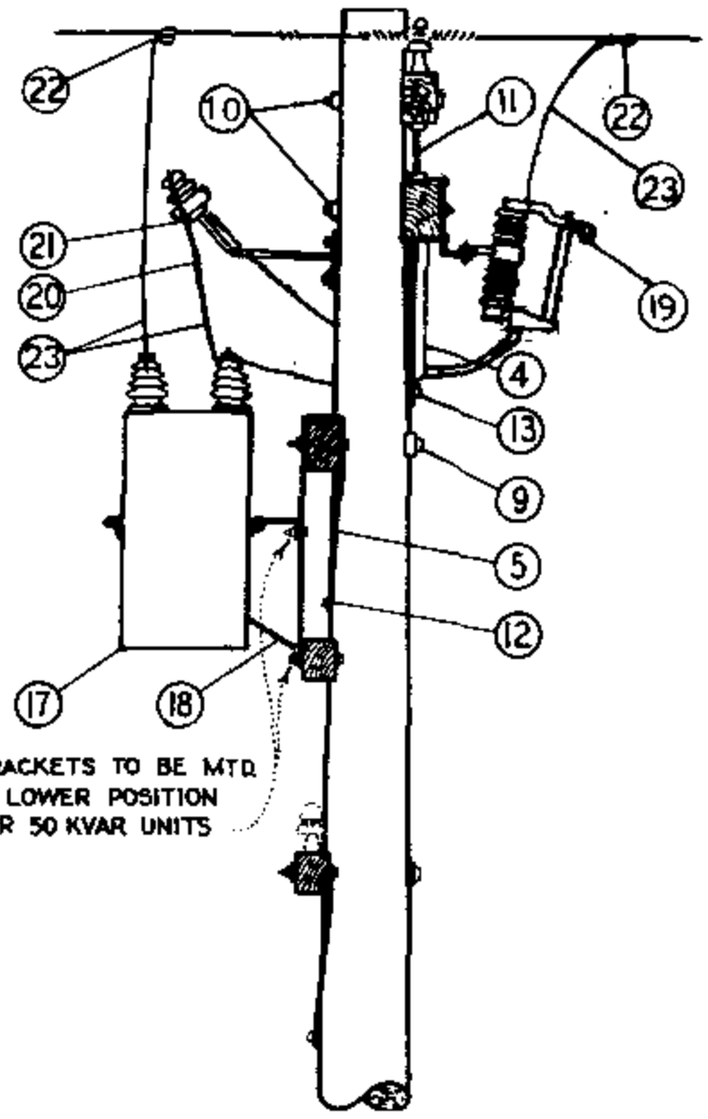
# CAPACITOR INSTALLATION 4KV-WYE-150 KVAR MAXIMUM

DATE 1-1-87
APPD AK/RDS

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750 - 7500 Volts




FOR FIELD MAINTENANCE ONLY

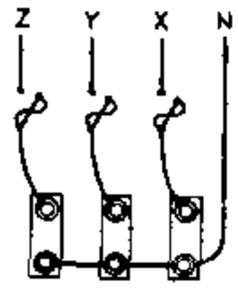



DIAGRAM OF 4 KV. WYE CONNECTIONS
150 KVAR (3-50 KVAR UNITS)
75 KVAR (3-25 KVAR UNITS)
45 KVAR (3-15 KVAR UNITS)

INSTALLATION:

A. CAPACITOR RACK TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | PG 380.01 IT. 2 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 4' - 0" | 1 | PG 380.05 IT. 3 |
| 3 | CROSSARM, 3 1/2" X 4 1/2" X 2' - 0" | 1 | PG 380.05 IT. 1 |
| 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| 5 | BRACE, FLAT CROSSARM, 26" | 2 | 164192 |
| 6 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| 7 | BOLT, MACH., GALV., 1/2" X 5", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| 8 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| 9 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH, 1 FLAT, 1 CURV & 1 NUT | 1 | STD 139, 140 (E) |
| 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4" SQ WASH & 1 NUT | 2 | STD 139, 140 (E) |
| 11 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140 (E) |
| 12 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| 13 | LAG SCREW, GALV., 5/8" X 5" | 1 | 621600 (E) |
| 14 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS | 1 | 647648-492224 (E) |
| 15 | | | |
| 16 | | | |
| 17 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 3 | 207200 |
| 18 | RACK, CAPACITOR | 1 | 402624 |
| 19 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297888 |
| 20 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| 21 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG 750.3 |
| 22 | CONNECTOR, COMPRESSION | 4 | PGS 786, 783 (E) |
| 23 | WIRE, BARE STRANDED, #6 | 30' | 813536 |

399.107
SUPERSEDES
15 (1-1-87)

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV-WYE-150 KVAR MAXIMUM

DATE 1-1-87
APPD AK/RDS

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# OH1316 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/08/2022:** SECONDARY CAPACITOR MOVED TO FMO

**07/13/2016:** MOVED TO FMO

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | | F | | | | | | |
| B | EDITORIAL CHANGES | EDM | JIK | JES | KRG | 04/08/2022 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JS | IL | MDJ | 07/13/2016 | D | | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

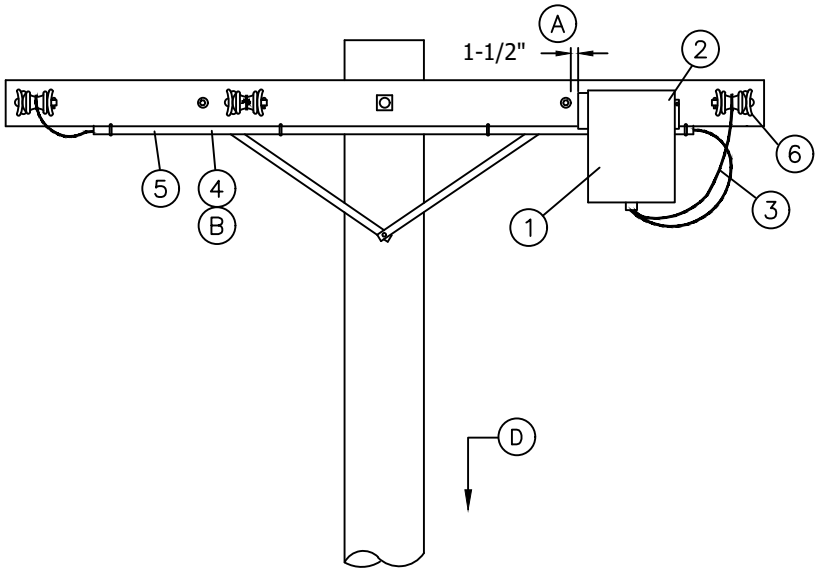
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SECONDARY CAPACITOR
CAPACITOR INSTALLATION 4KV-WYE-300 KVAR MAXIMUM

FMO OH1316

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF A SINGLE-PHASE, 240 VOLT, SECONDARY CAPACITOR FOR BOOSTING SECONDARY VOLTAGE AS A PRACTICAL ALTERNATIVE TO STRINGING ADDITIONAL PRIMARY AND SETTING AN ADDITIONAL TRANSFORMER.




## INSTALLATION:

(A) MOUNT CAPACITOR ON CROSSARM, OUTSIDE OF STRAP BRACE WITH 1-1/2" HARDWARE CLEARANCE.

(B) USE EXISTING UNDERARM MOUNTED CONDUIT IF POSSIBLE, OR, INSTALL MINIMUM OF 1" CONDUIT.

C. INSTALL CAPACITOR ON SOURCE SIDE OF LOAD.

(D) ATTACH TO BASE OF POLE A TAG WHICH READS **"240V SEC CAP"**.

FIELD MAINTENANCE ONLY

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | | QUANTITY | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CAPACITOR, SINGLE-PHASE, 240 VOLT, CROSSARM MOUNTED | 10 KVAR | 1 | S207160 |
| | | OR | | |
| | | 20 KVAR | 1 | S207162 |
| 2 | BOLT, CARRIAGE, GALV, ⅜" x 6", 2 ROUND & 1 LOCK WASHER | | 2 | S150080 |
| 3 | WIRE, #4 CU W.P. | | 14' | S812480 |
| 4 | CONDUIT, PVC, TYPE 2, SCHEDULE 40 | (B) | 6' | - |
| 5 | STRAP, PIPE, GALV, (SIZE AS REQ'D) AND 2-6D NAILS, GALV | | AS REQ'D | S491552 |
| 6 | CONNECTOR, WIRE, COMPRESSOR (SIZE AS REQ'D) | | AS REQ'D | S783-787 |

## NOTES:

I. THIS CAPACITOR TO BE CROSSARM MOUNTED WITH OPEN WIRE OR AERIAL CABLE SECONDARY. DO NOT POLE MOUNT. STANDARD PRACTICE 317 SHOULD BE REVIEWED PRIOR TO INSTALLATION.

**REFERENCE:** NONE

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| REV | CHANGE | DR | BY | DSN | APV | DATE | REV | CHANGE | DR | BY | DSN | APV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | MOVED TO FMO | EDM | JIK | JES | KRG | 04/08/2022 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 02/18/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | PTA | RDG | 12/15/1996 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

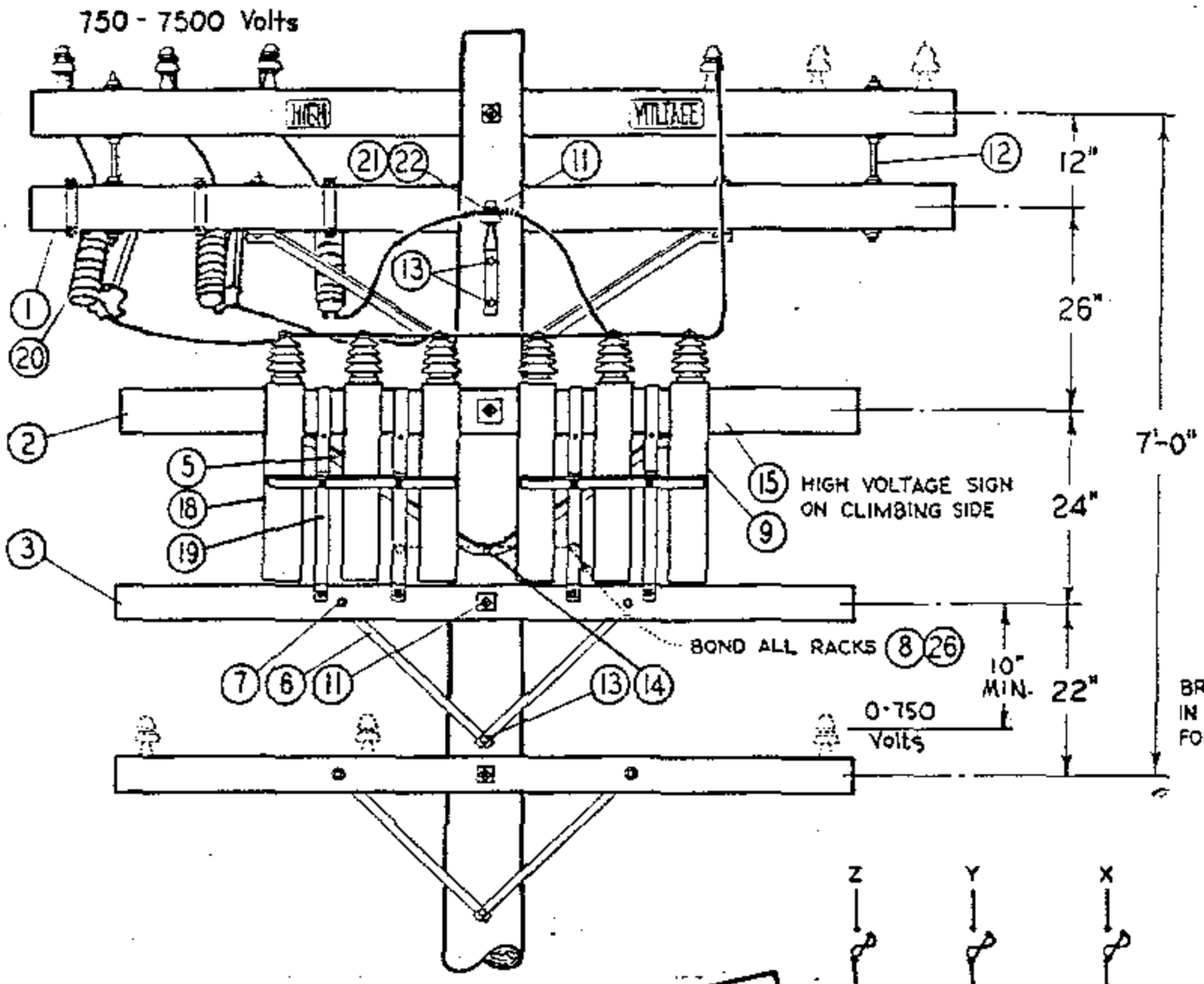
SINGLE-PHASE, 240V, SECONDARY CAPACITOR

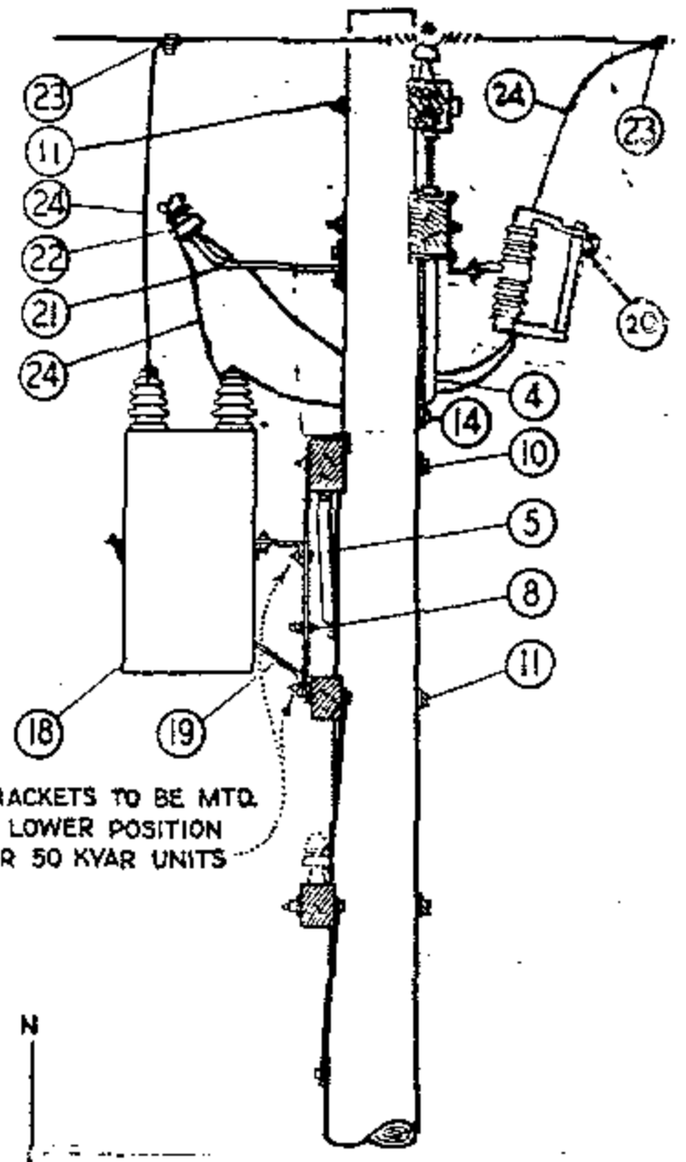
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FMO OH1316.1

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750 - 7500 Volts



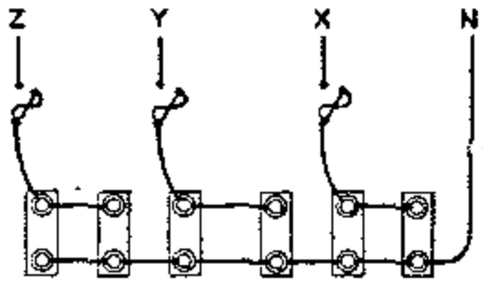




DIAGRAM OF 4 KV. WYE CONNECTIONS
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)
90 KVAR (6-15 KVAR UNITS)

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10'-0" | 1 | PG. 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8'-0" | 1 | PG. 380.05 |
| | 3 | CROSSARM, 3 1/2 X 4 1/2 X 8 - 0 | 1 | PG. 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| | 5 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 164032 |
| | 6 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| | 7 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 9 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 4 | STD 139, 140(E) |
| | 10 | BOLT; MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH., 1 FLAT, 1 CURV. & 1 NUT | 1 | STD 139, 140(E) |
| | 11 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4 SQ. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 12 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140(E) |
| | 13 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| | 14 | LAG SCREW, GALV., 5/8" X 5" | 2 | 621600 (E) |
| | 15 | SIGN, HIGH VOLTAGE & ROOFING NAILS | 1 | 647648-492224(E) |
| | 16 | | | |
| | 17 | | | |
| L T I | 18 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 6 | 207200 |
| | 19 | RACK, CAPACITOR (B) | 2 | 402620 |
| | 20 | CUTOUT, 12KV 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297868 |
| | 21 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| | 22 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG. 750.3 |
| | 23 | CONNECTOR, COMPRESSION | 4 | STD 786, 783(E) |
| | 24 | WIRE, #6 BARE STRANDED COPPER | 30' | 813536 |
| | 25 | | | |
| | 26 | WIRE, BARE SOLID ANNEALED COPPER #8 | 2'-6" | 812928 |
| | 27 | | | |

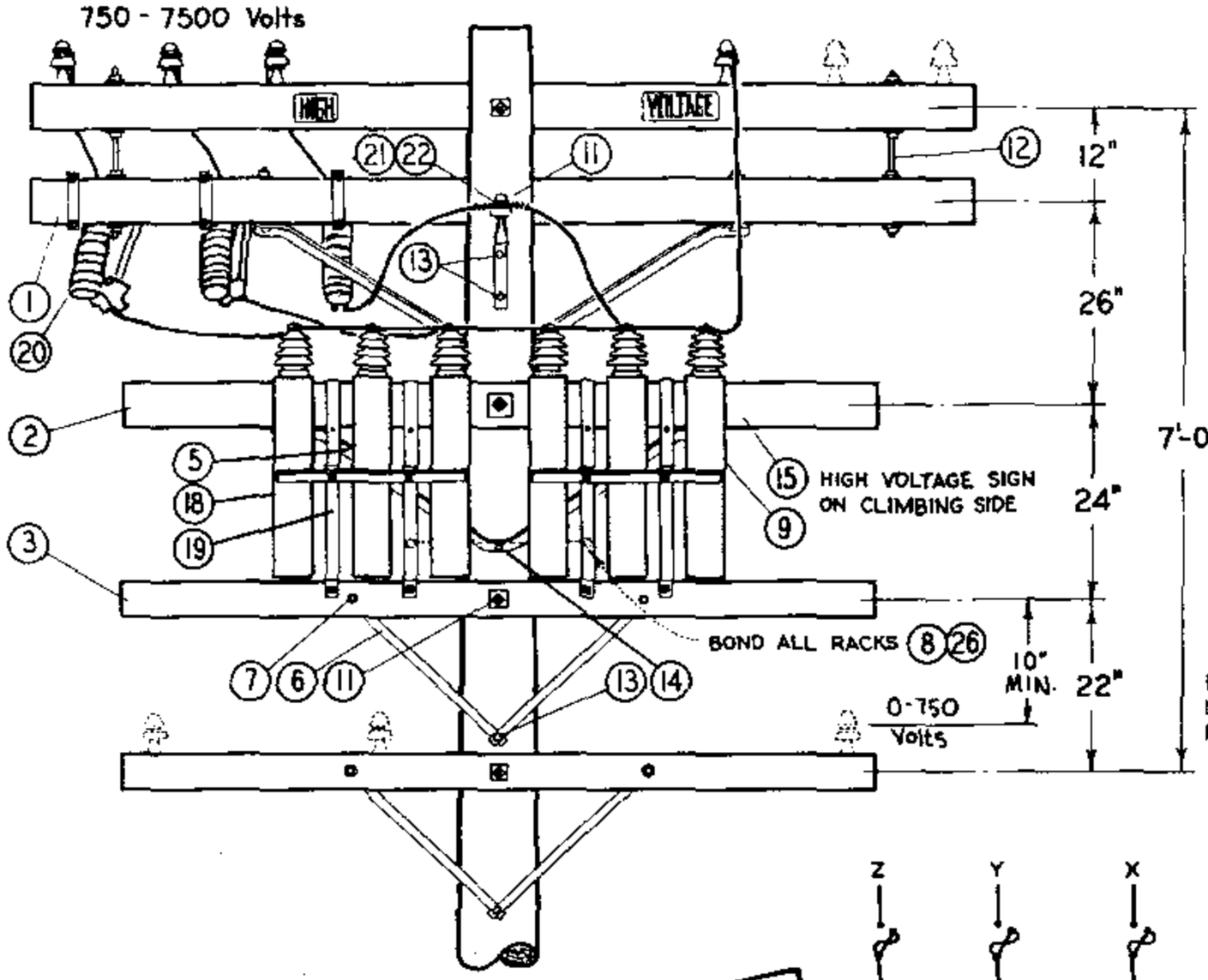
DATE 1-1-87
APPD AK/RDS

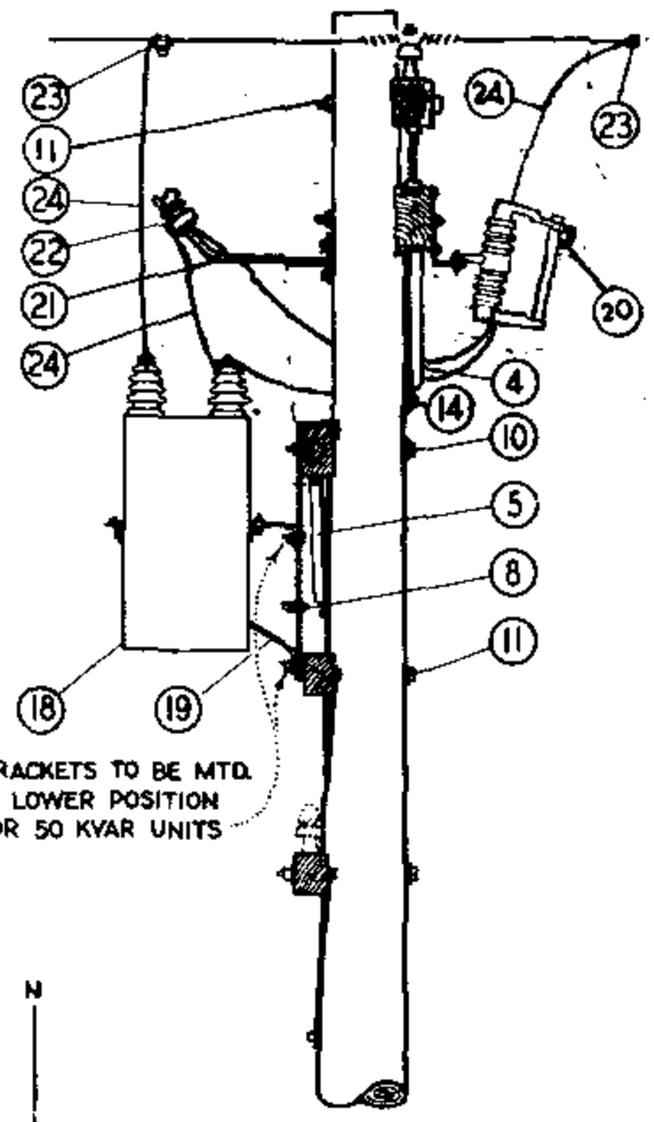
SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV - WYE - 300 KVAR MAXIMUM

1399.102
SUPERSEDES
1316 (1-1-87)

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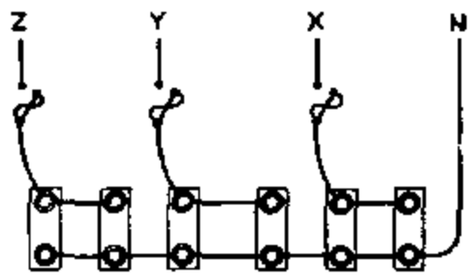




DIAGRAM OF 4 KV. WYE CONNECTIONS
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)
90 KVAR (6-15 KVAR UNITS)

INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' -0" | 1 | PG. 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | PG. 380.05 |
| | 3 | CROSSARM, 3 1/2 X 4 1/2 X 8 - 0 | 1 | PG. 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| | 5 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 164032 |
| | 6 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| | 7 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 9 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 4 | STD 139, 140(E) |
| | 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH., 1 FLAT, 1 CURV. & 1 NUT | 1 | STD 139, 140(E) |
| | 11 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4 SQ. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 12 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140(E) |
| | 13 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| | 14 | LAG SCREW, GALV., 5/8" X 5" | 2 | 621600 (E) |
| | 15 | SIGN, HIGH VOLTAGE & ROOFING NAILS | 1 | 647648-492224(E) |
| | 16 | | | |
| | 17 | | | |
| L T I | 18 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 6 | 207200 |
| | 19 | RACK, CAPACITOR (B) | 2 | 402620 |
| | 20 | CUTOUT, 12KV 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297888 |
| | 21 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| | 22 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG. 750.3 |
| | 23 | CONNECTOR, COMPRESSION | 4 | STD 786, 783(E) |
| | 24 | WIRE, #6 BARE STRANDED COPPER | 30' | 813536 |
| | 25 | | | |
| | 26 | WIRE, BARE SOLID ANNEALED COPPER #8 | 2'-6" | 812928 |
| | 27 | | | |

DATE 1-1-87
APPD AK/RDS

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV - WYE - 300 KVAR MAXIMUM

1399.108
SUPERSEDES
1316 (1-1-87)

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

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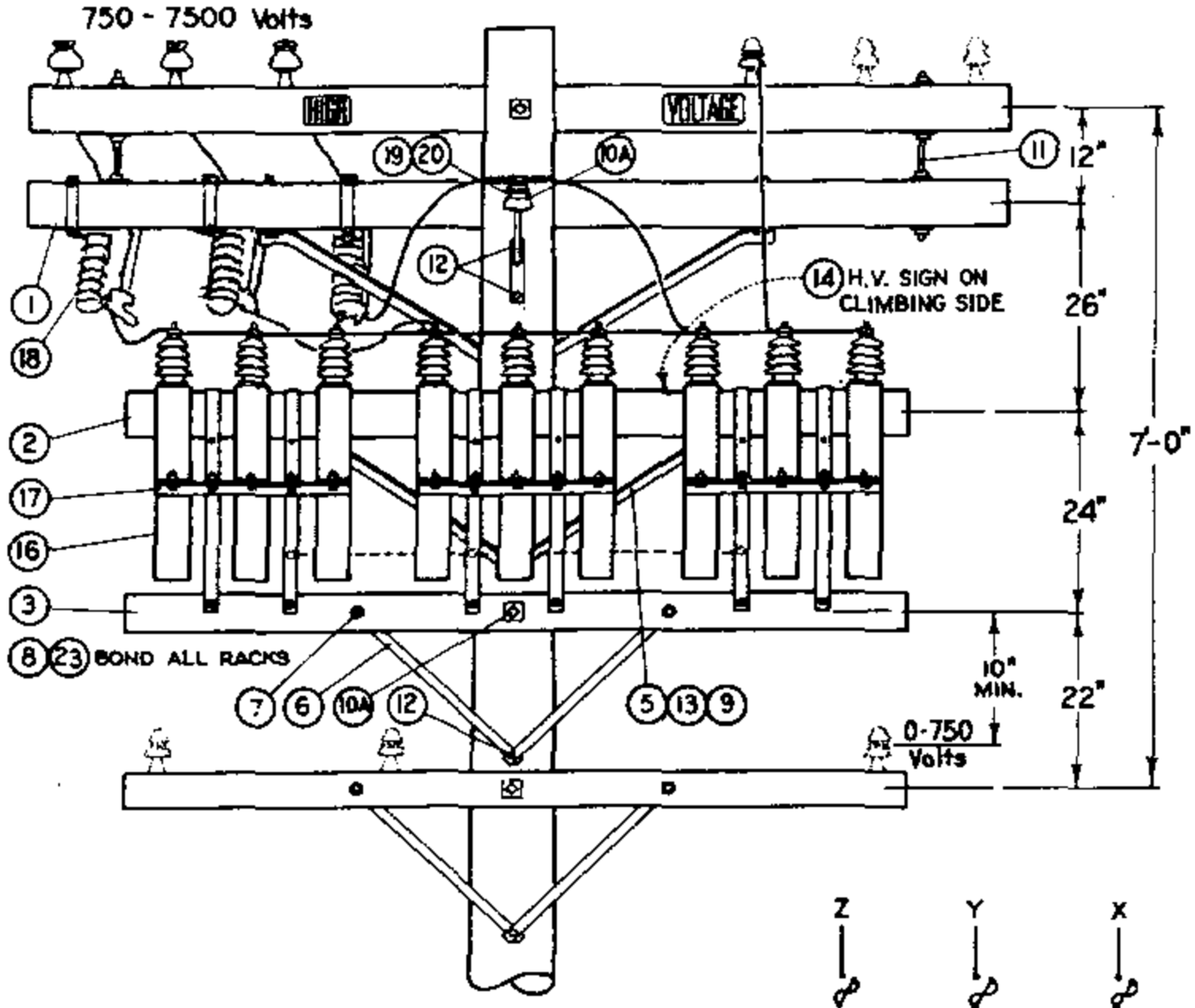
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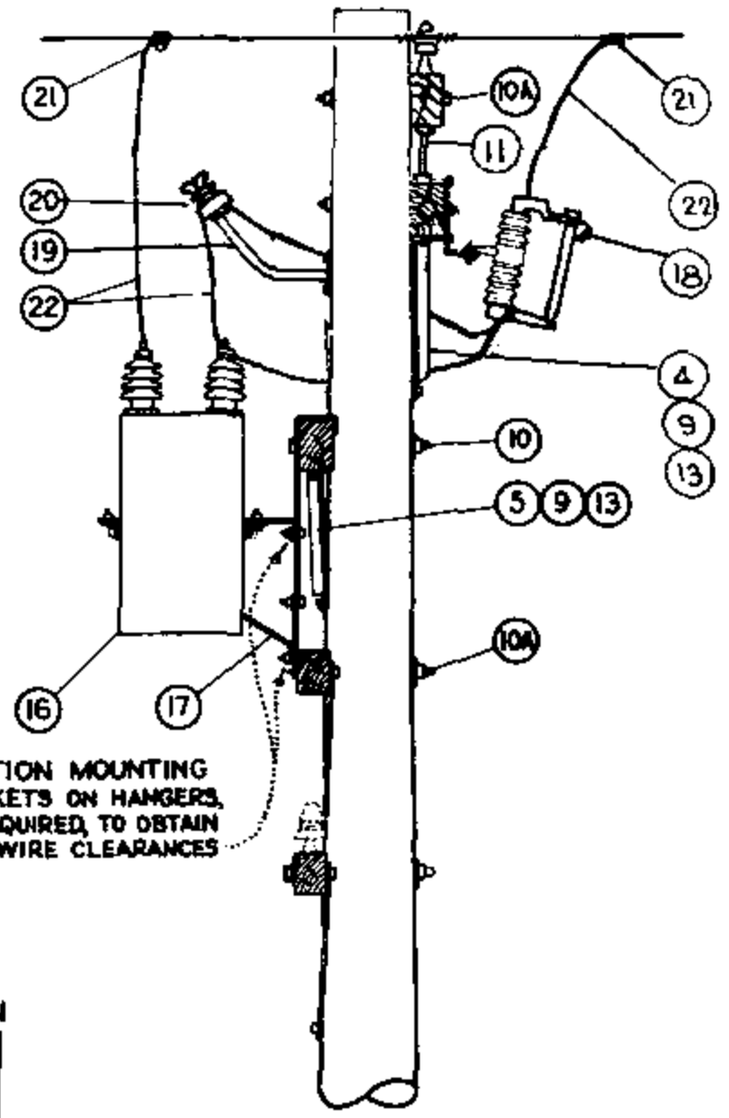
SDG&E ELECTRIC OVERHEAD STANDARD

CAPACITOR INSTALLATION 4KV-WYE-450 KVAR MAXIMUM

FMO OH 1317

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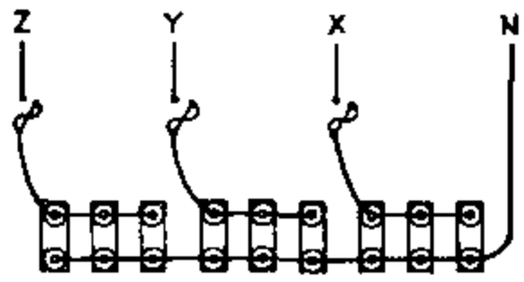



DIAGRAM OF 4 KV. WYE CONNECTIONS
450 KVAR (9-50 KVAR UNITS)
225 KVAR (9-25 KVAR UNITS)
135 KVAR (9-15 KVAR UNITS)

STALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 380.01 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 380.05 |
| 3 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 380.05 |
| 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| 5 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 164032 |
| 6 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| 7 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| 8 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2 RD. WASH. & 1 NUT | 3 | STD 139, 140(E) |
| 9 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 4 | STD 139, 140(E) |
| 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3" SQ. WASH., 1 FLAT, 1 CURV., & 1 NUT | 1 | STD 139, 140(E) |
| 10A | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4" SQ. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| 11 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140(E) |
| 12 | LAG SCREW, GALV. 1/2" X 4" | 3 | 621568 (E) |
| 13 | LAG SCREW, GALV. 5/8" X 5" | 2 | 621600 (E) |
| 14 | SIGN, HIGH VOLTAGE, & ROOFING NAILS (E) | 1 | 647648-492224 |
| 15 | | | |
| 16 | CAPACITOR UNIT, 2.4KV, (50 KVAR UNITS ILLUSTRATED) (8) | 9 | 207200 |
| 17 | RACK, CAPACITOR | 3 | 402624 |
| 18 | CUTOUT 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297888 |
| 19 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| 20 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | 750.3 |
| 21 | CONNECTOR, COMPRESSION | 4 | PGS 786, 783(E) |
| 22 | WIRE, #6 BARE STRANDED COPPER | 30' | 813536 |
| 23 | WIRE, BARE SOLID ANNEALED COPPER #8 | 6' | 812928 |
| 24 | | | |
| 25 | | | |
| 26 | | | |

1399.109
SUPERSEDES 317 (1-1-87)

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV - WYE - 450 KVAR MAXIMUM

DATE 1-1-87
APPD AK / RDG

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**REVISION HISTORY:**

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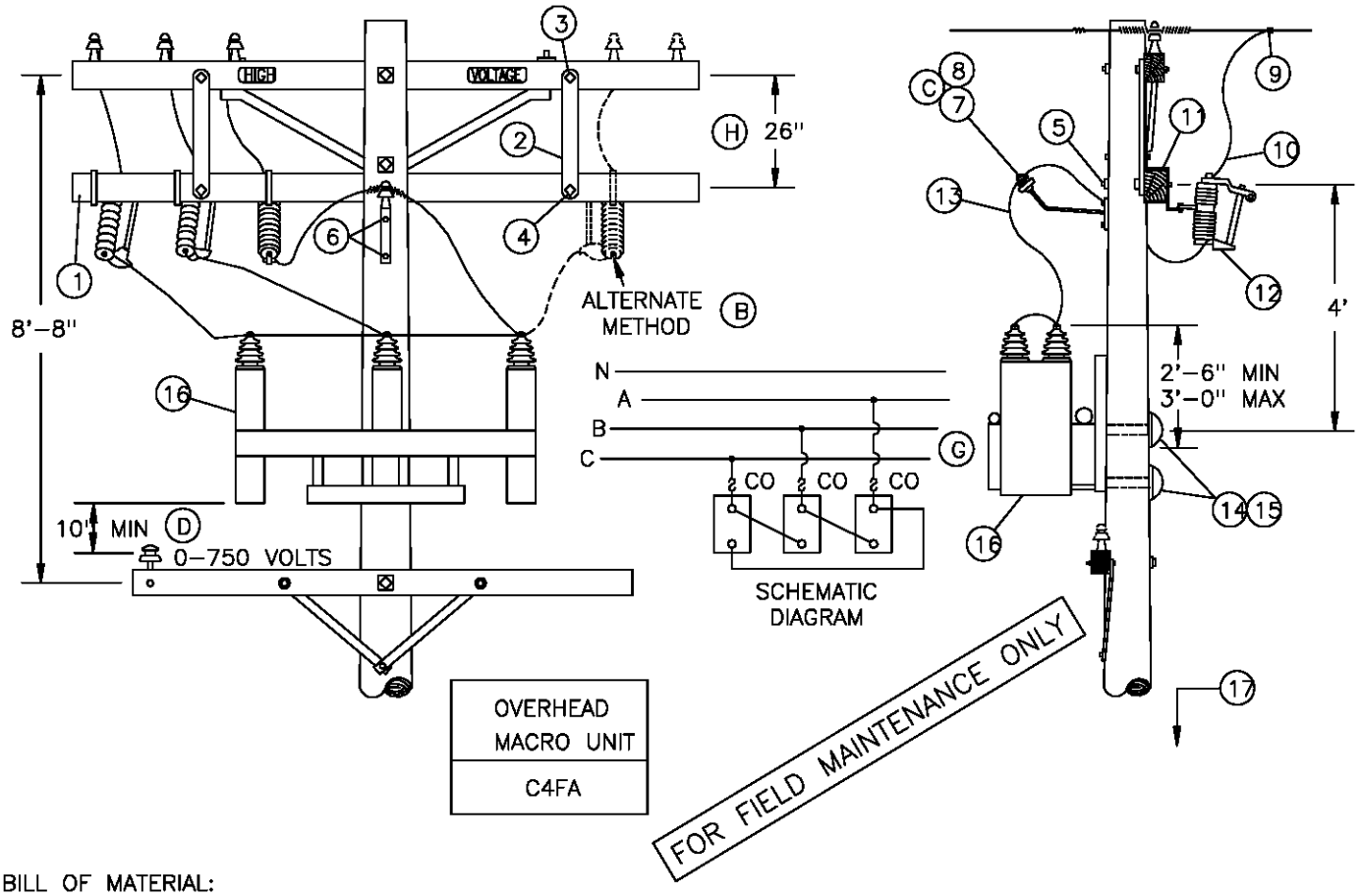
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SDG&E ELECTRIC OVERHEAD STANDARD

FIXED CAPACITOR INSTALLATION, 4.16KV DELTA
UNGROUNDED RACK

FMO
OH 1318

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 4.16KV DELTA FIXED CAPACITOR.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM 3 3/4" X 5 3/4" X 10' - 0" | 1 | - | 294128 |
| 2 | BRACE, FLAT, CROSSARM, 28" | 2 | - | 164192 |
| 3 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 2 | 392 | - |
| 4 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 RD & 1 SPRING WASHER | 2 | 392 | - |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE FLAT AND 1 DOUBLE COIL SPRING WASHER | 1 | 392 | - |
| 6 | LAG SCREW, GALV, 1/2" X 4" (C) | 2 | - | 621568 |
| 7 | BRACKET, INSULATOR, 1" LEAD THREAD (C) | 1 | - | 166134 |
| 8 | INSULATOR, PIN TYPE, CLASS AS REQUIRED (C) | 1 | 750 | - |
| 9 | CONNECTOR, COMPRESSION, CU OR AL (SIZE AS REQ'D) | AS REQ'D | 783, 786 | - |
| 10 | WIRE, BARE STRANDED, #6, COPPER | 9' | - | 813536 |
| 11 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | - | 166070 |
| 12 | CUTOUT, 12KV, 100A, HVY DUTY, WITH LOADBUSTER HOOK | 3 | - | 297888 |
| 13 | WIRE, BARE STRANDED, #4 COPPER | 12' | - | 813760 |
| 14 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED AND 1 DOUBLE COIL SPRING WASHER | 2 | 392 | - |
| 15 | COVER, THRU BOLT, PLASTIC & | 2 | - | 285696 |
| | 6-10D NAILS, GALV | - | - | 491392 |
| 16 | RACK, CAPACITOR (4.16KV, 200 KVAR) (G) | 1 | - | 564759 |
| 17 | TAG, STATION NUMBER | 1 | 200 SECT | - |

| | | |
|---|---|---|
| DATE 12-1-98<br>APPD PA/BSG | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4.16KV DELTA UNGROUNDED RACK | 1399.110<br>SUPERSEDES<br>1318.1 (12-1-98) |

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INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.

(B) INSTALL ONE CUTOUT AS SHOWN ON THE ALTERNATE METHOD IF THE 4KV CONDUCTORS ARE SPREAD OUT.

(C) OMIT ITEMS 6, 7, & 8 IF ALTERNATE METHOD (B) IS USED.

(D) FROM BOTTOM OF THE CAPACITOR RACK OR THE CASE, WHICHEVER IS LOWER.

F. CAPACITOR MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

(G) THE KVAR RATING OF 7200 VOLT CAPACITORS IS REDUCED BY A FACTOR OF THREE WHEN WIRED IN DELTA AND CONNECTED TO THE 4160 VOLT SYSTEM.

(H) IF ADDITIONAL SPACE IS REQUIRED BELOW THE CUTOUT ARM, THE SEPARATION BETWEEN THE LINE ARM AND CUTOUT ARM MAY BE REDUCED TO 12" WITH THE USE OF SPACE BOLTS.

FOR FIELD MAINTENANCE ONLY

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| 1399.111<br>SUPERSEDES<br>1318.2 (12-1-98) | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4.16KV DELTA UNGROUNDED RACK | DATE 12-1-98<br>APPD PSA/CMK |
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**REVISION HISTORY:**

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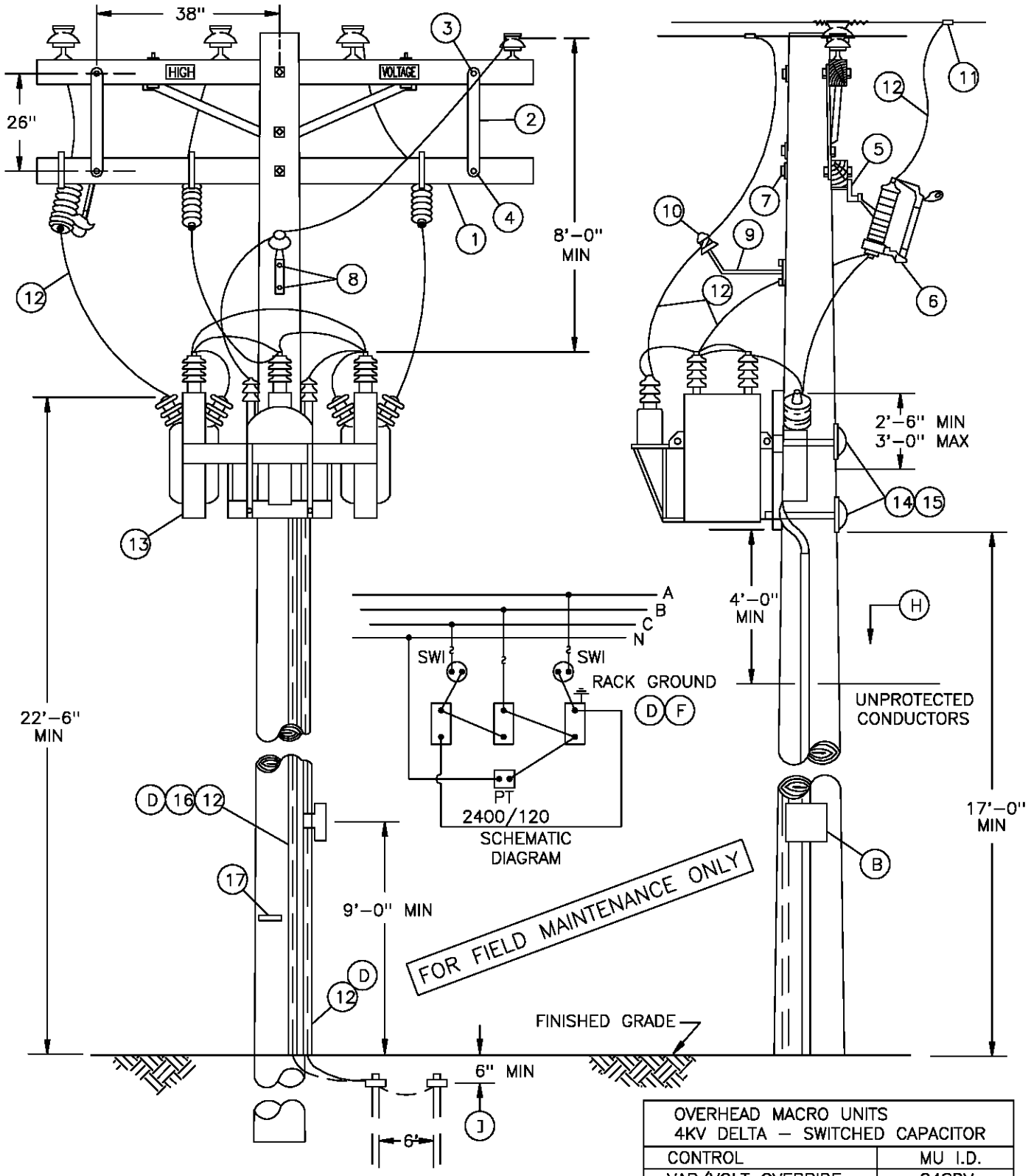
SDG&E ELECTRIC OVERHEAD STANDARD

SWITCHED CAPACITOR INSTALLATION
4.16 KV DELTA - 2 OIL SWITCHES

FMO
OH 1319

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 4.16KV DELTA SWITCHED CAPACITOR.




| OVERHEAD MACRO UNITS 4KV DELTA – SWITCHED CAPACITOR | |
|---|---|
| CONTROL | MU I.D. |
| VAR/VOLT OVERRIDE | C4SDV |
| VOLT W/TIME BIAS | C4STD |

NOTES:

– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

| | | |
|---|---|---|
| DATE 12–1–98<br>APPD PSA/CMK | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITOR INSTALLATION<br>4.16 KV DELTA – 2 OIL SWITCHES | 1399.112<br>SUPERSEDES<br>1319.1 (12–1–98) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | 1 | -- | 249128 |
| 2 | BRACE, FLAT, CROSSARM, 28" | 2 | -- | 164192 |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 SPR WASH & 1 RD WASH | 2 | 392 | -- |
| 4 | BOLT, MACH, GALV, 1/2 X 5", 1 RD WASH, 1 DBL COIL WASH | 2 | 392 | -- |
| 5 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | -- | 166070 |
| 6 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 1212 | -- |
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQ WASH & 1 DBL COIL WASH | 1 | 392 | -- |
| 8 | LAG SCREW, GALV, 1/2" X 4" | 2 | -- | 621568 |
| 9 | BRACKET, INSULATOR, 1" LEAD THREAD | 1 | -- | 166134 |
| 10 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | 750 | -- |
| 11 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–786 | -- |
| 12 | WIRE, BARE STRANDED, #4, COPPER | 100' | -- | 813760 |
| 13 | RACK, SWITCHED CAPACITOR, COMPLETE WITH SWITCHES AND POTENTIAL TRANSFORMER, (4.16KV, 200KVAR) (F) | 1 | -- | 564758 |
| 14 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURVE RIB WASH & 1 DBL COIL SPR WASH | 2 | 392 | -- |
| 15 | COVER, BOLT, PLASTIC & 6 – 1 3/4" NAILS, GALV | 2 | -- | 285696 |
| | | -- | -- | 492192 |
| 16 | UNIT GROUND, COMPLETE | 1 | -- | 603136 |
| 17 | TAG, STATION NUMBER | 1 | 200 SECT. | -- |

FOR FIELD MAINTENANCE ONLY

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INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.

(B) SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

C. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

(D) CONNECT CAPACITOR RACK GROUND LEAD TO GROUND ROD. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

(F) THE KVAR RATING OF 7200 VOLT CAPACITORS IS REDUCED BY A FACTOR OF THREE WHEN WIRED IN DELTA AND CONNECTED TO THE 4160 VOLT SYSTEM.

G. CAPACITOR MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

REFERENCE:

(H) POLE STEPPING – SEE STANDARD 363.

(I) GROUNDING METHODS – SEE STANDARD 1002.

J. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE – G.O. 95 RULE 22.2 (C).

| | | |
|---|---|---|
| 1399.113<br>SUPERSEDES<br>319.2 (12–1–98) | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITOR INSTALLATION<br>4.16 KV DELTA – OIL SWITCHES | DATE 12–1–98<br>APPD PSA / CMK |

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**REVISION HISTORY:**

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SDG&E ELECTRIC OVERHEAD STANDARD

SWITCHED CAPACITOR INSTALLATION
4.16 KV WYE - 3 OIL SWITCHES

FMO
OH 1321

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | 1 | – | 294128 |
| 2 | BRACE, FLAT, CROSSARM, 28" | 2 | – | 164192 |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 SPR & 1 RD WASHER | 2 | 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE & 1 DOUBLE COIL SPRING WASHER | 1 | 392 | – |
| 6 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783, 786 | – |
| 7 | WIRE, #4, BARE STRANDED COPPER | 95' | – | 813760 |
| 8 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | – | 166070 |
| 9 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 1212 | – |
| 10 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | – | 429216 |
| 11 | BRACKET, INSULATOR, 1" LEAD THREAD | 1 | – | 166134 |
| 12 | LAG SCREW, GALV, 1/2" X 4" | 2 | – | 621568 |
| 13 | RACK, SWITCHED CAPACITOR, COMPLETE WITH SWITCHES AND POTENTIAL TRANSFORMER, (4.16KV, 300KVAR) | 1 | – | 564773 |
| 14 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVE RIBBED & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |
| 15 | COVER, BOLT, PLASTIC & 6 – 1 3/4" NAILS, GALV | 2 | – | 285696 |
| | | – | – | 492192 |
| 16 | UNIT GROUND, COMPLETE | 1 | – | 603136 |
| 17 | TAG, STATION NUMBER | 1 | 338 | – |

FOR FIELD MAINTENANCE ONLY

| OVERHEAD MACRO UNITS 4KV WYE – SWITCHED CAPACITOR | |
|---|---|
| CONTROL | MU I.D. |
| VAR/VOLT OVERRIDE | C4S3DV |
| VOLT W/TIME BIAS | C4S3TD |

INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.

B. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

Ⓒ CONNECT CAPACITOR RACK GROUND LEAD TO GROUND ROD. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

REFERENCE:

Ⓕ SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

Ⓖ POLE STEPPING, SEE STANDARD 363.

Ⓗ GROUNDING METHOD, SEE STANDARD 1002.

I. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE – G.O. 95 RULE 22.2 (C).

J. CAPACITOR MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK. SEE DESIGN STANDARDS PAGE 5811.5.

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| 1399.204<br>SUPERSEDES<br>321.2 (12-1-98) | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITOR INSTALLATION<br>4.16 KV WYE – 3 OIL SWITCHES | DATE 12-1-98<br>APPD PSA/CMC |

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**REVISION HISTORY:**

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SDG&E ELECTRIC OVERHEAD STANDARD

CAPACITOR INSTALLATIONS, 12KV-WYE-900 KVAR MAX

FMO OH 1322

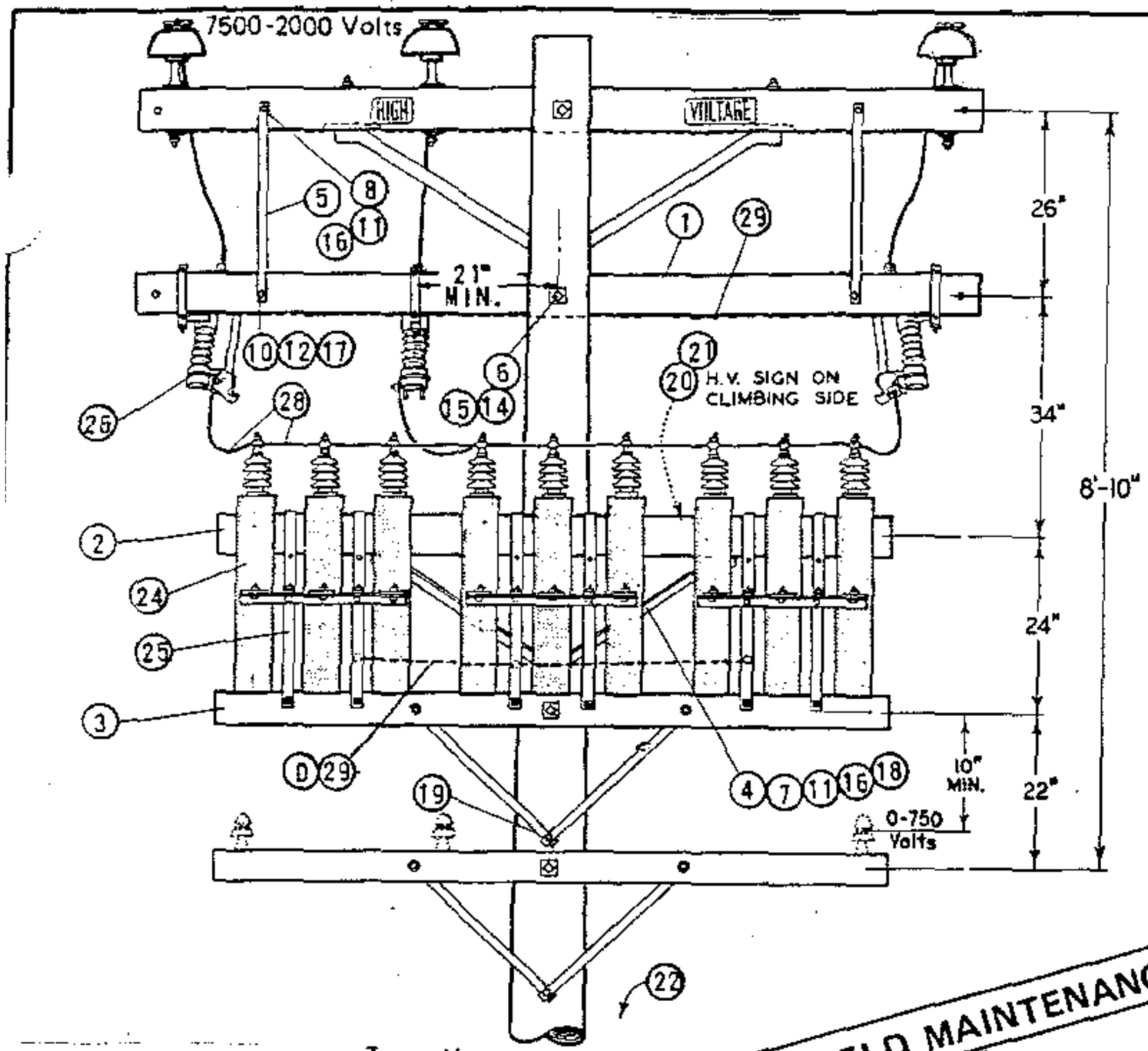



DIAGRAM OF 12KV WYE CONNECTIONS

600 KVAR (6-100 KVAR UNITS)
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)

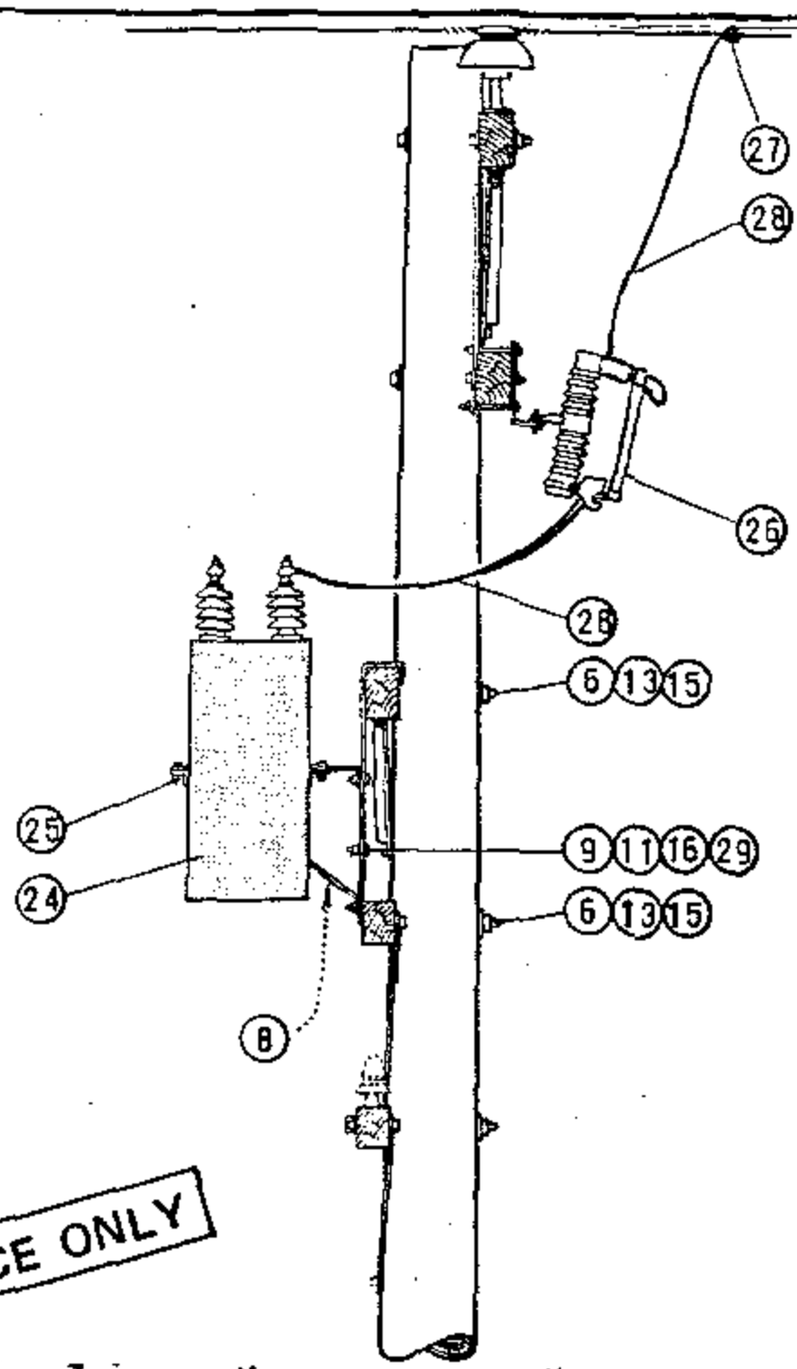


DIAGRAM OF 12KV WYE CONNECTIONS

900 KVAR (9-100 KVAR UNITS)
450 KVAR (9-50 KVAR UNITS)
225 KVAR (9-25 KVAR UNITS)

**FOR FIELD MAINTENANCE ONLY**

INSTALLATION:

(A) QUANTITY BASED ON 45' POLE.
(B) BRACKETS TO BE MOUNTED IN LOWER POSITION FOR 50 AND 100 KVAR UNITS.
C. BOND ALL 12KV HARDWARE WITHIN 3 MILES OF COAST.
(D) BOND ALL RACKS AS SHOWN IN ILLUSTRATION.
(E) EXEMPT MATERIAL.
(F) NO LONGER PURCHASED.
G. SEE PAGE 1323 FOR MATERIAL NEEDED FOR LIGHTING ARRESTERS ON 900 KVAR INSTALLATIONS.

| ITEM | DESCRIPTION | QUANTITY UNITS 6 | QUANTITY UNITS 9 | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 1 | 380.01 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 1 | 380.05 |
| 3 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 1 | 380.05 |
| 4 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 1 | 164032 |
| 5 | BRACE, FLAT CROSSARM, 28" | 2 | 2 | 164192 |
| 6 | BOLT, MACH. GALV. 5/8" X (LENGTH AS REQ'D) & 1 NUT | 3 | 3 | 139 (E) |
| 7 | BOLT, MACH. 1/2" X 7" & 1 NUT | 2 | 2 | 153120 (E) |
| 8 | BOLT, MACH. GALV. 1/2" X 5" & 1 NUT | 2 | 2 | 153024 (E) |
| 9 | BOLT, MACH. GALV. 1/2" X 1 1/2" & 1 NUT | 2 | 3 | 152608 (E) |
| 10 | BOLT, MACH. GALV. 3/8" X 5" & 1 NUT | 2 | 2 | 154368 (E) |
| 11 | WASHER, 1/2" ROUND | 10 | 8 | 800192 (E) |
| 12 | WASHER, 3/8" ROUND | 2 | 2 | 800288 (E) |
| 13 | WASHER, 3" SQ. CURVED | 4 | 4 | 798912 (E) |
| 14 | WASHER, 2 1/4" SQ. FLAT | 2 | 2 | 799040 (E) |
| 15 | WASHER, 5/8" SPRING DBL COIL | 3 | 3 | 798560 (E) |
| 16 | WASHER, 1/2" SPRING DBL COIL | 6 | 6 | 798464 (E) |
| 17 | WASHER, 3/8" SPRING DBL COIL | 2 | 2 | 798528 (E) |
| 18 | SCREW, LAG GALV. 5/8" X 5" | 1 | 1 | 621600 (E) |
| 19 | SCREW, LAG GALV. 1/2" X 4" | 1 | 1 | 621568 (E) |
| 20 | SIGN, HIGH VOLTAGE | 1 | 1 | 647648 (E) |
| 21 | NAILS, ROOFING #8 GALV. | 8 | 8 | 492224 (E) |
| 22 | STEPS, POLE (A) | 16 | 16 | 692992 (E) |
| 23 | | | | |
| 24 | CAPACITOR, UNIT 7.2KV (100 KVAR UNITS ILLUSTRATED) (F) | 6 | 9 | 207232 |
| 25 | RACK, CAPACITOR | 2 | 3 | 402656 |
| 26 | CUTOUT, 12KV, 100A HEAVY DUTY WITH LOADBUSTER HOOKS | 3 | 3 | 297888 |
| 27 | CONNECTORS, COMPRESSION | 3 | 3 | 786, 783 (E) |
| 28 | WIRE, #6 BARE STRANDED COPPER | 33' | 35' | 813536 |
| 29 | WIRE, #8 BARE SOLID ANNEALED COPPER | 13' | 15' | 812928 |
| 30 | | | | |

PT&F

LTI

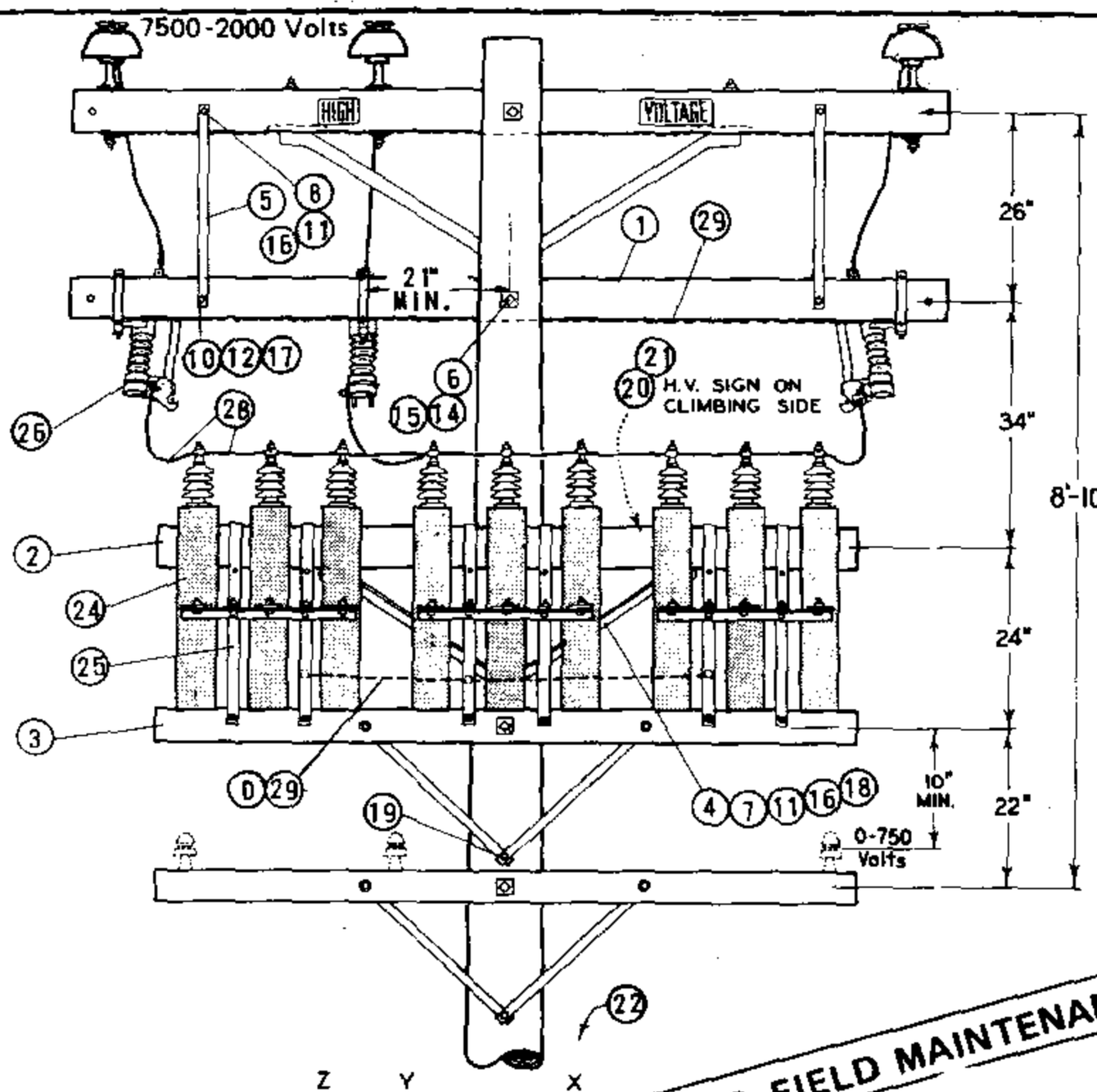
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PPD JWT/RCH

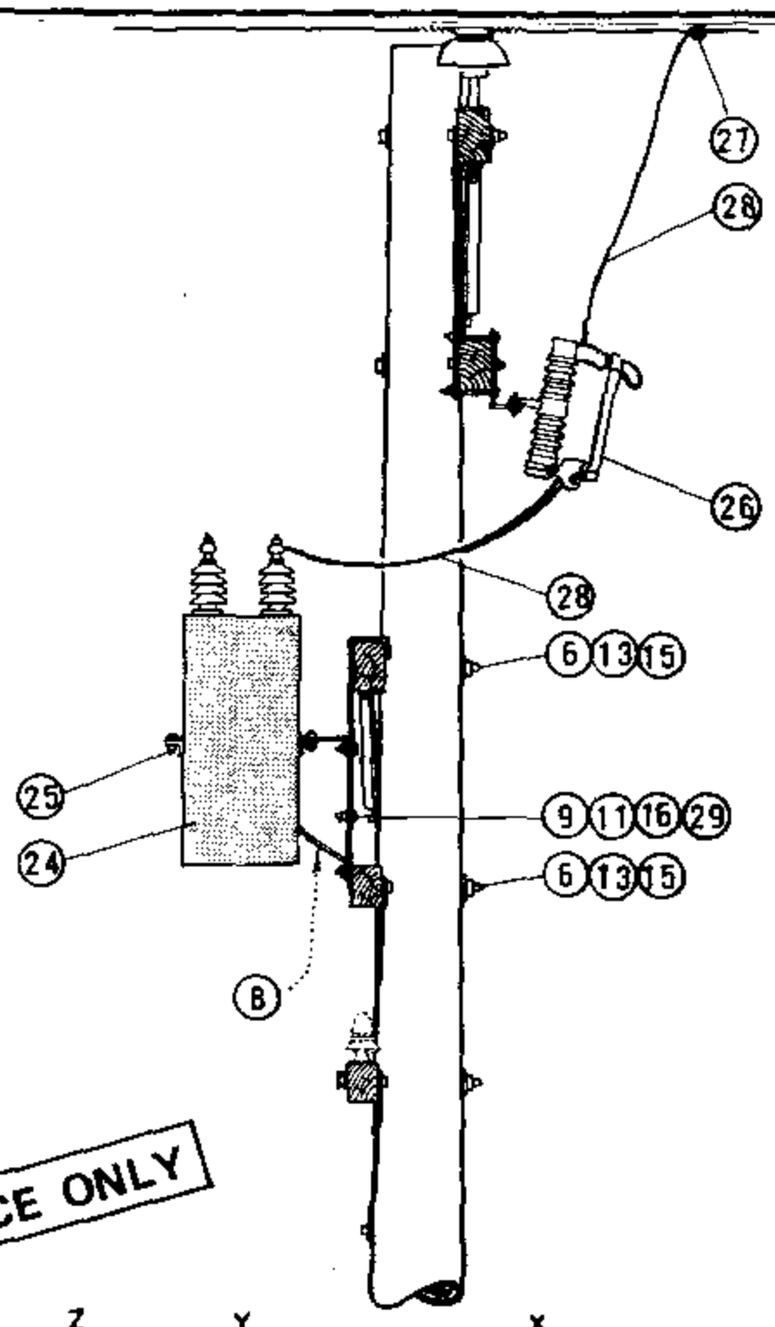
SDG&E ELECTRIC STANDARDS

CAPACITOR INSTALLATIONS, 12KV - WYE - 900 KVAR MAX.

1399.203
SUPERSEDES
1322 (11-5-82)

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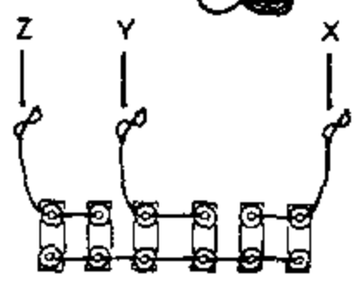



DIAGRAM OF 12KV WYE CONNECTIONS

600 KVAR (6-100 KVAR UNITS)
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)

**FOR FIELD MAINTENANCE ONLY**

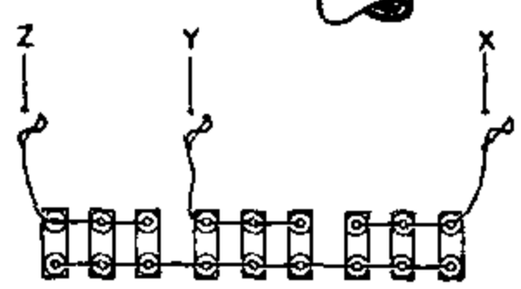



DIAGRAM OF 12KV WYE CONNECTIONS

900 KVAR (9-100 KVAR UNITS)
450 KVAR (9-50 KVAR UNITS)
225 KVAR (9-25 KVAR UNITS)

INSTALLATION:

(A) QUANTITY BASED ON 45' POLE.
(B) BRACKETS TO BE MOUNTED IN LOWER POSITION FOR 50 AND 100 KVAR UNITS.
C. BOND ALL 12KV HARDWARE WITHIN 3 MILES OF COAST.
(D) BOND ALL RACKS AS SHOWN IN ILLUSTRATION.
(E) EXEMPT MATERIAL.
(F) NO LONGER PURCHASED.
G. SEE PAGE 1323 FOR MATERIAL NEEDED FOR LIGHTING ARRESTERS ON 900 KVAR INSTALLATIONS.

| ITEM | | DESCRIPTION | QUANTITY UNITS 6 | QUANTITY UNITS 9 | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 1 | 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 1 | 380.05 |
| | 3 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 1 | 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 1 | 164032 |
| | 5 | BRACE, FLAT CROSSARM, 28" | 2 | 2 | 164192 |
| | 6 | BOLT, MACH. GALV. 5/8" X (LENGTH AS REQ'D) & 1 NUT | 3 | 3 | 139 (E) |
| | 7 | BOLT, MACH. 1/2" X 7" & 1 NUT | 2 | 2 | 153120 (E) |
| | 8 | BOLT, MACH. GALV. 1/2" X 5" & 1 NUT | 2 | 2 | 153024 (E) |
| | 9 | BOLT, MACH. GALV. 1/2" X 1 1/2" & 1 NUT | 2 | 3 | 152608 (E) |
| | 10 | BOLT, MACH. GALV. 3/8" X 5" & 1 NUT | 2 | 2 | 154368 (E) |
| | 11 | WASHER, 1/2" ROUND | 10 | 8 | 800192 (E) |
| | 12 | WASHER, 3/8" ROUND | 2 | 2 | 800288 (E) |
| | 13 | WASHER, 3" SQ. CURVED | 4 | 4 | 798912 (E) |
| | 14 | WASHER, 2 1/4" SQ. FLAT | 2 | 2 | 799040 (E) |
| | 15 | WASHER, 5/8" SPRING DBL COIL | 3 | 3 | 798560 (E) |
| P T & F | 16 | WASHER, 1/2" SPRING DBL COIL | 6 | 6 | 798464 (E) |
| | 17 | WASHER, 3/8" SPRING DBL COIL | 2 | 2 | 798528 (E) |
| | 18 | SCREW, LAG GALV. 5/8" X 5" | 1 | 1 | 621600 (E) |
| | 19 | SCREW, LAG GALV. 1/2" X 4" | 1 | 1 | 621568 (E) |
| | 20 | SIGN, HIGH VOLTAGE | 1 | 1 | 647648 (E) |
| | 21 | NAILS, ROOFING #8 GALV. | 8 | 8 | 492224 (E) |
| | 22 | STEPS, POLE (A) | 16 | 16 | 692992 (E) |
| | 23 | | | | |
| L T I | 24 | CAPACITOR, UNIT 7.2KV (100 KVAR UNITS ILLUSTRATED) (F) | 6 | 9 | 207232 |
| | 25 | RACK, CAPACITOR | 2 | 3 | 402656 |
| | 26 | CUTOUT, 12KV, 100A HEAVY DUTY WITH LOADBUSTER HOOKS | 3 | 3 | 297888 |
| | 27 | CONNECTORS, COMPRESSION | 3 | 3 | 786, 783 (E) |
| | 28 | WIRE, #6 BARE STRANDED COPPER | 33' | 35' | 813536 |
| | 29 | WIRE, #8 BARE SOLID ANNEALED COPPER | 13' | 15' | 812928 |
| | 30 | | | | |

DATE 11-5-82
APPD JHT/RCH

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATIONS, 12KV - WYE - 900 KVAR MAX.

1399.207
SUPERSEDES 1322 (11-5-82)

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

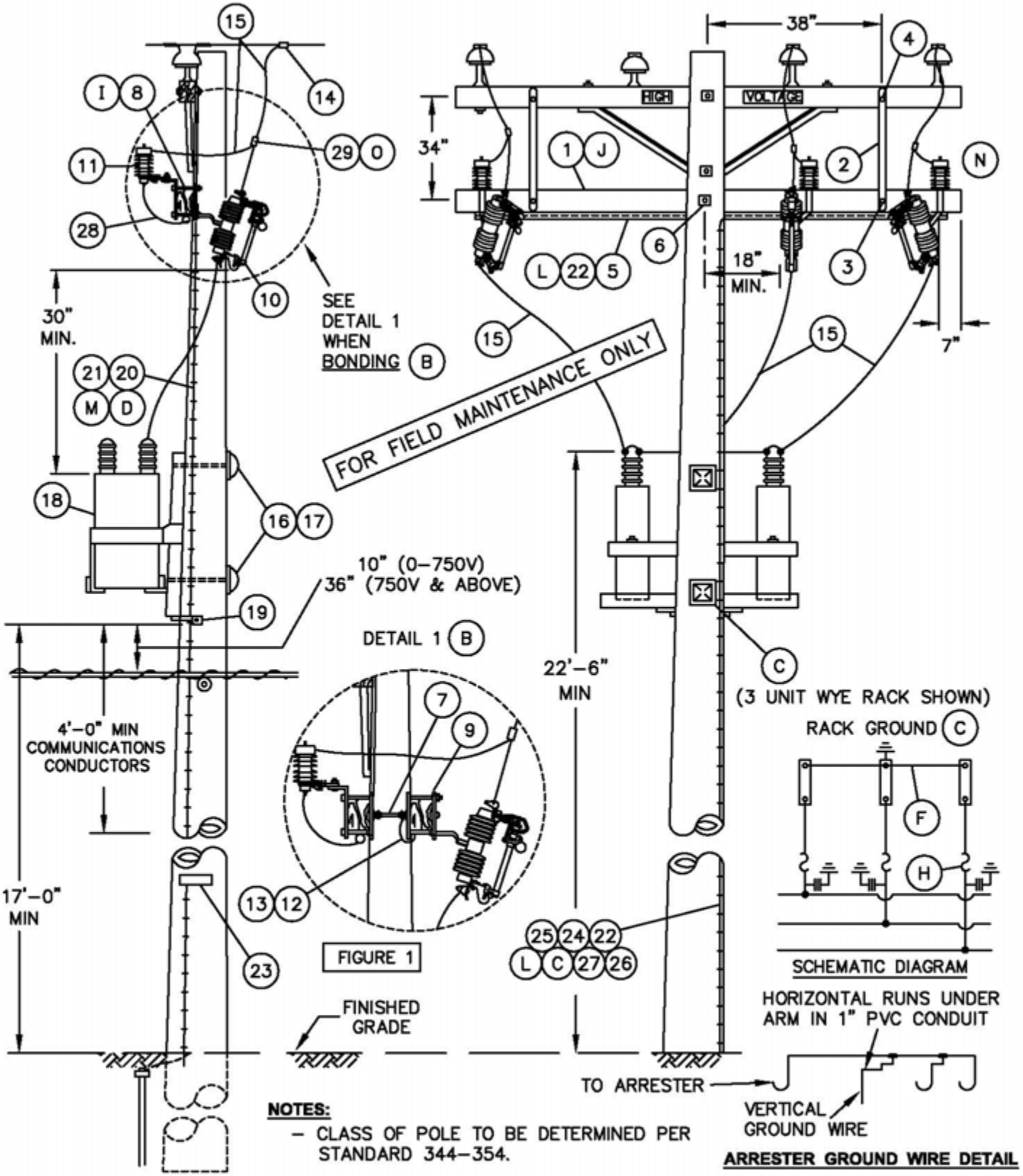
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

FIXED CAPACITOR INSTALLATION, 4KV WYE

FMO
OH 1323

**SCOPE:** THIS STANDARD SHOWS THE PREFERRED METHOD OF CONSTRUCTION FOR A FIXED CAPACITOR WHEN A NEW POLE IS REQUIRED.




**NOTES:**

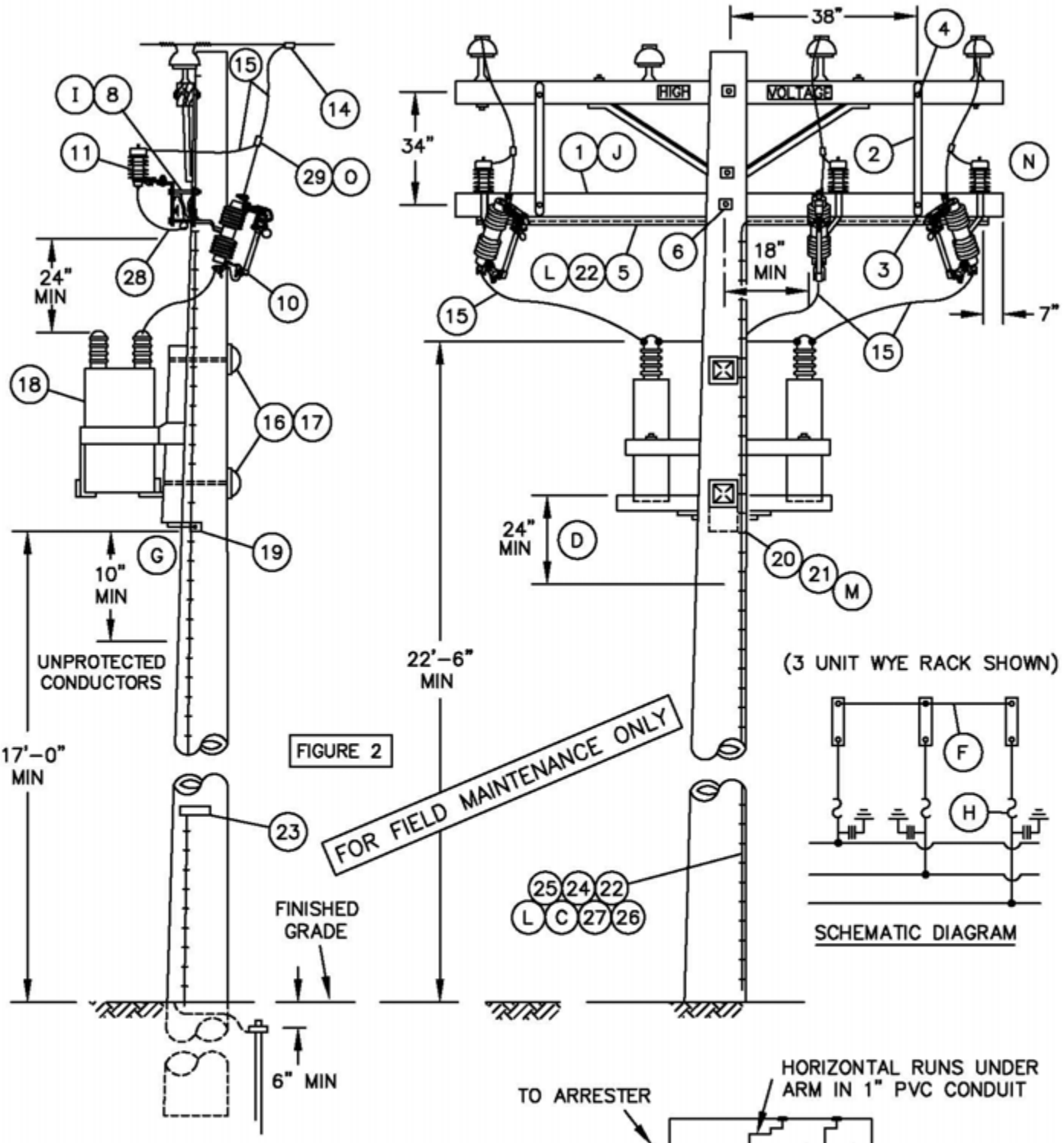
– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

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| | | |
|---|---|---|
| 1399.504<br>4299.507<br>SUPERSEDES<br>1323.1 (10–15–05) | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4KV WYE GROUNDED RACK | DATE 10–15–05<br>APPD PBA / JJ |

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**SCOPE:** THIS STANDARD SHOWS AN ALTERNATE METHOD OF INSTALLING A FIXED CAPACITOR ON AN EXISTING POLE OF PROPER CLASS BUT WITH INSUFFICIENT HEIGHT TO PERMIT THE CONSTRUCTION AS SHOWN ON PAGE 1323.1 FIGURE 1.




**NOTES:**

– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

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| | | |
|---|---|---|
| DATE 10–3–2012<br>APPD TQ/MJC | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4KV WYE UNGROUNDED RACK –– ALTERNATE | 1399.505<br>4299.508<br>SUPERSEDES<br>1323.2 (10–15–05) |

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY (B) UNBONDED | QUANTITY (B) BONDED | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNIT |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" (B) | 1 | 2 | 294128 | – |
| 2 | BRACE, FLAT, CROSSARM, 36" (J) | 2 | 2 | 164224 | – |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND & 1 LOCK WASHER (J) | 2 | 2 | STD 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DBL COIL SPR WASH (J) | 2 | 2 | STD 392 | – |
| 5 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" AND | 10' | 10' | 251200 | – |
| | STRAPS, PIPE, GALV. 1" WITH 1 3/4" ROOFING NAILS | AS REQ'D | | 697792 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | 1 | 1 | STD 392 | – |
| 7 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS & 2 NUTS | – | 2 | STD 392 | – |
| 8 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | 3 | – | 165442 | – |
| 9 | BRACKET, ARRESTER OR CUTOUT | – | 6 | 166070 | – |
| 10 | CUTOUT, 12KV, 100A, WITH LOADBUSTER HOOKS | 3 | 3 | STD 1212 | – |
| 11 | ARRESTER, LIGHTNING (SEE STD. 1247 FOR 4KV APPLICATION) 4 KV | 3 | 3 | 113216 | – |
| | OR 12 KV | 3 | 3 | 113248 | – |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (B) FT | – | 15 | 812928 | – |
| | LB | – | 1 | | |
| 13 | STAPLES, WIRE, GALV, 1 1/4" (B) | AS REQ'D | | 678528 | – |
| 14 | CONNECTOR, WIRE COMPRESSION, CU OR AL (SIZE AS REQ'D) | AS REQ'D | | 783–786 | – |
| 15 | WIRE, #4 BARE STRANDED COPPER FT | 100 | | 813760 | – |
| | LB | 13 | | | |
| 16 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV RIBBED & 1 DBL COIL SPRING WASHER | 2 | 2 | STD 392 | – |
| 17 | COVER, BOLT PLASTIC & | 2 | 2 | 285696 | – |
| | 6 – 1 3/4" NAILS, GALV | – | – | 492192 | – |
| 18 | CAPACITOR RACK – COMPLETE WITH CAPACITORS 4KV 65 KVAR (3 ● 200 KVAR) | 1 | 1 | 564759 | – |
| | 4KV 130 KVAR (3 ● 400 KVAR) | 1 | 1 | 564776 | – |
| | 12KV 600 KVAR (3 ● 200 KVAR) | 1 | 1 | 564763 | – |
| | 12KV 1200 KVAR (3 ● 400 KVAR) | 1 | 1 | 564764 | – |
| 19 | SCREW, LAG, GALV, 4" | 2 | 2 | 621568 | – |
| 20 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" (D) | 10' | 10' | 251168 | – |
| 21 | STRAPS, PIPE, GALV, 1/2", AND | AS REQ'D | | 697728 | – |
| | 2– 1 3/4" ROOFING NAILS, GALV. | – | – | 492192 | – |
| 22 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | 50' | 812490 | GNDPVC |
| 23 | TAG, STATION NUMBER | 1 | 1 | 200 SECT. | – |
| 24 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | 1 | 603072 | GNDPVC |
| 25 | COPPER BONDED GROUND CONNECTOR | 1 | 1 | 259010 | – |
| 26 | GROUND ENHANCING POWER SOLUTION (GEM) | AS REQ'D | | 424390 | – |
| 27 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | | 678562 | – |
| 28 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | | 698754 | – |
| 29 | HOT LINE CLAMP | 3 | 3 | 227680 | – |

FOR FIELD MAINTENANCE ONLY

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Indicates Latest Revision | Completely Revised | New Page | Information Removed

1399.506
4299.509
SUPERSEDES
1323.3 (10–15–05)

SDG&E ELECTRIC STANDARDS

FIXED CAPACITOR INSTALLATION, 4KV WYE

DATE 10–15–05
APPD PBA / JJ

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| OVERHEAD MACRO UNITS 12KV/4KV CAPACITOR STATIONS | | |
|---|---|---|
| FIXED – GROUNDED (FIG. 1) | | |
| KV | KVAR | MU I.D. |
| 12 | 600 | C6FP |
| 12 | 1200 | C12FP |
| FIXED–UNGROUNDED (FIG. 2) | | |
| 4 | 65 | C4FA |
| 4 | 130 | C4F3P |
| 12 | 600 | C6FA |
| 12 | 1200 | C12FA |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

(B) 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.

(C) CONNECT CAPACITOR RACK GROUND LEAD TO LIGHTNING ARRESTER GROUND (FIGURE 1 ONLY).

(D) RUN 1/2" SCHEDULE 40 PVC CONDUIT WITH LIGHTNING ARRESTER GROUND FROM LIGHTNING ARRESTER ARM TO A MINIMUM OF 2 FEET BELOW CAPACITOR RACK, THEN CONTINUE DOWN THE POLE USING PVC COVERED GROUND WIRE.

(F) DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.

(G) TEN INCHES FROM 0–750V CONDUCTORS BELOW, 12 INCHES FOR CONDUCTORS OF 750–7500V, 18 INCHES FOR CONDUCTORS OF 7500–22,500V PER G.O. 95 RULE 58.1–D.

(H) FUSE STATION ACCORDING TO CAPACITOR FUSING TABLE, STANDARD 1309.

(I) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(J) WHEN LA/CO CROSSARM AND CAPACITORS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2–36" FLATBRACES. SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1

**REFERENCE:**

(L) FOR GROUNDING REQUIREMENTS AND APPLICATION – SEE STANDARD 1002.

(M) PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE PER G. O. 95, RULE 22.2B.

(N) SECTIONALIZING CUTOUT INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR – SEE STANDARD 1240.

(O) FOR HOT LINE CLAMP CONNECTION, SEE STANDARD 788.

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| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION
3 OIL SWITCHES IN LINE

FMO
OH 1324

APPLICATION: THIS CONSTRUCTION SHALL BE USED FOR ALL VOLTAGE, TIME, OR TIME-VOLTAGE SWITCHED CAPACITORS WITH THREE OIL SWITCHES.

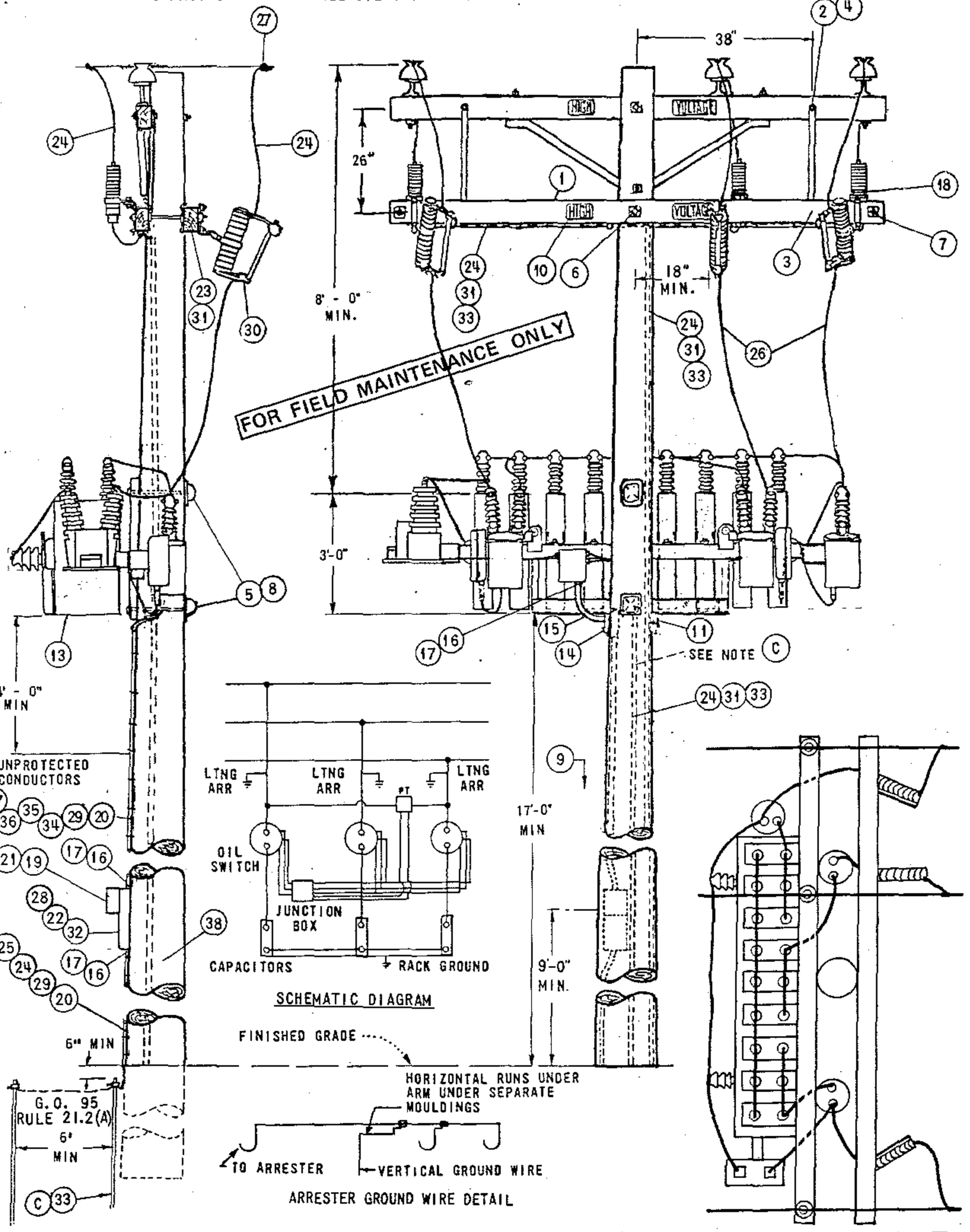



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|---|---|---|
| DATE 9-17-82<br>APPD JAT | SDG&E ELECTRIC STANDARDS<br>12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION<br>3 OIL SWITCHES IN LINE | 1399.201<br>SUPERSEDES<br>1324.1 (9-17-82) |

NOTES:

A. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.
B. BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS. AS IDENTIFIED ON STANDARDS PAGE 287.
(C) ONE GROUND IS REQUIRED FOR THE CAPACITOR RACK, ONE IS REQUIRED FOR THE ARRESTERS, AND A THIRD FOR THE CONTROL PANEL. THESE GROUNDS ARE NOT TO BE INTERCONNECTED.
D. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.
(E) EXEMPT MATERIALS.
(F) TO BE INSTALLED BY KEARNY ELECTRIC MAINTENANCE.
G. INSTALL CONTROL ON SAME SIDE OF POLE AS CAPACITOR RACK.
H. RACKS THAT CONTAIN PT'S WITH METAL TANKS TO BE INSULATED FROM RACK BY KEARNY MAINTENANCE BEFORE REINSTALLATION.
(I) THE POTENTIAL TRANSFORMERS FOR THIS INSTALLATION ARE CONNECTED PHASE-TO-PHASE. FOR POTENTIAL TRANSFORMERS CONNECTED PHASE-TO-NEUTRAL, SEE PAGE 1326.
J. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE. G.O. 95 RULE 22.2(C).
K. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

| | ITEM | | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|---|
| P T & F | 1 | | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | | 2 | 300 SECTION |
| | 2 | | BRACE, FLAT CROSSARM 28" | | 2 | 164192 |
| | 3 | | BOLT, MACHINE, GALV., 3/8" X 4 1/2", & 1 SPRING LOCK WASH. | (E) | 2 | PGS 139, 140 |
| | 4 | | BOLT, MACHINE, GALV., 1/2" X 5", 1 RD. WASH, 1 DBL. COIL SPR. WASH | (E) | 2 | PGS 139, 140 |
| | 5 | | BOLT, MACHINE, GALV., 3/4" X___, 1 SQ CURV RIB WASH, 1 DBL COIL SPR WASH | | 2 | PGS 139, 140 |
| | 6 | | BOLT, MACHINE, GALV, 5/8" X___, 2 SQ WASH, 1 DBL COIL SPR WASH | (E) | 1 | PGS 139, 140 |
| | 7 | | BOLT, SPACE, GALV., 5/8" X___, 4 SQ WASH, 2 DBL COIL SPR WASH, 2 RD WASH. | (E) | 2 | PGS 139,140 |
| | 8 | | COVER, BOLT, PLASTIC, 10 D NAILS, GALV | (E) | 2 | 285696 |
| | 9 | | STEPS, POLE | (E) | 16 | 692992 |
| | 10 | | SIGN, HIGH VOLTAGE & NAILS, GALV. | (E) | 4 | 647648, 492224 |
| | 11 | | SCREW, LAG, GALV, 4" | (E) | 2 | 621568 |
| | 12 | | | | | |
| | 13 | | SWITCHED CAPACITOR RACK, COMPLETE WITH CAPACITORS, SWITCHES & POTENTIAL TRANSFORMER | 900 KVAR (6 @ 150 KVAR) | 1 | 564704 |
| | | | | 1350 KVAR (9 @ 150 KVAR) | 1 | 564752 |
| | 14 | | ACCESS FITTING BODY TYPE LB PVC 3/4" | (F) (E) | 1 | 146384 |
| | 15 | | ELBOW, STANDARD RADIUS PVC 3/4" | (F) | 1 | 322166 |
| | 16 | | REDUCER COUPLING PVC 3/4"TO 1" | (F) | 3 | 573410 |
| | 17 | | TERMINAL ADAPTOR PVC 1" | (F) | 3 | 102756 |
| | 18 | | ARRESTERS, LIGHTNING, 12KV | | 3 | 113248 |
| | 19 | | CONTROL, CAPACITOR (SELECT TYPE AS REQ'D) | a TIME SWITCH (F) | 1 | 706160 |
| | | | | b TIME SWITCH W/VOLTAGE OVERRIDE (F) | 1 | 706176 |
| | | | | c VOLTAGE (F) | 1 | 273984 |
| L T I | 20 | | CONDUIT, PVC, SCHEDULE 40, 3/4" | (F) (E) | 40' | 251328 |
| | 21 | | PADLOCK, MASTER 7 | | 1 | 514912 |
| | 22 | | BRACKETS, CONTROL MOUNTING | (F) | 2 | SHOP MADE |
| | 23 | | WIRE, #8 SOL, ANNEALED BARE COPPER | | 10' (1/2#) | 812928 |
| | 24 | | WIRE, BARE STRANDED COPPER, #6 | | 110' | 813536 |
| | 25 | | ROD & CLAMP, GROUND | | 2 | 603072, 230016 (E) |
| | 26 | | WIRE, #4 COPPER, WP | | 20' | 812480 |
| | 27 | | CONNECTORS, WIRE, COMPRESSION, COPPER OR ALUMINUM AS REQ'D | (E) | 6 | PGS 786, 783 |
| | 28 | | SCREW, 1/4" X 2" LAG | (F) | 4 | 621888 |
| | 29 | | STRAPS, PIPE GALV, 3/4", 6D NAILS, GALV. | (F) (E) | AS REQ'D | 697888 |
| | 30 | | CUTOUTS 12KV 100A WITH LOADBUSTER HOOKS | | 3 | 1200 SECTION |
| | 31 | | STAPLES, WIRE GALV, 1 1/4" | (E) | AS REQ'D | 678528 |
| | 32 | | BOX, METER SOCKET SAFETY, 5 TERMINAL, 100 AMP | (F) | 1 | 161856 |
| | 33 | | UNIT GROUND COMPLETE (WITH PLAIN MLDG, WITH GRAY MLDG) | | 2 | 603136, 603120 |
| | 34 | | WIRE, THW #12 WHITE | (F) | 30' | 808704 |
| | 35 | | WIRE, THW #12 BLACK | (F) | 30' | 808096 |
| | 36 | | WIRE, THW #12 RED | (F) | 30' | 808576 |
| | 37 | | WIRE, THW #12 BLUE | (F) | 30' | 808416 |
| | 38 | | TAG, STATION NUMBER | | 1 | 300 SECTION |

FOR FIELD MAINTENANCE ONLY

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| 1399.202<br>SUPERSEDES<br>1324.2 (9-17-82) | SDG&E ELECTRIC STANDARDS<br>12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION<br>3 OIL SWITCHES IN LINE | DATE 9-17-82<br>APPD JHT. |

APPLICATION: THIS CONSTRUCTION SHALL BE USED FOR ALL VOLTAGE, TIME, OR TIME-VOLTAGE SWITCHED CAPACITORS WITH THREE OIL SWITCHES.

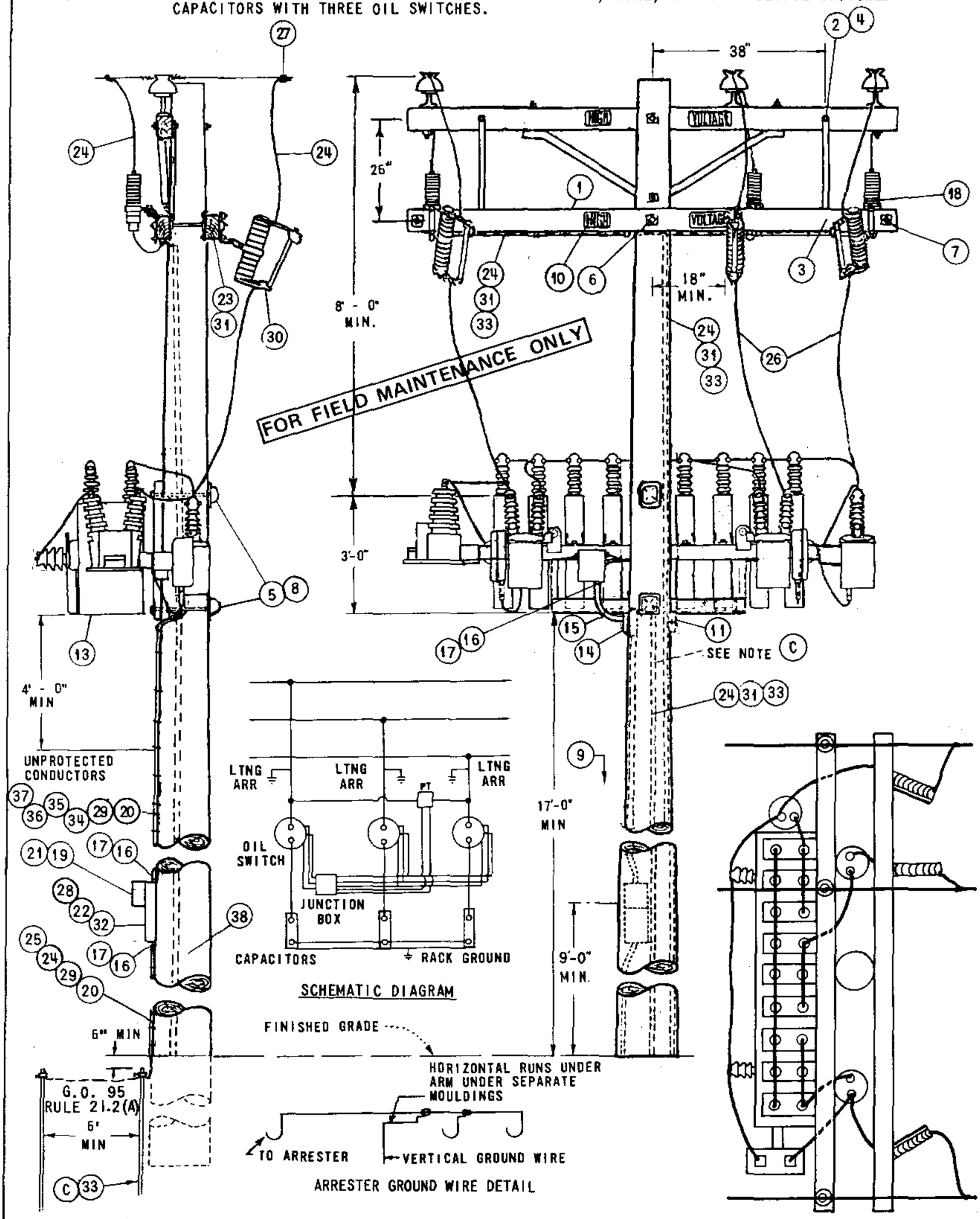



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| DATE 9-17-82<br>APPD JNT | SDG&E ELECTRIC STANDARDS<br>12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION<br>3 OIL SWITCHES IN LINE | 1399.205<br>SUPERSEDES<br>1324.1 (9-17-82) |

NOTES:

A. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.
B. BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS. AS IDENTIFIED ON STANDARDS PAGE 287.
(C) ONE GROUND IS REQUIRED FOR THE CAPACITOR RACK, ONE IS REQUIRED FOR THE ARRESTERS, AND A THIRD FOR THE CONTROL PANEL. THESE GROUNDS ARE NOT TO BE INTERCONNECTED.
D. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.
(E) EXEMPT MATERIALS.
(F) TO BE INSTALLED BY KEARNY ELECTRIC MAINTENANCE.
G. INSTALL CONTROL ON SAME SIDE OF POLE AS CAPACITOR RACK.
H. RACKS THAT CONTAIN PT'S WITH METAL TANKS TO BE INSULATED FROM RACK BY KEARNY MAINTENANCE BEFORE REINSTALLATION.
(I) THE POTENTIAL TRANSFORMERS FOR THIS INSTALLATION ARE CONNECTED PHASE-TO-PHASE. FOR POTENTIAL TRANSFORMERS CONNECTED PHASE-TO-NEUTRAL. SEE PAGE 1326.
J. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE. G.O. 95 RULE 22.2(C).
K. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

| ITEM | DESCRIPTION | | | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | | | 2 | 300 SECTION |
| 2 | BRACE, FLAT CROSSARM 28" | | | 2 | 164192 |
| 3 | BOLT, MACHINE, GALV., 3/8" X 4 1/2" & 1 SPRING LOCK WASH. | | (E) | 2 | PGS 139, 140 |
| 4 | BOLT, MACHINE, GALV., 1/2" X 5", 1 RD. WASH, 1 DBL. COIL SPR. WASH | | (E) | 2 | PGS 139, 140 |
| 5 | BOLT, MACHINE, GALV., 3/4" X___, 1 SQ CURV RIB WASH, 1 DBL COIL SPR WASH | | | 2 | PGS 139, 140 |
| 6 | BOLT, MACHINE, GALV, 5/8" X___, 2 SQ WASH, 1 DBL COIL SPR WASH | | (E) | 1 | PGS 139, 140 |
| 7 | BOLT, SPACE, GALV., 5/8" X___, 4 SQ WASH, 2 DBL COIL SPR WASH, 2 RD WASH. | | (E) | 2 | PGS 139,140 |
| 8 | COVER, BOLT, PLASTIC, 10 D NAILS, GALV | | (E) | 2 | 285696 |
| 9 | STEPS, POLE | | (E) | 16 | 692992 |
| 10 | SIGN, HIGH VOLTAGE & NAILS, GALV. | | (E) | 4 | 647648, 492224 |
| 11 | SCREW, LAG, GALV, 4" | | (E) | 2 | 621568 |
| 12 | | | | | |
| 13 | SWITCHED CAPACITOR RACK, COMPLETE WITH CAPACITORS, SWITCHES & POTENTIAL TRANSFORMER | 900 KVAR (6 @ 150 KVAR) | | 1 | 564704 |
| | | 1350 KVAR (9 @ 150 KVAR) | | 1 | 564752 |
| 14 | ACCESS FITTING BODY TYPE LB PVC 3/4" | | (F) (E) | 1 | 146384 |
| 15 | ELBOW, STANDARD RADIUS PVC 3/4" | | (F) | 1 | 322166 |
| 16 | REDUCER COUPLING PVC 3/4"TO 1" | | (F) | 3 | 573410 |
| 17 | TERMINAL ADAPTOR PVC 1" | | (F) | 3 | 102756 |
| 18 | ARRESTERS, LIGHTNING, 12KV | | | 3 | 113248 |
| 19 | CONTROL, CAPACITOR (SELECT TYPE AS REQ'D) | a TIME SWITCH | (F) | 1 | 706160 |
| | | b TIME SWITCH W/VOLTAGE OVERRIDE | (F) | 1 | 706176 |
| | | c VOLTAGE | (F) | 1 | 273984 |
| 20 | CONDUIT, PVC, SCHEDULE 40, 3/4" | | (F) (E) | 40' | 251328 |
| 21 | PADLOCK, MASTER 7 | | | 1 | 514912 |
| 22 | BRACKETS, CONTROL MOUNTING | | (F) | 2 | SHOP MADE |
| 23 | WIRE, #8 SOL, ANNEALED BARE COPPER | | | 10' (1/2#) | 812928 |
| 24 | WIRE, BARE STRANDED COPPER, #6 | | | 110' | 813536 |
| 25 | ROD & CLAMP, GROUND | | | 2 | 603072, 230016 (E) |
| 26 | WIRE, #4 COPPER, WP | | | 20' | 812480 |
| 27 | CONNECTORS, WIRE, COMPRESSION, COPPER OR ALUMINUM AS REQ'D | | (E) | 6 | PGS 786, 783 |
| 28 | SCREW, 1/4" X 2" LAG | | (F) | 4 | 621888 |
| 29 | STRAPS, PIPE GALV, 3/4", 6D NAILS, GALV. | | (F) (E) | AS REQ'D | 697888 |
| 30 | CUTOUTS 12KV 100A WITH LOADBUSTER HOOKS | | | 3 | 1200 SECTION |
| 31 | STAPLES, WIRE GALV, 1 1/4" | | (E) | AS REQ'D | 678528 |
| 32 | BOX, METER SOCKET SAFETY, 5 TERMINAL, 100 AMP | | (F) | 1 | 161856 |
| 33 | UNIT GROUND COMPLETE (WITH PLAIN MLDG, WITH GRAY MLDG) | | | 2 | 603136, 603120 |
| 34 | WIRE, THW #12 WHITE | | (F) | 30' | 808704 |
| 35 | WIRE, THW #12 BLACK | | (F) | 30' | 808096 |
| 36 | WIRE, THW #12 RED | | (F) | 30' | 808576 |
| 37 | WIRE, THW #12 BLUE | | (F) | 30' | 808416 |
| 38 | TAG, STATION NUMBER | | | 1 | 300 SECTION |

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399.206
SUPERSEDES
24.2 (9-17-82)

SDG&E ELECTRIC STANDARDS

# 12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION
# 3 OIL SWITCHES IN LINE

DATE 9-17-82
APPD

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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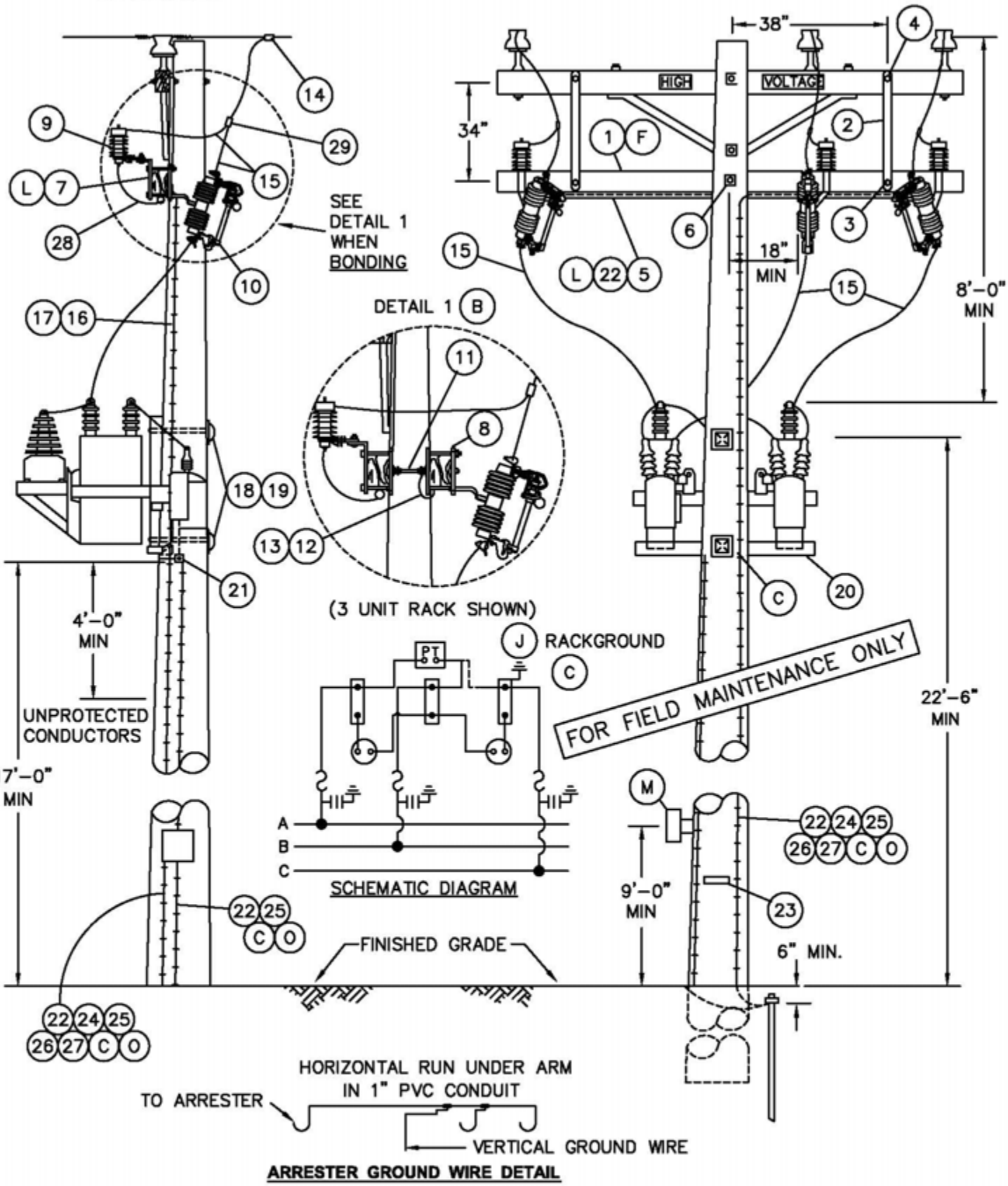
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

12 & 12.47KV SWITCHED CAPACITOR INSTALLATION
2 OIL SWITCHES IN CAPACITOR NEUTRAL

FMO
OH 1325

**SCOPE:** THIS CONSTRUCTION SHALL BE USED FOR ALL 12KV CAPACITOR STATIONS WITH TWO OIL SWITCHES.




**ARRESTER GROUND WIRE DETAIL**

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| | | |
|---|---|---|
| 1399.508<br>SUPERSEDES<br>1325.1 (10-15-05) | SDG&E ELECTRIC STANDARDS<br>12 & 12.47KV SWITCHED CAPACITOR INSTALLATION<br>2 OIL SWITCHES IN CAPACITOR NEUTRAL | DATE 10-15-05<br>APPD PA / JJ |

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**NOTE:**

– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

**BILL OF MATERIAL:**

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | | QUANTITY (B) UNBONDED | QUANTITY (B) BONDED | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNIT |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" (B) | | 1 | 2 | 294128 | – |
| 2 | BRACE, FLAT, CROSSARM, 36" (F) | | 2 | 2 | 164224 | – |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND & 1 LOCK WASHER (F) | | 2 | 2 | STD 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DBL COIL SPR WASH (F) | | 2 | 2 | STD 392 | – |
| 5 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" AND | | 10' | 10' | 251200 | – |
| | STRAPS PIPE, GALV, 1" WITH 2– 1 3/4" ROOFING NAILS. | | AS REQ'D | | 697792 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | | 1 | 1 | STD 392 | – |
| 7 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | | 3 | – | 165442 | – |
| 8 | BRACKET, ARRESTER, OR CUTOUT | | – | 6 | 166070 | – |
| 9 | ARRESTER, LIGHTNING, 12KV | | 3 | 3 | 113248 | – |
| 10 | CUTOUT, 12KV, 100A, WITH LOADBUSTER HOOKS | | 3 | 3 | STD 1212 | – |
| 11 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS & 2 NUTS | | – | 2 | STD 392 | – |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (B) | FT | – | 15 | 812928 | – |
| | | LB | – | 1 | | |
| 13 | STAPLES, WIRE, GALV, 1 1/4" (B) | | AS REQ'D | | 678528 | – |
| 14 | CONNECTOR, WIRE COMPRESSION, CU OR AL (SIZE AS REQ'D) | | AS REQ'D | | 783–786 | – |
| 15 | WIRE, #4 BARE STRANDED COPPER | FT | 110 | 110 | 813760 | – |
| | | LB | 14 | 14 | | |
| 16 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" | | 10' | 10' | 251168 | – |
| 17 | STRAPS, PIPE, GALV, 1/2" WITH 2– 1 3/4" ROOFING NAILS. | | AS REQ'D | | 697728 | – |
| 18 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV RIBBED & 1 DBL COIL SPRING WASHER | | 2 | 2 | STD 392 | – |
| 19 | COVER, BOLT PLASTIC & 6– 1 3/4" NAILS, GALV, ROOFING. | | 2 | 2 | 285696 | – |
| | | | – | – | 492192 | – |
| 20 | SWITCHED CAPACITOR RACK, COMPLETE WITH CAPACITORS, SWITCHES AND POTENTIAL TRANSFORMER | 600 KVAR (3 @ 200 KVAR) | 1 | 1 | 564761 | – |
| | | 1200 KVAR (3 @ 400 KVAR) | 1 | 1 | 564770 | – |
| 21 | SCREW, LAG, GALV, 4" | | 2 | 2 | 621568 | – |
| 22 | #4 CU SOLID GROUND WIRE, PVC COVERED | | 50' | 50' | 812490 | GNDPVC |
| 23 | TAG, STATION NUMBER | | 1 | 1 | STD. 208 | – |
| 24 | GROUND ROD, 5/8" X 8', COPPERWELD | | 1 | 1 | 603072 | GNDPVC |
| 25 | COPPER BONDED GROUND CONNECTOR | | 1 | 1 | 259010 | – |
| 26 | GROUND ENHANCING POWER SOLUTION (GEM) | | AS REQ'D | | 424390 | – |
| 27 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | | AS REQ'D | | 678562 | – |
| 28 | FLEXIBLE ARRESTER GROUND STRAP | | AS REQ'D | | 698754 | – |
| 29 | HOT LINE CLAMP | | 3 | 3 | 227680 | – |

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| | | |
|---|---|---|
| DATE 10–15–05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>12 & 12.47KV SWITCHED CAPACITOR INSTALLATION<br>2 OIL SWITCHES IN CAPACITOR NEUTRAL | 1399.509<br>SUPERSEDES<br>1325.2 (10–15–05) |

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| OVERHEAD MACRO UNITS<br>12KV – SWITCHED NEUTRAL CAPACITOR | | |
|---|---|---|
| KVAR | CONTROL | MU I.D. |
| 600 | VOLT/TIME, DIGITAL, PROGRAMMABLE | C6SCT |
| 1200 | VOLT/TIME, DIGITAL, PROGRAMMABLE | C12SCT |

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INSTALLATION:

(A) CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

(B) 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.

(C) CONNECT CAPACITOR RACK GROUND LEAD TO LIGHTNING ARRESTER GROUND. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF THE CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

D. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.

(F) WHEN LA/CO CROSSARM AND CAPACITORS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2–36" FLAT BRACES, SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1 FOR DRILLING MEASUREMENTS).

G. RACKS THAT CONTAIN POTENTIAL TRANSFORMERS (PT'S) WITH METAL TANKS ARE TO BE INSULATED FROM RACK BEFORE REINSTALLATION.

H. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

(J) PT CAN BE CONNECTED TO CENTER PHASE OR OUTSIDE PHASE DEPENDING ON FIELD CONDITION.

K. THE PT FOR THIS INSTALLATION IS CONNECTED PHASE–TO–PHASE.

(L) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

**REFERENCE:**

(M) SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

(N) PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE PER G.O. 95 RULE 22.2C.

(O) FOR GROUNDING REQUIREMENTS AND APPLICATION, SEE STANDARD 1002.

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

SWITCHED CAPACITORS - CURRENT SENSOR
12 & 12.47KV

FMO
OH 1326

**SCOPE:** THIS CONSTRUCTION SHALL BE USED FOR ALL SWITCHED CAPACITOR BANKS REQUIRING A CURRENT SENSOR.

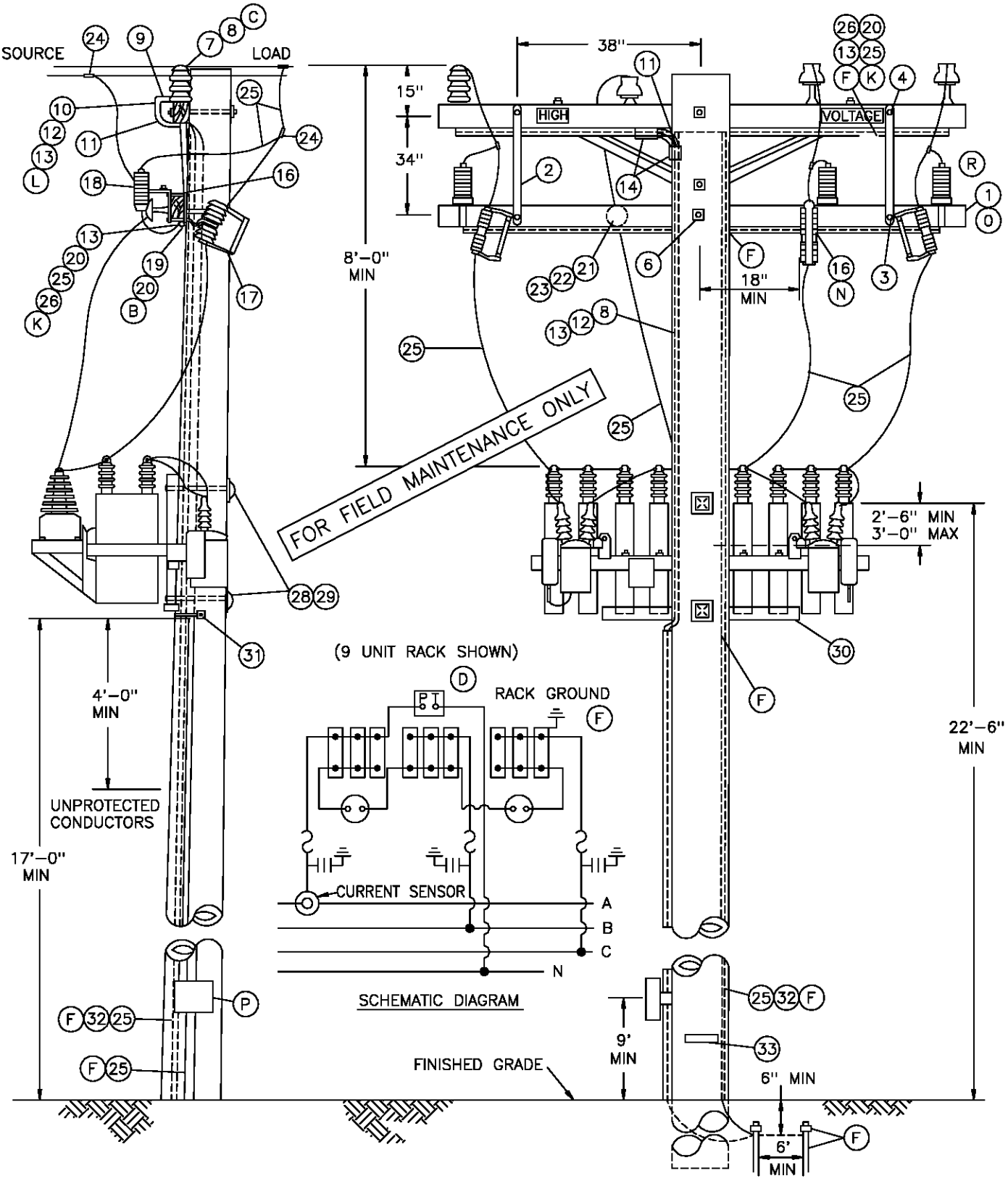



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NOTES:

- SENSOR PRODUCES ONE VOLT FOR EACH 60 AMPERES OF LINE CURRENT. OPEN CIRCUIT VOLTAGE IS NOT SIGNIFICANTLY HIGH.
- CLASS OF POLE IS TO BE DETERMINED PER STANDARD 344–354.

BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4' X 10' – 0" (B) | | 1 | 294128 |
| 2 | BRACE, FLAT, CROSSARM, 28" (O) | | 2 | 164192 |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND & 1 LOCK WASHER (O) | | 2 | STD 392 |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DBL COIL SPR WASH (O) | | 2 | STD 392 |
| 5 | | | | |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | | 1 | STD 392 |
| 7 | STUD, INSULATOR | | 1 | 701760 |
| 8 | SENSOR, CURRENT, COMPLETE WITH WHITE, GREEN AND BLACK INSULATED CONTROL WIRE | | 1 | 635820 |
| 9 | TERMINAL ADAPTOR, PVC, 3/4" | | 1 | 102754 |
| 10 | SLIP ELBOW, 90 PVC, 3/4" | | 2 | 322174 |
| 11 | ELBOW, STANDARD RADIUS, PVC, 3/4" | | 2 | 322166 |
| 12 | CONDUIT, PVC, TYPE 2, SCHED 40, 3/4" | | 15' | 251328 |
| 13 | STRAPS, PIPE, GALV, 3/4" & 2 – 1 3/4" ROOFING NAILS, GALV. | | AS REQ'D | 697888 |
| | | | – | 492192 |
| 14 | COUPLING, PVC, 3/4" | | 2 | 280416 |
| 15 | | | | |
| 16 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | | 3 | 165442 |
| 17 | CUTOUT, 12KV, 100A, WITH LOADBUSTER HOOKS | | 3 | STD 1212 |
| 18 | ARRESTER, LIGHTNING, 12KV | | 3 | 113248 |
| 19 | WIRE, #8 BARE SOLID ANNEALED COPPER (B) | | 15' OR 1 LB | 812928 |
| 20 | STAPLES, WIRE, GALV, 1 1/4" (B) | | AS REQ'D | 678528 |
| 21 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | 1 | STD 392 |
| 22 | PIN, TRANSFORMER ADAPTOR, 1" LEAD THREAD | | 1 | 529248 |
| 23 | INSULATOR, LINE, 12KV NEUTRAL | | 1 | 429216 |
| 24 | CONNECTOR, WIRE COMPRESSION, CU OR AL (SIZE AS REQ'D) | | AS REQ'D | 783–786 |
| 25 | WIRE, #4 BARE STRANDED COPPER | | 130' OR 17 LBS | 813760 |
| 26 | MOULDING, OAK HARDWOOD, 1" X 8' | | 2 | 487200 |
| 27 | | | | |
| 28 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV RIBBED & 1 DBL COIL SPRING WASHER | | 2 | STD 392 |
| 29 | COVER, BOLT PLASTIC & 6 – 1 3/4" NAILS, GALV | | 2 | 285696 |
| | | | – | 492192 |
| 30 | CAPACITOR RACK – COMPLETE WITH CAPACITORS | 600 KVAR (3 @ 200 KVAR) | 1 | 564761 |
| | | 900 KVAR (6 @ 150 KVAR) (J) | 1 | 564706 |
| | | 1200 KVAR (3 @ 400 KVAR) (M) | 1 | 564770 |
| | | 1350 KVAR (9 @ 150 KVAR) (J) | 1 | 564754 |
| 31 | SCREW, LAG, GALV, 4" | | 2 | 621568 |
| 32 | UNIT GROUND, COMPLETE | | 1 | 603136 |
| 33 | TAG, STATION NUMBER | | 1 | 200 SECT. |

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| OVERHEAD MACRO UNITS<br>12KV SWITCHED CAPACITOR W/CURRENT SENSOR | | |
|---|---|---|
| KVAR | CONTROL | MU I.D. |
| 600 | VAR/VOLT OVERRIDE | C6CV |
| 600 | VOLT W/TIME BIAS | C6CTB |
| 900 | VAR/VOLT OVERRIDE | C9CV |
| 900 | VOLT W/TIME BIAS | C9CTB |
| 1200 | VAR/VOLT OVERRIDE | C12CV |
| 1200 | VOLT W/TIME BIAS | C12CTB |
| 1350 | VAR/VOLT OVERRIDE | C13CV |
| 1350 | VOLT W/TIME BIAS | C13CTB |

INSTALLATION:

A. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

Ⓑ 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 ARRESTER.

Ⓒ THE CONTROL IS POLARITY SENSITIVE. WIRE AS SHOWN, ALWAYS FACE NIPPLE OF CURRENT SENSOR TOWARD LOAD, AND INSTALL CUTOUTS ON THE SOURCE SIDE.

Ⓓ THE H1 TERMINAL OF THE POTENTIAL TRANSFORMER MUST BE CONNECTED TO THE SAME PHASE AS THE CURRENT SENSOR.

Ⓕ CONNECT CAPACITOR RACK GROUND LEAD, CURRENT SENSOR BASE AND ALL INSULATOR PINS GROUND LEAD TO LIGHTNING ARRESTER GROUND. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

G. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.

H. RACKS THAT CONTAIN POTENTIAL TRANSFORMERS WITH METAL TANKS ARE TO BE INSULATED FROM RACK BEFORE REINSTALLATION.

I. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCKS.

Ⓙ NO LONGER PURCHASED.

FOR FIELD MAINTENANCE ONLY

Ⓚ PVC CONDUIT 3/4" SCHEDULE 40 MAY BE USED IN PLACE OF HARDWOOD MOULDING.

Ⓛ REMOVE STEEL NIPPLE FROM CURRENT SENSOR BASE.

Ⓜ ON VAR CONTROL BANKS, REPLACE 12,000 – 120 POTENTIAL TRANSFORMER (STOCK #762708) WITH 7200–120 POTENTIAL TRANSFORMER (STOCK #762734).

Ⓝ DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

Ⓞ WHEN LA/CO CROSSARM AND CAPACITORS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2 – 36" FLAT BRACES. SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1 FOR DRILLING MEASUREMENTS).

REFERENCE:

Ⓟ SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

Ⓠ PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE, G.O. 95 RULE 22.2(C).

Ⓡ SECTIONALIZING CUTOUT INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR – SEE STANDARD 1240.

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| 1399.210<br>SUPERSEDES<br>1326.3 (12–1–98) | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITORS – CURRENT SENSOR<br>12 & 12.47KV | DATE 12–1–98<br>APPD PLA/BSG |
|---|---|---|

# OH1330 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

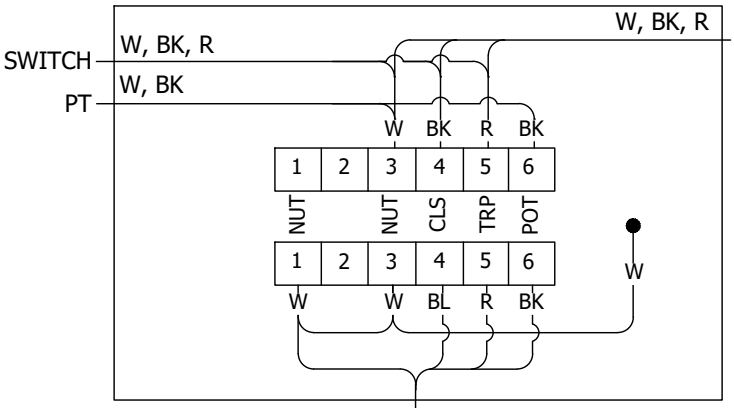
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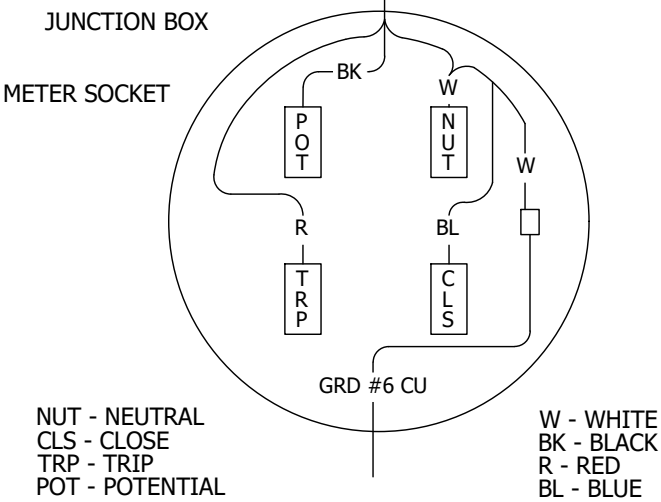
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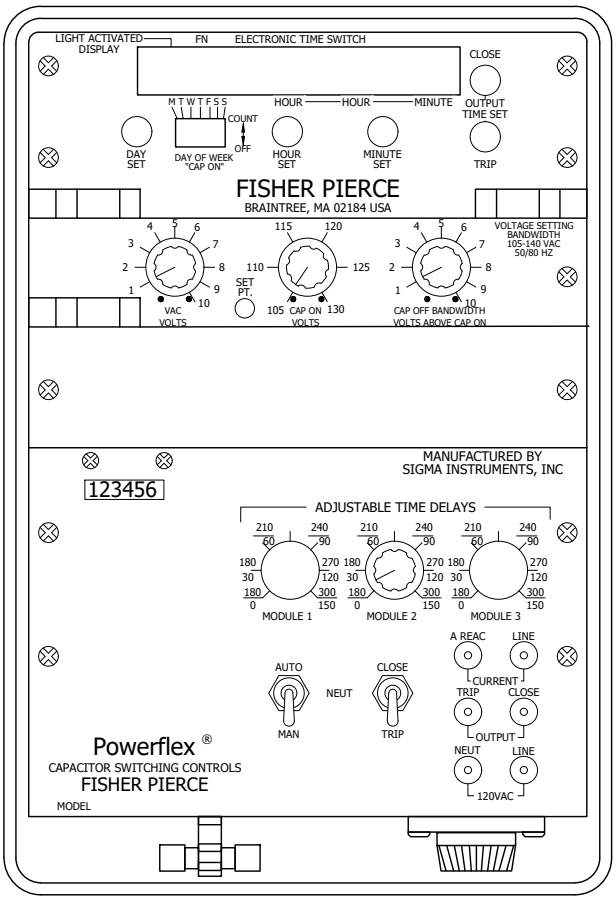
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| B | EDITORIAL CHANGES | EDM | JA | JES | FRC | 01/24/2022 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JS | IL | MDJ | 7/13/2016 | D | | | | | | |

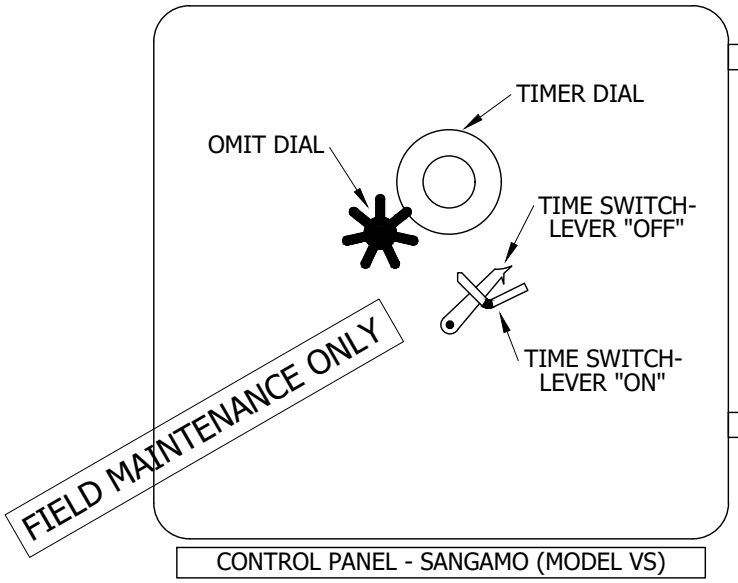


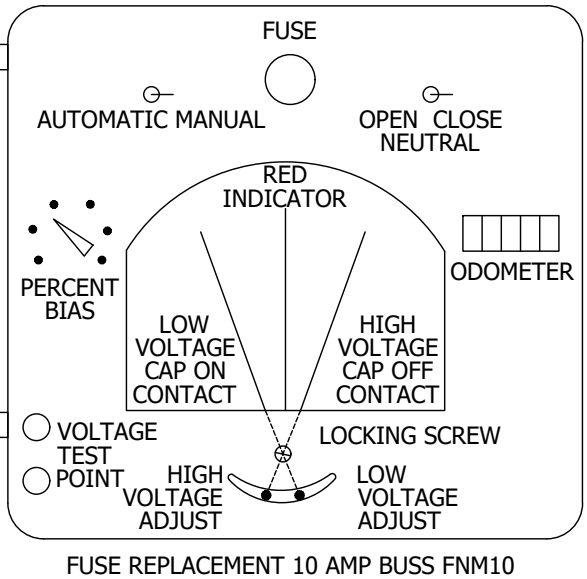

CAPACITOR CONTROL WIRING
VOLTAGE W/TIME BIAS




CONTROL PANEL
FISHER PIERCE (MODEL 2416)




CONTROL PANEL - SANGAMO (MODEL VS)




FUSE REPLACEMENT 10 AMP BUSS FNM10

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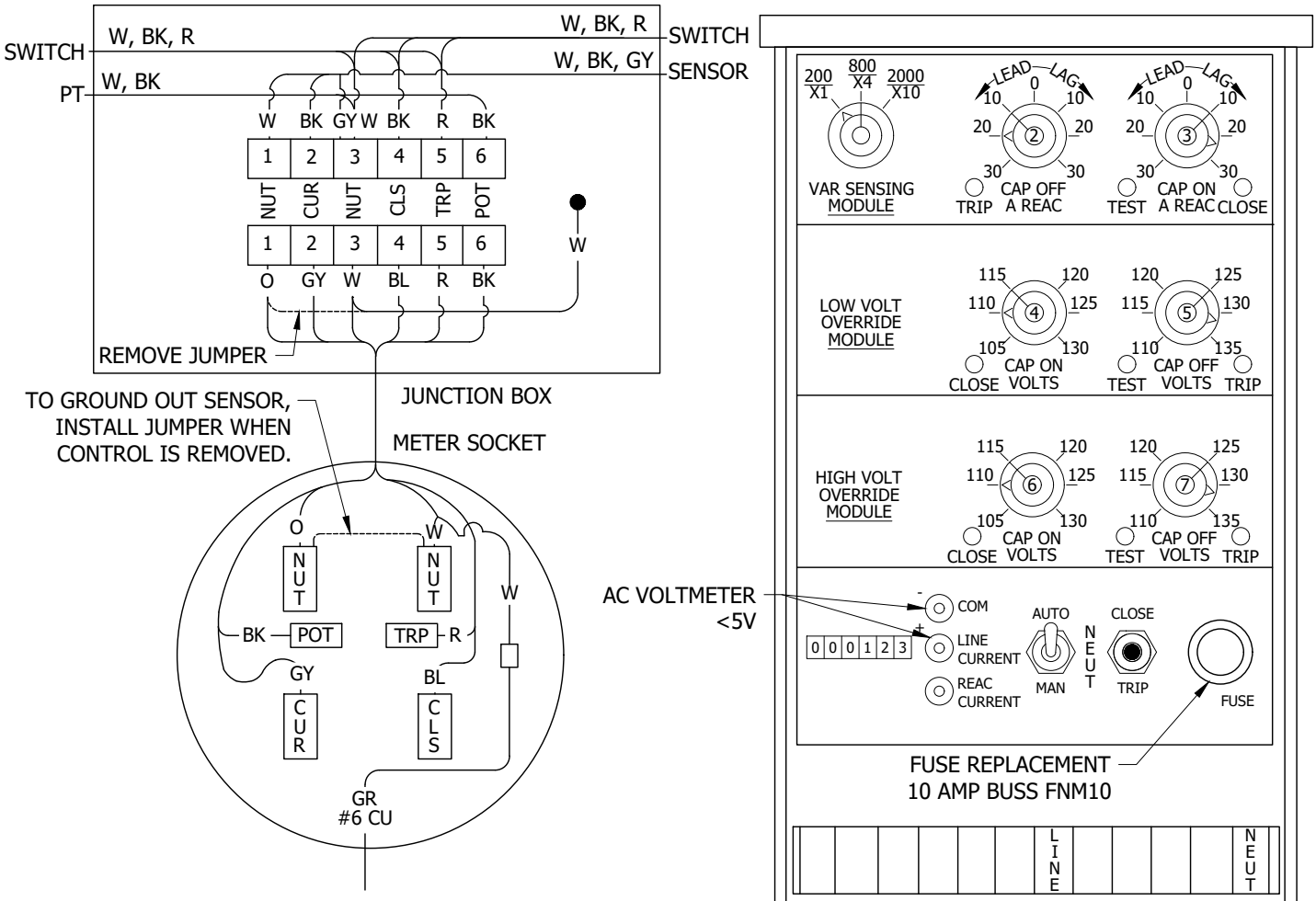
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 2 OF 3

CAPACITOR CONTROL MATERIAL AND INSTALLATION
VOLTAGE WITH TIME BIAS (TYPE 'TB')

FMO
OH1330.2

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CONTROL WIRE LEGEND

NUT - NEUTRAL
CUR - CURRENT SENSOR POTENTIAL
CLS - CLOSE
TRP - TRIP
POT - POTENTIAL

W - WHITE
BK - BLACK
GY - GREEN
R - RED
O - ORANGE
BL - BLUE

CAPACITOR CONTROL WIRING
VAR W/VOLTAGE OVERRIDE

CONTROL PANEL
FISHER PIERCE (MODEL 4604)

FIELD MAINTENANCE ONLY

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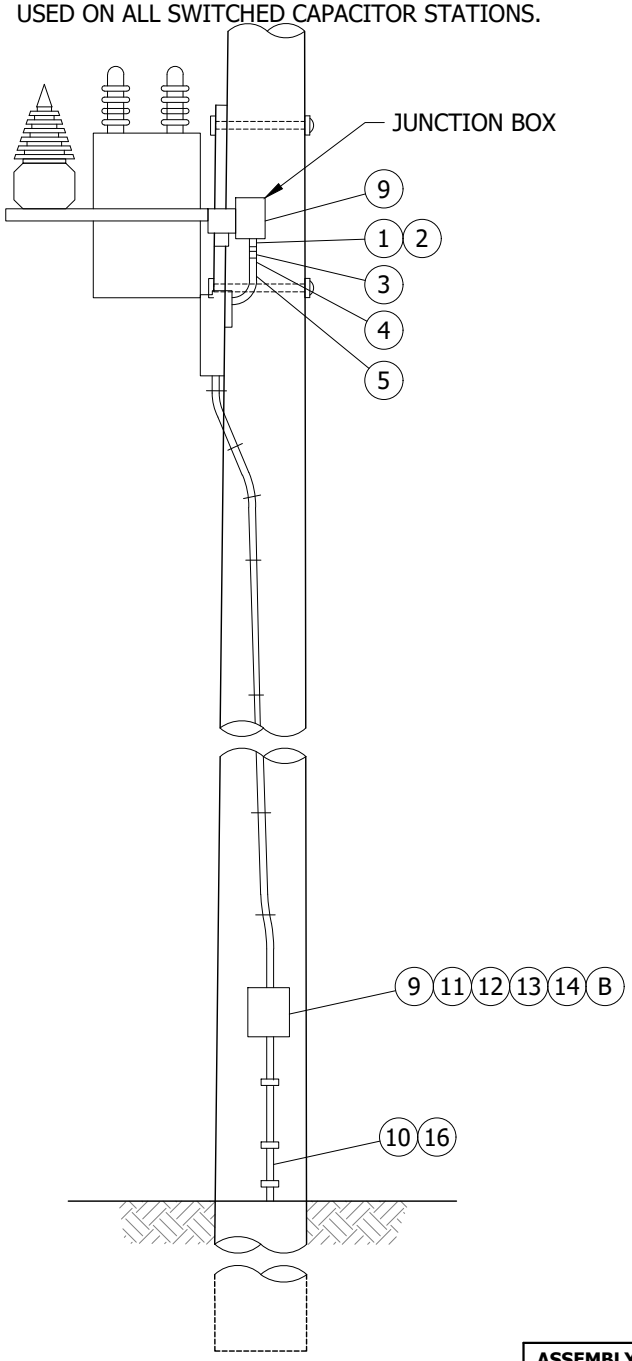
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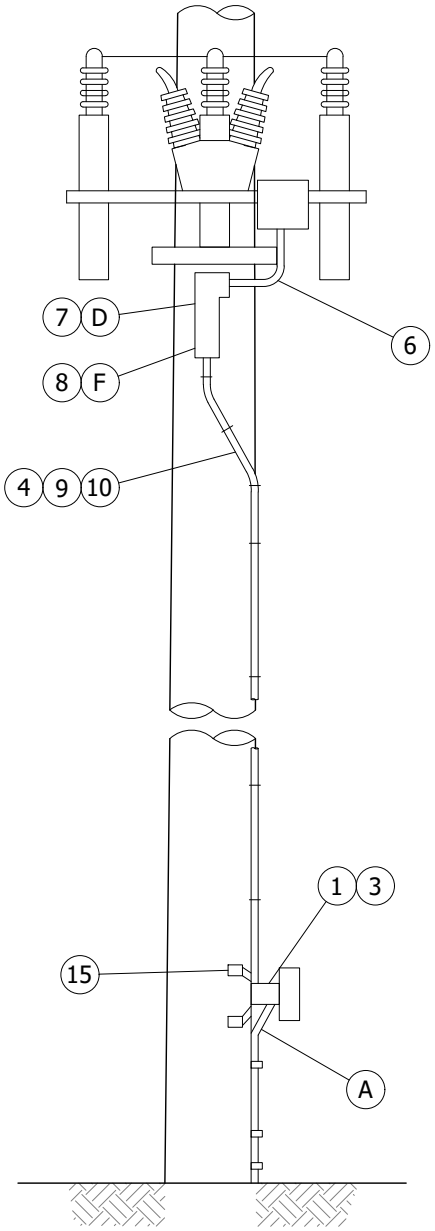
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CAPACITOR CONTROL MATERIAL AND INSTALLATION
TYPE 'VAR'

**SCOPE:** THIS STANDARD SHOWS TYPES OF CONTROLS, MATERIAL AND INSTALLATION OF A CAPACITOR CONTROL UNIT. THIS IS TO BE USED ON ALL SWITCHED CAPACITOR STATIONS.




**SIDE VIEW**




**FRONT VIEW**

| ASSEMBLY UNITS | DESCRIPTION |
|---|---|
| C/CTIM | CONTROL-DIGITAL, PROGRAMMABLE |

FIELD MAINTENANCE ONLY

**NOTES:**

- SEE PAGE 1330.4 FOR BILL OF MATERIAL.
- MATERIALS ORDERED ARE BASED ON 50' POLE.

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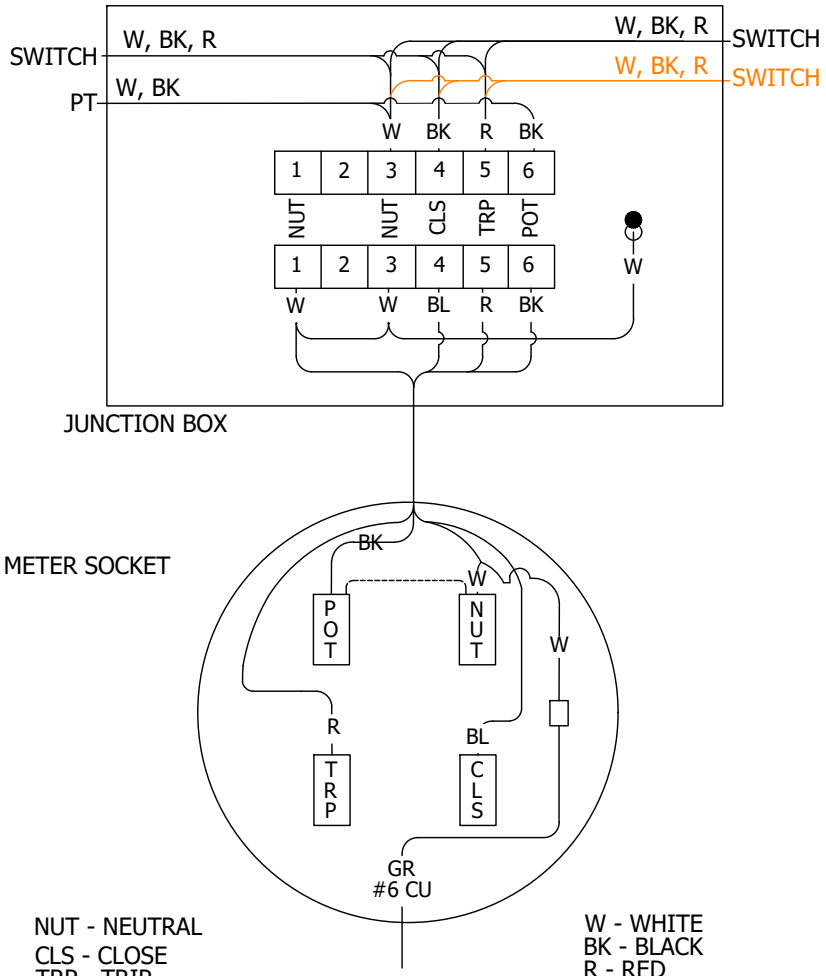
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CAPACITOR CONTROL MATERIAL AND INSTALLATION

FMO OH1330.1

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CAPACITOR CONTROL WIRING

CONTROL PANEL
(FACING METER SOCKET)

FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CAPACITOR CONTROL MATERIAL AND INSTALLATION
VOLTAGE WITH TIME BIAS (TYPE 'TB')

## BILL OF MATERIALS: (FOR CONTROL PORTION OF SWITCHED CAPACITOR JOBS)

| ITEM | DESCRIPTION | QUANTITY | STOCK NUMBER |
|---|---|---|---|
| 1 | TERMINAL ADAPTER, PVC 1" | 2 | 102756 |
| 2 | LOCKNUT, GALV. 1" | 1 | 468896 |
| 3 | REDUCER, PVC, 1" X 3/4" | 2 | 573410 |
| 4 | CONDUIT, PVC, 3/4" SCHEDULE 40 | 25' | 251328 |
| 5 | COUPLING, PVC 3/4" | 1 | 280416 |
| 6 | ELBOW, 90°, PVC, 3/4" | 1 | 322166 |
| 7 | ACCESS FITTING BODY TYPE "T" PVC 3/4" (D) | 1 | 147792 |
| 8 | ACCESS FITTING BODY TYPE "LB" PVC 3/4" (F) | 1 | 146384 |
| 9 | WIRE TW #12 WHITE | 30' | 808704 |
| | WIRE TW #12 BLACK | 30' | 808096 |
| | WIRE TW #12 BLUE | 30' | 808416 |
| | WIRE TW #12 RED | 30' | 808576 |
| 10 | STRAPS, PIPE, GALV, 3/4", 6D NAILS, GALV | AS REQ'D | 697888/490656 |
| 11 | METER SOCKET | 1 | 161898 |
| 12 | RING, STAINLESS STEEL, METER SEALING | 1 | 599034 |
| 13A | DIGITAL, PROGRAMMABLE CONTROL (C) | 1 | 706176 |
| 13B | FISHER PIERCE 2416 CONTROL REPLACEMENT BATTERY KIT (G)(H) | -- | 126800 |
| 14 | PADLOCK, MASTER 7 | 1 | 514912 |
| 15 | SCREW, LAG, 1/4" X 2" | 4 | 621888 |
| 16 | CONDUIT, PVC, 3/4" SCHEDULE 80 | 9 | 251520 |

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## INSTALLATION:

(A) ATTACH GROUND WIRE (ALREADY PROVIDED) TO GROUND TERMINAL OF METER SOCKET.

(B) INSTALL CONTROL 90° FROM FRONT SIDE OF CAPACITOR RACK.

(C) CONTROLS TO BE CONFIGURED/PROGRAMED PER THE DISTRIBUTION CAPACITOR INSTRUCTION, SETTING AND SURVEY INFORMATION MANUALS.

(D) FOR USE WHEN CURRENT SENSOR IS REQUIRED.

(E) NEW INSTALLATIONS MUST BE AUTHORIZED BY PLANNING ENGINEER.

(F) FOR USE WITHOUT CURRENT SENSOR.

(G) REPLACEMENT KIT INCLUDES: ONE 6 VOLT RECHARGEABLE LEAD ACID BATTERY, 2-30 INCH WIRES WITH CONNECTORS ON BOTH ENDS, DOUBLE SIDED ADHESIVE TAPE.

(H) IF BATTERY IS INSTALLED ON CIRCUIT BOARD BEHIND CONTROL PANEL, INSTALL NEW BATTERY ON RIGHT HAND SIDE OF CONTROL DOOR. DO NOT ATTEMPT TO REMOVE OLD BATTERY FROM CIRCUIT BOARD BECAUSE BOARD MAY BE DAMAGED.

## REFERENCE:

I. SEE STANDARD 1325 FOR A TWO OIL SWITCH INSTALLATION WITH CONTROL UNIT.

J. SEE FMO STANDARD 1399.208 FOR A SWITCH CAPACITOR USING CURRENT SENSOR AND CONTROL UNIT.

K. SEE STANDARD PRACTICE 302 FOR PROPER OPERATION OF CAPACITOR STATION AND CONTROL TESTING.

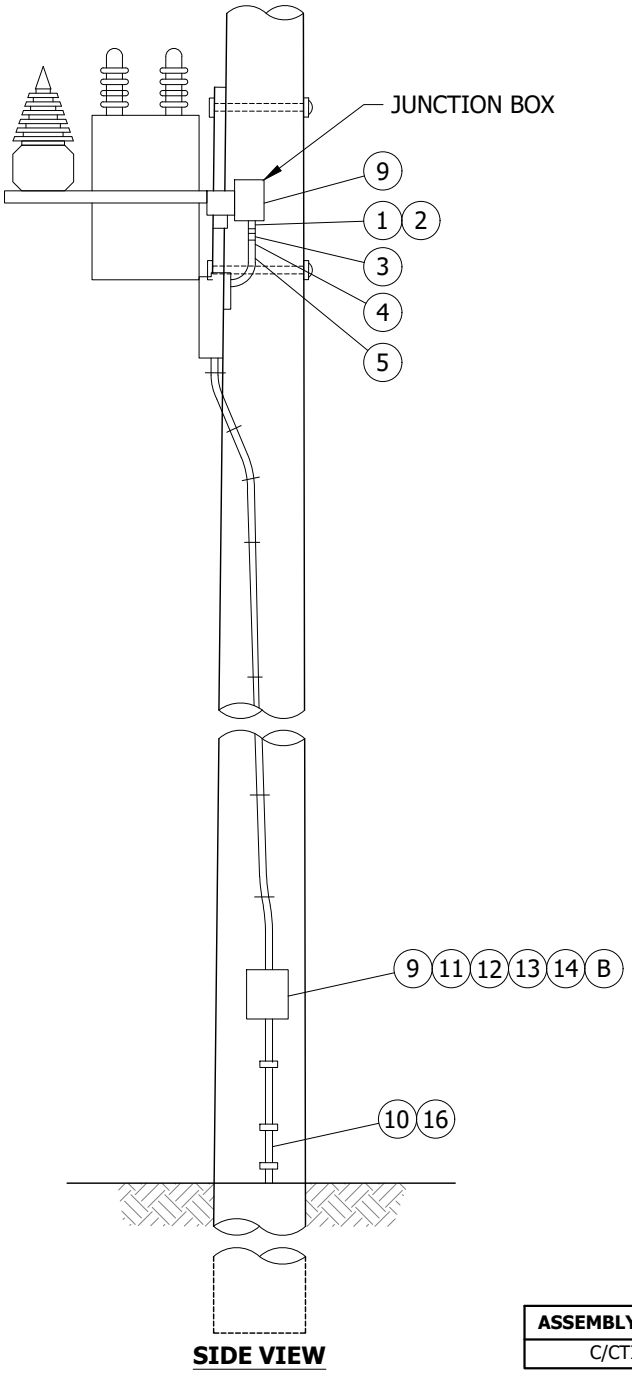
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FIELD MAINTENANCE ONLY

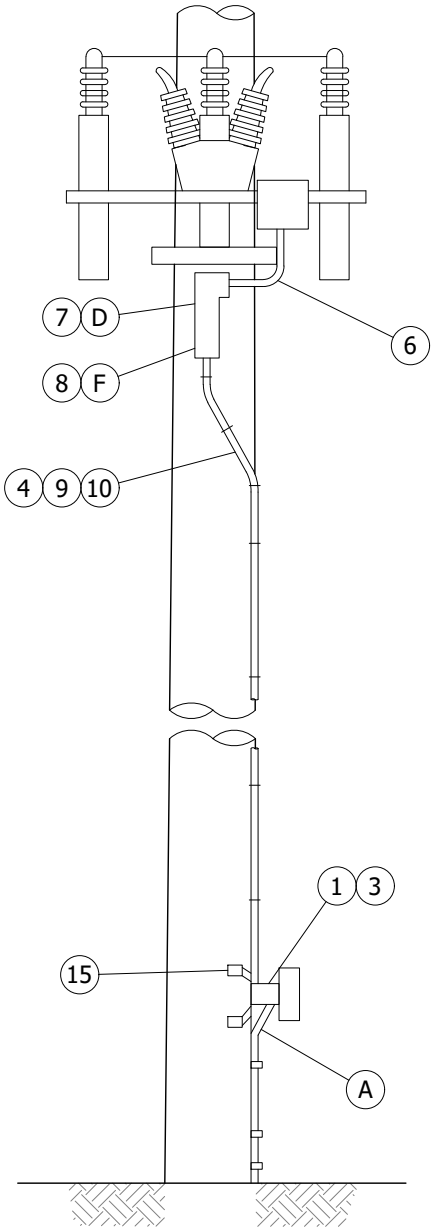
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**SCOPE:** THIS STANDARD SHOWS TYPES OF CONTROLS, MATERIAL AND INSTALLATION OF A CAPACITOR CONTROL UNIT. THIS IS TO BE USED ON ALL SWITCHED CAPACITOR STATIONS.




**SIDE VIEW**




**FRONT VIEW**

| ASSEMBLY UNITS | DESCRIPTION |
|---|---|
| C/CTIM | CONTROL-DIGITAL, PROGRAMMABLE |

FIELD MAINTENANCE ONLY

**NOTES:**

- SEE PAGE 1330.4 FOR BILL OF MATERIAL.
- MATERIALS ORDERED ARE BASED ON 50' POLE.

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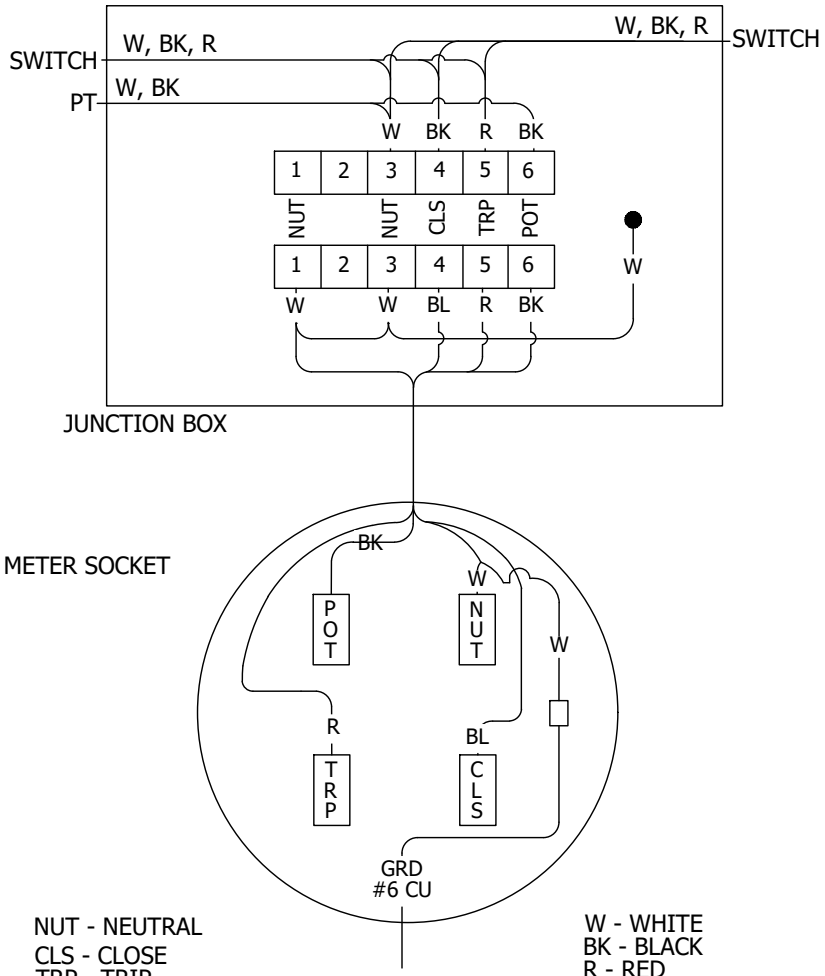
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CAPACITOR CONTROL MATERIAL AND INSTALLATION

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CAPACITOR CONTROL WIRING

CONTROL PANEL
(FACING METER SOCKET)

FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CAPACITOR CONTROL MATERIAL AND INSTALLATION
VOLTAGE WITH TIME BIAS (TYPE 'TB')

FMO
OH1330.2

## BILL OF MATERIALS: (FOR CONTROL PORTION OF SWITCHED CAPACITOR JOBS)

| ITEM | DESCRIPTION | QUANTITY | STOCK NUMBER |
|---|---|---|---|
| 1 | TERMINAL ADAPTER, PVC 1" | 2 | 102756 |
| 2 | LOCKNUT, GALV. 1" | 1 | 468896 |
| 3 | REDUCER, PVC, 1" X 3/4" | 2 | 573410 |
| 4 | CONDUIT, PVC, 3/4" SCHEDULE 40 | 25' | 251328 |
| 5 | COUPLING, PVC 3/4" | 1 | 280416 |
| 6 | ELBOW, 90°, PVC, 3/4" | 1 | 322166 |
| 7 | ACCESS FITTING BODY TYPE "T" PVC 3/4" (D) | 1 | 147792 |
| 8 | ACCESS FITTING BODY TYPE "LB" PVC 3/4" (F) | 1 | 146384 |
| 9 | WIRE TW #12 WHITE | 30' | 808704 |
| | WIRE TW #12 BLACK | 30' | 808096 |
| | WIRE TW #12 BLUE | 30' | 808416 |
| | WIRE TW #12 RED | 30' | 808576 |
| 10 | STRAPS, PIPE, GALV, 3/4", 6D NAILS, GALV | AS REQ'D | 697888/490656 |
| 11 | METER SOCKET | 1 | 161898 |
| 12 | RING, STAINLESS STEEL, METER SEALING | 1 | 599034 |
| 13A | DIGITAL, PROGRAMMABLE CONTROL (C) | 1 | 706176 |
| 13B | FISHER PIERCE 2416 CONTROL REPLACEMENT BATTERY KIT (G)(H) | -- | 126800 |
| 14 | PADLOCK, MASTER 7 | 1 | 514912 |
| 15 | SCREW, LAG, 1/4" X 2" | 4 | 621888 |
| 16 | CONDUIT, PVC, 3/4" SCHEDULE 80 | 9 | 251520 |

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## INSTALLATION:

(A) ATTACH GROUND WIRE (ALREADY PROVIDED) TO GROUND TERMINAL OF METER SOCKET.

(B) INSTALL CONTROL 90° FROM FRONT SIDE OF CAPACITOR RACK.

(C) CONTROLS TO BE CONFIGURED/PROGRAMED PER THE DISTRIBUTION CAPACITOR INSTRUCTION, SETTING AND SURVEY INFORMATION MANUALS.

(D) FOR USE WHEN CURRENT SENSOR IS REQUIRED.

(E) NEW INSTALLATIONS MUST BE AUTHORIZED BY PLANNING ENGINEER.

(F) FOR USE WITHOUT CURRENT SENSOR.

(G) REPLACEMENT KIT INCLUDES: ONE 6 VOLT RECHARGEABLE LEAD ACID BATTERY, 2-30 INCH WIRES WITH CONNECTORS ON BOTH ENDS, DOUBLE SIDED ADHESIVE TAPE.

(H) IF BATTERY IS INSTALLED ON CIRCUIT BOARD BEHIND CONTROL PANEL, INSTALL NEW BATTERY ON RIGHT HAND SIDE OF CONTROL DOOR. DO NOT ATTEMPT TO REMOVE OLD BATTERY FROM CIRCUIT BOARD BECAUSE BOARD MAY BE DAMAGED.

## REFERENCE:

I. SEE STANDARD 1325 FOR A TWO OIL SWITCH INSTALLATION WITH CONTROL UNIT.

J. SEE FMO STANDARD 1399.208 FOR A SWITCH CAPACITOR USING CURRENT SENSOR AND CONTROL UNIT.

K. SEE STANDARD PRACTICE 302 FOR PROPER OPERATION OF CAPACITOR STATION AND CONTROL TESTING.

L. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE PER G.O. 95 RULE 22.2 (C).

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## BILL OF MATERIALS: (FOR CONTROL PORTION OF SWITCHED CAPACITOR JOBS)

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| 6 | ELBOW, 90°, PVC, 3/4" | 1 | 322166 |
| 7 | ACCESS FITTING BODY TYPE "T" PVC 3/4" (D) | 1 | 147792 |
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| 10 | STRAPS, PIPE, GALV, 3/4", 6D NAILS, GALV | AS REQ'D | 697888/490656 |
| 11 | METER SOCKET | 1 | 161898 |
| 12 | RING, STAINLESS STEEL, METER SEALING | 1 | 599034 |
| 13A | THE CONTROL WILL BE ONE OF THE FOLLOWING: VOLTAGE W/TIME BIAS | 1 | 706176 |
| | VAR W/ VOLTAGE OVERRIDE | 1 | 273400 (E) |
| 13B | FISHER PIERCE CONTROL REPLACEMENT BATTERY KIT (G)(H) | -- | 126800 |
| 14 | PADLOCK, MASTER 7 | 1 | 514912 |
| 15 | SCREW, LAG, 1/4" X 2" | 4 | 621888 |
| 16 | CONDUIT, PVC, 3/4" SCHEDULE 80 | 9 | 251520 |

## INSTALLATION:

(A) ATTACH GROUND WIRE (ALREADY PROVIDED) TO GROUND TERMINAL OF METER SOCKET.

B. INSTALL CONTROL 90° FROM FRONT SIDE OF CAPACITOR RACK.

C. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE PER G.O. 95 RULE 22.2 (C).

(D) FOR USE WHEN CURRENT SENSOR IS REQUIRED.

(E) NEW INSTALLATIONS MUST BE AUTHORIZED BY PLANNING ENGINEER.

(F) FOR USE WITHOUT CURRENT SENSOR.

FIELD MAINTENANCE ONLY

(G) REPLACEMENT KIT INCLUDES: ONE 6 VOLT RECHARGEABLE LEAD ACID BATTERY, 2-30 INCH WIRES WITH CONNECTORS ON BOTH ENDS, DOUBLE SIDED ADHESIVE TAPE.

(H) IF BATTERY IS INSTALLED ON CIRCUIT BOARD BEHIND CONTROL PANEL, INSTALL NEW BATTERY ON RIGHT HAND SIDE OF CONTROL DOOR. DO NOT ATTEMPT TO REMOVE OLD BATTERY FROM CIRCUIT BOARD BECAUSE BOARD MAY BE DAMAGED.

## REFERENCE:

I. SEE STANDARD 1325 FOR A TWO OIL SWITCH INSTALLATION WITH CONTROL UNIT.

J. SEE STANDARD 1326 FOR A SWITCH CAPACITOR USING CURRENT SENSOR AND CONTROL UNIT.

K. SEE ELECTRIC STANDARD PRACTICE 302 FOR PROPER OPERATION OF CAPACITOR STATION AND CONTROL TESTING.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | REVISION | - | - | - | PEA/VCR | 01/28/2002 | F | | | | | | |
| B | REVISION | - | - | - | PEA/VCR | 01/01/2000 | E | MISSING VERSION ADDED TO FMO | EDM | JA | JES | FRC | 01/24/2022 |
| A | REVISION | - | - | - | PEA/CAK | 01/01/2000 | D | REVISION | - | - | - | PEA/JC | 12/05/2005 |

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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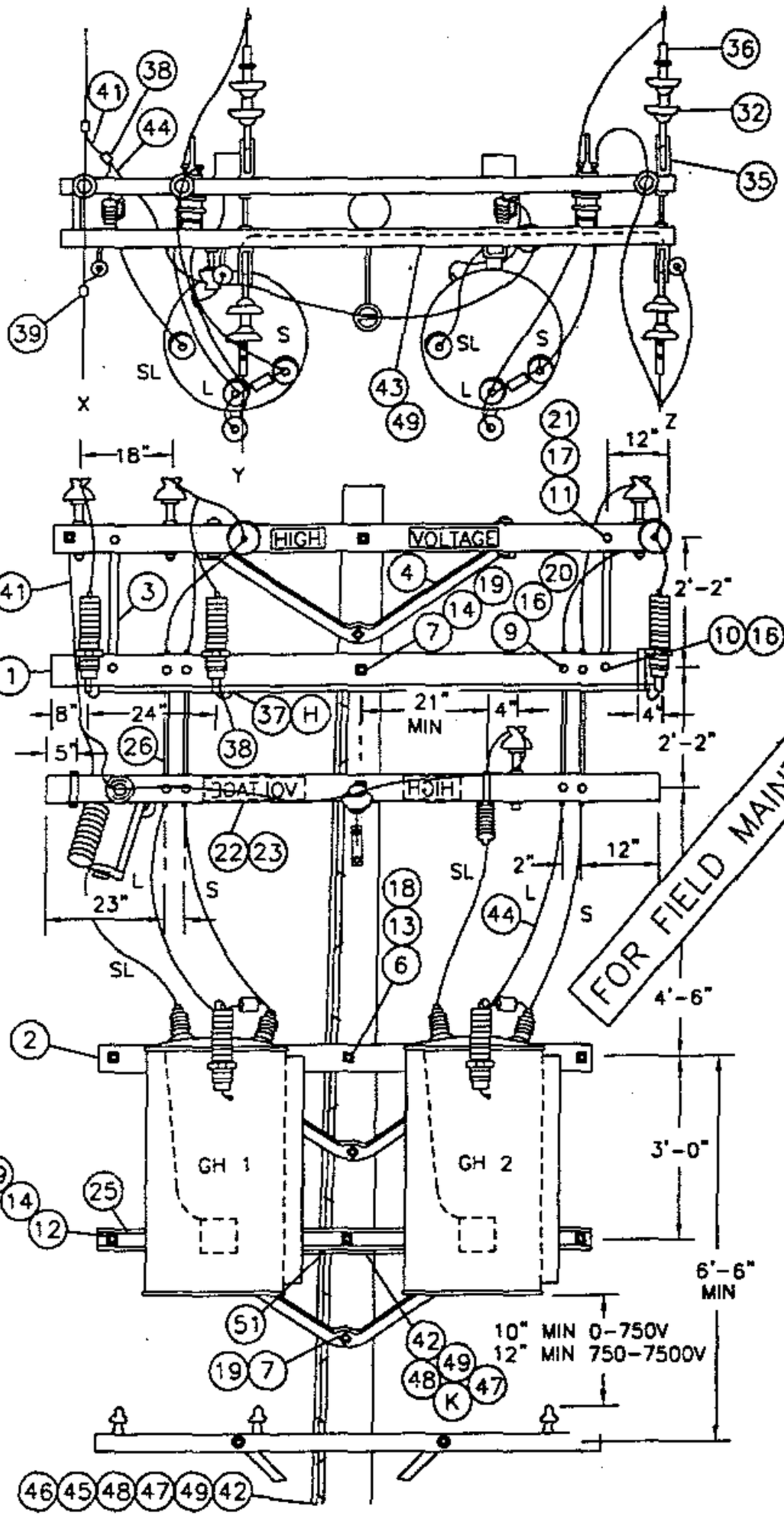
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SDG&E ELECTRIC OVERHEAD STANDARD

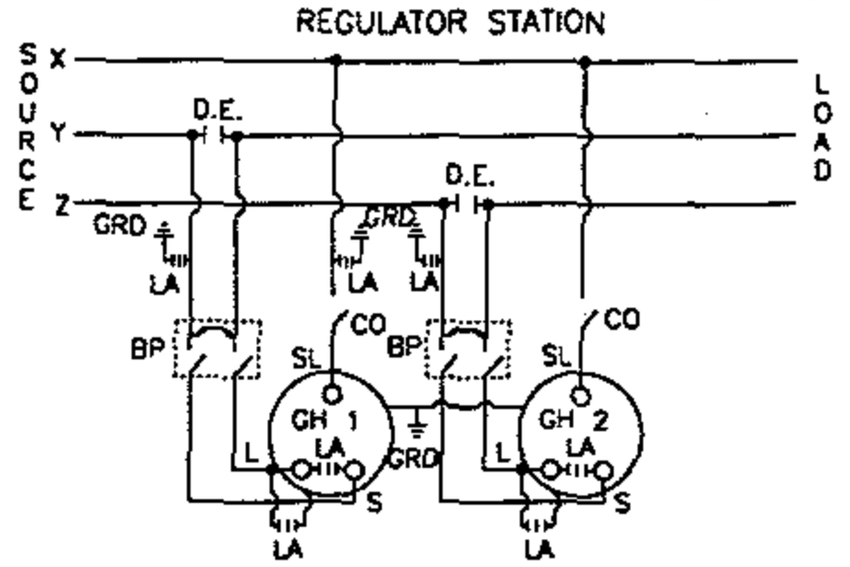
STEP-VOLTAGE REGULATOR STATION, OPEN DELTA, 12KV

FMO OH 1348

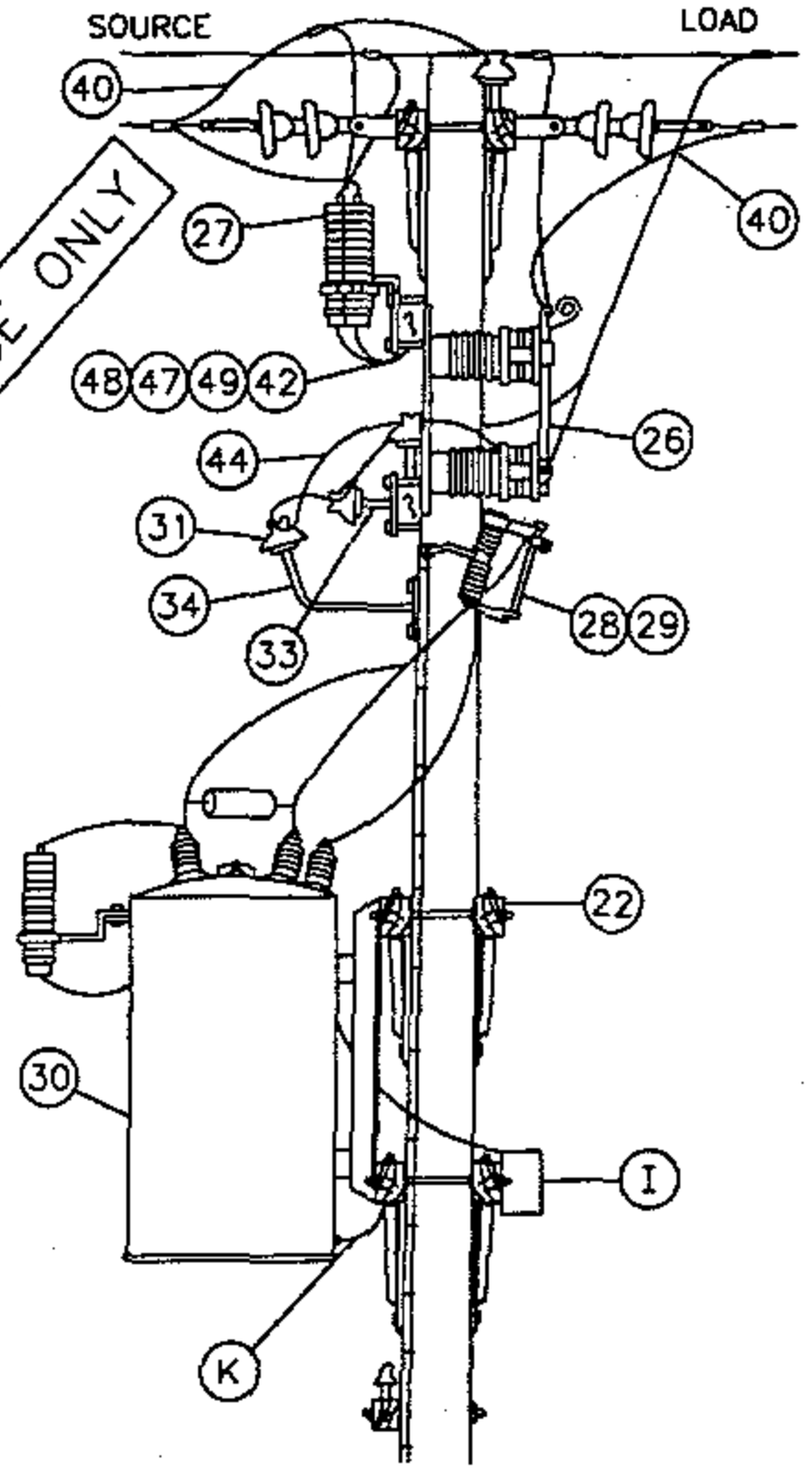
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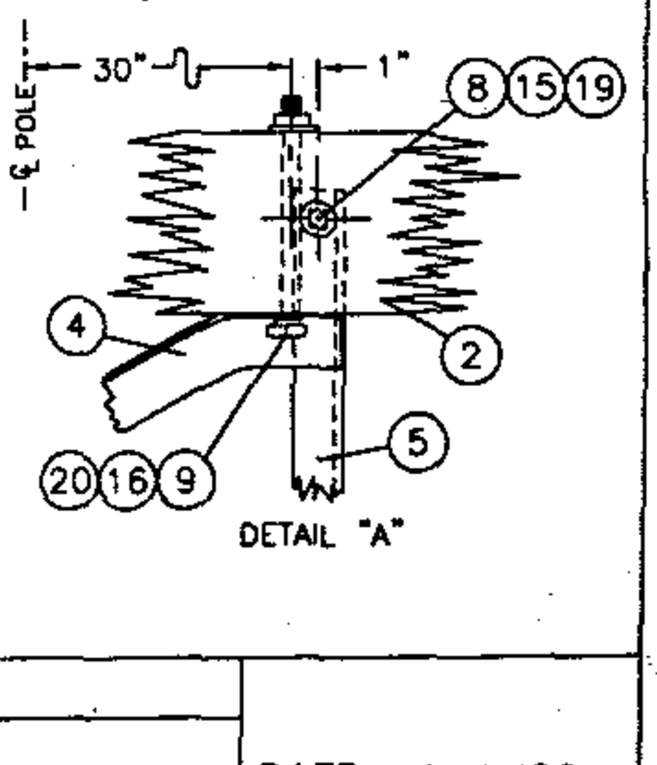



SCHEMATIC DIAGRAM OF A 12KV OPEN DELTA REGULATOR STATION

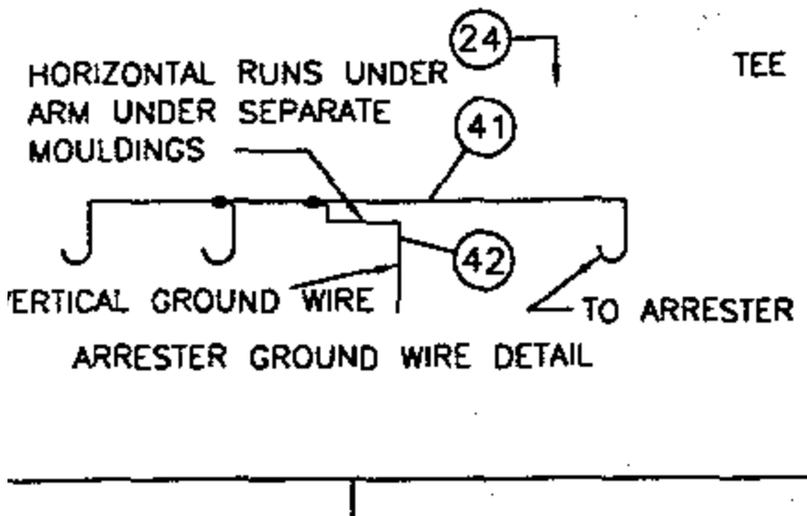



FOR FIELD MAINTENANCE ONLY

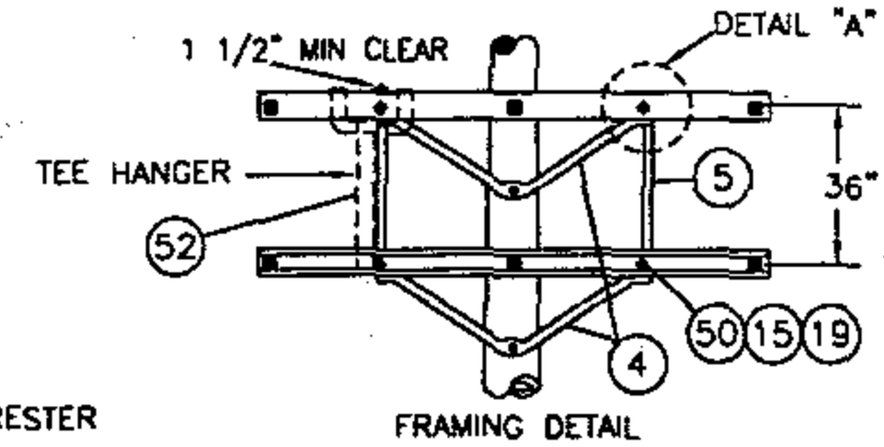



DETAIL "A"




ARRESTER GROUND WIRE DETAIL




FRAMING DETAIL
FOR 2-12KV STEP VOLTAGE REGULATORS

| | | |
|---|---|---|
| 1399.401<br>SUPERSEDES<br>348.1 1-1-96 | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, OPEN DELTA, 12KV | DATE 1-1-96<br>APPD PA 1/25/96 |

NOTES:

A. CAUTION: WHEN CONNECTING A STATION, REGULATORS MUST BE ON NEUTRAL. CLOSE CUTOUT TO SL BUSHING BEFORE CLOSING BYPASS DISCONNECT ON THAT POLE. WHEN DISCONNECTING A STATION, PUT REGULATORS ON NEUTRAL, AND OPEN BYPASS DISCONNECT BEFORE OPENING CUTOUT TO SL BUSHING. THIS AVOIDS A SERIOUS OVERLOAD CONDITION.

B. ON NEW CONSTRUCTION, USE AN EXTRA HEAVY CLASS ONE POLE WITH 10" MIN TOP DIA.

(C) USE TWO GROUND RODS FOR THE ARRESTERS AND TANKS. ALL GROUND RODS SHOULD BE SPACED A MINIMUM OF SIX FEET APART.

(D) UNIT GROUND COMPLETE, ORDER 603136.

F. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287.

G. BOND DEAD-END HARDWARE

(H) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(I) CONTROLS WILL BE MOUNTED BY KEARNY MAINTENANCE.

J. INSTALL DOUBLE COIL SPRING WASHER ON END OF BOLT WHICH ATTACHES TO LARGEST METALLIC OBJECT, SUCH AS A BRACKET OR BRACE.

(K) REGULATOR TANKS SHALL BE PERMANENTLY GROUNDED.

| ITEM | | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| PTF | LTI | OCD | | | |
| 1 | | | CROSSARM 3 3/4" X 5 3/4" X 10' - 0" | 3 | 380 |
| 2 | | | CROSSARM 3 3/4" X 5 3/4" X 8' - 0" | 4 | 380 |
| 3 | | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 4 | | | BRACE, ANGLE CROSSARM 5' - 0" | 5 | 164128 |
| 5 | | | BRACE, VERTICAL 36" | 2 | 164256 |
| 6 | | | BOLT, MACH 3/4" X __" | 2 | 100 SECTION |
| 7 | | | BOLT, MACH 5/8" X __" | 4 | 100 SECTION |
| 8 | | | BOLT, MACH 5/8" X 5" | 2 | 155488 |
| 9 | | | BOLT, MACH 1/2" X 7" | 16 | 153120 |
| 10 | | | BOLT, MACH 1/2" X 5" | 2 | 153024 |
| 11 | | | BOLT, MACH 3/8" X 5" | 2 | 154368 |
| 12 | | | BOLT, SPACE 5/8" X __" | 7 | 100 SECTION |
| 13 | | | WASHER, 3" SQ FLAT | 4 | 799104 |
| 14 | | | WASHER, 2 1/4" SQ FLAT | 28 | 799040 |
| 15 | | | WASHER, 5/8" ROUND | 4 | 800320 |
| 16 | | | WASHER, 1/2" ROUND | 20 | 800192 |
| 17 | | | WASHER, 3/8" ROUND | 2 | 800288 |
| 18 | | | WASHER, 3/4" SPRING DBL COIL | 2 | 798496 |
| 19 | | | WASHER, 5/8" SPRING DBL COIL | 21 | 798560 |
| 20 | | | WASHER, 1/2" SPRING DBL COIL | 20 | 798464 |
| 21 | | | WASHER, 3/8" SPRING DBL COIL | 2 | 798528 |
| 22 | | | SIGN, HIGH VOLTAGE | 2 | 647648 |
| 23 | | | NAILS, ROOFING #8 GALV | 16 | 492224 |
| 24 | | | STEPS, POLE | 19 | 692992 |
| 25 | | | STRIP, COVER 1 1/8" X 3 5/8" X 8' - 0" (2X4S4S) | 1 | 699328 |
| | 26 | | SWITCH BYPASS | 2 | 706944 |
| | 27 | | ARRESTER, LIGHTNING (12KV) | 3 | 113248 |
| | 28 | | CUTOUT, 12KV 100 AMP WITH LOAD BUSTER HOOKS | 2 | 1200 SECTION |
| | 29 | | BLADE, DISCONNECT CUTOUT | 2 | 1200 SECTION |
| | 30 | | REGULATOR, STEP VOLTAGE 1Ø, COMPLETE WITH HANGERS | 2 | 1300 SECTION |
| | 31 | | INSULATOR, PIN TYPE (CLASS AS REQ'D) | 3 | 700 SECTION |
| | | 32 | INSULATOR, SUSPENSION | 8 | 700 SECTION |
| 33 | | | PIN, INSULATOR (AS REQUIRED BY ITEM 31) | 2 | 532___ |
| 34 | | | BRACKET, INSULATOR (AS REQUIRED BY ITEM 31) | 1 | 100 SECTION |
| | | 35 | CLEVIS, DEAD END CLOSED | 4 | 235712 |
| | | 36 | CLAMPS, DEAD END | 4 | 700 SECTION |
| | 37 | | CONNECTOR, COMPRESSION (#2 TO #6) | 2 | 257792 |
| | 38 | | CONNECTOR, COMPRESSION (#6 TO #6) | 2 | 257952 |
| | 39 | | CONNECTORS, WIRE | 6 | 700 SECTION |
| | 40 | | WIRE, BARE STRANDED COPPER #4 | (2.5#) 20' | 813760 |
| | 41 | | WIRE, BARE STRANDED COPPER #6 | (2.5#) 30' | 813536 |
| | 42 | | WIRE, BARE STRANDED COPPER #2 | (9.2#) 45' | 813664 |
| | 43 | | WIRE, #8 ANNEALED SOLID COPPER | (.75#) 15' | 812928 |
| | 44 | | WIRE, #4 SOLID WP COPPER | (5.0#) 36' | 812480 |
| | 45 | | ROD, GROUND (C)(D) | 2 | 603072 |
| | 46 | | CLAMP, GROUND ROD (D) | 2 | 230016 |
| | 47 | | MOULDING, HARDWOOD #1 (D) | 50' | 487200 |
| | 48 | | STAPLES, GALV 3" X 1 1/16" X 1/4" (D) | 35 | 678560 |
| | 49 | | STAPLES, FENCE GALV 1 1/4" (D) | 30 | 678528 |
| 50 | | | BOLT, MACH 5/8" X 7" | 2 | 155552 |
| 51 | | | CONNECTOR, COMPRESSION (#2 TO #2) | 1 | 257760 |
| | 52 | | HANGER, TRANSFORMER T-2 | 2 | 402944 |

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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X Indicates Latest Revision | Completely Revised | New Page | Information Removed

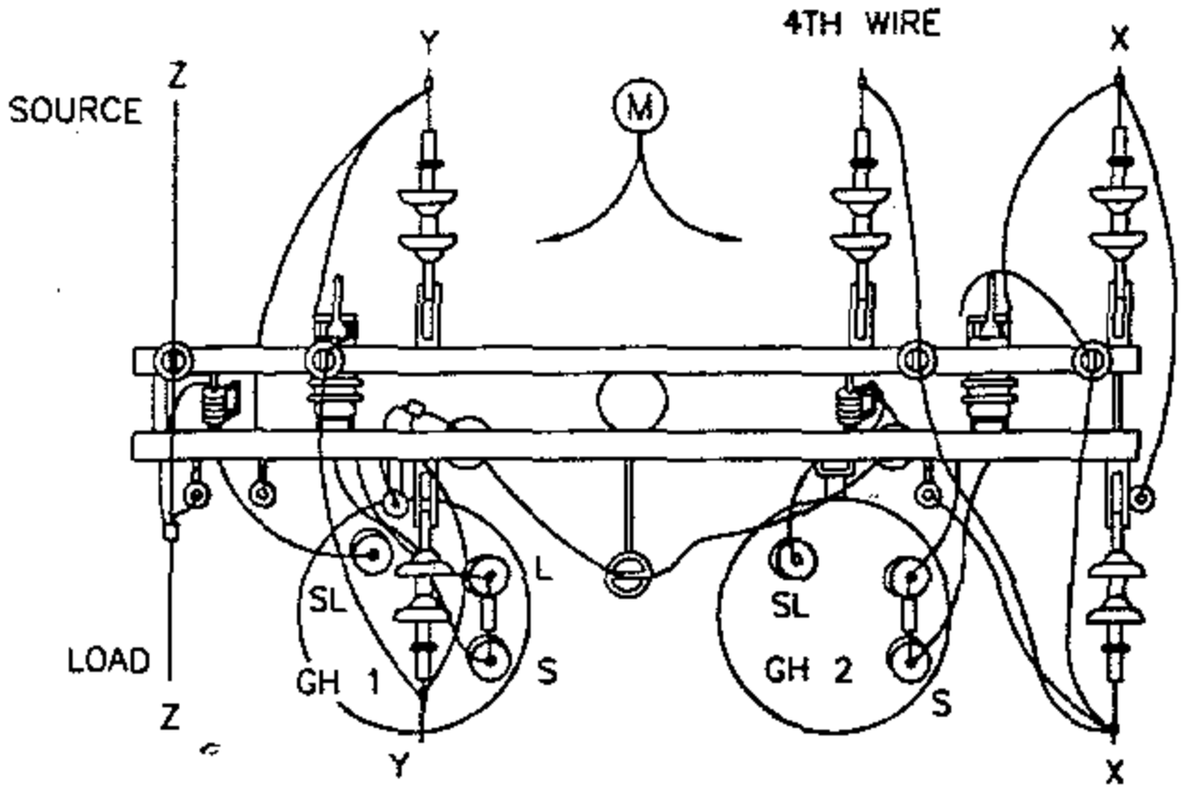
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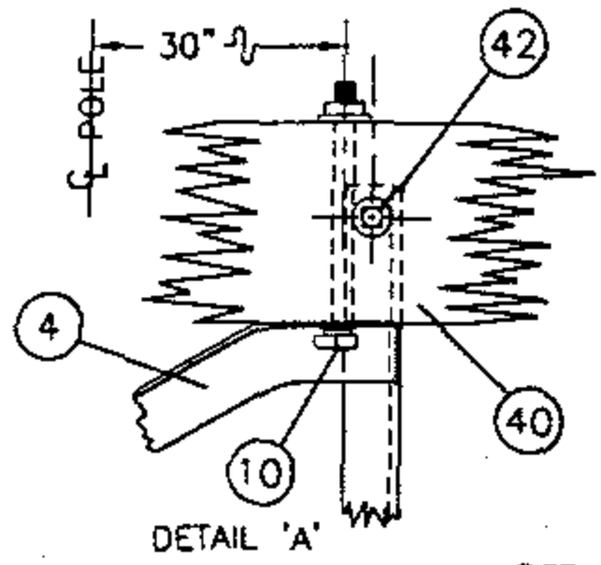
SDG&E ELECTRIC OVERHEAD STANDARD

STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES

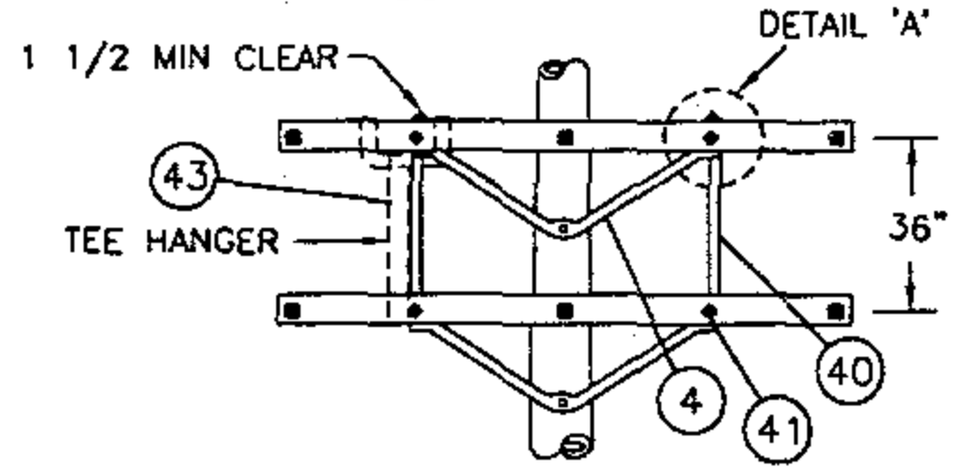
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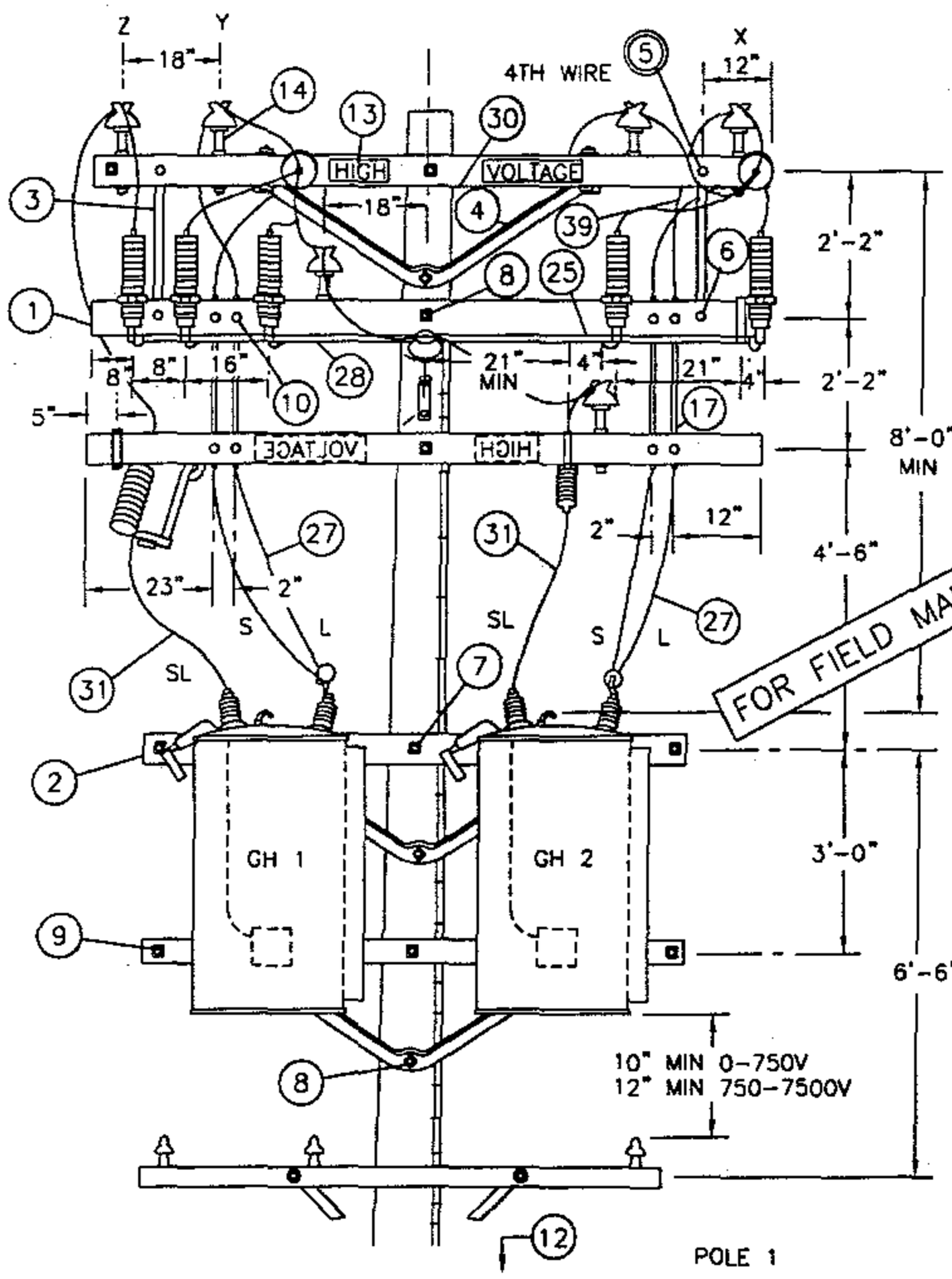


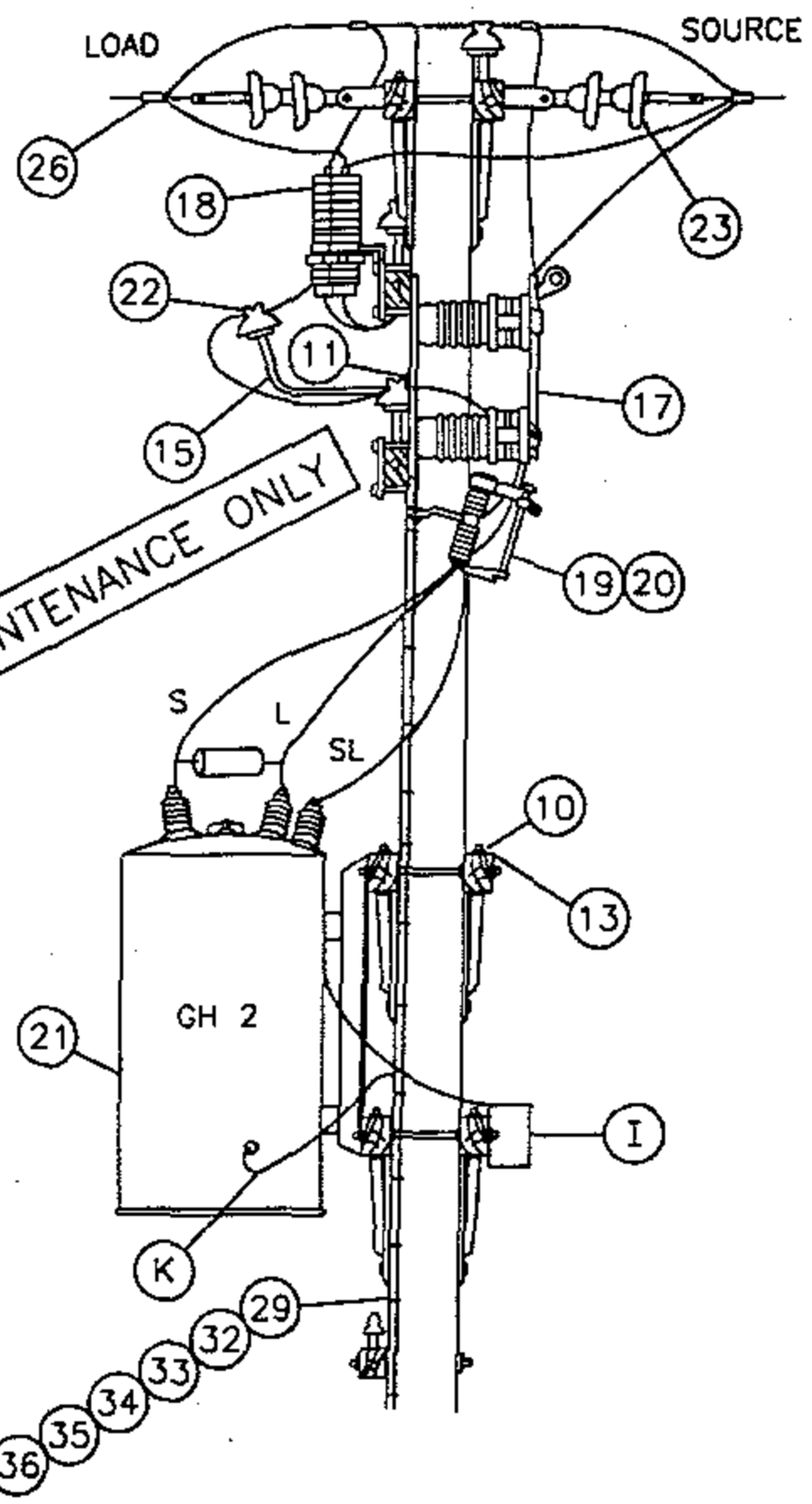

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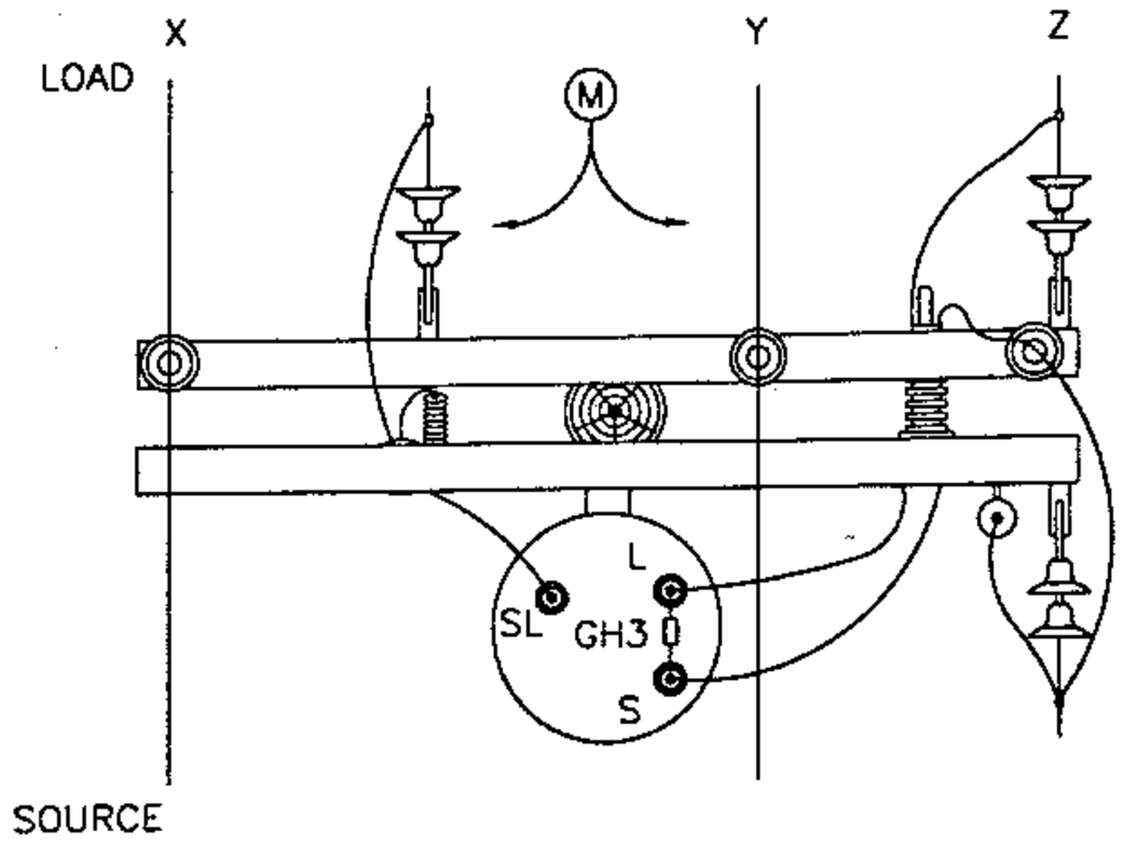

FRAMING DETAIL
FOR 2-12KV STEP-VOLTAGE REGULATORS



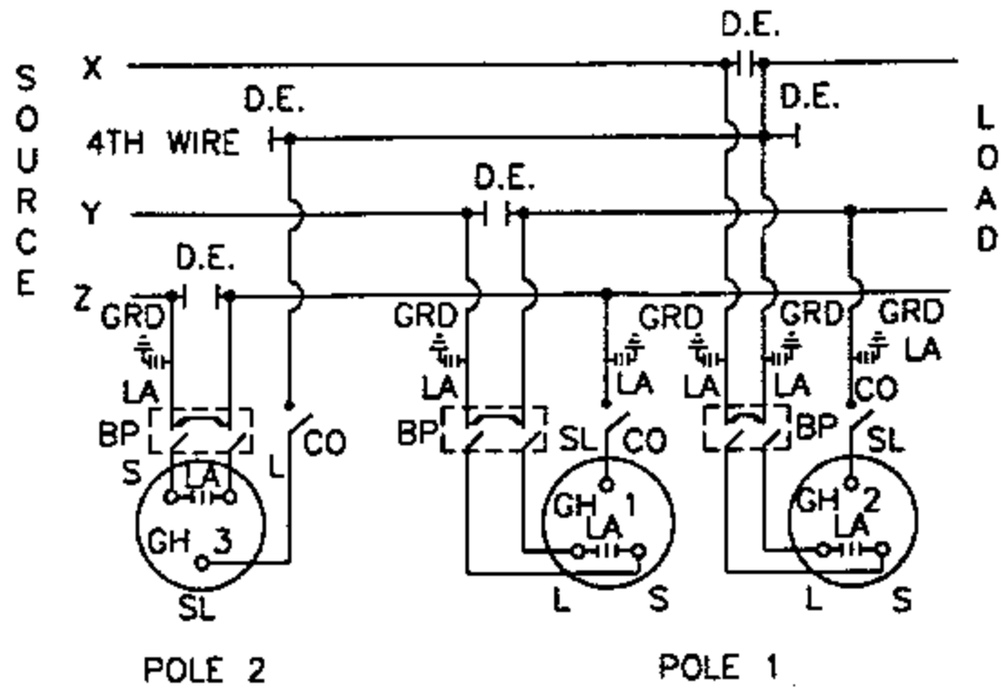

POLE 1

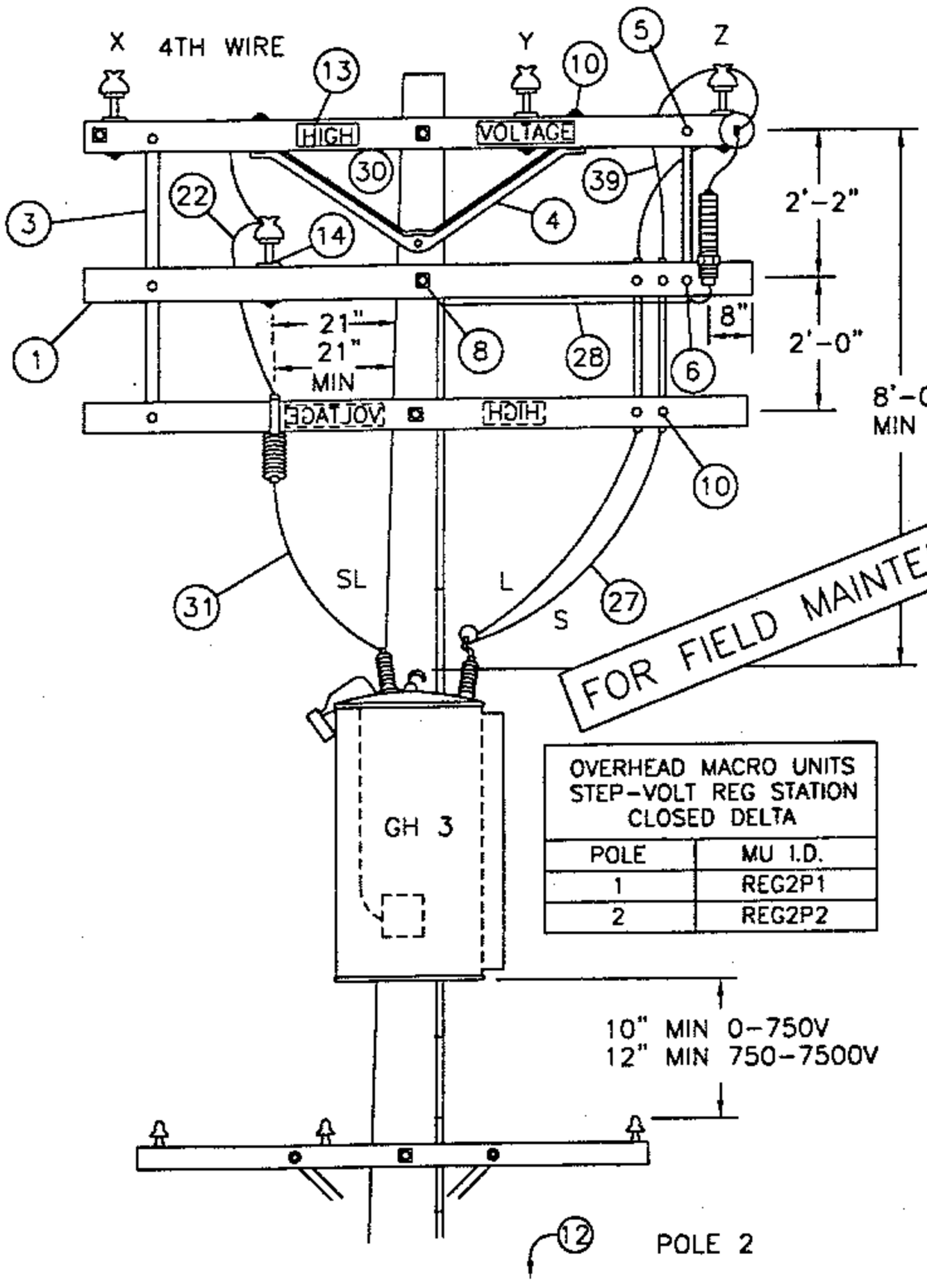



| | | |
|---|---|---|
| DATE 1-1-96<br>APPD PA/BSG | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES | 1399.403<br>SUPERSEDES<br>1349.1 1-1-96 |



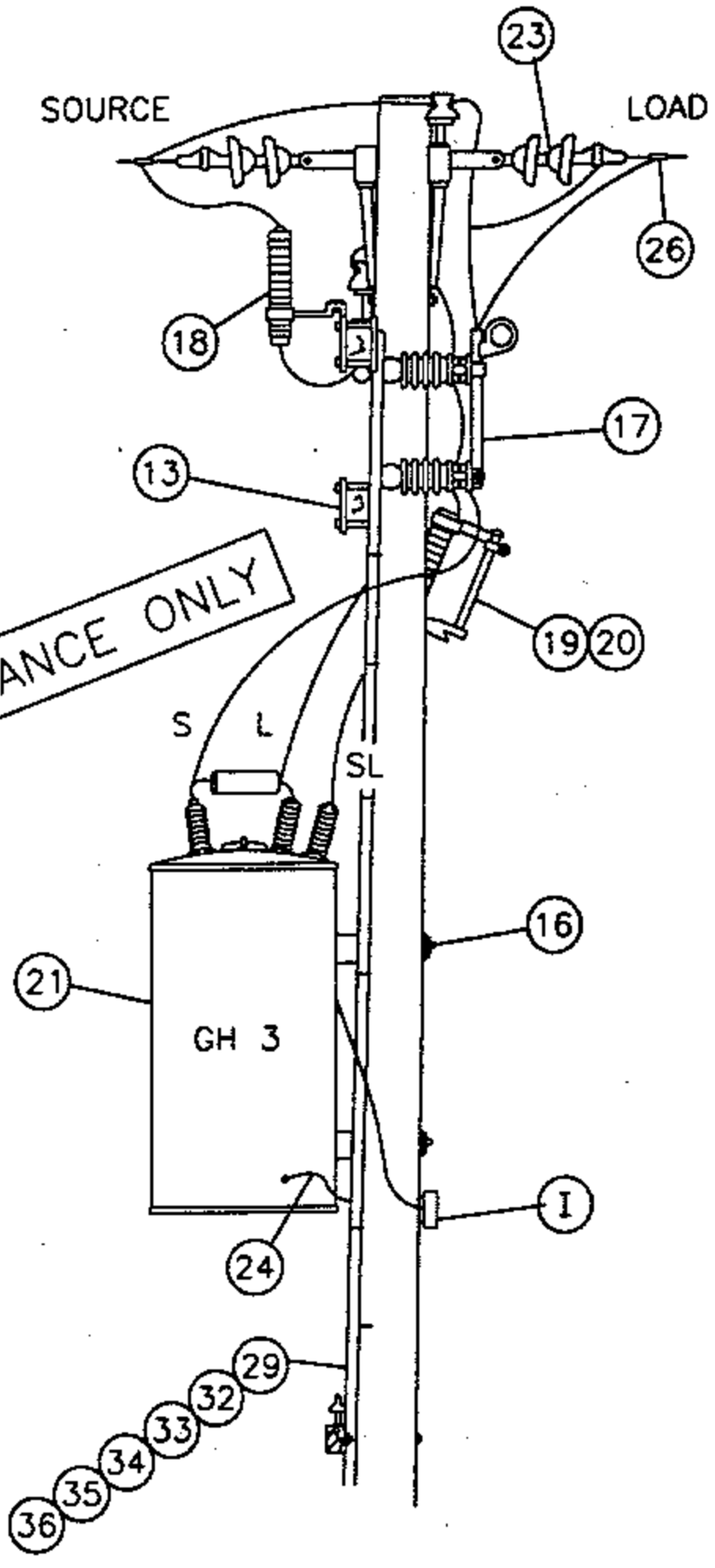

SCHEMATIC DIAGRAM OF A 12KV CLOSED DELTA REGULATOR STATION




| OVERHEAD MACRO UNITS STEP-VOLT REG STATION CLOSED DELTA | |
|---|---|
| POLE | MU I.D. |
| 1 | REG2P1 |
| 2 | REG2P2 |

FOR FIELD MAINTENANCE ONLY




| | | |
|---|---|---|
| 1399.404 SUPERSEDES 1349.2 1-1-96 | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES | DATE 1-1-96<br>APPD PBA /BSG |

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NOTES:

A. CAUTION: WHEN CONNECTING A STATION, REGULATORS MUST BE ON NEUTRAL. CLOSE CUTOUT TO SL BUSHING BEFORE CLOSING BYPASS DISCONNECT ON THAT POLE. WHEN DISCONNECTING A STATION, PUT REGULATORS ON NEUTRAL, AND OPEN BYPASS DISCONNECT BEFORE OPENING CUTOUT TO SL BUSHING. THIS AVOIDS A SERIOUS OVERVOLTAGE CONDITION.

B. USE EXTRA HEAVY CLASS ONE POLE WITH 10" MIN TOP DIA FOR POLE #1, AND A CLASS ONE FOR POLE #2.

(C) USE TWO GROUND RODS FOR THE ARRESTERS AND TANKS. ALL GROUND RODS SHOULD BE SPACED A MINIMUM OF SIX FEET APART.

(D) UNIT GROUND COMPLETE, ORDER 603136.

F. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287.

G. BOND DEAD-END HARDWARE.

(H) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(I) CONTROLS WILL BE MOUNTED BY KEARNY MAINTENANCE.

J. INSTALL DOUBLE COIL SPRING WASHER ON END OF BOLT WHICH ATTACHES TO LARGEST METALLIC OBJECT, SUCH AS A BRACKET OR BRACE.

(K) REGULATOR TANKS SHALL BE PERMANENTLY GROUNDED.

(M) THIS CONSTRUCTION TO BE USED WHEN CENTER PHASE WIRE IS TO THE RIGHT OF THE POLE WHEN LOOKING TOWARD THE LOAD.

| ITEM | DESCRIPTION | QUANTITY | | STOCK NO. OR |
|---|---|---|---|---|
| | | POLE 1 | POLE 2 | CONSTR. STD. |
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 3 | 3 | 380 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 4 | – | 380 |
| 3 | BRACE, FLAT CROSSARM 28" | 2 | 3 | 164192 |
| 4 | BRACE, ANGLE CROSSARM 5'-0" | 5 | 1 | 164128 |
| 5 | BOLT, MACHINE, 3/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | 2 | 392 |
| 6 | BOLT, MACHINE, 1/2" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH | 2 | 3 | 392 |
| 7 | BOLT, MACHINE, 3/4" X --, 1 SQ. CURV. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 392 |
| 8 | BOLT, MACHINE, 5/8" X --, 2 FLAT WASH., 1 DBL. COIL SPR. WASH. | 4 | 2 | 392 |
| 9 | BOLT, SPACE, 5/8" X --, 4 WASH & 4 NUTS, 2 DBL. COIL SPR. WASH. | 7 | 3 | 392 |
| 10 | BOLT, MACHINE, 1/2" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 18 | 6 | 392 |
| 11 | SCREW, LAG, 5/8" X 5" | 2 | – | 621600 |
| 12 | STEPS, POLE | 19 | 19 | 692992 |
| 13 | SIGN, HIGH VOLTAGE & NAILS, GALV. | 3 | 3 | 647648, 492224 |
| 14 | PIN, INSULATOR (AS REQUIRED BY ITEM 22) | 3 | 1 | 532--- |
| 15 | BRACKET, INSULATOR (AS REQUIRED BY ITEM 22) | 1 | – | 1661-- |
| 16 | COVER, BOLT, PLASTIC | – | 2 | 285696 |
| 17 | SWITCH, BYPASS | 2 | 1 | 706944 |
| 18 | ARRESTER, LIGHTNING (12KV) | 5 | 1 | 113248 |
| 19 | CUTOUT, 12KV 100 AMP WITH LOAD BUSTER HOOKS | 2 | 1 | 297888 |
| 20 | BLADE, DISCONNECT CUTOUT | 2 | 1 | 1200 SECTION |
| 21 | REGULATOR, STEP VOLTAGE 1Ø | 2 | 1 | 1300 SECTION |
| 22 | INSULATOR, PIN TYPE (CLASS AS REQUIRED) | 3 | 1 | 700 SECTION |
| 23 | INSULATOR, SUSPENSION | 10 | 6 | 700 SECTION |
| 24 | CONNECTOR, COMPRESSION (#2 TO #6) | 1 | 2 | 257792 |
| 25 | CONNECTOR, COMPRESSION (#6 TO #6) | 3 | – | 257952 |
| 26 | CONNECTORS, WIRE | 9 | 4 | 700 SECTION |
| 27 | WIRE, 2/0 WP COPPER | (12.4#) 24' | (6.2#) 12' | 808944 |
| 28 | WIRE, BARE STRANDED COPPER #6 | (1.8#) 24' | (1.8#) 22' | 813536 |
| 29 | WIRE, BARE STRANDED COPPER #2 | (9.2#) 45' | (9.8#) 45' | 813664 |
| 30 | WIRE, #8 ANNEALED SOLID COPPER | (.25#) 5' | (.25#) 5' | 812928 |
| 31 | WIRE, #4 SOLID WP COPPER | (1.8#) 10' | (.75#) 4' | 812480 |
| 32 | ROD, GROUND (C)(D) | 2 | 2 | 603072 |
| 33 | CLAMP, GROUND ROD (D) | 2 | 2 | 230016 |
| 34 | MOULDING, HARDWOOD 1" (D) | 45' | 48' | 487200 |
| 35 | STAPLES, GALV. 3" X 1 1/16" X 1/4" (D) | 32 | 35 | 678560 |
| 36 | STAPLES, FENCE GALV. 1 1/4" (D) | 28 | 30 | 678528 |
| 37 | CLEVIS, DEAD END CLOSED | 5 | 3 | 235712 |
| 38 | CLAMPS, DEAD END | 5 | 3 | 700 SECTION |
| 39 | WIRE, BARE STRANDED COPPER #1/0 | (3.3#) 10' | (3.3#) 10' | 813568 |
| 40 | BRACE, VERTICAL, 36" | 2 | – | 164256 |
| 41 | BOLT, MACHINE, 5/8" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 100 SECTION |
| 42 | BOLT, MACHINE, 5/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 100 SECTION |
| 43 | HANGER, TRANSFORMER T-2 | 2 | – | 402944 |

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SDG&E ELECTRIC STANDARDS

# STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA 12KV TWO POLES

1399.405
SUPERSEDES
1349.3 1-1-96

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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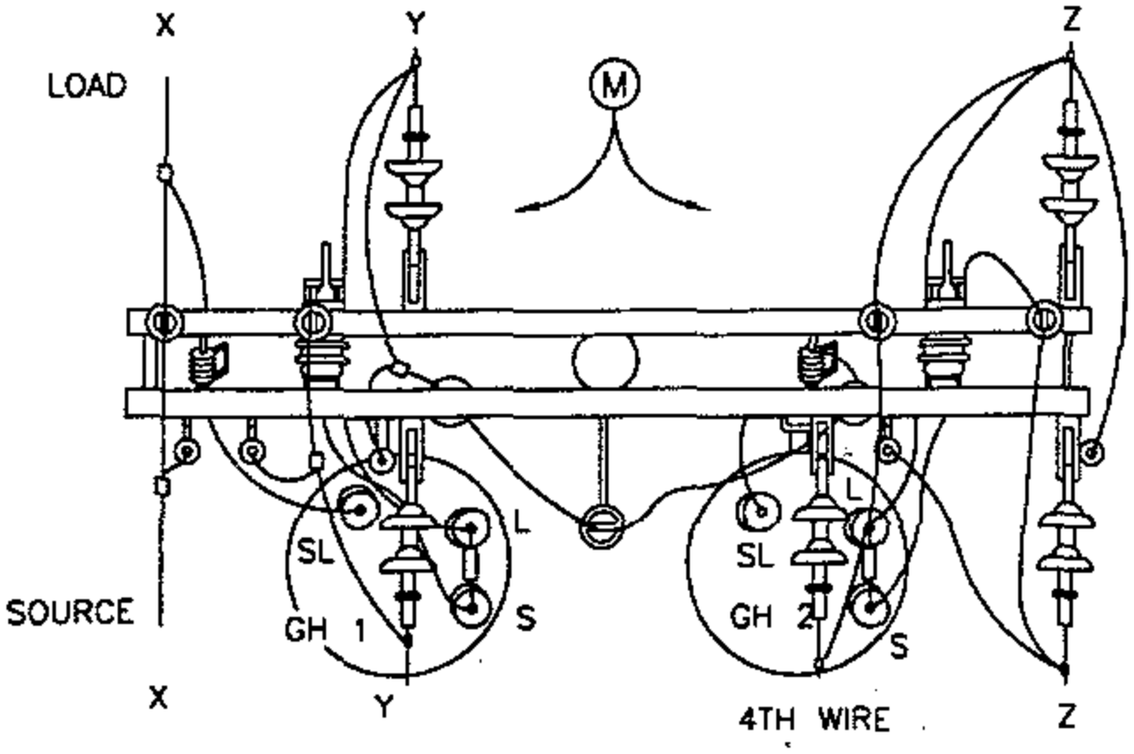
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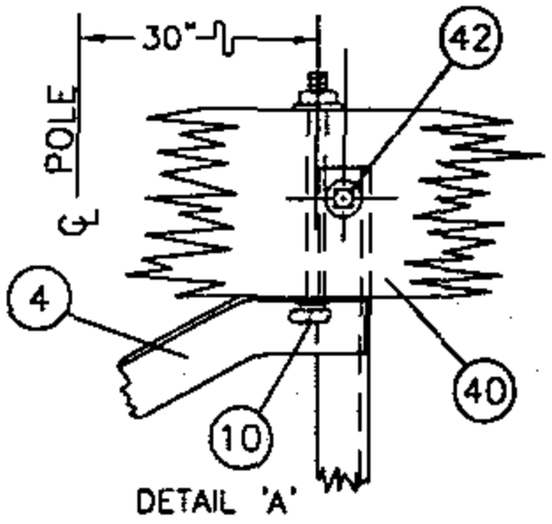
SDG&E ELECTRIC OVERHEAD STANDARD

STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES

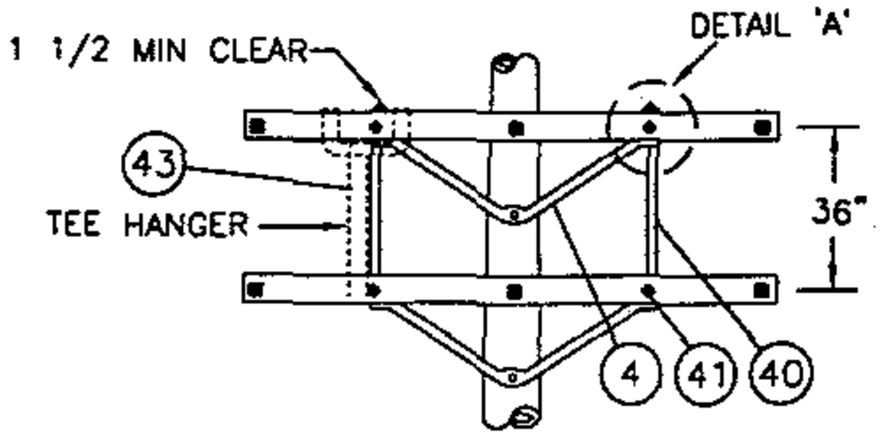
FMO OH 1350

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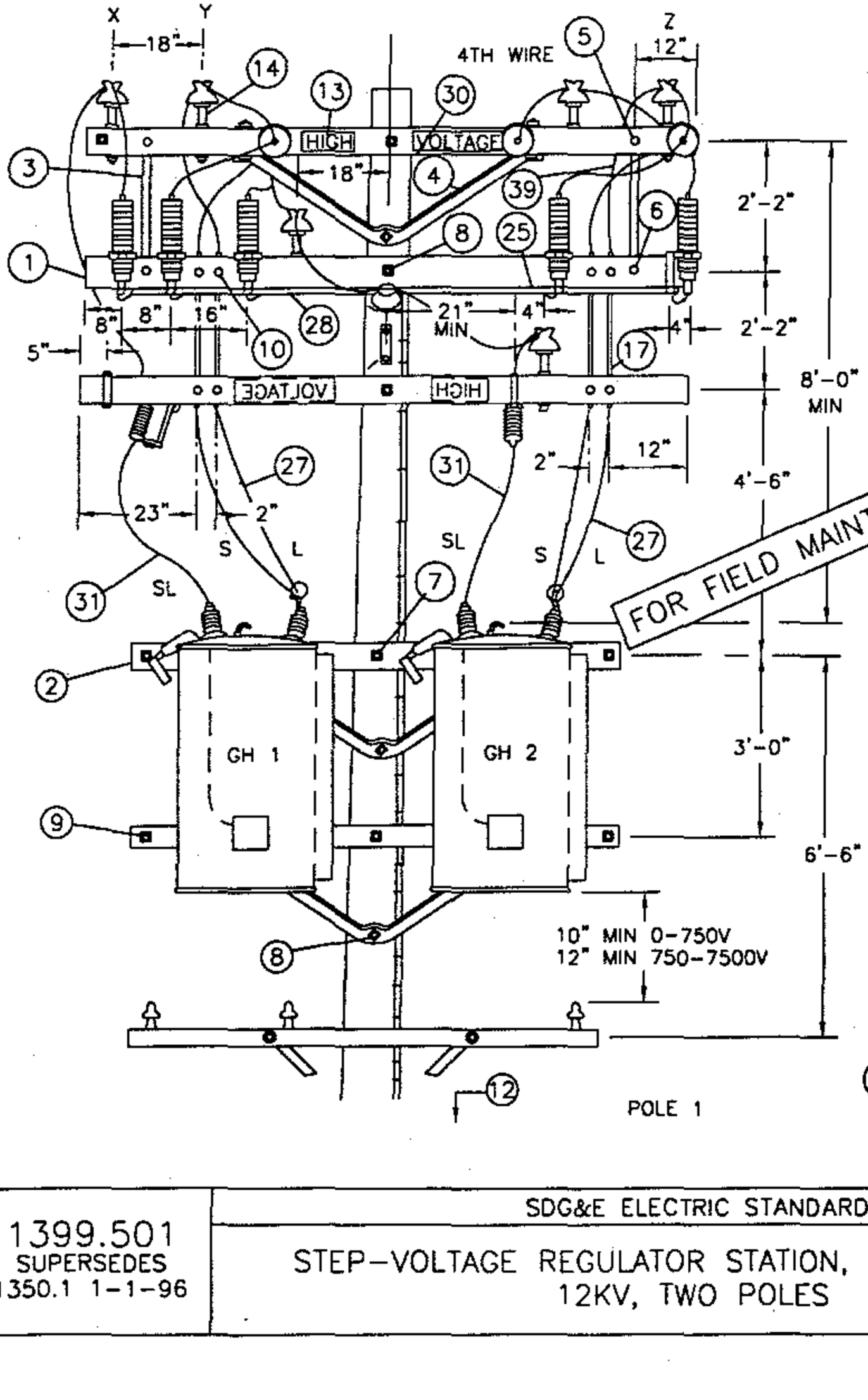


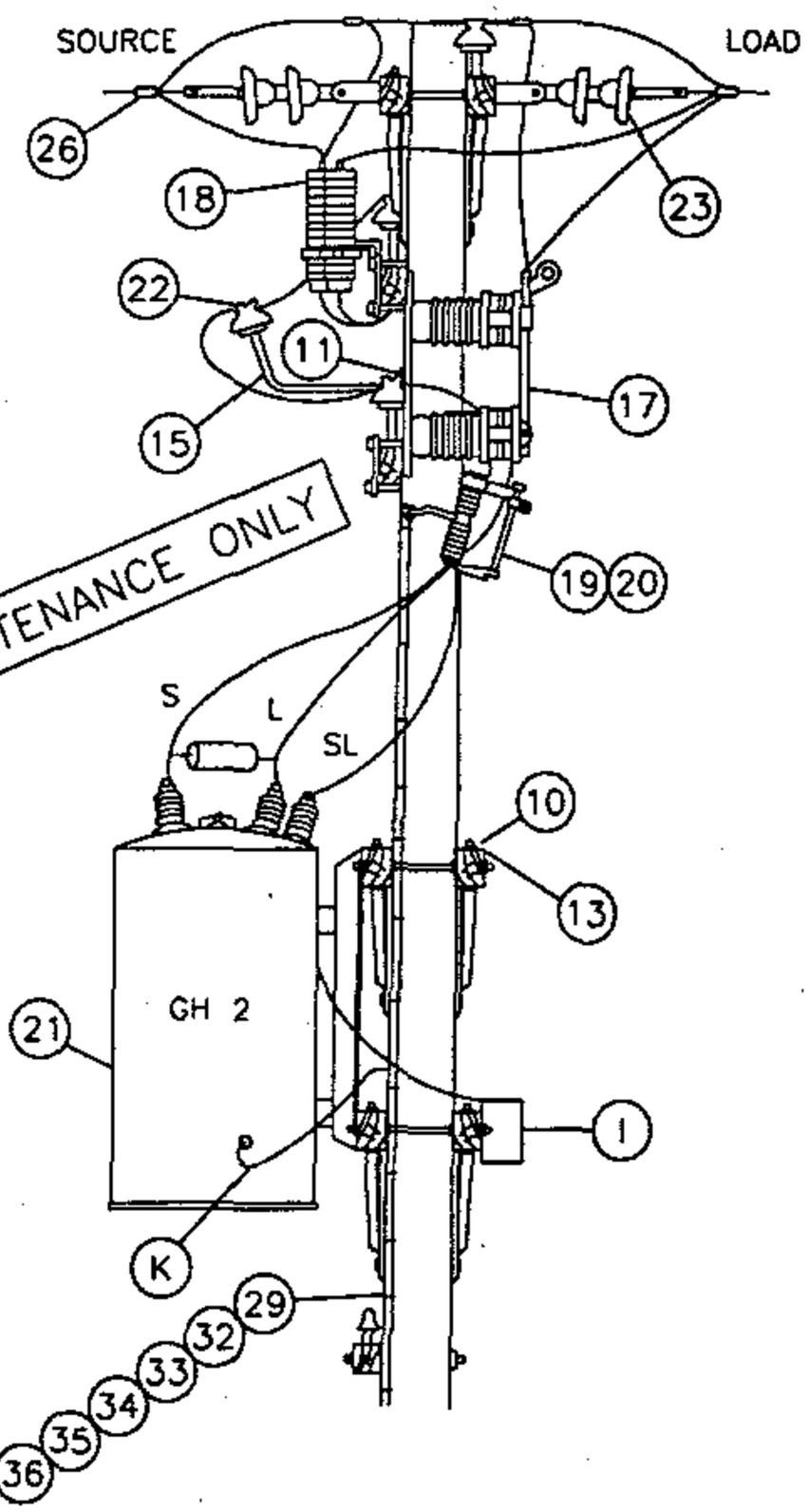




DETAIL 'A'




FRAMING DETAIL
FOR 2-12KV STEP-VOLTAGE REGULATORS

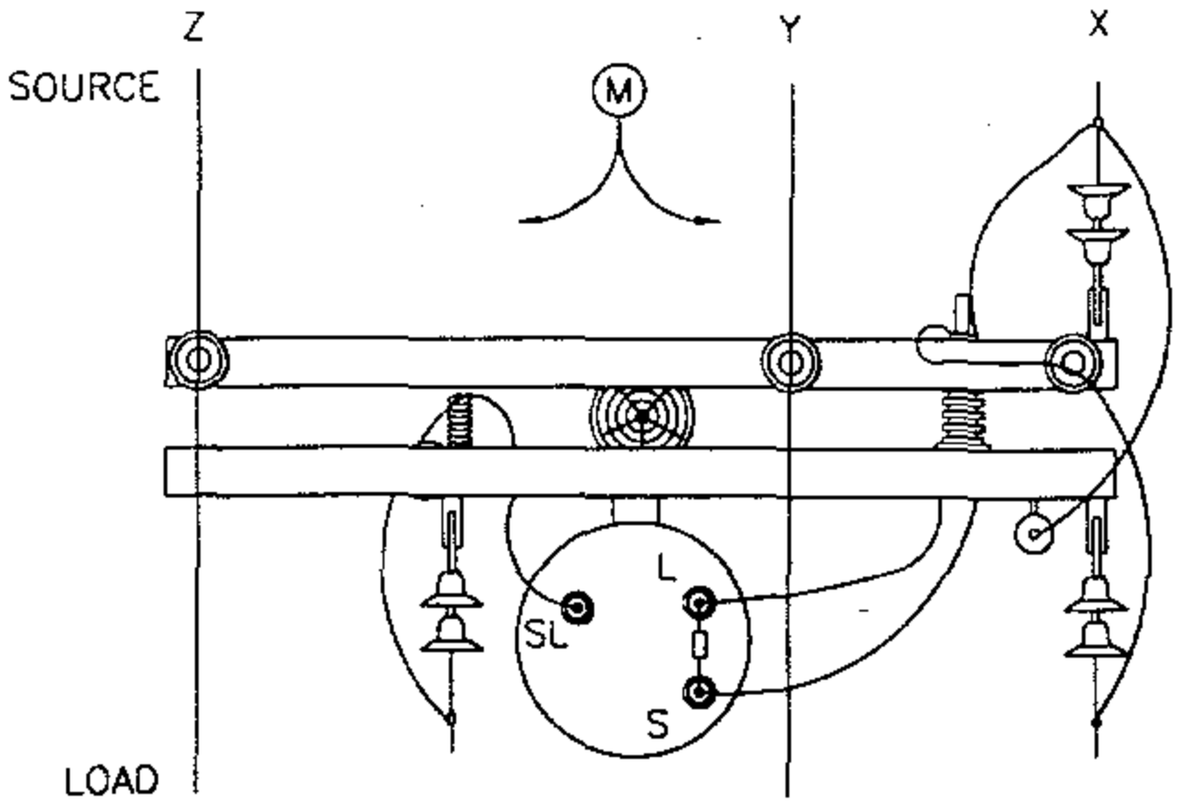


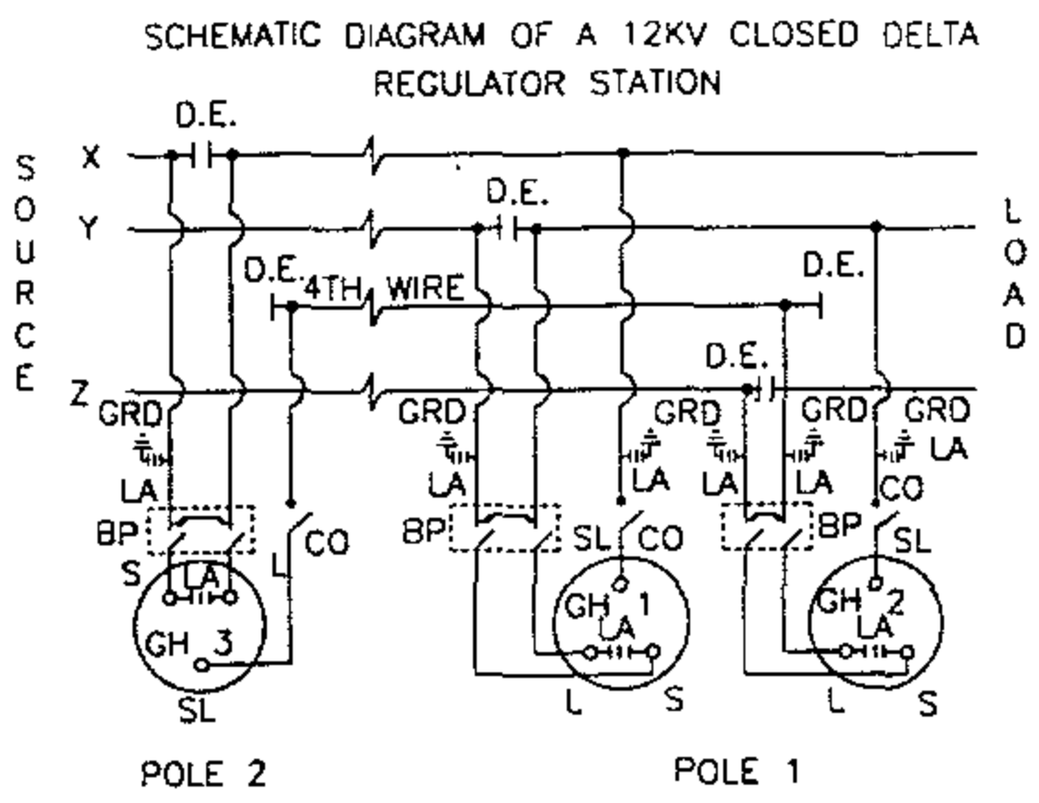



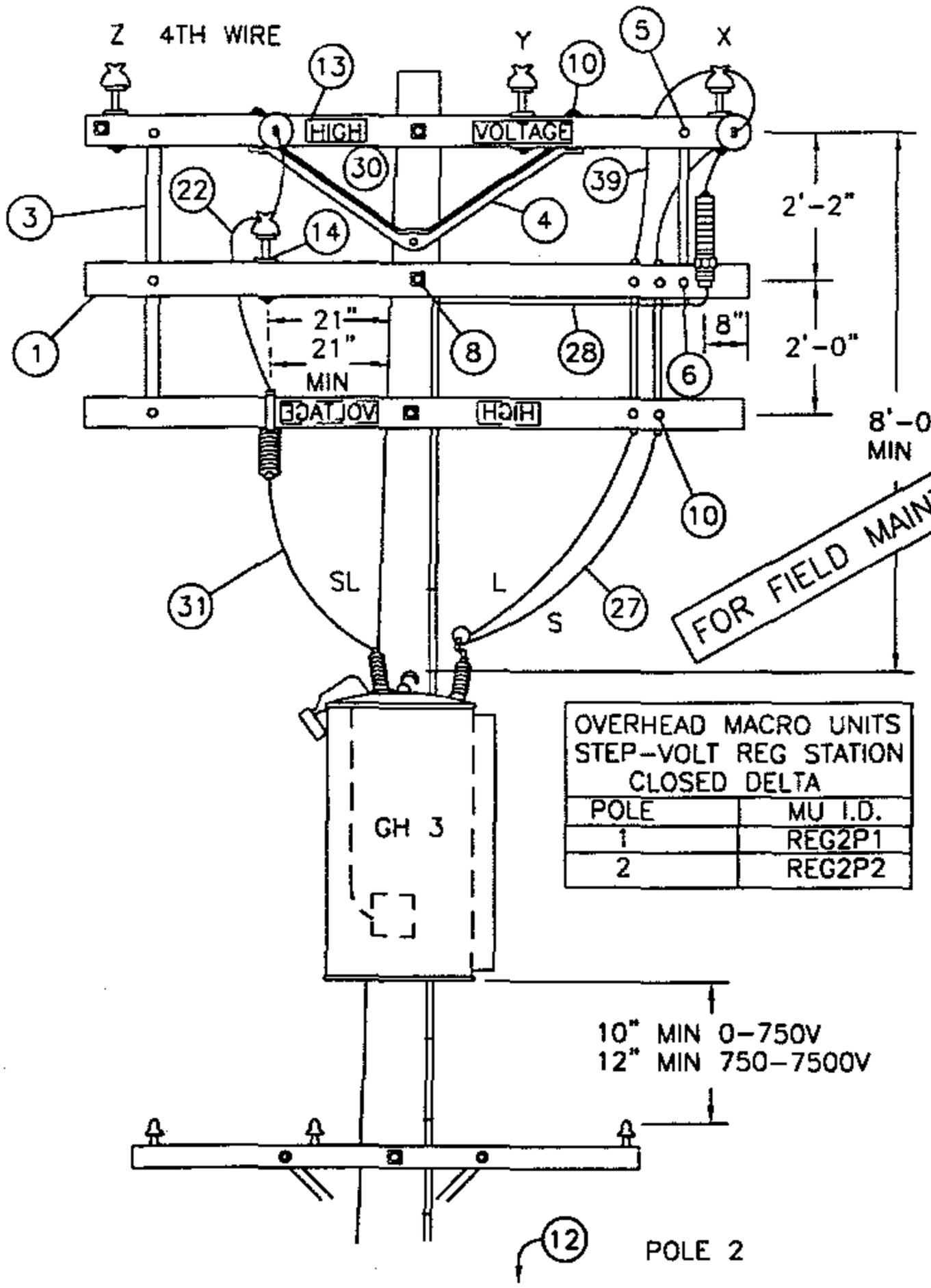

FOR FIELD MAINTENANCE ONLY

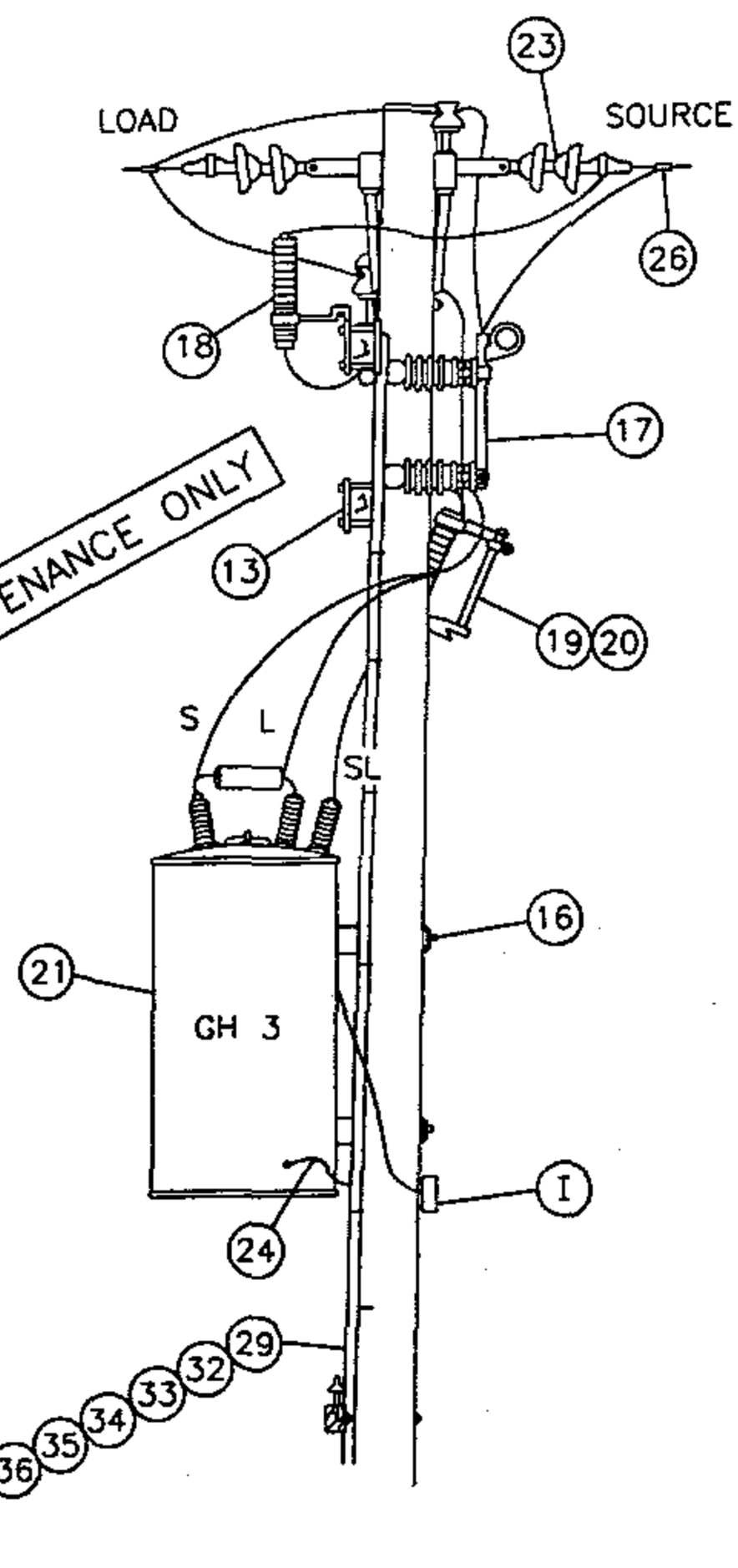
| | | |
|---|---|---|
| 1399.501<br>SUPERSEDES<br>1350.1 1-1-96 | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA<br>12KV, TWO POLES | DATE 1-1-96<br>APPD PA 1/09 |

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FOR FIELD MAINTENANCE CLEARANCE ONLY

| OVERHEAD MACRO UNITS STEP-VOLT REG STATION CLOSED DELTA | |
|---|---|
| POLE | MU I.D. |
| 1 | REG2P1 |
| 2 | REG2P2 |

| | | |
|---|---|---|
| DATE 1-1-96<br>APPD PA / BSG | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES | 1399.502<br>SUPERSEDES<br>1350.2 1-1-96 |

NOTES:

A. CAUTION: WHEN CONNECTING A STATION, REGULATORS MUST BE ON NEUTRAL. CLOSE CUTOUT TO SL BUSHING BEFORE CLOSING BYPASS DISCONNECT ON THAT POLE. WHEN DISCONNECTING A STATION, PUT REGULATORS ON NEUTRAL, AND OPEN BYPASS DISCONNECT BEFORE OPENING CUTOUT TO SL BUSHING. THIS AVOIDS A SERIOUS OVERVOLTAGE CONDITION.

B. USE EXTRA HEAVY CLASS ONE POLE WITH 10" MIN TOP DIA FOR POLE #1, AND A CLASS ONE FOR POLE #2.

(C) USE TWO GROUND RODS FOR THE ARRESTERS AND TANKS. ALL GROUND RODS SHOULD BE SPACED A MINIMUM OF SIX FEET APART.

(D) UNIT GROUND COMPLETE, ORDER 603136.

F. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287.

G. BOND DEAD-END HARDWARE.

(H) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(I) CONTROLS WILL BE MOUNTED BY KEARNY MAINTENANCE.

J. INSTALL DOUBLE COIL SPRING WASHER ON END OF BOLT WHICH ATTACHES TO LARGEST METALLIC OBJECT, SUCH AS A BRACKET OR BRACE.

(K) REGULATOR TANKS SHALL BE PERMANENTLY GROUNDED.

(M) THIS CONSTRUCTION TO BE USED WHEN CENTER PHASE WIRE IS TO THE LEFT OF THE POLE WHEN LOOKING TOWARD THE LOAD.

| ITEM | DESCRIPTION | QUANTITY | | STOCK NO. OR CONSTR. STD |
|---|---|---|---|---|
| | | POLE 1 | POLE 2 | |
| 1 | CROSSARM 3 3/4" X 5 3/4" X 10' - 0" | 3 | 3 | 380 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 8'-0" | 4 | – | 380 |
| 3 | BRACE, FLAT CROSSARM 28" | 2 | 3 | 164192 |
| 4 | BRACE, ANGLE CROSSARM 5'-0" | 5 | 1 | 164128 |
| 5 | BOLT, MACHINE, 3/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | 2 | 392 |
| 6 | BOLT, MACHINE, 1/2" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | 3 | 392 |
| 7 | BOLT, MACHINE, 3/4" X --, 1 SQ. CURV. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 392 |
| 8 | BOLT, MACHINE, 5/8" X --, 2 FLAT WASH., 1 DBL. COIL SPR. WASH. | 4 | 2 | 392 |
| 9 | BOLT, SPACE, 5/8" X --, 4 WASH. & 4 NUTS, 2 DBL. COIL SPR. WASH. | 7 | 3 | 392 |
| 10 | BOLT, MACHINE, 1/2" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 18 | 6 | 392 |
| 11 | SCREW, LAG, 5/8" X 5" | 2 | – | 621600 |
| 12 | STEPS, POLE | 19 | 19 | 692992 |
| 13 | SIGN, HIGH VOLTAGE & 8 NAILS, GALV. | 3 | 3 | 647648, 492224 |
| 14 | PIN, INSULATOR (AS REQUIRED BY ITEM 22) | 3 | 1 | 532--- |
| 15 | BRACKET, INSULATOR (AS REQUIRED BY ITEM 22) | 1 | – | 1661-- |
| 16 | COVER, BOLT, PLASTIC | – | 2 | 285696 |
| 17 | SWITCH, BYPASS | 2 | 1 | 706944 |
| 18 | ARRESTER, LIGHTNING (12KV) | 5 | 1 | 113248 |
| 19 | CUTOUT, 12KV 100 AMP WITH LOAD BUSTER HOOKS | 2 | 1 | 297888 |
| 20 | BLADE, DISCONNECT CUTOUT | 2 | 1 | 1200 SECTION |
| 21 | REGULATOR, STEP VOLTAGE 1Ø | 2 | 1 | 1300 SECTION |
| 22 | INSULATOR, PIN TYPE (CLASS AS REQUIRED) | 3 | 1 | 700 SECTION |
| 23 | INSULATOR, SUSPENSION | 10 | 6 | 700 SECTION |
| 24 | CONNECTOR, COMPRESSION (#2 TO #6) | 1 | 2 | 257792 |
| 25 | CONNECTOR, COMPRESSION (#6 TO #6) | 3 | – | 257952 |
| 26 | CONNECTORS, WIRE | 9 | 4 | 700 SECTION |
| 27 | WIRE, 2/0 WP COPPER | (12.4#) 24' | (6.2#) 12' | 808944 |
| 28 | WIRE, BARE STRANDED COPPER #6 | (1.8#) 24' | (1.8#) 22' | 813536 |
| 29 | WIRE, BARE STRANDED COPPER #2 | (9.2#) 45' | (9.8#) 45' | 813664 |
| 30 | WIRE, #8 ANNEALED SOLID COPPER | (.25#) 5' | (.25#) 5' | 812928 |
| 31 | WIRE, #4 SOLID WP COPPER | (1.8#) 10' | (.75#) 4' | 812480 |
| 32 | ROD, GROUND | 2 | 2 | 603072 |
| 33 | CLAMP, GROUND ROD (C)(D) | 2 | 2 | 230016 |
| 34 | MOULDING, HARDWOOD 1" (D) | 45' | 48' | 487200 |
| 35 | STAPLES, GALV. 3" X 1 1/16" X 1/4" (D) | 32 | 35 | 678560 |
| 36 | STAPLES, FENCE GALV. 1 1/4" (D) | 28 | 30 | 678528 |
| 37 | CLEVIS, DEAD END CLOSED (D) | 5 | 3 | 235712 |
| 38 | CLAMPS, DEAD END | 5 | 3 | 700 SECTION |
| 39 | WIRE, BARE STRANDED COPPER #1/0 | (3.3#) 10' | (3.3#) 10' | 813568 |
| 40 | BRACE, VERTICAL, 36" | 2 | – | 164256 |
| 41 | BOLT, MACHINE, 5/8" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 392 |
| 42 | BOLT, MACHINE, 5/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH | 2 | – | 392 |
| 43 | HANGER, TRANSFORMER T-2 | 2 | – | 402944 |

FOR FIELD MAINTENANCE ONLY

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1399.503
SUPERSEDES
350.3 1-1-96

SDG&E ELECTRIC STANDARDS

# STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA 12KV TWO POLES

DATE 1-1-96
APPD PA 1/1/96

# OH1360 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARDS MANUAL.

**REVISION HISTORY:**

**03/10/2023:** MOVED TO FMO

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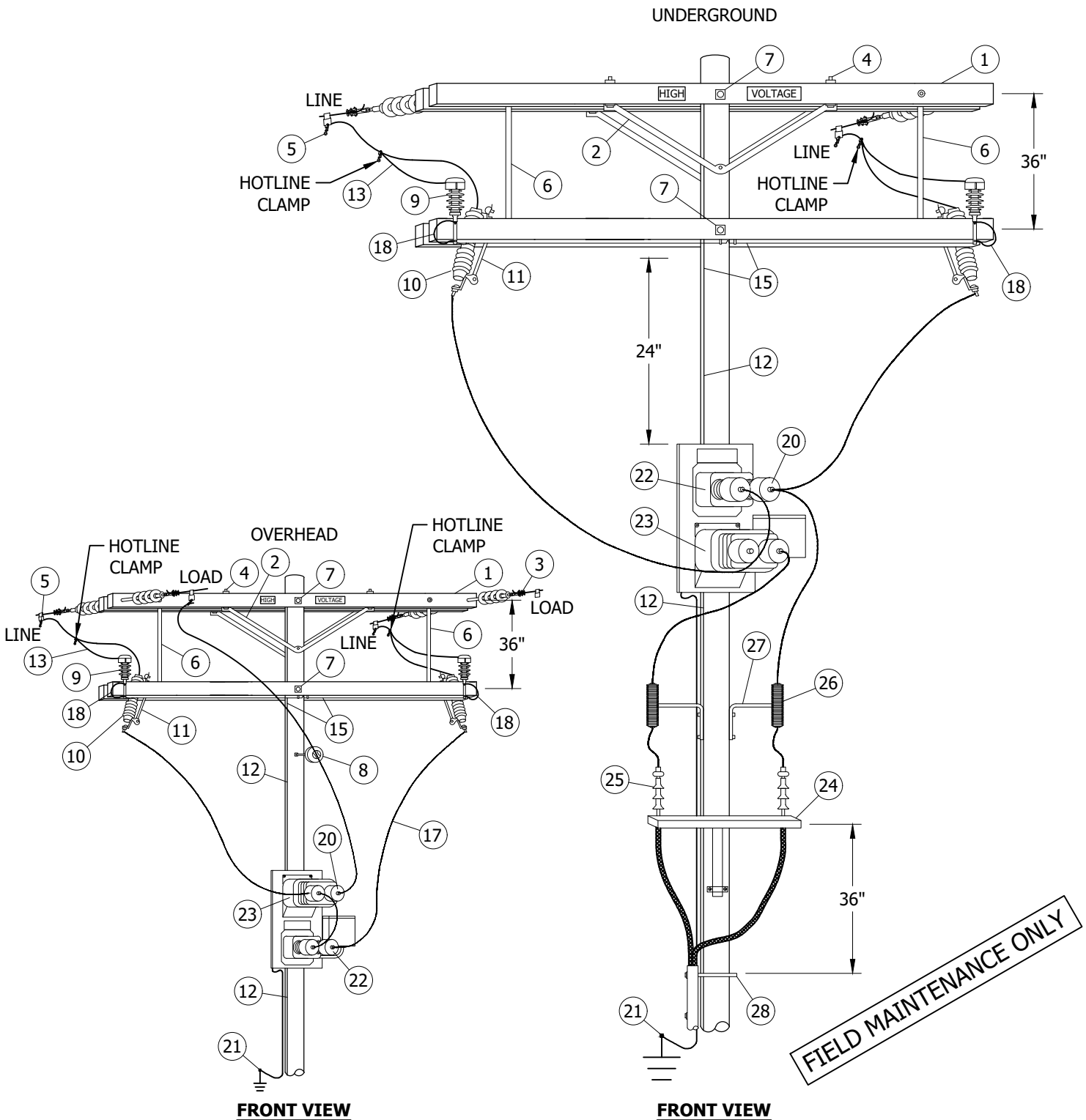



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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 1 OF 2

4KV/12KV SINGLE PHASE
PRIMARY METERING STATION

FMO
OH1360.1

## INSTALLATION:

(A) FOR SIZE REQUIREMENTS, CONTACT SERVICE STANDARDS (858) 654-8212.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER |
|---|---|---|---|---|
| 1 | 4, 12KV, 10' ARM | 3 | -- | 294128 |
| 2 | 5' HUB BRACE | 2 | -- | 164128 |
| 3 | DEADENDS 7 DESHOES D.E. CLEVIS | 4 | 739 | -- |
| 4 | LINE ARM HARDWARE | -- | 739 | -- |
| 5 | HOT LINE STIRUP & CLAMPS/SQUEEZE ON CONNECTORS | 6 | 788 | -- |
| 6 | 36" STRAP BRACE & BOLTS | 2 EACH | -- | 164192 |
| 7 | SPACE BOLTS 5/8" X 26" SQUARE WASHERS & NUTS | 2 | OH392.1 | -- |
| 8 | STAND OFF PIN 30" | 1 | -- | 166144 |
| 9 | C/O LTARR BRKT | 2 | -- | 166070 |
| 10 | 12KV LTNG ARR | 2 | 1247 | 113248 |
| 11 | 12KV C/O & FUSE HOLDER | 2 | 1212.1 | -- |
| 12 | #4 PVC COVERED GROUND WIRE | -- | -- | 251200 |
| 13 | 4/3 IBS CU | 40' | -- | 251764 |
| 14 | GROUND WIRE STAPLES | -- | -- | 678562 |
| 15 | 3/4" PVC & STRAPS | 10' | -- | -- |
| 16 | PLASTIC TIE WIRE | 1 | -- | -- |
| 17 | JUMPER COVER | 20' | -- | S289636 |
| 18 | L/A GRND STRAPS | 2 | -- | 698754 |
| 19 | L/A CAPS | 2 | -- | 289630 |
| 20 | BUSHING COVERS | 4 | -- | 558888 |
| 21 | GROUND RODS/CLAMP | 4 | 1002.2 | -- |
| 22 | 4KV OR 12KV POTENTIAL TRANSFORMER (A) | 1 | -- | -- |
| 23 | 4KV OR 12KV CURRENT TRANSFORMER (A) | 1 | -- | -- |
| 24 | BRACKET, GALV, TERMINAL UP SWEEP WITH PVC LINER | 1 | -- | 166856 |
| 25 | TERMINAL AND UNDERGROUND CABLE | 1 | 4111 | -- |
| 26 | CUTOUT FOR CURRENT LIMITING FUSE | -- | 1212 | 297952 |
| 27 | CUTOUT BRACKET MOUNTING | 1 | -- | 166448 |
| 28 | CALLED OUT ON RIGHT FRONT VIEW FIGURE?? | ?? | ?? | ?? |

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| A | REVISION | - | - | PIA | MC | 05/21/2009 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

4KV/12KV SINGLE PHASE
PRIMARY METERING STATION

FMO
OH1360.2

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| 1407 | CABLE POLE TERMINAL MOUNTING INFORMATION (PORCELAIN TERMINATIONS) (FOR CONTAMINATION DISTRICT 1) |
| 1414 | 0-750V UNDERGROUND SERVICE FROM AN OVERHEAD LINE |
| 1415 | 0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, ONE DUCT |
| 1417 | 0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, TWO DUCTS |
| 1418 | 0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, THREE AND FOUR DUCTS |
| 1428 | CROSSARM MOUNTED TERMINALS 4KV 4 WIRE WYE |
| 1429 | 12.47KV AND BELOW 3ϕ CABLE POLE 1/C PER ϕ, UPSWEEP BRACKET CONSTRUCTION |
| 1432 | 12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE-PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON-PORCELAIN TERMINALS |
| 1437 | BRACKET MOUNTED TERMINALS, 12KV 3 WIRE ARMLESS TANGENT CONSTRUCTION |
| 1438 | BRACKET MOUNTED TERMINALS, 12KV 3 WIRE ARMLESS DEADEND CONSTRUCTION |
| 1439 | CROSSARM CABLE POLE, 3ϕ, 1/C PER PHASE DEADEND CONSTRUCTION, 12.47KV AND BELOW |
| 1441 | 12.47KV AND BELOW DEADEND CABLE POLE ARM, 3ϕ, 1/C PER ϕ, HOOKSTICK SWITCHED |
| 1443 | 12.47KV AND BELOW DEADEND CABLE POLE THREE-PHASE, 1/CPER PHASE, GANG OPERATED SWITCHED, NON-PORCELAIN TERMINALS |
| 1445 | 12.47KV DEADEND CABLE POLE THREE-PHASE WITH NEUTRAL, HORIZONTAL SCADA-MATE SWITCH |
| 1451 | 12.47KV AND BELOW DEADEND CABLE POLE, 6 OR 7 OH CONDUCTORS, 1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED |
| 1481 | POLETOP METERING, 2.4KV SINGLE PHASE |
| 1482 | POLETOP METERING, 2.4KV OPEN DELTA |
| 1483 | POLETOP METERING, 4KV SINGLE-PHASE |
| 1484 | POLETOP METERING INSTALLATION, 4KV, 3 PHASE, 3 WIRE UG & OH SERVICES |
| 1485 | POLETOP METERING INSTALLATION, 4KV, 3 PHASE, 4 WIRE UG & OH SERVICES |
| 1486 | POLETOP METERING INSTALLATION, 12KV, 3 PHASE, 3 WIRE UG & OH SERVICES |
| 1487 | REVISED CT & PT POLETOP METERING INSTALLATION, 12KV, OH & UG SERVICES |
| 1489 | METERING RACK, CUSTOMER OWNED, CONSTRUCTION DETAILS |
| 1490 | 4KV METERING INSTALLATION ON RACK, FOR 3 WIRE AND 4 WIRE, 30 SERVICES |


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| C | EDITORIAL CHANGES | NV5 | RSL | MRF | MRF | 04/08/2024 | F | | | | | | |
| B | EDITORIAL CHANGES | - | RSL | JES | CZH | 4/13/2020 | E | | | | | | |
| A | ORIGINAL ISSUE | - | JS | IL | MDJ | 07/25/2016 | D | | | | | | |

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**REVISION HISTORY:**

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

JOINT CABLE POLE RISERS USING WOODEN LADDER ARMS

FMO OH 1402

SCOPE: THIS STANDARD: 1) SHOWS THE STANDARD CABLE POLE RISER POSITIONS FOR SDG&E, TELCO, AND CATV COMPANIES. IT IS FOR RISER PLACEMENT ONLY (SEE SECTION 1400/4200 FOR SPECIFIC CONSTRUCTION DETAILS).

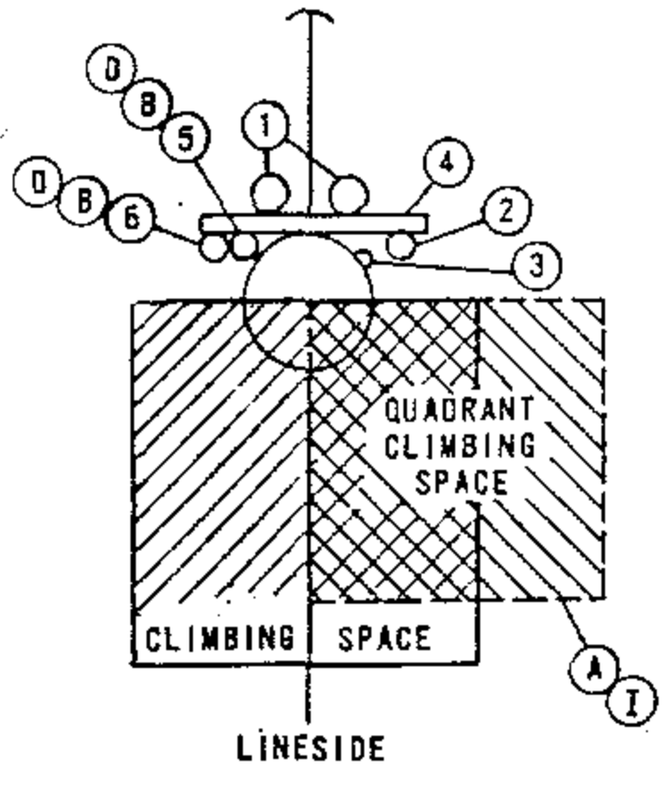



FIGURE 1

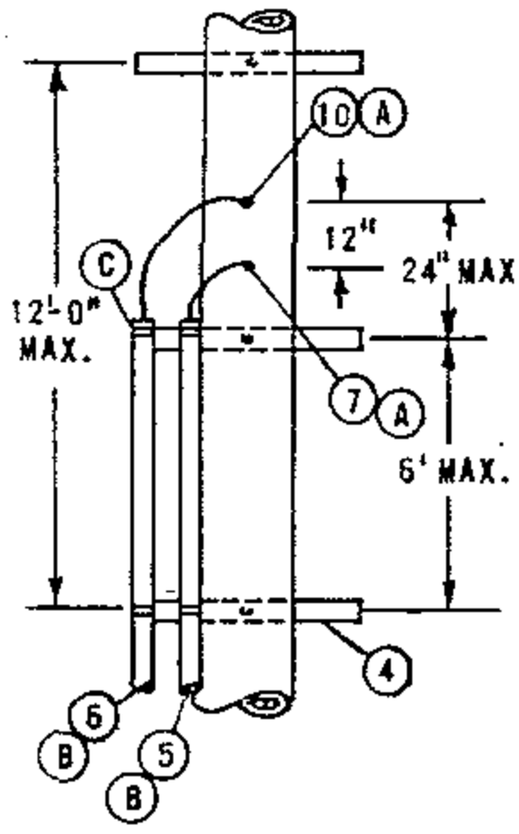



FIGURE 2

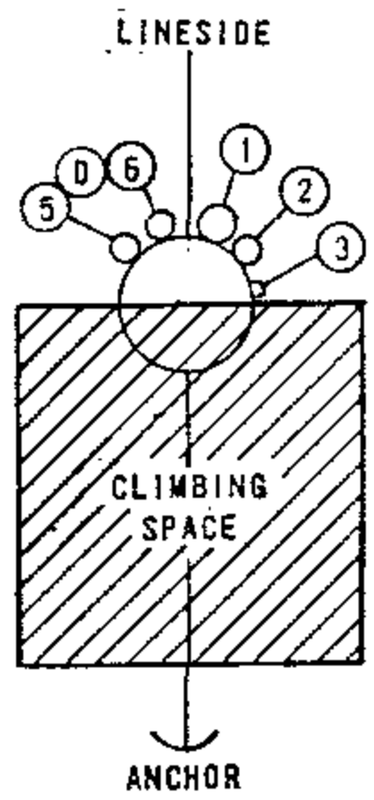



FIGURE 3

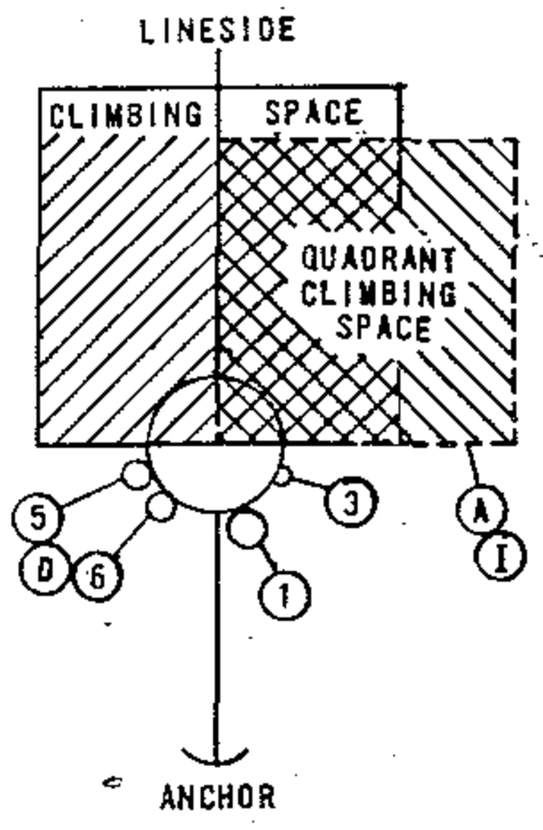



FIGURE 4

DEAD END CONSTRUCTION

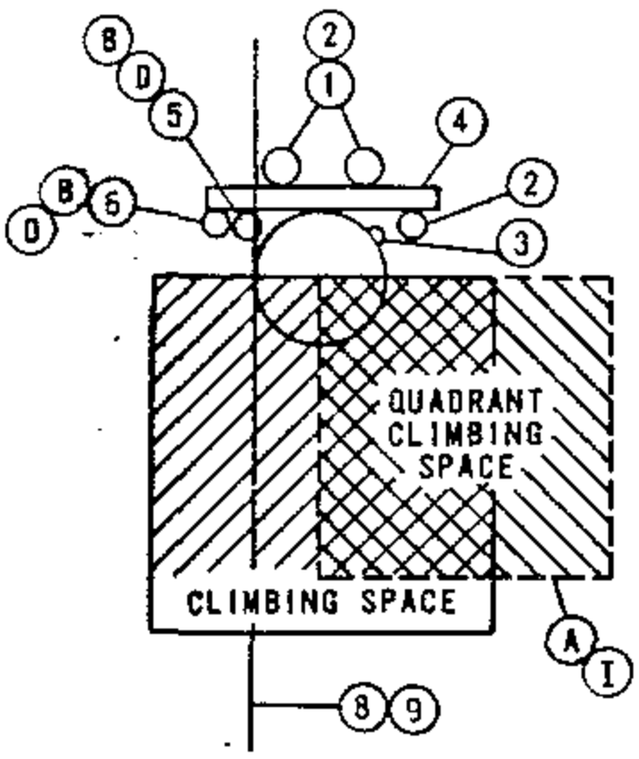



FIGURE 5

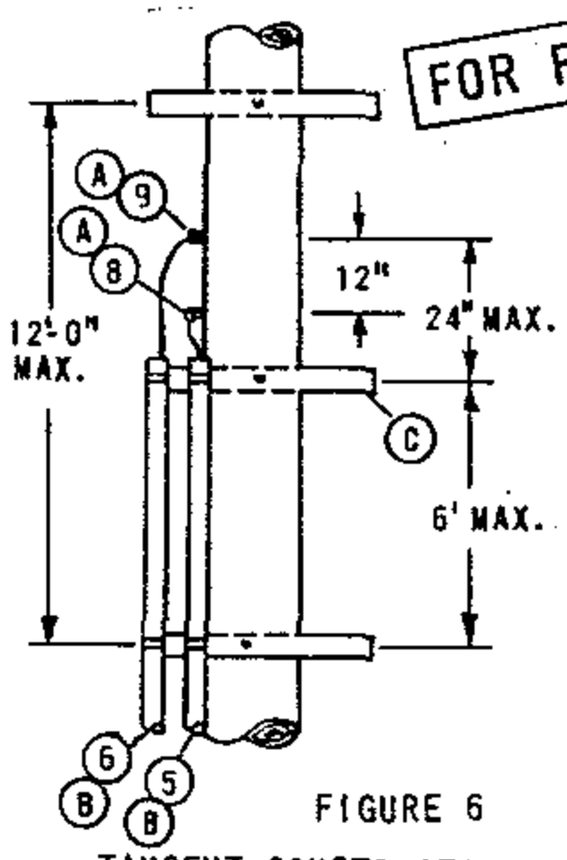



FIGURE 6

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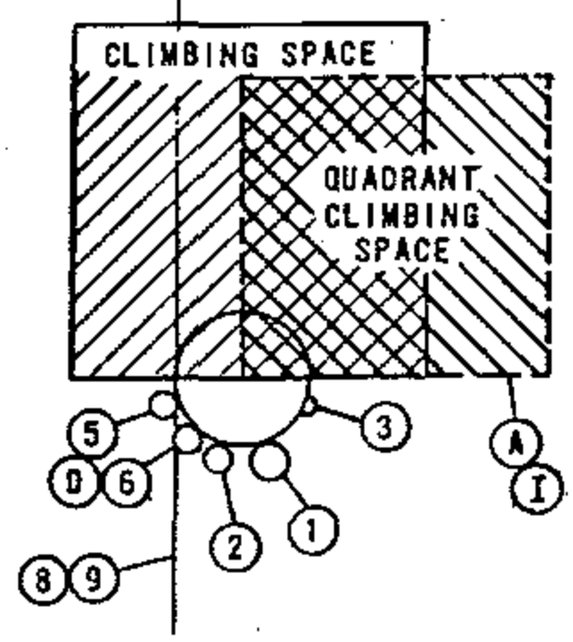



FIGURE 7

TANGENT CONSTRUCTION

INSTALLATION:

(A) QUADRANT CLIMBING SPACE PROVIDED THROUGH CATV AND TELCO AERIAL ATTACHMENT LEVELS ONLY:

(B) C.A.T.V. AND TELCO TO ATTACH CONDUIT TO BACK SIDE OF RISER LADDER ARMS.

(C) C.A.T.V. OR TELCO TO PLACE RISER LADDER ARM TO HOLD TOP OF OWN CONDUIT.

(D) C.A.T.V. AND TELCO TO ALWAYS BE IN SAME QUADRANT.

F. CONDUIT RISER AT BASE OF POLE NOT TO INFRINGE ON CURB OR SIDEWALK POSITIONS.

REFERENCES:

G. PVC RISERS ARE NOT PERMITTED WITHIN THE CLIMBING SPACE PER G.O. 95 RULE 22.2C.

H. G.O. 95 RULE 91.3-A1C REQUIRES POLE STEPS ON ALL JOINTLY USED CABLE POLES (SEE STANDARD 363).

I. SEE SECTION 200 FOR ALLOWABLE G.O. 95 CLIMBING SPACE OBSTRUCTIONS.

J. NO CATV OR TELCO JUMPERS ALLOWED IN QUADRANT CLIMBING SPACE PER G.O. 95 RULE 84.7.

| ITEM | DESCRIPTION | ITEM | DESCRIPTION |
|---|---|---|---|
| 1 | SDG&E PRIMARY RISER | 6 | C.A.T.V. RISER POSITION |
| 2 | SDG&E SECONDARY RISER | 7 | TELCO DEAD END ATTACHMENT |
| 3 | SDG&E ELECTRIC GROUND | 8 | TELCO TANGENT (THRU) POSITION |
| 4 | RISER LADDER ARM | 9 | C.A.T.V. TANGENT (THRU) POSITION |
| 5 | TELCO RISER POSITION | 10 | C.A.T.V. DEAD END ATTACHMENT |

DATE 11-16-81
APPD JEY

SDG&E ELECTRIC STANDARDS

JOINT CABLE POLE RISERS USING WOODEN LADDER ARMS

OH 1499.001
~~UG 4299.001~~
SUPERSEDES
1402.1 (11-16-81)

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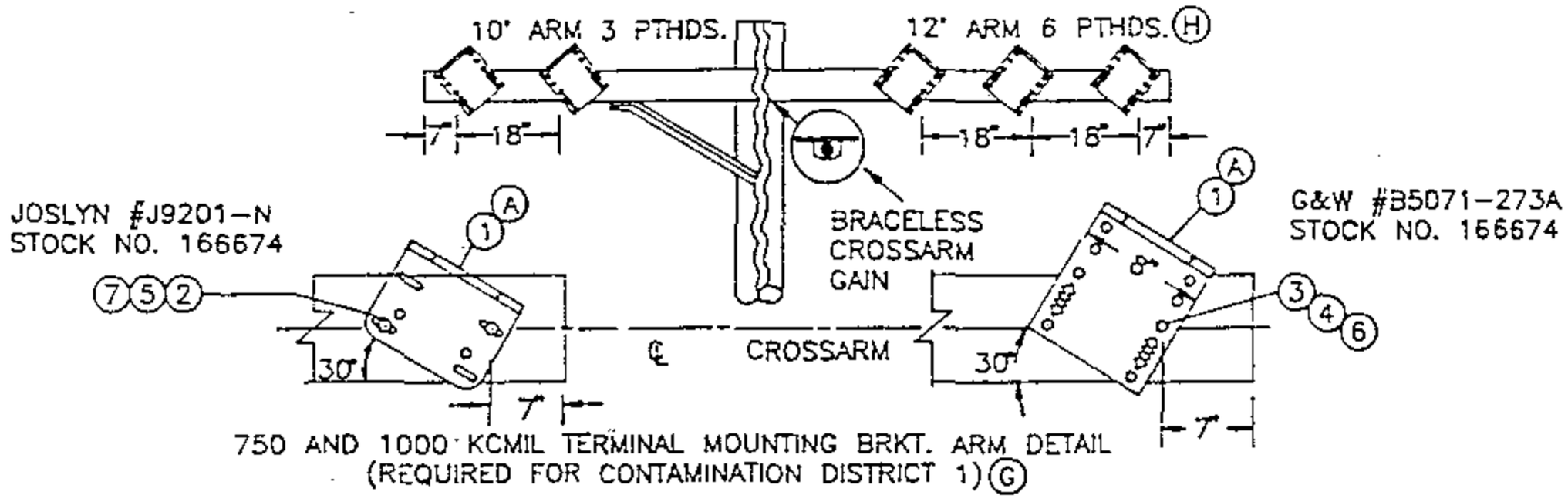
SHEET
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SDG&E ELECTRIC OVERHEAD STANDARD

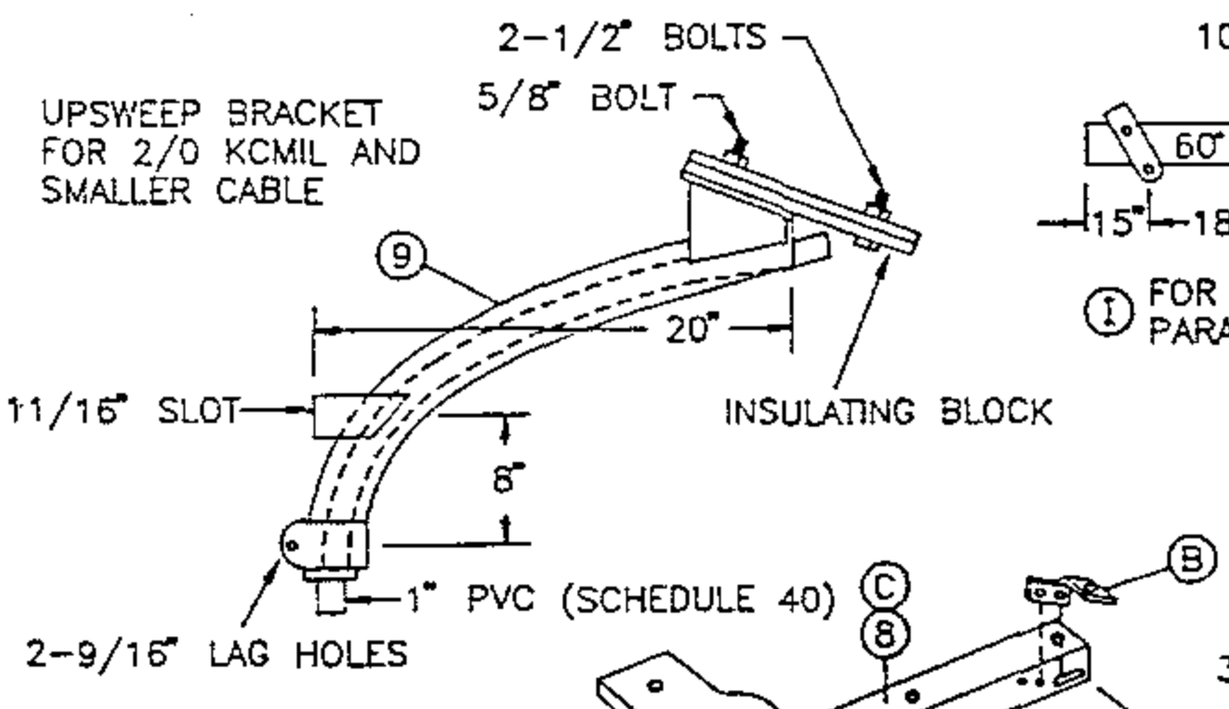
CABLE POLE TERMINAL MOUNTING INFORMATION
(PORCELAIN TERMINATIONS)
(FOR CONTAMINATION DISTRICT 1)

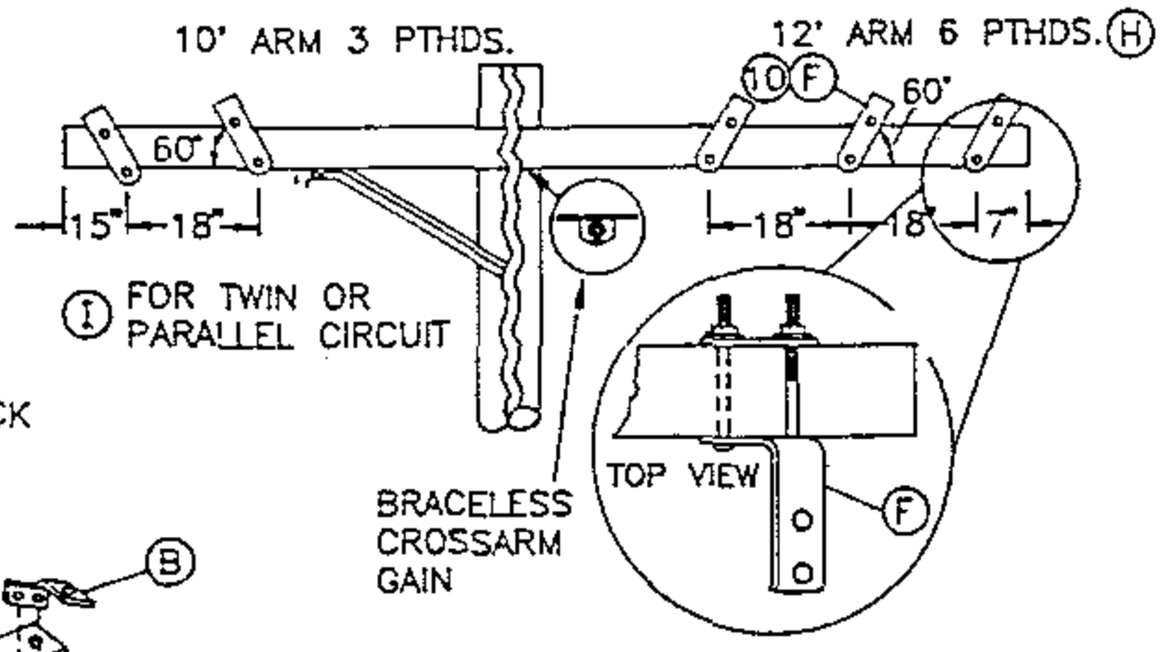
FMO
OH 1407

SCOPE: THIS STANDARD SHOWS VARIOUS METHODS OF CABLE TERMINATION BRACKETS USED TO CONNECT UNDERGROUND CABLES TO OVERHEAD CONDUCTORS.




750 AND 1000 KCMIL TERMINAL MOUNTING BRKT. ARM DETAIL
(REQUIRED FOR CONTAMINATION DISTRICT 1) (G)




350 KCMIL TERMINAL MOUNTING BRKT. ARM DETAIL
(REQUIRED FOR CONTAMINATION DISTRICT 1)

FOR FIELD MAINTENANCE ONLY

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD | ASSEMBLY UNITS |
|---|---|---|---|---|
| 1 | BRACKET, POTHEAD MOUNTING | 3 OR 6 | 166674 | P-X-BK |
| 2 | BOLT, MACHINE, GALV. 1/2" x 5" (E) | 2 | 153024 | - |
| 3 | BOLT, MACHINE, GALV. 3/8" x 5" (E) | 2 | 154368 | - |
| 4 | WASHER, 3/8" ROUND (E) | 4 | 800288 | - |
| 5 | WASHER, 1/2" ROUND (E) | 4 | 800192 | - |
| 6 | WASHER, 3/8" DBL COIL (E) | 2 | 798528 | - |
| 7 | WASHER, 1/2" DBL COIL (E) | 2 | 798464 | - |
| 8 | BRACKET TRIPLE TERMINAL (C) | 1 | 166676 | (OVERHEAD) TTB |
| 9 | BRACKET GALV. TERMINAL UPSWEEP | 1 | 166856 | (OVERHEAD) USB |
| 10 | BRACKET, CROSSARM TERMINAL | 3 OR 6 | 166060 | - |

INSTALLATION:

(A) HOLES IN ARM FOR POTHEAD MOUNTING BRACKETS ARE DRILLED BY OVERHEAD CREWS.
(B) THREE OF THESE BRACKETS ARE SUPPLIED WITH THE TRIPLE TERMINAL BRACKET (ITEM 8).
(C) THIS CONSTRUCTION TO BE USED ONLY FOR CABLE SIZES 2/0 AND BELOW.
(E) EXEMPT MATERIAL.
(F) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX. 60° ANGLE.

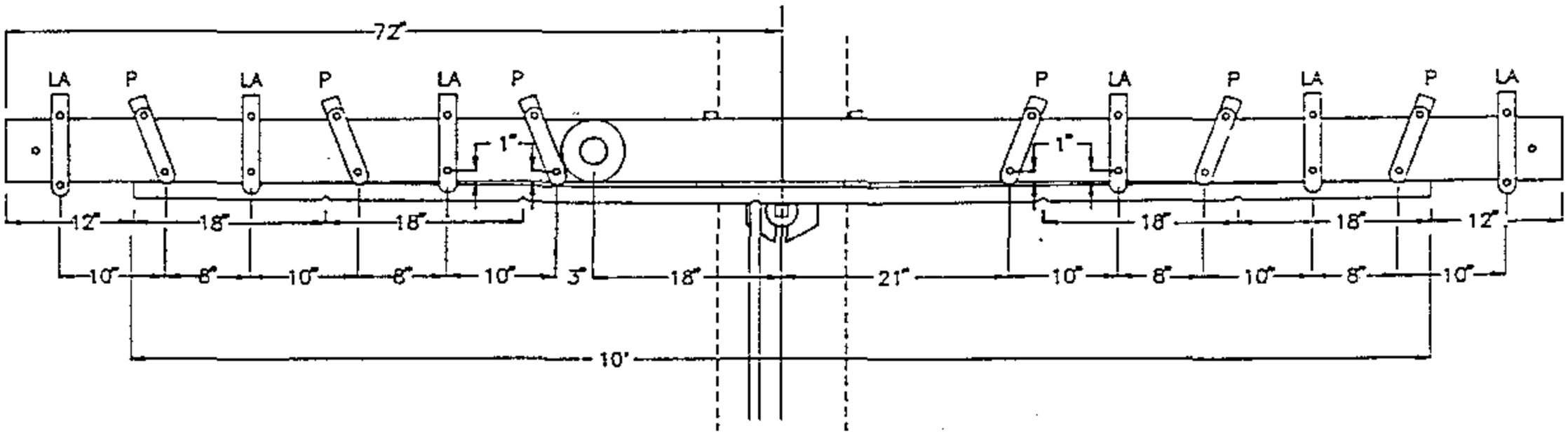
REFERENCE:

(G) FOR CONSTRUCTION IN CONTAMINATION DISTRICTS 2 AND 3, SEE STANDARD 1407.2/4207.2.
(H) SEE STANDARD 1407.2/4207.2 FOR TERMINAL AND LIGHTNING ARRESTER DETAIL.
(I) SEE STANDARD 1442.1/4242.1 FOR 3-350 KCMIL POTHEADS ON A 10 FOOT CROSSARM.

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| H 1499.010<br>~~G 4299.010~~<br>SUPERCEDES<br>1407.1 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>CABLE POLE TERMINAL MOUNTING INFORMATION<br>(PORCELAIN TERMINATIONS)<br>(FOR CONTAMINATION DISTRICT 1) | DATE 1-1-93<br>APPD JLB/RDA |

12' ARM 6 PTHS AND 6 ARRESTORS




350 KCMIL TERMINAL AND LIGHTNING ARRESTER BRACKETS MOUNTING DETAIL

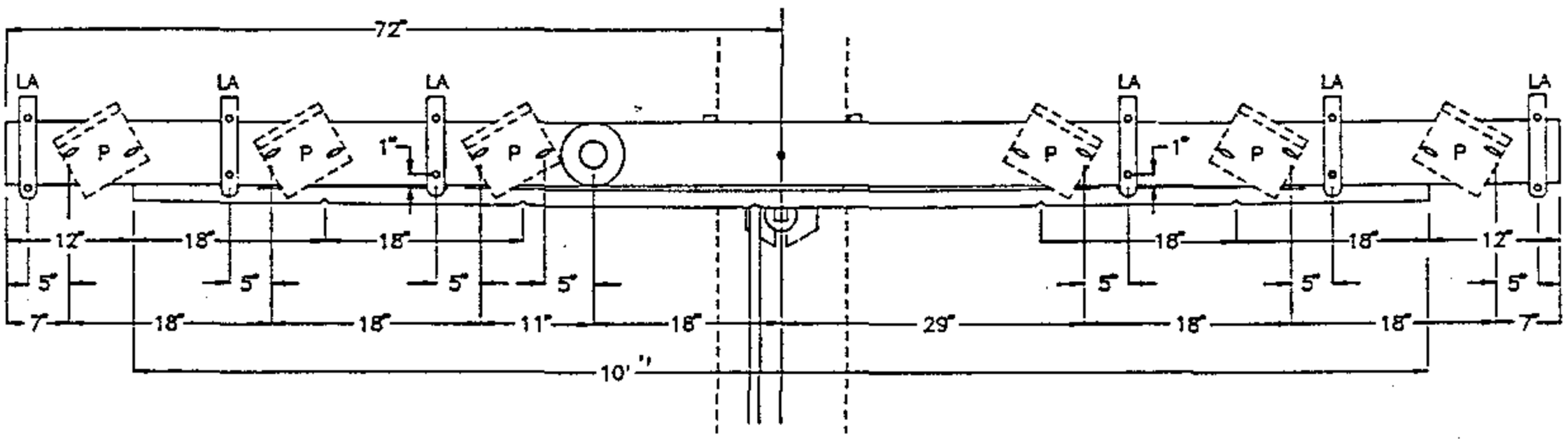
P=POTHEAD BRACKET

LA=LIGHTNING ARRESTER BRACKET

FOR FIELD MAINTENANCE ONLY

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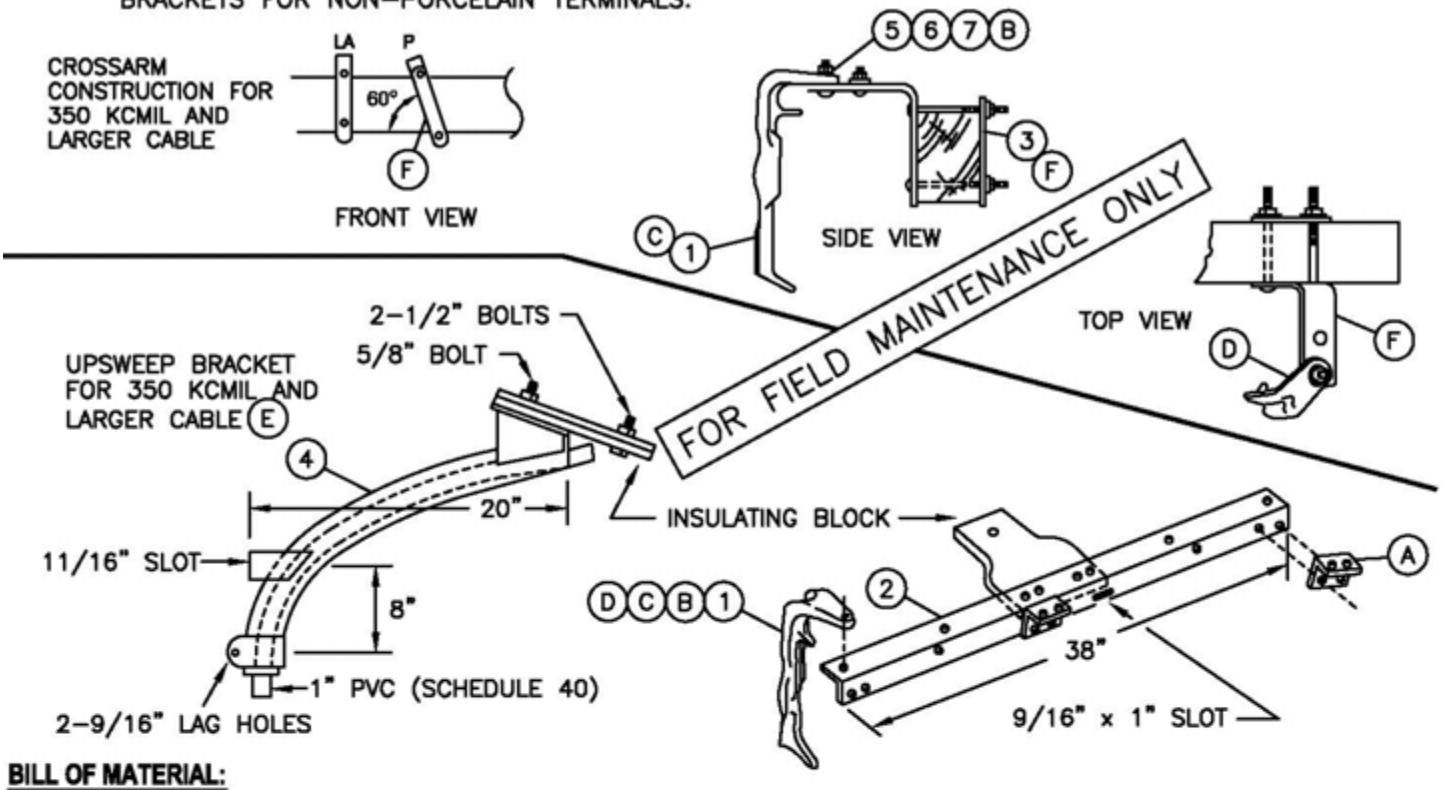
12' ARM 6 PTHS AND 6 ARRESTORS




750 AND 1000 KCMIL TERMINAL AND LIGHTNING ARRESTER BRACKETS MOUNTING DETAIL

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLB/RDJ | SDG&E ELECTRIC STANDARDS<br>CABLE POLE TERMINAL MOUNTING INFORMATION<br>(PORCELAIN TERMINATIONS)<br>(FOR CONTAMINATION DISTRICT 1) | OH 1499.011<br>~~UG 4299.011~~<br>SUPERCEDES<br>1407.2 (1-1-93) |

**SCOPE:** THIS STANDARD SHOWS VARIOUS METHODS OF INSTALLING CABLE TERMINATING MOUNTING BRACKETS FOR NON–PORCELAIN TERMINALS.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | BRACKET, MOUNTING CS 820 | 3 OR 6 | 4111 | 166064 | NP–BKT |
| 2 | BRACKET, TRIPLE TERMINAL (E) | 1 | – | 166676 | (OVERHEAD) TTB |
| 3 | BRACKET, CROSSARM TERMINAL | 3 OR 6 | – | 166060 | (OVERHEAD) 2/0BKT |
| 4 | BRACKET, TERMINAL UPSWEEP, GALV (E) | 1 | – | 166856 | (OVERHEAD) USB |
| 5 | BOLT, MACHINE, GALV 1/2" x 2" | 3 OR 6 | 392.1 | 152832 | |
| 6 | WASHER, ROUND 1/2" | 3 OR 6 | 392.2 | 800192 | |
| 7 | WASHER, SPRING LOCK 1/2" | 3 OR 6 | 392.2 | 796768 | |

**NOTES:**

– PORCELAIN TERMINALS (POTHEADS) ARE REQUIRED IN SUBSTATIONS (ALL DISTRICTS). SEE NOTE (I).

**INSTALLATION:**

(A) THREE BRACKETS ARE SUPPLIED WITH THE TRIPLE TERMINAL BRACKET.

(B) CS 820 MOUNTING BRACKETS SHALL BE BOLTED TO THE TOP OF THE TRIPLE TERMINAL BRACKET OR CROSSARM TERMINAL BRACKET.

(C) FOLLOW MANUFACTURES INSTRUCTIONS FOR SECURING CABLE TO MOUNTING BRACKET.

(D) MOUNTING BRACKET CS 820 TO BE POSITIONED TO CONFIRM WITH THE LAY OF THE CABLE.

(E) THESE ITEMS FIELD MAINTENANCE ONLY.

(F) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX 60 ANGLE.

**REFERENCE:**

H. SEE STD. 4111 FOR OUTDOOR CABLE TERMINALS, FOR POLYETHYLENE CABLES.

(I) SEE STD. PG. 1499.010/4299.010 FOR PORCELAIN MOUNTING BRACKETS.

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| | | |
|---|---|---|
| OH 1499.012<br>UG 4299.012<br>SUPERSEDES<br>1407 (1–1–94) | SDG&E ELECTRIC STANDARDS<br>CABLE POLE TERMINAL MOUNTING INFORMATION<br>(NON–PORCELAIN TERMINALS) | DATE 1–1–94<br>APPD JLG/RDS |

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# OH1414 UG4214 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/08/2024:** FIGURE 4 RACK CONSTRUCTION MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | FIGURE 4 MOVED TO FMO | NV5 | RSL | MRF | MRF | 04/08/2024 | D | | | | | | |

**SCOPE:** THIS STANDARD SHOWS THE VARIOUS METHODS OF SECONDARY CONSTRUCTION WHEN UNDERGROUND CUSTOMERS ARE SERVED FROM OVERHEAD SECONDARY.

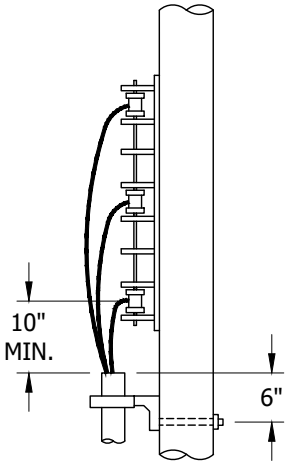



**FIGURE 4**
RACK CONSTRUCTION

## INSTALLATION:

(A) INSTALL CONDUIT ON THE BACK SIDE OF THE LADDER ARM BRACKET.

(B) INSTALL CABLE IN SCHEDULE 40 PVC UNDER ARM.

C. PVC RISER SHALL NOT BE INSTALLED IN THE CLIMBING SPACE. (b)

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

**REFERENCE:**

(a) FOR RISER CONSTRUCTION, SEE OH1404UG4204.

(b) SEE G.O. 95, RULE 22.2 (C).

FIELD MAINTENANCE ONLY

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| A | FIGURE 4 MOVED TO FMO | NV5 | RSL | MRF | MRF | 04/08/2024 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

0-750V UNDERGROUND SERVICE FROM AN OVERHEAD LINE

FMO
OH1414.1
UG4214.1

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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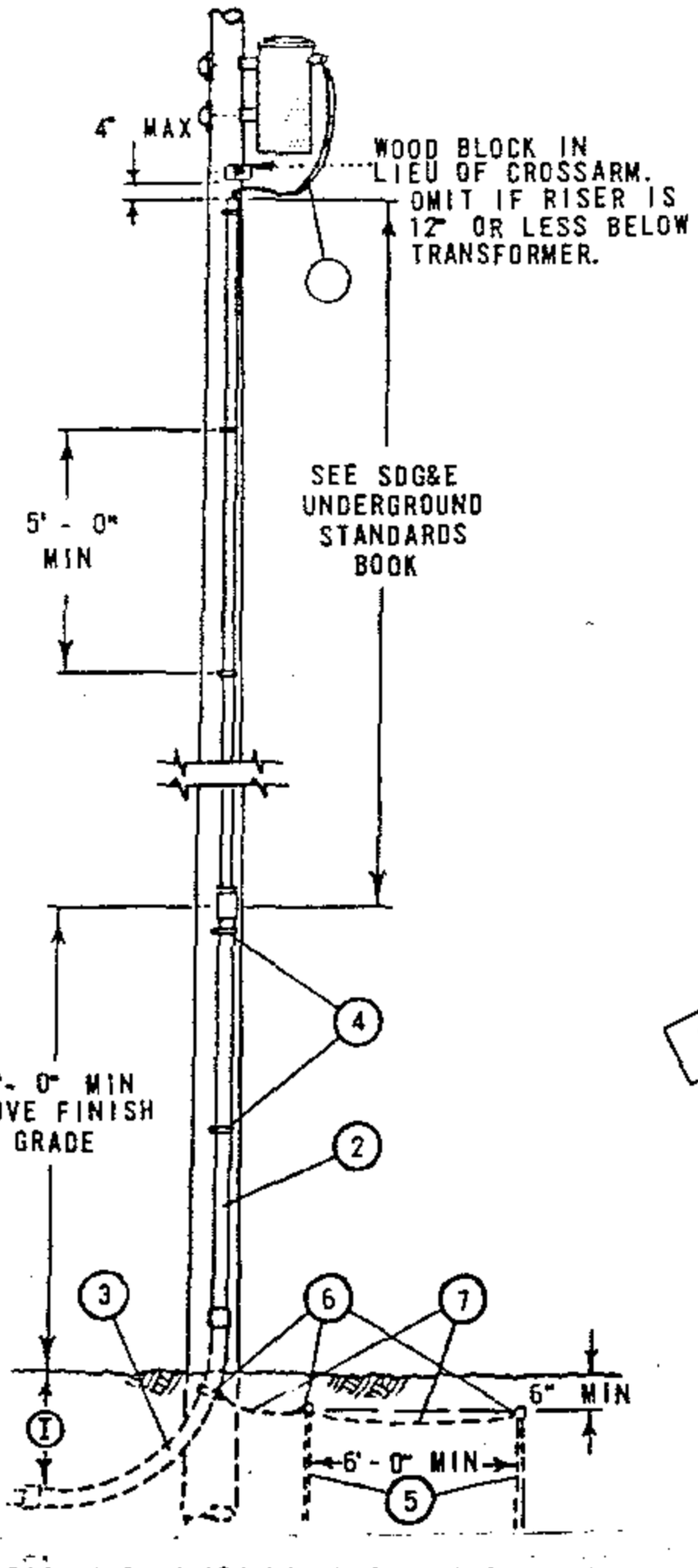
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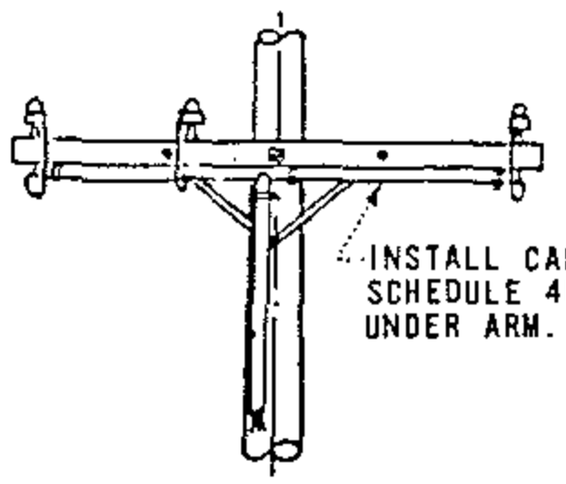
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SDG&E ELECTRIC OVERHEAD STANDARD

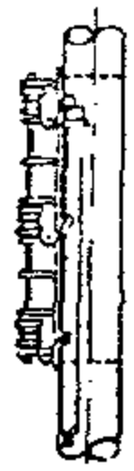
0-750V CUSTOMER OWNED UNDERGROUND SERVICE
FROM AN OVERHEAD LINE, ONE DUCT

FMO
OH 1415




CROSSARM CONSTRUCTION



RACK CONSTRUCTION

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) SEE PAGE 7404 /4204 FOR RISER CONSTRUCTION.

(B) CUSTOMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM SERVICE EQUIPMENT TO SECONDARY OR TRANSFORMER TERMINALS AND SHALL BE OF A LENGTH SUFFICIENT TO FORM DRIP LOOPS AT THE TOP OF THE RISER. CONTRACTOR SHALL IDENTIFY SERVICE ENTRANCE CONDUCTORS WITH CODING OR TAGGING FOR PURPOSE OF PARALLELING PHASES AND NEUTRALS. MAXIMUM SIZE OF EACH CONDUCTOR, SINGLE OR PARALLELED RUNS, SHALL NOT EXCEED 500 KCM.

(C) WHEN ITEMS 2 AND 3 ARE SCHEDULE 80 PVC OMIT ITEMS 5, 6, AND 7.(SEE SDG&E UNDERGROUND STANDARDS BOOK)

(D) OMIT ITEMS 5, 6, AND 7 WHERE CUSTOMER'S UNDERGROUND CONDUIT RUN IS AN APPROVED METALLIC CONDUIT.

(F) OMIT ITEM 5, AND 7 WHERE #6 BARE COPPER BONDING WIRE IS INSTALLED BETWEEN ITEMS 3 AND CUSTOMER'S SERVICE ENTRANCE EQUIPMENT.

(G) USE TWO ROD GROUND SPACED A MINIMUM OF 6 FEET APART.

H. APPROVED METALLIC CONDUIT OR #6 BARE COPPER BONDING WIRE SHALL BE GROUNDED AT THE SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(I) 18" MIN DEPTH ON PRIVATE AND PUBLIC PROPERTY OTHER THAN STREETS AND ALLEYS. 24" MIN DEPTH ACROSS STREETS AND ALLEYS. 24" MIN TO BE MAINTAINED CONTINUOUSLY WHERE DUCTS TRAVERSE BOTH STREETS (AND ALLEYS) AND PRIVATE PROPERTY. 24" MIN DEPTH FOR NON-METALLIC CONDUITS.

MATERIAL FURNISHED AND INSTALLED BY CUSTOMER

| ITEM | DESCRIPTION (A) | |
|---|---|---|
| 1 | CUSTOMER'S SERVICE ENTRANCE CONDUCTORS | (B) |
| 2 | CONDUIT, GALV. IRON RIGID RISER | (C) |
| 3 | CONDUIT, GALV IRON BEND, 90°, 36" RADIUS | (C) |
| 4 | STRAP, PIPE GALV, 2-10D GALV NAILS | |
| 5 | RODS, 5/8" X 8' - 0" COPPERCLAD STEEL GROUND | (D) (F) (G) |
| 6 | CLAMPS, APPROVED TYPE GROUNDING | (D) |
| 7 | WIRE, #6 BARE STRANDED COPPER | (D) (F) |
| | | |

OH 1499.101
~~UG 4299.101~~
SUPERSEDES
1415 (11-16-81)

SDG&E ELECTRIC STANDARDS

0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, ONE DUCT

DATE 11-16-81
APPD JEY

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**REVISION HISTORY:**

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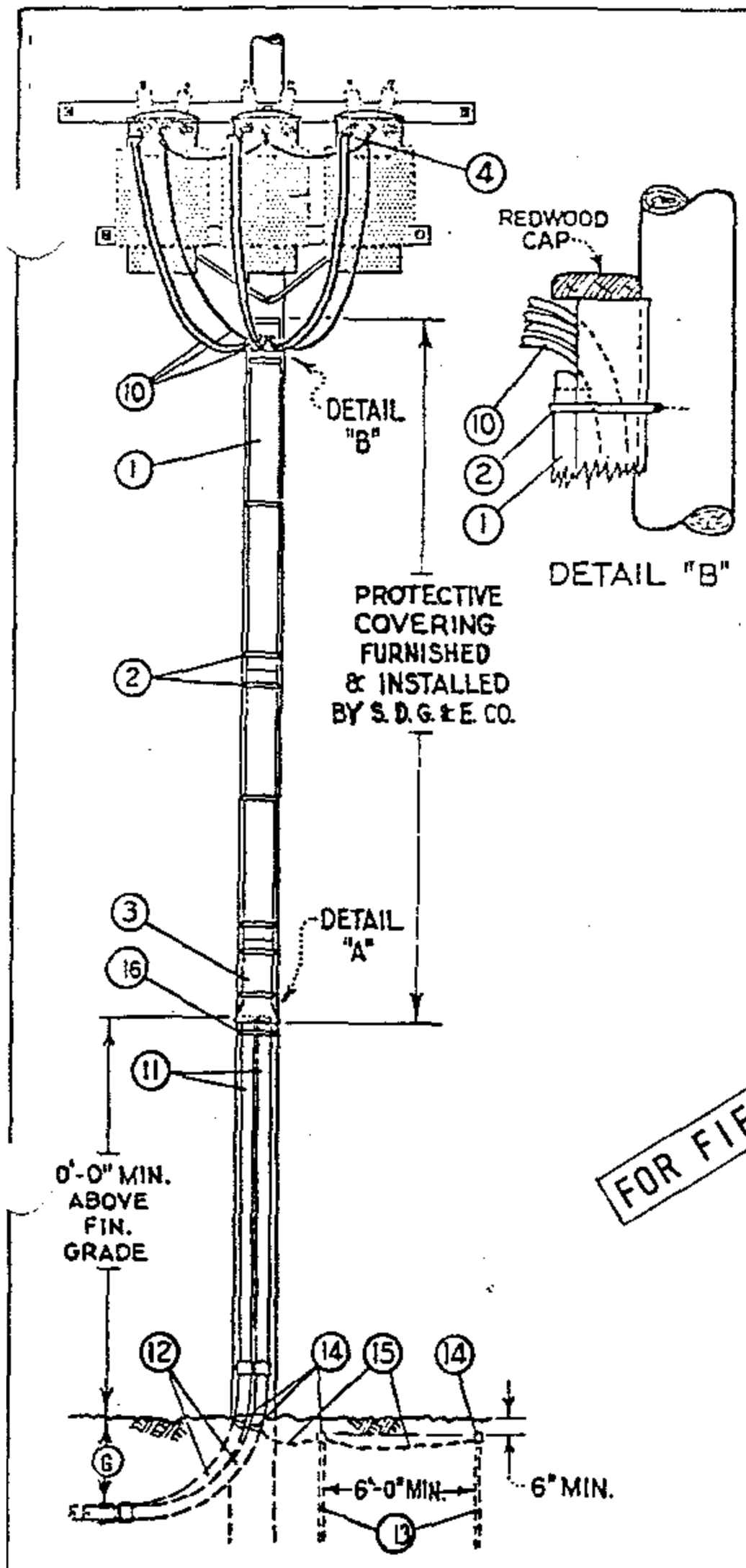
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SDG&E ELECTRIC OVERHEAD STANDARD

0-750V CUSTOMER OWNED UNDERGROUND SERVICE
FROM AN OVERHEAD LINE, TWO DUCTS

FMO
OH 1417

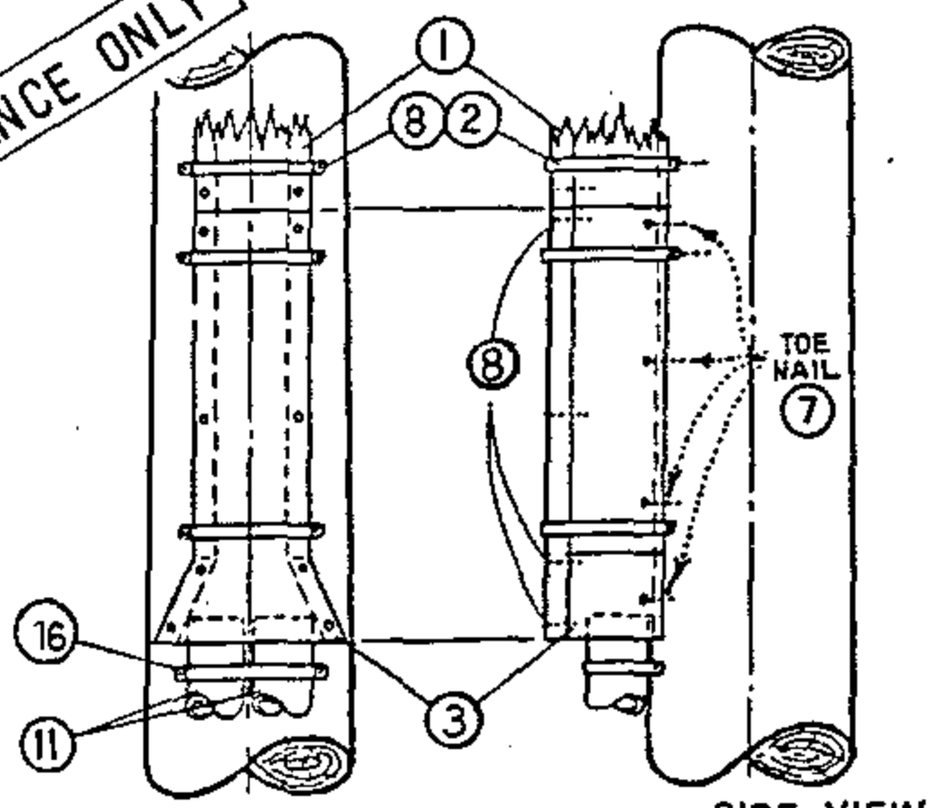



| MATERIAL FURNISHED AND INSTALLED BY SDG&E | | | |
|---|---|---|---|
| ITEM | DESCRIPTION | QUANT. | STOCK NO. OR CONSTR STD |
| 1 | REDWOOD BOX MOULDING, SIZE AS REQUIRED | 16' | PG 143 |
| 2 | MOULDING STRAPS, SIZE AS REQ'D | 6 | PG 143 |
| 3 | REDWOOD MOULDING BASE FOR 5¼"X6⅜", INSIDE DIMENSIONS, RDWD. BOX MOULDING | AS REQ'D | PG 143 |
| 4 | MULTIPLE TAP CONNECTORS, 2 LUG | AS REQ'D | PG 793 |
| | | | |
| | | | |
| 7 | BOX NAILS, GALV., 10D | ½# | 491392 |
| 8 | BOX NAILS, GALV., 16D | ½# | 491424 |
| | | | |

QUANTITIES SHOWN ARE BASED ON A 45' POLE AND TRANSFORMER SECONDARIES CONNECTED 120-208Y. WYE.

| MATERIAL FURNISHED AND INSTALLED BY CUSTOMER (A) | | |
|---|---|---|
| 10 | CUSTOMER'S SERVICE ENTRANCE CONDUCTORS (B) | SEE SDG&E UNDERGROUND STANDARD BOOK |
| 11 | G.I. RIGID CONDUIT RISERS | |
| 12 | G.I. RIGID CONDUIT BENDS, 90°, 36" RADIUS | |
| 13 | 5/8"DIAM. X 8'-0" COPPERCLAD STEEL GRND. RODS (C)(D)(E) | |
| 14 | APPROVED TYPE GROUNDING CLAMPS (C) | |
| 15 | #6 BARE STRANDED COPPER GROUND WIRE (C)(D) | |
| 16 | HEAVY PLUMBERS TAPE, HOT-DIP GALVANIZED | |

FOR FIELD MAINTENANCE ONLY




DETAIL "A"
REQUIRED FOR 2-3½" OR 4" DIAM. G.I. RISERS

NOTES:

(A) SEE SDG&E UNDERGROUND STANDARDS BOOK FOR CABLE CONDUIT SIZING INFORMATION.

(B) CUSTOMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM SERVICE EQUIPMENT TO TRANSFORMER TERMINALS AND SHALL BE OF A LENGTH SUFFICIENT TO FORM DRIP LOOPS AT THE TOP OF THE RISER. CONTRACTOR SHALL IDENTIFY SERVICE ENTRANCE CONDUCTORS WITH CODING OR TAGGING FOR PURPOSE OF PARALLELING PHASES AND NEUTRALS. MAXIMUM SIZE OF EACH CONDUCTOR, SINGLE OR PARELLELED RUNS, SHALL NOT EXCEED 500 KCM

(C) OMIT ITEMS 13, 14, AND 15 WHERE CUSTOMER'S UNDERGROUND CONDUIT RUN IS AN APPROVED METALLIC CONDUIT.

(D) OMIT ITEM NUMBERS 13 AND 15 WHERE #6 BARE COPPER BONDING WIRE IS INSTALLED BETWEEN ITEM 12 AND CUSTOMER'S SERVICE ENTRANCE EQUIPMENT.

(E) USE TWO ROD GROUND.

F. APPROVED METALLIC CONDUIT OR #6 BARE COPPER BONDING WIRE SHALL BE GROUNDED AT THE SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(G) 18" MIN DEPTH ON PRIVATE AND PUBLIC PROPERTY OTHER THAN STREETS AND ALLEYS. 24" MIN DEPTH ACROSS STREETS AND ALLEYS. 24" MIN TO BE MAINTAINED CONTINUOUSLY WHERE DUCTS TRAVERSE BOTH STREETS (AND ALLEYS) AND PRIVATE PROPERTY. 24" MIN DEPTH FOR NON-METALLIC CONDUITS.

