GE
Digital Energy

INSTRUCTIONS

Model JKW-150 to JKW-350 SUPERBUTE™

Station Class Current Transformers

Dry-type, Butyl-molded 150kV to 350kV BIL

GEI-52426F Issue 11/2014

Introduction

These instructions apply to Model JKW SUPERBUTE station class current transformers with standard ratings and applied under usual conditions (refer to IEEE C57.13). For information on unusual ratings for frequency, voltage, current, or on installations where unusual conditions exist, please consult with a GE sales representative.

These current transformers are of the dry-type, butyl-molded construction and are for indoor and outdoor use.
The full model name, nominal system voltages (NSV) and basic insulation levels (BIL) are shown in Table 1, below:

BIL (kV)	NSV (kV)	Model
150	25	JKW-150
200	34.5	JKW-200
250	46	JKW-250
350	69	JKW-350

Table 1 – Model Selection Guide

Figure 1 - Type JKW-200

Figure 2 – Type JKW-350

NOTE: In addition to this instruction book, further general information on dry-type instrument transformers can be found in instruction GEH-230.

Before Installation

Inspection

Immediately upon receiving the transformer, inspect it for physical damage that may have occurred during shipment or handling. If damage is evident, file a claim with the transportation company immediately and promptly notify GE sales representative.

These butyl-modeled current transformers are practically impervious to moisture. If, due to unusual circumstances, insulations tests indicate a possibility of entrance moisture, please consult with a GE sales representative for detailed information on the proper procedure.

Make sure that the short-circuit jumper is securely in place on at least two terminals of each secondary provided. Do not remove or cut away a jumper until the secondary circuit in question is closed through a suitable burden.

Testing

Insulation tests should be made in accordance with IEEE Std C57.13. Initial user tests should not be in excess of 75% of the factory test voltage. Periodic field test of insulation should not exceed 65% of the factory test voltage. For ratio and phase-angle tests, refer to IEEE Std C57.13.

Installation

Safety Precautions

1. Always consider an instrument transformer as a part of the circuit to which it is connected, and do not touch the leads and terminals or other parts of the transformer unless they are adequately grounded.

2. The insulation surface of molded transformers should be considered the same as the surface of a porcelain bushing, since a voltage stress exists across the entire insulation surface from terminals to grounded metal parts.

3. Always ground the metallic cases, frames, bases, etc., of instrument transformers. The secondaries should be grounded close to the transformers. However, when secondaries of transformers are interconnected, there should only be one grounded point in this circuit to prevent accidental paralleling with system grounding wires.

4. Do not open the secondary circuit of a current transformer while the transformer is energized, and do not energize while the secondary circuit is open. Current transformers may develop open-circuit secondary voltages which may be hazardous to personnel or damaging to the transformer or equipment connected in the secondary circuit.

Handling

Model JKW butyl-molded transformers are less fragile than porcelain, HCEP, and other epoxy insulated transformers, but nevertheless should be handled with care. It is recommended that, whenever possible, the transformer be left attached to its shipping pallet and moved in this manner up to the actual installation site. If the transformer is unbolted from the pallet, it should be considered unstable, and therefore should be adequately supported. The transformer can be lifted with a sling attached to lifting eyebolts in the base. The top end of the transformer should be securely attached to the sling. See Figure 3 for vertical and horizontal lifting.

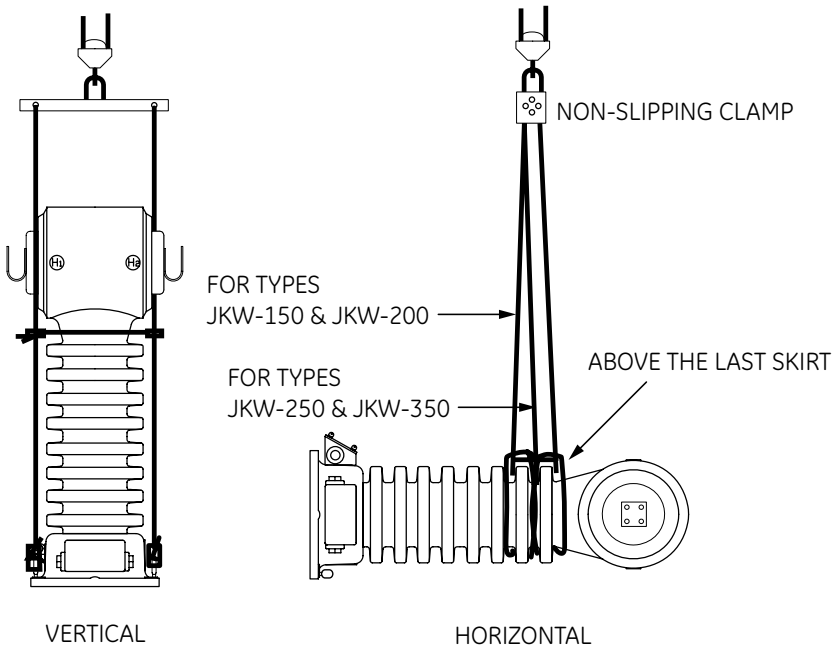


Figure 3 - Method of lifting transformers

Mounting

These current transformers can be mounted in any position: upright, horizontal, or even inverted, provided that the centerline through the primary terminals is horizontal. Figure 4. illustrates right and wrong ways for mounting.

Loading by lines or busswork should be kept to a minimum to avoid placing appreciable strain upon the transformer bushings and terminals. The maximum recommended loading from all sources should not be greater than the equivalent of a 200 pound external force applied at the axis of the primary terminal.

