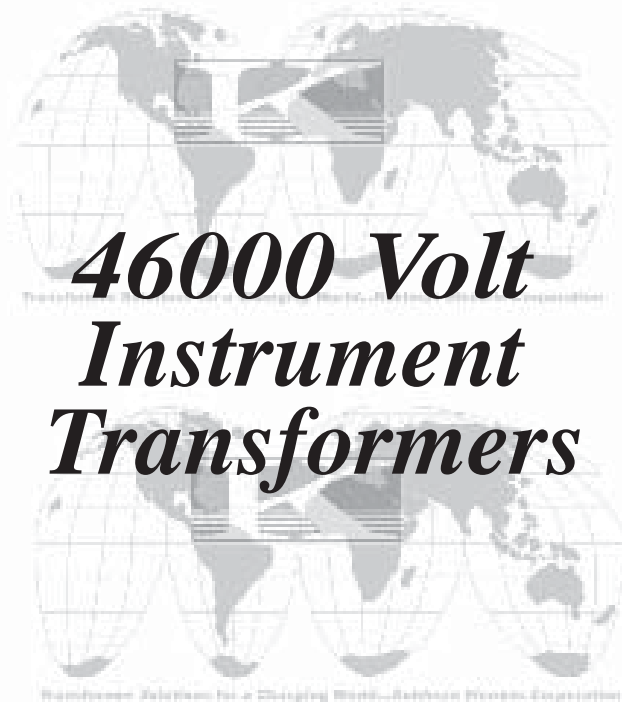


# *Kuhlman Electric Corporation*



| <b>Description</b>  | <b>Model</b>   | <b>Page</b> |
|---|----------------|-------------|
| Wound, Dry-Type VT (High Accuracy available)                            | U/VRU-52(H)    | 3-4         |
| Wound, Oil-Filled VT (High Accuracy available)                          | POF-250 (DB)   | 5-6         |
| Wound, Dry-Type CT  | CE-046         | 7-8         |
| Wound, Oil-filled CT (High Accuracy available)                          | COF(CXM)-250   | 9-10        |
| Wound, Oil-Filled, Station Service Voltage Transformer                  | SSVT-250       | 11-12       |
| Wound, Oil-Filled, Single Phase Metering Unit (High Accuracy available) | KA-48(KXM-250) | 13-14       |
| Wound, Oil-Filled, Three Phase Metering Unit (High Accuracy available)  | MVCT(MXM)-250  | 15-16       |

### application

The VRU-52(H) outdoor voltage transformer is rated for use on 46,000 volt systems with 250kV BIL. Primary voltage ratios are available from 190.4:1 to 693:1 for use on 46,000 volt systems, at 60 Hertz (Hz). This dry-type, solid-cast voltage transformer will operate with high accuracy for metering or relay applications.

### mechanical description

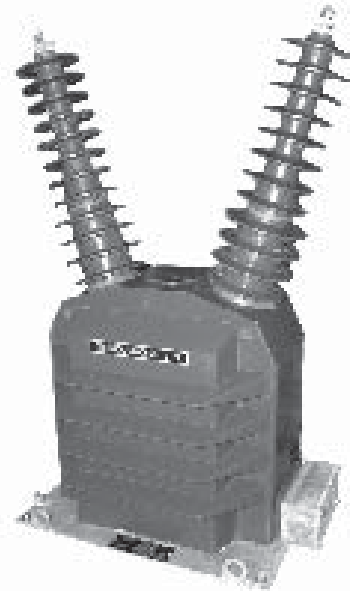
The core and coil assembly is wound and encapsulated in a high dielectric strength epoxy resin to provide high withstand capabilities. The external line to ground insulation consists of a cycloaliphatic epoxy resin that provides excellent arc track properties in addition to ultraviolet resistance and strong physical strength. The primary terminal(s) are M12 stud with a compression type lug for #8 - #2 AWG conductors. The clamp-type post secondary terminals have 1/4"-20 slotted screws and associated hardware located inside a removable terminal box with two (2) 1" NPT conduit hubs.

### accuracy performance

The VRU-52 will operate with 0.3 Class accuracy for metering and relay applications with burdens of 0, W, X, M, Y, Z and ZZ. The VRU-52H will operate with 0.15 Class accuracy for metering applications with burdens of 0, W, X, M, Y and Z. The transformer is accurate from 90% to 110% of rated primary voltage.

### mounting

The VRU is designed for mounting on poles or substation structures in an upright position. The mounting holes in the heavy galvanized steel plate are punched to industry standard dimensions for interchangeability in the field.



### testing

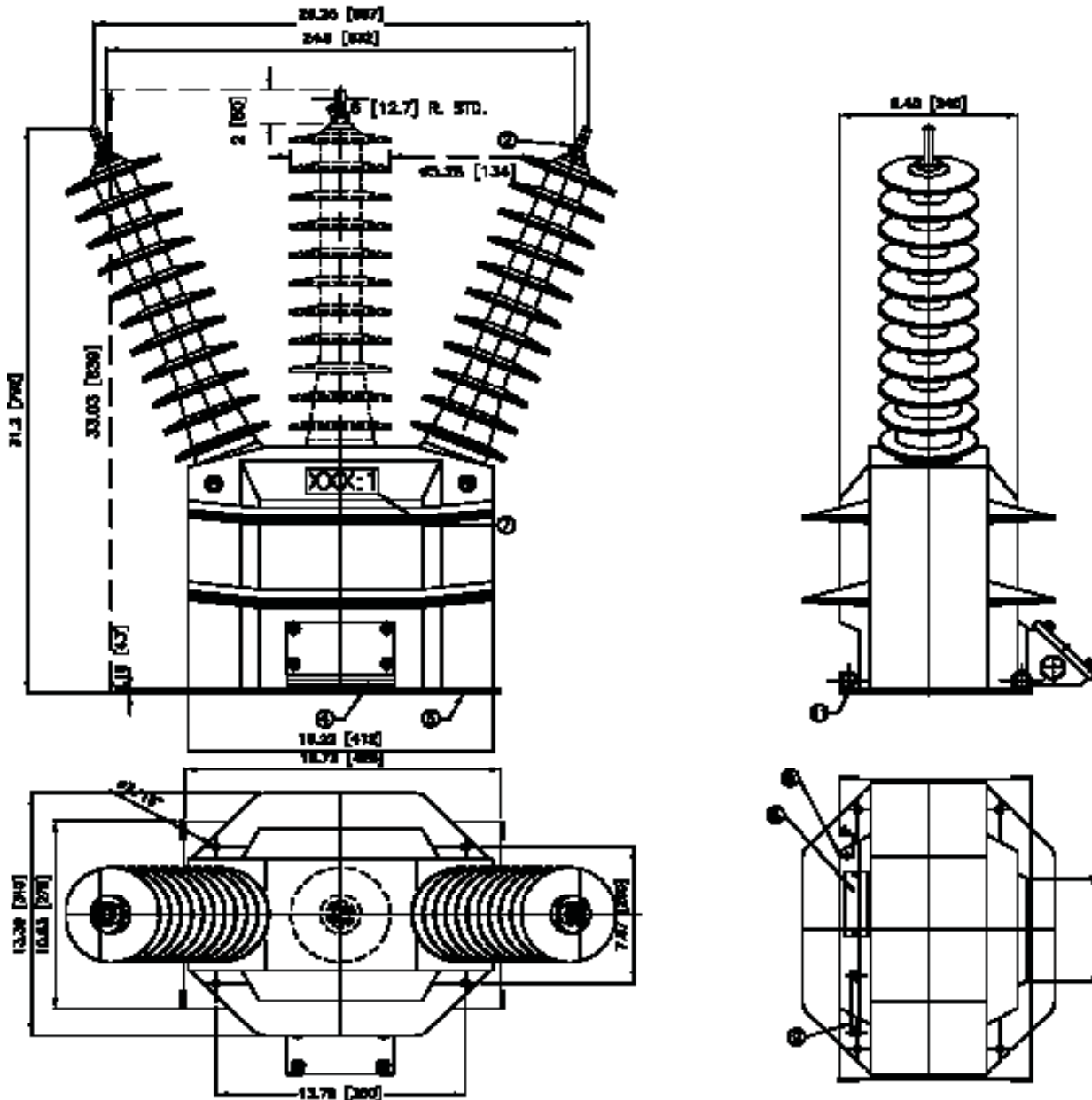
The unit is individually tested per the IEEE C57.13 standard, including applied and induced voltage, accuracy and polarity. Partial discharge testing is performed to guarantee the unit is free of partial discharge through 120% of the nominal system voltage.

