Process for Customer Referred Material

Process for Reviewing Customer-Referred Materials

Introduction

- CPS Energy has worked diligently to help mitigate the global supply chain issues that have affected our community. We are working through shortages of key materials and equipment, including transformers. As part of this mitigation, CPS Energy is encouraging customers whose projects may be impacted by supply chain shortages to locate materials through their own supply chain contacts. CPS Energy has a process for reviewing customer-referred material to ensure the material meets CPS Energy Standards & Specifications contained in the Customer-Referred Materials packet or on our website, **CPS Energy Standards & Specifications**. Customers can complete the attached form to submit information regarding customer-referred material to CPS Energy for evaluation and our teams will begin to engage with these suppliers through this process

Process

In order to evaluate customer-referred material, the following information must be provided by the customer:

- Quotation including cost and lead-time
- Cut sheet & general arrangement drawing (with dimensions) for material
- A name and contact information at the supplier
- A statement that the material meets the appropriate CPS Energy specification document for the material or identification of specific items within the Specification that the quoted material does not meet
- Written agreement that the customer is willing to pay any difference in cost between the customer-referred material and CPS Energy standard price for said material if the cost is higher (note: no credit will be given for lower priced material)

Note that the following items are requirements of the process:

- CPS Energy must determine that the material meets our specifications
- CPS Energy must make the purchase of the material and be the named entity on any warranty

Upon receipt of the customer-referred material review request, the information is first evaluated by CPS Energy's Standards & Specification Engineering team. This is a technical review to ensure the material meets CPS Energy Standards & Specifications and that it can safely integrate into CPS Energy's distribution system. **This review takes a maximum of 3 business days or more if further requests are made to the supplier for additional information.**

Upon approval of the technical review, the information is passed to CPS Energy's Supply Chain team. If the customer-referred material is provided by a supplier that is represented by one of CPS Energy's existing distributors, then Terms & Conditions will be reviewed, and a Purchase Order issued. **This process takes up to five business days.**

If CPS Energy must establish a relationship with a new vendor, the Supply Chain team will gather the required information from the vendor and develop the appropriate documentation to create the Purchase Order to purchase the material. **This process can take up to two weeks and is reliant on the supplier providing feedback into the process.**

Customer Referred Material Submission Form

Request for Material Consideration

CPS Energy will consider utilizing customer-referred materials to complete projects. Please refer to the Process for Reviewing Customer-Referred Material document within this packet. If you would like to refer materials to CPS Energy, please complete and sign this form and submit the required information to ce@cpsenergy.com with the **SUBJECT: REQUEST FOR MATERIAL CONSIDERATION**.

Please remember the following items are required for this process:

- CPS Energy must determine that the material meets our specifications contained within the Customer-Referred Materials packet or on website, **CPS Energy Standards & Specifications**
- CPS Energy must make the purchase of the material and be the named entity on any warranty

_____(CUSTOMER) hereby requests CPS Energy to review the customer-referred material listed below to ensure the material meets CPS Energy standards & specifications. Upon evaluation and acceptance of the customer-referred material, the customer agrees to pay any difference in cost between the customer-referred material and CPS Energy standard price, if the approved customer-referred material cost is greater and with the understanding that no credit will be given if the customer-referred material is lower priced materials.

Date of Submission: _____
Name of Project Referred Material will be used on: _____
CPS Energy BCA, Work Request of Project Number: _____
Description of Material Being Referred: _____

Referring Supplier's Information

Supplier's Company Name: _____
Supplier's Quotation Number: _____
Point of Contact at Supplier
Name: _____
Phone Number: _____
Email: _____

Submitters Contact Info

Company Name: _____
Submitter's Name: _____
Submitter's Phone Number: _____
Submitter's Email: _____

Please include the following when submitting this form:

☐A quote to include cost and lead-time
☐ Cut sheet & general arrangement drawing (with dimensions) for material

Do all materials meet the appropriate CPS Energy specification?

YES, all materials meet the appropriate CPS Energy specification

☐ A statement that the material meets the appropriate CPS Energy specification document for the material **CPS Energy Standards & Specifications**

NO, not all materials on the meet the appropriate CPS Energy specification

☐ A statement identifying the specific items within the specification that the quoted material does not meet **CPS Energy Standards & Specifications**

The following items within the specification **DO NOT** meet CPS Energy Standards & Specifications:

_____

_____

_____

_____

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_____

_____

_____

_____

By signing below, Customer verifies they are authorized to sign for the company listed and agrees to the terms outlined herein for Customer-Referred Materials identified above.

Signature: _____

Name: _____

Title: _____

Date: _____

SPECIFICATION FOR

TRANSFORMERS, DISTRIBUTION, PAD-MOUNT, SINGLE-PHASE, DEAD-FRONT, 13,200GY/7,620-240/120 VOLT AND 13,200GY/7,620-480/240 VOLT, 50-250 KVA, WITH SECTIONALIZING SWITCH

Specification Number: 426-30

Approved Date: March 31, 2017

CPS ENERGY

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San Antonio, Texas 78296

Robert Gourley
Director, Supply Chain

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Director, Distribution Engineering

Specification No. 426-30

CONTENTS

1.0 SCOPE

1.1 Application. This specification covers the minimum acceptable requirements for single-phase, pad-mounted, dead-front, distribution transformers rated 13,200GY/7,620-240/120 volts and 13,200GY/7,620-480/240 volts with a sectionalizing switch. These transformers are intended for use on concrete slabs or other suitable ground level foundations.

1.2 Applicable Standards. Transformers covered by this specification shall comply with the latest revised national standards listed below, as applicable, except where they conflict with the requirements of this specification. The order of precedence shall be this specification, then the following standards:

IEEE C57.12.00; General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

ANSI C57.12.25; Pad-Mounted Compartmental-Type, Self-Cooled Single-Phase Distribution Transformers with Separable Insulated High-Voltage Connectors, High-Voltage, 34500GrdY/19920 Volts and Below; Low-Voltage, 240/120 Volts; 167 kVA and Smaller-Requirements

IEEE C57.12.28; Pad-Mounted, Equipment-Enclosure Integrity

IEEE C57.12.35; Standard for Bar Coding for Distribution Transformers

IEEE C57.12.70; Terminal Markings and Connections for Distribution and Power Transformers

IEEE C57.12.80; Terminology for Power and Distribution Transformers

IEEE C57.12.90; Test Code for Liquid-Immersed Distribution, Power and Regulating Transformers and Guide for Short-Circuit Testing of Distribution and Power Transformers

IEEE 386; Separable Insulated Connector Systems for Power Distribution Systems above 600V

ASTM A 240; Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels

ASTM D1275b; Standard Test Method for Corrosive Sulfur in Electrical Insulating Liquids

ASTM D3487; Mineral Insulating Oil Used in Electrical Apparatus

NEMA 107; Methods of Measurement of Radio Influence Voltage (RIV) of High-Voltage Apparatus

NEMA 260-1991 (R1996); Safety Labels for Pad-Mounted Switchgear and Transformers Sited in Public Areas

UL 969-2001; Marking and Labeling Systems

10 CFR Part 431; Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule

1.3 Transformers Covered By This Specification.

CPS Energy Material No.	Description
1004735	TRAN PM 1P 50KVA 13200GY/7620-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 50 KVA, 13,200GY/7620-240/120 VOLT, WITH SECTIONALIZING SWITCH
1004736	TRAN PM 1P 75KVA 13200GY/7620-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 75 KVA, 13,200GY/7620-240/120 VOLT, WITH SECTIONALIZING SWITCH
1006276	TRAN PM 1P 75KVA 13200GY/7620-480/240V TRANSFORMER, PAD-MOUNT, 1-PHASE, 75 KVA, 13,200GY/7620-480/240 VOLT, WITH SECTIONALIZING SWITCH
1004737	TRAN PM 1P 100KVA 13200GY/7620-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 100 KVA, 13,200GY/7620-240/120 VOLT, WITH SECTIONALIZING SWITCH
1004738	TRAN PM 1P 167KVA 13200GY/7620-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 167 KVA, 13,200GY/7620-240/120 VOLT, WITH SECTIONALIZING SWITCH
1004739	TRAN PM 1P 250KVA 13200GY/7620-240/120V TRANSFORMER PAD-MOUNT, 1-PHASE, 250 KVA, 13,200GY/7620-240/120 VOLT, WITH SECTIONALIZING SWITCH

2.0 ELECTRICAL RATINGS

2.1 Kilovolt-Ampere (kVA). The kilovolt-ampere ratings shall be as specified in section 1.3 and shall meet the thermal load limits as specified in ANSI Standard C57.12.25.

2.2 Voltage. The nominal high-voltage rating shall be 13,200GY/7620 volts. The low-voltage rating shall be 240/120 volts or 480/120 as specified for each transformer in section 1.3.

2.3 Taps. No taps shall be provided.

2.4 Basic Impulse Level (BIL). The high-voltage and low-voltage basic impulse levels shall be 95 kV and 30 kV respectively.

2.5 Percent Impedance. The percent impedance shall be as indicated below.

kVA Rating	Percent Impedance
50-100	1.7-3.5
167-250	2.2-3.5

2.6 Radio Influence Voltage (RIV). The radio influence voltage level at the transformer bushings shall not exceed 100 microvolts when the unit is excited at 110% rated voltage and tested in accordance with NEMA Standard 107.

2.7 Minimum Efficiency. Transformers shall meet or exceed the efficiency levels for liquid-immersed distribution transformers as specified in Table I.1, of the Department of Energy ruling: 10 CFR Part 431 Energy Conservation Program for Commercial Equipment: Distribution Transformers; Final Rule; October 12, 2007. Manufacturer shall comply with the intent of all regulations set forth in noted ruling.

3.0 CONSTRUCTION AND MATERIALS

3.1 Assembly. The transformer shall consist of the tank and a cable terminating compartment assembled as an integral unit. The terminating compartment shall consist of a sill and hinged lid attached to the tank such that neither the sill nor the lid can be removed when the lid is in the closed position.

The sill shall be removable when the terminating compartment lid is open, allowing for installation and removal of the transformer without disturbing the cables. There shall be a lifting handle or other provision for opening the lid, and the lid shall be easily removable when it is in the open position.

3.2 Arrangement. The transformer arrangement shall be ANSI Type 1 in accordance with figure 1 (a) of ANSI Standard C57.12.25 and drawing 1 of this specification. Where there are dimensional differences between the ANSI standard and the CPS Energy specification drawing, this specification drawing shall take precedence.

3.3 Materials.

3.3.1 Tank and Anti-Corrosion Skirt. The transformer tank shall have an integral skirt on sides and back such that the bottom does not come in direct contact with the foundation surface. The transformer tank and skirt shall be constructed of minimum 12 gauge steel. A

minimum 1.5-inch stainless steel skirt shall be integrally butt welded (bolted construction not acceptable) around the lower edge of entire base of the transformer tank housing. The stainless steel skirt weld seam shall be at least 1 inch below the bottom elevation of the transformer tank. The stainless steel skirt is not required on the faceplate of the terminating compartment, if the base of the faceplate is a minimum of 1 inch above the slab foundation. The manufacturer shall ensure that the stainless steel skirt does not deform and remains rigid during handling and installation with ordinary care.

As an alternative design, the manufacturer may construct the entire transformer tank of minimum 12 gauge, Type 409 stainless steel per ASTM A240 or other grade stainless steel of equivalent corrosion resistance. The transformer tank bottom shall not come in direct contact with the foundation surface.

3.3.2 Lid. The terminating compartment lid shall be constructed of minimum 14 gauge steel.

3.3.3 Sill. The sill shall be constructed of minimum No. 14 gauge, Type 409 stainless steel per ASTM A240, or other grade stainless steel of equivalent corrosion resistance. A two-inch diameter access hole shall be provided with a removable cover plate. The access hole shall be centered on the right (secondary) side of the sill. The cover plate and all associated attachment hardware shall be made of stainless steel and shall be arranged to provide easy removal and reattachment from inside of terminating compartment. Cover plate attachment hardware shall not interfere with attachment of the conduit fitting using a 2.5-inch (O.D.) lock nut.

3.3.4 Fasteners and Hinges. Pentahead bolts and associated threaded receptacles, hinges and hinge pins shall be constructed of Type 304 stainless steel as per IEEE C57.12.28.

3.4 Drainage. When the lid is closed, the transformer shall drain freely such that no water stands on the transformer or drains into the terminating compartment.

3.5 Coating. The coating shall be highly resistant to weather, chipping, cracking, mildew and ultraviolet chalking, and shall adhere to all requirements as specified in IEEE Standard C57.12.28. All coating components shall be lead-free, asbestos-free, and chromate-free. All surfaces shall have a minimum dry-film thickness of 3 mils and on tanks constructed of carbon steel, all surfaces within 8 inches of foundation shall have a minimum dry-film thickness of 5 mils.

3.6 Bottom Corrosion Treatment. The tank bottom, the stainless steel skirt, any supports that are in contact with the foundation, and the stainless steel sill shall be properly treated to prevent corrosion.

3.7 Welding. All welding shall be in accordance with best-recommended practices set forth in the latest revision of AWS D9.1.

4.0 OIL

The insulating oil shall be manufactured from napthenic base crudes. Distillates from these crudes may be acid refined, hydrogen treated, solvent extracted, or processed by other suitable refining methods. After approval, no change in crude source, processing, and refining methods shall be made without prior approval. The refining method must yield acceptable mineral insulating oils for use in transformers, circuit breakers, and other electrical equipment as an insulating and cooling medium. The oil shall be Type II inhibited mineral oil in accordance with ASTM Standard D1275b and D3487, containing no more than 0.3% of 2, 6 Ditertiary-Butyl Para-Creosol or 2, 6 Ditertiary-Butyl Phenol Oxidation Inhibitor; and this shall be so stated in manufacturer code. The oil shall be free of any matter or contaminants which may be injurious to insulation, paint, varnish, metallic, and/or other parts of the electrical equipment. The oil shall be PCB Free (less than 1.0 ppm PCB), and shall meet any applicable federal, state, or other governmental regulation that restricts maximum PCB content to a lesser value. The oil level shall be such that all internal high-voltage components will remain under oil with the transformer tilted 10° in any direction.

5.0 SECURITY AND GROUNDING PROVISIONS

5.1 Locking Provisions. The terminating compartment lid shall be secured to the sill with a captive and recessed pentahead bolt per ANSI Standard C57.12.25. The lid shall also have provision for padlocking it to the sill. The bolt and padlock provision shall be arranged such that a padlock cannot be inserted until the pentahead bolt is fully engaged. This locking arrangement shall be recessed so that it does not extend beyond the front plane of the lid.

5.2 Tamper Resistance. When the lid is closed and locked, the transformer shall be tamper resistant in accordance with IEEE Standard C57.12.28 and shall not require any additional housing, fencing or other means to make the unit safe.

5.3 Grounding and Electrical Bonding Provisions.

5.3.1 Tank Ground Provisions. Two 1/2-13 UNC, 7/16 inch deep threaded grounding provisions shall be welded on the face of the tank, one below the high-voltage bushings and one below the low-voltage bushings, as indicated on drawing 1 of this specification. Each provision shall be equipped with an approved grounding terminal having a clamping range of 8 AWG solid through 2/0 AWG stranded. Approved grounding terminals are:

Anderson	GTCS-34A
Blackburn	TTC-2
Dossert	TGC13-50P
Penn Union	HGSE-020
Weaver	TGC-2

5.3.2 Lid and Sill Electrical Bond. The terminating compartment lid sill shall be electrically bonded to the tank using a minimum of 4 AWG flexible copper braid. A separate ground provision shall be provided on the tank face for this purpose. The tank ground provisions (section 5.3.1) shall not be used.

5.3.3 Low Voltage Neutral Ground Provision. A ground provision shall be provided below the low-voltage neutral bushing, as indicated on drawing 1, for externally grounding the low-voltage neutral.

5.3.4 Exterior Ground Provisions. Three 1/2-13 UNC, 7/16-inch deep threaded grounding provisions shall be welded on the exterior of side and back walls of the transformer tank. The provisions shall be at a maximum height of 1 1/4 inches above the tank bottom. The rear ground provision may be alternately located on the left side toward the back of the tank, see drawing 1 of this specification for the preferred and alternate provision locations. The threaded portion of the provisions shall be capped or plugged and free of paint and dirt.

6.0 BUSHINGS AND TERMINALS

6.1 High-Voltage Bushings. Each transformer shall have two 200 ampere, 95 kV BIL bushing wells in accordance with interface 3 of IEEE Standard 386. The bushing wells shall be externally clamped or bolted to the tank (welded type is not acceptable) and shall be located as shown in figure 1(a) of ANSI Standard C57.12.25 and drawing 1 of this specification. The bushings shall be internally bussed together for 200 ampere looped primary feed and be capable of load-make and load-break operation by means of a sectionalizing switch covered in section 7.0 of this specification.

