



Part B: Locating CT's for Earth Leakage protection on VSD's

One question which is discussed back and forth amongst suppliers, consultants and clients is;

- a) "Where are the CT's installed on a Variable Speed Drive – Input or output ?" and
- b) "Will the Earth Leakage relay see a fault on the motor when the CT is located on the input side of a variable speed drive?"

The Littelfuse Startco relays have been extensively tested in VSD applications by numerous parties including; clients, consultants and in the Littelfuse Startco R&D laboratory in Canada.

The simple answer to the above questions is;

- a) Either side – Input or Output.
- b) Yes, the Littelfuse Startco earth leakage relay will see a fault at the motor with the CT located on the input side of the VSD.

There is much more to be considered when selecting an earth leakage relay, appropriate CT and location, filtering adopted to suit the application, AS2081 compliance and settings – not to mention relay features, fail-safe, CT verify, 'Trip' latch / recall, warranty and so on.

In summary:

- a) The CT's can be located on the Input side of a VS drive.
- b) The CT's can be located on the Output side of a VS drive.

Based on the latest testing at Littelfuse Startco, the common-mode current (noise) is higher near the drive at the input and output of the VSD. This is because switching currents flow in the line-to-earth capacitance of the system on the input and output of the drive. Because of this, the trip settings in these locations will typically have to be set higher.

- c) The CT's can be located on the neutral of the transformer, either an N.E.R. system or solidly earth system.
- d) The CT's can be located on the MEN link.

Where possible locate CTs on neutral of the supply transformer or on the MEN link of the power system. This also avoids saturating the CT due to high common-mode start-up currents. This is not possible on multiple-drive systems and in this case you have no option but to locate CTs at input or output of the VSD.

Littelfuse has conducted and documented laboratory tests to confirm the SE-700 relays will operate on the input or output side of variable speed drives. A copy of this test report is available



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by contacting Startco Pty Ltd via return email and requesting a copy. Reference: Tech Aware 4 VSD Testing.