

PRIMARY METERED SERVICE

GENERAL

To qualify for one of the TEP's published primary service rates, a customer must install, own and maintain the equipment and material as outlined herein. The customer's installation shall comply with TEP's specifications as well as the requirements of the National Electrical Code and/or local codes. Primary metered service available only at TEP's option.

For primary service loads in excess of 140 amperes, the customer shall have a system of breakers or fuses which will protect TEP's system from faults in the customer's distribution lines and transformers. All equipment installed between the primary service point of delivery and the customer's first protection device shall meet TEP's minimum standards for feeder design, and the protective device shall be located as close to the point of delivery as practical. TEP shall provide the customer with the maximum available short circuit current and relay characteristics and settings on TEP breakers for proper coordination of the customer's protective device with TEP's system. The customer shall provide the characteristics of his protective device to TEP. The customer's system design must be approved by TEP.

Design, Service Requirements, and Service Delivery Department will review the customer's electrical plan and specify locations for point of delivery and customer provided service and metering facilities, whether pole mounted or pad mounted. TEP will prepare a construction drawing which depicts TEP primary service design and TEP requirements for same.

All primary metered services will require a "high voltage release" be signed by the customer in advance of service. In addition, easements may be required prior to the installation of TEP facilities.

The Customer shall provide a dedicated phone circuit to be utilized by TEP's Metering Department to allow communications with the metering equipment.

NORMAL SEQUENCE OF ACTIVITIES ASSOCIATED WITH ESTABLISHING OVERHEAD PRIMARY METERED SERVICE

1. Design, Service Requirements, and Service Delivery Department specifies location of metering poles. Customer install primary service pole with all related equipment as required and accordance with TEP specifications as shown on Pages 3,4, and 5. Customer specifies kind and size of cables and/or conductors that he will be installing.
2. Once all necessary easements are obtained and the installation is complete as outlined in Item 1 above customer calls Scheduling Coordinator for service inspection.
3. Design, Service Requirements and Service Delivery Department inspects customer's installation and, upon approval, releases work order to install primary service line and metering equipment with meters. Service Provider will contact TEP for joint meet.
4. Line construction crew installs fused or switched primary service line to customer Service pole and terminates source side conductor. Line construction crew leaves primary service de-energized and grounded.
5. TEP or Service Provider completes wiring of meter and advises the Scheduling Coordinator.



INITIATED BY

ES

REVISION NO.

5

STANDARDS COMM.

10-84

STANDARDS COMM.

6-06

EFFECTIVE DATE

7-06

SR-451
PG. 1 of 12

PRIMARY METERED SERVICE

6. Customer terminates cable, if underground, and connects load conductors to load side terminals of CT's. When complete, customer call Scheduling Coordinator.
7. Design, Service Requirements, and Service Delivery Department makes final inspection and, if passed, arranges for meter set order to be released if all contingencies are met. Scheduling Coordinator schedules the customer's electrical contractor to be at the when service to be energized.
8. Scheduling Coordinator contacts TEP Metering Department to set meter or to coordinate with Service Provider joint meet to set meter and energize.
9. If Service Provider meter set, Metering Department completes checkout of metering installation, once energized.

NORMAL SEQUENCE OF ACTIVITIES ASSOCIATED with establishing UNDERGROUND PRIMARY METERED SERVICE

1. Customer provides and installs either an approved pad-mounted primary metering enclosure package (Page 6) or a fabricated enclosure (Page 8) at location specified by Design, Service Requirements, and Service Delivery Department.
2. Customer provides and installs a pad for metering enclosure (Page 7) and duct from his primary metering enclosure to TEP pole or TEP pad-mounted equipment. The duct installation shall meet the requirements of SR-205, SR-220 and SR-240 (if applicable). The duct size will be determined by TEP and will be shown on TEP's construction drawing.
3. Customer provides and installs metering conduit and meter socket(s) in accordance with the following requirements:
0-200A; See SR-423, Note 3; 201-800A: See SR-431, SR-437, SR-438, and SR-451, pg. 8-12.
4. Once all necessary easements are obtained and the installation is complete as outlined in items 1-3 above, customer calls Scheduling Coordinator for service inspection.
5. Design, Service Requirements, and Service Delivery Department inspects customer's installation and, upon approval, releases work order to install primary service cable and metering equipment without meter.
6. Design, Service Requirements, and Service Delivery Department makes final inspection and, if passed, releases work order to install primary service cable and metering equipment without meter.
7. Line construction crew installs fused or switched primary service line to customer's pad-mounted primary metering enclosure, terminates the line side and leaves cable deenergized.
8. Once all contingencies are met, Scheduling Coordinator arranges for completion of metering work with either TEP's Metering Department or Service Provider. Scheduling Coordinator schedules customer's electrical contractor and Service Provider to be at the site when service is to be energized. TEP's metering crew completes wiring installation and check out of metering and leaves energized.
9. If Service Provider meter set, Metering department completes checkout of metering installation, and coordinates energizing.



INITIATED BY

ES

REVISION NO.

4

STANDARDS COMM.

10-84

STANDARDS COMM.

