

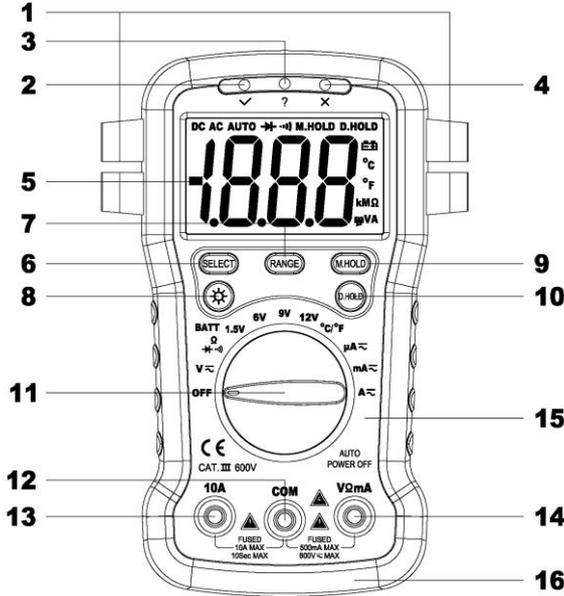
39B DIGITAL MULTIMETER OPERATOR'S MANUAL

1. Overview

The multimeter is characterized by slim size, portable, stable performance and anti-dropping capacity. Using 4000 counts digit LCD monitor with character 25mm high, they offer 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 exquisite making as a handy utility instrument.

The meters can be used to measure DC & AC voltage, DC & AC current, resistance, temperature, battery test, positive diode voltage fall and audible continuity.

2. Panel Layout



1. Test lead fixture: Fix the test lead.
2. Battery test green light: the green light show the battery being tested is good, it can continue to be used.
3. Battery test yellow light: the yellow light show the battery being tested is close to bad, it can be used but need to be changed as quickly as possible.
4. Battery test red light: the red light show the battery being tested is bad, it can not continue to be used.
5. LCD display: 3 1/2 digits LCD display, full function symbol display.
6. **SELECT** key: This key work on the " Ω \rightarrow \rightarrow \rightarrow " range, press the key to choose resistance, diode or continuity test, on the voltage or current range, change to DC or AC, on the $^{\circ}\text{C}/^{\circ}\text{F}$ range, change to $^{\circ}\text{C}$ or $^{\circ}\text{F}$ test.
7. **RANGE** Key: Press the "**RANGE**" key, the meter enters manual range mode, press it more than 2 seconds again, return to auto mode.
8. \odot Key: Press the " \odot " key over 2 seconds to light the back light, press it again for more than 2 seconds to lights off it, it can lights off automatically after 15 seconds too.
9. **M.HOLD** key: Press the "**M.HOLD**" key to lock **MAX** value, and the "**M.HOLD**" sign will appear on the display, press it again to exit. If press and hold the "**M.HOLD**" key to power on, "Auto Power Off" function will be disabled.
10. **D.HOLD** key: Press the "**D.HOLD**" key to lock display value, and the "**D.HOLD**" sign will appear on the display, press it again to exit.
11. Rotary Switch: Use this switch to select functions and ranges.
12. **COM**: COM and Temperature "-" Input Jack
13. **10A**: 10A Input Jack
14. **V Ω mA**: V/ μ AmA/BATT/ Ω \rightarrow \rightarrow \rightarrow / $^{\circ}\text{C}/^{\circ}\text{F}$ Input Jack
15. Crust of meter
16. Protective casing

3. Safety Information

3-1 The meter is designed according to IEC-1010 concerning electronic measuring instruments with an over-voltage category 600V (CAT III) 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 meters can be safe only according to standard procedures when used in conjunctions 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 cover is in place.

4-3 The range switch should be right position for the testing.

4-4 To avoid electric shock and damaging the instruments, the input signals are forbidden to exceed the specified limits.

4-5 When measuring TV set or switched power, attention should be paid to the possible pulses that may bring destruction to the circuit.

4-6 Range switch position is forbidden to be changed at random during measurement.

4-7 Take caution against shock in the course of measuring voltage higher than DC 60V & AC 30V.

4-8 Protection fuse should be replaced only with same type and same specification.

4-9 After operation is finished, set function switch at OFF to save battery power.

4-10 If the meter is without usage for long time, take out battery to avoid damage by battery leakage.

5. GENERAL SPECIFICATIONS

5-1 Max Voltage between input terminal and Earth Ground: CAT III600V

5-2 Over-range Indication: display "OL" for the significant digit.

5-3 Automatic display of negative polarity "-".

5-4 Low Battery Indication: "E" displayed.

5-5 Display: 3 1/2 digit LCD with a max. reading of 1999.

5-6 Auto range control

5-7 Auto Power Off: When measurement exceeds 15 minutes without switching mode and pressing key, the meter will switch to standby mode. Press any key to exit standby mode. When restart the system, press and hold **M.HOLD** key to disable auto power off.

