Model AWRMS™ 50 Automated Winding Resistance & Ratio Measurement System

- Computer Controlled Test System for 3 & 1 Phase Power Transformers & Reactors
- Winding Resistance, Turns Ratio, Phase Shift, Excitation Current, & Heat Run Tests
- Accurate Liquid & Surface Temperature Measurement (20 Channels of 4 Wire) & Moniyoring
- Unmatched Speed, Range, & Accuracy and 4 Wire Measurements for all Tests
- Heavy Duty & Safe Discharge Circuit
- Includes Two 3 kW DC Power Supplies, Two 6½ Digit DMMs, & an Industrial PC System with Interfaces
- User Friendly Software with Auto & Manual Modes
- Meets all International Standards

MODEL INFORMATION

GENERAL INFO. & MAIN BENEFITS

The demand for electric power and the cost of production are growing every year. Hence, there are ever increasing need to measure and reduce the losses as much as possible in the production, distribution, and usage machineries. The cost of accidents, tripping, transportation, repair, and downtime losses are very huge compared to the cost of initial testing and regular maintenance using a muti-parameter test system like our Automated Winding Resistance and Ratio Measurement System (**AWRMS™**).

Though this system can be used for post testing a unit-under-test (UUT) after a failure, it is wise to buy and use the system for pre-testing to detect catastrophic failures before they occur!

Thus, the AWRMS™ 50 is a "predictive maintenance test system". It very much reduces the nonprogrammed shutdowns and associated costs. It helps to improve the maintenance of the units and their testdata. The AWRMS™ 50 is a very versatile, most accurate, best performing, low cost system on the market, today!

INDUSTRY APPLICATIONS

The AWRMS™ system is primarily used for:

- Transformer and Rotating Machinery Manufacturers,
- Power Utilities,
- Electric Contractors,
- Govt. and Private Labs, and
- Service or Maintenance Companies.

SYSTEM APPLICATIONS:
The AWRMS™ 50 is capable of the testing both the three-phase (Y-Wye, Δ-Delta, or Mixed) and the single-phase power subsystems [(VA to MVA); (fractional HP to kHP or W to MW)]:

- Power and Distribution Transformers [(PTs& DTs) with / without onload tap changer (OLTC)].
- Voltage and Current Instrument Transformers (VTs & CTs).
- Autotransformers (ATs) and Variable Transformers.
- Electric Motors, Generators, and Reactors.
- Busbar Contacts & Joints and Bushings.
- Power Cables, Relays, and Circuit Breakers.

DESCRIPTION

The AWRMS™ 50 can be used standalone or in conjunction with the MIL's series of AccuLoss™ Loss Measurement Systems. This system is capable of performing all measurements in one set-up and in accordance to the IEEE and other International Standards (ANSI, IEC, NEMA, & VDE). It is based on the most recent developments in the Power Switching Technology. Built into a tough steel enclosure on heavy-duty castors, the system can be moved about easily. Long, current-, potential-, and temperature- measurement cables (10, 10, & 15m) are supplied. A flashing red warning light at the top of the system indicates that the system is in use.

Seven current cables (3 each for the high and low side and 1 for the high side neutral) and eight potential cables (4 each for the high and low side including the neutral) are available for connection to a three phase transformer (usage of the neutral cables are optional). Single phase transformers require only four current cables (2 from each side). Current and potential cables have clamps (insulated & color coded for each phase) for easy clipping to the poles of a transformer (UUT).

The same cables are used for both the winding- resistance and ratio measurements. Current and voltage are selected on the two power supplies automatically.

AWRMS™ FEATURES

Measurement Capabilities:
Source compliance of up to 60 VDC @ 50A (continuously variable) is used for cold resistance measurements.

The hot resistance is automatically temperature compensated for copper and aluminum windings (using a standard or customized reference temperature). AC voltage is used for VT ratio excitation current, phase shift, and CT ratio (on primary bushings) measurements.

System Accuracy:
4-Wire Measurement Technique allows the use of long measurement leads without sacrificing accuracy. All the measurements are made very accurately (See the System Specifications at the end).

Operating Convenience:
The system is computer controlled and fully automated for all the measurements. It requires no manual intervention when operating in the Automode.

Exceptional Reliability:
The components used in the AWRMS™ 50 are of the highest quality, and designed and manufactured for a rugged environment.

Software:
The AWRMS™ 50 Software provided with the system is written in LabVIEW™. The test results are output in a atabular format and an ASCII file for easy import to spreadsheets.

Industry Preference:
Addition to the innovative technology, the AWRMS™ 50's speed and accuracy account for the increased interest and preferred status among many well known transformer and reactor manufactures.

BENEFITS

Modern Technology:
State of the art technology that will meet todays and future testing requirements.

