

## Connecting Current Transformers for EIG Meters

**Scope:** Current transformers (CTs) are used to convert high current sources (aka, primary or high side) to a proportional, lower current (aka, secondary or low side) to be used by an electricity meter or protective equipment. To achieve accurate metering results, it is absolutely critical that the primary and secondary CT inputs are connected correctly. This guide explains how to make correct primary and secondary current CT connections. It also contains suggested best practices, such as documentation.



**CAUTION! De-energize source before installation. Installation by licensed electricians is required. Observe local and national electrical codes for safety and compliance. Always observe safety precautions when working with electricity!**

### Types of CTs

There are three types of CTs used in metering applications: split core CTs, solid core CTs (which can be either window type or donut type), and Rogowski coil CTs.

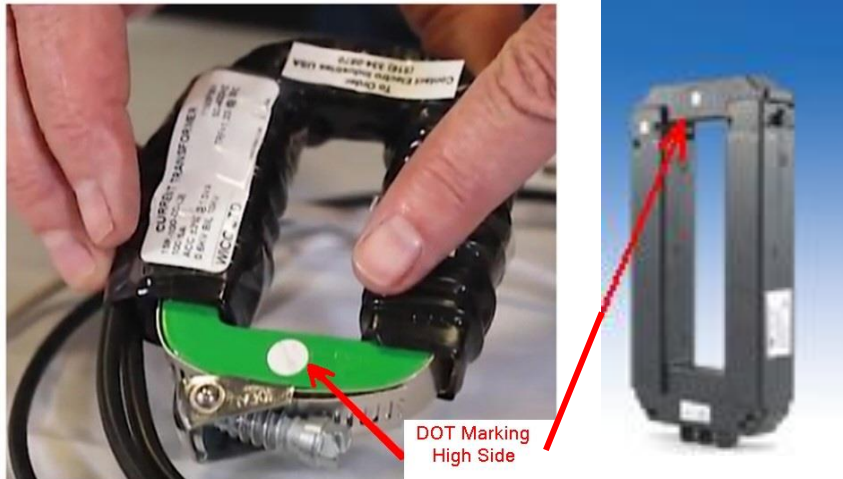
- Split core CTs allow the CT to be placed around the the cable without disconnecting the cable at one end. Because of this, split core CTs are easy to install.
- Solid core CTs require removal of the cable at one end in order to drive the cable through the CT window. However, solid core CTs enable more accurate measurements than split core CTs.
- Rogowski coil CTs are flexible current transformers. Their construction enables them to be opened and closed for easy installation and to be bent to fit in tight spaces and/or around equipment. Due to their design they often use an integrator to properly convert their output.

### Identifying the CT's High Side Polarity

Before installing a CT, you must identify the CT's high side, i.e., the side that will be connected to the power system / power source. CTs indicate the high side in one of the following three ways.

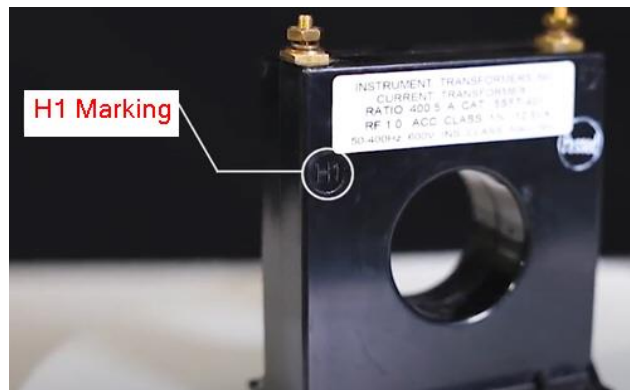
1. Marking the primary, high side with a dot:

As shown in the figures on the next page, CTs may be marked with a white or other color, e.g., yellow, dot to indicate the high side. When installing the CT, the dot side should be facing the power system (power source) side.