### options

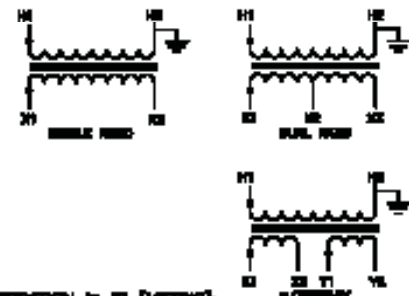
Units are available with dual system voltage ratings and/or in single or double bushing models. Contact factory for other needs.

| ORDERING INFO FOR U/VRU-52 |         |           |                |           |                     | HIGH ACCURACY U/VRU-52H                        |                     |
|----------------------------|---------|-----------|----------------|-----------|---------------------|--|---------------------|
| Ratio                      | Primary | Secondary | Catalog Number |           | Accuracy/<br>Burden | Catalog<br>Number                              | Accuracy/<br>Burden |
|                            |         |           | 1 Bushing      | 2 Bushing |                     |  |                     |
| 240:1                      | 27600   | 115       | H914G240S0     | H914240S0 | 0.3 0,W,X,M,Y,Z,ZZ  | Contact<br>factory<br>for<br>catalog<br>number | 0.15 0,W,X,M,Y,Z    |
| 240:1:1                    | 27600   | 115 & 115 | H914G240Y0     | H914240Y0 | 0.3 0,W,X,M,Y,Z,ZZ  |  | --                  |
| 240/400:1                  | 27600   | 115/69    | H914G240D0     | H914240D0 | 0.3 0,W,X,M,Y,Z,ZZ  |  | 0.15 0 to Z / Y     |
| 400:1                      | 46000   | 115       | H914G400S0     | H914400S0 | 0.3 0,W,X,M,Y,Z,ZZ  |  | 0.15 0,W,X,M,Y,Z    |
| 400:1:1                    | 46000   | 115 & 115 | H914G400Y0     | H914400Y0 | 0.3 0,W,X,M,Y,Z,ZZ  |  | --                  |
| 400/693:1                  | 46000   | 115/69    | H914G400D0     | H914400D0 | 0.3 0,W,X,M,Y,Z,ZZ  |  | 0.15 0 to Z / Y     |

- Thermal Burden Rating (Typical): 4000VA max; Tap & Tertiary Windings (2500VA).
- Overvoltage Rating: 1.1x cont.



- NOTES (DIMENSIONS IN INCHES [mm]):
- CONSTRUCTION: CORE/COIL ASSEMBLY IS VACUUM ENCAPSULATED IN CYCLOALIPHATIC RESIN.
  - PRIMARY TERMINALS ARE #12 STD WITH A COMPRESSION TYPE LUG FOR #6-#4 AWG CONDUCTOR. THE STD IS NON-REMOVABLE.  
MAXIMUM TORQUE: 18.5 lbf-in [2.1 N-m].  
MAXIMUM STATIC LOAD: 110 lb [50kg], ANY DIRECTION.
  - SECONDARY TERMINALS ARE CLAMP-TYPE POSTS SUITABLE FOR #14-#1 AWG WITH 1/4-20 STAINLESS STEEL SLOTTED SCREW & FLAT-WASHER.  
TORQUE VALUE 50 lbf-in [5.6 N-m] TYPICALLY.
  - SECONDARY CONDUIT BOX IS THERMOPLASTIC WITH (2) 1"-11.5 N.P.T. HUBS & BLANKING PLUGS. A KNOCKOUT FOR 1" [30] CONDUIT IS ACCESSIBLE IN THE BOTTOM. A REMOVABLE COVER IS ATTACHED WITH (4) SEALING-TYPE THUMB SCREWS.
  - BASEPLATE IS STEEL, HOT-DIPPED GALVANIZED.
  - METALLIC NAMEPLATE IS RWETED TO BASEPLATE.
  - VOLTAGE RATIO DECAL.
  - GROUND TAB, #0.44 [Ø11] THROUGH HOLE.
  - ATTACHMENT PLATE WITH BELLOWS FOR USER BADGE.
  - POLARITY IS SUBTRACTIVE (SEE WIRING DIAGRAM).  
H1 & X1 POLARITY IS HIGHLIGHTED IN WHITE ON UNIT.
  - (4) #0.75 [Ø18] LIFTING EYES.



**ELECTRICAL SPECIFICATION IN SI (METRIC):**  
 >TEMPERATURE CLASS - 130°C  
 >STROKE - 32.37" [820]  
 >CREEP - 61.08" [1552]  
 >CONNECTION IS LINE-LINE or LINE-GROUND  
 (SINGLE BUSHING IS LINE-GROUND ONLY)  
 PROVIDED THE CONNECTED VOLTAGE DOES NOT EXCEED THE RATED PRIMARY TERMINAL VOLTAGE.  
 >APPROXIMATE NET WEIGHT: 384 LBS [174 kg].

# POF-250 (DB) Voltage Transformer

Outdoor 46kV, 250kV BIL, Single & Dual Ratios (w/ Tertiary)  
Oil-Filled, Wound Type, Metering/Relaying

**46000 Volt**

March 2008

## application

The POF-250 (DB) outdoor voltage transformer is rated for use on 46,000 volt systems with 250kV BIL. Primary voltage ratios are available from 190.4:1 to 693:1 for use on 46,000 volt systems, at 60 Hertz (Hz). This oil-filled instrument voltage transformer will operate with high accuracy for metering or relay applications.

## mechanical description

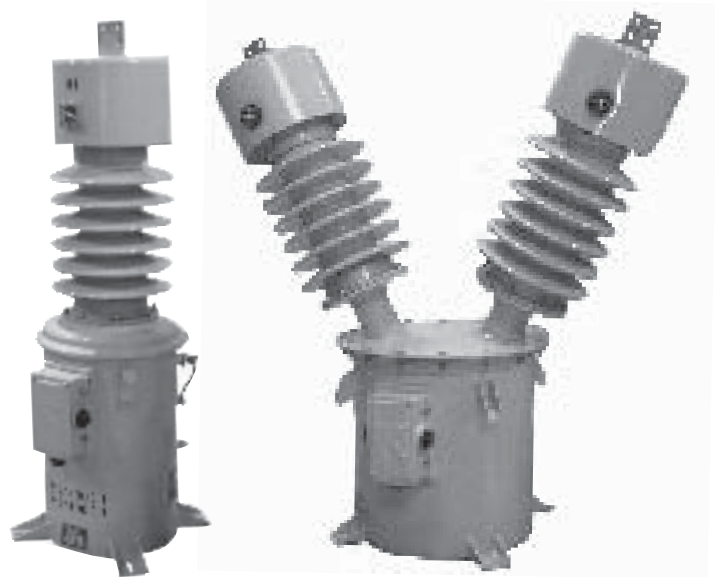
The tank and expansion chambers are steel plate, pressure and vacuum tight and hermetically sealed at the factory to prevent breathing and oil contamination. Expansion chambers allow for the expansion/contraction of oil for temperature and load fluctuations. Tank components are washed and coated with anticorrosive iron phosphate and then finished with ANSI 70 Gray baked-on electrostatic polyester powder. The primary bushing(s) are ANSI 70 Gray, high strength porcelain with a high degree of stability for transportation and seismic withstand. The primary terminal(s) are stainless steel NEMA 4-hole pad(s). The secondary terminals are 1/4"-20 copper studs with associated hardware located inside a removable terminal box with three (3) 1 1/2" NPT conduit hubs. The ground terminal is a stainless steel NEMA 2-hole pad. The unit is fitted with a 5kV H<sub>0</sub> Bushing (for single bushing designs), pressure relief valve, oil level indicator, 3/4" oil fill plug, and 1/2" drain valve.