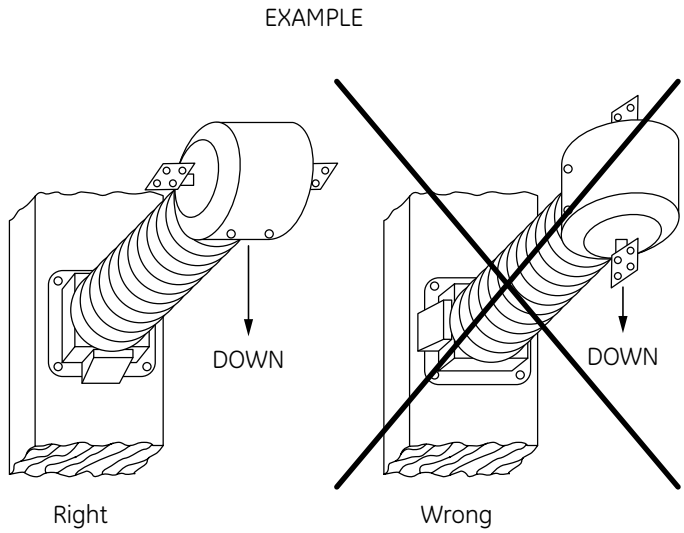


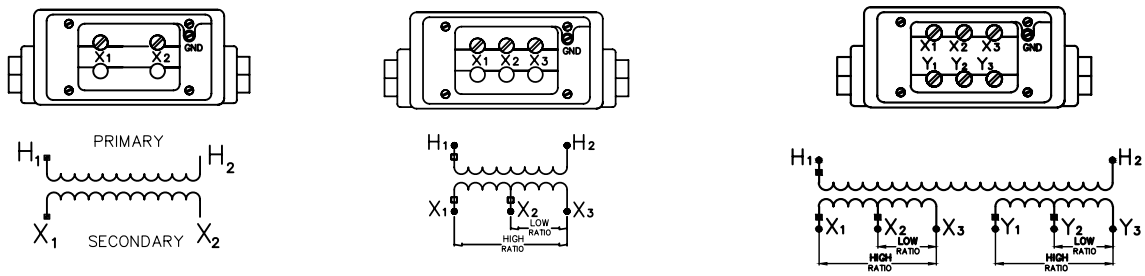
Figure 4 - Examples of right and wrong CT mounting

Connections

The resistance of all connections should be kept at a minimum to prevent overheating of the terminals and to prevent an increase in secondary burden. The resistance of the secondary leads should be included in calculating the impedance of the burden on the transformer. The total burden should be kept within the limits of the CT rating.

Primary terminals for current transformers rated 300/600:5 amperes (tapped secondary) or 600:5 amperes (single secondary) and below have a U-shaped pad for the primary terminals. Transformers rated 400/800:5 amperes (tapped secondary) or 800:5 amperes (single secondary) and above use a vertically oriented, flat copper bar for primary terminal pads. In both cases, the terminal pads contain four mounting holes with industry standard hole sizes and spacing.

The default configuration for JKW uses a tapped secondary winding for obtaining a dual-primary current rating. For tapped secondary designs, secondary connection are to be made as follows: for the lower primary current rating, connect the secondary burden to terminals X2 and X3. Leave terminal X1 "open" (no connection). For the higher primary current rating, connect the secondary burden to terminals X1 and X3. Leave terminal X2 "open" (no connection). The wiring diagrams for wound-type current transformers in this configuration, along with alternate options of single secondary or dual-tapped secondary, are all shown in Figure 5., below. For bar-type transformers and multi-ratio configurations, please contact a GE sales representative to obtain a copy of the appropriate connection diagram.



Single Secondary (Two secondary terminals)

Tapped Secondary (Default) (Four secondary terminals)

Dual-Tapped Secondary (Six secondary terminals)

Figure 5 - Connection Diagrams and Secondary Terminal Configurations

A detachable conduit box, shown in Figure 6 below, is provided for housing the secondary terminals. Two 1 ½ inch threaded horizontal hubs with pipe plugs are provided for making connection to 1 ½ conduit. A knockout is also provided on the bottom of the box for use in locations requiring bottom connection. A lock nut and bushing will be required if a smaller diameter conduit is used. The transformer may be taken out of service without dismantling the conduit merely by disconnecting the secondary leads and removing the four conduit-box mounting screws.

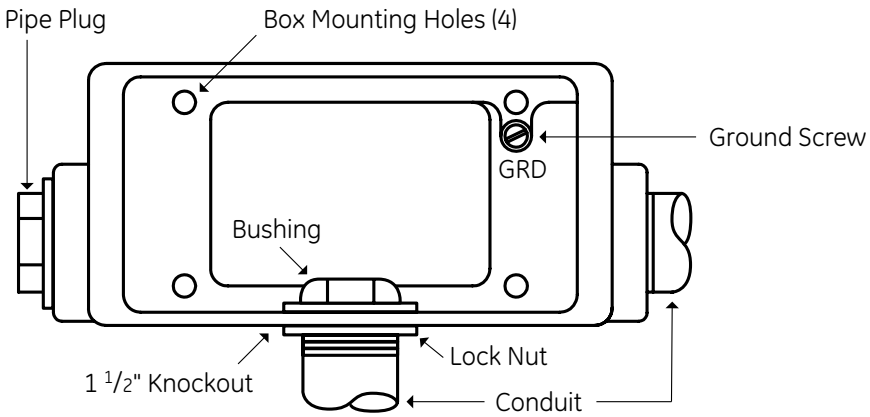


Figure 6 - Conduit Box connections

Indicator Tube for Tapped Secondary CT's

For tapped secondary CT's, an Indicator Tube is used in the secondary conduit box to indicate what ratio the CT is set up for.

Units are shipped by default in the low ratio setting with a spring load shunt wire across terminals X1 and X3 and the Indicator Tube is installed on X1, meaning X2 and X3 are the secondary terminals to be used. X2 and X3 terminals should be equipped with plated screws are the low ratio terminals (see figure 5, Connection Diagrams and Secondary Terminal Configurations, above). With the Indicator Tube installed on the X1 terminal, the conduit (secondary) box cover ratio plate will indicate low ratio. This ratio plate serves as a visual indicator.

