

THREE-PHASE PADMOUNT TRANSFORMER APPLICATION

- Installation of 12.5kV WYE primary three-phase transformers providing either 208Y/120V (4-wire), 480Y/277V (4-wire), 480V (3-wire), or 240V delta secondary.
  - Engineer is responsible for ordering properly sized transformer with required secondary voltage.
  - Elbow arresters shall be installed in the last transformer of a radial feed or at an open point in a loop feed configuration.
  - All primary conduit required for each installation shall be ordered by engineer.
  - See (U0005) for obstruction clearances around transformer.
  - If primary cables are expected to be left exposed to the elements for an extended period of time, cable ends shall be permanently sealed with heat shrink cap (GH).
  - See (U0025) for three-phase transformer identification and labeling requirements.
  - H0 and X0 bushings (when present) are NOT internally bonded by manufacturer.
1. Fuse (FV) and fuse holder (for transformers rated 1,000 kVA and smaller) are furnished and installed by transformer manufacturer.
  2. Ground straps on H0 and X0 bushings (for WYE-WYE transformers) are furnished and installed by transformer manufacturer.
  3. Secondary spade terminals vary in size depending on transformer KVA rating.
  4. Transformer must be de-energized before operating tap changer.
  5. Primary cables shall only enter beneath left half of transformer pad (viewed from the front). Secondary cables shall only enter beneath right half of transformer pad (viewed from the front). See page-5 for acceptable cable entrance areas.
  6. Secondary cables may be customer owned or NIPSCO owned. If secondary conductors route directly to customer service entrance, then customer shall own all secondary cables and conduit. If secondary conductors are required to route to secondary cabinet, then NIPSCO shall own and install cable and conduit to secondary cabinet. Customer shall own cable and conduit from secondary cabinet to service entrance.
  7. Label all cable ends with permanent paint stick to supplement finished labeling with tags (EA1).
  8. 1-1/2" rigid metal conduit shall be installed for metering control cable. See ER 13-210 for metering requirements.
  9. When meter socket is required to be installed on transformer pad, extend pad width by 8" to allow mounting structure. See page-5 for pad requirements.
  10. Instrument voltage transformers shall be installed on low-voltage side of high/low-voltage barrier wall. See ER 13-210 for metering requirements.

INCLUDED MATERIAL

| FIG MARK | STANDARD MATERIAL DESCRIPTION                                           | STANDARD | MATL #    | PM3L-### | PM3R-### | PM3R-D## |
|----------|-------------------------------------------------------------------------|----------|-----------|----------|----------|----------|
| (AM2)    | Clamp, Hot Tap, Copper, 400-#6 x 2/0-#6                                 | M 11-840 | 300056601 | -        | 3        | 3        |
| (AX1)    | Bolt-Terminal, 1/2" x 1-1/2"                                            | M 4-794  | 300006806 | 8        | 8        | 6        |
| (BL5)    | Connector, Compression, Terminal, #2/0 Str CU                           | M 19-440 | 300055876 | 4        | 4        | 3        |
| (CU)     | Lock, Pad, Company, General Purpose                                     | M 41-250 | 300047527 | 1        | 1        | 1        |
| (HF2)    | Clamp, 5/8" Ground Rod, 2/0                                             | M 11-750 | 300057810 | 1        | 1        | 1        |
| (IE1)    | Arrestor, Elbow, 12.5/7.2kV, 8.4kV MCOV                                 | M 1-660  | 300058173 | -        | 3        | -        |
| (IE2)    | Arrestor, Elbow, 15kV, 12.7kV MCOV                                      | M 1-660  | 300057176 | -        | -        | 3        |
| (J1)     | Wire, No. 6 Bare Cu, S.D.                                               | M 80-500 | 300059370 | -        | 6'       | 6'       |
| (J5)     | Wire, 2/0, Bare Stranded, SD Cu                                         | M 80-500 | 300059393 | 24'      | 24'      | 24'      |
| (JB)     | Transformer, Pad Mount, Three-Phase, Loop, Wye-Wye (Size as Required)   | M 73-520 | NA        | 1*       | 1*       | -        |
| (JC)     | Transformer, Pad Mount, Three-Phase, Loop, Wye-Delta (Size as Required) | M 73-525 | NA        | -        | -        | 1*       |
| (U)      | Connector, "C" Shape, Compression, Tap, Parallel, Cu                    | M 19-400 | Varies    | 6        | 3        | 3        |
| (U5)     | Connector, "C" Shape, 1/0-2/0 Str to #8-#2 Str                          | M 19-400 | 300056897 | -        | 3        | 3        |
| (U6)     | Connector, "C" Shape, 1/0-2/0 Str to 1/0-2/0 Str                        | M 19-400 | 300056897 | 2        | 2        | 1        |

\* denotes material ordered separately by engineer.

