



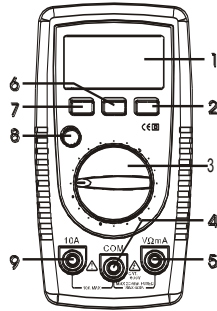
MTD84 DIY DIGITAL MULTIMETER OPERATOR'S MANUAL

1. Overview

The MTD84 DIY Digital Multimeter is a compact, portable, and stable meter for electrical and electronic measurements. Using 3½ digits 2000 count LCD display, the characters are 15mm high ensuring clear readings. With overall circuitry design centering on large-scale IC A/D converters in conjunction and over-load protection circuit, the meters give excellent performance and an excellent handy utility instrument. This meter is auto ranging and can be used to measure DC & AC voltage, DC & AC Current, Resistance, Temperature, Positive Diode Voltage Fall, hFE parameters for Transistor and Continuity.

2. Panel Layout

- ① LCD Display: 3½ digits, character 15mm high
- ② Back Light Button Switch: Press this button to switch on back light for dimly lit areas where it is difficult to read the display when measuring, the light will automatically turn off in 5 seconds. Press again to switch it on again. If the battery is in weak power, the light will be dimmed. Back light reduces battery life.
- ③ Rotary Switch: use this switch to select functions and ranges
- ④ "COM" Input Jack
- ⑤ "V Ω mA" Input Jack
- ⑥ Manual range button
- ⑦ Function button
- ⑧ Data-hold Switch (HOLD)
- ⑨ "10A" Input Jack



3. Safety Information

- 3-1 The meter is designed in accordance with IEC-1010 Safety Standards 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.
 - ⚡ Dangerous voltage may be presence.
 - ⊞ Double insulation (protection Class II)

4. Special Cautions for Operation

- 4-1 The meter is safe according to standard procedures when used in conjunction with the supplied test leads. To replace damaged test leads with only the same model or same electric specifications.
- 4-2 To avoid risk of electric shock, do not use the meters before the battery cover is in place.
- 4-3 The rotary switch should be set at the measurement range position before testing.
- 4-4 To avoid electric shock and damage to the instrument, the input signals must not exceed the specified limits.
- 4-5 When measuring a TV set or switched power, attention should be paid to the possible pulses that may damage the circuit.
- 4-6 Do not turn the range switch while performing measurements as this will damage the meter.
- 4-7 Take caution against shock in the case of measuring voltage higher than DC 60V & AC 30V.
- 4-8 The protection fuse should be replaced only with same type and same specification.

5. GENERAL SPECIFICATIONS

- 5-1 Max Voltage between input terminal and Earth Ground: CAT II 600V
- 5-2 Over-range Indication: display "OL" or "-OL" for the significant digit.
- 5-3 Automatic display of negative polarity "-".
- 5-4 Low Battery Indication: '⚡' displayed
- 5-5 Max LCD display: 1999 (3½ digits)
- 5-6 Fuse protection: F-200mA/250V (Ø5x20mm)
- 5-7 Power Supply: 1.5V AAA type battery x 2
- 5-8 Operating Temp.: 0 °C to 40 °C (relative humidity <85%)
- 5-9 Storage Temp.: -10 °C to 50 °C (relative humidity <85%)
- 5-10 Guaranteed precision Temp.: 23 °C ±5 °C (relative humidity <85%)
- 5-11 Dimension: 143x73x34.5mm (with holster)
- 5-12 Weight: approx: 200g (including battery)

6. Testing Specifications

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 75%.

6-1 DC Voltage

| Range | Resolution | Accuracy |
|-------|------------|---------------------------|
| 200mV | 0.1mV | ±(0.5% of rdg + 2 digits) |
| 2V | 1mV | ±(0.5% of rdg + 3 digits) |
| 20V | 10mV | ±(0.8% of rdg + 3 digits) |
| 200V | 100mV | ±(0.8% of rdg + 3 digits) |
| 500V | 1V | ±(0.8% of rdg + 5 digits) |

-- Input Impedence: 10MΩ

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

6-2 AC Voltage

| Range | Resolution | Accuracy |
|-------|------------|----------------------------|
| 2V | 1mV | ±(1.0% of rdg + 10 digits) |
| 20V | 10mV | ±(1.0% of rdg + 10 digits) |
| 200V | 100mV | ±(1.0% of rdg + 10 digits) |
| 500V | 1V | ±(1.0% of rdg + 10 digits) |

