Kuhlman Electric Corporation

Engineered Designs
Instrument Transformers

KUHLMAN ELECTRIC CORPORATION

A MEMBER OF THE ABB GROUP

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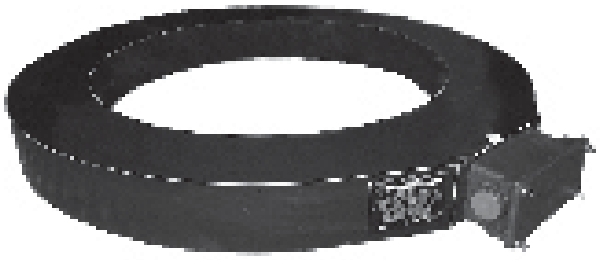
application

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).

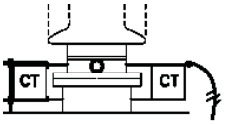


Figure 1

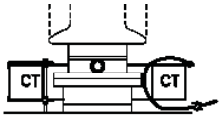


Figure 2

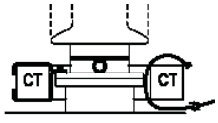


Figure 3

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).

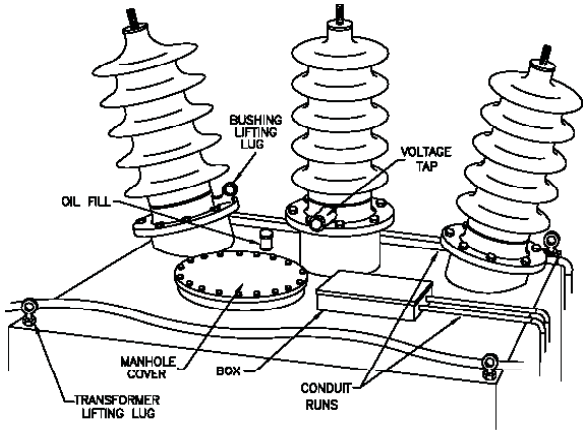


Figure 4

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.

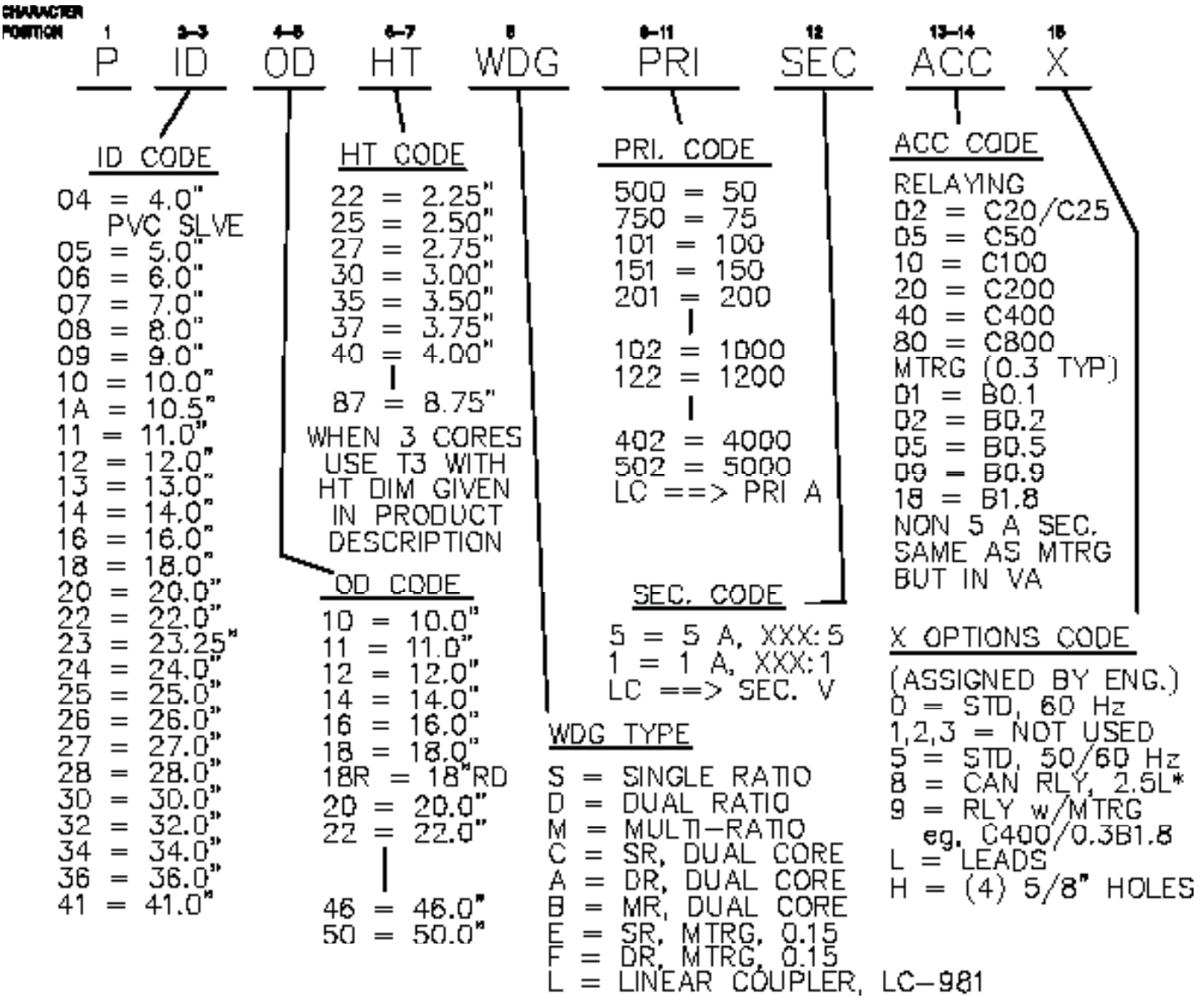
testing

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.

PS–981/PH–982 Current Transformer



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 dicuss other options.

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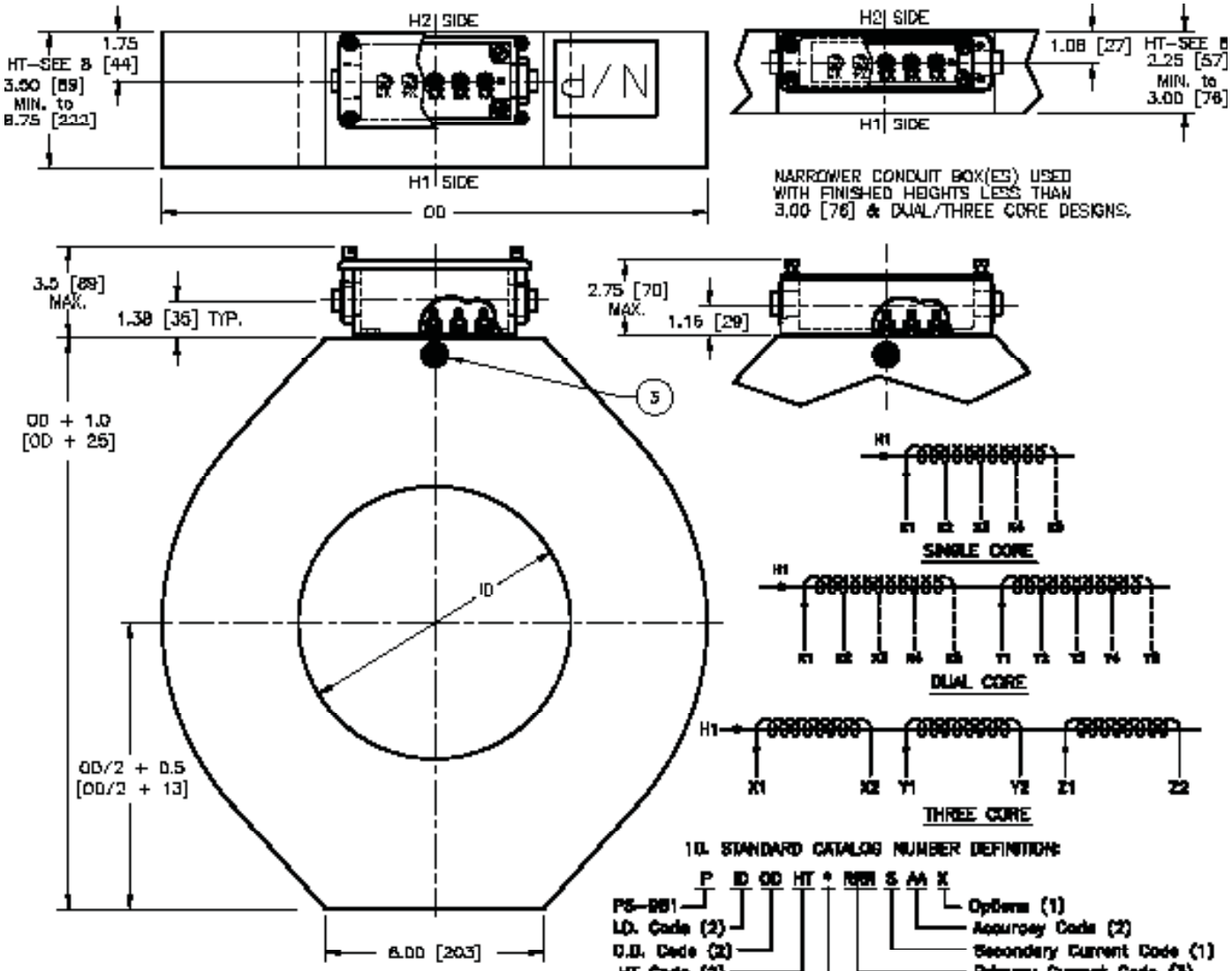

NOTES:
DIMENSIONS IN INCHES [mm]
1. INSULATION LEVEL: 0.6kV CLASS, 10kV B.I.L., 130°C.
2. CONSTRUCTION: CORE/COIL ASSEMBLY IS ENCAPSULATED IN A RESIN SUITABLE FOR INDOOR/OUTDOOR USE.
3. H1 POLARITY MARK IS PERMANENTLY ENGRAVED WHITE DOT.
4. X1 POLARITY MARK IS PERMANENTLY ENGRAVED WHITE DOT.
5. SECONDARY TERMINALS ARE 1/4–20 STUDS w/FLAT, CUPPED & LOCK WASHERS SECURED WITH HEX NUT. TIGHTEN TO COMPRESS LOCK WASHER ONLY – NOT TO EXCEED 50 lbF–in. EACH TERMINAL HAS PERMANENTLY ENGRAVED MARKING ADJACENT TO IT.
6. SECONDARY TERMINAL BOX IS WEATHERTIGHT WITH (2) 1"–11.5 N.P.T. HUBS AND BLANKING PLUGS. A REMOVABLE COVER IS ATTACHED WITH (4) SEALING–TYPE THUMB SCREWS FOR EASY ACCESS.
7. — SKIP – INTENTIONALLY LEFT BLANK. —
8. FINISHED HEIGHT CAN RANGE FROM 2.25 [57] TO 8.75 [222] AS REQ'D. TOLERANCE RANGE: ±0.25 [±6.4] ALONG ENTIRE OD.
9. WINDING ARRANGEMENTS AVAILABLE ARE:
   SINGLE RATIO (SR) DUAL RATIO (DR) MULTI RATIO (MR)
   (SEE WINDING DIAGRAMS FOR DETAILS)

10. STANDARD CATALOG NUMBER DEFINITION:

P	ID	OD	HT	*	RRR	S	AA	X
PS–981	I.D. Code (2)	O.D. Code (2)	HT Code (2)					

- Options (1)
- Accuracy Code (2)
- Secondary Current Code (1)
- Primary Current Code (3)
- Secondary Winding Code (1)

11. ELECTRICAL AND PHYSICAL PARAMETERS:

CATALOG NUMBER: _____
CURRENT RATIO: _____
ACCURACY: _____
R.F. @ 30Ω: _____
I.D. DIMENSION: _____
O.D. DIMENSION: _____
HT DIMENSION: _____
UNIT WEIGHT: _____

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

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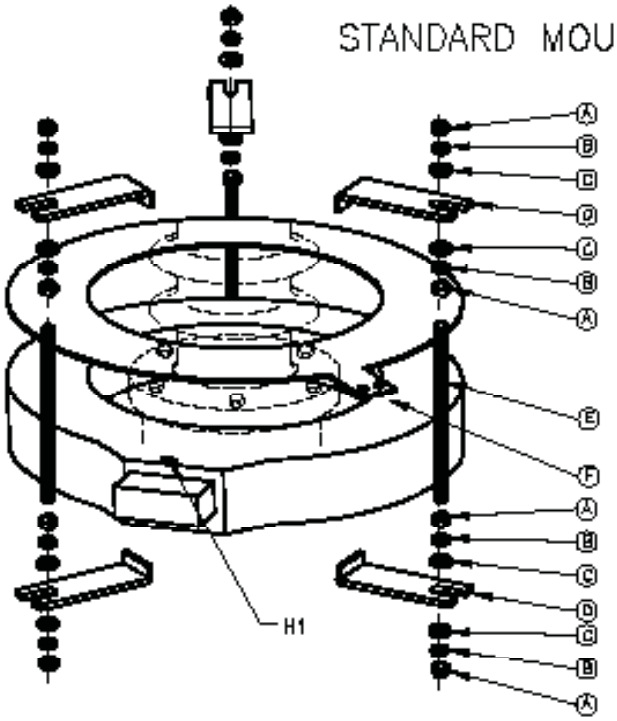
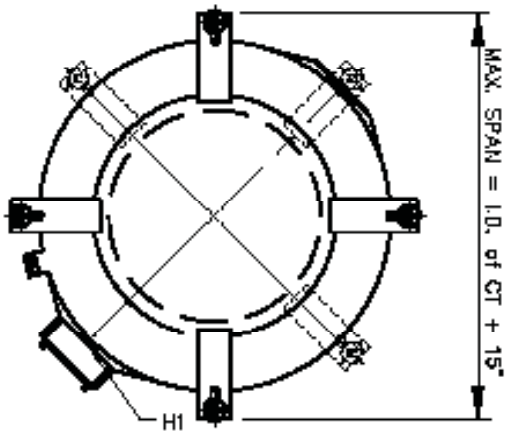
PS–981/PH–982 Current Transformer