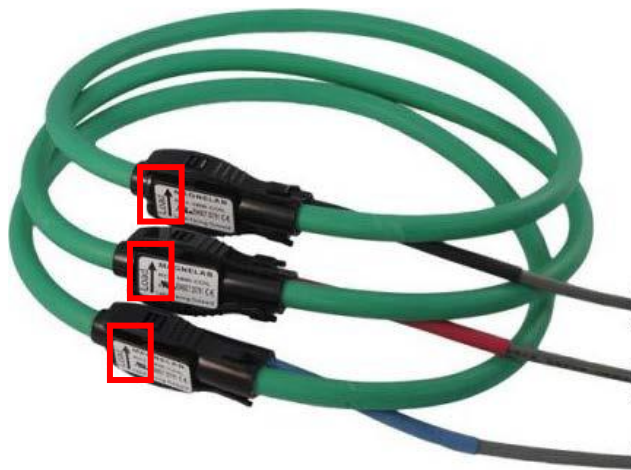
2. Marking the primary, high side with “H1”:

The high side of the CT is marked with “H1” as shown in the figure below. When installing the CT, the side tagged with H1 should be facing the power system (power source) side.



3. Marking the primary, high side with an arrow:

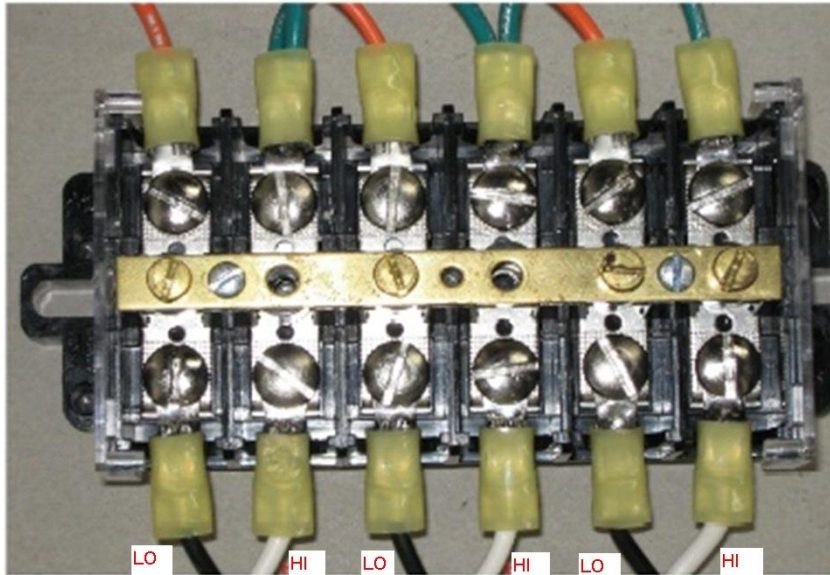
As shown in the figures below, some CTs use an arrow pointing to the source side. Sometimes the arrow is marked with the word LINE, SOURCE, or LOAD. This CT should be installed with the arrow pointing toward the power system (power source side).



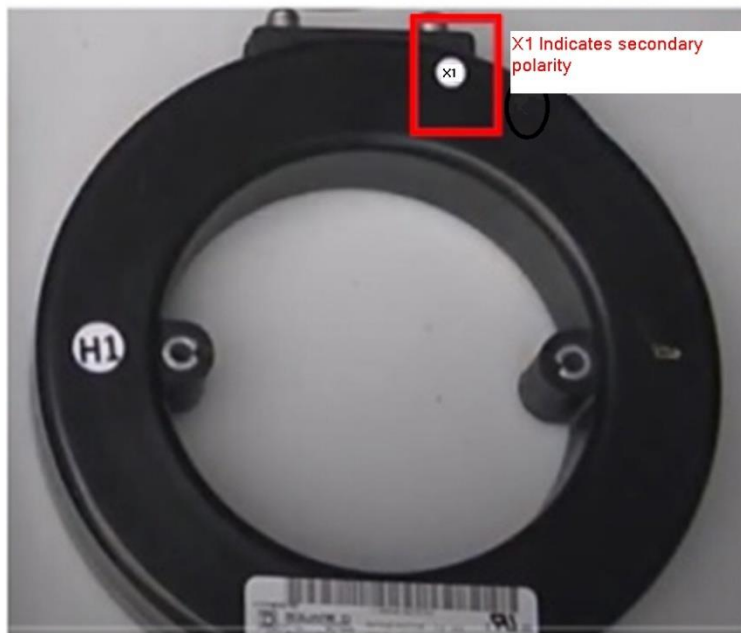
**IMPORTANT!** Make sure the CTs are connected onto the BUS bar as shown in the meter's electrical single-line diagram, as shown in its User Manual. See <https://www.electroind.com/power-metering-and-energy-monitoring-products/> to access the meter's product page, from which you can download the User Manual.

