

Protective earth resistance meter

RMO-E series

- Lightweight – only 8 kg / 17.6 lbs
- Powerful 1 A – 100* A DC (60 A for RMO60E)
- Measuring range 0,1 $\mu\Omega$ – 25,00 Ω
- Resolution to 0,1 $\mu\Omega$
- SINGLE and CONTIN Modes
- Mechanical protection IP50



Description

RMO-E series of Protective earth resistance meters (hereafter referred to as “RMO-E”) contain 2 models: **RMO60E** and **RMO100E**. The main difference between these models is the maximum test current that can be generated (60 A for RMO60E and 100 A for RMO-E model).

RMO-E is ideal for testing the protective bonding (grounding) of equipment following the standard 61010-1 IEC 2001. This standard specifies for plug connected equipment and for permanently connected equipment the following requirements:

The protective earth resistance should be below 0,1 Ω or the voltage between the protective conductor terminal and each accessible conductive part for which protective bonding is required not to exceed 10 V.

Conformity is checked by applying a test current for 1 minute and then calculating impedance, or measuring the voltage between the protective conductor terminal and each accessible conductive part for which protective bonding is required.

The test current should be greater of 25 A or twice the rated current for plug connected equipment, or twice the value of the overcurrent protection for the permanently connected equipment.

For both of these applications RMO-E can provide the right tool for verification of the conformity. Applying current up to the value of 60A and the ability of RMO-E to provide in the CONTIN menu (continuous operation) test current for the pre-set test duration (equal or exceeding 1 min) - gives a user possibility to easily check the protective bonding/grounding of the equipment. The full load voltage of 12V assures that the measurement is executed properly and that the result obtained (pass fail classification) is accurate.

RMO-E generates true DC current with automatically regulated test ramps. During the test RMO-E ramps with increasing current before measuring and decreasing current after the measurement. This decrease influence of magnetic transients. After the test current has been set, the automatic test procedure is started by pressing the **START** button.

The RMO-E instrument can store up to 500 measurements. All measurements are time and

date stamped. Using DV-Win software a test can be performed from a PC, and the results can be obtained directly at a PC Communication between RMO-E and PC is through USB or RS232 cable.

The set is equipped with thermal and overcurrent protection. The RMO-E has very high ability to cancel electrostatic and electromagnetic interference in HV electric fields. It is achieved by very efficient filtration. The filtration is made utilizing proprietary hardware and software.

Single Test

The RMO-E instrument generates a filtered (true ripple-free) DC current and output it in an automatically regulated current ramp.

By sloping the current up and down, magnetic transients are virtually eliminated.

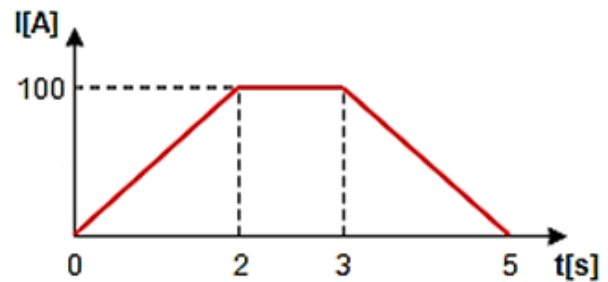
Applications

Typical application is measuring of protective earth resistance of equipment in compliance with IEC 61010-1 safety standard.

Other application is measuring contact resistance of non-inductive test objects:

- High and medium voltage circuit breakers
- High and medium voltage disconnecting switches
- High-current bus bar joints
- Cable splices
- Welding joints

Below is an example of single test ramp for the 100 A current.

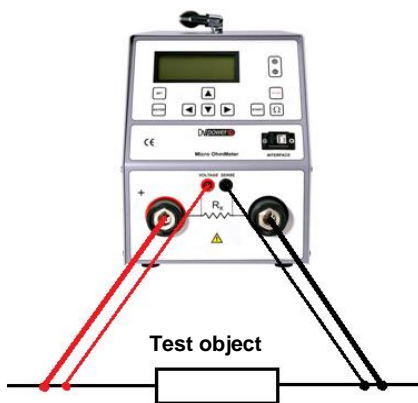


CONTIN Mode

RMO-E can generate a DC current continuously using the CONTIN menu. In this menu the current can be chosen the same way as in the SINGLE menu, but the duration of the test can be preset. The test is started pressing the *START*-button. During the test, a new result is shown on the display and stored into the PC (DV-Win) each second. Using DV-Win the result can be arranged as an Excel spreadsheet which can be later shown as a diagram and printed for a report.

Connecting the Test Object to RMO-A

The connection diagram of our RMO-E devices corresponds to the Kelvin's (four point) measurement principle. The measuring cables from the "Voltage Sense" sockets are attached as close as possible to R_x , and in between the current feeding cables. That way, a resistance of both cables and clamps is almost completely excluded from the resistance measurement.



DV-Win software

DV-Win software provides acquisition and analysis of the test results, as well as control of the RMO-E functions from a PC. The DV-Win also provides several advanced features as a supplement to multiple functions of RMO devices. Testing in Continuous mode is upgraded with a sample time feature which allows user to record test results in specific time intervals set in seconds.