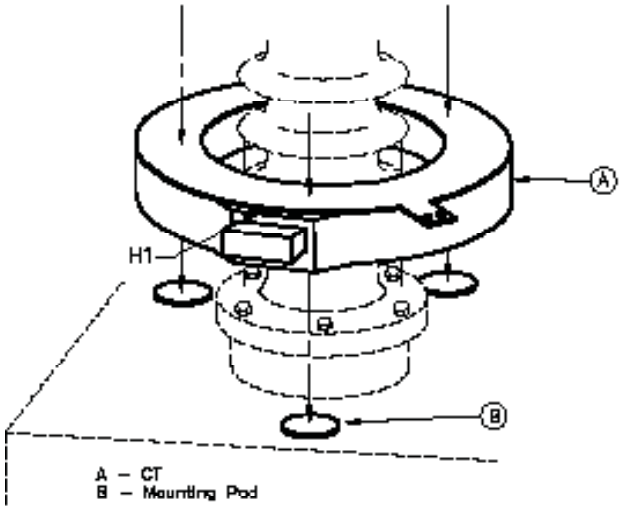
STANDARD MOUNTING HARDWARE





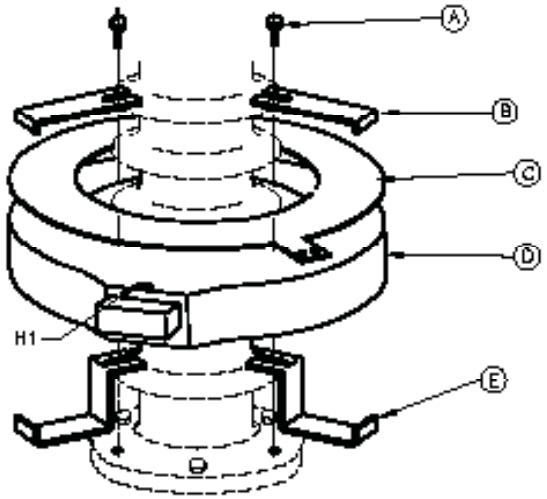
A – 5/8 Hot dipped galvanized nut.
B – 5/8 Lock washer.
C – 5/8 SS Flat washer.
D – Mounting bracket.
E – 5/8–11 Hot dipped galvanized rod.
F – Aluminum ground shield. Ground lug location to be customer determined. (Optional)

MOUNTING PAD INSTALLATION



A – CT
B – Mounting Pad

Z–BRACKET MOUNTING HARDWARE



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

Ground Shields					
ID	OD	Cat No.	ID	OD	Cat No.
6	16	PGS-0616	22	32	PGS-2232
8	18	PGS-0818	24	34	PGS-2434
10	20	PGS-1020	26	36	PGS-2636
12	22	PGS-1222	28	38	PGS-2838
14	24	PGS-1424	30	40	PGS-3040
16	26	PGS-1626	32	42	PGS-3242
18	28	PGS-1828	34	44	PGS-3444
20	30	PGS-2030	36	46	PGS-3646

NOTES: Ground Shields are ¼" thick.
Brackets come in pairs, top and bottom.
When steel is specified, galvanized is standard. Plain stainless steel may be substituted.
Rods are 5/8-11 x 14" galvanized steel bolt-ends with standard galv. nuts. Flat and lock washers are stainless steel. Longer bolt lengths are available in stainless steel - Consult Factory

For a Set of (4) ¼" thick Resin Pads for use under a CT mounting directly upon a power transformer cover, specify 123-0085-904.

Universal Slip-Over Mounting Bracket Kits			
Bracket Kit # 150-0305-XXX	Brackets per Kit	Bracket Material	Kit Weight Limit, lbs
901	3	Aluminum	200
919	3	Stainless Steel	300
902	4	Aluminum	275
908	4	Stainless Steel	475
903	6	Aluminum	350
904	6	Stainless Steel	650
905	8	Stainless Steel	850
918	10	Stainless Steel	1000

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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 & BRACKETING TO BE USED, PROVIDE ALL DIMENSIONS REQUESTED. KEEP IN MIND THAT SLINGS MAY BE NEEDED FOR OVER-HEAD ASSEMBLY AND MUST BE ACCOUNTED FOR WHEN SELECTING THE C.T. INNER DIAMETER.

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 SUPPOWER TOP CLOSE TO FLANGE LEVEL, ENGINEERING WILL DESIGN THE BRACKET HEIGHT TO UTILIZE ALL AVAILABLE SPACE.

SINCE THIS TYPE OF INSTALLATION IS SPECIFIC, THE NUMBER OF BRACKETS REQUIRED PER BUSHING IS BASED ON THE BOLTS AVAILABLE AND SIZE & WEIGHT OF THE C.T. AS DETERMINED BY KUHLMAN ENGINEERING UNLESS. IN SOME CASES NOT ALL OF THE AVAILABLE BOLTS WILL BE NEEDED. IT IS THE RESPONSIBILITY OF THE END USER TO ADVISE KUHLMAN ENGINEERING OF ANY OBSTACLES SUCH AS ADJACENT BUSHINGS, LIFTING EYES, COVERS, TEST PLUGS, CONDUIT RUNS or OTHER, THAT MAY INTERFERE WITH THE INSTALLATION.

CAUTION: – INSURE FLANGE BOLT LENGTH IS SUFFICIENT FOR ADDED THICKNESS OF (2) BRACKETS, (1.50" TYP.

CUSTOMER SUPPLIED DIMENSIONS (in Inches): (See Fig. 1)
or PROVIDE DETAILED BUSHING DWG

A. BUSHING THROAT DIAMETER _____
B. FLANGE BOLT CIRCLE DIAMETER _____
C. NUMBER OF FLANGE BOLTS _____
D. FLANGE BOLT SIZE or DIAMETER _____
E. BUSHING FLANGE DIAMETER _____
F. TANK FLANGE DIAMETER, IF > DIM E _____
S. SKIRT DIAMETER, IF > DIM's E & F _____
DROP. DISTANCE BELOW THE BSHG FLANGE, TOP OF FLANGE TO TOP OF TANK _____
RISE. DISTANCE ABOVE THE BSHG FLANGE, TOP OF FLANGE TO WHERE THE METAL ENDS AND THE PORCELAIN BEGINS _____

OBSTACLES – SEE FIG. 2

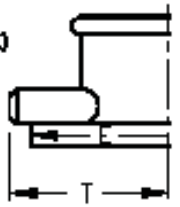
	LIFTING EYE	MANHOLE CVR	OTHER
V.	_____	_____	_____
W.	_____	_____	_____

STRIKE. LIVE PART TO GRND VERTICAL DISTANCE. _____

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

PHASE. BUSHING CENTERS, PHASE _____
HTmax. HIGHEST POINT–BUSHING FLANGE TOP TO APPARATUS TANK TOP. _____
HTmin LOWEST POINT–BUSHING FLANGE TOP TO APPARATUS TANK TOP. _____
EDGE OUTER BUSHING CTR. TO OUTER EDGE. _____
Ø BUSHING ANGLE FROM VERTICAL. IF UNKNOWN, WILL BE APPROXIMATED FROM HTmax & HTmin DIM's. _____
LL. LIFTING LUG SPAN (see Fig. 2) IF > DIMs E, F AND S _____
T. IF TEST PLUG EXTENDS BEYOND BUSHING FLANGE "E", THEN ITS DIMENSION MUST BE PROVIDED. _____

