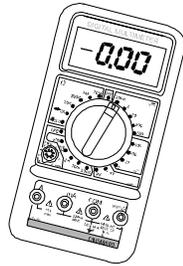


DMM8900 SERIES USERS MANUAL



----- Read the Users Manual thoroughly before use.

WARRANTY

This instrument is warranted to be free from defects in material and workmanship for a period of one year. Any instrument found defective within one year from the delivery date and returned to the factory with transportation charges prepaid, will be repaired, adjusted, or replaced at no charge to the original purchaser. This warranty does not cover expandable items such as batteries or fuses. If the defect has been caused by a misuse or abnormal operation conditions, the repair will be billed at a nominal cost.

SAFETY INFORMATION

8900 series digital multimeters have been designed according to IEC-1010 concerning electronic measuring instruments with an overvoltage category (CAT I) and pollution2.

ELECTRICAL SYMBOLS

- ~ AC (Alternating Current)
- ≡ DC (Direct Current)
- ▲ Important safety information. Refer to the manual.
- ⚡ Dangerous voltage may be present.
- ⊕ Earth ground
- ⊞ Fuse
- CE Conforms to European Union directives
- Double insulated

WARNING

To avoid possible electric shock or personal injury, follow these guidelines:

- ⓘ Do not use the meter if it is damaged. Before you use the meter, inspect the case. Pay particular attention to the insulation surrounding the connectors
- ⓘ Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads before you use the meter.
- ⓘ Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
- ⓘ Do not operate the meter around explosive gas, vapor, or dust.
- ⓘ Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth ground.
- ⓘ Before use, verify the meter's operation by measuring a known voltage.

- | When servicing the meter, use only specified replacement parts.
- | Use with caution when working above 30V ac rms, 42V peak, or 60V dc. Such voltages pose a shock hazard.
- | When using the probes, keep your fingers behind the finger guards on the probes.
- | Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- | Remove the test leads from the meter before you open the battery door.
- | Do not operate the meter with the battery door or portions of the cover removed or loosened.
- | To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator () appears.

CAUTION

To avoid possible damage to the meter or to the equipment under test, follow these guidelines:

- | Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- | Use the proper terminals, function, and range for your measurements.
- | Before measuring current, check the meter's fuses and turn power OFF to the circuit before connecting the meter to the circuit.
- | Before rotating the range switch to change functions, disconnect test leads from the circuit under test.
- | Before attempting to insert transistors for testing, always be sure that the test leads have been disconnected from any measurement circuits.
- | Remove test leads from the Meter before opening the Meter case.

MAINTENANCE

- | Before opening the case, always disconnect the test leads from all live circuits.
- | For continue protection against fire, replace fuse only with the specified voltage and current ratings: F 250mA/250V (Fast Blown) $\Phi 5 \times 20$
- | Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.

INTRODUCTION

DMM8900 series multimeters are compact, rugged, battery-powered and handheld 3 1/2-digit LCD digital multimeters for measuring DC and AC voltage, DC and AC current, resistance and diode, capacitance, inductance, battery, frequency, temperature, transistor and continuity test. The Dual-slope A/D Converter uses C-MOS technology for auto-zeroing, polarity selection and over-range indication. They are ideal instruments for use

in field, laboratory and at home. Following table shows the functions of the series multimeters:

Model	DCV	ACV	DCA	ACA	Ω	\rightarrow	\bullet)	T	Hz	\dashv	L	BAT
8901	*	*	*		*	*	*					*
8902	*	*	*	*	*	*	*					
8903	*	*	*	*	*	*	*			*		
8905	*	*	*	*	*	*	*	*		*		
8906	*	*	*	*	*	*	*		*	*		
8907	*	*	*	*	*	*	*	*	*	*		
8908	*	*	*	*	*	*	*			*	*	

FRONT PANEL



1. FUNCTION AND RANGE SWITCH

This switch is used to select the functions and desired ranges as well as to turn ON/OFF the meter.

To extend the life of battery, the switch should be set to "OFF" range when the meter is not in use.

2. DISPLAY

3 1/2-digit LCD.

-- 7 --

3. "BATT/V/Ω" JACK

Plug-in connector for the red (positive) test lead for all battery, voltage and resistance measurements.

4. "COM" JACK

Plug-in connector for black (negative) test lead.

5. "μA mA" JACK

Plug-in connector for the red (positive) test lead for current (less than 200mA) measurement.

6. "10A" JACK

Plug-in connector for the red (positive) test lead for current (between 200mA and 10A) measurement.

-- 8 --

There is no fuse in the built-in circuit for "10A" jack. To use safely, each measurement can not last for more than 10 seconds, and the interval between each measurement must be more than 15 minutes.