DATE 11-16-81
APPD JEY

SDG&E ELECTRIC STANDARDS

# 0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, TWO DUCTS

1499.102
SUPERSEDES
1417 (11-16-81)

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**REVISION HISTORY:**

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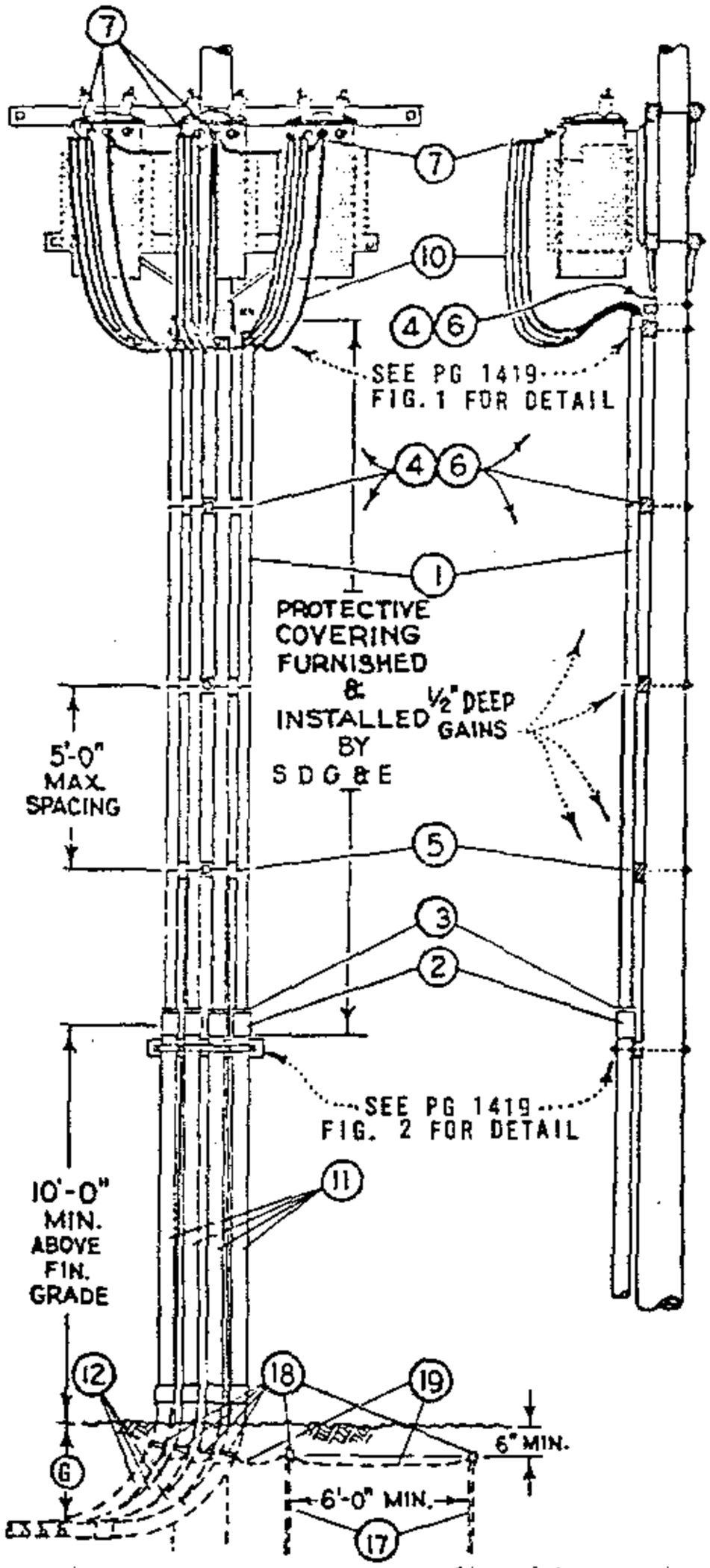
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SDG&E ELECTRIC OVERHEAD STANDARD

0-750V CUSTOMER OWNED UNDERGROUND SERVICE
FROM AN OVERHEAD LINE, THREE AND FOUR DUCTS

FMO
OH 1418




| MATERIAL FURNISHED AND INSTALLED BY SDG&E | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | QUANTITY NO. OF RISERS 3 | QUANTITY NO. OF RISERS 4 | STOCK NO. OR CONSTR STD 3" | STOCK NO. OR CONSTR STD 4" |
| ⊙1 | 3" OR 4" DIAM. PLASTIC CONDUIT, PVC TYPE II, SCHEDULE 40, 20' LENGTHS | 60' | 80' | 251552 | 251584 |
| ⊹2 | COUPLINGS, PLASTIC, SIZE AS REQUIRED | 3 | 4 | 280448 | 280480 |
| ⊙3 | BUSHINGS, PLASTIC, 4"OR 3½"X3" DIAM. FOR REDUCING CUSTOMER'S CONDUIT RISERS, WHERE REQUIRED | 3 | 4 | 3 1/2" X 3" 181024, 4" X 3" - 181056 | |
| 4 | RISER SUPPORT BLOCKS, 3½"x4½"x2'-0" | 5 | 5 | PG 1419 IT. 4 | |
| 5 | "J" BOLT, 1 SQ WASHER | 12 | 16 | PGS 139, 140 | |
| 6 | MACH. BOLT, GALV., ⅝"x16"-20", 2 SQ. WASHERS & 1 NUT | 5 | 5 | PGS 139, 140 | |
| 7 | MULTIPLE TAP CONNECTORS, SPECIFY NUMBER OF LUGS | 6 | 6 | PG 793 | |

⊙ QUANTITIES SHOWN ARE BASED ON A 45' POLE AND TRANSFORMER SECONDARIES CONNECTED 120/208 V WYE.

⊹ UNTHREADED FOR SLIP FIT OVER RIGID CONDUIT RISER.

| MATERIAL FURNISHED AND INSTALLED BY CUSTOMER | | |
|---|---|---|
| ITEM | DESCRIPTION (A) | STOCK NO. |
| 10 | CUSTOMER'S SERVICE ENTRANCE CONDUCTORS (B) | SEE SDG&E UNDERGROUND STANDARD BOOK |
| 11 | G.I. RIGID CONDUIT RISERS | |
| 12 | G. I. RIGID CONDUIT BENDS, 90°, 36" RADIUS | |
| 13 | SPACER BLOCK | |
| 14 | STRAP, GALV | |
| 15 | FOUR ½"X 9" MACH. BOLTS, GALV., 1 RD. WASHER | |
| 16 | ONE ⅝"X 20" MACH. BOLT, GALV., 2-2" SQ. WASHERS | |
| 17 | ⅝"X 8'-0" COPPERCLAD STEEL GROUND RODS (C) (D) (E) | |
| 18 | APPROVED TYPE GROUNDING CLAMPS (C) | |
| 19 | #6 BARE STRANDED COPPER GROUND WIRE (C) (D) | |

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) SEE UNDERGROUND STANDARDS BOOK FOR CABLE CONDUIT SIZING INFORMATION.

(B) CUSTORMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM SERVICE EQUIPMENT TO TRANSFORMER TERMINALS AND SHALL BE OF A LENGTH SUFFICIENT TO FORM DRIP LOOPS AT THE TOP OF THE RISER. CONTRACTOR SHALL IDENTIFY SERVICE ENTRANCE CONDUCTORS WITH CODING OR TAGGING FOR PURPOSE OF PARALLELING PHASES AND NEUTRALS. MAXIMUM SIZE OF EACH CONDUCTOR, SINGLE OR PARALLELED RUNS, SHALL NOT EXCEED 500 KCM.

(C) OMIT ITEM 17, 18, AND 19 WHERE CUSTOMER'S UNDERGROUND CONDUIT RUN IS AN APPROVED METALLIC CONDUIT.

(D) OMIT ITEM 17, AND 19 WHERE #6 BARE COPPER BONDING WIRE IS INSTALLED BETWEEN ITEM 12 AND CUSTOMER'S SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(E) USE TWO ROD GROUND.

F. APPROVED METALLIC CONDUIT OR #6 BARE COPPER BONDING WIRE SHALL BE GROUNDED AT THE SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(G) 18" MIN DEPTH ON PRIVATE AND PUBLIC PROPERTY OTHER THAN STREETS OR ALLEYS. 24" MIN DEPTH ACROSS STREETS AND ALLEYS. 24" MIN TO BE MAINTAINED CONTINUOUSLY WHERE DUCTS TRAVERSE BOTH STREETS (AND ALLEYS) AND PRIVATE PROPERTY. 24" MIN DEPTH FOR NON-METALLIC CONDUITS.

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| 1499.103 SUPERSEDES 418 (11-16-81) | SDG&E ELECTRIC STANDARDS<br>0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, THREE AND FOUR DUCTS | DATE 11-16-81 APPD JED |
|---|---|---|

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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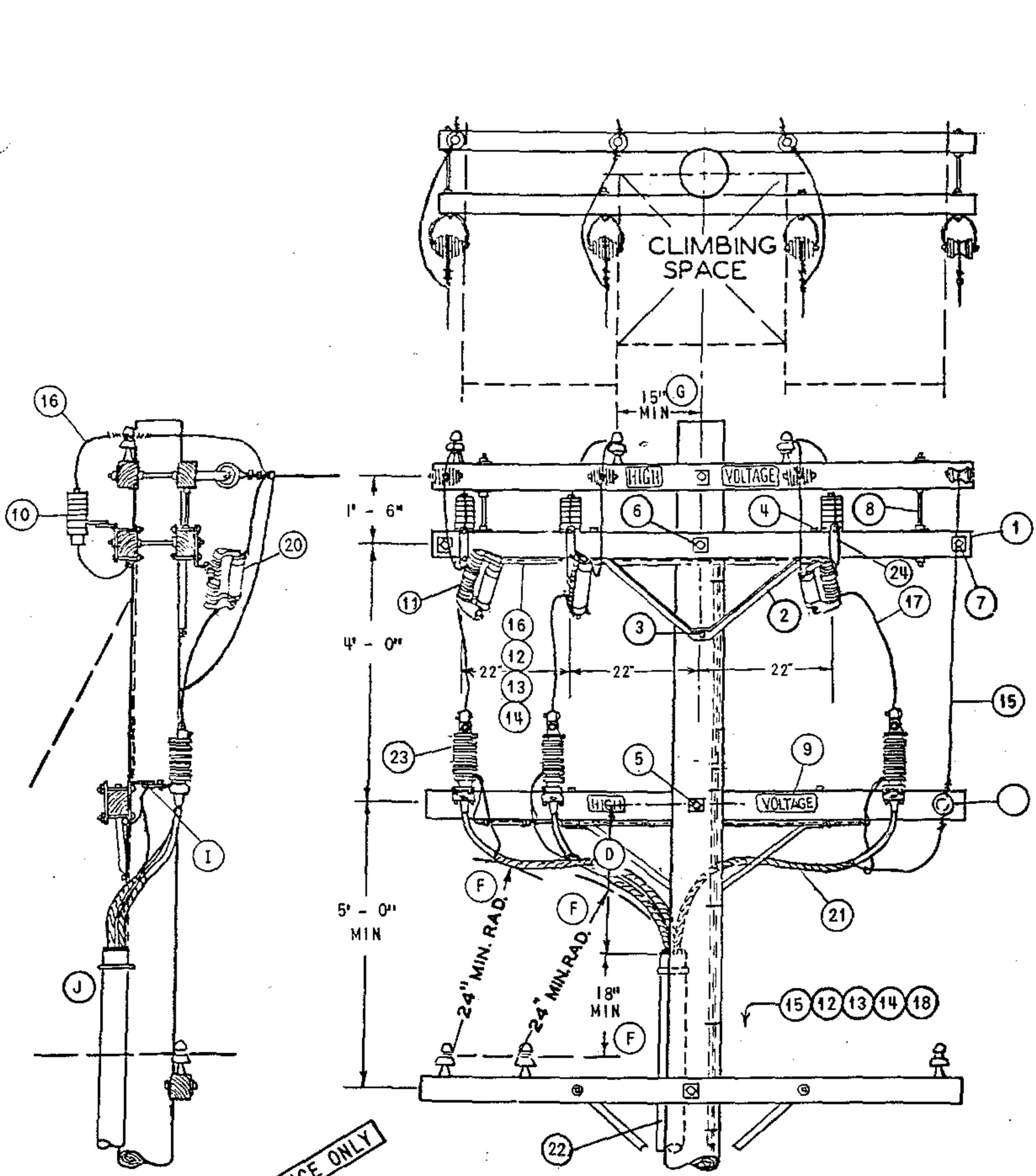
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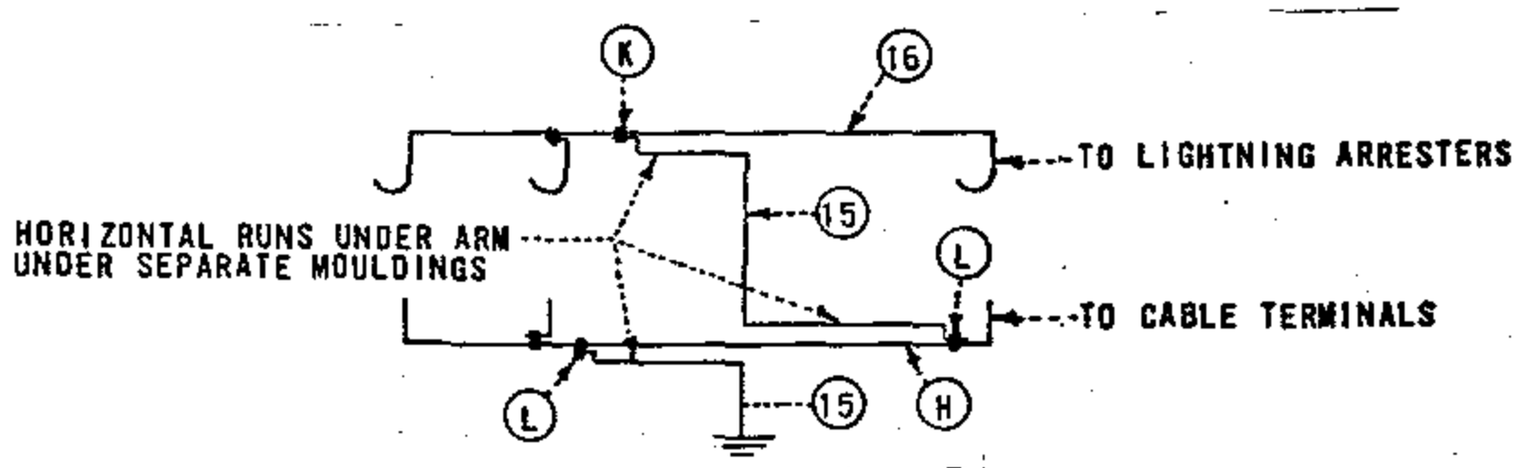
SDG&E ELECTRIC OVERHEAD STANDARD

CROSSARM MOUNTED TERMINALS 4KV 4 WIRE WYE

FMO OH 1428

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GROUND WIRE DETAIL (B)

| | | |
|---|---|---|
| DATE 8-27-82<br>APPD DRH | SDG&E ELECTRIC STANDARDS<br>CROSSARM MOUNTED TERMINALS 4KV 4 WIRE WYE | OH 1499.201<br>~~UG 4299.201~~<br>SUPERSEDES<br>1428.1 (11-16-81) |

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING

(B) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(C) USE TWO GROUND RODS SPACED A MINIMUM OF 6' APART.

(D) 3 FOOT MINIMUM DIMENSION, 4 FOOT DIMENSION PREFERRED FOR 750 KCM AND LARGER 15KV CABLE.

(E) EXEMPT MATERIAL.

(F) G.O. 95 MINIMUM DIMENSION.

(G) G.O. 95 MINIMUM DIMENSION FOR 4KV. USE 18" MIN IF BUILT WITH 15KV CABLE.

(H) USE #2 BARE STRANDED COPPER OR LARGER AS REQUIRED.

(J) CONNECT NEUTRAL, TERMINAL AND SHIELDED CABLE GROUNDS TO LIGHTNING ARRESTER GROUND.

(J) INSTALL RISER ON FACE OF POLE OPPOSITE CLIMBING SPACE AND IN A POSITION NEAREST THE END OF ARM ON WHICH THE TWO 4KV PHASES ARE LOCATED.

(K) CONNECT #2 BARE STRANDED COPPER CONDUCTOR TO #6 BARE STRANDED COPPER CONDUCTOR AT POINT NEAR CENTER LIGHTNING ARRESTER.

(L) CONNECT #2 BARE STRANDED COPPER CONDUCTOR TO REQUIRED CONDUCTOR AT POINT NEAR CENTER TERMINAL AND END TERMINAL.

FOR FIELD MAINTENANCE ONLY

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| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| PTF | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 3 | 300 SECTION |
| | 2 | BRACE, ANGLE CROSSARM 4' - 0" | 2 | 164032 |
| | 3 | SCREW, LAG GALV, 5/8" X 5" (E) | 2 | 621600 |
| | 4 | BOLT, MACH GALV, 1/2" X 7", 1 RD WASH. & 1 DBL COIL WASH. (E) | 4 | PGS 139, 140 |
| | 5 | BOLT, MACH GALV, 5/8" X 14", 2 - 3" SQ WASH. & 1 DBL COIL WASH. (E) | 1 | PGS 139, 140 |
| | 6 | BOLT, MACH GALV, 5/8" X 20", 2 - 3" SQ WASH. & 1 DBL COIL WASH. (E) | 1 | PGS 139, 140 |
| | 7 | BOLT, SPACE GALV, 5/8" X 20", 4 SQ WASH. & 4 DBL COIL WASH. (E) | 2 | PGS 139, 140 |
| | 8 | BOLT, SPACE GALV, 5/8" X 28", 4 SQ WASH. & 4 DBL COIL WASH. (E) | 2 | PGS 139, 140 |
| | 9 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS (E) | 1 | 647648, 492224 |
| UCD | 10 | ARRESTER, LIGHTNING 3KV | 3 | 113216 |
| | 11 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1200 SECTION |
| | 12 | STAPLES, FENCE GALV, 1 1/4" (A) (E) | 25 | 678528 |
| | 13 | MOULDING, HARDWOOD 1" (A) | 55' | 487200 |
| | 14 | STAPLES, MOULDING GALV, 3" X 1 1/16" X 1/4" (A) (E) | 25 | 678560 |
| | 15 | WIRE, #2 BARE STRANDED COPPER (B) | 44' | 813664 |
| | 16 | WIRE, #6 BARE STRANDED COPPER (B) | 18' | 813536 |
| | 17 | WIRE, COPPER, SIZED PER U.G. CABLE AMPACITY. | 8' | 81 |
| | 18 | ROD & CLAMP, GROUND (A) (C) | 2 | 603072, 230016 |
| | 19 | INSULATOR, 4KV WIRE HOLDER | 1 | 413792 |
| | 20 | FUSE, CURRENT-LIMITING SIZE AS SPECIFIED ON WORK ORDER | 3 | 1200 SECTION |
| | 21 | CABLE, POLYETHYLENE, CONCENTRIC NEUTRAL PRIMARY | AS REQ'D | SEE UG. STDS |
| | 22 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 SECTION |
| | 23 | TERMINAL CABLE | 3 | UG BOOK |
| | 24 | BRACKET, CUTOUT /ARRESTER CROSSARM MOUNTING (E) | 3 | 166070 |
| | 25 | | | |

OH 1499.202
~~UG 4299.202~~
SUPERSEDES
428.2 (11-16-81)

SDG&E ELECTRIC STANDARDS

# CROSSARM MOUNTED TERMINALS 4KV 4 WIRE WYE

DATE 8-27-82
APPD

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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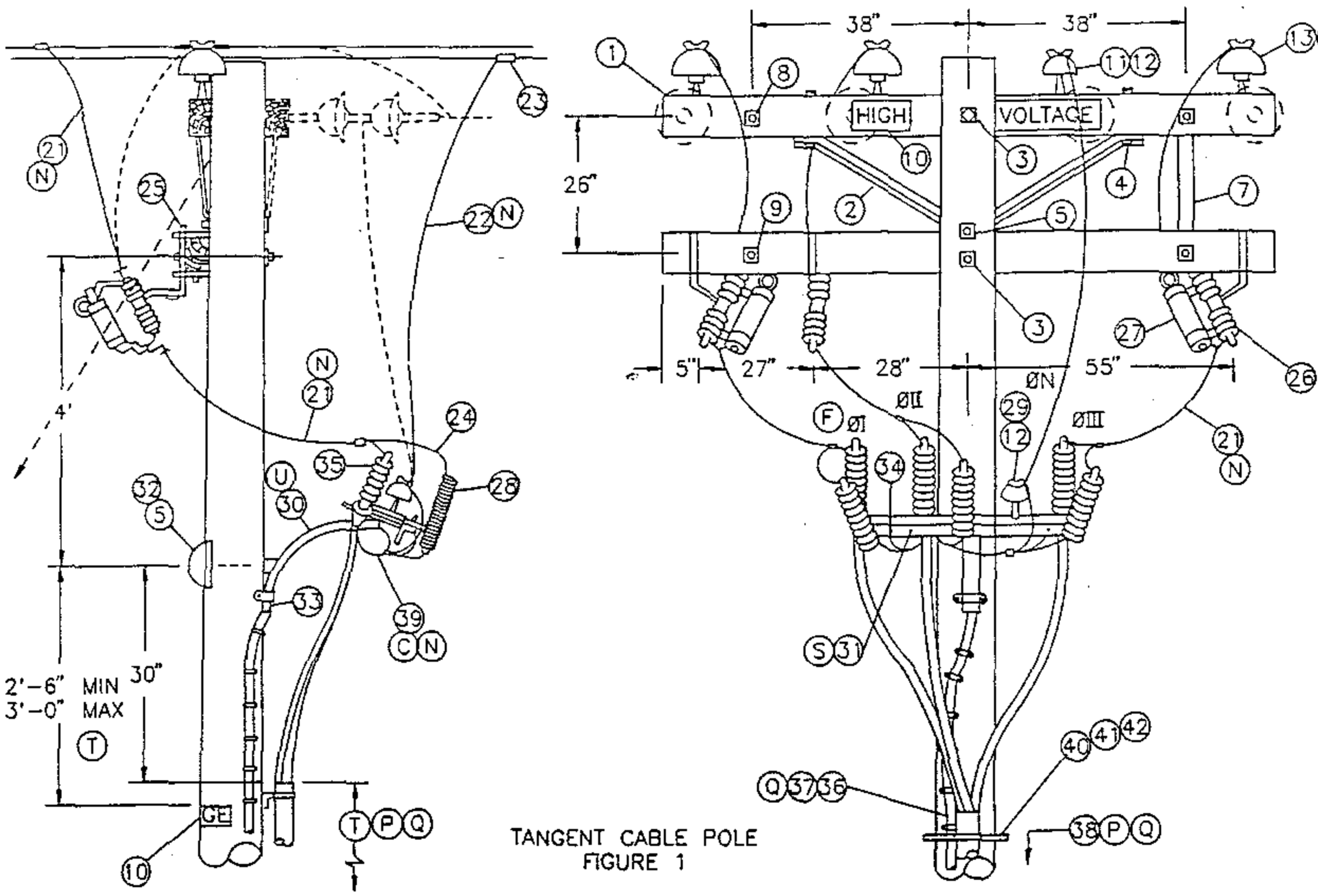
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SDG&E ELECTRIC OVERHEAD STANDARD

12.47KV AND BELOW 3Ø CABLE POLE 1/C PER Ø,
UPSWEEP BRACKET CONSTRUCTION

FMO
OH 1429

SCOPE: THIS STANDARD SHOWS TANGENT LINE (FIG.1) AND DEAD-END CONSTRUCTION (FIG.2) FOR 12.47 KV AND BELOW, 3Ø CABLE POLE WITH UPSWEEP BRACKET MOUNTED TERMINALS FOR #2/0 AND SMALLER UG CABLE.

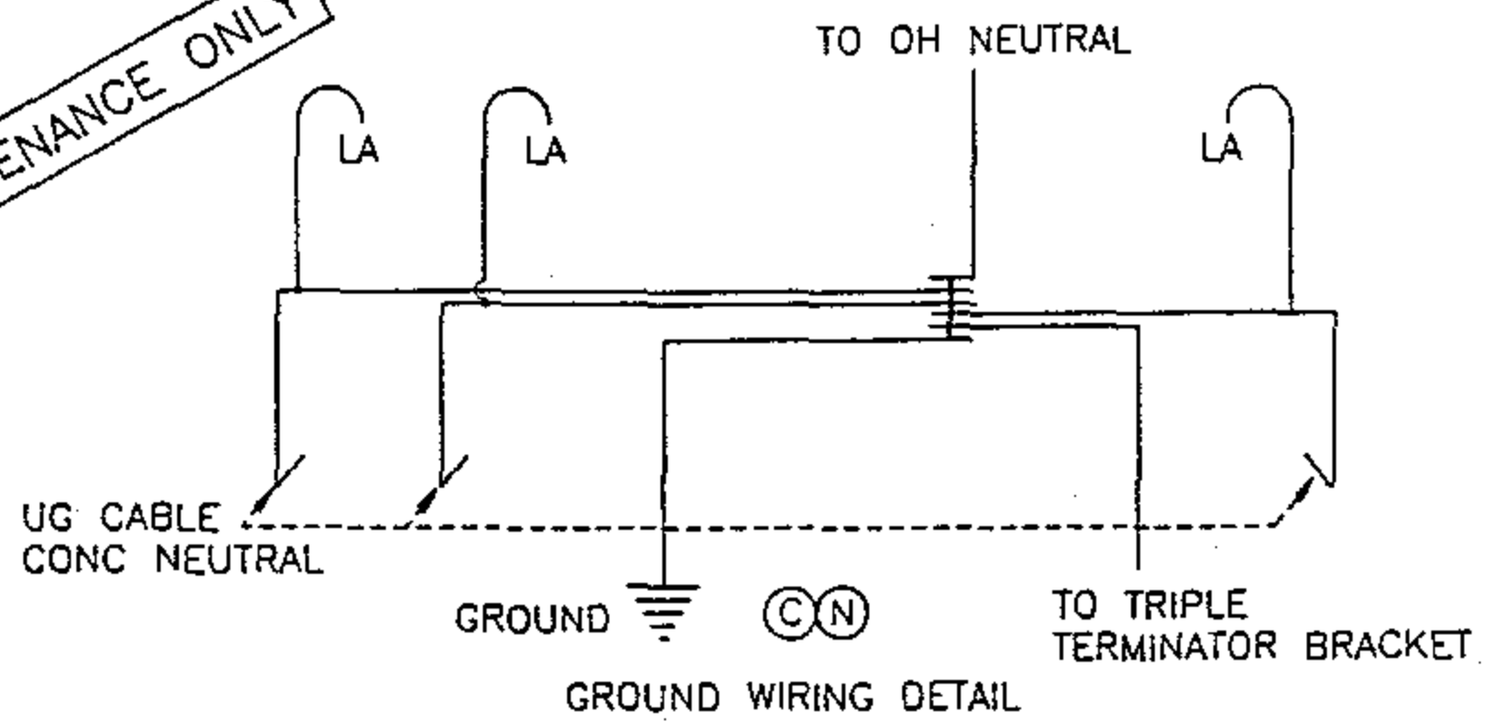



TANGENT CABLE POLE
FIGURE 1

NOTE:

- TANGENT CABLE POLE (FIG.1) OR DEAD-END CABLE POLE (DOTTED LINE) IS TO BE USED WHEN FURTHER LINE EXTENSION IS EXPECTED.
- DO NOT USE THIS UPSWEEP BRACKET CONSTRUCTION FOR 4KV, 3Ø CABLE POLE. INSTEAD, USE STANDARD 1439/4239.

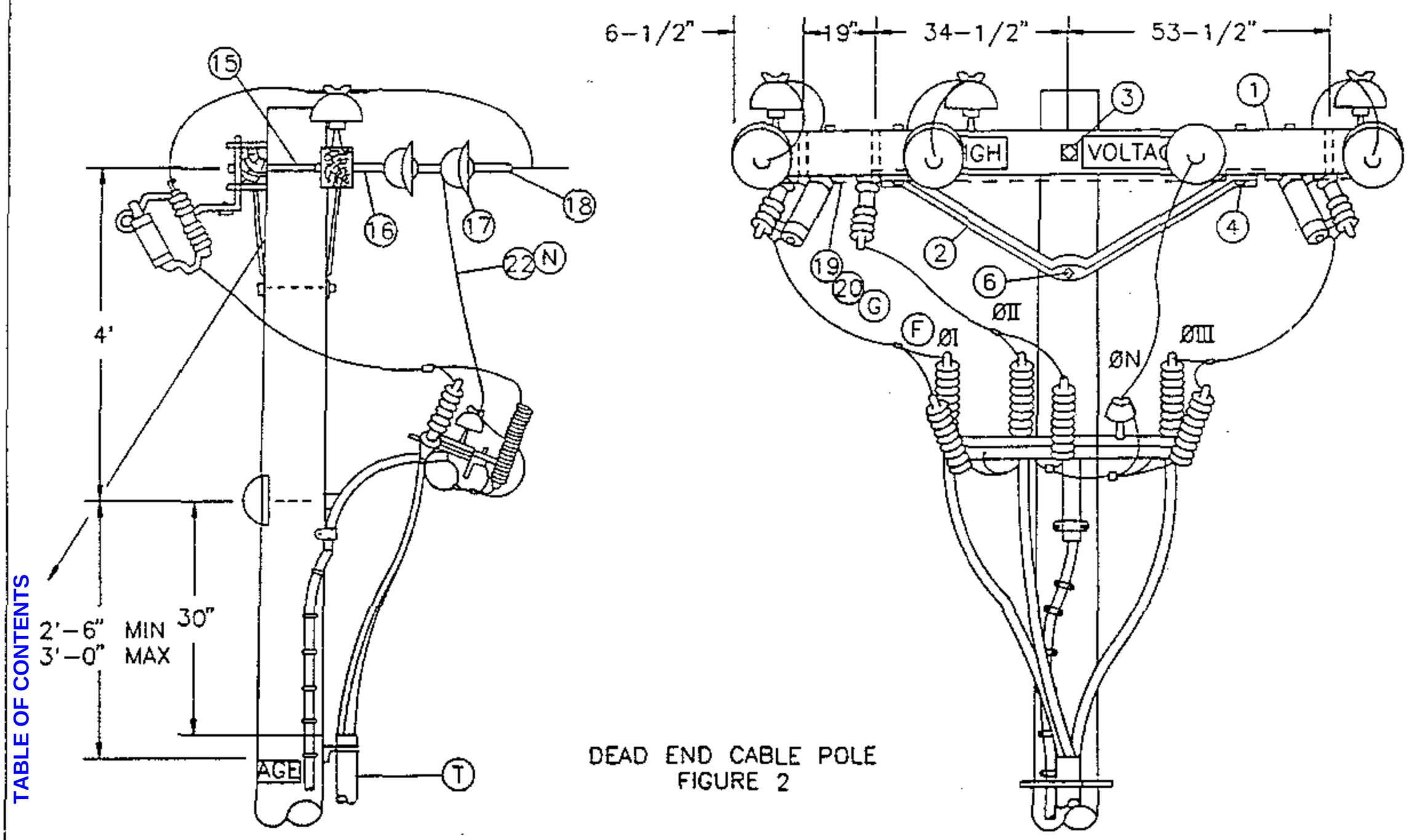
FOR FIELD MAINTENANCE ONLY




GROUND WIRING DETAIL

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLB/BDJ | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW 3Ø CABLE POLE 1/C PER Ø, UPSWEEP BRACKET CONSTRUCTION | OH 1499.203<br>~~UG 4299.203~~<br>SUPERCEDES<br>1429.1 (1-1-93) |

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DEAD END CABLE POLE
FIGURE 2

NOTE:

- DEAD END CABLE POLE (FIG.2) IS TO BE USED ONLY WHEN NO FURTHER LINE EXTENSION OR NO RECONDUCTORING IS EXPECTED.

FOR FIELD MAINTENANCE ONLY

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| OH 1499.204<br>~~UG 4299.204~~<br>SUPERCEDES<br>1429.2 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW 3Ø CABLE POLE 1/C PER Ø<br>UPSWEEP BRACKET CONSTRUCTION | DATE 1-1-93<br>APPD JYG/DDJ |

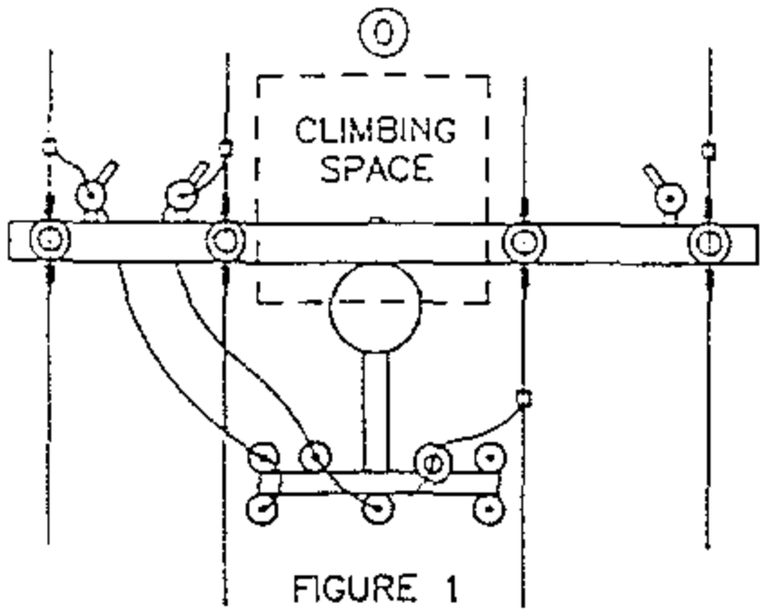



FIGURE 1

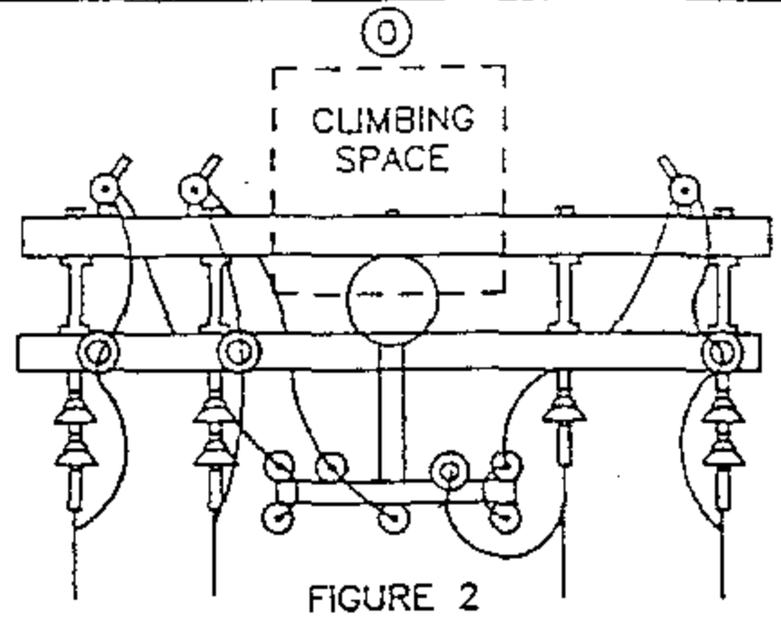



FIGURE 2

CLIMBING SPACE

BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY FIG.1 | QUANTITY FIG.2 | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 10'-0" | 2 | 2 | – | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 5' | 1 | 2 | – | 164128 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 1 | 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 4 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 1 | 392 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 DOUBLE COIL SPRING WASHER (E) | – | 1 | 392 | – |
| 7 | BRACE, FLAT, CROSSARM, 28" (E) | 2 | – | – | 164192 |
| 8 | BOLT, MACH, GALV, 3/8" X (LENGTH AS REQ'D), 1 ROUND & 1 SPRING WASHER (E) | 2 | – | 392 | – |
| 9 | BOLT, MACH, GALV, 1/2" X (LENGTH AS REQ'D), 1 ROUND & 1 DOUBLE COIL SPRING WASHER (E) | 2 | – | 392 | – |
| 10 | SIGN, HIGH VOLTAGE AND (E) | 3 | 3 | – | 647648 |
| | 9 ROOFING NAILS, GALV (E) | AS REQ'D | | – | 492224 |
| 11 | PIN, INSULATOR, STRAIGHT, 12KV, 1" LEAD THREAD (D) (E) | 1 | – | – | 532704 |
| 12 | INSULATOR, LINE, 12KV, NEUTRAL (D) (E) | 2 | 1 | – | 429216 |
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" OR (E) | 3 | 3 | – | 532704 |
| | 1-3/8" LEAD THREAD (E) | 3 | 3 | – | 532448 |
| 14 | INSULATOR, LINE, 12KV, 1" OR 1-3/8" PIN (E) | 3 | 3 | 750 | – |
| 15 | BOLT, SPACE, 5/8" X (LENGTH AS REQ'D) 3 SQ, 2 RD, 2 DOUBLE COIL SPRING WASHERS & 1 NUT (D) (E) | – | 4 | 392 | – |
| 16 | CLEVIS, DEAD END, 5/8" BOLT, STEEL (D) (E) | – | 4 | – | 235712 |
| 17 | INSULATOR, SUSPENSION, 12KV, CLEVIS (D) | – | 7 | 750 | – |
| 18 | CLAMP, STRAIGHT LINE, D.E. (D) (E) | – | 4 | 741 | – |
| 19 | WIRE, #8, BARE SOLID ANNEALED COPPER | 10' | 10' | – | 812928 |
| 20 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | | – | 678528 |
| 21 | WIRE, BARE STRANDED COPPER (OH JUMPER) (N) | 21' | 25' | 715-716 | – |
| 22 | WIRE, BARE STRANDED CU OR AL (OH NEUT JUMPER) (N) | 9' | 7' | 711-716 | – |
| 23 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) (D) (E) | AS REQ'D | | 785-787 | – |

| CABLE SIZE | UG MACRO UNIT PORCELAIN | |
|---|---|---|
| | W/O LADDER ARMS | W/LADDER ARMS |
| 3C-#2 AL | CP-3#2 | CP3#2L |
| 3C-#2/0 | CP#2/0 | CP2/0L |

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BILL OF MATERIAL: (CONTINUED)

| ITEM | DESCRIPTION | QUANTITY FIG. 1 | QUANTITY FIG. 2 | CONSTR. STD OR PAGE NO. | STOCK NUMBER |
|---|---|---|---|---|---|
| 24 | WIRE, #6, BARE STRANDED COPPER | 9' | 9' | – | 813536 |
| 25 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 3 | 3 | – | 166070 |
| 26 | CUTOUT BODY FOR CURRENT LIMITING FUSE | 3 | 3 | – | 297952 |
| 27 | FUSE, CURRENT–LIMITING, SIZE AS REQ'D | 3 | 3 | 1206 | – |
| 28 | ARRESTER, LIGHTNING | 3 | 3 | 1247 | – |
| 29 | PIN, SHORT SHANK, 1" LEAD THREAD (D) (E) | 1 | 1 | – | 534426 |
| 30 | BRACKET, GALV, TERMINAL, UPSWEEP | 1 | 1 | – | 166856 |
| 31 | BRACKET, TRIPLE TERMINATOR (S) | 1 | 1 | – | 166676 |
| 32 | COVER, BOLT, PLASTIC & (E) | 1 | 1 | – | 285696 |
| | 6 – 10D NAILS, GALV (E) | – | – | – | 491392 |
| 33 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | 2 | – | 621568 |
| 34 | BOLT, MACH, GALV, 5/8" X 1 1/2", 1 ROUND AND 1 LOCK WASHER (E) | 1 | 1 | 392 | – |
| 35 | TERMINALS AND UNDERGROUND CABLE | 3 | 3 | 4111 | – |
| 36 | WIRE, #4, BARE STRANDED COPPER | 50' | 45' | – | 813760 |
| 37 | UNIT GROUND, COMPLETE (Q) | 1 | 1 | – | 603136 |
| 38 | RISER CONSTRUCTION | – | – | 1400/4200 | – |
| 39 | WIRE, COPPER BARE STRANDED (CABLE POLE NEUTRAL) (N) | 5' | 5' | 715/716 | – |
| 40 | BRACKET, LADDER ARM (E) | AS REQ'D | | 1404/4204 | 167184 |
| 41 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" (E) | AS REQ'D | | 1404/4204 | 503488 |
| 42 | CHANNEL, DOUBLE GALV, 24" (E) | AS REQ'D | | 1404/4204 | 216700 |

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 2/0 AND SMALLER UNDERGROUND CABLE.

(C) CONNECT OVERHEAD NEUTRAL, TRIPLE TERMINAL BRACKET, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(E) EXEMPT MATERIAL.

(F) OMIT PHASE II AND PHASE N FOR SINGLE PHASE 12KV CABLE POLE; OMIT PHASE I AND PHASE II FOR SINGLE PHASE 6.9 KV CABLE POLE.

(G) INTERCONNECT CUTOUTS AND DEADEND BONDS PER G.O. 95 RULE 52.7D. BONDING SHOULD BE DONE IN ACCORDANCE WITH RULE 53.4.

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE CU | OH NEUT JUMPER SIZE AL | OH NEUT JUMPER SIZE | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| 2 | 4 | 6 | 2 | – | #6 PER PHASE |
| 2/0 | 4 | 6 | 2 | – | #6 PER PHASE |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STANDARD 251.

(P) POLE STEPPING – SEE STANDARD 363/4205.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

R. SEE STANDARD SECTION 1200/4300 FOR FUSING.

S. RISER POSITIONS – SEE STANDARD 1402/4202.

(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STANDARD 1406/4206.

(U) SEE STANDARD 1407/4207 FOR PORCELAIN AND NON–PORCELAIN TERMINAL MOUNTING BRACKET INSTALLATIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superceded by their current version found inside the Overhead Construction Standard Manual.

**2/20/2019:** Install S706680 in place of old style Disconnect Switch.

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SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE-PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON-PORCELAIN TERMINALS

FMO OH 1432

**SCOPE:** THIS STANDARD SHOWS THREE–PHASE CABLE POLE CONSTRUCTION USING NON–PORCELAIN TERMINALS FOR 350 KCMIL AND LARGER UG CABLE. (H)

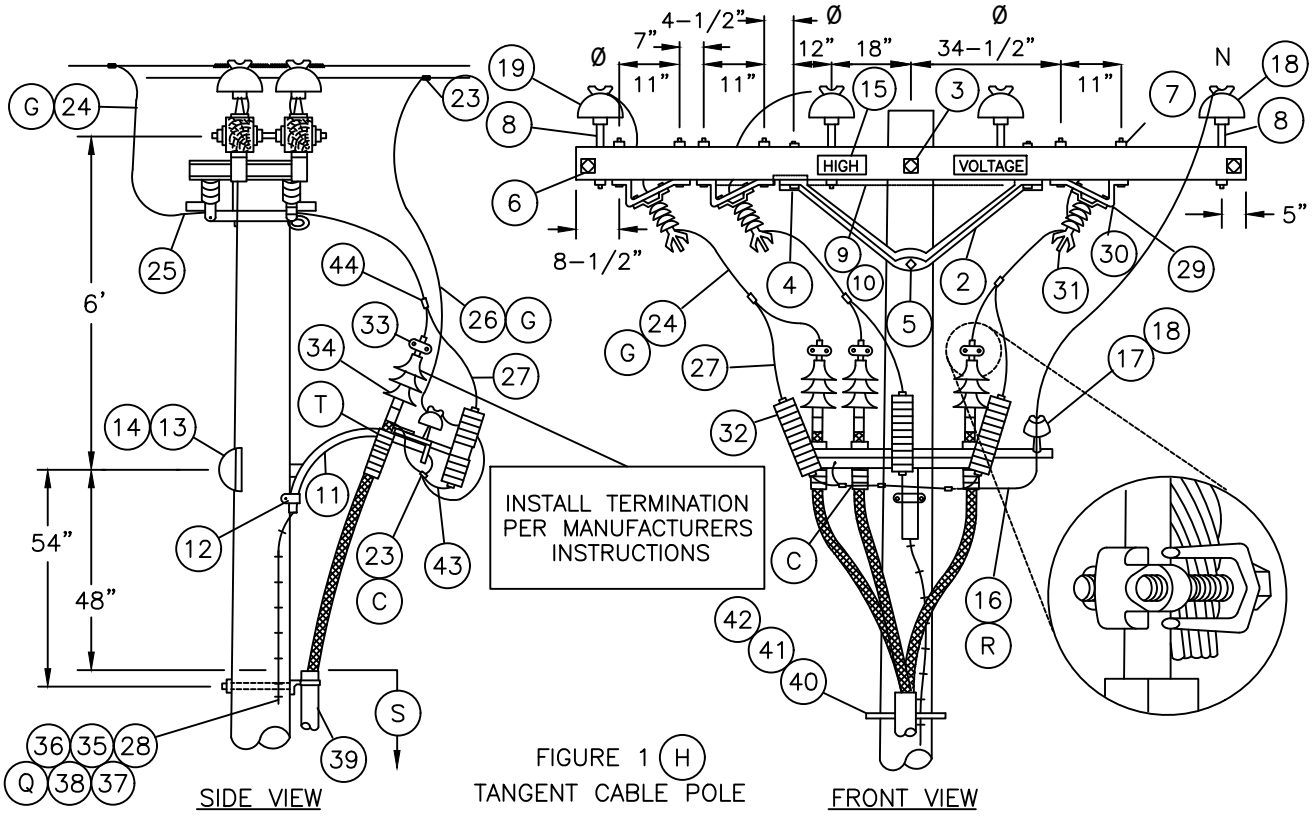



FIGURE 1 (H)
TANGENT CABLE POLE

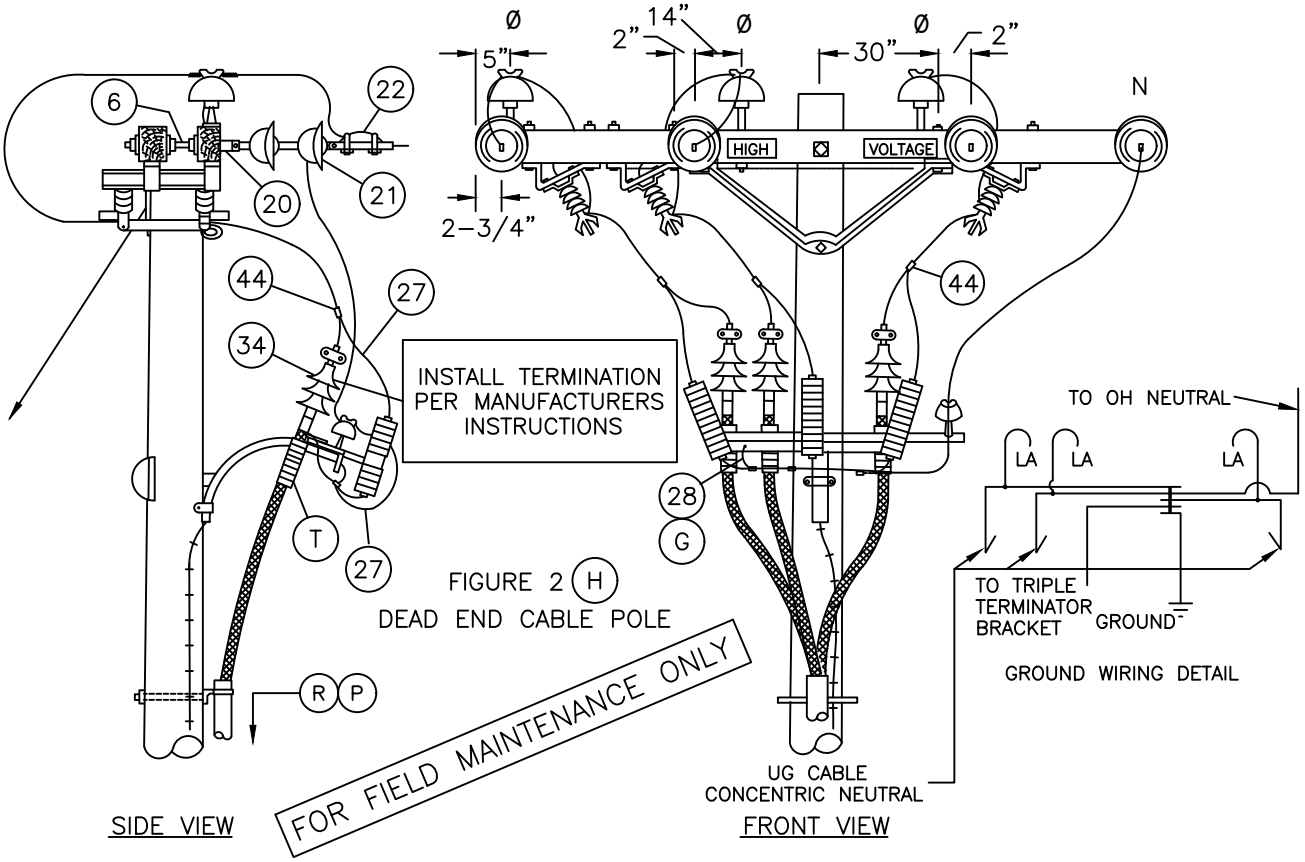



FIGURE 2 (H)
DEAD END CABLE POLE

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| | | |
|---|---|---|
| DATE 10–20–05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE–PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON–PORCELAIN TERMINALS | OH 1499.310<br>UG 4299.310<br>SUPERSEDES<br>1432.1 (10–20–05) |

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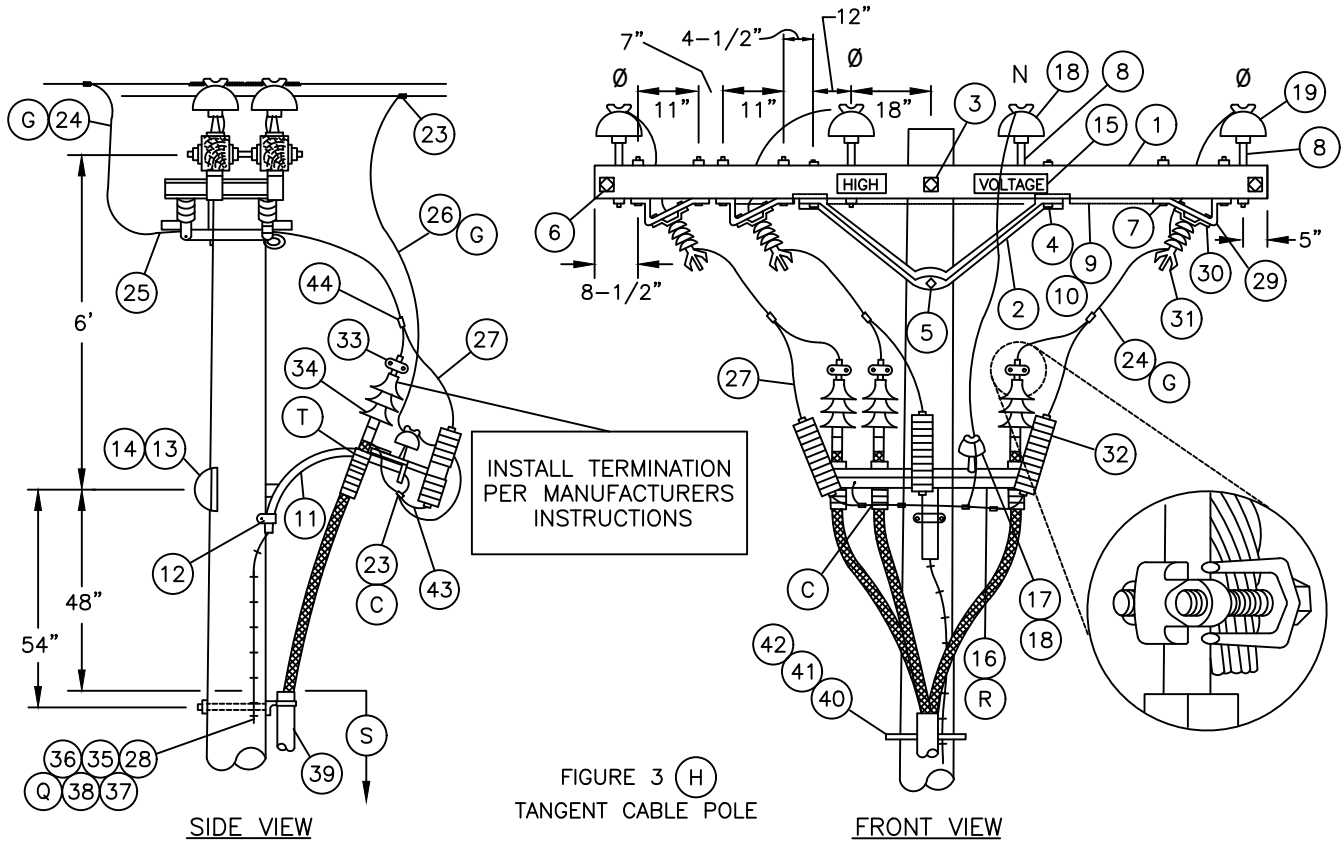



FIGURE 3 (H)
TANGENT CABLE POLE

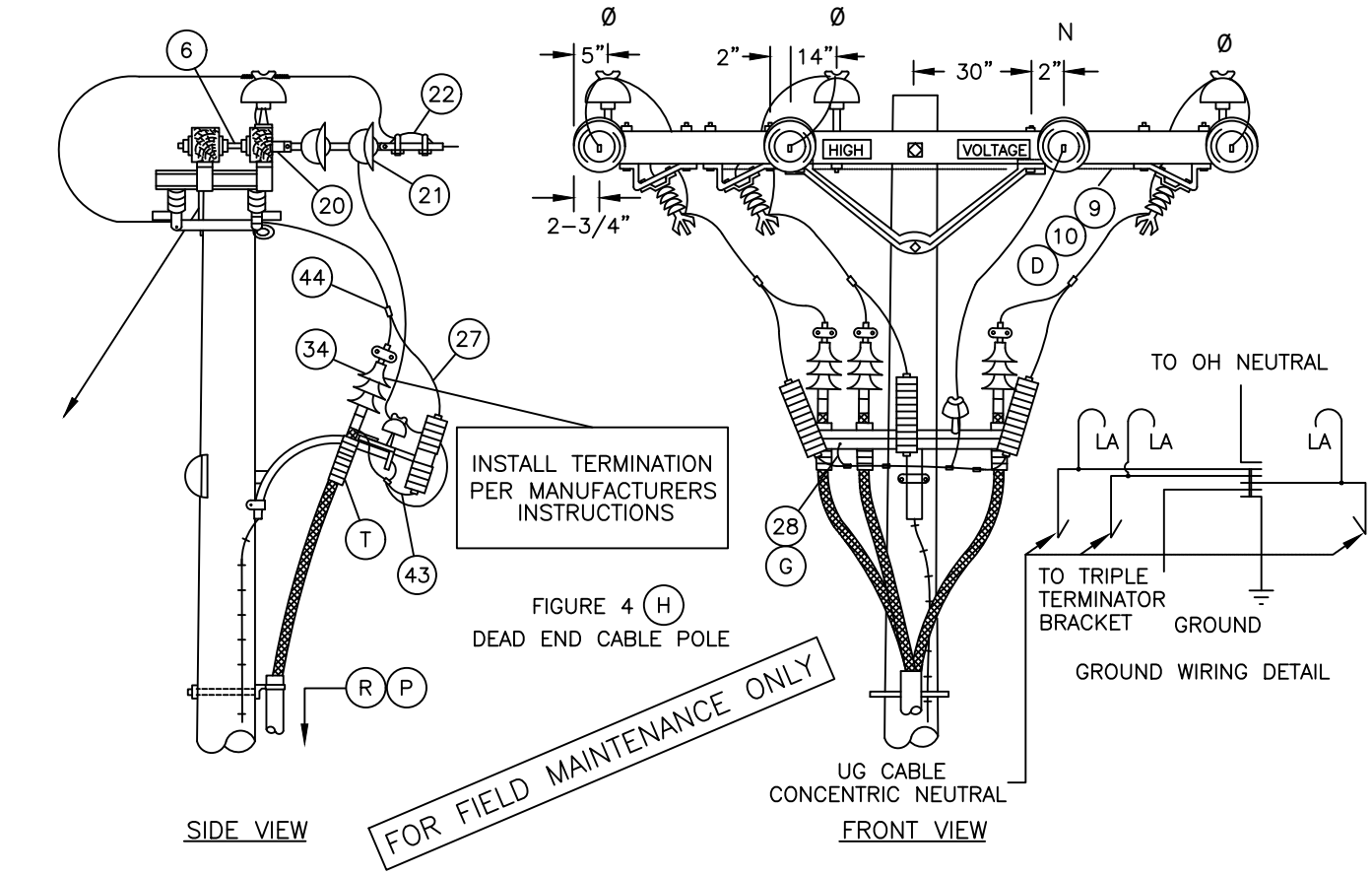



FIGURE 4 (H)
DEAD END CABLE POLE

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| | | |
|---|---|---|
| DATE 10-20-05<br>APPD PA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE-PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON-PORCELAIN TERMINALS | OH 1499.311<br>UG 4299.311<br>SUPERSEDES<br>1432.2 (10-20-05) |

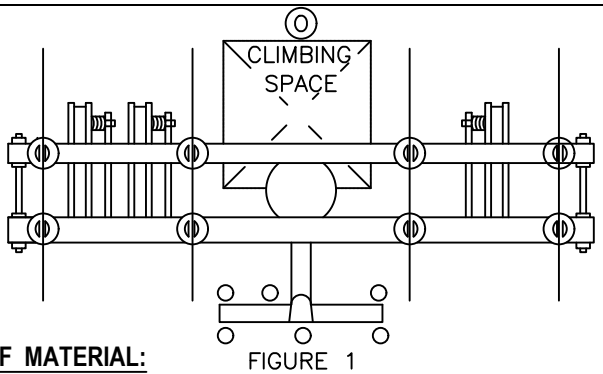



FIGURE 1

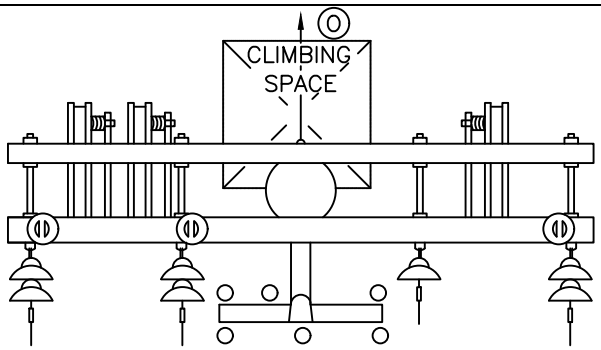



FIGURE 2

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY FIG 1 | QUANTITY FIG 2 | CONSTR STANDARD | STOCK NUMBER |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3–3/4" X 5–3/4" X 12'–0" (F) | 2 | 2 | | 294160 |
| 2 | BRACE, ANGLE, CROSSARM, 5' | 2 | 2 | – | 164128 |
| 3 | BOLT, MACH., GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHERS | 1 | 1 | 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 RD, 1 DBL COIL SPR WASH | 4 | 4 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), AND 1 DOUBLE COIL SPRING WASHER | 1 | 1 | 392 | – |
| 6 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 4 SQUARE, 2 ROUND AND 2 DOUBLE COIL SPRING WASHERS (E) | 2 | 4 | 392 | – |
| 7 | BOLT, MACH, GALV, 1/2" X 8", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 12 | 12 | 392 | – |
| 8 | PIN, INSULATOR, STRAIGHT, 12KV, 1" OR 1–3/8" (E) | 8 | 3 | – | 532704 |
| | (E) | 8 | 3 | – | 532448 |
| 9 | WIRE, #8, BARE SOLID ANNEALED COPPER | 15' | 15' | – | 812928 |
| 10 | STAPLES, FENCE, GALV, 1–1/4" | AS REQ'D | | – | 678528 |
| 11 | BRACKET, GALV, TERMINAL UPSWEEP (Q) | 1 | 1 | – | 166856 |
| 12 | SCREW, LAG, GALV, 4" | 2 | 2 | – | 621568 |
| 13 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 1 | 1 | 392 | – |
| 14 | COVER, BOLT, PLASTIC, AND 6 – 10D NAILS, GALV | 1 | 1 | – | 285696 |
| | | | | | 491392 |
| 15 | SIGN, HIGH VOLTAGE, AND 9 ROOFING NAILS, GALV | 2 | 2 | – | 647648 |
| | | | | | 492224 |
| 16 | BRACKET, TRIPLE TERMINATOR | 1 | 1 | – | 166676 |
| 17 | PIN, SHORT SHANK, 1" LEAD THREAD (E) | 1 | 1 | – | 532426 |
| 18 | INSULATOR, 12KV, NEUTRAL (E) | 3 | 1 | – | 429216 |
| 19 | INSULATOR, LINE, 12KV, 1" OR 1–3/8" PIN | 6 | 3 | 750 | – |
| 20 | CLEVIS, DEAD END, 5/8" BOLT, STEEL (E) | – | 4 | – | 235712 |
| 21 | INSULATOR, SUSPENSION, 12KV, CLEVIS (E) | – | 7 | 750 | – |
| 22 | CLAMP, STRAIGHT LINE, D.E. (E) | – | 4 | 741 | – |

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

| ITEM | DESCRIPTION | QUANTITY FIG 1 | QUANTITY FIG 2 | CONSTR STANDARD | STOCK NUMBER | ASSEMBLY UNIT |
|---|---|---|---|---|---|---|
| 23 | CONNECTOR, WIRE COMPRESSION, (SIZE AS REQ'D) | AS REQ'D | | 783–786 | – | – |
| 24 | WIRE, BARE STRANDED COPPER, (OH JUMPER) (G) | 21' | 30' | 715 | – | – |
| 25 | TERMINAL, COMPRESSION (SIZE AS REQ'D) | 6 | 6 | 794–795 | – | – |
| 26 | WIRE, BARE STRANDED COPPER, (OH NEUT JUMPER) (G) | 9' | 9' | 715 | – | – |
| 27 | WIRE, #6, BARE STRANDED COPPER | 12' | 12' | – | 813536 | – |
| 28 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | 50' | – | 812490 | GNDPVC |
| 29 | BRACKET, DISCONNECT, ANGLE MOUNTING | 6 | 6 | – | 166542 | – |
| 30 | BOLT, MACH, GALV, 3/8" X 3", 2 RD WASH & 1 LOCK WASH | 6 | 6 | 392 | – | – |
| 31 | SWITCH, HOOKSTICK DISCONNECT, 14.4KV, 600 A OR 1200 A | 3 | 3 | 1222 | – | – |
| 32 | ARRESTER, LIGHTNING | 3 | 3 | 1247 | – | – |
| 33 | CONNECTOR, TWO BOLT, BRONZE (SIZE AS REQ'D) | 3 | 3 | 4111 | – | – |
| 34 | TERMINALS, UNDERGROUND CABLE (T) | 3 | 3 | 4111 | – | – |
| 35 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | 1 | – | 603072 | GNDPVC |
| 36 | COPPER BONDED GROUND CONNECTOR | 1 | 1 | – | 259010 | – |
| 37 | GROUND ENHANCING POWER SOLUTION (GEM) | AS REQ'D | | – | 424390 | – |
| 38 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | | – | 678562 | – |
| 39 | RISER CONSTRUCTION | AS REQ'D | | 1400/4200 | – | – |
| 40 | BRACKET, LADDER ARM | AS REQ'D | | 1404/4204 | 167184 | – |
| 41 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | AS REQ'D | | 1404/4204 | 503488 | – |
| 42 | CHANNEL, DOUBLE GALV., 24" | AS REQ'D | | 1404/4204 | 216700 | – |
| 43 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | | – | 698754 | – |
| 44 | HOT LINE CLAMP | 3 | 3 | 788 | 227680 | – |

FOR FIELD MAINTENANCE ONLY

OVERHEAD MACRO UNIT
3NS–B

**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, TRIPLE TERMINAL BRACKET AND CONCENTRIC CABLE NEUTRAL TO LIGHTNING ARRESTER GROUND.

(D) INTERCONNECT SWITCH AND DEAD END BONDS PER G.O. 95 RULE 52.7 D.

(E) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(F) WHEN ADDING THIS CONSTRUCTION TO AN EXISTING POLE WITH A 10' LINE ARM, AND SUFFICIENT POLE HEIGHT EXISTS, INSTALL 10' SWITCH ARMS AND ASSOCIATED HARDWARE BELOW THE LINE ARM TO AVOID CHANGING LINE ARM FROM 10' TO 12' (SEE O.H. STANDARD 1222. FIG. 1–B).



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**INSTALLATION:** (CON'T)

Ⓖ

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |
| BECAUSE THE PROPER SIZE CONNECTOR IS NOT ALWAYS AVAILABLE, THE JUMPER FROM THE OVERHEAD LINE CONDUCTOR TO THE HOOKSTICK SWITCH CAN BE THE SAME SIZE AS, OR LARGER THAN THAT OF THE OVERHEAD CONDUCTOR. | | | | | |

Ⓗ – USE FIGURE ONE AND TWO FOR ALL **NE** CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH NEUTRAL ON OUTSIDE PIN POSITION. SEE DESIGN MANUAL PAGE 5124.2.

– USE FIGURE THREE AND FOUR ON EXISTING CONSTRUCTION WITH NEUTRAL ON INSIDE PIN POSITION.

**REFERENCE:**

Ⓞ ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251

Ⓟ POLE STEPPING – SEE STD. 363.

Ⓠ GROUNDING METHODS – SEE PAGE 1002.5.

Ⓡ RISER POSITIONS – SEE STANDARD 1402/4202.

Ⓢ MINIMUM VERTICAL SEPARATION AS PER G.O. 95 SEE STD. 1406/4206.

Ⓣ SEE STANDARD 1407/4207 FOR NON PORCELAIN TERMINAL MOUNTING INSTRUCTIONS AND MATERIALS.

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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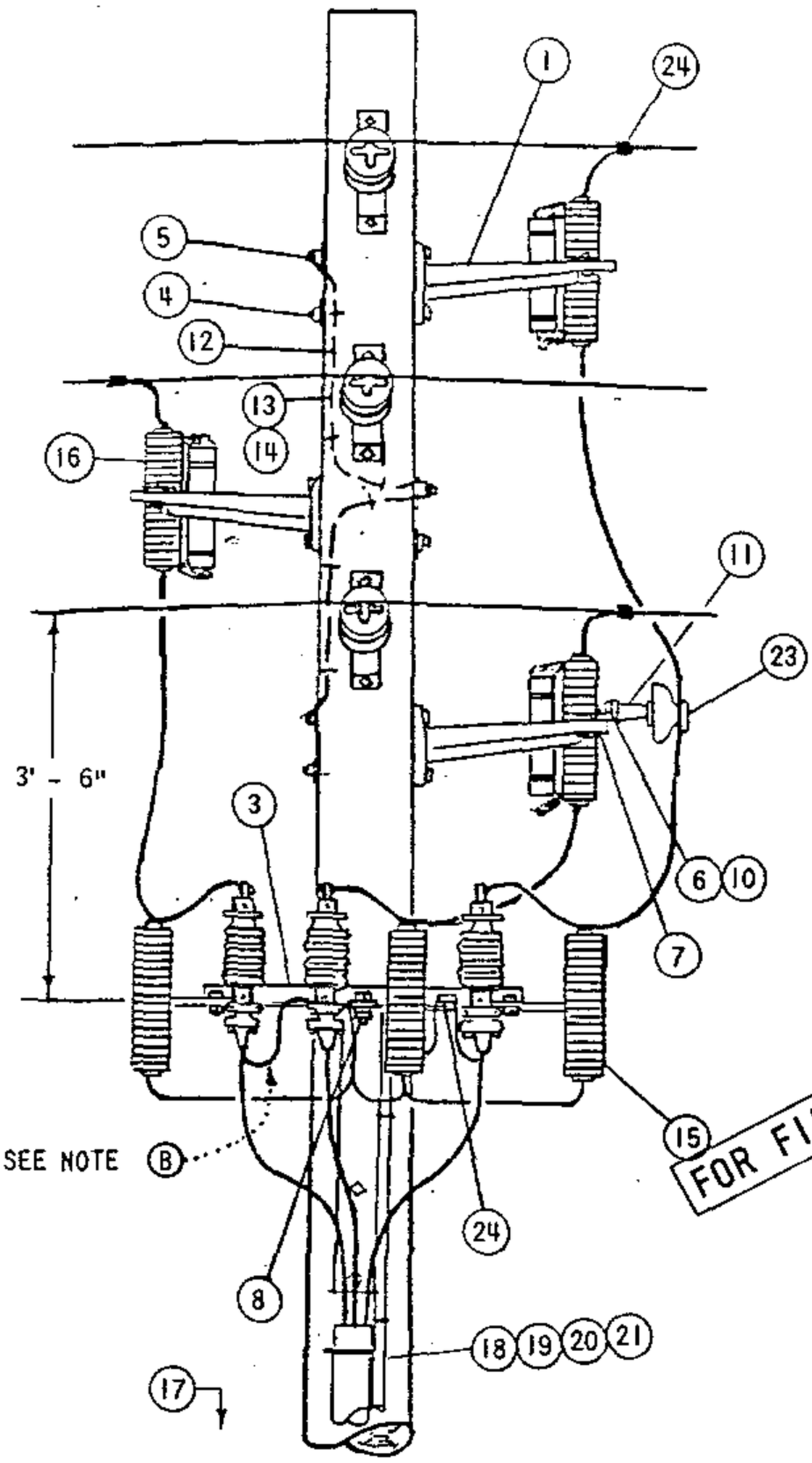
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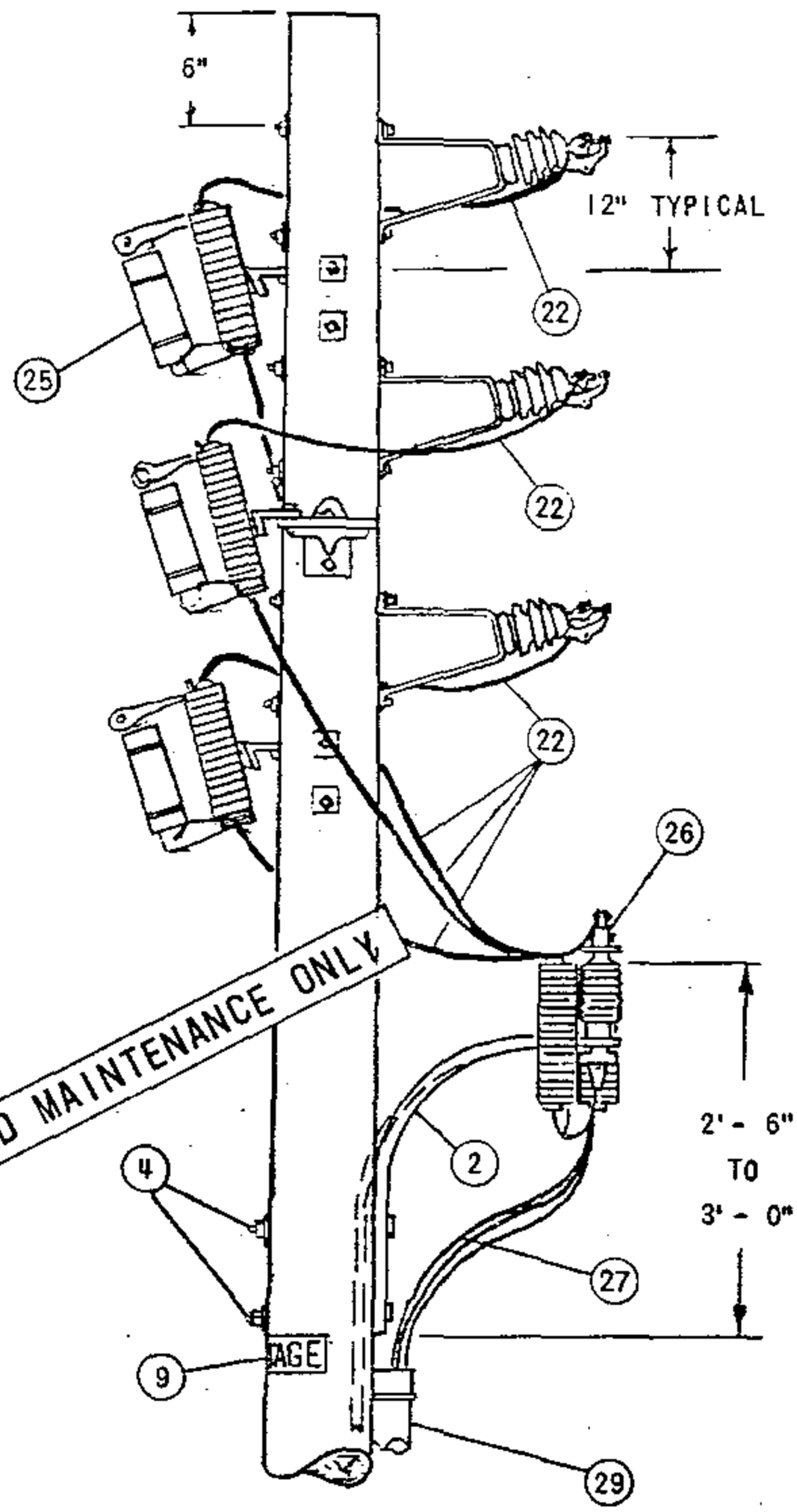
SDG&E ELECTRIC OVERHEAD STANDARD

BRACKET MOUNTED TERMINALS,
12KV 3 WIRE ARMLESS TANGENT CONSTRUCTION

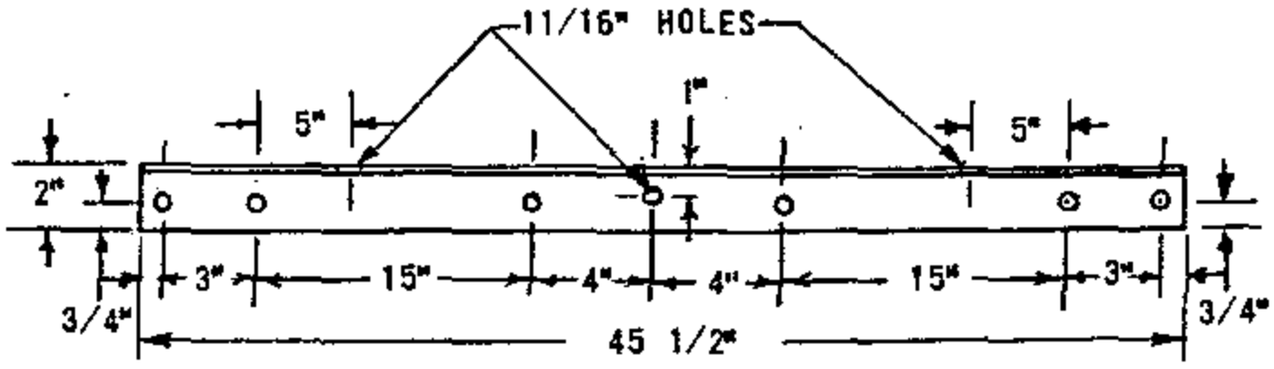
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ALL HOLES 9/16" EXCEPT AS NOTED

FABRICATE FROM 2" X 2" X 3/16" STEEL ANGLE
HOT DIP GALVANIZE AFTER FABRICATION

ARMLESS TERMINAL MOUNTING BRACKET

| | | |
|---|---|---|
| DATE 8-27-82<br>APPD ORH | SDG&E ELECTRIC STANDARDS<br>BRACKET MOUNTED TERMINALS,<br>12KV 3 WIRE ARMLESS TANGENT CONSTRUCTION | OH 1499.301<br>~~UG 4299.301~~<br>SUPERSEDES<br>1437.1(11-16-81) |

NOTES:

(A) UNIT GROUND, COMPLETE, ORDER 603120 WITH GRAY MOULDING, 603135 WITH PLAIN MOULDING.

(B) THE FIBERGLASS UPSWEEP TERMINAL BRACKET IS TO BE USED FOR UNDERGROUND CONDUCTORS 4/0 OR SMALLER. DO NOT USE FOR 500 KCM AND LARGER CONDUCTORS.

(C) USE TWO-ROD GROUND SPACED A MINIMUM OF 6 FEET APART.

D. CONNECT ONE STRAND OF CONCENTRIC NEUTRAL TO TERMINAL BOLT WITH DOUBLE NUT.

(E) EXEMPT MATERIAL

FOR FIELD MAINTENANCE ONLY

| ITEM | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| PTF | 1 | BRACKET, GALV., 4-HOLE, MOUNTING | 3 | 166240 |
| | 2 | BRACKET, FIBERGLASS, TERMINAL, UPSWEEP SEE NOTE (F) | 1 | 166864 |
| | 3 | BRACKET, ARMLESS, TERMINAL MOUNTING, SEE DETAIL PAGE 1437.1 | 1 | 166672 |
| | 4 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D., 1-SQ. CURV. WASH., 1-DBL. COIL SPR. WASH. & 1-NUT (E) | 5 | PGS 139, 140 |
| | 5 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D., 1-SQ., CURV. WASH., 1-DBL. COIL SPR.WASH., 2-FLAT RD. WASH. & 2-NUTS (E) | 3 | PGS 139, 140 |
| | 6 | MACH. BOLT, GALV., 5/8" X 1 1/2", 1-LOCK WASH. (E) | 1 | PGS 139, 140 |
| | 7 | MACH. BOLT, GALV., 1/2" X 1 1/2", 1-LOCK WASH.& 1-NUT (E) | 1 | PGS 139, 140 |
| | 8 | MACH. BOLT, GALV., 5/8" X 2 1/2", 1-LOCK, 2-RD. WASH. & 2-NUTS (E) | 1 | PGS 139, 140 |
| | 9 | HIGH VOLTAGE SIGN & 8-ROOFING NAILS, GALV. (E) | 2 | 647648, 492224 |
| | 10 | BRACKET, INSULATOR, MOUNTING ANGLE | 1 | 166208 |
| | 11 | PIN, INSULATOR, 12KV, 1" OR 1 3/8" LEAD THREAD | 1 | 529248-529216 |
| | 12 | WIRE, BOND, BARE SOLID ANNEALED, #6 | 6' | 812928 |
| | 13 | HARDWOOD MOULDING, 1" (OTHER THAN TOP CIRCUIT ON POLE) | 6' | 487200 |
| | 14 | MOULDING STAPLES, GALV., 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) | 6 | 678560 |
| UCD | 15 | LIGHTNING ARRESTER, 12KV | 3 | 113248 |
| | 16 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1200 SECTION |
| | 17 | GROUND ROD & CLAMP (A) (C) | 2 | 603072-230016 (E) |
| | 18 | HARDWOOD MOULDING, 1" (A) | 36' | 487200 |
| | 19 | STAPLES,MOULDING, GALV., 3" X 1 1/16" X 1/4" (A) (E) | 24 | 678560 |
| | 20 | STAPLES, FENCE, GALV., 1 1/4" (A) (E) | 1/3# | 678528 |
| | 21 | WIRE, BARE STRANDED COPPER, #2 (B) | 50' | 813664 |
| | 22 | WIRE, BARE STRANDED, COPPER, (SIZE AS REQ'D) | 25' | |
| | 23 | INSULATOR, 12KV, PIN TYPE (CLASS AS REQ'D) | 1 | 429056-429152 |
| | 24 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | 4 | |
| | 25 | FUSE, CURRENT-LIMITING SIZE AS SPECIFIED ON WORK ORDER | 3 | 1200 SECTION |
| | 26 | CABLE TERMINAL | 3 | SEE UG STDS |
| | 27 | CABLE, PRIMARY | AS REQ'D | SEE UG STDS |
| | 28 | | | |
| | 29 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 SECTION |

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SUPERSEDES
37.2 (11-16-81)

SDG&E ELECTRIC STANDARDS

BRACKET MOUNTED TERMINALS,
12KV 3 WIRE ARMLESS TANGENT CONSTRUCTION

DATE 8-27-82
APPD

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**REVISION HISTORY:**

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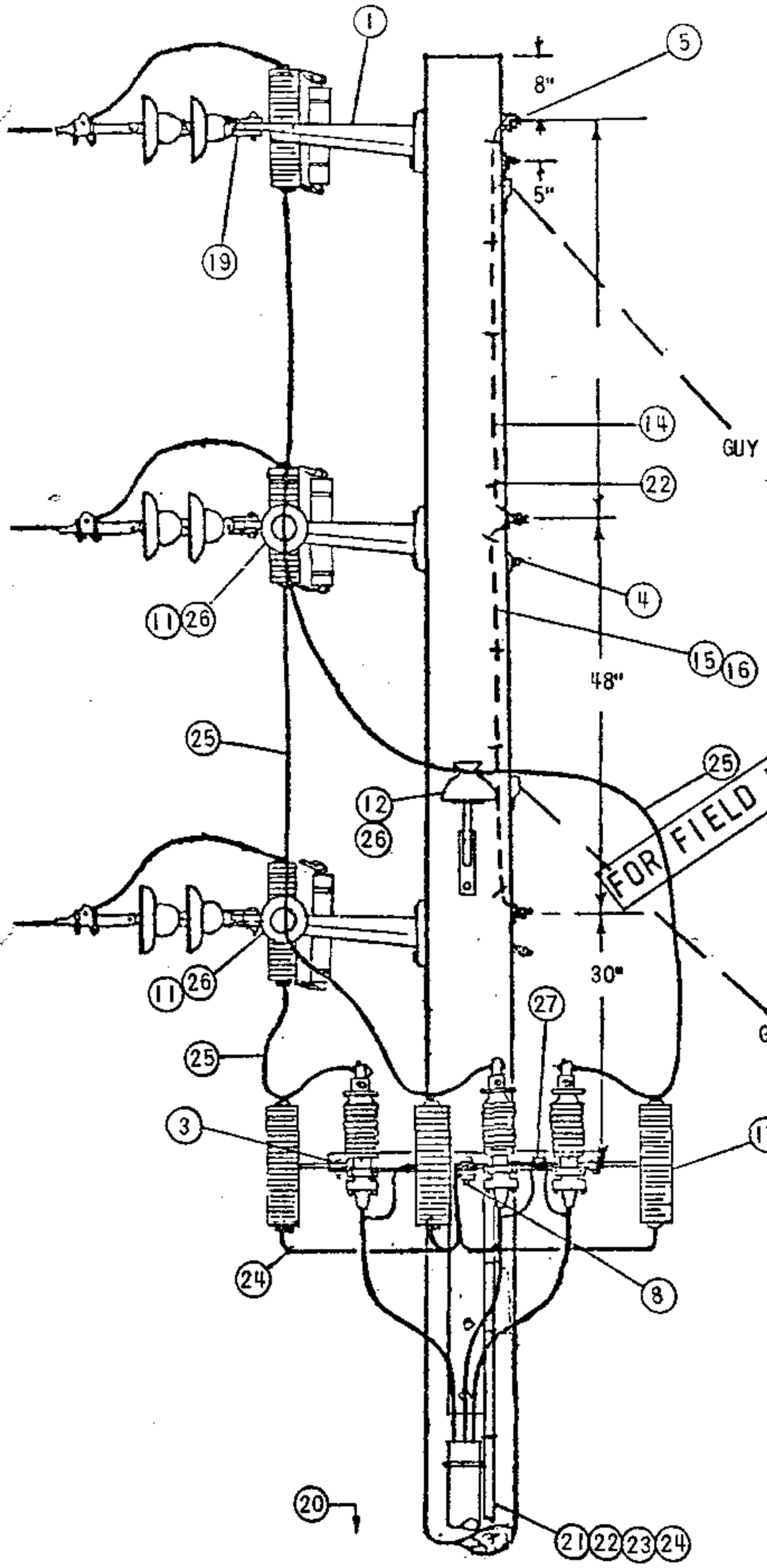
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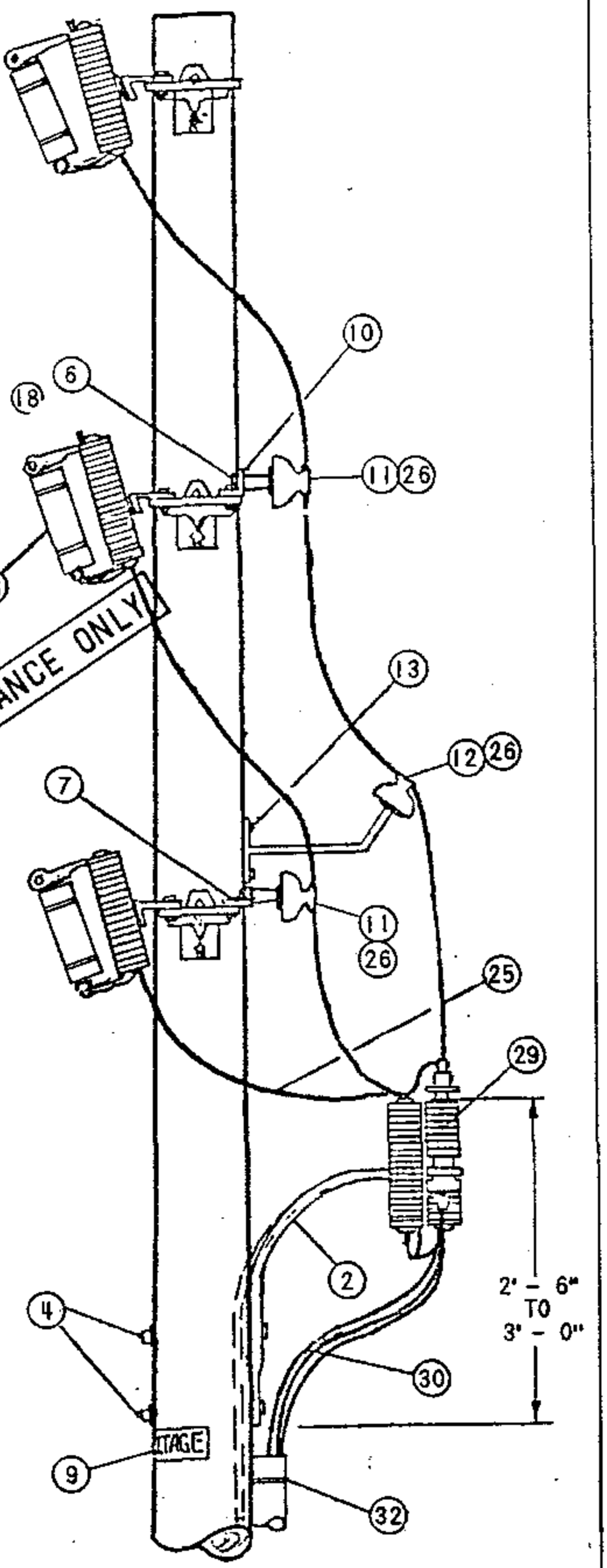
SDG&E ELECTRIC OVERHEAD STANDARD

BRACKET MOUNTED TERMINALS, 12KV 3 WIRE,
ARMLESS DEAD END CONSTRUCTION

FMO
OH 1438

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(DEAD ENDS OMITTED FOR CLARITY)

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| DATE 8-27-82<br>APPD LDR # | SDG&E ELECTRIC STANDARDS<br>BRACKET MOUNTED TERMINALS, 12KV 3 WIRE,<br>ARMLESS DEAD END CONSTRUCTION | OH 1499.303<br>~~UG 4299.303~~<br>SUPERSEDES<br>1438.1(11-16-81) |

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

B. UNTWIST SUFFICIENT LENGTH OF #2 STRANDED WIRE TO CONNECT EACH ARRESTER AND POTHEAD (TERMINAL) GROUND WITH A SINGLE STRAND.

(C) USE TWO-ROD GROUND SPACED A MINIMUM OF 6 FEET APART.

D. THIS CONFIGURATION NOT TO BE USED WHERE A FUTURE EXTENSION IS ANTICIPATED

(E) EXEMPT MATERIALS.

F. THIS INSTALLATION DOES NOT INCLUDE GUYING MATERIAL

(G) THE FIBERGLASS UPSWEEP TERMINAL BRACKET IS TO BE USED FOR UNDERGROUND CONDUCTORS 4/0 OR SMALLER. DO NOT USE FOR 500 KCM AND LARGER CONDUCTORS

FOR FIELD MAINTENANCE ONLY

| | ITEM | DESCRIPTION | QUANT | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| OH CREWS P T & F | 1 | BRACKET, GALV., 4-HOLE, MOUNTING SEE NOTE (G) | 3 | 166240 |
| | 2 | BRACKET, FIBERGLASS, TERMINAL, UPSWEEP | 1 | 166864 |
| | 3 | BRACKET, ARMLESS, TERMINAL MOUNTING (SEE DETAIL PG. 1437.1) | 1 | 166672 |
| | 4 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D., 1-SQ. CURV. WASH., 1-DBL. COIL SPR. WASH. & 1-NUT (E) | 5 | PGS 139, 140 |
| | 5 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D,, 1-SQ. CURV. WASH., 1-DBL. COIL SPR. WASH., 2-FLAT RD. WASH. & 2-NUTS (E) | 3 | PGS 139, 140 |
| | 6 | MACH. BOLT, GALV., 5/8" X 1 1/2" (E) | 2 | PGS 139, 140 |
| | 7 | MACH. BOLT, GALV., 1/2" X 1 1/2" (E) | 2 | PGS 139, 140 |
| | 8 | MACH. BOLT, GALV., 5/8" X 2 1/2", 1-LOCK, 2-rd. WASH. & 2-NUTS (E) | 1 | PGS 139, 140 |
| | 9 | HIGH VOLTAGE SIGN & 8-ROOFING NAILS, GALV. (E) | 2 | 647648, 492192 |
| | 10 | BRACKET, INSULATOR, MOUNTING ANGLE | 2 | PG 151 |
| | 11 | PIN, INSULATOR, 12KV, 1" OR 1 3/8" LEAD THREAD | 2 | 529248-529216 |
| | 12 | BRACKET, INSULATOR, 1" OR 1 3/8" LEAD THREAD | 1 | 166144-166176 |
| | 13 | SCREW, LAG, GALV., 1/2" X 4" (E) | 2 | 621568 |
| | 14 | WIRE, BOND, BARE SOLID ANNEALED, #8 | 10' | 812928 |
| | 15 | HARDWOOD MOULDING, 1", (OTHER THAN TOP CIRCUIT ON POLE) | 10' | 487200 |
| | 16 | MOULDING STAPLES, GALV., 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) (E) | 6 | 678560 |
| UC & D | 17 | LIGHTNING ARRESTER, 12KV | 3 | 113248 |
| | 18 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1200 SECTION |
| | 19 | CLEVIS | 3 | 235776 |
| | 20 | GROUND ROD & CLAMP (C) | 2 | 603072, 230016 (A) (E) |
| | 21 | HARDWOOD MOULDING, 1" | 36' | 487200 (A) |
| | 22 | STAPLES, MOULDING, GALV., 3" X 1 1/16" X 1/4" (E) | 24 | 678560 (A) |
| | 23 | STAPLES, FENCE, GALV., 1 1/4" (E) | 32 | 678528 (A) |
| | 24 | WIRE, BARE STRANDED, COPPER, #2 | 50' | 813664 |
| | 25 | WIRE, BARE STRANDED, COPPER, (SIZE AS REQ'D) | 25' | PGS 715-717 |
| | 26 | INSULATOR, 12KV, PIN TYPE, (CLASS 55-5 OR 56-1) | 3 | 429056-429152 |
| | 27 | CONNECTOR, WIRE, COMPRESSION, (SIZE AS REQ'D) | 1 | PGS 783-787 |
| | 28 | FUSE, CURRENT-LIMITING AS SPECIFIED ON WORK ORDER | 3 | 1200 SECTION |
| UG CREWS | 29 | CABLE TERMINAL | 3 | SEE UG STDS |
| | 30 | CABLE, PRIMARY | AS REQ'D | SEE UG STDS |
| | 31 | | | |
| | 32 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 SECTION |

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~~UG 4299.304~~
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438.2 (11-16-81)

SDG&E ELECTRIC STANDARDS

BRACKET MOUNTED TERMINALS, 12KV 3 WIRE, ARMLESS DEAD END CONSTRUCTION

DATE 8-27-82
APPD

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**REVISION HISTORY:**

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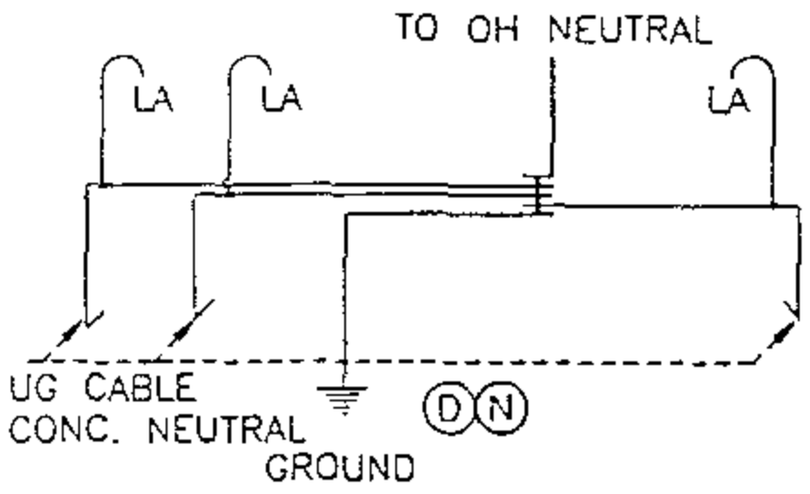
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SDG&E ELECTRIC OVERHEAD STANDARD

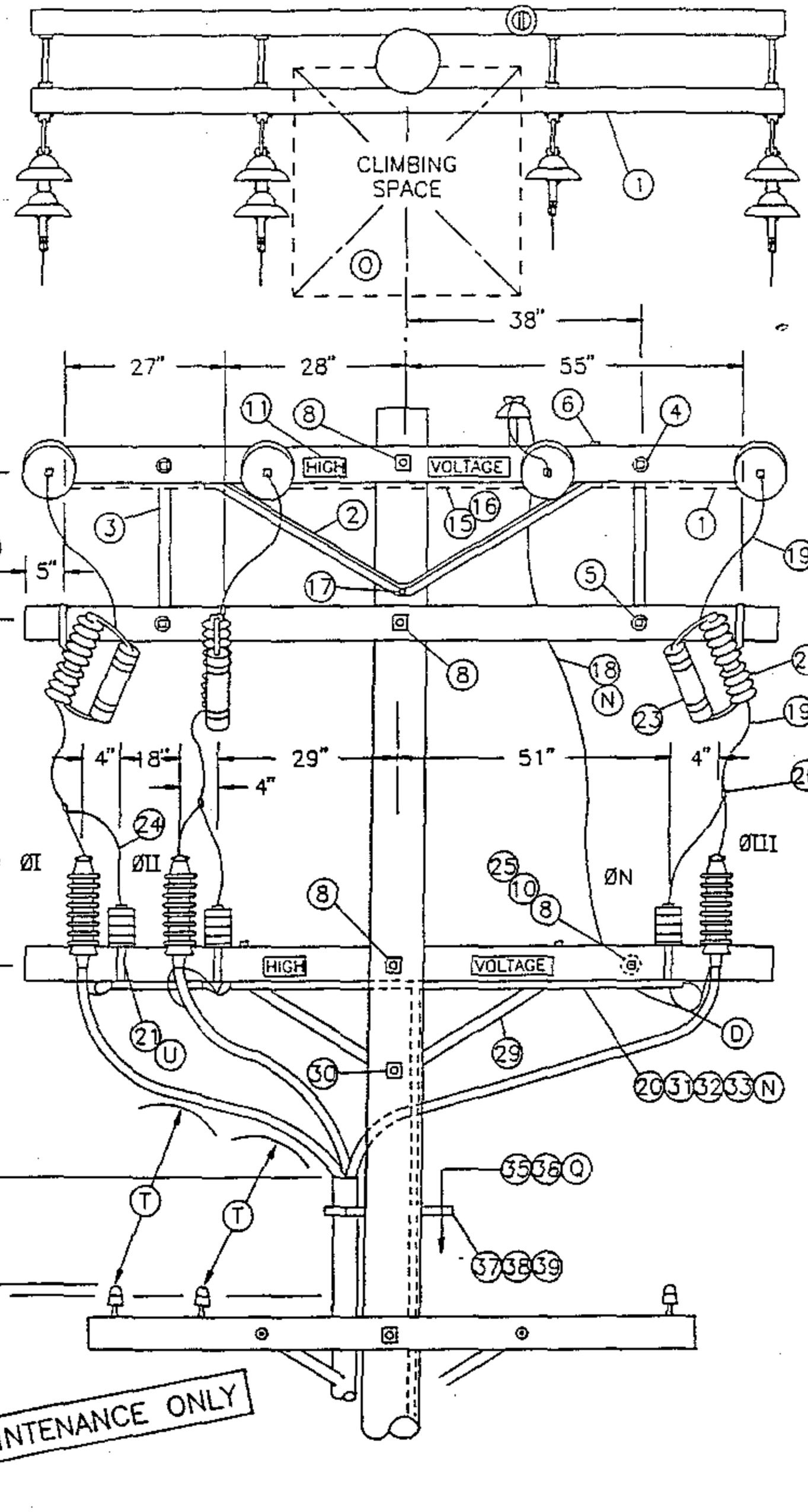
CROSSARM CABLE POLE, 3Ø, 1/C PER PHASE
DEAD END CONSTRUCTION, 12.47KV AND BELOW

FMO
OH 1439

SCOPE: THIS STANDARD SHOWS DEADEND CONSTRUCTION FOR 12.47KV AND BELOW, 3 PHASE CABLE POLE WITH CROSSARM MOUNTED TERMINALS FOR #2/0 AND SMALLER U.G. CABLE. THIS CONSTRUCTION IS TO BE USED IN CONTAMINATION DISTRICT 1 ONLY.




GROUND WIRING DETAIL




FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| DATE 1-1-93<br>APPD JLB/BDJ | SDG&E ELECTRIC STANDARDS<br>CROSSARM CABLE POLE, 3Ø, 1/C PER PHASE DEADEND CONSTRUCTION, 12.47KV AND BELOW | OH 1499.307<br>~~UG 4299.307~~<br>SUPERCEDES 1439.1 (1-1-93) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 10' - 0" | 4 | - | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 5' - 0" | 2 | - | 164128 |
| 3 | BRACE, FLAT, CROSSARM, 28" (E) | 2 | - | 164192 |
| 4 | BOLT, WASHERHEAD, GALV, 3/8" X 4-1/2", 1 ROUND & 1 SPRING WASHER (E) | 2 | 392 | - |
| 5 | BOLT, MACH, GALV, 1/2-1 X 5", 1 ROUND & 1 DOUBLE COIL, SPRING WASHER (E) | 2 | 392 | - |
| 6 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER (E) | 6 | 392 | - |
| 7 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 4 SQUARE & 2 DOUBLE COIL SPRING WASHERS (B) (E) | 4 | 392 | - |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (B) (E) | 4 | 392 | - |
| 9 | PIN, INSULATOR, STRAIGHT, 12KV, 1" (B) (E) | 1 | - | 532704 |
| 10 | INSULATOR, LINE, 12KV NEUTRAL (B) (E) | 2 | - | 429216 |
| 11 | SIGN, HIGH VOLTAGE & (E) | 4 | - | 647648 |
| | 9 ROOFING NAILS, GALV (E) | - | - | 492224 |
| 12 | CLEVIS, DEAD END, 5/8" BOLT STEEL (B) (E) | 4 | - | 235712 |
| 13 | INSULATOR, SUSPENSION, 12KV, CLEVIS (B) | 7 | 750 | - |
| 14 | CLAMP, STRAIGHT LINE, D.E. (B) | 4 | 741 | - |
| 15 | WIRE, #8, BARE SOLID ANNEALED COPPER | 10' | - | 812928 |
| 16 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | - | 678528 |
| 17 | BOLT, MACH, GALV, 5/3" X (LENGTH AS REQ'D) & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 18 | WIRE, COPPER, BARE STRANDED OR ACSR/AW BARE (OH NEUTRAL JUMPER) (B) (N) | 10' | 711-715 | - |
| 19 | WIRE, COPPER, BARE STRANDED (OH JUMPERS) (N) | 18' | 715 | - |
| 20 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-787 | - |
| 21 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 6 | - | 166070 |
| 22 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1212 | - |
| 23 | FUSE, CURRENT-LIMITING (SIZE AS SPECIFIED ON WORK ORDER) | 3 | 1207 | - |
| 24 | WIRE, BARE STRANDED COPPER, #6 | 14' | - | 813536 |
| 25 | PIN, TRANSFORMER ADAPTER, 1" LEAD THREAD (B) (E) | 1 | - | 529248 |
| 26 | ARRESTER, LIGHTNING | 3 | 1247 | - |
| 27 | BRACKET, CROSSARM, TERM (FOR #2 & #2/0 AL CABLE ONLY) (E) | 3 | - | 166060 |
| 28 | TERMINALS, UNDERGROUND CABLE | 3 | 4111 | - |
| 29 | BRACE, ANGLE, CROSSARM, 4' - 0" | 1 | - | 164032 |
| 30 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 31 | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (N) (CABLE POLE NEUTRAL) | 10' | 715 | - |
| 32 | CONDUIT, PVC TYPE 2, SCHEDULE 40, 1" (E) | 10' | - | 251200 |
| 33 | STRAPS, PIPE, GALV, 1" & (E) | AS REQ'D | - | 697792 |
| | 2 - 60 NAILS, GALV (E) | | - | 491552 |
| 34 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 | - |
| 35 | WIRE, #4, BARE STRANDED COPPER | 45' | - | 813760 |
| 36 | UNIT GROUND, COMPLETE (S) | 1 | | 603136 |
| 37 | BRACKET, LADDER ARM (E) | AS REQ'D | 1404/4204 | 167184 |
| 38 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" (E) | AS REQ'D | 1404/4204 | 503488 |
| 39 | CHANNEL, DOUBLE GALV, 24" (E) | AS REQ'D | 1404/4204 | 216700 |

FOR FIELD MAINTENANCE ONLY

| CABLE SIZE | UG MACRO UNIT | |
|---|---|---|
| | PORCELAIN | |
| | 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 |

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| OH 1499.308<br>~~UG 4299.308~~<br>SUPERCEDES<br>1439.2 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>CROSSARM CABLE POLE, 3Ø, 1/c PER PHASE<br>DEADEND CONSTRUCTION, 12.47KV AND BELOW | DATE 1-1-93<br>APPD JLB/DSJ |

INSTALLATION:

A. NEW CABLE POLES SHALL HAVE A STANDARD DEPTH OF 9'. IN MOST CASES THIS WILL REQUIRE A 5' TALLER POLE.

(B) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

C. USE THIS CONSTRUCTION FOR 2/0 AND SMALLER UNDERGROUND CABLE.

(D) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(E) EXEMPT MATERIAL.

(F) OMIT Ø II AND Ø N FOR SINGLE Ø 12KV CABLE POLE, OMIT Ø I AND ØII FOR SINGLE Ø 6.9KV CABLE POLE.

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 2 | 4 | 6 | 2 | – | #6 PER PHASE |
| 2/0 | 4 | 6 | 2 | – | #6 PER PHASE |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

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REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251.

(P) POLE STEPPING – SEE STD. 363/4205.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

R. SEE STANDARD SECTION 1200/4300 FOR FUSING.

(S) RISER POSITIONS – SEE STANDARD 1402/4202.

(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STD. 1406/4206.

(U) SEE STANDARD 1407/4207 FOR PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLB/BDG | SDG&E ELECTRIC STANDARDS<br>CROSSARM CABLE POLE, 3Ø, 1/C PER PHASE<br>DEADEND CONSTRUCTION, 12.47KV AND BELOW | OH 1499.309<br>~~UG 4299.309~~<br>SUPERCEDES<br>1439.3 (1-1-93) |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superceded by their current version found inside the Overhead Construction Standard Manual.

**2/20/2019:** Install S706680 in place of old style Disconnect Switch.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | EDITORIAL CHANGES | GLW | JES | CZH | 2/20/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

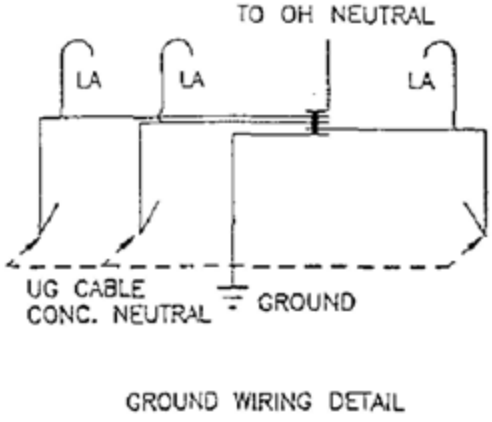
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

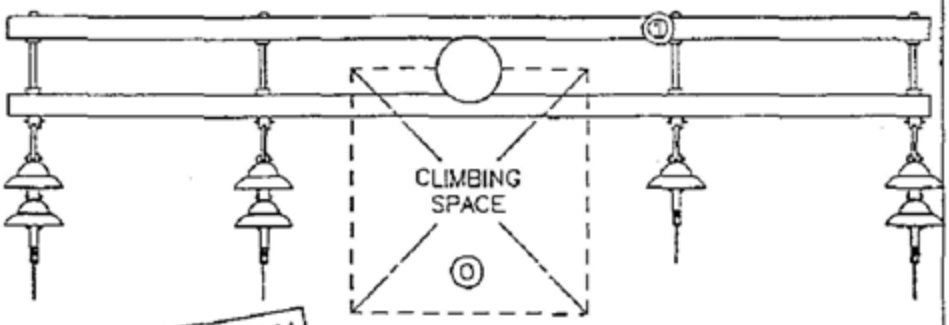
12.47 KV AND BELOW DEAD END CABLE POLE
ARM, 3Ø, 1/C PER Ø, HOOKSTICK SWITCHED

FMO
OH 1441

SCOPE: THIS STANDARD SHOWS CABLE POLE CONSTRUCTION USING PORCELAIN TERMINATIONS FOR 750 AND LARGER UNDERGROUND CABLE. (SEE STANDARD 1407/4207 FOR 350 KCMIL TERMINAL MOUNTING INFORMATION).




GROUND WIRING DETAIL




FOR FIELD MAINTENANCE ONLY

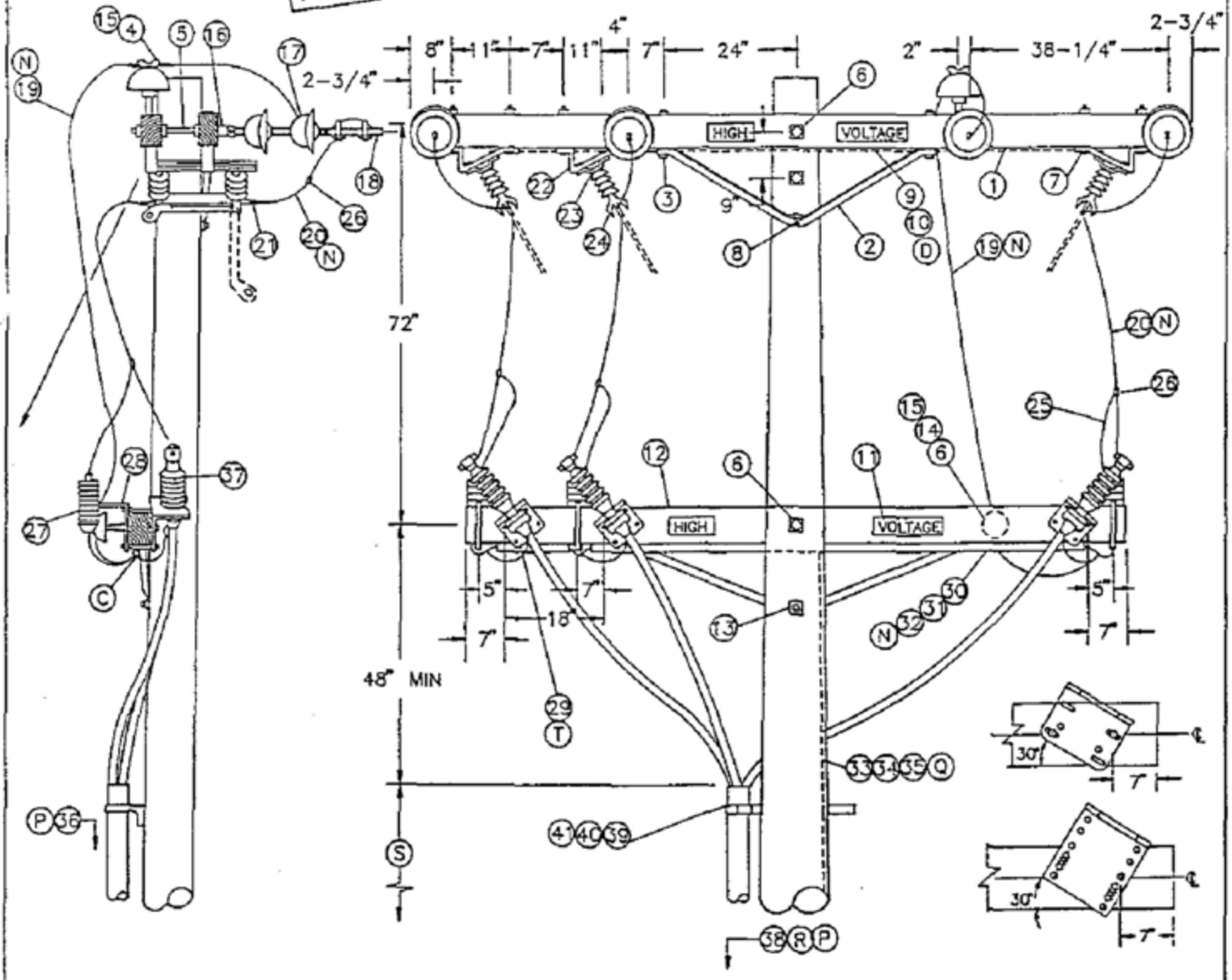



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| DATE 1-1-93<br>APPD JVG/BOJ | SDG&E ELECTRIC STANDARDS<br>12.47 KV AND BELOW DEAD END CABLE POLE ARM, 3Ø, 1/C PER Ø, HOOKSTICK SWITCHED | OH 1499.401<br>~~UG 4299.401~~<br>SUPERCEDES 1441.1 (1-1-93) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONSTR STANDARD | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 12'- 0" (G) | 2 | – | 294160 |
| 2 | BRACE, ANGLE, CROSSARM, 4'- 0" | 3 | – | 164032 |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 6 | 392 | – |
| 4 | PIN, INSULATOR, STRAIGHT, 12KV, 1" LEAD THREAD (F)(E) | 1 | – | 532704 |
| 5 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQUARE, 2 ROUND AND 2 DOUBLE COIL SPRING WASHERS (F)(E) | 4 | 392 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHERS (F)(E) | 3 | 392 | – |
| 7 | BOLT, MACH, GALV, 1/2" X 8", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 12 | 392 | – |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | – |
| 9 | WIRE, #8, BARE SOLID ANNEALED COPPER | 15' | – | 812928 |
| 10 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | – | 678528 |
| 11 | SIGN, HIGH VOLTAGE AND 9 ROOFING NAILS, GALV (E) | 4 | – | 647648<br>492224 |
| 12 | CROSSARM, 3-3/4" X 5-3/4 X 10'- 0" | 1 | – | 294128 |
| 13 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | – |
| 14 | PIN, TRANSFORMER LEAD ADAPTER, 1" (F)(E) | 1 | – | 529248 |
| 15 | INSULATOR, 12KV, NEUTRAL (F)(E) | 2 | – | 429216 |
| 16 | CLEVIS, DEAD END, 5/8" BOLT STEEL (F)(E) | 4 | – | 235712 |
| 17 | INSULATOR, SUSPENSION, 12KV, CLEVIS (F) | 7 | 750 | – |
| 18 | CLAMP, STRAIGHT LINE, D.E. (F) | 4 | 741 | – |
| 19 | WIRE, BARE STRANDED CU OR AL (OH NEUT JUMPER) (N)(F) | 12' | 711-715 | – |
| 20 | WIRE, BARE STRANDED COPPER (OH JUMPER) (N) | 25' | 715 | – |
| 21 | TERMINAL, COMPRESSION (E) | 6 | 794-795 | – |
| 22 | BRACKET, DISCONNECT, ANGLE MOUNTING | 6 | – | 166542 |
| 23 | BOLT, MACH, GALV, 3/8" X 3", 2 ROUND & 1 LOCK WASHER (E) | 6 | 392 | – |
| 24 | SWITCH, HOOKSTICK DISCONNECT, 14.4KV, 600 A OR 1200 A | 3 | 1222 | – |
| 25 | WIRE, #6, BARE STRANDED COPPER | 12' | – | 813536 |
| 26 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-787 | – |
| 27 | ARRESTER, LIGHTNING (N) | 3 | – | 113248 |
| 28 | BRACKET, CUTOUT/ARRESTER (E) | 3 | – | 166070 |
| 29 | BRACKET, TERMINAL MOUNTING | 3 | – | 166674 |
| 30 | CONDUIT, PVC TYPE 2, SCHEDULE 40, 1" (E) | 10' | – | 251200 |
| 31 | STRAPS, PIPE, GALV, 1" AND 2 – 6D NAILS , GALV (E) | AS REQ'D | – | 697792<br>491552 |
| 32 | WIRE, BARE STRANDED COPPER (CP NEUT-UNDER POTHEAD ARM) (N) | 15' | 715 | – |
| 33 | WIRE, #4, BARE STRANDED COPPER | 45' | – | 813760 |
| 34 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | – | 678528 |
| 35 | UNIT GROUND, COMPLETE (Q) | 1 | – | 603136 |
| 36 | TAGS, SWITCH NUMBER (E) | 2 | – | 720704 |
| 37 | TERMINALS, UNDERGROUND CABLE | 3 | 4111 | – |
| 38 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 | – |
| 39 | BRACKET, LADDER ARM (E) | AS REQ'D | 1404/4204 | 167184 |
| 40 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" (E) | AS REQ'D | 1404/4204 | 503488 |
| 41 | CHANNEL, DOUBLE GALV, 24" (E) | AS REQ'D | 1404/4204 | 216700 |

FOR FIELD MAINTENANCE ONLY

| CABLE SIZE | UG MACRO UNIT W/LADDER ARMS |
|---|---|
| 3C-#350 | CP350L |
| 3C-#750 | CP750L |
| 3C-#1000 | CP-1KL |

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OH 1499.402
~~UG-4299.402~~
SUPERCEDES 1441.2 (1-1-93)

SDG&E ELECTRIC STANDARDS

12.47KV AND BELOW DEAD END CABLE POLE ARM, 3Φ, 1/C PER Φ, HOTSTICK SWITCHED

DATE 1-1-93
APPD JVB/BDB

**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 350 KCMIL AND LARGER UNDERGROUND CABLE.

(C) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) INTERCONNECT SWITCH AND DEADEND BONDS PER G.O. 95 RULE 52.7D. BONDING SHOULD BE DONE IN ACCORDANCE WITH RULE 53.4.

(E) EXEMPT MATERIAL.

(F) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(G) WHEN ADDING THIS CONSTRUCTION TO AN EXISTING POLE WITH A 10' LINE ARM, AND SUFFICIENT POLE HEIGHT EXISTS, INSTALL 10' SWITCH ARMS AND ASSOCIATED HARDWARE BELOW THE LINE ARM TO AVOID CHANGING LINE ARM FROM 10' TO 12' (SEE O.H. STANDARD 1222, FIG. 1-B).

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 2 | 4 | 6 | 2 | -- | #6 PER PHASE |
| 2/0 | 4 | 6 | 2 | -- | #6 PER PHASE |
| 350 | 4/0 | 1/0 | 3/0 | -- | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

**REFERENCE:**

(O) ALLOWABLE WORKING AND CLIMBING SPACE - SEE STANDARD 251.

(P) POLE STEPPING - SEE STANDARD 363.

(Q) GROUNDING METHODS - SEE STANDARD 1002.

(R) RISER POSITIONS - SEE STANDARD 1402/4202.

(S) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 - SEE STANDARD 1406/4206.

(T) SEE STANDARD 1407/4207 FOR PORCELAIN AND NON PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

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| DATE 1-1-93<br>APPD JLG/BDJ | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE ARM, 3Ø, 1/C PER Ø, HOOKSTICK SWITCHED | OH 1499.403<br>~~UG 4299.403~~<br>SUPERCEDES 1441.3 (1-1-93) |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| B | | | | | | E | | | | | |
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X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

12.47 KV AND BELOW DEAD END CABLE POLE THREE-PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON-PORCELAIN TERMINALS

FMO OH 1443

SCOPE: THIS STANDARD SHOWS A DEADEND CONSTRUCTION FOR 12.47 KV AND BELOW, THREE-PHASE CABLE POLE USING NON-PORCELAIN TERMINALS WITH A MEMCO GANG OPERATED SWITCH FOR 350 KCMIL AND LARGER U.G. CABLE.

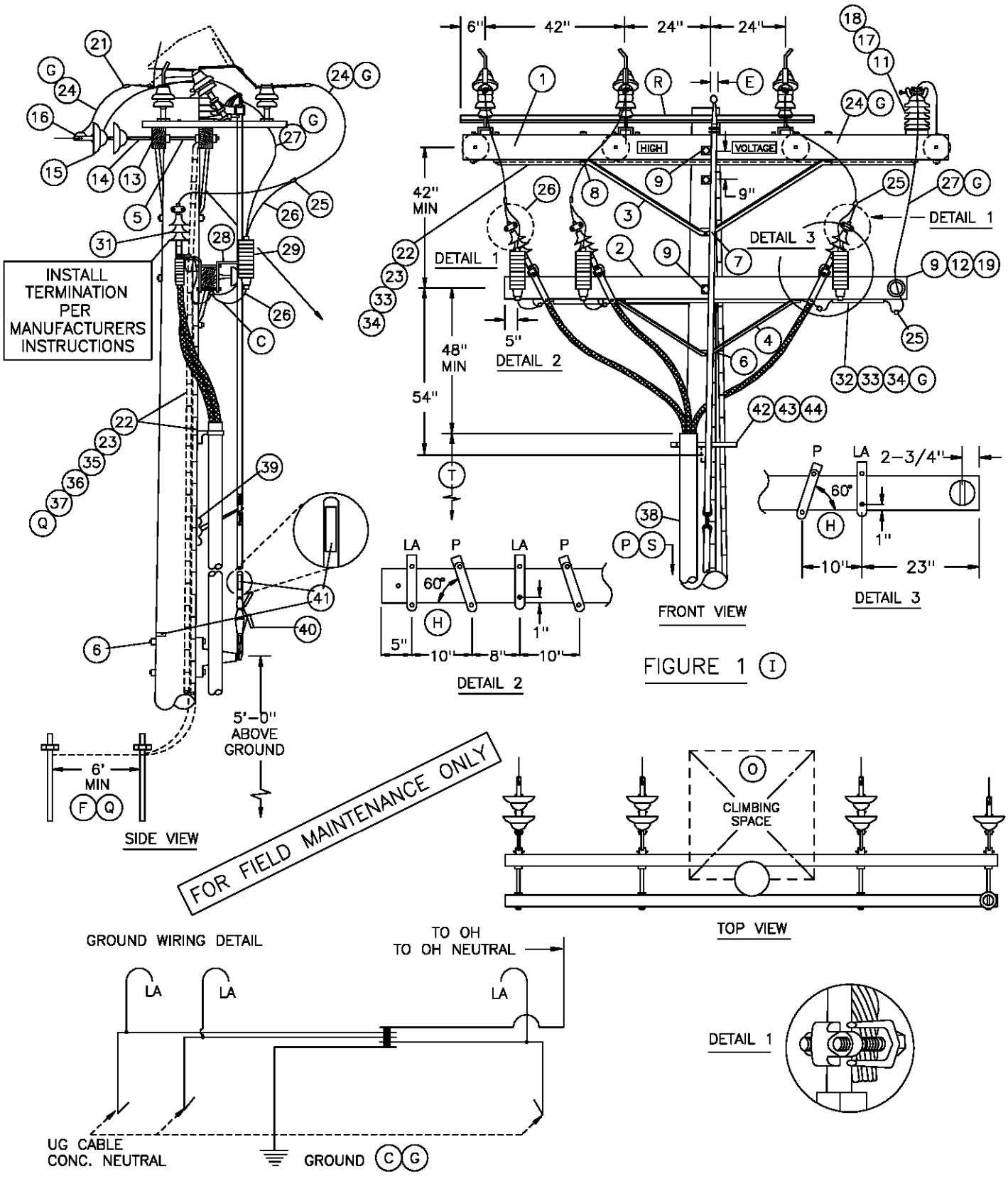
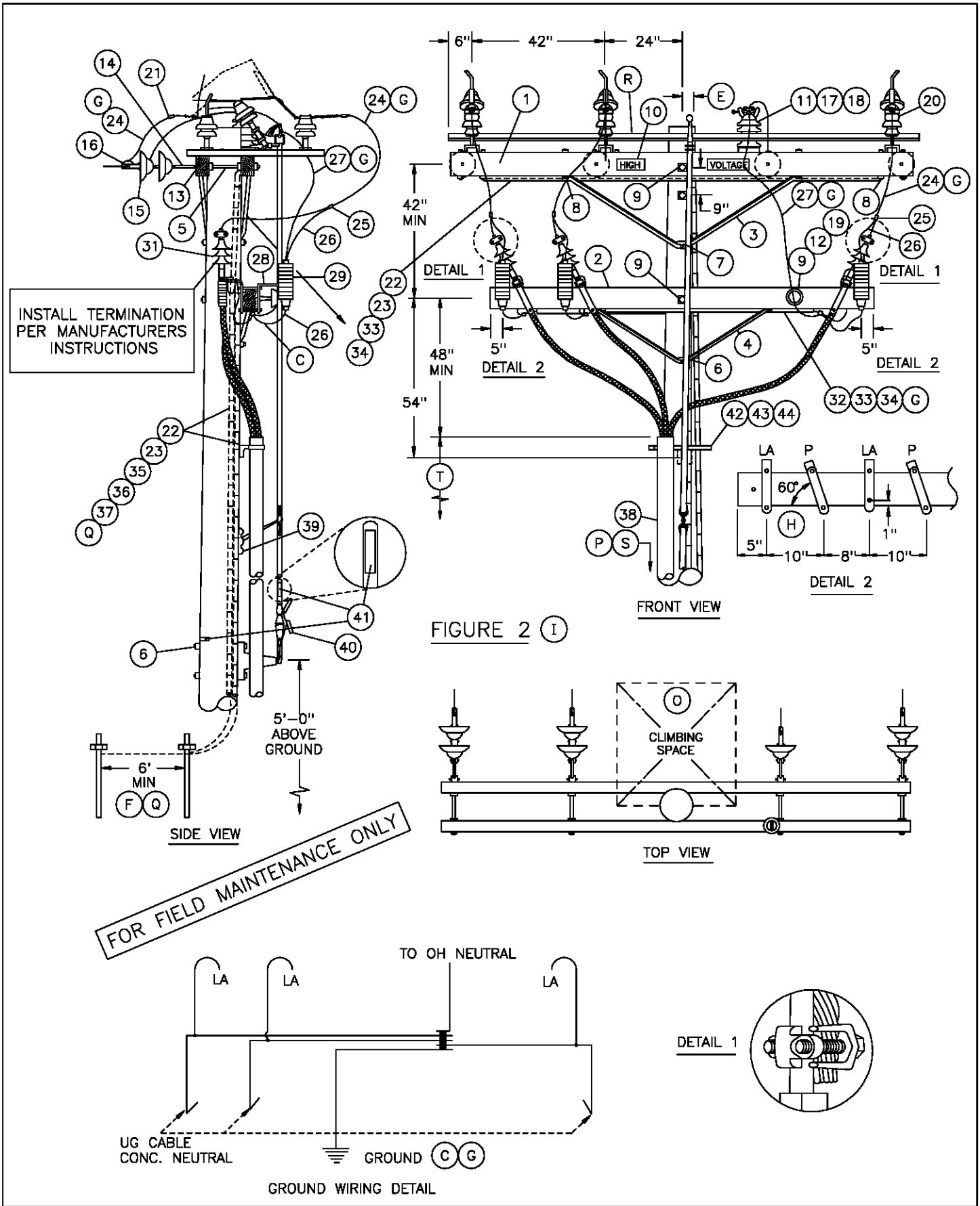



FIGURE 1 (I)

| | | |
|---|---|---|
| OH 1499.404<br>~~UG 4299.404~~<br>SUPERSEDES<br>1443.1 (9-1-00) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE THREE-PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON-PORCELAIN TERMINALS | DATE 1-1-96<br>APPD PBA / CMC |

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BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3–3/4" X 5–3/4" X 12'–0" | 2 | 380.2 | – |
| 2 | CROSSARM, 3–3/4" X 5–3/4" X 10'–0" | 1 | 380.2 | – |
| 3 | BRACE, 6', ANGLE, GALV | 2 | – | 164160 |
| 4 | BRACE, 4', ANGLE, GALV | 1 | – | 164032 |
| 5 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQ WASH & 2 DBL COIL SPRING WASH (D) | 4 | 392.1 &.2 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ WASH & 1 DBL COIL SPRING WASH | 3 | 392.1 &.2 | – |
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DBL COIL SPRING WASH | 1 | 392.1 &.2 | – |
| 8 | BOLT, MACH, GALV, 1/2" X 7", 1 RD WASH & 1 DBL COIL SPRING WASH | 18 | 392.1 &.2 | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ WASH & 1 DBL COIL SPRING WASH | 3 | 392.1 &.2 | – |
| 10 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | 2 | – | 647648 492224 |
| 11 | STUD, 7–1/2" X 5/8" & 1 DBL COIL SPRING WASH (D) | 1 | – | 701760 798560 |
| 12 | PIN, TRANSFORMER ADAPTER, 1", LEAD THREAD (D) | 1 | – | 529248 |
| 13 | CLEVIS, DEAD END, 5/8", BOLT STEEL (OPEN TYPE) (D) | 4 | – | 235618 |
| 14 | LINK , EXTENSION, 1/2" X 2" X 12" (D) | 4 | – | 466240 |
| 15 | INSULATOR, SUSPENSION, 12KV, CLEVIS (D) | 7 | 750.3 | – |
| 16 | CLAMP, STRAIGHT LINE, D.E. (D) | 4 | 741–743 | – |
| 17 | INSULATOR, VERTICAL POST (D) | 1 | – | 428608 |
| 18 | CLAMP, POST INSULATOR (D) | 1 | – | 227824 |
| 19 | INSULATOR, LINE, 12KV NEUTRAL (D) | 1 | – | 429216 |
| 20 | SWITCH, TPST TILTING INSULATOR, 600 AMP | 1 | – | 709254 |
| 21 | TERMINAL, COMPRESSION | 6 | 794–795 | – |
| 22 | WIRE, #4, BARE STRANDED, COPPER | 110' | – | 813760 |
| 23 | STAPLES, FENCE, GALV, 1–1/4" | AS REQ'D | – | 678528 |
| 24 | WIRE, BARE STRANDED COPPER (OH JUMPERS) (D) | 20' | 715 | – |
| 25 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – |
| 26 | WIRE, #6, BARE STRANDED COPPER | 12' | – | 813536 |
| 27 | WIRE, BARE STRANDED CU OR ACSR/AW BARE (OH NEUT JUMPER) (D)(G) | 10' | 711–715 | – |

FOR FIELD MAINTENANCE ONLY

| OVERHEAD MACRO UNIT |
|---|
| 3NGMXP |

| UG MACRO UNIT | |
|---|---|
| CABLE SIZE | ON LADDER ARMS |
| 3C–#350 | NP350L |
| 3C–#750C | NP750L |
| 3C–#1000 | N1000L |

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|---|---|---|
| OH 1499.406<br>~~UG 4299.406~~<br>SUPERSEDES<br>1443.3 (9–1–00) | SDG&E ELECTRIC STANDARDS<br>12.4KV AND BELOW DEAD END CABLE POLE THREE–PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS | DATE 1–1–98<br>APPD PSA / CMC |

BILL OF MATERIAL: (CONTINUED)

| ITEM | DESCRIPTION | QUANTITY | CONSTR STANDARD | STOCK NUMBER |
|---|---|---|---|---|
| 28 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | – | 166070 |
| 29 | ARRESTER, LIGHTNING | 3 | 1247 | – |
| 30 | | | | |
| 31 | TERMINALS & UNDERGROUND CABLE (U) | 3 | 4111 | – |
| 32 | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (G) | 20' | 715 | – |
| 33 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1–1/2" | 21' | – | 251232 |
| 34 | STRAPS, PIPE, GALV, 1–1/2" & 6–D NAILS | AS REQ'D | – | 697664<br>491552 |
| 35 | MOULDING, OAK HARDWOOD, 1" X 8' LONG | 11' | – | 487200 |
| 36 | STAPLES, MOULDING, GALV, 3" X 1–1/16" X 1/4" | AS REQ'D | – | 678560 |
| 37 | ROD & CLAMP, GROUND | 2 2 | – | 230016<br>603072 |
| 38 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 | – |
| 39 | SCREW, LAG, 1/2" X 4" | 2 | – | 621568 |
| 40 | PADLOCK, MEDECO | 1 | – | 514862 |
| 41 | TAGS, SWITCH NUMBER | 2 | 204/3104 | – |
| 42 | BRACKET, LADDER ARM | AS REQ'D | 1404/4204 | 167184 |
| 43 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | AS REQ'D | 1404/4204 | 503488 |
| 44 | CHANNEL, DOUBLE GALV, 24" | AS REQ'D | 1404/4204 | 216700 |

FOR FIELD MAINTENANCE ONLY

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 350 KCMIL AND LARGER UNDERGROUND CABLE.

(C) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(E) OFFSET AS REQUIRED TO CLEAR ANCHOR GUY.

(F) SWITCH GROUND AND LIGHTNING ARRESTER GROUND TO BE CONNECTED ON THE SAME GROUND ROD.

(G)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

(H) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX. 60° ANGLE.

| | Indicates Latest Revision | Completely Revised | New Page | Information Removed |
|---|---|---|---|---|

DATE 1–1–93
APPD JLB/RDJ

SDG&E ELECTRIC STANDARDS

12.4KV AND BELOW DEAD END CABLE POLE
THREE–PHASE, 1/C PER PHASE,
GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS

OH 1499.407
~~UG 4299.407~~
SUPERSEDES
1443.4 (9–1–00)

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INSTALLATION: (CON'T)

(I) – USE FIGURE ONE FOR ALL **NEW** CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH NEUTRAL ON OUTSIDE PIN POSITION.

– USE FIGURE TWO ON EXISTING CONSTRUCTION WITH NEUTRAL ON INSIDE PIN POSITION.

REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251.

(P) POLE STEPPING – SEE STD. 363.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

(R) GANG OPERATED SWITCH MOUNTING INSTRUCTIONS – SEE STD. SECTION 1200.

(S) RISER POSITION – SEE STANDARD 1402/4202.

(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STD. 1406/4206.

(U) SEE STANDARD 1407/4207 FOR NON–PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

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| OH 1499.408<br>~~UC 4299.408~~<br>SUPERSEDES<br>1443.5 (9–1–00) | SDG&E ELECTRIC STANDARDS<br>12.4KV AND BELOW DEAD END CABLE POLE<br>THREE–PHASE, 1/C PER PHASE,<br>GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS | DATE 1–1–93<br>APPD JLG/RDJ |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| C | | | | | | F | | | | | |
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| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

12.47 KV DEAD END CABLE POLE, THREE-PHASE
WITH NEUTRAL, HORIZONTAL SCADA-MATE SWITCH

FMO
OH 1445

**SCOPE:** THIS STANDARD SHOWS A DEADEND CONSTRUCTION FOR 12.47 KV, THREE–PHASE CABLE POLE, WITH NEUTRAL, AND A HORIZONTAL MOUNTED SCADA–MATE SWITCH. (B)

**NOTE:** THIS INSTALLATION REQUIRES TRUCK ACCESS. CONTACT TELECOMMUNICATIONS BEFORE DESIGN BEGINS TO DETERMINE COMMUNICATIONS REQUIREMENT.

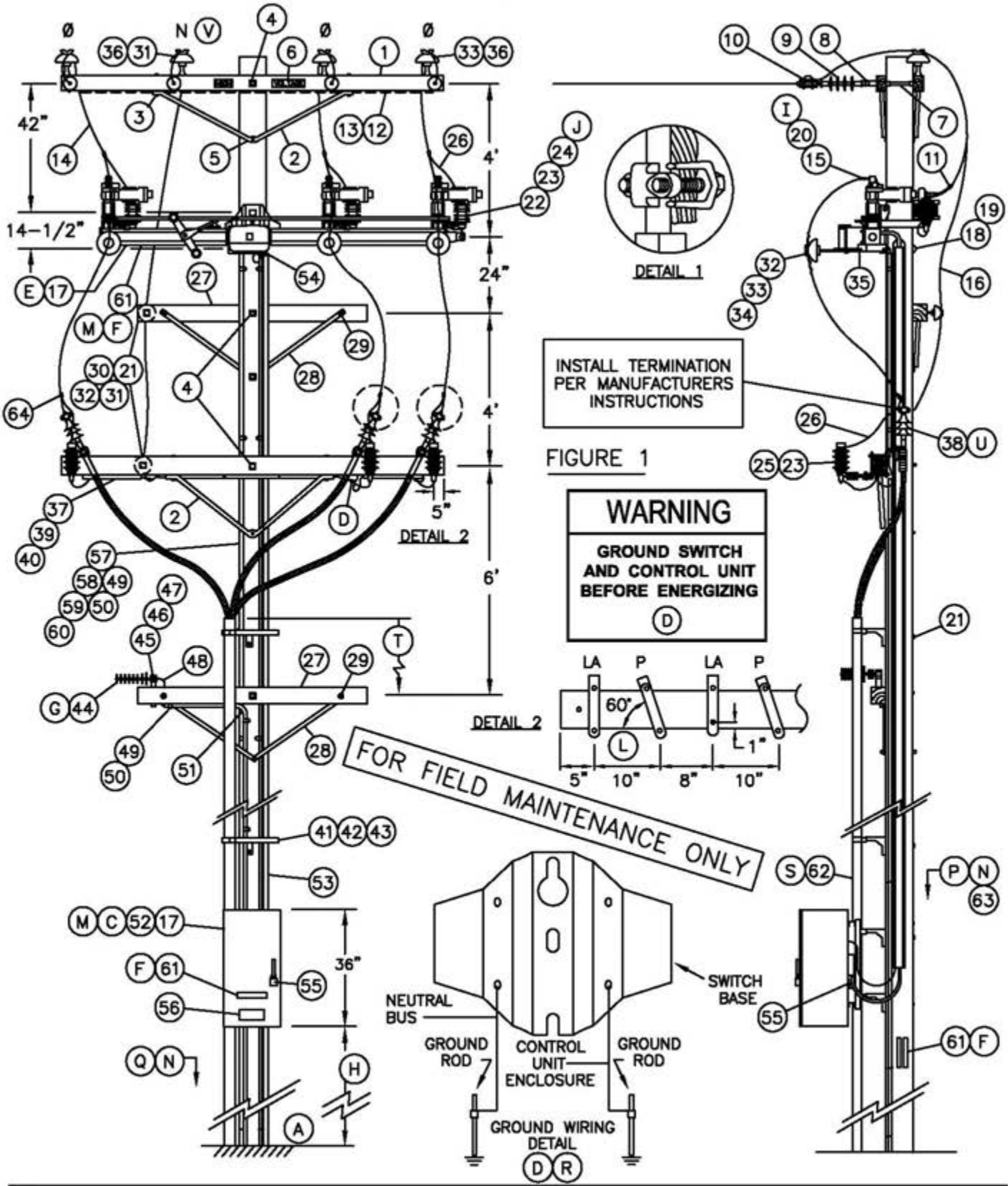


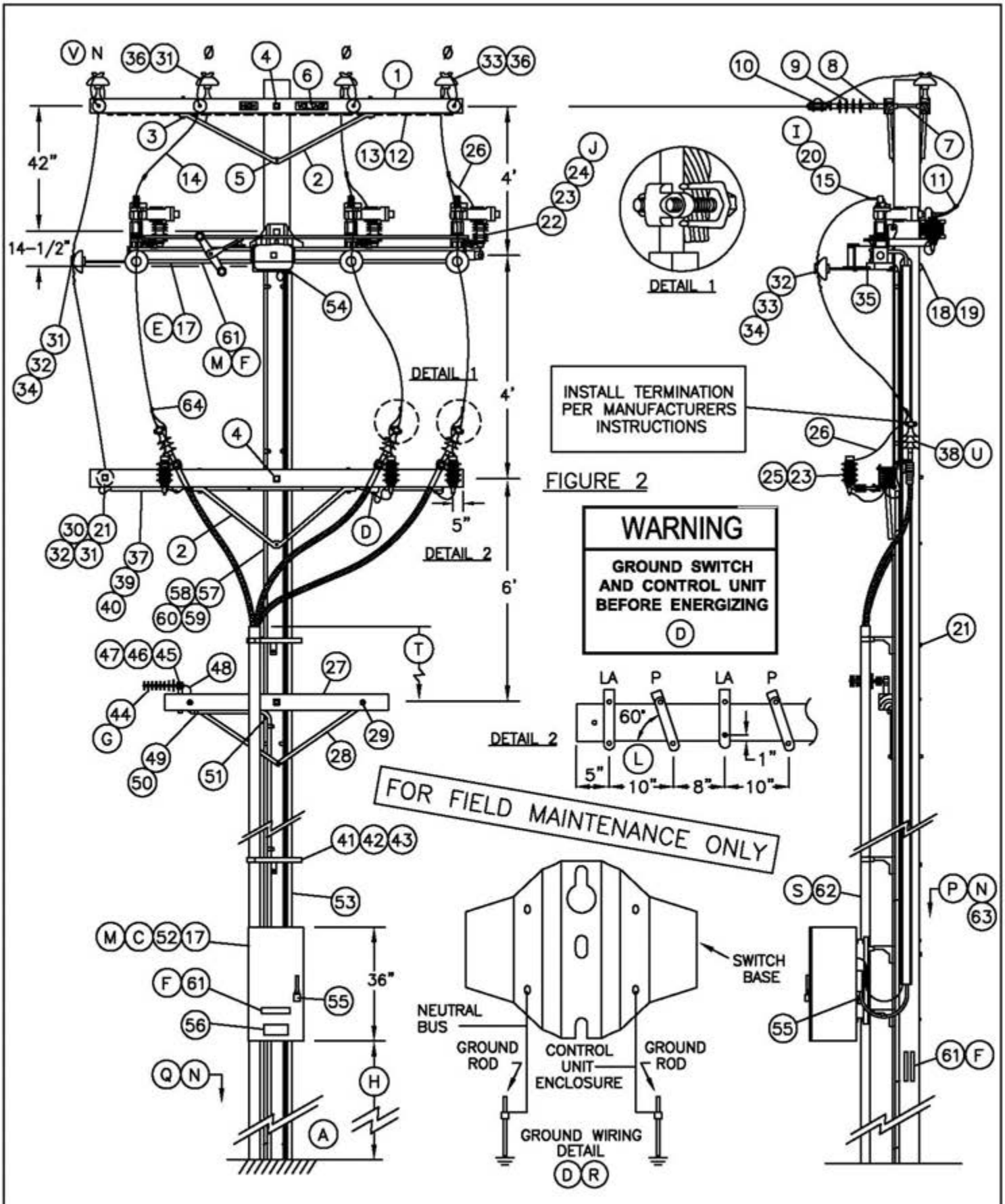

FIGURE 1

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| | | |
|---|---|---|
| 1499.601<br>4299.601<br>SUPERSEDES<br>1445.1 (10–20–05) | SDG&E ELECTRIC STANDARDS<br>12.47 KV DEAD END CABLE POLE, THREE–PHASE WITH NEUTRAL, HORIZONTAL SCADA–MATE SWITCH | DATE 10–20–05<br>APPD PA / JJ |

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## BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | CONSTR. STD | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 10'-0" | | 3 | – | 294128 | 4– |
| 2 | BRACE, ANGLE, LINEARM=5'-0", PH ARM=4'-0" | 4' | 1 | 391 | 164032 | 4HUB |
| | | 5' | 2 | 391 | 164128 | 5HUB |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | | 6 | 392 | – | – |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | 4 | 392 | – | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | | 1 | 392 | – | – |
| 6 | SIGN, HIGH VOLTAGE, AND | | 2 | – | 647648 | HV |
| | 9 ROOFING NAILS, GALV | | – | – | 492224 | |
| 7 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT | | 4 | 392 | – | – |
| 8 | CLEVIS, DEAD END, 5/8" BOLT STEEL (CLOSED TYPE) | | 4 | – | 235712 | – |
| 9 | INSULATOR, SUSPENSION, 12KV, CLEVIS | | 4 | 750 | 431650 | 4DE |
| 10 | CLAMP, STRAIGHT LINE, D.E. | | 4 | 741-743 | – | – |
| 11 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) | | AS REQ'D | 783-786 | – | – |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER | | 12' | – | 812928 | BOND8 |
| 13 | STAPLE, FENCE, GALV, 1-1/4" | | AS REQ'D | – | 678528 | |
| 14 | WIRE, BARE STRANDED COPPER (OH JUMPERS) (K) | | 45' | 715 | – | – |
| 15 | TERMINAL, COMPRESSION LUG (I) | | 6 | 794-795 | – | – |
| 16 | WIRE, BARE STRANDED CU OR ACSR/AW BARE (OH NEUT JUMPER) (K) | | 14' | 711-715 | – | – |
| 17 | SWITCH, SCADA-MATE, 14.4 KV, POLE MOUNTED, INCLUDING 35' CONTROL CABLE, CONTROL UNIT AND RTU (E) | | 1 | – | 704690 | AUTOSW (F) |
| 18 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED AND 1 DOUBLE COIL SPRING WASHER | | 2 | 392 | – | – |
| 19 | COVER, BOLT, PLASTIC & | | 2 | | 285696 | – |
| | 6 – 10D NAILS, GALV | | AS REQ'D | | 491392 | – |
| 20 | BOLT, STAINLESS STEEL, 1/2" X 1-1/2" WITH 2 FLAT & 2 BELLEVILLE WASHERS & SILICONE BRONZE NUT (I) | | 12 | 392 | 148672 | – |
| 21 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | | AS REQ'D | 392 | – | – |
| 22 | BOLT, MACH, GALV, 1/2 X 2-1/2", 1 ROUND AND 1 LOCK WASHER | | 3 | 392 | – | – |
| 23 | ARRESTER, LIGHTNING (J) | | 6 | – | 113248 | LA12C |
| 24 | SERVICE POST CONNECTOR | | 3 | – | 262560 | – |
| 25 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | | 3 | – | 166070 | LA/B-C |
| 26 | WIRE, #6, BARE STRANDED COPPER | FT | 18' | 715 | 813536 | BS6C |
| | | LB | 2 | | | |
| 27 | CROSSARM, 3-1/2" X 4-1/2" X 6'-0" | | 2 | 380.2 | 294112 | 2S |
| 28 | BRACE, FLAT, CROSSARM, 28" | | 4 | – | 164192 | |
| 29 | BOLT, MACH, GALV, 3/8" X 4-1/2" & 1 ROUND WASHER | | 4 | 392.2 | – | – |
| 30 | PIN, TRANSFORMER LEAD ADAPTER, 1" | | 2 | – | 529248 | PS/01 |
| 31 | INSULATOR, 12KV NEUTRAL | | 3 | – | 429216 | 55-3C |
| 32 | WIRE, TIE | | AS REQ'D | 760-764 | – | – |
| 33 | INSULATOR, 12KV, 55-5 | | 6 | 750 | 429056 | 55-5C |
| 34 | INSULATOR STANDOFF BRACKET, 1" X 30" | | 3 OR 4 | 394 | 166144 | KBKT30 |
| 35 | "L" BRACKET , 2-1/2" X 2-1/2", GALV | | 3 | – | 166208 | – |
| 36 | INSULATOR PIN, 12KV, 1" | | 4 | 396 | 532704 | PS1 |
| 37 | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (K) | | 12' | 715 | – | – |

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**BILL OF MATERIAL:** (CON'T)

| ITEM | DESCRIPTION | | QUANTITY | CONSTR. STD | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| 38 | TERMINALS AND UNDERGROUND CABLE (U) | | 3 | 4111 | – | – |
| 39 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1–1/2" | | 10' | – | 251232 | P11/2C |
| 40 | STRAPS, PIPE, GALV, 1–1/2", & 2 – 6D NAILS, GALV | | AS REQ'D | – | 697664 | – |
| | | | AS REQ'D | – | 491552 | |
| 41 | BRACKET, LADDER ARM | | AS REQ'D | 1404/4204 | 167184 | RSRARM |
| 42 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | | AS REQ'D | 1404/4204 | 503488 | |
| 43 | CHANNEL, DOUBLE GALV, 24" | | AS REQ'D | 1404/4204 | 216700 | |
| 44 | ANTENNA, SCADA, COMMUNICATION, BROADBAND AND CONNECTORS (G) | | 1 | – | 109570 | ANT |
| 45 | NIPPLE, PIPE 2" X 7", ALUM. | | 1 | – | – | ANTXMB |
| 46 | BOLT, MACH, GALV. 1/2" X 9" | | 1 | – | 153184 | |
| 47 | CENTERING WASHER, GALV. | | 2 | – | 795520 | |
| 48 | CABLE, FLEXIBLE 1/2" COAXIAL SCADA ANTENNA | | AS REQ'D | – | 191906 | ANTCAB |
| 49 | CONDUIT, PVC, SCHEDULE 40, 1/2" | | 150' | – | 251168 | P1/2–C |
| 50 | STRAPS, PIPE GALV, 1/2", & 6D NAILS, GALV | | AS REQ'D | – | 697728 | – |
| | | | AS REQ'D | – | 490656 | – |
| 51 | ELBOW, PVC, 1/2" | | 1 | – | – | – |
| 52 | TRANSCEIVER, 12V DC | | 1 | – | 749500 | SOTRAN |
| 53 | U–GUARD, 2" X 10', POLYETHYLENE | | 3 | – | 249940 | 2UMOLD |
| 54 | GRIP, CONTROL CABLE | | 1 | – | 394018 | – |
| 55 | PADLOCK, SCHLAGE ELECTRIC SERIES | | 2 | – | 514848 | – |
| 56 | DECAL "SCADA" "INFORM S.C.O. UPON ENTRY" | | 1 | 207 | 301934 | – |
| 57 | WIRE, #2 BARE STRANDED COPPER | FT | 100' | – | 813664 | BS2R |
| | | LB | 20# | | | |
| 58 | STAPLES, FENCE, GALV, 1–1/4" | | AS REQ'D | – | 678528 | – |
| | STAPLES, MOULDING, GALV, 3" X 1–1/16" X 1/4" | | AS REQ'D | – | 678560 | – |
| 59 | GROUND ROD, 5/8" X 8' (D)(R) | | 2 | 1002 | 603072 | ROD8 |
| 60 | COPPER BONDED GROUND CONNECTOR | | 2 | 1002 | 259010 | – |
| 61 | TAG, SWITCH NUMBER (F) | | 5 | 204 | – | – |
| 62 | RISER CONSTRUCTION (S) | | AS REQ'D | 1400/4200 | – | – |
| 63 | VISIBILITY STRIP (N) | | 4 | 208 | 304064 | VSTRIP |
| 64 | HOT LINE CLAMP | | 3 | 788 | 227680 | – |

FOR FIELD MAINTENANCE ONLY

| OH MACRO UNITS | | |
|---|---|---|
| FIG. | NEUTRAL POSITION | MU |
| 1 | INSIDE | SMCPNI |
| 2 | OUTSIDE | SMCPNO |

| UG MACRO UNITS | |
|---|---|
| CABLE SIZE | W/LADDER ARMS |
| 3C–#350 | NP350L |
| 3C–#750C | NP750L |
| 3C–#1000 | N1000L |

**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 350 KCMIL AND LARGER UNDERGROUND CABLE.

(C) SCADA SWITCH CONTROL IS SELF POWERED FROM POLE TOP SWITCH UNIT. NO LOCAL SECONDARY IS REQUIRED. FAULT INDICATION IS INTEGRATED WITH THE SWITCH CONTROL – NO EXTERNAL FAULT INDICATORS ARE REQUIRED.

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| DATE 10–20–05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47 KV DEAD END CABLE POLE, THREE–PHASE WITH NEUTRAL, HORIZONTAL SCADA–MATE SWITCH | 1499.604<br>4299.604<br>SUPERSEDES<br>1445.4 (10–20–05) |

Ⓓ **NOTE:** BEFORE ENERGIZING SWITCH, CONNECT GROUND LEADS TO THE GROUNDING POINT PROVIDED ON SWITCH MOUNTING BRACKET. INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE AND CONCENTRIC CABLE CONDUCTOR TO LIGHTNING ARRESTER GROUND. INSTALL TWO SEPARATE GROUND RUNS FROM BASE OF SWITCH TO BASE OF POLE, UNDER SEPARATE COVERS, IN ADJACENT POLE QUADRANTS. CONNECT EACH RUN TO A SEPARATE SET OF GROUND RODS. CONNECT CONTROL UNIT ENCLOSURE GROUND WIRE TO ONE OF THE GROUND RUNS AND POTHEAD UNDERARM NEUTRAL BUS TO THE OTHER. – SEE GROUND WIRING DETAIL.

Ⓔ WHEN MOUNTING SCADA SWITCH TO POLE, DISCARD POLE BAND. **DO NOT INSTALL POLE BAND.**

Ⓕ SCADA SWITCH ASSEMBLY UNIT WILL GENERATE TWO SWITCH NUMBERS–ONE FOR THE SF6 INTERRUPTER AND ANOTHER FOR THE MANUAL OPERATED DISCONNECT. THE VISUAL BREAK, MANUALLY OPERATED DISCONNECT WILL ALWAYS BE A LINE SWITCH, NORMALLY CLOSED AND ASSIGNED THE LOWER OF THE SWITCH ASSIGNMENT NUMBERS. A TAG FOR THE MANUALLY OPERATED DISCONNECT WILL BE INSTALLED AT THE BASE OF THE POLE AND ON THE UNDERSIDE OF THE SWITCH BASE NEAR THE OPERATING LEVER. THE SF6 INTERRUPTER CAN BE EITHER A LINE SWITCH OR A TIE SWITCH. TAGS FOR THE SF6 INTERRUPTER WILL BE INSTALLED IN THREE LOCATIONS; AT THE BASE OF THE POLE, OUTSIDE OF THE CONTROL CABINET DOOR AND ANOTHER ON THE INSIDE OF THE DOOR. AN INTERRUPTER OPEN/CLOSED INDICATOR IS LOCATED ON ONE END OF THE SWITCH ARM.

Ⓖ PLANNER TO SPECIFY QUADRANT OF POLE FOR ANTENNA MOUNT WITH DATA FROM STANDARDS. POINTS LIST TO BE COMPLETED BY PLANNER AND SENT TO SENIOR ENGINEER, DISTRIBUTION OPERATIONS. SEE ELECTRIC STANDARDS TEAM FOR POINTS LIST FORMS.

Ⓗ RTU TO BE MOUNTED AT 10' FROM GROUND LEVEL TO BOTTOM OF RTU CABINET WHEN NOT SUBJECT TO TRAFFIC CONTACT. IF VULNERABLE TO VEHICLE DAMAGE, MOUNT RTU AT 13' – 6" FROM GROUND LEVEL TO BOTTOM OF RTU CABINET. CONSIDER LARGE VEHICLES PARKING PARALLEL TO CURB.

Ⓘ IF ATTACHING 1/0 OR 4/0 COPPER JUMPERS TO SCADA–MATE SWITCH, USE TWO BRONZE CABLE TAP LUGS (S/N 471296) IN PLACE OF BOLTS AND COMPRESSION LUG.

Ⓙ INSTALL LIGHTNING ARRESTERS ON THE VOLTAGE SENSOR SIDE OF SCADA–MATE SWITCH IN THE PARTIAL ARRESTER PROTECTION AREA. INSTALL LIGHTNING ARRESTERS ON BOTH SIDES OF SCADA–MATE SWITCH IN THE GENERAL ARRESTER PROTECTION AREA. REFER TO STANDARD PAGE 1247.2 FOR LIGHTNING ARRESTER APPLICATION MAP. LIGHTNING ARRESTERS ARE TO BE GROUNDED THROUGH THE SWITCH BASE.

Ⓚ

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

Ⓛ TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROXIMATELY 60° ANGLE.

Ⓜ CONTROL AND ANTENNA CONNECTIONS TO BE MADE BY SCADA PROJECT CREW. LINE CREW MOUNTS SWITCH TO POLE AND LEAVES CONTROL CABLE ON SITE.

**REFERENCE:**

Ⓝ REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES – SEE STANDARD 208.

O. FOR OPERATION OF SCADA–MATE SWITCH – SEE STANDARD PRACTICE 311.

Ⓟ ALLOWABLE WORKING AND CLIMBING SPACE – SEE STANDARD 251.

Ⓠ POLE STEPPING – SEE O.H. STANDARD 363.

Ⓡ GROUNDING METHODS – SEE O.H. STANDARD 1002.

FOR FIELD MAINTENANCE ONLY

Ⓢ RISER POSITION – SEE STANDARD 1402/4202.

Ⓣ MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STANDARD 1406/4206.

Ⓤ SEE STANDARD 1407/4207 FOR NON–PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

Ⓥ ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE INSTALLED IN OUTSIDE PIN POSITION PER DESIGN MANUAL PAGE 5124.2.

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superceded by their current version found inside the Overhead Construction Standard Manual.

**2/20/2019:** Install S706680 in place of old style Disconnect Switch.

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| C | | | | | | F | | | | | |
| B | EDITORIAL CHANGES | GLW | JES | CZH | 2/20/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

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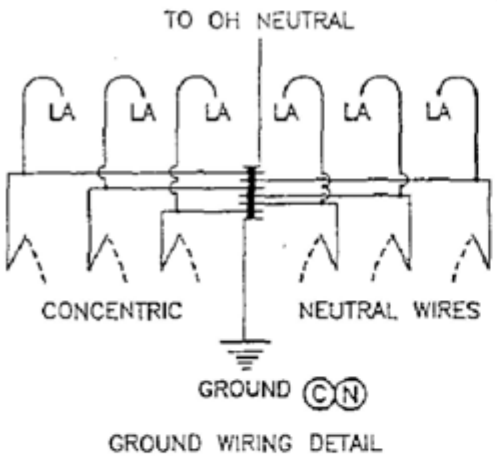
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD CONSTRUCTION STANDARDS

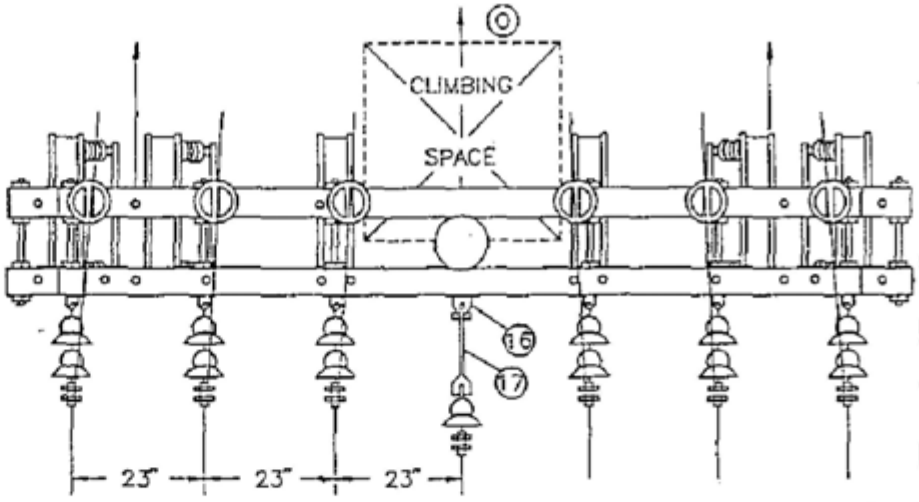
12.47 KV AND BELOW DEAD END CABLE POLE, 6 OR 7 OH CONDUCTORS, 1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED

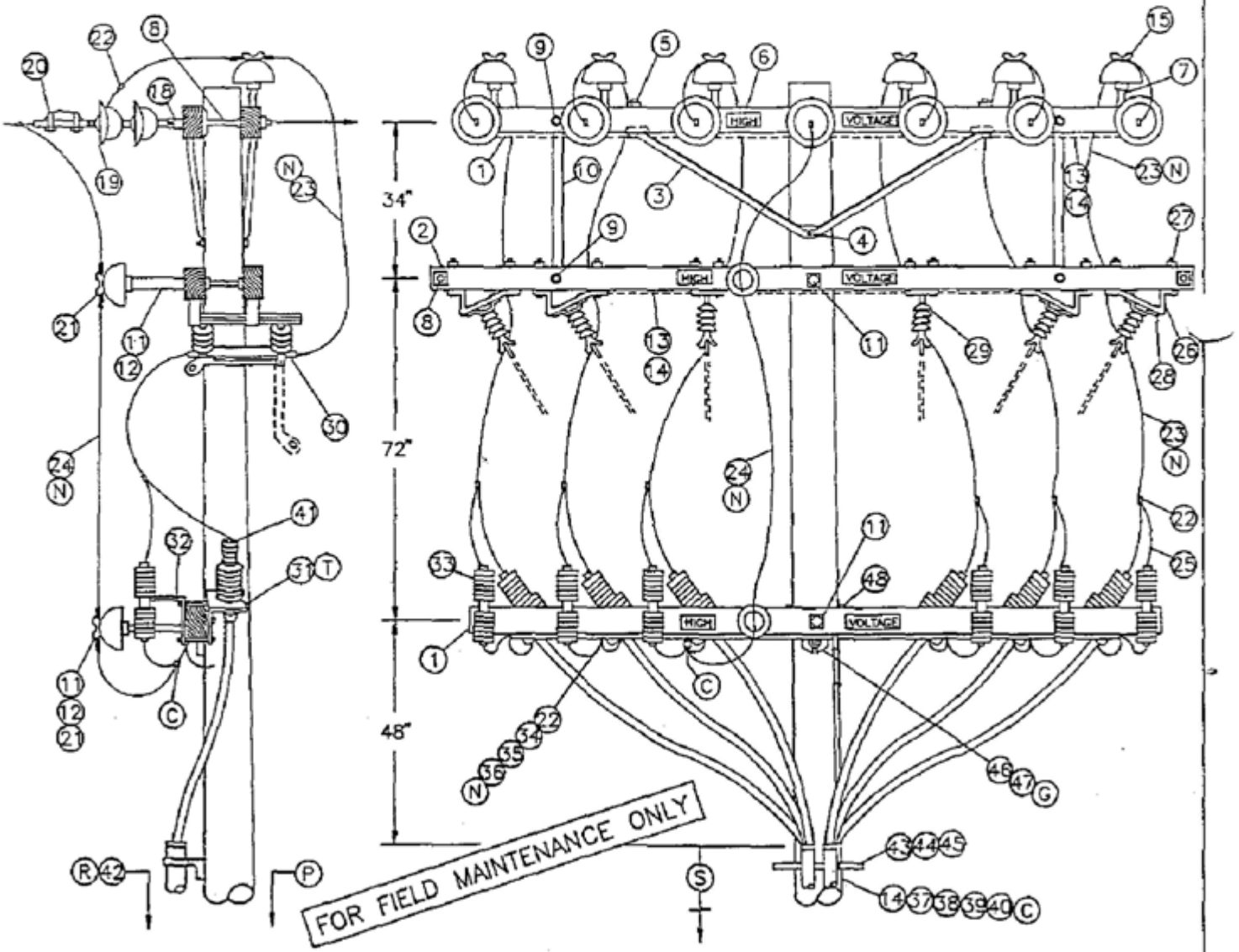
FMO OH 1451

SCOPE: THIS STANDARD SHOWS 6 OR 7 CONDUCTOR DEAD END CABLE POLE WITH HOOKSTICK SWITCHES FOR 750 KCMIL AND LARGER U.G. CABLE. (SEE STANDARD 1407/4207 FOR 350 KCMIL TERMINAL MOUNTING INFORMATION).




GROUND WIRING DETAIL




| OH 1499.504<br>~~UG 4299.504~~<br>SUPERCEDES<br>1451.1 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE, 6 OR 7 OH CONDUCTORS, 1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED | DATE 1-1-93<br>APPD JVB/BDG |
|---|---|---|

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BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | CONST STD OR PG NO | STOCK NUMBER |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 12'-0" | | 3 | – | 294160 |
| 2 | CROSSARM, 3-3/4" X 5-3/4" X 13'-6" | | 2 | – | 294368 |
| 3 | BRACE, ANGLE, CROSSARM, 6" | | 3 | – | 164160 |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 DBL COIL WASH | (E) | 1 | 392.1&.2 | – |
| 5 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL WASH | (E) | 4 | 392.1&.2 | – |
| 6 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS | (E) | 6 | – | 647648<br>492224 |
| 7 | PIN, INSULATOR, STRAIGHT, 12KV, 1" OR 1 3/8" | (E) | 6 | – | 532704<br>532448 |
| 8 | BOLT, SPACE, 5/8" X (LENGTH AS REQ'D), 3 SQ WASH & 2 DBL COIL WASH | (E) | 8 | 392.1&.2 | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 RD WASH & 1 DBL COIL WASH | (E) | 8 | 392.1&.2 | – |
| 10 | BRACE, VERTICAL, 36" | (E) | 4 | – | 164224 |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ FLAT WASH & 1 DBL COIL WASH | (E) | 5 | 392.1&.2 | – |
| 12 | PIN, TRANSFORMER ADAPTER, 1" LEAD THREAD | (D) (E) | 2 | – | 529248 |
| 13 | WIRE, #8, BARE SOLID ANNEALED COPPER | | 2 LB | – | 812928 |
| 14 | STAPLES, FENCE, GALV, 1-1/4" | (D) (E) | AS REQ'D | – | 678528 |
| 15 | INSULATOR, LINE, 12KV, 1" OR 1-3/8" PIN | | 6 | 750 | – |
| 16 | CLEVIS, DEAD END, 3/4" BOLT, STEEL (OPEN TYPE) | (D) (E) | 1 | – | 235618 |
| 17 | LINK, EXTENSION, 1/2" X 1-1/2" X 12" | (D) | 1 | – | 466240 |
| 18 | CLEVIS, DEAD END, 5/8" BOLT, STEEL (CLOSED TYPE) | (E) | 6 | – | 235712 |
| 19 | INSULATOR, SUSPENSION, 12KV | (D) | 13 | 750 | – |
| 20 | CLAMP, STRAIGHT LINE, D.E. | (D) | 7 | 742-743 | – |
| 21 | INSULATOR, LINE, 12KV, NEUTRAL | (D) (E) | 2 | – | 429216 |
| 22 | CONNECTOR, WIRE, (SIZE & TYPE AS REQ'D) | (E) | AS REQ'D | 783-787 | – |
| 23 | WIRE, BARE STRANDED COPPER, (OH JUMPER) | (N) | 72' | 715-716 | – |
| 24 | WIRE, BARE STRANDED CU OR AL, (OH NEUT JUMPER) | (N) | 12' | 711-716 | – |
| 25 | WIRE, #6, BARE STRANDED COPPER | | 25' | – | 813536 |
| 26 | BRACKET, DISCONNECT, ANGLE MOUNTING, 1/4" X 3" | | 8 | – | 166542 |
| 27 | BOLT, MACH, GALV, 1/2" X 8", 1 RD & 1 DBL COIL WASH | (D) | 24 | 392.1&.2 | – |
| 28 | BOLT, MACH, GALV, 3/8" X 3" | (E) | 8 | 392.1&.2 | – |
| 29 | SWITCH, DISCONNECT, 14.4KV, 600 A OR 1200 A | | 6 | 1205 | – |
| 30 | COMPRESSION TERMINALS, CU, 2 HOLE (SIZE AS REQ'D) | | 12 | 794-795 | – |
| 31 | BRACKET, POTHEAD MOUNTING | | 6 | 1400/4200 | – |
| 32 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | (E) | 6 | – | 166070 |
| 33 | ARRESTER, LIGHTNING | | 6 | 1247 | – |
| 34 | CONDUIT, PVC, SCHEDULE 40, 1-1/2" | (E) | 10' | – | 251232 |
| 35 | STRAPS, PIPE, GALV, 1" & 6D NAILS, GALV | (E) | AS REQ'D | – | 697792<br>491552 |
| 36 | WIRE, BARE STRANDED CU, (G.P. NEUTRAL SIZE) | (N) | 35' | 715-716 | – |
| 37 | WIRE, #4, BARE STRANDED COPPER | | 45' | – | 813760 |
| 38 | STAPLES, MOULDING, GALV, 3" X 1-1/16" X 1/4" | (D) (E) | AS REQ'D | – | 678560 |
| 39 | UNIT GROUND, COMPLETE | (Q) | 1 | – | 603136 |
| 40 | CLAMP, 5/8", GROUND ROD | (E) | 2 | – | 230016 |
| 41 | TERMINALS, UNDERGROUND CABLE | | 6 | 4111 | – |
| 42 | RISER CONSTRUCTION | | AS REQ'D | 1400/4200 | – |
| 43 | BRACKET, LADDER ARM | (E) | AS REQ'D | 1404/4204 | 167184 |
| 44 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | (E) | AS REQ'D | 1404/4204 | 503488 |
| 45 | CHANNEL, DOUBLE GALV, 24" | (E) | AS REQ'D | 1404/4204 | 216700 |
| 46 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | (E) | 1 | 392 | – |
| 47 | GAIN, CROSSARM, BRACELESS | (G) | 1 | – | 369598 |
| 48 | BOLT, MACH, GALV, 5/8" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | (E) | 2 | 392 | – |

FOR FIELD MAINTENANCE ONLY

| CABLE SIZE | UG MACRO UNIT PORCELAIN W/LADDER ARMS |
|---|---|
| 3C-#750 AL TWO RUNS | 2R750L |
| 3C-#1000 AL TWO RUNS | 2R-1KL |

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|---|---|---|
| DATE 1-1-93<br>APPD JVB/RDS | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE, 6 OR 7 OH CONDUCTORS 1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED | OH 1499.505<br>~~UG 4299.505~~<br>SUPERCEDES 1451.2 (1-1-93) |

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 CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL .

(E) EXEMPT MATERIAL.

(F) INSTRUCTIONS TO INSTALL POTHEAD MOUNTING BRACKETS AND LIGHTNING ARRESTER BRACKETS.

(G) DO NOT CUT GAINS IN THE POLE WHEN INSTALLING THE VERTICALLY MOUNTED SECTIONALIZING SWITCH ARMS. THE GAIN HARDWARE USED HERE MAKE CUT GAINS UNNECESSARY.

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUTRAL JUMPER SIZE CU OR AL | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|
| 350 | 4/0 | SAME SIZE | #2 PER PHASE |
| 750 | 500 | AS O.H. NEUT | 1/0 PER PHASE |
| 1000 | 500 | CONDUCTOR | 1/0 PER PHASE |

REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251.

(P) POLE STEPPING – SEE STD. 363.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

(R) RISER POSITIONS – SEE STANDARD 1402/4202.

(S) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STD. 1406/4206.

(T) SEE STANDARD 1407/4207 FOR PORCELAIN AND NON PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

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| OH 1499.506<br>~~UG 4299.506~~<br>SUPERCEDES<br>1451.3 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE,<br>6 OR 7 OH CONDUCTORS<br>1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED | DATE 1-1-93<br>APPD JLB/BDJ |

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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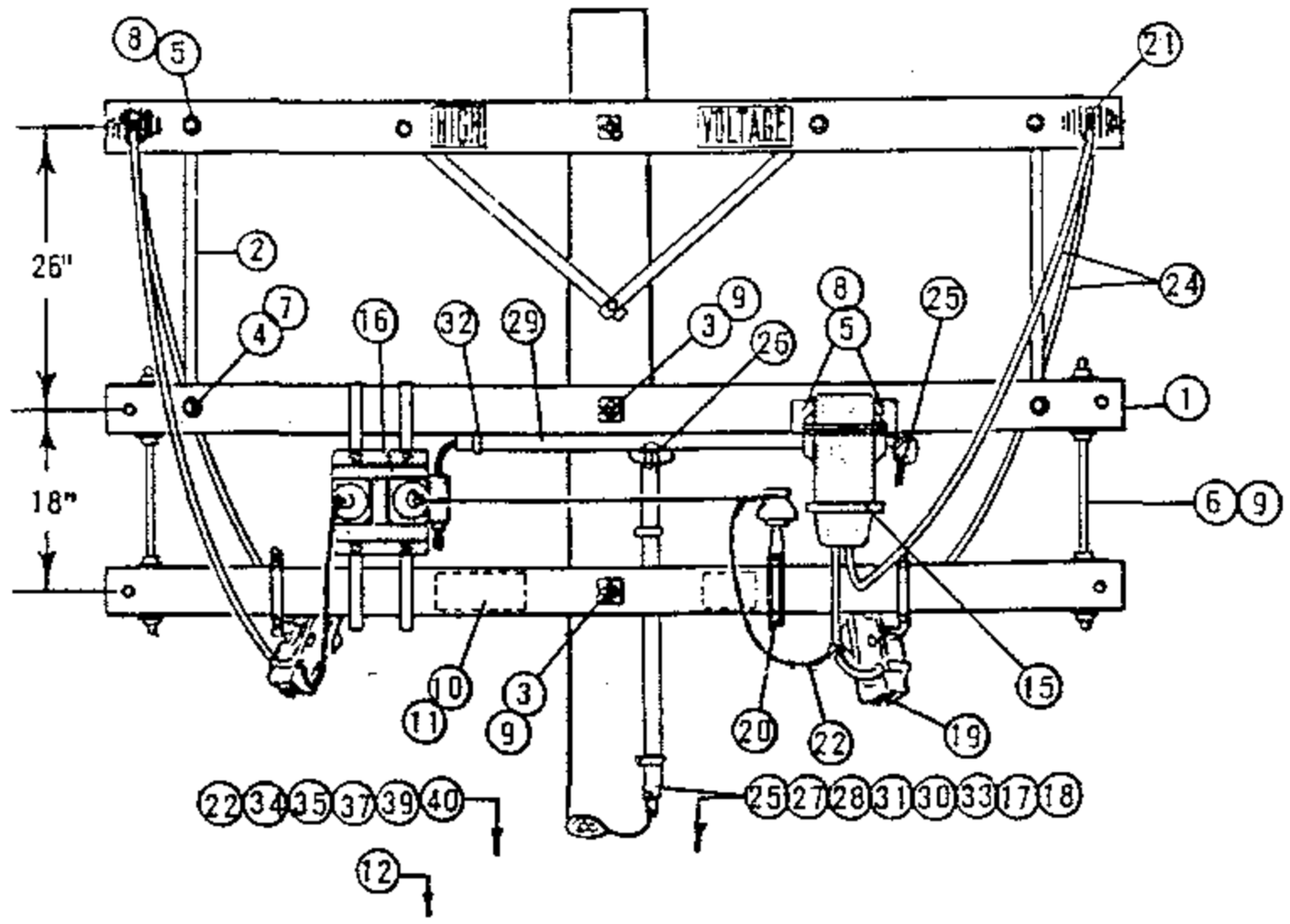
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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

POLETOP METERING, 2.4KV SINGLE PHASE

FMO OH 1481




ELEVATION - LOAD SIDE

FOR FIELD MAINTENANCE ONLY

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NOTE:

(A) NOT REQUIRED WHERE METER BOX HAS HUB.

| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 2 | PG 111 IT. 2 |
| 2 | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 3 | | BOLT, MACH 5/8" X 14" | 2 | 154880 |
| 4 | | BOLT, MACH 1/2" X 5" | 2 | 153024 |
| 5 | | BOLT, MACH 3/8" X 4 1/2" | 4 | 154368 |
| 6 | | BOLT, SPACE 5/8" X 24" | 2 | 156640 |
| 7 | | WASHER, 1/2" ROUND | 2 | 800192 |
| 8 | | WASHER, 3/8" ROUND | 4 | 800288 |
| 9 | | WASHER, 3" SQ FLAT | 12 | 799072. |
| 10 | | SIGN, HIGH VOLTAGE | 1 | 647648 |
| 11 | | NAILS, ROOFING #8 GALV | 8 | 492224 |
| 12 | | POLE STEP | 16 | 692992 |
| 13 | | | | |
| 14 | | | | |
| | 15 | TRANSFORMER, CURRENT, WEST. TYPE WO 5KV, 5A | 1 | - |
| | 16 | TRANSFORMER, POTENTIAL, WEST. PTO, 2400/120V, HANGERS & BOLTS | 1 | - |
| | 17 | METER, SINGLE PHASE POWER | 1 | - |
| | 18 | CABINET, METER, TEST SWITCH, LAG SCREWS | 1 | 161312 |
| | 19 | CUTOUT, 5KV | 2 | PG 1211 |
| | 20 | BRACKET, INSULATOR STAND OFF | 1 | 166208 |
| | 21 | CONNECTORS, SPLIT BOLT | 7 | PG 787 |
| | 22 | WIRE, #6 BARE STRANDED COPPER | 20' | 813536 |
| | 23 | | | |

| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| | 24 | WIRE, WP STRANDED (SAME SIZE AS PRIMARY) | 24' | 700 SECTION |
| | 25 | WIRE, #12 TYPE TW CODED COPPER, 3 CONDUCTORS, 41' EACH | 123' | - |
| | 26 | BODY, CONDUIT, 3/4" PVC TYPE "T", BLANK COVER | 1 | 147664 |
| | 27 | BODY, CONDUIT, 3/4" PVC TYPE LB, BLANK COVER (A) | 1 | 146384 |
| | 28 | CONDUIT, 3/4" PVC SCH 80 | 31' | 251520 |
| | 29 | CONDUIT, 1" PVC SCH 40 | 4' | 251200 |
| | 30 | CONDUIT, 2" PVC SCH 40 | 20' | 251296 |
| | 31 | STRAP, PIPE 3/4" & 2-10D GALV NAILS | 7 | 697888.491392 |
| | 32 | STRAP, PIPE 1" & 2-8D GALV. NAILS | 3 | 697792.491584 |
| | 33 | STRAP, PIPE 2" & 2-10D GALV NAILS | 12 | 697856.491392 |
| | 34 | ROD, AND CLAMP, GROUND | 1 | 630072.230016 |
| | 35 | MOULDING, HARDWOOD | 3' | 487200 |
| | 36 | | | |
| | 37 | STAPLES, MOULDING 3" X 1 1/16" X 1/4" | 2 | 678560 |
| | 38 | | | |
| | 39 | NAILS, 20D, GALV | 4 | 491456 |
| | 40 | STAPLES, FENCE 1 1/4" GALV | 6 | 678528 |
| | 41 | | | |
| | 42 | | | |

SDG&E ELECTRIC STANDARDS

DATE 2-28-83
APPD JWT / HRH

# POLETOP METERING, 2.4KV SINGLE PHASE

1499.801
SUPERSEDES
1481 (2-28-83)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

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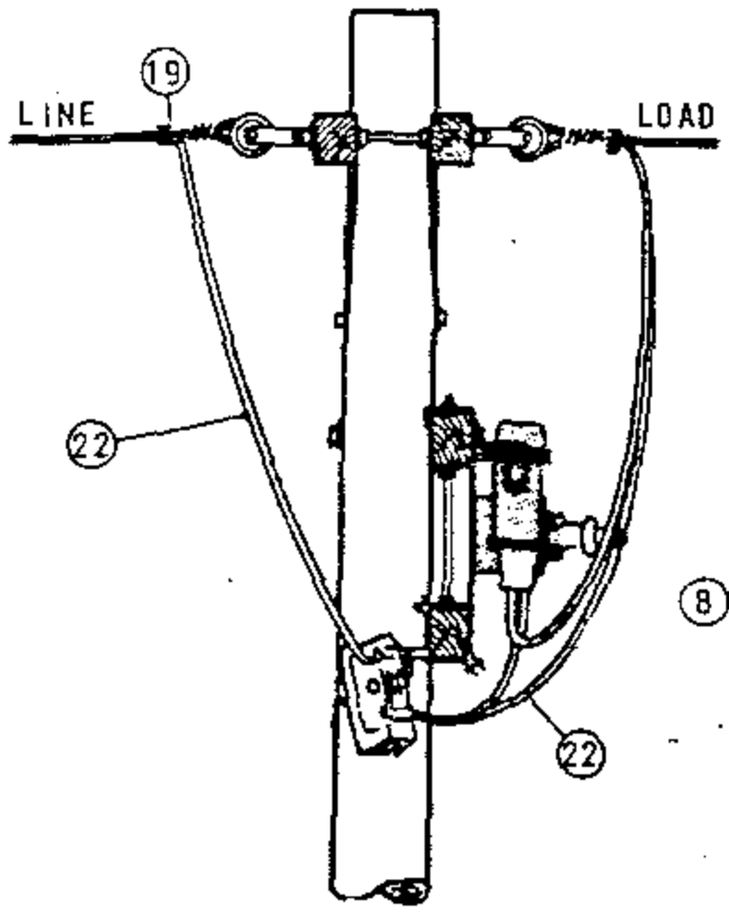
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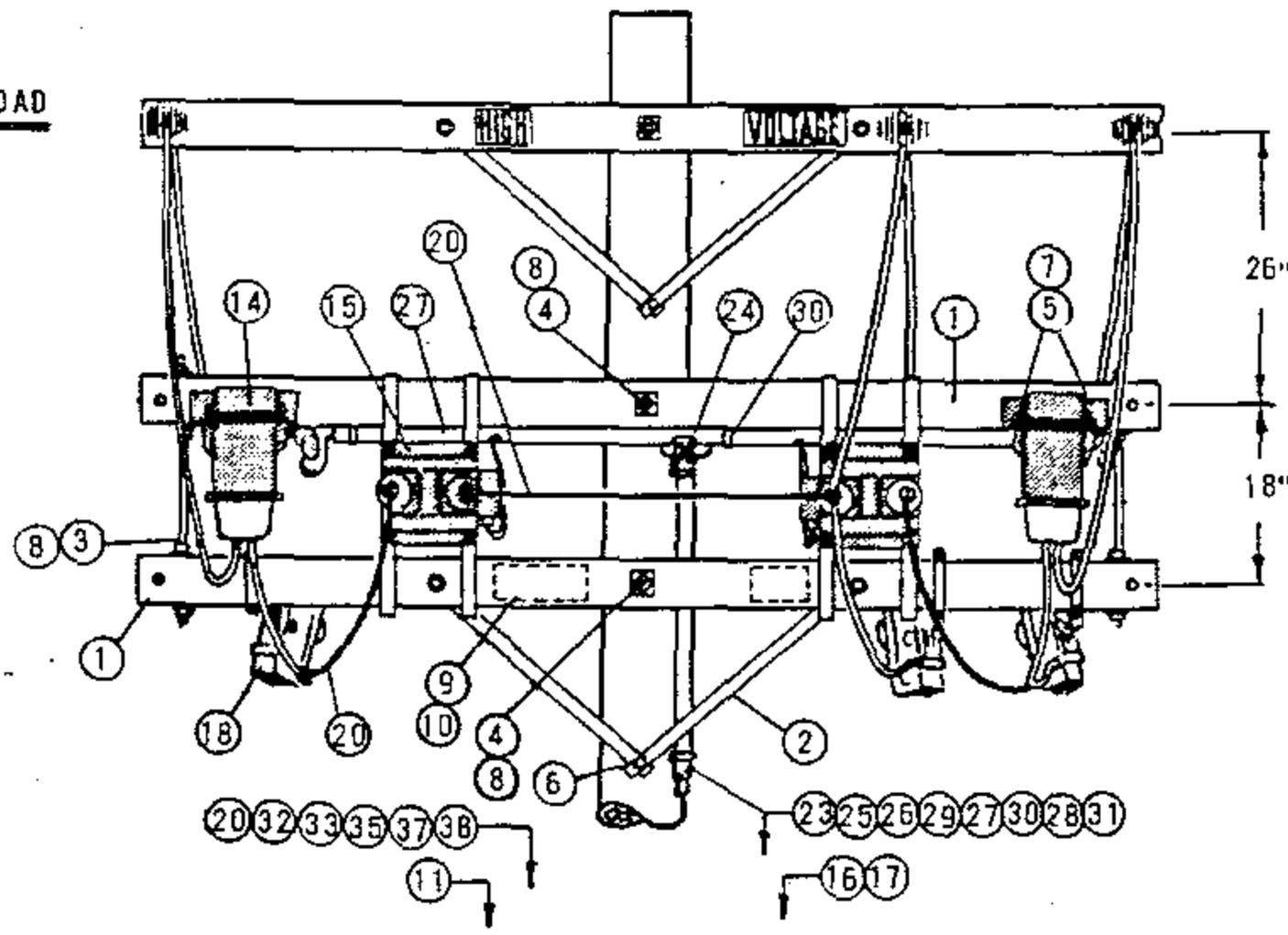
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SDG&E ELECTRIC OVERHEAD STANDARD

POLETOP METERING, 2.4KV OPEN DELTA

FMO OH 1482




ELEVATION - LOAD SIDE

FOR FIELD MAINTENANCE ONLY

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NOTE:

(A) NOT REQUIRED WHERE METER BOX HAS HUB.

| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 2 | PG 111 IT. 6 |
| 2 | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 3 | | BOLT, SPACE 5/8" X __" | 2 | PG 139 |
| 4 | | BOLT, MACH 5/8" X __" | 2 | PG 139 |
| 5 | | BOLT, MACH 3/8" X 4 1/2" | 4 | 154368 |
| 6 | | SCREW, LAG 1/2" X 4" | 1 | 621568 |
| 7 | | WASHER, 3/8" ROUND | 4 | 800288 |
| 8 | | WASHER, 3" SQUARE FLAT | 12 | 799072 |
| 9 | | SIGN, HIGH VOLTAGE | 1 | 647648 |
| 10 | | NAILS, ROOFING #8 GALV | 8 | 492224 |
| 11 | | POLE STEPS | 16 | 692992 |
| 12 | | | | |
| 13 | | | | |
| | 14 | TRANSFORMER, CURRENT WEST. TYPE CTO 5KV 5A, HANGERS & BOLTS | 2 | - |
| | 15 | TRANSFORMER, POTENTIAL WEST TYPE PTO 2400/120V, HANGER & BOLTS | 2 | - |
| | 16 | METER, THREE PHASE POWER | 1 | - |
| | 17 | CABINET, METER TEST SWITCH; LAG SCREWS FOR MOUNTING | 1 | 161312 |
| | 18 | CUTOUT, 5KV | 2 | PG 1211 |
| | 19 | CONNECTORS, SPLIT BOLT | 9 | PG 787 |
| | 20 | WIRE, #6 BR STRANDED COPPER | 18' | 813536 |
| | 21 | | | |
| | 22 | WIRE, WP STRANDED COPPER, 5KV (SAME SIZE AS PRIMARY) | 34' | 700 SECTION |
| | 23 | WIRE, #12 TYPE TW CODED CU 5 CONDUCTORS 46" EACH | 230" | - |
| | 24 | BODY, CONDUIT, 3/4" PVC TYPE "T", BLANK COVER | 1 | 147664 |
| | 25 | BODY, CONDUIT 3/4" PVC TYPE LB, BLANK COVER (A) | 1 | 146384 |
| | 26 | CONDUIT, 3/4" PVC SCH 80 | 31' | 251520 |
| | 27 | CONDUIT, 1" PVC SCH 40 | 5' | 251200 |
| | 28 | CONDUIT, 2" PVC SCH 40 | 20' | 251296 |
| | 29 | STRAP, 3/4" PIPE & 2-10D NAILS | 7 | 697888, 491392 |
| | 30 | STRAP, 1" PIPE & 2-8D NAILS | 3 | 697792, 491584 |
| | 31 | STRAP, 2" PIPE & 2-10D NAILS | 12 | 697856, 491392 |
| | 32 | ROD & CLAMP, GROUND | 1 | 630072, 230016 |
| | 33 | MOULDING, HARDWOOD | 3' | 487200 |
| | 34 | | | |
| | 35 | STAPLES, MOULDING | 2 | 678560 |
| | 36 | | | |
| | 37 | NAILS, 20D GALV | 4 | 491456 |
| | 38 | STAPLES, FENCE 1 1/4" GALV | 6 | 678528 |

| | | |
|---|---|---|
| 1499.802<br>SUPERSEDES<br>1482 (2-28-82) | SDG&E ELECTRIC STANDARDS<br>POLETOP METERING, 2.4KV OPEN DELTA | DATE 2-28-83<br>APPD [illegible] |

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**REVISION HISTORY:**

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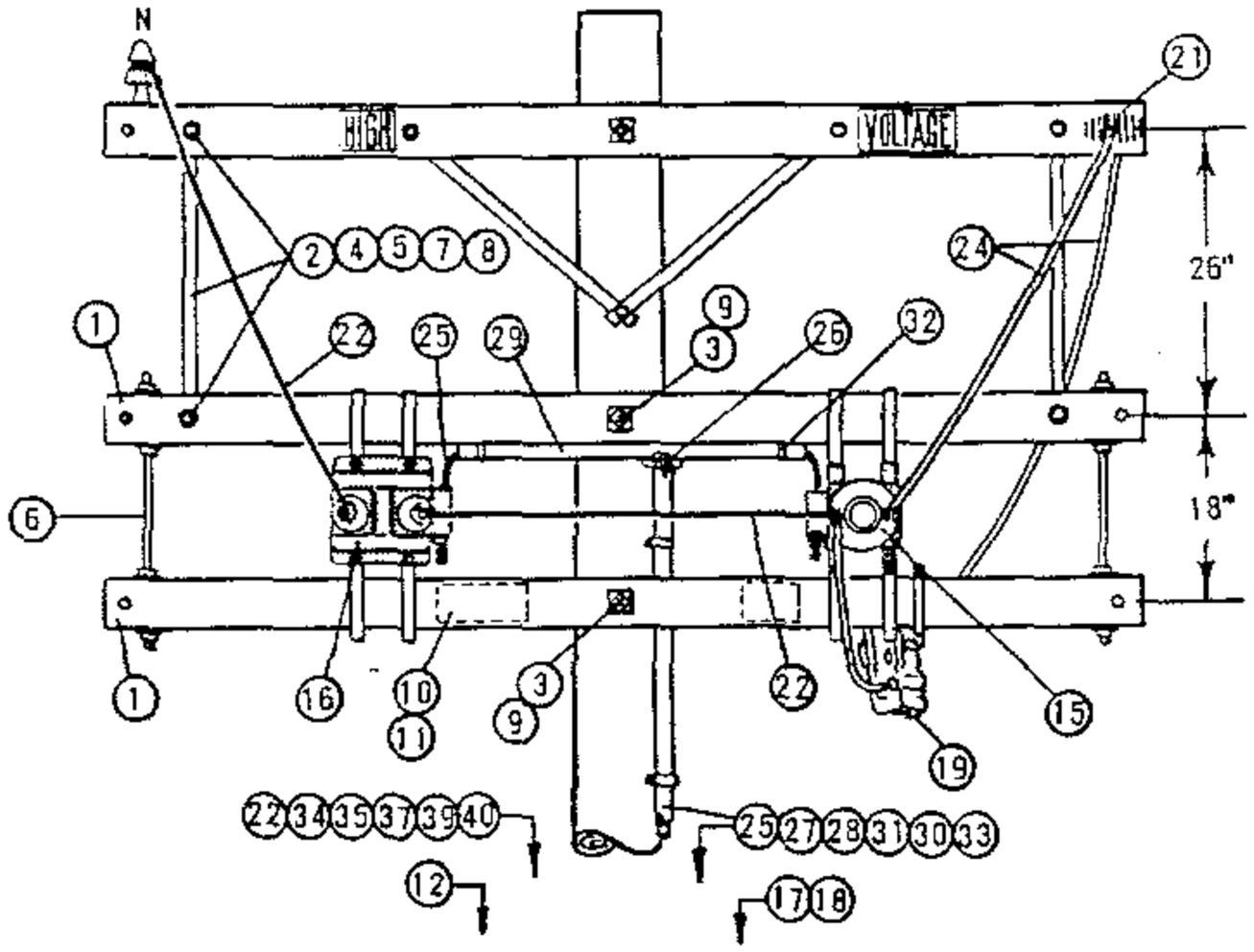
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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

POLETOP METERING, 4KV SINGLE PHASE

FMO OH 1483




ELEVATION - LOAD SIDE

FOR FIELD MAINTENANCE ONLY

NOTE:

(A) NOT REQUIRED WHERE METER BOX HAS HUB.

| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 2 | PG 111 IT. 2 |
| 2 | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 3 | | BOLT, MACH 5/8" X 14" | 2 | 154880 |
| 4 | | BOLT, MACH 1/2" X 5" | 2 | 153024 |
| 5 | | BOLT, MACH 3/8" X 4 1/2" | 4 | 154368 |
| 6 | | BOLT, SPACE 5/8" X 24" | 2 | 156640 |
| 7 | | WASHER, 1/2" ROUND | 2 | 800192 |
| 8 | | WASHER, 3/8" ROUND | 4 | 800288 |
| 9 | | WASHER, 3" SQ FLAT | 12 | 799072 |
| 10 | | SIGN, HIGH VOLTAGE | 1 | 647648 |
| 11 | | NAILS, ROOFING #8 GALV | 8 | 492224 |
| 12 | | POLE STEP | 16 | 692992 |
| 13 | | | | |
| 14 | | | | |
| | 15 | TRANSFORMER, CURRENT, WEST. TYPE WO 5KV, 5A | 1 | - |
| | 16 | TRANSFORMER, POTENTIAL, WEST. PTO, 2400/120V, HANGERS & BOLTS | 1 | - |
| | 17 | METER, SINGLE PHASE POWER | 1 | - |
| | 18 | CABINET, METER, TEST SWITCH, LAG SCREWS | 1 | 161312 |
| | 19 | CUTOUT, 5KV | 2 | PG 1211 |
| | 20 | | | |
| | 21 | CONNECTORS, SPLIT BOLT | 7 | PG 787 |
| | 22 | WIRE, #6 BARE STRANDED COPPER | 20' | 813536 |
| | 23 | | 10' | 194304 |

| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| | 24 | WIRE, WP STRANDED (SAME SIZE AS PRIMARY) | 24' | 700 SECTION |
| | 25 | WIRE, #12 TYPE TW CODED COPPER, 3 CONDUCTORS, 41" EACH | 123" | - |
| | 26 | BODY, CONDUIT, 3/4" PVC TYPE "T", BLANK COVER | 1 | 147664 |
| | 27 | BODY, CONDUIT, 3/4" PVC TYPE LB, BLANK COVER (A) | 1 | 146384 |
| | 28 | CONDUIT, 3/4" PVC SCH 80 | 31' | 251520 |
| | 29 | CONDUIT, 1" PVC SCH 40 | 4' | 251200 |
| | 30 | CONDUIT, 2" PVC SCH 40 | 20' | 251296 |
| | 31 | STRAP, PIPE 3/4" & 2-10D GALV NAILS | 7 | 697888,491392 |
| | 32 | STRAP, PIPE 1" & 2-8D GALV. NAILS | 3 | 697792,491584 |
| | 33 | STRAP, PIPE 2" & 2-10D GALV NAILS | 12 | 697856,491392 |
| | 34 | ROD, AND CLAMP, GROUND | 1 | 630072,230016 |
| | 35 | MOULDING, HARDWOOD | 3' | 487200 |
| | 36 | | | 486976,487008 |
| | 37 | STAPLES, MOULDING 3" X 1 1/16"X1/4" | 2 | 678560 |
| | 38 | | | |
| | 39 | NAILS, 20D, GALV | 4 | 491456 |
| | 40 | STAPLES, FENCE 1 1/4" GALV | 5 | 678528 |
| | 41 | | | |
| | 42 | | | |

SDG&E ELECTRIC STANDARDS

DATE 2-28-83
APPD JHT/HRH

POLETOP METERING, 4KV SINGLE PHASE

1499.803
SUPERSEDES
1483 (2-28-83)

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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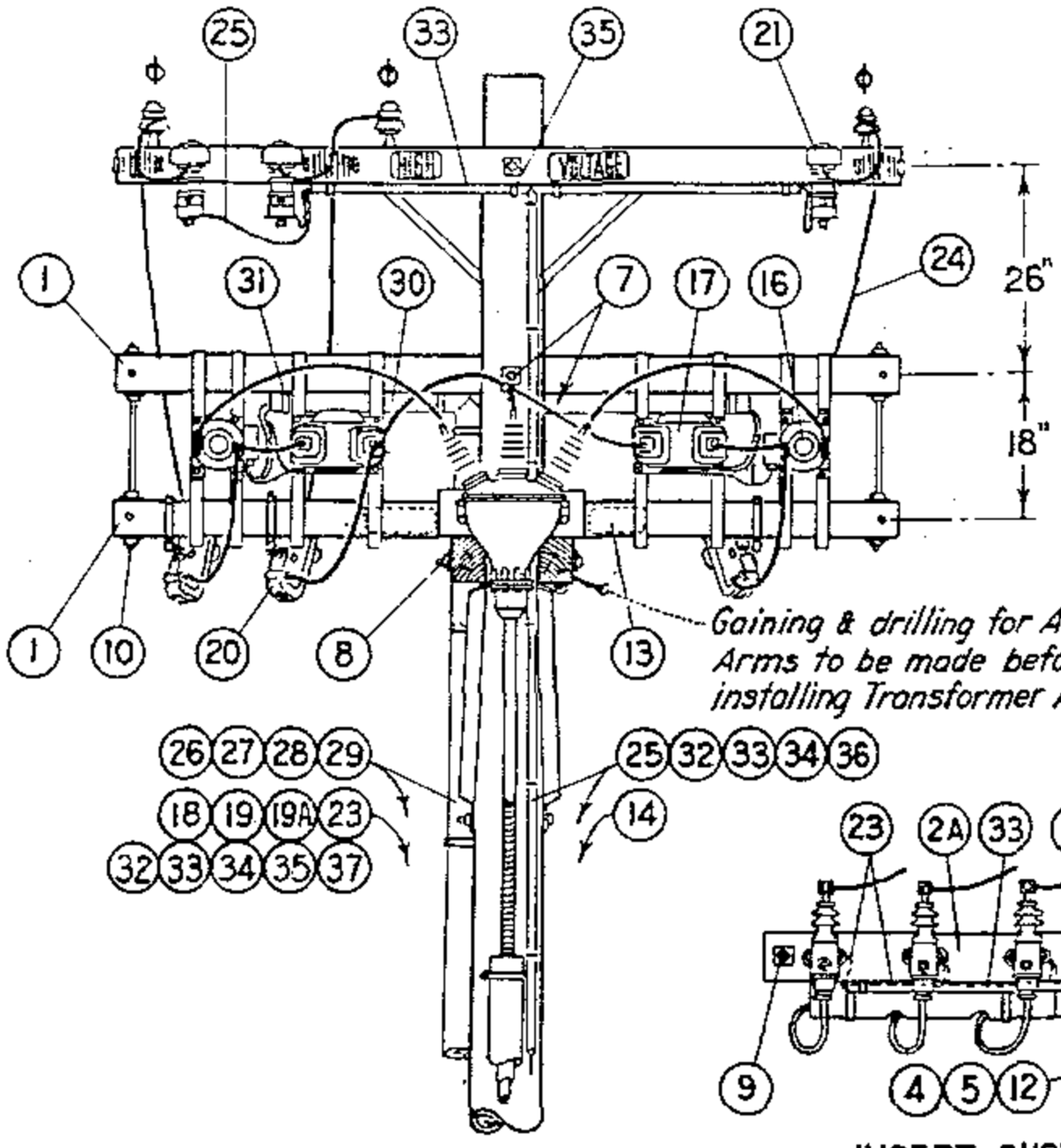
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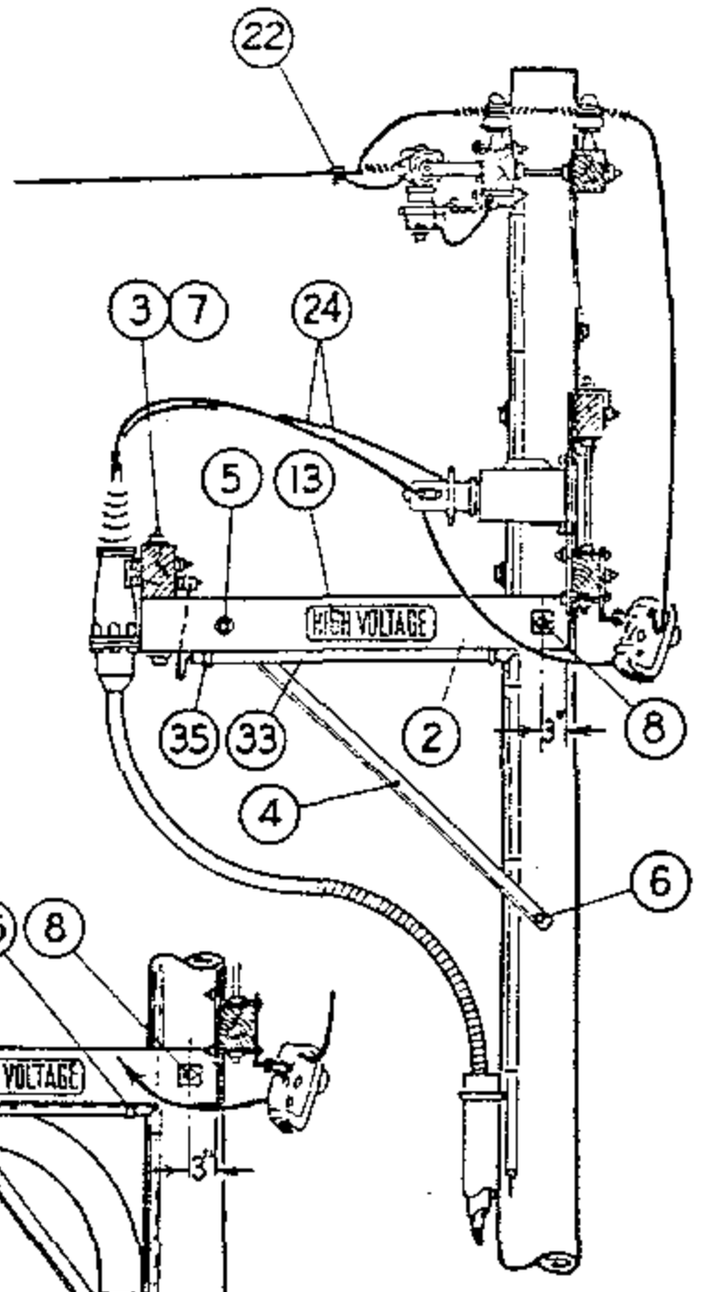
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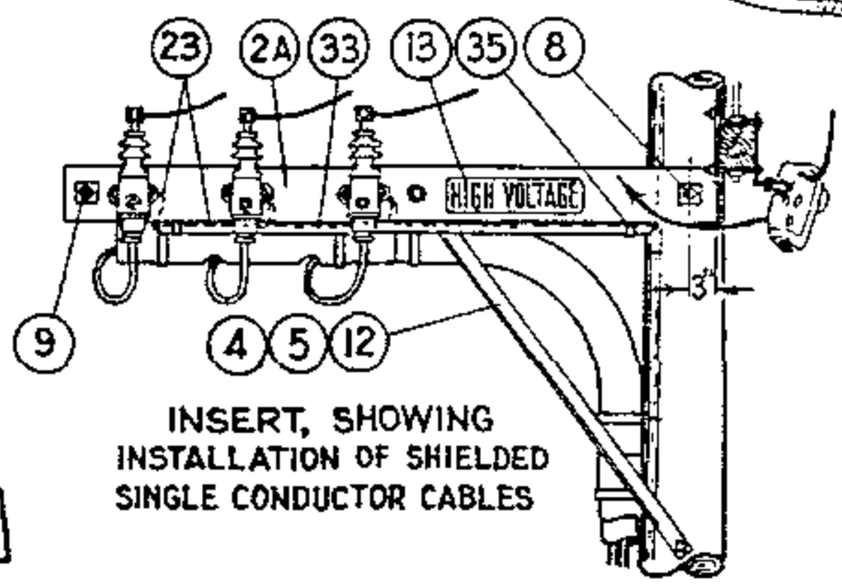
SDG&E ELECTRIC OVERHEAD STANDARD

POLETOP METERING INSTALLATION, 4KV, 3 PHASE,
3 WIRE UG & OH SERVICES

FMO
OH 1484



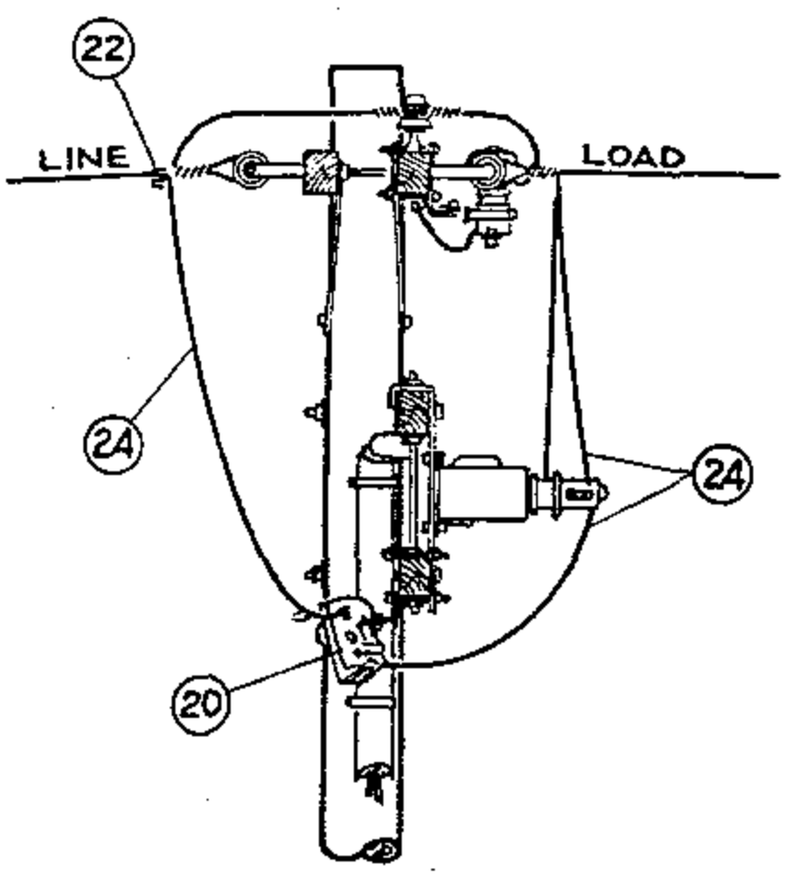



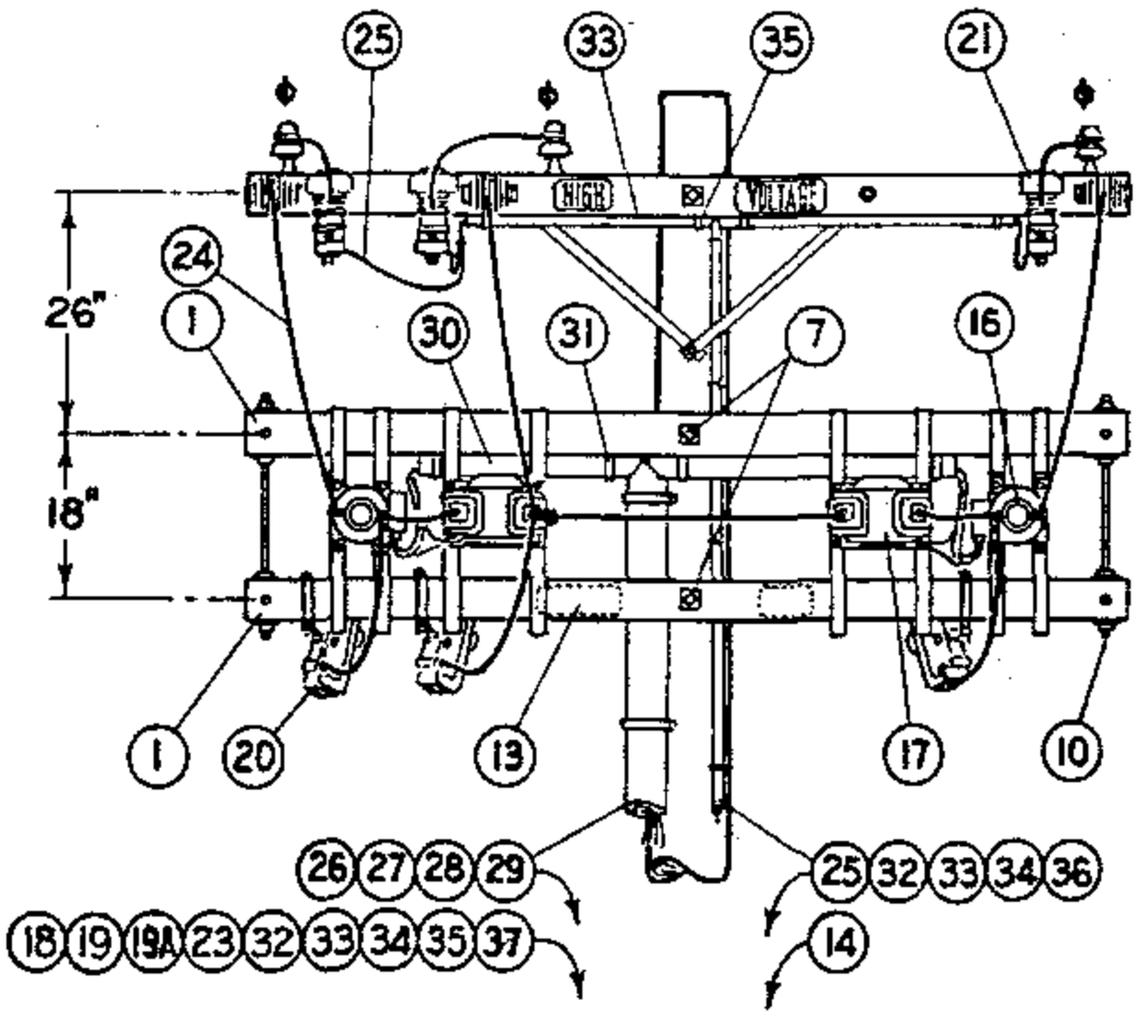




INSERT, SHOWING
INSTALLATION OF SHIELDED
SINGLE CONDUCTOR CABLES

FOR FIELD MAINTENANCE ONLY

UNDERGROUND SERVICE




OVERHEAD SERVICE

| | | |
|---|---|---|
| 1499.804<br>SUPERSEDES<br>1484.1 (2-28-83) | SDG&E ELECTRIC STANDARDS<br>POLETOP METERING INSTALLATION, 4KV, 3 PHASE,<br>3 WIRE UG & OH SERVICES | DATE 2-28-83<br>APPD ~~WT~~/KRH |

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FOR FIELD MAINTENANCE ONLY

NOTES:

(A) USE ONLY ONE GROUND ROD FOR LIGHTNING ARRESTER GROUND AND ONE GROUND ROD FOR METER GROUND WHERE A RESISTANCE OF LESS THAN 25 OHMS CAN BE OBTAINED WITH EACH ROD.

(B) DOUBLE METER CABINETS ARE REQUIRED FOR RKVAH METERING INSTALLATIONS.

(C) UNTWIST SUFFICIENT LENGTH OF #2 STRANDED WIRE TO CONNECT EACH ARRESTER AND POTHEAD GROUND WITH A SINGLE STRAND.

| | ITEM | DESCRIPTION | QUANTITY U.G. SERVICE P.I.L.C. | QUANTITY U.G. SERVICE RUBBER LIKE | QUANTITY O.H. SERV. | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|---|
| P. T. & F. | 1 | 3 1/2" x 4 1/2" x 8'-0" Crossarm, 6 Pin | 2 | 2 | 2 | PG 111 IT. 2 |
| | 2 | 3 3/4" x 5 3/4" x 4'-0" Pothead Alley Arm | 2 | – | – | PG 112 IT. 3 |
| | 2A | 3 3/4" x 5 3/4" x 6'-0" (10 Pin arm, cut in half) | – | 2 | – | PG 111 IT. 4 |
| | 3 | 3 3/4" x 5 3/4" x 18" Wood Block, Pothead Support | 1 | – | – | – |
| | 4 | Pothead Alley Arm Brace, 4'-0" | 2 | 1 | – | 163808 |
| | 5 | Mach. Bolt, Galv. 5/8" x 5", 1 rd. Washer & 1 Nut | 2 | 1 | – | PGS 139, 140 |
| | 6 | Mach. Bolt, Galv., 5/8" x 10" | 1 | – | – | PGS 139, 154816 |
| | 7 | Mach. Bolt, Galv. 5/8" x 14", 2 Sq. Washers & 1 Nut | 4 | 2 | 2 | PGS 139, 140 |
| | 8 | Mach. Bolt, Galv. 5/8" x 18", 2 Sq. Washers & 1 Nut | 1 | 1 | – | PGS 139, 140 |
| | 9 | Space Bolt, Galv. 5/8" x 20", 4 Sq. Washers & 4 Nuts | – | 1 | – | PGS 139, 140 |
| | 10 | Space Bolts, Galv. 5/8" x 26", 4 Sq. Washers & 4 Nuts | 2 | 2 | 2 | PGS 139, 140 |
| | 11 | | | | | |
| | 12 | Lag Screw, Galv. 5/8" x 5" | – | 1 | – | 621600 |
| | 13 | High Voltage Sign & Galv. Roofing Nails | 3 | 3 | 1 | 647648, 492224 |
| | 14 | Pole Steps | 16 | 16 | 16 | 692992 |
| | 15 | | | | | |
| M. I. | 16 | Current Transformer, 5 Kv, Hangers & Bolts | 2 | 2 | 2 | – |
| | 17 | Potential Transformers, 4800/120V, Hangers & Bolts | 2 | 2 | 2 | – |
| | 18 | Meter Three Phase Power | 1 | 1 | 1 | – |
| | 19 | Meter Cabinet; Single, 15" x 30" x 10 1/2"; Double, 30" x 30" x 10 1/2"; Lag Screws for Mounting (B) | 1 | 1 | 1 | SINGLE 161312, DOUBLE 161184 |
| | 19A | Test Switch | 1 | 1 | 1 | 710880-711008 |
| | 20 | Cutout, Expulsion Fuse | 3 | 3 | 3 | PG 1211 |
| | 21 | Lightning Arrester, 3 Kv. | 3 | 3 | 3 | 113216 |
| | 22 | Wire Connectors | 5 | 5 | 8 | PGS 783, 786 |
| | 23 | #6 Bare Stranded Copper Wire, Meter Ground | 14' | 14' | 14' | 813536 |
| | 24 | Bare Stranded Copper Wire, Size as Required | 35' | 35' | 50' | PGS 715, 716, 717 |
| | 25 | #2 Bare Stranded Copper Wire, L.A. Pothead Ground (C) | 52' | 52' | 52' | 813664 |
| | 26 | #12 Type TW Coded Wire, 5 Conductors, 40' Each | 200' | 200' | 200' | – |
| | 27 | Redwood Moulding | 26' | 26' | 26' | PG 143 IT 1 |
| | 28 | Moulding Straps, Galv. | 13 | 13 | 13 | 697024 |
| | 29 | 3/4" Conduit, Rigid Iron; Pipe Strap & 2-8d Nails, Galv. | 10' | 10' | 10' | 251008, 696704 |
| | 30 | 2" Fibre Conduit | 5' | 5' | 5' | 251618 |
| | 31 | 2" Fibre Conduit Strap & 2-8d Nails, Galv. | 4 | 4 | 4 | PG 143, 491584 |
| | 32 | Ground Rod and Clamp, incl. Conduit Ground Clamp | (A) 4 | (A) 4 | (A) 4 | 603072, 230016 |
| | 33 | Hardwood Moulding | 52' | 54' | 49' | 487200 |
| | 34 | Moulding Staples, Galv., 3" x 1 1/8" x 1/4" | 24 | 22 | 22 | 678560 |
| | 35 | 3/4" Pipe Straps, Galv. & 2 8d Nails, Galv. | 8 | 9 | 6 | 697888, 491584 |
| | 36 | 1/4" Fence Staples, Galv. | 14 | 12 | 12 | 678528 |
| | 37 | 3/4" Type "LB" Condulet | 1 | 1 | 1 | 146144 |
| | 38 | | | | | |

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SDG&E ELECTRIC STANDARDS

# POLETOP METERING INSTALLATION, 4KV, 3 PHASE, 3 WIRE UG & OH SERVICES

1499.805
SUPERSEDES
1484.2 (2-28-83)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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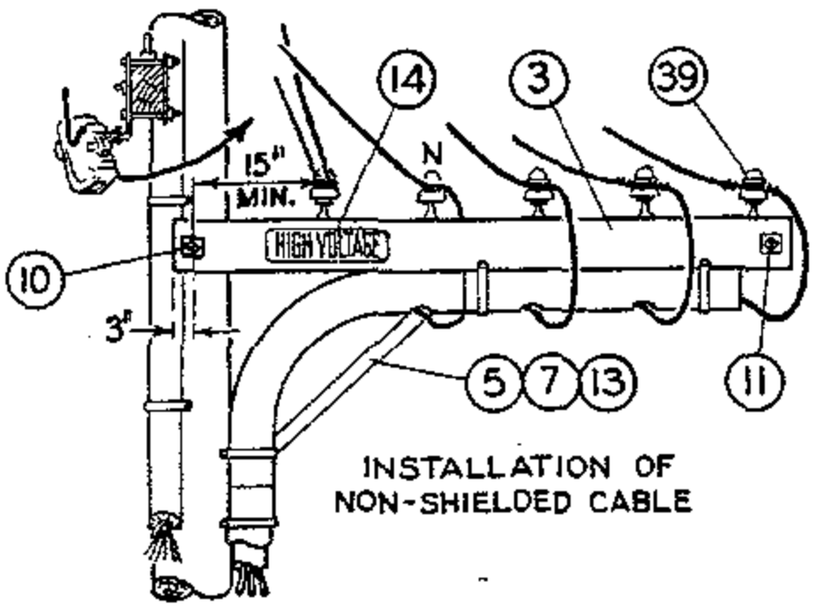
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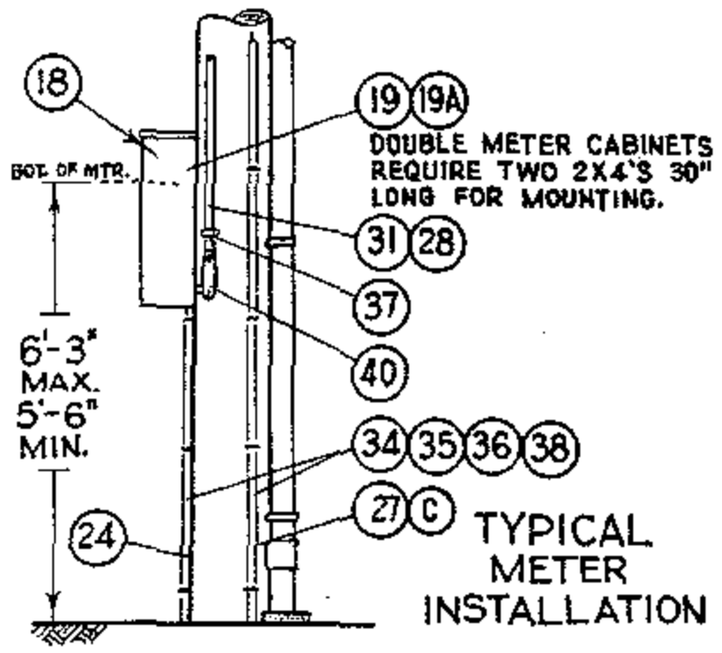
SDG&E ELECTRIC OVERHEAD STANDARD

POLETOP METERING INSTALLATION,
4KV, 3 PHASE, 4 WIRE UG & OH SERVICES

FMO
OH 1485




INSTALLATION OF NON-SHIELDED CABLE




TYPICAL METER INSTALLATION

**FOR FIELD MAINTENANCE ONLY**

NOTES:

(A) USE ONLY ONE GROUND ROD FOR LIGHTNING ARRESTER GROUND AND ONE GROUND ROD FOR METER GROUND WHERE A RESISTANCE OF LESS THAN 25 OHMS CAN BE OBTAINED WITH EACH ROD.

(B) DOUBLE METER CABINETS ARE REQUIRED FOR RKVAH METERING INSTALLATIONS.

(C) UNTWIST SUFFICIENT LENGTH OF #2 STRANDED WIRE TO CONNECT EACH ARRESTER AND POTHEAD GROUND WITH A SINGLE STRAND.

| | ITEM | DESCRIPTION | QUANTITY U.G. SERVICE P.I.L.C. | QUANTITY U.G. SERVICE SHIELD. | QUANTITY U.G. SERVICE NON SHIELD. | QUANTITY O.H. SERV. | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|---|---|
| P. T. & F. | 1 | 3 3/4" x 5 3/4" x 10'- 0" Standard Arm | 2 | 2 | 2 | 2 | PG 119 IT. 2 |
| | 2 | 3 3/4" x 5 3/4" x 4'- 0" Pothead Alley Arm | 2 | – | – | – | PG 112 IT. 3 |
| | 3 | 3 3/4" x 5 3/4" x 12'- 0" (12Kv. Arm, Cut in Half | – | 1 | 1 | – | PG 119 IT. 4 |
| | 4 | 3 3/4" x 5 3/4" x 18" Wood Block, Pothead Support | 1 | – | – | – | – |
| | 5 | Pothead Alley Arm Brace, 4'- 0" | 2 | 1 | 1 | – | 163808 |
| | 6 | | | | | | |
| | 7 | Machine Bolt, Galv., 5/8" x 5", 1 Round Washer & Nut | 2 | 1 | 1 | – | PGS 139, 140 |
| | 8 | Machine Bolt, Galv., 5/8" x 10" | 1 | – | – | – | PGS 139, 140 |
| | 9 | Machine Bolt, Galv., 5/8" x 14", 2 Square Washers & Nut | 4 | 2 | 2 | 2 | PGS 139, 140 |
| | 10 | Machine Bolt, Galv., 5/8" x 18", 2 Square Washers & Nut | 1 | 1 | 1 | – | PGS 139, 140 |
| | 11 | Space Bolt, Galv., 5/8" x 20", 4 Square Washers & 4 Nuts | – | 1 | 1 | – | PGS 139, 140 |
| | 12 | Space Bolt, Galv., 5/8" x 28", 4 Square Washers & 4 Nuts | 2 | 2 | 2 | 2 | PGS 139, 140 |
| | 13 | Lag Screw, Galv., 5/8" x 5" | – | 1 | 1 | – | 621600 |
| | 14 | High Voltage Sign & Galv. Roofing Nails | 3 | 3 | 3 | 1 | 647648, 492224 |
| | 15 | Pole Steps | 16 | 16 | 16 | 17 | 692992 |
| | 16 | Current Transformer, 5Kv., Hangers & Bolts | 3 | 3 | 3 | 3 | – |
| | 17 | Potential Transformer, 2400/120V, Hangers & Bolts | 3 | 3 | 3 | 3 | – |
| | 18 | Meter, Three Phase, Maximum Demand and/or Rkvah Recording | 1 | 1 | 1 | 1 | – |
| | 19 | Meter Cabinet; Single, 15" x 30" x 10 1/2"; Double, 30" x 30" x 10 1/2", Four Lag Screws for Mounting (B) | 1 | 1 | 1 | 1 | SINGLE 161312, DOUBLE 161184 |
| | 19A | Test Switch | 1 | 1 | 1 | 1 | 710880 - 711008 |
| | 20 | Cutout, Expulsion Fuse | 3 | 3 | 3 | 3 | PG 1211 |
| | 21 | Lightning Arrester, 3Kv. | 3 | 3 | 3 | 3 | 113216 |
| | 22 | Standoff Bracket | – | – | – | 2 | 165144 |
| | 23 | Wire Connectors | 6 | 6 | 6 | 13 | PGS 783, 786 |
| | 24 | #6 Bare Stranded Copper Wire, Meter Ground | 14' | 14' | 14' | 14' | 813536 |
| | 25 | Bare Stranded Copper Wire, Same Size as Line Neutral | 14' | 14' | 14' | 14' | PGS 715-717 |
| | 26 | Bare Stranded Copper Wire, Size as Required | 47' | 52' | 33' | 33' | PGS 715-717 |
| M. I. | 27 | #2 Bare Stranded Copper Wire, L. A. & Pothead Ground (C) | 52' | 52' | 52' | 52' | 813664 |
| | 28 | #12 Type TW Coded Wire, 7 Conductors, 40' Each | 280' | 280' | 280' | 280' | – |
| | 29 | Redwood Moulding | 20' | 20' | 20' | 20' | PG 143 IT 1 |
| | 30 | Moulding Strap, Galv. | 11 | 11 | 11 | 11 | 697024 |
| | 31 | 3/4" Conduit, Rigid Iron; Pipe Straps & 8d Nails; Galv. | 10' | 10' | 10' | 10' | 251008, 696704, 491584 |
| | 32 | 2" Fibre Conduit | 8' | 8' | 8' | 8' | 251616 |
| | 33 | 2" Fibre Conduit Straps & 2 8d Nails; Galv. | 6 | 6 | 4 | 4 | PG 143, 491584 |
| | 34 | Ground Rod & Clamp, Including Conduit Ground Clamp | (A) 4 | (A) 4 | (A) 4 | (A) 4 | 603072, 230016 |
| | 35 | Hardwood Moulding, 1" | 52' | 55' | 49' | 49' | 487200 |
| | 36 | Moulding Staples, Galv., 3" x 1 1/8" x 1/4" | 25 | 25 | 25 | 25 | 678560 |
| | 37 | 3/4" Pipe Straps, Galv. & 2 8d Nails, Galv. | 8 | 9 | 6 | 6 | 697888, 491584 |
| | 38 | 1 1/4" Fence Staples, Galv. | 14 | 12 | 12 | 12 | 678528 |
| | 39 | Insulator, 4Kv. and Steel Pin | 2 | 2 | 5 | 2 | PG 750, 532608 |
| | 40 | 3/4" Type "LB" Condulet | 1 | 1 | 1 | 1 | 146144 |
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| | 42 | | | | | | |

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SDG&E ELECTRIC STANDARDS

# POLETOP METERING INSTALLATION, 4KV, 3 PHASE, 4 WIRE UG & OH SERVICES

1499.807
SUPERSEDES
1485.2 (2-28-83)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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X Indicates Latest Revision | Completely Revised | New Page | Information Removed

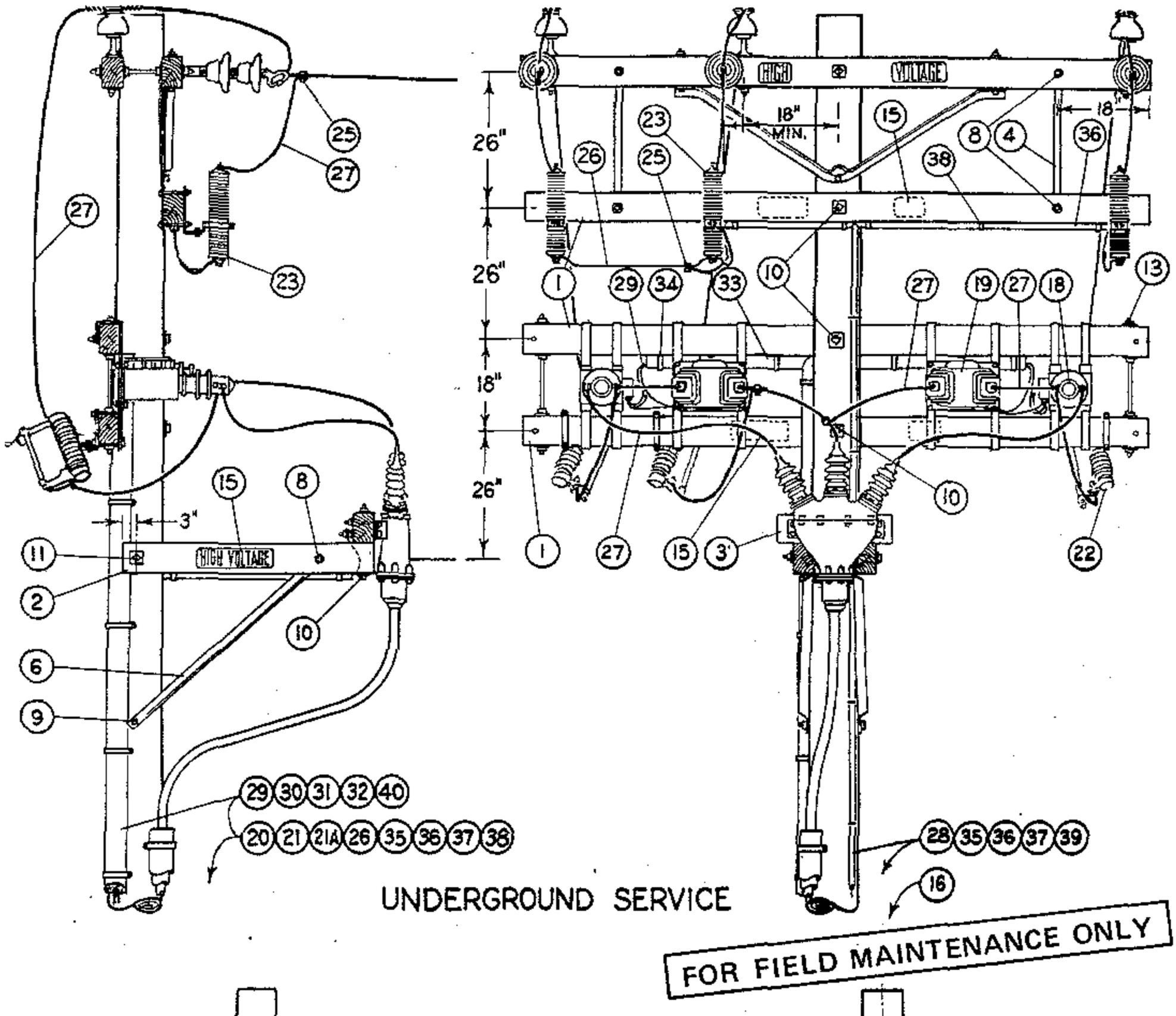
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SDG&E ELECTRIC OVERHEAD STANDARD

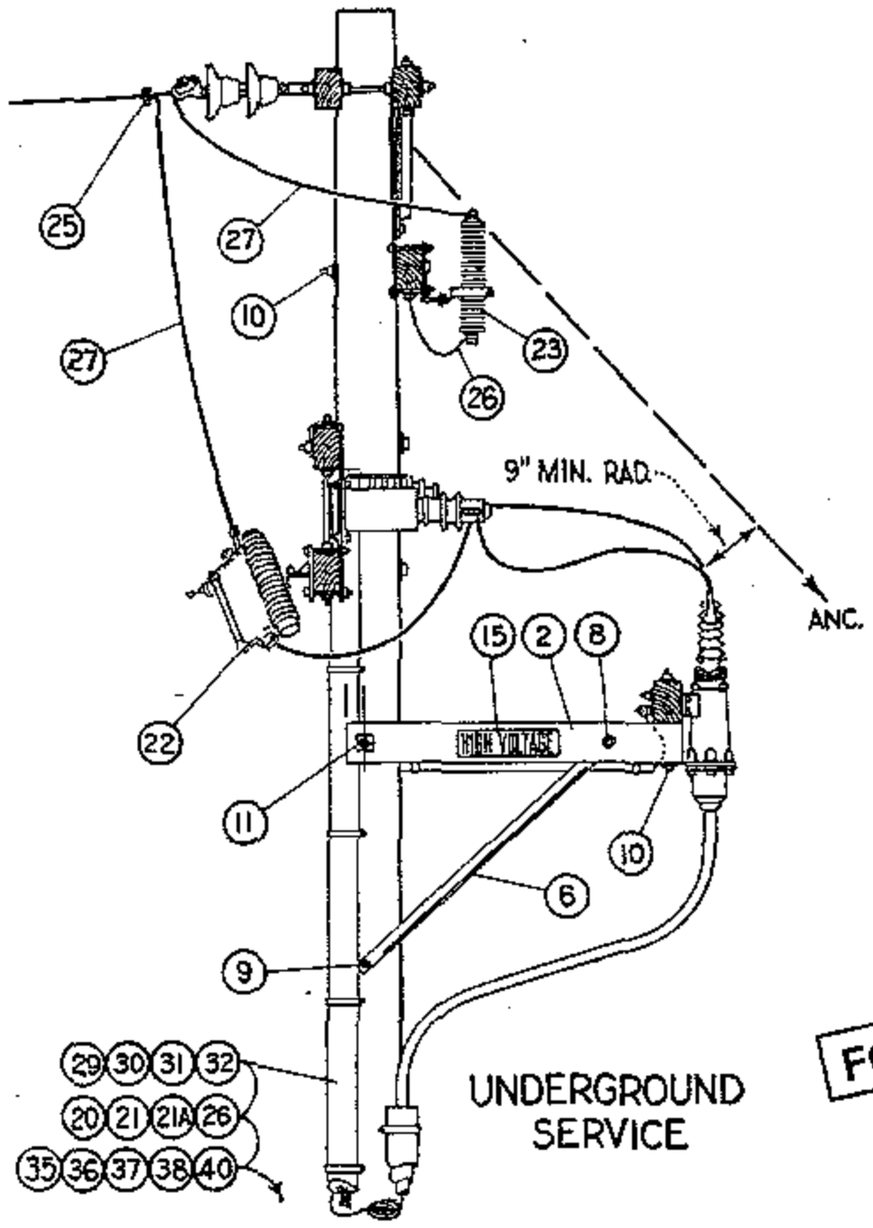
POLETOP METERING INSTALLATION, 12KV, 3 PHASE,
3 WIRE UG & OH SERVICES

FMO
OH 1486

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|---|---|---|




UNDERGROUND SERVICE

FOR FIELD MAINTENANCE ONLY

NOTES:

Ⓐ USE ONLY ONE GROUND ROD FOR LIGHTNING ARRESTER GROUND AND ONE GROUND ROD FOR METER GROUND WHERE RESISTANCE OF LESS THAN 25 OHMS CAN BE OBTAINED WITH EACH ROD.

Ⓑ DOUBLE METER CABINETS ARE REQUIRED FOR RKVAH METERING INSTALLATIONS.

| | ITEM | DESCRIPTION | QUANTITY U.G. SERV. | QUANTITY O.H. SERV. | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|
| P. T. & F. | 1 | 3 3/4" x 5 3/4" x 10'-0" Standard Arm | 3 | 3 | PG 119 IT. 2 |
| | 2 | 3 3/4" x 5 3/4" x 4'-0" Pothead Alley Arm | 2 | – | PG 112 IT. 3 |
| | 3 | 3 3/4" x 5 3/4" x 22" Wood Block, Pothead Support | 1 | – | – |
| | 4 | Flat Crossarm Brace, 36" | 2 | 2 | 164224 |
| | 5 | | | | |
| | 6 | Pothead Alley Arm Brace, 4'-0" | 2 | – | 163808 |
| | 7 | | | | |
| | 8 | Mach. Bolt, Galv., 5/8" x 5", 1 rd Washer, & 1 Nut | 9 | 4 | PGS 139, 140 |
| | 9 | Mach. Bolt, Galv., 5/8" x 10" | 1 | – | PGS 139, 140 |
| | 10 | Mach. Bolt, Galv., 5/8" x 14", 2 Sq. Washers & 1 Nut | 5 | 3 | PGS 139, 140 |
| | 11 | Mach. Bolt, Galv., 5/8" x 18", 2 Sq. Washers & 1 Nut | 1 | – | PGS 139, 140 |
| | 12 | | | | |
| | 13 | Space Bolt, Galv., 5/8" x 26", 4 Sq. Washers & 4 Nuts | 2 | 2 | PGS 139, 140 |
| | 14 | | | | PGS 1212, 1213 |
| | 15 | High Voltage Sign & Galv. Roofing Nails | 2 | 2 | 647648, 492224 |
| | 16 | Pole Steps | 14 | 15 | 692992 |
| | 17 | | | | |
| M. I. | 18 | Current Transformer, 15 KV, Hangers & Bolts | 2 | 2 | – |
| | 19 | Potential Transformer, 12000/120 v, Hangers & Bolts | 2 | 2 | – |
| | 20 | Meter, Three Phase Power | 1 | 1 | – |
| | 21 | Meter Cabinet; Single, 15" x 30" x 10 1/2"; Double, 30" x 30" x 10 1/2"; Lag Screws for Mounting Ⓑ | 1 | 1 | SINGLE 161312, DOUBLE 161184 |
| | 21A | Test Switch | 1 | 1 | 710680-711008 |
| | 22 | Cutout, Expulsion Fuse | 3 | 3 | PGS 1212, 1213 |
| | 23 | Lightning Arrester, 12 Kv. | 3 | 3 | 113216 |
| | 24 | | | | |
| | 25 | Wire Connectors | 5 | 8 | PGS 783, 786 |
| | 26 | #6 Bare Stranded Copper Wire - Meter Grnd. & L.A. Lateral | 27' | 27' | 813536 |
| | 27 | Bare Stranded Copper Wire, Size as Required | 55' | 65' | PGS 715-717 |
| | 28 | #2 Bare Stranded Copper, Lightning Arrester Ground | 54' | 45' | 813664 |
| | 29 | #12 Type T W Coded Copper Wire, 5 Conductors @ 34' | 170' | 170' | – |
| | 30 | Redwood Moulding, C-54.1 #1 | 16' | 16' | PG 143 IT. 1 |
| | 31 | Moulding Strap, Galv., C-54.1 #1A | 8 | 8 | 697024 |
| | 32 | 3/4" Conduit, Rigid Iron; Pipe Strap & 2-8d Nails, Galv. | 10' | 10' | 251008, 696704, 491584 |
| | 33 | 2" Fibre Conduit | 6' | 6' | 251616 |
| | 34 | 2" Pipe Straps & 2-8d Nails, Galv. | 4 | 4 | 697856, 491584 |
| | 35 | Ground Rod & Clamp | Ⓐ 4 | Ⓐ 4 | 603072, 230016 |
| | 36 | Hardwood Moulding, 1" | 49' | 45' | 487200 |
| | 37 | Moulding Staples, Galv., 3" x 1 1/8" x 1/4" | 30 | 30 | 678560 |
| | 38 | 3/4" Pipe Strap & 2-8d Nails, Galv. | 10 | 8 | 697888, 491584 |
| | 39 | 1 1/4" Fence Staples, Galv. | 12 | 12 | 678528 |
| | 40 | 3/4" Type "LB" Condulet | 1 | 1 | 146144 |

SDG&E ELECTRIC STANDARDS

DATE 2-28-83
APPD ONT/KVAR #

# POLETOP METERING INSTALLATION, 12KV, 3 PHASE, 3 WIRE U.G. & O.H. SERVICES

1499.809
SUPERSEDES
1486.2 (2-28-83)

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**OH1487/UG4287 FIELD MAINTENANCE ONLY**

ALL VERSIONS IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

## REVISION HISTORY:

**04/13/2020:** CREATED IN FMO

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Indicates Latest Revision | Completely Revised | X New Page | Information Removed

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

REVISED CT & PT POLETOP METERING INSTALLATION, 12KV, O.H. & U.G. SERVICES

FMO OH1487 UG4287

**SCOPE:** PRIMARY METERED DISTRIBUTION POLE: THIS STANDARD ILLISTRATES A PRIMARY METERED OVERHEAD AND UNDERGROUND DISTRIBUTION POLE AND HARDWARE.

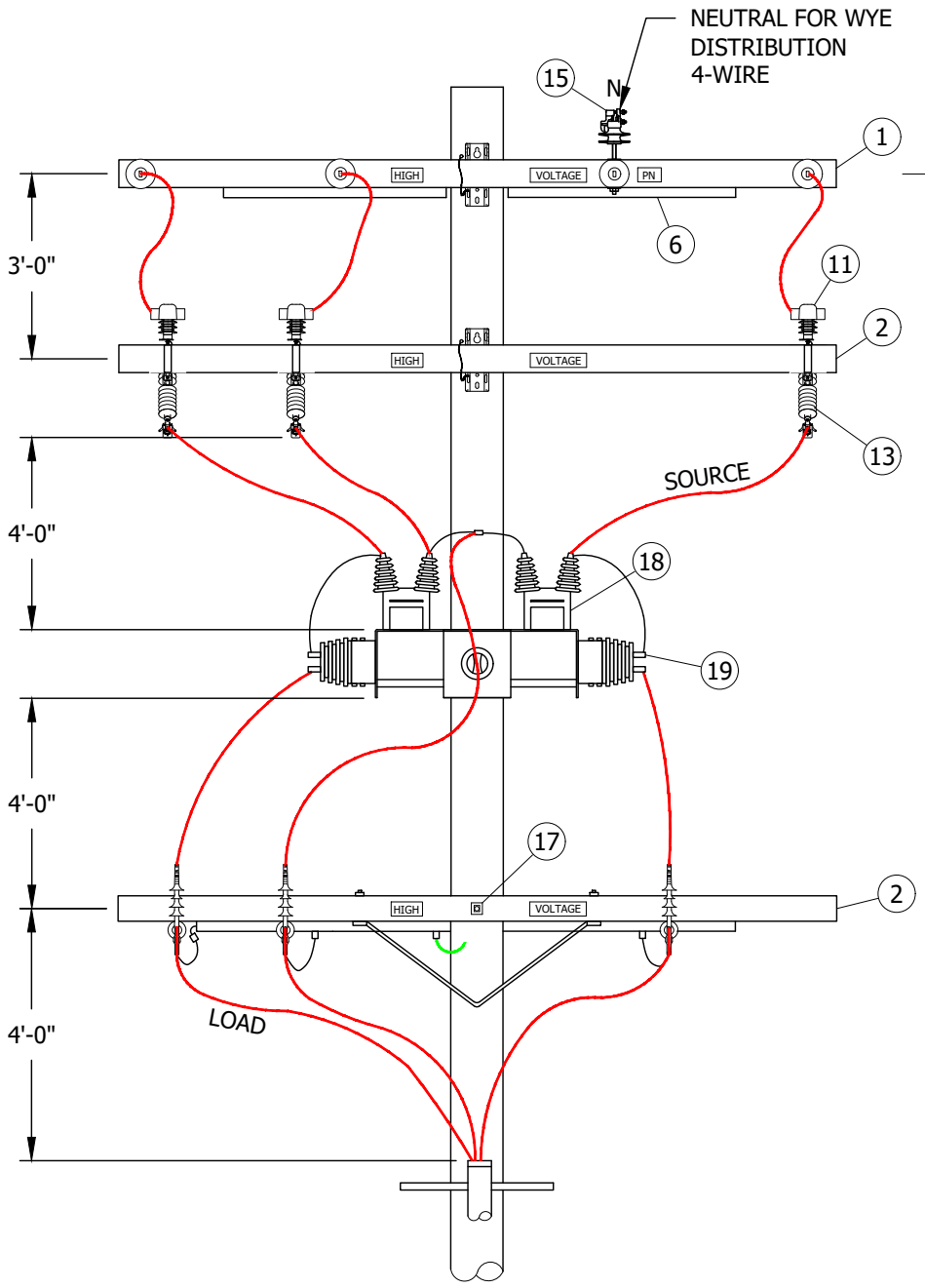



**FIGURE 1**
PRIMARY METERED UNDERGROUND CABLE POLE

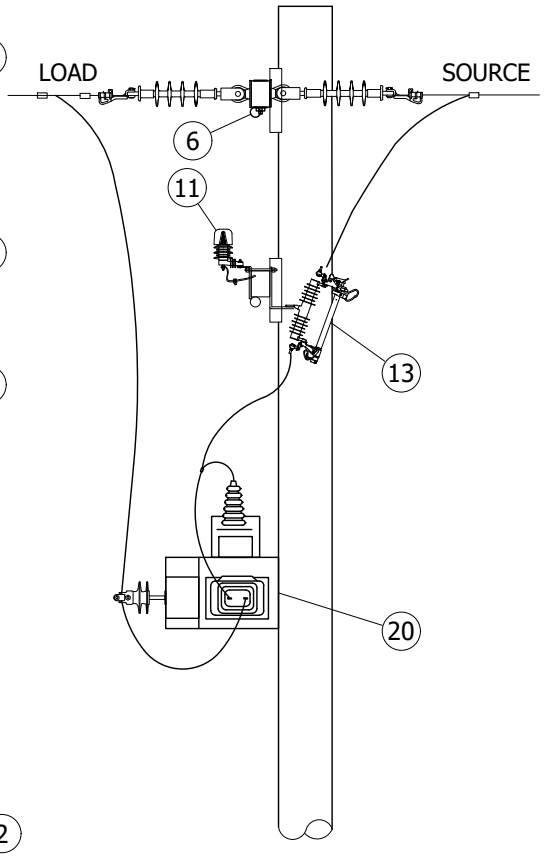



**FIGURE 2**
PRIMARY METERED OVERHEAD

FIELD MAINTENANCE ONLY

**INSTALLATION:** NONE

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

REVISED CT & PT POLETOP METERING INSTALLATION,
12KV, O.H. & U.G. SERVICES



FMO
OH1487.1
UG4287.1

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## BILL OF MATERIALS:

| ITEM | DESCRIPTION (a) | | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, FG, DEADEND | | AS REQ'D | - | AS REQ'D | - |
| 2 | CROSSARM, FG, TANGENT, EQUIPMENT | | AS REQ'D | - | AS REQ'D | - |
| 3 | DBL ARRESTOR/CUTOUT BRACKET | | 3 | - | S165422 | - |
| 4 | 28" STRAP BRACE | | 2 | - | S164192 | - |
| 5 | LIGHTNING ARRESTOR GROUND STRAP | | 3 | - | S698754 | - |
| 6 | 1" PVC | | AS REQ'D | - | S251200 | - |
| 7 | #6 BS | | AS REQ'D | - | S813536 | - |
| 8 | #4 BS | | AS REQ'D | - | S813764 | - |
| 9 | #4 PVC COVERED GROUND WIRE | | AS REQ'D | - | S812480 | - |
| 10 | GROUND WIRE STAPLES | | AS REQ'D | - | S678562 | - |
| 11 | 12KV LIGHTNING ARRESTER | | 3 | 1247 | S113248 | LA12 |
| 12 | CUTOUT, INTERCHANGEABLE, NON-PORC | ZONE 1<br>ZONE 2 | 3 | - | AS-REQ'D | - |
| 13 | FUSE HOLDER, SMU, FOR SMD30 CUTOUT BODY (100A) | | 3 | - | S368674 | - |
| 14 | STAND - OFF PIN, 1" | | AS REQ'D | - | S529248 | - |
| 15 | INSULATOR, VICE-TOP | | 1 | - | S429060 | IPCN1 |
| 16 | FUSE (SIZE AS REQ'D) | | AS REQ'D | - | AS REQ'D | - |
| 17 | SPACE BOLTS 5/8" X 26", SQUARE WASHERS & NUTS | | AS REQ'D | 392 | - | - |
| 18 | 12KV POTENTIAL TRANSFORMER | | AS REQ'D | - | - | - |
| 19 | 12KV CURRENT TRANSFORMER | | AS REQ'D | - | - | - |
| 20 | P.T./C.T. BRACKET | | 1 | - | S165380 | - |
| 21 | C/O / LADDER BRACKET | | AS-REQ'D | - | S166070 | - |
| 22 | INDICATOR, CUTOUT, FIREFLY | | 3 | - | S423606 | - |
| 23 | COVER, CUTOUT, AVIAN PROTECTION | | 3 | - | S298682 | - |

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## NOTES:

I. DISTRIBUTION CONSTRUCTION CREW TO INSTALL ALL HIGH SIDE CONNECTORS, JUMPERS AND EQUIPMENT. AMO TO INSTALL LOW SIDE CONNECTORS AND CONDUCTORS.

II. MAXIMUM WEIGHT FOR PT AND CT TRANSFORMERS IS 85 LBS. EACH.

## REFERENCE:

(a) THE ITEMS CONTAINED IN THE BILL OF MATERIALS REPRESENT WOOD CONSTRUCTION STANDARD, FOR STEEL CONSTRUCTION SEE CURRENT STANDARD.

b. FOR GROUNDING SEE STANDARD 1002.

c. CONTACT EMO FOR FUSING CORDINATION AND PT CT SELECTION.

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

REVISED CT & PT POLETOP METERING INSTALLATION, 12KV, O.H. & U.G. SERVICES

FMO
OH1487.2
UG4287.2

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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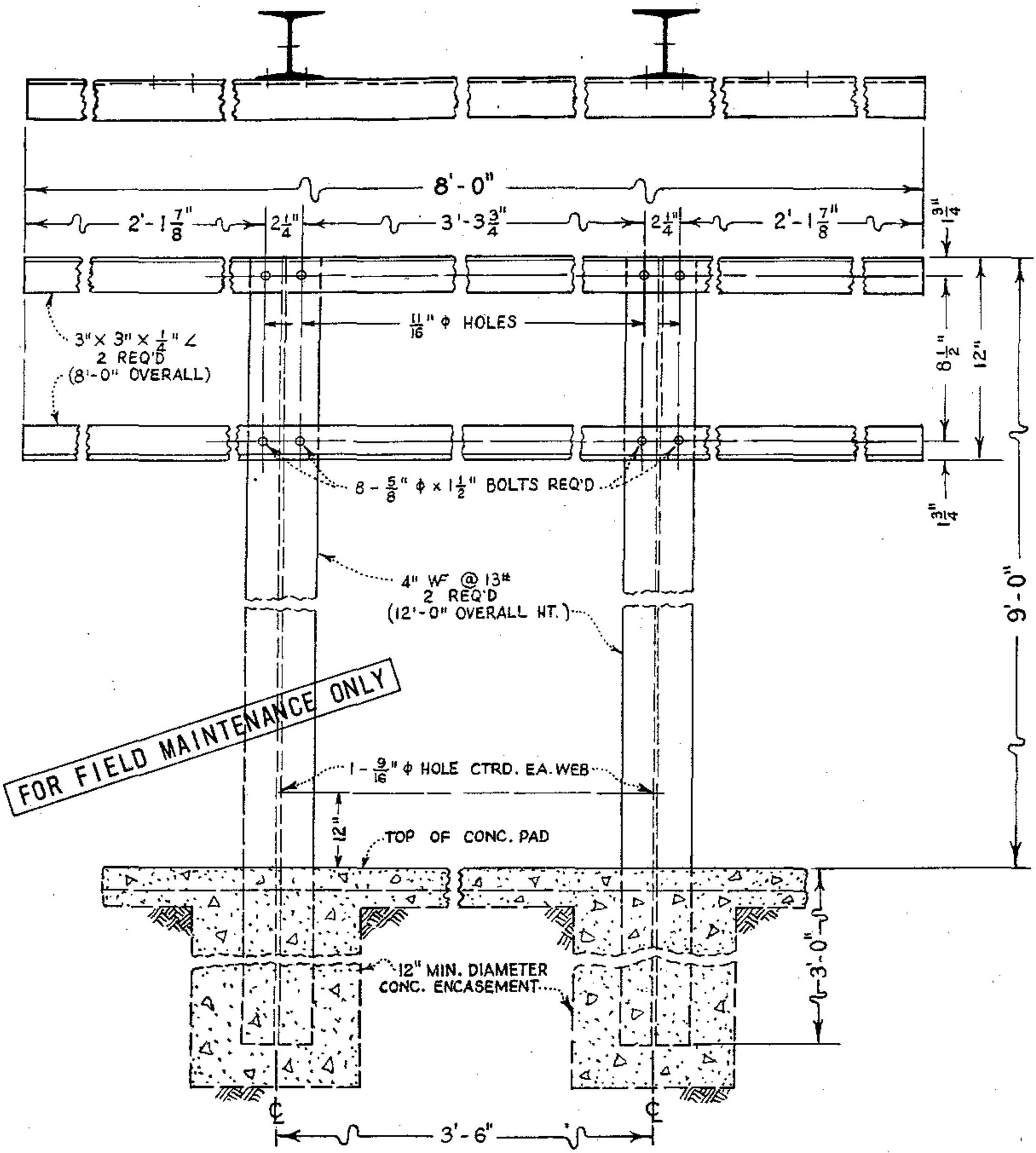
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

METERING RACK, CUSTOMER OWNED, CONSTRUCTION DETAILS

FMO OH 1489

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ALL STEEL TO BE HOT-DIP GALV. AFTER FABRICATION.

| | | |
|---|---|---|
| 1499.810<br>SUPERSEDES<br>1489 (1-6-82) | SDG&E ELECTRIC STANDARDS<br>METERING RACK, CUSTOMER OWNED, CONSTRUCTION DETAILS | DATE 2-28-83<br>APPD |

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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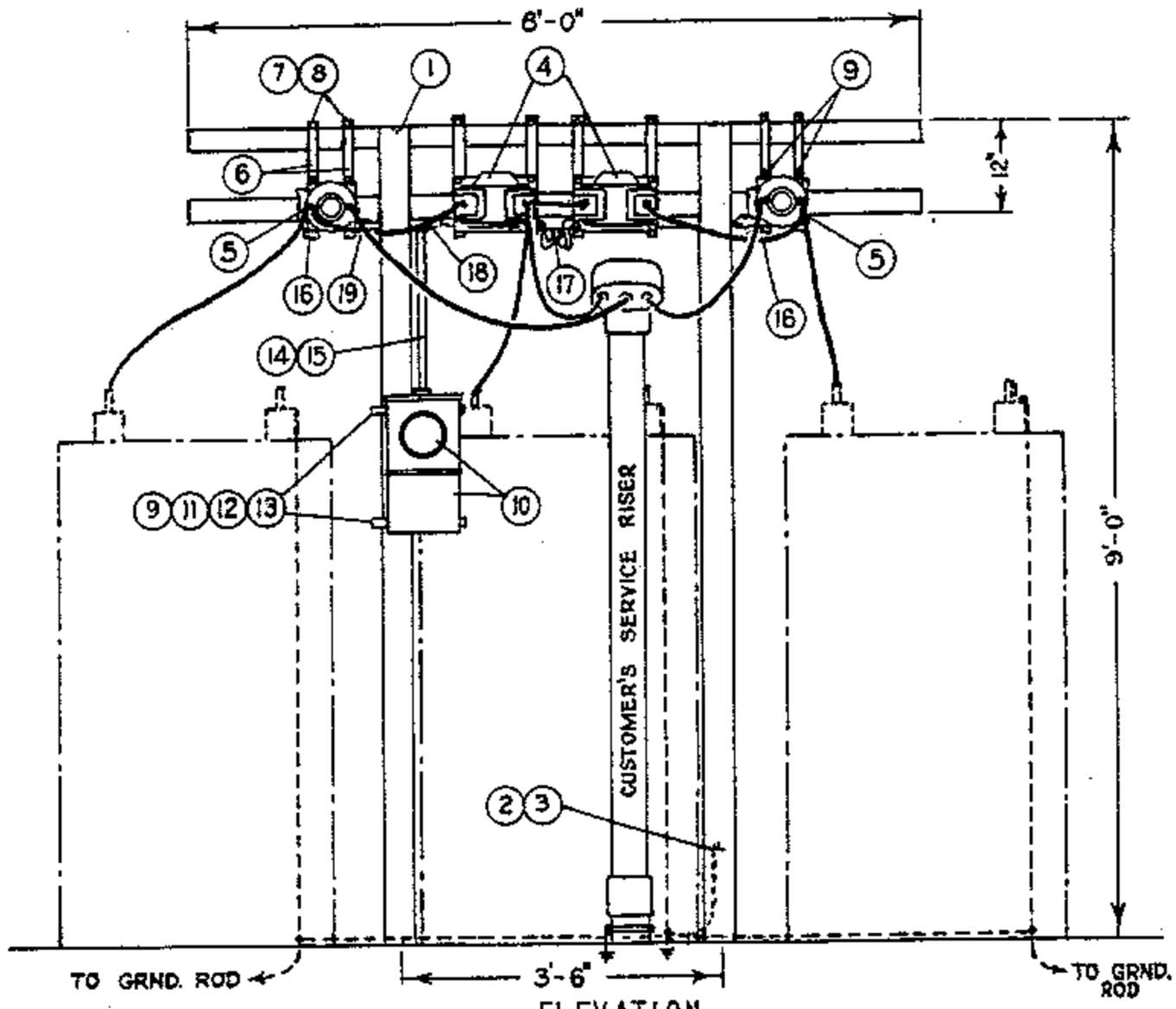
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

4KV METERING INSTALLATION ON RACK, FOR 3 WIRE AND 4 WIRE, 3Ø SERVICES

FMO
OH 1490

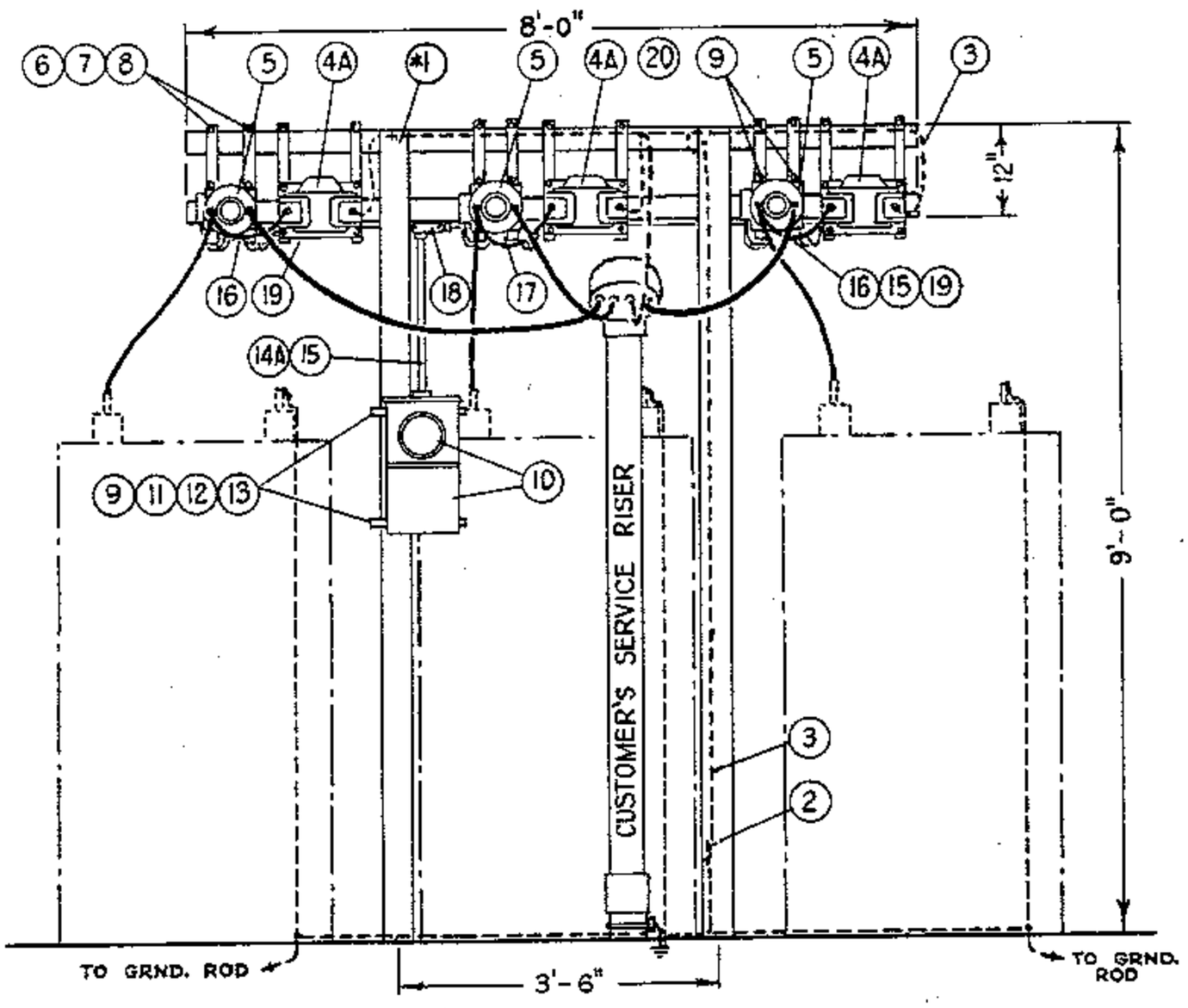
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ELEVATION

3 WIRE, 3ϕ SERVICE

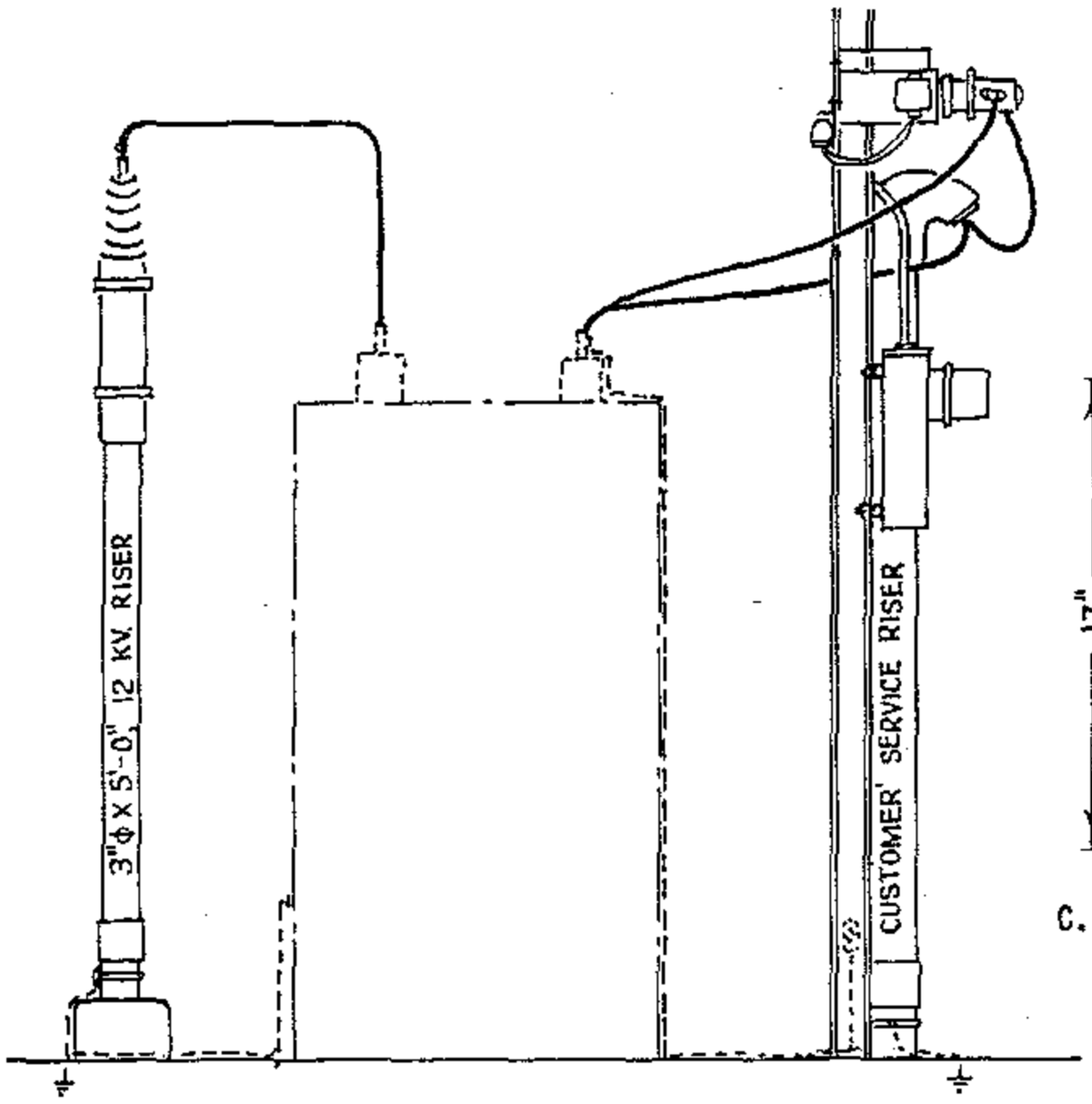
FOR FIELD MAINTENANCE ONLY



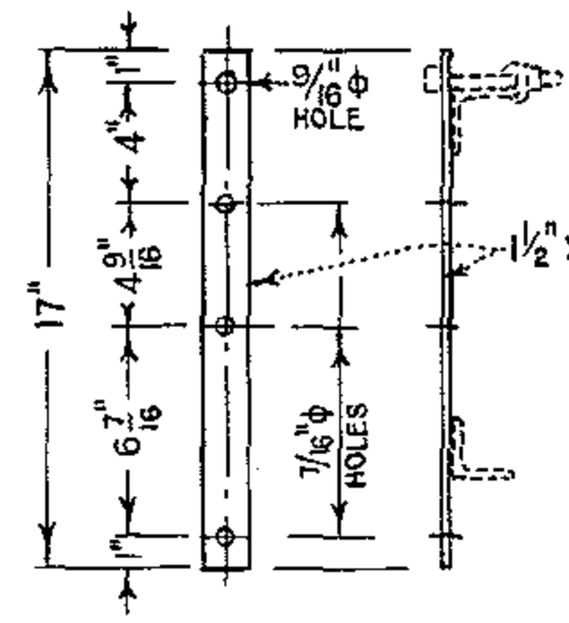

ELEVATION

4 WIRE, 3ϕ SERVICE

| | | |
|---|---|---|
| DATE 11-16-81<br>APPD JES | SDG&E ELECTRIC STANDARDS<br>4KV METERING INSTALLATION ON RACK, FOR 3 WIRE AND 4 WIRE, 3ϕ SERVICES | 1499.901<br>SUPERSEDES<br>1490.1(11-16-81) |




ELEVATION




C.T. & P.T. MTG STRAPS
ITEM 6

FOR FIELD MAINTENANCE ONLY

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NOTE:

(A) TO BE FURNISHED AND INSTALLED BY CUSTOMER.

| ITEM | DESCRIPTION | QUANTITY | | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| | | 3 Wire | 4 Wire | |
| 1 | Galv. Steel Metering Rack | (A) 1 | (A) 1 | PG 1479 |
| 2 | Ground Connector, 1 bolt, single groove | 1 | 1 | 230016 |
| 3 | Ground Wire. Bare Strd. copper | 5' | 20' | PGS 715-716 |
| 4 | Potential Transformer, 4800/120V, Base Mounted | 2 | - | - |
| 4A | Potential Transformer, 2400/120V, Base Mounted | - | 3 | - |
| 5 | Current Transformer, 5 Kv. Base Mounted | 2 | 3 | - |
| 6 | P.T. & C.T. Straps, Galv., per detail | 8 | 12 | - |
| 7 | Mach. Bolts, Galv., 1/2" x 4", 2 washers & 1 nut | 8 | 12 | PG 139, 140 |
| 8 | Nut Seats, Delta-Star | 8 | 12 | - |
| 9 | Mach. Bolts, Galv., 3/8" diam. X 1", 1 washer & 1 nut | 20 | 24 | PGS 139, 140 |
| 10 | Meter & Meter Socket Box | 1 | 1 | - |
| 11 | Unistrut, type P-4000, galv. | 30" | 30" | - |
| 12 | Beam Grip, Delta-Star | 4 | 4 | 392384 |
| 13 | Cap Screw, Galv., 1/2" diam. x 13/16" | 4 | 4 | 620320 |
| 14 | 5 - 1c #12 type TW Coded Wire | 40" | - | - |
| 14A | 7 - 1c #12 type TW Coded Wire | - | 64' | - |
| 15 | 3/4" Conduit, Galv., Rigid Iron | 6' | 8' | 251008 |
| 16 | 3/4" Condulet, Galv., Type "E" with 4 hole comp. cover | 2 | 2 | 145568, 145376 |
| 17 | 3/4" Condulet, Galv., Type "C" with 4 hole comp. cover | 1 | 1 | 145088, 145376 |
| 18 | 3/4" Condulet, Galv., Type "TR" with blank cover | 1 | 1 | - |
| 19 | Galv. steel conduit clamp | 4 | 4 | 227104 |
| 20 | Wire Connectors | - | 2 | PGS 783, 786 |

1499.902
SUPERSEDES
90.2 (11-16-81)

SDG&E ELECTRIC STANDARDS

4KV METERING INSTALLATION ON RACK, FOR 3 WIRE AND 4 WIRE, 3ϕ SERVICES

DATE 11-16-81
APPD JEG

| PAGE | SUBJECT |
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| 1503 | STREET LIGHT SWITCHING TIMES |
| 1509 | STREET LIGHT G.O. 95 MINIMUM CLEARANCES |
| 1510 | HIGH INTENSITY DISCHARGE LAMPS |
| 1511 | REPLACEMENT REFRACTORS |
| 1519 | LIGHTING INSTALLATION |
| 1520 | MERCURY VAPOR CONVENTIONAL LUMINAIRES AND REPLACEMENT REFRACTORS |
| 1521 | HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND STARTER |
| 1555 | SERIES CONTROLLED REGULATED OUTPUT STREET LIGHT TRANSFORMER INSTALLATION REMOTE CONTROL OUTDOOR CIRCUIT SWITCH CAPACITOR 4KV |
| 1556 | SERIES CONTROLLED R.O. STREET LIGHT TRANSFORMER AND R.C.O.C SWITCH, LINE ARM POSITION, 4KV |
| 1562 | P.E. CONTROLLED R.D. STREET LIGHT TRANSFORMER INSTALLATION, 12KV |

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| C | OH1503 MOVED TO FMO | GLC | GLW | JES | CZH | 10/09/2020 | F | | | | | | |
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# OH1503 FIELD MAINTENANCE ONLY

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**REVISION HISTORY:**

10/09/2020: MOVED TO FMO

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**SCOPE:** THIS STANDARD PROVIDES A SCHEDULE FOR STREET LIGHT SWITCHING TIMES BASED ON TURN–ON 15 MINUTES AFTER SUNSET AND TURN–OFF 30 MINUTES BEFORE SUNRISE, CHANGING AT 5 DAY INTERVALS. THIS SCHEDULE PROVIDES ABOUT 4165 BURNING HOURS PER YEAR.

| JANUARY | | | FEBRUARY | | | MARCH | | |
|---|---|---|---|---|---|---|---|---|
| DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF |
| 1 | 5:10 | 6:20 | 5 | 5:40 | 6:10 | 2 | 6:05 | 5:45 |
| 6 | 5:15 | 6:20 | 10 | 5:45 | 6:05 | 7 | 6:05 | 5:40 |
| 11 | 5:20 | 6:20 | 15 | 5:50 | 6:00 | 12 | 6:10 | 5:35 |
| 16 | 5:25 | 6:20 | 20 | 5:55 | 5:55 | 17 | 6:15 | 5:25 |
| 21 | 5:30 | 6:20 | 25 | 6:00 | 5:50 | 22 | 6:20 | 5:20 |
| 26 | 5:35 | 6:15 | **FIGURES FROM FIRST SUNDAY IN APRIL TO LAST SUNDAY IN OCTOBER INDICATE PACIFIC DAYLIGHT SAVING TIME** | | | 27 | 6:20 | 5:15 |
| 31 | 5:40 | 6:15 | | | | | | |

| APRIL | | | MAY | | | JUNE | | |
|---|---|---|---|---|---|---|---|---|
| DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF |
| 1 | 6:25/7:25 | 4:10/5:10 | 1 | 7:45 | 5:30 | 5 | 8:10 | 5:10 |
| 6 | 6:30 | 5:00 | 6 | 7:50 | 5:25 | 10 | 8:10 | 5:10 |
| 11 | 6:30 | 4:55 | 11 | 7:50 | 5:20 | 15 | 8:15 | 5:10 |
| 16 | 6:35 | 4:50 | 16 | 7:55 | 5:20 | 20 | 8:15 | 5:15 |
| 21 | 6:40 | 4:45 | 21 | 8:00 | 5:15 | 25 | 8:15 | 5:15 |
| 26 | 6:40/7:40 | 4:35/5:35 | 26 | 8:00 | 5:15 | 30 | 8:15 | 5:15 |
| | | | 31 | 8:05 | 5:15 | | | |

| JULY | | | AUGUST | | | SEPTEMBER | | |
|---|---|---|---|---|---|---|---|---|
| DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF |
| 5 | 8:15 | 5:20 | 4 | 8:00 | 5:35 | 3 | 7:25 | 5:55 |
| 10 | 8:15 | 5:20 | 9 | 7:55 | 5:40 | 8 | 7:20 | 6:00 |
| 15 | 8:10 | 5:25 | 14 | 7:50 | 5:40 | 13 | 7:15 | 6:00 |
| 20 | 8:10 | 5:25 | 19 | 7:45 | 5:45 | 18 | 7:05 | 6:05 |
| 25 | 8:05 | 5:30 | 24 | 7:40 | 5:50 | 23 | 7:00 | 6:05 |
| 30 | 8:05 | 5:30 | 29 | 7:35 | 5:50 | 28 | 6:55 | 6:10 |

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| A | REVISION | -- | -- | -- | PIA/RDJ | 2/6/1981 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STREET LIGHT SWITCHING TIMES

FMO OH1503.1

| OCTOBER | | | NOVEMBER | | | DECEMBER | | |
|---|---|---|---|---|---|---|---|---|
| DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF | DATES | TIME ON | TIME OFF |
| 3 | 6:50 | 6:15 | 2 | 5:15 | 5:35 | 2 | 5:00 | 6:00 |
| 8 | 6:40 | 6:15 | 7 | 5:10 | 5:40 | 7 | 5:00 | 6:05 |
| 13 | 6:35 | 6:20 | 12 | 5:05 | 5:45 | 12 | 5:00 | 6:10 |
| 18 | 6:30 | 6:25 | 17 | 5:05 | 5:50 | 17 | 5:00 | 6:15 |
| 23 | 6:25 | 6:30 | 22 | 5:05 | 5:55 | 22 | 5:05 | 6:15 |
| 28 | 6:20/5:20 | 6:30/5:30 | 27 | 5:00 | 6:00 | 27 | 5:10 | 6:20 |

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| A | REVISION | -- | -- | -- | PIA/RDJ | 2/6/1981 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STREET LIGHT SWITCHING TIMES

FMO OH1503.2

# OH1509 FIELD MAINTENANCE ONLY

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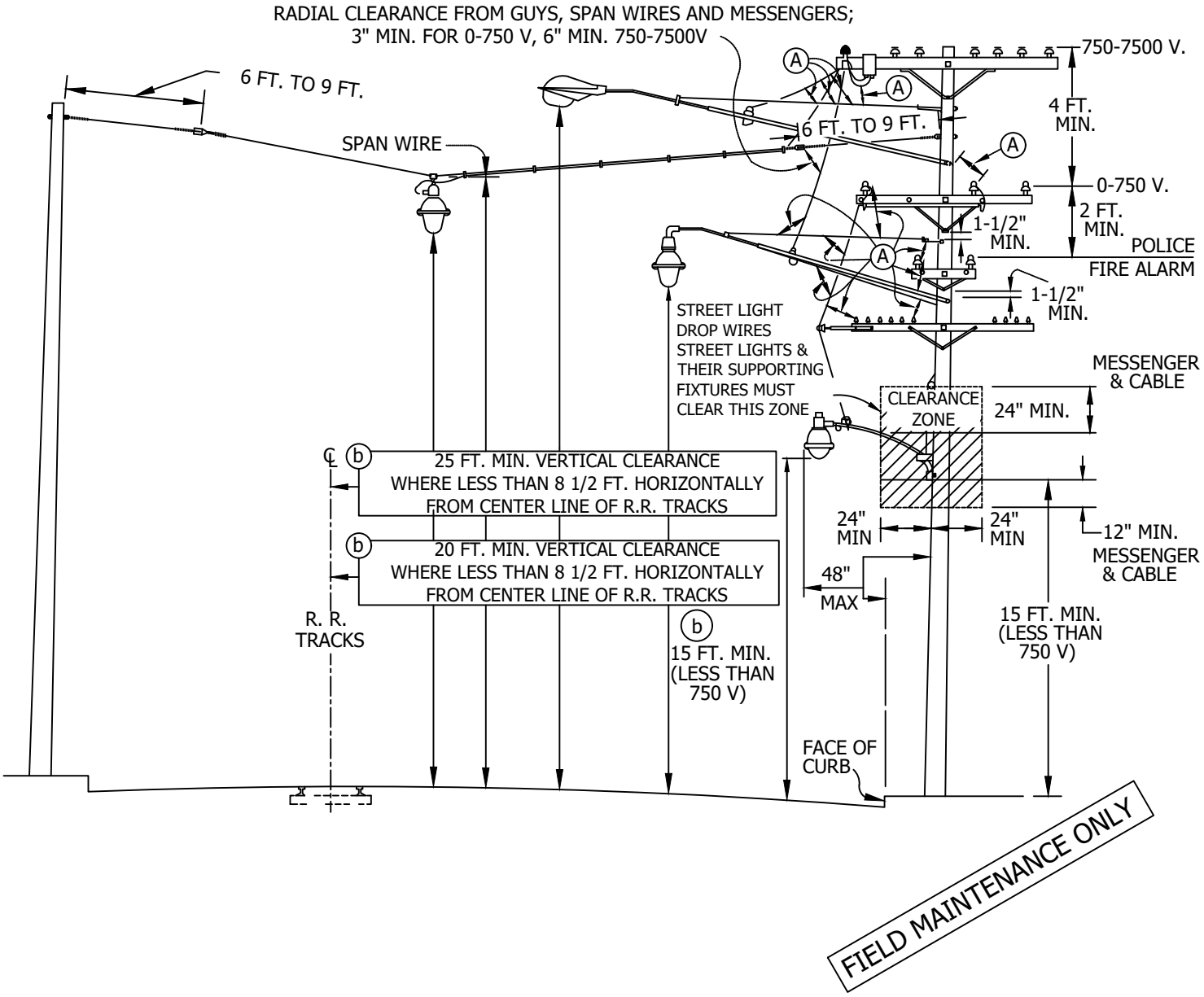
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STREET LIGHT G.O. 95 MINIMUM CLEARANCES

FMO OH1509

**SCOPE:** THIS STANDARD SHOWS MINIMUM CLEARANCES FOR STREET LIGHT AS REQUIRED BY G.O. 95.




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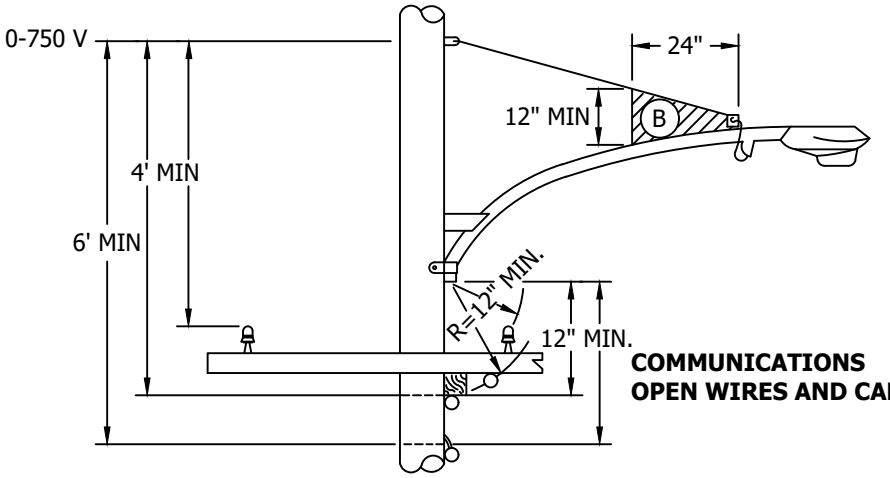
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STREET LIGHT G.O. 95 MINIMUM CLEARANCES

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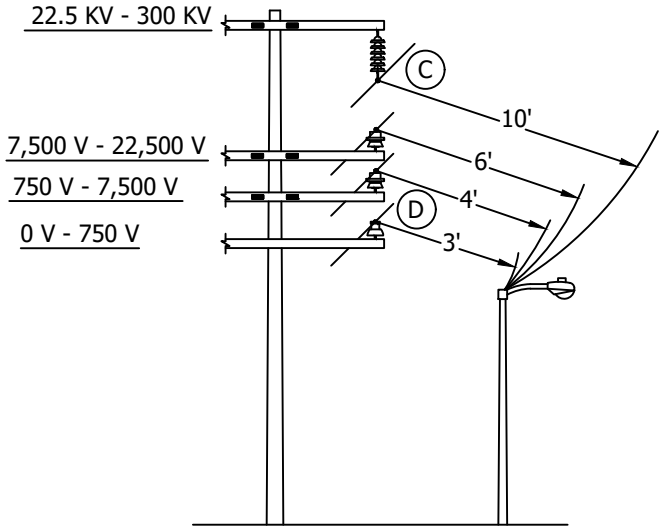




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**INSTALLATION:**

(A) ALL STREET LIGHT DROP WIRES, STREET LIGHTS AND THEIR SUPPORTING FIXTURES (INCLUDING RODS, BRACES AND GUYS) SHALL NOT BE LESS THAN 12" RADIALLY FROM UNPROTECTED CONDUCTORS NOT SUPPORTED ON MESSENGERS (INCLUDING LEAD WIRES & TAPS) EXCEPT LEAD WIRES SUPPLYING THE STREET LIGHTS WITHIN 24" OF THEIR POINTS OF ENTRANCE TO THE STREET LIGHTING EQUIPMENT.

(B) STREET LIGHT LEAD WIRE SHALL BE 12" MINIMUM RADIALLY FROM STREET LIGHT HARDWARE EXCEPT IN THE SHADED AREA.

(C) RADIAL CLEARANCES REQUIRED FOR VARIOUS VOLTAGE CONDUCTORS ARE THE SAME AT POLES AS AT MID-SPANS.

(D) MULTI-CONDUCTOR CABLE (SECONDARY CABLE AND SSC) 15" MINIMUM.

**BILL OF MATERIALS:** NONE

**NOTES:** NONE

FIELD MAINTENANCE ONLY

**REFERENCE:**

(b) SEE CONSTRUCTION PAGES IN 1500 SECTION FOR SPECIFIC MOUNTING HEIGHTS.

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| C | MOVED TO FMO | EDM | GLW | JES | CZH | 08/24/2021 | F | | | | | | |
| B | DRAWING UPDATE | - | PEI | - | - | 02/04/2019 | E | | | | | | |
| A | ORIGINAL ISSUE | - | - | - | PTA/RDG | 01/01/1988 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STREET LIGHT G.O. 95 MINIMUM CLEARANCES

# OH1510 UG4410 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARDS MANUALS.

**REVISION HISTORY:**

**07/20/2023:** MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | GLC | MRF | MRF | KRG | 07/20/2023 | D | | | | | | |

**SCOPE:** THIS STANDARD DESCRIBES ALL THE NECESSARY INFORMATION WHEN ORDERING LAMPS FOR MERCURY VAPOR, HIGH PRESSURE AND LOW PRESSURE SODIUM LUMINARIES.

## INSTALLATION:

(A) CLEAR MERCURY VAPOR LAMPS.

(B) DELUXE WHITE OR PHOSPHOR COATED LAMPS, IDENTIFIED BY 'DX'.

C. RATING BASED ON 16,000 HOURS ON LAMPS.

(D) LAMPS NOW BEING PURCHASED WILL WORK IN EITHER BASE UP OR BASE DOWN CONFIGURATION.

(E) LPSV LAMPS MUST BE INSTALLED HORIZONTAL OR BASE UP, AS SHOWN ON THE FOLLOWING FIGURES:

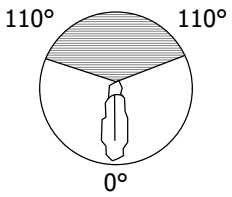



**FIGURE 1**
FOR 35 AND 55W (E)

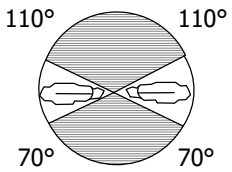



**FIGURE 2**
FOR 90, 135 AND 180W (E)

F. INSTALLER IS TO SCRIBE A VERTICAL LINE UNDER THE MONTH AND LAST DIGIT OF THE CURRENT YEAR WHEN INSTALLING LAMPS.

**BILL OF MATERIALS:** NONE

**TABLE 1**

| HIGH PRESSURE SODIUM VAPOR (HPSV) (D) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| LAMP SIZE (WATTS) | MANUFACTURER | | | ANSI LAMP DESIGNATION | LENGTH (IN) | APPROXIMATE LUMENS | | STOCK NUMBER | DESIGN UNITS |
| | GE LUCALUX | SYLVANIA LUMALUX | N.A. PHILIPS CERAMALUX | | | INITIAL | MEAN | | |
| 50 | LU-50 | LU-50 | C-50S68 | S68MS-50 | 7 3/4 | 4,000 | 3,600 | S452578 | LH50 |
| 70 | LU-70 | LU-70 | C-70S62 | S62ME-70 | 7 3/4 | 5,800 | 5,220 | S452580 | LH70 |
| 100 | LU-100 | LU-100 | C-100S54 | S54SB-100 | 7 3/4 | 9,500 | 8,550 | S452582 | LH100 |
| 150 | LU-150/55 | LU-150/55 | C-150S55 | S55SC-150 | 7 3/4 | 16,000 | 14,400 | S452584 | LH150 |
| 200 | LU-200 | LU-200 | C-200S66 | S66MN-200 | 9 3/4 | 22,000 | 19,800 | S452587 | LH200 |
| 250 | LU-250 | LU-250 | C-250S50/S | S50VA-250/S | 9 3/4 | 30,000 | 27,000 | S452588 | LH250 |
| 310 | LU-310 | LU-310 | C-310S67 | S67MR-310 | 9 3/4 | 37,000 | 33,000 | S452591 | LH310 |
| 400 | LU-400 | LU-400 | C-400S51 | S51WA-400 | 9 3/4 | 50,000 | 45,000 | S452592 | LH400 |
| 1000 | LU-1000 | LU-1000 | C-1000S52 | S52XB-1000 | 15 1/16 | 140,000 | 126,000 | S452594 | LH1000 |

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| A | ORIGINAL ISSUE | - | - | PTA | RDG | 01/01/1996 | D | MOVED TO FMO | GLC | MRF | MRF | KRG | 07/20/2023 |

## TABLE 2

| MERCURY VAPOR (MV) (D) (NO LONGER USED IN NEW INSTALLATION) | | | | | | | |
|---|---|---|---|---|---|---|---|
| LAMP SIZE (WATTS) | MANUFACTURER | | ANSI LAMP DESIGNATION | LENGTH (IN) | APPROXIMATE LUMENS | | STOCK NUMBER |
| | GE CATALOG NUMBER | SYLVANIA & N.A. PHILIPS CATALOG NUMBERS | | | INITIAL | MEAN (B) | |
| 175 | H175A39-22 | H39KB-175 | H39KB-175 | 8 1/4 | 7,950 | 7,470 | S452352 (A) |
| | H175DX39-22 | H39KC-175/DX | H39KC-175/DX | | 8,600 | 7,650 | S452580 (B) |
| 250 | H25OA37-5 | H37KB-250 | H37KB-250 | 8 1/4 | 11,200 | 10,300 | S452384 (A) |
| | H25ODX37-5 | H37KC-250/DX | H37KC-250/DX | | 12,100 | 10,400 | S452400 (B) |
| 400 | H40OA33-1 | H33CD-400 | H33CD-400 | 11 5/16 | 21,000 | 19,100 | S452416 (A) |
| | H40ODX33-1 | H33GL-400/DX | H33GL-400/DX | | 22,500 | 19,100 | S452448 (B) |
| 700 | H70ODX35-18 | H35ND-700/DX | H35ND-700/DX | 14 5/16 | 42,000 | 33,600 | S452576 (B) |

## TABLE 3

| LOW PRESSURE SODIUM VAPOR (LPSV) (E) | | | | | |
|---|---|---|---|---|---|
| LAMP SIZE (WATTS) | ANSI LAMP DESIGNATION | LENGTH (IN) | APPROXIMATE LUMENS | STOCK NUMBER | DESIGN 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:




**FIGURE 3** (I)

## REFERENCE:

a. FOR G.O. 95 MINIMUM CLEARANCE, SEE OH1509.

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**REVISION HISTORY:**

6/8/2020**:** MOVED TO FMO

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| | SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS | | | |
| | REPLACEMENT REFRACTORS | | | FMO OH1511 UG4411 |

**SCOPE:** NONE

## INSTALLATION:

(A) A GLASS OR LEXAN REFRACTOR MAY BE USED ON THESE LUMINAIRES.

B. LEXAN REFRACTORS TO BE USED IN HIGH VANDALISM AREAS ONLY.

## BILL OF MATERIALS:

**TABLE 1. REPLACEMENT REFRACTORS FOR LUMINAIRES ON PAGES 1521/4421**

| CONVENTIONAL LUMINAIRES | | LAMP TYPE | LAMP WATTAGE | REPLACEMENT REFRACTOR | | |
|---|---|---|---|---|---|---|
| MANUFACTURER | TYPE | | | TYPE | CATALOG NUMBER | STOCK NUMBER |
| GENERAL ELECTRIC | M250R2 | HPSV | 70, 100, 150 | GLASS | 35-962560-21 | S579104 |
| GENERAL ELECTRIC | M400R2 | HPSV | 200, 250, 400 | GLASS | 35-962620-05 | S579102 |
| GENERAL ELECTRIC | M1000 | HPSV | 1000 | GLASS | 35-130170R02 | S579100 |
| AMERICAN ELECTRIC | SERIES 113 | HPSV | 70, 100, 150 | GLASS | 13-2-A | S579110 |
| AMERICAN ELECTRIC | SERIES 125 | HPSV | 200, 250, 400 | GLASS | 25-3-A | S579108 |
| AMERICAN ELECTRIC | SERIES 327 | HPSV | 1000 | GLASS | 27-3-A | S79106 |

**TABLE 1. REPLACEMENT REFRACTORS FOR LUMINAIRES ON PAGES 4422**

| DECORATIVE LUMINAIRES | | LAMP TYPE | LAMP WATTAGE | REPLACEMENT REFRACTOR | | |
|---|---|---|---|---|---|---|
| MANUFACTURER | TYPE | | | TYPE | CATALOG NUMBER | STOCK NUMBER |
| GENERAL ELECTRIC | MISSION BELL (A) | HPSV | 70, 100, 150 | GLASS | 35-130583R01 | S579264 |
| | | | | LEXAN | 35-130707R01 | S579248 |
| | | HPSV | 250, 400 | GLASS | 35-2311374R1 | S579296 |
| | | | | LEXAN | 35-130015R02 | S579312 |
| GENERAL ELECTRIC | DECASHIELD | HPSV | 250, 400 | GLASS | 35-962880-23 | S578702 |
| MCGRAW EDISON | CONCOURSE STYLE A | HPSV | 70, 100, 150 | GLASS | LO-340X1 | S578694 |
| | | | 250, 400 | GLASS | LO-340X2 | S578696 |
| GARDCO | FORM 10P | HPSV | 70, 100, 150 | GLASS | P1413 | S578698 |
| | | | 250, 400 | GLASS | P1913 | S578700 |
| GARDCO | FORM 10P | HPSV | 250, 400 | GLASS | P1913 | S578700 |
| KIM | SQUARE | HPSV | 70, 200 | GLASS | 84044 | S578730 |
| BIEBER | SQUARE | HPSV | 70 | GLASS | BH-HP-GLASS | S578730 |

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SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

REPLACEMENT REFRACTORS

FMO
OH1511.1
UG4411.1

## BILL OF MATERIALS CONT'D:

**TABLE 3. REPLACEMENT REFRACTORS FOR LUMINAIRES ON PAGES 4423 AND 4424**

| POST TOP & DW LUMINAIRES | | LAMP TYPE | LAMP WATTAGE | REPLACEMENT REFRACTOR | | |
|---|---|---|---|---|---|---|
| MANUFACTURER | TYPE | | | TYPE | CATALOG NUMBER | STOCK NUMBER |
| MCGRAW EDISON | LAWNAIRE | HPSV | 50, 70, 100, 150 | ACRYLIC | LO-307X1 | S77920 |
| MCGRAW EDISON | TRADITIONAL TYPE III | HPSV | 100, 150 | ACRYLIC | LT-144X11 | S579232 (I) |
| | | | | ACRYLIC | LT-148X11 | S579220 (II) |
| | | | | ACRYLIC | LT-144X12 | S579228 (III) |
| | | | | ACRYLIC | LT-144X13 | S579224 (IV) |
| MCGRAW EDISON | TRADITIONAL TYPE V | HPSV | 50, 70 | ACRYLIC | LT-144X11 | S577920 (V) |
| GENERAL ELECTRIC | TC-100R AND TC-100R MANSARD | HPSV | 70, 150 | ACRYLIC | 35-963160-01 | S579204 (VI) |
| HOLOPHANE | RSL-350 | HPSV | 100, 150 | GLASS | 3313 | S578728 |
| AMERON | VICTORIAN TYPE III | HPSV | 70,200 | GLASS | 80645E | S578720 |

**TABLE 4. REPLACEMENT REFRACTORS FOR LUMINAIRES ON PAGES 1533**

| FLOOD LIGHT LUMINAIRES | LAMP TYPE | LAMP WATTAGE | REPLACEMENT REFRACTOR | | |
|---|---|---|---|---|---|
| MANUFACTURER | | | TYPE | CATALOG NUMBER | STOCK NUMBER |
| GENERAL ELECTRIC | HPSV | 250, 400, 1000 | GLASS | 35-964960-21 | S78712 |

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## NOTES:

(I) REFRACTOR PANEL TO BE INSTALLED ON STREET SIDE.

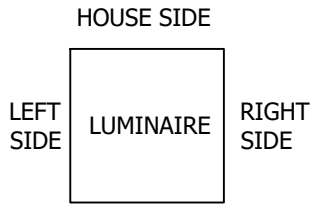
(II) REFRACTOR PANEL TO BE INSTALLED ON HOUSE SIDE.

(III) REFRACTOR PANEL TO BE INSTALLED ON RIGHT SIDE.

(IV) REFRACTOR PANEL TO BE INSTALLED ON LEFT SIDE.

(V) REFRACTOR PANEL TO BE INSTALLED ON ALL FOUR SIDES.

(VI) REFRACTOR PANEL TO BE INSTALLED PER DESIGNATED SIDE.




**REFERENCE:** NONE

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**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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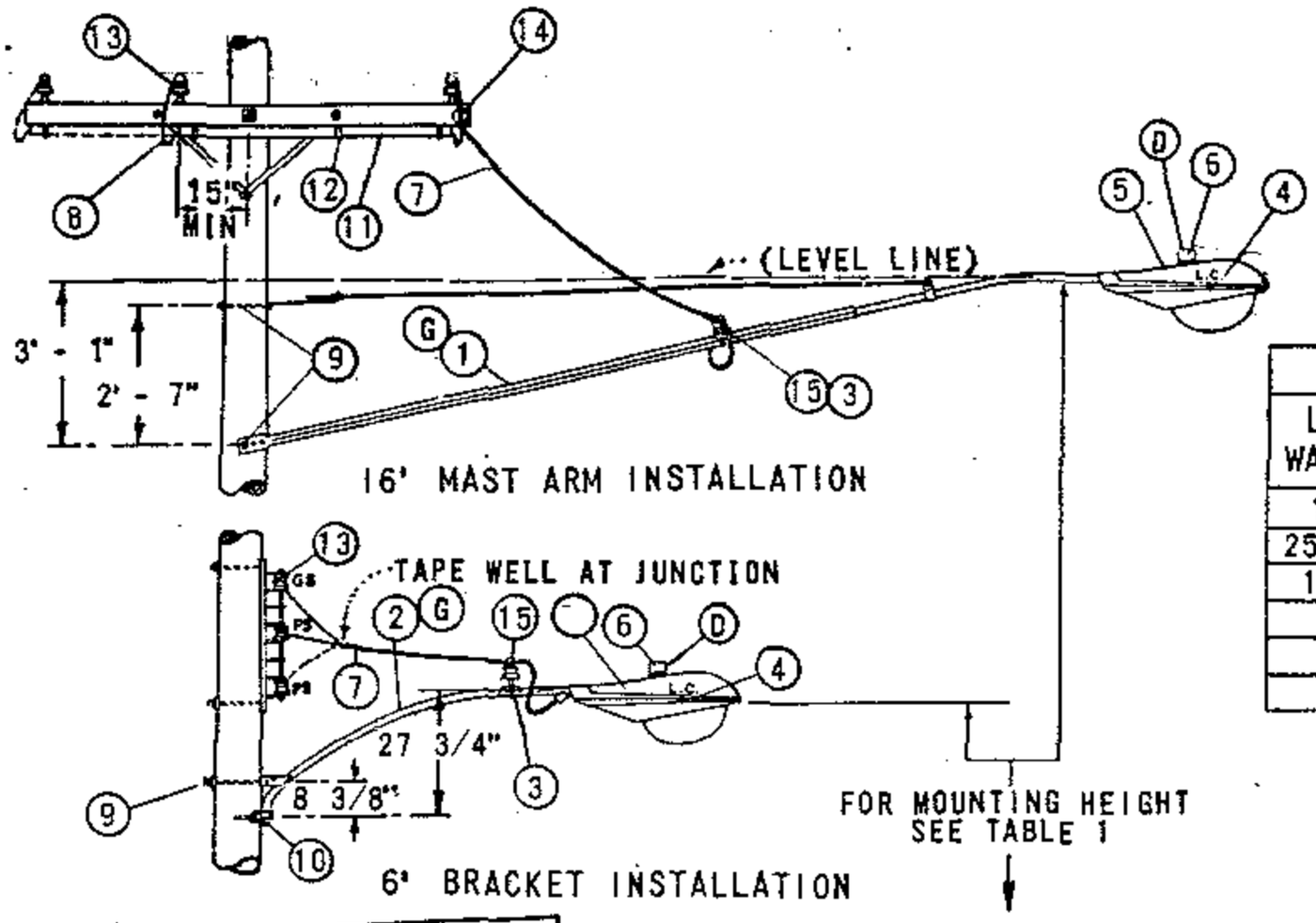
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SDG&E ELECTRIC OVERHEAD STANDARD

LIGHTING INSTALLATION



FMO OH 1519




| TABLE 1 | | |
|---|---|---|
| LAMP WATTAGE | MERCURY VAPOR MOUNTING HEIGHT | |
| 175 | 25' - 28' | |
| 250-400 | 30' - 32' | |
| 1000 | 35' - 37' | |
| | | |
| | | |
| | | |

FOR FIELD MAINTENANCE ONLY

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TABLE 2 (F)

| WATTS | LUMEN | MERCURY VAPOR STREET LIGHTING CODE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | REGULATOR BALLAST | | REACTOR BALLAST | | | | |
| | | BRACKET 6' | MAST ARM 16' | BRACKET 6' | MAST ARM 16' | | | |
| 175 | 7000 | 6AG | 16AG | 6AR | 16AR | | | |
| 250 | 10000 | 6BG | 16BG | 6BR | 16BR | | | |
| 400 | 20000 | 6CG | 16CG | - | - | | | |
| 1000 | 55000 | 6DG | 16DG | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTES:

(A) REQUIRED FOR SECONDARY LINE ARM CONSTRUCTION ONLY.

B. SEE STANDARDS PAGE 1509 FOR CLEARANCES.

(C) 30" STREET LIGHTING BRACKET, STOCK NUMBER 167200 MAY BE SUBSTITUTED.

(D) APPERTURE OF PHOTOELECTRIC CELL MUST BE SET TO FACE NORTH.

(E) EXEMPT MATERIALS.

(F) TABLE 2 IS PROVIDED FOR IDENTIFICATION OF LIGHTING INSTALLATIONS ON MAPS AND WORK ORDERS.

(G) A MAXIMUM OF ONE HALF OF MOUNTING BRACKET MAY BE INSTALLED IN CLIMBING SPACE.

| ITEM | | DESCRIPTION | QUANTITY BALLAST REGULATOR 6AG, 6BG, 6CG, 6DG | QUANTITY BALLAST REGULATOR 16AG, 16BG, 16CG, 16DG | QUANTITY BALLAST REACTOR 6AR, 6BR | QUANTITY BALLAST REACTOR 16AR, 16BR | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|---|---|
| | 1 | ARM, UPSWEEP MAST, 1 1/4" DIA, 16' - 0" | - | 1 | - | 1 | 110880 |
| | 2 | BRACKET, UPSWEEP, 1 1/4" DIA, 6' - 0" (C) | 1 | - | 1 | - | 167264 |
| | 3 | PIN, INSULATOR CLAMP (SUPPLIED WITH MAST ARM) | 1 | 1 | 1 | 1 | - |
| | 4 | LAMP | 1 | 1 | 1 | 1 | PG. 1510 |
| | 5 | LUMINAIRE | 1 | 1 | 1 | 1 | PG. 1520, 1521 |
| | 6 | CONTROL, PHOTOELECTRIC, TWISTLOCK BASE 105 TO 280 VOLT | 1 | 1 | 1 | 1 | 273888 |
| S | 7 | WIRE, #8, 600V, FLEXIBLE R.C. DUPLEX | AS REQ'D | | | | 811776 |
| L | 8 | WIRE, #12, TYPE THW, 600V, INSULATED COPPER (A) | 25' | 25' | 25' | 25' | 810272 |
| S | 9 | BOLT, MACH, GALV, 5/8" X 10", 2 SQ WASH. & 1 NUT (E) | 1 | 2 | 1 | 2 | PGS 139, 140 |
| S | 10 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | - | 2 | - | 621568 |
| | 11 | CONDUIT, PLASTIC, PVC, TYPE II, SCHEDULE 40 3/4" (A) (E) | 7' - 4" | 7' - 4" | 7' - 4" | 7' - 4" | 251328 |
| | 12 | STRAP, PIPE, GALV, 2-10D NAILS, GALV, 3/4" (A) (E) | 3 | 3 | 4 | 4 | PG 143 |
| | 13 | CONNECTOR, WIRE (E) | 2 | 2 | 2 | 2 | PGS 783-787 |
| | 14 | CLEVIS, SECONDARY DEAD END (A) | 1 | 1 | 1 | 1 | 235488 |
| | 15 | INSULATOR, PIN TYPE, TOP TIE, 4KV (CLASS 55-1) WHITE (E) | 1 | 1 | 1 | 1 | 429024 |
| | | | | | | | |

DATE 11-5-82
APPD JWF/RH

SDG&E ELECTRIC STANDARDS

LIGHTING INSTALLATION

1599.102
SUPERSEDES
1519 (11-5-82)

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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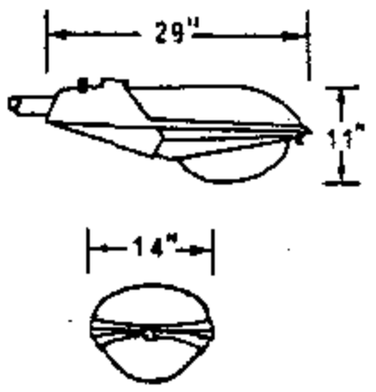
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1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

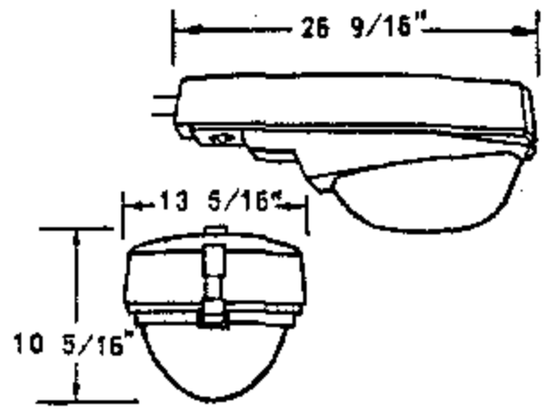
MERCURY VAPOR CONVENTIONAL LUMINAIRES
AND REPLACEMENT REFRACTORS

FMO
OH 1520

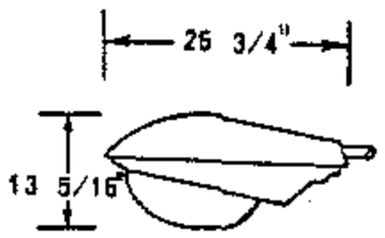
**SCOPE:** THIS STANDARD SHOWS MERCURY VAPOR LUMINAIRES USED TO PROVIDE ROADWAY AND DUSK TO DAWN LIGHTING, AND REPLACEMENT REFRACTORS.




GENERAL ELECTRIC
M-250A POWR/DOOR

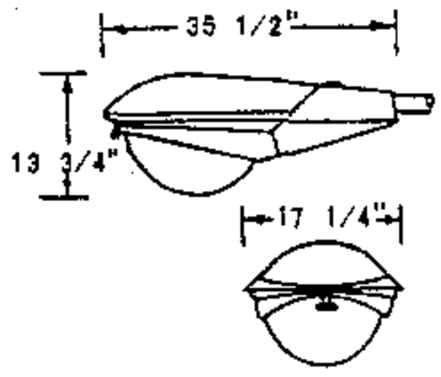



MCGRAW EDISON
UNIDOR 250

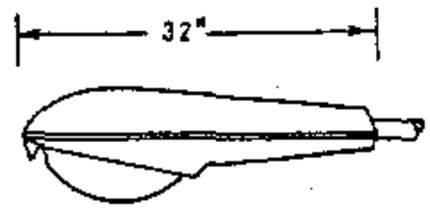



WESTINGHOUSE
OV-15

FIGURE 1




GENERAL ELECTRIC
M-400A POWR/DOOR




WESTINGHOUSE
OV-25

FOR FIELD MAINTENANCE ONLY

FIGURE 2

**BILL OF MATERIAL:**

| FIG. NO. | STOCK NUMBER | LAMP SIZE WATTS | BALLAST | | MANUFACTURER AND CATALOG NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TYPE | SOURCE VOLTAGE | GENERAL ELECTRIC | | MCGRAW EDISON | | WESTINGHOUSE | | UNICORN ELECTRIC | |
| | | | | | TYPE | CAT. NO. | TYPE | CAT. NO. | TYPE | CAT. NO. | TYPE | CAT. NO. |
| 1 | 473920 | 175 | REGULATOR | 120/240 (A) | M-250A POWR/DOOR | C727G002 (B) | UNIDOR 250 | UU1104-120R | OV-15 | 811A208G04 | | |
| | 474048 | | REACTOR NPF | 240 | | C727G014 (B) | | UU-1154R | | 811A208G20 | | |
| | 473910 | | SERIES | 6.6 AMPS | M-250-R2 | M2AR17CXSIGMS31036 | | | | | - | UCM-A66-175 |
| 2 | 474208 | 400 | REGULATOR | 120/240 (A) | M-400A POWR/DOOR | C723G001 (B) | | | OV-25 | 658A303G04 | | |
| | 473912 | | SERIES | 6.6 AMPS | M-250-R2 | M4AR40CXSIGMN32043 | | | | | - | UCM-A66-400 |

| REPLACEMENT REFRACTORS FOR MERCURY VAPOR LUMINAIRES | | | | | | |
|---|---|---|---|---|---|---|
| CONVENTIONAL LUMINAIRES | | LAMP TYPE | LAMP WATTAGE | REPLACEMENT REFRACTOR | | |
| MANUFACTURER | TYPE | | | TYPE | CATALOG NUMBER | STOCK NUMBER |
| GENERAL ELECTRIC | M-250A (C) | MV | 175,250 | GLASS | 35-130583-01 | 579284 |
| GENERAL ELECTRIC | M-400A (C) | MV | 400 | GLASS | 35-231137-01 | 579296 |
| | | | | LEXAN | 35-130015-02 | 579312 |
| AMERICAN ELECTRIC | 23 SERIES (C) | MV | 175,250 | GLASS | 23-002 | 579284 |
| AMERICAN ELECTRIC | 25 SERIES (C) | MV | 400 | GLASS | 25-003 | 578928 (F) |
| | | | | LEXAN | 25-003-6 | - (F) |
| AMERICAN ELECTRIC | 327 SERIES | MV | 1000 | GLASS | 27-003 | 578936 (F) |
| WESTINGHOUSE | OV-15 | MV | 175,250 | GLASS | 464-D067-H01 | 578976 (F) |
| WESTINGHOUSE | OV-25 (C) | MV | 400 | GLASS | 464-D336-H02 | 579040 |
| | | | | LEXAN | 6716-D13-H01 | 579056 (F) |

**INSTALLATION:**

(A) FACTORY WIRED FOR 120 VOLTS, DO NOT WIRE FOR 240 VOLTS ON NEW INSTALLATIONS.

(B) ASTRODOME UNITS ARE EQUIPPED WITH BUILT-IN PHOTOELECTRIC CELL. FOR REPLACEMENT SEE PAGE 1512/4412.

(C) A GLASS OR A LEXAN REFRACTOR MAY BE USED ON THESE LUMINAIRES.

D. LEXAN REFRACTORS TO BE USED IN HIGH VANDALISM AREAS ONLY.

(F) ITEM IS NO LONGER PURCHASED.

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| DH 1599.201<br>~~JG-4499.201~~<br>SUPERSEDES<br>1520.1 (11-5-82) | SDG&E ELECTRIC STANDARDS<br>MERCURY VAPOR CONVENTIONAL LUMINAIRES AND REPLACEMENT REFRACTORS | DATE 1-1-89<br>APPD PEA/DTE |

# OH1521 UG4421 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD AND UNDERGROUND CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**10/03/2016:** MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | - | JS | JS | MDJ | 10/03/2016 | D | | | | | | |

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| | Indicates Latest Revision | | Completely Revised | X | New Page | Information Removed |

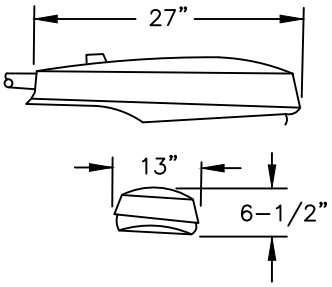
SDG&E ELECTRIC OVERHEAD AND UNDERGROUND FIELD MAINTENANCE ONLY STANDARDS

HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR
LUMINAIRE, REPLACEMENT BALLAST AND STARTER



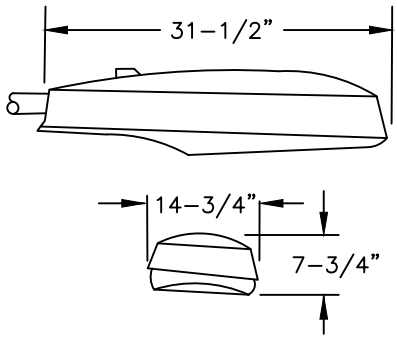
FMO
OH1521
UG4421

**SCOPE:** THIS STANDARD SHOWS HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRES USED TO PROVIDE ROADWAY AND DUSK TO DAWN LIGHTING, AND STARTER.



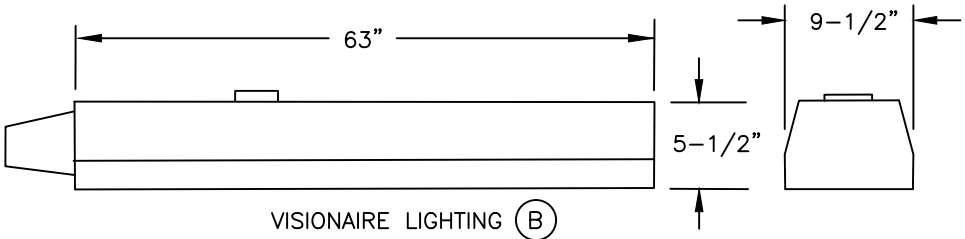

AMERICAN ELECTRIC
SERIES 115 CUTOFF
NON-POWER/PAD

**FIGURE**



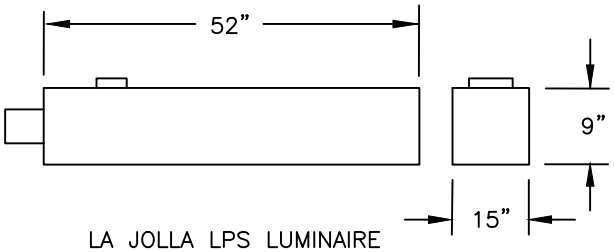

AMERICAN ELECTRIC
SERIES 125

**FIGURE**




VISIONAIRE LIGHTING (B)
ROADWAY RDW-3 (135, 180W SHOWN)

**FIGURE**




LA JOLLA LPS LUMINAIRE
(180W SHOWN)

**FIGURE**

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| | SDG&E ELECTRIC STANDARDS | REVISION |
|---|---|---|
| OH 1521.1<br>UG 4421.1 | HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND STARTER | DATE 2-3-06<br>APPD PA / JJ |

| (D) TABLE □□ □I□□ PRESS□RE SO□I□M □APOR □□PS□□L□MINAIRES □COMPLETE ASSEMBL□ □E□CL□□IN□ LAMP□ | | | | | |
|---|---|---|---|---|---|
| FIG. NO. | MANUFACTURER TYPE | LAMP SIZE WATTS | BALLAST TYPE | BALLAST SOURCE VOLTAGE | STOCK NUMBER |
| 1 | SERIES 115 | 70 | REACTOR–NPF | 120 | 473400 |
| | SERIES 115 | 100 | | | 473402 |
| | SERIES 115 | 150 | | | 473404 |
| 2 | SERIES 125 | 200 | HIGH REACTANCE–NPF | | 473406 |
| | | 250 | HIGH REACTANCE–NPF | | 473408 |
| | | 400 | CWA | | 473410 |

| TABLE □□ REPLACEMENT STARTER ONL□ FOR □I□□ PRESS□RE SO□I□M □APOR □□PS□□L□MINAIRES | | | | | |
|---|---|---|---|---|---|
| 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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REVISION DATE 2–3–06 APPD PSA / JJ

SDG&E ELECTRIC STANDARDS

HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND STARTER

OH 1521.2
UG 4421.2

| TABLE □□ LO□ PRESS□RE SO□I□M □APOR □LPS□□L□MINAIRES □COMPLETE ASSEMBL□ □E□CL□□IN□ 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 DATE 2-3-06 APPD PSA / JJ | SDG&E ELECTRIC STANDARDS<br>HIGH PRESSURE AND LOW PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND STARTER | OH 1521.3<br>UG 4421.3 |
|---|---|---|

**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

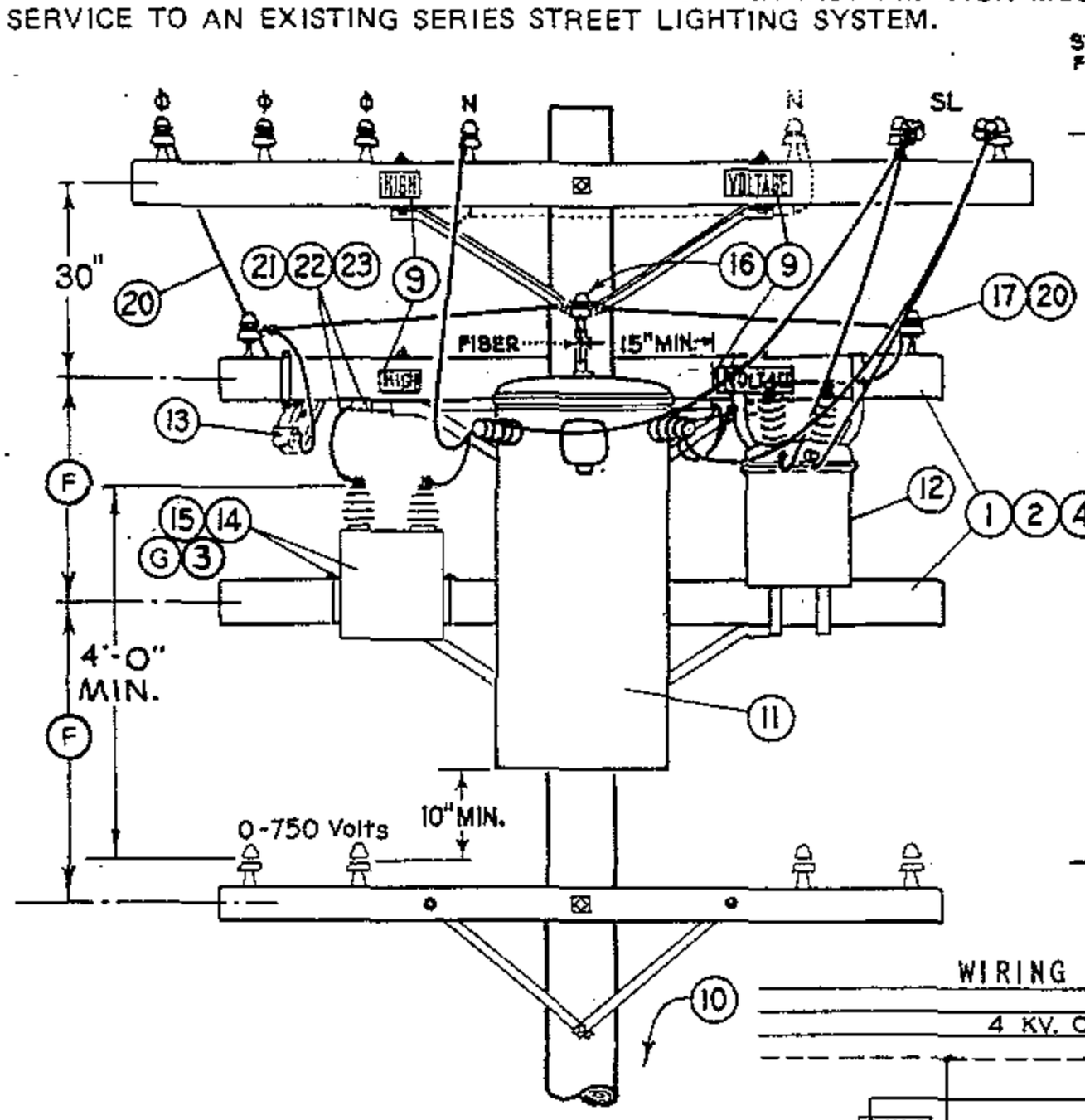
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

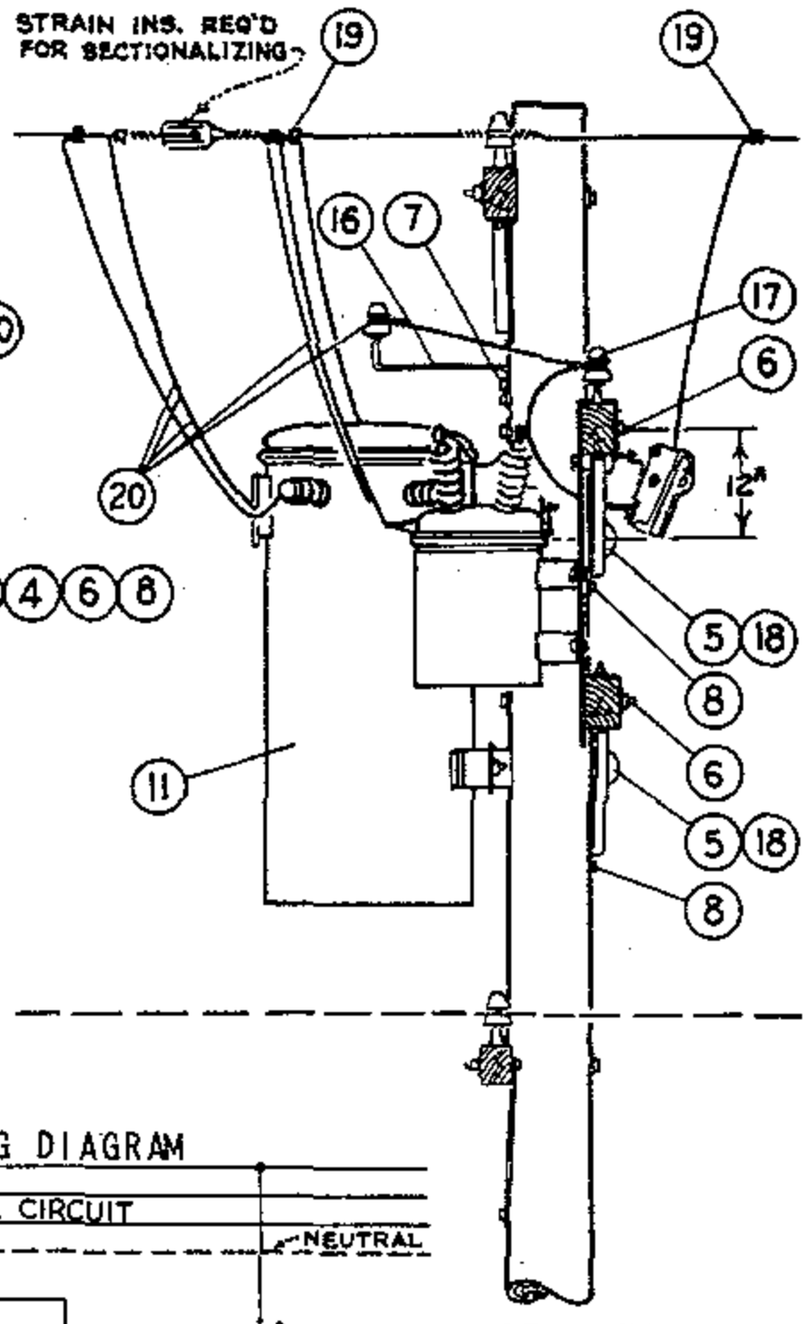
SERIES CONTROLLED REGULATED OUTPUT STREET LIGHT
TRANSFORMER INSTALLATION REMOTE CONTROL
OUTDOOR CIRCUIT SWITCH CAPACITOR 4KV

FMO
OH 1555

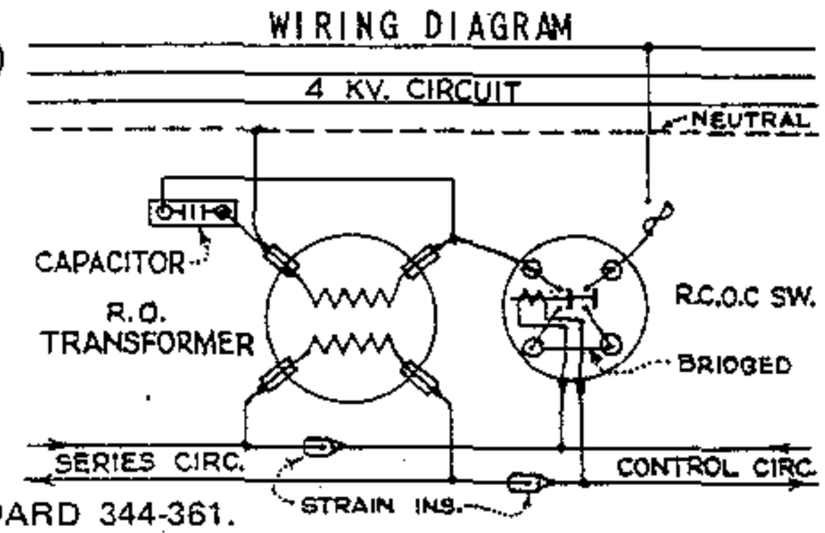
SCOPE: THIS STANDARD SHOWS 4KV CONSTANT CURRENT SERIES LIGHTING TRANSFORMER INSTALLATION AND SHALL ONLY BE USED WHEN AN EXISTING TRANSFORMER INSTALLATION MUST BE RELOCATED OR REBUILT TO MAINTAIN SERVICE TO AN EXISTING SERIES STREET LIGHTING SYSTEM.