-- Frequency Range: 40 to 400Hz

-- Response: average, calibrated in rms of sine wave

6-3 DC Current

| Range | Resolution | Accuracy |
|-------|------------|---------------------------|
| 200µA | 0.1µA | ±(1.0% of rdg + 5 digits) |
| 2mA | 1µA | ±(1.0% of rdg + 5 digits) |
| 20mA | 10µA | ±(1.0% of rdg + 5 digits) |
| 200mA | 100µA | ±(2.0% of rdg + 5 digits) |
| 2A | 1mA | ±(3.0% of rdg + 5 digits) |
| 10A | 10mA | |

-- Overload protection: F 200mA/250V fuse

Note:

10A range: not fused

6-4 AC Current

| Range | Resolution | Accuracy |
|--------|------------|---------------------------|
| 200µA | 0.1µA | ±(1.8% of rdg + 5 digits) |
| 2000µA | 1µA | ±(1.8% of rdg + 5 digits) |
| 20mA | 10µA | ±(1.8% of rdg + 5 digits) |
| 200mA | 100µA | ±(2.5% of rdg + 5 digits) |
| 2A | 1mA | ±(3.0% of rdg + 5 digits) |
| 10A | 10mA | ±(3.0% of rdg + 5 digits) |

-- Response: average, calibrated in rms of sine wave

6-5 Resistance

| Range | Resolution | Accuracy |
|--------|------------|---------------------------|
| 200 Ω | 0.1 Ω | ±(1.0% of rdg + 2 digits) |
| 2K Ω | 1 Ω | ±(1.0% of rdg + 2 digits) |
| 20K Ω | 10 Ω | ±(1.0% of rdg + 2 digits) |
| 200K Ω | 100 Ω | ±(1.0% of rdg + 2 digits) |
| 2M Ω | 1K Ω | ±(1.0% of rdg + 2 digits) |
| 20M Ω | 10K Ω | ±(1.5% of rdg + 2 digits) |

-- Over-load protection: 250V effective value

6-6 Temperature (only A960C)

| Range | Resolution | Accuracy |
|-------|----------------|---------------------------|
| °C | -20 °C —750 °C | ±(1.0% of rdg + 2 digits) |
| °F | -4 °F —1382 °F | ±(1.0% of rdg + 2 digits) |

-- Over-load Protection: 250V DC or rms AC

6-8 Diode Test

| Range | Resolution | Function |
|-------|------------|--|
| ▶ | 1mV | Display: read approximate forward voltage of diode |

-- Over-load Protection: 250V effective value

-- Forward DC current: approximate 1mA

-- Reversed DC voltage: approximate 1.5V

6-9 Continuity



| Range | Function |
|-------|--|
| ••••• | Built-in buzzer will sound if resistance is less than 70 Ω ±30 Ω |

-- Over-load protection: 250V effective value


-- Open circuit voltage: approximate 3.0V

7. OPERATING INSTRUCTIONS


7-1 Attention before operation

- 7-1-1 Check 3V battery. If the battery voltage is less than 2.4V, display will show "  ", the battery should be replaced to ensure measuring precision.
- 7-1-2 Pay attention to the "  " besides the input jack which shows that the input voltage or current should be within the specified value.
- 7-1-3 The range switch should be positioned to desired range for measurement before operation.

7-2 Measuring DC Voltage

- 7-2-1 Connect the black test lead to "COM" jack and the red to "V Ω mA" jack.
- 7-2-2 Set the rotary switch at the desired "V  " range position.
- 7-2-3 Connect test leads across the source or load under measurement.
- 7-2-4 Reading will be displayed on the LCD. The polarity of the red lead connection will be indicated along with the voltage value.


NOTE:

- 1. When the voltage being measured is unknown beforehand, set the range selector at the highest position.
- 2. When only the figure 'OL' or '-OL' is displayed, it indicates over-range situation and the higher range has to be selected.
- 3. "  " means you can't input the voltage more than 600V, it's possible to show higher voltage, but it may destroy the inner circuit or pose a shock.
- 4. Be cautious against shock when measuring high Voltage.

