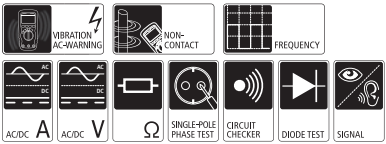
MultiMeter-Compact



Laserliner®
Innovation in Tools

Read the operating instructions and the enclosed brochure „Guarantee and additional notices“ completely. Follow the instructions they contain. Safely keep these documents for future reference.

Function/Application

Multimeter for taking measurements in the range of the overvoltage category CAT III up to max. 1000 V/CAT IV up to max 600 V. The meter can be used to measure DC and AC voltages, direct and alternating currents, resistances, capacitances, frequencies and duty factors within the specified ranges; it can also be used for continuity and diode testing. In addition, the meter is fitted with a non-contact voltage detector and a vibration alarm.

Symbols

Hazardous electrical voltage warning: Unprotected live components inside the device housing may pose a risk of electric shock.

Danger area warning

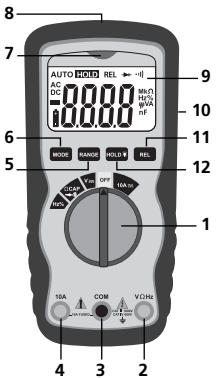
Protection class II: The test device has reinforced or double insulation.

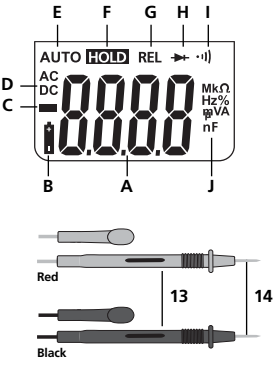
CAT III Overvoltage category III: Equipment in fixed installations and for applications where specific requirements with regard to the reliability and availability of equipment have to be met, e.g. circuit-breakers in fixed installations and devices used in industrial applications which are permanently connected to the fixed installation.

CAT IV Overvoltage category IV: Devices such as electricity meters, overcurrent circuit breakers and ripple-control units, which are intended for use at or near the infeed into the electrical installation of buildings, and specifically from the main distribution to the supply system.

Safety instructions

- Make sure that you always select the correct connections, the correct rotary switch position and the correct range for the measurement to be taken.
- Before measuring or checking the resistance, continuity, diodes or capacitance, disconnect the power supply to the electric circuit. Check that all high-voltage capacitors are discharged.
- Isolate the device from all current sources before opening the battery compartment cover.
- If possible, do not work alone.
- If you have to take hold of the measuring spikes, do so by the grip sections only. Do not touch the measuring contacts whilst the measurement is being taken.
- If the device comes into contact with moisture or other conductive residue, work must not be carried out under voltage. At and above voltages of 25 V AC/60 V DC, the presence of moisture creates the risk of life-threatening electric shocks. Clean and dry the device before use. When using the device outdoors, make sure that the weather conditions are appropriate and/or that suitable protection measures are taken.
- If you are working with voltages higher than 25 V AC/60 V DC, exercise extreme caution. Touching the electrical conductors at such voltages poses a risk of life-threatening electric shocks.
- Do not use the device in environments in which there are conductive particles or where the occurrence of moisture (in the form of condensation, for example) can create transient conductivity.
- The device must only be used in accordance with its intended purpose and within the scope of the specifications.
- If you are taking measurements in the hazardous vicinity of electrical installations, do not work alone and seek guidance from an electrically skilled person before starting work.
- Before taking any measurements, make sure that both the area to be tested (e.g. a line), the test device and the accessories used (e.g. connection cable) are in proper working order. Test the device by connecting it to known voltage sources (e.g. a 230 V socket in the case of AC testing or a car battery in the case of DC testing). Stop using the device if one or a number of its functions fails.





