

# Micro Ohmmeter **RMO500D**

- Lightweight – only 12 kg
- Powerful 5 A – 500 A DC
- Measuring range 0 – 999,9 mΩ
- Resolution to 0,1 μΩ
- Typical accuracy 0,1 %
- Remote Control Unit (optional)
- Both Sides Grounded Unit (optional)
- Rmax function
- Demagnetization of a CT core



## Description

RMO500D is a Micro Ohmmeter based on a state of the art technology, using the most advanced switch mode technique available today. RMO500D generates a true DC ripple-free current with automatically regulated test ramps. During a test the RMO500D ramps with increasing current before measuring and decreasing current after the measurement. This eliminates magnetic transients. After the test current has been set, the automatic test procedure is started by pressing the Ω-button.

The new feature is the ability to perform a fully automatic demagnetization of a current transformer core after the measurement. Demagnetizing a magnetic core of a current transformer requires alternating current applied with decreasing magnitude down to zero. The RMO500D provides this alternating current by internally changing the polarity of a controlled DC current. During the demagnetization process the instrument supplies a current at decreasing magnitude for each step, following a proprietary developed software solution.

The RMO500D instrument can store internally up to 500 measurements. All measurements are time and date stamped. Using the DV-Win software a test can be performed from a user's PC, and the results can be obtained directly on the PC. Communication between the RMO500D and a PC is through an USB (as standard) or an RS232 cable (as an option). Using the DV-Win the result can be arranged as an Excel spreadsheet which can be later shown as a diagram and printed for a report.

The set is equipped with a thermal and an overcurrent protection. The RMO500D has a very high ability to cancel electrostatic and electro-magnetic interference in HV electric fields. It is achieved by very efficient filtration. The filtration is made utilizing a proprietary hardware and software.

The RMO500D instrument has three separate test modes:

- SINGLE mode
- CONTIN mode
- BSG mode

## Single Test

The RMO500D instrument generates a filtered (true) DC current and output it in an automatically regulated current ramp. By sloping the current up and down, magnetic transients are virtually eliminated. Below is an example of single test ramp for the 200 A current.

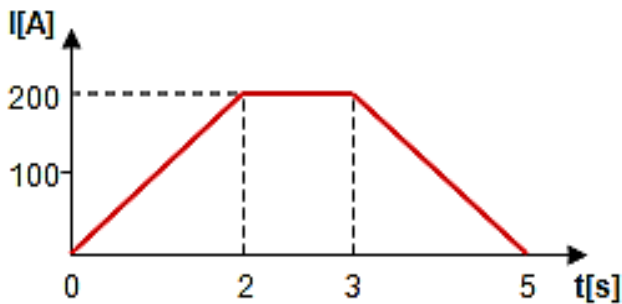


Figure 1 - Single test ramp

## Continuous Test

RMO500D can generate DC current continuously using the **Contin** menu. In this menu the current can be chosen the same way like in the **Single** menu, but the duration of the test can be preset.

The RMO500D current output is rated at 500 A for 30 seconds, at 300 A for 90 seconds and 200 A for 2,5 minutes at 25°C ambient temperature.

## BSG test

This test mode is specially designed for **Both Sides Grounded** testing. A current clamp meter is used for measuring the current through the grounding. The test setup is very simple (same as for the SINGLE test) and all calculations are made automatically by the device internal algorithm.

## Application

Typical application is measuring resistance of non-inductive test objects:

- High, middle and low voltage circuit breakers
- High, middle and low voltage disconnecting switches
- High-current bus bar joints
- Cable splices
- Welding joints

## Connecting the Test Object to RMO500D

With RMO500D turned off, connect RMO500D to the test object ( $R_x$ ) in such a way that 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.

