Kuhlman Electric Corporation

Engineered Designs
Instrument Transformers
<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slipover CT/ACCUSlip™ – Single, Dual &amp; Multi Ratio (High Accuracy Available)</td>
<td>PS-981/PH-982</td>
<td>3-14</td>
</tr>
<tr>
<td>Indoor, Bushing CT – Single, Dual &amp; Multi Ratio (High Accuracy Available)</td>
<td>BCT-605/BH-001</td>
<td>15-16</td>
</tr>
<tr>
<td>Zero-Sequence, Window CT – 600V, Single Ratio</td>
<td>PSZ-981</td>
<td>17-18</td>
</tr>
<tr>
<td>Zero-Sequence, Window CT – 5kV to 34.5kV, Single Ratio</td>
<td>BYZ-863/865</td>
<td>19-20</td>
</tr>
<tr>
<td>Split-Core, Window CT – Single, Dual &amp; Multi Ratio</td>
<td>SP-061</td>
<td>21-22</td>
</tr>
<tr>
<td>Generator &amp; ISO-Phase Bus CTs</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>Retrofit Applications – Before &amp; After</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Generator CT – Tape Wrapped Unit/Array</td>
<td>GCT-848/HW-945</td>
<td>25</td>
</tr>
<tr>
<td>Generator CT – Cast Resin Unit</td>
<td>PSG-981</td>
<td>26</td>
</tr>
<tr>
<td>GCT, HW, PSG Sample Outline Drawings</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>Testing Services – Field Engineering Services Division</td>
<td></td>
<td>28</td>
</tr>
</tbody>
</table>
application
The PS-981 / PH-982 outdoor “Slip-Over” / ACCUSlip™ current transformer is a 600 volt, 10kV BIL rated unit and designed to fit over a variety of specified bushing sizes. This unit can be applied over higher rated system voltages provided sufficient insulation is available on the point of application. Primary current ratios are available from 200:5 to 5000:5 at 60 Hertz (Hz) with a Rating Factor of up to 4.0. This unit is ideal for old electrical substation equipment with no internal space for BCT’s. This dry-type, solid-cast CT will operate with high accuracy for metering or relay applications.

mechanical description
The core and coil assembly is wound and encapsulated in a molded cast resin with various window sizes from 6” up to 44”. The secondary terminals are ¼”-20 studs with associated hardware located inside a removable terminal box with two (2) 1” NPT conduit hubs.

accuracy performance
The PS-981 can provide up to a 0.3 Class accuracy for metering with burdens of B0.1 to B1.8 and up to C800 for some relay applications (see specific ratings on pages 8-13). The transformer is accurate through its Rating Factor, and can be used continuously to this level. The PH-982 will operate with 0.15 Class accuracy for metering with burdens of B0.1 to B1.8 (see specific ratings on page 14). The transformer is accurate through its Rating Factor, and can be used continuously to this level.

Mounting
The PS / PH is designed for mounting over the bushings of a power transformer, circuit breaker or cable terminator (pothead). The unit can be mounted in three basic methods (see page 6 of the Engineered Designs Section):

MOUNTING RESIN PADS - 3 ½” diameter by ¼” thick resin pads can be adhered to the CT bottom to prevent water welling with the CT placed directly onto the unit surface. This is the easiest to install and is the suggested method for CT application to flat surfaces with no obstructions. If a ground shield is used, it can be fastened to the CT top with silicone RTV adhesive.

UNIVERSAL MOUNTING BRACKETS - Top and bottom clamps hold the CT while the threaded support bolts provide vertical adjustment. The threaded bolts can be tack welded to the electrical equipment cover. This is the most commonly used mounting method since it provides obstruction clearance and can be used on flat or radial surfaces and vertical or angled bushings. If a ground shield is used, it can be secured by the top brackets.

CUSTOM “Z” BRACKETS - “Z” brackets can be used on bushings, cable terminators (potheads) and other applications when the other methods are not practical. A special form requires the user to supply data to Kuhlman engineering upon which to design the brackets. It is important that all the required information is supplied. “Z” Brackets can be used on vertical or angled bushings. Top brackets or an RTV adhesive is required when installing a ground shield.

A ground shield should be used on the unit as it is normally mounted in an area of high lightning incidence, the strike-over zone of the bushing or close to the bottom of the porcelain. The ground shield lead should be routed on the same side of the CT where the mounting hardware is located (see Figures 1, 2 & 3).

With the countless physical layouts of transformers, breakers, potheads, etc... in use today, many obstructions can be encountered making CT mounting difficult (see Figure 4). To assure correct electrical and mechanical clearances, bushing and apparatus drawings, pictures, and/or measurements should be provided (see page 7 of the Engineered Designs Section) for sizing slipover current transformers at the time of quotation.

testing
The unit is individually tested per the IEEE C57.13 standard, including dielectric tests, accuracy and polarity.

options
The unit can be offered in single, dual or multiple core designs. Through careful calculation, steel selection and testing, existing current transformer characteristics can be matched. Existing characteristic curve would be required. Contact factory for other needs.
<table>
<thead>
<tr>
<th>ID CODE</th>
<th>HT CODE</th>
<th>PRI. CODE</th>
<th>ACC CODE</th>
<th>X OPTIONS CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>04 = 4.0”</td>
<td>22 = 2.25”</td>
<td>500 = 50</td>
<td>RELAYING</td>
<td>(ASSIGNED BY ENG.)</td>
</tr>
<tr>
<td>05 = 5.0”</td>
<td>25 = 2.50”</td>
<td>750 = 75</td>
<td>02 = C20/C25</td>
<td>0 - STD, 60 Hz</td>
</tr>
<tr>
<td>06 = 6.0”</td>
<td>27 = 2.75”</td>
<td>101 = 100</td>
<td>05 = C50</td>
<td>1,2,3, NOT USED</td>
</tr>
<tr>
<td>07 = 7.0”</td>
<td>30 = 3.00”</td>
<td>151 = 150</td>
<td>10 = C100</td>
<td>5 = STD, 50/60 Hz</td>
</tr>
<tr>
<td>08 = 8.0”</td>
<td>35 = 3.50”</td>
<td>201 = 200</td>
<td>20 = C200</td>
<td>B = CAN RLY, 2.5L*</td>
</tr>
<tr>
<td>09 = 9.0”</td>
<td>37 = 3.75”</td>
<td>102 = 1000</td>
<td>40 = C400</td>
<td>9 = RLY w/MTRG</td>
</tr>
<tr>
<td>10 = 10.0”</td>
<td>40 = 4.00”</td>
<td>122 = 1200</td>
<td>80 = CB800</td>
<td>eg, C400/0.3B1.8</td>
</tr>
<tr>
<td>1A = 10.5”</td>
<td>87 = 8.75”</td>
<td></td>
<td>MTRG (0.3 TYP)</td>
<td>L = LEADS</td>
</tr>
<tr>
<td>11 = 11.0”</td>
<td></td>
<td></td>
<td>01 = B0.1</td>
<td>H = (4) 5/8&quot; HOLES</td>
</tr>
<tr>
<td>12 = 12.0”</td>
<td></td>
<td></td>
<td>02 = B0.2</td>
<td></td>
</tr>
<tr>
<td>13 = 13.0”</td>
<td></td>
<td></td>
<td>03 = B0.5</td>
<td></td>
</tr>
<tr>
<td>14 = 14.0”</td>
<td></td>
<td></td>
<td>09 = B0.9</td>
<td></td>
</tr>
<tr>
<td>16 = 16.0”</td>
<td></td>
<td></td>
<td>18 = B1.8</td>
<td></td>
</tr>
<tr>
<td>18 = 18.0”</td>
<td></td>
<td></td>
<td>NON 5 A SEC.</td>
<td></td>
</tr>
<tr>
<td>20 = 20.0”</td>
<td></td>
<td></td>
<td>SAME AS MTRG</td>
<td></td>
</tr>
<tr>
<td>22 = 22.0”</td>
<td>10 = 10.0”</td>
<td>5 = 5 A, XXX: 5</td>
<td>BUT IN VA</td>
<td></td>
</tr>
<tr>
<td>23 = 23.25”</td>
<td>11 = 11.0”</td>
<td>1 = 1 A, XXX: 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 = 24.0”</td>
<td>12 = 12.0”</td>
<td>LC =&gt;&gt; SEC. V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 = 25.0”</td>
<td>14 = 14.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 = 26.0”</td>
<td>16 = 16.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 = 27.0”</td>
<td>18 = 18.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 = 28.0”</td>
<td>18R = 18”RD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 = 30.0”</td>
<td>20 = 20.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 = 32.0”</td>
<td>22 = 22.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34 = 34.0”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 = 36.0”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 = 41.0”</td>
<td>46 = 46.0”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 = 50.0”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## HOW TO ORDER

