

## DELTA-3000

# 10 kV Automated Insulation Dissipation Factor Test Set with "PowerDB OnBoard"



- **Integrated PowerDB software for automated control**
- **Analyze and trend data in field without the use of laptop**
- **Rugged, portable unit for field/shop use**
- **Designed to work in high interference switchyards**
- **Built-in capability for storing, printing and downloading test results**

### DESCRIPTION

The DELTA-3000 is a fully automatic 10 kV insulation dissipation factor test set designed for condition assessment of electrical insulation in high voltage apparatus such as transformers, bushings, circuit breakers, cables, lightning arresters and rotating machinery. In addition to performing insulation power factor tests, it can be used for measuring the excitation current of transformer windings.

The DELTA-3000 allows for direct data feed into PowerDB for automatically generating test reports. All data can be saved in an XML file with all historical data. If a user also has a full license of PowerDB, test sheets can be modified and downloaded to the instrument.

The unit's intuitive, easy-to-use interface allows the user to configure test sheets and pop-up test procedures. A QWERTY keyboard makes it simple for entering all nameplate and location information. USB drive support is also included in the unit with two exposed USB ports.

The test set is designed to provide an AC insulation diagnostic test. Measurements are performed automatically, and results are displayed on a full VGA color display. Measured quantities include voltage, current, power (loss), dissipation factor and capacitance. The operator has the option of correcting the current and loss readings to 2.5 kV or 10 kV equivalents. Information can be downloaded directly to a PC or printer. An optional 10 nF TTR capacitor in addition to two HV reference capacitors are also available.

The built-in tracking automatic interference suppression circuit ensures accurate and reliable test results under severe electrostatic and electromagnetic interference conditions. This feature allows the performance of test measurements in energized switchyards of up to 765 kV.

### FEATURES AND BENEFITS

- "PowerDB ONBOARD" software allows for automated control and the option of saving data in an XML file.
- QWERTY keyboard for quick information input.
- USB drive support for data download.
- Simplified operation eliminates the need for extensive software or hardware setups.
- Performs all standard ungrounded- and grounded-specimen tests, with or without a guard circuit.
- Utilizing the automatic suppression circuitry achieves high accuracy measurement under severe electrostatic and electromagnetic interference conditions.
- Two-piece design reduces size and weight of the system and provides easier transportation.
- Built-in self diagnostic and calibration check.
- Operator has the option of measuring either the power factor or dissipation factor ( $\tan \delta$ ).
- Open-ground detector ensures proper grounding before test.
- Interlock switches provide operator safety.

**SPECIFICATIONS**

**Input:** 120 V ±10%, 1φ, 60 Hz, 1440 VA

**Output:** 0 to 12 kV, continuously adjustable, 100 mA continuous, maximum 200 mA (15 minutes on, 15 minutes off, maximum 8 tests). The power supply capacity can be expanded to 4 Amps using the optional Resonating Inductor, catalog number 670600.

**Voltage and Current Accuracy**

(RMS) ±(1% of reading + 1 digit)

**Capacitance**

±(0.5% of reading + 2 pF) in UST mode  
±(0.5% of reading + 6 pF) in GST mode

**Measuring Ranges**

**Voltage:** 250 V to 12 kV, 10 V resolution. Minimum recommended voltage is 500 V

**Current:** 0 to 5 A, 1μA maximum resolution. The measurement can be corrected to either 2.5 kV or 10 kV equivalents.

**Capacitance:** 1 pF to 1.1 μF, 0.01 pF maximum resolution.

**Dissipation factor:** 0 to 90%, 0.01% maximum resolution.

**Watt-loss:** 0 to 2 kW, actual power, 0 to 100 kW when corrected to 10 kV equivalent. 0.1 mW maximum resolution. The measurement can be corrected to either 2.5 kV or 10 kV equivalents.

**Dissipation Factor:** ±(2% of reading + 0.05%)

**Watt-loss:** ±(2% of reading + 1mW)

**Test Frequency**

Same as line frequency

**Available Interference Suppression Methods**

- Operator selectable automatic forward/reverse measurement averaging.
- Operator selectable automatic tracking interference cancellation.

