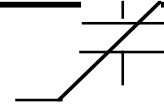


Connecting the Precision HVA and HVI to the Workstation or LC

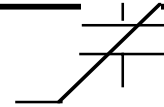
Radiant Technologies, Inc

September 22, 2004



Connections

- All Precision Materials testers have one or two COMM channels for controlling accessories.
 - High Voltage Interface (HVI)
 - 4KV
 - 10KV
 - High Voltage Amplifier (HVA) and ID Module
- Vision already knows how to talk to these Precision accessories. Once an accessory is connected to a COMM port on the Precision tester, Vision will recognize the accessory and allow it to be used in tests.

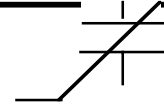


Connections

- Because the accessories are in separate enclosures, the signal lines must be connected between the test system and the accessories.
- One HVI can be connected to each COMM port.
 - One HVA can be connected to the Precision 4KV HVI
 - Two HVAs may be connected to the Precision 10KV HVI
 - The specific HVA to use in a test can be selected from the test menu.
- This document provides a pictorial description of how to connect the HVI and HVA to the Precision Tester.

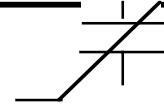
Connecting the Tester and HVI

- There are five signals that must go between the Precision Tester COMM port and the High Voltage Interface:
 - COMM
 - GND
 - DRIVE
 - RETURN
 - HV MONITOR



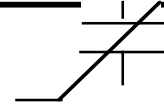
Tester to HVI

- COMM
 - The communications channel between the HVI and the tester. Also, the HVI will route communication requests to the HVA ID Module.
 - Vision will not allow a high voltage test to proceed if it cannot talk to the HVI and HVA being used. This is a safety procedure to ensure that the wrong voltage is not output by the test system.



Tester to HVI

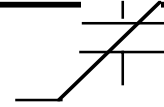
- GND
 - Earth Ground Connects the enclosures of the tester and the HVI together. The circuits for both systems are grounded to their enclosures and the enclosures in turn are connected to the earth ground pin of their respective
 - When a sample breaks down during a test, the HVI routes the current surge to its earth ground connection. the earth ground cable must be connected between the tester, the HVI, and the HVA during operation for the safety systems to function properly.



Tester to HVI

- **DRIVE** The low voltage drive signal from the tester is routed by the HVI to the input of the HVA.

- **RETURN** The return signal from the sample is routed by the HVI through protection circuits to the RETURN input of the tester.



Tester to HVI

- High Voltage Monitor (HV Monitor)

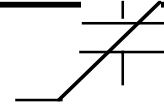
The HV Monitor signal is a deamplified version of the output of the HVA.

The HVI routes this signal from the HVA to the tester HV Monitor input. The tester uses this input to measure the output voltage of the HVA during a test.



Connecting the HVI and HVA

- There are five signals that must go between the Precision HVI and the High Voltage Amplifier:
 - COMM
 - GND (same as for HVI)
 - DRIVE (same as for HVI)
 - HV DRIVE
 - HV MONITOR (same as for HVI)
- All HVI connections to the HVA are in the back of the HVI. Most amplifiers have all of their connections on their back panel. A few have some connections on their front panel.

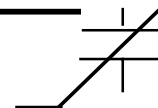


HVI to HVA

- **COMM** The HVA COMM connection is its ID Module. The ID Module carries the performance information of the HVA. Vision uses this information to formulate the measurement profile.

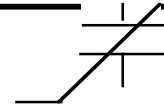
- **GND** It is very important for safety purposes to connect the enclosure ground of the high voltage amplifier to the that of the HVI and tester.

HVI to HVA



- HV DRIVE
 - As already stated, the low voltage DRIVE signal from the tester is routed by the HVI to the input of the HVA. The high voltage output from the HVA goes back to the HVI.
 - The HVI will connect the HVA output to the HV DRIVE connector on its front panel during a test.

HVI to HVA

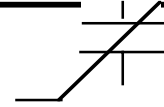


- HV MONITOR
 - On the Precision 4KV HVI, the HV Monitor of the HVA is always connected to the HV Monitor input of the tester.
 - On the Precision 10KV HVI, which has two HVA channels, Vision tells the HVI which HVA is being used and the HVI then routes the low voltage DRIVE signal to the input of the selected HVA and connects the HV Monitor signal from that HVA to the tester HV Monitor input.

HVI Operation

- Between tests when no task is operating, the HVI connects the HV DRIVE and HV RETURN connectors on the front panel to ground.
- At the start of a test, the HVI connects the HV DRIVE to the output of the selected high voltage amplifier and connects the HV RETURN to the low voltage RETURN input of the tester.

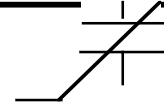
CAUTION: Whenever the "High Voltage Enabled" LED on the front panel of the HVI is turned on, the HV DRIVE connector of the HVI is connected directly to the output of the HVA!



What Happens During a Breakdown

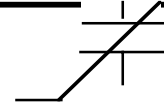
- The HV RETURN input has high current clipping diodes on it. If the sample shorts during a test, the excess current turns on the diodes and flows to the GND connection.
- If the short circuit lasts for more than 17ms;
 - the HVI disconnects the sample from the high voltage amplifier and the tester.
 - the HVI grounds both the HV DRIVE and HV RETURN inputs to the HVI.
 - The HVI turns off the “High Voltage Enabled” LED

Vision will automatically reset the HVI before the next test.



Tutorial

- Following this page is a pictorial description of the connections between the Precision tester, the HVI, and the HVA, and the ID Module.



Workstation and 10KV HVI

- The rear of the systems prior to connection