DV-Win Main Features

- Full control of the device in test
- Test reports available in several formats
- Several filters for results download to PC
- Sampling time feature for CONTIN mode

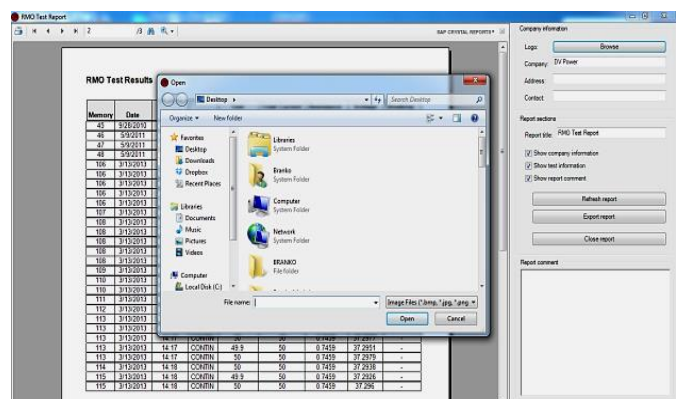
Benefits and features

The main benefits and features of RMO-E devices are listed below:

- High output voltage* (12 V at 100 A current)
*enables use of thinner/longer test cables
- The output current is filtered and has a ripple of less than 1 %.
- The instrument has a very high typical accuracy $\pm (0,1 \% \text{ rdg} + 0,1 \% \text{ FS})$.
- The best resolution of RMO-E is $0,1 \mu\Omega$.
- Rmax feature (*pass/fail criteria, enabled with the device and the DV-Win software*)
- Built-in thermal printer (*optional accessory*)

After performed measurements results can be saved in a various formats and test report can be generated and saved or printed. Result can also be downloaded from the device to the PC by use of several different search filters.

For the RMO-E form of DV-Win software there is Help menu available, with detailed instructions and explanations of all functions and features.



Technical data

Mains power supply

- Connection according to IEC/EN60320-1; C320
- Mains supply: 90 V – 264 V AC
- Frequency: 50 / 60 Hz
- 12 A / 250 V, type F

Output data

- Test current range:
 - RMO60E: 1 A – 60 A DC
 - RMO100E: 1 A – 100 A DC
- Full Load Voltage: 12,0 V DC

Measurement

- Resistance range 0,1 $\mu\Omega$ – 25,00 Ω
- Resolution:

0,1 $\mu\Omega$ – 999,9 $\mu\Omega$	0,1 $\mu\Omega$
1,000 m Ω – 9,999 m Ω	1,0 $\mu\Omega$
10,00 m Ω – 99,99 m Ω	10 $\mu\Omega$
100,0 m Ω – 999,9 m Ω	0,1 m Ω
1,000 Ω – 9,999 Ω	1 m Ω
10,00 Ω – 25,00 Ω	10 m Ω
- Typical accuracy: \pm (0,1 % rdg + 0,1 % FS)

Display

- LCD screen 20 characters by 4 lines; Display with backlight, visible in bright sunlight

Interface

- RMO-E is equipped with an USB port (optional: RS232) to connect to an external computer

Test Result Storage

- RMO-E can store up to 500 measurements

Printer (optional)

- Thermal printer
- Paper width 80 mm / 3.2 in

NOTE

The print density is guaranteed within the range 5°C to 40°C, 20 to 85% relative humidity, no condensation. The printer can operate from 0°C to 50°C.

Environmental conditions

- Operating temperature: -10 °C - +55 °C / +14 °F - +131 °F
- Storage & transportation: -40 °C - +70 °C / -40 °F - +158 °F
- Humidity 5 % - 95 % relative humidity

Dimensions and weight

- Dimensions (W x H x D):
198 mm x 255 mm x 380 mm
7,8 in x 10 in x 15 in
- Weight: 8 kg / 17.6 lbs

Environmental protection

- Ingress protection rating: IP50

Warranty

- 3 Years

Applicable Standards

- Installation/overvoltage: category II
- Pollution: degree 2
- Safety: Directive 2014/35/EU (CE conform) Applicable standards, for a class I instrument, pollution degree 2, Installation category II: IEC EN 61010-1
- EMC: Directive 2014/30/EU (CE conform) Applicable standard: EN 61326-1
- CAN/CSA-C22.2 No. 61010-1, 2nd edition, including Amendment 1

All specifications herein are valid at ambient temperature of + 25 °C and recommended accessories. Specifications are subject to change without notice



Current cables



Extension current cables



Voltage sense cables



Test shunt



Transport case



Cable bag

Order info

Instrument with included accessories	Article No
Protective earth resistance meter RMO-E	RMO060E-N-01
DV-Win PC software	RMO100E-N-01
Ground cable	
USB cable	
Transport case	
Recommended accessories	Article No
Current cables 2 x 5 m 16 mm ² with battery clips	C2-05-16LMB1
Sense cables 2 x 5 m with alligator clips	S2-05-02BPA2
Optional	Article No
Cable bag	CABLE-BAG-00
Test shunt 100 μΩ (600 A/60 mV)	SHUNT-600-MK
Current cables 2 x 10 m, 16 mm ² with battery clips	C2-10-16LMB1
Current cables 2 x 15 m, 25 mm ² with battery clips	C2-15-25LMB1
Current extension cable 2 x 10 m, 16 mm ²	E2-10-16LMLF
Sense cables, extension 2 x 10 m	E2-10-02BPBP
Sense cables 2 x 10 m with alligator clips	S2-10-02BPA2
Sense cables 2 x 15 m with alligator clips	S2-15-02BPA2
Built-in thermal printer	PRINT-080-00

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