

WRM-10P

Transformer Resistance Meter



Vanguard Instruments Company

www.vanguard-instruments.com

Accurately



WRM-10P™

Fast and Accurate Measurements

The WRM-10P is designed to accurately measure the winding resistance of highly inductive power transformers. The unit's dual resistance-reading input channels can measure two winding resistances simultaneously, and four-wire (Kelvin) connections provide high accuracy and require no lead compensation. The WRM-10P provides stable resistance readings of very large transformers by utilizing a 36Vdc power supply capable of outputting up to 10 Amperes. The resistance reading of a 100MVA transformer can be achieved in 5 minutes or less. The unit's power supply is cooled by heavy-duty fans designed for continuous operation. For greater flexibility in the field, the WRM-10P comes with a built-in 2.5-inch wide thermal printer used for printing test reports.

Since the WRM-10P can accurately measure resistances ranging from 1 micro-ohm to 2,000 ohms, it can also be used to measure EHV circuit-breaker contact resistance, motor winding resistance, or any low resistance. If the transformer winding temperature is entered, the WRM-10P can calculate the equivalent resistance value of the winding material (aluminum or copper) at any standard reference temperature. Also, a special test mode can run a test for up to 45 minutes while saving resistance readings at one-minute intervals. In addition to measuring the resistance value, the WRM-10P also checks the "make-before-break" tap-switching sequences of voltage regulators and load tap changers.

The WRM-10P can store test results in Flash EEPROM. Test results can be printed on the built-in 2.5-inch wide thermal printer or can be transferred to a PC via the RS-232C interface port.

The WRM-10P is furnished with three 50-foot test cables. Each test cable lead is terminated with a quick-disconnect test clip.

Built-in Safety Features

At the end of each test, the WRM-10P automatically dissipates the stored energy in the transformer. This discharge circuit will continue to work even if the supply voltage is lost. For added safety, the unit's power supply is thermally protected from over-load damage.

User Interface

The WRM-10P features a back-lit LCD screen (20 characters by 4 lines) that is viewable in both bright sunlight and low-light levels. A rugged, alpha-numeric, membrane keypad is used to control the unit.

Internal Test Record Storage

The WRM-10P can store 63 test records (up to 48 readings per test record) in Flash EEPROM. Test records can be retrieved and printed on the built-in thermal printer or can be transferred to a PC via the RS-232C interface port. A Windows® XP/Vista-based software application is provided with each WRM-10P. This software can be used to retrieve test records from the WRM-10P and can also be used to export records in Microsoft® Excel format.

SPECIFICATIONS

TYPE	Portable transformer winding resistance meter
PHYSICAL SPECIFICATIONS	16.8"W x 12.6"H x 10.6"D (42.6 cm x 32.0 cm x 26.9 cm); Weight: 27 lbs (12.2 kg)
INPUT POWER	100 – 120 Vac or 200 – 240 Vac (factory pre-set), 50/60 Hz
RESISTANCE READING RANGE	1 micro-ohm – 2,000 ohms
ACCURACY	1 – 19,999 micro-ohms: $\pm 0.5\%$ reading, ± 1 count; 20 – 999 milli-ohms: $\pm 1\%$ reading, ± 1 count; 1 – 2,000 ohms: $\pm 1.5\%$ reading, ± 1 count
TEST VOLTAGE	36 Vdc max
TEST CURRENT RANGE	Auto range, 10 Amperes max
DISPLAY	Back-lit LCD Screen (20 characters by 4 lines); viewable in bright sunlight and low-light levels
PRINTER	2.5-inch wide built-in thermal printer
KEYPAD	Rugged membrane keypad (10 alpha-numeric keys, 6 function keys)
INTERNAL TEST RECORD STORAGE	Stores 63 test records of 48 readings each
COMPUTER INTERFACE	One RS-232C (19,200 Baud) port
PC SOFTWARE	Windows® XP/Vista-based software is included with purchase price
SAFETY	Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
ENVIRONMENT	Operating: -10°C to 50°C (15°F to $+122^{\circ}\text{F}$); Storage: -30°C to 70°C (-22°F to $+158^{\circ}\text{F}$)
CABLES	Three 50-foot test cables, ground cable, power cord and cable bag
OPTIONS	Transportation case
WARRANTY	One year on parts and labor

Note: The above specifications are valid at nominal voltage and ambient temperature of $+25^{\circ}\text{C}$ ($+77^{\circ}\text{F}$). Specifications are subject to change without notice.

