

DM-83T DIGITAL MULTIMETER Operation Manual

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1. General Description

This is a 3 1/2 digital multimeter with high stability and performance. It uses a LCD with 20mm high figure, which makes the reading clearer and the operation more convenient. It can test DCV, ACV, DCA, ACA, resistance, NCV, temperature, transistor, diode, and continuity. This meter also designed with functions including unit symbol display, data hold, lighting, auto range, auto power off and warning functions. To assure high accuracy and resolution, it adopts integrated circuit of 8-bit microprocessor and a dual integral A/D conversion as LCD driver, giving high resolution and high accuracy. It is an ideal tool for labs, factories and radio-technology.

2. Safety Instructions

The instrument is designed in compliance with IEC1010 standard (safety standard issued by International Electro technical Committee). Please read the following safety instructions before operation.

- 2.1 Check the connection and insulation of test leads to avoid electric shock.
- 2.2 To avoid electric shock and damage to the meter, do not input voltage exceeding rated value.
- 2.3 When measuring voltage higher than DC 60V or AC 40V, please be careful and avoid electric shock.
- 2.4 Select correct function and range to avoid wrong operation.
- 2.5 Move the test leads away from test points when switching to other function.
- 2.6 Don't input voltage in current terminal.
- 2.7 Don't make any modification to the circuit. It may damage the meter or jeopardize safety.
- 2.8 Safety symbols:

“△” High voltage, “⚡” GND, “Ⓜ” Dual insulation, “ℹ” Refer to manual, “🔋” Low battery indication.

3. Features

3.1 General Characteristics

- 3.1.1 Display: LCD;
- 3.1.2 Max display: 2000 (3 1/2 digits, automatic polarity, and unit symbol display);
- 3.1.3 Measurement method: Analog to digital converter (in micro processor ADC+MCU);
- 3.1.4 Sampling rate: approx.3 times/sec.
- 3.1.5 Over-range display: “OL” displayed.
- 3.1.6 Low battery indicator: “🔋”
- 3.1.7 Working environment: (0~40)°C, relative humidity: <80%;
- 3.1.8 Store condition: (-10~50)°C, relative humidity: <80%
- 3.1.9 Battery: 2 pieces 1.5V battery (“AAA” 7# battery);
- 3.1.10 Dimension: 140×72×37mm (length x width x height);
- 3.1.11 Weight: approx. 195g (including battery);
- 3.1.12 Accessories: test leads, TP01 thermocouple, user manual, holster, gift box, and 2*1.5V batteries.

3.2 Technical Features

3.2.1 Accuracy: ± (a% × reading + digits). To assure accuracy, the ambient temperature should be (23±5) °C, relative humidity <75%. One year accuracy is guaranteed since production date.

3.2.2 DC Voltage (DCV)

| Range | Accuracy | Resolution |
|-------|-----------|------------|
| 200mV | ±(0.5%+4) | 0.1mV |
| 2V | | 1mV |
| 20V | | 10mV |

| | | |
|------|----------------|-------|
| 200V | | 100mV |
| 600V | $\pm(1.0\%+4)$ | 1V |

Input impedance: 200mV range >40M Ω , other ranges is 10M Ω .

Overload protection: 600V DC or 600V AC peak value.

3.2.3. AC Voltage (ACV)

| Range | Accuracy | Resolution |
|-------|----------------|------------|
| 2V | $\pm(0.8\%+6)$ | 1mV |
| 20V | | 10mV |
| 200V | | 100mV |
| 600V | $\pm(1.0\%+6)$ | 1V |

Input impedance: at 200mV range >40M Ω , at other ranges is 10M Ω .

Overload protection: 600V DC or 600V AC rms.

