



DTM Instruments, LLC

High Voltage Design, Testing and Measurements

DRVT-1000 & DRVT-1100



High Voltage Leakage Current and Partial Discharge Tester

Designed specifically to test the insulation of electronic isolators, optocouplers and other electronic components.



- The DRVT-1000/DRVT-1100 produces fast, accurate and repeatable results, reduces test time and increases throughput.
- The DRVT-1000 can produce up to 10,000 V_{Peak} (7,070 V_{RMS}), 500 μ A_{Peak} alternating current at 50 or 60 Hertz (regardless of mains supply frequency).
- The DRVT-1100 can produce up to 15,000 V_{Peak} (10,600 V_{RMS}), 500 μ A_{Peak} alternating current at 50 or 60 Hertz (regardless of mains supply frequency).
- The DRVT-1000/DRVT-1100 is compliant with the Voltage Withstand, Leakage Current, and Partial Discharge tests as described in Standard IEC-60747-5-3 (1997, AMD 2002).
- The DRVT-1000/DRVT-1100 assures isolator devices are tested to conform to VDE 0884, IEC 60747, IEC 61010, UL 1577, CSA 60950-1, IEC 60950-1, and VDE 0805. Adjustments can also be made to meet other international standards,
- Voltage is not affected by harmonics in mains supply and is precisely controlled to within $\pm(0.5\%+5)$ Volt.
- Transient free voltage with adjustable up and down ramp reduces stress on isolator device under test.
- The leakage current measurement accuracy is better than (1% $\pm 0.3\mu$ A). Leakage currents of less than 0.3 μ A can be detected. Automatic current compensation eliminates the influence of unwanted stray currents.
- Partial Discharge levels as low as 0.1 pC can be detected.
- Up to 16 test set up profiles can be stored within the DRVT-1000/DRVT-1100 memory for fast preselected test set up. An unlimited number of test set up profiles can be downloaded from external PC via Serial Interface Port.
- The Serial Interface Port (RS-232) allows the DRVT-1000/DRVT-1100 to connect to an external PC for Remote Controlled Operation, recording of Test data for statistical analysis and down loading of test profiles.
- Five (5) output BNC ports allow external signal processing (via oscilloscope or PC) of PD Pulses, PD Level, PD Signal, Test Voltage and Test Current.



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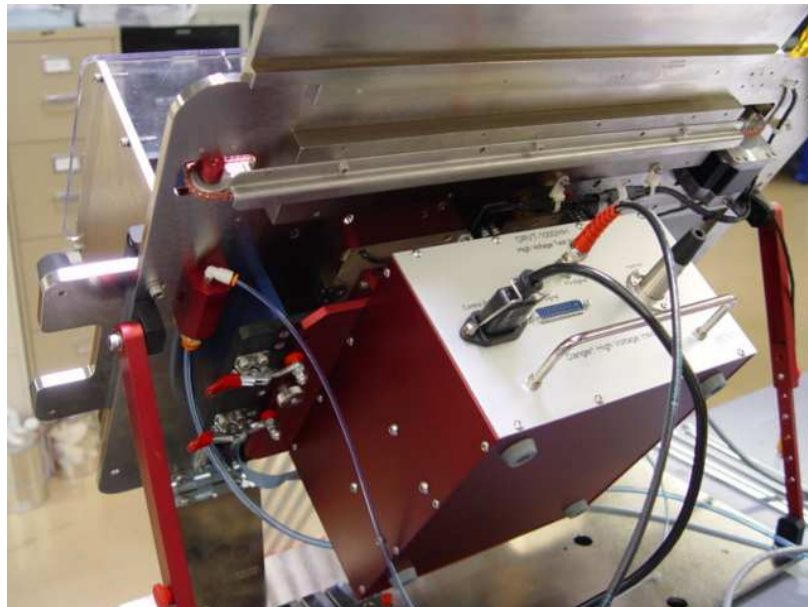
- Handler interface – custom designed to match each handler for safety, easy mounting, electrical and communications interfaces.
- DRVT-1000/DRVT-1100 is available in Production versions for high speed testing and Lab versions for R&D, prototype and life testing.
- Special custom configurations are also available, i.e. DRRA-1000 Resistance Test Adapter which connects and controls a Keithley 6517A High Resistance Meter



