

## CAST RESIN INSULATED INSTRUMENT TRANSFORMERS



### CURRENT TRANSFORMERS

A Current transformer belongs to the series connected class of electrical apparatus. The system current passes through the primary winding of Current Transformer and sets up a current in its secondary winding. Except for a little deviation, this current is in phase with the primary current and bears a definite ratio with it. The little deviation is expressed in terms of the ratio error and phase error of the Current Transformer. Various international standards on current transformers specify the limits of these errors for various accuracy classes of the Current Transformers, the accuracy class depending upon the duty the current transformer is called upon to perform as also upon the type of instrument / protective device it is supposed to feed.

Selection of Current Transformer :

The following points need to be considered while selecting Current Transformers :-

**(a) Ratio :-**

This is a ratio of the rated primary current and the rated secondary current and is usually specified as Rated primary current / Rated Secondary current.

The rated secondary is determined by the rated current of the apparatus which is to be fed by the Current Transformers. For the range of current transformers, described here we have standardized on a rated secondary current of 5 Amps although Current Transformers with rated secondary current other than 5 Amps are also manufactured

The rated primary current is determined by the

- i) Rated system current.
- ii) Fault level at the point in the system where the Current Transformer is to be located.

It is immediately apparent that the rated primary current of the Current Transformer should be at least equal to the rated system current, although it is usual to specify about 25% higher rating to cater for increases in the system load (Maximum overload permitted for a current transformer is 20% of its rated currents. When substantial changes in the system load are envisaged it is usual to specify double ratio current transformers, viz 200-100/5 A.

For multi-ratio current Transformer, the various ratios may either be obtained by a suitable tap on the secondary winding or by primary reconnection. If latter is the case, the accuracy

of the current transformation is same the regardless of the connected ratio. In the former case, however the accuracy is inferior for the lower ratio.

Fault level at the point in the system where the Current Transformer is to be located plays an important part in the selection of rated primary current as this influences the cross sectional area of the copper conductor to be used for the primary winding. If the fault level is high, it immediately puts a limitation on the total number of ampere turns at which a current transformer can be designed to operate which in turn puts a limit on the accuracy of current transformation it may therefore happen that with a given fault level the required accuracy cannot be obtained for a certain value of the rated primary current. In such a case next higher standard value of the rated current should be examined.

**(b) Rated Burden :**

Devices like meters relay coils etc. require certain voltage to be developed across them for satisfactory operation. The product of this voltage and the rated current of the device is called the burden of the device which is expressed in 'VA'. The burden imposed by each device is readily available from the makers of the device and the total burden on the Current Transformers due to the connection of number of such devices is merely an addition of the burdens imposed by each device.

**(c) Class of Accuracy :**

Depending on the permissible ratio and phase errors, current transformers are classified into various classes. Specifying an accuracy class higher than the one required for a particular duty may result in an unduly large and expensive current transformer. The different standard specifications for current transformers suggest suitable accuracy classes for various types of duties.

**(d) Accuracy Limit Factor :**

Under fault conditions the current through Current Transformer primary will be many times the rated current. A proportionate secondary current will be produced only if the core does not get saturated. An accuracy limit factor specifies the limit of primary current (protect of rated primary current and accuracy limit factor) till which the accuracy of current transformation is within the specified limits. Higher accuracy limit factors, than required, result into an unduly large and uneconomical Current Transformer for protective duty an accuracy limit factor of 10 is



33 kV RCCT



11 kVCTR



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