1 Rotary switch to set the measuring function

2 Red input socket (+)

3 Black COM socket (–)

4 Red 10 A input socket (+)

5 Select range manually

6 Switch over measuring function

7 Indicator (non-contact voltage detector)

8 Sensor (non-contact voltage detector)

9 LCD

10 Holder for test prods

11 Relative function

12 Hold current measured value, LCD illumination

13 Test prods

14 Measuring contacts

A Measured value display (4 segments, 4000 digits)

B Low battery charge

C Negative measured values

D Direct (DC) or alternating (AC) variables

E Automatic range selection

F Current measured value is held

G Relative function

H Diode test

I Continuity test

J Measurement units: mV, V, µA, mA, Ohm, kOhm, MOhm, nF, µF, Hz, kHz, MHz, %

Display: O.L: open line/ overflow: measuring circuit not closed or measuring range exceeded

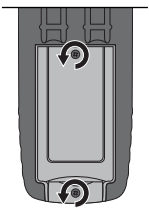
Maximum input power

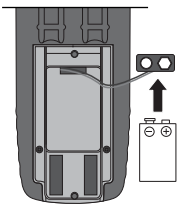
Function	Maximum input
V DC/V AC	1000 V DC, 1000 V AC
A DC/AC	10 A DC/AC (max. 30 seconds every 15 minutes)
Frequency, resistance, capacitance, duty factor, diode test, continuity test	1000 V DC/AC

AUTO OFF function

In order to preserve the batteries, the meter switches off automatically if it is left idle for 15 minutes.

1 Insertion of batteries

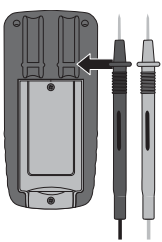


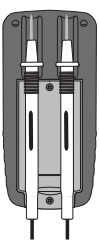


1 x 9V NEDA 1604 / IEC 6F22

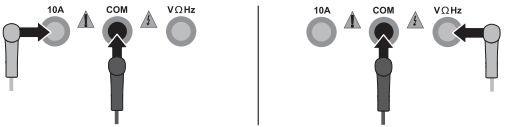
2 Attaching the test prods

In order to avoid the risk of injury, the test prods must always be kept in the holder on the rear of the meter when not in use and during transport.





3 Connection of test prods

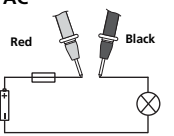


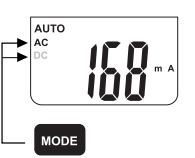
The black test prod (–) must always be connected to the „COM socket". When taking current measurements, the red test prod (+) must be connected to the „10 A socket". For all other measuring functions, the red test prod must be connected to the „VΩHZ socket".

! Please ensure that the test prods are connected correctly before each measurement. Taking a voltage measurement with 10 A current connections plugged in can cause the installed fuse to trip and result in damage to the measuring circuit.

4 10A≂ Current measurement DC/AC

To take a current measurement, turn the rotary switch to position „10 A" and press the „Mode" button to set the voltage mode (AC, DC). Disconnect the circuit before connecting the meter. Then connect the measuring contacts to the object to be tested. The measured value acquired and the polarity appear on the display. Disconnect the circuit again before disconnecting the meter.

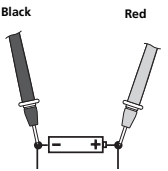


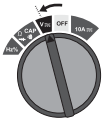


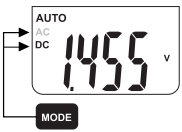
! Do not measure currents above 10 A for longer than 30 seconds. This could damage the device or the test prods.

5 V⎓ Voltage measurement DC/AC

To take a voltage measurement, turn the rotary switch to position „V" and press the „Mode" button to set the voltage mode (AC, DC). Then connect the measuring contacts to the object to be tested. The measured value acquired and the polarity appear on the display.

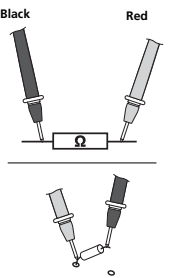






6 Ω Resistance measurement

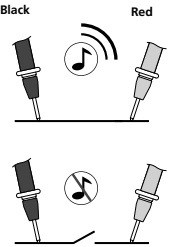
To measure the resistance, turn the rotary switch to position „Ω". Then connect the measuring contacts to the object to be tested. The measured value acquired appears on the display. If „O.L." appears on the display instead of a measured value, either the measuring range has been exceeded or the measuring circuit is not closed or has been interrupted. Resistances can only be measured correctly in isolation; therefore, the components might need to be disconnected from the remainder of the circuit.



! When measuring resistance, to avoid the risk of the results of a measurement being distorted, there must be no traces of dirt, oil, solder spray or other contamination on the test prods.