DRVT-1000/DRVT-1100 Production Testing



DRVT-1000 connected to Device Handler



Handler Mounting – Back View – HV Head



Features

Safety

Output Terminals are provided for two (2) hard wired external interlocks. The interlocks operate with 12V D.C.
Safety shut off is independent of PC or software response

Symmetric High Voltage Power Source

Symmetric Voltage is applied to the test object. For example for a 10kV test system, two 5kV voltages with opposite polarity are applied to the test object. This results in 10kV voltage stress over the test object, but only 5kV to ground which means less voltage clearance spacing requirements and less stress on test contacts and the handler. Compared to a single voltage to ground test, this improves reliability and service life of the entire system.

Electronic Power Source

The exciter voltage is created electronically, preventing the wear, transient spikes, and reliability problems caused by repeated switching of the exciter voltage.
The test voltage is precisely controlled. Voltage level and AC frequency are fully independent of the external AC power.

Over current limit

Current limits are built in to the power amplifier and the micro-controller. This insures the full voltage is applied to the test object independent of current draw.
Other methods using a current-limiting resistor have a voltage drop across the resistor resulting in a reduction of the actual test voltage applied to the test object. For example with a 100M Ω limiting resistor, a current of 10 μ A would result in a 1000V voltage reduction over the test object.

Built in arc detection and protection

The integrated arc detector circuit senses the voltage fluctuations associated with an arc over and switches off the power amplifier immediately. The power amplifier actively shorts and pulls the high-voltage transformer to ground, resulting in a very fast discharge of the stored energy. In less than 0.1 ms the high voltage source is discharged which prevents further arc damage to the test object.



High Voltage Mounting and Isolation

All High Voltage parts are isolated from the handler machine parts. The HV Test Head is custom designed to match each handler. DTM Instruments engineers work directly with the handler manufacturer to assure consistent design, easy mounting, safety, electrical and communications interfaces.

Power Supply

No external power conditioner is needed. Transient protection and noise filtering are included.

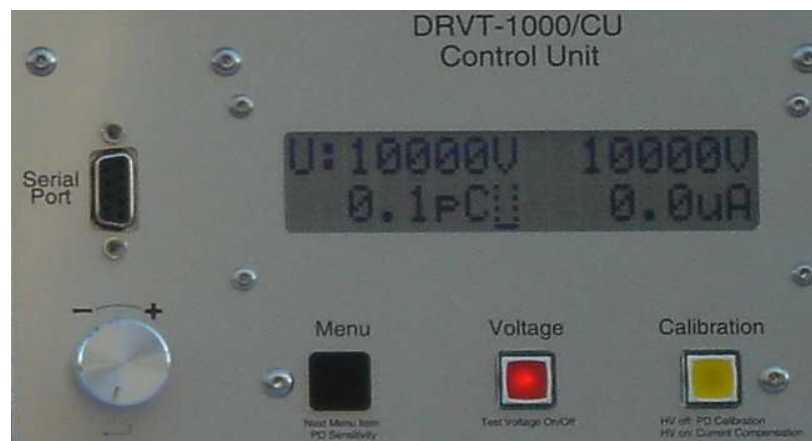
The DRVT-1000/DRVT-1100 Power supply is designed specifically for this application.

The test voltage is not affected by harmonics or flicker in the mains supply voltage.

The DRVT-1000/DRVT-1100 plugs into any convenient outlet and operates at 60 Hz or 50 Hz with input voltage of 110VAC or 230 VAC.

Controller

PC based controls with flexible software which can be modified to customer specific needs. Control settings can be Manually entered and adjusted via Digipot and Soft-keys. Test Sequences can be stored on the built-in EEPROM or downloaded from an external PC via the RS-232 port. Sixteen (16) different settings can be stored internally and recalled. All test parameters including Pass/Fail Levels for Hi-Pot Voltage, Ramp Time, maximum and minimum Leakage Current and Partial Discharge can be preset via RS-232 interface. Optionally, test results and actual test data can be transmitted to customer PC for statistical analysis.