REFERENCE MATERIAL

| FIG MARK | STANDARD MATERIAL DESCRIPTION                                            | STANDARD | MATL #    |
|----------|--------------------------------------------------------------------------|----------|-----------|
| (EA1)    | Tag, Identification, Cable, Indoor                                       | M 66-907 | 300046918 |
| (FV)     | Fuse-Link, Pad Mount Protection (Size as Required)                       | M 33-149 | NA        |
| (GH)     | Cap, Cable, Heat Shrink (Size as Required)                               | M 10-300 | NA        |
| (IM)     | Arrestor, Parking Stand, 12.5/7.2kV, 8.4.kV MCOV                         | M 1-670  | 300058179 |
| (IN)     | Cable, Concentric, EPR, Jacketed, 15kV, 3/C, Al or Cu (Size as Required) | M 8-678  | NA        |
| (J)      | Wire, Copper, Bare (Length as required)                                  | M 80-500 | NA        |

INCLUDED MATERIAL

(U0010) Terminations

# Transformer -Three-Phase

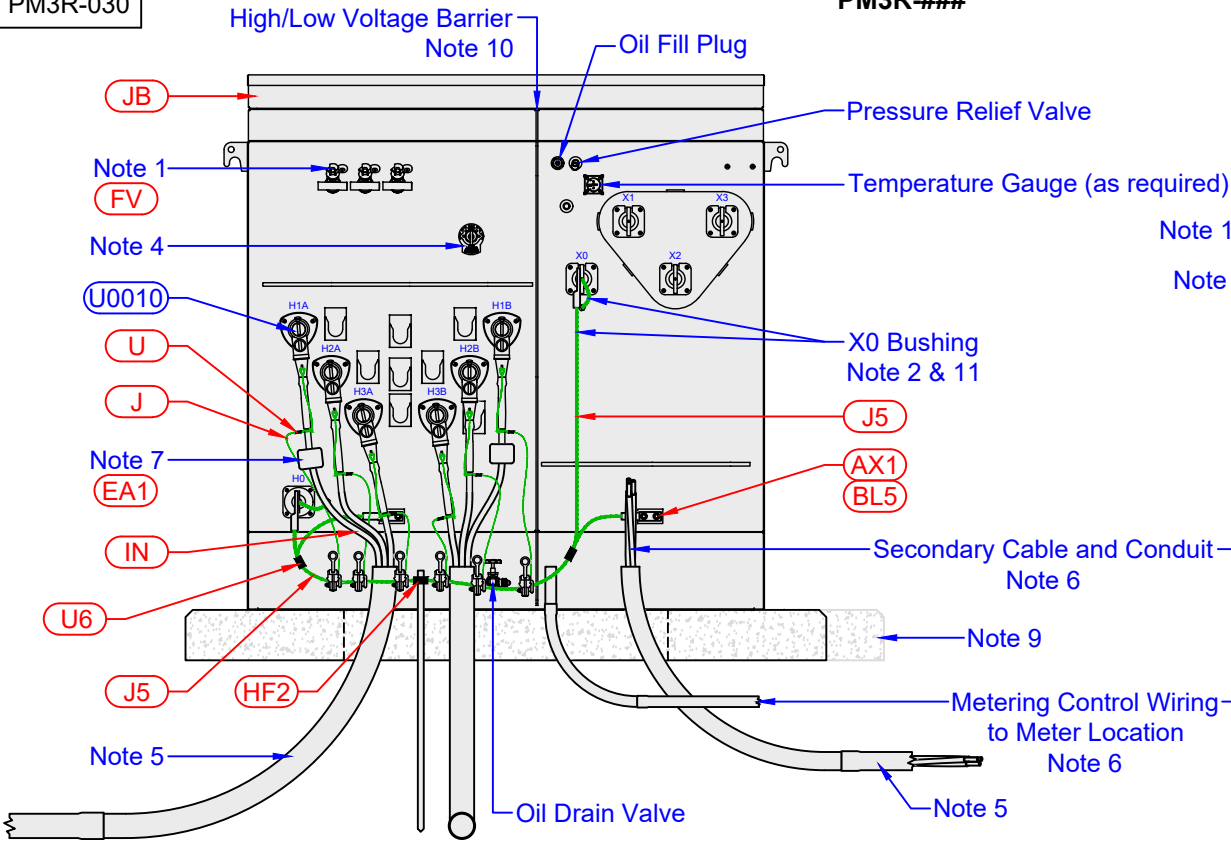
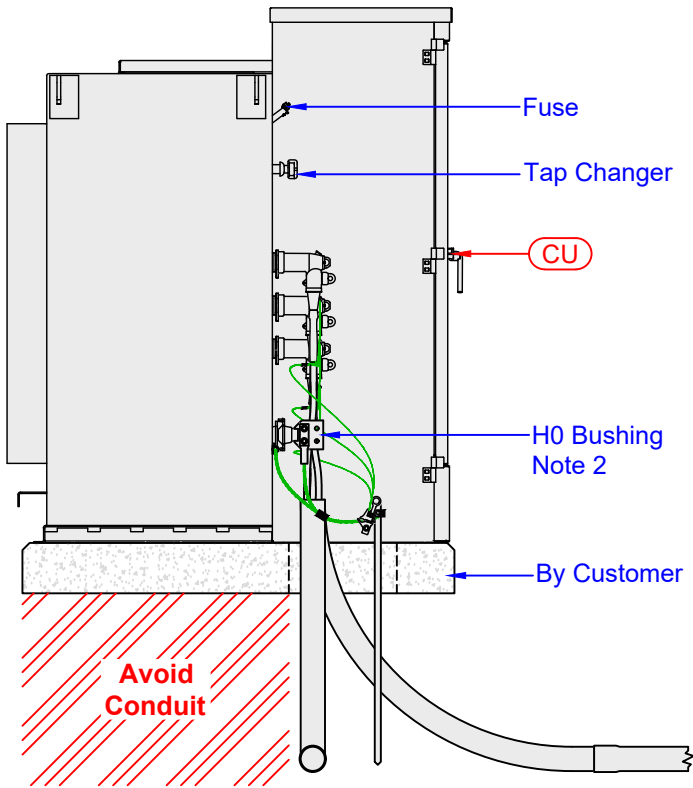
## WYE-WYE LOOP TRANSFORMER APPLICATION

