

AUTOMATIC TRANSFORMER WINDING RESISTANCE METER



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 offers a multitude of test currents over the range of 0.02.... 25 amperes and has a resistance measuring range from 0.1 micro ohms to 400 ohms with optimum resolution over the full range of measurement.

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

- * Fully automatic operation - Auto ranged; No resistance range selection is required.
- * Wide range of test current - Three fixed ranges of 0.02 A, 0.10 A, 0.5A ;
Continuously variable from 0.5A-25A-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
- * Incorporates facility for delta winding measurement & calculations.
- * Protected against current lead disconnection while in use.
- * Data Storage facility - can store upto 45 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.
- * Indicated 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 0.02A, 0.10A, 0.5A and a continuously variable current range from 0.5A upto 25A thereby providing several current 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 or automatically by the instrument.

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 one 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 0.1u Ohm upto 400 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 46 test results in the inbuilt EPROM memory. The stored results can be recalled either for printing or for transfer to an IBM compatible PC through the Windows Interface Software and RS232 port.

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.

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. Provision is also available for transferring the graph co-ordinates to an IBM Compatible PC using the Software provided with the instrument .

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

Using the Windows Analysis Software (Optional Accessory) one can further analyse the Test data by comparing each channel graph with the other three, provide temperature correction for Aluminum and Copper, compare readings with previous values etc. Full control of the test set via PC is also provided. The graph can be printed using the Windows Analysis software after it is transferred to a PC.

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 °C) .

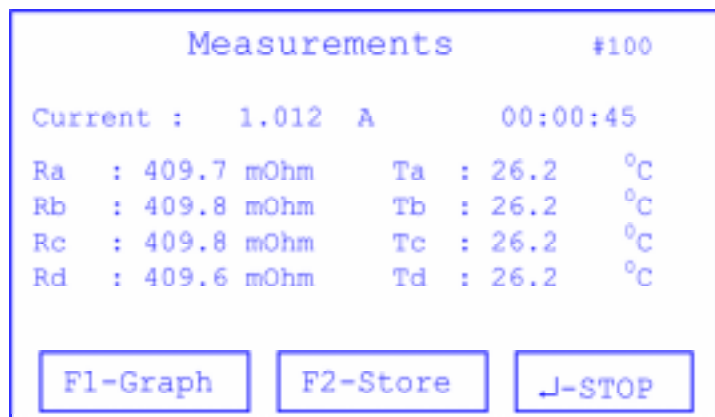
Temperature correction can also be disabled from the front panel at which time it only displays the measured resistance & measured temperature.

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.

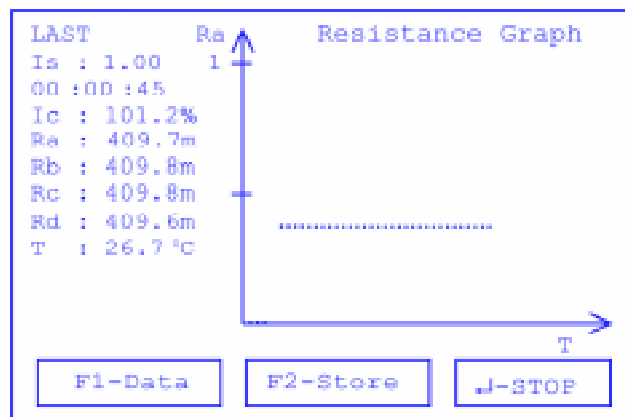
Error Indications: The test set provides a specimen discharging indication on the LCD panel along with a long beep. Error messages are also displayed when Current lead disconnected or opened; when sum of voltage of all Inputs exceeds 8 volts -to reduce current .

RS 232 Interface: The ATWRM-25 has an RS 232 interface to be connected to IBM Compatible PC. Using the Analysis Software full control through PC can also be provided.

