PHILEX **Digital Multimeter with Temperature Measurement**

83002R

USER GUIDE

Philex Customer Careline 08457 573479

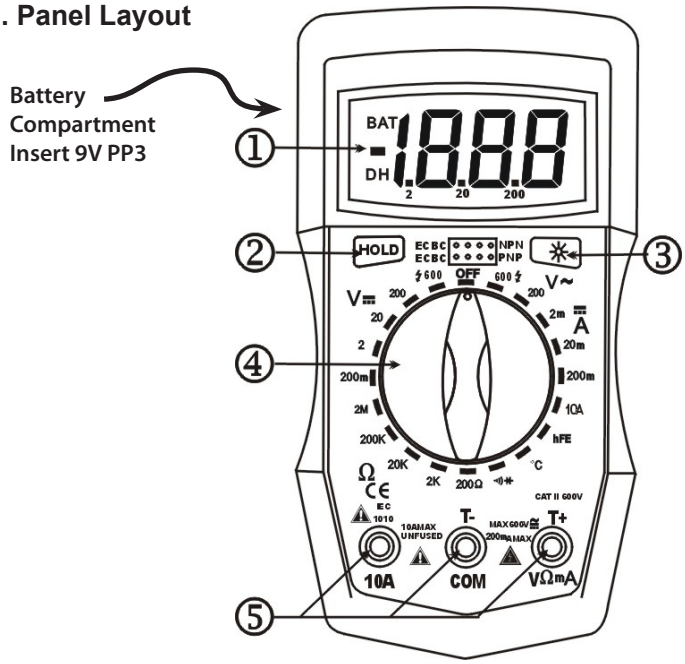
1. Overview

This multimeter is characterized by a compact rugged construction with protective holster and stand. The LCD Screen with 16mm display gives clear readings even in low light when the back light can be switched on. Features include sophisticated A/D converter in conjunction with overload protection.

Measures: DC & AC voltage, DC current Resistance and Temperature. Tests: Continuity, Diode forward bias and Transistor hFE gain. Includes standard probe test leads as well as temperature probe leads.

Before use you will need to fit a 9V PP3 battery (not supplied) in the compartment located on the back of the meter. To open the compartment remove the cross headed screw from the lid and lever open, clip the terminal studs over the battery terminal caps, close the compartment lid and screw tightly shut.

2. Panel Layout



1 LCD Display: 3½ digits, character 16mm high
2 Data-hold Switch (HOLD).
3 Back Light Button Switch: Press this button to switch on back light in low light conditions, the light will switch off automatically in 5 seconds. Press again to switch it on again. If the battery power is low the light will dim.
4 Rotary Switch: use this switch to select functions and ranges
5 T+V Ω mA Input socket; 10A Input socket; T- COM Input socket

3. Safety Information

3-1 This meter is designed according to IEC-1010 for electronic measuring instruments with an over-voltage category (CAT II) and pollution 2
3-2 Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good operating condition.
3-3 Safety symbols:
⚠ important safety information, refer to the operating manual.
⚠ Danger - high voltage.
⧈ Double insulation (protection Class II)

4. User Precautions

4-1 For safe use of the meter, use only the test leads supplied. If your test leads are damaged make sure they are replaced with leads of the same quality and specification.
4-2 Always use the meter with the blue holster in place.
4-3 Always check that the range switch is set to the correct position for the test being made.
4-4 Do not exceed the maximum inputs shown on the dial or in these instructions. Exceeding set inputs increases the chance of electric shock and can damage your meter.
4-5 When measuring TV sets or switched power, avoid high voltage components and high output pulse supplies.
4-6 During measurement be careful not to alter the Range switch position accidentally.
4-7 Take extra care to avoid bodily contact with live surfaces when measuring high voltage (especially more than DC 60V & AC 30V).
4-8 The Protection fuse should only be replaced with a fuse of the same type and specification.

5. GENERAL SPECIFICATIONS

5-1 Max Voltage between input terminal and Earth Ground: CAT II 600V
5-2 Over-range Indication: display "1" for the significant digit.
5-3 Automatic display of negative polarity "_" .
5-4 Low Battery Indication: '🪫' displayed
5-5 Max LCD display: 1999 (31/2 digits)
5-6 Fuse protection: F-200mA/250V (Ø5x20mm)
5-7 Power Supply: 9V battery, 6F22 or NEDA 1604
5-8 Operating Temp.: 0˚C to 40˚C (relative humidity <85%)
5-9 Storage Temp.:-1˚C to 50˚C (relative humidity <85%)
5-10 Guaranteed precision Temp.: 23±5 ˚C (relative humidity <85%)
5-11 Dimensions: 69x138x31mm (with holster)
5-12 Weight: approx. 170g (including battery)

6. Testing Specifications

Accuracy is specified for a period of 1 year after calibration and a temperature from 18˚C to 28˚C (64˚F to 82˚F) with relative humidity up to 75%.