6-90

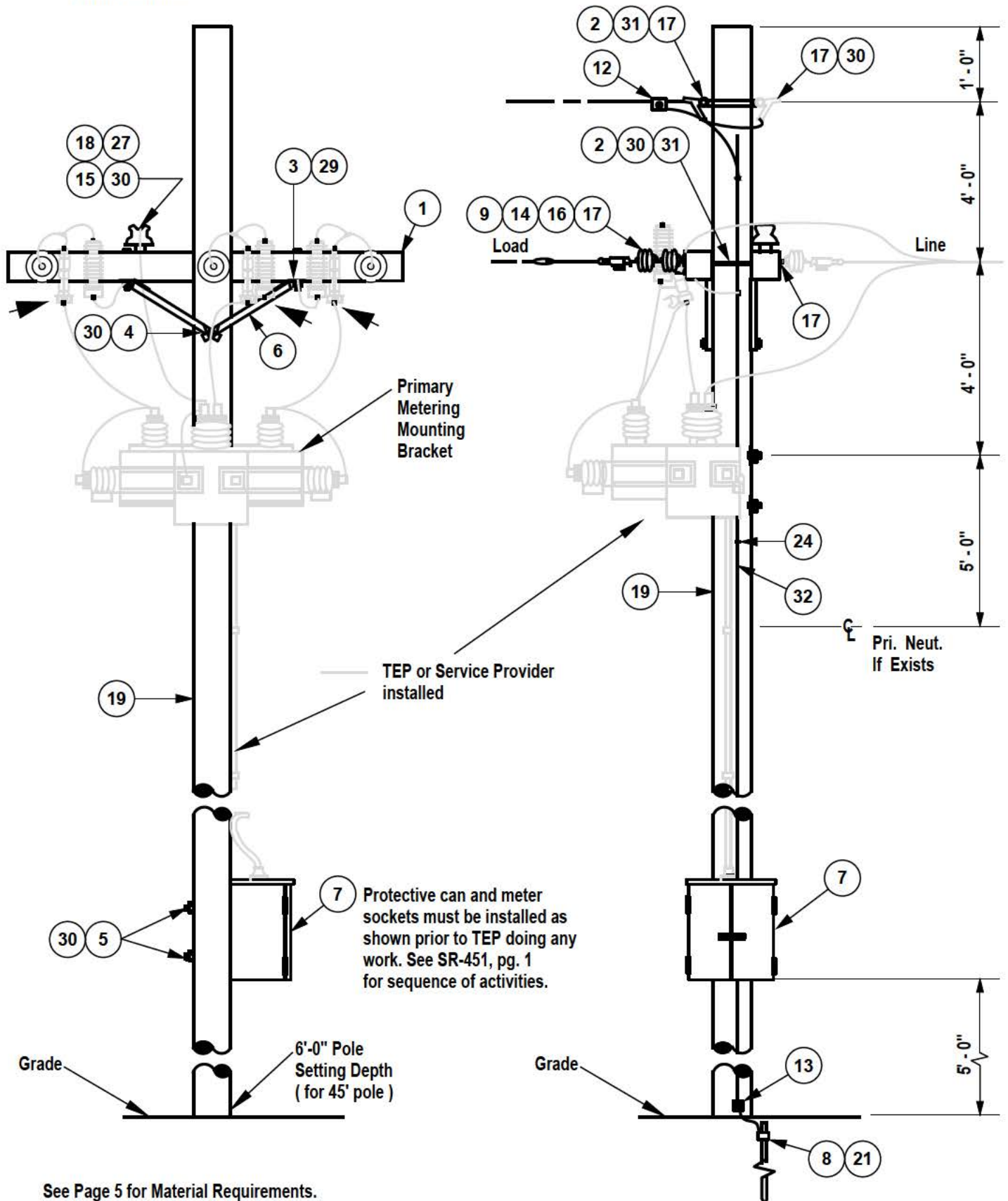
EFFECTIVE DATE

1-91

SR-451
PG. 2 of 12

USE: 7.97/13.8kV or 2.4/4.16kV
primary service.

PRIMARY METERED SERVICE OVERHEAD-TO-OVERHEAD



See Page 5 for Material Requirements.



UniSourceEnergy
Services
SANTA CRUZ COUNTY

INITIATED BY
STANDARDS COMM.

