

## TECHNICAL SPECIFICATIONS

### OIL FILLED PADMOUNTED THREE PHASE TRANSFORMERS

#### I. GENERAL

This specification covers three phase wye-wye and delta-wye padmounted transformers and is used in conjunction with the Specifications for Distribution Transformers; Pad Mount -General.

#### II. COMPONENTS

All components shall be installed in accordance with component manufacturers' instructions.

#### III. BUSHINGS, TERMINALS AND ACCESSORIES

- III.1. A dial indicator oil level gauge will be supplied and installed in the secondary compartment of each transformer.
- III.2. Six high voltage epoxy or nylon bushing wells with removable studs (GE 9U03-BRB001, Cooper BW150R / 800-32, ERMCO 9U03DAR125, HI 0061-100272-406, ABB 2B10537H01) suitable for receiving load break inserts to permit use on a loop feed system and five parking brackets shall be supplied per Exhibit III. All 4 kV transformers shall be equipped with 25 kV components except fuses and isolation links, as shown below.
- III.3. Six 26kV bushing inserts with drain lug, including dust covers, shall be supplied and installed. Installation to include bonding these inserts to ground. (Bond with #14 solid Bare Copper) JEA ITEM ID "BUSWI001" as approved in the JEA Master Mater Catalog, Electric are the only units acceptable.  
URL – <https://apps.jea.com/MaterialsCatalog/emmc.pdf>
- III.4. All low voltage bushings shall be supplied with NEMA spades with at least four available holes for 500kVA and below. Low voltage bushings on 750kVA and above units shall be supplied with eight hole NEMA spades.
- III.5. The Neutral low voltage Bushing shall be grounded using a stranded cable or other method that does not interfere with installation of the JEA connector system using all but the last two bolt holes of the Neutral Spade. The requirements of III.4 above must be met.
- III.6. Secondary Bushing Supports
  - III.6.1. Supports shall be provided for all spades with 8 or more holes.
  - III.6.2. Supports shall allow for the installation of secondary connector systems extending beyond the spades toward the cabinet door without any modification by JEA. I.e.
  - III.6.3. The support cannot extend below the top of the spade unless it is thinner than the spade.
  - III.6.4. Shall not detract from the minimum useable number of holes.
  - III.6.5. Approved Support style can be seen in Exhibit VI, Any alternatives Must be approved by Standards.
- III.7. Two tank ground lugs shall be supplied and installed (Anderson GTCS-34A, Dossert TGC8-50M, ITT Blackburn TTC2, Maclean Power Systems BVC-207 or Penn-Union HGSE-020). One ground lug shall be installed in the primary compartment and one ground lug shall be installed in the secondary compartment about 17 inches below the primary bushings and about 10 inches from the compartments divider.
- III.8. Under-oil arrestors (GE or Cooper) with disconnect switch shall be furnished in all 4 kV padmounted transformers. (Delta-Wye Units)
- III.9. All transformer tank tops shall have at a minimum 2.33 square foot removable plate for access to the bushings and fuse connections allowing entry of the upper torso inside the tank.
- III.10. All transformers shall have a steel drip tray welded to the tank wall, angling down and toward the right, close to the center divider, so oil will run down the divider as shown in EXHIBIT I.

- III.11. A temperature gage with well and temperature sweep hand to record highest temperature reached since reset will be included (Qualitrol 150-101-01).
- III.12. Transformers shall be equipped with oil-immersed bayonet overload sensing fuse holders with RTE series or ERMCO bayonet fuses. In addition, the transformers shall also be equipped with internal oil-immersed isolation links to protect against internal transformer faults. Isolation links shall be RTE or ELSP BACKUP fuses can be used. Fuse and isolation link are to be sized in accordance with manufacture's specifications.
- III.13. Alternate suppliers to the above listed components will be evaluated for use.
- III.14. One Load Break Switch shall be installed inside the transformer cabinet on the Primary side before the fuse (example location can be seen in EXHIBIT V).
- III.15. H0-X0 Grounding Strap needs to be Braided Copper.