For typical sizes, refer to tables for Slipover CTs in relaying and metering sections. For approximate ACCUSlip™ sizes, see table on page 14. When ordering Slipover CTs, include the following information:

1. Minimum inside diameter (ID) - ____________ in[mm]
2. Maximum outside diameter (OD) - ____________ in[mm]
3. Maximum allowable height (HT) - ____________ in[mm]
4. Current ratio and taps, if any - ____________ (:5A or :1A | SR, DR, MR)
5. Number of Cores - ____________ (1, 2 or 3)
6. Accuracy and burden requirements, for example,
   - Metering - ____________ (0.3 B0.1 thru B1.8)
   - High Accuracy - ____________ (0.15, see ACCUSlip™ table on page 14)
   - Relaying - ____________ (C100, C200, C400, or C800 or other)
    If IEC ratings, list class and burden - ____________ (e.g., class 0.2-20 VA, 5P20-40 VA)
7. Continuous Rating Factor - ____________ (standard is RF=2.0)
8. Frequency - ____________ (standard is 60 Hz)
9. Conduit Box Hub Size - ____________ (standard is 1" NPT)

**NOTE** - Kuhlman Electric offers many mounting options for Slipover CTs (see page 6 for diagrams). Units are custom manufactured to customer specifications. Contact factory to discuss other options.
NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.
**Engineered Designs**

**PS–981/PH–982 Current Transformer**

**STANDARD MOUNTING HARDWARE**

![Diagram of standard mounting hardware](image)

- **A** – 5/8” Hot dipped galvanized nut
- **B** – 5/8” Lock washer
- **C** – 5/8” SS Flat washer
- **D** – Mounting bracket
- **E** – E-3/8-11 Hot dipped galvanized rod
- **F** – Aluminum ground shield. Ground lug position to be customer determined. (Optional)

**MOUNTING PAD INSTALLATION**

![Diagram of mounting pad installation](image)

- **A** – CT
- **B** – Mounting Pad

**Z–BRACKET MOUNTING HARDWARE**

![Diagram of z-bracket mounting hardware](image)

- **A** – Flange Bolt (Form original bushing)
- **B** – Top Bracket
- **C** – CT Ground Shield
- **D** – CT
- **E** – Bottom Mounting Bracket

**Ground Shields**

<table>
<thead>
<tr>
<th>ID</th>
<th>OD</th>
<th>CS No.</th>
<th>ID</th>
<th>OD</th>
<th>CS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1</td>
<td>32</td>
<td>PGS-8018</td>
<td>28</td>
<td>32</td>
<td>PGS-2822</td>
</tr>
<tr>
<td>O2</td>
<td>32</td>
<td>PGS-8018</td>
<td>28</td>
<td>32</td>
<td>PGS-2822</td>
</tr>
<tr>
<td>O3</td>
<td>30</td>
<td>PGS-0328</td>
<td>28</td>
<td>32</td>
<td>PGS-2828</td>
</tr>
<tr>
<td>O4</td>
<td>30</td>
<td>PGS-0328</td>
<td>28</td>
<td>32</td>
<td>PGS-2828</td>
</tr>
<tr>
<td>O5</td>
<td>30</td>
<td>PGS-0328</td>
<td>28</td>
<td>32</td>
<td>PGS-2828</td>
</tr>
<tr>
<td>O6</td>
<td>30</td>
<td>PGS-0328</td>
<td>28</td>
<td>32</td>
<td>PGS-2828</td>
</tr>
</tbody>
</table>

**Universal Slip-Over Mounting Bracket Kits**

<table>
<thead>
<tr>
<th>Bracket Kit #</th>
<th>Bracket Kit</th>
<th>Bracket Material</th>
<th>Kit Weight Limit, lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>150-830-XXX</td>
<td>3</td>
<td>Stainless Steel</td>
<td>300</td>
</tr>
<tr>
<td>161</td>
<td>3</td>
<td>Aluminum</td>
<td>200</td>
</tr>
<tr>
<td>402</td>
<td>4</td>
<td>Stainless Steel</td>
<td>275</td>
</tr>
<tr>
<td>403</td>
<td>4</td>
<td>Stainless Steel</td>
<td>175</td>
</tr>
<tr>
<td>404</td>
<td>6</td>
<td>Aluminum</td>
<td>300</td>
</tr>
<tr>
<td>405</td>
<td>8</td>
<td>Stainless Steel</td>
<td>150</td>
</tr>
<tr>
<td>406</td>
<td>8</td>
<td>Stainless Steel</td>
<td>100</td>
</tr>
</tbody>
</table>

**NOTE:** OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.
PLEASE RETURN COMPLETED FORM BACK TO KUHLMAN ALONG w/ BUSHING & EQUIPMENT DWGS, PHOTOS AND ANY OTHER AVAILABLE INFO

NOTES:
1. TO AID IN THE SELECTION OF CT SIZE & BRACKETS TO BE USED, PROVIDE ALL DIMENSIONS REQUESTED.
2. MOST CASES, STANDARD BRACKET KITS CAN BE USED. CUSTOM BRACKETS MAY BE FABRICATED TO FACILITATE SPECIFIC MOUNTING ARRANGEMENTS.

3. FOR CUSTOM BRACKETS, IN ORDER TO POSITION THE BRACKET TOP CLOSE TO FLANGE LEVEL, ENGINEERING WILL DESIGN THE BRACKET HEIGHT TO UTILIZE ALL AVAILABLE SPACE.

CAUTION - INSURE FLANGE BOLT LENGTH IS SUFFICIENT FOR ADDED THICKNESS OF (2) BRACKETS, ELOO TYP.

CUSTOMER SUPPLIED DIMENSIONS (in inches): (See Fig. 1)

A. BUSHING THROAT DIAMETER
B. FLANGE BOLT CIRCLE DIAMETER
C. NUMBER OF FLANGE BOLTS
D. FLANGE BOLT SIZE & DIAMETER
E. BUSHING BOLT DIAMETER
F. BUSHING THROAT DIAMETER, IF > DIM E
G. SHORT DIAMETER, IF > DIM’S E & F
H. DROP, DISTANCE BELOW THE BUSHING FLANGE
I. RISE, DISTANCE ABOVE THE BUSHING FLANGE
J. TOP OF FLANGE TO TOP OF TANK
K. BOTTOM OF FLANGE TO BOTTOM OF TANK
L. LIFTING LOOP SPAN (see Fig. 2)
M. IF > DIMS E, F AND S
N. IF TEST PLUG EXTENDS BEYOND BUSHING FLANGE “E”, THEN ITS DIMENSION MUST BE PROVIDED.

**NOTE**: THESE SPECIFIC DIMENSIONS ARE REQUIRED WHEN IT MAY AFFECT THE SIZE AND MOUNTING OF THE CT, AND MAY NOT BE GIVEN ON THE EQUIPMENT DWG SUCH AS IN THE CASE OF BUSHINGS EXITING AT AN ANGLE OR WHEN LIFTING EARS MAY INTERFERE (see Fig. 2).

PHASE BUSHING CENDERS, PHASE:

HTmax HIGHEST POINT BUSHING FLANGE TO APPARATUS TANK TOP
HTmin LOWEST POINT BUSHING FLANGE TO APPARATUS TANK TOP
EDGE OUTER BUSHING CTL TO OUTER EDGE

SHOLD ANGLE FROM THERMAL FLOORING, WILL BE APPROXIMATED FROM HTmax & HTmin DIMS.

LIFTING LOOP SPAN (see Fig. 2)

IF > DIMS E, F AND S

IF TEST PLUG EXTENDS BEYOND BUSHING FLANGE “E”, THEN ITS DIMENSION MUST BE PROVIDED.

WILL TEST PLUG (OF AVAILABLE) BE USED?

Y / N

FIGURE 1

FIGURE 2

THE SPAN OF THE LIFTING DWGS “H” MUST BE PROVIDED IF THEY EXTEND BEYOND THE BUSHING FLANGE DIAMETER “E” AND SHORT DIAMETER “S”. IF CT IS TO DROP BELOW FLANGE, THEN V AND W (IF EXIST) AND DIM “F” MUST ALL BE GIVEN.