ES
10-84

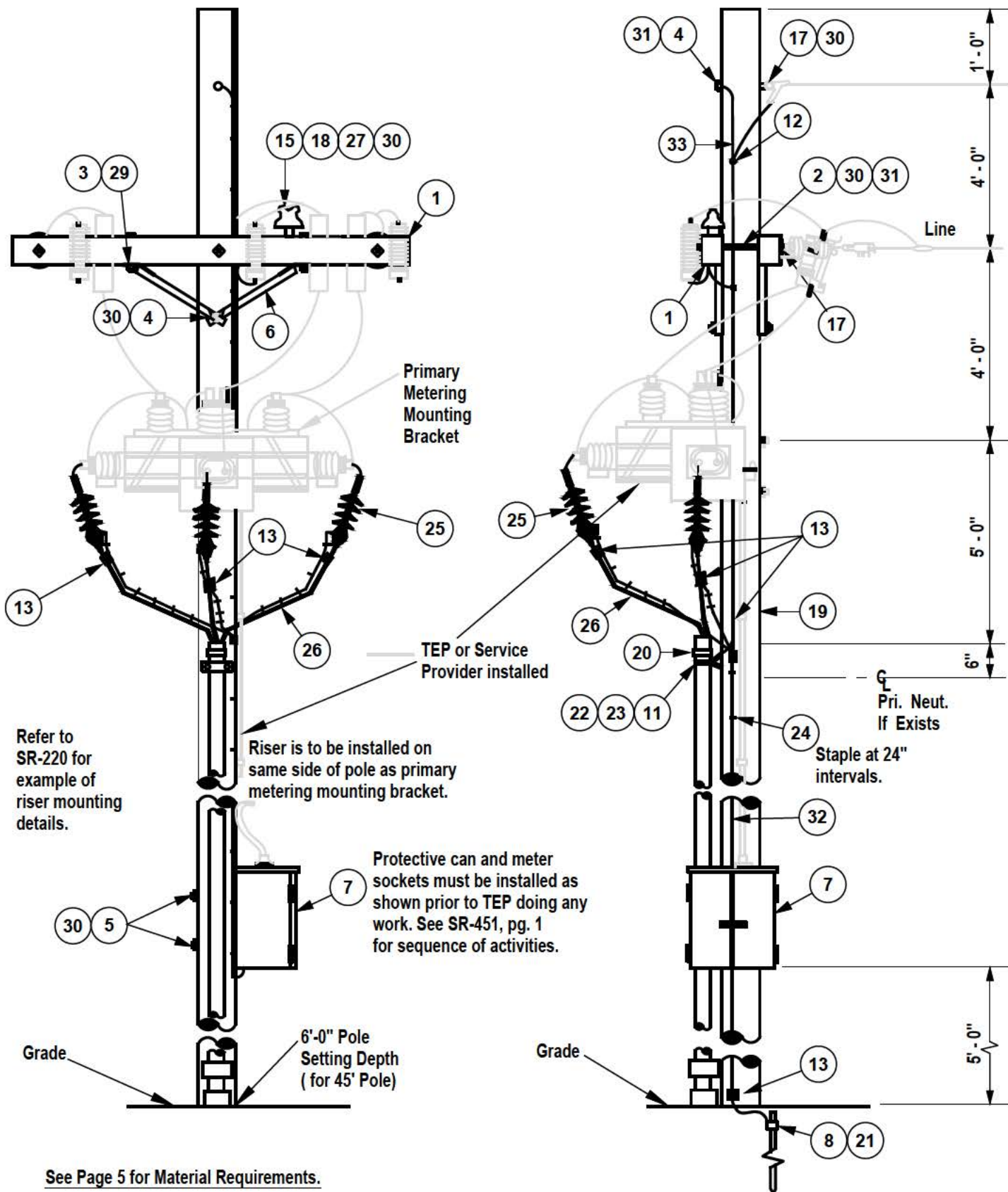
REVISION NO.
STANDARDS COMM.
EFFECTIVE DATE

6
10-91
1-92

SR-451
Pg. 3 of 12

USE: 7.97/13.8kV or 2.4/4.16kV
primary service.

PRIMARY METERED SERVICE OVERHEAD-TO-UNDERGROUND



See Page 5 for Material Requirements.



INITIATED BY	ES
STANDARDS COMM.	10-84

ES

REVISION NO.	6
STANDARDS COMM.	10-91
EFFECTIVE DATE	1-92

SR-451
Pg. 4 of 12

Item No.	Description	Quantity				Ref. TEP Spec.
		OH-OH 13.8 kV	OH-OH 4 kV	OH-UG 13.8 kV	OH-UG 4 kV	
1.	Arm, 8' 4SP	2	2	2	2	EM-A35
2.	Bolt, D.A. 5/8" x 18"	4	3	3	3	EM-B25
3.	Bolt, Mach. 1/2" x 7"	4	4	4	4	-
4.	Bolt, Mach. 5/8" x 12"			1		EM-B30
5.	Bolt, Mach. 5/8" x 14"	2	3	2	2	EM-B30
6.	Brace, Wood	4	4	4	4	EM-B76
7.	Cabinet, "F" Can *	1	1	1	1	SR-420
8.	Clamp, Ground Rod	1	1	1	1	EM-C27
9.	Clamp, Strain	3	3			EM-C25
10.	Clamp, Strain (Static)	1				EM-C25
11.	Conduit, Rigid Al			30'	30'	-
12.	Connector, (Pri. Neut-Gnd)		1		1	EM-C60
13.	Connector, Split Bolt #1	1	1	5	5	EM-C80
14.	Insulator, Suspension	6	6			EM-I22
15.	Insulator, Tie Top, 13.8 kV	1	1			EM-I20
16.	Link, Ext. (Center Phase Only)	1	1			EM-L70
17.	Nut, Eye	8	6	4	4	EM-N80
18.	Pin, Steel (Long Shank)	1	1	1	1	EM-P17
19.	Pole (45' Class 3 Min.)	1	1	1	1	EM-P80
20.	Riser, Grounding			1	1	EC-750
21.	Rod, Ground	1	1	1	1	EM-C25
22.	Screw, Lag 1/2" x 4"	1	1	8	8	EM-S10
23.	Standoff Bracket			4	4	EM-B76
24.	Staple, Ground Wire	18	18	18	18	EM-S60
25.	Termination Kit **			3	3	EC-1476
26.	Tie, Cable			9	9	EM-T25
27.	Tie, Insulator	1	1	1	1	EM-T15
28.	Washer, Round 3/8"	3	3	3	3	EM-W10
29.	Washer, Spring 1/2"	4	4	4	4	EM-W10
30.	Washer, Spring 3/4"	8	8	8	8	EM-W10
31.	Washer, Square 13/16"	6	6	6	6	EM-W10
32.	Wire, Ground #4 CW	48'	48'	48'	48'	EM-W84
33.	Wire, Ground #2/0 Str., Cu.	20'	20'	20'	20'	EM-W81

* Customer is to provide socket requirements within "F" can. Refer to SR-414, Page 2, for details.

** For load conductor size 1/0 AWG and below, customer to provide termination kit with pin terminal; for load conductor size larger than 1/0 AWG, order termination kit with 90° 2-hole connector.



INITIATED BY

ES

REVISION NO.

