RMO-M Series

Motor & Generator Winding Ohmmeters

- Test currents: 5 mA – 100 A
- Lightweight: 8,0 kg / 17.6 lbs
- Measurement range: 0,1 μΩ - 1 kΩ
- Accuracy: 0,1%
- Resolution: up to 0,1 μΩ
- Two resistance measurement channels
- Automatic discharge circuit

Description

The Motor & Generator Winding Ohmmeter instruments are designed to measure winding resistance of electrical motors and generators. Based on the state of the art technology, using the most advanced switch mode technology available today, RMO-M series instruments are: accurate (0,1%), powerful (up to 100 A) and lightweight (8,0 kg / 17.6 lbs). Instruments generate a true DC ripple free current with automatically regulated measurement and discharging circuit.

RMO-M series instruments can perform a simple, quick, and reliable DC resistance measurement of all types of rotating machine windings. Problems such as a turn-to-turn short circuit in a winding, which reduces a motor / generator's ability to produce a balanced magnetic field, and a phase-to-phase short circuit, which in most cases results in a motor / generator trip, can be easily detected with these instruments. Additionally, any anomalies of the power circuit occurring downstream of the test lead connections will be identified by a resistance imbalance.

Application

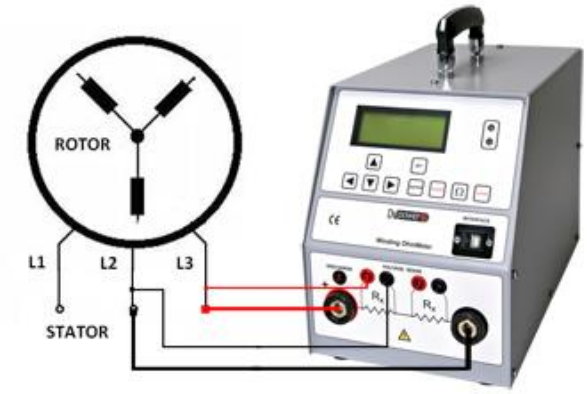
The list of the instrument applications includes:

- Two-channel winding resistance measurement, which enables simultaneous winding resistance measurement of up to two windings of motors and generators. The instrument is not intended for resistance measurement of high-inductive test objects such as power transformers
- Detection of turn-to-turn and phase-to-phase short circuits in the motor / generator windings, including problems with connections and contacts on the rotating machine
- Testing of the power circuit placed in between the rotating machine under a test and the test lead connections
- Resistance measurement of solder joints between the windings, welding joints, cable splices and any non-inductive test objects

B-RXXOMN-303-EN, 2016-03-10

Connecting the RMO-M device to a test object

Connection of the test leads to the test object should always be established respecting the Kelvin's four-point method. That way, cables resistance including current clamps contact resistance will be completely excluded from the measurement circuit.



Motor winding ohmmeter series instruments have two separate resistance measurement channels, which enable simultaneous resistance measurement of two windings. The dual-channel measurement option significantly speeds up the measurement process and reduces the total testing time.

Benefits and Features

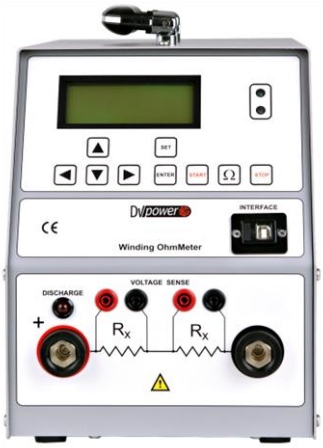
Winding Resistance Measurement

The instrument injects the DC current amplitude of up to (50 A)* 100 A. Combined with a high measurement precision (0,1 % accuracy) wide range of problems with a winding can be determined easily and undoubtedly by measuring the resistance.

Problems with windings that can be detected using the RMO-M instruments:

- Broken winding (open winding)
- Turn-to-turn short
- Short-circuited winding
- Phase-to-phase short
- Low quality of solder joints between the windings
- Power circuit problems

One of the common faults occurring in motor / generator windings is a turn-to-turn fault, or the insulation breakdown between two turns of the winding. Short-circuited turns are usually completely isolated from the ground so this problem will not result in a trip of a motor / generator. However, shorted turns reduce the winding's ability to produce a balanced magnetic field, which leads to increased vibration, reduction in output power and eventually bearing failures. Furthermore, additional heating generated by the shorted turns can also spread and result in a short-circuited winding or even phases. In addition, excessive heating might not only destroy the motor / generator windings, but also damage the insulation between the laminations of the stator core. Testing with the RMO-M instruments helps to detect possible problems and avoid significant damage of the test object.



There is enough memory within the RMO-M instruments to store 1 000 measurements. All measurements are time and date stamped.
The instruments are equipped with thermal and overcurrent protection. The RMO-M series have a very high ability to cancel electrostatic and electromagnetic interference that exist in HV electric fields. It is achieved by a proprietary filtration solution applied to both, the hardware construction and the application software implementation.