Frequency response: 600V range: 40~1000Hz, other ranges: 40~2000Hz

Displaying: True RMS response (calibration based on sine wave RMS)

3.2.4 DC Current (DCA)

| Range | Accuracy | Resolution |
|--------|----------------|------------|
| 200uA | $\pm(1.0\%+5)$ | 0.1uA |
| 2000uA | | 1uA |
| 20mA | | 10uA |
| 200mA | | 100uA |
| 2A | | 1mA |
| 10A | $\pm(2.0\%+5)$ | 10mA |

Maximum voltage drop: 200 mV for full range.

Maximum input current: 10A (within 10 seconds).

Overload protection: 0.2A/250V fuse and 10A/250V fuse.

3.2.5 AC Current (ACA)

| Range | Accuracy | Resolution |
|--------|-----------------|------------|
| 200uA | $\pm(1.5\%+5)$ | 0.1uA |
| 2000uA | | 1uA |
| 20mA | | 10uA |
| 200mA | | 100uA |
| 2A | | 1mA |
| 10A | $\pm(2.0\%+10)$ | 10mA |

Maximum voltage drop: 200 mV for full range.

Maximum input current: 10A (within 10 seconds).

Overload protection: 0.2A/250V fuse and 10A/250V fuse.

Frequency response: 10A range: 40~100Hz, other ranges: 40~400Hz.

3.2.6 Resistance (Ω)

| Range | Accuracy | Resolution |
|---------------|----------------|--------------|
| 200 Ω | $\pm(0.8\%+5)$ | 0.1 Ω |
| 2k Ω | $\pm(0.8\%+1)$ | 1 Ω |
| 20k Ω | | 10 Ω |
| 200k Ω | | 100 Ω |
| 2M Ω | | 1k Ω |
| 20M Ω | $\pm(1.2\%+5)$ | 10k Ω |

Open circuit voltage: 200mV

Overload protection: 250V DC/AC peak value.

3.2.7 Transistor (hFE)

| Measurement | Range | Test conditions |
|----------------|--------|--|
| hFE NPN or PNP | 0~1000 | Base current is approx 15uA, Vce is about 1.2V |

3.2.8 Diode and Continuity Test

| Measurement | Range | Test conditions |
|-------------|--|---|
| →)) | Diode forward voltage drop. | Forward DC current is approx 0.8mA, reverse voltage is approx 2.2V. |
| | When the resistance under test is less than 50Ω, buzzer sounds continuously. | Open circuit voltage: 2.2V |

Overload protection: 250V DC/AC peak value.

WARNING: Do not input voltage at this range!

3.2.9 Temperature (°C/°F)

| Range | Accuracy | Resolution |
|--------------|---------------------------------------|------------|
| -40°C~1000°C | <400°C ±(1.0%+5) ≥400°C ±(1.5%+15) | 1°C |
| 0F~1832°F | <750°F ±(1.0%+5) ≥750°F ±(1.5%+15) | 1°F |

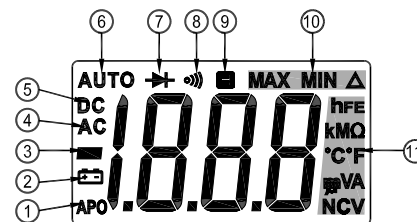
Thermocouple: K type.

WARNING: do not input voltage at this range!

Operation

4.1 Panel Description

①. LCD: Display the data and unit symbol



| Number | Feature | Description |
|--------|--|--|
| 1 | APO | Auto power off symbol. |
| 2 | ⚡ | Low battery indication. Warning: To avoid error readings, which could lead to possible electric shock or personal injury, please replace the battery in time. |
| 3 | - | Indicates negative readings. |
| 4 | AC | AC voltage or current measurement. |
| 5 | DC | DC voltage or current measurement. |
| 6 | AUTO | Auto range mode. |
| 7 | →)) | Diode test mode. |
| 8 | ·)) | Continuity beeper is on. |
| 9 | HOLD | Data Hold is active. |
| 10 | MAX MIN Δ | Null |
| 11 | hFE MΩ, kΩ, Ω °C/°F mV, V uA, mA, A NCV | hFE (Triode magnification measurement); Megohm, Kilohm, Ohm; Degrees Celsius, Degrees Fahrenheit; Millivolts, Volts; Microamp, Milliamp, Amperes (A); Non-contact voltage detector. |