If the Indicator Tube is instead installed on X2, then X1 and X3 are the secondary terminals to be used. X1 and X3 are the high ratio terminals. With Indicator Tube is installed on X2 terminal, conduit (secondary) box cover ratio plate will indicate high ratio.

If changing from the low ratio to the high ratio is desired, remove the four screws that hold the ratio plate on the conduit (secondary) box cover to find the high ratio side of the plate. Remove plated screw from X2 terminal and remove Indicator Tube from X1 terminal. Install plated screw into X1 terminal and install Indicator Tube into X2 terminal. With Indicator Tube installed on X2 terminal and plated screws on X1 and X3 terminals, the unit is set up for high ratio. Reinstall ratio plate on the conduit (secondary) box cover. An indentation on the ratio cover ensures proper placement which will indicate high ratio.

CT wiring should always be connected at plated screw locations. Unit ships with a spring loaded shunt wire across X1 and X3 terminals. The looped end of the wire is installed at X1. When unit is not in use or needs to be shunted, simply move or pivot wire onto X3 terminal. When unit is wired and ready for use, simply move or pivot wire away from X3 terminal (wire typically springs in the downward direction).

Primary By-Pass Protection

The primaries of these current transformers having wound-type construction are provided with by-pass protection. External by-pass protectors may be used, but are not necessary.

Grounding

A good, permanent, low-impedance ground is essential for adequate protection. The conduit box (Figure 6) contains a provision for grounding the secondary to the transformer base. Also a ground connector, designed to accept ground wires in the range of No. 2 solid through 500-MCM cable, is provided on the transformer base.

Polarity

When wiring instrument transformer circuits, it is necessary to maintain the correct polarity relationship between the line and the devices connected to the secondaries. The relative instantaneous polarity of each winding is indicated by a marker near each primary and secondary terminal. Where taps are present, all terminals are marked in order. The primary terminals are H1 and H2; the secondary terminals X1, X2, X3, etc; and the tertiary terminals Y1, Y2, Y3, etc., if another secondary is provided. H1 always indicates the same instantaneous polarity as X1 and Y1. Instantaneous current flow may be visualized as into H1 and out of X1 and Y1 in the full winding connection (out of X2 and Y2 on the tap connection).

High Altitude Operation

These transformers are designed to operate over the ambient temperature range as indicated at the standard ratings (see nameplate), provided the altitude does not exceed 3300 feet. If the transformers are to be used above 3300 feet, consult IEEE Standard C57.13 for the effect of altitude on temperature rise.

Maintenance

Whether mounted indoors or outdoors, these voltage transformers require no special care other than keeping the insulation surfaces free from accumulation of dirt.

Cleaning

Butyl-molded transformers may be cleaned by scrubbing the butyl surface with detergent and a stiff brush to remove accumulated dirt. Remove the detergent by washing with clean water.

Demagnetization

If a current transformer becomes magnetized, it should be demagnetized before being used for precision work. IEEE C57.13 lists methods for demagnetizing current transformers.

One method is to connect the transformer in the test circuit as shown in Figure 7, below. Pass rated current through the low-turn winding (usually the primary). Increase the resistance (R) in the high-turn winding (usually the secondary) circuit unit the transformer core is saturated; then, slowly reduce resistance to zero and disconnect the current source. Saturation of the core is indicated by a reduction of current in the high-turn
winding circuit.

On tapped-secondary current transformers, demagnetizing should be done using the X2-X3 section of the winding to reduce the voltage required for saturation.

On dual-secondary current transformers, the two secondaries should be paralleled during demagnetization.

WARNING: A CONTINUOUSLY VARIABLE RESISTANCE MUST BE USED TO AVOID OPENING THE HIGH-TURN WINDING CIRCUIT WHEN RESISTANCE VALUES ARE CHANGED. AS THE RESISTANCE IS INCREASED, THE VOLTAGE ACROSS THE RESISTANCE WILL APPROACH OPEN-CIRCUIT VALUE.

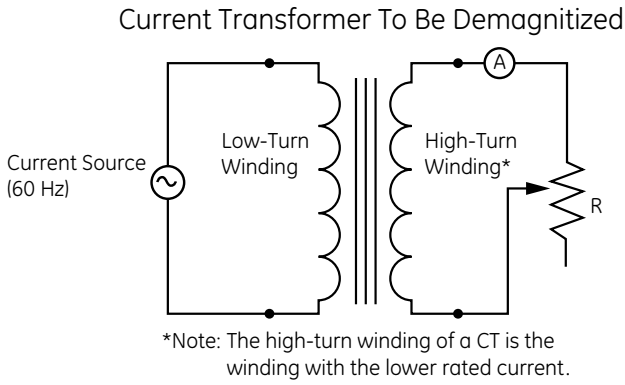


Figure 7 - Circuit for demagnetizing current transformers

Disclaimer

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with the installation, operation or maintenance. The equipment covered by these operating instructions should be operated and serviced only by competent technicians familiar with good safety practices, and these instructions are written for such personnel and are not intended as a substitute for adequate training and experience in safe procedures for this type of equipment. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the GE Company.

Product Dimensions

Transformer outline dimensions are illustrated in Figure 8-15 on pages 9-12. The complete list of outline drawing numbers for the various secondary terminal configurations are referenced in Table 2 and Table 3 below.

For a copy of any of the following outline drawings in PDF or AutoCAD format, and to ensure you have the latest revision, please contact your nearest GE Sales Office. GE reserves the right to make changes to product at any time without notice and without obligation to notify any person of such changes.