6

STANDARDS COMM.

10-84

STANDARDS COMM.

10-91

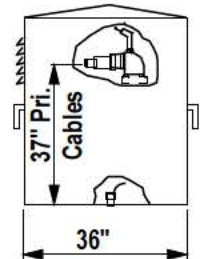
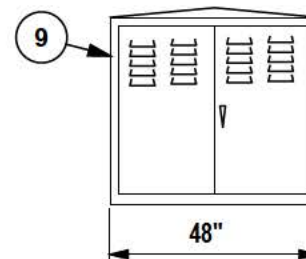
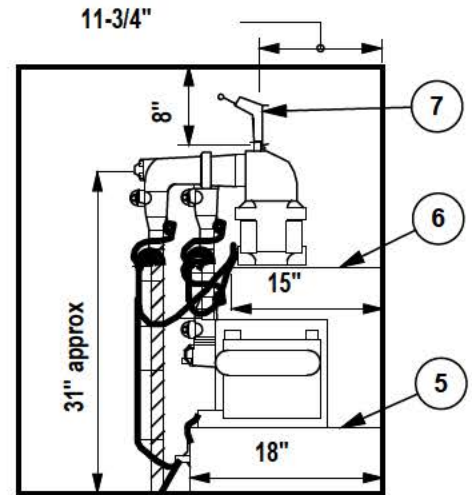
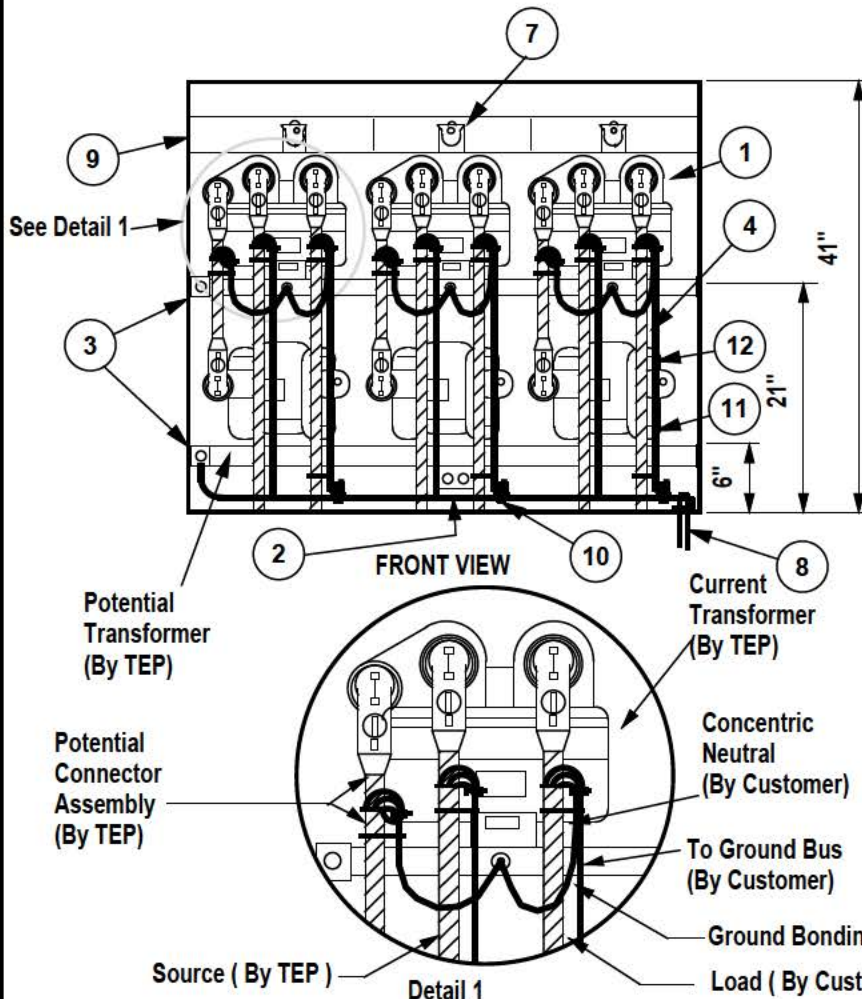
EFFECTIVE DATE

1-92

SR-451
Pg. 5 of 12

Primary Metering Enclosure
200A Max.,
13.8 kV; 3Ø, 4W Grd Y

PRIMARY METERED SERVICE
PAD-MOUNTED METERING
200A OR LESS



Item No.	Description	Ref. TEP Spec.
1.	Bushing & Elbow, 200A Load-break (3)	EM-B100 / EM-E70
2.	Ground Clamp (No. 2-500 MCM)	-
3.	Ground Clamp (No. 8-2/0)	-
4.	Primary Cable / Concentric Neutral	-
5.	Potential Transformer Shelf	-
6.	Current Transformer Shelf	-
7.	Parking Stand Bracket	-
8.	Ground Rod	EM-R78
9.	Cabinet, Enclosure	-
10.	Connector, Para. Groove, Center Bolt	EM-C80
11.	Wire Tie	EM-T25
12.	Wire, #2 Str. Cu.	EM-W81

NOTES:

1. Meter socket(s) and metering conduit shall be installed per SR-423.
2. Customer shall leave sufficient slack in cable to allow the 200A Elbows to be raised/secured to the parking stand bracket.
3. The pad-mounted enclosure shall conform to the latest revision of the Western Underground Guide 2.13, "Security for Pad-Mounted Equipment Enclosures."
4. The following list represents approved padmounted enclosures:
 - A. Malton Enclosure - Cat No. MEF 483642-M-SP
 - B. Maysteel Co. - Cat No. 63456803



INITIATED BY
STANDARDS COMM.