GENERAL SPECIFICATION

Maximum voltage between terminal and earth ground	CAT I 500V
Fuse	F 250mA/250V
Power supply	9V battery, NEDA 1604 or 6F22
Display	3 1/2-digit LCD, 1999 counts
Sampling rate	2~3 times/sec.
Measuring method	Dual-slope integration A/D converter
Over-range indication	Only figure "1" displayed on the LCD

-- 9 --

Polarity indication	"-" displayed for negative
Operating temperature	0°C~40°C(32°F~104°F)
Storage temperature	-10°C~50°C(14°F~122°F)
Low battery indication	" " appears on the LCD
Size	86mm(W)×186mm(D)×33mm(H)
Weight	Approx. 230g (including a 9V battery)

TECHNICAL SPECIFICATIONS

Accuracy is specified for a period of one year after calibration and at 18°C~28°C (64°F~82°F) with relative humidity up to 75%. Accuracy specifications take the form of:±[% of Reading]+[Number of Least Significant Digits]

-- 10 --

DC VOLTAGE

Range	Resolution	Accuracy
200mV	100μV	±(0.5% +1)
2V	1mV	
20V	10mV	
200V	100mV	
500V	1V	±(0.8% +2)

Input impedance: 10MΩ* for all ranges

-- 11 --

DC CURRENT

Range	Resolution	Accuracy
20μA	0.01μA	±(0.8% +1)
200μA	0.1μA	
2mA	1μA	
20mA	10μA	±(1.0% +1)
200mA	100μA	±(1.2% +1)
10A	10mA	±(2.0% +5)

Maximum input current: 10A

-- 12 --

AC VOLTAGE

Range	Resolution	Accuracy
200mV	100μV	±(1.2% +3)
2V	1mV	
20V	10mV	
200V	100mV	
400V	1V	±(1.2% +3)

Input impedance: 10MΩ, for all ranges

Frequency : 40Hz ~400Hz

Indication: Average (rms of sine wave)

-- 13 --

AC CURRENT

Range	Resolution	Accuracy
200μA	0.1μA	±(1.0% +3)
2mA	1μA	
20mA	10μA	
200mA	100μA	±(1.8% +3)
20A(10A)	10mA	±(3.0% +7)

Frequency range: 40Hz~400Hz

Maximum input current: 10A

Indication: Average (rms of sine wave)

-- 14 --

RESISTANCE

Range	Resolution	Accuracy
200Ω	0.1Ω	±(0.8% +3)
2kΩ	1Ω	
20KΩ	10Ω	
200KΩ	100Ω	
2MΩ	1KΩ	±(0.8% +1)
20 MΩ	10KΩ	±(1.0% +2)
200 MΩ	100KΩ	±(5%(rdg-10digits)±10digits)

Open circuit voltage: Less than 700mV (2.8V for range 200 MΩ).
 When the test leads are shorted together at range 200 MΩ, the meter will display the number 101 on the LCD. The number has to be subtracted from measuring results.

-- 15 --

CAPACITANCE

Range	Resolution	Accuracy
2000pF	1pF	±(2.5% +3)
20nF	10pF	
200nF	100pF	
2μF	1nF	
20μF	10nF	±(5.0% +3)
200μF	100nF	

-- 16 --

DIODE & CONTINUITY

Range	Description	Test Condition
	If the resistance of the circuit under test is less than 30Ω*, the built-in buzzer will sound.	The forward DC current is approx. 1mA, the reversed DC voltage is approx. 2.8V.
	The approx. forward voltage drop of the diode will be displayed on the LCD.	Open circuit voltage approx. 2.8V.

TRANSISTOR hFE TEST

Range	hFE	Test Current	Test Voltage
PNP & NPN	0-1000	1b=10μA	Vce=2.8V

-- 17 --

TEMPERATURE (K TYPE PROBE)

Range	Resolution	Accuracy
T	-40°C~+400°C	1°C
	+400°C~+1000°C	1°C
		±(1.0% +3°C)
		±(1.5% +15°C)

FREQUENCY

Range	Resolution	Accuracy
20KHz	10Hz	±(1.0% +5)

-- 18 --

BATTERY

Range	Description	Test Condition
1.5V	The working current of the battery will be displayed on the LCD so the quality of the battery could be judged.	Working current is about 40mA.
9V		Working current is about 24mA.

