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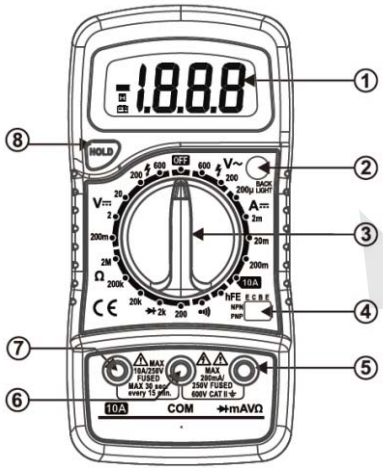
9242-ML100
DIGITAL MULTIMETER
OPERATION MANUAL

V0

Introduction

The instrument is a small hand-held 3 1/2 digital multimeter. Stable, highly reliable and anti-drop performance. It is provided with a LCD display of 15mm height for clear reading. The circuit design takes LSI double integral A/D converter as its core under the protection of an overload protection circuit, making it a superior and handy instrument. It can be used to measure DC and AC voltage, DC current, resistance, transistors, diodes and for in-circuit continuity test.



1. **Display**
3 1/2 digital display.
2. **BACKLIGHT**
Press the BACKLIGHT button to turn on again, hit the button as needed.
3. **Function and range switch**
Select different function and range.
4. **Transistor socket**
5. **VΩmA Jack**
6. **COM Jack**
7. **10A Jack**
8. **Data hold button**
Press the HOLD button, the LCD will hold the last reading measured and display the H symbol. When the button is released, the instrument will return to normal.

Safety Information

9242-ML100 is designed based on IEC61010, 600V CAT II and pollution degree 2.

WARNING

The special attention should be paid when using the meter because the improper usage may cause electric shock and damage the meter .The safety measures in common safety regulations and operating instruction should be complied with when using. In order to make fully use of its functions and ensure safe operations please comply with the usage in this section carefully.

1 Safety Symbols

⚠	Important safety information. Read the manual.
⚠	High voltage with danger.
⏚	Ground.
⧈	Double Insulation (Class II safety equipment).
▭	Fuse must be replaced as per the specification herein.
~	AC (Alternating Current)
⎓	AC (Alternating Current)

2 Notices

1. The instrument can only be used in conjunction with the probe for the compliance with the safety standards. If the probe needs replacing due to damage, the replacement must be of the same type or the same electrical specification.
2. Do not exceed the input limits specified for each range
3. When the instrument is measuring , do not touch the input terminal not in use.
4. When a measurement range is uncertain, turn the function/range switch to the maximum range position .
5. Before switching function/range please ensure that the probes are disconnected from any live circuit, failure to do so will void any warranty and may cause either internal fuse to fail.
Please check internal fuses before returning instrument.
6. Before on-line resistance measurement of, turn off all power and discharge all capacitors.
7. Be careful when taking measurement of voltage higher than 60VDC/30VAC. Remember to keep your

fingers behind the hand shield of the probe.
8. When measuring a TV set or switch power supply, watch for pulse in the circuit that may damage the multimeter.
9. Measure known voltage with the meter to verify that the meter is working properly. If the meter is working abnormally, stop using it immediately. A protective device may be damaged. If there is any doubt, please have the meter inspected by a qualified technician.
10. Before taking the measurement of voltage with the probe, make sure there is no electronic element connected to the test socket of the transistor.
11. Before measuring any transistor, make sure the probe is not connected to any circuit being measured.

3 Maintenance

1. Before removing the rear cover, disconnect the probe from the circuit to be measured.
2. To protect the internal circuit, replace the fuse with one of the same specification:
F1: F 250mA/250V; F2: F10A/250V
3. Don't use the instrument until the rear cover is placed back and the screw are tightened.
4. Clean the housing of instrument only with a wet rag dripped with little detergent but never chemical solution.
5. In case of any abnormality, stop using it and sent it for mainteance.

Specifications

1 Accuracy indicators

Accuracy is specified for a period of year after calibration and at 18°C to 28°C(64°F to 82°F)with relative humidity to 80%.

2 General Features

Safety Class	CAT II 600V
waterproof	IP20
Fuse	F1:F 250mA / 250V, F2:F 10A / 250V
Power	9V battery, NEDA 1604 or 6F22
Maximum display value	1999
Over-range indication	" 1 "
Polarity display	"−" for negative polarity
Low voltage indication	"🔋" on the display
Operating temperature	0~40°C(32~104°F)
Storage temperature	-10~50°C(14~122°F)
Relative humidity	<80% RH
Altitude	<2000m
Dimension (LxWxH)	144X74X40mm
Weight(no rubber case)	about 160g
weight(with rubber case)	about 250g

3 Electrical Specifications

1. DC Voltage

Measuring Range	Resolution	Accuracy
200mV	0.1mV	±(0.5% reading + 3dgt)
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	±(0.8% reading + 5dgt)

- Overload protection:
  200mV range: 250V DC or AC rms
  2V-600V ranges: 600V DC or AC rms

2. AC Voltage

Measuring Range	Resolution	Accuracy
200V	0.1V	±(1.2% reading + 10dgt)
600V	1V	

- Overload protection: 600V DC or AC rms
- Frequency range: 40~400Hz
- Display: average (effective value of sinusoid)