6-1 DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	±(0.5% of rdg + 10 digit)
2V	1mV	±(0.5% of rdg + 10 digits)
20V	10mV	±(0.5% of rdg + 10 digits)
200V	100mV	±(0.8% of rdg + 10 digits)
600V	1V	±(1.2% of rdg + 10 digits)

- Input Impedance: 10MΩ
- Overload protection: 250V for 200mV range, effective DC or AC 600V for other ranges

6-2 AC Voltage

Range	Resolution	accuracy
200V	100mV	±(1.2% of rdg + 20 digits)
600V	1V	±(1.2% of rdg + 20 digits)

- Frequency Range: 40 to 400Hz
- Response: average, calibrated in rms of sine wave

6-3 DC Current

Range	Resolution	Accuracy
2mA	1μA	±(1.0% of rdg + 10 digits)
20mA	10μA	±(1.0% of rdg + 10 digits)
200mA	100μA	±(1.5% of rdg + 20 digits)
10A	10mA	±(3.0% of rdg + 20 digits)

- Overload protection: F 200mA/250V fuse

Note: [1] 10A range: not fused

6-4 Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(1.5% of rdg + 25 digits)
2KΩ	1Ω	±(0.8% of rdg + 20 digits)
20KΩ	10Ω	±(0.8% of rdg + 20 digits)
200KΩ	100	±(0.8% of rdg + 20 digits)
2MΩ	1KΩ	±(1.2% of rdg + 25 digits)

- Overload protection: 250V effective value

6-5 Temperature

Range	Test Range	Accuracy
-30~400 ˚C	1˚C	±(1.2% of rdg +5 digits)
400~1000 ˚C	1˚C	±(2.0% of rdg + 15 digits)

- Overload Protection: 250V DC or rms AC

6-6 Transistor hFE Test

Range	Test Range	Test Current / Voltage
NPN & PNP	0-1000	Ib=10uA / Vce=3V

6-7 Diode Test

Range	Resolution	Function
⏩	1mV	Display: read approximate forward voltage of diode

- Overload Protection: 250V effective value
- Forward DC current: approximate 1mA
- Reversed DC voltage: approximate 3.0V

6-8 Continuity

Range	Function
•))	Built-in buzzer will sound if resistance is lower than 50Ω

- Overload protection: 250V effective value
- Open circuit voltage: approximate 3.0V

7. OPERATING INSTRUCTIONS

7-1 Attention before operation

7-1-1 Check 9V battery. If the voltage is less than 7V, display will show "🔋", the battery should be replaced to ensure accurate measurement.

7-1-2 Pay attention to the "⚠" beside test lead sockets, printed beside it is the maximum value for the input voltage or current for each socket.

7-1-3 The range switch should be set to the range to be measured before testing.

7-2 Measuring DC Voltage

7-2-1 Connect the black test lead to COM socket and the red to VΩmA socket.

7-2-2 Set the rotary switch to a suitable V⎓ (voltage) range position.

7-2-3 Connect test leads across the source or load to be measured.

7-2-4 The voltage reading appears on the LCD.The polarity is indicated along with the voltage value.

NOTE:

1. If you are not sure of the range to be measured, set the range switch to the maximum (600V) setting and then reduce the range until you get a reading.
2. If the LCD shows '1' or '-1', it indicates that you need to switch to a higher voltage setting.
3. Do not try to measure voltages exceeding 600V, it may be possible to get a reading, but your meter may be damaged and you risk receiving an electric shock.
4. Take extra care to avoid contact with live surfaces when measuring high voltages.

7-3 Measuring AC Voltage

7-3-1 Connect the black test lead to COM socket and the red to VΩmA socket.

7-3-2 Set the rotary switch to a suitable V~ range position.

7-3-3 Connect test leads across the source or load to be measured.

7-3-4 The voltage reading appears on the LCD.

NOTE:

1. If you are not sure of the range to be measured, set the range switch to the maximum (600V) setting
2. If the LCD shows '1' or '-1', it indicates that you need to switch to a higher voltage setting.
3. Do not try to measure voltages exceeding 600V, it may be possible to get a reading, but your meter maybe be damaged and you risk receiving an electric shock.
4. Take extra care to avoid contact with live surfaces when measuring high voltages.