5-8 Fuse protection: 500mA/500V Fast Fuse, 10A/500V Fast Fuse

5-9 Power supply: 9V 6F22 battery

5-10 Operating Temp.: 0°C to 40°C (relative humidity <85%)

5-11 Storage Temp.: -10°C to 50°C (relative humidity <85%)

5-12 Guaranteed precision Temp.: $23\pm 5^{\circ}\text{C}$ (relative humidity <70%)

5-13 Dimension: 150x100x36mm

5-14 Weight: approx. 250g (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 70%.

6-1 DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	$\pm(0.5\%$ of rdg + 2 digits)
2V	1mV	
20V	10mV	
200V	100mV	
600V	1V	$\pm(0.8\%$ of rdg + 2 digits)

-- Impedance: 10M Ω , More than 100M Ω on 200mV range

-- Overload protection: 600V DC or AC rms

6-2 AC Voltage

Range	Resolution	Accuracy
2V	1mV	$\pm(0.8\%$ of rdg + 3 digits)
20V	10mV	
200V	100mV	
600V	1V	$\pm(1.2\%$ of rdg + 3 digits)

-- Impedance: 10M Ω

-- Overload protection: 600V DC or AC rms

-- Frequency Range: 40 to 400Hz

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

6-3 DC Current

Range	Resolution	Accuracy
200 μ A	0.1 μ A	$\pm(1.2\%$ of rdg + 2 digits)
2000 μ A	1 μ A	
20mA	10 μ A	
200mA	100 μ A	
2A	1mA	$\pm(2.0\%$ of rdg + 3 digits)
10A	10mA	

-- Overload protection: 500mA/500V Fast Fuse

10A/500V Fast Fuse, 10A up to 10 seconds

6-4 AC Current

Range	Resolution	Accuracy
200 μ A	0.1 μ A	$\pm(1.5\%$ of rdg + 3 digits)
2000 μ A	1 μ A	
20mA	10 μ A	
200mA	100 μ A	
2A	1mA	$\pm(2.5\%$ of rdg + 5 digits)
10A	10mA	

-- Overload protection: 500mA/500V Fast Fuse

10A/500V Fast Fuse, 10A up to 10 seconds

-- Frequency Range: 40 to 400Hz

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

6-5 Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(1.0% of rdg + 3 digits)
2kΩ	1Ω	±(1.0% of rdg + 2 digits)
20kΩ	10Ω	
200kΩ	100Ω	
2MΩ	1kΩ	±(1.5% of rdg + 3 digits)
20MΩ	10kΩ	

-- Overload protection: 500V DC or AC rms

6-6 Temperature

Range	Accuracy	Resolution	
°C	-20~150°C	± (3°C 1 digit)	1°C
	150~1000°C	± (3% of rdg + 2 digits)	
°F	-4~302°F	± (5°F 2 digits)	1°F
	302~1832°F	± (3% of rdg + 3 digits)	

-- NiCr-NiSi K-type sensor

-- Overload protection: 500mA/500V Fast Fuse

6-7 Battery test

Range	Accuracy	Load current	Resolution
1.5V	±(5.0% of rdg + 5 digits)	Approx. 10mA	1mV
6V		Approx. 100mA	10mV
9V		Approx. 10mA	10mV
12V		Approx. 200mA	10mV

-- Overload protection: 500mA/500V Fast Fuse

LED light

Range	Green LED	Yellow LED	Red LED
1.5V	1.30V ± 0.08V and up.	0.94V ± 0.08V to 1.29V ± 0.08V	0.15V ± 0.08V to 0.93V ± 0.08V
6V	5.22V ± 0.3V and up.	3.76V ± 0.3V to 5.21V ± 0.3V	0.6V ± 0.3V to 3.75V ± 0.3V
9V	7.83V ± 0.45V and up.	5.64V ± 0.45V to 7.82V ± 0.45V	0.9V ± 0.45V to 5.63V ± 0.45V
12V	10.44V ± 0.6V and up.	7.52V ± 0.6V to 10.43V ± 0.6V	1.2V ± 0.6V to 7.51V ± 0.6V

-- When the voltage of the battery being tested is lower than 10% of its rated voltage, the red LED will not light.

-- When the battery connect to the meter is reverse, the meter will appear negative on the LCD display, but the LED will not light.

6-8 Diode and Audible continuity test

Range	Description	Test Condition
	Display read approximately forward voltage of diode	Forward DC current approx. 0.4mA Reversed DC voltage approx. 1.5V
	Built-in buzzer sounds if resistance is less than 100Ω	Open circuit voltage approx. 0.5V

Overload protection: 500V DC or AC rms

7. OPERATING INSTRUCTIONS

7-1 Attention before operation

7-1-1 Check battery. When the battery voltage drop below proper operation range, the "E" symbol will appear on the LCD display and the battery need to be changed.