ELEVATION




SIDE VIEW




NOTES:

- CLASS OF POLE SHOULD BE DETERMINED PER STANDARD 344-361.

BILL OF MATERIAL:

| ITEM | | DESCRIPTION | | QUANT. | CONST STD OR PAGE NO | STOCK NO. |
|---|---|---|---|---|---|---|
| P. T. & F. | 1 | 3¾"x5¾"x8'-0" Transformer Arm | | 2 | PAGE 380.5 IT.4 | 294960 |
| | 2 | Angle Crossarm Brace, 4'-0" | | 2 | | 164032 |
| | 3 | Mach. Bolt, Galv., ⅜"x1½", 2 rd. washers & 1 nut | (E) | 2 | STDS 392 | |
| | 4 | Mach. Bolt, Galv., ½"x7", 1 rd. washer & 1 nut | (E) | 4 | STDS 392 | |
| | 5 | Mach. Bolt, Galv., ⅝"x12", 1 sq. curv. wash. & 1 nut | (E) | 2 | STDS 392 | |
| | 6 | Mach. Bolt, Galv., ⅝"x14", 2 sq. washers & 1 nut | (E) | 2 | STDS 392 | |
| | 7 | Lag Screw, Galv., ½"x4" | (E) | 1 | | 621568 |
| | 8 | Lag Screw, Galv., ⅝"x5" | (E) | 2 | | 621600 |
| | 9 | High Voltage Sign & 9 galv. roofing nails | (E) | 1 | | 647648, 492224 |
| | 10 | POLE STEPS (SEE STANDARD 363) | (E) | - | | 692992 |
| L. T. I. | 11 | R.O. Transformer with 2 pole bolt Adapter Plates & bolts | | 1 | PG 1121 | |
| | 12 | R.C.O.C. Switch, paired hangers, adapter plates where req'd | | 1 | | 274656 (A) (B) |
| | 13 | Expulsion Fuse Indicating Cutout, 5 kv., 50 A. | (D) | 1 | SECTION 1200 | |
| | 14 | Capacitor, 2.4 kv., 15 or 25 kvar. | (A) | 1 | | 207392 OR 207168 |
| | 15 | Mounting Strap and 1-½"Φx3¾"x5¾" "U" bolt | (A)(C) | 2 | | 158432 |
| | 16 | Stand-Off Bracket with Insulator | | 1 | | 166144, 429216 (E) |
| | 17 | Insulator and 1" steel pin | (E) | 2 | PG 750 | 532608 |
| | 18 | Cover Thru Bolt Plastic & Nails, Galv. | (E) | 2 | | 285696, 492192 |
| | 19 | Wire Connector | (E) | 7 | STDS. 783 – 787 | |
| | 20 | #6 D.B.W.P. Copper Wire | | 55' | | 812512 |
| | 21 | #6 R.C. Strand. Copper Wire, 5 kv. | | 7' | | 194304 |
| | 22 | 1" PVC Conduit | (E) | 4' | | 251200 |
| | 23 | 1¼" Pipe Strap and 2-6d nails, galv. | (E) | 3 | | 697696, 491552 |

INSTALLATION:

(A) NO LONGER PURCHASED.
(B) KEARNY MAINTENANCE WILL SUPPLY.
(C) SALVAGE FROM EXISTING INSTALLATIONS, MIRAMAR SALVAGE YARD HAS LIMITED SUPPLY.
(D) CAN BE SUBSTITUTED WITH 12KV 100A CUTOUT.
(E) EXEMPT MATERIAL.
(F) SPACE KICK ARM & BRACE TO CLEAR LOWER TRANSFORMERS THRU BOLT COVER.
(G) IF CAPACITOR FAILS OR STATION IS RELOCATED, DO NOT REPLACE CAPACITOR.

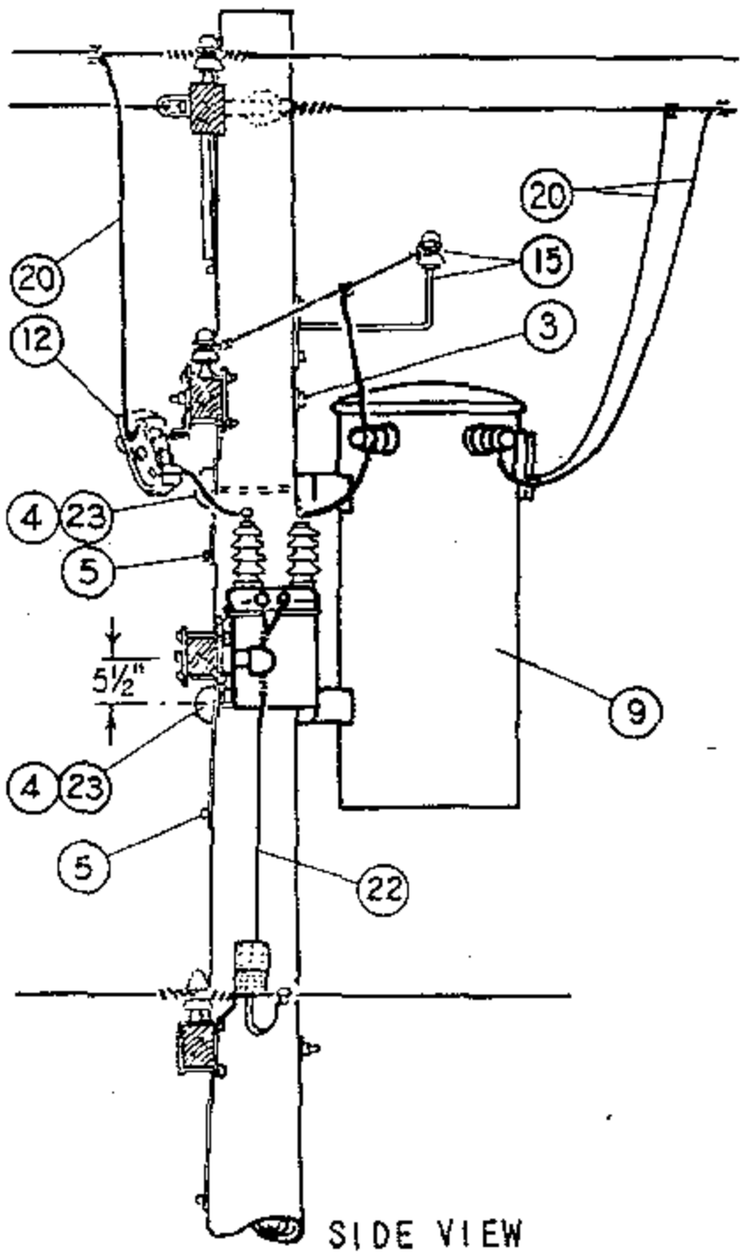
1599.502
SUPERCEDES
1555.1 (1-1-92)

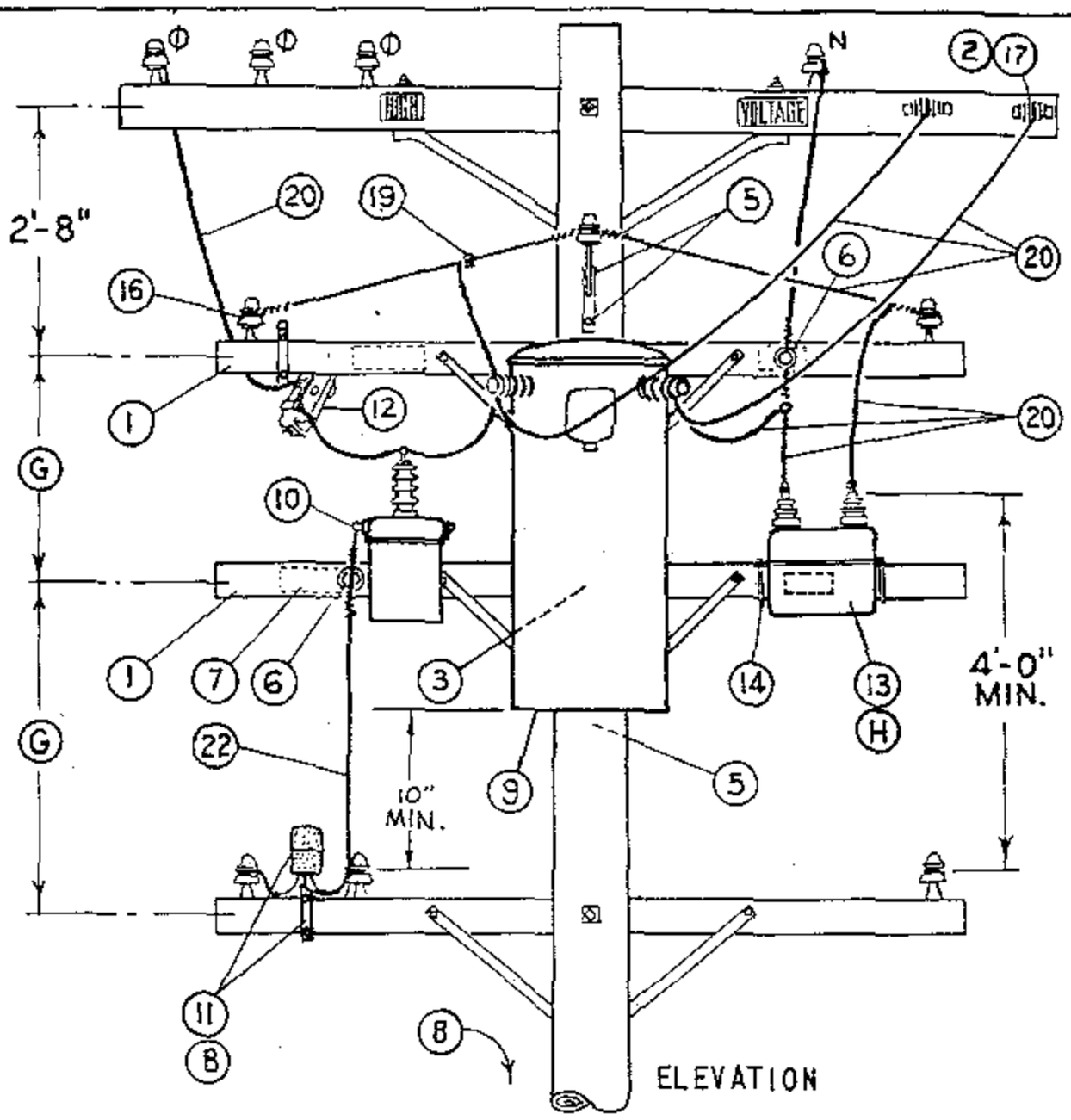
SDG&E ELECTRIC STANDARDS

# SERIES CONTROLLED REGULATED OUTPUT STREET LIGHT TRANSFORMER INSTALLATION REMOTE CONTROL OUTDOOR CIRCUIT SWITCH CAPACITOR 4KV

DATE 1-1-87
APPD AK/RDS

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**NOTES:**

- CLASS OF POLE SHOULD BE DETERMINED PER STANDARD 344-361.

**INSTALLATION:**

A. ROTATE COVER OF OIL SWITCH 180°, WHERE NECESSARY, TO POSITION MANUAL OPERATING LEVER ADJACENT TO CLIMBING SPACE.

(B) FACE PHOTO CELL TO THE NORTH.

(C) NO LONGER PURCHASED. SALVAGE FROM EXISTING INSTALLATION OR OBTAIN FROM KEARNY MAINTENANCE.

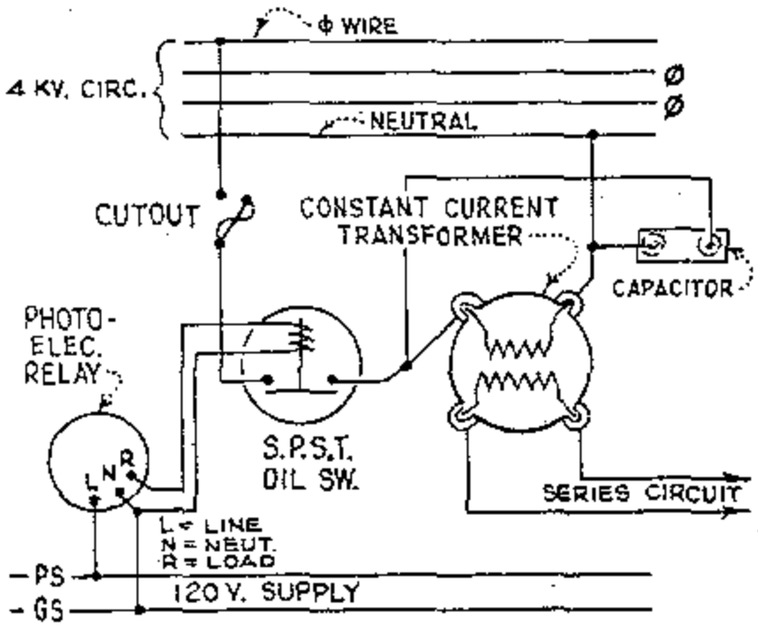
(D) NO LONGER PURCHASED. SALVAGE FROM EXISTING INSTALLATION OR OBTAIN FROM MIRAMAR SALVAGE YARD.

(E) EXEMPT MATERIAL.

(F) CAN BE SUBSTITUTED WITH 12KV 100A CUTOUT.

(G) SPACE KICK ARM & BRACE TO CLEAR LOWER TRANSFORMER THRU BOLT COVER.

(H) IF CAPACITOR FAILS OR STATION IS RELOCATED, DO NOT REPLACE CAPACITOR.




## WIRING DIAGRAM

| C.C. TRNSFMR. KW | CAPACITOR KVAR |
|---|---|
| 7½ (D) | 15 |
| 10 (D) | 15 |
| 15 (D) | 15 |
| 25 | 25 |

| ITEM | | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|
| P. T. & F. | 1 | 3½" x 4½" x 8'-0" Crossarm | | 2 | PG. 380.03 IT.1 |
| | 2 | Mach. Bolt, Galv., 5/8" x 6", 1 sq. washer & 1 nut | (E) | 2 | STD 139, 140 |
| | 3 | Mach. Bolt, Galv., 5/8" x 16", 2 sq. washers & 1 nut | (E) | 2 | STD 139, 140 |
| | 4 | Mach. Bolt, Galv., ¾" x 12", 1 sq. curved washers & 1 nut | (E) | 2 | STD 139, 140 |
| | 5 | Lag Screw, Galv., ½" x 4" | (E) | 4 | 621568 |
| | 6 | Pin, Transformer, Lead 1" Leadthread | (E) | 2 | 529248 |
| | 7 | High Voltage Sign & 8 galv. roofing nails | (E) | 2 | 647744, 492224 |
| | 8 | Pole Steps | (E) | 15 | 692992 |
| S. L. & S. | 9 | C. C. Transformer, 2.4 kv., incl. 2 pole bolt adapter plates | | 1 | PG-1121.12 |
| | 10 | South Bend Controller Co. Oil Switch, S.P.S.T., 75 A., 2.4 kv. type SPR-1-120 spec. 6210 with #6222 X-arm Mtg. Bracket | | 1 | 274528 (C) |
| | 11 | Photoelectric Relay, 1000 W. min., 120 V. | | 1 | 273888 166432 |
| | 12 | Cutout, 5 kv., 50 A. | (F) | 1 | Section 1200 |
| | 13 | Capacitor, Size per Table, 2.4 kv., 2-⅜" x 1" Mtg. Bolts & Washers | (H) | 1 | 207328, 207168 |
| | 14 | Capacitor Mounting Strap & "U" Bolt | (D) | 2 | 697___ 158432 |
| | 15 | Stand-Off Bracket with Insulator | | 1 | 166144 |
| | 16 | Insulator and 1" steel pin | (E) | 2 | 532608 |
| | 17 | D.E., 4 kv. | (E) | 2 | 235520 |
| | 18 | | | | |
| | 19 | Wire Connector | | 9 | STD 783-787 |
| | 20 | #6 B. Strand. Copper Wire | | 50' | 813536 |
| | 21 | | | | |
| | 22 | 2-C #16, 600 V. Type "S" Neoprene Jacketed Super Service Cord | | 5' | 814400 |
| | 23 | Cover Thru Bolt Plastics & 4 - 10d Nails, galv. | (E) | 2 | 285696, 492192 |

DATE 11-5-82
APPD

SDG&E ELECTRIC STANDARDS

# PHOTOELECTRIC CONTROLLED REGULATED OUTPUT STREET LIGHT TRANSFORMER INSTALLATION, 4KV

1599.503
SUPERCEDES
1555.2 (1-1-92)

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

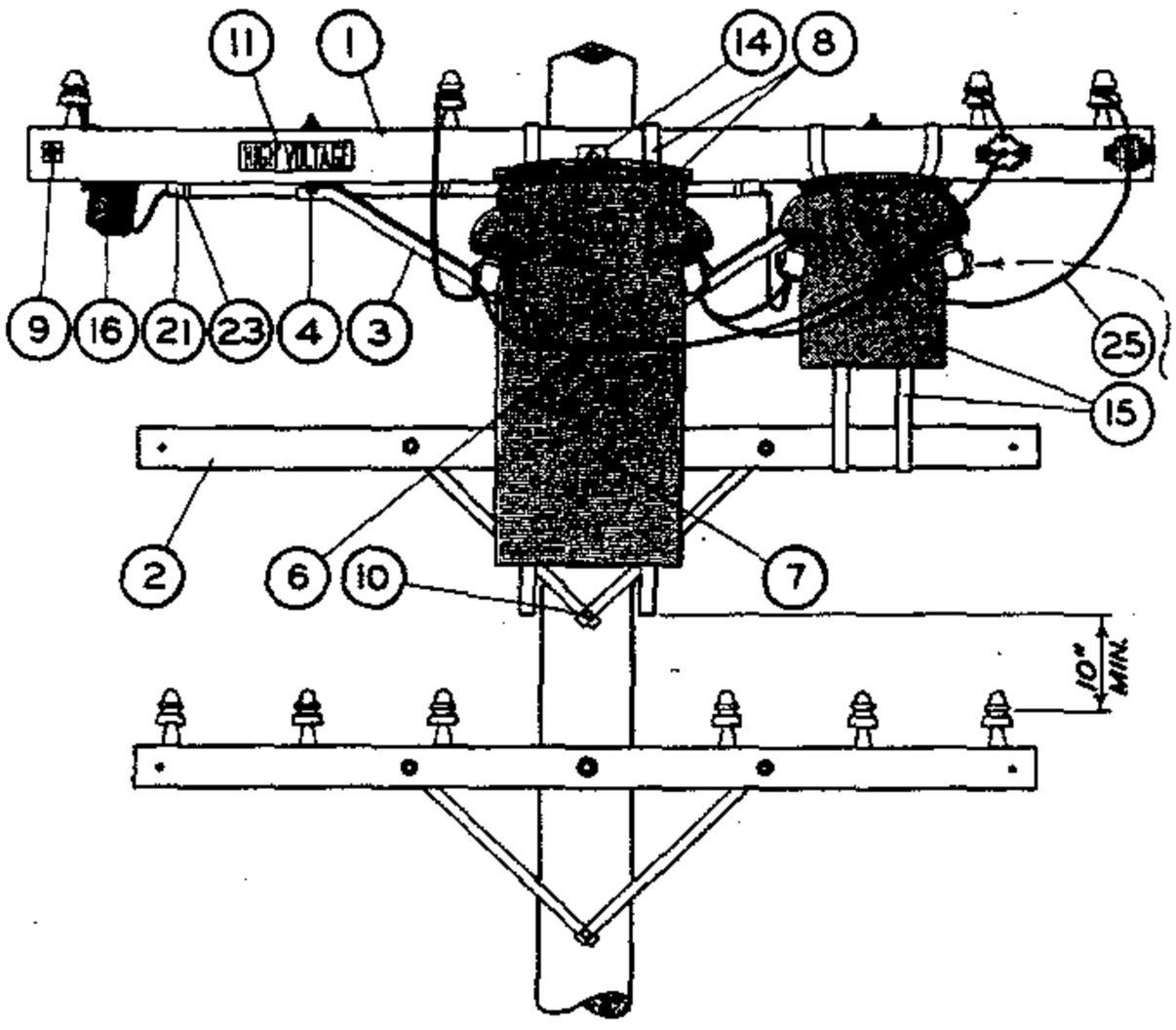
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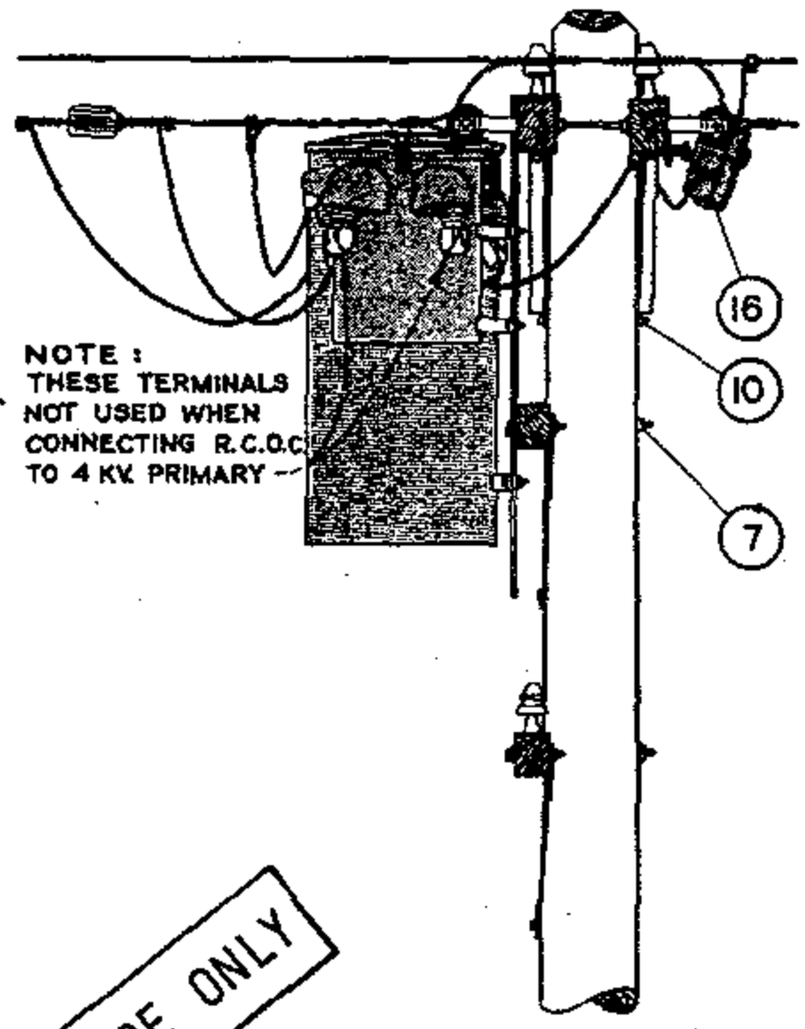
SHEET
1 OF 1

SDG&E ELECTRIC OVERHEAD STANDARD

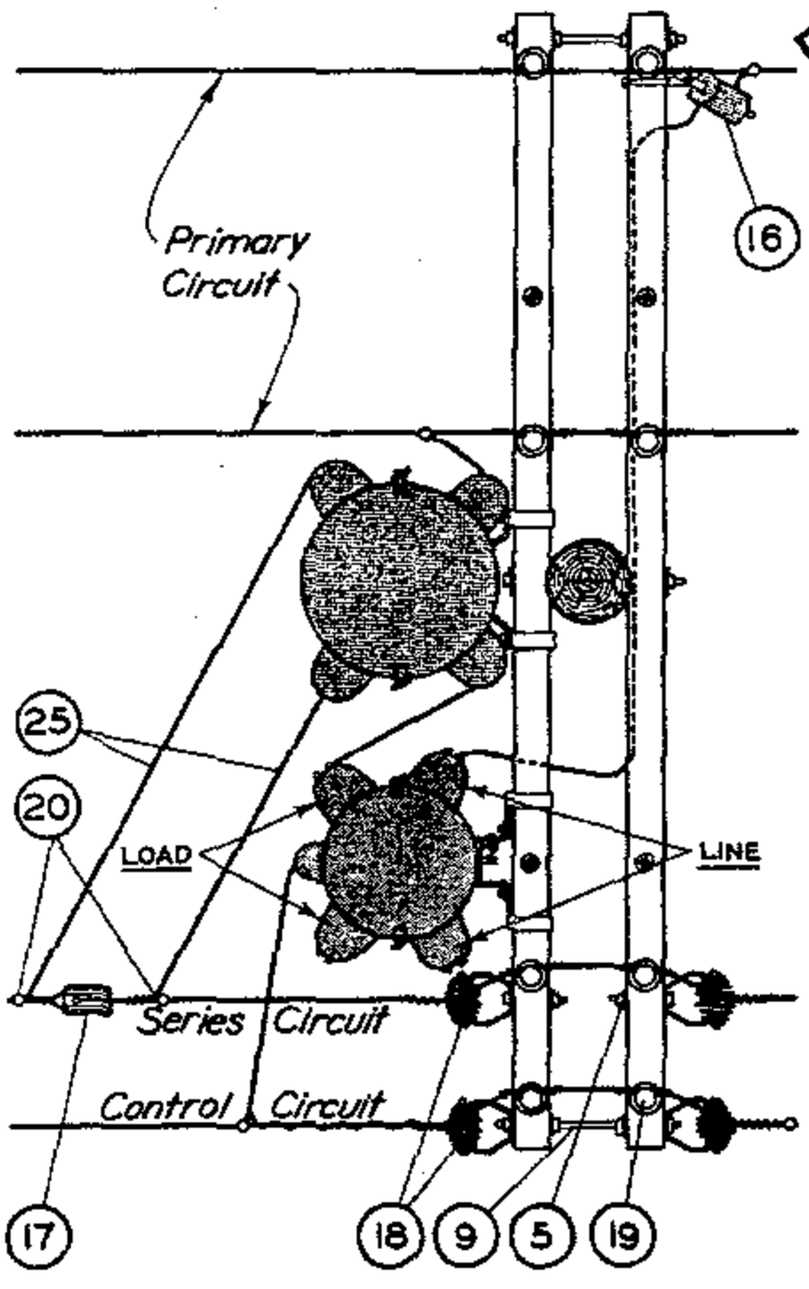
SERIES CONTROLLED R.O. STREET LIGHT TRANSFORMER
AND R.C.O.C. SWITCH, LINE ARM POSITION, 4KV

FMO
OH 1556




THIS PAGE FOR FIELD MAINTENANCE OFFICE ONLY




| ITEM | DESCRIPTION | QUANTITY | CONSTR STDS STOCK NO OR |
|---|---|---|---|
| 1 | 3-3/4"x 5-3/4"x 10'-0" Crossarm - 8 pin | 2 | PG 111 IT. 3 |
| 2 | 3-1/2"x 4-1/2"x 8'-0" Kick Arm | 1 | PG 111 IT. 2 |
| 3 | Angle Crossarm Brace - 4' or 5' | 2 | 164032 OR 164128 |
| 4 | Mach. Bolt, Galv. 1/2"x 7" - 1 rd. washer & 1 nut | 4 | PGS 139, 140 |
| 5 | Mach. Bolt, Galv. 5/8"x 5" - 1 rd. washer & 1 nut | 2 | PGS 139, 140 |
| 6 | Mach. Bolt, Galv. 5/8"x 10" - 1 nut | 1 | PGS 139, 140 |
| 7 | Mach. Bolt, Galv. 5/8"x 14" - 2 sq. washers & 1 nut | 1 | PGS 139, 140 |
| 8 | Mach. Bolt, Galv. 5/8"x 18" - 2-3"x 4" washers & 1 nut | 1 | PGS 139, 140 |
| 9 | Space Bolt, Galv. 5/8"x 18" - 4 washers & 4 nuts | 2 | PGS 139, 140 |
| 10 | Lag Screw, Galv. 1/2"x 4" | 1 | 621568 |
| 11 | High Voltage Sign & Nails #8, Roofing | 1 | 647648, 492224 |
| 12 | Pole Step | 16 | 692992 |
| 13 | | | |
| 14 | R.O. Transformer & Hangers | 1 | PGS 1121.00-1121.12 |
| 15 | R.C.O.C. Switch | 1 | 274560 |
| 16 | G.E. Expulsion Fuse Cutout | 1 | PG 1211 |
| 17 | Insulator, Strain #506 | 1 | 430880 |
| 18 | Insulator, 4 Kv. D.E. | 4 | 235520 |
| 19 | Insulator, D.G.D.P. | 4 | 428960 |
| 20 | #6 Wire Connector Split Bolt | 6 | 269056 |
| 21 | PVC Conduit, 1" diam. | 5' | 251200 |
| 23 | 1-1/4" Pipe Strap with 2 - 8d Nails | 3 | 697696, 491552 |
| 25 | #6 R.C. Strand. Copper Wire - 5 Kv. | 42' | 814112 |

SDG&E ELECTRIC STANDARDS

# SERIES CONTROLLED R.O. STREET LIGHT TRANSFORMER AND R.C.O.C. SWITCH, LINE ARM POSITION, 4KV

DATE 4-30-82
APPD LRH

1599.501
SUPERSEDES
1556 (4-30-82)

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**FIELD MAINTENANCE ONLY**

**REVISION HISTORY:**

**7/13/2016:** All versions prior to 2016 are superseded by their current version found inside the Overhead Construction Standard Manual.

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| B | | | | | | E | | | | | |
| A | ORIGINAL ISSUE | JS | IL | MDJ | 7/13/2016 | D | | | | | |

X Indicates Latest Revision | Completely Revised | New Page | Information Removed

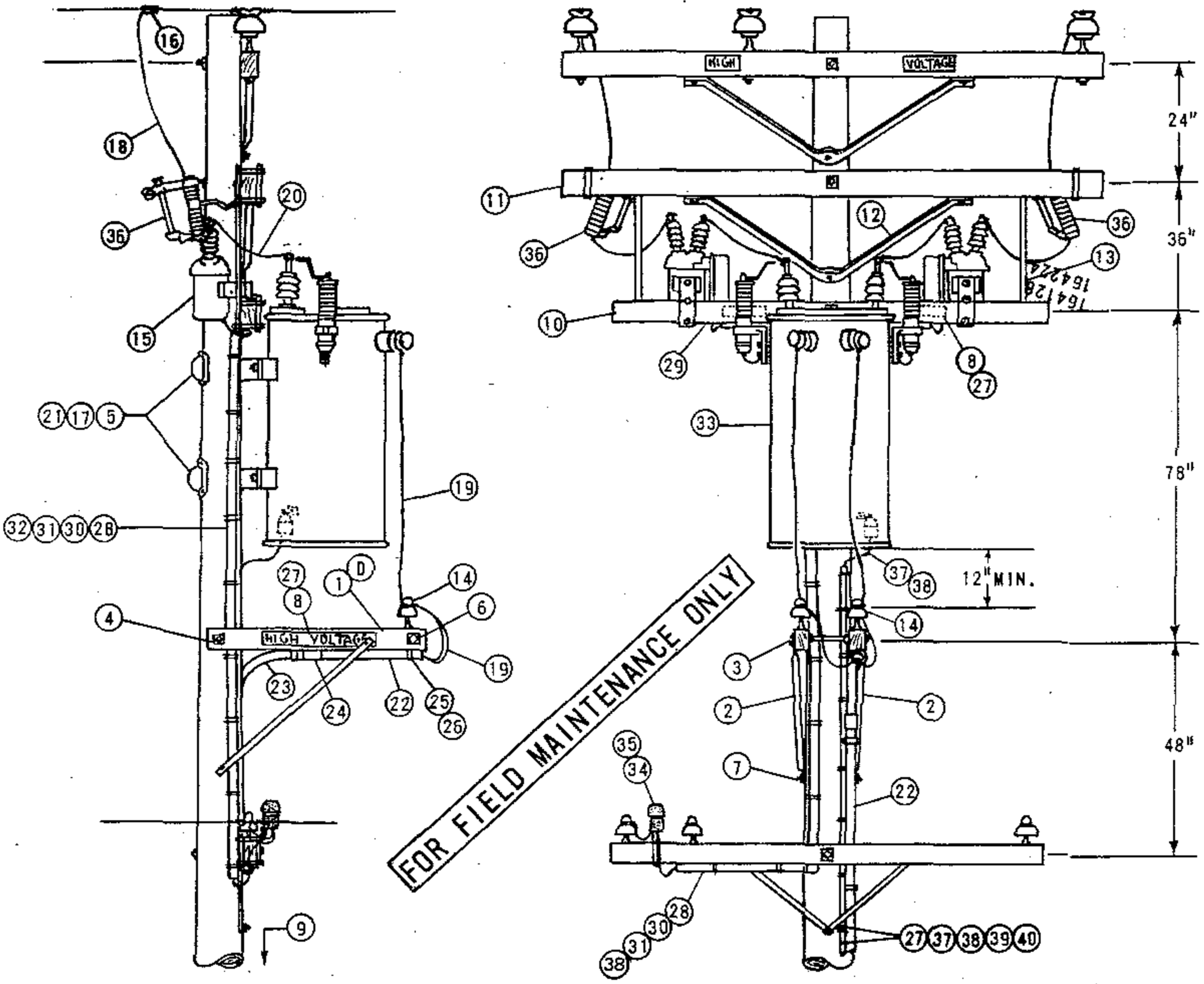
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1 OF 1

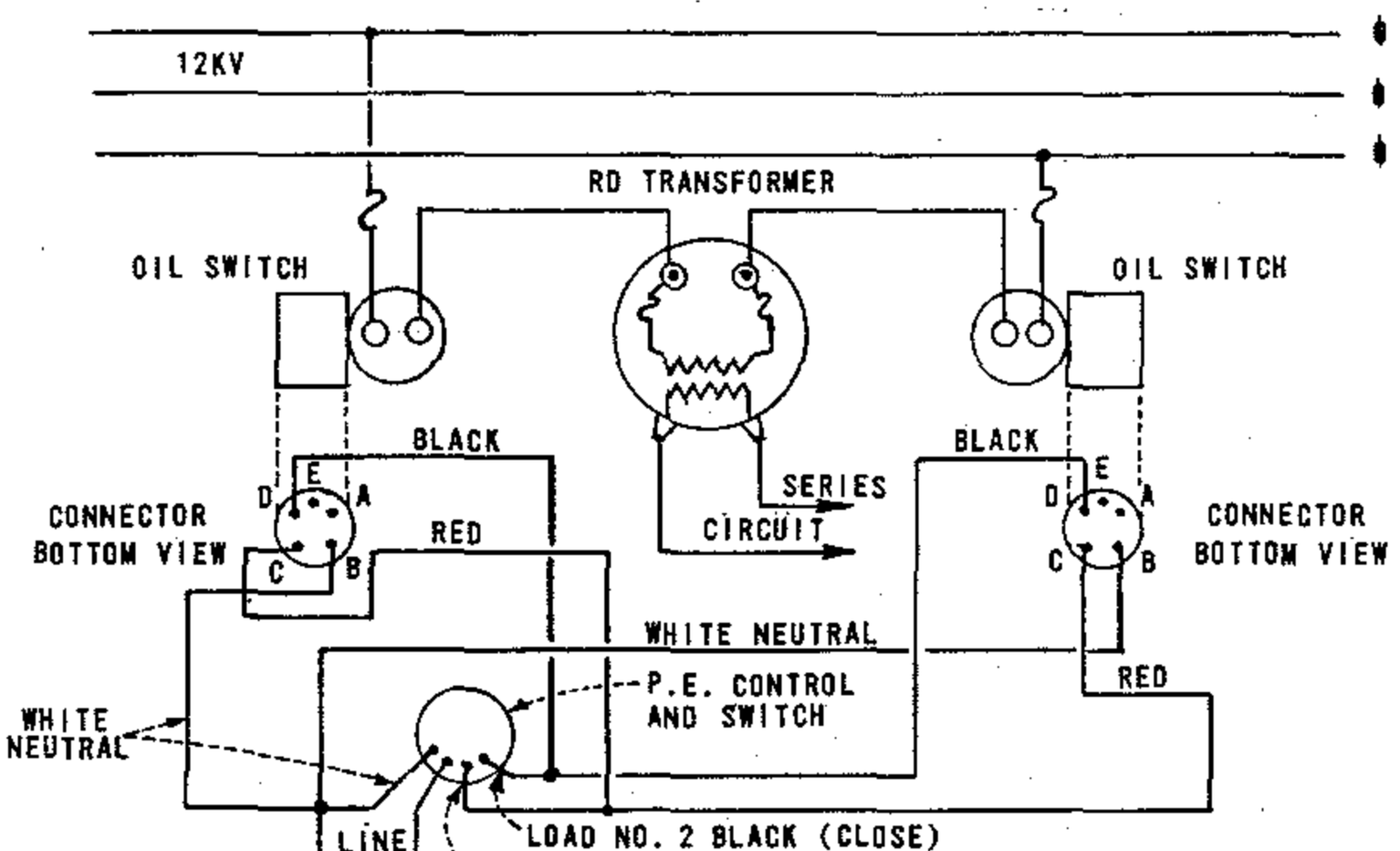
SDG&E ELECTRIC OVERHEAD STANDARD

P.E. CONTROLLED
R.D. STREET LIGHT TRANSFORMER INSTALLATION, 12KV

FMO
OH 1562

SCOPE : THIS STANDARD SHOWS A CONSTANT CURRENT SERIES LIGHTING R.D. TRANSFORMER INSTALLATION. IT IS TO BE USED ON EXISTING INSTALLATIONS.




WIRING DIAGRAM

| | | |
|---|---|---|
| 1599.601<br>SUPERSEDES<br>1562.1 (4-30-82) | SDG&E ELECTRIC STANDARDS<br>P.E. CONTROLLED<br>R.D. STREET LIGHT TRANSFORMER INSTALLATION, 12KV | DATE 4-30-82<br>APPD |

BILL OF MATERIAL :

| ITEM PTF | ITEM SL&SS | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 4'-0" | (D) | 1 | STD 380.05 IT. 3 |
| 2 | | BRACE, ALLEY ARM, 4'-0" | | 2 | 163808 |
| 3 | | BOLT, MACH. GALV., 5/8" X 5", 1 RD. WASHER & 1 NUT | (E) | 1 | STD 139, 140 |
| 4 | | BOLT, MACH. GALV., 5/8" X 18", 2 SQ. WASHERS & 1 NUT | (E) | 1 | STD 139, 140 |
| 5 | | BOLT, MACH. GALV., 3/4" X 12", 1 SQ. CURVED WASHER & 1 NUT | | 2 | STD 139, 140 |
| 6 | | BOLT, SPACE, GALV., 5/8" X 20", 4 SQ. WASHERS & 4 NUTS | (E) | 1 | STD 139, 140 |
| 7 | | SCREW, LAG, GALV., 5/8" X 5" | (E) | 1 | 621600 |
| 8 | | SIGN, HIGH VOLTAGE & NAILS, GALV ROOFING | (E) | 3 | 647648, |
| 9 | | STEPS, POLE | (E) | 15 | 692992 |
| 10 | | CROSSARM, 3 3/4" X 5 3/4" X 8' | | 1 | STD 380.01 |
| 11 | | CROSSARM, 3 3/4" X 5 3/4" X 10' | | 1 | STD 380.1 |
| 12 | | BRACE, 5'-0" | | 1 | |
| 13 | | BRACE, STRUT, 36" | | 2 | |
| | 14 | INSULATOR, 4KV | (E) | 2 | 700 SECTION |
| | 15 | SWITCH, OIL, NR, 15KV, 200 AMP | | 2 | 705568 |
| | 16 | CONNECTORS, COMPRESSION | (E) | 2 | 700 SECTION |
| | 17 | NAILS, GALV. 10d | (E) | 6 | 491392 |
| | 18 | WIRE, COPPER #6/3 STRAND | | 10' | 813536 |
| | 19 | CABLE, 1/C #6, 5KV XLP | | 60' | 194304 |
| | 20 | WIRE, COPPER, #4 SOLID W.P. | | 10' | 812480 |
| | 21 | COVER, PVC THRU BOLT | (E) | 2 | 285696 |
| | 22 | PIPE, PLASTIC 1 1/2" DIAM., PVC TYPE II, SCHEDULE 80, 20' LENGTHS | (E) | 1 | 251456 |
| | 23 | PIPE, 1 1/2" DIAM. PLASTIC, 90° ELBOW, PVC TYPE II, SCHEDULE 80 | | 1 | 322464 |
| | 24 | COUPLING, 1 1/2" DIAM. PLASTIC PIPE, PVC | (E) | 3 | 280512 |
| | 25 | STRAP, PIPE 1 1/2" DIAM., GALV. | (E) | AS REQ'D. | 697664 |
| | 26 | NAILS, 10d GALV. | (E) | AS REQ'D. | 491392 |
| | 27 | CLAMP, GROUND ROD | (E) | 2 | 230016 |
| | 28 | CONDUIT, PVC, TYPE II, SCHEDULE 80, 1" | (E) | 25' | 251424 |
| | 29 | PLUG, DISCONNECT CONDUCTOR, 5 TERMINAL | (F) | 2 | 544838 |
| | 30 | WIRE, COPPER, #12 TW, STRANDED WP, WHITE | (F) | 25' | 810016 |
| | 31 | WIRE, COPPER, #12 TW, STRANDED WP, RED | (F) | 25' | 809920 |
| | 32 | WIRE, COPPER, #12 TW, STRANDED WP, BLACK | (F) | 25' | 809504 |
| | 33 | TRANSFORMER, R.D., 12KV, 25KVA | | 1 | 763426 |
| | 34 | MOUNTING BRACKET | | 1 | 166432 |
| | 35 | PHOTO ELECTRIC RELAY, 120 V., 1000 W MIN. | | 1 | 273920 |
| | 36 | CUTOUT, 12KV 100A | | 2 | 297888 |
| | 37 | WIRE, COPPER #6 B. STRD. | | 50' | 813644 |
| | 38 | UNIT, GROUND (LTN'G ARR.) PLAIN/GREY | | 1 | 603136, 603120 |
| | 39 | STAPLE, FENCE 1 1/4" | (E) | AS REQ'D | 678520 |
| | 40 | STAPLE, MOULDING 3" x 1 1/16" x 1/4" | (E) | AS REQ'D | 678560 |

FOR FIELD MAINTENANCE ONLY

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INSTALLATION :

A. CLASS OF POLES SHOULD BE DETERMINED PER STDS 344-361.

B. APERTURE OF PHOTOELECTRIC CELL MUST BE SET TO FACE NORTH.

C. 12KV/6.6A CONSTANT CURRENT TRANSFORMER HAS INTERNAL FUSES.

(D) WHEN THERE IS NO SECONDARY ON A POLE, A 6 PIN COMBINATION ARM FOR THE TWO WIRE SERIES AND THE SECONDARY MAY BE USED. THE 4' ALLEY ARMS WILL NOT BE NEEDED. IDENTIFY THE SECONDARY WITH 0-750 VOLT SIGNS.

(E) EXEMPT MATERIAL.

(F) 5 TERMINAL PLUGS AND WIRE TO BE FABRICATED BY KEARNY MAINTENANCE.

G.

H.

REFERENCE :

I. G.O. 95 RULE 58.2 REQUIRES PRIMARY CONSTANT CURRENT SERIES LIGHTING CIRCUITS BE TREATED AS MORE THAN 750 VOLTS.

J. S D G & E RULE DOES NOT ALLOW FOR CONSTANT CURRENT SERIES LIGHTING CIRCUITS OVER 750 VOLTS TO BE PLACED ON THE SAME ARM WITH 12KV.

| | S D G & E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 4-30-82<br>APPD | P.E. CONTROLLED<br>R.D. STREET LIGHT TRANSFORMER INSTALLATION, 12KV | 1599.602<br>SUPERSEDES<br>1562.2 (4-30-82) |

| PAGE | SUBJECT |
|---|---|
| 1650 | CROSSARM CONSTRUCTION - 3 & 4 WIRE TANGENT AVIAN SAFE CONSTRUCTION |
| 1651 | CROSSARM CONSTRUCTION - 3 WIRE DEADEND AVIAN SAFE CONSTRUCTION |
| 1652 | CROSSARM CONSTRUCTION - 4 WIRE DEADEND AVIAN SAFE CONSTRUCTION |
| 1653 | CROSSARM CONSTRUCTION - 3 WIRE LINE & BUCK AVIAN SAFE CONSTRUCTION |
| 1660 | POLE TOP NEST PLATFORM |

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| C | | | | | | | F | | | | | | |
| B | AVIAN SECTION FMO | ARC | RSL | JAS | KRG | 04/07/2023 | E | | | | | | |
| A | OH1660 MOVED TO FMO | EDM | RSL | JAS | KRG | 09/30/2022 | D | | | | | | |



X Indicates Latest Revision | Completely Revised | New Page | Information Removed

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

WILDLIFE PROTECTION
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# OH1650 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/07/2023:** MOVED TO FMO

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SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 3 & 4 - WIRE TANGENT
AVIAN SAFE CONSTRUCTION

FMO
OH1650

**SCOPE:** THIS STANDARD ILLUSTRATES PHASE CONDUCTOR POSITIONS FOR NEW SINGLE CIRCUIT, TANGENT, THREE AND FOUR WIRE CONSTRUCTION IN AN AVIAN PROTECTION AREA.

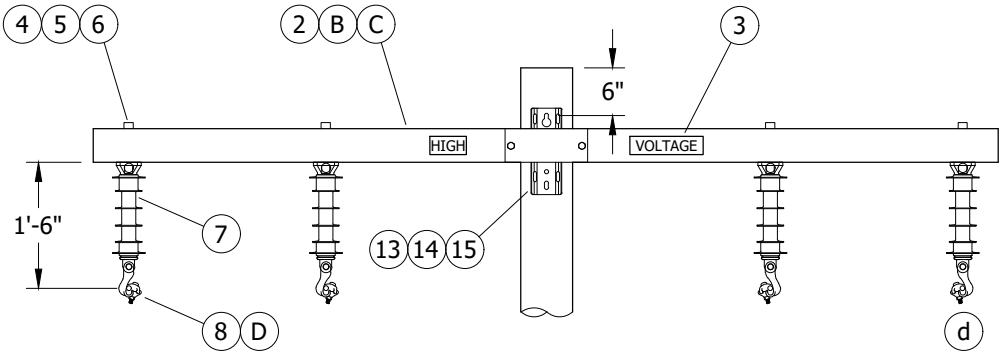



**FIGURE 1**

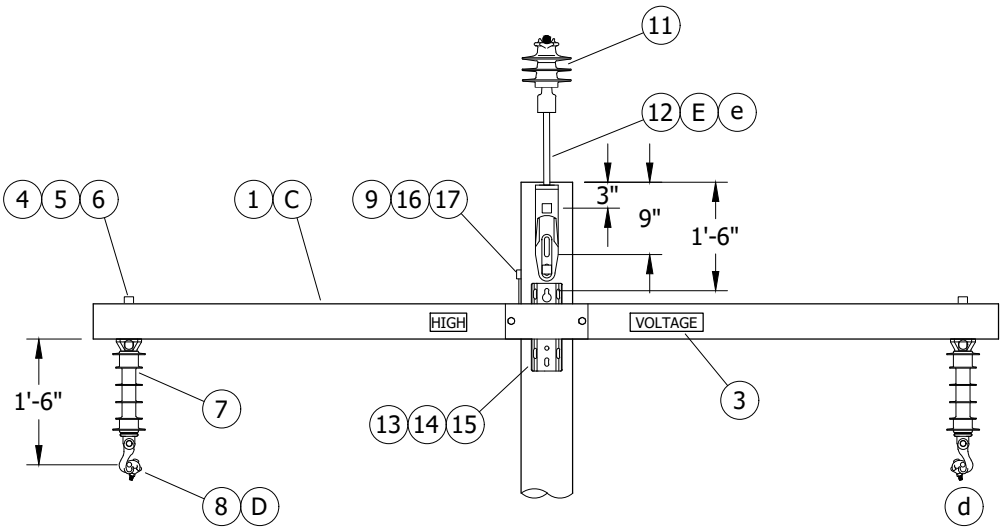



**FIGURE 2**

FIELD MAINTENANCE ONLY

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| C | BILL OF MATERIALS UPDATE | EDM | GLW | JES | CZH | 01/14/2020 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 01/15/2019 | E | MOVED TO FMO | ARC | RSL | JAS | KRG | 04/07/2023 |
| A | ORIGINAL ISSUE | - | JC | IL | JS | 01/05/2015 | D | NOTES UPDATE | EDM | MRF | GLW | CZH | 10/01/2021 |

## INSTALLATION:

A. THE REQUIRED MINIMUM DISTANCE OF UNCOVERED CONDUCTOR PHASE-TO-PHASE, PHASE-TO-GROUND OR PHASE-TO-NEUTRAL IS SIXTY INCHES. IF THE RIDGE PIN IS INSTALLED INLINE, THE CENTER PHASE DOES NOT NEED TO BE COVERED.

(B) TWELVE-FOOT TANGENT FIBERGLASS CROSSARM IS THE MINIMUM SIZE REQUIRED FOR THIS TYPE OF CONSTRUCTION.

(C) ENSURE THE FOLLOWING CALCULATION IS NOT VIOLATED WHEN COMPARING APPLIED LOADS TO ALLOWABLE LOADS SO THAT AN OVERALL SAFETY FACTOR OF TWO IS MAINTAINED:

$$\frac{\text{(APPLIED VERTICAL LOAD)}}{\text{(ALLOWABLE VERTICAL LOAD)}} + \frac{\text{(APPLIED HORIZONTAL LOAD)}}{\text{(ALLOWABLE HORIZONTAL LOAD)}} + \frac{\text{(APPLIED TRANSVERSE LOAD)}}{\text{(ALLOWABLE TRANSVERSE LOAD)}} \leq 1$$

(D) USE LINE GUARD OVER ALUMINUM CONDUCTORS AT PIN AND ALL SUSPENSION SUPPORTS.

(E) ALLOWABLE TO INSTALL RIDGE PIN ON ANY SIDE OF POLE. INSTALL SPLIT BOLT IF INSTALLATION IS ON WOOD POLE.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, LENGTH & SIZE AS REQ'D (C) | AS REQ'D | 379 | - | - |
| 2 | CROSSARM, FIBERGLASS, 12FT, TANGENT MINIMUM (C) | 1 | 379 | S294374 | 6FT |
| 3 | SIGN, ADHESIVE STICKER, HIGH VOLTAGE FOR GALV. STEEL & FIBERGLASS | 2 | 208.4 | S647650 | HV/D |
| 4 | STUD, POST INSULATOR, 7 1/2" | 2 | 751 | S701760 | STUD-W |
| 5 | WASHER, FLAT, SQUARE, 5/8" | AS REQ'D | 392.2 | S799040 | 5/8SQ |
| 6 | SPRING LOCK, WASHER, 5/8" | AS REQ'D | 392.2 | S796866 (X) | - |
| 7 | INSULATOR, UNDERARM | AS REQ'D | 750.1 | S431298 | UA-INS |
| 8 | SUSPENSION CLAMP | AS REQ'D | 775 | - | - |
| 9 | WASHER, SPRING LOCK, 5/8" | AS REQ'D | 390 | S796866 (X) | - |
| 10 | LINE GUARD | AS REQ'D | 759 | - | - |
| 11 | INSULATOR, 1" THREAD, PIN TYPE | 1 | 750.2 | S429050 | 56-1NP |
| 12 | RIDGE PIN, 1" THREAD, FIBERLGASS PIN, 18" FIBERGLASS | 1 | 396 | S529220 | PTP18 |
| 13 | BOLT, MACHINE, GALV. W/NUT, 3/4" X (LENGTH AS REQ'D) | AS REQ'D | 392.1 | - | - |
| 14 | WASHER, CURVED, SQUARE, 3/4" | AS REQ'D | 392.2 | S797760 | RIBWSH |
| 15 | SPRING LOCK, WASHER | AS REQ'D | 750.2 | S796802 (X) | LK-WSH |
| 16 | BOLT, MACHINE, GALV. W/NUT, 5/8" X (LENGTH AS REQ'D) | AS REQ'D | 390 | - | - |
| 17 | WASHER, CURVED, SQUARE, 5/8" | AS REQ'D | 390 | S797792 | - |

## NOTES:

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

a. SEE OH1003 FOR BONDING FOR CONTAMINATION DISTRICT 1 ONLY.

b. SEE OH379 FIBERGLASS CROSSARM ALLOWABLE LOADING.

c. SEE OH718 FOR COVERED COPPER EQUIPMENT AND LINE WIRE JUMPERS.

(d) SEE OH220-OH224 FOR G.O. 95 CLEARANCES.

(e) SEE OH396 FOR MAXIMUM ALLOWABLE LOAD ON AN 18-INCH FIBERGLASS RIDGE PIN.

FIELD MAINTENANCE ONLY

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| C | BILL OF MATERIALS UPDATE | EDM | GLW | JES | CZH | 01/14/2020 | F | | | | | | |
| B | DRAWING UPDATE | PEI | - | - | - | 01/15/2019 | E | MOVED TO FMO | ARC | RSL | JAS | KRG | 04/07/2023 |
| A | ORIGINAL ISSUE | - | JC | IL | JS | 01/05/2015 | D | NOTES UPDATE | EDM | MRF | GLW | CZH | 10/01/2021 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 3 & 4 - WIRE TANGENT
AVIAN SAFE CONSTRUCTION

# OH1651 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/07/2023:** MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | ARC | RSL | JAS | KRG | 04/07/2023 | D | | | | | | |

| | | | | |
|---|---|---|---|---|
| | Indicates Latest Revision | | Completely Revised | X New Page | | Information Removed |

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 1 OF 1

CROSSARM CONSTRUCTION - 3 WIRE
DEADEND AVIAN SAFE CONSTRUCTION

FMO
OH1651

**SCOPE:** THIS STANDARD ILLUSTRATES PHASE CONDUCTOR POSITIONS FOR NEW SINGLE CIRCUIT, DEADEND, THREE WIRE CONSTRUCTION IN AN AVIAN PROTECTION AREA.

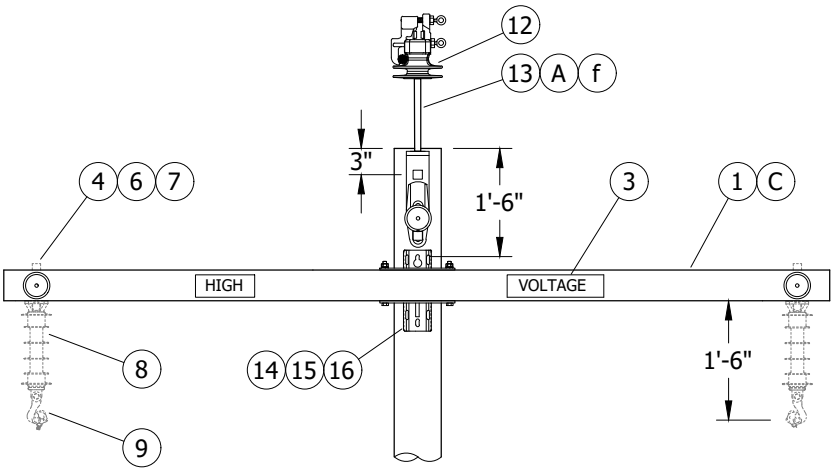



**FIGURE 1**
FRONT VIEW

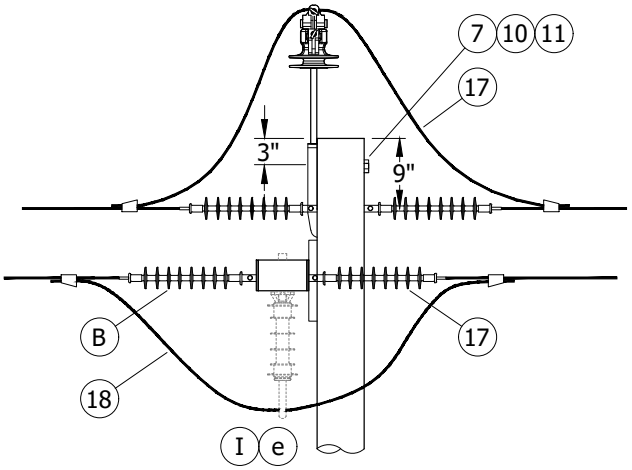



**FIGURE 1**
SIDE VIEW

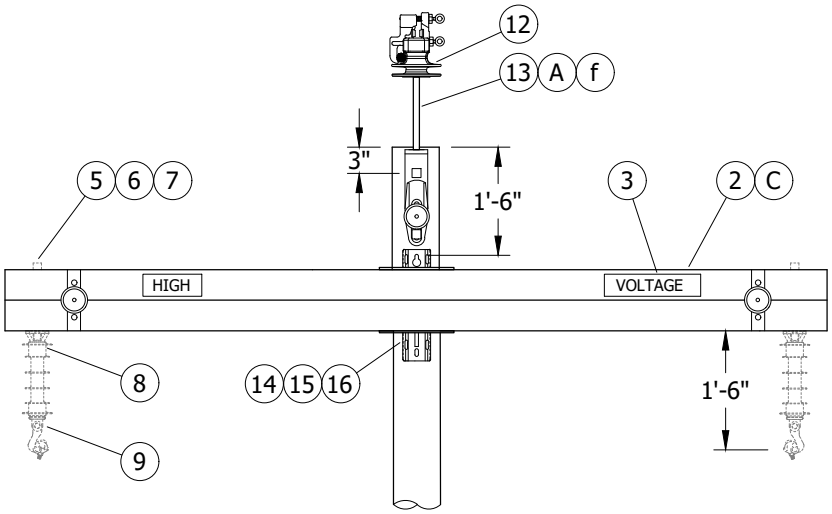



**FIGURE 2**
FRONT VIEW

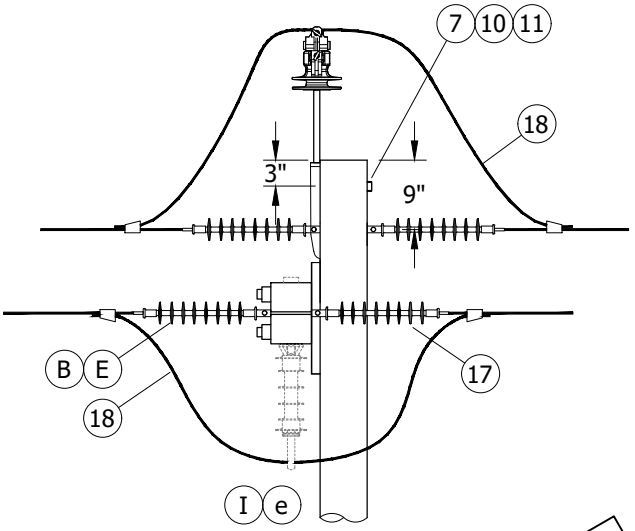



**FIGURE 2**
SIDE VIEW

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | BILL OF MATERIAL UPDATE | EDM | GLW | JES | CZH | 01/14/2020 | F | MOVED TO FMO | ARC | RSL | JAS | KRG | 04/07/2023 |
| B | DRAWING UPDATE | PEI | - | - | - | 01/15/2019 | E | NOTES UPDATE | EDM | MRF | GLW | CZH | 10/01/2021 |
| A | ORIGINAL ISSUE | - | JC | IL | JS | 01/05/2015 | D | EDITORIAL CHANGES | EDM | GLW | JES | CZH | 07/13/2020 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 3 WIRE
DEADEND AVIAN SAFE CONSTRUCTION



FMO
OH1651.1

## INSTALLATION:

(A) ALLOWABLE TO INSTALL RIDGE PIN ON ANY SIDE OF POLE.

(B) SHORTER DEADEND INSULATORS CAN BE USED ON OUTSIDE PHASE POSITION ON ARM SIDE.

(C) ENSURE THE FOLLOWING CALCULATION IS NOT VIOLATED WHEN COMPARING APPLIED LOADS TO ALLOWABLE LOADS SO THAT AN OVERALL SAFETY FACTOR OF TWO IS MAINTAINED:

$$\frac{\text{(APPLIED VERTICAL LOAD)}}{\text{(ALLOWABLE VERTICAL LOAD)}} + \frac{\text{(APPLIED HORIZONTAL LOAD)}}{\text{(ALLOWABLE HORIZONTAL LOAD)}} + \frac{\text{(APPLIED TRANSVERSE LOAD)}}{\text{(ALLOWABLE TRANSVERSE LOAD)}} \leq 1$$

(D) SIZE AS REQUIRED WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY OR GREATER.

(E) SHACKLES TO BE USED WITH FIBERGLASS, STACKED, DEADEND CROSSARMS IN TRANSVERSE (SIDE STRAIN) APPLICATIONS.

F. THE REQUIRED MINIMUM DISTANCE OF UNCOVERED CONDUCTOR PHASE-TO-PHASE, PHASE-TO-GROUND OR PHASE-TO-NEUTRAL IS SIXTY INCHES. IF THE RIDGE PIN IS INSTALLED INLINE, THE CENTER PHASE DOES NOT NEED TO BE COVERED.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, DEADEND (C) | AS REQ'D | 379 | - | - |
| 2 | STACKED, DEADEND, FIBERGLASS CROSSARM (C) | AS REQ'D | 379 | - | - |
| 3 | SIGN, ADHESIVE STICKER, HIGH VOLTAGE FOR GALV. STEEL & FIBERGLASS | 2 | 208 | S647650 | HV/D |
| 4 | STUD, POST INSULATOR, 7 1/2" | AS REQ'D | 751 | S701760 | STUD-W |
| 5 | STUD, POST INSULATOR, 10" | AS REQ'D | 396 | S701762 | STUD-L |
| 6 | WASHER, FLAT, SQUARE, 5/8" | AS REQ'D | 390 | S799040 | 5/8SQ |
| 7 | WASHER, SPRING LOCK, 5/8" | AS REQ'D | 390 | S796866 (X) | - |
| 8 | INSULATOR, UNDERARM | AS REQ'D | 750 | S431298 | UA-INS |
| 9 | SUSPENSION CLAMP | AS REQ'D | 775 | - | - |
| 10 | WASHER, CURVED, SQUARE, 5/8" | AS REQ'D | 390 | S797792 | - |
| 11 | BOLT, MACHINE, GALV., W/NUT, 5/8" X (LENGTH REQ'D) | AS REQ'D | 390 | - | - |
| 12 | INSULATOR, 1" THREAD, PIN TYPE | 1 | 750 | - | - |
| 13 | POLE TOP PIN, 1" COB, FIBERGLASS PIN, 30" OVERALL LENGTH | 1 | 396 | S529220 | PTP18 |
| 14 | BOLT, MACHINE, GALV., W/ NUT 3/4" X (LENGTH AS REQ'D) | AS REQ'D | 392 | - | - |
| 15 | WASHER, CURVED, SQUARE, 3/4" | AS REQ'D | 392 | S797760 | RIBWSH |
| 16 | SPRING LOCK, WASHER, 3/4" | AS REQ'D | 392 | S796802 (X) | LK-WSH |
| 17 | INSULATOR, DEADEND, POLYMER, 35KV | AS REQ'D | 750 | S428958 | LONGDE |
| 18 | WIRE, POLY COVERED, COPPER (D) | AS REQ'D | 711 | - | - |
| 19 | STRAIN CLAMPS (d) | AS REQ'D | 739 | - | - |
| 20 | SHACKLE, 5/8" PIN | AS REQ'D | 739 | S636432 (X) | 30KSHK |

## NOTES:

(I) VERTICAL POST INSULATOR REQUIRED IF JUMPER WIRE VERTICAL DISTANCE BELOW CENTER OF CROSSARM IS GREATER THAN EIGHTEEN INCHES. THIS APPLIES TO ALL CROSSARMS.

(X) THIS ITEM IS EXEMPT.

FIELD MAINTENANCE ONLY

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| B | DRAWING UPDATE | PEI | - | - | - | 01/15/2019 | E | NOTES UPDATE | EDM | MRF | GLW | CZH | 10/01/2021 |
| A | ORIGINAL ISSUE | - | JC | IL | JS | 01/05/2015 | D | EDITORIAL CHANGES | EDM | GLW | JES | CZH | 07/13/2020 |

**REFERENCE:**

a. SEE OH1003 FOR BONDING FOR CONTAMINATION DISTRICT 1 ONLY.
b. SEE OH379 FOR FIBERGLASS CROSSARM ALLOWABLE LOADING.
c. SEE OH718 FOR COVERED COPPER EQUIPMENT AND LINE WIRE JUMPERS.
(d) SEE OH741-OH743 FOR STRAIN CLAMP SIZE AND CONDUCTOR USE.
(e) SEE OH220-OH224 FOR G.O. 95 CLEARANCES.
(f) SEE OH396 FOR MAXIMUM ALLOWABLE LOAD ON AN 18-INCH FIBERGLASS RIDGE PIN.

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 3 WIRE
DEADEND AVIAN SAFE CONSTRUCTION

FMO
OH1651.3

# OH1652 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**04/07/2023:** MOVED TO FMO

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| B | | | | | | | E | | | | | | |
| A | ORIGINAL ISSUE | ARC | RSL | JAS | KRG | 04/07/2023 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 4 WIRE
DEADEND AVIAN SAFE CONSTRUCTION

**SCOPE:** THIS STANDARD ILLUSTRATES PHASE CONDUCTOR POSITIONS FOR NEW SINGLE CIRCUIT, DEADEND, FOUR WIRE CROSSARM CONSTRUCTION IN AN AVIAN PROTECTION AREA.

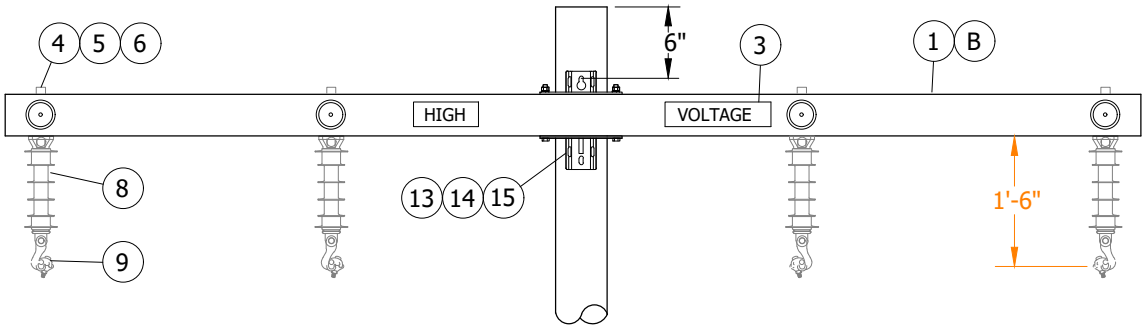



**FIGURE 1**
FRONT VIEW

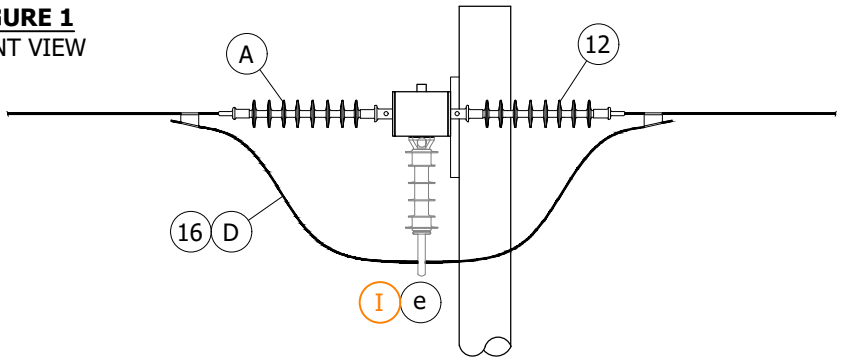



**FIGURE 1**
SIDE VIEW

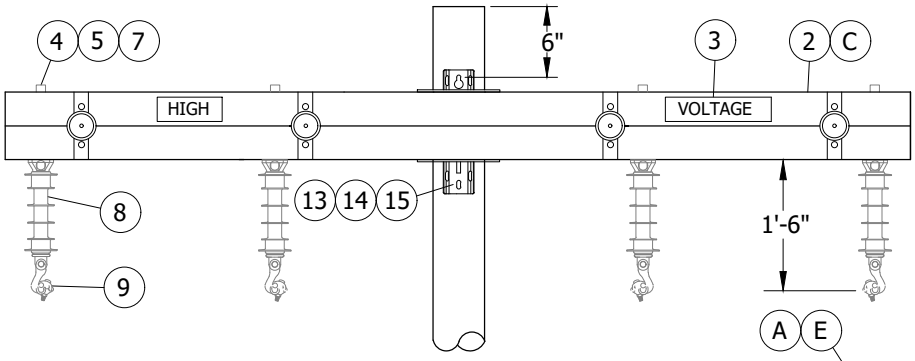



**FIGURE 2**
FRONT VIEW

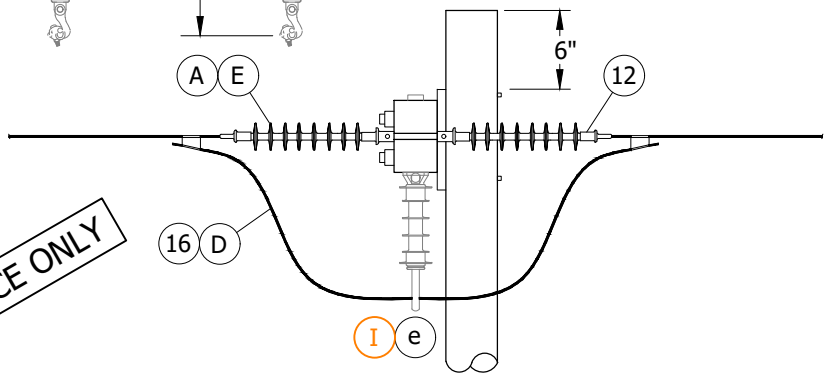



**FIGURE 2**
SIDE VIEW

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 4 WIRE
DEADEND AVIAN SAFE CONSTRUCTION



FMO
OH1652.1

## INSTALLATION:

(A) SHORTER DEADEND INSULATORS CAN BE USED ON OUTSIDE PHASE POSITION ON ARM SIDE.

(B) TWELVE-FOOT TANGENT FIBERGLASS CROSSARM IS THE MINIMUM SIZE REQUIRED FOR THIS TYPE OF CONSTRUCTION.

(C) ENSURE THE FOLLOWING CALCULATION IS NOT VIOLATED WHEN COMPARING APPLIED LOADS TO ALLOWABLE LOADS SO THAT AN OVERALL SAFETY FACTOR OF TWO IS MAINTAINED:

$$\frac{\text{(APPLIED VERTICAL LOAD)}}{\text{(ALLOWABLE VERTICAL LOAD)}} + \frac{\text{(APPLIED HORIZONTAL LOAD)}}{\text{(ALLOWABLE HORIZONTAL LOAD)}} + \frac{\text{(APPLIED TRANSVERSE LOAD)}}{\text{(ALLOWABLE TRANSVERSE LOAD)}} \leq 1$$

(D) SIZE AS REQUIRED WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY OR GREATER.

(E) SHACKLES TO BE USED WITH FIBERGLASS, STACKED, DEADEND CROSSARMS IN TRANSVERSE (SIDE STRAIN) APPLICATIONS.

F. THE REQUIRED MINIMUM DISTANCE OF UNCOVERED CONDUCTOR PHASE -TO-PHASE, PHASE-TO-GROUND OR PHASE-TO-NEUTRAL IS SIXTY INCHES.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, 12FT, DEADEND MINIMUM (C) | 1 | 379 | S294372 | 6DF |
| 2 | SQUARE FLAT WASHER 5/8" | AS REQ'D | 392.2 | S799040 | 5/8SQ |
| 3 | SIGN, ADHESIVE STICKER, HIGH VOLTAGE FOR GALV. STEEL & FIBERGLASS | 2 | 208.3 | S647650 | HV/D |
| 4 | SQUARE FLAT WASHER 5/8" | AS REQ'D | 392.2 | S799040 | 5/8SQ |
| 5 | SPRING LOCK, WASHER, 5/8" | AS REQ'D | 392.2 | S796866 (X) | - |
| 6 | STUD, POST INSULATOR, 7 1/2" | AS REQ'D | 751 | S701760 | STUD-W |
| 7 | STUD, POST INSULATOR, 10" | AS REQ'D | 396.1 | S701762 | STUD-L |
| 8 | INSULATOR, UNDERARM | AS REQ'D | 750.1 | S431298 | UA-INS |
| 9 | SUSPENSION CLAMP | AS REQ'D | 775 | - | - |
| 10 | STRAIN CLAMP (d) | AS REQ'D | 741-743 | - | - |
| 11 | SHACKLE, 5/8" PIN | AS REQ'D | 744 | S636432 (X) | 30KSHK |
| 12 | INSULATOR, DE, POLYMER, 35kV | AS REQ'D | 750.3 | S428958 | LONGDE |
| 13 | CURVED, WASHER, SQUARE 3/4" | AS REQ'D | 392.2 | S797760 | LK-WSH |
| 14 | BOLT, MACHINE, GALV. W/NUT, 3/4" X (LENGTHS REQ'D) | AS REQ'D | 392.1 | - | – |
| 15 | SPRING, LOCK, WASHER 3/4" | AS REQ'D | 392.1 | S796802 (X) | LK-WSH |
| 16 | WIRE, POLY COVERED COPPER (D) | AS REQ'D | 718 | - | - |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 4 WIRE
DEADEND AVIAN SAFE CONSTRUCTION

FMO OH1652.2

**NOTES:**

(I) VERTICAL POST INSULATOR REQUIRED IF JUMPER WIRE VERTICAL DISTANCE BELOW CENTER OF CROSSARM IS GREATER THAN EIGHTEEN INCHES. THIS APPLIES TO ALL CROSSARMS.

(X) THIS ITEM IS EXEMPT.

**REFERENCE:**

a. BONDING FOR CONTAMINATION DISTRICT 1 ONLY, SEE STD. 1003.

b. FIBERGLASS CROSSARM ALLOWABLE LOADING, SEE STANDARD 379.

c. COVERED COPPER EQUIPMENT AND LINE WIRE JUMPERS, SEE STANDARD 718.

(d) STRAIN CLAMP SIZE AND CONDUCTOR USE, SEE STANDARD. 741-743.

(e) FOR G.O. 95 CLEARANCES, SEE STANDARD 220-224.

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 4 WIRE
DEADEND AVIAN SAFE CONSTRUCTION

FMO
OH1652.3

# OH1653 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**03/27/2023:** MOVED TO FMO

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 3 WIRE-LINE
& BUCK AVIAN SAFE CONSTRUCTION

**SCOPE:** THIS STANDARD ILLUSTRATES PHASE CONDUCTOR POSITIONS FOR NEW SINGLE CIRCUIT, DEADEND, FOUR WIRE AND BUCK ARM CONSTRUCTION IN AN AVIAN PROTECTION AREA.

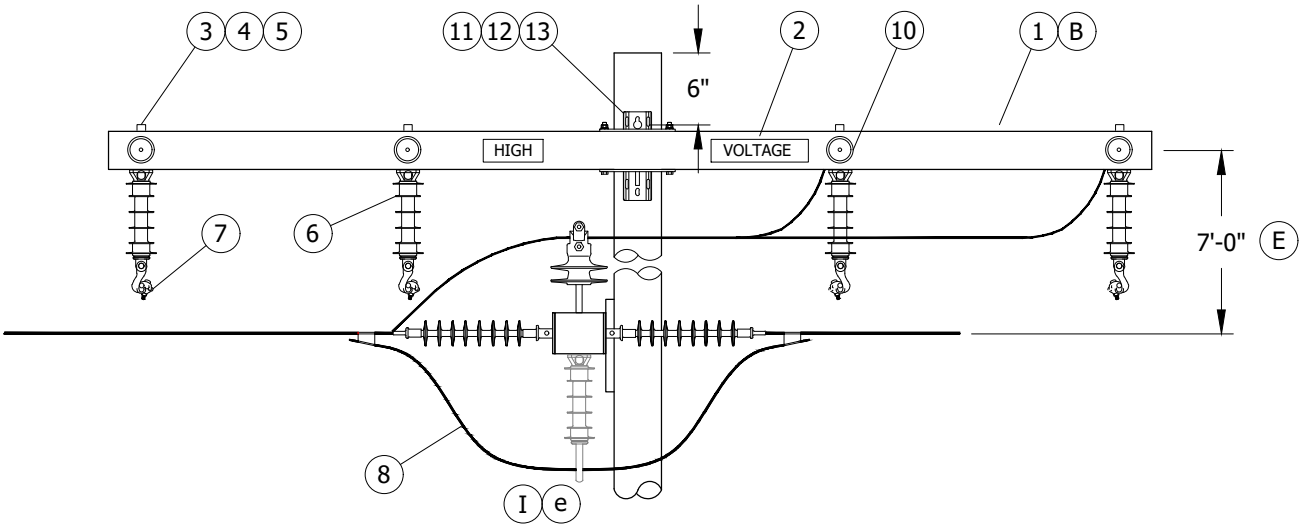



**FIGURE 1**
FRONT VIEW

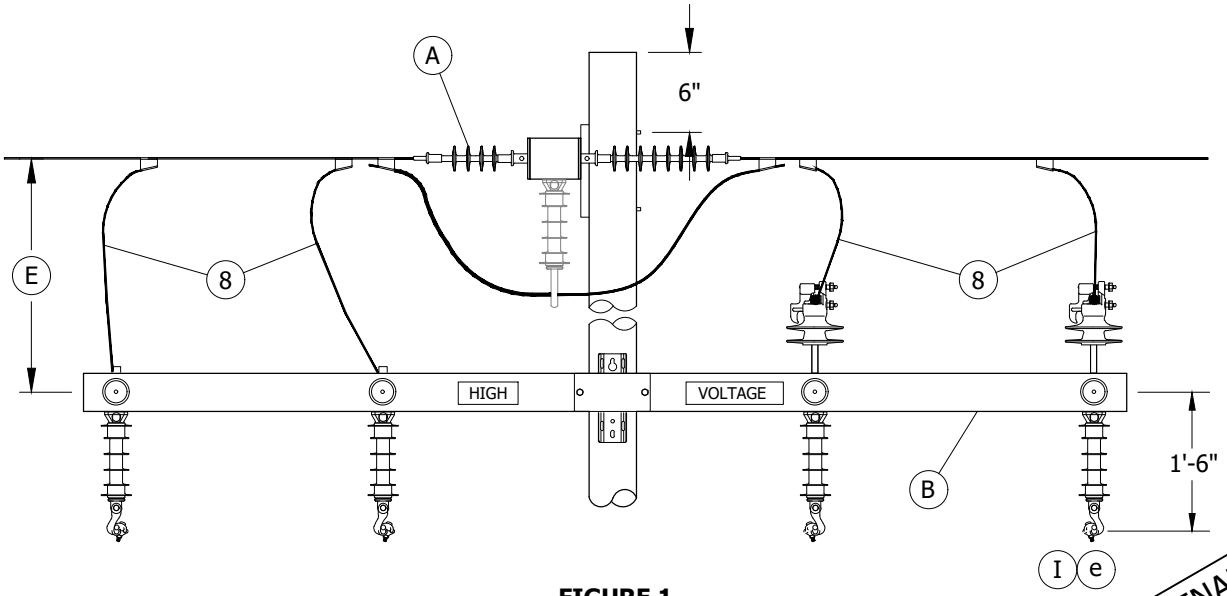



**FIGURE 1**
SIDE VIEW

FIELD MAINTENANCE ONLY

## INSTALLATION:

(A) SHORTER DEADEND INSULATORS CAN BE USED ON OUTSIDE PHASE POSITION ON ARM SIDE.

(B) TWELVE-FOOT DEADEND FIBERGLASS CROSSARM IS THE MINIMUM SIZE REQUIRED FOR THIS TYPE OF CONSTRUCTION.

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| C | EDITORIAL CHANGES | - | JS | JS | MDJ | 1/31/2017 | F | EDITORIAL CHANGES | EDM | GLW | JES | CZH | 7/13/2020 |
| B | NO CHANGES-REAFFIRMED | - | JC | JS | MDJ | 12/14/2016 | E | FIGURE UPDATE | EDM | GLW | JES | CZH | 1/14/2020 |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

CROSSARM CONSTRUCTION - 3 WIRE-LINE
& BUCK AVIAN SAFE CONSTRUCTION



FMO
OH1653.1

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## INSTALLATION (CONT'D):

(C) ENSURE THE FOLLOWING CALCULATION IS NOT VIOLATED WHEN COMPARING APPLIED LOADS TO ALLOWABLE LOADS SO THAT AN OVERALL SAFETY FACTOR OF TWO IS MAINTAINED:

$$\frac{\text{(APPLIED VERTICAL LOAD)}}{\text{(ALLOWABLE VERTICAL LOAD)}} + \frac{\text{(APPLIED HORIZONTAL LOAD)}}{\text{(ALLOWABLE HORIZONTAL LOAD)}} + \frac{\text{(APPLIED TRANSVERSE LOAD)}}{\text{(ALLOWABLE TRANSVERSE LOAD)}}$$

(D) SIZE AS REQUIRED WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY OR GREATER.

(E) WHERE A POLE IS BUCKET TRUCK ACCESSIBLE, TO ACCOMMODATE THE USE OF A BUCKET TRUCK AND THE RUBBER GLOVING WORK METHOD, DESIGN AND MAINTAIN SUFFICIENT CLEARANCE FOR THIS PURPOSE IF ECONOMICALLY FEASIBLE. SUFFICIENT CLEARANCE WILL BE SIX FEET BETWEEN TWO PRIMARY LEVELS, PRIMARY AND SECONDARY LEVEL, OR PRIMARY AND COMMUNICATION LEVEL. FOR POLES THAT ARE NOT BUCKET TRUCK ACCESSIBLE, FOUR FEET CLEARANCE SHALL BE MAINTAINED.

F. THE REQUIRED MINIMUM DISTANCE OF UNCOVERED CONDUCTOR PHASE-TO-PHASE, PHASE-TO-GROUND OR PHASE-TO-NEUTRAL IS SIXTY INCHES.

## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | DESIGN UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, FIBERGLASS, 12FT, DEADEND MINIMUM (C) | AS REQ'D | 379 | S294372 | 6DF |
| 2 | SIGN, ADHESIVE STICKER, HIGH VOLTAGE FOR GALV. STEEL & FIBERGLASS | 2 | 208 | S647650 | HV/D |
| 3 | WASHER, FLAT, SQUARE 5/8" | AS REQ'D | 390 | S799040 | 5/8SQ |
| 4 | SPRING LOCK, WASHER, 5/8" | AS REQ'D | 390 | S796866 (X) | - |
| 5 | STUD, INSULATOR, 7 1/2" | AS REQ'D | 751 | S701760 | STUD-W |
| 6 | INSULATOR, UNDERARM | 8 | 750 | S431298 | UA-INS |
| 7 | SUSPENSION CLAMP (D) | 8 | 775 | - | - |
| 8 | WIRE, POLY COVERED COPPER (d) | AS REQ'D | 718 | - | - |
| 9 | STRAIN CLAMPS | AS REQ'D | 741-743 | - | - |
| 10 | INSULATOR, DE, POLYMER, 35kV | 16 | 750 | S428958 | LONGDE |
| 11 | BOLT, MACHINE, GALV, W/NUT 3/4" X (LENGTH AS REQ'D) | AS REQ'D | 390 | - | - |
| 12 | SPRING, LOCK, WASHER | AS REQ'D | 390 | S796802 (X) | LK-WSH |
| 13 | WASHER, CURVED, SQUARE 3/4" | AS REQ'D | 390 | S797760 | RIBWSH |
| 14 | INSULATOR, 1" THREAD, PIN TYPE | AS REQ'D | 750 | - | - |
| 15 | PIN, TRANSFORMER, 1" | AS REQ'D | 396 | S529248 | PS/01 |

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## NOTES:

(I) VERTICAL POST INSULATOR REQUIRED IF JUMPER WIRE VERTICAL DISTANCE BELOW CENTER OF CROSSARM IS GREATER THAN EIGHTEEN INCHES. THIS APPLIES TO ALL CROSSARMS.

(X) THIS ITEM IS EXEMPT.

## REFERENCE:

a. BONDING FOR CONTAMINATION DISTRICT 1 ONLY, SEE OH1003.

b. FIBERGLASS CROSSARM ALLOWABLE LOADING, SEE OH379.

c. COVERED COPPER EQUIPMENT AND LINE WIRE JUMPERS, SEE OH718.

(d) STRAIN CLAMP SIZE AND CONDUCTOR USE, SEE OH741-743.

(e) FOR G.O. 95 CLEARANCES, SEE OH220-224.

f. FOR BUCKET TRUCK AND RUBBER GLOVE METHOD, SEE OH303.2.

FIELD MAINTENANCE ONLY

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| B | NO CHANGES-REAFFIRMED | - | JC | JS | MDJ | 12/14/2016 | E | FIGURE UPDATE | EDM | GLW | JES | CZH | 1/14/2020 |

# OH1660 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**09/30/2022:** MOVED TO FMO

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| A | ORIGINAL ISSUE | EDM | RSL | JAS | KRG | 09/30/2022 | D | | | | | | |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

POLE TOP NEST PLATFORM

**SCOPE:** THIS STANDARD ILLUSTRATES THE VARIOUS METHODS OF INSTALLING A POLE TOP NEST PLATFORM.

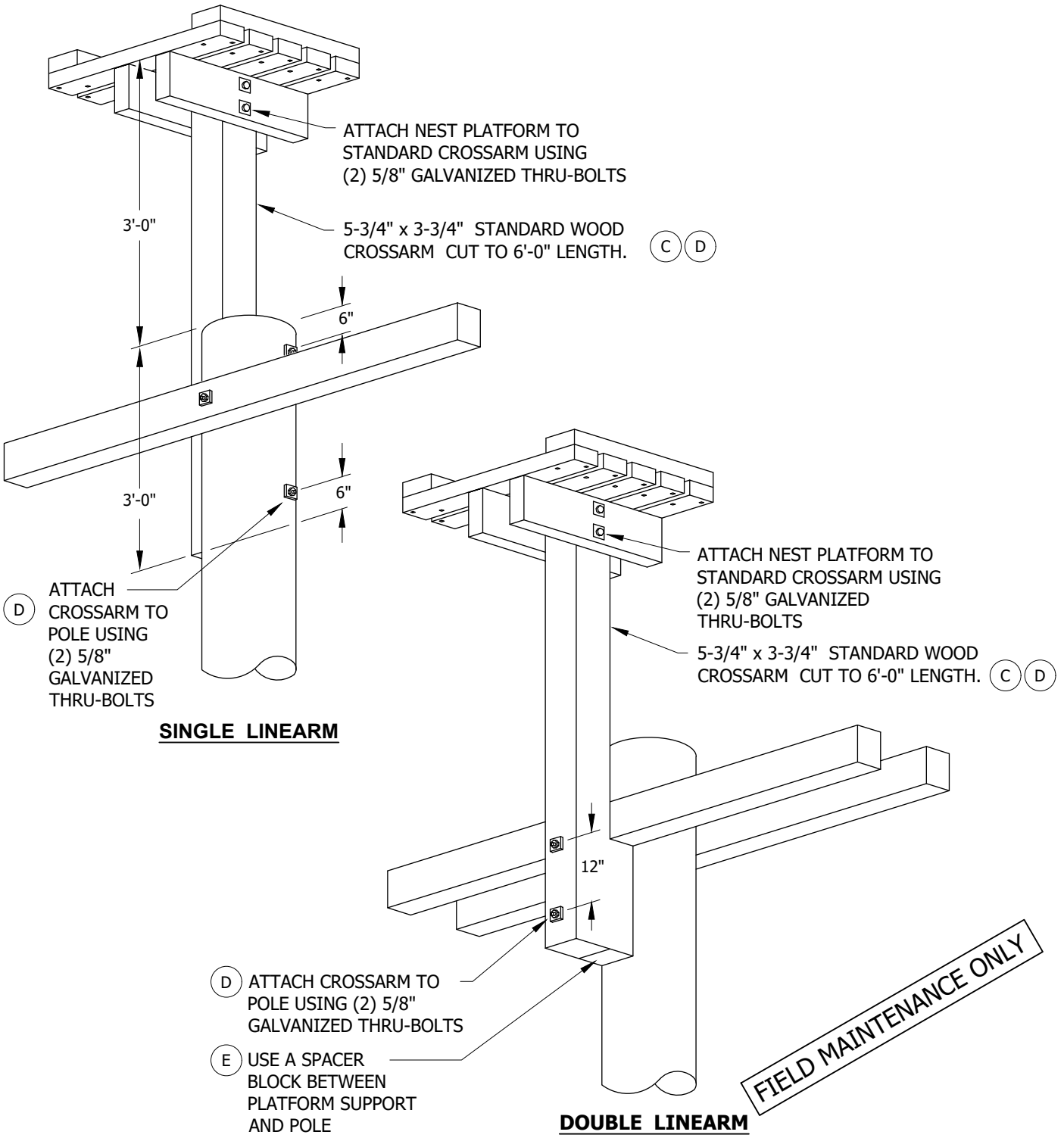



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| A | ORIGINAL ISSUE | - | - | PTA | JJ | 10/29/2005 | D | | | | | | |

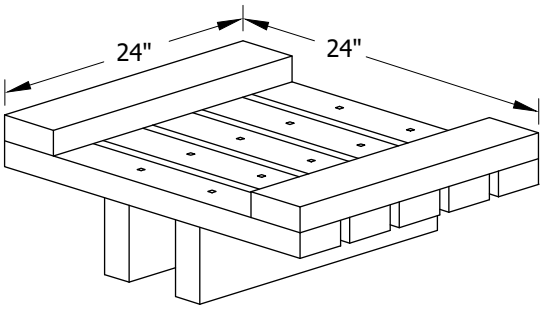
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

SHEET 1 OF 2

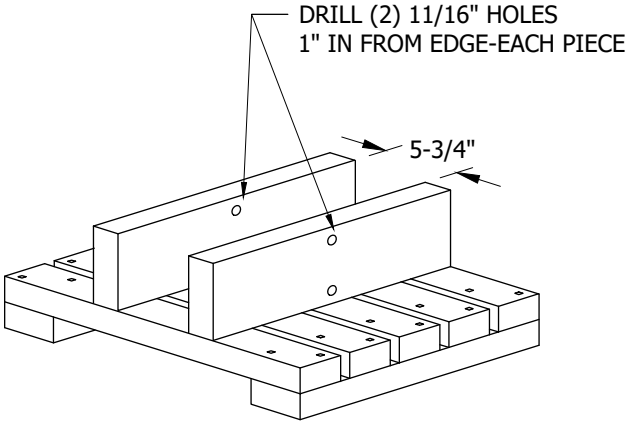
POLE TOP NEST PLATFORM

FMO OH1660.1




**TOP VIEW**

(A) (B)




**BOTTOM VIEW**

## INSTALLATION:

(A) POLE TOP NEST PLATFORMS ARE AN SDG&E SHOP MADE ITEM. AFTER ORDERING, ALLOW A TWO TO THREE WEEK LEAD TIME FOR THEIR MANUFACTURE.

(B) POLE TOP NEST PLATFORMS ARE CONSTRUCTED FROM UNTREATED, KILN-DRIED REDWOOD.

(C) NEST PLATFORMS ARE INSTALLED AT A LEVEL THREE FOOT ABOVE THE TOP OF THE POLE USING A 10' - 0" STANDARD CROSSARM THAT HAS BEEN CUT DOWN TO 6' - 0".

(D) ALL MOUNTING HARDWARE TO BE 5/8" GALVANIZED THRU-BOLTS. SEE DRAWINGS FOR DETAILS.

(E) TO MAKE SPACER BLOCK CUT A 15" SECTION FROM A 5-3/4" X 3-3/4" STANDARD CROSSARM.

## BILL OF MATERIALS:

NONE

## NOTES:

NONE

## REFERENCE:

NONE

FIELD MAINTENANCE ONLY

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| B | DRAWING UPDATE | PEI | - | - | - | 01/15/2019 | E | | | | | | |
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

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POLE TOP NEST PLATFORM

FMO OH1660.2

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| 1705 | STEEP GRADE LINE ANGLES: 0 TO 6 DEGREES |

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SDG&E ELECTRIC UNDERGROUND CONSTRUCTION STANDARD

SPACER CABLE SYSTEM FMO
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FMO
OH1701

# OH1705 FIELD MAINTENANCE ONLY

ALL VERSIONS LISTED IN FMO ARE SUPERSEDED BY THEIR CURRENT VERSION FOUND INSIDE THE OVERHEAD CONSTRUCTION STANDARD MANUAL.

**REVISION HISTORY:**

**07/08/2019:** MOVED TO FMO

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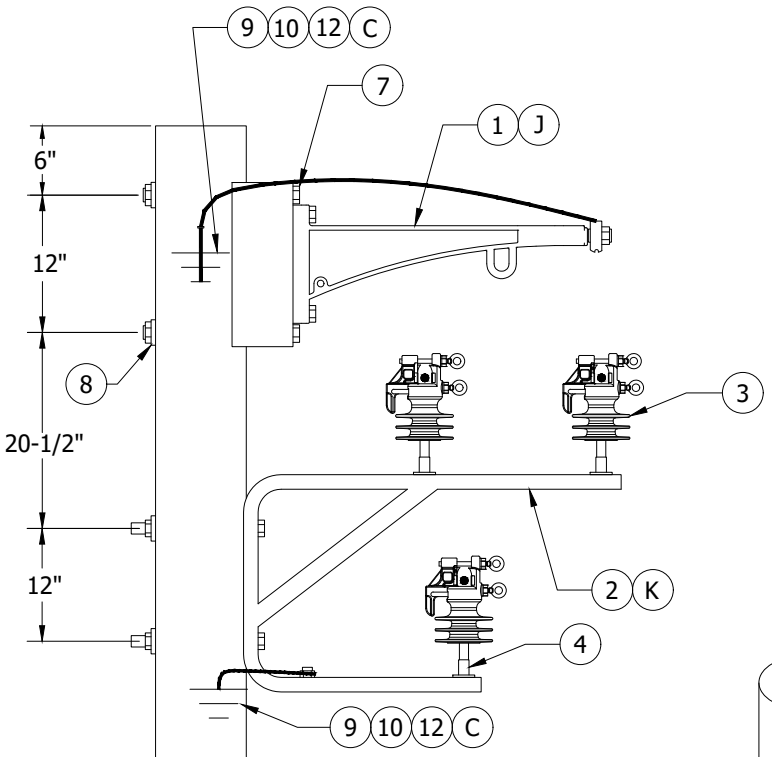
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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STEEP GRADE LINE ANGLES: 0 TO 6 DEGREES

FMO OH1705

**SCOPE:** FOR SLOPES LESS THAN 10 DEGREES, AND LINE ANGLES FROM 0 TO 6 DEGREES.




FOR USE WHEN SLOPE IS LESS THAN 10 DEGREES

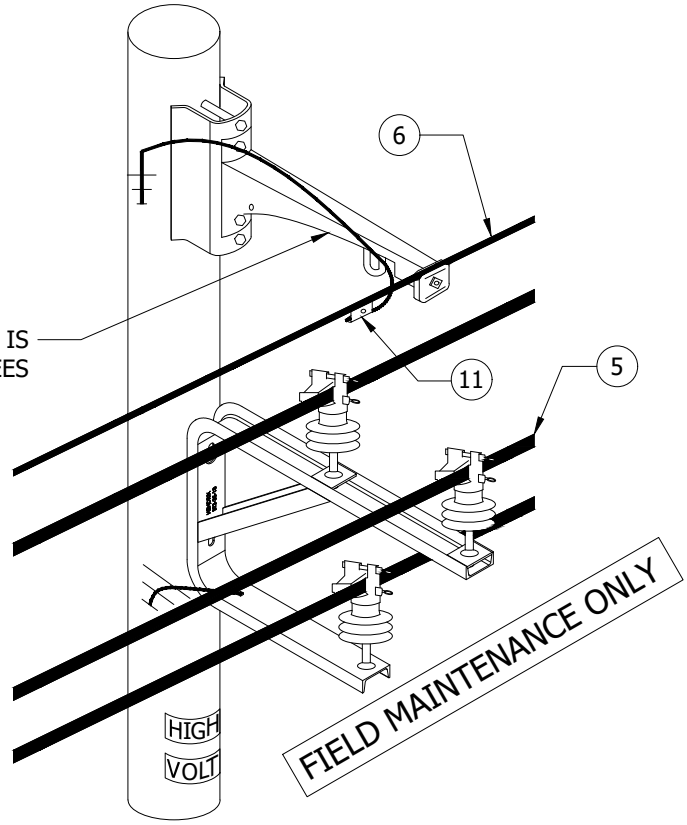



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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

STEEP GRADE LINE ANGLES: 0 TO 6 DEGREES



FMO OH1705.1

## INSTALLATION:

A. WHEN A GO95 SPACER IS REQUIRED FOR USE ON A MIDSPAN SLOPE GREATER THAN 20 DEGREES, A RTL-GO95DM SPACER (S663282) MUST BE USED INSTEAD.

B. REFERENCE STANDARDS PAGE 1706 FOR BEFORE & AFTER SLOPES THAT ARE EQUAL, IF NOT REFERENCE STANDARDS PAGE 1707.

(C) REFER TO WOOD AND STEEL POLE GROUNDING STANDARD 1002.

D. WHEN INSTALLING SPACER CABLE WIRE ABOVE OR IN THE PRESENCE OF 3-PHASE EQUIPMENT, REFERENCE STANDARD 1710 FOR CLEARANCE AND HARDWARE. SPACER CABLE WIRE MUST BE A MINIMUM OF 7 FEET FROM 3-PHASE EQUIPMENT.

E. WHEN INSTALLING SPACER CABLE WIRE ABOVE OR IN THE PRESENCE OF SINGLE-PHASE EQUIPMENT REFERENCE STANDARD 1710 FOR SINGLE-PHASE EQUIPMENT CLEARANCES AND HARDWARE. SPACER CABLE WIRE MUST BE A MINIMUM OF 7 FEET FROM SINGLE-PHASE EQUIPMENT.

F. LOWEST SPACER CABLE WIRE MUST BE INSTALLED A MINIMUM OF 6 FEET FROM FIBER/TELCO.

G. FOR EXTRA HEAVY LOADING CONDITIONS USE 127AWA MESSENGER (S814055) WITH DEAD-END MESSENGER GRIP ME-4179 (S392940) COLOR CODED, BLACK.

H. REFERENCE G.O. 95 CLEARANCES.

(J) TANGENT BRACKET - BRACKETS DESIGNED TO SUPPORT THE SPACER CABLE MESSENGER WIRE. THEY ARE USED ON TANGENT POLES AND FOR TRANSVERSE ANGLES UP TO 6 DEGREES.

(K) THESE BRACKETS MAINTAIN THE DIAMOND CONFIGURATION OF THE PHASE CONDUCTORS ON THE POLE.

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## BILL OF MATERIALS:

| ITEM | DESCRIPTION | QUANTITY | STANDARD PAGE | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | TANGENT BRACKET | 2 | - | S166150 | GUYARM |
| 2 | BRACKET, "C", TRANSFORMER TAP | 1 | - | S166152 | C-BKT |
| 3 | INSULATOR, PIN TYPE | 3 | 750.2 | S429060 | IPCN1 |
| 4 | INSULATOR PIN, SHORT SHANK, 1" LEAD THREAD | 3 | 396 | S532426 | PSS1 |
| 5 | SPACER CABLE (SIZE AND VOLTAGE RATING AS REQ.) | AS REQ | 1702 | - | - |
| 6 | MESSENGER (SIZE AND TYPE AS REQUIRED) | AS REQ | 1702 | - | - |
| 7 | MACHINE BOLT, 3/4" X REQ. LENGTH | AS REQ | 392.1 | - | - |
| 8 | WASHER, CURVED, SQUARE | AS REQ | 392.2 | S797760 | - |
| 9 | #4, 7 STRAND, COVERED JUMPER WIRE | AS REQ | 718 | S815044 | POLY4J |
| 10 | RIVNUT, THREADED, 1/2" X 13 | AS REQ | 1002.2 | S692998 | - |
| 11 | CONNECTOR, WEDGE (SIZE AND TYPE AS REQ.) | AS REQ | 784.5 | - | - |
| 12 | CONNECTOR, SPLIT BOLT, BRONZE 1/2" X 13 | AS REQ | 1002.3 | S263360 | SPCONN |

FIELD MAINTENANCE ONLY

## NOTES:
NONE

## REFERENCE:
NONE

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

ENGINEERED STEEL POLES
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# 1900 - MISCELLANEOUS EQUIPMENT

# 1900 - MISCELLANEOUS EQUIPMENT

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# 2000-COVERED CONDUCTOR

# 2000-COVERED CONDUCTOR

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# LEGACY OVERHEAD FIELD MAINTENANCE ONLY


| PAGES | SUBJECT |
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| 200-400 | DISTRIBUTION POLE TOPS |
| 500 | TRANSMISSION |
| 600-900 | SECONDARIES, CONDUCTOR, GUYING |
| 1100 | TRANSFORMERS |
| 1200 | SECTIONALIZING |
| 1300 | CAPACITORS, REGULATORS |
| 1400-1500 | CABLE POLES, LIGHTING |


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| 204 | OVERHEAD DISTRIBUTION SWITCH NUMBERING |
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| 218 | POLE TOP RAIL |
| 269 | 12KV SINGLE CIRCUIT TRANSPOSITION |
| 299.201 | AERIAL CABLE CLEARANCE |
| 399.401 | PROTECTIVE COVERINGS, MOLDINGS AND STRAPS |
| 399.402 | "J" BOLT FOR CABLE POLE RISERS |
| 399.501 | CAPACITOR MOUNTING STRAP |
| 399.502 | MOUNTING BRACKETS |
| 399.503-.504 | HORIZONTAL AND VERTICAL POLE LOADING |
| 399.701-.702 | REINFORCING WOOD POLES WITH STEEL SLEEVES |
| 399.703 | REINFORCING WOOD POLES WITH FIBERGLASS WRAP |
| 499.101 | FIBERGLASS SUPPORT CONSTRUCTION, 12KV AND BELOW |
| 499.102-.103 | POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 0° TO 5°, 12 AND 12.47KV |
| 499.104-.105 | POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 5° TO 30°, 12 AND 12.47KV |
| 499.201 | VERTICAL CONSTRUCTION 30° TO 60° ANGLES, 12 AND 12.47KV |
| 499.202 | VERTICAL CONSTRUCTION 60° TO 90° ANGLES, 12 AND 12.47KV |
| 499.203-.204 | POST INSULATOR AND BRACKET CONSTRUCTION, "4 WAY AND 'T' CORNERS", 12 AND 12.47KV |
| 499.301 | 750-7500 VOLT BUCKARM CORNERS |
| 499.701 | POLE TOP EXTENSION, FOR SERVICE CLEARANCE ARMS |

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SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LEGACY OVERHEAD FIELD MAINTENANCE
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DISTRIBUTION POLE TOPS

I. STATION NUMBERS GIVE A UNIQUE NUMBER TO, AND BRIEFLY DESCRIBE, DISTRIBUTION STATIONS. ALL STATION NUMBERS ARE ASSIGNED BY THE TRANSFORMER CLERK (EXT 1217 OR MICROWAVE 02167).

II. THE STATION NUMBER IS BROKEN UP INTO THREE PARTS: CIRCUIT; NUMBER; AND SUFFIX. [40 – 118 – MRO (CIRCUIT NUMBER SUFFIX)]

CIRCUIT – THE CIRCUIT DESIGNATION DESCRIBES THE VOLTAGE THAT FEEDS THE STATION. IF IT IS ONLY NUMERIC CHARACTERS, THEN THE CIRCUIT ORIGINATING AT THE SUBSTATION IS 12KV. IF IT HAS ALPHABETIC CHARACTERS IN IT, THEN THE CIRCUIT VOLTAGE IS 4 OR 2.4KV. (SEE NOTE F).

EXAMPLES:

40 – CIRCUIT 40 IS 12KV

NO1 – NORTH OTAY ONE IS 4KV

NUMBER – CONTAINS ONLY NUMERIC CHARACTERS. THIS PART IS ARBITRARY.

EXAMPLES:

118 – NUMBER SELECTED BY TRANSFORMER CLERK

908 – NUMBER SELECTED BY TRANSFORMER CLERK

SUFFIX – THE SUFFIX IS DESCRIPTIVE OF THE STATION, (SEE NOTE C) HIERARCHY (ARRANGEMENT IN SERIES) FOR COMBINING SUFFIXES IS:

I. NUMERIC CHARACTERS (1–99) (SEE NOTE D)
II. M, V, B, BU, G, R, L, SW, UP, N
III. RO, RC, SL
IV. Y, X, C
V. S

FOR FIELD MAINTENANCE ONLY

EXAMPLES:

C – CAPACITOR STATION
M – 12KV PRIMARY METERED STATION
MRO – METERED STREET LIGHT STATION
D – 4 OR 2.4KV STATION THAT IS FED FROM A STEPDOWN STATION SERVING ONLY 1 CUSTOMER OR ONLY PRIMARY METERED CUSTOMER(S)
1M – 4 OR 2.4KV PRIMARY METERED STATION FED FROM A STEPDOWN STATION

III. THESE PARTS ARE BROUGHT TOGETHER AS FOLLOWS:

A. WHEN WRITING THE STATION NUMBERS ON OTHER THAN FORMS FOR KEYPUNCH USE, EACH PART OF THE STATION NUMBER IS SEPARATED BY A DASH.

EXAMPLES:

| | |
|---|---|
| 40–118 | 12KV TRANSFORMER STATION |
| 40–216–C | 12KV CAPACITOR STATION |
| NO1–118 | 4 OR 2.4KV TRANSFORMER STATION |
| NO1–216–MRO | 4 OR 2.4KV METERED STREET LIGHT STATION |
| 40–908–D | 12 TO 4KV OR 12 TO 2.4KV STEPDOWN STATION (INDICATED BY D) (SEE NOTES A, B & F) |
| 40–118–2G | 12KV REGULATOR STATION, 2ND POLE OF 3–1Ø REGULATORS ON 3 POLES. |

B. THE FOLLOWING FORMS WILL BE USED FOR KEYPUNCHING AND THE STATION NUMBER IS REQUIRED ON THEM:

| | | | |
|---|---|---|---|
| 1. APARTMENT LIST | 101–4145A | 7. NEW SERVICE INPUT DOCUMENT | 124–10152 |
| 2. CIS MASTER STATION UPDATE | 124–13152 | 8. STATION FILE CUTOVERS | 111–391 |
| 3. CUSTOMER NEW SERVICE REQUEST | 124–6201 | 9. TRANSFORMER TAG | 120–5240A |
| 4. ELECTRIC CONSTRUCTION ORDER | (NO FILE NUMBER) | 10. TRANSFORMER STATION FILE PUNCH FORM | 110–591/21A |
| 5. ELECTRIC SERVICE ORDER | 107–212L | 11. TAG NOTICE TO ELECTRIC TROUBLEMAN | (TEMPORARY FORM) |
| 6. GAS/ELECTRIC SET ORDER | 124–610 | 12. CURRENT STATION/CUSTOMER TIE | (COMPUTER LISTING) |

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| ISSUE 1993<br>DATE 1–1–89<br>APPD / | SDG&E ELECTRIC STANDARDS<br>DISTRIBUTION STATION NUMBERING | OH 299.001<br>~~UG 3199.001~~<br>SUPERCEDES 203.1 (1–1–93) |

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C. THE RULES FOR FILLING IN THE STATION NUMBER ON THESE FORMS ARE AS FOLLOWS:

1. ALL ALPHABETIC CHARACTER O'S ARE TO BE WRITTEN WITH A SLANT MARK; i.e., Ø. THIS IS TO AVOID CONFUSION WITH THE NUMERIC CHARACTER ZERO.

2. INSTRUCTIONS FOR FILLING IN FORMS.

   a. THE CIRCUIT FIELD (COLUMN). SEE TABLE 1 BELOW.
   ALPHABETIC CHARACTERS ARE TO BE LEFT JUSTIFIED AND THE NUMERIC CHARACTERS RIGHT JUSTIFIED (SEE NOTE E). IN MOST CASES, THERE WILL BE BLANK COLUMNS IN THIS FIELD.

   b. THE NUMBER FIELD (COLUMN). SEE TABLE 1 BELOW.
   THE NUMERIC CHARACTERS ARE RIGHT JUSTIFIED AND ZEROS ARE ADDED TO COMPLETE FIELD.

   c. THE SUFFIX FIELD (COLUMN). SEE TABLE 1 BELOW.
   IF STATION NUMBER HAS NO SUFFIX, LEAVE THIS BLANK.
   THE ENTIRE PROPERLY FORMED SUFFIX IS LEFT JUSTIFIED AND ZEROS ARE ADDED TO COMPLETE FIELD.

EXAMPLES OF STATION NUMBERS WRITTEN ON FORMS:

TABLE 1

| | CIRCUIT | NUMBER | SUFFIX | |
|---|---|---|---|---|
| | 0040 | 0118 | | |
| | 0040 | 0216 | C00 | 0 |
| * | NØ01 | 0118 | | |
| * | NØ01 | 0216 | MRØ | 0 * |
| | 0040 | 0908 | D00 | 0 |
| | 0040 | 0908 | 310 | 0 |

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NOTES:

Ⓐ REFER TO THE DISTRIBUTION ENGINEER BEFORE ADDING LOAD TO THESE AREAS TO ENSURE THAT THE STEPDOWN STATION IS NOT OVERLOADED.

Ⓑ INDICATES A 2.4 OR 4KV STEPDOWN STATION SERVING ONLY ONE CUSTOMER OR ONLY PRIMARY METERED CUSTOMER(S).

Ⓒ SEE PAGE 299.126 OVERHEAD OR 3199.126 UNDERGROUND – ABBREVIATIONS & CODES, STATION SUFFIX FOR SUFFIX MEANINGS.

Ⓓ NUMERIC CHARACTERS 1 – 9 ARE RESERVED FOR STATIONS WITH ADDITIONAL SUFFIXES.

Ⓔ RIGHT AND LEFT JUSTIFICATION MAY BE A NEW TERM FOR MOST PEOPLE. RIGHT JUSTIFIED MEANS TO START WITH THE RIGHT MOST CHARACTER OF THE GROUP AND PUT IT INTO THE RIGHT MOST COLUMN, WORKING LEFT UNTIL ALL CHARACTERS ARE USED UP AND IN ALL REMAINING BLOCKS AND ZEROS. SIMILARLY FOR LEFT JUSTIFIED, ONLY WORK FROM LEFT TO RIGHT AND ADD ZEROS TO FILL UNUSED BLOCKS.

EXAMPLE: RIGHT JUSTIFY: 198

| | | | | | |
|---|---|---|---|---|---|
| STEP 1 | | | | 8 | |
| STEP 2 | | | 9 | 8 | |
| STEP 3 | | 1 | 9 | 8 | |
| FINAL STEP 4 | 0 | 1 | 9 | 8 | ADD ZERO IN REMAINING BLOCK(S) |

LEFT JUSTIFY ALPHABETIC CHARACTERS, RIGHT JUSTIFY NUMERIC CHARACTERS: NO1

| | | | | | |
|---|---|---|---|---|---|
| STEP 1 | | N | | | |
| STEP 2 | * | NØ | | | ALPHABETIC CHARACTERS LEFT JUSTIFIED |
| STEP 3 | * | NØ | | 1 | NUMERIC CHARACTER RIGHT JUSTIFIED |
| FINAL STEP 4 | | NØ | 0 | 1 | ADD ZERO IN REMAINING BLOCK(S) |

Ⓕ STEPDOWN STATIONS WILL BE GIVEN NAME EXCEPT FOR THOSE SERVING ONLY ONE CUSTOMER OR ONLY PRIMARY METERED CUSTOMER(S)

* SEE III, C, 1.

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**SCOPE:** THIS STANDARD EXPLAINS THE METHOD OF OVERHEAD DISTRIBUTION SWITCH NUMBERING.

1. EACH SWITCH IS IDENTIFIED BY A UNIQUE NUMBER THAT INDICATES THE CIRCUIT(S) ON WHICH IT OPERATES.

2. THERE ARE TWO TYPES OF SWITCH NUMBERS: **LINE** AND **TIE**

2.1 **LINE SWITCH NUMBERS** ARE BROKEN UP INTO TWO PARTS:

CIRCUIT AND NUMBER $\frac{\text{375}}{\text{CIRCUIT}} - \frac{\text{40–L}}{\text{NUMBER}}$

CIRCUIT – DESCRIBES THE VOLTAGE AND CIRCUIT NUMBER TO WHICH THE LINE SWITCH IS CONNECTED. IF THE CIRCUIT CONTAINS ONLY NUMERIC CHARACTERS, THEN THE CIRCUIT VOLTAGE IS 12KV. IF IT CONTAINS ALPHABETIC CHARACTERS (e.g. CD10), THEN THE CIRCUIT VOLTAGE IS 4 OR 2.4KV.

NUMBER – CONTAINS ONLY NUMERIC CHARACTERS, OR, NUMERIC CHARACTERS FOLLOWED BY AN "L". THE "L" INDICATES THAT THIS IS A LOADBREAK SWITCH. THE NUMERIC PORTION IS ARBITRARY AND EACH NUMBER SHALL NOT BE ASSIGNED TO MORE THAN ONE SWITCH FOR EACH CIRCUIT.

EXAMPLES:

375–40–L INDICATES A LINE SWITCH ON 12KV CIRCUIT 375 WITH AN ARBITRARY NUMBER 40, AND LOADBREAK CAPABILITY.

GA1–2 INDICATES A LINE SWITCH ON 4KV OR 2.4KV CIRCUIT GA 1 WITH AN ARBITRARY NUMBER 2, AND NO LOADBREAK CAPABILITY.

2.2 **TIE SWITCH NUMBERS** ARE BROKEN UP INTO THREE PARTS:

CIRCUIT; ALPHA NUMERIC; AND CIRCUIT $\frac{\text{375}}{\text{CIRCUIT}} - \frac{\text{T1}}{\text{ALPHA/NUMERIC}} - \frac{\text{376}}{\text{CIRCUIT}}$

CIRCUIT – DESCRIBES THE VOLTAGE AND CIRCUIT NUMBERS THE TIE SWITCH CONNECTS **AS STATED ABOVE.**

ALPHA/NUMERIC – ALWAYS CONTAINS THE ALPHA CHARACTER "T" AND IS FOLLOWED BY A BY A NUMBER (1,2,3, ETC.) WHICH IS CONSECUTIVELY ASSIGNED FOR TIE SWITCHES BETWEEN THE SAME TWO CIRCUITS. EACH ALPHA/NUMERIC IDENTIFICATION SHALL NOT BE ASSIGNED TO MORE THAN ONE TIE SWITCH BETWEEN THE SAME TWO CIRCUITS. TIE SWITCHES WITH THE NUMBER FOLLOWED BY AN "L" HAVE LOADBREAK CAPABILITY.

EXAMPLES:

85–T1–380 INDICATES THE FIRST TIE SWITCH BETWEEN CIRCUITS 85 & 380.

86–T2–87–L INDICATES THE SECOND TIE SWITCH, WITH LOADBREAK CAPABILITY, BETWEEN CIRCUITS 86 & 87.

88–T–89 INDICATES THE ONLY TIE SWITCH INSTALLED BEFORE 4–1–77, BETWEEN CIRCUITS 88 & 89. IF INSTALLED AFTER 4–1–77, THIS TIE SWITCH SHALL BE NUMBERED 88–T1–89.

3. WHERE SWITCHES IN PARALLEL ARE INSTALLED AS LINE OR TIE SWITCHES, EACH SWITCH WILL BE ASSIGNED AN INDIVIDUAL NUMBER AS DESCRIBED IN PARAGRAPH 2.

4. SWITCH NUMBERS WILL NOT BE ASSIGNED TO NORMALLY OPEN, BRIDGED, OR FUSED CUTOUTS, UNLESS THEY ARE USED FOR TIE PURPOSES.

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CABLE POLE
P233679

FUSE WITH BY-PASS (OH)
123-45 (OPEN)
3-60A
P677001

PRIMARY METERING STATION (UG) W/CUSTOMER OWNED STRUCTURE
123-345M
D12345 CO

SWITCH: (OH) GANG OPERATED (SCADA)
SCADA 95
123-17
P67778

PAD MOUNTED SWITCH AND FUSE
3-80A
463-11

FUSE - D&W
3-80A D&W
P234673

CABLE POLE (FUSED)
3-150A
P227692

SWITCH - ON/OFF (UG)
123-324

GROUNDING BANK (OH)
123-254GB

SERVICE RESTORER WITH BY-PASS (OH)
123-25 (OPEN)
123-24R
P75678

SWITCH-HOOK STICK (OH)
123-234
P76455

NEUTRAL

FUSE (OH)
1-10A
P17723

ELECTRONIC SECTIONALIZER (OH)
3-100A
P58961

FAULT INDICATOR
1000A

CAPACITOR (OH)
CF - FIXED
CW - SWITCHED
CM - SWITCHED, IN MANUAL MODE
123-435CW
1200KVAR
P79707

FOR FIELD MAINTENANCE ONLY

GROUNDING BANK (UG)
123-365GB

REGULATOR BYPASS WITH DISCONNECTS (OH)
123-123G
100A
P47487

FUSE-BRIDGED (O.H.)
3-BRGD
P570164

CUSTOMER GENERATION
CG103023
CG103023
EFI
939 COAST BLVD
250 KW

SIREN
(FOR SAN ONOFRE)
0C03
D6954127

CAPACITOR (UG)
CW - SWITCHED
CM - SWITCHED, IN MANUAL MODE
123-234CW
1200KVAR

REGULATOR (OH) UN-BYPASSED
123-123G
100A
P67423

REGULATOR INDUCTION (OH)
123-123G
P87219

OPEN TO ADJACENT CIRCUIT (OH)
CIRCUIT 123 OPEN

PAD MOUNTED SUB
JOHNSON
STEP-DOWN
12/4 KV
2000 HPP
HIGH FUSING: 1-150A
LOW FUSING: -NONE
FEED: CIR.552
D104329

POLE MOUNTED SUB
MISSION BEACH
STEP-DOWN
12/4 KV
300 HO
HIGH FUSING: 3-30A
LOW FUSING: -NONE
FEED: CIR. 58
P2321269883

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UG 3112.1

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OPEN TO SAME CIRCUIT

OPEN
P57769

STEP UP/DN (OH)

144–190SD
12000/4160
P470649

FUSE (UG)

3–30A CL

WITH BY–PASS
3–30A CL BP

PRIMARY WIRE & CALLOUT (OH)

< 3–3/0 ACSR >

(U.G.)
< 750 XLPE AL–3ØN >

FUSED ON/OFF SWITCHING CABINET

3–600A
287–5

PRIMARY JUMP

OH GROUP SWITCH SCADA MATE

SCADA 96
715–16
715–1
P79699

PME5 SWITCH

790–13
3–600A

PADMOUNT SERVICE RESTORER

SCADA 98
57–42

PME3 SWITCH

SCADA 99
228–7

OH DPQM

107–1
107–DPQM
P123456

FLYING TAP

LOADBREAK GANG OPERATED SWITCH

715–23–L
P234567

OH SCADA RTU POLE

SCADA 62
P123456A

SUBSTATION
EL CAJON
SUB
69/12KV

SPRING VALLEY
SUB
12/4KV

BOOST (UG)

280–124B
3750 HHR

THROWOVER AT A SUBSTATION

AUTO
206–VS PREF
208–VS ALT
VISTA
SUB
12/4KV

THROWOVER W/BUS BAR

109–11M
190–CUST1 PREF
110–CUST1 ALT
109 CUST1
PREF: SWI GEAR B LEVEL SIDE OF BLDG: 24 HR ACCESS PHONE LOADING DOCK N/E CORNER OF BLDG:

FOR MAINTENANCE ONLY

AUTO
CITY OF SD
CUST OWNED
U100311

THROWOVER W/O BUS BAR

456–8 ALT
428–8 PREF
428–18 PREF:
E ST W/O 15TH
BASEMENT "B"

MAN
CITY OF SD – POLICE DEPT
SDGE OWNED
D2013772340

PADMOUNT THROWOVER SWITCH PMH–6 STYLE

930–470 PREF:
NORTHWEST CORNER OF FACILITY, NEXT TO OUTDOOR CUSTOMER SWITCHGEAR

930–470 PREF
934–230 ALT
3–150A CL

AUTO
U.S. POSTAL SERVICE
SDG&E OWNED
Y100012

5–WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION

SCADA 987
WAY–1 321–12 AE
WAY–2 321–13 F
WAY–3 321–TI–432
WAY–4 321–14
WAY–5 321–15 AE

4–WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION

SCADA 987
WAY–1 321–12 AE
WAY–2 321–13 F
WAY–3 321–TI–432
WAY–4 321–14

4–WAY TRAYER, MANUAL

WAY–1 456–12
WAY–2 456–13
WAY–3 456–TI–458
WAY–4 456–15

SCHEMATIC DETAIL OF A TYPICAL 4 WAY SWITCH

123–8
123–9
123–10
123–11

M2346788654

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OH 212.2
UG 3112.2

SDG&E ELECTRIC STANDARDS

GFMS
SUMMARY OPERATING MAP SYMBOL TABLE

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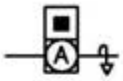
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PME-3



712-19 1000A
D130145

PME-3 WITH SCADA



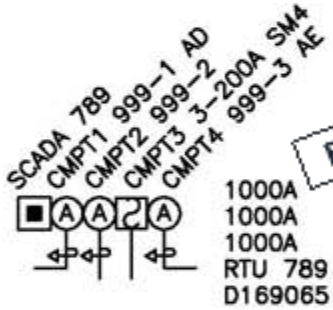
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RTU 178
SCADA 178
435-21 1000A
D131755

PME-10



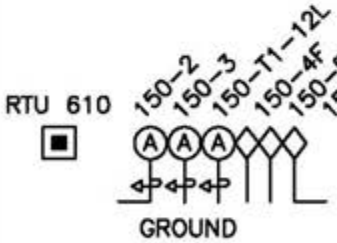

1000A
1000A
1000A
1000A
D123456

PME-11 WITH SCADA W/AUTOSECTIONALIZING



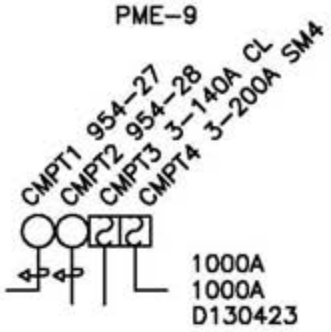

1000A
1000A
1000A
RTU 789
D169065

6-WAY SWITCH W/3 FAULT INTERUPTERS & SCADA



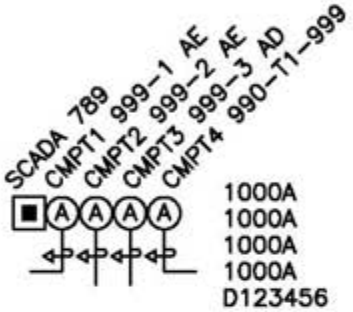

1000A
1000A
1000A
U123568

PME-9



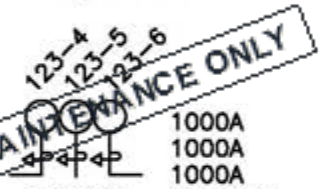

1000A
1000A
D130423

PME-10 WITH SCADA W/AUTOSECTIONALIZING




1000A
1000A
1000A
1000A
D123456

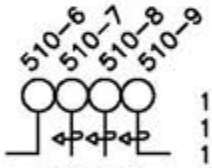
3-WAY PADMOUNT SWITCH W/GROUND




1000A
1000A
1000A
GROUND D123477

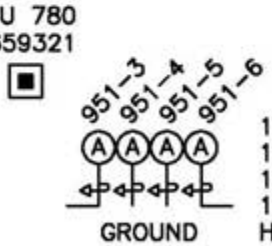
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4-WAY SWITCH W/GROUND



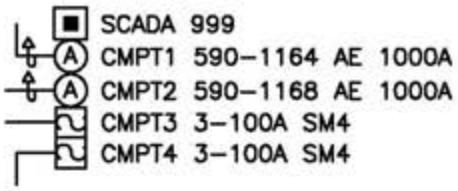

1000A
1000A
1000A
GROUND H775837

4-WAY SWITCH W/GROUND SCADA




1000A
1000A
1000A
1000A
GROUND H785477

PME-9 WITH SCADA W/AUTOSECTIONALIZING



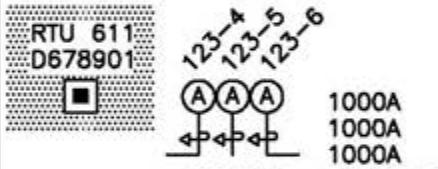

D131370

PME-11



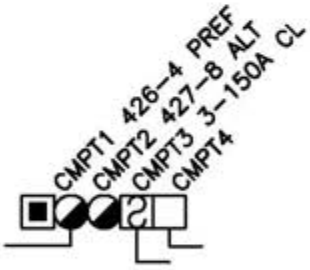

1000A
1000A
1000A
D130489

3-WAY PADMOUNT SWITCH W/GROUND SCADA




1000A
1000A
1000A
GROUND D123477

PME SOURCE TRANSFER SCADA




SCADA 56
MAN
SDGE OWNED
D100896

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BOOST STATION
155–76B
3750 HHR
D2791269123

600 AMP EXTENSION SPLICE
M123456
3–ES

CAPACITOR STATION
CW – SWITCHED
CM – SWITCHED, IN MANUAL MODE
124–61CW
900 KVAR
D2617473210

CIRCUIT (CABLE)
30/ #2PECN CU 100.

CONNECTORS LD. BREAK ELBOWS
395–76
D2617673212

CABLE TAPS (LD. BREAK ELBOWS)
H2617673212
3314 .3–4

PIGGY BACK ELBOWS
224–73
1–25 HDD
D3127573322
2–PB

"T" CONNECTOR W/200 AMP LBE
H3217573424
3316 3–T

HAND SPLICE
T SPLICE
H321773326
3314 .1–HS
1–TS

STRAIGHT CONNECTOR TRANSITION MODULE
M3217773326
3326 .1–SC
1–TM

"T" CONNECTOR
H3217773326
3314 .3–T

"Y" CONNECTOR
H3217833734
3314 .1–Y

W/200A LB CAPABILITY
H225678
3316

PAD MOUNTED SUB
JOHNSON
STEP–DOWN
12/4 KV
2000 HPP
HIGH FUSING: 1–150A
LOW FUSING: –NONE
FEED: CIR. 552
D104329

OPEN/SAME CIRCUIT
OPEN
44–68
1–500HAL
D3112559335

600A JUNCTION BAR W/GROUNDING POINT
3–TG

PASS THROUGH
H3227233832
3314 .3–PT

(LIVE FRONT)
D3237433835

MANHOLE
M2468176543
3324

(LIVE FRONT) CONNECTIONS
270–77
1–50 NEP
D3237333832

PRIMARY METERING STATION (UG)
CUSTOMER OWNED STATION (UG)
D123456 CO
123–345M
(STRESS CONE)

SDGE OWNED
D346678
123–456M
(600A TEE)
(200A LB ELBOW)

OPEN/DIFFERENT CIRCUIT
CIR 50 OPEN
H5470873521
3314 3–4

PAD D3407672348
TERMINALS

PRIMARY HANDHOLE
H2735784212
3315

GROUNDING BANK
800–632GB
D2175075201

STEP DOWNSTATION
125–201 SD
12000/2400/4160Y
D2185271210

STEP UP STATION
521–102SU
12000/2400/4160Y
D1581210217

SUBSTATION
EL CAJON SUB
69/12KV

SUBSTATION
SPRING VALLEY
12/4 KV

SUBSURFACE ENCLOSURE
S2345678690
3399

SUBSURFACE SWITCH ON/OFF
800–13
M3120560124
3322

FUSED ON/OFF SWITCH PAD MOUNTED
200–10
3–80A
D2335479573

HOOKSTICK SWITCH ON A CABLE POLE
122–8
P13064

GANG OPERATED SWITCH ON A CABLE POLE
113–10
P323040

FUSED ELBOWS
1–18A F.E.
900–75
1–25 NDD
D2918276127

3–30A F.E.
H2617673222
3314 .3–4

CONNECTOR (DEAD FRONT)
155–62
1–75YES
S3217773324
3399

CUSTOMER GENERATION
CG
CG01–310–599

FUSE CABINET
3–80A
D3124476143

WITH BY–PASS
3–30A CL BP
D1234567890

CABLE POLE
1–30A C.L.
P767412

BRIDGED FUSE
1–BRGD
D2454576262

3–BRGD
P10450

REGULATOR STATION BYPASS
715–117G
200A
D1404575271
3324

UNBYPASS
BY1–110G
100A
D2147536087
3322

FOR FIELD MAINTENANCE ONLY

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1Ø PAD MOUNTED (DEAD FRONT) RADIAL
159–253
1–75 HDD
D1479273159

1Ø PAD MOUNTED (DEAD FRONT) LOOP
561–173
1–25 NDD
D106009

1Ø PAD MOUNTED (DEAD FRONT) LOOP W/TAP
–OR–
561–173
1–25 NDL
D107077

1Ø PAD MOUNTED (LIVE FRONT)
561–139
1–50 NEP
D5114055518

3Ø PAD MOUNTED (DEAD FRONT) RADIAL
561–407
1–75 HZB
D118892

3Ø PAD MONTED (DEAD FRONT) LOOP
561–410
1–750 HNB
D118893

3Ø PAD MOUNTED (LIVE FRONT)
561–233
1–1000 HAP
D5109955539

CLOSED DELTA (DEAD FRONT)
100–55
1–25 HDD
2–75 NDD
D2125576655

OPEN DELTA (LIVE FRONT)
100–54
1–50 HEP
1–75 HEP
D2125576655

1Ø SUBSURFACE
165–65
1–15 WS
S3240064800
3399

3Ø PAD MOUNTED OPEN DELTA (DEAD FRONT)
900–75
2–75 HDL
D3123560390

3Ø TERMINATOR (LIVE FRONT)
D3108560114

PADMOUNT SERVICE RESTORER
SCADA 98
57–4R
D123456
3–C
3–C
PMSR W/"N" TRANSFORMER

SIREN (FOR SAN ONOFRE)
OC01
D2461767

UG SCADA RTU
RTU 88
D116890

1Ø PAD MOUNTED (LIVE FRONT)
"YP" TRANSFORMER
1–BRGD
1–18A NX
220–66
D3125676082

DEAD FRONT TERMINATOR
D123456
3–4

1Ø TERMINATOR WITH .1–4
D3099560044
1–4

PME5 SWITCH
790–13
3–150A
D126194

4–WAY SWITCH
80–15
80–16
80–17
80–18

THROWOVER AT A SUBSTATION
VISTA SUB
12/4KV
AUTO
206–VS PREF
208–VS ALT

10 PAD MOUNTED "YP" (LIVE FRONT)
1–BRGD 3Ø
1–35A NX 3Ø
700–357
D3215457

PME3 SWITCH
228–7
D135790

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5–WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION
SCADA 987
WAY–1 321–12 AE
WAY–2 321–13 F
WAY–3 321–11–432
WAY–4 321–14
WAY–5 321–15 AE

FAULT INDICATOR
800A

VAULT U2743171342

4–WAY TRAYER WITH SCADA W/AUTOSECTIONALIZING AND/OR FAULT INTERRUPTION
SCADA 987
WAY–1 321–12 AE
WAY–2 321–13 F
WAY–3 321–11–432
WAY–4 321–14

THROWOVER W/BUS BAR
109–11M
190– CUST1 PREF
110– CUST1 ALT
AUTO
CITY OF SD
CUST OWNED
U100311

109 CUST1 PREF: SWI GEAR B LEVEL – SIDE OF BLDG: 24 HR ACCESS PHONE – LOADING DOCK N/E CORNER OF BLDG:

PADMOUNT THROWOVER SWITCH PMH _6 STYLE
930–470 PREF
934–230 ALT
3–150A CL
AUTO
U.S. POSTAL SERVICE
SDG&E OWNED
Y100012

930–470 PREF: NORTHWEST CORNER OF FACILITY, NEXT TO OUTDOOR CUSTOMER SWITCHGEAR

THROWOVER W/O BUS BAR
426 –8 ALT
428 –18 PREF
MAN
CITY OF SD – POLICE DEPT
SDGE OWNED
D2013772340

428–18 PREF: E ST W/O 15TH BASEMENT "B"

4–WAY TRAYER, MANUAL
WAY–1 456–12
WAY–2 456–13
WAY–3 456–11–458
WAY–4 456–15

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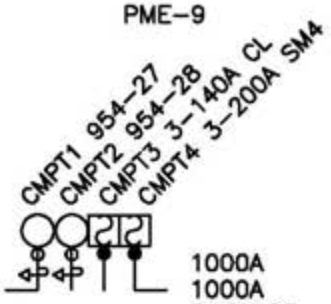
712-19 1000A
D130145

PME-3 WITH SCADA
& CAM-LINK CONNECTOR



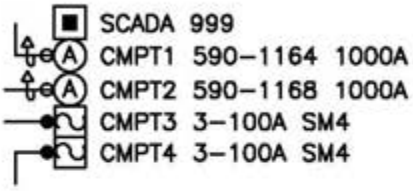
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RTU 178
SCADA 178
435-21 1000A
D131755
3-C

PME-9



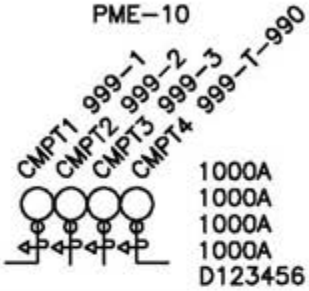

1000A
1000A
D130423

PME-9 WITH SCADA



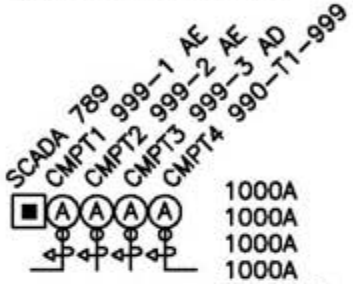

D131370

PME-10



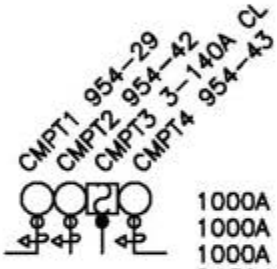

1000A
1000A
1000A
1000A
D123456

PME-10 WITH SCADA
W/AUTOSECTIONALIZING




1000A
1000A
1000A
1000A
D123456

PME-11




1000A
1000A
1000A
D130489

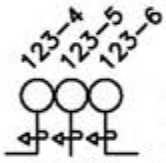
PME-11 WITH SCADA
W/AUTOSECTIONALIZING




1000A
1000A
1000A
RTU 789
D169065

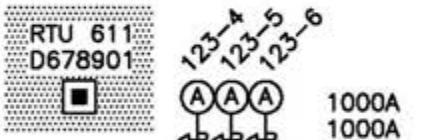
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3-WAY PADMOUNT SWITCH
W/GROUND



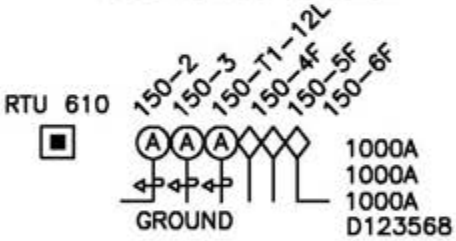

1000A
1000A
1000A
GROUND D123477

3-WAY PADMOUNT SWITCH
W/GROUND SCADA



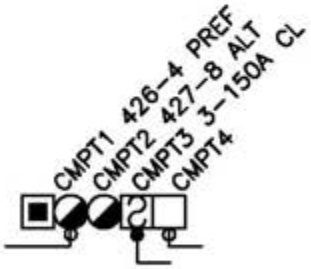

1000A
1000A
1000A
GROUND D123477

6-WAY SWITCH W/3 FAULT
INTERRUPTERS & SCADA



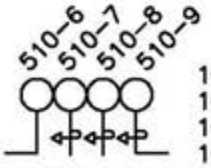

1000A
1000A
1000A
GROUND D123568

PME SOURCE TRANSFER SCADA



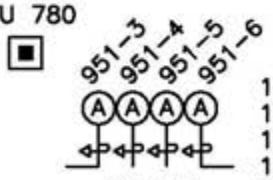

SCADA 56
MAN
SDGE OWNED
D100896

4-WAY SWITCH W/GROUND




1000A
1000A
1000A
1000A
GROUND H775837

4-WAY SWITCH W/GROUND SCADA




1000A
1000A
1000A
1000A
GROUND H785477

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| | | |
|---|---|---|
| OH 212.6<br>UG 3112.6 | SDG&E ELECTRIC STANDARDS<br>GFMS<br>UNDERGROUND OPERATING MAP SYMBOL TABLE | REVISION<br>DATE 5-22-06<br>APPD TR/ |

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BOOST STATION (1 PHASE)
242-66B 100HR P76933

BRIDGED FUSE
CIR 242 3- BRGD JP433234

CAPACITOR STATION
CF - FIXED
CW - SWITCHED
CM - SWITCHED, IN MANUAL MODE
242-65 CW/CM 1200 KVAR P234990

BUCK STATION (3 PHASE)
242-543BU 3750 HHT P43440

OH SCADA CABLE
SCADA 45

POLE MOUNTED SUB
MISSION BEACH STEP-DOWN 12/4 KV P2321269883

GROUNDING BANK STATION
242-74GB 3-50 YF P99032

STREET LIGHT TRANSFORMER STATION
242-85RO 1-25R P45433

SUBSTATION 12/4
POWAY SUB 12/4

OVERHEAD STREET LIGHT
P00710

REGULATOR STATION (3 PHASE)
242-227G 100A P124450

CUSTOMER GENERATION STATION
CG01-16-601 242-16M JP321881

POLE
P567332

STUB POLE
P116740S

REGULATOR STATION (PHASE 1)
242-105G 25A JP55609

SWITCH (GANG)
242-43 JP44302

SECONDARY CIRCUIT & POLE LINE
3-#4 B. STRD N

SWITCH (HOOKSTICK)
242-12 P445760

AVIAN PROTECTION PLAN (APP) WILDLIFE SYMBOL
432-10 1-25 HE P123456

SINGLE PHASE TRANSFORMER STATION
242-65 1-15 HE P44212

SECONDARY CABLE POLE
P990321

TRANSMISSION POLELINE & CIRCUIT
CIRCUIT 903

STEP UP STATION
242-60SU 12000/2400/4160Y P114532

PRIMARY CABLE POLE
P667990

PRIMARY CIRCUIT & POLE LINE
CIR 242 3ØN 4-#2 5005 N

STEP DOWN STATION
242-143SD 12000/2400/4160Y P445320

THREE PHASE TRANSFORMER STATION
242-145 3-75HF P554354

PRIMARY METERING STATION
242-60M P993111

SUPERVISORY CABLE

TERMINATION (SECONDARY DEAD ENDS)
JP556753

FOR FIELD MAINTENANCE ONLY

SERVICE RESTORER
242-20R P44358

SUBSTATION 69/12
ASH SUB 69/12

TRANSMISSION DOUBLE POLE
Z557090

TRANSMISSION POLE
Z554354

TRANSMISSION TOWER
Z113454

FUSE (CUTOUT)
CIR 242 3-30A P334143

ELECTRONIC SECTIONALIZER (CUTOUT)
CIR 455 3-100A P19926

SCADA ANTENNA POLE
P123456A

OH SCADA RTU POLE
SCADA 62 P123456A

DPQM
107-2 107-DPQM P123456

LOADBREAK GANG OPERATED SWITCH
58-23-L P234567

FT 58
FLYING TAP

PRIMARY DEAD END (MULTIPLE CIRCUITS SINGLE CIRCUIT OPEN)
CIR 242 OPEN CIR 242 OPEN P435431

PRIMARY DEAD END (MULTIPLE CIRCUITS)
CIR 169 OPEN CIR 242 OPEN P89000

THREE PHASE TRANSFORMER STATION (DBL POLE)
242-241 3-37.5 HGT JP44530

THROWOVER AT A SUBSTATION
AUTO
206-VT PREF
208-VT ALT
VISTA SUB 12/4KV

SCADA MATE OH GROUP SWITCH
SCADA 96 715-16 715-1 P79699

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SDG&E ELECTRIC STANDARDS

GFMS
OH STANDARD FACILITY MAP SYMBOL TABLE

OH 212.7
UG 3112.7

PAD MOUNTED SUB

JOHNSON STEP-DOWN 12/4 KV D104329

SERVICE POINT

SP

BOOST STATION (3 PHASE)

242-231B 3750 HHR D2234375400

CUSTOMER GENERATION

CG

M

CG01-310-599 242-439M D2345267898

DUCT BANK SECONDARY

ATLAS TEXT

23.11E

DUCT BANK (PRIMARY)

1 DB 3" 210'

CAPACITOR CW SWITCHED CM - SWITCHED, IN MANUAL MODE

242-55CW 1200 KVAR D2617473210

DUCT BANK (STREET LIGHT)

PAD

D2335479431

STEP DOWN STATION (3 PHASE)

242-89SD 12000/7200 D2233175212

SWITCH ON-OFF

242-21 H2133276443 3314

DUCT BANK (SUPERVISORY)

PRIMARY CIRCUIT

CIR 242 2ØN #2 PECN AL XY 120' 1 DB 3"

SUBSURFACE ENCLOSURE

S2341175331 3399

DUCT BANK (TRANSMISSION) & CIRCUIT

CIR 696

PRIMARY HANDHOLE

H2345977612 3316

TERMINATOR

T

D2312275112

BRIDGED FUSE

CIR 242 3-BRGD D2362174182

PRIMARY METERING STATION W/CUSTOMER OWNED STRUCTURE

M

242-439M D2617473210

SWITCH-FUSE (PAD MOUNTED)

CIR 242 2-80A 242-10 D2212376221

FUSE CABINET

CIR 242 2-150A D2241472001

REGULATOR STATION (3 PHASE)

242-70G 200A D2432176221

THREE PHASE TRANSFORMER (OPEN DELTA)

242-231 1-50 NDD 1-75 NDD D1983275321

FUSED ELBOW

CIR 242 3-30A F.E. H2362174162

SECONDARY CIRCUIT

3/0 SIDA

THREE PHASE TRANSFORMER

242-121 1-150 HMP D2112572121

GROUP SWITCH

242-8 242-9 242-10 242-11 M2578668752 3324

SECONDARY HANDHOLE

SUBSURFACE TRANSFORMER (THREE PHASE)

A7-3S 1-100WS 1-1 15WS S1990272028 3399 3-T

MANHOLE

M2354622132 3324

SINGLE PHASE TRANSFORMER

242-1021 1-25 HDD D2001275843

THREE PHASE TRANSFORMER (CLOSED DELTA)

242-71 1-25 HDD 2-75 NDD D2315476411

OPEN (CALLOUT ONLY)

CIR 242 OPEN CIR 242 OPEN H2234576212 3314

STEP UP STATION (1 PHASE)

242-43SU 2400/7200 D2376377291

VAULT

U2311476125

UNDERGROUND STREETLIGHT

2344341GM7 (OLD) L10099GG7 (NEW)

THROWOVER

100-2 ALT 100-1 PREF M111111 3324

UG SCADA CABLE

SCADA CABLE 100' 1 DB 4"

PADMOUNT SERVICE RESTORER

R

57-4R D123456

PME3

A

SCADA 99 228-7 D135790

GROUPS SWITCH W/SCADA

A

SCADA 56 115-8 115-7 115-6 115-5 U1985071902

SCADA RTU

RTU 88 D105276

PME5 SWITCH

N

790-13 3-600A D126194

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OH 212.8
UG 3112.8

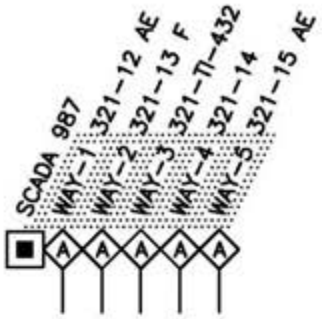
SDG&E ELECTRIC STANDARDS

GFMS
UG STANDARD FACILITY MAP SYMBOL TABLE

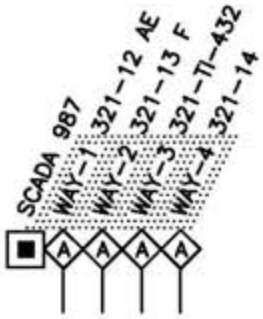
REVISION
DATE 12-9-05
APPD TR/ MF

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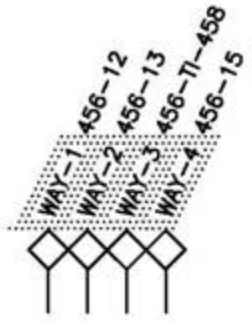
5-WAY TRAYER WITH SCADA




4-WAY TRAYER WITH SCADA




4-WAY TRAYER, MANUAL




FOR FIELD MAINTENANCE ONLY

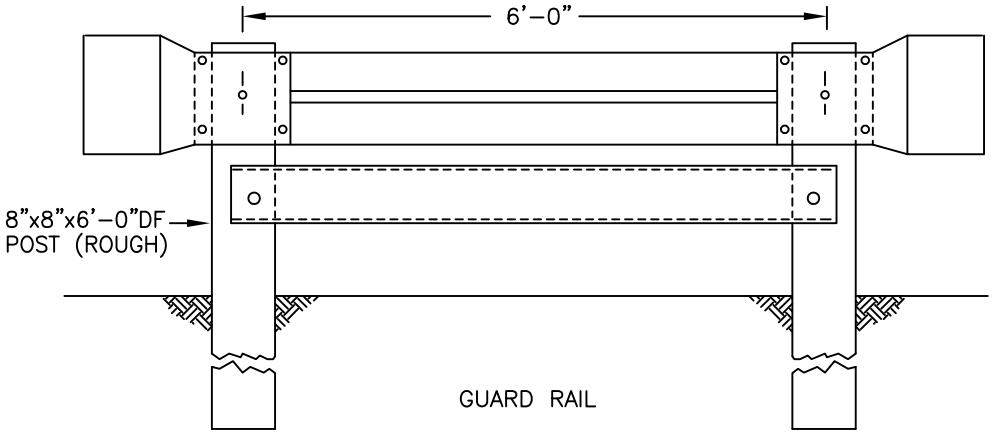
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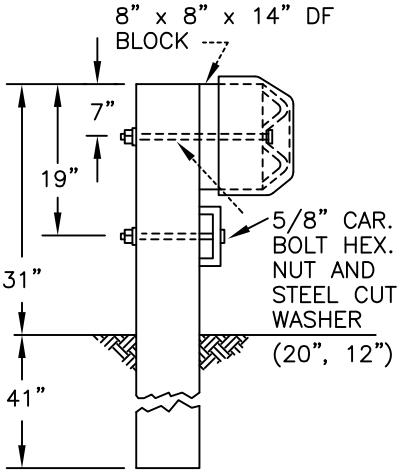
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|---|---|---|
| DATE 10-31-06 | GFMS<br>UG STANDARD FACILITY MAP SYMBOL TABLE | OH 212.9<br>UG 3112.9 |
| APPD TR/ MF | | |

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF A POLE GUARD RAIL.

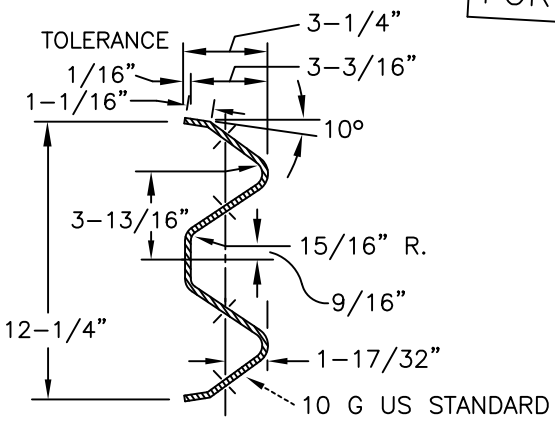



GUARD RAIL

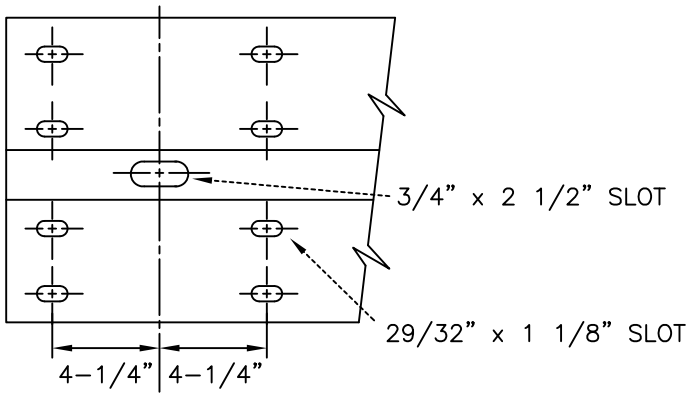



END VIEW

FOR FIELD MAINTENANCE ONLY

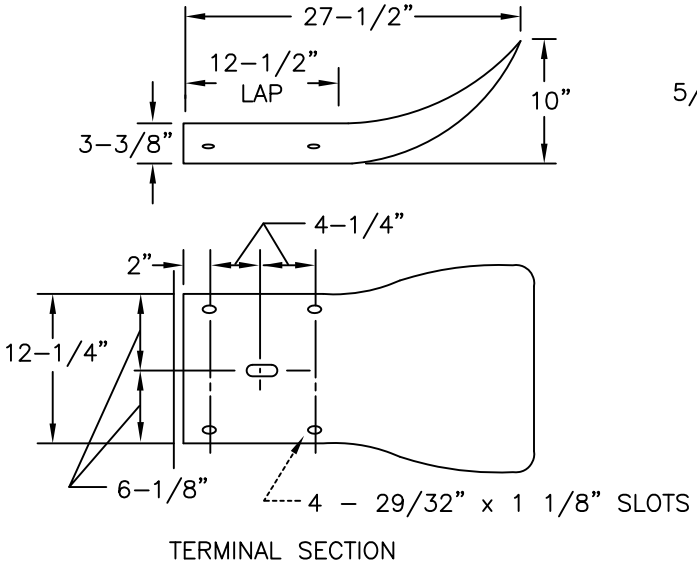



SECTION RAIL BEAM

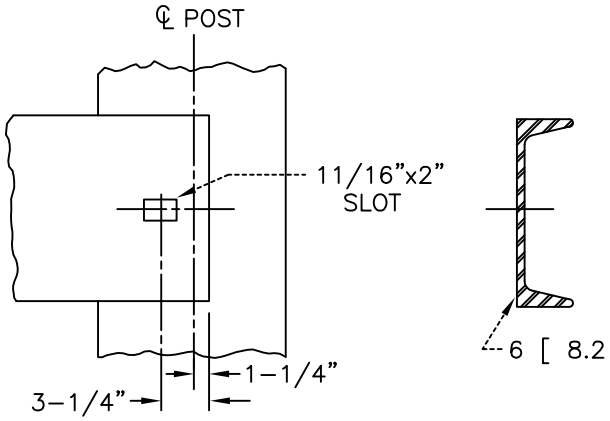



℄ POST BOLT SLOT

RAIL BEAM DRILLING
5/8" x 1-1/4" BUTTONHEAD OVAL SHOULDER
BOLTS WITH HEX. NUTS, 4 PER TERMINAL




TERMINAL SECTION




CHANNEL

**NOTES:**

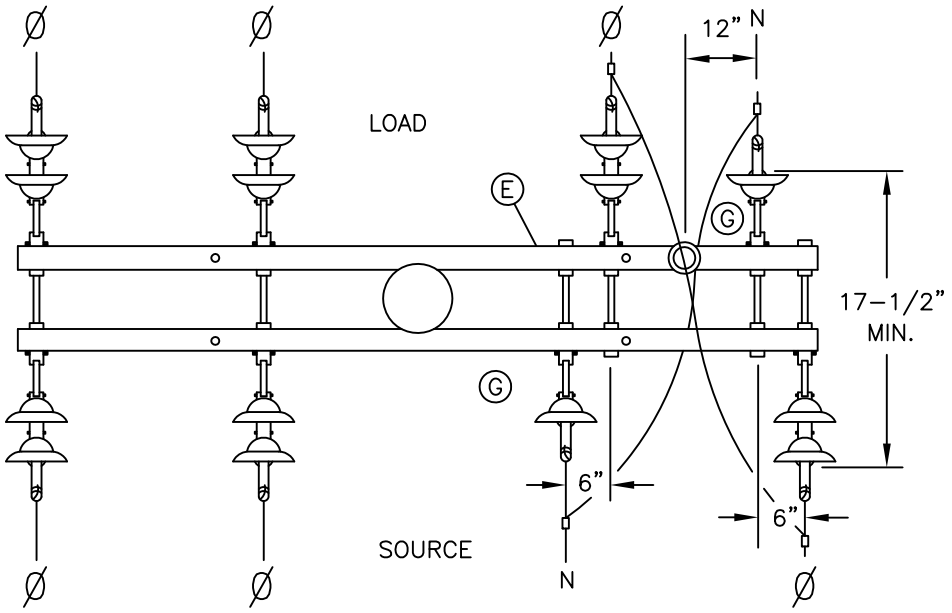
- POLE GUARD RAILS ARE DESIGNED TO BE INSTALLED IN PUBLIC R/W'S, NOT PRIVATE PROPERTY, MAINLY TO MAKE A POLE MORE VISIBLE. THEY HAVE LITTLE VALUE IN STOPPING A VEHICLE, AND SHOULD HAVE LIMITED USE.
- THE DISTRIBUTION OR TRANSMISSION ENGINEER SHALL SPECIFY OR APPROVE EACH INSTALLATION.

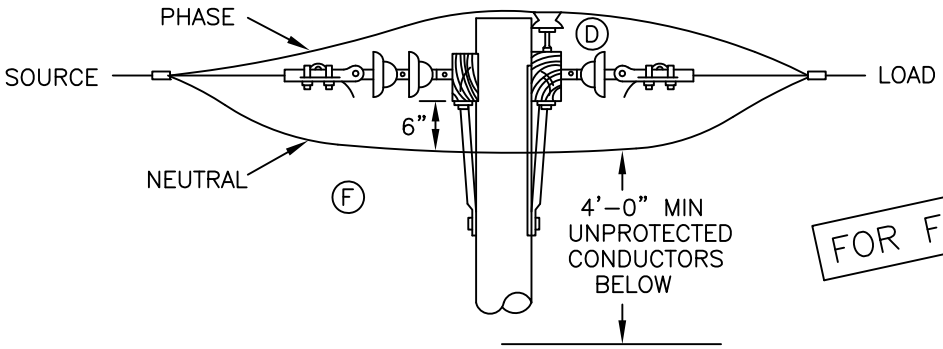
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| DATE 3-2-84<br>APPD PA/BSG | SDG&E ELECTRIC STANDARDS<br>POLE GUARD RAIL | 218 |

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**SCOPE:** THIS STANDARD ILLUSTRATES VARIOUS METHODS OF 12KV, SINGLE CIRCUIT TRANSPOSITION.



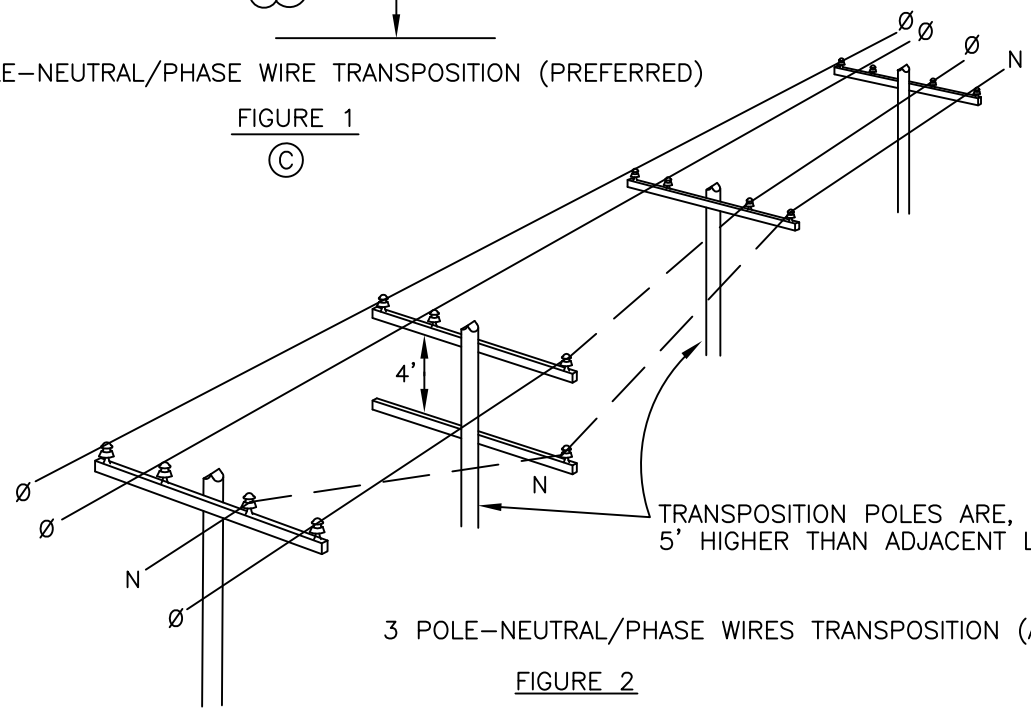




FOR FIELD MAINTENANCE ONLY

SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (PREFERRED)

FIGURE 1

Ⓒ




TRANSPOSITION POLES ARE, NORMALLY,
5' HIGHER THAN ADJACENT LINE POLES

3 POLE–NEUTRAL/PHASE WIRES TRANSPOSITION (ALTERNATE)

FIGURE 2

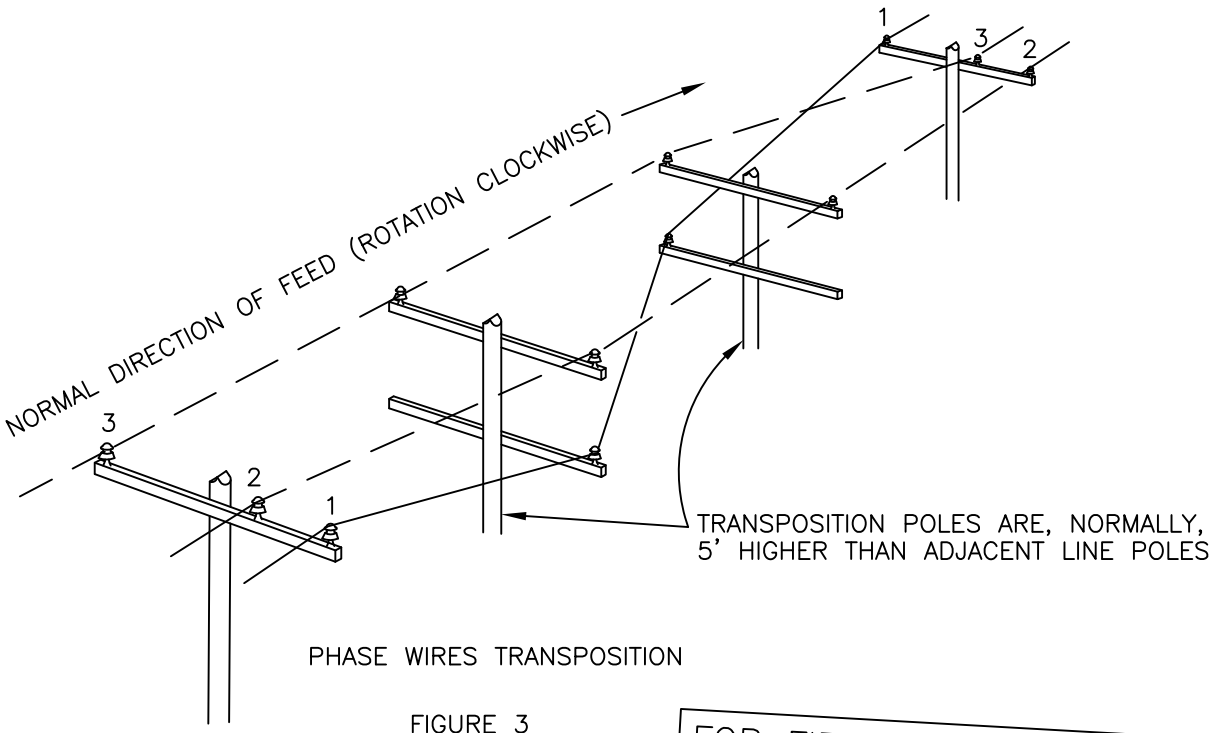
Ⓒ

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| REVISION<br>DATE 8–29–2013<br>APPD TQ / DW | SDG&E ELECTRIC STANDARDS<br>12KV SINGLE CIRCUIT TRANSPOSITION | 269.1 |
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PHASE WIRES TRANSPOSITION

FIGURE 3
(B)

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. ALL PROPOSED 12KV LINE EXTENSIONS CREATING PARALLELS WITH EXISTING OPEN WIRE COMMUNICATION LEADS SHALL BE REFERRED TO THE TELEPHONE COMPANY FOR COORDINATION OF TRANSPOSITIONS IN THE SUPPLY AND COMMUNICATION LINES.

(B) BUILDING FOUR WIRE, "PHASE WIRE ONLY" TRANSPOSITION, (FIG. 3), OR ADDING FOURTH WIRE (NEUTRAL) TO EXISTING TRANSPOSITION, REQUIRES NO DEVIATION.

(C) SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1) IS PREFFERED OVER THREE POLE NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 2).

(D) ON SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1), ALWAYS JUMPER PHASE WIRE OVER TOP OF ARM AND TIE INTO PIN AND INSULATOR.

(E) SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1) REQUIRES CROSSARM MINIMUM OF 10' IN LENGTH. IF TRANSPOSITION IS EXTENSION FROM EXISTING 8' CROSSARMS, CHANGE OUT TO 10' CROSSARMS.

(F) IN SINGLE POLE–NEUTRAL/PHASE WIRE TRANSPOSITION (FIG. 1), INSTALL NEUTRAL JUMPER NO LESS THAN 6" FROM BOTTOM OF CROSSARM.

(G) ON ALL TRANSPOSITIONS, MARK CROSSARM NEUTRAL POSITION WITH "PN" SIGN, EVEN THOUGH SIGN IS NOT REQUIRED BY STANDARD 208.

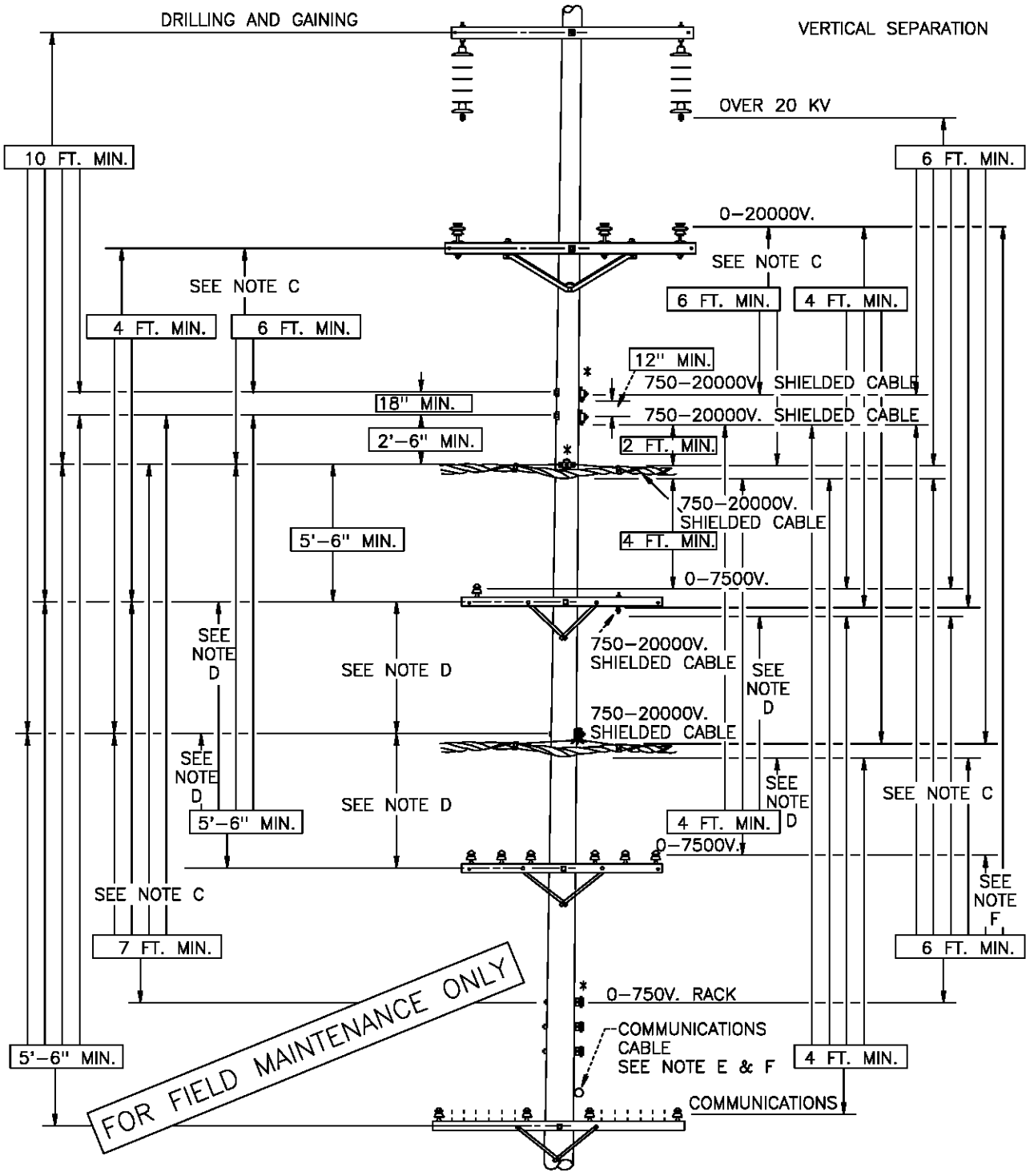
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| 269.2 | 12KV SINGLE CIRCUIT TRANSPOSITION | DATE 1-1-93<br>APPD PSA 1/2009 |

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NOTES:

A. DIFFERENCES DUE TO SAG OF DIFFERENT SIZE CONDUCTORS MUST BE COMPENSATED FOR AT POINTS OF SUPPORT.

B. VERTICAL SEPARATION OF UNPROTECTED SUPPLY CONDUCTORS FROM 750–7500V SHIELDED AERIAL CABLE WHICH HAS BEEN BONDED AND EFFECTIVELY GROUNDED AS PER GENERAL ORDER 95, RULE 57.8

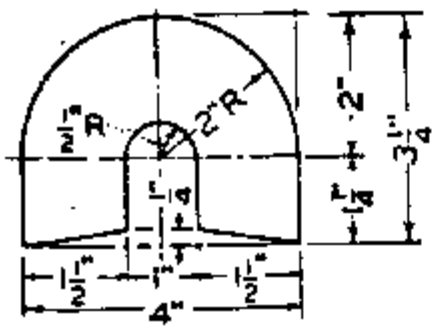
(C) INSTALLATION OF GUARD ARMS PERMITS A REDUCTION OF 2 FT. (* REPRESENTS GUARD ARM PLACEMENT). (G.O. 95, RULE 57.4–F)

(D) VERTICAL SEPARATION MAY BE REDUCED 2 FT. IF OPEN WIRE IS 0–750V

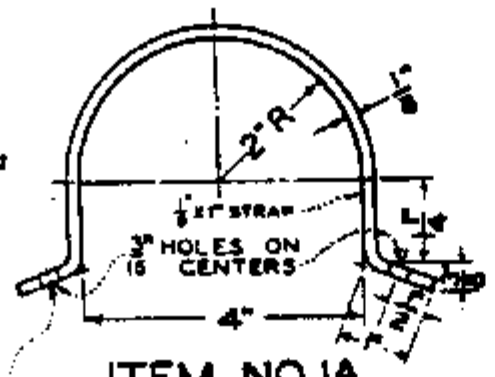
(E) 6 FT MINIMUM CLEARANCE IS REQUIRED TO POWER CONDUCTORS.

(F) GUARD ARMS MAY BE USED TO REDUCE REQUIRED CLEARANCE BY 2 FT FOR CONDUCTORS OR CABLES OF 0–750V.

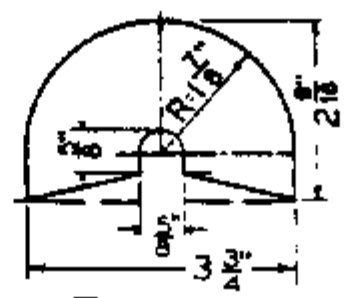
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|---|---|---|
| DATE 2–18–74<br>APPD PDA/DSG | SDG&E ELECTRIC STANDARDS<br>AERIAL CABLE, VERTICAL CLEARANCE FROM OPEN WIRE CONDUCTORS ON SAME POLE | 299.201<br>SUPERCEDES 223 (1–1–98) |



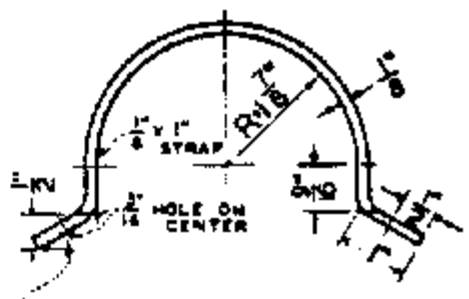

ITEM NO. 1
FOR 0-600 V VERTICAL RUNS
MAX. CONDTR. SIZE 3-#1/0



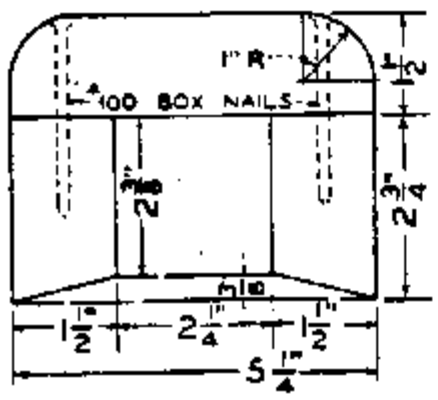

ITEM NO. 1A
USE GALV. 10D COMM. NAILS

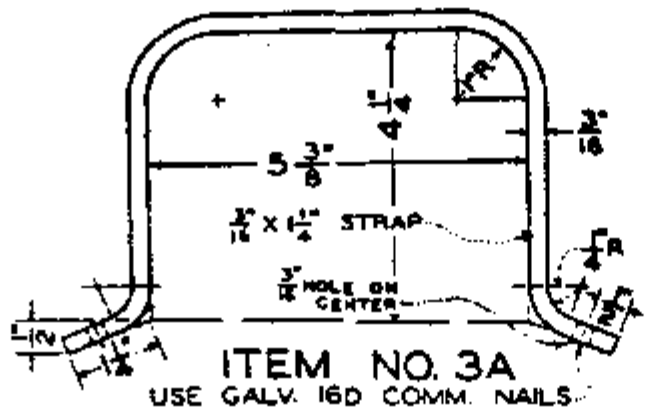



ITEM NO. 2
FOR GROUND WIRE




ITEM NO. 2A
USE GALV. 10D COMM NAILS

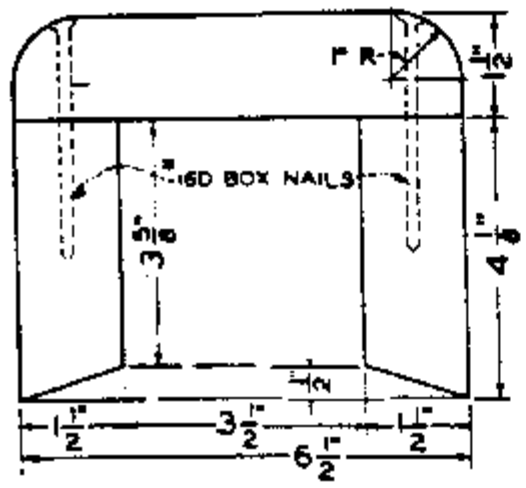


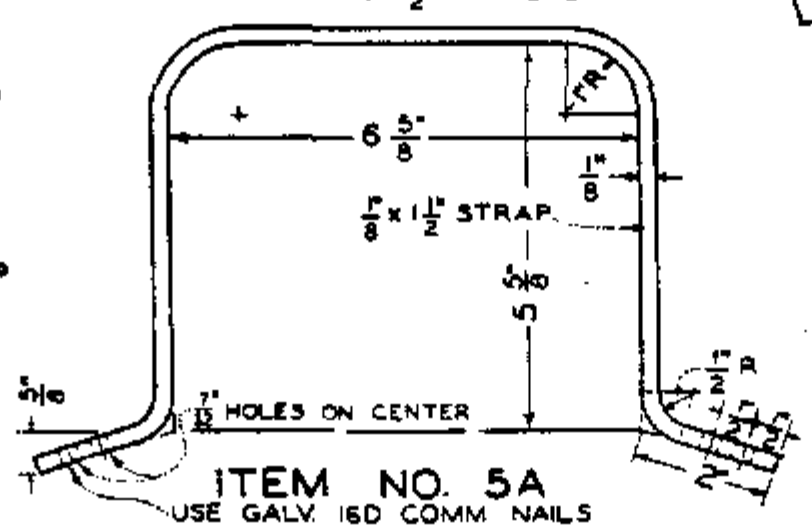




ITEM NO. 3A
USE GALV. 16D COMM. NAILS

ITEM NO. 3, FOR CABLE AND CONDUITS UP TO 1½" DIAMETER

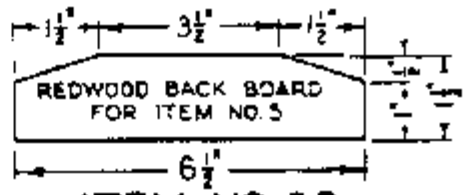
FOR FIELD MAINTENANCE ONLY



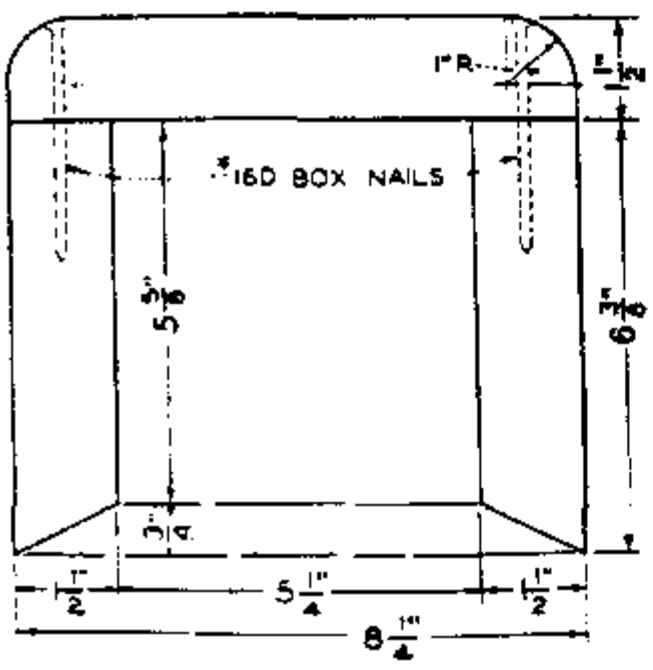



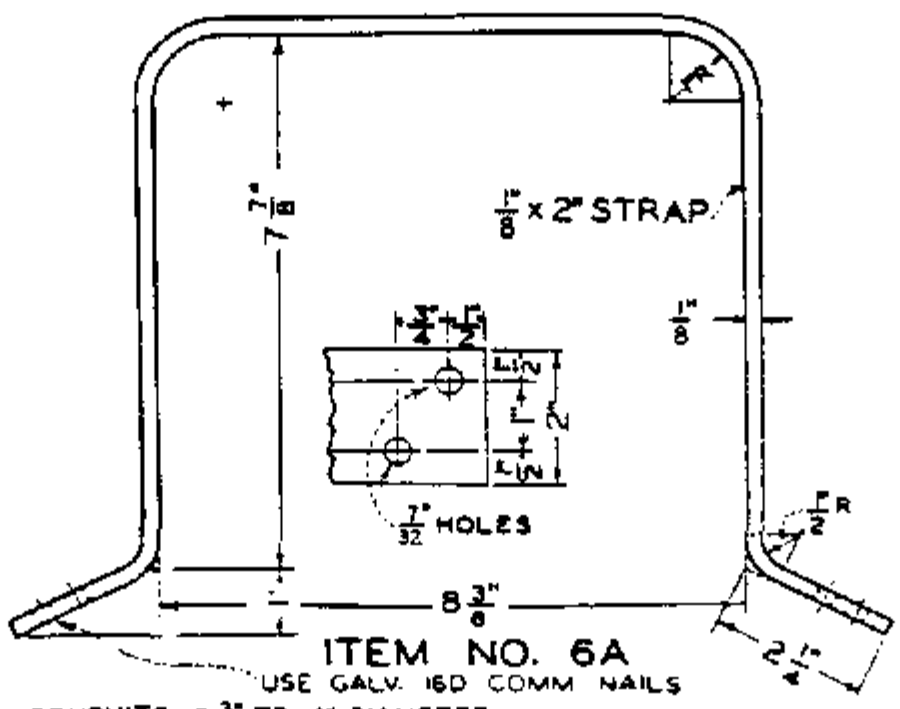

ITEM NO. 5A
USE GALV. 16D COMM NAILS

ITEM NO. 5, FOR CABLE AND CONDUITS 1¾" TO 2½" DIAMETER



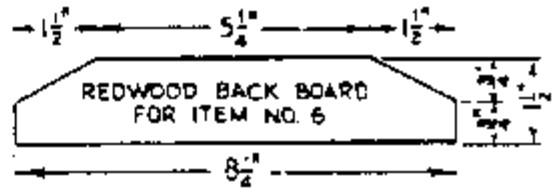

ITEM NO. 5B




ITEM NO. 6A
USE GALV. 16D COMM NAILS

ITEM NO. 6, FOR CABLE AND CONDUITS 2¾" TO 4" DIAMETER




ITEM NO. 6B

A. ITEMS 1, 3, 5 & 6 TO BE MAKE FROM SELECT REDWOOD HEART IN FULL 8' LENGTHS.
B. ITEM 2 TO BE MADE FROM SELECT REDWOOD HEART IN FULL 4' LENGTHS.
C.
D. ITEMS 5B & 6B TO BE MADE FROM SELECT REDWOOD HEART IN FULL 10' LENGTHS.
F. GALV. NAILS IN EDGES OF BOX COVERS TO BE SPACED 12" APART.

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | MOULDING | 487232 | 5 | MOULDING | 487072 |
| 1A | STRAP | 697024 | 5A | STRAP | 697056 |
| 2 | MOULDING, FIELD MAINTENANCE ONLY | | 5B | MOULDING, BACK BOARD | 486976 |
| 2A | STRAP, FIELD MAINTENANCE ONLY | | 6 | MOULDING | 487104 |
| 3 | MOULDING, FIELD MAINTENANCE ONLY | 487040 | 6A | STRAP | 697088 |
| 3A | STRAP, FIELD MAINTENANCE ONLY | 697120 | 6B | MOULDING, BACK BOARD | 487008 |

DATE 12-10-82
APPD JAF / GRH

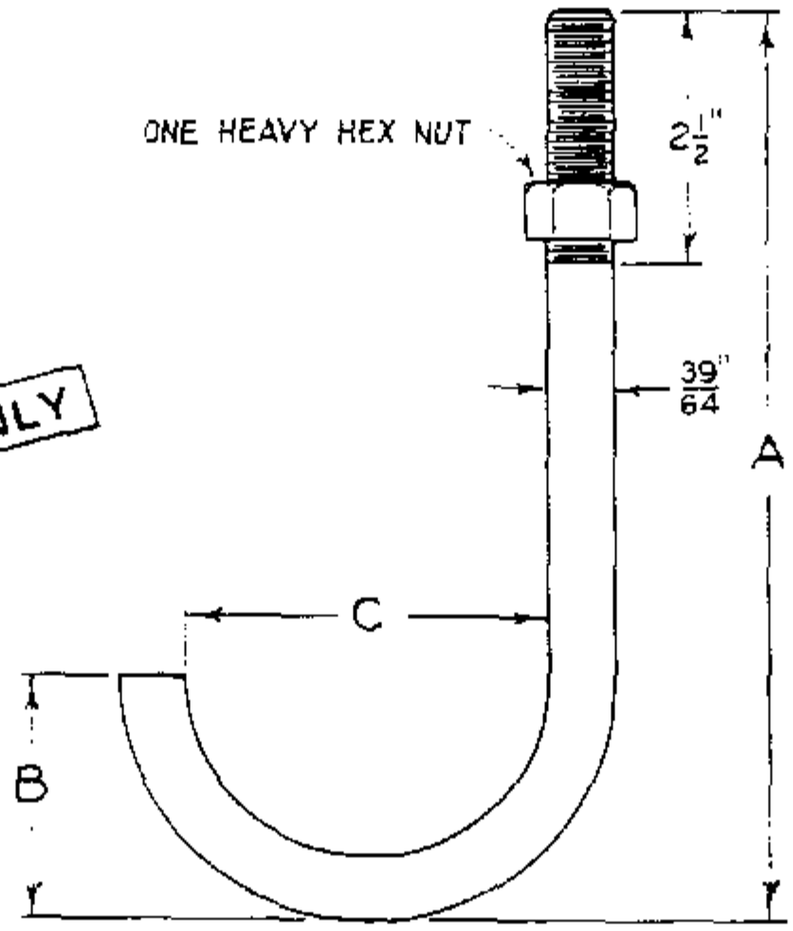
SDG&E ELECTRIC STANDARDS

PROTECTIVE COVERINGS
MOULDINGS AND STRAPS

399.401
SUPERSEDES
143 (12-10-82)

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FOR FIELD MAINTENANCE ONLY




# "J" BOLT

FOR SECURING PIPE RISERS TO SUPPORT ARMS ON CABLE POLES.

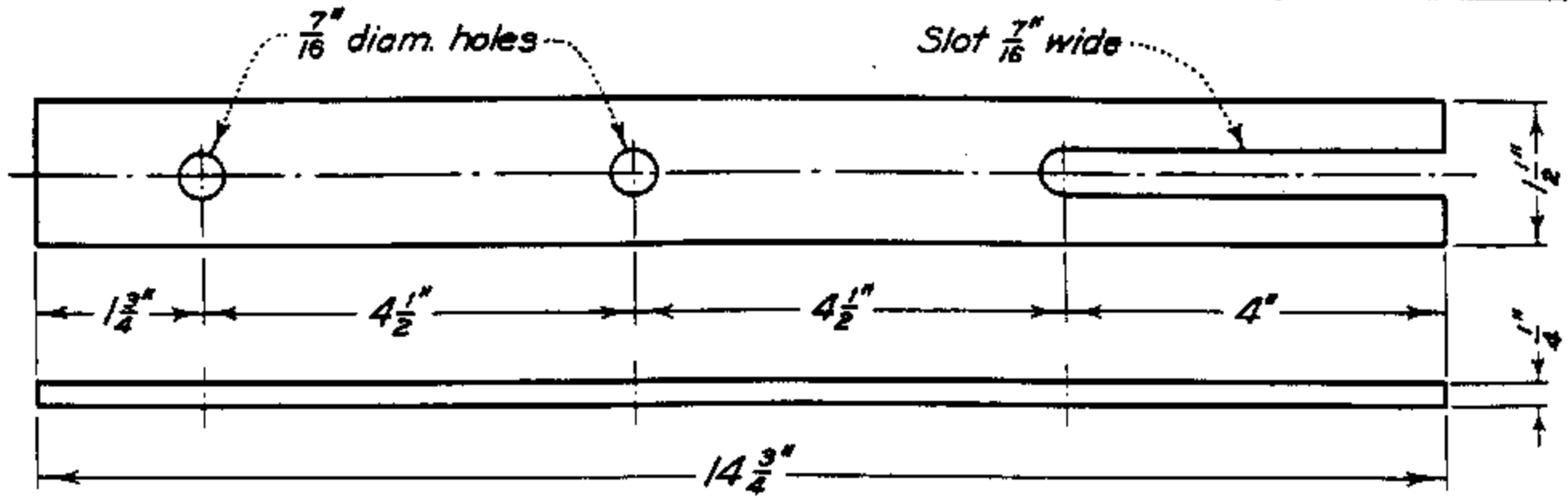
| CONDUIT SIZE INCHES | DIMENSIONS - INCHES | | | DESCRIPTION | STOCK NO. | CONDUIT SIZE INCHES | DIMENSIONS - INCHES | | | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | | A | B | C | | |
| 2 | 8 | 1 7/8 | 2 7/16 | | - | | | | | | |
| 3 | 9 | 2 3/8 | 3 9/16 | | 151360 | | | | | | |
| 4 | 10 | 2 7/8 | 4 9/16 | | 151392 | | | | | | |

NOTE:

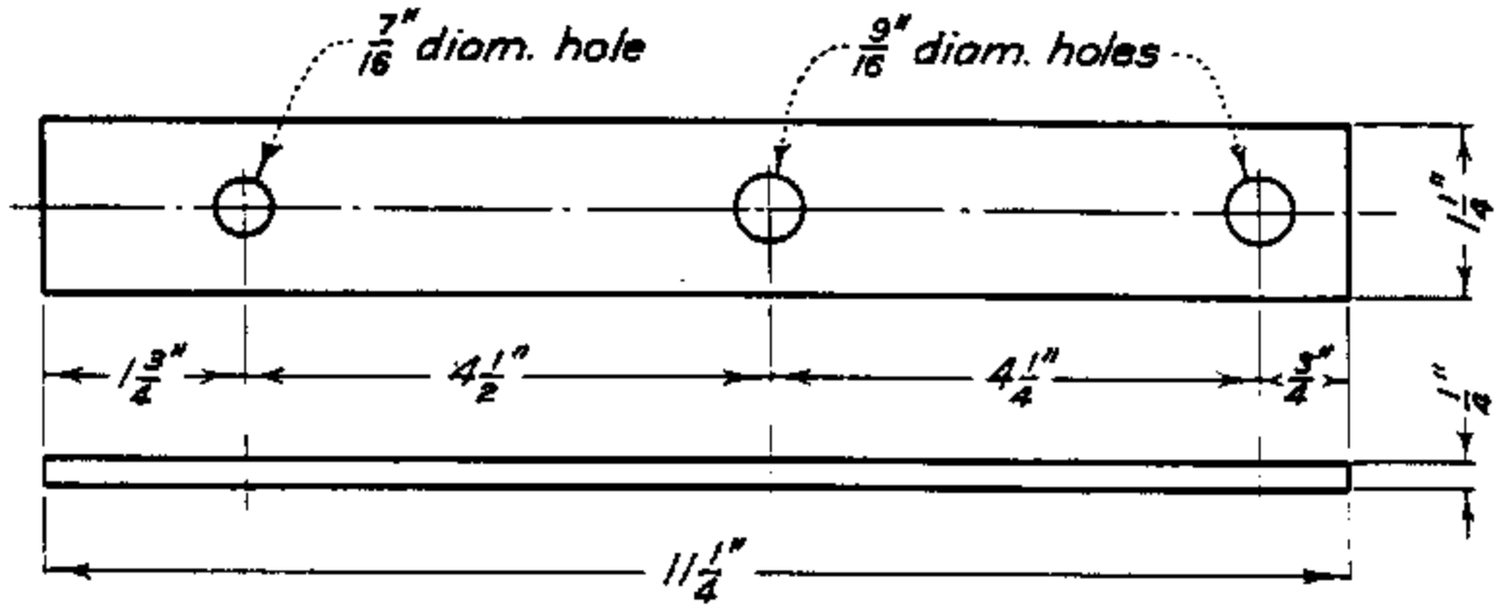
- ABOVE ITEM TO BE HOT DIP GALVANIZED PER A.S.T.M. SPECS. A153 - 53.

| 399.402 SUPERSEDES 144 (12-10-82) | SDG&E ELECTRIC STANDARDS | DATE 12-10-82 APPD WT/DRH |
|---|---|---|
| | 'J' BOLT FOR CABLE POLE RISERS | |

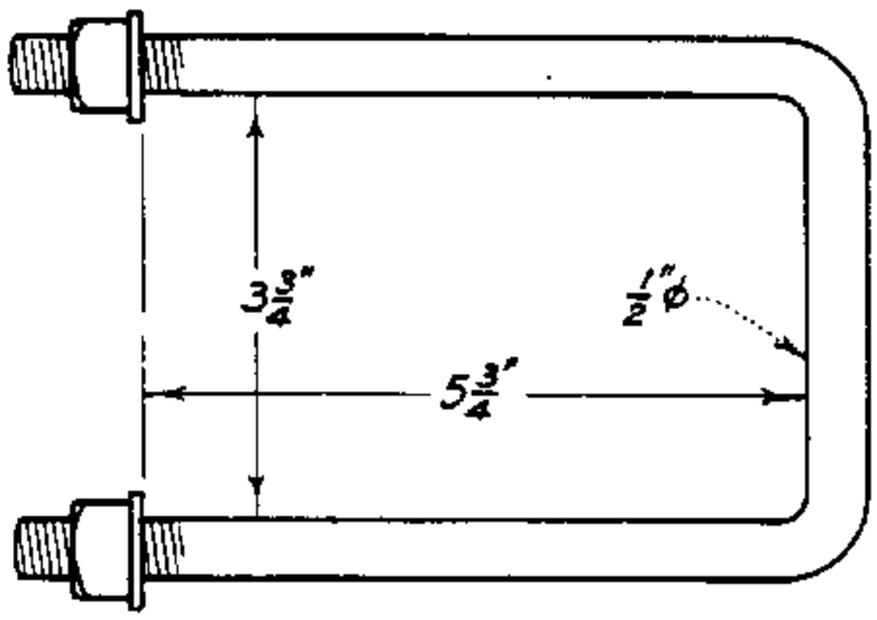
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## ITEM NO. 1
G. I. STRAP FOR MTG. 15 OR 25 KVAR CAPTR. UNITS BET. X-ARMS




## ITEM NO. 2
G. I. STRAP FOR MTG. A 15 OR 25 KVAR CAPTR. UNIT ON FACE OF X-ARM




## ITEM NO. 3
HORIZ. MTG. "U" BOLT FOR ITEM NO. 2
FOR 3¾" X 5¾" CROSSARMS

FOR FIELD MAINTENANCE ONLY

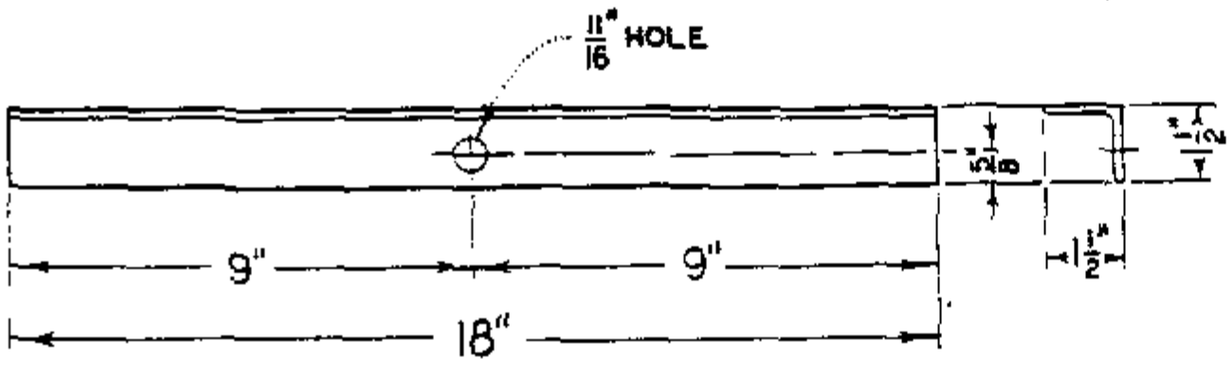
| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | STRAP, FIELD MAINTENANCE ONLY | 697216 | | | |
| | STRAP | 697184 | | | |
| 3 | BOLT, 'U' | 158432 | | | |

SDG&E ELECTRIC STANDARDS

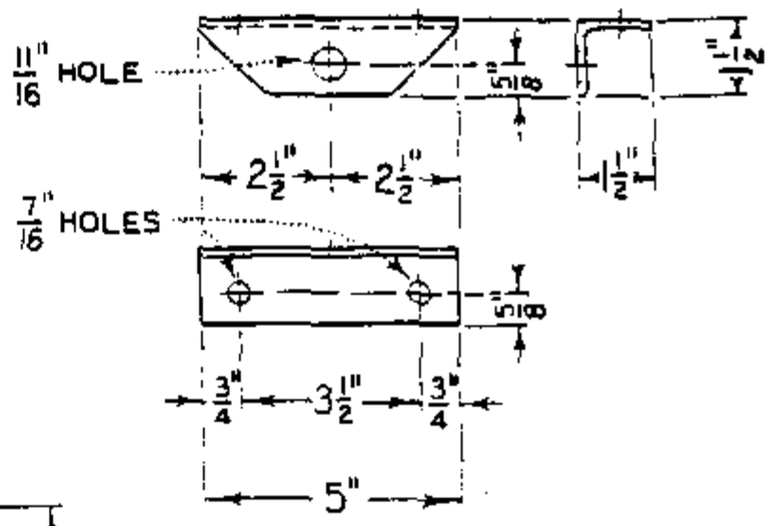
DATE 12-10-82
APPD /DRH

CAPACITOR MOUNTING STRAP

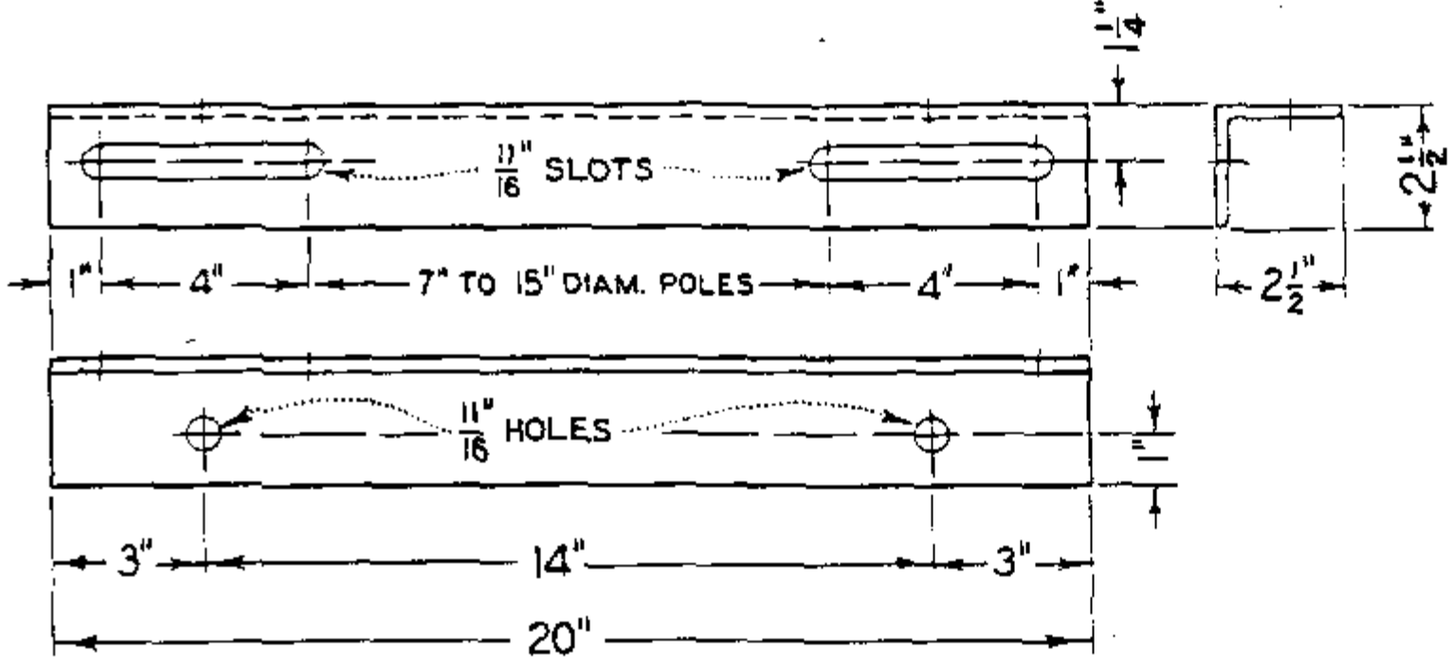
399.501
SUPERSEDES
157 (12-10-82)




ITEM NO. 1
1½" X 1½" X 3/16" Angle, Galv.




ITEM NO. 2
1½" X 1½" X 3/16" Angle, Galv.




ITEM NO. 3
2½" X 2½" X ¼" Angle, Galv.

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FOR FIELD MAINTENANCE ONLY

NOTE:

A. STOCK NUMBER 166464 CONSIST OF ITEMS 1, 2 & 3 ABOVE.

| | | |
|---|---|---|
| 399.502<br>SUPERSEDES<br>158 (12-10-82) | SDG&E ELECTRIC STANDARDS<br>MOUNTING BRACKETS | DATE 12-10-82<br>APPD |

**SCOPE:** THIS STANDARD LISTS VARIOUS TYPES OF CHEMICALLY TREATED POLES WITH THEIR USABLE STRENGTHS, WEIGHTS AND PHYSICAL DIMENSIONS.

| LENGTH FT | CLASS | HEIGHT FT | TREATMENT (H) STOCK NUMBER (F) NATURAL | CREOSOTE | (F) GRAY | WIND LOADING USABLE STRENGTH FT. - LBS. SF=4 | SF=3 | SF=2 | VERTICAL LOADING USABLE STRENGTH LBS. SF=4 | SF=3 | SF=2 | WEIGHT (F) LBS | (G) LBS | MIN TOP DIA IN | DIA 6' FROM BUTT DOUG. FIR | POND. PINE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 1 | 20.5 | 559984 | 550910 | 551966 | 19677 | 26672 | 40663 | 26944 | 35982 | 54060 | 600 | 846 | 8.6 | 10.7 | 12.0 |
| | 2 | | (C) | (C) | - | 15925 | 21640 | 33070 | 20354 | 27186 | 40849 | 521 | 693 | 8.0 | 10.0 | " |
| | 3 | | (C) | (C) | 552034 | 13191 | 17964 | 27510 | 14965 | 19991 | 30044 | 456 | 576 | 7.3 | 9.4 | 10.3 |
| | 4 | | - | (C) | - | 10727 | 14650 | 22497 | 11037 | 14748 | 22169 | - | 490 | 6.7 | 8.8 | 9.5 |
| | 5 | | 550432 | 551760 | 552062 | 8292 | 11372 | 17530 | 7737 | 10343 | 15555 | 342 | 419 | 6.1 | 8.1 | 8.9 |
| | 6 | | - | (C) | - | 5914 | 8170 | 12680 | 4908 | 6567 | 9884 | - | 360 | 5.4 | 7.3 | 8.1 |
| 30 | 1 | 25.0 | 550000 | 550912 | 551970 | 24368 | 33159 | 50742 | 21222 | 28365 | 42651 | 806 | 093 | 8.6 | 11.6 | 12.7 |
| | 2 | | (C) | (C) | - | 19416 | 26510 | 40699 | 15899 | 21257 | 31972 | 707 | 924 | 8.0 | 10.8 | 11.9 |
| | 3 | | 550336 | 551472 | 552038 | 16255 | 22249 | 34239 | 11793 | 15773 | 23731 | 612 | 787 | 7.3 | 10.2 | 11.1 |
| | 4 | | - | (C) | - | 12484 | 17175 | 26557 | 8418 | 11265 | 16959 | - | 670 | 6.7 | 9.4 | 10.3 |
| | 5 | | 550448 | 551776 | 552066 | 10146 | 14012 | 21743 | 6104 | 8172 | 12308 | 464 | 564 | 6.1 | 8.8 | 9.5 |
| | 6 | | - | (C) | - | 7416 | 10325 | 16144 | 3936 | 5275 | 7954 | - | 470 | 5.4 | 8.0 | 8.9 |
| 35 | 1 | 30.0 | 550016 | 550928 | 551974 | 29226 | 39958 | 61422 | 16764 | 22433 | 33769 | 1041 | 1340 | 8.6 | 12.4 | 13.5 |
| | 2 | | (C) | (C) | - | 23598 | 32387 | 49966 | 12672 | 16965 | 25550 | 908 | 1148 | 8.0 | 11.6 | 12.7 |
| | 3 | | 550352 | 551488 | 552042 | 18757 | 25859 | 40064 | 9121 | 12219 | 18415 | 787 | 987 | 7.3 | 10.8 | 11.9 |
| | 4 | | - | (C) | - | 14560 | 20196 | 31468 | 6563 | 8800 | 13275 | - | 858 | 6.7 | 10.0 | 11.0 |
| | 5 | | 550464 | 551792 | 552070 | 11074 | 15476 | 24278 | 4582 | 6152 | 9291 | 597 | 736 | 6.1 | 9.2 | 10.2 |
| | 6 | | - | (C) | - | 8863 | 12467 | 19675 | 3120 | 4195 | 6345 | - | 635 | 5.4 | 8.6 | 9.5 |
| 40 | 1 | 34.5 | 550032 | 550944 | 551978 | 33331 | 45779 | 70674 | 14074 | 18858 | 28425 | 1300 | 1610 | 8.6 | 13.1 | 14.3 |
| | 2 | | (C) | (C) | - | 27171 | 37477 | 58090 | 10533 | 14123 | 21303 | 1129 | 1387 | 8.0 | 12.2 | 13.5 |
| | 3 | | 550368 | 551504 | 552046 | 21827 | 30254 | 47110 | 7768 | 10424 | 15736 | 984 | 1199 | 7.3 | 11.5 | 12.6 |
| | 4 | | - | (C) | - | 17192 | 23987 | 37576 | 5639 | 7576 | 11450 | - | 1042 | 6.7 | 10.7 | 11.6 |
| | 5 | | 550480 | 551808 | 552074 | 13251 | 18535 | 29403 | 3976 | 5350 | 8099 | 745 | 905 | 6.1 | 9.9 | 10.8 |
| | 6 | | - | (C) | - | 9899 | 14077 | 22434 | 2605 | 3515 | 5336 | - | 787 | 5.4 | 9.1 | 10.0 |
| 45 | 1 | 39.0 | 550048 | 550960 | 551982 | 36856 | 50881 | 78930 | 11968 | 16062 | 24250 | 1573 | 1899 | 8.6 | 13.7 | 15.1 |
| | 2 | | (C) | (C) | - | 30245 | 41954 | 65371 | 9155 | 12296 | 18578 | 1372 | 1633 | 8.0 | 12.9 | 14.2 |
| | 3 | | 550384 | 551520 | 552050 | 23099 | 32290 | 50672 | 6446 | 8671 | 13123 | 1189 | 1422 | 7.3 | 11.9 | 13.2 |
| | 4 | | - | (C) | - | 18242 | 25701 | 40619 | 4695 | 6327 | 9589 | - | 1234 | 6.7 | 11.1 | 12.3 |
| | 5 | | 550496 | 551824 | 552078 | 14114 | 20074 | 31994 | 3320 | 4484 | 6813 | 904 | 1089 | 6.1 | 10.3 | 11.5 |
| 50 | 1 | 43.5 | 550064 | 550976 | 551986 | 40595 | 56327 | 87793 | 10402 | 13987 | 21158 | 1873 | 2209 | 8.6 | 14.3 | 15.8 |
| | 2 | | (C) | (C) | - | 32663 | 45605 | 71489 | 7871 | 10596 | 16044 | 1630 | 1892 | 8.0 | 13.4 | 14.8 |
| | 3 | | 550400 | 551536 | 552054 | 25102 | 35356 | 55863 | 5568 | 7510 | 11395 | 1417 | 1645 | 7.3 | 12.4 | 13.8 |
| | 5 | | 550512 | 551840 | 552082 | 15521 | 22287 | 35820 | 2891 | 3920 | 5978 | 1075 | 1277 | 6.1 | 10.8 | 11.9 |
| 55 | 1 | 48.0 | 550080 | 550992 | 551990 | 43538 | 60768 | 95228 | 9063 | 12217 | 18525 | 2193 | 2558 | 8.6 | 14.8 | 16.4 |
| | 2 | | (C) | (C) | - | 34308 | 48274 | 76207 | 6882 | 9290 | 14105 | 1908 | 2193 | 8.0 | 13.9 | 15.4 |
| | 3 | | 550416 | 551552 | 552058 | 27190 | 38588 | 61384 | 4892 | 6618 | 10071 | 1664 | 1880 | 7.3 | 12.9 | 14.3 |
| | 4 | | - | (C) | - | 21642 | 31020 | 49776 | 3589 | 4869 | 7428 | - | 1653 | 6.7 | 12.1 | 13.4 |
| | 5 | | (C) | (C) | - | 15873 | 23125 | 37628 | 3160 | 4286 | 6539 | - | 1480 | 6.1 | - | - |

INSTALLATION:

A. ULTIMATE FIBER STRESS 8000 PSI FOR DOUGLAS FIR AND 6000 PSI FOR PONDEROSA PINE.
B. BENDING MOMENT DUE TO WIND ON THE POLE HAS BEEN DEDUCTED FROM TOTAL POLE STRENGTH.
(C) DENOTES NOT A STOCK ITEM, BUT IS IN SERVICE.
D. USE SALVAGED CREOSOTE POLES IN PREFERENCE TO CELLON TREATED POLES IN APPROVED LOCATIONS.
(F) PRESSURE TREATMENT DONE BY THE CELLON OR DOW PROCESS.
(G) CREOSOTE TREATED POLES.

FOR FIELD MAINTENANCE ONLY

REFERENCE:

(H) SEE PAGE 354.1 TO 354.3 FOR PENTA-IN-OIL TREATED POLES.



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| LENGTH FT | CLASS | HEIGHT FT | TREATMENT Ⓗ STOCK NUMBER Ⓕ NATURAL | CREOSOTE | Ⓕ GRAY | WIND LOADING USABLE STRENGTH FT. - LBS. SF=4 | SF=3 | SF=2 | VERTICAL LOADING USABLE STRENGTH LBS SF=4 | SF=3 | SF=2 | WEIGHT Ⓕ LBS | Ⓖ LBS | MIN TOP DIA IN | DIA 6' FROM BUTT DOUG. FIR | POND. PINE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 1 | 53.0 | 550096 | 551008 | 551994 | 47095 | 66158 | 104285 | 7845 | 10610 | 16139 | 2535 | 2949 | 8.6 | 15.3 | 17.0 |
| | 2 | | 550224 | Ⓒ | - | 37271 | 52832 | 83953 | 5888 | 7978 | 12158 | 2204 | 2515 | 8.0 | 14.3 | 16.1 |
| | 3 | | Ⓒ | Ⓒ | - | 29687 | 42481 | 68069 | 4264 | 5792 | 8848 | 1923 | 2146 | 7.3 | 13.4 | 14.8 |
| | 5 | | Ⓒ | Ⓒ | - | 16933 | 25009 | 41162 | 2549 | 3497 | 5393 | - | 1888 | 6.7 | 11.5 | 12.6 |
| 65 | 1 | 57.5 | 550112 | 551024 | 551998 | 50278 | 71052 | 112600 | 7004 | 9509 | 14519 | 2892 | 3431 | 8.6 | 15.8 | 17.5 |
| | 2 | | Ⓒ | Ⓒ | - | 39965 | 57033 | 91170 | 5283 | 7185 | 10989 | 2516 | 2855 | 8.0 | 14.8 | 16.4 |
| | 3 | | Ⓒ | Ⓒ | - | 31115 | 44941 | 72590 | 3779 | 5156 | 7910 | 2193 | 2405 | 7.3 | 13.8 | 15.3 |
| | 5 | | Ⓒ | Ⓒ | - | 17827 | 26675 | 44371 | 2259 | 3121 | 4846 | - | 2152 | 6.7 | 11.9 | 13.4 |
| 70 | 1 | 62.5 | 550128 | 551040 | 552002 | 52892 | 75325 | 120190 | 6109 | 8338 | 12796 | 3268 | 3948 | 8.6 | 16.2 | 18.0 |
| | 2 | | Ⓒ | Ⓒ | - | 43163 | 62049 | 99823 | 4693 | 6414 | 9855 | 2846 | 3231 | 8.0 | 15.3 | 16.9 |
| | 3 | | Ⓒ | Ⓒ | - | 33760 | 49166 | 79980 | 3371 | 4623 | 7125 | 2478 | 2687 | 7.3 | 14.3 | 15.8 |
| | 5 | | Ⓒ | Ⓒ | - | 18890 | 28677 | 48252 | 1901 | 2656 | 4166 | - | 2405 | 6.7 | 12.1 | 13.5 |
| 75 | 1 | 67.0 | 550144 | 551056 | 552006 | 56261 | 80606 | 129296 | 5546 | 7608 | 11730 | 3659 | 4442 | 8.6 | 16.7 | 18.5 |
| | 2 | | Ⓒ | Ⓒ | - | 43880 | 63719 | 103396 | 4152 | 5708 | 8821 | 3196 | 3619 | 8.0 | 15.6 | 17.3 |
| | 3 | | Ⓒ | Ⓒ | - | 34292 | 50537 | 83028 | 2984 | 4119 | 6389 | - | 3000 | 7.3 | 14.6 | 16.2 |
| 80 | 1 | 72.0 | 550160 | 551072 | 552010 | 60261 | 86901 | 140182 | 4975 | 6869 | 10655 | 4074 | 5013 | 8.6 | 17.2 | 18.9 |
| | 2 | | Ⓒ | Ⓒ | - | 47191 | 69036 | 112727 | 3739 | 5175 | 8046 | 3553 | 4050 | 8.0 | 16.1 | 17.8 |
| 85 | 1 | 76.5 | 550176 | 551088 | 552014 | 61163 | 89003 | 144684 | 4424 | 6161 | 9633 | 4514 | 5640 | 8.6 | | 19.4 |
| | 2 | | Ⓒ | Ⓒ | - | 47844 | 70750 | 116563 | 3336 | 4655 | 7294 | 3929 | 4500 | 8.0 | 16.4 | 18.1 |
| 90 | 1 | 81.5 | 550192 | 551104 | 552018 | 62481 | 91842 | 150565 | 3871 | 5454 | 8619 | 4967 | 6376 | 8.6 | 17.8 | 19.9 |
| | 2 | | Ⓒ | Ⓒ | - | 51259 | 76367 | 126581 | 3023 | 4257 | 6726 | 4321 | 5017 | 8.0 | 16.9 | 18.6 |
| 95 | 1 | 86.0 | 550208 | 551120 | 552022 | 62352 | 92458 | 152671 | 3517 | 4986 | 7926 | 5734 | 6559 | 8.6 | 18.1 | 20.2 |
| | 2 | | Ⓒ | Ⓒ | - | 51097 | 76894 | 128488 | 2693 | 3841 | 6138 | 4735 | 5608 | 8.0 | 17.2 | 18.9 |
| 100 | HI | 91.0 | 549954 | - | - | 76453 | 118928 | - | 4171 | 5951 | 9510 | 8675 | - | 9.2 | 19.7 | 22.0 |
| | 1 | | 549952 | 550816 | 552026 | 66415 | 99155 | - | 3192 | 4578 | 7350 | 5917 | 7229 | 8.6 | 18.6 | 20.7 |
| | 2 | | Ⓒ | Ⓒ | - | 52001 | 79254 | - | 2389 | 3451 | 5574 | - | 6000 | 8.0 | 17.5 | 19.4 |
| 110 | HI | 100 | 549970 | - | - | 86151 | 134013 | - | 3387 | 4982 | 8174 | 10672 | - | 9.2 | 20.5 | 22.8 |
| | 1 | | 549968 | 550832 | 552030 | 70199 | 106952 | - | 2501 | 3736 | 6208 | 6950 | 9240 | 8.6 | 19.3 | 21.5 |
| | 2 | | Ⓒ | Ⓒ | - | 53483 | 83784 | - | 1782 | 2723 | 4604 | - | 8000 | 8.0 | 18.1 | 20.0 |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

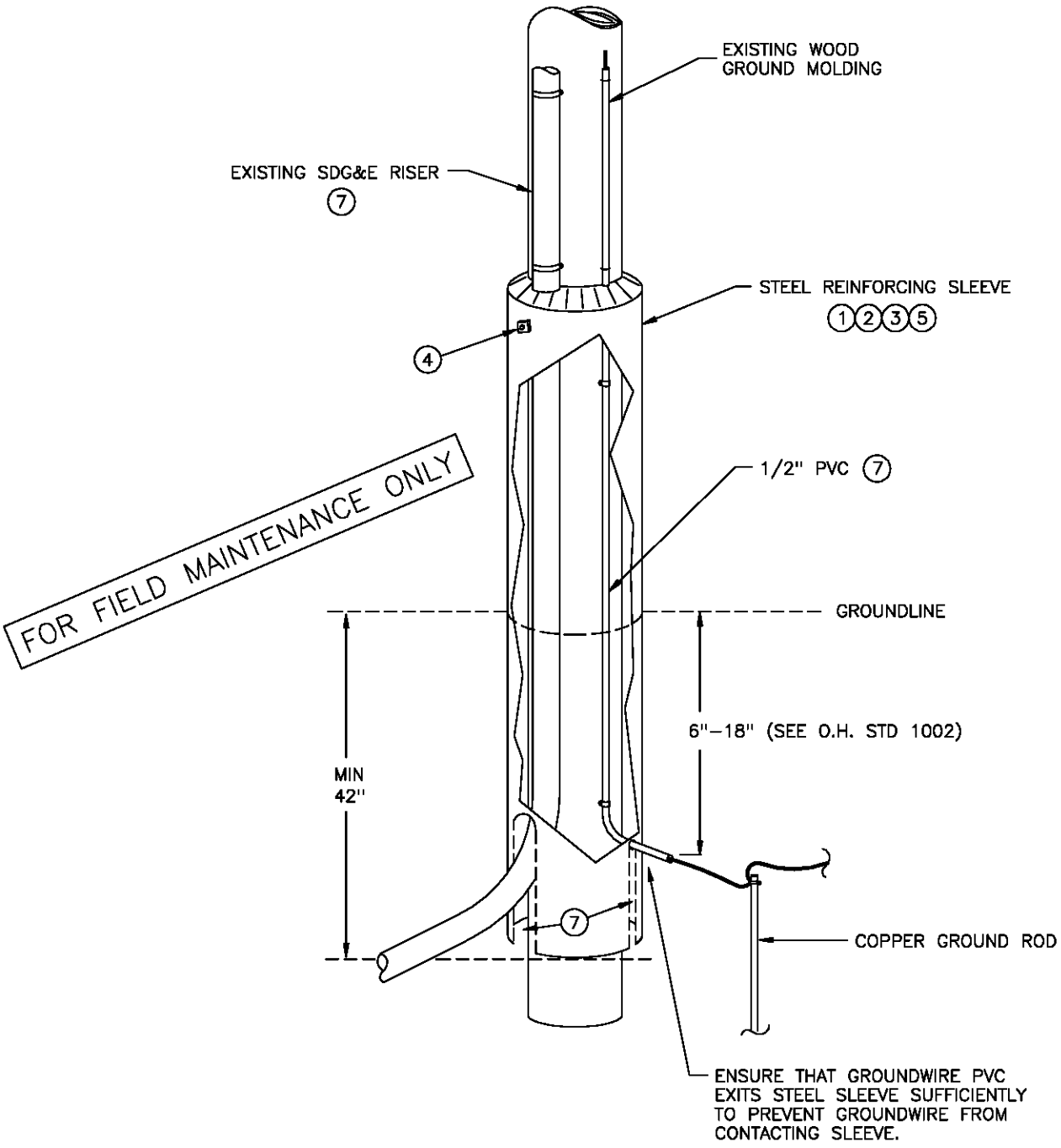
A. ULTIMATE FIBER STRESS 8000 PSI FOR DOUGLAS FIR AND 6000 PSI FOR PONDEROSA PINE.
B. BENDING MOMENT DUE TO WIND ON THE POLE HAS BEEN DEDUCTED FROM TOTAL POLE STRENGTH.
Ⓒ DENOTES NOT A STOCK ITEM, BUT IS IN SERVICE.
D. USE SALVAGED CREOSOTE POLES IN PREFERENCE TO CELLON TREATED POLES IN APPROVED LOCATIONS.
Ⓕ PRESSURE TREATMENT DONE BY THE CELLON OR DOW PROCESS.
Ⓖ CREOSOTE TREATED POLES.

REFERENCE:

Ⓗ SEE PAGE 354.1 TO 354.3 FOR PENTA-IN-OIL TREATED POLES.

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**SCOPE:** THIS STANDARD SHOWS A METHOD OF REINFORCING DETERIORATED WOOD POLES USING A STEEL SLEEVE.




**NOTES:**

–PRESENTLY ALL STEEL SLEEVES ARE INSTALLED BY OUTSIDE CONTRACTORS AS PART OF GROUND LINE TREATMENT AND REINFORCEMENT PROGRAM.

–FOR USE ON POLES SUFFERING FROM BUTT ROT ONLY OR WHERE VEHICLE CONTACT HAS WEAKENED THE POLE AT GROUND LINE SUFFICIENTLY TO REQUIRE RESTORATION.

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1–1–96<br>APPD PA 1/2009 | REINFORCING WOOD POLES WITH STEEL SLEEVES | 399.701 |

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## MINIMUM REQUIREMENTS FOR POLE

–POLE MUST NOT BE PART OF A GRADE "A" CONSTRUCTION PER G.O. 95 RULE 42 AND RULE 49.1.

## MINIMUM REQUIREMENTS FOR INSTALLATION

–COMPLETE WOOD TREATMENT, REINFORCING MATERIALS AND METHOD OF INSTALLATION REQUIREMENTS ARE OUTLINED IN **"TECHNICAL SPECIFICATION FOR THE GROUNDLINE RESTORATION OF DETERIORATED WOOD POLES".**

–INCLUDED IN THE SPECIFICATION ARE, BUT NOT LIMITED TO, THE FOLLOWING REQUIREMENTS: (CONTACT CONSTRUCTION STANDARDS FOR A COMPLETE COPY)

1. THE MINIMUM DIAMETER OF THE SLEEVE SHALL BE 5 INCHES GREATER THAN THE GROUNDLINE DIAMETER OF THE POLE.
2. THE SLEEVE SHALL BE OF SUFFICIENT LENGTH THAT:
   –FROM THE TOP OF THE INSTALLED SLEEVE TO A POINT MEASURED 18 INCHES BELOW THE TOP OF THE INSTALLED SLEEVE, THE MINIMUM GOOD WOOD SHELL THICKNESS OF THE POLE IS 2 INCHES.
   –THERE IS AT LEAST 42 INCHES OF SLEEVE BURIED WITH A MINIMUM OF 30" DEEP ANNULUS.
   –THERE IS AT LEAST 42 INCHES OF SLEEVE ABOVE GROUND.
3. THE INSTALLED SLEEVE SHALL BE PLACED CONCENTRICALLY ABOUT THE POLE SUCH THAT THE RADIAL DISTANCE FROM THE SURFACE OF THE POLE TO THE INSIDE EDGE OF THE SLEEVE DOES NOT VARY MORE THAN 1/2 INCH.
4. CLIMBING STEP ATTACHMENTS:
   –A MINIMUM OF TWO 5/8 INCH SQUARE STEEL NUTS SHALL BE WELDED TO THE EXTERIOR OF THE SLEEVE AT 18 INCH INTERVALS, 90 DEGREES APART, FOR THE PURPOSE OF TEMPORARY STEP ATTACHMENT.
   –REMOVE ANY PERMANENT POLE STEPS ATTACHED TO THE POLE WHICH ARE WITHIN 8 FEET OF THE TOP OF THE SLEEVE.
5. THE SLEEVE SHALL BE PAINTED ACCORDING TO THE SPECIFICATION.
6. WHEN THE POLE IS WITHIN 12 FEET OF A TRAVELED ROADWAY, OR IN AN ALLEY OR PARKING AREA, REFLECTIVE STRIPS MUST BE ATTACHED TO THE STEEL SLEEVE AS NOTED IN SPECIFICATION.
7. IF THE SLEEVE IS TO BE INSTALLED ON A POLE WITH EXISTING GROUND RUNS OR POLE MOUNTED RISERS, THE HOLE MUST BE HAND DUG AND THE SLEEVE NOTCHED SO AS NOT TO DISTURB THE UNDERGROUND CONDUITS. THE GROUND WIRE MUST BE ENCASED IN A 1/2" PVC CONDUIT BEFORE BEING ENCAPSULATED IN THE EPOXY AND AGGREGATE FILLER AS NOTED IN DRAWING.

FOR FIELD MAINTENANCE ONLY

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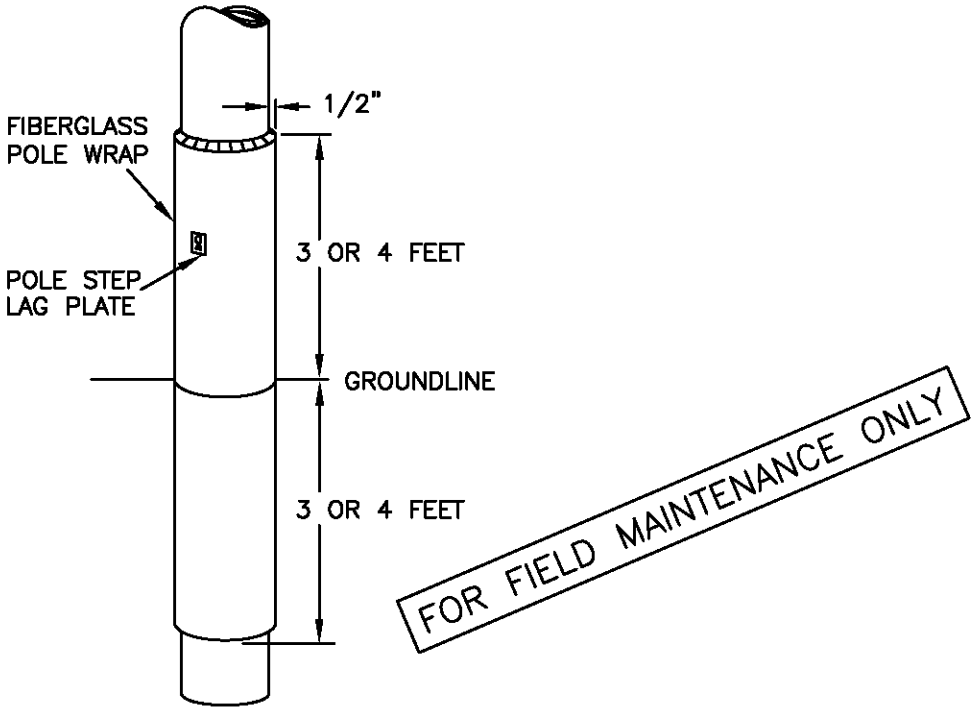
## ADDING RISERS OR GROUND RUNS TO POLE WITH EXISTING STEEL SLEEVE

–WHEN ADDING A RISER TO A POLE WITH AN EXISTING STEEL SLEEVE, RISER MUST BE ATTACHED TO LADDER ARM BRACKETS (SEE STANDARD 1404/4204).

–ADDING A GROUND RUN TO A POLE WITH AN EXISTING STEEL SLEEVE SHOULD BE AVOIDED. IF THERE IS NO ALTERNATIVE, CONTACT CONSTRUCTION STANDARDS FOR INSTALLATION METHOD.

| | | |
|---|---|---|
| | SDG&E ELECTRIC STANDARDS | |
| 399.702 | REINFORCING WOOD POLES WITH STEEL SLEEVES | DATE 1–1–96<br>APPD PA 12/09 |

**SCOPE:** THIS STANDARD SHOWS A METHOD OF REINFORCING DETERIORATED WOOD POLES USING A FIBERGLASS WRAP.




**NOTES:**

- ALL FIBERGLASS POLE WRAPS ARE INSTALLED BY AN OUTSIDE CONTRACTOR AS PART OF A GROUNDLINE TREATMENT AND REINFORCEMENT PROGRAM.
- FOR USE ON POLES SUFFERING FROM BUTT ROT ONLY OR WHERE VEHICLE CONTACT HAS WEAKENED THE POLE AT GROUNDLINE SUFFICIENTLY TO REQUIRE RESTORATION.

**MINIMUM REQUIREMENTS FOR POLE**

- POLE MUST NOT BE PART OF A GRADE "A" CONSTRUCTION PER G.O. 95 RULE 42 AND 49.1.

**MINIMUM REQUIREMENTS FOR INSTALLATION**

- COMPLETE WOOD TREATMENT, REINFORCING MATERIALS AND METHOD OF INSTALLATION REQUIREMENTS ARE OUTLINED IN **"TECHNICAL SPECIFICATION FOR GROUNDLINE RESTORATION OF DETERIORATED WOOD POLES.**
- THE FIBERGLASS WRAP TYPICALLY EXTENDS 3 TO 4 FEET ABOVE AND BELOW GROUNDLINE, BUT IT CAN EXTEND AS FAR UP THE POLE AS NEEDED TO A POINT WHERE THERE IS AN AVERAGE SHELL THICKNESS OF 4 INCHES.
- PRIOR TO THE POLE BEING WRAPPED, IT WILL BE TREATED WITH APPROVED PRESERVATIVES AND FUMIGANT TO STOP THE DECAY PROCESS.
- THE FIBERWRAP WILL EXTEND OUT FROM THE POLE NO MORE THAN 1/2".
- THE INSTALLATION CONTRACTOR WILL INSTALL POLE STEP LAG PLATES (S/N 541212) IN ACCORDANCE WITH G.O. 95 RULE 51.7.
- IF THE FIBERWRAP IS TO BE INSTALLED ON A POLE WITH EXISTING GROUND RUN, MOLDINGS AND STAPLES WILL BE REMOVED AND THE GROUNDWIRE PULLED AWAY FROM THE POLE. AFTER THE RESIN HAS GELLED, THE GROUNDWIRE WILL BE PLACED AGAINST THE POLE, AND COVERED WITH MOLDING BY PRE–DRILLING FOR THE MOLDING STAPLES. A NEW GROUND RUN MAY BE ATTACHED TO A POLE WITH EXISTING FIBER– WRAP USING THE SAME METHOD.
- EXISTING RISERS ATTACHED TO THE POLE WILL BE MOVED OUT BY SDG&E CREW PRIOR TO FIBERWRAP INSTALLATION, AND RE–ATTACHED AFTER INSTALLATION.

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| | | |
|---|---|---|
| DATE 1–1–96<br>APPD PA/BSJ | SDG&E ELECTRIC STANDARDS<br>REINFORCING WOOD POLES WITH FIBERGLASS WRAP | 399.703<br>SUPERSEDES<br>375 (1–1–96) |

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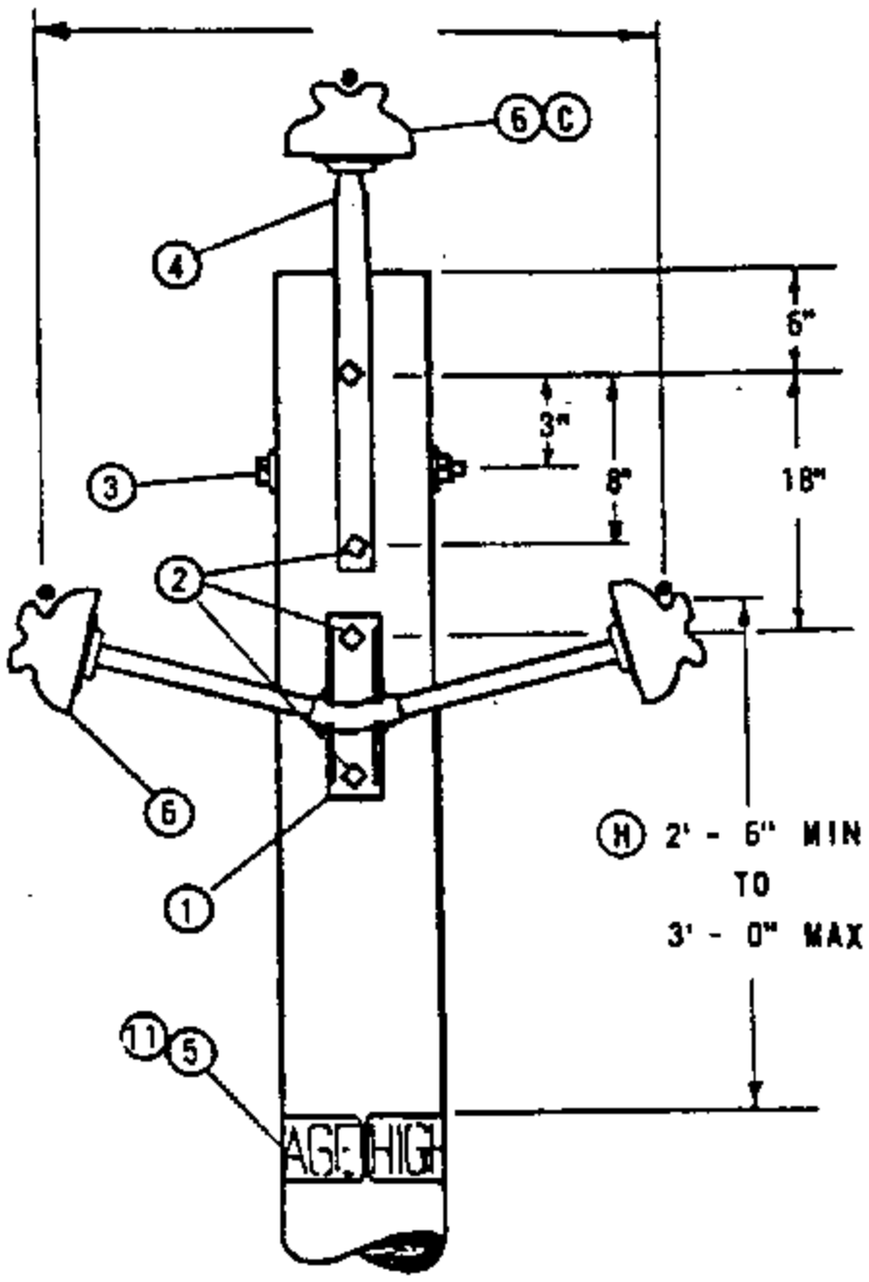



FIGURE 1
WORK ORDER DESIGNATION
"FGS AND PTP"

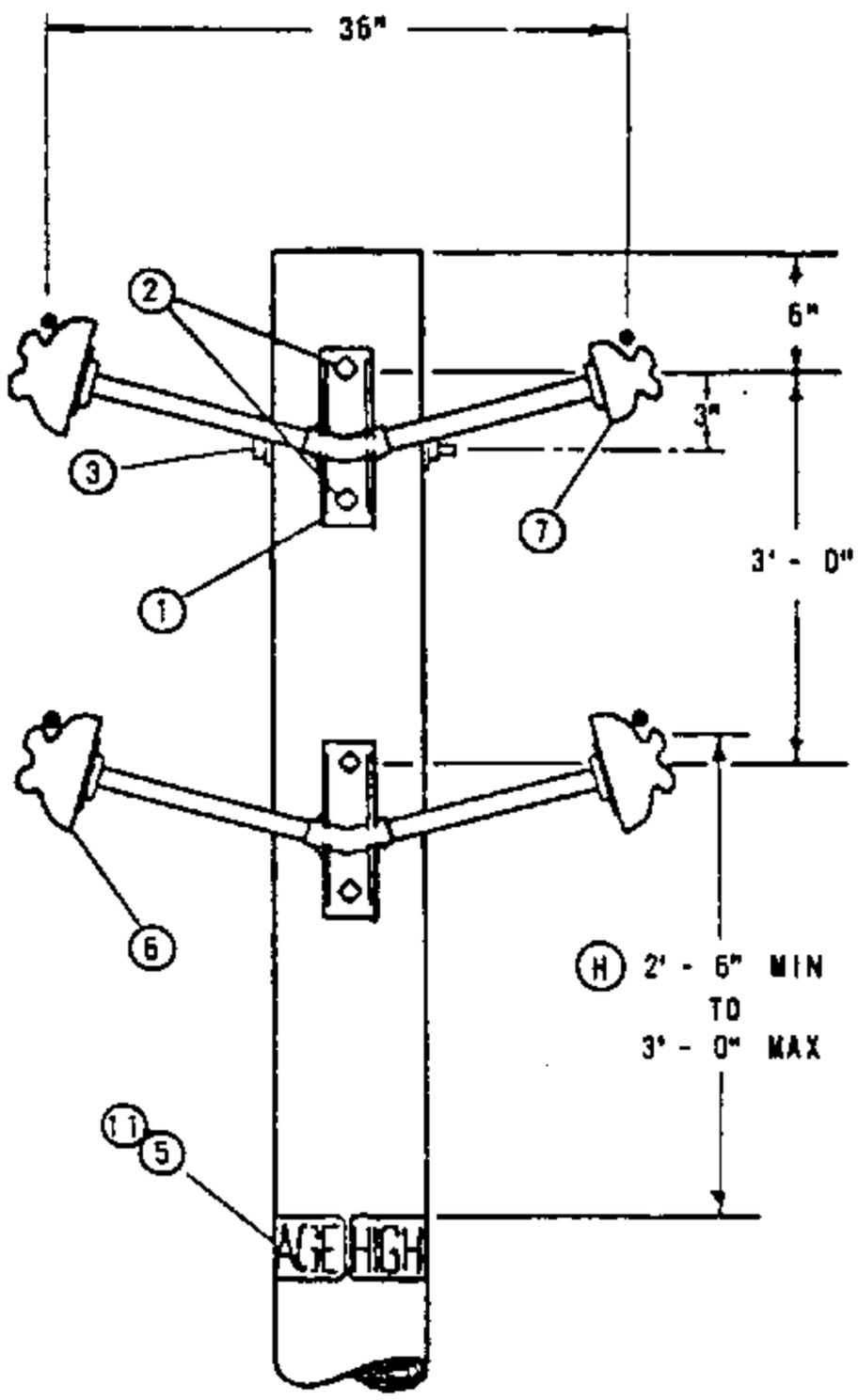



FIGURE 2
WORK ORDER DESIGNATION
"FGS"

NOTES:

A. USE MAXIMUM ANGLE OF DEVIATION OF 2.25°, BASED ON CLIMBING SPACE REQUIREMENTS (G.O. 95, RULE 54.7A2).

B. USE IN CONTAMINATION DISTRICTS 2 AND 3 AS DEFINED ON STANDARDS PAGE 287.

(C) SUBSTITUTE ONE 55-3 FOR ONE 55-5 INSULATOR AND CORRESPONDING PREFORMED TYPE TIE ON NEUTRAL WIRE FOR IDENTIFICATION.

(E) EXEMPT MATERIALS.

(F) ITEM 10 IS PREFERRED OVER ITEMS 8 & 9.

(G) 636 KCM AND 1033.5 KCM CONDUCTORS CANNOT BE USED SINCE NO CLAMP INSULATORS OF THIS TYPE ARE AVAILABLE.

(H) THESE DIMENSIONS ARE IN ACCORDANCE WITH G.O. 95.

I MAXIMUM SPAN LENGTH FOR THIS CONSTRUCTION IS 200'. IF SPAN LENGTH IS GREATER, PLEASE CONTACT SYSTEM STANDARDS.

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY FIG. 1 1Ø | QUANTITY FIG. 1 3Ø | QUANTITY FIG. 2 4 WIRE | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|---|---|
| 1 | | BRACKET, 2 PHASE PIN | 1 | 1 | 2 | 166912 |
| 2 | | BOLT, MACH 5/8 X ___", 1-2 1/4" FLAT WASH., 1 DBL COIL SPR. WASH. (E) | 2 | 4 | 4 | PGS 139, 140 |
| 3 | | BOLT, MACH 5/8" X ___", 2-2 1/4" FLAT WASH., 1 DBL COIL SPR WASH. (E) | 1 | 1 | 1 | PGS 139, 140 |
| 4 | | PIN, POLE TOP, 24", 1" LEAD THREADS | - | 1 | - | 532480 |
| 5 | | SIGN, HIGH VOLTAGE (E) | 2 | 2 | 2 | 647616 |
| | 6 | INSULATOR, PIN TYPE, CLASS 55-5 | 2 | 3 | 3 | 429056 |
| | 7 | INSULATOR, PIN TYPE, CLASS 55-3 | (C) | (C) | 1 | 429216 |
| | 8 | WIRE TIE, (F) | IF REQ'D. | | | 700 SECTION |
| | 9 | GUARD, LINE, ALUM CONDUCTOR (F) | IF REQ'D. | | | 700 SECTION |
| | 10 | TIE, PREFORMED, ALUMINUM CONDUCTORS, (F) | 2 | 3 | 4 | PG 760 |
| 11 | | NAILS, 1 3/4" GALV (E) | 16 | 16 | 16 | 492192 |

APP'D JLWK
SYS STDS ENGR

SDG&E ELECTRIC STANDARDS

# FIBERGLASS SUPPORT CONSTRUCTION, 12KV AND BELOW

499.101
SUPERCEDES
413 (1-1-92)

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**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 AND 12.47 KV LINES WITH A LINE ANGLE NOT EXCEEDING 5°, USING ARMLESS VERTICAL CONSTRUCTION.

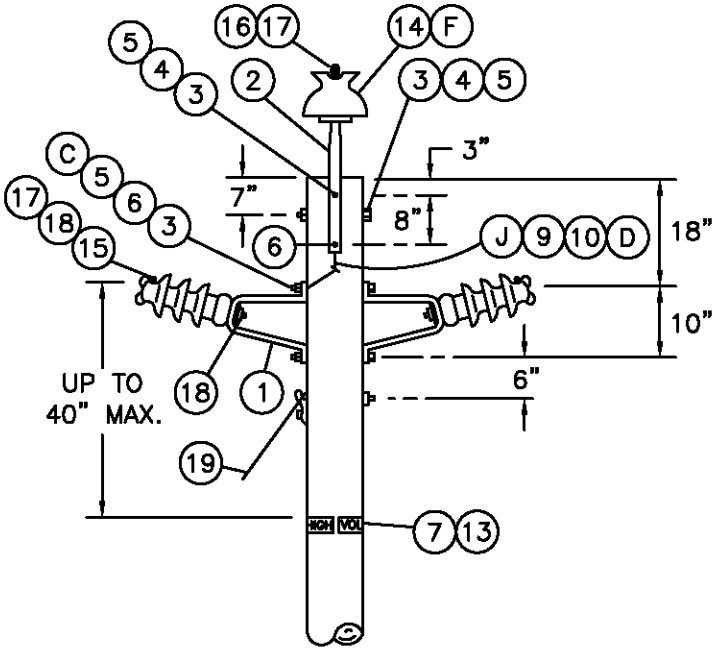



FIGURE 1

POLE TOP POSITION 3 WIRE CIRCUIT,
WORK ORDER DESIGNATION PTP, PIB, & TPI

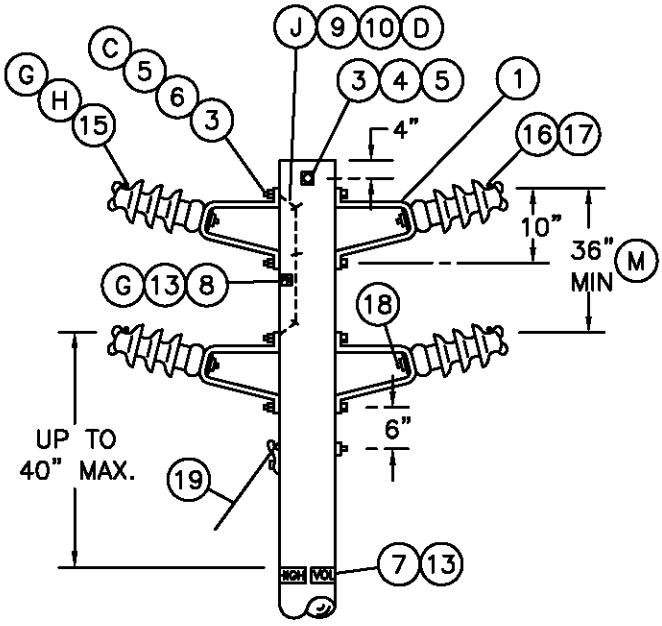



FIGURE 2

POLE TOP POSITION 2, 3, OR 4 WIRE CIRCUIT,
WORK ORDER DESIGNATION PIB & TPI

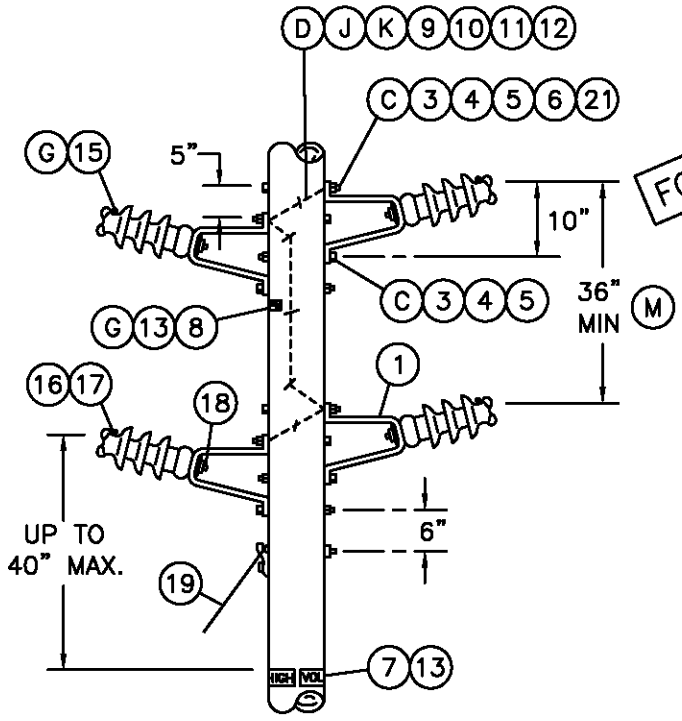



FIGURE 3

BELOW POLE TOP POSITION 2, 3, OR 4 WIRE CIRCUIT
WORK ORDER DESIGNATION PIB & TPI

FOR FIELD MAINTENANCE ONLY

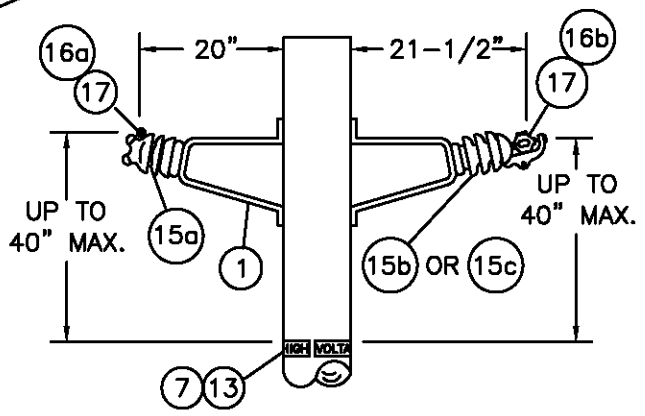



FIGURE 4

HORIZONTAL POST INSULATOR
WORK ORDER DESIGNATION PIB, TPI, & HPI

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| | | |
|---|---|---|
| DATE 1-1-96<br>APPD PA/BOG | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION,<br>ANGLES 0° TO 5°, 12 AND 12.47KV | 499.102<br>SUPERSEDES<br>414.1 (1-1-96) |

**INSTALLATION:**

A. CLIMBING SPACE MUST BE PROVIDED PER STANDARDS PAGE 252.

B. USE CLAMP TOP LINE POST INSULATORS AND CLAMPS FOR 1033 KCMIL ACSR.

(C) INSTALL DOUBLE COIL SPRING WASHER SO IT CONTACTS BRACKET.

(D) BONDING OF THE BRACKETS IS ONLY REQUIRED WITHIN HEAVY CONTAMINATION AREA, DISTRICT 1 ON PAGE 287. USE BONDING PROVISIONS ON BRACKETS, IF THEY ARE FURNISHED.

(F) SUBSTITUTE A CLASS 55-3 INSULATOR (STOCK NO. 429216) FOR NEUTRAL IDENTIFICATION.

(G) IF A SMALLER LINE POST INSULATOR IS NOT AVAILABLE FOR NEUTRAL AS COMPARED TO THOSE ON THE PHASE POSITION, THE "PN" SIGN SHALL BE USED TO IDENTIFY THE NEUTRAL.

(H) RESISTANCE GLAZE (RG) CLAMP TOP POST INSULATORS (STOCK NO 428952) SHALL BE USED WHEN AVAILABLE ON TRIAL APPLICATIONS ON PHASE CONDUCTORS IN HEAVY CONTAMINATION AREAS AS DEFINED ON PAGE 287 AND ONLY USING FIGURE 2 CONSTRUCTION. CONDUCTOR CLAMPS ARE REQUIRED WITH "RG" INSULATORS. INSTALL A "DO NOT WASH" SIGN ABOVE THE POLE TAGS IN SIGHT OF ON-COMING TRAFFIC.

I. USE FIGURES 2 OR 3 WHERE NEUTRAL MAY BE REQUIRED IN THE FUTURE. CONSULT WITH DISTRICT ENGINEER.

(J) TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.), DO NOT LOCATE BOND WIRE STAPLES WITHIN 1" OF BOLTS.

(L) ORDER (ITEM 18) FOR HPI ONLY.

(M) FOR SPAN LENGTHS GREATER THAN 250', THE CONDUCTOR SPACING IS DETERMINED BY THE FORMULA:

$$\text{SPACING} = 3' + \left[\frac{\text{SPAN LENGTH} - 250'}{50}\right]$$

IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

N. AN INSULATOR MOUNTED DIRECTLY ON THE SIDE OF A POLE SHALL BE CONSIDERED AS IN A HORIZONTAL POSITION (SEE FIG. 4). AN INSULATOR MOUNTED DIRECTLY AT THE TOP OF THE POLE IN A VERTICAL POSITION SHALL BE CONSIDERED AS IN A VERTICAL POSITION (SEE G.O. 95 RULE 54.11 A).

**BILL OF MATERIAL:**

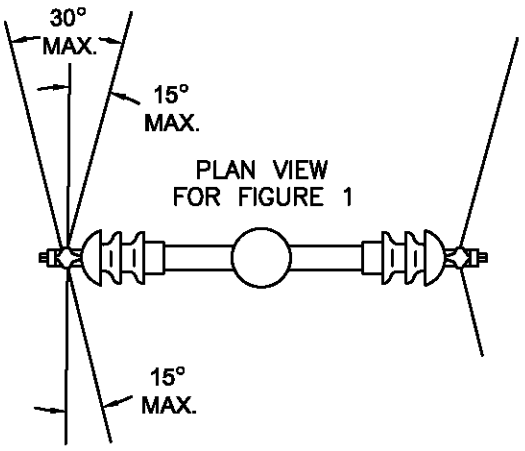
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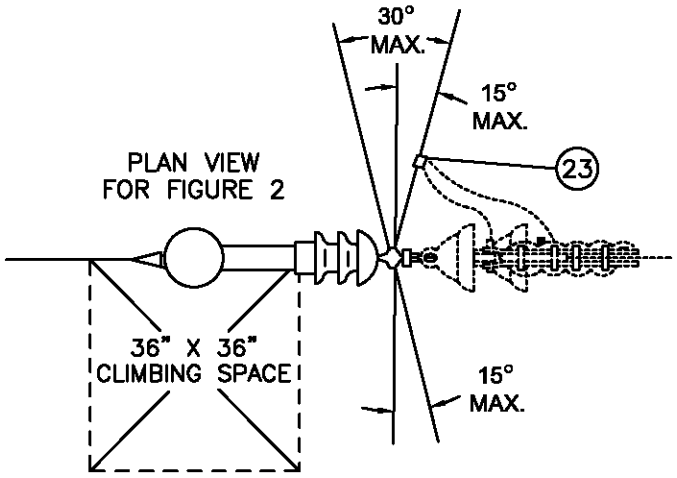
| ITEM | DESCRIPTION | QUANTITY FIG. 1 | QUANTITY FIG. 2 2 WIRE | QUANTITY FIG. 2 3 WIRE | QUANTITY FIG. 2 4 WIRE | QUANTITY FIG. 3 2 WIRE | QUANTITY FIG. 3 3 WIRE | QUANTITY FIG. 3 4 WIRE | STOCK NO. OR CONSTR STDS | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | BRACKET, POST INSULATOR (PIB) | 2 | 2 | 3 | 4 | 2 | 3 | 4 | 166848 | PIB |
| 2 | PIN, POLE TOP 24", 1" OR 1 3/8" LEAD THREAD AS REQ'D | 1 | – | – | – | – | – | – | 532480 | PTP1 |
| 3 | BOLT, MACH, 5/8" X ___" | 5 | 3 | 5 | 5 | 4 | 6 | 8 | STD 392 | – |
| 4 | WASHER, 2 1/4" SQ FLAT | 4 | 2 | 4 | 2 | 4 | 6 | 8 | STD 392 | – |
| 5 | WASHER, 5/8" DOUBLE COIL SPRING | 5 | 3 | 5 | 5 | 4 | 6 | 8 | STD 392 | – |
| 6 | WASHER, 5/8" ROUND (WHERE BONDING IS REQ'D (D)) | 4 | – | 4 | 4 | 4 | 6 | 8 | STD 392 | – |
| 7 | SIGN, HIGH VOLTAGE | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 647648 | HV |
| 8 | SIGN, PN (PRIMARY NEUTRAL) IF REQ'D | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 648000 | PN |
| 9 | WIRE, BARE SOLID ANNEALED COPPER #8 (WHERE BONDING IS REQ'D) | 3' | – | 6' | 6' | 2' | 6' | 8' | 812928 | BOND8 |
| 10 | STAPLES, GALV FENCE 1 1/4" (WHERE BONDING IS REQ'D) | 2 | – | 4 | 4 | 1 | 4 | 5 | 678528 | – |
| 11 | MOULDING, 1" HARDWOOD | – | – | – | – | – | 2.5 | 2.5 | 487200 | MLDG |
| 12 | STAPLES, MOULDING GALV 3" X 1 1/16" X 1/4" | – | – | – | – | – | 2 | 2 | 678560 | – |
| 13 | NAILS, 1 3/4" GALV | AS REQ'D | | | | | | | 492192 | – |
| 14 | INSULATOR, PIN TYPE, CLASS AS REQ'D | 1 | – | – | – | – | – | – | 700 SECTION | – |
| 15 | INSULATOR, POST a TIE TOP (TPI) | 2 | 2 | 3 | 4 | 2 | 3 | 4 | 700 SECTION | – |
| | INSULATOR, POST b HORIZONTAL CLAMP TOP (HPI) | | | | | | | | | |
| | INSULATOR, POST c HORIZONTAL CLAMP TOP RG (HPI) (H) | – | | | | – | – | – | | |
| 16 | TIE a FORMED OR WIRE | 3 | 2 | 3 | 4 | 2 | 3 | 4 | 700 SECTION | – |
| | TIE b CLAMP, HORIZONTAL POST INSULATOR | | | | | | | | | |
| 17 | GUARD, LINE, ALUMINUM, IF REQ'D | 3 | 2 | 3 | 4 | 2 | 3 | 4 | PG 759 | – |
| 18 | STUD, LINE POST, 5/8" X 1 3/4" (L) | 2 | 2 | 3 | 4 | 2 | 3 | 4 | 701728 | STUD-S |
| 19 | GUY | AS REQ'D | | | | | | | 900 SECTION | |
| 20 | SIGN, "DO NOT WASH" (H) | IF REQ'D | | | | | | | 648024 | NOWASH |
| 21 | NUT, 5/8" GALV | AS REQ'D | | | | | | | 506880 | – |

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| DATE 1-1-98<br>APPD PSA/CMC | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 0° TO 5°, 12 AND 12.47KV | 499.103<br>SUPERSEDES<br>414.2 (1-1-98) |

**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 AND 12.47KV LINES WITH A LINE ANGLE GREATER THAN 5°, BUT NOT EXCEEDING 30°, USING ARMLESS VERTICAL CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

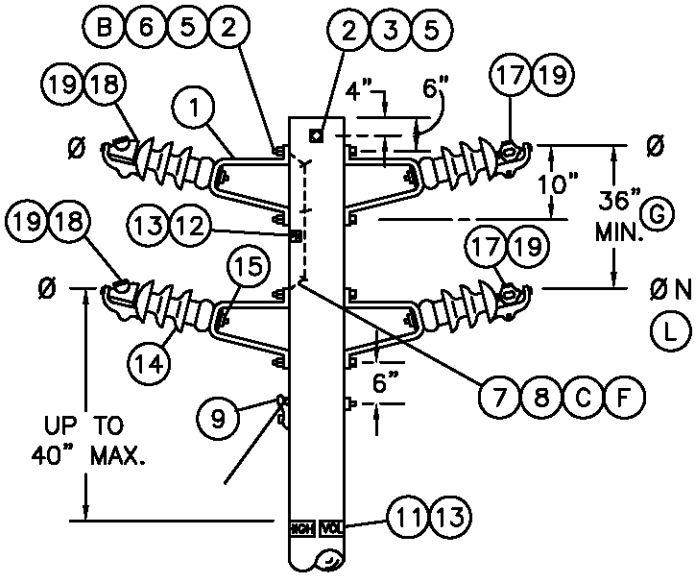



FIGURE 1 (J)

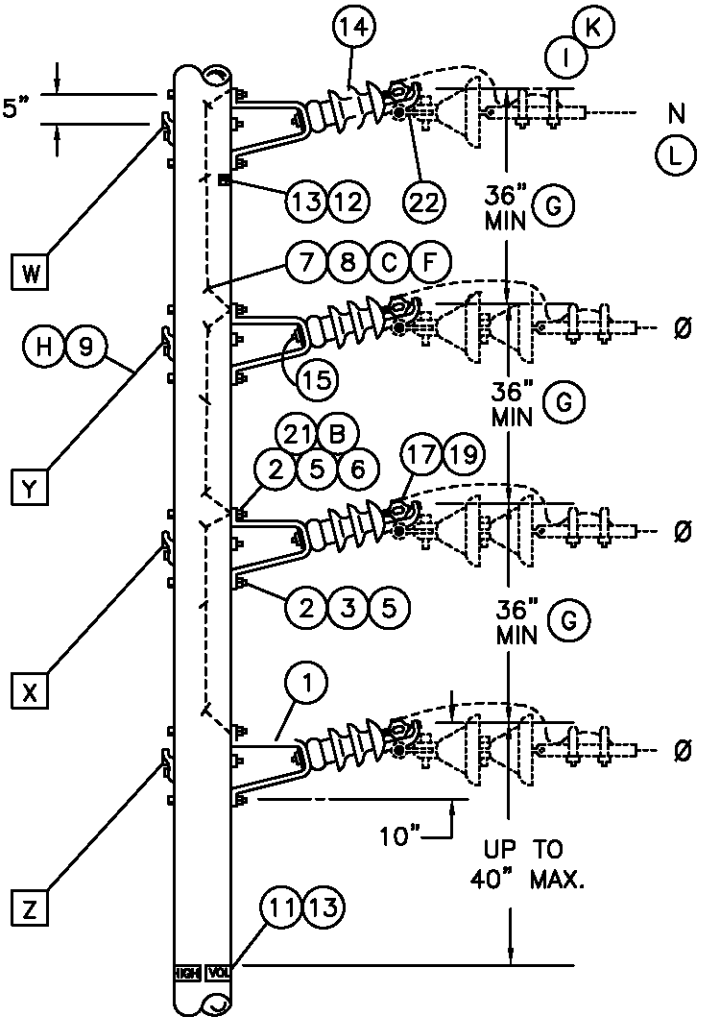



FIGURE 2

2, 3, OR 4 WIRE CIRCUIT,
ANGLES TO 30° BELOW POLE TOP
WORK ORDER DESIGNATION PIB & HPI

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| 499.104 SUPERSEDES 415.1 (9–13–05) | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 5° TO 30°, 12 AND 12.47KV | DATE 9–13–05<br>APPD PBA / JJ |
|---|---|---|

**INSTALLATION:**

A. CLIMBING SPACE MUST BE MAINTAINED PER STANDARD 252.

(B) INSTALL DOUBLE COIL SPRING WASHER SO IT CONTACTS BRACKET.

(C) BONDING OF THE BRACKETS IS ONLY REQUIRED WITHIN HEAVY CONTAMINATION AREA, DISTRICT 1, AS SHOWN ON STANDARD 287. USE BONDING PROVISIONS ON BRACKETS, IF THEY ARE FURNISHED.

(D) RESISTANCE GLAZE (RG) CLAMP TOP POST INSULATORS SHALL BE USED ONLY ON FIGURE 1 CONSTRUCTION WHEN AVAILABLE ON TRIAL APPLICATION ON PHASE CONDUCTORS IN HEAVY CONTAMINATION AREA. INSTALL A "DO NOT WASH" SIGN ABOVE THE POLE TAGS IN SIGHT OF ON-COMING TRAFFIC.

(F) TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.) DO NOT LOCATE BOND WIRE STAPLES WITHIN 1" OF BOLTS.

(G) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA:

$$\text{SPACING} = 3' + \left[\frac{\text{SPAN LENGTH} - 250'}{50}\right]$$

IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

(H) ADD THE GUYS IN ORDER INDICATED (W,X,Y,Z) AS REQUIRED IN THE GUYING SECTION.

(I) WHERE REQUIRED TO ADD A TAP TO THIS CONSTRUCTION, ATTACH DEADEND ASSEMBLY ON PAGE 422.1 AND 422.2 TO HPIs WITH DEADEND CLEVIS. IF PAGE 756 REQUIRES THIS ASSEMBLY TO BE BONDED, CONTACT DISTRIBUTION STANDARDS.

(J) WHERE REQUIRED TO ADD A TAP TO THIS CONSTRUCTION, USE FIG. 2.

(K) PER G.O.-95 RULE 54.4-C4 (b), ONLY TWO CONDUCTORS ARE ALLOWED TO BE DEAD ENDED FOR 4 KV OPERATION.

**REFERENCE:**

(L) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

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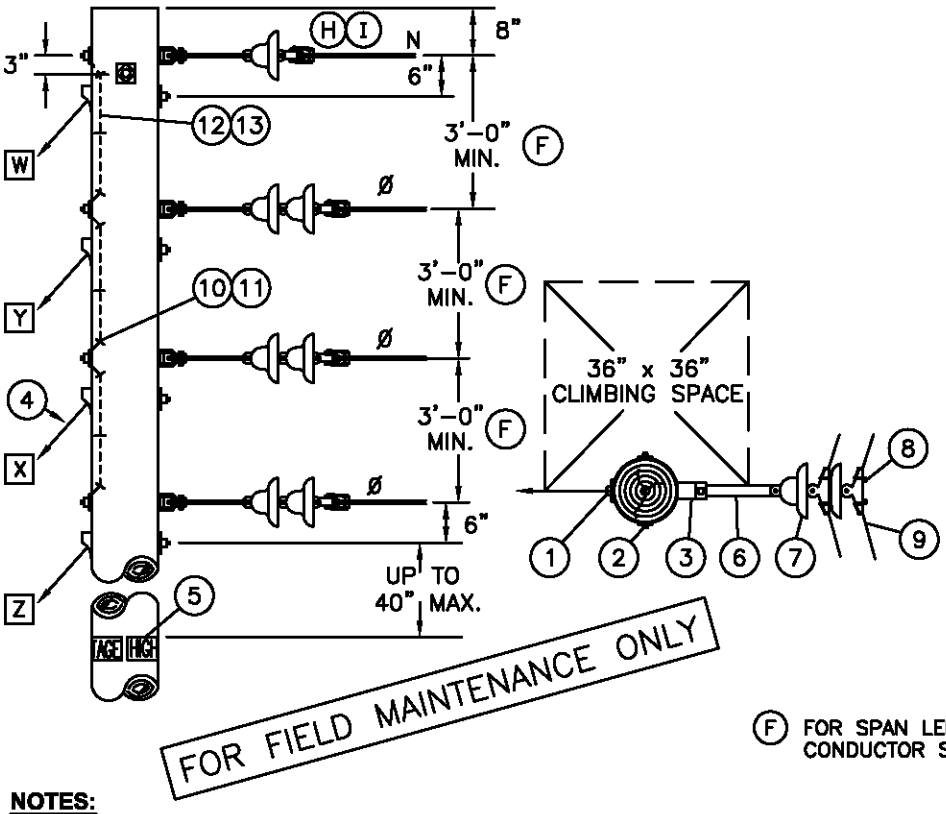
**BILL OF MATERIAL:**

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| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY FIGURE 1 2 WIRE | FIGURE 1 3 WIRE | FIGURE 1 4 WIRE | FIGURE 2 2 WIRE | FIGURE 2 3 WIRE | FIGURE 2 4 WIRE | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | BRACKET, POST INSULATOR (PIB) | 2 | 3 | 4 | 2 | 3 | 4 | 166848 |
| 2 | | BOLT, MACH, 5/8" X ___" | 2 | 4 | 4 | 4 | 6 | 8 | STD.139 |
| 3 | | WASHER, 2 1/4" FLAT SQ WASH. | – | 2 | – | 2 | 2 | 4 | 799040 |
| 4 | | WASHER, 3" CURVED SQ WASH. | – | – | – | 2 | 4 | 4 | 797792 |
| 5 | | WASHER, 5/8" DBL COIL SPRING | 2 | 4 | 4 | 4 | 6 | 8 | 798560 |
| 6 | | WASHER, 5/8" ROUND | – | 4 | 4 | 4 | 6 | 8 | 800320 |
| 7 | | WIRE, #8 SOLID BARE ANNEALED COPPER | – | 5' | 5' | 2' | 8' | 8' | 812928 |
| 8 | | STAPLES, 1 1/4" FENCE | – | 3 | 3 | 1 | 4 | 5 | 678528 |
| 9 | | GUY | AS REQ'D | | | | | | 900 SECTION |
| 10 | | | | | | | | | |
| 11 | | SIGN, HIGH VOLTAGE | 2 | 2 | 2 | 2 | 2 | 2 | 647648 |
| 12 | | SIGN, PRIMARY NEUTRAL, (PN) | 2 IF REQ'D | 2 IF REQ'D | 2 | 2 IF REQ'D | 2 IF REQ'D | 2 | 648000 |
| 13 | | NAILS, 1 3/4" | 24 | 24 | 24 | 24 | 24 | 24 | 492192 |
| | 14 | INSULATOR CLAMP TOP POST a HORIZONTAL | | | | 2 | 3 | 4 | 700 SECTION |
| | | INSULATOR CLAMP TOP POST b HORIZONTAL RG (D) | 2 | 3 | 4 | – | – | – | |
| | 15 | STUD, LINE POST, 5/8" X 1 3/4" | 2 | 3 | 4 | 2 | 3 | 4 | 701728 |
| | 16 | | | | | | | | |
| | 17 | CLAMP, POST INSULATOR, STANDARD | 1 | 2 | 2 | 1 | 2 | 2 | STD. 773 |
| | 18 | CLAMP, POST INSULATOR, ANGLE | 1 | 1 | 2 | 1 | 1 | 2 | STD. 773 |
| | 19 | GUARD, LINE, ALUMINUM, IF REQ'D | 2 | 3 | 4 | 2 | 3 | 4 | STD. 759 |
| 20 | | SIGN "DO NOT WASH" & 8 NAILS (IF REQ'D)(D) | 1 | 1 | 1 | 1 | 1 | 1 | 648024/492192 |
| 21 | | NUT, 5/8" GALV | AS REQ'D | | | | | | 506880 |
| | 22 | CLEVIS, DEADEND (I) | 2 | 3 | 4 | 2 | 3 | 4 | 235776 |
| | 23 | CONNECTOR, WIRE | – | – | – | 4 | 6 | 8 | STD. 783-787 |

| | | |
|---|---|---|
| DATE 9-20-05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION, ANGLES 5° TO 30°, 12 AND 12.47KV | 499.105<br>SUPERSEDES<br>415.2 (9-20-05) |

**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 & 12.47 KV LINES WITH A LINE ANGLE GREATER THAN 30°, BUT NOT EXCEEDING 60°, USING ARMLESS VERTICAL CONSTRUCTION.




| 12KV VERTICAL CONSTRUCTION ASSEMBLY – MACRO UNITS | | | |
|---|---|---|---|
| | QUANTITY | | |
| TYPE | 12KV DE | NDE | MU ID |
| 1/2 Y | 1 | 1 | HY1N |
| 1/2 Y | 2 | – | HY2 |
| 1/2 Y | 2 | 1 | HY2N |
| 1/2 Y | 3 | – | HY3 |
| 1/2 Y | 3 | 1 | HY3N |
| Y | 2 | 2 | Y1N |
| Y | 4 | – | Y2 |
| Y | 4 | 2 | Y2N |
| Y | 6 | – | Y3 |
| Y | 6 | 2 | Y3N |
| Z | 1 | 1 | Z1N |
| Z | 2 | – | Z2 |
| Z | 2 | 1 | Z2N |
| Z | 3 | – | Z3 |
| Z | 3 | 1 | Z3N |

**NOTES:**

A. MINIMUM VERTICAL PHASE TO PHASE SPACING OF TWO FEET MAY BE USED TO ELIMINATE POLE CHANGEOUTS ON FULL TENSION SPANS 100 FEET AND SHORTER.

B. INSTALL GUYS IN ORDER INDICATED ABOVE (W,X,Y,Z) AS REQUIRED BY THE "GUYING SECTION".

C. USE BONDING INSULATORS OR INSTALL NON STATIC CLIPS (237648) ON UNBONDED SUSPENSION INSULATORS WHEN THE RESULTANT MAXIMUM GUYING TENSION PER PHASE AT THESE ANGLES IS LESS THAN 1500 POUNDS.

D. TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.), DO NOT LOCATE STAPLES WITHIN 1" OF BOLTS.

(F) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA: SPACING=3'+ $\left[\frac{\text{SPAN LENGTH}-250'}{50}\right]$

IF SPAN IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

G. THE WORK ORDER DESIGNATION FOR THIS CONSTRUCTION IS "Z–CORNER".

(H) PER G.O. 95 RULE 54.4 – C4 (b), ONLY TWO CONDUCTORS ARE ALLOWED TO BE DEAD ENDED FOR 4 KV OPERATION.

(I) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

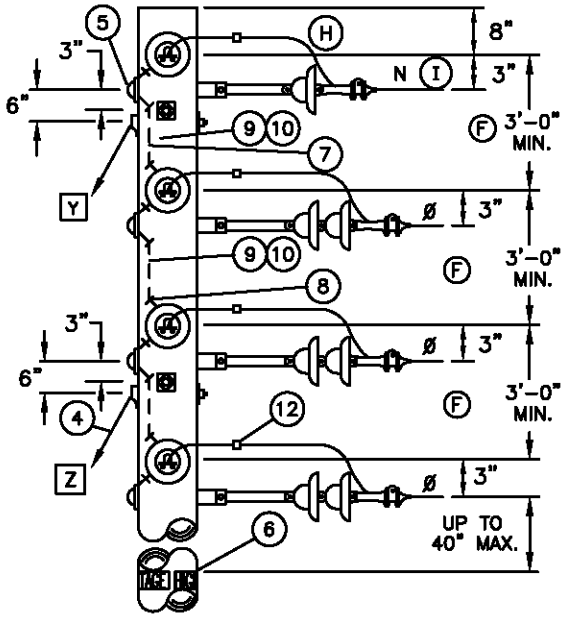
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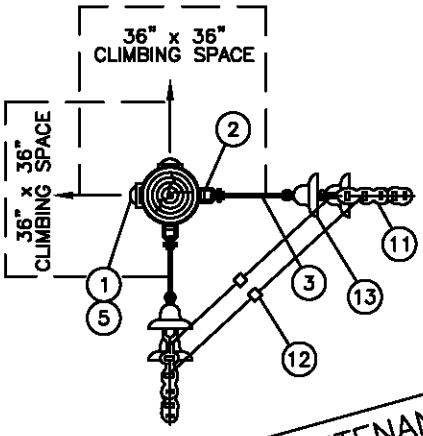
| ITEM | DESCRIPTION | QUANTITY | | | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| | | 1Ø | 3Ø | 3Ø & N | |
| 1 | BOLT, MACH, GALV 5/8" X ___", 1–3" SQ CURV WASH., 1 DBL COIL WASHER, 2–5/8" RD WASH. & 1 NUT | 2 | 3 | 4 | STD.392 |
| 2 | BOLT, MACH, GALV 5/8" X ___", 2–2 1/4" SQ WASH., 1 DBL COIL WASH., 2–5/8" RD WASH. | 1 | 1 | 1 | STD.392 |
| 3 | CLEVIS, DEADEND 5/8" BOLT STEEL (OPEN TYPE) | 2 | 3 | 4 | 235618 |
| 4 | GUY | AS REQ'D | | | 900 SECTION |
| 5 | SIGN, HIGH VOLTAGE & 9 NAILS | 2 | 2 | 2 | 647648, 492192 |
| 6 | LINK, EXTENSION, 12KV, 1/2" X 2" X 12" | 2 | 3 | 4 | 466240 |
| 7 | INSULATOR, SUSPENSION | 4 | 6 | 7 | PG 750 |
| 8 | CLAMP, SUSPENSION | 2 | 3 | 4 | STD. 776 |
| 9 | GUARD, LINE, ALUMINUM | 2 | 3 | 4 | STD. 759 |
| 10 | WIRE, BOND, BARE SOLID ANNEALED, COPPER, #8 | 4' | 6' | 8' | 812928 |
| 11 | STAPLE, FENCE | 3 | 6 | 9 | 678528 |
| 12 | MOULDING, HARDWOOD, 1" (OTHER THAN TOP CIRCUIT ON POLE) | 3'–6" | 5'–6" | 7'–6" | 487200 |
| 13 | STAPLES, MOULDING, GALV, 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) | 2 | 4 | 6 | 678560 |

| 499.201<br>SUPERSEDES<br>420 (9–12–05) | SDG&E ELECTRIC STANDARDS<br>VERTICAL CONSTRUCTION 30° TO 60° ANGLES, 12 AND 12.47KV | DATE 9–12–05<br>APPD PSA / JJ |
|---|---|---|

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**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 & 12.47 KV LINES WITH A LINE ANGLE GREATER THAN 60°, BUT NOT EXCEEDING 90°, USING ARMLESS VERTICAL CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. MINIMUM VERTICAL PHASE TO PHASE SPACING OF TWO FEET MAY BE USED TO ELIMINATE POLE CHANGEOUTS ON FULL TENSION SPANS 100 FEET AND SHORTER.

B. INSTALL GUYS IN ORDER INDICATED ABOVE (Y,Z) AS REQUIRED BY THE "GUYING SECTION" AND IN COMPLIANCE WITH G.O. 95 RULE 54.7A4.

C. USE BONDED INSULATORS WHEN THE MAXIMUM GUYING TENSION IS LESS THAN 1000 POUNDS PER CONDUCTOR.

D. TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.), DO NOT LOCATE STAPLES WITHIN 1" OF BOLT.

(F) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA: SPACING=3'+ $\frac{\text{SPAN LENGTH}-250'}{50}$ IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

G. THE WORK ORDER DESIGNATION FOR THIS CONSTRUCTION IS "Y-CORNER".

(H) PER G.O. 95 RULE 54.4-C4 (b), ONLY TWO CONDUCTORS ARE ALLOWED TO BE DEAD ENDED FOR 4 KV OPERATION.

**REFERENCE:**

(I) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

**BILL OF MATERIAL:**

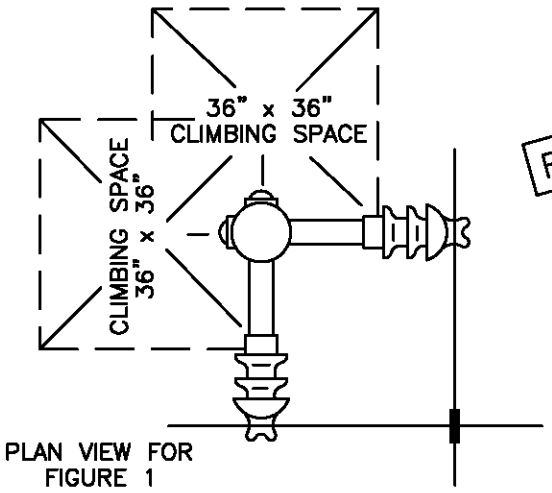
| ITEM | DESCRIPTION | QUANTITY | | | STOCK NUMBER OR CONSTR. STD. |
|---|---|---|---|---|---|
| | | 1Ø | 3Ø | 3Ø & N | |
| 1 | BOLT, MACH, GALV 5/8" X ___", 1-3" SQ CURV WASH., 1 DBL COIL WASHER, 2-5/8"RD WASH. & 1 NUT | 4 | 6 | 8 | STD 392 |
| 2 | CLEVIS, DEADEND 5/8" BOLT STEEL (OPEN TYPE) | 4 | 6 | 8 | 235618 |
| 3 | LINK, EXTENSION, 12KV, 1/2" X 2" X 12" | 4 | 6 | 8 | 466240 |
| 4 | GUY | AS REQ'D | | | 900 SECTION |
| 5 | COVER, BOLT, PLASTIC, & 6-10 D NAILS | 4 | 6 | 8 | 285696, 492192 |
| 6 | SIGN, HIGH VOLTAGE & 9-10 D NAILS | 2 | 2 | 2 | 647648, 492192 |
| 7 | WIRE, BOND, BARE SOLID ANNEALED, COPPER, #8 | 4' | 7' | 8' | 812928 |
| 8 | STAPLES, FENCE, GALV, 1 1/4" | 4 | 7 | 10 | 678528 |
| 9 | MOULDING, HARDWOOD, 1" (OTHER THAN TOP CIRCUIT ON POLE) | 2'-6" | 4'-6" | 6'-6" | 487200 |
| 10 | STAPLES, MOULDING, GALV, 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) | 2 | 4 | 6 | 678560 |
| 11 | CLAMP, DEADEND | 4 | 6 | 8 | STDS 741, 743 |
| 12 | CONNECTOR | 2 | 3 | 4 | 700 SECTION |
| 13 | INSULATOR, SUSPENSION | 8 | 12 | 14 | PG. 750.4 |

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 9-20-05<br>APPD PBA / JJ | VERTICAL CONSTRUCTION 60° TO 90° ANGLES, 12 AND 12.47KV | 499.202<br>SUPERSEDES<br>421 (9-20-05) |

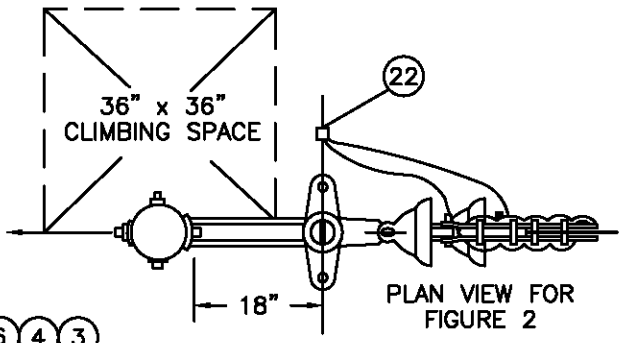
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**SCOPE:** THIS STANDARD SHOWS DISTRIBUTION CONSTRUCTION OF 12 & 12.47KV LINES OF THE "4 WAY AND 'T' CORNERS" USING ARMLESS VERTICAL CONSTRUCTION.

FOR FIELD MAINTENANCE ONLY




PLAN VIEW FOR FIGURE 1




PLAN VIEW FOR FIGURE 2

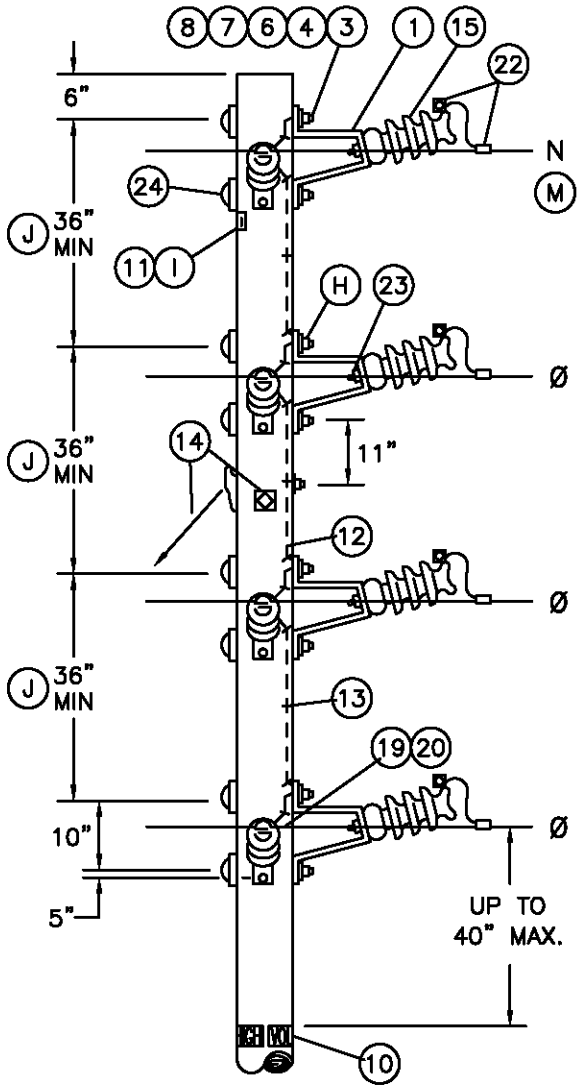



FIGURE 1
4 WAY CORNER

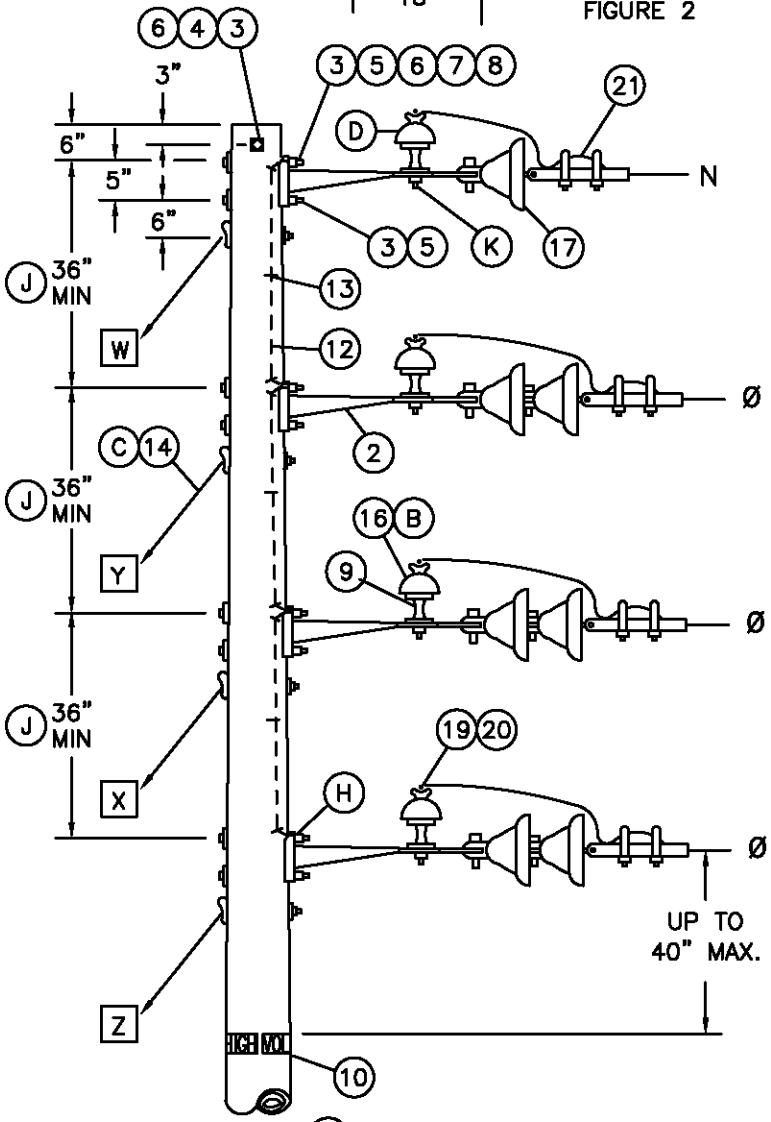



FIGURE 2 (L)
THROUGH CIRCUIT WITH SIDE TAP
"T" CORNER

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| 499.203<br>SUPERSEDES<br>422.1 (9-13-05) | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR AND BRACKET CONSTRUCTION,<br>"4 WAY AND 'T' CORNERS", 12 AND 12.47KV | DATE 9-13-05<br>APPD PA / JJ |

**INSTALLATION:**

A. TO PREVENT RADIO INFLUENCE VOLTAGE (R.I.V.) DO NOT LOCATE BOND WIRE STAPLES WITHIN 1" OF BOLTS.

(B) USE CLAMP TOP LINE POST INSULATORS AND CLAMPS FOR 1033 KCMIL ACSR.

(C) ADD THE GUYS IN ORDER INDICATED (W,X,Y,Z) AS REQUIRED IN THE GUYING SECTION.

(D) SUBSTITUTE A CLASS 55-3 INSULATOR (STOCK NO. 429216) FOR NEUTRAL IDENTIFICATION.

F. BONDING IS REQUIRED WITHIN HEAVY CONTAMINATION AREA, DISTRICT 1 ON STD. 287. USE BONDING PROVISIONS ON BRACKETS, IF THEY ARE FURNISHED.

(H) INSTALL DOUBLE COIL SPRING WASHER SO IT CONTACTS BRACKET.

(I) IF A SMALLER LINE POST INSULATOR IS NOT AVAILABLE FOR NEUTRAL AS COMPARED TO THOSE IN THE PHASE POSITIONS, THE "PN" SIGN SHALL BE USED TO IDENTIFY THE NEUTRAL.

(J) FOR SPAN LENGTHS GREATER THAN 250', DETERMINE CONDUCTOR SPACING BY THE FORMULA:

$$\text{SPACING} = 3' + \left[\frac{\text{SPAN LENGTH} - 250'}{50}\right]$$

IF SPAN LENGTH IS GREATER THAN 325', PLEASE CONTACT DISTRIBUTION STANDARDS.

FOR FIELD MAINTENANCE ONLY

(K) IF BONDING IS REQUIRED, ATTACH BOND WIRE TO INSULATOR PIN WITH ADDITIONAL NUT.

L TO BE USED FOR NEW CONSTRUCTION ONLY, FOR SIDE TAPS FROM EXISTING CONSTRUCTION, USE PGS. 415.1 & 415.2.

**REFERENCE:**

(M) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE PLACED IN THE TOP OR BOTTOM PIN POSITIONS PER DESIGN MANUAL PAGE 5124.2.

| 12KV VERTICAL CONSTRUCTION ASSEMBLY – TYPE YT MACRO UNITS | | | |
|---|---|---|---|
| QUANTITY | | | MU ID |
| 12KV DE | NDE | P & I | |
| 1 | 1 | 2/55-5 | YT1N |
| 2 | – | 2/55-5 | YT2 |
| 2 | 1 | 2/55-5<br>1/55-3 | YT2N |
| 3 | – | 3/55-5 | YT3 |
| 3 | 1 | 3/55-5<br>1/55-3 | YT3N |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | FIGURE 1 | | | | FIGURE 2 | | | | STOCK NO. OR CONSTR STD | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NEUTRAL WIRE | Ø WIRES | | | NEUTRAL WIRE | Ø WIRES | | | | |
| | | | 1 | 2 | 3 | | 1 | 2 | 3 | | |
| 1 | BRACKET, POST INSULATOR (PIB) | 2 | 2 | 4 | 6 | – | – | – | – | 166848 | PIB |
| 2 | BRACKET, 4 HOLE MOUNTING | – | – | – | – | 1 | 1 | 2 | 3 | 166240 | 4H-BKT |
| 3 | BOLT, 5/8" X __", GALV MACH | 4 | 4 | 8 | 12 | 2 | 3 | 5 | 7 | STD392 | – |
| 4 | WASHER, 2 1/2" SQ FLAT | 4 | 4 | 8 | 12 | – | 2 | 2 | 2 | STD392 | – |
| 5 | WASHER, 3" SQ CURVED | – | – | – | – | 2 | 2 | 4 | 6 | STD392 | – |
| 6 | WASHER, 5/8" DBL COIL SPRING | 4 | 4 | 8 | 12 | 1 | 2 | 3 | 4 | 798560 | – |
| 7 | WASHER, 5/8" ROUND (F) | 4 | 4 | 8 | 12 | 2 | 2 | 4 | 6 | 800320 | – |
| 8 | NUT, 5/8" (F) | 2 | 2 | 4 | 6 | 2 | 2 | 4 | 6 | 506880 | – |
| 9 | PIN, SHORT SHANK INSULATOR,1" OR 1 3/8" LEAD THREADS (B) | – | – | – | – | 1 | 1 | 2 | 3 | 532426/532434 | PSS1 |
| 10 | SIGN, HIGH VOLTAGE AND 9-10D NAILS | – | 2 | 2 | 2 | – | 2 | 2 | 2 | 647648/492192 | HV |
| 11 | SIGN, PRIMARY NEUTRAL (PN) AND 4-10D NAILS (I) | 2 | – | – | – | – | – | – | – | 648000/492192 | PN |
| 12 | WIRE, BARE SOLID ANNEALED #8 COPPER, | 5' | 2' | 6' | 10' | 4' | – | 4' | 8' | 812928 | BOND8 |
| 13 | STAPLES, FENCE 1 1/4" | 4 | 1 | 5 | 9 | 3 | – | 3 | 6 | 678528 | – |
| 14 | GUY (C) | – | IF REQ'D | | | AS REQ'D | | | | 900 SECTION | – |
| 15 | INSULATOR, POST a TIE TOP / b HORIZONTAL CLAMP TOP | 2 | 2 | 4 | 6 | – | – | – | – | 700 SECTION | – |
| 16 | INSULATOR, PIN TYPE, CLASS AS REQ'D (B) | – | – | – | – | 1 | 1 | 2 | 3 | 700 SECTION | – |
| 17 | INSULATOR, SUSPENSION CLEVIS | – | – | – | – | 1 | 2 | 4 | 6 | STD750, 756 | – |
| 18 | | | | | | | | | | | |
| 19 | GUARD, ALUMINUM IF REQ'D | 2 | 2 | 4 | 6 | 1 | 1 | 2 | 3 | STD759 | – |
| 20 | TIE a FORMED OR WIRE / b CLAMP,HORIZONTAL POST INSULATOR (B) | 2 | 2 | 4 | 6 | 1 | 1 | 2 | 3 | 700 SECTION | – |
| 21 | CLAMP, DEAD END | – | – | – | – | 1 | 1 | 2 | 3 | STD 741-743 | – |
| 22 | CONNECTOR, WIRE | 2 | 2 | 4 | 6 | 1 | 1 | 2 | 3 | STD783-787 | – |
| 23 | STUD, LINE POST, 5/8" X 1 3/4" | 2 | 2 | 4 | 6 | – | – | – | – | 701728 | STUD-S |
| 24 | BOLT, COVER PLASTIC & 6-1 3/4" NAILS | 4 | 4 | 8 | 12 | – | – | – | – | 285696/42919 | BCS |

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DATE 9-20-05
APPD PA / JJ

SDG&E ELECTRIC STANDARDS

# POST INSULATOR AND BRACKET CONSTRUCTION, "4 WAY AND 'T' CORNERS", 12 AND 12.47KV

499.204
SUPERSEDES
422.2 (9-20-05)

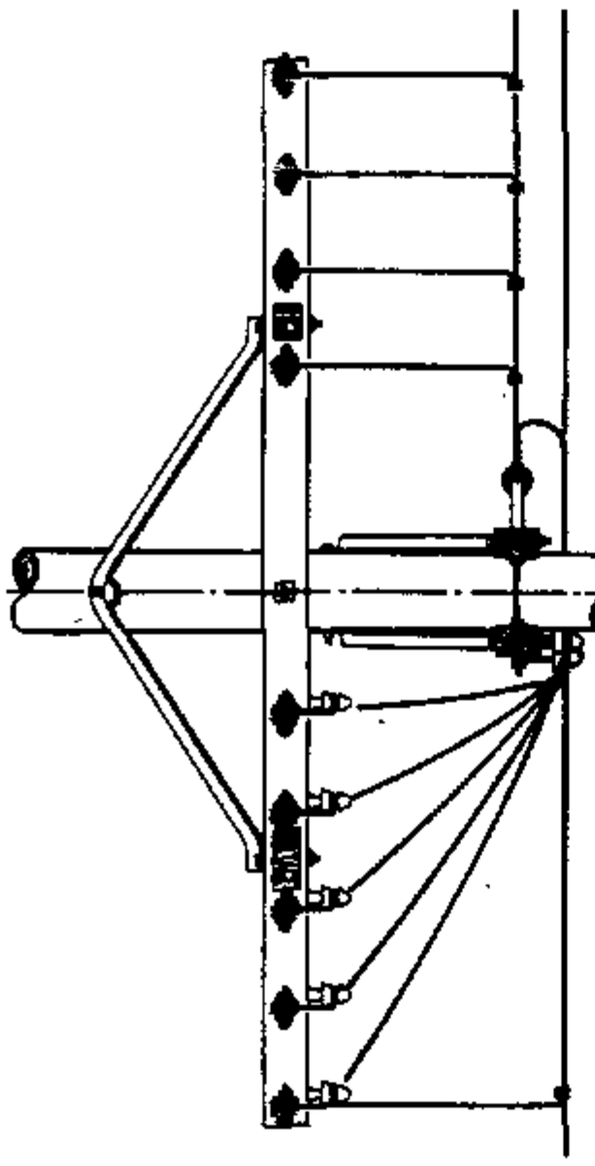
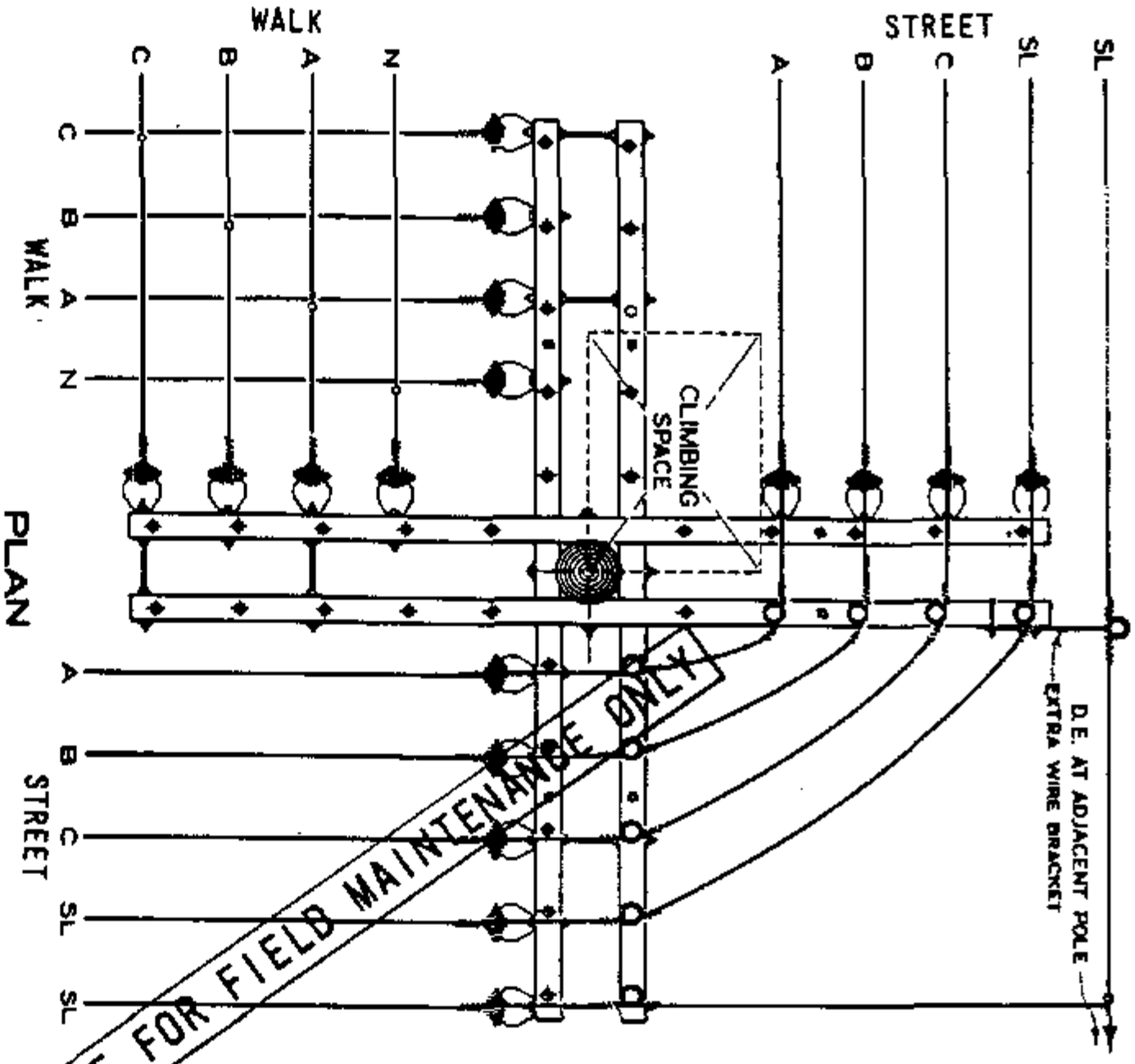


FIGURE 1




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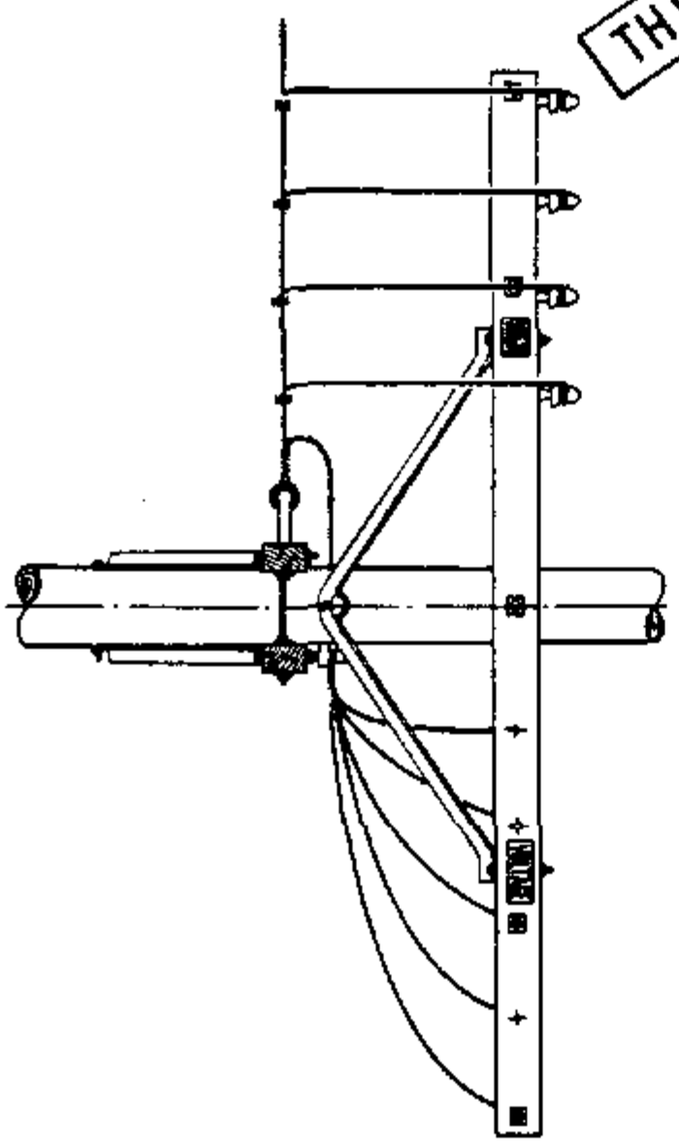


FIGURE 2

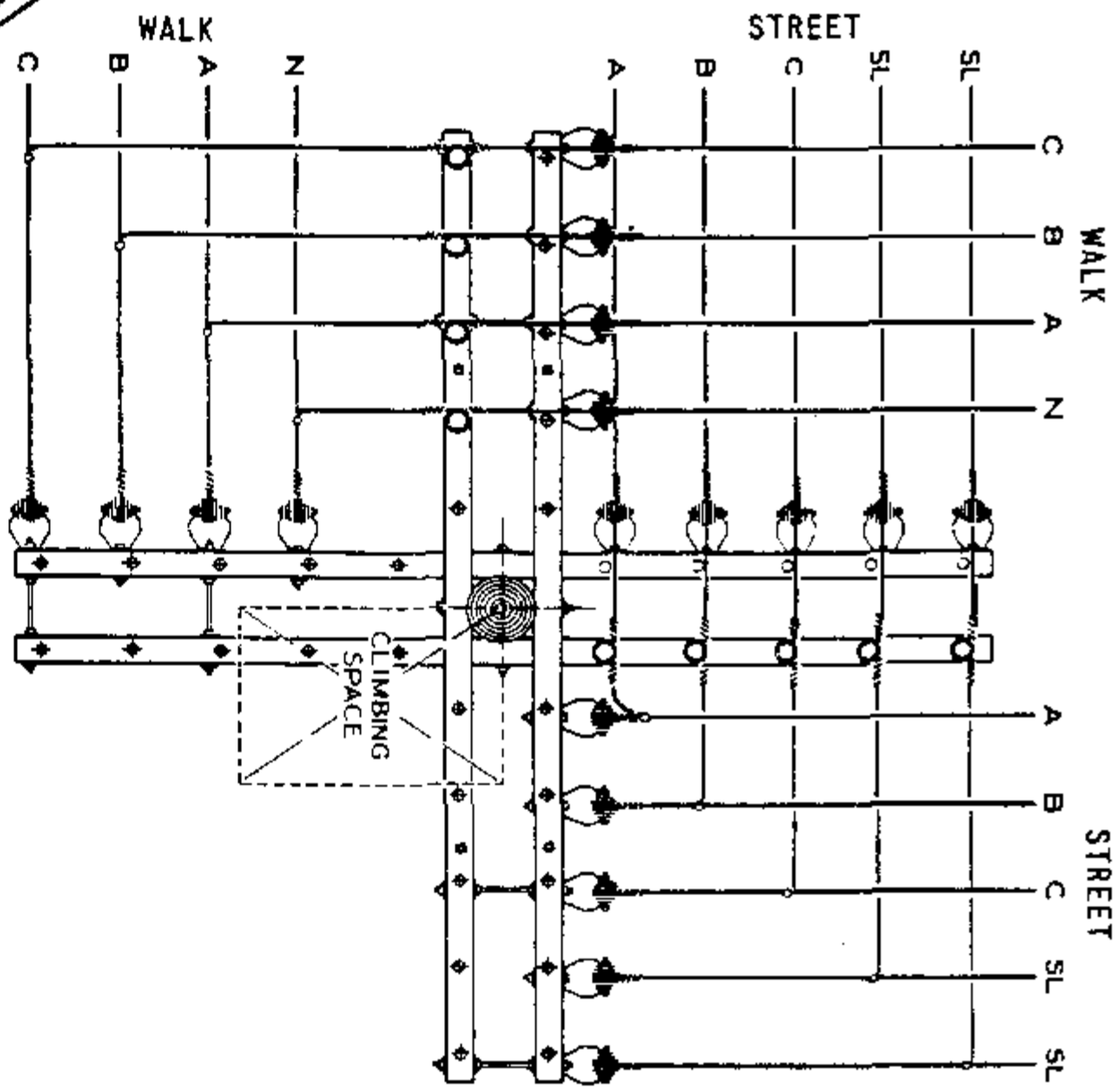



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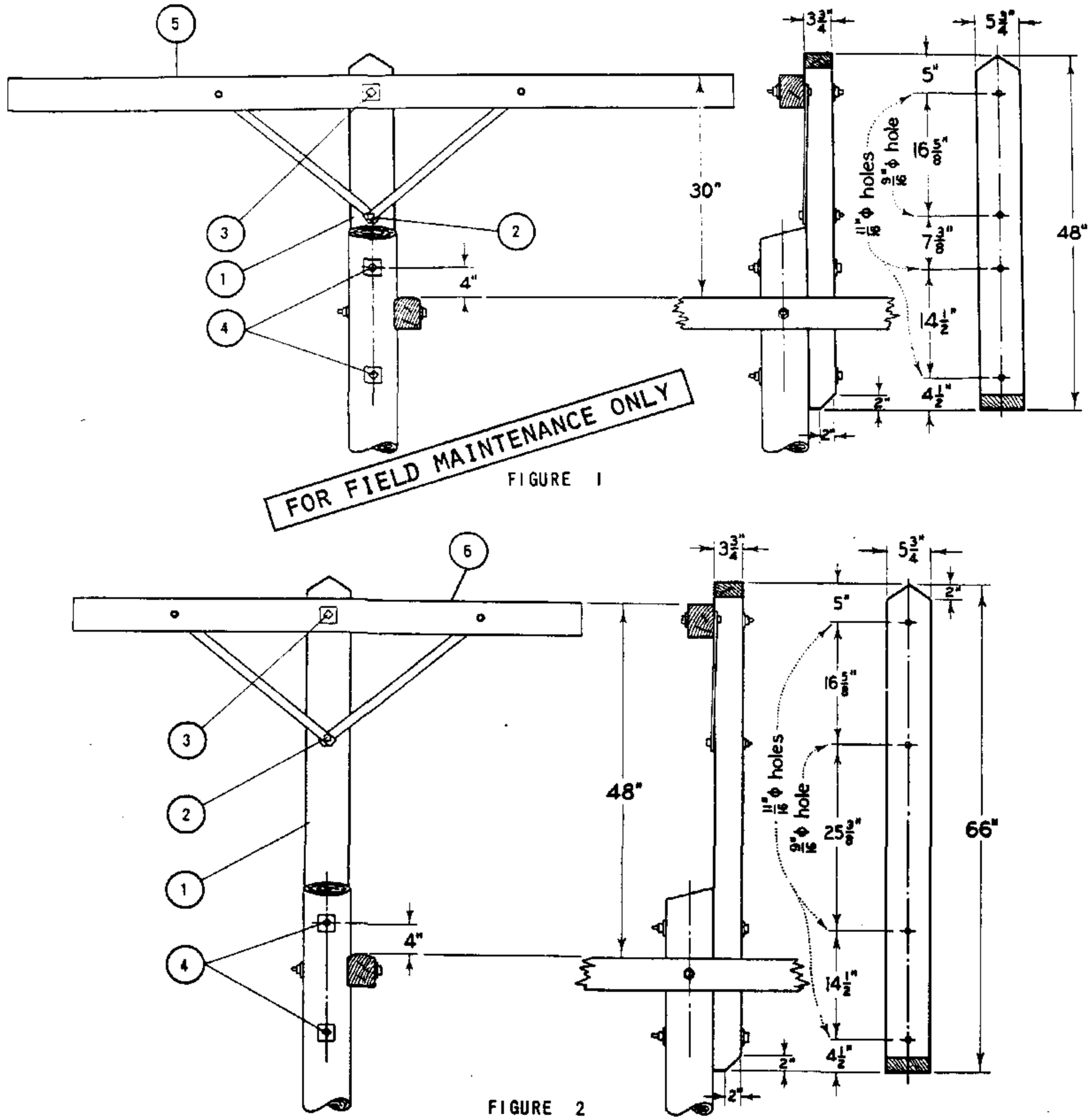



FIGURE 1




FIGURE 2

INSTALLATION :

A. DO NOT FLATTEN SURFACE OF POLE TO RECEIVE EXTENSION. HOWEVER, SHARP HUMPS OR KNOTS SHOULD BE REMOVED.

(E) EXEMPT MATERIAL.

BILL OF MATERIAL :

| ITEM | | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| P T F | 1 | EXTENSION, 3 3/4" X 5 3/4" DOUGLAS FIR POLE TOP, 48" OR 66" LONG | | 1 | 336288, 336352 |
| | 2 | BOLT, MACHINE 1/2" X 5" GALV, 1 RD WASHER | (E) | 1 | STD 139, 140 |
| | 3 | BOLT, MACHINE 5/8" X 10" GALV, 2 SQ WASHERS | (E) | 1 | STD 139, 140 |
| | 4 | BOLT, MACHINE 5/8" X 16" GALV, 2 SQ WASHERS | (E) | 2 | STD 139, 140 |
| | 5 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | | 1 | SECTION 300 |
| | 6 | CROSSARM, 3 1/2" X 4 1/2" X 5' - 7" | | 1 | SECTION 300 |

| 499.701<br>SUPERSEDES<br>476 (9-17-82) | SDG&E ELECTRIC STANDARDS<br>**POLE TOP EXTENSIONS FOR SERVICE CLEARANCE ARMS** | DATE 9-17-82<br>APPD |
|---|---|---|

# 500 TRANSMISSION

# 500 TRANSMISSION

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| 599.006-.007 | TRANSMISSION SUSPENSION INSULATORS |
| 599.101-.103 | TRANSMISSION HORIZONTAL POST INSULATORS |
| 599.104 | TRANSMISSION POST INSULATOR STUDS |
| 599.105 | TRANSMISSION STEEL TOWER GROUNDING |
| 599.106 | TRANSMISSION HARDWARE |
| 599.201-.305 | TRANSMISSION CONSTRUCTION |
| 599.306-.310 | OVERHEAD SCADA SWITCH, 12KV, HORIZONTAL LOADBREAK TYPE, SINGLE CIRCUIT, MOTOR OPERATED |
| 599.501 | TRANSMISSION LINE INSULATION TABLE |
| 599.901 | TRANSMISSION HARDWARE CROSSARM TIE-PLATE |
| 599.902 | TRANSMISSION HARDWARE "J" BOLT, HEXAGONAL C.I. FILLER |
| 599.903-.905 | SCADA LOAD MONITOR |


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| REV | CHANGE | BY | DSGN | APPV | DATE | REV | CHANGE | BY | DSGN | APPV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | COMPLETELY REVISED | JK | JS | CZH | 10/15/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JK | JS | CZH | 6/13/2019 | D | | | | | |

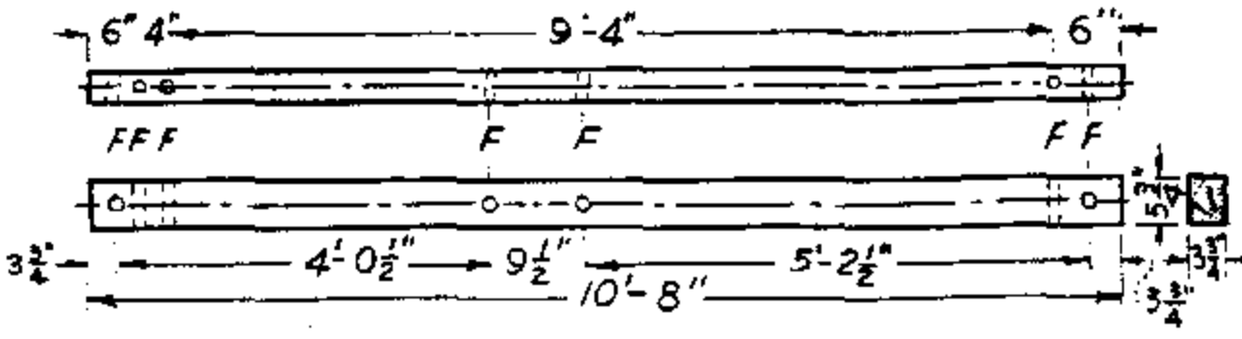
Indicates Latest Revision | X | Completely Revised | | New Page | | Information Removed

SHEET 1 OF 1
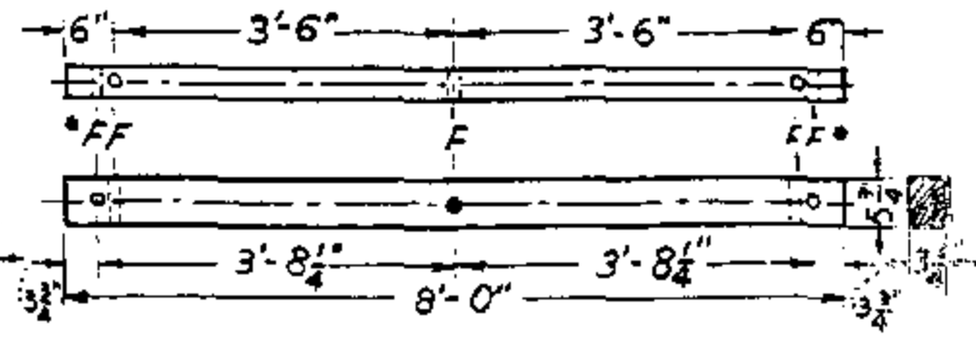
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LEGACY OVERHEAD FIELD MAINTENANCE
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TRANSMISSION

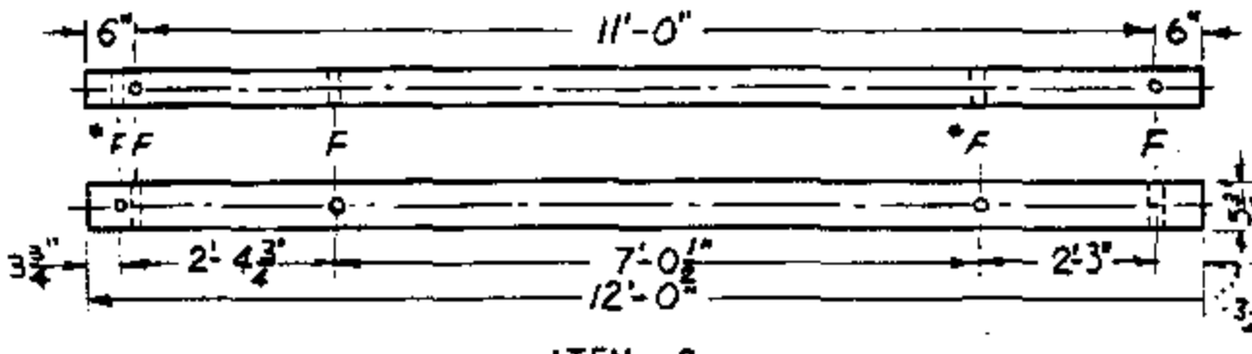
OH LEGACY
OHL501.1



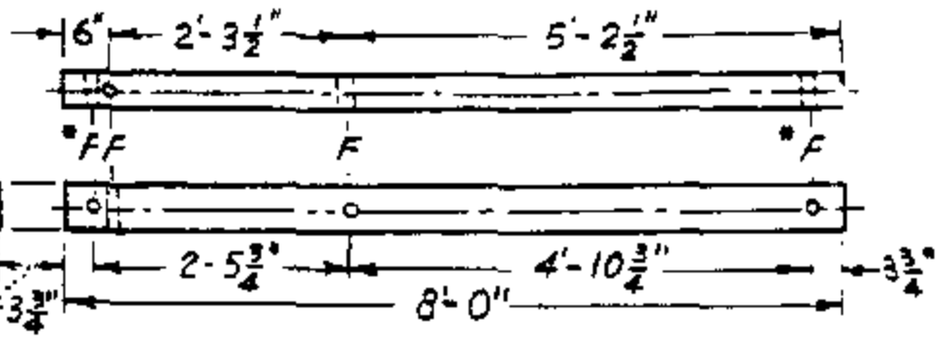

ITEM 1



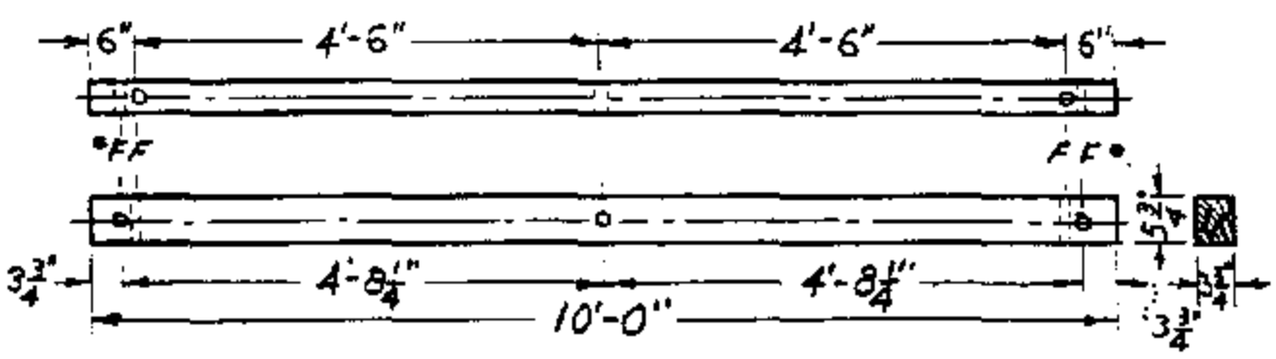

ITEM 2




ITEM 3




ITEM 2A



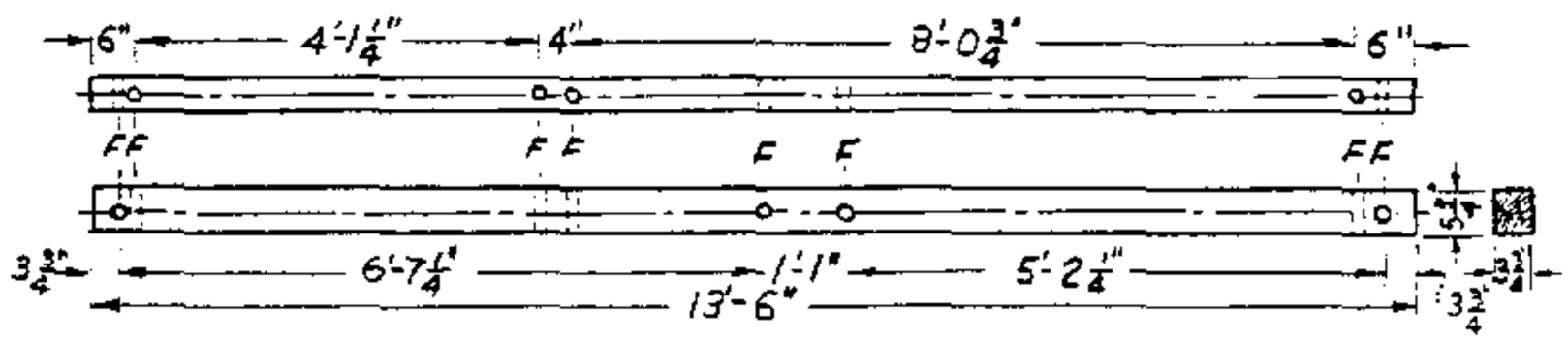

ITEM 4

FOR FIELD MAINTENANCE ONLY

REFERENCE

F - 11/16 DIA. HOLES

* TO BE DRILLED IN THE FIELD.




