Voltage Transformer Thermal Burden Rating

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It has been more than three decades since the microprocessor based relays were introduced however most of the Medium Voltage (MV) voltage transformer (VT) users still request the higher thermal burden VT ratings designed for electromechanical relays. A typical microprocessor based relay has a voltage input burden of less than 0.25VA, for which a lower thermal burden VT rating will provide the necessary accuracy in most applications. This technical brief will explain the VT thermal burden rating requirements for the medium voltage switchgear.

IEEE Std C57.13 states the thermal burden rating of a voltage transformer is the maximum burden in volt-amperes that the transformer can carry at rated secondary voltage without exceeding the temperature rise limits. A voltage transformer is assigned an accuracy rating for each of the standard burden designations up to a maximum of 400VA. So, if we consider a VT with an accuracy class of 0.3Y, it would mean that all lower burden designations are in that class, i.e., 75VA and below.

Most of the customer equipment specifications still call for the thermal burden ratings anywhere between 750VA and 2000VA at 30°C ambient temperature depending on the voltage rating. These higher burden voltage transformer values were necessary when electromechanical relays were used. Today, most relays are microprocessor based relays, so specifying that the burden rating be higher than the IEEE standard requirement is unnecessary. For example, a VT with a 0.3Y accuracy rating means the VT secondary can be loaded up to a maximum of 75VA and maintain the accuracy of 0.3%. With a 400VA maximum burden, the temperature rise is never an issue with the modern microprocessor based relaying or metering VT inputs connected to the VT secondary circuits.

Customers will occasionally request the control power for the circuit breaker control circuits or other continuous loads be supplied by the voltage transformer secondary circuit. Voltage transformers are not designed to supply power to the loads beyond the assigned VT burden. In such cases, Powell strongly recommends the use of an appropriately rated control power transformer (CPT).

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