## accuracy performance

The POF-250 (DB) will operate with 0.3 Class accuracy for metering applications with burdens of 0, W, X, M, Y, Z and ZZ. Upon request, 0.15 Class metering accuracy is available with burdens of 0, W, X, M, Y and Z, as well as 0.3 ZZ. The transformer is accurate from 90% to 110% of rated primary voltage.

## mounting

The POF is designed for mounting on substation structures with mounting feet in an upright position. Single bushing units can be mounted on poles with ANSI type "A" hanger brackets. NOTE: Must be installed per NESC electrical clearances.



## testing

The unit is individually tested per the IEEE C57.13 standard, including applied and induced voltage, accuracy and polarity. Additional tests include dissipation and partial discharge tests. Partial discharge testing is performed to guarantee the unit is free of partial discharge through 135% of the nominal system voltage.

## options

The POF is available in single or double bushing models, with Extra Creep Bushing(s), Polymer Bushing(s), Stainless Steel Tank, and/or -50°C oil. Contact factory for other needs.

| ORDERING INFO FOR POF-250 (DB) |                   |                                   |                |           | HIGH ACCURACY POF-250 (DB) |   |                     |
|--------------------------------|-------------------|-----------------------------------|----------------|-----------|----------------------------|---|---------------------|
| Ratio                          | Primary           | Secondary                         | Catalog Number |           | Accuracy/<br>Burden        | Catalog<br>Number   | Accuracy/<br>Burden |
|                                |                   |                                   | 1 Bushing      | 2 Bushing |                            |   |                     |
| 200/346.4:1:1                  | 24000             | 120/69.3 & 120/69.3               | H710346TA      | --        | 0.3 0,W,X,M,Y,Z,ZZ         | Add<br>"AAEW"<br>to the<br>end<br>of the<br>standard<br>catalog<br>number | 0.15 0 to Z, 0.3 ZZ |
| 240/400:1:1                    | 27600             | 115/69 & 115/69                   | *H710400TA     | H820400TA | 0.3 0,W,X,M,Y,Z,ZZ         |   | 0.15 0 to Z, 0.3 ZZ |
| 240/400:1:1:1                  | 27600             | (3) 115/69                        | TBD            | TBD       | 0.3 0,W,X,M,Y,Z,ZZ         |   | 0.15 0 to Z, 0.3 ZZ |
| 330:1                          | 37950             | 115                               | --             | H820330SA | 0.3 0,W,X,M,Y,Z,ZZ         |   | 0.15 0 to Z, 0.3 ZZ |
| 330:1:1                        | 37950             | 115 & 115                         | --             | H820330YA | 0.3 0,W,X,M,Y,Z,ZZ         |   | 0.15 0 to Z, 0.3 ZZ |
| 400:1:1                        | 46000             | 115 & 115                         | --             | H820400YA | 0.3 0,W,X,M,Y,Z,ZZ         |   | 0.15 0 to Z, 0.3 ZZ |
| 240/400:1 &<br>400/693:1       | 27600<br>or 46000 | 115/69 & 115<br>or 115 & 115/66.4 | --             | H820693TA | 0.3 0,W,X,M,Y,Z            |   | 0.15 0 to Y, 0.3 Z  |
| 400/693:1:1                    | 46000             | 115/66.4 & 115/66.4               | --             | H820693ZA | 0.3 0,W,X,M,Y,Z,ZZ         |   | 0.15 0 to Z, 0.3 ZZ |
|                                |                   |                                   |                |           | 0.3 0,W,X,M,Y,Z,ZZ         |   | 0.15 0 to Z, 0.3 ZZ |

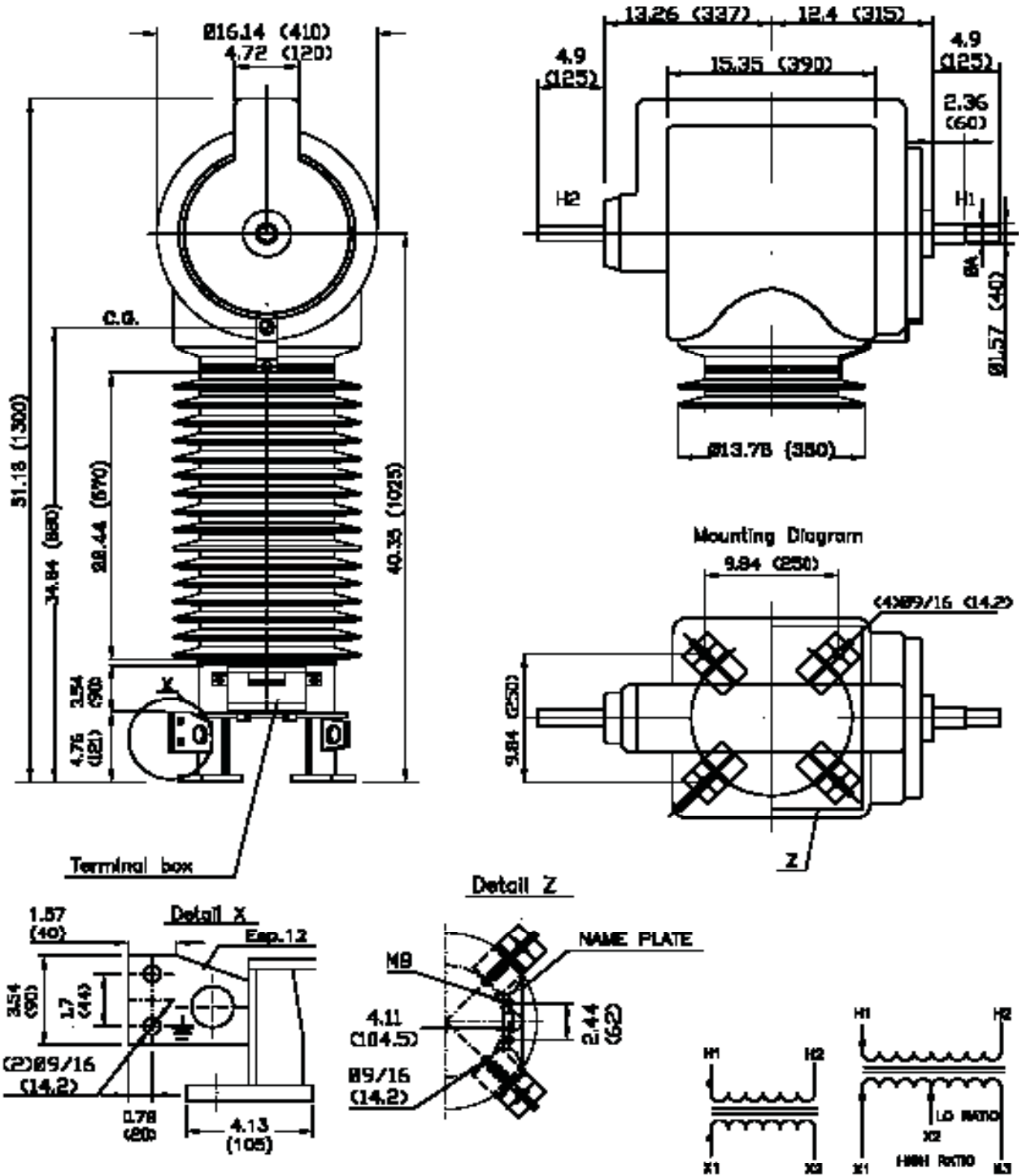
- Thermal Burden Rating (Typical): 5000VA. Dual primary units (4000VA L-G, 7000VA L-L).

- Overvoltage Rating: 1.1x cont., 1.9x 8 hours (single bushing designs).

- IC Approval \*(AE-1182 Rev. 1).







