

HOT WINDING RESISTANCE MEASUREMENT SYSTEMS

Models HOT-15 and HOT-30



The ED&D Hot Winding Resistance Measurement System is the industry-standard device that automates and simplifies the task of measuring the operating temperatures of transformer windings. The “rise of resistance” measurement is specified by UL, CSA, EN, IEC and other safety standards as the preferred method for establishing winding temperatures, since the result is an average temperature over the entire winding instead of a spot temperature as provided by a thermocouple.

The ED&D Hot Winding Resistance Tester takes out all of the tedious manual readings and calculations previously needed to perform this method of temperature measurement. It also has **8 channels** and can be connected to a second unit for a **16-channel** test capability! This feature packed device pays for itself in time savings alone. Competitive units are single channel only, and require purchase of numerous “optional” devices to even come close to our solution! This unit is being used by NRTL’s such as UL, CSA, TUV, ETL and MET Laboratories. It’s the only such device that is UL validated.

The **Windows** based software guides the operator through each stage of the measurement process, while collecting and analyzing all the relevant data. At the end of the test, the program can create a report suitable for submission, and/or generate a spreadsheet file containing all the raw data for more detailed engineering analyses.

Annex E (normative)

Temperature rise of a winding

(see 1.4.13)

The value of the temperature rise of a winding is calculated from the formula:

for a copper winding
$$\Delta t = \frac{R_2 - R_1}{R_1} (234,5 + t_1) - (t_2 - t_1)$$

for an aluminium winding
$$\Delta t = \frac{R_2 - R_1}{R_1} (225 + t_1) - (t_2 - t_1)$$

where

Δt is the temperature rise, in kelvins;

R_1 is the resistance of the winding at the beginning of the test, in ohms;

R_2 is the resistance of the winding at the end of the test, in ohms;

t_1 is the room temperature at the beginning of the test, in degrees Celsius;

t_2 is the room temperature at the end of the test, in degrees Celsius.

At the beginning of the test, the windings are at room temperature.

It is recommended that the resistance of windings at the end of the test be determined by taking resistance measurements as soon as possible after switching off, and then at short intervals so that a curve of resistance against time can be plotted for ascertaining the resistance at the instant of switching off.

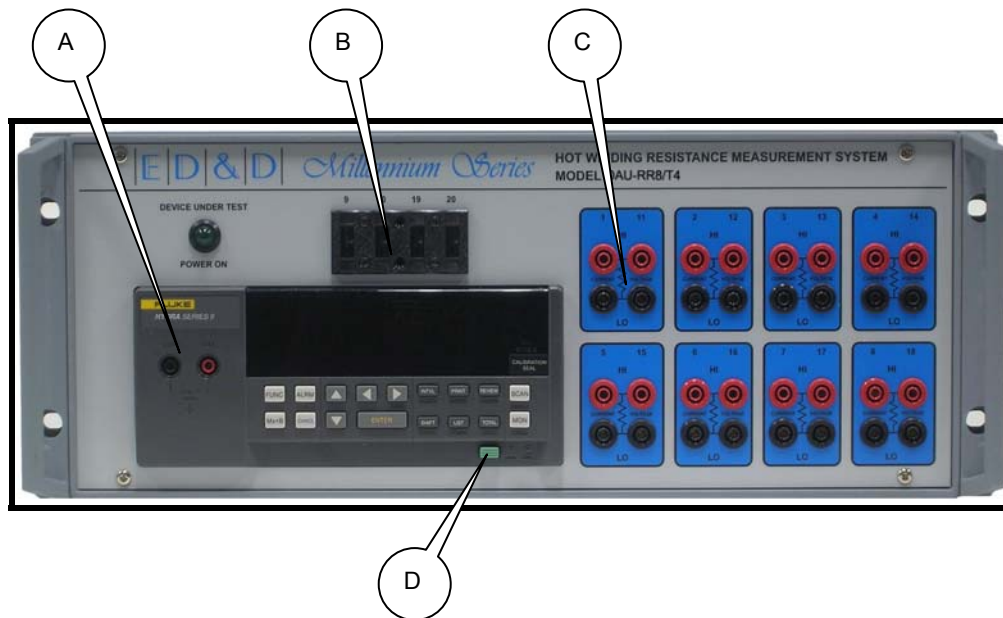
For comparison of winding temperatures determined by the resistance method of this annex with the temperature limits of Table 4B, 25 °C shall be added to the calculated temperature rise.

