

# AUTOMATIC TRANSFORMER WINDING RESISTANCE METER



ATWRM 25

The Eltel ATWRM-25 is a high current, digital direct reading Automatic Transformer Winding Resistance Meter. It is designed to measure the DC resistance of circuits associated with large Inductances. It is specifically designed to measure the resistances of highly inductive transformer windings very quickly and accurately. The operation of the instrument is micro-processor controlled and is fully automatic.

The ATWRM-25 test set can measure the winding resistance of any transformer- small or very large, distribution or power, single or Three Phase, star, delta or

zig-zag connected. There are four independent measuring channels which can be used to simultaneously measure the DC resistance of upto four windings at the same time.

The ATWRM-25 can also be used to measure motor winding resistances & for other low resistance test applications including the proper operation of On Load Tap Changers. It provides the user with many additional features for use during heat-run test. Being a fully automatic resistance measuring equipment there is no need to provide any polarity indication facility.

## FEATURES

- No resistance range selection is required.
- Wide range of test current-Three fixed ranges of 0.3-2.5A, 3-25A, 10mA to 80mA & dynamic range thus providing Continuously rated Current source over entire range.
- Direct digital reading, no conversion scales required
- True four - terminal measurement: no lead compensation required
- Inductive voltage kickback suppressed by instrument protection.
- Suitable for operation in energized switchyard conditions.
- Resistances of any four windings can be measured simultaneously
- Built-in automatic discharge circuit
- Data Storage facility - can store upto 100 readings (without graph).
- Built-in timer & graph facility for use during heat run test.
- Displays graph of measured Resistance Vs Time - for all four channels.
- Correction of resistance value to reference temperature.
- Indicates winding temperature based on reference resistance
- PC & Printer interface facility.
- Line power: no batteries required.
- Uses Switch mode technology - thus it is light weight and portable

## DESCRIPTION

The Eltel ATWRM-25 with its latest “ state of the art “ design is an unmatched high performance winding resistance test set providing fast measurements, wide continuous test current ranges, high accuracy and is ideally suited for low resistance measurements both in the laboratory and in HV switchyards.

**TEST CURRENT:** The ATWRM-25 has a highly stable, continuously rated current source .The Test Set has three fixed ranges of 80mA, 0.313 to 2.5amp, 3.13-25amp ranges for measurements.

The current supply unit with special control features is particularly useful when measuring Transformers with Delta connections which can be quickly saturated.This features is particularly useful for “Heat Run Test “ to comply with the required measurement time as specified in various standards.

### **VARYING TEST CURRENT CONDITIONS:**

The ATWRM-25 uses true ratiometric measurement technology where-in the unknown resistance can be measured at any required current .The test current may be set manually via the keyboard.

### **AUTOMATIC DISCHARGE PROTECTIONS:**

The advanced design technology of the ATWRM-25 provides a micro - processor controlled discharge circuitry. The discharge of the specimen is indicated on the front panel for operator safety

**FOUR CHANNELS:** The ATWRM-25 has four channels for measuring upto four unknown resistances, one channel for test current and two channel for external temperature input. Four Transformers Windings can be measured simultaneously and the values compared.

**RESISTANCE RANGE:** The ATWRM-25 provides resistance range of 0.1 Micro Ohm upto 1000 Ohms - auto ranged.The resistance ranges are autoranged internally so as to provide maximum resolution.

**DATA STORAGE FACILITY:** The instrument can store upto a maximum of 100 test results in the inbuilt EPROM memory.The stored results can be printed directly by USB printer port through dotmatrix printer.

**GRAPH FACILITY:** The ATWRM-25 plots a graph of measured Resistance Vs Time.The graph is plotted for all four measurement channels.The graph can be viewed on the front panel LCD display of the test set.

Such graphing is useful when measuring Transformer windings after a heat run when waiting for stability of readings of large delta connected transformers.

**BUILT IN TIMER:** The ATWRM-25 has a built in 24 hour timer (count up timer). This is ideal for use during heat run tests. The timer automatically starts as soon as the test procedure is initiated. At the time of print out of test results, the resistance values of each channel are indicated along with the appropriate time.

**TEMPERATURE MEASUREMENT:**

The ATWRM-25 provides correction of measured resistance values to a reference temperature. The test object temperature is measured using the provided temperature probe. The Instrument automatically calculates the resistance for the selected temperature (say 75 deg C).

