

MPK-215e

Digital micro-ohmmeter

User's Guide

GF-2010

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Safety warnings

- Before to use this instrument the User Guide and Safety warnings must be read and understood.
 - Safety procedures and rules for working near high voltage energized systems must be observed during the use of this equipment. The generated voltages and currents may be dangerous.
 - Before you begin the measurement verify the mains supply voltage compatibility.
 - The micro-ohmmeter must be connected to earth point, through the green terminal or the power cord (both use the same point).
 - During a circuit breaker measurement its contacts must be closed and connected to an earth point. The end connected to an earth point must be connected to the "C-" terminal.
 - Make sure the measurement points which will be connected to any of the terminals are free of any voltage in relation to earth point and between each other. Take in account that in a substation you will find in disconnected points high potential levels in relation to the earth point. Those potentials are caused by present electromagnetic fields and can be minimized following the indications in the paragraph before.
 - Make sure that the current connections are well connected as well as the C-clamp, to avoid undesirable heating.
 - Be careful when manipulating the current terminals in the instrument. You may get high temperatures in the current connections.
 - Never connect or disconnect the cables during a measurement. If you must modify any connection, it must be made after you have pressed the Stop button.
 - The equipment must be kept dry and clean.
 - Never use the equipment if you are in doubt regarding its functionality. The equipment must to be put out of service (contact your distributor service department).
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This equipment should be used only by a trained and competent person, strictly adhering to suitable safety rules.

Used symbols

	Caution, refer to User Guide.
	Warning, hot surface. Be careful when handling.
	Equipment complies with current EU Directives.
	The rubbish bin with a crossed line through it means that in the European Union, the product must undergo selective disposal for the recycling of electric and electronic material, in compliance with Directive WEEE 2002/96/EC.

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1. Description

The MPK-215e high-current micro-ohmmeter is a portable, digital instrument. It has optimized filters and protections for measurements in electrical substations. It can be used to accurately measure very low contact resistances of high voltage circuit-breakers and switches, busbars, etc., with test currents from 5A up to 200A. It employs the 4 terminals-method (U/I measuring principle) to avoid errors caused by test leads and their contact resistances.

Measurement accuracy is guaranteed by a state-of-the-arts signal amplification system, offset-free and of high long-term stability. Resistances readings are shown in the alphanumeric display with up to 4½ digits-resolution.

It has an internal memory for up to 50 registers with 80 readings each. The data output USB may be connected to a computer to download the stored values.

The high-current generation system is based on modern technology that allows to significantly decrease both its weight (approx. 11kg) and size. The cabinet is made of plastic material highly resistant to impacts and to environmental challenges. Internal thermal sensors in all sensitive components avoid any damage caused to the instrument due to overheating.

This is strong but lightweight equipment, and may be easily carried by one person. It is water-resistant and can be used under severe weather conditions (IP54 with closed lid) offering an excellent performance working both in the laboratory and out in the field.

2. Operating instructions

2.1. Operating principle

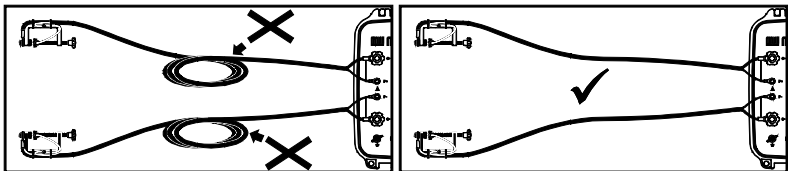
This device uses the Kelvin Bridge architecture, with four terminals, avoiding testing leads resistance to cause error during measurement. Test current may be chosen by the operator and the reading is obtained by comparison through internal high-stability standards. The result appears in the alphanumeric display which is very easy to read.

2.2. ⚠ Use of test probes

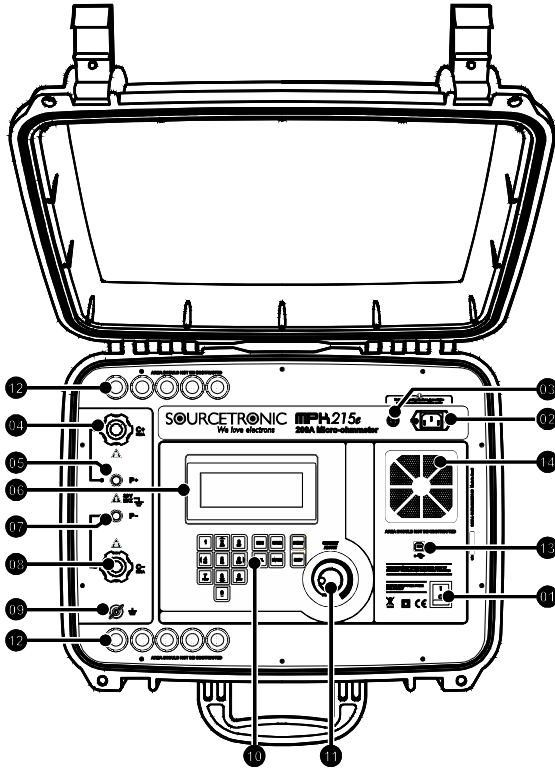
WARNING

Only use the test leads supplied with the equipment, for measurement and calibration procedure.