**NOTES: DIMENSIONS IN INCHES [mm].**

- > CONSTRUCTION: CORE/COIL ASSEMBLY IS VACUUM ENCAPSULATED IN CYCLOALIPHATIC EPOXY RESIN.
- > PRIMARY TERMINALS ARE COPPER STUDS SUPPLIED WITH NEMA 4 HOLE CONNECTORS. MAXIMUM STATIC LOAD IS 440 lbs [200 kg] IN ANY DIRECTION.
- > SECONDARY TERMINALS ARE M8 BRASS BOLT WITH FLATWASHER. TORQUE VALUE 50 lbf-in [5.8 N-m] TYP. A SHORTING STRAP IS PROVIDED.
- > SECONDARY CONDUIT BOX HAS A HINGED COVER WITH A 1.5" N.P.T. HUB IN THE BOTTOM.
- > GROUND PAD IS NEMA 2 HOLE.

**ELECTRICAL SPECIFICATIONS:**

- > TEMPERATURE CLASS - 130°C
- > STRIKE - 22.0 [560]
- > CREEP - 75.2 [1910]
- > BA: 1.18 (30) up to 1200A. O/W 1.57 (40)
- > APPROXIMATE NET WEIGHT: 771 lbs [350kg]

NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.

# COF(CXM)-250 Current Transformer

Outdoor 46kV, 250kV BIL, Single, Dual & Multi Ratios  
Oil-Filled, Wound Type, Metering/Relaying

46000 Volt

March 2008

## application

The COF(CXM)-250 outdoor current transformer is rated for use on 46,000 volt systems with 250kV BIL. Primary current ratios are available from 5:5 to 3000:5 at 60 Hertz (Hz) with a Rating Factor of up to 4.0 (3200A max). This oil-filled current transformer will operate with high accuracy for metering or relay applications.

## mechanical description

The tank dome is fabricated from carbon or stainless steel, depending on current rating. The units are pressure and vacuum tight and hermetically sealed at the factory to prevent breathing and oil contamination. Tank components are washed and coated with anticorrosive iron phosphate and then finished with ANSI 70 Gray baked-on electrostatic polyester powder. The bushing is ANSI 70 Gray, high strength porcelain with a high degree of stability for transportation and seismic withstand. The primary terminals are tin plated aluminum, NEMA 4-hole pads for units rated  $\geq 400A$  (copper for units rated  $\geq 2000A$ ) and NEMA 2-hole pads for units rated  $< 400A$ . A bypass protector is provided for all units rated below 1200:5 to protect from transients. The secondary terminals are #10 slotted screws on a short circuiting terminal block located behind a removable cover in the CT base with three (3) 1 1/2" NPT conduit hubs. The ground terminal is a stainless steel NEMA 2-hole pad. The unit is fitted with a pressure relief valve, oil level gauge, and 1/2" drain valve.

## accuracy performance

The COF-250 will operate with 0.3 Class accuracy for metering applications with burdens of B0.1 to B1.8. The unit can be designed with relay accuracy up to C800. The transformer is accurate through its Rating Factor, and can be used continuously to this level. The CXM-250 will operate with 0.15 Class high accuracy for metering applications with burdens of B0.1 to B1.8. The transformer maintains 0.15 Class accuracy from 0.5% of  $I_{nom}$  through its Rating Factor, and can be used continuously to this level.



## mounting

The COF(CXM) is designed for mounting on substations structures in an upright position with four mounting holes in the base.

## testing

The unit is individually tested per the IEEE C57.13 standard, including applied and induced voltage, accuracy and polarity. Additional tests include dissipation and partial discharge tests. Partial discharge testing is performed to guarantee the unit is free of partial discharge through 135% of the nominal system voltage.

## options

The COF(CXM) is available with an Extra Creep Bushing, Polymer Bushing, Stainless Steel Tank, 4kV spark gap and/or -50°C oil. The unit can be offered in single, dual or multiple core designs. Contact factory for other needs.

### ORDERING INFO FOR COF-250

| Ratio       | Catalog Number | Accuracy/<br>Burden | Rating<br>Factor |
|-------------|----------------|---------------------|------------------|
| 5:5         | H950005SA      | 0.3 B1.8            | 1.5              |
| 10:5        | H950010SA      | 0.3 B1.8            | 1.5              |
| ⋮           | ⋮              | ⋮                   | ⋮                |
| 150:5       | H950150SA      | 0.3 B1.8            | 1.5              |
| 200:5       | H950200SA      | 0.3 B1.8            | 1.5              |
| ⋮           | ⋮              | ⋮                   | ⋮                |
| 3000:5      | H953000SA      | 0.3 B1.8            | 1.0              |
| 5/10:5      | H950010DA      | 0.3 B1.8/B1.8       | 2.0/1.5          |
| 10/20:5     | H950020DA      | 0.3 B1.8/B1.8       | 2.0/1.5          |
| ⋮           | ⋮              | ⋮                   | ⋮                |
| 100/200:5   | H950200DA      | 0.3 B1.8/B1.8       | 2.0/1.5          |
| 150/300:5   | H950300DA      | 0.3 B1.8/B1.8       | 2.0/1.5          |
| ⋮           | ⋮              | ⋮                   | ⋮                |
| 1000/2000:5 | H952000DA      | 0.3 B1.8/B1.8       | 2.0/1.5          |
| 1500/3000:5 | H953000DA      | 0.3 B1.8/B1.8       | 2.0/1.0          |