7-4 Measuring DC Current

7-4-1 Connect the black test lead to COM socket and the red to the VΩmA socket for a maximum 200mA current, for a maximum 10A current, move the red lead to the 10A socket.

7-4-2 Set the rotary switch to a suitable A⎓ range position.

7-4-3 Connect test leads in series with the load to be measured.

7-4-4 The current reading appears on the LCD. The polarity will be indicated along with the current value.

NOTE:

1. If you are not sure of the range to be measured, set the range switch to the maximum (10A) setting.
2. If the LCD shows '1' or '-1', it indicates that you need to switch to a higher range setting.
3. When the VΩmA socket is used do not exceed 200mA as this will blow the fuse. Although the 10A socket is not fused do not exceed 10A current and do not leave connected for more than 1 sec to avoid overheating the meter.

7-5 Measuring Resistance

7-5-1 Connect the black test lead to the COM socket and the red to VΩmA socket.

7-5-2 Set the rotary switch a suitable Ω range position.

7-5-3 Connect test leads across the resistance to be measured.

7-5-4 The resistance reading appears on the LCD.

NOTE:

1. If the LCD shows '1', it indicates that you need to switch to a higher Ω (resistance) setting.
2. When measuring resistance above 1MΩ, allow a few seconds for the meter reading to stabilise.
3. When the input is not connected, i.e. the circuit is open, the figure '1' will be displayed for the over-range condition.
4. When checking in-circuit resistance, be sure the circuit under test has all power removed and that all capacitors have been discharged fully.
5. If you are not sure of the range to be measured, set the range switch to the maximum resistance (2MΩ) setting.

7-6 Measuring Temperature

7-6-1 Set the rotary switch at the ˚C range position.

7-6-2 The LCD will show the current temperature of the environment.

7-6-3 When measuring temperature with the thermocouple supplied, insert the 'K' type thermocouple probe red plug into theVΩmA socket and the black plug into the COM socket)

7-6-4 You can get a reading from the LCD.

7-6-5 To improve the accuracy of temperature measurement, leave the meters' back light switched off during measurement.

7-7 Transistor Testing

7-7-1 Set the rotary switch at 'hFE' position.

7-7-2 Determine whether the transistor under test is NPN or PNP and locate the emitter, base and collector leads. Insert the leads into the correct holes of hFE socket on the front panel.

7-7-3 Read the approximate hFE value at the testing condition of base current Ib10μA and Vce 3V.

7-8 Diode Testing

7-8-1 Connect the black test lead to the COM socket and the red to VΩmA socket. (the polarity of the red lead is '+')

7-8-2 Set the rotary switch to the ⏩ range position.

7-8-3 Connect the red lead to the anode and the black lead to the cathode of the diode to be tested.

7-8-4 You can get a reading from LCD.

NOTE:

1. The meter will show the approximate forward voltage drop of the diode.
2. If the lead connections are reversed, the reading will be '1' .

7-9 Continuity Testing

7-9-1 Connect the black test lead to the COM socket and the red to VΩmA socket.

7-9-2 Set the rotary switch at the •)) range position.

7-9-3 Connect the test leads across two points of the circuit to be tested.

7-9-4 If continuity exists (i.e. resistance is less than about 50Ω), the built-in buzzer will give a continuous tone.

NOTE:

If there is no continuity or the resistance is greater than 50Ω, the reading will be '1' .

8. Maintenance

8-1 Make sure test leads are disconnected from any circuit under test before you open the case or remove the battery cover.

8-2 To avoid electrical shock, disconnect test leads from circuit under test before replacing the fuse. For protection against fire, replace fuses only with specified ratings: F-200mA/250V fuse.

8-3 Replace the test leads immediately if they are damaged or conductor is exposed, make sure replacement leads are of the same quality and specification as the test leads supplied.

8-4 Use only moist fabric with a small amount of detergent for cleaning - do not use solvents or abrasive materials.

8-5 Do not use the meter if the back cover is not properly closed (screwed tight shut). If your meter shows any sign of malfunction, stop operation immediately and send the meter for maintenance.

8-6 Remove the battery if your meter is not going to be used for a long time.

9. Accessories

[1] Test Leads: rated @ 1000V 10A
[3] Fuse: F-200mA/250V (fitted)
[4] 'K' type Thermocouple
[5] Operator's Manual
[6] Holster

For any further information or queries please contact
Philex Customer Careline: 08457 573 479
(Local rate – UK only)
Technical Support: www.philex.com/support

Waste electrical and electronic products should not be disposed of with household waste. Please recycle where facilities exist. Check with your Local Authority for recycling advice.

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