ES
10-84

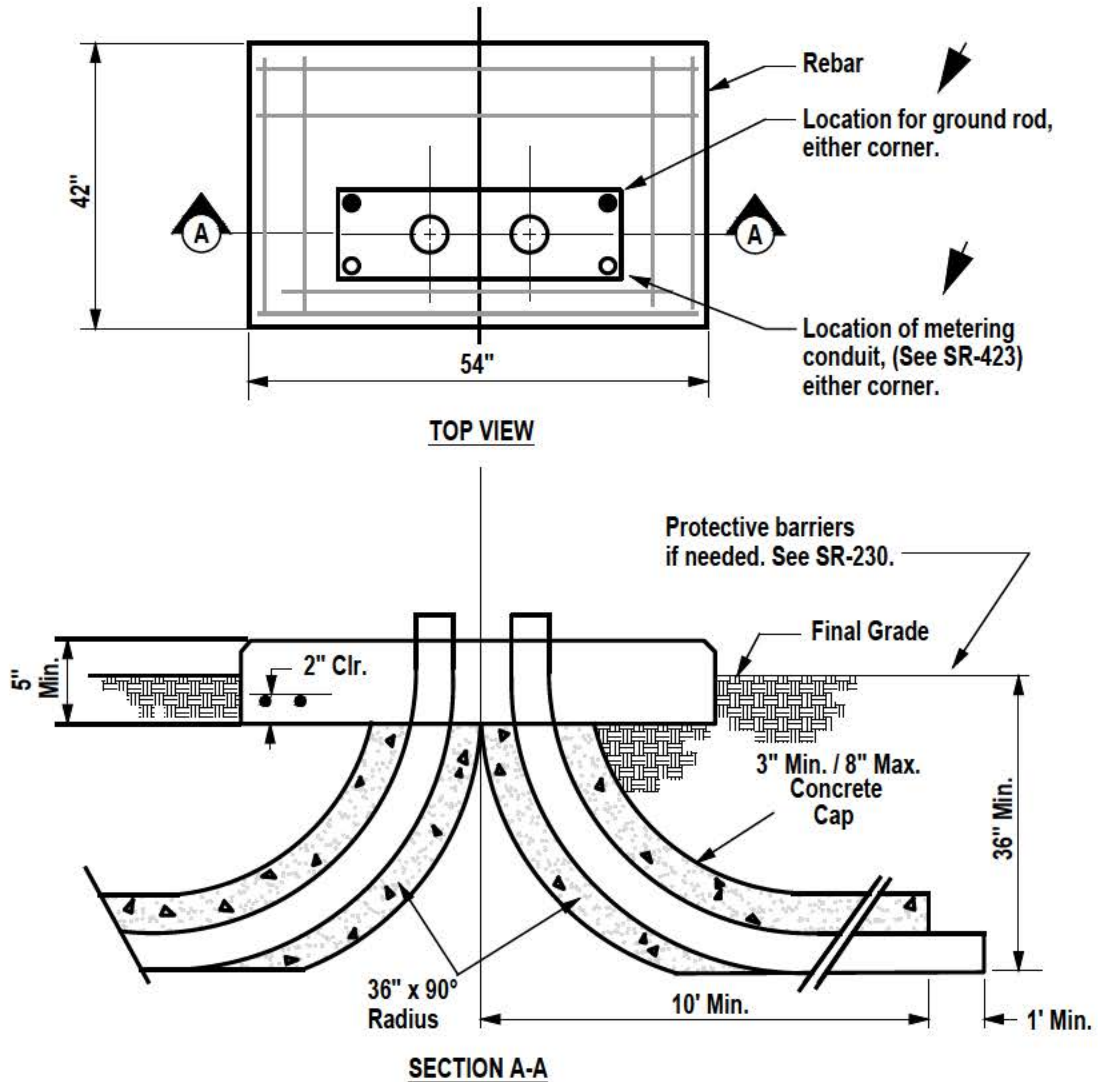
REVISION NO.
STANDARDS COMM.
EFFECTIVE DATE

7
1-01
1-02

SR-451
Pg. 6 of 12

PRIMARY METERED SERVICE PAD-MOUNTED METERING 200A OR LESS

**FIG. 1
PRIMARY METERING
PAD FOR ENCLOSURE
SHOWN ON PAGE 6**

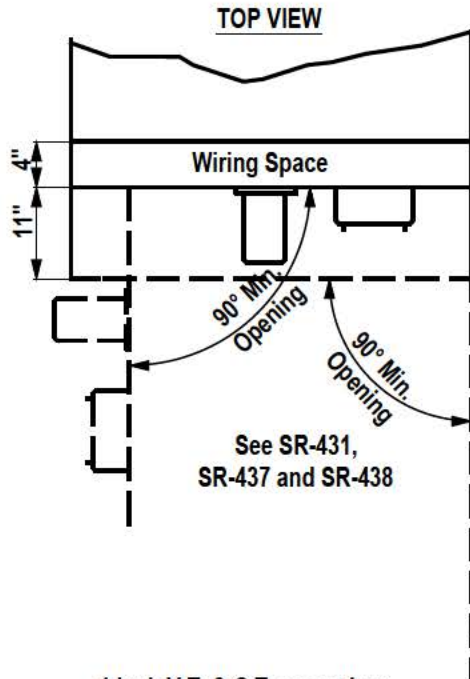


NOTES:

1. The pad size and duct placement are dependent on the enclosure used and requires plan review and approval by Design, Service Requirements & Service Delivery Dept. All rebar shall be No. 4 and shall be placed so that it does not extend into the pad opening. All concrete and reinforcement shall meet specifications contained in SR-205. The pad surface shall be level and troweled smooth.
2. The pad opening size shall be such that the opening in the enclosure completely covers the pad opening, thereby preventing entry into the compartment.
3. The rear edge and the sides of the enclosure pad shall be no closer than 3' to any building, wall or fence, and no structure of any kind shall overhang the pad and/or easement.