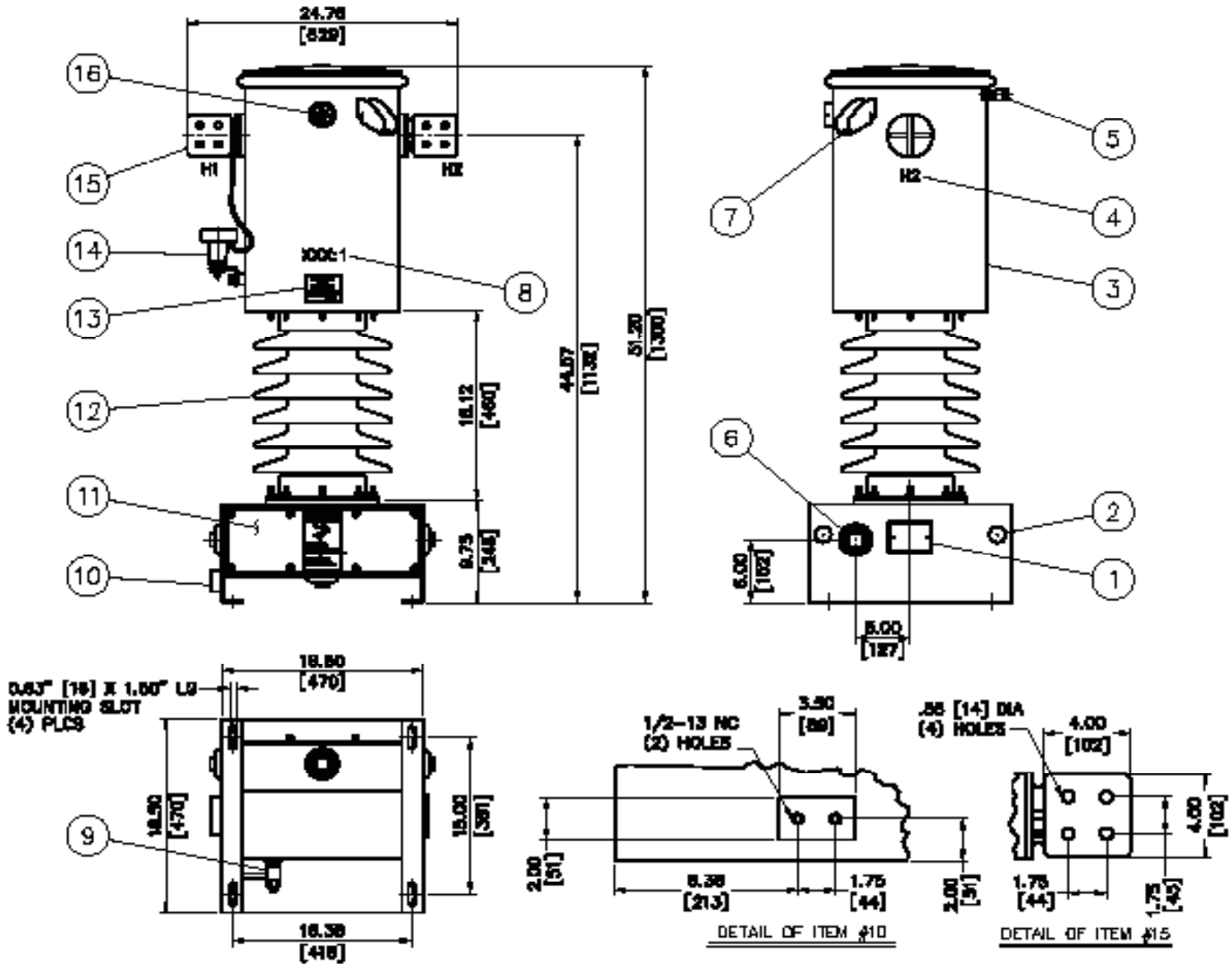
### HIGH ACCURACY CXM-250

| Catalog Number | 0.15 B1.8<br>Acc Range | Rating<br>Factor |
|----------------|------------------------|------------------|
| H890005SA      | 0.025 to 20A           | 4.0              |
| H890010SA      | 0.05 to 40A            | 4.0              |
| ⋮              | ⋮                      | ⋮                |
| H890150SA      | 0.75 to 600A           | 4.0              |
| H890200SA      | 1 to 800A              | 4.0              |
| ⋮              | ⋮                      | ⋮                |
| H893000SA      | 15 to 3200A            | 1.07             |
| --             | --                     | --               |
| --             | --                     | --               |
| --             | --                     | --               |
| --             | --                     | --               |
| --             | --                     | --               |
| --             | --                     | --               |
| --             | --                     | --               |

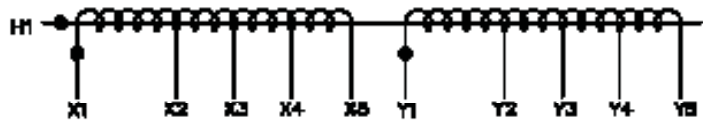
- Available in multi-ratio designs (full tap ratings same as single ratio above).

- 1 Second Thermal/Mechanical Rating: Single Ratio ( $150 \times I_{nom}$ ), Dual Ratio ( $75 \times$  full winding  $I_{nom}$ ), 144kA max.

COF(CXM)-250 Current Transformer



|      |                                     |     |
|------|-------------------------------------|-----|
| 16   | OIL LEVEL GAUGE                     | 1   |
| 15   | TIN PLATED PRIMARY TERMINAL         | 2   |
| 14   | BYPASS PROTECTOR                    | 1   |
| 13   | NON-PCB DECAL                       | 1   |
| 12   | PORCELAIN BUSHING, LIGHT GRAY GLAZE | 1   |
| 11   | SECONDARY TERMINAL COMPARTMENT      | 1   |
| 10   | NEMA STD. GROUND PAD                | 1   |
| 9    | 1/2" DRAIN VALVE                    | 1   |
| 8    | RATIO IDENTIFICATION STENCIL        | 1   |
| 7    | TANK LIFTING EAR                    | 2   |
| 6    | 1-1/2" NPT CONDUIT HUBS             | 3   |
| 5    | PRESSURE RELIEF VALVE               | 1   |
| 4    | POLARITY MARKER STENCIL             | 2   |
| 3    | 14.0" DIA TANK                      | 1   |
| 2    | 1.5 DIA LIFTING HOLES               | 4   |
| 1    | BAR-CODED NAMEPLATE                 | 1   |
| ITEM | DESCRIPTION                         | QTY |



NOTE:

1. SECONDARY TERMINALS TERMINATE TO A SHORT CIRCUITING TERMINAL BLOCK PENN UNION TYPE: 6000 SCS

SPECIFICATIONS:

1. BUSHING CREEP = 45.25 NOM. (37.0 MIN.)
2. STRIKE DISTANCE = 17.58 NOM. (17.0 MIN.)
3. TOTAL WT: 450 lbs (204kg)
4. OIL VOLUME: 15.0 GALLONS (57 LITERS)

10 NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.

Dry type: 3022 NC 43 North • Pinetops, NC 27864 • Phone: +1 252 827-3212 • www.abb.com/mediumvoltage  
 Oil type: 101 Kuhlman Blvd • Versailles, Kentucky 40383 • Phone: +1 859 879-2999 • www.abb.com/highvoltage

# SSVT-250 Station Service VT

Outdoor 46kV, 250kV BIL, Power Winding, Single & Dual Ratios (w/ Tertiary)  
Oil-Filled, Wound Type, Control Power/Metering/Relaying

46000 Volt

March 2008

## application

The SSVT-250 outdoor station service voltage transformer is rated for use on 46,000 volt systems with 250kV BIL. The unit is a station service voltage transformer with power and can be supplied with metering rated secondary winding(s). It provides a convenient and cost effective means of serving small power and/or metering requirements directly from a transmission line. Standard 125/250V nominal power winding designs are available with thermal ratings of 10, 25, 50, 100 kVA and higher. Primary voltage measurement ratios are available from 190.4:1 to 400:1 for use on 46,000 volt systems, at 60 Hertz (Hz). This oil-filled station service voltage transformer will provide control power and can provide high accuracy for metering or relay applications.

## mechanical description

The tank and expansion chambers are steel plate, pressure and vacuum tight and hermetically sealed at the factory to prevent breathing and oil contamination. Expansion chambers allow for the expansion/contraction of oil for temperature and load fluctuations. Tank components are washed and coated with anticorrosive iron phosphate and then finished with ANSI 70 Gray baked-on electrostatic polyester powder. The primary bushing is ANSI 70 Gray, high strength porcelain with a high degree of stability for transportation and seismic withstand. The primary terminal is a stainless steel, NEMA 4-hole pad. The secondary station service power terminals are 1"-14 externally mounted studs housed in an ANSI 4X low voltage terminal box separate from metering with a removable plate and 6" x 20" opening in the bottom for conduit entry. They are offered with high conductivity, tin plated aluminum, 2-hole set screw connectors suitable for 1/0 to 750MCM conductors terminals. The neutral, tank ground connector accepts 1/0 to 750 MCM conductors. The secondary metering terminals are 1/4"-20 copper studs with associated hardware located inside a removable terminal box with three (3) 1 1/2" NPT conduit hubs. The ground terminal is a stainless steel NEMA 2-hole pad. The unit is fitted with a 5kV H<sub>0</sub> Bushing, pressure relief valve, oil level gauge, 3/4" oil fill plug, and 3/4" drain valve.

## accuracy performance

The SSVT-250 will operate with nominal 125/250V control power output and if specified, a 0.15 Class metering accuracy for burdens of 0, W, X, M, Y, Z and ZZ (0.3 ZZ for 10kVA size power units). The transformer is accurate from 90% to 110% of rated primary voltage. Unique to the SSVT design is the ability to power motor loads of up to 10% of the transformer kVA rating and metering/relaying simultaneously.



## mounting

The SSVT is designed for mounting on substations structures in an upright position with four mounting holes in the base.

## testing

The unit is individually tested per the IEEE C57.13 standard, including applied and induced voltage, accuracy and polarity. Additional tests include dissipation and partial discharge tests. Partial discharge testing is performed to guarantee the unit is free of partial discharge through 135% of the nominal system voltage.

## options

The SSVT is available with an Extra Creep Bushing, Polymer Bushing, Stainless Steel Tank and/or Dome, one or two secondary metering windings, one or two CTs, de-energized taps and/or -50°C oil. Other secondary terminal connectors include Clamp Type for up to 1000MCM or NEMA 4-hole Pads. Contact factory for other needs.