6.2 Low-Voltage Bushings. Each transformer shall have three fully insulated low-voltage bushings located in accordance with ANSI Standard C57.12.25 and drawing 1 of this specification. The bushings shall be externally clamped or bolted to the tank and shall be keyed so that the bushing and stud cannot be twisted.

6.3 Low-Voltage Terminals.

6.3.1 Transformers 50 kVA and 75 kVA. Low-voltage phase and neutral terminals shall be 5/8-11 UNC threaded copper studs in accordance with figure 4 (c) of ANSI Standard C57.12.25.

6.3.2 Transformers 100 kVA through 250 kVA. Low-voltage phase and neutral terminals shall be 1-14 UNC threaded copper studs in accordance with figure 4 (c) of ANSI Standard C57.12.25.

6.4 Neutral Terminations.

6.4.1 High-Voltage Neutral. The H_2 end of the high-voltage winding lead shall be internally connected to the tank in accordance with ANSI Standard C57.12.25.

6.4.2 Low-Voltage Neutral. The low-voltage neutral shall be brought out of the tank through a fully insulated bushing (X_2). A removable, external copper grounding strap shall be provided connecting the neutral terminal to the low voltage neutral ground provision (section 5.3.3). The grounding strap shall be suitably sized for the short-circuit rating of the transformer, as defined in IEEE Standard C57.12.00.

6.5 Markings. Appropriate terminal designations (H_{1A}, H_{1B}, X_1, X_2 and X_3) shall be permanently marked on the transformer tank. The terminal markings and position of the X_1 and X_3 bushings shall be in accordance with ANSI Standard C57.12.25, Figure 1 and Note 4 and IEEE Standard C57.12.70. Transformer polarities shall be in accordance with IEEE Standard C57.12.00, section 5.7.1. The low voltage terminal designations as shown on drawing 1 of this specification are for the additive polarity transformers. The 250 kVA transformers shall have subtractive polarity, and the X_1 and X_3 terminal positions shall be reversed from the location shown in drawing 1 of this specification.

7.0 HIGH-VOLTAGE SWITCH

Each transformer shall be equipped with one single phase, under-oil, high-voltage, sectionalizing switch with a minimum voltage rating of 38 kV phase-to-phase, 21.9 kV phase-to-ground and 150 kV BIL. The switch shall have a minimum continuous current rating of 200 amperes, shall have load-make and load-break capability and shall have a minimum 10,000 ampere symmetrical and 16,000 ampere asymmetrical fault-make withstand capability.

The switch operating handle shall be mounted on the face of the transformer tank below the high-voltage bushings and shall be hot-stick operable. The switch type shall be a straight (On/Off) with two positions. The switch shall have an operating convention of clockwise rotation to close and counter-clockwise rotation to open. The switch operating handle "CLOSED" position shall be located at 12 or 6 o'clock and the "OPEN" position shall be located at 9 or 3 o'clock. The switch and internal high-voltage bus shall be connected in accordance with drawing 3 of this specification such that the following connections can be made:

HA OPEN (TRANSFORMER TO HB)
HA TO TRANSFORMER AND HB

7.1 Switch Diagram Plate. The manufacturer shall provide a metal plate with diagram of electrical connections as indicated on drawing 3 of this specification. The metal plate with diagrams and captions indicating the various switch electrical connections shall be permanently attached to the transformer tank face near the switch-operating handle.

7.2 Switch Position Labeling. Each switch handle position shall be clearly labeled to indicate the switch OPEN and CLOSED positions. The labels shall be stenciled on the faceplate in 1/2-inch high yellow characters. See labeling example for a 9 and 12 o'clock-oriented switch as indicated on drawing 3 of this specification.

8.0 ACCESSORIES

8.1 Transformer Lifting Provision. Four threaded provisions shall be welded near the top, two on each side, of the transformer tank, and removable threaded bolts shall be provided in the provisions for use in lifting the transformer. Lifting provisions shall be located, front-to-back, equal distance from balance point. The location and strength of the provisions and bolts

(minimum 5/8-inch bolts), and the length of the bolts shall be such so as to provide a safe and balanced lift.

8.2 Hold-Down Cleats. Each transformer shall be furnished with two 6 x 2 x 1/4-inch thick steel hold-down cleats shall be furnished with each transformer. These cleats will be used to secure the transformer to the foundation. Each cleat will be bolted to the foundation such that it will clamp down over the lip which shall be provided on the inside of the sill. Cleats shall be provided with a 1 1/2 x 9/16-inch slotted hole to accept a 1/2-inch bolt and shall be treated to prevent corrosion.

8.3 Pressure Relief Valve. The transformer shall be provided with a means to relieve excess pressure in accordance with ANSI Standard C57.12.25. The valve shall be a Tomco-Beta, Qualitrol or Circle Seal and shall have either a 1/4-inch or 1/2-inch inlet port.

8.4 Parking Stand. A cable accessory parking stand shall be provided as shown in figure 1 (a) of ANSI Standard C57.12.25 and drawing 1 of this specification.

8.5 Fault Indicator Provision. Each transformer shall have a provision for mounting a fault indicator in the door of the terminating compartment as indicated on drawing 2 of this specification.

9.0 BREAKERS AND FUSES

9.1 Breakers. No secondary breakers shall be provided.

9.2 Fusing. The high-voltage winding shall be fused with a bayonet type weak-link expulsion fuse in series with a partial range current limiting fuse. The current limiting fuse shall be connected between the high-voltage switch and the lower contacts of the bayonet fuse holder. The H_1 lead of the high-voltage winding shall be connected to the upper contacts of the bayonet fuse holder.

9.2.1 Weak-Link Expulsion Fuse. A replaceable weak-link expulsion fuse in a bayonet type, load-break fuse holder shall be located near the high-voltage bushings such that it will be accessible for hot-stick operation from the side of the transformer. The bayonet fuse holder shall have a flap closure to prevent oil spillage after bayonet removal. Approved fuse holder manufacturers and catalog numbers are as follows.

Cooper Power Systems	4000361C99FV
ABB Power	1C10775G03

An oil drip shield shall be provided under the fuse holder such that no oil will drip on the separable insulated connectors during normal bayonet withdrawal. The drip shield shall not interfere with hot-stick withdrawal or insertion of the fuse holder. Acceptable weak-link fuses for each transformer kVA size are listed in section 9.3.

9.2.2 Current Limiting Fuse. The current limiting fuse shall be a partial range back-up type suitable for under-oil application. It shall be securely mounted with ample clearance to ground

and to the top oil level. Acceptable current limiting fuses for each transformer kVA size are listed in section 9.3.

9.3 Acceptable Fuses.

Transformer KVA	Weak Link Expulsion Fuse	Current Limiting Fuse Manufacturer/Catalog No.
50	Kearney/124080-12 RTE/4000358C08	Kearney/150608-50 RTE/3543080M51M General Electric/9F59TBC065 HI-TECH/HTDS231065
75	Kearney/124080-15 RTE/4000358C08	Kearney/150608-65 RTE/3543100M51M General Electric/9F59TBC080 HI-TECH/HTDS231080
100	Kearney/124080-25 RTE/4000358C10	Kearney/150608-100 General Electric/9F59TCC125 HI-TECH/HTDS331125
167	Kearney/124080-30 RTE/4000358C12	Kearney/150608-125 General Electric/9F59TCC125 HI-TECH/HTDS331125
250	Kearney/124080-35	Kearney/150608-150 General Electric/9F59TCC150 HI-TECH/HTDS331150

If a manufacturer proposes to provide fuses other than those indicated above, the vendor shall indicate the proposed fuses and shall supply fuse curves with the quotation (see section 12.2).

10.0 NAMEPLATES

A permanent, durable, corrosion-resistant, metal nameplate shall be affixed to each transformer with stainless steel screws or rivets. The information on the nameplate shall be applied such that it is weatherproof, ultraviolet resistant, scratch resistant and permanent for the life of the transformer under normal handling and operating conditions of the transformer. Silk-screened and laser etched paint are unacceptable.

If all information cannot be included on a single nameplate, a second nameplate may be provided next to primary nameplate.

10.1 Location. The nameplate(s) shall be located on the tank wall on the low-voltage side of the terminating compartment such that it is readable when the cables are installed in the transformer.

10.2 Information. The nameplate(s) shall contain all information as specified in IEEE Standard C57.12.00 and shall include the following information:

10.2.1 Information in Print.

a. "Guaranteed maximum PCB content of transformer < 1 ppm PCB"
b. Gallons of transformer oil (U.S. Gallons)
c. CPS Energy Material Number
d. Year of Manufacture (separate from serial number)
e. Core steel type (i.e. silicon or amorphous)

10.2.2 Information in Bar Code. Transformer serial number(per IEEE C57.12.35, permanent bar code labels)

10.3 Bar Code Requirements. Bar codes shall meet all requirements for permanent bar code labels in IEEE C57.12.35 with the following exceptions: a minimum narrow bar width of 12.5 mils and a minimum wide-to-narrow ratio of 2.2:1.

11.0 SAFETY LABELS

Bilingual (English and Spanish) "WARNING" and "DANGER" safety labels meeting the requirements of NEMA Standard 260 (figures 3 and 4) shall be affixed to the transformer as indicated on drawing 3 of this specification.

12.0 INFORMATION REQUIRED FROM VENDOR

12.1 PCB Statement of Compliance. For all transformers supplied to CPS Energy, the vendor shall provide to the CPS Energy Environmental Section a "Statement of Compliance" that the oil in the transformers meets the PCB requirements of section 4.0 of this specification when the transformers are delivered to CPS Energy. Each Statement of Compliance shall include the name of the manufacturer and the serial numbers of all applicable transformers. The Statement of Compliance shall be sent to the SDS Data Manager, c/o CPS Energy Environmental Section, mail drop 100406, Main Office 4th Floor, P.O. Box 1771, San Antonio, TX 78296-1771.

12.2 Fuse Curves. The local distributor or vendor shall maintain an original fuse curve for each type fuse provided in the transformers supplied. Copies of these fuse curves shall be available upon request. If the manufacturer proposes to supply fuses other than those listed in section 9.3 of this specification, the vendor shall indicate this and shall supply fuse curves for the proposed fuses with the quotation.

12.3 Safety Data Sheet (SDS). The manufacturer shall provide copies of the SDS for any chemical component supplied in or with equipment and/or accessories as required by OSHA

Hazard Communication Standard (HCS). This requirement applies to any substance for which CPS Energy would be required to have an SDS due to CPS Energy personnel either using or being exposed to the substance while inspecting, operating or maintaining the equipment. SDS(s) shall be received prior to or with first delivery. The vendor is also responsible for providing any updates of respective SDS(s). All SDS(s) and updates shall be sent to the SDS Data Manager, c/o CPS Energy Environmental Section, mail drop 100406, P.O. Box 1771, San Antonio, TX 78296-1771. One copy of each SDS shall be supplied with each packing list (Section 14.3).

13.0 INSPECTION AND TESTING

13.1 Inspection. Transformers may be subject to inspection by a designated CPS Energy Representative to assure compliance with this specification.

13.2 Manufacturer's Tests. The manufacturer shall conduct design and routine tests as required by IEEE Standard C57.12.00. All tests shall be performed in accordance with IEEE Standard C57.12.90. Routine or other tests to be performed on each transformer shall include the following:

a. Routine Impulse Test (BIL)

b. Percent Impedance

c. Excitation Losses and Load Losses

13.3 Coating System Tests. The manufacturer shall conduct the coating's performance tests in accordance with IEEE Standard C57.12.28. The test results and the coating’s characteristics shall be provided to CPS Energy upon request.

13.4 CPS Energy Tests. Transformers will be subjected to electrical acceptance tests by CPS Energy.

14.0 SHIPPING INSTRUCTIONS

14.1 Packaging and Delivery. Each transformer shall be secured to a wooden pallet such that a fork lift can be used to lift and move the unit. Delivery shall be made on an open truck to be accepted.

14.2 Delivery Ticket. A delivery ticket shall be furnished with each delivery by the carrier. The delivery ticket shall show the CPS Energy PO number and the number of transformers being delivered.

14.3 Packing List. A packing list shall be furnished with each delivery. The packing list shall include the CPS Energy PO number, and a description and number of each type transformer being delivered.

15.0 WARRANTY

The manufacturer shall fully warrant each transformer and all components thereof against defective materials and workmanship for a period of 18 months from date of receipt by CPS Energy or 12 months from date of installation, whichever occurs first. The manufacturer shall bear all direct costs of correction and replacement of the defective materials or workmanship during the warranty period including shipping costs.

16.0 GENERAL INSTRUCTIONS

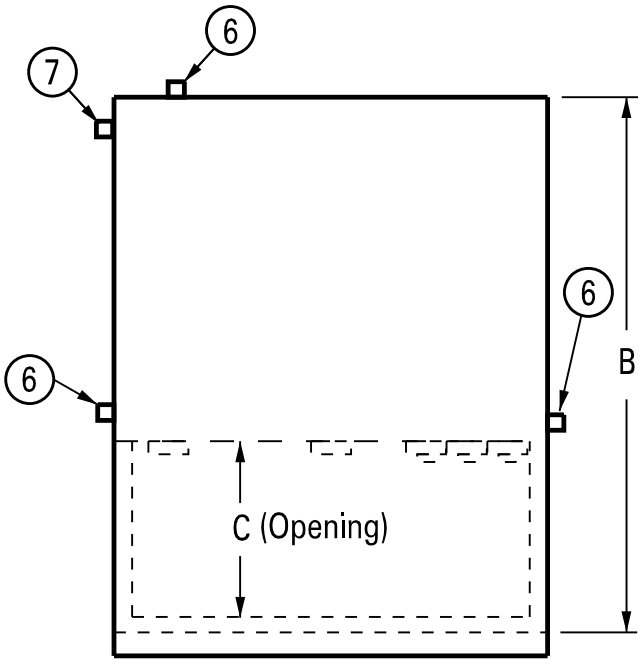
16.1 Copies Of This Specification. Copies of this specification must be obtained from the CPS Energy Website, Procurement and Suppliers, Distribution Electric Material Specification Search.

16.2 Approval and Furnishing of Product. Quotations will not be considered on a manufacturer's proposed product that is not approved by CPS Energy prior to solicitation of pricing. Products meeting the requirements of this specification shall be approved and furnished in accordance with CPS Specification 000-01 and any additional requirements in this specification. Where conflicts may arise between this specification and CPS Specification 000-01, this specification shall prevail.

16.2.1 Product Samples. Representative samples may be required if no factory inspection is made.

16.2.2 Factory Inspection. A factory inspection may be required if representative samples are not provided or are insufficient to determine fitness of products covered by this specification.

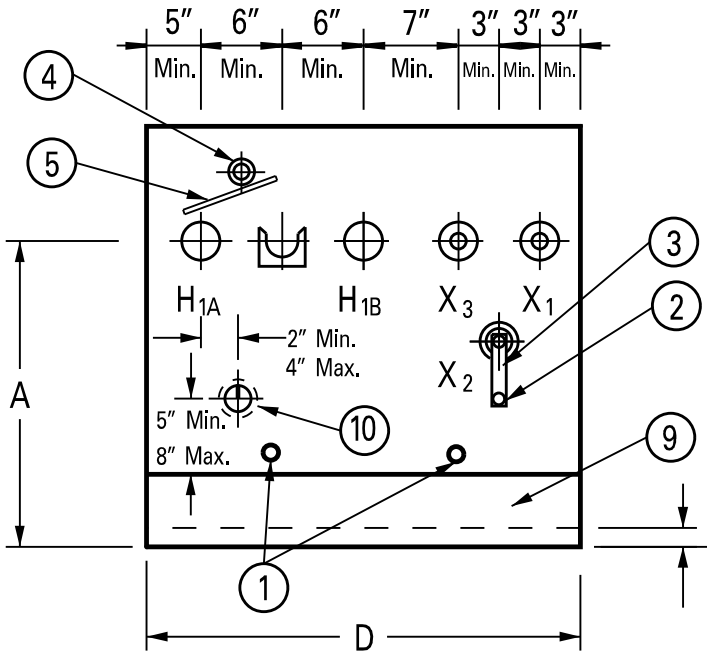
16.3 Exceptions. Any and all exceptions to this specification must be listed individually and accompany the quotation. If there are no exceptions, the words "NO EXCEPTIONS" must be written on the quotation.