This is the method ED&D utilizes, as this is the required method. Interestingly, this is not the method our competitors utilize.

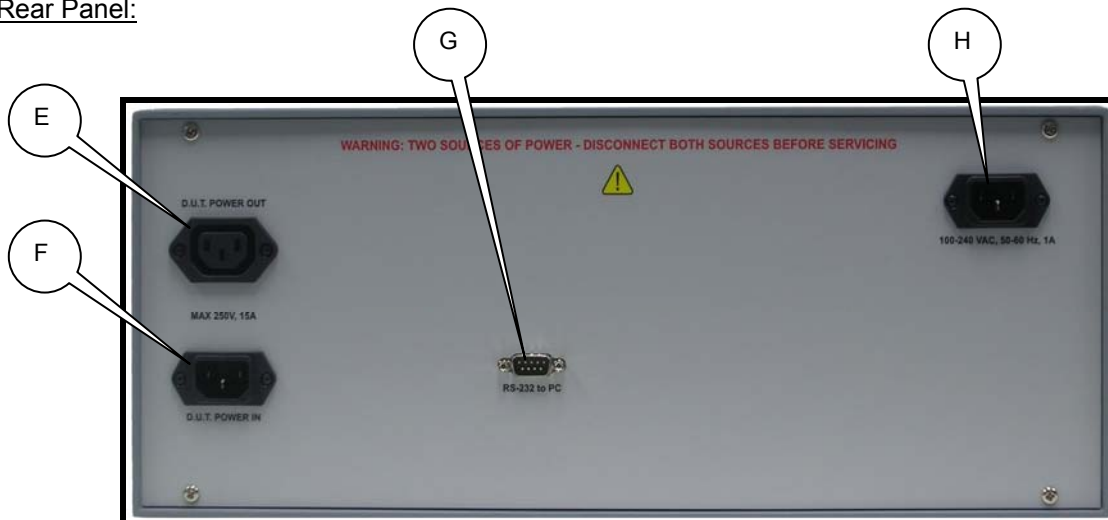
SYSTEM COMPONENTS:

- A. Fluke Data Acquisition Unit – controlled by included ED&D “Rise of Resistance Measurement System v1.31” software
- B. Thermocouple Inputs – channels 9, 10, 19, 20; channel 9 is reserved for ambient only
- C. Resistance Inputs – channel 1/11; dual banana jacks are inserted horizontally with the GND tab to the right
- D. Power Button – green button; depressed = on, raised = off
- E. D.U.T. Power Out – device under test power out software controlled
- F. D.U.T. Power In – device under test power in
- G. RS-232 to PC – DB9 connection to computer
- H. Main Power In – power to meter and system components

Front Panel:

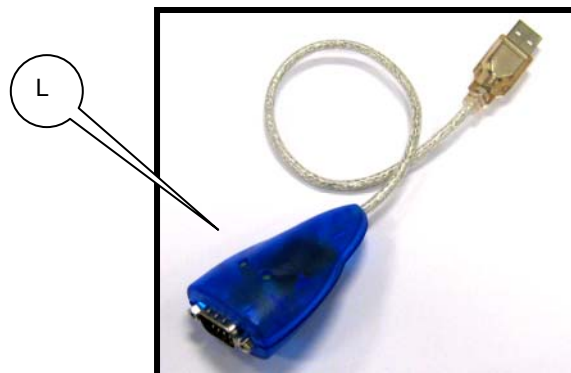
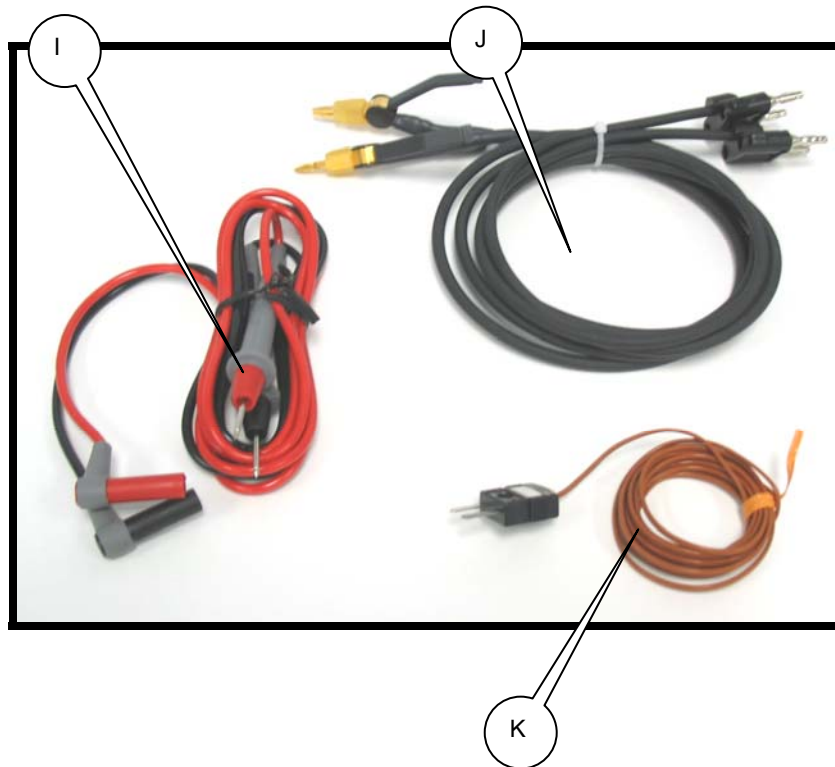


Rear Panel:



System Components – Included Accessories

- I. Test lead set (1)
- J. 4-wire Kelvin lead sets (8) – 1.2 m long ea.
- K. Thermocouple patch cables (4) – J Type, 2 m long ea.
- L. RS232 to USB Converter (1)
- M. Rise of Resistance Software – CD-ROM v1.31 (not pictured)





PRODUCT SAFETY SOLUTIONS



PRODUCT SPECIFICATIONS:

Mains Electrical Ratings:	90 – 264 VAC, 50 – 60 Hz, 10W
Mains Electrical Configuration:	2 Wire + Ground (Earth)
Power Connection:	Power supply cord with integral plug
D.U.T. Power Control Electrical Ratings:	Max 250 VAC, 15A
Operating Environment:	28 to 40°C, <=75% RH
Overall Dimensions:	16 in.Dx 19 in.W x 7.25 in.H (40.6x48.3x18.4 cm)
Overall Weight:	22 lbs. (10 Kg)
Test Voltage Range:	90mV to 300V dc or ac rms (channels 0,1,11); 90mV to 150V dc or ac rms (all other channels) IEC Overvoltage Category II
Resistance Range:	300Ω to 10 MΩ
Thermocouple Type:	ANSI/IEC Type J
Thermocouple Range:	-100 to 760°C

MINIMUM PC HARDWARE REQUIREMENTS:

Intel: 600MHz or higher Celeron, Pentium III/IV or Core Duo
AMD: Athalon XP 1700 or higher, or Athalon-64

256MB Ram
1024 x 768 Screen Resolution, 256 colors
50MB free disk space
Windows 98, NT4, 2000, or XP
RS232 Serial Port or USB



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