ITEM 5

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | CELLON | 294352 | 5 | CREOSOTE | 294528 |
| | CREOSOTE | 294496 | | | |
| 2 | FIELD MAINTENANCE ONLY | - | | | |
| 2A | FIELD MAINTENANCE ONLY | - | | | |
| 3 | FIELD MAINTENANCE ONLY | - | | | |
| 4 | FIELD MAINTENANCE ONLY | - | | | |
| 5 | | | | | |
| | CELLON | 294368 | | | |

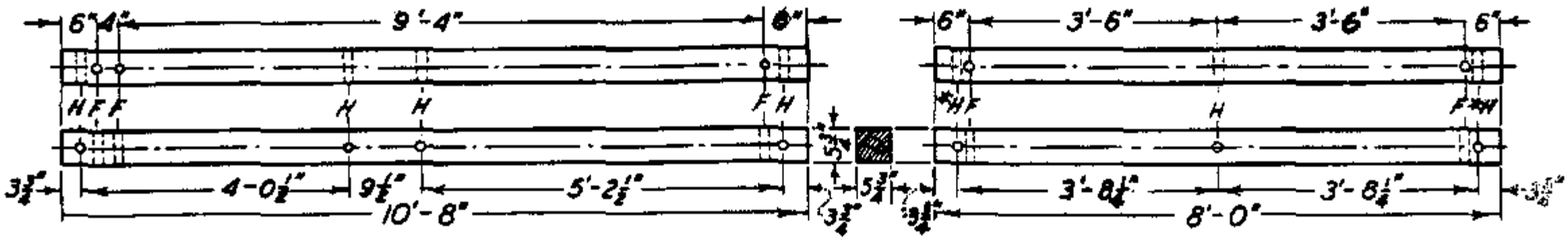
DATE 1-1-86
APPD AK/[illegible]

SDG&E ELECTRIC STANDARDS

TRANSMISSION CROSSARMS - 69KV

599.001
SUPERCEDES
380.6 (1986)

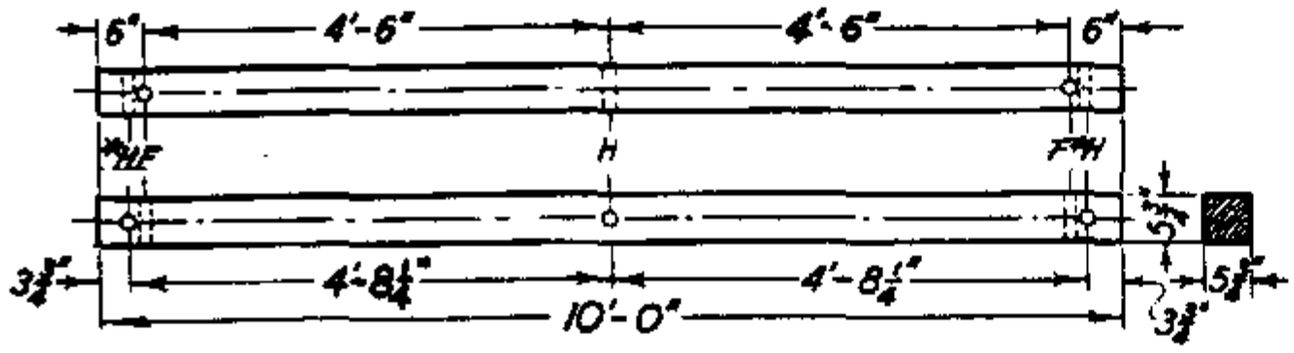
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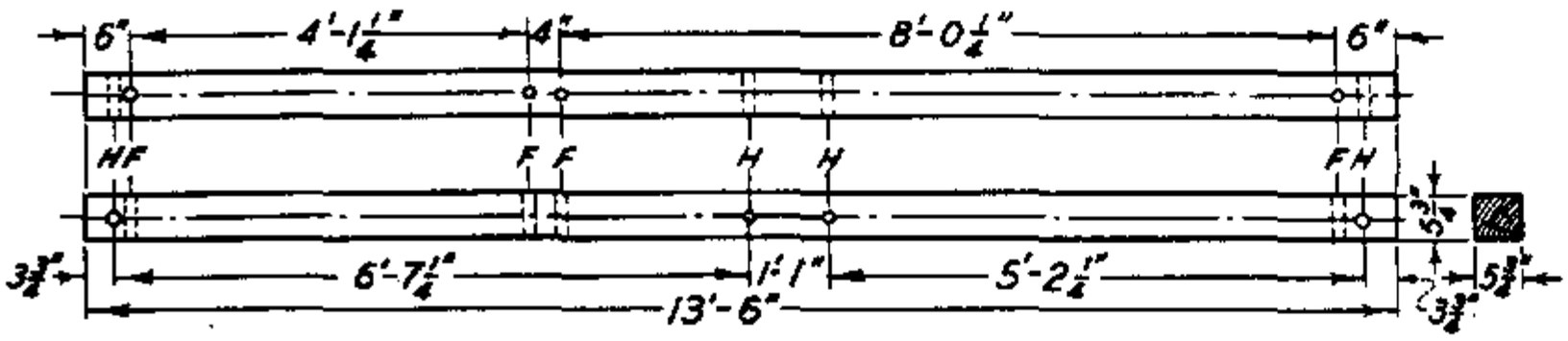

ITEM NO. 1




ITEM NO. 2




ITEM NO. 3




ITEM NO. 4

REFERENCE

F – 11/16" DIAM. HOLES
H – 13/16" " "

*TO BE DRILLED IN THE FIELD.

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | FIELD MAINTENANCE ONLY | — | | | |
| 2 | CREOSOTE, FIELD MAINTENANCE ONLY | 294816 | | | |
| 3 | FIELD MAINTENANCE ONLY | — | | | |
| 4 | CREOSOTE, FIELD MAINTENANCE ONLY | 294800 | | | |
| | | | | | |
| | | | | | |

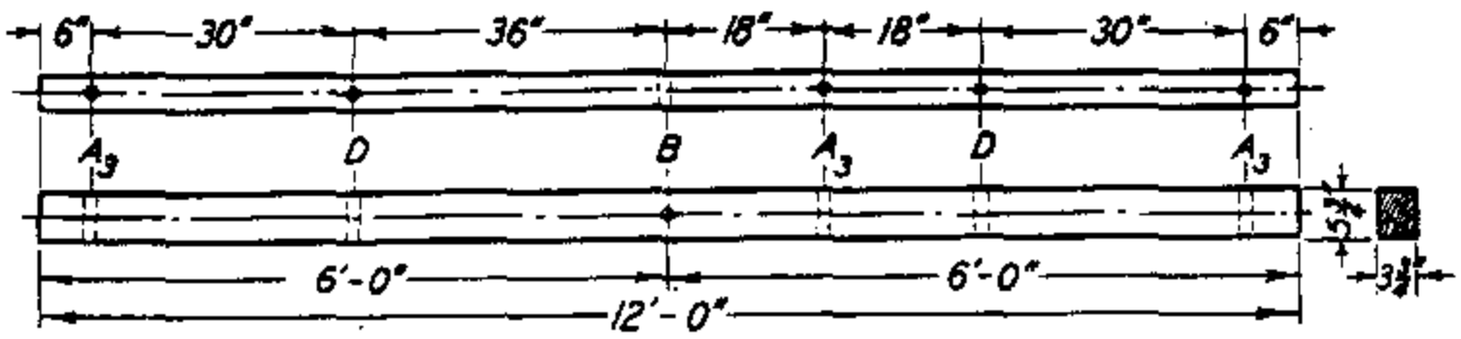
DATE 1-1-86
APPD AK / RDX

SDG&E ELECTRIC STANDARDS

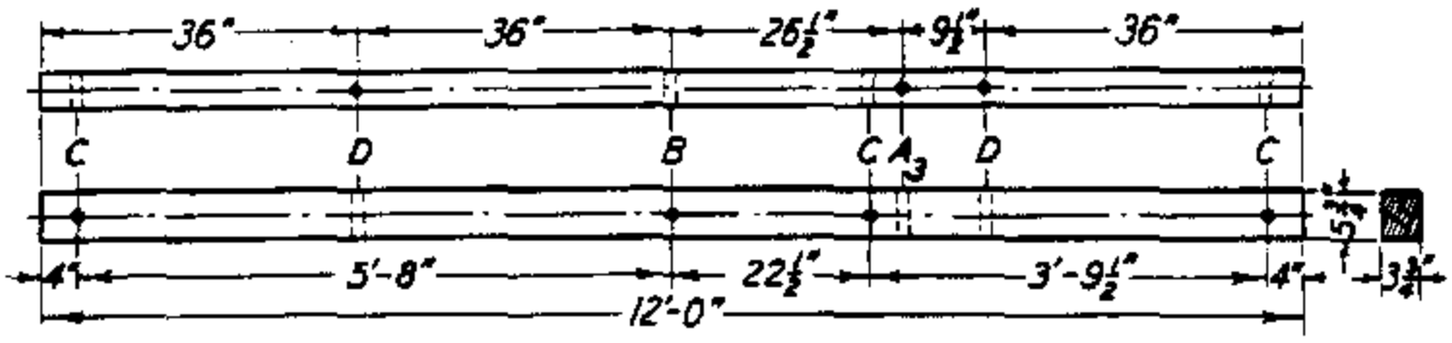
TRANSMISSION HEAVY CROSSARMS - 69KV

599.002
SUPERCEDES
380.7 (1986)

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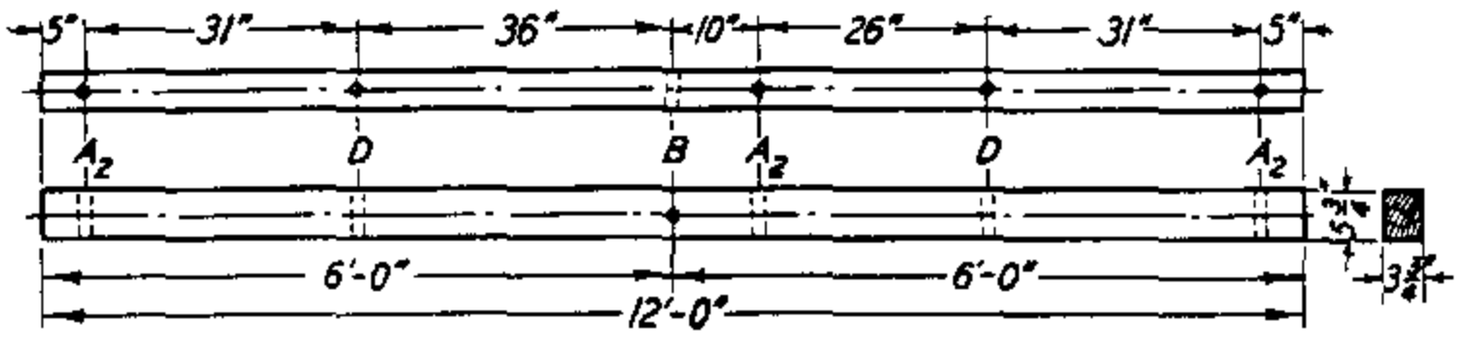



ITEM NO. 1 - LINE POST TANGENT ARM - 0° TO 3° ANGLES
(6' BRACE)

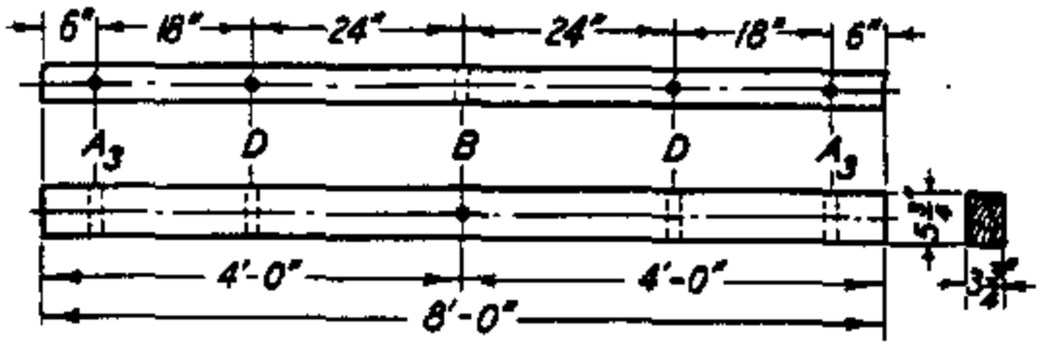



ITEM NO. 2 - LINE POST DEAD END ARM
(6' BRACE)

ITEMS 1, 2 & 3 ARE 69KV ARMS FOR HORIZONTAL CONSTRUCTION




ITEM NO. 3 - LINE POST ANGLE PIN ARM - 3° TO 9° ANGLES
(6' BRACE)




ITEM NO. 4 - LINE POST ARM
69KV ARM FOR TRIANGULAR CONSTRUCTION
(4' BRACE)

REFERENCES

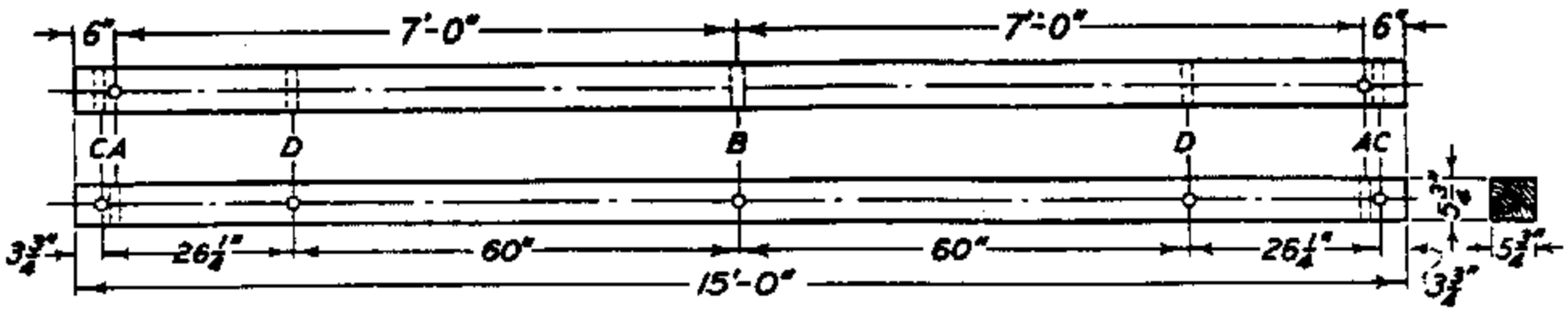
$A_2$ - PIN HOLES 13/16" DIAM.
$A_3$ - PIN HOLES 15/16" DIAM.
B - THRU BOLT HOLES 11/16" DIAM.
C - SPACE BOLT HOLES 11/16" DIAM.
D - BRACE BOLT HOLES 11/16" DIAM.

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | FIELD MAINTENANCE ONLY | — | | | |
| 2 | FIELD MAINTENANCE ONLY | — | | | |
| 3 | FIELD MAINTENANCE ONLY | — | | | |
| 4 | — | — | | | |
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| | | |
|---|---|---|
| 599.003<br>SUPERCEDES<br>380.8 (1986) | SDG&E ELECTRIC STANDARDS<br>TRANSMISSION CROSSARMS-69KV | DATE 1-1-86<br>APPD AE/RDF |

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ITEM NO. 1 - LONG SPAN CROSSARM
(6'-9" BRACES, SEE PAGE 599.106 ITEM 2)

REFERENCES

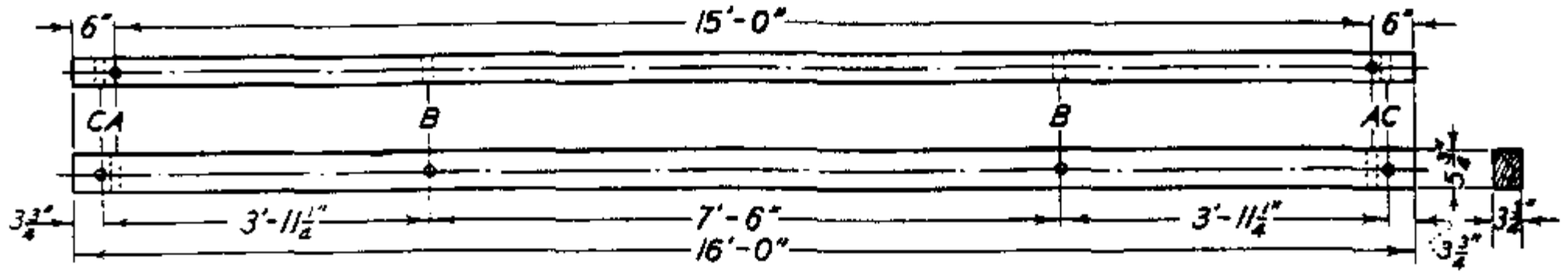
A - BRACKET BOLT HOLES 11/16" DIAM.
B - THRU BOLT HOLE 13/16" DIAM.
C - SPACE BOLT HOLES 13/16" DIAM.
D - BRACE BOLT HOLES 11/16" DIAM.

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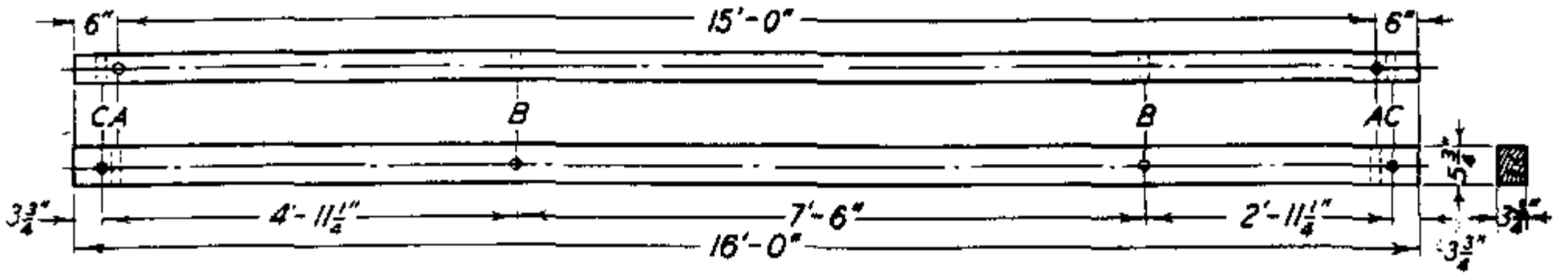
FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | — | — | | | |
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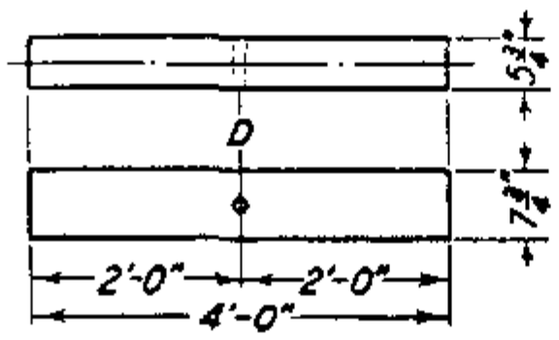
| | | |
|---|---|---|
| DATE 1-1-87<br>APPD AK/RDS | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>TRANSMISSION CROSSARMS -69KV TRIANGULAR CONFIGURATION | 599.004<br>SUPERCEDES<br>380.09 (1986) |




ITEM NO. 1 - 16 FT. TANGENT ARM - 0° TO 3° ANGLES




ITEM NO. 2 - 3° TO 15° ANGLE CROSSARM




ITEM NO. 3 - BEARING BLOCK

REFERENCE

A - "J" BOLT HOLES 11/16" DIAM.
B - THRU BOLT HOLES 11/16" DIAM.
C - SPLIT BOLT HOLES 9/16" DIAM.
D - BEARING BLOCK HOLES 13/16" DIAM.

FOR FIELD MAINTENANCE ONLY

TABLE OF CONTENTS

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | CREOSOTE, UNDRILLED | 294896 | | | |
| 2 | CREOSOTE, UNDRILLED | 294896 | | | |
| 3 | | — | | | |
| | | | | | |
| | | | | | |
| | | | | | |

599.005
SUPERCEDES
380.10 (1986)

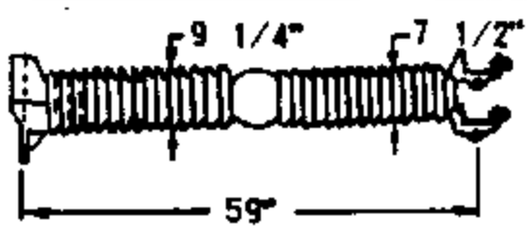
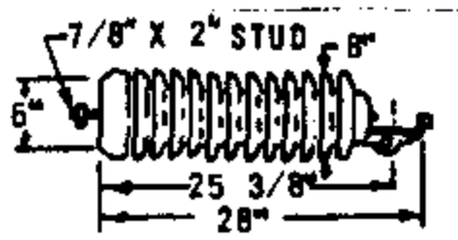
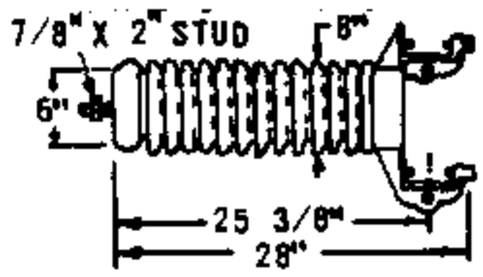
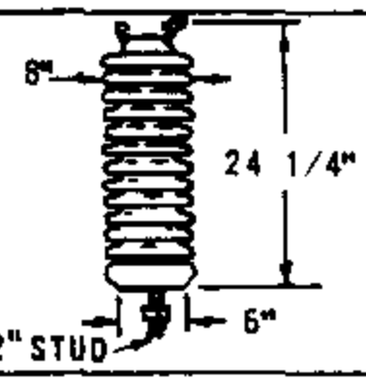
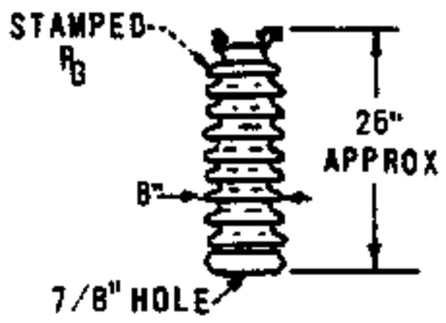
SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS

TRANSMISSION CROSSARMS - 69KV "H" FRAME CONSTRUCTION

DATE 1-1-86
APPD

**SCOPE:** THIS STANDARD SHOWS THE VARIOUS TYPES OF INSULATORS USED IN THE TRANSMISSION SYSTEM.

HORIZONTAL POST TYPE INSULATORS

| APPLICATION | DESCRIPTION | COLOR | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER |
|---|---|---|---|---|---|
| 138KV<br>FOR GENERAL APPLICATION<br>CODE 138P |  | GRAY | LAPP (SHOWN)<br>NGK (ONE PC PORCELAIN) | 70149<br>DA85205Y | 429280 |
| 138KV<br>FOR GENERAL BUNDLED APPLICATION<br>CODE 138PB |  | GRAY | LAPP | 93349-70 | 429296 |
| 69KV<br>FOR GENERAL APPLICATION<br>CODE 69P |  | GRAY | LAPP<br>NGK<br>OHIO BRASS | F4688-C-70<br>DA85192Z<br>48539-7100 (D) | 429312 |
| 69KV<br>FOR GENERAL BUNDLED APPLICATION<br>CODE 69PB |  | GRAY | LAPP | F-97517-70 | 429328 |
| 69KV<br>USE IN CONTAMINATION DISTRICT 1, TRIAL APPLICATION - CODE 69PR (A)(F) |  | GRAY | LAPP | F-510188 | - |
| 69KV<br>FOR GENERAL APPLICATION<br>CODE 69V |  | GRAY | LAPP | 4288-70 | 428672 (C) |
| 69KV<br>USE IN CONTAMINATION DISTRICT 1,<br>TRIAL APPLICATION<br>CODE 69VR (A)(F) |  | GRAY | LAPP | 510088 | - |

**INSTALLATION:**

(A) USE THIS INSULATOR WHICH HAS A SPECIAL RESISTIVE GLAZE, AVAILABLE ON A TRIAL BASIS, TO REDUCE FLASHOVER PROBLEMS. BASES MUST BE BONDED AND INSULATORS MUST NOT BE MIXED WITH OTHER TYPES ON PHASE WIRES ON ONE POLE. DO NOT WASH OR INSULGREASE THESE INSULATORS. FOR THREE PHASE APPLICATION ONLY.

B. LINE POST INSULATORS FOR DISTRIBUTION USE HAVE A 3/4" HOLE FOR MOUNTING STUD, WHILE 69 & 88KV POSTS HAVE A 7/8" HOLE. STUDS ARE STOCKED BY REFERENCING THE SIZE OF THE STUD WHICH MATES WITH THE REST OF THE STRUCTURE. THEREFORE, USE 3/4" STUDS FOR DISTRIBUTION AND 7/8" STUDS FOR TRANSMISSION. SEE PAGE 751.

(C) NO LONGER PURCHASED.

(D) NO LONGER MANUFACTURED.

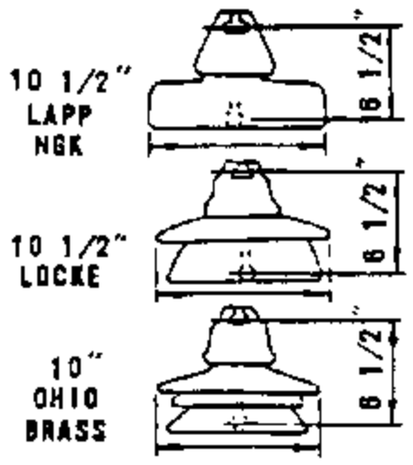
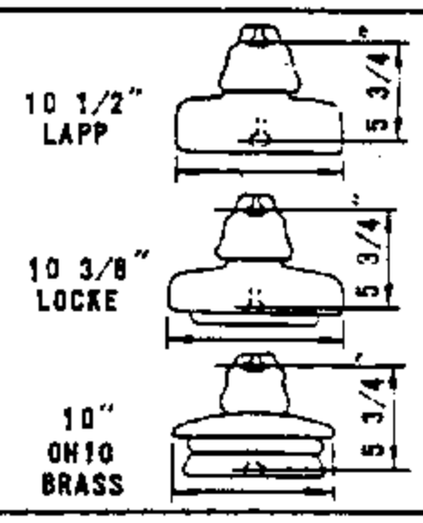
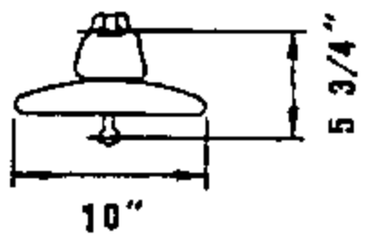
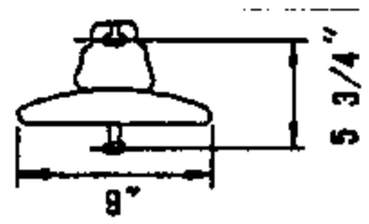
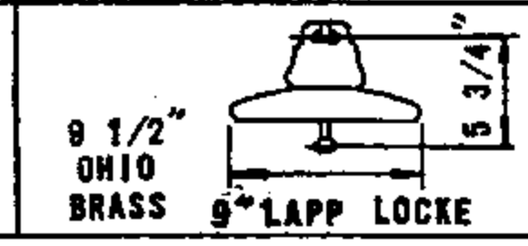
FOR FIELD MAINTENANCE ONLY

**REFERENCE:**

(F) CONTAMINATION DISTRICTS IDENTIFIED ON STANDARDS PAGE 287.



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| APPLICATION | DESCRIPTION OF SUSPENSION TYPE INSULATORS<br>DEMENSIONS | WORKING LOAD/ M&E RATING | BONDING | COLOR | MANUFACTURER | CATALOG NUMBER | STOCK NUMBER |
|---|---|---|---|---|---|---|---|
| 69 AND 138KV SUSPENSION INSTALLATIONS CONTAMINATION DISTRICT 1 CODE FB6 |  | 7,500/ 15,000 | BONDED | GRAY | LAPP<br>LOCKE<br>NGK<br>OHIO BRASS | 98392-70<br>18134<br>DWG#21852<br>47360 (B) | 431296 (A) |
| | | | | BROWN | LAPP | 98392 | 431300 (A) |
| 69 AND 138KV SUSPENSION INSTALLATIONS CONTAMINATION DISTRICT 1 CODE F6 | | | UN-BONDED | GRAY | LAPP<br>LOCKE<br>OHIO BRASS | 98392-70<br>18134<br>47360 (B) | 431328 (A) |
| | | | | BROWN | LAPP | 98392 | 431332 (A) |
| 69 AND 138KV SUSPENSION INSTALLATIONS CONTAMINATION DISTRICT 1 CODE FB5 |  | FOR FIELD MAINTENANCE ONLY<br>7,500/ 15,000 | BONDED | GRAY | LAPP<br>LOCKE<br>OHIO BRASS | 98391-70<br>20S185<br>47350 (B) | 431344 |
| 69 AND 138KV DEAD END INSTALLATIONS USE FOR TENSIONS ABOVE 5000 POUNDS PER PHASE CODE DH |  | 12,500/ 25,000 | UN-BONDED | GRAY | CHANCE<br>LAPP<br>LOCKE<br>NGK<br>OHIO BRASS | C907-1005<br>5960G-70<br>30S255<br>CA 500 MQ<br>47410 (B) | 431776 |
| | | | | BROWN | LAPP<br>LOCKE<br>OHIO BRASS | 5960G<br>30S255<br>47410 (B) | 431376 (A) |
| 69 AND 138KV SUSPENSIONS INSTALLATIONS CONTAMINATION DISTRICTS 2 AND 3 & FOR DEAD ENDS BELOW 1000 POUNDS TENSION PER PHASE EVERYWHERE CODE DB |  | 7,500/ 15,000 | BONDED | GRAY | CHANCE<br>LAPP<br>LOCKE<br>NGK | C907-1903<br>74165-70<br>15S419<br>CA 557 MH | 431520 |
| | | | | BROWN | LAPP | 74165 | 431524 (A) |
| 69 AND 138KV DEAD ENDS ABOVE 1000 POUNDS TENSION PER PHASE EVERYWHERE CODE D |  | 7,500/ 15,000 | UN-BONDED | GRAY | LAPP<br>LOCKE<br>OHIO BRASS | 74165-70<br>15S419<br>48008 (B) | 431424 |
| | | | | BROWN | LAPP | 74165 | 431420 (A) |

**INSTALLATION:**

(A) NO LONGER PURCHASED. BROWN INSULATORS SHALL BE USED ON BROWN POLES TO ELIMINATE STOCK. DO NOT MIX BROWN AND GRAY SUSPENSION INSULATORS AT A GIVEN LEVEL ON A POLE.

(B) NO LONGER MANUFACTURED.

C. USE BONDED INSULATORS IN SUSPENSION APPLICATIONS THROUGH RESIDENTIAL AND COMMERCIAL AREAS.

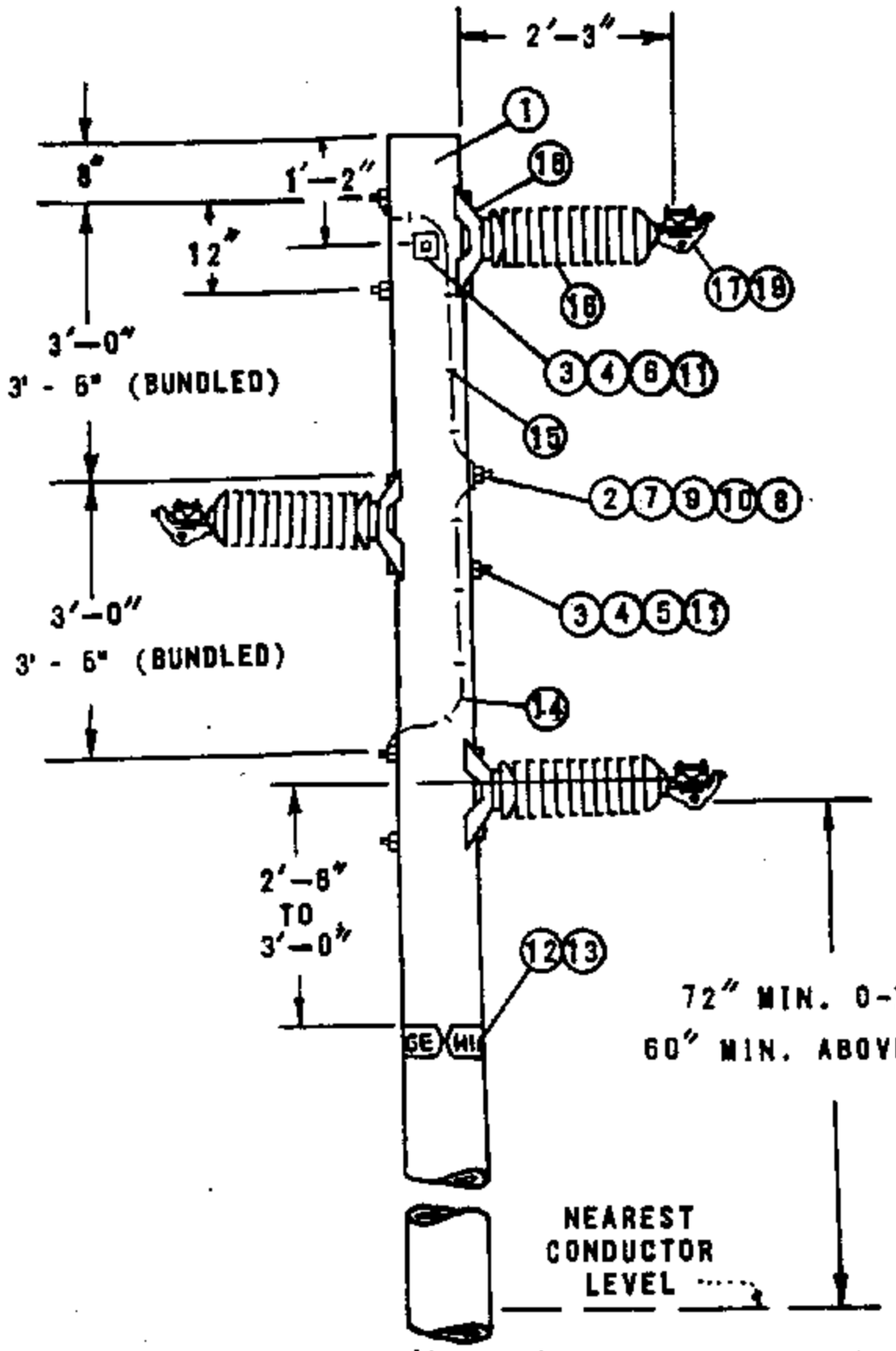
**REFERENCE:**

F. CONTAMINATION DISTRICTS IDENTIFIED ON STANDARDS PAGE 287.

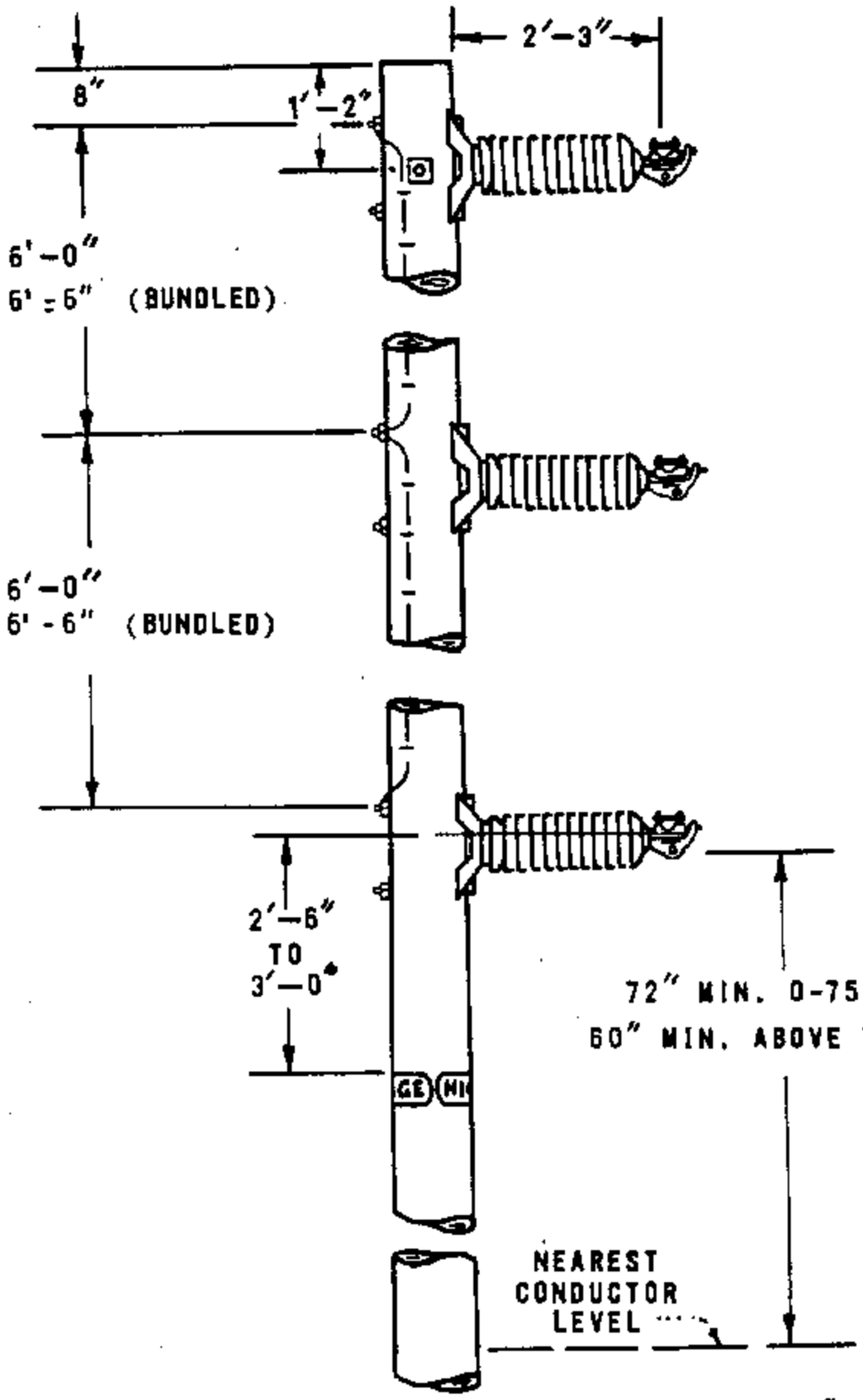
G. SEE STANDARDS PAGE 599.501 FOR TRANSMISSION LINE INSULATION TABLE.



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WORK ORDER DESIGNATION "69KV WPI"




WORK ORDER DESIGNATION "69 KV ZPI"

NOTES:

A. FOR USE ON LINE ANGLES 0 TO 30 DEGREES.

B. FOR LINE ANGLE CONSTRUCTION, GUY AS REQUIRED.

(E) EXEMPT MATERIALS.

| ITEM TPF | ITEM TOC | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | POLE, CLASS AND HEIGHT (AS REQUIRED) | 1 | 300 SECTION |
| 2 | | BOLT, MACHINE 3/4" (LENGTH AS REQ'D) | 3 | 100 SECTION |
| 3 | | BOLT, MACHINE 5/8" (LENGTH AS REQ'D) | (E) 4 | 100 SECTION |
| 4 | | WASHER, 3" SQUARE CURVED RIB | (E) 2 | 797782 |
| 5 | | WASHER, 3" SQ. CURV | 3 | 798912 |
| 6 | | WASHER, SPRING DBL COIL 5/8" | (E) 4 | 798560 |
| 7 | | WASHER, 4" SQUARE CURVED RIB | 6 | 797760 |
| 8 | | WASHER, RD. FLAT 3/4" | 6 | 800256 |
| 9 | | NUTS, 3/4" | 3 | 504768 |
| 10 | | LOCKNUT, M-F 3/4" | 3 | 504576 |
| 11 | | LOCKNUT, M-F 5/8" | 4 | 504608 |
| 12 | | SIGN, HIGH VOLTAGE | (E) 2 | 647648 |
| 13 | | NAILS, ROOFING G GALV. | (E) 16 | 492224 |
| 14 | | WIRE, #8 S. SOLID ANNEALED COPPER | 1 LB | 812928 |
| 15 | | STAPLES, 1 1/4" , FENCE, GALV. | (E) AS REQ'D | 678528 |
| | 16 | INSULATOR, 69KV HORIZ, SINGLE CONDUCTOR/BUNDLED | 3 | 429312/429328 |
| | 17 | CLAMP, CONDUCTOR | 3 | 700 SECTION |
| | 18 | INSULATOR BASE | 3 | 125728 |
| | 19 | GUARD LINE (FOR ALUMINUM CONDUCTORS) | 3 SETS | 700 SECTION |

FOR FIELD MAINTENANCE ONLY

SDG&E ELECTRIC STANDARDS

DATE 7-1-84

APPD. RCL/JRH

# 69KV SINGLE CIRCUIT - HORIZONTAL POST INSULATORS

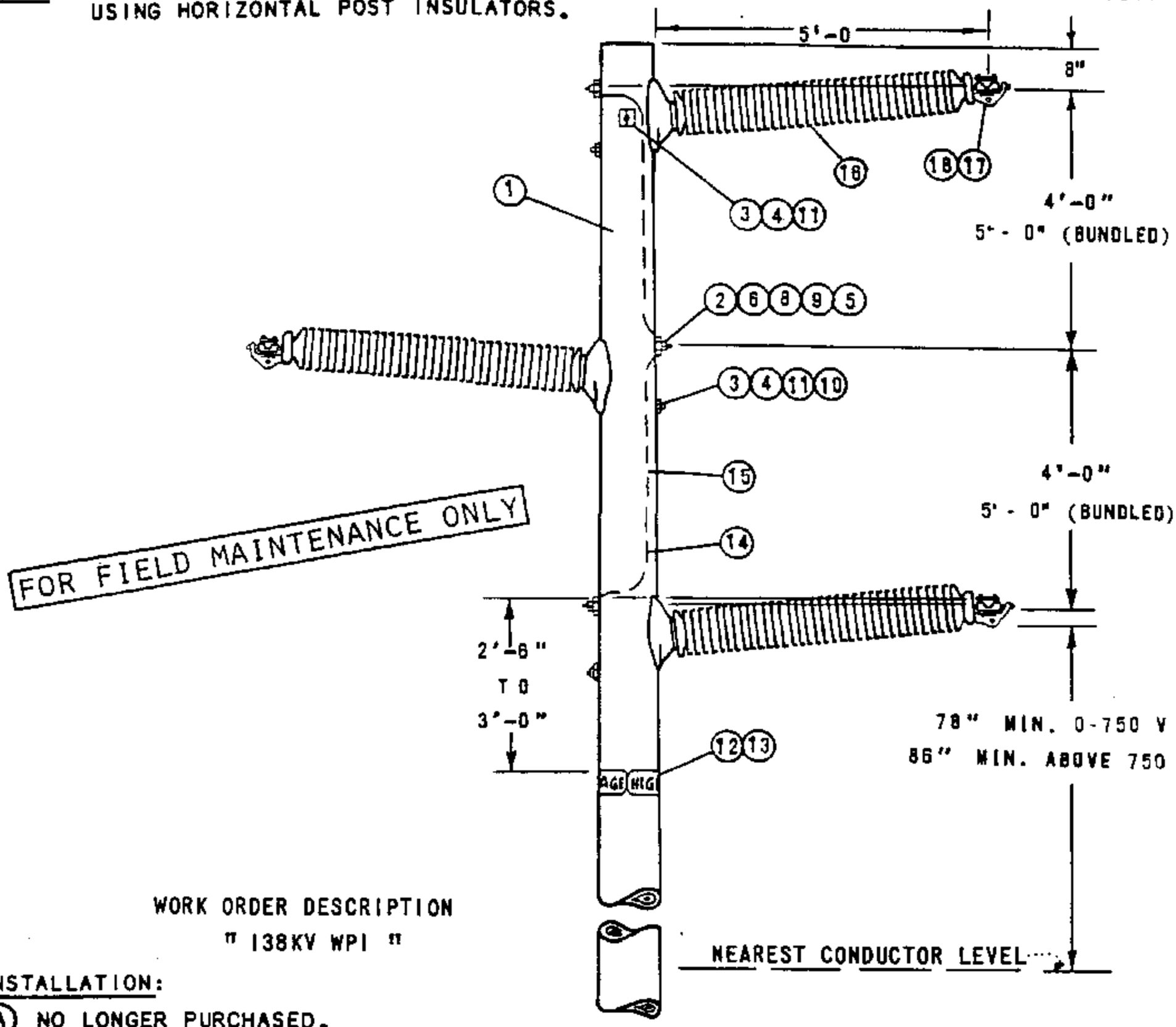
599.101

SUPERSEDES

511 (1985)

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**SCOPE:** THIS STANDARD SHOWS 138KV CONSTRUCTION USED WHEN DESIGNING SINGLE CIRCUIT TRANSMISSION LINES USING HORIZONTAL POST INSULATORS.




WORK ORDER DESCRIPTION
" 138KV WPI "

INSTALLATION:

(A) NO LONGER PURCHASED.
(E) EXEMPT MATERIAL.

| ITEM NUMBER T.P.F. | ITEM NUMBER T.O.C. | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| 1 | | POLE, CLASS AND HEIGHT (AS REQUIRED) | 1 | STD 361 |
| 2 | | BOLT, MACHINE 3/4"(LENGTH AS REQUIRED) | 3 | STD 139 |
| 3 | | BOLT, MACHINE 5/8"(LENGTH AS REQUIRED) | (E) 4 | STD 139 |
| 4 | | WASHER, 3" SQUARE CURVED RIB | (E) 2 | 797792 |
| 5 | | WASHER, RD FLAT 3/4" | (E) 6 | 800256 |
| 6 | | WASHER, 4" SQUARE, CURVED RIB | (E) 3 | 797780 |
| 7 | | WASHER, 3" SQ. CURVED | (A) (E) 3 | 800384 |
| 8 | | NUTS 3/4" | (E) 6 | 504768 |
| 9 | | LOCKNUT, M-F 3/4" | (E) 3 | 504576 |
| 10 | | LOCKNUT, M-F 5/8" | (E) 3 | 504608 |
| 11 | | WASHER, SPRING DBL COIL 5/8" | (E) 3 | 798560 |
| 12 | | SIGN, HIGH VOLTAGE | (E) 2 | 547548 |
| 13 | | NAILS, ROOFING 8 GALV. | (E) 16 | 492192 |
| 14 | | WIRE, #6 B. SOLID ANNEALED COPPER | 1 LB | 812828 |
| 15 | | STAPLES,1 1/4"FENCE, GALV. | (E) AS REQ'D | 878528 |
| | 16 | INSULATOR, 138KV, SINGLE CONDUCTOR/BUNDLED | 3 | 429280/429296 |
| | 17 | CONDUCTOR CLAMP | 3 | STD 775, 776 |
| | 18 | GUARD, LINE (FOR ALUMINUM CONDUCTORS) | 3 | STD 759 |

599.102
SUPERSEDES
512 (1985)

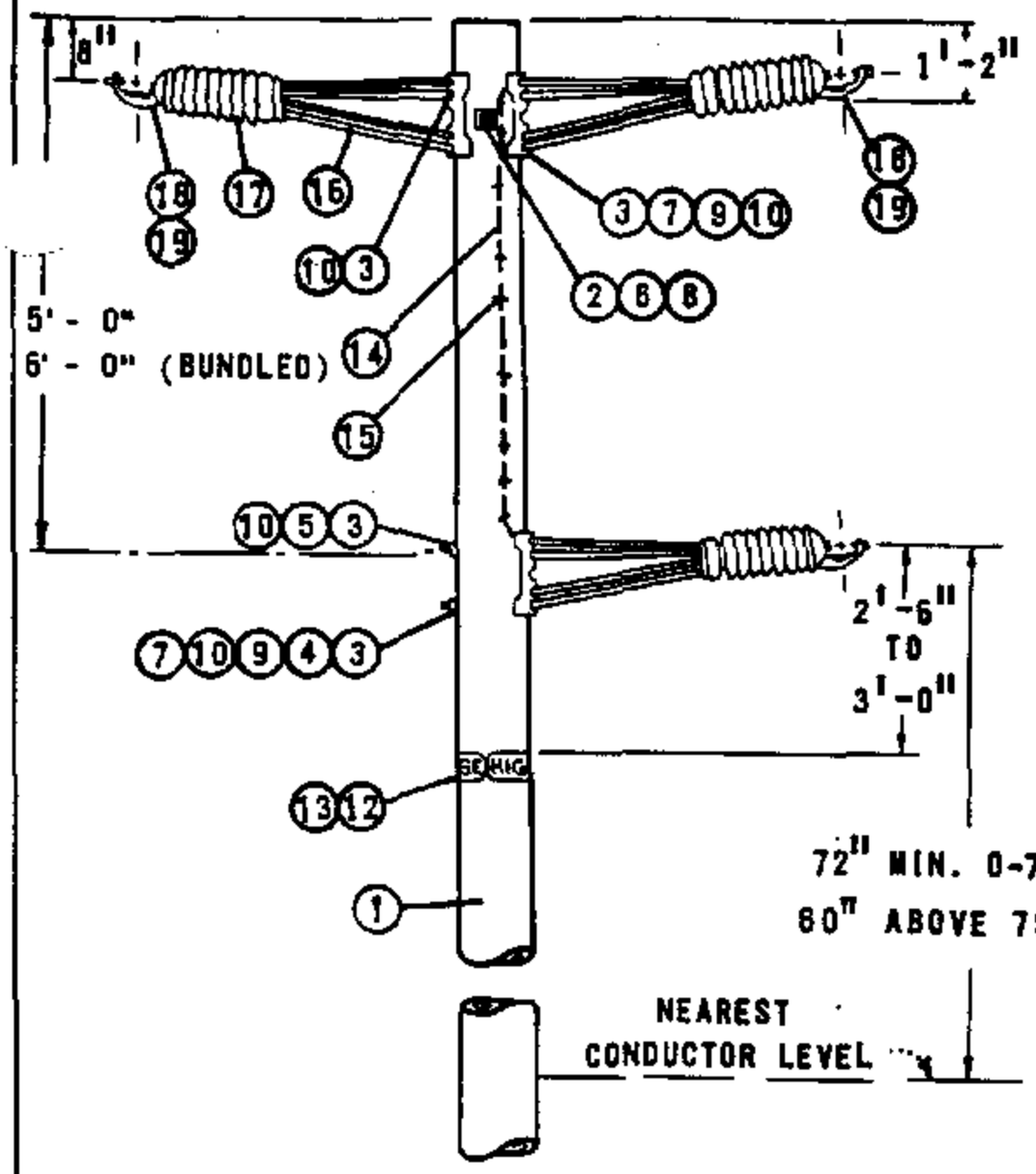
SDG&E ELECTRIC STANDARDS

# 138KV SINGLE CIRCUIT - HORIZONTAL POST INSULATORS

ISSUE 1993
DATE 7-1-84
APPD [signature]

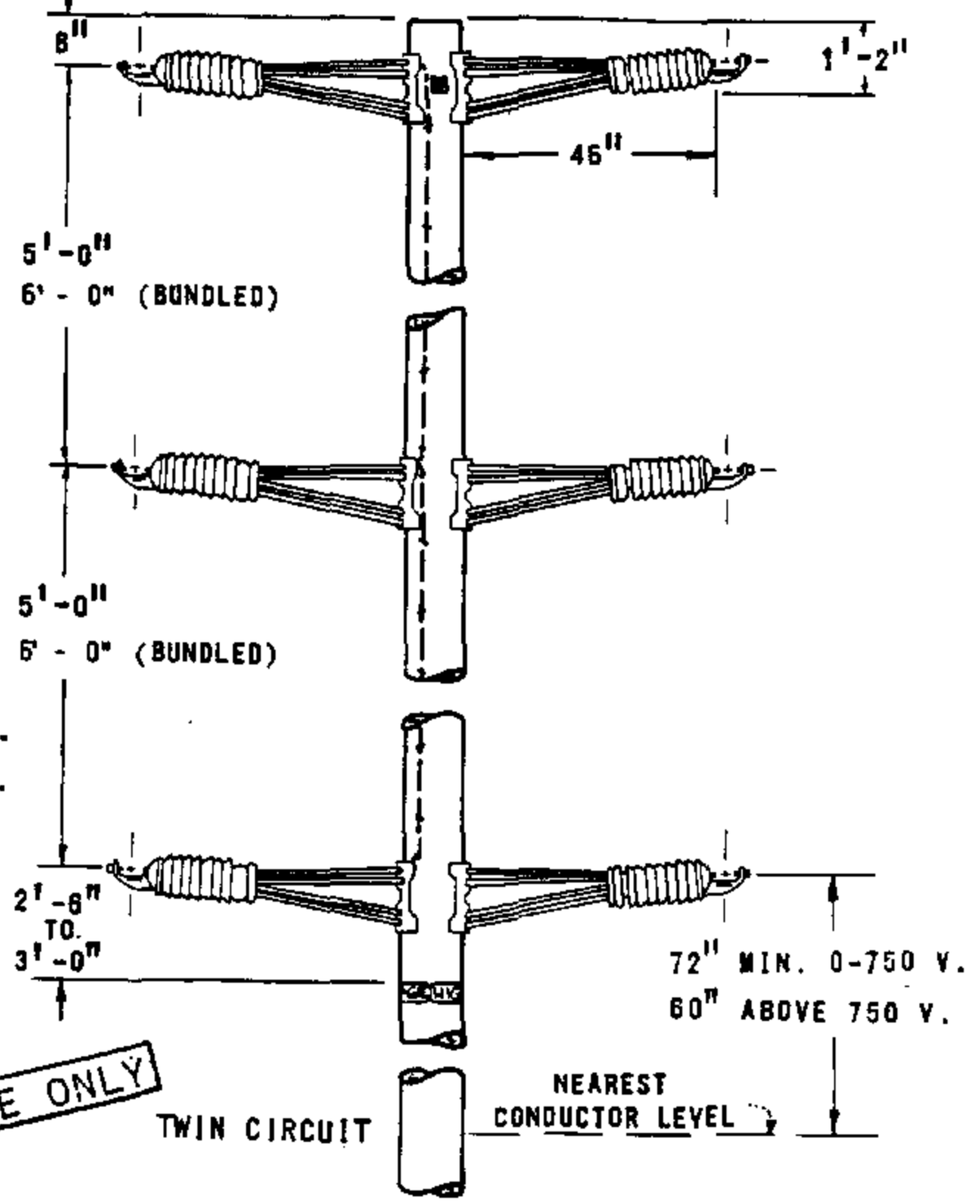
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SCOPE: THIS STANDARD SHOWS 69KV CONSTRUCTION USED WHEN DESIGNING SINGLE AND TWIN CIRCUIT TRANSMISSION LINES USING HORIZONTAL POST INSULATORS.




SINGLE CIRCUIT

WORK ORDER DESIGNATION "69 KV 2/1 WPI"




TWIN CIRCUIT

WORK ORDER DESIGNATION "69KV T.C. WPI"

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

(E) EXEMPT MATERIALS.

| ITEM PTF | ITEM TOC | DESCRIPTION | QUANTITY SGL CIR | QUANTITY DBL CIR | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| 1 | | POLE, CLASS AND HEIGHT (AS REQ'D) | 1 | 1 | PG. 361 |
| 2 | | BOLT, MACHINE 5/8" X (LENGTH AS REQ'D) | (E) 1 | 1 | PG. 139 |
| 3 | | BOLT, MACHINE 3/4" X (LENGTH AS REQ'D) | 4 | 6 | PG. 139 |
| 4 | | WASHER, 3" SQUARE CURVED | (E) 1 | - | 798912 |
| 5 | | WASHER, 4" SQUARE CURVED RIB | (E) 1 | - | 797760 |
| 6 | | WASHER, 3" SQUARE CURVED RIB | (E) 2 | 2 | 797792 |
| 7 | | WASHER, SPRING DBL. COIL 3/4" | (E) 2 | 3 | 798496 |
| 8 | | WASHER, SPRING DBL. COIL 5/8" | (E) 1 | 1 | 798560 |
| 9 | | WASHER, 3/4" ROUND | (E) 3 | 6 | 800256 |
| 10 | | LOCKNUT, M-F 3/4" | (E) 4 | 6 | 504576 |
| 11 | | | | | |
| 12 | | SIGN, HIGH VOLTAGE | (E) 2 | 2 | 647648 |
| 13 | | NAILS, ROOFING 8 GALV. | (E) 16 | 16 | 492224 |
| 14 | | WIRE, #6 B. SOLID ANNEALED COPPER | .5 lb | 1 lb. | 812928 |
| 15 | | STAPLES, 1 1/4", FENCE GALV. | (E) 6 | 12 | 678528 |
| 16 | | ARM, EXTENSION | 3 | 6 | 110752 |
| | | | | | |
| | 17 | INSULATOR, 88KV HORIZ. LINE POST W/STUD | 3 | 6 | 429312 |
| | 18 | CLAMP, CONDUCTOR | 3 | 6 | PG 775, 776 |
| | 19 | GUARD, LINE (FOR ALUMINUM CONDUCTORS) | 3 SETS | 6 SETS | PG. 759 |

SDG&E ELECTRIC STANDARDS

DATE 7-1-84
APPD RES/SCH

69KV SINGLE & TWIN CIRCUITS - HORIZONTAL POST INSULATORS

599.103
SUPERSEDES
513 (1985)

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**SCOPE:** THIS STANDARD SHOWS THE PROPER ASSEMBLY OF TRANSMISSION POST INSULATOR STUDS.

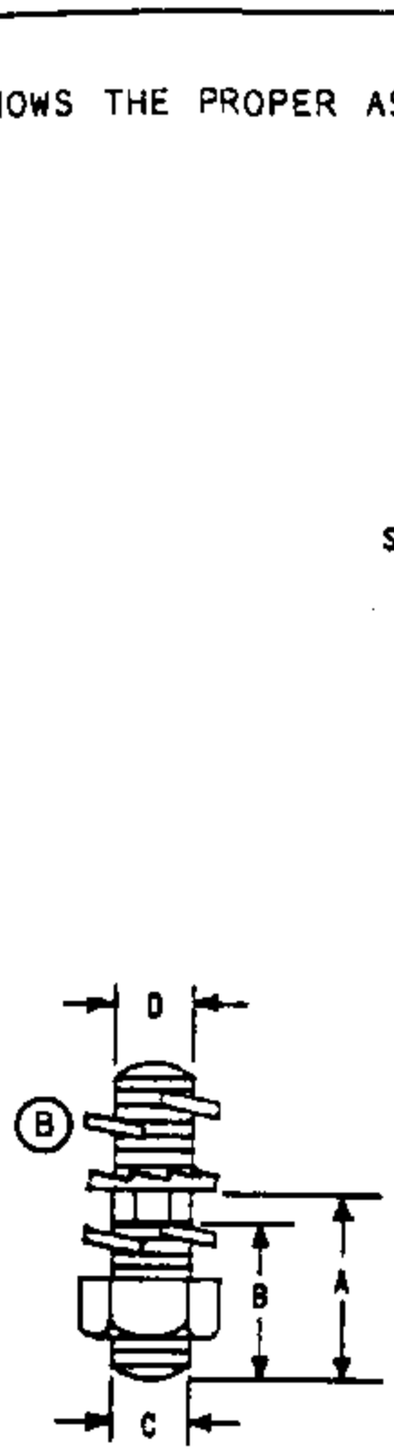



FIG. 1
FOR STEEL CROSS ARM
OR BRACKET

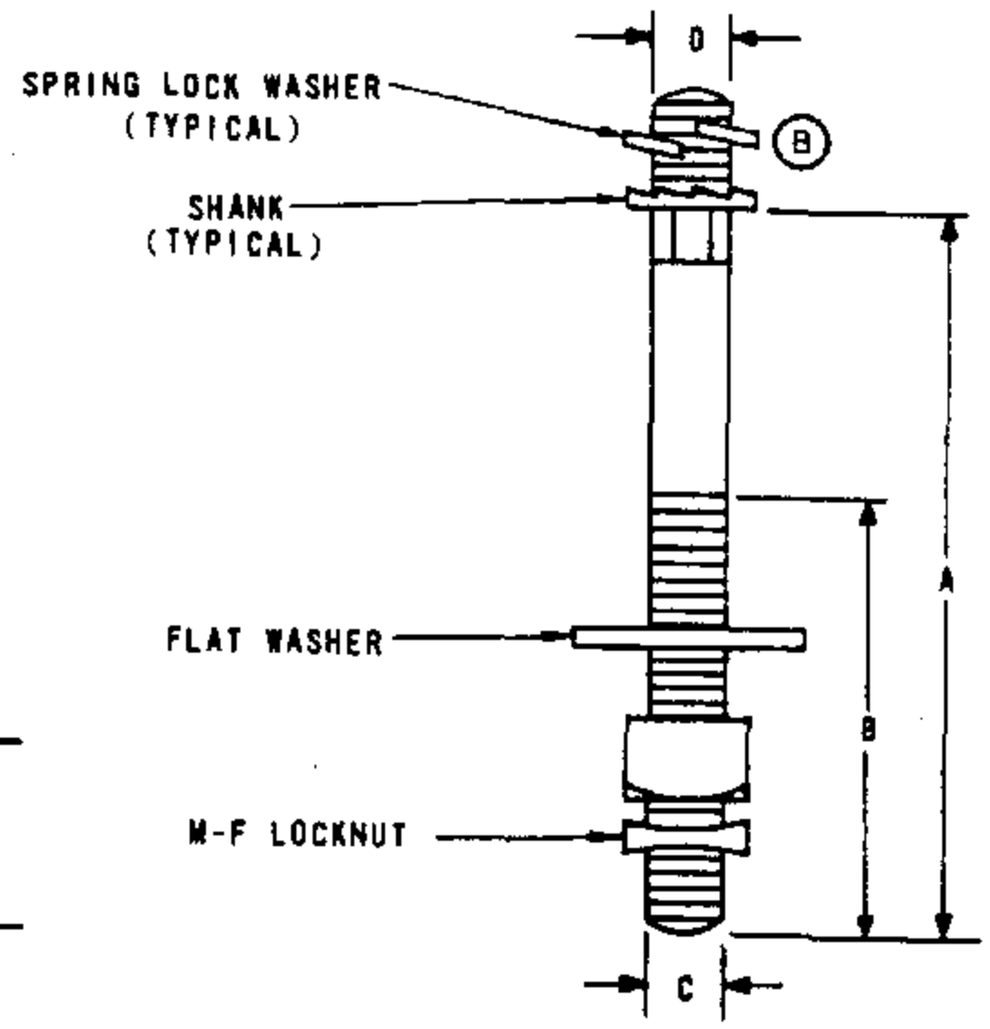



FIG. 2
FOR WOOD CROSS ARM

FOR FIELD MAINTENANCE ONLY

**BILL OF MATERIAL:**

| SIZE OF INSULATOR STUD | | | | FIGURE NUMBER | VOLTAGE CLASSIFICATION | JOSLYN CATALOG NUMBER | LAPP CATALOG NUMBER | STOCK NUMBER |
|---|---|---|---|---|---|---|---|---|
| A | B | C | D | | | | | |
| 2" | 1 11/16" | 7/8" | 7/8" | 1 | 88KV | - | 301616 | 701776 (A) |
| 8" | 4" | 7/8" | 7/8" | 2 | 88KV | - | 10362A | 701792 (A) |

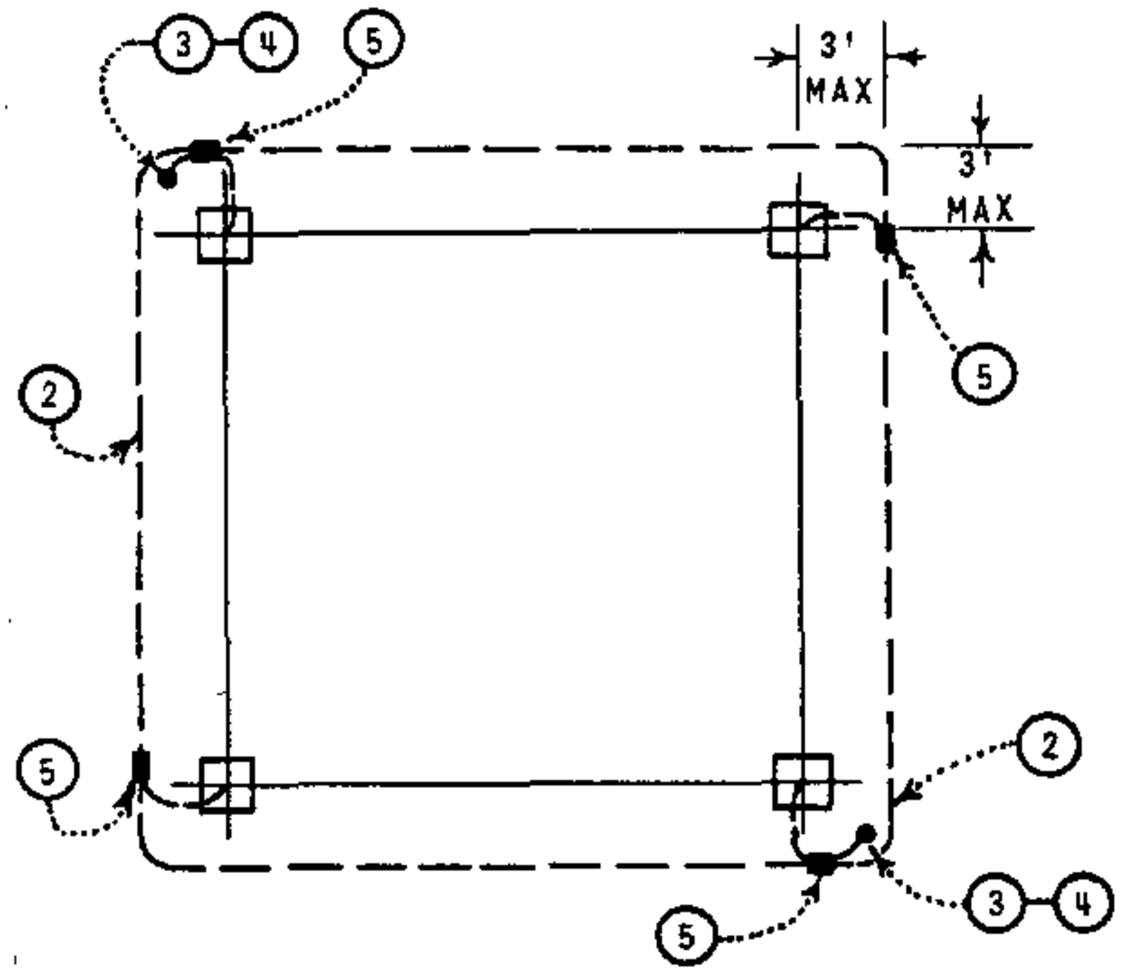
**INSTALLATION:**

(A) NOT NORMALLY PURCHASED.

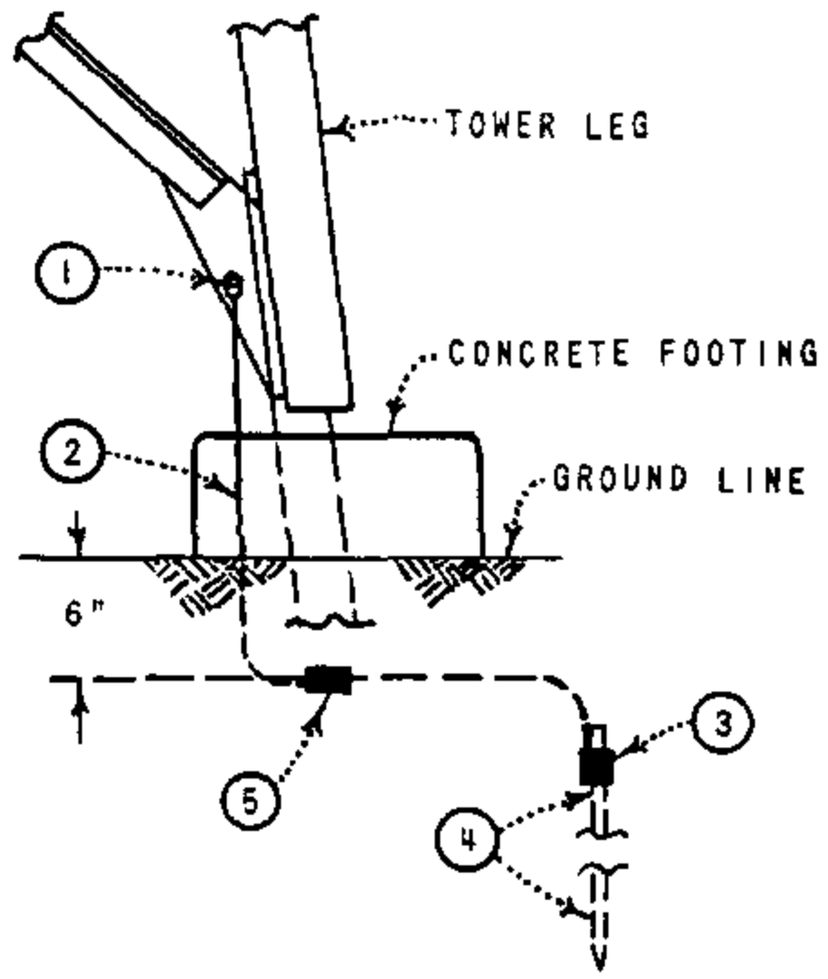
(B) WHEN ASSEMBLING STUD TO INSULATOR, MOVE A LOCKWASHER TO THE TOP OF THE STUD.

| 599.104 | SDG&E ELECTRIC STANDARDS<br>POST INSULATOR STUDS | DATE 1-1-86<br>APPD AK/RDX |
|---|---|---|

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PLAN




ELEVATION

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FOR FIELD MAINTENANCE ONLY

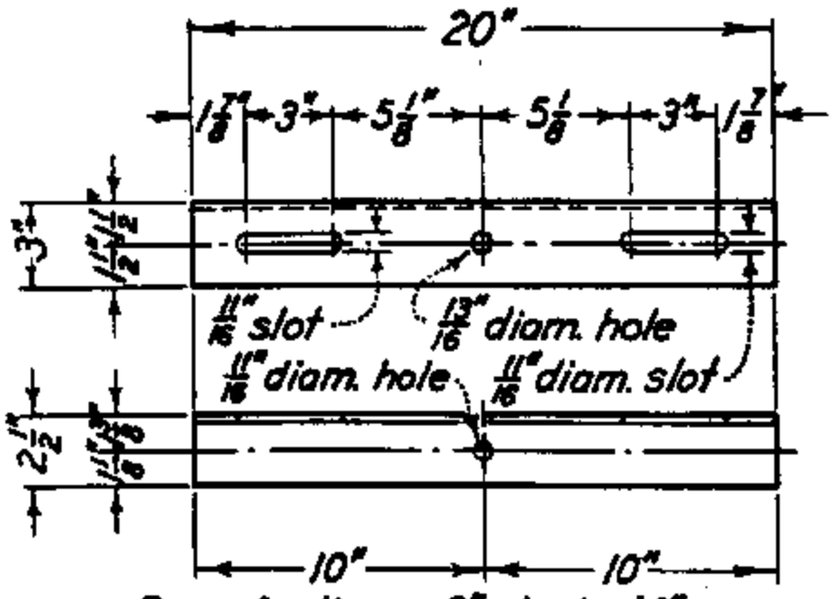
| ITEM | DESCRIPTION | QUANTITY | STOCK NUMBER |
|---|---|---|---|
| 1 | CONNECTOR, FLAT GROUND | 4 | 261600 |
| 2 | WIRE, #2 BARE SOLID COPPERWELD | as req'd | 813056 |
| 3 | CONNECTOR, COMPRESSION | 2 | 257888 |
| 4 | ROD: GROUND. COPPERWELD 5/8" X 8' - 0" | 2 | 603072 |
| 5 | CONNECTOR, COMPRESSION | 4 | 257792 |

DATE 1-1-86
APPD AK/RDS

SDG&E ELECTRIC STANDARDS

# STEEL TOWER GROUNDING

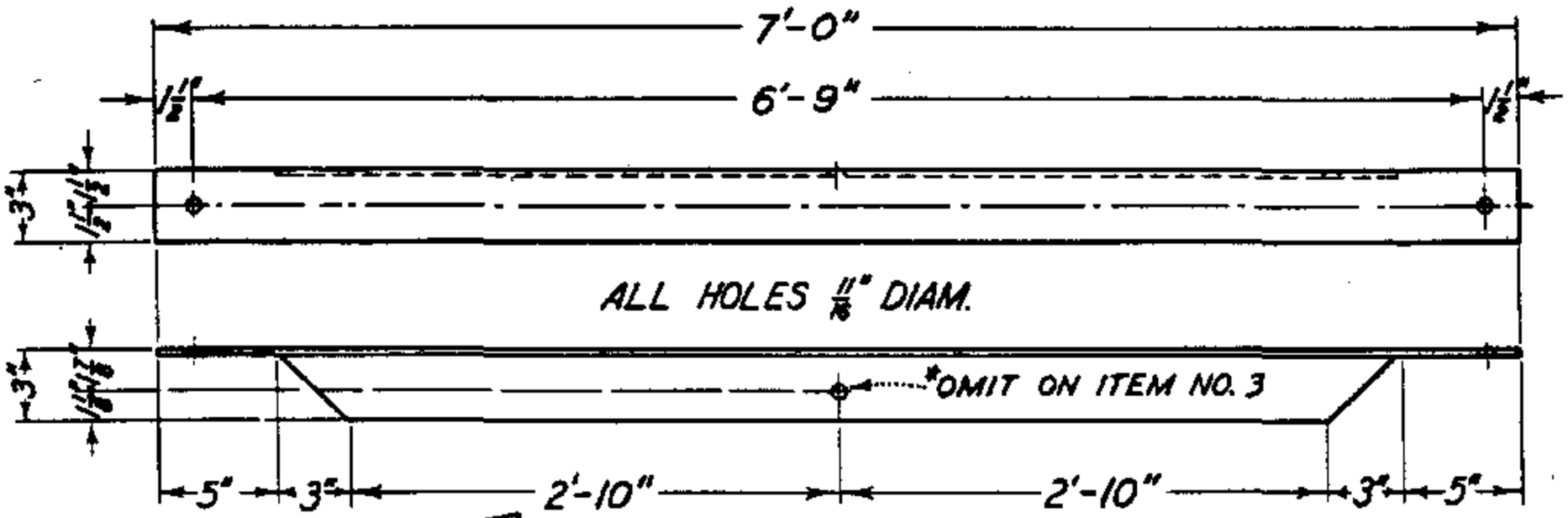
599.105
SUPERCEDES
1011 (1986)




For pole diams. 8" min. to 14" max.

ITEM 1

3" X 2 1/2" X 5/16" ANGLE BRACKET



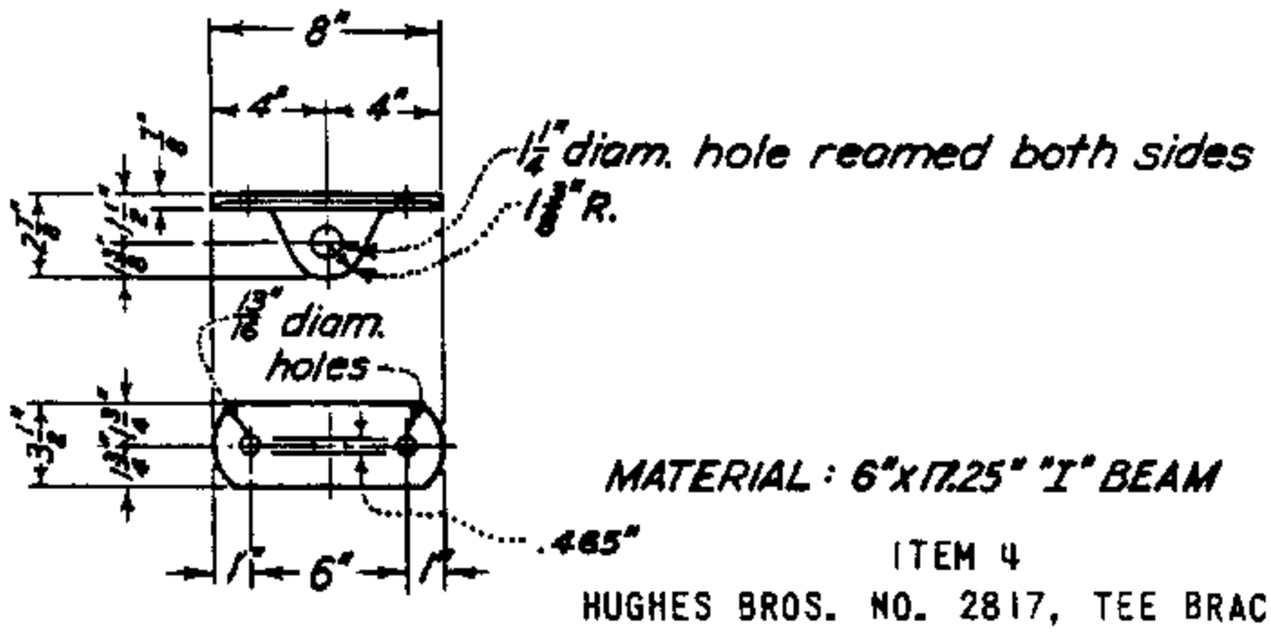

ITEM 2

3" X 3" X 1/4" HORIZONTAL ANGLE BRACE

FOR FIELD MAINTENANCE ONLY

ITEM 3

SAME AS ITEM 2, EXCEPT *OMIT CENTER HOLE




MATERIAL : 6"x17.25" "I" BEAM

ITEM 4

HUGHES BROS. NO. 2817, TEE BRACKET

INSTALLATION:

A. ITEMS TO BE MADE OF STEEL, HOT-DIP GALVANIZED AFTER FABRICATION.

(E) EXEMPT MATERIAL.

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | BRACKET (DOUBLE ARMING) | 165376 | | | |
| 2 | HORIZONTAL ANGLE CROSSARM BRACE (E) | 164416 | | | |
| 3 | HORIZONTAL ANGLE X-ARM BRACE (E) | 164416 | | | |
| 4 | TEE BRACKET FOR DEAD END ATTACHMENT | 723968 | | | |
| | | | | | |

DATE 1-1-86
APPD AK/RDA

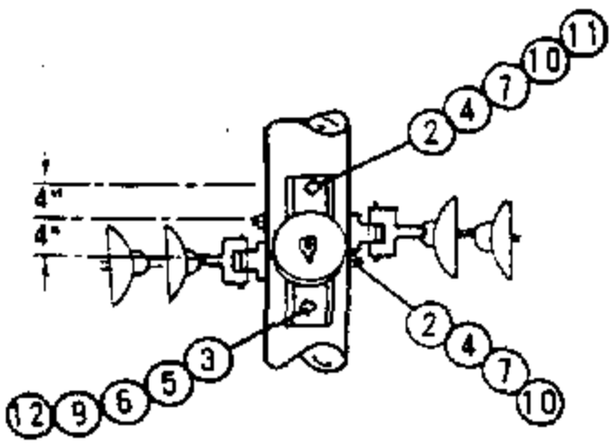
SDG&E ELECTRIC STANDARDS

TRANSMISSION HARDWARE ANGLE BRACKETS, HORIZONTAL BRACE

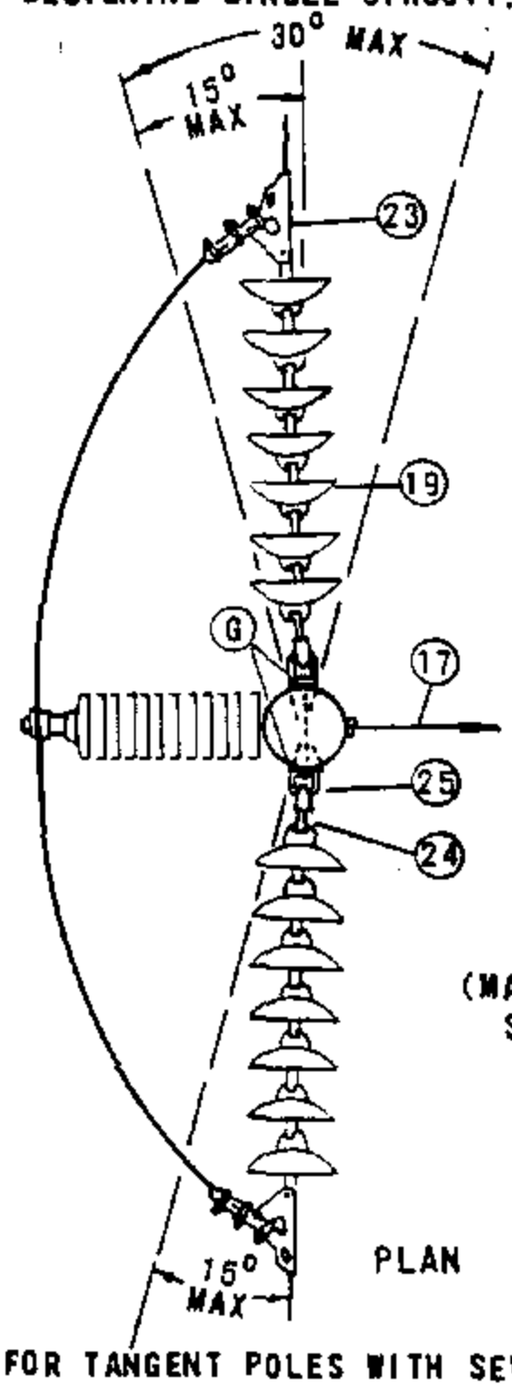
599.106
SUPERSEDES
391.1 (1986)

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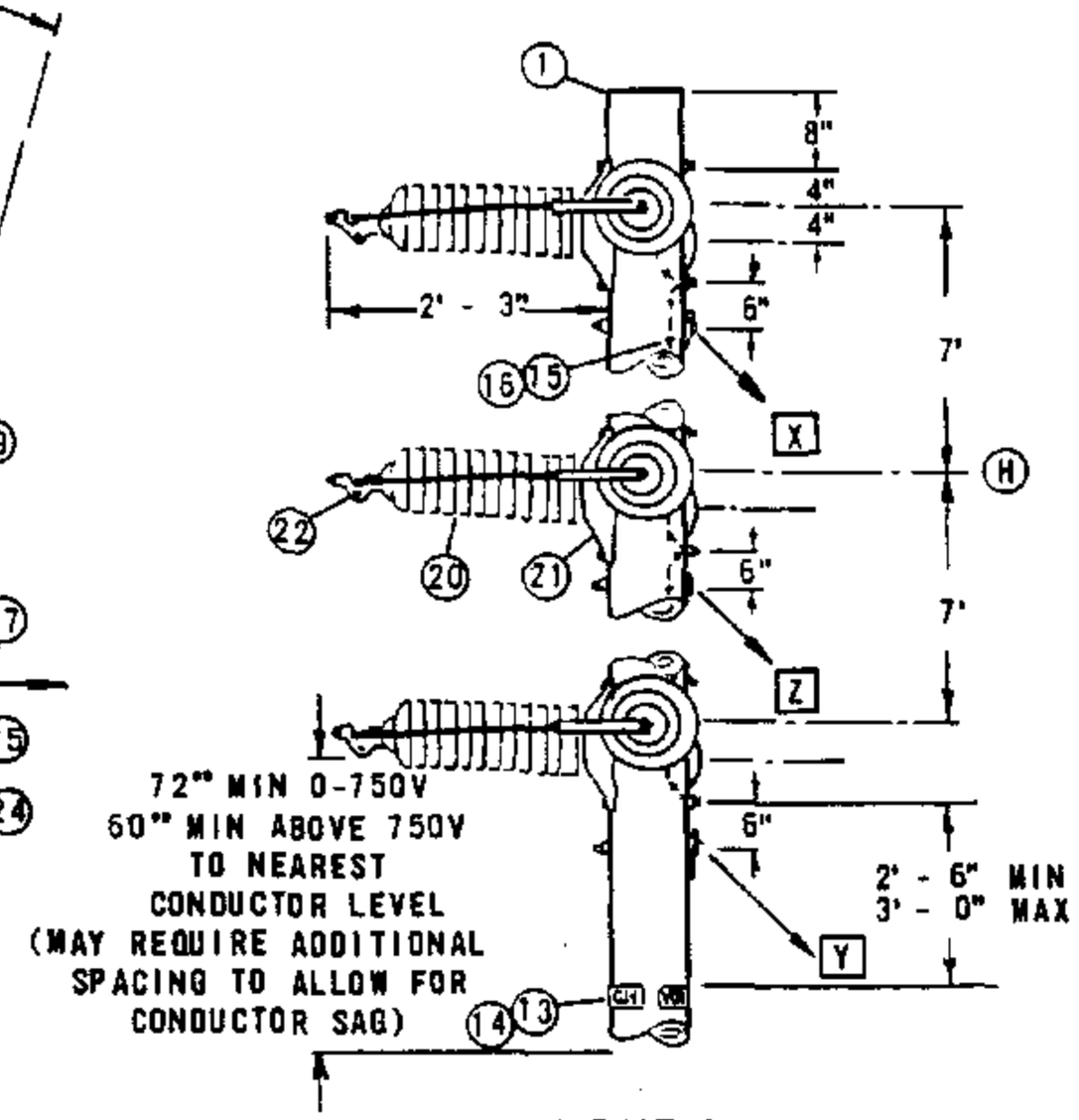
**SCOPE:** THIS PAGE IS TO BE USED WHEN DESIGNING SINGLE CIRCUIT, 69KV TRANSMISSION LINES USING HORIZONTAL POST INSULATORS.



TYPICAL DRILLING DETAIL




PLAN




ELEVATION

SINGLE CIRCUIT
WORK ORDER DESIGNATION
"69KV YP1"

**INSTALLATION:**

A. FOR USE ON ANGLES UP TO 30° AND FOR TANGENT POLES WITH SEVERE UPLIFT OR DOWN PULL.

B. GUY UPLIFT POLES IF UPLIFT IS GREATER THAN 80% OF STRUCTURE WEIGHT.

(C) ADD THE GUYS ON EITHER SIDE IN THE ORDER INDICATED ABOVE (X, Y, Z) AS REQUIRED BY THE GUYING SECTION.

D. POLE BANDS MAY BE SUBSTITUTED FOR MACHINE BOLTS WHEN ADDITIONAL STRENGTH IS REQUIRED UNDER HIGH TENSION CONDITIONS WHEN SPECIFIED BY THE TRANSMISSION ENGINEER.

(E) EXEMPT MATERIALS.

(F) CONTACT TRANSMISSION ENGINEERING WHEN USING BUNDLED CONDUCTOR.

(G) THRU BOLTS TO BE IN LINE WITH INSULATOR STRING.

(H) USE 7' FOR BOTH BUNDLED AND SINGLE CONDUCTOR INSTALLATIONS.

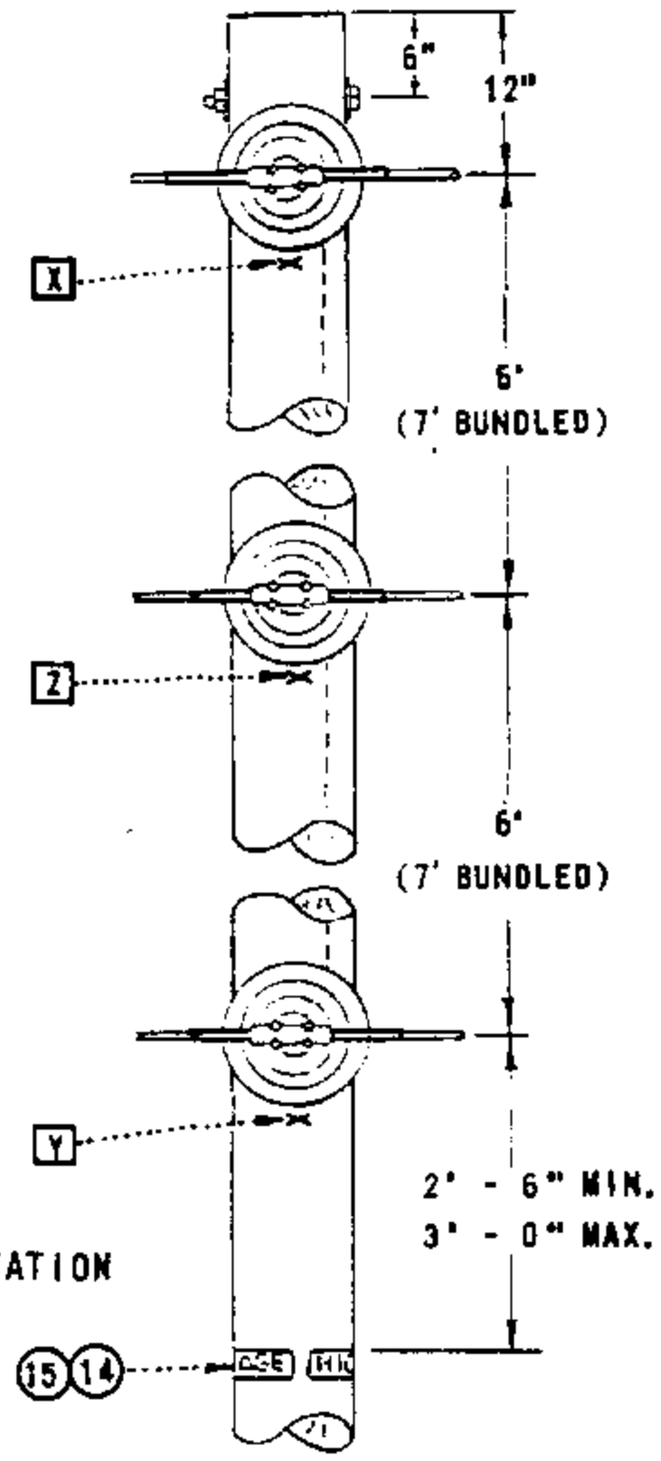
| ITEM TPF | ITEM TOC | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD |
|---|---|---|---|---|
| 1 | | POLE, CLASS AND HEIGHT (AS REQ'D) | 1 | STDS 353, 354 |
| 2 | | BOLT, MACH 3/4" X __" | 9 | STD 139 |
| 3 | | BOLT, MACH 5/8" X __" (E) | 4 | STD 139 |
| 4 | | WASHER, 4" SQUARE CURVED RIB | 12 | 797760 |
| 5 | | WASHER, 3" SQUARE CURVED RIB (E) | 2 | 797792 |
| 6 | | WASHER, 3" SQUARE CURVED | 3 | 798912 |
| 7 | | WASHER, 3/4" ROUND | 18 | 800256 |
| 9 | | WASHER, SPRING DBL COIL 5/8" (E) | 4 | 798560 |
| 10 | | NUT, 3/4" | 9 | 504768 |
| 11 | | LOCKNUT, M-F 3/4" | 3 | 504578 |
| 12 | | LOCKNUT, M-F 5/8" (E) | 4 | 504608 |
| 13 | | SIGN, HIGH VOLTAGE (E) | 2 | 647648 |
| 14 | | NAILS, ROOFING 8 GALV (E) | 16 | 492224 |
| 15 | | WIRE #8 BARE SOLID ANNEALED COPPER | 2.0# | 812928 |
| 16 | | STAPLES, 1 1/4" FENCE, GALV (E) | 10 | 678528 |
| 17 | | GUY (C) | AS REQ'D | 900 SECTION |
| 18 | | | | |
| | 19 | INSULATOR, SUSPENSION B/S DISC | AS REQ'D | STD 750 |
| | 20 | INSULATOR, 88KV HORIZ LINE POST W/STUD | 3 | 429312 |
| | 21 | INSULATOR, BASE | 3 | 125728 |
| | 22 | CLAMP, 1 CONDUCTOR/BUNDLED | 3 | STD 773/(F) |
| | 23 | CLAMP, STRAIN WITH SOCKET EYE | 6 | STDS 742, 744 |
| | 24 | CLEVIS, BALL | 6 | 235392 |
| | 25 | EYELET, STANDARD (E) | 6 | 235648 |

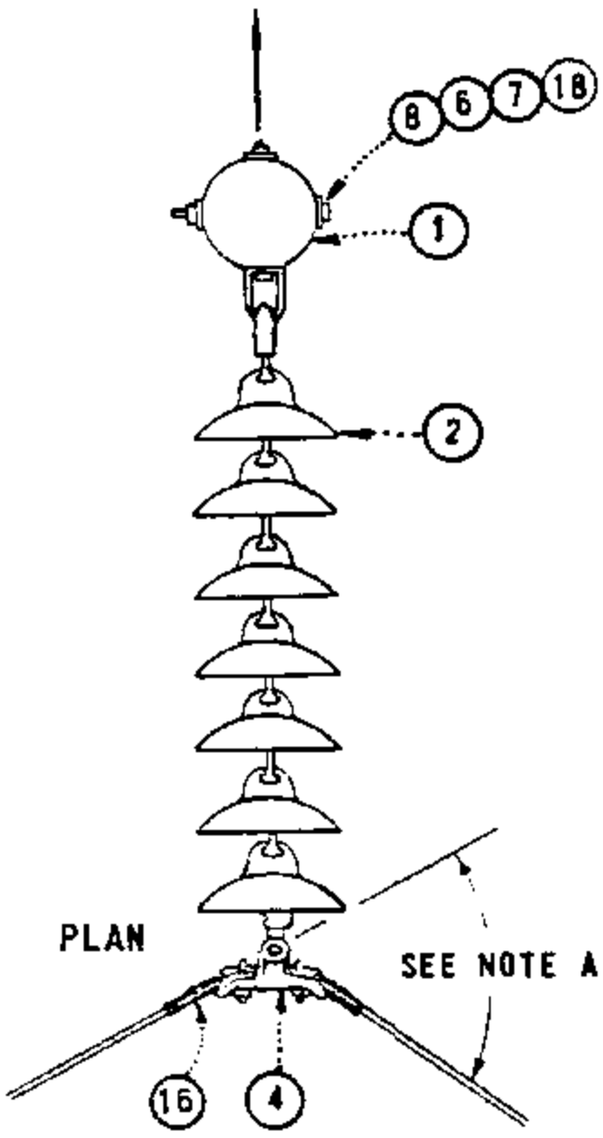
FOR FIELD MAINTENANCE ONLY

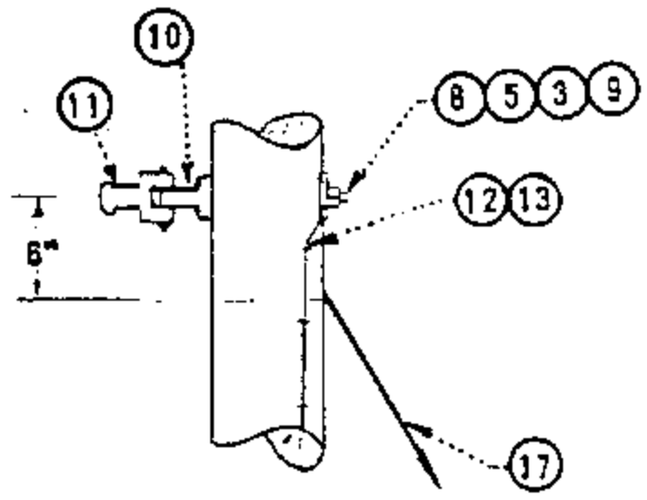
| | | |
|---|---|---|
| 599.201<br>SUPERSEDES<br>520 (1985) | SDG&E ELECTRIC STANDARDS<br>TRANSMISSION CONSTRUCTION,<br>69KV SINGLE CIRCUIT, HORIZONTAL POST INSULATORS | DATE 7-1-84<br>APPD |

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**SCOPE:** THIS PAGE IS TO BE USED WHEN DESIGNING SINGLE CIRCUIT 69KV TRANSMISSION LINES USING 'Z' TYPE VERTICAL CONSTRUCTION.




HARDWARE DETAIL

FOR FIELD MAINTENANCE ONLY

**STALLATION**

A. FOR USE WITH LINE ANGLES FROM 30° - 60°.

B. POLE BANDS MAY BE SUBSTITUTED FOR MACHINE BOLTS WHEN ADDITIONAL STRENGTH IS REQUIRED UNDER HIGH TENSION CONDITIONS WHEN SPECIFIED BY THE TRANSMISSION ENGINEER.

C. ADD THE GUYS IN ORDER INDICATED ABOVE (X, Y, Z) AS REQUIRED BY THE GUYING SECTION.

(E) EXEMPT MATERIAL.

| ITEM NUMBER | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| T.P.F. | T.O.C. | | | |
| 1 | | POLE, CLASS AND HEIGHT (AS REQ'D) | 1 | 300 SECTION |
| | 2 | INSULATOR, SUSPENSION, B/S DISC. | AS REQ'D | 700 SECTION |
| 3 | | WASHER, 3/4" ROUND (E) | 6 | 800256 |
| | 4 | CLAMP, SUSPENSION | 3 | 700 SECTION |
| 5 | | WASHER, 4" SQUARE CURVED RIB (E) | 3 | 797760 |
| 6 | | WASHER, SPRING DBL. COIL 3/4" (E) | 1 | 798496 |
| 7 | | WASHER, 3" X 3" SQUARE CURVE (E) | 2 | 798912 |
| 8 | | BOLT, MACHINE 3/4" X (LENGTH AS REQ'D) | 4 | STD 139 |
| 9 | | NUTS 3/4" (E) | 3 | 504768 |
| | 10 | EYELET, STANDARD (E) | 3 | 235648 |
| | 11 | CLEVIS, BALL (E) | 3 | 235392 |
| 12 | | WIRE, #8 B. SOLID ANNEALED COPPER | 1.5 LB | 812928 |
| 13 | | STAPLES, 1 1/4", FENCE, GALV. (E) | 10 | 678528 |
| 14 | | SIGN, HIGH VOLTAGE (E) | 2 | 647648 |
| 15 | | NAILS, ROOFING, 8 GALV. (E) | 16 | 492192 |
| 16 | | GUARD, LINE | 3 SETS | STD 759 |
| 17 | | GUY (SEE NOTE C) | AS REQ'D. | 900 SECTION |
| 18 | | LOCKNUT, M-F 3/4" (E) | 1 | 504576 |

DATE 7-1-84
APPD SRL/DRH

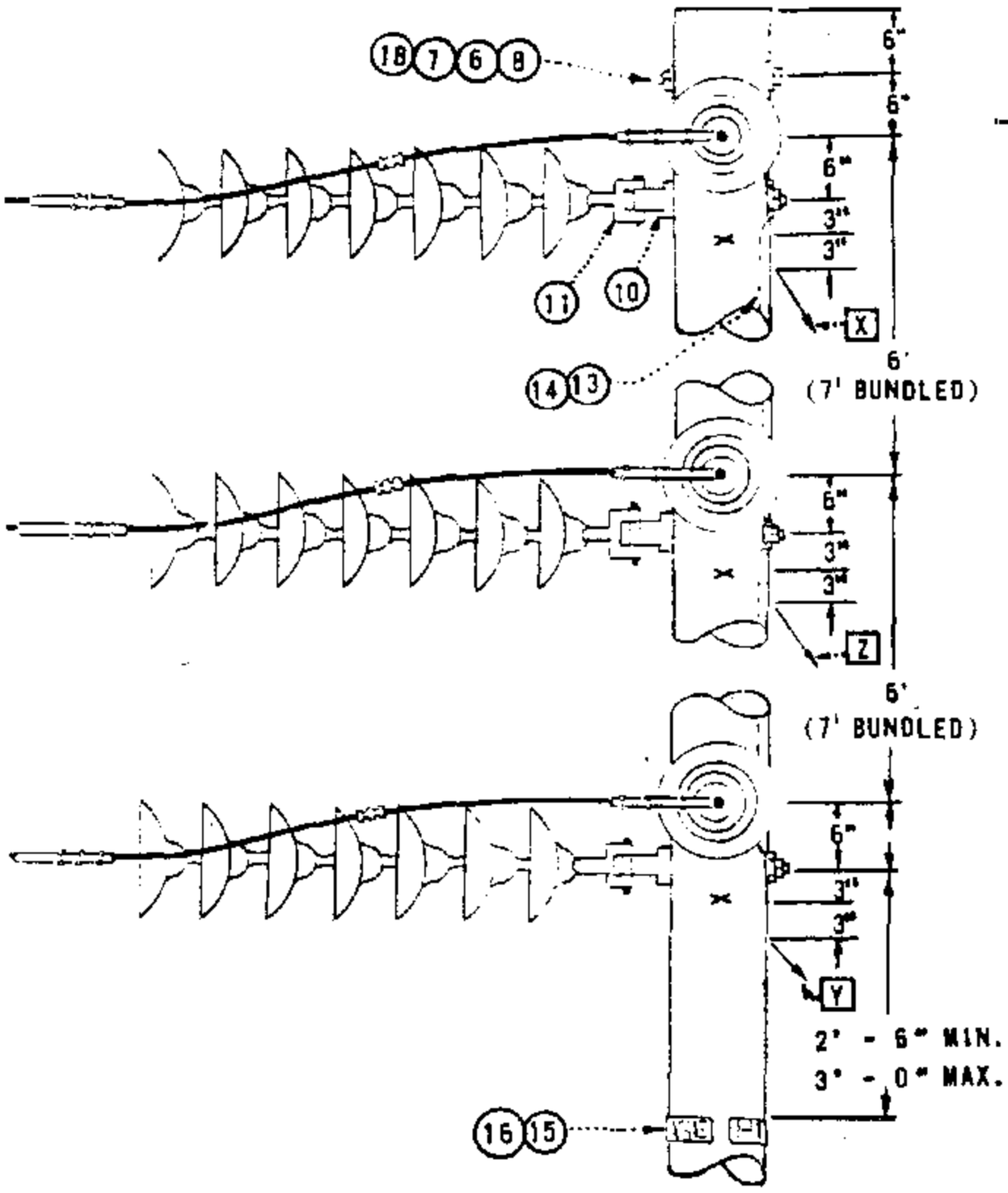
SDG&E ELECTRIC STANDARDS

TRANSMISSION CONSTRUCTION - 69KV
SINGLE CIRCUIT - VERTICAL CONFIGURATION - TYPE Z

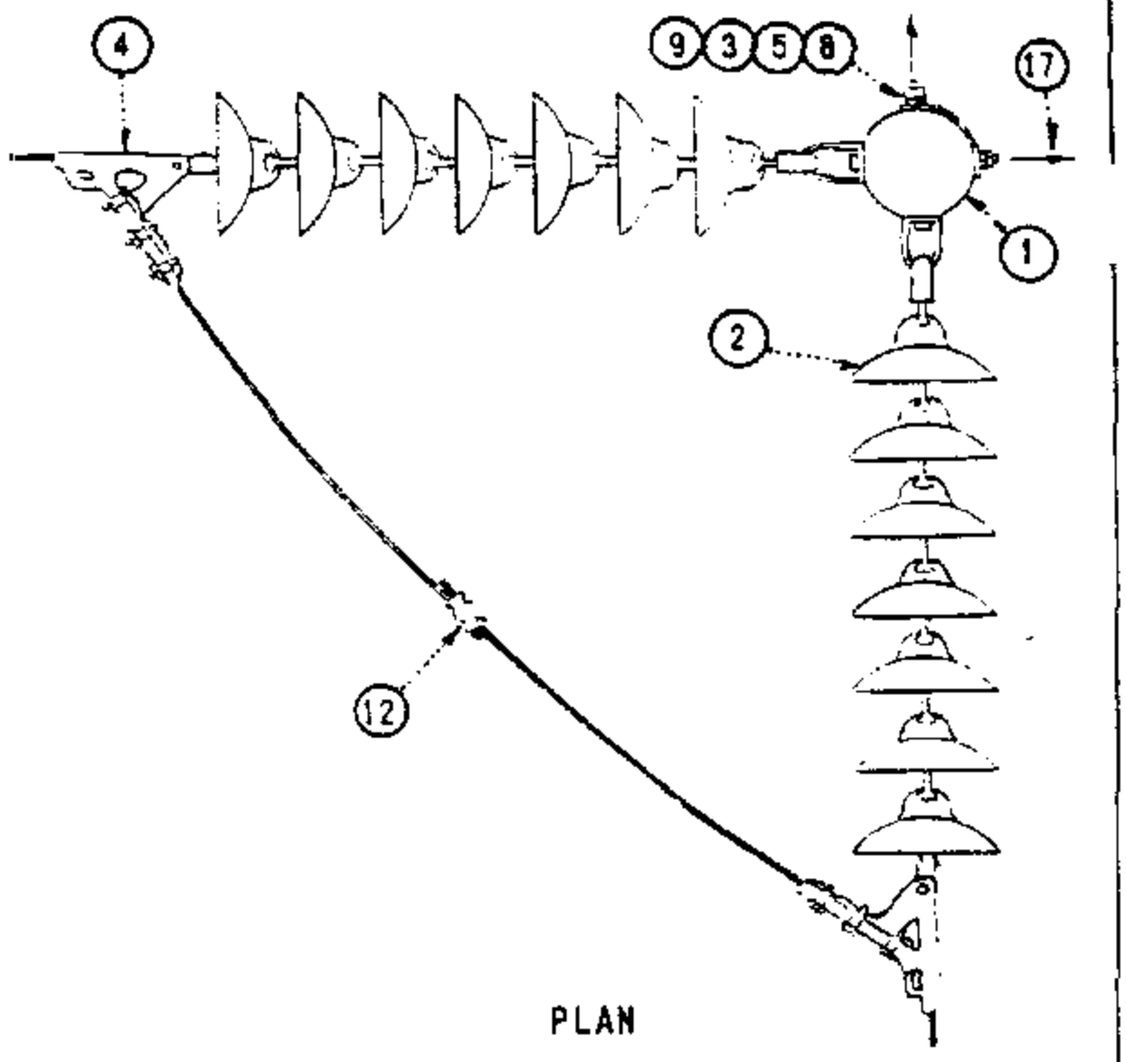
599.202
SUPERSEDES
521 (1985)

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**SCOPE:** THIS PAGE IS TO BE USED WHEN DESIGNING SINGLE CIRCUIT 69KV TRANSMISSION LINES USING 'Y' TYPE VERTICAL CONSTRUCTION.




ELEVATION




PLAN

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. FOR USE WITH LINE ANGLES GREATER THAN 60°.

B. POLE BANDS MAY BE SUBSTITUTED FOR MACHINE BOLTS WHEN ADDITIONAL STRENGTH IS REQUIRED UNDER HIGH TENSION CONDITIONS WHEN SPECIFIED BY THE TRANSMISSION ENGINEER.

C. ADD THE GUYS ON EITHER SIDE IN THE ORDER INDICATED ABOVE (X, Y, Z) AS REQUIRED BY THE GUYING SECTION.

(E) EXEMPT MATERIAL

| ITEM NUMBER | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| T.P.F. | T.O.C. | | | |
| 1 | | POLE, CLASS AND HEIGHT (AS REQ'D) | 1 | 300 SECTION |
| | 2 | INSULATOR, SUSPENSION, B/S DISC. | AS REQ'D | 700 SECTION |
| 3 | | WASHER, 3/4" ROUND (E) | 12 | 800256 |
| | 4 | CLAMP, STRAIN, WITH SOCKET EYE | 6 | 700 SECTION |
| 5 | | WASHER, 4" SQUARE CURVED RIB (E) | 6 | 797760 |
| 6 | | WASHER, SPRING DBL COIL, 3/4" (E) | 1 | 798496 |
| 7 | | WASHER, 3" X 3" SQUARE CURVED (E) | 2 | 798912 |
| 8 | | BOLT, MACHINE 3/4" X (LENGTH AS REQ'D) | 7 | 100 SECTION |
| 9 | | NUTS, 3/4" (E) | 6 | 504768 |
| | 10 | EYELET, STANDARD (E) | 6 | 235648 |
| | 11 | CLEVIS, BALL (E) | 6 | 235392 |
| | 12 | CONNECTOR, COMPRESSION | 3 | 700 SECTION |
| 13 | | WIRE #8 B. SOLID ANNEALED COPPER | 1.5 LB | 812928 |
| 14 | | STAPLES, 1 1/4" FENCE, GALV. (E) | 10 | 678528 |
| 15 | | SIGN, HIGH VOLTAGE (E) | 2 | 647648 |
| 16 | | NAILS, ROOFING 8 GALV. (E) | 16 | 492192 |
| 17 | | GUY (SEE NOTE C) | AS REQ'D | 900 SECTION |
| 18 | | LOCKNUT, M-F 3/4" (E) | 1 | 504576 |

599.203
SUPERSEDES
522 (1985)

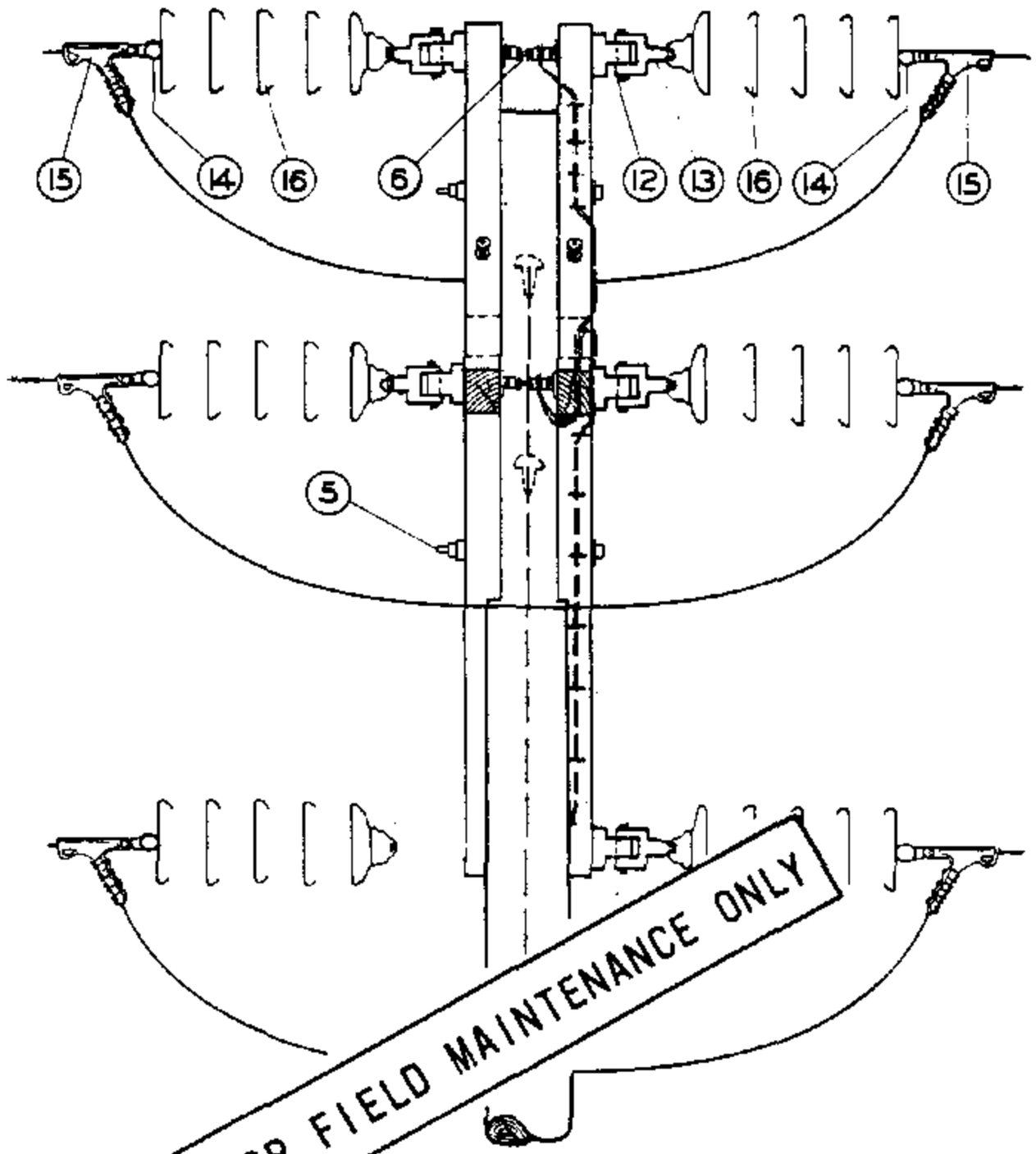
SDG&E ELECTRIC STANDARDS

TRANSMISSION CONSTRUCTION - 69KV
SINGLE CIRCUIT - VERTICAL CONFIGURATION - TYPE Y

DATE 7-1-84
APPD GRJ / SCH

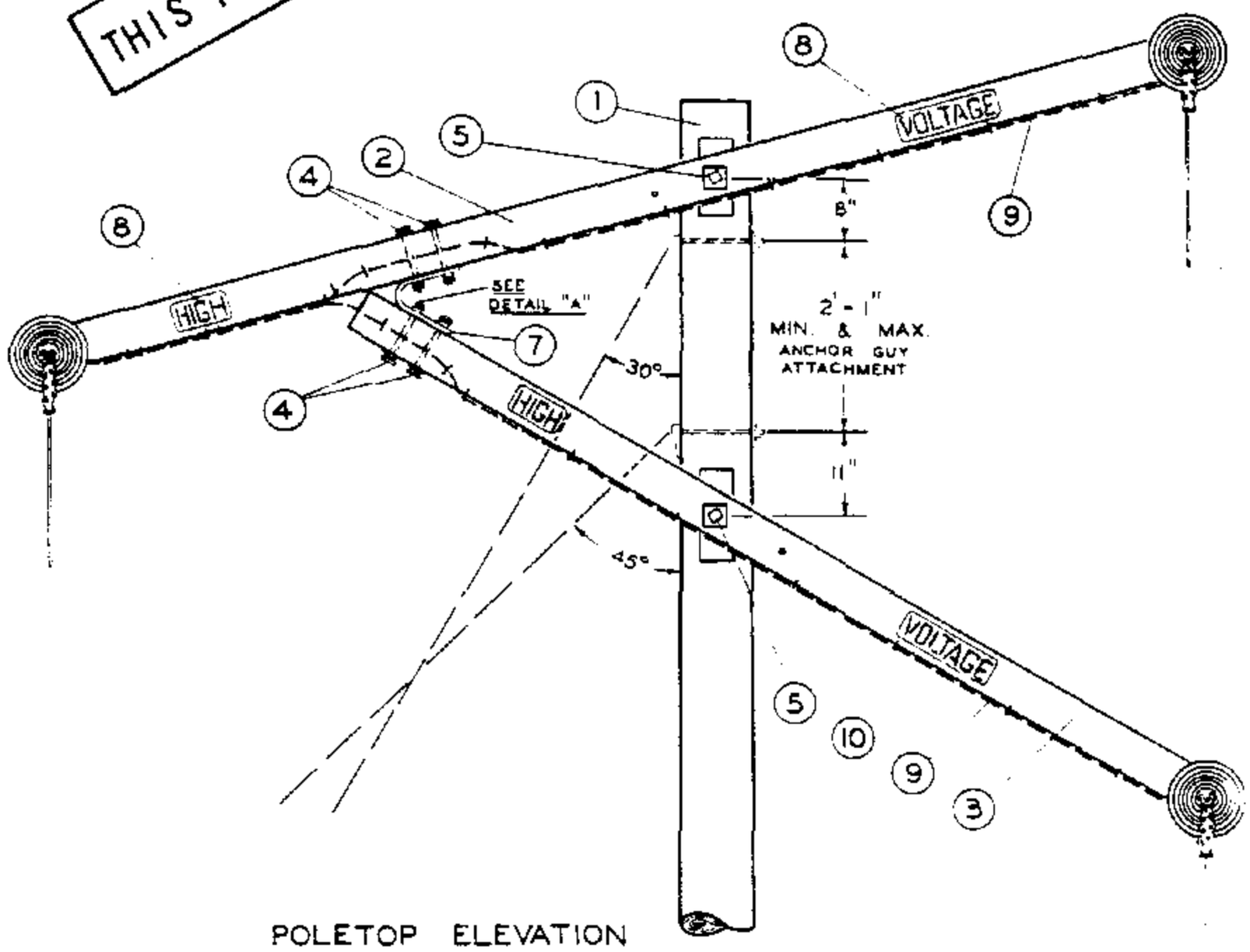
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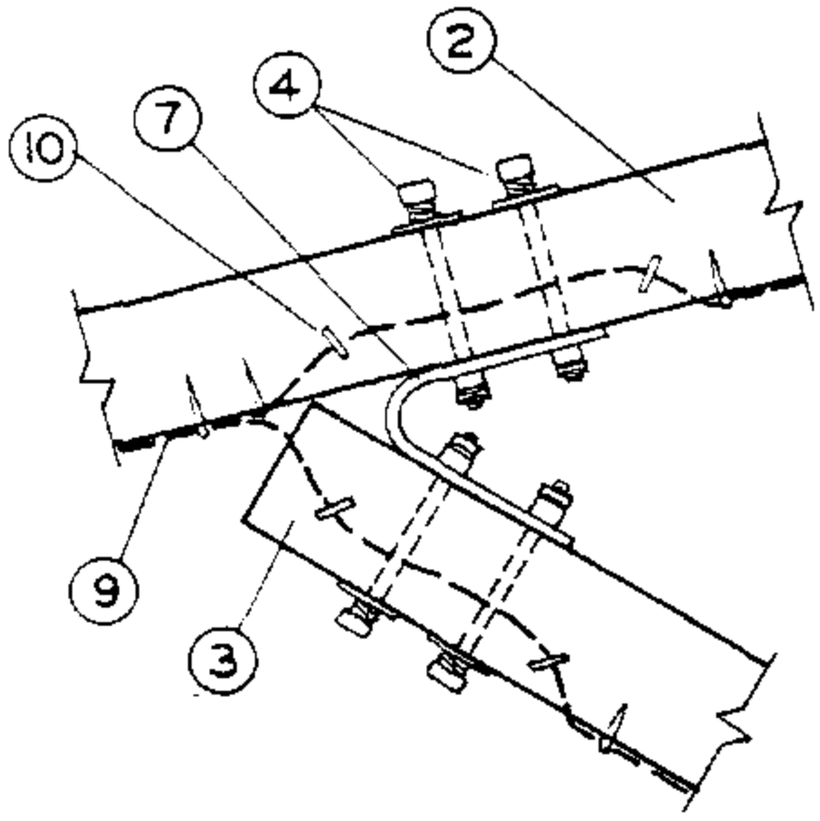

SIDE

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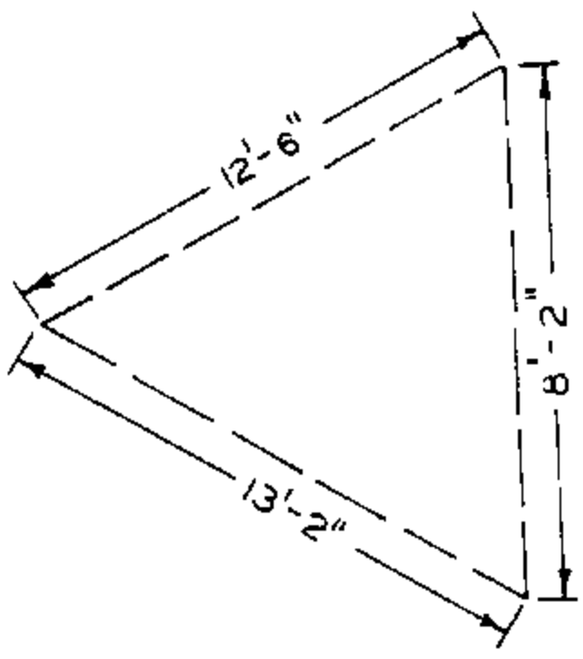



POLETOP ELEVATION

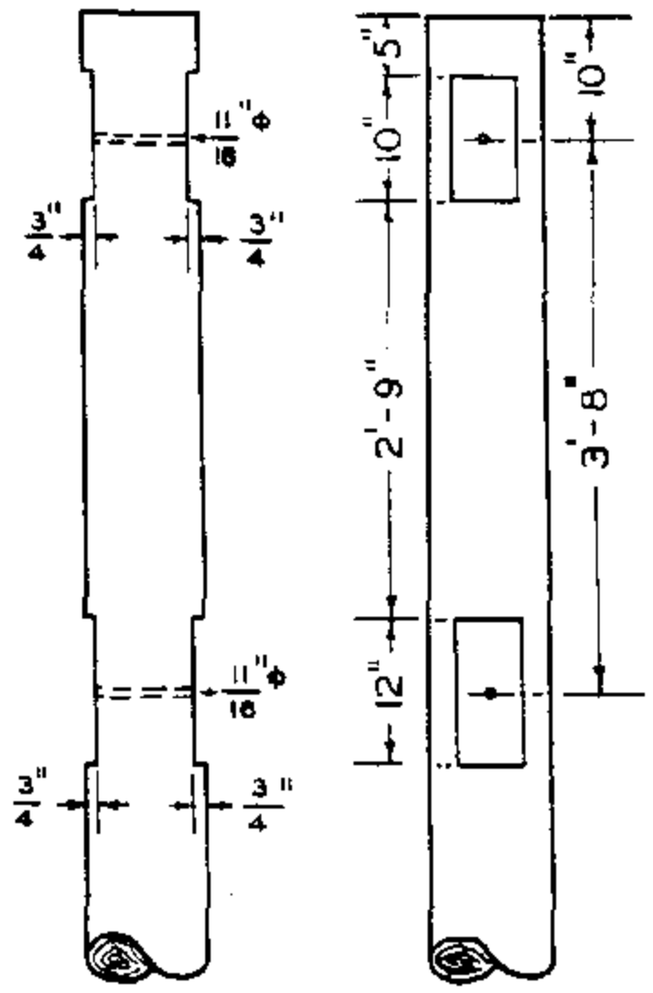
| | | |
|---|---|---|
| ISSUE 1993<br>DATE 7-1-84<br>APPD [signature] | SDG&E ELECTRIC STANDARDS<br>TRANSMISSION CONSTRUCTION, 69KV, SINGLE CIRCUIT,<br>FIGURE "4", TYPE X | 599.301<br>SUPERSEDES<br>532 (4-1-74) |




DETAIL "A"




CONDUCTOR
REACTANCE SPACING




POLETOP
GAINING AND DRILLING

THIS PAGE FOR FIELD MAINTENANCE ONLY

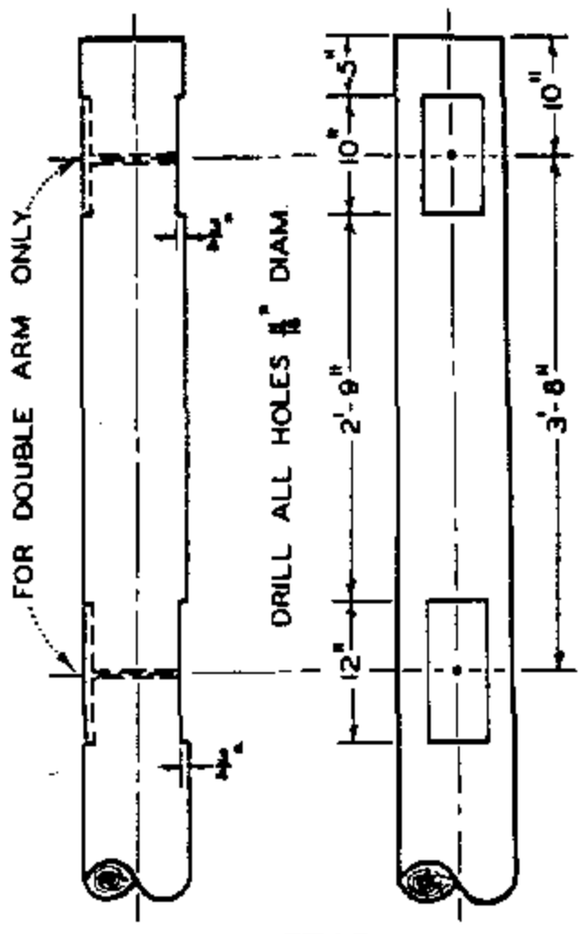
| ITEM | | DESCRIPTION | QUANT. | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| T. P. & F. | 1 | Pole, Class and Height as required | 1 | SECTION 300 |
| | 2 | 3 3/4" X 5 3/4" X 13'-6" Crossarm | 2 | STD 120 1T 5 |
| | 3 | 3 3/4" X 5 3/4" X 10'-8" Crossarm | 2 | STD 120 1T 5 |
| | 4 | Mach. Bolt, Galv., 5/8" X 8", 1-3" sq. wash., 1-dbl. coil spr. wash., 1-nut & 1-MF lock nut | 8 | STDS 138 140 |
| | 5 | Mach. Bolt, Galv., 5/8" X 18", 2-3" sq. wash., 1-flat spr. wash., 1-nut & 1-MF lock nut | 2 | STDS 139 140 |
| | 6 | Space Bolt, Galv., 5/8" X 20", 4-3" sq. wash., 5-nuts, 2-dbl. coil spr. wash., 2-rd. wash., & 2-MF lock nuts | 3 | STDS 138 140 |
| | 7 | Crossarm Tie Plate, Galv. | 2 | 543200 |
| | 8 | High Voltage Sign & 8 roofing nails, Galv. | 4 | 647648, 492224 |
| | 9 | #8 Bare Solid Annealed Copper Wire | 1 1/2# | 812928 |
| | 10 | 1 1/4" Fence Staples, Galv. | 23 | 678528 |
| | 11 | | | |
| T. O. C. & D. | 12 | EYELET, STANDARD | 6 | 235848 |
| | 13 | CLEVIS, BALL | 6 | 235392 |
| | 14 | Socket Eye | 6 | - |
| | 15 | Clamp, Strain | 6 | STD 742 |
| | 16 | Suspension Insulator, Ball & Socket | as reqd | STD 750 |
| | 17 | | | |

599.302
SUPERSEDES
533 (4-1-74)

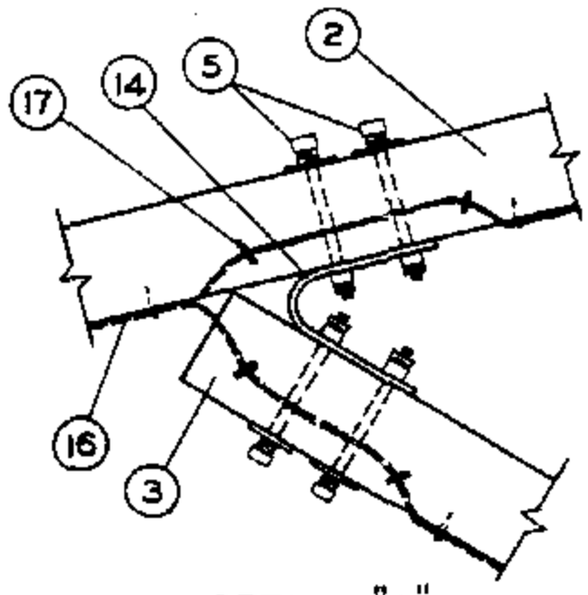
SDG&E ELECTRIC STANDARDS

TRANSMISSION CONSTRUCTION, 69KV, SINGLE CIRCUIT,
FIGURE "4", TYPE X

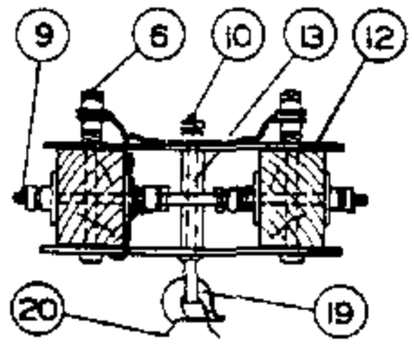
DATE 7-1-84
APPD GH/DRH



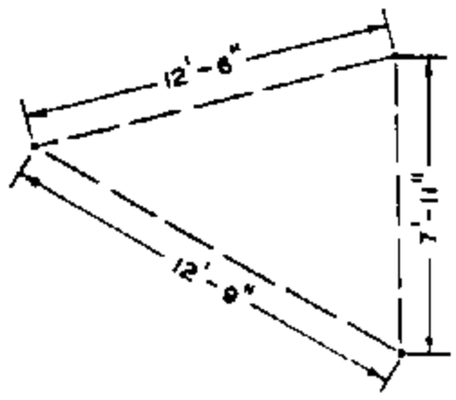

POLETOP
GAINING AND DRILLING




DETAIL "A"




DETAIL "B"



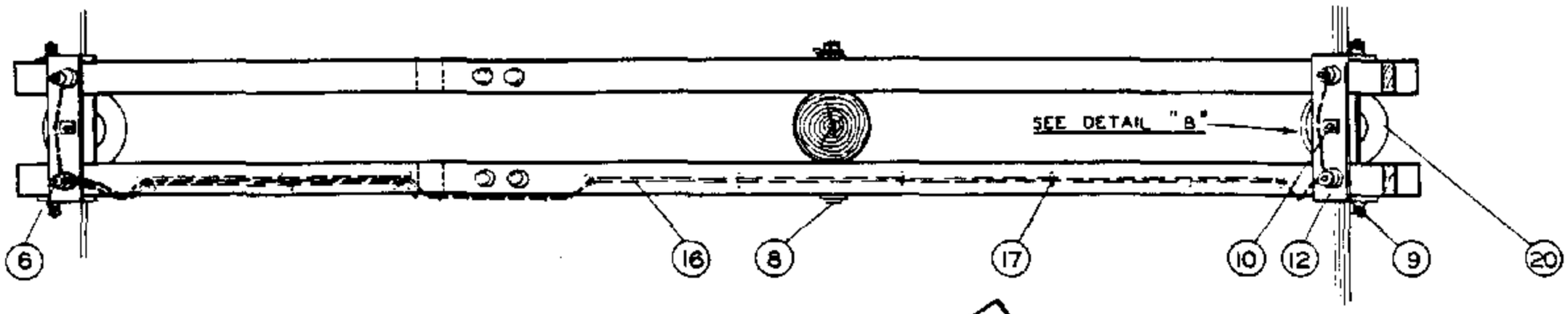

CONDUCTOR REACTANCE SPACING

THIS PAGE FOR FIELD MAINTENANCE ONLY

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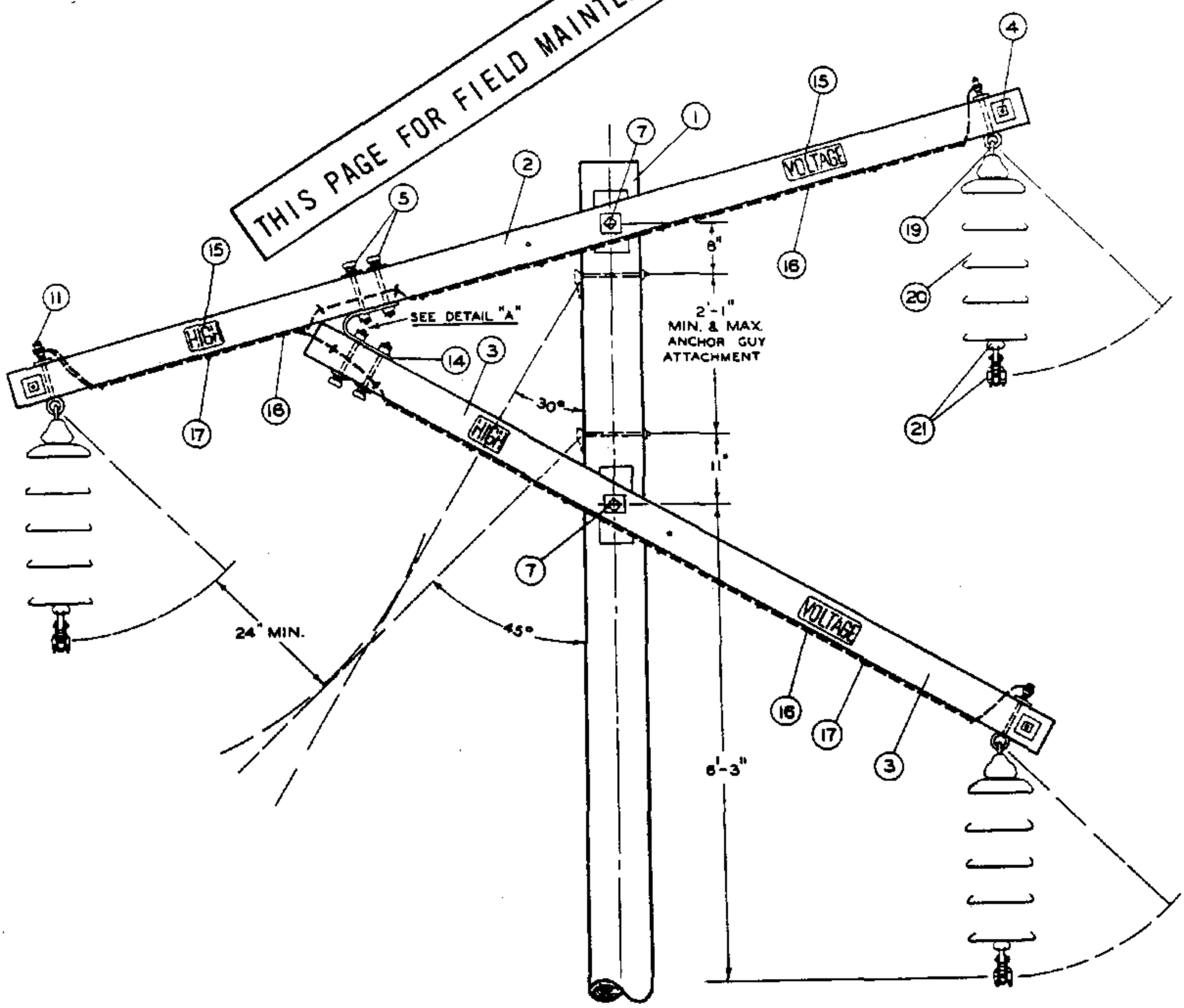
| ITEM | | DESCRIPTION | QUANTITY SINGLE ARM | QUANTITY DOUBLE ARM | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|
| | 1 | Pole, Class and Height as required | 1 | 1 | SECTION 300 |
| | 2 | 3 3/4" X 3 3/4" X 13'-6" Crossarm | 1 | 1 | PG 120 IT. 5 |
| | 3 | 3 3/4" X 5 3/4" X 10'-2" Crossarm | 1 | 1 | PG 120 IT. 1 |
| | 4 | Mach. Bolt, Galv., 5/8" X 6", 2-3" sq. wash.,1-dbl. coil spr. wash.,1-nut & 1-MF lock nut | 6 | 8 | PGS 139, 140 |
| | 5 | Mach. Bolt, Galv., 5/8" X 8", 1-2" sq. wash.,1-dbl. coil spr. wash.,1-nut & 1-MF lock nut | 4 | 6 | PGS 139, 140 |
| | 6 | Mach. Bolt, Galv., 5/8" X 9", 1-dbl. coil spr. wash.,2-nuts,2-rd. wash.,& 1-MF lock nut | 2 | 6 | PGS 139, 140 |
| | 7 | Mach. Bolt, Galv., 5/8" X 14", 2-3" sq. wash.,1-flat spr. wash.,1-nut & 1-MF lock nut | 2 | 2 | PGS 139, 140 |
| T. | 8 | Mach. Bolt, Galv., 5/8" X 18", 2-3" sq. wash.,1-flat spr. wash.,1-nut & 1-MF lock nut | 2 | 2 | PGS 139, 140 |
| P. | 9 | Space Bolt, Galv., 5/8" X 30", 4-3" sq. wash.,4-nuts,2-dbl. coil spr. wash. 4-MF lock nuts | 2 | 2 | PGS 139, 140 |
| & | 10 | Shoulder Eye Bolt, Galv., 5/8" X 8", 1-rd. wash.,1-nut & 1-MF lock nut | 2 | 2 | PGS 139, 140 |
| F. | 11 | Shoulder Eye Bolt, Galv., 5/8" X 9", 1-2 1/4" sq. wash.,1-dbl. coil spr. wash., 2-rd.wash., 2-nuts & 1-MF lock nut | 2 | 2 | PGS 139, 140 |
| | 12 | Double Aiming Plate, 4" X 1/4" X 17" | 2 | 6 | 541088 |
| | 13 | Spacer, 3/4" diameter X 5 3/4" pipe, Galv. | 2 | 2 | 663552 |
| | 14 | Crossarm Tie Plate, Galv. | 1 | 1 | 543200 |
| | 15 | High Voltage Sign & 8 roofing nails, Galv. | 4 | 4 | 647648, 492224 |
| | 16 | #6 Bare Solid Annealed Copper Wire | 1 1/2# | 1 1/2# | 812928 |
| | 17 | 1 1/4" Fence Staples, Galv. | 28 | 28 | 678528 |
| | 18 | | | | |
| T. | 19 | Ball Hook, short | 2 | 2 | 414880 OR 414912 |
| O. | 20 | Suspension Insulator, Ball & Socket | as required | | PG 750 |
| C. | 21 | Suspension Clamp, complete with socket eye | 2 | 2 | PGS 775, 776 |
| . | 22 | | | | |

| | | |
|---|---|---|
| DATE 7-1-84<br>APPD RE2/DRH | SDG&E ELECTRIC STANDARDS<br>TRANSMISSION CONSTRUCTION,<br>69KV, SINGLE CIRCUIT, FIGURE "6", TYPE W | 599.303<br>SUPERSEDES<br>531 (4-1-74) |




PLAN - DOUBLE ARM

THIS PAGE FOR FIELD MAINTENANCE ONLY

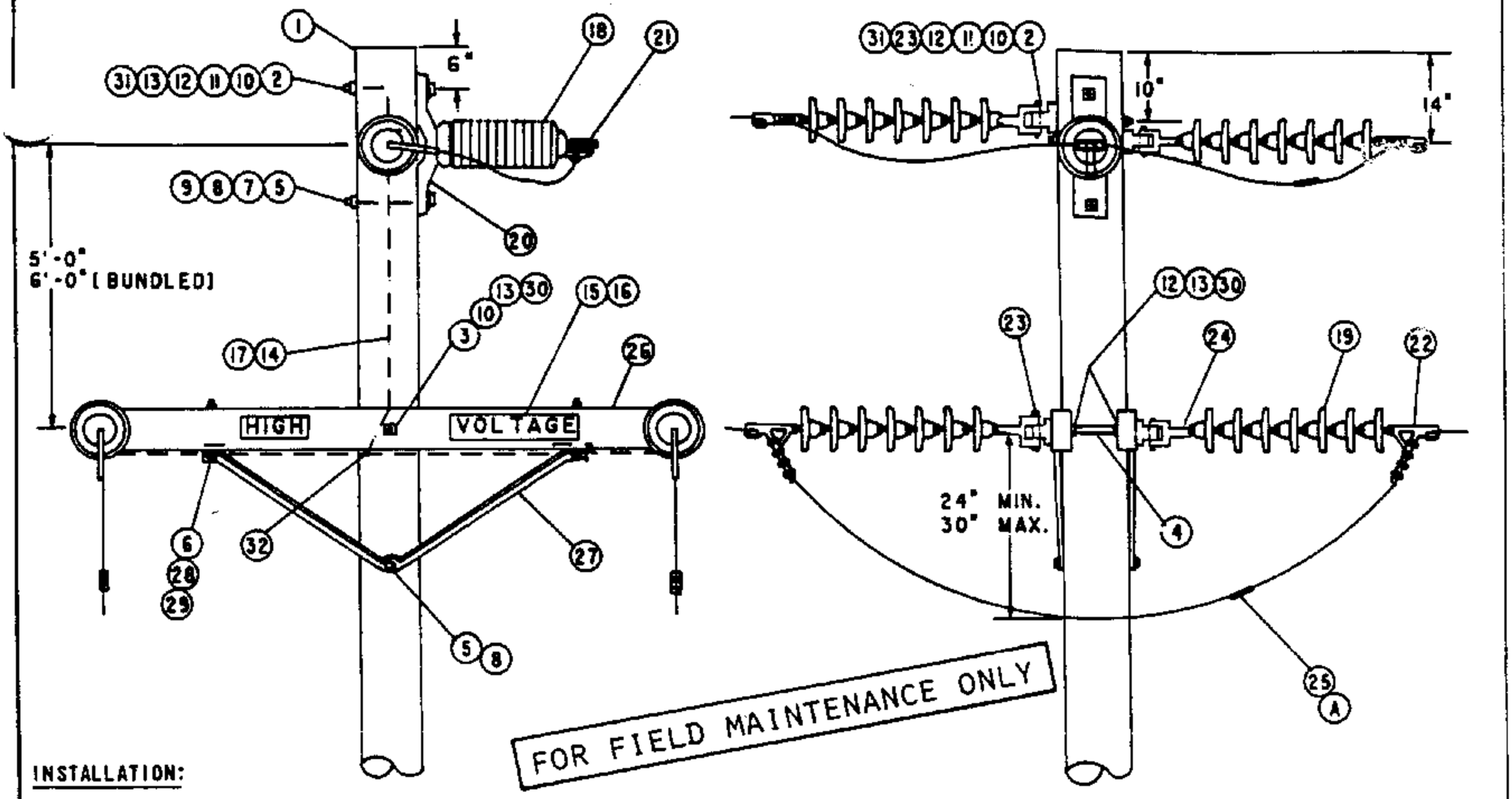



POLETOP ELEVATION - SINGLE ARM

| | | |
|---|---|---|
| 599.304<br>SUPERSEDES<br>530 (4-1-74) | SDG&E ELECTRIC STANDARDS<br>TRANSMISSION CONSTRUCTION,<br>69KV, SINGLE CIRCUIT, FIGURE "4", TYPE W | DATE 7-1-84<br>APPD |

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**SCOPE:** THIS PAGE IS TO BE USED WHEN DESIGNING SINGLE CIRCUIT 69KV TRANSMISSION LINES USING TYPE X-△ TRIANGULAR DEADEND CONFIGURATION




**INSTALLATION:**

(A) USE ONLY FOR CONDUCTOR REPLACEMENT. MAKE CONTINUOUS JUMPERS ON NEW CONSTRUCTION.

(E) EXEMPT ITEM.

| ITEM F | ITEM TOC | DESCRIPTION | QUANTITY | STOCK NO. OR CONST. STD. |
|---|---|---|---|---|
| 1 | | POLE, CLASS AND HEIGHT AS REQ'D. | 1 | STDS 353, 354 |
| 2 | | BOLT, MACH., 3/4" X 14" | 3 | 153440 |
| 3 | | BOLT, MACH., 3/4" X 26" | 1 | 153728 |
| 4 | | BOLT, SPACE, 3/4" X 26" | 2 | 156288 |
| 5 | | BOLT, MACH., 5/8" X 14", WITH NUT | 2 | 154880 |
| 6 | | WASHER, ROUND 1/2" FLAT (E) | 2 | 800192 |
| 7 | | WASHER, 3" SQ. CURVED, 5/8" (E) | 1 | 798912 |
| 8 | | WASHER, 5/8" DBL. COIL SPRING (E) | 2 | 798560 |
| 9 | | LOCKNUT, M-F 5/8" (E) | 2 | 504608 |
| 10 | | LOCKNUT, M-F 3/4" (E) | 12 | 504576 |
| 11 | | WASHER, 4" SQ. CURVED, 3/4" RIB | 3 | 797760 |
| 12 | | WASHER, ROUND 3/4" FLAT | 1 | 800256 |
| 13 | | WASHER, 3/4" DBL. COIL SPRING | 6 | 798496 |
| 14 | | WIRE, #8 B. SOLID ANNEALED COPPER | 1.5 LB. | 812928 |
| 15 | | SIGN, HIGH VOLTAGE (E) | 2 | 647648 |
| 16 | | NAILS, ROOFING, #8 GALV. (E) | 16 | 492224 |
| 17 | | STAPLES, 1 1/4" FENCE, GALV. (E) | 20 | 498528 |
| | 18 | INSULATOR, 88KV HORZ. POST | 1 | 429312 |
| | 19 | INSULATOR, SUSPENSION B/S DISC. | AS REQ'D | PG. 750.4 |
| | 20 | BASE, INSULATOR | 1 | 125728 |
| | 21 | CLAMP, CONDUCTOR POST INSULATOR | 1 | STD 773 |
| | 22 | CLAMP, CONDUCTOR STRAIN | 6 | STDS 742, 744 |
| | 23 | EYELET, STANDARD (E) | 6 | 235648 |
| | 24 | CLEVIS, BALL | 6 | 235392 |
| | 25 | SLEEVE, JUMPER (A) | 3 | 700 SECTION |
| 26 | | CROSSARM 3 3/4" X 5 3/4" X 10' | 2 | 294128 |
| 27 | | BRACE, ANGLE 5' | 2 | 164128 |
| 28 | | BOLT, MACH. 1/2" X 7" WITH NUT (E) | 2 | 153120 |
| 29 | | WASHER, DBL. COIL, 1/2" (E) | 2 | 798464 |
| 30 | | WASHER, 3" SQ. FLAT (E) | 10 | 799104 |
| 31 | | NUTS, MACHINE, 3/4" | 17 | 504768 |
| 12 | | CONNECTOR, SPLIT BOLT (E) | 1 | 269632 |

| | | |
|---|---|---|
| DATE 7-1-84<br>APPD [signature] | SDG&E ELECTRIC STANDARDS<br>TRANSMISSION - 69KV TYPE X-△<br>STRUCTURE SINGLE CIRCUIT - TRIANGULAR DEADEND | 599.305<br>SUPERSEDES<br>535 (1985) |

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**SCOPE:** THIS STANDARD SHOWS A MOTOR OPERATED HORIZONTAL BREAK GANG OPERATED POLE TOP SWITCH FOR SCADA.

NOTE:

– A. B. CHANCE TYPE "D" SWITCH ILLUSTRATED.

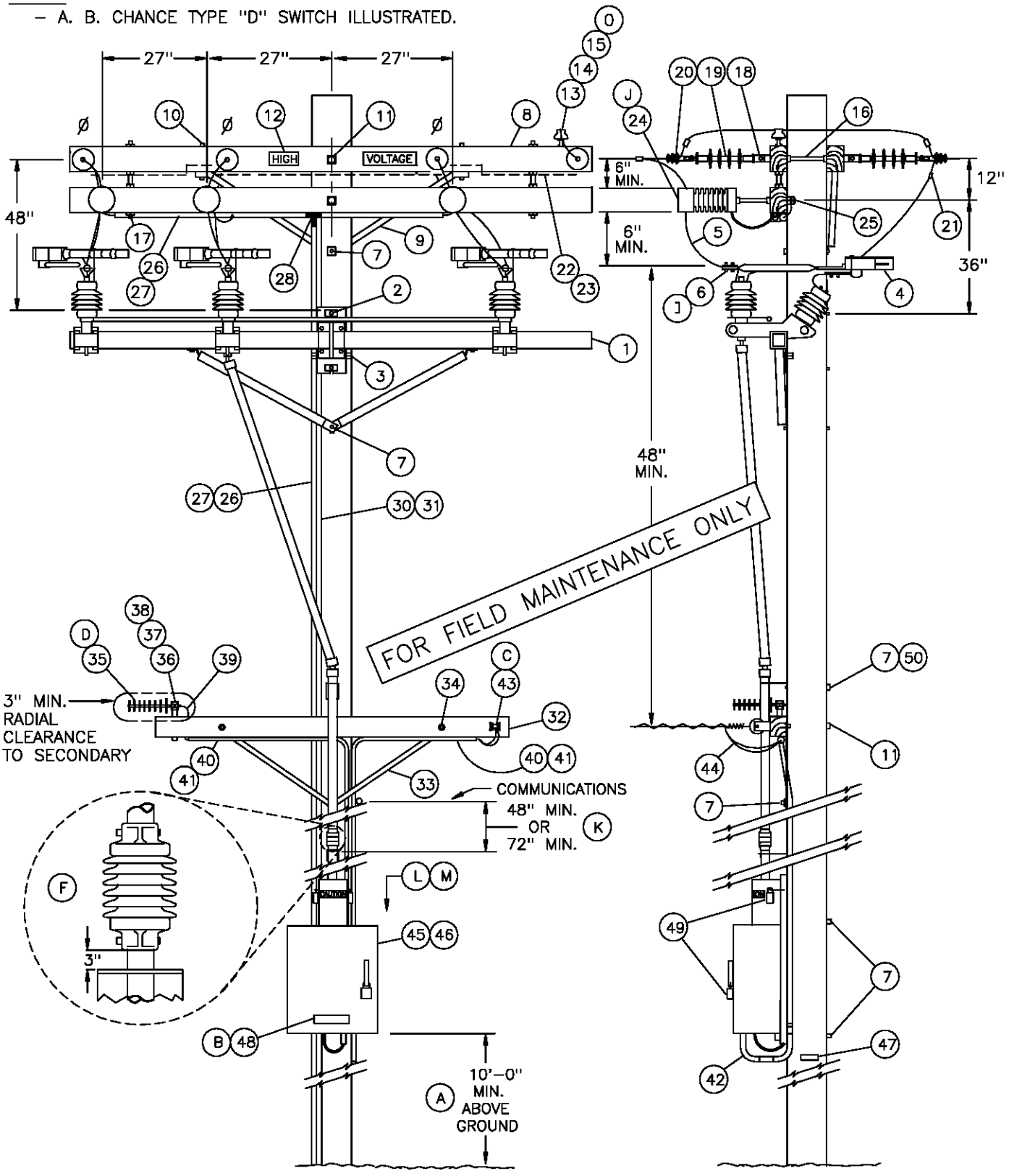
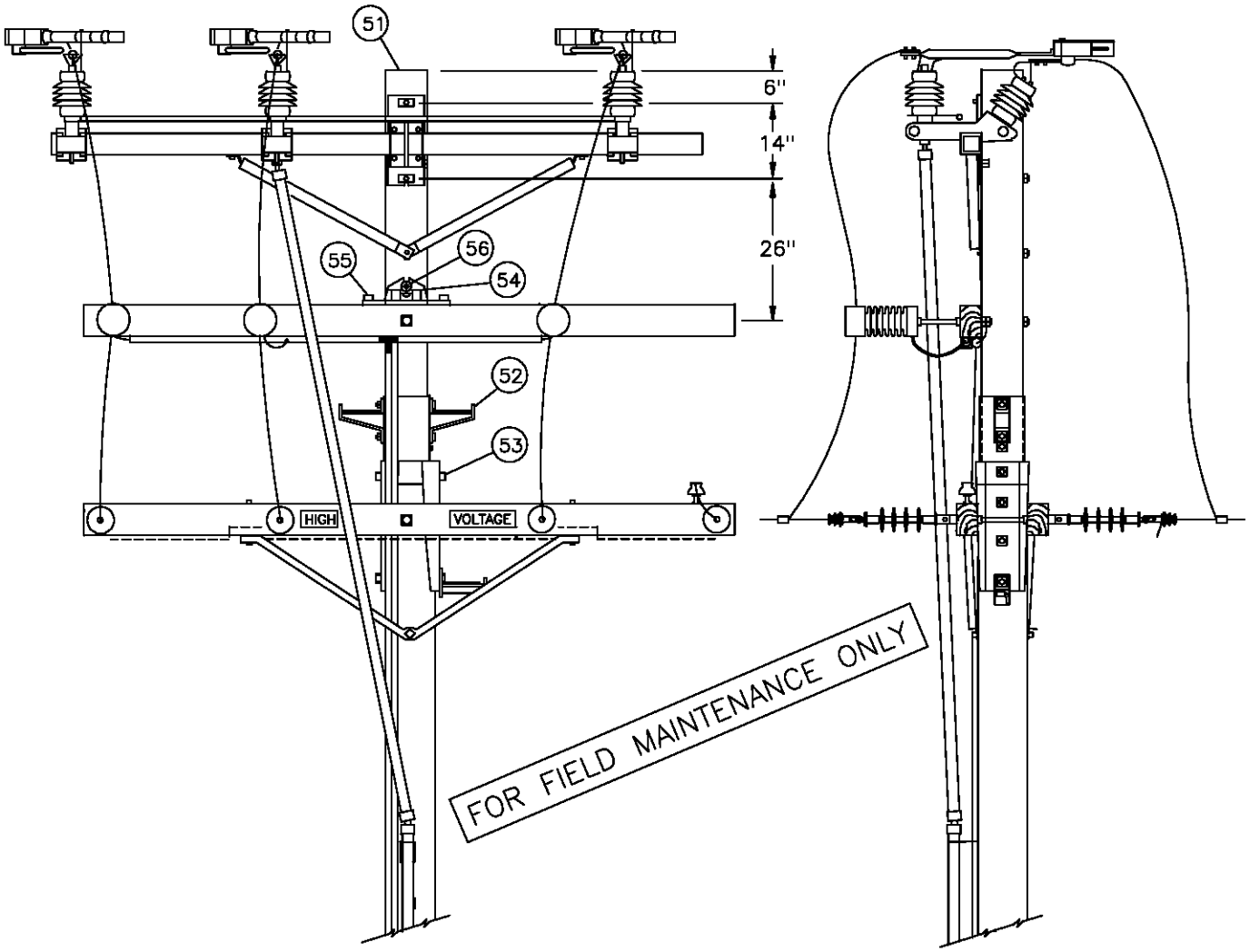



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| 599.306<br>SUPERSEDES<br>535.1 (11–1–98) | SDG&E ELECTRIC STANDARDS<br>OVERHEAD SCADA SWITCH 12KV<br>HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT<br>MOTOR OPERATED | DATE 11–1–98<br>APPD PA / CMC |




GANG–OPERATED SWITCH AND CURRENT SENSORS
MOUNTED ABOVE LINEARM (E)

BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | CONSTR. STD. OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| 1 | SWITCH, GANG–OPERATED, 15KV, 600 AMP, WITH LOAD INTERRUPTERS, INCLUDING 40' OF CONTROL ROD (G) | | 1 | – | 709258 | GANG–S |
| | ADDITIONAL 10'–6" CONTROL ROD WITH GUIDE BEARING AND COUPLING | A. B. CHANCE | AS REQ'D | – | 604428 | C–ROD |
| | | S & C | AS REQ'D | – | 602934 | S–ROD |
| 2 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | 2 | 392 | – | – |
| 3 | SCREW, LAG, GALV, 1/2" X 4" (CHANCE SWITCH ONLY) | | 2 | – | 621568 | – |
| 4 | LOAD INTERRUPTER–A. B. CHANCE SWITCH ONLY IF RETRO–FITTING REQUIRED | TYPE D | 3 | – | 433794 | LDBRKD |
| | | TYPE S | 3 | – | 433796 | LDBRKS |
| 5 | WIRE, BARE STRANDED CU OR AL (SIZE AS REQ'D) | | 33' | 711–715 | – | – |
| 6 | TERMINAL, COMPRESSION LUG (I) | | 6 | 794–795 | – | – |

CONTINUED NEXT PAGE:

| | | |
|---|---|---|
| DATE 12–1–98<br>APPD PSA / CMK | SDG&E ELECTRIC STANDARDS<br>OVERHEAD SCADA SWITCH 12KV<br>HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT<br>MOTOR OPERATED | 599.307<br>SUPERSEDES<br>535.2 (12–1–98) |

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BILL OF MATERIAL, CON'T:

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD. OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 6 | 392 | – | – |
| 8 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | 3 | – | 294128 | 4– |
| 9 | BRACE, ANGLE, 5' – 0" | 1 | – | 164128 | 5HUB |
| 10 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 3 | 392 | – | – |
| 12 | SIGN, HIGH VOLTAGE, AND | 2 | – | 647648 | HV |
| | 9 ROOFING NAILS, GALV | – | – | 492224 | – |
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" (H) | 2 | – | 532704 | PS1 |
| 14 | INSULATOR, 12KV NEUTRAL (H) | 2 | – | 429216 | 55–3/I |
| 15 | WIRE, TIE (DOUBLE) (H) | 1 | 760–764 | – | – |
| 16 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (H) | 4 | 392 | – | – |
| 17 | BOLT SPACE GALV. 5/8" X (LENGTH AS REQ'D) 4 SQUARE & 2 DOUBLE COIL SPRING WASHERS | 2 | 392 | – | – |
| 18 | CLEVIS, DEAD END, 5/8" BOLT STEEL (CLOSED TYPE) (H) | 8 | – | 235712 | – |
| 19 | INSULATOR, SUSPENSION, 12KV, CLEVIS, NON PORC (H) | 8 | 750 | – | – |
| 20 | CLAMP, STRAIGHT LINE, D.E. (H) | 8 | 741–743 | – | – |
| 21 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–786 | – | – |
| 22 | WIRE, #8 BARE SOLID ANNEALED COPPER | 12' | – | 812928 | BOND8 |
| 23 | STAPLE, FENCE, GALV, 1 1/4" | AS REQ'D | – | 678528 | – |
| 24 | LINE POST CURRENT SENSOR & 50' CABLE ASSEMBLY (J) | 3 | – | 116000 | CURSEN |
| 25 | BOLT, SPACE, GALV, 3/4" X (LENGTH AS REQ'D) 2 SQUARE, 2 ROUND & 2 DBL COIL SPRING WASHERS | 3 | 392 | – | – |
| 26 | CONDUIT, PVC, SCHED 40, 1" | 40' | – | 251200 | PVC–1 |
| 27 | STRAPS, PIPE, GALV, 1", AND | AS REQ'D | | 697792 | – |
| | 2–6D NAILS, GALV. | AS REQ'D | – | 490656 | – |
| 28 | ACCESS FITTING BODY, TYPE "T", PVC, 1" | 1 | – | 348900 | TEE–1 |
| 29 | UNIT GROUND, COMPLETE, AND | 1 | – | 603136 | GND6 |
| | #6 B.S. COPPER WIRE (N) | 6 LBS | – | 813536 | – |
| 30 | CONDUIT, PVC, SCHEDULE 40, 1/2" | 20' | – | 251168 | PVC1/2 |
| 31 | STRAPS, PIPE, GALV, 1/2", AND | AS REQ'D | – | 697728 | – |
| | 6D NAILS, GALV. | AS REQ'D | – | 490656 | – |
| 32 | CROSSARM, 3–1/2" X 4–1/2" X 6'–0" | 1 | 380.2 | 294112 | 2S |

FOR FIELD MAINTENANCE ONLY

CONTINUED NEXT PAGE:

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BILL OF MATERIAL, CON'T:

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD. OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 33 | BRACE, 28", FLAT, CROSSARM | 2 | – | 164192 | – |
| 34 | BOLT, MACH, GALV, 3/8" X 4–1/2" & 1 RD. WASHER | 2 | 392.2 | – | – |
| 35 | ANTENNA, BROADBAND, YAGI (D) | 1 | – | 109570 | ANT |
| 36 | NIPPLE, PIPE 2" X 6", GALV | 1 | – | 500960 | ANTXMB |
| 37 | BOLT, MACH, GALV. 1/2" X 9" | 1 | 392.2 | 153184 | |
| 38 | CENTERING WASHER, GALV. | 2 | – | 795520 | |
| 39 | CABLE, SUPERFLEX, ANTENNA | AS REQ'D | – | 197810 | ANTCAB |
| 40 | CONDUIT, PVC, SCHEDULE 40, 3/4" | 40' | – | 251328 | PVC3/4 |
| 41 | STRAPS, PIPE, GALV, 3/4", AND 2–6D NAILS, GALV. | AS REQ'D | – | 697888 | – |
| | | AS REQ'D | – | 490656 | – |
| 42 | ELBOW, PVC. 3/4" | 4 | – | 322166 | EL3/4 |
| 43 | SECONDARY DEADEND (C) | 1 | – | 235488 | 1SDE |
| 44 | WIRE, THW, #12, BLACK | 100' | – | 808096 | THW12 |
| 45 | MOTOR OPERATOR, INCLUDING COUPLING AND RTU | 1 | – | 509580 | ADMO |
| 46 | TRANSCEIVER, FIXED CHANNEL | 1 | – | 749500 | FCTRAN |
| | OR | | | | |
| | TRANSCEIVER SPREAD SPECTRUM | 1 | – | 749504 | SSTRAN |
| 47 | TAG, SWITCH NUMBER | 2 | 204 | – | – |
| 48 | TAG, RTU NUMBER | 1 | 208.5 | (B) | TAGRE |
| 49 | PADLOCK, SCHLAGE ELECTRIC SERIES | 3 | – | 514848 | – |
| 50 | SCREW, LAG, GALV, 5/8" X 5" | 2 | – | 621600 | – |
| 51 | 6' WOOD POLE TOP EXTENSION | 1 | 473 | 336324 | WPTX6 |
| 52 | POLE STEP KIT | 1 | 473 | 692950 | – |
| 53 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | 3 | 392 | – | – |
| 54 | GAIN, CROSSARM, BRACELESS | 1 | – | 369598 | BCGAIN |
| 55 | BOLT, MACH, GALV, 5/8" X 7" 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 56 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 1 | 392 | – | – |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

(A) MOTOR OPERATOR TO BE MOUNTED AT (13'–6") FROM GROUND–LEVEL TO BOTTOM OF CABINET WHEN LOCATED ON STREET–SIDE OF POLE. IF NOT VULNERABLE TO VEHICLE DAMAGE, MOUNT RTU AT 10' FROM GROUND–LEVEL TO BOTTOM OF CABINET.

(B) RTU NUMBER TO BE ASSIGNED BY DISTRIBUTION OPERATIONS AND ADDED TO JOB WITH DPSS NOTE.

(C) THIS ITEM NOT NECESSARY IF EXISTING SECONDARY RACK CONSTRUCTION.

| | | |
|---|---|---|
| DATE 11–1–98<br>APPD PSA / CMK | SDG&E ELECTRIC STANDARDS<br>OVERHEAD SCADA SWITCH 12KV<br>HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT<br>MOTOR OPERATED | 599.309<br>SUPERSEDES<br>535.4 (11–1–98) |

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INSTALLATION:

(D) PLANNER TO SPECIFY WHICH SIDE OF POLE FOR ANTENNA MOUNT WITH DATA FROM STANDARDS. POINTS LIST TO BE COMPLETED BY PLANNER AND SENT TO SENIOR ENGINEER, DISTRIBUTION OPERATIONS. SEE ELECTRIC STANDARDS TEAM FOR POINTS LIST FORMS AND COMMUNICATIONS REQUIREMENTS.

(E) IF INSUFFICIENT CLEARANCE BELOW THE LINEARM, MOUNT THE GANG-OPERATED SWITCH AND CURRENT SENSOR ARM ABOVE THE LINEARM USING A POLE TOP EXTENSION (SEE STANDARD 473). THIS CONFIGURATION MAY ALSO BE USED IF DISTRIBUTION IS UNDERBUILT ON A TRANSMISSION POLE.

(F) INSTALL CONTROL PIPE INSULATOR THREE INCHES ABOVE NEXT GUIDE BEARING ABOVE MOTOR OPERATOR

(G) SWITCHES ARE FURNISHED WITH 40 FEET OF OPERATING CONTROL ROD. THE TOP SECTION OF THE CONTROL ROD IS MADE OF FIBER GLASS, THE LOWER SECTIONS ARE MADE OF GALVANIZED PIPE.

(H) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(I) WHEN ATTACHING 1/0 AND 4/0 COPPER CONDUCTORS TO A POLE TOP SWITCH, USE A BRONZE CABLE TAP LUG, STOCK NUMBER 471296. IF EXCESSIVE VIBRATION OR WHIPPING COULD OCCUR, USE TWO LUGS IN SERIES.

(J) NOTE: BEFORE ENERGIZING SENSORS, GROUND ALL CURRENT SENSOR BASES BY ATTACHING GROUND WIRE TO MOUNTING BOLT ON BACKSIDE OF CROSSARM.

(K) THE MINIMUM CLEARANCE FROM GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT AT THE COMMUNICATIONS LEVEL TO THE UPPERMOST GROUNDED PORTION OF THE CONTROL ROD IS 72". IF NO GROUNDED METAL BOXES, HARDWARE OR EQUIPMENT ARE PRESENT, CLEARANCE MAY BE REDUCED TO 48".

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REFERENCES:

(L) POLE STEPPING – SEE STANDARD 363.

(M) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

(N) NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES TIE SWITCHES TO CIRCUITS EMANATING FROM DIFFERENT SUBSTATIONS. (SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3).

(O) GROUNDING METHODS – SEE STANDARDS 1002.

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| | | |
|---|---|---|
| 599.310<br>SUPERSEDES<br>535.5 (11-1-98) | SDG&E ELECTRIC STANDARDS<br>OVERHEAD SCADA SWITCH 12KV<br>HORIZONTAL LOADBREAK TYPE SINGLE CIRCUIT<br>MOTOR OPERATED | DATE 12-1-98<br>APPD PSA / CMK |

| INSULATION TABLE FOR TRANSMISSION LINES | | | | | | | |
|---|---|---|---|---|---|---|---|
| VOLTAGE | | INSULATION DISTRICT (A) | | | | | |
| | STRUCTURE | HEAVY CONTAMINATION | | MEDIUM CONTAMINATION | | LIGHT CONTAMINATION | |
| | | INSULATOR UNITS AND TYPE | | | | | |
| KV | TYPE | SUSPENSION | DEAD END | SUSPENSION | DEAD END | SUSPENSION | DEAD END |
| 69 | WOOD POLES & STRUCTURES | 5 FOGS | 7 DISCS | 5 DISCS | 6 DISCS | 4 DISCS | 5 DISCS |
| 69 | STEEL TOWERS & STRUCTURES | 6 FOGS | 8 DISCS | 6 DISCS | 7 DISCS | 5 DISCS | 6 DISCS |
| 138 | WOOD POLES & STRUCTURES | 9 FOGS | 11 DISCS | 9 DISCS | 11 DISCS | 8 DISCS | 10 DISCS |
| 138 | STEEL TOWERS & STRUCTURES | 10 FOGS | 12 DISCS | 10 DISCS | 12 DISCS | 9 DISCS | 11 DISCS |

NOTES:

(A) CONTAMINATION DISTRICTS IDENTIFIED ON STANDARD PAGE 287.

B. USE BONDED SUSPENSION UNITS THROUGH RESIDENTIAL AND COMMERCIAL AREAS.

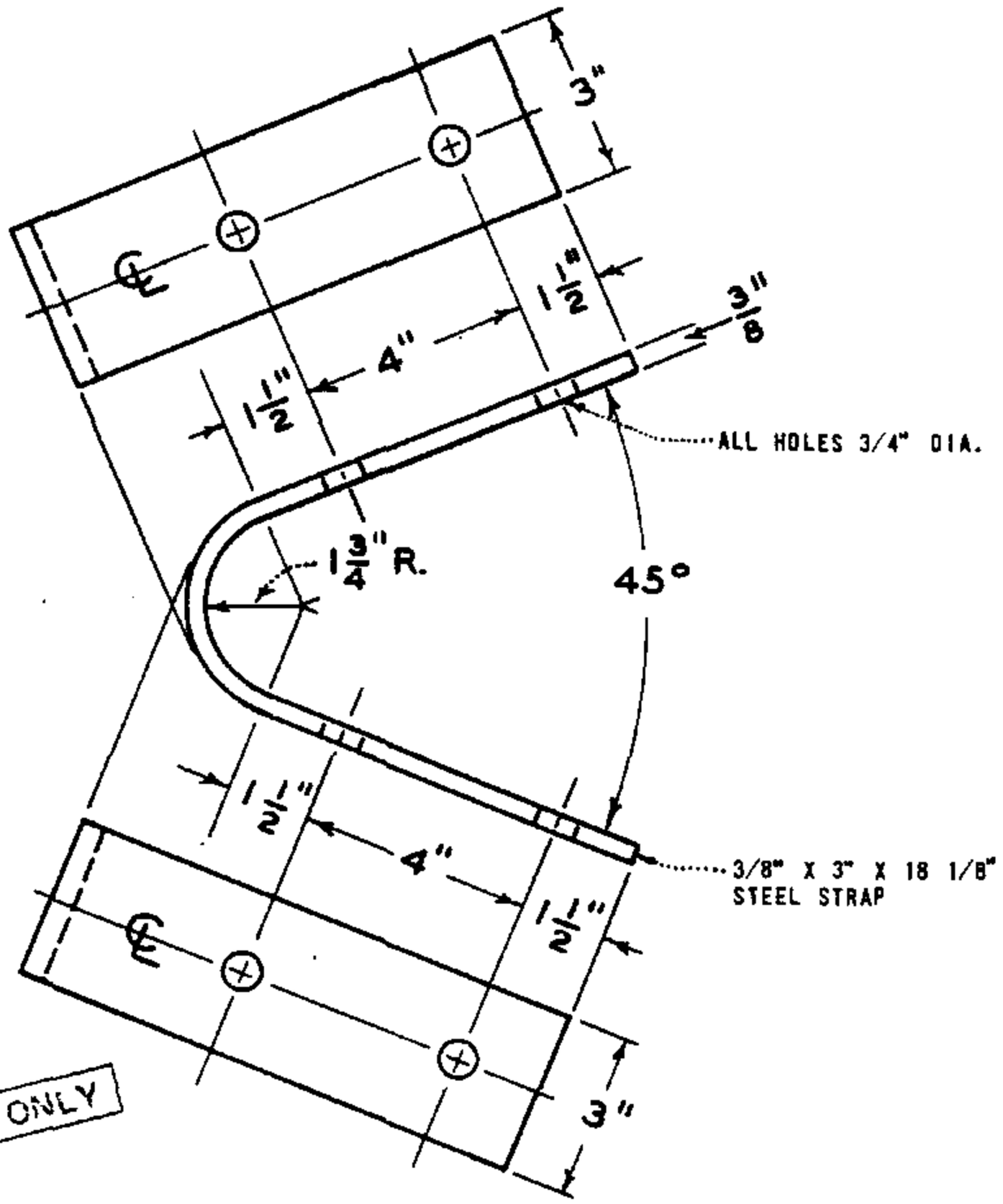
C. SEE STANDARDS PAGE 750.4 FOR SUSPENSION INSULATORS.

D. FOR BONDING DETAILS SEE STANDARDS PAGE 756.

FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| DATE 1-1-86<br>APPD | SDG&E ELECTRIC STANDARDS<br>TRANSMISSION LINE INSULATION TABLE | 599.501<br>SUPERSEDES<br>755 (1986) |




FOR FIELD MAINTENANCE ONLY

ITEM NO. 1

TO BE HOT-DIP GALV. AFTER FABRICATION

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | CROSSARM TIE-PLATE (FIGURE 4 CONSTRUCTION) | 543200 | | | |
| | | | | | |
| | | | | | |
| | | | | | |

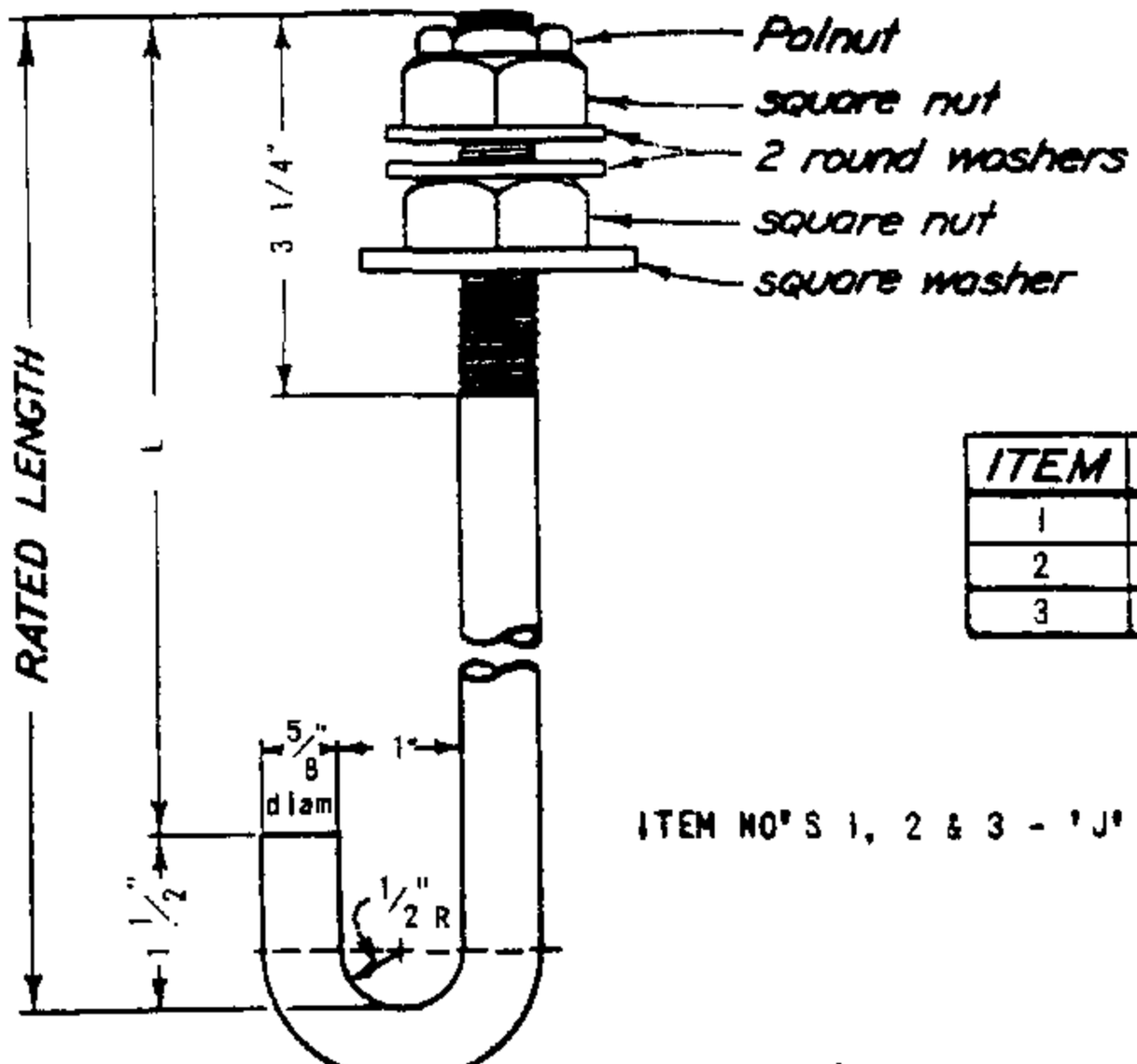
DATE 1-1-86
APPD AK / RD

SDG&E ELECTRIC STANDARDS

TRANSMISSION HARDWARE CROSSARM TIE-PLATE

599.901
SUPERSEDES
172 (12-10-82)

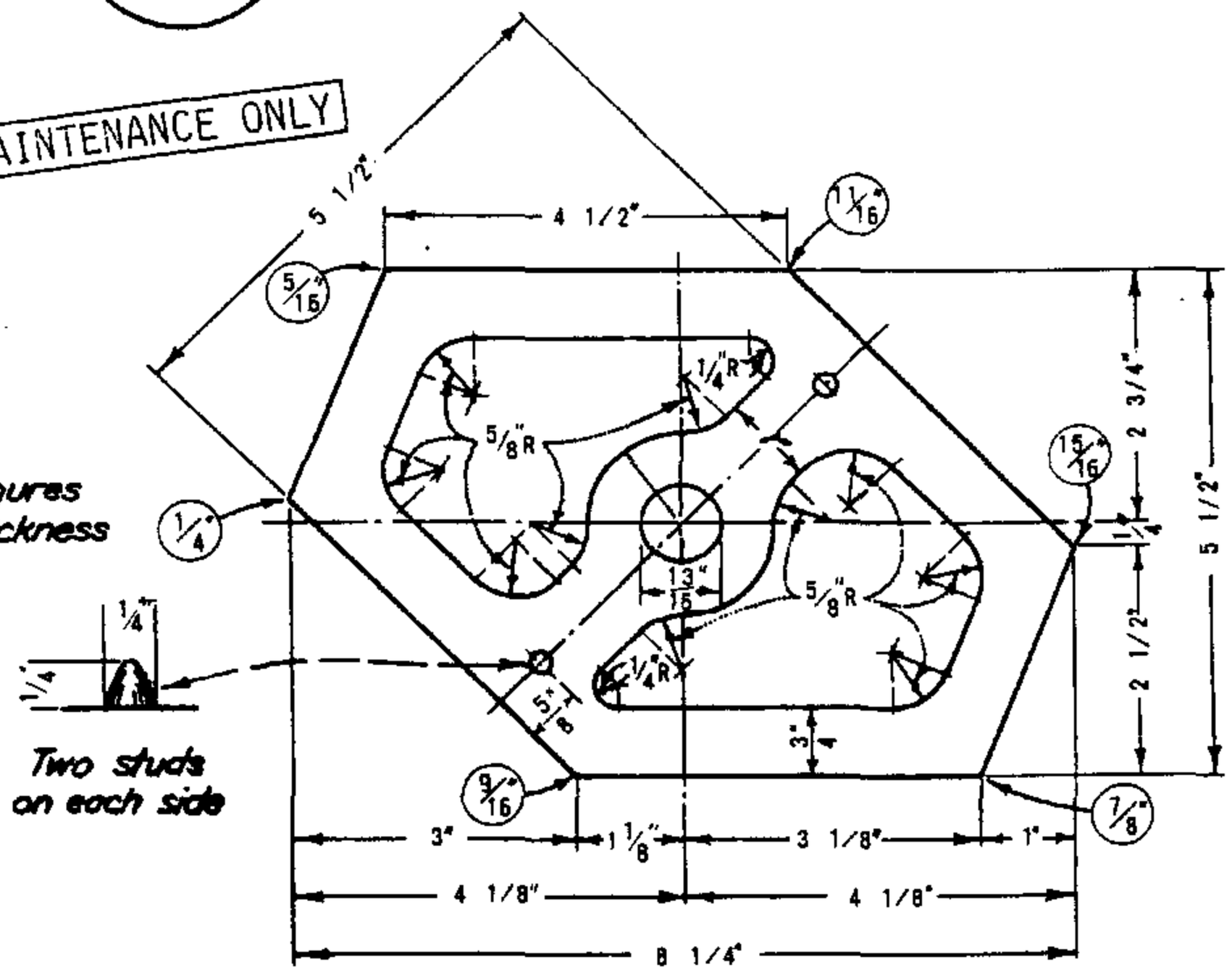
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| ITEM | FOR CROSSARM | "L" | RATED LENGTH |
|---|---|---|---|
| 1 | 5 3/4" deep | 8" | 9 1/2" |
| 2 | 6 3/4" deep | 9" | 10 1/2" |
| 3 | 7 3/4" deep | 10" | 11 1/2" |

ITEM NO'S 1, 2 & 3 - 'J' BOLT

FOR FIELD MAINTENANCE ONLY




*Encircled figures represent thickness at that point*

*Two studs on each side*

ITEM NO. 4 - HEXAGONAL C. I. FILLER, GALV.

| ITEM | DESCRIPTION | STOCK NO. | ITEM | DESCRIPTION | STOCK NO. |
|---|---|---|---|---|---|
| 1 | FIELD MAINTENANCE ONLY | 151328 | | | |
| 2 | FIELD MAINTENANCE ONLY | 151296 | | | |
| 3 | FIELD MAINTENANCE ONLY | — | | | |
| 4 | FIELD MAINTENANCE ONLY | 542400 | | | |

599.902
SUPERSEDES
173 (12-10-82)

SDG&E ELECTRIC STANDARDS

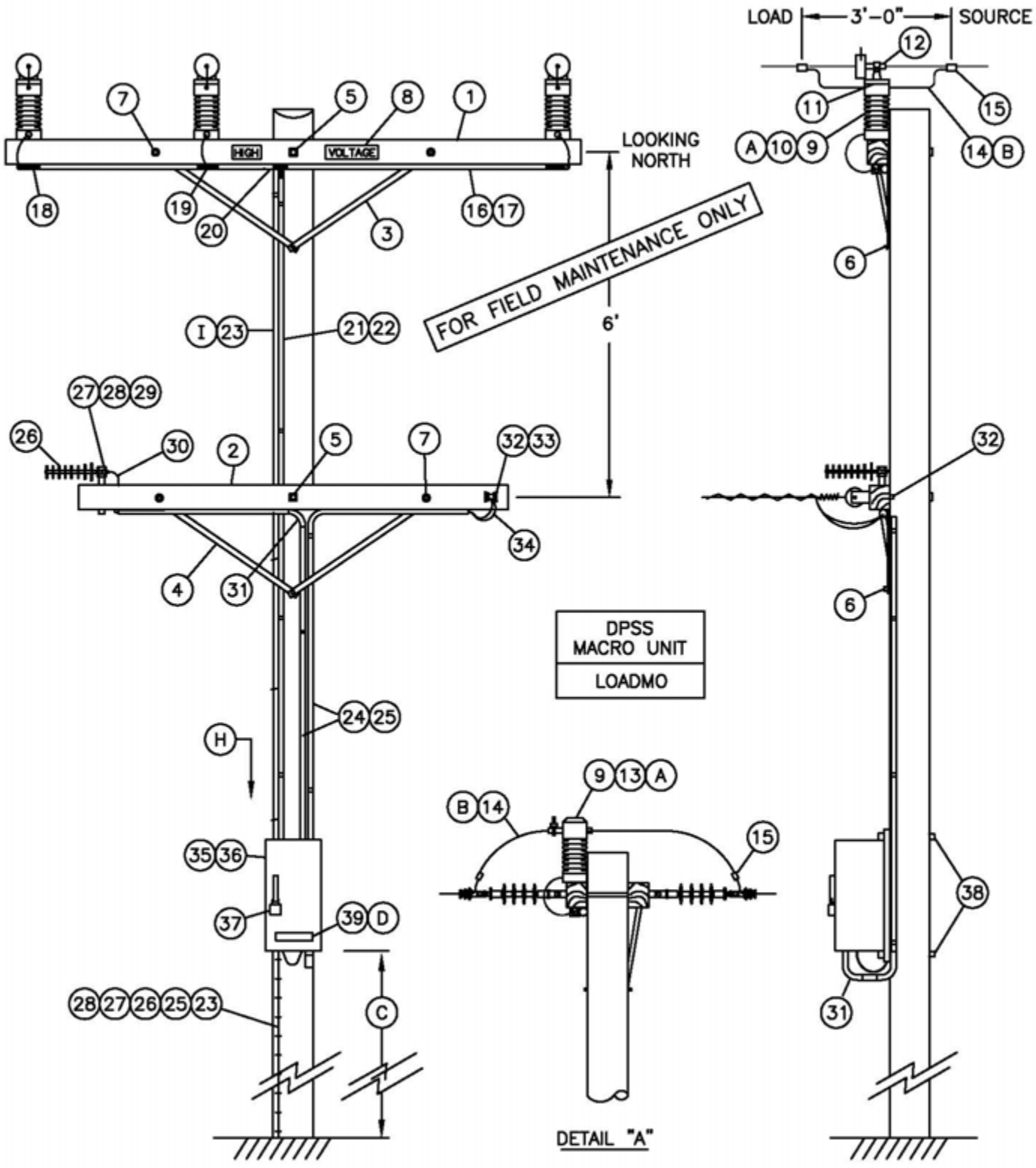
# TRANSMISSION HARDWARE 'J' BOLT, HEXAGONAL C. I. FILLER

DATE 1-1-86
APPD A.K. Hoff

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF A SCADA LOAD MONITOR WITH VARIOUS CONFIGURATIONS OF POWER SOURCE AND ANTENNA MOUNTING.

**NOTES:**

– CONTACT STANDARDS BEFORE DESIGN BEGINS TO DETERMINE COMMUNICATIONS REQUIREMENT.




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| | | |
|---|---|---|
| DATE 9-30-05<br>APPD PA / BDG | SDG&E ELECTRIC STANDARDS<br>SCADA LOAD MONITOR | 599.903<br>SUPERCEDES 540.1<br>(9-30-05) |

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## BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3–3/4" X 5–3/4" X 10'–0" | 1 | 380.2 | 294128 | – |
| 2 | CROSSARM, 3–1/2" X 4–1/2" X 6'–0" | 1 | 380.2 | 294112 | 2S |
| 3 | BRACE, 36", FLAT, CROSSARM | 2 | – | 164224 | 36FLAT |
| 4 | BRACE, 28", FLAT, CROSSARM | 2 | – | 164192 | – |
| 5 | BOLT, MACH. GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 2 | 392.2 | – | – |
| 6 | BOLT, LAG, GALV, 1/2" X 4" | 2 | 392.2 | – | – |
| 7 | BOLT, MACH, GALV, 3/8" X 4–1/2" & 1 RD. WASHER | 4 | 392.2 | – | – |
| 8 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV. | 2 | – | 647648 | HV |
| | | – | – | 492224 | – |
| 9 | VIP STUD, 7–1/2" | 3 | – | 701760 | STUD–W |
| 10 | LINE POST VOLTAGE/CURRENT SENSOR (CLAMP TOP TYPE) AND 45' CONNECTOR CABLE (A) | 3 | – | 635902 | C/VCT |
| 11 | TRUNION CLAMP ADAPTER WITH HARDWARE | 3 | – | 102926 | |
| 12 | TRUNION CLAMP, #2–336 ACSR OR AWAC CONDUCTOR | 3 | – | 229250 | TRU336 |
| | OR | | | | |
| | TRUNION CLAMP, 636 ACSR CONDUCTOR | 3 | – | 229256 | TRU636 |
| | OR | | | | |
| | TRUNION CLAMP, #4–4/0 CU CONDUCTOR | 3 | – | 229252 | TRU4/0 |
| | OR | | | | |
| | TRUNION CLAMP, 500 KCMIL CU CONDUCTOR | 3 | – | 229258 | TRU500 |
| 13 | LINE POST VOLTAGE/CURRENT SENSOR (SUBSTATION TYPE) AND 45' CONNECTOR CABLE (A) | 3 | – | 635904 | C/VSUB |
| 14 | WIRE, JUMPER, SAME SIZE & TYPE AS LINE WIRE | 12' | 711–715 | (B) | – |
| 15 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – | – |
| 16 | CONDUIT, PVC, SCHEDULE 40, 3/4" | 10' | – | 251328 | PVC3/4 |
| 17 | STRAPS, PIPE, GALV. 3/4", AND 6D NAILS, GALV. | AS REQ'D | – | 697888 | – |
| | | AS REQ'D | – | 490656 | – |
| 18 | ACCESS FITTING BODY, TYPE "T", PVC, 3/4" | 2 | – | 147792 | – |
| 19 | ACCESS FITTING BODY, TYPE "LL" PVC, 3/4" AND TYPE "LR", PVC, 3/4" | 1 | – | (F) | – |
| | | 1 | – | (F) | – |
| 20 | ACCESS FITTING BODY, TYPE "T", PVC, 1" AND (2) 3/4" REDUCERS | 1 | – | (F) | – |
| 21 | CONDUIT, PVC, SCHED 40, 1" | 30' | – | 251200 | PVC–1 |
| 22 | STRAPS, PIPE, GALV, 1", AND 2–6D NAILS, GALV. | AS REQ'D | – | 697792 | – |
| | | AS REQ'D | – | 490656 | – |
| 23 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | – | 812490 | GNDPVC |
| 24 | CONDUIT, PVC, SCHEDULE 40, 1/2" | 60' | – | 251168 | PVC1/2 |
| 25 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | – | 603072 | GNDPVC |
| 26 | COPPER BONDED GROUND CONNECTOR | 1 | – | 259010 | – |
| 27 | GROUND ENHANCING POWER SOLUTION (GEM) | AS REQ'D | – | 424390 | – |
| 28 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | – | 678562 | – |

FOR FIELD MAINTENANCE ONLY

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**BILL OF MATERIAL: CON'T:**

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 25 | STRAPS, PIPE, GALV, 1/2", AND | AS REQ'D | – | 697728 | – |
| | 6D NAILS, GALV. | AS REQ'D | – | 490656 | – |
| 26 | ANTENNA, BROADBAND, YAGI (E) | 1 | – | 109570 | ANT |
| 27 | NIPPLE, PIPE 2" X 6", GALV | 1 | – | 500960 | ANTXMB |
| 28 | BOLT, MACH, GALV. 1/2" X 9" | 1 | 392.2 | 153184 | |
| 29 | CENTERING WASHER, GALV. | 2 | – | 795520 | |
| 30 | CABLE, SUPERFLEX, ANTENNA | AS REQ'D | – | 197810 | ANTCAB |
| 31 | ELBOW, PVC. 1/2" | AS REQ'D | – | – | – |
| 32 | BOLT, MACHINE, GALV, 5/8" X (LENGTH AS REQ'D) 1 SQ. & 1 DOUBLE COIL SPRING WASHER | 1 | 392.2 | – | – |
| 33 | SECONDARY DEADEND | 1 | – | 235488 | 1SDE |
| 34 | WIRE, THW, #12, BLACK | 100' | – | 808096 | THW12 |
| 35 | TRANSCEIVER, 12V DC | 1 | – | 905390 | – |
| | OR | | | | |
| | SPREAD SPECTRUM RADIO | 1 | – | 749504 | – |
| 36 | RTU | 1 | – | (F) 484600 | LMRTU |
| 37 | PADLOCK, SCHLAGE ELECTRIC SERIES | 1 | – | 514848 | – |
| 38 | BOLT, MACHINE, GALV, 5/8" X (LENGTH AS REQ'D) 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 2 | 392.2 | – | – |
| 39 | TAG, RTU NUMBER | 1 | 208.5 | (D) | TAGRE |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(A) THE RANGE OF WIRE FOR THE CLAMP TOP TYPE VOLTAGE/CURRENT SENSOR IS .25" TO .8". THE APPLICATION OF THIS STANDARD TO EXISTING #6 LINE WIRE REQUIRES USE OF THE SUBSTATION STYLE VOLTAGE/CURRENT SENSOR AND FOR THE LINE WIRE TO BE DEAD-ENDED (SEE DETAIL "A"). ANY SIZE EXISTING DEAD-ENDED LINE WIRE CONSTRUCTION REQUIRES THE USE OF SUBSTATION STYLE VOLTAGE/CURRENT SENSORS.

**NOTE: BEFORE ENERGIZING SENSORS, GROUND ALL VOLTAGE/CURRENT SENSOR BASES BY ATTACHING GROUND WIRE TO MOUNTING STUD, ON BOTTOM OF CROSSARM.** WHEN INSTALLING SENSORS, IT IS PREFERRED THAT THE SENSOR CABLE CONNECTOR GO ON THE LOADSIDE. THIS WOULD PLACE THE "H1" LABEL ON THE SOURCE (LINE) SIDE.

(B) ALWAYS USE JUMPER WIRE OF AMPACITY EQUAL TO THAT OF THE MAIN CONDUCTOR.

(C) RTU TO BE MOUNTED AT 10' FROM GROUND LEVEL TO BOTTOM OF RTU CABINET WHEN NOT SUBJECT TO TRAFFIC CONTACT. IF VULNERABLE TO VEHICLE DAMAGE, MOUNT RTU AT 13' – 6" FROM GROUND LEVEL TO BOTTOM OF RTU CABINET. CONSIDER LARGE VEHICLES PARKING PARALLEL TO CURB. IN REMOTE AREAS WHERE VEHICLE ACCESS IS NOT POSSIBLE, MOUNT RTU AT 5' FROM GROUND LEVEL TO BOTTOM OF RTU CABINET.

(D) RTU NUMBER TO BE ASSIGNED BY DISTRIBUTION OPERATIONS AND ADDED TO JOB WITH DPSS NOTE.

(E) PLANNER TO SPECIFY QUADRANT OF POLE FOR ANTENNA MOUNT WITH DATA FROM STANDARDS. POINTS LIST TO BE COMPLETED BY PLANNER AND SENT TO SENIOR ENGINEER, DISTRIBUTION OPERATIONS. SEE ELECTRIC STANDARDS TEAM FOR POINTS LIST FORMS AND COMMUNICATIONS REQUIREMENTS.

(F) THESE ITEMS SUPPLIED BY SCADA PROJECT CREW (KEARNY). 120V SUPPLY, ANTENNA CONNECTIONS AND SENSOR CONNECTIONS TO BE MADE BY SCADA PROJECT CREW (KEARNY). LINE CREW MOUNTS RTU TO POLE.

**REFERENCE:**

(H) POLE STEPPING – SEE STANDARDS 363.

(I) GROUNDING METHODS – SEE STANDARDS 1002.

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# 600-900 SECONDARIES, CONDUCTOR, GUYING

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| 699.102 | MID-SPAN SERVICES |
| 699.201 | SECONDARY RACKS |
| 699.202 | SERVICE DROP ATTACHMENTS |
| 699.301 | SERVICE INSULATING BRACKETS, SINGLE |
| 699.302 | HEAVY DUTY SERVICE INSULATOR BRACKET |
| 699.500 | TV AMPLIFIER AND 120V METER INSTALLATION |
| 776 | ANGLE SUSPENSION CLAMPS |
| 799.101 | COPPER AND COPPERWELD WIRE TABLE |
| 799.102 | COPPER TREE WIRE |
| 799.103 | AUTOMATIC SLEEVES FOR COPPER & COPPERWELD CONDUCTORS |
| 799.401 | GALVANIZED DEAD END STRAIN CLAMP FOR COPPER CONDUCTORS |
| 799.402 | 12KV AL STRAIGHT STRAIN CLAMP FOR ACSR & 5005 AL ALLOY CONDUCTORS |
| 799.501 | PORCELAIN SUSPENSION INSULATOR BONDING |
| 799.801 | ALUMINUM PARALLEL GROVE CLAMPS |
| 962 | GUY HARDWARE |
| 999.601 | ALUMOWELD GUY WIRE |
| 999.602 | COPPER & COPPERWELD GUY GRIPS |
| 999.603 | ALUMOWELD GUY GRIPS |
| 999.604 | ALUMINUM GUY SPLICES |


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| REV | CHANGE | BY | DSGN | APPV | DATE | REV | CHANGE | BY | DSGN | APPV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | COMPLETELY REVISED | JK | JS | CZH | 10/15/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JK | JS | CZH | 6/13/2019 | D | | | | | |

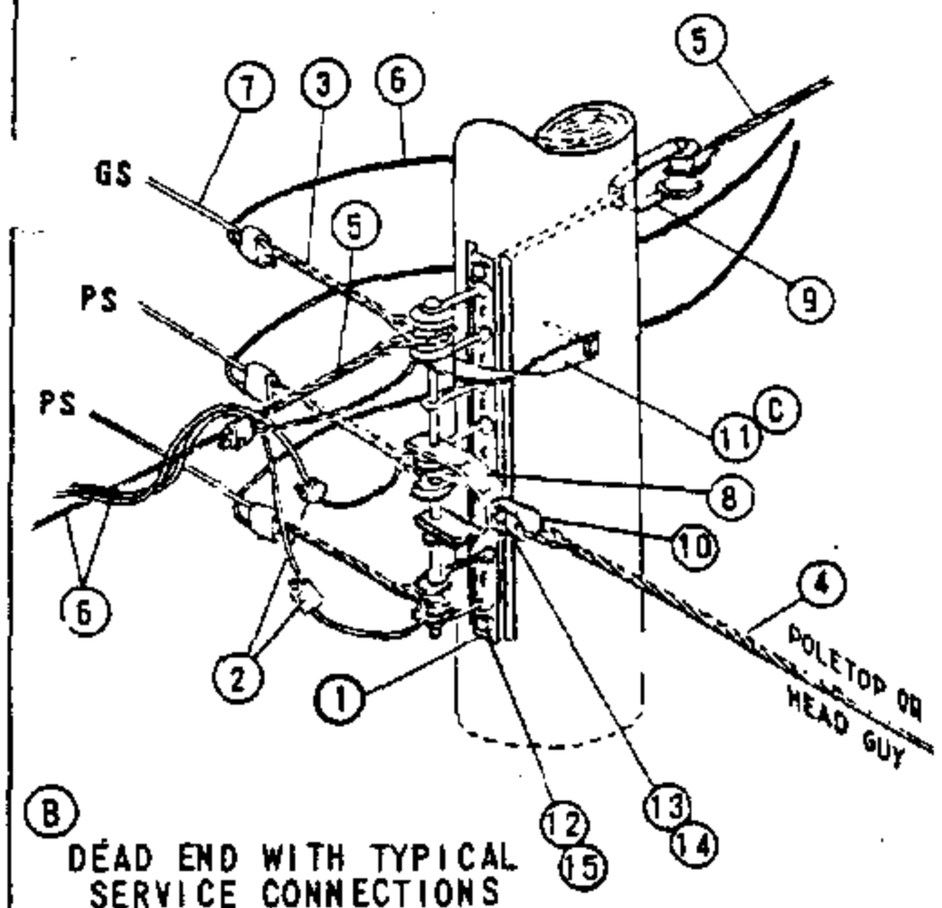
Indicates Latest Revision | X | Completely Revised | | New Page | | Information Removed

SHEET 1 OF 1

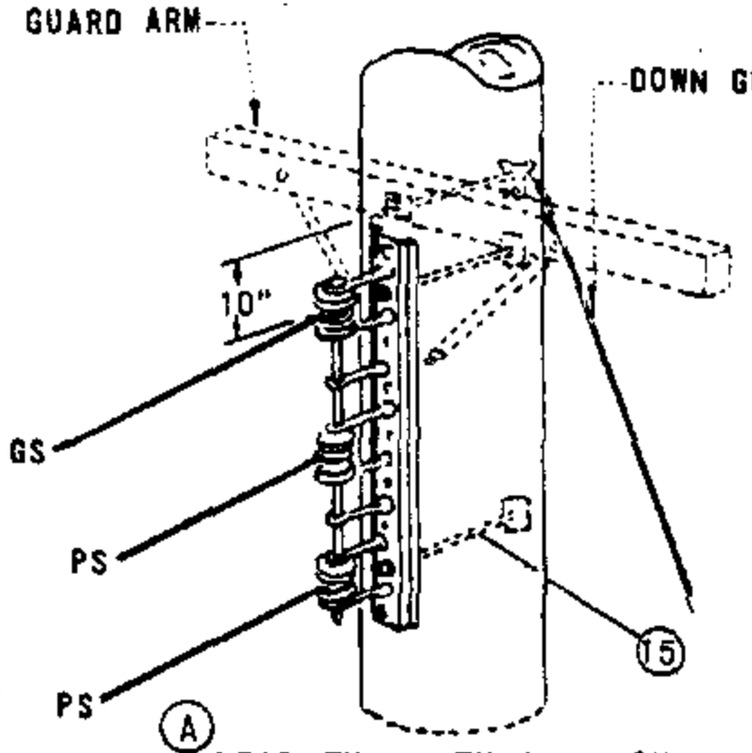
SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LEGACY OVERHEAD FIELD MAINTENANCE
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SECONDARIES, CONDUCTORS, GUYING

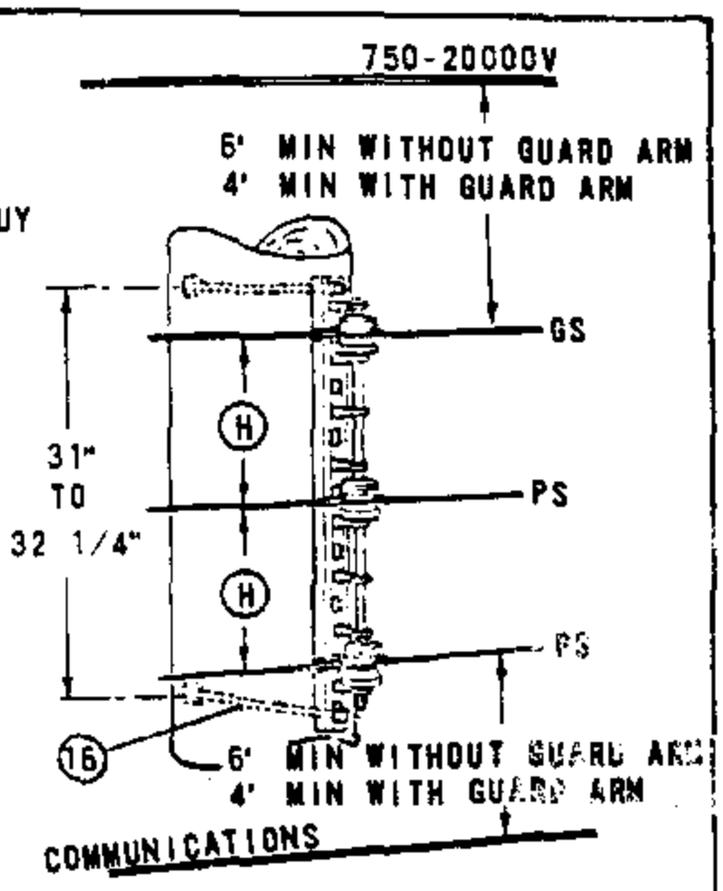
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OHL601.1



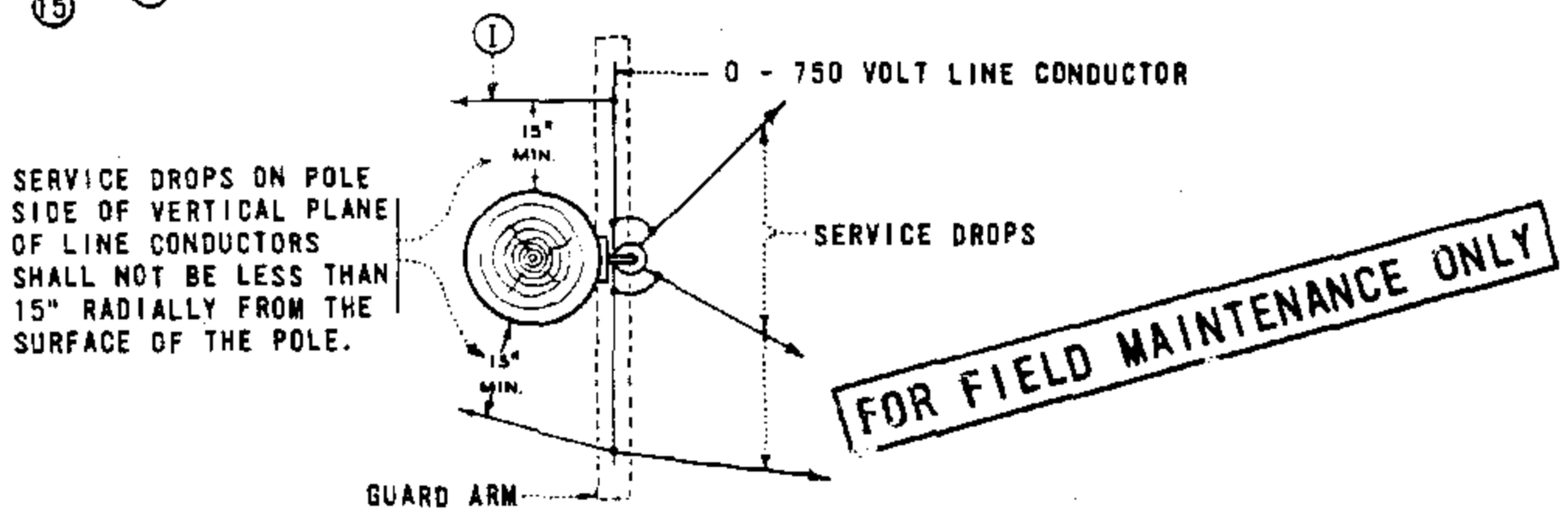

(B) DEAD END WITH TYPICAL SERVICE CONNECTIONS




(A) DEAD END WITH DOWN GUY




TANGENT OR ANGLE




FOR FIELD MAINTENANCE ONLY

NOTES:

(A) DEAD END WITH DOWN GUY IS PREFERRED CONSTRUCTION WHERE THERE IS NO FUTURE EXTENSION OF SECONDARY.

(B) DEAD END WITH POLETOP OR HEAD GUY IS PREFERRED CONSTRUCTION WHERE FUTURE EXTENSION OF SECONDARY IS EXPECTED.

(C) USE DEAD ENDING STRAPS BEHIND EACH CONDUCTOR WHERE RACK GUY CANNOT BE USED, SEE PAGE 629.

D. TO OBTAIN RADIAL CLEARANCE BETWEEN SUPPLY CONDUCTORS, OVERHEAD GUYS, AND CLIMBING SPACE USE EXTENSION BRACKET. SEE PAGE 629.

E. SEE PAGE 255 FOR CLIMBING SPACE REQUIREMENTS.

F. GUARD ARMS ARE REQUIRED WHEN REDUCING CLEARANCE FROM THE NORMAL 6 FT MINIMUM TO A 4 FT MINIMUM BETWEEN THE SECONDARY CABLE AND THE CONDUCTORS ABOVE.

G. WHEN USING GUARD ARMS, ADDITIONAL CLEVISES CANNOT BE ADDED TO THE POLE. REPLACE WITH MID-SPAN SERVICES SEE PAGE 618.

(H) MINIMUM VERTICAL SEPARATION FOR SPAN LENGTHS 200 FT OR LESS SHALL BE 8 IN. 200 FT THROUGH 330 FT MINIMUM SEPARATION SHALL BE 12 IN.

(I) WHEN USING GUARD ARMS, SERVICE DROPS ARE NOT PERMITTED TO PASS ABOVE OR BELOW THE GUARD ARM ON THE POLE SIDE OF THE RACK SECONDARY.

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| | 1 | RACK, 3 OR 4 WIRE SECONDARY | 1 | PG 629 |
| | 2 | CONNECTORS | AS REQ'D | PGS 783, 787 |
| | 3 | GRIPS, DEAD END FOR COATED SEC CONDUCTORS | AS REQ'D | PGS 745, 747 |
| | 4 | GRIPS, GUY | AS REQ'D | PGS 745, 747 |
| | 5 | GRIPS, TRIPLEX NEUTRALS SERVICE | AS REQ'D | PGS 745, 747 |
| | 6 | WIRE, TRIPLEX SERVICE | AS REQ'D | PGS 711, 715, 716 |
| | 7 | WIRE, W.P. SECONDARY | AS REQ'D | PGS 711, 715, 716 |
| | | CLEVIS, 4KV DEAD END | 1 | 235520 |
| | 9 | CLEVIS, SECONDARY DEAD END | 1 | 235488 |
| 10 | | EYELET, THIMBLE | 1 | 338176 |

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| | 11 | STRAP, DEAD ENDING, CURVED | AS REQ'D | PG 629 |
| | 12 | BOLT, MCH, 5/8" X LENGTH AS REQ'D | 2 | PG 139 |
| | 13 | BOLT, MACH, 5/8" X 2" | 1 | 155040 |
| | 14 | WASHER 5/8" LOCK SPRING | 1 | 796864 |
| | 15 | WASHER, 3" SQ CURVED | AS REQ'D | 797792 |
| | 16 | WASHER, 2 1/4" SQ FLAT | AS REQ'D | 799040 |

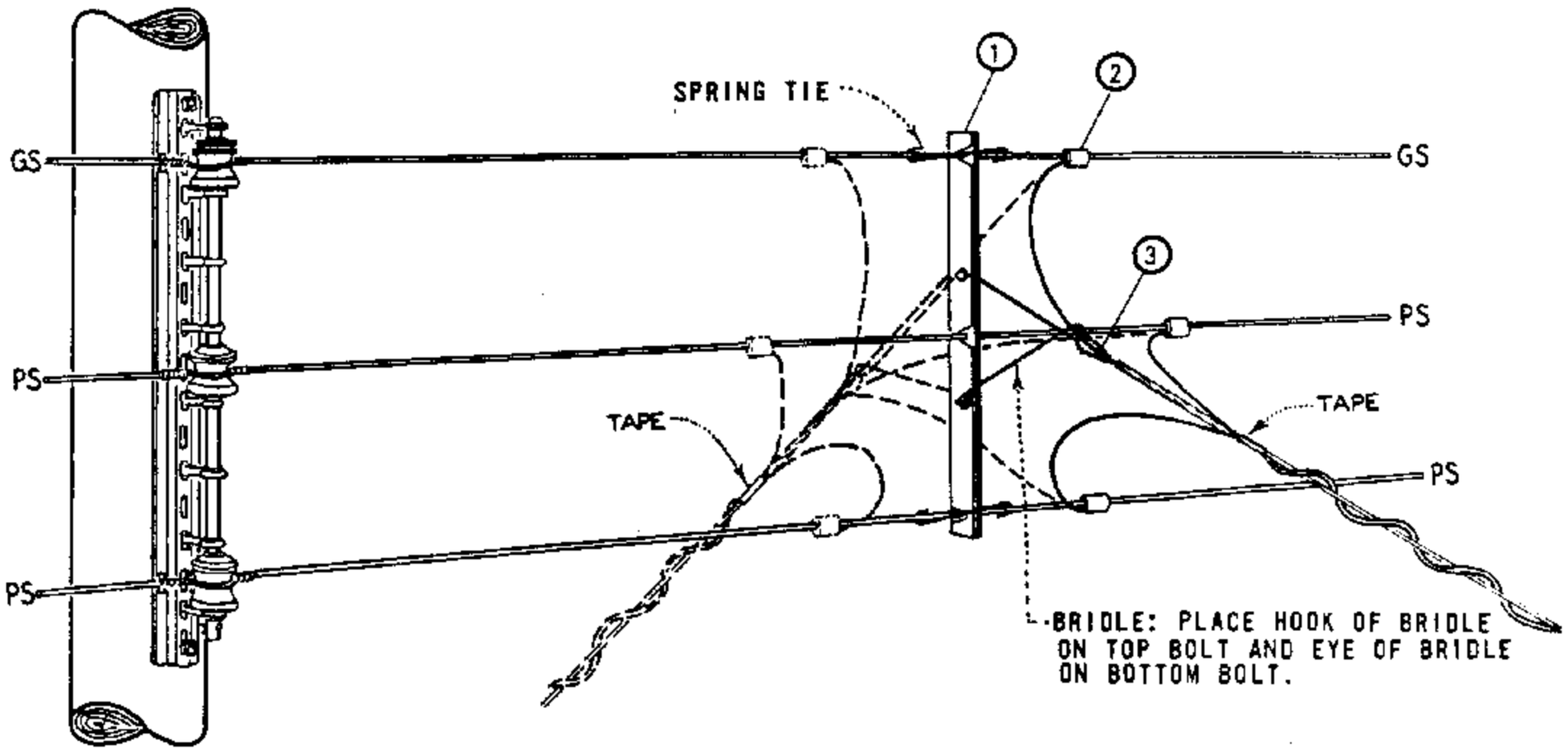
DATE 6-4-82
APPD

SDG&E ELECTRIC STANDARDS

SECONDARY RACK CONSTRUCTION

699.101
SUPERSEDES
616 (6-4-82)

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FOR FIELD MAINTENANCE ONLY

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## SECONDARY CONDUCTOR SPREADER

| NO. WIRES | SPACING (IN) | WIRE SLOT (IN) | | | | | | MATERIAL THICKNESS (IN) | MANUFACTURER | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TOP | | MIDDLE | | BOTTOM | | | NAME | CATALOG NUMBER | NAME | CATALOG NUMBER |
| | | DIA. | MAX. WIRE SIZE | DIA. | MAX. WIRE SIZE | DIA. | MAX. WIRE SIZE | | | | | |
| 3 | 12 | 1/2 | .500 | 19/32 | .594 | 19/32 | .594 | 1/4 | A.T. FLOWER | AF332-93 | JOSLYN | 32312 |
| | | | | | | | | | | | | |

NOTES.

A. FOR USE ON SERVICE DROPS 100 FEET OR LESS IN LENGTH.

B. WHERE TWO TO FOUR TRIPLEX SERVICE DROPS ARE INSTALLED ON ONE SECONDARY CONDUCTOR SPREADER, CONNECT RESPECTIVE SERVICE CONDUCTORS TO LINE CONDUCTOR WITH ONE COMPRESSION CONNECTOR AS PERMITTED BY STOCKED CONNECTOR SIZES.

C. SEE OTHER PAGES IN 'SECONDARIES, SERVICES' SECTION FOR RACK CONSTRUCTION DETAILS.

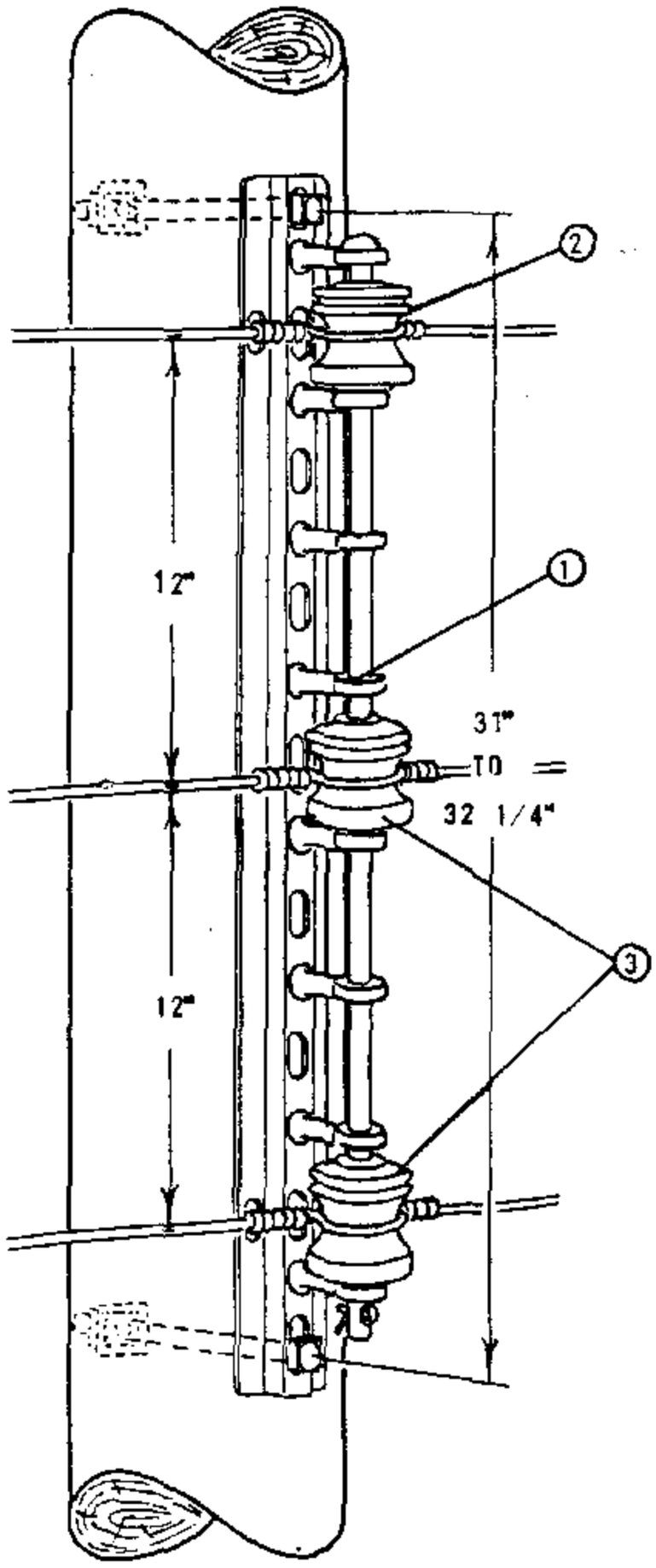
| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|
| 1 | SECONDARY CONDUCTOR SPREADER, COMPLETE WITH 1-SPREADER, BRIDLES AND SPRING TIES | 1 | 670592 |
| 2 | CONNECTOR, COMPRESSION | AS REQ'D | PGS 783, 7 |
| 3 | GRIPS, SERVICE | AS REQ'D | PGS 746, 747 |

699.102
SUPERSEDES
618 (3-25-83)

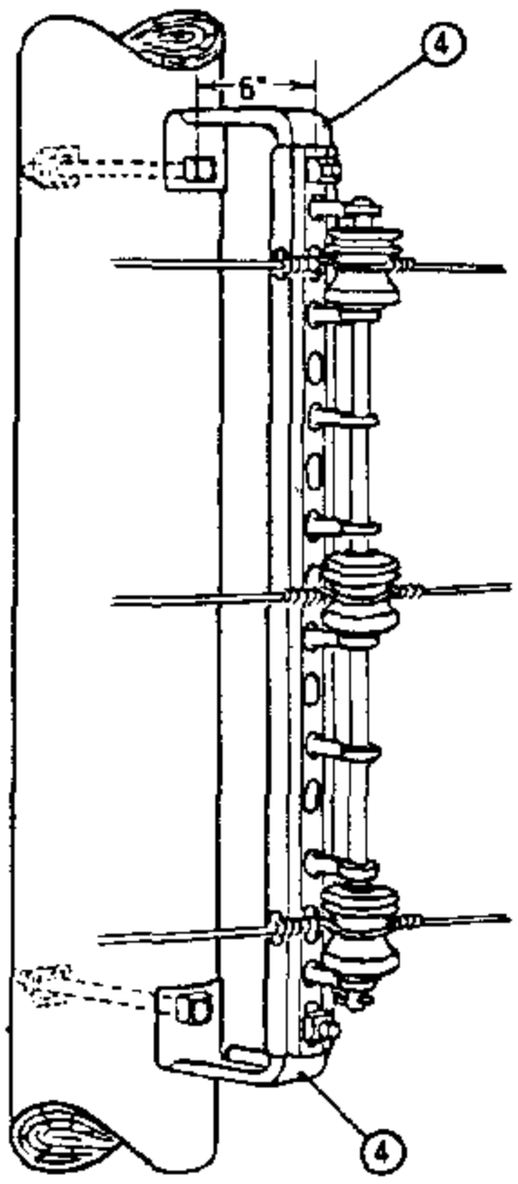
SDG&E ELECTRIC STANDARDS

# MID-SPAN SERVICES FROM VERTICAL RACK SECONDARY

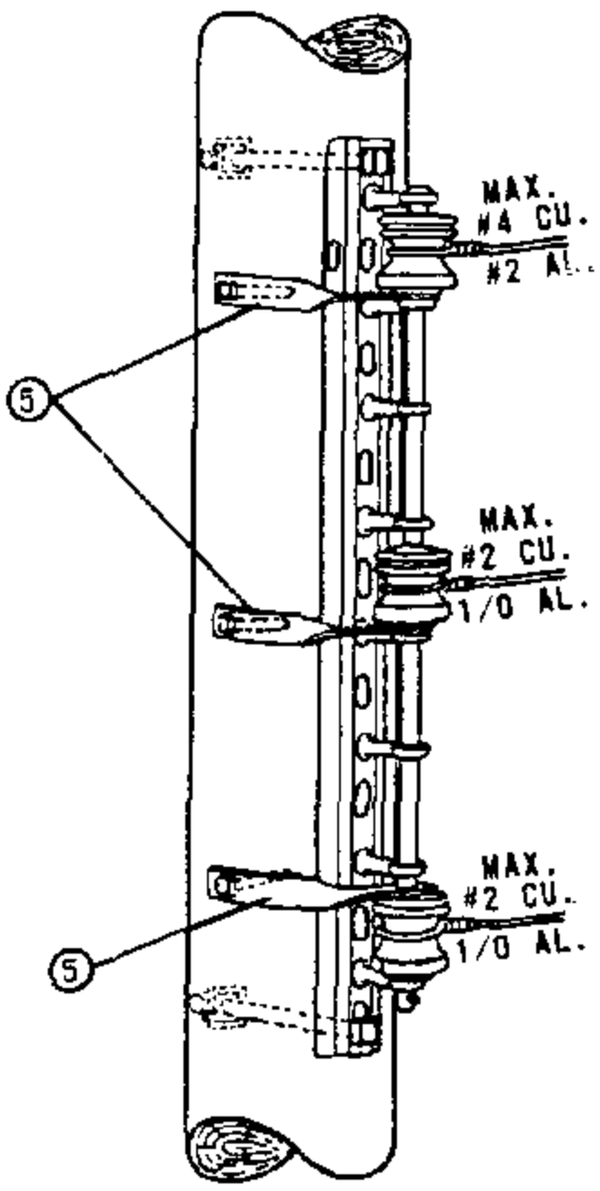
DATE 4-5-83
APPD JWF/GRH




TANGENT OR ANGLE




TANGENT OR ANGLE
EXTENSION BRACKET
(A)




DEAD END ON
SIDE OF POLE
(B)

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) USED TO OBTAIN RADIAL CLEARANCE BETWEEN SUPPLY CONDUCTORS AND OVERHEAD GUYS, ALSO TO OBTAIN CLIMBING SPACE.

(B) TO BE USED FOR TANGENT, ANGLE, OR CORNER CONSTRUCTION WHERE SECONDARY MAY BE EXTENDED AND WHERE RACK GUY CANNOT BE USED.

| ITEM | DESCRIPTION | CATALOG NUMBER | | | | | | | STOCK NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| | | CHANCE | HUBBARD | JOSLYN | KORTICK | McGRW ED | OLIVER | | |
| 1 | SECONDARY RACK | - | 1478 | - | K-6748 | - | 8348 | | 564864 |
| 2 | SPOOL INSULATOR, (WHITE) | 255W | 455W | - | - | - | - | | 430816 |
| 3 | SPOOL INSULATOR, (BROWN) | - | - | - | - | - | - | | 430656 |
| 4 | EXTENSION BRACKET | - | 3355 | J-2355 | K-4830 | - | - | | 166016 |
| 5 | DEAD ENDING STRAP, CURVED, 1/4" X 1 1/4" | - | 1000 | J-3120 | K-4833 | OR4MI | - | | 696832 |
| | | | | | | | | | |

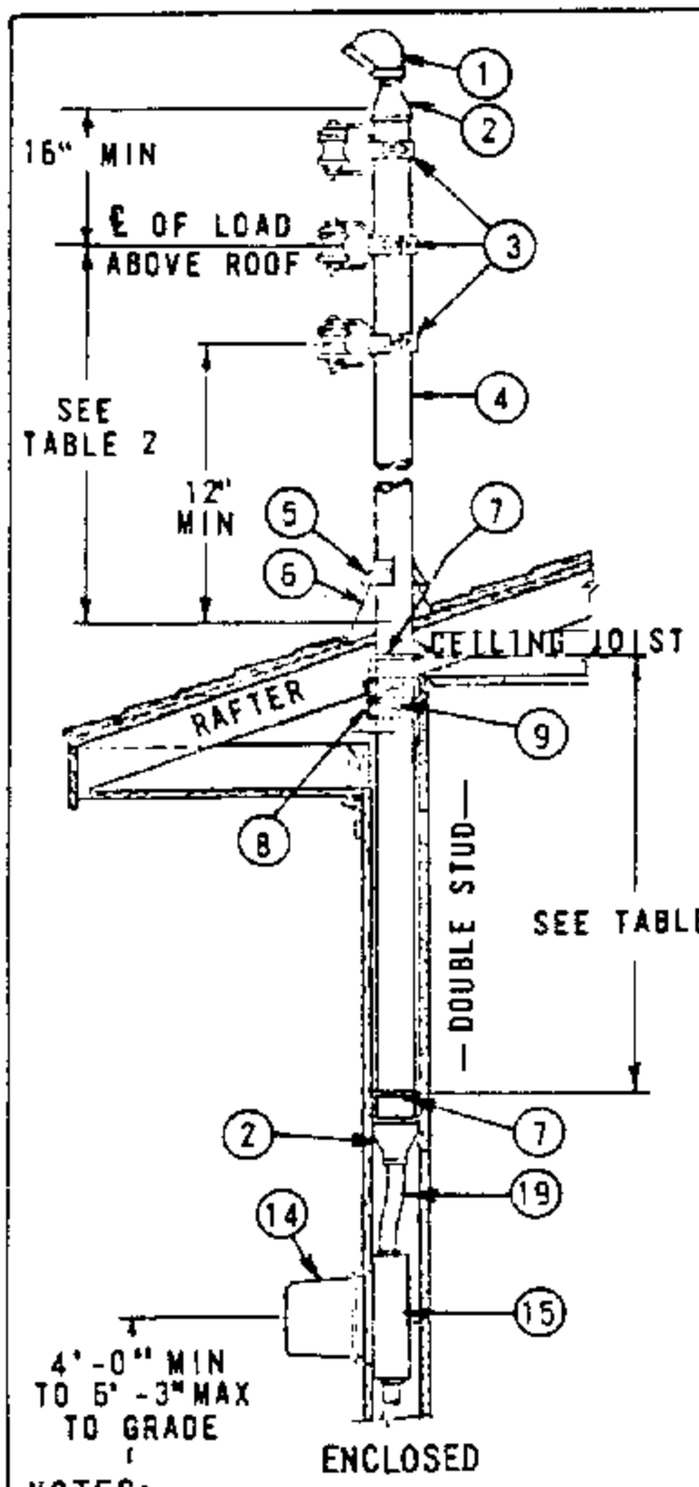
DATE 6-4-82
APPD

SDG&E ELECTRIC STANDARDS

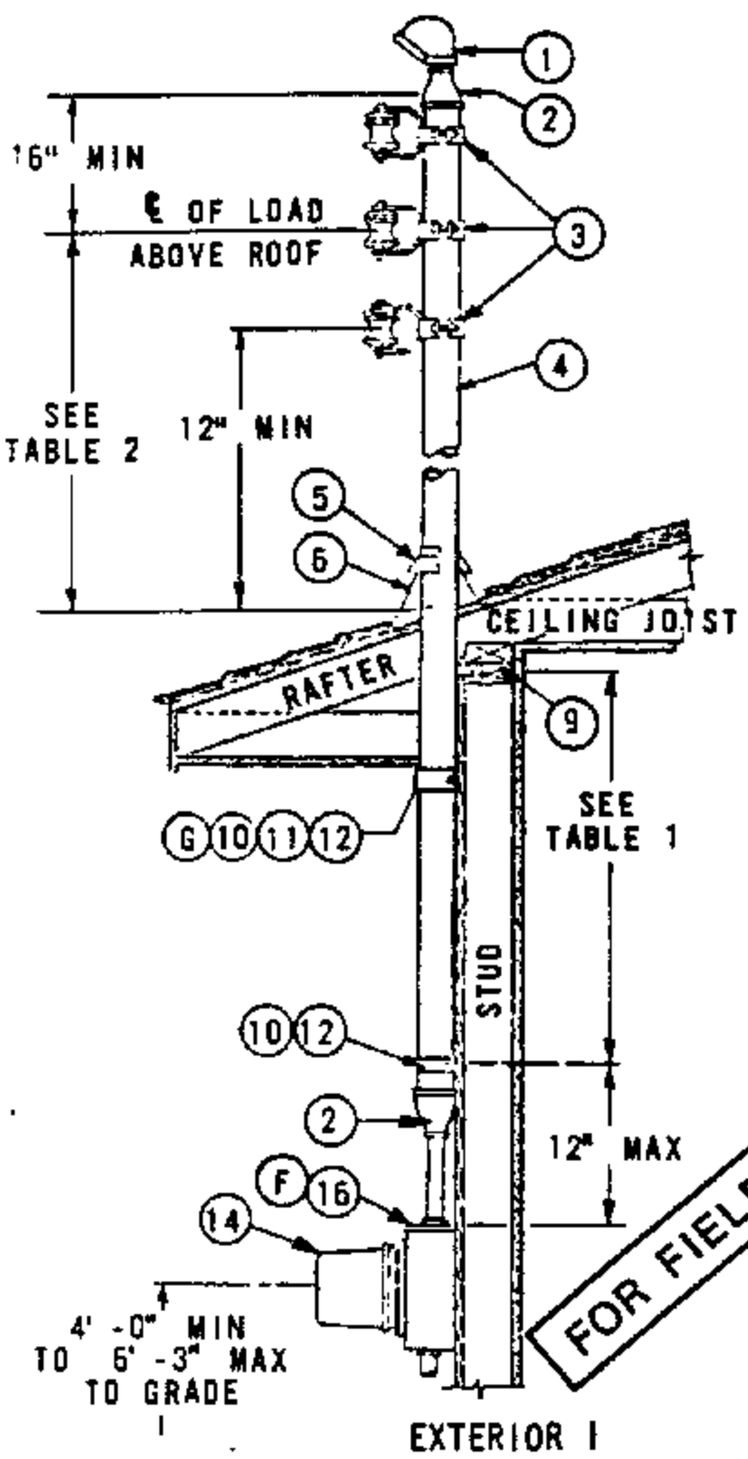
SECONDARY RACKS

699.201
SUPERSEDES
629 (6-4-82)

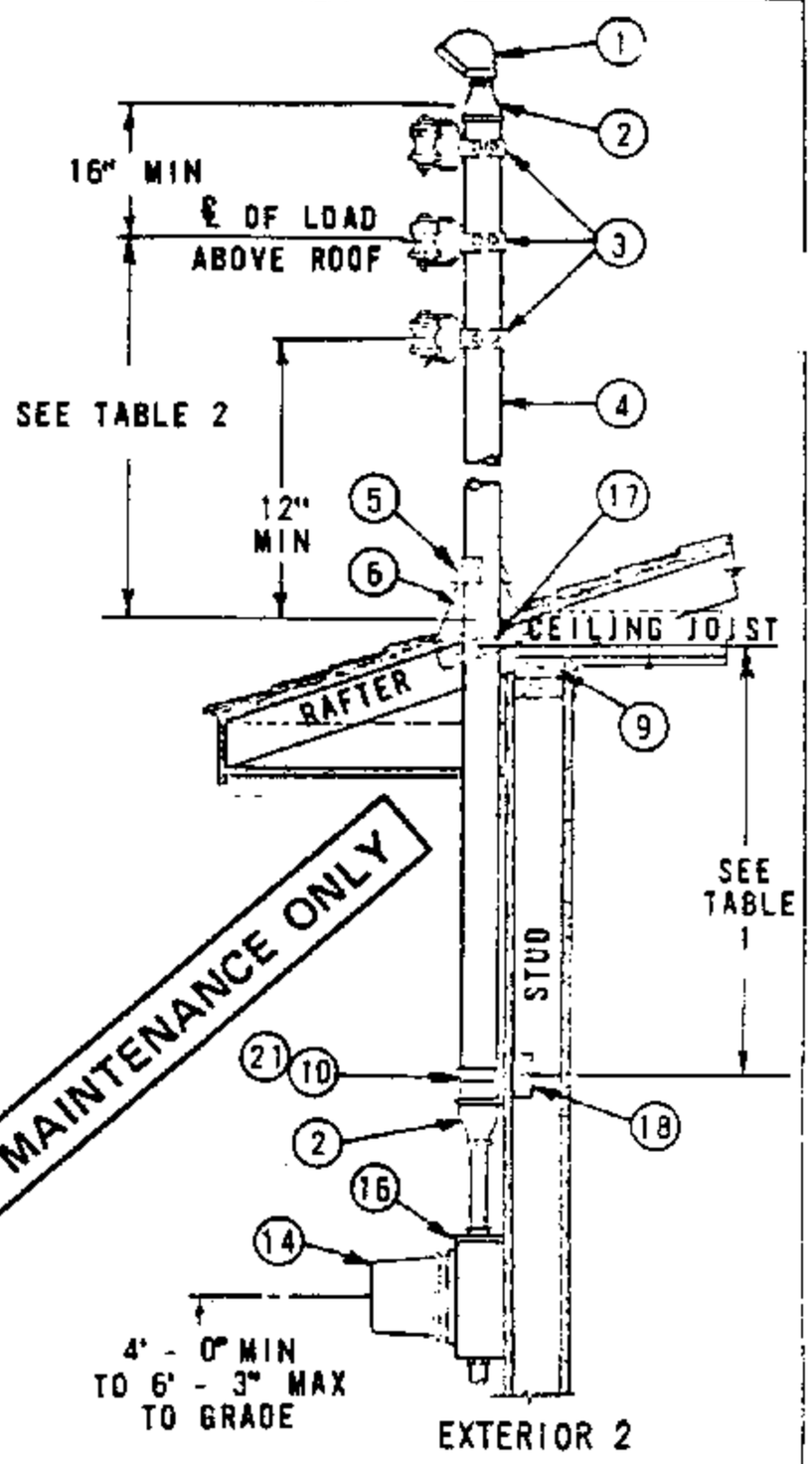
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ENCLOSED




EXTERIOR 1




EXTERIOR 2

FOR FIELD MAINTENANCE ONLY

NOTES:

A. SDG&E WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO THE BUILDING CAUSED BY RAIN OR STRUCTURAL FAILURE.

B. THESE METHODS ARE SUGGESTED TO OBTAIN THE REQUIRED GROUND AND ROOF CLEARANCES AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. WHEN THIS METHOD IS USED IT WILL BE ACCEPTABLE TO SDG&E PROVIDED THE DIMENSIONS AND CONSTRUCTION DETAILS ARE COMPLIED WITH.

C. THE DIMENSIONS SHOWN ARE BASED ON A "SLACK SPAN" SERVICE DROP LENGTH OF NOT MORE THAN 100 FEET. FOR SERVICE LENGTH GREATER THAN 100 FEET, SEE STANDARD 644.

D. NO COUPLINGS WILL BE PERMITTED BETWEEN THE TOP OF THE RISER AND THE LOWEST POINT OF SUPPORT FOR CONDUIT SIZES 1 1/4" TO 2" INCLUSIVE. IF A COUPLING IS NECESSARY IN THE 2 1/2" SIZE CONDUIT TO SECURE THE MAXIMUM HEIGHT, THE COUPLING SHALL BE INSTALLED AT THE UPPER END NEAR THE SERVICE CAP.

E. THESE CONDUIT RISERS SHALL BE USED FOR ATTACHMENT OF #2 OR LARGER SERVICE DROPS.

(F) METER SOCKET BOX MUST HAVE MINIMUM WIDTH OF 14".

(G) WHEN ROOF CONSTRUCTION HAS NO SOFFIT, MOVE STRAP UP AND LAG INTO PLATE 9. HEAVY DUTY ONE HOLE PIPE STRAP IS ACCEPTABLE IF USED WITH 1/4" X 3 1/2" LAG SCREW INTO WALL STUD.

| ITEM | DESCRIPTION | QUANTITY | | |
|---|---|---|---|---|
| | | ENCLOSED | EXTERIOR 1 | EXTERIOR 2 |
| 1 | CAP, SERVICE | 1 | 1 | 1 |
| 2 | REDUCER, PIPE, GALV IRON, IF REQ'D | 1 | 1 | 1 |
| 3 | INSULATOR AND CLAMPS, FURNISHED & INSTALLED BY SDG&E | 3 | 3 | 3 |
| 4 | CONDUIT, GALV RIGID IRON, OR INTERMEDIATE METAL CONDUIT | 1 | 1 | 1 |
| 5 | COLLAR, METAL OR NEOPRENE RAINSHED | 1 | 1 | 1 |
| 6 | FLASHING | 1 | 1 | 1 |
| 7 | BOLT, "U", 3/8" | 2 | - | - |
| 8 | STRAPS ON PLATES | AS REQ'D | - | - |
| 9 | PLATES | - | - | - |
| 10 | STRAP, PIPE, HEAVY DUTY, TWO HOLE (G) | - | 2 | - |
| 11 | SCREW, LAG, 1/4" X 3 1/2" | - | 2 | - |
| 12 | BOLT, TOGGLE, 1/4" | - | 2 | - |
| 13 | | | | |
| 14 | METER | 1 | 1 | 1 |
| 15 | BOX, METER SOCKET, FLUSH TYPE | 1 | - | - |
| 16 | BOX, METER SOCKET, SURFACE MOUNTED TYPE | - | 1 | 1 |
| 17 | BLOCKING, 2" X 4", BETWEEN RAFTERS (SOLIDLY INSTALLED) | - | - | AS REQ'D |
| 18 | BLOCKING, 2" X 4", BETWEEN STUDS | - | - | AS REQ'D |
| 19 | NIPPLE, CONDUIT, OFFSET | 1 | - | - |
| 20 | | | | |
| 21 | SCREW, LAG, 1/4" X 3" | - | - | AS REQ'D |

TABLE 1

MIN. DISTANCE BETWEEN SUPPORTS SHOWN

| CONDUIT SIZE | DISTANCE |
|---|---|
| 1 1/4" | 12' |
| 1 1/2" | 15' |
| 2" | 22" |
| 2 1/2" | 30" |

TABLE 2

MAX DISTANCE OF ℄ OF LOAD ABOVE ROOF

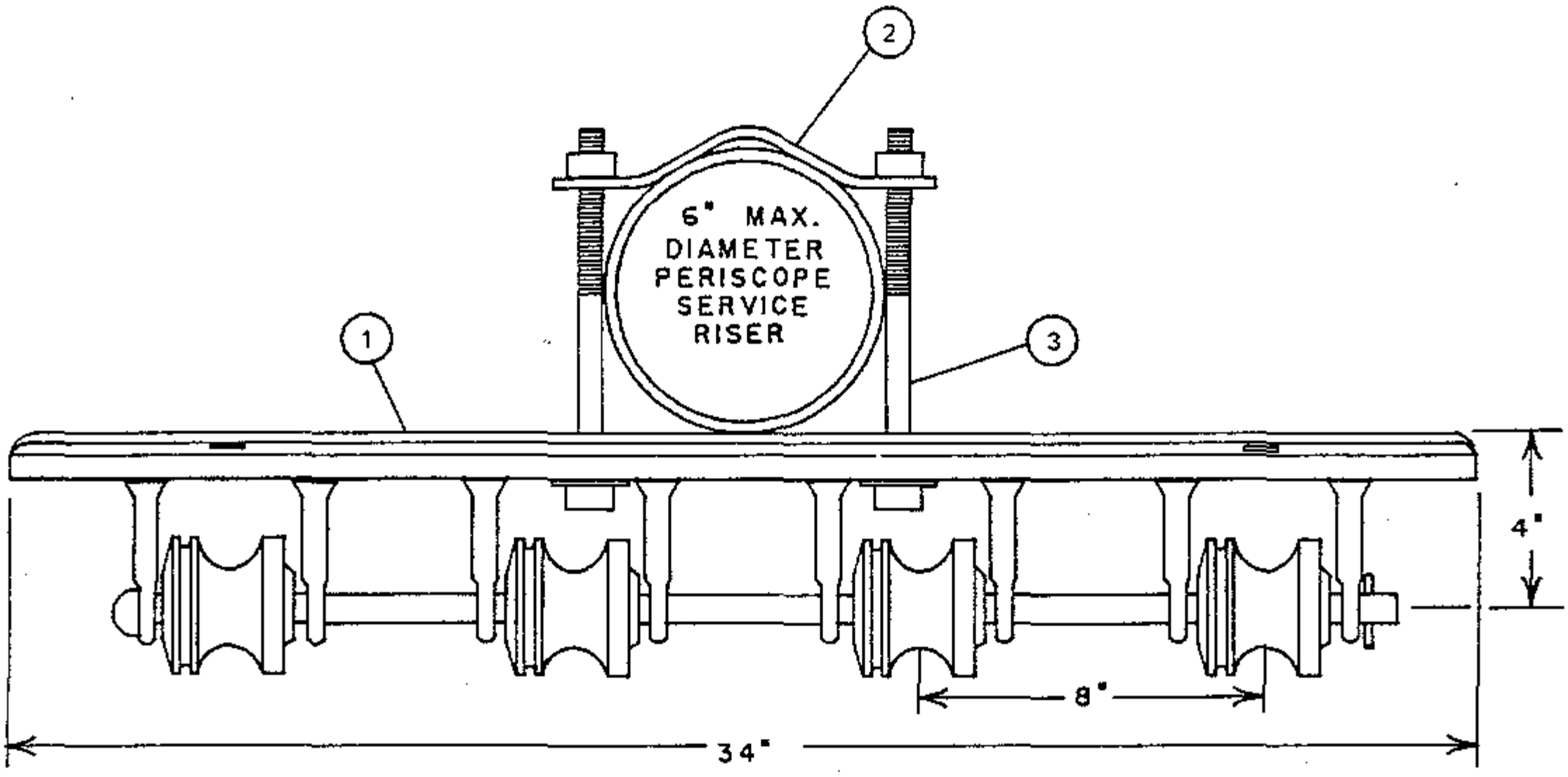
| CONDUIT SIZE | DISTANCE |
|---|---|
| 1 1/4" | 30" |
| 1 1/2" | 40" |
| 2" | 5'-0" |
| 2 1/2" | 8'-0" |

699.202
SUPERCEDES
642 (1-1-90)

SDG&E ELECTRIC STANDARDS

# SERVICE DROP ATTACHMENTS TO CONDUIT RISERS

DATE 1-1-90
APPD




FOUR SPOOL SERVICE INSULATOR BRACKET-ITEMS 1,2,3

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | CATALOG NUMBER | QUANTITY | STOCK NO. OR CONST. STD. |
|---|---|---|---|---|
| 1 | RACK, FOUR SPOOL SERVICE INSULATOR | HUBBARD 1478<br>KORTICK K-6748<br>OLIVER 8348 | 1 | 564864 |
| 2 | STRAP, CURVED BACK | - | 1 | 698016 |
| 3 | BOLT, MACH., GALV., 1/2" X [LENGTH AS REQ'D.] | - | 2 | PG. 139 |

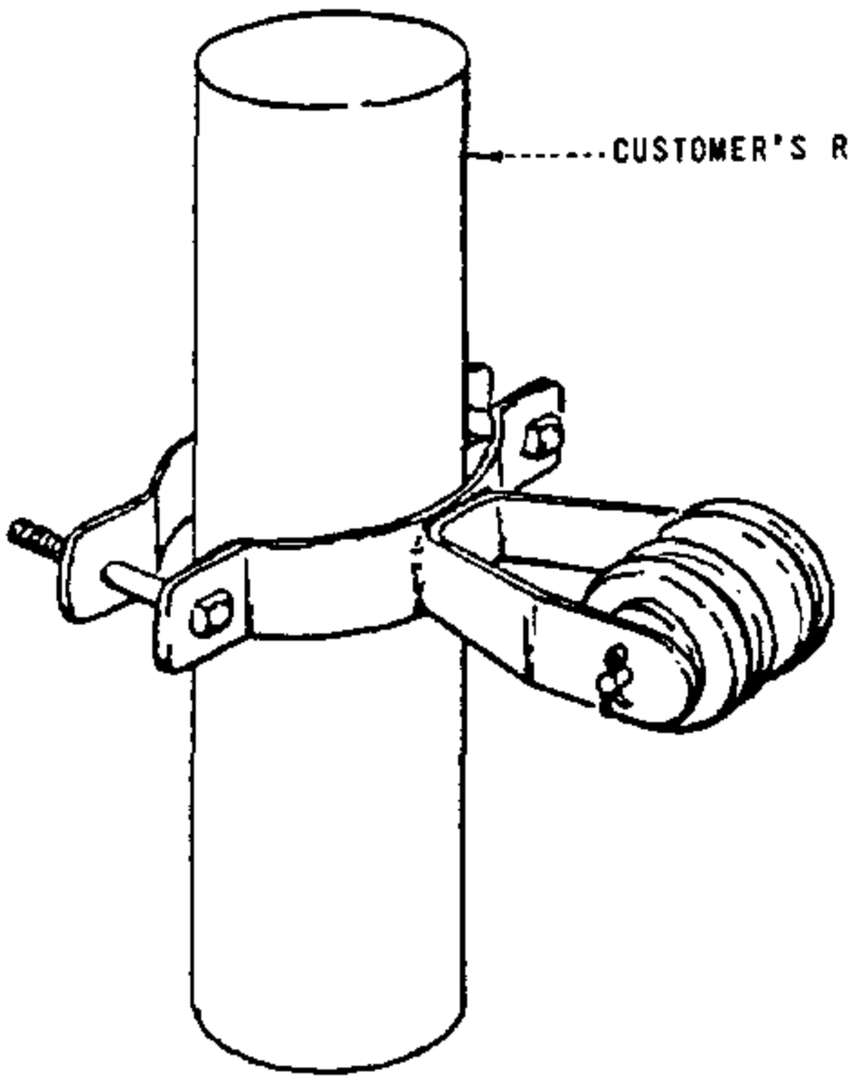
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DATE 9-17-82
APPD

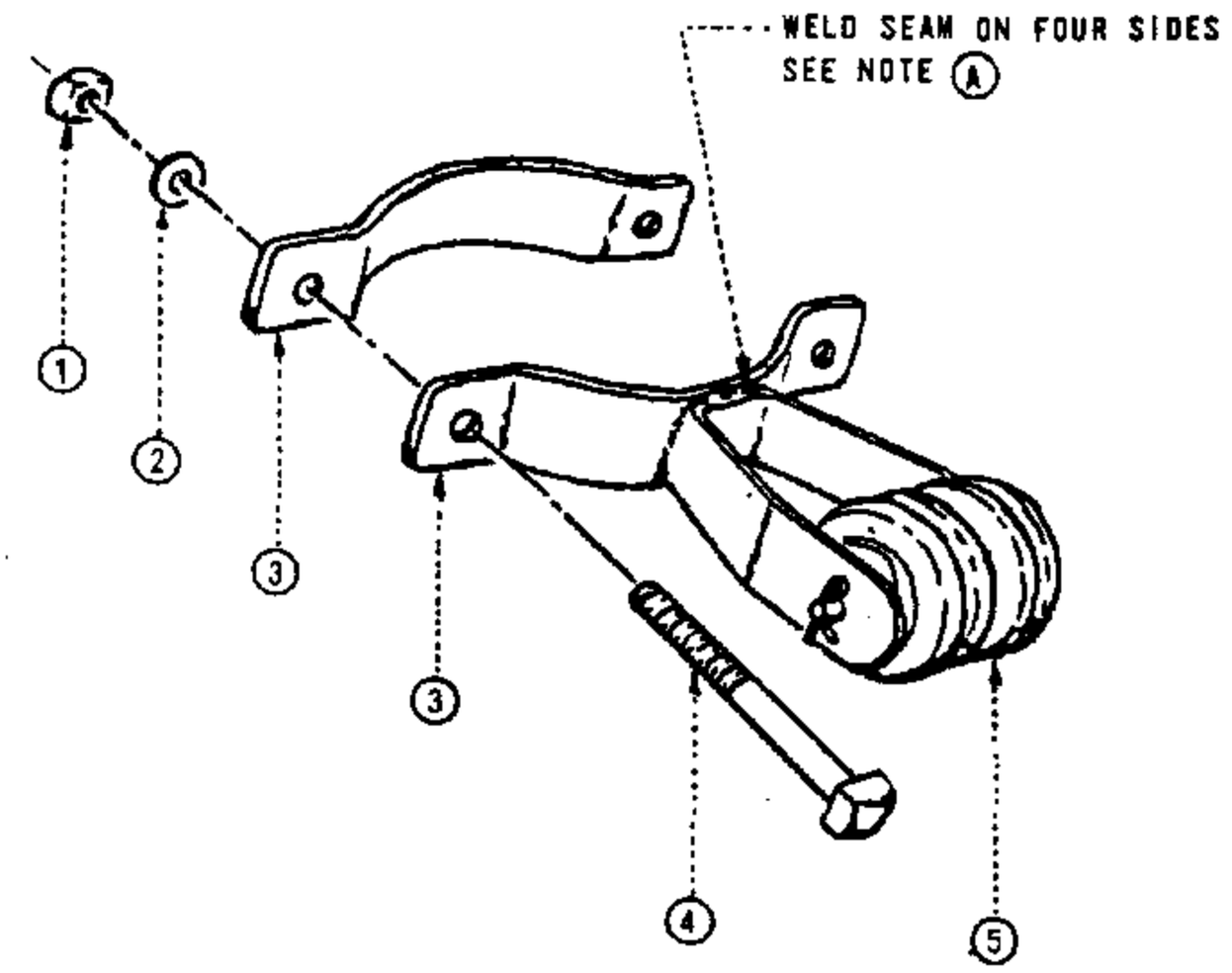
SDG&E ELECTRIC STANDARDS

SERVICE INSULATOR BRACKETS, SINGLE

699.301
SUPERSEDES
631 (9-17-82)




BRACKET ASSEMBLED




BRACKET EXPLODED

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) ITEM TO BE GALVALLOY ZINC AT WELDED JOINT OR HOT DIP GALVANIZED AFTER FABRICATION.

(B) ASSEMBLY WILL ACCOMODATE CUSTOMER'S RISER FROM 3" MINIMUM TO 6" MAXIMUM.

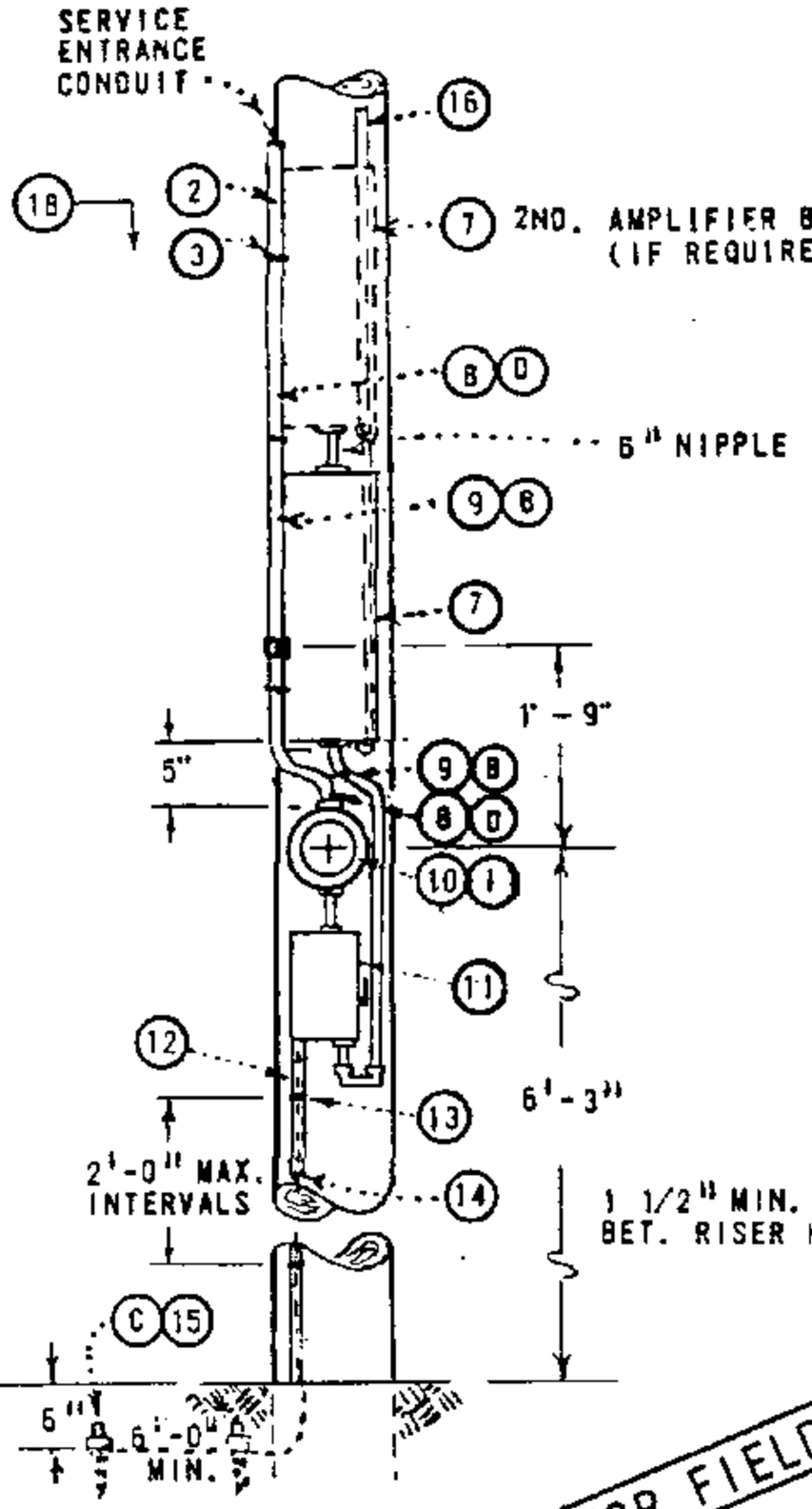
| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|
| 1 | NUT, GALV., 1/2" X 13 COURSE THREAD | 2 | 504736 |
| 2 | WASHER, FLAT, GALV., 1/2" DIAMETER | 2 | 800192 |
| 3 | STRAP, BACK, CURVED, GALV. | 2 | 698016 |
| 4 | BOLT, MACH., GALV., 1/2" X (LENGTH AS REQ'D) | 2 | PG. 139 |
| 5 | 4KV DEADEND ASSEMBLY | 1 | 166128 |
| | | | |

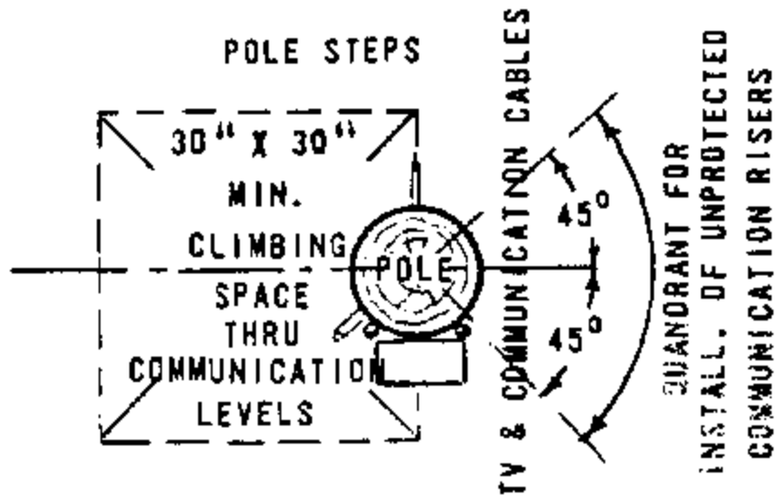
699.302
SUPERSEDES
632 (9-17-82)

SOG&E ELECTRIC STANDARDS

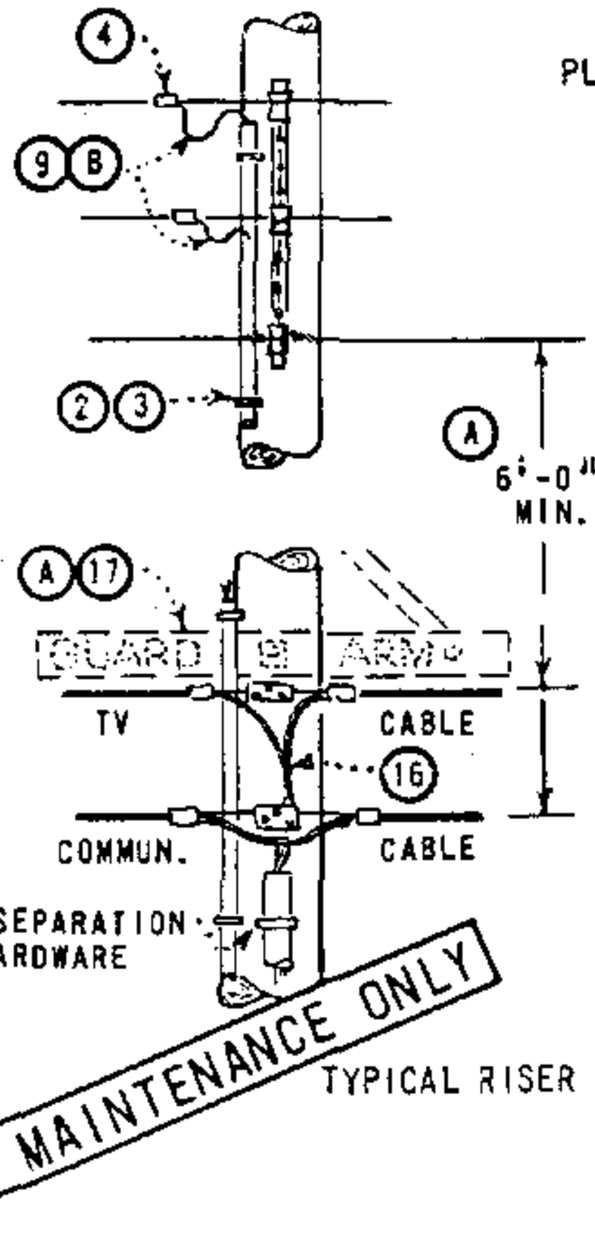
# HEAVY DUTY SERVICE INSULATOR BRACKET

DATE 9-17-82
APPD




PLAN OF CLIMBING SPACE




TYPICAL RISER TERMINATION



NOTES:

(A) SEPARATION BETWEEN SECONDARY LINE AND TV CABLE MAY BE REDUCED TO NOT LESS THAN 4'-0" WHERE A GUARD ARM HAS BEEN INSTALLED IMMEDIATELY ABOVE TV CABLE.

(B) CUSTOMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM METER SOCKET TERMINALS TO OVERHEAD SECONDARY LINE AND SHALL BE OF A LENGTH SUFFICIENT TO FORM LOOPS AT TOP OF THE RISER.

(C) USE TWO GROUND RODS WHERE AN IMPEDANCE OF LESS THAN 25 OHMS CANNOT BE OBTAINED WITH ONE GROUND ROD.

(D) IF PVC CONDUIT IS USED, ALL EQUIPMENT MOUNTED ON POLE BELOW 8' LEVEL TO BE EFFECTIVELY GROUNDED AND CONDUIT GROUND OMITTED.

E. THE EQUIPMENT ON LOADSIDE OF THE METER IS SUBJECT TO APPROVAL BY THE LOCAL INSPECTION AUTHORITIES.

F. ATTACH ONE SET OF LEADS FROM METER TO EXO SWITCH ONLY. LOWER AMPLIFIER MAY BE USED AS A JUNCTION BOX WHEN SECOND AMPLIFIER BOX IS REQUIRED.

G. THIS INSTALLATION SHALL BE LIMITED TO UTILITY POLES WHICH CONTAIN NO OTHER VERTICAL RUNS.

MATERIAL FURNISHED AND INSTALLED BY SDG&E

| ITEM | DESCRIPTION | QUANTITY | STOCK NO./ STD. PAGE |
|---|---|---|---|
| 1 | METER | 1 | 481840 |
| 2 | CONDUIT 3/4" DIAM., PVC, TYPE II, SCH. 80 (E) | AS REQ'D. | 251520 |
| 3 | STRAPS, PIPE, GALV., 3/4", 2-10d. NAILS (E) | AS REQ'D. | 697888 |
| 4 | CONNECTORS, WIRE (SIZE AS REQ'D.) | 2 | 783 OR 786 |
| 5 | COUPLING, PLASTIC, (SIZE AS REQ'D) | 1 | |
| | | | |

MATERIAL FURNISHED AND INSTALLED BY CUSTOMER

| | | |
|---|---|---|
| | 7 | TV AMPLIFIER EQUIPMENT(1 OR 2 BOX INSTALLATION) |
| (D) | 8 | G.I. RIGID OR PVC CONDUIT SCH. 80, WITH FITTINGS (TO 8'-0" LEVEL) |
| (B) | 9 | WIRE, 600V, #12, TYPE THW, (SERVICE CONDUCTORS) |
| | 10 | APPROVED METER SOCKET |
| | 11 | EXO SWITCH, COMPLETE WITH PROTECTION |
| | 12 | HARDWOOD MOULDING, 1" |
| | 13 | PIPE STRAPS, GALV., 1" & 2-10d. NAILS, GALV. |
| | 14 | WIRE, BARE STRANDED COPPER, #6 |
| (C) | 15 | GROUND ROD AND CLAMP, 5/8" X 8'-0" |
| | 16 | CO-AXIAL TV CABLES |
| (A) | 17 | GUARD ARM, 3" X 4 1/4" X 4'-0" (IF REQ'D.) WITH BRACE |
| | 18 | POLE STEPS (AS REQ'D) PAGE 363 |

DATE 8-31-81
APPD

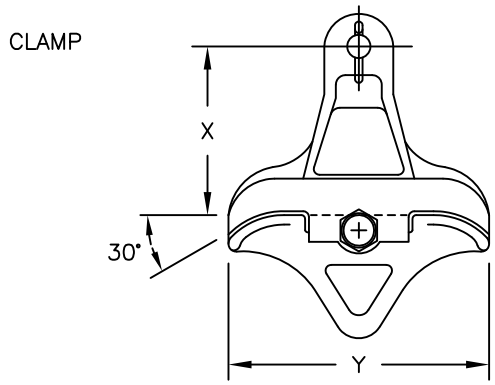
SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS

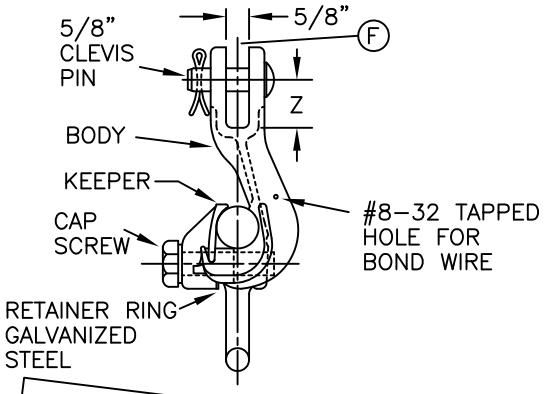
# CUSTOMER OWNED - 1 & 2 BOX TV AMPLIFIER & 120V. METER INSTALLATION

699.500
SUPERSEDES
652 (8-31-81)

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**SCOPE:** THIS PAGE SHOWS THE DIMENSIONS AND ULTIMATE VERTICAL LOADING STRENGTH OF THE ANGLE SUSPENSION CLAMP. THE CLAMP IS TO BE USED IN CONJUNCTION WITH THE CLEVIS OR SOCKET EYE CONNECTORS FOR SUPPORTING CONDUCTORS ON VERTICAL CONSTRUCTION. MAXIMUM ANGLE FOR CONSTRUCTION USING THIS CLAMP IS 30° .




**FOR FIELD MAINTENANCE ONLY**

**INSTALLATION:**

(A) LINE GUARDS ARE TO BE USED WITH CLAMPS.

B. BONDING IS REQUIRED IN CONTAMINATION DISTRICT 1. (SEE STANDARD 287)

**REFERENCE:**

C. TABLE 1 IS TO BE USED TO DETERMINE PHYSICAL DIMENSIONS AND STRENGTHS OF SUSPENSION CLAMPS.

D. TABLE 2 SHOWS THE PROPER SIZING OF SUSPENSION CLAMPS FOR CONDUCTORS.

(F) SEE STANDARD 777 FOR USE OF CLEVIS AND SOCKET EYES.

**TABLE 1**

| MANUFACTURER | | CLAMP RANGE DIA. (INCHES) | | DIMENSIONS (INCHES) | | | ULTIMATE STRENGTH VERT.LOAD | MATERIAL | STOCK NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| CAT.NO. | NAME | MIN. | MAX. | X | Y | Z | | | |
| 1301 | LINDSEY | .160 | .430 | 3–7/16 | 5–1/2 | 1–1/2 | 18,000 | DUCTILE IRON | 226662 |
| 1305 | LINDSEY | .300 | .650 | 4–1/4 | 6–1/2 | 1–1/2 | 18,000 | DUCTILE IRON | 226664 |
| 1308 | LINDSEY | .50 | .70 | 4–1/4 | 7 | 1–1/4 | 12,000 | ALUM. | 232004 |
| 1312 | LINDSEY | .68 | 1.00 | 4–1/4 | 6–7/8 | 1 | 12,000 | ALUM. | 232008 |
| 1316 | LINDSEY | 1.00 | 1.313 | 5–3/8 | 6–7/8 | 1–1/4 | 12,000 | ALUM. | 232012 |
| 1320 | LINDSEY | 1.24 | 1.500 | 5–5/8 | 7 | 1–1/4 | 15,000 | ALUM. | 226660 |

**TABLE 2**

| COPPER | | | | | | | | | | | | COPPERWELD | | | | | | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 4 | 3 SOL. | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 250 KCM | | | 8A | 6 | 4 | | | | | |
| X | X | X | X | X | X | X | | | | | | X | X | X | | | | 226662 | SCACS |
| | | | | | | | X | X | X | | | | | | | | | 226664 | SCACL |

| AWAC (A) | | | ACSR (A) | | | | | | | | | 5005 (A) | | | | | | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1/0 | | 4 | 2 | 1/0 | 3/0 | 4/0 | 336 18/1 | 336 26/7 | 397 | 636 | 4 | 2 | 1/0 | 3/0 | 394.5 | | | |
| X | X | | X | X | X | | | | | | | X | X | X | | | | 232004 | SC4<br>SC1/0 |
| | | | | | | X | X | X | | | | | | | X | | | 232008 | – |
| | | | | | | | | | X | X | | | | | | X | | 232012 | SC397 |
| | | | | | | | | | | | X | | | | | | | 226660 | SC636 |

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Indicates Latest Revision | Completely Revised | New Page | Information Removed

| | SDG&E ELECTRIC STANDARDS | REVISION |
|---|---|---|
| 776 | ANGLE SUSPENSION CLAMPS | DATE 1–1–94<br>APPD PA 1/99 |

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## COPPER WIRE (FOR FIELD MAINTENANCE ONLY)

| SIZE OF WIRE | AWG | 6 | 1 | – | – |
|---|---|---|---|---|---|
| | CIRC MILS (CU EQUIV) | 26250 | 83690 | 250K | 400K |
| STOCK NUMBER | | S813536 | S812352 | S813696 | S812416 |
| NUMBER OF STRANDS | | 3 | 7 | 19 | 19 |
| DIAMETER (INCHES) | | .201 | .328 | .574 | .726 |
| WEIGHT (LBS/1000 FT) | | 82.5 | 258.4 | 771.9 | 1235 |
| ULTIMATE TENSILE STRENGTH (LBS) | | 1204 | 3154 | 9366 | 13850 |
| AMPACITY (AMPERES) AT 75° C | | 130 | 270 | 540 | 730 |
| RESISTANCE AT 75° C OHMS/1000 FT | | .49 | .15 | .052 | .033 |

FOR FIELD MAINTENANCE ONLY

## COPPERWELD WIRE (FOR FIELD MAINTENANCE ONLY)

| SIZE OF WIRE | AWG | 6 | 4 | | | – | – | – |
|---|---|---|---|---|---|---|---|---|
| | CIRC MILS (CU EQUIV) | 26250 | 47140 | | | 47124 | 92667 | 370100 |
| STOCK NUMBER | | S813120 | S813088 | S813152 | S813216 | S813280 | S813312 | S813184 |
| CW. CONDUCTOR TYPE NO. | | 6A | 4A | 4D | 4N | 3/8 (7 #8) | 9/16 (7 #5) | .810E |
| NUMBER OF STRANDS CW/CU | | 1/2 | 1/2 | 2/1 | 5/2 | 40% 7-HS | 40% 7-HS | 7/12 |
| DIAMETER (INCHES) | | .230 | .290 | .348 | .328 | .385 | .546 | .810 |
| WEIGHT (LBS/1000 FT) | | 101.6 | 161.5 | 225.5 | 240.0 | 323.9 | 649.4 | 1484 |
| ULTIMATE TENSILE STRENGTH (LBS) | | 2585 | 3938 | 7340 | 8460 | 10460 | 18510 | 34290 |
| AMPACITY (AMPERES) AT 75° C | | 140 | 180 | 190 | 180 | 200 | 305 | 660 |
| RESISTANCE AT 75° C OHMS/1000 FT | | .50 | .32 | .32 | .32 | .28 | .14 | .035 |

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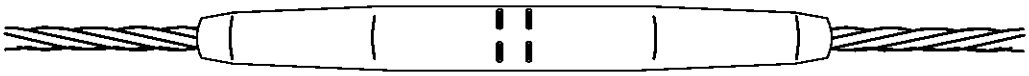
| 799.101<br>SUPERSEDES<br>715 (5-6-83) | SDG&E ELECTRIC STANDARDS<br>COPPER AND COPPERWELD WIRE TABLE | DATE 3-23-2011<br>APPD PSA/MJC |
|---|---|---|

| SIZE OF WIRE | | | | | | |
|---|---|---|---|---|---|---|
| | A.W.G. | 4 | 2 | 1/0 | 3/0 | 4/0 |
| | CIRCULAR MILS. | 41740 | 66370 | 105500 | 167800 | 211600 |
| STOCK NUMBER | | 815456 | 815520 | 815488 | 815552 | – |
| NUMBER OF STRANDS | | 3 | 7 | 7 | 7 | 7 |
| CONDUCTOR AREA SQUARE INCHES | | .0328 | .0521 | .0829 | .1318 | .1662 |
| NOMINAL O.D. INCHES | | .566 | .604 | .680 | .766 | .839 |
| APPROX. WEIGHT LBS. PER M FT. | | 215 | 300 | 440 | 650 | 800 |
| ULTIMATE TENSILE STRENGTH – LBS. | | 1564 | 2517 | 3953 | 6204 | 7772 |
| CAPACITY AMPERES AT 75° C | | 125 | 166 | 222 | 294 | 343 |
| RESISTANCE AT 75° C OHMS M FEET | | .32 | .20 | .12 | .079 | .062 |
| ASSEMBLY UNITS | | TR4 | TR2 | TR1/0 | TR3/0 | – |

FOR FIELD MAINTENANCE ONLY

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| DATE 1–1–96<br>APPD PA / RDG | SDG&E ELECTRIC STANDARDS<br>COPPER TREE WIRE | 799.102<br>SUPERSEDES<br>717 (1–1–96) |



**AUTOMATIC COPPER SLEEVE**

**NOTES:**

- SLEEVES SHALL NOT BE INSTALLED IN GRADE A CROSSING SPANS OR IN TRANSMISSION CONSTRUCTION.
- AUTOMATIC SLEEVES DEPEND ON LINE TENSION FOR THEIR OPERATION. THEY SHALL NOT BE USED IN TAPS, JUMPERS, OR REDUCED TENSION.

| AUTOMATIC SLEEVES FOR COPPER CONDUCTORS | | |
|---|---|---|
| WIRE | | STOCK NUMBER |
| SIZE | STRAND | |
| 6 | SOLID | S653318 |
| 6 | 3 | S653320 |
| 4 | SOLID | S653320 |

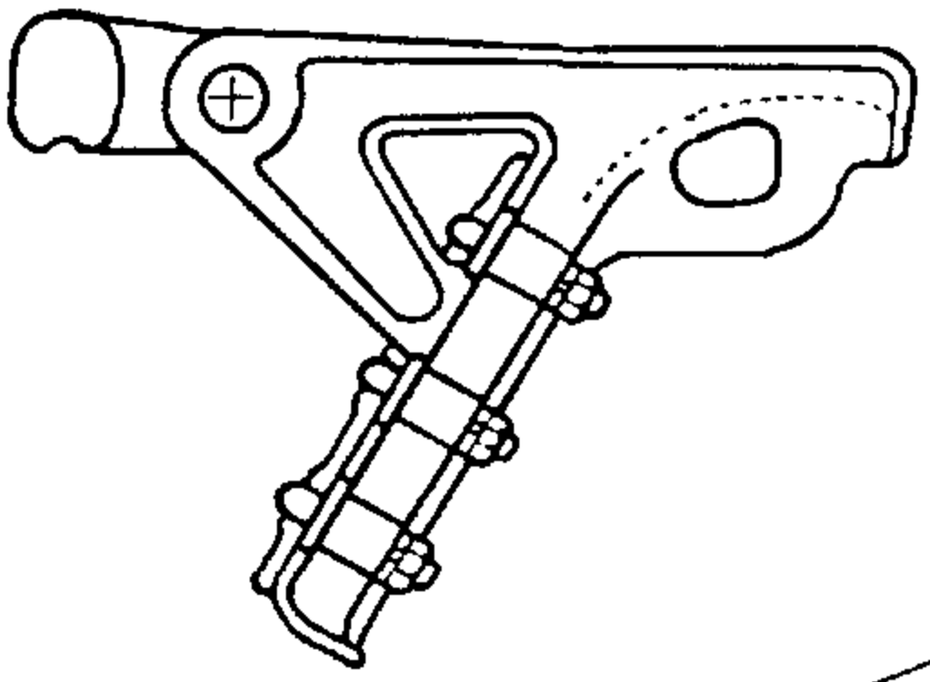
| AUTOMATIC SLEEVES FOR COPPERWELD CONDUCTORS | | |
|---|---|---|
| WIRE | | STOCK NUMBER |
| SIZE | STRAND | |
| 8A | 1/2 | S653320 |
| 6A | 1/2 | S653342 |

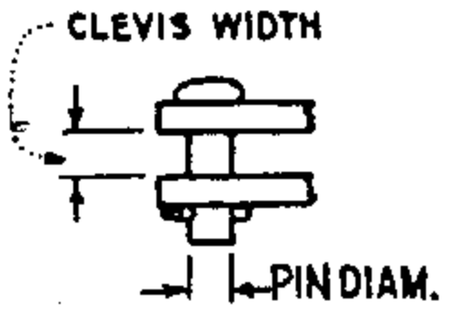
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| | | |
|---|---|---|
| DATE 9–16–2014<br>APPD IL / DW | SDG&E ELECTRIC STANDARDS<br>AUTOMATIC SLEEVES FOR COPPER AND COPPERWELD CONDUCTORS | 799.103<br>SUPERSEDES<br>720.8 (2–11–2014) |

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THIS PAGE FOR FIELD MAINTENANCE ONLY

RECOMMENDED U-BOLT NUT TORQUE

1/2" = 50 FT. LBS.

9/16"= 67 FT. LBS.

5/8" = 83 FT. LBS.

NOTES:

A. REFER TO PAGE 777 FOR CLAMP CONNECTORS.

B. HAND TIGHTEN U BOLT NUTS AND THEN ALTERNATELY APPLY WRENCH UNTIL DESIRED TORQUE IS ACHIEVED.

Ⓒ NO LONGER PURCHASED, BUT WILL BE SALVAGED.

Ⓓ ITEM 231488 IS BRONZE

| COPPER WIRE SIZE AND DIAMETER (INCHES) | | | | | | | | | CLAMP RANGE | | CONNECTION | CLEVIS WIDTH | PIN DIAM. | STOCK NO OR CONST STD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 .254 | 2 .320 | 1/0 .368 | 4/0 .527 | 250MCM .574 | 400MCM .726 | 500MCM .813 | 750MCM .997 | 1000MCM 1.151 | MIN. | MAX. | | | | |
| X | X | X | X | - | - | - | - | - | .20 | .55 | SOCKET | 11/16" | 5/8" | 231264 |
| - | - | X | X | X | - | - | - | - | .30 | .68 | SOCKET | 13/16" | 5/8" | 231328 |
| - | - | - | X | X | X | - | - | - | .48 | .84 | SOCKET | 7/8" | 5/8" | 231392 Ⓒ |
| - | - | - | X | X | X | X | - | - | .50 | .96 | SOCKET | 1" | 5/8" | 231456 Ⓒ |
| - | - | - | - | - | X | X | X | X | .71 | 1.30 | SOCKET | 1 7/16" | 3/4" | 231488 Ⓓ |
| | | | | | | | | | | | | | | |
| - | X | X | X | X | - | - | - | - | .30 | .68 | NONE | 13/16" | 5/8" | 231136 |
| | - | - | X | X | X | X | - | - | .48 | .84 | NONE | 7/8" | 5/8" | 231200 Ⓒ |

DATE 1-1-88

APPD

SDG&E ELECTRIC STANDARDS

# GALVANIZED DEAD END STRAIN CLAMPS FOR COPPER CONDUCTORS

799.401

SUPERSEDES 744 (8-31-81)

SCOPE: THIS STANDARD SHOWS STRAIGHT STRAIN CLAMPS USED TO ATTACH ACSR AND 5005 ALUMINUM ALLOY CONDUCTORS TO DEAD END INSULATORS.

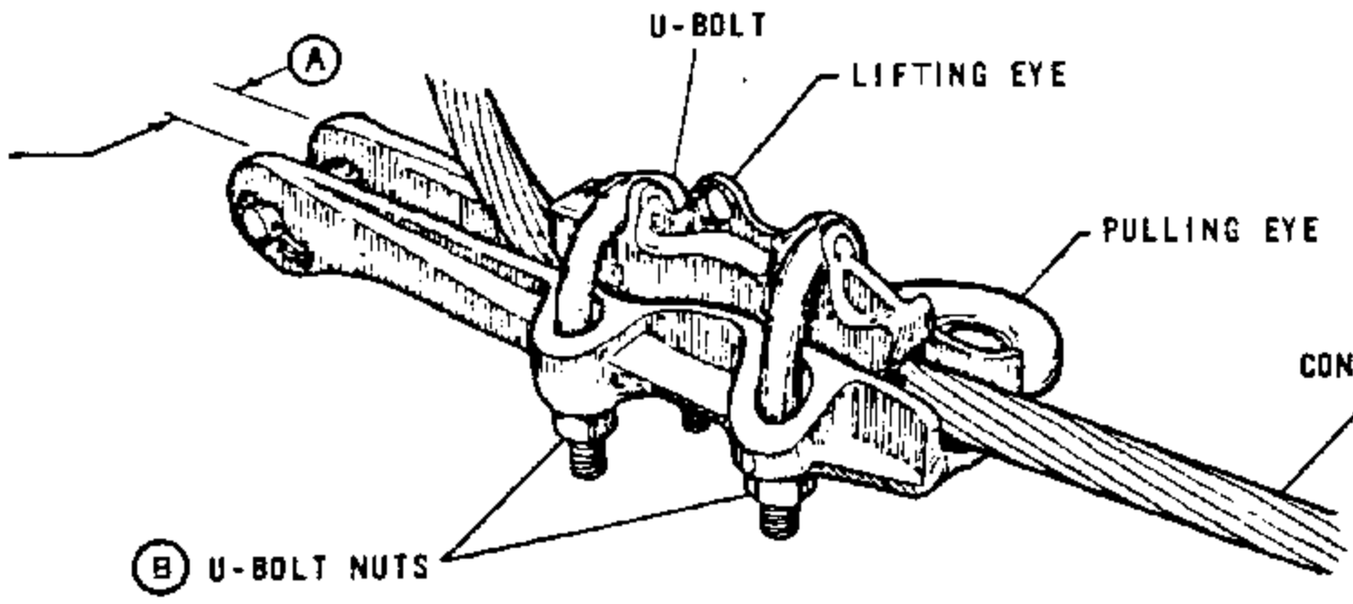
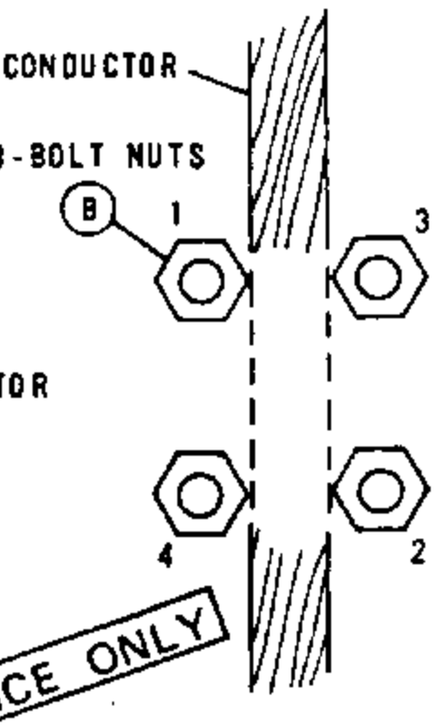



FIG. 1




TORQUING SEQUENCE
FIG. 2

FOR FIELD MAINTENANCE ONLY

**NOTES:**

- DO NOT USE STRAIGHT STRAIN CLAMP ON AWAC CONDUCTORS.
- THIS CLAMP MAY BE USED IN ALL LOADING DISTRICTS.

BILL OF MATERIAL:

| WIRE SIZE | | | | | | | | CLAMP RANGE (INCHES) | | CLAMP DATA | | MFG | CATALOG NUMBER | STOCK NO OR CONSTR STD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACSR OR 5005 (AWG) | | | ACSR | | | | 5005 | | | | | | | |
| 2 6/1 | 1/0 6/1 | 3/0 6/1 | 336.4 KCMIL 18/1 | 336.4 KCMIL 26/7 | 636 KCMIL 24/7 | 1033.5 KCMIL 45/7 | 394.5 KCMIL 19 | MIN | MAX | TORQUE (FT-LBS) | CLEVIS WIDTH (A) | | | |
| X | X | X | - | - | - | - | - | .184 | .563 | 35 | 5/8 | ALCOA | E221.2 | 230432 (E) |
| X | X | X | X | X | - | - | X | .316 | .814 | 40 | 13/16 | | E222.3 | 230512 |
| - | - | - | X | X | X | - | X | .522 | 1.153 | 40 | 3/4 | | E223.4 | - (C) |
| - | - | - | - | - | - | X | - | 1.022 | 1.454 | 40 | 3/4 | | 225 | - (C) |
| X | X | - | - | - | - | - | - | .19 | .47 | 25 | 11/16 | BETHEA | ASD-2-N | 230432 (E) |
| - | - | X | X | X | - | - | X | .46 | .75 | 45 | 3/4 | | ASD-37-N | 230464 (E) |
| X | X | - | - | - | - | - | - | .191 | .447 | 20 | 3/4 | FARGO | GD-971A | 230432 (E) |
| X | X | X | X | - | - | - | X | .25 | .724 | 45 | 3/4 | | GD-972A | 230512 |
| X | - | - | - | - | - | - | - | .15 | .37 | 50 | 11/16 | OHIO BRASS | 87650 | - (C) |
| X | X | X | - | - | - | - | - | .30 | .60 | 50 | 3/4 | | 91560 | - (C) |
| - | - | X | X | X | - | - | X | .46 | .88 | 50 | 7/8 | | 91570 | 230464 (E) |
| - | - | - | - | - | X | X | - | .86 | 1.30 | 40 | 1-1/16 | ANDERSON | ADE-130-N | 230496 |

**INSTALLATION:**

(A) SEE CLAMP DATA COLUMN FOR CLEVIS WIDTH.
(B) HAND TIGHTEN U-BOLT NUTS AND THEN TORQUE BOLTS AS SHOWN IN FIG. 2 TO THE VALUES IN CLAMP DATA COLUMN.
(C) SPECIAL ORDER.
(E) EXEMPT MATERIAL

799.402
SUPERCEDES
741 (1986)

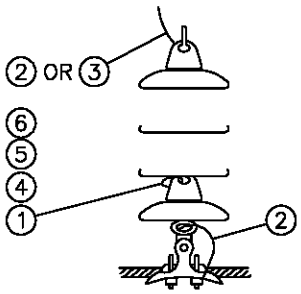
SDG&E ELECTRIC STANDARDS

# 12KV ALUMINUM STRAIGHT STRAIN CLAMP FOR ACSR & 5005 ALUMINUM ALLOY CONDUCTORS

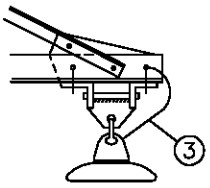
DATE 1-1-86
APPD AK/RDS

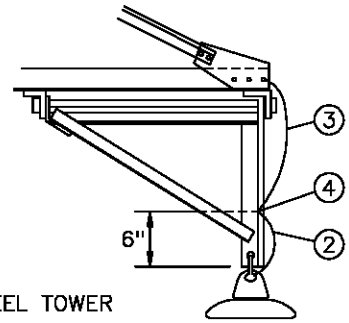
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TABLE OF CONTENTS

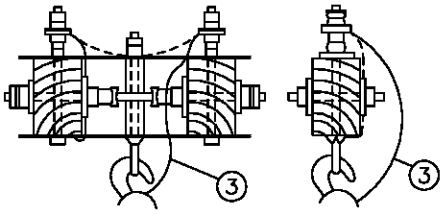



SUSPENSION

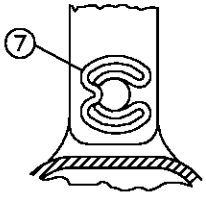


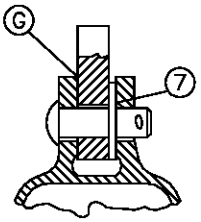

STEEL TOWER



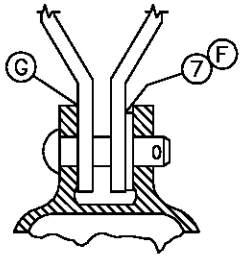

DOUBLE & SINGLE ARM



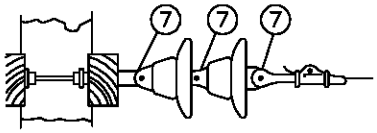

SIDE VIEW



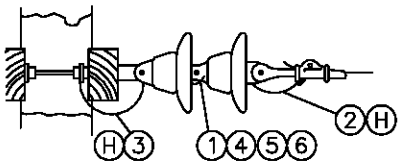

LOCATION BETWEEN EXTENSION LINK OR INSULATOR EYE AND OPEN CLEVIS




LOCATION BETWEEN CLOSED CLEVIS AND INSULATOR CLEVIS




12KV DEAD END USING RIV CLIPS
SEE NOTE "B2b"




RIV CLIP INFORMATION – SEE NOTE "B2b"

12KV DEAD END USING BOND WIRES
SEE NOTE "B1 AND B2a"

NOTES:

A. USE BONDED INSULATORS ON 138 AND 69KV WHERE: 1) MAXIMUM GUYING TENSION PER CONDUCTOR IS BELOW 1000 POUNDS, OR 2) THROUGH RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL AREAS. ALSO, WHERE FUTURE DEVELOPMENT OF SIMILAR AREAS ADJACENT TO TRANSMISSION LINES ARE ANTICIPATED.

(B) USE THE FOLLOWING TO DETERMINE WHEN TO USE BONDED OR UNBONDED INSULATORS, AND WHEN RIV CLIPS ARE TO BE ADDED TO UNBONDED INSULATORS ON 12KV AND 12.47KV SYSTEMS IN CONTAMINATION DISTRICTS DESCRIBED ON PAGE 287.

1) SLACK SPANS (SPANS INSTALLED AT MORE THAN NORMAL SAG): IN ALL CONTAMINATION DISTRICTS: USE BONDED INSULATORS.

2) FULL TENSION INSTALLATIONS WHERE MAXIMUM GUYING TENSION PER CONDUCTOR IS 1000 POUNDS OR LESS:
   a) CONTAMINATION DISTRICT 1, USE BONDED INSULATORS.
   b) CONTAMINATION DISTRICTS 2 AND 3, USE UNBONDED INSULATORS WITH RIV CLIPS

3) FULL TENSION INSTALLATIONS WHERE MAXIMUM GUYING TENSION PER CONDUCTOR IS OVER 1000 POUNDS: ALL CONTAMINATION DISTRICTS: USE UNBONDED INSULATORS.

C. INSULATORS BONDED PER SDG&E SPECIFICATION 138 INCLUDE ITEMS 1 THROUGH 6 LISTED BELOW.

D. SEE STANDARDS PAGE 750.4 FOR SUSPENSION INSULATOR INFORMATION.

(F) INSTALL RIV CLIP BETWEEN CLEVIS AND INSULATOR CAP AS SHOWN.

(G) ADD SECOND RIV CLIP IF ONLY ONE CLIP DOES NOT MAKE TIGHT CONNECTION BETWEEN HARDWARE. NEVER USE MORE THAN 2 RIV CLIPS AT ONE CONNECTION, OR, ON ONE PIN.

(H) ATTACH BOND WIRES LEAVING SHORT LOOPS AS SHOWN. CUT OFF EXCESS BOND WIRE.

BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS | ASSEMBLY UNITS |
|---|---|---|---|---|
| 1 | WIRE ROPE, 3" STAINLESS STEEL, MACWYTE, 1/16" OD, 7x7 PREFORMED, AIFI TYPE 304 | AS REQ'D | 606720 | 12BOND |
| 2 | WIRE ROPE, 12" STAINLESS STEEL, MACWYTE, 1/16" OD, 7x7 PREFORMED, AIFI TYPE 304 | AS REQ'D | | |
| 3 | WIRE ROPE, 24" STAINLESS STEEL, MACWYTE, 1/16" OD, 7x7 PREFORMED, AIFI TYPE 304 | AS REQ'D | | |
| 4 | SCREW, 8–32, STAINLESS STEEL, PHILLIPS HEAD | AS REQ'D | 622464 | – |
| 5 | TERMINAL, AMP 322334, #8 STUD, STAINLESS STEEL OR NICKEL | AS REQ'D | 732064 | – |
| 6 | LOCKWASHER, EXTERNAL TOOTH, #8 STUD, STAINLESS STEEL | AS REQ'D | 796352 | – |
| 7 | CLIP, INSULATOR NON STATIC (RIV) | AS REQ'D | 237648 | RIVCLP |

| | | |
|---|---|---|
| DATE 1–1–94<br>APPD PA / RDG | SDG&E ELECTRIC STANDARDS<br>PORCELAIN SUSPENSION INSULATOR BONDING | 799.501<br>SUPERSEDES<br>756 (1–1–98) |

**NOTES:** (A) TO CHOOSE THE PROPER GROOVE CLAMP, LOCATE THE TWO WIRE SIZES ON THE CHART, DRAW A HORIZONTAL LINE FROM THE LARGER CONDUCTOR SIZE AND A VERTICAL LINE FROM THE SMALLER SO THAT THEY INTERSECT. THE AREA CONTAINING THE INTERSECTION INDICATES THE CORRECT STOCK NUMBER.

EXAMPLE: FOR CONDUCTOR SIZES 3/0 ACSR AND #2 ACSR, THE CORRECT GROOVE CLAMP STOCK NUMBER IS 277968.

B. THE ADJACENT TABLE CAN BE USED TO DETERMINE THE SPECIFIC MANUFACTURER'S CATALOG NUMBER FOUND UNDER A STOCK NUMBER.

C. BE SURE TO CLEAN CONDUCTOR WHICH WILL BE UNDER CLAMP, CLEAN CONDUCTOR GROOVES OF CLAMP IF NECESSARY, AND FILL THE GROOVES WITH INHIBITOR (247200) BEFORE INSTALLING THE CLAMP.

D. FOR USE WHEN MAKING AL. TO AL. AND AL. TO CU. PERMANENT CONNECTIONS AND WHERE CONNECTIONS MAY BE OPENED OCCASIONALLY FOR OPERATING CONVENIENCE.

F. WHEN MAKING AL. TO CU. CONNECTIONS, LOCATE THE CU. AT THE SAME LEVEL OR BELOW THE AL. CONDUCTOR.

| CONDUCTOR DIA. IN. | AWG OR KCM | DESCRIPTION |
|---|---|---|
| .162 | 6 | SOLID |
| .184 | 6 | 7 STR. |
| .198 | 6 | ACSR 6/1 |
| .198 | 6 | 5005 7W |
| .199 | 8A | CUWLD 3 STR. |
| .202 | 6 | 3 STR. |
| .204 | 4 | SOLID |
| .229 | 3 | SOLID |
| .230 | 6A | CUWLD 3 STR. |
| .232 | 4 | 7 STR. |
| .250 | 4 | ACSR 6/1 |
| .250 | 4 | 5005 7W |
| .254 | 4 | 3 STR. |
| .258 | 2 | SOLID |
| .276 | 6D | CUWLD 3 STR. |
| .289 | 1 | SOLID |
| .290 | 4A | CUWLD 3 STR. |
| .292 | 2 | 7 STR. |
| .316 | 2 | ACSR 6/1 |
| .316 | 2 | 5005 7W |
| .320 | 2 | 3 STR. |
| .324 | 1/0 | SOLID |
| .325 | 2 | ACSR 7/1 |
| .328 | 4N | CUWLD 7 STR. |
| .330 | 2 | AWAC 5/2 |
| .338 | 1/0 | 7 STR. COMP. |
| .348 | 4D | CUWLD 3 STR. |
| .360 | 1 | 3 STR. |
| .368 | 1/0 | 7 STR. |
| .373 | 1/0 | 19 STR. |
| .386 | 2 | AWAC 3/4 |
| .398 | 1/0 | ACSR 6/1 |
| .398 | 1/0 | 5005 7W |
| .409 | 3/0 | SOLID |
| .414 | 2/0 | 7 STR. |
| .426 | 3/0 | 7 STR. COMP. |
| .447 | 1/0 | AWAC 4/3 |
| .460 | 4/0 | SOLID |
| .464 | 3/0 | 7 STR. |
| .470 | 3/0 | 19 STR. |
| .502 | 3/0 | ACSR 6/1 |
| .502 | 3/0 | 5005 7W |
| .522 | 4/0 | 7 STR. |
| .528 | 4/0 | 19 STR. |
| .533 | 4/0 | 37 STR. |
| .563 | 4/0 | ACSR 6/1 |
| .575 | 250 | 19-37 STR. |
| .629 | 300 | 19-37 STR. |
| .666 | 336 | 19 STR. |
| .680 | 350 | 19-37 STR. |
| .684 | 336 | ACSR 18/1 |
| .721 | 336 | ACSR 26/7 |
| .721 | 394 | 5005 19W |
| .727 | 400 | 19-37 STR. |
| .743 | 397 | ACSR 18/1 |
| .783 | 397 | ACSR 26/7 |
| .811 | 500 | 19 STR. |
| .977 | 636 | ACSR 24/7 |
| .998 | 750 | 37-61 STR. |
| 1.152 | 1000 | 61-91 STR. |

EXAMPLE (A)

227936

| ASSEMBLY UNITS |
|---|
| PG6C |
| PG4C |
| PG2A |
| PG2C |
| PG1/0A |
| PG1/0C |

227968

| ASSEMBLY UNITS |
|---|
| PG3/0A |
| PG4/0C |

NO CONNECTOR AVAILABLE

228000

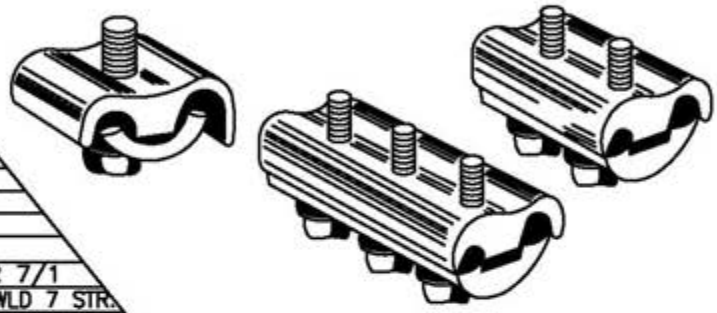
| ASSEMBLY UNITS |
|---|
| PG336 |
| PG394 |
| PG400 |

228032

| ASSEMBLY UNITS |
|---|
| PG500– |

228064 (G)

| ASSEMBLY UNITS STK No. 228064 |
|---|
| PG397 |
| PG500 |
| PG636 |
| PG750 |
| PG1000 |



| STOCK NUMBER | BOLTS NO. | BOLTS SIZE IN. | BOLTS TORQUE LB.-FT | ALCOA CATALOG NUMBER |
|---|---|---|---|---|
| 227936 | 1 | 3/8 | 13 | 396.6 |
| 227968 | 2 | 1/2 | 25 | 482.1 |
| 228000 | 3 | 1/2 | 25 | 482.2 |
| 228032 | 2 | 5/8 | 40 | 483.2 |
| 228064 | 3 | 5/8 | 40 | 483.3 |
| | | | | |
| | | | | |

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| | Indicates Latest Revision | | Completely Revised | | New Page | | Information Removed |
|---|---|---|---|---|---|---|---|

REVISION
DATE 1-1-94
APPD PSA 1/20/94

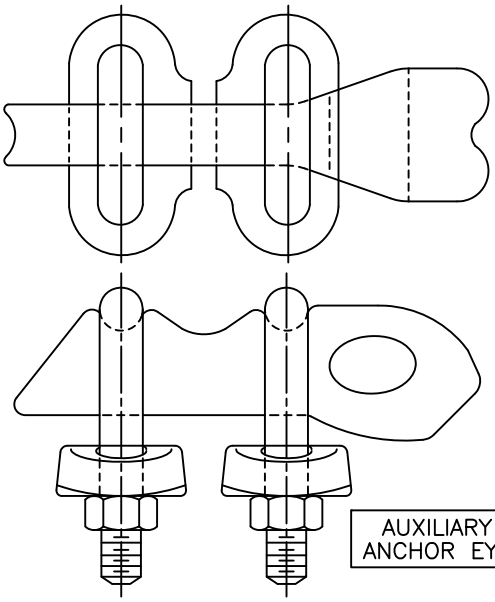
SDG&E ELECTRIC STANDARDS

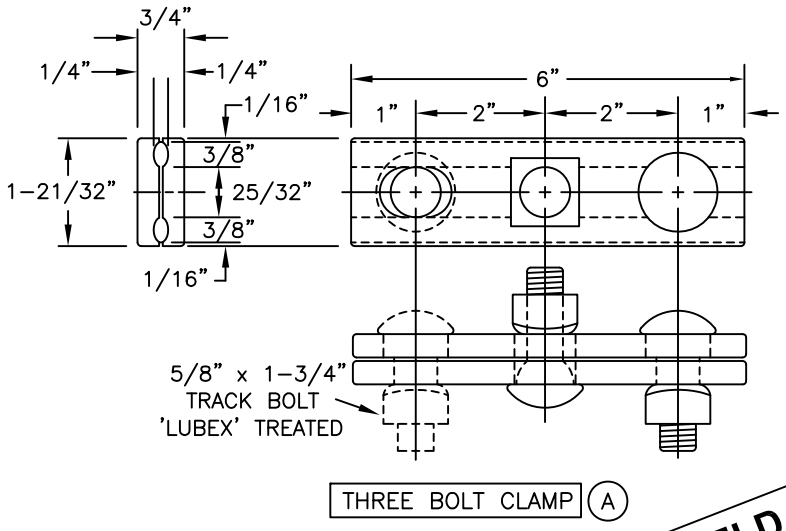
# ALUMINUM PARALLEL GROOVE CLAMPS

799.801
SUPERSEDES
785 (1-20-06)

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THREE BOLT CLAMP (A)

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(A) NO LONGER PURCHASED. USE FACTORY GUY GRIP WHEN PRACTICAL. SALVAGE THREE BOLT CLAMP AND USE ONLY WHEN A GUY GRIP CANNOT BE USED.

| DESCRIPTION | MOUNTING BOLT SIZE | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|
| CLAMP, THREE BOLT | – | 227296 | – |
| EYE, AUX ANCHOR | – | 337536 | AUXEYE |
| THIMBLE, 1/2", OPEN | – | 736600 | OPTHMB |

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SCOPE: THIS STANDARD LISTS TYPES AND SIZES OF GUY STRAND WIRE USED IN DISTRIBUTION CONSTRUCTION.

| ALUMOWELD GUY STRAND (A) | | | | |
|---|---|---|---|---|
| TYPE DESIGNATION | 4M | 6M | 10M | 16M |
| STOCK NUMBER | 810944 | 810976 | 811008 | 811040 |
| ASSEMBLY UNITS | 4M | 6M | 10M | 16M |
| NOMINAL DIAMETER (INCHES) | .220 | .242 | .306 | .386 |
| NUMBER OF STRANDS | 3 | 7 | 7 | 7 |
| STRAND DIAMETER (INCHES) | .102 | .081 | .102 | .128 |
| POUNDS PER 100 FEET | 7 | 10.4 | 16.5 | 26.2 |
| FEET PER POUND | 14.3 | 9.6 | 6.1 | 3.8 |
| WORKING STRENGTH (LBS) (C) | 2000 | 3000 | 5000 | 8000 (B) |

INSTALLATION:

(A) ALUMOWELD GUY STRAND WIRE IS PREFERRED IN CONTAMINATION DISTRICT 1, BUT IS LEFT TO THE DISCRETION OF THE DISTRICT.

(B) WHEN STRAIN INSULATORS ARE USED TO SECTIONALIZE GUY WIRE, THE LOADING MUST NOT EXCEED THE WORKING STRENGTH OF THE INSULATOR, 6,000 LBS FOR 54–2, 10,000 LBS FOR THE 54–3.

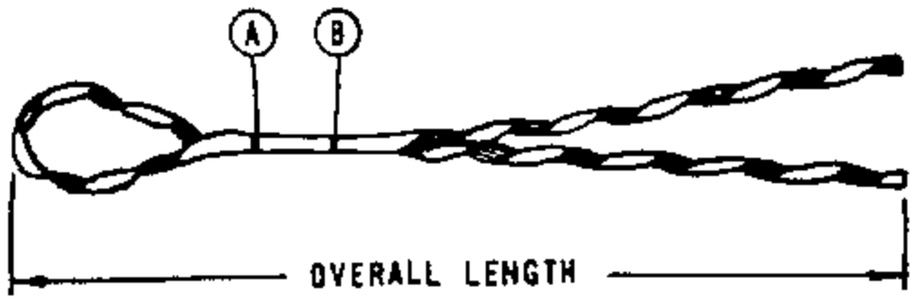
(C) A SAFETY FACTOR OF TWO IS INCLUDED IN THE WORKING STRENGTH VALUE.

REFERENCE:

F. CONTAMINATION DISTRICTS ARE DEFINED ON STANDARDS PAGE 287.

FOR FIELD MAINTENANCE ONLY

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COPPERWELD (M SERIES)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4M | 3 WIRE | .209" | WHITE | CDE-8106 | 18 | — | — | (E) 393056 |
| 6M | 7 WIRE | .237" | YELLOW | CDE-3103 | 21 | — | — | (E) 393088 |
| 10M | 7 WIRE | .303" | RED | CDE-3109 | 25 | — | — | (E) 392992 |
| 16M | 7 WIRE | .386" | WHITE | CDE-3115 | 31 | — | — | (E) 393024 |
| | | | | | | | | |
| COPPERWELD - COPPER & COPPERWELD | | | | | | | | |
| #8C | 1CW/2CU | .179" | RED | CDE-8102 | 17 | — | — | (E) 393120 |
| #6A | 1CW/2CU | .230" | YELLOW | CDE-3103 | 21 | — | — | (E) 393088 |
| #6C | 1CW/2CU | .225" | YELLOW | CDE-3103 | 21 | — | — | (E) 393088 |
| #4A | 1CW/2CU | .290" | RED | CDE-3109 | 25 | — | — | (E) 392992 |
| | | | | | | | | |
| #2F | 1CW/6CU | .308" | RED | CDE-3109 | 25 | — | — | (E) 392992 |
| — | — | — | — | — | — | — | — | — |

FOR FIELD MAINTENANCE ONLY

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INSTALLATION:

(A) COLORED MARK INDICATES CROSSOVER POINT FOR SMALL INSULATORS OR THIMBLEYES.

(B) COLORED MARK INDICATES CROSSOVER POINT FOR LARGE INSULATORS.

(E) EXEMPT MATERIAL

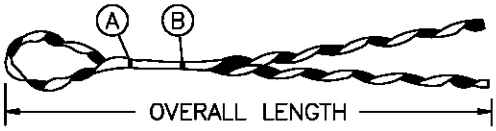
DATE 9-17-82
APPD

SDG&E ELECTRIC STANDARDS

# COPPER & COPPERWELD GUY GRIPS

999.602
SUPERSEDES
965 (9-17-82)

SCOPE: THIS STANDARD LISTS TYPES AND SIZES OF GUY GRIPS USED TO ATTACH GUY WIRE TO SUPPORT EQUIPMENT.




| FORMED GUY GRIPS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ALUMOWELD STRAND | | | | | | | | | |
| GUY WIRE STRAND DATA | | MEAN DIAM | COLOR CODE | MANUFACTURER | | | | STOCK NO. OR CONSTR STD | ASSEMBLY UNITS |
| | | | | PREFORMED | | CHANCE | | | |
| SIZE | STRANDING | | | CAT. NO. | LENGTH(IN) | CAT. NO. | LENGTH(IN) | | |
| 4M | 3 WIRE | .220" | GREEN | AWDE-4108 | 21 | 4M-AWSBG | 18 | 392928 | – |
| 6M | 7 WIRE | .242" | YELLOW | AWDE-4110 | 22 | 6M-AWSBG | 21 | 392960 | GR6M |
| 10M | 7 WIRE | .306" | BLACK | AWDE-4116 | 26 | 10M-AWSBG | 25 | 392864 | GR10M |
| 16M | 7 WIRE | .386" | ORANGE | AWDE-4122 | 32 | 16M-AWSBG | 30 1/2 | 392896 | GR16M |

INSTALLATION:

(A) COLORED MARK INDICATES CROSSOVER POINT FOR SMALL INSULATORS OR THIMBLEYES.

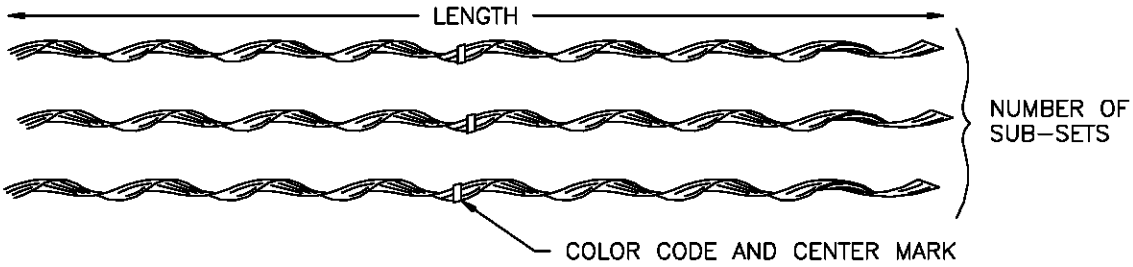
(B) COLORED MARK INDICATES CROSSOVER POINT FOR LARGE INSULATORS.

