

Ohm and Current Meter

Milli-TO 3

Technical Specifications

General Data

Measuring:	control via START-/STOP-button, remote or internal timer
Reading rate:	approx. 1 reading per second within same range
Ranges:	7 ranges, auto ranging or manual ranging
Function:	controlled by buttons, RS232 interface or remote at rear side
Response time:	to rated accuracy 10 minutes
Displays:	2 LCD's with 2 rows by 20 digits each range display in scientific form (e.g. 16.55 E9 for 16.55 GΩ) LED's to indicate V_M ON! and FAULT, LED's in all buttons
Indications:	limit indication by relay contact (max. 24 V/ 0.5 A) and beeper for overrun or underrun of programmable limit window; overflow or underflow indicated in display as OVERRANGE or UNDERRANGE and send via RS 232
Power Supply:	100 VAC to 240 VAC, 50 Hz to 60 Hz approx. 20 VA
Fuses:	main fuse in Euro-socket 1.6 AT; Rx-Low fuse at the rear side 1.6 AT; fuse in the switching power supply 2 AT (qualified technician required)
Connectors:	at the rear side for LIMIT and Remote via SUB-D 9 pole as well as GND and earth pole via 4 mm panel jack
Safety class:	Schutzklasse 1 (Germany)
Protective System:	Schutzart IP 40 (Germany)
Temperature:	operating: 15 °C - 23 °C - 35 °C storage: -10 °C to +60 °C
Humidity:	max. 50 %, no condensation allowed!
Housing:	desktop case with metal hand grip
Size in mm:	W/H/L 340 x 150 x 300
Weight:	5,7 kg



I_x (Current Measurement)

Measuring range:	0.01 x 10 ⁻¹² A resolution to 1.1 x 10 ⁻³ A
Display:	3½ digit (0.0 to 1.100)
Ranges:	7; full auto ranging or manual ranging
Accuracy at 23 °C +/- 1 K:	range 1 to 5: +/- 0.2 % +2 digit range 6: +/- 0.5 % +2 digit range 7: +/- 1 % +2 digit
Temperature coefficient (15 to 35 °C):	+/- 0.02 % / K
DC input resistance of the current circuit (R _i):	range 1: 200 Ω (auto) range 1: 1.1 kΩ range 2: 10.1 kΩ range 3: 100 kΩ range 4: 1 MΩ range 5: 10 MΩ range 6: 100 MΩ range 7: 1 GΩ
Overvoltage protection at input R _x / I _x :	+/- 10 VDC
Overcurrent protection at input R _x / I _x :	+/- 10 mADC

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High-Ohm (High Resistance Measurement)

Measuring range:

- at measurement voltage

1 V: 0.9×10^3 to $3.3 \times 10^{12} \Omega$

10 V: 9×10^3 to $33 \times 10^{12} \Omega$

100 V: 90×10^3 to $0,33 \times 10^{15} \Omega$

500 V: 450×10^3 to $1.6 \times 10^{15} \Omega$

up to 2×10^{15} detectable
(through current measurement)

Ranges: 7; full auto ranging or manual ranging

Accuracy at 23 °C +/- 1 K within 12 months:

range 1 to 5: +/- 0.3% +2 digits

range 6: +/- 0.5% +2 digits

range 7: +/- 1% +2 digits

Temperature coefficient: 15 °C to 35 °C: +/-0.1% / K

Test voltage: 10 V, 100 V, 500 V
or variable 1 V bis 500 V in
1 V steps

Accuracy of test voltage: at 23 °C: +/- 0.2 %

Temperature coefficient
of test voltage: +/- 0.01 % / K

Test current: max. 3 mA at 10 kΩ
load resistance

Test voltage source: continuous short-circuit
allowed

Overvoltage protection at:

V_M 10 V: 20 VDC

V_M 100 V: 200 VDC

V_M 500 V: 750 VDC

var. V_M 1 V to 500 V: $2 \times V_M$, max. 750 VDC

Test Voltage V_M OFF: EUT deloads over 10 kΩ
(the contact V_M is
connected to GND through
a 10 kΩ resistor)

Overvoltage at V_M OFF: +/- 100 VDC

R_X / I_X connectors: coax jack 4 mm/13 mm
(DIN 47284)

V_M / GND: panel jack 4 mm

Low-Ohm (Low Resistance Measurement)

Measuring Range: 180 mΩ to 180 kΩ

Resolution at 4½-digit Display:

range 1: 10 μΩ

range 2: 100 μΩ

range 3: 1 mΩ

range 4: 10 mΩ

range 5: 100 mΩ

range 6: 1 Ω

range 7: 10 Ω

Test current:

range 1: 1.0 A

range 2: 100 mA

range 3: 10 mA

range 4: 1 mA

range 5: 100 μA

range 6: 10 μA

range 7: 1.0 μA

Display: 2½-digit, 3½-digit, 4½-
digit programmable

Method of measuring: 2- or 4-terminal method
(Kelvin method)
decade constant
current

Compensation and controlling of thermo-voltage:
0 to +/- 20 mV allowed

Accuracy at 23 °C +/- 1K: +/- 0,2 % of input
+/- 2 digit
(typically 0.1 %)

Temperature coefficient (15 to 30 °C):
+/- 0.1 % / K

Max. voltage over EUT: < 4 VDC

Max. external voltage between source clamps:
-24 VDC and +3 VDC

Max. external voltage between sense clamps:
+/- 48 VDC

R_X connectors: 4 x 4 mm jack or 5-pol
DIN connector

Fuse in the low-ohm circuit: 1.6 A MT at the
rear side