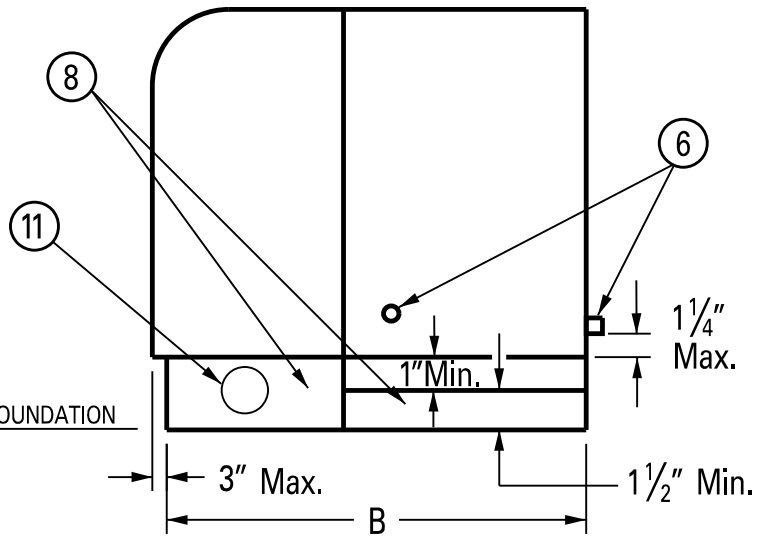
TOP

1. TANK GROUNDING TERMINALS
2. X_2 GROUNDING BOSS
3. X_2 GROUNDING STRAP
4. BAYONET FUSE HOLDER
5. OIL DRIP SHIELD
6. EXTERNAL GROUND BOSSES
7. ALTERNATE LOCATION FOR REAR GROUND BOSS
8. STAINLESS STEEL SILL & TANK SKIRT
9. MILD STEEL FACEPLATE WITH 1" MIN. HEIGHT ABOVE FOUNDATION
10. SECTIONALIZING SWITCH
11. ACCESS HOLE, 2" DIA., CENTER IN SILL

KVA	A	B	C	D
50 – 75	23 ½" ± ½"	41" Max.	15" Min.	38" Max.
100	25 ½" ± 2 ½"	46" Max.	15" Min.	38" Max.
167 – 250	25 ½" ± 2 ½"	46" Max.	16" Min.	42" Max.



TERMINATING COMPARTMENT

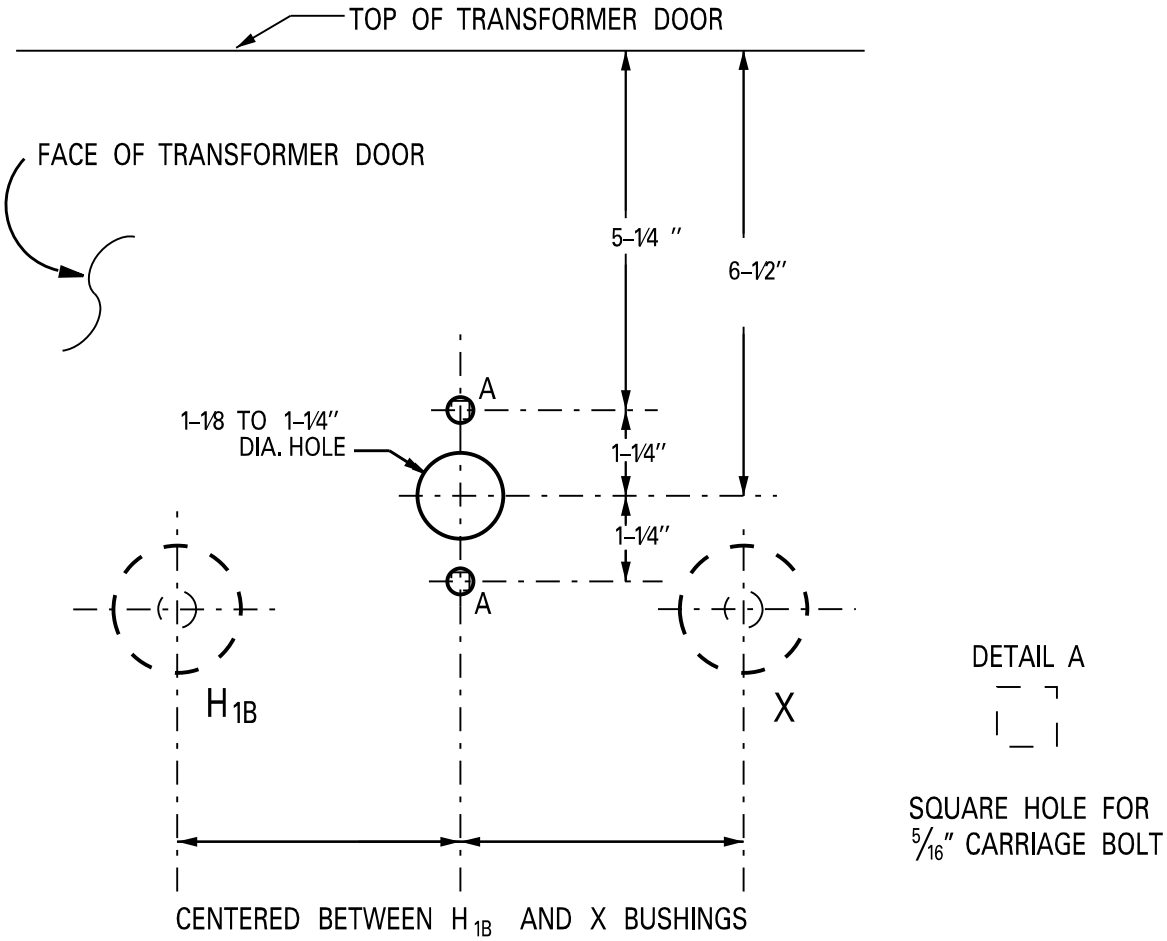


SIDE

NOTES:

1. NO DRIP–SHIELDS, MOLDINGS, ETC. SHALL BLOCK OR INTERFERE WITH SIDE HOT–STICK OPERATION OF FUSE HOLDER.
2. FOR THE 250 KVA TRANS., THE "X1" AND "X3" TERMINAL DESIGNATIONS SHALL BE IN THE SUBTRACTIVE POLARITY POSITION AND REVERSED FROM THE LOCATION SHOWN.

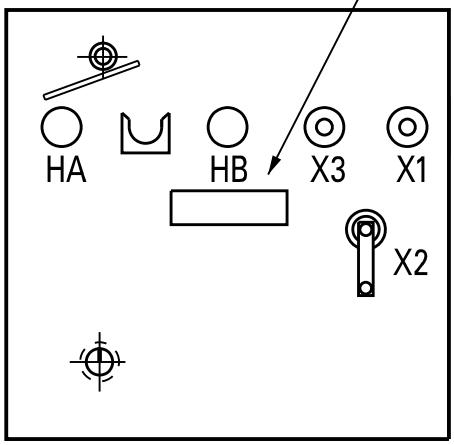
SPECIFICATION 426-30	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S01 OF 3		



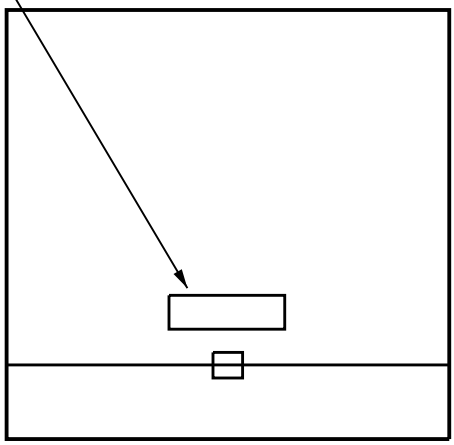
FAULT INDICATOR PROVISION

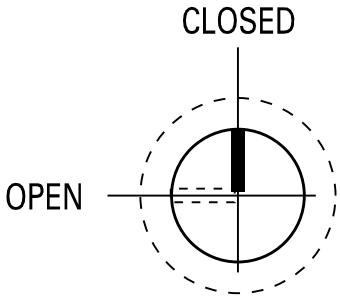
EACH TRANSFORMER SHALL HAVE PROVISION FOR MOUNTING A FAULT INDICATOR ON THE FRONT FACE OF THE TRANSFORMER DOOR. THIS PROVISION WILL INCLUDE THREE HOLES PUNCHED IN THE TRANSFORMER DOOR AS INDICATED ABOVE. IN ADDITION, A 12 GAGE STEEL COVER PLATE WILL BE ATTACHED INSIDE THE DOOR USING TWO (2) 5/16" X 1" STAINLESS STEEL CARRIAGE BOLTS THROUGH HOLES "A". THE COVER PLATE MAY BE PUNCHED WITH SQUARE OR ROUND HOLES AT THE DISCRETION OF THE MANUFACTURER. THE COVER PLATE SHALL BE DIMENSIONED SUCH THAT IT WILL EXTEND A MINIMUM OF ONE (1) INCH BEYOND ALL THE HOLES IN THE DOOR. HOLES SHALL BE DRILLED PRIOR TO PAINTING THE TRANSFORMER, AND THE COVER PLATE PAINTED WITH THE SAME PAINT AS THE TRANSFORMER DOOR.

LOCATION OF DANGER LABEL (INSIDE THE TERMINATING COMPARTMENT OF THE PADMOUNT TRANS.)

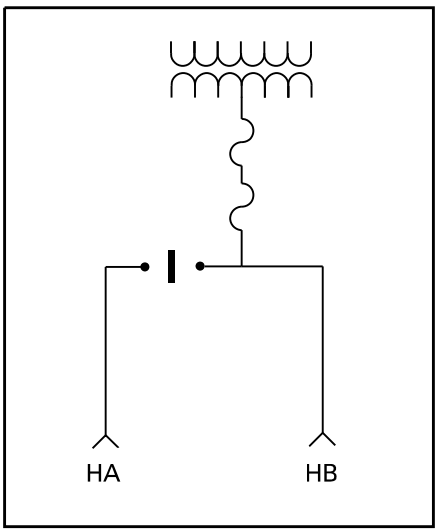


LOCATION OF WARNING LABEL (FRONT OF PADMOUNT TRANS. JUST ABOVE LOCKING LATCH)

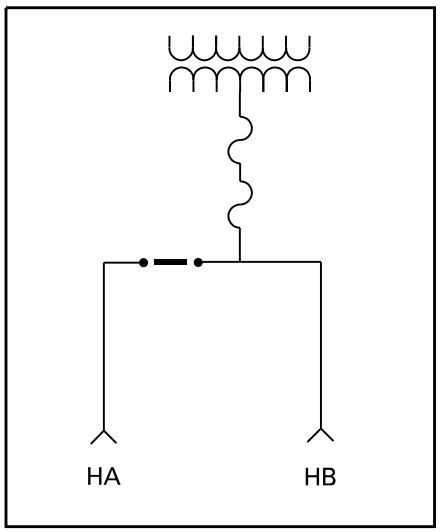




SWITCH POSITION LABELS (TYP.)



HB TO XFMR
HA OPEN
(OPEN)



HA AND HB
TO XFMR
(CLOSED)

METAL SWITCH DIAGRAM PLATE

SPECIFICATION 426-30	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S03 OF 3		

SPECIFICATION FOR

TRANSFORMERS, DISTRIBUTION, PAD-MOUNT, SINGLE-PHASE, DEAD-FRONT, 34,500GY/19,920-240/120 VOLT AND 34,500GY/19,920-480/240 VOLT, 50-250 KVA, LARGE INTERFACE, WITH SECTIONALIZING SWITCH

Specification Number: 426-20

Approved: March 31, 2017

CPS ENERGY

P. O. Box 1771

San Antonio, Texas 78296

Robert Gourley
Director, Supply Chain

Rick Lopez
Director, Distribution Engineering

Specification No. 426-20

CONTENTS

1.0 SCOPE

1.1 Application. This specification covers the minimum acceptable requirements for single-phase, pad-mounted, dead-front, distribution transformers rated 34,500GY/19,920-240/120 volts and 34,500GY/19,920-480/240 volts with a sectionalizing switch. These transformers are intended for use on concrete slabs or other suitable ground level foundations.

1.2 Applicable Standards. Transformers covered by this specification shall comply with the latest revised national standards listed below, as applicable, except where they conflict with the requirements of this specification. The order of precedence shall be this specification, then the following standards:

IEEE C57.12.00; General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

ANSI C57.12.25; Pad-Mounted, Compartmental-Type, Self-Cooled, Single-Phase Distribution Transformers with Separable Insulated High-Voltage Connectors; High-Voltage, 34500GY/19920 Volts and Below; Low-Voltage, 240/120 Volts; 167 kVA and Smaller-Requirements

IEEE C57.12.28; Pad-Mounted Equipment-Enclosure Integrity

IEEE C57.12.35; Standard for Bar Coding for Distribution Transformers

ANSI C57.12.70; Terminal Markings and Connections for Distribution and Power Transformers

ANSI X3.182; Bar Code Print Quality Guideline

AWS D9.1M/D9.1; Sheet Metal Welding Code

IEEE C57.12.80; Terminology for Power and Distribution Transformers

IEEE C57.12.90; Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and Guide for Short-Circuit Testing of Distribution and Power Transformers

IEEE 386; Separable Insulated Connector Systems for Power Distribution Systems above 600V

ASTM A240; Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels

ASTM D1275b; Standard Test Method for Corrosive Sulfur in Electrical Insulating Liquids

ASTM D3487; Mineral Insulating Oil Used in Electrical Apparatus

NEMA 107; Methods of Measurement of Radio Influence Voltage (RIV) of High-Voltage Apparatus

NEMA 260; Safety Labels for Pad-Mounted Switchgear and Transformers Sited in Public Areas

UL 969; Marking and Labeling Systems

10 CFR Part 431; Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule

1.3 Transformers Covered By This Specification.

CPS Energy Material No.	Description
1005553	TRAN PM 1P 50KVA 34.5GY/19.9KV-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 50 KVA, 34,500GRDY/19,920-240/120 VOLT, LARGE-INTERFACE (IEEE 386 200A LB INTERFACE 8), WITH SECTIONALIZING SWITCH
1005554	TRAN PM 1P 75KVA 34.5GY/19.9KV-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 75 KVA, 34,500GRDY/19,920-240/120 VOLT, LARGE-INTERFACE (IEEE 386 200A LB INTERFACE 8), WITH SECTIONALIZING SWITCH
1005555	TRAN PM 1P 100KVA 34.5GY/19.9KV-240/120V TRANSFORMER PAD-MOUNT 1-PHASE, 100 KVA, 34,500GRDY/19,920-240/120 VOLT, LARGE-INTERFACE (IEEE 386 200A LB INTERFACE 8), WITH SECTIONALIZING SWITCH
1005556	TRAN PM 1P 167KVA 34.5GY/19.9KV-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 167 KVA, 34,500GRDY/19,920-240/120 VOLT, LARGE-INTERFACE (IEEE 386 200A LB INTERFACE 8), WITH SECTIONALIZING SWITCH

1005557	TRAN PM 1P 250KVA 34.5GY/19.9KV-240/120V TRANSFORMER, PAD-MOUNT, 1-PHASE, 250 KVA, 34,500GRDY/19,920-240/120 VOLT, LARGE-INTERFACE (IEEE 386 200A LB INTERFACE 8), WITH SECTIONALIZING SWITCH
1005558	TRAN PM 1P 75KVA 34.5GY/19.9KV-480/240V TRANSFORMER, PAD-MOUNT, 1-PHASE, 75 KVA, 34,500GRDY/19,920-480/240 VOLT, LARGE-INTERFACE (IEEE 386 200A LB INTERFACE 8), WITH SECTIONALIZING SWITCH

2.0 ELECTRICAL RATINGS

2.1 Kilovolt-Ampere (kVA). The kilovolt-ampere ratings shall be as specified in section 1.3 of this specification, and meet the thermal load limits as specified in ANSI C57.12.25, section 3.1.

2.2 Voltage. The nominal high-voltage rating shall be 34,500GY/19,920 volts. The low-voltage rating shall be 240/120 volts or 480/240 volts, as specified for each transformer in section 1.3.

2.3 Taps. No taps shall be provided.

2.4 Basic Impulse Insulation Level (BIL). The high-voltage and low-voltage basic impulse insulation levels shall be 150 kV and 30 kV respectively.

2.5 Percent Impedance. The percent impedance shall be as follows:

kVA Rating	Percent Impedance
50-75	1.7-3.5
100-250	2.2-3.5

2.6 Radio Influence Voltage (RIV). The radio influence voltage level at the transformer bushings shall not exceed 100 microvolts when the unit is excited at 110% rated voltage and tested in accordance with NEMA 107.

2.7 Minimum Efficiency. Transformers shall meet or exceed the efficiency levels for liquid-immersed distribution transformers as specified in Table I.1, of the Department of Energy ruling: 10 CFR Part 431 Energy Conservation Program for Commercial Equipment: Distribution Transformers; Final Rule; October 12, 2007. Manufacturer shall comply with the intent of all regulations set forth in noted ruling.

3.0 CONSTRUCTION AND MATERIALS

3.1 Assembly. The transformer shall consist of the tank and a cable terminating compartment assembled as an integral unit. The terminating compartment shall consist of a sill and hinged lid attached to the tank such that neither the sill nor the lid can be removed when the lid is in the closed position.

The sill shall be removable when the terminating compartment lid is open, allowing for installation and removal of the transformer without disturbing the cables. There shall be a lifting handle or other provision for opening the lid and the lid shall be easily removable when it is in the open position.

3.2 Arrangement. The transformer arrangement shall be ANSI Type 1 in accordance with figure 1(b) of ANSI C57.12.25 and drawing 1 of this specification. Where there are dimensional differences between the ANSI standard and the CPS Energy specification drawing, this specification drawing takes precedence.