WILL TEST PLUG (IF AVAILABLE) BE USED? Y N



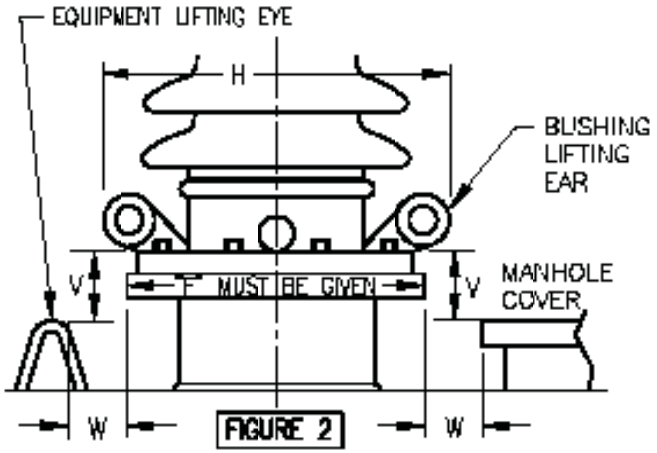


FIGURE 2

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

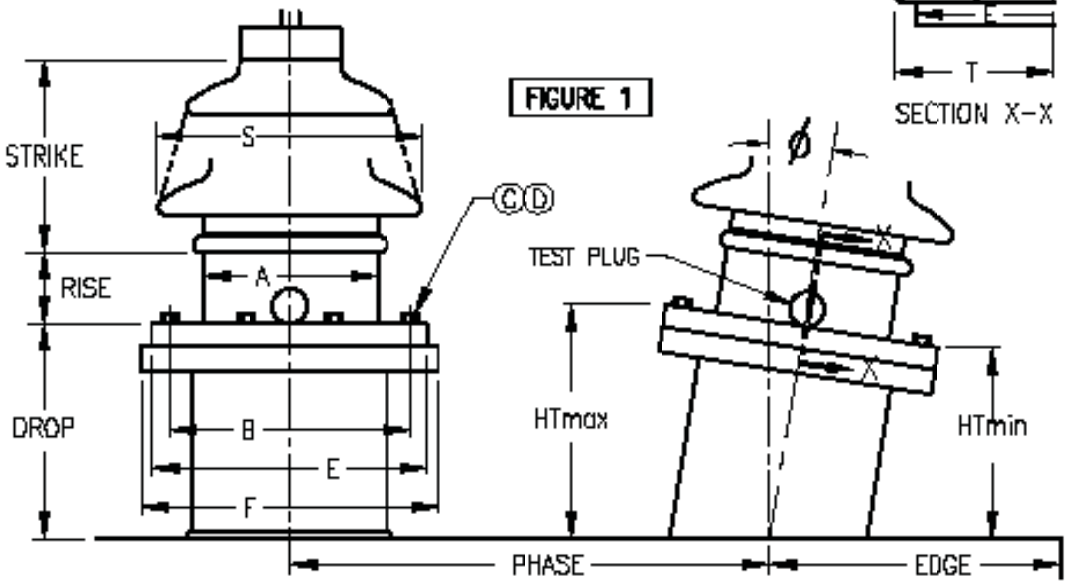


FIGURE 1

QUOTE/SO#: _____ PROJECT: _____ CURRENT RATIO: _____ PROVIDED BY: _____

CUSTOMER: _____ BUSHING RATING: ____kV ____kV BIL ACCURACY CLASS: _____ BUSHING/EQUIPMENT DWGs PROVIDED: Y / N

PS–981 Current Transformer

RELAY CLASS ACCURACY SLIPOVER CT RATINGS*														
Inside Ø (ID)		6"			8"			10"			12"			
Outside Ø (OD)		16"			18"			20"			22"			
Current Ratio	Acc Rating	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	
50:5	C25	P061645S5005020	4.50	130	P081845S5005020	4.50	150	P102045S5005020	4.50	175	P122245S5005020	4.50	195	
	C50	P061675S5005050	7.50	235	P081875S5005050	7.50	280	P102075S5005050	7.50	320	P122275S5005050	7.50	375	
100:5	C50	P061645S1015050	4.50	130	P081845S1015050	4.50	150	P102045S1015050	4.50	175	P122245S1015050	4.50	195	
	C100	P061675S1015100	7.50	235	P081875S1015100	7.50	280	P102075S1015100	7.50	320	P122275S1015100	7.50	375	
200:5	C50	P061635S2015050	3.50	90	P081835S2015050	3.50	105	P102035S2015050	3.50	125	P122235S2015050	3.50	140	
	C100	P061645S2015100	4.50	130	P081845S2015100	4.50	150	P102045S2015100	4.50	175	P122242S2015100	4.25	195	
	C200	P061670S2015200	7.00	220	P081870S2015200	7.00	260	P102070S2015200	7.00	295	P122270S2015200	7.00	350	
400:5	C100	P061630S4015100	3.00	80	P081830S4015100	3.00	95	P102030S4015100	3.00	100	P122230S4015100	3.00	115	
	C200	P061642S4015200	4.25	125	P081842S4015200	4.25	145	P102042S4015200	4.25	165	P122242S4015200	4.25	185	
	C400	P061665S4015400	6.50	215	P081865S4015400	6.50	250	P102065S4015400	6.50	280	P122265S4015400	6.50	320	
600:5	C200	P061635S6015200	3.50	90	P081835S6015200	3.50	105	P102035S6015200	3.50	125	P122235S6015200	3.50	140	
	C400	P061650S6015400	5.00	145	P081850S6015400	5.00	170	P102050S6015400	5.00	195	P122250S6015400	5.00	220	
	C800	P061680S6015800	8.00	250	P081880S6015800	8.00	300	P102080S6015800	8.00	345	P122280S6015800	8.00	395	
800:5	C200	P061630S8015200	3.00	80	P081830S8015200	3.00	95	P102030S8015200	3.00	100	P122230S8015200	3.00	115	
	C400	P061642S8015400	4.25	125	P081842S8015400	4.25	145	P102042S8015400	4.25	170	P122242S8015400	4.25	190	
	C800	P061665S8015800	6.50	215	P081865S8015800	6.50	250	P102065S8015800	6.50	280	P122265S8015800	6.50	320	
1000:5	C200	P061630S1025200	3.00	80	P081830S1025200	3.00	95	P102030S1025200	3.00	100	P122230S1025200	3.00	115	
	C400	P061635S1025400	3.50	95	P081835S1025400	3.50	110	P102035S1025400	3.50	130	P122235S1025400	3.50	145	
	C800	P061655S1025800	5.50	175	P081855S1025800	5.50	205	P102055S1025800	5.50	235	P122255S1025800	5.50	260	
1200:5	C200	P061625S1225200	2.50	65	P081825S1225200	2.50	70	P102025S1225200	2.50	80	P122225S1225200	2.50	85	
	C400	P061635S1225400	3.50	95	P081835S1225400	3.50	110	P102035S1225400	3.50	130	P122235S1225400	3.50	145	
	C800	P061650S1225800	5.00	155	P081850S1225800	5.00	180	P102050S1225800	5.00	205	P122250S1225800	5.00	230	
2000:5	C200	P061625S2025200	2.50	70	P081825S2025200	2.50	75	P102025S2025200	2.50	85	P122225S2025200	2.50	90	
	C400	P061627S2025400	2.75	85	P081827S2025400	2.75	100	P102027S2025400	2.75	110	P122227S2025400	2.75	115	
	C800	P061635S2025800	3.50	100	P081835S2025800	3.50	115	P102035S2025800	3.50	135	P122235S2025800	3.50	150	
3000:5	C200	P061625S3025200	2.50	75	P081825S3025200	2.50	80	P102025S3025200	2.50	90	P122225S3025200	2.50	95	
	C400	P061625S3025400	2.50	75	P081825S3025400	2.50	80	P102025S3025400	2.50	90	P122225S3025400	2.50	95	
	C800	P061635S3025800	3.50	105	P081835S3025800	3.50	120	P102035S3025800	3.50	140	P122235S3025800	3.50	155	
4000:5	C200	P061625S4025200	2.50	80	P081825S4025200	2.50	85	P102025S4025200	2.50	95	P122225S4025200	2.50	100	
	C400	P061625S4025400	2.50	80	P081825S4025400	2.50	85	P102025S4025400	2.50	95	P122225S4025400	2.50	100	
	C800	P061630S4025800	3.00	95	P081830S4025800	3.00	110	P102030S4025800	3.00	115	P122230S4025800	3.00	130	
5000:5	C200	P061625S5025200	2.50	85	P081825S5025200	2.50	90	P102025S5025200	2.50	100	P122225S5025200	2.50	105	
	C400	P061625S5025400	2.50	85	P081825S5025400	2.50	90	P102025S5025400	2.50	100	P122225S5025400	2.50	105	
	C800	P061627S5025800	2.75	95	P081827S5025800	2.75	100	P102027S5025800	2.75	120	P122227S5025800	2.75	125	

* 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

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RELAY CLASS ACCURACY SLIPOVER CT RATINGS*														
Inside Ø (ID)		14"			16"			18"			20"			
Outside Ø (OD)		24"			26"			28"			30"			
Current Ratio	Acc Rating	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	
50:5	C25	P142445S5005020	4.50	220	P162645S5005020	4.50	240	P182845S5005020	4.50	260	P203045S5005020	4.50	280	
	C50	P142475S5005050	7.50	405	P162675S5005050	7.50	450	P182875S5005050	7.50	490	P203075S5005050	7.50	520	
100:5	C50	P142445S1015050	4.50	220	P162645S1015050	4.50	240	P182845S1015050	4.50	260	P203045S1015050	4.50	280	
	C100	P142475S1015100	7.50	405	P162675S1015100	7.50	450	P182875S1015100	7.50	490	P203075S1015100	7.50	520	
200:5	C50	P142435S2015050	3.50	150	P162635S2015050	3.50	170	P182835S2015050	3.50	185	P203035S2015050	3.50	200	
	C100	P142445S2015100	4.50	220	P162645S2015100	4.50	240	P182845S2015100	4.50	260	P203045S2015100	4.50	280	
	C200	P142470S2015200	7.00	375	P162670S2015200	7.00	415	P182870S2015200	7.00	450	P203070S2015200	7.00	465	
400:5	C100	P142430S4015100	3.00	130	P162630S4015100	3.00	140	P182830S4015100	3.00	155	P203030S4015100	3.00	165	
	C200	P142442S4015200	4.25	210	P162642S4015200	4.25	230	P182842S4015200	4.25	245	P203042S4015200	4.25	265	
	C400	P142465S4015400	6.50	350	P162665S4015400	6.50	385	P182865S4015400	6.50	420	P203065S4015400	6.50	455	
600:5	C200	P142435S6015200	3.50	150	P162635S6015200	3.50	170	P182835S6015200	3.50	185	P203035S6015200	3.50	200	
	C400	P142450S6015400	5.00	250	P162650S6015400	5.00	275	P182850S6015400	5.00	300	P203050S6015400	5.00	325	
	C800	P142480S6015800	8.00	435	P162680S6015800	8.00	480	P182880S6015800	8.00	525	P203080S6015800	8.00	570	
800:5	C200	P142430S8015200	3.00	130	P162630S8015200	3.00	140	P182830S8015200	3.00	155	P203030S8015200	3.00	165	
	C400	P142442S8015400	4.25	210	P162642S8015400	4.25	230	P182842S8015400	4.25	245	P203042S8015400	4.25	265	
	C800	P142465S8015800	6.50	350	P162665S8015800	6.50	385	P182865S8015800	6.50	420	P203065S8015500	6.50	455	
1000:5	C200	P142430S1025200	3.00	130	P162630S1025200	3.00	140	P182830S1025200	3.00	155	P203030S1025200	3.00	165	
	C400	P142435S1025400	3.50	155	P162635S1025400	3.50	175	P182835S1025400	3.50	190	P203035S1025400	3.50	205	
	C800	P142455S1025800	5.50	290	P162655S1025800	5.50	320	P182855S1025800	5.50	350	P203055S1025500	5.50	360	
1200:5	C200	P142425S1225200	2.50	95	P162625S1225200	2.50	105	P182825S1225200	2.50	115	P203025S1225200	2.50	125	
	C400	P142435S1225400	3.50	155	P162635S1225400	3.50	175	P182835S1225400	3.50	190	P203035S1225400	3.50	205	
	C800	P142450S1225800	5.00	260	P162650S1225800	5.00	285	P182850S1225800	5.00	310	P203050S1225500	5.00	335	
2000:5	C200	P142425S2025200	2.50	100	P162625S2025200	2.50	110	P182825S2025200	2.50	120	P203025S2025200	2.50	130	
	C400	P142427S2025400	2.75	130	P162627S2025400	2.75	145	P182827S2025400	2.75	160	P203027S2025400	2.75	175	
	C800	P142435S2025800	3.50	160	P162635S2025800	3.50	180	P182835S2025800	3.50	195	P203035S2025800	3.50	210	
3000:5	C200	P142425S3025200	2.50	105	P162625S3025200	2.50	115	P182825S3025200	2.50	125	P203025S3025200	2.50	135	
	C400	P142425S3025400	2.50	105	P162625S3025400	2.50	115	P182825S3025400	2.50	125	P203025S3025400	2.50	135	
	C800	P142435S3025800	3.50	165	P162635S3025800	3.50	185	P182835S3025800	3.50	200	P203035S3025800	3.50	215	
4000:5	C200	P142425S4025200	2.50	110	P162625S4025200	2.50	120	P182825S4025200	2.50	130	P203025S4025200	2.50	140	
	C400	P142425S4025400	2.50	110	P162625S4025400	2.50	120	P182825S4025400	2.50	130	P203025S4025400	2.50	140	
	C800	P142430S4025800	3.00	145	P162630S4025800	3.00	155	P182830S4025800	3.00	170	P203030S4025800	3.00	180	
5000:5	C200	P142425S5025200	2.50	115	P162625S5025200	2.50	125	P182825S5025200	2.50	135	P203025S5025200	2.50	145	
	C400	P142425S5025400	2.50	115	P162625S5025400	2.50	125	P182825S5025400	2.50	135	P203025S5025400	2.50	145	
	C800	P142427S5025800	2.75	130	P162627S5025800	2.75	145	P182827S5025800	2.75	160	P203027S5025800	2.75	175	

* 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

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PS–981 Current Transformer

RELAY CLASS ACCURACY SLIPOVER CT RATINGS*													
Inside Ø (ID)		22"			24"			26"			28"		
Outside Ø (OD)		32"			34"			36"			38"		
Current Ratio	Acc Rating	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)
50:5	C25	P223245S5005020	4.50	280	P243445S5005020	4.50	330	P263645S5005020	4.50	350	P283845S5005020	4.50	375
	C50	P223275S5005050	7.50	565	P243475S5005050	7.50	610	P263675S5005050	7.50	655	P283875S5005050	7.50	700
100:5	C50	P223245S1015050	4.50	280	P243445S1015050	4.50	330	P263645S1015050	4.50	350	P283845S1015050	4.50	375
	C100	P223275S1015100	7.50	565	P243475S1015100	7.50	610	P263675S1015100	7.50	655	P283875S1015100	7.50	700
200:5	C50	P223235S2015050	3.50	215	P243435S2015050	3.50	230	P263635S2015050	3.50	250	P283835S2015050	3.50	265
	C100	P223245S2015100	4.50	280	P243445S2015100	4.50	330	P263645S2015100	4.50	350	P283845S2015100	4.50	375
	C200	P223270S2015200	7.00	465	P243470S2015200	7.00	560	P263670S2015200	7.00	605	P283870S2015200	7.00	645
400:5	C100	P223230S4015100	3.00	175	P243430S4015100	3.00	190	P263630S4015100	3.00	205	P283830S4015100	3.00	215
	C200	P223242S4015200	4.25	275	P243442S4015200	4.25	310	P263642S4015200	4.25	330	P283842S4015200	4.25	355
	C400	P223265S4015400	6.50	490	P243465S4015400	6.50	530	P263665S4015400	6.50	560	P283865S4015400	6.50	600
600:5	C200	P223235S6015200	3.50	215	P243435S6015200	3.50	230	P263635S6015200	3.50	250	P283835S6015200	3.50	265
	C400	P223250S6015400	5.00	350	P243450S6015400	5.00	375	P263650S6015400	5.00	400	P283850S6015400	5.00	425
	C800	P223280S6015800	8.00	615	P243480S6015800	8.00	660	P263680S6015800	8.00	705	P283880S6015800	8.00	750
800:5	C200	P223230S8015200	3.00	175	P243430S8015200	3.00	190	P263630S8015200	3.00	205	P283830S8015200	3.00	215
	C400	P223242S8015400	4.25	275	P243442S8015400	4.25	310	P263642S8015400	4.25	330	P283842S8015400	4.25	355
	C800	P223265S8015800	6.50	490	P243465S8015800	6.50	530	P263665S8015800	6.50	560	P283865S8015800	6.50	600
1000:5	C200	P223230S1025200	3.00	175	P243430S1025200	3.00	190	P263630S1025200	3.00	205	P283830S1025200	3.00	215
	C400	P223235S1025400	3.50	220	P243435S1025400	3.50	235	P263635S1025400	3.50	255	P283835S1025400	3.50	270
	C800	P223255S1025800	5.50	410	P243455S1025800	5.50	435	P263655S1025800	5.50	460	P283855S1025800	5.50	490
1200:5	C200	P223225S1225200	2.50	135	P243425S1225200	2.50	140	P263625S1225200	2.50	150	P283825S1225200	2.50	165
	C400	P223235S1225400	3.50	220	P243435S1225400	3.50	235	P263635S1225400	3.50	255	P283835S1225400	3.50	270
	C800	P223250S1225800	5.00	360	P243450S1225800	5.00	385	P263650S1225800	5.00	410	P283850S1225800	5.00	435
2000:5	C200	P223225S2025200	2.50	140	P243425S2025200	2.50	145	P263625S2025200	2.50	155	P283825S2025200	2.50	170
	C400	P223227S2025400	2.75	185	P243427S2025400	2.75	195	P263627S2025400	2.75	205	P283827S2025400	2.75	225
	C800	P223235S2025800	3.50	225	P243435S2025800	3.50	240	P263635S2025800	3.50	260	P283835S2025800	3.50	275
3000:5	C200	P223225S3025200	2.50	145	P243425S3025200	2.50	150	P263625S3025200	2.50	160	P283825S3025200	2.50	175
	C400	P223225S3025400	2.50	145	P243425S3025400	2.50	150	P263625S3025400	2.50	160	P283825S3025400	2.50	175
	C800	P223235S3025800	3.50	230	P243435S3025800	3.50	245	P263635S3025800	3.50	265	P283835S3025800	3.50	280
4000:5	C200	P223225S4025200	2.50	150	P243425S4025200	2.50	155	P263625S4025200	2.50	165	P283825S4025200	2.50	180
	C400	P223225S4025400	2.50	150	P243425S4025400	2.50	155	P263625S4025400	2.50	165	P283825S4025400	2.50	180
	C800	P223230S4025800	3.00	190	P243430S4025800	3.00	205	P263630S4025800	3.00	220	P283830S4025800	3.00	230
5000:5	C200	P223225S5025200	2.50	155	P243425S5025200	2.50	160	P263625S5025200	2.50	170	P283825S5025200	2.50	185
	C400	P223225S5025400	2.50	155	P243425S5025400	2.50	160	P263625S5025400	2.50	170	P283825S5025400	2.50	185
	C800	P223227S5025800	2.75	185	P243427S5025800	2.75	195	P263627S5025800	2.75	210	P283827S5025800	2.75	220