- 12.5kV closed wye primary (loop or radial feed) with 208Y/120V (4-wire), 480Y/277V (4-wire), or 480V (3-wire) secondary.
- In loop circuit configurations where transformer is at a normally open (N.O.) point, one circuit shall be parked on parking stand arresters (IM) and unused transformer bushings shall have an 8.4kV MCOV elbow arrester (IE1) installed on each phase. Separately order parking stand arresters (assembly #16070620) and elbow arresters (assembly #16070600); one unit issued per assembly.

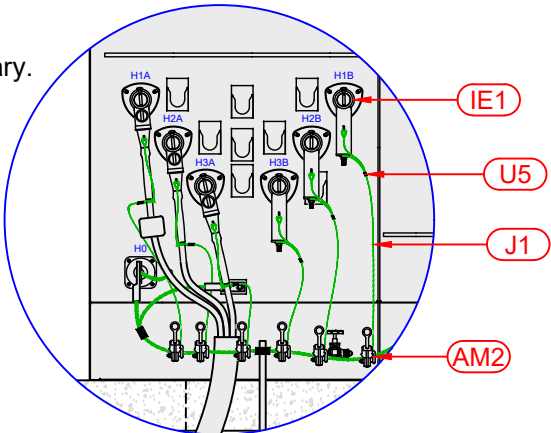
11. For 480Y volt (3-wire) service: do not use X0 bushing. Remove ground strap from X0 bushing then tape.

## TRANSFORMER ASSEMBLIES

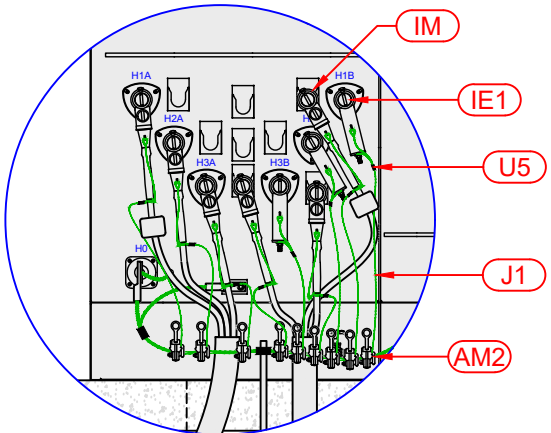
|                                    | Primary Cable Size |          |          |
|------------------------------------|--------------------|----------|----------|
|                                    | #2                 | #2/0     | #4/0     |
| Closed Loop Circuit, Wye Secondary | PM3L-010           | PM3L-020 | PM3L-030 |
| Radial Circuit, Wye Secondary      | PM3R-010           | PM3R-020 | PM3R-030 |