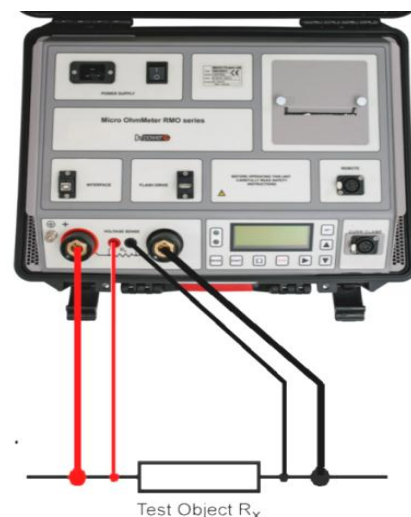
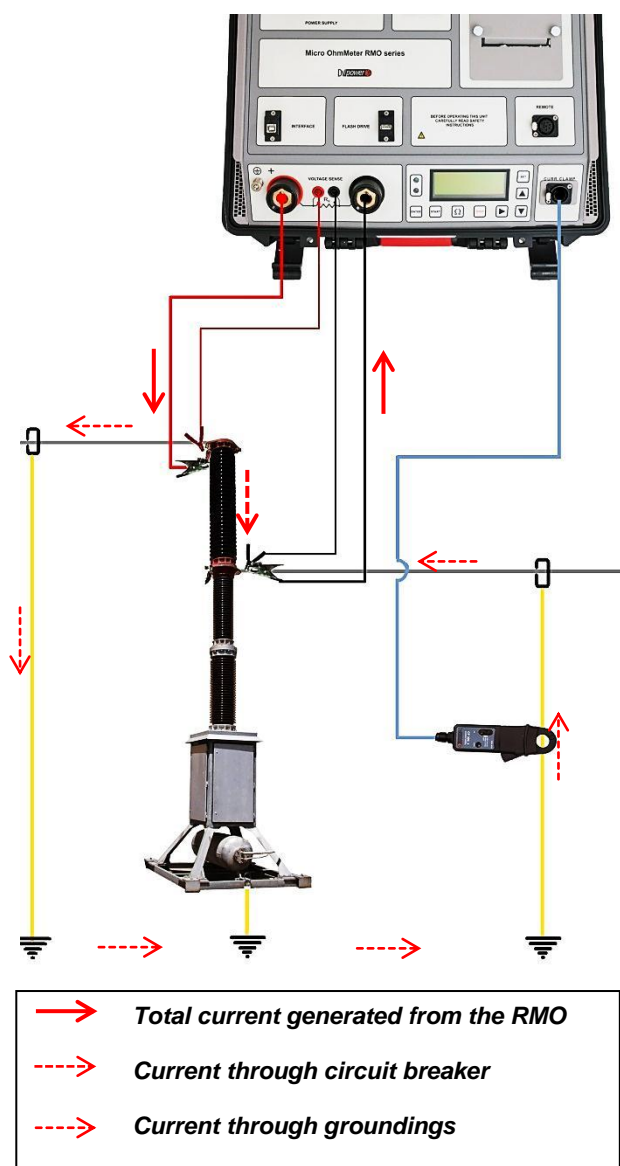


Figure 2 – Connecting to the test object

## Both Sides Grounded Unit

Using RMO500D with both sides grounded option it is possible to make safer measurement of breakers with both terminals of the breaker grounded.



Using the RMO500D with a current clamp-meter is an additional safety feature. Measurement of a circuit breaker contact resistance is done with both sides of the breaker grounded.

The RMO500D device will measure the current through the ground circuit connection and add this value to the selected test current value in order to provide the selected test current through the test object.

## Remote Control Unit

The RMO Remote Control Unit is an optional control unit that is used to start and stop the tests from a remote location, away from the actual RMO.

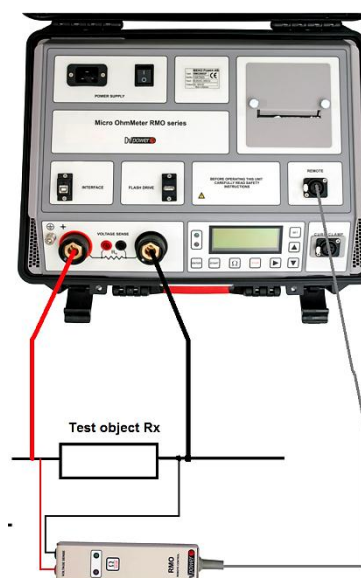


Figure 4 – Measurement with the Remote Control Unit

Provided that, for a series of tests, the same test current is fed through the test object, multiple measurements can be carried out with the RMO Remote Control Unit.

## Benefits and features

The RMO500D device has very stable and powerful voltage source used for current injecting. A very high voltage output enables wide resistance measurement range even when very high currents are used. In addition, this enables use of thinner/longer test cables, depending of the customer requirement.

The full output is available from the RMO500D at 230 V Mains Supply. A reduced output is available from lower supply voltages.

Supply Voltage	Output Current	Full Load Voltage
230 V AC	500 A DC smoothed	5,8 V DC
	300 A DC smoothed	6,0 V DC
115 V AC	500 A DC smoothed	4,7 V DC
	300 A DC smoothed	4,6 V DC

The output current is filtered and has a ripple of less than 1 %.

The instrument has a very high typical accuracy  $\pm (0,1 \% \text{ rdg} + 0,1 \% \text{ FS})$ , with the best resolution of  $0,1 \mu\Omega$ .

Several advanced features are available as standard/optional accessories:

- Both Sides Grounded Unit (*requires current clamps available as optional accessory*)

- Remote Control Unit (*enables remote testing; optional accessory*)
- Rmax feature (*pass/fail criteria, enabled with the device and the DV-Win software*)
- Demagnetization feature (*enables testing of Dead Tank circuit breakers with current transformer mounted on its bushings*)
- Built-in thermal printer (*optional accessory*)

## DV-Win software

DV-Win software provides acquisition and analysis of the test results, as well as control of all the RMO 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.