②. Rotary switch: it is used to change the range and choose functions.

| Switch position | Description |
|-----------------|---|
| V~ | AC voltage measurement.. |
| V= | DC voltage measurement. |
| Ω | Resistance measurement. |
| →)) | Diode/continuity measurement. Press SELECT key to choose diode or continuity range. |
| hFE | Triode magnification measurement. |
| °C/°F | Temperature measurement, press SELECT key to choose °C or °F. |
| NCV | Non-contact voltage detector. |
| uA~ | DC current measurement (from 0uA to 2000uA). Press SELECT key to switch to AC current measurement (from 0uA to 2000uA). |
| mA~ | DC current measurement (from 0mA to 200mA). Press SELECT key to switch to AC current measurement (from 0mA to 200mA). |
| A~ | DC current measurement (from 0A to 10A). Press SELECT key to switch to AC current measurement (from 0A to 10A). |

③ Input Terminal

| Terminal | Description |
|----------|---|
| A | Input terminal for AC and DC current from 0 to 10.00A (Overload for max 10 seconds). |
| VΩmA | Input terminal for voltage, resistance, diode, and continuity, and temperature positive (+) terminal. AC and DC current from 0uA to 200mA (Max 18 hours for less than 200mA). |
| COM | Common terminal for all measurements, and temperature negative (-) terminal. |
| hFE | Input terminal for triode measurement. |

④ Function Key

SELECT/⇨⇩ Key:

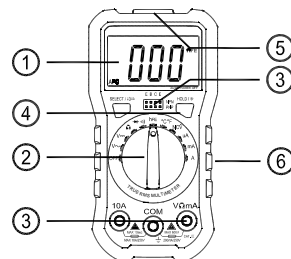
- 1) Select function: Press SELECT key to choose DC or AC measurement under \approx ranges. Under $\rightarrow \rightarrow$ (Diode/Continuity) range, press SELECT key to choose \rightarrow (diode test) or \rightarrow (continuity test). Under temperature ranges, press SELECT key to choose Degrees Celsius or Degrees Fahrenheit.
- 2) When there is no measurement in 15 minutes, the meter will automatically power off and enter sleep mode. One minute before sleep mode, the buzzer will beep for 5 times to remind user. Press any button or turn the rotary switch will exit the sleep mode.
- 3) Press SELECT key to active the meter from the sleep mode or hold the SELECT key down when turn on the meter to cancel auto power off function.
- 4) TORCH FUNCTION Key: Press TORCH FUNCTION key for more than 2 seconds to turn on the torch. Press it for more than 2 seconds once again to turn off the torch.

HOLD/☀ Light Key

- 1) HOLD Key : Press HOLD key to enter HOLD mode. The current value will be hold, and symbol "H" will be displayed. Press HOLD again to exit the HOLD mode.
- 2) ☀ Light Key: Press HOLD key for more than 2 seconds to turn on the backlight. The backlight can last for 15 seconds. During 15 seconds, press "☀" light key for 2 seconds again to turn off the backlight.

⑤ Non-contact voltage detector area.

⑥ Holster, Battery door.
See picture.



4.2 DCV measurement

4.2.1 Insert the black test lead into "COM" terminal, and the red one into "VΩmA" terminal.

4.2.2 Turn the rotary to switch to "V \approx " ranges. Under Auto Range status, it will display "AUTO" symbol.

4.2.3 Connect test leads to the test point; LCD will display polarity and voltage of the test point connected by the red test lead.

NOTE:

- 1) Do not input voltage over 600V. If LCD display "OL", it may cause damage to the circuit of the meter, and the built-in buzzer will alarm.
- 2) Be careful while measuring a high voltage circuit. DO NOT touch the high voltage circuit.