Fast Measurements:
Measurements on the primary and secondary of the three phase UUT are done simultaneously. Two power supplies (max: 60 VDC & 50 A), handle even the largest PTs and saturates them within the shortest time. Auto tapchanger control signal is available for PTs with OLTC.

Operating Efficiency:
A wide range of features specifically tailored for the testing of large PTs are accomplished through a 20 Channel Scanner Matrix (4-Wire). This ensures that all the temperature measurements are automated improving operator efficiency and eliminating human errors.

Safety:
An intrinsically safe and heavy duty discharge circuit rapidly dissipates the stored magnetic energy in the UUT after each test. At that time, red warning indications come on the monitor. Over voltage protection is provided on all lines between the system and the UUT.

Cost Reduction:
The AWRMS™ 50 is a multi-parameter rack system and costs lesser than other similar systems. Its automated operation improves measurement efficiency and reduces testing cost. The system, very much reduces the maintenance and unexpected shutdown costs.

SYSTEM HARDWARE

System control and data acquisition and measurement hardware as well as charging and discharging circuits.

- Two powerful supplies (3 kW) enable quick (≤ 40 Sec.) measurements at various test configurations on the UUTs with up to 3 windings with 3 phases.
- Test cable set for all measurements (except temperature), each with a length of 10 m.
- Built in industrial grade PC with IEEE 488.2 Interface, LCD Monitor, Keyboard, Mouse, MS Windows (XP / Vista), MS Office 2007, AWRMS™ 50 Software, and Laser Printer.
- Automated Temperature Measurements: Very accurate temperature measurements on 20 Channels are available using 4 Wire RTDs, which are most stable.
- System has ability to accommodate Thermo Thermocouples and Thermistors also.
- The system is supplied with Six (6), PT100 Standard RTDs for liquid insulates (oil) each with a cable length of 15 m.
- The system is also supplied with six (6) PT100 Stadard RTDs for metallic surfaces (magnetic holder type), each with a cable length of 15 m. Longer lengths are available at the time of order. A total of 20 Channels are provided The system can be further expanded up to 40 channels.
- All connections fo high current measurements are made at the rear of the AWRMS for both high and low sides of the transformer. Each conductor is color coded. All connections are of the screw on, locking type are are used for both resistance and ratio measurements. Standard cables are 10m in length, longer cables are available at time of order.

SOFTWARE

AWRMS™ 50 Software Features:

- User friendly program for Resistance, Ratio, No Load Current, and Phase Displacement measurements.
- The program offers Auto and Manual Modes and flexibility for customization.
- Heat Run Test Software outputs temperature rise or cooling curve results in either graphcal or tabular form
- All results in ASCII file can easily be convered to Word, PDF, HTML, XML,CSV, etc.

CALIBRATION & VERIFICATION

Items required for calibration are Standard Resistor models 9331 /0.0001, 0.001, 0.01, and 0.1Ω and Model 9331 10Ω

SYSTEM SPECIFICATIONS	
Resistance Measurement (Range & Accuracy)	1 µΩ to 9 µΩ, 10 µΩ to 500 Ω, 0.05% of Full Scale, 501 Ω to 20 kΩ
Power Supplies	2 X 3 kW
Max. Test Voltage / Current	60 V-DC / 50 A (Continuously Variable)
Settling Time	≤ 40 Sec. (Typical)
Ratio Measurement (Range & Accuracy)	0.8 to 100 ± 0.03%, 101 to 4000 ± 0.05%, 4001 to 13000 ± 0.15%, 13001 to 20000 ± 0.2%
Test Voltage / Current	6, 12, 24, 48, 60, & 120 V-AC / Limited: 2 A
Excitation Current Measurement	0 to 2 A ± 1 mA
Phase Shift Measurement	± 180° ± 15°
Temperature Measurement	-100° to 400° C ± 1° C (RTDs: PT100-Standard Compatible)
Measurement Cycle Time	Selectable from Seconds to Minutes
Environmental Conditions	
Ambient Temperature (Operating)	0° to 45° C
Relative Humidity (Operating)	20 to 60 %
General Specifications	
Mains Supply	120 / 240 V-AC, 100 / 50 A, 50 / 60 Hz
Ambient Temperature (Reference)	15° to 35° C
Relative Humidity (Reference)	30 to 75% (non-condensing)
Size (D X W X H)	800 X 600 X 1513 mm (31.5 X 23.6 X 59.6 in) (H: Excludes warning light & castor.)
Weight	220 Kg (485 lbs), Cables 45kg (99 lbs)
Warranty	1 Year (Parts & Labor).

OPTIONAL ITEMS:

Power Supplies: Other than 3 kW
Max. Test Voltage / Current: Different from 60 VDC/50A
Cables (Current & Potential): > 10m
Number of Channels: >20 (4-Wire) or 40 (2-Wire)
Temperature Probes: RTDs, Thermocouples, and Thermistors

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