#### **IV. ADDITIONAL REQUIREMENTS**

- IV.1. Transformers shall be labeled with the JEA ITEM ID on the outside of the transformer. The label shall be placed on the back of the transformer cabinet on the top right so as to be visually viable to our fork lift operators (primary side of the transformer). This labeling shall have a black background with yellow reflective characters and are to be made with 3M Scotchlite Sheetings (Series 3200) and 3M Ink and Toners. Individual characters or a single label may be used. Labels are to be 1" tall with 3/4" characters. Other labeling to accomplish this purchase must be approved by the Design, Construction and Material Standards department of JEA before implementation.
- IV.2. All three phase compartment doors shall be designed with a three point latch so the secondary terminals are accessible without opening the primary compartment, i.e. a deliberate action is necessary to gain access to the primary terminations.
- IV.3. JEA normal practice is to use bayonet fuses to energize and de energize Padmount Transformers when only secondary connection work is required. The removal and replacement of the bayonet fuses must be able to be accomplished with the Hot Stick in a horizontal position. Cabinet design and door height must allow for this function. This can be a problem on smaller KVA units and may require the cabinet top to be higher than it might be for other users. See EXHIBIT 1 for detail dimensional requirements.
- IV.4. Three 5/16" Dia. holes shall be Drilled or Punched into the Skirt of the enclosure in order to accommodate three FCI (Purchased Separately). These holes are to be capped during shipment to prevent any water leakage. The holes shall be located on the Transformer's Primary side at the top of the Skirt even with the center line of the door. (see EXHIBIT IV for example location).
- IV.5. The lid of the compartment shall be a lift door that can only be opened once both front doors are in the open position. It must come with a method to keep the Lid in an open position.
- IV.6. The Compartment side panels shall not be doors, part of the front doors, or swing extension for the front doors.

#### **V. IMPEDANCE**

Unless otherwise noted, Impedance Voltage, as measured on the rated voltage tap or connection shall be 5.75% on all classifications on KVA sizes 750 and larger. Tolerances of impedance voltage shall be  $\pm 7.5\%$  of specified value.

#### **VI. MOUNTING**

- VI.1. Transformers shall be compatible with JEA standard concrete mounting pads. (See Exhibit II).
- VI.2. The base of the assembly shall be provided with a suitable flange as shown on Exhibit II, to permit anchoring the unit on the pad from within the cable terminating compartments.
- VI.3. Two stainless steel hold down cleats shall be provided for bolting each transformer into place. The cleats shall be supplied for anchoring the front sill to the pad. The cleats shall be attached to the parking stand holder to prevent loss during shipping. (See exhibit II).

## VII. WARNING, DANGER, SAFETY & SHRUB LABELS

VII.1. A bilingual Warning Label shall be affixed outside, on the front center of transformer. Approved manufacture Warning Labels for JEA item ID SIGNS001 are:

- UTICOM part# U7510WWN-ES-JEA-10
- ALMETEK part# 11659

As a future reference see JEA ITEM ID "SIGNS001" in the "JEA Master Mater Catalog, Electric" for the only labels acceptable/approved. Online at: URL: <https://apps.jea.com/MaterialsCatalog/emmc.pdf>

VII.2. A bilingual Danger Label shall be affixed inside, on the tank center below bushings. Approved manufacture Danger Labels for JEA item ID SIGNS002 are:

- UTICOM part# U5251075DP-JEA-10
- ALMETEK PART# 11548

As a future reference see JEA ITEM ID "SIGNS002" in the "JEA Master Mater Catalog, Electric" for the only labels acceptable/approved. Online at: – <https://apps.jea.com/MaterialsCatalog/emmc.pdf>

## VIII. RATING

The following is the "Transformer Ratings" table for primary and secondary voltages, BIL and KVA ratings

### WYE -WYE Transformers

TRANSFORMER RATINGS

ITEM ID	KVA SIZES	PRIMARY VOLTAGE	SECONDARY VOLTAGE	BIL (KV)
TRAPA000	75	4160 GrdY/2400	208Y/120	60
TRAPA001	150	4160 GrdY/2400	208Y/120	60
TRAPA002	300	4160 GrdY/2400	208Y/120	60
TRAPA003	500	4160 GrdY/2400	208Y/120	60
TRAPA004	750	4160 GrdY/2400	208Y/120	60
TRAPA009	75	4160 GrdY/2400	480Y/277	60
TRAPA005	150	4160 GrdY/2400	480Y/277	60
TRAPA006	300	4160 GrdY/2400	480Y/277	60
TRAPA007	500	4160 GrdY/2400	480Y/277	60
TRAPA008	750	4160 GrdY/2400	480Y/277	60
TRAPB000	75	13200 GrdY/7620	208Y/120	95
TRAPB001	150	13200 GrdY/7620	208Y/120	95
TRAPB003	300	13200 GrdY/7620	208Y/120	95
TRAPB004	500	13200 GrdY/7620	208Y/120	95
TRAPB005	750	13200 GrdY/7620	208Y/120	95
TRAPB006	1000	13200 GrdY/7620	208Y/120	95
TRAPB016	1500	13200 GrdY/7620	208Y/120	95
TRAPB015	75	13200 GrdY/7620	480Y/277	95
TRAPB007	150	13200 GrdY/7620	480Y/277	95
TRAPB009	300	13200 GrdY/7620	480Y/277	95
TRAPB010	500	13200 GrdY/7620	480Y/277	95
TRAPB011	750	13200 GrdY/7620	480Y/277	95
TRAPB012	1000	13200 GrdY/7620	480Y/277	95
TRAPB013	1500	13200 GrdY/7620	480Y/277	95
TRAPB017	2000	13200 GrdY/7620	480Y/277	95 *
TRAPB014	2500	13200 GrdY/7620	480Y/277	95 *

