

**To all residents of the European Union**  
**Important environmental information about this product**



This symbol on the device or the package indicates that disposal of the device after its lifecycle could harm the environment.

Do not dispose of the unit (or batteries) as unsorted municipal waste; it should be taken to a specialised company for recycling.

This device should be returned to your distributor or to a local recycling service.

Respect the local environmental rules.

**If in doubt, contact your local waste disposal authorities.**

## 1. SAFETY

### 1.1. SAFETY INFORMATION

This multimeter has been designed in accordance with IEC-1010. This norm pertains to electronic measuring instruments that emit pollution 2 and belong to an overvoltage category (CAT II).

Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good running order.

Full compliance with safety standards can only be guaranteed when the buyer uses the test leads supplied with this packaging. If necessary, they should be replaced with identical leads.

### 1.2. SAFETY SYMBOLS



Important safety information, refer to the user manual.



Dangerous voltage is possible.



Earthing.



Double insulation (class II-protection)



Replace a blown fuse by a fuse with the same ratings as specified in this manual.

## 2. MAINTENANCE

- Before opening the case, always disconnect the test leads from all live circuits.
- Avoiding fire risks : respect the specified voltage and current ratings when replacing the fuse.

F 200mA / 250V (Quick acting)

- Do not use the device unless the back cover is in place and securely fastened.
- Do not apply abrasives or solvents to the meter. Use a damp cloth and mild detergent for cleaning purposes.