* 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

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RELAY CLASS ACCURACY SLIPOVER CT RATINGS*														
Inside Ø (ID)		30"			32"			34"			36"			
Outside Ø (OD)		40"			42"			44"			46"			
Current Ratio	Acc Rating	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)
50:5	C25	P304045S5005020	4.50	400	P324245S5005020	4.50	425	P344445S5005020	4.50	440	P364645S5005020	4.50	465
	C50	P304075S5005050	7.50	750	P324275S5005050	7.50	790	P344475S5005050	7.50	830	P364675S5005050	7.50	875
100:5	C50	P304045S1015050	4.50	400	P324245S1015050	4.50	425	P344445S1015050	4.50	440	P364645S1015050	4.50	465
	C100	P304075S1015100	7.50	750	P324275S1015100	7.50	790	P344475S1015100	7.50	830	P364675S1015100	7.50	875
200:5	C50	P304035S2015050	3.50	275	P324235S2015050	3.50	295	P344435S2015050	3.50	310	P364635S2015050	3.50	325
	C100	P304045S2015100	4.50	395	P324245S2015100	4.50	420	P344445S2015100	4.50	435	P364645S2015100	4.50	460
	C200	P304070S2015200	7.00	660	P324270S2015200	7.00	720	P344470S2015200	7.00	755	P364670S2015200	7.00	800
400:5	C100	P304030S4015100	3.00	225	P324230S4015100	3.00	240	P344430S4015100	3.00	255	P364630S4015100	3.00	265
	C200	P304042S4015200	4.25	370	P324242S4015200	4.25	395	P344442S4015200	4.25	410	P364642S4015200	4.25	435
	C400	P304070S4015400	7.00	635	P324270S4015400	7.00	660	P344470S4015400	7.00	700	P364670S4015400	7.00	735
600:5	C200	P304035S6015200	3.50	275	P324235S6015200	3.50	295	P344435S6015200	3.50	310	P364635S6015200	3.50	325
	C400	P304050S6015400	5.00	450	P324250S6015400	5.00	475	P344450S6015400	5.00	505	P364650S6015400	5.00	525
	C800	P304080S6015800	8.00	795	P324280S6015800	8.00	835	P344480S6015800	8.00	885	P364680S6015800	8.00	925
800:5	C200	P304030S8015200	3.00	225	P324230S8015200	3.00	240	P344430S8015200	3.00	255	P364630S8015200	3.00	265
	C400	P304042S8015400	4.25	370	P324242S8015400	4.25	395	P344442S8015400	4.25	410	P364642S8015400	4.25	435
	C800	P304065S8015800	6.50	635	P324265S8015800	6.50	660	P344465S8015800	6.50	700	P364665S8015800	6.50	735
1000:5	C200	P304030S1025200	3.00	225	P324230S1025200	3.00	240	P344430S1025200	3.00	255	P364630S1025200	3.00	265
	C400	P304035S1025400	3.50	280	P324235S1025400	3.50	300	P344435S1025400	3.50	315	P364635S1025400	3.50	330
	C800	P304055S1025800	5.50	520	P324255S1025800	5.50	550	P344455S1025800	5.50	575	P364655S1025800	5.50	605
1200:5	C200	P304025S1225200	2.50	170	P324225S1225200	2.50	180	P344425S1225200	2.50	190	P364625S1225200	2.50	195
	C400	P304035S1225400	3.50	280	P324235S1225400	3.50	300	P344435S1225400	3.50	315	P364635S1225400	3.50	330
	C800	P304050S1225800	5.00	460	P324250S1225800	5.00	485	P344450S1225800	5.00	515	P364650S1225800	5.00	535
2000:5	C200	P304025S2025200	2.50	175	P324225S2025200	2.50	185	P344425S2025200	2.50	195	P364625S2025200	2.50	200
	C400	P304027S2025400	2.75	230	P324227S2025400	2.75	240	P344427S2025400	2.75	250	P364627S2025400	2.75	260
	C800	P304035S2025800	3.50	285	P324235S2025800	3.50	305	P344435S2025800	3.50	320	P364635S2025800	3.50	335
3000:5	C200	P304025S3025200	2.50	180	P324225S3025200	2.50	190	P344425S3025200	2.50	200	P364625S3025200	2.50	205
	C400	P304025S3025400	2.50	180	P324225S3025400	2.50	190	P344425S3025400	2.50	200	P364625S3025400	2.50	205
	C800	P304035S3025800	3.50	290	P324235S3025800	3.50	310	P344435S3025800	3.50	325	P364635S3025800	3.50	340
4000:5	C200	P304025S4025200	2.50	185	P324225S4025200	2.50	195	P344425S4025200	2.50	205	P364625S4025200	2.50	210
	C400	P304025S4025400	2.50	185	P324225S4025400	2.50	195	P344425S4025400	2.50	205	P364625S4025400	2.50	210
	C800	P304030S4025800	3.00	240	P324230S4025800	3.00	255	P344430S4025800	3.00	270	P364630S4025800	3.00	280
5000:5	C200	P304025S5025200	2.50	190	P324225S5025200	2.50	200	P344425S5025200	2.50	210	P364625S5025200	2.50	215
	C400	P304025S5025400	2.50	190	P324225S5025400	2.50	200	P344425S5025400	2.50	210	P364625S5025400	2.50	215
	C800	P304027S5025800	2.75	235	P324227S5025800	2.75	240	P344427S5025800	2.75	240	P364627S5025800	2.75	245

* 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*

Inside Ø (ID)		6"			8"			10"			12"		
Outside Ø (OD)		16"			18"			20"			22"		
Current Ratio	0.3 Acc Burden	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)
400:5	B0.5	P061650S4015050	5.0	145	P081850S4015050	5.0	170	P102050S4015050	5.0	195	P122250S4015050	5.0	220
	B0.9	P061660S4015090	6.0	180	P081860S4015090	6.0	215	P102060S4015090	6.0	245	P122260S4015090	6.0	275
500:5	B0.5	P061640S5015050	4.0	105	P081840S5015050	4.0	125	P102040S5015050	4.0	145	P122240S5015050	4.0	165
	B0.9	P061660S5015090	6.0	180	P081860S5015090	6.0	215	P102060S5015090	6.0	245	P122260S5015090	6.0	275
	B1.8	P061675S5015180	7.5	235	P081875S5015180	7.5	280	P102075S5015180	7.5	320	P122275S5015180	7.5	375
600:5	B0.5	P061630S6015050	3.0	75	P081830S6015050	3.0	90	P102030S6015050	3.0	95	P122230S6015050	3.0	110
	B0.9	P061640S6015090	4.0	105	P081840S6015090	4.0	125	P102040S6015090	4.0	145	P122235S6015090	4.0	165
	B1.8	P061660S6015180	6.0	180	P081860S6015180	6.0	215	P102060S6015180	6.0	245	P122260S6015180	6.0	275
800:5	B1.8	P061635S8015180	3.5	95	P081835S8015180	3.5	110	P102035S8015180	3.5	130	P122235S8015180	3.5	145
1000:5	B1.8	P061635S1025180	3.5	95	P081835S1025180	3.5	110	P102035S1025180	3.5	130	P122235S1025180	3.5	145
1200:5	B1.8	P061635S1225180	3.5	95	P081825S1225180	3.5	110	P102035S1225180	3.5	130	P122235S1225180	3.5	145
1500:5	B1.8	P061635S1525180	3.5	95	P081835S1525180	3.5	110	P102035S1525180	3.5	130	P122235S1525180	3.5	145
1600:5	B1.8	P061635S1625180	3.5	95	P081835S1625180	3.5	110	P102035S1625180	3.5	130	P122235S1625180	3.5	145
2000:5	B1.8	P061625S2025180	2.5	70	P081825S2025180	2.5	75	P102025S2025180	2.5	85	P122225S2025180	2.5	90
3000:5	B1.8	P061635S3025180	2.5	75	P081835S3025180	2.5	80	P102035S3025180	2.5	90	P122235S3025180	2.5	95

Inside Ø (ID)		14"			16"			18"			20"		
Outside Ø (OD)		24"			26"			28"			30"		
Current Ratio	0.3 Acc Burden	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)
400:5	B0.5	P142450S4015050	5.0	250	P162650S4015050	5.0	275	P182850S4015050	5.0	300	P203050S4015050	5.0	325
	B0.9	P142460S4015090	6.0	310	P162660S4015090	6.0	340	P182860S4015090	6.0	370	P203060S4015090	6.0	410
500:5	B0.5	P142440S5015050	4.0	185	P162640S5015050	4.0	205	P182840S5015050	4.0	220	P203040S5015050	4.0	240
	B0.9	P142460S5015090	6.0	310	P162660S5015090	6.0	340	P182860S5015090	6.0	370	P203060S5015090	6.0	410
	B1.8	P142475S5015180	7.5	405	P162675S5015180	7.5	450	P182875S5015180	7.5	490	P203075S5015180	7.5	520
600:5	B0.5	P142430S6015050	3.0	125	P162630S6015050	3.0	135	P182830S6015050	3.0	150	P203030S6015050	3.0	160
	B0.9	P142440S6015090	4.0	185	P162640S6015090	4.0	205	P182840S6015090	4.0	220	P203040S6015090	4.0	240
	B1.8	P142460S6015180	6.0	310	P162660S6015180	6.0	340	P182860S6015180	6.0	370	P203060S6015180	6.0	410
800:5	B1.8	P142435S8015180	3.5	155	P162635S8015180	3.5	175	P182835S8015180	3.5	190	P203035S8015180	3.5	205
1000:5	B1.8	P142435S1025180	3.5	155	P162635S1025180	3.5	175	P182835S1025180	3.5	190	P203035S1025180	3.5	205
1200:5	B1.8	P142435S1225180	3.5	155	P162635S1225180	3.5	175	P182835S1225180	3.5	190	P203035S1225180	3.5	205
1500:5	B1.8	P142435S1525180	3.5	155	P162635S1525180	3.5	175	P182835S1525180	3.5	190	P203035S1525180	3.5	205
1600:5	B1.8	P142435S1625180	3.5	155	P162635S1625180	3.5	175	P182835S1625180	3.5	190	P203035S1625180	3.5	205
2000:5	B1.8	P142425S2025180	2.5	100	P162625S2025180	2.5	110	P182825S2025180	2.5	120	P203025S2025180	2.5	130
3000:5	B1.8	P142425S3025180	2.5	105	P162625S3025180	2.5	115	P182825S3025180	2.5	125	P203025S3025180	2.5	135

* 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

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METERING CLASS ACCURACY SLIPOVER CT RATINGS*														
Inside Ø (ID)		22"			24"			26"			28"			
Outside Ø (OD)		32"			34"			36"			38"			
Current Ratio	0.3 Acc Burden	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)
400:5	B0.5	P223250S4015050	5.0	350	P243450S4015050	5.0	375	P263650S4015050	5.0	400	P283850S4015050	5.0	425
	B0.9	P223260S4015090	6.0	440	P243460S4015090	6.0	470	P263660S4015090	6.0	500	P283860S4015090	6.0	535
500:5	B0.5	P223240S5015050	4.0	260	P243440S5015050	4.0	280	P263640S5015050	4.0	300	P283840S5015050	4.0	320
	B0.9	P223260S5015090	6.0	440	P243460S5015090	6.0	470	P263660S5015090	6.0	500	P283860S5015090	6.0	535
	B1.8	P223275S5015180	7.5	540	P243475S5015180	7.5	610	P263675S5015180	7.5	655	P283875S5015180	7.5	700
600:5	B0.5	P223230S6015050	3.0	170	P243430S6015050	3.0	185	P263630S6015050	3.0	200	P283630S6015050	3.0	210
	B0.9	P223240S6015090	4.0	260	P243440S6015090	4.0	280	P263640S6015090	4.0	300	P283840S6015090	4.0	320
	B1.8	P223260S6015180	6.0	440	P243460S6015180	6.0	470	P263660S6015180	6.0	500	P283860S6015180	6.0	535
800:5	B1.8	P223235S8015180	3.5	220	P243435S8015180	3.5	235	P263635S8015180	3.5	255	P283635S8015180	3.5	270
1000:5	B1.8	P223235S1025180	3.5	220	P243435S1025180	3.5	235	P263635S1025180	3.5	255	P283635S1025180	3.5	270
1200:5	B1.8	P223235S1225180	3.5	220	P243435S1225180	3.5	235	P263635S1225180	3.5	255	P283835S1225180	3.5	270
1500:5	B1.8	P223235S1525180	3.5	220	P243435S1525180	3.5	235	P263635S1525180	3.5	255	P283835S1525180	3.5	270
1600:5	B1.8	P223235S1625180	3.5	220	P243435S1625180	3.5	235	P263635S1625180	3.5	255	P283835S1625180	3.5	270
2000:5	B1.8	P223225S2025180	2.5	140	P243425S2025180	2.5	145	P263625S2025180	2.5	155	P283625S2025180	2.5	170
3000:5	B1.8	P223225S3025180	2.5	145	P243425S3025180	2.5	150	P263625S3025180	2.5	160	P283625S3025180	2.5	175