INDUCTANCE

Range	Resolution	Accuracy
2mH	1μH	±(3.0% +5)
20mH	10μH	
200mH	100μH	±(5.0% +5)
2H	1mH	
20H	10mH	

-- 19 --

OPERATING INSTRUCTIONS-

DC Voltage Measurement

1. Connect the red test lead to the "BATT/V/Ω" jack and the black test lead to the "COM" jack.
2. Set the rotary switch to the desired V range. If the voltage to be measured is not known beforehand, set the range switch to the highest range and then turn down range by range until satisfactory resolution is obtained.
3. Connect the test leads to the source or load to be measured.
4. Read the voltage value displayed on the LCD along with the polarity of the red test lead.

-- 20 --

DC Current Measurement

1. Connect the black test lead to the "COM" jack and the red test lead to the "μA mA" jack. (While the current to be measured is between 200mA and 10A, remove the red test lead to the "10A" jack.)
2. Set the rotary switch to the desired A range. If the current to be measured is not known beforehand, set the range switch to the highest range and then turn down range by range until satisfactory resolution is obtained.
3. Open the circuit in which the current is to be measured, and connect the test leads in series with the circuit.
4. Read the current value displayed on the LCD along with the polarity of the red test lead.

-- 21 --

AC Voltage Measurement

1. Connect the red test lead to the "BATT/V/Ω" jack and the black test lead to the "COM" jack.
2. Set the rotary switch to the desired V range. If the voltage to be measured is not known beforehand, set the range switch at the highest range and then turn down range by range until satisfactory resolution is obtained.
3. Connect the test leads to the source or load to be measured.
4. Read the voltage value displayed on the LCD.

AC Current measurement

1. Connect the black test to the "COM" jack and the red test lead to the "μA mA" ack. (While the current to be measured is between 200mA and 10A, remove the red test lead to the "10A" jack.)

-- 22 --

2. Set the rotary switch to the desired A range. If the current to be measured is not known beforehand, set the range switch at the highest range and then turn down range by range until satisfactory resolution is obtained.
3. Open the circuit in which the current is to be measured, and connect the test leads in series with the circuit.
4. Read the current value displayed on the LCD.

Resistance Measurement

1. Connect the red test lead to the "BATT/V/ Ω " jack and the black test lead to the "COM" jack.
2. Set the rotary switch to the desired Ω range.
3. Connect the test leads to the resistor to be measured and read the value displayed on the LCD.

-- 23 --

Note

- 1 For resistance about $1M\Omega$ and above, the meter may take a few seconds to stabilize. This is normal for high resistance readings.

Capacitance Measurement

1. Set the rotary switch to the desired C range.
2. Connect the capacitor to be measured to the input sockets.

Note:

- 1 Observe polarity when connecting polarized capacitors.
- 1 When testing large capacitances, note that there will be a certain time lag before the indication.

-- 24 --

Temperature Measurement

1. Connect the K type probe to the K probe jack.
2. Set the rotary switch to the "TC" range.
3. Read the temperature value displayed on the LCD.

Diode Test

1. Connect the red test lead to the "BATT/V/ Ω " jack and the black test lead to the "COM" jack. (The polarity of the red test lead is positive "+".)
2. Set the rotary switch to " " range.
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 approximate forward voltage drop of the diode will be displayed on the LCD. If the connection is reversed, only figure "1" will be shown.

-- 25 --

Transistor Test

1. Set the rotary switch to "hFE" range.
2. Determine whether the transistor to be tested is NPN or PNP, and locate the E, B, C leads. Insert the leads into the proper holes of the hFE socket on the front panel.
3. Read the approximate hFE value at the test condition of base current $10\mu A$ and V_{ce} 2.8V.

Audible Continuity Test

1. Connect the red test lead to the "BATT/V/ Ω " and the black test lead to the "COM" jack.
2. Set the rotary switch to " " range.
3. Connect the test leads to the two terminals of the circuit to be tested. If the resistance is less than about 30Ω , the built-in buzzer will sound.

-- 26 --

Battery Test

1. Set the rotary switch to the "BAT" range.
2. Connect the black test lead to the "COM" jack and the red test lead to the "BATT/V/Ω" jack. Connect the test leads separately to the two polar of the battery under test.

Inductance Measurement

1. Set the rotary switch to the desired "L" range.
2. Connect the inductor to be measured into the input socket "LX".

Battery & Fuse Replacement

If " " appears on the LCD, it indicates that the battery should be replaced. To replace the battery, open the case, replace the exhausted battery with the ratings specified: 9V, NEDA

1604 or 6F22, and then close the case.

The fuse rarely needs to be replaced and is blown as a result of the operator's error. To replace the fuse, open the case, replace the blown fuse with the ratings specified: F 250mA/250V, and then close the case.

ACCESSORIES

Users Manual	1 copy
Test Leads	1 pair
9V Battery (NEDA 1604 or 6F22)	1 piece