### 1 Description

The passive demonstration multimeter is a pointer instrument for direct and alternating voltages and currents. As neither an amplifier nor batteries are needed, the instrument is always ready for operation. The device is particularly suited for demonstration experiments due to the large scale at the front and the function and operating mode selector switches arranged at the front and the back. Measured values are immediately displayed on seven switch-selectable scales, six scales having their zeroes on the left and one scale having it in the centre. The measuring ranges are 1 mA to 10 A for currents and 1 V to 300 V for voltages.

### Safety notes

- Do not measure hazardous contact voltages over 300 V, and measure currents over 2 mA only at voltages that do not exceed 300 V.
- There is shock hazard if the following limits are exceeded at voltages higher than safety extra-low voltages: 2 mA direct current or 0.5 mA alternating current (root-mean-square value) for the current that flows through a non-inductive resistor of 2 kΩ or 45 μA for the charge at voltages up to 15 kV and 350 mJ for the energy stored at voltages over 15 kV. Safety extra-low voltages are voltages up to 60 V direct voltage or 30 V root-mean-square value.
- Do not exceed the maximum voltage of 300 V between any socket and earth.
- Use faultless connection leads only, and for measurements of voltages higher than safety extra-low voltages use safety connection leads (500 600 ff).
- Do not carry out adjustments, maintenance or repair while a voltage is applied to the instrument and the housing is open. Such work has to be done by an expert who is familiar with the risks involved.

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Before putting the demonstration multimeter into operation, examine the housing as well as the control and display components for damages. In the case of malfunction or visible damages, stop operation of the instrument and prevent it from being used inadvertently.
2 Scope of supply
1 Demonstration multimeter, passive
2 Holder, for fixing in the demonstration-experiment-frame (301 300)

3 Technical data
System: moving-coil element
( core magnet)
Accuracy:
Class 1.5 for zero-frequency quantities
( 1.5 % of full-scale value)
Class 2.5 for periodic quantities
( 2.5 % of full-scale value)
Position of normal use: vertical
Frequency range: 10 Hz ... 10 kHz
Overload capacity:
Voltage measuring ranges: 300 V
Current measuring ranges: 1 A (measuring ranges up to 0.3 A)
15 A (measuring ranges up to 10 A)
Large display (front):
Length of scale arc: 200 mm
Height of digits: 25 mm
Scales:
0 ... 1 / 0 ... 3 / 0 ... 10 / 0 ... 30
/ 0 ... 100 / 0 ... 300 / -10 ... 10
Scale division: linear
Number of scale markings
105 (0 ... 1/ 10 / 100)
66 (0 ... 3/ 30/ 300)
42 (-10 ... 10)
Small display (back):
Length of scale arc: 80 mm
Height of digits: 2 mm
Scales:
0 ... 10 / 0 ... 3 / -10 ... 10
Scale division: linear
Number of scale markings
21 (0 ... 10)
33 (0 ... 3)
22 (-10 ... 10)
Insulation:
Insulation: double or reinforced throughout
max. permissible voltage between all sockets and earth: 300 V
Voltage measurement:
Measuring ranges: 1/ 3/ 10/ 30/ 100/ 300 V
Internal resistances: 5.2/ 15.8/ 52.6/ 156/ 525/ 1580
kΩ for direct voltage
0.3 / 1 / 3.3 / 138 / 474/ 1440 kΩ; for alternating voltage
Current measurement:
Measuring ranges: 1/ 3/ 10/ 30/ 100/ 300 mA
1/ 3 / 10 A
Internal resistances: 650/ 262/ 81/ 26/ 8/ 2,6/
0.8/ 0.27/ 0.08 Ω
for direct current
675/ 182/ 10.8/ 3.6/ 3 / 3.8 /
0.8/ 0.3/ 0.15 Ω
for alternating current
Mechanical data:
Dimensions of housing: about 39 cm x 34 cm x 23 cm
Mass: about 5.0 kg
4 Explanation of symbols

⚠️ Danger point (mind instruction sheet)

Moving-coil element (core magnet)

_common earth connection

Earth symbol

Double or reinforced insulation throughout

_alternating current/voltage

Direct current/voltage

1.5 Accuracy class (here: 1.5)

EC mark of conformity

5 Operation

5.1 Zero adjustment

- Disconnect the demonstration multimeter from the measuring circuit, and switch it on.
- Adjust the zero of the desired scale, e.g. with a screwdriver.

5.2 Mounting in the demonstration-experiment-frame

- Attach he holder to the demonstration multimeter, and clamp it with the handle.
- Hang the demonstration multimeter up on a channel of the demonstration-experiment-frame (301 300).
6 Measuring voltages

Voltage measurement up to 300 V:

Attention: do not load the measuring ranges over 300 V.

- Set the measuring function to V with the function switch, and establish the connections.
- Select the kind of current \( \sim \) or \( \equiv \).
- Select one of the scales 0 ... 1, 0 ... 3, 0 ... 10, 0 ... 30, 0 ... 100, 0 ... 300 or -10 ... 10 with the scale selector.

7 Measuring currents

7.1 Current measurement up to 300 mA:

Attention: do not load the measuring ranges over 1 A.

- Set the measuring function to mA with the function switch, and establish the connections.
- Select the kind of current \( \sim \) or \( \equiv \).
- Select one of the scales 0 ... 1, 0 ... 3, 0 ... 10, 0 ... 30, 0 ... 100, 0 ... 300 or -10 ... 10 with the scale selector.

7.2 Current measurement up to 10 A:

Attention: do not load the measuring ranges over 15 A.

- Set the measuring function to A with the function switch, and establish the connections.
- Select the kind of current \( \sim \) or \( \equiv \).
- Select one of the scales 0 ... 1, 0 ... 3, 0 ... 10, or -10 ... 10 with the scale selector.