Temperature correction can also be disabled from the front panel at which time it only displays the measured resistance & measured temperature.

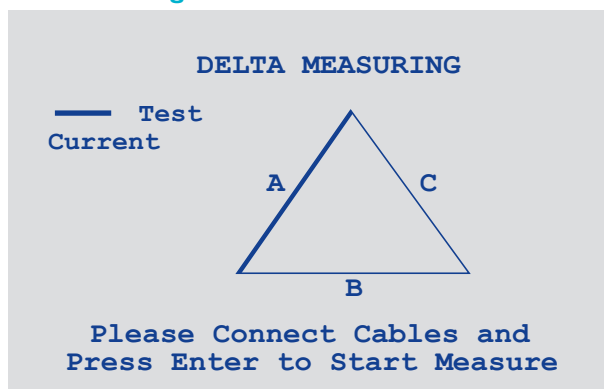
The ATWRM-25 also indicates winding temperature based on a reference resistance and reference temperature. For this both the reference values (benchmark values) have to be entered from the front panel keypad. (No need to connect the temperature probe). The Test Set Automatically calculates the winding temperature based on the measured resistance value.

**ERROR INDICATIONS:** The test set provides a specimen discharging indication on the LCD panel along with a long beep. When sum of voltage of all Inputs exceeds 8 volts - message will display to reduce current. USB Printer Port: Any 80 Column Printer can be connected directly to the test set. The test results can be printed out directly from the test set to a printer. No additional Software is necessary.

**AUTOMATIC DELTA RESISTANCE**

**CALCULATION:** The ATWRM-25 has the unique facility of providing directly the Resistance values of each arm of a delta connected network automatically. This simplifies the need for any manual calculations and conversions.

**Delta Winding Measurement**



**SPECIFICATIONS**

Current Supply Principle :	Advanced Switch Mode Power Supply with Automatic control circuitry
Open Circuit Voltage :	32V DC.
Test Current Ranges :	High current 25, 12.5, 6.25, 3.13 amp. Medium Current - 2.5, 1.25, 0.625, 0.313amp Low current- 80 mA nominal.
Resistance :	Four isolated independent, High Input impedance measuring channels
Range :	0.1µW to 1000 - auto ranged
Resolution :	0.03%
Accuracy :	± 0.5% of reading ± resolution of range selected for 0.1µW to 100W ±1% of reading for 100W to 1000W (80mA setting)
Reading rate :	One per second
Channels :	Four measurement channels for Resistance. External Temp. Sensor Input
Display :	240 by 128 dot matrix backlit LCD panel
Key Board :	20 Key Soft touch membrane key board

## SPECIFICATIONS

Computer Interface	: RS 232C Interface for PC control.
Printer Output	: USB parallel printer port
Temperature Probe	: 2 Semiconductor temperature sensor.
Temp. measurement Range	: -25°C to 100°C.
Accuracy of Temp. Measurement	: ± 1°C.
Front panel Indicators	: LED indication of current flow Power ON Indicator
Operating Temperature	: 0 to 50°C
Humidity	: Ambient to 90% Non-Condensing
Packed Weight ATWRM - 25	: Approx. 17 Kgs.
Cable Box	: Approx. 20 Kgs.
Dimensions (LxBxH)	: 530mm x 330mm x 210mm (821 ultra case )
Input supply	: 230V/110V ±10% , 50/60Hz, 800VA W



## STANDARD ACCESSORIES

- One set of current leads (25A rating) of 15 meter length
- Four sets of Potential leads each of 15 meter length
- One shorting lead of 5 meter length (25A rating)
- One Three - wire line power cord - 2 meter length
- One printer interfacing cable - 2 meter length
- One PC interfacing cable - 2 meter length
- One Operation Manual
- One Transport case with adequate packing
- One ground cable of 15 meter length

## OTHER PRODUCTS

- Automatic Transformer Ratio Meters.
- Digital Micro Ohm Meter with built in 100A DC Source.
- Manual & Automatic Transformer Winding Resistance & On Load Tap Changer Test Sets.
- Automatic 12kV & 5kV Capacitance & Tan Delta Test Sets.
- Automatic CT/VT Test Sets & Systems.
- Automatic Tan Delta & Resistivity Test Sets for Transformer Oil.
- Relaying Current Transformer Analyser.
- Digital Micro Ohm Meter with built in 100A DC Source.



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(Specifications subject to change without notice)