QUOTE/SQ:

PROJECT:

CURRENT RATIO: 

PROVIDED BY:

CUSTOMER:

BUSHING RATING: 

KV 

KV BIL ACCURACY CLASS: 

BUSHING/EQUIPMENT DWG PROVIDED: 

Y / N
## PS–981 Current Transformer

### RELAY CLASS ACCURACY SLIPOVER CT RATINGS*

<table>
<thead>
<tr>
<th>Current Ratio</th>
<th>Inside Ø (ID)</th>
<th>Outside Ø (OD)</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Catalog Number</td>
<td>Acc Rating</td>
<td>HT (&quot;#)</td>
<td>WT</td>
<td>Catalog Number</td>
<td>HT (&quot;#)</td>
</tr>
<tr>
<td>500:5</td>
<td>P06164S5S0050020</td>
<td>C25</td>
<td>130</td>
<td>4.5</td>
<td>P06184S5S0050020</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>P06166S5S0050050</td>
<td>C50</td>
<td>235</td>
<td>7.5</td>
<td>P06187S5S0050050</td>
<td>280</td>
</tr>
<tr>
<td>1000:5</td>
<td>P06164S10150050</td>
<td>C50</td>
<td>130</td>
<td>4.5</td>
<td>P06184S10150050</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>P06166S10150100</td>
<td>C100</td>
<td>235</td>
<td>7.5</td>
<td>P06187S10150100</td>
<td>280</td>
</tr>
<tr>
<td>2000:5</td>
<td>P06164S20250050</td>
<td>C50</td>
<td>130</td>
<td>4.5</td>
<td>P06184S20250050</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>P06166S20250100</td>
<td>C100</td>
<td>235</td>
<td>7.5</td>
<td>P06187S20250100</td>
<td>280</td>
</tr>
<tr>
<td>4000:5</td>
<td>P06164S40450050</td>
<td>C50</td>
<td>130</td>
<td>4.5</td>
<td>P06184S40450050</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>P06166S40450100</td>
<td>C100</td>
<td>235</td>
<td>7.5</td>
<td>P06187S40450100</td>
<td>280</td>
</tr>
<tr>
<td>6000:5</td>
<td>P06164S60650050</td>
<td>C50</td>
<td>130</td>
<td>4.5</td>
<td>P06184S60650050</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>P06166S60650100</td>
<td>C100</td>
<td>235</td>
<td>7.5</td>
<td>P06187S60650100</td>
<td>280</td>
</tr>
<tr>
<td>10000:5</td>
<td>P06164S10250050</td>
<td>C50</td>
<td>130</td>
<td>4.5</td>
<td>P06184S10250050</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>P06166S10250100</td>
<td>C100</td>
<td>235</td>
<td>7.5</td>
<td>P06187S10250100</td>
<td>280</td>
</tr>
</tbody>
</table>

* Rating Factors (Typical) - 2.0 for units up to 2000:5, 1.5 for 3000:5 and above - contact factory for other options
* - Units also available in dual ratio designs
* - Units available in multi ratio designs. For multi-ratio, change "S" of catalog number to "M"
* - Preferred sizes are shown. Other sizes are readily available - contact factory for details

### OPTIONAL ITEMS:
For Ground Shields and Mounting Options, see page 6 of the Engineered Designs section
### PS–981 Current Transformer

#### RELAY CLASS ACCURACY SLIPOVER CT RATINGS

<table>
<thead>
<tr>
<th>Inside Ø (ID)</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Ratio</td>
<td>50:5</td>
<td>100:5</td>
<td>200:5</td>
<td>400:5</td>
</tr>
<tr>
<td>Outside Ø (OD)</td>
<td>8&quot;</td>
<td>12&quot;</td>
<td>16&quot;</td>
<td>20&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inside Ø (ID)</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Ratio</td>
<td>50:5</td>
<td>100:5</td>
<td>200:5</td>
<td>400:5</td>
</tr>
<tr>
<td>Outside Ø (OD)</td>
<td>24&quot;</td>
<td>30&quot;</td>
<td>32&quot;</td>
<td>36&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Ratio</th>
<th>50:5</th>
<th>100:5</th>
<th>200:5</th>
<th>400:5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Ø (OD)</td>
<td>24&quot;</td>
<td>30&quot;</td>
<td>32&quot;</td>
<td>36&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Ratio</th>
<th>50:5</th>
<th>100:5</th>
<th>200:5</th>
<th>400:5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Ø (OD)</td>
<td>24&quot;</td>
<td>30&quot;</td>
<td>32&quot;</td>
<td>36&quot;</td>
</tr>
</tbody>
</table>

### Engineering Designs

#### OPTIONAL ITEMS:

For Ground Shields and Mounting Options, see page 9 of the Engineered Designs section.

* Rating Factors (Typical) - 2.0 for units up to 2000:5, 1.5 for 3000:5 and above - contact factory for other options
- Units also available in dual ratio designs.
- Units available in multi ratio designs. For multi-ratio, change "S" of catalog number to "M".
- Preferred sizes are shown. Other sizes are readily available - contact factory for details.  

---

3022 NC 43 North • Pinetops, NC 27864 • Phone: +1 252 827-3212 • www.abb.com/mediumvoltage
# PS–981 Current Transformer

## RELAY CLASS ACCURACY SLIPOVER CT RATINGS*

<table>
<thead>
<tr>
<th>Inside Ø (ID)</th>
<th>Outside Ø (OD)</th>
<th>22&quot; (ш)</th>
<th>24&quot; (ш)</th>
<th>26&quot; (ш)</th>
<th>28&quot; (ш)</th>
<th>32&quot; (ш)</th>
<th>34&quot; (ш)</th>
<th>36&quot; (ш)</th>
<th>38&quot; (ш)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Ratio</strong></td>
<td><strong>Acc Rating</strong></td>
<td><strong>Catalog Number</strong></td>
<td><strong>HT (°C)</strong></td>
<td><strong>Catalog Number</strong></td>
<td><strong>HT (°C)</strong></td>
<td><strong>Catalog Number</strong></td>
<td><strong>HT (°C)</strong></td>
<td><strong>Catalog Number</strong></td>
<td><strong>HT (°C)</strong></td>
</tr>
<tr>
<td>50:5</td>
<td>C25</td>
<td>P2232SSS50050020</td>
<td>4.50</td>
<td>500</td>
<td>P2234SSS50050020</td>
<td>4.50</td>
<td>500</td>
<td>P2636SSS50050020</td>
<td>4.50</td>
</tr>
<tr>
<td></td>
<td>C50</td>
<td>P2232SSS50050050</td>
<td>7.50</td>
<td>500</td>
<td>P2235SSS50050050</td>
<td>7.50</td>
<td>500</td>
<td>P2637SSS50050050</td>
<td>7.50</td>
</tr>
<tr>
<td>100:5</td>
<td>C50</td>
<td>P2232SSS10050050</td>
<td>4.50</td>
<td>500</td>
<td>P2234SSS10050050</td>
<td>4.50</td>
<td>500</td>
<td>P2636SSS10050050</td>
<td>4.50</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS10051000</td>
<td>7.50</td>
<td>500</td>
<td>P2235SSS10051000</td>
<td>7.50</td>
<td>500</td>
<td>P2637SSS10051000</td>
<td>7.50</td>
</tr>
<tr>
<td>200:5</td>
<td>C50</td>
<td>P2232SSS20051000</td>
<td>3.50</td>
<td>215</td>
<td>P2234SSS20051000</td>
<td>3.50</td>
<td>215</td>
<td>P2635SSS20051000</td>
<td>3.50</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS20051500</td>
<td>5.00</td>
<td>350</td>
<td>P2234SSS20051500</td>
<td>5.00</td>
<td>350</td>
<td>P2635SSS20051500</td>
<td>5.00</td>
</tr>
<tr>
<td>400:5</td>
<td>C50</td>
<td>P2232SSS40051500</td>
<td>3.00</td>
<td>175</td>
<td>P2234SSS40051500</td>
<td>3.00</td>
<td>175</td>
<td>P2635SSS40051500</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS40052000</td>
<td>4.25</td>
<td>275</td>
<td>P2234SSS40052000</td>
<td>4.25</td>
<td>275</td>
<td>P2635SSS40052000</td>
<td>4.25</td>
</tr>
<tr>
<td>800:5</td>
<td>C50</td>
<td>P2232SSS80052000</td>
<td>3.00</td>
<td>175</td>
<td>P2234SSS80052000</td>
<td>3.00</td>
<td>175</td>
<td>P2635SSS80052000</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS80052500</td>
<td>4.25</td>
<td>275</td>
<td>P2234SSS80052500</td>
<td>4.25</td>
<td>275</td>
<td>P2635SSS80052500</td>
<td>4.25</td>
</tr>
<tr>
<td>1000:5</td>
<td>C50</td>
<td>P2232SSS100052500</td>
<td>3.00</td>
<td>175</td>
<td>P2234SSS100052500</td>
<td>3.00</td>
<td>175</td>
<td>P2635SSS100052500</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS100053000</td>
<td>4.25</td>
<td>275</td>
<td>P2234SSS100053000</td>
<td>4.25</td>
<td>275</td>
<td>P2635SSS100053000</td>
<td>4.25</td>
</tr>
<tr>
<td>1200:5</td>
<td>C50</td>
<td>P2232SSS120053000</td>
<td>3.00</td>
<td>175</td>
<td>P2234SSS120053000</td>
<td>3.00</td>
<td>175</td>
<td>P2635SSS120053000</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS120053500</td>
<td>4.25</td>
<td>275</td>
<td>P2234SSS120053500</td>
<td>4.25</td>
<td>275</td>
<td>P2635SSS120053500</td>
<td>4.25</td>
</tr>
<tr>
<td>2000:5</td>
<td>C50</td>
<td>P2232SSS200053500</td>
<td>3.50</td>
<td>215</td>
<td>P2234SSS200053500</td>
<td>3.50</td>
<td>215</td>
<td>P2635SSS200053500</td>
<td>3.50</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS200054000</td>
<td>5.00</td>
<td>350</td>
<td>P2234SSS200054000</td>
<td>5.00</td>
<td>350</td>
<td>P2635SSS200054000</td>
<td>5.00</td>
</tr>
<tr>
<td>3000:5</td>
<td>C50</td>
<td>P2232SSS300054000</td>
<td>3.50</td>
<td>215</td>
<td>P2234SSS300054000</td>
<td>3.50</td>
<td>215</td>
<td>P2635SSS300054000</td>
<td>3.50</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS300054500</td>
<td>5.00</td>
<td>350</td>
<td>P2234SSS300054500</td>
<td>5.00</td>
<td>350</td>
<td>P2635SSS300054500</td>
<td>5.00</td>
</tr>
<tr>
<td>4000:5</td>
<td>C50</td>
<td>P2232SSS400054500</td>
<td>3.50</td>
<td>215</td>
<td>P2234SSS400054500</td>
<td>3.50</td>
<td>215</td>
<td>P2635SSS400054500</td>
<td>3.50</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS400055000</td>
<td>5.00</td>
<td>350</td>
<td>P2234SSS400055000</td>
<td>5.00</td>
<td>350</td>
<td>P2635SSS400055000</td>
<td>5.00</td>
</tr>
<tr>
<td>5000:5</td>
<td>C50</td>
<td>P2232SSS500055000</td>
<td>3.50</td>
<td>215</td>
<td>P2234SSS500055000</td>
<td>3.50</td>
<td>215</td>
<td>P2635SSS500055000</td>
<td>3.50</td>
</tr>
<tr>
<td></td>
<td>C100</td>
<td>P2232SSS500055500</td>
<td>5.00</td>
<td>350</td>
<td>P2234SSS500055500</td>
<td>5.00</td>
<td>350</td>
<td>P2635SSS500055500</td>
<td>5.00</td>
</tr>
</tbody>
</table>