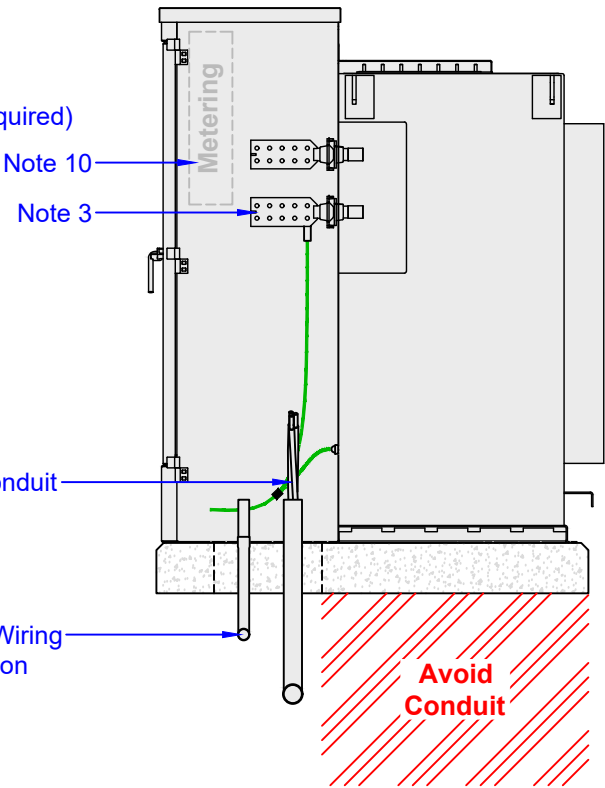
Loop Feed - PM3L-###



Radial Feed  
PM3R-###



Loop Feed  
with N.O.



