All about a CT Burden

In Power Automation

Application Note

Date: Dec. 2022

Doc NO.: 40457

Rev. : 01.00

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simplifying systems

What is CT Burden?

CT burden is the total resistance of the secondary load of a current transformer or, in other words, the maximum load that can be applied to a CT's secondary. A CT's maximum burden will vary depending on the CT's turns ratio, the desired CT output, and the sensor's current rating.

CT burden is commonly expressed in one of two ways:

1. The total impedance of the circuit in ohms (Ω)
2. The total VA (volt-amperes) and PF (power factor) at a specified current/voltage and frequency

A CT's total impedance is a combination of three factors:

1. The sum of all resistance present in the CT's secondary winding
2. The resistance in the CT's lead wires
3. The resistance present in the MFM (Multi Function Meter), Protection Relay, or any type of IED modules used in power measurement (PM03, PM04), connected to the CT.

Why is it important to know a CT's burden?

Depending on a facility's layout, it is possible that a power meter may need to be installed some distance away from the load to be measured.

In these instances, it can be helpful to extend the leads of a CT to accommodate longer distances. However, it is also important to note that there is a maximum distance that the leads can be lengthened to beyond which the accuracy will decline. This is because the CT's maximum burden is being exceeded by the added resistance of the CT leads.

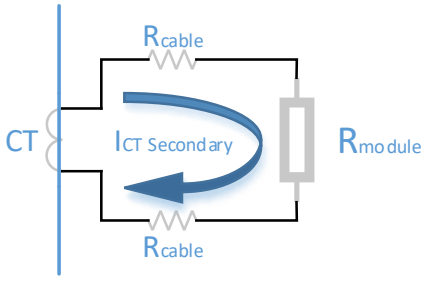
The burden can be calculated by using the following formula:

$$\text{Burden}(\Omega) = (2 \times R_{cable}) + R_{module}$$

or

$$\text{Burden}(VA) = (I_{CT\_Secondary})^2 \times ((2 \times R_{cable}) + R_{module})$$

$$R_{cable}\ (\Omega) = R_{cable}(\Omega/m) \times \text{Length}(m)$$



What is the impedance of the RTU32M Power Meter module?

Module Type	Impedance (Ω)	Max current (A)	VA
PM03A	0.20	1	0.20
PM03B	0.022	5	0.110
PM04A	0.20	1	0.20
PM04B	0.022	5	0.110

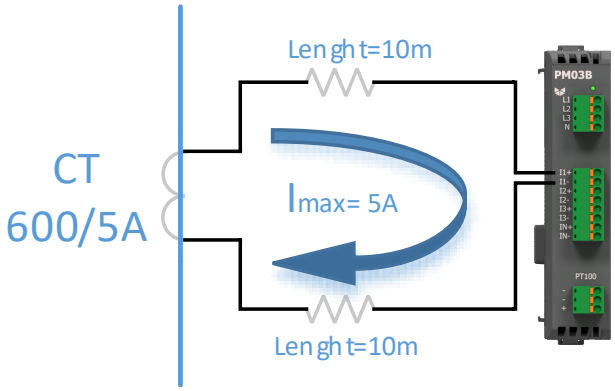
Example :

CT Ratio: 600/5A

CT Burden: 4.1 Ω

Cable Resistance: 11.5 (ohm/km)

Module Impedance: 0.022 Ω



Burden(Ω) = $(2 \times R_{cable}) + R_{module} = 2\times(10\times0.0115) + 0.022 = 0.252$ Ω

Burden < CT burden ==➔ The Accuracy will not affected or decreased