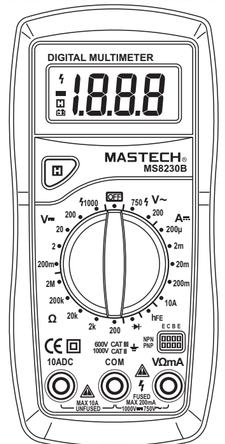
MASTECH® MS8230B

DIGITAL MULTIMETER
INSTRUCTION MANUAL



Safety Information

⚠ Warning

To ensure safe operation, and in order to exploit to the full the functionality of the meter, please follow the directions in this section carefully.

This multimeter has been designed according to IEC-1010 concerning electronic measuring instruments with an over voltage category CAT II 1000V, CAT III 600V and pollution 2.
Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good operating condition.
With proper use and care, the digital meter will give you years of satisfactory service.

• Preliminary

- When using the meter, the user must observe all normal safety rules concerning:
  Protection against the dangers of electrical current.
  Protection of the meter against misuse.
- When the meter is delivered, check that it has not been damaged in transit.
- When poor condition under harsh preservation or shipping conditions caused, inspect and confirm this meter without delay.
- Test leads must be in good condition. Before using verify that the insulation on test leads is not damaged and/or the leads wire is not exposed.
- Full compliance with safety standards can be guaranteed only if used with test leads supplied. If necessary, they must be replaced with the same model or same electric ratings.

• During Use

- Before using, you must select the right input jack, function and range.
- Never exceed the protection limit values indicated in specifications for each range of measurement.
- When the value scale to be measured is unknown beforehand, set the range selector at the highest position.

- Do not measure voltage if the voltage on the terminals exceeds 1000V above earth ground.
- Always be careful when working with voltages above 60V DC or 30V AC rms, keep fingers behind the probe barriers while measuring.
- Before rotating the transform switch to change functions and ranges, disconnect test leads from the circuit under test.
- Never perform resistance, transistor and diode measurements on live circuits.
- Never use the meter under the condition of the explosive air, steam or dirt.
- If any faults or abnormalities are observed, the meter can not be used any more and it has to be checked out.
- Never use the meter unless the rear case is in place and fastened fully.
- Please do not store or use meter in areas exposed to direct sunlight, high temperature, humidity or condensation.

• Symbols

⚠ Important safety information, refer to the operating manual.
Double insulation (Protection class II).
CAT II Overvoltage (Installation) category II, Pollution Degree 2 per IEC1010-1 refers to the level of Impulse Withstand Voltage protection provided.
CAT III Overvoltage (Installation) category III, Pollution Degree 2 per IEC1010-1 refers to the level of Impulse Withstand Voltage protection provided.
High voltage warning symbol
CE Conforms to european union directive
Earth ground
Fuse
~ Alternating current

⎓ Direct current
Diode
H This indicates that the display data is being held.
The battery is not sufficient for proper operation.

• Maintenance

-Please do not attempt to adjust or repair the meter by removing the rear case while voltage is being applied. A technician who fully understands danger involved should only carry out such actions.
- Before opening the battery cover or case of the meter, always disconnect test leads from all tested circuits.
- To avoid the wrong reading causing electricity attack, when the meter displays " ", you must change the battery.
- For continue protection against fire, replace fuse only with the specified voltage and current ratings: F 200mA/250V (quick acting).
- Do not use abrasives or solvents on the meter, use a damp cloth and mild detergent only.
- Always set the power switch to the OFF position when the meter is not in use.
- If the meter is to be stored for a long period of time, the batteries should be removed to prevent damage to the unit.

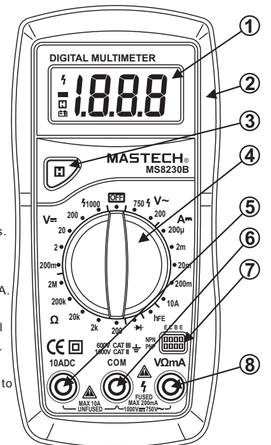
• Description

- This meter is a portable professional measuring instrument with handsome LCD easily reading.
- Single operation of a transform switch makes measurement convenient. Overload protection and low battery indication are provided, this meter is ideal for use in the fields, workshop, school, hobby and home applications.
- This meter is with the functions of data hold.

FRONT PANEL

• Names of Components

①LCD Display
②Panel
③H Button:
This Button is used to the switch of data hold.
④Transform Switch:
This switch is used to select functions and desired ranges.
⑤ 10A Jack:
Input terminal for current 0 ~ 10A.
⑥ COM Jack:
Common terminal for measurement.
⑦ hFE Jack:
This Jack is used to transistor test.
⑧ V/Ω/mA Jack:
Input Jack



• 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%.

• General Specifications

- Max. Voltage Between Terminals And Earth Ground: 1000V DC or 750V AC
- Fuse Protection: F 200mA/250V (quick acting).
- Display: 15mm LCD
- Max. Show Value: 1999 (3 1/2)
- Polarity Indication: '-'indicates negative polarity.
- Overrange Indication: Display '1'
- Sampling Time: approx. 0.4 second
- Low Battery Indication: " displayed
- Power Supply: 1.5V×3 AAA battery.
- Operating Temperature: 0°C to 40°C (32°F to 104°F)
- Storage Temperature: -10°C to 50°C (10°F to 122°F)
- Dimension & Weight: 158×74×32 mm, 250g (including battery)

• Electrical Specifications

Circumstance Temperature: 23±5°C, Relative Humidity: < 75%

DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	±(0.5% of rdg + 2 digits)
2V	0.001V	±(0.5% of rdg + 3 digits)
20V	0.01V	±(0.8% of rdg + 3 digits)
200V	0.1V	
1000V	1V	±(0.8% of rdg + 5 digits)

- Input Impedance: 1MΩ
- Overload Protection: 200mV range: 250V DC or AC rms,
  2V-1000V ranges: 1000V DC or 750VAC rms.
- Max. Input Voltage: 1000V DC

AC Voltage

Range	Resolution	Accuracy
200V	0.1V	±(1.2% of rdg + 10 digits)
750V	1V	

- Input Impedance: 1MΩ
- Overload Protection: 750V AC rms or 1000V DC
- