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PICVD & PICW 600 V Window Type Current Transformer

Product Manual

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Current Transformers: Standards and Ratings

Standard Features	Voltage Ratings				
<p>Current Ratings Most Polycast current transformers are available as single, double or multi-ratio units. Five amp secondaries are standard, but one amp secondaries are available for most styles. Maximum and minimum primary ratings depend upon the style selected.</p> <p>Accuracy Ratings For most applications the simplicity and high mechanical withstand capability of window type and bar type CTs makes them preferable for most applications. Wound primary CTs are recommended where very high accuracy at lower ratios (5-5A through 300-5A) is required.</p> <p>Testing Polycast testing capabilities include polarity, ratio and phase angle, saturation, temperature rise, open circuit, induced, power factor, hipot, impulse, partial discharge, low temperature withstand and other physical and mechanical testing.</p> <p>Note: All Polycast current transformers are individually tested. Routine and type test reports are available upon request.</p>	Polycast Standard Designation	Nom. Voltage Class kV	Low Freq. Dry kV	Impulse (BIL) kV Crest 1.2x50Qs	Chopped Wave kV Crest (Qs)
	0.6	0.7	4	10	12 (1.0)
	05	5.0	19	60	69 (1.5)
	08	8.7	26	75	88 (1.6)
	15	15.0L	34	95	110 (2.0)
	18	15.0H	36	110	130 (2.0)
	25	27.5L	50	125	145 (3.0)
	28	27.5H	60	150	175 (3.0)
	<p>The above values are based upon, and are intended to meet the most stringent requirements of, the following standards: ANSI/IEEE C57.13, CSA-C60044-1 and IEC 61869-2</p>				

Material Standards

- Cores are grain-oriented silicon steel (M4 or higher), annealed after forming, to provide maximum accuracy.
- Core insulation is electrical grade pressboard and kraft paper, or epoxy.
- Secondary coils are 200°C rated copper magnet wire with silver soldered connections to terminals or leads, and high quality electrical grade kraft or nomex interlayer insulation.
- Primaries (where provided) are electrolytic copper, electroplated with silver.
- Cast indoor units are manufactured from Bisphenol-A epoxy.
- Cast outdoor units are manufactured of cycloaliphatic epoxy, and are complete with weatherproof terminal boxes.
- All have nameplates and prominent polarity markings

Standard Terminology

Turns Ratio	The ratio of the secondary turns to one.
Current Ratio	The ratio of the primary current to the secondary current in amps
Transformer Correction Factor (TCF)	The correction for the overall error due to both ratio and phase angle error for a specified primary circuit power factor.
Ratio Correction Factor (RCF)	The ratio of the true ratio to the marked ratio (excitation & other losses result in ratio error)
Rated Burden	The maximum load which may be placed on the CT secondary without causing an error greater than that allowed by the stated accuracy (in ohms impedance, e.g. B0.1, B0.9, B2 or corresponding volt-ampere values of 2.5, 22.5, 50 VA).
Accuracy Class	<p>Metering Accuracy: The TCF shall be within specified limits at 10%, 100%, and $CCRF \times 100\%$ at a given power factor with a specified burden</p> <p>Relaying Accuracy: The composite error shall not exceed a specified percentage error at a specified secondary terminal voltage based on a maximum fault level of secondary current</p>
Continuous Current Rating Factor (CCRF)	The factor by which the rated current of the CT can be multiplied to obtain the maximum continuous current that the CT can carry without exceeding the temperature rise or accuracy requirements
1 Second Thermal Withstand	The maximum RMS symmetrical primary current that can be carried for one second with the secondary short circuited without exceeding the limiting temperature
Mechanical Withstand	The maximum RMS asymmetrical primary current that a CT can carry with the secondary short circuited without any damage which would render it incapable of meeting other standard accuracy and transformation requirements

Special Considerations

- Current Transformers should never have primary current applied with the secondaries open-circuited. This is especially true at higher current ratios (1200-5A and above) where the open circuit voltage may exceed the open circuit standard test voltage limit of 3500 Volts.
- The test standard and any special requirements for each current transformer ordered should be specified on the purchase order.
- Because the conditions of use of any current transformer is beyond the control of the supplier, it is always the responsibility of the user to ensure that the current/voltage ratings and the accuracy of the transformer used is adequate for his application.