FOR FIELD MAINTENANCE ONLY

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| | | |
|---|---|---|
| 999.603 | SDG&E ELECTRIC STANDARDS<br>ALUMOWELD GUY GRIPS | DATE 1-1-98<br>APPD PSA/CMK |

**SCOPE:** THIS STANDARD LISTS TYPES AND SIZES OF GUY SPLICES USED TO SPLICE GUY WIRE.




NOTES:

A. INDIVIDUAL RODS ARE ASSEMBLED INTO SUBSETS AND GRITTED INTO GROUPS OF TWO, THREE, OR FOUR.

B. CENTER MARK ESTABLISHES ALIGNMENT OF RODS DURING APPLICATION.

C. COLOR CODE AND LENGTH ASSIST IN IDENTIFICATION OF STRAND SIZE.

| FORMED SPLICES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALUMOWELD STRAND | | | | | | | | | | | |
| GUY WIRE STRAND DATA | | | COLOR CODE | NO. SUBSETS | | MANUFACTURER | | | | STOCK NO. OR CONSTR STD | ASSEMBLY UNITS |
| | | | | | | PREFORMED | | FANNER | | | |
| SIZE | STRANDING | MEAN DIAM. | | PLP | FAN | CAT. NO. | LENGTH(IN) | CAT. NO. | LENGTH(IN) | | |
| 4M | 3 WIRE | .220" | GREEN | 2 | 2 | AWLS–4108 | 24 | 4MAWFS | 23 | 667488 | – |
| 6M | 7 WIRE | .242" | YELLOW | 2 | 2 | AWLS–4110 | 25 | 6MAWFS | 24 | 667520 | SP6M |
| 10M | 7 WIRE | .306" | BLACK | 3 | 2 | AWLS–4116 | 30 | 10MAWFS | 29 | 667424 | SP10M |
| 16M | 7 WIRE | .386" | ORANGE | 3 | 3 | AWLS–4122 | 38 | 16MAWFS | 38 | 667456 | SP16M |

FOR FIELD MAINTENANCE ONLY

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| 1199.301-.306 | 2.4KV OR 4KV, SINGLE PHASE TRANSFORMER INSTALLATION, CONTINUED |
| 1199.401-.405 | 7.2KV OR 12KV, SINGLE TRANSFORMER INSTALLATION |
| 1199.501-.504 | 4KV OPEN WYE OR 2.4KV OPEN DELTA TRANSFORMER INSTALLATION |
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| 1199.704-.707 | 7.2 & 12KV THREE-PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION - ALLEY ARM CONSTRUCTION |
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| C | | | | | | F | | | | | |
| B | COMPLETELY REVISED | JK | JS | CZH | 10/15/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JK | JS | CZH | 6/13/2019 | D | | | | | |

Indicates Latest Revision | X | Completely Revised | | New Page | | Information Removed



SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LEGACY OVERHEAD FIELD MAINTENANCE
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TRANSFORMERS

OH LEGACY
OHL1101.1

| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION | KVA | (D) (F) TAPS | STOCK NUMBER |
|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | | | | |
| A | 240 | 120 | 1Ø SECONDARY | 1 | - | - (A) |
| | | | | 3 | - | 750368 (G) |
| BB | 240/120 | 240/120 | AUTO TRANSF'MR 5% BUCK OR BOOST, DRY TYPE | 25 | - | 750400 (G) |
| | | | | 37.5 | - | - (A) |
| X | 480 | 120/240 | 1Ø SECONDARY | 2 | - | 757792 (A) |
| | | | | 3 | (H) | 757824 (A) |
| | | | | 5 | (H) | 757856 (A) |
| | | | | 10 | (H) | 757760 (A) |
| W | 2400/4160Y | 120/240 | 1Ø SECONDARY<br>3Ø SECONDARY (K) | 1.5 | - | - (A) |
| | | | | 2 | - | - (A) |
| | | | | 3 | - | 755296 (A) |
| | | | | 3 | (J) | 755328 (A) |
| | | | | 5 | - | 755424 (A) |
| | | | | 5 | (J) | 755456 (A) |
| | | | | 7.5 | - | 755520 (A) |
| | | | | 7.5 | (J) | 755552 (A) |
| | | | | 10 | (J) | 754912 (A) |
| | | | | 15 | (B) & (J) | 755040 (A) |
| | | | | 20 | - | 755136 (A) |
| | | | | 25 | (J) | 755200 (A) |
| | | | | 30 | - | - (A) |
| | | | | 37.5 | - | 755360 (A) |
| | | | | 37.5 | (J) | 755392 (A) |
| | | | | 40 | - | - (A) |
| | | | | 50 | (B) & (J) | 755488 (A) |
| | | | | 75 | (B) & (J) | 755616 (A) |
| | | | | 100 | (J) | 754976 (A) |
| | | | | 150 | - | - (A) |
| | | | | 167 | (J) | 755104 (A) |
| | | | | 200 | - | - (A) |
| | | | | 250 | (J) | 775264 (A) |
| WE | 2400/4160Y | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER,<br>1Ø SECONDARY<br>3Ø SECONDARY (K) | 10 | - | 755696 (A) |
| | | | | 15 | - | 755712 (A) |
| | | | | 25 | - | 755728 (A) |
| | | | | 50 | - | 755776 (A) |
| | | | | 50 | (J) | 755808 (A) |
| WJ | 2400/4160Y | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER, LIGHTNING ARRESTER,<br>1Ø SECONDARY<br>3Ø SECONDARY (K) | 1.5 | - | 756800 (A) |
| | | | | 3 | - | 756928 (A) |
| | | | | 3 | (J) | 756960 (A) |
| | | | | 5 | - | 757024 (A) |
| | | | | 7.5 | - | 757056 (A) |
| | | | | 7.5 | (J) | 757088 (A) |
| | | | | 10 | (J) | 756848 (A) |
| | | | | 15 | (J) | 756880 (A) |
| | | | | 25 | (J) | 756912 (A) |
| | | | | 37.5 | - | 756992 (A) |
| WF | 2400/4160Y | 240/480 | SINGLE-PHASE TRANSFORMER<br>1Ø SECONDARY<br>3Ø SECONDARY (K) | 10 | - | 755840 (A) |
| | | | | 15 | - | 755968 (A) |
| | | | | 25 | - | 756128 (A) |
| | | | | 37.5 | - | 756192 (A) |
| | | | | 37.5 | (B) | 756224 (A) |
| | | | | 50 | - | 756288 (A) |
| | | | | 75 | - | 756336 (A) |
| | | | | 100 | - | 755904 (A) |
| | | | | 200 | (J) | 756096 (A) |

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| 1199.201 | SDG&E ELECTRIC STANDARDS<br>TRANSFORMER PREFIXES, POLE-MOUNTED<br>SINGLE PHASE | DATE 1-1-88<br>APPD AK/RDS |
|---|---|---|

| PREFIX | VOLTAGE PRIMARY | VOLTAGE SECONDARY | DESCRIPTION AND APPLICATION | KVA | (D) (F) TAPS | STOCK NUMBER |
|---|---|---|---|---|---|---|
| WFY | 2400/4160Y | 277 | 1Ø TRANSFORMER, 1Ø SEC, 3Ø SEC (K) | 25 | - | - (A) |
| OY | 4160 | 120/240 | 1Ø SECONDARY<br>3Ø SECONDARY (K) | 15 | (J) | 754656 (A) |
| | | | | 37.5 | - | 754688 (A) |
| | | | | 37.5 | (J) | 754720 (A) |
| | | | | 50 | (J) | 754752 (A) |
| | | | | 75 | - | 754784 (A) |
| | | | | 75 | (J) | 754800 (A) |
| | | | | 100 | (J) | 754620 (A) |
| | | | | 167 | - | - (A) |
| WYN | 7200 X 2400 | 120/240-277 | PORTABLE SUBSTATION FOR GT GENERATOR | - | - | - (A) |
| YNG | 7200 X 2400 | 277 X 120 | PORTABLE | 250 | - | - (A) |
| Y | 7200/12470Y | 120/240 | 3Ø SECONDARY (K) | 1.5 | - | 757936 (A) |
| | | | | 3 | - | 757988 (A) |
| | | | | 3 | (I) & (J) | 757990 (A) |
| | | | | 5 | - | 757960 (A) |
| | | | | 5 | (B) (I) (J) | 757986 (A) |
| | | | | 7.5 | (I) & (J) | 757964 (A) |
| | | | | 10 | (I) & (J) | 757948 (A) |
| | | | | 15 | (J) | 757954 (A) |
| | | | | 25 | (J) | 757984 (A) |
| | | | | 50 | (J) | 757980 (A) |
| YE | 7200/12470Y | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER<br>1Ø SECONDARY<br>3Ø SECONDARY (K) | 10 | - | 757923 (A) |
| | | | | 15 | - | 757924 (A) |
| | | | | 25 | - | 757992 (G) |
| | | | | 25 | (B) | 757993 (A) |
| | | | | 25 | (J) | 750432 (A) |
| | | | | 50 | - | 757925 (A) |
| | | | | 75 | - | 757926 (A) |
| YJ | 7200/12470Y | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER<br>LIGHTNING ARRESTER, 1Ø SECONDARY<br>3Ø SECONDARY (K) | 3 | (J) | 758002 (A) |
| | | | | 5 | - | 758006 (A) |
| | | | | 5 | (J) | 758008 (A) |
| | | | | 7.5 | (J) | 758014 (A) |
| | | | | 10 | (J) | 757995 (A) |
| | | | | 15 | (J) | 757999 (A) |
| | | | | 25 | (J) | 758001 (A) |
| | | | | 37.5 | - | 758004 (A) |
| | | | | 37.5 | (J) | 758005 (A) |
| | | | | 50 | (J) | 758013 (A) |
| | | | | 75 | (J) | 758011 (A) |
| H | 12000 | 120/240 | 3Ø SECONDARY (K) | 1 | - | - (A) |
| | | | | 2.5 | - | 750752 (A) |
| | | | | 3 | - | 750880 (A) |
| | | | | 3 | (J) | 750912 (A) |
| | | | | 5 | - | 751040 (A) |
| | | | | 5 | (J) | 751072 (A) |
| | | | | 7.5 | - | 751200 (A) |
| | | | | 7.5 | (J) | 751216 (A) |
| | | | | 10 | (J) | 750496 (A) |
| | | | | 15 | (J) | 750656 (A) |
| | | | | 25 | (J) | 750848 (A) |

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DATE 1-1-88
APPD AK/BOS

SDG&E ELECTRIC STANDARDS

TRANSFORMER PREFIXES, POLE-MOUNTED
SINGLE PHASE

1199.202

| PREFIX | VOLTAGE PRIMARY | VOLTAGE SECONDARY | DESCRIPTION AND APPLICATION | KVA | (D) & (F) TAPS | STOCK NUMBER |
|---|---|---|---|---|---|---|
| H | 12000 | 120/240 | 3Ø SECONDARY (K) | 37.5 | - | 750976 (A) |
| | | | | 37.5 | (J) | 751008 (A) |
| | | | | 50 | (J) | 751136 (A) |
| | | | | 75 | (J) | 751264 (A) |
| | | | | 100 | (J) | 750560 (A) |
| | | | | 200 | - | 750784 (A) |
| | | | | 200 | (B) | 750800 (G) |
| | | | | 250 | (B) | 750864 (G) |
| | | | | 333 | - | 750944 (G) |
| | | | | 500 | - | 751168 (G) |
| HE | 12000 | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER 1Ø SECONDARY | 3 | - | 752160 (A) |
| | | | | 3 | (J) | 752192 (A) |
| | | | | 5 | - | 752288 (A) |
| | | | | 5 | (J) | 752320 (A) |
| | | | | 10 | (J) | 751936 (A) |
| | | | | 15 | (J) | 752064 (A) |
| | | | | 25 | (J) | 752128 (A) |
| | | | | 37.5 | - | 752224 (A) |
| | | | | 37.5 | (J) | 752256 (A) |
| | | | | 50 | (J) | 752384 (A) |
| | | | | 75 | (J) | 752448 (A) |
| | | | | 100 | - | 751968 (G) |
| | | | | 100 | (J) | 752000 (G) |
| HEB | 12000 | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER, USED ON BANKED SECONDARY SYSTEM, 1Ø SECONDARY | 10 | - | 752480 (A) |
| | | | | 10 | (J) | 752512 (A) |
| | | | | 15 | - | 752544 (A) |
| | | | | 15 | (J) | 752576 (A) |
| | | | | 25 | - | 752608 (A) |
| | | | | 25 | (J) | 752640 (A) |
| | | | | 37.5 | (J) | 752864 (A) |
| HF | 12000 | 240/480 | SINGLE PHASE TRANSFORMER 1Ø SECONDARY 3Ø SECONDARY (K) | 75 | - | - (A) |
| | | | | 250 | (B) & (J) | 752800 (G) |
| | | | | 333 | (B) | 752832 (G) |
| | | | | 500 | (B) | 752960 (G) |
| HJ | 12000 | 120/240 | INTERNALLY FUSED, SECONDARY BREAKER LIGHTNING ARRESTER, 1Ø SECONDARY | 2.5 | - | - (A) |
| | | | | 2.5 | (J) | 753408 (A) |
| | | | | 3 | - | - (A) |
| | | | | 3 | (J) | 753504 (A) |
| | | | | 5 | - | 753536 (A) |
| | | | | 5 | (J) | 753568 (A) |
| | | | | 7.5 | - | - (A) |
| | | | | 7.5 | (J) | 753600 (A) |
| | | | | 10 | (J) | 753312 (A) |
| | | | | 15 | (J) | 753376 (A) |
| | | | | 25 | (J) | 753472 (A) |
| | | | | 50 | (J) | - (A) |
| | | | | 75 | - | - (A) |
| | | | | 75 | (J) | - (A) |
| | | | | 100 | (J) | 753328 (A) |
| HY | 12000 | 277 | SINGLE PHASE TRANSFORMER 1Ø SECONDARY 3Ø SECONDARY (K) | 100 | (B) | 754602 (G) |
| | | | | 333 | (B) | 754604 (G) |
| | | | | 500 | (B) | 754608 (G) |

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| 1199.203 | SDG&E ELECTRIC STANDARDS<br>TRANSFORMER PREFIXES, POLE-MOUNTED<br>SINGLE PHASE | DATE 1-1-88<br>APPD AE / RBS |
|---|---|---|

| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION | KVA | (D) (F) TAPS | STOCK NUMBER |
|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | | | | |
| HD | 12000 | 480X2400 | SINGLE PHASE TRANSFORMER, STEPDOWN<br>1Ø SECONDARY<br>3Ø SECONDARY (K) | 50 | - | 751808 (A) |
| | | | | 100 | - | 751584 (A) |
| | | | | 100 | (J) | 751616 (A) |
| | | | | 200 | - | 751680 (A) |
| | | | | 200 | (H) | 751712 (A) |
| | | | | 250 | - | - (A) |
| | | | | 333 | - | 751744 (A) |
| | | | | 333 | (J) | 751776 (A) |
| | | | | 500 | (J) | 751840 (A) |
| HO | 12000 | 2400/4160Y | SINGLE PHASE TRANSFORMER<br>STEPDOWN 12KV | 100 | - | - (A) |
| | | | | 150 | - | 753888 (A) |
| | | | | 150 | (J) | - (A) |
| | | | | 200 | (J) | 753984 (A) |
| | | | | 250 | - | 754048 (A) |
| | | | | 250 | (B) | 754080 (A) |
| | | | | 333 | - | 754112 (A) |
| | | | | 500 | - | 754208 (A) |
| | | | | 833 | - | 754304 (A) |
| | | | | 1250 | - | 753856 (A) |
| HOY | 12000 | 7200X2400 | SINGLE PHASE TRANSFORMER<br>STEPDOWN | 100 | - | 754528 (A) |
| | | | | 100 | (B) | 754560 (A) |
| | | | | 333 | (B) | 754592 (A) |

FOR FIELD MAINTENANCE ONLY

TRANSFORMER PREFIXES, STREETLIGHT:

| PREFIX | COIL RATING | DESCRIPTION & APPLICATION | KVA | TAPS (D) | STOCK NUMBER |
|---|---|---|---|---|---|
| RCA | 240 - 6.6A | CONSTANT CURRENT WITH BUILT-IN CAPACITOR | 4.95 | - | 763424 (G) |
| R | 2400 - 6.6A | CONSTANT CURRENT | 5 | - | 763296 (G) |
| | | | 7.5 | - | 763328 (G) |
| | | | 10 | - | 763168 (G) |
| | | | 15 | - | 763200 (G) |
| | | | 20 | - | - (G) |
| | | | 30 | - | 763264 (G) |
| RC | 2400 - 6.6A | CONSTANT CURRENT WITH BUILT-IN CAPACITOR | 10 | - | 763360 (G) |
| | | | 15 | - | 763392 (G) |
| RH | 12000 - 6.6A | CONSTANT CURRENT | 20 | - | 763504 (G) |
| RS | 2400 - 6.6A | SUBWAY TYPE, CONSTANT CURRENT | 5 | - | - (G) |
| | | | 10 | - | 763616 (G) |
| | | | 15 | - | 763648 (G) |
| | | | 25 | (J) | 763712 (G) |
| | | | 30 | - | 763744 (G) |
| RR | 2400 - 20A | CONSTANT CURRENT | 10 | - | 763528 (G) |
| | | | 30 | - | 763584 (G) |
| RRS | 2400 - 20A | SUBWAY TYPE, CONSTANT CURRENT | 30 | (J) | 763746 (G) |
| L | 6.6A - 6.6A | CONSTANT CURRENT | .5 | - | - (G) |
| | | | 1 | - | 762976 (G) |
| | | | 2 | - | 763040 (G) |
| | | | 3 | - | 763072 (G) |
| | | | 4 | - | 763104 (G) |
| | | | 5 | - | 763136 (G) |
| | | | 10 | - | 763008 (G) |

| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION | KVA | (D) (F) TAPS | STOCK NUMBER |
|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | | | | |
| WT | 2400X4160Y | 240/480 | THREE-PHASE TRANSFORMER WITH A 120V TERMINAL RATED 5% OF KVA RATING WHEN CONNECTED FOR 240V OPERATION | 10 | - | - (A) |
| | | | | 15 | - | - (A) |
| | | | | 25 | - | - (A) |
| | | | | 30 | - | - (A) |
| | | | | 37.5 | - | 757600 (A) |
| | | | | 45 | - | - (A) |
| | | | | 50 | - | - (A) |
| | | | | 75 | - | 757632 (A) |
| | | | | 100 | - | 757568 (A) |
| | | | | 112.5 | - | - (A) |
| WAT | 2400/4160Y | 240 | THREE-PHASE TRANSFORMER WITH A TERMINAL RATED 5% OF KVA RATING | 30 | - | 755664 (A) |
| | | | | 45 | - | 755680 (A) |
| WFT | 2400X4160Y | 240/480 | THREE-PHASE TRANSFORMER | 25 | - | 756480 (A) |
| | | | | 25 | (H) | 756512 (A) |
| | | | | 30 | - | 756544 (A) |
| | | | | 30 | (H) | 756576 (A) |
| | | | | 37.5 | - | 756608 (A) |
| | | | | 37.5 | (H) | 756640 (A) |
| | | | | 45 | - | 756672 (A) |
| | | | | 45 | (H) | 756704 (A) |
| | | | | 50 | - | 756736 (A) |
| | | | | 50 | (H) | 756768 (A) |
| | | | | 112.5 | - | 756416 (A) |
| HGT | 12000 | 208Y/120 | THREE-PHASE TRANSFORMER | 75 | (H) | 753152 (A) |
| | | | | 150 | (B) | 753056 (A) |
| | | | | 225 | (J) | 753072 (A) |
| | | | | 300 | (B) | 753104 (A) |
| | | | | 500 | (B) | 753136 (G) |
| | | | | 750 | (B) | 753184 (G) |
| HZT | 12000 | 208Y/120 | INTERNALLY FUSED, SECONDARY BREAKER | 75 | - | 754616 (A) |
| | | | | 75 | (B) | 754618 (A) |
| | | | | 150 | - | 754612 (A) |
| | | | | 150 | (B) | 754614 (A) |

FOR FIELD MAINTENANCE ONLY

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| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION | KVA | (D) (F) TAPS | STOCK NUMBER |
|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | | | | |
| HAT | 12000 | 240 | THREE-PHASE TRANSFORMER<br>INCLUDES A 120V TERMINAL<br>RATED 5% OF KVA RATING | 30 | (C) & (H) | 751328 (A) |
| | | | | 45 | (H) | 751392 (A) |
| | | | | 150 | - | 751296 (A) |
| | | | | 500 | - | - (A) |
| HBT | 12000 | 240 X 480 | THREE-PHASE TRANSFORMER<br>INCLUDES A 120V TERMINAL RATED 5%<br>OF KVA RATING WHEN CONNECTED FOR<br>240V OPERATION<br>FOR FIELD MAINTENANCE ONLY | 10 | - | - (A) |
| | | | | 15 | - | - (A) |
| | | | | 25 | - | - (A) |
| | | | | 30 | - | 751424 (A) |
| | | | | 30 | (C) | 751456 (A) |
| | | | | 37.5 | - | - (A) |
| | | | | 45 | (C) | 751488 (A) |
| | | | | 50 | - | - (A) |
| | | | | 75 | - | 751520 (A) |
| | | | | 75 | (C) | 751552 (A) |
| | | | | 100 | - | - (A) |
| | | | | 112.5 | - | - (A) |
| HLT | 12000 | 240 X 480 | THREE-PHASE TRANSFORMER | 25 | - | - (A) |
| | | | | 25 | (C) | 753696 (A) |
| | | | | 37.5 | - | - (A) |
| | | | | 100 | - | 753664 (A) |
| HMT | 12000 | 480 | THREE-PHASE TRANSFORMER | 45 | - | - (A) |
| HJM | 12000 | 480 | THREE PHASE TRANSFORMER<br>INTERNALLY FUSED, SECONDARY BREAKER<br>LIGHTNING ARRESTER | 45 | - | 753632 (A) |
| HNT | 12000 | 480Y/277 | THREE-PHASE TRANSFORMER | 225 | (B) | - (G) |
| | | | | 300 | (B) | - (G) |
| | | | | 500 | (B) | 753760 (G) |
| | | | | 750 | (B) | 753792 (G) |
| | | | | 1000 | (B) | 753728 (G) |

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| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION | KVA | (D) (F) TAPS | STOCK NUMBER |
|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | | | | |
| HOT | 12000 | 4160Y/2400 | THREE PHASE TRANSFORMER<br>STEPDOWN<br>FOR FIELD MAINTENANCE ONLY | 150 | - | 754368 (G) |
| | | | | 1250 | (B) | 754336 (G) |
| | | | | 1500 | | 754400 (G) |
| | | | | 2000 | (B) | 754432 (G) |
| | | | | 2500 | - | 754464 (G) |
| | | | | 3750 | - | - (G) |
| | | | | 5000/ 6250 | (B) | 754496 (G) |

TRANSFORMER PREFIXES, SUBSTATION:

| PREFIX | VOLTAGE | | DESCRIPTION AND APPLICATION |
|---|---|---|---|
| | PRIMARY | SECONDARY | |
| KO | 69000 | 4160 | SUBSTATION USE 1Ø |
| K | 69000 | 12000 | SUBSTATION USE 1Ø |
| KOT | 69000 | 4160 | SUBSTATION USE 3Ø |
| KT | 69000 | 12000 | SUBSTATION USE 3Ø |
| KHT | 69000 X 33000 | 12000/4160Y | SUBSTATION USE 3Ø |
| KK | 138000 | 69000 | SUBSTATION USE 1Ø |
| KNT | 138000 | 12000 | SUBSTATION USE 3Ø |
| KKT | 138000 | 69000 | SUBSTATION USE 3Ø |
| KLT | 230000 | 69000 | SUBSTATION USE 3Ø |
| KMT | 230000 | 138000 | SUBSTATION USE 3Ø |
| KXX | - | - | NON-STANDARD ALL VOLTAGE GENERATING STATION USE ONLY |

**INSTALLATION:**

(A) NO LONGER PURCHASED.

(B) TWO 2 1/2% TAPS ABOVE AND BELOW.

(C) ONE 5% TAP ABOVE AND BELOW.

(D) WHEN MIRAMAR SUBSTITUTES TAPPED TRANSFORMERS FOR UNTAPPED ONES, THEY SHALL BE USED IN THE FLAT (STRAIGHT OR NEUTRAL) TAP POSITION.

(F) AUTHORIZATION FROM DISTRICT ENGINEERING REQUIRED BEFORE USING TAPS. IF AFTER NORMAL WORKING HOURS, AND TAPS MUST BE USED, INFORM DISTRICT ENGINEERING OF THE USE AND TAP SETTING THE NEXT DAY.

(G) SPECIAL ORDER.

(H) TWO 5% TAPS BELOW.

(I) THREE 4 1/2% TAPS BELOW.

(J) FOUR 2 1/2% TAPS BELOW.

(K) 3Ø SECONDARY AVAILABLE WHEN BANKED.

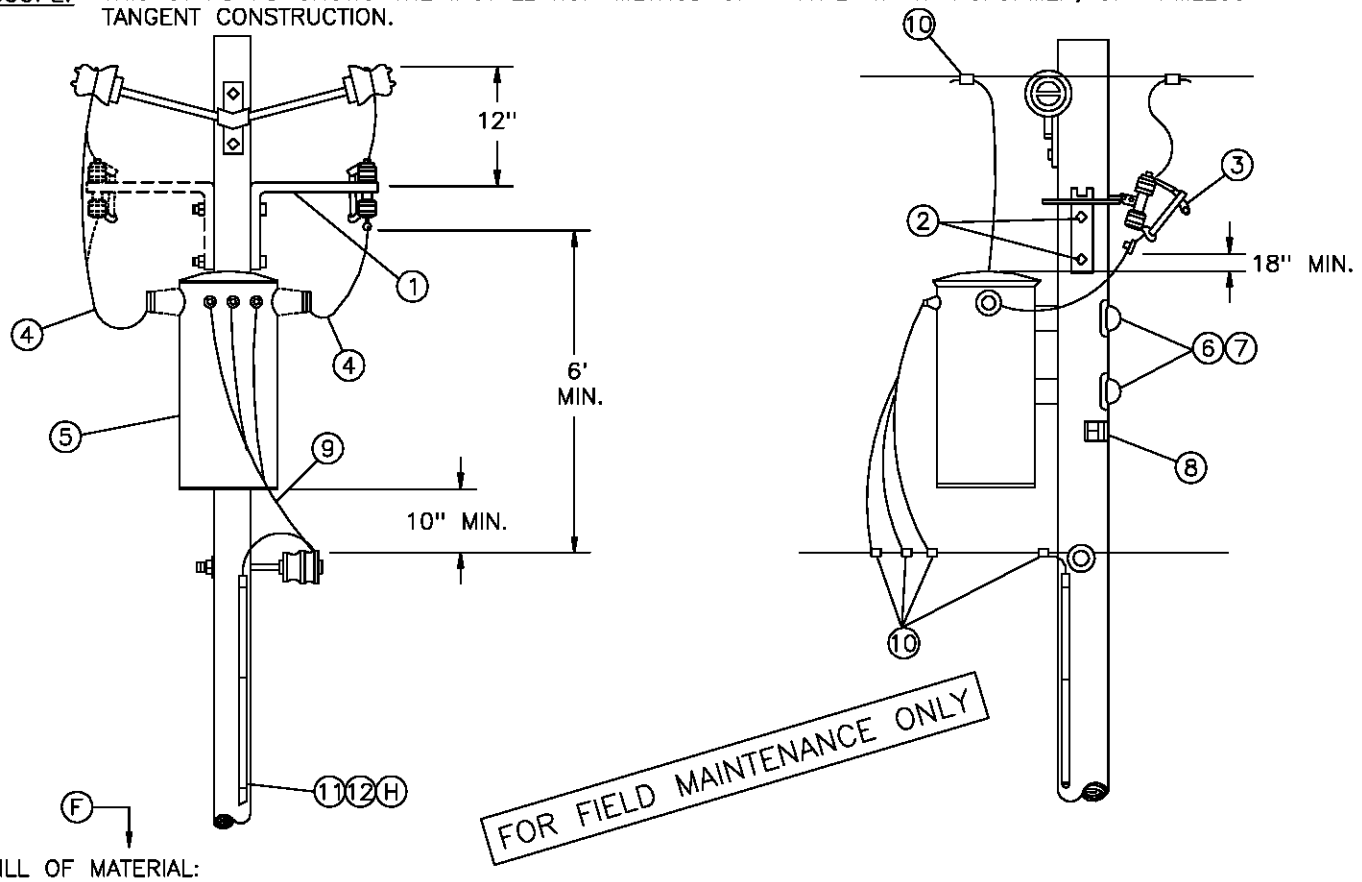
**REFERENCE:**

L. FOR SINGLE AND THREE PHASE PAD-MOUNTS, AND SUBSURFACE TRANSFORMERS, SEE UG STANDARDS BOOK.

| 1199.207 | SDG&E ELECTRIC STANDARDS<br>TRANSFORMER PREFIXES, POLE-MOUNTED AND SUBSTATION, SINGLE AND THREE-PHASE | DATE 1-1-88<br>APPD |
|---|---|---|

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON ARMLESS TANGENT CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| | | 2.4KV | 4KV | |
| 1 | BRACKET, CUTOUT MOUNTING | 2 | 1 | 166448 |
| 2 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 SQ CURVED WASHER | 2 | 2 | STD 392 |
| 3 | CUTOUT, 12KV | 2 | 1 | STD 1212 |
| 4 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 8' | 10' | 194304 |
| 5 | TRANSFORMER, SINGLE PHASE, TYPE W | 1 | 1 | STD 1121 |
| 6 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURV & 1 DBL COIL SPRING WASHER | 2 | 2 | STD 392 |
| 7 | COVER, BOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 2<br>– | 285696<br>491392 |
| 8 | SIGN, HIGH VOLTAGE &<br>9 ROOFING NAILS, GALV | 1<br>– | 1<br>– | 647648<br>492224 |
| 9 | WIRE, W.P. (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 10 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | | 783–787 |
| 11 | WIRE, BARE STRANDED, COPPER, #6 | 42' | 42' | 813536 |
| 12 | UNIT GROUND, COMPLETE | 1 | 1 | 603136 |

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

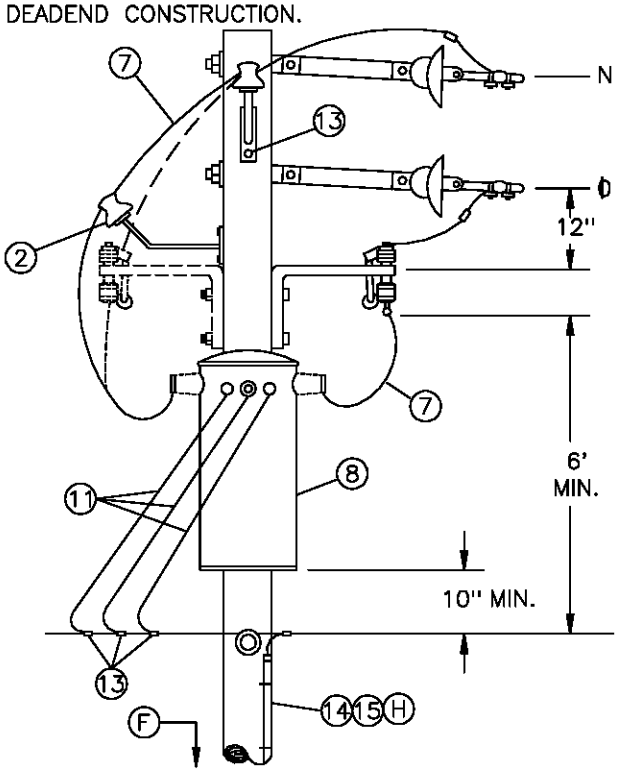
(H) GROUNDING METHODS – SEE STANDARD 1002.

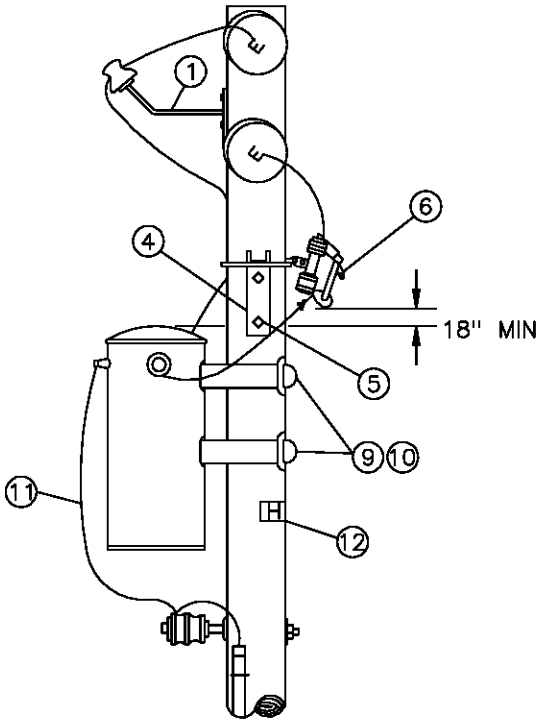
I. FOR POLE TOP MATERIAL – SEE DISTRIBUTION POLE TOPS (SECTION 400).

| | | |
|---|---|---|
| DATE 1–1–86<br>APPD / | SDG&E ELECTRIC STANDARDS<br>2.4 OR 4KV SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION<br>100 KVA MAXIMUM, ARMLESS TANGENT CONST | 1199.208<br>SUPERSEDES<br>1128 (1–1–93) |

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON ARMLESS DEADEND CONSTRUCTION.




| ITEM | DESCRIPTION | QUANTITY | | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| | | 2.4KV | 4KV | |
| 1 | BRACKET, INSULATOR, 1" LEAD THREAD | 2 | 2 | 166134 |
| 2 | INSULATOR, CLASS AS REQUIRED | 1 | 2 | STD 750 |
| 3 | SCREW, LAG, GALV. 1/2" X 4" | 2 | 2 | 621568 |
| 4 | BRACKET, CUTOUT MOUNTING | 2 | 1 | 166448 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 SQ CURVED WASHER | 2 | 2 | STD 392 |
| 6 | CUTOUT, 12KV | 2 | 1 | STD 1212 |
| 7 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 10' | 12' | 194304 |
| 8 | TRANSFORMER, SINGLE PHASE, TYPE W | 1 | 1 | STD 1211 |
| 9 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | 2 | STD 392 |
| 10 | COVER, BOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 2<br>– | 285696<br>491392 |
| 11 | WIRE, W.P. (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 12 | SIGN, HIGH VOLTAGE &<br>9 ROOFING NAILS, GALV | 1<br>– | 1<br>– | 647648<br>492224 |
| 13 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | | 783–787 |
| 14 | WIRE, BARE STRANDED, COPPER, #6 | 42' | 42' | 813536 |
| 15 | UNIT GROUND, COMPLETE | 1 | 1 | 603136 |

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

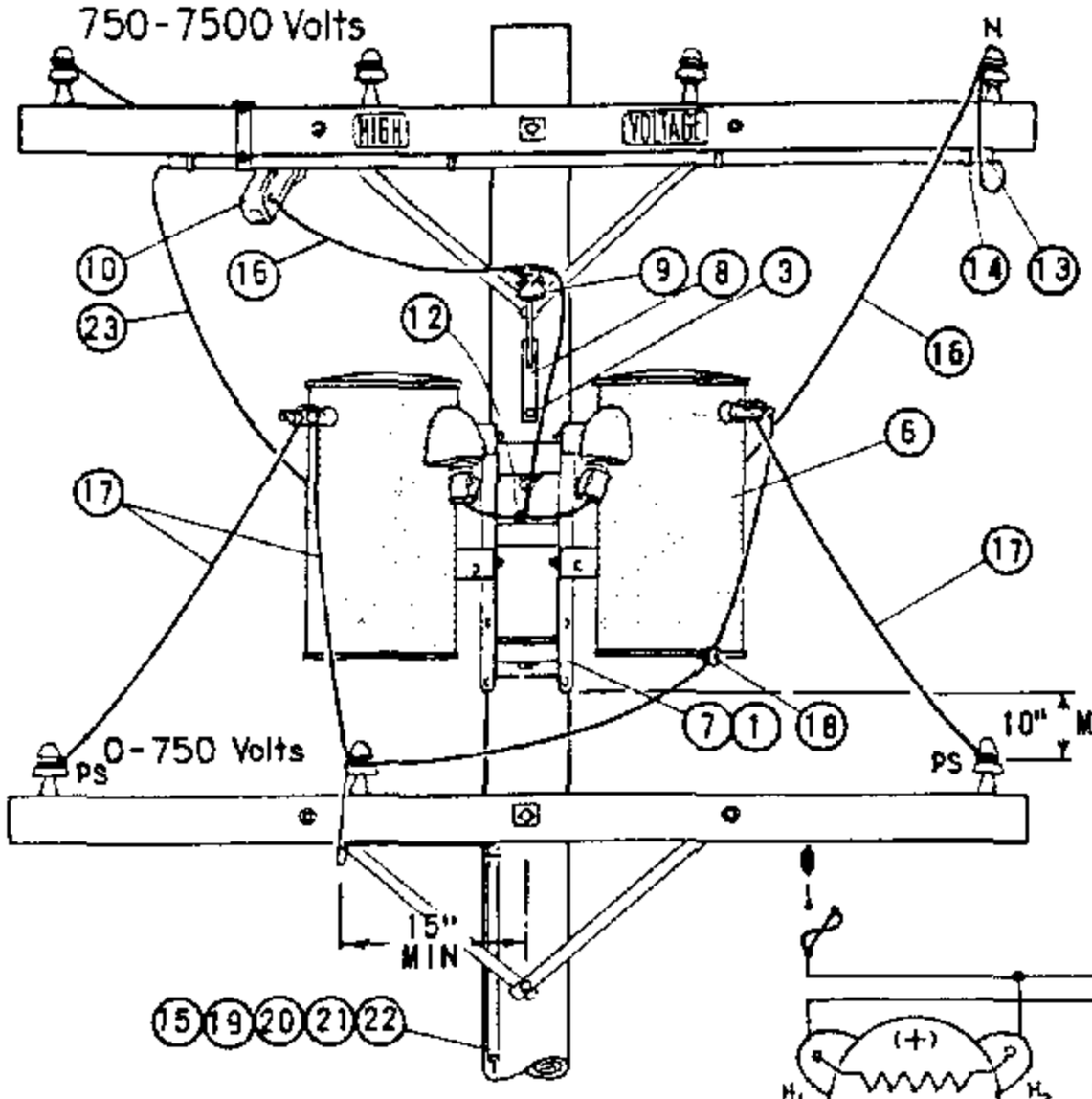
G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

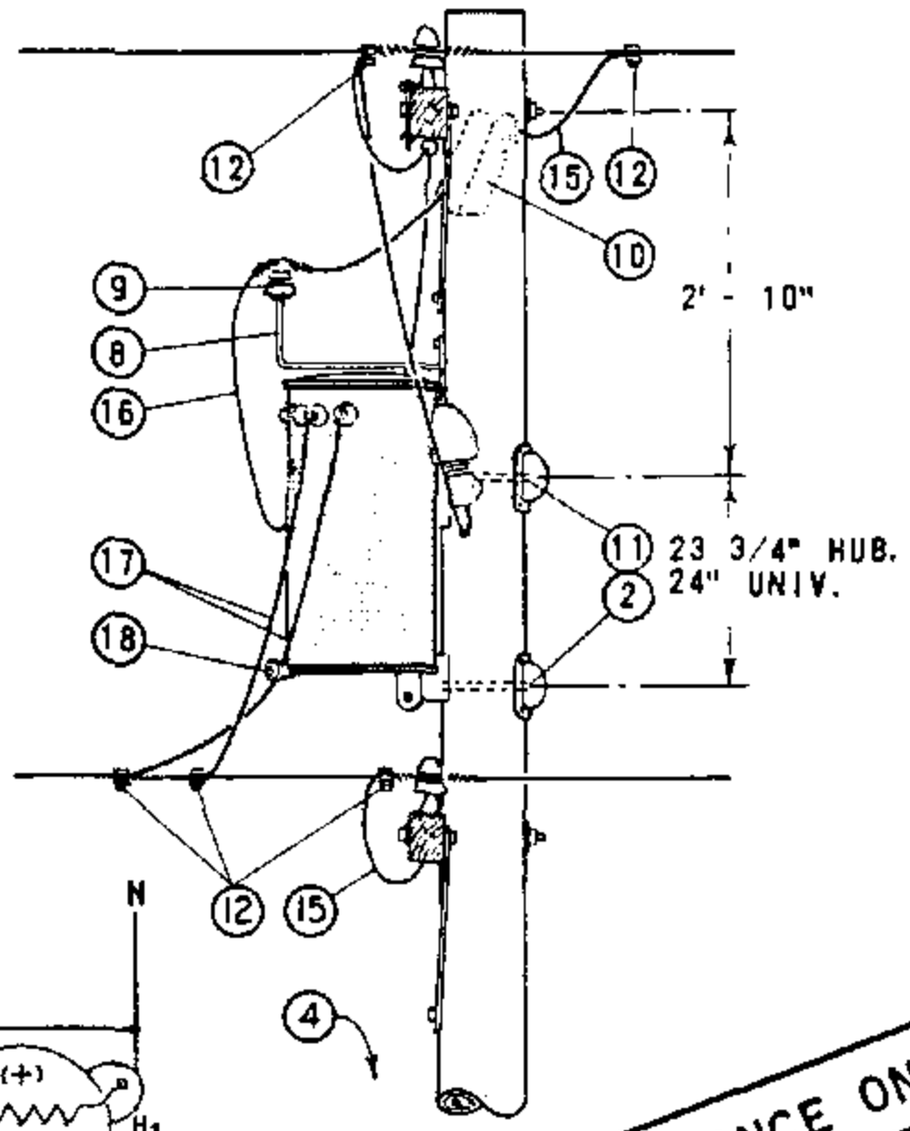
(H) GROUNDING METHODS – SEE STANDARD 1002.

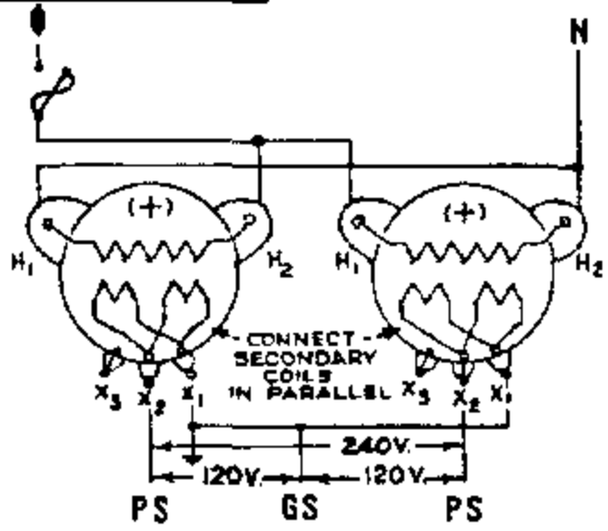
I. FOR POLE TOP MATERIAL – SEE DISTRIBUTION POLE TOPS (SECTION 400).

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1–1–86<br>APPD / | 2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION<br>100KVA MAXIMUM, ARMLESS DEAD END CONST | 1199.209<br>SUPERSEDES<br>1129 (1–1–93) |

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WIRING DIAGRAM

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) LIMITED TO TWO 15 KVA TRANSFORMERS.

(B) USE TWO GROUND RODS SPACED A MINIMUM OF 6 FEET APART FOR EACH GROUND UNIT.

(C) PHASE TO PHASE CONNECTIONS ON 2.4 KV DELTA AND 4 KV WYE SYSTEMS REQUIRE TWO CUTOUTS.

D. FUSE FOR COMBINED KVA OF PARALLELED TRANSFORMERS.

(E) EXEMPT MATERIALS.

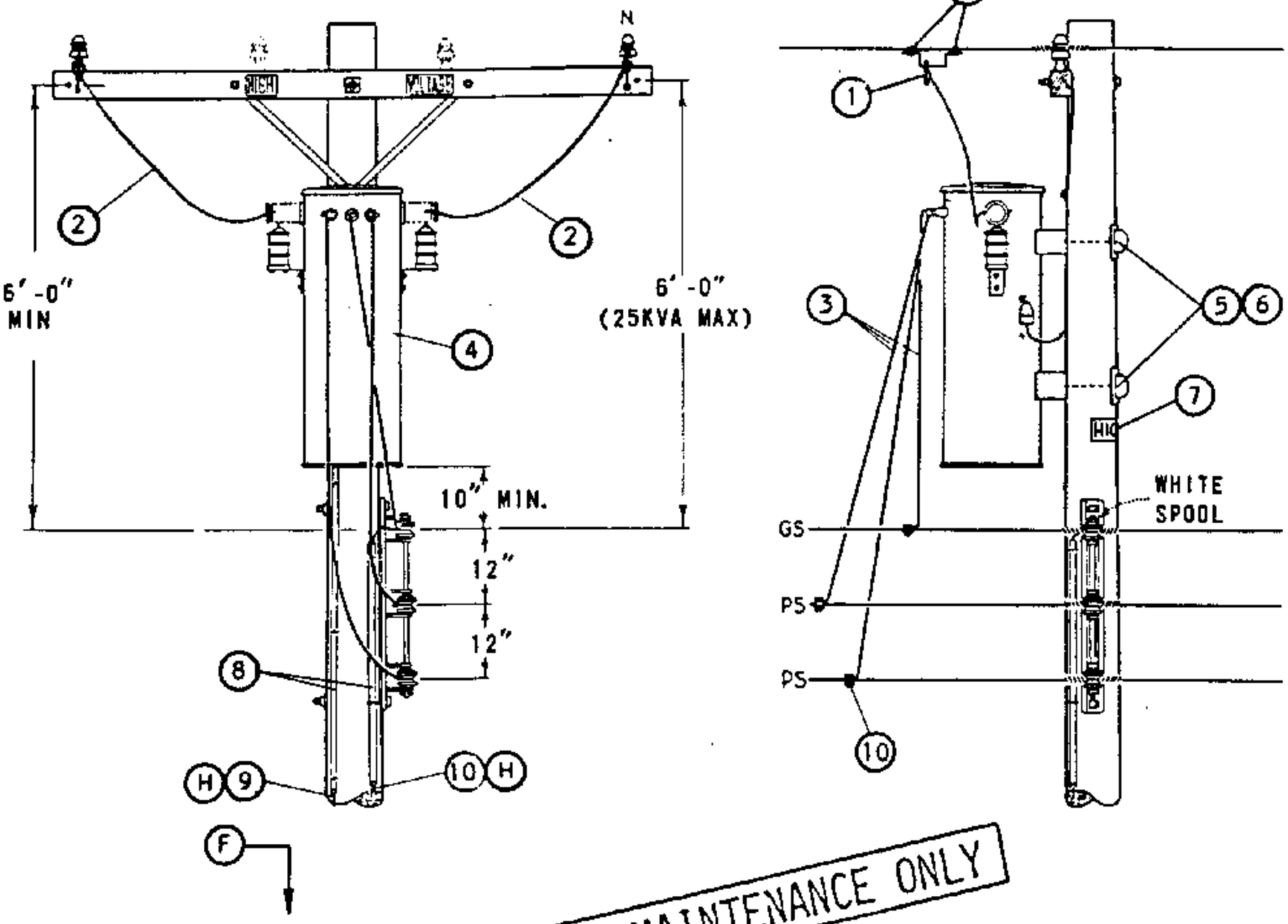
(F) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| 1 | | BOLT, MACH GALV, 5/8" (E) OR 3/4" X 2", 2 WASH & 1 NUT. | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH GALV, 3/4" X 10", 1 SQ CURV WASH. & 1 NUT. | 2 | PGS 139, 140 |
| 3 | | SCREW, LAG GALV, 1/2" X 4" (E) | 2 | 621568 |
| 4 | | STEP, POLE (E) | 16 | 692992 |
| 5 | | | | |
| | 6 | TRANSFORMER, SINGLE PHASE TYPE W OR OY (A) | 2 | PGS 1121.01-1121.12 |
| | 7 | BRACKET, TRANSFORMER MTG | 1 | 402976 |
| | 8 | BRACKET, INSULATOR, 1" OR 1 3/8" THREAD, AS REQ'D | 1 | 166144 / 166176 |
| | 9 | INSULATOR, 12KV | 1 | 700 SECTION |
| | 10 | CUTOUT, 5KV (C) | 2 | PG 1211 |
| | 11 | COVER, THRU BOLT & 6-10D NAILS GALV | 2 | 285696, 491392 |
| | 12 | CONNECTOR, WIRE, AS REQ'D | 7 | PGS 783-787 |
| | 13 | CONDUIT, PLASTIC PVC, 3/4" SCHEDULE 40, TYPE II (E) | 5' | 251328 |
| | 14 | STRAP, PIPE 3/4" & 2-6D NAILS, GALV (E) | 3 | 697888, 491552 |
| | 15 | WIRE, BARE STRANDED COPPER, #6 | 48' | 813536 |
| | 16 | WIRE, #4 SOLID WP COPPER | 8' | 814112 |
| | 17 | WIRE, WP COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 24' | PG 1125 |
| | 18 | BRACKET, INSULATOR | 1 | 167520 |
| | 19 | ROD & CLAMP, GROUND (B) (F) | 2 | 603072, 230016 (E) |
| | 20 | MOULDING, HARDWOOD 1" (F) | 27' | 487200 |
| | 21 | STAPLES, MOULDING, GALV 3" X 1 1/16" X 1/4" (F) (E) | 18 | 678560 |
| | 22 | STAPLES, FENCE, GALV 1 1/4" (F) (E) | 16 | 678528 |
| | 23 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 16' | 194304 |

| | | |
|---|---|---|
| 1199.301<br>SUPERSEDES<br>1138 (1-1-86) | SDG&E ELECTRIC STANDARDS<br>2.4KV OR 4KV, SINGLE PHASE PARALLELED TRANSFORMER INSTALLATION | DATE 1-1-86<br>APPD AK/RDS |

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'WE' TRANSFORMER, ON SECONDARY RACK CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | STD 788 |
| 2 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 3 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 4 | TRANSFORMER, SINGLE PHASE (TYPE 'WE' OR 'WJ') | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 285696<br>491392 |
| 7 | SIGN, HIGH VOLTAGE & (E)<br>9 ROOFING NAILS, GALV (E) | 1<br>- | 647648<br>492224 |
| 8 | UNIT GROUND, COMPLETE (A) | 2 | 603136 |
| 9 | WIRE, #4 BARE STRANDED COPPER (A) | 42' | 813760 |
| 10 | WIRE, #6 BARE STRANDED COPPER | 42' | 813536 |
| 11 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | 783-787 |

**INSTALLATION:**

(A) OMIT LIGHTNING ARRESTER GROUND ON TYPE 'WE' TRANSFORMER INSTALLATION.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

G. WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE TYPE 'WJ' TRANSFORMER.

(H) GROUNDING METHODS - SEE STANDARD 1002.

DATE 1-1-86
APPD AK/RAS

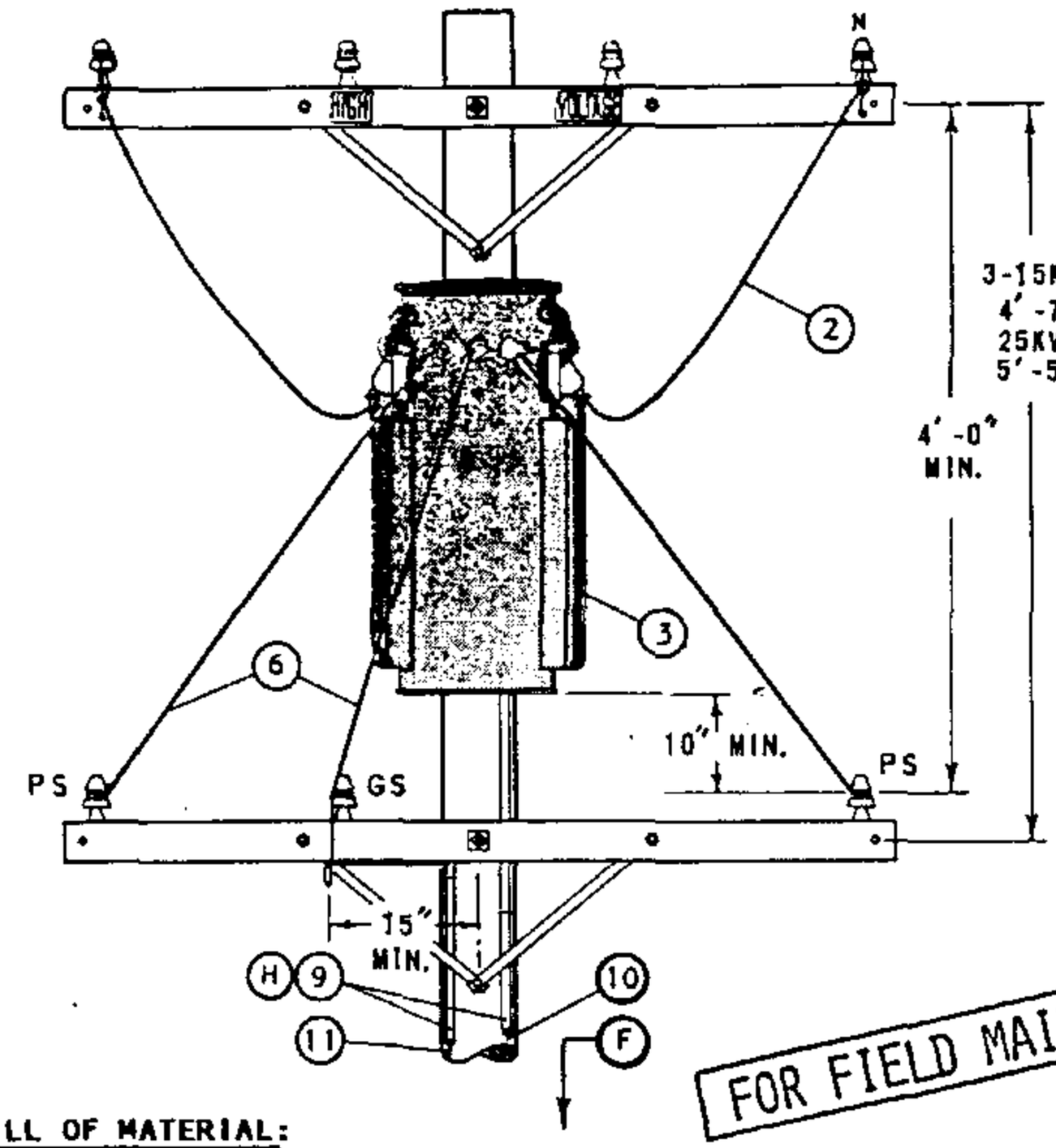
SDG&E ELECTRIC STANDARDS

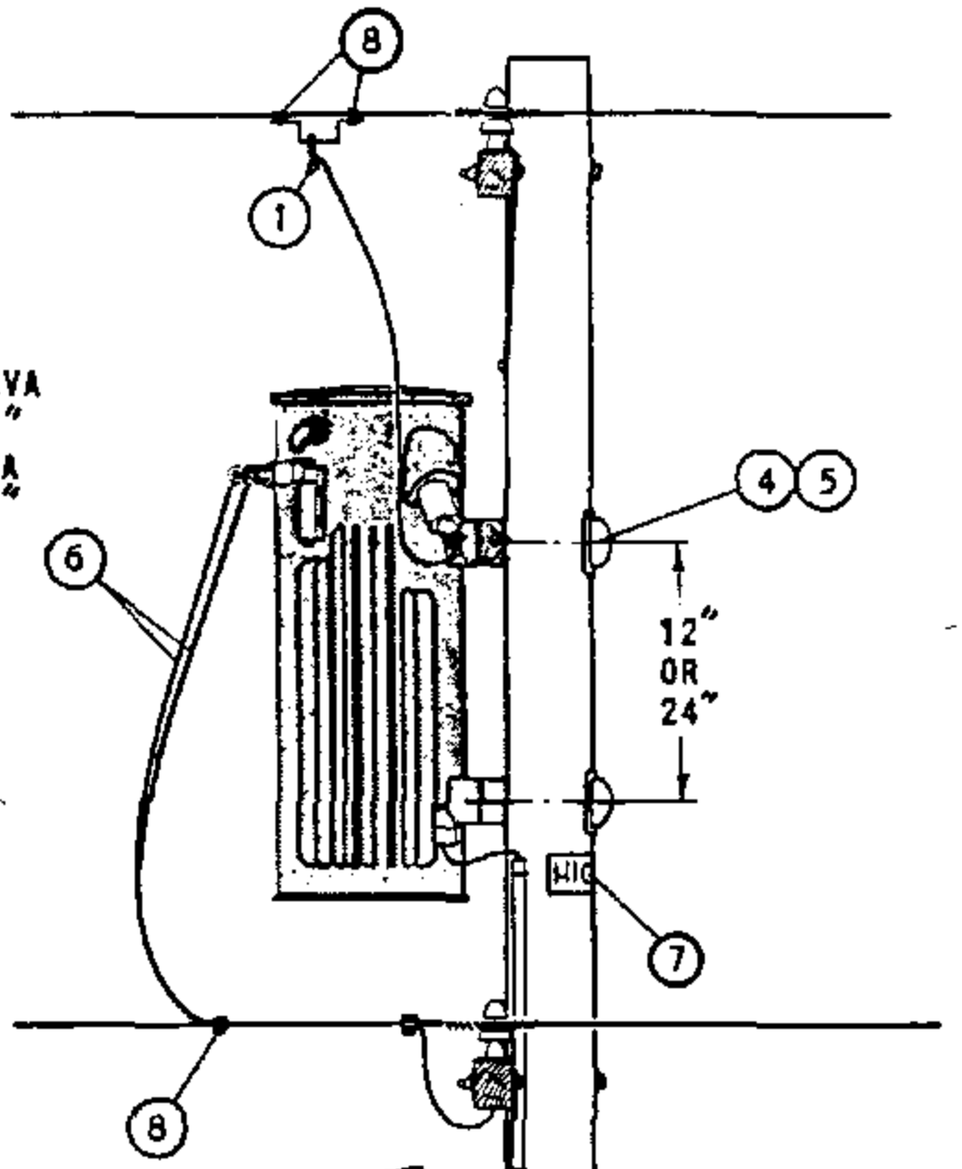
# 2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER INSTALLATION, 25 KVA MAX, SECONDARY RACK CONSTRUCTION

1199.302
SUPERSEDES
1131 (1-1-93)

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'WE' TRANSFORMER, ON SECONDARY LINE ARM CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | STD 788 |
| 2 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 3 | TRANSFORMER, SINGLE PHASE (TYPE 'WE' OR 'WJ') | 1 | STD 1121 |
| 4 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | STD 392 |
| 5 | COVER, BOLT, PLASTIC (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 285696<br>491392 |
| 6 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 7 | SIGN, HIGH VOLTAGE (E)<br>9 ROOFING NAILS, GALV (E) | 1<br>- | 647648<br>492224 |
| 8 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | 783-787 |
| 9 | UNIT GROUND, COMPLETE (A) | 2 | 603136 |
| 10 | WIRE, #4 BARE STRANDED COPPER (A) | 41' | 813760 |
| 11 | WIRE, #6 BARE STRANDED COPPER | 42' | 813536 |

**INSTALLATION:**

(A) OMIT LIGHTNING ARRESTER GROUND ON TYPE 'WE' TRANSFORMER INSTALLATION.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

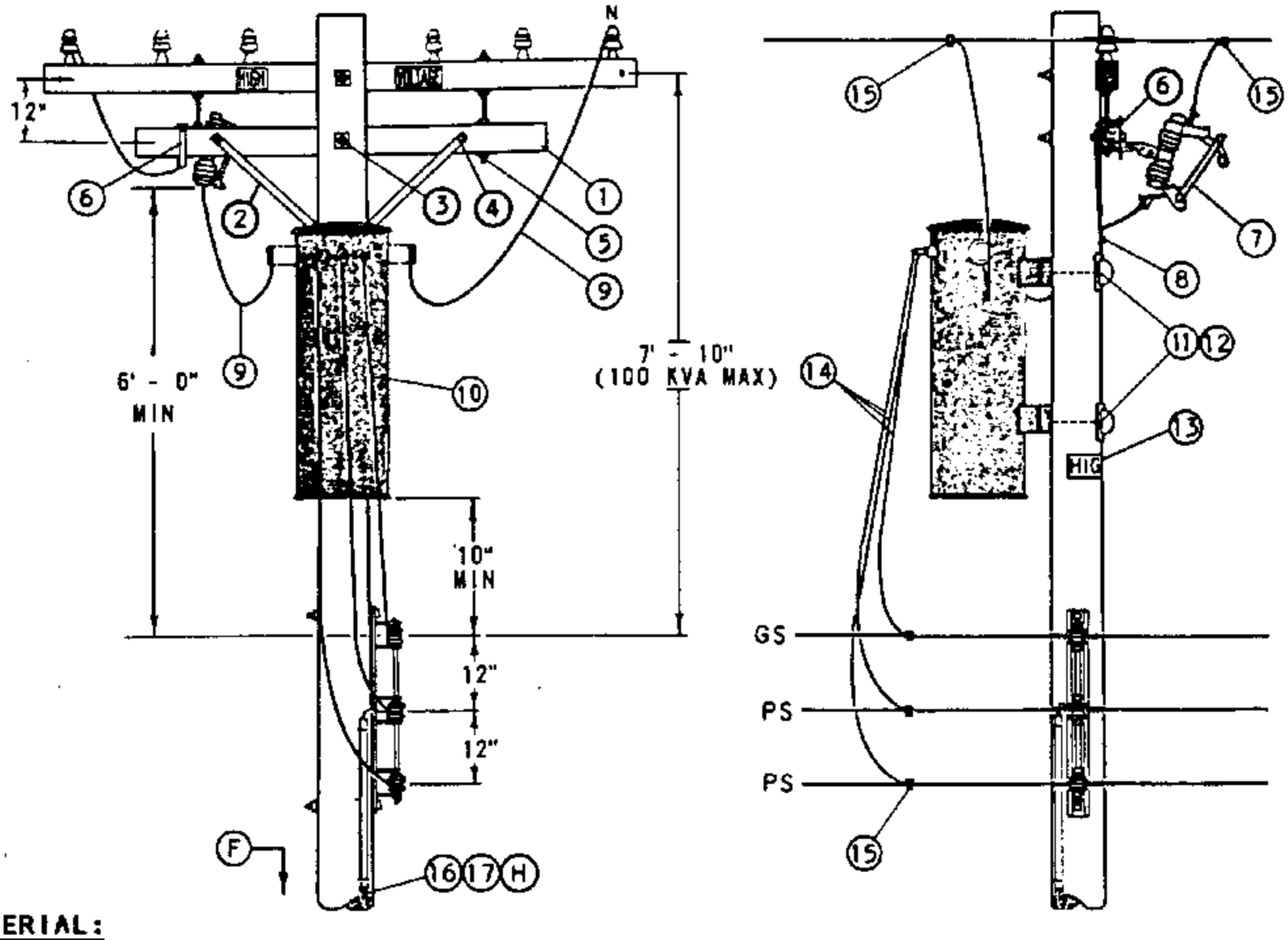
G. WHEN LIGHTNING ARRESTERS ARE REQUIRED, PER STANDARD 1247, USE TYPE 'WJ' TRANSFORMER.

(H) GROUNDING METHODS - SEE STANDARD 1002.

| 1199.303<br>SUPERSEDES<br>1132 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>2.4 OR 4KV, SINGLE PHASE, TYPE "WE" TRANSFORMER INSTALLATION, 25 KVA MAX, SECONDARY LINE ARM CONSTRUCTION | DATE 1-1-86<br>APPD AK/RSB |
|---|---|---|

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON SECONDARY RACK CONSTRUCTION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 1/2" X 4 1/2" X 6' - 0" | | 1 | 294112 |
| 2 | BRACE, FLAT, CROSSARM, 28" | (E) | 1 | 164192 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 4 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 RD & 1 SPRING LOCK WASHER | (E) | 2 | STD 392 |
| 5 | BOLT, SPACE, GALV, 5/8" X 20", 4 SQ & 2 DBL COIL SPR WASHERS | (E) | 2 | STD 392 |
| 6 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | (E) | 1 | 166070 |
| 7 | CUTOUT, 12KV | (A) | 1 | STD 1212 |
| 8 | BOLT, MACH, GALV, 1/2" X (LENGTH AS REQ'D), 1 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 9 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | | 12' | 194304 |
| 10 | TRANSFORMER, SINGLE PHASE, TYPE 'W' | | 1 | STD 1121 |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | (E) | 2 | STD 392 |
| 12 | COVER, BOLT, PLASTIC & 6 - 10D NAILS, GALV | (E)<br>(E) | 2<br>- | 285696<br>491392 |
| 13 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | (E)<br>(E) | 1<br>- | 647648<br>492224 |
| 14 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | 21' | STD 1125 |
| 15 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | (E) | AS REQ'D | 783-787 |
| 16 | WIRE, BARE STRANDED COPPER, #6 | | 42' | 813536 |
| 17 | UNIT GROUND, COMPLETE | | 1 | 603136 |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(A) 2.4KV SINGLE PHASE INSTALLATIONS REQUIRE TWO CUTOUTS.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS - SEE STANDARD 1247.

(H) GROUNDING METHODS - SEE STANDARD 1002.

DATE 1-1-86
APPD AK/RDS

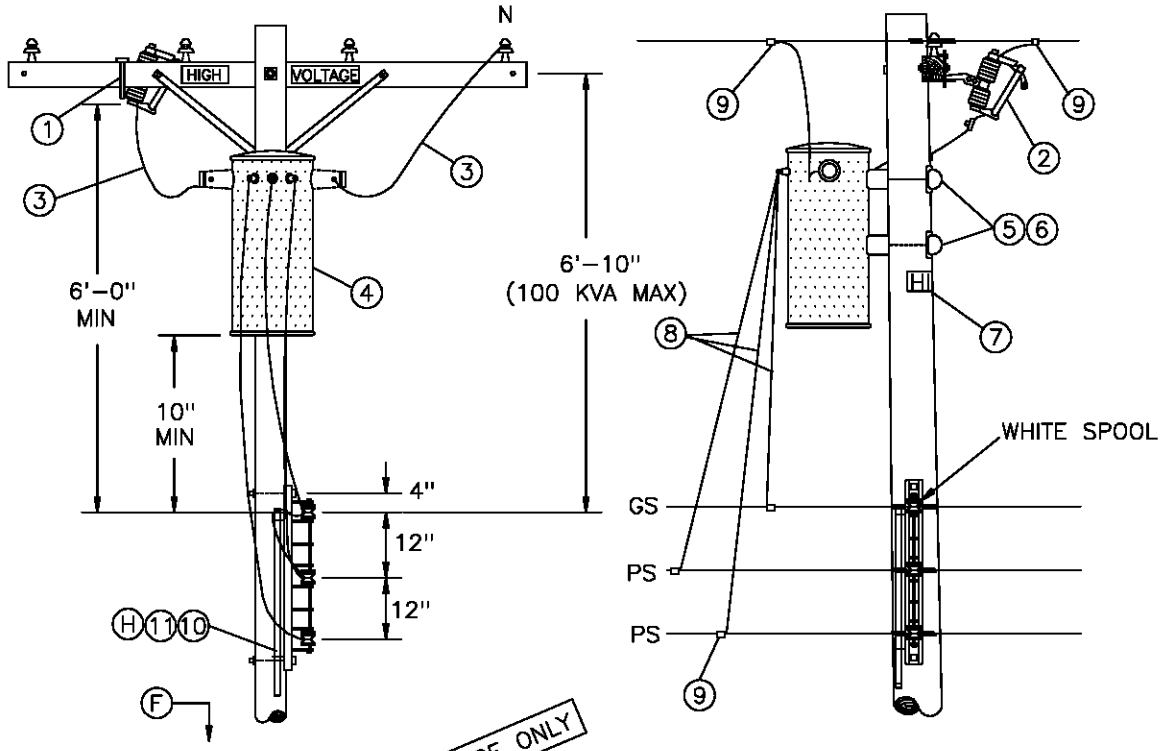
SDG&E ELECTRIC STANDARDS

2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM, C.O. ARM, SECONDARY RACK CONSTRUCTION

1199.304
SUPERSEDES
1133 (1-1-93)

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, ON SECONDARY RACK CONSTRUCTION WITH CUTOUT ON LINE ARM.




FOR FIELD MAINTENANCE ONLY

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 1 | 166070 |
| 2 | CUTOUT, 12KV (A) | 1 | STD 1212 |
| 3 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'W' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 285696<br>491392 |
| 7 | SIGN, HIGH VOLTAGE &<br>9 ROOFING NAILS, GALV | 1<br>– | 647648<br>492224 |
| 8 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR A, AS REQ'D | AS REQ'D | 783–787 |
| 10 | WIRE, BARE STRANDED COPPER, #6 | 42' | 813536 |
| 11 | UNIT GROUND, COMPLETE | 1 | 603136 |

INSTALLATION:

(A) 2.4KV SINGLE PHASE INSTALLATIONS REQUIRE TWO CUTOUTS.

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

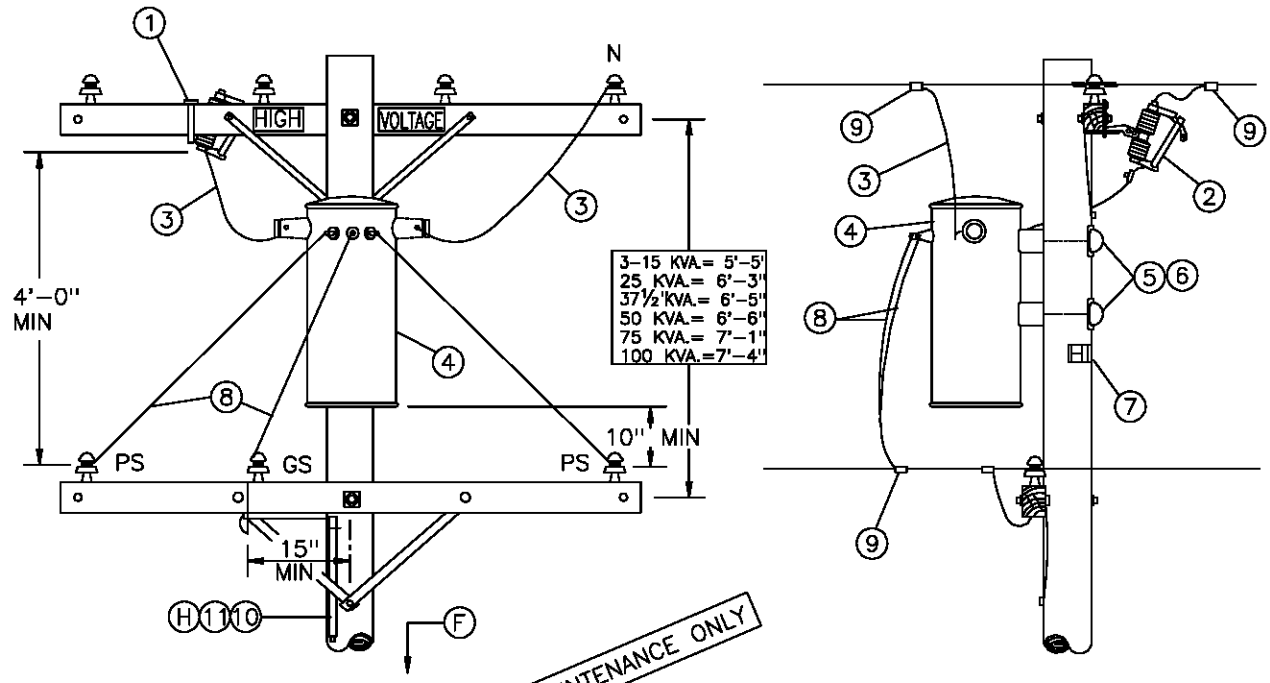
G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

(H) GROUNDING METHODS – SEE STANDARD 1002.

| | | |
|---|---|---|
| 1199.305<br>SUPERSEDES<br>1135 (1–1–93) | SDG&E ELECTRIC STANDARDS<br>2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM LINE ARM MOUNTED C.O., SECONDARY RACK CONSTRUCION | DATE 1–1–86<br>APPD / |

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'W' TRANSFORMER, WITH SECONDARY LINE ARM CONSTRUCTION AND CUTOUT MOUNTED ON LINE ARM.




BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 1 | 166070 |
| 2 | CUTOUT, 12KV (A) | 1 | STD 1212 |
| 3 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 12' | 194304 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'W' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & 6 – 10D NAILS, GALV | 2 – | 285696 491392 |
| 7 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | 1 – | 647648 492224 |
| 8 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–787 |
| 10 | WIRE, BARE STRANDED COPPER, #6 | 42' | 813536 |
| 11 | UNIT GROUND, COMPLETE | 1 | 603136 |

INSTALLATION:

(A) 2.4KV SINGLE PHASE INSTALLATIONS REQUIRE TWO CUTOUTS.

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

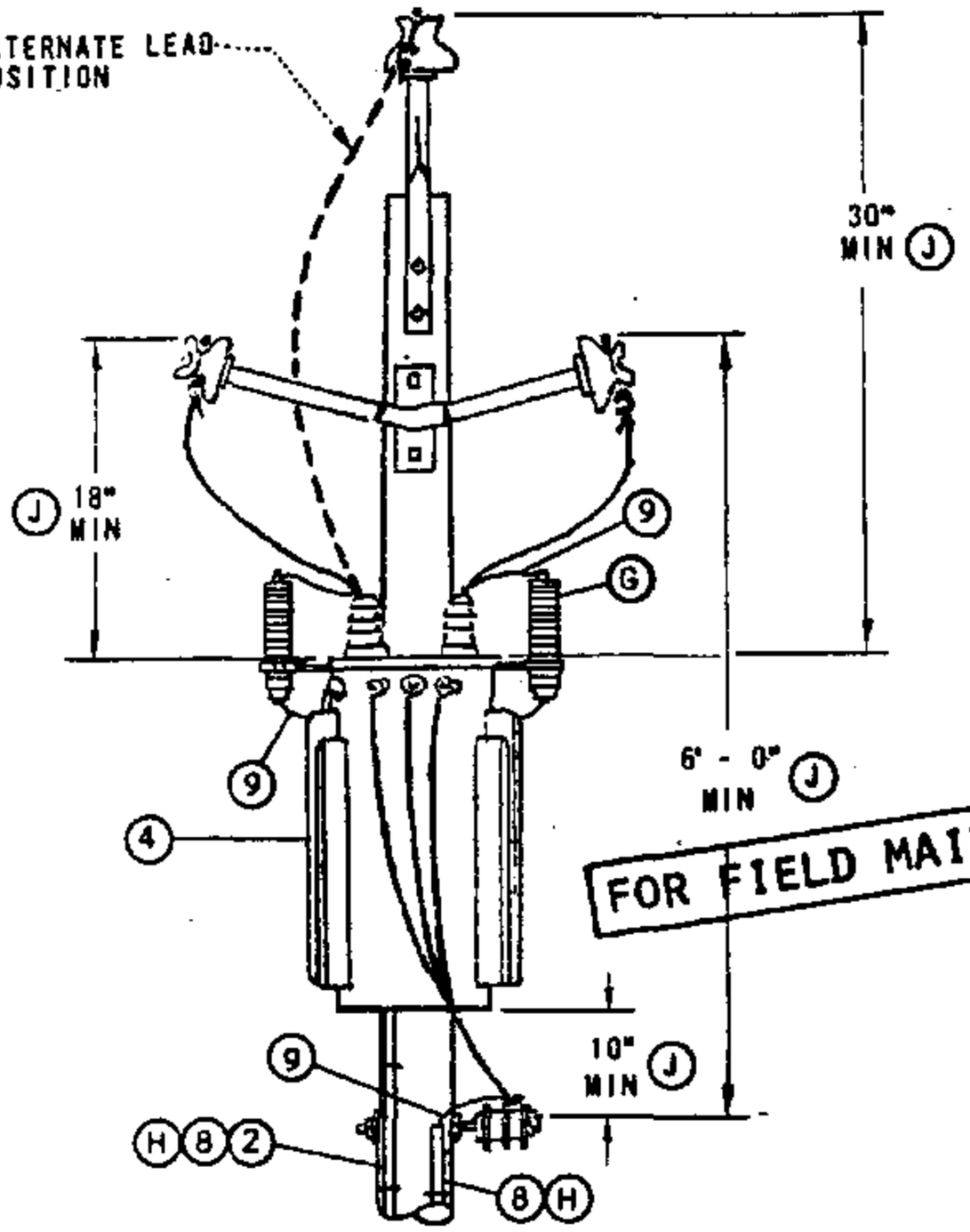
G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

(H) GROUNDING METHODS – SEE STANDARD 1002.

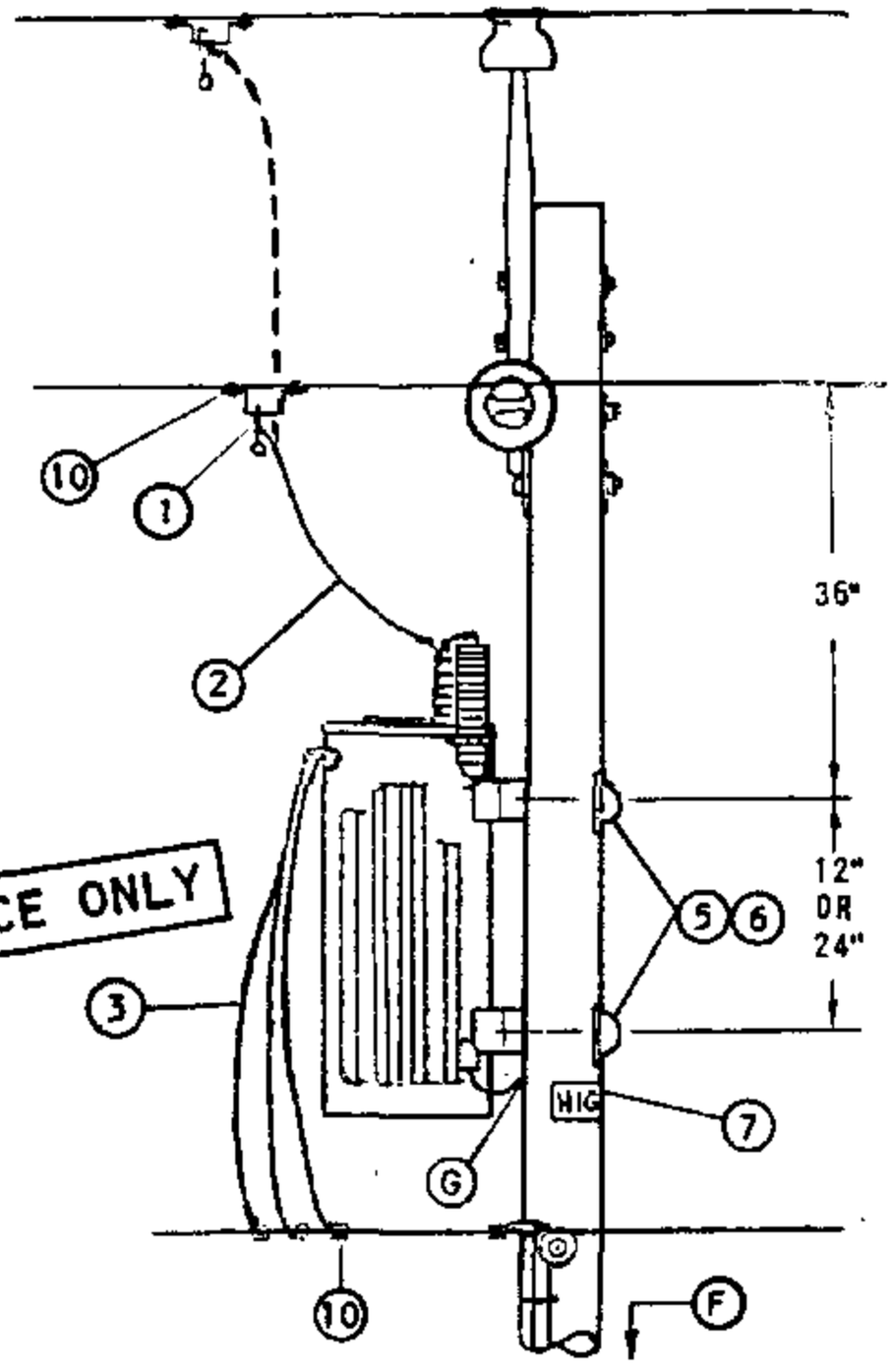
| | | |
|---|---|---|
| DATE 1–1–86<br>APPD / | SDG&E ELECTRIC STANDARDS<br>2.4 OR 4KV, SINGLE PHASE TYPE "W" TRANSFORMER INSTALLATION, 100 KVA MAXIMUM<br>LINE ARM MOUNTED C.O., SECONDARY LINE ARM CONSTRUCTION | 1199.306<br>SUPERSEDES<br>1136 (1–1–93) |

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE PHASE TRANSFORMER, ON ARMLESS TANGENT CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY HE, YE | QUANTITY HJ, YJ | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | 2 | STD 788 |
| 2 | WIRE, #4, BARE STRANDED COPPER | 7' | 55' | 813760 |
| 3 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 4 | TRANSFORMER, SINGLE PHASE (TYPE 'HE', 'HJ', 'YE' OR 'YJ') | 1 | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 OBL COIL SPRING WASHER (E) | 2 | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 2<br>- | 285696<br>491392 |
| 7 | SIGN, HIGH VOLTAGE & (E)<br>8 ROOFING NAILS, GALV (E) | 1<br>- | 1<br>- | 647648<br>492224 |
| 8 | UNIT GROUND, COMPLETE (H) | 1 | 2 | 603136 |
| 9 | WIRE, #6 BARE STRANDED COPPER | 42' | 50' | 813536 |
| 10 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | | 783-787 |

**INSTALLATION:**

A. WHEN INSTALLING A NEW STATION ON THE 7.2/12.47KV SYSTEM IN MEOD, IF NO PRIMARY NEUTRAL GROUND EXISTS ON THE POLE, INCLUDE THE NECESSARY MATERIALS TO INSTALL THE REQUIRED PRIMARY NEUTRAL GROUND. CONNECT TO TRANSFORMER TANK GAP GROUND.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE TYPE 'HJ' OR 'YJ' TRANSFORMERS, AND GROUND TANK GAP.

(H) GROUNDING METHODS - SEE STANDARD 1002.

I. FOR POLE TOP MATERIAL - SEE DISTRIBUTION POLE TOPS (SECTION 400). FGS AND PTP ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

(J) G.O. 95 MINIMUM REQUIREMENTS.

K. FOR AERIAL CABLE CONSTRUCTION - SEE SECTION 600.

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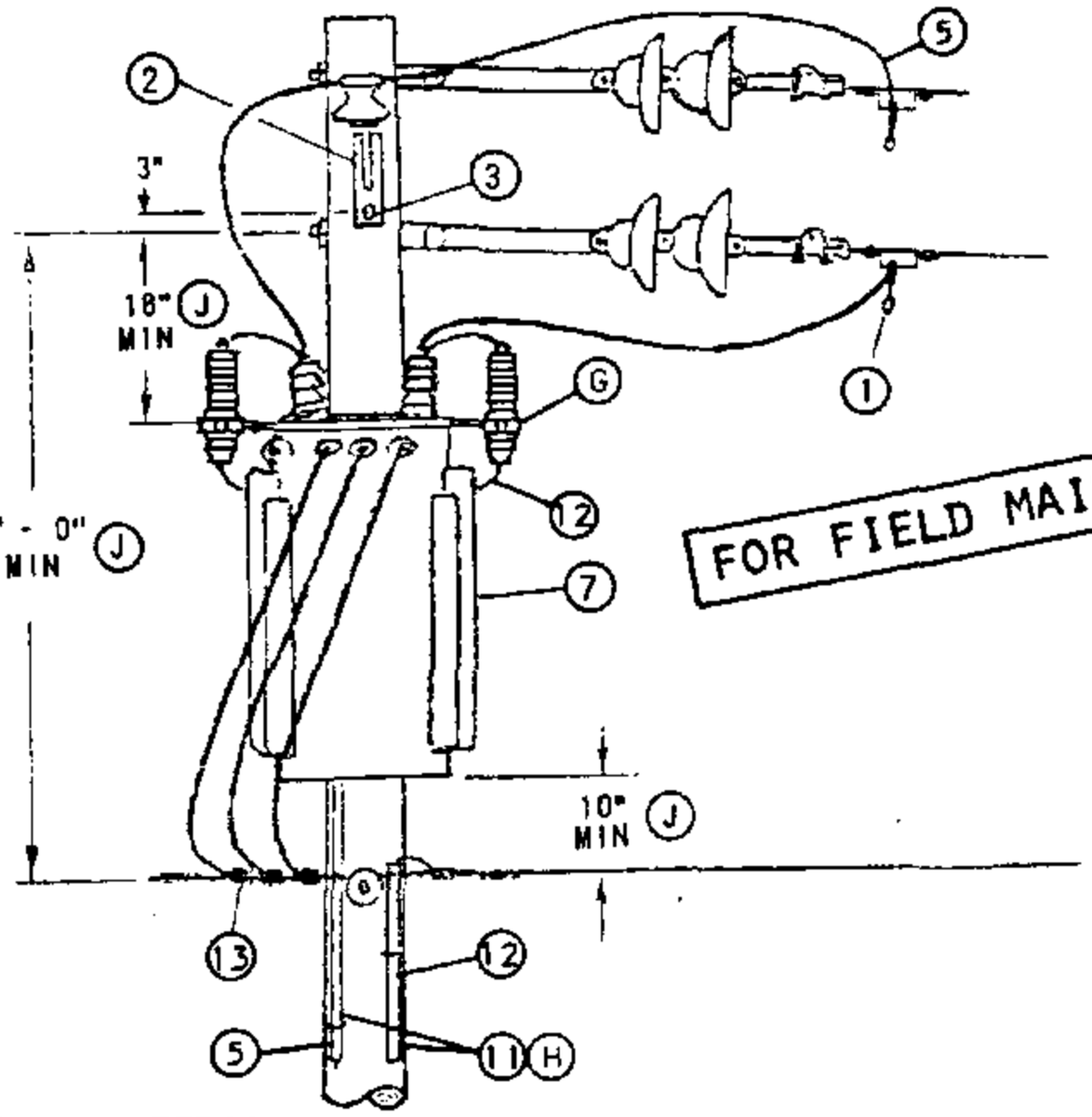
SDG&E ELECTRIC STANDARDS

DATE 1-1-86
APPD AK/RDS

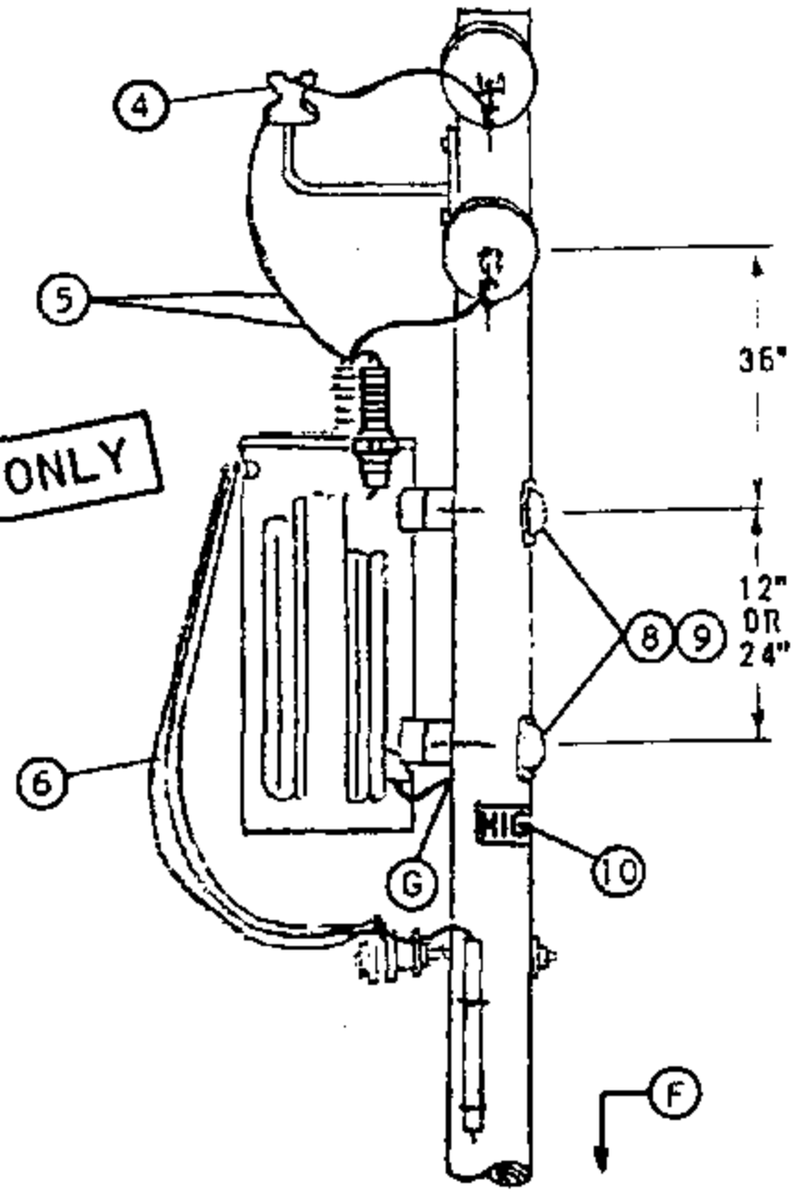
**7.2 OR 12KV SINGLE PHASE YE, YJ, HE, OR HJ TRANSFORMER INSTALLATION 100 KVA MAXIUM ARMLESS TANGENT CONSTRUCTION**

1199.401
SUPERSEDES
1141 (1-1-86)

**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE PHASE TRANSFORMER, ON ARMLESS DEADEND CONSTRUCTION.




FOR FIELD MAINTENANCE ONLY




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY HE, YE | QUANTITY HJ, YJ | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | 2 | STD 788 |
| 2 | BRACKET, INSULATOR, 1", LEAD THREAD | 1 | 1 | 166144 |
| 3 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | 2 | 621568 |
| 4 | INSULATOR, 12KV, CLASS 55-5 | 1 | 1 | 429056 |
| 5 | WIRE, #4, BARE STRANDED COPPER | 12' | 55' | 813760 |
| 6 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 7 | TRANSFORMER, SINGLE PHASE (TYPE 'HE', 'HJ', 'YE' OR 'YJ') | 1 | 1 | STD 1121 |
| 8 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD 392 |
| 9 | COVER, BOLT, PLASTIC & (E)<br>6 - 10D NAILS, GALV (E) | 2<br>- | 2<br>- | 285696<br>491392 |
| 10 | SIGN, HIGH VOLTAGE & (E)<br>8 ROOFING NAILS, GALV (E) | 1<br>- | 1<br>- | 647648<br>492224 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 2 | 603136 |
| 12 | WIRE, #6 BARE STRANDED COPPER | 42' | 50' | 813536 |
| 13 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | | 783-787 |

**INSTALLATION:**

A. WHEN INSTALLING A NEW STATION ON THE 7.2/12.47KV SYSTEM IN MEOD, AND IF NO PRIMARY NEUTRAL GROUND EXIST ON THE POLE, INCLUDE THE NECESSARY MATERIALS TO INSTALL THE REQUIRED PRIMARY NEUTRAL GROUND. CONNECT TO TRANSFORMER TANK GAP GROUND.

B. FOR USE ONLY WHERE FUTURE EXTENSION IS UNLIKELY, SUCH AS CUL-DE-SACS.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE TYPE 'HJ' OR 'YJ' TRANSFORMERS, AND GROUND TANK GAP.

(H) GROUNDING METHODS - SEE STANDARD 1002.

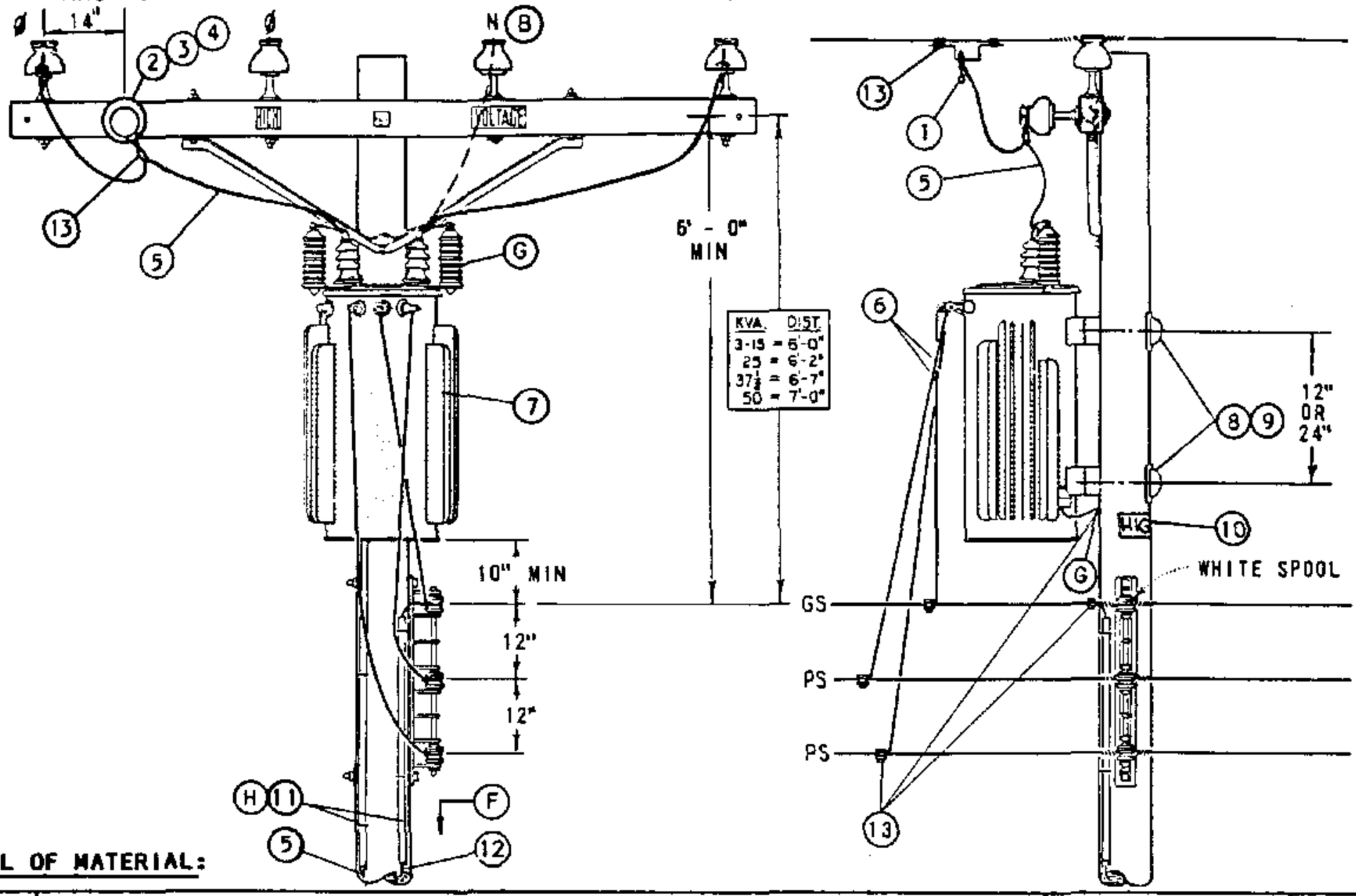
(J) FOR POLE TOP MATERIAL - SEE DISTRIBUTION POLE TOPS (SECTION 400).
G.O. 95 MINIMUM REQUIREMENTS.

K. FOR AERIAL CABLE CONSTRUCTION - SEE SECTION 600.

| | | |
|---|---|---|
| 1199.402<br>SUPERSEDES<br>1142 (1-1-86) | SDG&E ELECTRIC STANDARDS<br>7.2 OR 12KV SINGLE PHASE YE, YJ, HE, OR HJ TRANSFORMER<br>INSTALLATION 100 KVA MAXIMUM ARMLESS DEAD END CONSTRUCTION | ISSUE 1993<br>DATE 1-1-86<br>APPD AK/RPS |

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A SINGLE PHASE TRANSFORMER, WITH SECONDARY RACK CONSTRUCTION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY HE,YE | QUANTITY HJ,YJ | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CLAMP, HOTLINE & STIRRUP (E) | 2 | 2 | STD 788 |
| 2 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ WASHERS & 1 DBL COIL SPRING WASHER (E) | 1 | 1 | STD 392 |
| 3 | PIN, TRANSFORMER LEAD ADAPTER 1" OR (E) | 1 | 1 | 529248 |
| | 1 3/8" (E) | 1 | 1 | 529216 |
| 4 | INSULATOR, 12KV, 1" OR 1 3/8" PIN | 1 | 1 | STD 750 |
| 5 | WIRE, #4, BARE STRANDED COPPER | 14' | 55' | 813760 |
| 6 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | 21' | STD 1125 |
| 7 | TRANSFORMER, SINGLE PHASE (TYPE HE, HJ, OR YJ, YE) | 1 | 1 | STD 1121 |
| 8 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD 392 |
| 9 | COVER, BOLT, PLASTIC & (E) | 2 | 2 | 285696 |
| | 6 - 10D NAILS, GALV (E) | - | - | 491392 |
| 10 | SIGN, HIGH VOLTAGE & (E) | 1 | 1 | 647648 |
| | 9 ROOFING NAILS, GALV (E) | - | - | 492224 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 2 | 603136 |
| 12 | WIRE, #6 BARE STRANDED COPPER | 42' | 50' | 813536 |
| 13 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D (E) | AS REQ'D | | 783-787 |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. WHEN INSTALLING A NEW STATION ON THE 7.2/12.47KV SYSTEM IN MEOD IF NO PRIMARY NEUTRAL GROUND EXISTS ON THE POLE, INCLUDE THE NECESSARY MATERIALS TO INSTALL THE REQUIRED PRIMARY NEUTRAL GROUND. CONNECT TO TRANSFORMER TANK GAP GROUND.

(B) YE & YJ TRANSFORMERS ARE TO BE CONNECTED PHASE TO NEUTRAL.

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) WHEN LIGHTNING ARRESTERS ARE REQUIRED PER STANDARD 1247, USE 'HJ' OR 'YJ' TYPE TRANSFORMER WITH TANK GAP GROUND.

(H) GROUNDING METHODS - SEE STANDARD 1002.

DATE 1-1-86
APPD AK/RBB

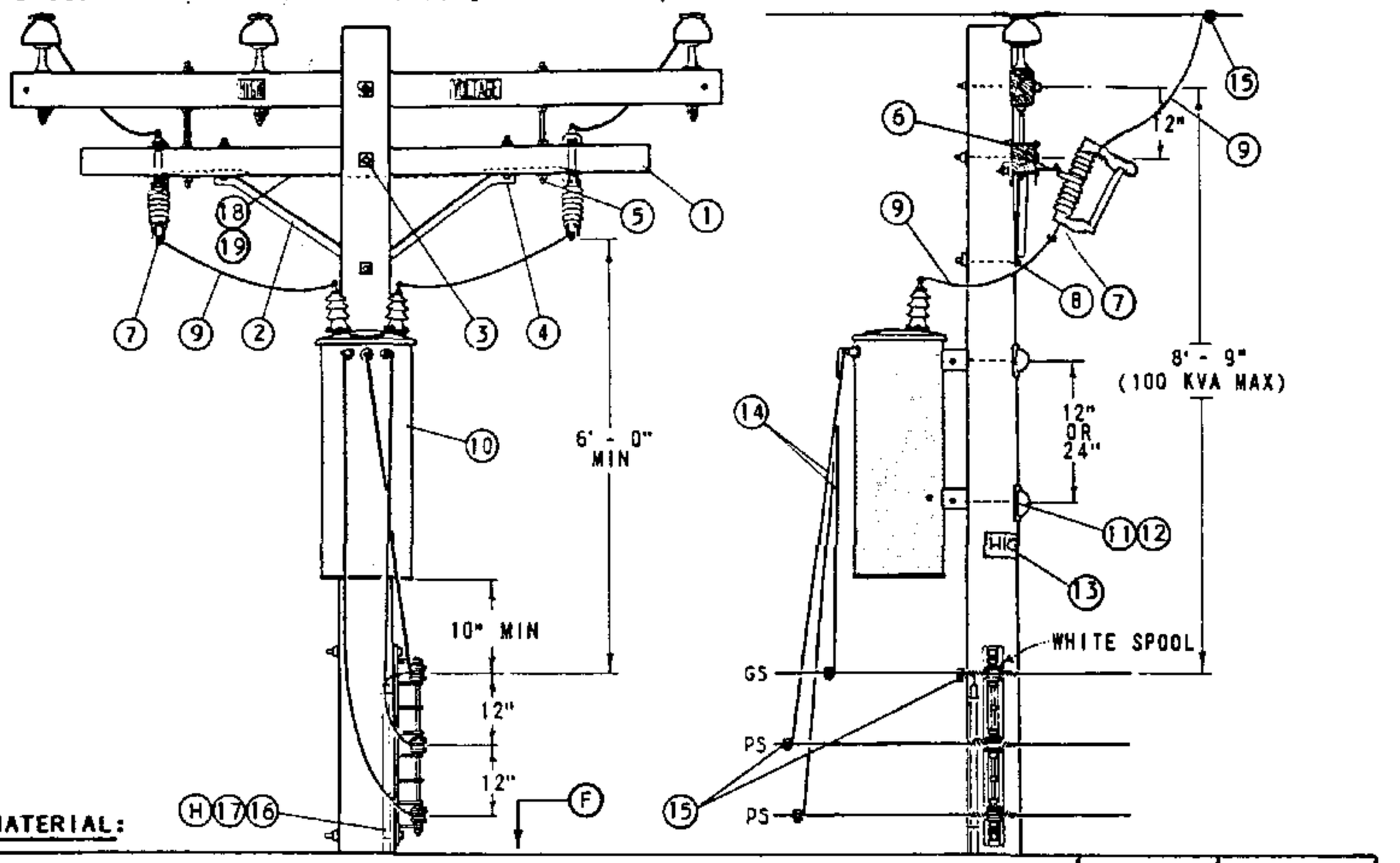
SDG&E ELECTRIC STANDARDS

# 7.2 OR 12KV SINGLE Ø YE, YJ, HE OR HJ TRANSFORMER INSTALLATION, SECONDARY RACK CONSTRUCTION

1199.403
SUPERSEDES
1145 (1-1-93)

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'H' TRANSFORMER, WITH CUTOUT ARM AND SECONDARY RACK CONSTRUCTION.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | | 1 | 293680 |
| 2 | BRACE, ANGLE, CROSSARM, 4' - 0" | | 1 | 164032 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 SPRING LOCK WASHER | (E) | 2 | STD 392 |
| 5 | BOLT, SPACE, GALV, 5/8" X 20", 4 SQ & 2 DBL COIL SPR WASHERS | (E) | 2 | STD 392 |
| 6 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | (E) | 2 | 166070 |
| 7 | CUTOUT, 12KV | | 2 | STD 1212 |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ & 1 DBL COIL SPRING WASHER | (E) | 1 | STD 392 |
| 9 | WIRE, #4 BARE STRANDED COPPER | | 14' | 813760 |
| 10 | TRANSFORMER, SINGLE PHASE, TYPE 'H' | | 1 | STD 1121 |
| 11 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | (E) | 2 | STD 392 |
| 12 | COVER, BOLT, PLASTIC & | (E) | 2 | 285696 |
| | 6 - 10D NAILS, GALV | (E) | - | 491392 |
| 13 | SIGN, HIGH VOLTAGE & | (E) | 1 | 647648 |
| | 9 ROOFING NAILS, GALV | (E) | - | 492224 |
| 14 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | | 21' | STD 1125 |
| 15 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | (E) | AS REQ'D | 783-787 |
| 16 | WIRE, #6 BARE STRANDED COPPER | | 40' | 813536 |
| 17 | UNIT GROUND, COMPLETE | (H) | 1 | 603136 |
| 18 | WIRE, #8 BARE SOLID ANNEALED COPPER | (I) | 8' | 812928 |
| 19 | STAPLES, FENCE, GALV, 1 1/4" | (I) (E) | AS REQ'D | 678528 |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(E) EXEMPT MATERIAL.

**REFERENCE:**

(F) POLE STEPPING - SEE STANDARD 363.

(G) FOR LIGHTNING ARRESTER REQUIREMENTS - SEE STANDARD 1247.

(H) GROUNDING METHODS - SEE STANDARD 1002.

(I) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287. IF BONDING IS REQUIRED, ORDER ADDITIONAL ITEMS 18 & 19.

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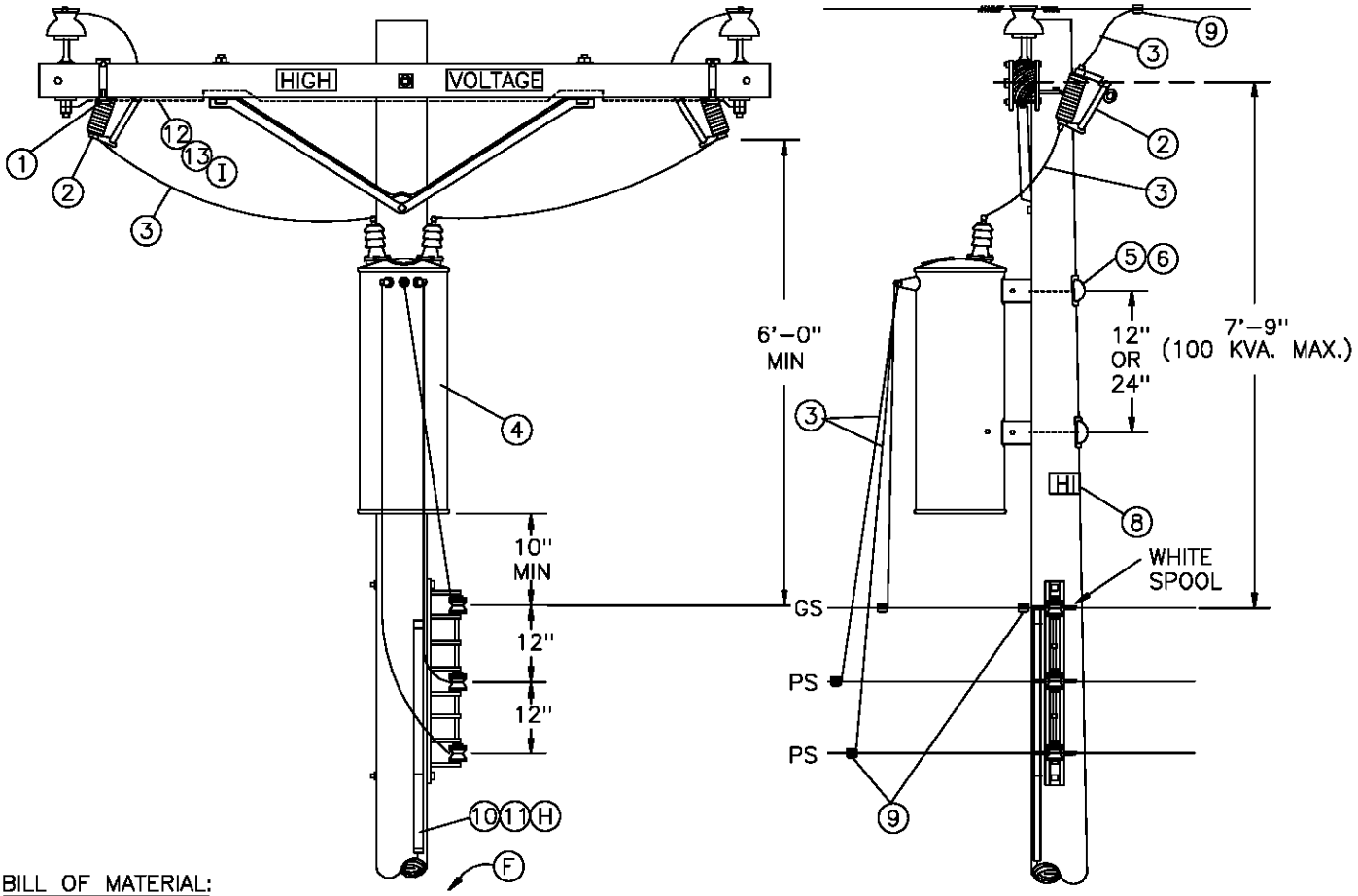
1199.404
SUPERSEDES
1147 (1-1-93)

SDG&E ELECTRIC STANDARDS

# 12KV, SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION, C.O. ARM, SECONDARY RACK CONSTRUCTION

DATE 1-1-86
APPD AK/RBF

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'H' TRANSFORMER, WITH THE CUTOUTS MOUNTED ON THE LINE ARM AND SECONDARY RACK CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 2 | 166070 |
| 2 | CUTOUT, 12KV | 2 | STD 1212 |
| 3 | WIRE, #4 BARE STRANDED COPPER | 14' | 813760 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'H' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & 6 – 10D NAILS, GALV | 2 – | 285696 491392 |
| 7 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 8 1 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV | 1 – | 647648 492224 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–787 |
| 10 | WIRE, #6 BARE STRANDED COPPER | 40' | 813536 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 603136 |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (I) | 10' | 812928 |
| 13 | STAPLES, FENCE, GALV, 1 1/4" (I) | AS REQ'D | 678528 |

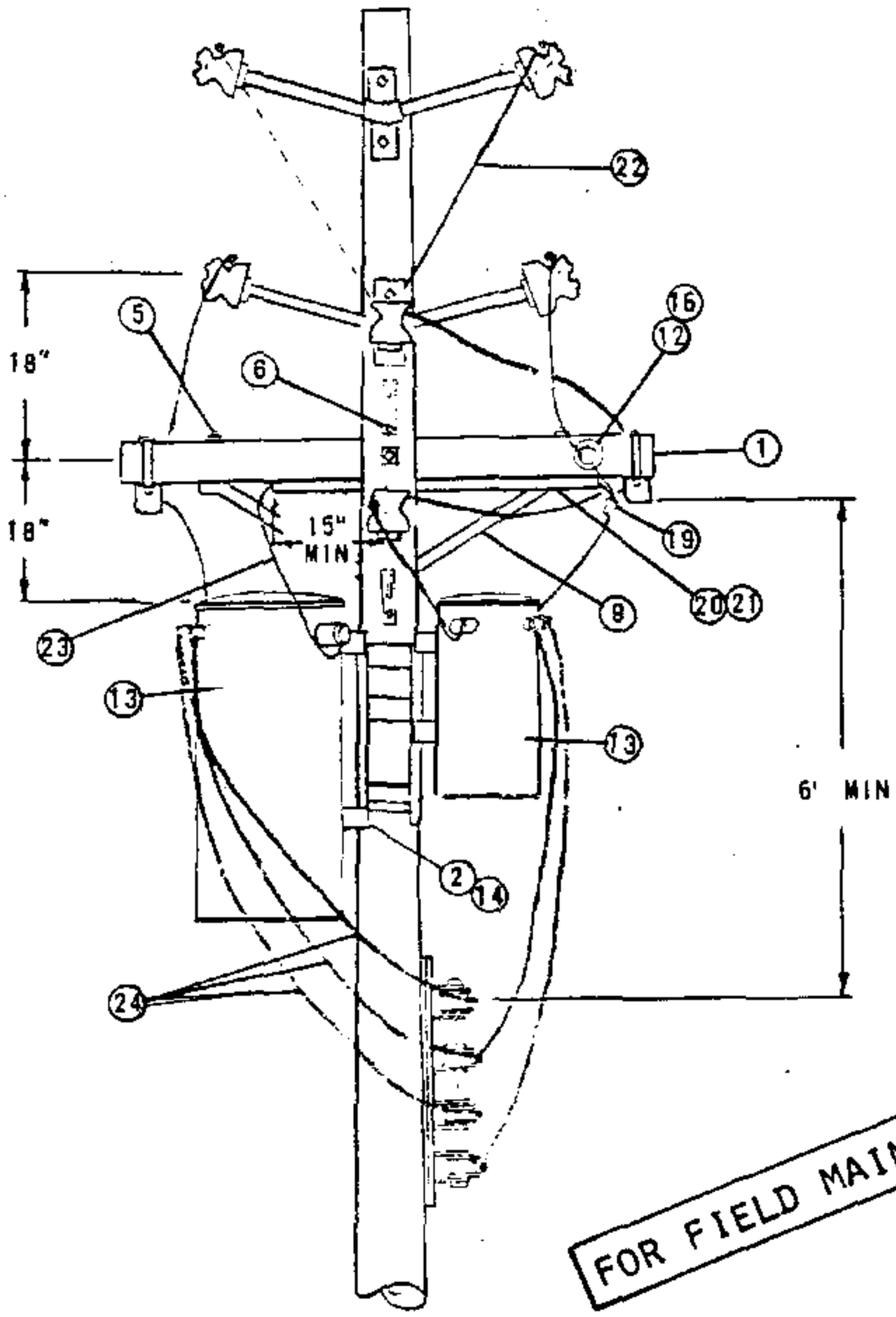
FOR FIELD MAINTENANCE ONLY

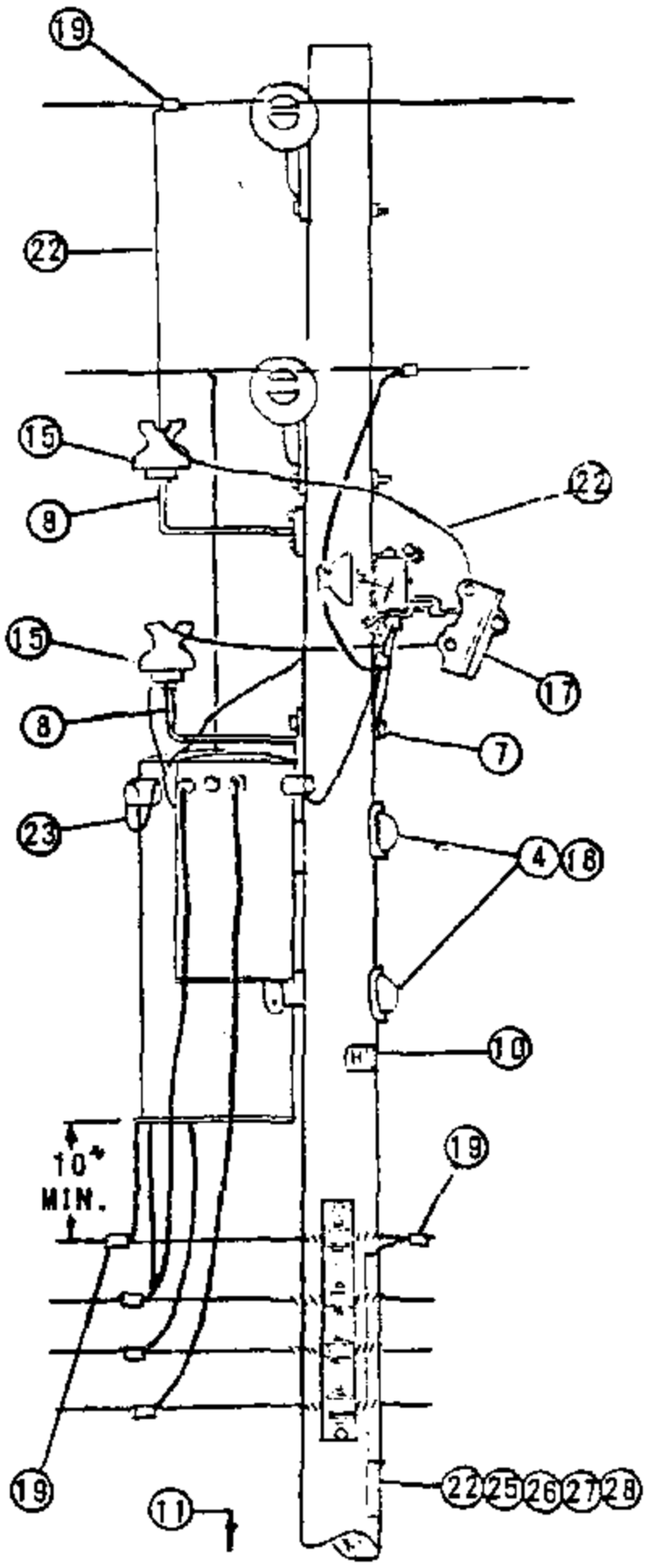
REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.
G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.
(H) GROUNDING METHODS – SEE STANDARD 1002.
BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 827.
(I) IF BONDING IS REQUIRED, ORDER ADDITIONAL ITEMS 12 & 13.

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1–1–86<br>APPD / | 12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION<br>100KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY RACK CONSTRUCTION | 1199.405<br>SUPERSEDES<br>1149 (1–1–93) |

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| DATE 1-1-86<br>APPD AE/KDS | SDG&E ELECTRIC STANDARDS<br>4KV OPEN WYE OR 2.4KV OPEN DELTA TYPE "W" TRANSFORMER INSTALLATION 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION | 1199.501<br>SUPERSEDES<br>1154.1 (1-1-86) |

NOTES:

(A) LIMITED TO TWO 50KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.
(B) USE TWO GROUND RODS SPACED A MINIMUM OF 6 FEET APART FOR EACH GROUND UNIT.
(C) 2.4KV 3ϕ OPEN DELTA INSTALLATIONS REQUIRE THREE CUTOUTS. FOR CONNECTIONS SEE PAGES 1117 AND 1118.
D. DO NOT USE OPEN DELTA OR OPEN WYE CONSTRUCTION WHERE SIZE OF A SINGLE 3ϕ MOTOR IS 15 HP OR LARGER.
(E) EXEMPT MATERIAL.
F. SEE DISTRIBUTION POLE TOPS SECTION FOR POLE TOP MATERIAL.
(G) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.
H. SEE ARRESTER SECTION FOR ARRESTER REQUIREMENTS.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD. |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2"X 4 1/2"X 6'-0" | 1 | PG |
| 2 | | BOLT, MACH., GALV., 5/8" (E) OR 3/4"X 2", 1 LOCK SPR WASH. | 4 | PGS 139, 140 |
| 3 | | BOLT, MACH., GALV., 5/8"X___", 2 SQ WASH. 1 DBL. COIL SPR. WASH. (E) | 1 | PGS 139, 140 |
| 4 | | BOLT, MACH., GALV., 3/4"X___", 1 SQ. CURV. WASH. WASH & 1 DBL COIL SPR. WASH. | 2 | PGS 139, 140 |
| 5 | | BOLT, MACH., GALV., 1/2"X 6", 1 RD WASH., 1 DBL. COIL SPR. WASH. (E) | 2 | 153088 |
| 6 | | SCREW, LAG. GALV., 1/2"X 4" (E) | 4 | 621568 |
| 7 | | SCREW, LAG. GALV., 5/8"X 5" (E) | 1 | 621600 |
| 8 | | BRACKET, INSULATOR, 1" | 2 | 166144 |
| 9 | | BRACE, CROSSARM, ANGLE 4'-0" | 1 | 164032 |
| 10 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV. (E) | 1 | 647648, 492224 |
| 11 | | STEPS, POLE (E) | 16 | 692992 |
| | 12 | BOLT, MACH. 5/8" X 5" (E) | 1 | 155488 |
| | 13 | TRANSFORMER, SINGLE PHASE | 2 | PGS 1121.1-1121.12 |
| | 14 | BRACKET, TRANSFORMER MOUNTING | 1 | 402976 |
| | 15 | INSULATOR (E) | 2 | 429024, 429216 |
| | 16 | PIN ADAPTER, 1 INCH THREAD | 1 | 529248 |
| | 17 | CUTOUT, 5KV (C) | 2 | PG 1211 |
| | 18 | COVER, PLASTIC THRU BOLT & 2-20D NAILS, GALV. (E) | 2 | 285696, 491392 |
| | 19 | CONNECTORS, WIRE COMPRESSION | 9 | PGS 783-787 |
| | 20 | CONDUIT, PVC, 3/4", SCHEDULE 40, TYPE 11 (E) | 4'-0" | 251328 |
| | 21 | STRAPS, PIPE, 3/4", 2-6D NAILS, GALV. (E) | 3 | 697888 |
| | 22 | WIRE, BARE STRANDED COPPER #6 | 41' | 813536 |
| | 23 | WIRE, INSULATED, XLP, STRANDED COPPER, 5KV, #6 | 30' | 194304 |
| | 24 | WIRE, W.P., COPPER, (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 30' | PG 1125 |
| | 25 | ROD, GROUND & CLAMP (B) (G) | 2 | 603072, 230016 (E) |
| | 26 | MOULDING, HARDWOOD, 1" (G) | 27' | 487200 |
| | 27 | STAPLES, MOULDING, GALV., 3"X 1 1/16"x 1/4" (G) (E) | 18 | 678560 |
| | 28 | STAPLES, FENCE, GALV., 1 1/4" (G) (E) | 20 | 678528 |
| | 29 | | | |

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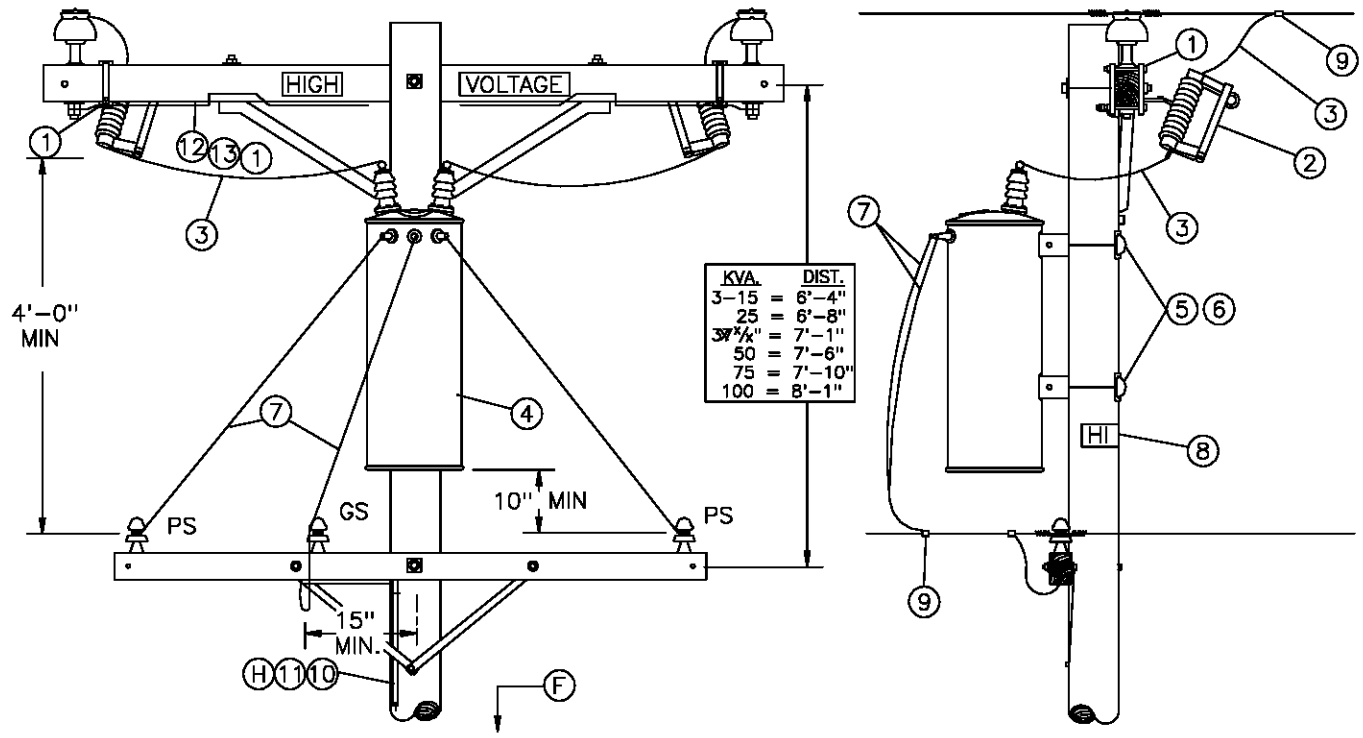
1199.502
SUPERSEDES
1154.2 (1-1-86)

SDG&E ELECTRIC STANDARDS

4KV OPEN WYE OR 2.4KV OPEN DELTA TYPE "W" TRANSFORMER
INSTALLATION 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION

DATE 1-1-86
APPD AK/RDS

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A TYPE 'H' TRANSFORMER, WITH THE CUTOUTS MOUNTED ON THE LINE ARM AND SECONDARY CROSSARM CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 2 | 166070 |
| 2 | CUTOUT, 12KV | 2 | STD 1212 |
| 3 | WIRE, #4 BARE STRANDED COPPER | 14' | 813536 |
| 4 | TRANSFORMER, SINGLE PHASE, TYPE 'H' | 1 | STD 1121 |
| 5 | BOLT, MACH, GALV, 5/8" OR 3/4" X (LENGTH AS REQ'D), 1 SQ CURVED & 1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 6 | COVER, BOLT, PLASTIC & 6 – 10D NAILS, GALV | 2 – | 285696 491392 |
| 7 | WIRE, W.P., COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 21' | STD 1125 |
| 8 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV | 1 – | 647648 492224 |
| 9 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–787 |
| 10 | WIRE, #6 BARE STRANDED COPPER | 40' | 813536 |
| 11 | UNIT GROUND, COMPLETE (H) | 1 | 603136 |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (I) | 10' | 812928 |
| 13 | STAPLES, FENCE, GALV, 1 1/4" (I) | AS REQ'D | 678528 |

FOR FIELD MAINTENANCE ONLY

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.

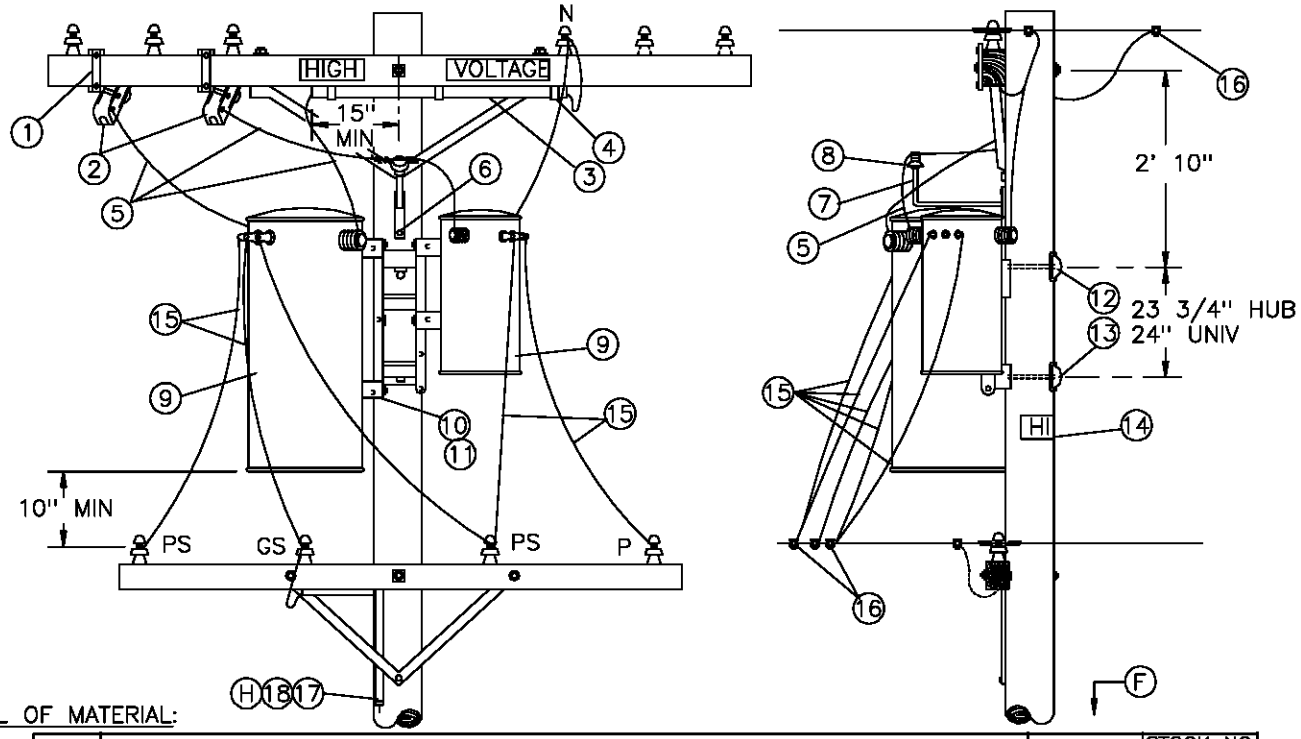
(H) GROUNDING METHODS – SEE STANDARD 1002.

(I) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287. IF BONDING IS REQUIRED, ORDER ADDITIONAL ITEMS 12 & 13.

| | | |
|---|---|---|
| DATE 1-1-86<br>APPD / | SDG&E ELECTRIC STANDARDS<br>12KV SINGLE PHASE TYPE "H" TRANSFORMER INSTALLATION, 100 KVA MAX, LINE ARM MOUNTED CO'S, SECONDARY LINE ARM CONSTRUCTION | 1199.503<br>SUPERSEDES 1150 (1-1-93) |

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 4KV OPEN WYE WITH TYPE 'W' TRANSFORMERS, AND SECONDARY LINE ARM CONSTRUCTION.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STANDARD |
|---|---|---|---|
| 1 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 2 | 166070 |
| 2 | CUTOUT, 12KV (B) | 2 | STD 1212 |
| 3 | CONDUIT, PVC, 3/4" X 4', SCHED 40, TYPE 2 | 1 | 251328 |
| 4 | STRAP, CONDUIT, 3/4", GALV &<br>2 – 6D NAILS, GALV | 3<br>– | 697888<br>491552 |
| 5 | WIRE, 5KV INSULATED, XLP, #6 STRANDED COPPER | 25' | 194304 |
| 6 | SCREW, LAG, 1/2" X 4" | 2 | 621568 |
| 7 | BRACKET, INSULATOR, 1" LEAD THREAD | 1 | 166134 |
| 8 | INSULATOR, 12KV NEUTRAL | 1 | 429216 |
| 9 | TRANSFORMER, SINGLE PHASE, TYPE W (A) | 1 | STD 1121 |
| 10 | BRACKET, TRANSFORMER MOUNTING | 1 | 402976 |
| 11 | BOLT, MACH, GALV, 5/8" OR 3/4" X 2", 2 RD & 1 LOCK WASHER | 4 | STD 392 |
| 12 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV &<br>1 DBL COIL SPRING WASHER | 2 | STD 392 |
| 13 | COVER, VOLT, PLASTIC &<br>6 – 10D NAILS, GALV | 2<br>– | 285696<br>491392 |
| 14 | SIGN, HIGH VOLTAGE &<br>8 ROOFING NAILS, GALV | 1<br>– | 647648<br>492224 |
| 15 | WIRE, W.P. (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 35' | STD 1125 |
| 16 | CONNECTORS, WIRE COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–787 |
| 17 | WIRE, BARE STRANDED, COPPER, #6 | 40' | 813536 |
| 18 | UNIT GROUND, COMPLETE (H) | 1 | 603136 |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

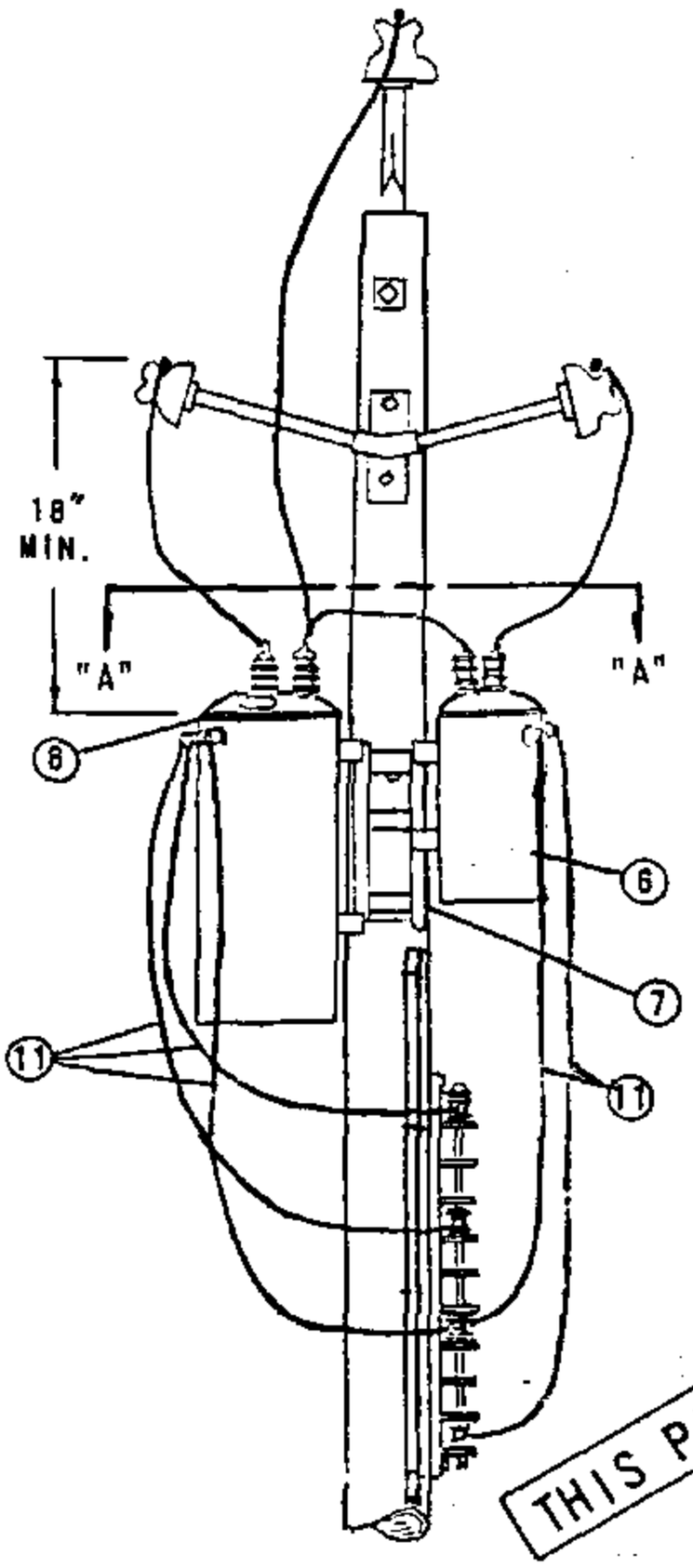
(A) LIMITED TO 50 KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.
(B) 2.4KV 30 OPEN DELTA INSTALLATIONS REQUIRE THREE CUTOUTS. FOR CONNECTIONS SEE PAGE 1117.
C. DO NOT USE OPEN DELTA OR OPEN WYE CONSTRUCTION WHERE SIZE OF A SINGLE 3Ø MOTOR IS 15 HP OR LARGER.

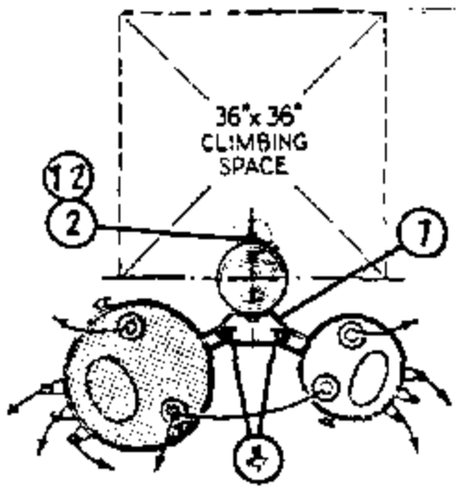
REFERENCE:

(F) POLE–STEPPING – SEE STANDARD 363.
G. FOR LIGHTNING ARRESTER REQUIREMENTS – SEE STANDARD 1247.
(H) GROUNDING METHODS – SEE STANDARD 1002.
I. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON STANDARD 287.

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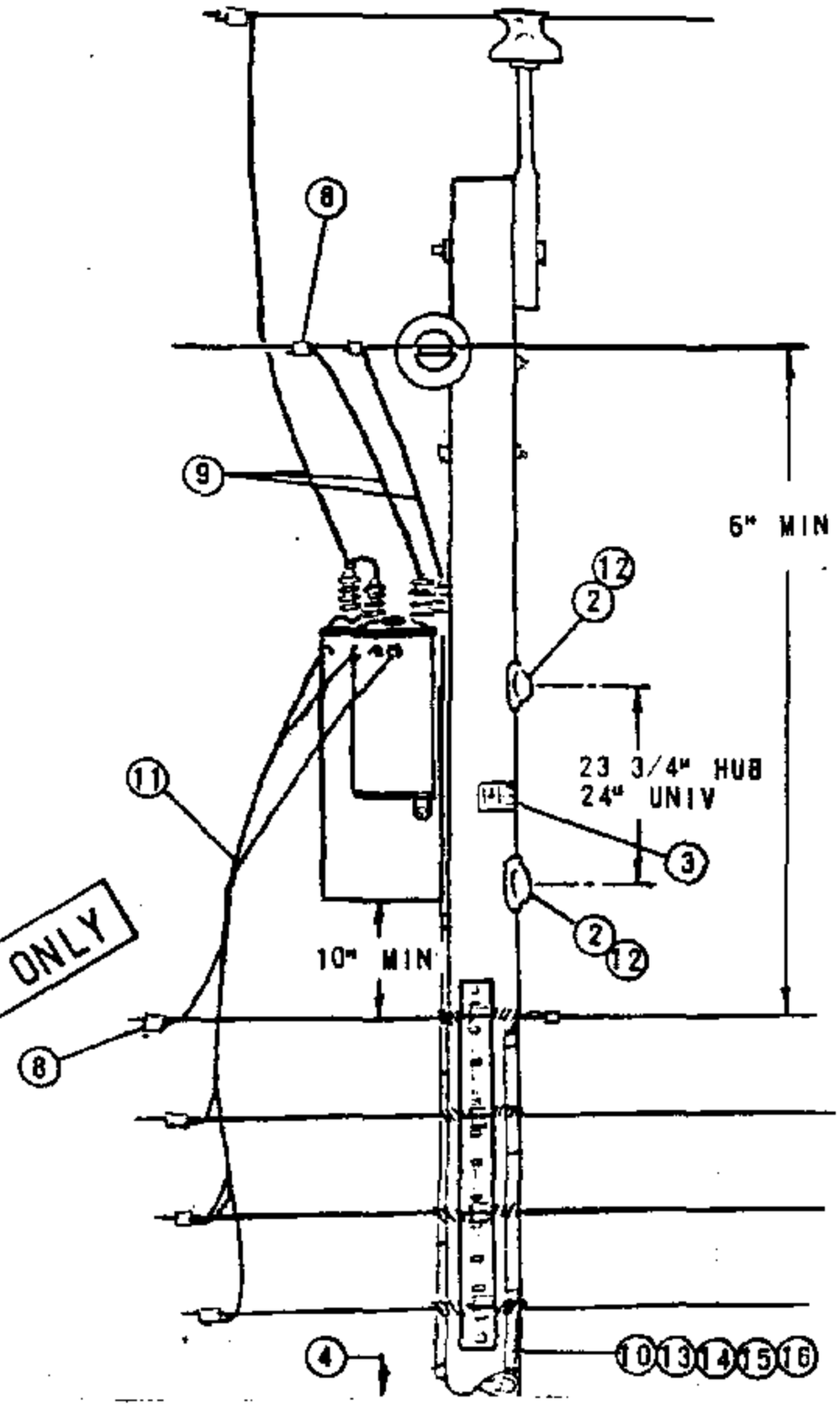
| | | |
|---|---|---|
| 1199.504<br>SUPERSEDES<br>1156 (1–1–93) | SDG&E ELECTRIC STANDARDS<br>4KV OPEN WYE TYPE "W" TRANSFORMER INSTALLATION, SECONDARY LINE ARM CONSTRUCTION | DATE 1–1–86<br>APPD / |




SECTION "A" - "A"

THIS PAGE FIELD MAINTENANCE ONLY




NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

(B) USE TWO ROD GROUND.

C. SEE DISTRIBUTION POLE TOP SECTION FOR POLE TOP MATERIAL.

D. LIMITED TO TWO 50KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.

(E) EXEMPT MATERIAL.

F. WHEN ARRESTERS ARE REQUIRED PER STANDARDS PAGE 1247, USE TYPE "HJ" TRANSFORMERS.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY HE | QUANTITY HJ | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| | | BOLT, MACH., GALV., 5/8" (E) OR 3/4" X 2", 1 SQ. CURV WASH., 1 LOCK SPR WASH. | 4 | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH., GALV., 3/4"X___" 1 SQ. CURV. WASH, 1 DBL COIL SPR WASH. | 2 | 2 | PGS 139,140 |
| 3 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV (E) | 1 | 1 | 647648, 492192 |
| 4 | | STEPS, POLE (E) | 16 | 16 | 592992 |
| 5 | | | | | |
| | 6 | TRANSFORMER, SELF PROTECTED TYPE, SINGLE PHASE (HE or HJ) | 2 | 2 | PGS 1121.01-1121.12 |
| | 7 | BRACKET, TRANSFORMER MOUNTING | 1 | 1 | 402976 |
| | 8 | CONNECTORS, WIRE, COMPRESSION | 10 | 11 | PGS 783 - 787 |
| | 9 | WIRE, BARE STRANDED, COPPER, #6 | 70' | 70' | 813536 |
| | 10 | WIRE, BARE STRANDED, COPPER, #2 | — | 40' | 813664 |
| | 11 | WIRE, W.P. COPPER, (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 30' | 30' | PG 1125 |
| | 12 | COVER, PVC THRU BOLT & 6-100. NAILS, GALV. (E) | 2 | 2 | 285696, 491392 |
| | 13 | ROD, GROUND & CLAMP (B) (A) | 2 | 4 | 603072, 230016 (E) |
| | 14 | MOULDING, HARDWOOD, 1" (A) | 27' | 57' | 487200 |
| | 15 | STAPLES, MOULDING, GALV., 3"X 1 1/16"X 1/4" (A) (E) | 20 | 38 | 678560 |
| | 16 | STAPLES, FENCE, GALV., 1 1/4" (A) (E) | 25 | 50 | 678528 |
| | 17 | | | | |

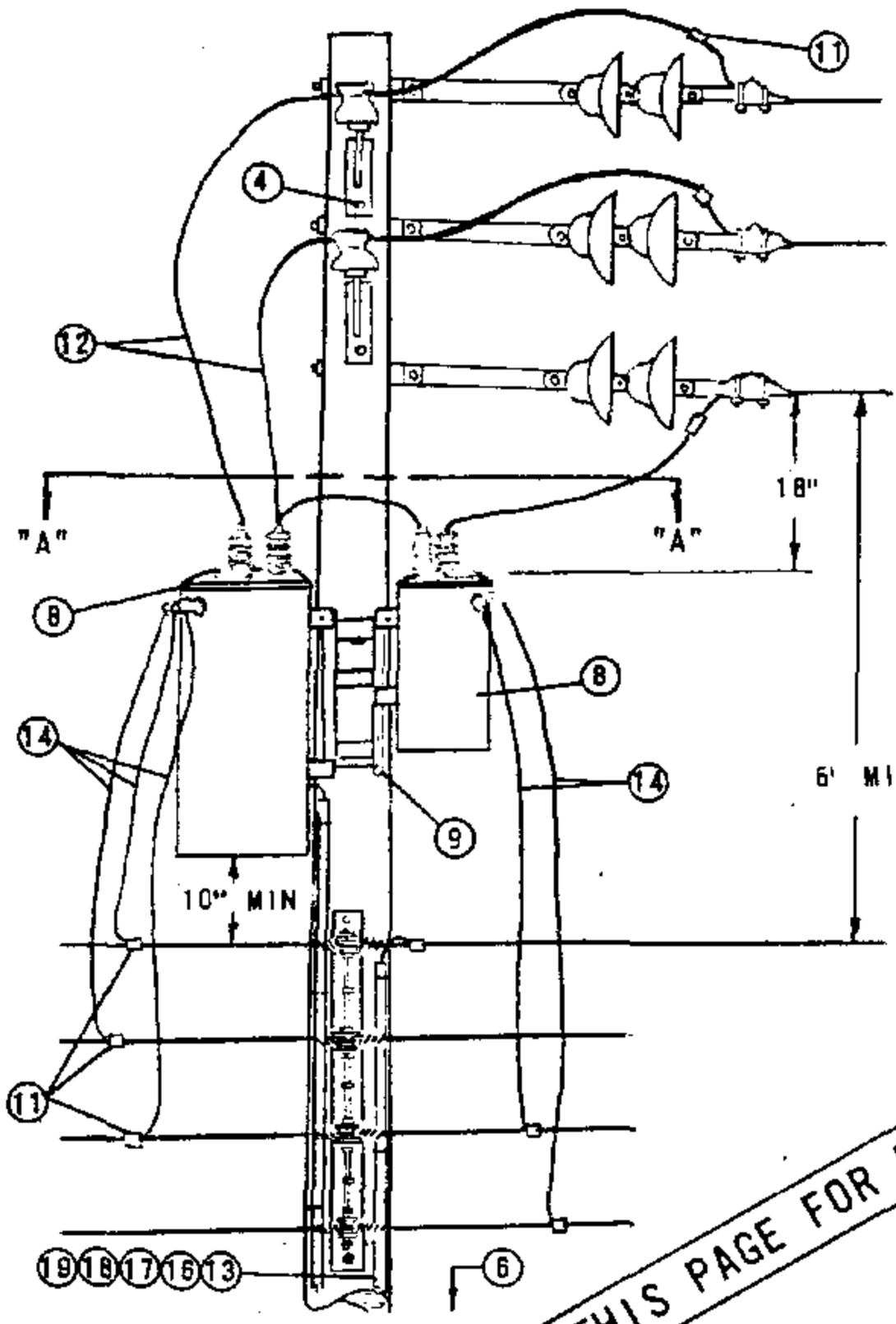
SDG&E ELECTRIC STANDARDS

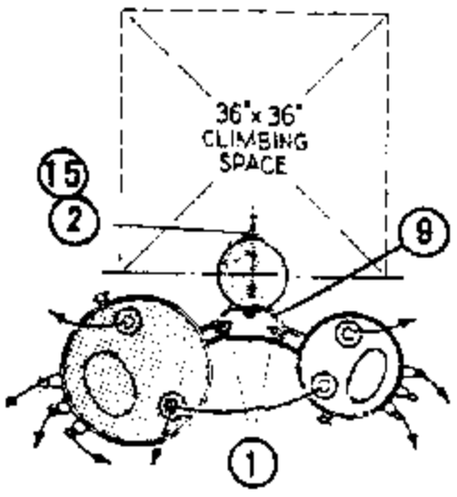
DATE 1-1-86
APPD AE/RDS

# 12KV OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, 2-50KVA MAX., ARMLESS TANGENT CONSTRUCTION

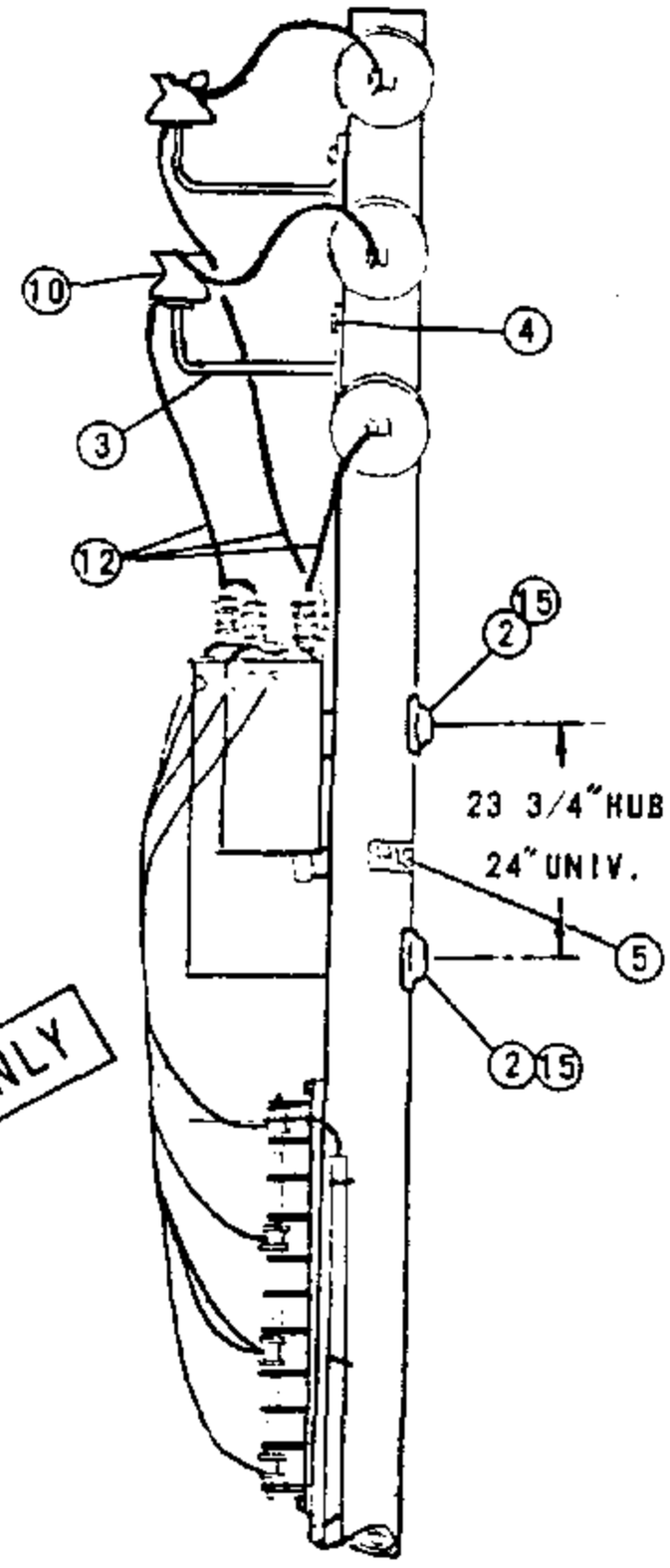
1199.601
SUPERSEDES
1161 (1-1-86)

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SECTION "A" - "A"




THIS PAGE FOR FIELD MAINTENANCE ONLY

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.
(B) USE TWO ROD GROUND.
C. SEE DISTRIBUTION POLE TOP SECTION FOR POLE TOP MATERIAL.
D. LIMITED TO TWO 50KVA MAXIMUM TRANSFORMER BECAUSE OF ENCROACHMENT INTO CLIMBING SPACE.
(E) EXEMPT MATERIAL.
F. WHEN ARRESTERS ARE REQUIRED PER STANDARDS PAGE 1247, USE TYPE 'HJ' TRANSFORMERS.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY HE | QUANTITY HJ | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| 1 | | BOLT, MACH., GALV., 5/8" (E) DR 3/4"X 2", 1 SQ. CURV WASH., 1 LOCK SPR WASH. | 4 | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH., GALV., 3/4"X__" 1 SQ. CURV WASH., 1 DBL. COIL SPR. WASH. | 2 | 2 | PGS 139, 140 |
| 3 | | BRACKET, INSULATOR, 1"OR 1 3/8"LEAD THREAD | 2 | 2 | 166144-166176 |
| 4 | | SCREW, LAG, GALV., 1/2"X 4" (E) | 4 | 4 | 621568 |
| 5 | | SIGN, HIGH VOLTAGE, & 8 ROOFING NAILS, GALV. (E) | 1 | 1 | 647648, 492192 |
| 6 | | STEPS, POLE (E) | 16 | 16 | 692992 |
| 7 | | | | | |
| | 8 | TRANSFORMER, SELF PROTECTED TYPE, SINGLE PHASE, (HE or HJ) | 2 | 2 | PGS 1121.01-1121.12 |
| | 9 | BRACKET, TRANSFORMER MOUNTING | 1 | 1 | 402976 |
| | 10 | INSULATOR, 12KV, (CLASS 55-5 OR 56-1) | 2 | 2 | PG 750 |
| | 11 | CONNECTORS, WIRE COMPRESSION | 9 | 9 | PGS 783-787 |
| | 12 | WIRE, BARE STRANDED, COPPER #6 | 70' | 70' | 813536 |
| | 13 | WIRE, BARE STRANDED, COPPER #2 | — | 40' | 813664 |
| | 14 | WIRE, W.P. COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 30' | 30' | PG 1125 |
| | 15 | COVER, PVC THRU BOLT & 6-10D NAILS, GALV. | 2 | 2 | 285696, 491392 |
| | 16 | ROD, GROUND & CLAMP (B) (A) | 2 | 4 | 603072, 230016 (E) |
| | 17 | MOULDING, HARDWOOD, 1" (A) | 27' | 57' | 487200 |
| | 18 | STAPLES, MOULDING GALV., 3"X 1 1/16"X 1/4" (A) (E) | 20 | 38 | 678560 |
| | 19 | STAPLES, FENCE, GALV., 1 1/4" (A) (E) | 25 | 50 | 678528 |

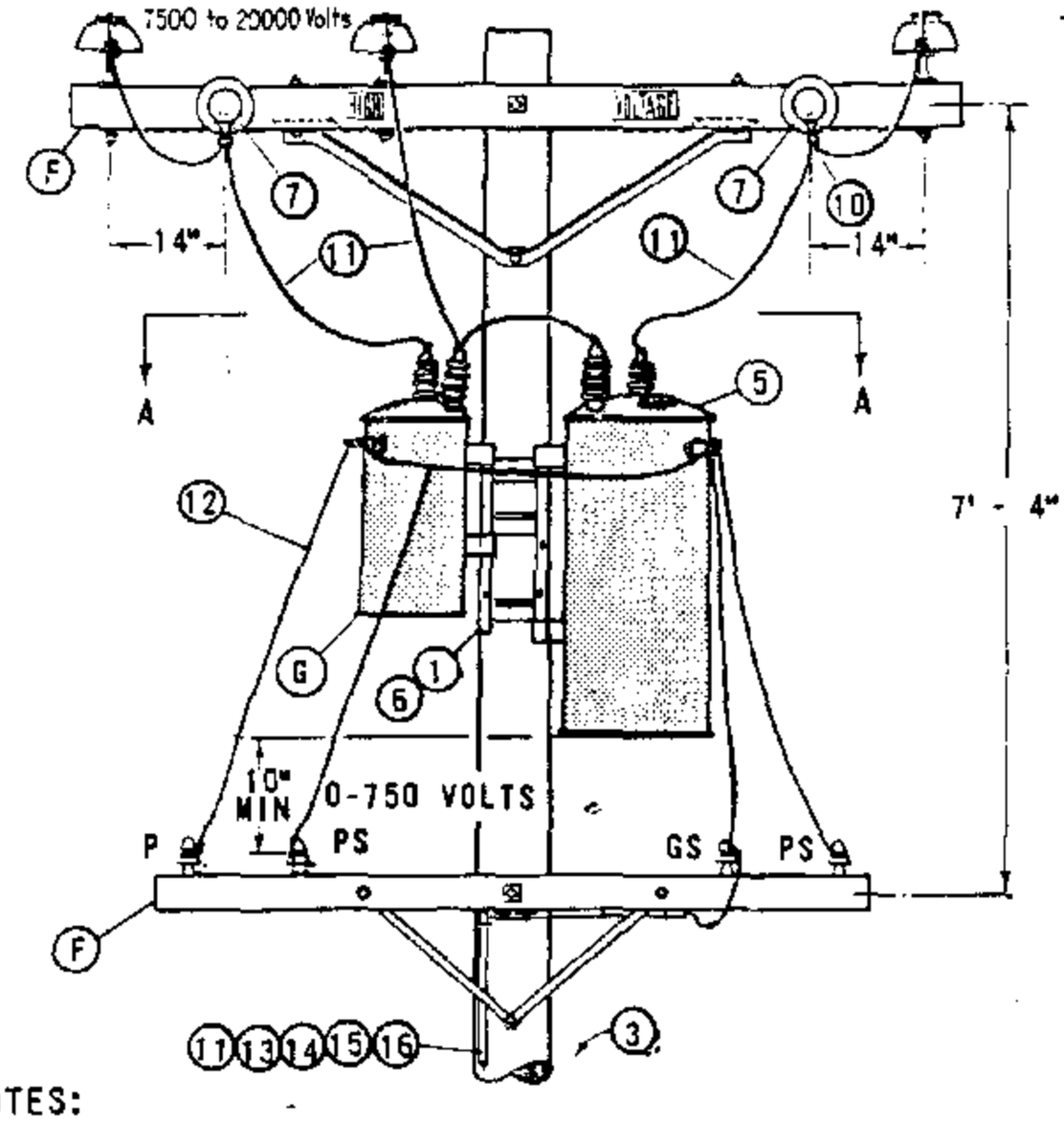
1199.602
SUPERSEDES
1162 (1-1-86)

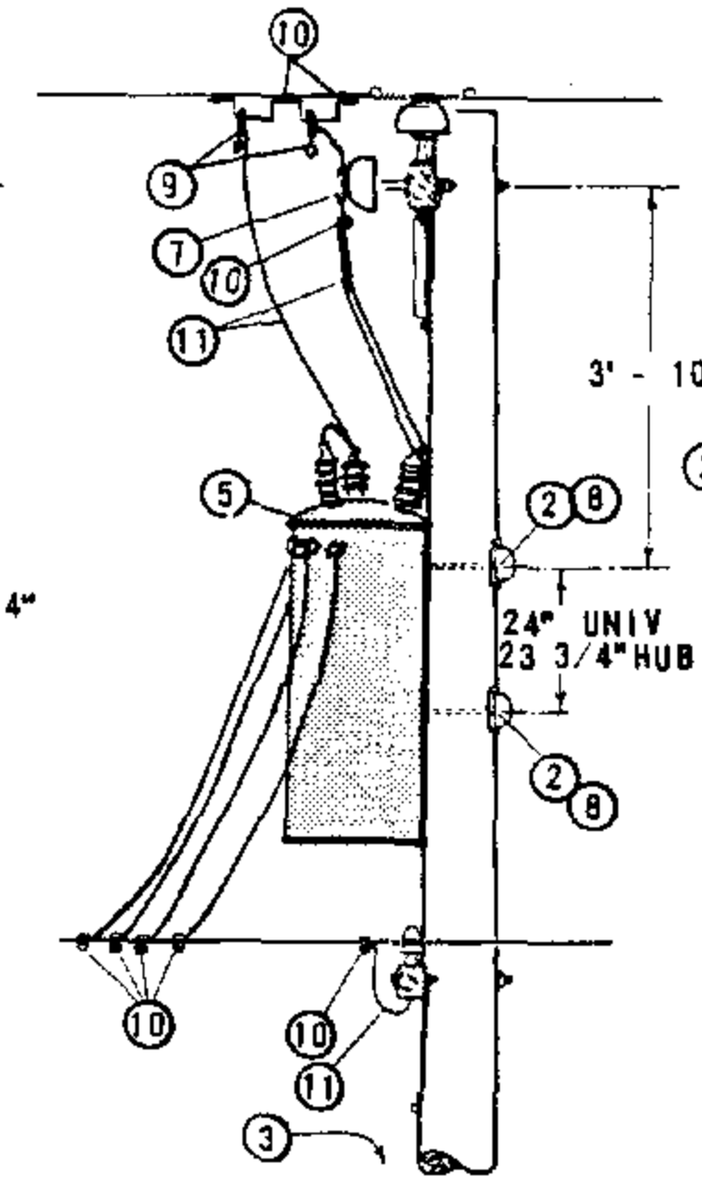
SDG&E ELECTRIC STANDARDS

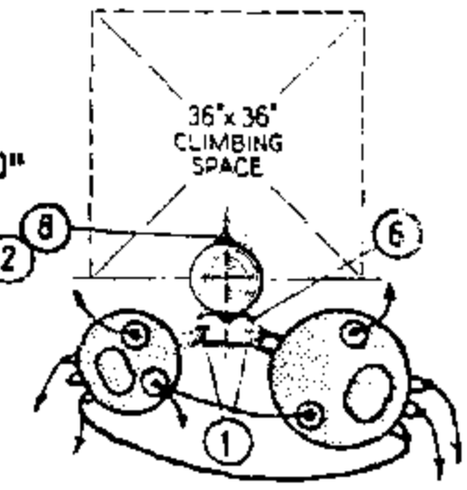
12KV OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION
2-50KVA MAX., ARMLESS DEAD END CONSTRUCTION

DATE 1-1-86
APPD AK/RPS

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PLAN AT A - A

NOTES:

A. USE PAGE 1165 FOR NEW CONSTRUCTION. THIS CONSTRUCTION MAY BE USED TO ELIMINATE POLE CHANGEOUTS ON EXISTING POLES WITH THE PRIMARY ALREADY ON ARMS.

(B) LIMITED TO TWO 50 KVA MAXIMUM TRANSFORMERS BECAUSE OF ENCROACHMENT ON CLIMBING SPACE. 75 KVA TRANSFORMERS MAY BE USED IF THEY HAVE SMALL CASES.

(C) USE TWO GROUND RODS SPACED NOT LESS THAN 6 FEET APART.

(D) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

(E) EXEMPT MATERIAL.

(F) PRIMARY AND SECONDARY CONSTRUCTION SHOWN ARE TYPICAL, AND THEIR MATERIALS ARE NOT INCLUDED. MAY BE INSTALLED WITH ARMLESS PRIMARY, RACK SECONDARY, ETC.

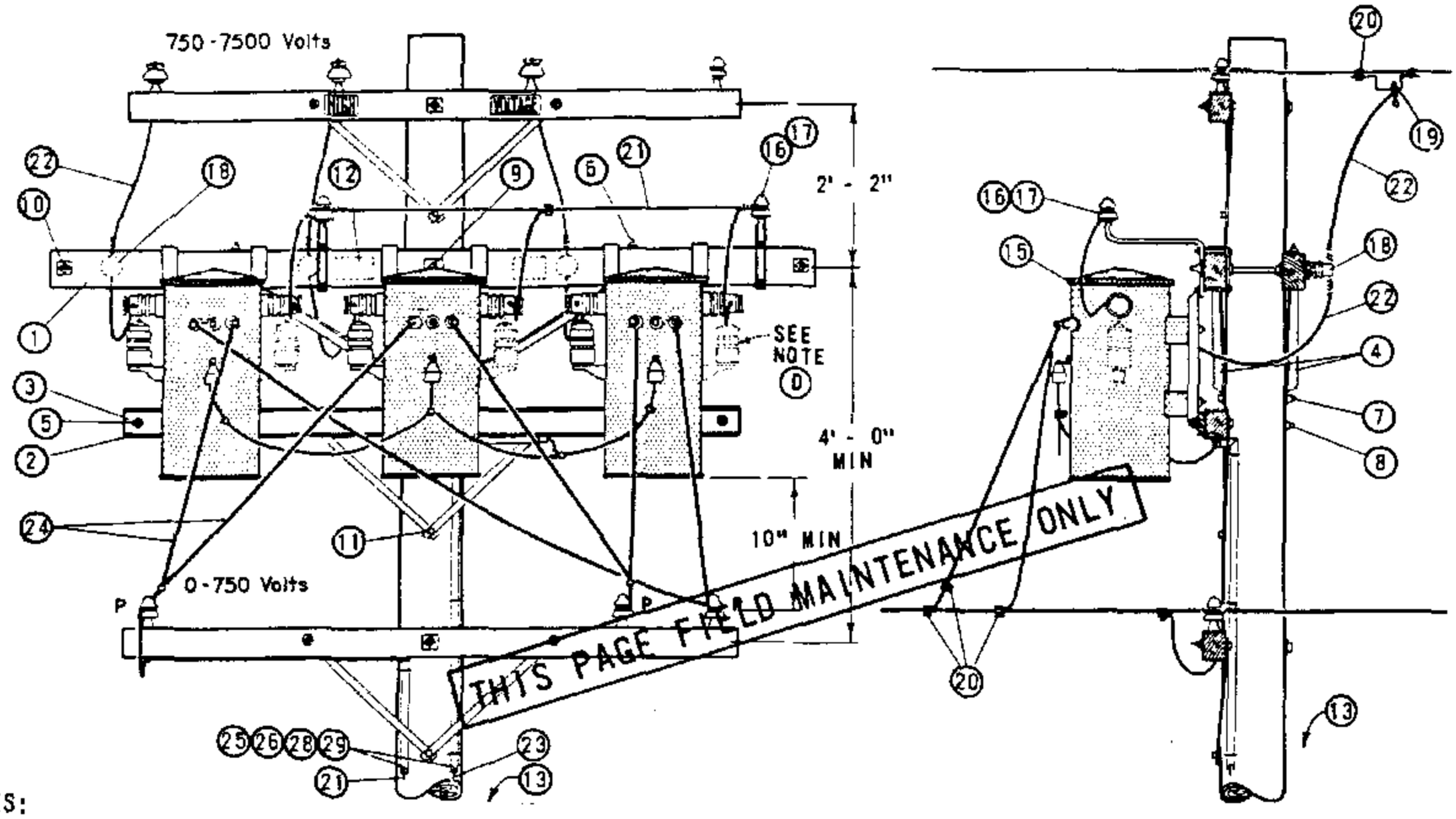
(G) POWER TRANSFORMER TO BE HUNG ON THE SAME SIDE OF POLE AS 2 PHASE WIRES TO PREVENT PHASING PROBLEMS WHEN CLOSING DELTA.

| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO OR CONSTR STDS |
|---|---|---|---|---|
| 1 | | BOLT, MACH GALV, 5/8" (E) OR 3/4" X 2", 1 RD WASH. & 1 NUT, 1 DBL COIL SPR WASH. | 4 | PGS 139, 140 |
| 2 | | BOLT, MACH GALV, 3/4" X 10", 1" SQ CURVE WASH., 1 NUT & 1 DBL COIL SPR WASH. | 2 | PGS 139, 140 |
| 3 | | STEP, POLE (E) | 19 | 592992 |
| 4 | | | | |
| | 5 | TRANSFORMER, SELF PROTECTED TYPE, SINGLE PHASE (HE, HJ) (B) | 2 | PGS 1121.01-1121.12 |
| | 6 | BRACKET, TRANSFORMER MTG | 1 | 402976 |
| | 7 | INSULATOR & PIN, 12KV | 2 | 700 SECTION |
| | 8 | COVER, PVC THRU BOLT & 6-10D NAILS, GALV (E) | 2 | 285696, 491392 |
| | 9 | CLAMP, HOT LINE (E) & STIRRUP | 3 | PG 788 |
| | 10 | CONNECTORS, WIRE, COPPER, AS REQ'D | 13 | PGS 783-787 |
| | 11 | WIRE, STRANDED #6 COPPER | 70' | 813536 |
| | 12 | WIRE, WP COPPER (SIZE GOVERNED BY TRANSFORMER CAPACITY) | 30' | PG 1125 |
| | 13 | ROD & CLAMP, GROUND (D) (C) | 2 | 603072, 230016(E) |
| | 14 | MOULDING, HARDWOOD 1" (D) | 30' | 487200 |
| | 15 | STAPLES, MOULDING GALV, 3" X 1 1/16" X 1/4" (D) (E) | 20 | 678560 |
| | 16 | STAPLES, FENCE GALV, 1 1/4" (D) (E) | 25 | 678528 |

FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-86<br>APPD AE/RDS | SDG&E ELECTRIC STANDARDS<br>12KV, OPEN DELTA TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, 2-50 KVA MAX, SECONDARY ARM CONSTRUCTION | 1199.603<br>SUPERSEDES<br>1167 (1-1-86) |

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NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

B. SEE DISTRIBUTION POLE TOP SECTION FOR POLE TOP MATERIALS.

(C) USE TWO ROD GROUND

(D) REMOVE RIGHT HAND LIGHTNING ARRESTERS BEFORE INSTALLING TRANSFORMERS.

(E) EXEMPT MATERIAL.

F. WHEN ARRESTERS ARE REQUIRED PER STANDARDS PAGE 1247, USE TYPE "WJ" TRANSFORMERS.

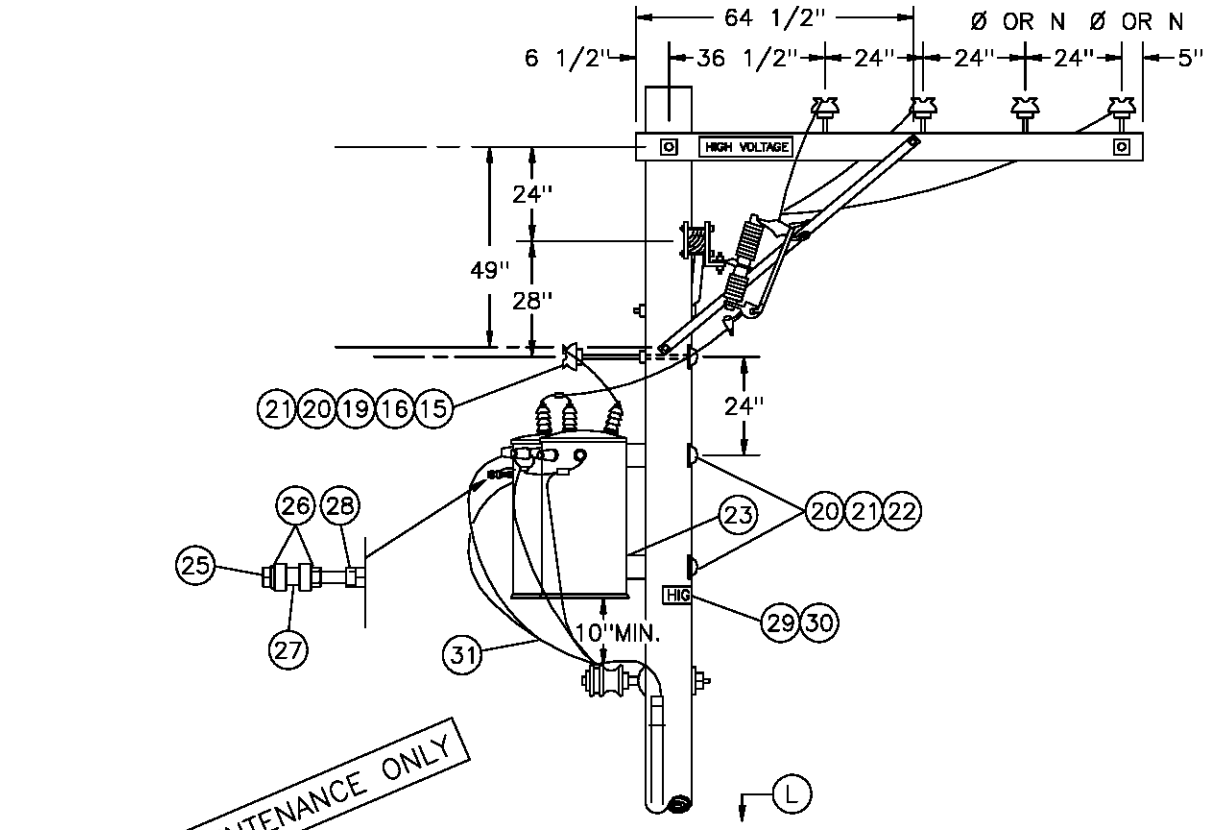
G. SEE STANDARDS PAGE 1118 FOR TRANSFORMER CONNECTION DIAGRAMS. CONNECTION SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY.

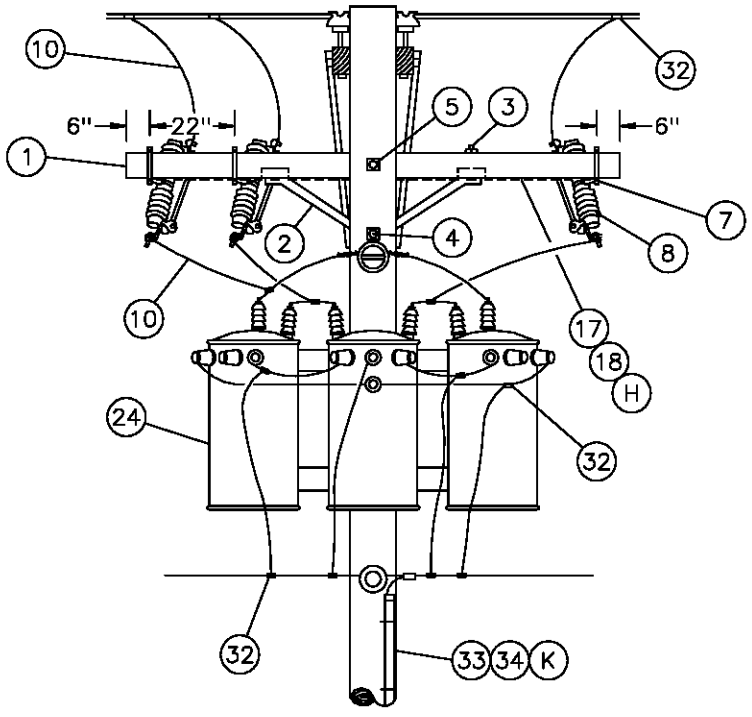
| ITEM PTF | ITEM LTI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/4" X 5 3/4" X 10' - 0" | 2 | PG 111 IT. 2 |
| 2 | | CROSSARM, KICK 3 3/4" X 5 3/4" X 8' - 0" | 1 | PG 116 IT. 1 |
| 3 | | COVER STRIP, 1 5/8" X 4 1/2" X 8' - 0" (2X4 S4S) | 1 | 699328 |
| 4 | | BRACE, ANGLE CROSSARM | 2 | 164128 |
| 5 | | BOLT, MACH GALV 3/8" X 6", 2 RD WASH. & 1 NUT (E) | 2 | PGS 139, 140 |
| 6 | | BOLT, MACH GALV 1/2" X 7", 1 RD WASH. & 1 NUT (E) | 4 | PGS 139, 140 |
| 7 | | BOLT, MACH GALV 5/8" X 10" (E) | 1 | PGS 139, 140 |
| 8 | | BOLT, MACH GALV 5/8" X 14", 2 SQ WASH. & 1 NUT (E) | 1 | PGS 139, 140 |
| 9 | | BOLT, MACH GALV 5/8" X 18", 2 - 3 SQ WASH & 1 NUT (E) | 1 | PGS 139, 140 |
| 10 | | BOLT, SPACE GALV 5/8" X 20", 4 WASH. & 4 NUTS (E) | 2 | PGS 139, 140 |
| 11 | | SCREW, LAG GALV 1/2" X 4" (E) | 1 | 621568 |
| 12 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV (E) | 1 | 647648, 492224 |
| 13 | | STEPS, POLE (E) | 16 | 692992 |
| 14 | | | | |
| | 15 | TRANSFORMER, SINGLE PHASE TYPE WE OR WJ, #1 TEE HANGER | 3 | PGS 1121.01-1121.12 |
| | 16 | BRACKET, INSULATOR, 1" | 2 | 166208 |
| | 17 | INSULATOR, 5KV | 2 | 428960 |
| | 18 | HOLDER, WIRE | 3 | 413792 |
| | 19 | CLAMP, HOT LINE (E) & STIRRUP | 3 | PG 788 |
| | 20 | CONNECTOR, WIRE, AS REQ'D | 12 | PGS 783-787 |
| | 21 | WIRE, #6 BARE STRANDED COPPER | 60' | 813536 |
| | 22 | CABLE, 5KV, 1/C #6 STRANDED COPPER | 34' | 194304 |
| | 23 | WIRE #2 BARE STRANDED COPPER, TANK GROUND | 50' | 813664 |
| | 24 | WIRE, W.P. COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 45' | PG 1125 |
| | 25 | ROD & CLAMP, GROUND (A) (C) | 4 | 603072, 230015 (E) |
| | 26 | MOULDING, HARDWOOD, 1" (A) | 64' | 487200 |
| | 27 | | | |
| | 28 | STAPLES, 3" X 1 1/16" X 1/4" MOULDING, GALV (A) (E) | 40 | 678560 |
| | 29 | STAPLES, 1 1/4" FENCE, GALV (A) (E) | 36 | 678528 |

| | | |
|---|---|---|
| 1199,701<br>SUPERSEDES<br>1172 (1-1-86) | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>4KV, THREE PHASE, TYPE "WE" OR "WJ" TRANSFORMER INSTALLATION,<br>3-25 KVA MAX SECONDARY LINE ARM CONSTRUCTION | DATE 1-1-86<br>APPD AK/BBS |

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF 7.2 AND 12KV, 3Ø TRANSFORMERS, ALLEY ARM CONSTRUCTION, WITH CLUSTER MOUNTING BRACKET AND SECONDARY RACK CONSTRUCTION.



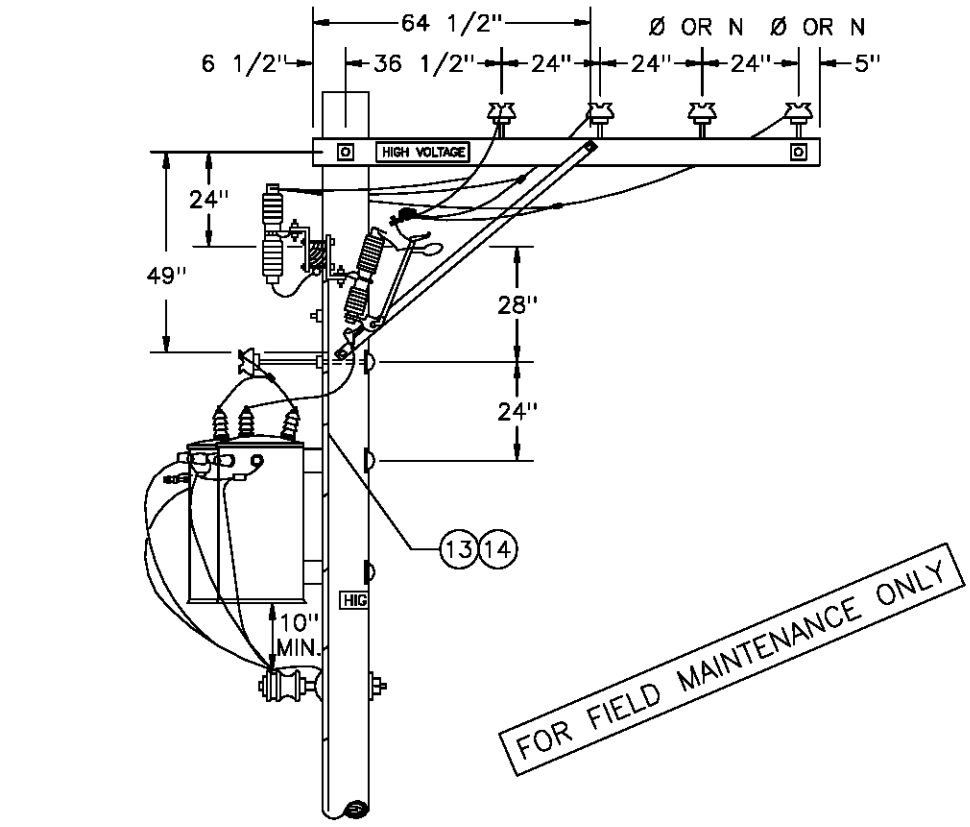



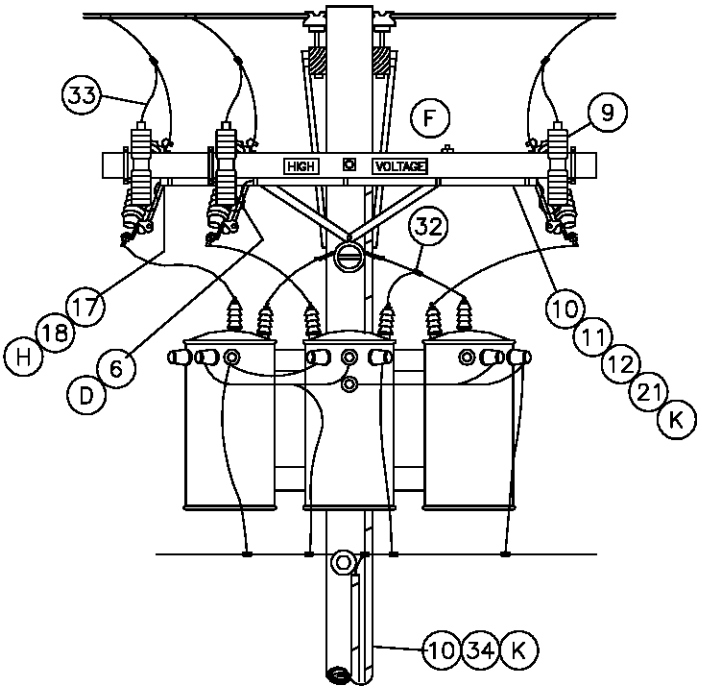

DELTA PRIMARY CONNECTION

| | | |
|---|---|---|
| DATE 1-1-89<br>APPD PSA / DTE | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE-PHASE TRANSFORMER<br>CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | 1199.704<br>SUPERSEDES<br>1174.1 (1-1-93) |

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WYE PRIMARY CONNECTION
WITH LIGHTNING ARRESTERS (J)

| | | |
|---|---|---|
| DATE 1-1-91<br>APPD PA/DG | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE-PHASE TRANSFORMER<br>CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | 1199.705<br>SUPERSEDES<br>1174.2 (1-1-93) |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | | STOCK NUMBER OR CONSTR STANDARD |
|---|---|---|---|---|
| | | STATION WITH (J) ARRESTERS | STATION WITHOUT ARRESTERS | |
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | 1 | 1 | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 4' | 1 | 1 | 164032 |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 6 | BRACKET, DOUBLE, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 3 | – | 165442 |
| 7 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | – | 3 | 166070 |
| 8 | CUTOUT, 12KV, WITH LOADBUSTER HOOK | 3 | 3 | STD. 1212 |
| 9 | ARRESTER, LIGHTNING | 3 | – | 113248 |
| 10 | WIRE, #4 BARE STRANDED COPPER FT / LB | 100 / 13 | 40 / 5 | 813760 |
| 11 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" X 10' (E) | 1 | – | 251200 |
| 12 | STRAPS, PIPE, GALV, 1" (E) | AS REQ'D | – | 697792 |
| 13 | | | | |
| 14 | | | | |
| 15 | INSULATOR, PIN TYPE, CLASS AS REQ'D | 1 | 1 | STD. 750 |
| 16 | WIRE, TIE (E) | 1 | 1 | 815232 |
| 17 | WIRE, #8 BARE SOLID ANNEALED COPPER (G) FT / LB | 15 / 1 | 15 / 1 | 812928 |
| 18 | STAPLES, 1 1/4", FENCE, GALV (G)(E) | AS REQ'D | AS REQ'D | 678528 |
| 19 | BRACKET, INSULATOR, 1" OR 1 3/8" THREAD (AS REQ'D) | 1 / 1 | 1 / 1 | 166144 / 166176 |
| 20 | COVER, BOLT, PLASTIC (E) | 3 | 3 | 285696 |
| 21 | NAILS, GALV, 1 3/4" ROOFING (E) | AS REQ'D | AS REQ'D | 492192 |
| 22 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 23 | BRACKET, TRANSFORMER CLUSTER MOUNTING | 1 | 1 | 403008 |
| 24 | TRANSFORMER, SINGLE PHASE, TYPE 'Y', 'YF', 'H' OR 'HF' | 3 | 3 | STD. 1121 |
| 25 | BOLT, MACH, GALV, 1/2" X 5" (E) | 1 | 1 | 153024 |
| 26 | WASHER, GALV, 1/2", ROUND (E) | 2 | 2 | 800192 |
| 27 | INSULATOR, SECONDARY, SPOOL, PORCELAIN (E) | 1 | 1 | 430752 |
| 28 | NUT, GALV, 1/2" (E) | 1 | 1 | 504736 |
| 29 | SIGN, HIGH VOLTAGE (E) | 3 | 1 | 647648 |
| 30 | NAILS, GALV, 7/8" ROOFING (E) | 27 | 9 | 492224 |

FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| 1199.706<br>SUPERSEDES<br>1174.3 (1–1–93) | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE–PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION–ALLEY ARM CONSTRUCTION | DATE 1–1–91<br>APPD PLA / BDG |

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

| ITEM | DESCRIPTION | | QUANTITY | | STOCK NUMBER OR CONSTR STANDARD |
|---|---|---|---|---|---|
| | | | STATION WITH (J) ARRESTERS | STATION WITHOUT ARRESTERS | |
| 31 | WIRE, THW COPPER, SIZED PER TRANSFORMER CAPACITY | | 35' | 35' | STD 1125 |
| 32 | CONNECTOR, WIRE, COMPRESSION, CU OR AL AS REQ'D (E) | | AS REQ'D | AS REQ'D | 783–786 |
| 33 | WIRE, #6, 3 STRAND, BARE COPPER | FT | 55 | 40 | 813536 |
| | | LB | 4 | 3 | |
| 34 | UNIT, GROUND, COMPLETE (K) | | 2 | 1 | 603136 |
| 35 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" (E) | | 10' | – | 251168 |
| 36 | STRAPS, PIPE, GALV. 1/2" AND 1–3/4" ROOFING NAILS (E) | | AS REQ'D | – | 697728 |

**INSTALLATION:**

A. USE THIS CONSTRUCTION FOR TRANSFORMERS RATED 12KV AND BELOW WHICH HAVE HIGH VOLTAGE BUSHINGS MOUNTED ON TOP OF COVER.

B. LIMITED TO TRANSFORMERS 100 KVA AND SMALLER, EACH WEIGHING 1200 POUNDS OR LESS.

C. WHEN PRACTICAL, BOLT TRANSFORMERS TO BRACKET ON THE GROUND AND INSTALL THEM AS A PREWIRED ASSEMBLY.

(D) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(E) EXEMPT MATERIAL.

(F) INSTALL LA/CO CROSSARM ON SAME SIDE OF POLE AS TRANSFORMERS.

(H) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT, AS IDENTIFIED ON STANDARD 287. IN AREAS WHERE BONDING IS REQUIRED, TO AVOID BONDWIRE AND LIGHTNING ARRESTER GROUNDWIRE ON THE ON THE SAME CROSSARM, USE TWO CROSSARMS; ONE FOR CUTOUTS AND ONE FOR LIGHTNING ARRESTERS

**REFERENCE:**

I. PRIMARY AND SECONDARY CONNECTIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES. SEE STANDARD 1118–1119 FOR SPECIFIC CONNECTION DIAGRAMS.

(J) LIGHTNING ARRESTER APPLICATION, SEE STANDARD 1247.

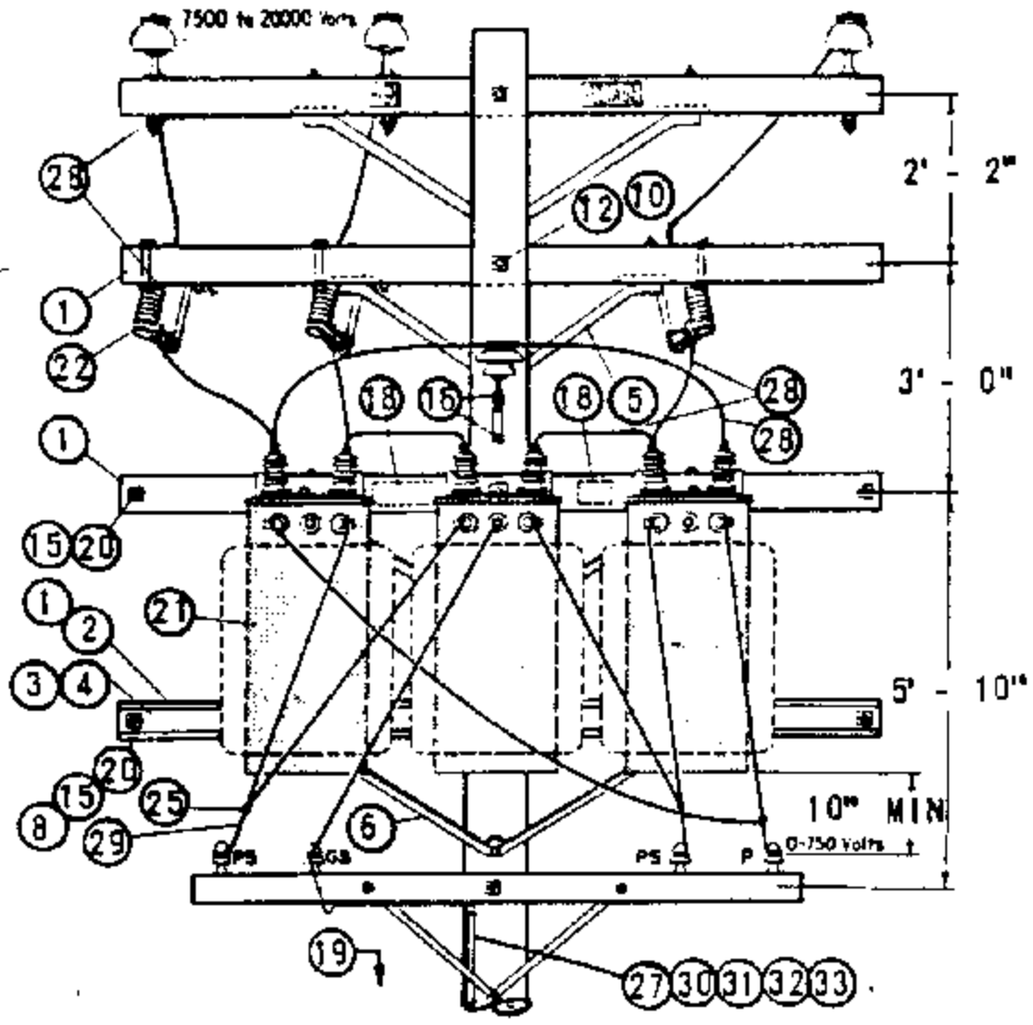
(K) GROUNDING METHOD AND APPLICATION, SEE STANDARD 1002.

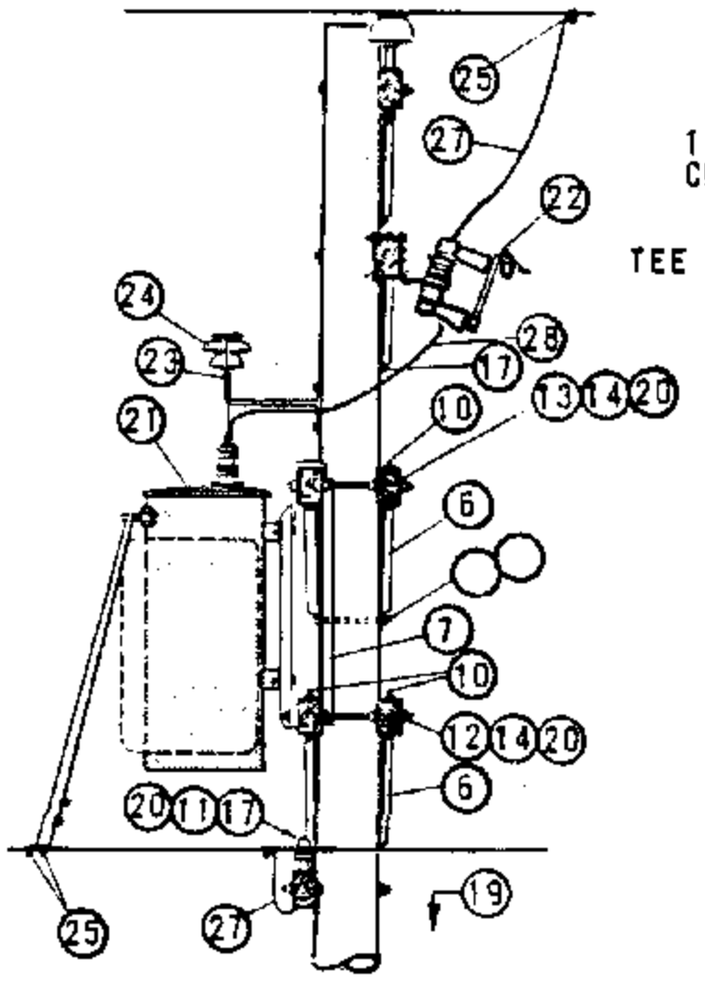
(L) POLE STEPPING, SEE STANDARD 363.

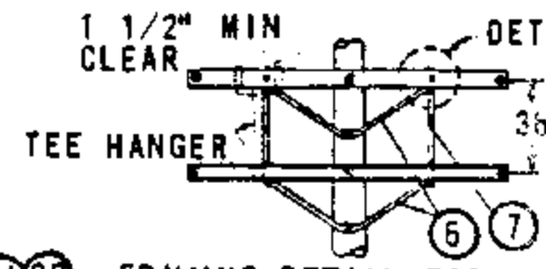
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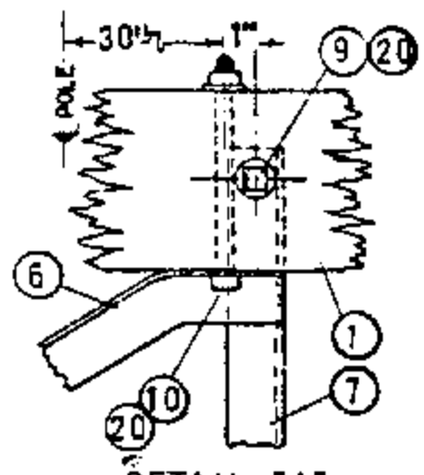
| | | |
|---|---|---|
| DATE 1–1–91<br>APPD PBA / DTE | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION–ALLEY ARM CONSTRUCTION | 1199.707<br>SUPERSEDES 1174.4 (1–1–93) |






FRAMING DETAIL FOR 3 - 37.5 TO 3 - 75 KVA INSTALLATIONS




DETAIL "A"

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603135 WITH PLAIN MOULDING.

B. SEE ARRESTER SECTION FOR ARRESTER REQUIREMENTS.

(C) USE TWO ROD GROUND.

D. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICTS AS IDENTIFIED ON STANDARDS PAGE 287.

(E) EXEMPT MATERIAL

F. USE EXTRA HEAVY CLASS ONE POLES WITH 10" MINIMUM TOP DIAMETER ON NEW CONSTRUCTION FOR 3 - 37.5 TO 3 - 75 KVA TRANSFORMER INSTALLATIONS.

G. LIMITED TO TRANSFORMERS WEIGHING 1200# OR LESS.

H. SPACING OF TRANSFORMERS TO BE AS CLOSE AS PRACTICABLE BUT NOT TO EXCEED 33.5" CENTER TO CENTER.

I. SEE STANDARDS PAGE 1119 FOR SPECIFIC TRANSFORMER CONNECTIONS. 240V, 4 WIRE DELTA IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

| ITEM | MLT | DESCRIPTION | QUANTITY 5 TO 25 KVA | QUANTITY 37.5 TO 75 KVA | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| 1 | | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 3 | 5 | PG. 119 IT. 2 |
| 2 | | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 0 | PG. 116 IT. 1 |
| 3 | | COVER STRIP, 1 5/8" X 3 5/8" X 8' - 0" (2X4S4S) | 1 | 0 | 699328 |
| 4 | | COVER STRIP, 1 5/8" X 3 5/8" X 10' - 0" (2X4S4S) | 0 | 1 | 699360 |
| 5 | | BRACE, ANGLE CROSSARM, GALV, 4' - 0" | 1 | 1 | 164032 |
| 6 | | BRACE, ANGLE CROSSARM, GALV, 5' - 0" | 2 | 4 | 164128 |
| 7 | | BRACE, VERTICAL 36" | 0 | 2 | 164256 |
| 8 | | BOLT, MACH GALV, 3/8" X 6", 2 RD WASH & 1 NUT (E) | 2 | 0 | PGS 139, 140 |
| 9 | | BOLT, MACH GALV, 5/8" X 5", 1 RD WASH. & 1 NUT (E) | 0 | 4 | PGS 139, 140 |
| 10 | | BOLT, MACH GALV, 1/2" X 8", 1 RD WASH & 1 NUT (E) | 6 | 10 | PGS 139, 140 |
| 11 | | BOLT, MACH GALV, 5/8" X __", 1 NUT (E) | 1 | 2 | PGS 139, 140 |
| 12 | | BOLT, MACH GALV, 5/8" X 14", 2 SQ WASH & 1 NUT (E) | 2 | 1 | PGS 139, 140 |
| 13 | | BOLT, MACH GALV, 5/8" X 20", 2 - 3" SQ WASH & 1 NUT (E) | 1 | 0 | PGS 139, 140 |
| 14 | | BOLT, MACH GALV, 3/4" X 20", 2 - 3" SQ WASH & 1 NUT | 0 | 2 | PGS 139, 140 |
| 15 | | BOLT, SPACE GALV, 5/8" X __", 4 SQ WASH, & 4 NUTS (E) | 2 | 4 | PGS 139, 140 |
| 16 | | SCREW, LAG GALV, 1/2" X 4" (E) | 3 | 2 | 621568 |
| 17 | | SCREW, LAG GALV, 5/8" X 5" (E) | 1 | 1 | 621600 |
| 18 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV (E) | 1 | 1 | 647648, 492224 |
| 19 | | STEP, POLE (E) | 19 | 19 | 692992 |
| 20 | | WASHER, DOUBLE COIL SPRING, FOR ITEMS 8 THRU 15 | AS REQ'D | | PG 140 |
| | 21 | TRANSFORMER, SINGLE PHASE, TYPE H OR HF | 3 | 3 | PGS 1121.01-1121.12 |
| | 22 | CUTOUT, 12KV | 3 | 3 | PGS 1212, 1213 |
| | 23 | BRACKET, INSULATOR | 1 | 1 | 166176 |
| | 24 | INSULATOR, 12KV | 1 | 1 | 429152 |
| | 25 | CONNECTOR, WIRE | 11 | 11 | PGS 783-787 |
| | 26 | WIRE, BARE SOLID ANNEALED COPPER #8 | AS REQ'D | | 812928 |
| | 27 | WIRE, BARE STRANDED COPPER #6 | 70' | 70' | 813536 |
| | 28 | WIRE, SOLID W.P. COPPER #4 | 10' | 10' | 813536 |
| | 29 | WIRE, W.P. COPPER, SIZE GOVERNED BY TRANSFORMER CAPACITY | 60' | 60' | PG 1125 |
| | 30 | ROD & CLAMP (A) (C) | 2 | 2 | 603072, 230016 (E) |
| | 31 | MOULDING, HARDWOOD 1" (A) | 27' | 27' | 487200 |
| | 2 | STAPLES, MOULDING GALV, 3" X 1 1/16" X 1/4" (A) (E) | 18 | 18 | 678560 |
| | 33 | STAPLES, FENCE GALV, 1 1/4" (A) (E) | 17 | 17 | 678528 |

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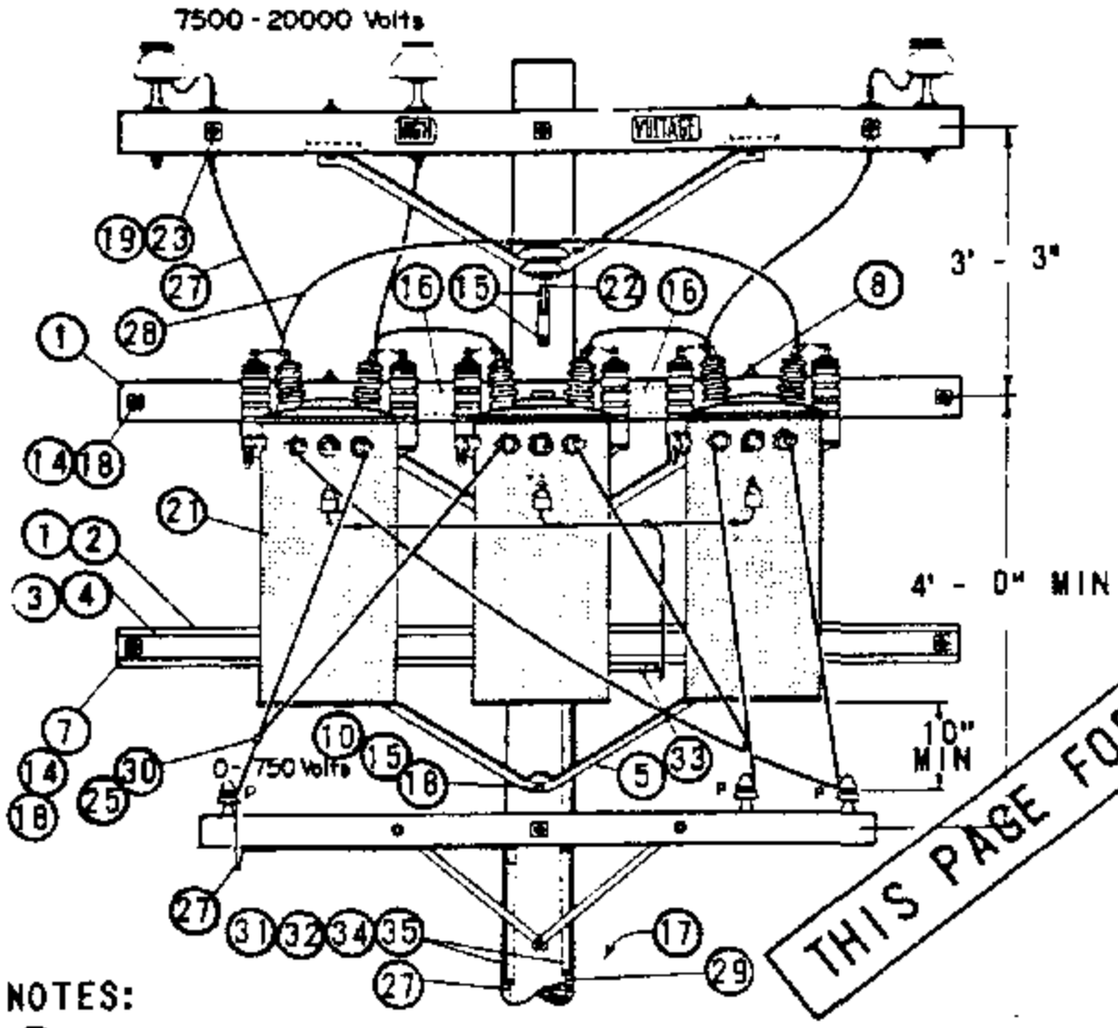
DATE 1-1-86
APPD AK/RDS

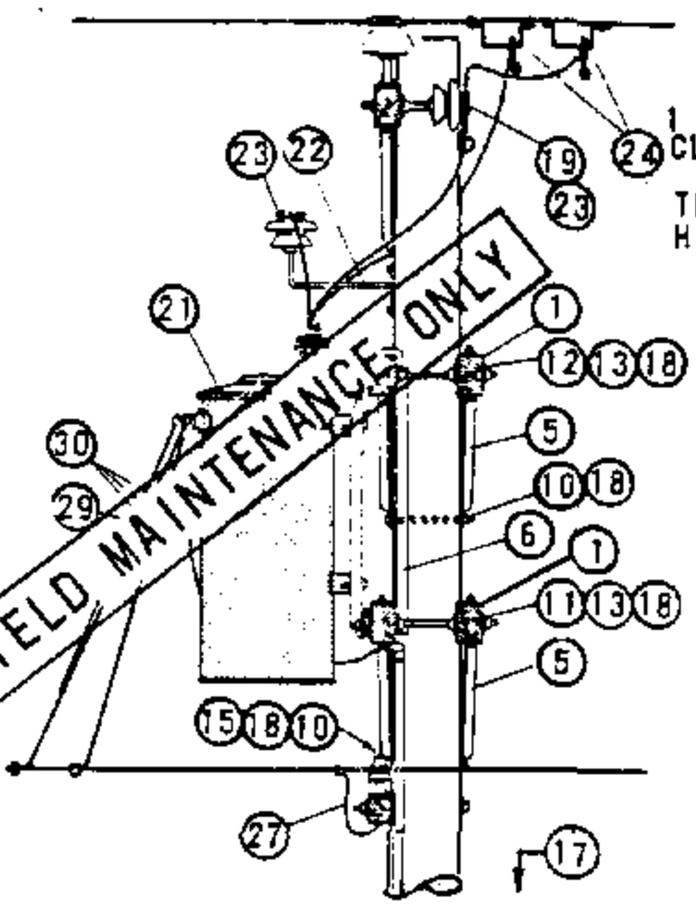
SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS

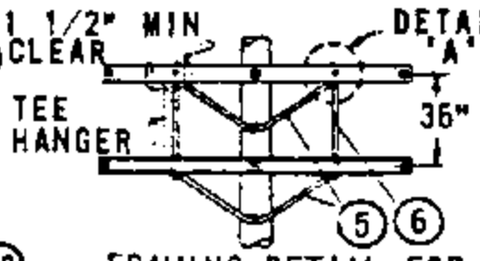
12KV, THREE PHASE, TYPE "H" OR "HF" TRANSFORMER INSTALLATION, THREE 75 KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION

1199.801
SUPERSEDES
1181 (1-1-86)

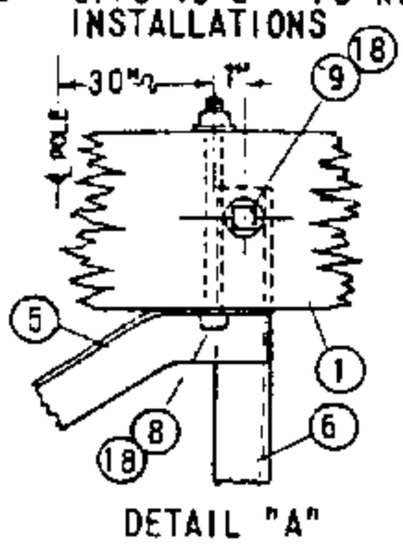
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FRAMING DETAIL FOR 3 - 37.5 TO 3 - 75 KVA INSTALLATIONS




DETAIL "A"

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

(B) USE TWO ROD GROUND.

C. THIS PAGE FOR FIELD MAINTENANCE ONLY. USE TYPE 'H' TRANSFORMERS ON NEW INSTALLATIONS.

D. USE EXTRA HEAVY CLASS ONE POLES WITH 10" MINIMUM TOP DIAMETER ON NEW CONSTRUCTION FOR 3 - 37.5 TO 3 - 75 KVA TRANSFORMER INSTALLATIONS.

(E) EXEMPT MATERIALS

F. LIMITED TO TRANSFORMERS WEIGHING 1200# OR LESS.

G. SPACING OF TRANSFORMERS TO BE AS CLOSE AS PRACTICABLE BUT NOT TO EXCEED 33.5" CENTER TO CENTER.

H. SEE DISTRIBUTION POLE TOPS SECTION FOR POLE TOP MATERIALS.

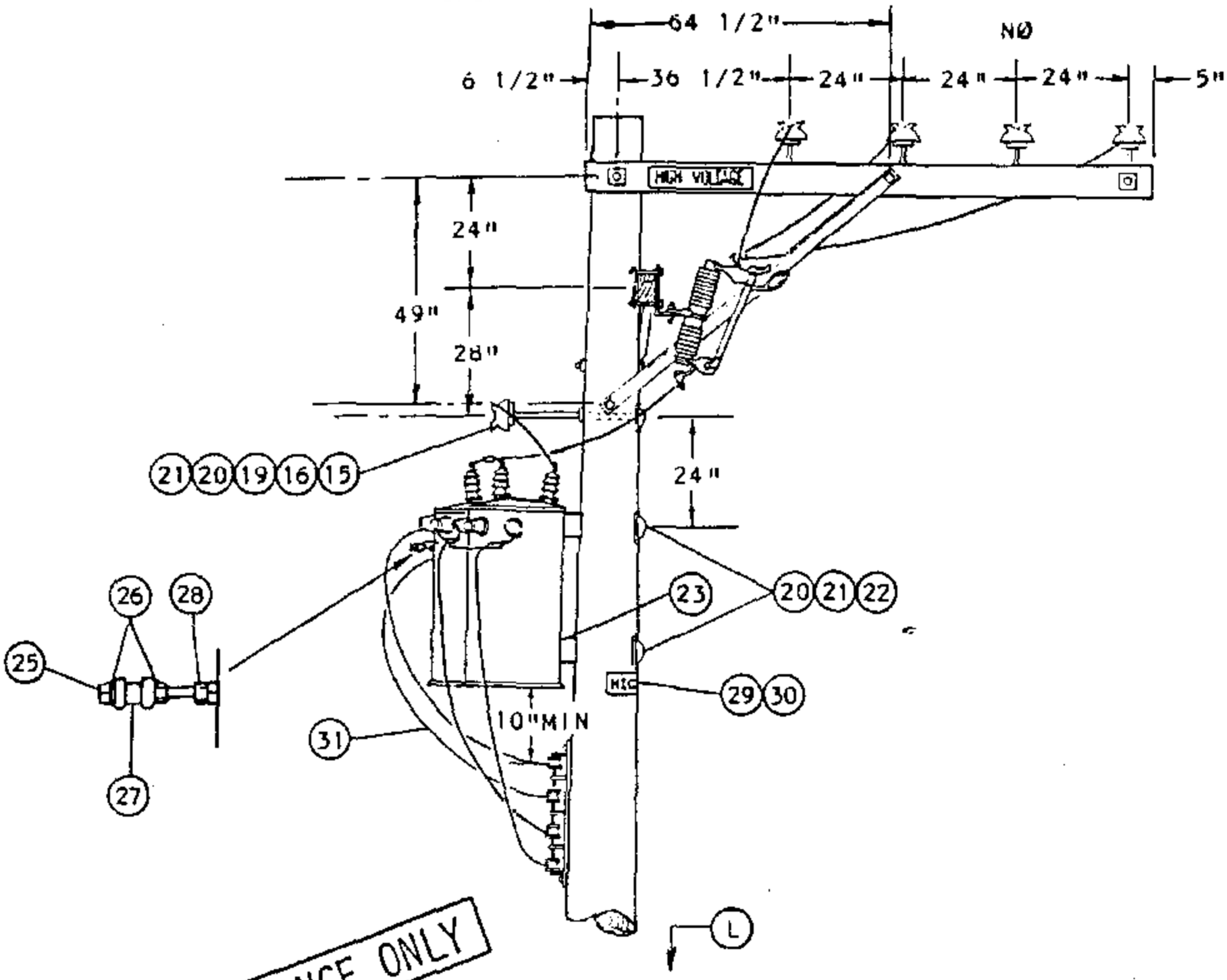
I. OMIT LIGHTNING ARRESTER TANK GAP GROUNDING MATERIAL WHERE INSTALLING TRANSFORMERS NOT EQUIPPED WITH ARRESTERS.

| ITEM PTF. | ITEM LTI | DESCRIPTION | QUANTITY 5 TO 25 KVA | QUANTITY 37.5 TO 75 KVA | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| 1 | | CROSSARMS, 3 3/4" X 5 3/4" X 10' - 0" | 2 | 4 | PG 119 LT 2 |
| 2 | | CROSSARMS, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 0 | PG 111 LT 2 |
| 3 | | COVER STRIP, 1 5/8" X 3 5/8" X 8' - 0" (2X4S4S) | 1 | 0 | 699328 |
| 4 | | COVER STRIP, 1 5/8" X 3 5/8" X 10' - 0" (2X4S4S) | 0 | 1 | 699360 |
| 5 | | BRACE, ANGLE CROSSARM 5' - 0" | 2 | 4 | 164128 |
| 6 | | BRACE, VERTICAL 36" | 0 | 2 | 164256 |
| 7 | | BOLT, MACH GALV, 3/8" X 6", 2 RD WASH. (E) | 2 | 0 | PGS 139,140 |
| 8 | | BOLT, MACH GALV, 1/2" X 8", 1 RD WASH (E) | 4 | 8 | PGS 139, 140 |
| 9 | | BOLT, MACH GALV, 5/8" X 5", 1 RD WASH. (E) | 0 | 4 | PGS 139, 140 |
| 10 | | BOLT, MACH GALV, 5/8" X ___", (E) | 1 | 2 | PGS 139, 140 |
| 11 | | BOLT, MACH GALV, 5/8" X 14", 2 SQ WASH. (E) | 1 | 0 | PGS 139, 140 |
| 12 | | BOLT, MACH GALV, 5/8" X 20", 2 - 3" SQ WASH. (E) | 1 | 0 | PGS 139, 140 |
| 13 | | BOLT, MACH GALV, 3/4" X 20", 2 - 3" SQ WASH. | 0 | 2 | PGS 139, 140 |
| 14 | | BOLT, SPACE GALV, 5/8" X ___", 4 SQ WASH (E) | 2 | 4 | PGS 139, 140 |
| 15 | | SCREW, LAG GALV, 1/2" X 4" (E) | 3 | 2 | 621568 |
| 16 | | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS, GALV (E) | 1 | 1 | 647648, 492224 |
| 17 | | STEP, POLE (E) | 19 | 19 | 692992 |
| 18 | | WASHER, DOUBLE COIL SPRING FOR ITEMS 7 THRU 14 | AS REQ'D | | PG 140 |
| 19 | | PIN, INSULATOR 12KV, SIZE PER ITEM 23, 1 /1 3/8" | 2 | 2 | 531072/532448 |
| 20 | | | | | |
| | 21 | TRANSFORMER, SINGLE PHASE, TYPE HE OR HJ | 3 | 3 | PGS 1121.01-1121.12 |
| | 22 | BRACKET, INSULATOR, SIZE PER ITEM 23 | 1 | 1 | PG 152 |
| | 23 | INSULATOR, 12KV, CLASS AS REQ'D | 3 | 3 | PG 750 |
| | 24 | CLAMP, HOT LINE (E) AND STIRRUP | 7 | 7 | PG 788 |
| | 25 | CONNECTOR, WIRE | 7 | 7 | PGS 783-787 |
| | 26 | | | | |
| | 27 | WIRE, BARE STRANDED COPPER #6 | 76' | 76' | 813536 |
| | 28 | WIRE, BARE STRANDED COPPER #4 | 8' | 8' | 813760 |
| | 29 | WIRE, BARE STRANDED COPPER #2 | 50' | 50' | 813664 |
| | 30 | WIRE, W.P. COPPER, SIZE GOVERENED BY TRANSFORMER CAPACITY | 60' | 60' | PG 1125 |
| | 31 | ROD AND CLAMP, GROUND (A) (B) | 4 | 4 | 603072, 230016 (E) |
| | 32 | MOULDING, HARDWOOD 1" (A) | 64' | 64' | 487200 |
| | 33 | | | | |
| | 34 | STAPLES, MOULDING GALV 1 1/4" X 3 1/16" X 1/4" (A) (E) | 40 | 40 | 678560 |
| | 35 | STAPLES, FENCE GALV 1 1/4" (A) (E) | 36 | 36 | 678528 |

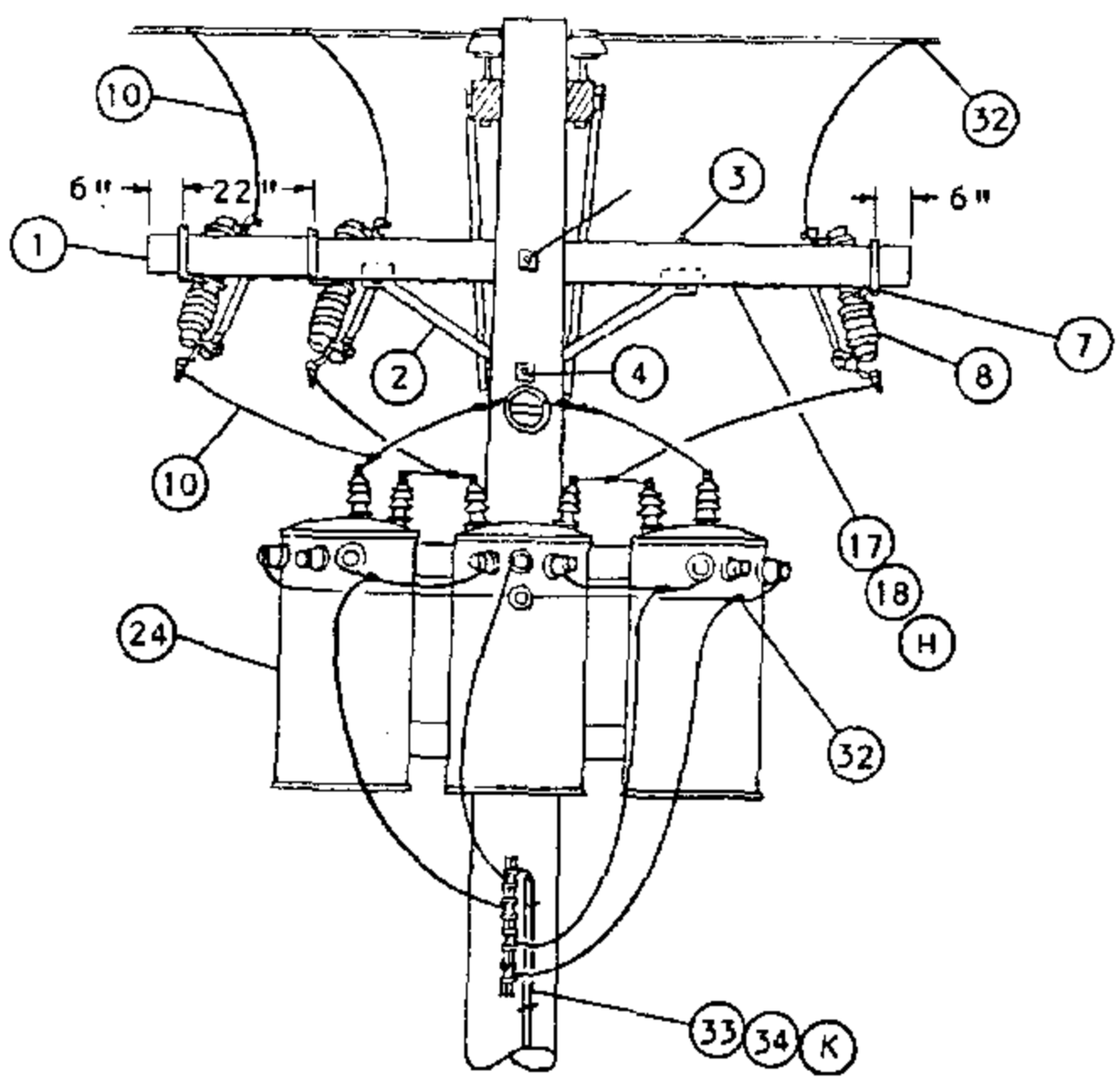
| | | |
|---|---|---|
| 1199.802 SUPERSEDES 1184 (1-1-86) | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>12KV, THREE PHASE, TYPE "HE" OR "HJ" TRANSFORMER INSTALLATION, THREE 75 KVA MAXIMUM, SECONDARY LINE ARM CONSTRUCTION | DATE 1-1-86<br>APPD AE/RDS |

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION OF 7.2 AND 12KV, 3Ø TRANSFORMERS, ALLEY ARM CONSTRUCTION, WITH CLUSTER MOUNTING BRACKET AND SECONDARY RACK CONSTRUCTION.



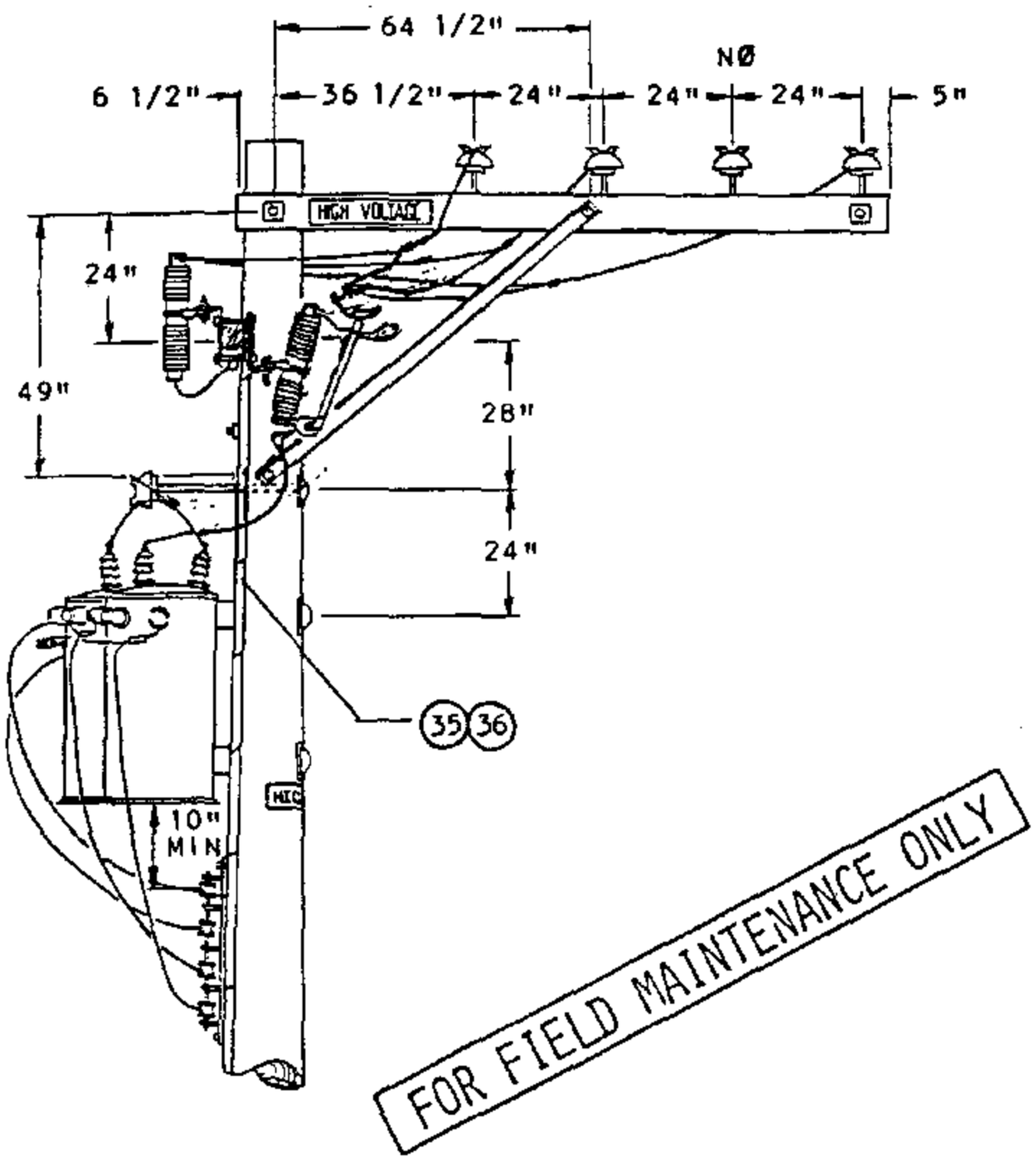

FOR FIELD MAINTENANCE ONLY



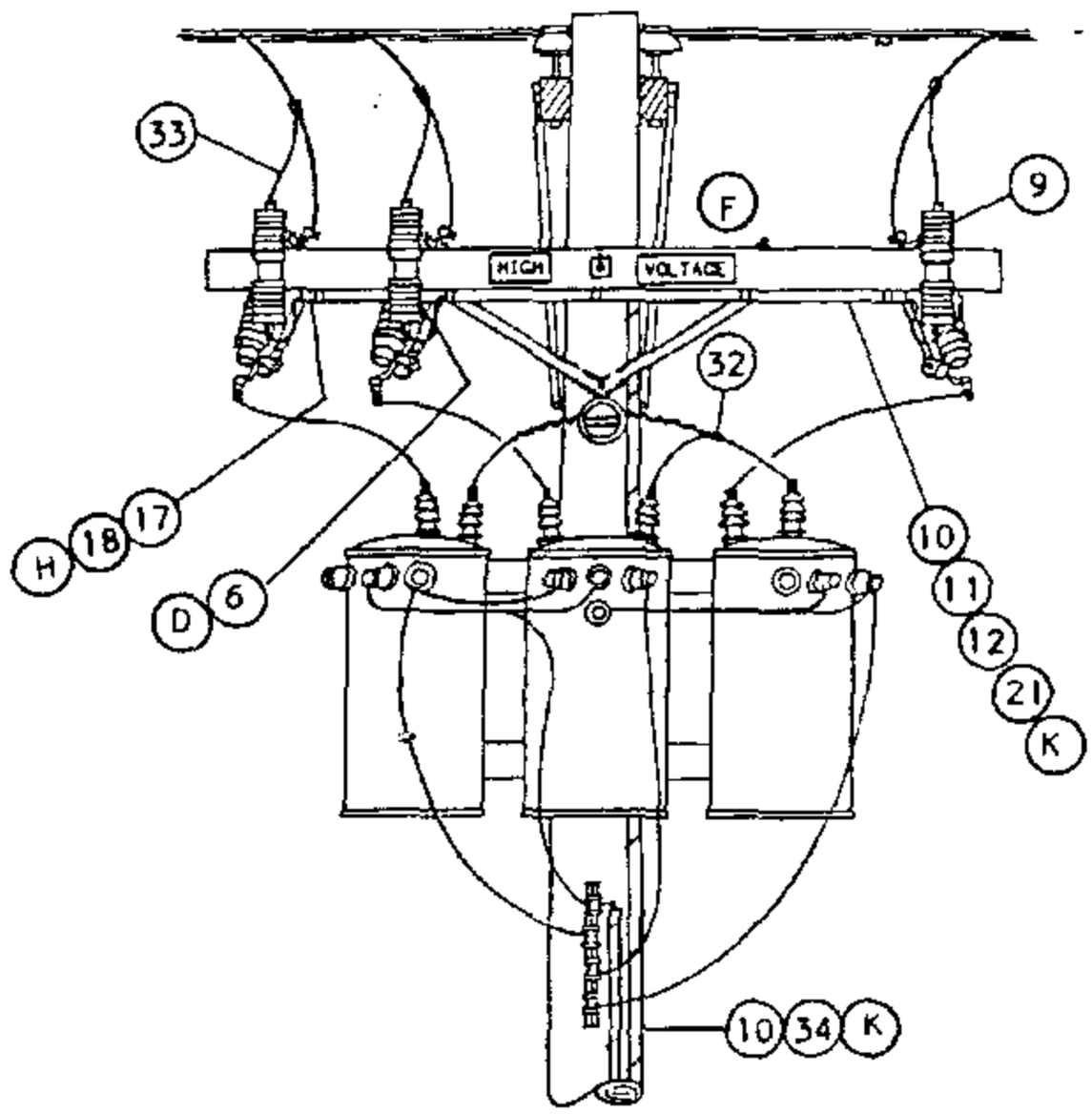

DELTA PRIMARY CONNECTION

| | | |
|---|---|---|
| DATE 1-1-89<br>APPD PLA / DTE | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | 1199.8C3<br>SUPERSEDES<br>1174.1 (1-1-93) |

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FOR FIELD MAINTENANCE ONLY




WYE PRIMARY CONNECTION
WITH LIGHTNING ARRESTERS (J)

| | | |
|---|---|---|
| 1199.804<br>SUPERSEDES<br>1174.2 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE PHASE TRANSFORMER<br>CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | DATE 1-1-91<br>APPD PGA/DS |

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY: STATION (J) WITH ARRESTERS | QUANTITY: STATION WITHOUT ARRESTERS | STOCK NUMBER OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 1 | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 4' | 1 | 1 | 164032 |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 1 | STD. 392 |
| 6 | BRACKET, DOUBLE, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 3 | - | 165442 |
| 7 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | - | 3 | 166070 |
| 8 | CUTOUT, 12KV, WITH LOADBUSTER HOOK | 3 | 3 | STD. 1212 |
| 9 | ARRESTER, LIGHTNING | 3 | - | 113248 |
| 10 | WIRE, #4 BARE STRANDED COPPER (E) FT / LB | 100 / 13 | 40 / 5 | 813760 |
| 11 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" X 10' (E) | 1 | - | 251200 |
| 12 | STRAPS, PIPE, GALV, " (E) | AS REQ'D | - | 697792 |
| 13 | | | | |
| 14 | | | | |
| 15 | INSULATOR, PIN TYPE, CLASS AS REQ'D | 1 | 1 | STD. 750 |
| 16 | WIRE, TIE (E) | 1 | 1 | 815232 |
| 17 | WIRE, #8 BARE SOLID ANNEALED COPPER (G) FT / LB | 15 / 1 | 15 / 1 | 812928 |
| 18 | STAPLES, 1 1/4", FENCE, GALV (G) (E) | AS REQ'D | AS REQ'D | 678528 |
| 19 | BRACKET, INSULATOR, 1" OR 1 3/8" THREAD (AS REQ'D) | 1 / 1 | 1 / 1 | 166144 / 166176 |
| 20 | COVER, BOLT, PLASTIC (E) | 3 | 3 | 285696 |
| 21 | NAILS, GALV, 1 3/4" ROOFING (E) | AS REQ'D | AS REQ'D | 492192 |
| 22 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 2 | STD. 392 |
| 23 | BRACKET, TRANSFORMER CLUSTER MOUNTING | 1 | 1 | 403008 |
| 24 | TRANSFORMER, SINGLE PHASE, TYPE 'Y', 'YF', 'H' OR 'HF' | 3 | 3 | STD 1121 |
| 25 | BOLT, MACH, GALV, 1/2" X 5" (E) | 1 | 1 | 153024 |
| 26 | WASHER, GALV, 1/2", ROUND (E) | 2 | 2 | 800192 |
| 27 | INSULATOR, SECONDARY, SPOOL, PORCELAIN (E) | 1 | 1 | 430752 |
| 28 | NUT, GALV, 1/2" (E) | 1 | 1 | 504736 |
| 29 | SIGN, HIGH VOLTAGE (E) | 3 | 1 | 647648 |
| 30 | NAILS, GALV, 7/8" ROOFING (E) | 27 | 9 | 492224 |

FOR FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC STANDARDS

# 7.2 AND 12KV THREE PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION

DATE 1-1-91
APPD PLA/ESS

1199.805
SUPERSEDES
1174.3 (1-1-93)

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

| ITEM | DESCRIPTION | QUANTITY STATION (J) WITH ARRESTERS | QUANTITY STATION WITHOUT ARRESTERS | STOCK NUMBER OR CONSTR STANDAR |
|---|---|---|---|---|
| 31 | WIRE, W.P. COPPER, SIZED PER TRANSFORMER CAPACITY | 35' | 35' | STD 1125 |
| 32 | CONNECTOR, WIRE, COMPRESSION, CU OR AL AS REQ'D (E) | AS REQ'D | AS REQ'D | 783-786 |
| 33 | WIRE, #6, 3 STRAND, BARE COPPER FT / LB | 55 / 4 | 40 / 3 | 813536 |
| 34 | UNIT, GROUND, COMPLETE (K) | 2 | 1 | 603136 |
| 35 | CONDUIT, PVC. TYPE 2, SCHEDULE 40, 1/2" (E) | 10' | – | 251168 |
| 36 | STRAPS, PIPE, GALV. 1/2" AND 1 3/4" ROOFING NAILS (E) | AS REQ'D. | – | 697728 |

**INSTALLATION:**

A. USE THIS CONSTRUCTION FOR TRANSFORMERS RATED 12KV AND BELOW WHICH HAVE HIGH VOLTAGE BUSHINGS MOUNTED ON TOP OF COVER.

B. LIMITED TO TRANSFORMERS 100 KVA AND SMALLER, EACH WEIGHING 1200 POUNDS OR LESS.

C. WHEN PRACTICAL, BOLT TRANSFORMERS TO BRACKET ON THE GROUND AND INSTALL THEM AS A PREWIRED ASSEMBLY.

(D) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(E) EXEMPT MATERIAL.

(F) INSTALL LA/CO CROSSARM ON SAME SIDE OF POLE AS TRANSFORMERS.

(H) BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT, AS IDENTIFIED 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.

**REFERENCE:**

1. PRIMARY AND SECONDARY CONNECTIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES. SEE STANDARD 1118-1119 FOR SPECIFIC CONNECTION DIAGRAMS.

(J) LIGHTNING ARRESTER APPLICATION, SEE STANDARD 1247.

(K) GROUNDING METHOD AND APPLICATION, SEE STANDARD 1002.

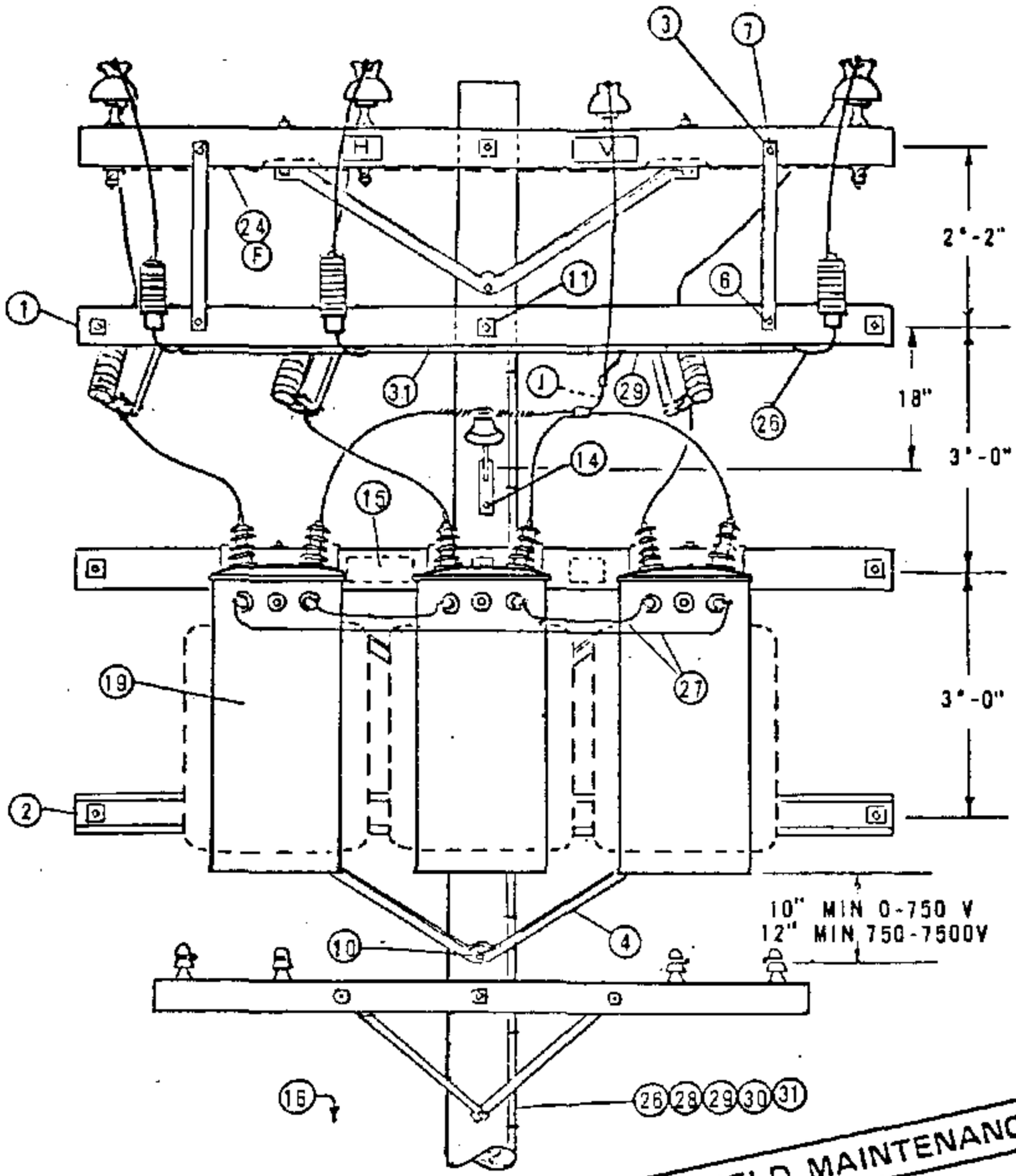
(L) POLE STEPPING, SEE STANDARD 363.

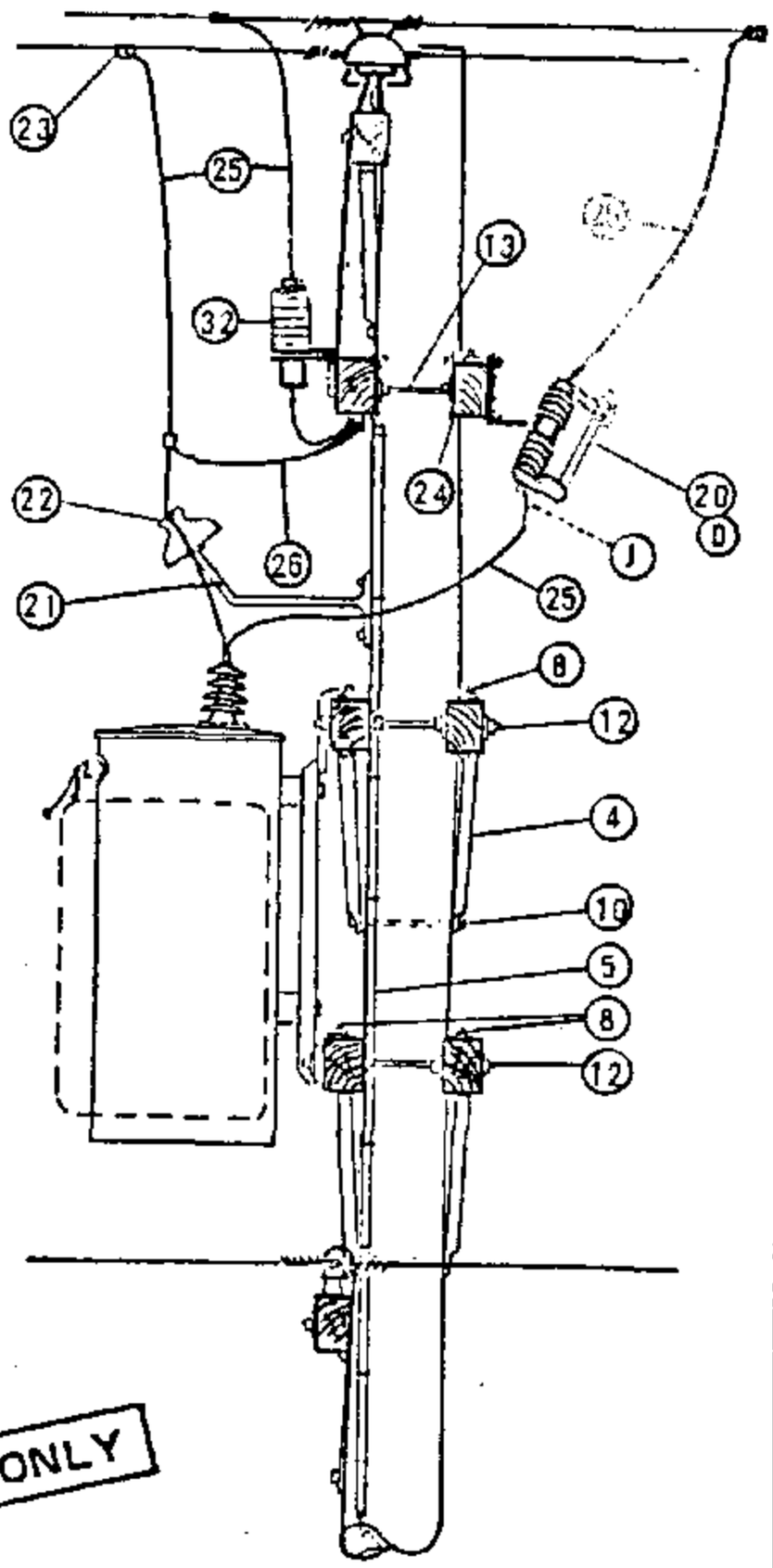
FOR FIELD MAINTENANCE ONLY

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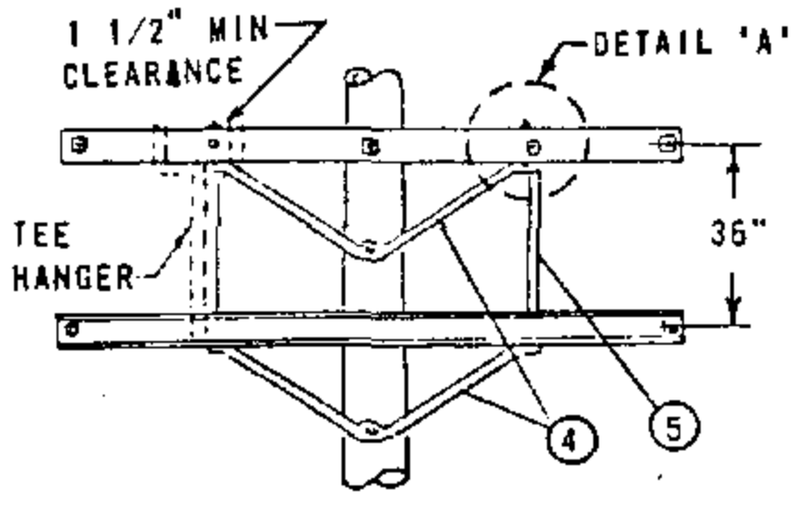
| | | |
|---|---|---|
| 1199.806<br>SUPERSEDES<br>1174.4 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>7.2 AND 12KV THREE PHASE TRANSFORMER CLUSTER MOUNT INSTALLATION-ALLEY ARM CONSTRUCTION | DATE 1-1-89<br>APPD |

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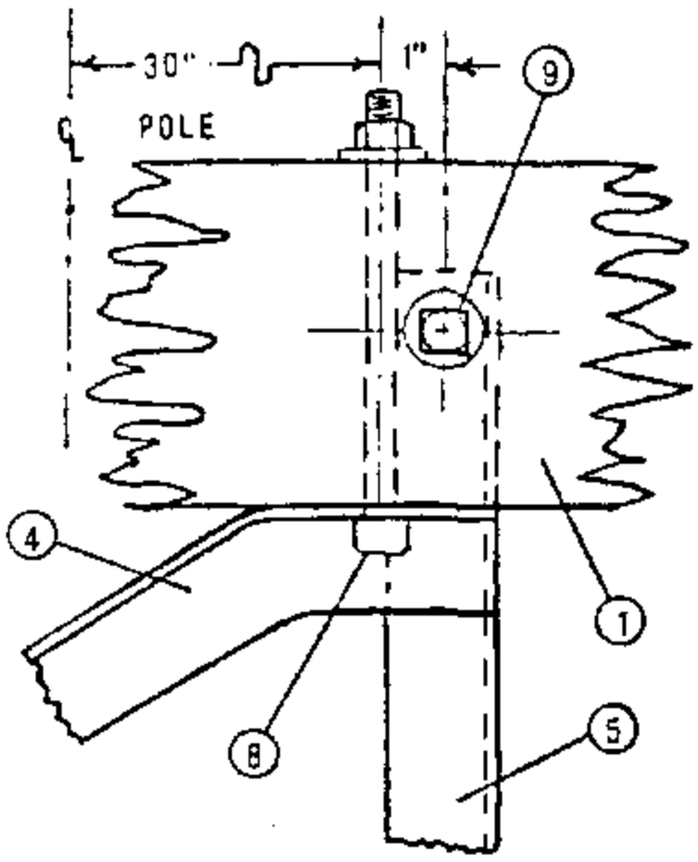


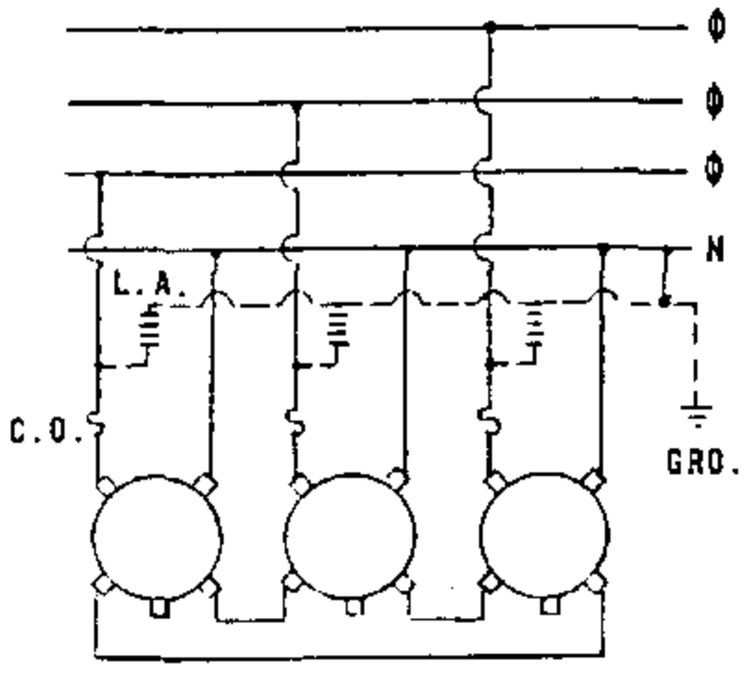
FOR FIELD MAINTENANCE ONLY




FRAMING DETAIL




DETAIL "A"




SCHEMATIC WIRING DIAGRAM

| | | |
|---|---|---|
| DATE 1-1-88<br>APPD AK/RSK | SDG&E ELECTRIC STANDARDS<br>12KV GROUNDING BANK INSTALLATION | 1199.901 |

NOTES:

A. USE EXTRA HEAVY CLASS ONE POLE WITH 10" MIN. TOP DIAMETER ON NEW CONSTRUCTION.

(B) CONSTRUCT USING 3-50 OR 3-75 KVA TRANSFORMERS WEIGHING 1200# OR LESS APIECE.

C. SPACING OF TRANSFORMERS TO BE AS CLOSE AS PRACTICAL AND NOT TO EXCEED 33 1/2" CENTER TO CENTER.

(D) FUSE ALL INSTALLATIONS AT 15 AMP.

E. DO NOT GROUND SECONDARY.

(F) BOND ALL CUTOUTS AND LINE HARDWARE WITHIN 3 MILES OF COAST.

G. BOND ALL DEADEND HARDWARE EVERYWHERE.

H. USE TWO ROD GROUNDS.

(I) UNIT GROUND COMPLETE, ORDER 603120 (WITH GRAY MOULDING) OR 603136 (WITH PLAIN MOULDING).

(J) BARE 2" OF WIRE TO PERMIT APPLICATION OF TEMPORARY WORKING GROUNDS. NEUTRAL WORKING GROUND MAY BE ATTACHED TO BARE CONDUCTOR.

FOR FIELD MAINTENANCE ONLY

| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR STD. PAGE |
|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10'-0" | 6 | PG 119 IT 2 |
| | 2 | COVER STRIP, 1 5/8" X 3 5/8" X 10'-0" (2X4S4S) | 1 | 699360 |
| | 3 | FLAT CROSSARM BRACE, 28" | 2 | 164192, |
| | 4 | ANGLE CROSSARM BRACE, 5'-0" | 4 | 164128 |
| | 5 | VERTICAL BRACE, 36" | 2 | 164256, |
| | 6 | MACH. BOLT, GALV., 3/8" X 5", 1-RD. WASH. & 1 NUT | 2 | PGS 139, 140 |
| | 7 | MACH. BOLT, GALV., 1/2" X 5", 1-RD. WASH. & 1 NUT | 2 | PGS 139, 140 |
| | 8 | MACH. BOLT GALV., 1/2" X 8", 1-RD. WASH.. & 1 NUT | 8 | PGS 139, 140 |
| | 9 | MACH. BOLT, GALV., 5/8" X 5", 1-RD. WASH 1 DBL COIL SPR WASH & 1 NUT | 4 | PGS 139, 140 |
| | 10 | MACH. BOLT, GALV., 5/8" X 10" OR 12", 1 DBL COIL SPR WASH & 1 NUT | 2 | PGS 139, 140 |
| | 11 | MACH. BOLT, GALV., 5/8" X 20", 2-3" SQ. WASH. 1 DBL COIL SPR WASH & 1 NUT | 1 | PGS 139, 140 |
| | 12 | MACH. BOLT, GALV., 3/4" X 20", 2-3" SQ. WASH. 1 DBL COIL SPR WASH & 1 NUT | 2 | PGS 139, 140 |
| | 13 | SPACE BOLT, GALV., 5/8" X 20" OR 22", 4-SQ. WASH. 2 DBL COIL SPR WASH & 2 NUTS | 6 | PGS 139, 140 |
| | 14 | LAG SCREW, GALV., 1/2" X 4" | 2 | 621568 |
| | 15 | HIGH VOLTAGE SIGN & 8-ROOFING NAILS, GALV. | 1 | 647776-492224 |
| | 16 | POLE STEPS | 19 | 692992 |
| | 17 | | | |
| | 18 | | | |
| L T I | 19 | TRANSFORMER, SINGLE PHASE (WITH T HANGERS) HF OR YF | 3 | PG 1121 (B) |
| | 20 | CUTOUT, 12KV, HEAVY DUTY, 100A. | 3 | PGS 1212, 1213 |
| | 21 | INSULATOR BRACKET, 1" LEAD THREAD | 1 | 166144 |
| | 22 | INSULATOR, 12KV, (CLASS 55-3) | 1 | 429152-429152 |
| | 23 | WIRE CONNECTORS, COMPRESSION (SIZE AS REQ'D) | 9 | PGS 783, 786 |
| | 24 | WIRE, BARE SOLID ANNEALED, #8 | AS REQ'D | 812928 |
| | 25 | WIRE, #4 CU WP | AS REQ'D | 812480 |
| | 26 | WIRE, BARE STRANDED, #2 | 55' | 813664 |
| | 27 | WIRE, COPPER, POLYETHYLENE, W.P. 3-50KVA - 1/0<br>3-75KVA - 4/0 | 10 LBS<br>15 LBS | 812576<br>812640 |
| | 28 | GROUND ROD AND CLAMP | 2 | 603072-230018 (1) |
| | 29 | HARDWOOD MOULDING, 1" | 47' | 487200 (1) |
| | 30 | MOULDING STAPLES, GALV., 3" X 1 1/16" X 1/4" | 35 | 678560 (1) |
| | 31 | FENCE STAPLES, GALV., 1 1/4" | 30 | 678528 (1) |
| | 32 | ARRESTER LIGHTNING, 12KV | 3 | 113248 |
| | 33 | | | |

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SDG&E ELECTRIC STANDARDS

1199.902

# 12KV GROUNDING BANK INSTALLATION

DATE 1-1-88

APPD AE/RJ

# 1200 SECTIONALIZING

# 1200 SECTIONALIZING

| PAGE | SUBJECT |
|---|---|
| 1299.001 | OVERHEAD 12KV CURRENT - LIMITING FUSE INSTALLATION |
| 1299.101 | 12KV EXPULSION FUSED CUTOUT |
| 1299.201-.203 | POLE TOP SWITCH VERTICAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION |
| 1299.204 | POLE TOP SWITCH INSTALLATION, 4KV DISCONNECT SWITCH, HOOKSTICK OPERATED |
| 1299.205-.206 | LINE TENSION DISCONNECT SWITCH - HOOKSTICK OPERATED |
| 1299.207 | IN-LINE DISCONNECT SWITCHES WEDGE TAP CONNECTED - 12KV AND BELOW |
| 1299.208-.209 | POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION |
| 1299.301-.304 | POLE TOP SWITCH INSTALLATION, 12KV SINGLE CIRCUIT, HORIZONTAL AND VERTICAL CONFIGURATION |
| 1299.305-.306 | POLE TOP SWITCH INSTALLATION, 69KV SINGLE CIRCUIT, TRIANGULAR CONFIGURATION |
| 1299.307-.309 | POLE TOP SWITCH INSTALLATION, 12KV, HORIZONTAL BREAK |
| 1299.401 | POLE TOP SWITCH INSTALLATION, 4KV WESTINGHOUSE OIL SWITCH, TYPE FO 11 |
| 1299.701-.703 | SERVICE RESTORER WITH CUTOUT DISCONNECT |
| 1299.704-.706 | SERVICE RESTORER WITH HOOKSTICK SWITCH DISCONNECT |
| 1299.707-.711 | SERVICE RESTORER BUCK POSITION, HOOKSTICK SWITCH |

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| REV | CHANGE | BY | DSGN | APPV | DATE | REV | CHANGE | BY | DSGN | APPV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | COMPLETELY REVISED | JK | JS | CZH | 10/15/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JK | JS | CZH | 6/13/2019 | D | | | | | |

Indicates Latest Revision | X | Completely Revised | | New Page | | Information Removed

SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

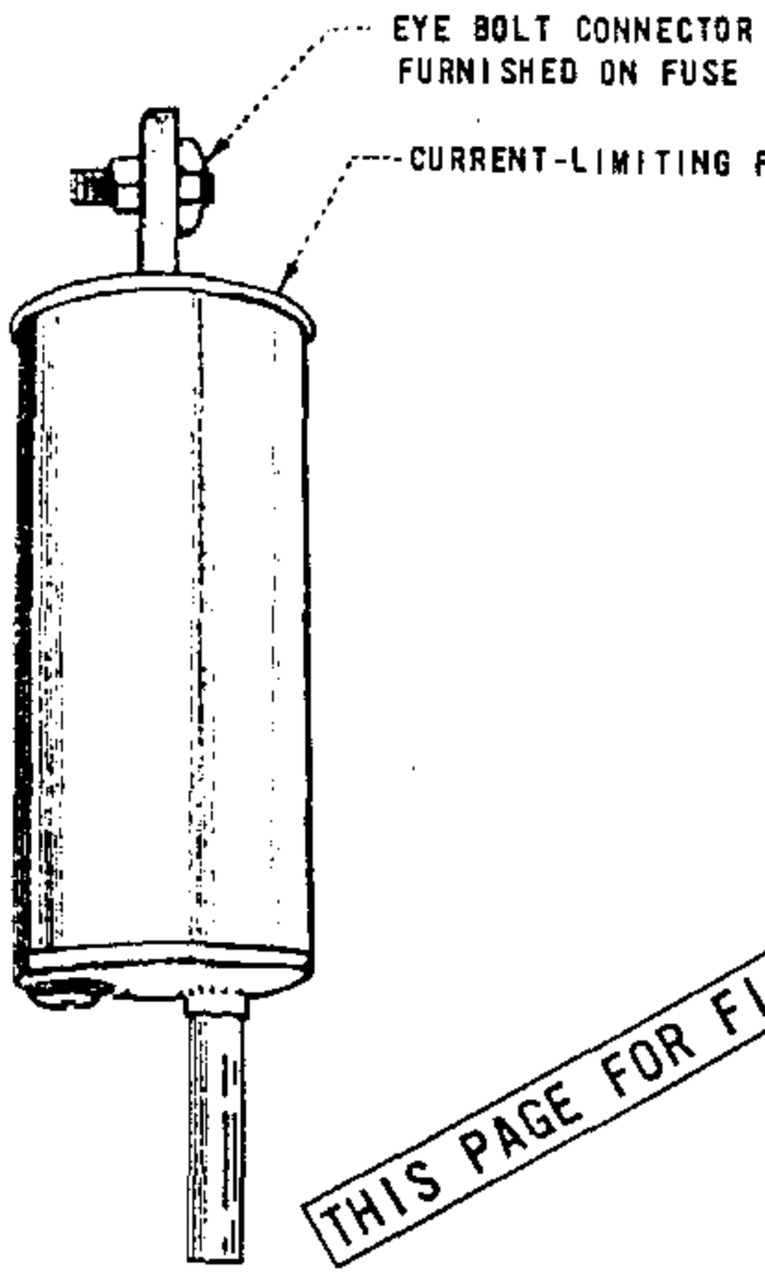
LEGACY OVERHEAD FIELD MAINTENANCE
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SECTIONALIZING

OH LEGACY
OHL1201.1

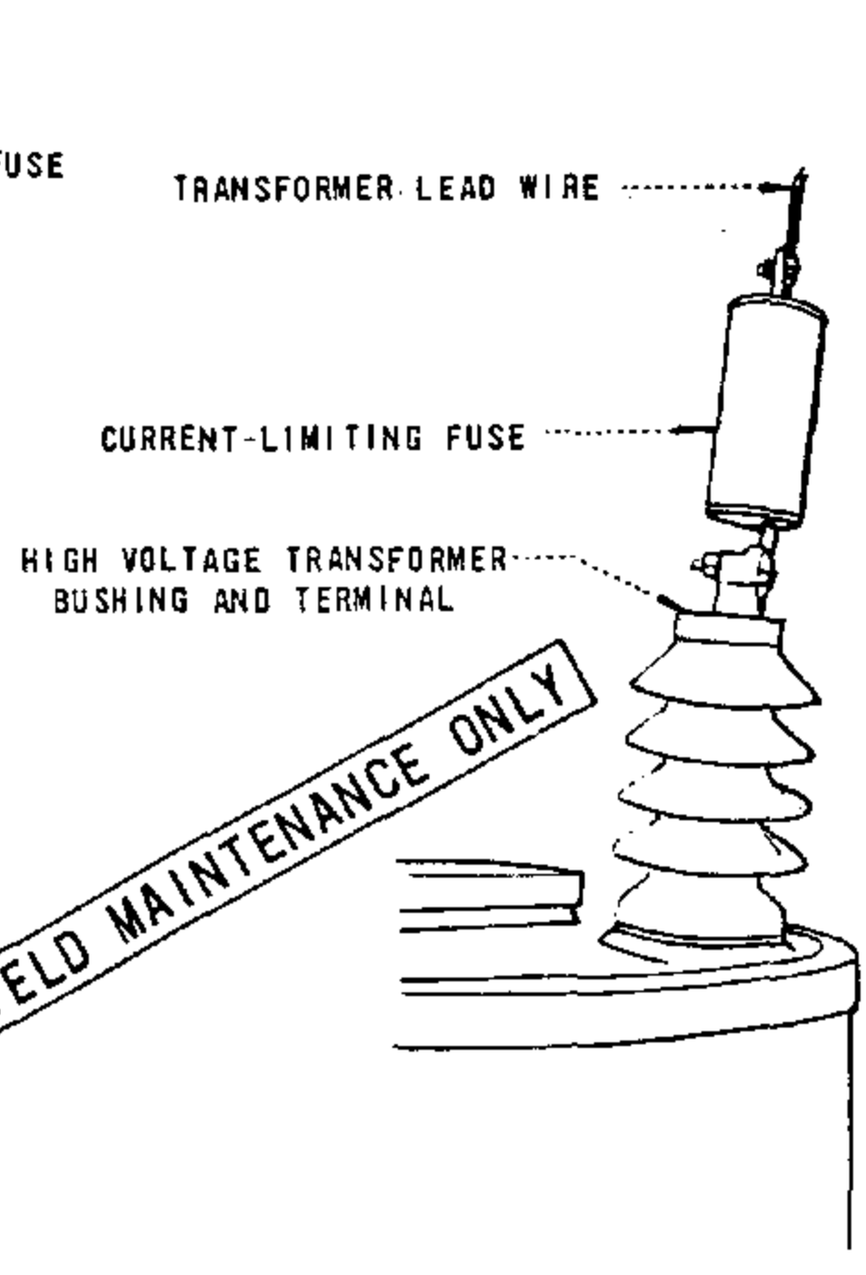
Back-up current-limiting fuses, such as the Chance K-Mate fuse, shall be permanently installed only at the direction of the Protection Engineer in conjunction with expulsion fuses. Current-limiting fuses have the ability to limit high values of fault current so it remains within the interrupting capability of some cutouts. Back-up type current-limiting fuses are used in series with expulsion fuses in order to clear both low and high values of fault current. The back-up current-limiting fuse insures clearing of high current and the expulsion fuse, low current faults.

If a small amount of fault current passes through the two fuses (expulsion fuse in the cutout and current-limiting fuse), only the expulsion fuse will operate and the fuse tube will drop out as normal. At higher fault currents, both fuses will operate, but only the expulsion fused cutout will give the visual indication that it has operated. If the expulsion fuse has operated, always check the current-limiting fuse. To do this, remove the current-limiting fuse, and check for continuity.

The recommended method of installing these current-limiting fuses (Stock No. 365634) is to insert the stud end into the transformer cover mounted high voltage bushing terminal and connect the transformer riser in the eye bolt connector furnished with the current-limiting fuse, as shown below.




FUSE DETAIL




METHOD OF MOUNTING

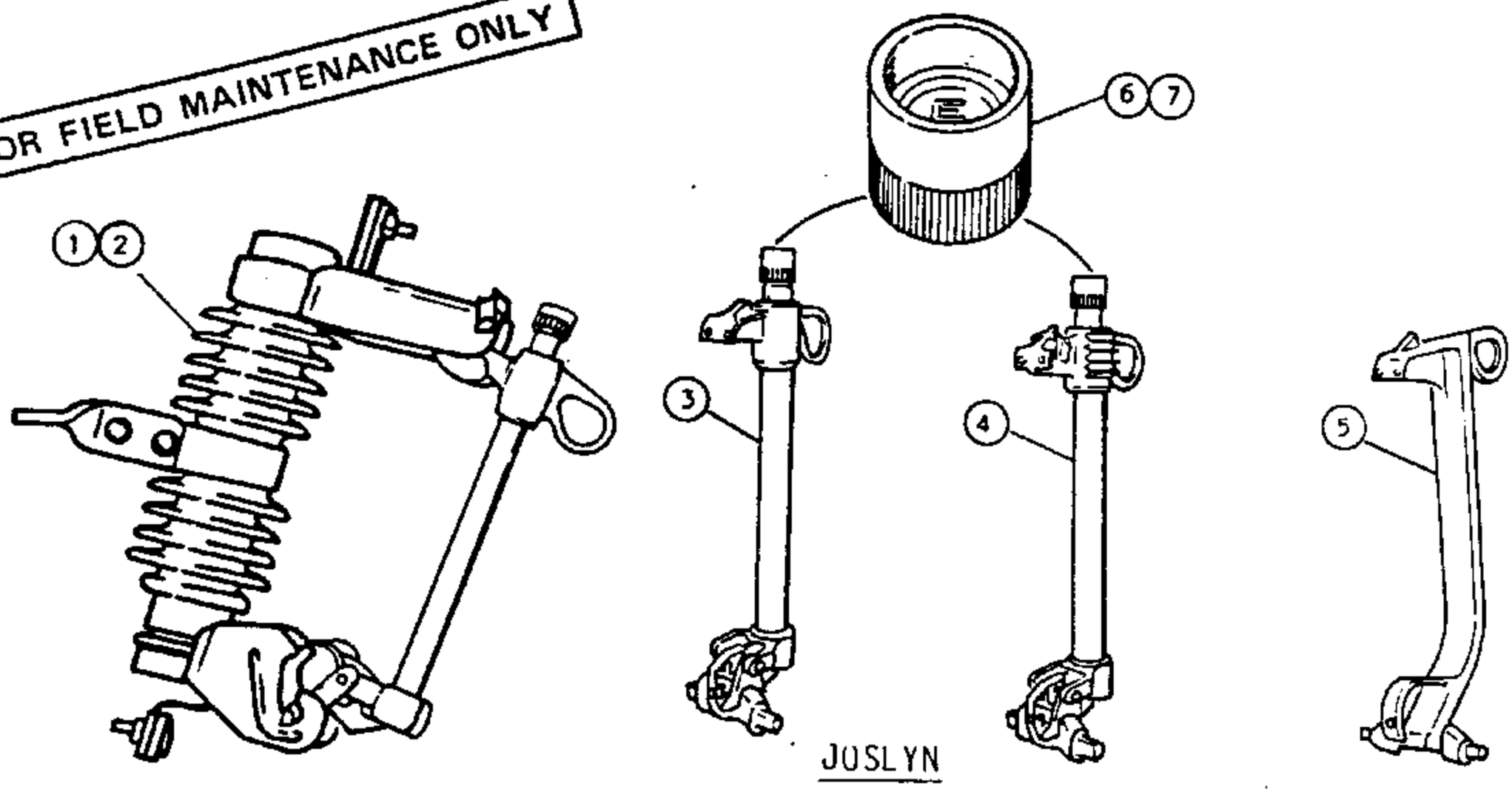
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| | | |
|---|---|---|
| DATE 4-5-83<br>APPD JMT/DCH | SDG&E ELECTRIC STANDARDS<br>OVERHEAD 12KV CURRENT-LIMITING FUSE INSTALLATION | 1299.001<br>SUPERSEDES<br>1206.1 (3-25-83) |

**SCOPE:** THIS STANDARD SHOWS A 12KV STANDARD LEAKAGE EXPULSION FUSED CUTOUT AND THE GENERAL APPLICATION.

FOR FIELD MAINTENANCE ONLY




JUSLYN

**BILL OF MATERIAL:**

| ITEM | CURRENT RANGE | CONTAMINATION DISTRICT | DESCRIPTION | STOCK NUMBER |
|---|---|---|---|---|
| 1 | FUSE 5 THRU 100A | 2 & 3 | CUTOUT BODY, STANDARD LEAKAGE, JOSLYN, COMPLETE WITH 100A HD FUSEHOLDER (A) (C) (D) (F) | 297888 |
| 2 | FUSE 125 THRU 200A | 2 & 3 | CUTOUT BODY, STANDARD LEAKAGE, JOSLYN, COMPLETE WITH 200A HD FUSEHOLDER (A) (C) (D) (F) | 297920 |
| 3 | FUSE 5 THRU 100A | 2 & 3 | FUSEHOLDER ONLY, 100A WITH EXPENDABLE CAP, REPLACEMENT PART FOR CUTOUT BODY ITEM #1 (F) | 413192 |
| 4 | FUSE 125 THRU 200A | 2 & 3 | FUSEHOLDER ONLY, 200A WITH EXPENDABLE CAP, REPLACEMENT PART FOR CUTOUT BODY ITEM #2 (F) | 413194 |
| 5 | SOLID 5 THRU 300A | 2 & 3 | SOLID BLADE 300A, FOR USE IN CUTOUT BODY ITEM #1 OR #2 | 138816 |
| 6 | FUSE 5 THRU 100A | ALL | CAP, 100A, DOUBLE VENTING, EXPENDABLE REPLACEMENT PART FOR FUSEHOLDER ITEM #1 & #3 (E) | 203882 |
| 7 | FUSE 125 THRU 200A | ALL | CAP, 200A, DOUBLE VENTING, EXPENDABLE REPLACEMENT PART FOR FUSEHOLDER ITEM #2 & #4 (E) | 203890 |

**INSTALLATION:**

(A) NO LONGER PURCHASED OR SALVAGED.

B. HIGH LEAKAGE CUTOUTS SHALL BE USED ON ALL NEW CABLE POLES IN ALL CONTAMINATION DISTRICTS.

(C) HIGH LEAKAGE CUTOUTS SHALL BE USED WHEN CUTOUTS ARE MOUNTED ON A COMMON METAL BRACKET OR WHEN THEIR MOUNTING BRACKET IS BONDED OR GROUNDED.

(D) HIGH LEAKAGE CUTOUTS SHALL BE USED IN CONTAMINATION DISTRICT 1, AND MAY BE USED IN CONTAMINATION DISTRICTS 2 & 3 IF STANDARD LEAKAGE CUTOUTS ARE NOT AVAILABLE.

(E) EXEMPT MATERIAL.

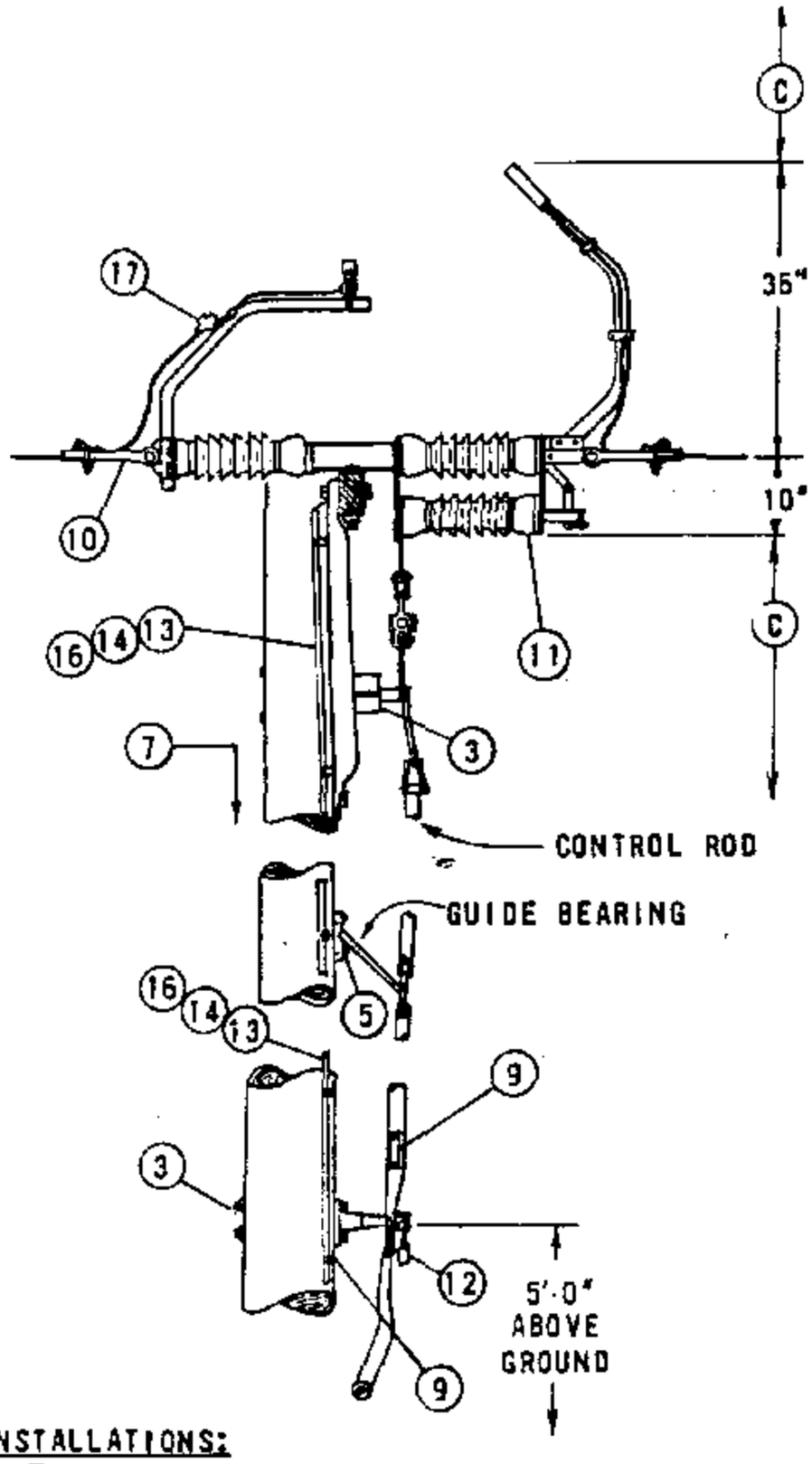
(F) ALL JOSLYN CUTOUTS AND FUSE HOLDERS PURCHASED PRIOR TO JULY 1984 HAVE NON EXPENDABLE CAPS. IF THE FAULT DUTY EXCEEDS 8000 AMPS REPLACE THE NON EXPENDABLE CAPS WITH EXPENDABLE CAPS, ITEM (6) OR (7) AS REQUIRED.

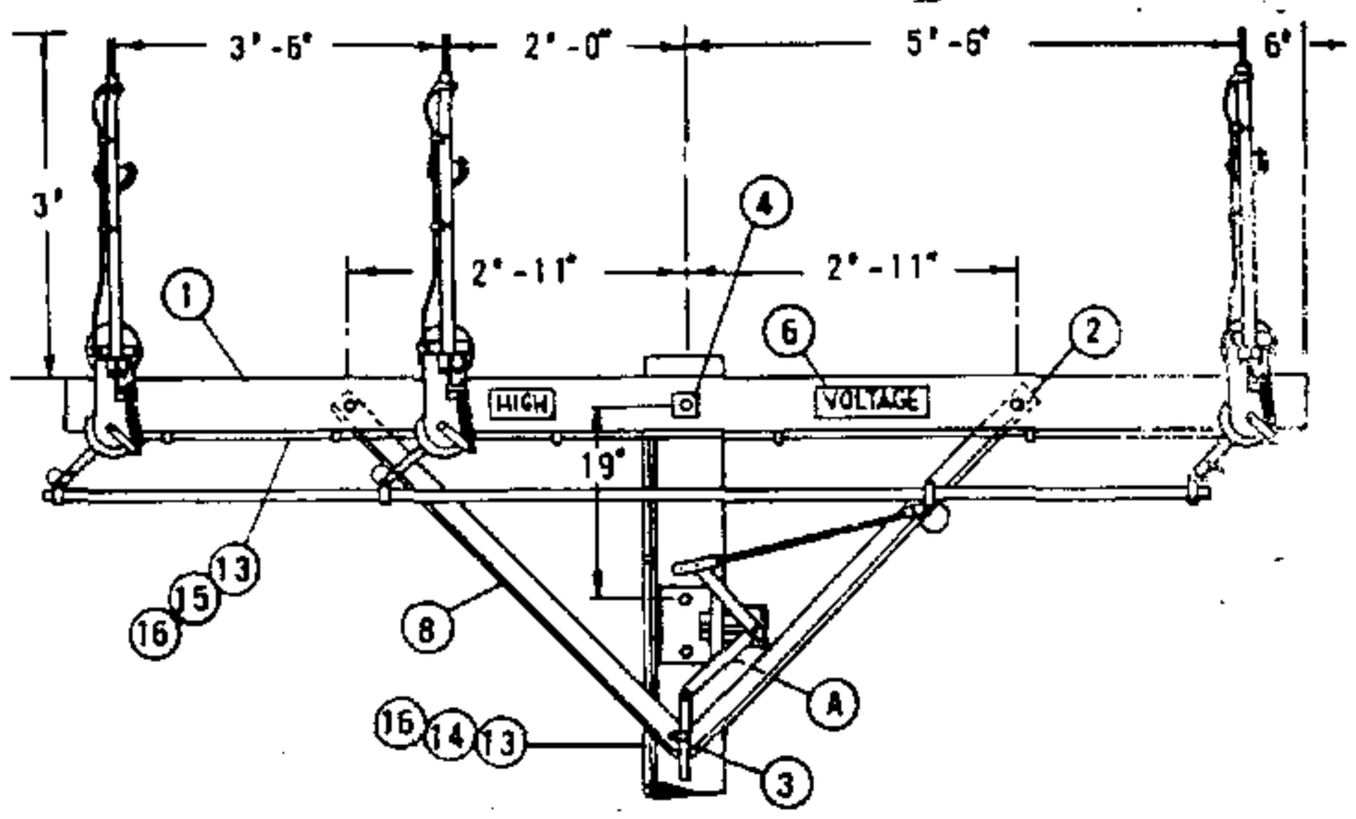
G. CUTOUT BODIES OF ITEM (1) AND (2) ARE THE SAME.

H. CUTOUTS ARE PURCHASED WITHOUT CROSSARM MOUNTING BRACKETS - THESE BRACKETS (UNDER STOCK #166070) ARE EXEMPT MATERIALS.

| 1299.101 | SDG&E ELECTRIC STANDARDS<br>12KV EXPULSION FUSED CUTOUT | DATE 1-1-88<br>APPD AE/RDS |
|---|---|---|

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THIS PAGE FOR FIELD MAINTENANCE ONLY

INSTALLATIONS:

(A) POSITION OF BELL CRANK ASSEMBLY WITH SWITCH IN OPEN POSITION.
(E) EXEMPT MATERIAL

REFERENCES:

B. SEE PAGE 1230 TO DETERMINE WHEN THIS SWITCH SHALL BE USED.
(C) SEE SECTIONS 200 AND 500 FOR MINIMUM VERTICAL SEPARATION.

| | ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONST. STDS. |
|---|---|---|---|---|---|
| P T F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 12'-0" | | 1 | 300 SECTION |
| | 2 | BOLT, MACH, GALV, 5/8" X 5", 1-RD WASH, & 1-DBL COIL WASH | (E) | 2 | 100 SECTION |
| | 3 | BOLT, MACH, GALV, 5/8" X ___", 1-DBL COIL WASH & 1-SQ WASH | (E) | 5 | 100 SECTION |
| | 4 | BOLT, MACH, GALV, 5/8" X ___", 2-SQ WASH, & 1-DBL COIL WASH | (E) | 1 | 100 SECTION |
| | 5 | SCREW, LAG, GALV, 1/2" X 4" | (E) | 2 | 621568 |
| | 6 | SIGN, HIGH VOLTAGE AND NAILS, 9 ROOFING, GALV | (E) | 2 | 647648, 492224 |
| | 7 | STEPS, POLE | (E) | 16 | 692992 |
| | 8 | BRACE, 4', SPECIAL | | 2 | 163808 |
| | 9 | TAG, SWITCH NUMBER | (E) | 2 | 300 SECTION |
| | | | | | |
| | | | | | |
| O C O | 10 | CLAMP, STRAIGHT LINE, D.E. | | 6 | 700 SECTION |
| | 11 | SWITCH, T.P.S.T., 600 AMP | | 1 | 709248 |
| | 12 | PADLOCK | | 1 | 514848 |
| | 13 | WIRE, BARE STRANDED, #6 | | 55' | 813536 |
| | 14 | GROUND UNIT, (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| | 15 | MOULDING, HARDWOOD 1"(GRAY OR PLAIN) | | 24' | 487184, 487200 |
| | 16 | STAPLE, FENCE, GALV, 1 1/4" | (E) | 30 | 678528 |
| | 17 | TERMINAL, COMPRESSION LUG | | 6 | 700 SECTION |
| | | | | | |
| | | | | | |
| | | | | | |

SDG&E ELECTRIC STANDARDS

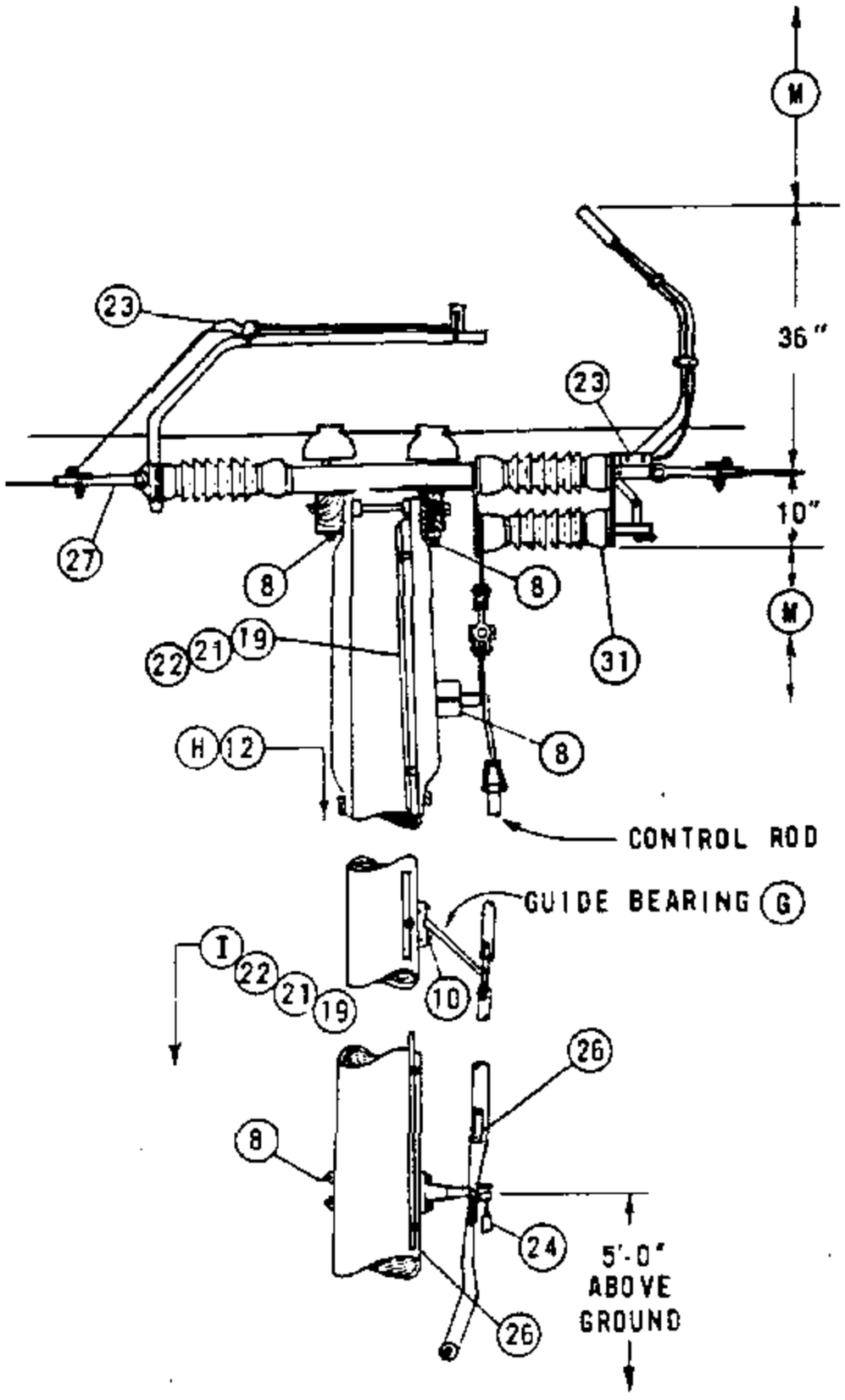
DATE 6-4-82
APPD JRH

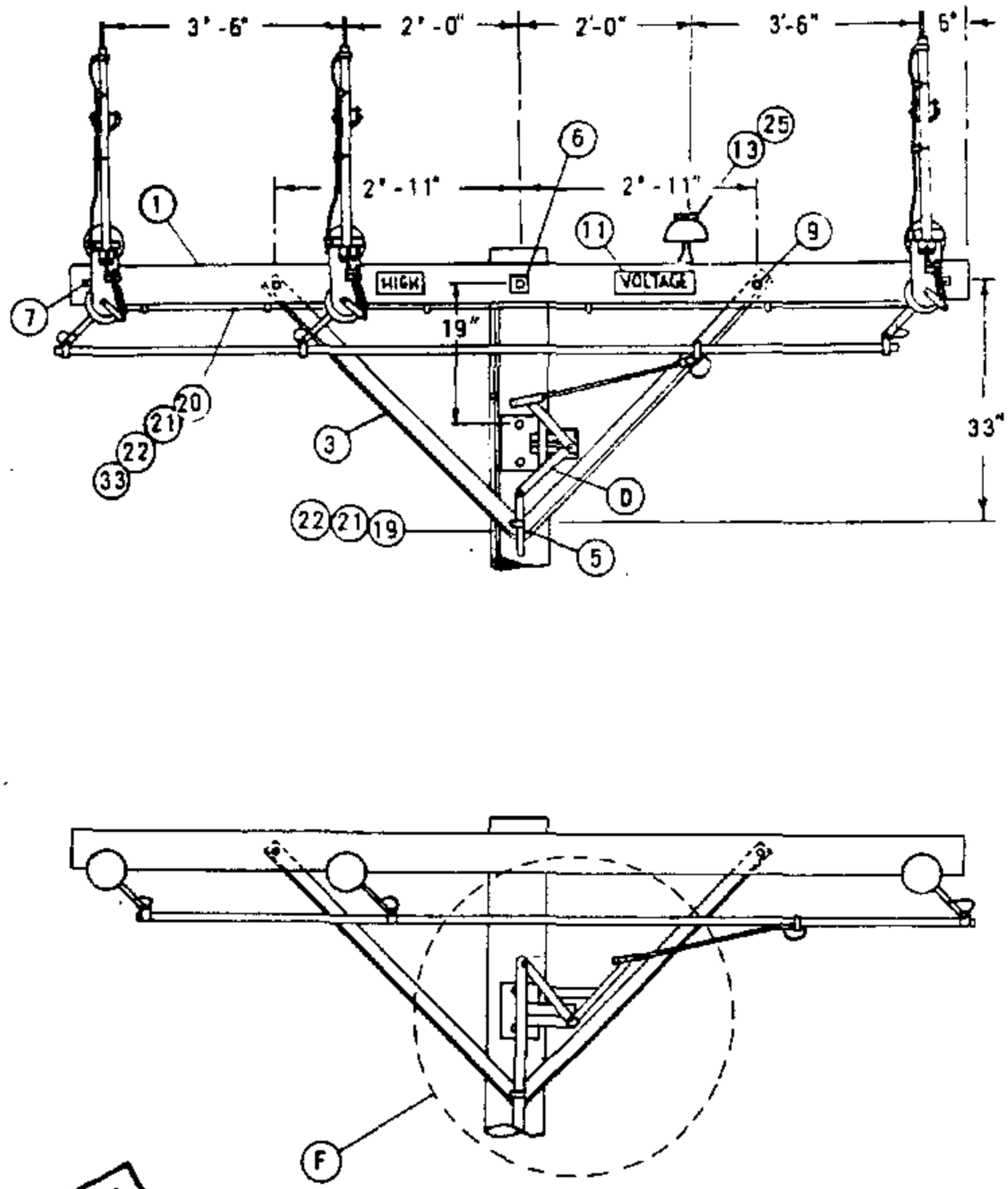
POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT
HORIZONTAL CONFIGURATION - DOUBLE DEAD END

1299.201
SUPERSEDES
1229 (6-4-82)

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SCOPE: THIS SWITCH IS TO BE USED FOR TANGENT CONFIGURATIONS. IT IS TO BE USED FOR CIRCUIT TIES AND FOR SECTIONALIZING PURPOSES. MAXIMUM ALLOWABLE LINE ANGLE FOR THIS SWITCH IS 6 DEGREES.







FOR FIELD MAINTENANCE ONLY

SEE PAGE 1299.203 FOR NOTES AND BILL OF MATERIAL.



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INSTALLATIONS:

A. CONTROL ROD AND SWITCH HANDLE ARE NOT ALLOWED IN THE CLIMBING SPACE. (G.O. 95 54.7-A4)

B. ATTACH GROUND WIRE TO SWITCH MOUNTING BOLTS BY USING AN ADDITIONAL ROUND WASHER.

(C) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(D) POSITION OF BELL CRANK ASSEMBLY WITH SWITCH IN OPEN POSITION.

(E) EXEMPT MATERIAL.

(F) POSITION OF BELL CRANK ASSEMBLY WITH SWITCH IN CLOSED POSITION.

(G) GUIDE BEARING PIVOTS THROUGH 90°. IN THE OPENED AND CLOSED POSITIONS THE GUIDE BEARING MAKES A 45° ANGLE WITH THE POLE.

(H) POLES ARE TO BE STEPPED PER STANDARD 363.

(I) USE TWO GROUND RODS SPACED A MINIMUM OF 6' APART PER G.O. 95 RULE 21.1.

REFERENCES:

J. SEE STANDARD 1443 FOR SINGLE DEADEND CONFIGURATION.

K. SEE STANDARD 1205 TO DETERMINE WHEN TO USE GANG OR HOOKSTICK SWITCHES.

L. SEE DESIGN MANUAL PAGE 5621 - CRITERIA AND GENERAL PRACTICES FOR SECTIONALIZING.

(M) SEE SECTIONS 200 AND 500 FOR MINIMUM VERTICAL SEPARATION.

(N) SEE STANDARD 759 FOR USE OF LINE GUARD.

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 12'-0" | | 2 | 300 SECTION |
| 2 | BRACE, ANGLE, 6'-0" | | - | 164160 |
| 3 | BRACE, 4' SPECIAL | | 4 | 163808 |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1-RD WASH, & 1-DBL COIL WASH | (E) | - | 100 SECTION |
| 5 | BOLT, MACH, GALV, 5/8" X__", & 1-DBL COIL WASH | (E) | 1 | 100 SECTION |
| 6 | BOLT, MACH, GALV, 5/8" X__", 2-SQ WASH & 1-DBL COIL WASH | (E) | 1 | 100 SECTION |
| 7 | BOLT, SPACE, GALV, 5/8" X__", 4-SQ WASH & 2- DBL COIL WASH | (C) (E) | 2 | 100 SECTION |
| 8 | BOLT, MACH, GALV, 5/8" X__", 1-SQ WASH & 1-DBL COIL WASH | (E) | 16 | 100 SECTION |
| 9 | BOLT, MACH, GALV, 5/8" X 5", 1-RD WASH & 1-DBL COIL WASH | (E) | 4 | 100 SECTION |
| 10 | SCREW, LAG, GALV, 1/2" X 4" | (E) | 2 | 621568 |
| 11 | SIGN, HIGH VOLTAGE AND NAILS, 9 ROOFING, GALV | (E) | 2 | 647648, 492224 |
| 12 | STEPS, POLE | (H) (E) | 16 | 692992 |
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" & 1-DBL COIL WASH | (C) | 2 | 532704, 798560 (E) |
| 14 | STUD, 7 1/2" & 1-DBL COIL WASH | (C) | - | 701760, 798560 (E) |
| 15 | | | | |
| 16 | CLEVIS, DEAD END, 5/8" BOLT STEEL (OPEN TYPE) | (C) (E) | - | 235618 |
| 17 | LINK, EXTENSION GALV, 1/2" X 2" X 12" | (C) | - | 466240 |
| 18 | STRAP, EXTENSION GALV, 1/2" X 1 1/2" X 28" | (C) | - | 696864 |
| 19 | GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| 20 | MOULDING, HARDWOOD 1" (GRAY OR PLAIN) | | 24' | 487184, 487200 |
| 21 | STAPLE, FENCE, GALV, 1 1/4" | (E) | 30 | 678528 |
| 22 | WIRE, BARE STRANDED, #6 | | 5 LBS | 813536 |
| 23 | TERMINAL, COMPRESSION LUG | | 6 | 700 SECTION |
| 24 | PADLOCK | | 1 | 514848 |
| 25 | INSULATOR, LINE, 12KV NEUTRAL | (C) (E) | 2 | 429216 |
| 26 | TAG, SWITCH NUMBER | | 2 | 300 SECTION |
| 27 | CLAMP, STRAIGHT LINE, O.E. | (C) | 6 | 700 SECTION |
| 28 | CLAMP, POST INSULATOR | (N) (C) | - | 700 SECTION |
| 29 | INSULATOR, VERTICAL POST | (C) | - | 428608 |
| 30 | INSULATOR, SUSPENSION | (C) | - | 700 SECTION |
| 31 | SWITCH, T.P.S.T., 600 AMP | | 1 | 709246 |
| 32 | SWITCH, T.P.S.T., 600 AMP | | - | 709250 |
| 33 | STAPLES, MOULDING, GALV, 3" X 1 1/16" X 1/4" | (E) | AS REQD | 678560 |
| 34 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) | (C) | - | 700 SECTION |
| | | | | |

SDG&E ELECTRIC STANDARDS

DATE 1-1-87
APPD AK/RD

POLE TOP SWITCH 12KV VERTICAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION

1299.203
SUPERSEDES
1228.3 (1-1-87)

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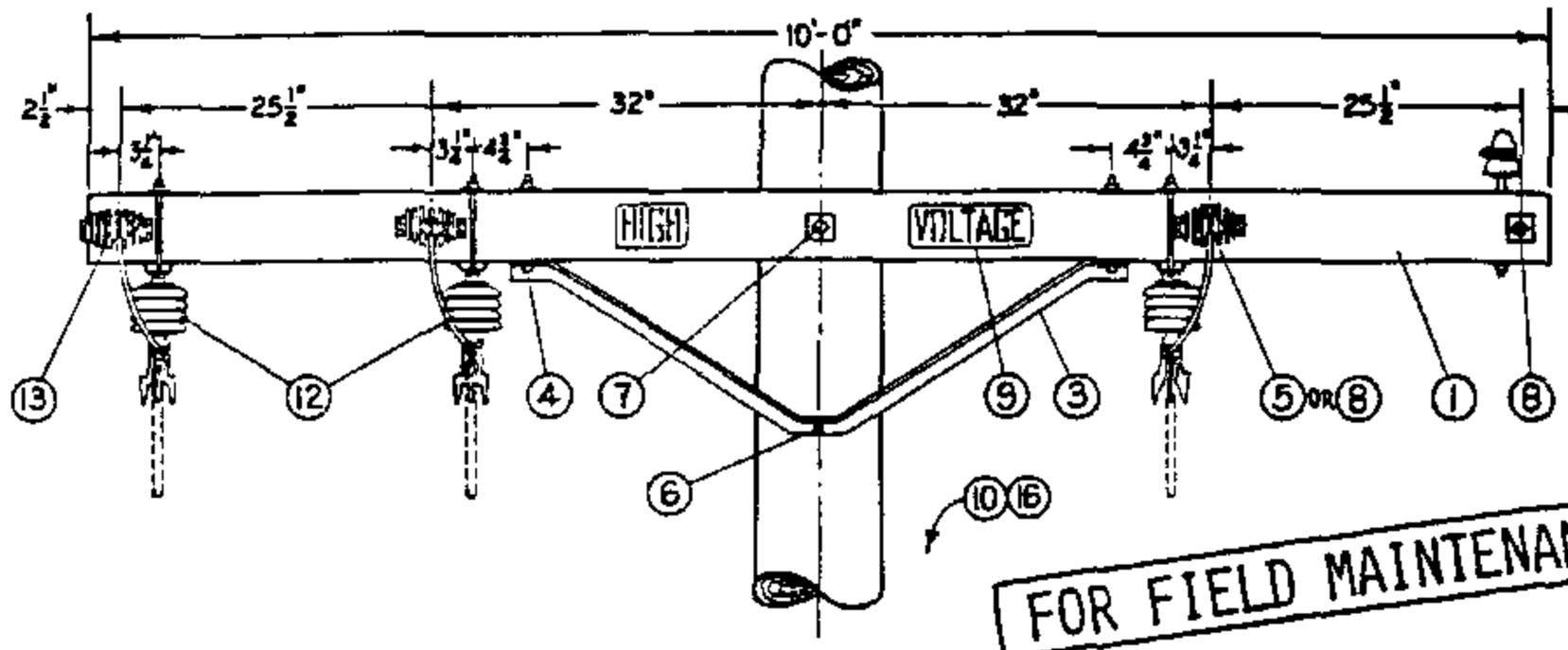



FIGURE 1
SPREAD CONSTRUCTION

FOR FIELD MAINTENANCE ONLY

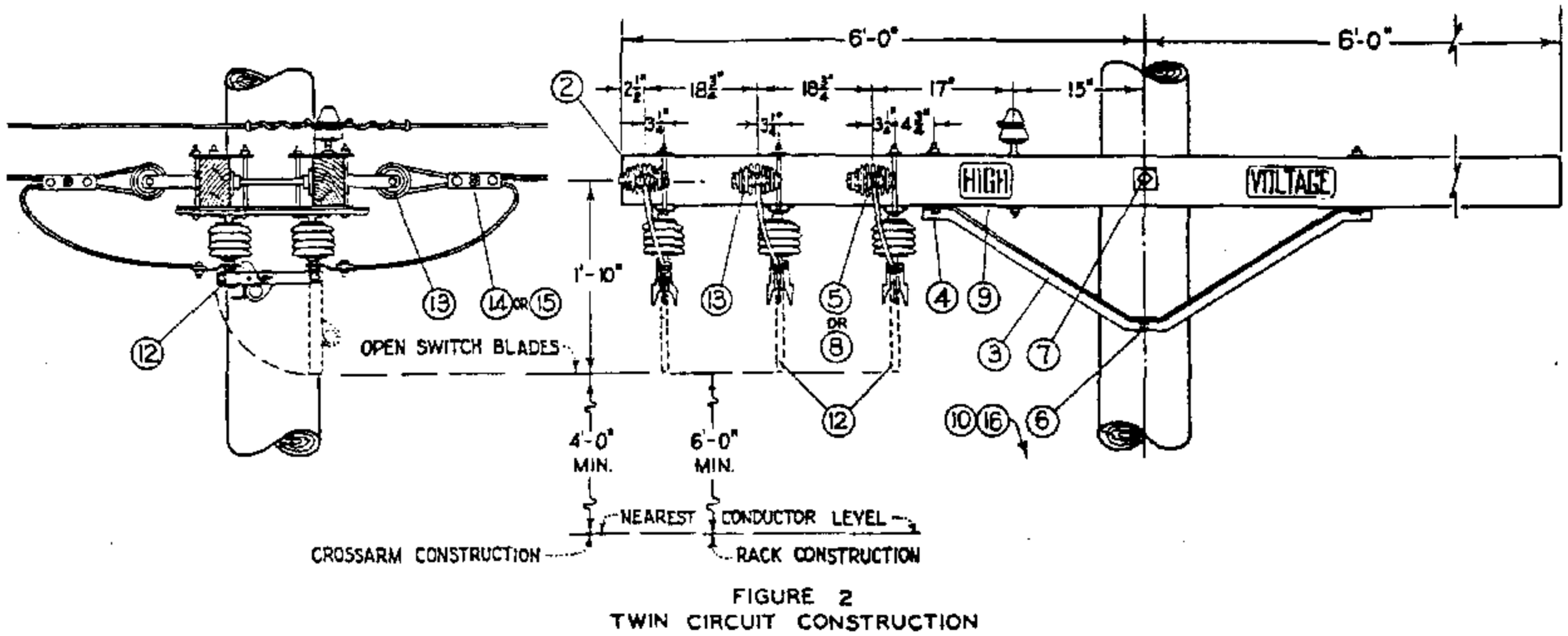



FIGURE 2
TWIN CIRCUIT CONSTRUCTION

NOTE:

A. FOR ARM-END CONSTRUCTION, REDRILL CROSSARMS IN FIELD AS SPECIFIED BY FIGURE 2

| | ITEM | DESCRIPTION | QUANTITY | | | | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|---|---|---|
| | | | FIGURE 1 | | FIGURE 2 | | |
| | | | #4 or SMALLER | #2 or LARGER | #4 or SMALLER | #2 or LARGER | |
| P T & F | 1 | Crossarm, 3 3/4" X 5 3/4" X 10'-0" | 2 | 2 | - | - | PG 119 IT. 2 |
| | 2 | Crossarm, 3 3/4" X 5 3/4" X 12'-0" | - | - | 2 | 2 | PG 119 IT. 4 |
| | 3 | Angle Crossarm Brace, 4'-0" | 2 | 2 | 2 | 2 | 164032 |
| | 4 | Mach. Bolt, Galv., 1/2" X 7", 1-rd. wash. & 1-nut | 4 | 4 | 4 | 4 | PGS 139, 140 |
| | 5 | Mach. Bolt, Galv., 5/8" X 5", 1-sq. wash. & 1-nut | 4 | - | 4 | - | PGS 139, 140 |
| | 6 | Mach. Bolt, Galv., 5/8" X 10", 1-nut | 1 | 1 | 1 | 1 | PGS 139, 140 |
| | 7 | Mach. Bolt, Galv., 5/8" X 18", 2-sq. wash. & 1-nut | 1 | 1 | 1 | 1 | PGS 139, 140 |
| | 8 | Space Bolt, Galv., 5/8" X 20", 4-sq. wash & 4-nuts | 2 | 4 | 2 | 4 | PGS 139, 140 |
| | 9 | High Voltage Sign & 8-Roofing Nails, Galv. | 2 | 2 | 2 | 2 | 647776, 492192 |
| | 10 | Pole Steps | 17 | 17 | 17 | 17 | 692992 |
| | 11 | | | | | | |
| D C & D | 12 | Disconnect Switch, 14.4 KV, 600 A, S.P.S.T., with Hanger Straps and Bolts | 3 | 3 | 3 | 3 | 707008 |
| | 13 | Insulator, D. E. | 6 | 6 | 6 | 6 | 235520 |
| | 14 | Wire Connector, Split Bolt | 12 | - | 12 | - | PGS 783, 786 |
| | 15 | Wire Connector, 3-Bolt Clamp | - | 6 | - | 6 | 227296 |
| | 16 | Switch Tag | 2 | 2 | 2 | 2 | — |

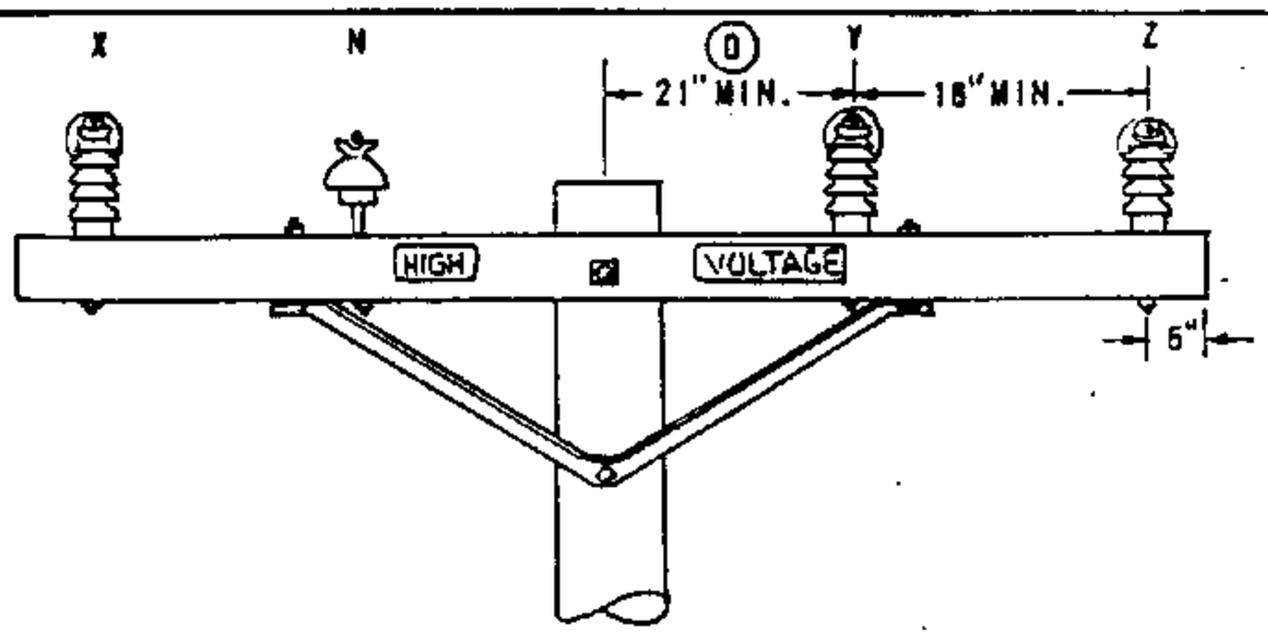
1299.204
SUPERSEDES
1221 (1-1-87)

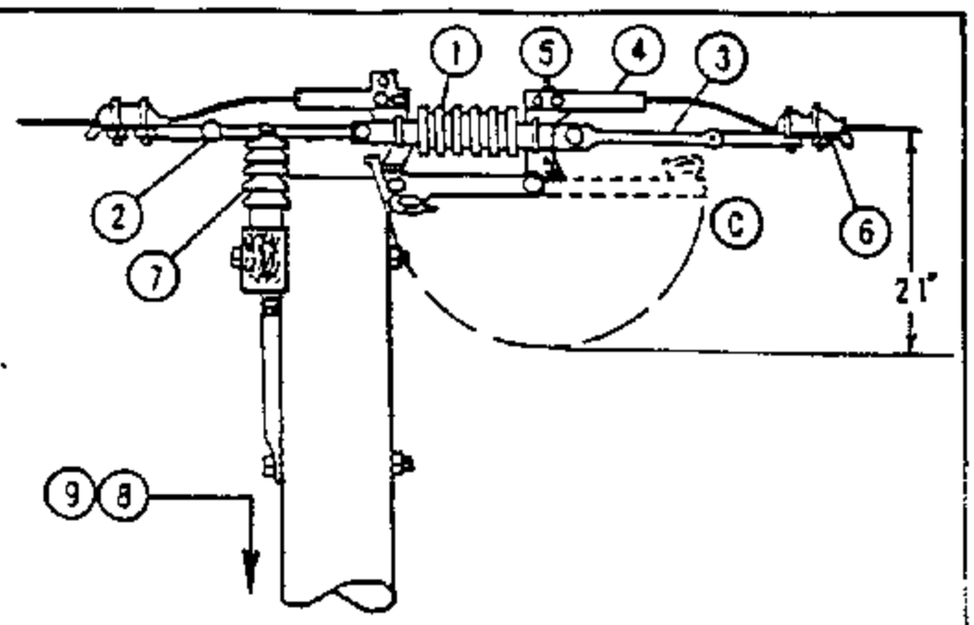
SDG&E ELECTRIC STANDARDS

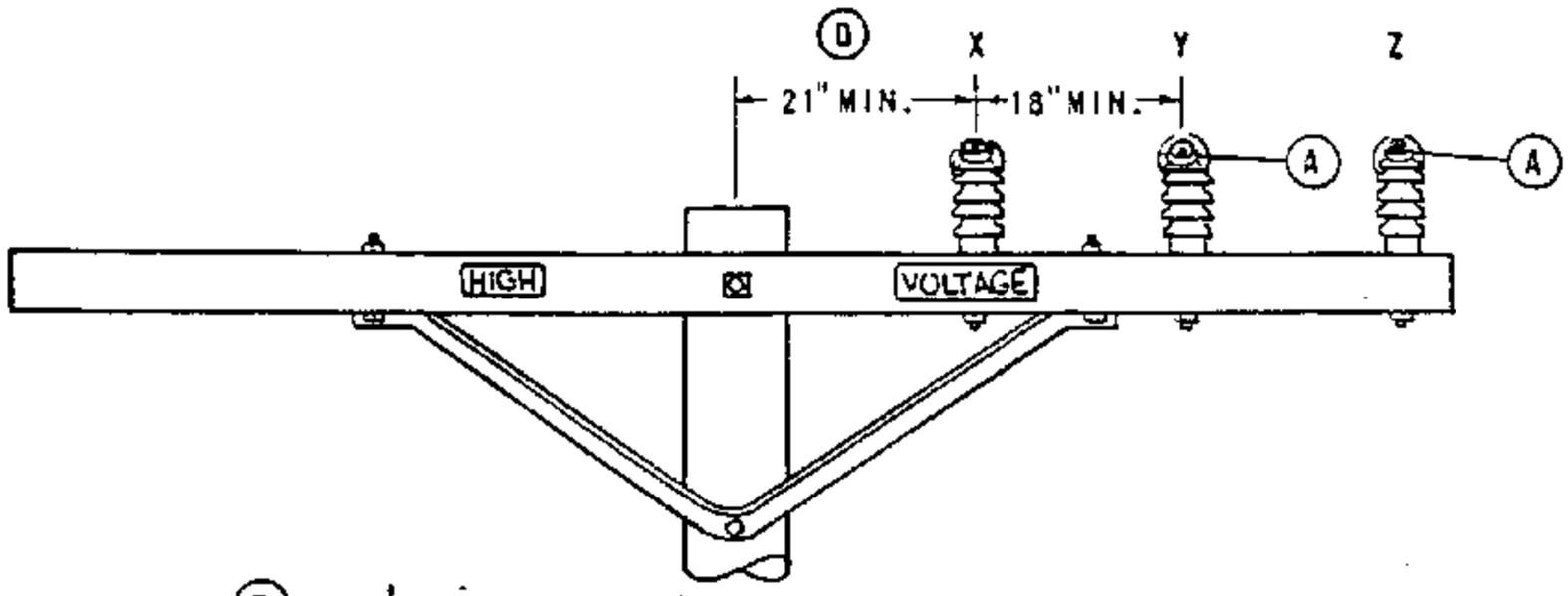
# POLE TOP SWITCH INSTALLATION
# 4KV DISCONNECT SWITCH, HOOK STICK OPERATED

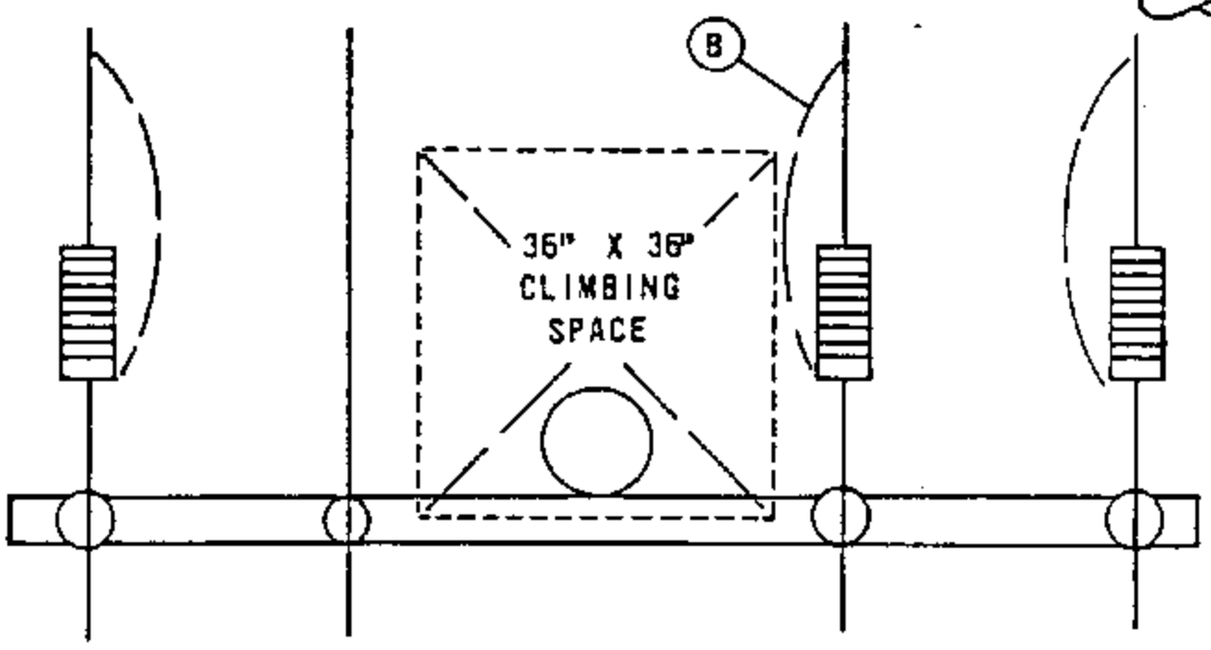
DATE 1-1-87
APPD AK/DS

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FOR FIELD MAINTENANCE ONLY

NOTES:

(A) ROTATE DISCONNECTS TOWARD THE POLE USING ADJUSTABLE TRUNNION LINKS TO PERMIT EASE OF OPERATION.

(B) KEEP THIS DISCONNECT VERTICAL TO KEEP IT OUT OF THE CLIMBING SPACE.

(C) LOCK AS SHOWN WHEN LEFT IN THE OPEN POSITION.

(D) G.O. 95 MINIMUM SPACING REQUIREMENT. THIS DIMENSION WILL ALLOW A 36" CLIMBING SPACE ON THE SAME SIDE OF THE POLE AS THE SWITCHES.

(E) EXEMPT MATERIAL.

F. INSTALL ONLY IN FULL TENSION SPANS OF 3/0 ACSR, 3/0 5005, 1/0 COPPER, OR LARGER CONDUCTOR.

(G) SEE 400 SECTION FOR POLE TOP MATERIALS.

H. BOND INSULATOR STUDS IN CONTAMINATION DISTRICT 1.

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| | 1 | SWITCH, LINE TENSION DISCONNECT, 15KV, 600 AMPS | 3 | 707014 |
| | 2 | LINK, ADJUSTABLE TRUNNION, 12" | 3 | 465550 |
| | 3 | LINK, EXTENSION, GALV., 1/2"X 1-3/4"X 12" | 3 | 466272 |
| | 4 | TERMINAL, ALUMINUM COMPRESSION, 2-HOLE | 6 | 700 SECTION |
| | 5 | BOLT, MACH, STAINLESS STEEL, ASSEMBLY, 1/2" X 1 1/2" (E) | 12 | 148672 |
| | 6 | CLAMPS, DEAD-END | 6 | 700 SECTION |
| | 7 | INSULATOR, VERTICAL POST CLAMP TYPE (ITEM 2 CONTAINS CLAMP) | 3 | 700 SECTION |
| 8 | | STEPS, POLE (E) | AS REQ'D. | 692992 |
| 9 | | TAG, SWITCH NUMBER (E) | 2 | 300 SECTION |
| | 10 | STUD 7 1/2" | 3 | 701760 |
| | 11 | WASHER, 5/8" DOUBLE COIL SPRING (E) | 3 | 798560 |
| | 12 | WASHER, 2 1/4" X 2 1/4" FLAT (E) | 3 | 799040 |

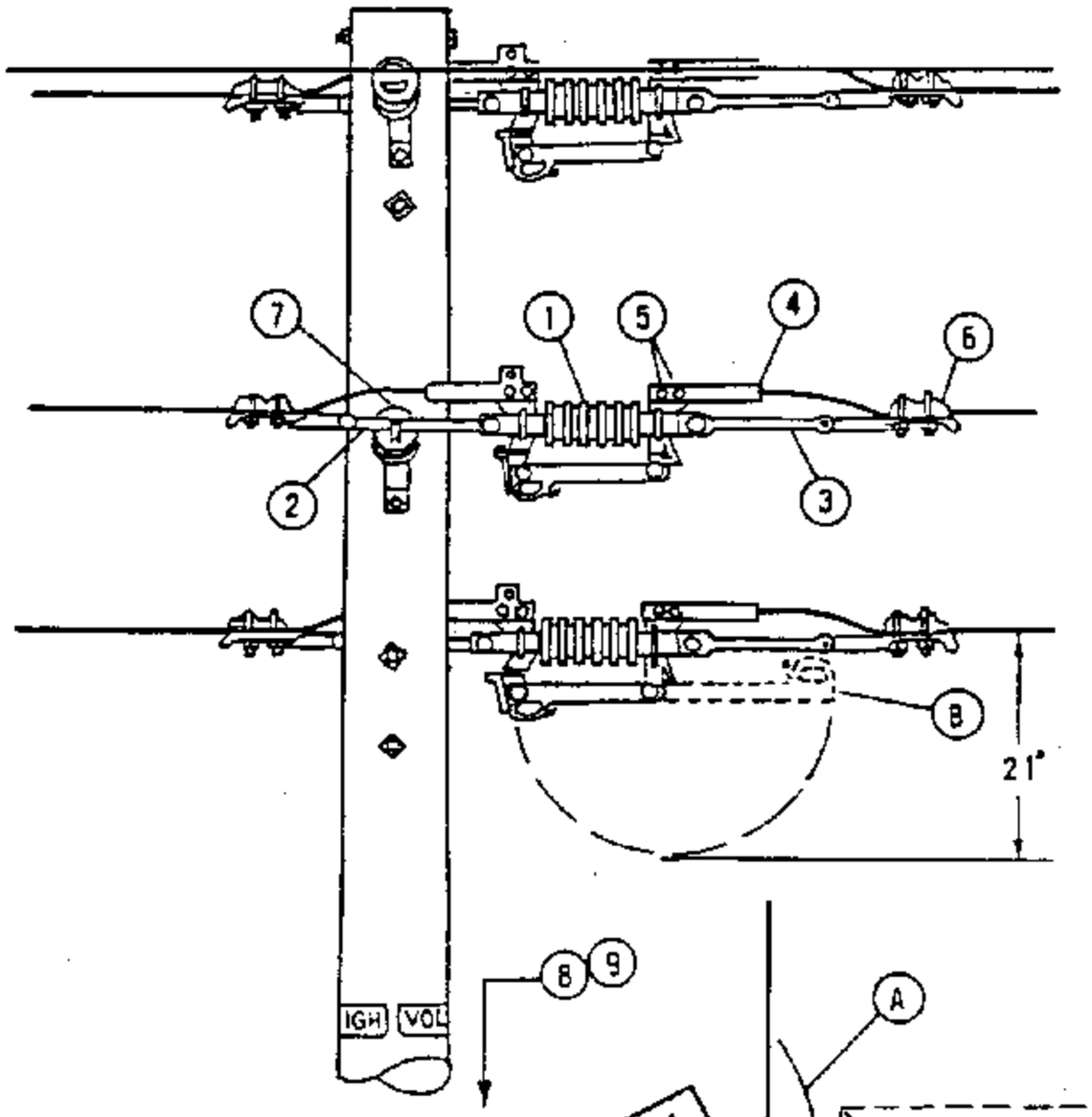
DATE 2-3-78
APPD JAF

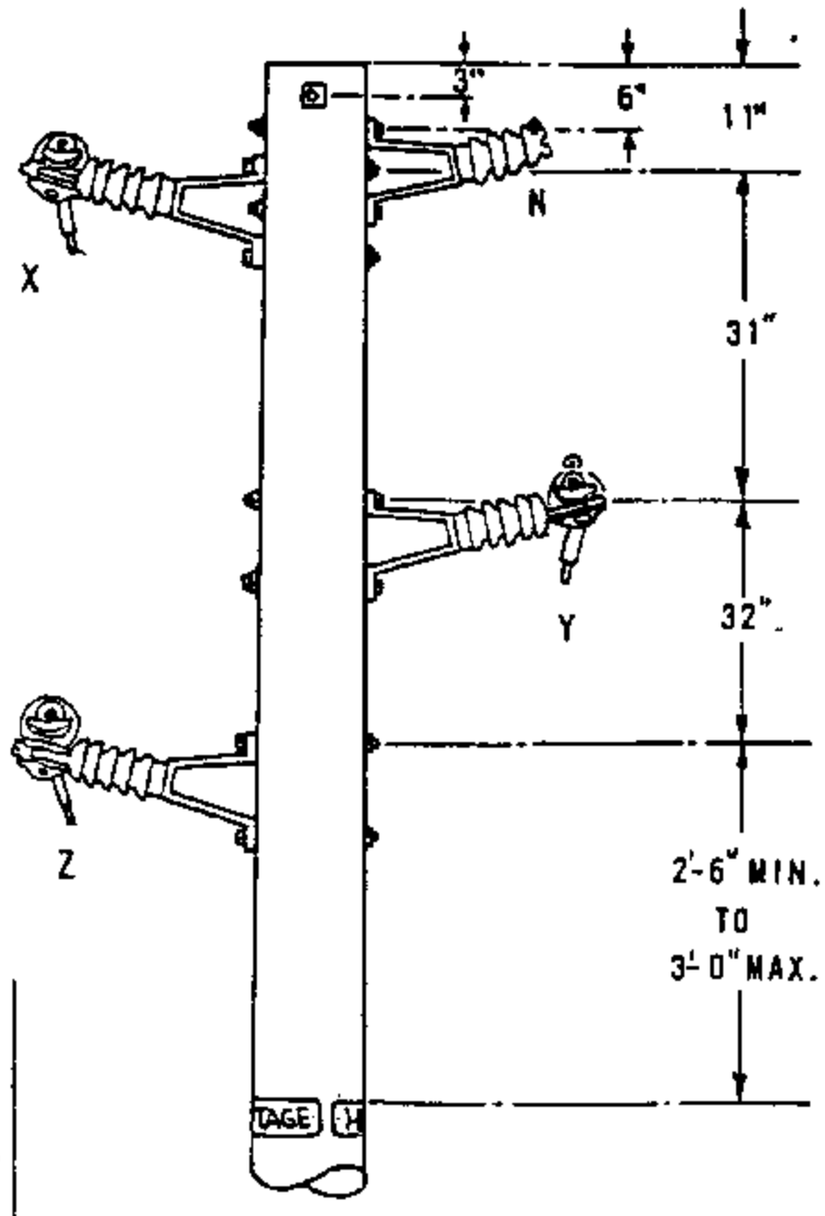
SDG&E ELECTRIC STANDARDS

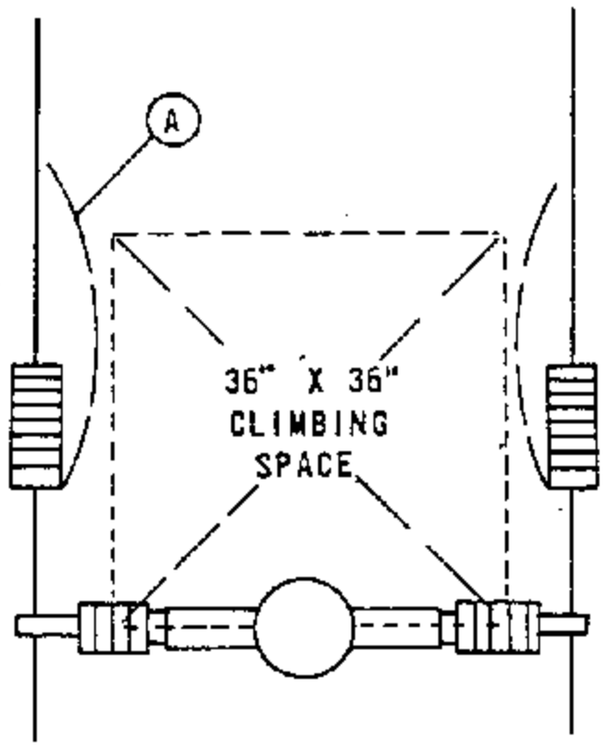
# LINE TENSION DISCONNECT SWITCH HOOK STICK OPERATED

1299.205
SUPERSEDES
1225 (1-1-92)

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FOR FIELD MAINTENANCE ONLY

NOTES:

(A) ROTATE DISCONNECTS AS SHOWN USING ADJUSTABLE TRUNNION LINK FOR EASE OF OPERATION, KEEPING BLADE OUT OF CLIMBING SPACE.

(B) LOCK AS SHOWN WHEN LEFT IN THE OPEN POSITION.

C. INSTALL ONLY IN FULL TENSION SPANS OF 3/0 ACSR, 3/0 5005, 1/0 COPPER OR LARGER CONDUCTOR.

D. SEE 400 SECTION FOR POLE TOP MATERIALS, SPAN LIMITATIONS AND OTHER REQUIREMENTS.

(E) EXEMPT MATERIAL.

F. BOND INSULATOR BRACKETS IN CONTAMINATION DISTRICT 1.

| ITEM PTF | ITEM OCD | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| | 1 | SWITCH, LINE TENSION DISCONNECT, 15KV, 600 AMPS | 3 | 707014 |
| | 2 | LINK, ADJUSTABLE, TRUNNION, 12" | 3 | 465550 |
| | 3 | LINK, EXTENSION, GALV., 1/2"X 1 3/4"X 12" | 3 | 466272 |
| | 4 | TERMINAL, ALUMINUM COMPRESSION, 2-HOLE | 6 | 700 SECTION |
| | 5 | BOLT, MACH, STAINLESS STEEL, ASSEMBLY, 1/2" X 1 1/2" (E) | 12 | 148672 |
| | 6 | CLAMPS, DEAD END | 6 | 700 SECTION |
| | 7 | INSULATOR, HORIZONTAL POST CLAMP TYPE (ITEM 2 CONTAINS CLAMP) | 3 | 700 SECTION |
| 8 | | STEPS, POLE (E) | AS REQ'D. | 692992 |
| 9 | | TAG, SWITCH NUMBER (E) | 2 | 300 SECTION |

1299.206
SUPERSEDES
1226 (1-1-92)

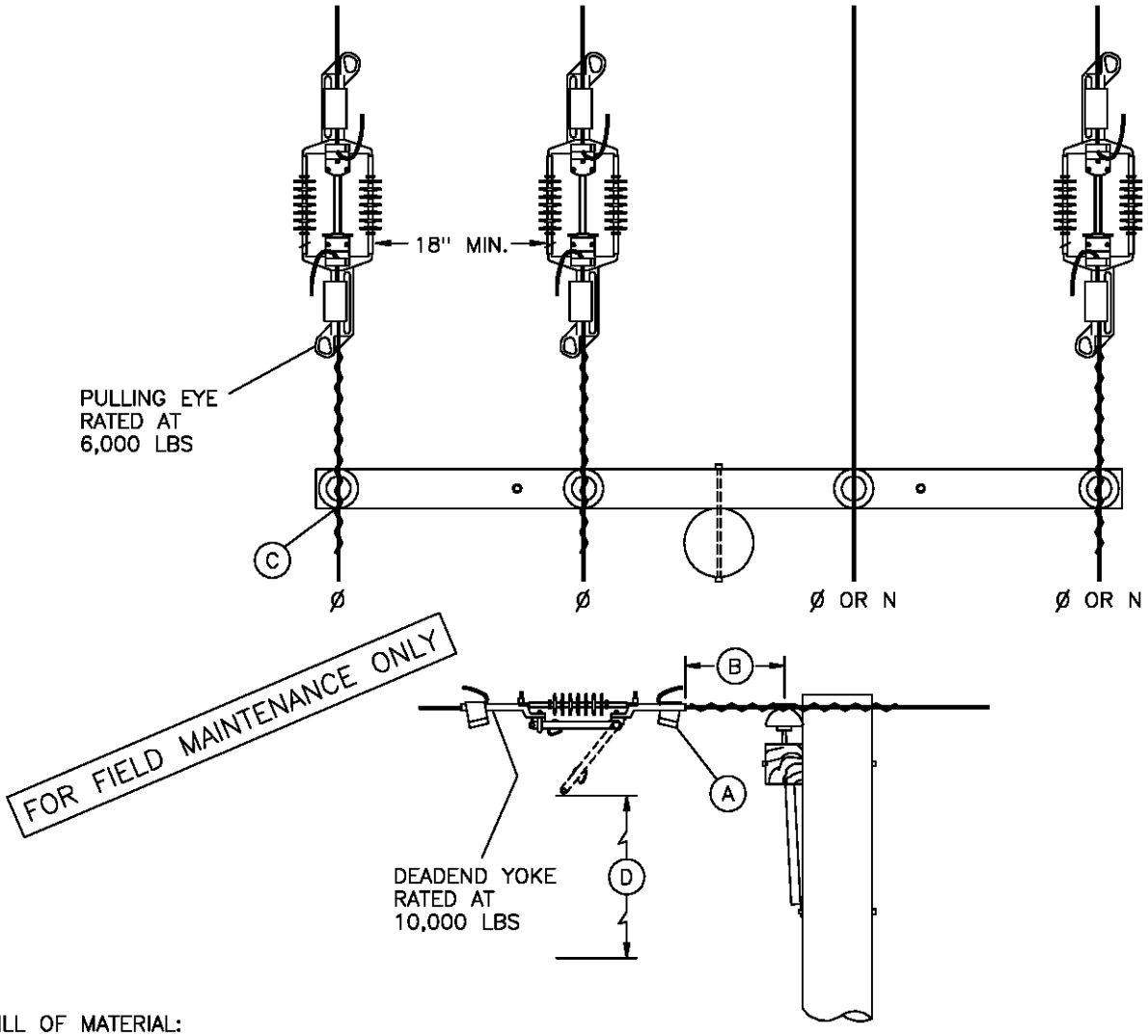
SDG&E ELECTRIC STANDARDS

# LINE TENSION DISCONNECT SWITCH HOOK OPERATED ARMLESS

DATE 2-3-78
APPD TAF

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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION OF PRIMARY IN–LINE HOOKSTICK DISCONNECTS, WEDGE TAP CONNECTED. THIS IS A PREFERRED METHOD FOR EXISTING PIN AND INSULATOR CONSTRUCTION. THESE SWITCHES CAN BE INSTALLED ON 336 AND 636 ACSR CONDUCTOR ONLY.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | SWITCH, DISCONNECT, IN–LINE, 900A INCLUDING 2 WEDGE TYPE TAP CONNECTORS | 336.4 ACSR | 3 | 707010 | ILD336 |
| | | 636 ACSR | 3 | 707012 | ILD636 |
| 2 | TAP CONNECTORS, WEDGE TYPE, (REPLACEMENT) (A) | 336.4 ACSR | AS REQ'D | 265940 | – |
| | | 636 ACSR | | 265942 | – |

INSTALLATION:

(A) WHEN INSTALLING SWITCH, USE ONLY WEDGE TYPE DEADEND TAP CONNECTORS SUPPLIED WITH SWITCH, OR EQUIVALENT REPLACEMENT ITEM. **DO NOT REUSE DEADEND TAP CONNECTORS.** IF REINSTALLING SWITCH, USE NEW DEADEND TAP CONNECTORS.