7-3 Measuring AC Voltage

- 7-3-1 Connect the black test lead to "COM" jack and the red to "V Ω mA" jack.
- 7-3-2 Set the rotary switch at the desired "V~" range position.
- 7-3-3 Connect test leads across the source or load under measurement.
- 7-3-4 Reading will be displayed on the LCD


NOTE:

- 1. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
- 2. When only the figure "OL" is displayed, it indicates over-range situation and the higher range has to be selected.
- 3. "  " means you can't input the voltage more than 600V, it's possible to show higher voltage, but it may destroy the inner circuit or pose a shock.
- 4. Be cautious against shock when measuring high Voltage.

7-4 Measuring DC & AC Current

- 7-4-1 Connect the black test lead to "COM" jack and the red to the "V Ω mA" jack for a maximum 200mA current, for a maximum 10A current, move the red lead to the 10A jack.
- 7-4-2 Set the rotary switch at the desired "10A" range position.
- 7-4-3 Connect test leads in series with the load under measurement.
- 7-4-4 Reading will be displayed on the LCD. The polarity of the red lead connection will be indicated along with the current value. Press the "SELECT" button to select **AC** or **DC** mode.

NOTE:

- 1. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
- 2. When only the figure 'OL' or '-OL' is displayed, it indicates over-range situation and the higher range has to be selected.
- 3. "  " means the socket mA's maximum current is 200mA and 10A's maximum current is 10A, over current will destroy the fuse. Since 10A is not fused, the measuring time should be less than 15 second to prevent precision from affecting by circuit heating.

7-5 Measuring Resistance

- 7-5-1 Connect the black test lead to "COM" jack and the red to "V Ω mA" jack.
- 7-5-2 Set the rotary switch at the desired "Ω" range position.
- 7-5-3 Connect test leads across the resistance under measurement.

7-5-4 Reading will be displayed on the LCD.


NOTE:

- 1. When only the figure 'OL' or '-OL' is displayed, it indicates over-range situation and the higher range has to be selected.
- 2. For measuring resistance above 1MΩ, the meter may take a few seconds to get stable reading.
- 3. When the input is not connected, i.e. at open circuit, 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 the resistance to be measured is unknown beforehand, set the range selector at the highest position.

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 thermocouple, temperature probe for this meter can be used. Insert 'K' type thermocouple probe (red one into "V Ω mA" jack and black one into "COM" jack)
- 7-6-4 Reading will be displayed on the LCD.
- 7-6-5 Press the SELECT button is °C to °F change.


7-7 Diode Testing

- 7-7-1 Connect the black test lead to "COM" jack and the red to "V Ω mA" jack. (the polarity of red lead is '+')
- 7-7-2 Set the rotary switch at the "  " range position.
- 7-7-3 Connect the red lead to the anode and the black lead to the cathode of the diode under testing.
- 7-7-4 Reading will be displayed on the LCD.

NOTE:

- 1. The meter will show approximate forward voltage drop of the diode.
- 2. If the lead connections is reversed, only 'OL' will be displayed.

7-8 Continuity Testing

- 7-8-1 Connect the black test lead to "COM" jack and the red to "V Ω mA" jack.
- 7-8-2 Set the rotary switch at the "  " range position.
- 7-8-3 Connect test leads across two points of the circuit under testing.
- 7-8-4 If continuity exists (i.e. resistance less than 70 Ω ±30 Ω), built-in buzzer will sound.

NOTE:

If the input is open circuit, the figure "OL" will be displayed.

8. Maintenance

- 8-1 Before attempting to remove the battery door or open the case, be sure that test leads have been disconnected from measurement circuit top avoid electric shock hazard.
- 8-2 To avoid electrical shock, remove test leads from measurement circuits before replacing the fuse. For protection against fire, replace fuses only with specified ratings: F-200mA/250V fuse.
- 8-3 Your must replace the test leads if the lead is exposed, and should replace the leads with the same specifications as origin.
- 8-4 Use only moist fabric or small amount of detergent but not chemical solution for cleaning.
- 8-5 Do not use the meter before the back cover is properly closed and screw secured. Upon any abnormality, stop operation immediately and send the meter for maintenance.

9. Accessories

- [1] Test Leads: electric rating 1000V 10A
- [2] Battery: AAA 1.5V ×2
- [3] Fuse: F-200mA/250V
- [4] 'K' type Thermocouple
- [5] Operator's Manual
- [6] Holster