Power circuit testing

Besides the windings, resistance test can also provide valuable information about the power circuit condition. The power circuit refers to circuit breakers, fuses, disconnecting switches, conductors, etc. placed in the control box or local panel and connected to the motor / generator.

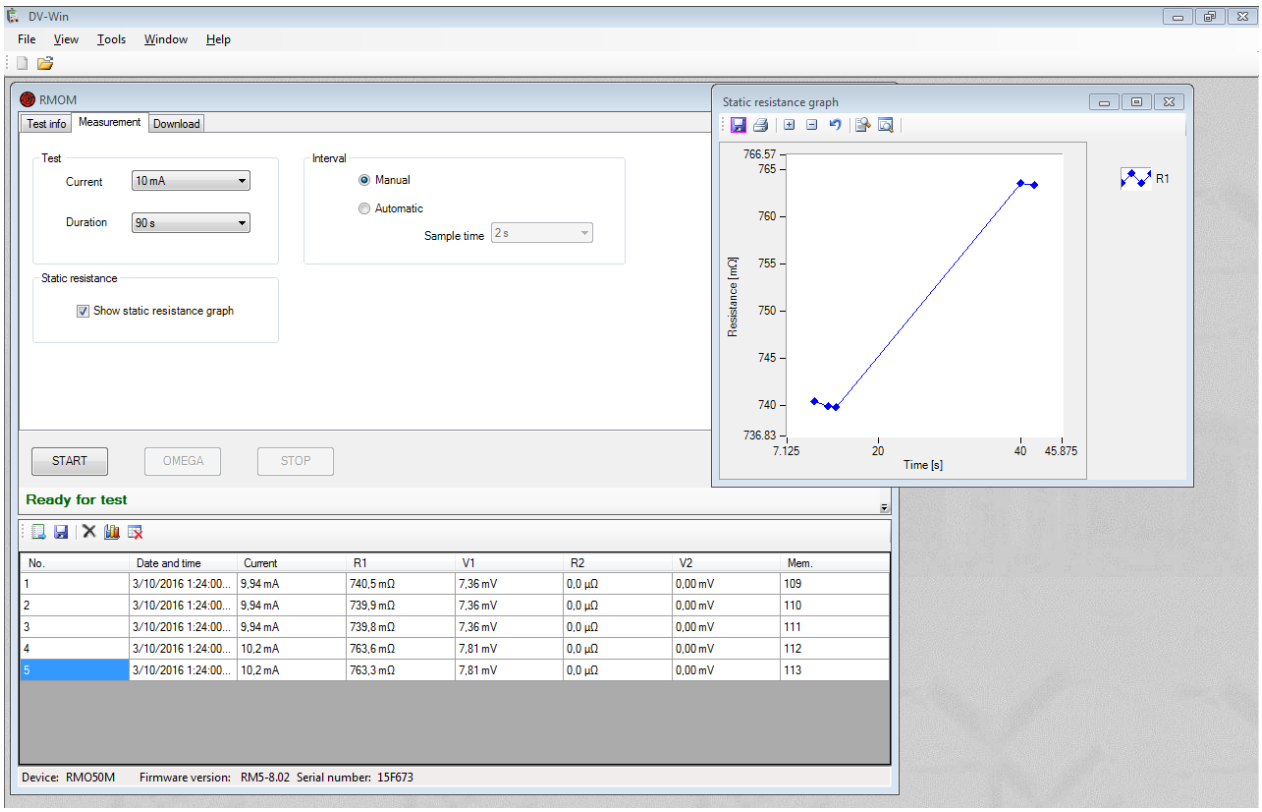
High resistance in the power circuit can be a result of:

- Corroded terminals
- Corroded contacts
- Malfunction in operation of circuit breakers or disconnecting switches
- Loosen cables
- Loosen bus bars
- Open circuit

Any problem with the power circuit, manifesting as increased resistance of the phase(s) under test, may cause problems with harmonics or voltage and current imbalances. Such problems lead to reduced output power, temperature increase, and eventual insulation damage. Therefore, a proper functionality of the power circuit is required for a long-term operational life of the motor / generator.

DV-Win Software

The DV-Win application software enables control and monitoring of the test process steps, as well as saving and analyzing the results on a PC. It provides a test report, arranged in a selectable form as an Excel spreadsheet, PDF, Word, or ASCII format. The standard interface is USB. RS232 is optional.



Technical Data

Winding Resistance Measurement

- Test currents: 5 mA – (50 A)100 A DC
- Measurement range: 0,1 µΩ - 1 kΩ
- Typical accuracy: ± (0,1% rdg + 0,1% F.S.)