4.3 ACV measurement

4.3.1 Insert the black test lead into "COM" terminal, and the red one into "VΩmA" terminal.

4.3.2 Select the rotary to switch to "V \sim " ranges. Under Auto Range status, it will display "AUTO" symbol.

4.3.3 Connect test leads to the test point; LCD will display voltage of the test point connected by the test leads.

NOTE:

- 1) Do not input voltage over 600V. If LCD display "OL", it may cause damage to the circuit of the meter, and the built-in buzzer will alarm.
- 2) Be careful while measuring a high voltage circuit. DO NOT touch the high voltage circuit.

4.4 DCA measurement

4.4.1 Insert the black test lead into "COM" terminal and the red one into "VΩmA" terminal (Max.200mA) or into "10A" terminal (Max.10A);

4.4.2 Turn the rotary switch to a proper current range, and then connect the test leads to the circuit. LCD will display polarity and current of the test point connected by the red

test lead.

NOTE:

- 1) If you are not sure about the range of current under test, please select the highest range, and then select the proper range based on displaying value.
- 2) If the LCD displays "OL", it means the current is over range. Now you need to select a higher range.
- 3) Maximum input current is 200mA or 10A (subject to which terminal the red test lead is inserted into). Current exceeding rated value will damage the fuse, and may cause damage to the circuit of meter.

4.5 ACA measurement

4.5.1 Insert the black test lead into "COM" terminal and the red one into "VΩmA" terminal (Max.200mA) or into "10A" terminal (Max.10A);

4.5.2 Turn the rotary switch to a proper current range. Press "SELECT/⇌" key to select the AC mode, and then connect the test leads to the circuit. LCD will display current value.

NOTE:

- 1) If you are not sure about the range of current under test, please select the highest range, and then select the proper range based on displaying value.
- 2) If the LCD displays "OL", it means the current is over range. Now you need to select a higher range.
- 3) Maximum input current is 200mA or 10A (which terminal the red test lead is inserted into). Current exceeding rated value will damage the fuse, and may cause damage to the circuit of meter.

4.6 RESISTANCE measurement

4.6.1 Insert the black test lead into "COM" terminal and the red one into "VΩmA" terminal;

4.6.2 Turn the rotary switch to "Ω" ranges, under Auto Range status, it will display "AUTO" symbol.

NOTE:

- 1) When input terminal is in open circuit, LCD will display "OL";
- 2) When measuring value is over 1MΩ, the reading will take a few seconds to be stable. It's normal for high resistance measurement;
- 3) Before measuring in line resistor, make sure that the power is off and all capacitors are discharged completely;
- 4) When there is big error, it may be affected by other online component or there is voltage on the resistor;
- 5) Do not input any voltage at resistance range.

4.7 NON-CONTACT VOLTAGE (NCV) DETECT

WARNING:

This function could be affected by different external interference sources, and then the alarm is activated by wrong signal. The measurement result is for reference only.

Turn the rotary function switch to "NCV" position. When the testing circuit is placed above the meter, the meter displays the strength of signal, and the buzzer alarms with "beep beep".

NOTE:

- 1) Even if there is no voltage indication, there may be voltage on the circuit. Do not rely on NCV detector as the only way to detect voltage.
- 2) Voltage detecting may be affected by power socket design, type of insulation and its thickness and other factors.
- 3) Interference sources in the external environment, such as flashing light, motor, would cause wrong signal to activate alarm function.


4.8 TRANSISTOR hFE MEASUREMENT

4.8.1 Turn the rotary switch to hFE range;

4.8.2 Identify the transistor is NPN or PNP type. Insert the emitter, base and collector separately into the relative hole. The value will be displayed on LCD.