## ORDERING INFO FOR SSVT-250

| kVA Rating | Primary Voltage | Secondary Volts |          | Catalog Number |              | Metering Acc/ Burden |
|------------|-----------------|-----------------|----------|----------------|--------------|----------------------|
|            |                 | Power°          | Metering | w/o Metering   | w/ Metering* |                      |
| 10         | 27600           | 125/250         | 115/69   | H97N222010A    | H97M222010A  | 0.3 0,W,X,Y,Z,ZZ     |
| 25         | 27600           | 125/250         | 115/69   | H99N222025B    | H99M222025B  | 0.15 0,W,X,Y,Z,ZZ    |
| 50         | 27600           | 125/250         | 115/69   | H99N222050B    | H99M222050B  | 0.15 0,W,X,Y,Z,ZZ    |
| 100        | 27600           | 125/250         | 115/69   | H99N225100B    | H99M225100B  | 0.15 0,W,X,Y,Z,ZZ    |

\*For two metering secondaries, change M to D in catalog no.

°Nominal output. Actual rated output is supplied on unit nameplate.

- Overvoltage Ratings: 1.1x cont., 1.73x 1 min.



### application

The KA-48(KXM-250) outdoor single phase metering unit is rated for use on 46,000 volt systems with 250kV BIL. Primary current ratios are 5:5 to 4000:5 for 60 Hertz (Hz) with a Rating Factor of up to 4.0 (4800A max). Primary line to ground rated voltage ratios are available from 240:1 to 400:1 for use on 46,000 volt systems. This oil-filled metering unit will operate with high accuracy for metering applications.

### mechanical description

The transformer contains two fully insulated coils for both current and voltage measurement. The tank is steel plate, pressure and vacuum tight and hermetically sealed at the factory to prevent breathing and oil contamination. The dome is corrosion resistant aluminum and contains stainless steel expansion bellows to allow for the expansion/contraction of oil for temperature and load fluctuations. The bellows maintain constant pressure on the oil under various ambient and load conditions to allow for horizontal shipment. Tank components are shot-blasted, washed and coated with a heavy galvanized finish, effectively making the unit paint-free. The primary bushing is ANSI 70 Gray, high strength porcelain with a high degree of stability for transportation and seismic withstand. The primary terminals are tin plated aluminum, NEMA 4-hole pads (copper for units rated above 1800A). An adjustable primary spark gap is provided for all units to protect from high transients. The secondary terminals are M8 hex-head bolts with associated hardware located inside a hinged cover, terminal box with three (3) 1 1/2" NPT conduit hubs. The ground terminal is an integral NEMA 2-hole configuration on the tank wall. The unit is fitted with a 5kV H<sub>0</sub> terminal, oil level indicator, and oil sampling valve.

### accuracy performance

The KA-48 will operate, for the current transformer, with 0.3 Class accuracy for metering with burdens of B0.1 to B1.8. The CT is accurate through its Rating Factor, and can be used continuously to this level. The unit will operate, for the voltage transformer,

with 0.3 Class accuracy for metering with burdens of 0, W, X, M, Y, Z and ZZ. The VT is accurate from 90% to 110% of rated primary voltage. The KXM-250 will operate, for the current transformer, with 0.15 Class high accuracy for metering applications with burdens of B0.1 to B1.8. The transformer maintains 0.15 Class accuracy from 0.5% of I<sub>nom</sub> through its Rating Factor, and can be used continuously to this level. The unit can be provided, for the voltage transformer, with 0.15 Class accuracy for metering with burdens of 0, W, X, M, Y and Z. The VT is accurate from 90% to 110% of rated primary voltage.

### mounting

The KA(KXM) is designed for mounting on substation structures in an upright position with four mounting holes in the base.

### testing

The unit is individually tested per the IEEE C57.13 standard, including applied and induced voltage, accuracy and polarity. Additional tests include dissipation and partial discharge tests. Partial discharge testing is performed to guarantee the unit is free of partial discharge through 135% of the nominal system voltage.

### options

The KA(KXM) is available with an Extra Creep Bushing, Polymer Bushing, Stainless Steel Tank, and/or -50°C oil. The unit can be offered in single, dual or multiple core designs. Contact factory for other needs.