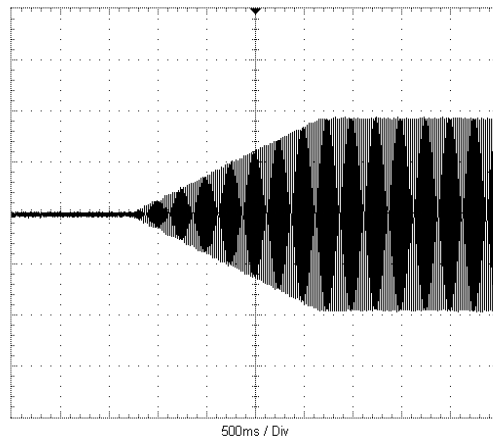
Digital Display and Communication Port



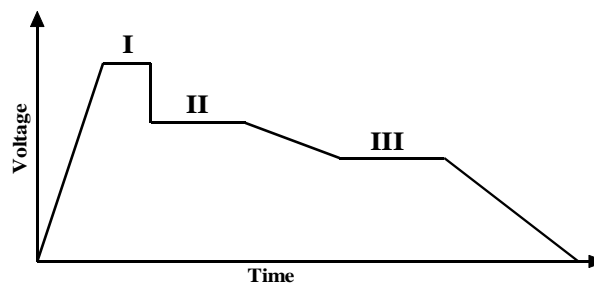
Voltage Control

The DRVT-1000/DRVT-1100 reaches test voltage from zero in a smooth and rapid action.

The voltage is free of any transients during the turn-on/ turn-off cycles and prevents unnecessary over stressing of the test object. The voltage ramp up (rate of rise) can be adjusted with easy commands.



Automatic test profiles can contain up to three (3) different voltage levels with different dwell times and rate of rise can be stored within the DRVT-1000/DRVT-1100 Controller or external PC.



Partial Discharge Calibration

A built-in calibrator allows fast and easy calibration of the partial discharge sensitivity.

An Automatic PD calibration is also performed during each test run.

The built-in calibrator can be verified and calibrated regularly with an external Certified Traceable Standard Calibrator.



Optional Configurations

- **DRVT-1004/DRVT-1104** Four Channel System
Increase test throughput to 4 devices per test cycle
- **DRVT-1000L/DRVT-1100L** Manual Adapter
Lab bench top configuration for manual operation
- **DRRA-1000** Resistance Test Adapter
Connects and controls a Keithley 6517A High Resistance Meter

Technical Data

DRVT-1000/DRVT-1100 Control Unit

- Dimensions: 380×533×184 mm (15" x 21" x 7.25")
- Weight: 15kg (33lbs)
- Mains Input Voltage: 115 / 230V (switchable), 50 – 60Hz, 2A
- PD detector sensitivity: better than 0.1pC
- PD accuracy: ± (5% + 0.2pC)
- Power Amplifier Output: 0 – 100V, 0.5A, 40 – 80 Hz

DRVT-1000/DRVT-1100 High Voltage Head

- Dimensions: 254×236×133 mm (10" x 9.3" x 5.25")
- Weight DRVT-1000/HVH: 5.4kg (12lbs)
- Output voltage DRVT-1000/HVH: 0 – 10,000 V_{Peak}, 0 – 7,070V_{RMS} symmetric to ground
- Weight DRVT-1000/HVH: 5.7kg (12.5lbs)
- Output voltage DRVT-1000/HVH: 0 – 15,000 V_{Peak}, 0 – 10,600V_{RMS} symmetric to ground
- Voltage accuracy: ± (0.5% + 5V)
- Output current: 0.5 mA, limited
- Current accuracy: ± (1% + 0.3µA)
- PD free operating voltage: 10,000V_{Peak}
- Calibrator range: 1 – 20pC



DRRA-1000 Resistance Test Adapter

- Dimensions: 254×236×76 mm (10" x 9.3" x 3.0")
- Weight: 2.85kg (6.25lbs)
- Test Voltage voltage: ±1,000V DC
- Nominal Protection Resistance: 200kΩ
- Maximum Resistance: > 1TΩ



DRVT 1000L Lab bench top configuration

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