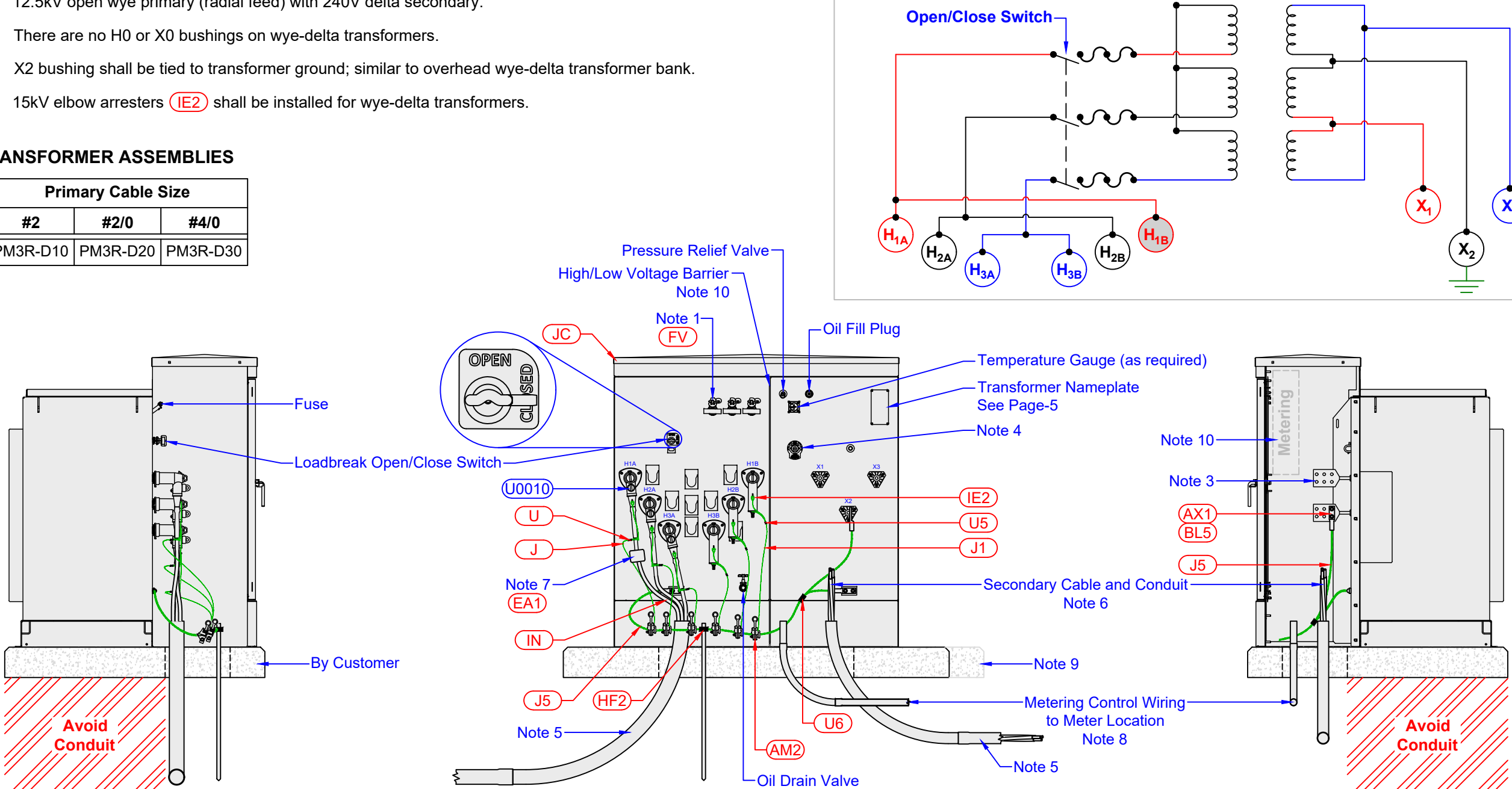
# Transformer -Three-Phase

## WYE-DELTA LOOP TRANSFORMER APPLICATION

- 12.5kV open wye primary (radial feed) with 240V delta secondary.
- There are no H0 or X0 bushings on wye-delta transformers.
- X2 bushing shall be tied to transformer ground; similar to overhead wye-delta transformer bank.
- 15kV elbow arresters (IE2) shall be installed for wye-delta transformers.

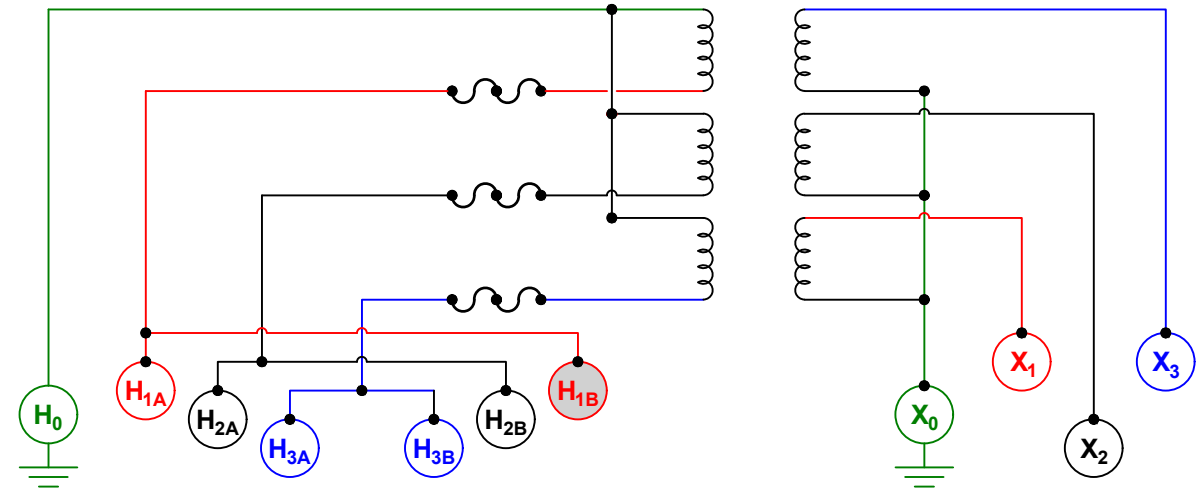
## TRANSFORMER ASSEMBLIES

| Primary Cable Size |          |          |
|--------------------|----------|----------|
| #2                 | #2/0     | #4/0     |
| PM3R-D10           | PM3R-D20 | PM3R-D30 |