### Connecting the CT's Secondary Side Leads

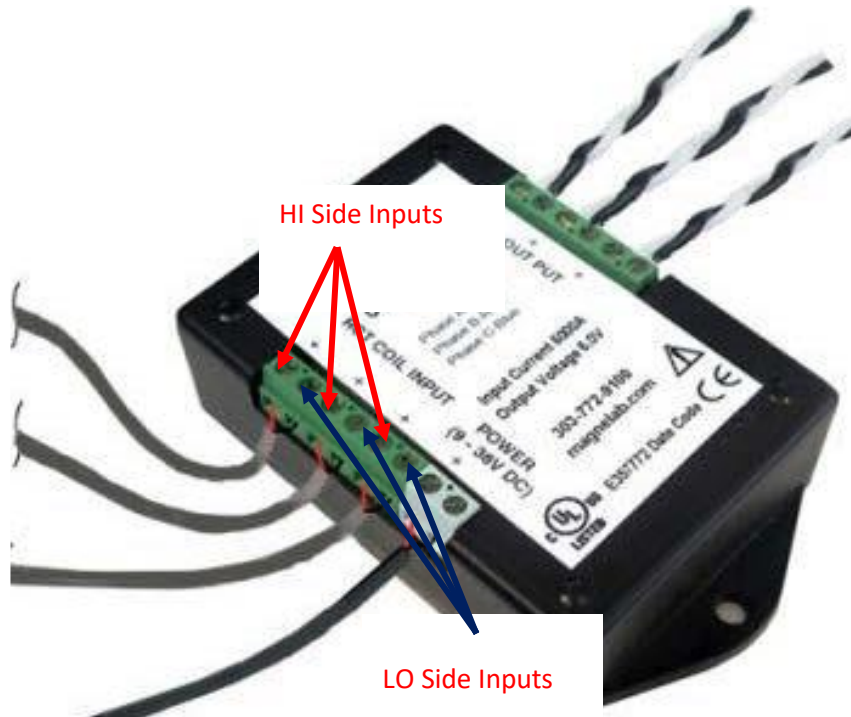
Typically, the secondary CT leads are interfaced with the meter via a CT terminal/shorting block, as shown in the figure below. Each CT will have two leads, marked HI (high), which is the polarity terminal and LO (low), which is the current return, or non polarity.



In most split core CTs, the polarity lead is white or red and the non polarity lead is black (see the figure on the previous page). In the solid core CT, the secondary terminals are marked as X1 for the polarity terminal and X2 for the non polarity terminal. Sometimes, only X1 is marked, as shown in the figure below.



**NOTE:** For Rogowski coil CTs, wire the white (or red) leads to the integrator's HI side and the other leads (usually black) to the integrator's LO side.



### Suggested Best Practices for Documentation of the System Connections

- Make sure to document the CT ratios installed in the panel, e.g., 200:5A.
- Label the corresponding phase A, B, C wiring in the meter enclosures to avoid cross-phasing.
- Label and make sure to connect the correct polarity: “white +Ve” and “black -Ve” CT wire connection, matching phase A, B, B in the meter to avoid phase wire polarity swap.
- For the MP200™ metering system in enclosure, with 8 or 24 circuits, fill out the enclosure label that came with the unit, entering the CT/PT ratio, circuit name, IP address, Subnet mask, and gateway prior to meter commissioning. This requirement should be fulfilled by certified electrical contractors.

### References

For additional information, see the video posted at this link:

<https://www.youtube.com/watch?v=7zg07amf1Q4>