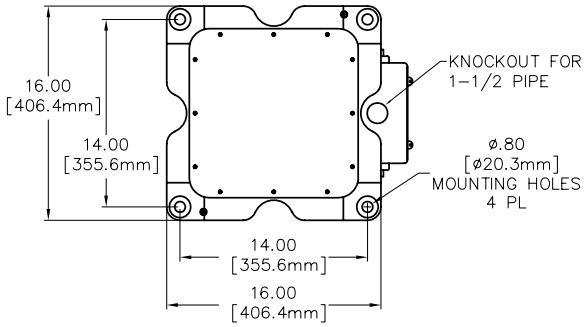
Secondary Configuration	Ratio Type	Model JKW-150	Model JKW-200	Model JKW-250	Model JKW-350
Two secondary terminals	Single Ratio	9926780018	9926780014	9926780011	9926780009
Three secondary terminals	Tap Ratio	9926780001	9926780003		9926780017
Six secondary terminals	Dual/Tapped Ratio			9926780005	

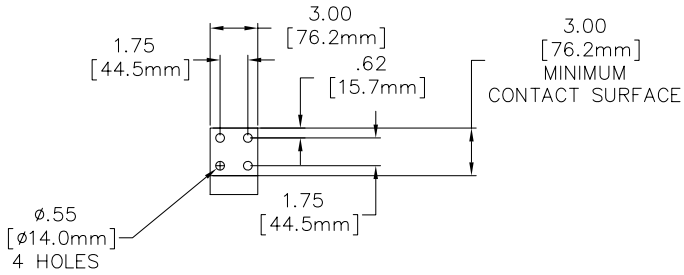
Table 2 – Outline Drawing Number for Models JKW, **UP TO 600A**

Secondary Configuration	Ratio Type	Model JKW-150	Model JKW-200	Model JKW-250	Model JKW-350
Two secondary terminals	Single Ratio	9926780015	9926780016	9926780012	9926780010
Three secondary terminals	Tap Ratio	9926780002	9926780004	9926780006	9926780008
Six secondary terminals	Dual/Tapped Ratio				9926362001
Ten secondary terminals	Multi-Ratio	9932478	9932478	9932478	9932478

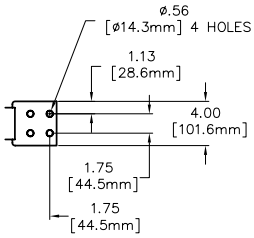
Table 3 – Outline Drawing Number for Models JKW, **800A AND ABOVE**

MOUNTING PLATE & PRIMARY TERMINAL CONFIGURATIONS (All models, all ratios)

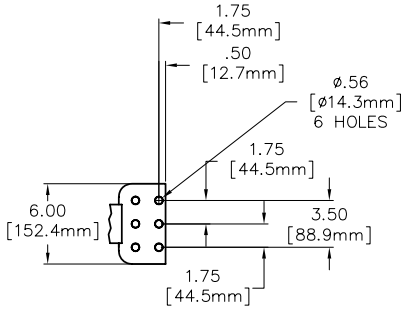




PRIMARY – 1 PAD, UP TO 600A

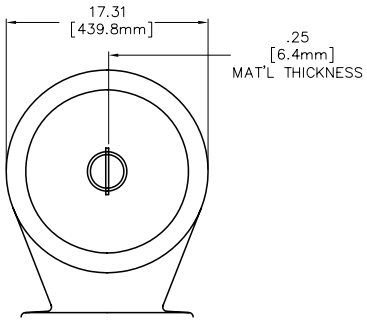


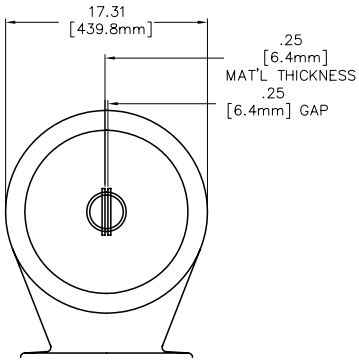
PRIMARY – 1 AND 2 PAD, UP TO 2000A



PRIMARY – 3 PAD, 3000A

PAD CONFIGURATIONS (All models, 800A and above, only)





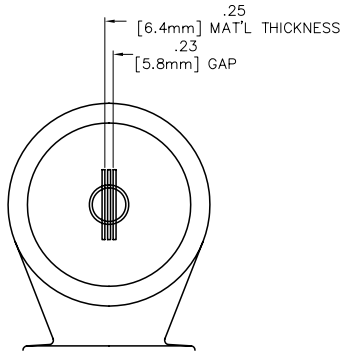


Figure 8. Outline dimensions for Model JKW-150 (Up to 600A)

