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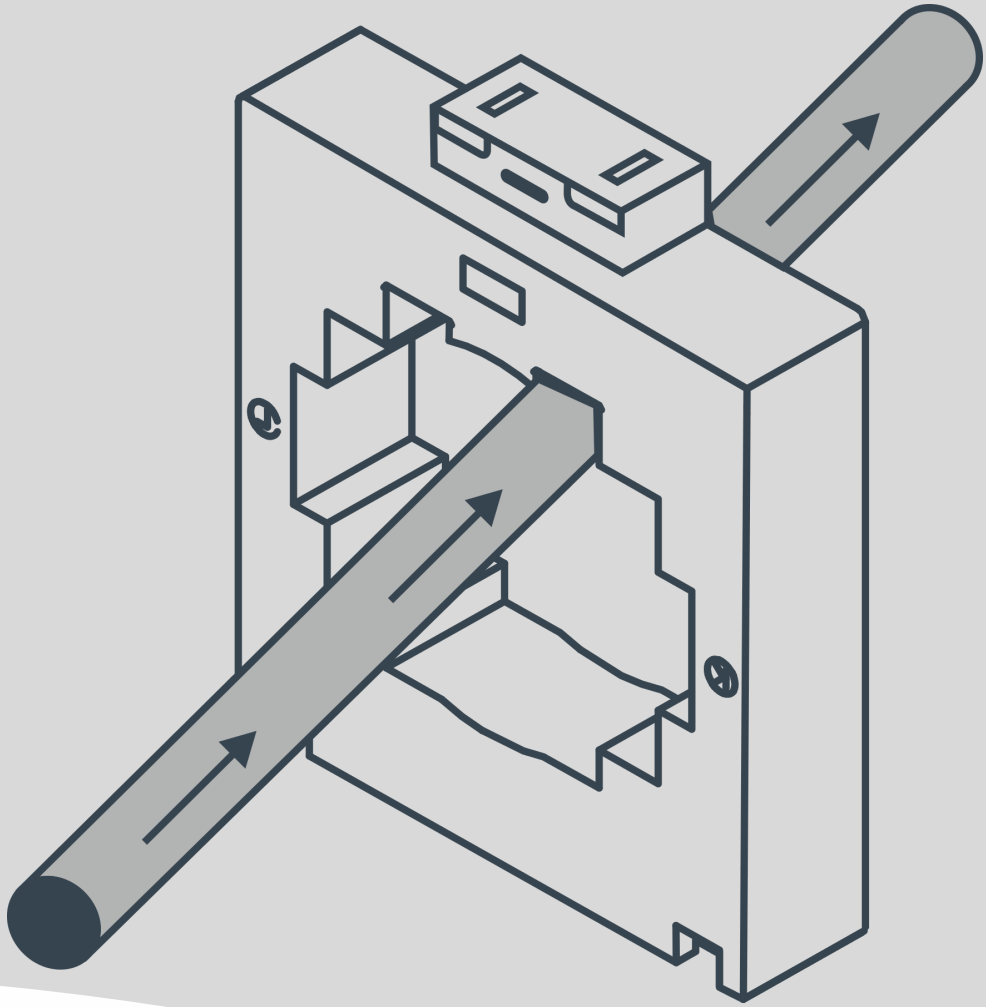
Why should the CT Secondary never be open?



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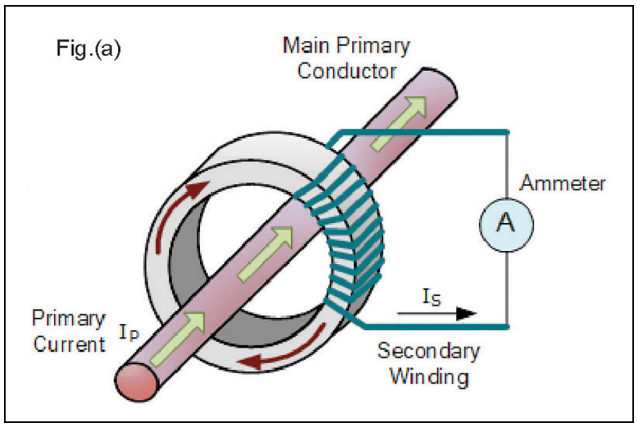
Why Should the CT Secondary Never be Open?

Introduction

It is dangerous to open-circuit the CT secondary circuit when primary circuit is energized.