(B) WHEN INSTALLING, POSITION SWITCH ON CONDUCTOR 18 INCHES FROM INSULATOR PIN TO SWITCH PULLING EYE, OR, 18 INCHES FROM DEADEND CLAMP PULLING EYE TO SWITCH PULLING EYE.

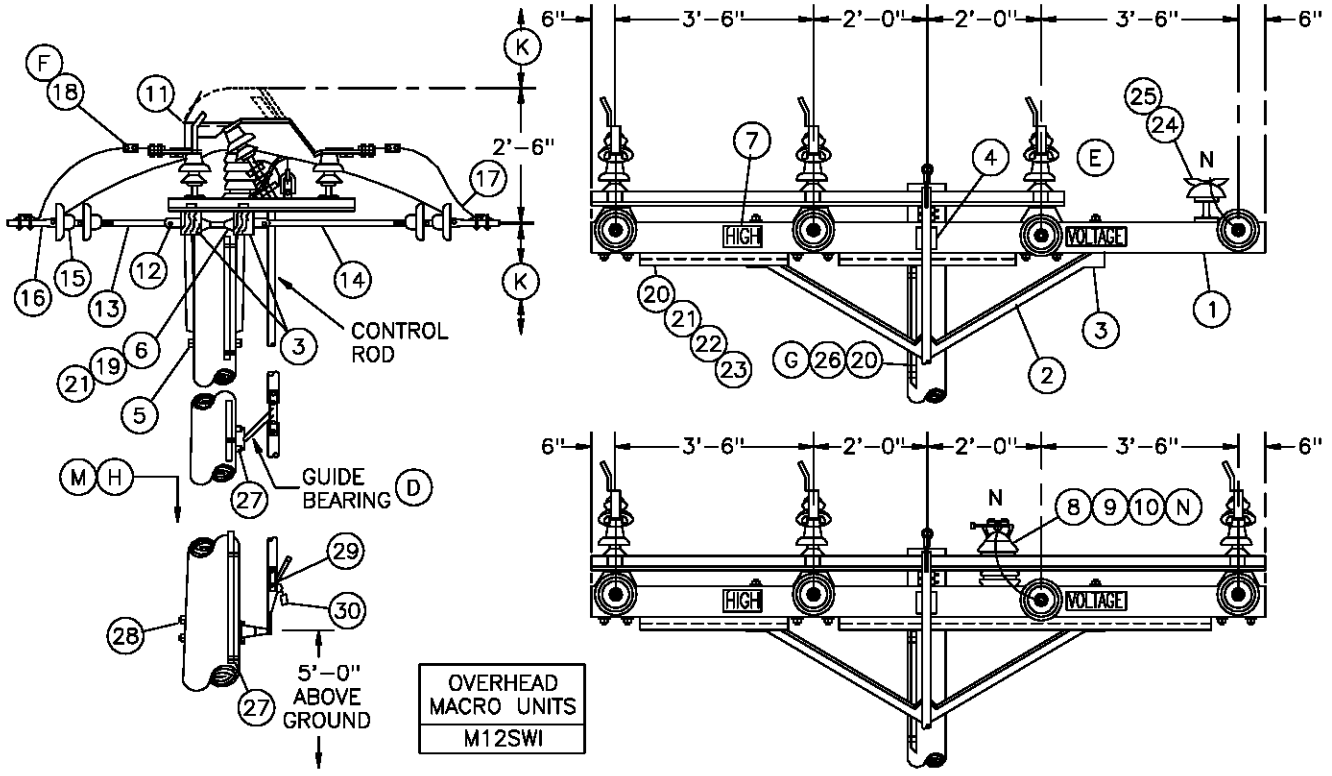
(C) IF TIE WIRE EXISTING, REPLACE WITH PREFORMED TIE. DO NOT REPLACE EXISTING CLAMP TOP INSULATOR.

(D) 4'–0" MIN. CLEARANCE TO NEAREST CONDUCTOR BELOW WHEN SWITCH IS OPEN. WHERE CONSTRUCTION IS REQUIRED BELOW SWITCH, IT SHALL NOT INTERFERE WITH OPERATION OF ANY SWITCH FROM THE POLE.

| | | |
|---|---|---|
| DATE 1–1–98<br>APPD PSA / CMK | SDG&E ELECTRIC STANDARDS<br>IN–LINE DISCONNECT SWITCHES<br>WEDGE TAP CONNECTED–12K AND BELOW | 1299.207<br>SUPERSEDES<br>1220 (4–30–99) |

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SCOPE: THIS STANDARD SHOWS A GANG OPERATED POLE TOP SWITCH FOR CIRCUIT TIES OR SECTIONALIZING PURPOSES AND IS TO BE USED FOR TANGENT AND DEAD-END CONFIGURATIONS.




BILL OF MATERIAL:

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNITS |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" x 5 3/4" x 12'-0" | 2 | 294160 | 6- |
| 2 | BRACE, ANGLE, 6'-0" | 2 | 164160 | 6HUB |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 16 | STD 392 | - |
| 4 | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 1 | STD 392 | - |
| 5 | BOLT, MACH, GALV, 5/8" x (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | 1 | STD 392 | - |
| 6 | BOLT, SPACE, GALV, 5/8" (LENGTH AS REQ'D), 2 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (C) | 4 | STD 392 | - |
| 7 | SIGN, HIGH VOLTAGE, AND | 2 | 647648 | HV |
| | 9 ROOFING NAILS, GALV | 18 | 492224 | - |
| 8 | STUD, 5/8" x 7 1/2" AND 1 DOUBLE COIL SPRING WASHER (C) | 1 | 701760 | STUD-W |
| | | 1 | 798560 | - |
| 9 | INSULATOR, VERTICAL POST (C) | 1 | 428608 | VPI |
| 10 | CLAMP, POST INSULATOR (L)(C) | 1 | STD 773 | - |
| 11 | SWITCH T.P.S.T. 600 AMP, INCLUDING 31' OF CONTROL ROD | 1 | 709254 | MEMCO |
| | ADDITIONAL INTERMEDIATE 10'-6" CONTROL ROD WITH GUIDE BEARING AND END FITTINGS | AS REQ'D | 604432 | FC-ROD |
| | REPLACEMENT UPPER CONTROL ROD WITH END FITTINGS | AS REQ'D | 604434 | - |
| | REPLACEMENT LOWER CONTROL ROD WITH END FITTINGS | AS REQ'D | 604436 | - |
| 12 | CLEVIS, DEAD END, 5/8" BOLT STEEL (OPEN TYPE) (C) | 8 | 235618 | - |



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BILL OF MATERIAL: (CON'T)

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNITS |
|---|---|---|---|---|
| 13 | LINK, EXTENSION, GALV, 1/2" X 2" X 12" (C) | 4 | 466240 | DEEXT |
| 14 | STRAP, EXTENSION, GALV, 1/2" X 1 1/2" x 28" (C) | 4 | 696864 | – |
| 15 | INSULATOR, SUSPENSION (C) | 14 | STD 750 | – |
| 16 | CLAMP, STRAIGHT LINE, D.E. (C) | 8 | 741–743 | – |
| 17 | CONNECTOR, WIRE COMPRESSION ( SIZE AS REQ'D ) | AS REQ'D | 783–786 | – |
| 18 | TERMINAL, COMPRESSION LUG (F) | 6 | 794–795 | – |
| 19 | WIRE, #8 BARE SOLID ANNEALED COPPER | 15' | 812928 | BOND8 |
| 20 | WIRE, BARE STRANDED, #4 | 65' | 813760 | BS4 |
| 21 | STAPLE, FENCE, GALV, 1 1/4" | AS REQ'D | 678528 | – |
| 22 | MOULDING, OAK HARDWOOD, 1" | 10' | 487200 | MLDG |
| 23 | STRAPS, GALV, 3/4" AND 2–1 3/4" ROOFING NAILS | AS REQ'D | 697888 | – |
| 24 | PIN, INSULATOR, STRAIGHT, 12KV, 1" | 1 | 532704 | PS1 |
| 25 | INSULATOR, LINE, 12KV, NEUTRAL | 1 | 429216 | 55–3/I |
| 26 | GROUND UNIT, COMPLETE | 1 | 603136 | GND4 |
| 27 | SCREW, LAG, GALV, 1/2" X 4" | 2 | 621568 | – |
| 28 | BOLT, MACH, GALV, 5/8" X ( LENGTH AS REQ'D ), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 2 | STD 392 | – |
| 29 | TAG, SWITCH NUMBER | 2 | STD 204 | – |
| 30 | PADLOCK, SCHLAGE ELECTRIC SERIES | 1 | 514848 | – |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

A. CONTROL ROD AND SWITCH HANDLE ARE NOT ALLOWED IN THE CLIMBING SPACE (G.O. 95, 54.7–A4).

B. ATTACH GROUND WIRE TO SWITCH MOUNTING BOLTS BY USING AN ADDITIONAL ROUND WASHER.

(C) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(D) GUIDE BEARING PIVOTS THROUGH 90°. IN THE OPENED AND CLOSED POSITIONS THE GUIDE BEARING MAKES A 45° ANGLE WITH THE POLE.

(E) CUT OFF EXCESS INTERPHASE SHAFT.

(F) WHEN ATTACHING 1/0 AND 4/0 COPPER CONDUCTORS TO A POLE TOP SWITCH, USE A BRONZE CABLE TAP LUG, STOCK NUMBER 471296. IF EXCESSIVE VIBRATION OR WHIPPING COULD OCCUR, USE TWO LUGS IN SERIES.

REFERENCES:

(G) GROUNDING METHODS – SEE STANDARD 1002.

(H) POLE STEPPING – SEE STANDARD 363.

I. SEE STANDARD 1443 FOR SINGLE DEADEND CONFIGURATION.

J. SEE DESIGN MANUAL PAGE 6111 – FEEDER CIRCUIT SECTIONALIZING AND PROTECTION.

(K) SEE SECTION 200 FOR MINIMUN VERTICAL SEPARATION.

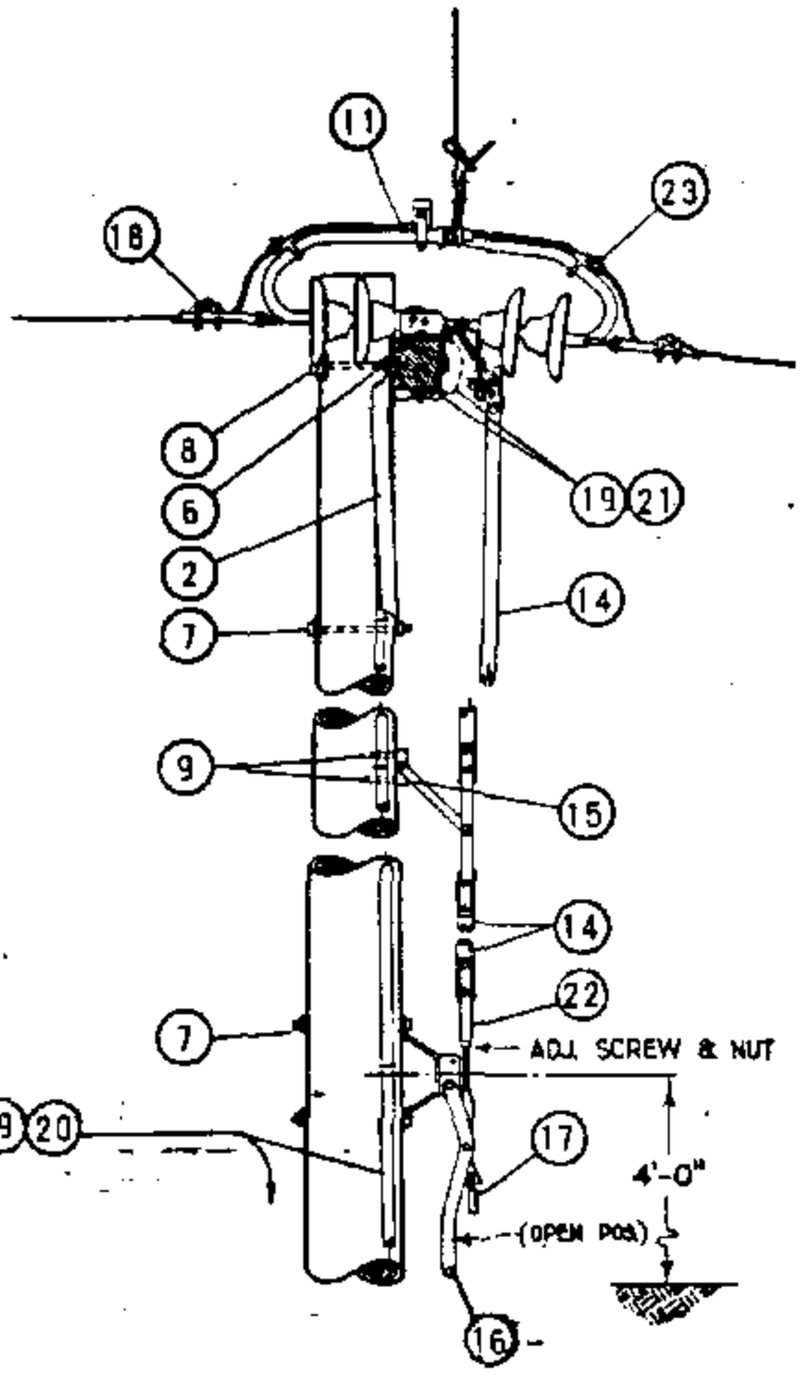
(L) SEE STANDARD 759 FOR USE OF LINE GUARD.

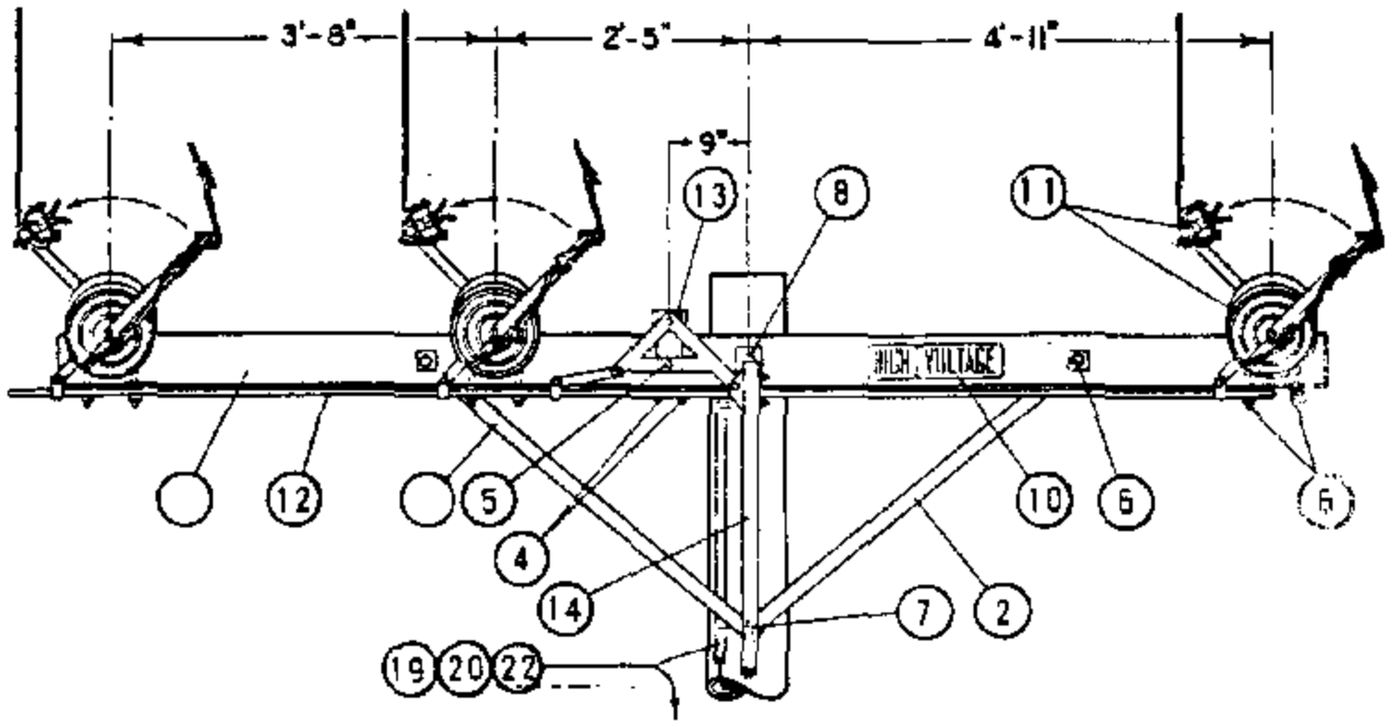
(M) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12).

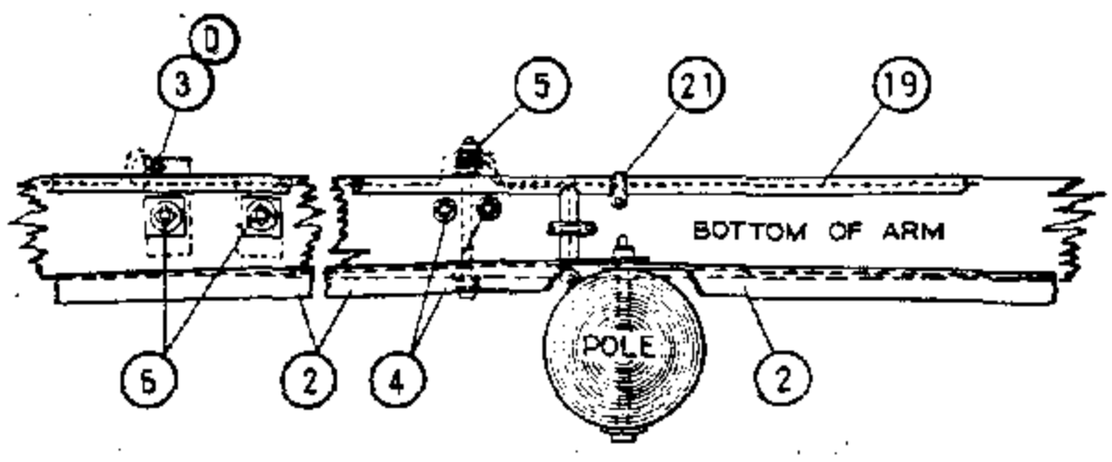
(N) NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES TIE SWITCHES TO CIRCUITS EMANATING FROM DIFFERENT SUBSTATIONS. (SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3).

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| DATE 1–1–93<br>APPD PA 1/1/93 | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV VERTICAL BREAK TYPE<br>SINGLE CIRCUIT HORIZONTAL CONFIGURATION | 1299.209<br>SUPERSEDES<br>1228.2 (8–1–00) |




GROUNDING DETAIL

FOR FIELD MAINTENANCE ONLY

NOTES:

A. MAXIMUM VERTICAL ANGLE SHALL NOT EXCEED 7° FOR ANY CONDUCTOR SIZE.

B. WHERE THE VERTICAL ANGLE EXCEEDS 7° OR THE HORIZONTAL ANGLE EXCEEDS THE VALUE SHOWN IN THE TABLE BELOW, USE SWITCH CONSTRUCTION PG. 1229.

(C) IF THE MAXIMUM DESIGN TENSION IS GREATER THAN 3000 LBS, THE ANGLE CAN BE CALCULATED BY: THE SINE OF THE ANGLE $= \frac{200}{\text{TENSION}}$. THE ANGLE THEN CAN BE DETERMINED FROM TRIGONOMETRIC FUNCTION TABLES.

(D) ITEM 3 IS A BOLT USED TO GROUND THE SWITCH MOUNTING HARDWARE.

MAXIMUM ALLOWABLE LINE ANGLE FOR SWITCHES

| CONDUCTOR SIZE AWG OR KCM | COPPER | | | | COPPERWELD COPPER | | 5005 | | | | ACSR | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 2 | 1/0 | 4/0 | 4A | 4N | 2 | 1/0 | 3/0 | 394.5 | 2 6/1 | 1/0 6/1 | 3/0 6/1 | 336.4 18/1 | 336.4 26/7 | 636 24/7 | 1033 45/7 |
| LINE ANGLE DEGREES | 15 | 9 | 6 | 5 | 7 | 3 | 16 | 11 | 8 | 4 | 13 | 9 | 6 | 5 | 4 | 4 | 4 |
| MAXIMUM DESIGN TENSION LBS/CONDUCTOR | 752 | 1218 | 1900 | 2424 | 1575 | 3384 | 717 | 1050 | 1480 | 2898 | 845 | 1300 | 1860 | 2450 | (C) 3000 | (C) 3000 | (C) 3000 |

DATE 1-1-87
APPD AL/BDS

SDG&E ELECTRIC STANDARDS

POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT
HORIZONTAL CONFIGURATION

1299.301
SUPERSEDES
1230.1 (1-1-87)

METHOD OF ADJUSTING SWITCH

A. FIRST CLOSE SWITCH AND TIGHTEN SWITCH UNIT CRANK CLAMPS TO INTERPHASE CONNECTING PIPE (12)

B. THEN OPEN SWITCH UNTIL SWITCH UNIT CRANK CLAMPS ARE PERPENDICULAR TO ARM.

C. WITH SHORT ARM BELL CRANK (13) ALSO PERPENDICULAR TO ARM, TIGHTEN BELL CRANK CLAMP.

D. WHILE CRANKS ARE PERPENDICULAR TO ARM, CONNECT WOODEN CONTROL ROD (14) TO LONG LEG OF BELL CRANK, CLAMP GUIDES (15) AND CONTOL HANDLE (16) SHOULD BE PERPENDICULAR TO POLE AND HOLD DOWN HOLES (9) DRILLED WHILE IN THIS POSITION

(E) EXEMPT MATERIAL

F. LUBRICATE MOVING PARTS WITH A THIN LAYER OF #89 MEDIUM SILICONE GREASE OR EQUIVALENT.

G. GIVE SWITCH A FEW TRAIL OPERATIONS AND MAKE ADJUSTMENTS ON ADJUSTING SCREW AS NECESSARY.

H. 400 AMP SWITCHES MAY BE USED WITH 336.4 KCMIL AND SMALLER CONDUCTORS. 600 AMP SWITCHES SHALL BE USED ON 636 KCMIL CONDUCTOR AND 1200 AMP SWITCHES SHALL BE USED ON 1033.5 KCMIL CONDUCTOR.

FOR FIELD MAINTENANCE ONLY

| ITEM | | DESCRIPTION | | QUAN. | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 5 3/4" X 5 3/4" X 12'-0" | | 1 | 294016 |
| | 2 | BRACE, ALLEY ARM, 4'-0" | | 2 | 163808 |
| | 3 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2-RD., 1-LOCK WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 4 | BOLT, MACH., GALV., 1/2" X 8", 1-RD., 1-DBL. COIL SPR. WASH & 1-NUT | (E) | 2 | 100 SECTION |
| | 5 | BOLT, MACH., GALV., 1/2" X 8", 3-RD., 1-DBL. COIL SPR. WASH. & 2-NUTS | (E) | 1 | 100 SECTION |
| | 6 | BOLT, MACH., GALV., 5/8" X 8", 1-2 1/4" SQ., 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 8 | 100 SECTION |
| | 7 | BOLT, MACH., GALV., 5/8" X (LENGTH AS REQ'D), 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 8 | BOLT, MACH., GALV., 3/4" X 16", 1-3" SQ., 1-FLAT, 1-CURV., 1-DBL. COIL SPR. WASH & 1-NUT | | 1 | 100 SECTION |
| | 9 | SCREW, LAG, GALV., 1/2" X 4" | (E) | 4 | 621568 |
| | 10 | SIGN, HIGH VOLTAGE, 8-ROOFING NAILS, GALV. | (E) | 2 | 647648, 492192 |
| O C & D | 11 | POLE TOP SWITCH, 15KV, T.P.S.T., HORIZONTALLY MOUNTED, RIGID DISC. INSULATORS ARCING HORNS & INCLUDING ITEMS #13 THRU #17. | | 1 | 709168 400A<br>709184 600A<br>709280 1200A |
| | 12 | PIPE, INTERPHASE CONNECTING, GALV., 1/2" X 11'-6" OR WOOD 1 3/4" X 1 3/4" X 11'-6" | | 1 | - |
| | 13 | BELL CRANK ASSEMBLY | | 1 | 290624 |
| | 14 | ROD, CONTROL, 1 3/4" X 1 3/4" X 10'-0", LAMINATED WOOD | | 4 | 602938 |
| | 15 | GUIDE BEARING, INTERMEDIATE | | 3 | 398688 |
| | 16 | OPERATING LEVER ASSEMBLY COMPLETE WITH ADJUSTING SCREW & NUT | | 1 | - |
| | 17 | PADLOCK, ELECTRIC FF | | 1 | 514848 |
| | 18 | CLAMP, STRAIGHT LINE O.E. | | 6 | 700 SECTION |
| | 19 | WIRE, BARE STRANDED COPPER, #6 BONDING & GROUNDING WIRE | | 60' | 813536 |
| | 20 | GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| | 21 | PIPE STRAP, 3/4" & 2-8D NAILS, GALV. | (E) | 9 | 697888, 491584 |
| | 22 | TAGS, SWITCH NUMBER | (E) | 2 | 720704 |
| | 23 | CONNECTOR, COPPER TO ALUMINUM #1/0-336.4 MCM ACSR OR 5005, WHERE REQ'D. | | 6 | 700 SECTION |
| | | | | | |
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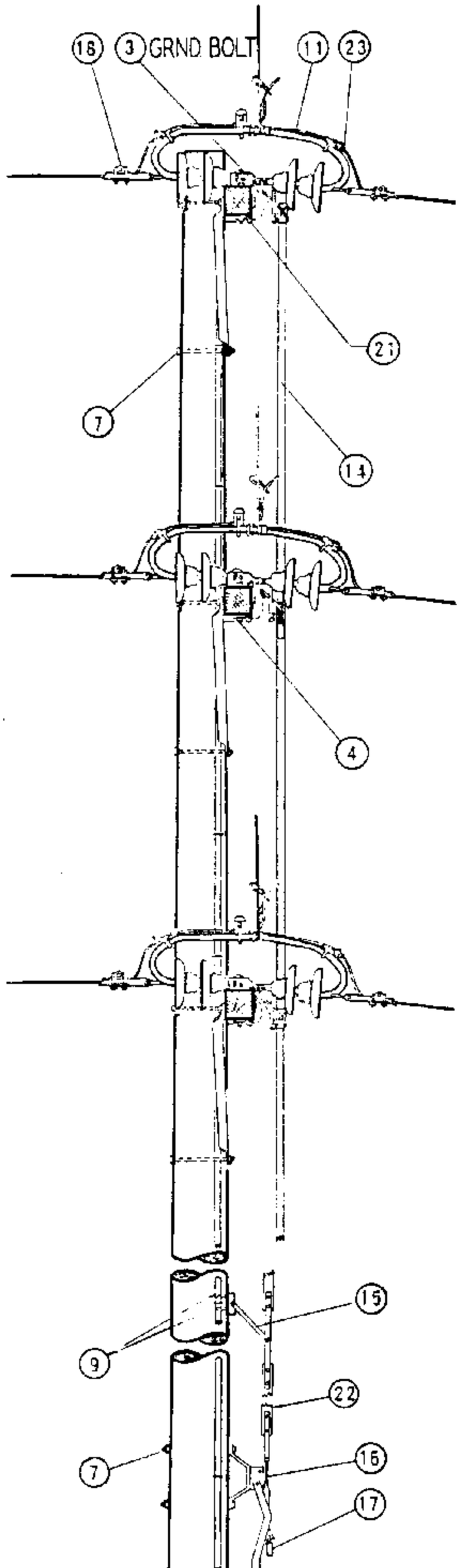
1299.302
SUPERSEDES
1230.2 (1-1-87)

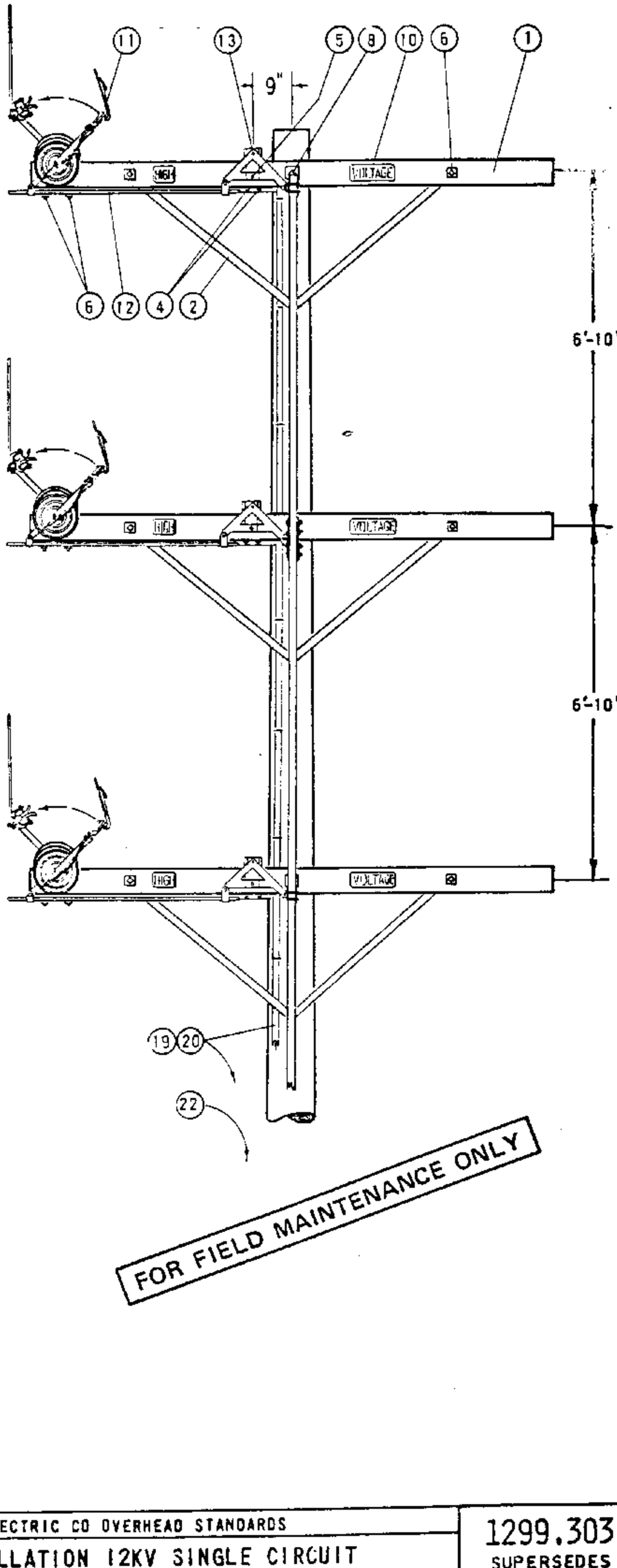
SDG&E ELECTRIC STANDARDS

# POLE TOP SWITCH INSTALLATION
# 12KV SINGLE CIRCUIT HORIZONTAL CONFIGURATION

DATE 1-1-87
APPD AK /

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FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-87<br>APPD AK/RJS | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>POLE TOP SWITCH INSTALLATION 12KV SINGLE CIRCUIT<br>VERTICAL CONFIGURATION | 1299.303<br>SUPERSEDES<br>1231.1 (1-1-87) |

FOR FIELD MAINTENANCE ONLY

NOTES:
A. FOR METHOD OF ADJUSTING SWITCH, SEE PAGE 1230.
(E) EXEMPT MATERIAL.

| ITEM | | DESCRIPTION | | QUAN. | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P T B F | 1 | CROSSARM, 5 3/4" X 5 3/4" X 10'-0" | | 3 | 294016 |
| | 2 | BRACE, ALLEY ARM, 4'-0" | | 6 | 163808 |
| | 3 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2-RD., 1-LOCK WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 4 | BOLT, MACH., GALV., 1/2" X 8", 1-RD., 1-DBL. COIL SPR. WASH & 1-NUT | (E) | 6 | 100 SECTION |
| | 5 | BOLT, MACH., GALV., 1/2" X 8", 3-RD., 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 3 | 100 SECTION |
| | 6 | BOLT, MACH., GALV., 5/8" X 8", 1-2 1/4" SQ., 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 12 | 100 SECTION |
| | 7 | BOLT, MACH., GALV., 5/8" X (LENGTH AS REQ'D), 1-DBL. COIL SPR. WASH. & 1-NUT | (E) | 5 | 100 SECTION |
| | 8 | BOLT, MACH., GALV., 3/4" X 16", 1-3" SQ., 1-FLAT, 1-CURV., 1-DBL. COIL SPR. WASH & 1-NUT | | 3 | 100 SECTION |
| | 9 | SCREW, LAG, GALV., 1/2" X 4" | (E) | 6 | 621568 |
| | 10 | SIGN, HIGH VOLTAGE, 8-ROOFING NAILS, GALV. | (E) | 6 | 647648, 492192 |
| O C B D | 11 | POLE TOP SWITCH, 15KV, T.P.S.T., VERTICALLY MOUNTED, RIGID DISC. INSULATORS ARCING HORNS & INCLUDING ITEMS #13 THRU #17. | | 1 | 709168 400A<br>709184 600A |
| | 12 | PIPE, INTERPHASE CONNECTING, GALV., 1/2" X 4'-6" | | 3 | - |
| | 13 | BELL CRANK ASSEMBLY | | 3 | 290624 |
| | 14 | ROD, CONTROL, 1 3/4" X 1 3/4" X 10'-0", LAMINATED WOOD | | 6 | 602938 |
| | 15 | GUIDE BEARING, INTERMEDIATE | | 4 | 398688 |
| | 16 | OPERATING LEVER ASSEMBLY COMPLETE WITH ADJUSTING SCREW & NUT | | 1 | - |
| | 17 | PADLOCK, ELECTRIC FF | | 1 | 514848 |
| | 18 | CLAMP, STRAIGHT LINE D.E. | | 6 | 700 SECTION |
| | 19 | WIRE, BARE STRANDED COPPER, #6 | | 70' | 813536 |
| | 20 | GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| | 21 | PIPE STRAP, 3/4" & 2-8D NAILS, GALV. | (E) | 9 | 697888, 491584 |
| | 22 | TAGS, SWITCH NUMBER | (E) | 2 | 720704 |
| | 23 | CONNECTOR, COPPER TO ALUMINUM #1/0-336.4 MCM ACSR OR 5005, WHERE REQ'D. | | 6 | 700 SECTION |
| | | | | | |
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1299.304
SUPERSEDES
1231.2 (1-1-87)

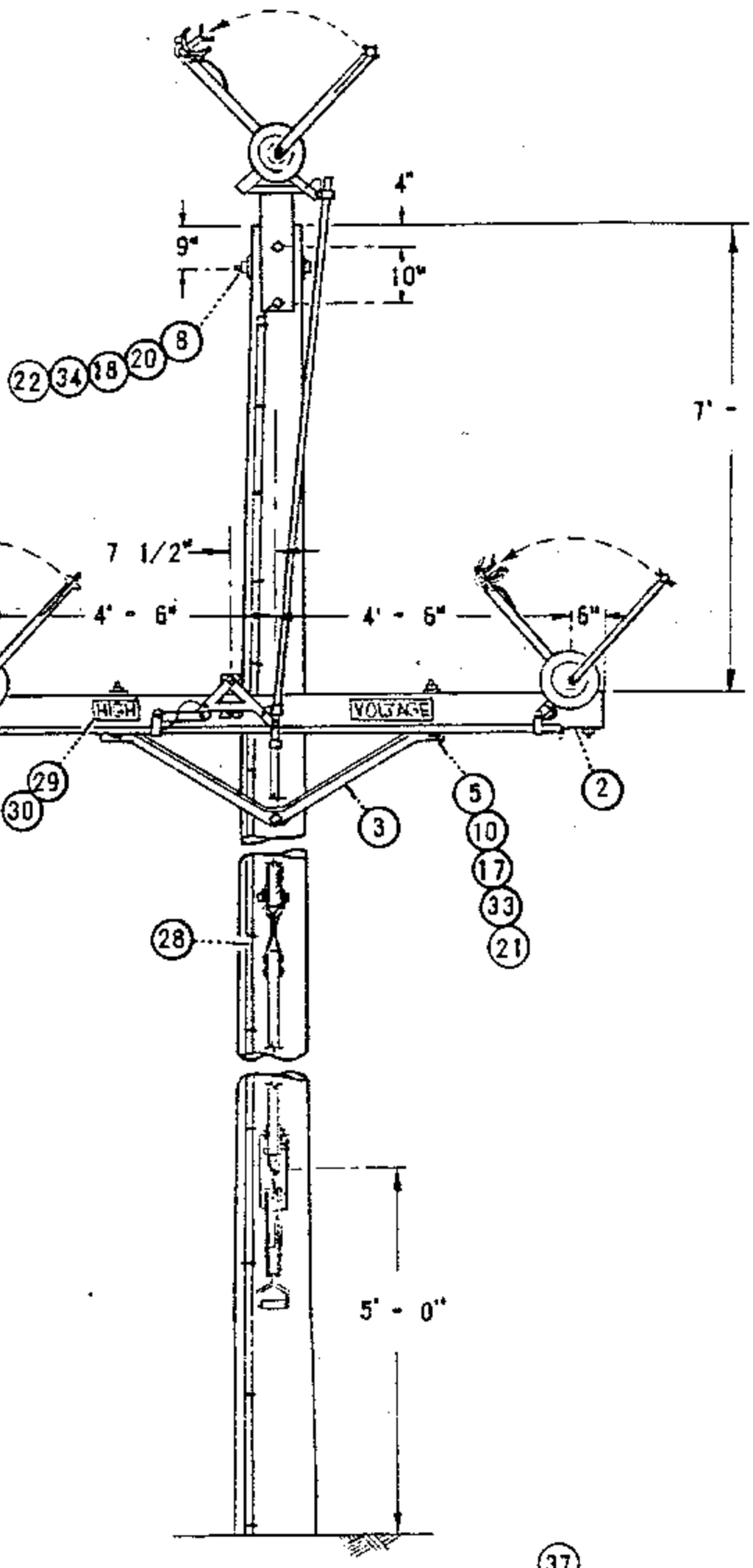
SDGBE ELECTRIC STANDARDS

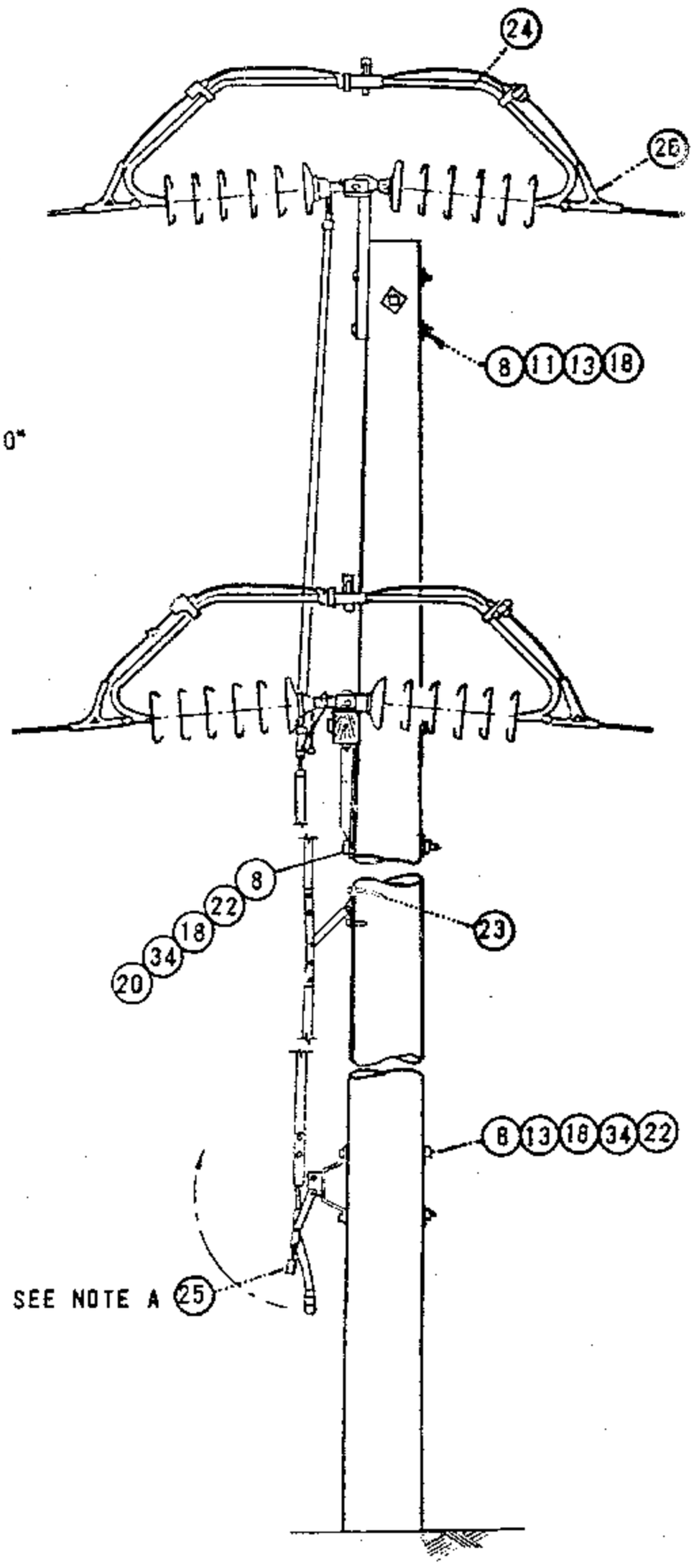
# POLE TOP SWITCH INSTALLATION
# 12KV SINGLE CIRCUIT VERTICAL CONFIGURATION

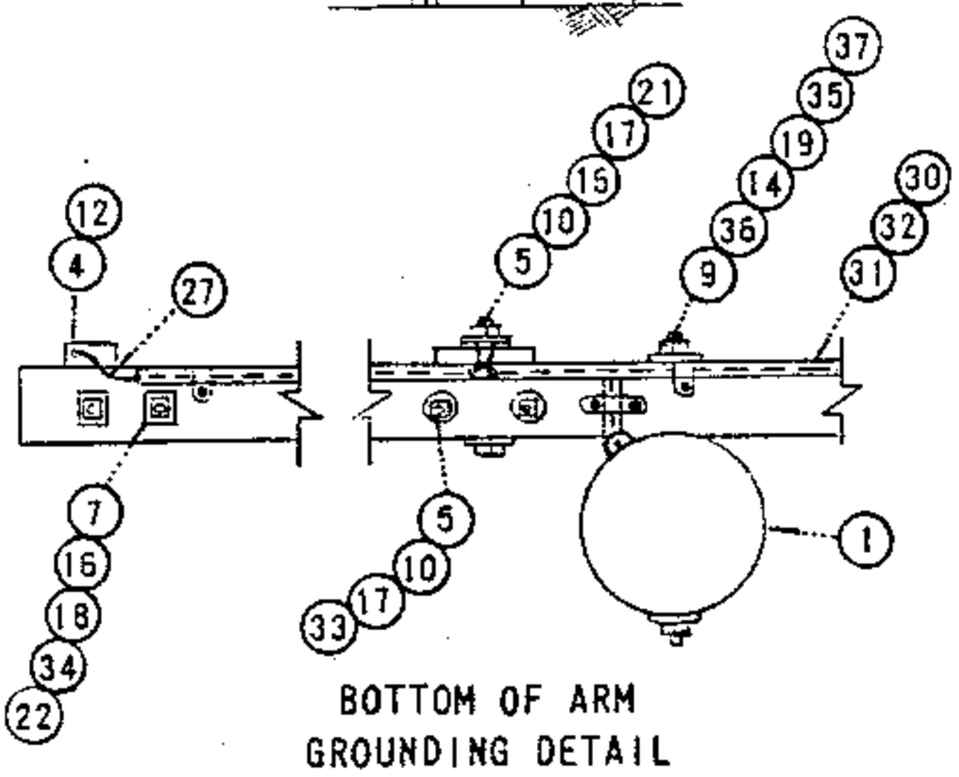
DATE 1-1-87
APPD AK 1/87

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BOTTOM OF ARM
GROUNDING DETAIL

FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-87<br>APPD AK/DSS | SAN DIEGO GAS & ELECTRIC CO OVERHEAD STANDARDS<br>POLE TOP SWITCH INSTALLATION 69KV<br>SINGLE CIRCUIT TRIANGULAR CONFIGURATION | 1299.305<br>SUPERSEDES<br>1236.1 (1-1-87) |

FOR FIELD MAINTENANCE ONLY

NOTES:

A. SWITCH HANDLE SHOWN IN OPEN POSITION.

B. REFER TO PAGE 1230 FOR METHOD OF ADJUSTING SWITCH AND FOR DETERMINING MAXIMUM LINE ANGLE PERMITTED FOR SWITCH.

C. THE 600 AMP SWITCH MAY BE USED ON SINGLE CIRCUIT 636 KCMIL AND SMALLER CONDUCTORS.

(E) EXEMPT MATERIAL.

| ITEM PTF | ITEM TOC | MATERIAL | | QUANTITY | STOCK NO OR CONSTR STD. |
|---|---|---|---|---|---|
| 1 | | POLE, CLASS AND HEIGHT (AS REQ'D) | | 1 | 300 SECTION |
| 2 | | CROSSARM, 5 3/4" X 5 3/4" X 10' - 0" (CELLON OR GRAY) | | 1 | 294144 OR 294304 |
| 3 | | BRACE, CROSSARM 5' - 0" ANGLE STEEL | | 1 | 164128 |
| 4 | | BOLT, MACH. 1/2" X 1 1/2" | (E) | 3 | 152608 |
| 5 | | BOLT, MACH. 1/2" X 8" | (E) | 5 | 153152 |
| 6 | | | | | |
| 7 | | BOLT, MACH. 5/8" X 8" | (E) | 4 | 155584 |
| 8 | | BOLT, MACH. 5/8" X (LENGTH AS REQ'D) | (E) | 6 | 100 SECTION |
| 9 | | BOLT, MACH 3/4" X (LENGTH AS REQ'D) | | 1 | 100 SECTION |
| 10 | | WASHER, 1/2" ROUND | (E) | 11 | 800192 |
| 11 | | WASHER, 5/8" ROUND | (E) | 2 | 800320 |
| 12 | | WASHER, 1/2" LOCK | (E) | 3 | 796768 |
| 13 | | WASHER, 3" SQUARE CURVED RIB | (E) | 5 | 797792 |
| 14 | | WASHER, 4" SQUARE CURVED RIB | | 1 | 797760 |
| 15 | | | | | |
| 16 | | WASHER, 2 1/4" SQUARE FLAT | (E) | 7 | 799040 |
| 17 | | WASHER, SPRING DOUBLE COIL 1/2" | (E) | 5 | 798464 |
| 18 | | WASHER, SPRING DOUBLE COIL 5/8" | (E) | 12 | 798560 |
| 19 | | WASHER, SPRING DOUBLE COIL 3/4" | | 1 | 798496 |
| 20 | | WASHER, 3" SQUARE CURVED | | 2 | 798912 |
| 21 | | NUT, 1/2" | (E) | 8 | 504736 |
| 22 | | NUT 5/8" | (E) | 12 | 506880 |
| 23 | | SCREW, LAG 1/2" X 4" | (E) | 2 | 621568 |
| | 24 | POLE TOP SWITCH, 69KV, 600 AMP | | 1 | 709088 |
| | 25 | PAD LOCK, ELECTRIC FF | | 1 | 514848 |
| | 26 | CLAMPS, STRAIN | | 6 | 700 SECTION |
| 27 | | WIRE, BARE STRANDED COPPER, #6 | | 60' | 813536 |
| 28 | | ROD, GROUND UNIT (GRAY OR PLAIN) | | 1 | 603120, 603136 |
| 29 | | SIGN, HIGH VOLTAGE | (E) | 2 | 647648 |
| 30 | | NAILS, ROOFING 8 GALV. | (E) | 28 | 492192 |
| 31 | | CONDUIT, SCH. 40, 1/2" | (E) | 9' | 251168 |
| 32 | | STRAP, 1/2" PIPE | (E) | 5 | 697728 |
| 33 | | LOCKNUT, M-F 1/2" | (E) | 5 | 504544 |
| 34 | | LOCKNUT, M-F 5/8" | (E) | 10 | 504608 |
| 35 | | LOCKNUT, M-F 3/4" | | 1 | 504576 |
| 36 | | WASHER, 3" SQUARE FLAT | | 1 | 799104 |
| 37 | | NUT, 3/4 | | 1 | 100 SECTION |
| 38 | | TAGS, SWITCH NUMBER | | 2 | 720704 |
| | | | | | |
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1299.306
SUPERSEDES
1236.2 (1-1-87)

SDG&E ELECTRIC STANDARDS

POLE TOP SWITCH INSTALLATION 69KV
SINGLE CIRCUIT TRIANGULAR CONFIGURATION

DATE 1-1-87
APPD AK RDS

SCOPE: THIS STANDARD SHOWS A HORIZONTAL BREAK GANG OPERATED POLE TOP SWITCH FOR CIRCUIT TIES OR SECTIONALIZING PURPOSES. THIS INSTALLATION IS PREFERRED OVER STANDARD 1228.

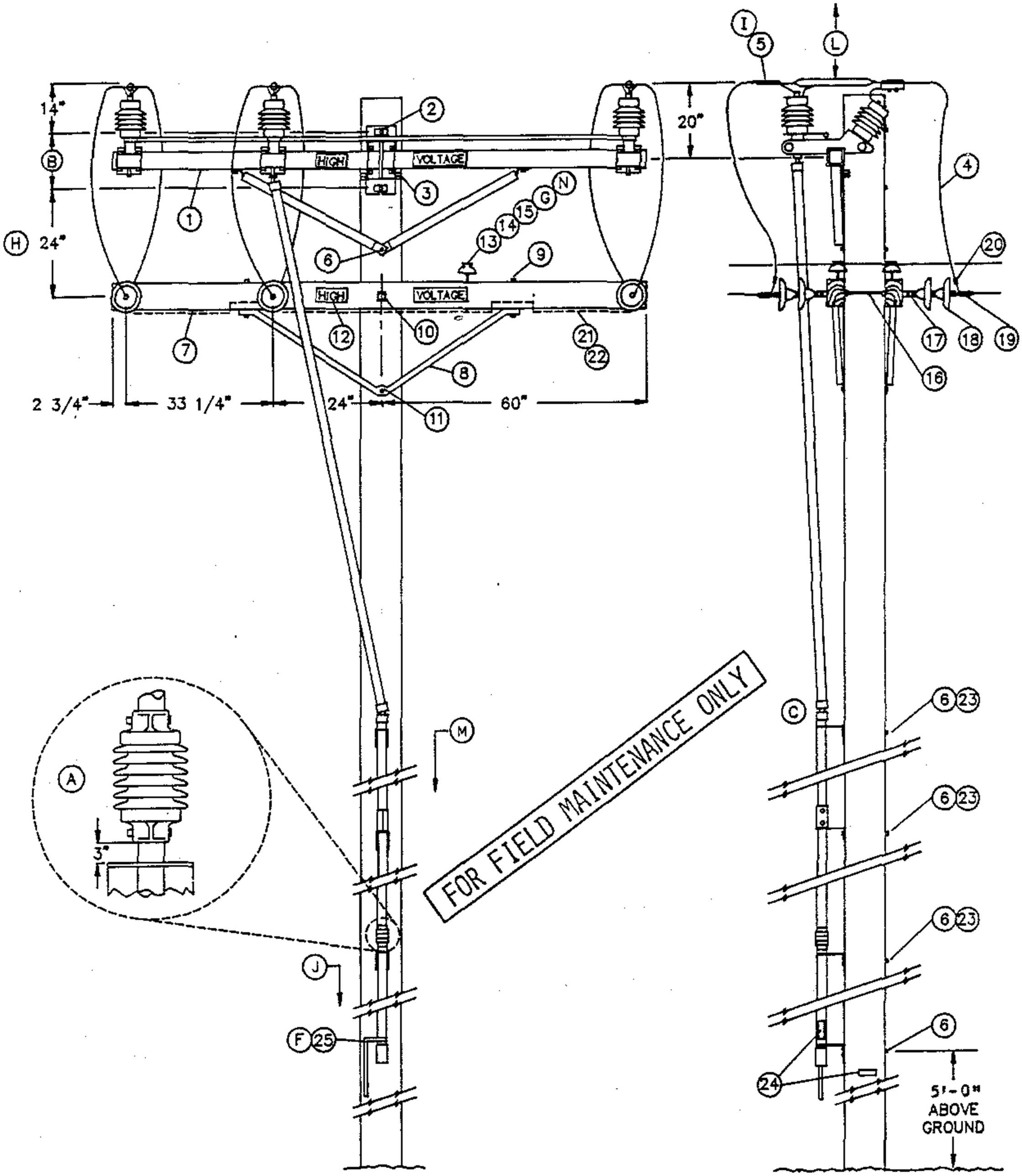



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| DATE 1-1-93<br>APPD | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV HORIZONTAL BREAK TYPE SINGLE CIRCUIT HORIZONTAL CONFIGURATION | 1299.307<br>SUPERSEDES 1230.1 (1-1-92) |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONSTR. STD | STOCK NUMBER |
|---|---|---|---|---|
| 1 | SWITCH, T.P.S.T., 600 AMP, INCLUDING 40' OF CONTROL ROD (C) | 1 | - | 709250 |
| | ADDITIONAL 10'-6" CONTROL ROD WITH GUIDE BEARING AND COUPLING | AS REQ'D | - | 604428 |
| 2 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 2 | 392 | - |
| 3 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | - | 621568 |
| 4 | WIRE, BARE STRANDED CU OR AL (SIZE AS REQ'D) | 33' | 711-715 | - |
| 5 | TERMINAL, COMPRESSION LUG (I) (E) | 6 | 794-795 | - |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 5 | 392 | - |
| 7 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 2 | - | 294128 |
| 8 | BRACE, ANGLE, 5' - 0" | 2 | - | 164128 |
| 9 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 4 | 392 | - |
| 10 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 12 | SIGN, HIGH VOLTAGE, AND (E)<br>9 ROOFING NAILS, GALV (E) | 2<br>- | -<br>- | 647648<br>492224 |
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" (G) (E) | 2 | - | 532704 |
| 14 | INSULATOR, 12KV NEUTRAL (G) | 2 | - | 429216 |
| 15 | WIRE, TIE (DOUBLE) (G) (E) | 1 | 760-764 | - |
| 16 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (E) | 3 | 392 | - |
| 17 | CLEVIS, DEAD END, 5/8" BOLT STEEL (CLOSED TYPE) (E) | 6 | - | 235712 |
| 18 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 12 | 750 | - |
| 19 | CLAMP, STRAIGHT LINE, D.E. | 6 | 741-743 | - |
| 20 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-786 | - |
| 21 | WIRE, #8 BARE SOLID ANNEALED COPPER | 12' | - | 812928 |
| 22 | STAPLE, FENCE, GALV, 1 1/4" (E) | AS REQ'D | - | 678528 |
| 23 | SCREW, LAG, GALV, 5/8" X 5" (E) | 2 | - | 621600 |
| 24 | TAG, SWITCH NUMBER | 2 | 204 | - |
| 25 | PADLOCK , MEDECO | 1 | - | 514862 |

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FOR FIELD MAINTENANCE ONLY

INSTALLATION:

(A) INSTALL CONTROL PIPE INSULATOR THREE INCHES ABOVE THE NEXT GUIDE BEARING UP FROM THE SWITCH HANDLE.

(B) USE THE FOLLOWING THROUGH-BOLT DRILLING DIMENSIONS: A.B. CHANCE = 13-1/4", S&C = 14".

(C) SWITCHES ARE FURNISHED WITH 40 FEET OF OPERATING CONTROL ROD. THE TOP SECTION OF THE CONTROL ROD IS MADE OF FIBER GLASS, THE LOWER SECTIONS ARE MADE OF GALVANIZED PIPE.

D. SWITCH CONTROL MECHANISM DOES NOT REQUIRE GROUNDING.

(E) EXEMPT MATERIAL.

(F) THE SWITCH IS SHIPPED FACTORY ADJUSTED. HOWEVER, THE SWITCH HANDLE LOCK SEGMENTS WILL REQUIRE ADJUSTMENT. REFER TO INSTALLATION INSTRUCTIONS PROVIDED WITH SWITCH.

(G) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(H) SWITCH MAY BE INSTALLED BELOW LINEARM. DRILL SWITCH ARM UPPER MOUNTING BOLT HOLE 36" BELOW LINE ARM THRU BOLT (SEE STANDARD 1444).

(I) WHEN ATTACHING 1/0 AND 4/0 COPPER CONDUCTORS TO A POLE TOP SWITCH, USE A BRONZE CABLE TAP LUG, STOCK NUMBER 471296. IF EXCESSIVE VIBRATION OR WHIPPING COULD OCCUR, USE TWO LUGS IN SERIES.

REFERENCES:

(J) POLE STEPPING – SEE STANDARD 363.

K. SEE DESIGN MANUAL PAGE 6111 – FEEDER CIRCUIT SECTIONALIZING AND PROTECTION.

(L) SEE SECTION 200 FOR MINIMUM VERTICAL SEPARATION.

(M) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

(N) NEUTRALS SHALL BE SOLIDLY TIED TOGETHER AT ALL SWITCHES REGARDLESS WHETHER THEY ARE NORMALLY OPEN OR CLOSED. THIS INCLUDES TIE SWITCHES TO CIRCUITS EMANATING FROM DIFFERENT SUBSTATIONS. (SEE DESIGN MANUAL STANDARD PAGE 6221.2, D.3).

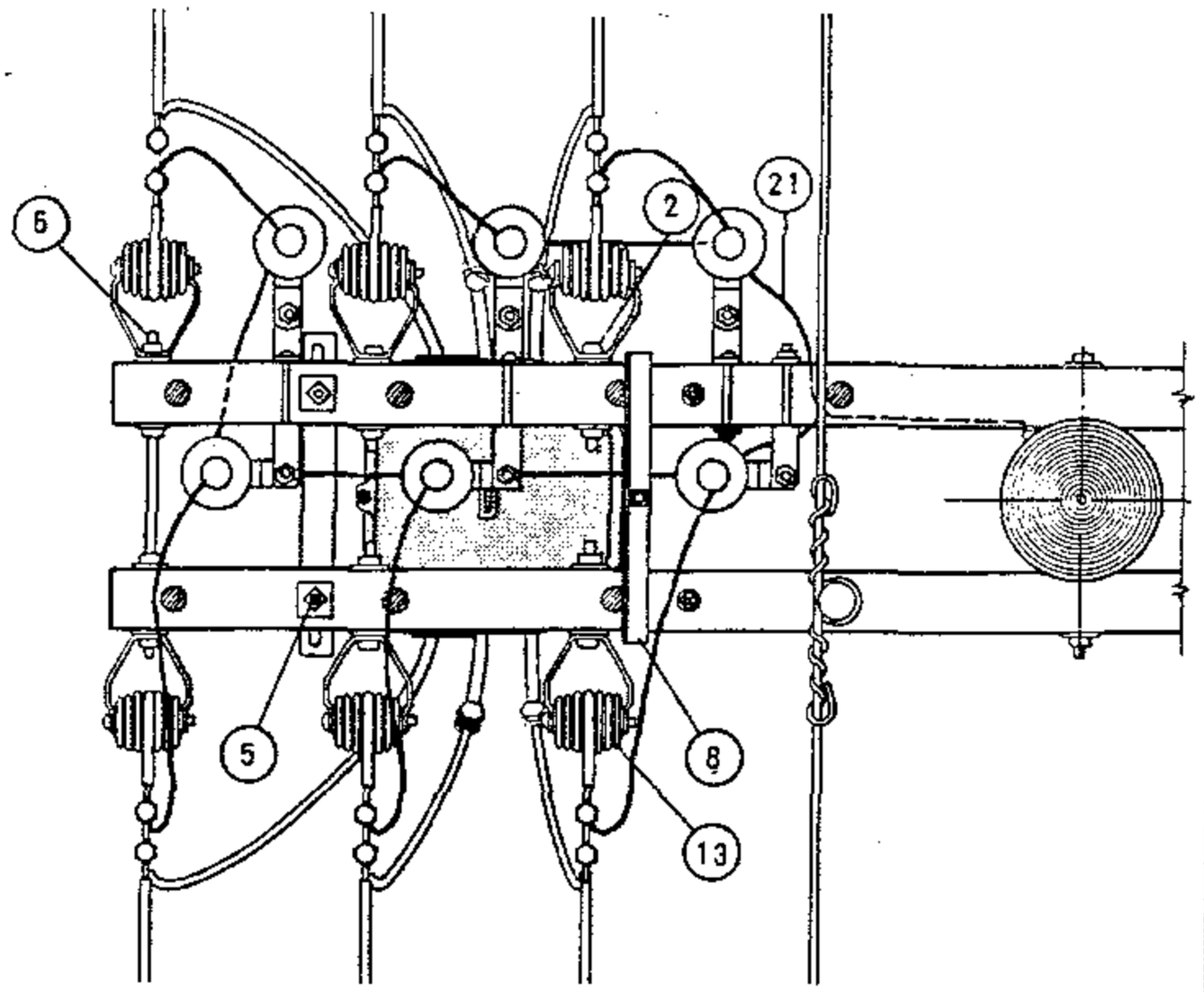
O. CONTROL PIPE AND SWITCH HANDLE ARE NOT ALLOWED IN THE CLIMBING SPACE (G.O. 95, 54.7-A4 ).

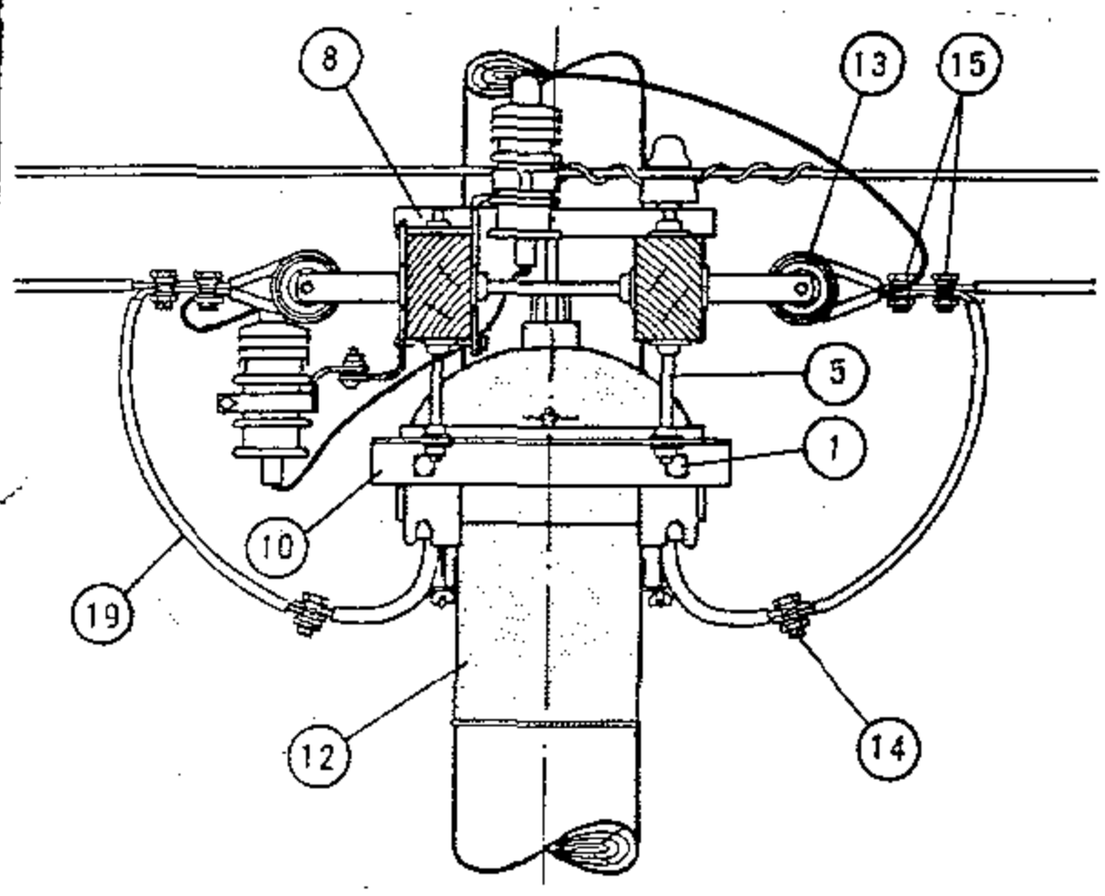
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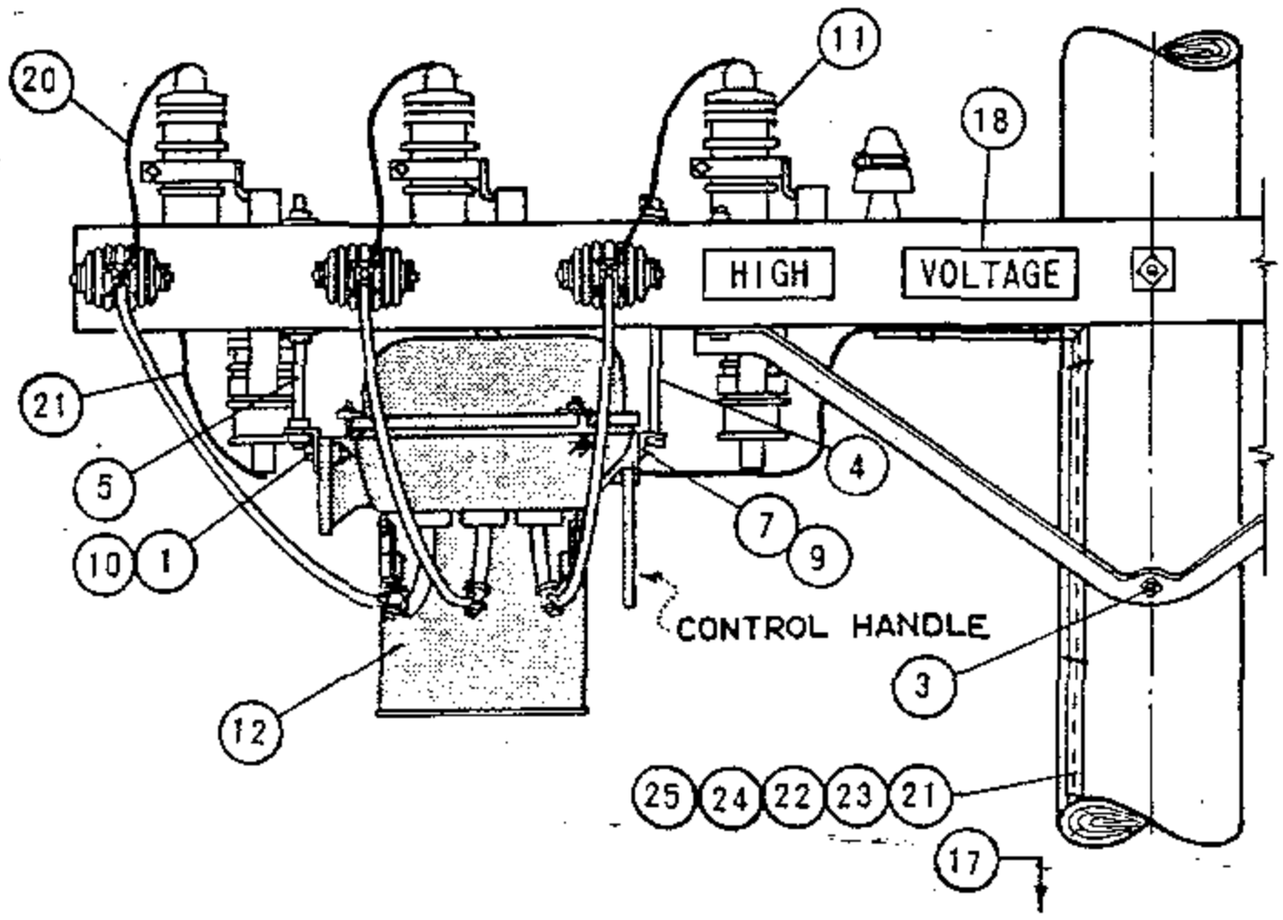
FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| DATE 1-1-93<br>APPD P.A./2009 | SDG&E ELECTRIC STANDARDS<br>POLE TOP SWITCH 12KV HORIZONTAL BREAK TYPE<br>SINGLE CIRCUIT HORIZONTAL CONFIGURATION | 1299.309<br>SUPERSEDES<br>1230.3 (1-1-92) |

THIS PAGE FOR FIELD MAINTENANCE ONLY




A. BETWEEN SWITCH CASE AND ARRESTER, 1 1/2 INCH CLEARANCE MUST BE MAINTAINED. USE LONGER BOLTS FOR SWITCH SUPPORTS IF REQUIRED.

(E) EXEMPT MATERIAL

| ITEM | DESCRIPTION | QUANTITY #6 #4 OR | QUANTITY #2 UP | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | MACH BOLT, GALV, 5/8" X 2" 1 RD WASHER & 1 NUT (E) | 2 | 2 | PGS 139, 140 |
| 2 | MACH BOLT, GALV, 5/8" X 5" 1-2 1/2" SQ WASHER & 1 NUT (E) | 4 | 0 | PGS 139, 140 |
| 3 | MACH BOLT, GALV, 5/8" X 10" TO 16", 1 NUT (E) | 1 | 1 | PGS 139, 140 |
| 4 | MACH BOLT, GALV, 5/8" X 14", 1 NUT (E) | 1 | 1 | PGS 139, 140 |
| 5 | SPACE BOLT, GALV, 5/8" X 16", 2 RD & 2 SQ WASH & 2 NUTS (E) | 2 | 2 | PGS 139, 140 |
| 6 | SPACE BOLT, GALV, 5/8" X 16" TO 24", 4 SQ WASHER & 4 NUTS (E) | 2 | 2 | PGS 139, 140 |
| 7 | CAP SCREW, GALV, 3/8" X 3/4" | 2 | 2 | 619328 |
| 8 | MOUNTING BRACKET, OIL SWITCH | 1 | 1 | 166464 |
| 9 | MOUNTING BRACKET, OIL SWITCH | 1 | 1 | 166464 |
| 9 | MOUNTING BRACKET, OIL SWITCH | 1 | 1 | 166464 |
| 11 | ARRESTER, 3 KV | 6 | 6 | PG 1247 |
| 12 | POLETOP SWITCH, WEST. TYPE FO 11, 5KV, 400 A | 1 | 1 | 171584 |
| 13 | INSULATOR, 4KV O.E. WITH CLEVIS (E) | 6 | 6 | 430848 |
| 14 | WIRE CONNECTOR, SPLIT BOLT, SIZE AS REQUIRED (E) | 19 | 7 | PG 783 |
| 15 | WIRE CLAMP OR O.E. | 0 | 6 | PGS 743, 787 |
| 16 | | | | |
| 17 | POLE STEPS (E) | 17 | 17 | 592992 |
| 18 | SIGN, HIGH VOLTAGE & ROOFING NAILS (E) | 2 | 2 | 647648, 492224 |
| 19 | WIRE SAME SIZE AS LINE | 15' | 15' | PGS 711 716 |
| 20 | WIRE, BARE COPPER #6 | 12 | 12 | 813536 |
| 21 | WIRE, BARE COPPER #2 | AS REQ'D | | 813664 |
| 22 | MOULDING, 1" HARDWOOD | AS REQ'D | | 487200 |
| 23 | STAPLES, FENCE GALV 1 1/4" (E) | AS REQ'D | | 678528 |
| 24 | STAPLES, 3" GALV (E) | AS REQ'D | | 678560 |
| 25 | ROD, GROUND & CLAMP | 2 | 2 | 603072, 230015 (E) |

DATE 6-4-82
APPD JRH

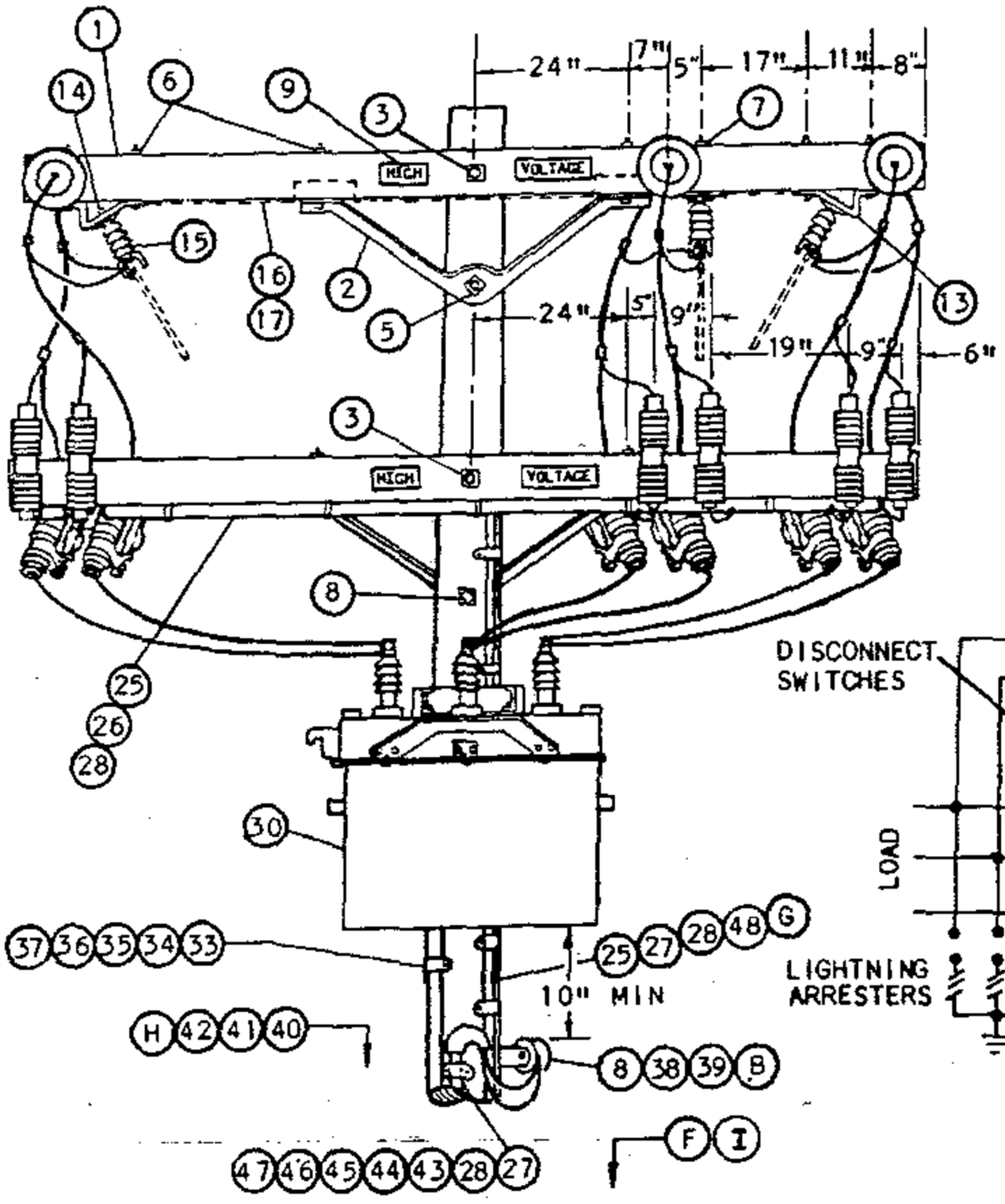
SDG&E ELECTRIC STANDARDS

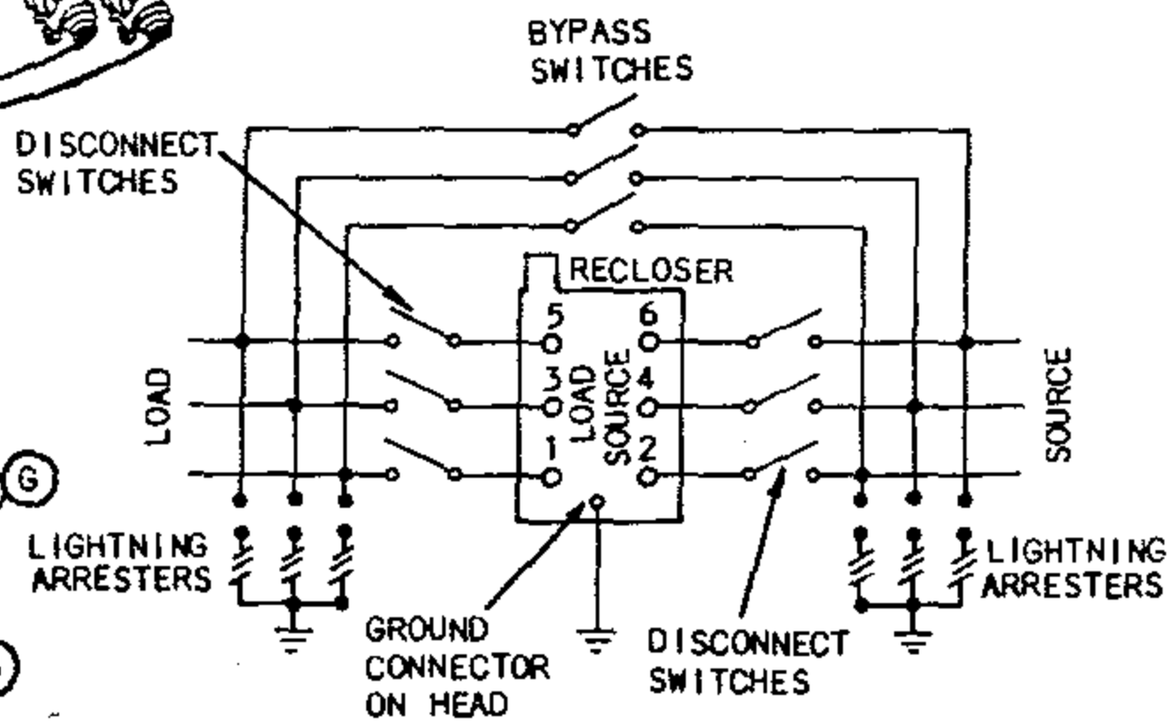
# POLE TOP SWITCH INSTALLATION
## 4 KV WESTINGHOUSE OIL SWITCH, TYPE FO11

1299.401
SUPERSEDES
1240 (6-4-82)

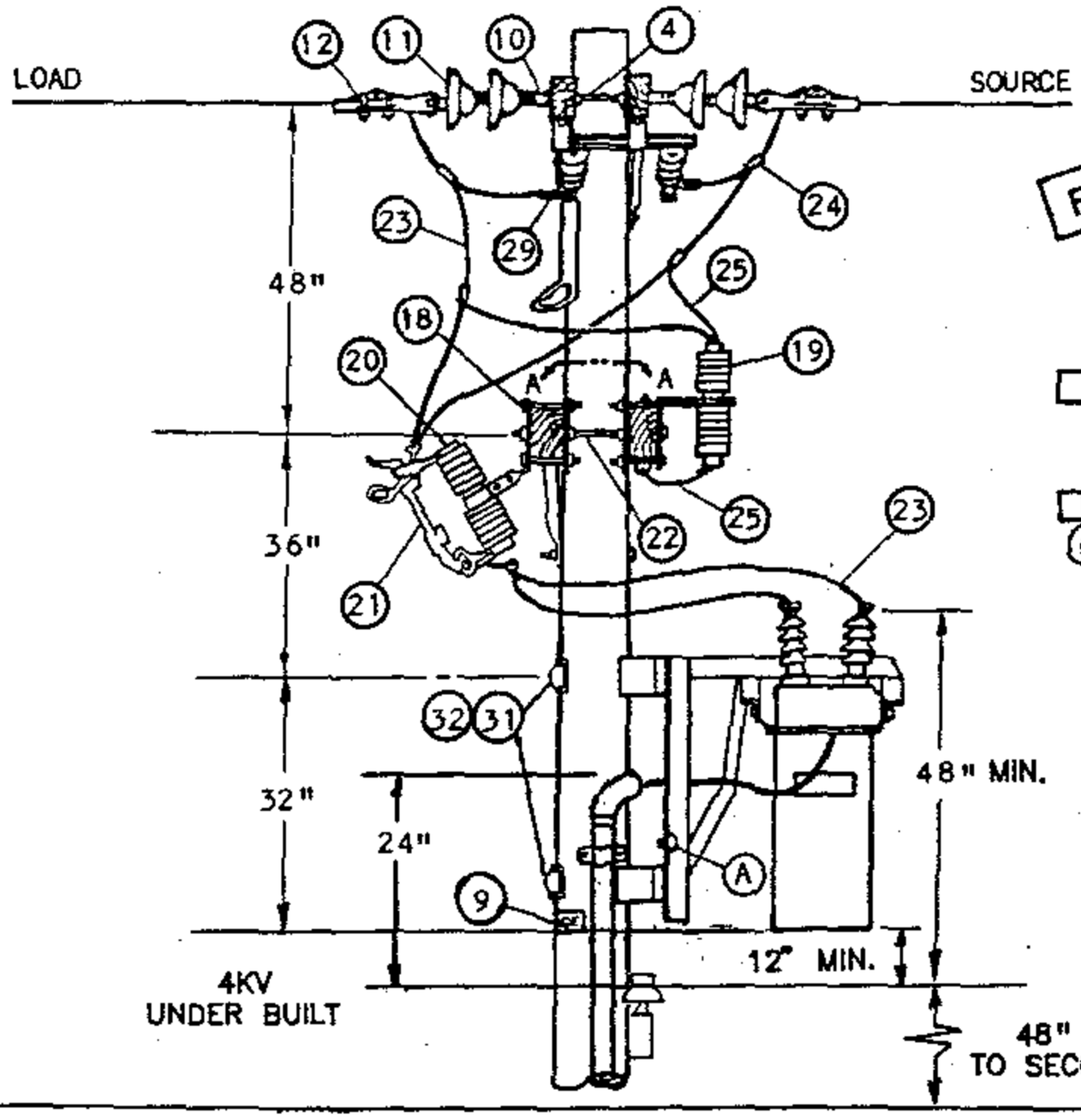
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**SCOPE:** THIS STANDARD SHOWS THE INSTALLATION METHOD OF A DISTRIBUTION SERVICE RESTORER WHICH MAY BE USED WITH #3/0 ACSR OR #1/0 COPPER AND SMALLER CONDUCTORS.

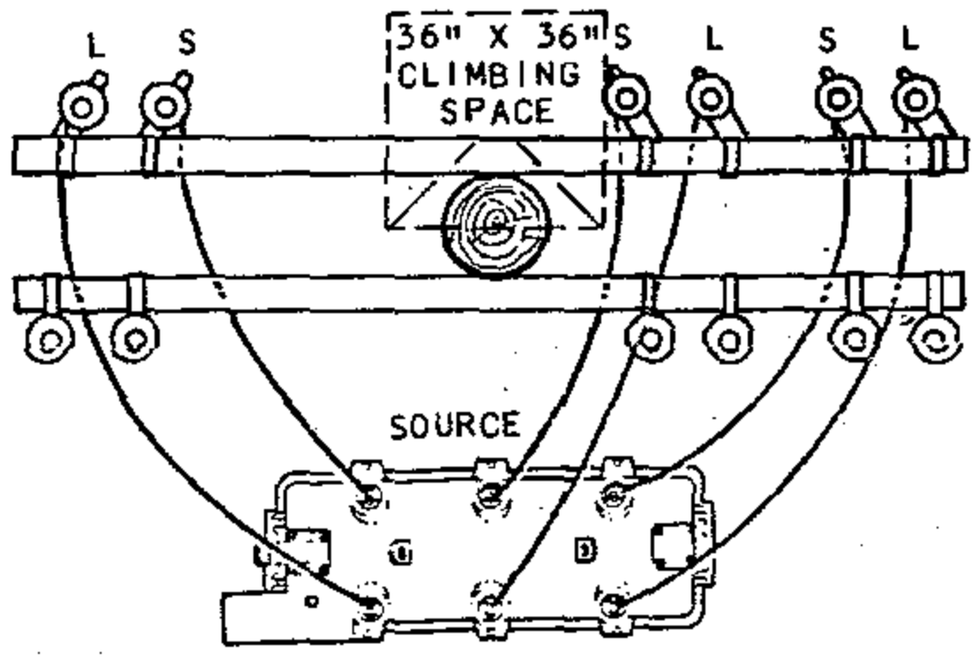



SCHEMATIC DIAGRAM




FOR FIELD MAINTENANCE ONLY




SECTION VIEW A-A

| | | |
|---|---|---|
| 1299.701<br>SUPERSEDES<br>1270.1 (1-1-90) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER WITH CUTOUT DISCONNECT | DATE 1-1-90<br>APPD PHA / DTC |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 12' - 0" | 4 | - | 294160 |
| 2 | BRACE, 4', ANGLE, GALV | 3 | - | 164032 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHERS (E) | 2 | 392 | - |
| 4 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 2 SQUARE, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (E) | 3 | 392 | - |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 6 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 14 | 392 | - |
| 7 | BOLT, MACH, GALV, 1/2" X 8", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 2 | 392 | - |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 2 | 392 | - |
| 9 | SIGN, HIGH VOLTAGE & (E)<br>9 ROOFING NAILS, GALV (E) | 5<br>- | -<br>- | 647648<br>492224 |
| 10 | CLEVIS, DEAD-END, 5/8", BOLT STEEL (CLOSED TYPE) | 6 | - | 235712 |
| 11 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 12 | - | 431616 |
| 12 | CLAMP, STRAIGHT LINE, O.E. | 6 | 741-743 | - |
| 13 | BRACKET, DISCONNECT, ANGLE MOUNTING | 4 | - | 166542 |
| 14 | BOLT, MACH, GALV, 3/8" X 2", 2 ROUND & 1 LOCK WASHER (E) | 4 | 392 | - |
| 15 | SWITCH, DISCONNECT, 14.4KV, 600A | 3 | - | 707008 |
| 16 | WIRE, BARE SOLID ANNEALED COPPER, #8 | 30' | - | 812928 |
| 17 | STAPLES, FENCE, GALV, 1 1/4" (E) | AS REQ'D | - | 678528 |
| 18 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 12 | - | 166070 |
| 19 | ARRESTER, LIGHTNING, 12KV | 6 | - | 113248 |
| 20 | CUTOUT BODY, 12KV | 6 | 1212 | 297956 |
| 21 | SOLID BLADE, 300A, 12KV CUTOUT | 6 | 1212 | 138850 |
| 22 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT (E) | 2 | 392 | - |
| 23 | WIRE, BARE STRANDED COPPER, 1/0 | 75' | - | 813568 |
| 24 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-787 | - |
| 25 | WIRE, BARE STRANDED COPPER, #4 | 105' | - | 813760 |
| 26 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" X 10', AND (E)<br>STRAPS, PIPE, GALV, 1" AND 2-1 3/4" ROOFING NAILS (E) | 1<br>AS REQ'D | -<br>- | 251200<br>697792 |
| 27 | CONDUIT, PVC, TYPE 2, SCHEDULE 80, 3/4" X 10' (E) | 3 | - | 251520 |
| 28 | STRAPS, PIPE, GALV, 3/4" AND (E)<br>2 - 6D NAILS, GALV (E) | AS REQ'D<br>AS REQ'D | -<br>- | 697888<br>491552 |
| 29 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) (E) | 6 | 794/795 | - |
| 30 | RECLOSER, MCGRAW-EDISON, 560A, TYPE WE (INCLUDING BRACKET) (C) | 1 | - | 572110 |

FOR FIELD MAINTENANCE ONLY

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SDG&E ELECTRIC STANDARDS

DATE 1-1-90
APPD PEA/DTB

# SERVICE RESTORER WITH CUTOUT DISCONNECT

1299.702
SUPERSEDES
1270.2 (1-1-90)

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 31 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVE RIBBED AND 1 DOUBLE COIL SPRING WASHER - (E) | 2 | 392 | - |
| 32 | COVER, BOLT, PLASTIC AND (E)<br>6 10-D NAILS, GALV (E) | 2<br>- | -<br>- | 285696<br>491392 |
| 33 | CONTROL CABLE FOR McGRAW-EDISON RECLOSER (H) | 1 | - | 192010 |
| 34 | CONDUIT, PVC, SCHEDULE 40, 2" X 10' (E) | 2 | - | 251296 |
| 35 | ELBOW, PVC, SCHEDULE 40, 2" (E) | 2 | - | 321792 |
| 36 | ELBOW, PVC, SCHEDULE 40, 2", 12" RADIUS (E) | 1 | - | 321816 |
| 37 | STRAP, PIPE, GALV, 2" AND (E)<br>2 - 10D NAILS, GALV, (E) | AS REQ'D<br>AS REQ'D | -<br>- | 697856<br>491392 |
| 38 | BRACKET, SERVICE INSULATOR | 1 | - | 166128 |
| 39 | WIRE, COPPER #8, 600 VOLT, DUPLEX (B) | AS REQ'D | - | 196432 |
| 40 | CONTROLLER, RECLOSER, McGRAW-EDISON (H) | 1 | - | 273928 |
| 41 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | - | 621568 |
| 42 | PADLOCK, CORBIN #27 (FF KEY) (E) | 1 | - | 514848 |
| 43 | COVER, PVC, DRIP LOOP, 3/4" (E) | 1 | - | 287248 |
| 44 | COUPLING, PVC, 3/4" (E) | 2 | - | 280416 |
| 45 | TERMINAL, ADAPTOR, PVC, 3/4" | 1 | - | 102754 |
| 46 | ELBOW, 90 , PULLING, PVC, 3/4" (E) | 2 | - | - |
| 47 | NIPPLE, PIPE SCREW, GALV, 3/4" X 1" | 1 | - | - |
| 48 | UNIT, GROUND, COMPLETE | 1 | - | 603136 |

INSTALLATION:

(A) CONNECT RECLOSER RACK GROUND LEAD TO LIGHTNING ARRESTER GROUND.

(B) RECLOSER CONTROL REQUIRES 120 VOLT SUPPLY, PREFERABLY COMING FROM THE SOURCE SIDE.

(C) THE 400A, TYPE RXE RECLOSER (S/N 572100) IS NO LONGER PURCHASED.

(E) EXEMPT MATERIAL.

FOR FIELD MAINTENANCE ONLY

REFERENCE:

(F) POLE STEPPING – SEE STANDARD 363.

(G) GROUNDING METHODS – SEE STANDARD 1002. (INSTALL GROUND MOULDING IN SUCH A MANNER AS NOT TO INTERFERE WITH A LADDER WHEN PLACED AGAINST THE POLE).

(H) CONTROL INSTALLATION TO BE DONE BY SUBSTATION CONSTRUCTION AND MAINTENANCE AND IS TO BE INSTALLED A MINIMUM OF 13'–6" ABOVE GROUND LEVEL.

(I) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

| 1299.703<br>SUPERSEDES<br>1270.3 (1-1-90) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER WITH CUTOUT DISCONNECT | DATE 1-1-90<br>APPD PEA/DTS |
|---|---|---|

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A DISTRIBUTION SERVICE RESTORER TO BE USED WITH ALL CONDUCTOR SIZES

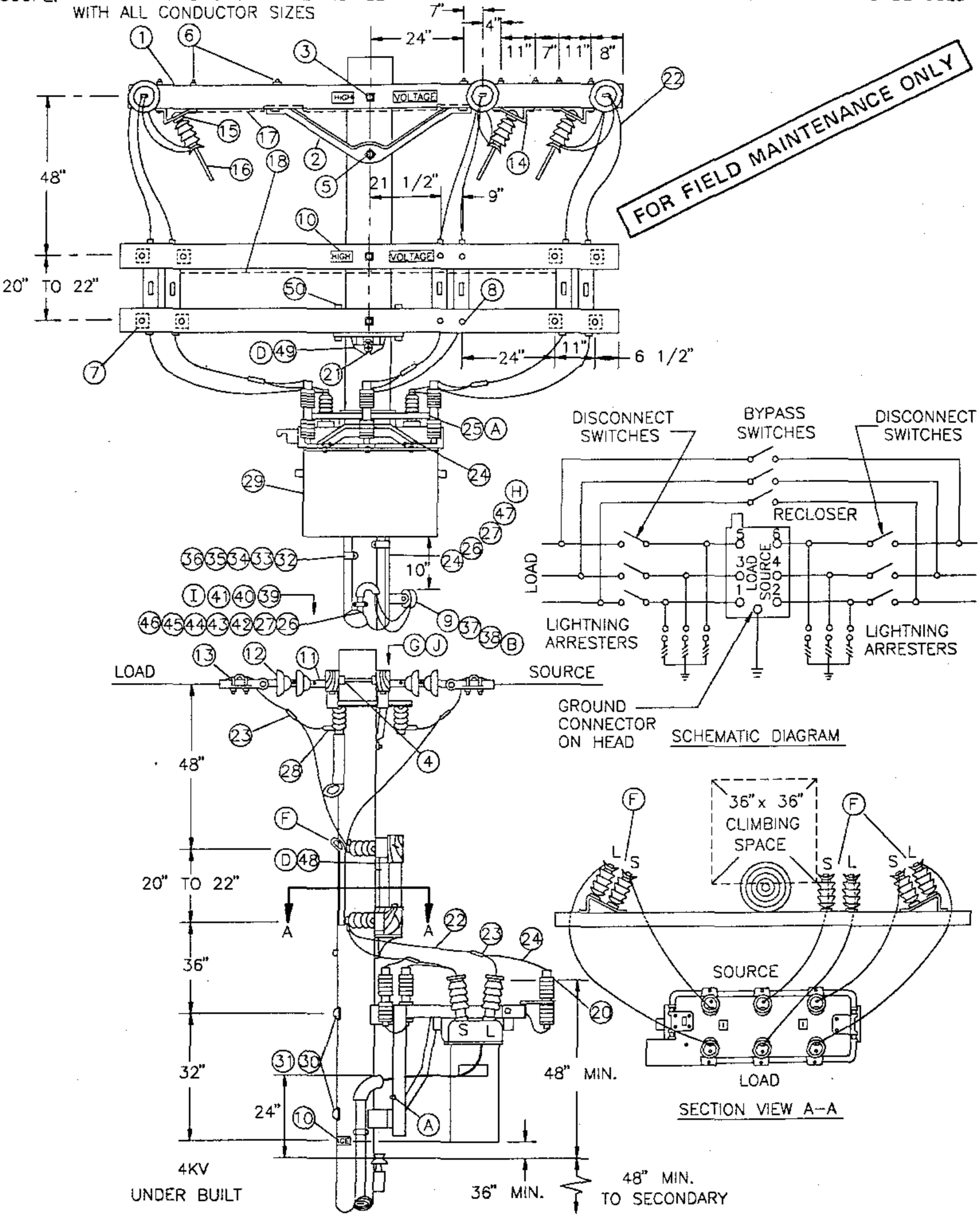



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|---|---|---|
| DATE 1-1-93<br>APPD PHA/BDJ | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER<br>WITH HOOK STICK SWITCH DISCONNECT | 1299.704<br>SUPERSEDES<br>1271.1 (1-1-94) |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STANDARD OR PAGE NO. | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 12' – 0" | 5 | – | 294160 |
| 2 | BRACE, ANGLE, CROSSARM, 4' – 0" | 2 | – | 164032 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 3 | 392 | – |
| 4 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE, 2 ROUND & 2 DOUBLE COIL SPRING WASHERS | 3 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DOUBLE COIL SPRING WASHERS | 1 | 392 | – |
| 6 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 16 | 392 | – |
| 7 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 8 | 392 | – |
| 8 | BOLT, MACH, GALV, 3/8" X 6", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 4 | 392 | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 1 | 392 | – |
| 10 | SIGN, HIGH VOLTAGE & | 5 | – | 647648 |
| | 9 ROOFING NAILS, GALV | AS REQ'D | – | 492224 |
| 11 | CLEVIS, DEAD–END, 5/8", BOLT STEEL (CLOSED TYPE) | 6 | – | 235712 |
| 12 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 12 | – | 431616 |
| 13 | CLAMP, STRAIGHT LINE, D.E. | 6 | 741–743 | – |
| 14 | BRACKET, DISCONNECT, ANGLE MOUNTING | 10 | – | 166542 |
| 15 | BOLT, MACH, GALV, 3/8" X 2", 2 ROUND & 1 LOCK WASHER | 14 | 392 | – |
| 16 | SWITCH, DISCONNECT, 14.4KV, 600A | 9 | – | 707008 |
| 17 | WIRE, #8, BARE SOLID ANNEALED COPPER | 30' | – | 812928 |
| 18 | STAPLES, FENCE, GALV, 1 1/4" | AS REQ'D | – | 678528 |
| 19 | | | | |
| 20 | ARRESTER, LIGHTNING, 12KV | 6 | – | 113248 |
| 21 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 1 | 392 | – |
| 22 | WIRE, BARE STRANDED COPPER, (SIZE AS REQ'D WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY, OR GREATER) © | 75' | 715 | – |
| 23 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – |
| 24 | WIRE, #4, BARE STRANDED COPPER | 100' | – | 813760 |
| 25 | CONNECTOR, SPLIT BOLT, #2 | 2 | – | 269536 |
| 26 | CONDUIT, PVC, TYPE 2, SCHEDULE 80, 3/4" X 10' | 3 | – | 251520 |
| 27 | STRAPS, PIPE, GALV, 3/4" & | AS REQ'D | – | 697888 |
| | 2 – 6D NAILS, GALV | AS REQ'D | – | 491552 |
| 28 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) | 6 | 794/795 | – |
| 29 | RECLOSER, MCGRAW–EDISON, 560A, TYPE WE (INCLUDING BRACKET) © | 1 | – | 572110 |

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|---|---|---|
| 1299.705<br>SUPERSEDES<br>1271.2 (1–1–94) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER<br>WITH HOOK STICK SWITCH DISCONNECT | DATE 1–1–90<br>APPD |

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 30 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |
| 31 | COVER, BOLT, PLASTIC & | 2 | – | 285696 |
| | 6 – 10D NAILS, GALV | AS REQ'D | – | 491392 |
| 32 | CONTROL CABLE, FOR MCGRAW–EDISON RECLOSER (I) | 1 | – | 192010 |
| 33 | CONDUIT, PVC, SCHED 40, 2" X 10' (I) | 2 | – | 251296 |
| 34 | ELBOW, PVC, SCHED 40, 2", 12" RADIUS (I) | 1 | – | 321816 |
| 35 | ELBOW, PVC, SCHED 40, 2" (I) | 2 | – | – |
| 36 | STRAPS, PIPE, GALV, 2" & (I) | AS REQ'D | – | 697856 |
| | 2 – 10 D NAILS, GALV | AS REQ'D | – | 491392 |
| 37 | BRACKET, SERVICE INSULATOR | 1 | – | 166128 |
| 38 | WIRE, COPPER, #8, 600 VOLT, DUPLEX (B) | AS REQ'D | – | 196432 |
| 39 | CONTROLLER, RECLOSER, MCGRAW–EDISON (I) | 1 | – | 273928 |
| 40 | SCREW, LAG, GALV, 1/2" X 4" | 2 | – | 621568 |
| 41 | PADLOCK, CORBIN #27 (FF KEY) | 1 | – | 514848 |
| 42 | COVER, PVC, DRIPLOOP, 3/4" | 1 | – | 287248 |
| 43 | COUPLING, PVC, 3/4" | 2 | – | 280416 |
| 44 | TERMINAL, ADAPTOR, PVC, 3/4" | 1 | – | 102754 |
| 45 | ELBOW, 90°, PULLING, PVC, 3/4" | 2 | – | – |
| 46 | NIPPLE, PIPE SCREW, GALV, 3/4" X 1" | 1 | – | – |
| 47 | UNIT, GROUND, COMPLETE | 1 | – | 603136 |
| 48 | GAIN, CROSSARM (D) | 1 | – | 369596 |
| 49 | GAIN, CROSSARM, BRACELESS (D) | 1 | – | 369598 |
| 50 | BOLT, MACH, GALV, 5/8" X 7" 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(A) CONNECT GROUND LEAD TO RECLOSER MOUNTING FRAME. CONNECT LIGHTNING ARRESTER GROUND LEADS TO LIGHTNING ARRESTER MOUNTING BRACKETS. CONNECT GROUND CONNECTOR ON HEAD TO RECLOSER MOUNTING FRAME.

(B) RECLOSER CONTROL REQUIRES 120 VOLT SUPPLY, PREFERABLY COMING FROM THE SOURCE SIDE.

(C) THE 400A, TYPE RXE RECLOSER (S/N 572100) IS NO LONGER PURCHASED.

(D) DO NOT CUT GAINS IN THE POLE WHEN INSTALLING THE VERTICALLY MOUNTED SECTIONALIZING SWITCH ARMS. THE GAIN HARDWARE USED HERE MAKE CUT GAINS UNNECESSARY.

(F) IT IS NECESSARY TO CUT OFF INSIDE LOAD BREAK EARS ON EACH PAIR OF VERTICALLY MOUNTED DISCONNECT SWITCHES TO PREVENT PHYSICAL CONTACT.

**REFERENCE:**

(G) POLE STEPPING – SEE STANDARD 363.

(H) GROUNDING METHODS – SEE STANDARD 1002.

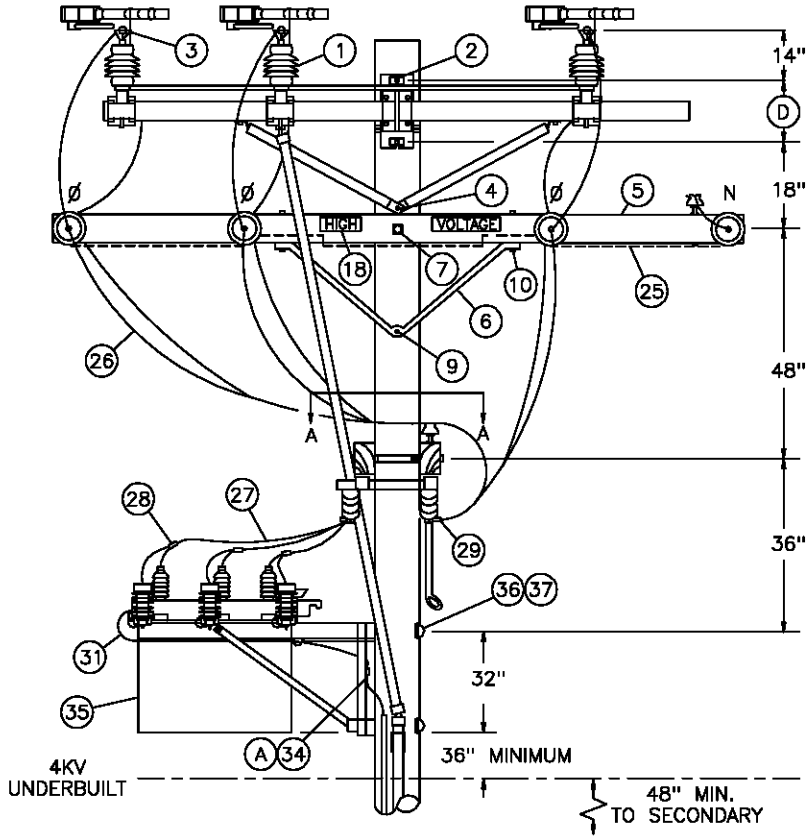
(I) CONTROL INSTALLATION TO BE DONE BY SUBSTATION CONSTRUCTION AND MAINTENANCE AND IS TO BE INSTALLED A MINIMUM OF 13'–6" ABOVE GROUND LEVEL. INSTALLER WILL SUPPLY CONDUIT ITEMS 33 THRU 36.

(J) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

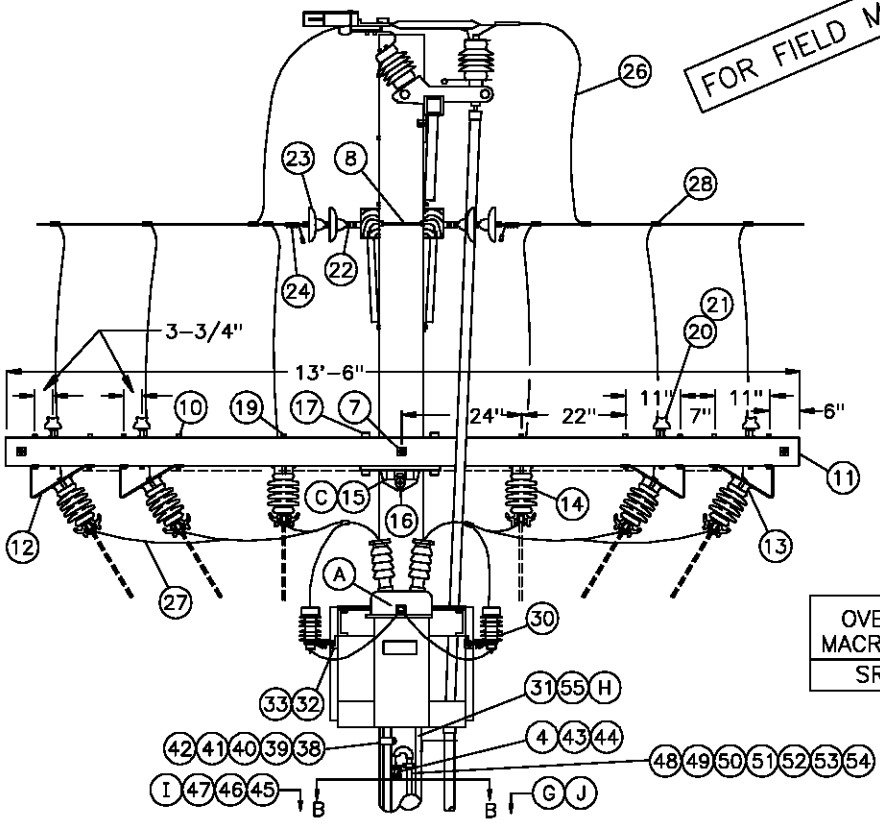


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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A DISTRIBUTION SERVICE RESTORER TO BE USED WITH ALL CONDUCTOR SIZES.




FOR FIELD MAINTENANCE ONLY

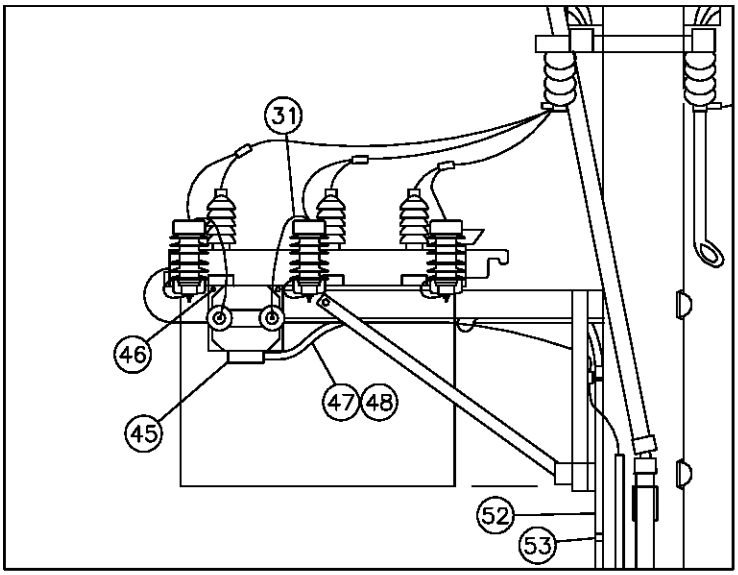



| OVERHEAD MACRO UNITS |
| --- |
| SR560S |

| 1299.707<br>SUPERSEDES<br>1271.1 (1-1-98) | SDG&E ELECTRIC STANDARDS<br>SERVICE RESTORER-BUCK POSITION<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY-PASS | DATE 1-1-98<br>APPD PSA / CMK |
| --- | --- | --- |

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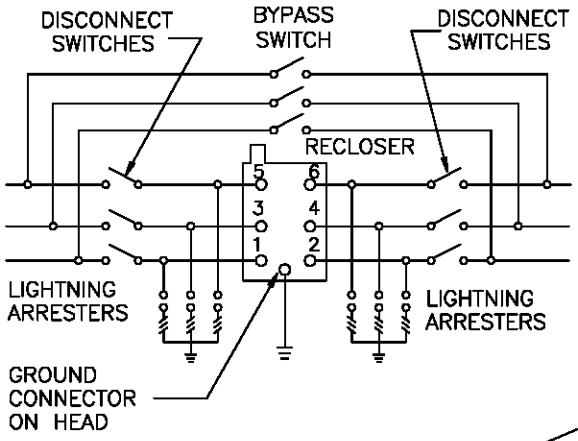
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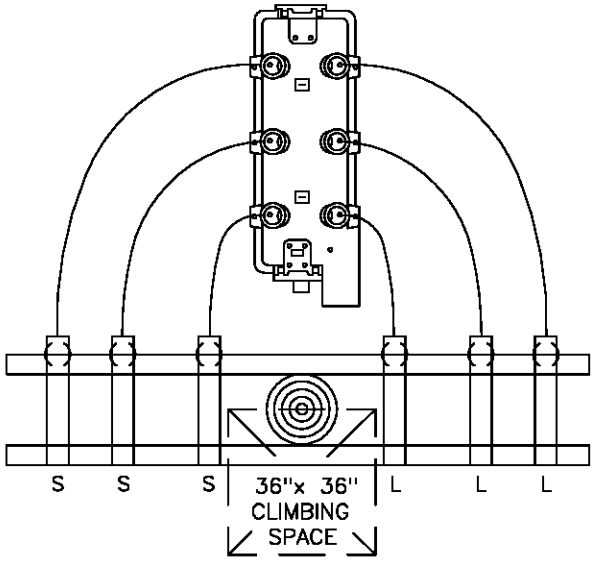

OVERHEAD MACRO UNIT
SRSEC

POTENTIAL TRANSFORMER–SECONDARY POWER SOURCE (B)

STREET SIDE (PREFERRED)

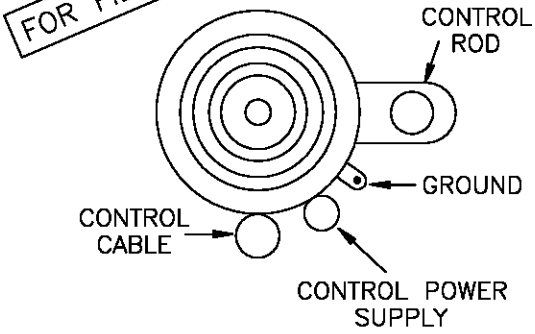



SCHEMATIC DIAGRAM




SECTION VIEW A–A

FOR FIELD MAINTENANCE ONLY




SECTION VIEW B–B

| | | |
|---|---|---|
| DATE 1–1–98<br>APPD PSA / CMC | SDG&E ELECTRIC STANDARDS<br>BUCK POSITION SERVICE RESTORER<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY–PASS | 1299.708<br>SUPERSEDES<br>1271.2 (1–1–98) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STANDARD OR PAGE NO. | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | SWITCH, GANG–OPERATED, 15KV, 600AMP,WITH DUOGAP INTERRUPTERS, INCLUDING 40' OF CONTROL ROD | 1 | – | 709250 | CHANCE |
| 2 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 3 | LUG, EYEBOLT TERMINAL, BRONZE | 12 | – | 471296 | – |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 2 | 392 | – | – |
| 5 | CROSSARM, 3 3/4" X 5 3/4" X 12' – 0" | 2 | – | 294160 | 6– |
| 6 | BRACE, ANGLE, CROSSARM, 4' – 0" | 2 | 392 | 164032 | 4HUB |
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHERS | 2 | 392 | – | – |
| 8 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE, 2 ROUND & 2 DOUBLE COIL SPRING WASHERS | 6 | 392 | – | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DOUBLE COIL SPRING WASHERS | 1 | 392 | – | – |
| 10 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHERS | 20 | 392 | – | – |
| 11 | CROSSARM 3–3/4" X 5–3/4" X 13'–6" | 2 | – | 294368 | 13SWI– |
| 12 | BRACKET, DISCONNECT, ANGLE MOUNTING | 8 | – | 166542 | ABRKT |
| 13 | BOLT, MACH, GALV, 3/8" X 2", 2 ROUND & 1 LOCK WASHER | 8 | 392 | – | – |
| 14 | SWITCH, DISCONNECT, 14.4KV, 600A | 6 | – | 707008 | D600 |
| 15 | GAIN, CROSSARM, BRACELESS Ⓒ | 1 | – | 369598 | BCGAIN |
| 16 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 1 | 392 | – | – |
| 17 | BOLT, MACH, GALV, 5/8" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 18 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | 2 | – | 647648 | HV |
| | | AS REQ'D | – | 492224 | – |
| 19 | BOLT, MACH, 1/2" X 9", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 4 | 392 | – | – |
| 20 | PIN, INSULATOR, STRAIGHT, 12KV 1" OR 1–3/8" THREAD | 5 | 396 | – | – |
| 21 | INSULATOR, LINE, 12KV | 5 | 750 | – | – |
| 22 | CLEVIS, DEAD–END, 5/8", BOLT STEEL (CLOSED TYPE) | 8 | – | 235712 | – |
| 23 | INSULATOR, SUSPENSION, 12KV, CLEVIS | 14 | – | 431616 | 6DE |
| 24 | CLAMP, STRAIGHT LINE, D.E. | 8 | 739–743 | – | – |
| 25 | WIRE, #8, BARE SOLID ANNEALED COPPER, AND | 30' 1.5# | – | 812928 | BOND8 |
| | STAPLES, FENCE, GALV, 1 1/4" | AS REQ'D | – | 678528 | – |
| 26 | WIRE, BARE STRANDED CU OR AL (SIZE AS REQ'D) | 90' | 711–715 | – | – |
| 27 | WIRE, BARE STRANDED COPPER, (SIZE AS REQ'D WITH MINIMUM SIZE EQUAL TO LINE CONDUCTOR AMPACITY, OR GREATER) | 25' | 715 | – | – |
| 28 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – | – |
| 29 | TERMINAL, COMPRESSION, CU OR AL (SIZE AS REQ'D) | 12 | 794–795 | – | – |
| 30 | ARRESTER, LIGHTNING, 12KV | 6 | – | 113248 | LA12 |
| 31 | WIRE, #4, BARE STRANDED COPPER | 100' 13# | – | 813760 | Ⓔ |

FOR FIELD MAINTENANCE ONLY

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|---|---|---|

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 32 | Z–BRACKET, GALV, 1–5/8" | 6 | – | 703168 | – |
| 33 | BOLT, MACH, GALV, 1/2" X 2", 1 ROUND & 1 LOCK WASHER | 12 | 392 | – | – |
| 34 | CONNECTOR, SPLIT BOLT, #2 | 2 | – | 269536 | – |
| 35 | RECLOSER, MCGRAW–EDISON, 560A, TYPE WE (INCLUDING BRACKET) | 1 | – | 572110 | SR560 |
| 36 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – | – |
| 37 | COVER, BOLT, PLASTIC & 6 – 10D NAILS, GALV | 2 | – | 285696 | – |
| | | AS REQ'D | – | 491392 | – |
| 38 | CONTROL CABLE, FOR MCGRAW–EDISON RECLOSER, 35' (I) | 1 | – | 192010 | (E) |
| 39 | CONDUIT, PVC, SCHED 40, 2" X 10' (I) | 2 | – | 251296 | (E) |
| 40 | ELBOW, PVC, SCHED 40, 2", 12" RADIUS (I) | 1 | – | 321816 | (E) |
| 41 | ELBOW, PVC, SCHED 40, 2" (I) | 2 | – | – | – |
| 42 | STRAPS, PIPE, GALV, 2" & 2 – 10 D NAILS, GALV (I) | AS REQ'D | – | 697856 | – |
| | | AS REQ'D | – | 491392 | – |
| 43 | BRACKET, SERVICE INSULATOR | 1 | – | 166128 | – |
| 44 | WIRE, COPPER, #8, 600 VOLT, DUPLEX (B) | AS REQ'D | – | 196432 | DX8C |
| 45 | POTENTIAL TRANSFORMER, 12000/120 VOLTS (B) | 1 | – | 762722 | SRPT |
| 46 | BOLT, MACH, GALV, 3/8" X 1–1/2", AND 1 LOCK WASHER (B) | 2 | – | 154144 | – |
| 47 | CONDUIT, 3/4", FLEXABLE STEEL (B) | 6' | – | 250112 | – |
| 48 | WIRE, THHN, #12, WHITE (B) | 40' | – | 808704 | THW12W |
| | WIRE, THHN, #12, BLACK (B) | 40' | – | 808096 | THW12 |
| 49 | CONTROLLER, RECLOSER, COOPER, MODEL KME5 (I) | 1 | – | 273930 | C/RSTR |
| 50 | SCREW, LAG, GALV, 1/2" X 4" | 2 | – | 621568 | – |
| 51 | PADLOCK, SCHLAGE ELECTRIC SERIES | 1 | – | 514848 | (E) |
| 52 | CONDUIT, PVC, TYPE 2, SCHEDULE 80, 3/4" X 10' | 3 | – | 251520 | (E) |
| 53 | STRAPS, PIPE, GALV, 3/4" & 2 – 6D NAILS, GALV | AS REQ'D | – | 697888 | – |
| | | AS REQ'D | – | 491552 | – |
| 54 | COVER, PVC, DRIPLOOP, 3/4" | 1 | – | 287248 | (E) |
| 55 | COUPLING, PVC, 3/4" | 2 | – | 280416 | (E) |
| 56 | TERMINAL, ADAPTOR, PVC, 3/4" | 1 | – | 102754 | (E) |
| 57 | ELBOW, 90°, PULLING, PVC, 3/4" | 2 | – | – | – |
| 58 | NIPPLE, PIPE SCREW, GALV, 3/4" X 1" | 1 | – | – | – |
| 59 | UNIT, GROUND, COMPLETE | 1 | – | 603136 | (E) |

FOR FIELD MAINTENANCE ONLY

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| DATE 1–1–2000<br>APPD PSA/VCL | SDG&E ELECTRIC STANDARDS<br>BUCK POSITION SERVICE RESTORER<br>HOOKSTICK SWITCH DISCONNECT<br>LOADBREAK GANG SWITCH BY–PASS | 1299.710<br>SUPERSEDES<br>1271.4 (1–1–2000) |

INSTALLATION:

Ⓐ CONNECT GROUND LEAD TO RECLOSER MOUNTING FRAME. CONNECT LIGHTNING ARRESTER GROUND LEADS AND GROUND CONNECTOR ON HEAD TO RECLOSER MOUNTING FRAME.

Ⓑ RECLOSER CONTROL REQUIRES 120 VOLT SUPPLY, PREFERABLY COMING FROM THE SOURCE SIDE. IF IMPRACTICAL, POWER MAY ORIGINATE FROM THE LOAD SIDE.

NOTE: IF SECONDARY POWER SOURCE NOT AVAILABLE, OR WOULD BE DIFFICULT TO INSTALL, POWER MAY BE SUPPLIED BY MOUNTING POTENTIAL TRANSFORMER ON SERVICE RESTORER FRAME.

Ⓒ DO NOT CUT GAINS IN THE POLE WHEN INSTALLING THE HORIZONTALLY MOUNTED SECTIONALIZING SWITCH ARMS. THE GAIN HARDWARE USED HERE MAKE CUT GAINS UNNECESSARY.

Ⓓ USE THE FOLLOWING THRU-BOLT DRILLING DIMENSIONS: A.B. CHANCE=13-1/4", S&C=14".

Ⓔ THESE MATERIAL ITEMS INCLUDED WITH CONTROLLER ASSEMBLY UNIT "C/RSTR".

REFERENCE:

F. DETERMINE MIMIMUM POLE CLASS DUE TO SERVICE RESTORER MOUNTED IN THE BUCK POSITION-SEE STANDARD 347.

Ⓖ POLE STEPPING - SEE STANDARD 363.

Ⓗ GROUNDING METHODS - SEE STANDARD 1002.

Ⓘ CONTROL INSTALLATION TO BE DONE BY SUBSTATION CONSTRUCTION AND MAINTENANCE, AND, IS TO BE INSTALLED 14'-0" FROM GROUND LEVEL TO BOTTOM OF CONTROLLER WHEN LOCATED ON STREET SIDE OF POLE. CONTROLLER LOCATED ON PROPERTY SIDE OF POLE WILL BE MOUNTED NO MORE THAN 9' FROM GROUND LEVEL TO BOTTOM OF CONTROLLER. STANDARD CONTROL CABLE LENGTH IS 35'. HOWEVER, LONGER CABLE LENGTHS ARE AVAILABLE IF REQUIRED. INSTALLER WILL SUPPLY CONDUIT ITEMS 39 THROUGH 42.

Ⓙ REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES AND SERVICE RESTORER POLES. (SEE STD. 208.3 ITEM 12)

K. POLE TOP SWITCH INSTALLATION-SEE STANDARD 1230.

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| REV | CHANGE | BY | DSGN | APPV | DATE | REV | CHANGE | BY | DSGN | APPV | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | COMPLETELY REVISED | JK | JS | CZH | 10/15/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JK | JS | CZH | 6/13/2019 | D | | | | | |

Indicates Latest Revision | X | Completely Revised | | New Page | | Information Removed

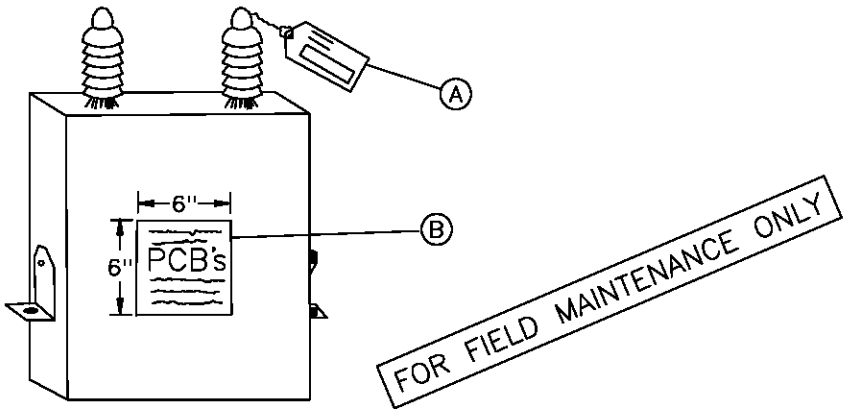
SHEET 1 OF 1

SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LEGACY OVERHEAD FIELD MAINTENANCE
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CAPACITORS, REGULATORS

OH LEGACY
OHL1301.1

SCOPE: THIS STANDARD DESCRIBES CAPACITOR MARKING AND HANDLING PROCEDURES.




## (A) CAPACITOR TAGS

THIS IDENTIFICATION TAG (SDG&E FORM 120-7240, STK. NO. 043450) IS USED FOR TRACKING THE CAPACITOR DURING REMOVAL/RETIREMENT AND INSTALLATION. IT SHALL BE USED ON ALL CAPACITORS, PCB UNITS AND NON-PCB UNITS.

EACH CAPACITOR UNIT IN STOCK WILL BE AFFIXED WITH A CAPACITOR IDENTIFICATION TAG BEFORE IT IS REMOVED FROM STOCK. THIS TAG IS TO BE COMPLETED BY THE FIELD PERSONNEL WHO EITHER REMOVES OR INSTALLS A CAPACITOR UNIT. ONE SIDE OF THIS TAG IS USED FOR REMOVAL AND THE OTHER FOR INSTALLATION.

1. INSTALLATION

   THE DISTRICT STOCKKEEPER SHALL COMPLETE AS MUCH OF THE CAPACITOR TAG(S) AS POSSIBLE ON THE INSTALLATION SIDE OF THE TAG AND ATTACH TO THE SPECIFIC UNIT. WHEN THE INSTALLATION IS COMPLETED, THE CREW FOREMAN SHALL REMOVE THE TAG AND COMPLETE THE REQUESTED INFORMATION.

2. REPLACEMENT

   WHEN A CAPACITOR UNIT IS REPLACING ONE THAT IS BEING REMOVED, THE FOREMAN SHALL FILL OUT BOTH SIDES OF THE TAG.

   IF REMOVAL AND REPLACEMENT IS NOT COMPLETED WITHIN TWO CONSECUTIVE WORKDAYS, TWO FORMS ARE TO BE COMPLETED, ONE FOR A REMOVAL, AND ANOTHER FOR INSTALLATION.

   IF REPLACEMENT IS DUE TO FAILURE OF ONE OR MORE UNITS, AN EQUIPMENT FAILURE REPORT IS REQUIRED.

3. REMOVAL

   WHEN A CAPACITOR UNIT IS REMOVED, THE CREW FOREMAN SHALL COMPLETE THE REMOVAL PORTION ONLY. IF TAGS ARE NOT STORED ON THE TRUCKS, THE DISPATCHER SHALL PROVIDE THE CREW WITH SUFFICENT TAGS FOR EACH CAPACITOR UNIT TO BE REMOVED.



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4. RETIREMENT

WHEN A CAPACITOR UNIT IS RETIRED, THE RETIRED PORTION OF THE CAPACITOR TAG MUST BE FILLED OUT BY THE PERSONNEL RETIRING THE UNIT.

5. DISPOSITION

IT SHALL BE THE DISPATCHER'S RESPONSIBILITY TO SEE THAT THE COMPLETED TAGS ARE SENT TO THE DISTRICT'S RECORDS SECTION, ATTENTION OF THE ENGINEERING CLERK, WITHIN ONE WORKING DAY AFTER THE CAPACITOR UNITS HAVE BEEN INSTALLED OR REMOVED.

Ⓑ DECAL

THIS DECAL (STOCK NO. 301880) IS TO BE PLACED ON ALL CAPACITOR UNITS WHICH CONTAIN PCB'S.

FIELD PERSONNEL AND STOCKKEEPERS SHOULD MAKE EVERY EFFORT TO INSURE THAT ALL PCB UNITS HAVE A DECAL, AND THAT ALL WORN, WEATHERED DECALS BE REPLACED WITH NEW DECALS. THE DECAL IS BLACK PRINT ON EITHER YELLOW OR WHITE BACKGROUND.

1. MARKING

EVERY CAPACITOR IN SERVICE OR IN STORAGE, WHICH USES AN INSULATING FLUID CONTAINING PCB'S, SHALL BE LABELED WITH THE DECAL (STOCK NO. 301880).

EVERY PCB CAPACITOR WHICH IS REMOVED FROM SERVICE AND DOES NOT HAVE THE DECAL (STOCK NO. 301880) SHALL HAVE THE DECAL PUT ON IT AT THE TIME IT IS REMOVED FROM SERVICE. THIS SHALL BE DONE BY THE WORK CREW THAT REMOVES THE UNIT. IF A PCB UNIT ARRIVES AT A STOREYARD WITH NO PCB DECAL, THE STOCKKEEPER SHALL PUT A DECAL ON.

NOTE: ALL CAPACITOR UNITS PURCHASED BEFORE 1977 USED AN INSULATING FLUID WHICH CONTAINED PCB'S. THE UNITS WITH THE PCB FLUIDS CAN BE IDENTIFIED BY THE WORDS "NON-FLAMMABLE LIQUID" ON NAMEPLATE OR BY THE MANUFACTURER'S TRADE NAMES WHICH ARE:

G.E. – PYRANOL
WESTINGHOUSE – INERTEEN
MCGRAW-EDISON – ELEMEX
CORNEL DUBILIER OR FEDERAL PACIFIC – DYKANOL
SANGAMO – DIACHLOR
ALLIS CHALMERS – CHLOREXTOL

FOR FIELD MAINTENANCE ONLY

ALL OF THE CAPACITOR UNITS RECEIVED THAT DO NOT CONTAIN PCB INSULATING FLUIDS HAVE THE WORDS "CONTAINS A NON-PCB INSULATING FLUID" ON THE NAMEPLATE OR ON A BLUE TANK DECAL.

2. HANDLING CAPACITORS CONTAINING POLYCHLORINATED BIPHENYLS (PCB)

CAPACITORS CONTAINING PCB SHALL BE HANDLED AS SPECIFIED IN THE PCB HANDLING AND PERSONAL SAFETY PROCEDURES. (SEE CONSTRUCTION MANAGEMENT STANDARD PRACTICE 107).

3. RETIRING RUPTURED OR DAMAGED UNITS

WHENEVER TRANSPORTATION OR KEARNY MAINTENANCE RETIRES A CAPACITOR AND DISPOSES OF IT, SPECIFIC DATA (I.E. SERIAL NUMBER, PCB OR NON-PCB, MANUFACTURER, SIZE, ETC.) MUST BE RECORDED ON THE CAPACITOR TAG AND SENT TO THE DISTRICT'S RECORDS SECTION, ATTENTION OF THE ENGINEERING CLERK.



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C. PRECAUTIONARY MEASURES – DAMAGED CAPACITOR UNITS

DAMAGED CAPACITOR UNITS WITH BULGED CASES MAY HAVE EXCESSIVE PRESSURE INSIDE. THE UNITS MAY RUPTURE WHEN HANDLED OR BUMPED. SINCE THE INSULATING LIQUID IN THE UNITS IS TOXIC, CARE SHALL BE EXERCISED WHEN WORKING WITH BULGED OR OTHERWISE DAMAGED UNITS. UNITS WITH BULGED OR DAMAGED CASES SHALL NOT BE RE–ENERGIZED.

D. CAPACITOR NAMEPLATES

THE CAPACITOR NAMEPLATE AND UNIT SHALL REMAIN INTACT. UNDER NO CIRCUMSTANCES SHALL THE NAMEPLATE BE REMOVED FROM THE CAPACITOR UNIT.

F. SERIES STREET LIGHTING TRANSFORMERS

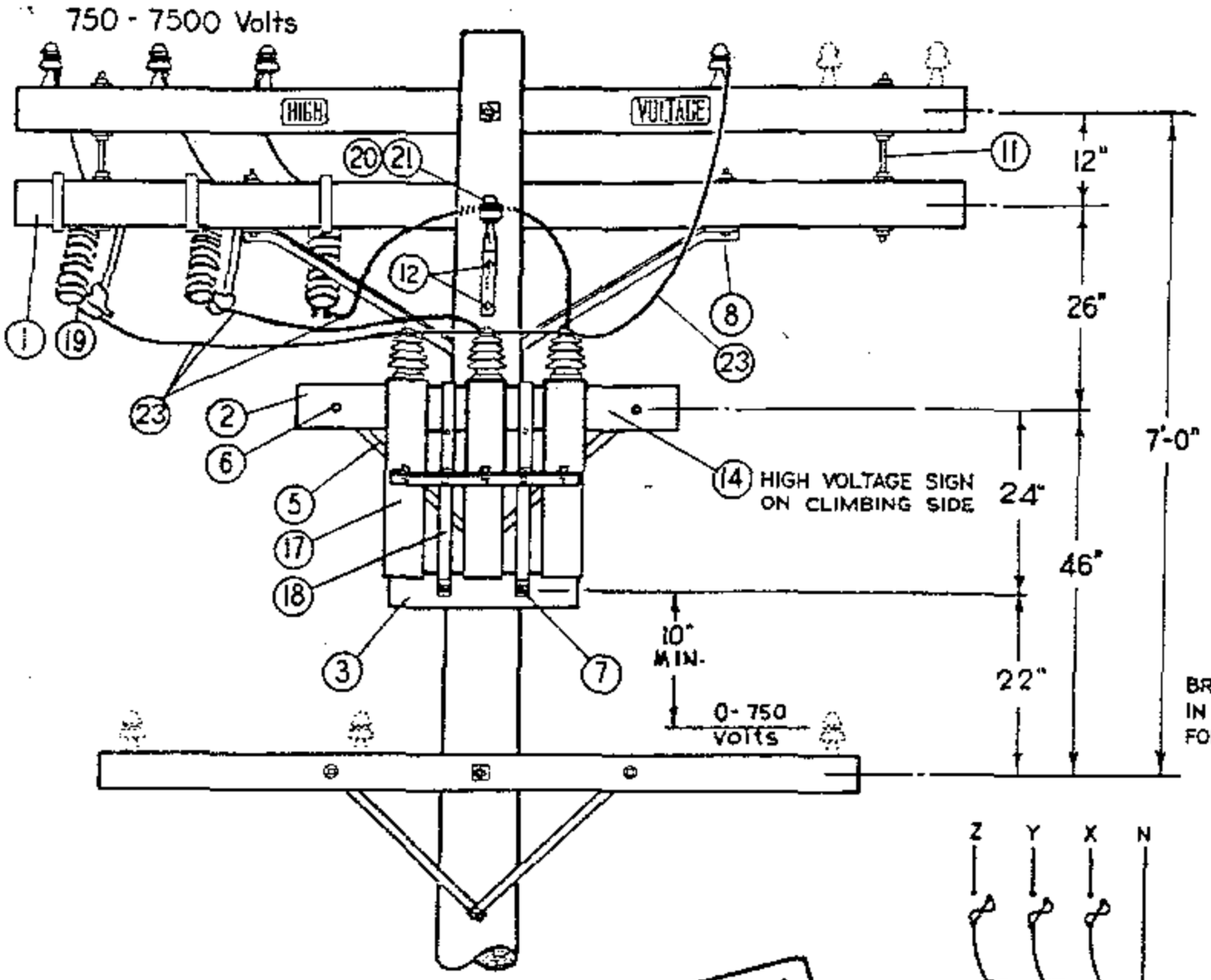
THE TROUBLEMAN AND/OR CREW SHALL CHECK THE NAMEPLATE OF ANY RUPTURED 2400 VOLT, CONSTANT CURRENT STREET LIGHTING TRANSFORMER TO DETERMINE IF IT CONTAINS AN INTERNAL CAPACITOR. IF NO CAPACITOR IS SHOWN ON THE NAMEPLATE, THE TRANSFORMER IS TO BE TREATED AS ANY OTHER TRANSFORMER ON THE SYSTEM, NO SPECIAL HANDLING OR DISPOSAL IS REQUIRED. IF IT DOES, IT SHALL BE TREATED AS ANY PCB CONTAINING DEVICE UNTIL IT REACHES KEARNY MAINTENANCE. (SEE CONSTRUCTION MANAGEMENT STANDARD PRACTICE 107).

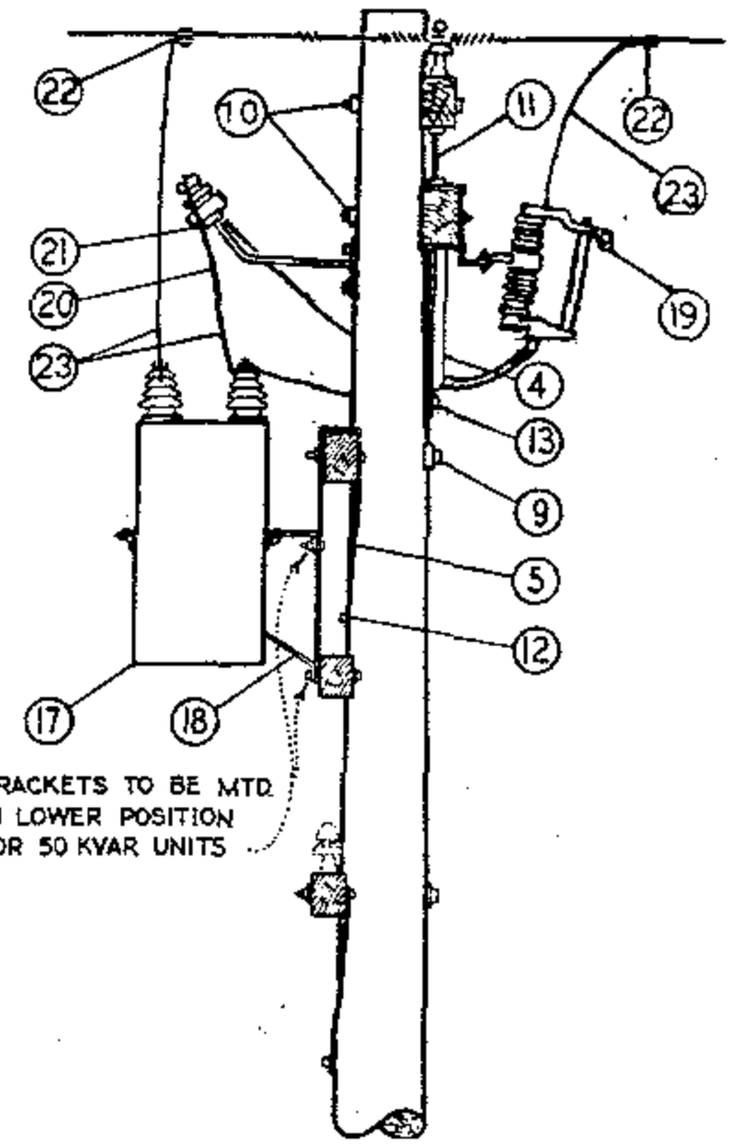
KEARNY SHALL REMOVE THE INTERNAL CAPACITOR IMMEDIATELY AND CHECK TO SEE IF IT HAS LEAKED. IF IT HAS NOT LEAKED, THE CAPACITOR SHALL BE DISPOSED OF IN ACCORDANCE WITH THE EPA REGULATIONS. THE TRANSFORMER MAY THEN RE–ENTER THE SYSTEM AS AN RO UNIT OR BE SCRAPPED.

IF PCB CONTAMINATION OF THE TRANSFORMER OIL IS SUSPECTED, KEARNY MAINTENANCE SHALL HAVE THE BEST LAB VERIFY THE LEVEL OF CONTAMINATION. IF IT IS 500PPM OR GREATER, THE OIL AND THE TRANSFORMER SHALL BE DISPOSED OF ACCORDING TO EPA REGULATIONS.

FOR FIELD MAINTENANCE ONLY

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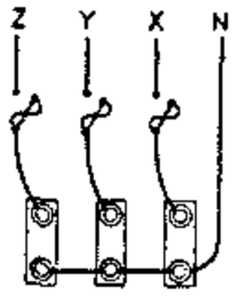




DIAGRAM OF 4 KV. WYE CONNECTIONS
150 KVAR (3-50 KVAR UNITS)
75 KVAR (3-25 KVAR UNITS)
45 KVAR (3-15 KVAR UNITS)

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

A. CAPACITOR RACK TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | PG 380.01 IT.2 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 4' - 0" | 1 | PG 380.05 IT.3 |
| | 3 | CROSSARM, 3 1/2" X 4 1/2" X 2' - 0" | 1 | PG 380.05 IT.1 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| | 5 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| | 6 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| | 7 | BOLT, MACH., GALV., 1/2" X 5", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| | 9 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH, 1 FLAT, 1 CURV & 1 NUT | 1 | STD 139, 140 (E) |
| | 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4" SQ WASH & 1 NUT | 2 | STD 139, 140 (E) |
| | 11 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140 (E) |
| | 12 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| | 13 | LAG SCREW, GALV., 5/8" X 5" | 1 | 621600 (E) |
| | 14 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS | 1 | 647648-492224 (E) |
| | 15 | | | |
| | 16 | | | |
| L T I | 17 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 3 | 207200 |
| | 18 | RACK, CAPACITOR | 1 | 402624 |
| | 19 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297688 |
| | 20 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| | 21 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG 750.3 |
| | 22 | CONNECTOR, COMPRESSION | 4 | PGS 786, 783 (E) |
| | 23 | WIRE, BARE STRANDED, #6 | 30' | 813536 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

1399.101
SUPERSEDES
1315 (1-1-87)

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV-WYE-150 KVAR MAXIMUM

DATE 1-1-87
APPD AK/RDS

SCOPE: THIS STANDARD LISTS THE INFORMATION NEEDED TO DETERMINE PROPER CAPACITOR APPLICATIONS.

| PREFIX | PHASE | VOLTAGE | DESCRIPTION | | KVAR | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|---|
| C | 1 | 2400/4160Y | CAPACITOR UNITS | | 100 | (A) 207330 | – |
| CT | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3 100KVAR 1Ø UNITS, 4 WIRE CONNECTED WYE. | | 300 | 564772 | CT3F |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 3–100KVAR 1Ø UNITS AND 3 OIL SWITCHES WITH 2.4KV POTENTIAL TRANSFORMER. | | 300 | 564773 | CT3S |
| CTD | 3 | 4160 △ | SWITCHED CAPACITOR RACK CONSISTING OF 3–200 KVAR, 7200V UNITS DELTA CONNECTED AND A POTENTIAL TRANSFORMER RATED AT 2400–120V FOR USE ON 4KV SYSTEM. | 2 – OIL SWITCHES | (B) 200 | 564758 | CTD2S |
| | | | FIXED CAPACITOR RACK CONSISTING OF 3–200 KVAR, 7200V UNITS DELTA CONNECTED FOR USE ON 4KV SYSTEM. | | (B) 200 | 564759 | CTD2F |
| YC | 1 | 7200/12470Y | CAPACITOR UNITS | | 150 | (A) 207344 | YC150 |
| HC | 3 | 7200/12470Y | CAPACITOR UNITS | | 300 | (A) 207336 | – |
| HCT | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3–400 KVAR, 7200V UNITS WYE CONNECTED FOR USE ON 4KV SYSTEM. | | 130 | 564776 | HCT1F |
| | 3 | 7200/12470Y | SWITCHED CAPACITOR RACK CONSISTING OF 6–150KVAR 1Ø UNITS WITH 7.2KV POTENTIAL TRANSFORMER | 3 – OIL SWITCHES | 900 | (A)564706 | – |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 6–150KVAR 1Ø UNITS WITH 12KV POTENTIAL TRANSFORMER | 2 – OIL SWITCHES | 900 | (A)564708 | – |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 6–150KVAR 1Ø UNITS WITH 12KV POTENTIAL TRANSFORMER | 3 – OIL SWITCHES | 900 | (A)564704 | – |
| | | | FIXED CAPACITOR RACK CONSISTING OF 6–150 KVAR 1Ø UNITS | | 900 | (A)564680 | 900F |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 9–150KVAR 1Ø UNITS WITH 7.2KV POTENTIAL TRANSFORMER | 3 – OIL SWITCHES | 1350 | (A)564754 | – |
| | | | SWITCHED CAPACITOR RACK CONSISTING OF 9–150KVAR 1Ø UNITS WITH 12KV POTENTIAL TRANSFORMER | 2 – OIL SWITCHES | 1350 | (A)564756 | – |
| | | | | 3 – OIL SWITCHES | 1350 | (A)564752 | – |
| | | | FIXED CAPACITOR RACK CONSISTING OF 9–150KVAR 1Ø UNITS | | 1350 | (A)564744 | 1350F |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

(A) NO LONGER PURCHASED.

(B) THE KVAR RATING OF 7200 VOLT CAPACITORS IS REDUCED BY A FACTOR OF THREE WHEN WIRED IN DELTA AND CONNECTED TO THE 4160 VOLT SYSTEM.



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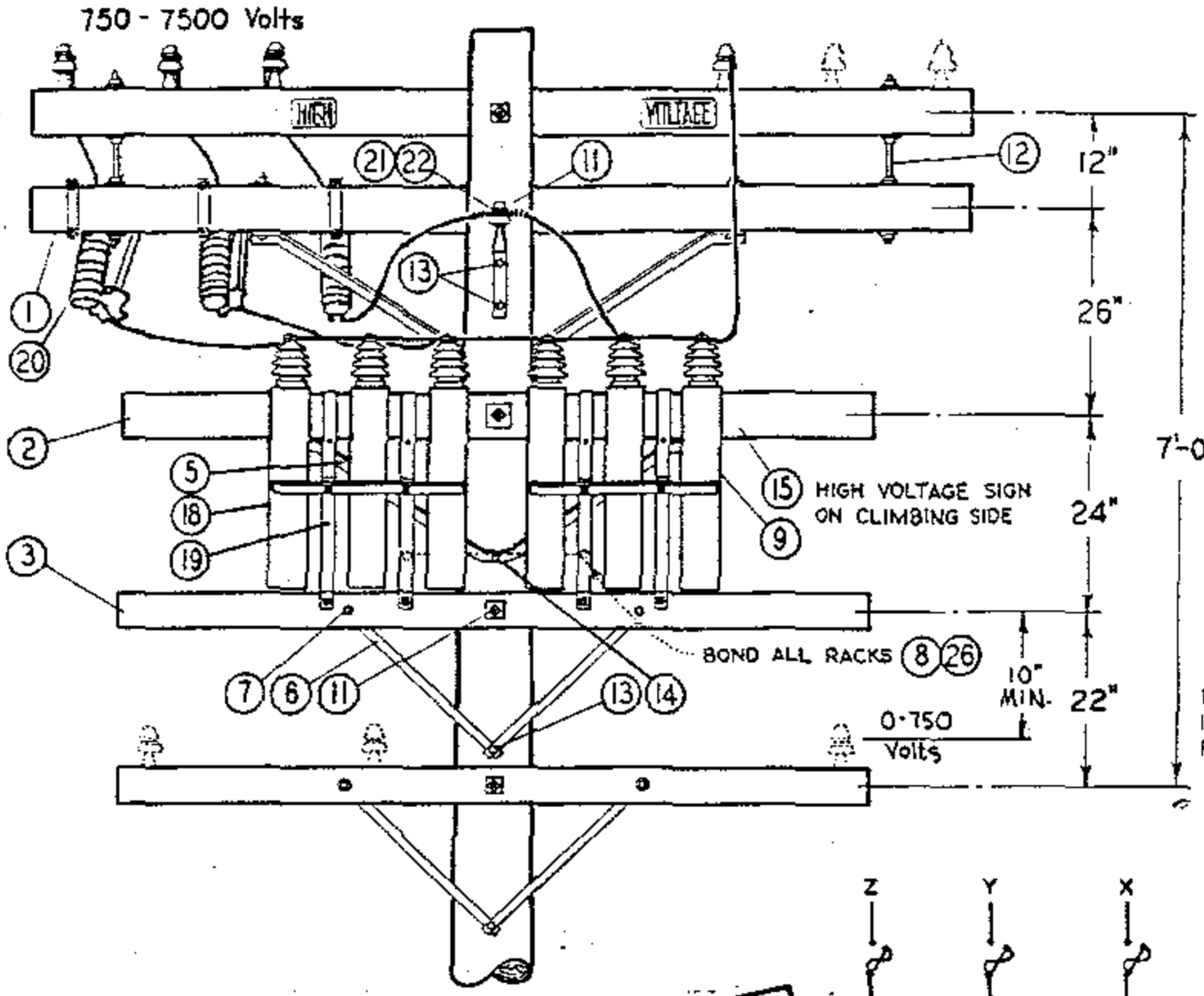
**SCOPE:** THIS STANDARD LISTS THE INFORMATION NEEDED TO DETERMINE PROPER CAPACITOR APPLICATIONS.

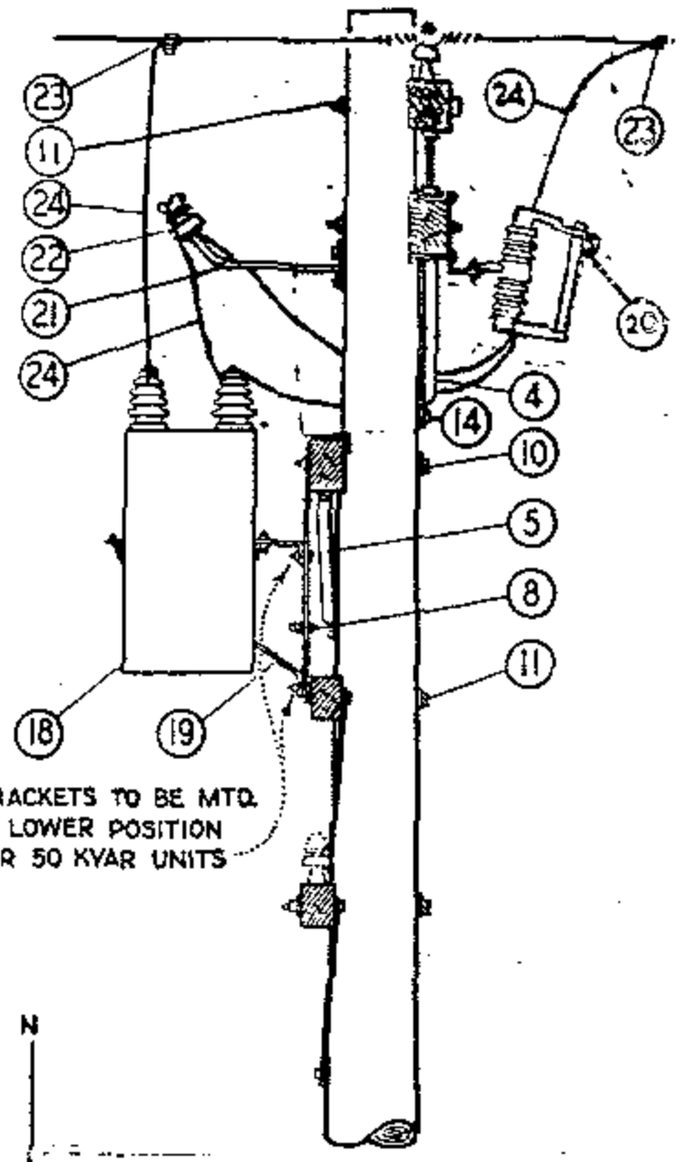
| PREFIX | PHASE | VOLTAGE | DESCRIPTION | KVAR | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| YC | 1 | 7200/12470Y | CAPACITOR UNITS | 200 | 207350 | YC200 |
| | | | | 400 | 207348 | – |
| HCT | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3–400 KVAR, 7200V UNITS WYE CONNECTED FOR USE ON 4KV SYSTEM. | 130 | 564776 | HCT1F |
| | 3 | 2400/4160Y | FIXED CAPACITOR RACK CONSISTING OF 3–200 KVAR, 7200V UNITS WYE CONNECTED FOR USE ON 4KV SYSTEM. | 65 | 564759 | HCT6F |
| | 3 | 7200/12470Y | SWITCHED CAPACITOR RACK CONSISTING OF 3–200 KVAR SINGLE–PHASE UNITS WITH 12KV POTENTIAL TRANSFORMER | 600 | 564761 | 600S |
| | 3 | 7200/12470Y | FIXED CAPACITOR RACK CONSISTING OF 3–200 KVAR SINGLE–PHASE UNITS. | 600 | 564763 | 600F |
| | 3 | 7200/12470Y | SWITCHED CAPACITOR RACK CONSISTING OF 3–400KVAR SINGLE–PHASE UNITS WITH 12KV POTENTIAL TRANSFORMER — 2 – OIL SWITCHES | 1200 | 564770 | 1200S |
| | | | FIXED CAPACITOR RACK CONSISTING OF 3–400 KVAR SINGLE–PHASE UNITS | 1200 | 564764 | 1200F |

FOR FIELD MAINTENANCE ONLY

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750 - 7500 Volts



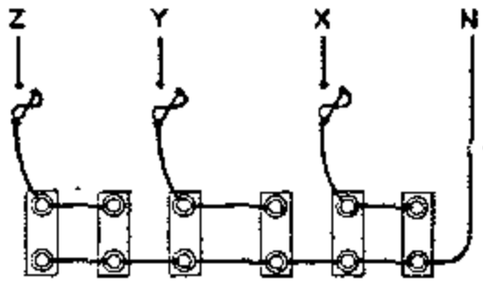




DIAGRAM OF 4 KV. WYE CONNECTIONS
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)
90 KVAR (6-15 KVAR UNITS)

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

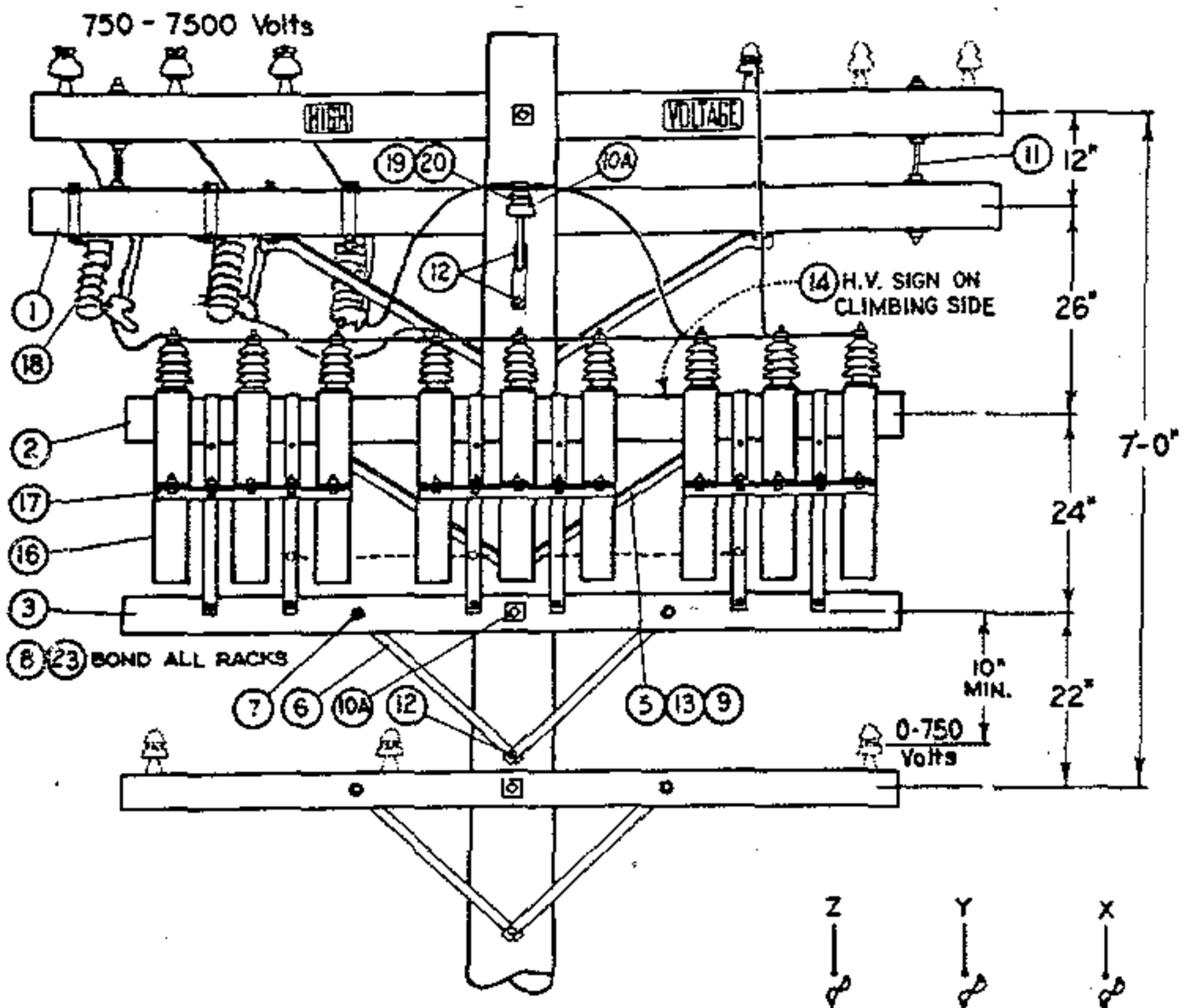
| ITEM | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' -0" | 1 | PG. 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | PG. 380.05 |
| | 3 | CROSSARM, 3 1/2 X 4 1/2 X 8 - 0 | 1 | PG. 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| | 5 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 164032 |
| | 6 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| | 7 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 9 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 4 | STD 139, 140(E) |
| | 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH., 1 FLAT, 1 CURV. & 1 NUT | 1 | STD 139, 140(E) |
| | 11 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4 SQ. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 12 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140(E) |
| | 13 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| | 14 | LAG SCREW, GALV., 5/8" X 5" | 2 | 621600 (E) |
| | 15 | SIGN, HIGH VOLTAGE & ROOFING NAILS | 1 | 647648-492224(E) |
| | 16 | | | |
| | 17 | | | |
| L T I | 18 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 6 | 207200 |
| | 19 | RACK, CAPACITOR (B) | 2 | 402620 |
| | 20 | CUTOUT, 12KV 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297888 |
| | 21 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| | 22 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG. 750.3 |
| | 23 | CONNECTOR, COMPRESSION | 4 | STD 786, 783(E) |
| | 24 | WIRE, #6 BARE STRANDED COPPER | 30' | 813536 |
| | 25 | | | |
| | 26 | WIRE, BARE SOLID ANNEALED COPPER #8 | 2'-6" | 812928 |
| | 27 | | | |

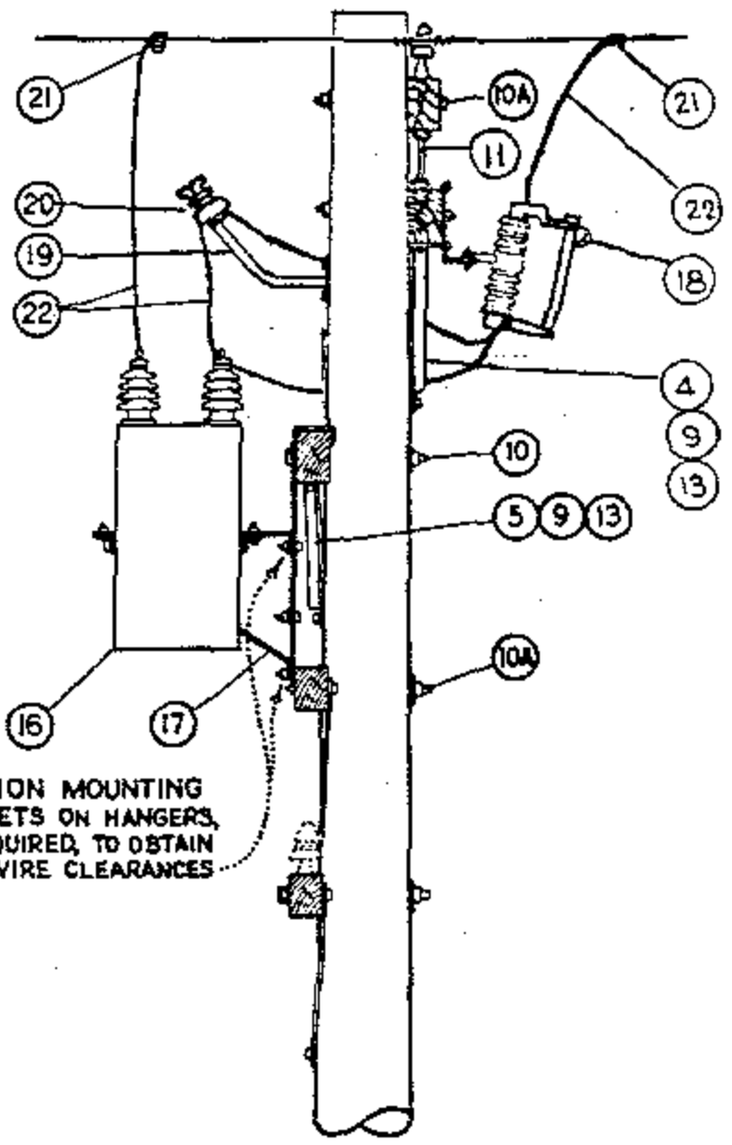
DATE 1-1-87
APPD AK/RDS

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV - WYE - 300 KVAR MAXIMUM

1399.102
SUPERSEDES
1316 (1-1-87)



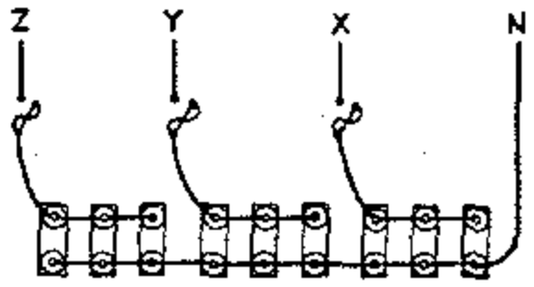




DIAGRAM OF 4 KV. WYE CONNECTIONS
450 KVAR (9-50 KVAR UNITS)
225 KVAR (9-25 KVAR UNITS)
135 KVAR (9-15 KVAR UNITS)

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 380.05 |
| | 3 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| | 5 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 164032 |
| | 6 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| | 7 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2 RD. WASH. & 1 NUT | 3 | STD 139, 140(E) |
| | 9 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 4 | STD 139, 140(E) |
| | 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3" SQ. WASH., 1 FLAT, 1 CURV., & 1 NUT | 1 | STD 139, 140(E) |
| | 10A | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4" SQ. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 11 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140(E) |
| | 12 | LAG SCREW, GALV. 1/2" X 4" | 3 | 621568 (E) |
| | 13 | LAG SCREW, GALV. 5/8" X 5" | 2 | 621600 (E) |
| | 14 | SIGN, HIGH VOLTAGE, & ROOFING NAILS (E) | 1 | 647648-492224 |
| | 15 | | | |
| L T I | 16 | CAPACITOR UNIT, 2.4KV, (50 KVAR UNITS ILLUSTRATED) (B) | 9 | 207200 |
| | 17 | RACK, CAPACITOR | 3 | 402624 |
| | 18 | CUTOUT 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297888 |
| | 19 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| | 20 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | 750.3 |
| | 21 | CONNECTOR, COMPRESSION | 4 | PGS 786, 783(E) |
| | 22 | WIRE, #6 BARE STRANDED COPPER | 30' | 813536 |
| | 23 | WIRE, BARE SOLID ANNEALED COPPER #8 | 6' | 812928 |
| | 24 | | | |
| | 25 | | | |
| | 26 | | | |

1399.103
SUPERSEDES
1317 (1-1-87)

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV - WYE - 450 KVAR MAXIMUM

DATE 1-1-87
APPD AK/DSG

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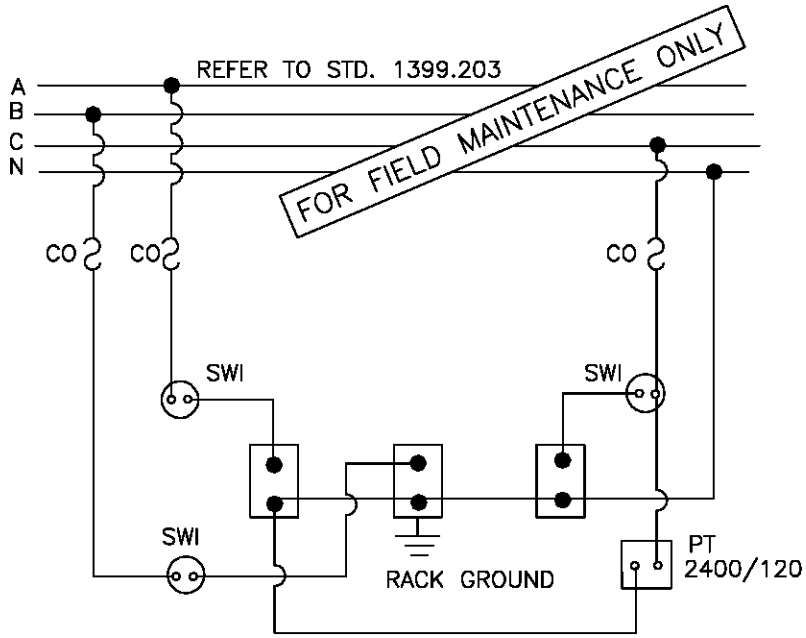
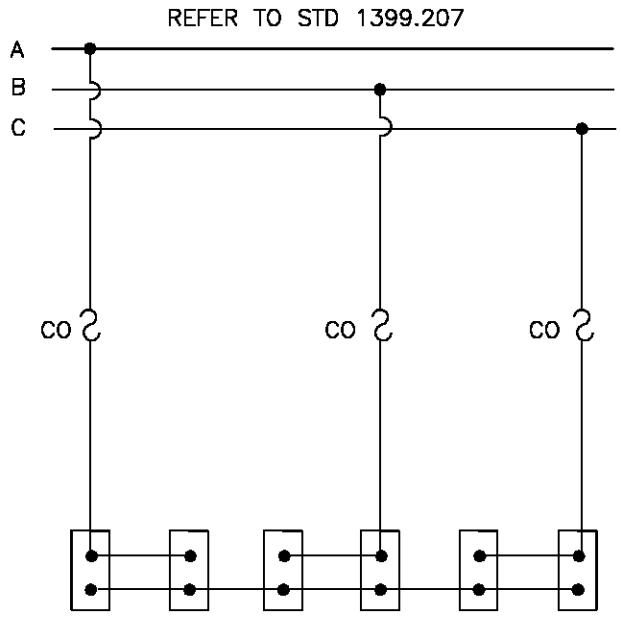



DIAGRAM OF 4KV WYE CONNECTED
SWITCHED 300KVAR (3–100KVAR UNITS)

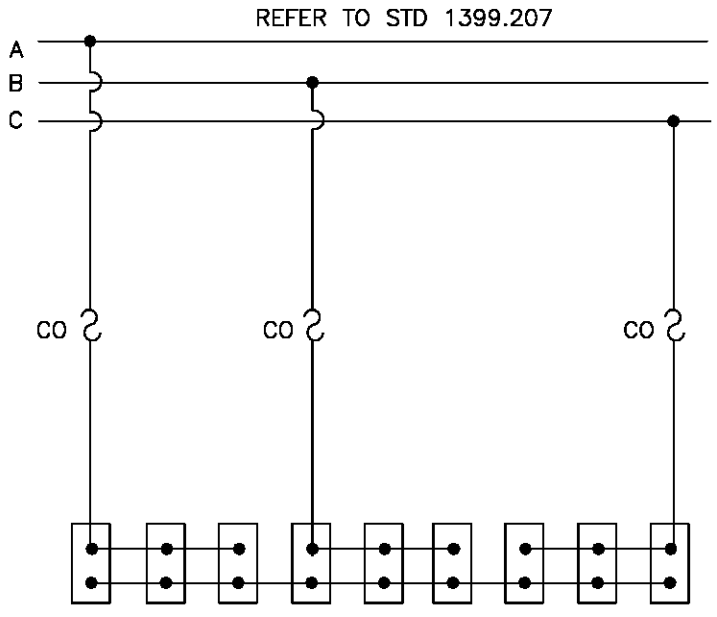
NOTE:

– DO NOT GROUND THE CAPACITOR NEUTRAL BUS. IT IS ALREADY GROUNDED THROUGH THE 4KV NEUTRAL SYSTEM.




SCHEMATIC DIAGRAM

600 KVAR (6–100 KVAR UNITS)
300 KVAR (6–50 KVAR UNITS)
150 KVAR (6–25 KVAR UNITS)



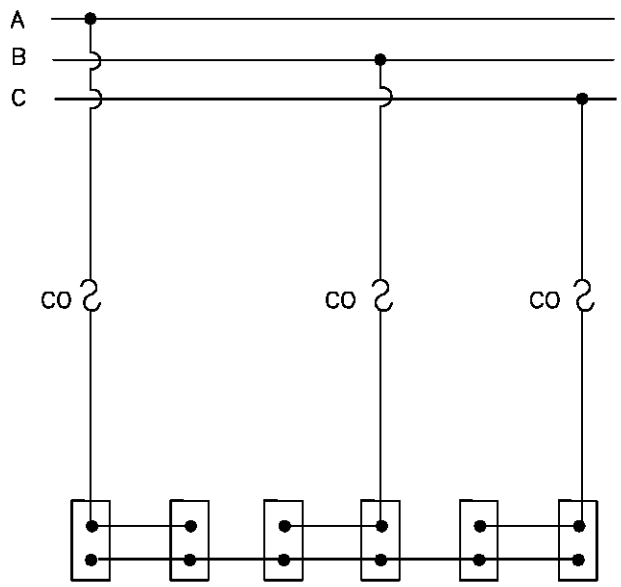

SCHEMATIC DIAGRAM

900 KVAR (9–100 KVAR UNITS)
450 KVAR (9–50 KVAR UNITS)
225 KVAR (9–25 KVAR UNITS)

| | | |
|---|---|---|
| DATE 12–1–98<br>APPD PA 12/98 | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONNECTION 4KV WYE | 1399.104<br>SUPERSEDES<br>1314.3 (12–1–98) |

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REFER TO STD 1399.207

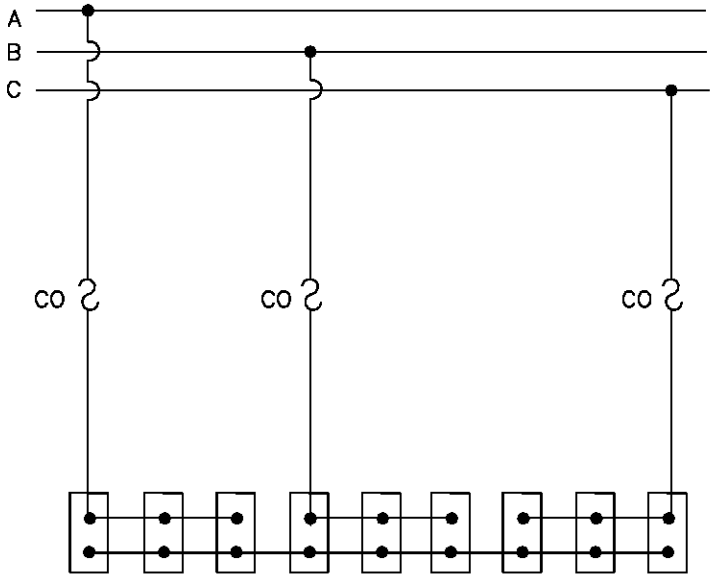



SCHEMATIC DIAGRAM

600 KVAR (6–100 KVAR UNITS)
300 KVAR (6–50 KVAR UNITS)
150 KVAR (6–25 KVAR UNITS)

FOR FIELD MAINTENANCE ONLY

REFER TO STD 1399.207




SCHEMATIC DIAGRAM

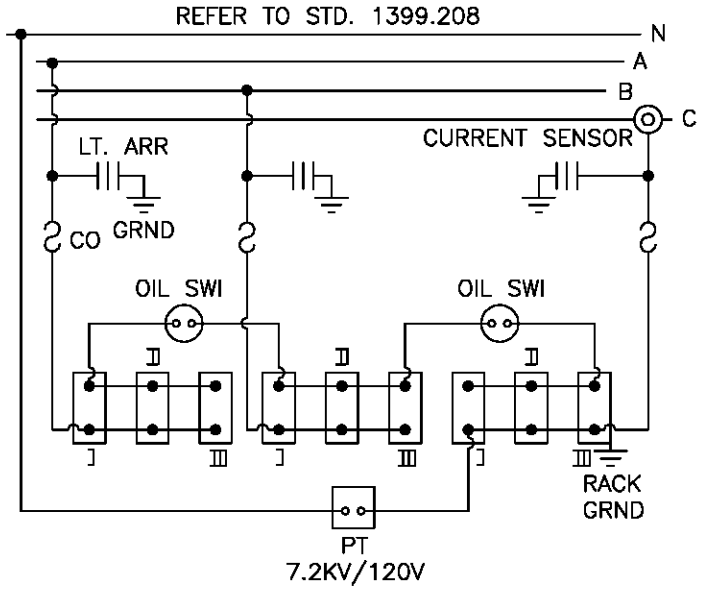
900 KVAR (9–100 KVAR UNITS)
450 KVAR (9–50 KVAR UNITS)
225 KVAR (9–25 KVAR UNITS)

NOTE:

–SEE STD. 1309 FOR CAPACITOR FUSING.

| 1399.105<br>SUPERSEDES<br>1314.4 (12–1–98) | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONNECTION 12KV–WYE (FIXED) | DATE 12–1–98<br>APPD PA/BS |
|---|---|---|

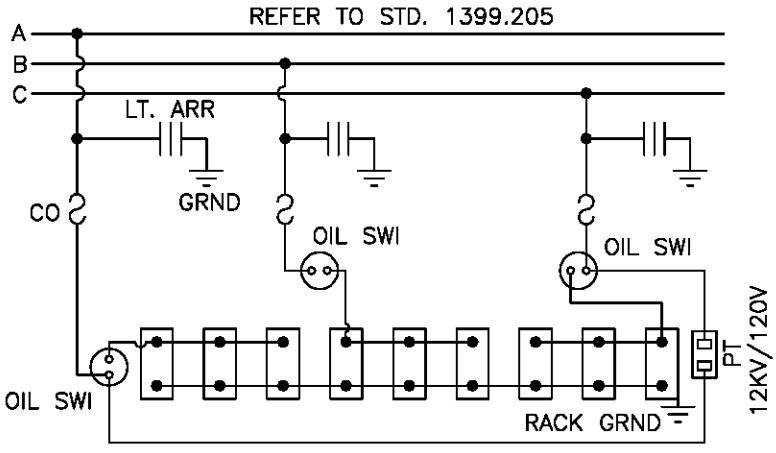
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SCHEMATIC DIAGRAM

1350 KVAR (9–150 KVAR UNITS) I, II, III
1200 KVAR (6–200 KVAR UNITS) I & III
900 KVAR (6–150 KVAR UNITS) I & III
600 KVAR (3–200 KVAR UNITS) II

FOR FIELD MAINTENANCE ONLY



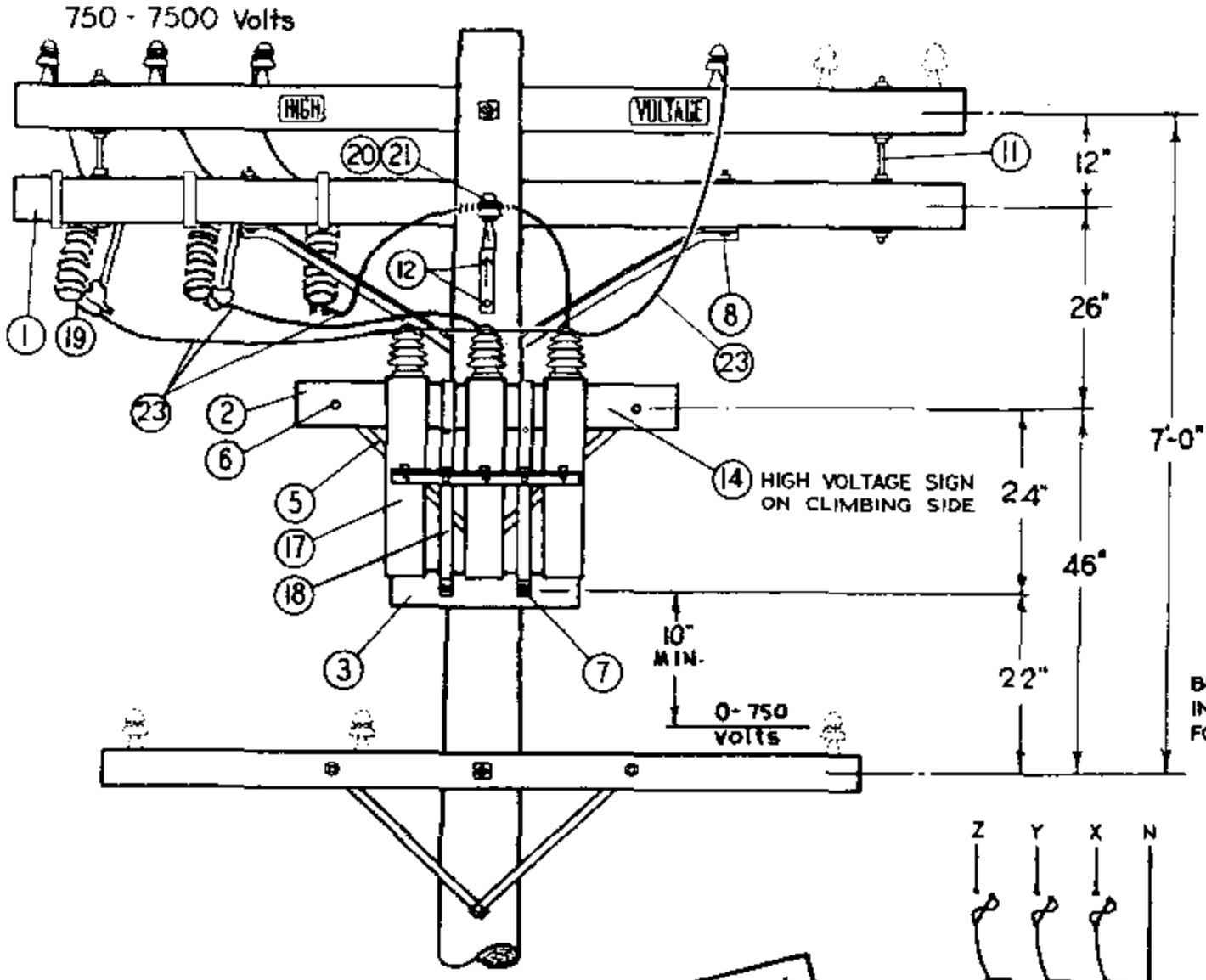

SCHEMATIC DIAGRAM
1350 KVAR (9–150 KVAR UNITS)
WITH 3 OIL SWITCHES

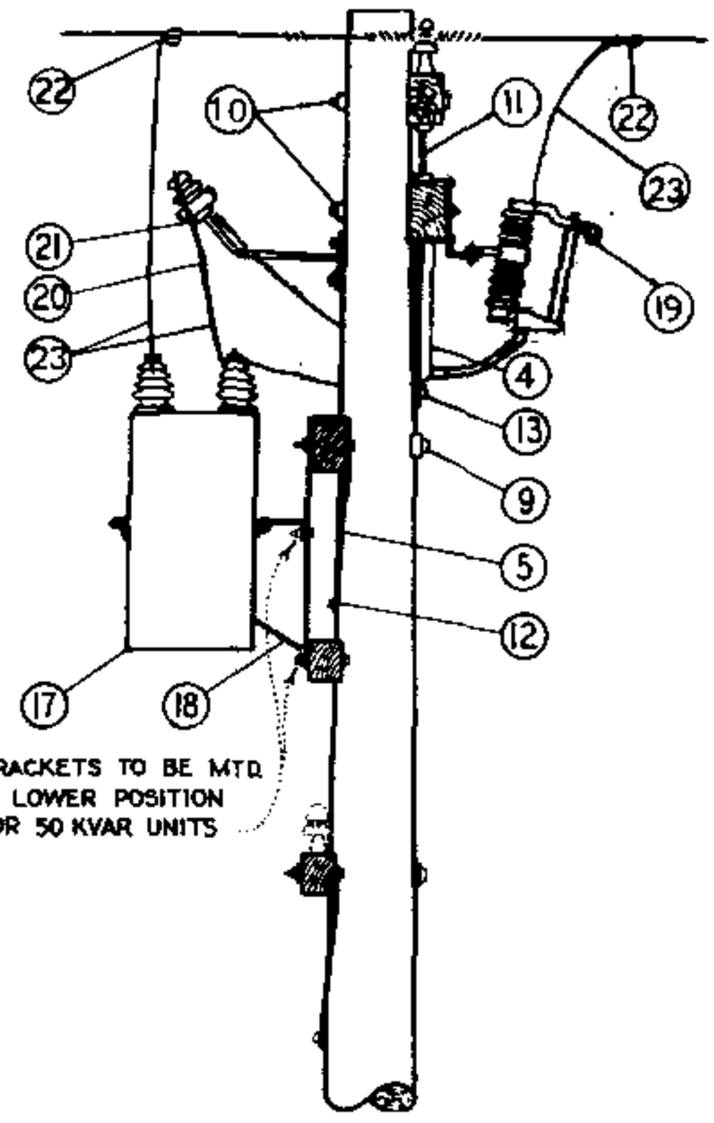
NOTE:

–SEE STD. 1309 FOR CAPACITOR FUSING.

| | | |
|---|---|---|
| DATE 12–1–98<br>APPD PA / RDG | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONNECTION 12 & 12.47KV–WYE (SWITCHED) | 1399.106<br>SUPERSEDES<br>1314.5 (12–1–98) |

750 - 7500 Volts



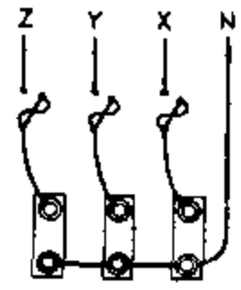




DIAGRAM OF 4 KV. WYE CONNECTIONS
150 KVAR (3-50 KVAR UNITS)
75 KVAR (3-25 KVAR UNITS)
45 KVAR (3-15 KVAR UNITS)

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

A. CAPACITOR RACK TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

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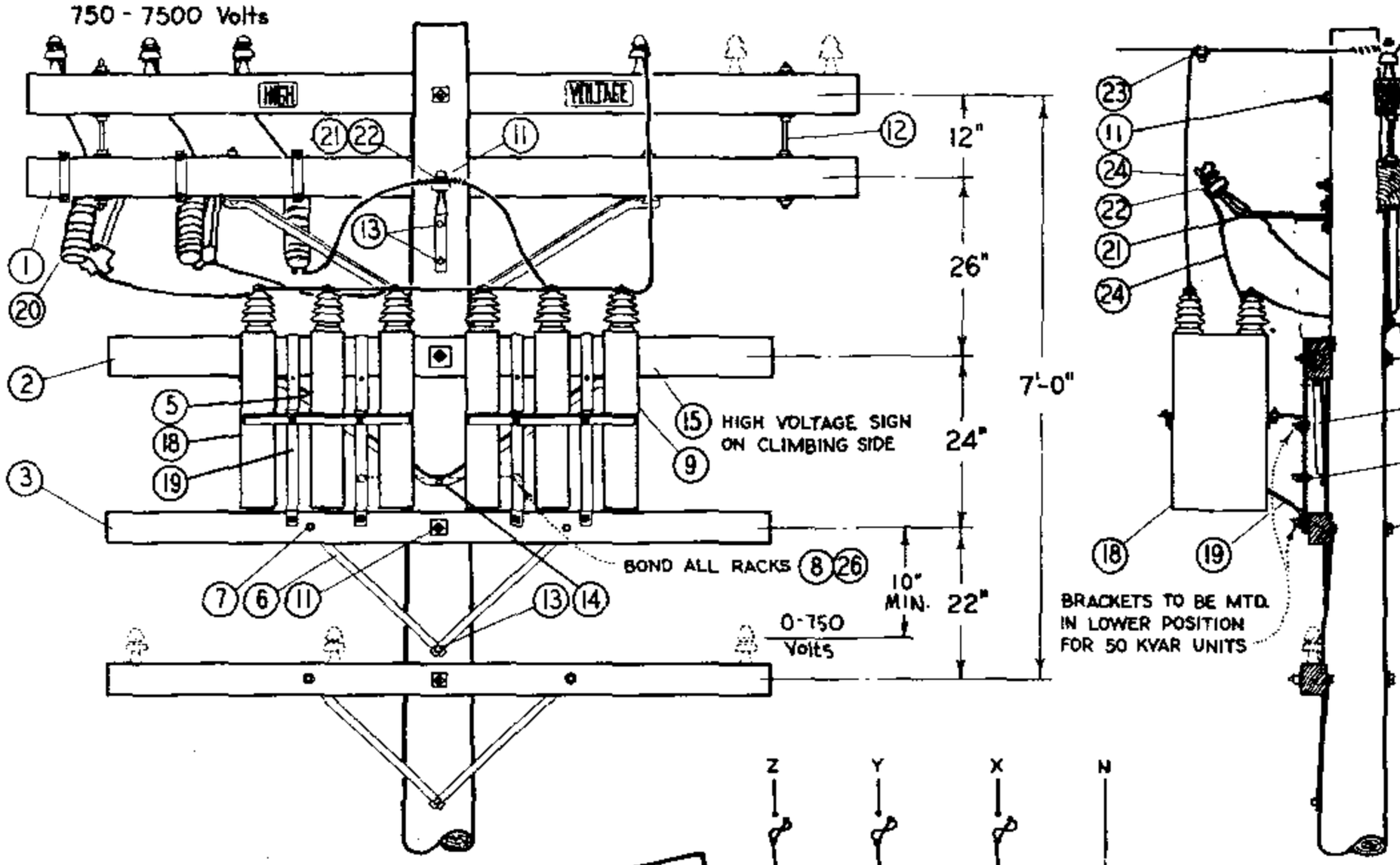
| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | PG 380.01 IT. 2 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 4' - 0" | 1 | PG 380.05 IT. 3 |
| | 3 | CROSSARM, 3 1/2" X 4 1/2" X 2' - 0" | 1 | PG 380.05 IT. 1 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| | 5 | BRACE, FLAT CROSSARM, 26" | 2 | 164192 |
| | 6 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| | 7 | BOLT, MACH., GALV., 1/2" X 5", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140 (E) |
| | 9 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH, 1 FLAT, 1 CURV & 1 NUT | 1 | STD 139, 140 (E) |
| | 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4" SQ WASH & 1 NUT | 2 | STD 139, 140 (E) |
| | 11 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140 (E) |
| | 12 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| | 13 | LAG SCREW, GALV., 5/8" X 5" | 1 | 621600 (E) |
| | 14 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS | 1 | 647648-492224 (E) |
| | 15 | | | |
| | 16 | | | |
| L T I | 17 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 3 | 207200 |
| | 18 | RACK, CAPACITOR | 1 | 402624 |
| | 19 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297888 |
| | 20 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| | 21 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG 750.3 |
| | 22 | CONNECTOR, COMPRESSION | 4 | PGS 786, 783 (E) |
| | 23 | WIRE, BARE STRANDED, #6 | 30' | 813536 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

1399.107
SUPERSEDES
1315 (1-1-87)

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV-WYE-150 KVAR MAXIMUM

DATE 1-1-87
APPD AK/RDS



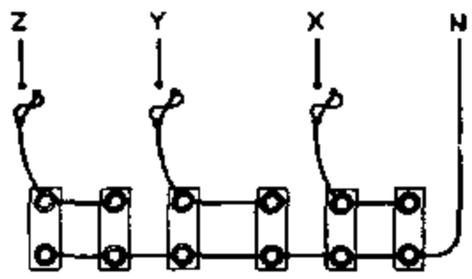




DIAGRAM OF 4 KV. WYE CONNECTIONS
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)
90 KVAR (6-15 KVAR UNITS)

INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| | ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| PT&F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' -0" | 1 | PG. 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | PG. 380.05 |
| | 3 | CROSSARM, 3 1/2 X 4 1/2 X 8 - 0 | 1 | PG. 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | 1 | 164128 |
| | 5 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 164032 |
| | 6 | BRACE, FLAT CROSSARM, 28" | 2 | 164192 |
| | 7 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2 RD. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 9 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | 4 | STD 139, 140(E) |
| | 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3 SQ. WASH., 1 FLAT, 1 CURV. & 1 NUT | 1 | STD 139, 140(E) |
| | 11 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4 SQ. WASH. & 1 NUT | 2 | STD 139, 140(E) |
| | 12 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | 2 | STD 139, 140(E) |
| | 13 | LAG SCREW, GALV., 1/2" X 4" | 3 | 621568 (E) |
| | 14 | LAG SCREW, GALV., 5/8" X 5" | 2 | 621600 (E) |
| | 15 | SIGN, HIGH VOLTAGE & ROOFING NAILS | 1 | 647648-492224(E) |
| | 16 | | | |
| | 17 | | | |
| LI | 18 | CAPACITOR UNIT (2.4KV, 50 KVAR ILLUSTRATED) (B) | 6 | 207200 |
| | 19 | RACK, CAPACITOR (B) | 2 | 402620 |
| | 20 | CUTOUT, 12KV 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 297888 |
| | 21 | BRACKET, INSULATOR 1" LEAD THREAD | 1 | 166134 |
| | 22 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | PG. 750.3 |
| | 23 | CONNECTOR, COMPRESSION | 4 | STD 786, 783(E) |
| | 24 | WIRE, #6 BARE STRANDED COPPER | 30' | 813536 |
| | 25 | | | |
| | 26 | WIRE, BARE SOLID ANNEALED COPPER #8 | 2'-6" | 812928 |
| | 27 | | | |

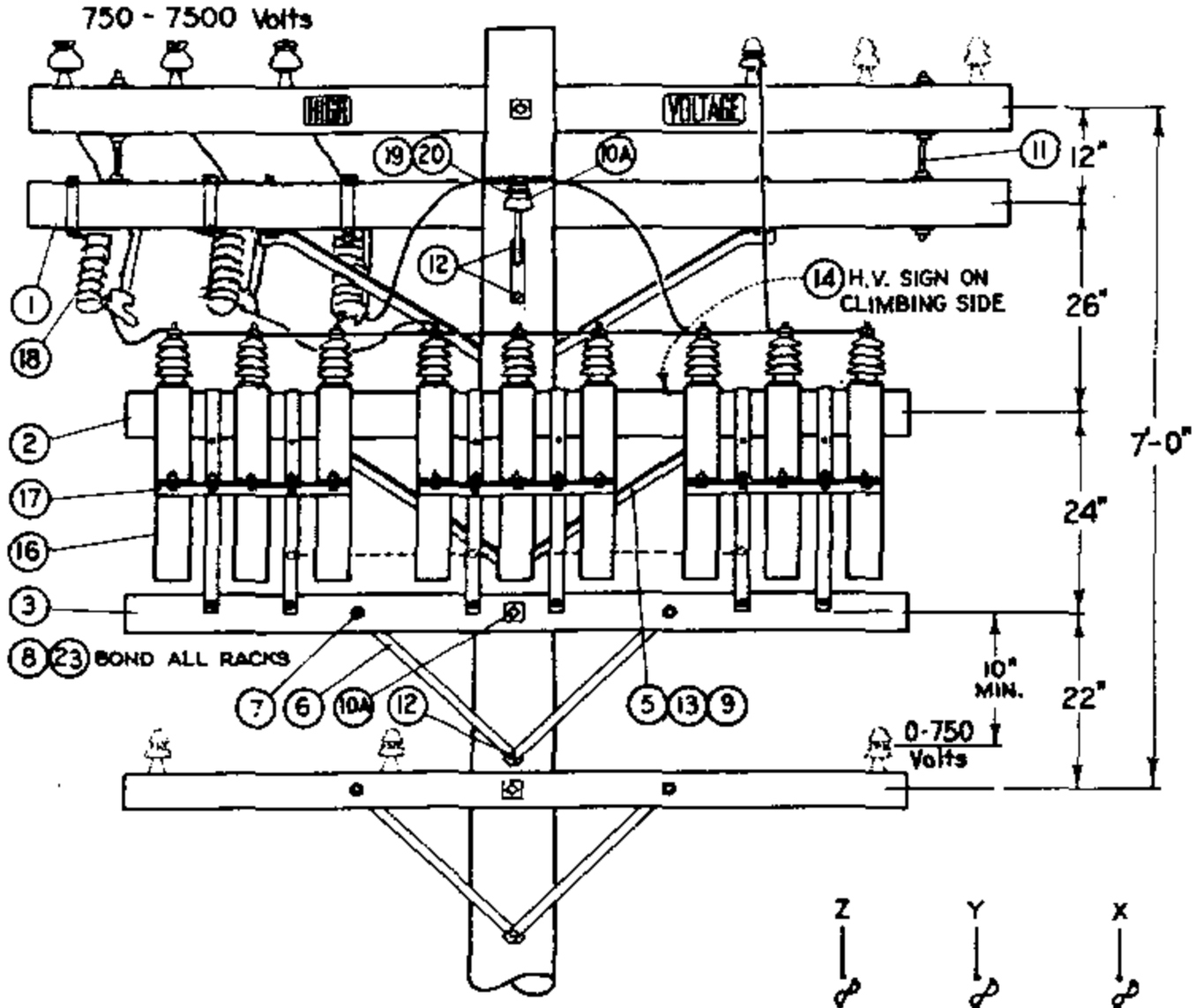
DATE 1-1-87
APPD AK/RDS

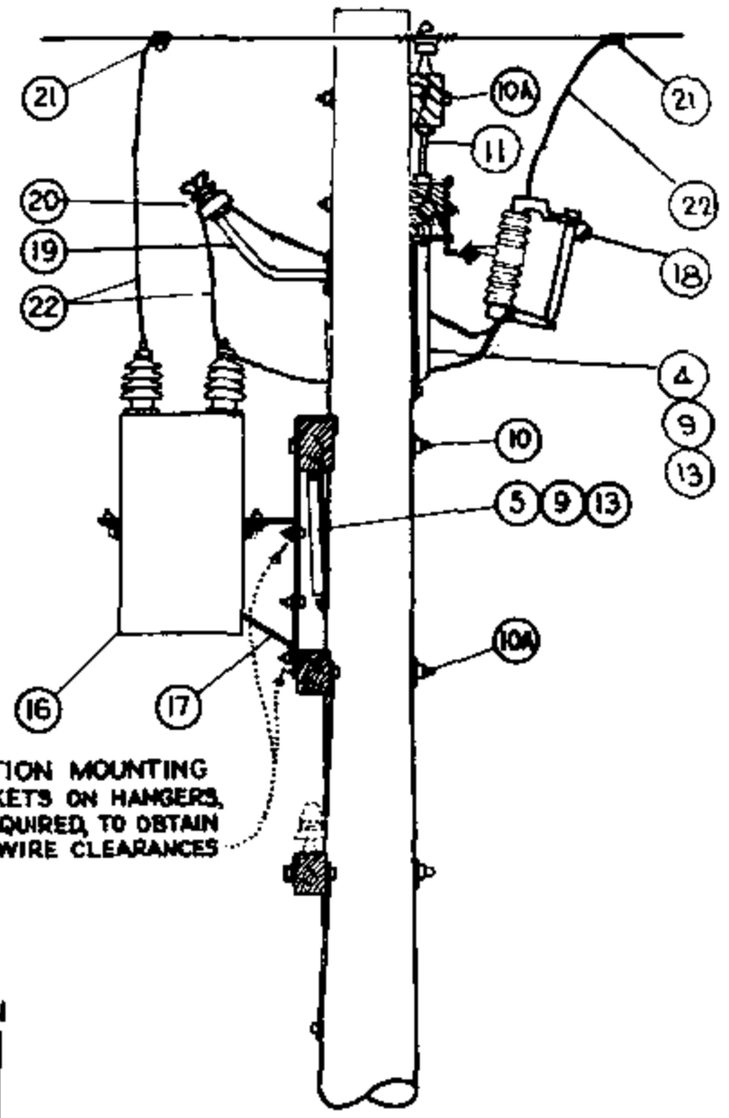
SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATION 4KV - WYE - 300 KVAR MAXIMUM

1399.108
SUPERSEDES
1316 (1-1-87)

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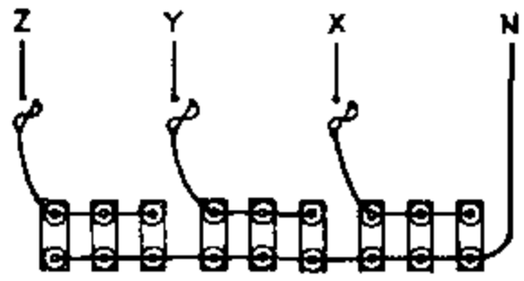



DIAGRAM OF 4 KV. WYE CONNECTIONS
450 KVAR (9-50 KVAR UNITS)
225 KVAR (9-25 KVAR UNITS)
135 KVAR (9-15 KVAR UNITS)

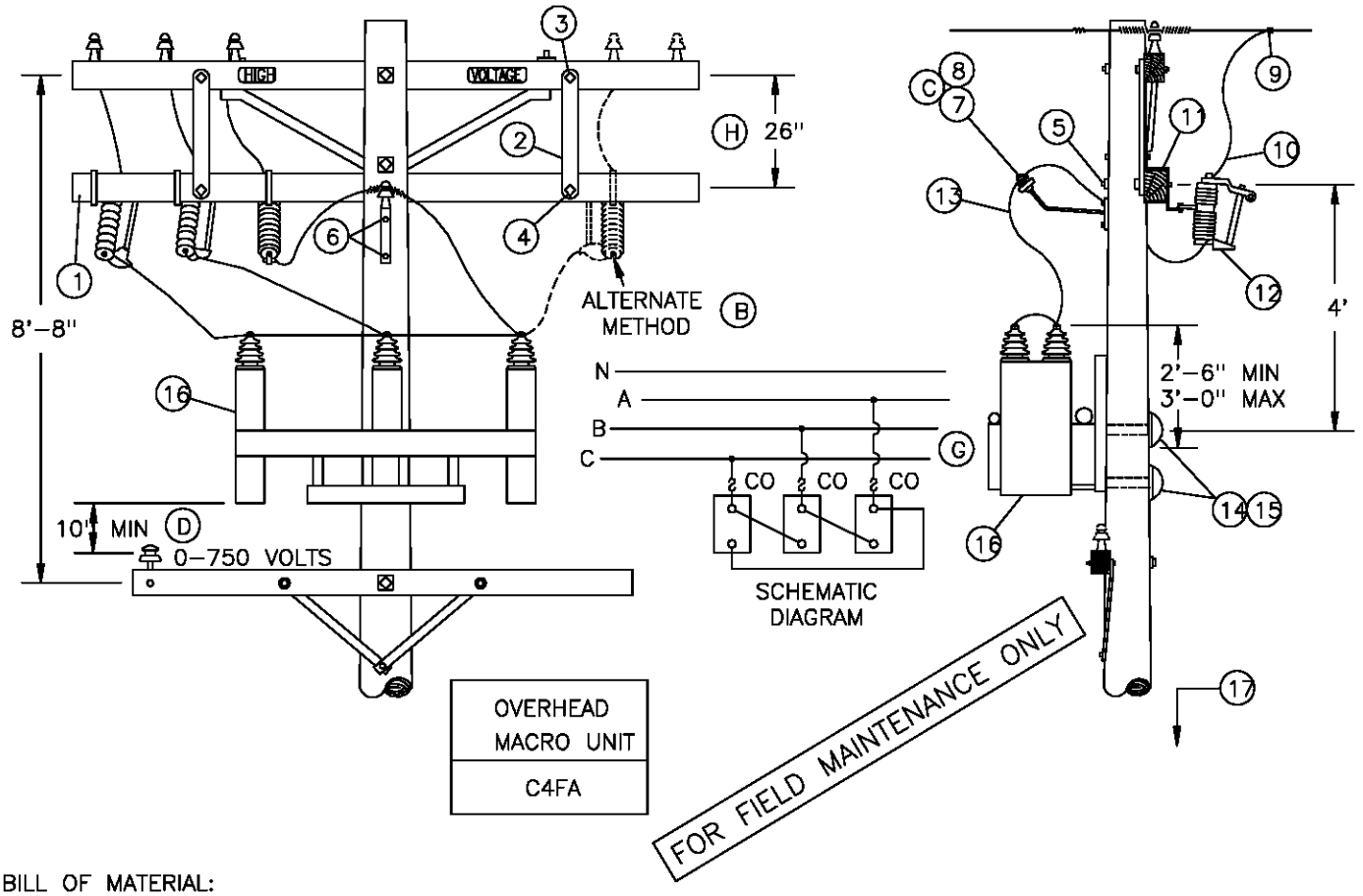
INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.
(B) NO LONGER PURCHASED.
C. FOR POLE STEPPING REFER TO STD. 363.
(E) EXEMPT MATERIAL.

| | ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | | 1 | 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | | 1 | 380.05 |
| | 3 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | | 1 | 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 5' - 0" | | 1 | 164128 |
| | 5 | BRACE, ANGLE CROSSARM, 4' - 0" | | 1 | 164032 |
| | 6 | BRACE, FLAT CROSSARM, 28" | | 2 | 164192 |
| | 7 | BOLT, MACH., GALV., 3/8" X 4 1/2", 1 RD. WASH. & 1 NUT | | 2 | STD 139, 140 (E) |
| | 8 | BOLT, MACH., GALV., 1/2" X 1 1/2", 2 RD. WASH. & 1 NUT | | 3 | STD 139, 140 (E) |
| | 9 | BOLT, MACH., GALV., 1/2" X 7", 1 RD. WASH. & 1 NUT | | 4 | STD 139, 140 (E) |
| | 10 | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 3" SQ. WASH., 1 FLAT, 1 CURV., & 1 NUT | | 1 | STD 139, 140 (E) |
| | 10A | BOLT, MACH., GALV., 5/8" X (AS REQ'D) 2-2 1/4" SQ. WASH. & 1 NUT | | 2 | STD 139, 140 (E) |
| | 11 | BOLT, SPACE, GALV., 5/8" X 22", 4 SQ. WASH. & 4 NUTS | | 2 | STD 139, 140 (E) |
| | 12 | LAG SCREW, GALV. 1/2" X 4" | | 3 | 621568 (E) |
| | 13 | LAG SCREW, GALV. 5/8" X 5" | | 2 | 621600 (E) |
| | 14 | SIGN, HIGH VOLTAGE, & ROOFING NAILS | (E) | 1 | 647648-492224 |
| | 15 | | | | |
| L T I | 16 | CAPACITOR UNIT, 2.4KV, (50 KVAR UNITS ILLUSTRATED) | (B) | 9 | 207200 |
| | 17 | RACK, CAPACITOR | | 3 | 402624 |
| | 18 | CUTOUT 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | | 3 | 297888 |
| | 19 | BRACKET, INSULATOR 1" LEAD THREAD | | 1 | 166134 |
| | 20 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | | 1 | 750.3 |
| | 21 | CONNECTOR, COMPRESSION | | 4 | PGS 786, 783 (E) |
| | 22 | WIRE, #6 BARE STRANDED COPPER | | 30' | 813536 |
| | 23 | WIRE, BARE SOLID ANNEALED COPPER #8 | | 6' | 812928 |
| | 24 | | | | |
| | 25 | | | | |
| | 26 | | | | |

| 1399.109 | SDG&E ELECTRIC STANDARDS | DATE 1-1-87 |
|---|---|---|
| SUPERSEDES 1317 (1-1-87) | CAPACITOR INSTALLATION 4KV - WYE - 450 KVAR MAXIMUM | APPD AK / RDG |

SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 4.16KV DELTA FIXED CAPACITOR.




BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM 3 3/4" X 5 3/4" X 10' - 0" | 1 | - | 294128 |
| 2 | BRACE, FLAT, CROSSARM, 28" | 2 | - | 164192 |
| 3 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 2 | 392 | - |
| 4 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 RD & 1 SPRING WASHER | 2 | 392 | - |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE FLAT AND 1 DOUBLE COIL SPRING WASHER | 1 | 392 | - |
| 6 | LAG SCREW, GALV, 1/2" X 4" (C) | 2 | - | 621568 |
| 7 | BRACKET, INSULATOR, 1" LEAD THREAD (C) | 1 | - | 166134 |
| 8 | INSULATOR, PIN TYPE, CLASS AS REQUIRED (C) | 1 | 750 | - |
| 9 | CONNECTOR, COMPRESSION, CU OR AL (SIZE AS REQ'D) | AS REQ'D | 783, 786 | - |
| 10 | WIRE, BARE STRANDED, #6, COPPER | 9' | - | 813536 |
| 11 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | - | 166070 |
| 12 | CUTOUT, 12KV, 100A, HVY DUTY, WITH LOADBUSTER HOOK | 3 | - | 297888 |
| 13 | WIRE, BARE STRANDED, #4 COPPER | 12' | - | 813760 |
| 14 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVED AND 1 DOUBLE COIL SPRING WASHER | 2 | 392 | - |
| 15 | COVER, THRU BOLT, PLASTIC & | 2 | - | 285696 |
| | 6-10D NAILS, GALV | - | - | 491392 |
| 16 | RACK, CAPACITOR (4.16KV, 200 KVAR) (G) | 1 | - | 564759 |
| 17 | TAG, STATION NUMBER | 1 | 200 SECT | - |

| | | |
|---|---|---|
| DATE 12-1-98<br>APPD PA/BSG | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4.16KV DELTA UNGROUNDED RACK | 1399.110<br>SUPERSEDES<br>1318.1 (12-1-98) |

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INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.

(B) INSTALL ONE CUTOUT AS SHOWN ON THE ALTERNATE METHOD IF THE 4KV CONDUCTORS ARE SPREAD OUT.

(C) OMIT ITEMS 6, 7, & 8 IF ALTERNATE METHOD (B) IS USED.

(D) FROM BOTTOM OF THE CAPACITOR RACK OR THE CASE, WHICHEVER IS LOWER.

F. CAPACITOR MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

(G) THE KVAR RATING OF 7200 VOLT CAPACITORS IS REDUCED BY A FACTOR OF THREE WHEN WIRED IN DELTA AND CONNECTED TO THE 4160 VOLT SYSTEM.

(H) IF ADDITIONAL SPACE IS REQUIRED BELOW THE CUTOUT ARM, THE SEPARATION BETWEEN THE LINE ARM AND CUTOUT ARM MAY BE REDUCED TO 12" WITH THE USE OF SPACE BOLTS.

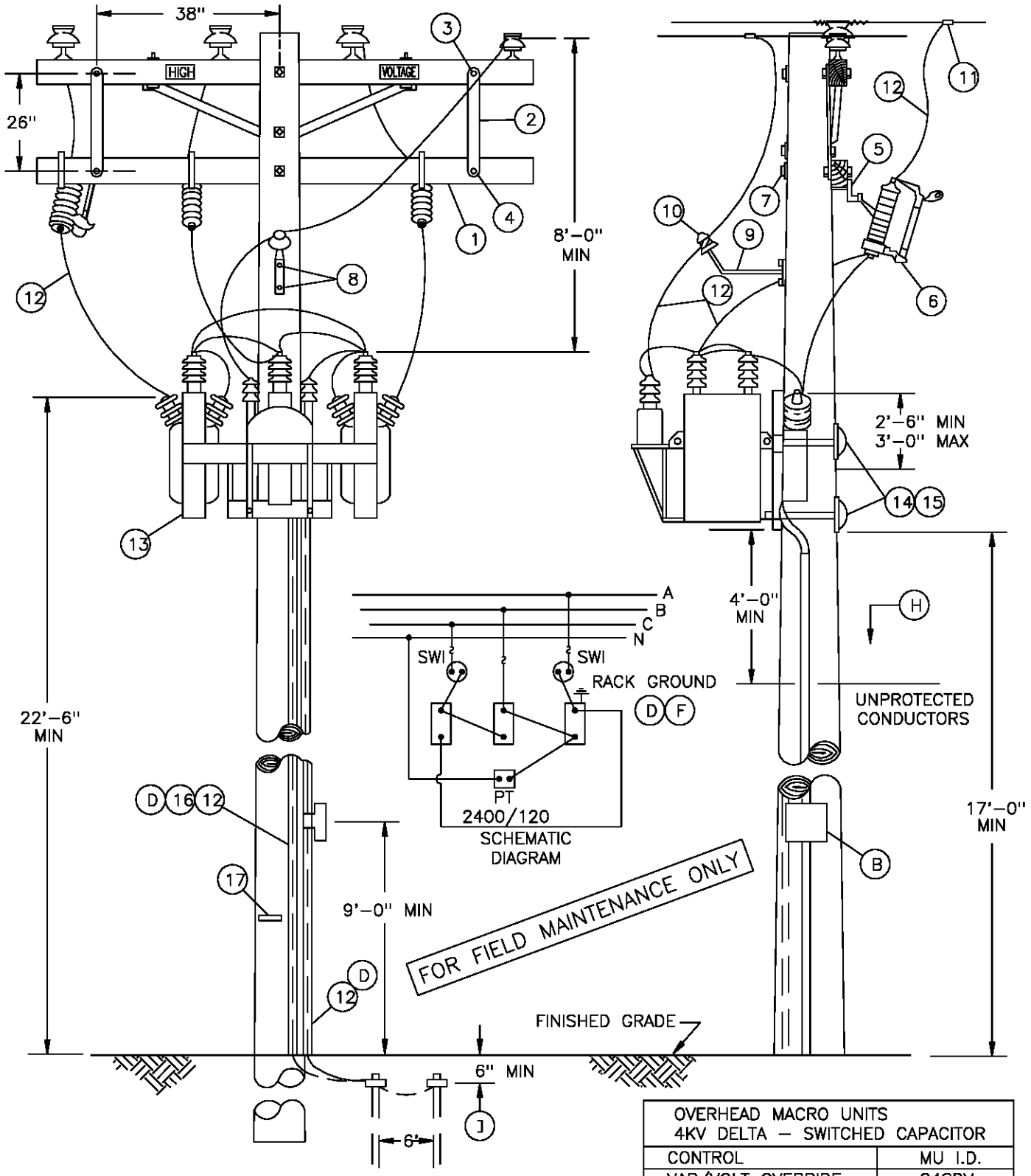
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|---|---|---|
| 1399.111<br>SUPERSEDES<br>1318.2 (12-1-98) | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4.16KV DELTA UNGROUNDED RACK | DATE 12-1-98<br>APPD PSA/CMK |

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SCOPE: THIS STANDARD SHOWS THE INSTALLATION METHOD OF A 4.16KV DELTA SWITCHED CAPACITOR.




| OVERHEAD MACRO UNITS 4KV DELTA – SWITCHED CAPACITOR | |
|---|---|
| CONTROL | MU I.D. |
| VAR/VOLT OVERRIDE | C4SDV |
| VOLT W/TIME BIAS | C4STD |

NOTES:

– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

| | | |
|---|---|---|
| DATE 12–1–98<br>APPD PSA/CMK | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITOR INSTALLATION<br>4.16 KV DELTA – 2 OIL SWITCHES | 1399.112<br>SUPERSEDES<br>1319.1 (12–1–98) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | 1 | -- | 249128 |
| 2 | BRACE, FLAT, CROSSARM, 28" | 2 | -- | 164192 |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 SPR WASH & 1 RD WASH | 2 | 392 | -- |
| 4 | BOLT, MACH, GALV, 1/2 X 5", 1 RD WASH, 1 DBL COIL WASH | 2 | 392 | -- |
| 5 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | -- | 166070 |
| 6 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 1212 | -- |
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQ WASH & 1 DBL COIL WASH | 1 | 392 | -- |
| 8 | LAG SCREW, GALV, 1/2" X 4" | 2 | -- | 621568 |
| 9 | BRACKET, INSULATOR, 1" LEAD THREAD | 1 | -- | 166134 |
| 10 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | 750 | -- |
| 11 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783–786 | -- |
| 12 | WIRE, BARE STRANDED, #4, COPPER | 100' | -- | 813760 |
| 13 | RACK, SWITCHED CAPACITOR, COMPLETE WITH SWITCHES AND POTENTIAL TRANSFORMER, (4.16KV, 200KVAR) (F) | 1 | -- | 564758 |
| 14 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURVE RIB WASH & 1 DBL COIL SPR WASH | 2 | 392 | -- |
| 15 | COVER, BOLT, PLASTIC & 6 – 1 3/4" NAILS, GALV | 2 | -- | 285696 |
| | | -- | -- | 492192 |
| 16 | UNIT GROUND, COMPLETE | 1 | -- | 603136 |
| 17 | TAG, STATION NUMBER | 1 | 200 SECT. | -- |

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INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.

(B) SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

C. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

(D) CONNECT CAPACITOR RACK GROUND LEAD TO GROUND ROD. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

(F) THE KVAR RATING OF 7200 VOLT CAPACITORS IS REDUCED BY A FACTOR OF THREE WHEN WIRED IN DELTA AND CONNECTED TO THE 4160 VOLT SYSTEM.

G. CAPACITOR MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

REFERENCE:

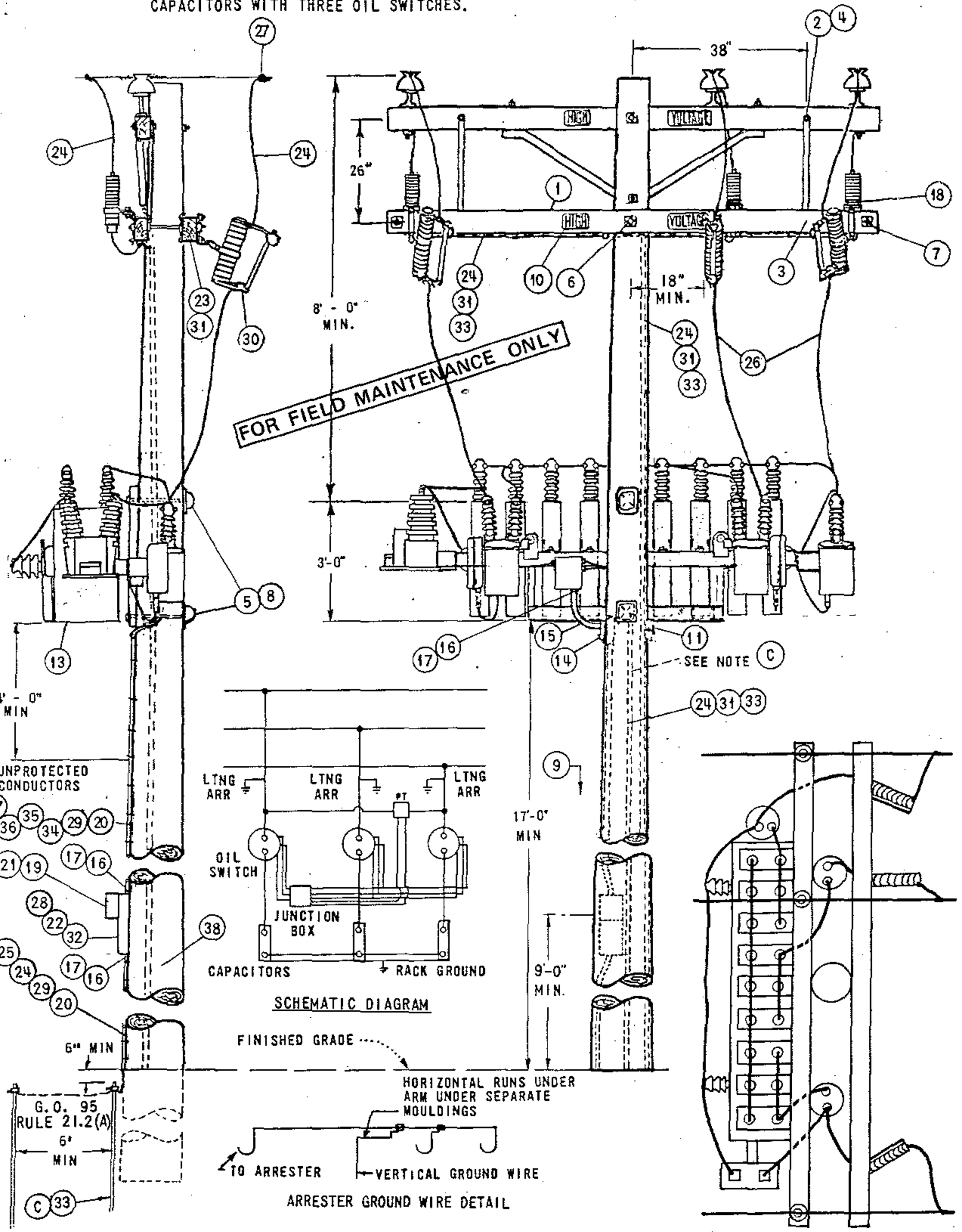
(H) POLE STEPPING – SEE STANDARD 363.

(I) GROUNDING METHODS – SEE STANDARD 1002.

J. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE – G.O. 95 RULE 22.2 (C).

| | | |
|---|---|---|
| 1399.113<br>SUPERSEDES<br>1319.2 (12–1–98) | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITOR INSTALLATION<br>4.16 KV DELTA – OIL SWITCHES | DATE 12–1–98<br>APPD PSA / CMK |

APPLICATION: THIS CONSTRUCTION SHALL BE USED FOR ALL VOLTAGE, TIME, OR TIME-VOLTAGE SWITCHED CAPACITORS WITH THREE OIL SWITCHES.




| | | |
|---|---|---|
| DATE 9-17-82<br>APPD JAT | SDG&E ELECTRIC STANDARDS<br>12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION<br>3 OIL SWITCHES IN LINE | 1399.201<br>SUPERSEDES<br>1324.1 (9-17-82) |

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NOTES:

A. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.
B. BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS. AS IDENTIFIED ON STANDARDS PAGE 287.
(C) ONE GROUND IS REQUIRED FOR THE CAPACITOR RACK, ONE IS REQUIRED FOR THE ARRESTERS, AND A THIRD FOR THE CONTROL PANEL. THESE GROUNDS ARE NOT TO BE INTERCONNECTED.
D. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.
(E) EXEMPT MATERIALS.
(F) TO BE INSTALLED BY KEARNY ELECTRIC MAINTENANCE.
G. INSTALL CONTROL ON SAME SIDE OF POLE AS CAPACITOR RACK.
H. RACKS THAT CONTAIN PT'S WITH METAL TANKS TO BE INSULATED FROM RACK BY KEARNY MAINTENANCE BEFORE REINSTALLATION.
(I) THE POTENTIAL TRANSFORMERS FOR THIS INSTALLATION ARE CONNECTED PHASE-TO-PHASE. FOR POTENTIAL TRANSFORMERS CONNECTED PHASE-TO-NEUTRAL, SEE PAGE 1326.
J. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE. G.O. 95 RULE 22.2(C).
K. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

| | ITEM | DESCRIPTION | | | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | | | 2 | 300 SECTION |
| | 2 | BRACE, FLAT CROSSARM 28" | | | 2 | 164192 |
| | 3 | BOLT, MACHINE, GALV., 3/8" X 4 1/2", & 1 SPRING LOCK WASH. | | (E) | 2 | PGS 139, 140 |
| | 4 | BOLT, MACHINE, GALV., 1/2" X 5", 1 RD. WASH, 1 DBL. COIL SPR. WASH | | (E) | 2 | PGS 139, 140 |
| | 5 | BOLT, MACHINE, GALV., 3/4" X___, 1 SQ CURV RIB WASH, 1 DBL COIL SPR WASH | | | 2 | PGS 139, 140 |
| | 6 | BOLT, MACHINE, GALV, 5/8" X___, 2 SQ WASH, 1 DBL COIL SPR WASH | | (E) | 1 | PGS 139, 140 |
| | 7 | BOLT, SPACE, GALV., 5/8" X___, 4 SQ WASH, 2 DBL COIL SPR WASH, 2 RD WASH. | | (E) | 2 | PGS 139,140 |
| | 8 | COVER, BOLT, PLASTIC, 10 D NAILS, GALV | | (E) | 2 | 285696 |
| | 9 | STEPS, POLE | | (E) | 16 | 692992 |
| | 10 | SIGN, HIGH VOLTAGE & NAILS, GALV. | | (E) | 4 | 647648, 492224 |
| | 11 | SCREW, LAG, GALV, 4" | | (E) | 2 | 621568 |
| | 12 | | | | | |
| | 13 | SWITCHED CAPACITOR RACK, COMPLETE WITH CAPACITORS, SWITCHES & POTENTIAL TRANSFORMER | 900 KVAR (6 @ 150 KVAR) | | 1 | 564704 |
| | | | 1350 KVAR (9 @ 150 KVAR) | | 1 | 564752 |
| | 14 | ACCESS FITTING BODY TYPE LB PVC 3/4" | | (F) (E) | 1 | 146384 |
| | 15 | ELBOW, STANDARD RADIUS PVC 3/4" | | (F) | 1 | 322166 |
| | 16 | REDUCER COUPLING PVC 3/4"TO 1" | | (F) | 3 | 573410 |
| | 17 | TERMINAL ADAPTOR PVC 1" | | (F) | 3 | 102756 |
| | 18 | ARRESTERS, LIGHTNING, 12KV | | | 3 | 113248 |
| | 19 | CONTROL, CAPACITOR (SELECT TYPE AS REQ'D) | a TIME SWITCH | (F) | 1 | 706160 |
| | | | b TIME SWITCH W/VOLTAGE OVERRIDE | (F) | 1 | 706176 |
| | | | c VOLTAGE | (F) | 1 | 273984 |
| L T I | 20 | CONDUIT, PVC, SCHEDULE 40, 3/4" | | (F) (E) | 40' | 251328 |
| | 21 | PADLOCK, MASTER 7 | | | 1 | 514912 |
| | 22 | BRACKETS, CONTROL MOUNTING | | (F) | 2 | SHOP MADE |
| | 23 | WIRE, #8 SOL, ANNEALED BARE COPPER | | | 10' (1/2#) | 812928 |
| | 24 | WIRE, BARE STRANDED COPPER, #6 | | | 110' | 813536 |
| | 25 | ROD & CLAMP, GROUND | | | 2 | 603072, 230016 (E) |
| | 26 | WIRE, #4 COPPER, WP | | | 20' | 812480 |
| | 27 | CONNECTORS, WIRE, COMPRESSION, COPPER OR ALUMINUM AS REQ'D | | (E) | 6 | PGS 786, 783 |
| | 28 | SCREW, 1/4" X 2" LAG | | (F) | 4 | 621888 |
| | 29 | STRAPS, PIPE GALV, 3/4", 6D NAILS, GALV. | | (F) (E) | AS REQ'D | 697888 |
| | 30 | CUTOUTS 12KV 100A WITH LOADBUSTER HOOKS | | | 3 | 1200 SECTION |
| | 31 | STAPLES, WIRE GALV, 1 1/4" | | (E) | AS REQ'D | 678528 |
| | 32 | BOX, METER SOCKET SAFETY, 5 TERMINAL, 100 AMP | | (F) | 1 | 161856 |
| | 33 | UNIT GROUND COMPLETE (WITH PLAIN MLDG, WITH GRAY MLDG) | | | 2 | 603136, 603120 |
| | 34 | WIRE, THW #12 WHITE | | (F) | 30' | 808704 |
| | 35 | WIRE, THW #12 BLACK | | (F) | 30' | 808096 |
| | 36 | WIRE, THW #12 RED | | (F) | 30' | 808576 |
| | 37 | WIRE, THW #12 BLUE | | (F) | 30' | 808416 |
| | 38 | TAG, STATION NUMBER | | | 1 | 300 SECTION |

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| 1399.202<br>SUPERSEDES<br>1324.2 (9-17-82) | SDG&E ELECTRIC STANDARDS<br>12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION<br>3 OIL SWITCHES IN LINE | DATE 9-17-82<br>APPD JHT. |

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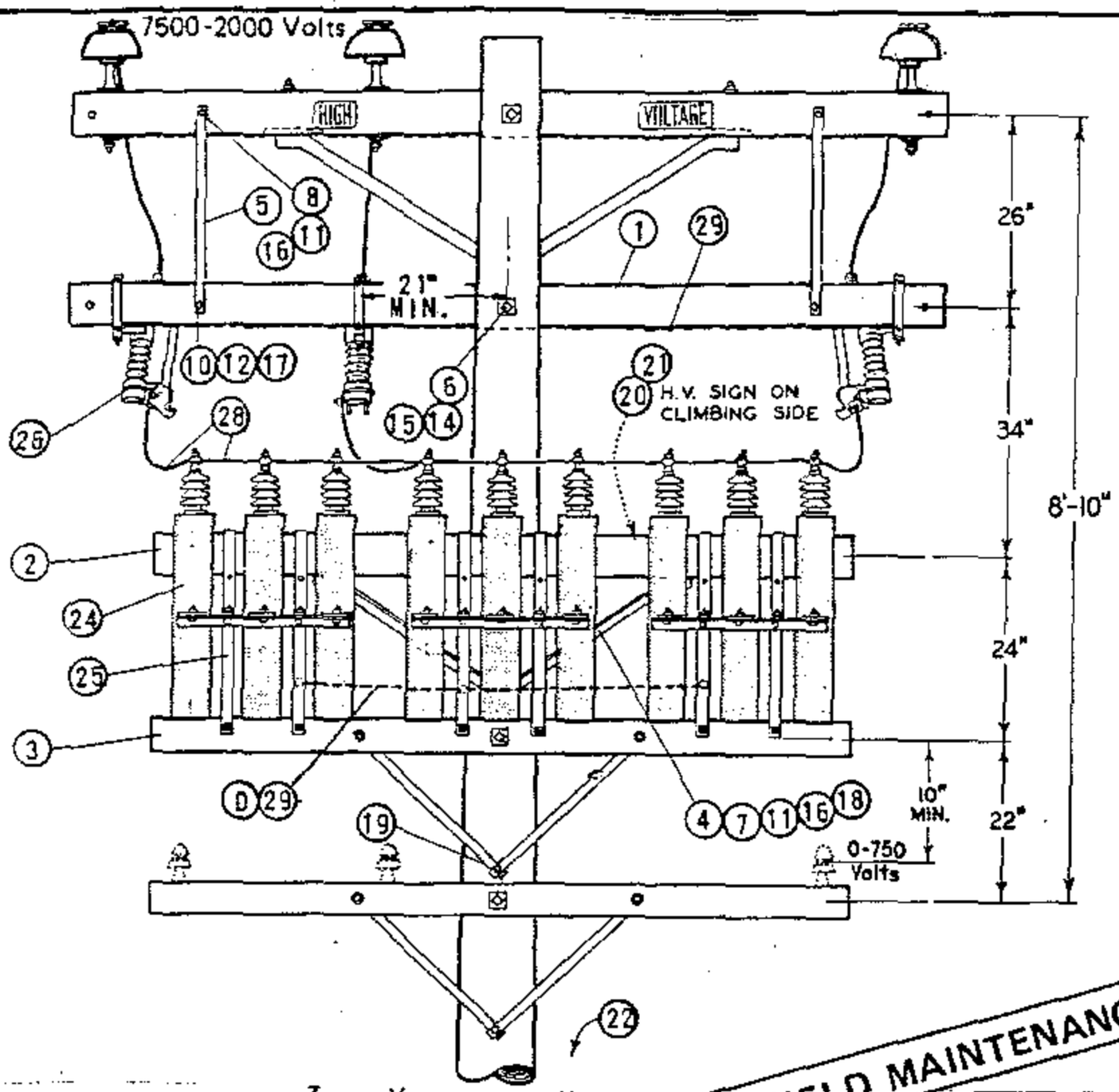
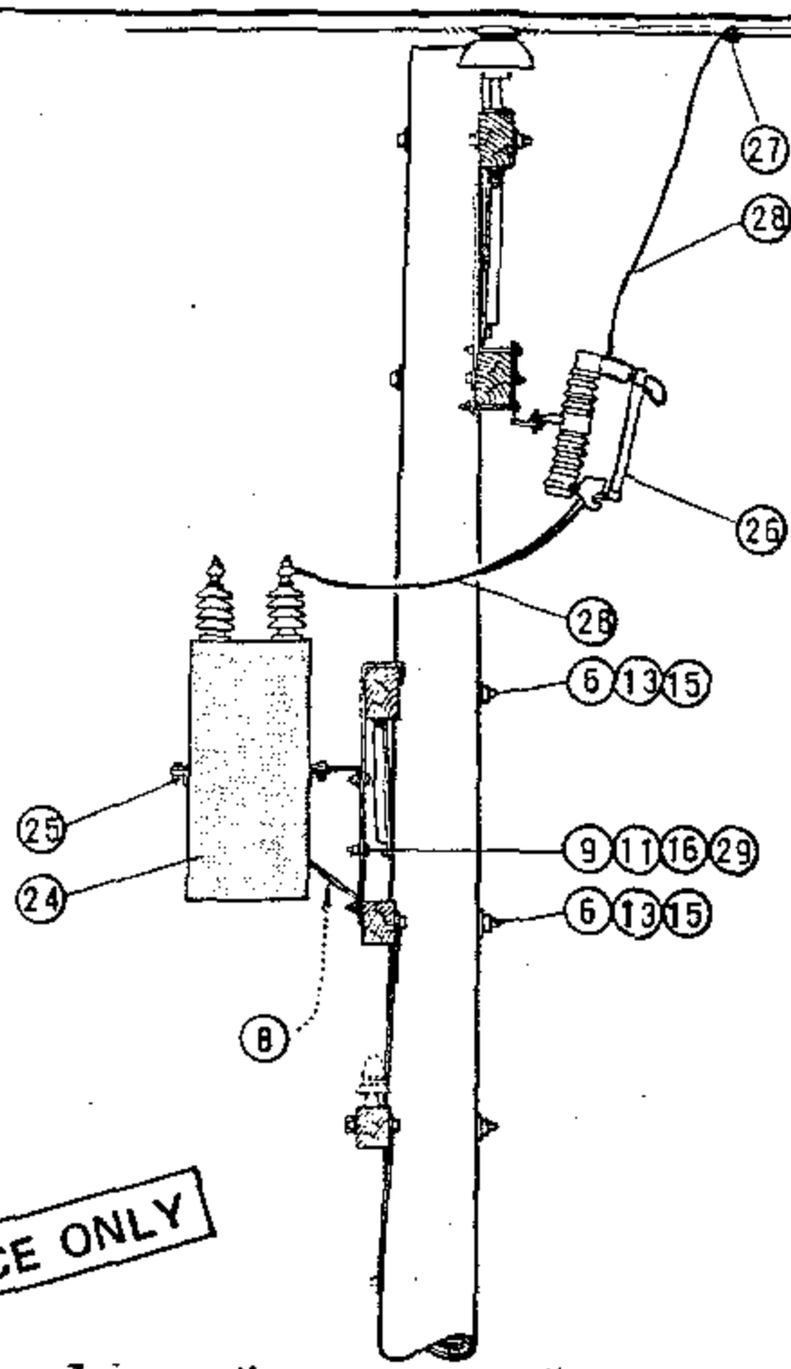



DIAGRAM OF 12KV WYE CONNECTIONS

600 KVAR (6-100 KVAR UNITS)
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)



FOR FIELD MAINTENANCE ONLY

DIAGRAM OF 12KV WYE CONNECTIONS

900 KVAR (9-100 KVAR UNITS)
450 KVAR (9-50 KVAR UNITS)
225 KVAR (9-25 KVAR UNITS)

INSTALLATION:

(A) QUANTITY BASED ON 45' POLE.
(B) BRACKETS TO BE MOUNTED IN LOWER POSITION FOR 50 AND 100 KVAR UNITS.
C. BOND ALL 12KV HARDWARE WITHIN 3 MILES OF COAST.
(D) BOND ALL RACKS AS SHOWN IN ILLUSTRATION.
(E) EXEMPT MATERIAL.
(F) NO LONGER PURCHASED.
G. SEE PAGE 1323 FOR MATERIAL NEEDED FOR LIGHTING ARRESTERS ON 900 KVAR INSTALLATIONS.

| | ITEM | DESCRIPTION | QUANTITY UNITS 6 | QUANTITY UNITS 9 | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| PT&F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 1 | 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 1 | 380.05 |
| | 3 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 1 | 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 1 | 164032 |
| | 5 | BRACE, FLAT CROSSARM, 28" | 2 | 2 | 164192 |
| | 6 | BOLT, MACH. GALV. 5/8" X (LENGTH AS REQ'D) & 1 NUT | 3 | 3 | 139 (E) |
| | 7 | BOLT, MACH. 1/2" X 7" & 1 NUT | 2 | 2 | 153120 (E) |
| | 8 | BOLT, MACH. GALV. 1/2" X 5" & 1 NUT | 2 | 2 | 153024 (E) |
| | 9 | BOLT, MACH. GALV. 1/2" X 1 1/2" & 1 NUT | 2 | 3 | 152608 (E) |
| | 10 | BOLT, MACH. GALV. 3/8" X 5" & 1 NUT | 2 | 2 | 154368 (E) |
| | 11 | WASHER, 1/2" ROUND | 10 | 8 | 800192 (E) |
| | 12 | WASHER, 3/8" ROUND | 2 | 2 | 800288 (E) |
| | 13 | WASHER, 3" SQ. CURVED | 4 | 4 | 798912 (E) |
| | 14 | WASHER, 2 1/4" SQ. FLAT | 2 | 2 | 799040 (E) |
| | 15 | WASHER, 5/8" SPRING DBL COIL | 3 | 3 | 798560 (E) |
| PT&F | 16 | WASHER, 1/2" SPRING DBL COIL | 6 | 6 | 798464 (E) |
| | 17 | WASHER, 3/8" SPRING DBL COIL | 2 | 2 | 798528 (E) |
| | 18 | SCREW, LAG GALV. 5/8" X 5" | 1 | 1 | 621600 (E) |
| | 19 | SCREW, LAG GALV. 1/2" X 4" | 1 | 1 | 621568 (E) |
| | 20 | SIGN, HIGH VOLTAGE | 1 | 1 | 647648 (E) |
| | 21 | NAILS, ROOFING #8 GALV. | 8 | 8 | 492224 (E) |
| | 22 | STEPS, POLE (A) | 16 | 16 | 692992 (E) |
| | 23 | | | | |
| LTI | 24 | CAPACITOR, UNIT 7.2KV (100 KVAR UNITS ILLUSTRATED) (F) | 6 | 9 | 207232 |
| | 25 | RACK, CAPACITOR | 2 | 3 | 402656 |
| | 26 | CUTOUT, 12KV, 100A HEAVY DUTY WITH LOADBUSTER HOOKS | 3 | 3 | 297888 |
| | 27 | CONNECTORS, COMPRESSION | 3 | 3 | 786, 783 (E) |
| | 28 | WIRE, #6 BARE STRANDED COPPER | 33' | 35' | 813536 |
| | 29 | WIRE, #8 BARE SOLID ANNEALED COPPER | 13' | 15' | 812928 |
| | 30 | | | | |

SDG&E ELECTRIC STANDARDS

DATE 11-5-82
APPD JHT/RCH

CAPACITOR INSTALLATIONS, 12KV - WYE - 900 KVAR MAX.

1399.203
SUPERSEDES
1322 (11-5-82)

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" | 1 | – | 294128 |
| 2 | BRACE, FLAT, CROSSARM, 28" | 2 | – | 164192 |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 SPR & 1 RD WASHER | 2 | 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE & 1 DOUBLE COIL SPRING WASHER | 1 | 392 | – |
| 6 | CONNECTOR, WIRE, COMPRESSION, CU OR AL, AS REQ'D | AS REQ'D | 783, 786 | – |
| 7 | WIRE, #4, BARE STRANDED COPPER | 95' | – | 813760 |
| 8 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | – | 166070 |
| 9 | CUTOUT, 12KV, 100A, HEAVY DUTY, WITH LOADBUSTER HOOKS | 3 | 1212 | – |
| 10 | INSULATOR, PIN TYPE, CLASS AS REQUIRED | 1 | – | 429216 |
| 11 | BRACKET, INSULATOR, 1" LEAD THREAD | 1 | – | 166134 |
| 12 | LAG SCREW, GALV, 1/2" X 4" | 2 | – | 621568 |
| 13 | RACK, SWITCHED CAPACITOR, COMPLETE WITH SWITCHES AND POTENTIAL TRANSFORMER, (4.16KV, 300KVAR) | 1 | – | 564773 |
| 14 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQUARE CURVE RIBBED & 1 DOUBLE COIL SPRING WASHER | 2 | 392 | – |
| 15 | COVER, BOLT, PLASTIC & 6 – 1 3/4" NAILS, GALV | 2 | – | 285696 |
| | | – | – | 492192 |
| 16 | UNIT GROUND, COMPLETE | 1 | – | 603136 |
| 17 | TAG, STATION NUMBER | 1 | 338 | – |

FOR FIELD MAINTENANCE ONLY

| OVERHEAD MACRO UNITS 4KV WYE – SWITCHED CAPACITOR | |
|---|---|
| CONTROL | MU I.D. |
| VAR/VOLT OVERRIDE | C4S3DV |
| VOLT W/TIME BIAS | C4S3TD |

INSTALLATION:

A. CAPACITOR RACKS TO BE MOUNTED ON OPPOSITE SIDE OF LINE AND CUTOUT ARMS.

B. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

Ⓒ CONNECT CAPACITOR RACK GROUND LEAD TO GROUND ROD. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

REFERENCE:

Ⓕ SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

Ⓖ POLE STEPPING, SEE STANDARD 363.

Ⓗ GROUNDING METHOD, SEE STANDARD 1002.

I. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE – G.O. 95 RULE 22.2 (C).

J. CAPACITOR MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK. SEE DESIGN STANDARDS PAGE 5811.5.

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| 1399.204 SUPERSEDES 1321.2 (12-1-98) | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITOR INSTALLATION<br>4.16 KV WYE – 3 OIL SWITCHES | DATE 12-1-98<br>APPD PSA/CMC |
|---|---|---|

APPLICATION: THIS CONSTRUCTION SHALL BE USED FOR ALL VOLTAGE, TIME, OR TIME-VOLTAGE SWITCHED CAPACITORS WITH THREE OIL SWITCHES.

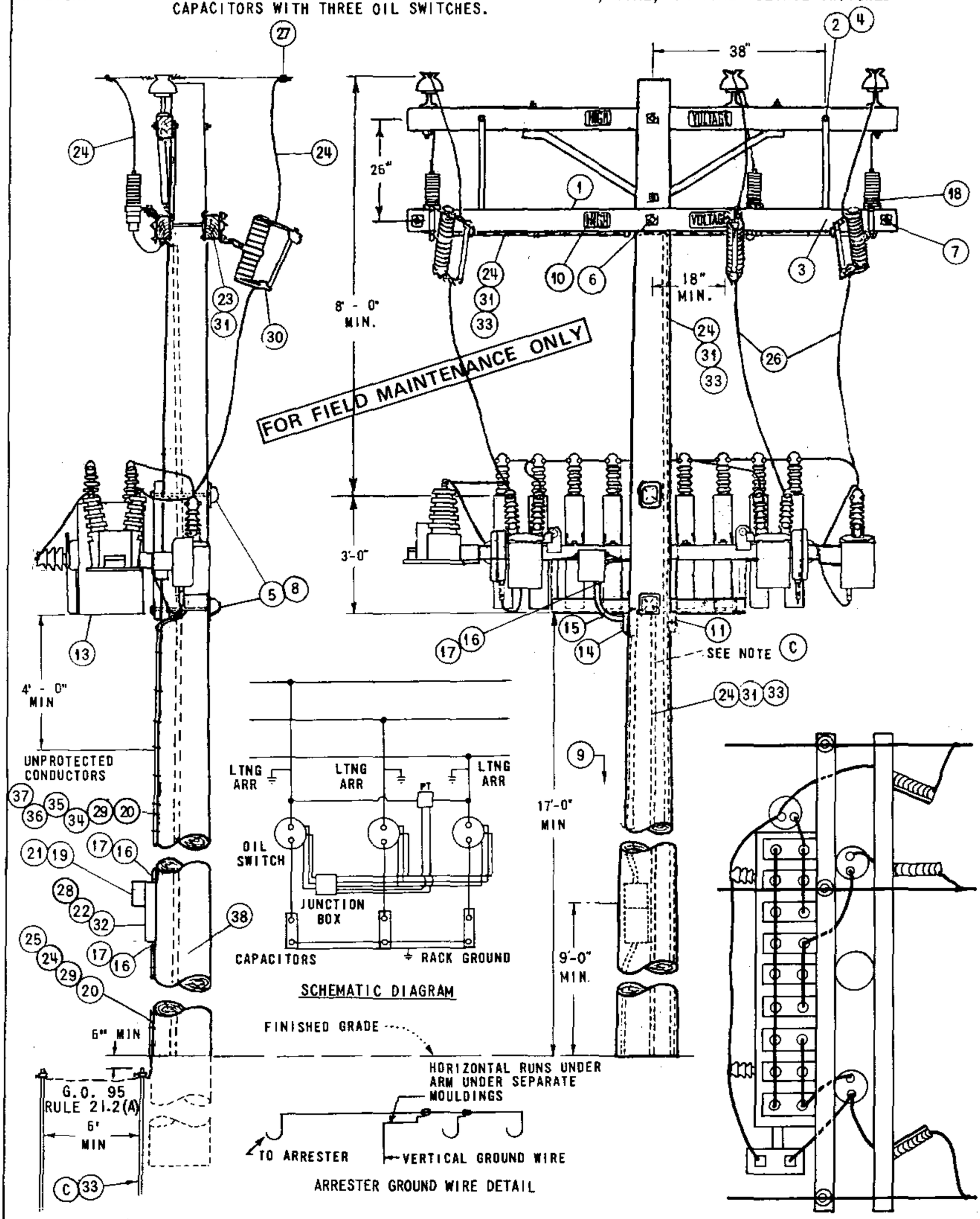



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| DATE 9-17-82<br>APPD JNT | SDG&E ELECTRIC STANDARDS<br>12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION<br>3 OIL SWITCHES IN LINE | 1399.205<br>SUPERSEDES<br>1324.1 (9-17-82) |

NOTES:

A. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.
B. BOND CUTOUTS IN HEAVY CONTAMINATION DISTRICTS. AS IDENTIFIED ON STANDARDS PAGE 287.
(C) ONE GROUND IS REQUIRED FOR THE CAPACITOR RACK, ONE IS REQUIRED FOR THE ARRESTERS, AND A THIRD FOR THE CONTROL PANEL. THESE GROUNDS ARE NOT TO BE INTERCONNECTED.
D. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.
(E) EXEMPT MATERIALS.
(F) TO BE INSTALLED BY KEARNY ELECTRIC MAINTENANCE.
G. INSTALL CONTROL ON SAME SIDE OF POLE AS CAPACITOR RACK.
H. RACKS THAT CONTAIN PT'S WITH METAL TANKS TO BE INSULATED FROM RACK BY KEARNY MAINTENANCE BEFORE REINSTALLATION.
(I) THE POTENTIAL TRANSFORMERS FOR THIS INSTALLATION ARE CONNECTED PHASE-TO-PHASE. FOR POTENTIAL TRANSFORMERS CONNECTED PHASE-TO-NEUTRAL. SEE PAGE 1326.
J. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE. G.O. 95 RULE 22.2(C).
K. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

| ITEM | | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | | 2 | 300 SECTION |
| | 2 | BRACE, FLAT CROSSARM 28" | | 2 | 164192 |
| | 3 | BOLT, MACHINE, GALV., 3/8" X 4 1/2" & 1 SPRING LOCK WASH. | (E) | 2 | PGS 139, 140 |
| | 4 | BOLT, MACHINE, GALV., 1/2" X 5", 1 RD. WASH, 1 DBL. COIL SPR. WASH | (E) | 2 | PGS 139, 140 |
| | 5 | BOLT, MACHINE, GALV., 3/4" X___, 1 SQ CURV RIB WASH, 1 DBL COIL SPR WASH | | 2 | PGS 139, 140 |
| | 6 | BOLT, MACHINE, GALV, 5/8" X___, 2 SQ WASH, 1 DBL COIL SPR WASH | (E) | 1 | PGS 139, 140 |
| | 7 | BOLT, SPACE, GALV., 5/8" X___, 4 SQ WASH, 2 DBL COIL SPR WASH, 2 RD WASH. | (E) | 2 | PGS 139,140 |
| | 8 | COVER, BOLT, PLASTIC, 10 D NAILS, GALV | (E) | 2 | 285696 |
| | 9 | STEPS, POLE | (E) | 16 | 692992 |
| | 10 | SIGN, HIGH VOLTAGE & NAILS, GALV. | (E) | 4 | 647648, 492224 |
| | 11 | SCREW, LAG, GALV, 4" | (E) | 2 | 621568 |
| | 12 | | | | |
| | 13 | SWITCHED CAPACITOR RACK, COMPLETE WITH CAPACITORS, SWITCHES & POTENTIAL TRANSFORMER — 900 KVAR (6 @ 150 KVAR) | | 1 | 564704 |
| | | SWITCHED CAPACITOR RACK, COMPLETE WITH CAPACITORS, SWITCHES & POTENTIAL TRANSFORMER — 1350 KVAR (9 @ 150 KVAR) | | 1 | 564752 |
| | 14 | ACCESS FITTING BODY TYPE LB PVC 3/4" | (F) (E) | 1 | 146384 |
| | 15 | ELBOW, STANDARD RADIUS PVC 3/4" | (F) | 1 | 322166 |
| | 16 | REDUCER COUPLING PVC 3/4"TO 1" | (F) | 3 | 573410 |
| | 17 | TERMINAL ADAPTOR PVC 1" | (F) | 3 | 102756 |
| | 18 | ARRESTERS, LIGHTNING, 12KV | | 3 | 113248 |
| L T I | 19 | CONTROL, CAPACITOR (SELECT TYPE AS REQ'D) — a TIME SWITCH | (F) | 1 | 706160 |
| | | b TIME SWITCH W/VOLTAGE OVERRIDE | (F) | 1 | 706176 |
| | | c VOLTAGE | (F) | 1 | 273984 |
| | 20 | CONDUIT, PVC, SCHEDULE 40, 3/4" | (F) (E) | 40' | 251328 |
| | 21 | PADLOCK, MASTER 7 | | 1 | 514912 |
| | 22 | BRACKETS, CONTROL MOUNTING | (F) | 2 | SHOP MADE |
| | 23 | WIRE, #8 SOL, ANNEALED BARE COPPER | | 10' (1/2#) | 812928 |
| | 24 | WIRE, BARE STRANDED COPPER, #6 | | 110' | 813536 |
| | 25 | ROD & CLAMP, GROUND | | 2 | 603072, 230016 (E) |
| | 26 | WIRE, #4 COPPER, WP | | 20' | 812480 |
| | 27 | CONNECTORS, WIRE, COMPRESSION, COPPER OR ALUMINUM AS REQ'D | (E) | 6 | PGS 786, 783 |
| | 28 | SCREW, 1/4" X 2" LAG | (F) | 4 | 621888 |
| | 29 | STRAPS, PIPE GALV, 3/4", 6D NAILS, GALV. | (F) (E) | AS REQ'D | 697888 |
| | 30 | CUTOUTS 12KV 100A WITH LOADBUSTER HOOKS | | 3 | 1200 SECTION |
| | 31 | STAPLES, WIRE GALV, 1 1/4" | (E) | AS REQ'D | 678528 |
| | 32 | BOX, METER SOCKET SAFETY, 5 TERMINAL, 100 AMP | (F) | 1 | 161856 |
| | 33 | UNIT GROUND COMPLETE (WITH PLAIN MLDG, WITH GRAY MLDG) | | 2 | 603136, 603120 |
| | 34 | WIRE, THW #12 WHITE | (F) | 30' | 808704 |
| | 35 | WIRE, THW #12 BLACK | (F) | 30' | 808096 |
| | 36 | WIRE, THW #12 RED | (F) | 30' | 808576 |
| | 37 | WIRE, THW #12 BLUE | (F) | 30' | 808416 |
| | 38 | TAG, STATION NUMBER | | 1 | 300 SECTION |

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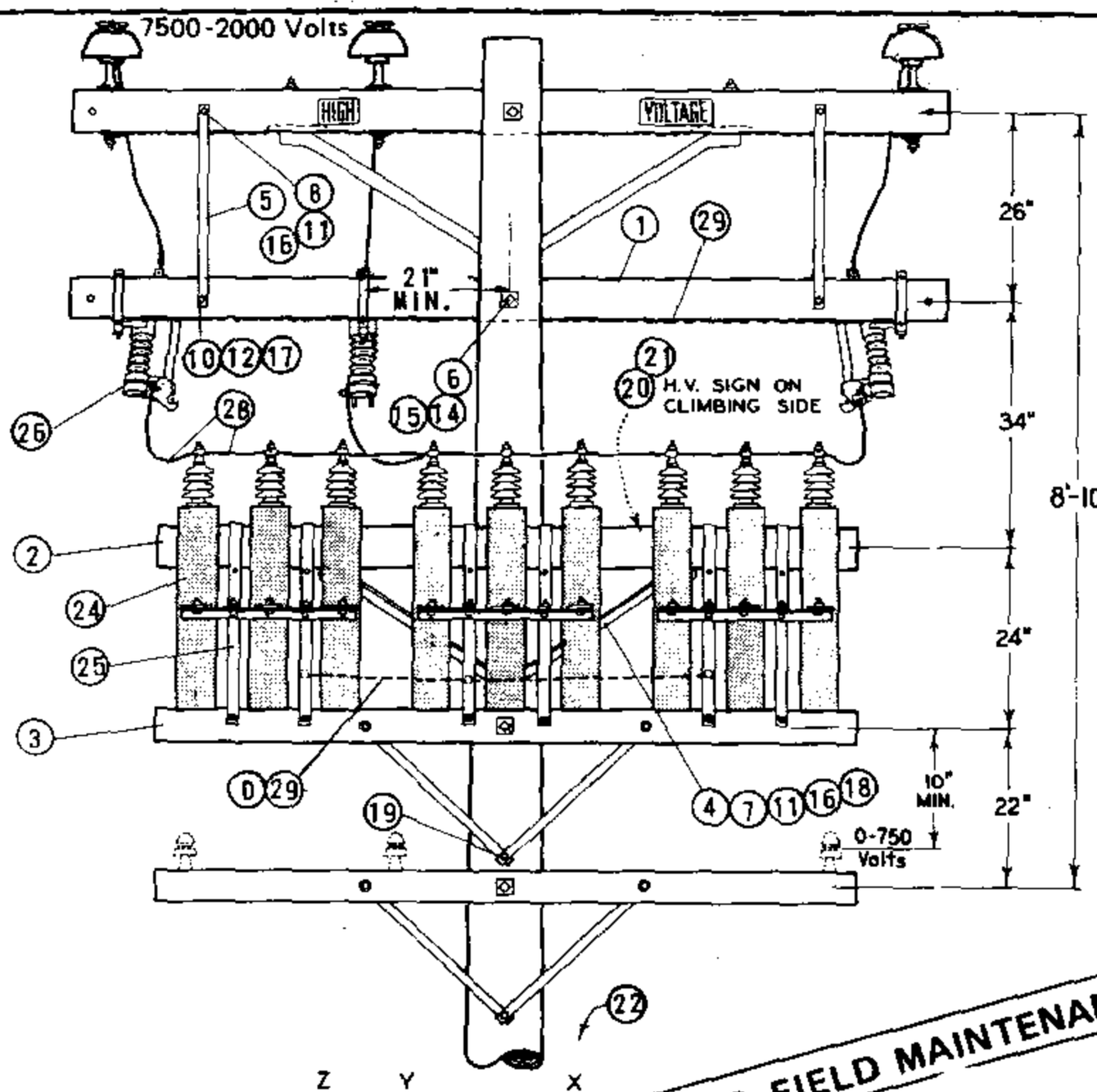
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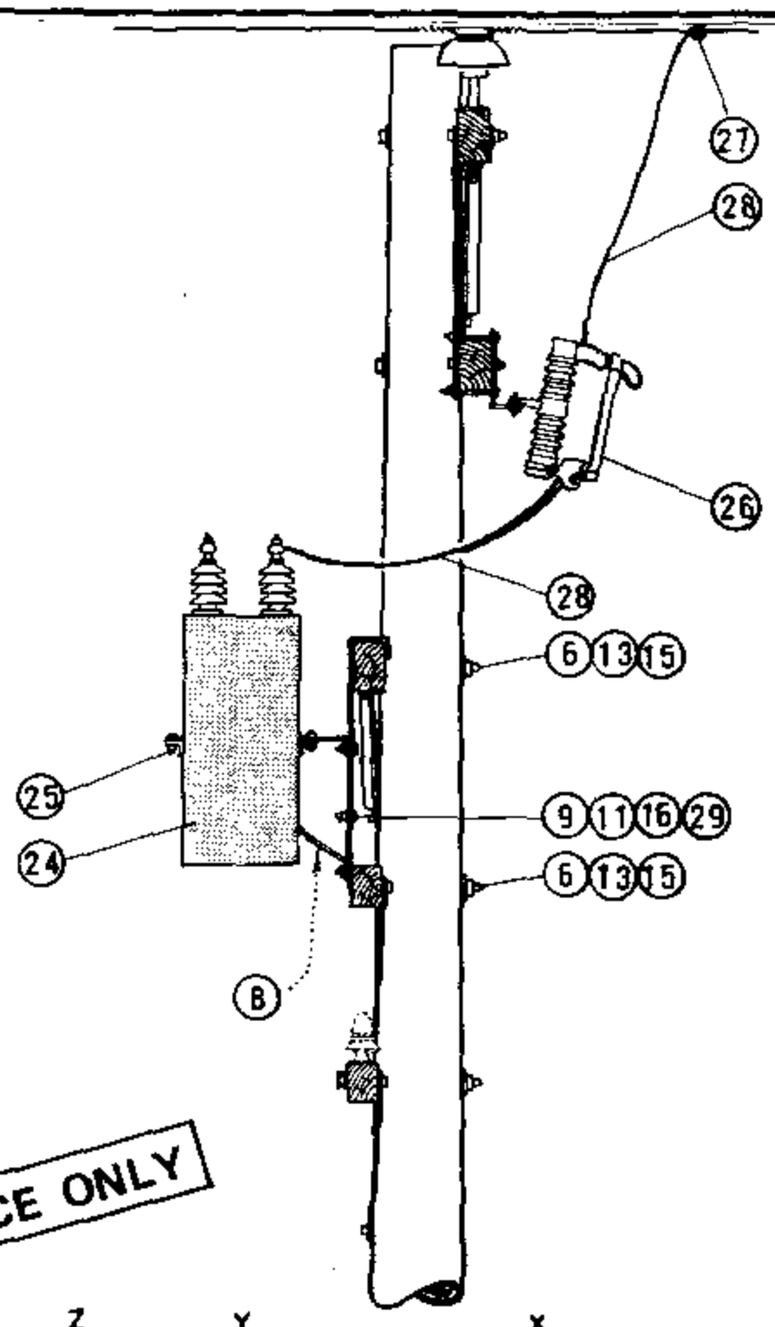
1399.206
SUPERSEDES
1324.2 (9-17-82)

SDG&E ELECTRIC STANDARDS

# 12 & 12.47 KV SWITCHED CAPACITOR INSTALLATION 3 OIL SWITCHES IN LINE

DATE 9-17-82
APPD



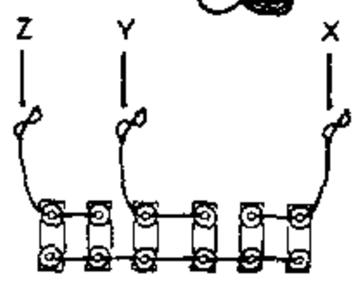



DIAGRAM OF 12KV WYE CONNECTIONS

600 KVAR (6-100 KVAR UNITS)
300 KVAR (6-50 KVAR UNITS)
150 KVAR (6-25 KVAR UNITS)

**FOR FIELD MAINTENANCE ONLY**

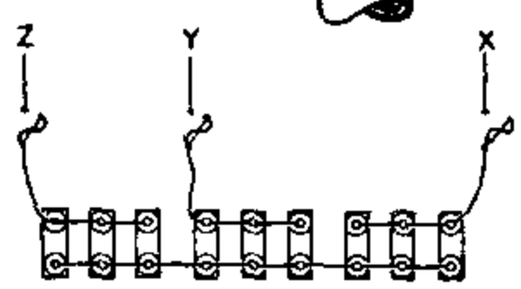



DIAGRAM OF 12KV WYE CONNECTIONS

900 KVAR (9-100 KVAR UNITS)
450 KVAR (9-50 KVAR UNITS)
225 KVAR (9-25 KVAR UNITS)

INSTALLATION:

(A) QUANTITY BASED ON 45' POLE.
(B) BRACKETS TO BE MOUNTED IN LOWER POSITION FOR 50 AND 100 KVAR UNITS.
C. BOND ALL 12KV HARDWARE WITHIN 3 MILES OF COAST.
(D) BOND ALL RACKS AS SHOWN IN ILLUSTRATION.
(E) EXEMPT MATERIAL.
(F) NO LONGER PURCHASED.
G. SEE PAGE 1323 FOR MATERIAL NEEDED FOR LIGHTING ARRESTERS ON 900 KVAR INSTALLATIONS.

| ITEM | | DESCRIPTION | QUANTITY UNITS 6 | QUANTITY UNITS 9 | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 1 | 1 | 380.01 |
| | 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 1 | 1 | 380.05 |
| | 3 | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 1 | 1 | 380.05 |
| | 4 | BRACE, ANGLE CROSSARM, 4' - 0" | 1 | 1 | 164032 |
| | 5 | BRACE, FLAT CROSSARM, 28" | 2 | 2 | 164192 |
| | 6 | BOLT, MACH. GALV. 5/8" X (LENGTH AS REQ'D) & 1 NUT | 3 | 3 | 139 (E) |
| | 7 | BOLT, MACH. 1/2" X 7" & 1 NUT | 2 | 2 | 153120 (E) |
| | 8 | BOLT, MACH. GALV. 1/2" X 5" & 1 NUT | 2 | 2 | 153024 (E) |
| | 9 | BOLT, MACH. GALV. 1/2" X 1 1/2" & 1 NUT | 2 | 3 | 152608 (E) |
| | 10 | BOLT, MACH. GALV. 3/8" X 5" & 1 NUT | 2 | 2 | 154368 (E) |
| | 11 | WASHER, 1/2" ROUND | 10 | 8 | 800192 (E) |
| | 12 | WASHER, 3/8" ROUND | 2 | 2 | 800288 (E) |
| | 13 | WASHER, 3" SQ. CURVED | 4 | 4 | 798912 (E) |
| | 14 | WASHER, 2 1/4" SQ. FLAT | 2 | 2 | 799040 (E) |
| | 15 | WASHER, 5/8" SPRING DBL COIL | 3 | 3 | 798560 (E) |
| P T & F | 16 | WASHER, 1/2" SPRING DBL COIL | 6 | 6 | 798464 (E) |
| | 17 | WASHER, 3/8" SPRING DBL COIL | 2 | 2 | 798528 (E) |
| | 18 | SCREW, LAG GALV. 5/8" X 5" | 1 | 1 | 621600 (E) |
| | 19 | SCREW, LAG GALV. 1/2" X 4" | 1 | 1 | 621568 (E) |
| | 20 | SIGN, HIGH VOLTAGE | 1 | 1 | 647648 (E) |
| | 21 | NAILS, ROOFING #8 GALV. | 8 | 8 | 492224 (E) |
| | 22 | STEPS, POLE (A) | 16 | 16 | 692992 (E) |
| | 23 | | | | |
| L T I | 24 | CAPACITOR, UNIT 7.2KV (100 KVAR UNITS ILLUSTRATED) (F) | 6 | 9 | 207232 |
| | 25 | RACK, CAPACITOR | 2 | 3 | 402656 |
| | 26 | CUTOUT, 12KV, 100A HEAVY DUTY WITH LOADBUSTER HOOKS | 3 | 3 | 297888 |
| | 27 | CONNECTORS, COMPRESSION | 3 | 3 | 786, 783 (E) |
| | 28 | WIRE, #6 BARE STRANDED COPPER | 33' | 35' | 813536 |
| | 29 | WIRE, #8 BARE SOLID ANNEALED COPPER | 13' | 15' | 812928 |
| | 30 | | | | |

DATE 11-5-82
APPD JHT/RCH

SDG&E ELECTRIC STANDARDS

# CAPACITOR INSTALLATIONS, 12KV - WYE - 900 KVAR MAX.

1399.207
SUPERSEDES 1322 (11-5-82)

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**SCOPE:** THIS CONSTRUCTION SHALL BE USED FOR ALL SWITCHED CAPACITOR BANKS REQUIRING A CURRENT SENSOR.

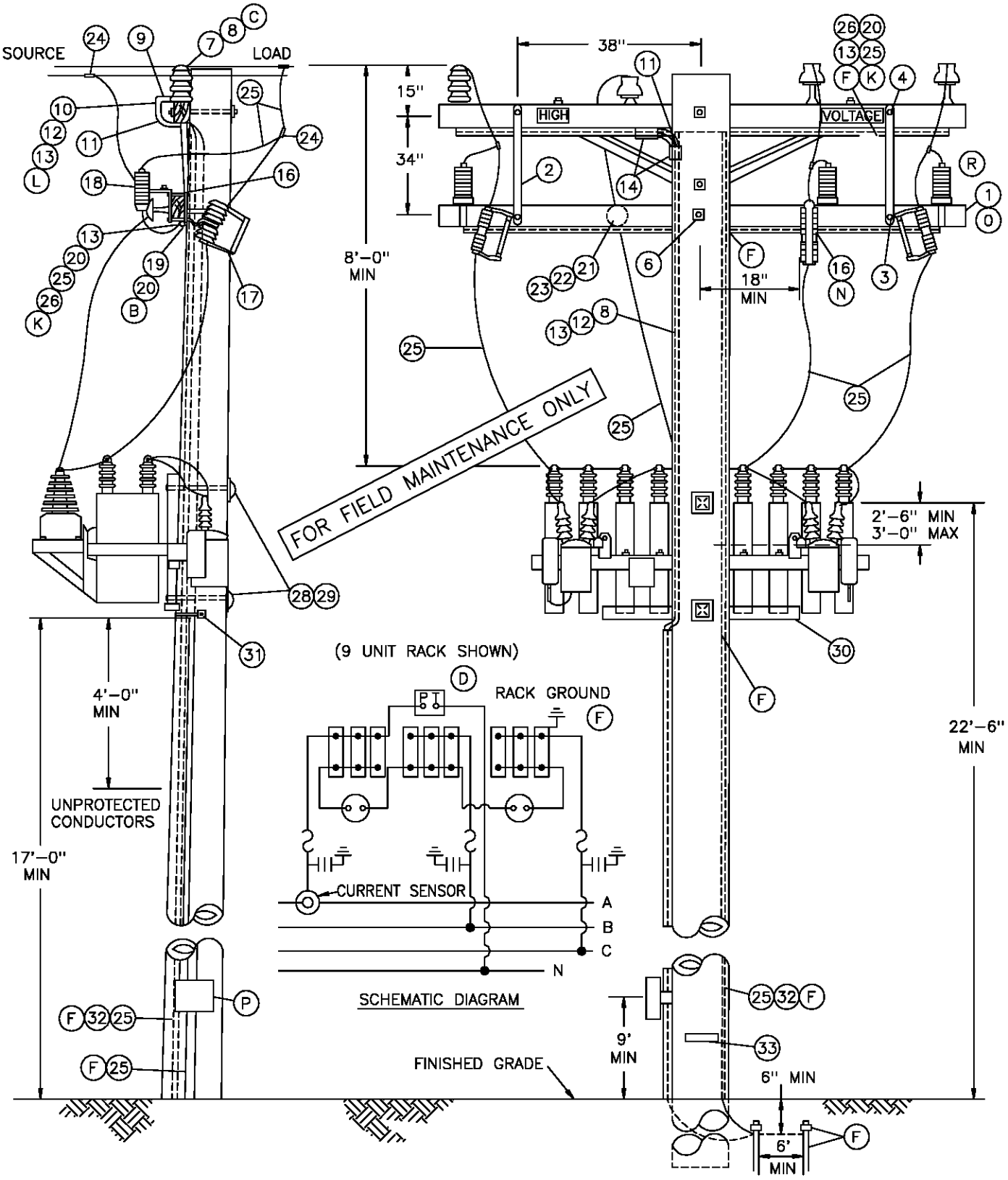



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| 1399.208<br>SUPERSEDES<br>1326.1 (12–1–98) | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITORS – CURRENT SENSOR<br>12 & 12.47KV | DATE 12–1–98<br>APPD PSA / CMK |

NOTES:

- SENSOR PRODUCES ONE VOLT FOR EACH 60 AMPERES OF LINE CURRENT. OPEN CIRCUIT VOLTAGE IS NOT SIGNIFICANTLY HIGH.
- CLASS OF POLE IS TO BE DETERMINED PER STANDARD 344–354.

BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STANDARD |
|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4' X 10' – 0" (B) | | 1 | 294128 |
| 2 | BRACE, FLAT, CROSSARM, 28" (O) | | 2 | 164192 |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND & 1 LOCK WASHER (O) | | 2 | STD 392 |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DBL COIL SPR WASH (O) | | 2 | STD 392 |
| 5 | | | | |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | | 1 | STD 392 |
| 7 | STUD, INSULATOR | | 1 | 701760 |
| 8 | SENSOR, CURRENT, COMPLETE WITH WHITE, GREEN AND BLACK INSULATED CONTROL WIRE | | 1 | 635820 |
| 9 | TERMINAL ADAPTOR, PVC, 3/4" | | 1 | 102754 |
| 10 | SLIP ELBOW, 90 PVC, 3/4" | | 2 | 322174 |
| 11 | ELBOW, STANDARD RADIUS, PVC, 3/4" | | 2 | 322166 |
| 12 | CONDUIT, PVC, TYPE 2, SCHED 40, 3/4" | | 15' | 251328 |
| 13 | STRAPS, PIPE, GALV, 3/4" & 2 – 1 3/4" ROOFING NAILS, GALV. | | AS REQ'D | 697888 |
| | | | – | 492192 |
| 14 | COUPLING, PVC, 3/4" | | 2 | 280416 |
| 15 | | | | |
| 16 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | | 3 | 165442 |
| 17 | CUTOUT, 12KV, 100A, WITH LOADBUSTER HOOKS | | 3 | STD 1212 |
| 18 | ARRESTER, LIGHTNING, 12KV | | 3 | 113248 |
| 19 | WIRE, #8 BARE SOLID ANNEALED COPPER (B) | | 15' OR 1 LB | 812928 |
| 20 | STAPLES, WIRE, GALV, 1 1/4" (B) | | AS REQ'D | 678528 |
| 21 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | 1 | STD 392 |
| 22 | PIN, TRANSFORMER ADAPTOR, 1" LEAD THREAD | | 1 | 529248 |
| 23 | INSULATOR, LINE, 12KV NEUTRAL | | 1 | 429216 |
| 24 | CONNECTOR, WIRE COMPRESSION, CU OR AL (SIZE AS REQ'D) | | AS REQ'D | 783–786 |
| 25 | WIRE, #4 BARE STRANDED COPPER | | 130' OR 17 LBS | 813760 |
| 26 | MOULDING, OAK HARDWOOD, 1" X 8' | | 2 | 487200 |
| 27 | | | | |
| 28 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV RIBBED & 1 DBL COIL SPRING WASHER | | 2 | STD 392 |
| 29 | COVER, BOLT PLASTIC & 6 – 1 3/4" NAILS, GALV | | 2 | 285696 |
| | | | – | 492192 |
| 30 | CAPACITOR RACK – COMPLETE WITH CAPACITORS | 600 KVAR (3 @ 200 KVAR) | 1 | 564761 |
| | | 900 KVAR (6 @ 150 KVAR) | (J) 1 | 564706 |
| | | 1200 KVAR (3 @ 400 KVAR) | (M) 1 | 564770 |
| | | 1350 KVAR (9 @ 150 KVAR) | (J) 1 | 564754 |
| 31 | SCREW, LAG, GALV, 4" | | 2 | 621568 |
| 32 | UNIT GROUND, COMPLETE | | 1 | 603136 |
| 33 | TAG, STATION NUMBER | | 1 | 200 SECT. |

FOR FIELD MAINTENANCE ONLY

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| DATE 12-1-98<br>APPD PEA / CMK | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITORS – CURRENT SENSOR<br>12 & 12.47KV | 1399.209<br>SUPERSEDES<br>1326.2 (12-1-98) |

| OVERHEAD MACRO UNITS 12KV SWITCHED CAPACITOR W/CURRENT SENSOR | | |
|---|---|---|
| KVAR | CONTROL | MU I.D. |
| 600 | VAR/VOLT OVERRIDE | C6CV |
| 600 | VOLT W/TIME BIAS | C6CTB |
| 900 | VAR/VOLT OVERRIDE | C9CV |
| 900 | VOLT W/TIME BIAS | C9CTB |
| 1200 | VAR/VOLT OVERRIDE | C12CV |
| 1200 | VOLT W/TIME BIAS | C12CTB |
| 1350 | VAR/VOLT OVERRIDE | C13CV |
| 1350 | VOLT W/TIME BIAS | C13CTB |

INSTALLATION:

A. CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

Ⓑ 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 ARRESTER.

Ⓒ THE CONTROL IS POLARITY SENSITIVE. WIRE AS SHOWN, ALWAYS FACE NIPPLE OF CURRENT SENSOR TOWARD LOAD, AND INSTALL CUTOUTS ON THE SOURCE SIDE.

Ⓓ THE H1 TERMINAL OF THE POTENTIAL TRANSFORMER MUST BE CONNECTED TO THE SAME PHASE AS THE CURRENT SENSOR.

Ⓕ CONNECT CAPACITOR RACK GROUND LEAD, CURRENT SENSOR BASE AND ALL INSULATOR PINS GROUND LEAD TO LIGHTNING ARRESTER GROUND. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

G. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.

H. RACKS THAT CONTAIN POTENTIAL TRANSFORMERS WITH METAL TANKS ARE TO BE INSULATED FROM RACK BEFORE REINSTALLATION.

I. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCKS.

Ⓙ NO LONGER PURCHASED.

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Ⓚ PVC CONDUIT 3/4" SCHEDULE 40 MAY BE USED IN PLACE OF HARDWOOD MOULDING.

Ⓛ REMOVE STEEL NIPPLE FROM CURRENT SENSOR BASE.

Ⓜ ON VAR CONTROL BANKS, REPLACE 12,000 – 120 POTENTIAL TRANSFORMER (STOCK #762708) WITH 7200–120 POTENTIAL TRANSFORMER (STOCK #762734).

Ⓝ DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

Ⓞ WHEN LA/CO CROSSARM AND CAPACITORS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2 – 36" FLAT BRACES. SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1 FOR DRILLING MEASUREMENTS).

REFERENCE:

Ⓟ SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

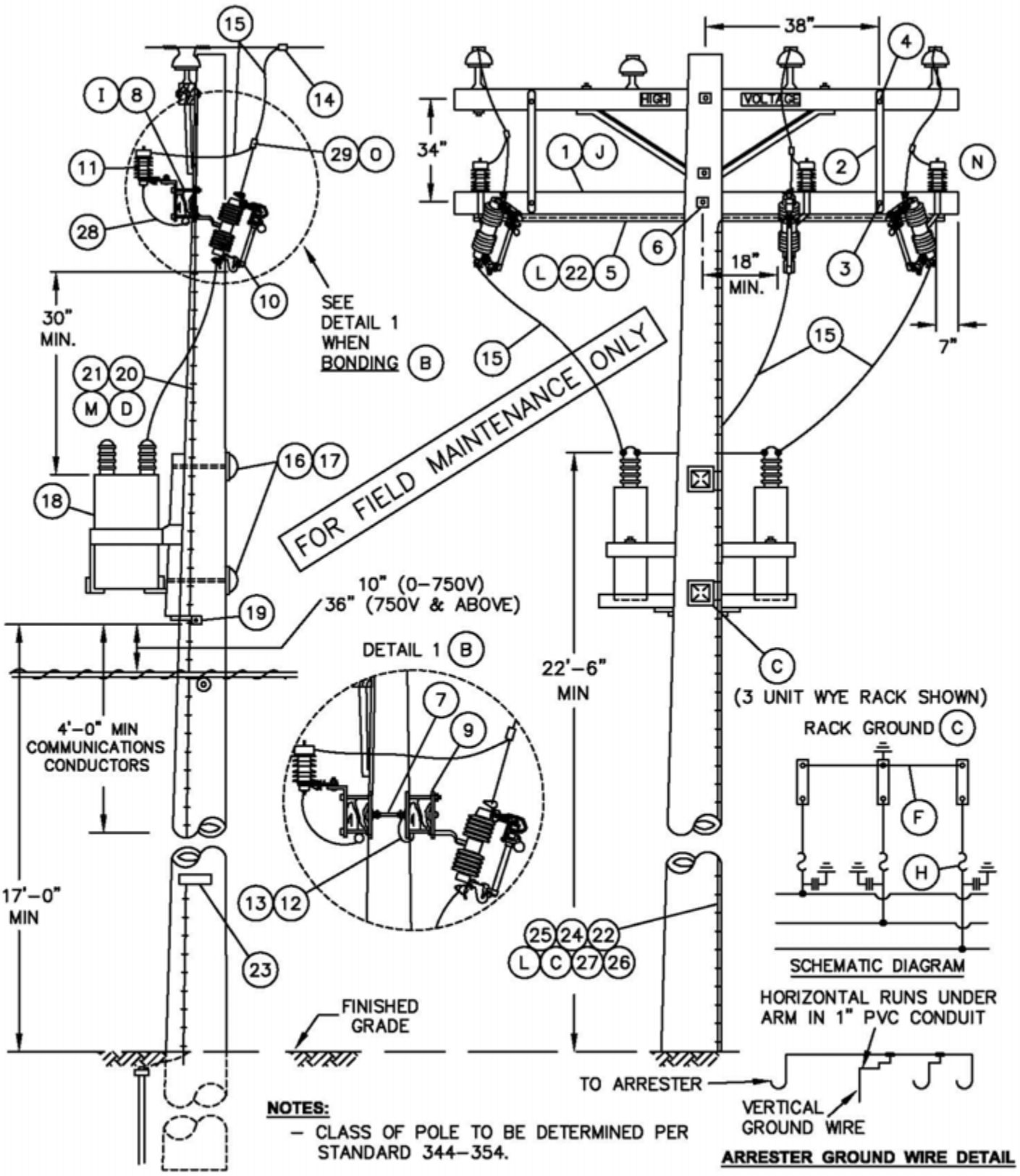
Ⓠ PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE, G.O. 95 RULE 22.2(C).

Ⓡ SECTIONALIZING CUTOUT INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR – SEE STANDARD 1240.

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| 1399.210 SUPERSEDES 1326.3 (12–1–98) | SDG&E ELECTRIC STANDARDS<br>SWITCHED CAPACITORS – CURRENT SENSOR<br>12 & 12.47KV | DATE 12–1–98<br>APPD PLA/BSG |
|---|---|---|

**SCOPE:** THIS STANDARD SHOWS THE PREFERRED METHOD OF CONSTRUCTION FOR A FIXED CAPACITOR WHEN A NEW POLE IS REQUIRED.




**NOTES:**

– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

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| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| 1399.211 | FIXED CAPACITOR INSTALLATION, 4KV WYE<br>4KV WYEGROUNDED RACK | DATE 6-9-09<br>APPD PBA /MC |

| OVERHEAD MACRO UNITS 4KV CAPACITOR STATIONS | | |
|---|---|---|
| FIXED–UNGROUNDED (FIG. 2) | | |
| 4 | 130 | C4F3P |
| | | |
| | | |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

(B) 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.

(C) CONNECT CAPACITOR RACK GROUND LEAD TO LIGHTNING ARRESTER GROUND

(D) RUN 1/2" SCHEDULE 40 PVC CONDUIT WITH LIGHTNING ARRESTER GROUND FROM LIGHTNING ARRESTER ARM TO A MINIMUM OF 2 FEET BELOW CAPACITOR RACK, THEN CONTINUE DOWN THE POLE USING PVC COVERED GROUND WIRE.

(G) TEN INCHES FROM 0–750V CONDUCTORS BELOW, 12 INCHES FOR CONDUCTORS OF 750–7500V, 18 INCHES FOR CONDUCTORS OF 7500–22,500V PER G.O. 95 RULE 58.1–D.

(H) FUSE STATION ACCORDING TO CAPACITOR FUSING TABLE, STANDARD 1309.

(I) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(J) WHEN LA/CO CROSSARM AND CAPACITORS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2–36" FLATBRACES. SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1

**REFERENCE:**

(L) FOR GROUNDING REQUIREMENTS AND APPLICATION – SEE STANDARD 1002.

(M) PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE PER G. O. 95, RULE 22.2B.

(N) SECTIONALIZING CUTOUT INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR – SEE STANDARD 1240.

(O) FOR HOT LINE CLAMP CONNECTION, SEE STANDARD 788.

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| DATE 6-9-09<br>APPD PBA /MC | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4KV WYE | 1399.212 |
|---|---|---|

**BILL OF MATERIAL:**

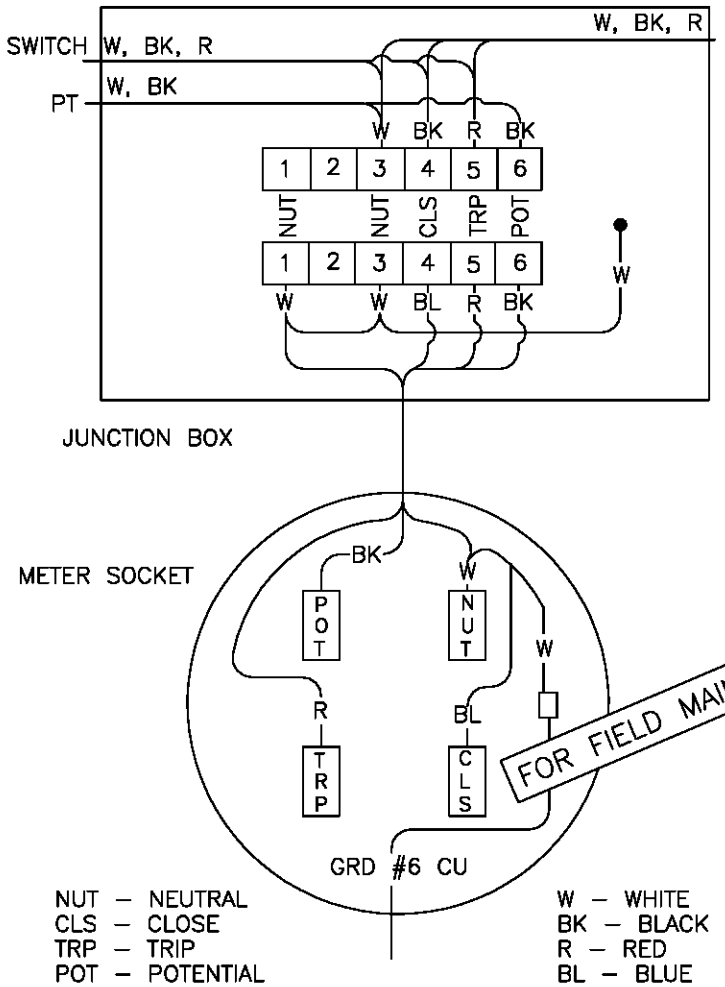
| ITEM | DESCRIPTION | | QUANTITY (B) UNBONDED | QUANTITY (B) BONDED | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNIT |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" (B) | | 1 | 2 | 294128 | – |
| 2 | BRACE, FLAT, CROSSARM, 36" (J) | | 2 | 2 | 164224 | – |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND & 1 LOCK WASHER (J) | | 2 | 2 | STD 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DBL COIL SPR WASH (J) | | 2 | 2 | STD 392 | – |
| 5 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" AND | | 10' | 10' | 251200 | – |
| | STRAPS, PIPE, GALV. 1" WITH 1 3/4" ROOFING NAILS | | AS REQ'D | | 697792 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | | 1 | 1 | STD 392 | – |
| 7 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS & 2 NUTS | | – | 2 | STD 392 | – |
| 8 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | | 3 | – | 165442 | – |
| 9 | BRACKET, ARRESTER OR CUTOUT | | – | 6 | 166070 | – |
| 10 | CUTOUT, 12KV, 100A, WITH LOADBUSTER HOOKS | | 3 | 3 | STD 1212 | – |
| 11 | ARRESTER, LIGHTNING (SEE STD. 1247 FOR 4KV APPLICATION) | 4 KV | 3 | 3 | 113216 | – |
| | OR | 12 KV | 3 | 3 | 113248 | – |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (B) | FT | – | 15 | 812928 | – |
| | | LB | – | 1 | | |
| 13 | STAPLES, WIRE, GALV, 1 1/4" (B) | | AS REQ'D | | 678528 | – |
| 14 | CONNECTOR, WIRE COMPRESSION, CU OR AL (SIZE AS REQ'D) | | AS REQ'D | | 783–786 | – |
| 15 | WIRE, #4 BARE STRANDED COPPER | FT | 100 | | 813760 | – |
| | | LB | 13 | | | |
| 16 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV RIBBED & 1 DBL COIL SPRING WASHER | | 2 | 2 | STD 392 | – |
| 17 | COVER, BOLT PLASTIC & | | 2 | 2 | 285696 | – |
| | 6 – 1 3/4" NAILS, GALV | | – | – | 492192 | – |
| 18 | CAPACITOR RACK – COMPLETE WITH CAPACITORS | 4KV 130 KVAR (3 @ 400 KVAR) | 1 | 1 | 564776 | – |
| 19 | SCREW, LAG, GALV, 4" | | 2 | 2 | 621568 | – |
| 20 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" (D) | | 10' | 10' | 251168 | – |
| 21 | STRAPS, PIPE, GALV, 1/2", AND | | AS REQ'D | | 697728 | – |
| | 2– 1 3/4" ROOFING NAILS, GALV. | | – | – | 492192 | – |
| 22 | #4 CU SOLID GROUND WIRE, PVC COVERED | | 50' | 50' | 812490 | GNDPVC |
| 23 | TAG, STATION NUMBER | | 1 | 1 | 200 SECT. | – |
| 24 | GROUND ROD, 5/8" X 8', COPPERWELD | | 1 | 1 | 603072 | GNDPVC |
| 25 | COPPER BONDED GROUND CONNECTOR | | 1 | 1 | 259010 | – |
| 26 | GROUND ENHANCING POWER SOLUTION (GEM) | | AS REQ'D | | 424390 | – |
| 27 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | | AS REQ'D | | 678562 | – |
| 28 | FLEXIBLE ARRESTER GROUND STRAP | | AS REQ'D | | 698754 | – |
| 29 | HOT LINE CLAMP | | 3 | 3 | 227680 | – |

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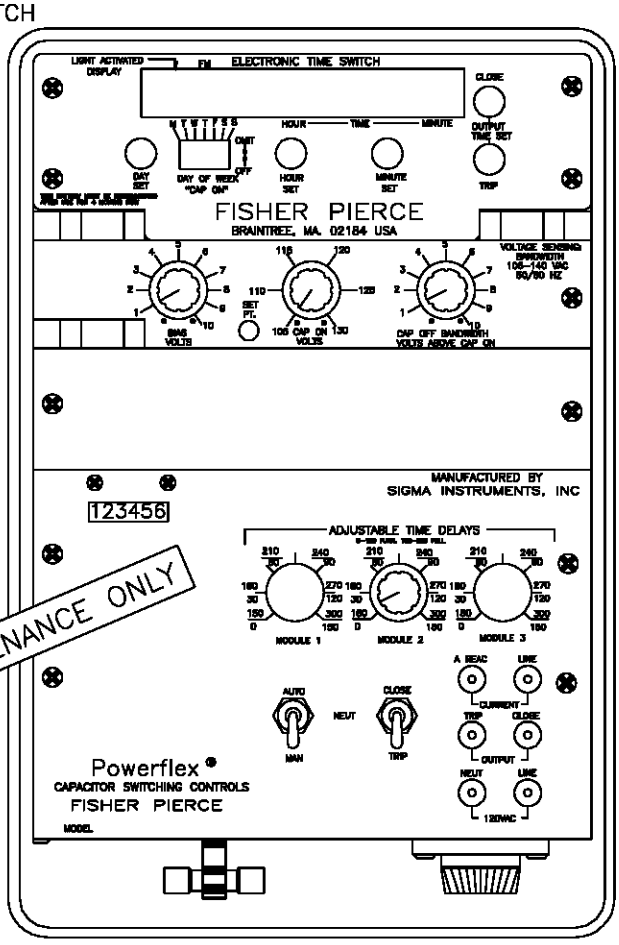
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| 1399.213 | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4KV WYE | DATE 6-9-09<br>APPD PBA /MC |

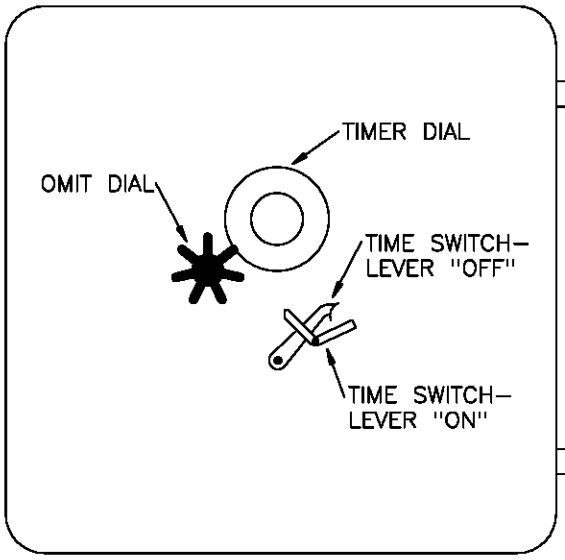
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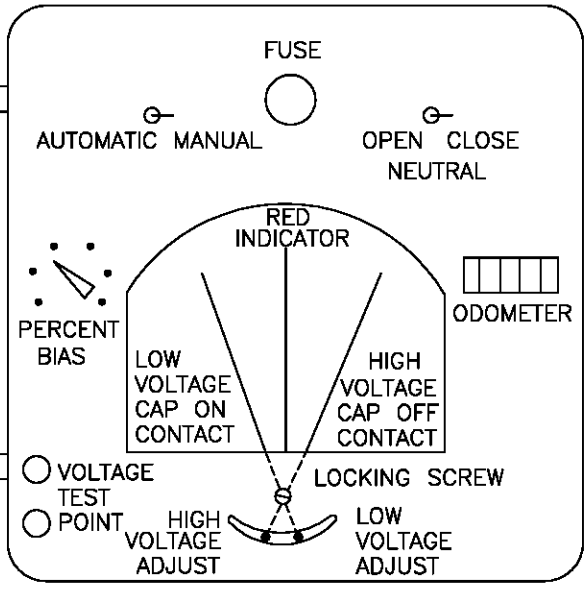

CAPACITOR CONTROL WIRING
VOLTAGE W/TIME BIAS




CONTROL PANEL
FISHER PIERCE (MODEL 2416)

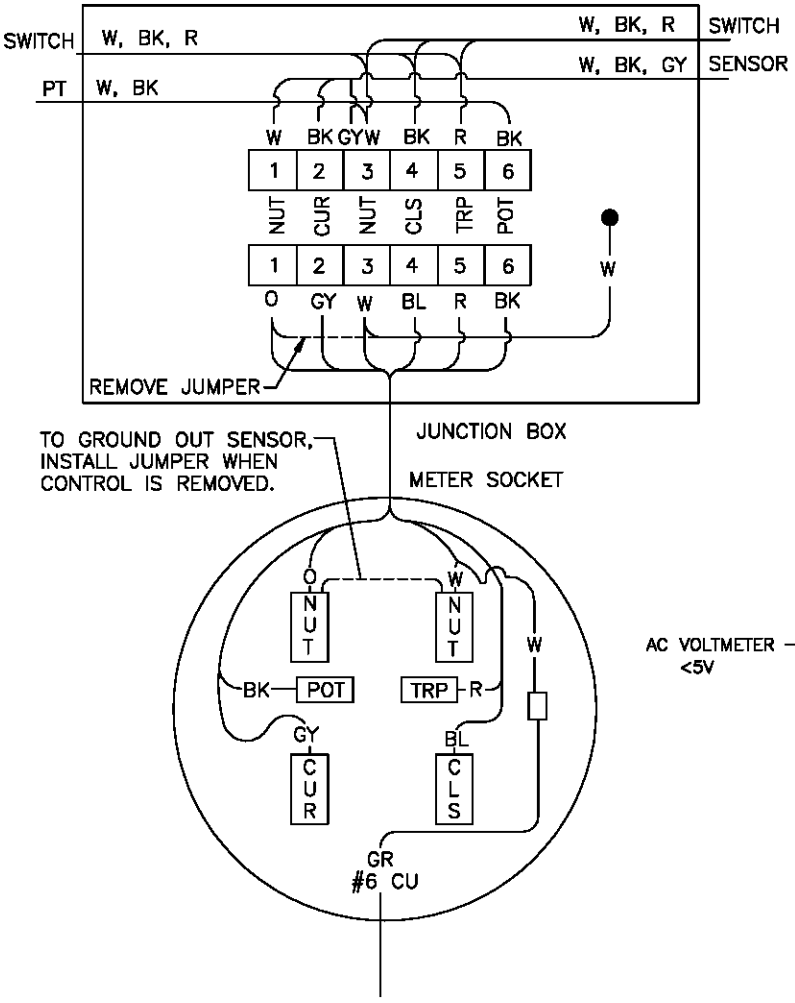


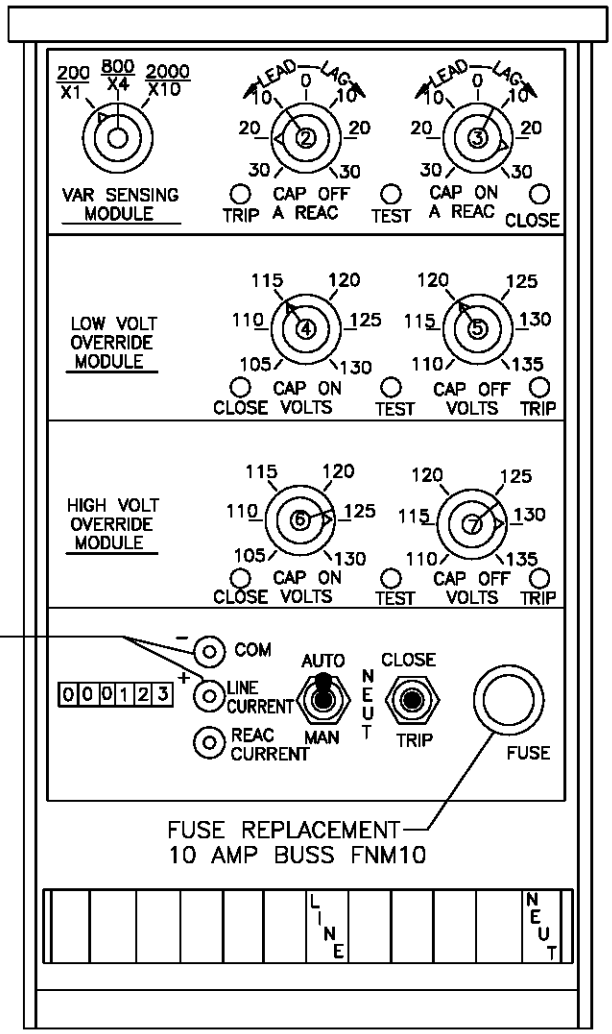

CONTROL PANEL – SANGAMO (MODEL VS)




FUSE REPLACEMENT 10 AMP BUSS FNM10

| | | |
|---|---|---|
| DATE 1–1–2000<br>APPD PBA / BDG | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONTROL MATERIAL AND INSTALLATION<br>VOLTAGE WITH TIME BIAS (TYPE 'TB') | 1399.301<br>SUPERSEDES<br>1330.2 (1–1–90) |




CONTROL WIRE LEGEND

NUT – NEUTRAL
CUR – CURRENT SENSOR POTENTIAL
CLS – CLOSE
TRP – TRIP
POT – POTENTIAL

W – WHITE
BK – BLACK
GY – GREEN
R – RED
O – ORANGE
BL – BLUE

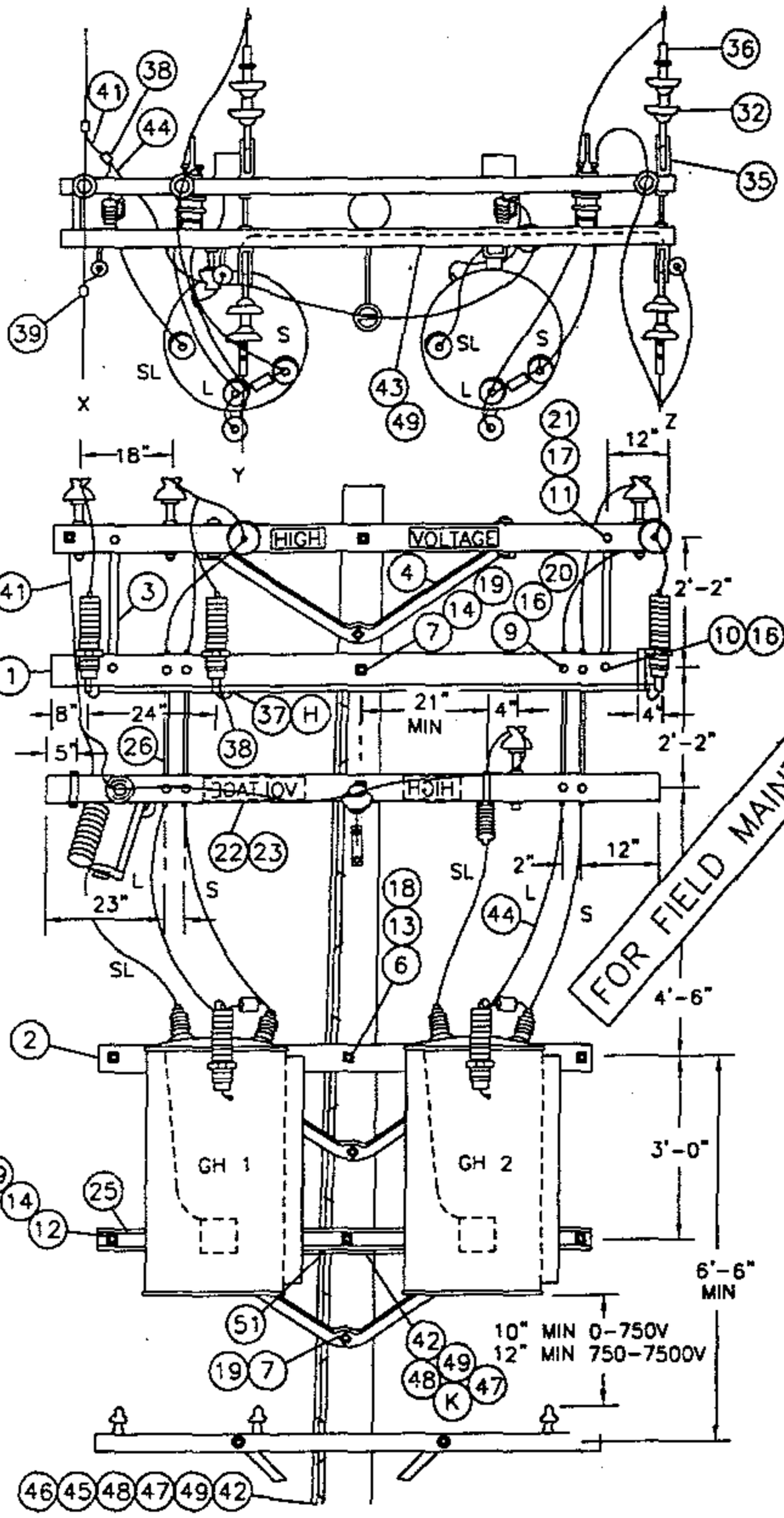
FOR FIELD MAINTENANCE ONLY

CONTROL PANEL
FISHER PIERCE (MODEL 4604)

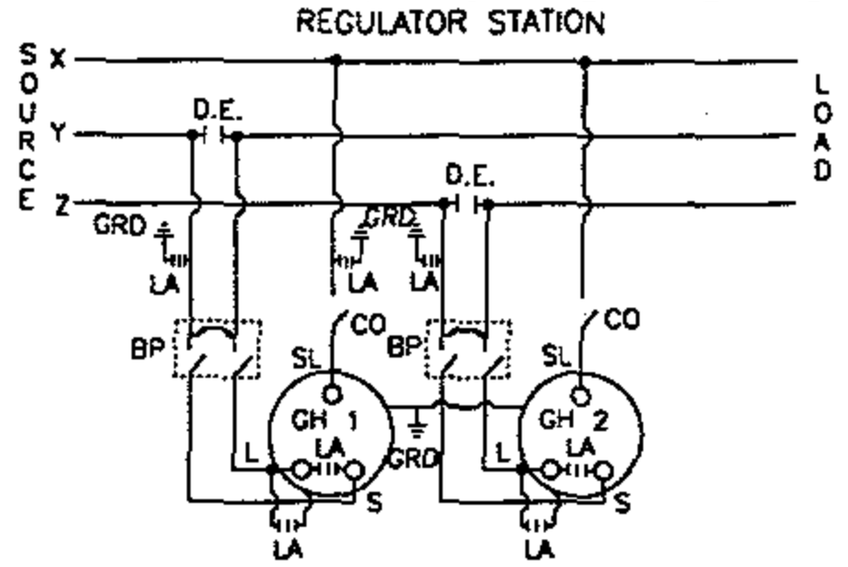
CAPACITOR CONTROL WIRING
VAR W/VOLTAGE OVERRIDE

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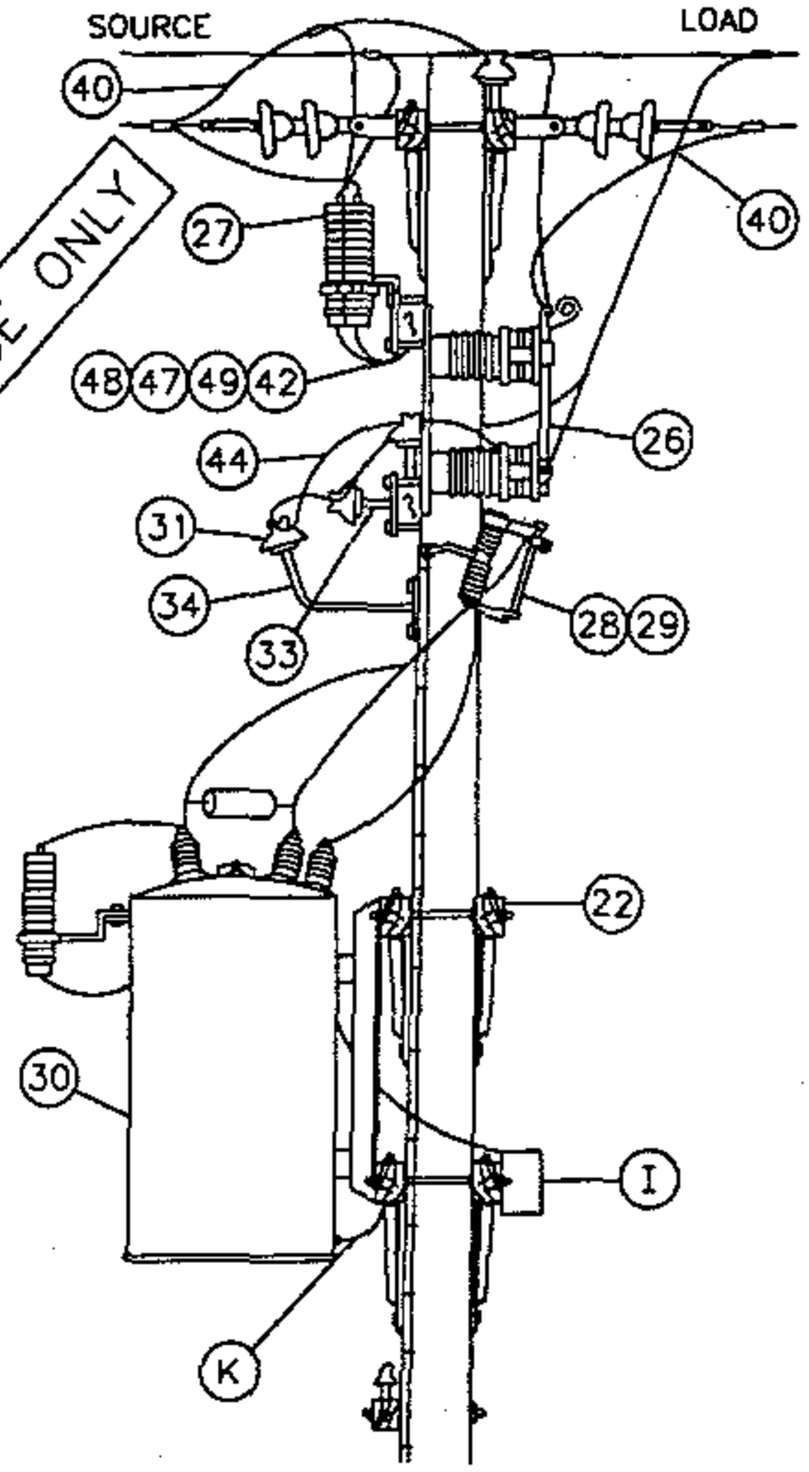
| | | |
|---|---|---|
| 1399.302<br>SUPERSEDES<br>1330.3 (1–1–90) | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONTROL MATERIAL AND INSTALLATION<br>TYPE 'VAR' | DATE 1–1–2000<br>APPD PJA/DSG |

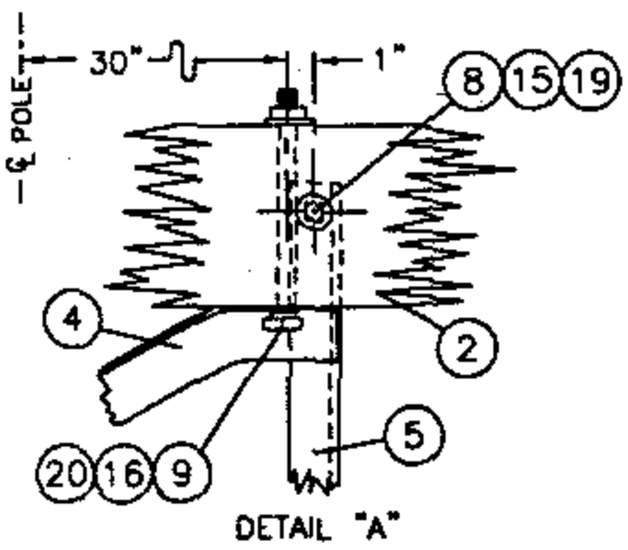



SCHEMATIC DIAGRAM OF A 12KV OPEN DELTA REGULATOR STATION

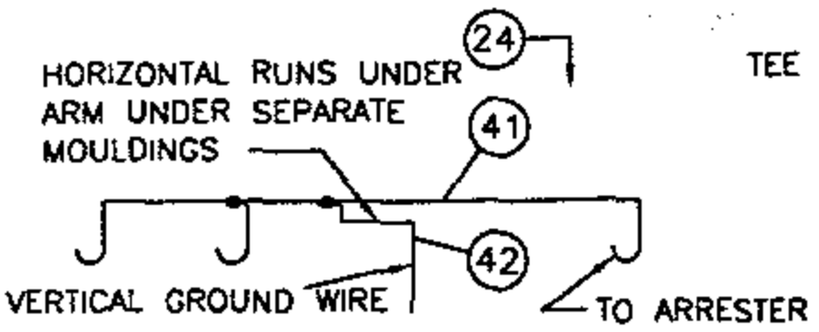



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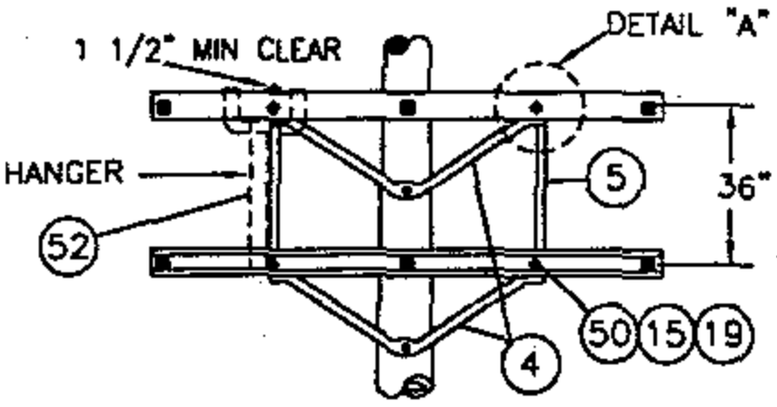



DETAIL "A"




ARRESTER GROUND WIRE DETAIL




FRAMING DETAIL
FOR 2-12KV STEP VOLTAGE REGULATORS

| | | |
|---|---|---|
| 1399.401<br>SUPERSEDES<br>1348.1 1-1-96 | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, OPEN DELTA, 12KV | DATE 1-1-96<br>APPD PA 1/29/96 |

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NOTES:

A. CAUTION: WHEN CONNECTING A STATION, REGULATORS MUST BE ON NEUTRAL. CLOSE CUTOUT TO SL BUSHING BEFORE CLOSING BYPASS DISCONNECT ON THAT POLE. WHEN DISCONNECTING A STATION, PUT REGULATORS ON NEUTRAL, AND OPEN BYPASS DISCONNECT BEFORE OPENING CUTOUT TO SL BUSHING. THIS AVOIDS A SERIOUS OVERLOAD CONDITION.

B. ON NEW CONSTRUCTION, USE AN EXTRA HEAVY CLASS ONE POLE WITH 10" MIN TOP DIA.

(C) USE TWO GROUND RODS FOR THE ARRESTERS AND TANKS. ALL GROUND RODS SHOULD BE SPACED A MINIMUM OF SIX FEET APART.

(D) UNIT GROUND COMPLETE, ORDER 603136.

F. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287.

G. BOND DEAD-END HARDWARE

(H) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(I) CONTROLS WILL BE MOUNTED BY KEARNY MAINTENANCE.

J. INSTALL DOUBLE COIL SPRING WASHER ON END OF BOLT WHICH ATTACHES TO LARGEST METALLIC OBJECT, SUCH AS A BRACKET OR BRACE.

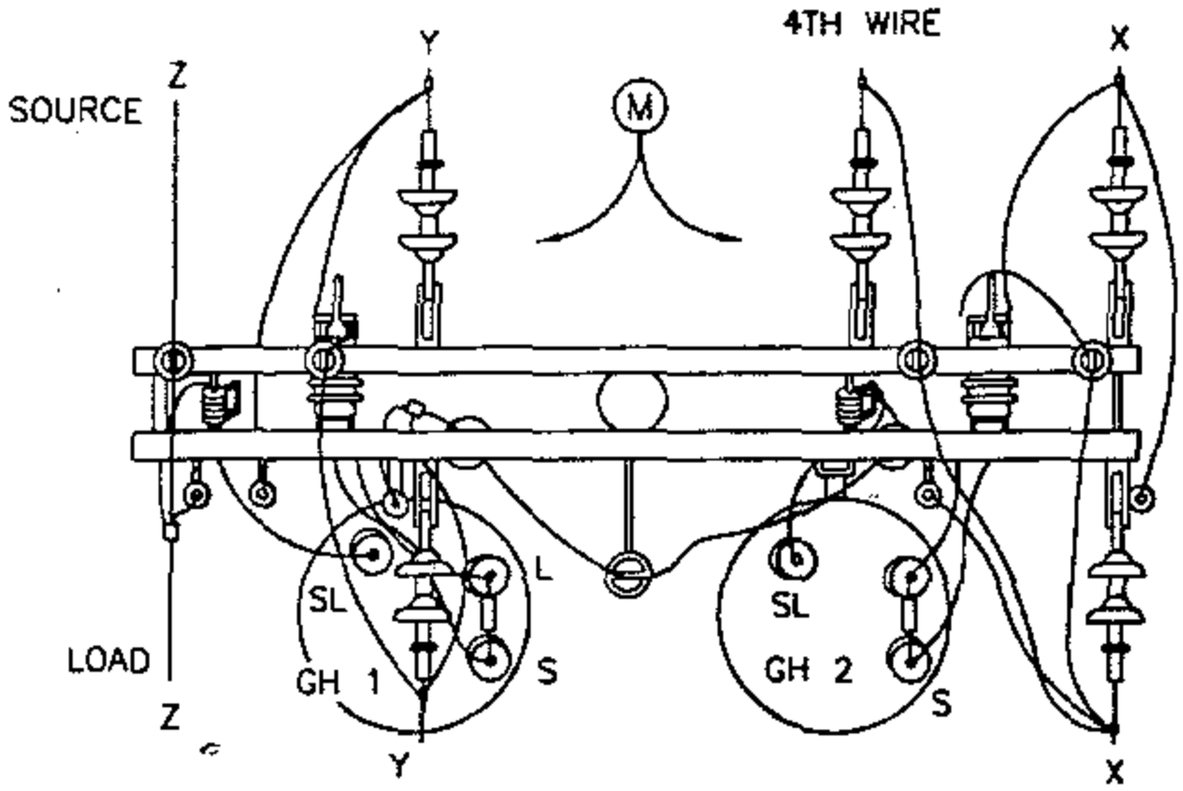
(K) REGULATOR TANKS SHALL BE PERMANENTLY GROUNDED.