Inside Ø (ID)		30"			32"			34"			36"		
Outside Ø (OD)		40"			42"			44"			46"		
Current Ratio	0.3 Acc Burden	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)	Catalog Number	HT (")	WT (#)
400:5	B0.5	P304050S4015050	5.0	450	P324250S4015050	5.0	475	P344450S4015050	5.0	505	P364650S4015050	5.0	525
	B0.9	P304060S4015090	6.0	565	P324260S4015090	6.0	600	P344460S4015090	6.0	630	P364660S4015090	6.0	660
500:5	B0.5	P304040S5015050	4.0	335	P324240S5015050	4.0	355	P344440S5015050	4.0	375	P364640S5015050	4.0	395
	B0.9	P304060S5015090	6.0	565	P324260S5015090	6.0	600	P344460S5015090	6.0	630	P364660S5015090	6.0	660
	B1.8	P304075S5015180	7.5	740	P324275S5015180	7.5	780	P344475S5015180	7.5	820	P364675S5015180	7.5	865
600:5	B0.5	P304030S6015050	3.0	220	P324230S6015050	3.0	235	P344430S6015050	3.0	250	P364630S6015050	3.0	260
	B0.9	P304040S6015090	4.0	335	P324240S6015090	4.0	355	P344440S6015090	4.0	375	P364640S6015090	4.0	395
	B1.8	P304060S6015180	6.0	565	P324260S6015180	6.0	600	P344460S6015180	6.0	630	P364660S6015180	6.0	660
800:5	B1.8	P304035S8015180	3.5	280	P324235S8015180	3.5	300	P344435S8015180	3.5	315	P364635S8015180	3.5	330
1000:5	B1.8	P304035S1025180	3.5	280	P324235S1025180	3.5	300	P344435S1025180	3.5	315	P364635S1025180	3.5	330
1200:5	B1.8	P304035S1225180	3.5	280	P324235S1225180	3.5	300	P344435S1225180	3.5	315	P364635S1225180	3.5	330
1500:5	B1.8	P304035S1525180	3.5	280	P324235S1525180	3.5	300	P344435S1525180	3.5	315	P364635S1525180	3.5	330
1600:5	B1.8	P304035S1625180	3.5	280	P324235S1625180	3.5	300	P344435S1625180	3.5	315	P364635S1625180	3.5	330
2000:5	B1.8	P304025S2025180	2.5	175	P324225S2025180	2.5	185	P344425S2025180	2.5	195	P364625S2025180	2.5	200
3000:5	B1.8	P304025S3025180	2.5	180	P324225S3025180	2.5	190	P344425S3025180	2.5	200	P364625S3025180	2.5	205

* 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

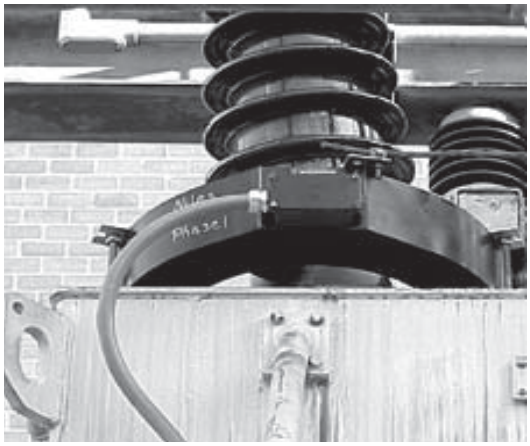
ACCUSlip™ Current Transformer Selection Guide

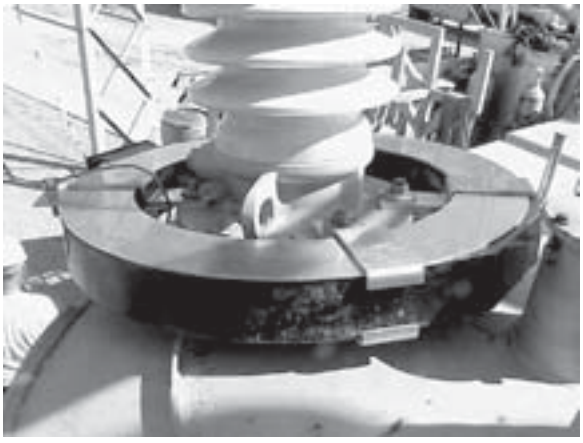
	NOMINAL CURRENT RATIO									
ID x OD	100:5	150:5	200:5	300:5	400:5	500:5	600:5	900:5	1000:5	1200:5 & up
RF	2.0	2.0	2.0	3.0-4.0	4.0	4.0	4.0	4.0	3.0	see note
HT	8.75"	8.75"	8"	6" - 8"	6" - 8"	6" - 8"	6"	6"	6"	3" - 6"
6 x 16	0.3 B0.1 class ONLY	0.3 B0.2 class ONLY	0.15 B0.2 - 5% 0.3 B0.9	0.15 B0.5 0.3 B0.9 - 10%	0.15 B0.5 - 5% 0.3 B0.9 - 10%	0.15 B0.5 - 5% 0.15 B0.9 0.3 B1.8	0.15 B1.8 - 5%	0.15 B0.9 - 5% 0.3 B1.8 - 5%	0.15 B0.9 - 5% 0.15 B1.8 - 10%	0.15 B0.9 - 5% 0.15 B1.8 - 10% MAY BE LOWER AS RATIO INCREASES - WILL POSSIBLY HOLD ACCURACY DOWN TO 1%
8 x 18										
10 x 20							0.15 B0.9 - 5% 0.15B1.8-10%			
12 x 22			0.15B0.2 -10% 0.3 B0.9							
14 x 24							0.15 B0.5 - 5% 0.15 B0.9 0.3 B1.8			
16 x 26				0.15 B0.2 0.3 B0.9						
18 x 28			0.15 B0.2 0.3 B0.9							
20 x 30										
22 x 32										
24 x 34			0.3 B0.1 - 5% 0.3 B0.2/B0.4 0.6 B0.5		0.15B0.2 - 5% 0.15 B0.5 0.3 B0.9	0.15 B0.5 - 5% 0.3 B0.9 - 10% 0.3 B1.8	0.15B0.9 - 10% 0.3 B1.8	0.15 B0.5 - 5% 0.15 B0.9 0.3 B1.8		
26 x 36										
28 x 38							0.15 B0.5 - 5% 0.15 B0.9 0.3 B1.8			
30 x 40					0.15B0.2 - 5% 0.3 B0.5 0.6 B0.9					
32 x 42										
34 x 44										
36 x 46										

Notes–

Rating Factor: unless otherwise noted, 1000:5 thru 2000:5 - RF 3.0; 2500:5 thru 3000:5 - RF 2.0; 4000:5 and above - RF 1.5.
This application guide is intended to assist the engineer 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 10X% rated current throught the CT rating factor. *This table is based on test results of various designs produced and is subject to change. If is to be used as a guide only - for actual performance, contact 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 adjustment 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-881 pages 3-7 of this guide.





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

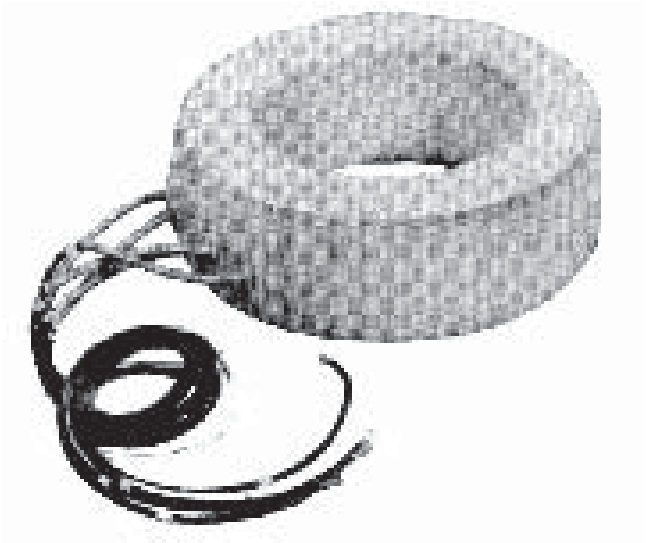
The core and coil assembly is wound and tape wrapped with various window sizes from 2.5" up to 45". The secondary leads are typically #10 AWG THHN cut to a specified length. May also be provided with TEFZEL insulation.

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

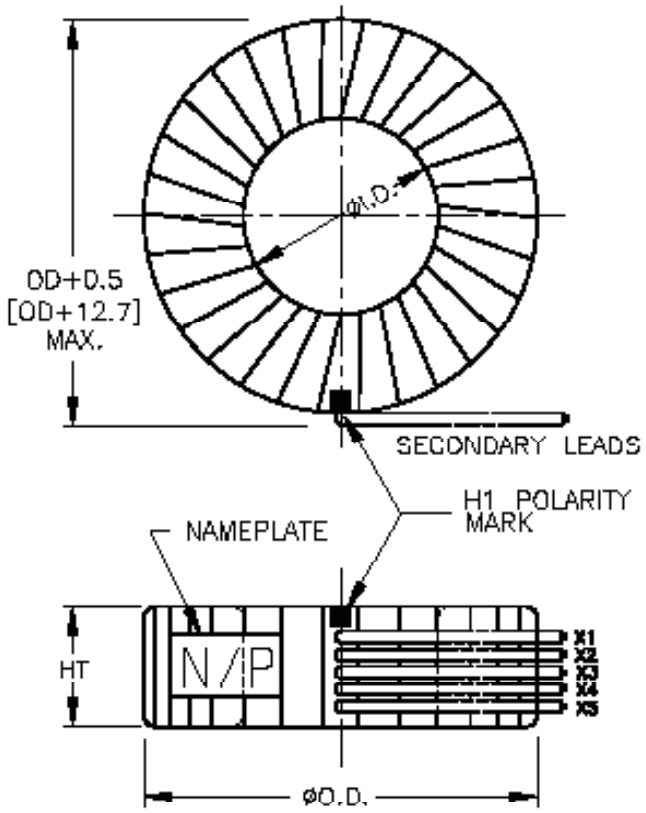
For approximate sizes, refer to tables for Slipover CTs in relaying and metering sections, keeping in mind that BCTs will be slightly smaller. When ordering BCTs, include the following information:

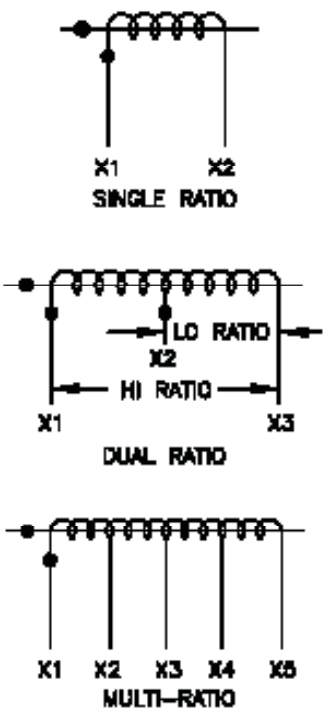
1. Minimum inside diameter (ID) - _____ in[mm]
2. Maximum outside diameter (OD) - _____ in[mm]
3. Maximum allowable height (HT) - _____ in[mm]
4. Current ratio and taps, if any - _____ (:5A or :1A | SR, DR, MR)
5. Accuracy and burden requirements, for example,
   - Metering - _____ (0.3 B0.1 thru B1.8)
   - 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 surroudings - _____ (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





SECONDARY TERMINALS	LEAD COLOR
X1	BLACK
X2	RED
X3	BLUE
X4	ORANGE
X5	YELLOW

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.

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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.