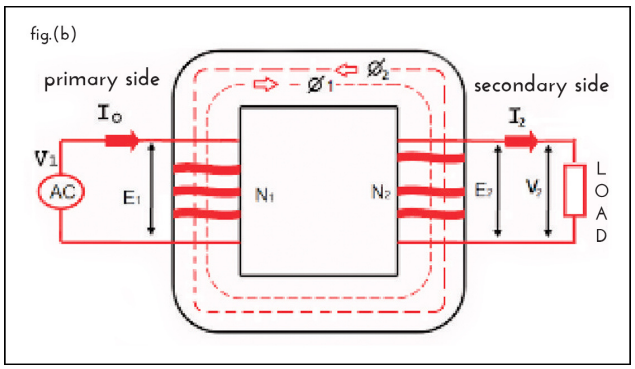
Current Measurement using CT and Meter:

A step-down CT and a 5A Ammeter is used to measure current above 5A as shown in fig. (a):



Example: Assume that the current to be measured is 1000A and if we use 1000A/5 CT then the CT steps down the primary current of 1000 A into secondary current of 5A which is measured by Ammeter. The Ammeter is scaled to read the correct primary value.

How does a CT work?

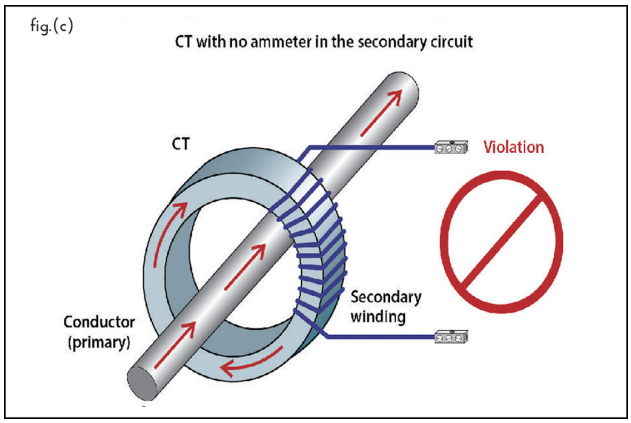


When current flows through primary, as per Faraday's law of Electricity, it induces primary flux Ø 1 into the core which results in secondary current I2. This current I2 also induces secondary flux Ø 2 but in opposite direction. Hence it opposes the primary flux Ø 1.

Therefore, it is called as counter balancing flux. This resultant flux Ø = Ø 1 - Ø 2 is the flux that flows through the core. Its value is relatively small compared to Ø 1. This flux maintains linear relationship between I secondary and I primary depending on the core material (shown In fig.(b)).

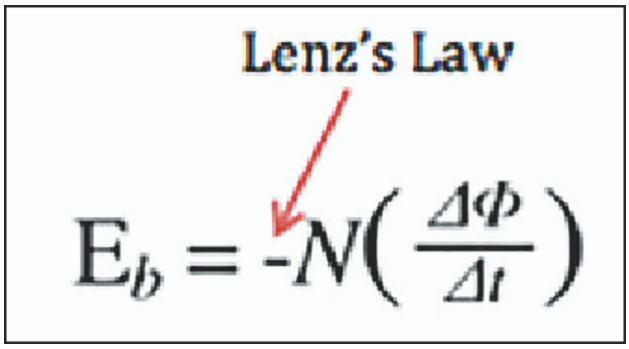
CT secondary opened when primary is energized:

When secondary circuit is an open circuit as shown in fig. (c), a very high back Emf voltage is generated according to Lenz's law of electricity.



In fig b, when secondary circuit is open, there is no secondary current I2 and hence counter-balancing flux Ø 2 is absent and hence Net flux = Ø = Ø 1 which is very large and this produces a very high back emf as per Lenz's equation.

Lenz's equation for electromagnetic induction is as follows:



This voltage (back emf) is extremely dangerous. It can result in deadly shock to the person who opened the secondary. This extreme high voltage can exceed insulation levels of CT and result in fire hazard and even explosion of CT. CT secondary is terminated to the Meter. If there is a loose connection or open circuit at meter end, such hazard might happen.

Conclusion

When CT secondary is terminated at Meter, it must be ensured that the connections for secondary circuit are secure and reliable in order to avoid fire and shock hazard.

Comprehensive Range of CT/PTs and Multi-Function Meters (MFMs)

Current Transformer Nylon Casing

Metering Type CT'S

- Window Type CT'S
- (Bus Bar)
- WPL Type
- Round ID Type CT'S

Protection Type CT'S

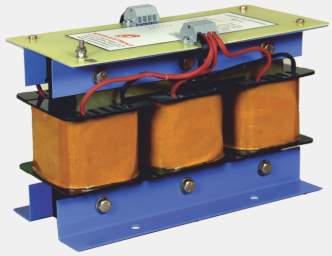
- Nylon Casing- Protective Type Bus Bar

Resin Cast-Round ID

Metering Type CT'S

- Resin Cast - WPL
- Resin Cast - Bus Bar
- Resin Cast - Round ID

Control Transformer



- Single-phase Resin Cast
- Three-phase Resin Cast

Digital Meter

- Energy Meter
- MFM Meter
- VAF Meter
- DPM Meter

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