Resolution

- 0,1 µΩ – 999,9 µΩ: 0,1 µΩ
- 1,000 mΩ – 9,999 mΩ: 1 µΩ
- 10,00 mΩ – 99,99 mΩ: 10 µΩ
- 100,0 mΩ – 999,9 mΩ: 0,1 mΩ
- 1,000 Ω – 9,999 Ω: 1 mΩ
- 10,00 Ω - 99,99 Ω: 10 mΩ
- 100,0 Ω – 999,9 Ω: 0,1 Ω

Data Storage

- 1 000 internal memory positions

Printer (optional)

- Thermal printer
- Graphic and numeric printout
- Paper width 80 mm

Computer Interface

- USB
- Optional: RS232

Dimensions and Weight

- Dimensions (W x H x D):
  198 mm x 255 mm x 380 mm
  7.8 in x 10.0 in x 15.0 in
- Weight: 8,0 kg / 17.6 lbs

Warranty

- Three years

Environmental Conditions

- Operating temperature:
  - 10 ºC to + 55 ºC / +14 F to + 131 ºF
- Storage & transportation:
  - 40 ºC to + 70 ºC / - 40 F to + 158 ºF
- Humidity 5 % - 95 % relative humidity,
  non condensing

Mains Power Supply

- Connection according to IEC/EN60320-1;
  UL498, CSA 22.2
- Mains supply: 90 V – 264 V AC
- Frequency: 50 / 60 Hz
- Input power: (600 VA) 1 200 VA
- Fuse 15 A / 250 V, type F, not user replaceable

Applicable Standards

- Low Voltage Directive:
- Directive 2014/35/EU (CE conform)
- Applicable standards, for a class I instrument, pollution degree2,
- Installation category II: IEC EN 61010-1
- Electromagnetic Compatibility :
- Directive 2014/30/EU (CE Conform)
- Applicable standard EN 61326-1:

All specifications herein are valid at ambient temperature of + 23±5 °C and recommended accessories.
Specifications are subject to change without notice.

B-RXXOMN-303-EN, 2016-03-10

Accessories

Current cables with battery clamps

Voltage Sense cables with TTA clamps

Current connection cable with battery clamps

Test shunt

Device bag

Cable bag

Transport case

Cable plastic case

Instrument	Article No
Motor Winding Ohmmeter RMO50M	RMO050M-N-00
Motor Winding Ohmmeter RMO100M	RMO100M-N-00

Order info

Included accessories
DV-Win PC software including USB cable
Mains Power cable
Ground (PE) cable

Recommended accessories	Article No
Current cables 2 x 5 m 10 mm2 (16.4 ft, 7 AWG) with TTA clamps*	CS-05-10LMWC
Current cables 2 x 5 m 16 mm2 (16.4 ft, 5 AWG) with battery clamps**	CS-05-16LMB1
Sense cables 2 x 5 m (16.4 ft) with TTA clamps (2 pcs)	S2-05-02BPWC
Current connection cable 1 x 5 m 10 mm2 (16.4 ft, 7 AWG) with TTA clamps*	CX-05-102XWC
Current connection cable 1 x 5 m 16 mm2 (16.4 ft, 5 AWG) with battery clamps**	CX-05-162XB1
Device bag	DEVIC-BAG-00
Cable bag	CABLE-BAG-00

Recommended with RMO50M only
Recommended with RMO100M only

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Optional accessories	Article No
Test shunt 150 A / 150 mV	SHUNT-150-MK
Thermal printer 80 mm (3.15 in) (built-in)	PRINT-080-00
Thermal printer roll 80 mm (3.15 in)	PRINT-080-RO
Transport case	HARD-CASE-ME
Current cables 2 x 10 m 10 mm^2 (32.8 ft, 7 AWG) with TTA clamps	C2-10-10LMWC
Current cables 2 x 15 m 10 mm^2 (49.2 ft, 7 AWG) with TTA clamps	C2-15-10LMWC
Current cables 2 x 20 m 16 mm^2 (65.6 ft, 5 AWG) with TTA clamps	C2-20-10LMWC
Current Cables 2 x 10 m 16 mm^2 (32.8 ft, 5 AWG) with battery clamps	C2-10-16LMB1
Current Cables 2 x 15 m 25 mm^2 (49.2 ft, 4 AWG) with battery clamps	C2-15-25LMB1
Current Cables 2 x 20 m 35 mm^2 with battery clamps	C2-20-35LMB1
Sense cables 2 x 10 m (32.4 ft) with TTA clamps	S2-10-02BPWC
Sense cables 2 x 15 m (49.2 ft) with TTA clamps	S2-15-02BPWC
Sense cables 2 x 20 m (65.6 ft) with TTA clamps	S2-20-02BPWC
Current connection cable 1 x 12 m 10 mm^2 (39.4 ft, 7 AWG) with TTA clamps	CX-12-102XWC
Current connection cable 1 x 12 m 16 mm^2 (39.4 ft, 5 AWG) with TTA clamps	CX-12-102XWC
Cable plastic case – medium size	CABLE-CAS-02
Cable plastic case with wheels – medium size	CABLE-CAS-W2
Bluetooth communication module	BLUET-MOD-00

B-RXXOMN-303-EN, 2016-03-10

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