

# programmable micro-ohmmeter

## OM 21



OM21 micro-ohmmeter is used for four-wire resistance measurement of very low values (with a resolution of 0.1  $\mu\Omega$ ) up to 20 k $\Omega$ , with an excellent accuracy.

It can be powered from mains or from rechargeable batteries.

The instrument is calibrated electronically, with no internal adjustment needed.

- High resolution: 0.1  $\mu\Omega$
- Programmable by RS232 or IEEE 488 link
- High accuracy: 0.03%
- Choice of current waveforms
- Storage and analysis of 1 000 measurements

### Applications.....

- Cable resistance and resistivity measurements
  - High resolution (0.1  $\mu\Omega$ ),
  - Compensation for sample temperature and thermal emfs,
  - Display in  $\Omega/\text{km}$ .
- Metallisation and ground continuity measurements
  - GAM-EG13 standards,
  - Pulsed or alternate current (10 A),

- Automatic compensation for thermal emfs.

- Contact resistance measurements (connectors, switches, relays)
  - Standard NFC 93050, DIN/IEC,
  - Maximum measurement Voltage limited to 20 or 50 mV,
  - Automatic compensation for thermal emfs.
- Inductive resistance measurement (motors, transformers, etc.)

- Total protection against overvoltages

- Direct current,
- Compensation for thermal emfs and for sample temperature,
- Automatic calculation of winding heating.
- Measurement of heat-sensitive devices (thermistors, temperature-sensitive components)
  - Single-shot, pulsed current, very low power delivered.

### general specifications

**Display** .....  
 26 000 counts, 16-segment illuminated LCD, 11.5 mm high, alphanumeric characters for messages, measurement indication includes value and unit of measurement.  
 Incorrect connections or measurements going beyond range are indicated by an error message.

Manual or automatic range change.

Manual or automatic measurement triggering, with measurement rate programmable from one measurement per second to one per hour.

Four-wire measurement.

**Measurement current** .....

- Amplitude selection (from 100  $\mu\text{A}$  to 10 A,
- Waveform selection
  - continuous,
  - alternate pulses,
  - positive pulses,
- With each type of current, measurements can be single-shot or repetitive (pos-

sibility to select the repetition rate),  
 • Current may also be supplied from an external source.

Measurement time.....  
 < 1 second in continuous mode,  
 < 1.5 second in pulsed mode,  
 < 2 seconds in alternating pulsed mode.

Protection.....  
 • Electronic protection against break-off

currents when measuring an inductive resistance,  
 • Possibility of limiting the voltage across the resistor terminals to 20 or 50 mV.

Environment.....  
 Nominal operating range: 0 to 50°C, 20 to 75% relative humidity.  
 Operating range limits: -10 to 55°C, 10 to 80% relative humidity.

Power supply.....  
 • 110/220 VAC ± 10%, 50/60 Hz,  
 • optional battery with built-in charger.

Presentation.....  
 Bench unit with optional rack mounting kit.  
 Dimensions: 225 x 88 x 300 mm.  
 Weight: 2 to 3 kg depending on options.

## functions

The instrument measures very low value resistances in a four-wire terminal. It has eight measurement ranges. For the same current, the range can be changed manually or automatically. The user has a choice of three current values for each measurement range, except for the extreme ranges.

Temperature coefficient < 10% of the accuracy per degree Celsius.

Automatic compensation for thermal electromotive forces (emfs).....

Range	Resolution	Measurement current	Voltage drop	Accuracy (1)
2 m	0.1 μ	10 A	20 mV	0.05% + 0.3 μ
20 m	1 μ	10 A	200 mV	0.05% + 2 μ
20 m	1 μ	1 A	20 mV	0.05% + 3 μ
200 m	10 μ	10 A	2 V	0.05% + 10 μ
200 m	10 μ	1 A	200 mV	0.05% + 20 μ
200 m	10 μ	100 mA	20 mV	0.03% + 30 μ
2	100 μ	1 A	2 V	0.05% + 100 μ
2	100 μ	100 mA	200 mV	0.03% + 200 μ
2	100 μ	10 mA	20 mV	0.03% + 300 μ
20	1 m	100 mA	2 V	0.03% + 1 m
20	1 m	10 mA	200 mV	0.03% + 2 m
20	1 m	1 mA	20 mV	0.03% + 3 m
200	10 m	10 mA	2 V	0.03% + 10 m
200	10 m	1 mA	200 mV	0.03% + 20 m
200	10 m	100 μA	20 mV	0.03% + 30 m
2 k	100 m	1 mA	2 V	0.03% + 100 m
2 k	100 m	100 μA	200 mV	0.03% + 200 m
20 k	1	100 μA	2 V	0.03% + 1

(1) The accuracy is given as ± (% of the reading + counts). The count corresponds to the value of the last figure displayed, i.e. to the resolution on this range. The accuracy is given over 90 days at 23±1°C.

## additional functions

Automatic temperature compensation of the element measured for temperatures between 0°C and 100°C.....  
 The instrument calculates the resistance value at 20°C.