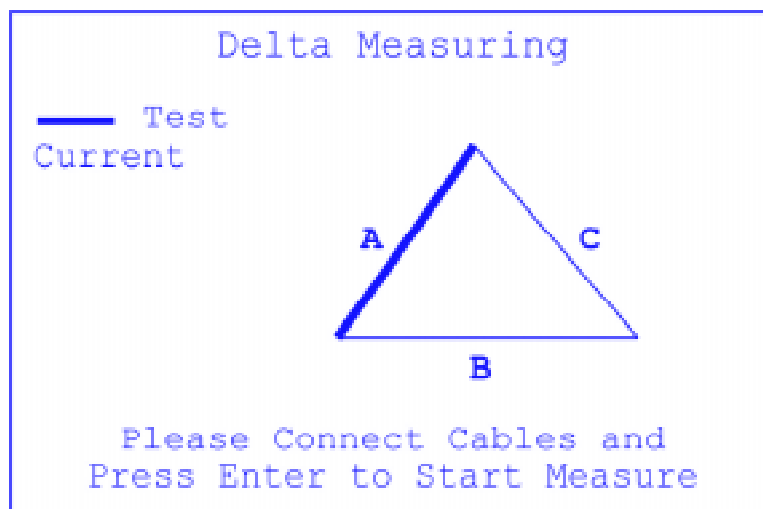
Centronix Parallel Port: Any 80 Column Printer can be connected directly to the test set . The test results can be printed out directly from the test set to a printer. No additional Software is necessary.



Sample Measurements Screen



Graph Format



Delta Winding Measurement

Specifications

- ✘ Current Supply Principle : Advanced Switch Mode Power Supply with Automatic control circuitry
- ✘ Open Circuit Voltage : 32V DC.
- ✘ Test Current Ranges : Continuous rated current source.
Three fixed current ranges 0.02, 0.10 and 0.5A
Continuously variable from 0.5A upto 25A
- ✘ Resistance Range : Four isolated independent , High Input impedance measuring channels
Resolution : 0.1 $\mu\Omega$ to 400 Ω -auto ranged
Accuracy : 0.03%
Reading rate : \pm 0.3% of reading
Channels : One per second
: Four measurement channels for Resistance One channel for test current & one channel for External Temp. Input
- ✘ Display : 240 by 128 dot matrix backlit LCD panel
- ✘ Key Board : 20 Key Soft touch membrane key board
- ✘ Computer Interface : RS 232C Interface for PC control.
- ✘ Printer Output : Centronix paralled printer port
- ✘ Temperature Probe : Semiconductor temperature sensor with magnetic attachment.
Temp. measurement range Accuracy of Temp. : -25 $^{\circ}\text{C}$ to 100 $^{\circ}\text{C}$.
Measurement : \pm 1 $^{\circ}\text{C}$.
- ✘ Front panel Indicators : LED indication of current flow Power ON Indicator
- ✘ Error messages : Specimen discharging Sum of all Inputs exceeding 8 V
- ✘ Operating Temperature : 0 to 50 $^{\circ}\text{C}$
- ✘ Humidity : Ambient to 90% Non-Condensing
- ✘ Weight : Test set Approx. 13 Kgs
- ✘ Dimensions (LxHxB) : 450mm x 200mm x 250mm
- ✘ Input supply : 110 - 260V \pm 10% , 50/60Hz, 200VA

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
- ✘ One Three - wire line power chord - 2 meter length
- ✘ One printer interfacing cable - 2 meter length
- ✘ One PC interfacing cable - 2 meter length
- ✘ One Operation Manual
- ✘ Data Transfer Software
- ✘ One Transport case with adequate packing

Reptame Equipment Inc.
www.reptame.com
(905) 936-6979

Optional Accessory - Windows based Analysis Software

OTHER PRODUCTS

- * Manual & Automatic Transformer Ratio Meters.
- * Digital Micro Ohm Meters. with built in 100Amp source.
- * Manual & Automatic Transformer Winding Resistance & On Load Tap Changer Test sets.
- * Automatic CT/PT Test sets & Systems
- * Automatic & Semi Automatic HV Capacitance & Tan Delta Test sets, 10 kV Oil Test Cell.
- * Manual & Automatic Tan Delta & Resistivity Test sets for Transformer Oil, Solid Test Cell.
- * Portable LV Manual & Automatic Capacitance and Tan Delta Test sets.

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