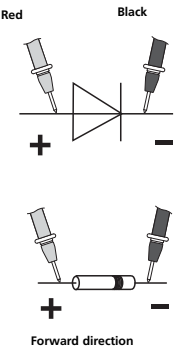
7 Continuity test

To test continuity, turn the rotary switch to position „Ω“ and press the „Mode“ switch twice to activate the „Continuity test“ function. Then connect the measuring contacts to the object to be tested. A measured value of < 150 ohms is recognised as continuity; this is confirmed by an audible signal. If „O.L.“ appears on the display instead of a measured value, either the measuring range has been exceeded or the measuring circuit is not closed or has been interrupted.



8 Diode test

To test the diode, turn the rotary switch to position „Ω“ and press the „Mode“ button once to activate the „Diode test“ function. Then connect the measuring contacts to the diode. The measured value acquired for the forward voltage appears on the display. If „O.L.“ appears on the display instead of a measured value, the diode has either been tested in the reverse direction or is faulty. If 0.0 V is measured, the diode is faulty or a short-circuit has occurred.



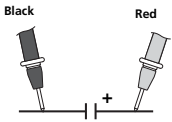
Forward direction

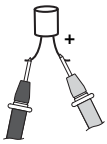
Reverse direction

Forward direction

9 CAP Capacitance measurement

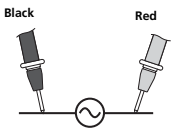
To take a capacitance measurement, turn the rotary switch to position „CAP“ and press the „Mode“ button three times to activate the „Capacitance measurement“ function. Then connect the measuring contacts to the object to be tested. In the case of poled capacitors, connect the positive pole to the red test prod.

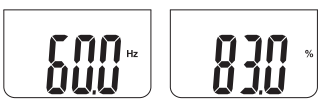




10 Hz % Frequency and duty factor measurements

To take a frequency measurement, turn the rotary switch to position „Hz“. Then connect the measuring contacts to the object to be tested. Press the „Mode“ button to switch from Hz to % (duty factor).





11 Auto range/Manual range

The „Auto range“ function is activated automatically when the meter is switched on. Auto range searches for the best possible range for each measurement in the corresponding measuring functions. Press the „Range“ button to activate manual range selection, then press the „RANGE“ button several times until you reach the desired range. Pay attention to changes in decimal places or units. To return to the „Auto range“ range, press the „RANGE“ button and hold it down for 2 seconds. „AUTO“ reappears on the display. The „Range“ function can only be used for voltage, current and resistance measurements.

12 Comparative measurement

The comparative measurement function takes a measurement relative to a reference value that has been saved previously. This enables the difference between the current measured value and the saved reference value to be displayed. Press the „REL" button whilst a reference measurement is being taken in the corresponding measuring function. The display now shows the difference between the current measurement and the set reference value. Press the „REL" button again to deactivate the function. The „Rel" function can only be used for voltage, current and capacitance measurements, as well as continuity tests.

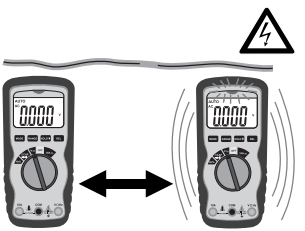
13 Hold function

The „Hold" function enables you to keep the current measured value on the display. Press the „HOLD" button to activate and deactivate the function.

14 LCD-Backlight

15 Voltage detection, non-contact (AC warning)

The non-contact voltage detector integrated in the meter is able to detect AC voltages from 100 V to 600 V, thus enabling live cables or cable breaks, for example, to be identified. Turn the rotary switch to position „V" and run the voltage sensor along the object to be tested (5 - 10 mm). The display lights up and the device starts to vibrate if AC voltage is detected.



! Non-contact voltage detection is no substitute for conventional voltage testing. As the device detects an electrical field, it will react even to static charge.

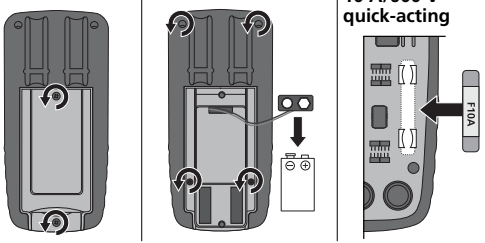
16 Voltage detection, single-pole phase test

For reasons of safety, you must disconnect the black measuring lead from the COM socket on the device to take this measurement. Turn the rotary switch to position „V". Connect the red test prod to the phase or neutral conductor. The red LED only lights up if the phase conductor is live. When the single-pole phase test is carried out on the outer conductor, the indicator function may be adversely affected under certain conditions (e.g. when insulating personnel protective equipment is used or at insulated locations).