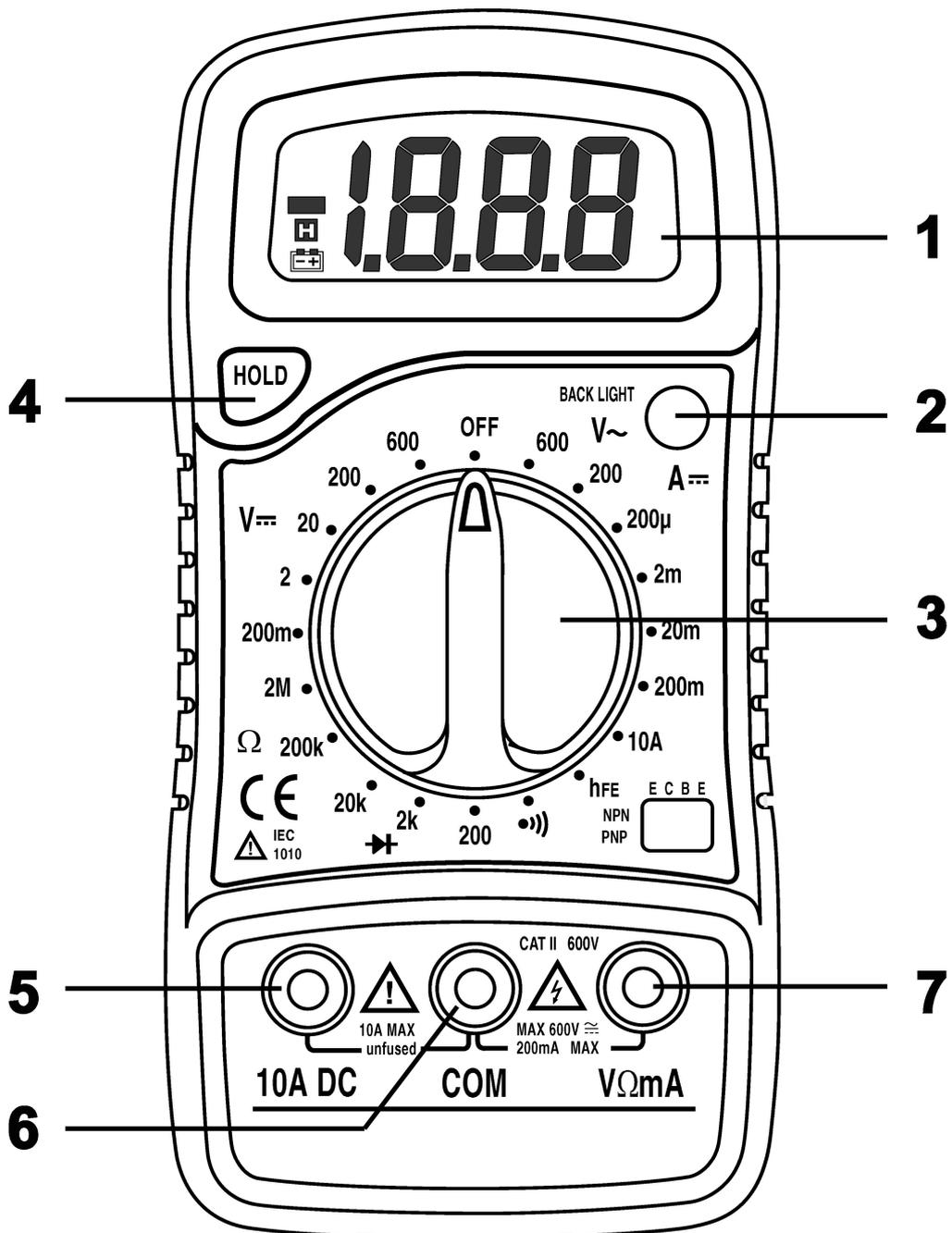
## 3. DURING USE

- Never exceed the limit value for protection. This limit value is listed separately in the specifications for each range of measurement.
- Do not touch unused terminals when the meter is linked to a circuit which is being tested.
- Never use the meter with category II installations when measuring voltages that might exceed the safety margin of 600V above earth ground.
- Set the range selector at its highest position if the intensity of the charge to be measured is unknown beforehand.
- Disconnect the test leads from the tested circuit before rotating the range selector in order to change functions.
- When carrying out measurements on a TV set or switching power circuits, always remember that the meter may be damaged by any high amplitude voltage pulses at test points.
- Always be careful when working with voltages above 60Vdc or 30Vac rms. Keep your fingers behind the probe barriers at all times during measurement.
- Before attempting to insert transistors for testing, always verify if the test leads have been disconnected.
- Components should not be connected to the hFE socket while test leads are being used to execute voltage measurements.
- Never perform resistance measurements on live circuits.

## 4. GENERAL DESCRIPTION

The device is a battery-operated, hand-held 3 ½ digital multimeter for measuring DC and AC voltages, DC current and resistance. It also offers the possibility of executing continuity tests and of testing diodes and transistors. The back light is optional.

## 4.1. FRONT PANEL



## 4.2. FRONT PANEL DESCRIPTION

- ① Display  
3 ½ digits, 7 segments, LCD : 15mm high
- ② Back light  
When this button is pushed, the back light will illuminate your display for approximately 5 seconds.
- ③ Rotary switch  
This switch is used to select functions and desired ranges as well as to turn the meter on/off.
- ④ Hold button  
Upon pushing this button, the display will retain the last reading and the ""-symbol will remain on the LCD until the button is pushed again.
- ⑤ "10A" jack  
Insert the red test lead in this connector in order to measure a max. current of 10A.
- ⑥ "COM" jack  
Insert the black (negative) test lead.
- ⑦ "VΩmA" jack  
Insert the red (positive) test lead in this connector to measure voltage, resistance and current (except 10A).

## 5. SPECIFICATIONS

Maximum accuracy is achieved during a one-year period after calibration. The ideal set of circumstances requires a temperature of 18 to 28°C (64°F to 82°F) with a maximum relative humidity of 80%.

Maximum voltage between terminals and earth ground	CAT II 600V
<b>Fuse protection</b>	F 200mA / 250V
Power	9V battery
Display	LCD, 1999 counts, updates 2-3/sec.
Measuring method	Dual-slope integration A/D converter
Overrange indication	Only figure "1" on the display
Polarity indication	"-" displayed for negative polarity
Operating temperature	0 to 40°C
Storage temperature	-10°C to 50°C
Low battery indication	"  " appears on the display
Dimensions	138 x 69 x 31mm
Weight	Approx. 170g

## 5.1. DC VOLTAGE

Range	Resolution	Accuracy
200mV	100 $\mu$ V	$\pm 0.5\%$ of rdg $\pm 2$ digits
2V	1mV	$\pm 0.5\%$ of rdg $\pm 2$ digits
20V	10mV	$\pm 0.5\%$ of rdg $\pm 2$ digits
200V	100mV	$\pm 0.5\%$ of rdg $\pm 2$ digits
600V	1V	$\pm 0.8\%$ of rdg $\pm 2$ digits

Overload protection : 250Vrms for the 200mV range and 600Vdc or rms ac for other ranges.

## 5.2. DC CURRENT

Range	Resolution	Accuracy
200 $\mu$ A	0.1 $\mu$ A	$\pm 1\%$ of rdg $\pm 2$ digits
2mA	1 $\mu$ A	$\pm 1\%$ of rdg $\pm 2$ digits
20mA	10 $\mu$ A	$\pm 1\%$ of rdg $\pm 2$ digits
200mA	100 $\mu$ A	$\pm 1.5\%$ of rdg $\pm 2$ digits
10A	10mA	$\pm 3\%$ of rdg $\pm 2$ digits

Overload protection : F 200mA / 250V fuse. (no fuse for the 10A range).

## 5.3. AC VOLTAGE

Range	Resolution	Accuracy
200V	100mV	$\pm 1.2\%$ of rdg $\pm 2$ digits
600V	1V	$\pm 1.2\%$ of rdg $\pm 2$ digits

Overload protection : 600Vdc or rms ac for all ranges.