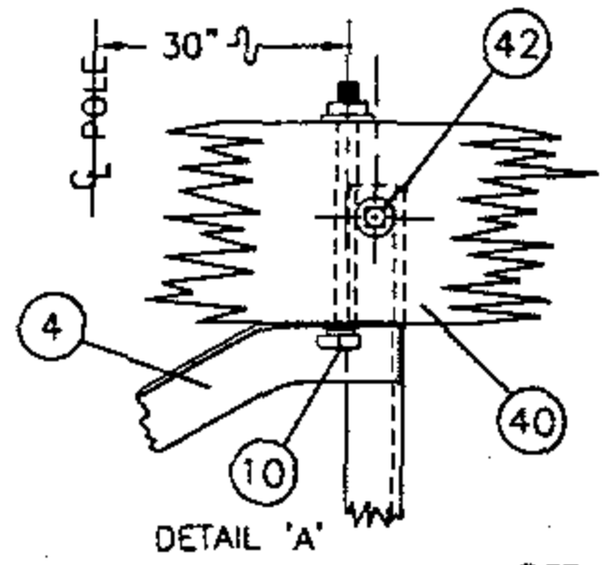
| ITEM | | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|---|
| PTF | LTI | OCD | | | |
| 1 | | | CROSSARM 3 3/4" X 5 3/4" X 10' - 0" | 3 | 380 |
| 2 | | | CROSSARM 3 3/4" X 5 3/4" X 8' - 0" | 4 | 380 |
| 3 | | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 4 | | | BRACE, ANGLE CROSSARM 5' - 0" | 5 | 164128 |
| 5 | | | BRACE, VERTICAL 36" | 2 | 164256 |
| 6 | | | BOLT, MACH 3/4" X __" | 2 | 100 SECTION |
| 7 | | | BOLT, MACH 5/8" X __" | 4 | 100 SECTION |
| 8 | | | BOLT, MACH 5/8" X 5" | 2 | 155488 |
| 9 | | | BOLT, MACH 1/2" X 7" | 16 | 153120 |
| 10 | | | BOLT, MACH 1/2" X 5" | 2 | 153024 |
| 11 | | | BOLT, MACH 3/8" X 5" | 2 | 154368 |
| 12 | | | BOLT, SPACE 5/8" X __" | 7 | 100 SECTION |
| 13 | | | WASHER, 3" SQ FLAT | 4 | 799104 |
| 14 | | | WASHER, 2 1/4" SQ FLAT | 28 | 799040 |
| 15 | | | WASHER, 5/8" ROUND | 4 | 800320 |
| 16 | | | WASHER, 1/2" ROUND | 20 | 800192 |
| 17 | | | WASHER, 3/8" ROUND | 2 | 800288 |
| 18 | | | WASHER, 3/4" SPRING DBL COIL | 2 | 798496 |
| 19 | | | WASHER, 5/8" SPRING DBL COIL | 21 | 798560 |
| 20 | | | WASHER, 1/2" SPRING DBL COIL | 20 | 798464 |
| 21 | | | WASHER, 3/8" SPRING DBL COIL | 2 | 798528 |
| 22 | | | SIGN, HIGH VOLTAGE | 2 | 647648 |
| 23 | | | NAILS, ROOFING #8 GALV | 16 | 492224 |
| 24 | | | STEPS, POLE | 19 | 692992 |
| 25 | | | STRIP, COVER 1 1/8" X 3 5/8" X 8' - 0" (2X4S4S) | 1 | 699328 |
| | 26 | | SWITCH BYPASS | 2 | 706944 |
| | 27 | | ARRESTER, LIGHTNING (12KV) | 3 | 113248 |
| | 28 | | CUTOUT, 12KV 100 AMP WITH LOAD BUSTER HOOKS | 2 | 1200 SECTION |
| | 29 | | BLADE, DISCONNECT CUTOUT | 2 | 1200 SECTION |
| | 30 | | REGULATOR, STEP VOLTAGE 1Ø, COMPLETE WITH HANGERS | 2 | 1300 SECTION |
| | 31 | | INSULATOR, PIN TYPE (CLASS AS REQ'D) | 3 | 700 SECTION |
| | | 32 | INSULATOR, SUSPENSION | 8 | 700 SECTION |
| 33 | | | PIN, INSULATOR (AS REQUIRED BY ITEM 31) | 2 | 532___ |
| 34 | | | BRACKET, INSULATOR (AS REQUIRED BY ITEM 31) | 1 | 100 SECTION |
| | | 35 | CLEVIS, DEAD END CLOSED | 4 | 235712 |
| | | 36 | CLAMPS, DEAD END | 4 | 700 SECTION |
| | 37 | | CONNECTOR, COMPRESSION (#2 TO #6) | 2 | 257792 |
| | 38 | | CONNECTOR, COMPRESSION (#6 TO #6) | 2 | 257952 |
| | 39 | | CONNECTORS, WIRE | 6 | 700 SECTION |
| | 40 | | WIRE, BARE STRANDED COPPER #4 | (2.5#) 20' | 813760 |
| | 41 | | WIRE, BARE STRANDED COPPER #6 | (2.5#) 30' | 813536 |
| | 42 | | WIRE, BARE STRANDED COPPER #2 | (9.2#) 45' | 813664 |
| | 43 | | WIRE, #8 ANNEALED SOLID COPPER | (.75#) 15' | 812928 |
| | 44 | | WIRE, #4 SOLID WP COPPER | (5.0#) 36' | 812480 |
| | 45 | | ROD, GROUND (C)(D) | 2 | 603072 |
| | 46 | | CLAMP, GROUND ROD (D) | 2 | 230016 |
| | 47 | | MOULDING, HARDWOOD #1 (D) | 50' | 487200 |
| | 48 | | STAPLES, GALV 3" X 1 1/16" X 1/4" (D) | 35 | 678560 |
| | 49 | | STAPLES, FENCE GALV 1 1/4" (D) | 30 | 678528 |
| 50 | | | BOLT, MACH 5/8" X 7" | 2 | 155552 |
| 51 | | | CONNECTOR, COMPRESSION (#2 TO #2) | 1 | 257760 |
| | 52 | | HANGER, TRANSFORMER T-2 | 2 | 402944 |

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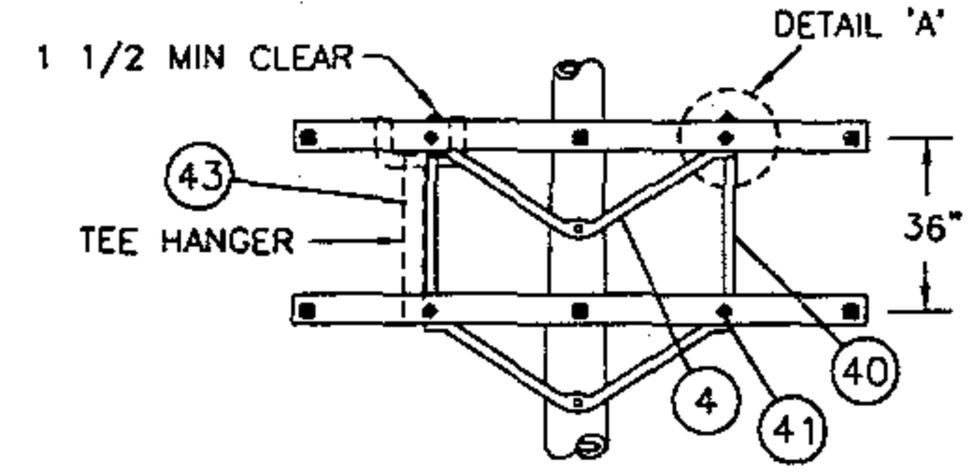
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| DATE 1-1-96<br>APPD PLA/DSG | SDG&E ELECTRIC STANDARDS<br>STEP VOLTAGE REGULATOR STATION, OPEN DELTA, 12KV | 1399.402<br>SUPERSEDES<br>1348.2 1-1-96 |

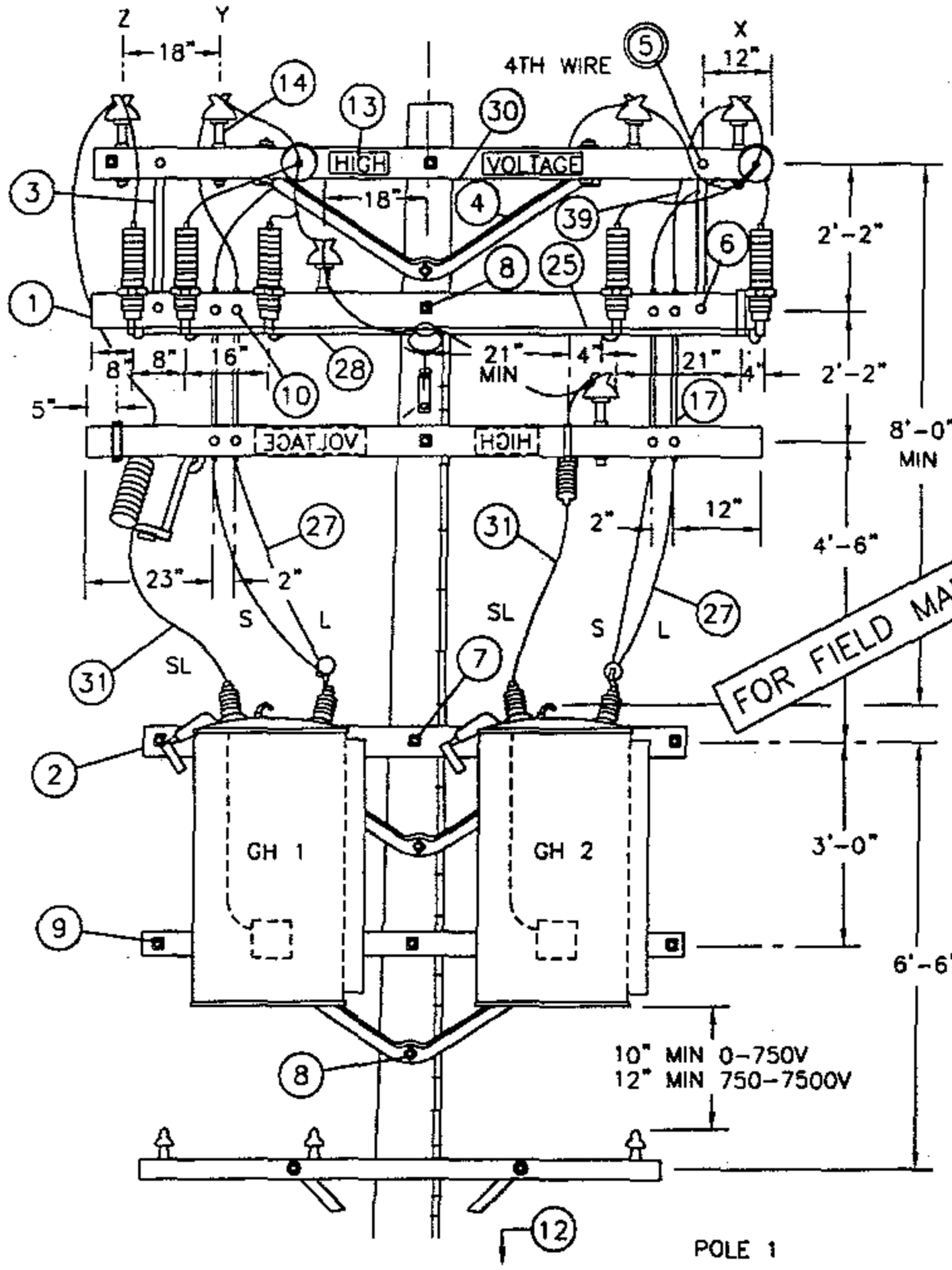


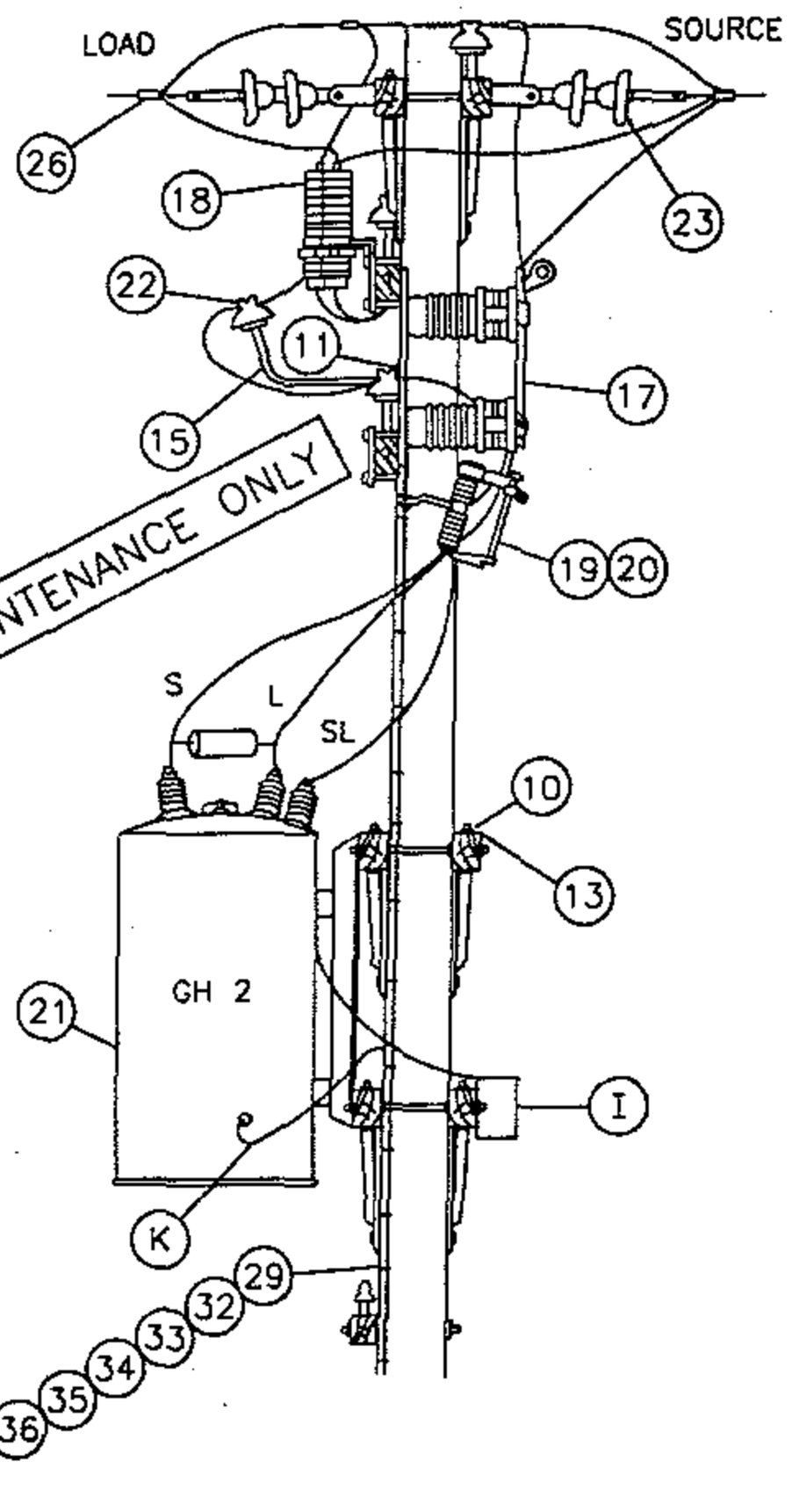




DETAIL 'A'



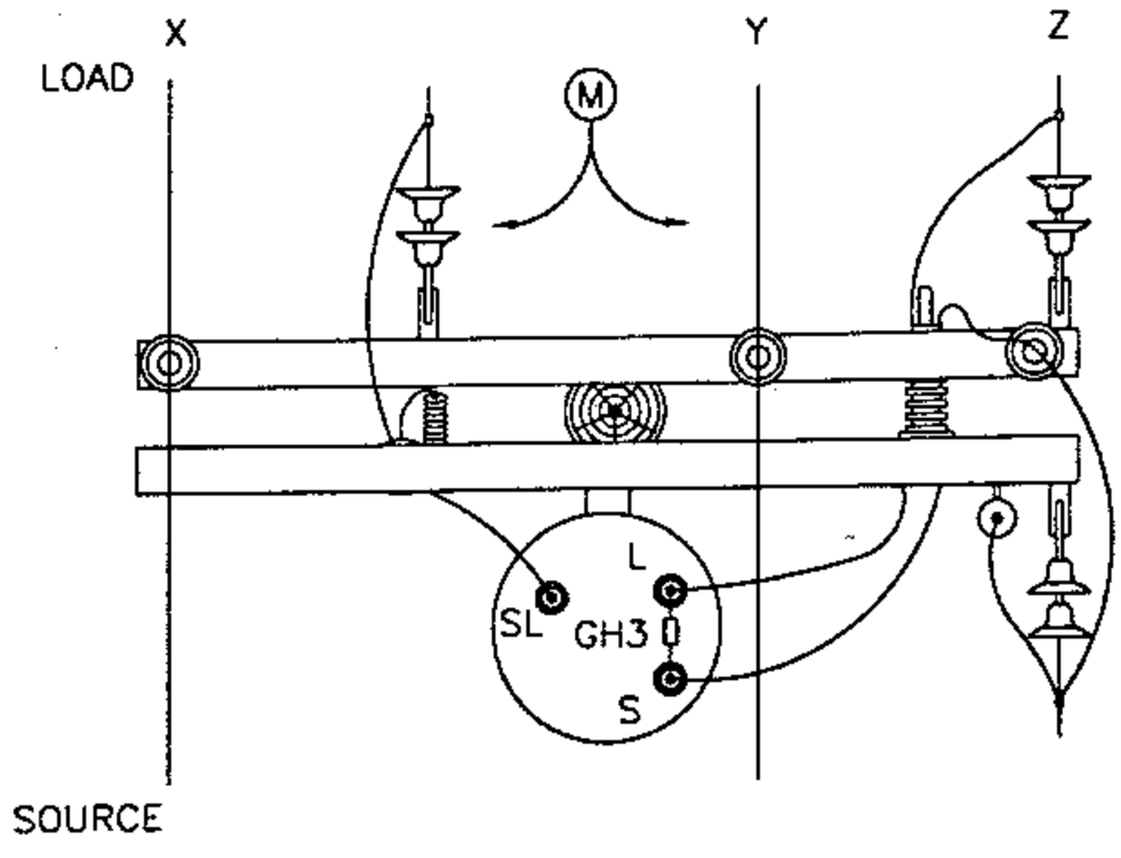

FRAMING DETAIL
FOR 2-12KV STEP-VOLTAGE REGULATORS



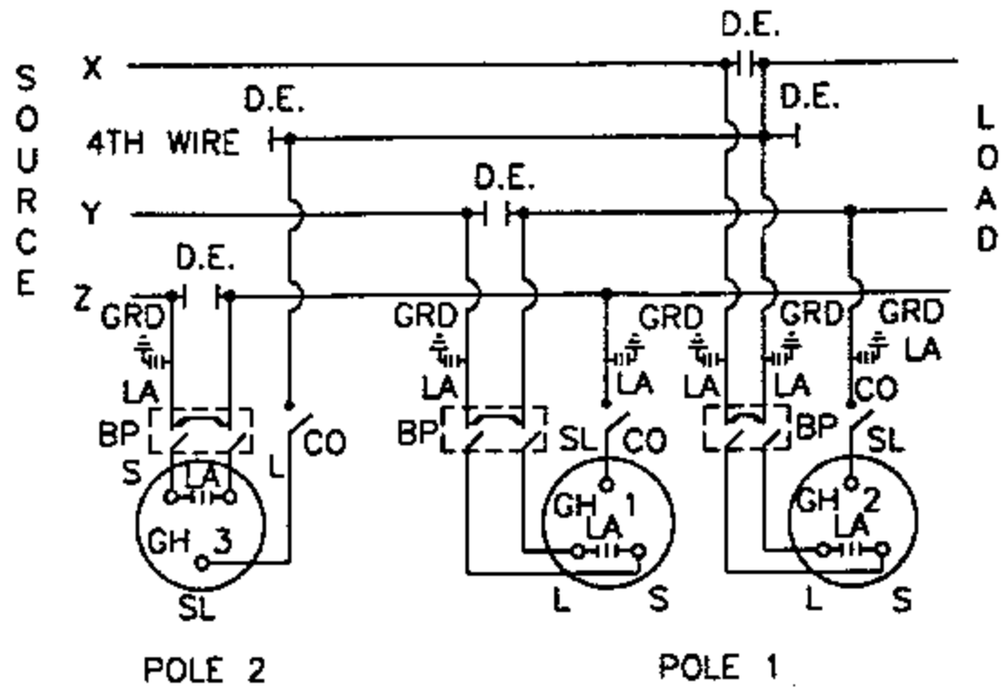



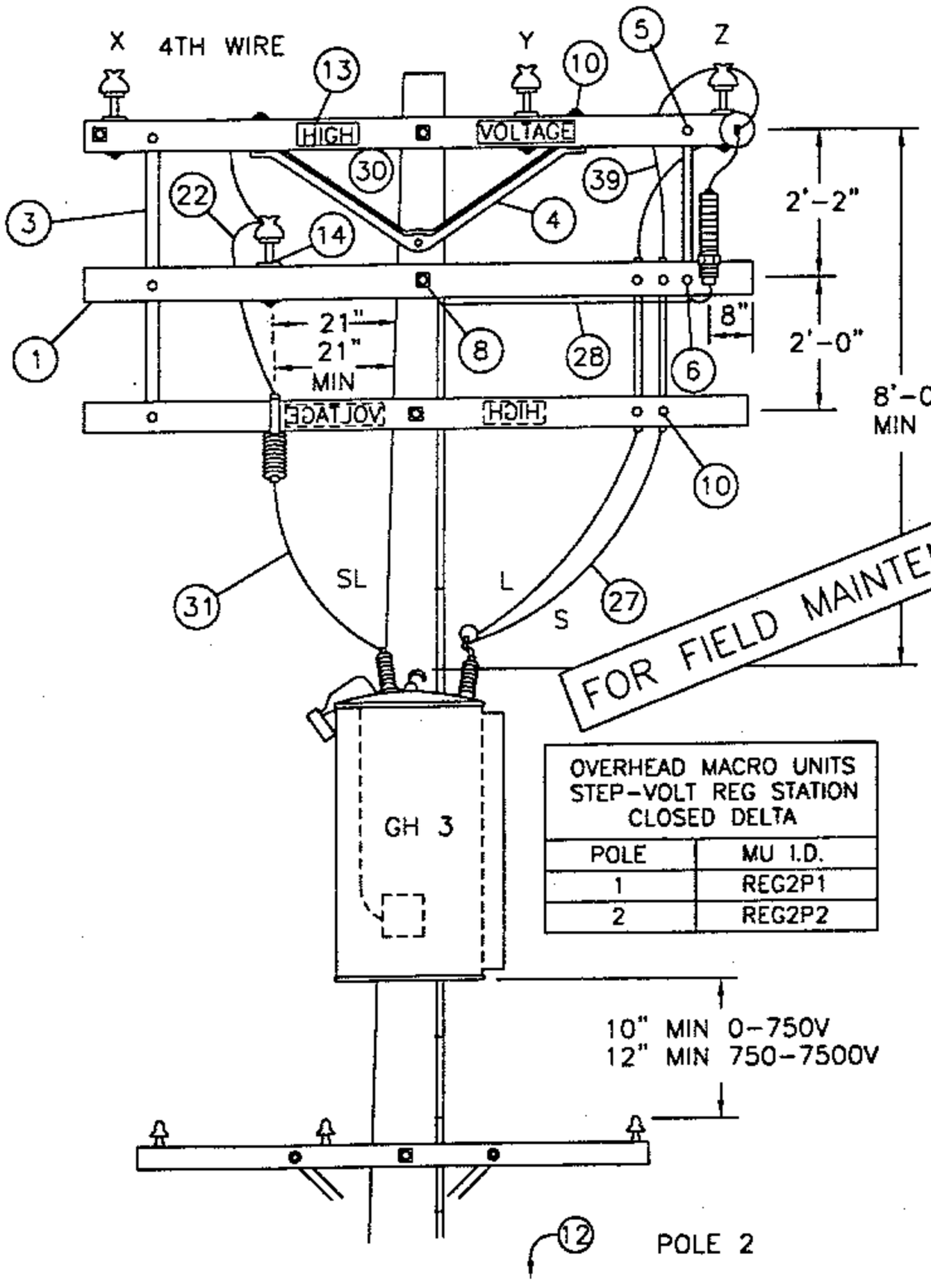

| | | |
|---|---|---|
| DATE 1-1-96<br>APPD PA/BSG | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES | 1399.403<br>SUPERSEDES<br>1349.1 1-1-96 |

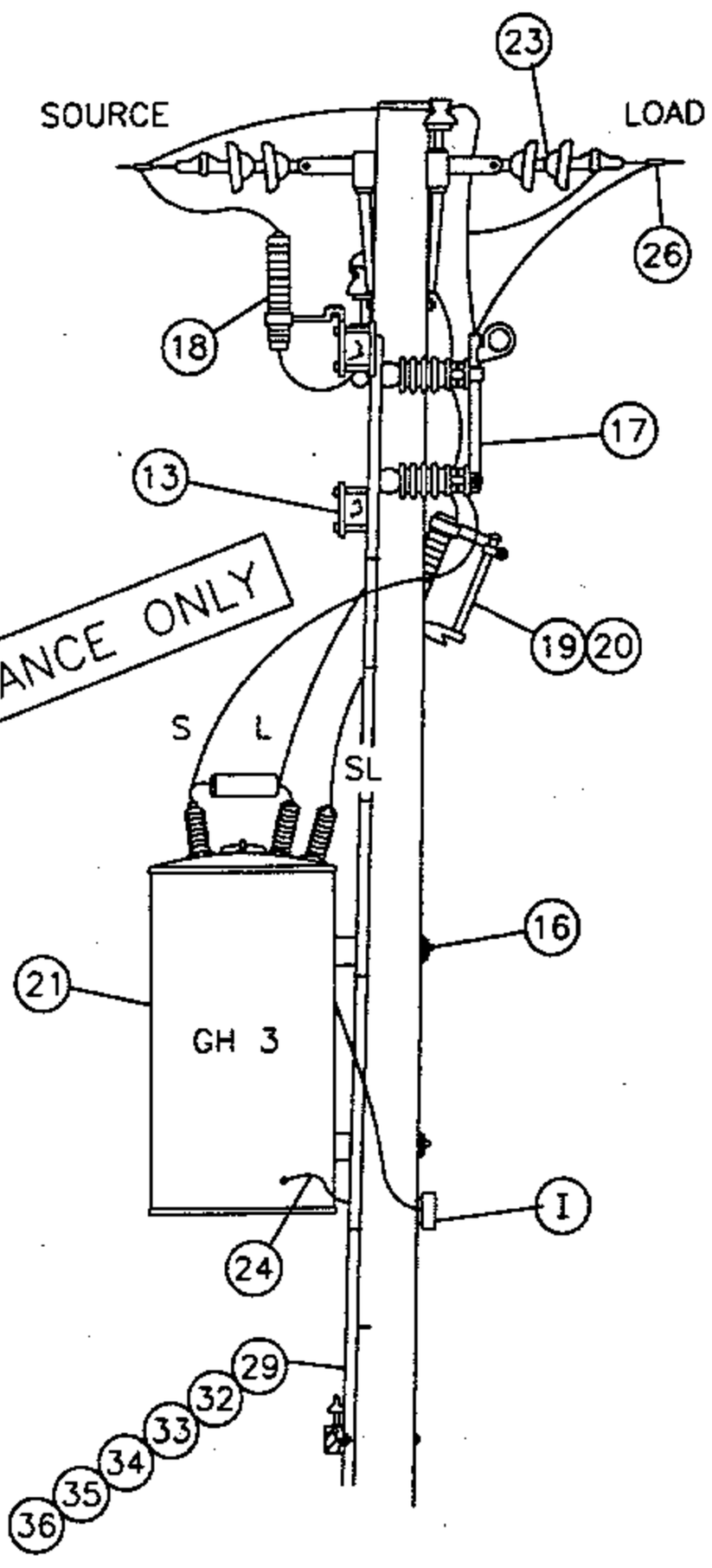
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SCHEMATIC DIAGRAM OF A 12KV CLOSED DELTA REGULATOR STATION




FOR FIELD MAINTENANCE ONLY

| OVERHEAD MACRO UNITS STEP-VOLT REG STATION CLOSED DELTA | |
|---|---|
| POLE | MU I.D. |
| 1 | REG2P1 |
| 2 | REG2P2 |

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| | | |
|---|---|---|
| 1399.404<br>SUPERSEDES<br>1349.2 1-1-96 | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES | DATE 1-1-96<br>APPD PBA 1/25/96 |

NOTES:

A. CAUTION: WHEN CONNECTING A STATION, REGULATORS MUST BE ON NEUTRAL. CLOSE CUTOUT TO SL BUSHING BEFORE CLOSING BYPASS DISCONNECT ON THAT POLE. WHEN DISCONNECTING A STATION, PUT REGULATORS ON NEUTRAL, AND OPEN BYPASS DISCONNECT BEFORE OPENING CUTOUT TO SL BUSHING. THIS AVOIDS A SERIOUS OVERVOLTAGE CONDITION.

B. USE EXTRA HEAVY CLASS ONE POLE WITH 10" MIN TOP DIA FOR POLE #1, AND A CLASS ONE FOR POLE #2.

(C) USE TWO GROUND RODS FOR THE ARRESTERS AND TANKS. ALL GROUND RODS SHOULD BE SPACED A MINIMUM OF SIX FEET APART.

(D) UNIT GROUND COMPLETE, ORDER 603136.

F. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287.

G. BOND DEAD-END HARDWARE.

(H) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(I) CONTROLS WILL BE MOUNTED BY KEARNY MAINTENANCE.

J. INSTALL DOUBLE COIL SPRING WASHER ON END OF BOLT WHICH ATTACHES TO LARGEST METALLIC OBJECT, SUCH AS A BRACKET OR BRACE.

(K) REGULATOR TANKS SHALL BE PERMANENTLY GROUNDED.

(M) THIS CONSTRUCTION TO BE USED WHEN CENTER PHASE WIRE IS TO THE RIGHT OF THE POLE WHEN LOOKING TOWARD THE LOAD.

| ITEM | DESCRIPTION | QUANTITY | | STOCK NO. OR |
|---|---|---|---|---|
| | | POLE 1 | POLE 2 | CONSTR. STD. |
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 3 | 3 | 380 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 8' - 0" | 4 | – | 380 |
| 3 | BRACE, FLAT CROSSARM 28" | 2 | 3 | 164192 |
| 4 | BRACE, ANGLE CROSSARM 5'-0" | 5 | 1 | 164128 |
| 5 | BOLT, MACHINE, 3/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | 2 | 392 |
| 6 | BOLT, MACHINE, 1/2" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH | 2 | 3 | 392 |
| 7 | BOLT, MACHINE, 3/4" X --, 1 SQ. CURV. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 392 |
| 8 | BOLT, MACHINE, 5/8" X --, 2 FLAT WASH., 1 DBL. COIL SPR. WASH. | 4 | 2 | 392 |
| 9 | BOLT, SPACE, 5/8" X --, 4 WASH & 4 NUTS, 2 DBL. COIL SPR. WASH. | 7 | 3 | 392 |
| 10 | BOLT, MACHINE, 1/2" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 18 | 6 | 392 |
| 11 | SCREW, LAG, 5/8" X 5" | 2 | – | 621600 |
| 12 | STEPS, POLE | 19 | 19 | 692992 |
| 13 | SIGN, HIGH VOLTAGE & NAILS, GALV. | 3 | 3 | 647648, 492224 |
| 14 | PIN, INSULATOR (AS REQUIRED BY ITEM 22) | 3 | 1 | 532--- |
| 15 | BRACKET, INSULATOR (AS REQUIRED BY ITEM 22) | 1 | – | 1661-- |
| 16 | COVER, BOLT, PLASTIC | – | 2 | 285696 |
| 17 | SWITCH, BYPASS | 2 | 1 | 706944 |
| 18 | ARRESTER, LIGHTNING (12KV) | 5 | 1 | 113248 |
| 19 | CUTOUT, 12KV 100 AMP WITH LOAD BUSTER HOOKS | 2 | 1 | 297888 |
| 20 | BLADE, DISCONNECT CUTOUT | 2 | 1 | 1200 SECTION |
| 21 | REGULATOR, STEP VOLTAGE 1Ø | 2 | 1 | 1300 SECTION |
| 22 | INSULATOR, PIN TYPE (CLASS AS REQUIRED) | 3 | 1 | 700 SECTION |
| 23 | INSULATOR, SUSPENSION | 10 | 6 | 700 SECTION |
| 24 | CONNECTOR, COMPRESSION (#2 TO #6) | 1 | 2 | 257792 |
| 25 | CONNECTOR, COMPRESSION (#6 TO #6) | 3 | – | 257952 |
| 26 | CONNECTORS, WIRE | 9 | 4 | 700 SECTION |
| 27 | WIRE, 2/0 WP COPPER | (12.4#) 24' | (6.2#) 12' | 808944 |
| 28 | WIRE, BARE STRANDED COPPER #6 | (1.8#) 24' | (1.8#) 22' | 813536 |
| 29 | WIRE, BARE STRANDED COPPER #2 | (9.2#) 45' | (9.8#) 45' | 813664 |
| 30 | WIRE, #8 ANNEALED SOLID COPPER | (.25#) 5' | (.25#) 5' | 812928 |
| 31 | WIRE, #4 SOLID WP COPPER | (1.8#) 10' | (.75#) 4' | 812480 |
| 32 | ROD, GROUND (C)(D) | 2 | 2 | 603072 |
| 33 | CLAMP, GROUND ROD (D) | 2 | 2 | 230016 |
| 34 | MOULDING, HARDWOOD 1" (D) | 45' | 48' | 487200 |
| 35 | STAPLES, GALV. 3" X 1 1/16" X 1/4" (D) | 32 | 35 | 678560 |
| 36 | STAPLES, FENCE GALV. 1 1/4" (D) | 28 | 30 | 678528 |
| 37 | CLEVIS, DEAD END CLOSED | 5 | 3 | 235712 |
| 38 | CLAMPS, DEAD END | 5 | 3 | 700 SECTION |
| 39 | WIRE, BARE STRANDED COPPER #1/0 | (3.3#) 10' | (3.3#) 10' | 813568 |
| 40 | BRACE, VERTICAL, 36" | 2 | – | 164256 |
| 41 | BOLT, MACHINE, 5/8" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 100 SECTION |
| 42 | BOLT, MACHINE, 5/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 100 SECTION |
| 43 | HANGER, TRANSFORMER T-2 | 2 | – | 402944 |

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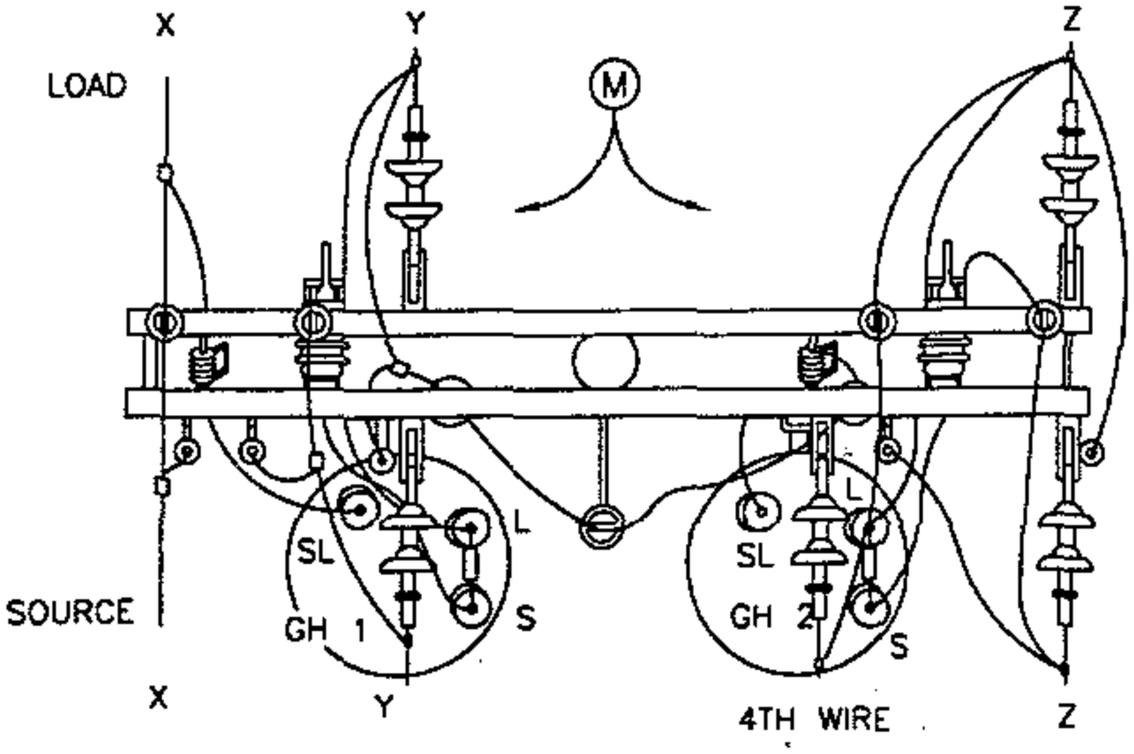
DATE 1-1-96
APPD PA/BDG

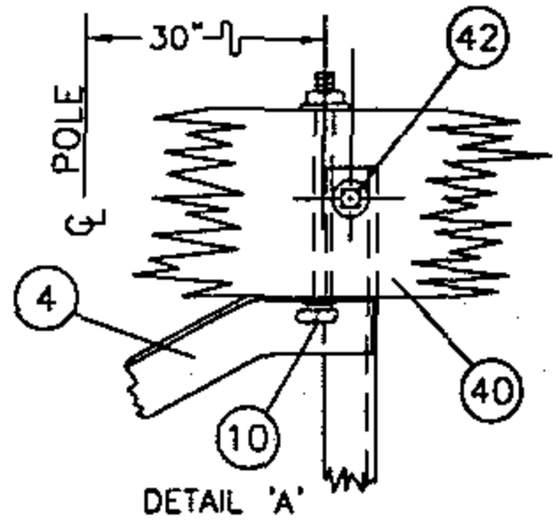
SDG&E ELECTRIC STANDARDS

# STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA 12KV TWO POLES

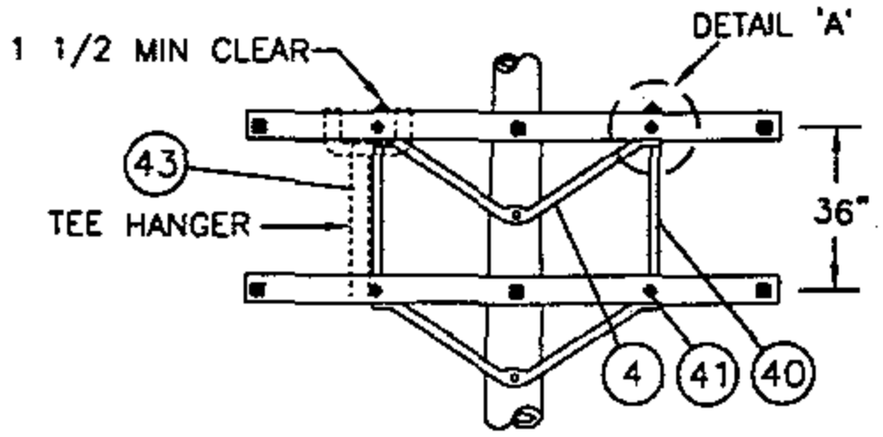
1399.405
SUPERSEDES
1349.3 1-1-96

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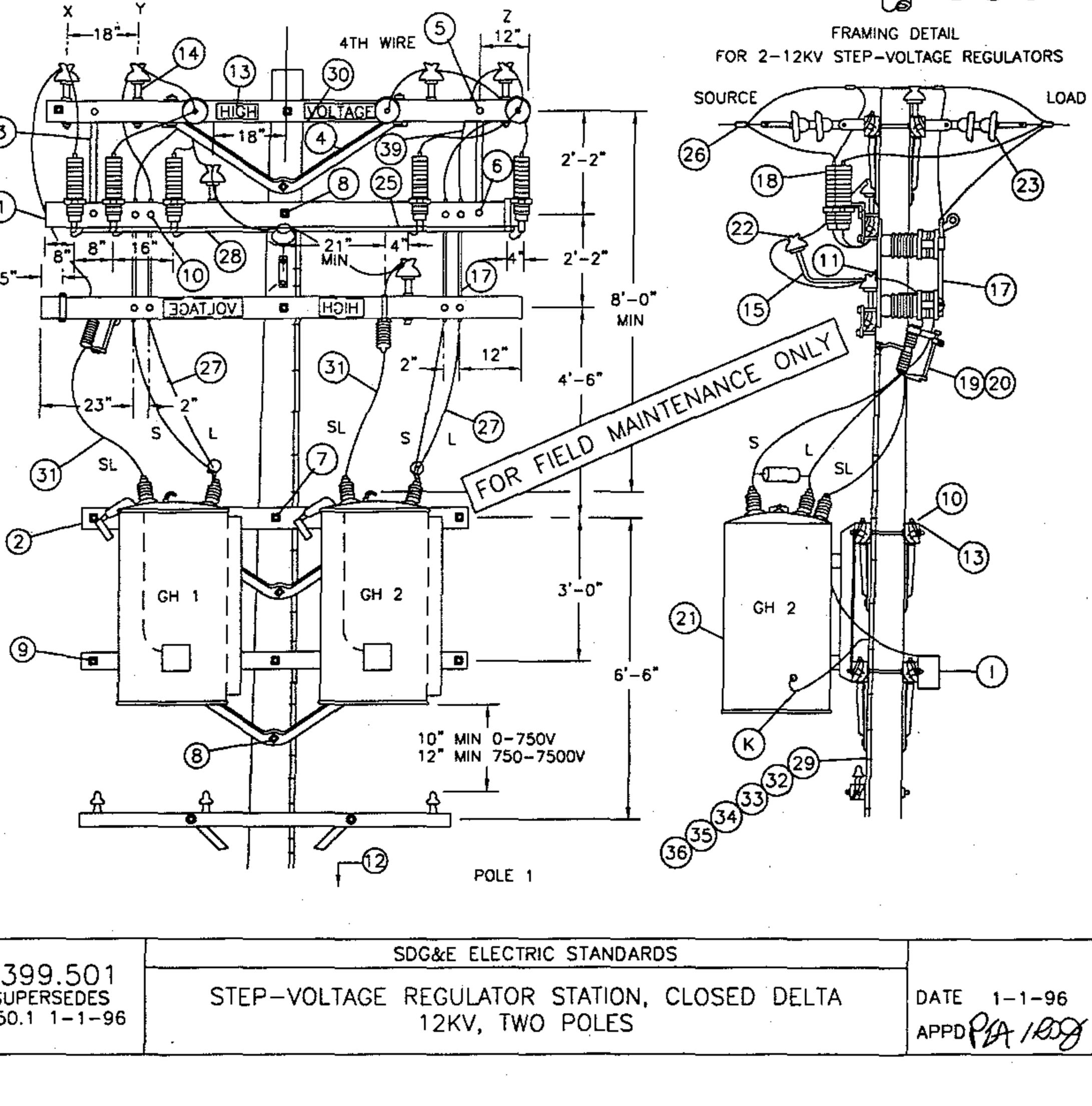



DETAIL 'A'

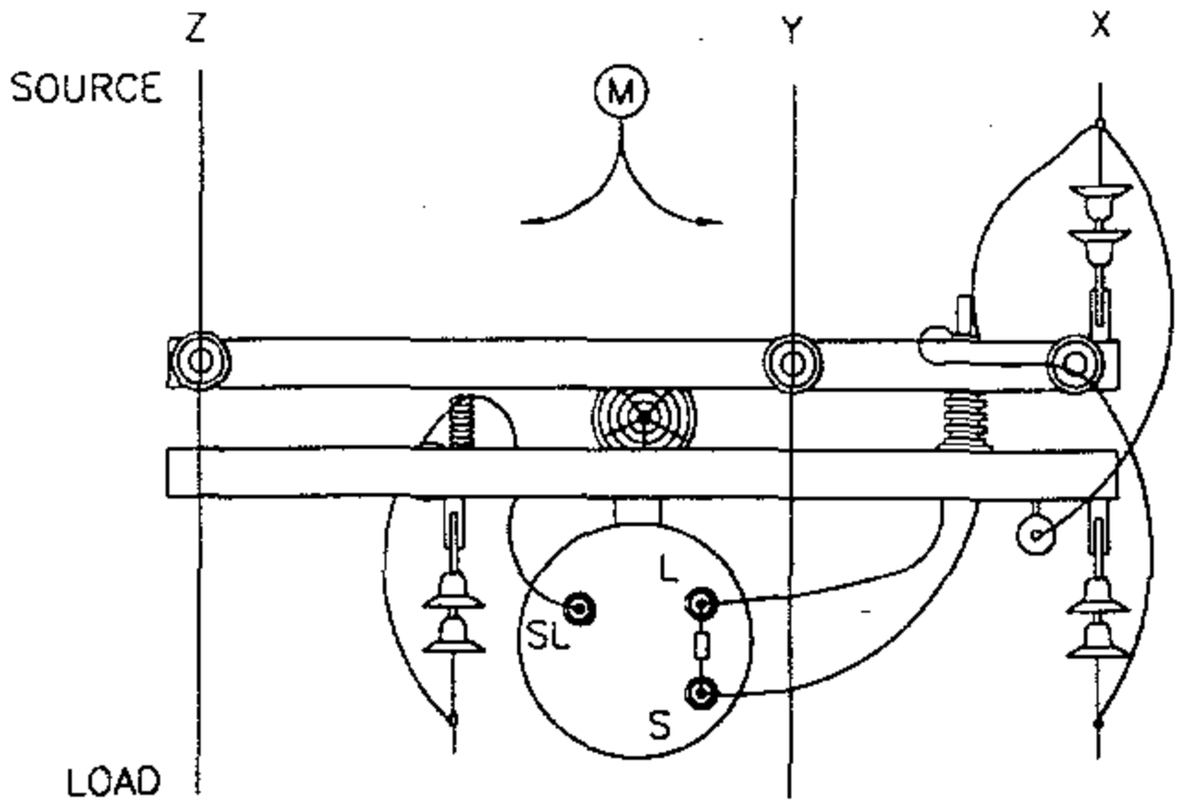



FRAMING DETAIL
FOR 2-12KV STEP-VOLTAGE REGULATORS

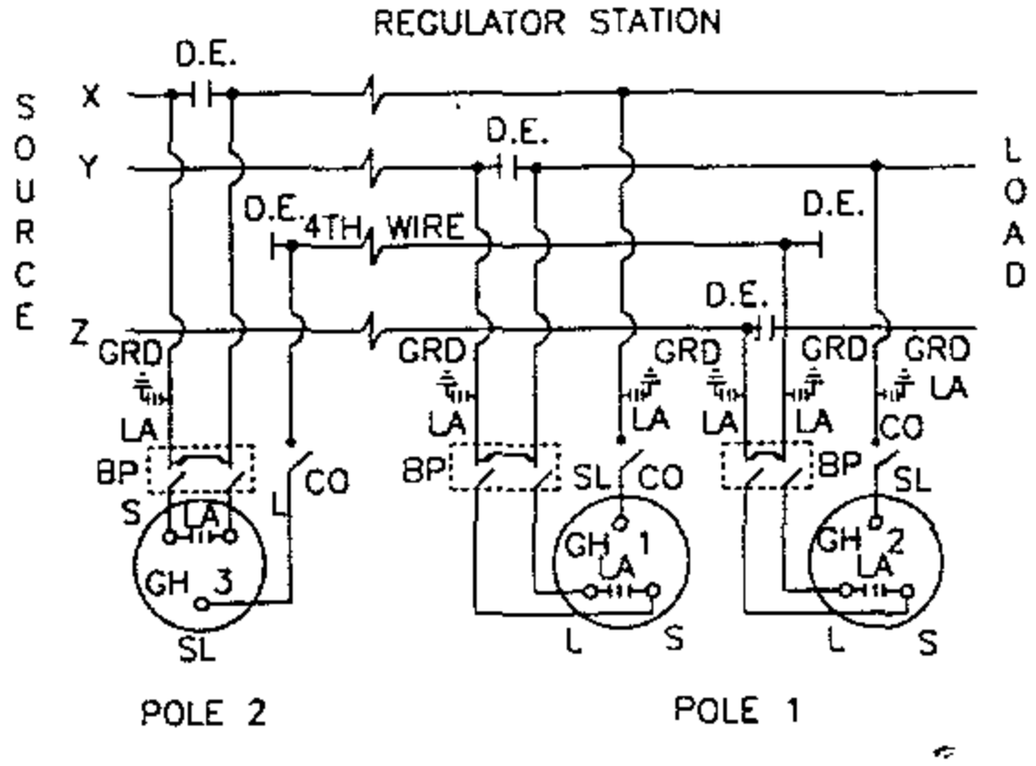


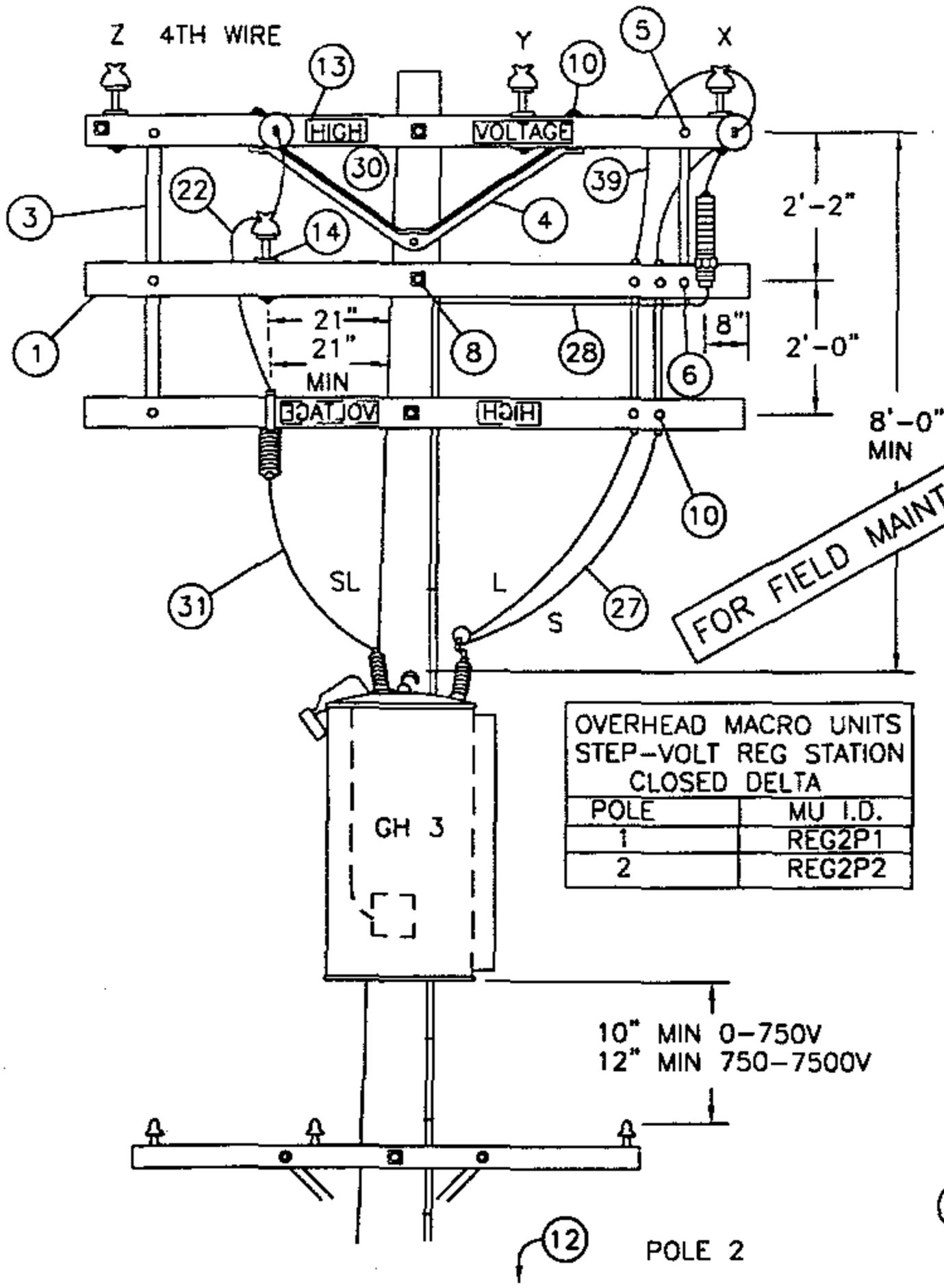

POLE 1

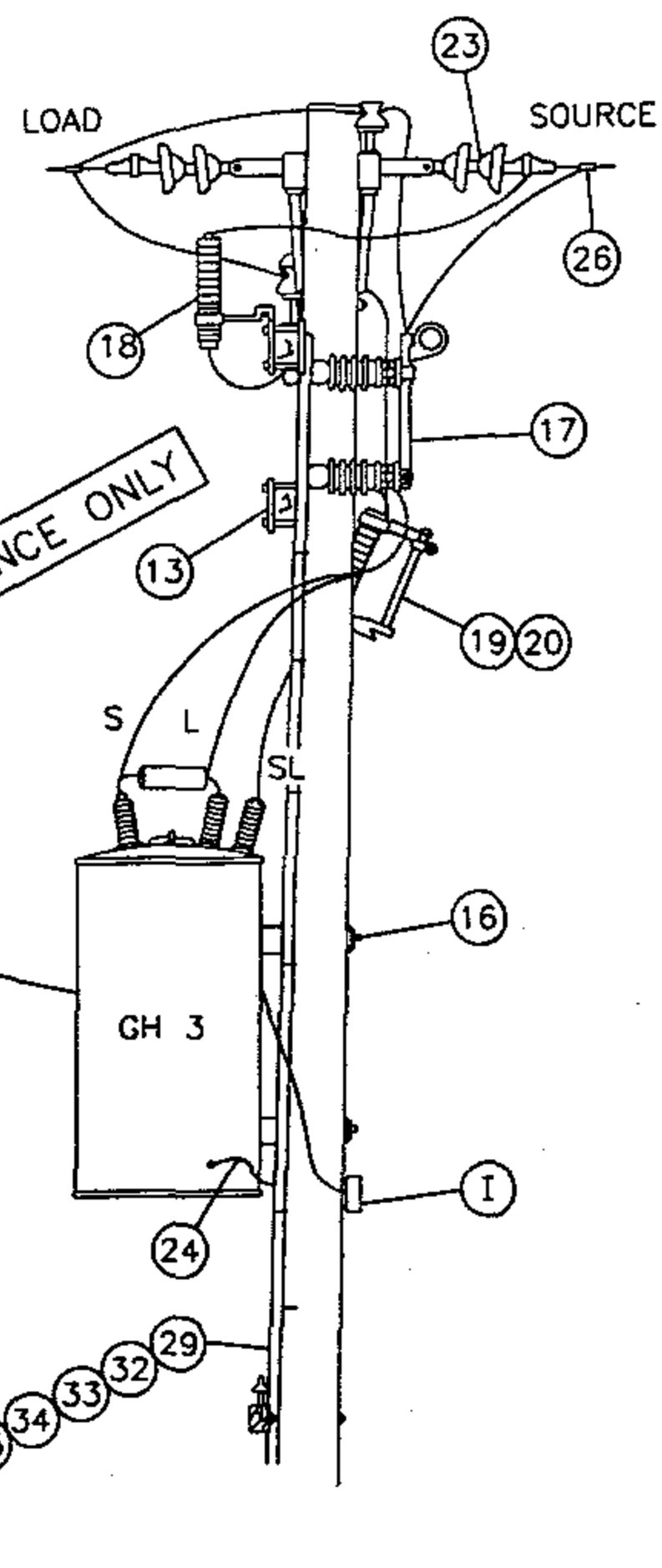
| | | |
|---|---|---|
| 1399.501<br>SUPERSEDES<br>1350.1 1-1-96 | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA<br>12KV, TWO POLES | DATE 1-1-96<br>APPD PA 1/09 |




SCHEMATIC DIAGRAM OF A 12KV CLOSED DELTA REGULATOR STATION




| OVERHEAD MACRO UNITS STEP-VOLT REG STATION CLOSED DELTA | |
|---|---|
| POLE | MU I.D. |
| 1 | REG2P1 |
| 2 | REG2P2 |

| | | |
|---|---|---|
| DATE 1-1-96<br>APPD PA / BSG | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA, 12KV, TWO POLES | 1399.502<br>SUPERSEDES<br>1350.2 1-1-96 |

NOTES:

A. CAUTION: WHEN CONNECTING A STATION, REGULATORS MUST BE ON NEUTRAL. CLOSE CUTOUT TO SL BUSHING BEFORE CLOSING BYPASS DISCONNECT ON THAT POLE. WHEN DISCONNECTING A STATION, PUT REGULATORS ON NEUTRAL, AND OPEN BYPASS DISCONNECT BEFORE OPENING CUTOUT TO SL BUSHING. THIS AVOIDS A SERIOUS OVERVOLTAGE CONDITION.

B. USE EXTRA HEAVY CLASS ONE POLE WITH 10" MIN TOP DIA FOR POLE #1, AND A CLASS ONE FOR POLE #2.

(C) USE TWO GROUND RODS FOR THE ARRESTERS AND TANKS. ALL GROUND RODS SHOULD BE SPACED A MINIMUM OF SIX FEET APART.

(D) UNIT GROUND COMPLETE, ORDER 603136.

F. BOND ALL CUTOUTS IN HEAVY CONTAMINATION DISTRICT AS IDENTIFIED ON STANDARDS PAGE 287.

G. BOND DEAD-END HARDWARE.

(H) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(I) CONTROLS WILL BE MOUNTED BY KEARNY MAINTENANCE.

J. INSTALL DOUBLE COIL SPRING WASHER ON END OF BOLT WHICH ATTACHES TO LARGEST METALLIC OBJECT, SUCH AS A BRACKET OR BRACE.

(K) REGULATOR TANKS SHALL BE PERMANENTLY GROUNDED.

(M) THIS CONSTRUCTION TO BE USED WHEN CENTER PHASE WIRE IS TO THE LEFT OF THE POLE WHEN LOOKING TOWARD THE LOAD.

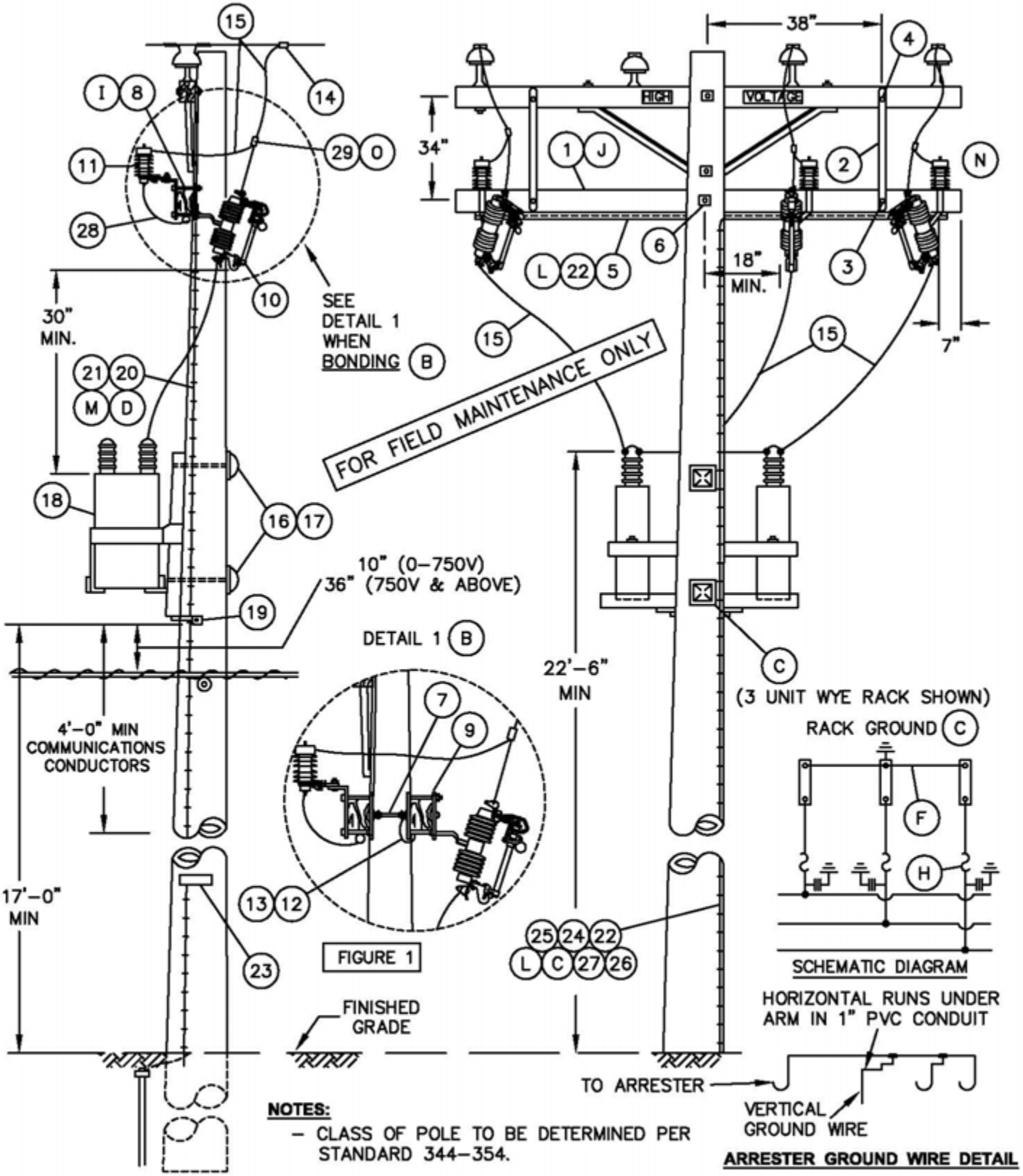
| ITEM | DESCRIPTION | QUANTITY | | STOCK NO. OR CONSTR. STD |
|---|---|---|---|---|
| | | POLE 1 | POLE 2 | |
| 1 | CROSSARM 3 3/4" X 5 3/4" X 10' - 0" | 3 | 3 | 380 |
| 2 | CROSSARM, 3 3/4" X 5 3/4" X 8'-0" | 4 | – | 380 |
| 3 | BRACE, FLAT CROSSARM 28" | 2 | 3 | 164192 |
| 4 | BRACE, ANGLE CROSSARM 5'-0" | 5 | 1 | 164128 |
| 5 | BOLT, MACHINE, 3/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | 2 | 392 |
| 6 | BOLT, MACHINE, 1/2" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | 3 | 392 |
| 7 | BOLT, MACHINE, 3/4" X --, 1 SQ. CURV. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 392 |
| 8 | BOLT, MACHINE, 5/8" X --, 2 FLAT WASH., 1 DBL. COIL SPR. WASH. | 4 | 2 | 392 |
| 9 | BOLT, SPACE, 5/8" X --, 4 WASH. & 4 NUTS, 2 DBL. COIL SPR. WASH. | 7 | 3 | 392 |
| 10 | BOLT, MACHINE, 1/2" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 18 | 6 | 392 |
| 11 | SCREW, LAG, 5/8" X 5" | 2 | – | 621600 |
| 12 | STEPS, POLE | 19 | 19 | 692992 |
| 13 | SIGN, HIGH VOLTAGE & 8 NAILS, GALV. | 3 | 3 | 647648, 492224 |
| 14 | PIN, INSULATOR (AS REQUIRED BY ITEM 22) | 3 | 1 | 532--- |
| 15 | BRACKET, INSULATOR (AS REQUIRED BY ITEM 22) | 1 | – | 1661-- |
| 16 | COVER, BOLT, PLASTIC | – | 2 | 285696 |
| 17 | SWITCH, BYPASS | 2 | 1 | 706944 |
| 18 | ARRESTER, LIGHTNING (12KV) | 5 | 1 | 113248 |
| 19 | CUTOUT, 12KV 100 AMP WITH LOAD BUSTER HOOKS | 2 | 1 | 297888 |
| 20 | BLADE, DISCONNECT CUTOUT | 2 | 1 | 1200 SECTION |
| 21 | REGULATOR, STEP VOLTAGE 1Ø | 2 | 1 | 1300 SECTION |
| 22 | INSULATOR, PIN TYPE (CLASS AS REQUIRED) | 3 | 1 | 700 SECTION |
| 23 | INSULATOR, SUSPENSION | 10 | 6 | 700 SECTION |
| 24 | CONNECTOR, COMPRESSION (#2 TO #6) | 1 | 2 | 257792 |
| 25 | CONNECTOR, COMPRESSION (#6 TO #6) | 3 | – | 257952 |
| 26 | CONNECTORS, WIRE | 9 | 4 | 700 SECTION |
| 27 | WIRE, 2/0 WP COPPER | (12.4#) 24' | (6.2#) 12' | 808944 |
| 28 | WIRE, BARE STRANDED COPPER #6 | (1.8#) 24' | (1.8#) 22' | 813536 |
| 29 | WIRE, BARE STRANDED COPPER #2 | (9.2#) 45' | (9.8#) 45' | 813664 |
| 30 | WIRE, #8 ANNEALED SOLID COPPER | (.25#) 5' | (.25#) 5' | 812928 |
| 31 | WIRE, #4 SOLID WP COPPER | (1.8#) 10' | (.75#) 4' | 812480 |
| 32 | ROD, GROUND | 2 | 2 | 603072 |
| 33 | CLAMP, GROUND ROD (C)(D) | 2 | 2 | 230016 |
| 34 | MOULDING, HARDWOOD 1" (D) | 45' | 48' | 487200 |
| 35 | STAPLES, GALV. 3" X 1 1/16" X 1/4" (D) | 32 | 35 | 678560 |
| 36 | STAPLES, FENCE GALV. 1 1/4" (D) | 28 | 30 | 678528 |
| 37 | CLEVIS, DEAD END CLOSED (D) | 5 | 3 | 235712 |
| 38 | CLAMPS, DEAD END | 5 | 3 | 700 SECTION |
| 39 | WIRE, BARE STRANDED COPPER #1/0 | (3.3#) 10' | (3.3#) 10' | 813568 |
| 40 | BRACE, VERTICAL, 36" | 2 | – | 164256 |
| 41 | BOLT, MACHINE, 5/8" X 7", 1 RD. WASH., 1 DBL. COIL SPR. WASH. | 2 | – | 392 |
| 42 | BOLT, MACHINE, 5/8" X 5", 1 RD. WASH., 1 DBL. COIL SPR. WASH | 2 | – | 392 |
| 43 | HANGER, TRANSFORMER T-2 | 2 | – | 402944 |

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| 1399.503<br>SUPERSEDES<br>1350.3 1-1-96 | SDG&E ELECTRIC STANDARDS<br>STEP-VOLTAGE REGULATOR STATION, CLOSED DELTA<br>12KV TWO POLES | DATE 1-1-96<br>APPD PA 1/1/96 |

**SCOPE:** THIS STANDARD SHOWS THE PREFERRED METHOD OF CONSTRUCTION FOR A FIXED CAPACITOR WHEN A NEW POLE IS REQUIRED.




**NOTES:**

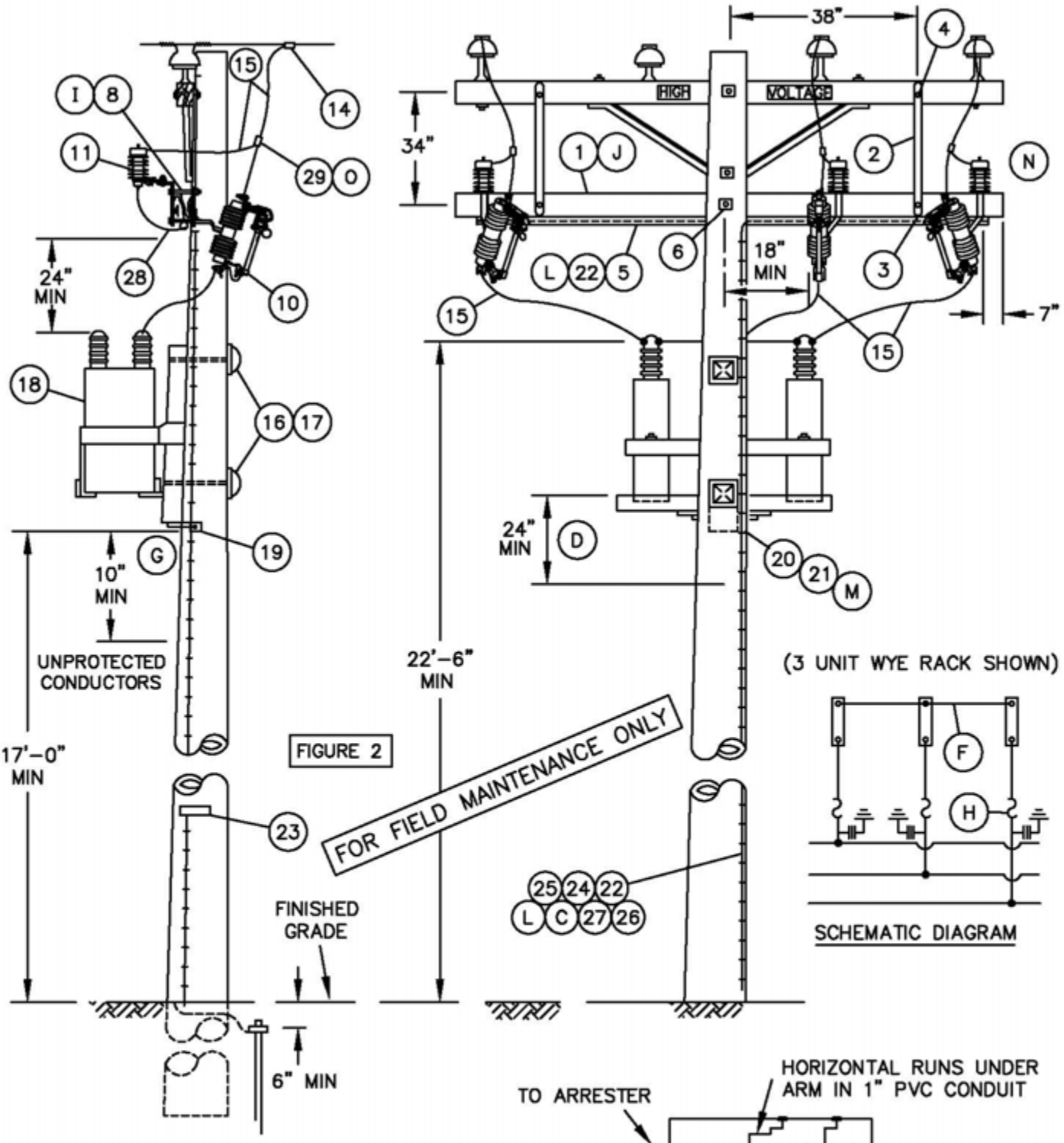
– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

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| | | |
|---|---|---|
| 1399.504<br>4299.507<br>SUPERSEDES<br>1323.1 (10–15–05) | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4KV WYE GROUNDED RACK | DATE 10–15–05<br>APPD PBA / JJ |

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**SCOPE:** THIS STANDARD SHOWS AN ALTERNATE METHOD OF INSTALLING A FIXED CAPACITOR ON AN EXISTING POLE OF PROPER CLASS BUT WITH INSUFFICIENT HEIGHT TO PERMIT THE CONSTRUCTION AS SHOWN ON PAGE 1323.1 FIGURE 1.




**NOTES:**

– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

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| | | |
|---|---|---|
| DATE 10–3–2012<br>APPD TQ/MJC | SDG&E ELECTRIC STANDARDS<br>FIXED CAPACITOR INSTALLATION, 4KV WYE UNGROUNDED RACK –– ALTERNATE | 1399.505<br>4299.508<br>SUPERSEDES<br>1323.2 (10–15–05) |

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY (B) UNBONDED | QUANTITY (B) BONDED | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNIT |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" (B) | 1 | 2 | 294128 | – |
| 2 | BRACE, FLAT, CROSSARM, 36" (J) | 2 | 2 | 164224 | – |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND & 1 LOCK WASHER (J) | 2 | 2 | STD 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DBL COIL SPR WASH (J) | 2 | 2 | STD 392 | – |
| 5 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" AND | 10' | 10' | 251200 | – |
| | STRAPS, PIPE, GALV. 1" WITH 1 3/4" ROOFING NAILS | AS REQ'D | | 697792 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | 1 | 1 | STD 392 | – |
| 7 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS & 2 NUTS | – | 2 | STD 392 | – |
| 8 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | 3 | – | 165442 | – |
| 9 | BRACKET, ARRESTER OR CUTOUT | – | 6 | 166070 | – |
| 10 | CUTOUT, 12KV, 100A, WITH LOADBUSTER HOOKS | 3 | 3 | STD 1212 | – |
| 11 | ARRESTER, LIGHTNING (SEE STD. 1247 FOR 4KV APPLICATION) 4 KV | 3 | 3 | 113216 | – |
| | OR 12 KV | 3 | 3 | 113248 | – |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (B) FT | – | 15 | 812928 | – |
| | LB | – | 1 | | |
| 13 | STAPLES, WIRE, GALV, 1 1/4" (B) | AS REQ'D | | 678528 | – |
| 14 | CONNECTOR, WIRE COMPRESSION, CU OR AL (SIZE AS REQ'D) | AS REQ'D | | 783–786 | – |
| 15 | WIRE, #4 BARE STRANDED COPPER FT | 100 | | 813760 | – |
| | LB | 13 | | | |
| 16 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV RIBBED & 1 DBL COIL SPRING WASHER | 2 | 2 | STD 392 | – |
| 17 | COVER, BOLT PLASTIC & | 2 | 2 | 285696 | – |
| | 6 – 1 3/4" NAILS, GALV | – | – | 492192 | – |
| 18 | CAPACITOR RACK – COMPLETE WITH CAPACITORS 4KV 65 KVAR (3 ● 200 KVAR) | 1 | 1 | 564759 | – |
| | 4KV 130 KVAR (3 ● 400 KVAR) | 1 | 1 | 564776 | – |
| | 12KV 600 KVAR (3 ● 200 KVAR) | 1 | 1 | 564763 | – |
| | 12KV 1200 KVAR (3 ● 400 KVAR) | 1 | 1 | 564764 | – |
| 19 | SCREW, LAG, GALV, 4" | 2 | 2 | 621568 | – |
| 20 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" (D) | 10' | 10' | 251168 | – |
| 21 | STRAPS, PIPE, GALV, 1/2", AND | AS REQ'D | | 697728 | – |
| | 2– 1 3/4" ROOFING NAILS, GALV. | – | – | 492192 | – |
| 22 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | 50' | 812490 | GNDPVC |
| 23 | TAG, STATION NUMBER | 1 | 1 | 200 SECT. | – |
| 24 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | 1 | 603072 | GNDPVC |
| 25 | COPPER BONDED GROUND CONNECTOR | 1 | 1 | 259010 | – |
| 26 | GROUND ENHANCING POWER SOLUTION (GEM) | AS REQ'D | | 424390 | – |
| 27 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | | 678562 | – |
| 28 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | | 698754 | – |
| 29 | HOT LINE CLAMP | 3 | 3 | 227680 | – |

FOR FIELD MAINTENANCE ONLY

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Indicates Latest Revision | Completely Revised | New Page | Information Removed

1399.506
4299.509
SUPERSEDES
1323.3 (10–15–05)

SDG&E ELECTRIC STANDARDS

# FIXED CAPACITOR INSTALLATION, 4KV WYE

DATE 10–15–05
APPD PBA / JJ

| OVERHEAD MACRO UNITS 12KV/4KV CAPACITOR STATIONS | | |
|---|---|---|
| FIXED – GROUNDED (FIG. 1) | | |
| KV | KVAR | MU I.D. |
| 12 | 600 | C6FP |
| 12 | 1200 | C12FP |
| FIXED–UNGROUNDED (FIG. 2) | | |
| 4 | 65 | C4FA |
| 4 | 130 | C4F3P |
| 12 | 600 | C6FA |
| 12 | 1200 | C12FA |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

A. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

(B) 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.

(C) CONNECT CAPACITOR RACK GROUND LEAD TO LIGHTNING ARRESTER GROUND (FIGURE 1 ONLY).

(D) RUN 1/2" SCHEDULE 40 PVC CONDUIT WITH LIGHTNING ARRESTER GROUND FROM LIGHTNING ARRESTER ARM TO A MINIMUM OF 2 FEET BELOW CAPACITOR RACK, THEN CONTINUE DOWN THE POLE USING PVC COVERED GROUND WIRE.

(F) DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.

(G) TEN INCHES FROM 0–750V CONDUCTORS BELOW, 12 INCHES FOR CONDUCTORS OF 750–7500V, 18 INCHES FOR CONDUCTORS OF 7500–22,500V PER G.O. 95 RULE 58.1–D.

(H) FUSE STATION ACCORDING TO CAPACITOR FUSING TABLE, STANDARD 1309.

(I) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

(J) WHEN LA/CO CROSSARM AND CAPACITORS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2–36" FLATBRACES. SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1

**REFERENCE:**

(L) FOR GROUNDING REQUIREMENTS AND APPLICATION – SEE STANDARD 1002.

(M) PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE PER G. O. 95, RULE 22.2B.

(N) SECTIONALIZING CUTOUT INSTALLATION MAY VARY WITH POSITION OF NEUTRAL CONDUCTOR – SEE STANDARD 1240.

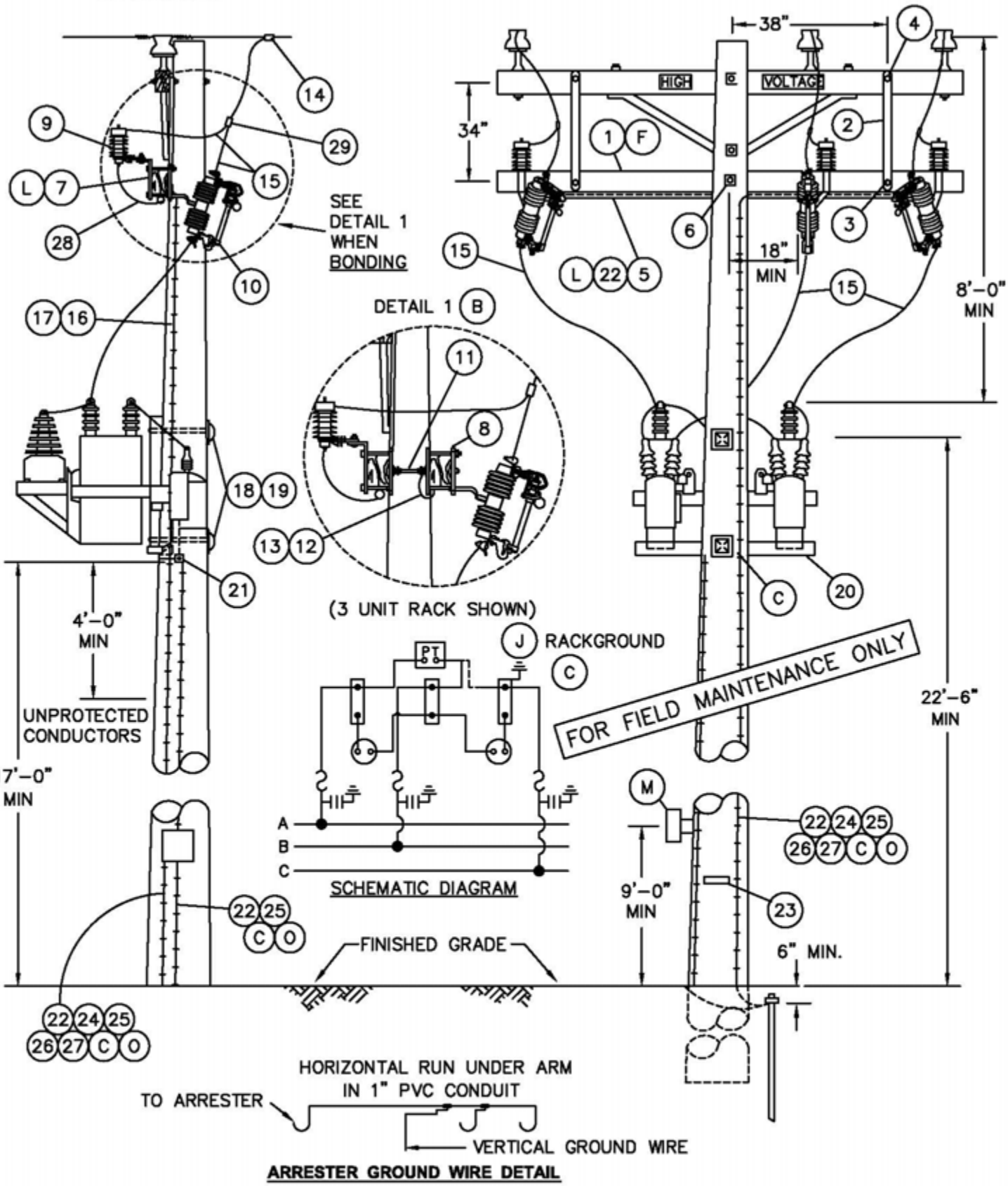
(O) FOR HOT LINE CLAMP CONNECTION, SEE STANDARD 788.

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**SCOPE:** THIS CONSTRUCTION SHALL BE USED FOR ALL 12KV CAPACITOR STATIONS WITH TWO OIL SWITCHES.




**ARRESTER GROUND WIRE DETAIL**

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| | | |
|---|---|---|
| 1399.508<br>SUPERSEDES<br>1325.1 (10-15-05) | SDG&E ELECTRIC STANDARDS<br>12 & 12.47KV SWITCHED CAPACITOR INSTALLATION<br>2 OIL SWITCHES IN CAPACITOR NEUTRAL | DATE 10-15-05<br>APPD PA / JJ |

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**NOTE:**

– CLASS OF POLE TO BE DETERMINED PER STANDARD 344–354.

**BILL OF MATERIAL:**

FOR FIELD MAINTENANCE ONLY

| ITEM | DESCRIPTION | | QUANTITY (B) UNBONDED | QUANTITY (B) BONDED | STOCK NO. OR CONSTR STANDARD | ASSEMBLY UNIT |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' – 0" (B) | | 1 | 2 | 294128 | – |
| 2 | BRACE, FLAT, CROSSARM, 36" (F) | | 2 | 2 | 164224 | – |
| 3 | BOLT, MACH, GALV, 3/8" X 4 1/2", 1 ROUND & 1 LOCK WASHER (F) | | 2 | 2 | STD 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 5", 1 ROUND & 1 DBL COIL SPR WASH (F) | | 2 | 2 | STD 392 | – |
| 5 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1" AND STRAPS PIPE, GALV, 1" WITH 2– 1 3/4" ROOFING NAILS. | | 10' | 10' | 251200 | – |
| | | | AS REQ'D | | 697792 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | | 1 | 1 | STD 392 | – |
| 7 | BRACKET, DOUBLE CUTOUT/ARRESTER, FOR CROSSARM MOUNTING. | | 3 | – | 165442 | – |
| 8 | BRACKET, ARRESTER, OR CUTOUT | | – | 6 | 166070 | – |
| 9 | ARRESTER, LIGHTNING, 12KV | | 3 | 3 | 113248 | – |
| 10 | CUTOUT, 12KV, 100A, WITH LOADBUSTER HOOKS | | 3 | 3 | STD 1212 | – |
| 11 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 4 SQUARE, 2 DOUBLE COIL SPRING WASHERS & 2 NUTS | | – | 2 | STD 392 | – |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER (B) | FT | – | 15 | 812928 | – |
| | | LB | – | 1 | | |
| 13 | STAPLES, WIRE, GALV, 1 1/4" (B) | | AS REQ'D | | 678528 | – |
| 14 | CONNECTOR, WIRE COMPRESSION, CU OR AL (SIZE AS REQ'D) | | AS REQ'D | | 783–786 | – |
| 15 | WIRE, #4 BARE STRANDED COPPER | FT | 110 | 110 | 813760 | – |
| | | LB | 14 | 14 | | |
| 16 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1/2" | | 10' | 10' | 251168 | – |
| 17 | STRAPS, PIPE, GALV, 1/2" WITH 2– 1 3/4" ROOFING NAILS. | | AS REQ'D | | 697728 | – |
| 18 | BOLT, MACH, GALV, 3/4" X (LENGTH AS REQ'D), 1 SQ CURV RIBBED & 1 DBL COIL SPRING WASHER | | 2 | 2 | STD 392 | – |
| 19 | COVER, BOLT PLASTIC & 6– 1 3/4" NAILS, GALV, ROOFING. | | 2 | 2 | 285696 | – |
| | | | – | – | 492192 | – |
| 20 | SWITCHED CAPACITOR RACK, COMPLETE WITH CAPACITORS, SWITCHES AND POTENTIAL TRANSFORMER | 600 KVAR (3 ⊖ 200 KVAR) | 1 | 1 | 564761 | – |
| | | 1200 KVAR (3 ⊖ 400 KVAR) | 1 | 1 | 564770 | – |
| 21 | SCREW, LAG, GALV, 4" | | 2 | 2 | 621568 | – |
| 22 | #4 CU SOLID GROUND WIRE, PVC COVERED | | 50' | 50' | 812490 | GNDPVC |
| 23 | TAG, STATION NUMBER | | 1 | 1 | STD. 208 | – |
| 24 | GROUND ROD, 5/8" X 8', COPPERWELD | | 1 | 1 | 603072 | GNDPVC |
| 25 | COPPER BONDED GROUND CONNECTOR | | 1 | 1 | 259010 | – |
| 26 | GROUND ENHANCING POWER SOLUTION (GEM) | | AS REQ'D | | 424390 | – |
| 27 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | | AS REQ'D | | 678562 | – |
| 28 | FLEXIBLE ARRESTER GROUND STRAP | | AS REQ'D | | 698754 | – |
| 29 | HOT LINE CLAMP | | 3 | 3 | 227680 | – |

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| | | |
|---|---|---|
| DATE 10–15–05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>12 & 12.47KV SWITCHED CAPACITOR INSTALLATION<br>2 OIL SWITCHES IN CAPACITOR NEUTRAL | 1399.509<br>SUPERSEDES<br>1325.2 (10–15–05) |

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| OVERHEAD MACRO UNITS<br>12KV – SWITCHED NEUTRAL CAPACITOR | | |
|---|---|---|
| KVAR | CONTROL | MU I.D. |
| 600 | VOLT/TIME, DIGITAL, PROGRAMMABLE | C6SCT |
| 1200 | VOLT/TIME, DIGITAL, PROGRAMMABLE | C12SCT |

FOR FIELD MAINTENANCE ONLY

INSTALLATION:

(A) CAUTION: OPEN OIL SWITCHES BEFORE OPENING CUTOUTS.

(B) 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.

(C) CONNECT CAPACITOR RACK GROUND LEAD TO LIGHTNING ARRESTER GROUND. A SECOND GROUND WIRE IS REQUIRED FOR THE CONTROL PANEL TO BE CONNECTED ON THE SAME GROUND ROD. COIL LOOSE END OF THE CONTROL PANEL GROUND WIRE AND STAPLE TO POLE (TO BE WORKED BY SERVICE CREW).

D. DO NOT TIE CAPACITOR BANK NEUTRAL TO 12KV CIRCUIT NEUTRAL. IT IS TO REMAIN FLOATING.

(F) WHEN LA/CO CROSSARM AND CAPACITORS CANNOT BE INSTALLED ON THE SAME SIDE OF THE POLE AS AN EXISTING LINEARM, DELETE ITEMS 2, 3, & 4. INSTEAD, FIELD DRILL LA/CO CROSSARM FOR 2–36" FLAT BRACES, SECURE BRACES TO POLE WITH A LAG SCREW. (SEE STD. 380.1, ITEM 1 FOR DRILLING MEASUREMENTS).

G. RACKS THAT CONTAIN POTENTIAL TRANSFORMERS (PT'S) WITH METAL TANKS ARE TO BE INSULATED FROM RACK BEFORE REINSTALLATION.

H. CAPACITORS MUST BE INSTALLED ON POLES ACCESSIBLE BY BUCKET TRUCK.

(J) PT CAN BE CONNECTED TO CENTER PHASE OR OUTSIDE PHASE DEPENDING ON FIELD CONDITION.

K. THE PT FOR THIS INSTALLATION IS CONNECTED PHASE–TO–PHASE.

(L) DRILL THROUGH CROSSARM 1" UP FROM LOWER EDGE SO THAT LOWER CROSSARM MOUNTING BRACKET BOLT DOES NOT INTERFERE WITH PVC CONDUIT.

**REFERENCE:**

(M) SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. SEE STANDARD 1330 FOR CONTROL INSTALLATION AND MATERIAL.

(N) PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE PER G.O. 95 RULE 22.2C.

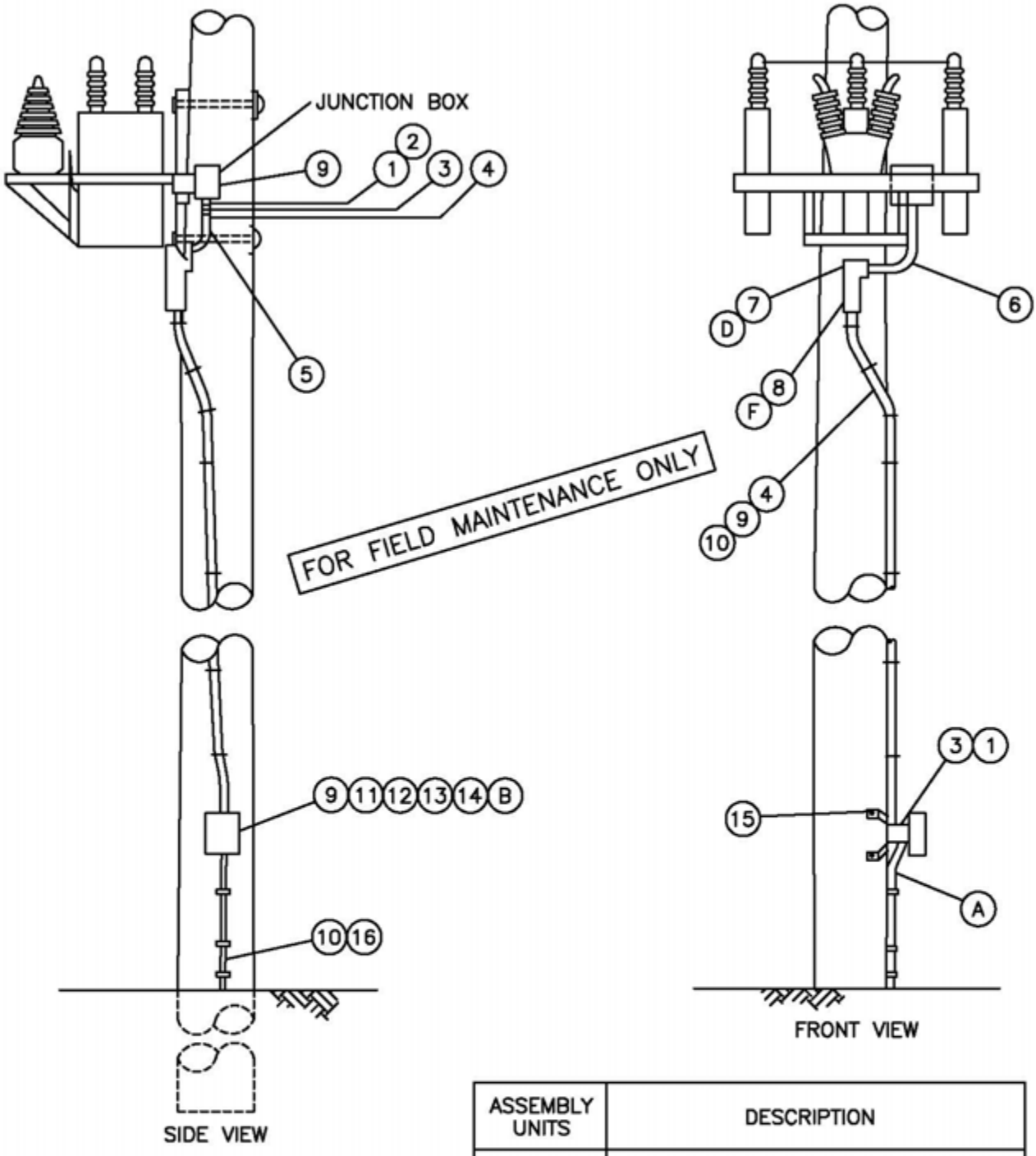
(O) FOR GROUNDING REQUIREMENTS AND APPLICATION, SEE STANDARD 1002.

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**SCOPE:** THIS STANDARD SHOWS TYPES OF CONTROLS, MATERIAL AND INSTALLATION OF A CAPACITOR CONTROL UNIT. THIS IS TO BE USED ON ALL SWITCHED CAPACITOR STATIONS.




| ASSEMBLY UNITS | DESCRIPTION |
|---|---|
| C/CTIM | CONTROL–DIGITAL, PROGRAMMABLE |

**NOTE:**

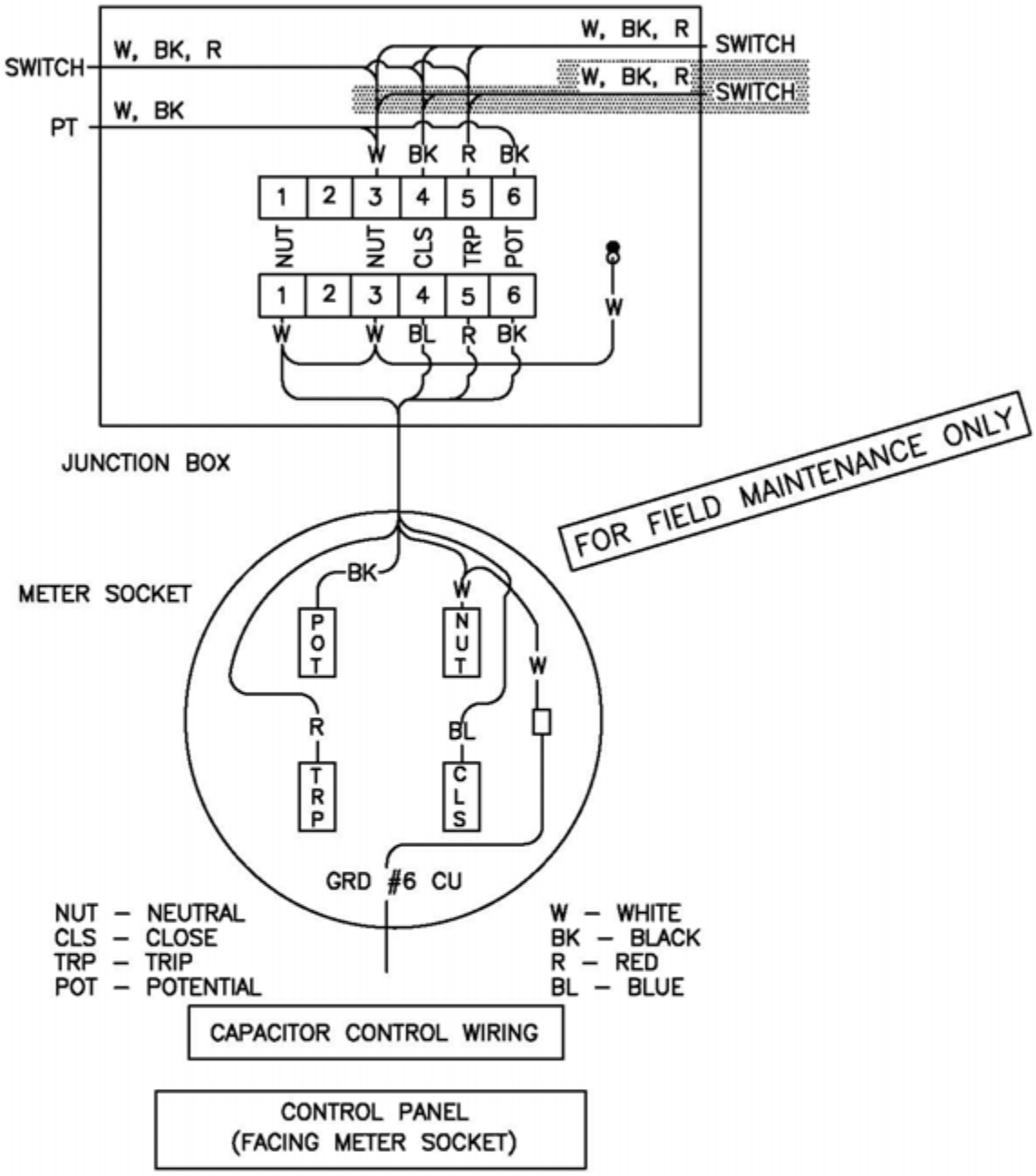
- SEE PAGE 1330.4 FOR BILL OF MATERIAL
- MATERIALS ORDERED ARE BASED ON A 50' POLE.

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| DATE 1–1–2000<br>APPD PBA/VCR | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONTROL MATERIAL AND INSTALLATION | 1399.511<br>SUPERSEDES<br>1330.1 (1–1–2000) |
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| 1399.512<br>SUPERSEDES<br>1330.2 (4–3–09) | SDG&E ELECTRIC STANDARDS<br>CAPACITOR CONTROL MATERIAL AND INSTALLATION<br>VOLTAGE WITH TIME BIAS (TYPE 'TB') | DATE 4–3–09<br>APPD PA / BV |

**BILL OF MATERIAL:** (FOR CONTROL PORTION OF SWITCHED CAPACITOR JOBS)

| ITEM | DESCRIPTION | QUANTITY | STOCK NUMBER |
|---|---|---|---|
| 1 | TERMINAL ADAPTER, PVC 1" | 2 | 102756 |
| 2 | LOCKNUT, GALV. 1" | 1 | 468896 |
| 3 | REDUCER, PVC 1" X 3/4" | 2 | 573410 |
| 4 | CONDUIT, PVC 3/4" SCHEDULE 40 | 25' | 251328 |
| 5 | COUPLING, PVC 3/4" | 1 | 280416 |
| 6 | ELBOW 90° , PVC 3/4" | 1 | 322166 |
| 7 | ACCESS FITTING BODY TYPE "T" PVC 3/4" (D) | 1 | 147792 |
| 8 | ACCESS FITTING BODY TYPE "LB" PVC 3/4" (F) | 1 | 146384 |
| 9 | WIRE TW #12 WHITE | 30' | 808704 |
| | WIRE TW #12 BLACK | 30' | 808096 |
| | WIRE TW #12 BLUE | 30' | 808416 |
| | WIRE TW #12 RED | 30' | 808576 |
| 10 | STRAPS, PIPE GALV 3/4", 6 D NAILS, GALV | AS REQ'D | 697888/490656 |
| 11 | METER SOCKET | 1 | 161898 |
| 12 | RING, STAINLESS STEEL, METER SEALING | 1 | 599034 |
| 13A | DIGITAL, PROGRAMMABLE CONTROL (C) | 1 | 706176 |
| 13B | FISHER PIERCE 2416 CONTROL REPLACEMENT BATTERY KIT (G)(H) | – | 126800 |
| 14 | PADLOCK, MASTER 7 | 1 | 514912 |
| 15 | SCREW, LAG 1/4" X 2" | 4 | 621888 |
| 16 | CONDUIT, PVC 3/4" SCHEDULE 80 | 9 | 251520 |

FOR FIELD MAINTENANCE ONLY

**INSTALLATION:**

(A) ATTACH GROUND WIRE (ALREADY PROVIDED) TO GROUND TERMINAL OF METER SOCKET.

(B) INSTALL CONTROL 90° FROM FRONT SIDE OF CAPACITOR RACK.

(C) CONTROLS TO BE CONFIGURED/PROGRAMED PER THE DISTRIBUTION CAPACITOR INSTRUCTION, SETTING AND SURVEY INFORMATION MANUALS.

(D) FOR USE WHEN CURRENT SENSOR IS REQUIRED.

(E) NEW INSTALLATIONS MUST BE AUTHORIZED BY PLANNING ENGINEER.

(F) FOR USE WITHOUT CURRENT SENSOR.

(G) REPLACEMENT KIT INCLUDES: ONE 6 VOLT RECHARGEABLE LEAD ACID BATTERY, 2–30 INCH WIRES WITH CONNECTORS ON BOTH ENDS, DOUBLE SIDED ADHESIVE TAPE.

(H) IF BATTERY IS INSTALLED ON CIRCUIT BOARD BEHIND CONTROL PANEL, INSTALL NEW BATTERY ON RIGHT HAND SIDE OF CONTROL DOOR. DO NOT ATTEMPT TO REMOVE OLD BATTERY FROM CIRCUIT BOARD BECAUSE BOARD MAY BE DAMAGED.

**REFERENCE:**

I. SEE STANDARD 1325 FOR A TWO OIL SWITCH INSTALLATION WITH CONTROL UNIT.

J. SEE FMO STANDARD 1399.208 FOR A SWITCH CAPACITOR USING A CURRENT SENSOR AND CONTROL UNIT.

K. SEE ELECTRIC STANDARD PRACTICE 302 FOR PROPER OPERATION OF CAPACITOR STATION AND CONTROL TESTING.

L. PVC CONDUIT IS NOT PERMITTED IN THE CLIMBING SPACE–SEE G.O. 95 RULE 22.2(C).

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# 1400-1500 CABLE POLES, LIGHTING

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| 1499.009 | CABLE POLE RISER INSTALLATION, MODIFICATION FROM SINGLE TO DOUBLE RISER FOR EXISTING CABLE POLES |
| 1499.010-.012 | CABLE POLE TERMINAL MOUNTING INFORMATION (PORCELAIN TERMINALS) (FOR CONTAMINATION DISTRICT 1) |
| 1499.101-.104 | 0-750 UNDERGROUND SERVICE AND RISERS |
| 1499.201-.202 | 4KV CABLE POLE CONSTRUCTION |
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| 1499.305-.306 | 12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE-PHASE, 1/C PER PHASE, LINEARM MOUNTED DISCONNECTS |
| 1499.307-.309 | CROSS ARM CABLE POLE 3 PHASE, 1/C PER PHASE DEADEND CONSTRUCTION, 12.47KV AND BELOW |
| 1499.310-.314 | 12.47KV AND BELOW CABLE POLE UPSWEEP BRACKET |
| 1499.401-.403 | 12.47KV AND BELOW DEAD END CABLE POLE ARM, 3 PHASE, 1/C PER PHASE, HOOKSTICK SWITCHED |
| 1499.404-.413 | 12.47KV AND BELOW DEAD END CABLE POLE THREE-PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED NON-PORCELAIN TERMINALS |
| 1499.501-.503 | CABLE POLE, STEEL, LIGHT DUTY |
| 1499.504-.506 | 12.47KV AND BELOW DEAD END CABLE POLE, 6 OR 7 OH CONDUCTORS, 1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED |
| 1499.601-.605 | 12.47KV DEAD END CABLE POLE, THREE-PHASE WITH NEUTRAL, HORIZONTAL SCADA-MATE SWITCH |
| 1499.801-.902 | METERING |
| 1599.102 | LIGHTING INSTALLATION |
| 1599.201 | MERCURY VAPOR CONVENTIONAL LUMINAIRES |
| 1599.203-.204 | HIGH PRESSURE SODIUM VAPOR LUMINAIRE AND REPLACEMENT BALLAST |
| 1599.210 | LOW PRESSURE SODIUM VAPOR LUMINAIRE AND REPLACEMENT BALLAST |
| 1599.501 | SERIES CONTROLLED R.O. STREET LIGHT TRANSFORMER INSTALLATIONS |
| 1599.502 | SERIES CONTROLLED, REGULATED OUTPUT STREET LIGHT TRANSFORMER INSTALLATION, REMOTE CONTROL OUTDOOR CIRCUIT, SWITCH CAPACITOR, 4KV |
| 1599.503 | PHOTOELECTRIC CONTROLLED, REGULATED OUTPUT, STREET LIGHT TRANSFORMER INSTALLATION, 4KV |
| 1599.601-.602 | PHOTOELECTRIC CONTROLLED R.O. STREET LIGHT TRANSFORMERS INSTALLATION, 12KV |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| C | | | | | | F | | | | | |
| B | COMPLETELY REVISED | JK | JS | CZH | 10/15/2019 | E | | | | | |
| A | ORIGINAL ISSUE | JK | JS | CZH | 6/13/2019 | D | | | | | |

Indicates Latest Revision | X Completely Revised | New Page | Information Removed



SDG&E ELECTRIC OVERHEAD FIELD MAINTENANCE ONLY STANDARDS

LEGACY OVERHEAD FIELD MAINTENANCE
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CABLE POLES, LIGHTING

SCOPE: THIS STANDARD: 1) SHOWS THE STANDARD CABLE POLE RISER POSITIONS FOR SDG&E, TELCO, AND CATV COMPANIES. IT IS FOR RISER PLACEMENT ONLY (SEE SECTION 1400/4200 FOR SPECIFIC CONSTRUCTION DETAILS).

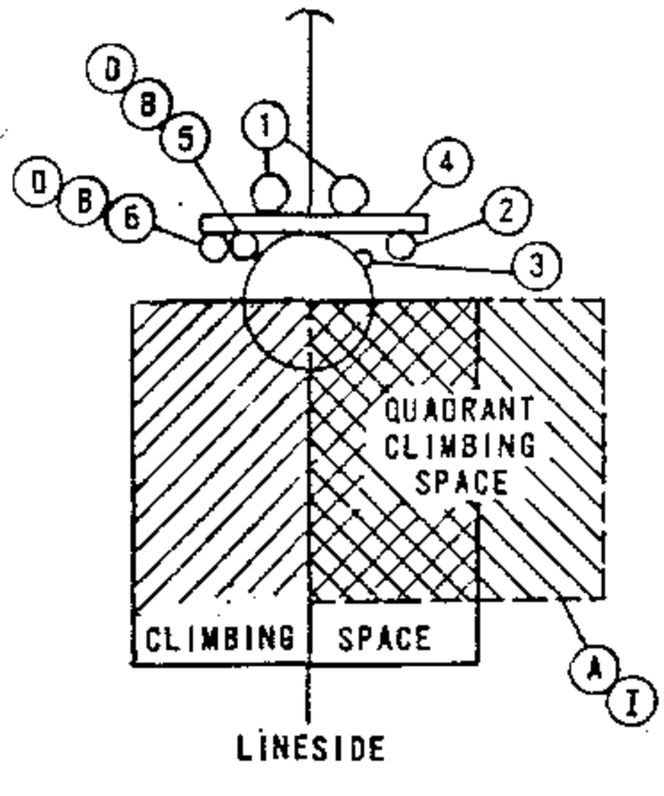



FIGURE 1

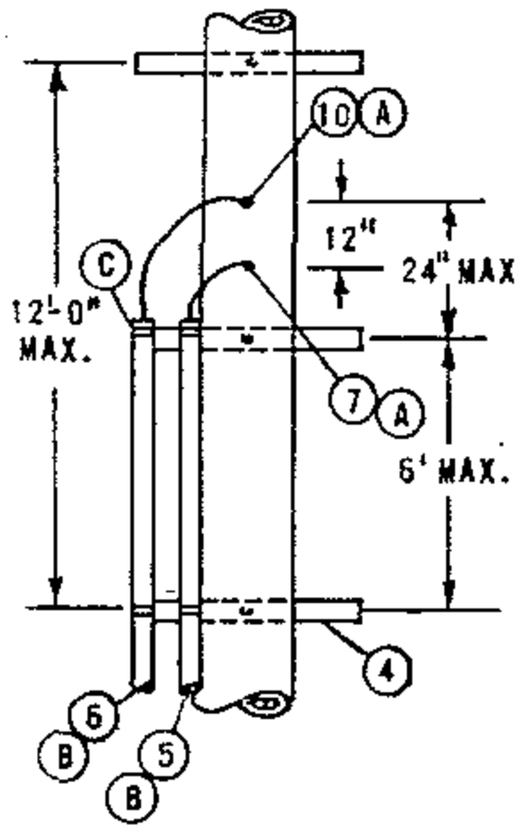



FIGURE 2

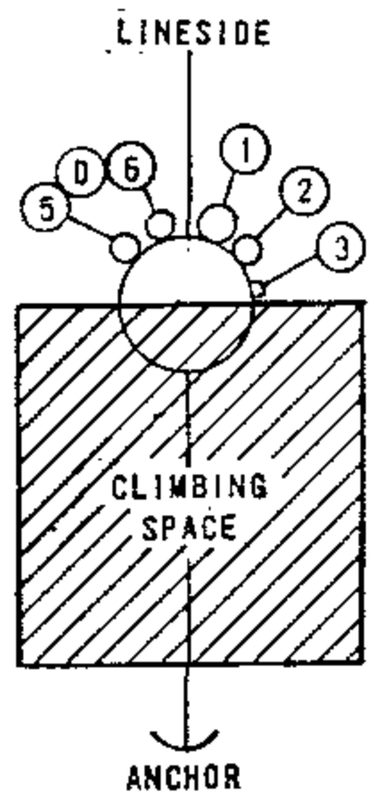



FIGURE 3

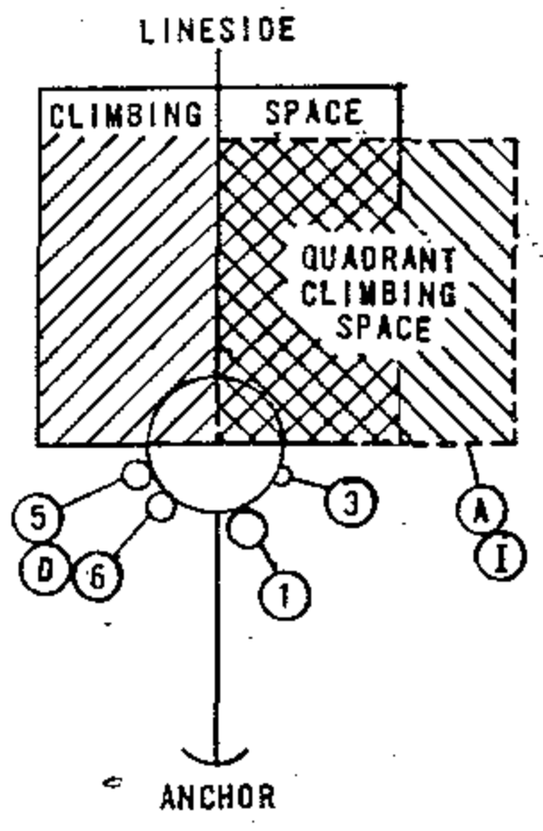



FIGURE 4

DEAD END CONSTRUCTION

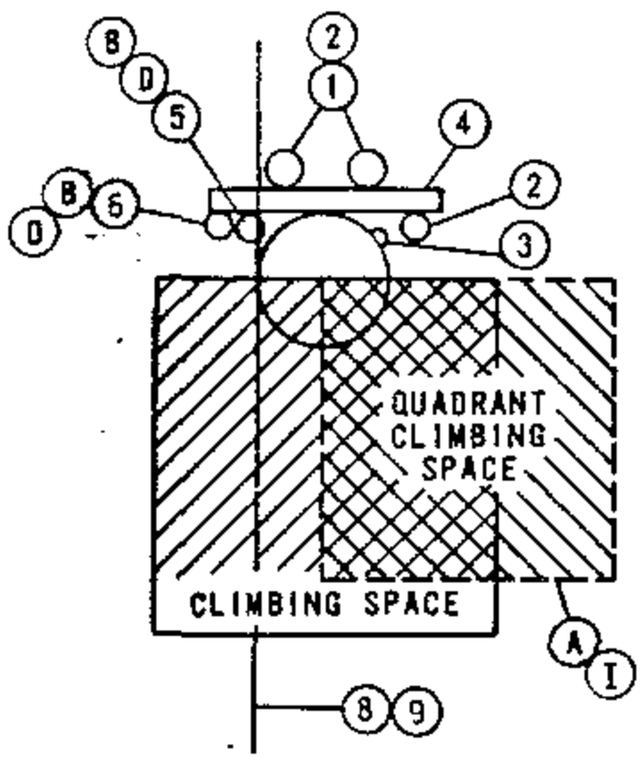



FIGURE 5

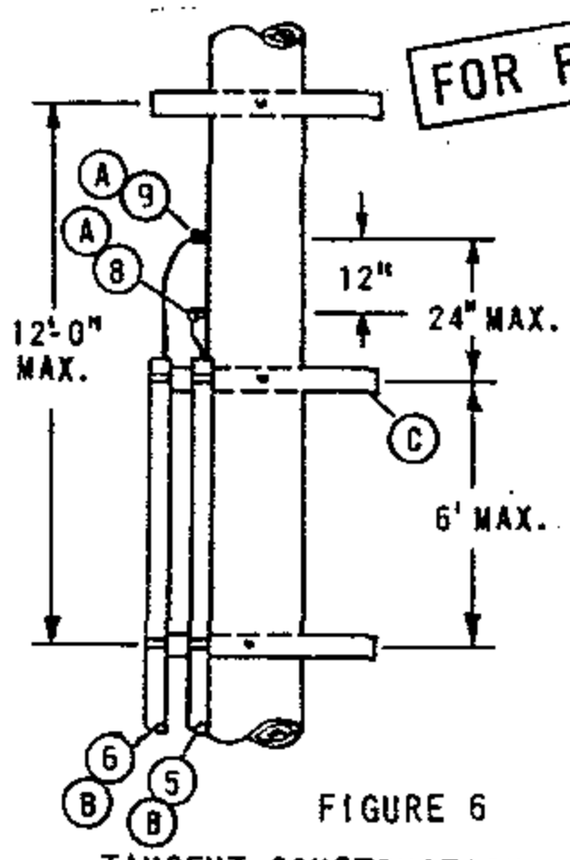



FIGURE 6

FOR FIELD MAINTENANCE ONLY

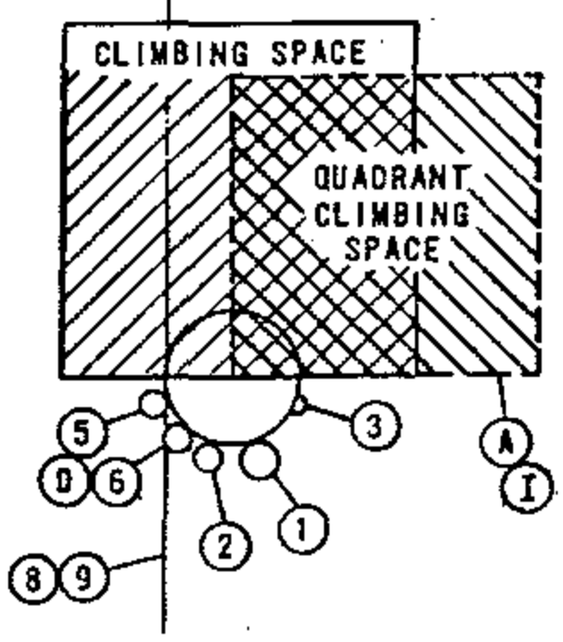



FIGURE 7

TANGENT CONSTRUCTION

INSTALLATION:

(A) QUADRANT CLIMBING SPACE PROVIDED THROUGH CATV AND TELCO AERIAL ATTACHMENT LEVELS ONLY.

(B) C.A.T.V. AND TELCO TO ATTACH CONDUIT TO BACK SIDE OF RISER LADDER ARMS.

(C) C.A.T.V. OR TELCO TO PLACE RISER LADDER ARM TO HOLD TOP OF OWN CONDUIT.

(D) C.A.T.V. AND TELCO TO ALWAYS BE IN SAME QUADRANT.

F. CONDUIT RISER AT BASE OF POLE NOT TO INFRINGE ON CURB OR SIDEWALK POSITIONS.

REFERENCES:

G. PVC RISERS ARE NOT PERMITTED WITHIN THE CLIMBING SPACE PER G.O. 95 RULE 22.2C.

H. G.O. 95 RULE 91.3-A1C REQUIRES POLE STEPS ON ALL JOINTLY USED CABLE POLES (SEE STANDARD 363).

I. SEE SECTION 200 FOR ALLOWABLE G.O. 95 CLIMBING SPACE OBSTRUCTIONS.

J. NO CATV OR TELCO JUMPERS ALLOWED IN QUADRANT CLIMBING SPACE PER G.O. 95 RULE 84.7.

| ITEM | DESCRIPTION | ITEM | DESCRIPTION |
|---|---|---|---|
| 1 | SDG&E PRIMARY RISER | 6 | C.A.T.V. RISER POSITION |
| 2 | SDG&E SECONDARY RISER | 7 | TELCO DEAD END ATTACHMENT |
| 3 | SDG&E ELECTRIC GROUND | 8 | TELCO TANGENT (THRU) POSITION |
| 4 | RISER LADDER ARM | 9 | C.A.T.V. TANGENT (THRU) POSITION |
| 5 | TELCO RISER POSITION | 10 | C.A.T.V. DEAD END ATTACHMENT |

DATE 11-16-81
APPD JEY

SDG&E ELECTRIC STANDARDS

JOINT CABLE POLE RISERS USING WOODEN LADDER ARMS

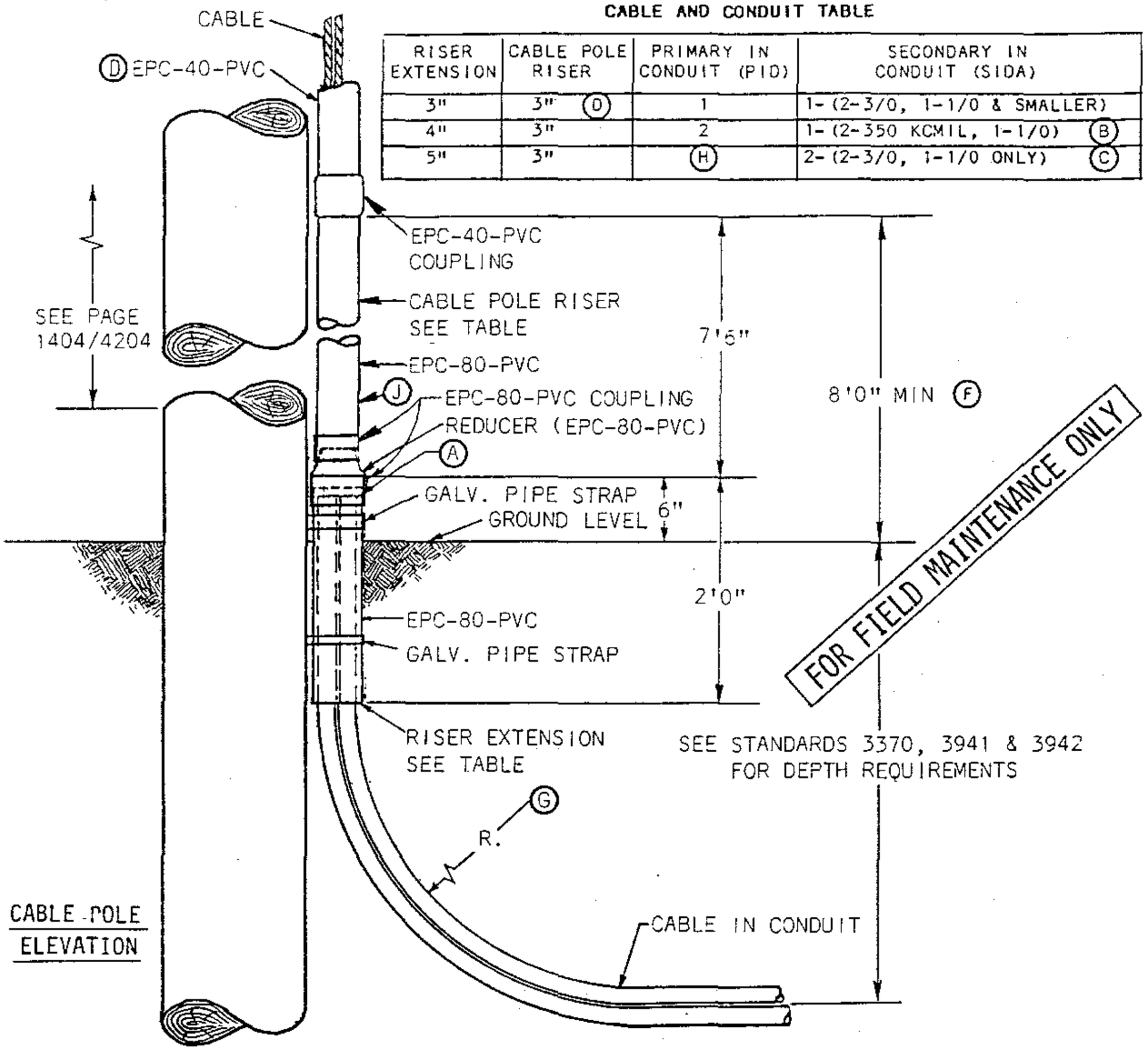
OH 1499.001
~~UG 4299.001~~
SUPERSEDES
1402.1 (11-16-81)

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**SCOPE:** THIS STANDARD SHOWS THE CONSTRUCTION FOR SINGLE-PHASE PRIMARY AND SECONDARY CABLE-IN-CONDUIT (CIC) INSTALLATIONS.

**CABLE AND CONDUIT TABLE**

| RISER EXTENSION | CABLE POLE RISER | PRIMARY IN CONDUIT (PID) | SECONDARY IN CONDUIT (SIDA) |
|---|---|---|---|
| 3" | 3" (D) | 1 | 1- (2-3/0, 1-1/0 & SMALLER) |
| 4" | 3" | 2 | 1- (2-350 KCMIL, 1-1/0) (B) |
| 5" | 3" | (H) | 2- (2-3/0, 1-1/0 ONLY) (C) |




**NOTES:** NO MORE THAN TWO CIC CONDUITS FOR A RIGID CONDUIT RISER IS ALLOWED.

**INSTALLATION:**

(A) CUT CONDUIT FROM CABLE-IN-CONDUIT 4 INCHES ABOVE GROUND LEVEL.

(B) THE 350 KCMIL CABLE-IN-CONDUIT (SIDA) SHALL NOT BE USED FOR SERVICES. IF A SERVICE REQUIRES 350 CABLE, USA CABLE AND RIGID CONDUIT MUST BE USED.

(C) FOR 2 RUNS OF SIDA IN ONE RISER, DERATE AMPACITY 20%.

(D) FOR 3/0 AND SMALLER SIDA, REDUCE THE TOP PORTION OF THE RISER ABOVE THE 8 FOOT LEVEL TO 2 INCH CONDUIT.

**REFERENCE:**

(F) RISERS OF PLASTIC PIPE SHALL BE EPC-80-PVC (SCHEDULE 80) WITH A MINIMUM NOMINAL PIPE SIZE OF 3 INCHES FROM THE GROUND LINE TO A LEVEL NOT LESS THAN 8 FEET ABOVE THE GROUND LINE PER G.O. 95, RULE 54.6-E.

(G) SEE PAGE 3380.2 FOR CABLE-IN-CONDUIT MINIMUM BENDING RADIUS.

(H) SEE PAGES 1403.2/4203.2 THRU 1403.7/4203.7 FOR THREE-PHASE PRIMARY CABLE IN CONDUIT INSTALLATION WHICH REQUIRES 'U' SHAPED MOULDING.

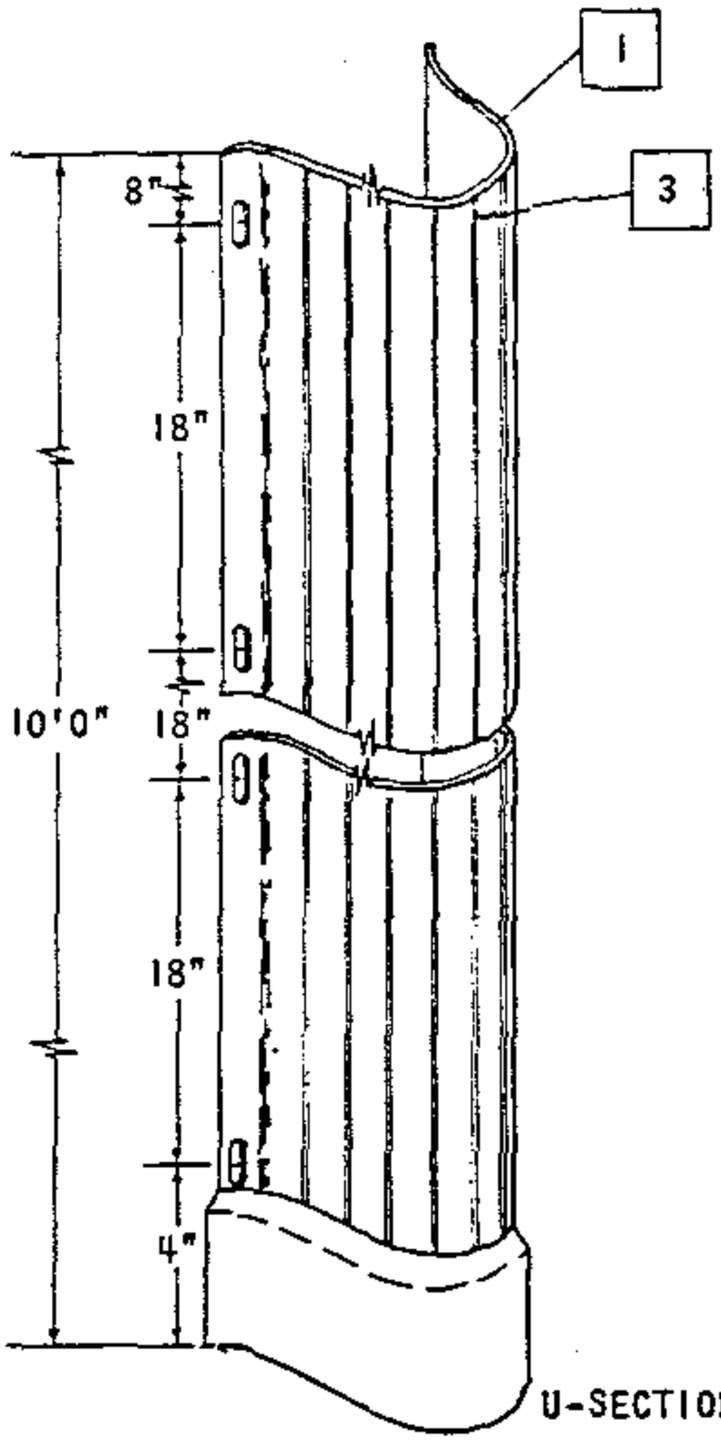
(I) SEE PAGE 1404.2/4204.2 FOR CABLE POLE RISER BILL OF MATERIAL.

(J) SEE PAGES 1405.1/4205.1 THRU 1405.3/4205.3 FOR MULTIPLE RISER INSTALLATION.

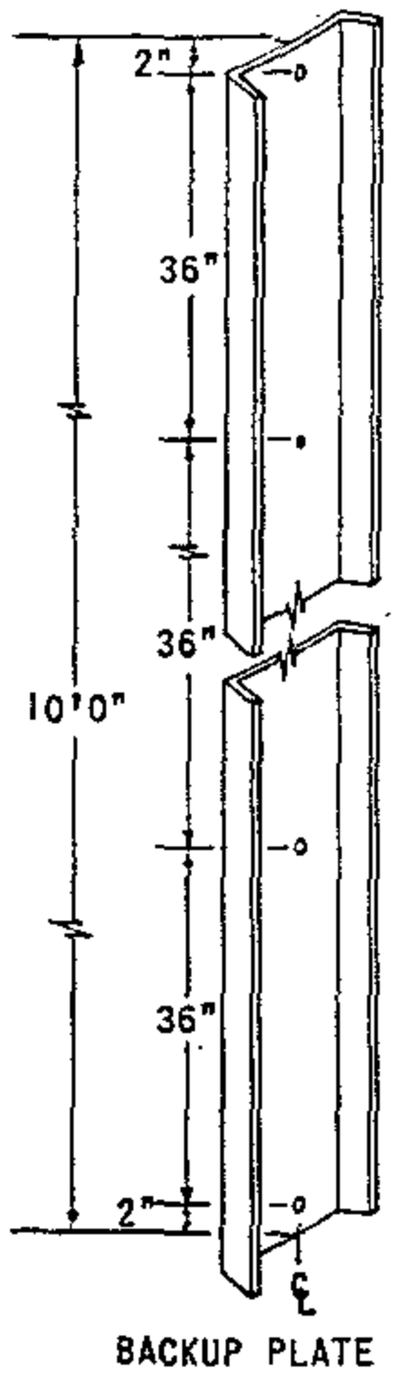
| | | |
|---|---|---|
| OH 1499.002<br>~~UG 4299.002~~<br>SUPERCEDES 4203.1 (3-2-84) | SDG&E ELECTRIC STANDARDS<br>CABLE POLE RISER INSTALLATION<br>CABLE-IN-CONDUIT | DATE 1-1-87<br>APPD JLB 12/12/86 |

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SCOPE: THIS STANDARD SHOWS THE MATERIALS AND PROCEDURES FOR TERMINATING THREE PREASSEMBLED CABLE-IN-CONDUIT ON RISER POLE.

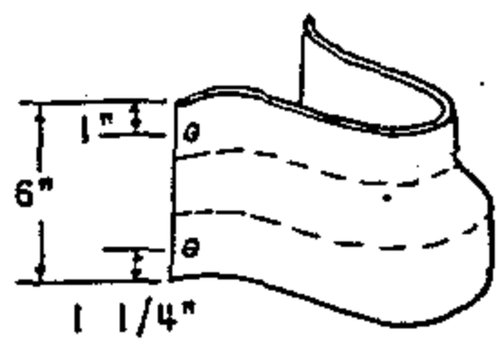



U-SECTION




BACKUP PLATE

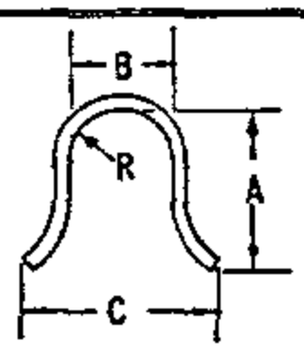
FOR FIELD MAINTENANCE ONLY

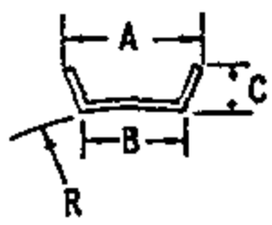


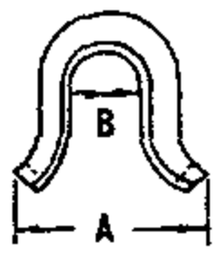

REDUCER BOOT

NOTE: DIMENSIONS A, B, & C HAVE A TOLERANCE OF ± .13".

BILL OF MATERIAL:




| | U-SECTION MOLDING | | | BACKUP PLATE | | REDUCER BOOT | | |
|---|---|---|---|---|---|---|---|---|
| SIZE | 3" | 3" | 4" | 3" | 4" | 3" TO 4" | | |
| SCHEDULE | 80 | 30 | 40 | N/A | N/A | N/A | | |
| LENGTH | 10'0" | 10'0" | 10'0" | 10'0" | 10'0" | 6" | | |
| M & S NO. | 600064 | 600032 | 600096 | 542992 | 542994 | 160608 | | |
| A | 3 3/8" | 3 3/8" | 4 1/8" | 3 1/4" | 4 1/4" | 8 1/4" | | |
| B | 3" | 3" | 4" | 2 5/8" | 3 5/8" | 2 5/8" | | |
| C | 6 1/4" | 6 1/4" | 7 1/4" | 7/8" | 1" | -- | | |
| R | 1 7/16" | 1 19/32" | 2" | 5" | 5" | -- | | |
| WALL THICKNESS | .300" | .150" | .237" | .063" | .063" | .150" | | |
| TOLERANCE | -.0" +.036" | -.0" +.020" | -.0" +.020" | ±.015" | ±.015" | -.0" +.015" | | |

SDG&E ELECTRIC STANDARDS

DATE 1-1-87
APPD J.Y.S/R.D.S.

# 3Ø CABLE POLE RISER INSTALLATION CABLE-IN-CONDUIT

~~OH 1499.003~~
~~UG 4299.003~~
SUPERCEDES 4203.2 (1-4-80)

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## SEQUENCE FOR INSPECTION

| SEQ | DESCRIPTION/DIMENSIONS | | | TOLERANCE |
|---|---|---|---|---|
| 1 | WALL THICKNESS | | | |
| | U-Sections | 3" | Sch. 80 .300 | -.0" + .036" |
| | | 3" | Sch. 30 .150" | -.0" + .020" |
| | | 4" | Sch. 40 .237" | -.0" + .020" |

Above wall thicknesses are in accordance with G.O. 95 Rule 54.6D2.

2 GENERAL APPEARANCE ALL SURFACES

U-Sections, Backup Plates and Reducer Boot — Free from warpage, cuts, blemishes and protrusions.

FOR FIELD MAINTENANCE ONLY

3 SCRIBE MARK

Scribe mark indicating minimum overlap distance should be visible 1" from the plain end of the U-Section.

BILL OF MATERIAL:

| ITEM | *QUANTITY REQUIRED | DESCRIPTION | USE BELOW 8 FT. | USE ABOVE 8 FT. | STOCK NO. OR CONST. STDS. |
|---|---|---|---|---|---|
| 1 | 3' | Riser, U-Section 4"x10' Sch. 40 | yes | no | 600096 |
| 2 | 1 | Riser, U-Section 3"x10' Sch. 80 | yes | no** | 600064 |
| 3 | 2 | Riser, U-Section 3"x10' Sch. 40 | no | yes | 600032 |
| 4 | 1 | Boot, Reducer 4" to 3" | yes | no | 160608 |
| 5 | 3 | Plate, Backup 3"x10' | yes | yes | 542992 |
| 6 | 3' | Plate, Backup 4"x10' | yes | no | 542994 |
| 7 | 1 | Screw, Lag, Sq. Head 1/2'x4" (E) | no | yes | 621568 |
| 8 | 42 | Screw, Lag, Sq. Head 1/4"x 2 1/2" (E) | yes | yes | 621856 |
| 9 | 42 | Washer, Std. Flat Round 1/4" (E) | yes | yes | 799520 |
| 10 | 46 | 6d Galvanized Nails (E) | yes | yes | — |
| 11 | 3 | Grip, Cable 5 1/4"x12" | no | yes | 394336 |

(E) Exempt Material

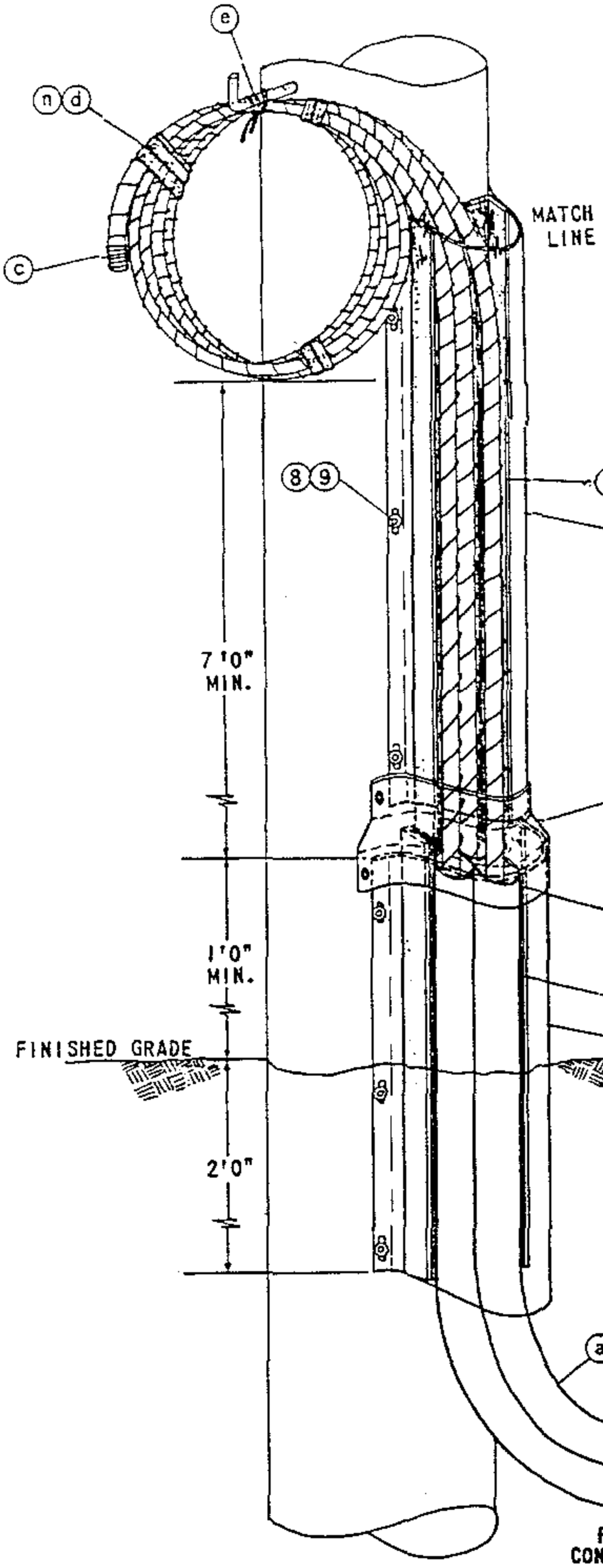
* This quantity is a typical 40' riser installation, if pole height varies from this distance adjust appropriate material accordingly.

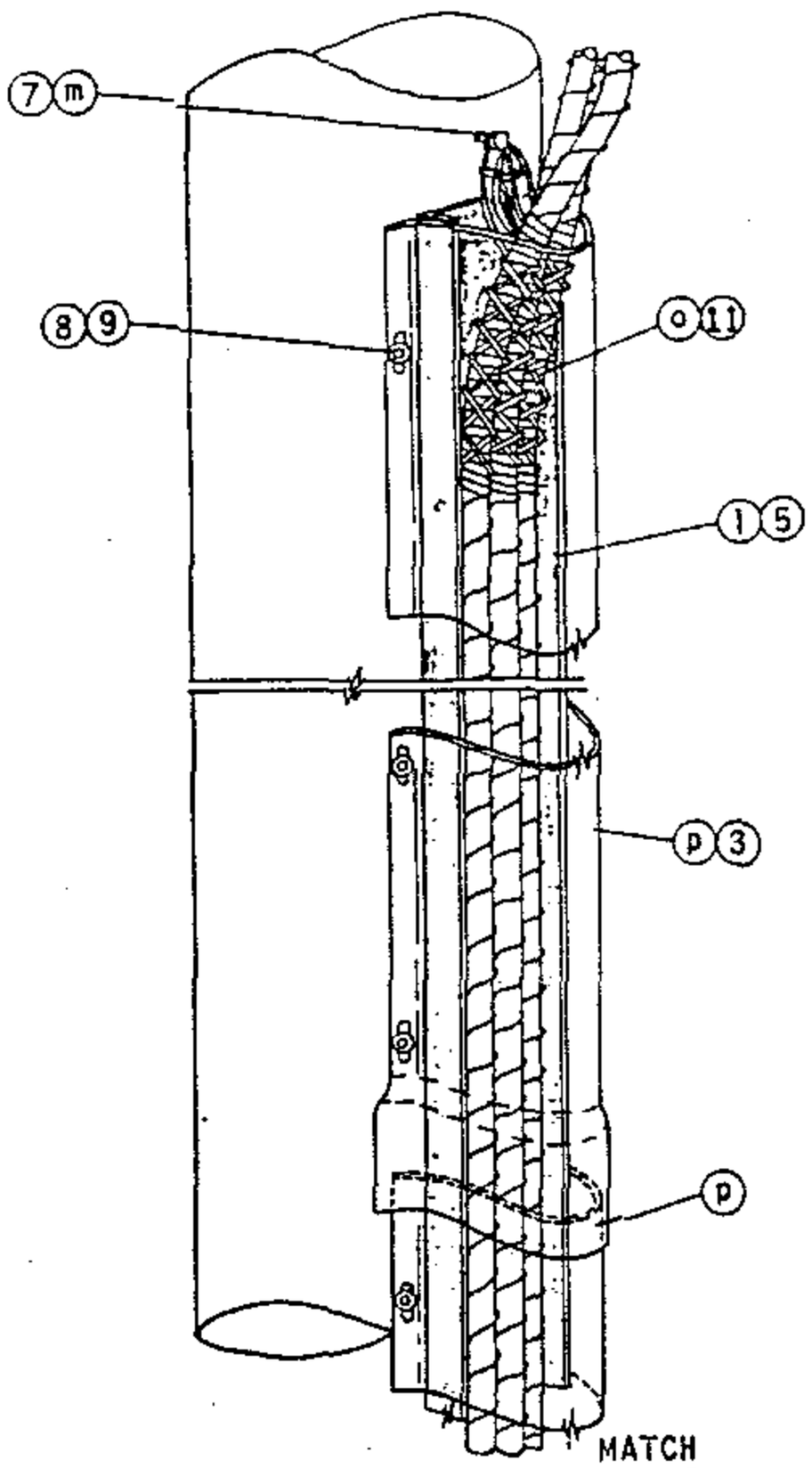
** Only excess portion of 1 - 10 ft. 3" Sch. 80 U-Section is allowed above the 8 ft. level.

| | | |
|---|---|---|
| OH 1499.004<br>~~UG 4299.004~~<br>SUPERCEDES 4203.3<br>(11-16-81) | SDG&E ELECTRIC STANDARDS<br>30 CABLE POLE RISER INSTALLATION<br>CABLE-IN-CONDUIT | DATE 1-1-87<br>APPD JLG/RDT |

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# INSTALLATION INSTRUCTIONS




NOTE: Care must be taken not to spike conductors with linemans hooks while performing installation, ascending or descending a riser pole.

FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| DATE 1-1-87<br>APPD JLS 1/12 | SDG&E ELECTRIC STANDARDS<br>3Ø CABLE POLE RISER INSTALLATION<br>CABLE-IN-CONDUIT | OH ~~1499.005~~<br>~~UG 4299.005~~<br>SUPERCEDES 4203.4<br>(1-23-80) |

FOR FIELD MAINTENANCE ONLY

## U-SECTION MOLDING LOCATION

Verify that the quadrant selected by Designer/Planner for the cable pole riser meets the following requirements. If the following requirements cannot be met, contact the Designer or Planner who requested the installation:

### Clearances

The U-section molding shall not enter climbing space per G.O. 95 Rule 22.2D. See O.H. Standard page 251 for allowable working and climbing space requirements.

Location of U-section molding in relation to TELCO and CATV (per Overhead Standards page 1402).

## U-SECTION MOLDING INSTALLATION

### Material Installation Sequence

Note: If installation can be completed sequencially, steps c, d and n, can be eliminated.

(a) Terminate PID at cable pole by forming a 36" minimum radius bend with the cable-in-conduit at the base of the pole. Provide sufficient cable-in-conduit needed to terminate cable with drip loop at terminal level before cutting cable-in-conduit from cable reel.

(b) Cut and remove excess pvc conduit from the PID run so the remaining conduit terminates 1' above finished grade. When removing excess pvc conduit, carefully slide excess conduit away from primary conductors.

(c) To prevent moisture from entering exposed conductors, always seal exposed ends of conductors with "Aquaseal" and pvc tape.

(d) Individually coil each primary conductor making sure coil is not less than 2' in diameter. Secure each coil in several places with a gray gas wrap tape to prevent conductors from uncoiling.

(e) Secure coils to the bottom of the pole step with rope to prevent conductors from damage when the pole is climbed. If pole steps are not available, install lag screws (M&S 621856) in place of pole steps. Bottom of each coil must be 8' above existing grade to prevent vandalism.

(f) Install a 3' section of 4" backup plate with 2' extended below finished grade and 1' extended above finished grade. Temporarily push conductors to one side of the riser quadrant and secure 4" backup plate to pole with 6d galvanized nails at each end and in the middle. Because holes are not provided nails must be driven through backup plate.

ⓖ Install a 3' section of 4" U-section molding over the previously installed backup plate (step f) encasing the conduits. Nail 4" U-section molding to pole every 18" using lag screws and washers, (items 8 and 9 from bill of materials).

ⓗ Install a 10' section of 3" backup plate behind primary conductors and mate to previously installed backup plate. Temporarily push conductors to one side of the riser quadrant to prevent damage to conductors. Use 6d galvanized nails to attach backup plate to pole starting and ending at each end.

ⓘ Install a 10' section of 3" U-section molding schedule 80, over previously installed backup plate (step h) encasing primary conductors. To permit thermal expansion, do not drive lag screws tight and leave approximately 1/4" gap between the 3" and 4" U-section moldings. Secure U-section molding to pole every 18" with lag screw and washers (item 8 and 9 from bill of materials).

ⓙ Install reducer boot over 3" and 4" U-section molding using 6d galvanized nails. Make sure reducer boot fits securely over each section.

FOR FIELD MAINTENANCE ONLY

ⓚ When the contractor provides trench, the area around the riser bend at base of pole must be backfilled and compacted to 90% and a distance equal to the depth of the trench by the crew to prevent damage to conductors.

ⓛ Install remaining backup plate from termination point in (step h) to elevation of pole where U-section molding will terminate. Refer to Overhead Standards page 1406 for elevation of U-section molding termination. Nail backup plate to pole with 6d galvanized nails every 18".

ⓜ Install lag screw (item 7 from bill of materials) 2" beyond termination of U-section molding for cable grip support.

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ⓝ Remove each conductor coil from pole step, and remove binding tape. Uncoil each conductor carefully to prevent bending conductor.

ⓞ Install one cable grip approximately 2' from the end of each conductor, (item 11 from bill of materials). Hoist each conductor and hang cable grip on lag screw installed by (step m) . Adjust cable grips to determine optimum support positions, tie cables temporarily to pole and slide cable grip below final position. Tape over concentric neutral at final position where grip will seat with half lapped layers of glass tape (720256) and vinyl plastic (720580) over glass tape to assure positive grip. Position cable grip over taped area and attach cable grip to lag screw installed in (step m).

ⓟ Install required amount of 3" U-section schedule 30 sections needed to cover backup plate and encase conductors to the termination point of the riser installation. Install belled end of U-section molding over a plain end of previously installed U-section molding. Line up edge of belled end with scribe mark 1" from plain end to ensure that sufficient spacing is provided between U-sections for thermal expansion. Nail U-section molding to pole with lag screws and washers (item 8 and 9 from bill of materials) every 36". Lag screws should be snug but not tight, this is also to allow thermal expansion of U-section. Additional lag screws may be needed at 18" intervals if U-section molding separates more than 1/16" away from pole.

| | | |
|---|---|---|
| DATE 1-1-87<br>APPD JLB/RDT | SDG&E ELECTRIC STANDARDS<br>3Ø CABLE POLE RISER INSTALLATION<br>CABLE-IN-CONDUIT | OH 1499.007<br>~~UG 4299.007~~<br>SUPERCEDES 4203.6<br>(6-14-83) |

MAINTENANCE REQUIREMENTS

Inspection

The U-section molding installation shall be inspected periodically for the following:

Warpage of U-Section Exposing Conductors

For Separation of U-Section Molding From Pole More than 1/16"

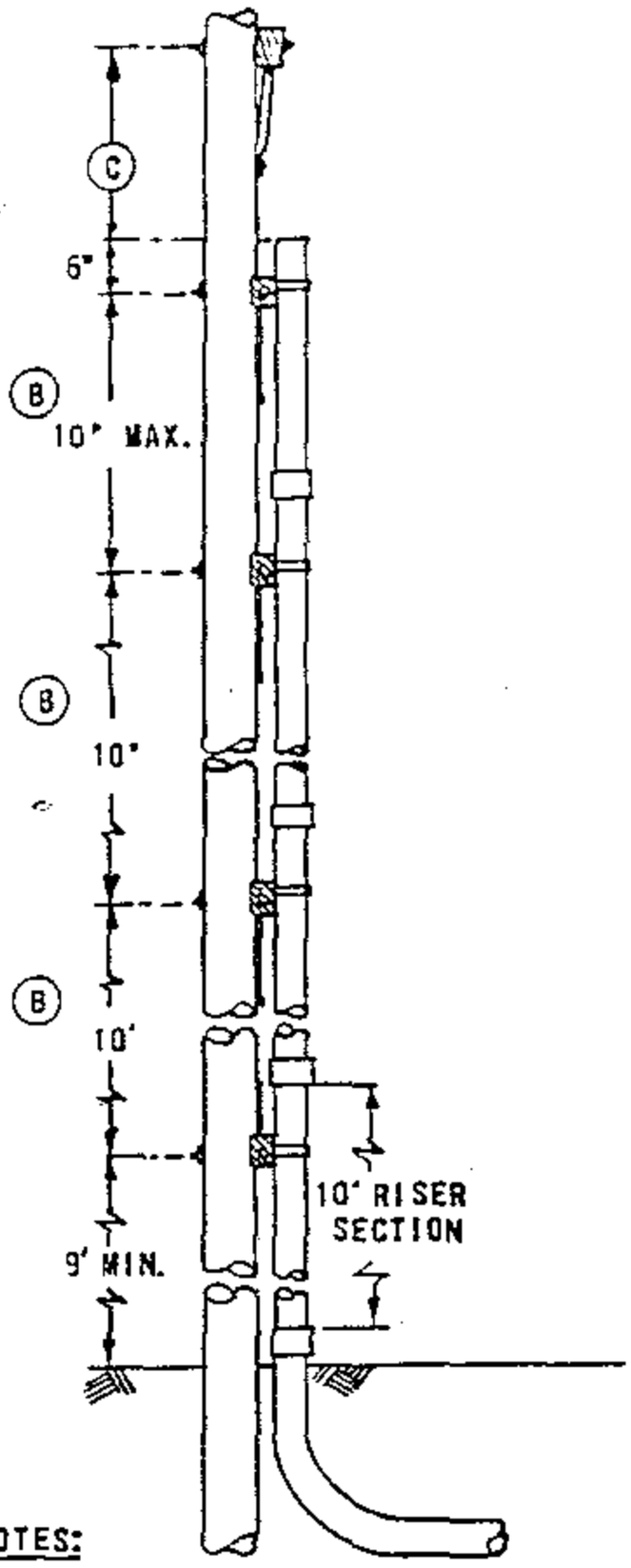
Cracks or Damage in U-Sections Which Expose Conductors

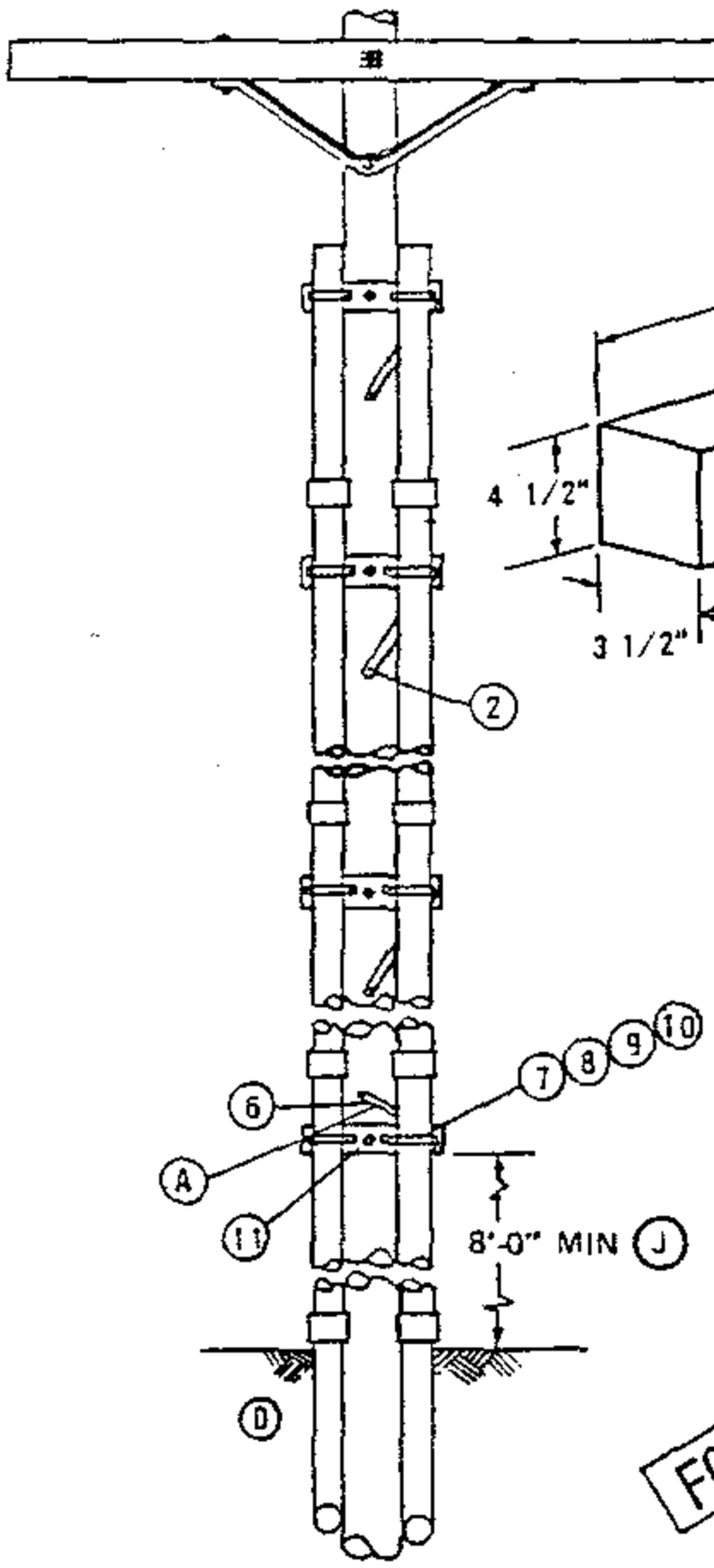
FOR FIELD MAINTENANCE ONLY

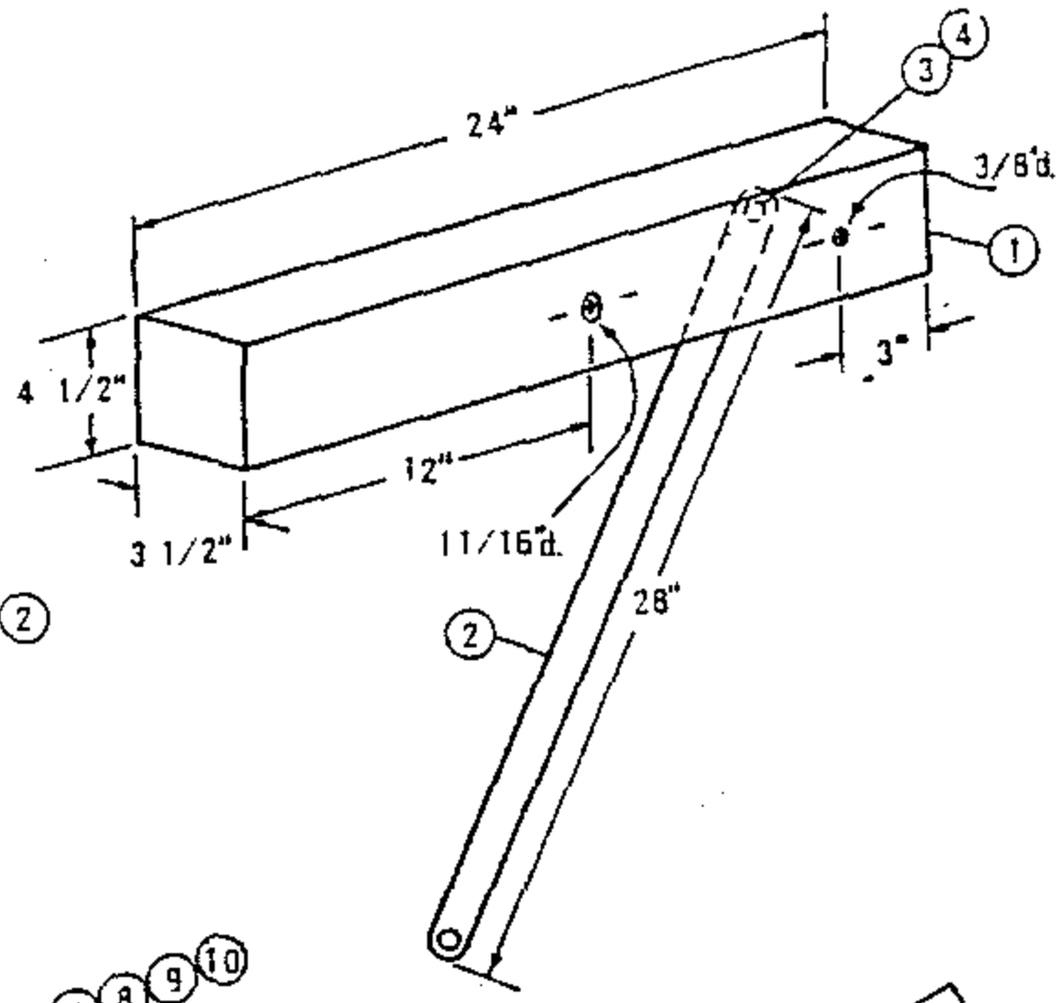
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| | | |
|---|---|---|
| OH 1499.008-<br>~~UG 4299.008~~<br>SUPERCEDES 4203.7<br>(12-23- | SDG&E ELECTRIC STANDARDS<br>3Ø CABLE POLE RISER INSTALLATION<br>CABLE-IN-CONDUIT | DATE 1-1-87<br>APPD JLB RDT |

SCOPE: THIS STANDARD SHOWS THE CONSTRUCTION USED WHEN MODIFYING AN EXISTING SINGLE RISER CABLE POLE WHERE A SECOND RISER IS ADDED.




FOR FIELD MAINTENANCE ONLY

NOTES:

- THIS CONSTRUCTION IS RESTRICTED TO A MAXIMUM OF TWO SDG&E RISERS, (PRIMARY OR SECONDARY).
- WHENEVER POSSIBLE RISERS SHOULD BE INSTALLED ON THE SIDE OF THE POLE OPPOSITE TRAFFIC FLOW.
- SPARE DUCT SHALL BE CAPPED JUST ABOVE GROUND LEVEL TO PREVENT MOISTURE ENTRY AND NOT TO BE CONSIDERED AS A RISER.

BILL OF MATERIAL:

| ITEM | | DESCRIPTION | QUANTITY | STOCK NO. OR CONST. STDS. | ITEM | | DESCRIPTION | QUANITY | STOCK NO. OR CONST. STDS. |
|---|---|---|---|---|---|---|---|---|---|
| P T & F | 1 | CROSSARM, 3-1/2" x 4-1/2" x 2'-0" | AS REQ'D. | 380.05 IT.1 | P T & F | 8 | STRAP, PIPE, 2 HOLE, GALV., 4" | AS REQ'D. | 697952 (E) |
| | 2 | BRACE, FLAT 28" | AS REQ'D. | 164192 | | 9 | STRAP, PIPE, 2 HOLE, GALV., 5" | AS REQ'D. | 697984 (E) |
| | 3 | BOLT, WASHER HEAD 3/8" X 4 1/2" | AS REQ'D. | 158528 (E) | | 10 | NAILS, FLATHEAD, STEEL GALV. 16D | AS REQ'D. | 491424 (E) |
| | 4 | WASHER, 3/8" SPRING LOCK | AS REQ'D. | 796832 (E) | | 11 | BOLT, MACH. GALV., 5/8" X (LENGTH AS REQ'D), 2-SQ. WASH 1-OBL COIL WASH | AS REQ'D. | PG. 392.1 392.2 (E) |
| | 5 | | | | | | | | |
| | 6 | SCREW, LAG 1/2" X 4" | AS REQ'D. | 621568 (E) | | | | | |
| | 7 | STRAP, PIPE, 2 HOLE, GALV., 3" | AS REQ'D. | 697920 (E) | | | | | |

INSTALLATION:

(A) LADDER ARMS TO BE INSTALLED BY U.G. CREWS. MOUNT LOWEST ARM NO LOWER THAN 9 FEET AND INSTALL THE FLAT BRACE ABOVE THE FIRST ARM AS SHOWN.
(B) INSTALL AT LEAST ONE BRACKET FOR EACH JOINT OF CONDUIT.
(C) 48 INCHES MINIMUM FOR 350 OR LARGER UG CABLE, 30 INCHES MINIMUM FOR 2/0 AND SMALLER CABLE. THIS DIMENSION APPLIES TO THE TRIPLE TERMINATOR BRACKET AS WELL AS CROSSARMS.
(D) EXCAVATION MIGHT BE REQUIRED AROUND EXISTING RISER TO FACILITATE THE INSTALLATION OF LADDER ARMS.
(E) EXEMPT MATERIAL.

REFERENCE:

F. SEE PAGE 1402.1/4202.1 FOR POSITION OF RISERS INVOLVING MORE THAN ONE UTILITY.
G. POLES ARE TO BE STEPPED PER STANDARD 363.
H. SEE PAGE 1404.1 FOR INSTALLATION OF ONE CABLE RISER.
I. PVC RISERS ARE NOT PERMITTED WITHIN THE CLIMBING SPACE PER G.O. 95 RULE 22.2C.
(J) RISERS OF PLASTIC PIPE SHALL BE EPC-80-PVC SCHEDULE 80, WITH A MINIMUM NORMAL PIPE SIZE OF 2-1/2 INCHES, FROM THE GROUND LINE TO A LEVEL NOT LESS THAN 8 FEET ABOVE THE GROUND LINE PER G.O. 95 RULE 54-6-E.

DATE 1-1-87
APPD J.LB / RDT

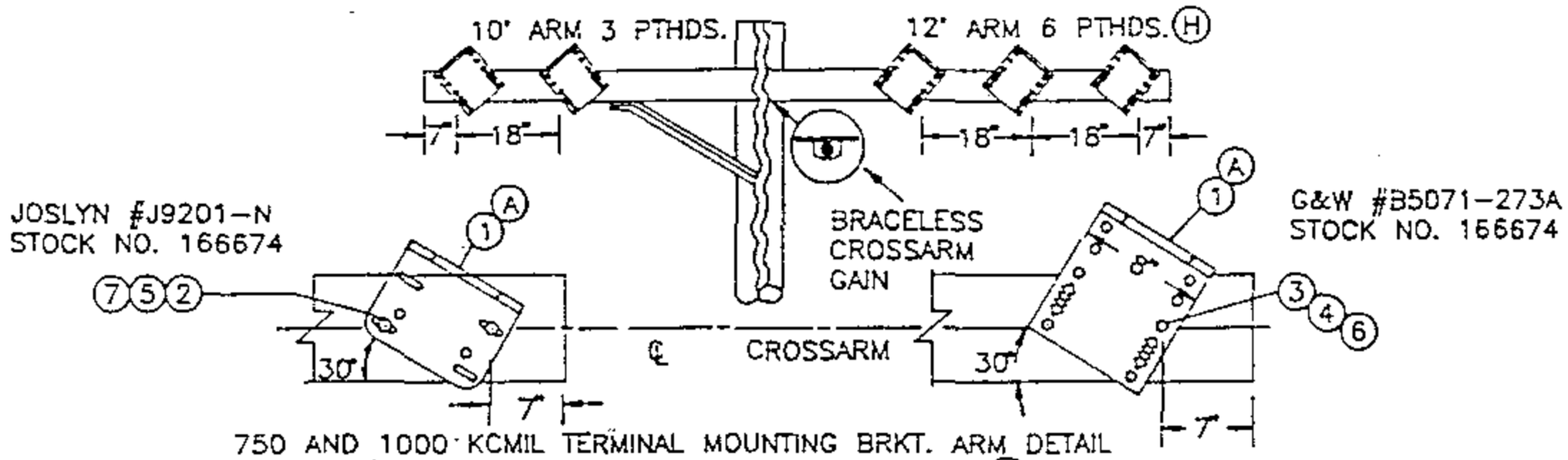
SDG&E ELECTRIC STANDARDS

# 3Ø CABLE POLE RISER INSTALLATION MODIFICATION FROM SINGLE TO DOUBLE RISER FOR EXISTING CABLE POLES

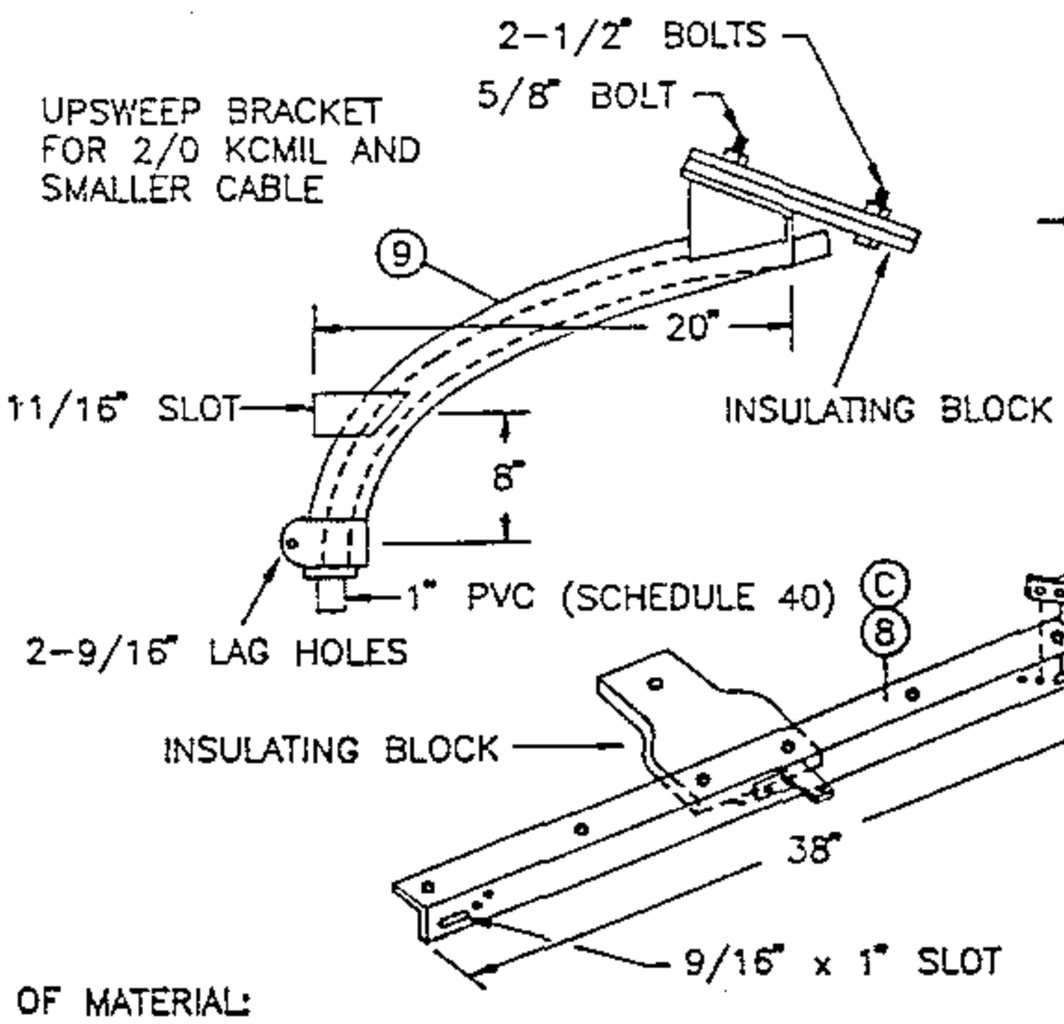
OH 1499.009
~~UG 4299.009~~
SUPERCEDES 4205.1
(6-14-83)

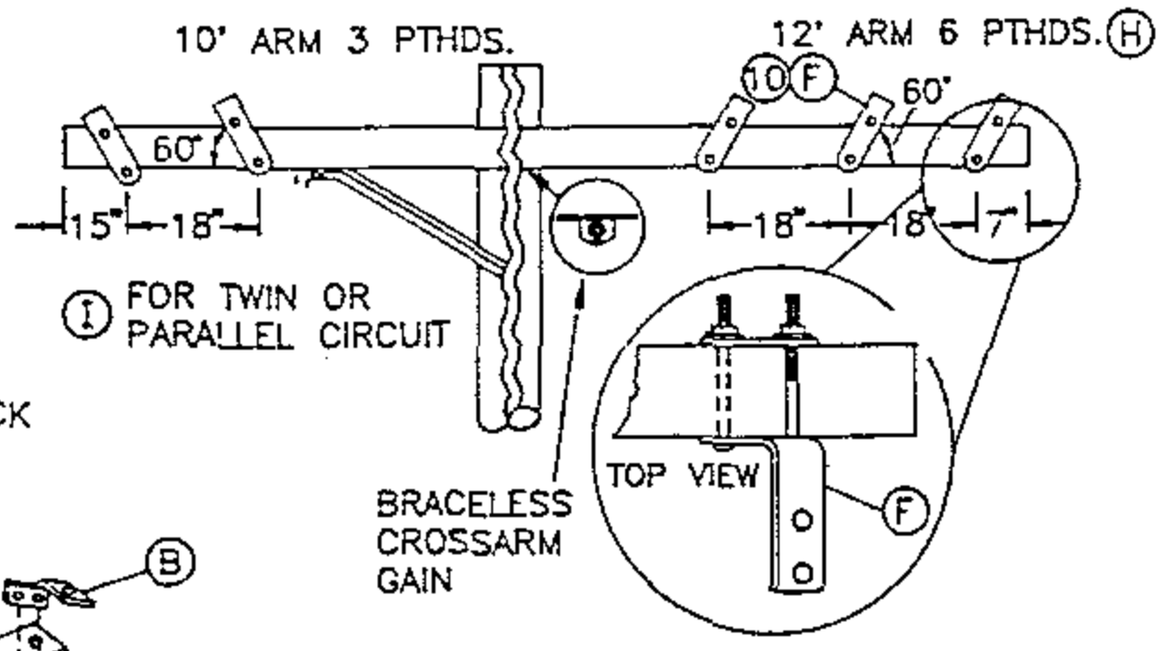
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SCOPE: THIS STANDARD SHOWS VARIOUS METHODS OF CABLE TERMINATION BRACKETS USED TO CONNECT UNDERGROUND CABLES TO OVERHEAD CONDUCTORS.




750 AND 1000 KCMIL TERMINAL MOUNTING BRKT. ARM DETAIL
(REQUIRED FOR CONTAMINATION DISTRICT 1) (G)




350 KCMIL TERMINAL MOUNTING BRKT. ARM DETAIL
(REQUIRED FOR CONTAMINATION DISTRICT 1)

FOR FIELD MAINTENANCE ONLY

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD | ASSEMBLY UNITS |
|---|---|---|---|---|
| 1 | BRACKET, POTHEAD MOUNTING | 3 OR 6 | 166674 | P-X-BK |
| 2 | BOLT, MACHINE, GALV. 1/2" x 5" (E) | 2 | 153024 | - |
| 3 | BOLT, MACHINE, GALV. 3/8" x 5" (E) | 2 | 154368 | - |
| 4 | WASHER, 3/8" ROUND (E) | 4 | 800288 | - |
| 5 | WASHER, 1/2" ROUND (E) | 4 | 800192 | - |
| 6 | WASHER, 3/8" DBL COIL (E) | 2 | 798528 | - |
| 7 | WASHER, 1/2" DBL COIL (E) | 2 | 798464 | - |
| 8 | BRACKET TRIPLE TERMINAL (C) | 1 | 166676 | (OVERHEAD) TTB |
| 9 | BRACKET GALV. TERMINAL UPSWEEP | 1 | 166856 | (OVERHEAD) USB |
| 10 | BRACKET, CROSSARM TERMINAL | 3 OR 6 | 166060 | - |

INSTALLATION:

(A) HOLES IN ARM FOR POTHEAD MOUNTING BRACKETS ARE DRILLED BY OVERHEAD CREWS.
(B) THREE OF THESE BRACKETS ARE SUPPLIED WITH THE TRIPLE TERMINAL BRACKET (ITEM 8).
(C) THIS CONSTRUCTION TO BE USED ONLY FOR CABLE SIZES 2/0 AND BELOW.
(E) EXEMPT MATERIAL.
(F) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX. 60° ANGLE.

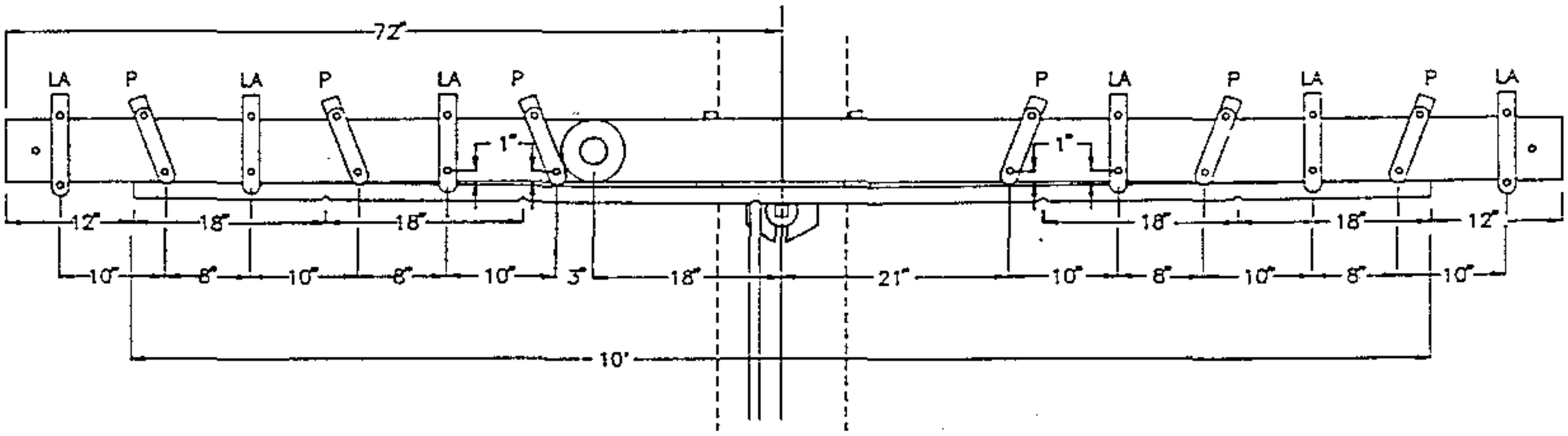
REFERENCE:

(G) FOR CONSTRUCTION IN CONTAMINATION DISTRICTS 2 AND 3, SEE STANDARD 1407.2/4207.2.
(H) SEE STANDARD 1407.2/4207.2 FOR TERMINAL AND LIGHTNING ARRESTER DETAIL.
(I) SEE STANDARD 1442.1/4242.1 FOR 3-350 KCMIL POTHEADS ON A 10 FOOT CROSSARM.

| | | |
|---|---|---|
| OH 1499.010<br>~~UG 4299.010~~<br>SUPERCEDES<br>1407.1 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>CABLE POLE TERMINAL MOUNTING INFORMATION<br>(PORCELAIN TERMINATIONS)<br>(FOR CONTAMINATION DISTRICT 1) | DATE 1-1-93<br>APPD JLB/LDG |

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12' ARM 6 PTHS AND 6 ARRESTORS




350 KCMIL TERMINAL AND LIGHTNING ARRESTER BRACKETS MOUNTING DETAIL

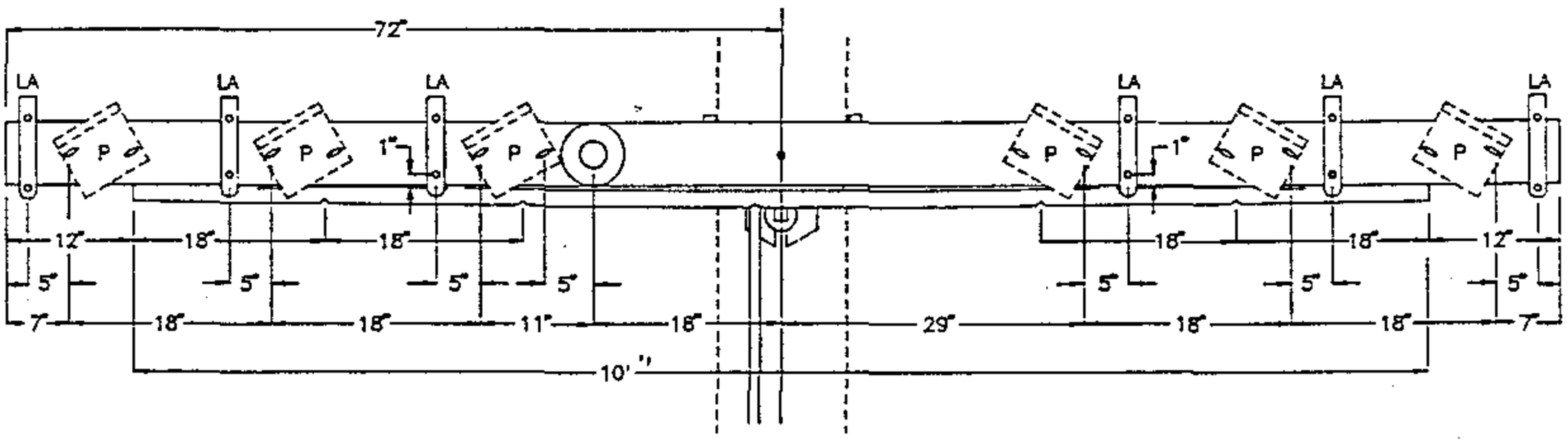
P=POTHEAD BRACKET

LA=LIGHTNING ARRESTER BRACKET

FOR FIELD MAINTENANCE ONLY

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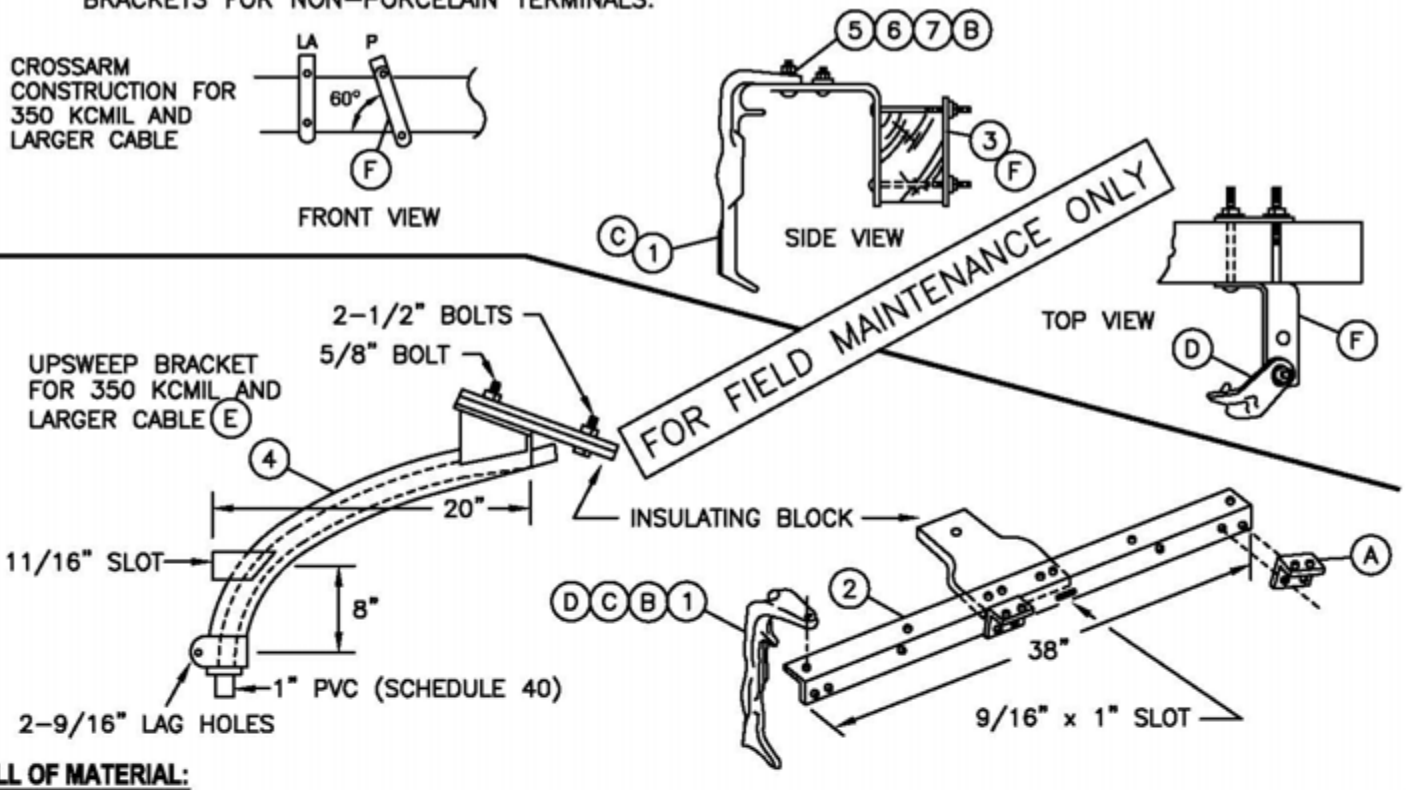
12' ARM 6 PTHS AND 6 ARRESTORS




750 AND 1000 KCMIL TERMINAL AND LIGHTNING ARRESTER BRACKETS MOUNTING DETAIL

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLB/RDJ | SDG&E ELECTRIC STANDARDS<br>CABLE POLE TERMINAL MOUNTING INFORMATION<br>(PORCELAIN TERMINATIONS)<br>(FOR CONTAMINATION DISTRICT 1) | OH 1499.011<br>~~UG 4299.011~~<br>SUPERCEDES<br>1407.2 (1-1-93) |

**SCOPE:** THIS STANDARD SHOWS VARIOUS METHODS OF INSTALLING CABLE TERMINATING MOUNTING BRACKETS FOR NON–PORCELAIN TERMINALS.




**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|
| 1 | BRACKET, MOUNTING CS 820 | 3 OR 6 | 4111 | 166064 | NP–BKT |
| 2 | BRACKET, TRIPLE TERMINAL (E) | 1 | – | 166676 | (OVERHEAD) TTB |
| 3 | BRACKET, CROSSARM TERMINAL | 3 OR 6 | – | 166060 | (OVERHEAD) 2/0BKT |
| 4 | BRACKET, TERMINAL UPSWEEP, GALV (E) | 1 | – | 166856 | (OVERHEAD) USB |
| 5 | BOLT, MACHINE, GALV 1/2" x 2" | 3 OR 6 | 392.1 | 152832 | |
| 6 | WASHER, ROUND 1/2" | 3 OR 6 | 392.2 | 800192 | |
| 7 | WASHER, SPRING LOCK 1/2" | 3 OR 6 | 392.2 | 796768 | |

**NOTES:**

– PORCELAIN TERMINALS (POTHEADS) ARE REQUIRED IN SUBSTATIONS (ALL DISTRICTS). SEE NOTE (I).

**INSTALLATION:**

(A) THREE BRACKETS ARE SUPPLIED WITH THE TRIPLE TERMINAL BRACKET.

(B) CS 820 MOUNTING BRACKETS SHALL BE BOLTED TO THE TOP OF THE TRIPLE TERMINAL BRACKET OR CROSSARM TERMINAL BRACKET.

(C) FOLLOW MANUFACTURES INSTRUCTIONS FOR SECURING CABLE TO MOUNTING BRACKET.

(D) MOUNTING BRACKET CS 820 TO BE POSITIONED TO CONFIRM WITH THE LAY OF THE CABLE.

(E) THESE ITEMS FIELD MAINTENANCE ONLY.

(F) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX 60 ANGLE.

**REFERENCE:**

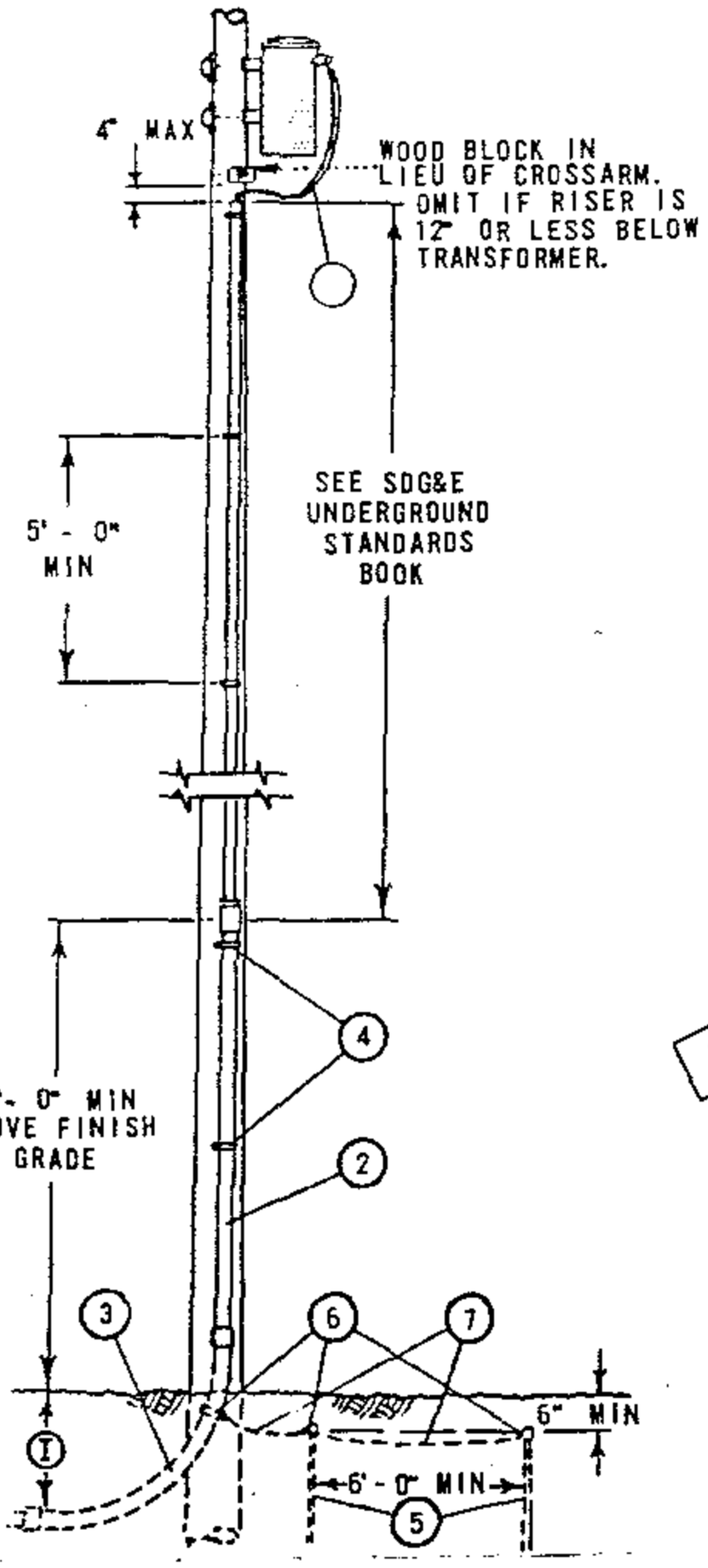
H. SEE STD. 4111 FOR OUTDOOR CABLE TERMINALS, FOR POLYETHYLENE CABLES.

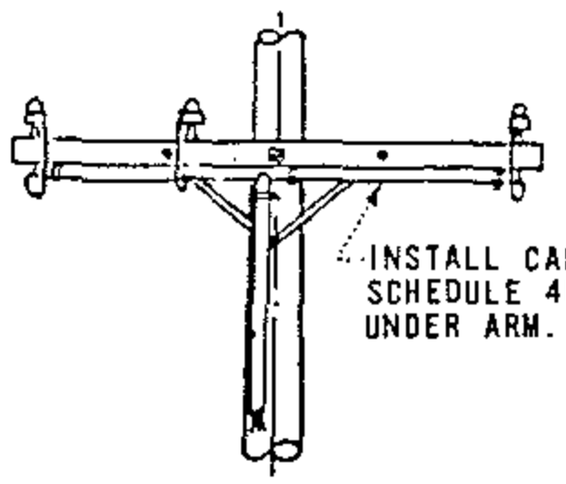
(I) SEE STD. PG. 1499.010/4299.010 FOR PORCELAIN MOUNTING BRACKETS.

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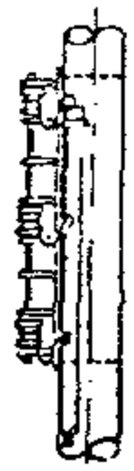
| | | |
|---|---|---|
| OH 1499.012<br>UG 4299.012<br>SUPERSEDES<br>1407 (1–1–94) | SDG&E ELECTRIC STANDARDS<br>CABLE POLE TERMINAL MOUNTING INFORMATION<br>(NON–PORCELAIN TERMINALS) | DATE 1–1–94<br>APPD JLG/RDS |

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CROSSARM CONSTRUCTION



RACK CONSTRUCTION

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) SEE PAGE 7404 /4204 FOR RISER CONSTRUCTION.

(B) CUSTOMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM SERVICE EQUIPMENT TO SECONDARY OR TRANSFORMER TERMINALS AND SHALL BE OF A LENGTH SUFFICIENT TO FORM DRIP LOOPS AT THE TOP OF THE RISER. CONTRACTOR SHALL IDENTIFY SERVICE ENTRANCE CONDUCTORS WITH CODING OR TAGGING FOR PURPOSE OF PARALLELING PHASES AND NEUTRALS. MAXIMUM SIZE OF EACH CONDUCTOR, SINGLE OR PARALLELED RUNS, SHALL NOT EXCEED 500 KCM.

(C) WHEN ITEMS 2 AND 3 ARE SCHEDULE 80 PVC OMIT ITEMS 5, 6, AND 7. (SEE SDG&E UNDERGROUND STANDARDS BOOK)

(D) OMIT ITEMS 5, 6, AND 7 WHERE CUSTOMER'S UNDERGROUND CONDUIT RUN IS AN APPROVED METALLIC CONDUIT.

(F) OMIT ITEM 5, AND 7 WHERE #6 BARE COPPER BONDING WIRE IS INSTALLED BETWEEN ITEMS 3 AND CUSTOMER'S SERVICE, ENTRANCE EQUIPMENT.

(G) USE TWO ROD GROUND SPACED A MINIMUM OF 6 FEET APART.

H. APPROVED METALLIC CONDUIT OR #6 BARE COPPER BONDING WIRE SHALL BE GROUNDED AT THE SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(I) 18" MIN DEPTH ON PRIVATE AND PUBLIC PROPERTY OTHER THAN STREETS AND ALLEYS. 24" MIN DEPTH ACROSS STREETS AND ALLEYS. 24" MIN TO BE MAINTAINED CONTINUOUSLY WHERE DUCTS TRAVERSE BOTH STREETS (AND ALLEYS) AND PRIVATE PROPERTY. 24" MIN DEPTH FOR NON-METALLIC CONDUITS.

MATERIAL FURNISHED AND INSTALLED BY CUSTOMER

| ITEM | DESCRIPTION (A) | |
|---|---|---|
| 1 | CUSTOMER'S SERVICE ENTRANCE CONDUCTORS | (B) |
| 2 | CONDUIT, GALV. IRON RIGID RISER | (C) |
| 3 | CONDUIT, GALV IRON BEND, 90°, 36" RADIUS | (C) |
| 4 | STRAP, PIPE GALV, 2-10D GALV NAILS | |
| 5 | RODS, 5/8" X 8' - 0" COPPERCLAD STEEL GROUND | (D) (F) (G) |
| 6 | CLAMPS, APPROVED TYPE GROUNDING | (D) |
| 7 | WIRE, #6 BARE STRANDED COPPER | (D) (F) |
| | | |

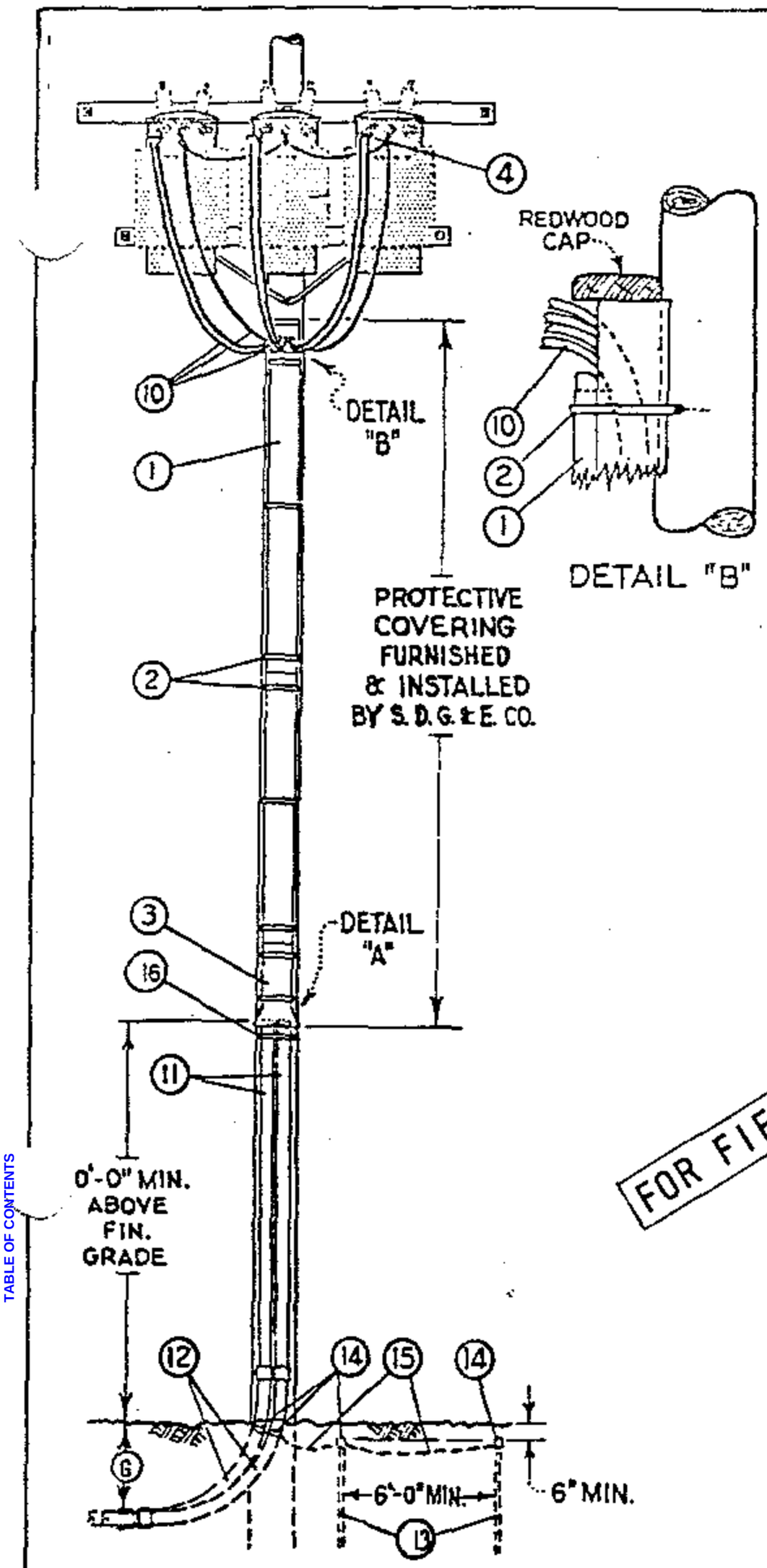
OH 1499.101
~~UG 4299.101~~
SUPERSEDES
1415 (11-16-81)

SDG&E ELECTRIC STANDARDS

0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, ONE DUCT

DATE 11-16-81
APPD JEY

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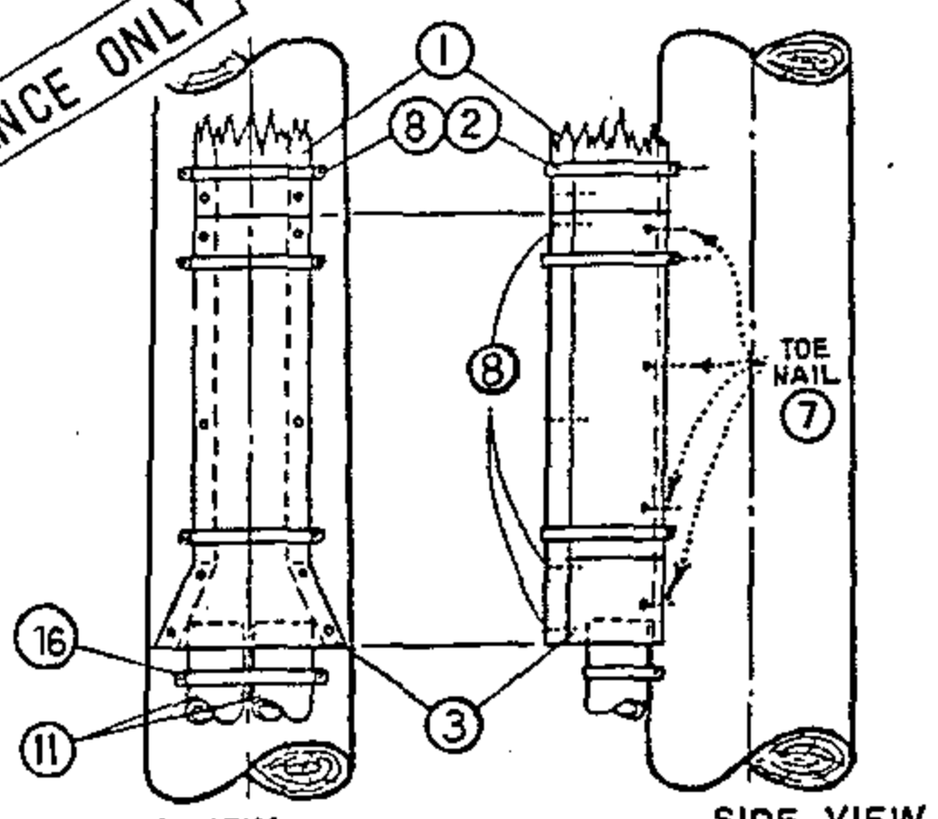



| MATERIAL FURNISHED AND INSTALLED BY SDG&E | | | |
|---|---|---|---|
| ITEM | DESCRIPTION | QUANT. | STOCK NO. OR CONSTR STD |
| 1 | REDWOOD BOX MOULDING, SIZE AS REQUIRED | 16' | PG 143 |
| 2 | MOULDING STRAPS, SIZE AS REQ'D | 6 | PG 143 |
| 3 | REDWOOD MOULDING BASE FOR 5¼"X6⅜", INSIDE DIMENSIONS, RDWD. BOX MOULDING | AS REQ'D | PG 143 |
| 4 | MULTIPLE TAP CONNECTORS, 2 LUG | AS REQ'D | PG 793 |
| | | | |
| | | | |
| 7 | BOX NAILS, GALV., 10D | ½# | 491392 |
| 8 | BOX NAILS, GALV., 16D | ½# | 491424 |
| | | | |

QUANTITIES SHOWN ARE BASED ON A 45' POLE AND TRANSFORMER SECONDARIES CONNECTED 120-208Y. WYE.

| MATERIAL FURNISHED AND INSTALLED BY CUSTOMER (A) | | |
|---|---|---|
| 10 | CUSTOMER'S SERVICE ENTRANCE CONDUCTORS (B) | SEE SDG&E UNDERGROUND STANDARD BOOK |
| 11 | G.I. RIGID CONDUIT RISERS | |
| 12 | G.I. RIGID CONDUIT BENDS, 90°, 36" RADIUS | |
| 13 | 5/8"DIAM. X 8'-0" COPPERCLAD STEEL GRND. RODS (C)(D)(E) | |
| 14 | APPROVED TYPE GROUNDING CLAMPS (C) | |
| 15 | #6 BARE STRANDED COPPER GROUND WIRE (C)(D) | |
| 16 | HEAVY PLUMBERS TAPE, HOT-DIP GALVANIZED | |

FOR FIELD MAINTENANCE ONLY




DETAIL "A"

REQUIRED FOR 2-3½" OR 4" DIAM. G.I. RISERS

NOTES:

(A) SEE SDG&E UNDERGROUND STANDARDS BOOK FOR CABLE CONDUIT SIZING INFORMATION.

(B) CUSTOMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM SERVICE EQUIPMENT TO TRANSFORMER TERMINALS AND SHALL BE OF A LENGTH SUFFICIENT TO FORM DRIP LOOPS AT THE TOP OF THE RISER. CONTRACTOR SHALL IDENTIFY SERVICE ENTRANCE CONDUCTORS WITH CODING OR TAGGING FOR PURPOSE OF PARALLELING PHASES AND NEUTRALS. MAXIMUM SIZE OF EACH CONDUCTOR, SINGLE OR PARELLELED RUNS, SHALL NOT EXCEED 500 KCM

(C) OMIT ITEMS 13, 14, AND 15 WHERE CUSTOMER'S UNDERGROUND CONDUIT RUN IS AN APPROVED METALLIC CONDUIT.

(D) OMIT ITEM NUMBERS 13 AND 15 WHERE #6 BARE COPPER BONDING WIRE IS INSTALLED BETWEEN ITEM 12 AND CUSTOMER'S SERVICE ENTRANCE EQUIPMENT.

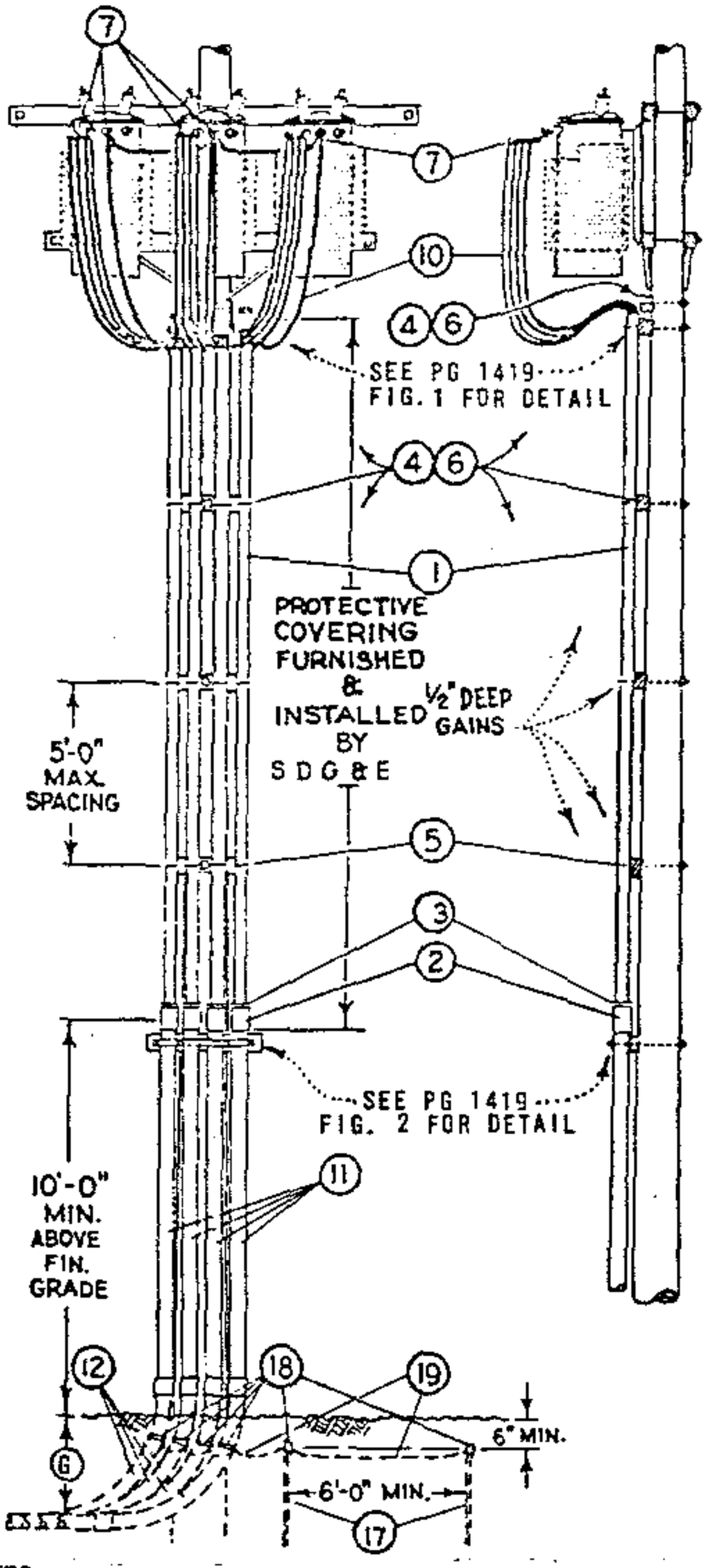
(E) USE TWO ROD GROUND.

F. APPROVED METALLIC CONDUIT OR #6 BARE COPPER BONDING WIRE SHALL BE GROUNDED AT THE SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(G) 18" MIN DEPTH ON PRIVATE AND PUBLIC PROPERTY OTHER THAN STREETS AND ALLEYS. 24" MIN DEPTH ACROSS STREETS AND ALLEYS. 24" MIN TO BE MAINTAINED CONTINUOUSLY WHERE DUCTS TRAVERSE BOTH STREETS (AND ALLEYS) AND PRIVATE PROPERTY. 24" MIN DEPTH FOR NON-METALLIC CONDUITS.

| | | |
|---|---|---|
| DATE 11-16-81<br>APPD JEY | SDG&E ELECTRIC STANDARDS<br>0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, TWO DUCTS | 1499.102<br>SUPERSEDES<br>1417 (11-16-81) |

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| MATERIAL FURNISHED AND INSTALLED BY SDG&E | | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | QUANTITY NO. OF RISERS 3 | QUANTITY NO. OF RISERS 4 | STOCK NO. OR CONSTR STD 3" | STOCK NO. OR CONSTR STD 4" |
| ⊙1 | 3" OR 4" DIAM. PLASTIC CONDUIT, PVC TYPE II, SCHEDULE 40, 20' LENGTHS | 60' | 80' | 251552 | 251584 |
| ⊹2 | COUPLINGS, PLASTIC, SIZE AS REQUIRED | 3 | 4 | 280448 | 280480 |
| ⊙3 | BUSHINGS, PLASTIC, 4"OR 3½"X3" DIAM. FOR REDUCING CUSTOMER'S CONDUIT RISERS, WHERE REQUIRED | 3 | 4 | 3 1/2" X 3" 181024, 4" X 3" - 181056 | |
| 4 | RISER SUPPORT BLOCKS, 3½"x4½"x2'-0" | 5 | 5 | PG 1419 IT. 4 | |
| 5 | "J" BOLT, 1 SQ WASHER | 12 | 16 | PGS 139, 140 | |
| 6 | MACH. BOLT, GALV., ⅝"x16"-20", 2 SQ. WASHERS & 1 NUT | 5 | 5 | PGS 139, 140 | |
| 7 | MULTIPLE TAP CONNECTORS, SPECIFY NUMBER OF LUGS | 6 | 6 | PG 793 | |

⊙ QUANTITIES SHOWN ARE BASED ON A 45' POLE AND TRANSFORMER SECONDARIES CONNECTED 120/208 V WYE.

⊹ UNTHREADED FOR SLIP FIT OVER RIGID CONDUIT RISER.

| MATERIAL FURNISHED AND INSTALLED BY CUSTOMER | | |
|---|---|---|
| ITEM | DESCRIPTION (A) | STOCK NO. |
| 10 | CUSTOMER'S SERVICE ENTRANCE CONDUCTORS (B) | SEE SDG&E UNDERGROUND STANDARD BOOK |
| 11 | G.I. RIGID CONDUIT RISERS | |
| 12 | G. I. RIGID CONDUIT BENDS, 90°, 36" RADIUS | |
| 13 | SPACER BLOCK | |
| 14 | STRAP, GALV | |
| 15 | FOUR ½"X 9" MACH. BOLTS, GALV., 1 RD. WASHER | |
| 16 | ONE ⅝"X 20" MACH. BOLT, GALV., 2 - 2" SQ. WASHERS | |
| 17 | ⅝"X 8'-0" COPPERCLAD STEEL GROUND RODS (C) (D) (E) | |
| 18 | APPROVED TYPE GROUNDING CLAMPS (C) | |
| 19 | #6 BARE STRANDED COPPER GROUND WIRE (C) (D) | |

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) SEE UNDERGROUND STANDARDS BOOK FOR CABLE CONDUIT SIZING INFORMATION.

(B) CUSTORMER'S SERVICE ENTRANCE CONDUCTORS SHALL RUN CONTINUOUSLY WITHOUT SPLICES FROM SERVICE EQUIPMENT TO TRANSFORMER TERMINALS AND SHALL BE OF A LENGTH SUFFICIENT TO FORM DRIP LOOPS AT THE TOP OF THE RISER. CONTRACTOR SHALL IDENTIFY SERVICE ENTRANCE CONDUCTORS WITH CODING OR TAGGING FOR PURPOSE OF PARALLELING PHASES AND NEUTRALS. MAXIMUM SIZE OF EACH CONDUCTOR, SINGLE OR PARALLELED RUNS, SHALL NOT EXCEED 500 KCM.

(C) OMIT ITEM 17, 18, AND 19 WHERE CUSTOMER'S UNDERGROUND CONDUIT RUN IS AN APPROVED METALLIC CONDUIT.

(D) OMIT ITEM 17, AND 19 WHERE #6 BARE COPPER BONDING WIRE IS INSTALLED BETWEEN ITEM 12 AND CUSTOMER'S SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(E) USE TWO ROD GROUND.

F. APPROVED METALLIC CONDUIT OR #6 BARE COPPER BONDING WIRE SHALL BE GROUNDED AT THE SERVICE ENTRANCE IN ACCORDANCE WITH REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITY.

(G) 18" MIN DEPTH ON PRIVATE AND PUBLIC PROPERTY OTHER THAN STREETS OR ALLEYS. 24" MIN DEPTH ACROSS STREETS AND ALLEYS. 24" MIN TO BE MAINTAINED CONTINUOUSLY WHERE DUCTS TRAVERSE BOTH STREETS (AND ALLEYS) AND PRIVATE PROPERTY. 24" MIN DEPTH FOR NON-METALLIC CONDUITS.

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| 1499.103 SUPERSEDES 1418 (11-16-81) | SDG&E ELECTRIC STANDARDS<br>0-750V CUSTOMER OWNED UNDERGROUND SERVICE FROM AN OVERHEAD LINE, THREE AND FOUR DUCTS | DATE 11-16-81 APPD JED |
|---|---|---|

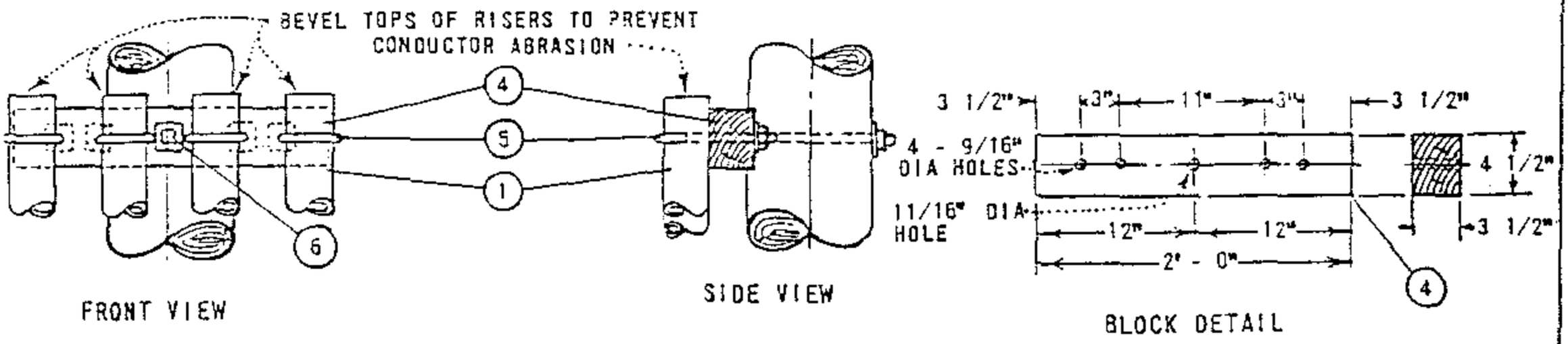
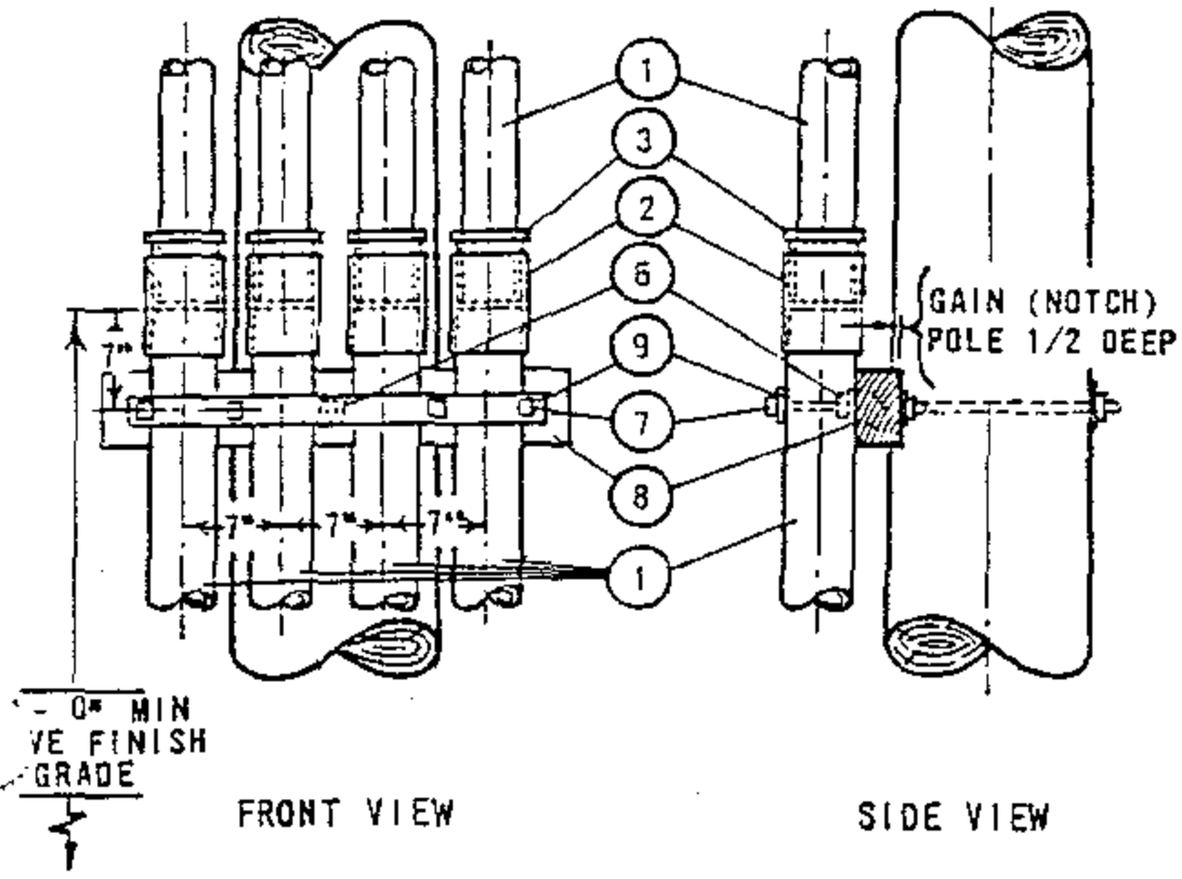



FIGURE 1
PLASTIC PIPE RISER SUPPORT DETAILS



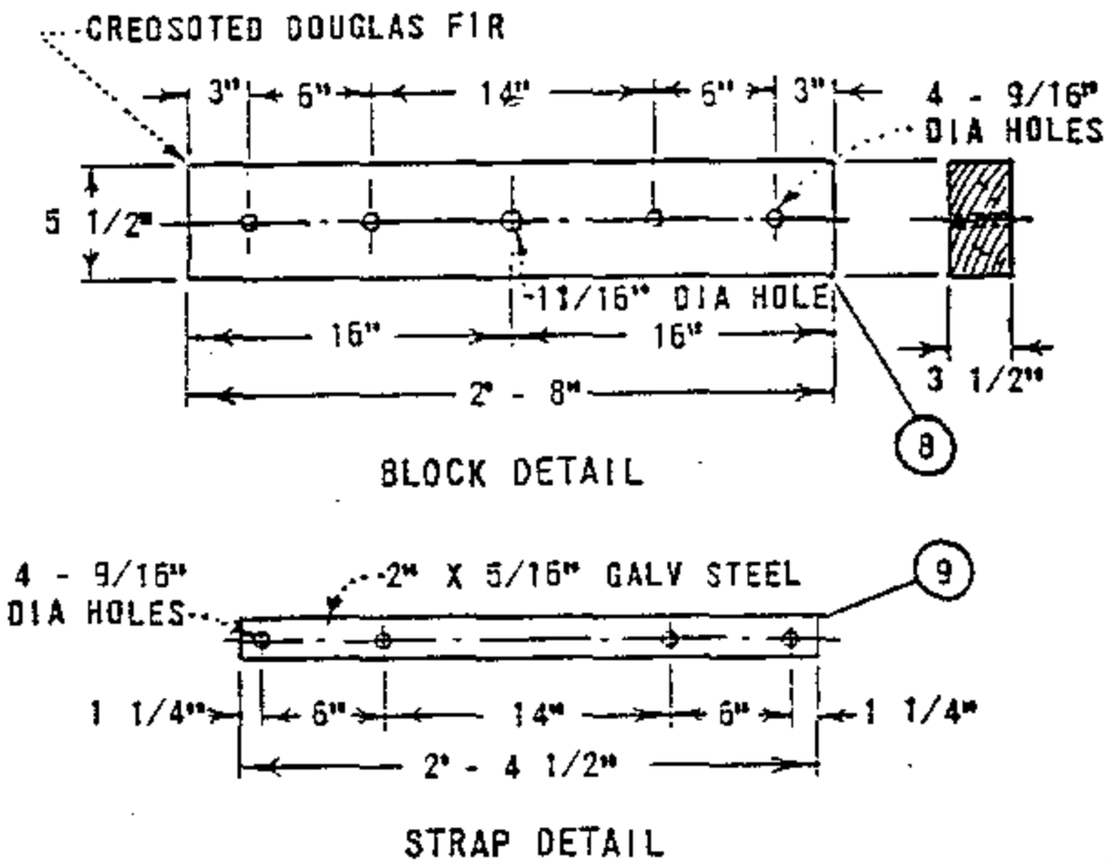




FIGURE 2
GALVANIZED PIPE RISER SUPPORT DETAIL

FOR FIELD MAINTENANCE ONLY

NOTES:

A. SEE UNDERGROUND STANDARDS BOOK FOR CABLE, CONDUIT SIZING INFORMATION.

(E) EXEMPT MATERIALS.

| ITEM | DESCRIPTION | QUANTITY NUMBER OF RISERS 3" | QUANTITY NUMBER OF RISERS 4" | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | CONDUIT, PVC SIZE AS REQUIRED | AS REQ'D | | 3" - 251552, 4" - 251584 |
| 2 | COUPLINGS, PLASTIC SIZE AS REQ'D | AS REQ'D | | 3" - 280448, 4" - 280480 |
| 3 | BUSHINGS, PLASTIC REDUCER 3 1/2" OR 4" X 3" | 3 | 4 | 3½" - 181024, 4" - 573408 |
| 4 | BLOCKS, RISER SUPPORT (SEE FIGURE 1) | 1 | 1 | - |
| 5 | BOLT, 'J' 1 SQ WASH. | 3 | 4 | PGS 140, 144 |
| 6 | BOLT, MACH 5/8" X __"; 2 - 2" SQ WASH. (E) | 1 | 1 | PGS 139, 140 |
| 7 | BOLT MACH 1/2" X 9", 1 RD WASH. (E) | 3 | 4 | 153184, 800192 |
| 8 | BLOCK, SPACER (SEE FIGURE 2) | 1 | 1 | - |
| | STRAP, GALV STEEL (SEE FIGURE 2) | 1 | 1 | - |

SDG&E ELECTRIC STANDARDS

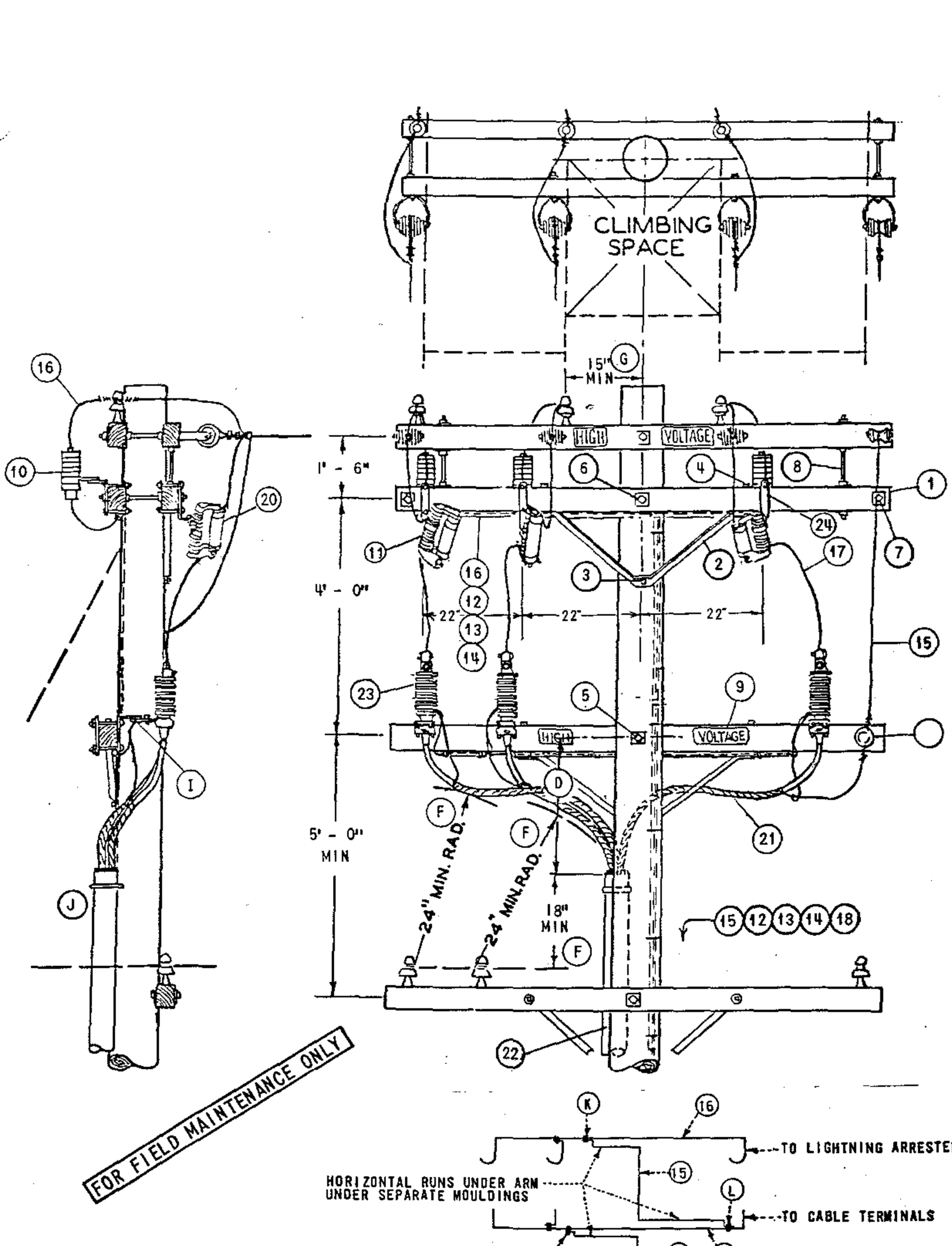
DATE 1-1-87
APPD JLS/RDL

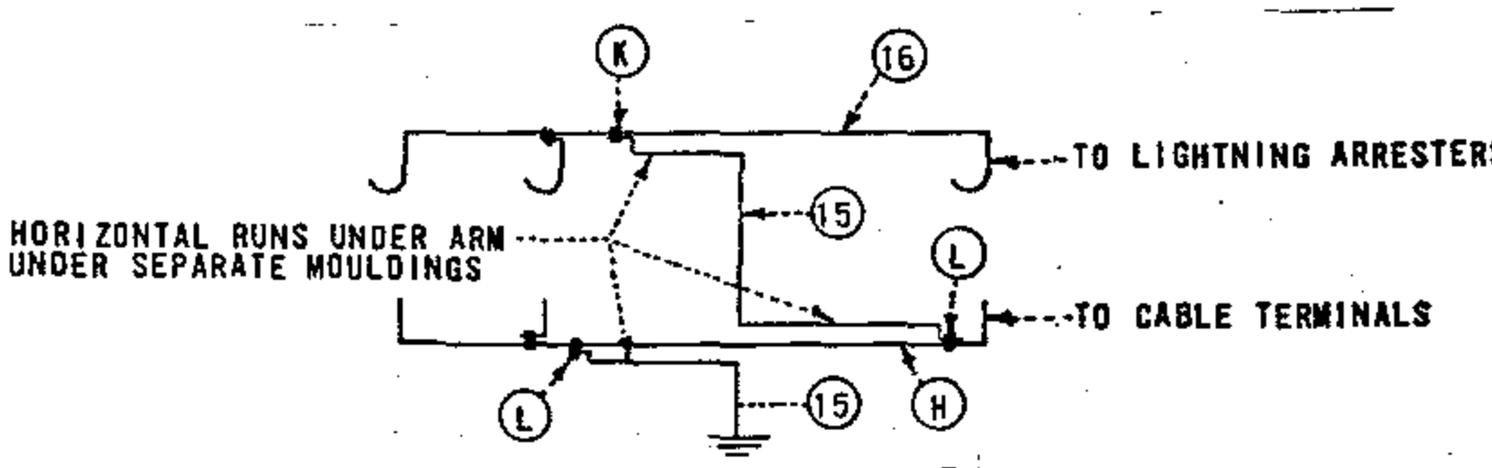
0-750 VOLT THREE AND FOUR DUCT RISER SUPPORTS

OH 1499.104
~~UG 4299.104~~
SUPERCEDES 4219
(5-22-75)

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GROUND WIRE DETAIL (B)

| | | |
|---|---|---|
| DATE 8-27-82<br>APPD DRH | SDG&E ELECTRIC STANDARDS<br>CROSSARM MOUNTED TERMINALS 4KV 4 WIRE WYE | OH 1499.201<br>~~UG 4299.201~~<br>SUPERSEDES<br>1428.1 (11-16-81) |

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING

(B) INTERCONNECT ARRESTER GROUND LEAD DISCONNECTS WITH #6 BARE COPPER AND GROUND IT WITH #2 BARE COPPER NEAR CENTER ARRESTER.

(C) USE TWO GROUND RODS SPACED A MINIMUM OF 6' APART.

(D) 3 FOOT MINIMUM DIMENSION, 4 FOOT DIMENSION PREFERRED FOR 750 KCM AND LARGER 15KV CABLE.

(E) EXEMPT MATERIAL.

(F) G.O. 95 MINIMUM DIMENSION.

(G) G.O. 95 MINIMUM DIMENSION FOR 4KV. USE 18" MIN IF BUILT WITH 15KV CABLE.

(H) USE #2 BARE STRANDED COPPER OR LARGER AS REQUIRED.

(I) CONNECT NEUTRAL, TERMINAL AND SHIELDED CABLE GROUNDS TO LIGHTNING ARRESTER GROUND.

(J) INSTALL RISER ON FACE OF POLE OPPOSITE CLIMBING SPACE AND IN A POSITION NEAREST THE END OF ARM ON WHICH THE TWO 4KV PHASES ARE LOCATED.

(K) CONNECT #2 BARE STRANDED COPPER CONDUCTOR TO #6 BARE STRANDED COPPER CONDUCTOR AT POINT NEAR CENTER LIGHTNING ARRESTER.

(L) CONNECT #2 BARE STRANDED COPPER CONDUCTOR TO REQUIRED CONDUCTOR AT POINT NEAR CENTER TERMINAL AND END TERMINAL.

FOR FIELD MAINTENANCE ONLY

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| ITEM | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| PTF | 1 | CROSSARM, 3 3/4" X 5 3/4" X 10' - 0" | 3 | 300 SECTION |
| | 2 | BRACE, ANGLE CROSSARM 4' - 0" | 2 | 164032 |
| | 3 | SCREW, LAG GALV, 5/8" X 5" (E) | 2 | 621600 |
| | 4 | BOLT, MACH GALV, 1/2" X 7", 1 RD WASH. & 1 DBL COIL WASH. (E) | 4 | PGS 139, 140 |
| | 5 | BOLT, MACH GALV, 5/8" X 14", 2 - 3" SQ WASH. & 1 DBL COIL WASH. (E) | 1 | PGS 139, 140 |
| | 6 | BOLT, MACH GALV, 5/8" X 20", 2 - 3" SQ WASH. & 1 DBL COIL WASH. (E) | 1 | PGS 139, 140 |
| | 7 | BOLT, SPACE GALV, 5/8" X 20", 4 SQ WASH. & 4 DBL COIL WASH. (E) | 2 | PGS 139, 140 |
| | 8 | BOLT, SPACE GALV, 5/8" X 28", 4 SQ WASH. & 4 DBL COIL WASH. (E) | 2 | PGS 139, 140 |
| | 9 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS (E) | 1 | 647648, 492224 |
| UCD | 10 | ARRESTER, LIGHTNING 3KV | 3 | 113216 |
| | 11 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1200 SECTION |
| | 12 | STAPLES, FENCE GALV, 1 1/4" (A) (E) | 25 | 678528 |
| | 13 | MOULDING, HARDWOOD 1" (A) | 55' | 487200 |
| | 14 | STAPLES, MOULDING GALV, 3" X 1 1/16" X 1/4" (A) (E) | 25 | 678560 |
| | 15 | WIRE, #2 BARE STRANDED COPPER (B) | 44' | 813664 |
| | 16 | WIRE, #6 BARE STRANDED COPPER (B) | 18' | 813536 |
| | 17 | WIRE, COPPER, SIZED PER U.G. CABLE AMPACITY. | 8' | 81 |
| | 18 | ROD & CLAMP, GROUND (A) (C) | 2 | 603072, 230016 |
| | 19 | INSULATOR, 4KV WIRE HOLDER | 1 | 413792 |
| | 20 | FUSE, CURRENT-LIMITING SIZE AS SPECIFIED ON WORK ORDER | 3 | 1200 SECTION |
| | 21 | CABLE, POLYETHYLENE, CONCENTRIC NEUTRAL PRIMARY | AS REQ'D | SEE UG. STDS |
| | 22 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 SECTION |
| | 23 | TERMINAL CABLE | 3 | UG BOOK |
| | 24 | BRACKET, CUTOUT /ARRESTER CROSSARM MOUNTING (E) | 3 | 166070 |
| | 25 | | | |

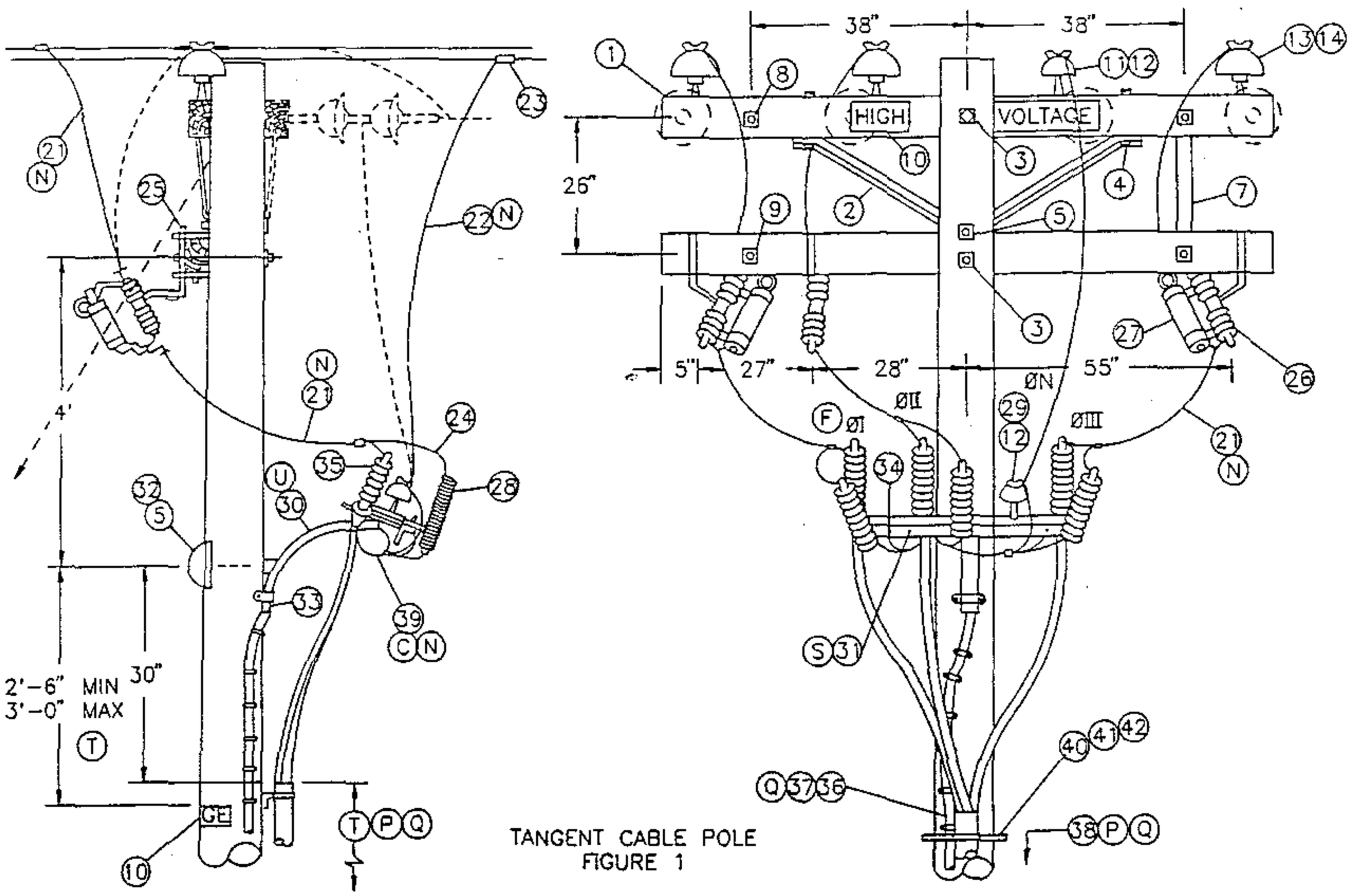
OH 1499.202
~~UG 4299.202~~
SUPERSEDES
1428.2 (11-16-81)

SDG&E ELECTRIC STANDARDS

# CROSSARM MOUNTED TERMINALS 4KV 4 WIRE WYE

DATE 8-27-82
APPD

SCOPE: THIS STANDARD SHOWS TANGENT LINE (FIG.1) AND DEAD-END CONSTRUCTION (FIG.2) FOR 12.47 KV AND BELOW, 3Ø CABLE POLE WITH UPSWEEP BRACKET MOUNTED TERMINALS FOR #2/0 AND SMALLER UG CABLE.

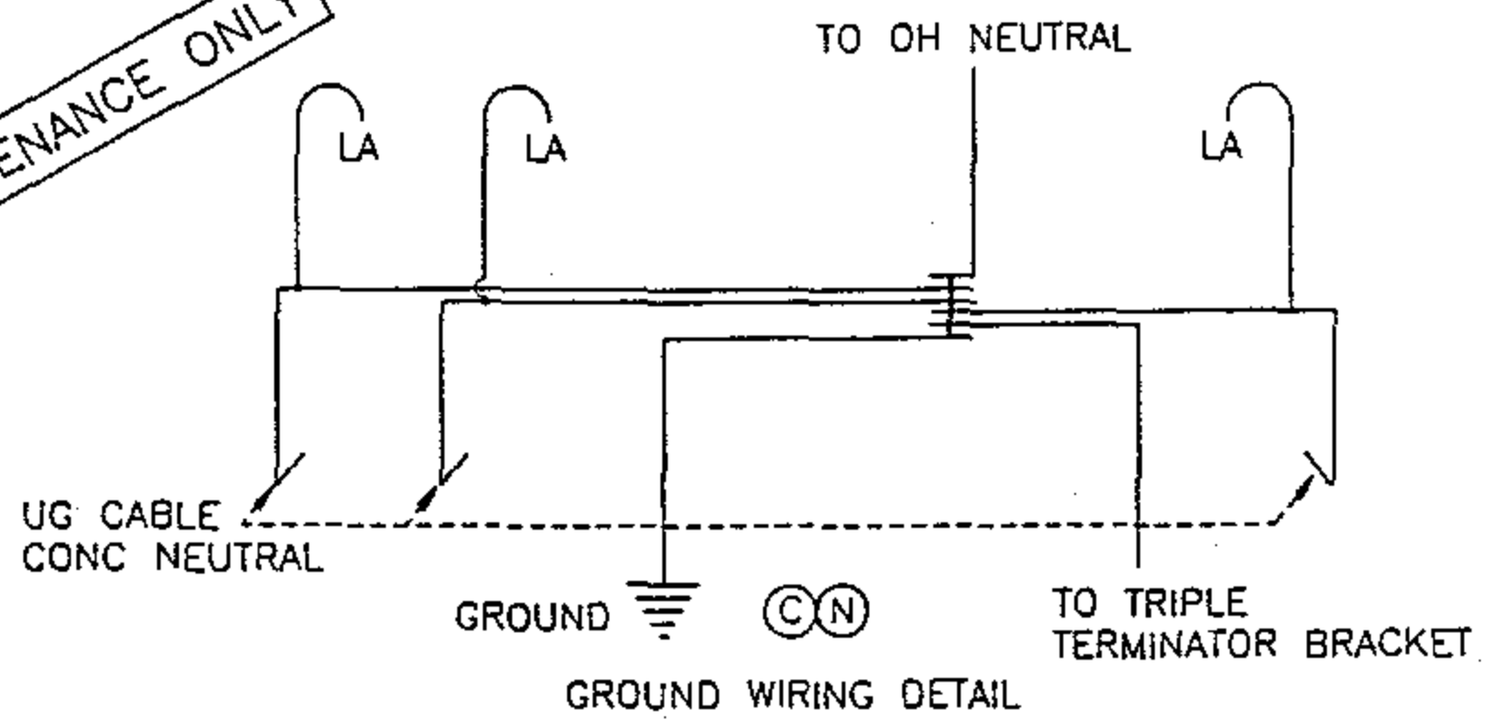



TANGENT CABLE POLE
FIGURE 1

NOTE:

- TANGENT CABLE POLE (FIG.1) OR DEAD-END CABLE POLE (DOTTED LINE) IS TO BE USED WHEN FURTHER LINE EXTENSION IS EXPECTED.
- DO NOT USE THIS UPSWEEP BRACKET CONSTRUCTION FOR 4KV, 3Ø CABLE POLE. INSTEAD, USE STANDARD 1439/4239.

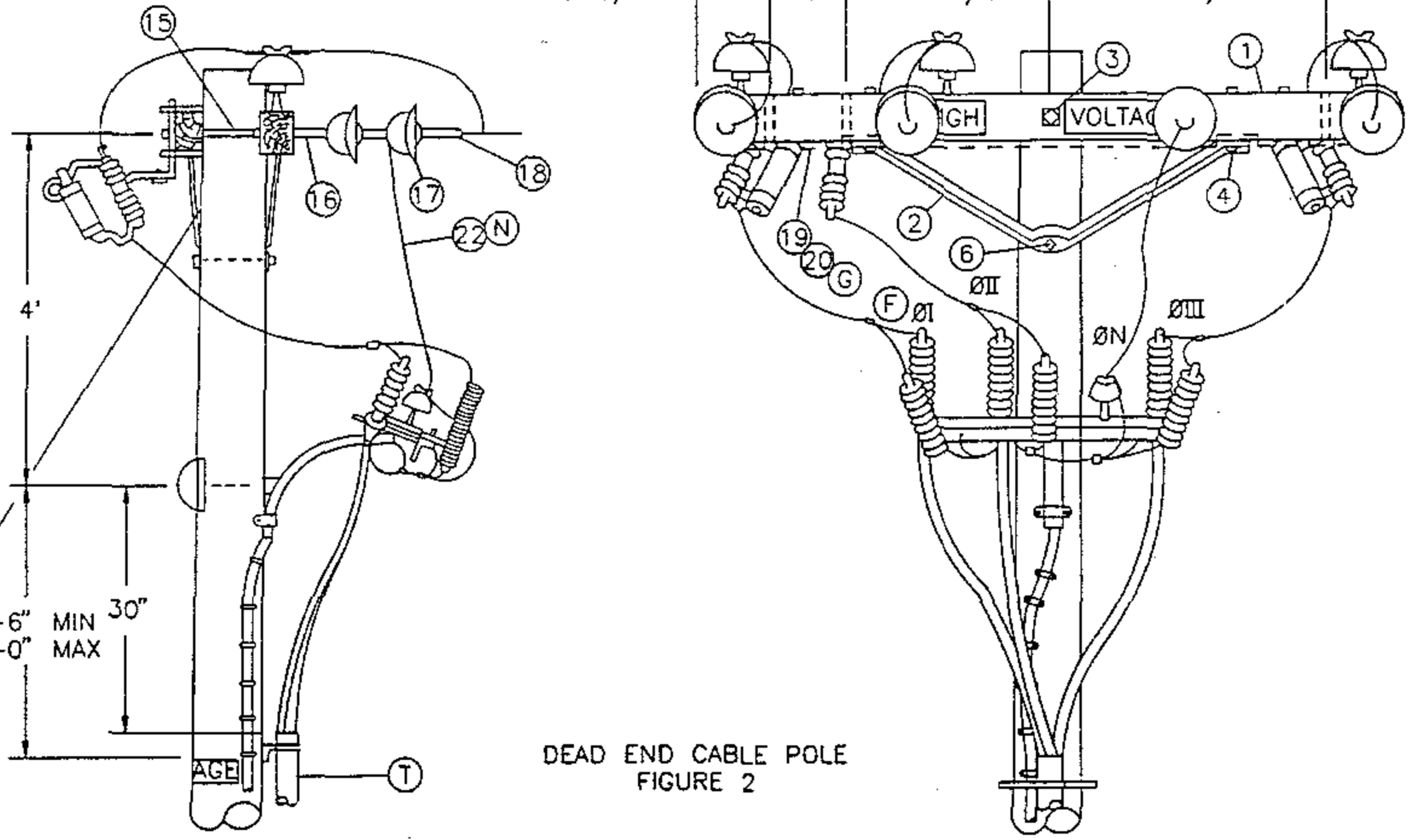
FOR FIELD MAINTENANCE ONLY




GROUND WIRING DETAIL

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLB/BDJ | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW 3Ø CABLE POLE 1/C PER Ø, UPSWEEP BRACKET CONSTRUCTION | OH 1499.203<br>~~UG 4299.203~~<br>SUPERCEDES<br>1429.1 (1-1-93) |

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DEAD END CABLE POLE
FIGURE 2

NOTE:

- DEAD END CABLE POLE (FIG.2) IS TO BE USED ONLY WHEN NO FURTHER LINE EXTENSION OR NO RECONDUCTORING IS EXPECTED.

FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| OH 1499.204<br>~~UG 4299.204~~<br>SUPERCEDES<br>1429.2 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW 3Ø CABLE POLE 1/C PER Ø<br>UPSWEEP BRACKET CONSTRUCTION | DATE 1-1-93<br>APPD JVG/DDJ |

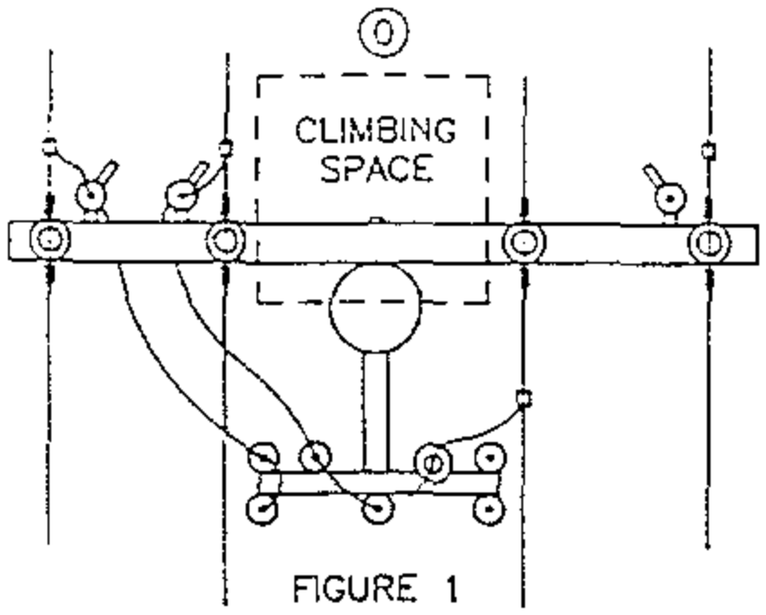



FIGURE 1

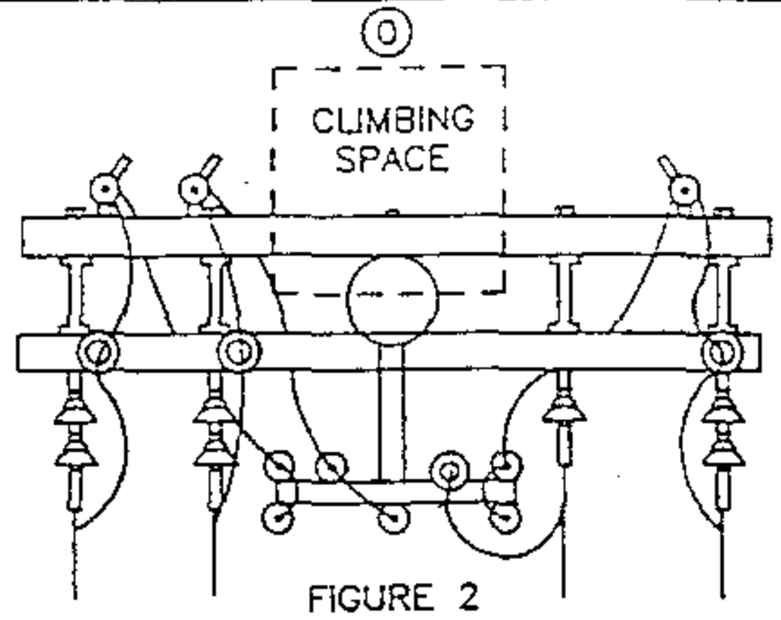



FIGURE 2

CLIMBING SPACE

FOR FIELD MAINTENANCE ONLY

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY FIG.1 | QUANTITY FIG.2 | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 10'-0" | 2 | 2 | – | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 5' | 1 | 2 | – | 164128 |
| 3 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 1 | 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 4 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 2 | 1 | 392 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 DOUBLE COIL SPRING WASHER (E) | – | 1 | 392 | – |
| 7 | BRACE, FLAT, CROSSARM, 28" (E) | 2 | – | – | 164192 |
| 8 | BOLT, MACH, GALV, 3/8" X (LENGTH AS REQ'D), 1 ROUND & 1 SPRING WASHER (E) | 2 | – | 392 | – |
| 9 | BOLT, MACH, GALV, 1/2" X (LENGTH AS REQ'D), 1 ROUND & 1 DOUBLE COIL SPRING WASHER (E) | 2 | – | 392 | – |
| 10 | SIGN, HIGH VOLTAGE AND (E) | 3 | 3 | – | 647648 |
| | 9 ROOFING NAILS, GALV (E) | AS REQ'D | | – | 492224 |
| 11 | PIN, INSULATOR, STRAIGHT, 12KV, 1" LEAD THREAD (D) (E) | 1 | – | – | 532704 |
| 12 | INSULATOR, LINE, 12KV, NEUTRAL (D) (E) | 2 | 1 | – | 429216 |
| 13 | PIN, INSULATOR, STRAIGHT, 12KV, 1" OR (E) | 3 | 3 | – | 532704 |
| | 1-3/8" LEAD THREAD (E) | 3 | 3 | – | 532448 |
| 14 | INSULATOR, LINE, 12KV, 1" OR 1-3/8" PIN (E) | 3 | 3 | 750 | – |
| 15 | BOLT, SPACE, 5/8" X (LENGTH AS REQ'D) 3 SQ, 2 RD, 2 DOUBLE COIL SPRING WASHERS & 1 NUT (D) (E) | – | 4 | 392 | – |
| 16 | CLEVIS, DEAD END, 5/8" BOLT, STEEL (D) (E) | – | 4 | – | 235712 |
| 17 | INSULATOR, SUSPENSION, 12KV, CLEVIS (D) | – | 7 | 750 | – |
| 18 | CLAMP, STRAIGHT LINE, D.E. (D) (E) | – | 4 | 741 | – |
| 19 | WIRE, #8, BARE SOLID ANNEALED COPPER | 10' | 10' | – | 812928 |
| 20 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | | – | 678528 |
| 21 | WIRE, BARE STRANDED COPPER (OH JUMPER) (N) | 21' | 25' | 715-716 | – |
| 22 | WIRE, BARE STRANDED CU OR AL (OH NEUT JUMPER) (N) | 9' | 7' | 711-716 | – |
| 23 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) (D) (E) | AS REQ'D | | 785-787 | – |

| CABLE SIZE | UG MACRO UNIT PORCELAIN | |
|---|---|---|
| | W/O LADDER ARMS | W/LADDER ARMS |
| 3C-#2 AL | CP-3#2 | CP3#2L |
| 3C-#2/0 | CP#2/0 | CP2/0L |

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DATE 1-1-93
APPD JVB/LDG

SDG&E ELECTRIC STANDARDS

12.47KV AND BELOW 3Ø CABLE POLE 1/C PER Ø
UPSWEEP BRACKET CONSTRUCTION

OH 1499.205
~~UG 4299.205~~
SUPERCEDES
1429.3 (1-1-93)

BILL OF MATERIAL: (CONTINUED)

| ITEM | DESCRIPTION | QUANTITY FIG. 1 | QUANTITY FIG. 2 | CONSTR. STD OR PAGE NO. | STOCK NUMBER |
|---|---|---|---|---|---|
| 24 | WIRE, #6, BARE STRANDED COPPER | 9' | 9' | – | 813536 |
| 25 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 3 | 3 | – | 166070 |
| 26 | CUTOUT BODY FOR CURRENT LIMITING FUSE | 3 | 3 | – | 297952 |
| 27 | FUSE, CURRENT-LIMITING, SIZE AS REQ'D | 3 | 3 | 1206 | – |
| 28 | ARRESTER, LIGHTNING | 3 | 3 | 1247 | – |
| 29 | PIN, SHORT SHANK, 1" LEAD THREAD (D) (E) | 1 | 1 | – | 534426 |
| 30 | BRACKET, GALV, TERMINAL, UPSWEEP | 1 | 1 | – | 166856 |
| 31 | BRACKET, TRIPLE TERMINATOR (S) | 1 | 1 | – | 166676 |
| 32 | COVER, BOLT, PLASTIC & (E) | 1 | 1 | – | 285696 |
| | 6 – 10D NAILS, GALV (E) | – | – | – | 491392 |
| 33 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | 2 | – | 621568 |
| 34 | BOLT, MACH, GALV, 5/8" X 1 1/2", 1 ROUND AND 1 LOCK WASHER (E) | 1 | 1 | 392 | – |
| 35 | TERMINALS AND UNDERGROUND CABLE | 3 | 3 | 4111 | – |
| 36 | WIRE, #4, BARE STRANDED COPPER | 50' | 45' | – | 813760 |
| 37 | UNIT GROUND, COMPLETE (Q) | 1 | 1 | – | 603136 |
| 38 | RISER CONSTRUCTION | – | – | 1400/4200 | – |
| 39 | WIRE, COPPER BARE STRANDED (CABLE POLE NEUTRAL) (N) | 5' | 5' | 715/716 | – |
| 40 | BRACKET, LADDER ARM (E) | AS REQ'D | | 1404/4204 | 167184 |
| 41 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" (E) | AS REQ'D | | 1404/4204 | 503488 |
| 42 | CHANNEL, DOUBLE GALV, 24" (E) | AS REQ'D | | 1404/4204 | 216700 |

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 2/0 AND SMALLER UNDERGROUND CABLE.

(C) CONNECT OVERHEAD NEUTRAL, TRIPLE TERMINAL BRACKET, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(E) EXEMPT MATERIAL.

(F) OMIT PHASE II AND PHASE N FOR SINGLE PHASE 12KV CABLE POLE; OMIT PHASE I AND PHASE II FOR SINGLE PHASE 6.9 KV CABLE POLE.

(G) INTERCONNECT CUTOUTS AND DEADEND BONDS PER G.O. 95 RULE 52.7D. BONDING SHOULD BE DONE IN ACCORDANCE WITH RULE 53.4.

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE CU | OH NEUT JUMPER SIZE AL | OH NEUT JUMPER SIZE | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| 2 | 4 | 6 | 2 | – | #6 PER PHASE |
| 2/0 | 4 | 6 | 2 | – | #6 PER PHASE |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STANDARD 251.

(P) POLE STEPPING – SEE STANDARD 363/4205.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

R. SEE STANDARD SECTION 1200/4300 FOR FUSING.

S. RISER POSITIONS – SEE STANDARD 1402/4202.

(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STANDARD 1406/4206.

(U) SEE STANDARD 1407/4207 FOR PORCELAIN AND NON-PORCELAIN TERMINAL MOUNTING BRACKET INSTALLATIONS AND MATERIALS.

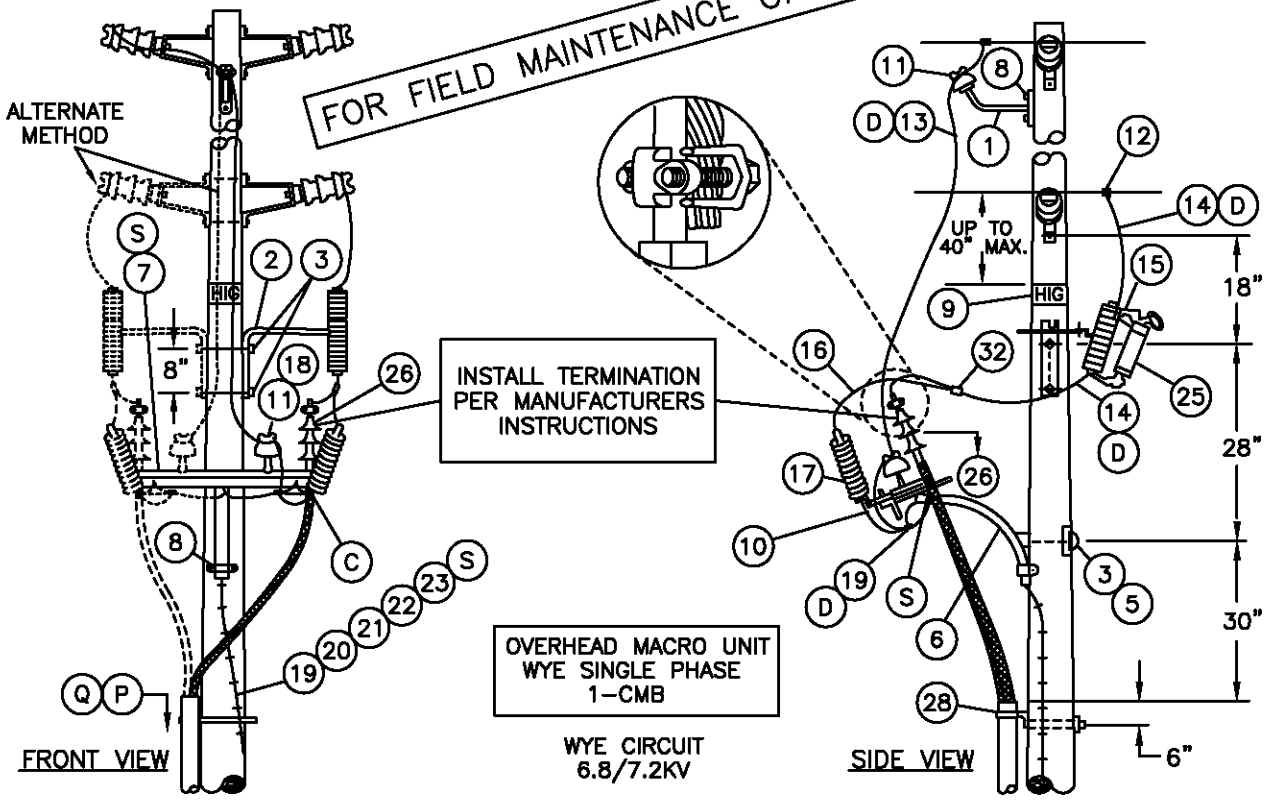
FOR FIELD MAINTENANCE ONLY

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| OH 1499.206<br>~~UG 4299.206~~<br>SUPERCEDES<br>1429.4 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW 3 PHASE, CABLE POLE, 1/C PER PHASE, UPSWEEP BRACKET CONSTRUCTION | DATE 1-1-93<br>APPD JLG/DDJ |

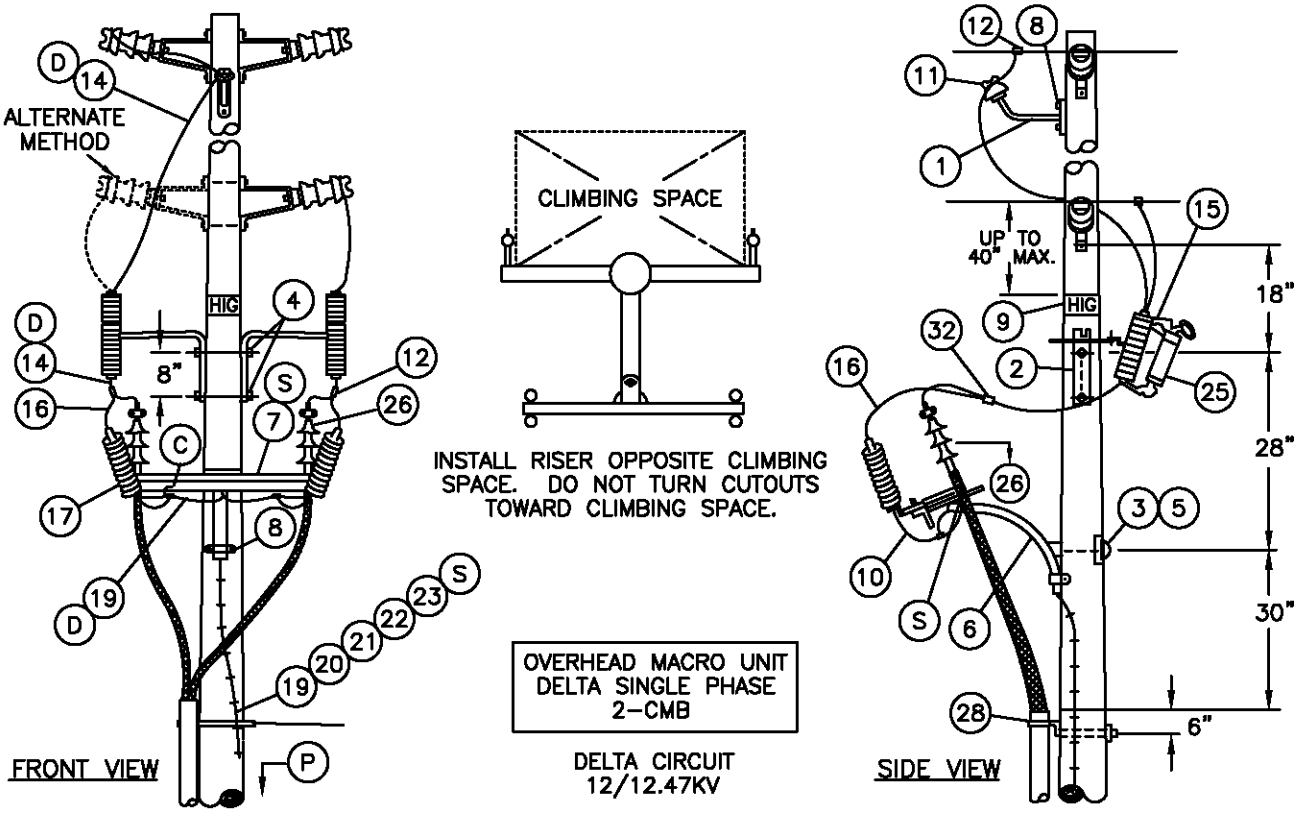
**SCOPE:** THIS STANDARD SHOWS ARMLESS TANGENT CONSTRUCTION FOR 12.47KV AND BELOW SINGLE-PHASE CABLE POLE WITH BRACKET MOUNTED TERMINALS FOR #2 UG CABLE USING NON-PORCELAIN TERMINALS.

FOR FIELD MAINTENANCE ONLY




OVERHEAD MACRO UNIT
WYE SINGLE PHASE
1-CMB

WYE CIRCUIT
6.8/7.2KV




OVERHEAD MACRO UNIT
DELTA SINGLE PHASE
2-CMB

DELTA CIRCUIT
12/12.47KV

| | | |
|---|---|---|
| OH 1499.207<br>UG 4299.207<br>SUPERSEDES<br>4221.1 (10-20-05) | SDG&E ELECTRIC STANDARDS<br>BRACKET MOUNTED TERMINALS, 12.47KV AND BELOW,<br>SINGLE-PHASE ARMLESS TANGENT CONSTRUCTION,<br>NON-PORCELAIN TERMINALS | DATE 10-20-05<br>APPD PA / JJ |

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**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY 6.9– | QUANTITY 12KV | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNIT |
|---|---|---|---|---|---|---|
| 1 | BRACKET, INSULATOR, 1" OR 1–3/8" LEAD THREAD | 1 | 1 | – | 166144<br>166176 | – |
| 2 | BRACKET, CUTOUT MOUNTING | 1 | 2 | – | 166448 | – |
| 3 | BOLT, MACH., GALV., 5/8" X (LENGTH AS REQ'D), 1 SQ. WASH 1 RD. WASH., 1 DBL. COIL SPRING WASH. | 3 | 1 | 1392.1 &.2 | – | – |
| 4 | BOLT, MACH., GALV., 5/8" X (LENGTH AS REQ'D), 2 RD. WASH, 1 DBL. COIL SPR. WASH. | – | 2 | 1392.1 &.2 | – | – |
| 5 | COVER, BOLT, PLASTIC, & 6–10D NAILS, GALV. | 1 | 1 | – | 285696<br>491392 | – |
| 6 | BRACKET, GALV., TERMINAL UPSWEEP, WITH PVC LINER | 1 | 1 | – | 166856 | – |
| 7 | BRACKET, TRIPLE TERMINAL | 1 | 1 | – | 166676 | – |
| 8 | SCREW, LAG, 1/2" X 4", GALV. | 4 | 4 | – | 621568 | – |
| 9 | SIGN, HIGH VOLTAGE, 8 GALV. ROOFING NAILS | 2 | 2 | – | 647648<br>492192 | – |
| 10 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | | – | 698754 | – |
| 11 | INSULATOR, 12KV, PIN TYPE, (CLASS AS REQ'D) | 2 | 1 | 750.3 | – | – |
| 12 | CONNECTOR, WIRE COMPRESSION, (SIZE AND TYPE AS REQ'D) | 3 | 4 | 783–796 | – | – |
| 13 | WIRE, BARE STRANDED COPPER (OH NEUTRAL JUMPER) Ⓓ | 9' | – | 711 | – | – |
| 14 | WIRE, BARE STRANDED COPPER (OH JUMPER) Ⓓ | 6' | 15' | 715 | – | – |
| 15 | CUTOUT BODY, FOR CURRENT–LIMITING FUSE | 1 | 2 | 1212 | 297952 | – |
| 16 | WIRE, BARE STRANDED COPPER, #6 | 2' | 4' | – | 813536 | – |
| 17 | ARRESTER, LIGHTNING | 1 | 2 | 1247.1 &.2 | – | – |
| 18 | PIN, SHORT SHANK, 1" LEAD THREAD | 1 | – | – | 532426 | – |
| 19 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | 50' | – | 812490 | GNDPVC |
| 20 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | 1 | – | 603072 | |
| 21 | COPPER BONDED GROUND CONNECTOR | 1 | 1 | – | 259010 | – |
| 22 | GROUND ENHANCING POWER SOLUTION (GEM) | AS REQ'D | | – | 424390 | – |
| 23 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | | – | 678562 | – |
| 24 | | | | | | – |
| 25 | FUSE, CURRENT LIMITING, (SIZE AS SPECIFIED ON W.O.) | 1 | 2 | 1207/4308 | – | – |
| 26 | TERMINALS, UNDERGROUND CABLE Ⓢ | 1 | 2 | 4111 | – | – |
| 27 | WIRE, BARE STRANDED COPPER, (UNDER TRIPLE TERM BRKT) Ⓓ | – | 3' | 715 | – | – |
| 28 | RISER CONSTRUCTION | AS REQ'D | | 1400/4200 | – | – |
| 29 | BRACKET, LADDER ARM | AS REQ'D | | 1404/4204 | 167184 | – |
| 30 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | AS REQ'D | | 1404/4204 | 503488 | – |
| 31 | CHANNEL, DOUBLE GALV. 24" | AS REQ'D | | 1404/4204 | 216700 | – |
| 32 | HOT LINE CLAMP | 2 | | 788 | 227680 | – |

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| CABLE SIZE | | UG MACRO UNIT PORCELAIN W/O LADDER ARMS | UG MACRO UNIT PORCELAIN W/LADDER ARMS |
|---|---|---|---|
| 1C#2AL | 3"BEND | CP–1#2 | CP1#2L |
| 2C#2AL | 3"BEND | CP–2#2 | CP2#2L |
| 1C#2AL | 2"BEND | C1#2–S | C1#2LS |

DATE 6–30–06
APPD PSA / JJ

SDG&E ELECTRIC STANDARDS

BRACKET MOUNTED TERMINALS, 12.47KV AND BELOW, SINGLE–PHASE ARMLESS TANGENT CONSTRUCTION, NON–PORCELAIN TERMINALS

OH 1499.208
UG 4299.208
SUPERSEDES
4221.2 (6–30–06)

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**INSTALLATION:**

A. NEW CABLE POLES SHALL HAVE A STANDARD DEPTH OF 9'. IN MOST CASES THIS WILL REQUIRE A 5' TALLER POLE.

B. USE THIS CONSTRUCTION FOR #2 CABLE.

(C) CONNECT ONE STRAND OF CONCENTRIC NEUTRAL TO SPLIT BOLT GROUND LUG.

(D)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 2 | 4 | 6 | 2 | – | #6 PER PHASE |

**REFERENCE:**

(O) POLE STEPPING – SEE STANDARD 363/4205.

P. POLE TOP CONSTRUCTION – SEE SECTION 400.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

R. SEE STANDARD SECTION 1200/4300 FOR FUSING.

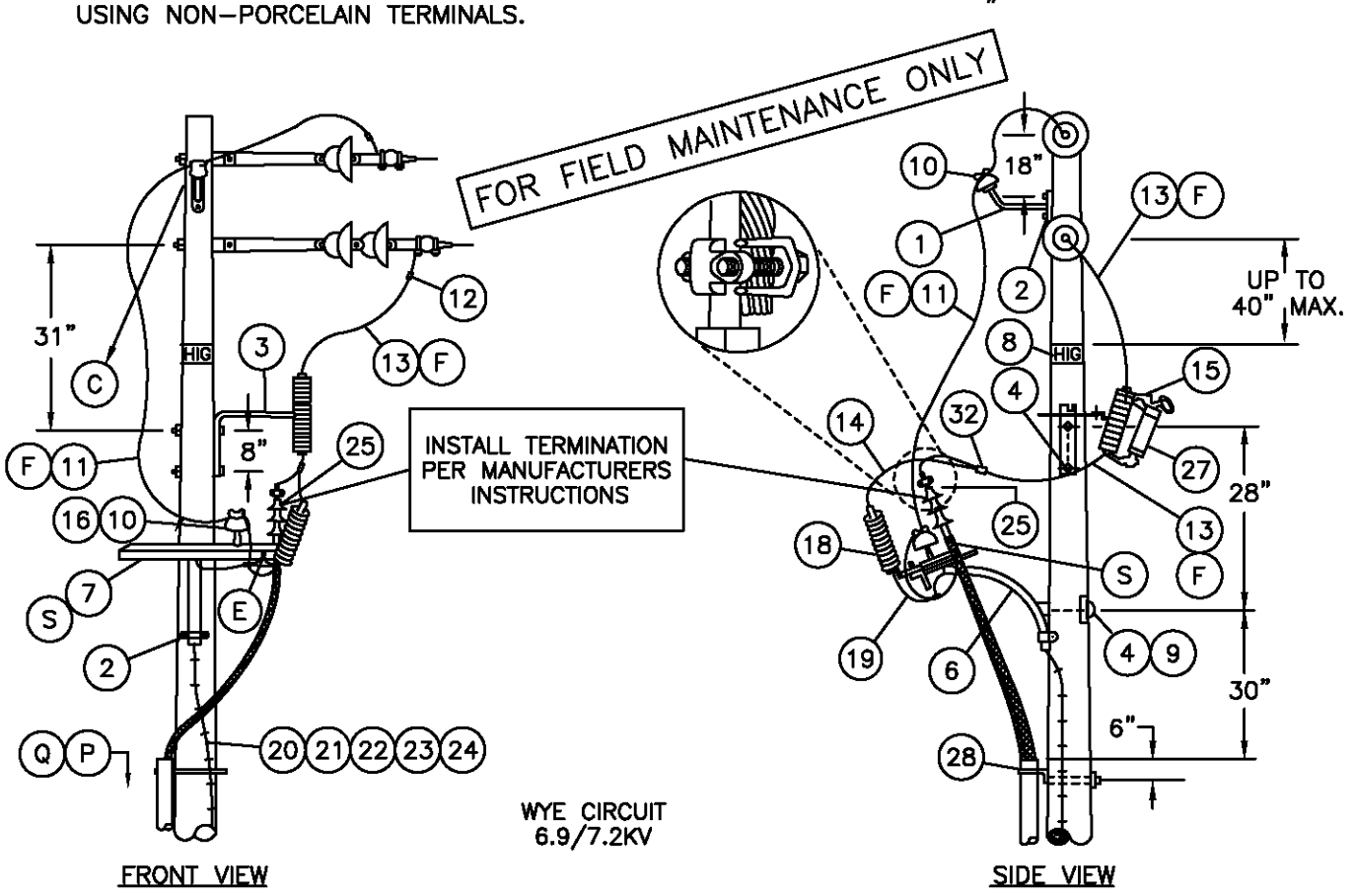
(S) SEE STANDARD 1407/4207 FOR NON–PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

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| REVISION | SDG&E ELECTRIC STANDARDS | OH 1499.209 |
|---|---|---|
| DATE 1–1–93 | BRACKET MOUNTED TERMINALS, 12.47KV AND BELOW, SINGLE–PHASE ARMLESS TANGENT CONSTRUCTION, NON–PORCELAIN TERMINALS | UG 4299.209 |
| APPD JJG/RDJ | | SUPERSEDES 4221.3 (1–1–93) |

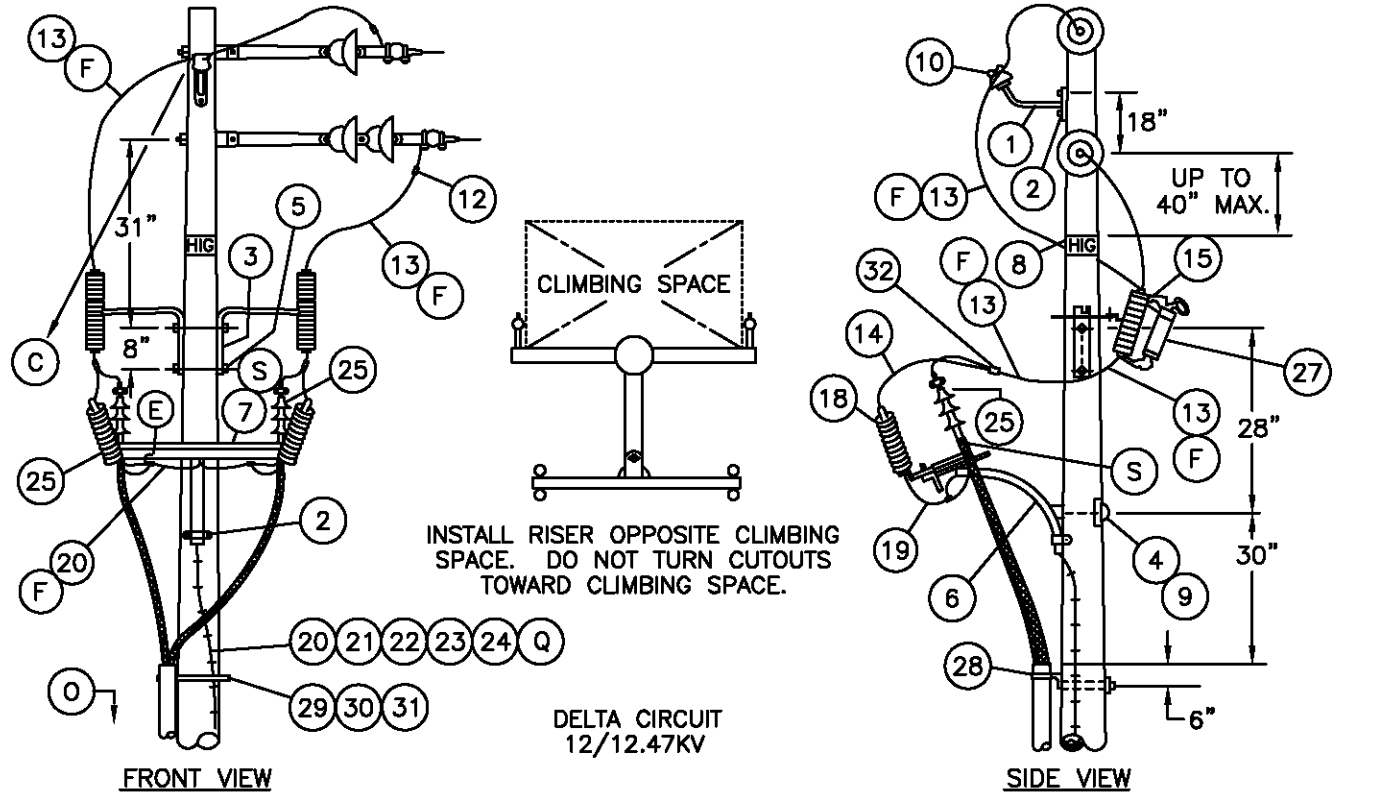
**SCOPE:** THIS STANDARD SHOWS ARMLESS DEADEND CONSTRUCTION FOR 12.47KV AND BELOW SINGLE-PHASE CABLE POLE WITH BRACKET MOUNTED TERMINALS FOR #2 UG CABLE USING NON-PORCELAIN TERMINALS.




WYE CIRCUIT
6.9/7.2KV

FRONT VIEW

SIDE VIEW




DELTA CIRCUIT
12/12.47KV

FRONT VIEW

SIDE VIEW

| | | |
|---|---|---|
| OH 1499.210<br>UG 4299.210<br>SUPERSEDES<br>4223.1 (10-20-05) | SDG&E ELECTRIC STANDARDS<br>BRACKET MOUNTED TERMINALS, 12.47KV AND BELOW,<br>SINGLE-PHASE ARMLESS DEADEND CONSTRUCTION,<br>NON-PORCELAIN TERMINALS | DATE 10-20-05<br>APPD PA / JJ |

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## BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY 7.2– | QUANTITY 12KV | CONST STD OR PAGE NO | STOCK NUMBER | ASSEMBLY UNIT |
|---|---|---|---|---|---|---|
| 1 | BRACKET, INSULATOR, 1" OR 1–3/8" LEAD THREAD | 1 | 1 | – | 166144<br>166176 | – |
| 2 | SCREW, LAG, GALV, 1/2" X 4" | 4 | 4 | – | 621568 | – |
| 3 | BRACKET, CUTOUT MOUNTING | 1 | 2 | – | 166448 | – |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ WASH, 1 RD WASH, 1 DBL COIL SPRING WASH | 3 | 1 | 392.1 &.2 | – | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 RD WASH, 1 DBL COIL SPRING WASH | – | 2 | 392.1 &.2 | – | – |
| 6 | BRACKET, GALV, TERMINAL UPSWEEP, WITH PVC LINER | 1 | 1 | – | 166856 | – |
| 7 | BRACKET, TRIPLE TERMINAL | 1 | 1 | – | 166676 | – |
| 8 | SIGN, HIGH VOLTAGE, 8 ROOFING NAILS, GALV | 2 | 2 | – | 647648<br>492192 | – |
| 9 | COVER, BOLT, PLASTIC, & 6–10D NAILS, GALV. | 1 | 1 | – | 285696<br>491392 | – |
| 10 | INSULATOR, 12KV, PIN TYPE, (CLASS AS REQ'D) | 2 | 1 | 750.3 | – | – |
| 11 | WIRE, BARE STRANDED CU OR AL (OH NEUTRAL JUMPER) Ⓕ | 12' | – | 715 | – | – |
| 12 | CONNECTOR, WIRE, COMPRESSION, (SIZE AS REQ'D) | AS REQ'D | | 783–786 | – | – |
| 13 | WIRE, BARE STRANDED COPPER (OH JUMPER) Ⓕ | 6' | 16' | 715 | – | – |
| 14 | WIRE, #6, BARE STRANDED COPPER | 2' | 4' | – | 813536 | – |
| 15 | CUTOUT, FOR CURRENT–LIMITING FUSE | 1 | 2 | 1212 | 297952 | – |
| 16 | PIN, SHORT SHANK, 1" LEAD THREAD | 1 | – | – | 532426 | – |
| 17 | | | | | | – |
| 18 | ARRESTER, LIGHTNING | 1 | 2 | 1247.1 | – | – |
| 19 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | | – | 698754 | – |
| 20 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | 50' | – | 812490 | GNDPVC |
| 21 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | 1 | – | 603072 | |
| 22 | COPPER BONDED GROUND CONNECTOR | 1 | 1 | – | 259010 | – |
| 23 | GROUND ENHANCING POWER SOLUTION (GEM) | AS REQ'D | | – | 424390 | – |
| 24 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | | – | 678562 | – |
| 25 | TERMINAL AND UNDERGROUND CABLE | 1 | 2 | 4111 | – | – |
| 26 | WIRE, BARE STRANDED CU (UNDER TRIPLE TERM BRKT) | – | 3' | 715 | – | – |
| 27 | FUSE, CURRENT–LIMITING, (SIZE AS SPECIFIED ON W.O.) | 1 | 2 | 1207/4308 | – | – |
| 28 | RISER CONSTRUCTION | – | – | 1400/4200 | – | – |
| 29 | BRACKET, LADDER ARM | AS REQ'D | | 1404/4204 | 167184 | – |
| 30 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | AS REQ'D | | 1404/4204 | 503488 | – |
| 31 | CHANNEL, DOUBLE GALV. 24" | AS REQ'D | | 1404/4204 | 216700 | – |
| 32 | HOT LINE CLAMP | 2 | | 788 | 227680 | – |

FOR FIELD MAINTENANCE ONLY

| CABLE SIZE | | UG MACRO UNIT PORCELAIN W/O LADDER ARMS | UG MACRO UNIT PORCELAIN W/LADDER ARMS |
|---|---|---|---|
| 1C#2AL | 3"BEND | CP–1#2 | CP1#2L |
| 2C#2AL | 3"BEND | CP–2#2 | CP2#2L |
| 1C#2AL | 2"BEND | C1#2–5 | C1#2LS |

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DATE 6–30–06
APPD PSA / JJ

SDG&E ELECTRIC STANDARDS

BRACKET MOUNTED TERMINALS, 12.47KV AND BELOW, SINGLE–PHASE ARMLESS DEADEND CONSTRUCTION, NON–PORCELAIN TERMINALS

OH 1499.211
UG 4299.211
SUPERSEDES
4223.2 (6–30–06)

**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 #2 CABLE.

(C) DO NOT ATTACH GUY HOOK TO TOP DEAD-END THRU BOLT.

D. THIS CONSTRUCTION IS LIMITED TO CUL-DE-SAC APPLICATION WHERE NO FUTURE O.H. IS ANTICIPATED.

(E) CONNECT ONE STRAND OF CONCENTRIC NEUTRAL TO SPLIT BOLT GROUNDING LUG.

(F)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 2 | 4 | 6 | 2 | – | #6 PER PHASE |

**REFERENCE:**

(O) POLE STEPPING – SEE STANDARD 363/4205.

P. POLE TOP CONSTRUCTION – SEE SECTION 400.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

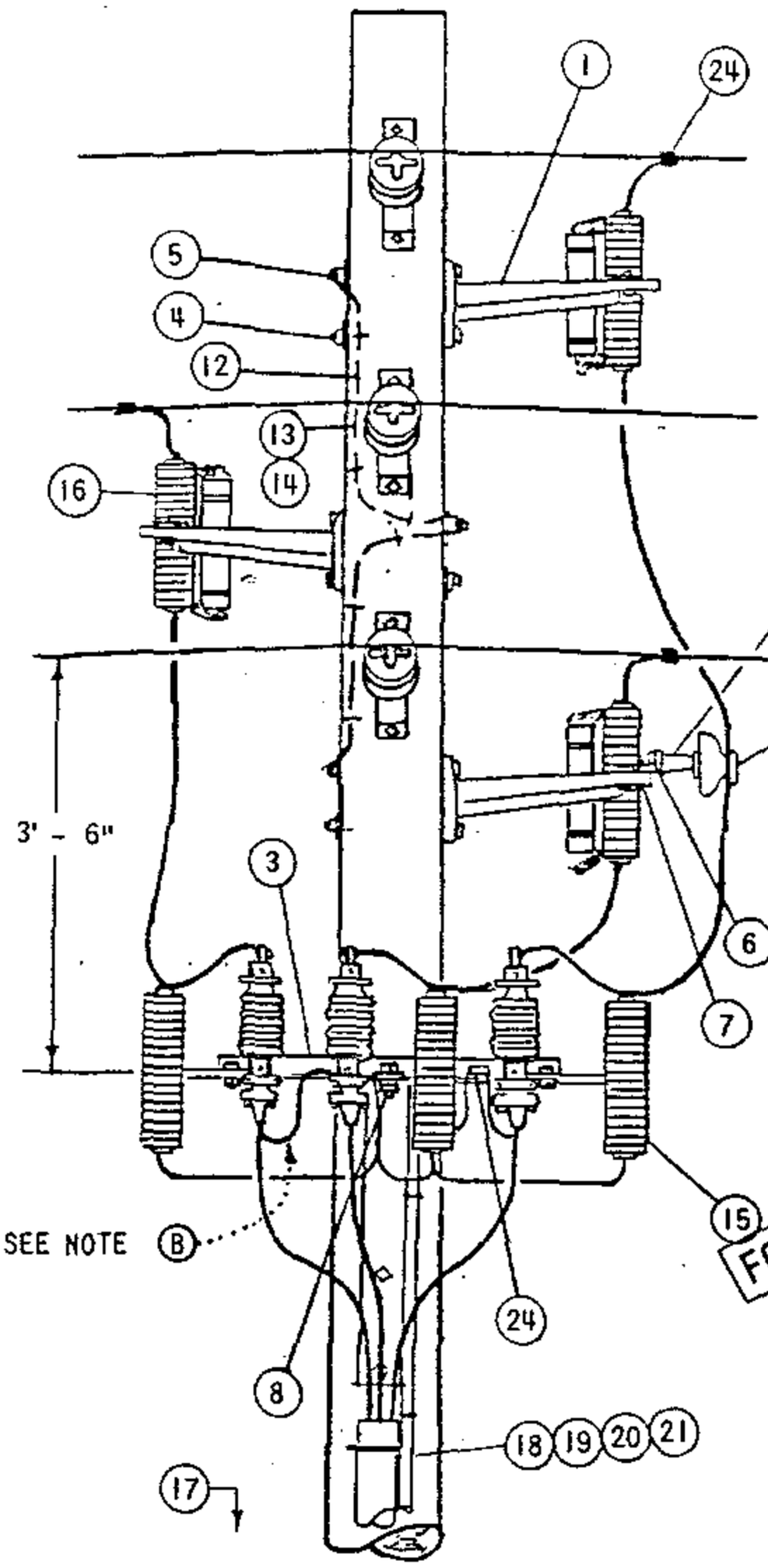
R. SEE STANDARD SECTION 1200/4300 FOR FUSING.

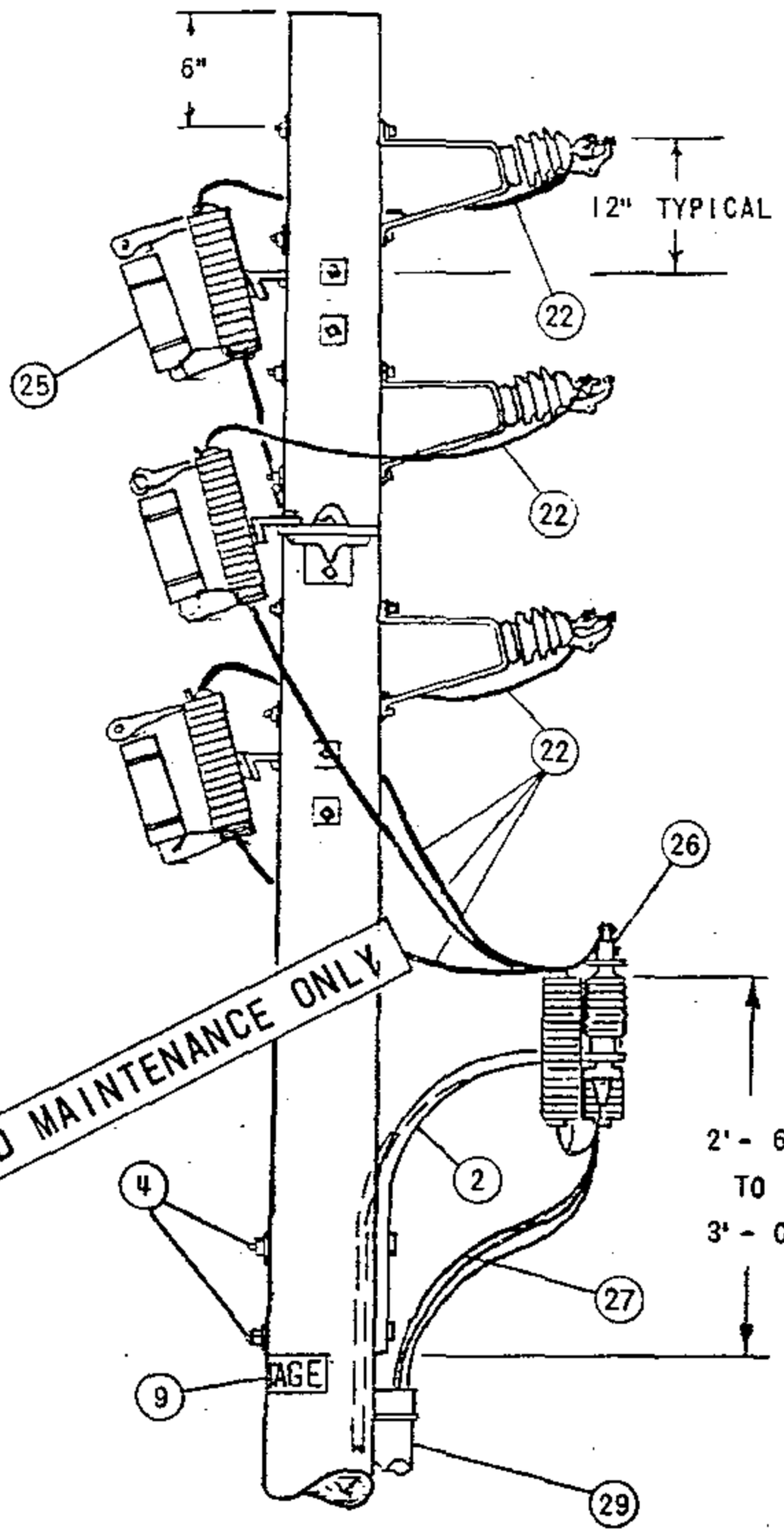
(S) SEE STANDARD 1407/4207 FOR NON-PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

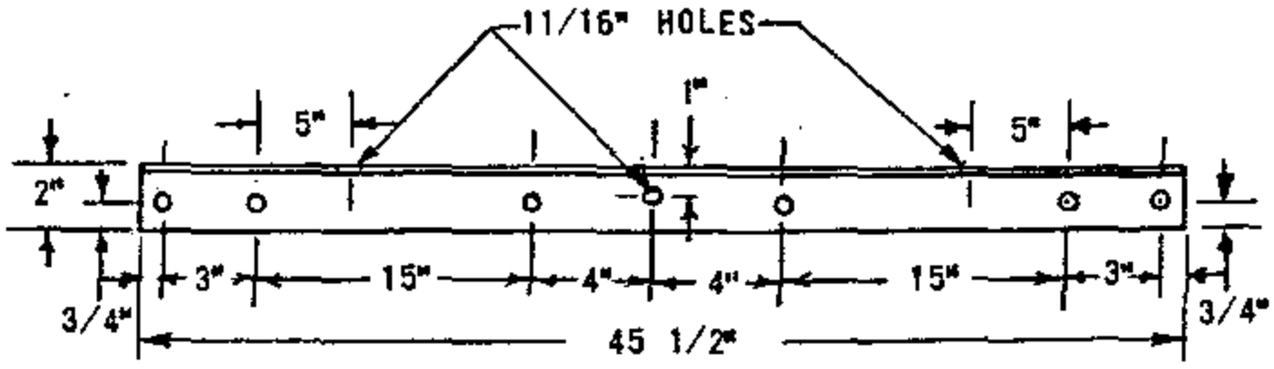
FOR FIELD MAINTENANCE ONLY

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| OH 1499.212<br>UG 4299.212<br>SUPERSEDES<br>4223.3 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>BRACKET MOUNTED TERMINALS, 12.47KV AND BELOW,<br>SINGLE-PHASE ARMLESS DEADEND CONSTRUCTION,<br>NON-PORCELAIN TERMINALS | DATE 1-1-93<br>APPD JJB/RDJ |




ALL HOLES 9/16" EXCEPT AS NOTED

FABRICATE FROM 2" X 2" X 3/16" STEEL ANGLE
HOT DIP GALVANIZE AFTER FABRICATION

ARMLESS TERMINAL MOUNTING BRACKET

| | | |
|---|---|---|
| DATE 8-27-82<br>APPD ORH | SDG&E ELECTRIC STANDARDS<br>BRACKET MOUNTED TERMINALS,<br>12KV 3 WIRE ARMLESS TANGENT CONSTRUCTION | OH 1499.301<br>~~UG 4299.301~~<br>SUPERSEDES<br>1437.1(11-16-81) |

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NOTES:

(A) UNIT GROUND, COMPLETE, ORDER 603120 WITH GRAY MOULDING, 603135 WITH PLAIN MOULDING.

(B) THE FIBERGLASS UPSWEEP TERMINAL BRACKET IS TO BE USED FOR UNDERGROUND CONDUCTORS 4/0 OR SMALLER. DO NOT USE FOR 500 KCM AND LARGER CONDUCTORS.

(C) USE TWO-ROD GROUND SPACED A MINIMUM OF 6 FEET APART.

D. CONNECT ONE STRAND OF CONCENTRIC NEUTRAL TO TERMINAL BOLT WITH DOUBLE NUT.

(E) EXEMPT MATERIAL

FOR FIELD MAINTENANCE ONLY

| ITEM | | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| INSTALLED BY OH CREWS | 1 | BRACKET, GALV., 4-HOLE, MOUNTING | 3 | 166240 |
| | 2 | BRACKET, FIBERGLASS, TERMINAL, UPSWEEP SEE NOTE (F) | 1 | 166864 |
| | 3 | BRACKET, ARMLESS, TERMINAL MOUNTING, SEE DETAIL PAGE 1437.1 | 1 | 166672 |
| PTF | 4 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D., 1-SQ. CURV. WASH., 1-DBL. COIL SPR. WASH. & 1-NUT (E) | 5 | PGS 139, 140 |
| | 5 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D., 1-SQ., CURV. WASH., 1-DBL. COIL SPR.WASH., 2-FLAT RD. WASH. & 2-NUTS (E) | 3 | PGS 139, 140 |
| | 6 | MACH. BOLT, GALV., 5/8" X 1 1/2", 1-LOCK WASH. (E) | 1 | PGS 139, 140 |
| | 7 | MACH. BOLT, GALV., 1/2" X 1 1/2", 1-LOCK WASH.& 1-NUT (E) | 1 | PGS 139, 140 |
| | 8 | MACH. BOLT, GALV., 5/8" X 2 1/2", 1-LOCK, 2-RD. WASH. & 2-NUTS (E) | 1 | PGS 139, 140 |
| | 9 | HIGH VOLTAGE SIGN & 8-ROOFING NAILS, GALV. (E) | 2 | 647648, 492224 |
| | 10 | BRACKET, INSULATOR, MOUNTING ANGLE | 1 | 166208 |
| | 11 | PIN, INSULATOR, 12KV, 1" OR 1 3/8" LEAD THREAD | 1 | 529248-529216 |
| | 12 | WIRE, BOND, BARE SOLID ANNEALED, #8 | 6' | 812928 |
| | 13 | HARDWOOD MOULDING, 1" (OTHER THAN TOP CIRCUIT ON POLE) | 6' | 487200 |
| | 14 | MOULDING STAPLES, GALV., 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) | 6 | 678560 |
| UCD | 15 | LIGHTNING ARRESTER, 12KV | 3 | 113248 |
| | 16 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1200 SECTION |
| | 17 | GROUND ROD & CLAMP (A) (C) | 2 | 603072-230016 (E) |
| | 18 | HARDWOOD MOULDING, 1" (A) | 36' | 487200 |
| | 19 | STAPLES,MOULDING, GALV., 3" X 1 1/16" X 1/4" (A) (E) | 24 | 678560 |
| | 20 | STAPLES, FENCE, GALV., 1 1/4" (A) (E) | 1/3# | 678528 |
| | 21 | WIRE, BARE STRANDED COPPER, #2 (B) | 50' | 813664 |
| | 22 | WIRE, BARE STRANDED, COPPER, (SIZE AS REQ'D) | 25' | |
| | 23 | INSULATOR, 12KV, PIN TYPE (CLASS AS REQ'D) | 1 | 429056-429152 |
| | 24 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | 4 | |
| | 25 | FUSE, CURRENT-LIMITING SIZE AS SPECIFIED ON WORK ORDER | 3 | 1200 SECTION |
| UG CREWS | 26 | CABLE TERMINAL | 3 | SEE UG STDS |
| | 27 | CABLE, PRIMARY | AS REQ'D | SEE UG STDS |
| | 28 | | | |
| | 29 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 SECTION |

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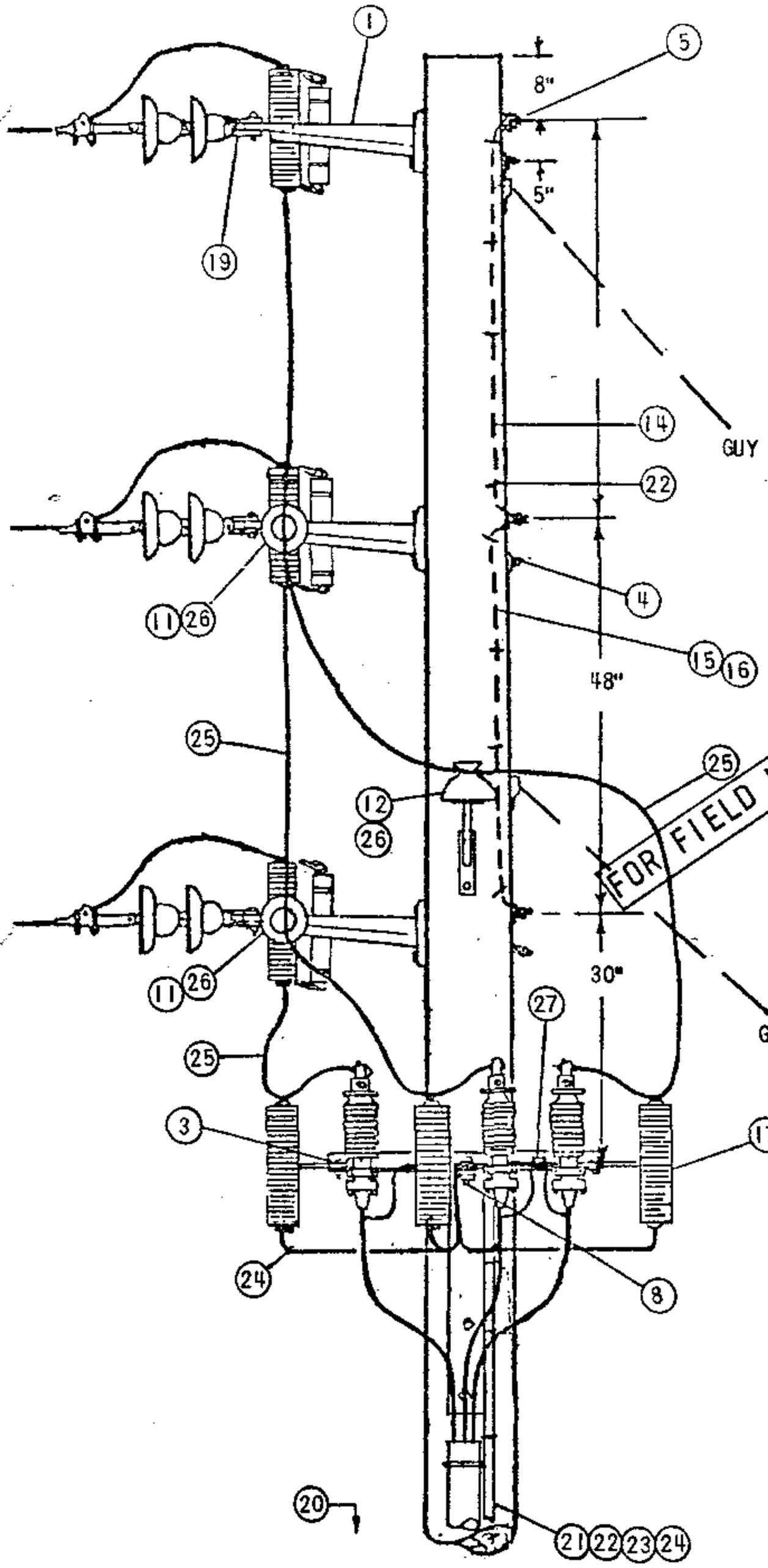
OH 1499.302
~~UG 4299.302~~
SUPERSEDES
1437.2 (11-16-81)

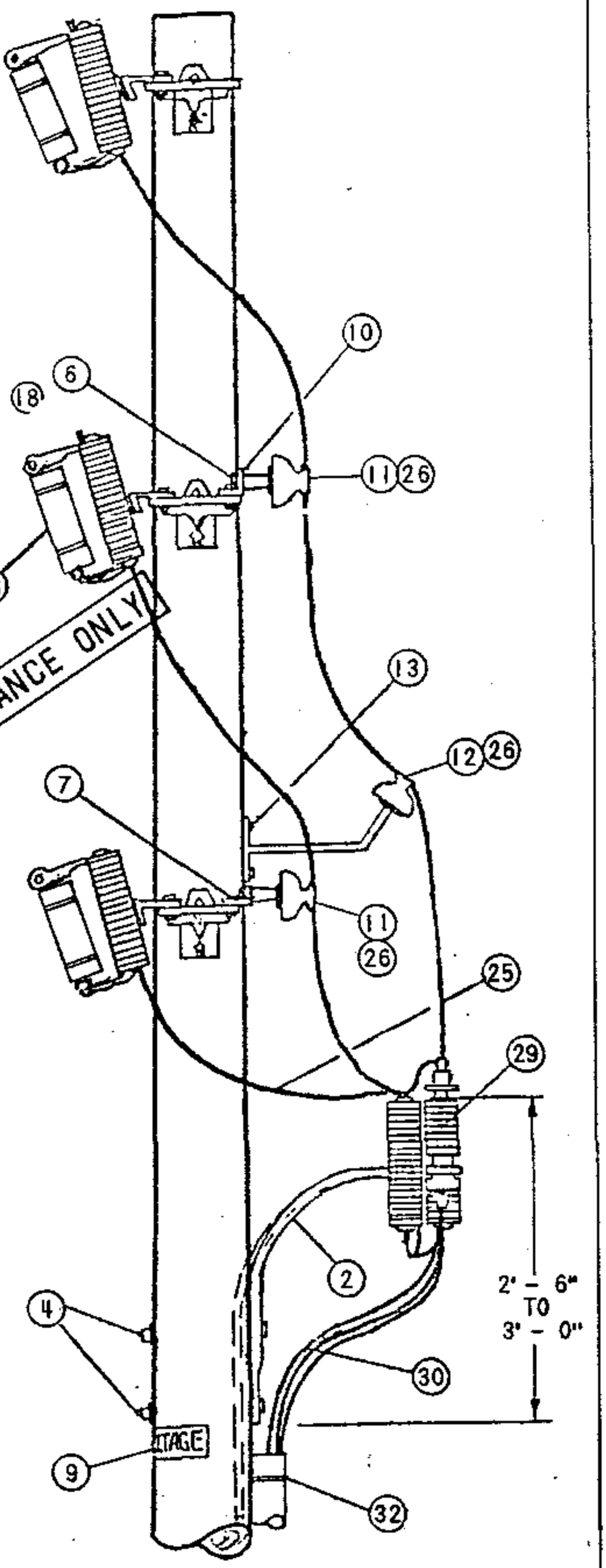
SDG&E ELECTRIC STANDARDS

BRACKET MOUNTED TERMINALS,
12KV 3 WIRE ARMLESS TANGENT CONSTRUCTION

DATE 8-27-82
APPD

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(DEAD ENDS OMITTED FOR CLARITY)

| | | |
|---|---|---|
| DATE 8-27-82<br>APPD LDR # | SDG&E ELECTRIC STANDARDS<br>BRACKET MOUNTED TERMINALS, 12KV 3 WIRE,<br>ARMLESS DEAD END CONSTRUCTION | OH 1499.303<br>~~UG 4299.303~~<br>SUPERSEDES<br>1438.1(11-16-81) |

NOTES:

(A) UNIT GROUND COMPLETE ORDER 603120 WITH GRAY MOULDING, 603136 WITH PLAIN MOULDING.

B. UNTWIST SUFFICIENT LENGTH OF #2 STRANDED WIRE TO CONNECT EACH ARRESTER AND POTHEAD (TERMINAL) GROUND WITH A SINGLE STRAND.

(C) USE TWO-ROD GROUND SPACED A MINIMUM OF 6 FEET APART.

D. THIS CONFIGURATION NOT TO BE USED WHERE A FUTURE EXTENSION IS ANTICIPATED

(E) EXEMPT MATERIALS.

F. THIS INSTALLATION DOES NOT INCLUDE GUYING MATERIAL

(G) THE FIBERGLASS UPSWEEP TERMINAL BRACKET IS TO BE USED FOR UNDERGROUND CONDUCTORS 4/0 OR SMALLER. DO NOT USE FOR 500 KCM AND LARGER CONDUCTORS

FOR FIELD MAINTENANCE ONLY

| | ITEM | DESCRIPTION | QUANT | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|
| OH CREWS P T & F | 1 | BRACKET, GALV., 4-HOLE, MOUNTING SEE NOTE (G) | 3 | 166240 |
| | 2 | BRACKET, FIBERGLASS, TERMINAL, UPSWEEP | 1 | 166864 |
| | 3 | BRACKET, ARMLESS, TERMINAL MOUNTING (SEE DETAIL PG. 1437.1) | 1 | 166672 |
| | 4 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D., 1-SQ. CURV. WASH., 1-DBL. COIL SPR. WASH. & 1-NUT (E) | 5 | PGS 139, 140 |
| | 5 | MACH. BOLT, GALV., 5/8" X LENGTH AS REQ'D,, 1-SQ. CURV. WASH., 1-DBL. COIL SPR. WASH., 2-FLAT RD. WASH. & 2-NUTS (E) | 3 | PGS 139, 140 |
| | 6 | MACH. BOLT, GALV., 5/8" X 1 1/2" (E) | 2 | PGS 139, 140 |
| | 7 | MACH. BOLT, GALV., 1/2" X 1 1/2" (E) | 2 | PGS 139, 140 |
| | 8 | MACH. BOLT, GALV., 5/8" X 2 1/2", 1-LOCK, 2-rd. WASH. & 2-NUTS (E) | 1 | PGS 139, 140 |
| | 9 | HIGH VOLTAGE SIGN & 8-ROOFING NAILS, GALV. (E) | 2 | 647648, 492192 |
| | 10 | BRACKET, INSULATOR, MOUNTING ANGLE | 2 | PG 151 |
| | 11 | PIN, INSULATOR, 12KV, 1" OR 1 3/8" LEAD THREAD | 2 | 529248-529216 |
| | 12 | BRACKET, INSULATOR, 1" OR 1 3/8" LEAD THREAD | 1 | 166144-166176 |
| | 13 | SCREW, LAG, GALV., 1/2" X 4" (E) | 2 | 621568 |
| | 14 | WIRE, BOND, BARE SOLID ANNEALED, #8 | 10' | 812928 |
| | 15 | HARDWOOD MOULDING, 1", (OTHER THAN TOP CIRCUIT ON POLE) | 10' | 487200 |
| | 16 | MOULDING STAPLES, GALV., 3" X 1 1/16" X 1/4" (OTHER THAN TOP CIRCUIT ON POLE) (E) | 6 | 678560 |
| OH CREWS U C & D | 17 | LIGHTNING ARRESTER, 12KV | 3 | 113248 |
| | 18 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1200 SECTION |
| | 19 | CLEVIS | 3 | 235776 |
| | 20 | GROUND ROD & CLAMP (C) | 2 | 603072, 230016 (A)(E) |
| | 21 | HARDWOOD MOULDING, 1" | 36' | 487200 (A) |
| | 22 | STAPLES, MOULDING, GALV., 3" X 1 1/16" X 1/4" (E) | 24 | 678560 (A) |
| | 23 | STAPLES, FENCE, GALV., 1 1/4" (E) | 32 | 678528 (A) |
| | 24 | WIRE, BARE STRANDED, COPPER, #2 | 50' | 813664 |
| | 25 | WIRE, BARE STRANDED, COPPER, (SIZE AS REQ'D) | 25' | PGS 715-717 |
| | 26 | INSULATOR, 12KV, PIN TYPE, (CLASS 55-5 OR 56-1) | 3 | 429056-429152 |
| | 27 | CONNECTOR, WIRE, COMPRESSION, (SIZE AS REQ'D) | 1 | PGS 783-787 |
| | 28 | FUSE, CURRENT-LIMITING AS SPECIFIED ON WORK ORDER | 3 | 1200 SECTION |
| UG CREWS | 29 | CABLE TERMINAL | 3 | SEE UG STDS |
| | 30 | CABLE, PRIMARY | AS REQ'D | SEE UG STDS |
| | 31 | | | |
| | 32 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 SECTION |

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OH 1499.304
~~UG 4299.304~~
SUPERSEDES
1438.2 (11-16-81)

SDG&E ELECTRIC STANDARDS

# BRACKET MOUNTED TERMINALS, 12KV 3 WIRE, ARMLESS DEAD END CONSTRUCTION

DATE 8-27-82
APPD WRH

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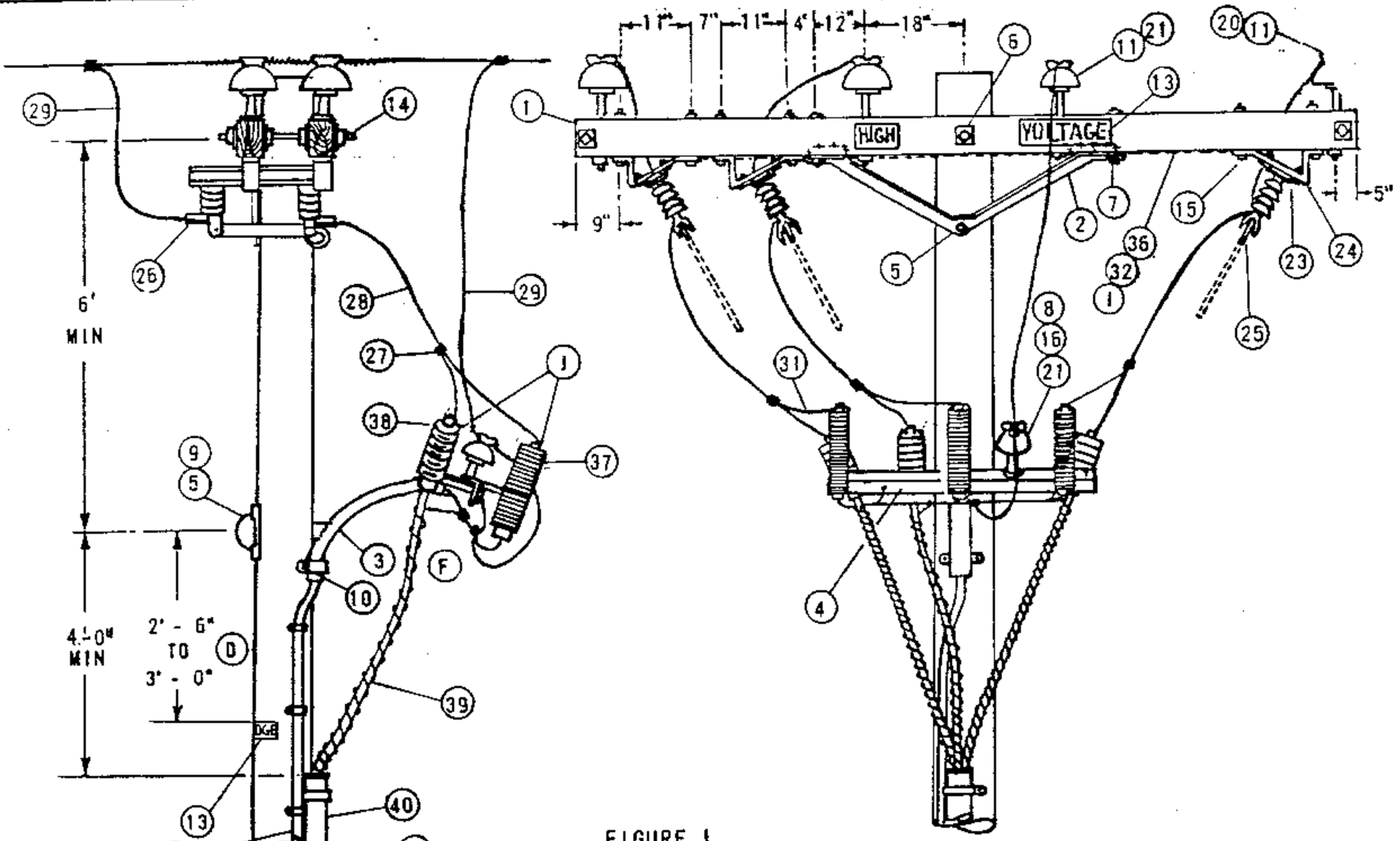



FIGURE 1
TANGENT CABLE POLE

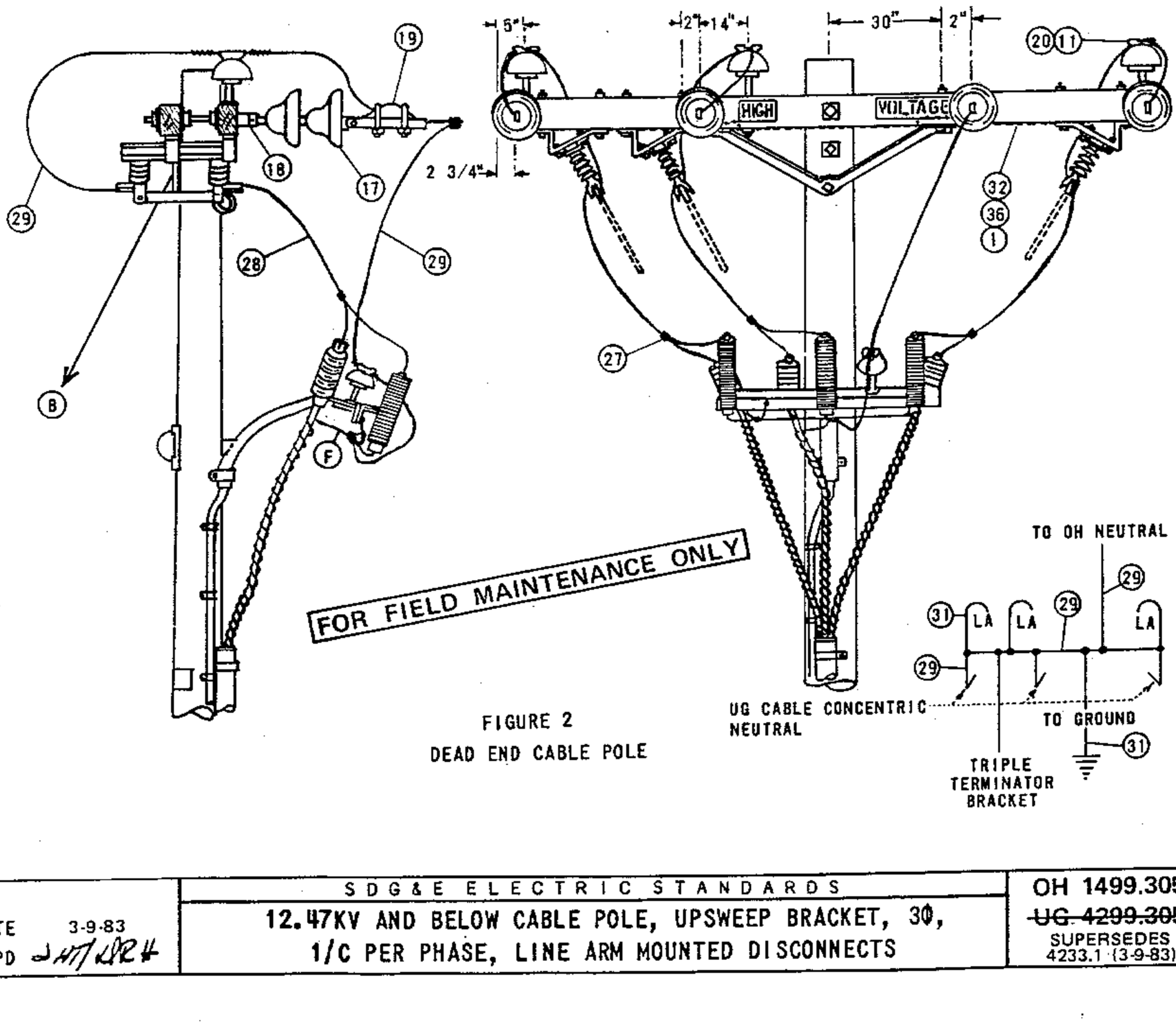



FIGURE 2
DEAD END CABLE POLE

| | | |
|---|---|---|
| DATE 3-9-83<br>APPD | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, 3Φ, 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS | OH 1499.305<br>~~UG 4299.305~~<br>SUPERSEDES 4233.1 (3-9-83) |

FIGURE 1

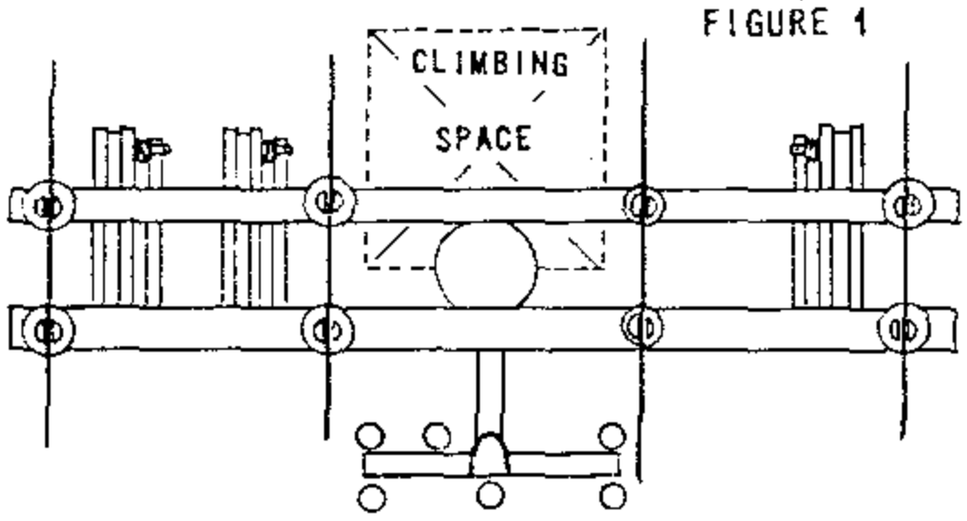
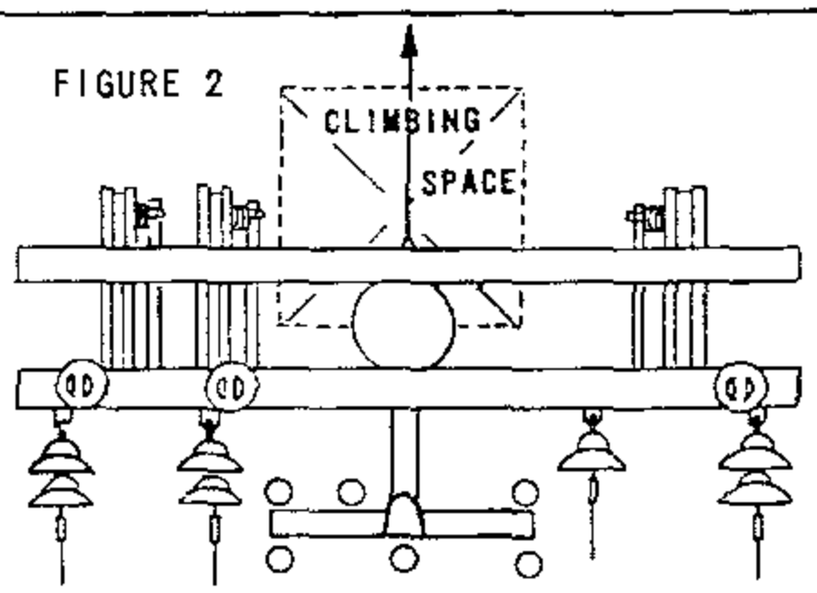



FIGURE 2




NOTES:

A. SEE PAGE 1406/4206 FOR G.O. 95 MINIMUM VERTICAL SEPARATION BETWEEN TOP OF RISER PROTECTION AND NEXT LOWER CONDUCTOR LEVEL.

(B) SEE PAGE 251 FOR ALLOWABLE CLIMBING SPACE OBSTRUCTIONS.

(C) USE TWO GROUND RODS SPACED A MINIMUM OF-6' APART.

(D) G.O. 95 DIMENSION.

(E) EXEMPT MATERIAL.

(F) INTERCONNECT TRIPLE TERMINAL BRACKET, LIGHTNING ARRESTER GROUND, CONCENTRIC NEUTRAL, AND OVERHEAD NEUTRAL.

(G) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

H. THIS CONSTRUCTION TO BE USED WITH 350 KCMIL AND LARGER UNDERGROUND CABLE.

(I) INTERCONNECT SWITCH AND DEAD END BONDS PER G.O. 95 RULE 52.7 D

(J) ARRESTER AND CABLE TERMINAL POSITIONS MAY BE INTERCHANGED AT THE DISCRETION OF DISTRICT OPERATIONS PERSONNEL.

FOR FIELD MAINTENANCE ONLY

| ITEM | | DESCRIPTION | QUANTITY FIG 1 | QUANTITY FIG 2 | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|
| | 1 | CROSSARM, 3 3/4" X 5 3/4" X 12'-0" | 2 | 2 | 300 SECTION |
| | 2 | BRACE, ANGLE, CROSSARM, 5' | 2 | 2 | 164128 |
| | 3 | BRACKET, GALV, TERMINAL UPSWEEP, WITH PVC LINER, COMPLETE | 1 | 1 | 166856 |
| | 4 | BRACKET, TRIPLE TERMINAL | 1 | 1 | 166676 |
| | 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ WASH., 1 DBL COIL WASH. (E) | 1 | 1 | 100 SECTION |
| | 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2-SQ WASH., 1 DBL COIL WASH. (E) | 1 | 1 | 100 SECTION |
| P | 7 | BOLT, MACH, GALV, 1/2" X 7", 1 RD WASH., 1 DBL COIL WASH (E) | 4 | 4 | 100 SECTION |
| T | 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 LOCK WASH (G) (E) | 1 | 1 | 100 SECTION |
| F | 9 | COVER, BOLT, PLASTIC, & 6-10D NAILS (E) | 1 | 1 | 285696 |
| | 10 | SCREW, LAG, GALV, 4" (E) | 2 | 2 | 621568 |
| | 11 | PIN INSULATOR STRAIGHT 12KV (AS REQ'D BY ITEM 21) (G) | 8 | 3 | 532704, 532448 |
| | 12 | STEPS, POLE (E) | 16 | 16 | 692992 |
| | 13 | SIGN, HIGH VOLTAGE, & 8 ROOFING NAILS | 3 | 3 | 647648, 492224 |
| | 14 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D) 4-SQ WASH., 2 DBL COIL WASH, (G) (E) | 2 | 4 | 100 SECTION |
| | 15 | BOLT, MACH, GALV, 1/2" X 8", 1 RD WASH., 1 DBL COIL WASH (E) | 12 | 12 | 100 SECTION |
| | 16 | PIN, TRANSFORMER ADAPTER, 1" LEAD THREAD (G) | 1 | 1 | 529248 |
| | 17 | INSULATOR, SUSPENSION, 12KV, CLEVIS (G) | - | 7 | 700 SECTION |
| O | 18 | CLEVIS, DEAD END, 5/8" BOLT STEEL (G) (E) | - | 4 | 235712 |
| C | 19 | CLAMP, STRAIGHT LINE, O.E. (G) | - | 4 | 700 SECTION |
| D | 20 | INSULATOR, LINE, 12KV | 6 | 3 | 700 SECTION |
| | 21 | INSULATOR, 12KV, NEUTRAL (G) (E) | 3 | 1 | 429216 |
| | 22 | | | | |
| | 23 | BOLT MACH, GALV, 1/2" X 3" 1-LOCK WASH (E) | 12 | 12 | 100 SECTION |
| | 24 | BRACKET, DISCONNECT ANGLE MOUNTING, 1/4" X 3" MILD STEEL | 6 | 6 | 166542 |
| | 25 | SWITCH, HOOKSTICK DISCONNECT, 14.4KV, 400 A, 600 A, | 3 | 3 | 1200 SECTION |
| | 26 | TERMINAL, COMPRESSION | 6 | 6 | 700 SECTION |
| | 27 | CONNECTOR WIRE COMPRESSION (SIZE AS REQ'D) (E) | 13 | 9 | 700 SECTION |
| | 28 | WIRE, COPPER W.P., SIZE PER UG CABLE AMPACITY | 15' | 15' | 700 SECTION |
| | 29 | WIRE, BARE STRANDED COPPER, SIZE PER UG CABLE AMPACITY | 22' | 31' | 700 SECTION |
| | 30 | | | | |
| U | 31 | WIRE, #6, BARE STRANDED COPPER | 40' | 40' | 813536 |
| C | 32 | STAPLES, FENCE, GALV, 1 1/4" (E) | 40 | 40 | 678528 |
| D | 33 | | | | |
| | 34 | | | | |
| | 35 | UNIT GROUND, COMPLETE (WITH GRAY MLDG, WITH PLAIN MLDG) (C) | 1 | 1 | 603120, 603136 |
| | 36 | WIRE, #8, BARE SOLID ANNEALED COPPER | 1 LB | 1 LB | 812928 |
| | 37 | ARRESTER, LIGHTNING | 3 | 3 | 1200 SECTION |
| | 38 | TERMINALS UG CABLE | 3 | 3 | SEE UG STDS |
| | 39 | CABLE PRIMARY | AS REQ'D | | SEE UG STDS |
| | 40 | RISER CONSTRUCTION | AS REQ'D | | 1400/4200 SECTION |

OH 1499.306
~~UG-4299.306~~
SUPERSEDES
4233.2 (3-9-83)

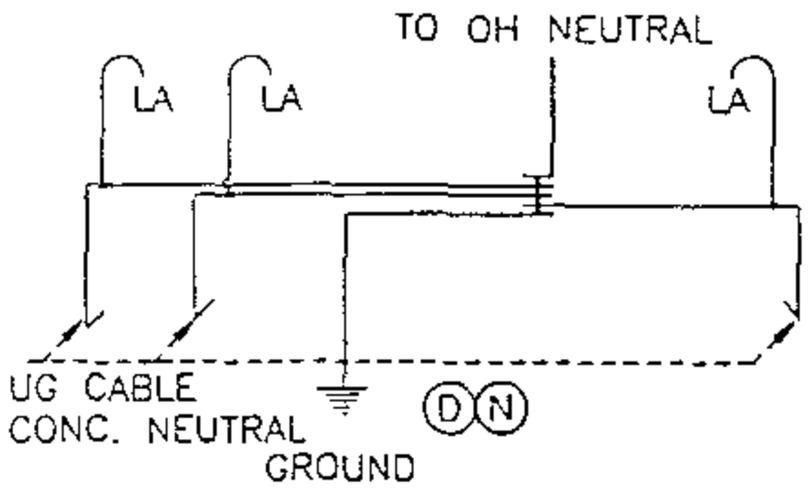
SDG&E ELECTRIC STANDARDS

12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, 3Φ, 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS

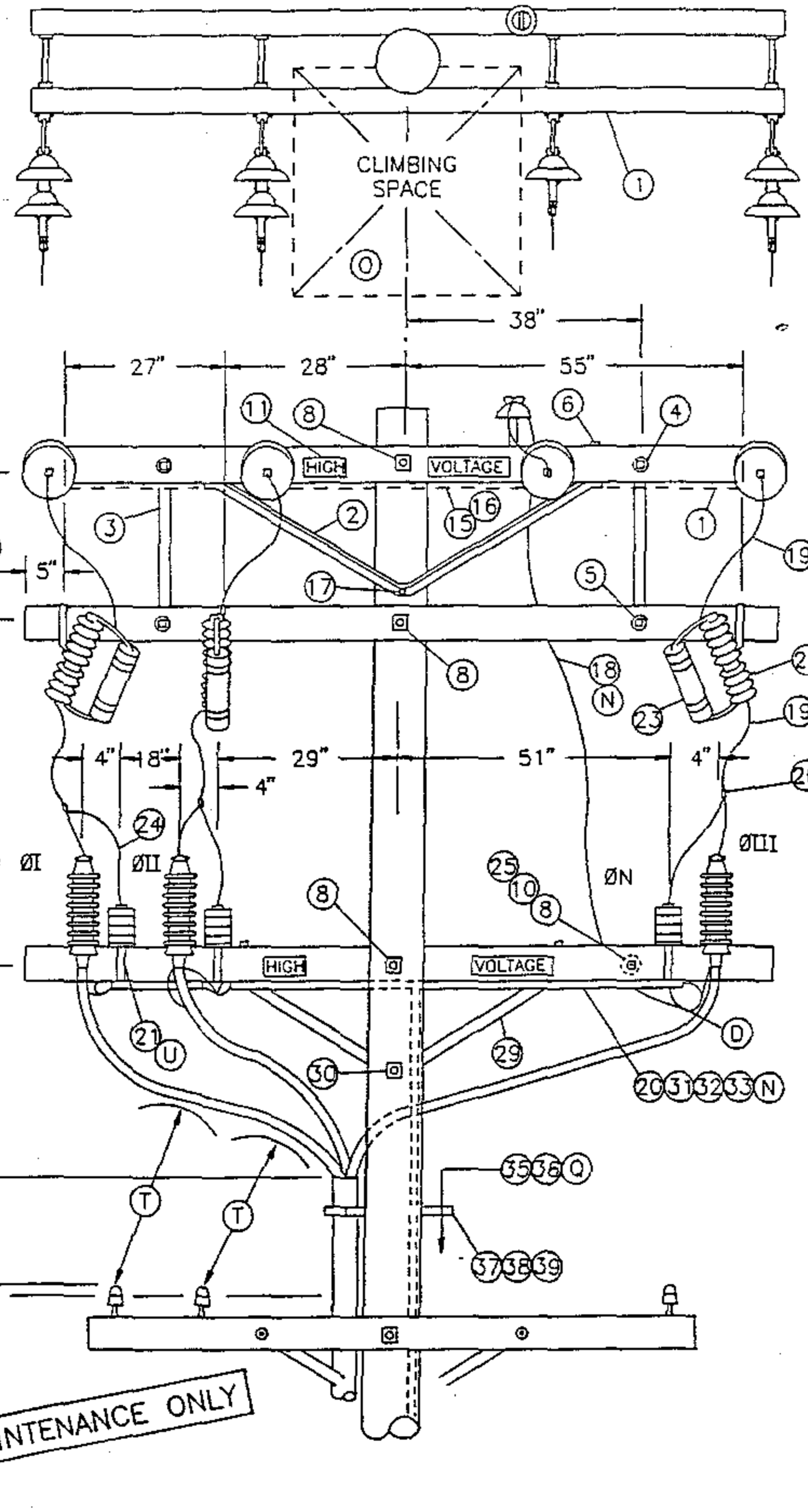
DATE 3-9-83
APPD WT/KR

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SCOPE: THIS STANDARD SHOWS DEADEND CONSTRUCTION FOR 12.47KV AND BELOW, 3 PHASE CABLE POLE WITH CROSSARM MOUNTED TERMINALS FOR #2/0 AND SMALLER U.G. CABLE. THIS CONSTRUCTION IS TO BE USED IN CONTAMINATION DISTRICT 1 ONLY.