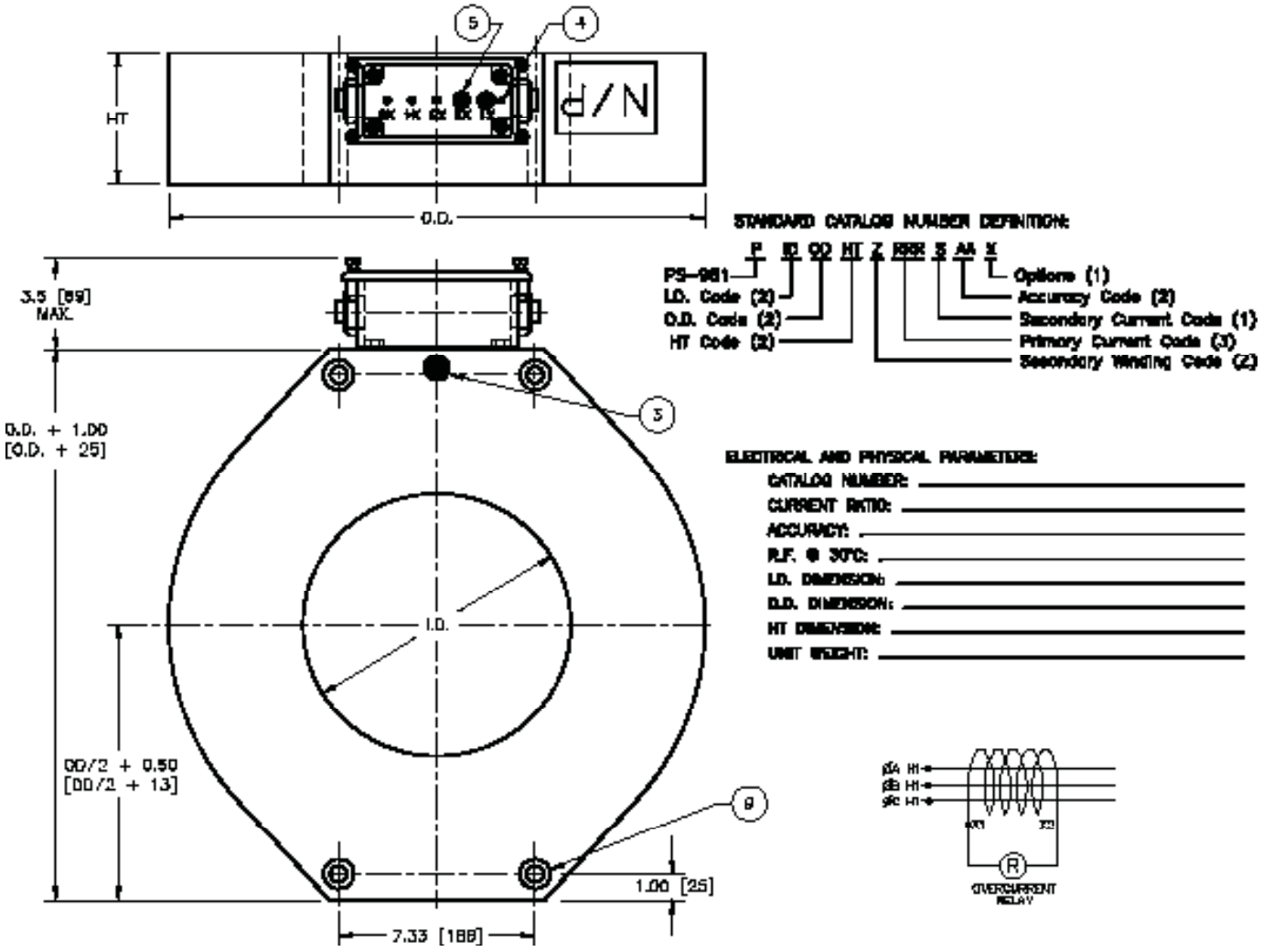
HOW TO ORDER

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.

PSZ–981 Current Transformer



GENERAL NOTES:

DIMENSIONS IN INCHES [mm]

1. INSULATION LEVEL: 0.6 kV Class, 10 kV B.I.L., 130°C.
2. CONSTRUCTION: CORE/COIL ASSEMBLY IS ENCAPSULATED IN AN OUTDOOR RATED RESIN.
3. H1 POLARITY MARK IS PERMANENTLY ENGRAVED WHITE DOT.
4. X1 POLARITY MARK IS PERMANENTLY ENGRAVED WHITE DOT.
5. SECONDARY TERMINALS ARE 1/4–20 STUDS WITH FLAT, CUPPED, AND LOCK WASHERS SECURED WITH A HEX NUT. TIGHTEN TO COMPRESS LOCKWASHER ONLY – NOT TO EXCEED 50 in–lbF. EACH TERMINAL IDENTIFICATION IS PERMANENTLY ENGRAVED. ALL TERMINALS ARE HOUSED INSIDE A WEATHERTIGHT CONDUIT BOX BOX WITH (2) 1" NPT HUBS. A REMOVABLE COVER IS ATTACHED WITH (4) SEALING–TYPE THUMB SCREWS FOR EASY ACCESS.
6. PREFERRED SIZES (ID x OD) ARE FOUND ON PAGES 8–11 OF THIS ENGINEERED DESIGNS SECTION. FOR NON–STANDARD SIZES USING A COMBINATION OF ID, OD & HT – CONSULT FACTORY.
7. FOR SPECIFIC RATIO, ACCURACY, HEIGHT, and WEIGHT, REFER TO QUOTATION and/or ORDER ACKNOWLEDGEMENT DESCRIPTION.
8. MAXIMUM FINISHED HEIGHT IS 8.75 [222].
9. OPTIONAL MOUNTING SLEEVE, ø0.63 [ø16] THRU, 4 PLACES CONSULT FACTORY.
10. APPLICATION: FOR GROUND FAULT DETECTION OF ZERO–SEQUENCE CURRENTS WHEN CONNECTED PER WINDING DIAGRAM. SECONDARY WINDING IS DISTRIBUTED SUCH TO ELIMINATE NUISANCE TRIPPING UNDER NORMAL OPERATING CONDITIONS.

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

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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

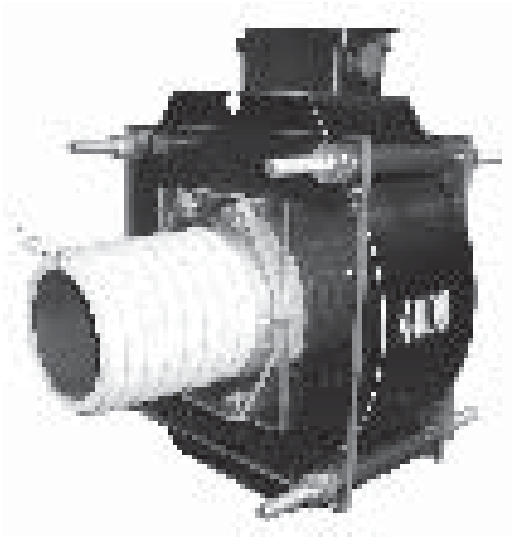
The core and coil assembly is wound and encapsulated in a molded cast resin with 4 ½" window porcelain primary bushing(s) to provide high withstand capabilities. The coil is specially designed and arranged for 3-phase conductor use to prevent localized saturation and/or nuisance tripping. The high strength 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.

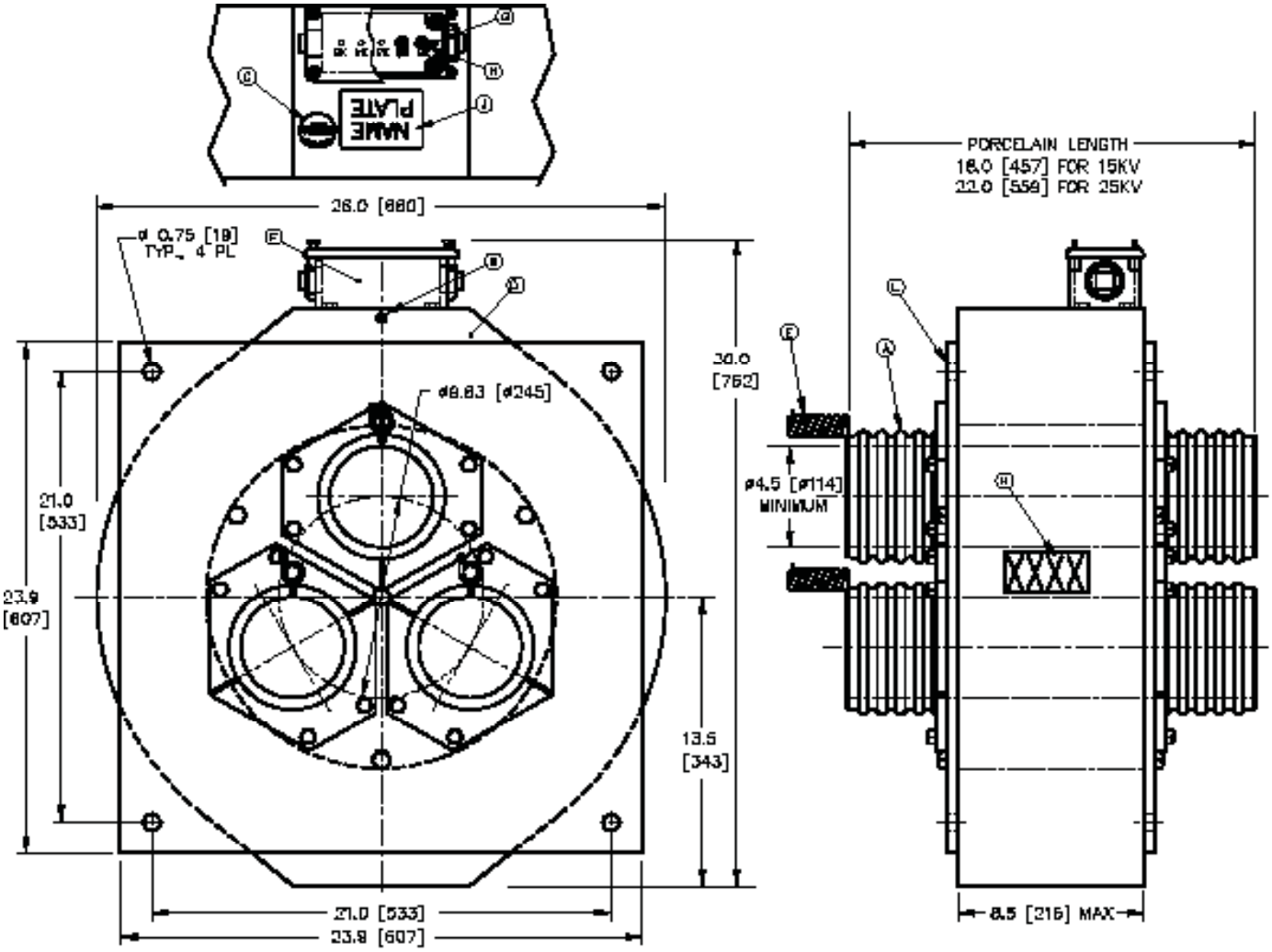
HOW TO ORDER

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")
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)

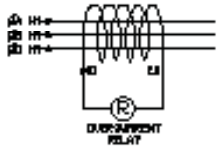
NOTE – Kuhlman Electric offers many mounting options for Zero-Sequence CTs.
Units are custom manufactured to customer specifications. Contact factory to discuss other options.

BYZ–683 / 685 Current Transformer



NOTES: DIMENSIONS IN INCHES [mm]

A. PORCELAIN TUBE, MUNSELL 7G "SKY GREY", INTERIOR IS METALIZED FOR CORONA AND R.I.V. CONTROL.
B. H1 POLARITY MARK IS PERMANENTLY ENGRAVED WHITE DOT.
C. "CORONA FREE" DECAL AFFIXED TO UNIT.
D. CONSTRUCTION: TRANSFORMER CORE/COIL ASSEMBLY IS ENCAPSULATED IN AN OUTDOOR RATED RESIN.
E. PIGTAIL LEAD FOR CONNECTION FROM PORCELAIN TUBE TO PRIMARY CONDUCTOR FOR VOLTAGE EQUALIZATION TO CONTROL CORONA AND R.I.V.
F. WEATHERTIGHT CONDUIT BOX WITH (2) 1" NPT HUBS, STRAIGHT THRU, PROVIDED WITH BLANKING PLUGS. A REMOVABLE COVER ATTACHED WITH (4) SEALING TYPE THUMB SCREWS.
G. X1 POLARITY MARK IS PERMANENTLY ENGRAVED WHITE DOT.
H. SECONDARY TERMINALS ARE 1/4–20 STUDS WITH FLAT, LOCK & CUPPED WASHERS, SECURED WITH A HEX NUT. TIGHTEN TO COMPRESS LOCKWASHER ONLY – NOT TO EXCEED 30 in–lbf.
J. NAMEPLATE IS ANODIZED ALUMINUM, LASER ETCHED, ADHERED TO UNIT.
K. PRIMARY CURRENT DECAL, BOLD YELLOW CHRS 1.0 [25] HIGH, AFFIXED TO UNIT.
L. HIGH VOLTAGE SLEEVES ARE SUPPORTED WITH CLAMPS MADE OF LEXAN, SECURED WITH 3/8 HARDWARE.



ELECTRICAL SPECIFICATIONS:

1. INSULATION LEVEL: 15/28 kV CLASS, 110/150 kV BIL TO GROUND, 105°C
2. TEMPERATURE RISE: 30°C OVER 30°C AMBIENT, TYP.
3. SHORT–TIME MECHANICAL RATING: UNLIMITED
4. SHORT–TIME THERMAL RATING: 80 X NOMINAL, 1 sec.
5. CORONA FREE UP THRU MAXIMUM SYSTEM VOLTAGE.

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 ingression 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.