### TRANSFORMER RATINGS (CONT)

ITEM ID	KVA SIZES	PRIMARY VOLTAGE	SECONDARY VOLTAGE	BIL (KV)
TRAPC000	75	25565 GrdY/14760	208Y/120	125
TRAPC001	150	25565 GrdY/14760	208Y/120	125
TRAPC002	300	25565 GrdY/14760	208Y/120	125
TRAPC003	500	25565 GrdY/14760	208Y/120	125
TRAPC004	750	25565 GrdY/14760	208Y/120	125
TRAPC005	1000	25565 GrdY/14760	208Y/120	125
TRAPC006	1500	25565 GrdY/14760	208Y/120	125
TRAPC015	75	25565 GrdY/14760	480Y/277	125
TRAPC007	150	25565 GrdY/14760	480Y/277	125
TRAPC009	300	25565 GrdY/14760	480Y/277	125
TRAPC010	500	25565 GrdY/14760	480Y/277	125
TRAPC011	750	25565 GrdY/14760	480Y/277	125
TRAPC012	1000	25565 GrdY/14760	480Y/277	125
TRAPC013	1500	25565 GrdY/14760	480Y/277	125
TRAPC029	2000	25565 GrdY/14760	480Y/277	125 *
TRAPC014	2500	25565 GrdY/14760	480Y/277	125 *
TRAPC016	3750	25565 GrdY/14760	480Y/277	125 *

\* Due to unit weight, delivery must be scheduled with the receiving location 72 hours in advance of arrival.

### DELTA -WYE Transformers

ITEM ID	KVA SIZES	PRIMARY VOLTAGE	SECONDARY VOLTAGE	BIL (KV)
TRAPA019	300	4160 Delta	480Y/277	60
TRAPC027	1000	4160 Delta	480Y/277	60
TRAPC030	500	13200 Delta	480Y/277	95
TRAPC026	750	13200 Delta	480Y/277	95
TRAPC031	1500	13200 Delta	480Y/277	95
TRAPC032	2500	13200 Delta	480Y/277	95 *

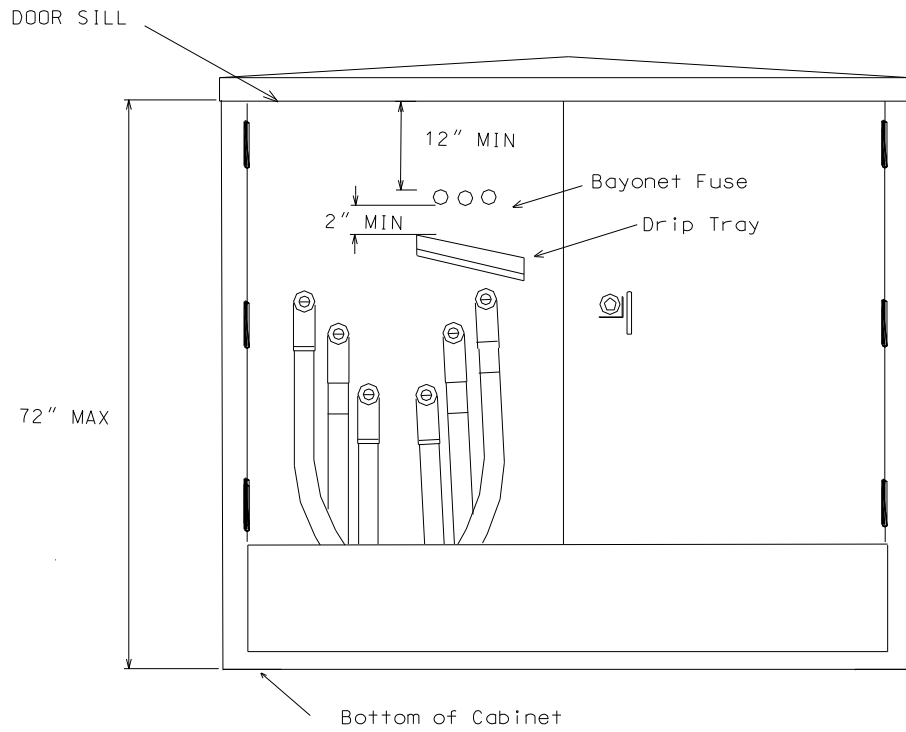
\* Due to unit weight, delivery must be scheduled with the receiving location 72 hours in advance of arrival.