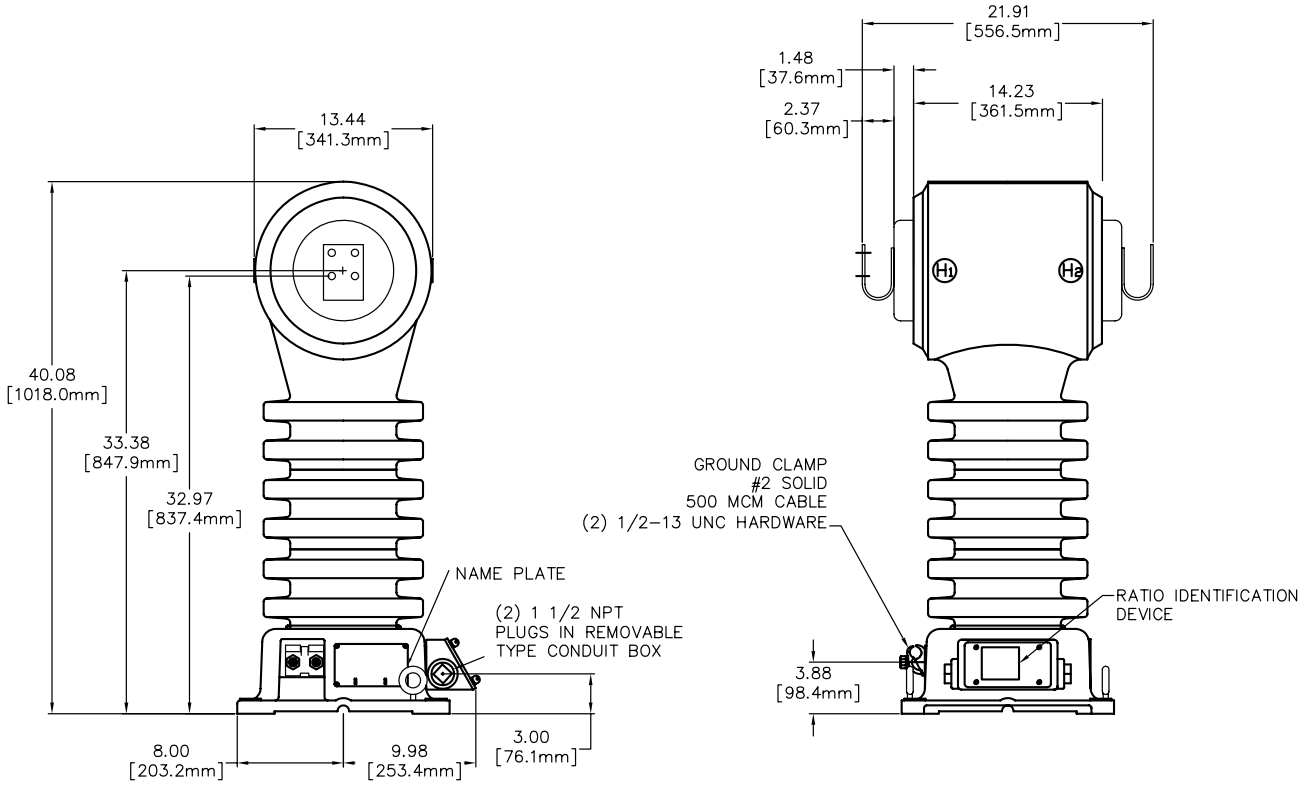


Figure 9. Outline dimensions for Model JKW-150 (800A and above)

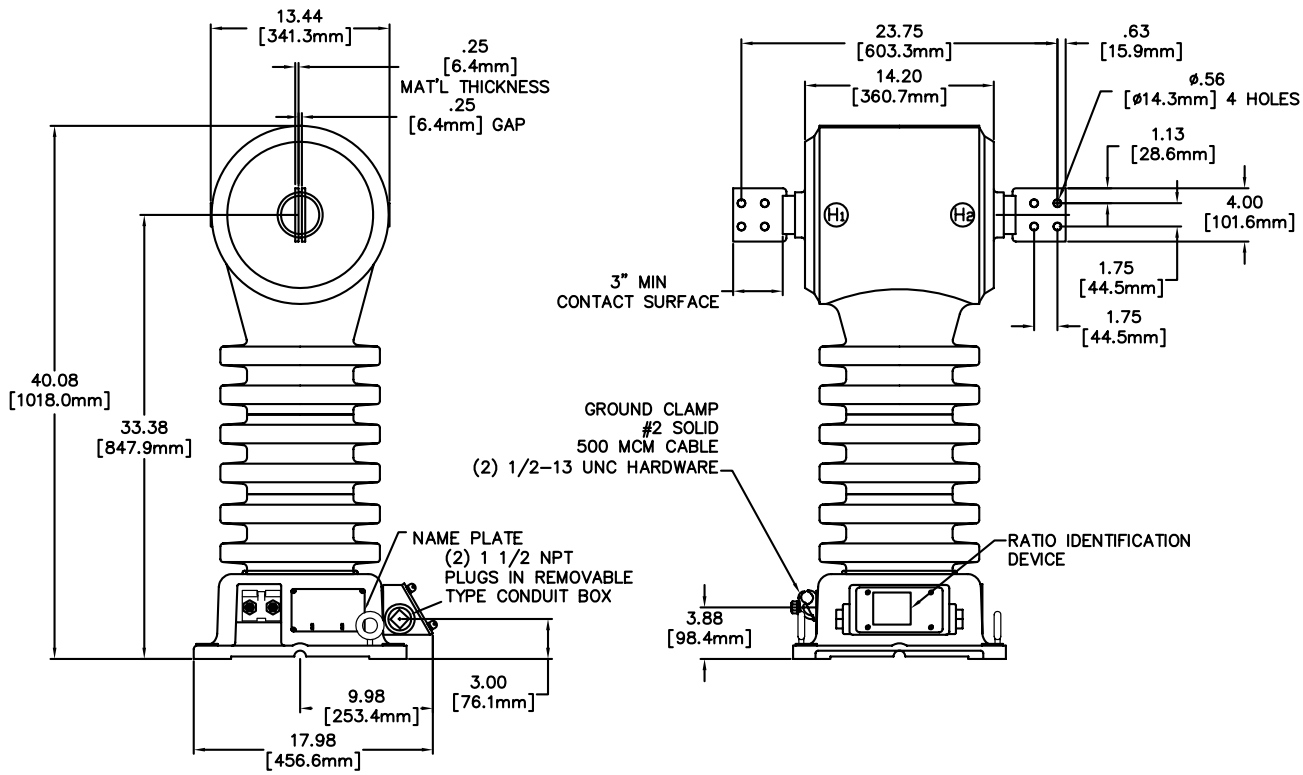


Figure 10. Outline dimensions for Model JKW-200 (Up to 600A)