Lightweight Winding Resistance Meter

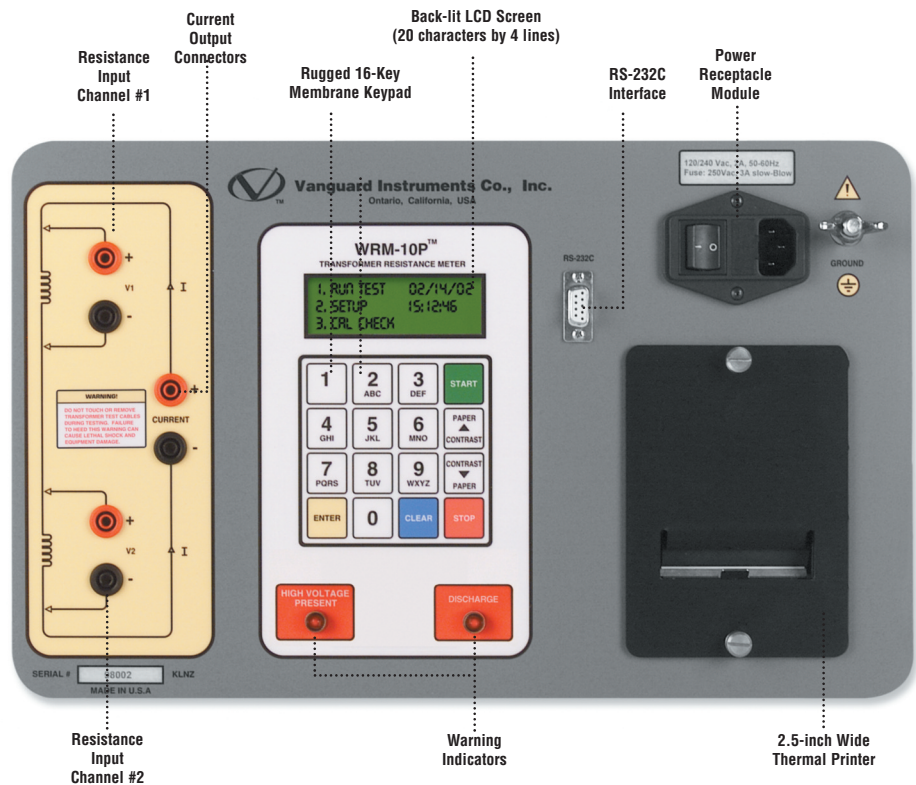
Measure Winding Resistances of Highly Inductive Power Transformers

Thermal Printer Output

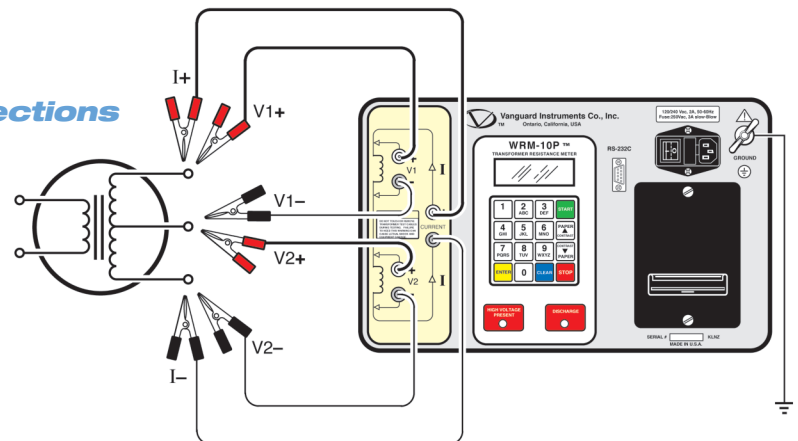
REC NUMBER 3	
TEST RESULTS	
DATE: 01/21/05	TIME: 14:55:09
COMPANY: NPC	
STATION: WSH	
CIRCUIT: BNKS	
MFR: EFACEC	
MODEL: C13968	
S/N: C13968	
KVA RATING: 138 13	
OPERATOR: AG	
EQUIVALENT RESISTANCE DATA	
MEAS TEMP $T_m = 20.5C$	68.9F
REF TEMP $T_s = 85.0C$	185.0F
COPPER WINDINGS, $T_K = 234.5C$	
$R_s = R_{meas} \times [(T_s + T_K) / (T_m + T_K)]$	
All temps for eqn are in deg C	
V1 & V2 TEST	
R1 = 60.393 MILLI-OHMS	
R1s = 75.67 MILLI-OHMS	
R2 = 60.377 MILLI-OHMS	
R2s = 75.65 MILLI-OHMS	
TAP/WINDING: _____	
V1 & V2 TEST	
R1 = 60.430 MILLI-OHMS	
R1s = 75.71 MILLI-OHMS	
R2 = 60.395 MILLI-OHMS	
R2s = 75.67 MILLI-OHMS	
TAP/WINDING: _____	

FEATURES

- Auto discharge circuit for operator safety
- Auto current ranging from 10 mA to 10 Amperes
- Digital resistance reading from 1 micro-ohm to 2,000 Ohms
- Calculates equivalent resistance value at reference temperature
- Stores 63 records (of 48 readings each)
- Built-in 2.5-inch wide thermal printer
- Weighs 27 lbs (12.2 Kg)



Connections



Ordering Information

WRM-10P™ Winding Resistance Meter

WRM-10P™, Cable, Software
Part No: WRM-10P

WRM-10P™ Shipping Case
Part No: WRM-10P Case

50-ft Test Cable
Part No: WRM Test Cable

2.5-inch Printer Paper
Part No: Paper TP3

Vanguard Instruments Company, Inc.

Vanguard Instruments Co., (VIC), was founded in 1991. Currently, our 28,000 square-foot facility houses Administration, Design & Engineering, and Manufacturing operations. From its inception, VIC's vision was, and is to develop and manufacture innovative test equipment for use in testing substation EHV circuit breakers and other electrical apparatus.

The first VIC product was a computerized circuit-breaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuit-breaker test equipment. Since its beginning, VIC's product line has expanded to include microcomputer-based, precision micro-ohmmeters, single and three-phase transformer winding turns-ratio testers, winding-resistance meters, transformer tap-changing controllers, megaohm resistance meters, and a variety of other electrical utility maintenance support products.

VIC's performance-oriented products are well suited for the utility industry. They are rugged, reliable, accurate, user friendly, and most are computer controlled. Computer control, with innovative programming, provides many automated testing functions. VIC's instruments eliminate tedious and time-consuming operations, while providing fast, complex, test-result calculations. Errors are reduced and the need to memorize long sequences of procedural steps is eliminated. Every VIC instrument is competitively priced and is covered by a liberal warranty.



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