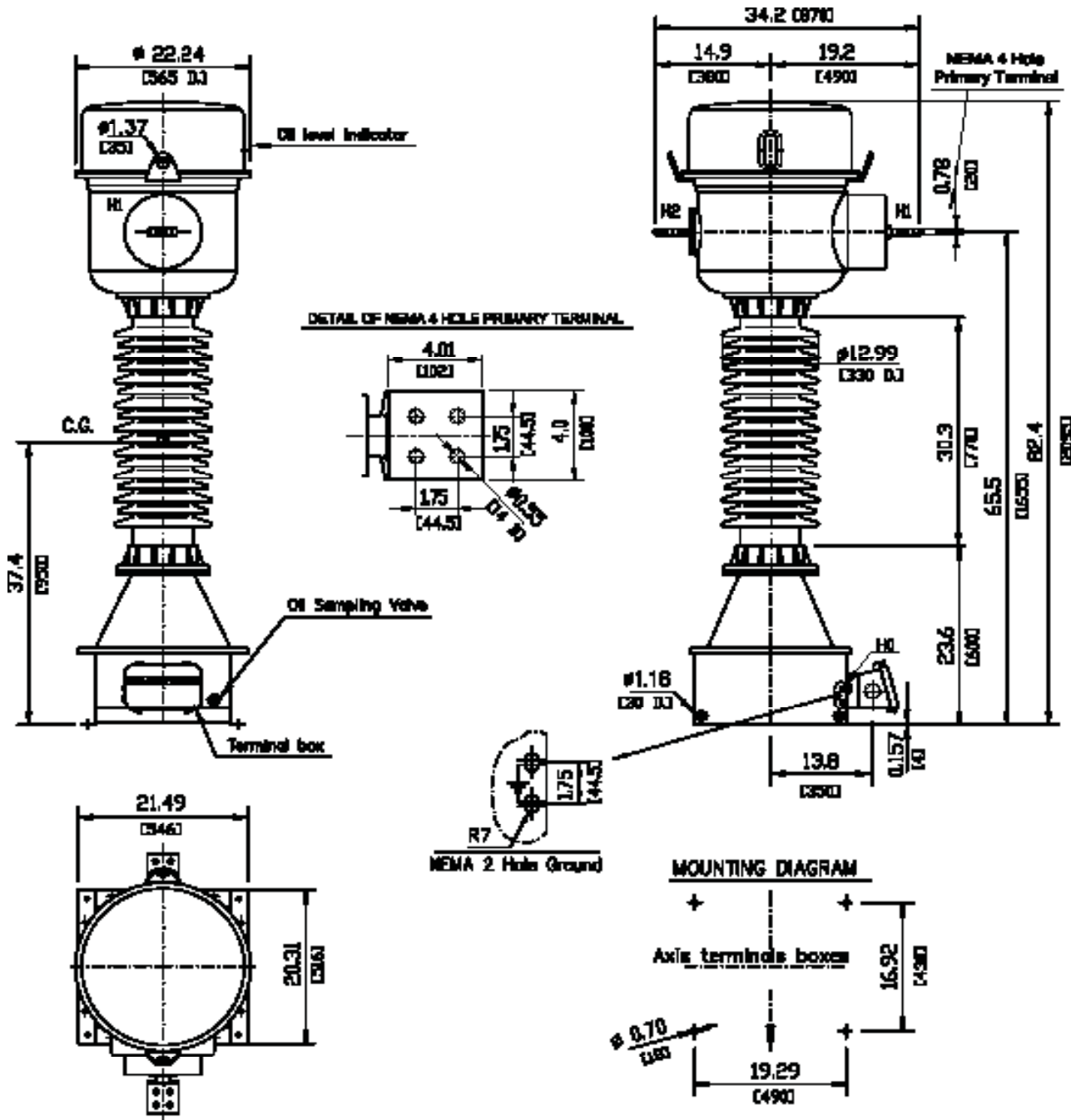


| ORDERING INFO FOR KA-48 |                                   |                    |               | HIGH ACCURACY KXM-250 |                     |               |
|-------------------------|-----------------------------------|--------------------|---------------|-----------------------|---------------------|---------------|
| Voltage Ratings         | Ratio* - 240/400:1:1              | Accuracy/Burden    |               | Accuracy/Burden       |                     |               |
|                         | Pri*:Sec - 27,600:115/69 & 115/69 | 0.3 0,W,X,M,Y,Z,ZZ |               | 0.3 0,W,X,M,Y,Z,ZZ    |                     |               |
| Current Ratio           | Catalog Number                    | Accuracy/Burden    | Rating Factor | Catalog Number        | 0.15 B1.8 Acc Range | Rating Factor |
| 5:5                     | H750400T005S                      | 0.3 B1.8           | 1.5           | H750400T005X          | 0.025 to 20A        | 4.0           |
| 10:5                    | H750400T010S                      | 0.3 B1.8           | 1.5           | H750400T010X          | 0.05 to 40A         | 4.0           |
| ⋮                       | ⋮                                 | ⋮                  | ⋮             | ⋮                     | ⋮                   | ⋮             |
| 100:5                   | H750400T100S                      | 0.3 B1.8           | 1.5           | H750400T100X          | 0.5 to 400A         | 4.0           |
| 150:5                   | H750400T150S                      | 0.3 B1.8           | 1.5           | H750400T150X          | 0.75 to 600A        | 4.0           |
| ⋮                       | ⋮                                 | ⋮                  | ⋮             | ⋮                     | ⋮                   | ⋮             |
| 4000:5                  | H750400T402S                      | 0.3 B1.8           | 1.0           | H750400T402X          | 20 to 4800A         | 1.2           |
| 5/10:5                  | H750400T005D                      | 0.3 B1.8/B1.8      | 2.0/1.5       | --                    | --                  | --            |
| 10/20:5                 | H750400T010D                      | 0.3 B1.8/B1.8      | 2.0/1.5       | --                    | --                  | --            |
| ⋮                       | ⋮                                 | ⋮                  | ⋮             | --                    | --                  | --            |
| 2000/4000:5             | H750400T202D                      | 0.3 B1.8/B1.8      | 2.0/1.0       | --                    | --                  | --            |

\* Available in other Primary Voltage Ratings. - Thermal Burden Rating (Typical): 2000VA.

- Overvoltage Ratings: 1.1x cont., 1.9x 8 hours.

- 1 Second Thermal/Mechanical Rating: KA (75x full winding I<sub>nom</sub>), KXM (150x I<sub>nom</sub>), 80kA max.



**NOTES:**

1. THREE WEATHERPROOF BLANKING PLUGS ARE FURNISHED IN TERMINAL BOX.
2. SECONDARY TERMINALS ARE M6 HEX HEAD BOLTS WITH ASSOCIATED HARDWARE.
3. GROUND PAD HARDWARE IS SUPPLIED ONLY WHEN GROUND CONNECTORS ARE REQUESTED AND SUPPLIED WITH THE UNIT.

**SPECIFICATIONS IN SI (METRIC)**

1. APPROX. NET WEIGHT-825 LBS. (375 kg)
2. APPROX. OIL - 23 GAL. (87 L)
3. CREEPAGE - 99.4" (2525mm)
4. STRIKE - 30.3" (770mm)

14 NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.

# MVCT(MXM)-250 3 Ø Metering Unit

Outdoor 46kV, 250kV BIL, Single, Dual & Multi Ratios  
Oil-Filled, Wound Type, 3Ø Metering

46000 Volt

March 2008

## application

The MVCT(MXM)-250 outdoor three phase metering unit is rated for use on 46,000 volt systems with 250kV BIL. Primary current ratios are 5:5 to 800:5 for 60 Hertz (Hz) with a Rating Factor of up to 4.0 (900A max). Primary voltage ratios are available from 190.4:1 to 693:1 for use on 46,000 volt systems. This oil-filled metering unit will operate with high accuracy for 2, 2 1/2 or 3 element metering applications.

## mechanical description

The unit is built of heavy walled steel construction similar to proven distribution and small power transformer construction and is strongly braced to withstand both electrical and mechanical stresses. The tank is washed and coated with anticorrosive iron phosphate and then finished with an ANSI 70 Gray baked-on electrostatic polyester powder. The primary bushings are ANSI 70 Gray, high strength porcelain with tin plated aluminum, NEMA 4-hole primary terminals. The secondary terminals consist of a feed thru block with 1/4"-20 copper studs and associated hardware located inside a terminal box with three (3) 1 1/2" NPT conduit hubs. The ground terminal is a stainless steel NEMA 2-hole pad. The unit includes a pressure relief valve, CT by-pass protectors, 5kV H<sub>0</sub> Bushing (for 3P 4W designs), 1/2" oil drain valve, and a magnetic type oil level gauge which is easily read from a distance.

## accuracy performance

The MVCT-250 will operate, for the current transformers, with 0.3 Class accuracy for metering with burdens of B0.1 to B1.8. The CT's are accurate through their Rating Factor, and can be used continuously to this level. The unit will operate, for the voltage transformers, with 0.3 Class accuracy for metering with burdens of 0, W, X, M, Y, Z and ZZ. The VT's are accurate from 90% to 110% of rated primary voltage. The MXM-250 will operate, for the current transformers, with 0.15 Class high accuracy for

metering applications with burdens of B0.1 to B1.8. The transformer maintains 0.15 Class accuracy from 0.5% of I<sub>nom</sub> through its Rating Factor, and can be used continuously to this level. The unit will operate, for the voltage transformers, with 0.15 Class accuracy for metering with burdens of 0, W, X, M, Y and Z, as well as 0.3 ZZ. The VT's are accurate from 90% to 110% of rated primary voltage.



## mounting

The MVCT(MXM) is designed for overhead mounting on poles or substation structures in an upright position with ANSI type "C" hanger brackets or four mounting holes in the base. NOTE: Must be installed per NESC electrical clearances.

## testing

The unit is individually tested per the IEEE C57.13 standard, including applied and induced voltage, accuracy and polarity. Additional tests include dissipation and partial discharge tests. Partial discharge testing is performed to guarantee the unit is free of partial discharge through 135% of the nominal system voltage.

## options

The MVCT(MXM) is available with Polymer Bushing(s), a Stainless Steel Tank, 4kV Spark Gaps and/or -50°C oil. Contact factory for other needs.

### ORDERING INFO FOR MVCT-250

| Voltage Ratings | Ratio* - 240:1 | Accuracy/Burden      |
|-----------------|----------------|----------------------|
|                 |                | Pri*:Sec - 27600:115 |

| Current Ratio | Catalog Number (3P 4W)** | Accuracy/Burden | Rating Factor |
|---------------|--------------------------|-----------------|---------------|
| 10:5          | H88001S24CA              | 0.3 B1.8        | 1.5           |
| 20:5          | H88002S24CA              | 0.3 B1.8        | 1.5           |
| ⋮             | ⋮                        | ⋮               | ⋮             |
| 150:5         | H88015S24CA              | 0.3 B1.8        | 1.5           |
| 200:5         | H88020S24CA              | 0.3 B1.8        | 1.5           |
| ⋮             | ⋮                        | ⋮               | ⋮             |
| 600:5         | H88060S24CA              | 0.3 B1.8        | 1.5           |
| 800:5         | H88080S24CA              | 0.3 B1.8        | 1.5           |
| 5/10:5        | H88001D24CA              | 0.3 B1.8/B1.8   | 2.0/1.5       |
| 10/20:5       | H88002D24CA              | 0.3 B1.8/B1.8   | 2.0/1.5       |
| ⋮             | ⋮                        | ⋮               | ⋮             |
| 300/600:5     | H88060D24CA              | 0.3 B1.8/B1.8   | 2.0/1.5       |
| 400/800:5     | H88080D24CA              | 0.3 B1.8/B1.8   | 2.0/1.125     |

### HIGH ACCURACY MXM-250

| Accuracy/Burden          |
|--------------------------|
| 0.15 0,W,X,M,Y,Z, 0.3 ZZ |