* Rating Factors (Typical) - 2.0 for units up to 2000:5, 1.5 for 3000:5 and above - contact factory for other options
- Units also available in dual ratio designs
- Units available in multi ratio designs. For multi-ratio, change "S" of catalog number to "M"
- Preferred sizes are shown. Other sizes are readily available - contact factory for details

**OPTIONAL ITEMS:**
For Ground Shields and Mounting Options, see page 8 of the Engineered Designs section
### PS–981 Current Transformer

#### RELAY CLASS ACCURACY SLIPOVER CT RATINGS

<table>
<thead>
<tr>
<th>Inside Ø (ID)</th>
<th>Outside Ø (OD)</th>
<th>Current Ratio</th>
<th>Acc Rating</th>
<th>Catalog Number</th>
<th>HT</th>
<th>WT</th>
<th>Catalog Number</th>
<th>HT</th>
<th>WT</th>
</tr>
</thead>
<tbody>
<tr>
<td>30&quot;</td>
<td>40&quot;</td>
<td>50:5</td>
<td>C5</td>
<td>P304035505050550</td>
<td>4.50</td>
<td>450</td>
<td>P304035505050550</td>
<td>4.50</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100:5</td>
<td>C50</td>
<td>P304075505050550</td>
<td>7.50</td>
<td>750</td>
<td>P304075505050550</td>
<td>7.50</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200:5</td>
<td>C50</td>
<td>P304045505050550</td>
<td>4.50</td>
<td>450</td>
<td>P304045505050550</td>
<td>4.50</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>600:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>800:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1200:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3000:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5000:5</td>
<td>C50</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
<td>P304035505050550</td>
<td>3.50</td>
<td>350</td>
</tr>
</tbody>
</table>

* Rating Factors (Typical) - 2.0 for units up to 2000:5, 1.5 for 3000:5 and above - contact factory for other options
- Units also available in dual ratio designs.
- Units available in multi ratio designs. For multi-ratio, change "S" of catalog number to "M"
- Preferred sizes are shown. Other sizes are readily available - contact factory for details

### OPTIONAL ITEMS:

For Ground Shields and Mounting Options, see page 6 of the Engineered Designs section
### PS–981 Current Transformer

#### METERING CLASS ACCURACY SLIPOVER CT RATINGS

<table>
<thead>
<tr>
<th>Inside Ø (ID)</th>
<th>Outside Ø (OD)</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Ratio</td>
<td>Burden</td>
<td>16&quot;</td>
<td>18&quot;</td>
<td>20&quot;</td>
<td>22&quot;</td>
</tr>
<tr>
<td>0.3 Acc</td>
<td>Catalog Number</td>
<td>HT</td>
<td>WT</td>
<td>HT</td>
<td>WT</td>
</tr>
<tr>
<td>400:5</td>
<td>B0.5</td>
<td>5.0</td>
<td>145</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>500:5</td>
<td>B0.5</td>
<td>5.0</td>
<td>105</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>B1.8</td>
<td>7.5</td>
<td>235</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>600:5</td>
<td>B0.5</td>
<td>7.5</td>
<td>30</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>B1.8</td>
<td>9.0</td>
<td>105</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>800:5</td>
<td>B1.8</td>
<td>9.5</td>
<td>90</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>1000:5</td>
<td>B1.8</td>
<td>9.5</td>
<td>90</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>1200:5</td>
<td>B1.8</td>
<td>9.5</td>
<td>90</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>1500:5</td>
<td>B1.8</td>
<td>9.5</td>
<td>90</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>1800:5</td>
<td>B1.8</td>
<td>9.5</td>
<td>90</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>2000:5</td>
<td>B1.8</td>
<td>9.5</td>
<td>90</td>
<td>6.0</td>
<td>180</td>
</tr>
<tr>
<td>3000:5</td>
<td>B1.8</td>
<td>9.5</td>
<td>90</td>
<td>6.0</td>
<td>180</td>
</tr>
</tbody>
</table>

* Rating Factors (Typical) - 2.0 for units up to 2000:5, 1.5 for 3000:5 - contact factory for other options
- Units also available in dual ratio designs
- Preferred sizes are shown. Other sizes are readily available - contact factory for details

**OPTIONAL ITEMS:**

For Ground Shields and Mounting Options, see page 6 of the Engineered Designs section
### Metering Class Accuracy SiLover CT Ratings*

<table>
<thead>
<tr>
<th>Inside Ø (ID)</th>
<th>22&quot;</th>
<th>24&quot;</th>
<th>26&quot;</th>
<th>28&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Ø (OD)</td>
<td>32&quot;</td>
<td>34&quot;</td>
<td>36&quot;</td>
<td>38&quot;</td>
</tr>
<tr>
<td>Current Ratio</td>
<td>0.3 Acc Burden</td>
<td>Catalog Number</td>
<td>HT (°)</td>
<td>WT (°)</td>
</tr>
<tr>
<td>400:5</td>
<td>B0.5</td>
<td>P22325S0S4015050</td>
<td>5.0</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>B0.9</td>
<td>P22326S0S015050</td>
<td>5.0</td>
<td>440</td>
</tr>
<tr>
<td>500:5</td>
<td>B0.5</td>
<td>P22324S0S015050</td>
<td>5.0</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>B0.9</td>
<td>P22326S0S015050</td>
<td>5.0</td>
<td>440</td>
</tr>
<tr>
<td></td>
<td>B1.8</td>
<td>P22327S0S015050</td>
<td>7.5</td>
<td>540</td>
</tr>
<tr>
<td>600:5</td>
<td>B0.5</td>
<td>P22323S0S015050</td>
<td>3.0</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td>B0.9</td>
<td>P22324S0S015050</td>
<td>4.0</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>B1.8</td>
<td>P22326S0S015050</td>
<td>6.0</td>
<td>440</td>
</tr>
<tr>
<td>800:5</td>
<td>B1.8</td>
<td>P22323S0S015050</td>
<td>3.5</td>
<td>220</td>
</tr>
<tr>
<td>1000:5</td>
<td>B1.8</td>
<td>P22323S0S015050</td>
<td>3.5</td>
<td>220</td>
</tr>
<tr>
<td>1200:5</td>
<td>B1.8</td>
<td>P22323S0S015050</td>
<td>3.5</td>
<td>220</td>
</tr>
<tr>
<td>1500:5</td>
<td>B1.8</td>
<td>P22323S0S015050</td>
<td>3.5</td>
<td>220</td>
</tr>
<tr>
<td>1800:5</td>
<td>B1.8</td>
<td>P22323S0S015050</td>
<td>3.5</td>
<td>220</td>
</tr>
<tr>
<td>2000:5</td>
<td>B1.8</td>
<td>P22322S0S015050</td>
<td>2.5</td>
<td>140</td>
</tr>
<tr>
<td>3000:5</td>
<td>B1.8</td>
<td>P22322S0S015050</td>
<td>2.5</td>
<td>140</td>
</tr>
</tbody>
</table>