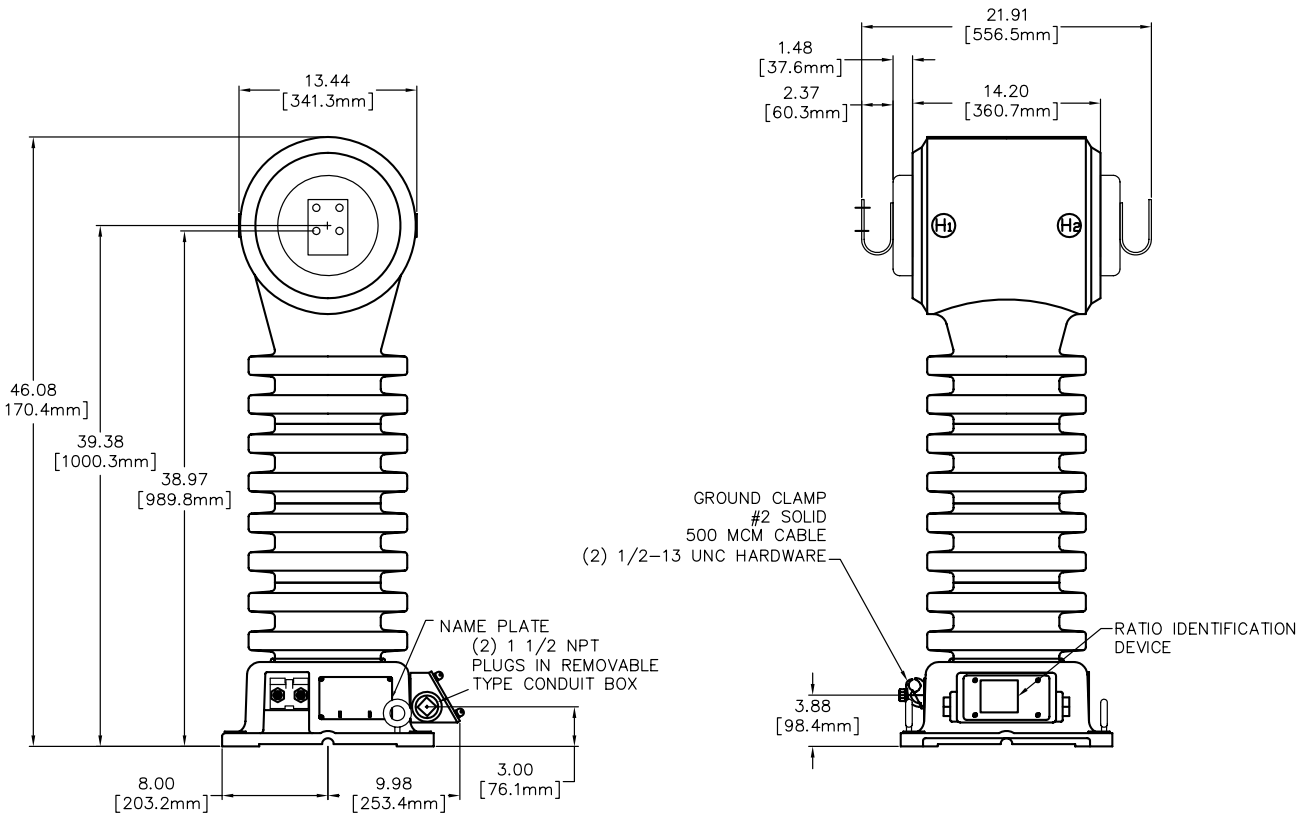


Figure 11. Outline dimensions for Model JKW-200 (800A and above)

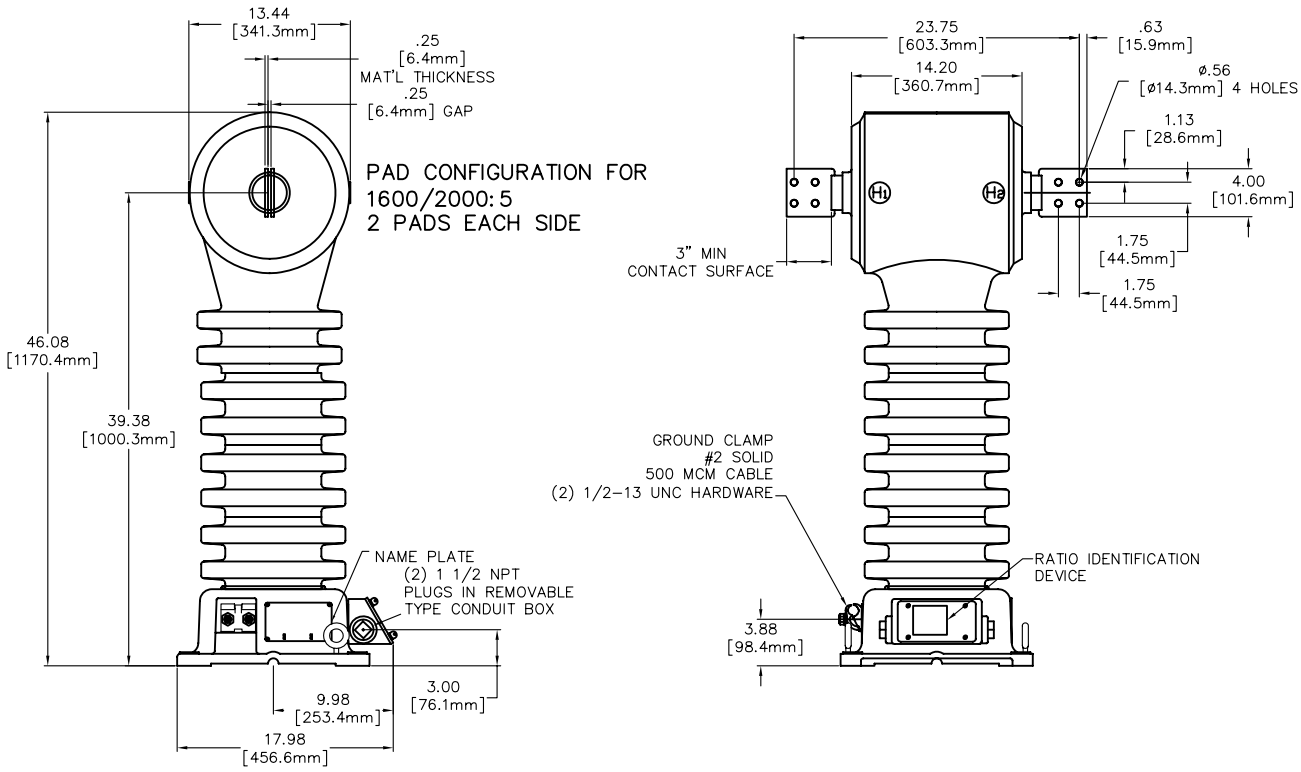


Figure 12. Outline dimensions for Model JKW-250 (Up to 600A)