**Measurement**

The following test modes are available, using the blue and red measuring leads, and can be selected by the operator:

- UST: Ground Red, Measure Blue
- UST: Ground Blue, Measure Red
- UST: No Ground, Measure to both Red and Blue
- GST: No Guard
- GST: Guard Blue, Ground Red
- GST: Guard Red, Ground Blue
- GST: Guard Red, and Blue, No Grounding
- UST: Ungrounded Specimen Testing
- GST: Grounded Specimen Testing

**Safety Qualifications**

Meets the specifications of both the IEC-1010 and CE mark.  
Meets the shock/vibration requirements of ASTM D999.75 standard.

**Environment**

**Operating Temperature:** 32 to 122° F ( 0 to 50° C)  
**Storage Temperature:** -58 to +140° F (-50 to +60° C)

**Relative Humidity**

**Operating:** 0 to 90% non-condensing  
**Storage:** 0 to 95% non-condensing

**Dimensions**

**Control Unit**

16 H x 22 W x 16 D in. (406 H x 559 W x 406 D mm)

**High Voltage Unit**

16 H x 22 W x 16 D in. (406 H x 559 W x 406 D mm)

**Weight**

**Control Unit:** 74 lb (33kg)  
**High Voltage unit:** 63 lb (29 kg)  
**Cables:** 35 lb (16 kg)

**ORDERING INFORMATION**

Item [Qty]	Cat. No.	Item [Qty]	Cat. No.
<b>DELTA-3000</b>			
120 Vac, 60 Hz	673001	<b>Optional Accessories</b>	
120 Vac, 50 Hz	673001-44	HV TTR capacitor (10 nF, 10 kV)	36610
240 Vac, 60 Hz	673001-45	HV reference capacitor (100 pF, 10 kV)	36610-1
240 Vac, 50 Hz	673001-47	HV reference capacitor (1000 pF, 10 kV)	36610-2
<b>Included Accessories</b>		Carry case for capacitors	36610-CC
High voltage lead: 70 ft (21.4 m), double shielded	30012-5	Capacitor kit (TTR cap, 2 ref caps, carry case)	36610-KIT
Low voltage leads: 70 ft (21.4 m), shielded		Resonating inductor	670600
Color-coded Red	25572-1	Calibration standard	670500-1
Color-coded Blue	25572-2	Oil test cell	670511
Ground lead: 15 ft (4.6 m)	4702-7	Hot collar belts [3]	670505
120 volt Power cord: [1] 8 ft (2.5 m)	17032-4	Bushing tap connectors [2]	670506
240 volt Power cord: [1] 8 ft (2.5 m)	17032-2	Transit cases for cables (heavy-duty, foam-padded)	218744
Safety hand switch, Interlock #1: 70 ft (21.4 m)	34460-021	Transit cases for calibration standard (heavy-duty, foam-padded)	670635
Safety hand switch, Interlock #2: 8 ft (2.5 m)	34460-020	Bar code scanner	36528
Interconnect cables: For connecting the control and high voltage units, two 5 ft (1.5 m)	27978, 27979	High voltage lead, 25 ft (7.6 m)	30012-8
Heavy duty, foam transit case	35582	Accessory kit: mini bushing tap connectors [2], hot collar straps [3], temperature/humidity meter [1], .75" bushing tap connector [1], 1" bushing tap connector [1], "J" probe bushing tap connector [1], 3-ft non-insulating shorting lead [3], 6-ft non-insulating shorting lead [3]	670501
AC 120 V adapter	33841-2		
AC 230 V adapter	33841-3		
Instruction and application manual	AVTM673001		

**UK**  
Archcliffe Road, Dover  
CT17 9EN England  
T +44 (0) 1 304 502101  
F +44 (0) 1 304 207342  
UKsales@megger.com

**UNITED STATES**  
4271 Bronze Way  
Dallas, TX 75237-1019 USA  
T 1 800 723 2861 (USA only)  
T +1 214 333 3201  
F +1 214 331 7399  
USsales@megger.com

**OTHER TECHNICAL SALES OFFICES**  
Täby SWEDEN, Norristown USA,  
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