3.3 Materials.

3.3.1 Tank and Anti-Corrosion Skirt. The transformer tank shall have an integral skirt on sides and back such that the bottom does not come in direct contact with the foundation surface. The transformer tank and skirt shall be constructed of minimum no. 12 gauge steel. A minimum 1.5 inch, stainless steel strip shall be integrally butt welded (bolted construction not acceptable) around the lower edge of entire base of the transformer tank housing. The stainless steel skirt weld seam shall be at least 1 inch below the bottom elevation of the transformer tank. The stainless steel skirt is not required on the faceplate of the terminating compartment, if the base of the faceplate is a minimum of 1 inch above the slab foundation. The manufacturer shall ensure that the skirt does not deform and remains rigid during handling and installation with ordinary care.

As an alternative design, the manufacturer may construct the entire transformer tank of minimum no. 12 gauge, Type 409 stainless steel per ASTM A240, or other grade stainless steel of equivalent corrosion resistance.

3.3.2 Lid. The terminating compartment lid shall be constructed of minimum no. 14 gauge steel.

3.3.3 Sill. The sill shall be constructed of minimum no. 14 gauge, Type 409 stainless steel per ASTM A240, or other grade stainless steel of equivalent corrosion resistance. A two-inch diameter access hole shall be provided with a removable cover plate. The access hole shall be centered on the right (secondary) side of the sill. The cover plate and all associated attachment hardware shall be made of stainless steel and shall be

arranged to provide easy removal and reattachment from inside of terminating compartment. Cover plate attachment hardware shall not interfere with attachment of the conduit fitting using a 2.5-inch (O.D.) lock nut.

3.3.4 Fasteners and Hinges. Pentahead bolts and associated threaded receptacles, hinges and hinge pins shall be constructed of Type 304 stainless steel per ANSI C57.12.28.

3.4 Drainage. When the lid is closed, the transformer shall drain freely such that no water stands on the transformer or drains into the terminating compartment.

3.5 Coating. The coating shall be highly resistant to weather, chipping, cracking, mildew and ultraviolet chalking, and adhere to all requirements as specified in ANSI C57.12.28. All coating components shall be lead-free, asbestos-free, and chromate free. All surfaces shall have a minimum dry-film thickness of 3-mils and on tanks constructed of carbon steel, all surfaces within 8 inches of the foundation shall have a minimum dry-film thickness of 5-mils.

3.6 Bottom Corrosion Treatment. The tank bottom and sides, under tank, shall be properly treated to prevent corrosion.

3.7 Welding. All welding shall be in accordance with best-recommended practices set forth in the latest revision of AWS D9.1.

4.0 TRANSFORMER OIL

The insulating oil shall be manufactured from napthenic base crudes. Distillates from these crudes may be acid refined, hydrogen treated, solvent extracted, or processed by other suitable refining methods. After approval, no change in crude source, processing, and refining methods shall be made without prior approval. The refining method must yield acceptable mineral insulating oils for use in transformers, circuit breakers, and other electrical equipment as an insulating and cooling medium. The oil shall be Type II inhibited mineral oil in accordance with ASTM D1275b and D3487, containing no more than 0.3% of 2, 6 Ditertiary-Butyl Para-Creosol or 2, 6 Ditertiary-Butyl Phenol Oxidation Inhibitor; and this shall be so stated in manufacturer code. The oil shall be free of any matter or contaminants which may be injurious to insulation, paint, varnish, metallic, and/or other parts of the electrical equipment. The oil shall be PCB Free (less than 1.0 ppm PCB), and shall meet any applicable federal, state, or other governmental regulation that restricts maximum PCB content to a lesser value. The oil level shall be such that all internal high-voltage components will remain under oil with the transformer tilted 10° in any direction.

5.0 SECURITY AND GROUNDING PROVISIONS

5.1 Locking Provisions. The terminating compartment lid shall be secured to the sill with a captive, recessed pentahead bolt per ANSI C57.12.25. The lid shall also have a provision for padlocking it to the sill. The bolt and padlock provision shall be arranged such that a padlock cannot be inserted until the pentahead bolt is fully engaged. This locking arrangement shall be recessed so that it does not extend beyond the front plane of the lid.

5.2 Tamper Resistance. When the lid is closed and locked, the transformer shall be tamper resistant in accordance with ANSI C57.12.28 and shall not require any additional housing, fencing or other means to make the unit safe.

5.3 Grounding and Electrical Bonding Provisions.

5.3.1 Tank Ground Provisions. Two 1/2-13 UNC, 7/16-inch deep threaded grounding provisions shall be welded on the face of the tank, one below the high-voltage bushings and one below the low-voltage bushings, as indicated on drawing no. 1 of this specification. Each provision shall be equipped with an approved grounding terminal having a clamping range of no. 8 solid through 2/0 stranded. Approved grounding terminals are:

Anderson	GTCS-34A
Blackburn	TTC-2
Dossert	TGC13-50P
Penn Union	HGSE-020
Weaver	TGC-2

5.3.2 Lid and Sill Electrical Bond. The terminating compartment lid and sill shall be electrically bonded to the tank using a minimum of no. 4 AWG flexible copper braid. A separate ground provision shall be provided on the tank face for this purpose. The tank ground provisions (section 5.3.1) shall not be used.

5.3.3 Low-Voltage Neutral Ground Provision. A ground provision shall be provided below the low-voltage neutral bushing, as indicated on drawing 1, for externally grounding the low-voltage neutral.

5.3.4 Exterior Ground Provisions. Three 1/2-13 UNC, 7/16-inch deep threaded grounding provisions shall be welded on the exterior of side and back walls of the transformer tank. The provisions shall be at a maximum height of 1 1/4 inches above the tank bottom. The rear ground provision may be alternately located on the left side toward the back of the tank, see drawing 1 of this specification for the preferred and alternate provision locations. The threaded portion of the provisions shall be capped or plugged and free of paint and dirt.

6.0 BUSHINGS AND TERMINALS

6.1 High-Voltage Bushings. Each transformer shall have two 200 ampere, 150 kV BIL, three-phase, 35 kV class bushings with a load-break interface 8 in accordance with IEEE 386. The bushings shall be externally clamped or bolted to the tank (welded type is not acceptable) and shall be located as shown in figure 1(b) of ANSI C57.12.25 and drawing 1 of this specification. The bushings shall be internally bussed together for 200 ampere looped primary feed. Bushings shall be capable of load-make and load-break operation by means of a sectionalizing switch covered in section 7.0 of this specification.

6.2 Low-Voltage Bushings. Each transformer shall have three fully insulated low-voltage bushings located in accordance with figure 1 of ANSI C57.12.25 and drawing 1 of this specification. The bushings shall be externally clamped or bolted to the tank and shall be keyed so that the bushing and stud cannot be twisted.

6.3 Low-Voltage Terminals.

6.3.1 Transformers 50 kVA through 75 kVA. Low-voltage phase and neutral terminals shall be 5/8-11 UNC threaded copper studs in accordance with figure 4 (c) of ANSI C57.12.25.

6.3.2 Transformers 100 kVA through 250 kVA. Low-voltage phase and neutral terminals shall be 1-14 UNC threaded copper studs in accordance with figure 4 (c) of ANSI C57.12.25.

6.4 Neutral Terminations.

6.4.1 High-Voltage Neutral. The H_2 end of the high-voltage winding lead shall be internally connected to the tank in accordance with section 6.2.4 of ANSI C57.12.25.

6.4.2 Low-Voltage Neutral. The low-voltage neutral shall be brought out of the tank through a fully insulated bushing. A removable, external copper grounding strap shall be provided connecting the neutral terminal to the low-voltage neutral ground provision (section 5.3.3). The grounding strap shall be suitably sized for the short-circuit rating of the transformer, as defined in IEEE C57.12.00.

6.5 Markings. Appropriate terminal designations (H_{1A}, H_{1B}, X_1, X_2 and X_3) shall be permanently marked on the transformer tank. The terminal markings and position of the X_1 and X_3 bushings shall be in accordance with ANSI C57.12.25, figure 1 and note 4 and ANSI C57.12.70. Transformer polarities shall be in accordance with IEEE C57.12.00, section 5.7.1. The low voltage terminal designations as shown on drawing 1 are for subtractive polarity transformers.

7.0 HIGH-VOLTAGE SWITCH

7.1 Switch. Each transformer shall be equipped with one single phase, under-oil, high-voltage, sectionalizing switch with a minimum voltage rating of 38 kV phase-to-phase, 21.9 kV phase-to-ground and 150 kV BIL. The switch shall have a minimum continuous current rating of 200 amperes, shall have load-make and load-break capability and shall have a minimum 10,000 ampere symmetrical and 16,000 ampere asymmetrical fault-make withstand capability.

7.2 Switch Arrangement/Operation. The switch operating handle shall be mounted on the face of the transformer tank below the high-voltage bushings and shall be hot-stick operable. The switch type shall be a straight (On/Off) with two positions. The switch shall have an operating convention of clockwise rotation to close and counter-clockwise rotation to open. The switch operating handle "CLOSED" position shall be located at 12 or 6 o'clock and the "OPEN" position shall be located at 9 or 3 o'clock. The switch and internal high-voltage bus shall be connected in accordance with drawing 3 such that the following connections can be made:

HA OPEN (TRANSFORMER TO HB)
HA TO TRANSFORMER AND HB

7.3 Switch Diagram Plate. The manufacturer shall provide a metal plate with diagram of electrical connections as indicated on drawing 3. The metal plate with diagrams and captions indicating the various switch electrical connections shall be permanently attached to the transformer tank face near the switch-operating handle.

7.4 Switch Position Labeling. Each switch handle position shall be clearly labeled to indicate the switch OPEN and CLOSED positions. The labels shall be stenciled on the faceplate in 1/2-inch high yellow characters. See labeling example for a 9 and 12 o'clock-oriented switch as indicated on drawing 3.

8.0 ACCESSORIES

8.1 Transformer Lifting Provision. Threaded provisions shall be welded near the top on each side of the transformer tank, and removable threaded bolts shall be provided in the provisions for use in lifting the transformer. The location and strength of the provisions,

bolts (minimum 5/8-inch bolts), and the length of the bolts shall be such so as to provide a safe and balanced lift.

8.2 Hold-Down Cleats. Each transformer shall be furnished with two 6 x 2 x 1/4-inch thick steel hold-down cleats. These cleats will be used to secure the transformer to the foundation. Each cleat will be bolted to the foundation such that it will clamp down over the lip which shall be provided on the inside of the sill. Cleats shall be provided with a 1 1/2 x 9/16-inch slotted hole to accept a 1/2-inch bolt and shall be treated to prevent corrosion.

8.3 Pressure Relief Valve. The transformer shall be provided with a means to relieve excess pressure in accordance with IEEE C57.12.25. The valve shall be a Tomco-Beta, Qualitrol, or Circle Seal and shall have either a 1/4-inch or 1/2-inch inlet port.

8.4 Parking Stand. A cable accessory parking stand shall be provided as shown in figure 1(b) of ANSI C57.12.25 and drawing 1 of this specification.

8.5 Fault Indicator Provision. Each transformer shall have a provision for mounting a fault indicator in the door of the terminating compartment as indicated on drawing 2 of this specification.

9.0 BREAKERS AND FUSES

9.1 Breakers. No secondary breakers shall be provided.

9.2 Fusing. The high-voltage winding shall be fused with a bayonet type weak-link expulsion fuse in series with a partial range current limiting fuse. The current limiting fuse shall be connected between the high-voltage switch and the lower contacts of the bayonet fuse holder. The H1 lead of the high-voltage winding shall be connected to the upper contacts of the bayonet fuse holder.

9.2.1 Weak-Link Expulsion Fuse. A replaceable weak-link expulsion fuse in a bayonet type, load-break fuse holder shall be located near the high-voltage bushings such that it will be accessible for hot-stick operation from the side of the transformer. The bayonet fuse holder shall have a flap closure to prevent oil spillage after bayonet removal. Approved fuse holder manufacturers and catalog numbers are as follows.

Cooper Power Systems	4000361C99FV
ABB Power	1C10775G03

An oil drip shield shall be provided under the fuse holder such that no oil will drip on the separable insulated connectors during normal bayonet withdrawal. The drip shield shall not interfere with hot-stick withdrawal or insertion of the fuse holder. Acceptable weak-link expulsion fuses for each transformer kVA size are listed in section 9.3.

9.2.2 Current Limiting Fuse. The current limiting fuse shall be a partial range back-up type suitable for under-oil application. It shall be securely mounted with ample clearance to ground and to the top oil level. Acceptable current limiting fuses for each transformer kVA size are listed in section 9.3.

9.3 Acceptable Fuses.

Transformer KVA	Weak-Link Expulsion Fuse Manufacturer/Catalog No.	Current Limiting Fuse Manufacturer/Catalog No.
50	Kearney/124080-5	Kearney/150621-30 RTE/3545040M61M General Electric/9F59TBE040 HI-TECH/HTDS251040
75	Kearney/124080-6 RTE/4000358C05	Kearney/150621-50 RTE/3545040M61M General Electric/9F59TBE040 HI-TECH/HTDS251040
100	Kearney/124080-8 RTE/4000358C05	Kearney/150621-50 RTE/3545050M61M General Electric/9F59TBE040 HI-TECH/HTDS251040
167	Kearney/124080-12	Kearney/150621-50 General Electric/9F59TBE050 HI-TECH/HTDS251050
250	Kearney/124080-15	Kearney/150621-65 General Electric/9F59TBE065 HI-TECH/HTDS251065

If a manufacturer proposes to provide fuses other than those indicated above, the vendor shall indicate the proposed fuses and shall supply fuse curves with the quotation (see section 12.5).

10.0 NAMEPLATES

A permanent, durable, corrosion-resistant, metal nameplate shall be affixed to each transformer with stainless steel screws or rivets. The information on the nameplate shall be applied such that it is weatherproof, ultraviolet-resistant, scratch-resistant and

permanent for the life of the transformer under normal handling and operating conditions of the transformer. Silk-screened and laser-etched paint are unacceptable.

If all information cannot be included on a single nameplate, a second nameplate may be provided next to primary nameplate.

10.1 Location. The nameplate(s) shall be located on the tank wall on the low-voltage side of the terminating compartment such that it is readable when the cables are installed in the transformer.

10.2 Information. The nameplate(s) shall contain all information as specified in IEEE C57.12.00 and shall include the following information:

10.2.1 Information in Print

a. "Guaranteed maximum PCB content of transformer oil < 1 ppm PCB"
b. Gallons of transformer oil (U.S. Gallons)
c. CPS Energy Material Number
d. Year of Manufacture (separate from serial number)
e. Core steel type (i.e. silicon or amorphous)

10.2.2 Information in Bar Code. Transformer serial number (per IEEE C57.12.35, permanent bar code labels)

10.3 Bar Code Requirements. Bar codes shall meet all requirements for permanent bar code labels in IEEE C57.12.35 with the following exceptions: a minimum narrow bar width of 12.5 mils and a minimum wide-to-narrow ratio of 2.2:1.

11.0 SAFETY LABELS

Bilingual (English and Spanish) "WARNING" and "DANGER" safety labels meeting the requirements of NEMA 260 (figures 3 and 4) shall be affixed to the transformer as indicated on drawing 3 of this specification.

12.0 INFORMATION REQUIRED FROM VENDOR

12.1 PCB Statement of Compliance. For all transformers supplied to CPS Energy, the vendor shall provide to the CPS Energy Environmental section a "Statement of Compliance" that the oil in the transformers meets the PCB requirements of section 4.0 of this specification when the transformers are delivered to CPS Energy. Each Statement of Compliance shall include the name of the manufacturer and the serial numbers of all applicable transformers. The Statement of Compliance shall be sent to the SDS Data Manager, c/o CPS Energy Environmental Section, mail drop 100406, P.O. Box 1771, San Antonio, TX 78296-1771.

12.2 Safety Data Sheet (SDS). The manufacturer shall provide copies of the SDS for any chemical component supplied in or with equipment and/or accessories as required by OSHA Hazard Communication Standard (HCS). This requirement applies to any substance for which CPS Energy would be required to have an SDS due to CPS Energy personnel either using or being exposed to the substance while inspecting, operating or maintaining the equipment. SDS(s) shall be received prior to or with first delivery. The vendor is also responsible for providing any updates of respective SDS(s). All SDS(s) and updates shall be sent to the SDS Data Manager, c/o CPS Energy Environmental Section, mail drop 100406, P.O. Box 1771, San Antonio, TX 78296-1771.

12.3 Fuse Curves. The local distributor or vendor shall maintain an original fuse curve for each type fuse provided in the transformers supplied. Copies of these fuse curves shall be available to CPS Energy upon request. If the manufacturer proposes to supply fuses other than those listed in section 9.3 of this specification, the vendor shall indicate this and shall supply fuse curves for the proposed fuses with the quotation.