4.9 DIODE AND CONTINUITY TEST

4.9.1 Insert the black test lead into “COM” terminal and the red one into “VΩmA” terminal (the polarity of red lead is “+”);

4.9.2 Turn the rotary switch to “” range. It is default in Diode measurement mode.

4.9.3 Forward measurement: connect red test lead to the positive polarity and the black test lead to the negative polarity of the diode. LCD will display the approx. value of forward voltage drop.


4.9.4 Backward measurement: connect red test lead to the negative polarity and the black test lead to positive polarity of the diode. LCD will display “OL”.

4.9.5 The complete diode test includes forward and backward measurement, if the result doesn't meet the descriptions above; it means the diode is broken.


4.9.6 Press “SELECT/” key to select the continuity measurement mode.

4.9.7 Connect test leads to two points of tested circuit, if the resistance is less than 50 Ω, the built-in buzzer sounds.

NOTE:

- 1) DO NOT input voltage at “” range.
- 2) When test circuits, make sure the power is off and all capacitors are discharged. Any negative potential or AC signal will activate the buzzer.

4.10 TEMPERATURE MEASUREMENT

4.10.1 Turn the rotary switch to “°C/°F” range. Press “SELECT/” key to select °C or °F mode.

4.10.2 Insert the cold end (free end) of thermocouple in “VΩmA(+)” and “COM(-)” terminal, and put the working end (temperature measuring end) of thermocouple on the surface or inside the tested object. Then LCD will display the temperature of tested object, and the reading is in °C/°F (when the polarity is contrary. The reading will decrease when the temperature of the tested object increase).

NOTE:


- 1) When the input terminal is open circuit, it will display the environment temperature.
- 2) To ensure measure accuracy, do not replace the temperature probe unless it is necessary.

3) Do not input voltage at temperature range.

5. MAINTENANCE

This meter is a precise instrument. Any modification to the circuit is not allowed.

NOTE:

- 1) Don't input the voltage value higher than 600V DC or ACrms.
- 2) Don't input voltage at current, resistance, diode or continuity range.
- 3) Don't make any measurements when the battery is not properly installed or the back cover isn't fixed.
- 4) Before replacing battery or fuse, please remove the test leads from the measuring point and turn off the power.
- 5) Keep the meter away from water, dust and shock.
- 6) Don't expose the meter under high temperature, high humidity, combustible, explosive and strong magnetic place.
- 7) Wipe the case with a damp cloth and detergent. Do not use abrasives and alcohol to clean the meter.
- 8) If the meter will not be used for a long time, please take out the battery to avoid leakage damage.
- 9) When “” symbol is displayed, please replace the battery according to the following steps:
 - ① Remove the holster.
 - ② Screw off the fixing screws of the battery door and remove the cover;
 - ③ Take off the old battery and replace with a new one. To extend the using life, it's better to use alkaline battery.
 - ④ Fix the battery door.
 - ⑤ Put on the holster.
- 10) Fuse replacement: When replacing fuse, please use fuse with same type and specification.
 - ① Remove the holster first, then screw off the fixing screws of the battery door and back cover to remove the cover;
 - ② Take off the old fuse and replace with a new one.

- ③ Install the back cover, then fix the screws of the battery door and back cover.
Put on the holster.

6. Trouble Shooting

If the meter does not work properly, please check the meter as following steps:

(If the problems still cannot be solved, please refer to repairing center or contact the local dealers.)

| Fatult | Solution |
|-------------------|---|
| No reading on LCD | ■ Turn on the power; ■ Release the HOLD key; ■ Replace battery. |
| ⚡signal appears | ■ Replace battery. |
| No input | ■ Replace fuse. |
| Big error Value | ■ Replace battery. |

- The specifications are subject to changes without prior notice;
- The content of this manual is regarded as correct. If users find out any mistakes or omissions, please kindly contact the manufacturer;
- The manufacturer will not be responsible for accidents and damage caused by improper operations;
- The functions described in this User Manual shall not be considered as the reason for any special usages;