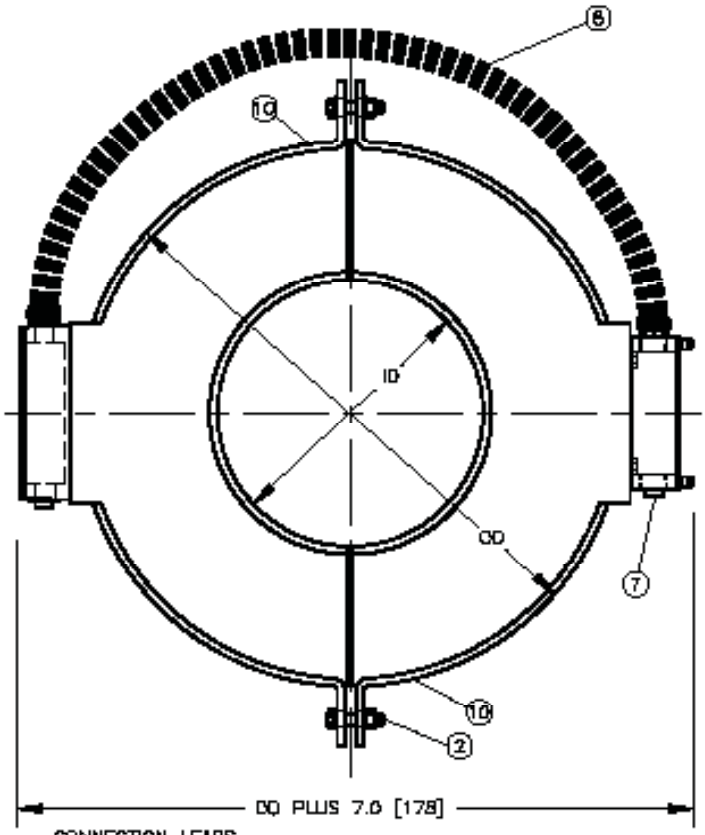
HOW TO ORDER

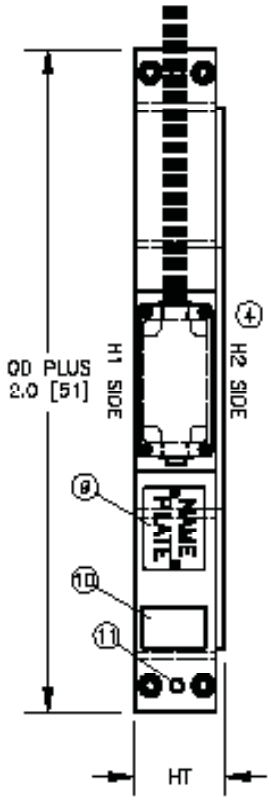
For typical sizes, refer to tables for Slipover CTs on pages 8-13. Actual Split-Core design will be larger in finished height. When ordering Split-Core CTs, include the following information:

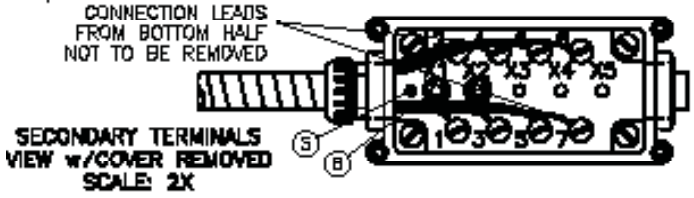
1. Minimum inside diameter (ID) - _____ in[mm]
2. Maximum outside diameter (OD) - _____ in[mm]
3. Maximum allowable height (HT) - _____ in[mm]
4. Current ratio and taps, if any - _____ (:5A or :1A | SR, DR, MR)
5. Accuracy and burden requirements, for example,
   Metering - _____ (0.3 B0.1 thru B1.8)
   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

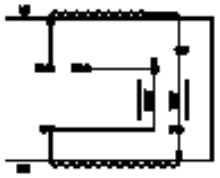




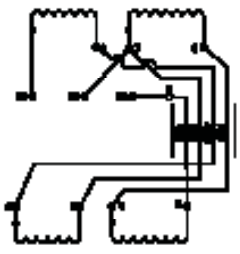


NOTES:
1. DIMENSIONS IN INCHES [mm].
2. CONSTRUCTION: CORE/COIL ASSEMBLY IS CAST IN AN ALUMINUM SHELL, CUT IN 2 HALVES, SECURELY BOLTED TOGETHER WITH (4) 3/8" S/S BOLTS, BELEVILLE WASHERS AND SILICONE BRONZE HEX NUTS – TIGHTEN TO 20 FT–LBF. THE OUTER HOUSING ALSO SERVES AS A GROUND SHIELD.
3. APPLICATION: FOR INDOOR OR OUTDOOR SERVICE WHERE THE PRIMARY CONDUCTOR CANNOT BE OPENED. REFER TO INSTRUCTION SHEET 157–0650–902 FOR INSTALLATION DETAILS.
4. H2 POLARITY IS TOP SURFACE OF OUTER SHELL.
5. X1 POLARITY IS EMBOSSED WHITE DOT ADJACENT TO TERMINAL.
6. SECONDARY TERMINALS ARE 1/4–20 STUDS WITH CUPPED, FLAT & LOCK WASHERS SECURED WITH HEX NUT.
7. SECONDARY CONDUIT BOX IS METALLIC WITH (2) 1"–11.5 N.P.T. HUBS THRU, WITH BLANKING PLUGS. A REMOVABLE COVER IS ATTACHED WITH (4) SEALING–TYPE THUMB SCREWS.
8. A FLEXIBLE WEATHERTIGHT CONDUIT IS USED TO CONNECT THE HALVES TOGETHER. THE LEADS ARE PRE–WIRED AT THE FACTORY AND SHOULD NOT BE REMOVED. THE SMALLER CONDUIT BOX ON THE OPPOSITE END OF THE MAIN BOX IS NOT TO BE OPENED.
9. NAMEPLATE IS ANODIZED ALUMINUM, LASER ETCHED, RIVETED TO THE OUTER HOUSING.
10. INSTRUCTION LABEL AFFIXED BY BOLTS, EACH SIDE
11. #9/16" [#14] HOLE IS AVAILABLE FOR INSERTING AN EYEBOLT FOR LIFTING PURPOSES, AND CAN ALSO BE USED TO ESTABLISH GROUND CONNECTION.
12. MANUFACTURED AND TESTED IN ACCORDANCE WITH IEEE C57.13.

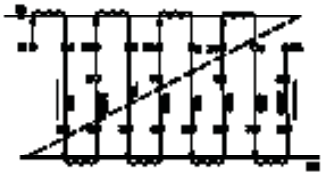
13. ELECTRICAL SPECIFICATIONS:
13.1 – INSULATION LEVEL: 0.6kV CLASS, 10kV B.I.L., 130°C CLASS.
13.2 – SHORT–TIME MECHANICAL RATING: UNLIMITED.
13.3 – SHORT–TIME THERMAL RATING: 80X NOMINAL, 1 second, TYP.
13.4 – POLARITY IS SUBTRACTIVE. WINDINGS ARE EQUALLY DISTRIBUTED ABOUT EACH CORE HALVE. SERIES CONNECTED.



SINGLE RATIO



DUAL RATIO



MULTI RATIO

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

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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 A – Dielectric Requirements of C37.23

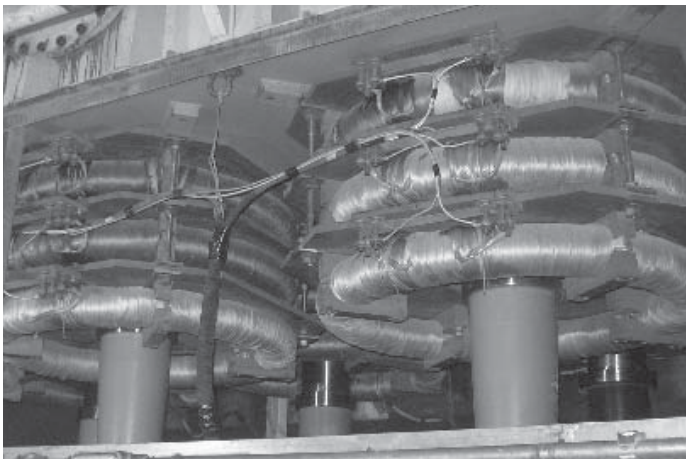
Maximum System Voltage, kV	Applied Voltage Withstand, 60Hz for 1 minute	Impulse Level, kV BIL
0.635	2.2 [4.0]	--
4.76	19.0	60
15.5	36 / 50 [34]	95 / 110
25.8 / 29.5	50 / 60 [34 / 40]	110 / 125
38.0	80 [70]	150 [200]

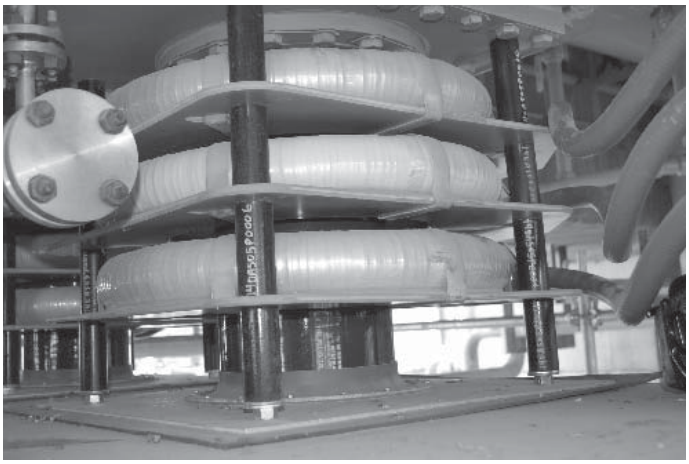
FOOTNOTE – [ ] are values tested in C57.13 IEEE Standard Requirements for Instrument Transformers

Whatever your application, Kuhlman has a solution.

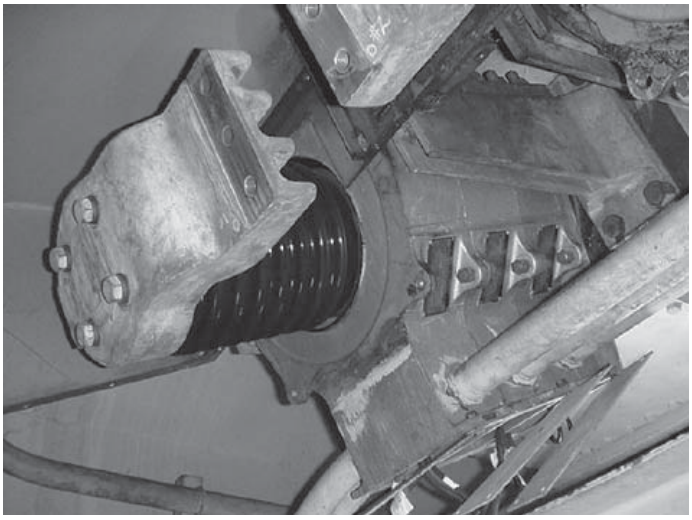
Generator & ISO-Phase Bus Current Transformers

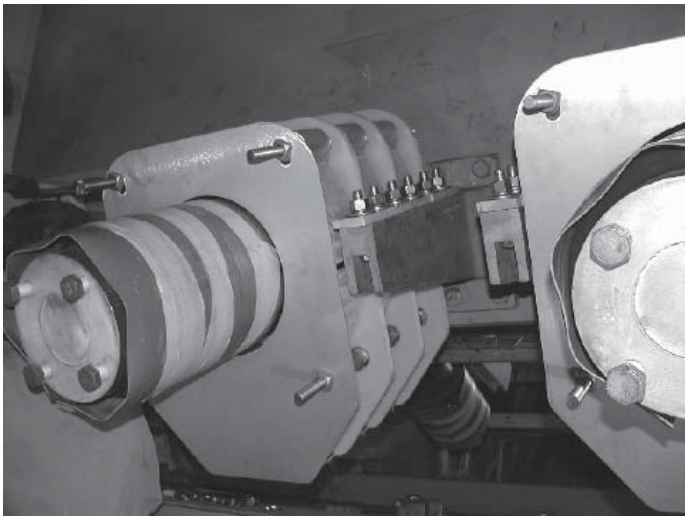
Retrofit Applications of Kuhlman GCT, HW & PSG Type Generator CTs



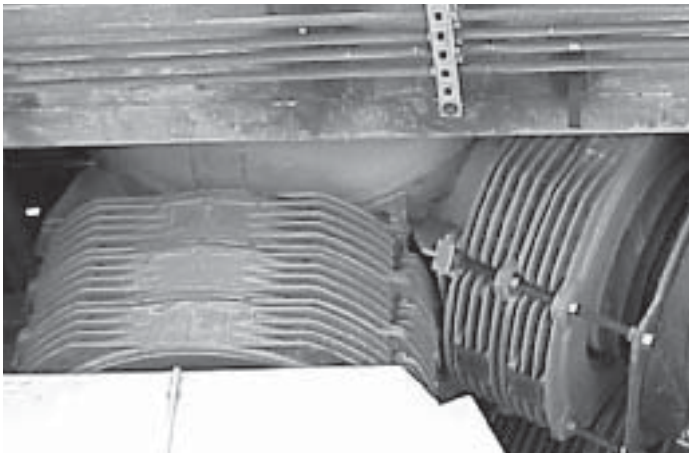


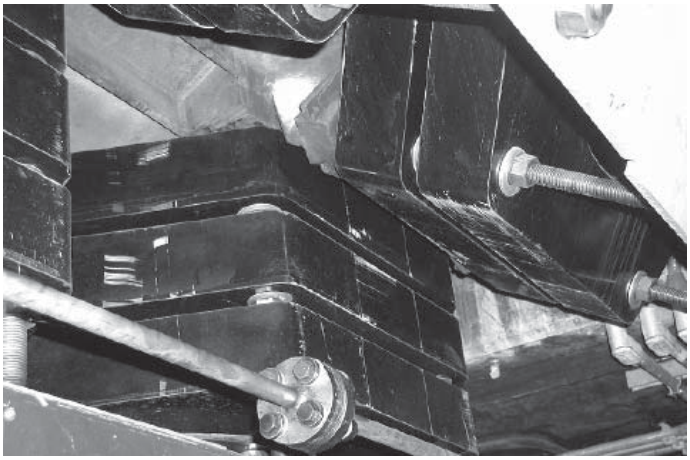
Left: Older European Style GCT stacks without Secondary Terminal Boxes for conduit connection.
Right: Kuhlman GCTs (GCT-848) with Terminal Boxes & matched mounting configuration.