Frequency range : 40Hz to 400Hz. Response : average, calibration in rms of a sine wave.

## 5.4. DIODE & CONTINUITY

Range	Description
	If continuity exists (less than 60 $\Omega$ ), built-in buzzer will sound
	Displays the diode's approx. forward voltage drop

Overload protection : 250Vdc or rms ac

## 5.5. RESISTANCE

Range	Resolution	Accuracy
200 $\Omega$	0.1 $\Omega$	$\pm 0.8\%$ of rdg $\pm 2$ digits
2k $\Omega$	1 $\Omega$	$\pm 0.8\%$ of rdg $\pm 2$ digits
20k $\Omega$	10 $\Omega$	$\pm 0.8\%$ of rdg $\pm 2$ digits
200k $\Omega$	100 $\Omega$	$\pm 0.8\%$ of rdg $\pm 2$ digits
2M $\Omega$	1k $\Omega$	$\pm 1.0\%$ of rdg $\pm 2$ digits

Maximum open circuit voltage : 3.2V

Overload protection : 250Vdc or rms ac for all ranges.

## 5.6. TRANSISTOR hFE TEST (0-1000)

Range	Tested range	Tested current	Tested voltage
NPN & PNP	0-1000	I <sub>b</sub> = 10 $\mu$ A	V <sub>cd</sub> = 3V

## 6. OPERATING INSTRUCTIONS

### 6.1. DC VOLTAGE MEASUREMENT

1. Connect the red test lead to the "V $\Omega$ mA" jack and the black lead to the "COM" jack.
2. Set the rotary switch in the desired DCV position. If the voltage to be measured is unknown beforehand, you should set the range switch in the highest range position and then reduce gradually until the ideal resolution is obtained.
3. Connect the test leads to the source being measured.
4. Read the voltage value on the LCD display along with the polarity of the red lead connection.

### 6.2. DC CURRENT MEASUREMENT

1. Connect the red test lead to the "V $\Omega$ mA" jack and the black test lead to the "COM" jack (switch the red lead to the "10A" jack for measurements between 200mA and 10A).
2. Set the rotary switch (DCA) in the desired position.
3. Open the circuit in which the current is to be measured and connect the test leads to the circuit **IN SERIES**.
4. Read the current value and the polarity of the red lead connection on the LCD display

### 6.3. AC VOLTAGE MEASUREMENT

1. Connect the red test lead to the "V $\Omega$ mA" jack and the black test lead to the "COM" jack.
2. Set the rotary switch in the appropriate ACV position.
3. Connect the test leads to the source to be measured.
4. Read the voltage value on the LCD display.

### 6.4. RESISTANCE

1. Connect the red test lead to the "V $\Omega$ mA" jack and the black test lead to the "COM" jack (the red lead has a positive polarity "+").
2. Set the rotary switch in the appropriate " $\Omega$ " range position.
3. Connect the test leads to the resistor to be measured and read the LCD display.
4. If the resistance being measured is connected to a circuit, turn off the power and discharge all capacitors before applying the test probes.

### 6.5. DIODE TEST

1. Connect the red test lead to "V $\Omega$ mA" jack and the black one to the "COM" jack (the red lead has a positive polarity "+").
2. Set the rotary switch in the " $\rightarrow$ +" position.
3. Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode of the diode. The approx. forward voltage drop of the diode will be displayed. If the connection is reversed, the display will merely show a "1".

### 6.6. TRANSISTOR TEST

1. Set the rotary switch in the "hFE" position.
2. Determine whether the transistor under testing is NPN or PNP and locate the emitter, base and collector leads. Insert the leads into the proper holes of the hFE-socket on the front panel.
3. Read the approximate hFE-value obtained under the following test conditions : a base current of 10 $\mu$ A and Vce 3V.

## 6.7. AUDIBLE CONTINUITY TEST

1. Connect the red test lead to "V $\Omega$ mA" and the black one to "COM".
2. Set the range switch in the "•))" position.
3. Connect the test leads to two points of the circuit to be tested. If continuity exists, the built-in buzzer will sound.

## 7. BATTERY & FUSE REPLACEMENT

When " is displayed, the battery should be replaced.

Fuses rarely need replacement and blown fuses almost always result from human error.

To replace the battery or fuse (200mA / 250V), simply remove the 2 screws at the back of the case. Remove the old specimen and insert the new one.

Please remember to observe battery polarity.

## 8. WARNING



Before attempting to open the case, verify if the test leads have been disconnected. Before using the meter, please remember to close the case and tighten the screws properly in order to avoid electroshocks.

## 9. ACCESSORIES

- User manual
- Set of test leads
- Gift box
- 9V battery
- Holster