



POWER ELECTRONICAL

High Voltage Dielectric Diagnostics



PE-AORDF-1

Fully Automatic Oil Resistivity & Dissipation Factor Tester

Oil suffers from electrical and mechanical stresses while a transformer is in operation. In addition there are contaminations caused due to chemical interactions with windings and other solid insulations, catalyzed by high operating temperature. As a result the original chemical properties of Transformer Oil changes gradually, rendering it ineffective for its intended purpose after extensive usage. Hence this oil has to be periodically tested to ascertain its basic electrical properties, and make sure it is suitable for further use, or be able to advise necessary filtration / regeneration to be done.

PE-AORDF-1 Fully Automatic Oil Resistivity & Tan-Delta tester is a 2-pc unit, consisting of Heater unit and Measuring Bridge. The Stainless Steel oil cell is to be mounted inside the Heater unit. Heater unit is separated from main unit, to avoid component derating and influence of temperature on measurements Measuring Bridge consists of AC/DC high voltage supply, Tera-ohm meter, and precision electronic bridges to measure & derive the readings for

Resistance
Resistivity
Capacitance
Power Factor
Tan-Delta
Watt-loss
Dielectric Constant
Temperature
Voltage
Frequency

Pre-programmed international test methods compliant to

ASTM-D924-04	ASTM-D1169	VDE-0380-2
IEC-60247	IEC-61620	BS-5737

Features

- Complete automatic test procedure. Once test voltage is selected, it applies excitation to the 3-terminal Oil cell, measures R, C, DF, F, V, and then displays and prints the results on integrated printer
- High Accuracy, Best resolution in its class
- Programmable AC & DC test voltages
- Pure Sine test operation for AC measurements and <0.1% ripple for DC measurements
- Heater interfaced with main unit for temperature set, control and display
- Multiple temperature set values programmable
- Measures cell constant automatically for Resistivity and Dielectric Constant
- SF6 Gas Capacitor integrated inside for std reference
- Big Touch-screen LCD 320 X 240 with white LED backlit for user convenience
- Integrated Thermal printer for immediate printing
- Pre-programmed 9 test sequences, and user-programmable 10 test sequences
- USB2.0 interface for PC
- PC software for control and display of test results
- On-site calibration possible for yearly schedule
- Optional Bluetooth/RS485/RF interface with user definable config, for Automated Laboratory setup

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Trust the experts!!

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Operation

The PE-AORDF-1 has been designed to be used in extreme atmospheric conditions and rough handling by experienced but unskilled persons. The user interface is either thro a touch panel graphical LCD, or thro the PC software. Parameters can be set on both sides, and display and printing of test results can too be done either side. The user has to either select from an array of pre-programmed test options including most international standards, or his own customized test sequence. He has to then load the Oil cell with Oil and put it in the heater compartment, connect the HV, LV and GND wires to the Oil test cell and the main equipment, and then press the Start Test button on the display. The user can then rest while the equipment controls the Heater to take it up to the programmed

elevated temperature and upon reaching that temperature, measures all the necessary readings. Exception is only in the case of measuring Dielectric Constant, whereby user has to first load a clean empty test cell, and then upon prompting by the equipment, reload it with an oil filled test cell. De-polarization is done automatically between AC and DC measurements to avoid faulty readings. The test results are then automatically stored in the internal memory with the unique ID that was allotted at the time of start of test. The synopsis of the test results is automatically printed on the integrated thermal printer. The user can anytime access the last 99 stored records on the internal non-volatile memory of AORDF-1 thro a PC, and print them on the local printer or store them for future reference

Safety

User safety has been given paramount importance while designing, followed by instrument safety. Integrated interlocks have been designed to make sure that despite connection errors, the automatic systems prevent the user and instrument from any hazards. Important safety features that have been incorporated are

- **Ground Open interlock.** The set will not function ahead unless a proper Gnd is provided to the instrument
- **Different pin configurations** on test leads and terminals for HV & LV connection, that cannot be mated together
- **Miniature Circuit Breaker** and ultra fast blow fuse (SIBA) installed to avoid accidental short-circuit
- **High-Voltage suppressor** and **line filters** integrated to avoid supply fluctuation
- Completely **shielded test leads**, tested with 1.5 times test voltage to avoid shock hazard to user
- **Automatic discharging** of test object (Oil cell) after test completion to avoid residual charge impact on user
- Heater incorporated with **Fire retardant** materials, and partitioned with main instrument to restrict damage

Specifications

Input

- Power Supply – Single Phase 220V AC 50 Hz + 10%
- Input pin type – Round 3-pin (L, N, E). European, Australian, US pin types available on request
- Measuring Bridge VA – max 500VA
- Heater VA – max 500VA

Heater

- Temperature Range – ambient to 120 deg C
- Temperature error – 1%
- Time to 90 deg C < 20 mins

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Test Voltage

- For Dielectric Constant & Tan-Delta
 - 100V to 2500V AC (in steps of 1V)
- For DC Resistivity
 - 100V to 1000V DC (up to 2500V available on request (in steps of 1V))
- Accuracy of Voltage setting
 - $\pm 2.5V$ max

Measured Parameters

- Tan Delta range
 - 0 % to 100 %
- Tan Delta resolution
 - 0.000001 (10^{-6})
- Tan Delta Accuracy
 - 1 % of reading + 10 digits

- Capacitance range
 - 0.1 pF to 2000 pF
- Capacitance resolution
 - 0.01 pF
- Capacitance Accuracy
 - 0.1 % of reading $\pm 0.1pF$

- Dielectric Constant range
 - 1 to 20 when using a typical test cell (C ~ 60-70pF)
- Dielectric Constant resolution
 - ± 0.1 %
- Dielectric Constant Accuracy
 - 0.001

- Resistance Range
 - 1 M Ω to 10 T Ω
- Resistance Resolution
 - 5 digits
- Resistance Accuracy
 - 2% of reading over entire range

- Resistivity Range
 - 1000 M Ω cm to 1000 T Ω cm
- Resistivity Resolution
 - 5 digits
- Resistivity Accuracy
 - 2% of reading over entire range

Atmospheric

- Storage Temp
 - minus 20 deg C to +60 deg C
- Operating Temp
 - minus 10 deg C to +50 deg C
- Humidity
 - < 90% non-condensing

Physical

- Size
 - 200mm(H) \times 375mm(W) \times 450mm(D)
- Gross Weight
 - 50kgs (incl accessories), except packing

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Standard Accessories

Test equipment – 1 no

Heater unit – 1 no

Stainless Steel Oil cell – 1 no

PT 100 RTD Temperature Sensor – 1 no

Printer roll – 1 no (already loaded), plus 1 spare roll

Connecting AC mains cable – 1 no

Connection test leads – 1 set

User manual – 1 no

Test certificate – 1 no

Warranty Certificate – 1no (Standard warranty 1 yr)

Note – Power Electronical reserves the right to change product specifications for continual improvement. Please order a fresh copy of specs from contact@powerelectronical.com, before placing new orders. Jurisdiction limits within territory of Republic of India only.

Our other Products are –

- Automatic Cap & Tan Delta test system 10kV / 12kV
- Manual C&DF test system 12kV
- Automatic Oil Breakdown Voltage Tester 80kV / 100kV
- Motorised Oil BDV set 0-100kV
- Hipot AC/DC Testers up to 500kV
- Insulation Testers (10M to 15T, 2% accuracy)
- High Voltage Breakdown testers (10kV-50kV)
- SF6 Gas filled Standard Capacitors (upto 1000kV)

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