13.0 INSPECTION AND TESTING

13.1 Inspection. Transformers will be subject to inspection by designated CPS Energy representatives to assure compliance with CPS Energy requirements.

13.2 Manufacturer's Tests. The manufacturer shall conduct design and routine tests as required by IEEE C57.12.00. All tests shall be performed in accordance with IEEE C57.12.90. Routine or other tests to be performed on each transformer shall include the following:

a. Routine Impulse Test (BIL)

b. Percent Impedance

c. Excitation Losses and Load Losses

13.3 Coating System Tests. The manufacturer shall conduct the coating’s performance tests in accordance with ANSI C57.12.28. The test results and the coating’s characteristics shall be provided to CPS Energy upon request.

13.4 CPS Energy Tests. Transformers will be subjected to electrical acceptance tests by CPS Energy.

14.0 SHIPPING INSTRUCTIONS

14.1 Packaging and Delivery. Each transformer shall be secured to a wooden pallet such that a fork lift can be used to lift and move the unit. Delivery shall be made on an open truck to be accepted.

14.2 Delivery Ticket. A delivery ticket shall be furnished with each delivery by the carrier. The delivery ticket must show the CPS Energy PO number and the number of transformers being delivered.

14.3 Packing List. A packing list shall be furnished with each delivery. The packing list must include the CPS Energy PO number, and a description and number of each type transformer being delivered.

15.0 WARRANTY

The manufacturer shall fully warrant each transformer and all components thereof against defective materials and workmanship for a period of eighteen months from date of receipt by CPS Energy or twelve months from date of installation, whichever occurs first. The manufacturer shall bear all direct costs of correction and replacement of the defective materials or workmanship during the warranty period including shipping costs.

16.0 GENERAL INSTRUCTIONS

16.1 Ordering Information. All requisitions, RFQs, and POs for transformers covered by this specification will contain the following information:

a. CPS Energy material number

b. Number of transformers required

c. Brief description of transformers required, including phase, kVA and voltage ratings

d. Delivery date

e. Delivery destination

f. Reference to this specification by number and latest date

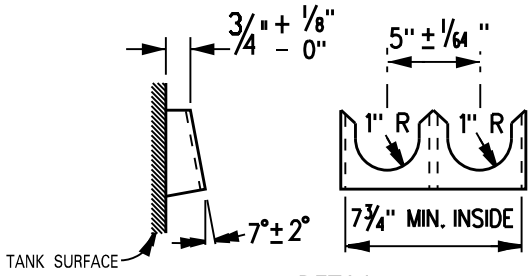
16.2 Copies of This Specification. Copies of this specification may be obtained from the CPS Energy Website (https://www.cpsenergy.com/), Work With Us, Procurement and Suppliers, Distribution Electric Material Specification Search.

16.3 Approval and Furnishing of Product. Quotations will not be considered on a manufacturer's proposed product that is not approved by CPS Energy prior to solicitation of pricing. Products meeting the requirements of this specification shall be approved and furnished in accordance with CPS Specification 000-01 and any additional requirements in this specification. Where conflicts may arise between this specification and CPS Specification 000-01, this specification shall prevail.

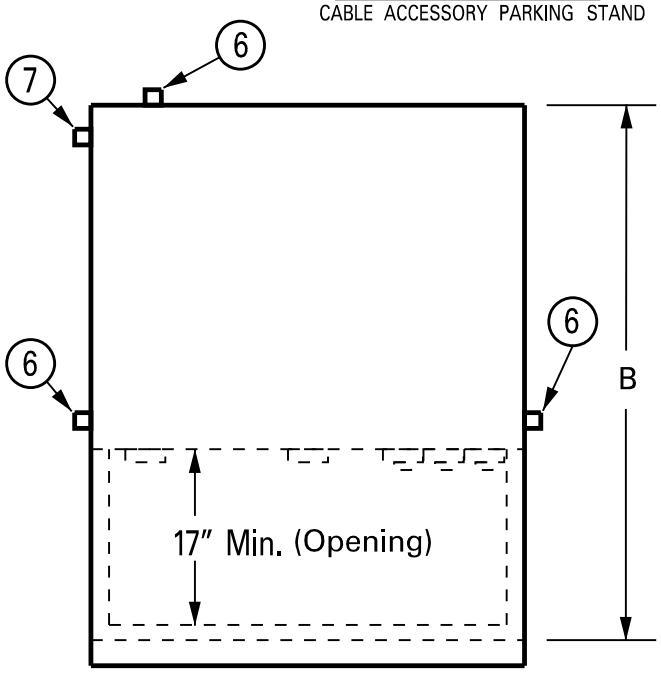
16.3.1 Product Samples. Representative samples may be required if no factory inspection is made.

16.3.2 Factory Inspection. A factory inspection may be required if representative samples are not provided or are insufficient to determine fitness of products covered by this specification.

16.4 Exceptions. Any and all exceptions to this specification must be listed individually and accompany the quotation. If there are no exceptions, the words "NO EXCEPTIONS" must be written on the quotation.



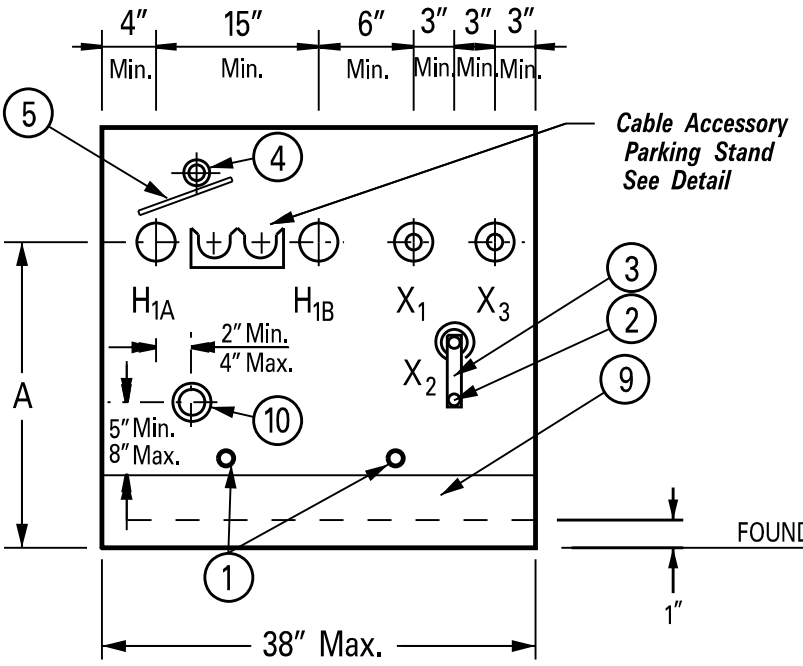
DETAIL
CABLE ACCESSORY PARKING STAND



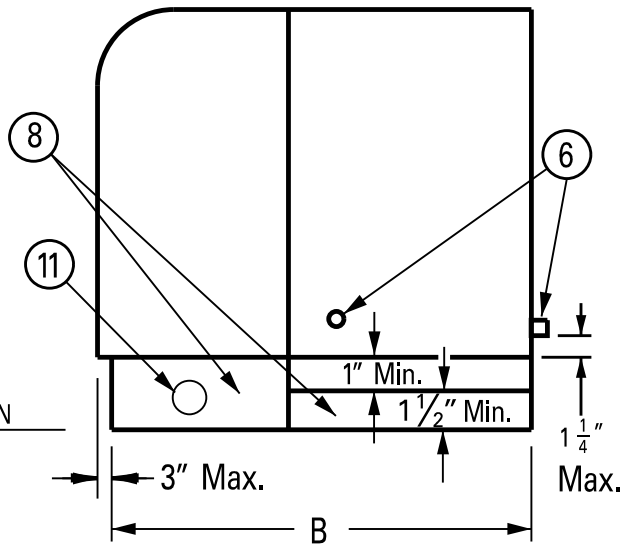
TOP

1. TANK GROUNDING TERMINALS
2. X_2 GROUNDING BOSS
3. X_2 GROUNDING STRAP
4. BAYONET FUSE HOLDER
5. OIL DRIP SHIELD
6. EXTERNAL GROUND BOSSES
7. ALTERNATE GROUND BOSS LOCATION
8. STAINLESS STEEL SILL & TANK SKIRT
9. MILD STEEL FACEPLATE WITH 1" MIN. HEIGHT ABOVE FOUNDATION.
10. SECTIONALIZING SWITCH
11. ACCESS HOLE, 2"-DIA., CENTER IN SILL

KVA	A	B
50 – 75	$23\frac{1}{2}" \pm \frac{1}{2}"$	41" Max.
100 – 250	$25\frac{1}{2}" \pm 2\frac{1}{2}"$	46" Max.



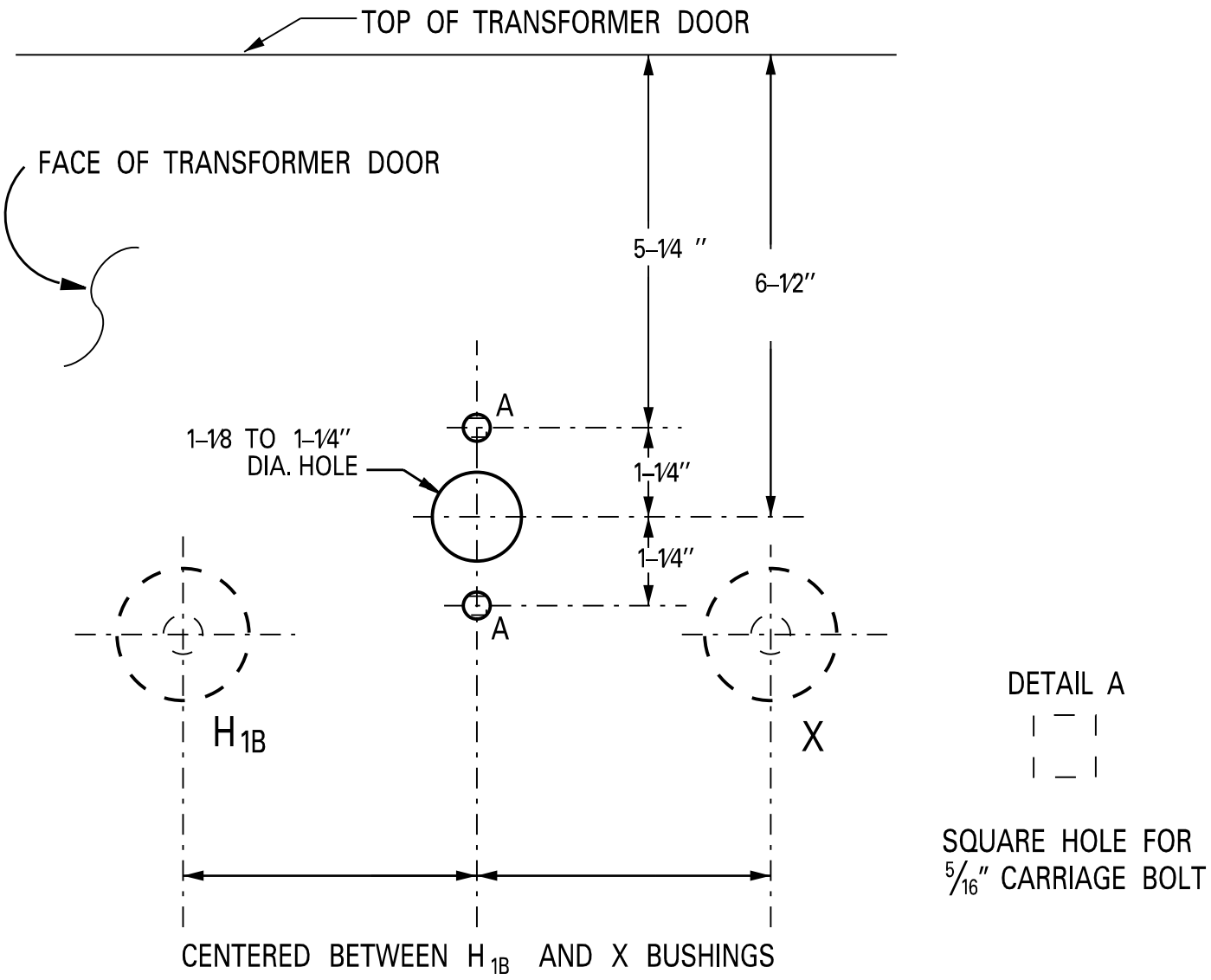
TERMINATING COMPARTMENT



SIDE

NOTE: NO DRIP-SHIELDS, MOLDINGS, ETC. SHALL BLOCK OR INTERFERE WITH SIDE HOT-STICK OPERATION OF FUSE HOLDER.

SPECIFICATION 426-20	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S01 OF 3		

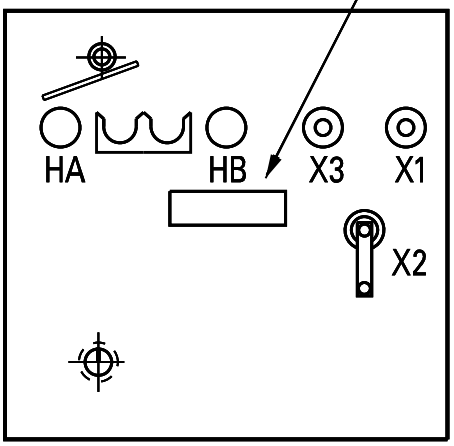


FAULT INDICATOR PROVISION

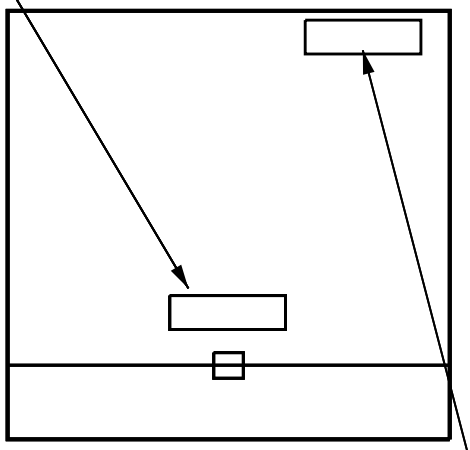
EACH TRANSFORMER SHALL HAVE PROVISION FOR MOUNTING A FAULT INDICATOR ON THE FRONT FACE OF THE TRANSFORMER DOOR. THIS PROVISION WILL INCLUDE THREE HOLES PUNCHED IN THE TRANSFORMER DOOR AS INDICATED ABOVE. IN ADDITION, A 12 GAGE STEEL COVER PLATE WILL BE ATTACHED INSIDE THE DOOR USING TWO (2) 5/16" X 1" STAINLESS STEEL CARRIAGE BOLTS THROUGH HOLES "A". THE COVER PLATE MAY BE PUNCHED WITH SQUARE OR ROUND HOLES AT THE DISCRETION OF THE MANUFACTURER. THE COVER PLATE SHALL BE DIMENSIONED SUCH THAT IT WILL EXTEND A MINIMUM OF ONE (1) INCH BEYOND ALL THE HOLES IN THE DOOR. HOLES SHALL BE DRILLED PRIOR TO PAINTING THE TRANSFORMER, AND THE COVER PLATE PAINTED WITH THE SAME PAINT AS THE TRANSFORMER DOOR.

SPECIFICATION 426-20	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S02 OF 3		

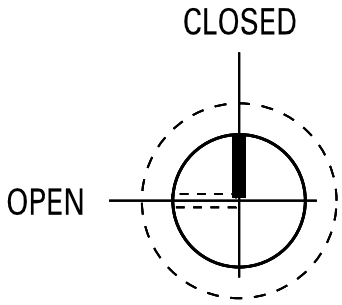
LOCATION OF DANGER LABEL (INSIDE THE TERMINATING COMPARTMENT OF THE PADMOUNT TRANS.)



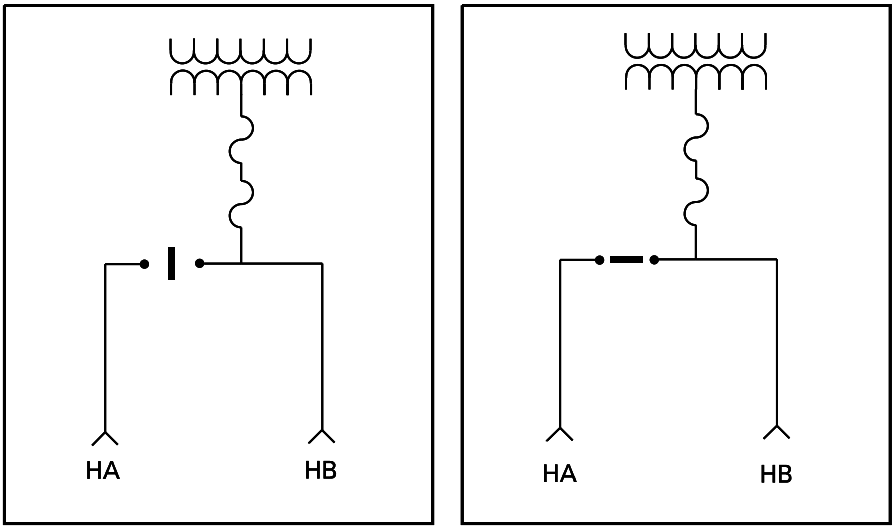
LOCATION OF WARNING LABEL (FRONT OF PADMOUNT TRANS. JUST ABOVE LOCKING LATCH)



LOCATION OF SECONDARY NAMEPLATE



SWITCH POSITION LABELS (TYP.)