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.

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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)

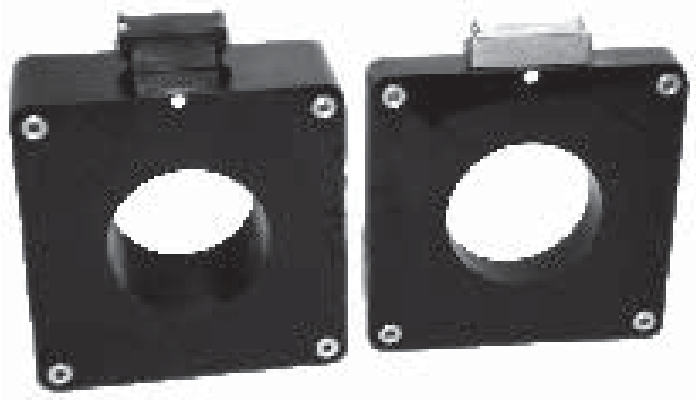
NOTE – Units are custom manufactured to customer specifications. Contact factory to discuss other options.

PSG–981 Current Transformer

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

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.

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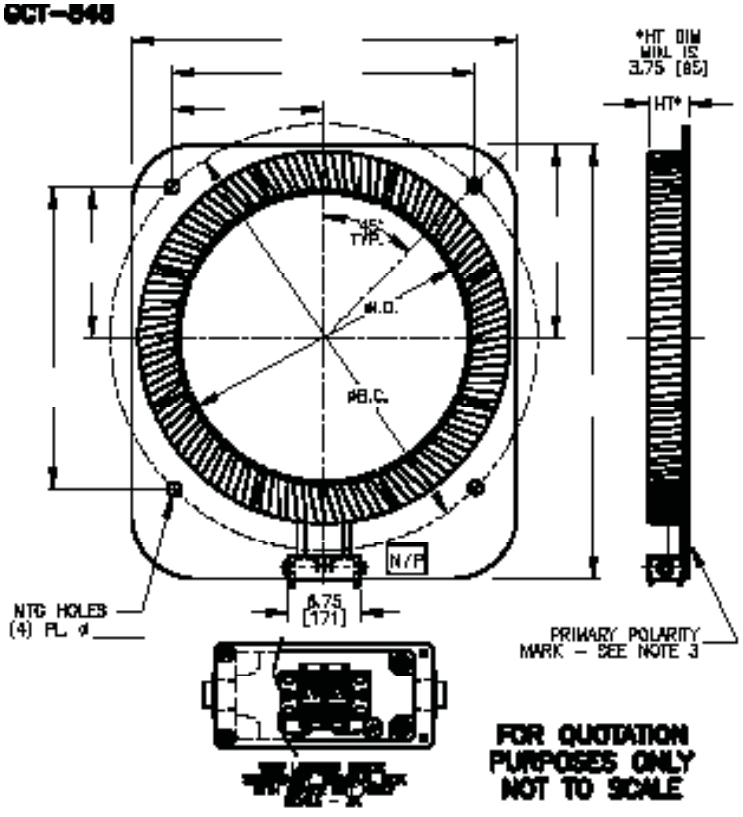
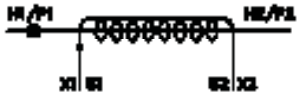
GCT-648

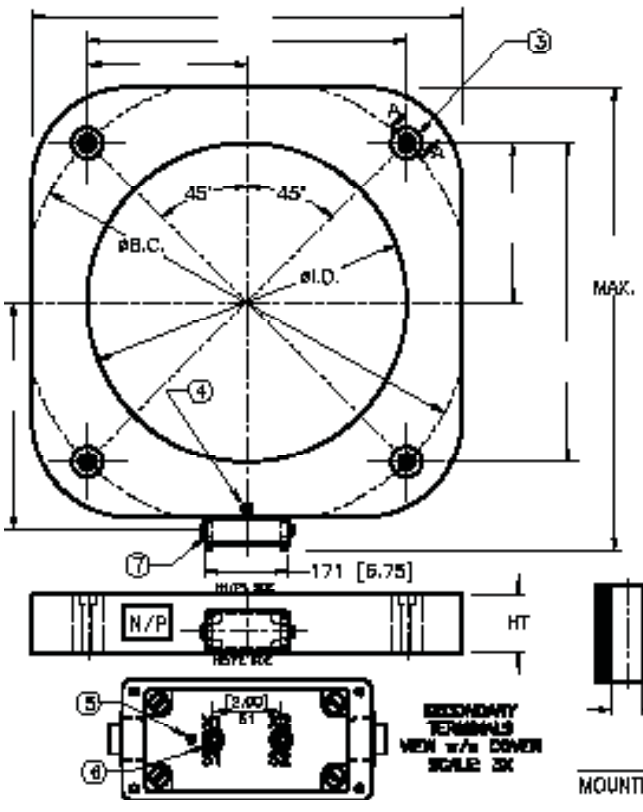


NOTES: DIMENSIONS IN INCHES [mm].
1. INSULATION LEVEL: 0.6kV CLASS, 10kV BIL. TEMPERATURE CLASS AVAILABLE IN 130°C OR 150°C – MUST BE SPECIFIED.
2. CONSTRUCTION: CORE/COIL ASSEMBLY IS WRAPPED WITH POLYESTER TAPE THROUGHOUT, SECURED TO A 200°C HIGH STRENGTH POLYESTER BOARD WITH HIGH STRENGTH BANDS AND ADHESIVE.
3. "H1/P1" OR "H2/P2" POLARITY IS EMBOSSED IN THE BOARD. 0.75 [19] HIGH CHARACTERS IN A BOLD CIRCLE, LOCATED OPPOSITE SIDE OF COIL.
4. SECONDARY TERMINALS ARE #10–32 SCREWS, EACH LEAD IDENTIFIED ABOVE THE SCREW.
5. DUST–TIGHT CONDUIT BOX WITH (2) NPT HUBS, STRAIGHT THRU, PROVIDED W/BLANKING PLUGS. A REMOVABLE COVER IS ATTACHED W/(4) SEALING–TYPE THUMB SCREWS.
   HUB OPTIONS: 1"–11.5 N.P.T. (DEFAULT IF NOT OTHERWISE STATED).
   1.5"–11.5 N.P.T.
   ø2.05" [ø52] W/SPOT–FACED SURFACES
   OTHER OPTIONS MAY BE AVAILABLE – CONSULT FACTORY.
6. NAMEPLATE IS ANODIZED ALUMINUM, LASER ETCHED, FASTENED TO THE BOARD.
7. SUITABLE FOR MOUNTING AT ANY ANGLE BETWEEN 0–75° FROM THE HORIZONTAL, COIL SIDE UP. BOARD HAS (4) MAJOR HOLES FOR MOUNTING DIRECTLY ONTO TERMINAL BUSHING FLANGE. HOLE SIZE MUST BE SPECIFIED. IF THE BOLT HOLES ARE NOT ON A SQUARE PATTERN THEN IT MUST BE SPECIFIED.
8. POLARITY IS SUBTRACTIVE. WINDING IS FULLY DISTRIBUTED.



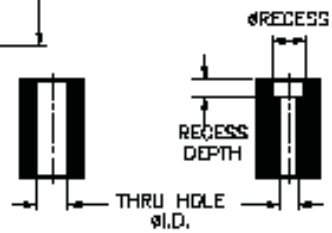
9. ELECTRICAL SPECIFICATIONS (UNLESS OTHERWISE NOTED):
   9.1 – SHORT–TIME MECHANICAL RATING: UNLIMITED.
   9.2 – SHORT–TIME THERMAL RATING: 150X NOMINAL, 1 second.
   9.3 – CONTINUOUS CURRENT RATING: 1.0 @ 55°C AMB., TYP. TEMPERATURE RISE: 80°C OVER 30°C AMBIENT, TYP.
   9.4 – SECONDARY WINDING IS INTERNALLY SHIELDED TO MINIMIZE EFFECTS OF STRAY FLUX FROM ADJACENT CONDUCTORS.
   9.5 – COMPLIES WITH IEEE C57.13 and/or IEC 60044–1 & –8 WHEN APPLICABLE.
10. FOR ADDITIONAL RATING INFO AND CATALOG NUMBERS, REFER TO QUOTATION.

PSG-981



NOTES:
1. DIMENSIONS IN INCHES [mm].
2. CONSTRUCTION: CORE/COIL ASSEMBLY IS FULLY ENCAPSULATED IN A RESIN SUITABLE FOR INDOOR/OUTDOOR USE.
3. (4) MOUNTING HOLES THRU, IN AN ALUMINUM HUB, SIZED PER SECTION A–A.
4. H1/P1 POLARITY IS ENGRAVED WHITE DOT.
5. X1/S1 POLARITY IS ENGRAVED WHITE DOT.
6. SECONDARY TERMINALS ARE 1/4–20 UNC STUDS WITH FLAT, LOCK AND DOMED WASHER SECURED WITH HEX NUT. EACH TERMINAL IS PERMANENTLY EMBOSSED.
7. SECONDARY TERMINALS ARE HOUSED INSIDE A DUST–TIGHT METALLIC TERMINAL BOX W/(2) HUBS AND BLANKING PLUGS. A REMOVABLE COVER IS ATTACHED W/(4) SEALING–TYPE THUMB SCREWS.
   HUB OPTIONS: 1"–11.5 N.P.T. (DEFAULT IF NOT OTHERWISE SPECIFIED)
   1.5"–11.5 N.P.T.
   ø2.05 [ø52] W/SPOT–FACED SURFACES
   OTHER – PLEASE SPECIFY
8. NAMEPLATE IS ANODIZED ALUMINUM, LASER ETCHED, ADHERED TO UNIT.
9. ELECTRICAL SPECIFICATIONS:
   9.1 – INSULATION LEVEL: 0.6kV CLASS, 10kV B.I.L.
   9.2 – TEMPERATURE CLASS: CLASS B (130°C)
   9.3 – TEMPERATURE RISE LIMITS: 80°C RISE OVER 30°C AMBIENT, TYP. 80°C RISE OVER 55°C AMBIENT, TYP.
   9.4 – SHORT–TIME MECHANICAL RATING: UNLIMITED
   9.5 – SHORT–TIME THERMAL RATING: 60X NOMINAL CURRENT, 1 second; 40X NOMINAL CURRENT, 3 seconds
   9.6 – THE SECONDARY WINDING IS INTERNALLY SHIELDED TO MINIMIZE THE EFFECTS OF STRAY FLUX FROM ADJACENT PHASE AND RETURN LEADS.
   9.7 – POLARITY IS SUBTRACTIVE AND WINDINGS ARE FULLY DISTRIBUTED.

10. MECHANICAL SPECIFICATIONS:
    10.1 – UNITS MAY BE STACKED DIRECTLY WITHOUT USING SPACERS, BUT IT IS RECOMMENDED THAT THE MAX. ALLOWABLE SPACE BE USED FOR BEST AIR FLOW.
    10.2 – SECURING HARDWARE TO REST ON MOUNTING HUB SURFACE ONLY.
    10.3 – UNIT SUITABLE FOR MOUNTING AT ANY ANGLE.
    10.4 – INSULATION SYSTEM CAPABLE OF WITHSTANDING VIBRATION OF 3.0g's X 10^6 CYCLES.



MOUNTING HUB SIZE & CONFIGURATION

FOR QUOTATION PURPOSES ONLY
NOT TO SCALE

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

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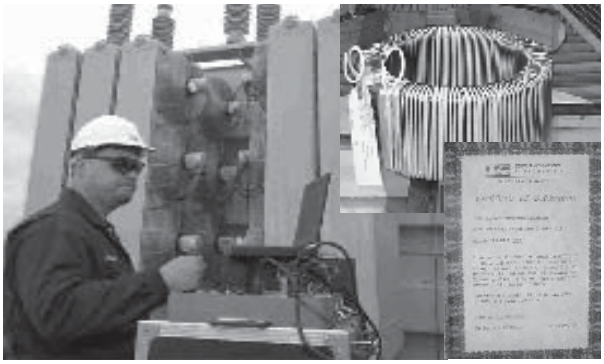
Testing Services

Field Engineering Services Division

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

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