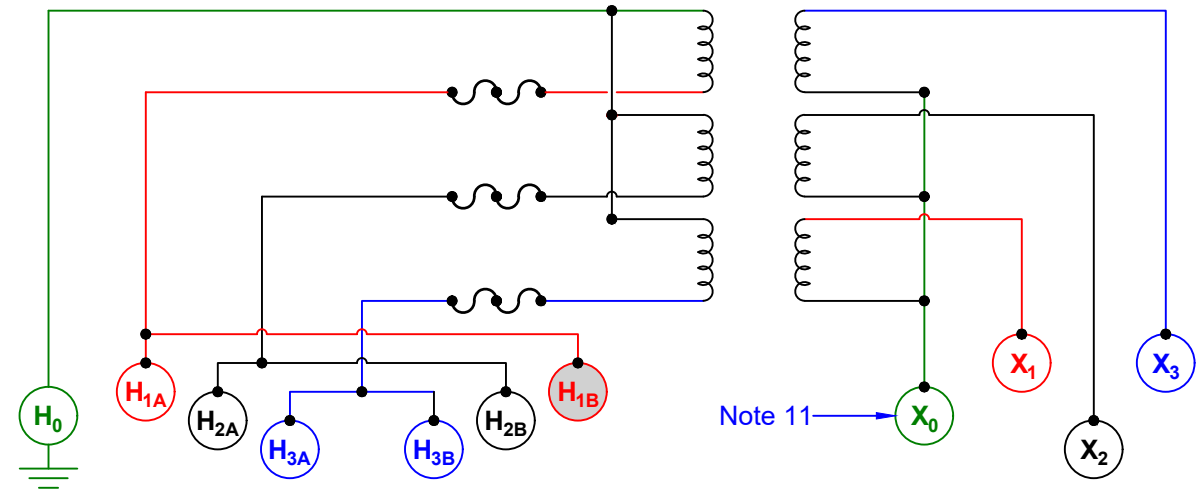


## 208Y/120V (4-WIRE), 480Y/277V (4-WIRE), 480V (3-WIRE) TRANSFORMER INTERNAL WIRING

- The same padmount transformer is used for both 480Y/277V (4-wire) secondary and 480Y (3-wire) secondary. 480Y (3-wire) secondary is considered an ungrounded wye service providing same voltage as 480V delta.



12.5 kV Wye Primary; 208Y/120V Secondary  
12.5 kV Wye Primary; 480Y/277V Secondary