**PRIMARY METERED SERVICE
PAD-MOUNTED METERING
200-800 AMPS**

EUSERC DWG. NO. 407

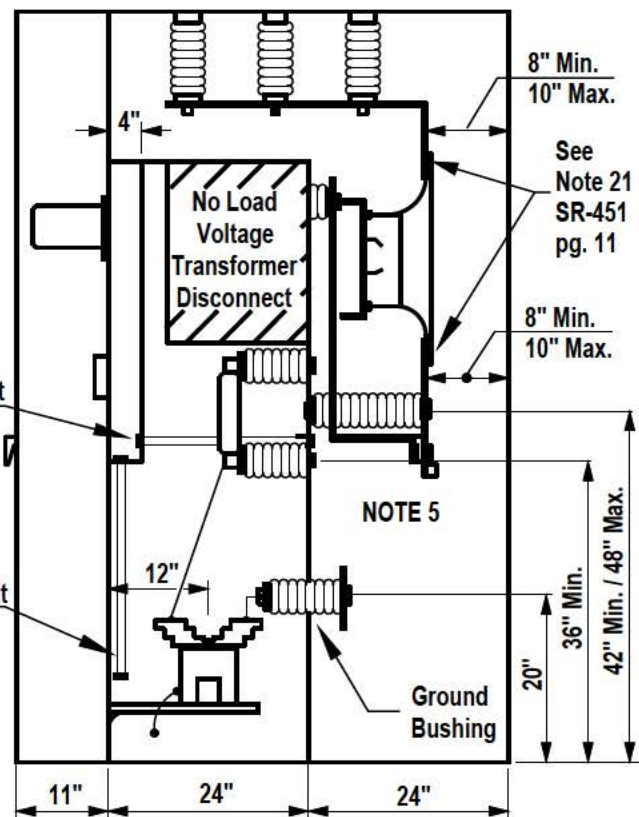
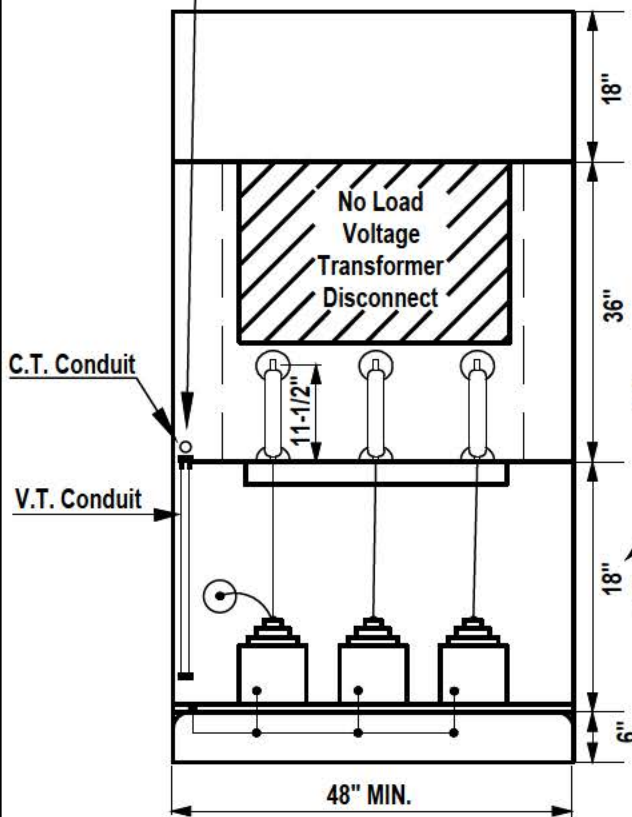


RATING 14400 V

MINIMUM BARE BUS CLEARANCE Ø TO GROUND = 6"

MINIMUM BARE BUS CLEARANCE Ø TO Ø = 7-1/2"

1 inch V.T. & C.T. secondary
conduits shall be located on the
same side as meter panel hinges.



UniSourceEnergy
Services
SANTA CRUZ COUNTY

INITIATED BY
STANDARDS COMM.

