

DELTA-2000

10 kV Automated Insulation Power Factor Test Set



- Extremely easy to use, without any extensive hardware or software setup
- Designed to work in high interference switchyards of up to 765 kV
- Built-in capability for storing, printing and downloading test results
- Rugged and portable design for field and shop use

DESCRIPTION

The DELTA-2000 is a fully automatic 10 kV insulation power 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.

This set has been designed to provide a comprehensive AC insulation diagnostic test. Measurements are performed automatically by the DELTA-2000, and results are displayed on a large graphical LCD display. Measured quantities include voltage, current, power (loss), power factor and capacitance. The operator has the option of correcting the current and loss readings to their 2.5 kV or 10 kV equivalents.

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.

The operator has the option of storing the test results on the provided data key, or download directly to a PC or the included thermal printer. The data key has storage capacity for 127 sets of test results. Information stored on the data key can be easily retrieved on a PC using the provided software program and interface box.

In addition to performing insulation power factor tests, the DELTA-2000 can be used for measuring the excitation current of transformer windings.

FEATURES AND BENEFITS

- Fully automatic operation eliminates operator error and reduces testing time.
- Simplified operation procedure eliminates the need for extensive software or hardware setups.
- Performs all standard ungrounded-specimen tests (UST) and grounded-specimen tests (GST), 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.
- The 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.
- Built-in interface to the optional Resonating Inductor (Cat. No. 670600) to extend the capacitance measuring range to 1 μ F at 10 kV.
- Data key stores 127 sets of test results for retrieval and analysis. Stored results can be easily transferred to a PC using the provided interface box.

- RS-232 serial interface for downloading the test results to a PC.
- Includes a battery/line operated printer for a hard copy of the test results.
- Optional bar code wand and PC software for recording an alphanumeric test identification in the field.
- All test results are date and time stamped.
- Optional Oil Test Cell for testing insulating fluids up to 10 kV.
- Optional Calibration Standard verifies proper operation and accuracy of the test results.

SPECIFICATIONS**Input**

120 V \pm 10%, 1 ϕ , 60 Hz, 600 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.

Measuring Ranges**Voltage**

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

Current

0 to 5 Amps, 1 μ A maximum resolution. The measurement can be corrected to either 2.5 kV or 10 kV equivalents.

Capacitance

1 pF to 1.1 μ F, 0.01 pF maximum resolution.

Power Factor

0 to 90%, 0.01% max. 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.

Accuracy**Voltage**

(RMS) \pm (1% of reading + 1 digit)

Current

(RMS) \pm (1% of reading + 1 digit)



Data Keys with PC interface box and thermal printer.

Capacitance

\pm (0.5% of reading + 2 pF) in UST mode

\pm (0.5% of reading + 6 pF) in GST mode

Power Factor

\pm (2% of reading + 0.05%)

Watt-loss

\pm (2% of reading + 1mW)

Measurement

The following seven 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

Test Frequency

Same as line frequency

Interference Suppression

Available Suppression Methods

1. Operator selectable automatic forward/reverse measurement averaging.

2. Operator selectable automatic tracking interference cancellation.

Safety Qualifications

The test set meets the requirements of both the IEC-1010 and the CE mark specifications. The test set also meets the shock and vibration requirements of the ASTM D999.75 standard.

Environment**Temperature**

Operating: 32 to 122° F (0 to 50° C),

Storage: -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**

15 H x 22 W x 16 D in.

(381 H x 559 W x 406 D mm)

High Voltage Unit

15 H x 22 W x 16 D in.

(381 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)

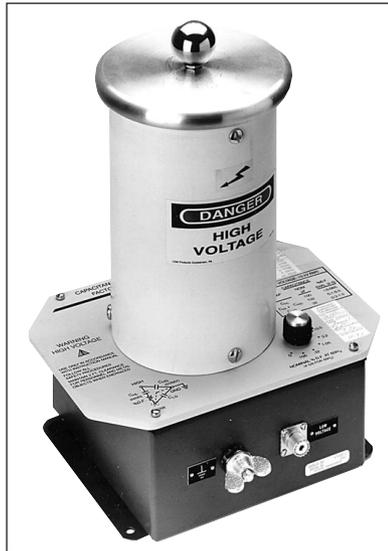


Optional bar code wand for recording an alphanumeric test identification.

OPTIONAL ACCESSORIES



The optional Oil Test Cell is used for testing insulating fluids up to 10 kV.



The optional Calibration Standard traceable to the NIST for quick operating or calibration checks of test set bridges calibrated in dissipation factor or in watts loss.



The optional Resonating Inductor expands the capacitance range of the DELTA 2000.

ORDERING INFORMATION

Item (Qty)	Cat. No.	Item (Qty)	Cat. No.
DELTA-2000, 10 kV Automated Insulation Test Set		Battery/line power serial thermal printer	33842
120 Vac, 60 Hz	672001	120 V	33841-2
120 Vac, 50 Hz	672001-44	230 V	33841-3
240 Vac, 60 Hz	672001-45	Data keys — two, complete with:	
240 Vac, 50 Hz	672001-47	One PC interface box	30603
		Interface box, 120 volt	30606
		Interface box, 240 volt	30606-1
		Download software	34706
		Instruction and application manual	AVTM672001
Included Accessories		Optional Accessories	
High voltage lead: 70 ft (21.4 m), double shielded, interchangeable hook or clip termination	30012-5	Resonating inductor	670600
Low voltage leads: 70 ft (21.4 m), shielded		Calibration standard	670500-1
Color-coded Red	25572-1	Oil test cell	670511
Color-coded Blue	25572-2	Hot collar belts [3]	670505
Ground lead: 15 ft (4.6 m)	4702-7	Bushing tap connectors [2]	670506
Power cord: one 8 ft (2.5 m)		Transit cases for cables (heavy-duty, foam-padded)	218744
120 volt	17032-4	Transit cases for calibration standard (heavy-duty, foam-padded)	670635
240 volt	17032-2	Bar code wand and software	34705
Safety hand switch		RS-232 cable	34675
Interlock #1: 70 ft (21.4 m)	34460-021	High voltage lead, 25 ft (7.6 m)	30012-8
Interlock #2: 8 ft (2.5 m)	34460-020		
Interconnect cables: For connecting the control and high voltage units, two 5 ft (1.5 m)	27978, 27979		
Carrying bag (for test leads)	34460-010		
Foam transit case: two, foam padded, heavy-duty cases for control and high voltage unit	34460-040		

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