## IX. TRANSFORMER TAPS

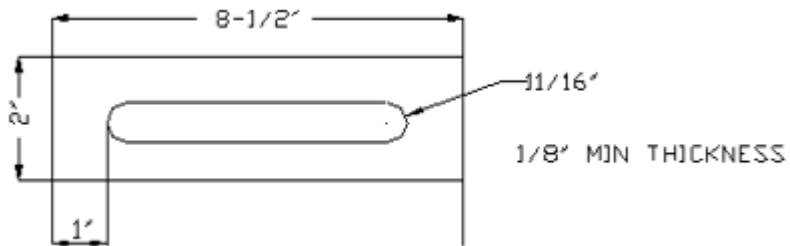
### IX.1. TAP CHANGER

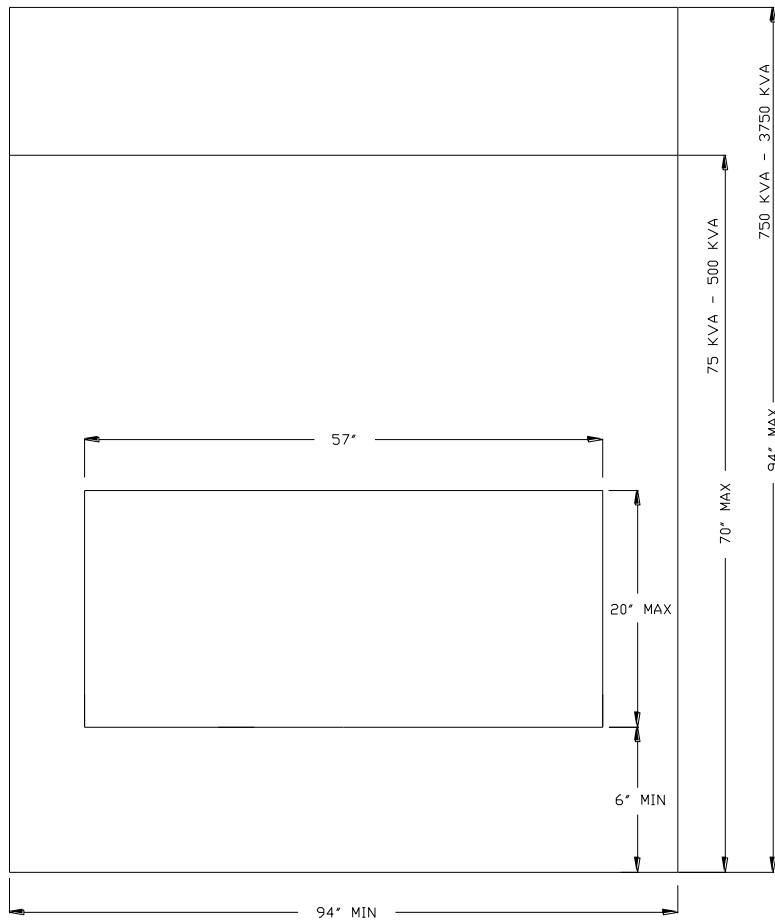
Tap changers will be furnished on all transformers. Tap changers will have two positions above and below nominal voltage of 2-2.5% each for a total range of 10%. External handles shall be furnished with tap changers on 167 KVA and smaller. Larger than 167 KVA may have external tap changers with external handles, but a handhole will be furnished when internal tap changers are used. Tap changers shall have a positive "Snap Action" or "Cam Action" operation. Manufacturer may supply any of the following approved manufacturer's tap changer switch.