- Make sure that the current connections are well connected as well as the C-clamps, to avoid undesirable heating.
- Attention when manipulating the current terminals of the instrument. You may get high temperatures in the current connections.
- Make sure that the cables are straight during the measurement to avoid overheating.



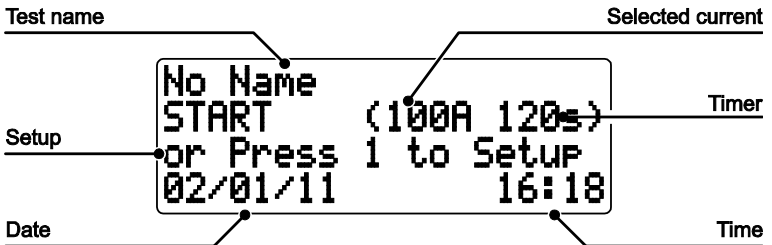
2.3. Control panel



- 01 On/Off switch.
- 02 Power cord connector.
- 03 Fuse.
- 04 Current output terminal (C+).
- 05 Potential terminal (P+).
- 06 Alphanumeric display.
- 07 Potential terminal (P-).
- 08 Current output terminal (C-).
- 09 Ground.
- 10 Keyboard.
- 11 Test current control.
- 12 Cooling system air output.
- 13 USB interface.
- 14 Cooling system air inlet.

3. Display

Alphanumeric LCD display where the measurement result, the corresponding measuring unit, the elapsed time since the measurement started and messages to the operator are displayed.



Built-in chronometer

It features the elapsed time (in minutes and seconds) since test current is applied.

Real time clock

It has a real time clock with date, hours and minutes indication, to make identification of tests recorded in memory easier.

Test number

Tests are automatically numbered by the equipment to make their identification easier. The test number is stored in memory.

Model and serial number


At the beginning of each test, the equipment model, as well its serial number, are registered, making it possible to relate the obtained results with their respective equipment Calibration Certificate.

3.1. Display messages

<p>MPK215e</p>	<p>When turning the equipment on using the On/Off switch, this introduction message appears for a while.</p>
<p>Auto Check 1/3</p>	<p>The equipment is carrying out some functional verifications.</p>
<p>No Name START (100A 120s) or Press 1 to Setup 02/01/11 16:18</p>	<p>Main screen where a test can be started, or setup a new one.</p>
<p>Edit Record Name: -</p>	<p>Screen to edit the record name.</p>
<p>CURRENT (100A) 1 - 50A 2 - 100A 3 - 150A 4 - 200A 5 - MANUAL</p>	<p>Screen to select the test current.</p>
<p>TIME OF TEST _99 sec Min = 5s Max = 120s</p>	<p>Screen to setup test duration.</p>
<p>LOW CURRENT I= 5.0A TIME:003/120s 02/01/11 16:18</p>	<p>Indicates that the test current is not enough to carry out the reading.</p>

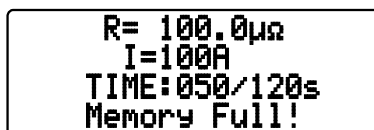
<pre> R=OVERRANGE I=200A TIME:004/120s 02/01/11 16:18 </pre>	<p>Indicates that the measured resistance is higher than the maximum value readable in the selected range.</p>
<pre> R= 100.0µΩ I=100A Overheating 02/01/11 16:18 </pre>	<p>Indicates that some part of the equipment has achieved the critical temperature. Thus the system will cut the high current generation.</p>
<pre> R= 100.0µΩ I=100A PROTECTION ACTIVATED 02/01/11 16:18 </pre>	<p>It indicates that any of the security protections of the equipment was turned on.</p>
<pre> R= 1.000Ω I= 7.0A (max) TIME:004/120s 02/01/11 16:18 </pre>	<p>The message (max) indicates that the test current value shown in the display is the maximum value possible according with the measured resistance value.</p>

4. Internal memory

This equipment can store up to 50 records with 80 readings each. Each register works like a folder where all readings saved will be stored in until the operator creates another folder (record). During a measurement, when you want to save a measured value, press the  button.



The model and serial number, register name, test number, date and time, elapsed time, current and resistance value will be stored. In the display, the percentage of free memory will be displayed. When the memory is full, download all the registers and erase the equipment memory (use ST-Logger software).



5. Protections

Current ramp

The device creates a ramp to smoothly reach the selected value of current.