Element temperature is:  
 - either programmed,  
 - or is measured by a platinum resistance probe (Pt100).  
 Metal type, or its temperature coefficient, is indicated on the OM.

Relative measurements.....  
 The instrument can display:  
 • either  $D = M/R$ ,  
 • or  $D = (M-R)/R$  (i.e. direct read-out in %)  
 (D = reading display, M = value measured, R = stored reference value).

Memory.....  
 Up to 1 000 measurements can be stored, along with their mean, minimum or maximum, and can be read back on the read-out or through digital or analog interfaces.

Two programmable thresholds.....  
 With output on two relays (1 A/220 V AC).

Floating analog output.....  
 0 to 2.5 V (load 2.5 k, 10 mV resolution).  
 An image can be constructed of all or part of the measured values: the origin and extent of the measurements can be programmed to get a "zoom" effect. The measurement values stored in the memory can be extracted and output in the form of analog voltages.

Calculations.....  
 OM21 can calculate automatically the heat-up of a motor or transformer. Similarly it can calculate the resistance per km of single core or multi-core cables.

RS 232C and IEEE 488-2 interfaces.....  
 The standard RS 232C and optional IEEE 488-2 interfaces make it possible, by computer, to:  
 • program the instrument completely,  
 • analyse the measurements (curve plot, printout, etc.)  
 • calibrate the instrument.

## software

The PC software allows programming of the OM21 or 22 from a compatible PC. It is menu-driven, with the operator completely guided by a question and answer system.

A second function of the software is to ma-

nipulate the stored readings; transfer into the PC memory or onto a disk in a file which can be used for spreadsheets; presentation of the readings in the form of tables or graphs.

**Labview driver** .....  
This driver, delivered, on request, free of charge with IEEE version, allows to connect OM with Labview, to command the microhmmeter (OM 21 or 22 with IEEE) from a PC and to process the data.

## accessories

### KELVIN lead set - AN 5806

A pair of measurement leads, each with a KELVIN clip, 1.20 m of wire and two 4 mm plugs. The KELVIN clip can be used for four-wire measurement because there is a perfect galvanic isolation between the current input and the voltage connector. Gold-plated contacts.  
Maximum opening: 1.2 cm.  
Maximum current: 10 A.



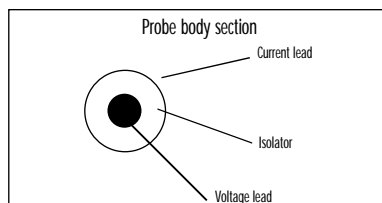
### Large Kelvin clip - AMT 004

One measurement lead with a large Kelvin clip.  
Length of wire: 3 m.  
Equipped of two 4 mm security banana plugs.  
Maximum opening of clip: 3 cm.  
Maximum current: 10 A.



### Kelvin test probe - AMT 003

One measurement lead with a dual probe (concentric).  
Length of rod: 85 mm.  
Diameter of rod: 8 mm.  
Length of wire: 3 m.  
Equipped of two 4 mm security banana plugs.  
Maximum current: 10 A.



### Carrying case - AN 6901

A soft carrying case designed for storage and transport of all bench type instruments (OM 21, 22).  
Dimensions: 31 x 26 x 14 mm.

### Clamping device - 2381

With the help of the clamping device type 2381 and a microhmmeter, the ohmic resistances of test cables and samples of materials in the shape of cords or strips can be measured. Fields of application include production monitoring, quality assurance and general test measurements. The 2381 consists of a robust, warp-resistant, light-metal rail with one movable and one rig clamping device. It allows the measurement of samples 1000 mm long. The clamping device is designed to accommodate cable cross-sections of 0.1 mm<sup>2</sup> to approx. 100 mm<sup>2</sup>. It is equipped with a wire guide 2388.  
Dimensions: 170 x 2100 x 250 mm.  
Weight: 25 kg.

### Rack mounting kit - AN 5884

This kit allows rack mounting of bench instruments. It includes 2 brackets (AN 5883) and a 19" rack panel (3 U).

## ordering instructions

RS 232 programmable micro-ohmmeter  
Basic instrument 10 A  
Basic instrument 10 A + battery and charger  
Basic instrument 10 A + IEEE 488-2  
Basic instrument 10 A + IEEE 488-2 + battery

OM 21-1  
OM 21-2  
OM 21-3  
OM 21-4

### Accessories

Kelvin lead set AN 5806  
Large Kelvin clip AMT004  
Kelvin micro-probe AMT003  
Clamping device 2381  
Wire guide 2388  
Carrying case AN 6901  
Brackets for panel mounting AN 5883  
Rack mounting AN 5884  
RS 232 cable (9-25 pin, female) (1) AN 5874  
RS 232 cable (9-9 pin, female) (1) AN 5875  
RS 232 cable (9-25 pin, male) (1) AN 5876  
IEEE 488 cable AN 5836  
PC 9/25 pin converter AN 5894  
Labview driver OM2-LABV-DRIV  
For OM21-1 and 21-3: power supply 3 V/10 A AMT002



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(1) The RS 232 connector is a 9 pin female