Central Moloney  
Cooper Power System  
ABB



## EXHIBIT I





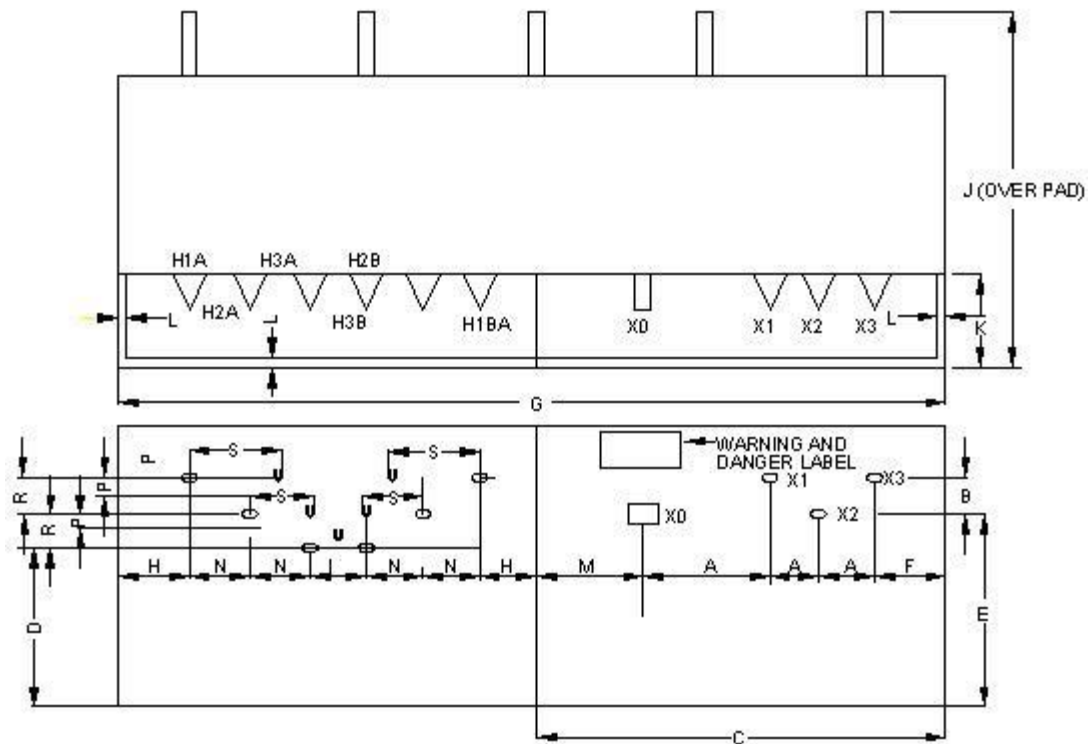
THREE PHASE TRANSFORMER  
75 KVA - 3750 KVA: STANDARD DIMENSION SINGLE 3-PHASE PADMOUNT  
CONCRETE MOUNTING PAD DIMENSIONS

## EXHIBIT II

	75 kVA - 500 kVA	750 kVA - 3750 kVA
	DIMENSIONS	DIMENSIONS
A	8" $\pm$ 1/8"	8" $\pm$ 1/8"
B	8" $\pm$ 1/8"	8" $\pm$ 1/8"
C	31" MIN	31" MIN
D	27" $\pm$ 1/8"	27" $\pm$ 1/8"
E	31" $\pm$ 1/2"	46" $\pm$ 1/2"
F	5-1/2" MIN **	5-1/2" MIN **
G	64" MIN (94" MAX) ***	64" MIN (94" MAX) ***
H	3-1/2" MIN **	3-1/2" MIN **
I	4kV/13kV=9" MIN 26kV=12" MIN	4kV/13kV=9" MIN 26kV=12" MIN
J	70" MAX	94" MAX
K	23" MIN	23" MIN
L	3/4" MIN (1-1/2" MAX)	3/4" MIN (1-1/2" MAX)
M	5.5" MIN	5.5" MIN
N	4-1/2" MIN	4-1/2" MIN
P	1" MIN	1" MIN
R	6" MIN	6" MIN
S	6.5"	6.5"