HB TO XFMR
HA OPEN
(OPEN)

HA AND HB
TO XFMR
(CLOSED)

METAL SWITCH DIAGRAM PLATE

SPECIFICATION 426-20	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S03 OF 3		

SPECIFICATION FOR

TRANSFORMERS, DISTRIBUTION, PAD-MOUNT, THREE-PHASE, SIX-BUSHING, DEAD-FRONT, 34,500GRDY/19,920-480Y/277 VOLT, 34,500GRDY/19,920-208Y/120 VOLT 13,200GRDY/7,620-480Y/277 VOLT, 13,200GRDY/7,620-208Y/120 VOLT

Specification Number: 426-13

Approved Date: March 31, 2017

CPS Energy

P. O. Box 1771

San Antonio, Texas 78296

Robert Gourley
Director, Supply Chain

Rick Lopez
Director, Distribution Engineering

Specification No. 426-13

CONTENTS

1.0 SCOPE

1.1 Application. This specification covers the minimum acceptable requirements for three-phase, pad-mounted, dead-front, distribution transformers intended for use on concrete slabs or other suitable ground level foundations. Transformer ratings covered by this specification include:

34,500GrdY/19,920-480Y/277 volts
34,500GrdY/19,920-208Y/120 volts
13,200GrdY/7,620-480Y/277 volts
13,200GrdY/7,620-208Y/120 volts

1.2 Applicable Standards. Transformers covered by this specification shall comply with the latest revised national standards listed below, except where they conflict with the requirements of this specification. The order of precedence shall be this specification, then the following standards:

IEEE C57.12.00; IEEE Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

IEEE C57.12.34; Standard for Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers, 10MVA and smaller; High-Voltage, 34.5kV Nominal System Voltage and Below; Low-Voltage, 15 kV Nominal System Voltage and Below

IEEE C57.12.28; Pad-Mounted Equipment-Enclosure Integrity

IEEE C57.12.35; Standard for Bar Coding for Distribution Transformers

IEEE C57.12.70; Terminal Markings and Connections for Distribution and Power Transformers

IEEE C57.12.80; IEEE Standard Terminology for Power and Distribution Transformers

IEEE C57.12.90; IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers

IEEE 386; Separable Insulated Connector Systems for Power Distribution Systems above 600V

IEEE C57.12.35; IEEE Standard for Bar Coding for Distribution Transformers

ASTM A666; Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar

ASTM D1275b; Standard Test Method for Corrosive Sulfur in Electrical Insulating Liquids

ASTM D3487; Mineral Insulating Oil Used in Electrical Apparatus

NEMA 107; Methods of Measurement of Radio Influence Voltage (RIV) of High-Voltage Apparatus

NEMA 260; Safety Labels for Pad-Mounted Switchgear and Transformers Sited in Public Areas

UL 969; Marking and Labeling Systems

10 CFR Part 431; Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule

1.3 Transformers Covered By This Specification.

CPS Energy Material No.	Description
1005550	TRAN PM 3P 6B 500KVA 13200GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 500KVA, 13,200GY/7620-208Y/120 VOLT, DEAD FRONT
1005722	TRAN PM 3P 6B 750KVA 13200GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 750KVA, 13,200GY/7620-208Y/120 VOLT, DEAD FRONT
1005551	TRAN PM 3P 6B 1000KVA 13200GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1000KVA, 13,200GY/7620-208Y/120 VOLT, DEAD FRONT
1005552	TRAN PM 3P 6B 1500KVA 13200GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1500KVA, 13,200GY/7620-208Y/120 VOLT, DEAD FRONT
1005721	TRAN PM 3P 6B 500KVA 13200GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 500KVA, 13,200GY/7620-480Y/277 VOLT, DEAD FRONT
1005591	TRAN PM 3P 6B 750KVA 13200GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 750KVA, 13,200GY/7620-480Y/277 VOLT, DEAD FRONT

1005592	TRAN PM 3P 6B 1000KVA 13200GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1000KVA, 13,200GY/7620-480Y/277 VOLT, DEAD FRONT
1005594	TRAN PM 3P 6B 2000KVA 13200GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 2000KVA, 13,200GY/7620-480Y/277 VOLT, DEAD FRONT
1005595	TRAN PM 3P 6B 2500KVA 13200GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 2500KVA, 13,200GY/7620-480Y/277 VOLT, DEAD FRONT
1005593	TRAN PM 3P 6B 1500KVA 13200GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1500KVA, 13,200GY/7620-480Y/277 VOLT, DEAD FRONT
1005015	TRAN PM 3P 6B 500KVA 34500GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 500KVA, 34,500GY/19,920-208Y/120 VOLT, DEAD FRONT
1005017	TRAN PM 3P 6B 750KVA 34500GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 750KVA, 34,500GY/19,920-208Y/120 VOLT, DEAD FRONT
1005018	TRAN PM 3P 6B 1000KVA 34500GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1000KVA, 34,500GY/19,920-208Y/120 VOLT, DEAD FRONT
1005019	TRAN PM 3P 6B 1500KVA 34500GY-208Y/120V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1500KVA, 34,500GY/19,920-208Y/120 VOLT, DEAD FRONT
1005232	TRAN PM 3P 6B 500KVA 34500GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 500KVA, 34,500GY/19,920-480Y/277 VOLT, DEAD FRONT
1005233	TRAN PM 3P 6B 750KVA 34500GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 750KVA, 34,500GY/19,920-480Y/277 VOLT, DEAD FRONT
1005234	TRAN PM 3P 6B 1000KVA 34500GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1000KVA, 34,500GY/19,920-480Y/277 VOLT, DEAD FRONT

1005235	TRAN PM 3P 6B 1500KVA 34500GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 1500KVA, 34,500GY/19,920-480Y/277 VOLT, DEAD FRONT
1005236	TRAN PM 3P 6B 2000KVA 34500GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 2000KVA, 34,500GY/19,920-480Y/277 VOLT, DEAD FRONT
1005237	TRAN PM 3P 6B 2500KVA 34500GY-480Y/277V TRANSFORMER, PAD MOUNT, 3-PHASE, 6-BUSHING, 2500KVA, 34,500GY/19,920-480Y/277 VOLT, DEAD FRONT

2.0 ELECTRICAL RATINGS

2.1 Kilovolt-Ampere (kVA). The kilovolt-ampere ratings shall be as specified in Section 1.3 and shall meet the thermal load limits as specified in IEEE Standard C57.12.34.

2.2 Voltage. The nominal high-voltage rating shall be 34,500 GrdY/19,920 volts or 13,200GRDY/7620 volts, and the low-voltage rating shall be 208Y/120 volts or 480Y/277 volts as specified for each transformer in Section 1.3.

2.3 Taps. Each transformer shall have two 2-1/2% taps above nominal voltage and two 2-1/2% taps below nominal voltage.

HIGH VOLTAGE TAPS

HIGH VOLTAGE RATING (V)	TAP RATINGS (V)
34,500GRDY/19,920	36,225/ 35,363/ 34,500/ 33,638/ 32,775
13,200GRDY/7620	13,860/ 13,530/ 13,200/ 12,870/ 12,540

2.4 Basic Impulse Level (BIL). The high-voltage and low-voltage basic impulse levels shall be as follows:

BASIC IMPULSE LEVEL

HIGH VOLTAGE RATING (V)	HIGH VOLTAGE (kV)	LOW VOLTAGE (kV)
34,500GRDY/19,920	150	30
13,200GRDY/7620	95	30

2.5 Percent Impedance Voltage. The percent impedance shall be as indicated below:

KVA Rating	Percent Impedance Voltage
500	2.5-3.5
750 & Above	5.32-6.18

2.6 Radio Influence Voltage (RIV). The radio influence voltage level at the transformer bushings shall not exceed 100 microvolts when the unit is excited at 110% rated voltage and tested in accordance with NEMA Standard 107.

2.7 Minimum Efficiency. The tested efficiency of all units shipped shall meet or exceed the energy conservation standards in 10 CFR 431, Table I.1, for liquid-immersed distribution transformers. Certified test data by serial number and material number shall be provided to confirm compliance with this requirement.

3.0 CONSTRUCTION

3.1 General. The transformer shall consist of the tank with high-voltage and low-voltage terminating compartments assembled as an integral unit. The high-voltage and low-voltage terminating compartments shall be separated by a metal barrier and shall have separate doors for each compartment. The terminating compartment shall have fixed sides but may be equipped with a lid that is hinged to open up to allow removal of bayonet fuses. The terminating compartment bottom sill shall be a maximum of 12 inches in height and shall be removable only from inside the terminating compartments, to allow for installation and removal of the transformer without disturbing the cables. The overall minimum and maximum width of the terminating compartment shall be per drawings 1 and 2. The minimum terminating compartment depth shall be 18 inches and 30 inches for the 13 kV and 35 kV respectively. The maximum overall dimension of each unit shall not exceed 96 inches in depth and 96 inches in width for 13,200 GrdY/7620 volt transformers and 96 inches in depth and 120 inches in width for 34,500 GrdY/19,920V transformers.

3.2 Arrangement. The transformer high-voltage and low-voltage terminating compartment arrangement shall be in accordance with IEEE Standard C57.12.34 and drawings 1 and 2 of this specification. Where dimensional differences exist between the IEEE standard and the CPS Energy specification drawing, the CPS Energy specification drawings take precedence.

3.3 Material. The transformer tank shall be constructed of minimum 10 gauge steel. The terminating compartment walls, barrier, doors, and sill shall be constructed of minimum 13 gauge steel. The hinges and hinge pins shall be stainless steel.

3.4 Gaskets. The terminating compartment shall be designed to prevent the ingress of water. If the terminating compartment is bolted to the transformer tank, gaskets shall be mounted between the terminating compartments and the main tank. The gaskets shall

be made of Buna rubber material, cork neoprene Armstrong NC 710, or preapproved equivalent.

3.5 Drainage. The roof of the assembled transformer unit shall drain freely such that no water stands on any part of the transformer. The assembled unit shall be constructed such that water does not drain into the terminating compartments or on the interface between the tank and the compartments.

3.6 Coating System. The coating system shall be in accordance with the Enclosure Coating System requirements of IEEE Standard C57.12.28. The coating system shall have a minimum total dry film thickness of three mils and shall be highly resistant to weathering, chipping, cracking, mildew, and ultraviolet chalking. All coating components shall be lead-free, asbestos-free, and chromate free.

3.7 Bottom Treatment. The tank bottom shall not come in direct contact with the foundation surface. The sill, skids, and supports that are in contact with the foundation, and tank bottom shall be properly treated to prevent corrosion.

4.0 TRANSFORMER OIL

All 13 kV transformers shall contain less than 500 gallons of oil. All 35-kV transformers up to 1500 kVA shall contain less than 500 gallons of oil and transformers 2000 kVA and above shall contain less than 660 gallons of oil. Failure to meet volume requirement for a specific design may not be automatic disqualification if all other approved manufacturers also fail to meet requirement. All electrical components shall be a minimum of 3 inches below the 25°C oil level line. The insulating oil shall be manufactured from napthenic base crudes. Distillates from these crudes may be acid refined, hydrogen treated, solvent extracted, or processed by other suitable refining methods. After approval, no change in crude source, processing, and refining methods shall be made without prior approval. The refining method must yield acceptable mineral insulating oils for use in transformers, circuit breakers, and other electrical equipment as an insulating and cooling medium. The oil shall be Type II inhibited mineral oil in accordance with ASTM Standard D3487 and D1275b, containing no more than 0.3% of 2, 6 Ditertiary-Butyl Para-Creosol or 2, 6 Ditertiary-Butyl Phenol Oxidation Inhibitor; and this shall be so stated in manufacturer code. The oil shall be free of any matter or contaminants which may be injurious to insulation, paint, varnish, metallic, and/or other parts of the electrical equipment. The oil shall be PCB Free (less than 1.0 ppm PCB), and shall meet any applicable federal, state, or other governmental regulation that restricts maximum PCB content to a lesser value.

5.0 SECURITY AND GROUNDING PROVISIONS

5.1 Locking Provisions. The high-voltage compartment door shall be secured with a penta-head bolt which is accessible only after the low-voltage compartment door has been opened. The low-voltage compartment door shall be secured with a recessed,

captive penta-head bolt, per IEEE Standard C57.12.28, and a three-point latching mechanism with latching handle. The latching handle shall have a suitable provision for padlocking it.

5.2 Tamper Resistance. When the terminating compartment doors are closed and properly secured, the transformer shall be tamper resistant in accordance with IEEE Standard C57.12.28 and shall not require any additional housing, fencing or other means to make the unit safe.

5.3 Transformer Grounding Provisions.

5.3.1 Tank Ground Pads. Two stainless steel grounding pads shall be welded flat to the transformer tank face to provide ground connections, one each in the high-voltage and the low-voltage terminating compartments. The pads shall be tapped and threaded as indicated on drawing's 1 and 2 of this specification.

5.3.2 Terminating Compartment Electrical Bond. The terminating compartments, compartment doors, metal barrier and bottom sill shall be electrically bonded to the transformer tank using a minimum of 4 AWG flexible copper braid, such that the entire unit can be safely grounded by grounding the tank.

6.0 BUSHINGS

6.1 High-Voltage Phase Bushings. Each transformer shall have six externally clamped or bolted type phase bushings for a loop-feed system. These bushings shall be externally replaceable and the leads shall be sufficiently long for external accessibility to connections. There shall be no bolts, clamps, or other protrusions within a 4-inch radius of the center of each high-voltage bushing that will prevent the installation of feed through bushing inserts. Area in terminating compartment extending 12 inches directly below lowest bushings shall remain clear of any protrusions.

6.1.1 Bushings, 34,500GRDY/19,920. The bushings shall be 200 ampere loadbreak interface 8 in accordance with IEEE Standard 386 and shall be arranged in accordance with IEEE Standard C57.12.34 and drawing 1 of this specification.

6.1.2 Bushings, 13,200GRDY/7620. The bushings shall be 200 ampere bushing well interface 3 rated 8.3/14.4 kV in accordance with IEEE Standard 386 and shall be arranged in accordance with IEEE Standard C57.12.34 and drawing 2 of this specification.

6.2 High-Voltage Neutral Bushing. The high-voltage neutral bushing (H0) shall be an externally clamped or bolted, insulated, live front type with a tinned copper spade terminal. The bushing shall be externally replaceable and the lead shall be sufficiently long for external accessibility to connections. The bushing shall be located as indicated

on drawings 1 and 2 of this specification. Any deviation from this location must be specified as an exception on the CPS Energy Request for Quotation (RFQ).

6.3 Low-Voltage Bushings. Each transformer shall have four fully insulated, externally clamped or bolted type, low-voltage bushings sized for the transformer rating. The low-voltage bushings shall be arranged in accordance with IEEE Standard C57.12.34 and drawings 1 and 2 of this specification. These bushings shall be externally replaceable.

7.0 TERMINALS

7.1 Low-Voltage Terminals. The terminals shall be tinned copper spades in accordance with the chart below. There shall be a minimum of 3 1/2 inches clearance between the transformer secondary spade terminal and the first two vertical holes in the spade terminal on each phase as indicated on drawing 3 of this specification. Each low-voltage phase terminal must be able to support the weight of the conductors as specified in the chart below. Insulated supports shall be used on spade terminals with eight or more holes to meet this requirement.

Transformer KVA	Spade Terminal	Maximum Copper Conductor Size
500	8-hole	1000 KCM
750	8-hole	1000 KCM
1000	10-hole	1000 KCM
1500	10-hole	1000 KCM
2000	10-hole	1000 KCM
2500	10-hole	1000 KCM

7.2 Neutral Terminations. The high-voltage and low-voltage winding neutrals shall not be internally connected to each other, and neither neutral shall be internally connected to the tank. Each winding neutral shall be brought out of the tank through its respective bushing and externally grounded to the ground pad on the surface of the tank with a removable copper ground strap. The ground strap shall be suitably sized for the short circuit rating of the transformer, as defined in IEEE Standard C57.12.00.