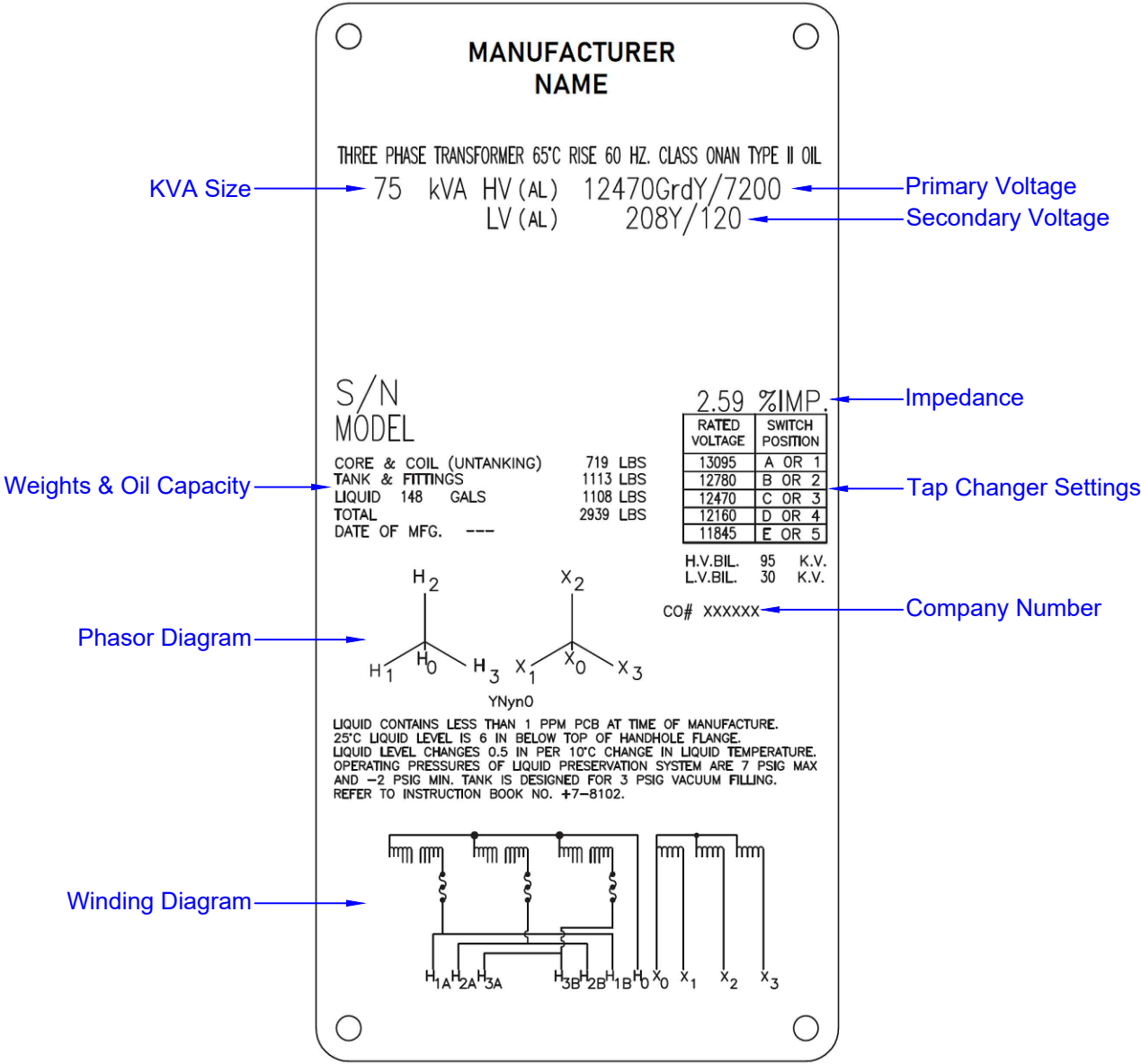


12.5 kV Wye Primary; 480Y 3-Wire Secondary

11. 480Y volt (3-wire) service: do not use X0 bushing. Remove ground strap from X0 bushing then tape.

## TRANSFORMER NAMEPLATE

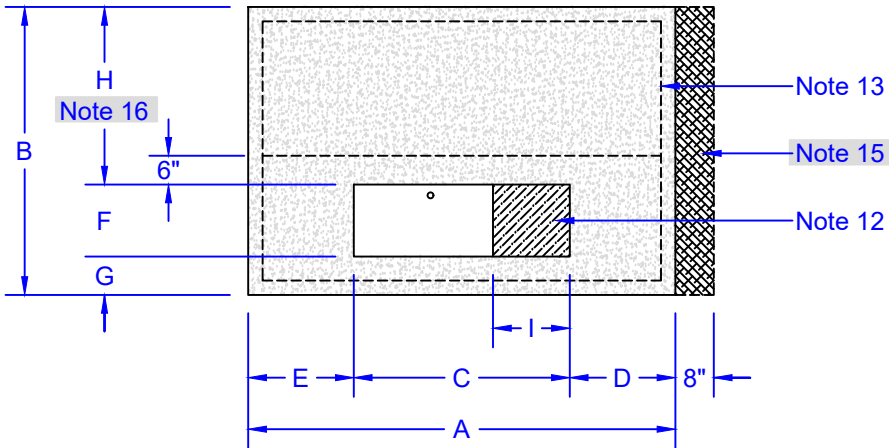
- Each transformer is required to have a diagrammatic nameplate in the low voltage transformer compartment.



POURED PAD FOUNDATION DIMENSIONS

- See **U0020** for sub-base requirements below concrete pad foundation.
- Region in which service conduits may be installed.
  - Rebar shall be completely encased within concrete pad 2" from bottom and 3" from outside edges.
  - Concrete shall have a minimum compressive strength of 3000 psi.
  - Additional 8" section of foundation added for meter installation. Cubic yard volume listed does not include additional metering extension.
  - Avoid conduit in this area under the heaviest portion of the transformer.
  - Each transformer shall have one (1) driven ground with a resistance as low as practical, and in all cases, should be less than 25 Ohms. If driven ground cannot meet this requirement with two (2) vertical 6'-0" rods, then an additional 6'-0" rod shall be added using rod coupling to reach the 25 Ohm value for the driven ground. A single driven ground shall not exceed three (3) total vertical rods.