! The single-pole phase test is not suitable for checking for zero voltage. To do this, you need to carry out a two-pole phase test.

17 Replacing the fuse

To replace the fuse, first disconnect the test prods from their voltage source and then from the device. Remove all screws from the rear of the meter and then remove the battery. Open the housing and replace the fuse with one of the same type and specification (10 A/600 V). Close the housing and carefully screw the meter back together.



18 Calibration

The meter needs to be calibrated and tested on a regular basis to ensure it produces accurate measurement results. We recommend carrying out calibration once a year.

Technical data

Function	Range	Accuracy
DC voltage	400.0 mV	± (0.5% rdg ± 2 digits)
	4.000 V 40.00 V 400.0 V	± (1.2% rdg ± 2 digits)
	600 V	± (1.5% rdg ± 2 digits)
AC voltage	400.0 mV	± (1.5% rdg ± 4 mV)
	4.000 V	± (1.2% rdg ± 2 digits)
	40.00 V 400.0 V	± (1.5% rdg ± 3 digits)
	600 V	± (2.0% rdg ± 4 digits)
DC current	10 A	± (2.5% rdg ± 5 digits)
AC current	10 A	± (3.0% rdg ± 7 digits)
Resistance	400.0 Ω	± (1.2% rdg ± 4 digits)
	4.000 kΩ	± (1.0% rdg ± 2 digits)
	40.00 kΩ 400.0 kΩ 4.000 MΩ	± (1.2% rdg ± 2 digits)
	40.00 MΩ	± (2.0% rdg ± 3 digits)
Capacitance	40.000 nF	± (5.0% rdg ± 50 digits)
	400.0 nF	± (3.0% rdg ± 5 digits)
	4.000 µF	
	40.00 µF	
	100.0 µF	± (5.0% rdg ± 5 digits)
Frequency	9.999 Hz	± (1.5% rdg ± 5 digits)
	99.99 Hz	
	999.9 Hz	± (1.2% rdg ± 3 digits)
	9.999 kHz	
	99.99 kHz	
	999.9 kHz	
	9.999 MHz	± (1.5% rdg ± 4 digits)

Duty factor	0.1%…99.9%	± (1.2% rdg ± 2 digits)
Diode test	0.3 mA	± (10% rdg ± 5 digits)
Polarity	Sign for negative polarity	
LCD	0 … 3999	
Fuse	10 A/600 V quick-acting, 240 A2/s (6.35 x 31.8 mm)	
Protection class	II, double insulation	
Overvoltage	CAT III - 1000 V, CAT IV - 600 V	
Pollution degree	2	
Test standards	EN 61326, EN 61010-1, EN 61010-2-031	
Max. rel. humidity	80% non-condensing	
Operating temperature	0°C to 55°C	
Power supply	1 x 9 V battery (NEDA 1604, IEC 6F22)	
Dimensions	150 x 70 x 48 mm	
Weight	255 g	

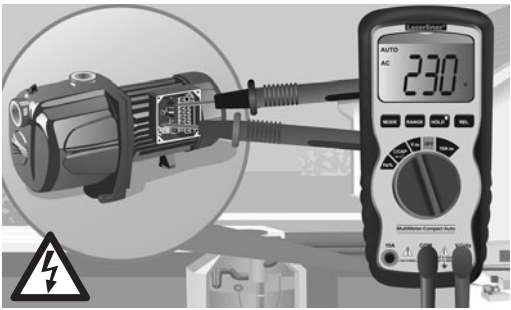
Subject to technical alterations. 06.2010

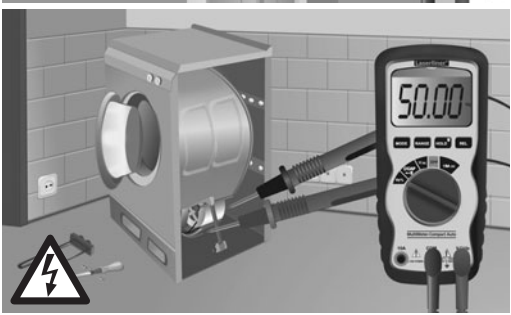
EU directives and disposal

This device complies with all necessary standards for the free movement of goods within the EU.

This product is an electric device and must be collected separately for disposal according to the European Directive on waste electrical and electronic equipment.

Further safety and supplementary notices at:
www.laserliner.com/info





SERVICE

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