8.0 HIGH-VOLTAGE SWITCHES

Each transformer shall be equipped with two individual three-phase, high-voltage switches mounted inside the tank. Each switch shall have a minimum of 200 ampere loadbreak, 10,000 ampere symmetrical, 16,000 ampere asymmetrical make and latch sectionalizing capabilities. The individual operating handles for the switches shall be located in the high-voltage compartment. The switches and internal high-voltage bus shall be connected in accordance with drawings 1 and 2 of this specification such that the following connections can be made:

HA to transformer windings

HB to transformer windings
HA to HB to transformer windings
No connections to transformer windings from HA or HB

9.0 ACCESSORIES

9.1 Main Tank Cover and Removable Handhole(s). Main-tank cover shall be welded with bolted handhole(s) to provide access to the tap changer and all internal fusing. The handhole(s) shall have a minimum clear opening of 14 x 24 inches. Handhole covers shall be fitted with a guard cover to protect bolted connection from weather and tampering. The guard cover shall be secured from inside the terminating cabinet with a minimum number of fasteners dedicated to this purpose. Removal of handhole covers shall not require any disassembly or removal of terminating cabinet.

9.2 Jacking, Rolling, and Lifting Provisions. Each transformer shall have provisions for jacking, rolling, and lifting the unit as specified in IEEE Standard C57.12.34. Lifting hooks shall seat a one inch diameter hook, sling or shackle and shall have a minimum hook depth of 1 1/2 inches to prevent the lifting device from slipping out of the hook during transformer installation.

9.3 Drain Valve. A one-inch drain valve with a built-in sampling device shall be provided near the tank bottom in the high-voltage compartment.

9.4 Pressure Relief Valve. The transformer shall be provided with a means to relieve excess pressure in accordance with IEEE Standard C57.12.34. The valve shall be a Tomco-Beta, Qualitrol or Circle Seal and shall have either a 1/4-inch or 1/2-inch inlet port.

9.5 Oil Level Identification. The 25°C oil level shall be identified by a sight gauge liquid level indicator, Tomco catalog number SG35-201 or preapproved equivalent. The sight gauge shall be installed in the high-voltage compartment with the 25ºC oil level at the midline of the gauge sight glass. The 140°C oil level shall be identified with a permanent mark stenciled on the outer tank surface of the low-voltage compartment. The mark shall be easily identifiable as the 140°C oil level and located below the pressure relief valve.

9.6 Tap Changer Handle. A tap changer handle shall be provided in the high-voltage terminating compartment. All tap positions shall be clearly labeled, and a label shall be attached to the transformer tank at the tap changer handle stating that the transformer must be de-energized before the tap changer can be operated.

9.7 Parking Stands. Cable accessory parking stands shall be provided as indicated on drawings 1 and 2 of this specification and constructed as shown in IEEE C57.12.34 for respective parking stand.

9.8 Metering Provisions. All transformer with 480Y/277 secondary-voltage shall have provisions for metering.

9.8.1 Metering Brackets. Metering brackets shall be provided in the low-voltage compartment for as indicated on drawings 1 and 2 of this specification. Metering brackets shall be constructed of 3 x 2-inch angle iron with 5/16-inch holes on 4-inch centers. The minimum thickness of the angle iron shall be equivalent to 7 gauge (0.1793 inch). The front face (2-inch side) of the angle iron shall be approximately 3 inches off the face of the tank and shall face towards the center of the compartment as indicated on the drawing. No accessories (e.g. pressure relief valve, oil level indicator) shall be located between the metering brackets.

9.8.2 VT Pack. Mounting provisions shall be provided on metal barrier between primary and secondary compartments, on secondary side, to accommodate the mounting of a VT pack. The mounting provisions shall consist of three 1/4-20 x 1/2 inch studs welded, or press fit, to metal barrier and located so as to mount VT pack approximately 6 inches from door and 6 inches below top of cabinet. The arrangement and spacing of studs are shown in drawing 5 of this specification. Each stud shall be supplied with a nylon-insert locknut.

10.0 FUSES

10.1 Fusing 13 kV Primary. Each high-voltage winding shall be fused with an under-oil expulsion fuse in series with an appropriate isolation link. Fuses shall be securely mounted with ample clearance to ground and to the top oil level. Acceptable fuses for each transformer kVA size are listed in Section 10.5.

10.2 Fusing 35 kV Primary. Each high-voltage winding shall be fused with an under-oil expulsion fuse in series with an under oil current limiting fuse with the expulsion fuse on the load side of the current limiting fuse. Fuses shall be securely mounted with ample clearance to ground and to the top oil level. Current limiting fuses shall be located such that they are readily accessible for field replacement through cover. Acceptable fuses for each transformer kVA size are listed in Section 10.6.

10.3 Transformers 500 and 750 kVA. A replaceable expulsion fuse in a bayonet type fuse holder shall be located in the high-voltage compartment such that it is readily accessible for hot-stick operation without interference. The bayonet fuse holder shall have a flap closure to prevent oil spillage after bayonet removal. Approved fuse holder manufacturers and catalog number are as follows:

Cooper Power Systems	4000361C99FV
ABB Power	1C10775G03

The fuse holder shall be located, or a drip shield shall be provided, such that no oil drips on the separable insulated connectors during bayonet withdrawal.

10.4. Transformers 1000 kVA through 2500 kVA. All internal fuses shall be located such that they are readily accessible for field replacement through the removable handhole cover.

10.5 Acceptable Fuses 13 kV Transformers.

Transformer KVA	Expulsion Fuse Manufacturer/Cat. No.
500	Kearney/124080-30 RTE/4000358C12
750	Kearney/124080-35 RTE/4000358C14
1000	Kearney/124084-14 GE/9F54WLD202
1500	Kearney/124084-15 GE/9F54WLD303
2000	Kearney/124084-16 GE/9F54WLD303
2500	Kearney/124084-16 GE/9F54WLD402

Note: 2500 kVA Transformers - Two of each type fuse shall be paralleled.

10.6 Acceptable Fuses 35kV Transformers.

Transformer kVA	Expulsion Fuse Manufacturer/Cat. #	Current Limiting Fuse Manufacturer/Cat. No.
500	Kearney/124080-12	Kearney/150621-50 GE/9F59TBE040 High Tech/HTDS251040
750	Kearney/124080-15	Kearney/150621-50 GE/9F59TBE040 High Tech/HTDS251040

1000	Kearney/124092-30 GE/9F54DCA901	Kearney/150621-65 GE/9F59TBE065 High Tech/HTDS251065
1500	Kearney/124092-35 GE/9F54DCB101	Kearney/150621-80
2000	Kearney/124092-35	Kearney/150621-80
2500	Kearney/124092-30	Kearney/150621-65

Note: 2500 kVA Transformers - Two of each type fuse shall be paralleled

If a manufacturer proposes to provide fuses other than those indicated above, the vendor shall indicate the proposed fuses and supply fuse curves with the quotation.

10.7 Fuse Curves. The local distributor or vendor shall maintain an original fuse curve for each type fuse provided in the transformers supplied. Copies of these fuse curves shall be available to CPS Energy upon request.

11.0 NAMEPLATES

Two permanent, durable, corrosion-resistant, metal nameplates shall be affixed to each transformer with corrosion-resistant screws. The information on the nameplates shall be applied such that it is weatherproof, ultraviolet resistant, scratch resistant and permanent for the life of the transformer under normal handling and operating conditions of the transformer. Silk-screened and laser etched paint are unacceptable.

If all information cannot be included on a single nameplate, a second nameplate may be provided and located next to primary nameplate.

11.1 Location. One nameplate shall be located on the inside of the low-voltage compartment door and a duplicate nameplate mounted on the transformer tank face inside the low-voltage compartment.

11.2 Information. The nameplate shall contain all information specified in IEEE Standard C57.12.00 and shall include the following information:

11.2.1 Information in Print.

a. Guaranteed maximum PCB content of transformer oil (e.g. < 1 ppm PCB)
b. Gallons of transformer oil (U.S. gallons)
c. CPS Energy material number
d. Year of manufacture (separate from the serial number)

e. Core steel type (i.e. Silicon or Amorphous)

11.2.2 Information in Bar Code. Transformer serial number per IEEE Standard C57.12.35, permanent bar code labels.

11.3 Bar Code Requirements. Bar codes shall meet all requirements for permanent bar code labels in IEEE C57.12.35 with the following exceptions: a minimum narrow bar width of 12.5 mils and a minimum wide-to-narrow ratio of 2.2:1.

12.0 SAFETY LABELS

Bilingual (Spanish and English) "WARNING" and "DANGER" safety labels meeting the requirements of NEMA Standard 260 shall be affixed to the transformers as indicated on drawing 4 of this specification. The "WARNING" label shall include "CPS Energy 353-4357".

13.0 INFORMATION REQUIRED FROM VENDOR

13.1 Test Reports. Certified copies of the factory test reports shall be provided to CPS ENERGY upon request.

13.2 PCB Statement of Compliance. For all transformers supplied to CPS Energy, the vendor shall provide to the CPS Energy Environmental Section a "Statement of Compliance" that the oil in the transformers meets the PCB requirements of Section 4.0 of this specification when the transformers are delivered. Each Statement of Compliance shall include the name of the manufacturer and the serial numbers of all applicable transformers. The Statement of Compliance shall be sent to the SDS Data Manager, c/o CPS Energy Environmental Section, mail drop 100406, P.O. Box 1771, San Antonio, TX 78296-1771.

13.5 Safety Data Sheet (SDS). The manufacturer shall provide copies of the SDS for any chemical component supplied in or with equipment and/or accessories as required by OSHA Hazard Communication Standard (HCS). This requirement applies to any substance for which CPS Energy would be required to have an SDS due to CPS Energy personnel either using or being exposed to the substance while inspecting, operating or maintaining the equipment. SDS(s) shall be received prior to or with first delivery. The vendor is also responsible for providing any updates of respective SDS(s). All SDS(s) and updates shall be sent to the SDS Data Manager, c/o CPS ENERGY Environmental Section, mail drop 100406, P.O. Box 1771, San Antonio, TX 78296-1771.

13.6 Fuse Curves. The local distributor or vendor shall maintain an original fuse curve for each type fuse provided in the transformers supplied. Copies of these fuse curves shall be available to CPS Energy upon request. If the manufacturer proposes to supply fuses other than those listed in Section 10.0 of this specification, the vendor shall indicate this and supply fuse curves for the proposed fuses with the quotation.

13.7 Approval Drawings. Approval drawings shall be submitted for all transformer designs proposed to be supplied that have not been previously supplied or approved. Dimensions and quantity of oil shall be included on drawings.

14.0 INSPECTION AND TESTING

14.1 Inspection. All transformers will be subject to inspection at the point of delivery by a designated CPS Energy Representative to assure compliance with CPS Energy requirements.

14.2 Manufacturer's Tests. The manufacturer shall conduct design and routine tests as required by IEEE Standard C57.12.00. All tests shall be performed in accordance with IEEE Standard C57.12.90. Routine or other tests to be performed on each transformer shall include the following:

a. Routine Impulse Test (BIL)

b. Percent Impedance

c. Excitation Losses and Load Losses

14.3. Insulation Power Factor. Transformers shall have less than 1.0% power factor when tested with a 10 kV Doble test set.

14.4 CPS Energy Tests. Transformers will be subjected to electrical acceptance tests by designated CPS Energy personnel at the point of delivery.

15.0 SHIPPING INSTRUCTIONS

15.1 Carrier. Transformers must be delivered on an open truck to facilitate unloading by a crane.

15.2 Notification of Delivery. The CPS Energy receiving storeroom shall be notified of the intended delivery of transformers, whose individual gross weight exceeds 4,000 pounds, 24 hours prior to the actual delivery to the designated location. Notification is needed so that CPS Energy personnel and equipment may be available to accept delivery.

15.3 Delivery Ticket. A delivery ticket must be furnished with each delivery by the carrier. The delivery ticket must show the CPS Energy purchase order (PO) number and the number of transformers being delivered to CPS Energy.

15.4 Packing List. A packing list must be furnished with each delivery. The packing list must include the CPS Energy PO number, and a description and number of each type transformer being delivered.

15.5 Packaging. All transformers weighing 17,500 lbs. or less shall be fitted with removable blocking to allow unloading with a 10-ton forklift. Blocking shall provide sufficient space for forks (6-inch height minimum) to safely pickup and not cause damage to transformer while unloading or moving. Removal of blocking shall not require any special tools or tools shall be provided.

16.0 WARRANTY

The manufacturer shall fully warrant each transformer and all components thereof against defective materials and workmanship for a period of 18 months from date of receipt by CPS Energy or 12 months from date of installation by CPS Energy, whichever occurs first. The manufacturer shall bear all direct costs of correction and replacement of the defective materials or workmanship during the warranty period including shipping costs.

17.0 GENERAL INSTRUCTIONS

17.1 Requirements for Product Approval. All products must be approved before quotations will be considered on a manufacturer's proposed product. Products covered by this specification shall be approved in accordance with CPS Energy Specification 000-01 and any additional requirements of this specification. Where conflicts arise between this specification and CPS Energy Specification 000-01, this specification shall prevail.

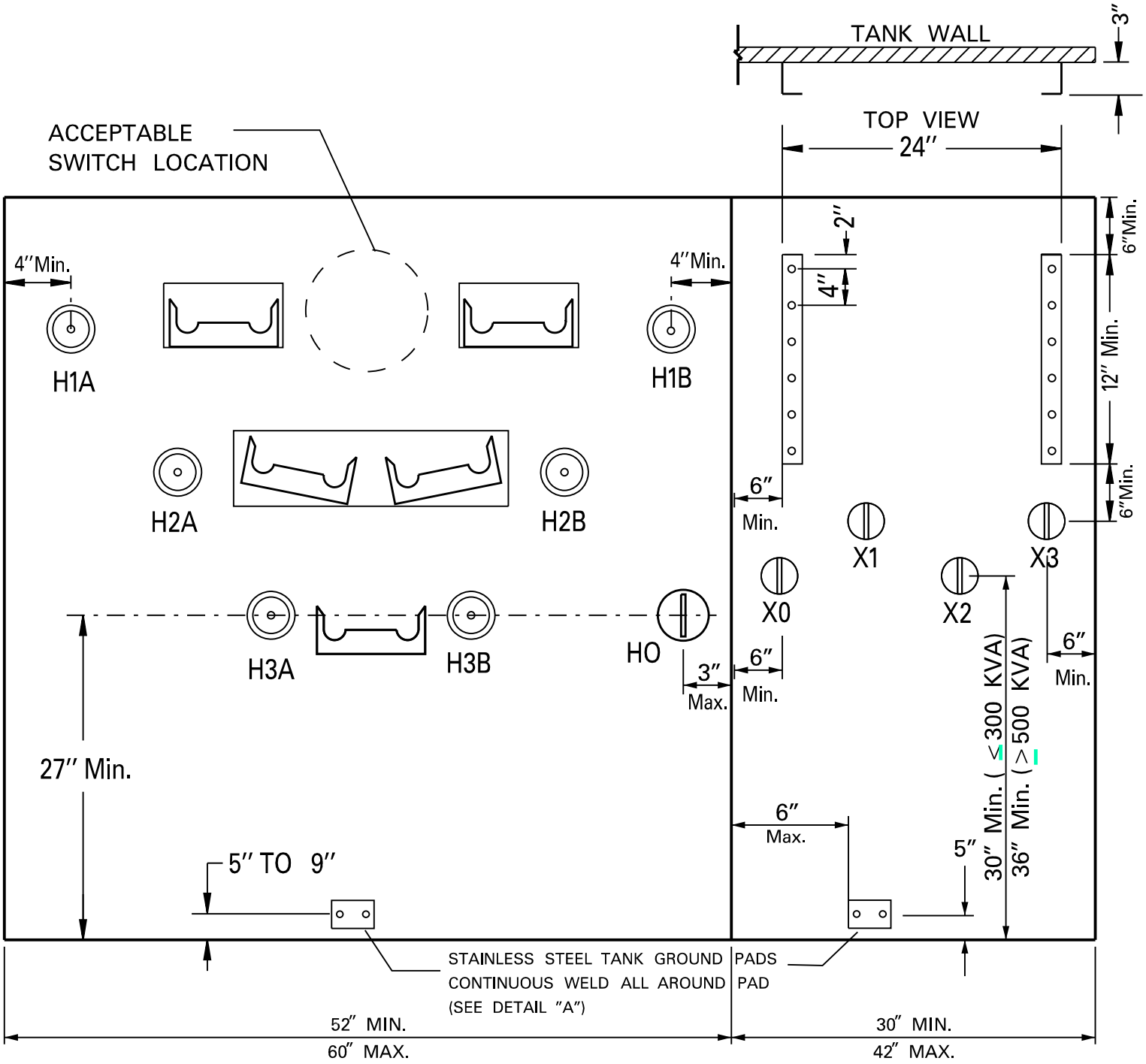
17.1.1 Product Samples. Representative samples may be required if no factory inspection is made.

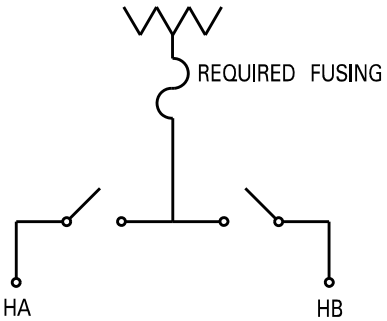
17.1.2 Factory Inspection. A factory inspection may be required if representative samples are not provided or are insufficient to determine fitness of products covered by this specification.