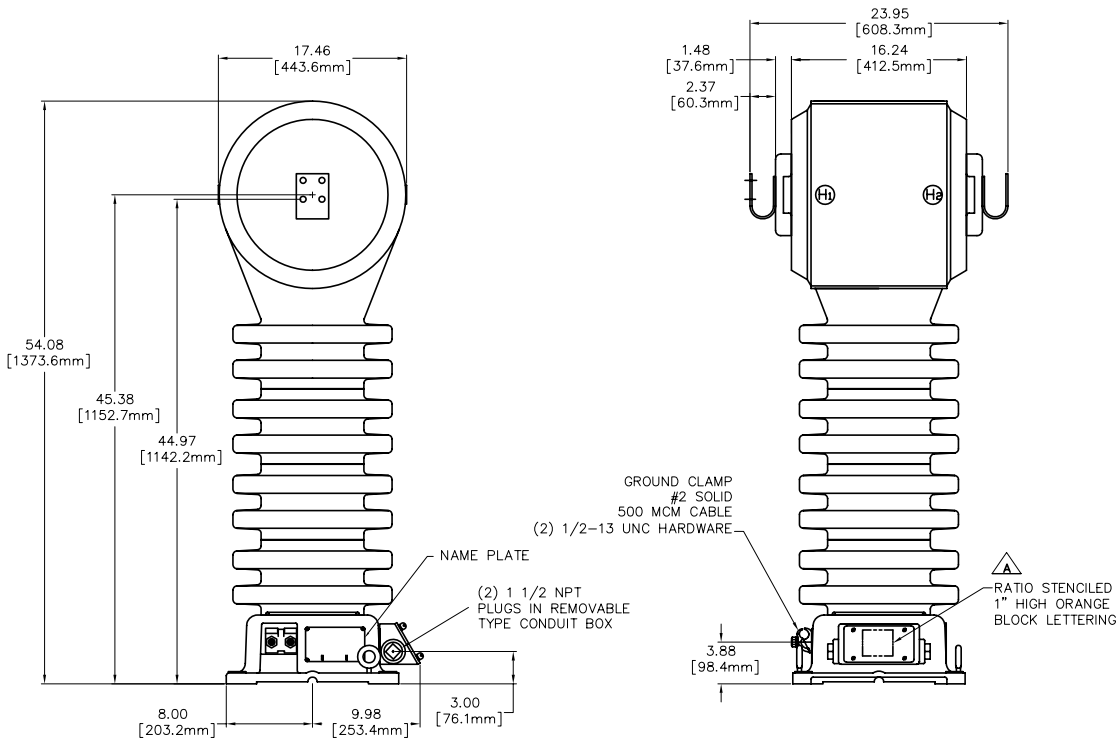


Figure 13. Outline dimensions for Model JKW-250 (800A and above)

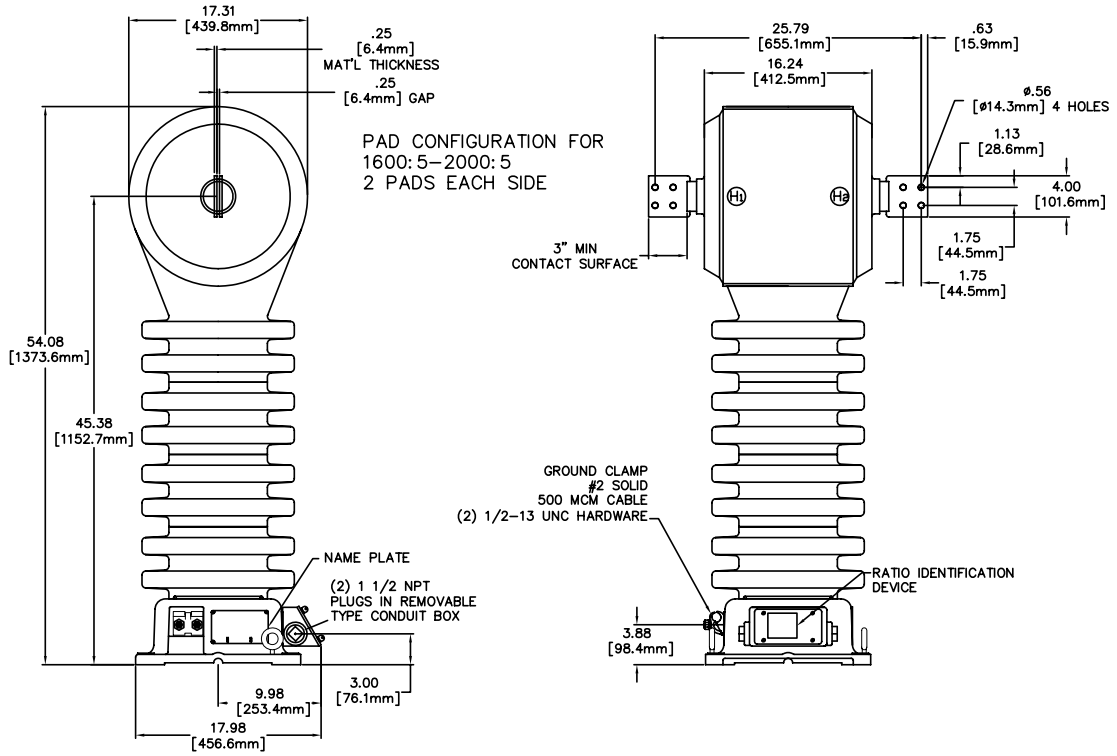


Figure 14. Outline dimensions for Model JKW-350 (Up to 600A)