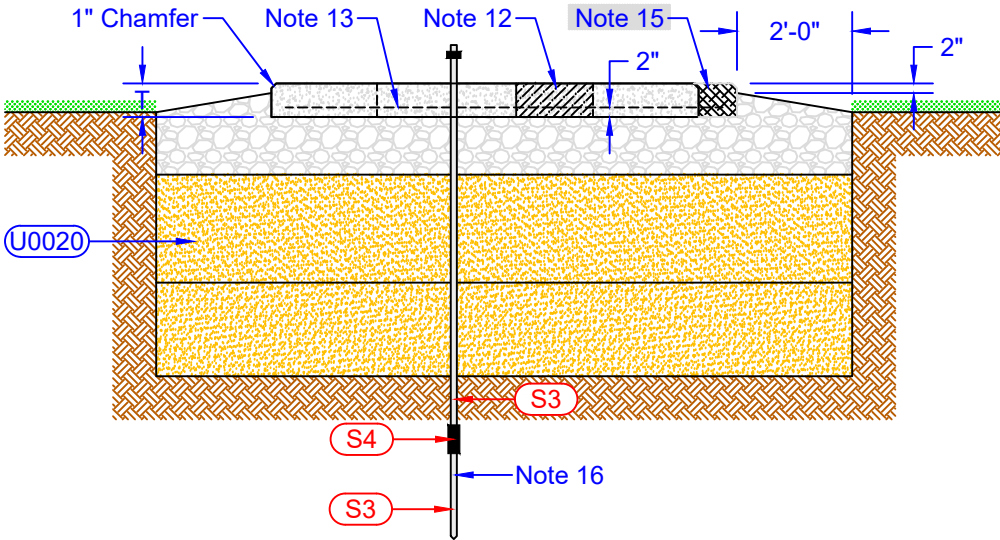
| Pad Number | Dimensions (in) |     |    |      |      |    |   |    |    |   | Concrete Volume (CY) |
|------------|-----------------|-----|----|------|------|----|---|----|----|---|----------------------|
|            | A               | B   | C  | D    | E    | F  | G | H  | I  | T |                      |
| 1          | 89              | 60  | 45 | 22   | 22   | 15 | 8 | 37 | 16 | 6 | 0.59                 |
| 2          | 91              | 80  | 50 | 20.5 | 20.5 | 16 | 8 | 56 | 19 | 6 | 0.83                 |
| 3          | 130             | 93  | 50 | 40   | 40   | 16 | 8 | 69 | 19 | 6 | 1.45                 |
| 4          | 130             | 106 | 57 | 36.5 | 36.5 | 16 | 8 | 82 | 22 | 8 | 2.2                  |
| 5          | 130             | 116 | 58 | 36   | 36   | 16 | 8 | 92 | 22 | 8 | 2.43                 |



TRANSFORMER PAD NUMBER SELECTION

| Pad Number | 208Y/120V                   | 480Y/277V<br>480V Delta | Transformer Rating (kVA) | 240V Delta                  |                          |
|------------|-----------------------------|-------------------------|--------------------------|-----------------------------|--------------------------|
|            | Service Amps                | Service Amps            |                          | Service Amps                | Transformer Rating (kVA) |
| 1          | 100, 200, 300, 400, 600     | 100, 200                | 75, 150                  | 100, 200, 300, 400, 600     | 50, 150                  |
| 2          | 800, 1000, 1200, 1600, 2000 | 300, 400, 600, 800      | 75, 150, 225, 300, 500   | 800, 1000, 1200, 1600, 2000 | 150, 300, 500            |
| 3          | 2400, 3000, 3600, 4000      | 1000, 1200, 1600        | 300, 500, 750, 1000      | -                           | -                        |
| 4          | -                           | 2000, 2400              | 750, 1000, 1500          | -                           | -                        |
| 5          | -                           | 3000, 3600, 4000        | 1000, 1500, 2000, 2500   | -                           | -                        |

TRANSFORMER PAD SUB-BASE



INCLUDED MATERIAL

| FIG MARK  | STANDARD MATERIAL DESCRIPTION         | STANDARD | MATL #    | QUANTITY |
|-----------|---------------------------------------|----------|-----------|----------|
| <b>S3</b> | Rod, Ground, 5/8" x 6'-0", Copperclad | M 58-400 | 300058073 | 2        |
| <b>S4</b> | Rod, Ground, Coupling, Bronze         | M 58-400 | 300057862 | 1        |