---

* Rating Factors (Typical) - 2.0 for units up to 2000:5, 1.5 for 3000:5 - contact factory for other options
- Units also available in dual ratio designs
- Preferred sizes are shown. Other sizes are readily available - contact factory for details

**OPTIONAL ITEMS:**
For Ground Shields and Mounting Options, see page 6 of the Engineered Designs section
### ACCUSlip™ Current Transformer Selection Guide

<table>
<thead>
<tr>
<th>ID x OD</th>
<th>1000:5</th>
<th>2000:5</th>
<th>3000:5</th>
<th>4000:5</th>
<th>5000:5</th>
<th>6000:5</th>
<th>7000:5</th>
<th>8000:5</th>
<th>10000:5</th>
<th>15000:5</th>
<th>20000:5</th>
<th>30000:5</th>
<th>40000:5</th>
<th>50000:5</th>
<th>60000:5</th>
<th>70000:5</th>
<th>80000:5</th>
<th>100000:5</th>
<th>150000:5</th>
<th>200000:5</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>3.0-4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>3.0</td>
<td>see note</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT</td>
<td>0.75</td>
<td>0.75</td>
<td>0.8</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td>0.8-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ID x OD</th>
<th>18 x 18</th>
<th>19 x 20</th>
<th>12 x 22</th>
<th>14 x 24</th>
<th>15 x 26</th>
<th>18 x 28</th>
<th>20 x 30</th>
<th>22 x 32</th>
<th>24 x 34</th>
<th>25 x 36</th>
<th>26 x 38</th>
<th>30 x 40</th>
<th>32 x 42</th>
<th>34 x 44</th>
<th>36 x 46</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>0.15 BIL 1.2-5%</td>
<td>0.15 BIL 1.2-10%</td>
<td>0.15 BIL 3-10%</td>
<td>0.15 BIL 6-10%</td>
<td>0.15 BIL 1.2-10%</td>
<td>0.15 BIL 3-10%</td>
<td>0.15 BIL 6-10%</td>
<td>0.15 BIL 1.2-10%</td>
<td>0.15 BIL 3-10%</td>
<td>0.15 BIL 6-10%</td>
<td>0.15 BIL 9-10%</td>
<td>0.15 BIL 9-10%</td>
<td>0.15 BIL 9-10%</td>
<td>0.15 BIL 9-10%</td>
<td>0.15 BIL 9-10%</td>
</tr>
<tr>
<td>HT</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
<td>0.3 BIL 1.2-10%</td>
</tr>
</tbody>
</table>

**Notes:**
- This application guide is intended to assist the enginier in selecting the metering range desired by CT size and current ratio.
- The standard accuracy class as defined by IEEE C57.13 states that the accuracy at 10% rated current can be twice the accuracy class by which it is rated at nominal current, and must be in that same class from 115% rated current through the CT rating factor. The table is based on test results of various designs produced and is subject to change. It is to be used as a guide only for actual performance, consult factory. This table provides the lowest measurable range obtainable, based on actual test data, the CT will deliver to the rated burden. If a percentage is missing, it is assumed to respond as defined. For stated percentages, the accuracy will be maintained from that percentage of rated current through its rating factor. For other sizes and special burden requirements - consult KEC Engineering.
- Non-standard burdens or adjustments to fixed burdens are possible. No units will be available with build-ups and/or heights less than 3.00".

For information regarding dimensional data, mounting configurations and options, see the standard PS-88M pages 3-7 of this guide.

ACCUSlip™ is a registered trademark of Kuhlman Electric Corporation.
application
The BCT-605 / BH-001 indoor bushing current transformer (BCT) is a 600 volt rated unit and designed to fit over a variety of specified bushing sizes. The insulation of the bushing provides the dielectric protection for the CT. Primary current ratios are available from 200:5 thru 5000:5 at 60 Hertz (Hz) with a Rating Factor of up to 4.0. This unit is ideal for replacing old transformer BCT’s or for use in switchgear. This tape-wound CT will operate with high accuracy for metering or relay applications.

mechanical description
The core and coil assembly is wound and tape wrapped with various window sizes from 2.5” up to 45”. The secondary leads are typically #10 AWG THHN cut to a specified length. May also be provided with TEFZEL insulation.

accuracy performance
The BCT-605 can provide up to a 0.3 Class accuracy for metering with burdens of B0.1 to B1.8 and up to C800 for some relay applications (see similar ratings on pages 8-13). The transformer is accurate through its Rating Factor, and can be used continuously to this level. The BH-001 will operate with 0.15 Class accuracy for metering with burdens of B0.1 to B1.8 (see similar ratings on page 14). The transformer is accurate through its Rating Factor, and can be used continuously to this level.

mounting
The BCT / BH is designed for mounting around the internal bushings of a power transformer, circuit breaker or pothead or in switchgear.

testing
The unit is individually tested per the IEEE C57.13 standard, including dielectric tests, accuracy and polarity.

options
Through careful calculation, steel selection and testing, existing current transformer characteristics can be matched. Existing characteristic curve would be required. Contact factory for other needs.

HOW TO ORDER
For approximate sizes, refer to tables for Slipover CTs in relaying and metering sections, keeping in mind that BCTs will be slightly smaller. When ordering BCTs, include the following information:
1. Minimum inside diameter (ID) - ____________ in[mm]
2. Maximum outside diameter (OD) - ____________ in[mm]
3. Maximum allowable height (HT) - ____________ in[mm]
4. Current ratio and taps, if any - ____________ (:5A or :1A | SR, DR, MR)
5. Accuracy and burden requirements, for example,
   Metering - ____________ (0.3 B0.1 thru B1.8)
   High Accuracy - ____________ (0.15, see ACCUSlip™ table on page 14)
   Relaying - ____________ (C100, C200, C400, or C800 or other)
   If IEC ratings, list class and burden - ____________ (e.g. class 0.2-20 VA, 5P20-40 VA)
6. Continuous Rating Factor - ____________ (standard is RF=2.0)
7. Frequency - ____________ (standard is 60 Hz)
8. Lead length & type - ____________, size - ____________ (standard is #10 AWG THHN)
9. Used in or above oil - ____________ (Yes/No), or in dry surroundings - ____________ (Yes/No)

NOTE – Due to the many variations of mounting, Kuhlman Electric does not supply mounting hardware. Units are custom manufactured to customer specifications. Contact factory to discuss other options.
BCT–605/BH–001 Current Transformer

COMMON NOTES:
1. UNLESS STATED, DIMENSIONS IN INCHES [mm].
2. CONSTRUCTION: CORE/COIL ASSEMBLY IS WRAPPED WITH INSULATING TAPE SUITABLE FOR THE DESIRED APPLICATION:
   DRY–TYPE (NOT IN OIL) – PVC OR POLYESTER.
   FOR USE IN OR ABOVE OIL — FABRIC WRAP (COTTON).
3. H1 POLARITY MARK IS ADJACENT TO THE X1 LEAD.
4. SECONDARY LEADS TERMINATED TO COIL ENDS. EACH LEAD IS MARKED NEAR THE BODY AND NEAR THE LEAD END. TYPE THHN IS AVAILABLE IN COLORS. WHEN TEFZEL IS USED, THEY WILL BE EITHER BLACK OR GREY. TYPE, SIZE AND LENGTH MUST BE SPECIFIED. OTHER OPTIONS ARE AVAILABLE.
   — CONSULT WITH FACTORY.
5. NAMEPLATE IS ANCHORED INTO THE OUTER WRAP.