17.2 Copies of This Specification. Copies of this specification must be obtained from CPS Energy Website (https://www.cpsenergy.com/), Work with Us, Procurement and Suppliers, and then Distribution Electric Material Specification Search.

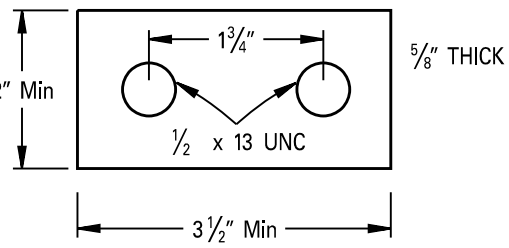
17.3 Exceptions. Any and all exceptions to this specification must be listed individually and accompany the quotation. If there are no exceptions, the words "NO EXCEPTIONS" must be written on the quotation.

34,500GRDY/19,920 TERMINATING COMPARTMENT ARRANGEMENT





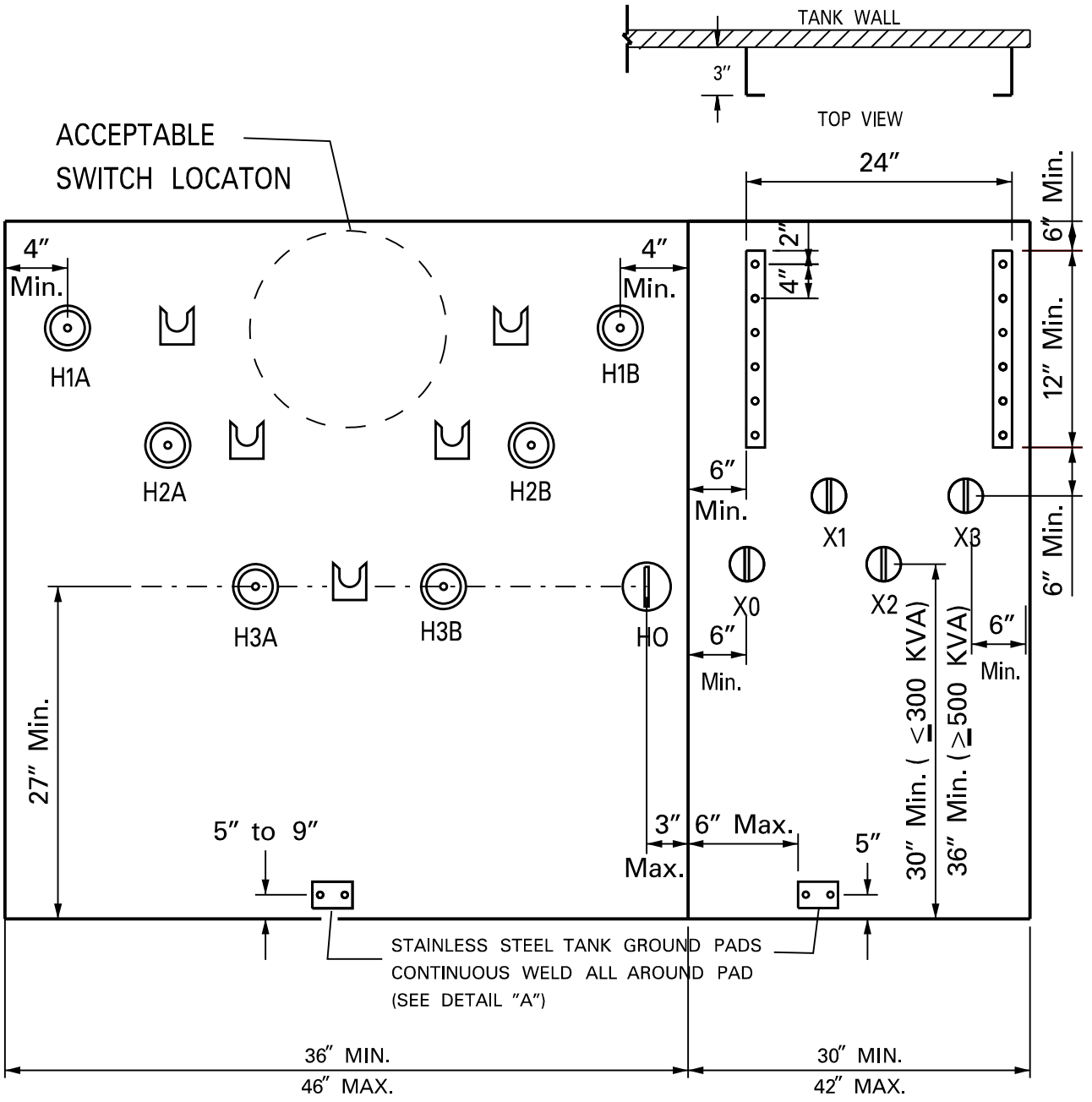
PRIMARY ONE–LINE DIAGRAM
TWO–200A LD BK SECTIONALIZING SWITCHES

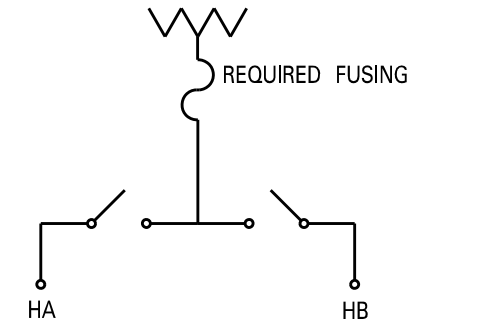


DETAIL"A"
TANK GROUND PADS

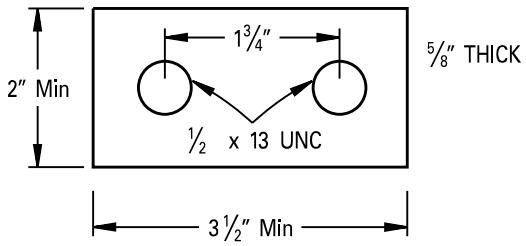
SPECIFICATION 426-13	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S01 OF 5		

13,200GRDY/7,620 TERMINATING COMPARTMENT ARRANGEMENT



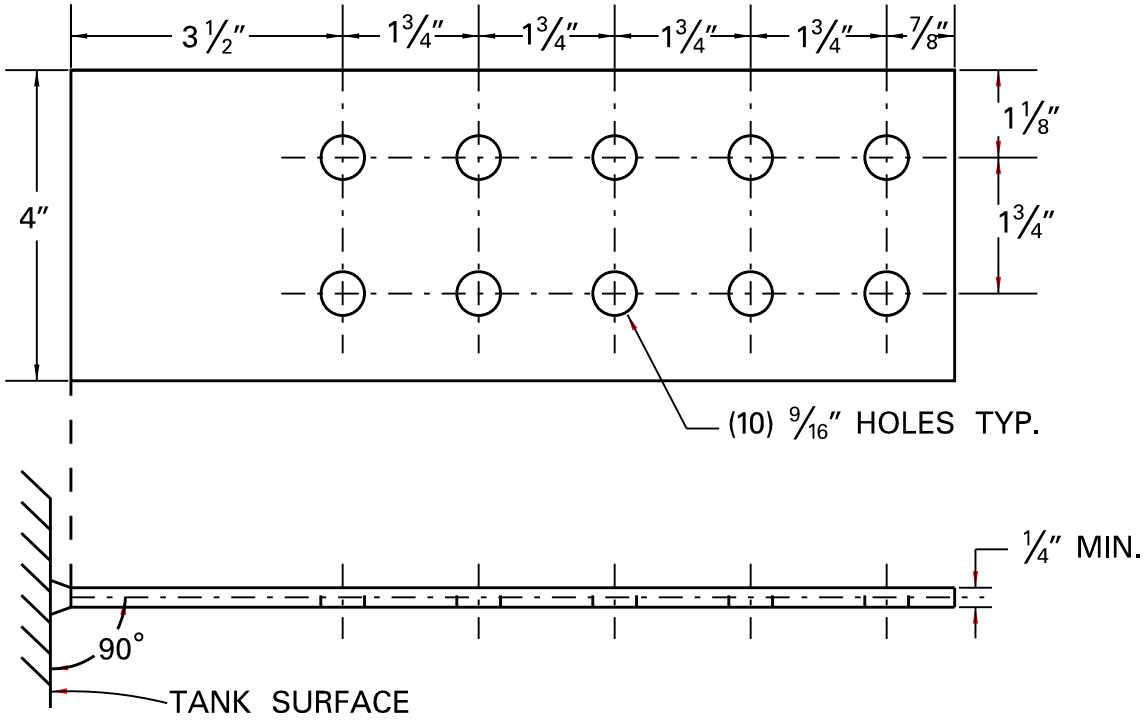


PRIMARY ONE–LINE DIAGRAM
TWO–200A LD BK SECTIONALIZING SWITCHES



DETAIL"A"
TANK GROUND PADS

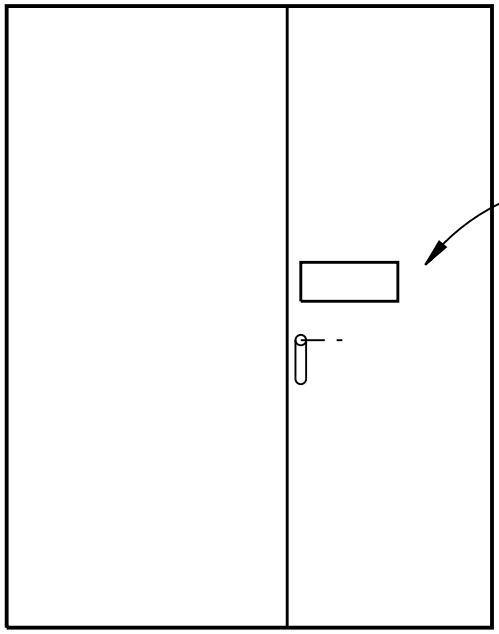
SPECIFICATION 426-13	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S02 OF 5		



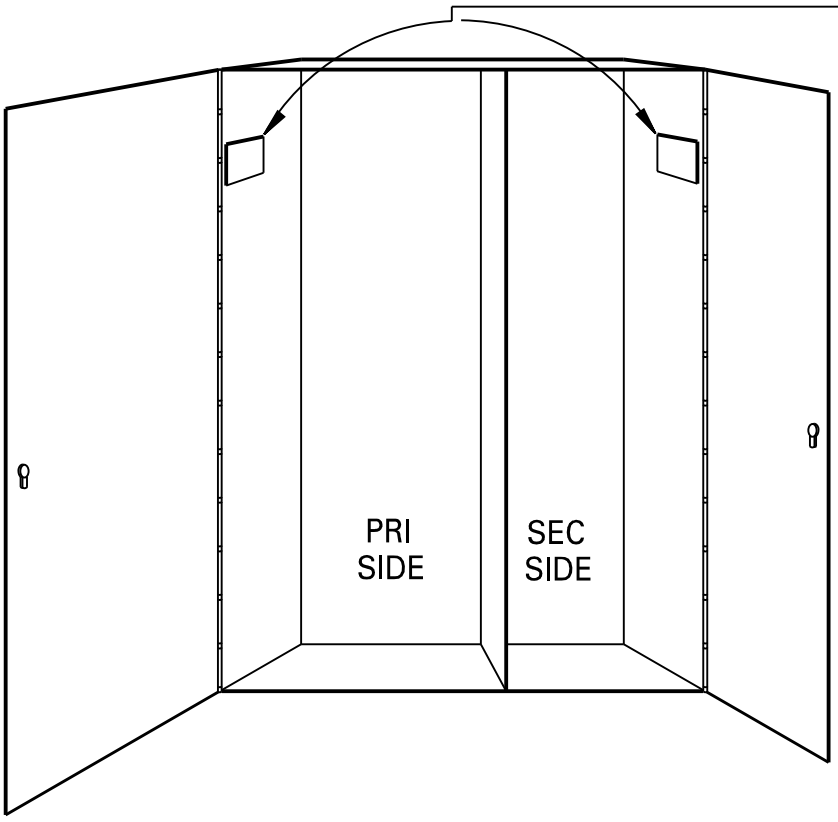
NOTE:
MEASUREMENT IS TAKEN FORM THE END OF THE SPADE TERMINAL BUSHING AND NOT FROM THE TRANSFORMER TANK.

LOW–VOLTAGE SPADE TERMINAL

SPECIFICATION 426-13	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S03 OF 5		

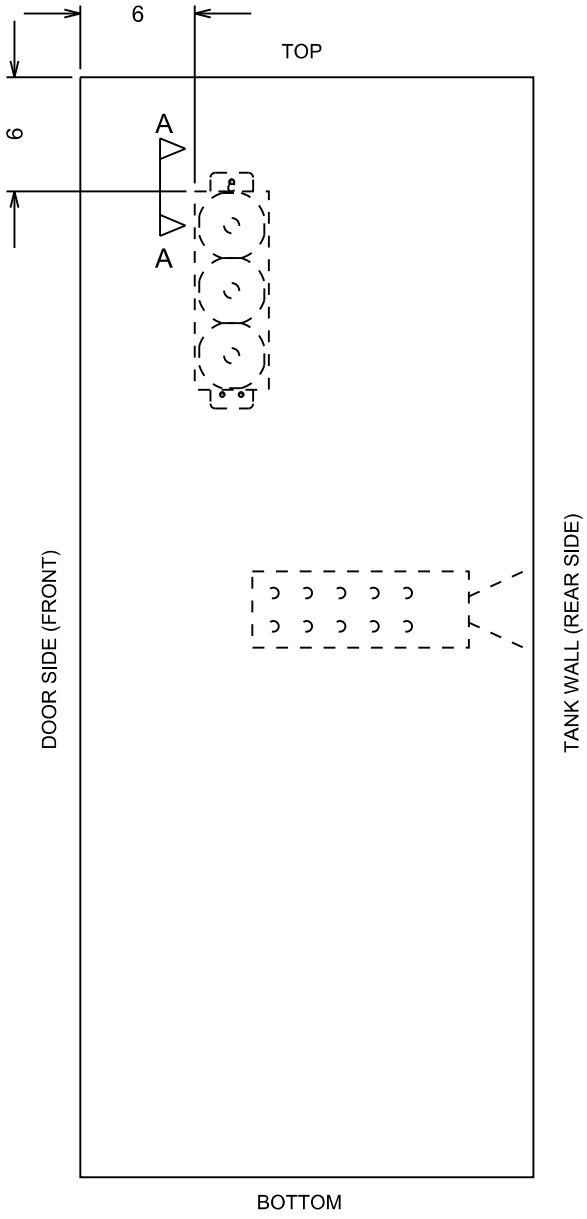


LOCATION OF WARNING LABEL ON FRONT OF PADMOUNT TRANSFORMER JUST ABOVE LOCKING LATCH

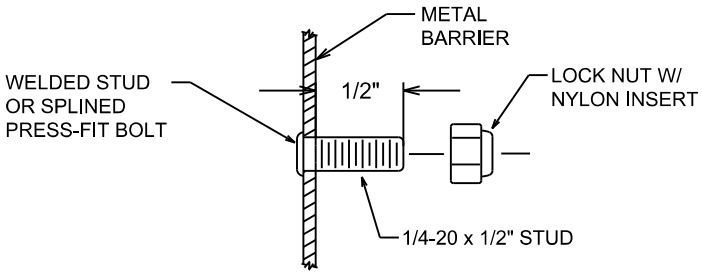


THE DANGER LABELS SHOULD BE ABOVE THE HIGH AND LOW VOLTAGE BUSHINGS TOWARD THE FRONT DOORS

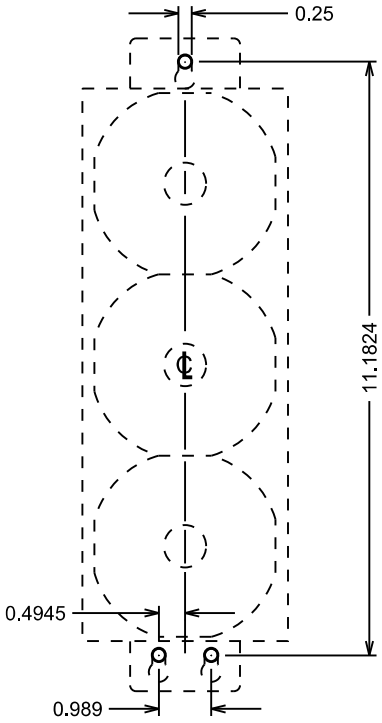
SPECIFICATION 426-13	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S04 OF 5		



SIDE VIEW
METAL BARRIER,
SECONDARY SIDE
(NOT TO SCALE)



DETAIL A
SECTION VIEW A-A
MOUNTING PROVISION
(NOT TO SCALE)



DETAIL B
MOUNTING PROVISIONS - LAYOUT
(NOT TO SCALE)

Note: All dimensions in inches

SPECIFICATION 426-13	CPS ENERGY	APPROVED: 2017-03-31
DRAWING S05 OF 5		