GROUND WIRING DETAIL




FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLB/BDJ | SDG&E ELECTRIC STANDARDS<br>CROSSARM CABLE POLE, 3Ø, 1/C PER PHASE<br>DEADEND CONSTRUCTION, 12.47KV AND BELOW | OH 1499.307<br>~~UG 4299.307~~<br>SUPERCEDES<br>1439.1 (1-1-93) |

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BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 10' - 0" | 4 | - | 294128 |
| 2 | BRACE, ANGLE, CROSSARM, 5' - 0" | 2 | - | 164128 |
| 3 | BRACE, FLAT, CROSSARM, 28" (E) | 2 | - | 164192 |
| 4 | BOLT, WASHERHEAD, GALV, 3/8" X 4-1/2", 1 ROUND & 1 SPRING WASHER (E) | 2 | 392 | - |
| 5 | BOLT, MACH, GALV, 1/2-1 X 5", 1 ROUND & 1 DOUBLE COIL, SPRING WASHER (E) | 2 | 392 | - |
| 6 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER (E) | 6 | 392 | - |
| 7 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 2 ROUND, 4 SQUARE & 2 DOUBLE COIL SPRING WASHERS (B) (E) | 4 | 392 | - |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DOUBLE COIL SPRING WASHER (B) (E) | 4 | 392 | - |
| 9 | PIN, INSULATOR, STRAIGHT, 12KV, 1" (B) (E) | 1 | - | 532704 |
| 10 | INSULATOR, LINE, 12KV NEUTRAL (B) (E) | 2 | - | 429216 |
| 11 | SIGN, HIGH VOLTAGE & (E) | 4 | - | 647648 |
| | 9 ROOFING NAILS, GALV (E) | - | - | 492224 |
| 12 | CLEVIS, DEAD END, 5/8" BOLT STEEL (B) (E) | 4 | - | 235712 |
| 13 | INSULATOR, SUSPENSION, 12KV, CLEVIS (B) | 7 | 750 | - |
| 14 | CLAMP, STRAIGHT LINE, D.E. (B) | 4 | 741 | - |
| 15 | WIRE, #8, BARE SOLID ANNEALED COPPER | 10' | - | 812928 |
| 16 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | - | 678528 |
| 17 | BOLT, MACH, GALV, 5/3" X (LENGTH AS REQ'D) & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 18 | WIRE, COPPER, BARE STRANDED OR ACSR/AW BARE (OH NEUTRAL JUMPER) (B) (N) | 10' | 711-715 | - |
| 19 | WIRE, COPPER, BARE STRANDED (OH JUMPERS) (N) | 18' | 715 | - |
| 20 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-787 | - |
| 21 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING (E) | 6 | - | 166070 |
| 22 | CUTOUT, FOR CURRENT-LIMITING FUSE | 3 | 1212 | - |
| 23 | FUSE, CURRENT-LIMITING (SIZE AS SPECIFIED ON WORK ORDER) | 3 | 1207 | - |
| 24 | WIRE, BARE STRANDED COPPER, #6 | 14' | - | 813536 |
| 25 | PIN, TRANSFORMER ADAPTER, 1" LEAD THREAD (B) (E) | 1 | - | 529248 |
| 26 | ARRESTER, LIGHTNING | 3 | 1247 | - |
| 27 | BRACKET, CROSSARM, TERM (FOR #2 & #2/0 AL CABLE ONLY) (E) | 3 | - | 166060 |
| 28 | TERMINALS, UNDERGROUND CABLE | 3 | 4111 | - |
| 29 | BRACE, ANGLE, CROSSARM, 4' - 0" | 1 | - | 164032 |
| 30 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE & 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | - |
| 31 | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (N) (CABLE POLE NEUTRAL) | 10' | 715 | - |
| 32 | CONDUIT, PVC TYPE 2, SCHEDULE 40, 1" (E) | 10' | - | 251200 |
| 33 | STRAPS, PIPE, GALV, 1" & (E) | AS REQ'D | - | 697792 |
| | 2 - 6D NAILS, GALV (E) | | - | 491552 |
| 34 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 | - |
| 35 | WIRE, #4, BARE STRANDED COPPER | 45' | - | 813760 |
| 36 | UNIT GROUND, COMPLETE (S) | 1 | | 603136 |
| 37 | BRACKET, LADDER ARM (E) | AS REQ'D | 1404/4204 | 167184 |
| 38 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" (E) | AS REQ'D | 1404/4204 | 503488 |
| 39 | CHANNEL, DOUBLE GALV, 24" (E) | AS REQ'D | 1404/4204 | 216700 |

FOR FIELD MAINTENANCE ONLY

| CABLE SIZE | UG MACRO UNIT | |
|---|---|---|
| | PORCELAIN | |
| | 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 |

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| OH 1499.308<br>~~UG 4299.308~~<br>SUPERCEDES<br>1439.2 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>CROSSARM CABLE POLE, 3Ø, 1/c PER PHASE<br>DEADEND CONSTRUCTION, 12.47KV AND BELOW | DATE 1-1-93<br>APPD JLB/BSJ |

INSTALLATION:

A. NEW CABLE POLES SHALL HAVE A STANDARD DEPTH OF 9'. IN MOST CASES THIS WILL REQUIRE A 5' TALLER POLE.

(B) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

C. USE THIS CONSTRUCTION FOR 2/0 AND SMALLER UNDERGROUND CABLE.

(D) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(E) EXEMPT MATERIAL.

(F) OMIT Ø II AND Ø N FOR SINGLE Ø 12KV CABLE POLE, OMIT Ø I AND ØII FOR SINGLE Ø 6.9KV CABLE POLE.

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 2 | 4 | 6 | 2 | – | #6 PER PHASE |
| 2/0 | 4 | 6 | 2 | – | #6 PER PHASE |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

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REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251.

(P) POLE STEPPING – SEE STD. 363/4205.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

R. SEE STANDARD SECTION 1200/4300 FOR FUSING.

(S) RISER POSITIONS – SEE STANDARD 1402/4202.

(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STD. 1406/4206.

(U) SEE STANDARD 1407/4207 FOR PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLG/EDG | SDG&E ELECTRIC STANDARDS<br>CROSSARM CABLE POLE, 3Ø, 1/C PER PHASE DEADEND CONSTRUCTION, 12.47KV AND BELOW | OH 1499.309<br>~~UG 4299.309~~<br>SUPERCEDES 1439.3 (1-1-93) |

**SCOPE:** THIS STANDARD SHOWS THREE–PHASE CABLE POLE CONSTRUCTION USING NON–PORCELAIN TERMINALS FOR 350 KCMIL AND LARGER UG CABLE. (H)

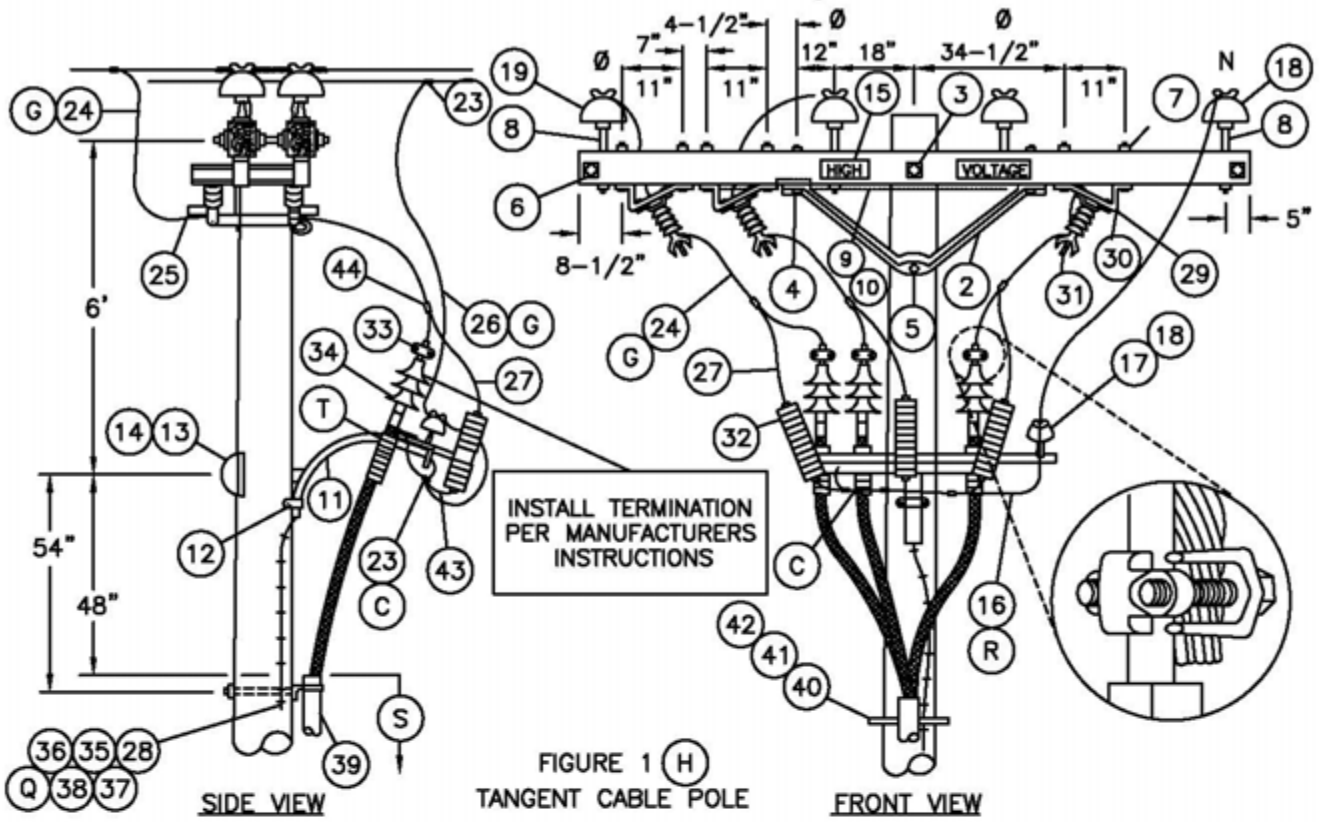



FIGURE 1 (H)
TANGENT CABLE POLE

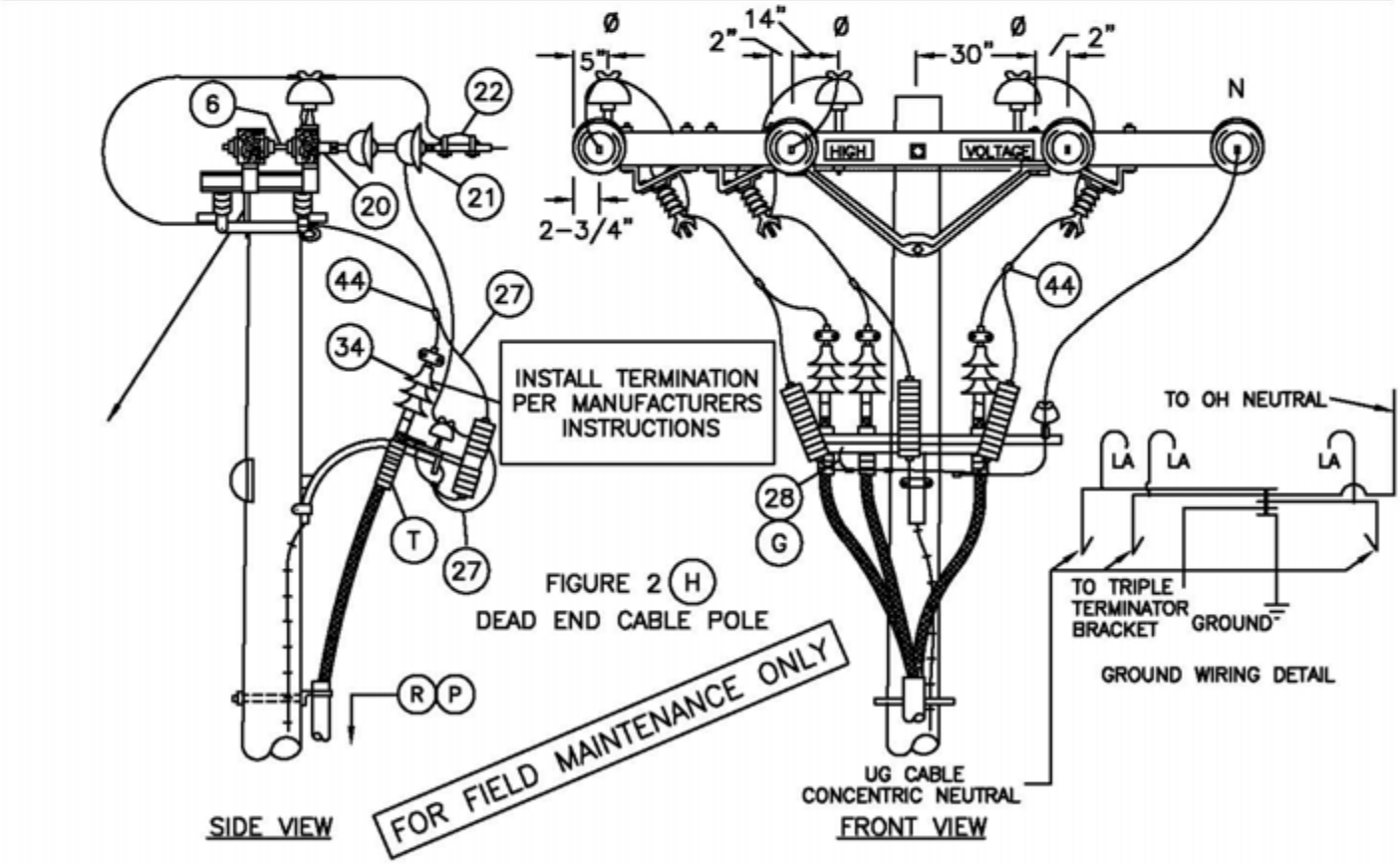



FIGURE 2 (H)
DEAD END CABLE POLE

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| | | |
|---|---|---|
| DATE 10–20–05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE–PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON–PORCELAIN TERMINALS | OH 1499.310<br>UG 4299.310<br>SUPERSEDES<br>1432.1 (10–20–05) |

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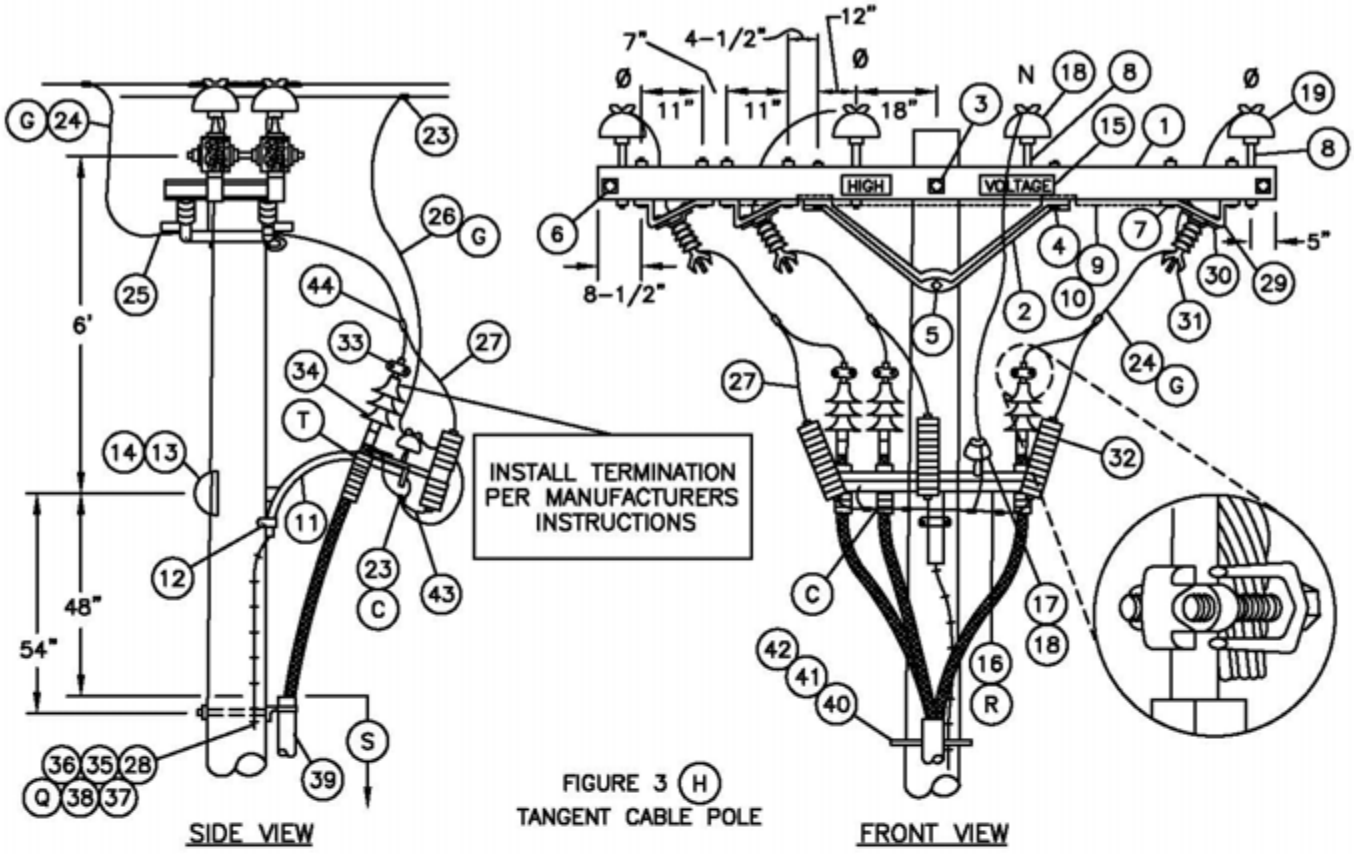



FIGURE 3 (H)
TANGENT CABLE POLE

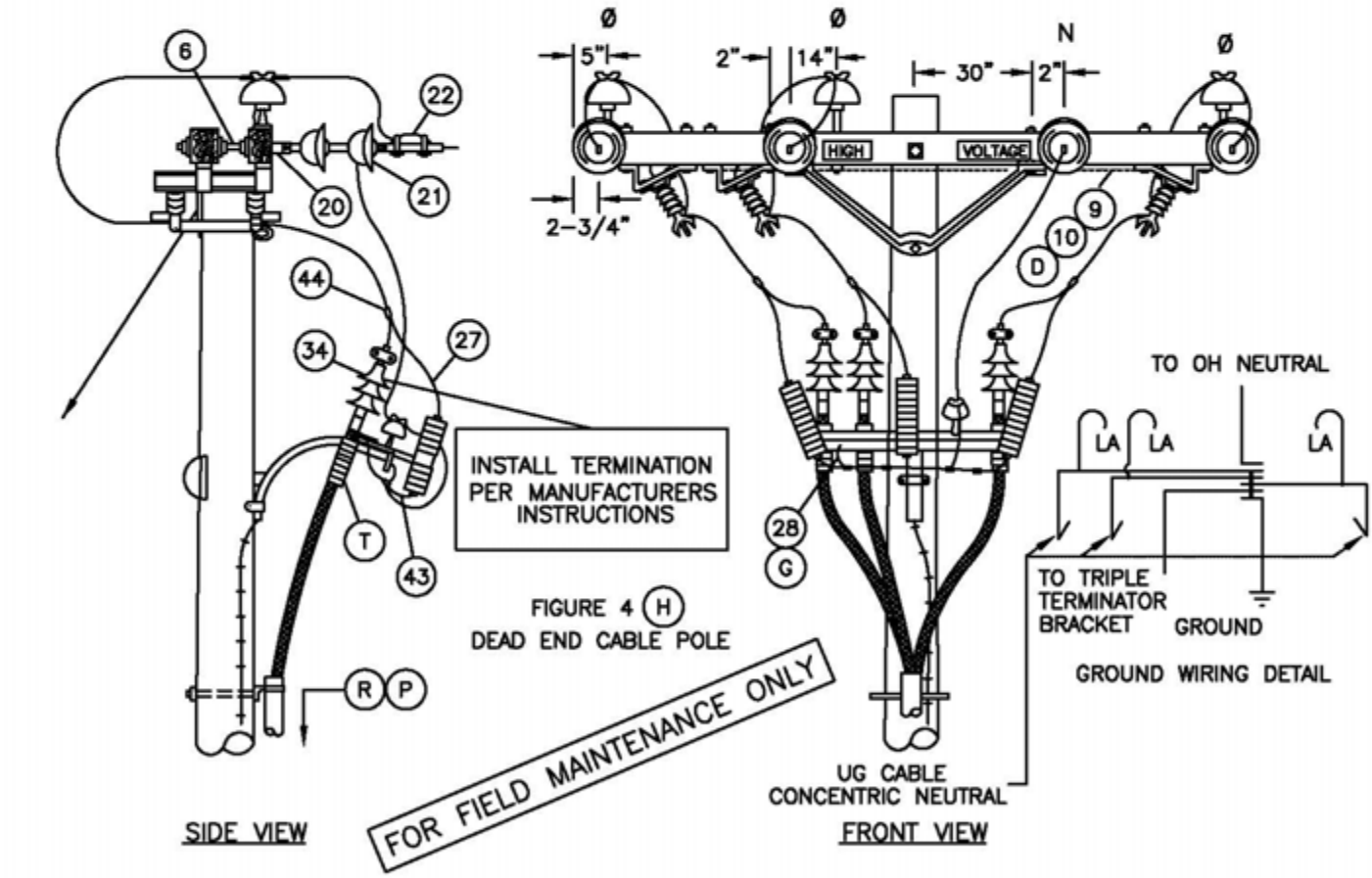



FIGURE 4 (H)
DEAD END CABLE POLE

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| | | |
|---|---|---|
| DATE 10-20-05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE-PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON-PORCELAIN TERMINALS | OH 1499.311<br>UG 4299.311<br>SUPERSEDES<br>1432.2 (10-20-05) |

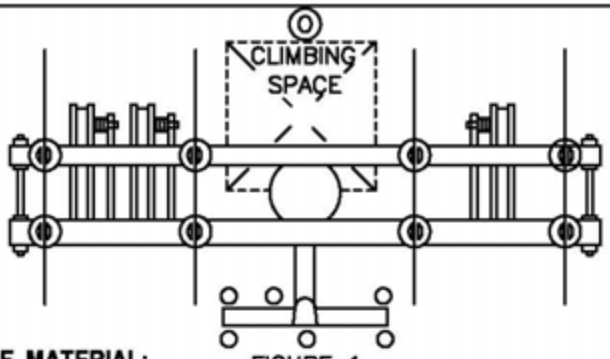


FIGURE 1

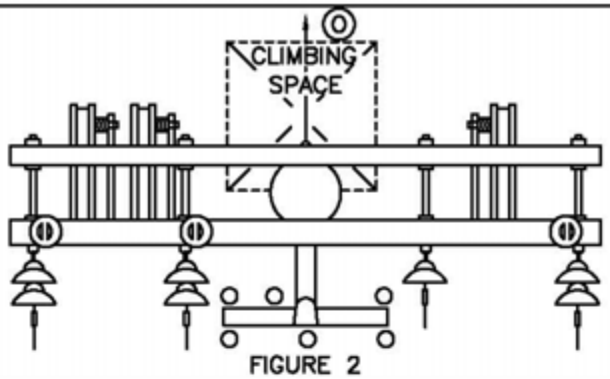


FIGURE 2

**BILL OF MATERIAL:**

| ITEM | DESCRIPTION | QUANTITY FIG 1 | QUANTITY FIG 2 | CONSTR STANDARD | STOCK NUMBER |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 12'-0" (F) | 2 | 2 | | 294160 |
| 2 | BRACE, ANGLE, CROSSARM, 5' | 2 | 2 | – | 164128 |
| 3 | BOLT, MACH., GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHERS | 1 | 1 | 392 | – |
| 4 | BOLT, MACH, GALV, 1/2" X 7", 1 RD, 1 DBL COIL SPR WASH | 4 | 4 | 392 | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), AND 1 DOUBLE COIL SPRING WASHER | 1 | 1 | 392 | – |
| 6 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 4 SQUARE, 2 ROUND AND 2 DOUBLE COIL SPRING WASHERS (E) | 2 | 4 | 392 | – |
| 7 | BOLT, MACH, GALV, 1/2" X 8", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | 12 | 12 | 392 | – |
| 8 | PIN, INSULATOR, STRAIGHT, 12KV, 1" OR (E) | 8 | 3 | – | 532704 |
| | 1-3/8" (E) | 8 | 3 | – | 532448 |
| 9 | WIRE, #8, BARE SOLID ANNEALED COPPER | 15' | 15' | – | 812928 |
| 10 | STAPLES, FENCE, GALV, 1-1/4" | AS REQ'D | | – | 678528 |
| 11 | BRACKET, GALV, TERMINAL UPSWEEP (Q) | 1 | 1 | – | 166856 |
| 12 | SCREW, LAG, GALV, 4" | 2 | 2 | – | 621568 |
| 13 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER | 1 | 1 | 392 | – |
| 14 | COVER, BOLT, PLASTIC, AND 6 – 10D NAILS, GALV | 1 | 1 | – | 285696 / 491392 |
| 15 | SIGN, HIGH VOLTAGE, AND 9 ROOFING NAILS, GALV | 2 | 2 | – | 647648 / 492224 |
| 16 | BRACKET, TRIPLE TERMINATOR | 1 | 1 | – | 166676 |
| 17 | PIN, SHORT SHANK, 1" LEAD THREAD (E) | 1 | 1 | – | 532426 |
| 18 | INSULATOR, 12KV, NEUTRAL (E) | 3 | 1 | – | 429216 |
| 19 | INSULATOR, LINE, 12KV, 1" OR 1-3/8" PIN | 6 | 3 | 750 | – |
| 20 | CLEVIS, DEAD END, 5/8" BOLT, STEEL (E) | – | 4 | – | 235712 |
| 21 | INSULATOR, SUSPENSION, 12KV, CLEVIS (E) | – | 7 | 750 | – |
| 22 | CLAMP, STRAIGHT LINE, D.E. (E) | – | 4 | 741 | – |

FOR FIELD MAINTENANCE ONLY

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| OH 1499.312<br>UG 4299.312<br>SUPERSEDES<br>1432.2 (1-1-98) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE-PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON-PORCELAIN TERMINALS | DATE 1-1-98<br>APPD PSA / CMC |

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

| ITEM | DESCRIPTION | QUANTITY FIG 1 | QUANTITY FIG 2 | CONSTR STANDARD | STOCK NUMBER | ASSEMBLY UNIT |
|---|---|---|---|---|---|---|
| 23 | CONNECTOR, WIRE COMPRESSION, (SIZE AS REQ'D) | AS REQ'D | | 783–786 | – | – |
| 24 | WIRE, BARE STRANDED COPPER, (OH JUMPER) (G) | 21' | 30' | 715 | – | – |
| 25 | TERMINAL, COMPRESSION (SIZE AS REQ'D) | 6 | 6 | 794–795 | – | – |
| 26 | WIRE, BARE STRANDED COPPER, (OH NEUT JUMPER) (G) | 9' | 9' | 715 | – | – |
| 27 | WIRE, #6, BARE STRANDED COPPER | 12' | 12' | – | 813536 | – |
| 28 | #4 CU SOLID GROUND WIRE, PVC COVERED | 50' | 50' | – | 812490 | GNDPVC |
| 29 | BRACKET, DISCONNECT, ANGLE MOUNTING | 6 | 6 | – | 166542 | – |
| 30 | BOLT, MACH, GALV, 3/8" X 3", 2 RD WASH & 1 LOCK WASH | 6 | 6 | 392 | – | – |
| 31 | SWITCH, HOOKSTICK DISCONNECT, 14.4KV, 600 A OR 1200 A | 3 | 3 | 1222 | – | – |
| 32 | ARRESTER, LIGHTNING | 3 | 3 | 1247 | – | – |
| 33 | CONNECTOR, TWO BOLT, BRONZE (SIZE AS REQ'D) | 3 | 3 | 4111 | – | – |
| 34 | TERMINALS, UNDERGROUND CABLE (T) | 3 | 3 | 4111 | – | – |
| 35 | GROUND ROD, 5/8" X 8', COPPERWELD | 1 | 1 | – | 603072 | GNDPVC |
| 36 | COPPER BONDED GROUND CONNECTOR | 1 | 1 | – | 259010 | – |
| 37 | GROUND ENHANCING POWER SOLUTION (GEM) | AS REQ'D | | – | 424390 | – |
| 38 | GALVANIZED STAPLES FOR PVC COVERED GROUND WIRE | AS REQ'D | | – | 678562 | – |
| 39 | RISER CONSTRUCTION | AS REQ'D | | 1400/4200 | – | – |
| 40 | BRACKET, LADDER ARM | AS REQ'D | | 1404/4204 | 167184 | – |
| 41 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | AS REQ'D | | 1404/4204 | 503488 | – |
| 42 | CHANNEL, DOUBLE GALV., 24" | AS REQ'D | | 1404/4204 | 216700 | – |
| 43 | FLEXIBLE ARRESTER GROUND STRAP | AS REQ'D | | – | 698754 | – |
| 44 | HOT LINE CLAMP | 3 | 3 | 788 | 227680 | – |

FOR FIELD MAINTENANCE ONLY

OVERHEAD MACRO UNIT
3NS–B

**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, TRIPLE TERMINAL BRACKET AND CONCENTRIC CABLE NEUTRAL TO LIGHTNING ARRESTER GROUND.

(D) INTERCONNECT SWITCH AND DEAD END BONDS PER G.O. 95 RULE 52.7 D.

(E) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(F) WHEN ADDING THIS CONSTRUCTION TO AN EXISTING POLE WITH A 10' LINE ARM, AND SUFFICIENT POLE HEIGHT EXISTS, INSTALL 10' SWITCH ARMS AND ASSOCIATED HARDWARE BELOW THE LINE ARM TO AVOID CHANGING LINE ARM FROM 10' TO 12' (SEE O.H. STANDARD 1222. FIG. 1–B).

| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 10–20–05<br>APPD PA / JJ | 12.47KV AND BELOW CABLE POLE, UPSWEEP BRACKET, THREE–PHASE 1/C PER PHASE, LINE ARM MOUNTED DISCONNECTS, NON–PORCELAIN TERMINALS | OH 1499.313<br>UG 4299.313<br>SUPERSEDES<br>1432.4 (10–20–05) |

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**INSTALLATION:** (CON'T)

(G)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |
| BECAUSE THE PROPER SIZE CONNECTOR IS NOT ALWAYS AVAILABLE, THE JUMPER FROM THE OVERHEAD LINE CONDUCTOR TO THE HOOKSTICK SWITCH CAN BE THE SAME SIZE AS, OR LARGER THAN THAT OF THE OVERHEAD CONDUCTOR. | | | | | |

(H) – USE FIGURE ONE AND TWO FOR ALL **NEW** CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH NEUTRAL ON OUTSIDE PIN POSITION. SEE DESIGN MANUAL PAGE 5124.2.

– USE FIGURE THREE AND FOUR ON EXISTING CONSTRUCTION WITH NEUTRAL ON INSIDE PIN POSITION.

**REFERENCE:**

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251

(P) POLE STEPPING – SEE STD. 363.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

(R) RISER POSITIONS – SEE STANDARD 1402/4202.

(S) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 SEE STD. 1406/4206.

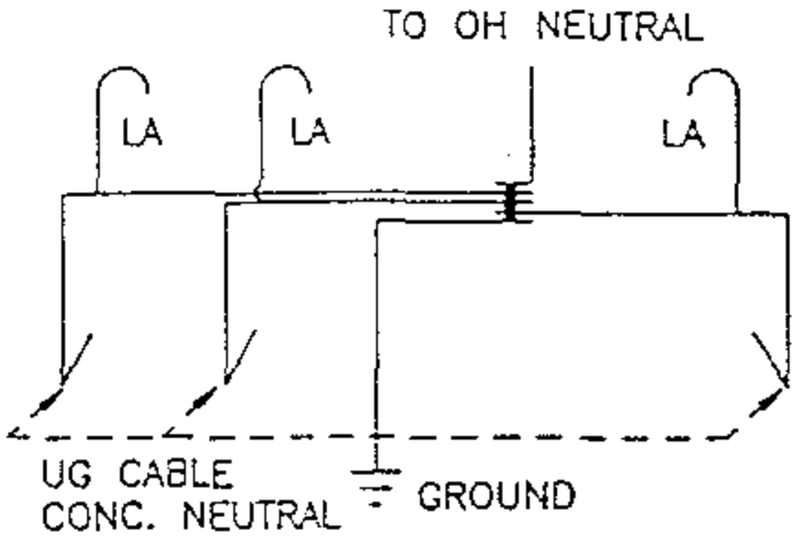
(T) SEE STANDARD 1407/4207 FOR NON PORCELAIN TERMINAL MOUNTING INSTRUCTIONS AND MATERIALS.

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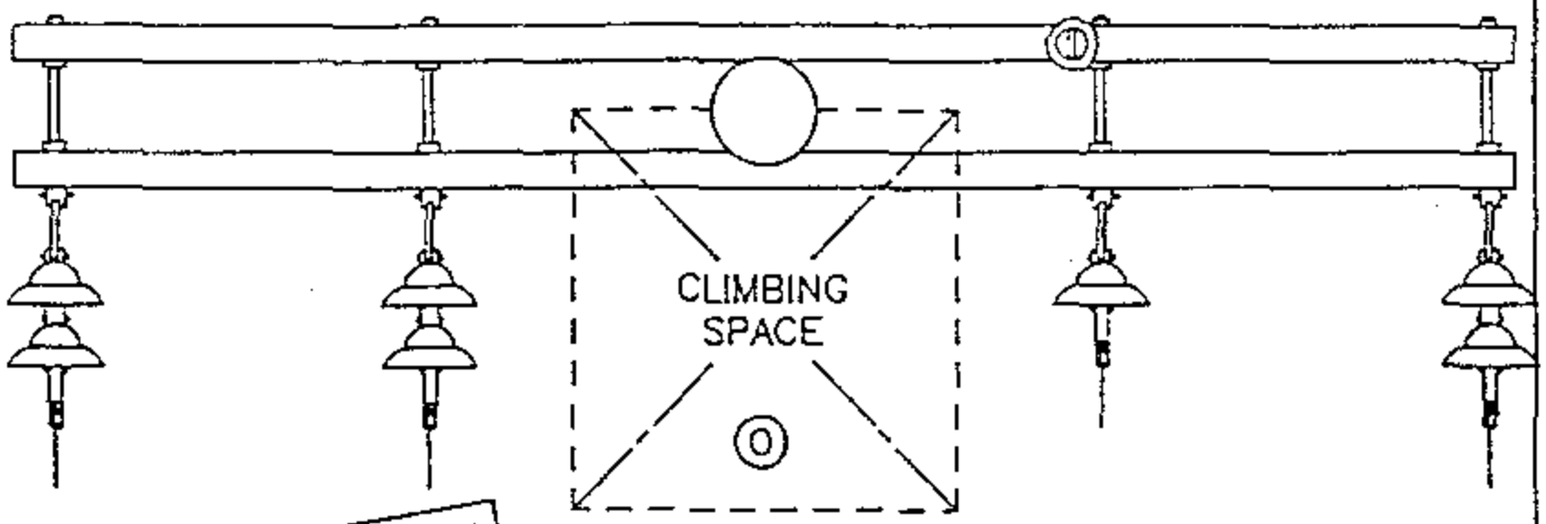
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SCOPE: THIS STANDARD SHOWS CABLE POLE CONSTRUCTION USING PORCELAIN TERMINATIONS FOR 750 AND LARGER UNDERGROUND CABLE. (SEE STANDARD 1407/4207 FOR 350 KCMIL TERMINAL MOUNTING INFORMATION).




GROUND WIRING DETAIL




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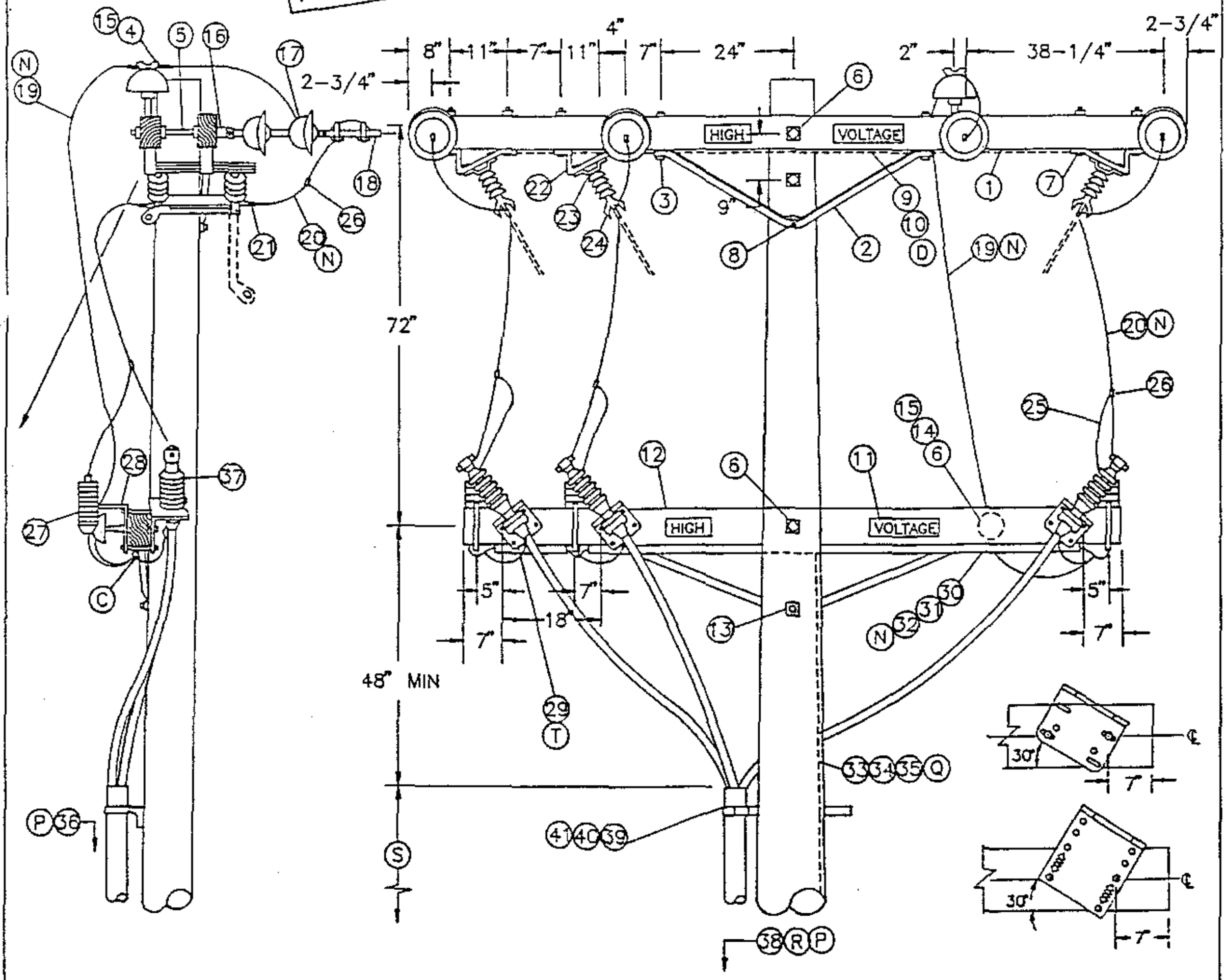



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| DATE 1-1-93<br>APPD JLG/EDJ | SDG&E ELECTRIC STANDARDS<br>12.47 KV AND BELOW DEAD END CABLE POLE<br>ARM, 3Ø, 1/C PER Ø, HOOKSTICK SWITCHED | OH 1499.401<br>~~UG 4299.401~~<br>SUPERCEDES<br>1441.1 (1-1-93) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONSTR STANDARD | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 12'- 0" (G) | 2 | – | 294160 |
| 2 | BRACE, ANGLE, CROSSARM, 4'- 0" | 3 | – | 164032 |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 6 | 392 | – |
| 4 | PIN, INSULATOR, STRAIGHT, 12KV, 1" LEAD THREAD (F)(E) | 1 | – | 532704 |
| 5 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQUARE, 2 ROUND AND 2 DOUBLE COIL SPRING WASHERS (F)(E) | 4 | 392 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHERS (F)(E) | 3 | 392 | – |
| 7 | BOLT, MACH, GALV, 1/2" X 8", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER (E) | 12 | 392 | – |
| 8 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | – |
| 9 | WIRE, #8, BARE SOLID ANNEALED COPPER | 15' | – | 812928 |
| 10 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | – | 678528 |
| 11 | SIGN, HIGH VOLTAGE AND 9 ROOFING NAILS, GALV (E) | 4 | – | 647648<br>492224 |
| 12 | CROSSARM, 3-3/4" X 5-3/4 X 10'- 0" | 1 | – | 294128 |
| 13 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE AND 1 DOUBLE COIL SPRING WASHER (E) | 1 | 392 | – |
| 14 | PIN, TRANSFORMER LEAD ADAPTER, 1" (F)(E) | 1 | – | 529248 |
| 15 | INSULATOR, 12KV, NEUTRAL (F)(E) | 2 | – | 429216 |
| 16 | CLEVIS, DEAD END, 5/8" BOLT STEEL (F)(E) | 4 | – | 235712 |
| 17 | INSULATOR, SUSPENSION, 12KV, CLEVIS (F) | 7 | 750 | – |
| 18 | CLAMP, STRAIGHT LINE, D.E. (F) | 4 | 741 | – |
| 19 | WIRE, BARE STRANDED CU OR AL (OH NEUT JUMPER) (N)(F) | 12' | 711-715 | – |
| 20 | WIRE, BARE STRANDED COPPER (OH JUMPER) (N) | 25' | 715 | – |
| 21 | TERMINAL, COMPRESSION (E) | 6 | 794-795 | – |
| 22 | BRACKET, DISCONNECT, ANGLE MOUNTING | 6 | – | 166542 |
| 23 | BOLT, MACH, GALV, 3/8" X 3", 2 ROUND & 1 LOCK WASHER (E) | 6 | 392 | – |
| 24 | SWITCH, HOOKSTICK DISCONNECT, 14.4KV, 600 A OR 1200 A | 3 | 1222 | – |
| 25 | WIRE, #6, BARE STRANDED COPPER | 12' | – | 813536 |
| 26 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) (E) | AS REQ'D | 783-787 | – |
| 27 | ARRESTER, LIGHTNING (N) | 3 | – | 113248 |
| 28 | BRACKET, CUTOUT/ARRESTER (E) | 3 | – | 166070 |
| 29 | BRACKET, TERMINAL MOUNTING | 3 | – | 166674 |
| 30 | CONDUIT, PVC TYPE 2, SCHEDULE 40, 1" (E) | 10' | – | 251200 |
| 31 | STRAPS, PIPE, GALV, 1" AND 2 – 6D NAILS , GALV (E) | AS REQ'D | – | 697792<br>491552 |
| 32 | WIRE, BARE STRANDED COPPER (CP NEUT-UNDER POTHEAD ARM) (N) | 15' | 715 | – |
| 33 | WIRE, #4, BARE STRANDED COPPER | 45' | – | 813760 |
| 34 | STAPLES, FENCE, GALV, 1-1/4" (E) | AS REQ'D | – | 678528 |
| 35 | UNIT GROUND, COMPLETE (Q) | 1 | – | 603136 |
| 36 | TAGS, SWITCH NUMBER (E) | 2 | – | 720704 |
| 37 | TERMINALS, UNDERGROUND CABLE | 3 | 4111 | – |
| 38 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 | – |
| 39 | BRACKET, LADDER ARM (E) | AS REQ'D | 1404/4204 | 167184 |
| 40 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" (E) | AS REQ'D | 1404/4204 | 503488 |
| 41 | CHANNEL, DOUBLE GALV, 24" (E) | AS REQ'D | 1404/4204 | 216700 |

FOR FIELD MAINTENANCE ONLY

| CABLE SIZE | UG MACRO UNIT |
|---|---|
| | W/LADDER ARMS |
| 3C-#350 | CP350L |
| 3C-#750 | CP750L |
| 3C-#1000 | CP-1KL |

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|---|---|---|
| OH 1499.402<br>~~UG 4299.402~~<br>SUPERCEDES 1441.2 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE ARM, 3ϕ, 1/C PER ϕ, HOTSTICK SWITCHED | DATE 1-1-93<br>APPD JLB/BDG |

## 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 350 KCMIL AND LARGER UNDERGROUND CABLE.

(C) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) INTERCONNECT SWITCH AND DEADEND BONDS PER G.O. 95 RULE 52.7D. BONDING SHOULD BE DONE IN ACCORDANCE WITH RULE 53.4.

(E) EXEMPT MATERIAL.

(F) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(G) WHEN ADDING THIS CONSTRUCTION TO AN EXISTING POLE WITH A 10' LINE ARM. AND SUFFICIENT POLE HEIGHT EXISTS, INSTALL 10' SWITCH ARMS AND ASSOCIATED HARDWARE BELOW THE LINE ARM TO AVOID CHANGING LINE ARM FROM 10' TO 12' (SEE O.H. STANDARD 1222, FIG. 1-B).

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 2 | 4 | 6 | 2 | – | #6 PER PHASE |
| 2/0 | 4 | 6 | 2 | – | #6 PER PHASE |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

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## REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STANDARD 251.

(P) POLE STEPPING – SEE STANDARD 363.

(Q) GROUNDING METHODS – SEE STANDARD 1002.

(R) RISER POSITIONS – SEE STANDARD 1402/4202.

(S) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STANDARD 1406/4206.

(T) SEE STANDARD 1407/4207 FOR PORCELAIN AND NON PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

| | | |
|---|---|---|
| DATE 1-1-93<br>APPD JLG/EDG | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE ARM, 3Ø, 1/C PER Ø, HOOKSTICK SWITCHED | OH 1499.403<br>~~UG 4299.403~~<br>SUPERCEDES 1441.3 (1-1-93) |

SCOPE: THIS STANDARD SHOWS A DEADEND CONSTRUCTION FOR 12.47 KV AND BELOW, THREE-PHASE CABLE POLE USING NON-PORCELAIN TERMINALS WITH A MEMCO GANG OPERATED SWITCH FOR 350 KCMIL AND LARGER U.G. CABLE.

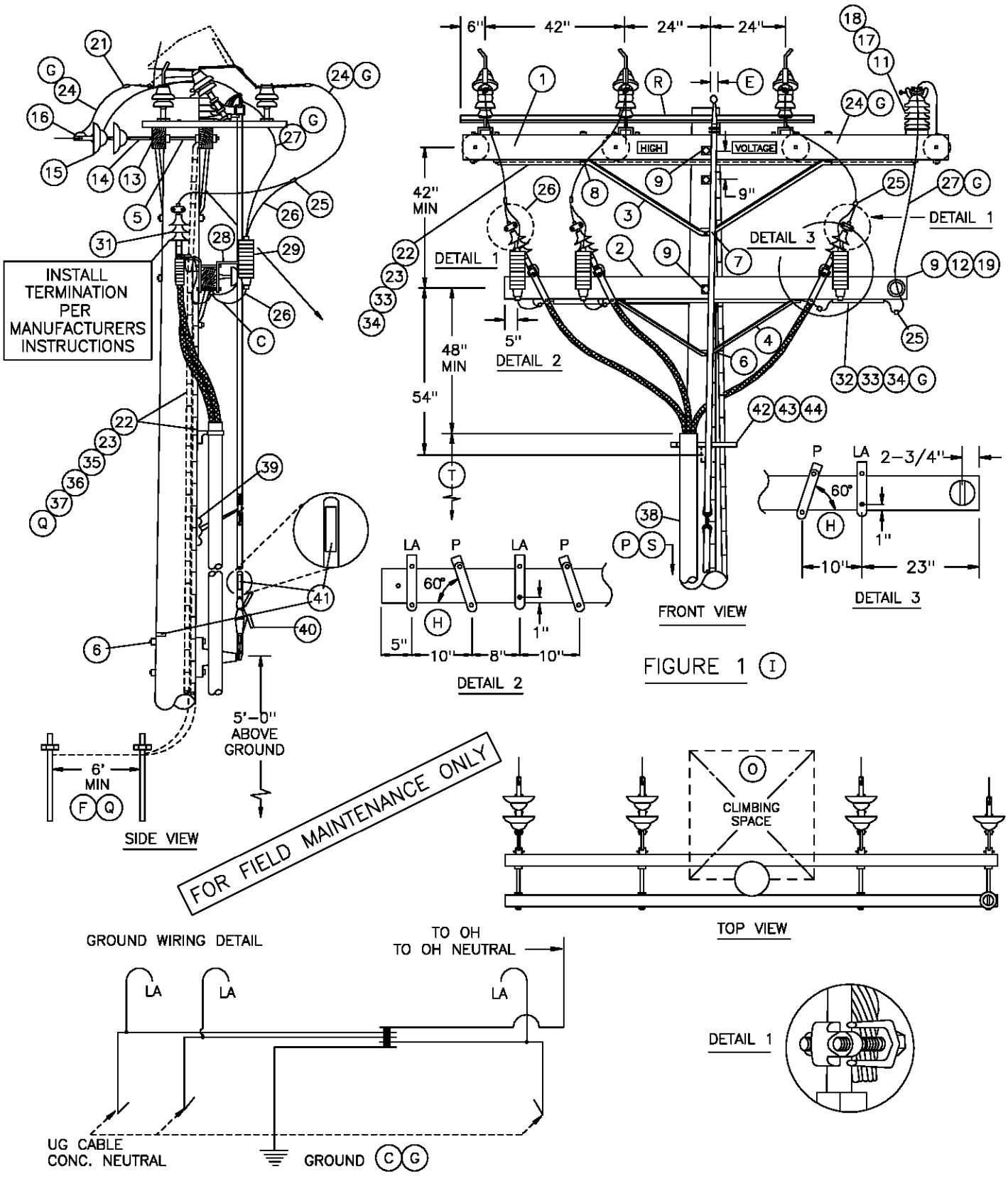
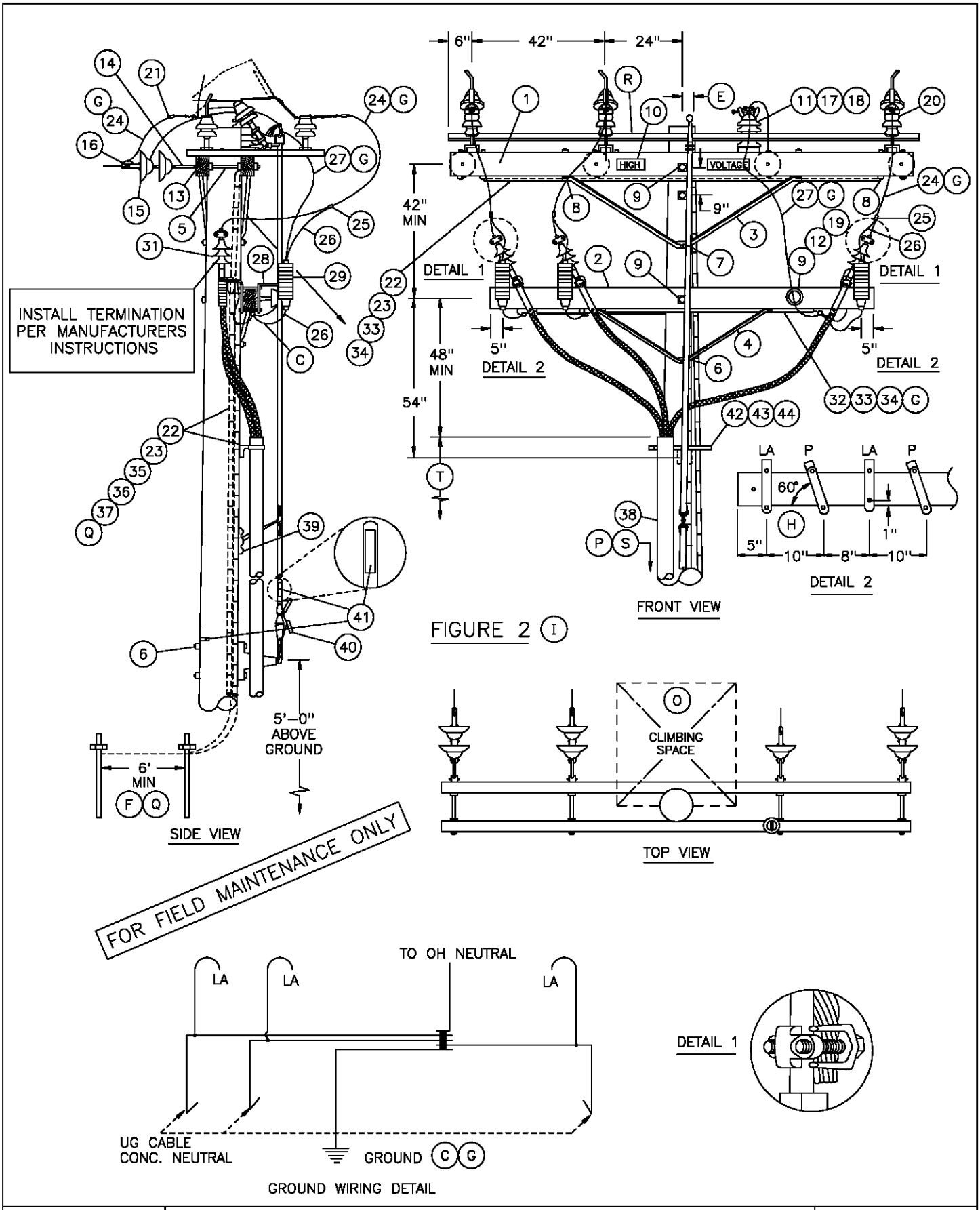



FIGURE 1 (I)

| | | |
|---|---|---|
| OH 1499.404<br>~~UG 4299.404~~<br>SUPERSEDES<br>1443.1 (9-1-00) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE THREE-PHASE,<br>1/C PER PHASE, GANG OPERATED SWITCHED,<br>NON-PORCELAIN TERMINALS | DATE 1-1-96<br>APPD PBA / CMC |

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|---|---|---|
| DATE 1-1-96<br>APPD PSA / CMC | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE THREE-PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON-PORCELAIN TERMINALS | OH 1499.405<br>~~UG 4299.405~~<br>SUPERSEDES<br>1443.2 (9-1-00) |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3–3/4" X 5–3/4" X 12'–0" | 2 | 380.2 | – |
| 2 | CROSSARM, 3–3/4" X 5–3/4" X 10'–0" | 1 | 380.2 | – |
| 3 | BRACE, 6', ANGLE, GALV | 2 | – | 164160 |
| 4 | BRACE, 4', ANGLE, GALV | 1 | – | 164032 |
| 5 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQ WASH & 2 DBL COIL SPRING WASH (D) | 4 | 392.1 &.2 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ WASH & 1 DBL COIL SPRING WASH | 3 | 392.1 &.2 | – |
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DBL COIL SPRING WASH | 1 | 392.1 &.2 | – |
| 8 | BOLT, MACH, GALV, 1/2" X 7", 1 RD WASH & 1 DBL COIL SPRING WASH | 18 | 392.1 &.2 | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ WASH & 1 DBL COIL SPRING WASH | 3 | 392.1 &.2 | – |
| 10 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | 2 | – | 647648 492224 |
| 11 | STUD, 7–1/2" X 5/8" & 1 DBL COIL SPRING WASH (D) | 1 | – | 701760 798560 |
| 12 | PIN, TRANSFORMER ADAPTER, 1", LEAD THREAD (D) | 1 | – | 529248 |
| 13 | CLEVIS, DEAD END, 5/8", BOLT STEEL (OPEN TYPE) (D) | 4 | – | 235618 |
| 14 | LINK , EXTENSION, 1/2" X 2" X 12" (D) | 4 | – | 466240 |
| 15 | INSULATOR, SUSPENSION, 12KV, CLEVIS (D) | 7 | 750.3 | – |
| 16 | CLAMP, STRAIGHT LINE, D.E. (D) | 4 | 741–743 | – |
| 17 | INSULATOR, VERTICAL POST (D) | 1 | – | 428608 |
| 18 | CLAMP, POST INSULATOR (D) | 1 | – | 227824 |
| 19 | INSULATOR, LINE, 12KV NEUTRAL (D) | 1 | – | 429216 |
| 20 | SWITCH, TPST TILTING INSULATOR, 600 AMP | 1 | – | 709254 |
| 21 | TERMINAL, COMPRESSION | 6 | 794–795 | – |
| 22 | WIRE, #4, BARE STRANDED, COPPER | 110' | – | 813760 |
| 23 | STAPLES, FENCE, GALV, 1–1/4" | AS REQ'D | – | 678528 |
| 24 | WIRE, BARE STRANDED COPPER (OH JUMPERS) (D) | 20' | 715 | – |
| 25 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – |
| 26 | WIRE, #6, BARE STRANDED COPPER | 12' | – | 813536 |
| 27 | WIRE, BARE STRANDED CU OR ACSR/AW BARE (OH NEUT JUMPER) (D)(G) | 10' | 711–715 | – |

FOR FIELD MAINTENANCE ONLY

| OVERHEAD MACRO UNIT |
|---|
| 3NGMXP |

| UG MACRO UNIT | |
|---|---|
| CABLE SIZE | ON LADDER ARMS |
| 3C–#350 | NP350L |
| 3C–#750C | NP750L |
| 3C–#1000 | N1000L |

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|---|---|---|
| OH 1499.406<br>~~UG 4299.406~~<br>SUPERSEDES<br>1443.3 (9–1–00) | SDG&E ELECTRIC STANDARDS<br>12.4KV AND BELOW DEAD END CABLE POLE THREE–PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS | DATE 1–1–98<br>APPD PSA / CMC |

BILL OF MATERIAL: (CONTINUED)

| ITEM | DESCRIPTION | QUANTITY | CONSTR STANDARD | STOCK NUMBER |
|---|---|---|---|---|
| 28 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | – | 166070 |
| 29 | ARRESTER, LIGHTNING | 3 | 1247 | – |
| 30 | | | | |
| 31 | TERMINALS & UNDERGROUND CABLE (U) | 3 | 4111 | – |
| 32 | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (G) | 20' | 715 | – |
| 33 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1–1/2" | 21' | – | 251232 |
| 34 | STRAPS, PIPE, GALV, 1–1/2" & 6–D NAILS | AS REQ'D | – | 697664<br>491552 |
| 35 | MOULDING, OAK HARDWOOD, 1" X 8' LONG | 11' | – | 487200 |
| 36 | STAPLES, MOULDING, GALV, 3" X 1–1/16" X 1/4" | AS REQ'D | – | 678560 |
| 37 | ROD & CLAMP, GROUND | 2 2 | – | 230016<br>603072 |
| 38 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 | – |
| 39 | SCREW, LAG, 1/2" X 4" | 2 | – | 621568 |
| 40 | PADLOCK, MEDECO | 1 | – | 514862 |
| 41 | TAGS, SWITCH NUMBER | 2 | 204/3104 | – |
| 42 | BRACKET, LADDER ARM | AS REQ'D | 1404/4204 | 167184 |
| 43 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | AS REQ'D | 1404/4204 | 503488 |
| 44 | CHANNEL, DOUBLE GALV, 24" | AS REQ'D | 1404/4204 | 216700 |

FOR FIELD MAINTENANCE ONLY

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 350 KCMIL AND LARGER UNDERGROUND CABLE.

(C) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(E) OFFSET AS REQUIRED TO CLEAR ANCHOR GUY.

(F) SWITCH GROUND AND LIGHTNING ARRESTER GROUND TO BE CONNECTED ON THE SAME GROUND ROD.

(G)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

(H) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX. 60° ANGLE.

| | Indicates Latest Revision | Completely Revised | New Page | Information Removed |
|---|---|---|---|---|

SDG&E ELECTRIC STANDARDS

DATE 1–1–93
APPD JLB/RDJ

12.4KV AND BELOW DEAD END CABLE POLE
THREE–PHASE, 1/C PER PHASE,
GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS

OH 1499.407
~~UG 4299.407~~
SUPERSEDES
1443.4 (9–1–00)

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INSTALLATION: (CON'T)

(I) – USE FIGURE ONE FOR ALL **NEW** CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH NEUTRAL ON OUTSIDE PIN POSITION.

– USE FIGURE TWO ON EXISTING CONSTRUCTION WITH NEUTRAL ON INSIDE PIN POSITION.

REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251.

(P) POLE STEPPING – SEE STD. 363.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

(R) GANG OPERATED SWITCH MOUNTING INSTRUCTIONS – SEE STD. SECTION 1200.

(S) RISER POSITION – SEE STANDARD 1402/4202.

(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STD. 1406/4206.

(U) SEE STANDARD 1407/4207 FOR NON–PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

FOR FIELD MAINTENANCE ONLY

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Indicates Latest Revision | | Completely Revised | | New Page | | Information Removed |

| | | |
|---|---|---|
| OH 1499.408<br>~~UC 4299.408~~<br>SUPERSEDES<br>1443.5 (9–1–00) | SDG&E ELECTRIC STANDARDS<br>12.4KV AND BELOW DEAD END CABLE POLE<br>THREE–PHASE, 1/C PER PHASE,<br>GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS | DATE 1–1–93<br>APPD JLG/RDJ |

SCOPE: THIS STANDARD SHOWS A DEADEND CONSTRUCTION FOR 12.47 KV AND BELOW, THREE-PHASE CABLE POLE USING NON-PORCELAIN TERMINALS WITH A MEMCO GANG OPERATED SWITCH FOR 350 KCMIL AND LARGER U.G. CABLE.

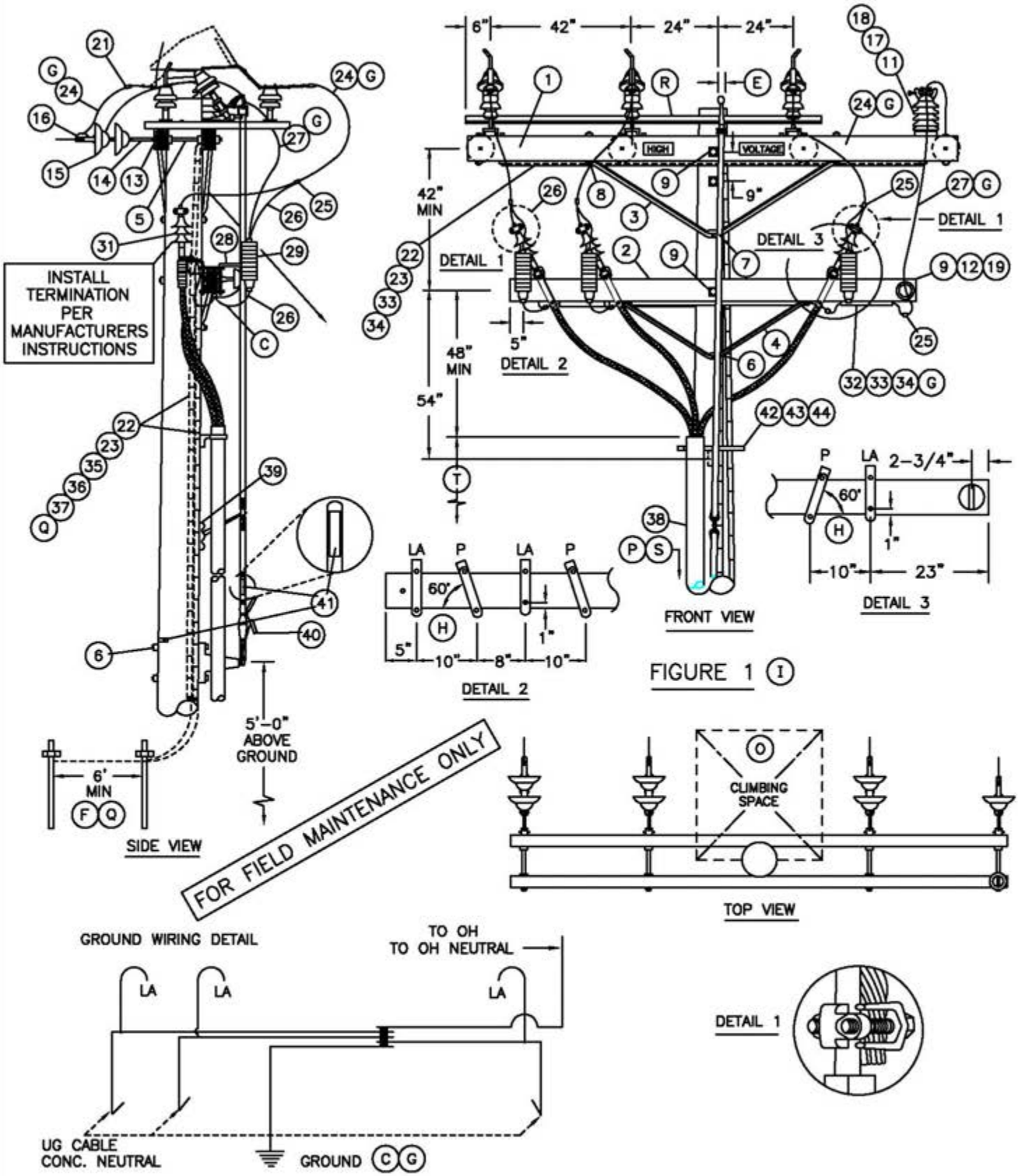



FIGURE 1 (I)

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| | | |
|---|---|---|
| DATE 1-1-96<br>APPD PSA / CMC | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE THREE-PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON-PORCELAIN TERMINALS | OH 1499.409<br>UG 4299.404 |

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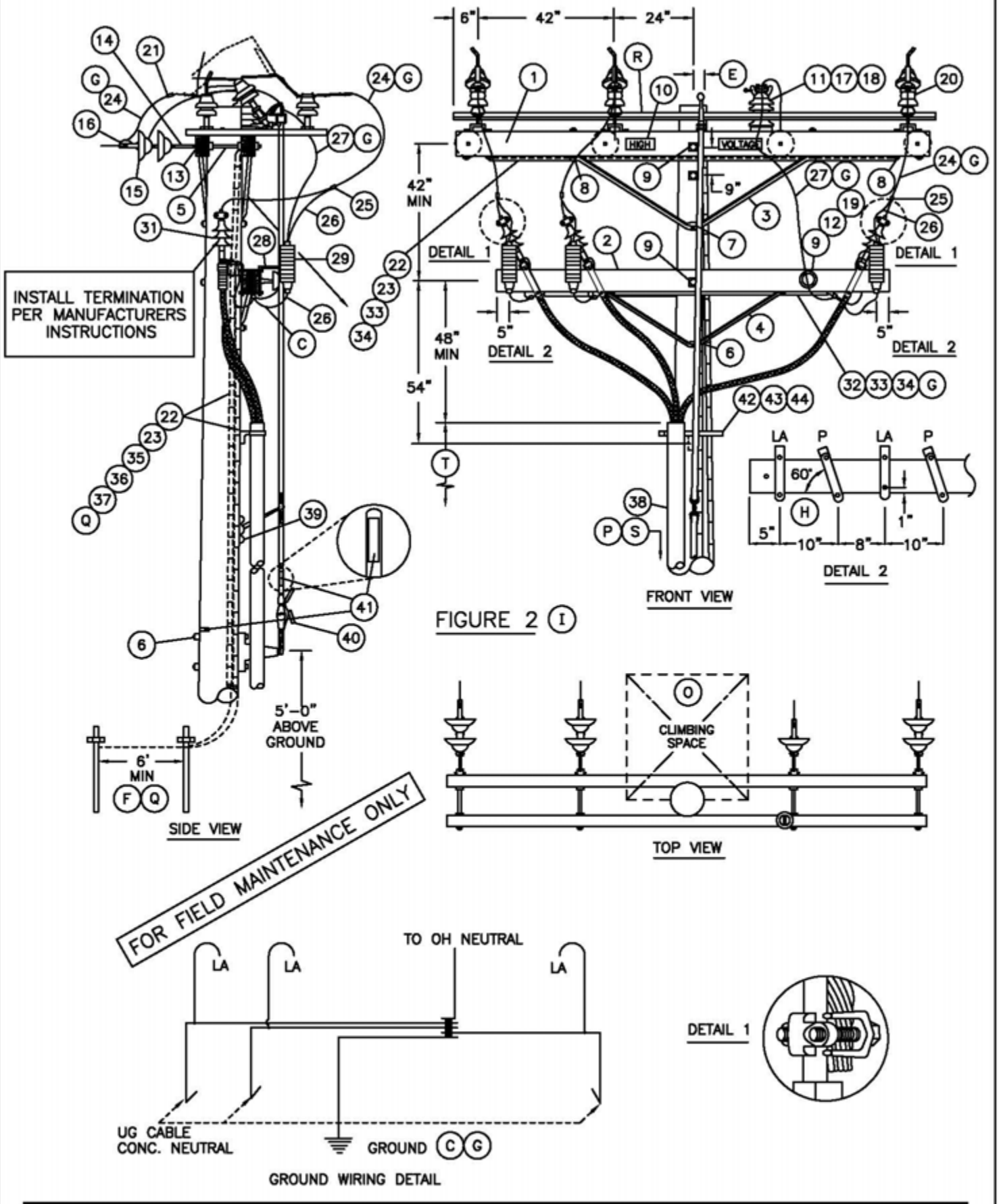



FIGURE 2 (I)

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| | | |
|---|---|---|
| OH 1499.410<br>UG 4299.405 | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE THREE-PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON-PORCELAIN TERMINALS | DATE 1-1-96<br>APPD PSA / CMK |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | QUANTITY | CONST STD OR PAGE NO | STOCK NUMBER |
|---|---|---|---|---|
| 1 | CROSSARM, 3–3/4" X 5–3/4" X 12'–0" | 2 | 380.2 | – |
| 2 | CROSSARM, 3–3/4" X 5–3/4" X 10'–0" | 1 | 380.2 | – |
| 3 | BRACE, 6', ANGLE, GALV | 2 | – | 164160 |
| 4 | BRACE, 4', ANGLE, GALV | 1 | – | 164032 |
| 5 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQ WASH & 2 DBL COIL SPRING WASH (D) | 4 | 392.1 &.2 | – |
| 6 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQ WASH & 1 DBL COIL SPRING WASH | 3 | 392.1 &.2 | – |
| 7 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) & 1 DBL COIL SPRING WASH | 1 | 392.1 &.2 | – |
| 8 | BOLT, MACH, GALV, 1/2" X 7", 1 RD WASH & 1 DBL COIL SPRING WASH | 18 | 392.1 &.2 | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ WASH & 1 DBL COIL SPRING WASH | 3 | 392.1 &.2 | – |
| 10 | SIGN, HIGH VOLTAGE & 9 ROOFING NAILS, GALV | 2 | – | 647648 492224 |
| 11 | STUD, 7–1/2" X 5/8" & 1 DBL COIL SPRING WASH (D) | 1 | – | 701760 798560 |
| 12 | PIN, TRANSFORMER ADAPTER, 1", LEAD THREAD (D) | 1 | – | 529248 |
| 13 | CLEVIS, DEAD END, 5/8", BOLT STEEL (OPEN TYPE) (D) | 4 | – | 235618 |
| 14 | LINK , EXTENSION, 1/2" X 2" X 12" (D) | 4 | – | 466240 |
| 15 | INSULATOR, SUSPENSION, 12KV, CLEVIS (D) | 7 | 750.3 | – |
| 16 | CLAMP, STRAIGHT LINE, D.E. (D) | 4 | 741–743 | – |
| 17 | INSULATOR, VERTICAL POST (D) | 1 | – | 428608 |
| 18 | CLAMP, POST INSULATOR (D) | 1 | – | 227824 |
| 19 | INSULATOR, LINE, 12KV NEUTRAL (D) | 1 | – | 429216 |
| 20 | SWITCH, TPST TILTING INSULATOR, 600 AMP | 1 | – | 709254 |
| 21 | TERMINAL, COMPRESSION | 6 | 794–795 | – |
| 22 | WIRE, #4, BARE STRANDED, COPPER | 110' | – | 813760 |
| 23 | STAPLES, FENCE, GALV, 1–1/4" | AS REQ'D | – | 678528 |
| 24 | WIRE, BARE STRANDED COPPER (OH JUMPERS) (D) | 20' | 715 | – |
| 25 | CONNECTOR, WIRE, COMPRESSION (SIZE AS REQ'D) | AS REQ'D | 783–787 | – |
| 26 | WIRE, #6, BARE STRANDED COPPER | 12' | – | 813536 |
| 27 | WIRE, BARE STRANDED CU OR ACSR/AW BARE (OH NEUT JUMPER) (D)(G) | 10' | 711–715 | – |

FOR FIELD MAINTENANCE ONLY

| OVERHEAD MACRO UNIT |
|---|
| 3NGMXP |

| UG MACRO UNIT | |
|---|---|
| CABLE SIZE | ON LADDER ARMS |
| 3C–#350 | NP350L |
| 3C–#750C | NP750L |
| 3C–#1000 | N1000L |

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DATE 1–1–98
APPD PSA / CMC

SDG&E ELECTRIC STANDARDS

12.4KV AND BELOW DEAD END CABLE POLE THREE–PHASE, 1/C PER PHASE, GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS

OH 1499.411
UG 4299.406

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BILL OF MATERIAL: (CONTINUED)

| ITEM | DESCRIPTION | QUANTITY | CONSTR STANDARD | STOCK NUMBER |
|---|---|---|---|---|
| 28 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | 3 | – | 166070 |
| 29 | ARRESTER, LIGHTNING | 3 | 1247 | – |
| 30 | | | | |
| 31 | TERMINALS & UNDERGROUND CABLE (U) | 3 | 4111 | – |
| 32 | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (G) | 20' | 715 | – |
| 33 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1-1/2" | 21' | – | 251232 |
| 34 | STRAPS, PIPE, GALV, 1-1/2" & 6-D NAILS | AS REQ'D | – | 697664<br>491552 |
| 35 | MOULDING, OAK HARDWOOD, 1" X 8' LONG | 11' | – | 487200 |
| 36 | STAPLES, MOULDING, GALV, 3" X 1-1/16" X 1/4" | AS REQ'D | – | 678560 |
| 37 | ROD & CLAMP, GROUND | 2 \| 2 | – | 230016<br>603072 |
| 38 | RISER CONSTRUCTION | AS REQ'D | 1400/4200 | – |
| 39 | SCREW, LAG, 1/2" X 4" | 2 | – | 621568 |
| 40 | PADLOCK, MEDECO | 1 | – | 514862 |
| 41 | TAGS, SWITCH NUMBER | 2 | 204/3104 | – |
| 42 | BRACKET, LADDER ARM | AS REQ'D | 1404/4204 | 167184 |
| 43 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | AS REQ'D | 1404/4204 | 503488 |
| 44 | CHANNEL, DOUBLE GALV, 24" | AS REQ'D | 1404/4204 | 216700 |

FOR FIELD MAINTENANCE ONLY

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 350 KCMIL AND LARGER UNDERGROUND CABLE.

(C) INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE, AND CONCENTRIC CABLE NEUTRAL CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL.

(E) OFFSET AS REQUIRED TO CLEAR ANCHOR GUY.

(F) SWITCH GROUND AND LIGHTNING ARRESTER GROUND TO BE CONNECTED ON THE SAME GROUND ROD.

(G)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

(H) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROX. 60° ANGLE.

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| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| OH 1499.412<br>UG 4299.407 | 12.4KV AND BELOW DEAD END CABLE POLE<br>THREE-PHASE, 1/C PER PHASE,<br>GANG OPERATED SWITCHED, NON-PORCELAIN TERMINALS | DATE 1-1-93<br>APPD JLG/DSJ |

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INSTALLATION: (CON'T)

(I) – USE FIGURE ONE FOR ALL **NEW** CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION WITH NEUTRAL ON OUTSIDE PIN POSITION.

– USE FIGURE TWO ON EXISTING CONSTRUCTION WITH NEUTRAL ON INSIDE PIN POSITION.

REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251.

(P) POLE STEPPING – SEE STD. 363.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

(R) GANG OPERATED SWITCH MOUNTING INSTRUCTIONS – SEE STD. SECTION 1200.

(S) RISER POSITION – SEE STANDARD 1402/4202.

(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STD. 1406/4206.

(U) SEE STANDARD 1407/4207 FOR NON–PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

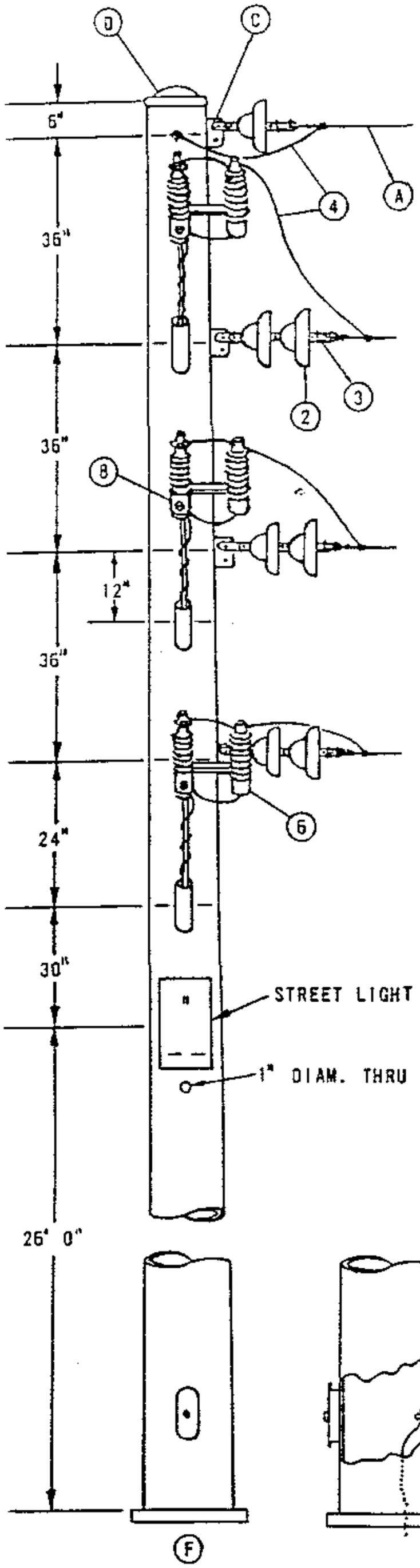
FOR FIELD MAINTENANCE ONLY

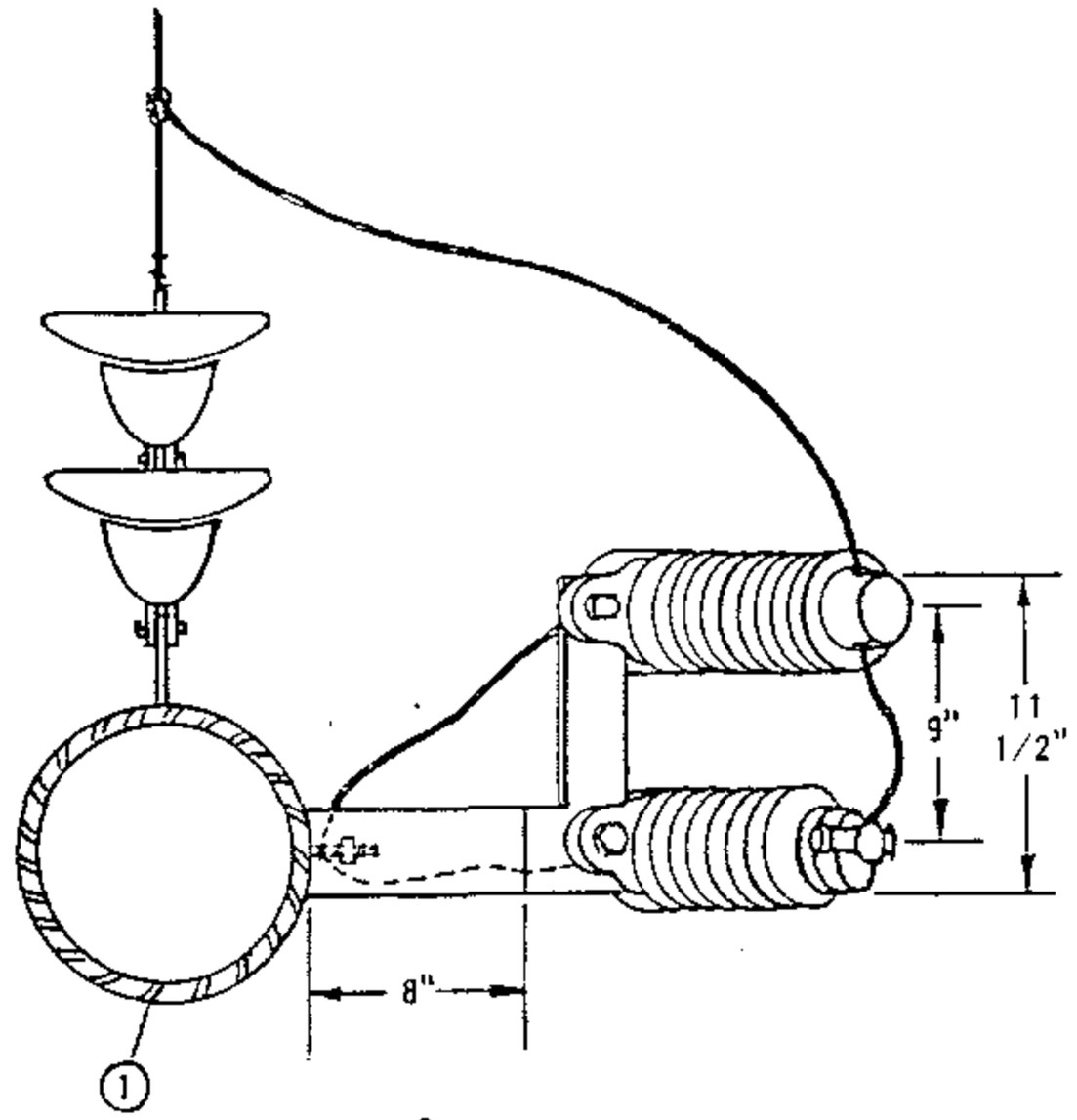
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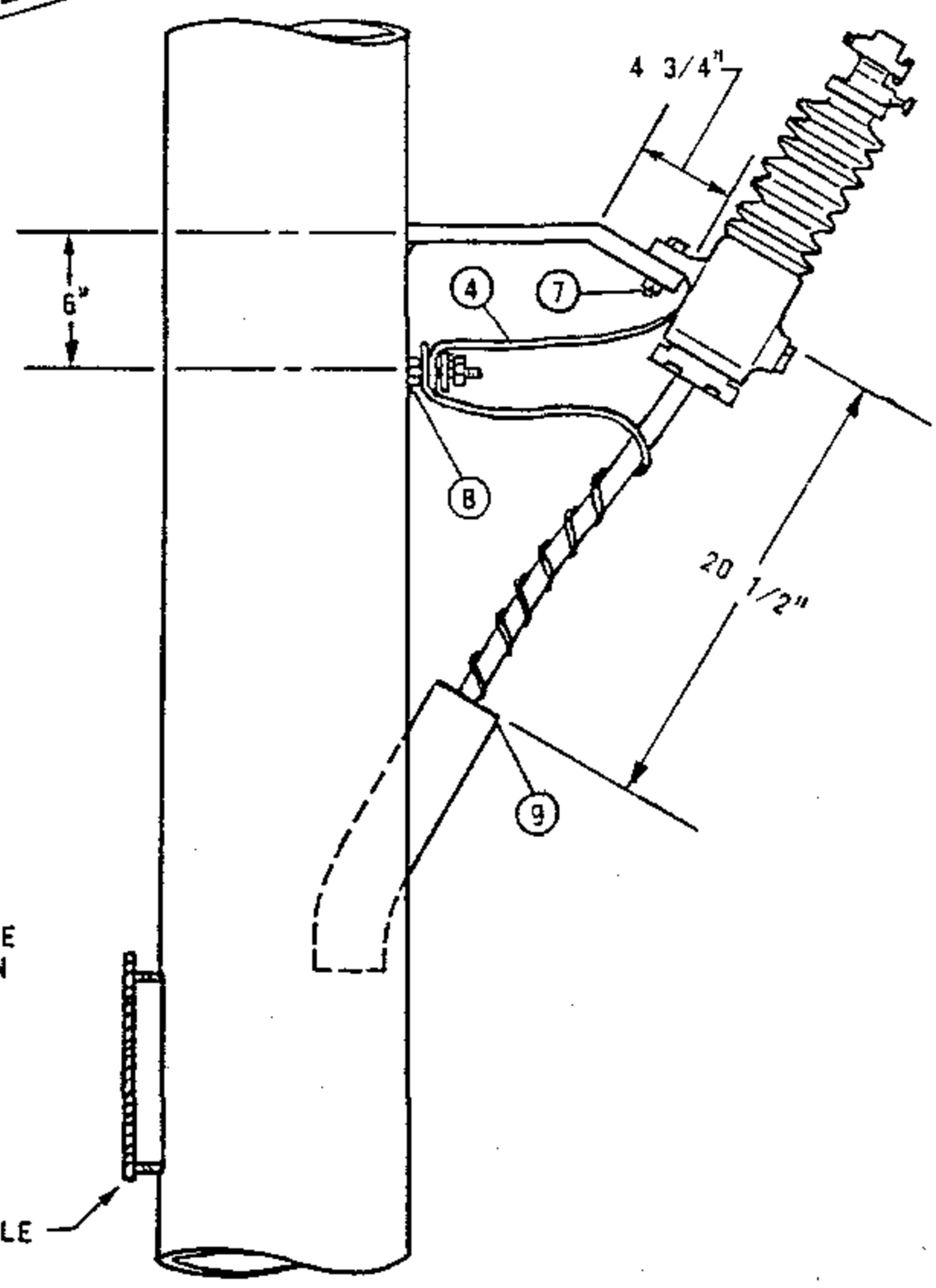
| REVISION | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1–1–93<br>APPD JLG/RDS | 12.4KV AND BELOW DEAD END CABLE POLE<br>THREE–PHASE, 1/C PER PHASE,<br>GANG OPERATED SWITCHED, NON–PORCELAIN TERMINALS | OH 1499.413<br>UG 4299.408 |

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| | | |
|---|---|---|
| DATE 1-1-92<br>APPD | SDG&E ELECTRIC STANDARDS<br>CABLE POLE, STEEL, LIGHT DUTY | OH 1499.501<br>~~UG 4299.501~~ |

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) THIS POLE IS DESIGNED FOR A MAXIMUM LOADED TENSION OF 850# PER CONDUCTOR, AND A MAXIMUM SPAN LENGTH OF 250'.

(B) LIGHTNING ARRESTER GROUND, AND CONCENTRIC CABLE NEUTRAL ARE CONNECTED TO STUD AS SHOWN. BASE OF TERMINAL GROUNDED THROUGH MOUNTING BRACKET.

(C) DEAD END TO BE ATTACHED TO TOP HOLE OF DEAD END ATTACHMENT PLATE.

(D) TOP IS REMOVABLE.

(E) EXEMPT MATERIAL.

(F) SEE STANDARDS PAGES 1454/4241 FOR FOUNDATION CONSTRUCTION.

G. SECTIONALIZING TO BE DONE ON ADJACENT POLE.

H. THIS POLE IS NONCLIMBABLE.

(I) TO BE USED FOR STREET LIGHT SECONDARY FROM UG SYSTEM.

J. NO OVERHEAD ATTACHMENT THAN THOSE SHOWN MAY BE MADE TO THIS POLE.

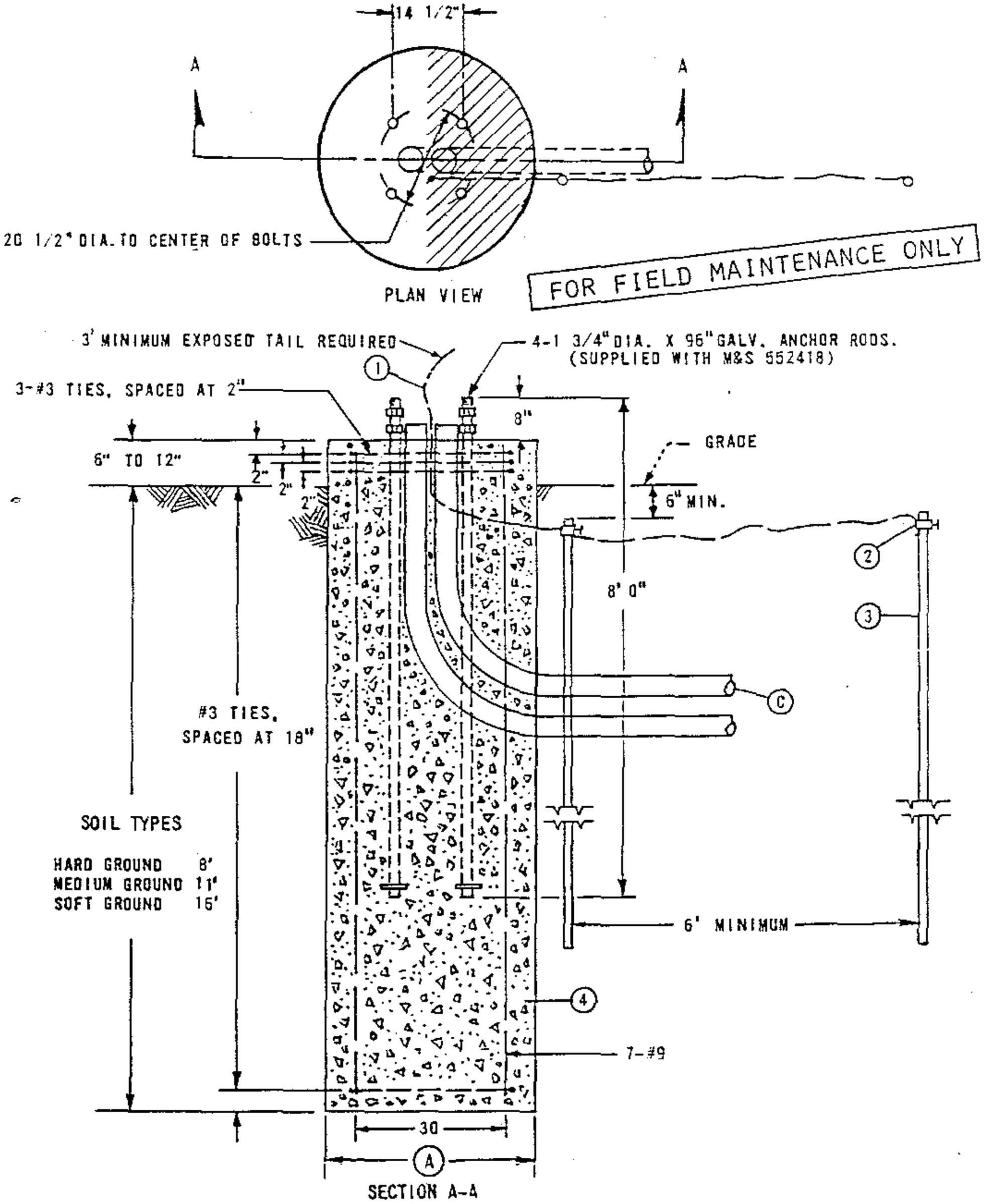
| ITEM PTF | ITEM UCD | MATERIAL | QUANTITY | STOCK NO. OR CONSTR. STD. |
|---|---|---|---|---|
| 1 | | POLE, LIGHT DUTY, STEEL CABLE, NONCLIMBABLE | 1 | 552418 |
| 2 | | INSULATOR, SUSPENSION | 7 | 700 SECTION |
| 3 | | CLAMP, DEAD END | 4 | 700 SECTION |
| | 4 | WIRE, #2 WP COPPER | 10' | 812608 |
| | 5 | WIRE, #6 BS COPPER | 8' | 813536 |
| | 6 | ARRESTER, LIGHTNING | 3 | 1200 SECTION |
| | 7 | BOLT, MACH., GALV., 5/8" X 2", 1 LOCK WASHER. (E) | 6 | 100 SECTION |
| | 8 | TERMINAL, UNDERGROUND CABLE | 3 | SEE U.G. STDS. |
| | 9 | GRIP, CABLE | 3 | 394048 |
| | | | | |
| | | | | |

SDG&E ELECTRIC STANDARDS

OH 1499.502
~~UG 4299.502~~

CABLE POLE, STEEL, LIGHT DUTY

DATE 1-1-92
APPD




NOTES:

(A) WHEN DIRECTION OF PULL OF THE OVERHEAD CONDUCTORS IS IN SHADED AREA IN THE PLAN VIEW, FOUNDATION DIAMETER SHALL BE 48". WHEN IN THE UNSHADED AREA THE FOUNDATION DIAMETER MAY BE REDUCED TO 42". DIAMETER REQUIRED ON WORK ORDER.

B CONTACT CIVIL ENGINEERING FOR CONFIRMATION OF SOIL TYPES BEFORE DECIDING FOUNDATION DIMENSIONS.

(C) TWO DUCTS TO BE INSTALLED IN FOUNDATION. THREE DUCTS ARE REQUIRED IF STREET LIGHT IS TO BE INSTALLED ON POLE.

(E) EXEMPT MATERIAL.

| ITEM | DESCRIPTION | QUANTITY | STOCK NO. | VOLUME OF CONCRETE ( IN CUBIC YARDS ) | | |
|---|---|---|---|---|---|---|
| | | | | DEPTH ( IN FEET ) | DIAMETER ( IN INCHES ) 42 | 48 |
| 1 | WIRE, #2 BARE STRANDED COPPER | 15' | 813664 | | | |
| 2 | CLAMPS, GROUND (E) | 2 | 230016 | | | |
| 3 | RODS, GROUND | 2 | 603072 | 8 | 2.85 | 3.72 |
| 4 | CONCRETE | (SEE TABLE) | — | 11 | 3.92 | 5.12 |
| | | | | 16 | 5.70 | 7.45 |

SDG&E ELECTRIC STANDARDS

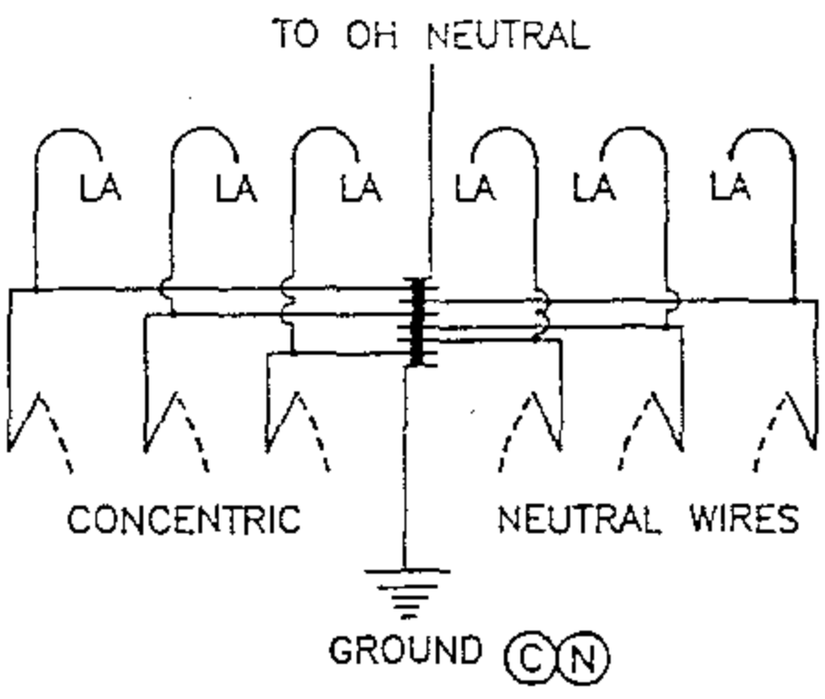
DATE 1-1-92
APPD JJB/BDG

FOUNDATION, STEEL CABLE POLE, LIGHT DUTY

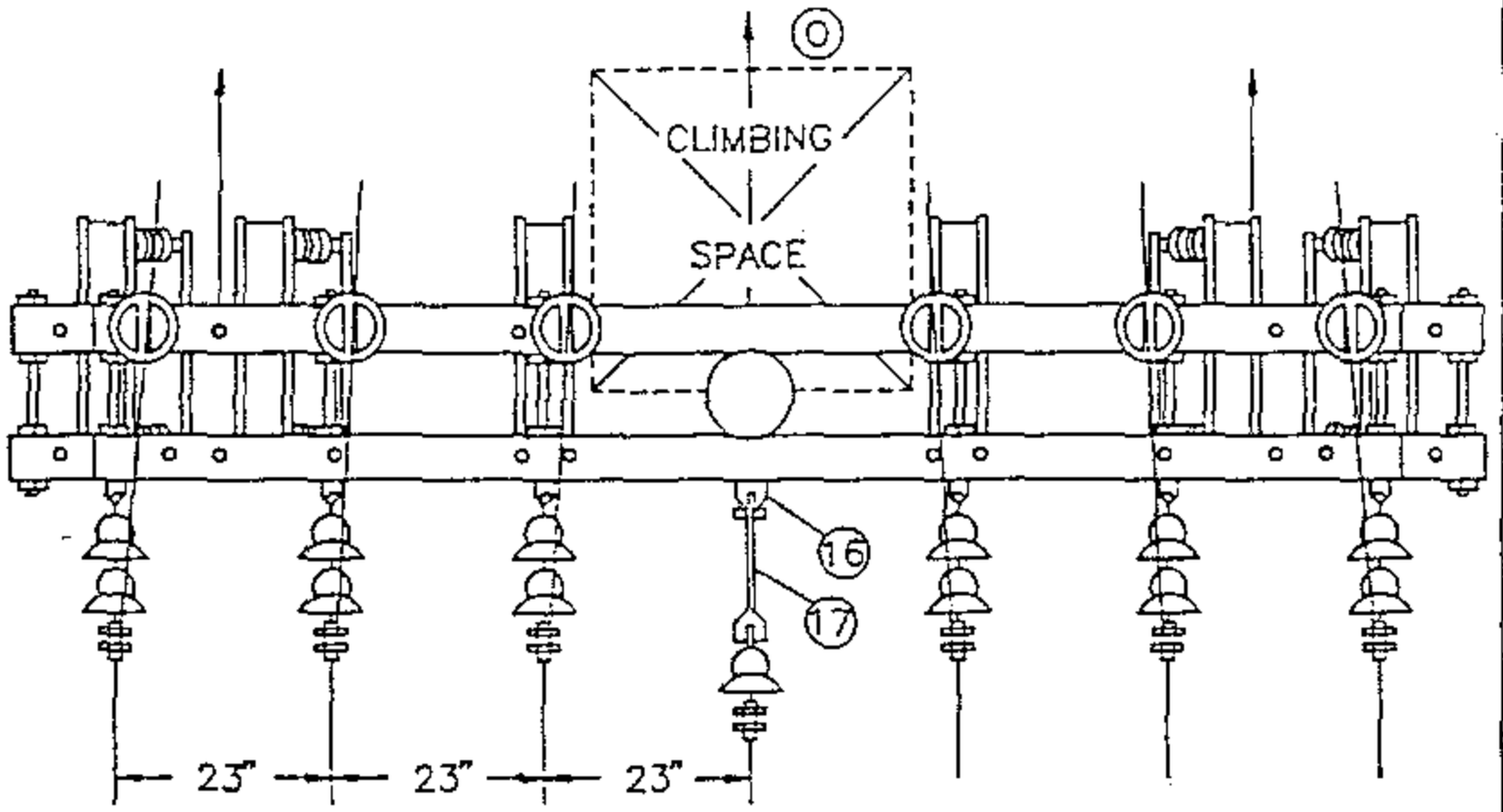
OH 1499.503
~~UG 4299.503~~

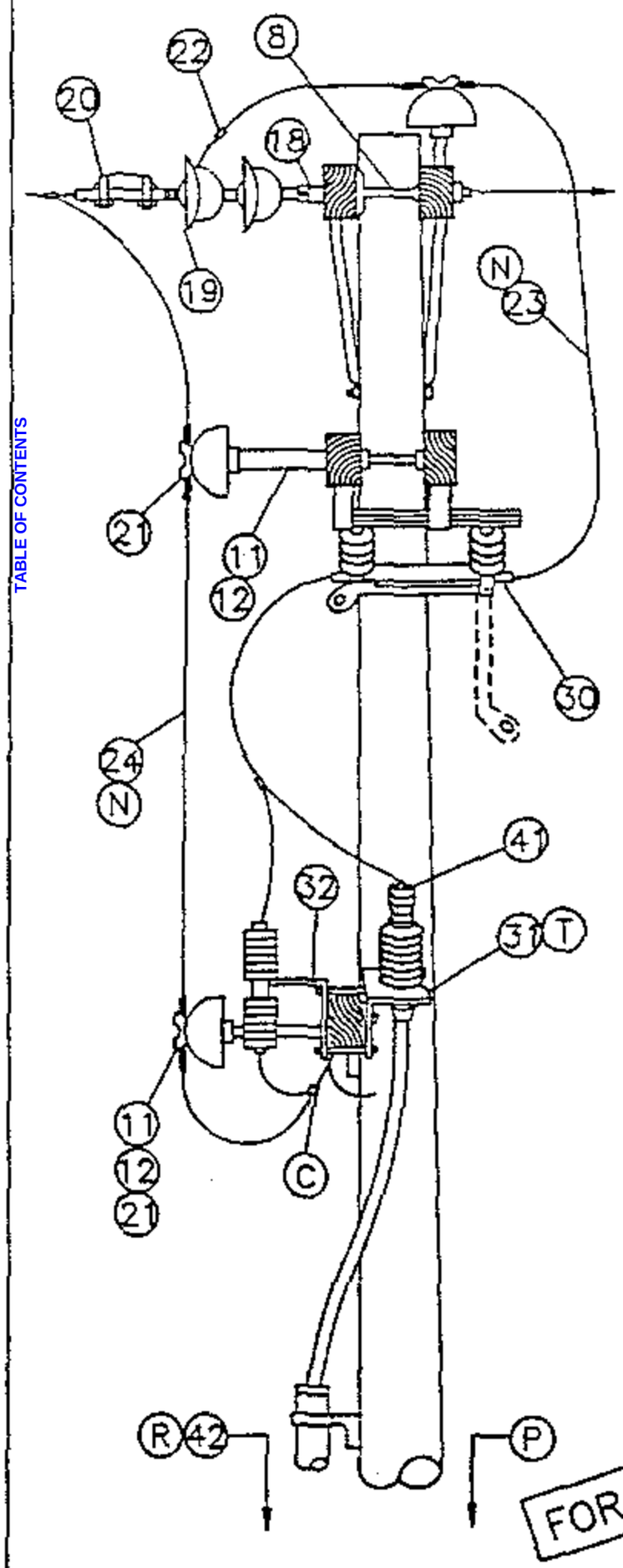
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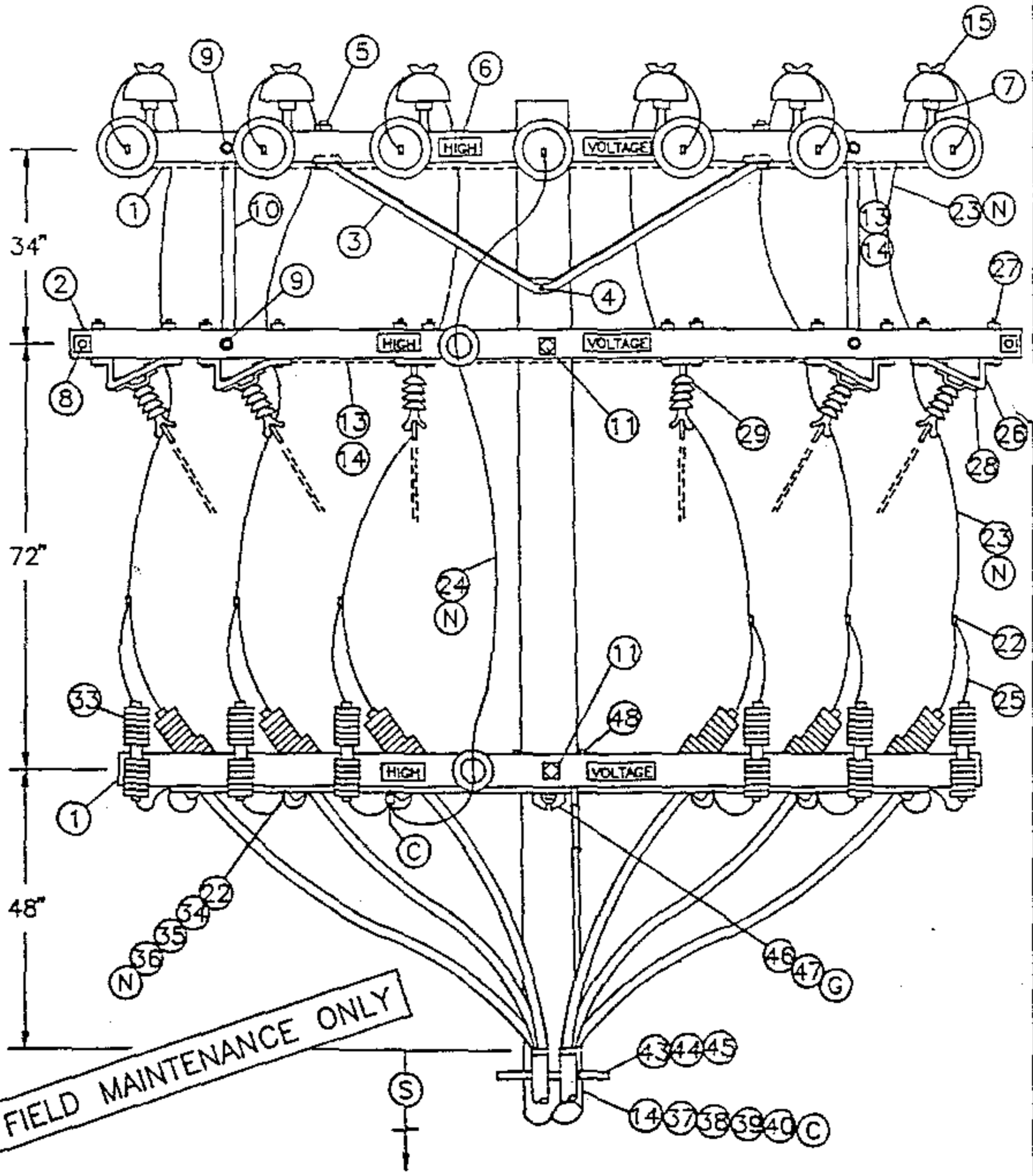
SCOPE: THIS STANDARD SHOWS 6 OR 7 CONDUCTOR DEAD END CABLE POLE WITH HOOKSTICK SWITCHES FOR 750 KCMIL AND LARGER U.G. CABLE. (SEE STANDARD 1407/4207 FOR 350 KCMIL TERMINAL MOUNTING INFORMATION).




GROUND WIRING DETAIL




FOR FIELD MAINTENANCE ONLY

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|---|---|---|
| OH 1499.504<br>~~UG-4299.504~~<br>SUPERCEDES<br>1451.1 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE, 6 OR 7 OH CONDUCTORS, 1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED | DATE 1-1-93<br>APPD JWB/DGJ |

BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | CONST STD OR PG NO | STOCK NUMBER |
|---|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 12'-0" | | 3 | – | 294160 |
| 2 | CROSSARM, 3-3/4" X 5-3/4" X 13'-6" | | 2 | – | 294368 |
| 3 | BRACE, ANGLE, CROSSARM, 6" | | 3 | – | 164160 |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 DBL COIL WASH | (E) | 1 | 392.1&.2 | – |
| 5 | BOLT, MACH, GALV, 1/2" X 7", 1 RD & 1 DBL COIL WASH | (E) | 4 | 392.1&.2 | – |
| 6 | SIGN, HIGH VOLTAGE & 8 ROOFING NAILS | (E) | 6 | – | 647648<br>492224 |
| 7 | PIN, INSULATOR, STRAIGHT, 12KV, 1" OR 1 3/8" | (E) | 6 | – | 532704<br>532448 |
| 8 | BOLT, SPACE, 5/8" X (LENGTH AS REQ'D), 3 SQ WASH & 2 DBL COIL WASH | (E) | 8 | 392.1&.2 | – |
| 9 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 RD WASH & 1 DBL COIL WASH | (E) | 8 | 392.1&.2 | – |
| 10 | BRACE, VERTICAL, 36" | (E) | 4 | – | 164224 |
| 11 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQ FLAT WASH & 1 DBL COIL WASH | (E) | 5 | 392.1&.2 | – |
| 12 | PIN, TRANSFORMER ADAPTER, 1" LEAD THREAD | (D) (E) | 2 | – | 529248 |
| 13 | WIRE, #8, BARE SOLID ANNEALED COPPER | | 2 LB | – | 812928 |
| 14 | STAPLES, FENCE, GALV, 1-1/4" | (D) (E) | AS REQ'D | – | 678528 |
| 15 | INSULATOR, LINE, 12KV, 1" OR 1-3/8" PIN | | 6 | 750 | – |
| 16 | CLEVIS, DEAD END, 3/4" BOLT, STEEL (OPEN TYPE) | (D) (E) | 1 | – | 235618 |
| 17 | LINK, EXTENSION, 1/2" X 1-1/2" X 12" | (D) | 1 | – | 466240 |
| 18 | CLEVIS, DEAD END, 5/8" BOLT, STEEL (CLOSED TYPE) | (E) | 6 | – | 235712 |
| 19 | INSULATOR, SUSPENSION, 12KV | (D) | 13 | 750 | – |
| 20 | CLAMP, STRAIGHT LINE, D.E. | (D) | 7 | 742-743 | – |
| 21 | INSULATOR, LINE, 12KV, NEUTRAL | (D) (E) | 2 | – | 429216 |
| 22 | CONNECTOR, WIRE, (SIZE & TYPE AS REQ'D) | (E) | AS REQ'D | 783-787 | – |
| 23 | WIRE, BARE STRANDED COPPER, (OH JUMPER) | (N) | 72' | 715-716 | – |
| 24 | WIRE, BARE STRANDED CU OR AL, (OH NEUT JUMPER) | (N) | 12' | 711-716 | – |
| 25 | WIRE, #6, BARE STRANDED COPPER | | 25' | – | 813536 |
| 26 | BRACKET, DISCONNECT, ANGLE MOUNTING, 1/4" X 3" | | 8 | – | 166542 |
| 27 | BOLT, MACH, GALV, 1/2" X 8", 1 RD & 1 DBL COIL WASH | (D) | 24 | 392.1&.2 | – |
| 28 | BOLT, MACH, GALV, 3/8" X 3" | (E) | 8 | 392.1&.2 | – |
| 29 | SWITCH, DISCONNECT, 14.4KV, 600 A OR 1200 A | | 6 | 1205 | – |
| 30 | COMPRESSION TERMINALS, CU, 2 HOLE (SIZE AS REQ'D) | | 12 | 794-795 | – |
| 31 | BRACKET, POTHEAD MOUNTING | | 6 | 1400/4200 | – |
| 32 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | (E) | 6 | – | 166070 |
| 33 | ARRESTER, LIGHTNING | | 6 | 1247 | – |
| 34 | CONDUIT, PVC, SCHEDULE 40, 1-1/2" | (E) | 10' | – | 251232 |
| 35 | STRAPS, PIPE, GALV, 1" & 60 NAILS, GALV | (E) | AS REQ'D | – | 697792<br>491552 |
| 36 | WIRE, BARE STRANDED CU, (C.P. NEUTRAL SIZE) | (N) | 35' | 715-716 | – |
| 37 | WIRE, #4, BARE STRANDED COPPER | | 45' | – | 813760 |
| 38 | STAPLES, MOULDING, GALV, 3" X 1-1/16" X 1/4" | (D) (E) | AS REQ'D | – | 678560 |
| 39 | UNIT GROUND, COMPLETE | (Q) | 1 | – | 603136 |
| 40 | CLAMP, 5/8", GROUND ROD | (E) | 2 | – | 230016 |
| 41 | TERMINALS, UNDERGROUND CABLE | | 6 | 4111 | – |
| 42 | RISER CONSTRUCTION | | AS REQ'D | 1400/4200 | – |
| 43 | BRACKET, LADDER ARM | (E) | AS REQ'D | 1404/4204 | 167184 |
| 44 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | (E) | AS REQ'D | 1404/4204 | 503488 |
| 45 | CHANNEL, DOUBLE GALV, 24" | (E) | AS REQ'D | 1404/4204 | 216700 |
| 46 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE, 1 ROUND & 1 DOUBLE COIL SPRING WASHER | (E) | 1 | 392 | – |
| 47 | GAIN, CROSSARM, BRACELESS | (G) | 1 | – | 369598 |
| 48 | BOLT, MACH, GALV, 5/8" X 7", 1 ROUND & 1 DOUBLE COIL SPRING WASHER | (E) | 2 | 392 | – |

FOR FIELD MAINTENANCE ONLY

| CABLE SIZE | UG MACRO UNIT PORCELAIN |
|---|---|
| | W/LADDER ARMS |
| 3C-#750 AL TWO RUNS | 2R750L |
| 3C-#1000 AL TWO RUNS | 2R-1KL |

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| | SDG&E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 1-1-93<br>APPD JLB/RDJ | 12.47KV AND BELOW DEAD END CABLE POLE, 6 OR 7 OH CONDUCTORS<br>1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED | OH 1499.505<br>~~UG 4299.505~~<br>SUPERCEDES<br>1451.2 (1-1-93) |

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 CONDUCTOR TO LIGHTNING ARRESTER GROUND.

(D) REDUCE QUANTITIES AS REQUIRED WHEN NOT USING NEUTRAL .

(E) EXEMPT MATERIAL.

(F) INSTRUCTIONS TO INSTALL POTHEAD MOUNTING BRACKETS AND LIGHTNING ARRESTER BRACKETS.

(G) DO NOT CUT GAINS IN THE POLE WHEN INSTALLING THE VERTICALLY MOUNTED SECTIONALIZING SWITCH ARMS. THE GAIN HARDWARE USED HERE MAKE CUT GAINS UNNECESSARY.

(N)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUTRAL JUMPER SIZE CU OR AL | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|
| 350 | 4/0 | SAME SIZE | #2 PER PHASE |
| 750 | 500 | AS O.H. NEUT | 1/0 PER PHASE |
| 1000 | 500 | CONDUCTOR | 1/0 PER PHASE |

REFERENCE:

(O) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STD. 251.

(P) POLE STEPPING – SEE STD. 363.

(Q) GROUNDING METHODS – SEE PAGE 1002.5.

(R) RISER POSITIONS – SEE STANDARD 1402/4202.

(S) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STD. 1406/4206.

(T) SEE STANDARD 1407/4207 FOR PORCELAIN AND NON PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

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| OH 1499.506<br>~~UG 4299.506~~<br>SUPERCEDES<br>1451.3 (1-1-93) | SDG&E ELECTRIC STANDARDS<br>12.47KV AND BELOW DEAD END CABLE POLE,<br>6 OR 7 OH CONDUCTORS<br>1 OR 2 TERMINALS PER CONDUCTOR, HOOKSTICK SWITCHED | DATE 1-1-93<br>APPD JLB/LDJ |

**SCOPE:** THIS STANDARD SHOWS A DEADEND CONSTRUCTION FOR 12.47 KV, THREE–PHASE CABLE POLE, WITH NEUTRAL, AND A HORIZONTAL MOUNTED SCADA–MATE SWITCH. (B)

**NOTE:** THIS INSTALLATION REQUIRES TRUCK ACCESS. CONTACT TELECOMMUNICATIONS BEFORE DESIGN BEGINS TO DETERMINE COMMUNICATIONS REQUIREMENT.

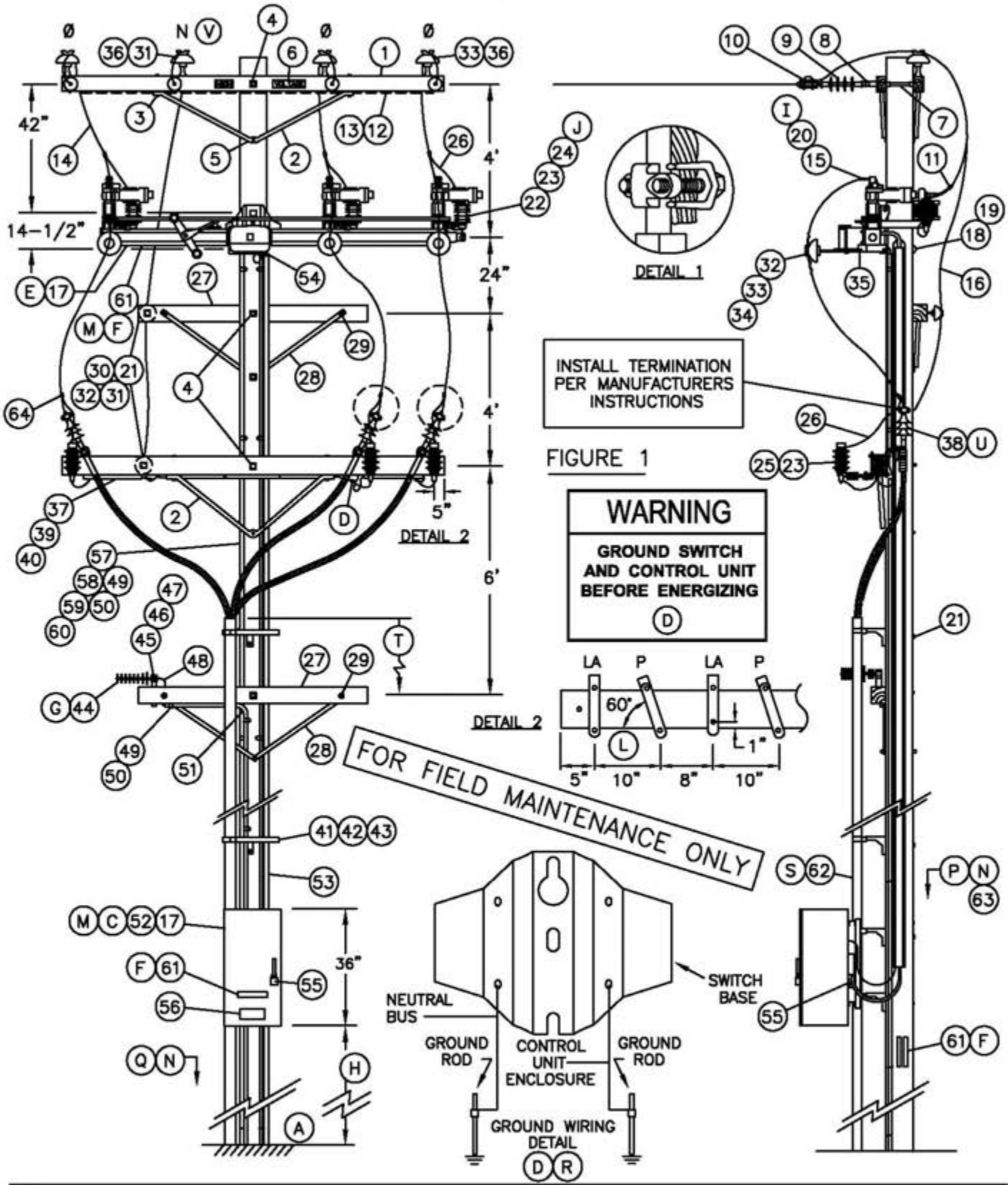


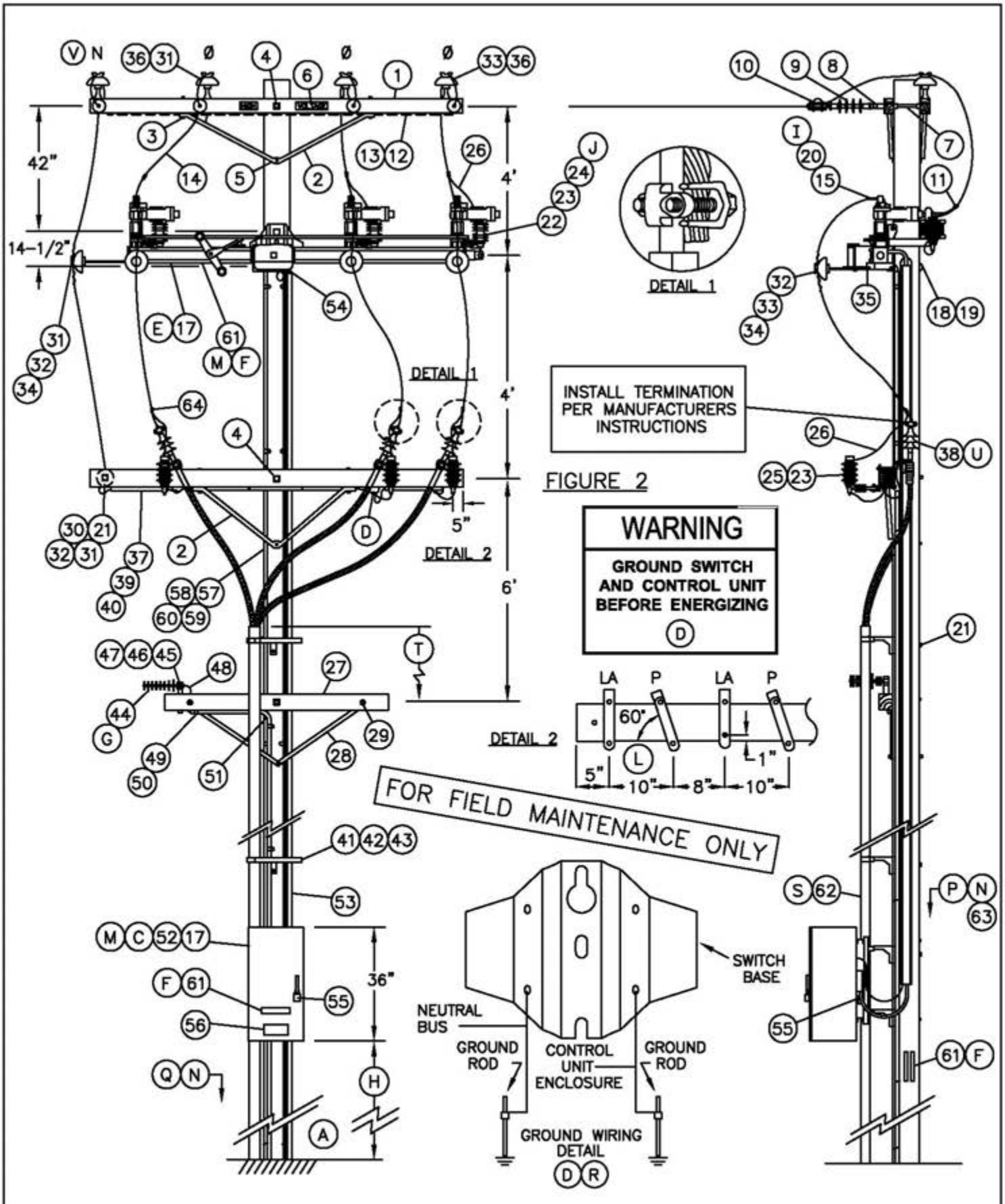

FIGURE 1

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| | | |
|---|---|---|
| 1499.601<br>4299.601<br>SUPERSEDES<br>1445.1 (10–20–05) | SDG&E ELECTRIC STANDARDS<br>12.47 KV DEAD END CABLE POLE, THREE–PHASE WITH NEUTRAL, HORIZONTAL SCADA–MATE SWITCH | DATE 10–20–05<br>APPD PA / JJ |

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|---|---|---|
| DATE 10-20-05<br>APPD PA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47 KV DEAD END CABLE POLE, THREE-PHASE WITH NEUTRAL, HORIZONTAL SCADA-MATE SWITCH | 1499.602<br>4299.602<br>SUPERSEDES<br>1445.2 (10-20-05) |

## BILL OF MATERIAL:

| ITEM | DESCRIPTION | | QUANTITY | CONSTR. STD | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| 1 | CROSSARM, 3-3/4" X 5-3/4" X 10'-0" | | 3 | – | 294128 | 4– |
| 2 | BRACE, ANGLE, LINEARM=5'-0", PH ARM=4'-0" | 4' | 1 | 391 | 164032 | 4HUB |
| | | 5' | 2 | 391 | 164128 | 5HUB |
| 3 | BOLT, MACH, GALV, 1/2" X 7", 1 ROUND AND 1 DOUBLE COIL SPRING WASHER | | 6 | 392 | – | – |
| 4 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE AND 1 DOUBLE COIL SPRING WASHER | | 4 | 392 | – | – |
| 5 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D) AND 1 DOUBLE COIL SPRING WASHER | | 1 | 392 | – | – |
| 6 | SIGN, HIGH VOLTAGE, AND | | 2 | – | 647648 | HV |
| | 9 ROOFING NAILS, GALV | | – | – | 492224 | |
| 7 | BOLT, SPACE, GALV, 5/8" X (LENGTH AS REQ'D), 3 SQUARE, 2 ROUND, 2 DOUBLE COIL SPRING WASHERS AND 1 NUT | | 4 | 392 | – | – |
| 8 | CLEVIS, DEAD END, 5/8" BOLT STEEL (CLOSED TYPE) | | 4 | – | 235712 | – |
| 9 | INSULATOR, SUSPENSION, 12KV, CLEVIS | | 4 | 750 | 431650 | 4DE |
| 10 | CLAMP, STRAIGHT LINE, D.E. | | 4 | 741–743 | – | – |
| 11 | CONNECTOR, WIRE COMPRESSION (SIZE AS REQ'D) | | AS REQ'D | 783–786 | – | – |
| 12 | WIRE, #8 BARE SOLID ANNEALED COPPER | | 12' | – | 812928 | BOND8 |
| 13 | STAPLE, FENCE, GALV, 1-1/4" | | AS REQ'D | – | 678528 | |
| 14 | WIRE, BARE STRANDED COPPER (OH JUMPERS) (K) | | 45' | 715 | – | – |
| 15 | TERMINAL, COMPRESSION LUG (I) | | 6 | 794–795 | – | – |
| 16 | WIRE, BARE STRANDED CU OR ACSR/AW BARE (OH NEUT JUMPER) (K) | | 14' | 711–715 | – | – |
| 17 | SWITCH, SCADA-MATE, 14.4 KV, POLE MOUNTED, INCLUDING 35' CONTROL CABLE, CONTROL UNIT AND RTU (E) | | 1 | – | 704690 | AUTOSW (F) |
| 18 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 1 SQUARE CURVED RIBBED AND 1 DOUBLE COIL SPRING WASHER | | 2 | 392 | – | – |
| 19 | COVER, BOLT, PLASTIC & | | 2 | | 285696 | – |
| | 6 – 10D NAILS, GALV | | AS REQ'D | | 491392 | – |
| 20 | BOLT, STAINLESS STEEL, 1/2" X 1-1/2" WITH 2 FLAT & 2 BELLEVILLE WASHERS & SILICONE BRONZE NUT (I) | | 12 | 392 | 148672 | – |
| 21 | BOLT, MACH, GALV, 5/8" X (LENGTH AS REQ'D), 2 SQUARE & 1 DBL COIL SPRING WASHER | | AS REQ'D | 392 | – | – |
| 22 | BOLT, MACH, GALV, 1/2 X 2-1/2", 1 ROUND AND 1 LOCK WASHER | | 3 | 392 | – | – |
| 23 | ARRESTER, LIGHTNING (J) | | 6 | – | 113248 | LA12C |
| 24 | SERVICE POST CONNECTOR | | 3 | – | 262560 | – |
| 25 | BRACKET, CUTOUT/ARRESTER, FOR CROSSARM MOUNTING | | 3 | – | 166070 | LA/B-C |
| 26 | WIRE, #6, BARE STRANDED COPPER | FT | 18' | 715 | 813536 | BS6C |
| | | LB | 2 | | | |
| 27 | CROSSARM, 3-1/2" X 4-1/2" X 6'-0" | | 2 | 380.2 | 294112 | 2S |
| 28 | BRACE, FLAT, CROSSARM, 28" | | 4 | – | 164192 | |
| 29 | BOLT, MACH, GALV, 3/8" X 4-1/2" & 1 ROUND WASHER | | 4 | 392.2 | – | – |
| 30 | PIN, TRANSFORMER LEAD ADAPTER, 1" | | 2 | – | 529248 | PS/01 |
| 31 | INSULATOR, 12KV NEUTRAL | | 3 | – | 429216 | 55-3C |
| 32 | WIRE, TIE | | AS REQ'D | 760–764 | – | – |
| 33 | INSULATOR, 12KV, 55-5 | | 6 | 750 | 429056 | 55-5C |
| 34 | INSULATOR STANDOFF BRACKET, 1" X 30" | | 3 OR 4 | 394 | 166144 | KBKT30 |
| 35 | "L" BRACKET , 2-1/2" X 2-1/2", GALV | | 3 | – | 166208 | – |
| 36 | INSULATOR PIN, 12KV, 1" | | 4 | 396 | 532704 | PS1 |
| 37 | WIRE, BARE STRANDED COPPER (UNDER POTHEAD ARM) (K) | | 12' | 715 | – | – |

FOR FIELD MAINTENANCE ONLY

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| | | |
|---|---|---|
| 1499.603<br>4299.603<br>SUPERSEDES<br>1445.3 (10-20-05) | SDG&E ELECTRIC STANDARDS<br>12.47 KV DEAD END CABLE POLE, THREE-PHASE WITH NEUTRAL, HORIZONTAL SCADA-MATE SWITCH | DATE 7-9-03<br>APPD PBALMPB |

**BILL OF MATERIAL:** (CON'T)

| ITEM | DESCRIPTION | | QUANTITY | CONSTR. STD | STOCK NUMBER | ASSEMBLY UNITS |
|---|---|---|---|---|---|---|
| 38 | TERMINALS AND UNDERGROUND CABLE (U) | | 3 | 4111 | – | – |
| 39 | CONDUIT, PVC, TYPE 2, SCHEDULE 40, 1–1/2" | | 10' | – | 251232 | P11/2C |
| 40 | STRAPS, PIPE, GALV, 1–1/2", & 2 – 6D NAILS, GALV | | AS REQ'D | – | 697664 | – |
| | | | AS REQ'D | – | 491552 | |
| 41 | BRACKET, LADDER ARM | | AS REQ'D | 1404/4204 | 167184 | RSRARM |
| 42 | NUT, CLAMPING CHANNEL, W/SPRING, 1/2" | | AS REQ'D | 1404/4204 | 503488 | |
| 43 | CHANNEL, DOUBLE GALV, 24" | | AS REQ'D | 1404/4204 | 216700 | |
| 44 | ANTENNA, SCADA, COMMUNICATION, BROADBAND AND CONNECTORS (G) | | 1 | – | 109570 | ANT |
| 45 | NIPPLE, PIPE 2" X 7", ALUM. | | 1 | – | – | ANTXMB |
| 46 | BOLT, MACH, GALV. 1/2" X 9" | | 1 | – | 153184 | |
| 47 | CENTERING WASHER, GALV. | | 2 | – | 795520 | |
| 48 | CABLE, FLEXIBLE 1/2" COAXIAL SCADA ANTENNA | | AS REQ'D | – | 191906 | ANTCAB |
| 49 | CONDUIT, PVC, SCHEDULE 40, 1/2" | | 150' | – | 251168 | P1/2–C |
| 50 | STRAPS, PIPE GALV, 1/2", & 6D NAILS, GALV | | AS REQ'D | – | 697728 | – |
| | | | AS REQ'D | – | 490656 | – |
| 51 | ELBOW, PVC, 1/2" | | 1 | – | – | – |
| 52 | TRANSCEIVER, 12V DC | | 1 | – | 749500 | SOTRAN |
| 53 | U–GUARD, 2" X 10', POLYETHYLENE | | 3 | – | 249940 | 2UMOLD |
| 54 | GRIP, CONTROL CABLE | | 1 | – | 394018 | – |
| 55 | PADLOCK, SCHLAGE ELECTRIC SERIES | | 2 | – | 514848 | – |
| 56 | DECAL "SCADA" "INFORM S.C.O. UPON ENTRY" | | 1 | 207 | 301934 | – |
| 57 | WIRE, #2 BARE STRANDED COPPER | FT | 100' | – | 813664 | BS2R |
| | | LB | 20# | | | |
| 58 | STAPLES, FENCE, GALV, 1–1/4" | | AS REQ'D | – | 678528 | – |
| | STAPLES, MOULDING, GALV, 3" X 1–1/16" X 1/4" | | AS REQ'D | – | 678560 | – |
| 59 | GROUND ROD, 5/8" X 8' (D)(R) | | 2 | 1002 | 603072 | ROD8 |
| 60 | COPPER BONDED GROUND CONNECTOR | | 2 | 1002 | 259010 | – |
| 61 | TAG, SWITCH NUMBER (F) | | 5 | 204 | – | – |
| 62 | RISER CONSTRUCTION (S) | | AS REQ'D | 1400/4200 | – | – |
| 63 | VISIBILITY STRIP (N) | | 4 | 208 | 304064 | VSTRIP |
| 64 | HOT LINE CLAMP | | 3 | 788 | 227680 | – |

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| OH MACRO UNITS | | |
|---|---|---|
| FIG. | NEUTRAL POSITION | MU |
| 1 | INSIDE | SMCPNI |
| 2 | OUTSIDE | SMCPNO |

| UG MACRO UNITS | |
|---|---|
| CABLE SIZE | W/LADDER ARMS |
| 3C–#350 | NP350L |
| 3C–#750C | NP750L |
| 3C–#1000 | N1000L |

**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 350 KCMIL AND LARGER UNDERGROUND CABLE.

(C) SCADA SWITCH CONTROL IS SELF POWERED FROM POLE TOP SWITCH UNIT. NO LOCAL SECONDARY IS REQUIRED. FAULT INDICATION IS INTEGRATED WITH THE SWITCH CONTROL – NO EXTERNAL FAULT INDICATORS ARE REQUIRED.

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|---|---|---|
| DATE 10–20–05<br>APPD PBA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47 KV DEAD END CABLE POLE, THREE–PHASE WITH NEUTRAL, HORIZONTAL SCADA–MATE SWITCH | 1499.604<br>4299.604<br>SUPERSEDES<br>1445.4 (10–20–05) |

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(D) **NOTE:** BEFORE ENERGIZING SWITCH, CONNECT GROUND LEADS TO THE GROUNDING POINT PROVIDED ON SWITCH MOUNTING BRACKET. INTERCONNECT OVERHEAD NEUTRAL, TERMINAL BASE AND CONCENTRIC CABLE CONDUCTOR TO LIGHTNING ARRESTER GROUND. INSTALL TWO SEPARATE GROUND RUNS FROM BASE OF SWITCH TO BASE OF POLE, UNDER SEPARATE COVERS, IN ADJACENT POLE QUADRANTS. CONNECT EACH RUN TO A SEPARATE SET OF GROUND RODS. CONNECT CONTROL UNIT ENCLOSURE GROUND WIRE TO ONE OF THE GROUND RUNS AND POTHEAD UNDERARM NEUTRAL BUS TO THE OTHER. – SEE GROUND WIRING DETAIL.

(E) WHEN MOUNTING SCADA SWITCH TO POLE, DISCARD POLE BAND. **DO NOT INSTALL POLE BAND.**

(F) SCADA SWITCH ASSEMBLY UNIT WILL GENERATE TWO SWITCH NUMBERS–ONE FOR THE SF6 INTER–RUPTER AND ANOTHER FOR THE MANUAL OPERATED DISCONNECT. THE VISUAL BREAK, MANUALLY OPERATED DISCONNECT WILL ALWAYS BE A LINE SWITCH, NORMALLY CLOSED AND ASSIGNED THE LOWER OF THE SWITCH ASSIGNMENT NUMBERS. A TAG FOR THE MANUALLY OPERATED DISCONNECT WILL BE INSTALLED AT THE BASE OF THE POLE AND ON THE UNDERSIDE OF THE SWITCH BASE NEAR THE OPERATING LEVER. THE SF6 INTERRUPTER CAN BE EITHER A LINE SWITCH OR A TIE SWITCH. TAGS FOR THE SF6 INTERRUPTER WILL BE INSTALLED IN THREE LOCATIONS; AT THE BASE OF THE POLE, OUTSIDE OF THE CONTROL CABINET DOOR AND ANOTHER ON THE INSIDE OF THE DOOR. AN INTERRUPTER OPEN/CLOSED INDICATOR IS LOCATED ON ONE END OF THE SWITCH ARM.

(G) PLANNER TO SPECIFY QUADRANT OF POLE FOR ANTENNA MOUNT WITH DATA FROM STANDARDS. POINTS LIST TO BE COMPLETED BY PLANNER AND SENT TO SENIOR ENGINEER, DISTRIBUTION OPERATIONS. SEE ELECTRIC STANDARDS TEAM FOR POINTS LIST FORMS.

(H) RTU TO BE MOUNTED AT 10' FROM GROUND LEVEL TO BOTTOM OF RTU CABINET WHEN NOT SUBJECT TO TRAFFIC CONTACT. IF VULNERABLE TO VEHICLE DAMAGE, MOUNT RTU AT 13' – 6" FROM GROUND LEVEL TO BOTTOM OF RTU CABINET. CONSIDER LARGE VEHICLES PARKING PARALLEL TO CURB.

(I) IF ATTACHING 1/0 OR 4/0 COPPER JUMPERS TO SCADA–MATE SWITCH, USE TWO BRONZE CABLE TAP LUGS (S/N 471296) IN PLACE OF BOLTS AND COMPRESSION LUG.

(J) INSTALL LIGHTNING ARRESTERS ON THE VOLTAGE SENSOR SIDE OF SCADA–MATE SWITCH IN THE PARTIAL ARRESTER PROTECTION AREA. INSTALL LIGHTNING ARRESTERS ON BOTH SIDES OF SCADA–MATE SWITCH IN THE GENERAL ARRESTER PROTECTION AREA. REFER TO STANDARD PAGE 1247.2 FOR LIGHTNING ARRESTER APPLICATION MAP. LIGHTNING ARRESTERS ARE TO BE GROUNDED THROUGH THE SWITCH BASE.

(K)

| UG CABLE SIZE AWG OR KCMIL, AL | OH JUMPER COND SIZE, AWG OR KCMIL, CU | OH NEUT JUMPER SIZE | | | CABLE POLE NEUT SIZE (CU) UNDER POTHEAD ARM OR TRIPLE TERM BRKT |
|---|---|---|---|---|---|
| | | CU | AL | | |
| 350 | 4/0 | 1/0 | 3/0 | – | #2 PER PHASE |
| 750 | 500 | 4/0 | 336.4 | OR SAME SIZE AS O.H. NEUT CONDUCTOR | 1/0 PER PHASE |
| 1000 | 500 | 4/0 | 336.4 | | 1/0 PER PHASE |

(L) TURN TOP OF BRACKET OUTWARD TO OBTAIN APPROXIMATELY 60° ANGLE.

(M) CONTROL AND ANTENNA CONNECTIONS TO BE MADE BY SCADA PROJECT CREW. LINE CREW MOUNTS SWITCH TO POLE AND LEAVES CONTROL CABLE ON SITE.

**REFERENCE:**

(N) REFLECTOR STRIPS ARE REQUIRED ON ALL SECTIONALIZING/TIELINE SWITCHES – SEE STANDARD 208.

O. FOR OPERATION OF SCADA–MATE SWITCH – SEE STANDARD PRACTICE 311.

(P) ALLOWABLE WORKING AND CLIMBING SPACE – SEE STANDARD 251.

(Q) POLE STEPPING – SEE O.H. STANDARD 363.

(R) GROUNDING METHODS – SEE O.H. STANDARD 1002.

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(S) RISER POSITION – SEE STANDARD 1402/4202.

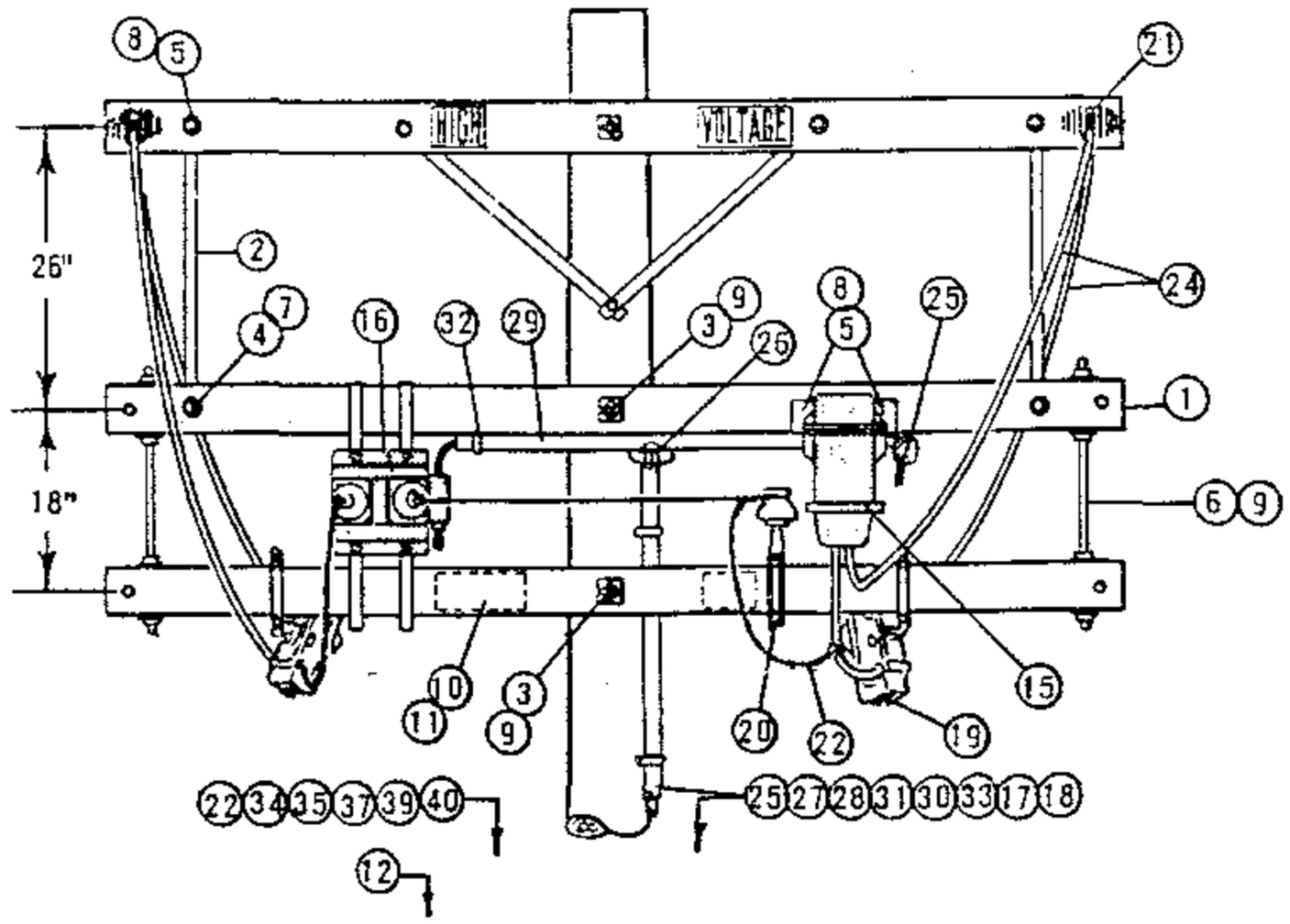
(T) MINIMUM VERTICAL SEPARATION AS PER G.O. 95 – SEE STANDARD 1406/4206.

(U) SEE STANDARD 1407/4207 FOR NON–PORCELAIN TERMINAL MOUNTING BRACKET INSTRUCTIONS AND MATERIALS.

(V) ON ALL NEW CONSTRUCTION AND WHEN ADDING TO EXISTING CONSTRUCTION, NEUTRAL TO BE INSTALLED IN OUTSIDE PIN POSITION PER DESIGN MANUAL PAGE 5124.2.

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| | | |
|---|---|---|
| DATE 9–13–05<br>APPD PSA / JJ | SDG&E ELECTRIC STANDARDS<br>12.47 KV DEAD END CABLE POLE, THREE–PHASE WITH NEUTRAL, HORIZONTAL SCADA–MATE SWITCH | 1499.605<br>4299.605<br>SUPERSEDES<br>1445.5 (10–20–05) |




ELEVATION - LOAD SIDE

FOR FIELD MAINTENANCE ONLY

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NOTE:

(A) NOT REQUIRED WHERE METER BOX HAS HUB.

| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 2 | PG 111 IT. 2 |
| 2 | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 3 | | BOLT, MACH 5/8" X 14" | 2 | 154880 |
| 4 | | BOLT, MACH 1/2" X 5" | 2 | 153024 |
| 5 | | BOLT, MACH 3/8" X 4 1/2" | 4 | 154368 |
| 6 | | BOLT, SPACE 5/8" X 24" | 2 | 156640 |
| 7 | | WASHER, 1/2" ROUND | 2 | 800192 |
| 8 | | WASHER, 3/8" ROUND | 4 | 800288 |
| 9 | | WASHER, 3" SQ FLAT | 12 | 799072. |
| 10 | | SIGN, HIGH VOLTAGE | 1 | 647648 |
| 11 | | NAILS, ROOFING #8 GALV | 8 | 492224 |
| 12 | | POLE STEP | 16 | 692992 |
| 13 | | | | |
| 14 | | | | |
| | 15 | TRANSFORMER, CURRENT, WEST. TYPE WO 5KV, 5A | 1 | - |
| | 16 | TRANSFORMER, POTENTIAL, WEST. PTO, 2400/120V, HANGERS & BOLTS | 1 | - |
| | 17 | METER, SINGLE PHASE POWER | 1 | - |
| | 18 | CABINET, METER, TEST SWITCH, LAG SCREWS | 1 | 161312 |
| | 19 | CUTOUT, 5KV | 2 | PG 1211 |
| | 20 | BRACKET, INSULATOR STAND OFF | 1 | 166208 |
| | 21 | CONNECTORS, SPLIT BOLT | 7 | PG 787 |
| | 22 | WIRE, #6 BARE STRANDED COPPER | 20' | 813536 |
| | 23 | | | |

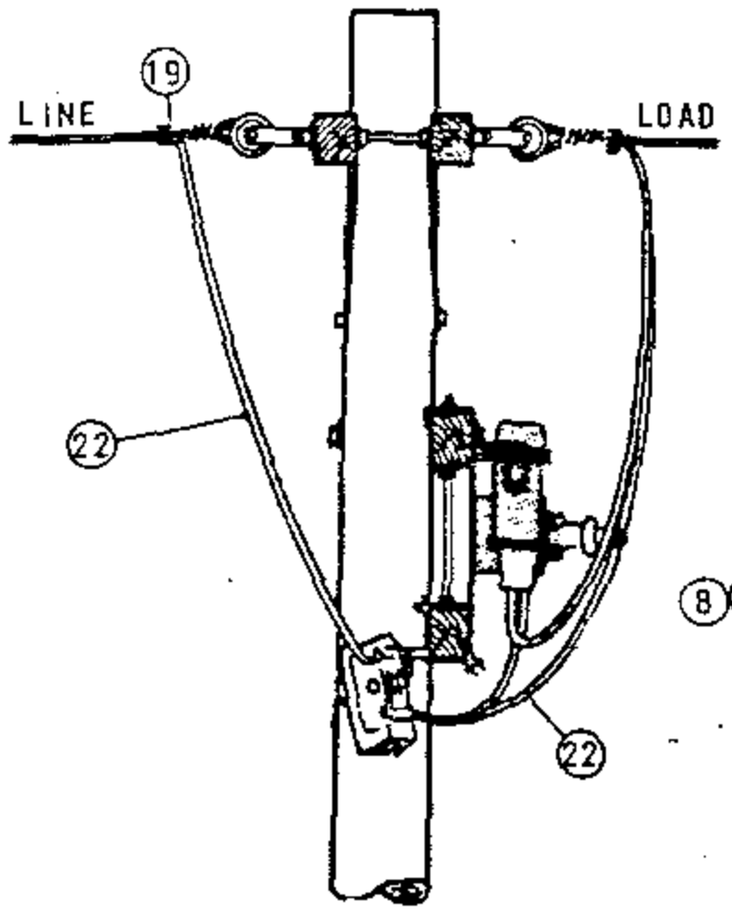
| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| | 24 | WIRE, WP STRANDED (SAME SIZE AS PRIMARY) | 24' | 700 SECTION |
| | 25 | WIRE, #12 TYPE TW CODED COPPER, 3 CONDUCTORS, 41' EACH | 123' | - |
| | 26 | BODY, CONDUIT, 3/4" PVC TYPE "T", BLANK COVER | 1 | 147664 |
| | 27 | BODY, CONDUIT, 3/4" PVC TYPE LB, BLANK COVER (A) | 1 | 146384 |
| | 28 | CONDUIT, 3/4" PVC SCH 80 | 31' | 251520 |
| | 29 | CONDUIT, 1" PVC SCH 40 | 4' | 251200 |
| | 30 | CONDUIT, 2" PVC SCH 40 | 20' | 251296 |
| | 31 | STRAP, PIPE 3/4" & 2-10D GALV NAILS | 7 | 697888.491392 |
| | 32 | STRAP, PIPE 1" & 2-8D GALV. NAILS | 3 | 697792.491584 |
| | 33 | STRAP, PIPE 2" & 2-10D GALV NAILS | 12 | 697856.491392 |
| | 34 | ROD, AND CLAMP, GROUND | 1 | 630072.230016 |
| | 35 | MOULDING, HARDWOOD | 3' | 487200 |
| | 36 | | | |
| | 37 | STAPLES, MOULDING 3" X 1 1/16" X 1/4" | 2 | 678560 |
| | 38 | | | |
| | 39 | NAILS, 20D, GALV | 4 | 491456 |
| | 40 | STAPLES, FENCE 1 1/4" GALV | 6 | 678528 |
| | 41 | | | |
| | 42 | | | |

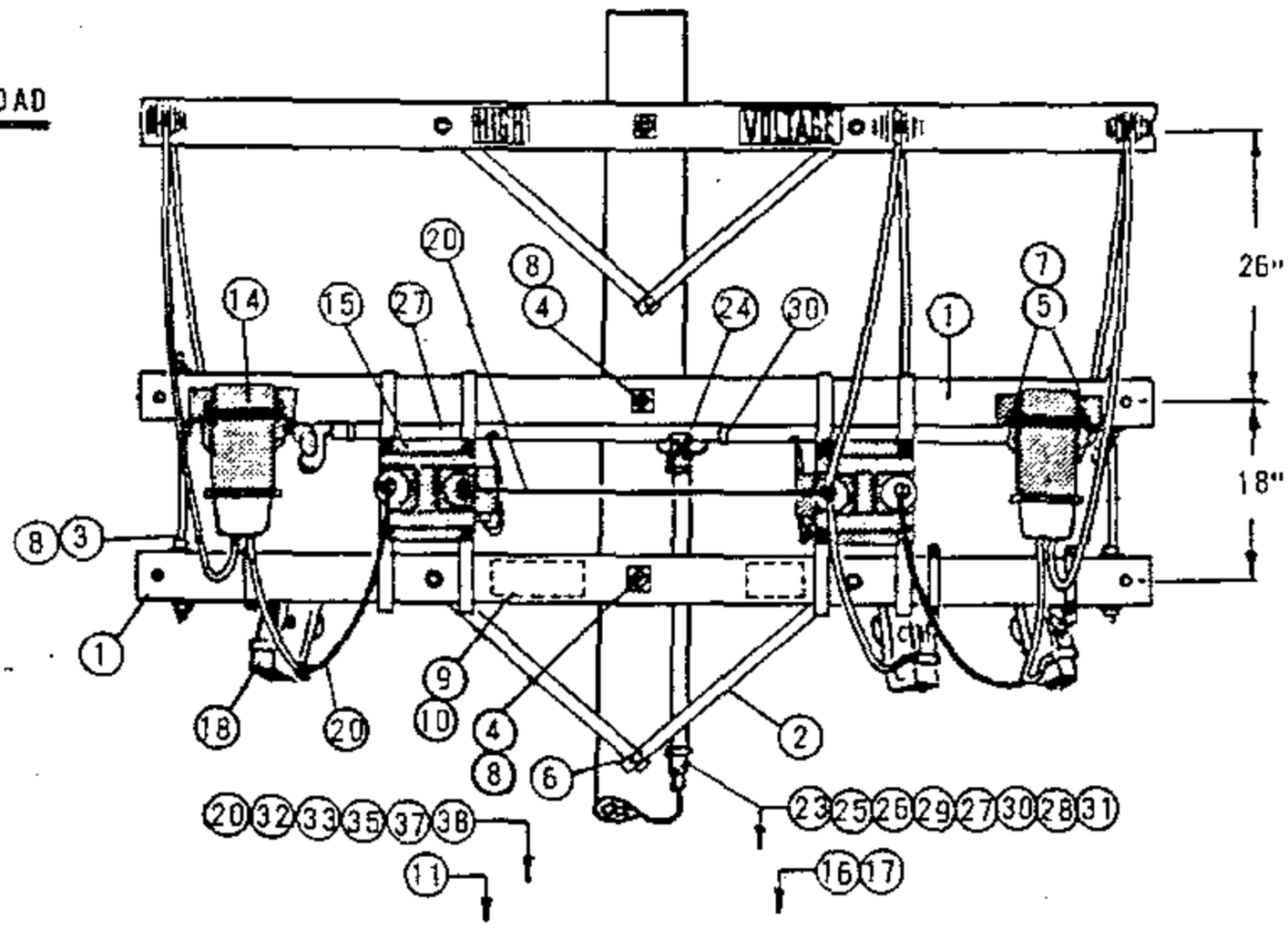
DATE 2-28-83
APPD JWT / HRH

SDG&E ELECTRIC STANDARDS

# POLETOP METERING, 2.4KV SINGLE PHASE

1499.801
SUPERSEDES
1481 (2-28-83)




ELEVATION - LOAD SIDE

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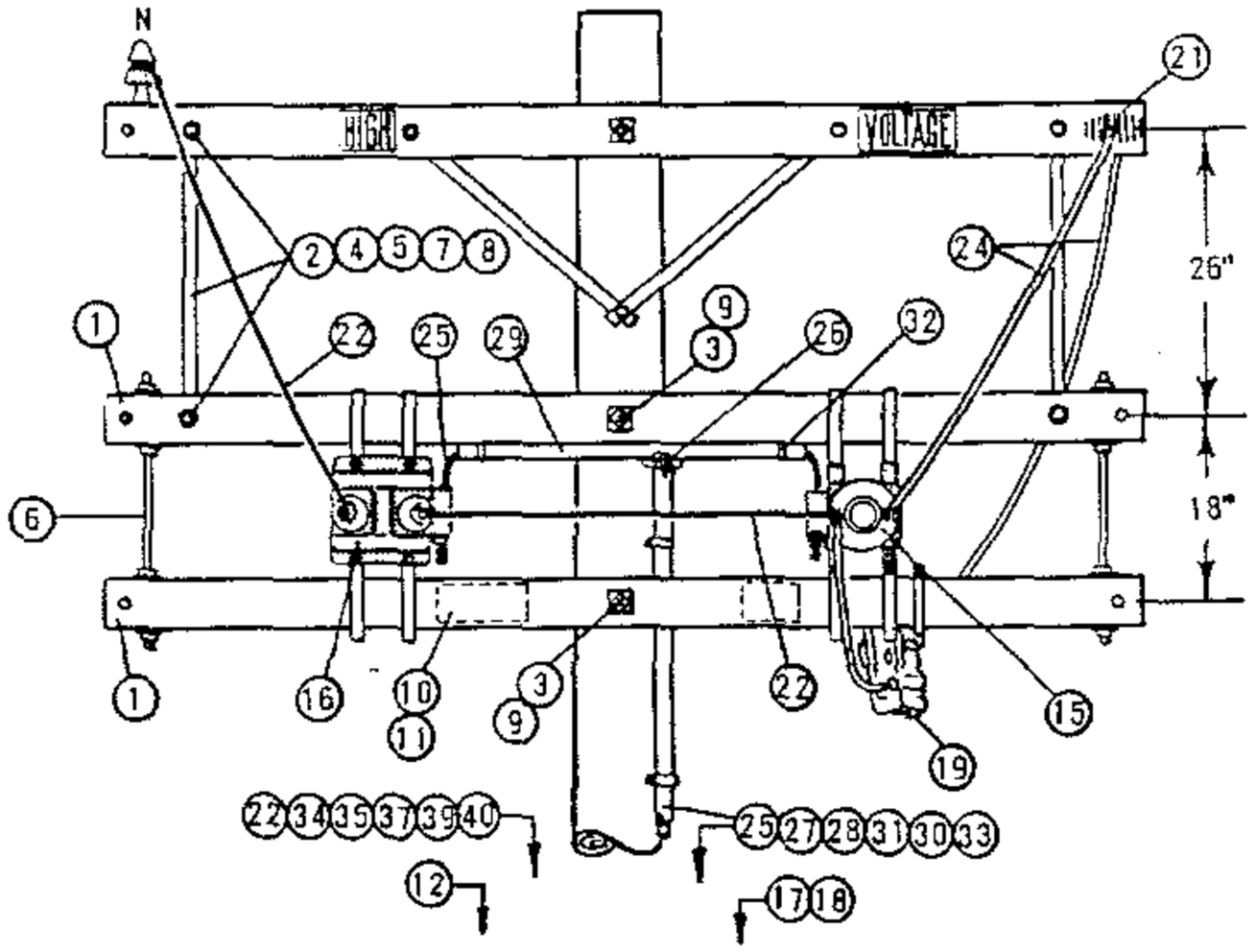
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NOTE:

(A) NOT REQUIRED WHERE METER BOX HAS HUB.

| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 2 | PG 111 IT. 6 |
| 2 | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 3 | | BOLT, SPACE 5/8" X __" | 2 | PG 139 |
| 4 | | BOLT, MACH 5/8" X __" | 2 | PG 139 |
| 5 | | BOLT, MACH 3/8" X 4 1/2" | 4 | 154368 |
| 6 | | SCREW, LAG 1/2" X 4" | 1 | 621568 |
| 7 | | WASHER, 3/8" ROUND | 4 | 800288 |
| 8 | | WASHER, 3" SQUARE FLAT | 12 | 799072 |
| 9 | | SIGN, HIGH VOLTAGE | 1 | 647648 |
| 10 | | NAILS, ROOFING #8 GALV | 8 | 492224 |
| 11 | | POLE STEPS | 16 | 692992 |
| 12 | | | | |
| 13 | | | | |
| | 14 | TRANSFORMER, CURRENT WEST. TYPE CTO 5KV 5A, HANGERS & BOLTS | 2 | - |
| | 15 | TRANSFORMER, POTENTIAL WEST TYPE PTO 2400/120V, HANGER & BOLTS | 2 | - |
| | 16 | METER, THREE PHASE POWER | 1 | - |
| | 17 | CABINET, METER TEST SWITCH; LAG SCREWS FOR MOUNTING | 1 | 161312 |
| | 18 | CUTOUT, 5KV | 2 | PG 1211 |
| | 19 | CONNECTORS, SPLIT BOLT | 9 | PG 787 |
| | 20 | WIRE, #6 BR STRANDED COPPER | 18' | 813536 |
| | 21 | | | |
| | 22 | WIRE, WP STRANDED COPPER, 5KV (SAME SIZE AS PRIMARY) | 34' | 700 SECTION |
| | 23 | WIRE, #12 TYPE TW CODED CU 5 CONDUCTORS 46" EACH | 230" | - |
| | 24 | BODY, CONDUIT, 3/4" PVC TYPE "T", BLANK COVER | 1 | 147664 |
| | 25 | BODY, CONDUIT 3/4" PVC TYPE LB, BLANK COVER (A) | 1 | 146384 |
| | 26 | CONDUIT, 3/4" PVC SCH 80 | 31' | 251520 |
| | 27 | CONDUIT, 1" PVC SCH 40 | 5' | 251200 |
| | 28 | CONDUIT, 2" PVC SCH 40 | 20' | 251296 |
| | 29 | STRAP, 3/4" PIPE & 2-10D NAILS | 7 | 697888, 491392 |
| | 30 | STRAP, 1" PIPE & 2-8D NAILS | 3 | 697792, 491584 |
| | 31 | STRAP, 2" PIPE & 2-10D NAILS | 12 | 697856, 491392 |
| | 32 | ROD & CLAMP, GROUND | 1 | 630072, 230016 |
| | 33 | MOULDING, HARDWOOD | 3' | 487200 |
| | 34 | | | |
| | 35 | STAPLES, MOULDING | 2 | 678560 |
| | 36 | | | |
| | 37 | NAILS, 20D GALV | 4 | 491456 |
| | 38 | STAPLES, FENCE 1 1/4" GALV | 6 | 678528 |

| | | |
|---|---|---|
| 1499.802<br>SUPERSEDES<br>1482 (2-28-82) | SDG&E ELECTRIC STANDARDS<br>POLETOP METERING, 2.4KV OPEN DELTA | DATE 2-28-83<br>APPD [signature] |




ELEVATION - LOAD SIDE

FOR FIELD MAINTENANCE ONLY

NOTE:

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| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 8' - 0" | 2 | PG 111 IT. 2 |
| 2 | | BRACE, FLAT CROSSARM 28" | 2 | 164192 |
| 3 | | BOLT, MACH 5/8" X 14" | 2 | 154880 |
| 4 | | BOLT, MACH 1/2" X 5" | 2 | 153024 |
| 5 | | BOLT, MACH 3/8" X 4 1/2" | 4 | 154368 |
| 6 | | BOLT, SPACE 5/8" X 24" | 2 | 156640 |
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| 9 | | WASHER, 3" SQ FLAT | 12 | 799072 |
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| 12 | | POLE STEP | 16 | 692992 |
| 13 | | | | |
| 14 | | | | |
| | 15 | TRANSFORMER, CURRENT, WEST. TYPE WO 5KV, 5A | 1 | - |
| | 16 | TRANSFORMER, POTENTIAL, WEST. PTO, 2400/120V, HANGERS & BOLTS | 1 | - |
| | 17 | METER, SINGLE PHASE POWER | 1 | - |
| | 18 | CABINET, METER, TEST SWITCH, LAG SCREWS | 1 | 161312 |
| | 19 | CUTOUT, 5KV | 2 | PG 1211 |
| | 20 | | | |
| | 21 | CONNECTORS, SPLIT BOLT | 7 | PG 787 |
| | 22 | WIRE, #6 BARE STRANDED COPPER | 20' | 813536 |
| | 23 | | 10' | 194304 |

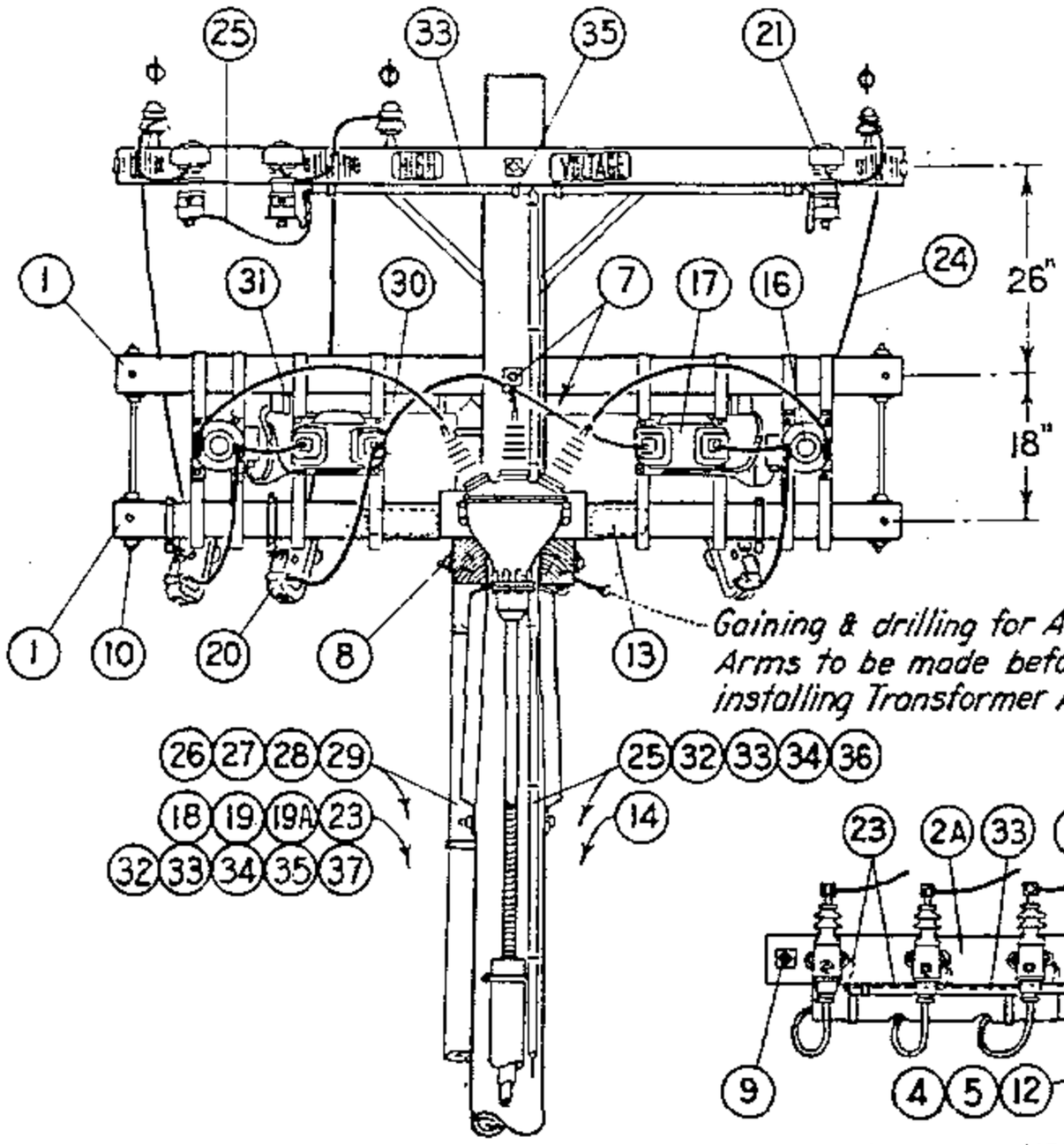
| ITEM PTF | ITEM MI | DESCRIPTION | QUANTITY | STOCK NO. OR CONSTR STD |
|---|---|---|---|---|
| | 24 | WIRE, WP STRANDED (SAME SIZE AS PRIMARY) | 24' | 700 SECTION |
| | 25 | WIRE, #12 TYPE TW CODED COPPER, 3 CONDUCTORS, 41" EACH | 123" | - |
| | 26 | BODY, CONDUIT, 3/4" PVC TYPE "T", BLANK COVER | 1 | 147664 |
| | 27 | BODY, CONDUIT, 3/4" PVC TYPE LB, BLANK COVER (A) | 1 | 146384 |
| | 28 | CONDUIT, 3/4" PVC SCH 80 | 31' | 251520 |
| | 29 | CONDUIT, 1" PVC SCH 40 | 4' | 251200 |
| | 30 | CONDUIT, 2" PVC SCH 40 | 20' | 251296 |
| | 31 | STRAP, PIPE 3/4" & 2-10D GALV NAILS | 7 | 697888,491392 |
| | 32 | STRAP, PIPE 1" & 2-8D GALV. NAILS | 3 | 697792,491584 |
| | 33 | STRAP, PIPE 2" & 2-10D GALV NAILS | 12 | 697856,491392 |
| | 34 | ROD, AND CLAMP, GROUND | 1 | 630072,230016 |
| | 35 | MOULDING, HARDWOOD | 3' | 487200 |
| | 36 | | | 486976,487008 |
| | 37 | STAPLES, MOULDING 3" X 1 1/16"X1/4" | 2 | 678560 |
| | 38 | | | |
| | 39 | NAILS, 20D, GALV | 4 | 491456 |
| | 40 | STAPLES, FENCE 1 1/4" GALV | 5 | 678528 |
| | 41 | | | |
| | 42 | | | |

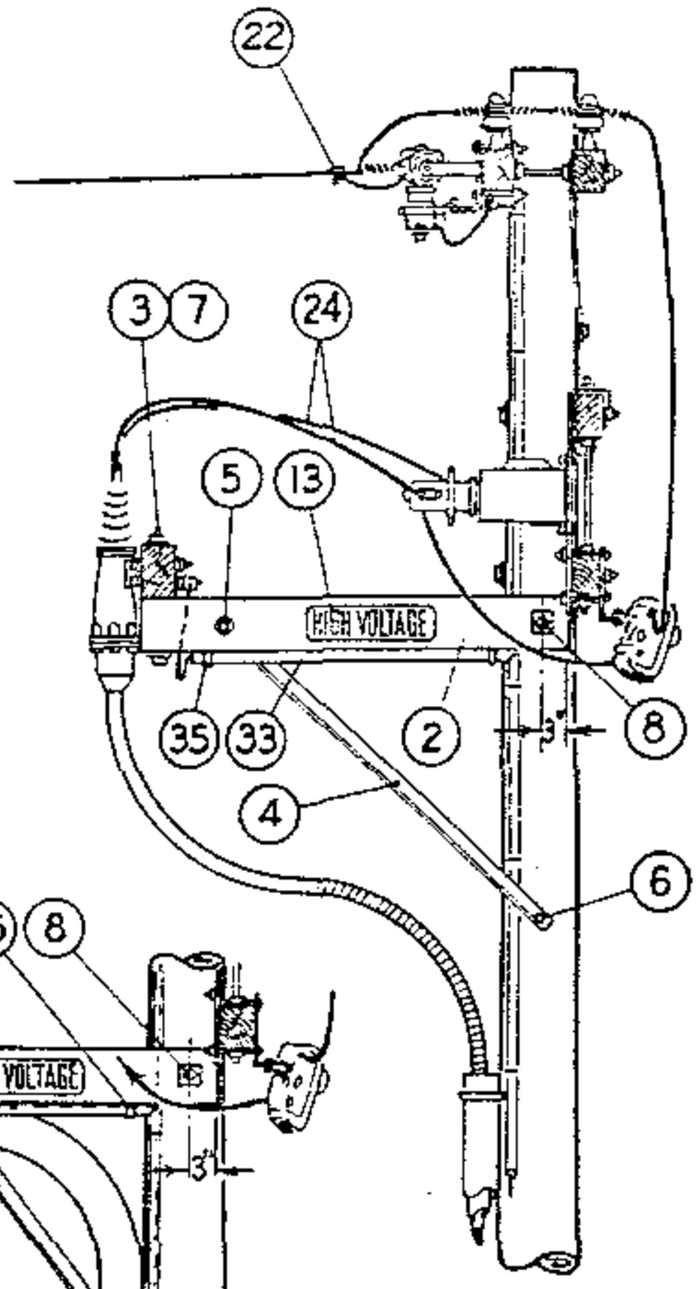
SDG&E ELECTRIC STANDARDS

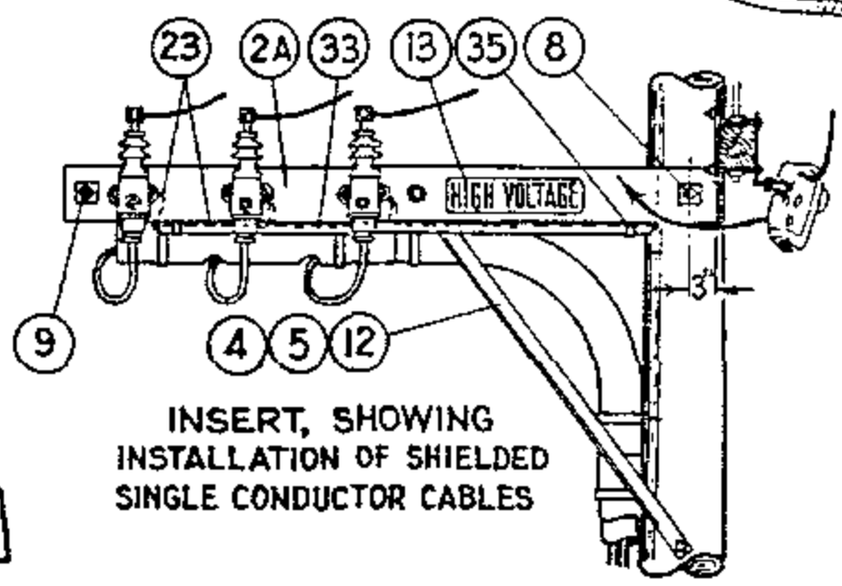
DATE 2-28-83
APPD JHT/HRH

POLETOP METERING, 4KV SINGLE PHASE

1499.803
SUPERSEDES
1483 (2-28-83)



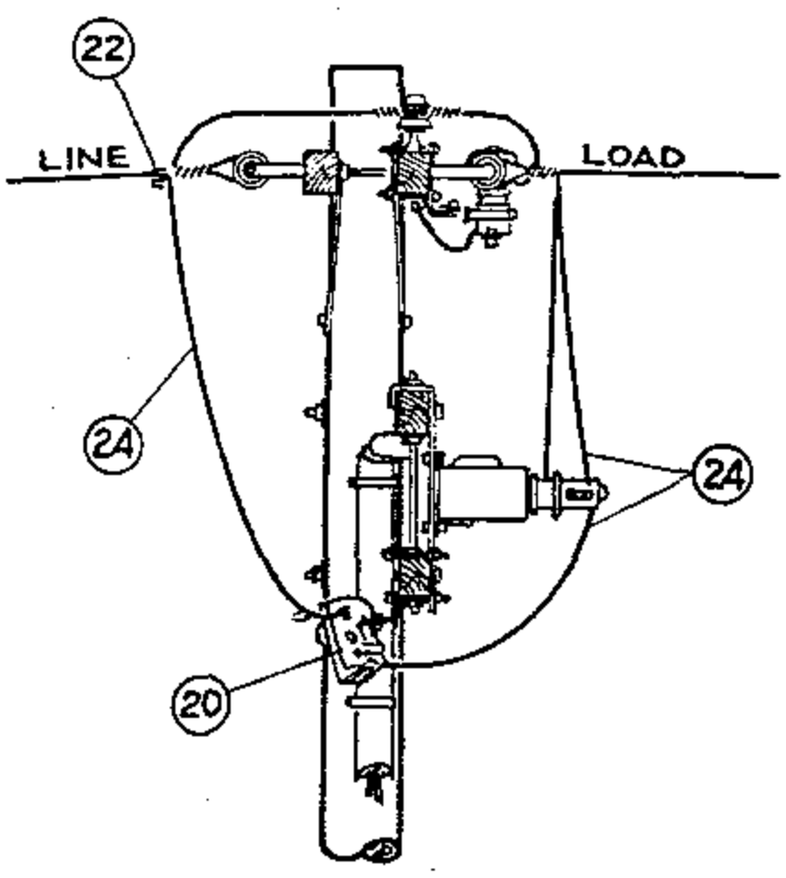



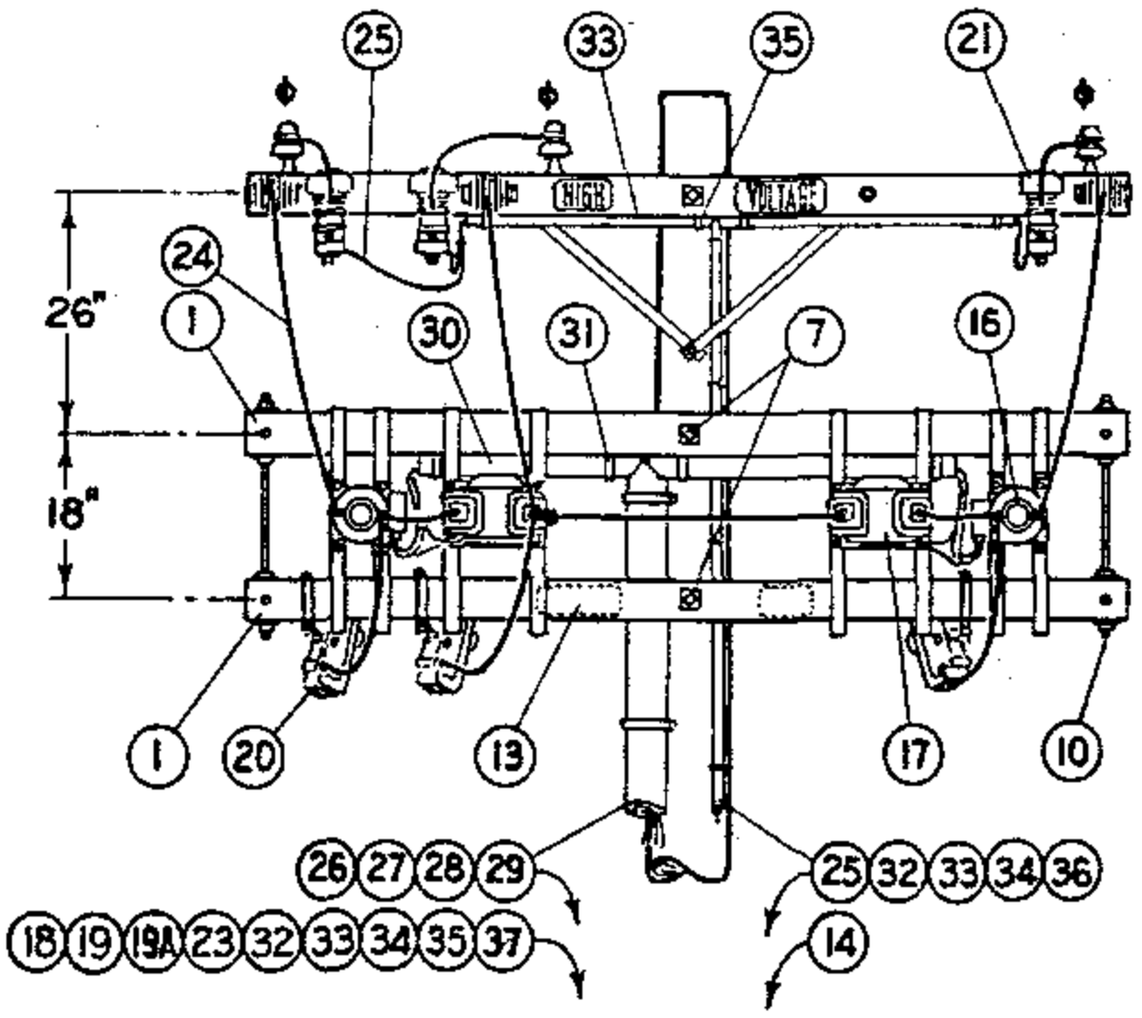




INSERT, SHOWING
INSTALLATION OF SHIELDED
SINGLE CONDUCTOR CABLES

FOR FIELD MAINTENANCE ONLY

UNDERGROUND SERVICE




OVERHEAD SERVICE

| | | |
|---|---|---|
| 1499.804<br>SUPERSEDES<br>1484.1 (2-28-83) | SDG&E ELECTRIC STANDARDS<br>POLETOP METERING INSTALLATION, 4KV, 3 PHASE,<br>3 WIRE UG & OH SERVICES | DATE 2-28-83<br>APPD ~~WT~~/KRH |

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FOR FIELD MAINTENANCE ONLY

NOTES:

(A) USE ONLY ONE GROUND ROD FOR LIGHTNING ARRESTER GROUND AND ONE GROUND ROD FOR METER GROUND WHERE A RESISTANCE OF LESS THAN 25 OHMS CAN BE OBTAINED WITH EACH ROD.

(B) DOUBLE METER CABINETS ARE REQUIRED FOR RKVAH METERING INSTALLATIONS.

(C) UNTWIST SUFFICIENT LENGTH OF #2 STRANDED WIRE TO CONNECT EACH ARRESTER AND POTHEAD GROUND WITH A SINGLE STRAND.

| | ITEM | DESCRIPTION | QUANTITY U.G. SERVICE P.I.L.C. | QUANTITY U.G. SERVICE RUBBER LIKE | QUANTITY O.H. SERV. | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|---|
| P. T. & F. | 1 | 3 1/2" x 4 1/2" x 8'-0" Crossarm, 6 Pin | 2 | 2 | 2 | PG 111 IT. 2 |
| | 2 | 3 3/4" x 5 3/4" x 4'-0" Pothead Alley Arm | 2 | – | – | PG 112 IT. 3 |
| | 2A | 3 3/4" x 5 3/4" x 6'-0" (10 Pin arm, cut in half) | – | 2 | – | PG 111 IT. 4 |
| | 3 | 3 3/4" x 5 3/4" x 18" Wood Block, Pothead Support | 1 | – | – | – |
| | 4 | Pothead Alley Arm Brace, 4'-0" | 2 | 1 | – | 163808 |
| | 5 | Mach. Bolt, Galv. 5/8" x 5", 1 rd. Washer & 1 Nut | 2 | 1 | – | PGS 139, 140 |
| | 6 | Mach. Bolt, Galv., 5/8" x 10" | 1 | – | – | PGS 139, 154816 |
| | 7 | Mach. Bolt, Galv. 5/8" x 14", 2 Sq. Washers & 1 Nut | 4 | 2 | 2 | PGS 139, 140 |
| | 8 | Mach. Bolt, Galv. 5/8" x 18", 2 Sq. Washers & 1 Nut | 1 | 1 | – | PGS 139, 140 |
| | 9 | Space Bolt, Galv. 5/8" x 20", 4 Sq. Washers & 4 Nuts | – | 1 | – | PGS 139, 140 |
| | 10 | Space Bolts, Galv. 5/8" x 26", 4 Sq. Washers & 4 Nuts | 2 | 2 | 2 | PGS 139, 140 |
| | 11 | | | | | |
| | 12 | Lag Screw, Galv. 5/8" x 5" | – | 1 | – | 621600 |
| | 13 | High Voltage Sign & Galv. Roofing Nails | 3 | 3 | 1 | 647648, 492224 |
| | 14 | Pole Steps | 16 | 16 | 16 | 692992 |
| | 15 | | | | | |
| M. I. | 16 | Current Transformer, 5 Kv, Hangers & Bolts | 2 | 2 | 2 | – |
| | 17 | Potential Transformers, 4800/120V, Hangers & Bolts | 2 | 2 | 2 | – |
| | 18 | Meter Three Phase Power | 1 | 1 | 1 | – |
| | 19 | Meter Cabinet; Single, 15" x 30" x 10 1/2"; Double, 30" x 30" x 10 1/2"; Lag Screws for Mounting (B) | 1 | 1 | 1 | SINGLE 161312, DOUBLE 161184 |
| | 19A | Test Switch | 1 | 1 | 1 | 710880-711008 |
| | 20 | Cutout, Expulsion Fuse | 3 | 3 | 3 | PG 1211 |
| | 21 | Lightning Arrester, 3 Kv. | 3 | 3 | 3 | 113216 |
| | 22 | Wire Connectors | 5 | 5 | 8 | PGS 783, 786 |
| | 23 | #6 Bare Stranded Copper Wire, Meter Ground | 14' | 14' | 14' | 813536 |
| | 24 | Bare Stranded Copper Wire, Size as Required | 35' | 35' | 50' | PGS 715, 716, 717 |
| | 25 | #2 Bare Stranded Copper Wire, L.A. Pothead Ground (C) | 52' | 52' | 52' | 813664 |
| | 26 | #12 Type TW Coded Wire, 5 Conductors, 40' Each | 200' | 200' | 200' | – |
| | 27 | Redwood Moulding | 26' | 26' | 26' | PG 143 IT 1 |
| | 28 | Moulding Straps, Galv. | 13 | 13 | 13 | 697024 |
| | 29 | 3/4" Conduit, Rigid Iron; Pipe Strap & 2-8d Nails, Galv. | 10' | 10' | 10' | 251008, 696704 |
| | 30 | 2" Fibre Conduit | 5' | 5' | 5' | 251618 |
| | 31 | 2" Fibre Conduit Strap & 2-8d Nails, Galv. | 4 | 4 | 4 | PG 143, 491584 |
| | 32 | Ground Rod and Clamp, incl. Conduit Ground Clamp | (A) 4 | (A) 4 | (A) 4 | 603072, 230016 |
| | 33 | Hardwood Moulding | 52' | 54' | 49' | 487200 |
| | 34 | Moulding Staples, Galv., 3" x 1 1/8" x 1/4" | 24 | 22 | 22 | 678560 |
| | 35 | 3/4" Pipe Straps, Galv. & 2 8d Nails, Galv. | 8 | 9 | 6 | 697888, 491584 |
| | 36 | 1/4" Fence Staples, Galv. | 14 | 12 | 12 | 678528 |
| | 37 | 3/4" Type "LB" Condulet | 1 | 1 | 1 | 146144 |
| | 38 | | | | | |

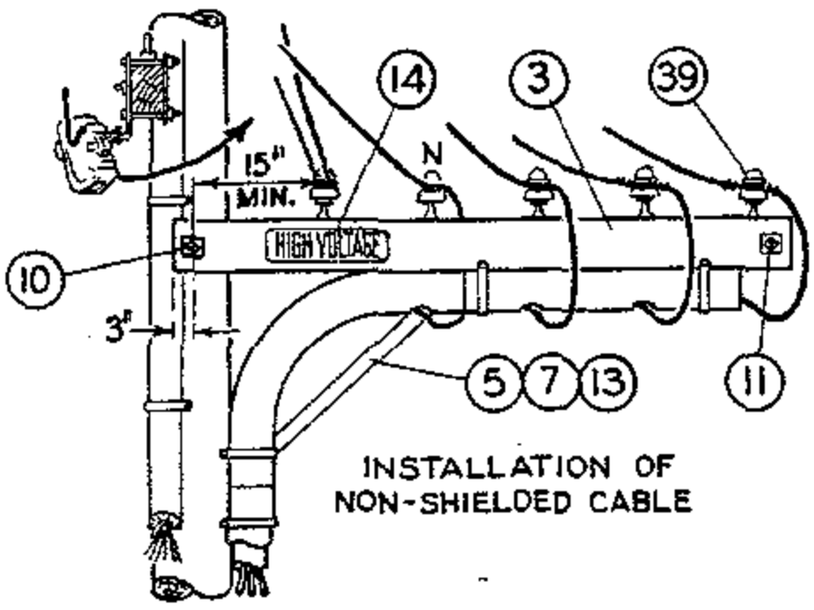
DATE 2-28-83
APPD JWT/ARH

SDG&E ELECTRIC STANDARDS

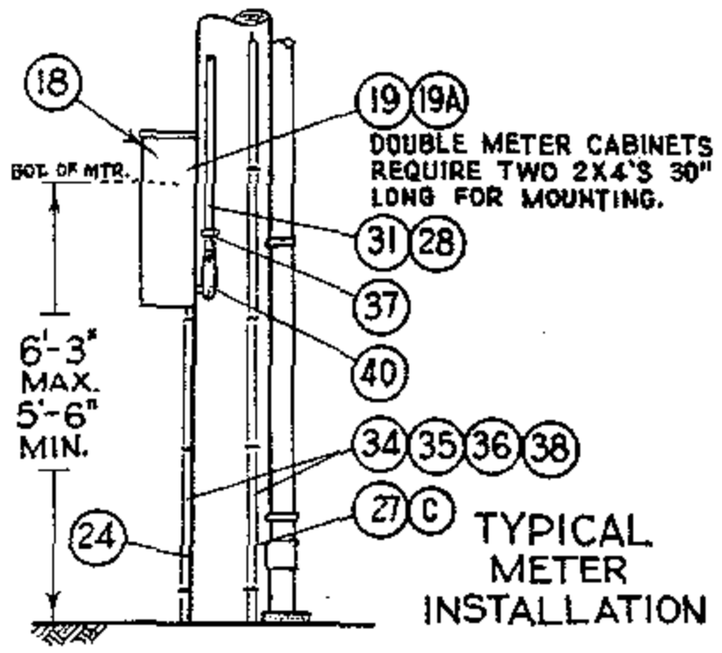
# POLETOP METERING INSTALLATION, 4KV, 3 PHASE, 3 WIRE UG & OH SERVICES

1499.805
SUPERSEDES
1484.2 (2-28-83)

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INSTALLATION OF NON-SHIELDED CABLE




TYPICAL METER INSTALLATION

FOR FIELD MAINTENANCE ONLY

NOTES:

(A) USE ONLY ONE GROUND ROD FOR LIGHTNING ARRESTER GROUND AND ONE GROUND ROD FOR METER GROUND WHERE A RESISTANCE OF LESS THAN 25 OHMS CAN BE OBTAINED WITH EACH ROD.

(B) DOUBLE METER CABINETS ARE REQUIRED FOR RKVAH METERING INSTALLATIONS.

(C) UNTWIST SUFFICIENT LENGTH OF #2 STRANDED WIRE TO CONNECT EACH ARRESTER AND POTHEAD GROUND WITH A SINGLE STRAND.

| | ITEM | DESCRIPTION | QUANTITY U.G. SERVICE P.I.L.C. | QUANTITY U.G. SERVICE SHIELD. | QUANTITY U.G. SERVICE NON SHIELD. | QUANTITY O.H. SERV. | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|---|---|
| P. T. & F. | 1 | 3 3/4" x 5 3/4" x 10'- 0" Standard Arm | 2 | 2 | 2 | 2 | PG 119 IT. 2 |
| | 2 | 3 3/4" x 5 3/4" x 4'- 0" Pothead Alley Arm | 2 | – | – | – | PG 112 IT. 3 |
| | 3 | 3 3/4" x 5 3/4" x 12'- 0" (12Kv. Arm, Cut in Half | – | 1 | 1 | – | PG 119 IT. 4 |
| | 4 | 3 3/4" x 5 3/4" x 18" Wood Block, Pothead Support | 1 | – | – | – | – |
| | 5 | Pothead Alley Arm Brace, 4'- 0" | 2 | 1 | 1 | – | 163808 |
| | 6 | | | | | | |
| | 7 | Machine Bolt, Galv., 5/8" x 5", 1 Round Washer & Nut | 2 | 1 | 1 | – | PGS 139, 140 |
| | 8 | Machine Bolt, Galv., 5/8" x 10" | 1 | – | – | – | PGS 139, 140 |
| | 9 | Machine Bolt, Galv., 5/8" x 14", 2 Square Washers & Nut | 4 | 2 | 2 | 2 | PGS 139, 140 |
| | 10 | Machine Bolt, Galv., 5/8" x 18", 2 Square Washers & Nut | 1 | 1 | 1 | – | PGS 139, 140 |
| | 11 | Space Bolt, Galv., 5/8" x 20", 4 Square Washers & 4 Nuts | – | 1 | 1 | – | PGS 139, 140 |
| | 12 | Space Bolt, Galv., 5/8" x 28", 4 Square Washers & 4 Nuts | 2 | 2 | 2 | 2 | PGS 139, 140 |
| | 13 | Lag Screw, Galv., 5/8" x 5" | – | 1 | 1 | – | 621600 |
| | 14 | High Voltage Sign & Galv. Roofing Nails | 3 | 3 | 3 | 1 | 647648, 492224 |
| | 15 | Pole Steps | 16 | 16 | 16 | 17 | 692992 |
| M. I. | 16 | Current Transformer, 5Kv., Hangers & Bolts | 3 | 3 | 3 | 3 | – |
| | 17 | Potential Transformer, 2400/120V, Hangers & Bolts | 3 | 3 | 3 | 3 | – |
| | 18 | Meter, Three Phase, Maximum Demand and/or Rkvah Recording | 1 | 1 | 1 | 1 | – |
| | 19 | Meter Cabinet; Single, 15" x 30" x 10 1/2"; Double, 30" x 30" x 10 1/2", Four Lag Screws for Mounting (B) | 1 | 1 | 1 | 1 | SINGLE 161312, DOUBLE 161184 |
| | 19A | Test Switch | 1 | 1 | 1 | 1 | 710880 - 711008 |
| | 20 | Cutout, Expulsion Fuse | 3 | 3 | 3 | 3 | PG 1211 |
| | 21 | Lightning Arrester, 3Kv. | 3 | 3 | 3 | 3 | 113216 |
| | 22 | Standoff Bracket | – | – | – | 2 | 165144 |
| | 23 | Wire Connectors | 6 | 6 | 6 | 13 | PGS 783, 786 |
| | 24 | #6 Bare Stranded Copper Wire, Meter Ground | 14' | 14' | 14' | 14' | 813536 |
| | 25 | Bare Stranded Copper Wire, Same Size as Line Neutral | 14' | 14' | 14' | 14' | PGS 715-717 |
| | 26 | Bare Stranded Copper Wire, Size as Required | 47' | 52' | 33' | 33' | PGS 715-717 |
| | 27 | #2 Bare Stranded Copper Wire, L. A. & Pothead Ground (C) | 52' | 52' | 52' | 52' | 813664 |
| | 28 | #12 Type TW Coded Wire, 7 Conductors, 40' Each | 280' | 280' | 280' | 280' | – |
| | 29 | Redwood Moulding | 20' | 20' | 20' | 20' | PG 143 IT 1 |
| | 30 | Moulding Strap, Galv. | 11 | 11 | 11 | 11 | 697024 |
| | 31 | 3/4" Conduit, Rigid Iron; Pipe Straps & 8d Nails; Galv. | 10' | 10' | 10' | 10' | 251008, 696704, 491584 |
| | 32 | 2" Fibre Conduit | 8' | 8' | 8' | 8' | 251616 |
| | 33 | 2" Fibre Conduit Straps & 2 8d Nails; Galv. | 6 | 6 | 4 | 4 | PG 143, 491584 |
| | 34 | Ground Rod & Clamp, Including Conduit Ground Clamp | (A) 4 | (A) 4 | (A) 4 | (A) 4 | 603072, 230016 |
| | 35 | Hardwood Moulding, 1" | 52' | 55' | 49' | 49' | 487200 |
| | 36 | Moulding Staples, Galv., 3" x 1 1/8" x 1/4" | 25 | 25 | 25 | 25 | 678560 |
| | 37 | 3/4" Pipe Straps, Galv. & 2 8d Nails, Galv. | 8 | 9 | 6 | 6 | 697888, 491584 |
| | 38 | 1 1/4" Fence Staples, Galv. | 14 | 12 | 12 | 12 | 678528 |
| | 39 | Insulator, 4Kv. and Steel Pin | 2 | 2 | 5 | 2 | PG 750, 532608 |
| | 40 | 3/4" Type "LB" Condulet | 1 | 1 | 1 | 1 | 146144 |
| | 41 | | | | | | |
| | 42 | | | | | | |

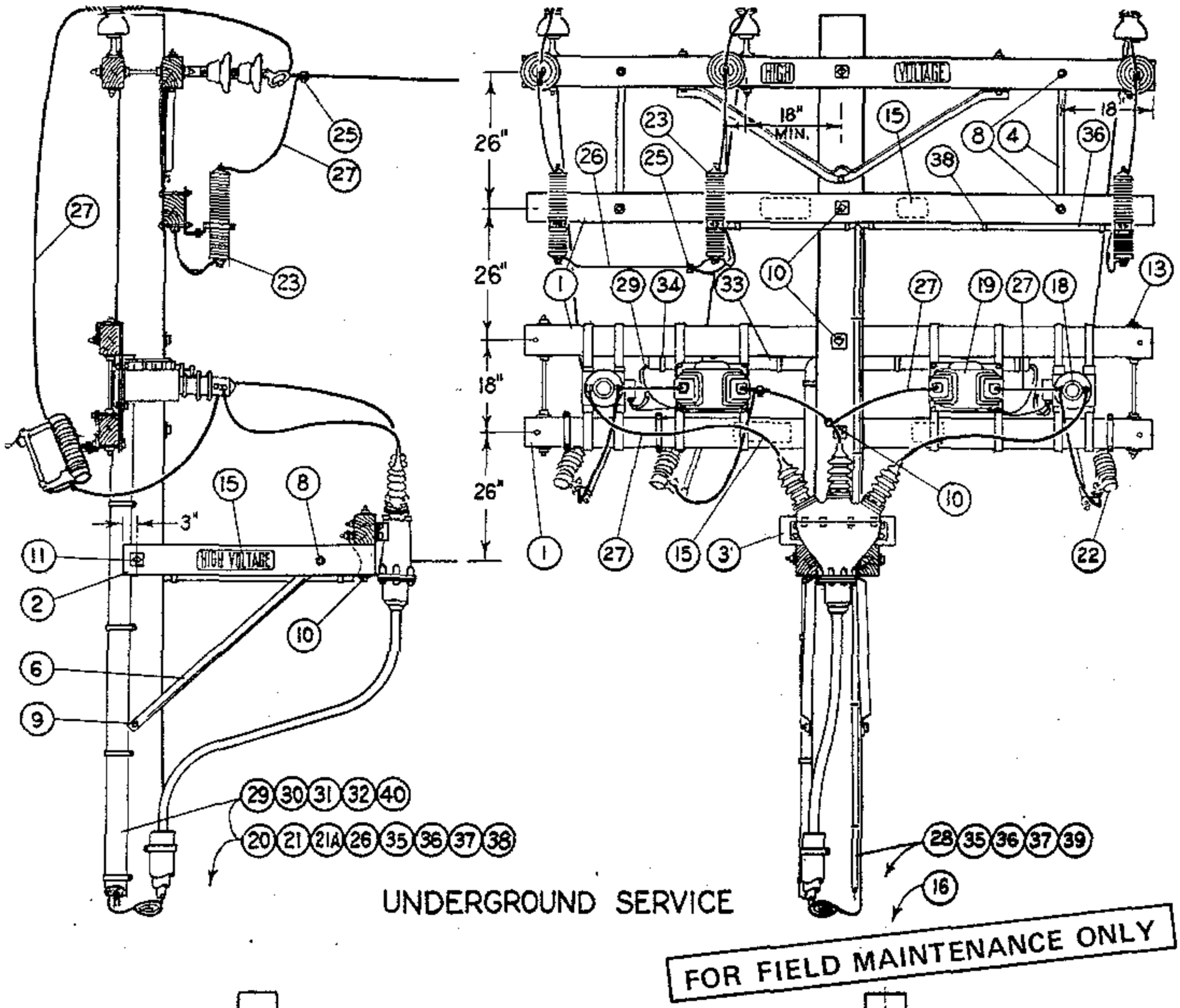
DATE 2-28-83
APPD JHF/KRH

SDG&E ELECTRIC STANDARDS

# POLETOP METERING INSTALLATION, 4KV, 3 PHASE, 4 WIRE UG & OH SERVICES

1499.807
SUPERSEDES
1485.2 (2-28-83)

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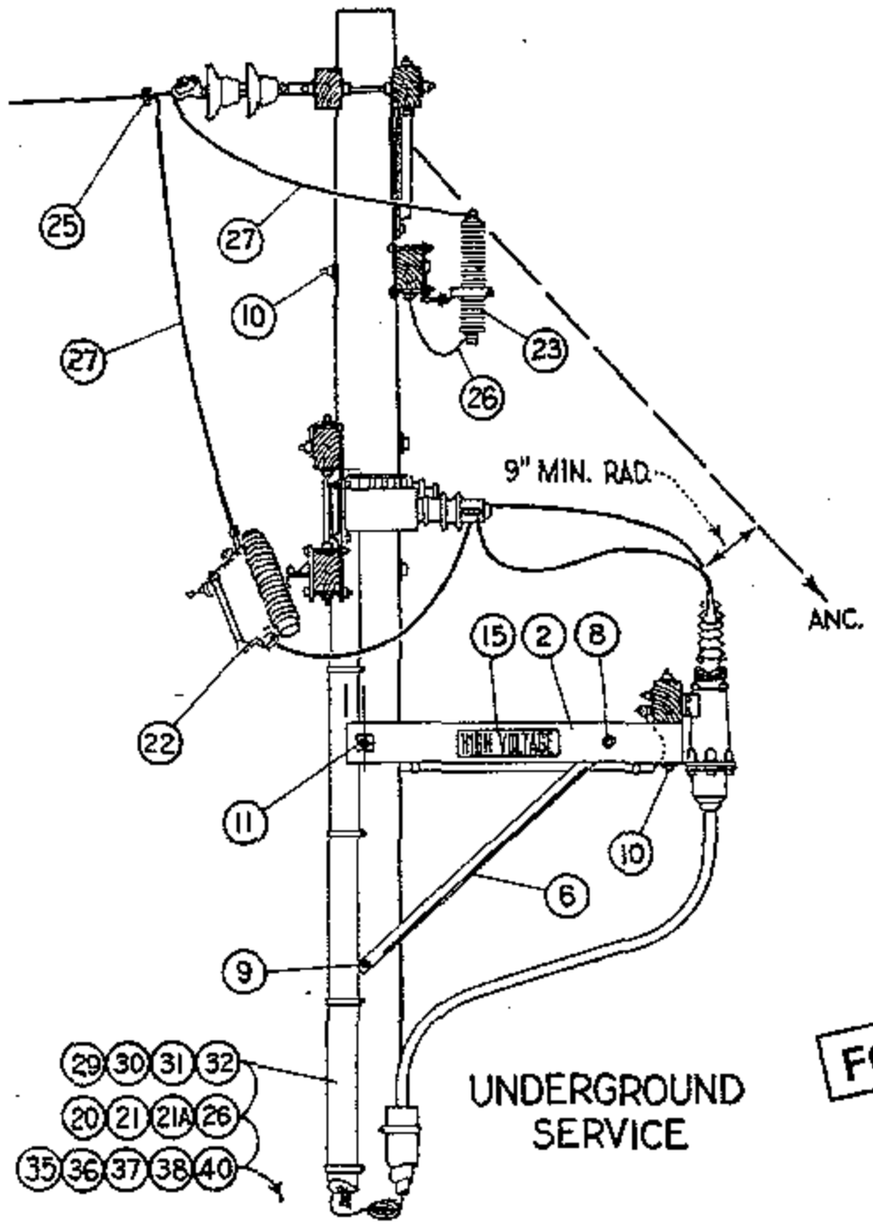

UNDERGROUND SERVICE

FOR FIELD MAINTENANCE ONLY

OVERHEAD SERVICE

| | | |
|---|---|---|
| 1499.808<br>SUPERSEDES<br>1486.1 (2-28-83) | SDG&E ELECTRIC STANDARDS<br>POLETOP METERING INSTALLATION, 12KV, 3 PHASE,<br>3 WIRE U.G. & O.H. SERVICES | DATE 2-28-83<br>APPD JMT/ARH |

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UNDERGROUND SERVICE

FOR FIELD MAINTENANCE ONLY

NOTES:

Ⓐ USE ONLY ONE GROUND ROD FOR LIGHTNING ARRESTER GROUND AND ONE GROUND ROD FOR METER GROUND WHERE RESISTANCE OF LESS THAN 25 OHMS CAN BE OBTAINED WITH EACH ROD.

Ⓑ DOUBLE METER CABINETS ARE REQUIRED FOR RKVAH METERING INSTALLATIONS.

| | ITEM | DESCRIPTION | QUANTITY U.G. SERV. | QUANTITY O.H. SERV. | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|
| P. T. & F. | 1 | 3 3/4" x 5 3/4" x 10'-0" Standard Arm | 3 | 3 | PG 119 IT. 2 |
| | 2 | 3 3/4" x 5 3/4" x 4'-0" Pothead Alley Arm | 2 | – | PG 112 IT. 3 |
| | 3 | 3 3/4" x 5 3/4" x 22" Wood Block, Pothead Support | 1 | – | – |
| | 4 | Flat Crossarm Brace, 36" | 2 | 2 | 164224 |
| | 5 | | | | |
| | 6 | Pothead Alley Arm Brace, 4'-0" | 2 | – | 163808 |
| | 7 | | | | |
| | 8 | Mach. Bolt, Galv., 5/8" x 5", 1 rd Washer, & 1 Nut | 9 | 4 | PGS 139, 140 |
| | 9 | Mach. Bolt, Galv., 5/8" x 10" | 1 | – | PGS 139, 140 |
| | 10 | Mach. Bolt, Galv., 5/8" x 14", 2 Sq. Washers & 1 Nut | 5 | 3 | PGS 139, 140 |
| | 11 | Mach. Bolt, Galv., 5/8" x 18", 2 Sq. Washers & 1 Nut | 1 | – | PGS 139, 140 |
| | 12 | | | | |
| | 13 | Space Bolt, Galv., 5/8" x 26", 4 Sq. Washers & 4 Nuts | 2 | 2 | PGS 139, 140 |
| | 14 | | | | PGS 1212, 1213 |
| | 15 | High Voltage Sign & Galv. Roofing Nails | 2 | 2 | 647648, 492224 |
| | 16 | Pole Steps | 14 | 15 | 692992 |
| | 17 | | | | |
| M. I. | 18 | Current Transformer, 15 KV, Hangers & Bolts | 2 | 2 | – |
| | 19 | Potential Transformer, 12000/120 v, Hangers & Bolts | 2 | 2 | – |
| | 20 | Meter, Three Phase Power | 1 | 1 | – |
| | 21 | Meter Cabinet; Single, 15" x 30" x 10 1/2"; Double, 30" x 30" x 10 1/2"; Lag Screws for Mounting Ⓑ | 1 | 1 | SINGLE 161312, DOUBLE 161184 |
| | 21A | Test Switch | 1 | 1 | 710680-711008 |
| | 22 | Cutout, Expulsion Fuse | 3 | 3 | PGS 1212, 1213 |
| | 23 | Lightning Arrester, 12 Kv. | 3 | 3 | 113216 |
| | 24 | | | | |
| | 25 | Wire Connectors | 5 | 8 | PGS 783, 786 |
| | 26 | #6 Bare Stranded Copper Wire - Meter Grnd. & L.A. Lateral | 27' | 27' | 813536 |
| | 27 | Bare Stranded Copper Wire, Size as Required | 55' | 65' | PGS 715-717 |
| | 28 | #2 Bare Stranded Copper, Lightning Arrester Ground | 54' | 45' | 813664 |
| | 29 | #12 Type T W Coded Copper Wire, 5 Conductors # 34' | 170' | 170' | – |
| | 30 | Redwood Moulding, C-54.1 #1 | 16' | 16' | PG 143 IT. 1 |
| | 31 | Moulding Strap, Galv., C-54.1 #1A | 8 | 8 | 697024 |
| | 32 | 3/4" Conduit, Rigid Iron; Pipe Strap & 2-8d Nails, Galv. | 10' | 10' | 251008, 696704, 491584 |
| | 33 | 2" Fibre Conduit | 6' | 6' | 251616 |
| | 34 | 2" Pipe Straps & 2-8d Nails, Galv. | 4 | 4 | 697856, 491584 |
| | 35 | Ground Rod & Clamp | Ⓐ 4 | Ⓐ 4 | 603072, 230016 |
| | 36 | Hardwood Moulding, 1" | 49' | 45' | 487200 |
| | 37 | Moulding Staples, Galv., 3" x 1 1/8" x 1/4" | 30 | 30 | 678560 |
| | 38 | 3/4" Pipe Strap & 2-8d Nails, Galv. | 10 | 8 | 697888, 491584 |
| | 39 | 1 1/4" Fence Staples, Galv. | 12 | 12 | 678528 |
| | 40 | 3/4" Type "LB" Condulet | 1 | 1 | 146144 |

SDG&E ELECTRIC STANDARDS

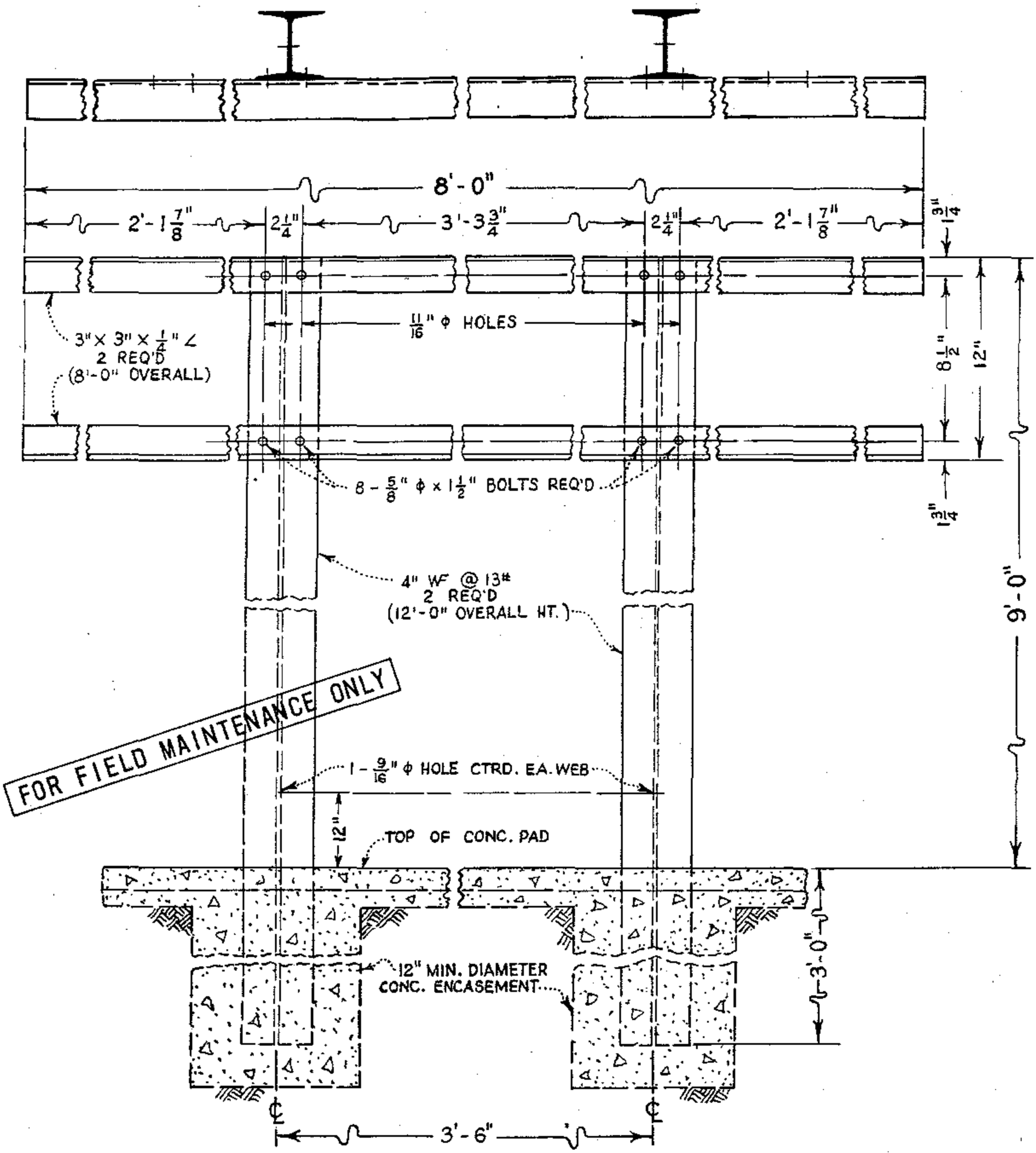
DATE 2-28-83
APPD ONT/KAR #

# POLETOP METERING INSTALLATION, 12KV, 3 PHASE, 3 WIRE U.G. & O.H. SERVICES

1499.809
SUPERSEDES
1486.2 (2-28-83)

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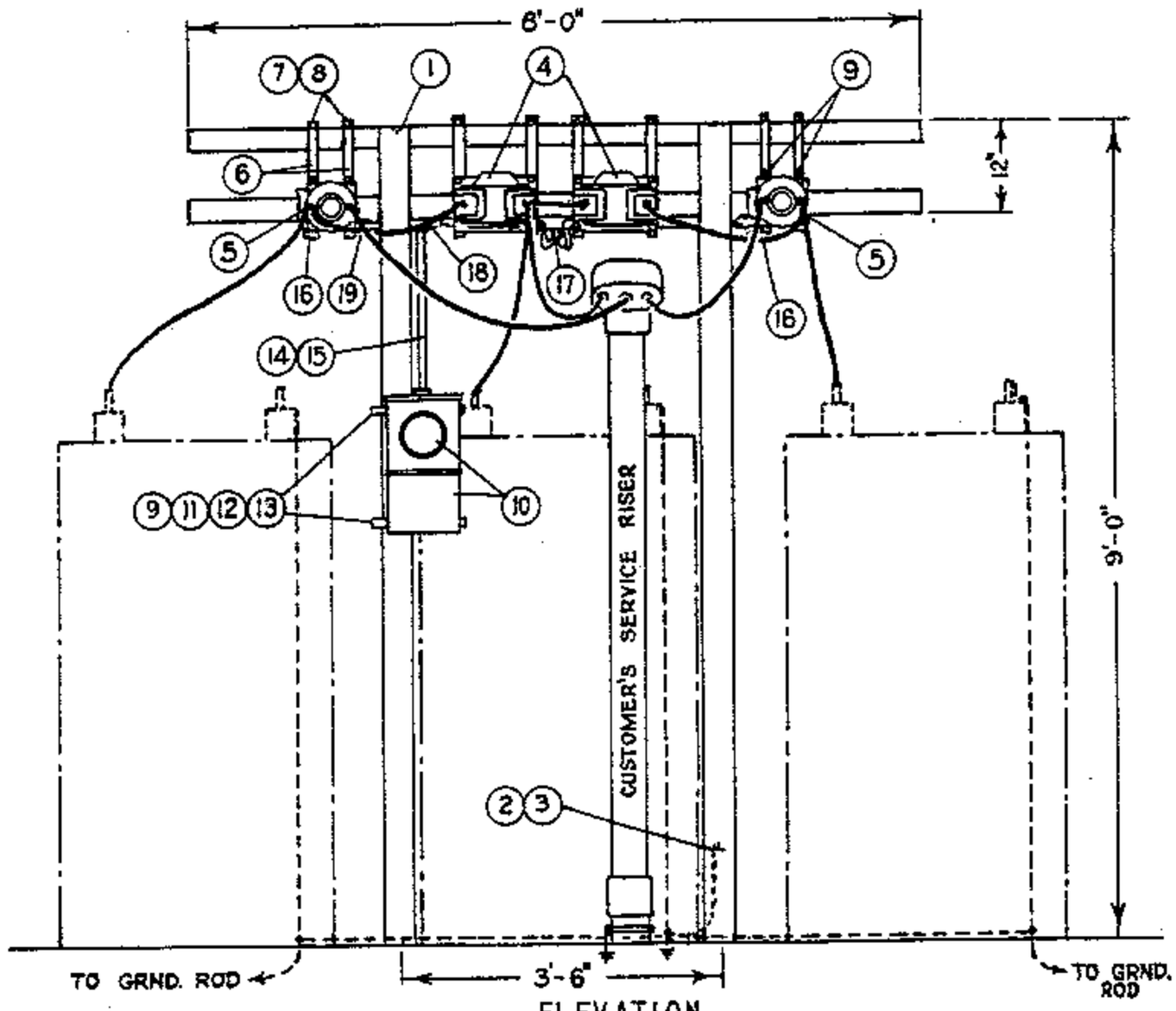
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ALL STEEL TO BE HOT-DIP GALV. AFTER FABRICATION.

| | | |
|---|---|---|
| 1499.810<br>SUPERSEDES<br>1489 (1-6-82) | SDG&E ELECTRIC STANDARDS<br>METERING RACK, CUSTOMER OWNED, CONSTRUCTION DETAILS | DATE 2-28-83<br>APPD |

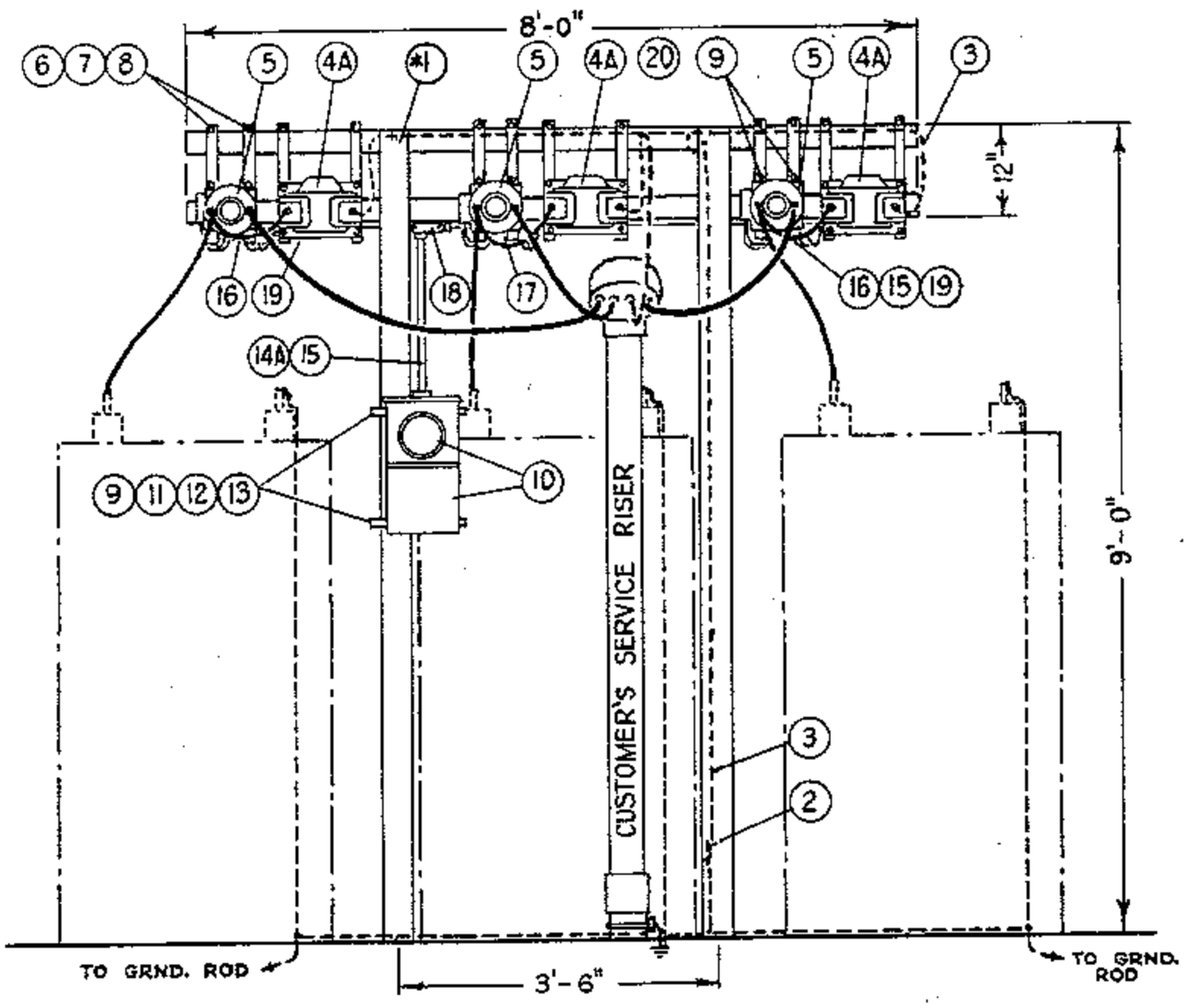
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ELEVATION

3 WIRE, 3ϕ SERVICE

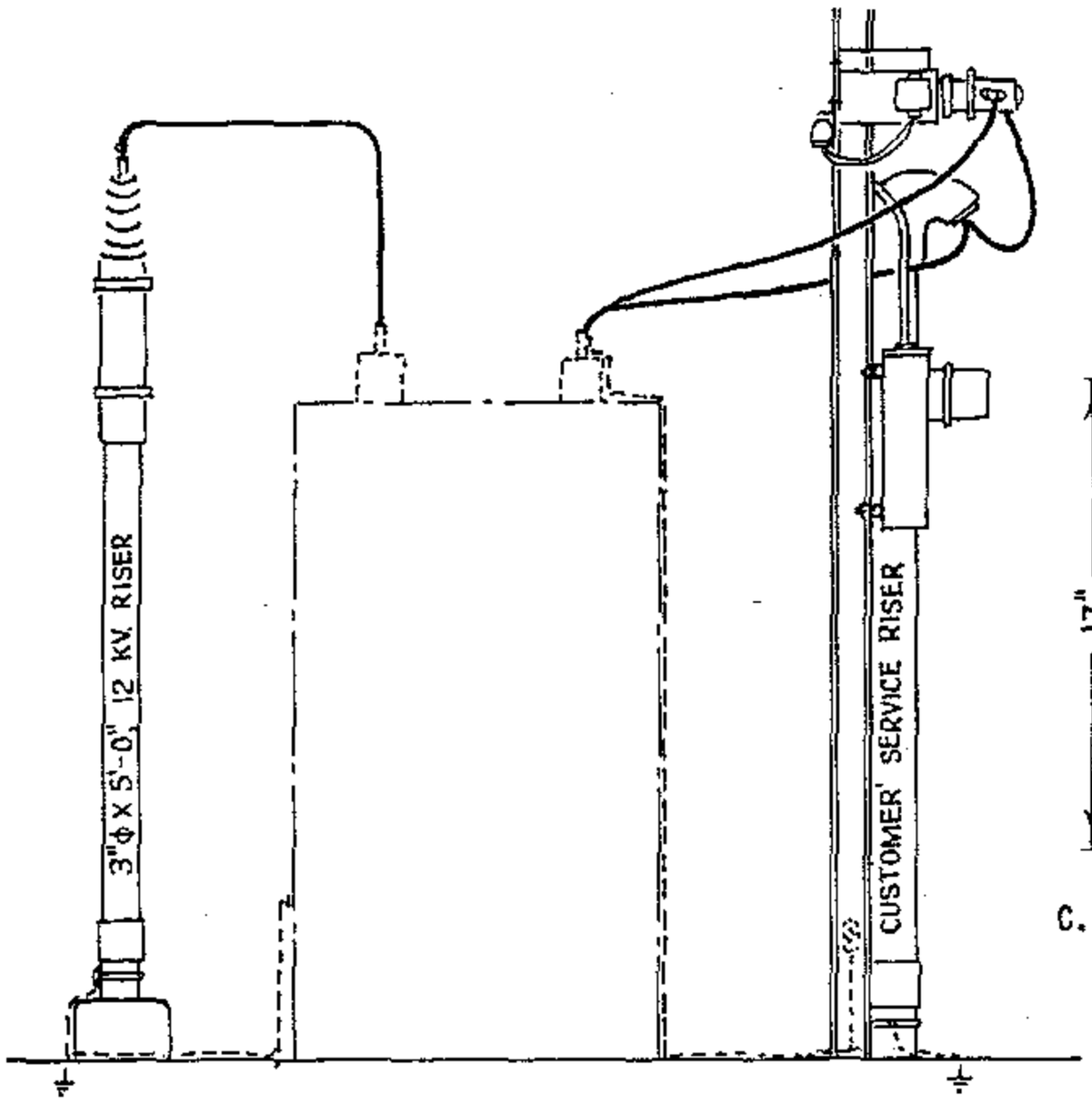
FOR FIELD MAINTENANCE ONLY



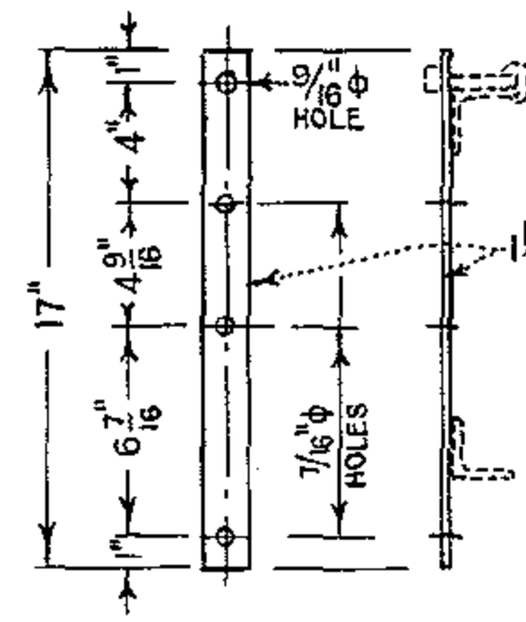

ELEVATION

4 WIRE, 3ϕ SERVICE

| | | |
|---|---|---|
| DATE 11-16-81<br>APPD JES | SDG&E ELECTRIC STANDARDS<br>4KV METERING INSTALLATION ON RACK, FOR 3 WIRE AND 4 WIRE, 3ϕ SERVICES | 1499.901<br>SUPERSEDES<br>1490.1(11-16-81) |




ELEVATION




C.T. & P.T. MTG STRAPS
ITEM 6

FOR FIELD MAINTENANCE ONLY

NOTE:

(A) TO BE FURNISHED AND INSTALLED BY CUSTOMER.

| ITEM | | DESCRIPTION | QUANTITY 3 Wire | QUANTITY 4 Wire | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|
| | 1 | Galv. Steel Metering Rack | (A) 1 | (A) 1 | PG 1479 |
| | 2 | Ground Connector, 1 bolt, single groove | 1 | 1 | 230016 |
| | 3 | Ground Wire. Bare Strd. copper | 5' | 20' | PGS 715-716 |
| | 4 | Potential Transformer, 4800/120V, Base Mounted | 2 | - | - |
| | 4A | Potential Transformer, 2400/120V, Base Mounted | - | 3 | - |
| | 5 | Current Transformer, 5 Kv. Base Mounted | 2 | 3 | - |
| | 6 | P.T. & C.T. Straps, Galv., per detail | 8 | 12 | - |
| | 7 | Mach. Bolts, Galv., 1/2" x 4", 2 washers & 1 nut | 8 | 12 | PG 139, 140 |
| | 8 | Nut Seats, Delta-Star | 8 | 12 | - |
| | 9 | Mach. Bolts, Galv., 3/8" diam. X 1", 1 washer & 1 nut | 20 | 24 | PGS 139, 140 |
| | 10 | Meter & Meter Socket Box | 1 | 1 | - |
| | 11 | Unistrut, type P-4000, galv. | 30" | 30" | - |
| | 12 | Beam Grip, Delta-Star | 4 | 4 | 392384 |
| | 13 | Cap Screw, Galv., 1/2" diam. x 13/16" | 4 | 4 | 620320 |
| | 14 | 5 - 1c #12 type TW Coded Wire | 40" | - | - |
| | 14A | 7 - 1c #12 type TW Coded Wire | - | 64' | - |
| | 15 | 3/4" Conduit, Galv., Rigid Iron | 6' | 8' | 251008 |
| | 16 | 3/4" Condulet, Galv., Type "E" with 4 hole comp. cover | 2 | 2 | 145568, 145376 |
| | 17 | 3/4" Condulet, Galv., Type "C" with 4 hole comp. cover | 1 | 1 | 145088, 145376 |
| | 18 | 3/4" Condulet, Galv., Type "TR" with blank cover | 1 | 1 | - |
| | 19 | Galv. steel conduit clamp | 4 | 4 | 227104 |
| | 20 | Wire Connectors | - | 2 | PGS 783, 786 |

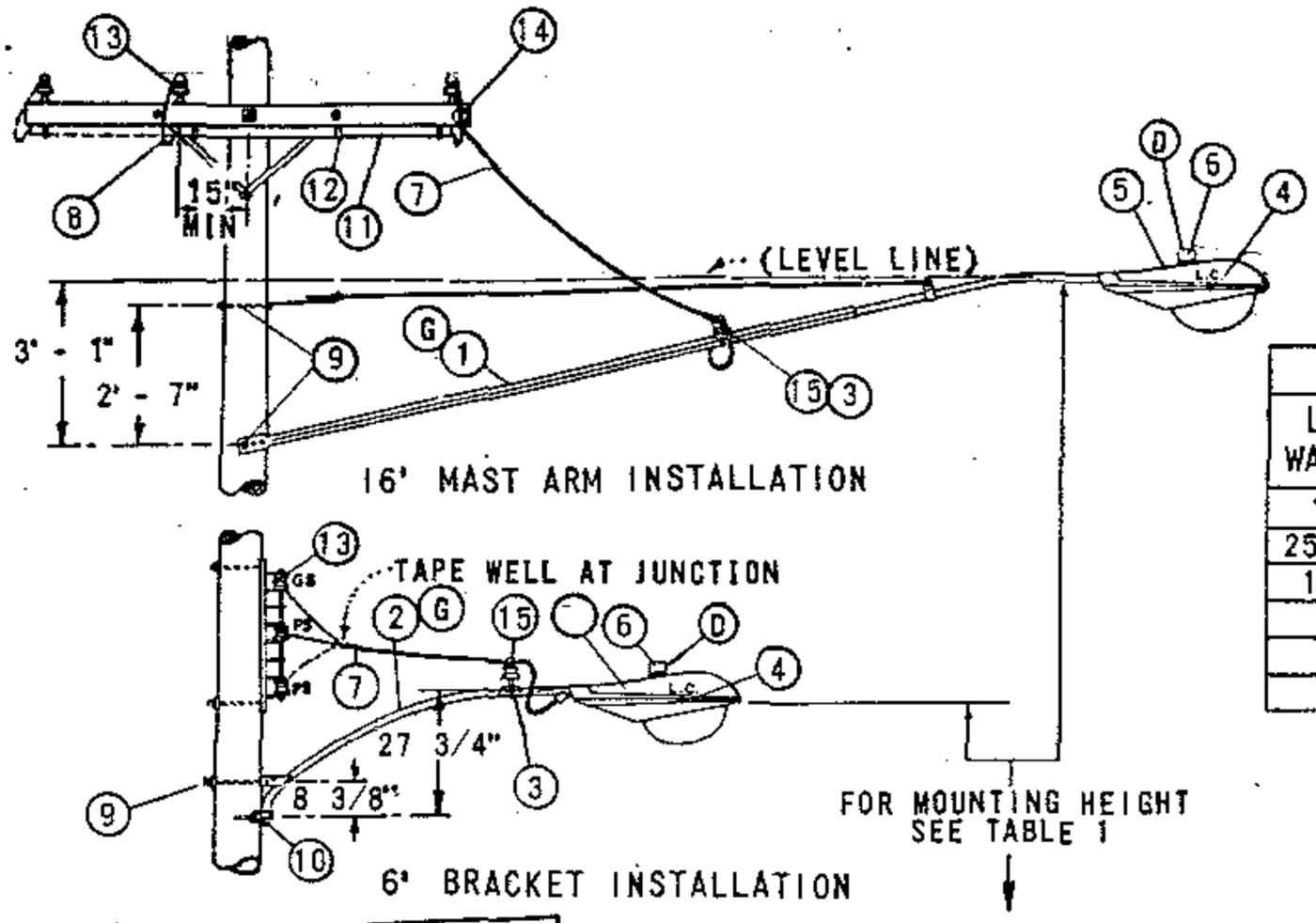
E.M.

1499.902
SUPERSEDES
1490.2 (11-16-81)

SDG&E ELECTRIC STANDARDS

4KV METERING INSTALLATION ON RACK, FOR 3 WIRE AND 4 WIRE, 3ϕ SERVICES

DATE 11-16-81
APPD JEG




| TABLE 1 | | |
|---|---|---|
| LAMP WATTAGE | MERCURY VAPOR MOUNTING HEIGHT | |
| 175 | 25' - 28' | |
| 250-400 | 30' - 32' | |
| 1000 | 35' - 37' | |
| | | |
| | | |
| | | |

FOR FIELD MAINTENANCE ONLY

TABLE 2 (F)

| WATTS | LUMEN | MERCURY VAPOR STREET LIGHTING CODE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | REGULATOR BALLAST | | REACTOR BALLAST | | | | |
| | | BRACKET 6' | MAST ARM 16' | BRACKET 6' | MAST ARM 16' | | | |
| 175 | 7000 | 6AG | 16AG | 6AR | 16AR | | | |
| 250 | 10000 | 6BG | 16BG | 6BR | 16BR | | | |
| 400 | 20000 | 6CG | 16CG | - | - | | | |
| 1000 | 55000 | 6DG | 16DG | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTES:

(A) REQUIRED FOR SECONDARY LINE ARM CONSTRUCTION ONLY.

B. SEE STANDARDS PAGE 1509 FOR CLEARANCES.

(C) 30" STREET LIGHTING BRACKET, STOCK NUMBER 167200 MAY BE SUBSTITUTED.

(D) APPERTURE OF PHOTOELECTRIC CELL MUST BE SET TO FACE NORTH.

(E) EXEMPT MATERIALS.

(F) TABLE 2 IS PROVIDED FOR IDENTIFICATION OF LIGHTING INSTALLATIONS ON MAPS AND WORK ORDERS.

(G) A MAXIMUM OF ONE HALF OF MOUNTING BRACKET MAY BE INSTALLED IN CLIMBING SPACE.

| ITEM | | DESCRIPTION | QUANTITY BALLAST REGULATOR 6AG, 6BG, 6CG, 6DG | QUANTITY BALLAST REGULATOR 16AG, 16BG, 16CG, 16DG | QUANTITY BALLAST REACTOR 6AR, 6BR | QUANTITY BALLAST REACTOR 16AR, 16BR | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|---|---|
| | 1 | ARM, UPSWEEP MAST, 1 1/4" DIA, 16' - 0" | - | 1 | - | 1 | 110880 |
| | 2 | BRACKET, UPSWEEP, 1 1/4" DIA, 6' - 0" (C) | 1 | - | 1 | - | 167264 |
| | 3 | PIN, INSULATOR CLAMP (SUPPLIED WITH MAST ARM) | 1 | 1 | 1 | 1 | - |
| | 4 | LAMP | 1 | 1 | 1 | 1 | PG. 1510 |
| | 5 | LUMINAIRE | 1 | 1 | 1 | 1 | PG. 1520, 1521 |
| | 6 | CONTROL, PHOTOELECTRIC, TWISTLOCK BASE 105 TO 280 VOLT | 1 | 1 | 1 | 1 | 273888 |
| S | 7 | WIRE, #8, 600V, FLEXIBLE R.C. DUPLEX | AS REQ'D | | | | 811776 |
| L | 8 | WIRE, #12, TYPE THW, 600V, INSULATED COPPER (A) | 25' | 25' | 25' | 25' | 810272 |
| S | 9 | BOLT, MACH, GALV, 5/8" X 10", 2 SQ WASH. & 1 NUT (E) | 1 | 2 | 1 | 2 | PGS 139, 140 |
| S | 10 | SCREW, LAG, GALV, 1/2" X 4" (E) | 2 | - | 2 | - | 621568 |
| | 11 | CONDUIT, PLASTIC, PVC, TYPE II, SCHEDULE 40 3/4" (A) (E) | 7' - 4" | 7' - 4" | 7' - 4" | 7' - 4" | 251328 |
| | 12 | STRAP, PIPE, GALV, 2-10D NAILS, GALV, 3/4" (A) (E) | 3 | 3 | 4 | 4 | PG 143 |
| | 13 | CONNECTOR, WIRE (E) | 2 | 2 | 2 | 2 | PGS 783-787 |
| | 14 | CLEVIS, SECONDARY DEAD END (A) | 1 | 1 | 1 | 1 | 235488 |
| | 15 | INSULATOR, PIN TYPE, TOP TIE, 4KV (CLASS 55-1) WHITE (E) | 1 | 1 | 1 | 1 | 429024 |
| | | | | | | | |

DATE 11-5-82
APPD JWF/RH

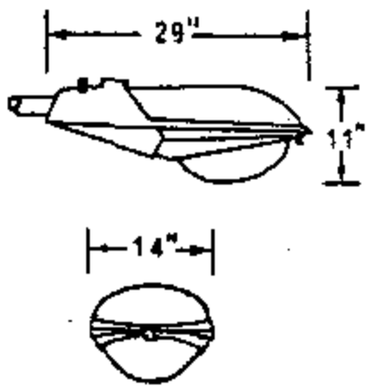
SDG&E ELECTRIC STANDARDS

LIGHTING INSTALLATION

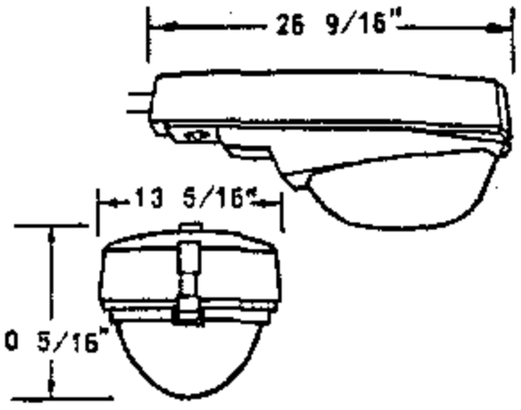
1599.102
SUPERSEDES
1519 (11-5-82)

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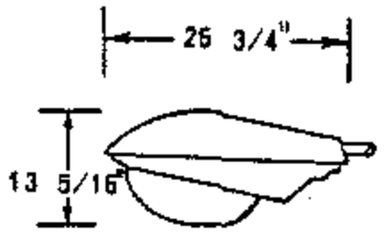
**SCOPE:** THIS STANDARD SHOWS MERCURY VAPOR LUMINAIRES USED TO PROVIDE ROADWAY AND DUSK TO DAWN LIGHTING, AND REPLACEMENT REFRACTORS.




GENERAL ELECTRIC
M-250A POWR/DOOR

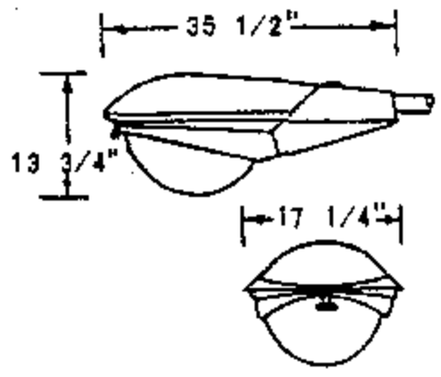



MCGRAW EDISON
UNIDOR 250

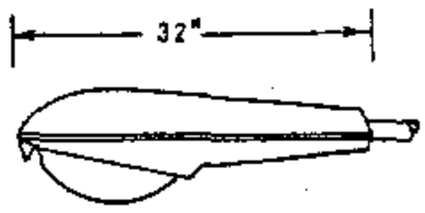



WESTINGHOUSE
OV-15

FIGURE 1




GENERAL ELECTRIC
M-400A POWR/DOOR




WESTINGHOUSE
OV-25

FOR FIELD MAINTENANCE ONLY

FIGURE 2

**BILL OF MATERIAL:**

| FIG. NO. | STOCK NUMBER | LAMP SIZE WATTS | BALLAST TYPE | BALLAST SOURCE VOLTAGE | MANUFACTURER AND CATALOG NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | GENERAL ELECTRIC | | MCGRAW EDISON | | WESTINGHOUSE | | UNICORN ELECTRIC | |
| | | | | | TYPE | CAT. NO. | TYPE | CAT. NO. | TYPE | CAT. NO. | TYPE | CAT. NO. |
| 1 | 473920 | 175 | REGULATOR | 120/240 (A) | M-250A POWR/DOOR | C727G002 (B) | UNIDOR 250 | UU1104-120R | OV-15 | 811A208G04 | | |
| | 474048 | | REACTOR NPF | 240 | | C727G014 (B) | | UU-1154R | | 811A208G20 | | |
| | 473910 | | SERIES | 6.6 AMPS | M-250-R2 | M2AR17CXSIGMS31036 | | | | | – | UCM-A66-175 |
| 2 | 474208 | 400 | REGULATOR | 120/240 (A) | M-400A POWR/DOOR | C723G001 (B) | | | OV-25 | 658A303G04 | | |
| | 473912 | | SERIES | 6.6 AMPS | M-250-R2 | M4AR40CXSIGMN32043 | | | | | – | UCM-A66-400 |

| REPLACEMENT REFRACTORS FOR MERCURY VAPOR LUMINAIRES | | | | | | |
|---|---|---|---|---|---|---|
| CONVENTIONAL LUMINAIRES | | LAMP TYPE | LAMP WATTAGE | REPLACEMENT REFRACTOR | | |
| MANUFACTURER | TYPE | | | TYPE | CATALOG NUMBER | STOCK NUMBER |
| GENERAL ELECTRIC | M-250A (C) | MV | 175,250 | GLASS | 35-130583-01 | 579284 |
| GENERAL ELECTRIC | M-400A (C) | MV | 400 | GLASS | 35-231137-01 | 579296 |
| | | | | LEXAN | 35-130015-02 | 579312 |
| AMERICAN ELECTRIC | 23 SERIES (C) | MV | 175,250 | GLASS | 23-002 | 579284 |
| AMERICAN ELECTRIC | 25 SERIES (C) | MV | 400 | GLASS | 25-003 | 578928 (F) |
| | | | | LEXAN | 25-003-6 | – (F) |
| AMERICAN ELECTRIC | 327 SERIES | MV | 1000 | GLASS | 27-003 | 578936 (F) |
| WESTINGHOUSE | OV-15 | MV | 175,250 | GLASS | 464-D067-H01 | 578976 (F) |
| WESTINGHOUSE | OV-25 (C) | MV | 400 | GLASS | 464-D336-H02 | 579040 |
| | | | | LEXAN | 6716-D13-H01 | 579056 (F) |

**INSTALLATION:**

(A) FACTORY WIRED FOR 120 VOLTS, DO NOT WIRE FOR 240 VOLTS ON NEW INSTALLATIONS.

(B) ASTRODOME UNITS ARE EQUIPPED WITH BUILT-IN PHOTOELECTRIC CELL. FOR REPLACEMENT SEE PAGE 1512/4412.

(C) A GLASS OR A LEXAN REFRACTOR MAY BE USED ON THESE LUMINAIRES.

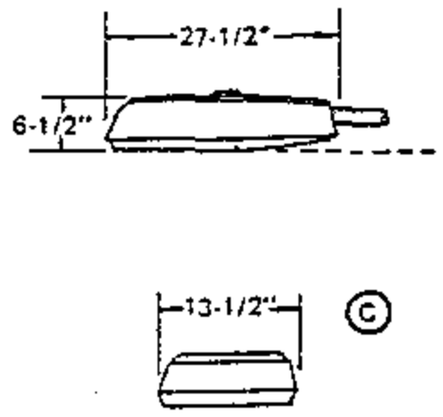
D. LEXAN REFRACTORS TO BE USED IN HIGH VANDALISM AREAS ONLY.

(F) ITEM IS NO LONGER PURCHASED.

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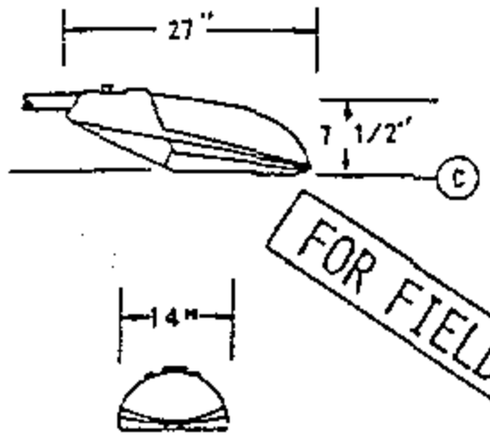
| | | |
|---|---|---|
| OH 1599.201<br>~~UG-4499.201~~<br>SUPERSEDES<br>1520.1 (11-5-82) | SDG&E ELECTRIC STANDARDS<br>MERCURY VAPOR CONVENTIONAL LUMINAIRES AND REPLACEMENT REFRACTORS | DATE 1-1-89<br>APPD PEA/DTE |

**SCOPE:** THIS STANDARD SHOWS HIGH PRESSURE SODIUM VAPOR LUMINAIRES USED TO PROVIDE ROADWAY AND DUSK TO DAWN LIGHTING, REPLACEMENT BALLAST AND REFRACTORS.



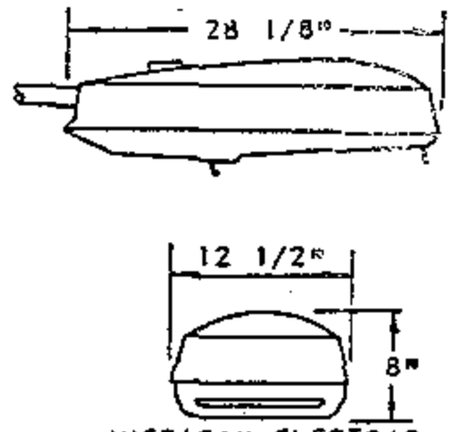

GENERAL ELECTRIC
M150 CUTOFF POWER/DOOR

FIGURE 1




GENERAL ELECTRIC
M-250A CUTOFF POWER/DOOR

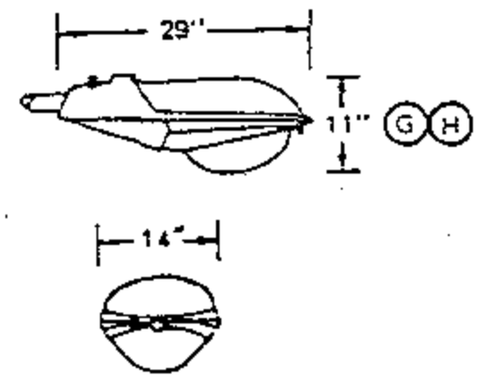
FIGURE 2




AMERICAN ELECTRIC
SERIES 213 CUTOFF
POWER/PAD

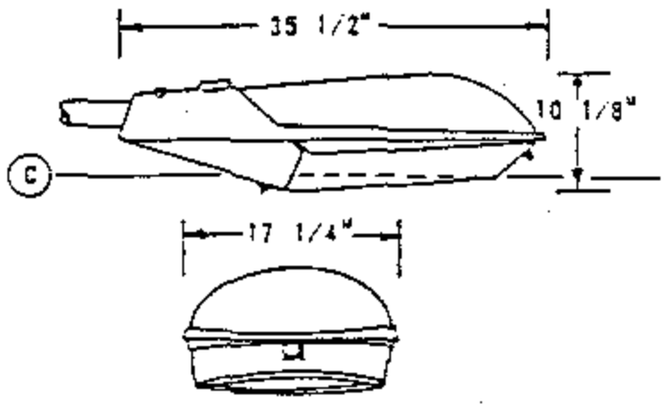
FIGURE 3

FOR FIELD MAINTENANCE ONLY



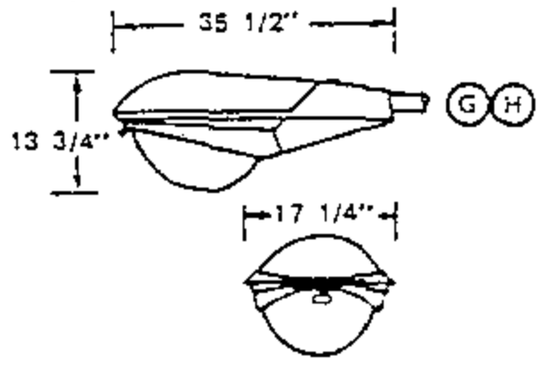

GENERAL ELECTRIC
M-250A POWER/DOOR

FIGURE 4



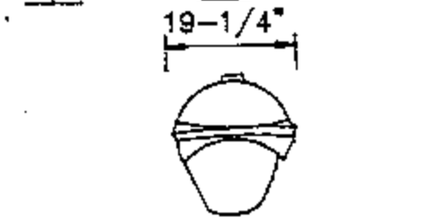

GENERAL ELECTRIC
M-400A CUTOFF
POWER/DOOR

FIGURE 5



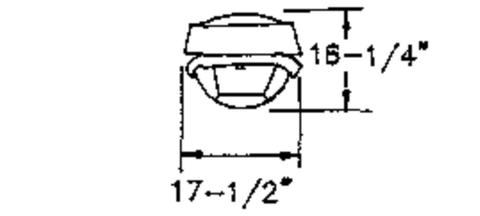

GENERAL ELECTRIC
M-400A POWER/DOOR

FIGURE 6




GENERAL ELECTRIC
M-1000

FIGURE 7




AMERICAN ELECTRIC
SERIES 327

FIGURE 8

TABLE 1 (D)
HIGH PRESSURE SODIUM VAPOR (HPSV) LUMINAIRES - COMPLETE ASSEMBLY (EXCLUDING LAMP)

| FIG. NO. | MANUFACTURER | | LAMP SIZE | BALLAST | | STOCK |
|---|---|---|---|---|---|---|
| | GENERAL ELECTRIC | AMER. ELECT. | WATTS | TYPE | SOURCE VOLTAGE | NUMBER |
| 1, 2 & 3 | M 150 CUTOFF<br>M 250A CUTOFF | SERIES 213 | 70 | REACTOR | 120 | 473382 |
| | M 150 CUTOFF<br>M 250A CUTOFF | SERIES 213 | 100 | | 120 | 473376 |
| | M 150 CUTOFF<br>M 250A CUTOFF | SERIES 213 | 150 | | 120 | 473344 |
| 4 | M 250A | - | 100 | REACTOR | 120 | 473924 |
| 5 & 6 | M 400A | - | 200 | REGULATOR | 120 | 473360 |
| | M 400A CUTOFF | - | 250 | AUTO REGULATOR | 120 | 473312 |
| | | | 400 | REGULATOR | 120 | 473280 |
| 6 | M 400A | - | 250 | AUTO REGULATOR | 120 | 473928 |
| 7 & 8 | M 1000 | SERIES 327 | 1000 | AUTO REGULATOR | 120 | 473248 |

SDG&E ELECTRIC STANDARDS

DATE 1-1-94
APPD PSA/RDG

# HIGH PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND REFRACTORS

OH 1599.203
~~UG 4499.203~~

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**BILL OF MATERIAL:** Ⓓ

**TABLE 1. - HIGH PRESSURE SODIUM VAPOR (HPSV) LUMINAIRES - COMPLETE ASSEMBLY (EXCLUDING LAMP)**

| FIG. NO. | MANUFACTURER | | LAMP SIZE WATTS | BALLAST | | STOCK NUMBER |
|---|---|---|---|---|---|---|
| | GENERAL ELECTRIC | AMERICAN ELECTRIC | | TYPE | SOURCE VOLTAGE | |
| 1, 2, & 3 | M 150 CUTOFF M 250A CUTOUT | SERIES 213 | 70 | REACTOR | 120 | 473382 |
| | M 150 CUTOFF M 250A CUTOFF | SERIES 213 | 100 | | 120 | 473376 |
| | M 150 CUTOFF M 250A CUTOFF | SERIES 213 | 150 | | 120 | 473344 |
| 4 | M 250A | – | 100 | REACTOR | 120 | 473924 |
| 5 & 6 | M 400A | – | 200 | REGULATOR | 120 | 473360 |
| | M 400A CUTOFF | | 250 | AUTO REGULATOR | 120 | 473312 |
| | | | 400 | REGULATOR | 120 | 473280 |
| 6 | M 400A | – | 250 | AUTO REGULATOR | 120 | 473928 |
| 7 & 8 | M 1000 | SERIES 113 | 1000 | AUTO REGULATOR | 120 | 473248 |
| 9 & 10 | M 250R2 CUTOFF | SERIES 113 | 70 | REACTOR–NPF | 120 | 473400 |
| | M 250R2 CUTOFF | SERIES 113 | 100 | | 120 | 473402 |
| | M 250R2 CUTOFF | SERIES 113 | 150 | | 120 | 473404 |
| 11 | M 400R2 CUTOFF | – | 200 | HIGH REACTANCE–NPF | 120 | 473406 |
| | M 400R2 CUTOFF | – | 250 | | 120 | 473408 |
| | M 400R2 CUTOFF | – | 400 | CWA | 120 | 473410 |

FOR FIELD MAINTENANCE ONLY

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| | | |
|---|---|---|
| DATE 1–1–94<br>APPD PEA / DTE | SDG&E ELECTRIC STANDARDS<br>HIGH PRESSURE SODIUM VAPOR LUMINAIRES, REPLACEMENT BALLAST AND REFRACTORS | OH 1599.203B<br>UG 4499.203B |

## TABLE 2

| REPLACEMENT BALLAST FOR (HPSV) LUMINAIRES | | | | | | |
|---|---|---|---|---|---|---|
| FIG. NO. | BALLAST | | LAMP SIZE WATTS | MANUFACTURER | | STOCK NUMBER |
| | TYPE | SOURCE VOLTAGE | | MANUFACTURER | TYPE POWER/DOOR | |
| 1, 2, 3 & 4 | REACTOR | 120 | 70 | GE | M 150 | 121044 (B) |
| | | | | GE | M 250A | 121140 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 213 | 121172 (B) |
| | | 120 | 100 | GE | M 150 | 121076 (B) |
| | | | | GE | M 250A | 121142 |
| | | | | AMERICAN ELECTRIC | SERIES 213 | 121174 (B) |
| | | 120 | 150 | GE | M 150/ M250A2 | 121108 |
| | | | | GE | M 250A | 121144 |
| | | | | AMERICAN ELECTRIC | SERIES 213 | 121176 (B) |
| 5 & 6 | REACTOR | 120 | 150 | GE | M 400A | 121146 |
| | REGULATOR | 120 | 200 | GE | M 400A | 121204 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 25 | 121178 (B) |
| | AUTO REGULATOR | 120 | 250 | GE | M 400A/ M400A2 | 121148 |
| | | | | AMERICAN ELECTRIC | SERIES 25 | 121180 (B) |
| | REGULATOR | 120 | 400 | GE | M 400A/ M400A2 | 121150 |
| | | | | AMERICAN ELECTRIC | SERIES 25 | 121182 (B) |
| 9 & 10 | REACTOR | 120 | 70 | GE | M 250R2 | 121346 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 113 | 121358 (B) |
| | | 120 | 100 | GE | M 250R2 | 121348 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 113 | 121360 (B) |
| | | 120 | 150 | GE | M 250R2 | 121350 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 113 | 121362 (B) |
| 11 | REGULATOR | 120 | 200 | GE | M 400R2 | 121352 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 125 | 121364 (B) |
| | AUTO REGULATOR | 120 | 250 | GE | M 400R2 | 121354 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 125 | 121366 (B) |
| | REGULATOR | 120 | 400 | GE | M 400R2 | 121356 (B) |
| | | | | AMERICAN ELECTRIC | SERIES 125 | 121368 (B) |

## TABLE 3

| REPLACEMENT REFRACTORS FOR HPSV LUMINAIRES | | | | | |
|---|---|---|---|---|---|
| CONVENTIONAL LUMINAIRES | | LAMP TYPE | LAMP WATTAGE | REPLACEMENT REFRACTOR | |
| MANUFACTURER | TYPE | | | TYPE | STOCK NUMBER |
| GENERAL ELECTRIC | M-250A (I) | HPSV | 100, 150 | LEXAN | 579248 |
| GENERAL ELECTRIC | M-250A-CUTOFF | HPSV | 70, 100, 150 | GLASS | 579282 |
| GENERAL ELECTRIC | M-250R2 | HPSV | 70, 100, 150 | GLASS | 579104 (B) |
| GENERAL ELECTRIC | M-400A-CUTOFF | HPSV | 250, 400 | GLASS | 578706 |
| GENERAL ELECTRIC | M-400R2 | HPSV | 200, 250, 400 | GLASS | 578102 |
| GENERAL ELECTRIC | M-1000 | HPSV | 1000 | GLASS | 578704 (B) |
| AMERICAN ELECTRIC | 23 SERIES (I) | HPSV | 100, 150 | LEXAN | 579248 |
| AMERICAN ELECTRIC | 25 SERIES CUTOFF | HPSV | 250, 400 | GLASS | - (B) |
| AMERICAN ELECTRIC | 327 SERIES | HPSV | 1000 | GLASS | 578936 (B) |

**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) ITEM IS NO LONGER PURCHASED.

(C) CUTOFF LUMINAIRES SHALL BE INSTALLED WITH THE OPTICAL ASSEMBLY (GLASSWARE) HORIZONTAL.

(D) ITEMS IN TABLE 1 ARE FOR COMPLETE LUMINAIRE UNITS AND ARE NO LONGER PURCHASED.

**BILL OF MATERIAL:** **TABLE 4**

| REPLACEMENT STARTERS FOR HPSV LUMINAIRES | | | | |
|---|---|---|---|---|
| MANUFACTURER | | LAMP SIZE WATTS | SOURCE VOLTAGE | STOCK NUMBER |
| MANUFACTURER | TYPE | | | |
| AMERICAN ELECTRIC | SERIES 113 | 35-400 | 120 | 679130 |
| GENERAL ELECTRIC | M 250R2 | 50-150 | 120 | 679132 |
| GENERAL ELECTRIC | M 400R2 | 250-400 | 120 | 679134 |

(F) STOCK NUMBERS IN TABLE 2 ARE FOR BALLAST ONLY AND MAY BE PURCHASED FOR PURPOSE OF REPLACEMENT.

(G) ASTRODOME UNITS ARE EQUIPPED WITH BUILT-IN PHOTOELECTRIC CELL.

(H) USE LEVELING PAD FOR PROPER ADJUSTMENT OF LUMINAIRE.

(I) A GLASS OR A LEXAN REFRACTOR MAY BE USED ON THESE LUMINAIRES (LEXAN REFRACTORS TO BE USED IN HIGH VANDALISM AREAS ONLY).

FOR FIELD MAINTENANCE ONLY

**REFERENCE:**

J. SEE STANDARD 1512/4412 FOR PHOTOELECTRIC CONTROL.

K. SEE STANDARD 1514/4414 FOR IDENTIFICATION DECAL.

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SDG&E ELECTRIC STANDARDS

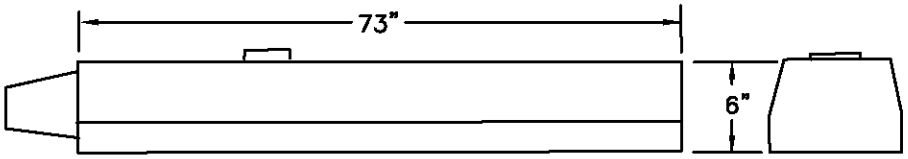
OH 1599.204
UG 4499.204

# HIGH PRESSURE SODIUM VAPOR LUMINAIRE, REPLACEMENT BALLAST AND REFRACTORS

DATE 1-1-89
APPD PEA / DTE

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**SCOPE:** THIS STANDARD SHOWS LOW PRESSURE SODIUM VAPOR (LPSV) LUMINAIRES USED TO PROVIDE ROADWAY AND DUSK TO DAWN LIGHTING, AND REPLACEMENT BALLAST.




PACIFIC LIGHTING
SPAULDING

FIGURE 1

FOR FIELD MAINTENANCE ONLY

**BILL OF MATERIAL:** **TABLE 1 :** (C)

| LOW PRESSURE SODIUM VAPOR (LPSV) LUMINAIRES - COMPLETE ASSEMBLY EXCLUDING LAMP | | | | | |
|---|---|---|---|---|---|
| FIG. NO. | MANUFACTURER | LAMP SIZE WATTS | BALLAST | | STOCK NUMBER |
| | | | TYPE | SOURCE VOLTAGE | |
| 1 | SPAULDING/PACIFIC LIGHTING | 35/55 (B) | HPF REACTOR | 120 | 473800 |
| | | 90 | | | 473802 |
| | | 135 | | | 473804 |
| | | 180 | | | 473806 |

**BILL OF MATERIAL:** **TABLE 2 :** (C)

| REPLACEMENT BALLAST FOR LPSV LUMINAIRES | | | | | |
|---|---|---|---|---|---|
| FIG. NO. | BALLAST | | LAMP SIZE WATTS | MANUFACTURER | STOCK NUMBER |
| | TYPE | VOLTAGE | | | |
| 1 | HPF REACTOR | 120 | 35/55 | SPAULDING/ PACIFIC LIGHTING | 121310 |
| | | | 90 | | 121308 |
| | | | 135 & 180 | | 121306 |

**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) THIS LUMINAIRE WILL ACCEPT BOTH 35 WATT AND 55 WATT LAMPS.

(C) MANUFACTURERS IN THIS TABLE ARE NO LONGER PURCHASED.

**REFERENCE:**

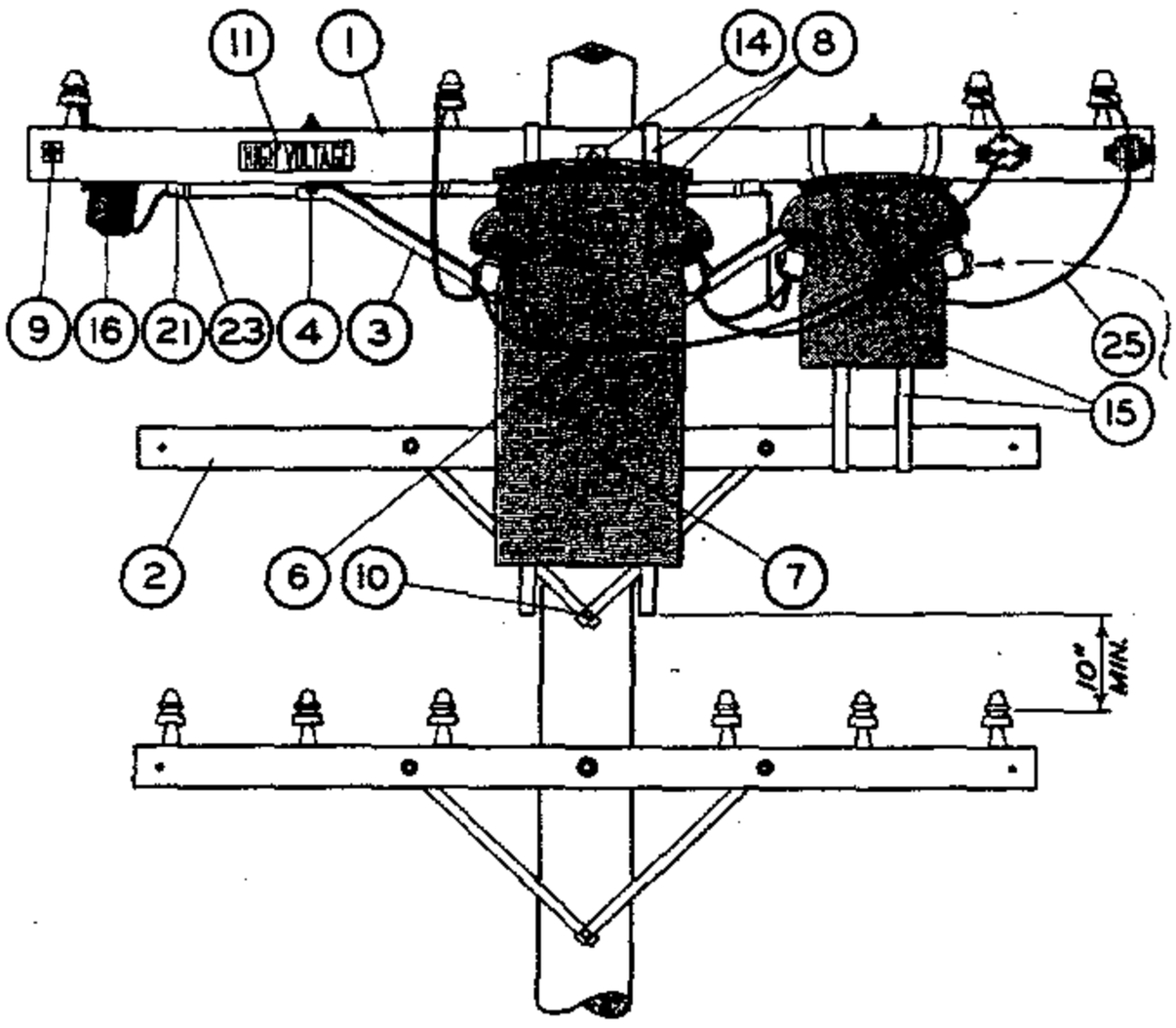
D. SEE STANDARD 1512/4412 FOR PHOTOELECTRIC CONTROL.

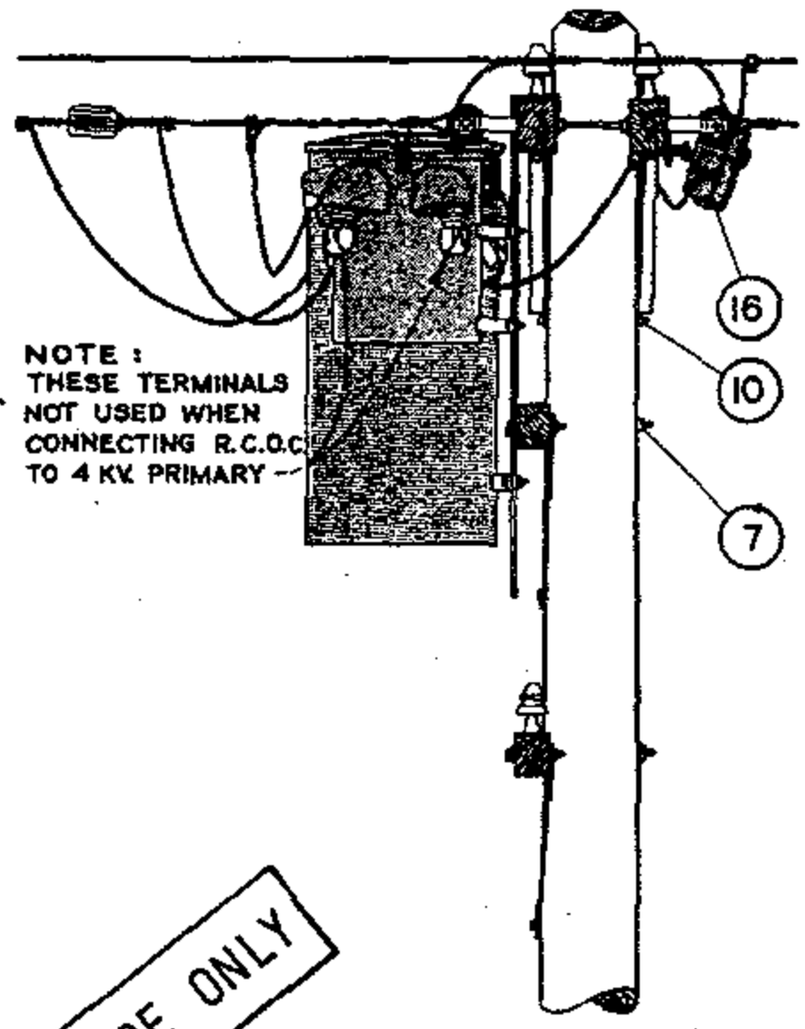
E. SEE STANDARD 1514/4414 FOR IDENTIFICATION DECAL.

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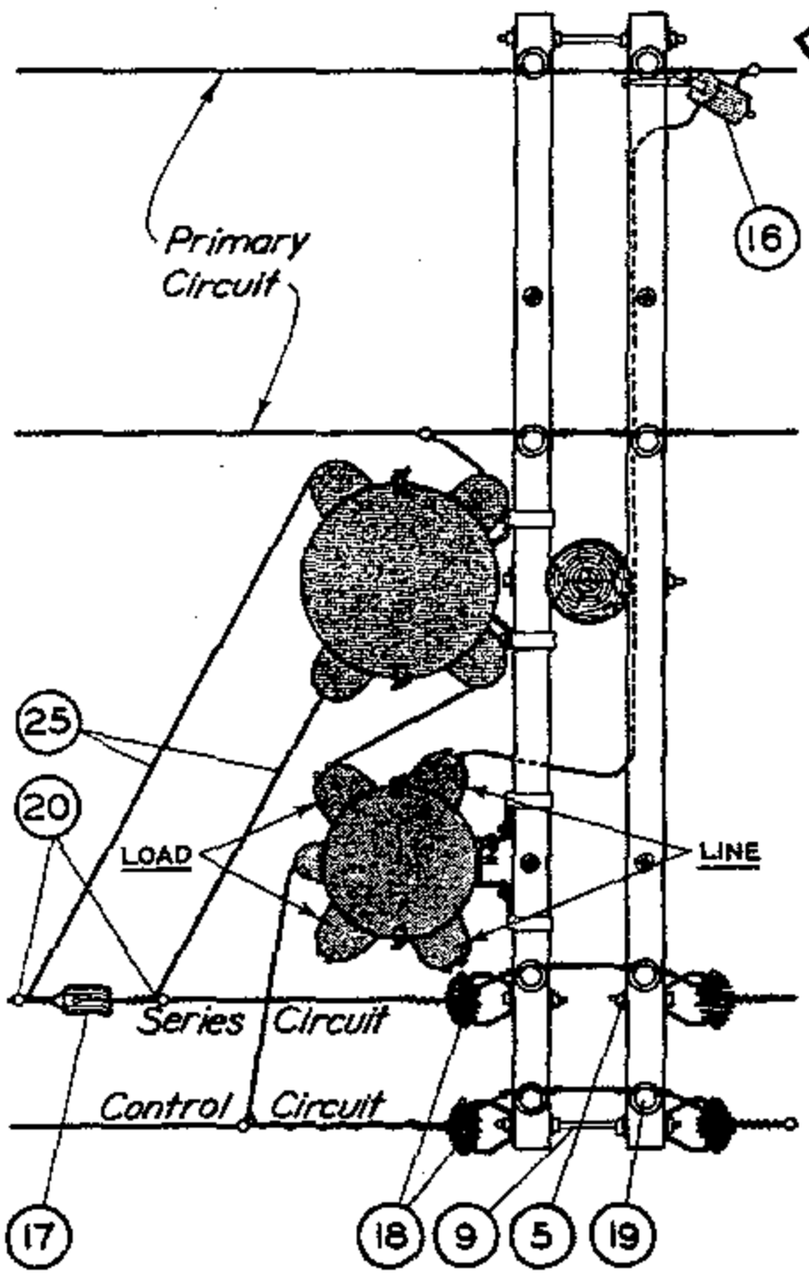
| DATE 3-2-06<br>APPD PEA / DTE | SDG&E ELECTRIC STANDARDS<br>LOW PRESSURE SODIUM VAPOR LUMINAIRE AND REPLACEMENT BALLAST | OH 1599.210<br>UG 4499.210 |
|---|---|---|

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THIS PAGE FOR FIELD MAINTENANCE USE ONLY




| ITEM | DESCRIPTION | QUANTITY | CONSTR STDS STOCK NO OR |
|---|---|---|---|
| 1 | 3-3/4"x 5-3/4"x 10'-0" Crossarm - 8 pin | 2 | PG 111 IT. 3 |
| 2 | 3-1/2"x 4-1/2"x 8'-0" Kick Arm | 1 | PG 111 IT. 2 |
| 3 | Angle Crossarm Brace - 4' or 5' | 2 | 164032 OR 164128 |
| 4 | Mach. Bolt, Galv. 1/2"x 7" - 1 rd. washer & 1 nut | 4 | PGS 139, 140 |
| 5 | Mach. Bolt, Galv. 5/8"x 5" - 1 rd. washer & 1 nut | 2 | PGS 139, 140 |
| 6 | Mach. Bolt, Galv. 5/8"x 10" - 1 nut | 1 | PGS 139, 140 |
| 7 | Mach. Bolt, Galv. 5/8"x 14" - 2 sq. washers & 1 nut | 1 | PGS 139, 140 |
| 8 | Mach. Bolt, Galv. 5/8"x 18" - 2-3"x 4" washers & 1 nut | 1 | PGS 139, 140 |
| 9 | Space Bolt, Galv. 5/8"x 18" - 4 washers & 4 nuts | 2 | PGS 139, 140 |
| 10 | Lag Screw, Galv. 1/2"x 4" | 1 | 621568 |
| 11 | High Voltage Sign & Nails #8, Roofing | 1 | 647648, 492224 |
| 12 | Pole Step | 16 | 692992 |
| 13 | | | |
| 14 | R.O. Transformer & Hangers | 1 | PGS 1121.00-1121.12 |
| 15 | R.C.O.C. Switch | 1 | 274560 |
| 16 | G.E. Expulsion Fuse Cutout | 1 | PG 1211 |
| 17 | Insulator, Strain #506 | 1 | 430880 |
| 18 | Insulator, 4 Kv. D.E. | 4 | 235520 |
| 19 | Insulator, D.G.D.P. | 4 | 428960 |
| 20 | #6 Wire Connector Split Bolt | 6 | 269056 |
| 21 | PVC Conduit, 1" diam. | 5' | 251200 |
| 23 | 1-1/4" Pipe Strap with 2 - 8d Nails | 3 | 697696, 491552 |
| 25 | #6 R.C. Strand. Copper Wire - 5 Kv. | 42' | 814112 |

SDG&E ELECTRIC STANDARDS

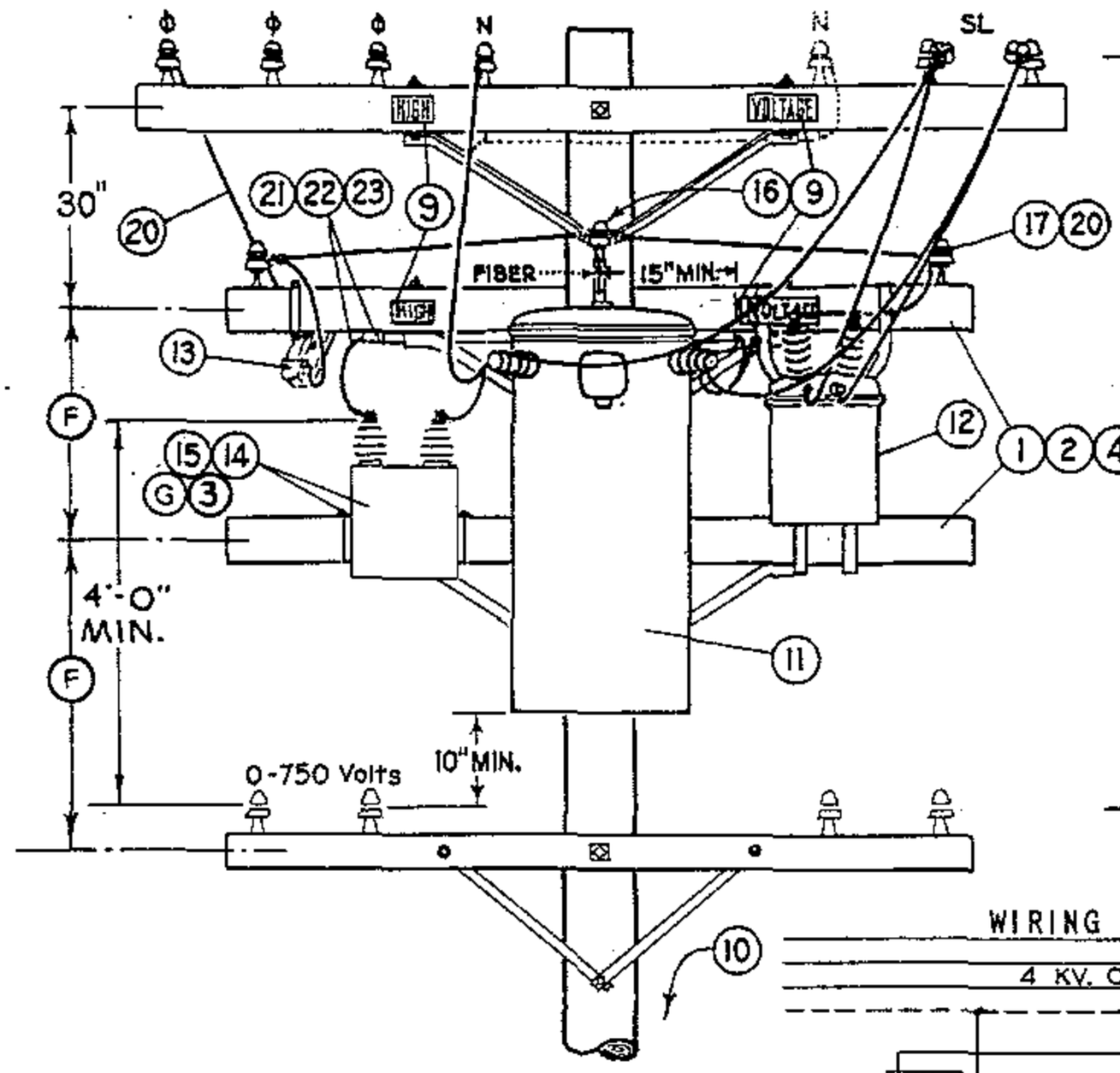
# SERIES CONTROLLED R.O. STREET LIGHT TRANSFORMER AND R.C.O.C. SWITCH, LINE ARM POSITION, 4KV

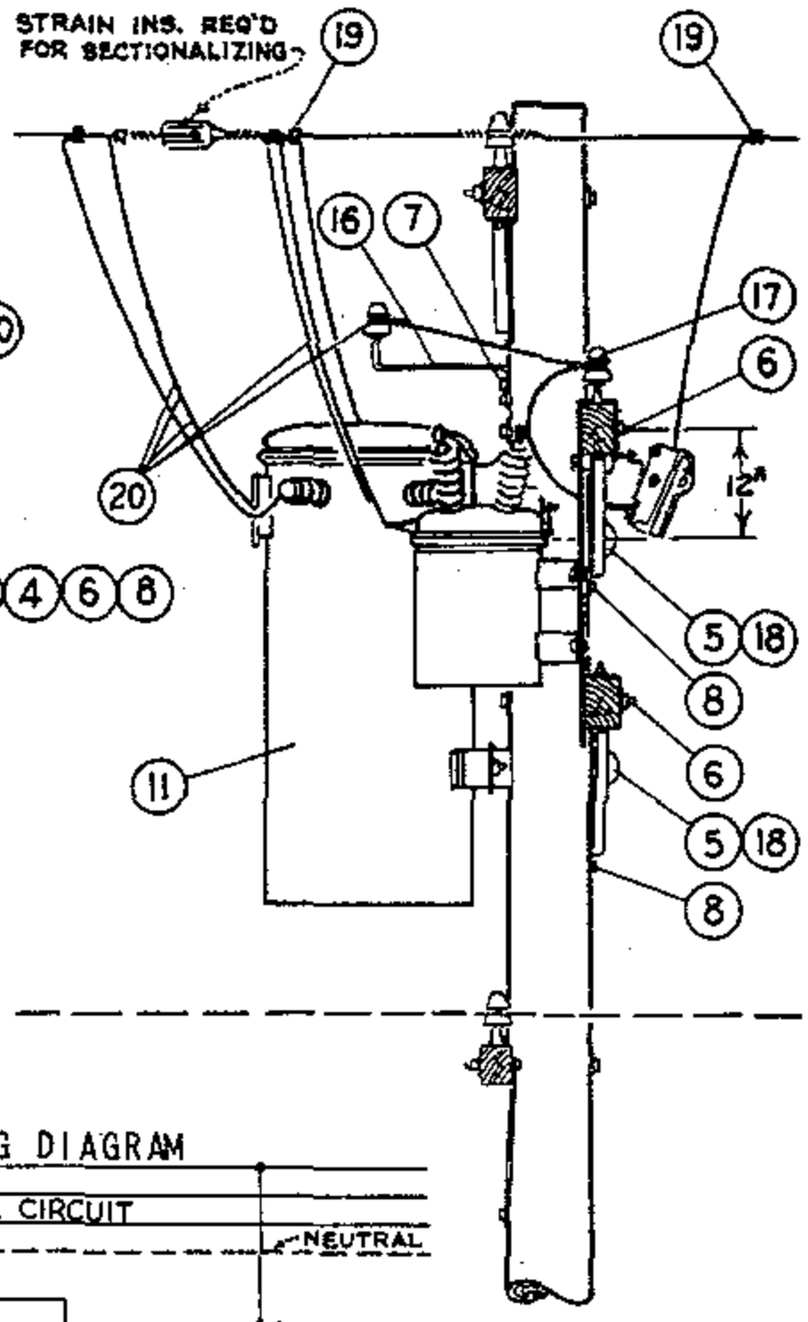
DATE 4-30-82
APPD LRH

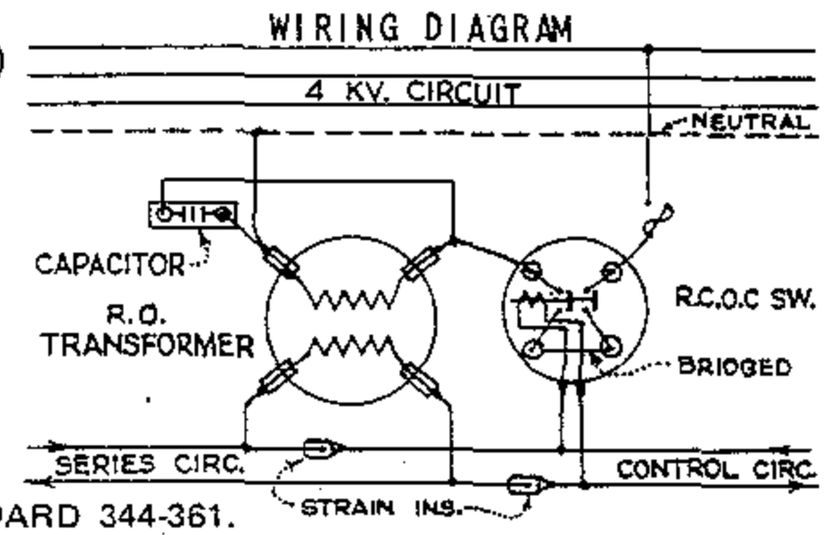
1599.501
SUPERSEDES
1556 (4-30-82)

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SCOPE: THIS STANDARD SHOWS 4KV CONSTANT CURRENT SERIES LIGHTING TRANSFORMER INSTALLATION AND SHALL ONLY BE USED WHEN AN EXISTING TRANSFORMER INSTALLATION MUST BE RELOCATED OR REBUILT TO MAINTAIN SERVICE TO AN EXISTING SERIES STREET LIGHTING SYSTEM.




NOTES:

- CLASS OF POLE SHOULD BE DETERMINED PER STANDARD 344-361.

BILL OF MATERIAL:

| ITEM | | DESCRIPTION | QUANT. | CONST STD OR PAGE NO | STOCK NO. |
|---|---|---|---|---|---|
| P. T. & F. | 1 | 3¾" x 5¾" x 8'-0" Transformer Arm | 2 | PAGE 380.5 IT.4 | 294960 |
| | 2 | Angle Crossarm Brace, 4'-0" | 2 | | 164032 |
| | 3 | Mach. Bolt, Galv., ⅜" x 1½", 2 rd. washers & 1 nut (E) | 2 | STDS 392 | |
| | 4 | Mach. Bolt, Galv., ½" x 7", 1 rd. washer & 1 nut (E) | 4 | STDS 392 | |
| | 5 | Mach. Bolt, Galv., ⅝" X 12", 1 sq. curv. wash. & 1 nut (E) | 2 | STDS 392 | |
| | 6 | Mach. Bolt, Galv., ⅝" X 14", 2 sq. washers & 1 nut (E) | 2 | STDS 392 | |
| | 7 | Lag Screw, Galv., ½" X 4" (E) | 1 | | 621568 |
| | 8 | Lag Screw, Galv., ⅝" X 5" (E) | 2 | | 621600 |
| | 9 | High Voltage Sign & 9 galv. roofing nails (E) | 1 | | 647648, 492224 |
| | 10 | POLE STEPS (SEE STANDARD 363) (E) | - | | 692992 |
| L. T. I. | 11 | R.O. Transformer with 2 pole bolt Adapter Plates & bolts | 1 | PG 1121 | |
| | 12 | R.C.O.C. Switch, paired hangers, adapter plates where req'd | 1 | | 274656 (A) (B) |
| | 13 | Expulsion Fuse Indicating Cutout, 5 kv., 50 A. (D) | 1 | SECTION 1200 | |
| | 14 | Capacitor, 2.4 kv., 15 or 25 kvar. (A) | 1 | | 207392 OR 207168 |
| | 15 | Mounting Strap and 1-½"Φ x 3¾" x 5¾" "U" bolt (A) (C) | 2 | | 158432 |
| | 16 | Stand-Off Bracket with Insulator | 1 | | 166144, 429216 (E) |
| | 17 | Insulator and 1" steel pin (E) | 2 | PG 750 | 532608 |
| | 18 | Cover Thru Bolt Plastic & Nails, Galv. (E) | 2 | | 285696, 492192 |
| | 19 | Wire Connector (E) | 7 | STDS. 783 – 787 | |
| | 20 | #6 D.B.W.P. Copper Wire | 55' | | 812512 |
| | 21 | #6 R.C. Strand. Copper Wire, 5 kv. | 7' | | 194304 |
| | 22 | 1" PVC Conduit (E) | 4' | | 251200 |
| | 23 | 1¼" Pipe Strap and 2-6d nails, galv. (E) | 3 | | 697696, 491552 |

INSTALLATION:

(A) NO LONGER PURCHASED.
(B) KEARNY MAINTENANCE WILL SUPPLY.
(C) SALVAGE FROM EXISTING INSTALLATIONS, MIRAMAR SALVAGE YARD HAS LIMITED SUPPLY.
(D) CAN BE SUBSTITUTED WITH 12KV 100A CUTOUT.
(E) EXEMPT MATERIAL.
(F) SPACE KICK ARM & BRACE TO CLEAR LOWER TRANSFORMERS THRU BOLT COVER.
(G) IF CAPACITOR FAILS OR STATION IS RELOCATED, DO NOT REPLACE CAPACITOR.

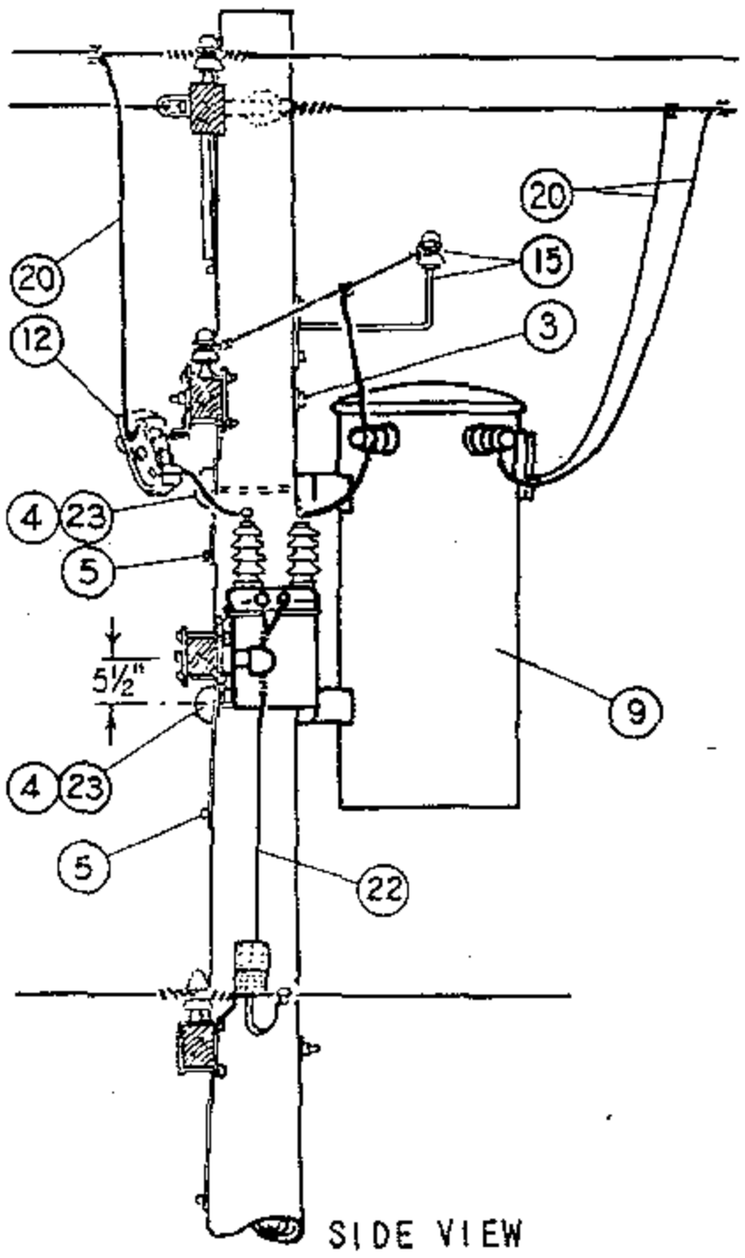
1599.502
SUPERCEDES
1555.1 (1–1–92)

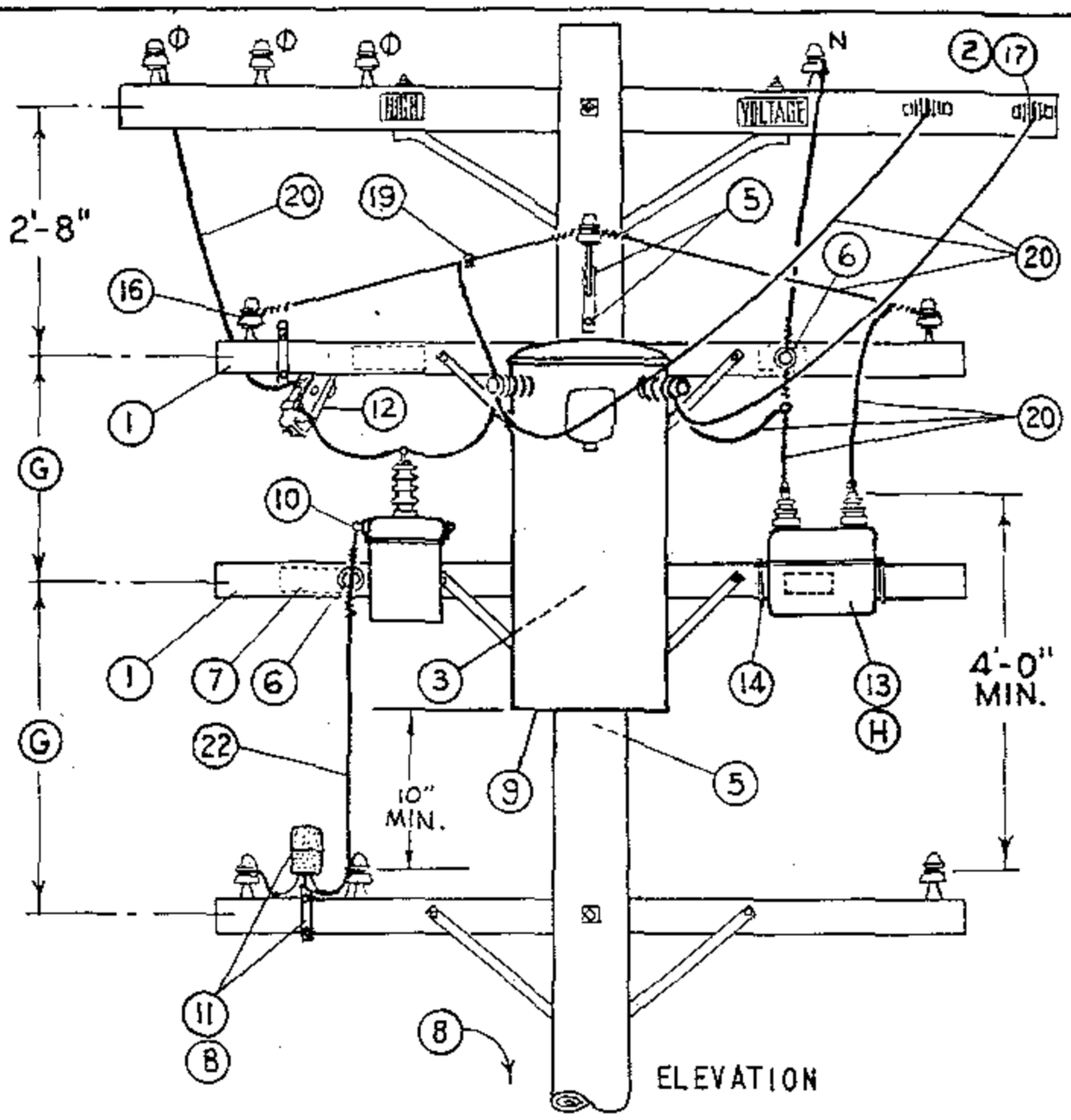
SDG&E ELECTRIC STANDARDS

# SERIES CONTROLLED REGULATED OUTPUT STREET LIGHT TRANSFORMER INSTALLATION REMOTE CONTROL OUTDOOR CIRCUIT SWITCH CAPACITOR 4KV

DATE 1-1-87
APPD AK/RDS

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**NOTES:**

- CLASS OF POLE SHOULD BE DETERMINED PER STANDARD 344-361.

**INSTALLATION:**

A. ROTATE COVER OF OIL SWITCH 180°, WHERE NECESSARY, TO POSITION MANUAL OPERATING LEVER ADJACENT TO CLIMBING SPACE.

(B) FACE PHOTO CELL TO THE NORTH.

(C) NO LONGER PURCHASED. SALVAGE FROM EXISTING INSTALLATION OR OBTAIN FROM KEARNY MAINTENANCE.

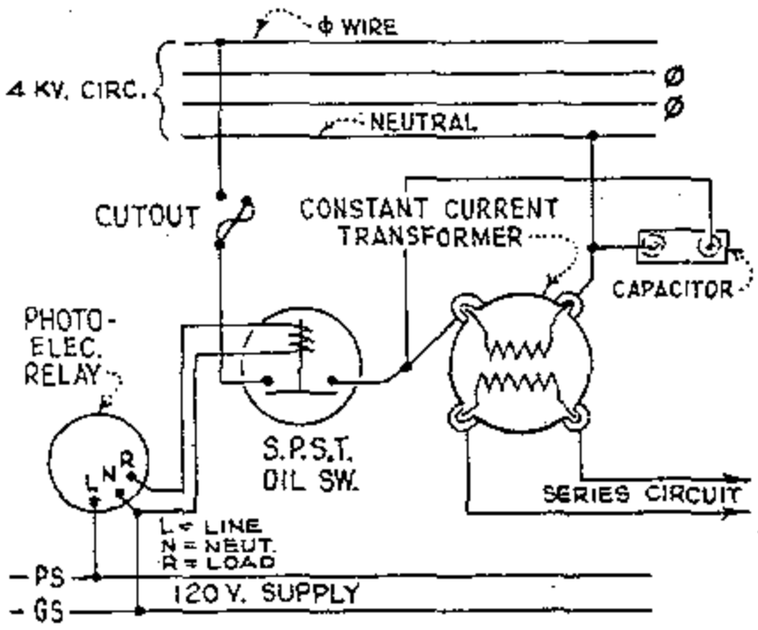
(D) NO LONGER PURCHASED. SALVAGE FROM EXISTING INSTALLATION OR OBTAIN FROM MIRAMAR SALVAGE YARD.

(E) EXEMPT MATERIAL.

(F) CAN BE SUBSTITUTED WITH 12KV 100A CUTOUT.

(G) SPACE KICK ARM & BRACE TO CLEAR LOWER TRANSFORMER THRU BOLT COVER.

(H) IF CAPACITOR FAILS OR STATION IS RELOCATED, DO NOT REPLACE CAPACITOR.




## WIRING DIAGRAM

| C.C. TRNSFMR. KW | CAPACITOR KVAR |
|---|---|
| 7½ (D) | 15 |
| 10 (D) | 15 |
| 15 (D) | 15 |
| 25 | 25 |

| ITEM | | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR STDS |
|---|---|---|---|---|---|
| P. T. & F. | 1 | 3½" x 4½" x 8'-0" Crossarm | | 2 | PG. 380.03 IT.1 |
| | 2 | Mach. Bolt, Galv., 5/8" x 6", 1 sq. washer & 1 nut | (E) | 2 | STD 139, 140 |
| | 3 | Mach. Bolt, Galv., 5/8" x 16", 2 sq. washers & 1 nut | (E) | 2 | STD 139, 140 |
| | 4 | Mach. Bolt, Galv., ¾" x 12", 1 sq. curved washers & 1 nut | (E) | 2 | STD 139, 140 |
| | 5 | Lag Screw, Galv., ½" x 4" | (E) | 4 | 621568 |
| | 6 | Pin, Transformer, Lead 1" Leadthread | (E) | 2 | 529248 |
| | 7 | High Voltage Sign & 8 galv. roofing nails | (E) | 2 | 647744, 492224 |
| | 8 | Pole Steps | (E) | 15 | 692992 |
| S. L. & S. | 9 | C. C. Transformer, 2.4 kv., incl. 2 pole bolt adapter plates | | 1 | PG-1121.12 |
| | 10 | South Bend Controller Co. Oil Switch, S.P.S.T., 75 A., 2.4 kv. type SPR-1-120 spec. 6210 with #6222 X-arm Mtg. Bracket | | 1 | 274528 (C) |
| | 11 | Photoelectric Relay, 1000 W. min., 120 V. | | 1 | 273888 166432 |
| | 12 | Cutout, 5 kv., 50 A. | (F) | 1 | Section 1200 |
| | 13 | Capacitor, Size per Table, 2.4 kv., 2-⅜" x 1" Mtg. Bolts & Washers | (H) | 1 | 207328, 207168 |
| | 14 | Capacitor Mounting Strap & "U" Bolt | (D) | 2 | 597___ 158432 |
| | 15 | Stand-Off Bracket with Insulator | | 1 | 166144 |
| | 16 | Insulator and 1" steel pin | (E) | 2 | 532608 |
| | 17 | D.E., 4 kv. | (E) | 2 | 235520 |
| | 18 | | | | |
| | 19 | Wire Connector | | 9 | STD 783-787 |
| | 20 | #6 B. Strand. Copper Wire | | 50' | 813536 |
| | 21 | | | | |
| | 22 | 2-C #16, 600 V. Type "S" Neoprene Jacketed Super Service Cord | | 5' | 814400 |
| | 23 | Cover Thru Bolt Plastics & 4 - 10d Nails, galv. | (E) | 2 | 285696, 492192 |

DATE 11-5-82
APPD

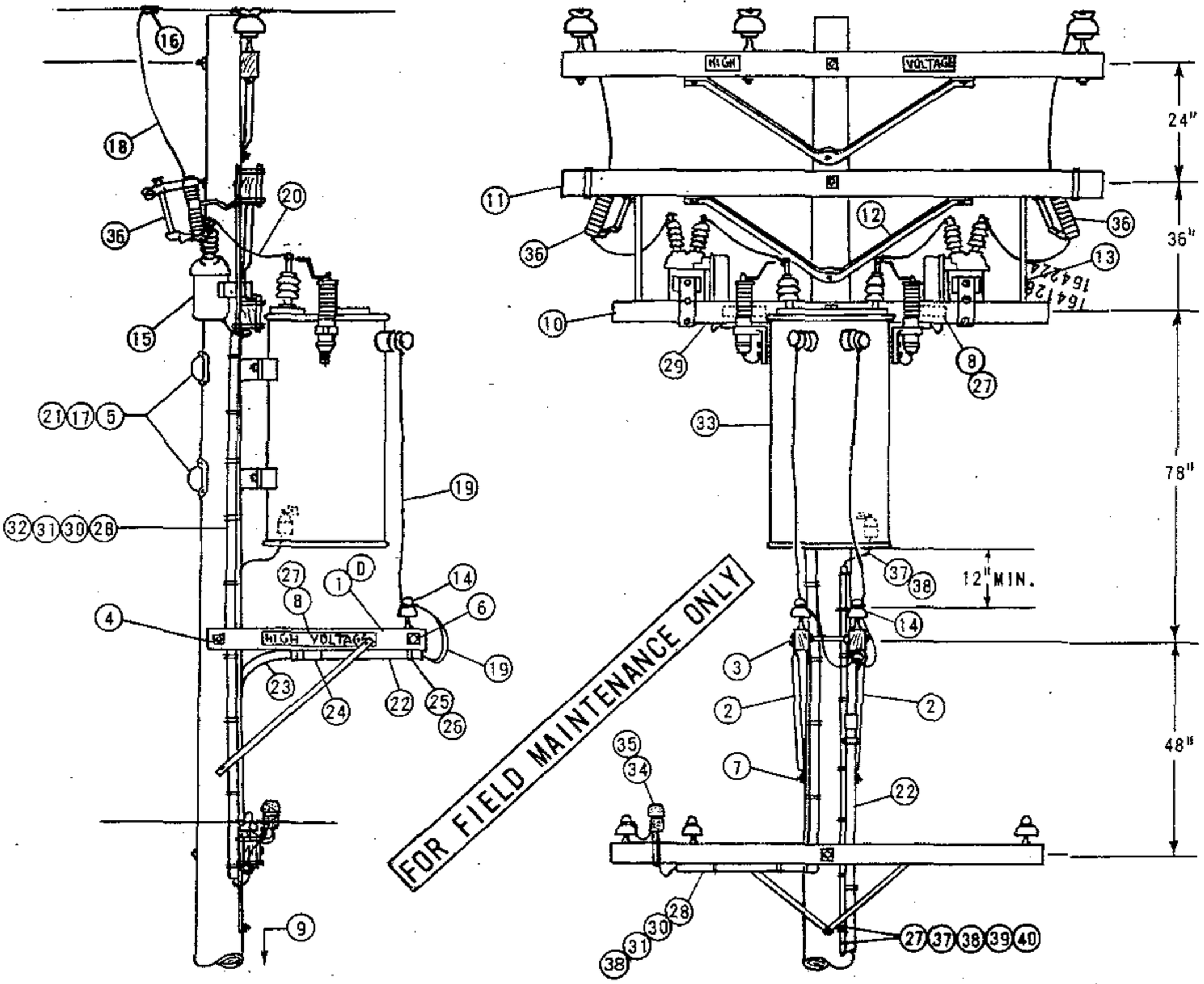
SDG&E ELECTRIC STANDARDS

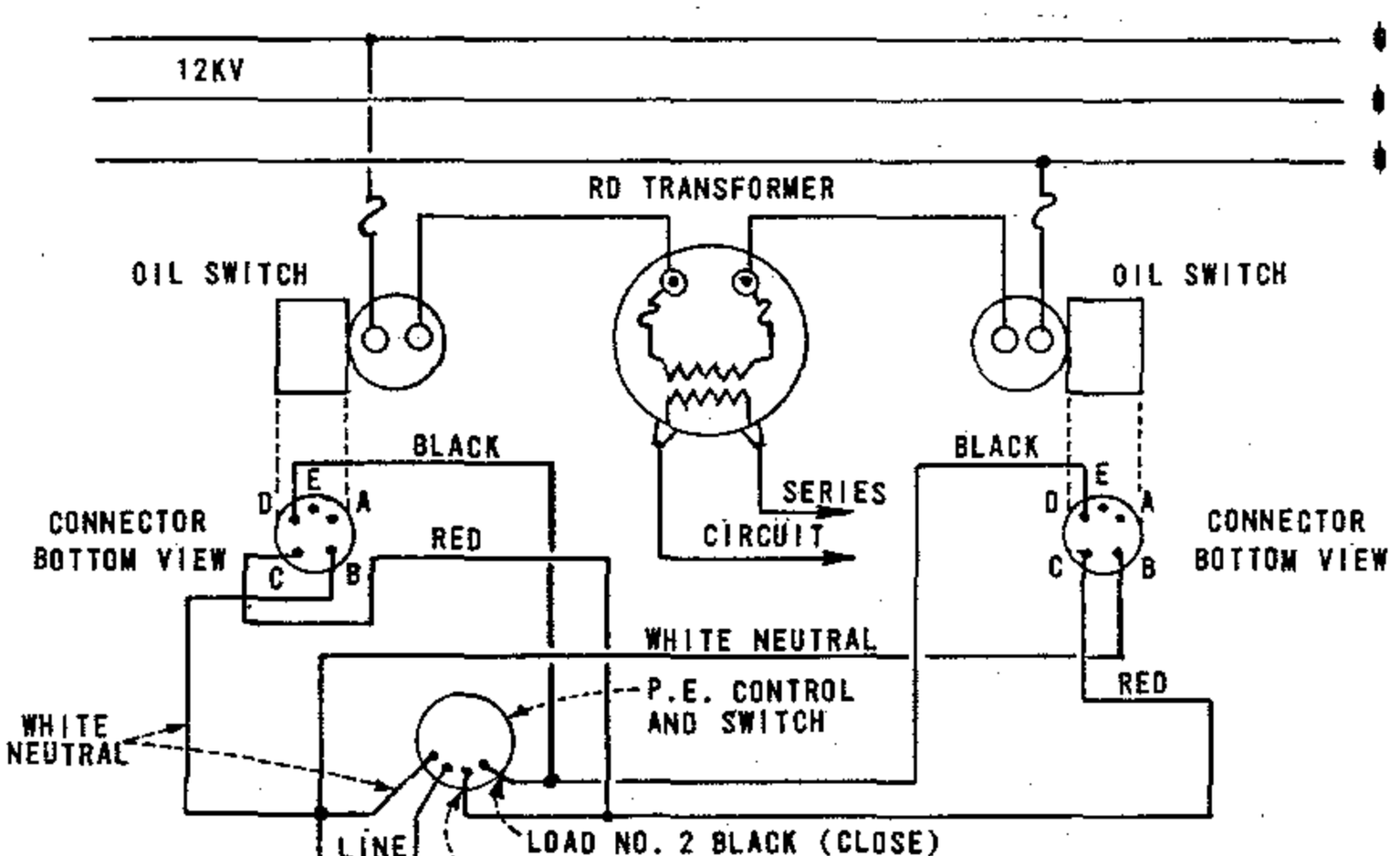
# PHOTOELECTRIC CONTROLLED REGULATED OUTPUT STREET LIGHT TRANSFORMER INSTALLATION, 4KV

1599.503
SUPERCEDES
1555.2 (1-1-92)

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SCOPE : THIS STANDARD SHOWS A CONSTANT CURRENT SERIES LIGHTING R.D. TRANSFORMER INSTALLATION. IT IS TO BE USED ON EXISTING INSTALLATIONS.




WIRING DIAGRAM

| | | |
|---|---|---|
| 1599.601<br>SUPERSEDES<br>1562.1 (4-30-82) | SDG&E ELECTRIC STANDARDS<br>P.E. CONTROLLED<br>R.D. STREET LIGHT TRANSFORMER INSTALLATION, 12KV | DATE 4-30-82<br>APPD |

BILL OF MATERIAL :

| ITEM PTF | ITEM SL&SS | DESCRIPTION | | QUANTITY | STOCK NO. OR CONSTR. STDS. |
|---|---|---|---|---|---|
| 1 | | CROSSARM, 3 1/2" X 4 1/2" X 4'-0" | (D) | 1 | STD 380.05 IT. 3 |
| 2 | | BRACE, ALLEY ARM, 4'-0" | | 2 | 163808 |
| 3 | | BOLT, MACH. GALV., 5/8" X 5", 1 RD. WASHER & 1 NUT | (E) | 1 | STD 139, 140 |
| 4 | | BOLT, MACH. GALV., 5/8" X 18", 2 SQ. WASHERS & 1 NUT | (E) | 1 | STD 139, 140 |
| 5 | | BOLT, MACH. GALV., 3/4" X 12", 1 SQ. CURVED WASHER & 1 NUT | | 2 | STD 139, 140 |
| 6 | | BOLT, SPACE, GALV., 5/8" X 20", 4 SQ. WASHERS & 4 NUTS | (E) | 1 | STD 139, 140 |
| 7 | | SCREW, LAG, GALV., 5/8" X 5" | (E) | 1 | 621600 |
| 8 | | SIGN, HIGH VOLTAGE & NAILS, GALV ROOFING | (E) | 3 | 647648, |
| 9 | | STEPS, POLE | (E) | 15 | 692992 |
| 10 | | CROSSARM, 3 3/4" X 5 3/4" X 8' | | 1 | STD 380.01 |
| 11 | | CROSSARM, 3 3/4" X 5 3/4" X 10' | | 1 | STD 380.1 |
| 12 | | BRACE, 5'-0" | | 1 | |
| 13 | | BRACE, STRUT, 36" | | 2 | |
| | 14 | INSULATOR, 4KV | (E) | 2 | 700 SECTION |
| | 15 | SWITCH, OIL, NR, 15KV, 200 AMP | | 2 | 705568 |
| | 16 | CONNECTORS, COMPRESSION | (E) | 2 | 700 SECTION |
| | 17 | NAILS, GALV. 10d | (E) | 6 | 491392 |
| | 18 | WIRE, COPPER #6/3 STRAND | | 10' | 813536 |
| | 19 | CABLE, 1/C #6, 5KV XLP | | 60' | 194304 |
| | 20 | WIRE, COPPER, #4 SOLID W.P. | | 10' | 812480 |
| | 21 | COVER, PVC THRU BOLT | (E) | 2 | 285696 |
| | 22 | PIPE, PLASTIC 1 1/2" DIAM., PVC TYPE II, SCHEDULE 80, 20' LENGTHS | (E) | 1 | 251456 |
| | 23 | PIPE, 1 1/2" DIAM. PLASTIC, 90° ELBOW, PVC TYPE II, SCHEDULE 80 | | 1 | 322464 |
| | 24 | COUPLING, 1 1/2" DIAM. PLASTIC PIPE, PVC | (E) | 3 | 280512 |
| | 25 | STRAP, PIPE 1 1/2" DIAM., GALV. | (E) | AS REQ'D. | 697664 |
| | 26 | NAILS, 10d GALV. | (E) | AS REQ'D. | 491392 |
| | 27 | CLAMP, GROUND ROD | (E) | 2 | 230016 |
| | 28 | CONDUIT, PVC, TYPE II, SCHEDULE 80, 1" | (E) | 25' | 251424 |
| | 29 | PLUG, DISCONNECT CONDUCTOR, 5 TERMINAL | (F) | 2 | 544838 |
| | 30 | WIRE, COPPER, #12 TW, STRANDED WP, WHITE | (F) | 25' | 810016 |
| | 31 | WIRE, COPPER, #12 TW, STRANDED WP, RED | (F) | 25' | 809920 |
| | 32 | WIRE, COPPER, #12 TW, STRANDED WP, BLACK | (F) | 25' | 809504 |
| | 33 | TRANSFORMER, R.D., 12KV, 25KVA | | 1 | 763426 |
| | 34 | MOUNTING BRACKET | | 1 | 166432 |
| | 35 | PHOTO ELECTRIC RELAY, 120 V., 1000 W MIN. | | 1 | 273920 |
| | 36 | CUTOUT, 12KV 100A | | 2 | 297888 |
| | 37 | WIRE, COPPER #6 B. STRD. | | 50' | 813644 |
| | 38 | UNIT, GROUND (LTN'G ARR.) PLAIN/GREY | | 1 | 603136, 603120 |
| | 39 | STAPLE, FENCE 1 1/4" | (E) | AS REQ'D | 678520 |
| | 40 | STAPLE, MOULDING 3" x 1 1/16" x 1/4" | (E) | AS REQ'D | 678560 |

FOR FIELD MAINTENANCE ONLY

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INSTALLATION :

A. CLASS OF POLES SHOULD BE DETERMINED PER STDS 344-361.

B. APERTURE OF PHOTOELECTRIC CELL MUST BE SET TO FACE NORTH.

C. 12KV/6.6A CONSTANT CURRENT TRANSFORMER HAS INTERNAL FUSES.

(D) WHEN THERE IS NO SECONDARY ON A POLE, A 6 PIN COMBINATION ARM FOR THE TWO WIRE SERIES AND THE SECONDARY MAY BE USED. THE 4' ALLEY ARMS WILL NOT BE NEEDED. IDENTIFY THE SECONDARY WITH 0-750 VOLT SIGNS.

(E) EXEMPT MATERIAL.

(F) 5 TERMINAL PLUGS AND WIRE TO BE FABRICATED BY KEARNY MAINTENANCE.

G.

H.

REFERENCE :

I. G.O. 95 RULE 58.2 REQUIRES PRIMARY CONSTANT CURRENT SERIES LIGHTING CIRCUITS BE TREATED AS MORE THAN 750 VOLTS.

J. S D G & E RULE DOES NOT ALLOW FOR CONSTANT CURRENT SERIES LIGHTING CIRCUITS OVER 750 VOLTS TO BE PLACED ON THE SAME ARM WITH 12KV.

| | S D G & E ELECTRIC STANDARDS | |
|---|---|---|
| DATE 4-30-82<br>APPD | P.E. CONTROLLED<br>R.D. STREET LIGHT TRANSFORMER INSTALLATION, 12KV | ~~1599.602~~<br>SUPERSEDES<br>1562.2 (4-30-82) |