6. ELECTRICAL SPECIFICATION:
6.1 — INSULATION CLASS: 0.6kV, 105°C (CLASS A)
   130°C (CLASS B) ALSO AVAILABLE — CONSULT FACTORY.
6.2 — SHORT–TIME MECHANICAL RATING: 2X SHORT–TIME THERMAL RATING, MINIMUM.
6.3 — WINDINGS ARE FULLY DISTRIBUTED ABOUT CORE PERIPHERY, AND EQUALLY DISTRIBUTED BETWEEN TAPS.
6.4 — POLARITY IS SUBTRACTIVE.
6.5 — DESIGNED & TESTED IN ACCORDANCE WITH IEEE C57.13, IEC 60044–1, OR OTHERS AS APPLICABLE.

7. APPLICATION: FOR USE ON FULLY INSULATED PRIMARY CONDUCTOR, BUSHING OR SLEEVE.

NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.
**PSZ–981 Current Transformer**

*Indoor/Outdoor 600V, 10kV BIL, Single Ratios*
*Molded Resin, Window Type, Relaying*

### application
The PSZ-981 indoor/outdoor zero-sequence current transformer is a 600 volt, 10kV BIL rated unit and is designed to fit over a variety of specified primary conductor sizes. The insulation of the three phase primary conductors provide the dielectric protection for the zero-sequence CT. Primary current ratios are available from 50:5 to 200:5 at 60 Hertz (Hz) with a Rating Factor of up to 3.0. This dry-type, solid-cast, zero-sequence CT will operate with relay accuracy for ground fault detection applications.

### mechanical description
The core and coil assembly is wound and encapsulated in a molded cast resin with various window sizes from 6” up to 44”. The coil is specially designed and arranged for 3-phase conductor use to prevent localized saturation and/or nuisance tripping. The secondary terminals have ¼”-20 studs with associated hardware located inside a removable terminal box with two (2) 1” NPT conduit hubs.

### accuracy performance
The PSZ-981 can provide up to a C200 relay accuracy (see ratings specific to each ratio). The transformer is accurate through its Rating Factor, and can be used continuously to this level.

### mounting
The PSZ is designed for mounting over the primary conductors of a three-phase system. The unit can be mounted in a variety of ways (see page 6 for diagrams) as well as an option for four mounting holes molded in with two holes near the secondary terminal box and two on the opposite end.

### testing
The unit is individually tested per the IEEE C57.13 standard, including dielectric tests, accuracy and polarity.

### options
Contact factory for other needs.

---

**HOW TO ORDER**

For typical sizes, refer to Slipover CT tables on pages 8-11.

When ordering Zero-Sequence CTs, include the following information:

1. Minimum inside diameter (ID) - ____________ in[mm]
2. Maximum outside diameter (OD) - ____________ in[mm]
3. Maximum allowable height (HT) - ____________ in[mm]
4. Current ratio - ____________ (standards are 50:5, 100:5 or 200:5 SR)
5. Accuracy and burden requirements, for example,
   - Relaying - ____________ (standards are C50, C100 or C200)
   - If IEC ratings, list class and burden - ____________ (e.g., class 5P20-40 VA)
6. Continuous Rating Factor - ____________ (standard is RF=2.0)
7. Frequency - ____________ (standard is 60 Hz)
8. Conduit Box Hub Size - ____________ (standard is 1” NPT)

**NOTE** – Kuhlman Electric offers many mounting options for Zero-Sequence CTs (see page 6 for diagrams). Units are custom manufactured to customer specifications. Contact factory to discuss other options.
ENGINEERED DESIGNS

PSZ–981 CURRENT TRANSFORMER

March 2008

NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.
application
The BYZ-863 / 865 indoor/outdoor zero-sequence current transformer can be provided in 15,000 and 25,000 volt classes, 110 and 150kV BIL to ground, respectively, and is designed to fit over a variety of specified insulated primary conductors. Primary current ratios are available from 50:5 to 200:5 at 60 Hertz (Hz) with a Rating Factor of up to 3.0. This dry-type, solid-cast, zero-sequence CT will operate with relay accuracy for ground fault detection applications.

mechanical description
The core and coil assembly is wound and encapsulated in a molded cast resin with 4 ½” window porcelain primary bushing(s) to provide high withstand capabilities. The coil is specially designed and arranged for 3-phase conductor use to prevent localized saturation and/or nuisance tripping. The high strength porcelain(s) has(have) a semi conductive interior with a pigtail lead to be connected to the primary conductor(s) to equalize the voltage and prevent radio interference and corona. The secondary terminals have ¼"-20 studs with associated hardware located inside a removable terminal box with two (2) 1" NPT conduit hubs.

accuracy performance
The BYZ-863 / 865 can provide up to C200 relay accuracy (see ratings specific to each ratio). The transformer is accurate through its Rating Factor, and can be used continuously to this level.

mounting
The BYZ is designed for mounting over the primary conductors of a three-phase system in the upright or underhung position with the tube horizontal, or in the cantilever position with the tube vertical. Open end slots are provided on the aluminum mounting legs.

testing
The unit is individually tested per the IEEE C57.13 standard, including dielectric tests, accuracy and polarity.

options
Unit is available with 2 or 3 tubes. Contact factory for other needs.

HOW TO ORDER
When ordering a 15kV or 25kV rated Zero-Sequence CTs, include the following information:

1. Minimum inside diameter (ID) - ____________ in[mm] (standard min is 4 ½”/phase)
2. Maximum outside diameter (OD) - ____________ in[mm] (standard min is 26”)
3. Current ratio - ____________ (standards are 50:5, 100:5 or 200:5 SR)
4. Accuracy and burden requirements, for example, Relaying - ____________ (standards are C50, C100 or C200)
   If IEC ratings, list class and burden - ____________ (e.g., class 5P20-40 VA)
5. Continuous Rating Factor - ____________ (standard is RF=2.0)
6. Frequency - ____________ (standard is 60 Hz)
7. Conduit Box Hub Size - ____________ (standard is 1” NPT)

NOTE – Kuhlman Electric offers many mounting options for Zero-Sequence CTs. Units are custom manufactured to customer specifications. Contact factory to discuss other options.
NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.
application
The SP-061 outdoor, split-core bushing current transformer (BCT) is a 600 volt, 10kV BIL rated unit. This unit can be applied over higher rated system voltages provided sufficient insulation is available on the point of application. Primary current ratios are available from 200:5 to 5000:5 with a Rating Factor of up to 2.0. This unit is convenient to install where the primary conductor cannot be broken or opened. This dry-type, solid-cast, split-core CT will operate with reasonable accuracy for metering or relay applications.

mechanical description
The core and coil assembly is fully encapsulated with resin and then on 3 sides with an aluminum shell. The aluminum shell, provided in a variety of window sizes, is cut in two to provide the split core capability and also serves as a ground shield. The core halves on the side opposite the flexible conduit can opened as far as needed to fit around the conductor. Once in place the halves are joined back together and secured with stainless steel hardware. For permanent installations it is recommended that silicone RTV be used to seal the core gap areas from ingestion of moisture. The flexible weather-tight conduit is used to interconnect the two winding halves together. The leads are pre-wired and should not be removed. All connections from the bottom half of the core are terminated to their dedicated positions. These connections need not be removed while wiring the secondary circuit. The black plastic main conduit box contains the secondary terminals for instrumentation wiring, and the small metallic terminal box, opposite the main box, does not need to be opened or removed and is so marked on its cover. The secondary terminals are ¼"-20 studs with flat, lock and cupped washers located. The conduit box has (1) 1"-11.5 NPT hub available.

accuracy performance
The SP-061 can provide up to 0.3 Class accuracy for metering with burdens of B0.1 up to B1.8 and up to C800 for relay applications (ratings are specific to each ratio). The transformer is accurate through its Rating Factor, and can be used continuously to this level.

mounting
The SP is designed for mounting around the bushings of a power transformer, circuit breaker or cable terminator (pothead). The unit must be mounted on a flat surface to eliminate any tension on the seams of the split-core CT. Resin pads can be provided to eliminate any water welling. It is important that no metallic bracket or plate extend from the OD to the ID on the H2 (bottom) side as this will create a shorted electrical turn around the core and cause mis-operation of the CT.

testing
Each unit is individually tested per IEEE C57.13, including dielectric tests, accuracy and polarity.

options
The unit can be offered in various window sizes. Through careful calculation, steel selection and testing, existing current transformer characteristics can be matched with split-core CT’s on special order. Existing characteristic curve would be required. Contact factory for other needs.

