

WHITEPAPER

600 volt class current transformers

Usage in higher voltage rated equipment



600 volt class current transformers are traditionally used in medium and high voltage equipment in conjunction with high voltage insulators, bushings, air, oil, or other insulating mediums.

For decades it has been common practice to use 600 volt class (600 V) window-type current transformers (CTs) (donut, ring, toroidal, BCT, slipover, etc.) in medium voltage (MV) and high voltage (HV) equipment such as metal-clad switchgear, HV power circuit breakers, and power transformers. These units are also used on insulated bus and cables, isolated phase bus (IPB) compartments and enclosures, large power generator terminals, in underground to overhead termination points (potheads), and countless other applications.

The use of 600 V CTs in higher rated systems now has some coverage under the new normative Annex B in IEEE C57.13-2016, where it touches on application and dielectric concerns.

On their own, 600 V CTs have a limited primary insulation rated up to 4 kV dielectric withstand and 10 kV BIL, or may have no primary insulation at all, such as the bushing-type CT (BCT). When used properly in conjunction with HV insulators, bushings, air, oil, or other insulating mediums, 600 V CTs can be used in applications with ratings of up to 800 kV.

When properly aligned with other system components, 600 V CTs provide a very economical, maintenance-free solution that is easy to install and access. The most common application is on MV and HV bushing terminals where the CTs are mounted along the ground plane of the bushing. This is a well proven and widely accepted practice on metal-clad switchgear, HV breakers, and power transformers.

In MV IPB enclosures, 600 V CTs are installed over uninsulated bus with adequate air clearance. In switchboards or bus runs in the rear of switchgear cabinets, they are installed over insulated bus with some clearance. Over fully insulated MV and HV cables that have outer ground sheathings that contain the voltage stress within the cable itself, there is unrestricted clearance.

Many MV and HV standalone devices that incorporate 600 V CTs are required to meet their full dielectric withstand and BLL ratings as a complete assembly.

One of the best features of window-type CTs is high short-time ratings which, in many cases, far exceed the equipment short-time ratings. This is normally a weak link when using fully rated primary wound type CTs in MV and HV applications.

For more details about applying 600 V CTs in a higher voltage class system, contact your ABB representative.

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01 Tape wrapped BCTs suspended under a transformer cover along the ground shank of the terminal bushing that will be submerged in transformer oil

02 Tape wrapped BCTs mounted at the base of a HV bushing, external to the power circuit breaker; protected from the elements by a sealed aluminum cover.

03 Plastic encased CTs mounted on the inside cover of a MV breaker utilizing the bushing and air to meet 15-34 kV ratings

04 Molded 600 V CTs mounted at the base of bushing terminals on a MV recloser







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05 Molded 600 V slipover CT mounted at the base of a cable terminating bushing

C Molded 600 V slipover CT installed on the HV bushing flange of a power transformer. Notice the CT is mounted above the test tap but below where the bushing flange is attached to the porcelain insulator.

07 Molded 600 V slipover CTs installed on a substation medium power transformer

08 Molded 600 V CTs with specific mounting features installed on the terminal bushings of a large power generator. The CTs are between the generator lead box and the IPB ducts.





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09 Tape wrapped 600 V BCTs installed over insulated MV bus

10 Molded 600 V CTs installed in non-segregated IPB compartment using air clearance between the window and uninsulated bus to achieve 25 kV/150 kV BIL rating

11 Molded 600 V CT installed with insulated MV bus passing through its window

12 Molded 600 V zerosequence CT installed in MV switchgear with insulated bus







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