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

## DV-Win Main Features

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

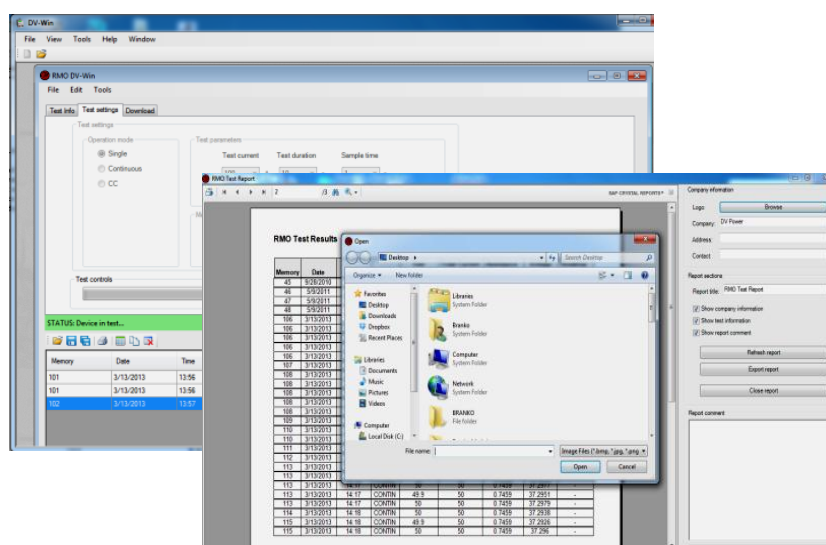


Figure 5 – DV-Win Software for RMO

## Technical data

### Mains power supply

- Connection according to IEC/EN60320-1; C320
- Mains supply: 90 V – 264 V AC
- Frequency: 50 / 60 Hz
- Input power: 3870 VA (230 V AC)  
3620 VA (115 V AC)
- Fuse: 15 A / 250 V, type F

### Output data

- Test current: 5 A – 500 A DC
- Max load interval (at 500 A): 30 s
- Full Load Voltage (at 500 A): 5,8 V  
\*At 230 V of supply voltage

### Measurement

- Resistance range: 0,1  $\mu\Omega$  – 999,9 m $\Omega$
- Resolution
 

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

### Display

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

### Interface

- RMO500D is equipped with an USB port
- optional: RS232 (connection to an external computer)

### Test Result Storage

- RMO500D can store up to 500 measurements

### 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

### Environmental protection

- Ingress protection rating: IP67  
(with closed lid)

### Printer (optional)

- Thermal printer
- Paper width 80 mm / 3.2 in

### Dimensions and weight

- Dimensions (W x H x D):  
480 x 190 x 395 mm  
18.9 x 7.48 x 15.16 in
- Weight: 12 kg / 26.5 lbs

### Applicable Standards

- Installation/overvoltage: category II
- Pollution: degree 2
- Safety: LVD 2006/95/EC (CE Conform)  
EN 61010-1
- EMC: Directive 2004/108/EC (CE Conform)  
Standard EN 61326-1:2006
- CAN/CSA-C22.2 No.61010-1, 2nd edition,  
including Amendment 1

### Warranty

- 3 Years

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



**Current cables**



**Voltage sense cables**



**Extension cable**



**Test shunt**



**Cable bag**



**Current clamp 30/300A + cable set 5 m (16.4 ft.)**

\* Besides battery clamps, current cables are also available with C clamps or with alligator clamps (as option)

\*\* Besides semi-isolated alligator (A1) clamps, sense cables are also available with isolated alligator (A2) clamps or with TTA clamps (as option)

## Order info

Instrument with included accessories	Article No
<b>Micro Ohmmeter RMO500D</b>	RMO500D-N-00
DV-Win PC software including USB cable	
Mains power cable	
Ground (PE) cable	

Recommended accessories	Article No
Current cables 2 x 5 m (16.4 ft.), 50 mm <sup>2</sup> (0 (1/0) AWG) with battery clips	C2-05-50MVB3
Sense cables 2 x 5 m (16.4 ft.) with alligator clips	S2-05-02BPA1
Cable bag	CABLE-BAG-00

Optional accessories	Article No
Transport case	HARD-CASE-LC
Test shunt 100 $\mu\Omega$ (600 A/60 mV)	SHUNT-600-MK
Current cables 2 x 10 m (32.8 ft.), 50 mm <sup>2</sup> (0 (1/0) AWG) with battery clips	C2-10-50VMB3
Current cables 2 x 15 m, 70 mm <sup>2</sup> (00 (2/0) AWG) with battery clips	C2-15-70VMB3
Current extension cable 2 x 10 m (32.8 ft.), 70 mm <sup>2</sup> (00 (2/0) AWG)	E2-10-70VMVF
Sense cables, extension 2 x 10 m (32.8 ft.)	E2-10-02BPBP
Sense cables 2 x 10 m (32.8 ft.) with alligator clips	S2-10-02BPA1
Sense cables 2 x 15 m (49.2 ft.) with alligator clips	S2-15-02BPA1
Built-in thermal printer	PRINT-080-00
<b>Remote control unit</b>	<b>RMORCU-09-00</b>
<b>Current clamps (Both Sides Grounded Unit)</b>	<b>CACL-0300-06</b>

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