HOW TO ORDER
For typical sizes, refer to tables for Slipover CTs on pages 8-13. Actual Split-Core design will be larger in finished height. When ordering Split-Core CTs, include the following information:

1. Minimum inside diameter (ID) - ____________ in[mm]
2. Maximum outside diameter (OD) - ____________ in[mm]
3. Maximum allowable height (HT) - ____________ in[mm]
4. Current ratio and taps, if any - ____________ (:5A or :1A | SR, DR, MR)
5. Accuracy and burden requirements, for example,
   - Metering - ____________ (0.3 B0.1 thru B1.8)
   - Relaying - ____________ (C100, C200, C400, or C800 or other)
   - If IEC ratings, list class and burden - ____________ (e.g., class 0.2-20 VA, 5P20-40 VA)
6. Continuous Rating Factor - ____________ (standard is RF=2.0)
7. Frequency - ____________ (standard is 60 Hz)
8. Conduit Box Hub Size - ____________ (standard is 1” NPT)

NOTE – Split-Core CTs must be mounted flat using resin pads or mounting brackets (see manual 167-0650-902). Units are custom manufactured to customer specifications. Contact factory to discuss other options.
SP–061 Current Transformer

Engineered Designs
March 2008

NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.
Generator and ISO-Phase Bus Current Transformers

In response to the strict performance and reliability requirements of the generator manufacturers, Associated Engineering Company (AECO), a subsidiary of Kuhlman Electric Corporation since 1978, developed, designed, and manufactured state-of-the-art generator current transformers (GCTs) and isolated-phase bus current transformers (ISO-CTs) since 1980. In 1994, Associated Engineering became the Instrument Transformer Division of Kuhlman Electric Corporation.

In the late 1960s, General Electric Company (GE) approached AECO to help address performance problems they were experiencing with generator current transformers (GCTs). At that time both GE and Westinghouse was producing their own GCTs, mostly potted epoxy coils in large die cast aluminum and copper housings. These housings were not providing the degree of shielding anticipated. And in high current fields, eddy currents contributed much heat into the epoxy cast core/coil assembly that over time began to degrade the insulation system. It was also discovered that unshielded cast epoxy units were not performing well above 10,000 amperes. AECO worked closely with GE to develop and perfect AECO’s unique internal shield design that is still in use today.

To date we have delivered more than 15,000 special designed, reliable, indoor and outdoor class GCTs and ISO-CTs to generator manufacturers, power generation utilities, and service companies worldwide – each meeting the special requirements needed for generator protection and metering. All of the GCT product types have been tested to, and have met and exceeded the requirements of GE, Siemens Power (formerly Siemens-Westinghouse), Mitsubishi, Hitachi, Hyundai, and others. Kuhlman prides itself as being a leader in the power generation industry.

Today we offer a full range of indoor / outdoor class, shielded and un-shielded, board mounted and resin cast current transformers specifically designed for generation metering and protection. They are provided with inside diameters up to 41” [1040mm], ratios to 50,000:5 and standard insulation ratings of 130°C or as high as 155°C for high temperature applications.

To insure quality and reliability, Kuhlman Electric Corporation performs a stringent routine factory test program on every unit manufactured and shipped. Each provided with a Certified Test Report documenting all results in accordance with IEEE C57.13 and/or IEC 60044-1 (and 60044-6 when applicable) – all calibrated and traceable to NIST and NRC. A Design Type Test program is available to assure meeting certain qualifications that may not be covered in a routine factory test, or as a separate user requirement – consult factory for more details.

These products can be used in a variety of applications within the generation system. The most common installation is directly on the terminal bushing. These are always 0.6kV class / 10kV BIL rated GCT, in the GCT-848 (see page 25) or PSG-981 (see page 26) style. The GCT-848 is ideal when short lead times are needed. They are a rugged, open frame construction, available up to 155°C class insulation system. They are always mounted with the coil upright, and up to angles of 60° from the horizontal. Because of its construction it can be made to accommodate just about any mounting pattern. The PSG-981 is also a rugged construction that is well suited for harsh environments up to 130°C. It is suitable for outdoor use, has a much higher dielectric withstand than the open frame construction, and can handle moderate abuse.

In the isolated phase bus compartments, the PSG-981 is well suited for upright mounting, centrally positioned around non-insulated bus. With adequate air space, the 0.6kV unit can satisfy the dielectric requirements of the bus rating, and meet the requirements of C37.23 – IEEE Guide for Metal-Enclosed Bus and Calculating Losses in ISOLATED-Phase Bus. Table A show some of those requirements.

<table>
<thead>
<tr>
<th>Maximum System Voltage, kV</th>
<th>Applied Voltage Withstand, 60Hz for 1 minute</th>
<th>Impulse Level, kV BIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.635</td>
<td>2.2 [4.0]</td>
<td>--</td>
</tr>
<tr>
<td>4.76</td>
<td>19.0</td>
<td>60</td>
</tr>
<tr>
<td>15.5</td>
<td>36 / 50 [34]</td>
<td>95 / 110</td>
</tr>
<tr>
<td>25.8 / 29.5</td>
<td>50 / 60 [34 / 40]</td>
<td>110 / 125</td>
</tr>
<tr>
<td>38.0</td>
<td>80 [70]</td>
<td>150 [200]</td>
</tr>
</tbody>
</table>

FOOTNOTE – [ ] are values tested in C57.13 IEEE Standard Requirements for Instrument Transformers

Whatever your application, Kuhlman has a solution.
Left: Older European Style GCT stacks without Secondary Terminal Boxes for conduit connection. Right: Kuhlman GCTs (GCT-848) with Terminal Boxes & matched mounting configuration.

Left: Lower Current, Metal Enclosed, Potted GCT stack nearing 30-40 year service life. Right: Kuhlman Board Mounted GCT array (HW-945) built with consistent mounting arrangement.

Left: Higher Current, Metal Enclosed (Cu or Al) GCTs. Units are heavy, expensive and run at elevated temperatures due to circulating eddy currents in the outer shell. Right: Low Cost, Light Weight, Kuhlman Resin Cast GCTs (PSG-981) built with internal shield winding to better dissipate heat.
**application**

The GCT-848 indoor/outdoor, board-mounted generator current transformer is a 600 volt, 10kV BIL rated unit and designed to fit over a variety of specified bushing sizes. The insulation of the bushing provides the dielectric protection for the CT. Primary current ratios are available up to 50,000:5 (as well as up to 25,000:1) at 50 and/or 60 Hertz (Hz) with a typical Rating Factor of 1.0 @ 55°C. This unit is ideal for new installations or for quick replacement/retrofit on older generators. This Mylar or polyester tape-wrapped, board-mounted CT will operate with high accuracy for metering and/or relay applications.

**mechanical description**

The core and coil assembly is wound and tape wrapped with various window sizes from 6” up to 44”. The CT has an internally shielded winding for 10kA and above rated units to minimize the effects of stray flux from adjacent current carrying conductors. The CT is mounted to the non-magnetic insulating board using high strength straps and silicone adhesive to provide excellent mechanical strength to withstand the high vibration application on generators. The secondary terminals are #10-32 screws located inside an aluminum terminal box with two (2) 1” NPT conduit hubs. The unit is moisture resistant and can withstand direct water spray equivalent to 1” of rain per hour for two hours and remain dielectrically sound.

**accuracy performance**

The GCT-848 can provide up to 0.3 Class (0.2S IEC) accuracy for metering with burdens of B0.1 to B1.8 (45VA IEC) and up to C800 (5P20-200VA IEC) for some relay applications (see ratings specific to each ratio). The transformer is accurate through its Rating Factor, and can be used continuously to this level.

**mounting**

The GCT is designed for mounting over a generator bushing. Mounting holes are located in the four corners of the board to application specific sizes. The unit can be mounted anywhere from 0° to 60° from horizontal with the coil side always up (see ratings specific to each design).

**testing**

The unit is individually tested per the IEEE C57.13 and/or IEC 60044-1 standard, including dielectric tests, accuracy and polarity. Unit can be tested per IEC 60044-6 when applicable.

**options**

The unit can be provided in a pre-assembled array of 2 to 5 GCT’s (HW-945). The unit can also be provided without an insulating board and #10 TEFZEL leads (GCT-802). Through careful calculation, steel selection and testing, existing current transformer characteristics can be matched. Existing characteristic curve would be required. Contact factory for other needs.