3. Transistor hFE test

Function	Test Range	Test Current	Test Voltage
NPN & PNP	0-1000	Lb=10μA	V_{ce}=3V

4. DC Current

Measuring Range	Resolution	Accuracy
200μA	0.1μA	±(1.0% reading + 3dgt)
2mA	1μA	
20mA	0.01mA	±(1.0% reading + 5dgt)
200mA	0.1mA	±(1.5% reading + 5dgt)
10A	10mA	±(3% reading + 10dgt)

- Overload protection:
  F1: F 250mA/250V; F2: F10A/250V

5. Resistance

Measuring Range	Resolution	Accuracy
200Ω	0.1Ω	±(0.8% reading + 5dgt)
2kΩ	0.001kΩ	±(0.8% reading + 2dgt)
20kΩ	0.01kΩ	
200kΩ	0.1kΩ	
2MΩ	0.001MΩ	±(1.0% reading + 5dgt)

- Maximum open circuit voltage: 3.2V
- Overload protection: 250V DC or AC rms

6. Diode and Continuity Test

Function	Description
•))	If measured resistance is less than 70±30Ω, the built-in buzzer will beep.
⊣◁	Displays approx. forward-biased voltage.

- Overload protection: 250V DC or AC rms.

Operating Instructions

1 Notice before operation

1. If the battery voltage is low, the" ▭ " symbol appears on the display. Replace the batteries before making measurements.
2. The "⚠" besides the probe jack indicates that the input voltage or current should not exceed the specified limits to protect the internal circuit.
3. Before measurement, turn the function/range switch to the desired range.

2 DC Voltage

1. Plug the black test lead into the **COM** jack and the red test lead into the **VΩmA** jack.
2. Turn the rotary switch to the **V⎓** position. Connect the test leads to the voltage source or load terminals for measurement.
3. Read the voltage value on the display. The polarity symbol denotes the polarity of the red test lead.

Note:
1. If you do not know the measured voltage range in advance, select the highest range first and then gradually turn to smaller ranges until satisfactory resolution.
2. If ' **1**' is shown on the display, it means the measurement has exceeded the range. A higher range should be selected.
3. To prevent electric shock and damage to the meter or personal injury, do not measure voltages that may exceed 600V.
4. When measuring the high voltage, pay special attention to avoid an electric shock.

3 AC Voltage

1. Plug the black test lead into the **COM** jack and the red test lead into the **VΩmA** jack.
2. Turn the rotary switch to the **V~** position. Connect the test leads to the voltage source or load terminals for measurement.
3. Read the voltage value on the display.

Note:
Refer to point 1, 2, 3 and 4 for DC voltage measurement.

4 DC Current

1. Plug the black test lead into the **COM** jack. For current to be measured not exceeding 200mA, put the red test lead into the **VΩmA** jack. For current to be measured between 200mA and 10A, put the red test lead into the **10A** jack.

2. Turn the rotary switch to the **A⎓** position. Connect the test leads in series with the load to be measured.
3. Read the results on the display.

5 Resistance

1. Plug the black test lead into the **COM** jack and the red test lead into the **VΩmA** jack.
2. Turn the rotary switch to the **Ω** position. Connect the test leads to the resistor for measurement.
3. Read the results on the display.

Note:
1. If ' **1**' is shown on the display, it means the measurement has exceeded the range. A higher range should be selected.
2. When the leads are not connected or when measuring an open circuit, the display will read "1".
3. Risk of electric shock. be sure all power to circuit is off and capacitors have fully discharged before measureing resistance.

6 Diode Test

1. Plug the black test lead into the COM jack and the red test lead into the **VΩmA** jack.
2. Turn the rotary switch to the ⊣⊢ position. Connect the red probe to the anode (+) and black test lead to the cathode (-) of the diode.
3. The display will show the measured value.

7 Continuity

1. Plug the black test lead into the COM jack and the red test lead into the **VΩmA** jack.
2. Turn the rotary switch to the •)) position. Connect the probes in parallel with two points of the circuit being mearsured.
3. If the measured resistance is less than 70±30Ω, the buzzer will beep.

8 Transistor Test

1. Turn the rotary switch to the "**hFE**" position.
2. Determine whether the transisitor under testing is NPN or PNP and locate the emitter, base and collector leads. Insert the leads into proper holes of the hFE socket on the front panel.
3. Read the approximate hFE value at the test condition of base current 10μA and Vce 3V.

9 Replacing the Battery and Fuse

1. Under normal conditions, it is unnecessary to replace the fuse. Don't replace it until the probes are unplugged and the power is shutdown. Take out the screws of the rear cover to remove the housing.
2. The replacement of the fuse should be of the same specification : F1: F 250mA/250V; F2: F10A/250V.
3. The replacement of the battery should be of the same specification : 9V NEDA 1604 or 6F22 battery.
4. Don't put the instrument into use until the rear cover is screwed after replacing battery cover or fuse.

WARNING

To prevent electric shock, make sure the probes are disconnected from the measured circuit before removing the rear cover. make sure the cover is tightly screwed before using the instrument.

10 Replacing the Test Leads

If the test lead's insulation is damaged or has any wires exposed, the leads need to be replaced.

WARNING

Use meet EN 61010-031 standard, rated CAT II 600V 10A, or better test leads.

Accessories

Test Lead	Rating: CAT II 600V 10A	1set
Battery	9V NEDA 1604/6F22	1pc
Manual		1pc