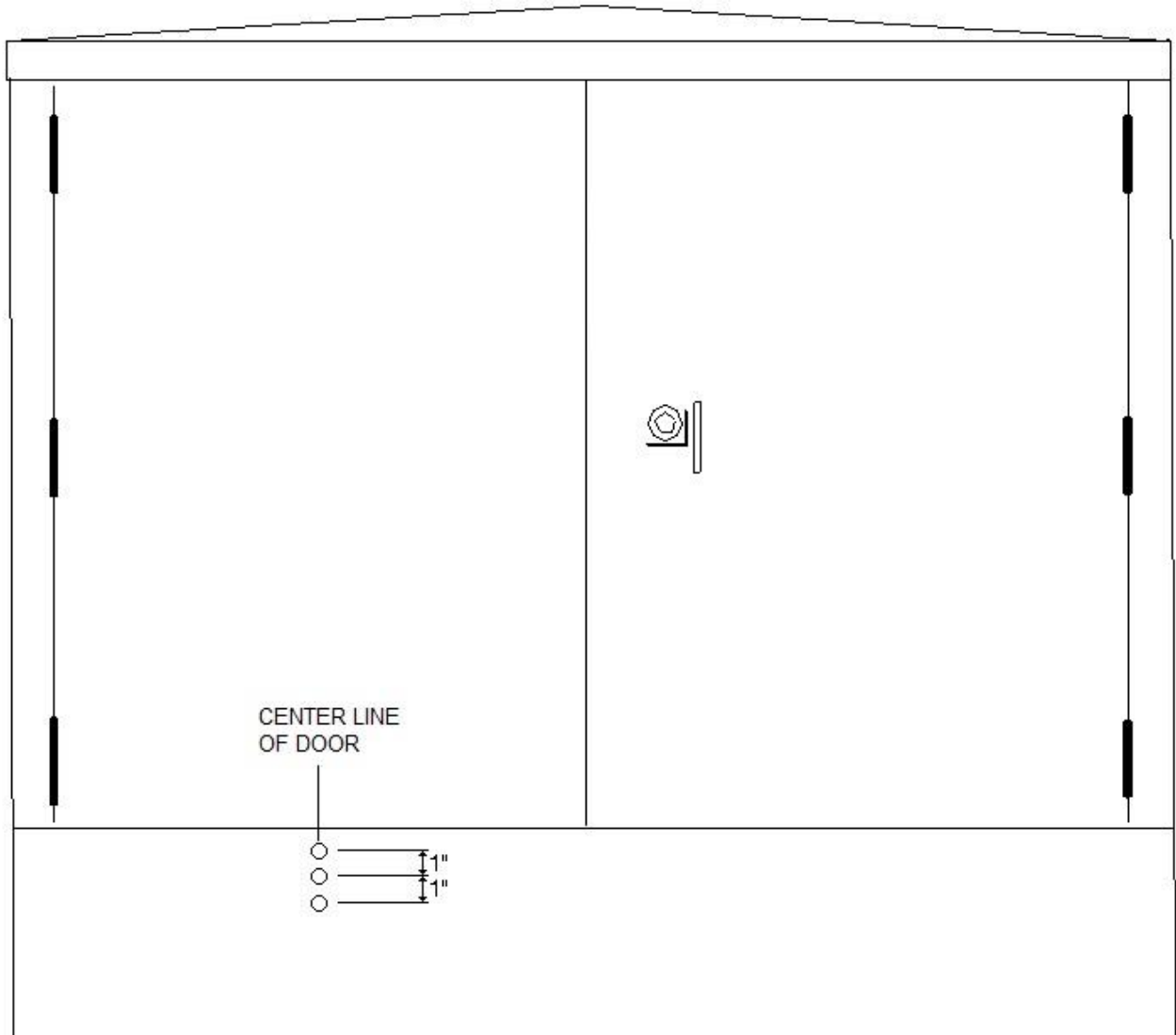
\*\* "CLEAR" OF CABINET DOOR LIP, SIDE BRACING, ETC.

\*\*\* TANK, CABINET AND COOLING FINS MUST REMAIN OVER PAD.  
COOLING FINS FOR 3750 kVA UNITS MAY EXTEND UP TO 12" BEYOND  
TRANSFORMER PAD.