KR
10-88

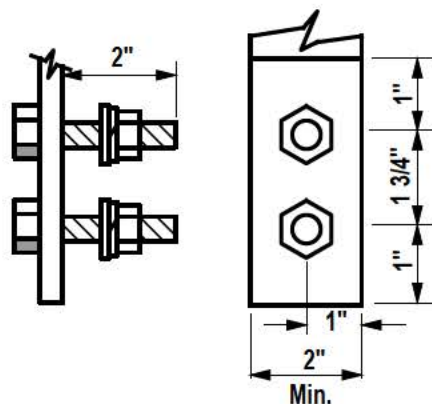
REVISION NO.	8
STANDARDS COMM.	9-12
EFFECTIVE DATE	10-12

SR-451
Pg. 8 of 12

**PRIMARY METERED SERVICE
PAD-MOUNTED METERING
200-800 AMPS**

ESERC DIG. NO. 407

1. Only copper and Alstan or Alstan 80 plated aluminum bus shall be used in the metering enclosure. Aluminum bus shall be identified with the plating process where the service cables are terminated and the current transformer are mounted.
Note: At any time Design, Service Requirements & Service Delivery Department may require certification and supporting documentation of manufacturing process to meet electroplating thickness requirements.
2. Maximum bus size shall be 3/8 inch X 4 inches. Minimum bus size shall be 1/4 inch x 2 inches unless otherwise indicated on specific drawing. Bus size outside these limits require special engineering and consultation with Design, Service Requirements, and Service Delivery Department.
3. When the main switch or circuit breaker enclosure is adjacent to and on the source side of the metering enclosure, connections form the load side of the main switch or circuit breaker to the line side of the current transformers shall be made with bus bars.
4. Where cable or busses pass through compartment walls, through-the-wall bushings with full voltage rating of the switchboard must be used.
5. One landing terminal with two 1/2 inch steel bolts spaced on 1-3/4 inch vertical centers shall be provided on each phase and neutral bus. These bolts, 2 inches in length, shall be provided with nuts, flat washers and pressure maintaining spring washer. All parts shall be plated to prevent corrosion.



Landing Terminal Detail

6. Vertical bussing in the pull section and CT compartment shall be spaced 12" on centerlines between phases, and the center phase shall be on the enclosure centerline. BIL for this enclosure shall be not less than that for customer's associated switchgear.
7. Ventilation openings shall be provided as per NEMA Standards, and shall be louvered or screened and be guarded with internal barriers to prevent access to energized parts.
8. Bussed thru-wall insulators for phase and neutral VT taps to be furnished with lugs on VT compartment side. Cables or bus conductors may be furnished for the taps to the fuse carriage and to the VT compartment, maintaining bare bus clearance.
9. The neutral termination bus shall be insulated from the metering cubicle.



INITIATED BY	KW
STANDARDS COMM.	10-88

REVISION NO.	5
STANDARDS COMM.	10-89
EFFECTIVE DATE	1-90

**SR-451
PG. 9 of 12**

**PRIMARY METERED SERVICE
PAD-MOUNTED METERING
200-800 AMPS**

10. Provide VT and adjustable CT mounting bases. Bus drilling and spacing shall accommodate ampere rating of 15 kV Class CT's.
11. Kirk key (or equivalent) interlocking is required between the voltage transformer disconnect and the voltage transformer compartment door so that, for personnel safety, the voltage transformer compartment cannot be entered until the following conditions are met:
 - a. The disconnect is fully and visibly open.
 - b. When the voltage transformer disconnect is fully open the disconnect blades must ground automatically.
 - c. The disconnect is locked open with a Kirk key interlock system.
12. The interlock system must prevent closing of the disconnect without first closing and locking the voltage transformer compartment door.
13. Primary contacts for the voltage disconnect shall be of the blade and jaw design or equivalent to insure continued adequate contact. Wiping or pressure contact is not acceptable. Operating handle or lever of the VT disconnect switch shall be padlockable in the closed position.
14. As an alternate, the meter panel may be mounted in front of the CT/Termination compartment, provided that when the meter panel is opened the compartment is fully isolated by a removable or hinged barrier. Customer to furnish and install 13 terminal meter sockets designed for back connection a test switch (Superior Cat. # 1058-F or exact equivalent), and a cover (Superior Cat. #7943BC or exact equivalent). **Note:** Test switch and cover not supplied by switchgear manufacturer. See also SR-431, SR-438, SR-414, page 2, fig. #2.
15. Compartments of the metering enclosure shall be permanently labeled with matching engraved laminated phenolic or equal tags, 1/4" white letters and numbers on the dark colored material which are readily visible and mechanically attached to the face of the following compartments:
 - a. Utility Voltage Transformer (VT) Compartment.
 - b. Utility Voltage Transformer (VT) Fuse Compartment.
 - c. Utility Service Termination Compartment.
 - d. Utility Metering Panel.
 - e. In addition each panel of the switchgear shall be labeled, using at least 1" white letters and numbers, stating the utility serving voltage such as 13800Y/7970 volts.

Current and voltage transformers, meters and all secondary wiring from the transformers to the meters will be furnished and installed by TEP or Service Provider up to 25 KV. TEP installs exclusively over 25 KV.



INITIATED BY

KR

REVISION NO.

7

STANDARDS COMM.

10-88

STANDARDS COMM.

8-93

EFFECTIVE DATE

1-94

**SR-451
PG. 10 of 12**

**PRIMARY METERED SERVICE
PAD-MOUNTED METERING
200-800 AMPS**

16. Voltage transformer fuses shall be furnished and installed by TEP or Service Provider shall provide mounting clips for indoor current-limiting fuses, nominal voltage rating 14000, current range 0.5 to 0.3 amperes. The mounting clip separation shall be 11-1/2 inches on centers, fuse ferrule diameter 1-5/8 inches.

17. Equipment is shown with weatherproof door. The meter panel shall be hinged on the opposite side from the outer door on weatherproof units to permit 90 degree opening of both doors. Omit weatherproof door if outer door is omitted, furnish lockable meter panel. The front weatherproof door shall be a single door equipped with a latch type handle for TEP's padlock.

18. Refer to EUSERC Dwgs. No.'s 407, 411, & 414 for additional details.

19. The customer shall submit copies of the cabinet design drawings to TEP as required for approval prior to fabrication. Such drawings shall indicate the customer's name and the job address.

20. Pad size and duct placement for this enclosure requires plan review and approval by Design, Service Requirements and Service Delivery Department.