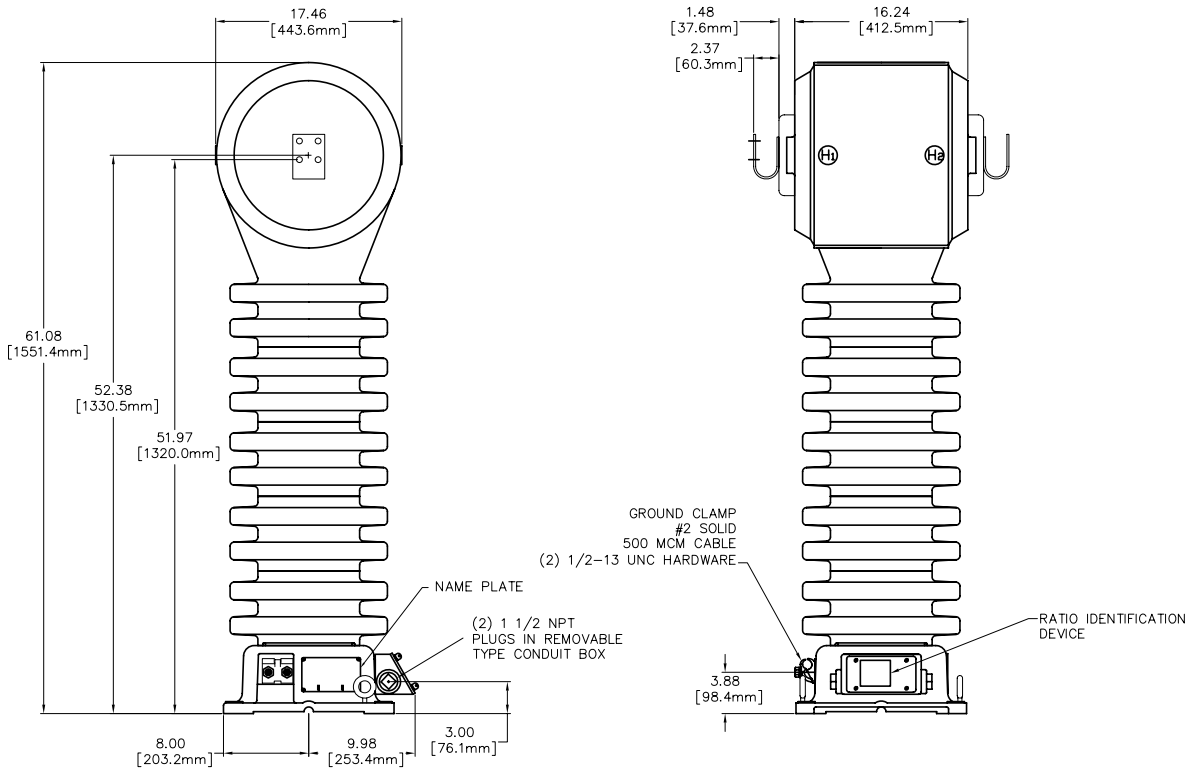
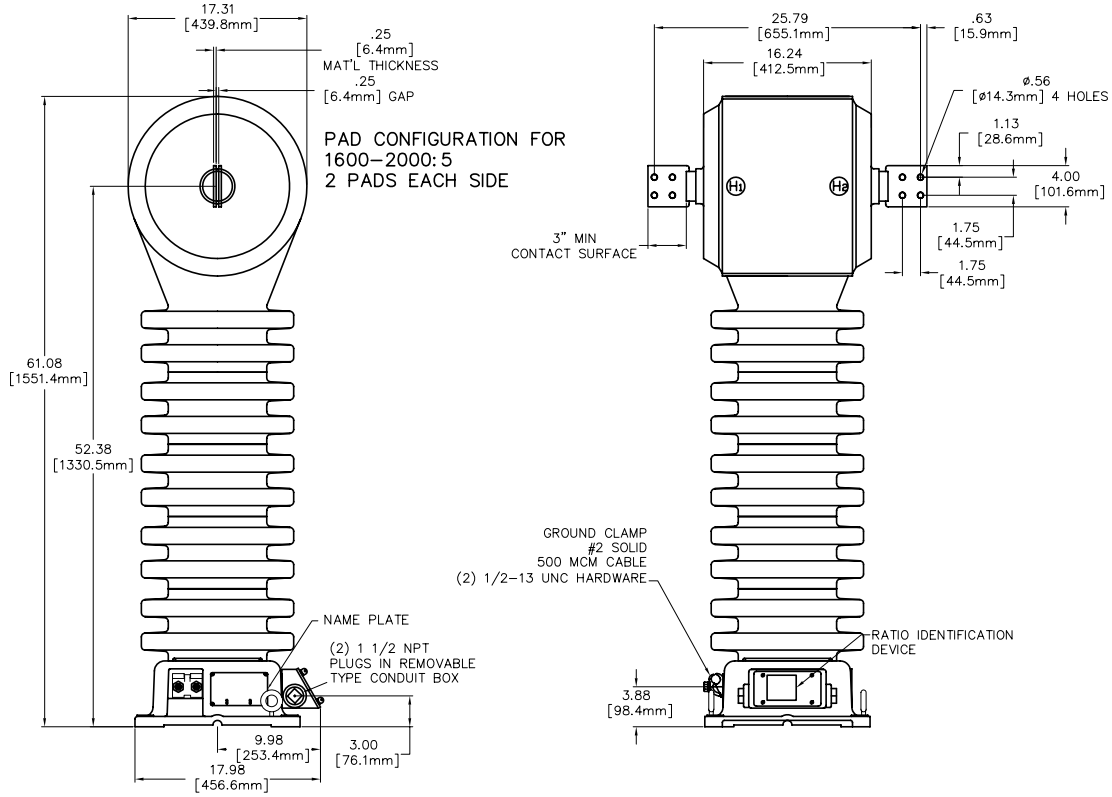


Figure 15. Outline dimensions for Model JKW-350 (800A and above)



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