**HOW TO ORDER**

When ordering Generator CTs, include the following information:

1. Minimum inside diameter (ID) - ____________ in[mm]
2. Maximum outside diameter (OD) - ____________ in[mm]
3. Maximum allowable height (HT) - ____________ in[mm]
4. Current ratio - ____________ (:5A or :1A)
5. Number of Cores - ____________ (1 - GCT-848; 2, 3, 4, or 5 - HW-945)
6. Accuracy and burden requirements, for example,
   Metering - ____________ (IEEE C57.13 or IEC 60044-1)
   Relaying - ____________ (IEEE C57.13 or IEC 60044-1)
7. Continuous Rating Factor - ____________ (standard is RF=1.0 @ 55°C)
8. Mounting Hole Arrangement - ____________, size - ____________ (e.g. 34° BC, (4) ¾”Ø holes)
9. For GCT-802, Lead length & type - ____________, size - ____________ (standard is #10 AWG)
10. Frequency - ____________ (50, 60 Hz, other)
11. Conduit Box Hub Size - ____________ (standard is 1” NPT)

**NOTE** – Units are custom manufactured to customer specifications. Contact factory to discuss other options.
application
The PSG-981 indoor/outdoor, generator current transformer is a 600 volt, 10kV BIL rated unit and designed to fit over a variety of specified generator bushing sizes. The insulation of the bushing provides the dielectric protection for the CT. Primary current ratios are available up to 50,000:5 (as well as up to 25,000:1) at 50 and/or 60 Hertz (Hz) with a typical Rating Factor of 1.0 @ 55°C. This unit is ideal for new installations or for quick replacement/retrofit on older generators. This dry-type, solid-cast CT will operate with high accuracy for metering and/or relay applications.

mechanical description
The core and coil assembly is wound and encapsulated in a molded cast resin with various window sizes from 6” up to 44”. The CT has an internally shielded winding for 10kA and above rated units to minimize the effects of stray flux from adjacent current carrying conductors. The secondary terminals are ¼”-20 studs with associated hardware located inside a removable terminal box with two (2) 1” NPT conduit hubs. The unit is moisture resistant and can withstand direct water spray equivalent to 1” of rain per hour for two hours and remain dielectrically sound.

accuracy performance
The PSG-981 can provide up to 0.3 Class (0.2S IEC) accuracy for metering with burdens of B0.1 to B1.8 (45VA IEC) and up to C800 (5P20-200VA IEC) for some relay applications (see ratings specific to each ratio). The transformer is accurate through its Rating Factor, and can be used continuously to this level.

mounting
The PSG is designed for mounting over a generator bushing. Mounting holes are located in the four corners of the housing to application specific sizes. The unit can be mounted at any angle.

testing
The unit is individually tested per the IEEE C57.13 and/or IEC 60044-1 standard, including dielectric tests, accuracy and polarity. Unit can be tested per IEC 60044-6 when applicable.

options
The unit can be stacked on top of one another, but it is highly recommended that some space exists to allow for air circulation and cooling. Through careful calculation, steel selection and testing, existing current transformer characteristics can be matched. Existing characteristic curve would be required. Contact factory for other needs.

HOW TO ORDER
When ordering molded resin Generator CTs, include the following information:

1. Minimum inside diameter (ID) - ____________ in[mm]
2. Maximum outside diameter (OD) - ____________ in[mm]
3. Maximum allowable height (HT) - ____________ in[mm]
4. Current ratio - ____________ (:5A or :1A)
5. Number of Cores - ____________ (1, 2 or 3)
6. Accuracy and burden requirements, for example,
   Metering - ____________ (IEEE C57.13 or IEC 60044-1)
   Relaying - ____________ (IEEE C57.13 or IEC 60044-1)
7. Continuous Rating Factor - ____________ (standard is RF=1.0 @ 55°C)
8. Mounting Hole Arrangement - ____________, size - ____________ (e.g. 34° BC, (4) ¾”Ø holes)
9. Frequency - ____________ (50, 60 Hz, other)
10. Conduit Box Hub Size - ____________ (standard is 1” NPT)

NOTE – Units are custom manufactured to customer specifications. Contact factory to discuss other options.
Engineered Designs
March 2008

Generator & ISO-Phase Bus
Current Transformers

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

NOTE: DIMENSIONS IN INCHES [mm].
1. Insulation Level: Class 110, 155 kV.
   Temperature Class Available in 130°C or 155°C.
2. Construction: Core/Coil Assembly is wrapped with Polyester Tape throughout, secured to a rigid high-strength Polyester board with high-strength adhesives.
3. 1/1 PT or 120/5 PT Polarity is embedded in the board. 0.75% (1%)
   5% (1%) for Secondary Ratios. Location of coil is noted on the drawing.
4. Secondary Terminals are #10-32 screws, each lead identified above the board.
5. Dust-Tight Conduit with (2) NPT Holes, Straight Thru, Provided, 1/8" stemmed plugs. A reasonable cover is attached w/(4) sealing-type velocity screws.
   Hub Options: 1"-1.5" N.P.T. [Optional if not otherwise specified.]
   1.5"-2.5" M.P.T.
   Select [size] x 1/8"-1/4"-plated surfaces. Other options may be available - consult Factory.
6. Nameplate is anodized aluminum, laser engraved, fastened to the board.
7. Suitable for mounting at any angle between 0°-78° from the horizontal. Coil side up. Board has (4) major holes for mounting directly onto terminal mounting flange. Hole size must be specified. If the bolt holes are not on a square pattern, then it must be specified.
8. Polarity is stamped. Winding is fully distributed.

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

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

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

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

NOTE: OUTLINES ARE FOR REFERENCE ONLY. CONTACT FACTORY FOR ACTUAL DESIGN DRAWINGS.
TESTING SERVICES by KUHLMAN ELECTRIC

With market deregulation expanding throughout the U.S. and Canada, there has been an increased need for metering of power facilities and transmission points. This has increased focus on upgrading metering at these locations to provide reliable data for power flow. Kuhlman has developed tests specific to each site situation and has test equipment and standards certified traceable to National Institute of Standard and Technology (NIST) and National Research Council of Canada (NRCC).

With the right equipment and experts in instrument transformer design and instrumentation engineering, Kuhlman is uniquely positioned to provide customers with testing options to meet requirements for revenue metering certification, excitation verification, actual burden measurement and/or instrumentation system performance. Kuhlman has performed tests thus far on hundreds of installed instrument transformers with transformer performance detailed on formal test reports identified to specific installed units.

Kuhlman's Field Engineering Services Division has trained crews and high resolution test equipment needed to provide highly accurate measurements that you can trust will precisely identify performance of any installed instrument transformer.

Field Engineering Services Testing consists of:

1) On site tests:
   a. In-service testing of CTs to identify excitation performance.
   b. Deenergized accuracy testing of any CT w/o disassembly.
   c. Deenergized accuracy testing of any VT up to 34.5kV.
   d. Measurement of actual burden connected into circuit.
   e. Relaying performance tests for instrumentation system.
   f. Calibration of user laboratory test equipment to NIST/NRCC.
   g. Calibration of user standard transformers to NIST/NRCC.

2) Factory tests:
   a. Accuracy testing of instrument transformers at Kuhlman test facilities traceable to NIST/NRCC.
   b. Special dielectric testing for product prototypes.
   c. Transformer failure analysis and design information.

In- Service Testing (On Site Test)

As a service to the power generation industry, and because traditional testing methods all require the generator or substation be down, Kuhlman now provides custom substation CT, BCT and GCT In Service Testing Programs using our patented methods and procedures.

• Fast, efficient—only 2-4 minutes per CT
• Plant operations normal – at power
• Field proven – no plant trips
• Tests for all known failure modes of CT

Benefits of In-Service Testing-

• Avoids costly outages required by traditional test methods
• Provides condition analysis almost immediately
• Provides early detection of imminent failures
• Certifies relaying accuracy performance of CTs or GCTs
• Metering accuracy approximated for CTs or GCTs
• Certifies loop instrumentation performance
• Provides performance data for predictive maintenance data

Deenergized CT and VT Testing (On Site Test)

With the need to accurately meter generation facilities, and limited space to locate free-standing CTs, more power generators are turning to using internal BCTs for metering needs. These transformers must be accuracy tested to confirm revenue metering performance. Kuhlman offers an on site deenergized accuracy test that will identify Ratio Correction Factor (RCF) and Phase Angle (PA) results at 10% and 100% operating levels at burden rating for all CTs and voltage comparator accuracy testing for VTs at full voltage up to 34.5kV applications.

Testing can check CTs in-place mounted in power transformers or generators, and on circuit breakers. Access for CT testing in power transformers and generators is at the CT secondary terminal block. For circuit breaker CT testing, Kuhlman does a comparator test that actually establishes a primary current loop to check the CTs in the breaker. Actual connected burdens are measured.

Benefits of On Site Deenergized Testing

• Traceable to NIST/NRCC for PSC verification of revenue use
• No disassembly of installed CTs/VTs to get accuracy results
• Actual burden & wiring confirmed to insure accurate metering
• Test results immediately confirm if revenue metering capable