THREE PHASE TRANSFORMER  
75 kVA - 3750 kVA  
DRAWING NOT TO SCALE

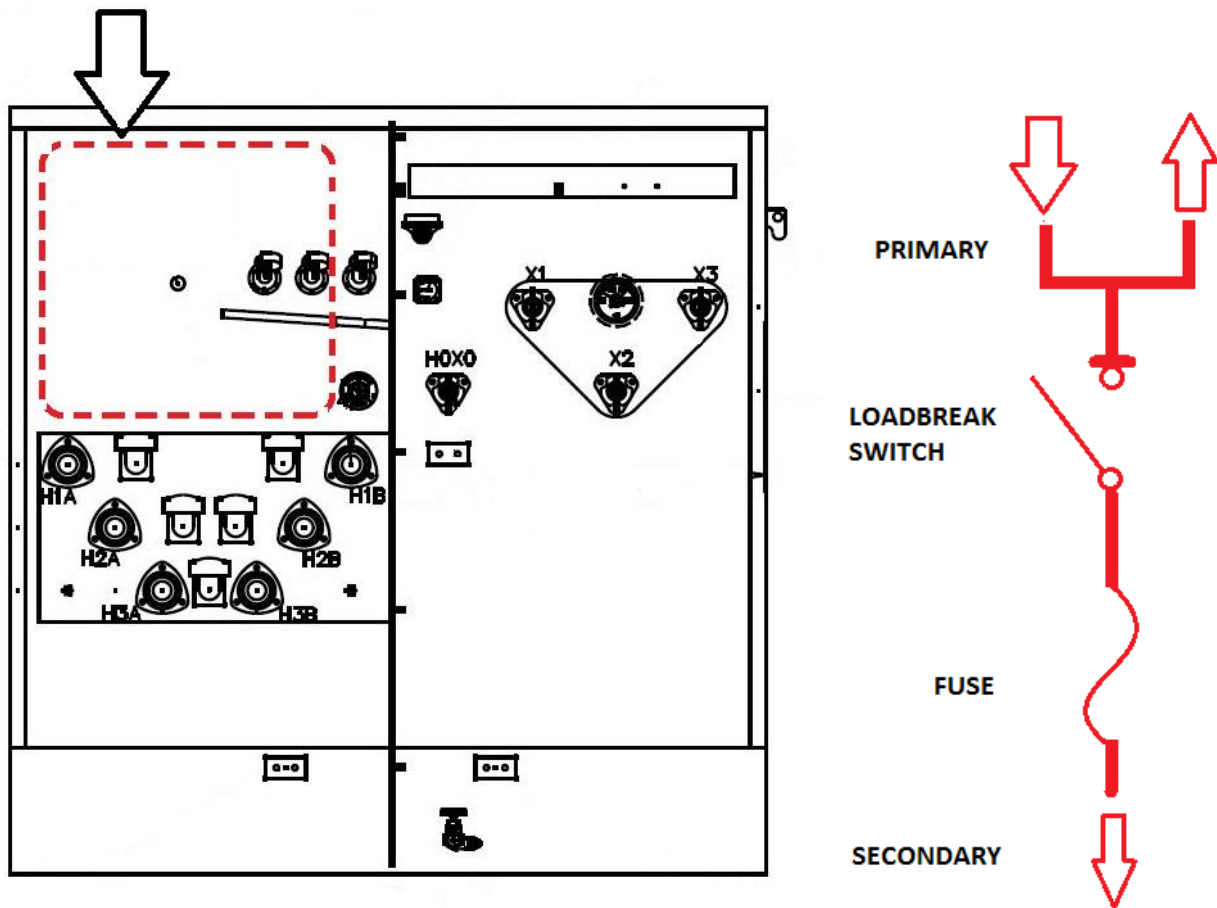
## EXHIBIT III



EXAMPLE LOCATION OF THE THREE 5/16" DIA. HOLES ON  
THREE PHASE PADMOUNT TRANSFORMER

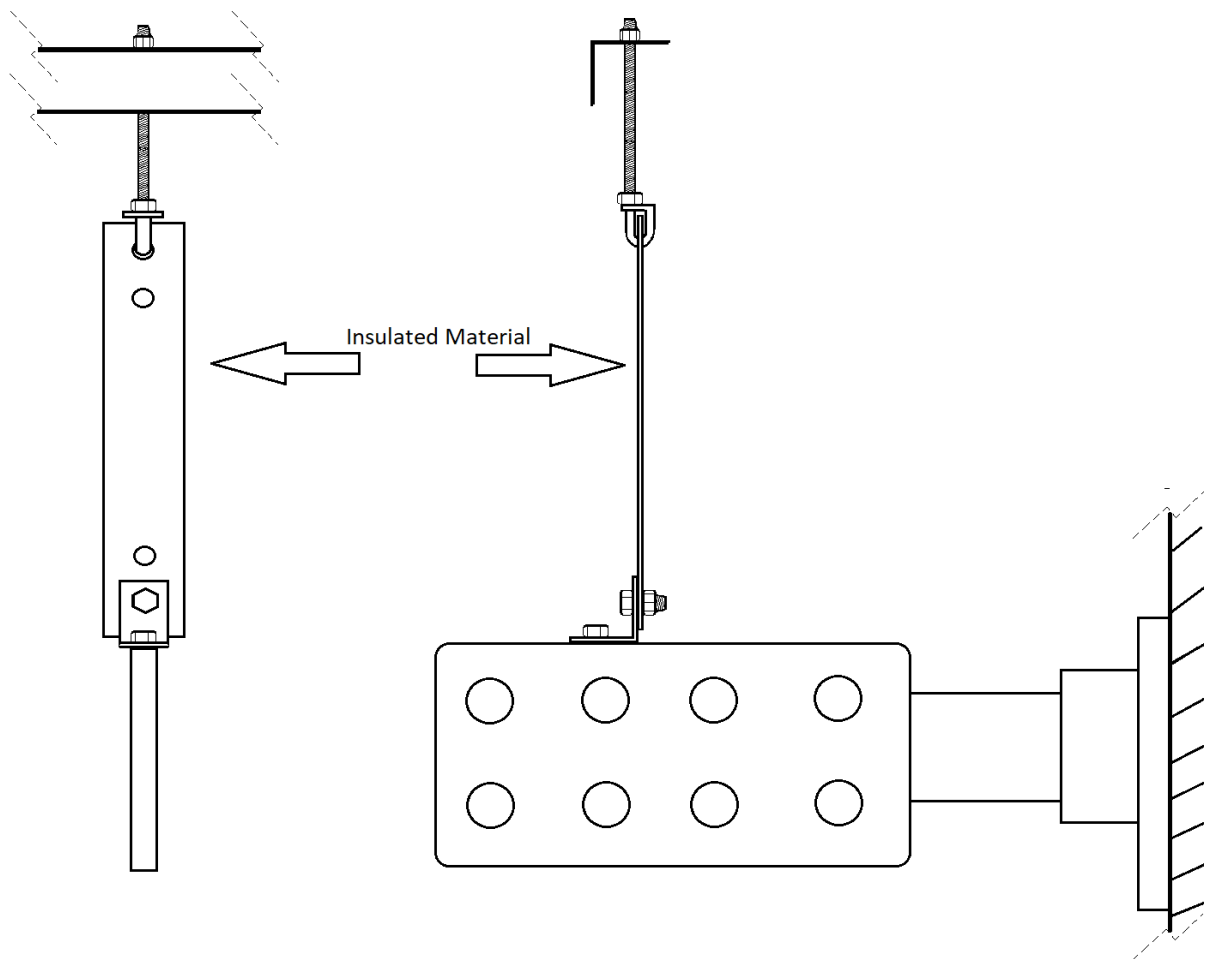
## EXHIBIT IV





EXAMPLE LOCATION OF A LOAD BREAK SWITCH ON  
A THREE PHASE PADMOUNT TRANSFORMER

## EXHIBIT V



EXAMPLE DRAWING OF DESIRED SPADE SUPPORT

## EXHIBIT VI

## Adjustments

Date	Change	Author
7/20/17	Changed the Picture of the three 5/16" dia. hole locations on page 10	PARKTA
7/20/17	Adjusted the Hole location description in IV.4 on page 2	PARKTA
8/16/17	Removed the Transformers of Rating list that had Triangle indications page 3 and page 4.	PARKTA
8/16/17	Removed off Transformer Rating list the Baldwin transformers page 4	PARKTA
8/16/17	Removed Section X. 23KV-27KV Baldwin Transformer Taps page 5	PARKTA
8/16/17	Removed Baldwin Tap Changer Label in Exhibit IV page 9	PARKTA
8/16/17	Changed Label for Exhibit V to Exhibit IV and Exhibit VI to Exhibit V page 10 and page 11.	PARKTA
8/16/17	Changed Exhibit V callout to Exhibit IV and Exhibit VI callout to Exhibit V page 2.	PARKTA
6/1/20	Added Requirement IV.5 to have Lift lids for compartment of Tx, page 2	PARKTA
6/1/20	Added Requirement IV.6 to not allow side panel swing doors, page 2	PARKTA
7/20/20	Added Exhibit VI for visual reference on the Desired Spade Brace Style on page 10	PARKTA
7/30/20	Overhaul to III.6 on page 1	PARKTA
10/29/20	Section III. Removed Reference to "Approval prior to bid opening is required"	PARKTA
8/24/23	Corrected Drawing of Cleat in Exhibit I	PARKTA
8/24/23	Checked and updated Part numbers on pg1	PARKTA
8/24/23	Combined Delta-Wye Spec into this Spec, Table was added from D-W spec below W-W tables on pg4.	PARKTA
3/14/24	Wording change on VII on pg 3.	PARKTA