Temperature protection

The time of **MPK-215e** continuous use is limited by thermal considerations. Some internal sensors measure the temperature of the sensitive parts and trigger the protection that will cut the current circulation, if any of them exceeds the limit temperature, thus avoiding any damage. The OVERHEATING message will appear in the display. Under these conditions, measurements will be inhibited up to the temperature decreases sufficiently.

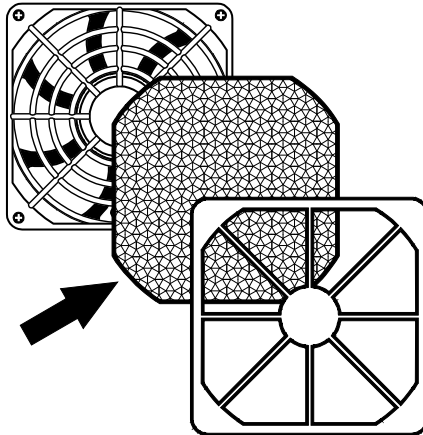
Safety Protections

The equipment has an intelligent security system designed to protect components during the test. If this protection is activated, appears on the display "PROTECTION ACTIVATED" message. In this case check the connections, making sure the cables are securely attached to the terminals of the equipment and the test point. checking that there is no poor contact, try to perform the test again. If the message persists, contact an authorized service center.

6. Cooling system

The MPK-215e has a cooling system that allows it to perform a large number of consecutive tests without activating the thermal protection. Under normal environmental conditions you can perform up to 30 consecutive tests with duration of 1 minute and 1 minute interval. This interval is usually used for repositioning the test lead in another test point.

The cooling system filter must be replaced periodically. Changing the filter can be easily performed. Pull the grid up, replace the filter and place the grid again in the panel.



The lack of filter maintenance can decrease the cooling efficiency and thus the amount of consecutive tests.

You should use only filters supplied by SOURCETRONIC.

7. Test setup

On the main screen, press the **1** key to configure the test.



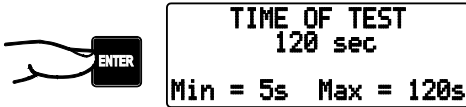
On the next screen use the keyboard to enter a name for the record (group of tests) and press the **ENTER** key to save. To switch between uppercase and lowercase letters quickly press twice the **1** key. To cancel the operation, press **ESC** button.



All the measured values saved will be associated with this name until the operator changes the record name. Select the test current with the keys **1** **2** **3** **4** or press **5** to manual adjust. Press the **ENTER** button to save.



Set the test duration using the keypad and press the  button to save:



The display will return to the main screen. Now the equipment is configured to perform a test.

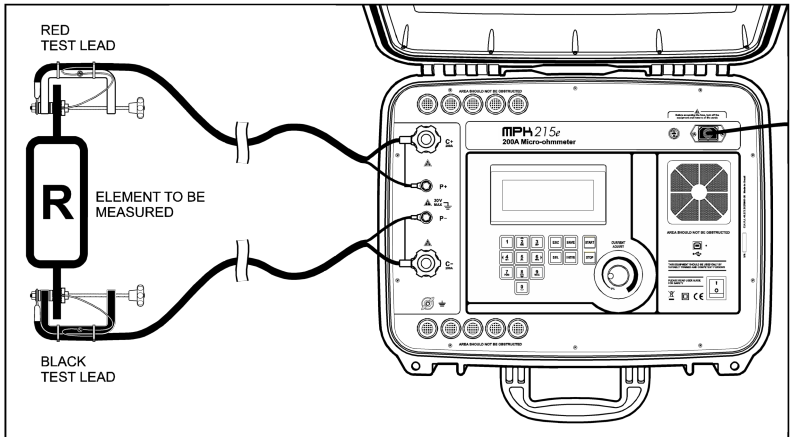
```
OBJECT 1
START (200A 120s)
or Press 1 to Setup
02/01/11 16:18
```

7.1. Measurement

Warning

- Before to use this instrument the User's guide and Safety warnings must be read and understood.
- Safety procedures and rules for working near high voltage energized systems must be observed during the use of this equipment. The generated voltages and currents may be dangerous.

1. The equipment should be connected to the mains supply.
2. Before turning the equipment on, connect the test probes to the item to be measured and to the front panel terminals.



The test leads in the drawings are only for illustration.

3. Turn-On the equipment using the **On/Off** switch.



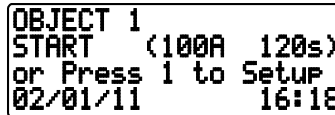
4. An introduction message appears for a while.