7-1-2 Pay attention to the "A" 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 & AC Voltage

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

7-2-2 Set the rotary switch at the desired "V" range position, it shows symbol for testing DC voltage, if you want to test AC voltage, push "SELECT" button switch.

7-2-3 Connect test leads across the source or load under measurement.

7-2-4 You can get reading from LCD. The polarity of the red lead connection will be indicated along with the DC voltage value.

NOTE:

1. "A" 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.

2. Be cautious against shock when measuring high Voltage.

7-3 Measuring DC & AC Current

7-3-1 Connect the black test lead to **COM** jack and the red to the **VΩmA** jack for a maximum 200mA current, for a maximum 2A or 10A current, move the red lead to the **10A** jack.

7-3-2 Set the rotary switch at the desired "uA" & "mA" & "A" range position, it shows symbol for testing DC current, if you want to test AC current, push "SELECT" button switch.

7-3-3 Connect test leads in series with the load under measurement.

7-3-4 You can get reading from LCD. The polarity of the red lead connection will be indicated along with the DC current value.

NOTE:

1. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.

2. When only "OL" is displayed, it indicates over-range situation and the higher range has to be selected.

3. "A" means the socket mA's maximum current is 500mA and 10A's maximum current is 10A, over 500mA or 10A current can be protected by the fast fuse.

4. On the 10A range, the measuring time should be less than 10 seconds to prevent precision from affecting by circuit heating.

7-4 Measuring Resistance

7-4-1 Connect the black test lead to **COM** jack and the red to **VΩmA** jack.

7-4-2 Set the rotary switch at the desired "Ω" range position.

7-4-3 Connect test leads across the resistance under measurement.

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

NOTE: Max. input overload: 500V rms < 10sec

1. For measuring resistance above 1MΩ, the meter may take a few seconds to get stable reading.

2. When the input is not connected, i.e. at open circuit, the figure 'OL' will be displayed for the over-range condition.

3. When checking in-circuit resistance, be sure the circuit under test has all power removed and that all capacitors have been discharged fully.

7-5 Battery Testing

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

7-5-2 Set the rotary switch at the desired **BATT** "1.5V", "6V", "9V" or "12V" range position to test 1.5V, 6V, 9V or 12V battery.

7-5-3 Connect the red test lead to the positive of the battery and the black test lead to the negative of the battery.

7-5-4 You can get reading from LCD and the corresponding LED will light.

NOTE:

1. the green LED light show the battery being tested is good, it can continue to be used; the yellow LED light show the battery being tested is close to bad, it can be used but need to be changed as quickly as possible; the red LED light show the battery being tested is bad, it can not continue to be used.

2. When the battery connect to the meter is reverse, the meter will appear negative on the LCD display, but the LED will not light.

7-6 Diode & Audible continuity Testing

7-6-1 Connect the black test lead to **COM** jack and the red to **VΩmA** jack.

7-6-2 Set the rotary switch at the "Ω" range position, push "SELECT" to choose **Diode** or **Audible continuity** measurement.

7-6-3 On **diode** range, connect the test leads across the diode under measurement, display shows the approx. forward voltage of this diode.

7-6-4 On **Audible continuity** range, connect the test leads to two point of circuit, if the resistance is lower than approx. 100Ω, the buzzer sounds.

NOTE: Make sure the power is cut off and all capacitors need to be discharged under this measurement.

8. Battery replacement

8-1 When the battery voltage drop below proper operation range the "E" symbol will appear on the LCD display and the battery need to be changed.

8-2 Before changing the battery, set the selector switch to "OFF" position and remove the test leads from the terminals. Open the cover of the battery cabinet by a screwdriver.

8-3 Replace the old battery with the same type battery (9V 6F22).

8-4 Close the cover of the battery cabinet and fasten the screw.

9. Fuse replacement

9-1 This meter is provided with a 500mA/500V fast fuse to protect the battery test, temperature test and the current measuring circuits which measure up to 200mA, with a 10A/500V fuse to protect the 10A range.

9-2 Ensure the meter is not connected to any external circuit, set the selector switch to "OFF" position and remove the test leads from the terminals. Open the cover of the battery cabinet by a screwdriver.

9-3 Replace the old fuse with the same type and rating: 6×30mm 500mA/500V fast fuse or 6×30mm 10A/500V fast fuse.

9-4 Close the cover of the battery cabinet and fasten the screw.

10. Maintenance

10-1 You must replace the test leads if the lead is exposed, and should adopt the leads with the same specifications as origin.

10-2 Use only moist fabric or small amount of detergent but not chemical solution for cleaning.

10-3 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.

10-4 Please take out the battery when not using for a long time.

11. Accessories

[1] Test Leads: electric rating 1000V 10A

[2] Operator's Manual



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