

Tech Talk from HVI: Circuit & Feature Explanations



Subject: Current Meter Guard/Ground Connections

When measuring leakage currents while using a hipot, there are two modes of operation: **Guard and Ground**. Depending on the objective of the test and the test specimen, one or the other should be chosen. In both cases, the high voltage output from the hipot connects to one end of the load and the other end of the load is connected to the Return wire, which connects back to the Return post on the hipot. A switch on the hipot selects whether the current meter will read all **leakage currents to ground (Ground Mode)** or only those **through the test object (Guard Mode)**, as long as Return side of the test object can be isolated from ground.

Ground Return Mode

When using the Ground mode, **all leakage currents to ground will run through the current meter**. This includes the internal leakage current within the high voltage power supply, the output cable, and any and all other leakage currents to ground.

Example: If testing the leakage current of a transformer's windings to the steel core, the tank & core would be grounded and the current measured will be everything from the windings to ground.

Example: If the bus within switchgear is to be tested, the HV output from the test set would attach to the bus and the return lead would come from the chassis of the switchgear. With this connection, all leakage currents from the bus to ground through all the insulating standoffs and to all other ground points would be measured.

Guard Return Mode

The Guard Return mode is used to measure the **leakage current through the test object only** and not any other stray leakage currents. This permits the accurate reading of leakage currents through only the insulation area desired. When using the Guard Return mode, so long as the low end of the load, **the return wire connection, is insulated from ground**, only the leakage currents through the load are sent through the current meter. Stray leakage currents to ground are not shown on the meter.

Example: If the insulation between two windings of a transformer is to be tested, one coil would attach to the high voltage output of the tester and the other coil would attach to the return wire. Leakage currents to the core of the transformer will not be shown on the current meter.