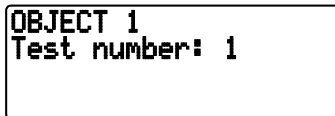
5. The equipment will make some functional verifications. During this process the display shows the message:



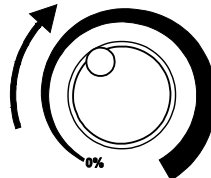
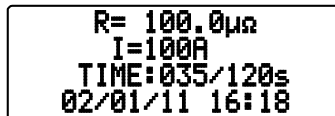
6. To start the test, press **START** key.



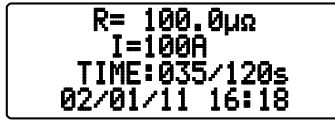
7. Will be displayed the record name and test number.








8. If the manual current adjust was selected, use the Test Current Control to select the desired current.



9. The display will show the value of measured resistance (R), the value of the applied current (I), the elapsed time / maximum time (in seconds) and the date and time.



R= 100.0µΩ
I=100A
TIME:035/120s
02/01/11 16:18

10. The value can be stored in the internal memory by pressing the  button.
11. Press the  button in order to finish the measurement.
12. Press the  button to start a new test or the  button to return to the main screen.
13. Do not turn off the equipment with the **On/Off** switch without having pressed the  button before.
14. Finally, when finishing measurements, turn the equipment off using the **On/Off** switch.

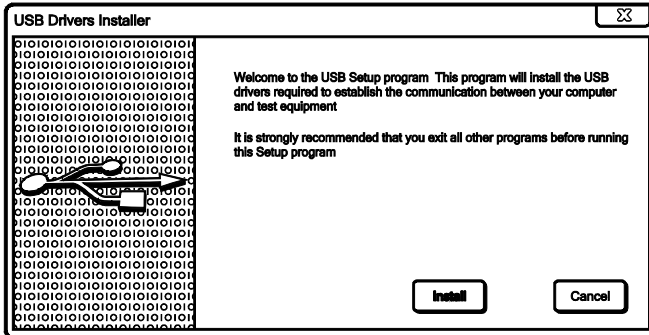


Precaution: Do not connect or disconnect the test leads during the measurement.

7.2. USB Drivers

To install the USB drivers required for the communication between PC and equipment follow the instructions:

1. Connect the equipment in the PC using the USB cable.
2. If there is an available Internet connection, Windows will silently connect to the Windows Update website and install any suitable driver it finds for the device. If no suitable driver is automatically found then you need to insert the CD-ROM, supplied with the equipment, in the PC, run the executable "**usb-install.exe**" and click in "**Install**".



7.3. ST-Logger software

This software makes communication between the equipment and a computer with Windows operative system easier. It makes possible to synchronize the date and time of the equipment internal clock with the computer clock, to transfer the stored date, to clear the memory, to generate test reports, etc.

8. Replacement fuse

To check the instrument **fuse**, remove it with a screwdriver. If the fuse is ruptured replace it by another with the following specifications:

*Fuse Schurter, model SPT 5 x 20 (Time-lag) 15A/250V.
High breaking capacity.*

9. Technical support

Technical support / repair for your equipment can be obtained by contacting SOURCETRONIC:

Customer Service

Tel.: +49 421 277 9999

Fax: +49 421 277 9998

e-mail: info@sourcetric.com
www.sourcetric.com

10. Technical specifications

Test currents	: From 5A up to 200 A (True DC). The test current may be adjusted in steps of 0.2 A from 5 A up to 20 A and steps of 1 A from 20 A to 200 A
Resistance ranges	: 0.1 $\mu\Omega$ up to 2 m Ω , with a resolution of 0.1 $\mu\Omega$. 2 m Ω up to 200 m Ω , with a resolution of 10 $\mu\Omega$. 200 m Ω up to 1 Ω , with a resolution of 1 m Ω .
Measurement principle	: Four-terminal, Kelvin-type.
Protections	: Overcurrent, short-circuit and overheating.
Programmable test time	: Allows to setup the test time from 5 seconds up to 120 seconds.
Basic accuracy	: ± 1 % of reading.
Advanced features	: Digital direct reading of very low resistances in the alphanumeric display, with up to 4½ digits. Very fast and accurate measurements.
Internal memory	: Capacity to store 50 registers with 80 readings each.
Interface	: USB
Environmental protection	: IP54 with closed lid.
Safety class	: Meets the requirements of IEC 61010-1.
Power supply	: Mains: 100-240 V~ 60 Hz.
Operating temperature range	: 0°C to 50°C
Storage temperature range	: -10°C to 60°C.
Humidity range	: 95% RH (non condensing)
Equipment weight	: Approx. 11 kg.
Dimensions	: 502 x 394 x 190 mm
Accessories	: 2 Combined test leads (current and potential), C-clamp type (sargent), 15m/49ft. 1 Power cord. 1 Ground cable. 1 USB communication cable. 1 CD with license key for the software ST-Logger. 1 Case for the accessories. 1 User guide.

Subject to technical change without notice.