Design and Construction:

Window type current transformers are used to provide an output in their secondary windings which is a representation of current flowing through a conductor which passes through its window.

A **PICW**-style current transformer is manufactured using an insulated annealed toroidal core of high grade grain-oriented silicon electrical steel around which is wound turns of 200°C enamel coated copper wire. The turns are uniformly distributed around the core to ensure low leakage flux. This assembly is then encapsulated in a bisphenol-A epoxy, with brass inserts for the secondary terminals. Polarity is clearly indicated by white dots at the X1 terminal and at the corresponding face of the cast current transformer. Each unit has a nameplate which indicates the required electrical ratings and a unique serial number.

A **PICVD**-style current transformer is manufactured using an insulated annealed toroidal core of high grade grain-oriented silicon electrical steel around which is wound turns of 200°C enamel coated copper wire which comprises a uniformly distributed secondary winding. This assembly is then insulated by a layer of cotton or fibreglass tape and then is sealed by several layers of insulating varnish. Optional wire lead types, gauges, lengths and colors are available. Polarity is clearly indicated by a dot at the X1 terminal and at the corresponding face of the taped current transformer. Each unit has a nameplate which indicates the relevant electrical characteristics and unique serial number.



PICVD-Style Current Transformer



PICW-Style Current Transformer

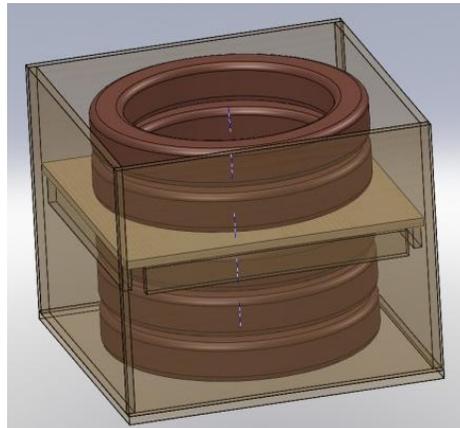
Maintenance:

Periodically it may be necessary to check that all connections between the current transformer and control panel are secure. If required, electrical testing of the current transformers must only be done by trained and fully qualified personnel.

Both the **PICW** and **PICVD**-style current transformers require little or no maintenance. The current transformers are insensitive to temperature extremes, moisture and most environmental contaminants.

Shipping:

Current transformers are typically shipped in wooden crates which contain from one to five current transformers, depending on the size and weight of each unit. Each current transformer is surrounded with ½" thick styrofoam sheets to prevent any movement inside of crate during transport.



Example of crated units

Handling:

When lifting the PICW or PICVD Series Current Transformer, to unpack, move or re-pack them in shipping crates, slip a hoist sling through the window of the unit. Ensure that the sling is fitted properly and that none of the leads are being pinched.

Storage:

Current transformers should be stored in a clean and dry location in their factory packed condition prior to installation. For **PICW** and **PICVD**-style current transformers, the allowed storage temperature range is from -5°C to +55°C. If removed from packaging, current transformers shall be protected from exposure to direct sun light.

Handling & Storage Questions:

If you have any questions on handling or storing Polycast products, please contact:

Manager, Customer Relations
Polycast International
1-800-665-7445; Ext. 211
service@polycast.ca

Installation:

The **PICW** and **PICVD**-style current transformers are custom designed to fit over any bushing shank. They can be supported horizontally by mounting plates or non-magnetic straps.

When stacking multiple **PICVD**-style current transformers, an insulating ring should be placed between each unit. If installed with a mounting plate that is magnetic, an insulating ring should also be placed between the unit and mounting plate. When clamping **PICVD**-style current transformers between plates, do not over-tighten as any large mechanical force may physically damage the unit or change its performance characteristic.

CAUTION:

If the secondary of a current transformer is left open circuited when energized, dangerously high voltages can develop between the secondary terminals within the current transformer winding. If such an event occurs, the current transformer must be demagnetized and tested before being placed in service. Circuits are closed by use of an appropriate burden connected to the terminals, or by a short circuiting link.