21. If the switchgear is rated for 1200 amps but the actual load is 600 amps or less the measurements for the current transformer mounting space shall be those in the 10-800 ampere column of the dimensions chart depicted in SR-451 pg. 12 of 12.

22. Working clearances at customer's job site may determine if the manufacturer is to furnish either a single or double, full height, hinged rear door access. In addition to provision for a three point locking mechanism with hardware for attachment of utility furnished padlock, each door shall, when closed, be secured in place with the standard "stud and wing-nut assembly" for sealing.

23. Instrument transformer compartment or cabinet shall be used solely for TEP equipment. The compartment or cabinet shall not be used as a raceway for customer load conductors, other service conductors, or any other customer equipment.



INITIATED BY

KR

REVISION NO.

9

STANDARDS COMM.

10-88

STANDARDS COMM.

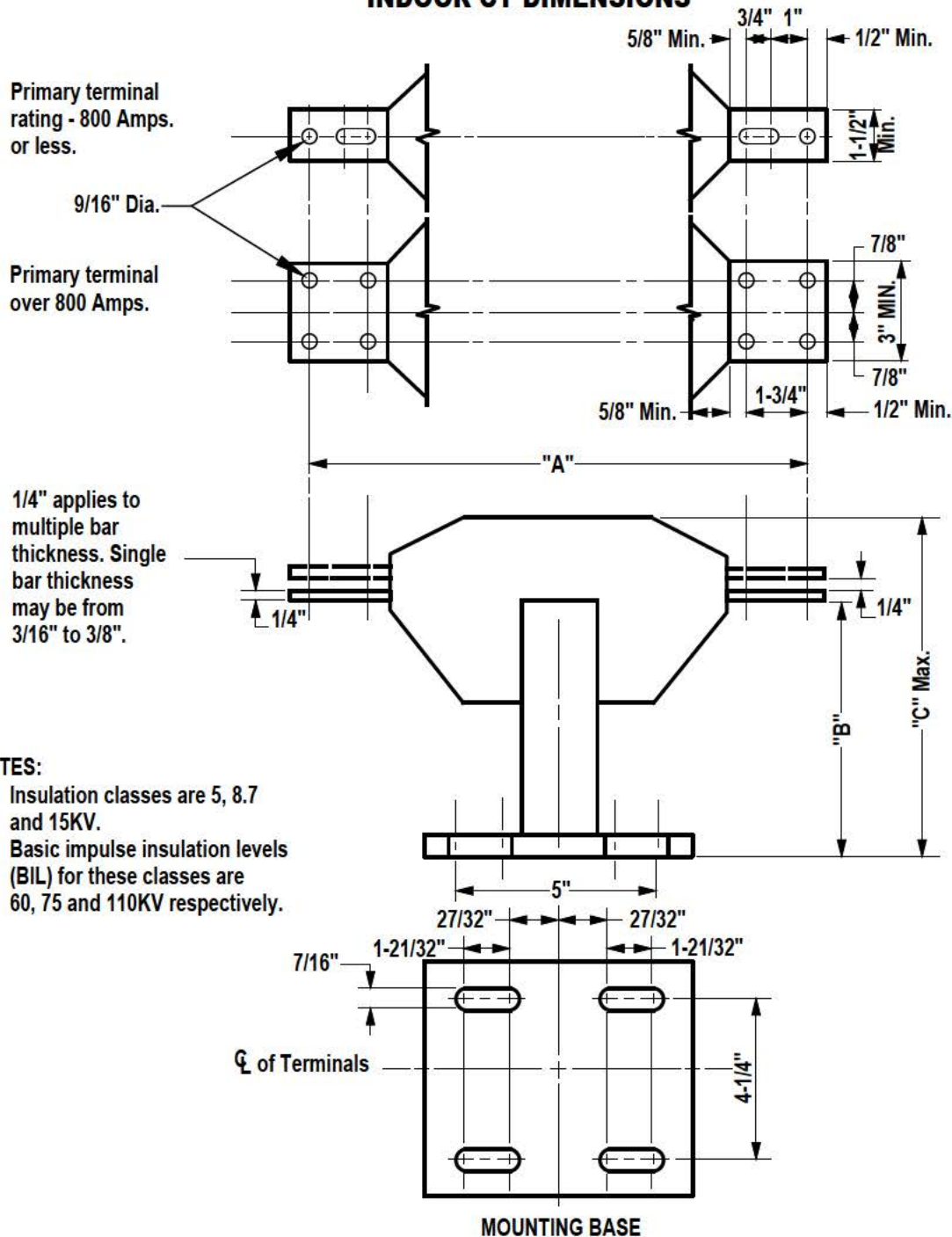
10-16

EFFECTIVE DATE

10-16

**SR-451
PG. 11 of 12**

PRIMARY METERED SERVICE INDOOR CT DIMENSIONS



NOTES:

Insulation classes are 5, 8.7 and 15KV.
Basic impulse insulation levels (BIL) for these classes are 60, 75 and 110KV respectively.

DIMENSIONS - INCHES*						
INSULATION CLASS KV	"A"		"B"		"C" (Maximum)	
	AMPERES		AMPERES		AMPERES	
	10-800	1200-2000	10-800	1200-2000	10-800	1200-2000
5.0	14	—	5-3/4	—	8	—
8.7	15	—	8	—	10-1/2	—
15.0	22	26	9	5-3/4	11-1/4	13

* Unless otherwise indicated tolerance, plus or minus 1/16 inch.



INITIATED BY
STANDARDS COMM.

MS
9-89

REVISION NO.
STANDARDS COMM.
EFFECTIVE DATE

1-90

SR-451
Pg. 12 of 12