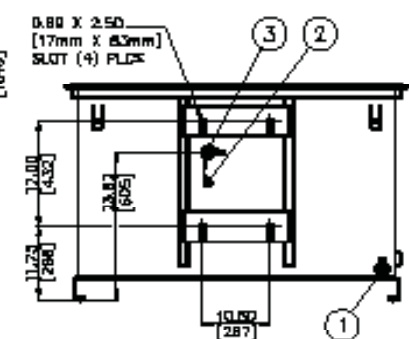
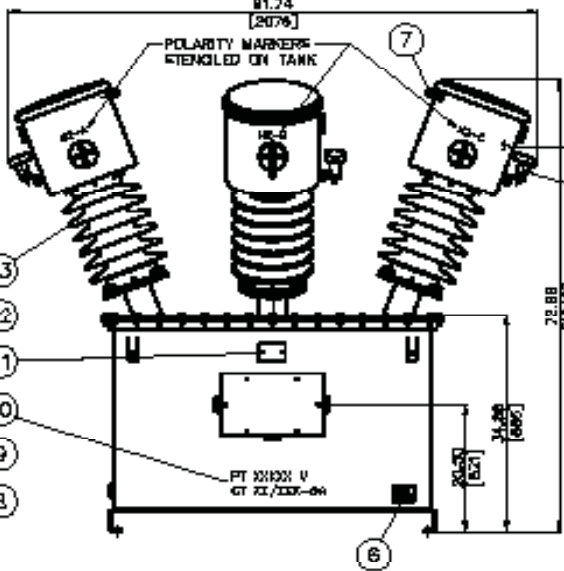
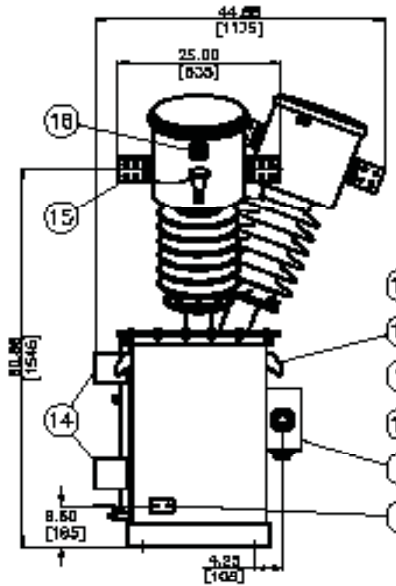
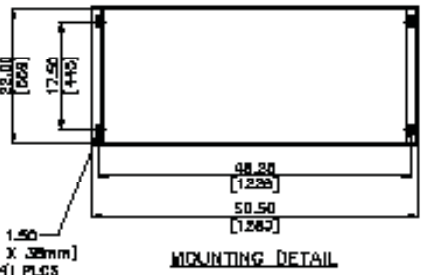
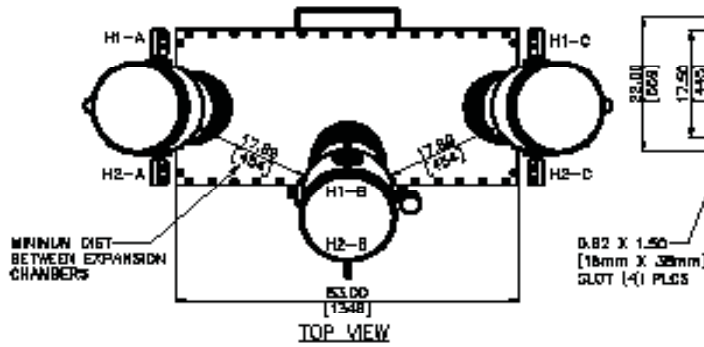
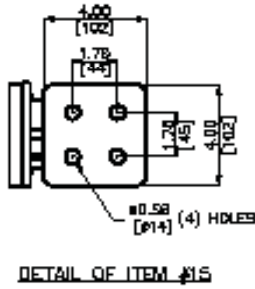
| Catalog Number (3P 4W) | 0.15 B1.8 Acc Range | Rating Factor |
|------------------------|---------------------|---------------|
| H86001S24CA            | 0.05 to 40A         | 4.0           |
| H86002S24CA            | 0.1 to 80A          | 4.0           |
| ⋮                      | ⋮                   | ⋮             |
| H86015S24CA            | 0.75 to 600A        | 4.0           |
| H86020S24CA            | 1 to 800A           | 4.0           |
| ⋮                      | ⋮                   | ⋮             |
| H86060S24CA            | 3 to 900A           | 1.5           |
| H86080S24CA            | 4 to 900A           | 1.125         |
| --                     | --                  | --            |
| --                     | --                  | --            |
| --                     | --                  | --            |
| --                     | --                  | --            |
| --                     | --                  | --            |

- Available in multi-ratio designs.

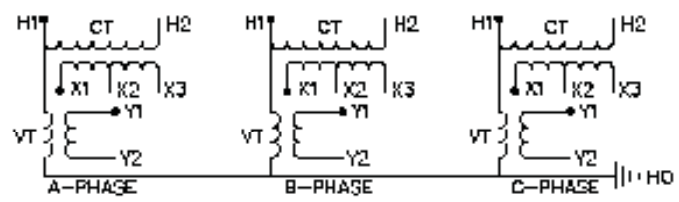
- Thermal Burden Rating (Typical): 6000VA (2000VA/phase). - Overvoltage Rating: 1.1x cont., 1.9x 8 hours (3P 4W).

- 1 Second Thermal/Mechanical Rating: Single Ratio (150x I<sub>nom</sub>), Dual Ratio (75x full winding I<sub>nom</sub>), 144kA max.

\* Other Primary Voltage Ratings Available, contact factory. \*\* For 3P 3W, change catalog digits "88" to "87".



| ITEM | DESCRIPTION                                 | QTY |
|------|---|-----|
| 18   | MAGNETIC OIL GAUGE                          | 3   |
| 15   | NEMA 4-HOLE "H" SPADE CONNECTORS            | 6   |
| 14   | HANGER BRACKET, "C" TYPE                    | 2   |
| 13   | HV BUSHING-LIGHT GRAY GLAZE 250KV BIL.      | 3   |
| 12   | LIFTING EAR                                 | 4   |
| 11   | NAMEPLATE, LASER SCRIBED ANODIZED ALUM      | 1   |
| 10   | RATIO IDENTIFICATION STENCILED ON TANK      | 1   |
| 9    | SECONDARY TERMINAL BOX WITH (3) 1-1/2" HUBS | 1   |
| 8    | NEMA TWO HOLE GROUND PAD                    | 1   |
| 7    | PRESSURE RELIEF DEVICE                      | 3   |
| 6    | NON-PCB DECAL                               | 1   |
| 5    | 14.0" DIA EXPANSION CHAMBER                 | 3   |
| 4    | BY-PASS PROTECTOR                           | 3   |
| 3    | INSULATED NEUTRAL HV BUSHING, 5kv           | 1   |
| 2    | GROUND STRAP, REMOVABLE                     | 1   |
| 1    | DRAIN VALVE 1/2" HPT                        | 1   |

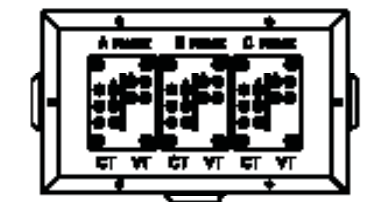


**NOTES:**

- THIS UNIT IS DESIGNED FOR POLE MOUNTED ARRANGEMENT OR SITTING ON A PLATFORM WITH THE BASE BOLTED OR CLAMPED TO THE PLATFORM.
- THREE WEATHERPROOF BLANKING PLUGS ARE FURNISHED IN THE TERMINAL BOX.
- SECONDARY TERMINALS ARE 1/4"-20 COPPER STUDS WITH LOCK WASHERS & HEX NUTS.
- ALL DIMENSIONS ARE INCHES WITH MILLIMETERS IN [ ].

**SPECIFICATIONS:**

- APPROX. NET WEIGHT-----2700 lbs (1225 kg)
- APPROX. OIL -----135 GAL (505 liters)
- BUSHING CREEPADE-----43.25" (1108 mm) NOMINAL
- BUSHING STRIKE-----17.65" (446 mm) NOMINAL
- MSV -----48 KV
- BIL -----250 KV
- PHASE-PHASE CLEARANCE-----25.30" (643 mm) MIN REQ'D 19.00" (483 mm) MIN



NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.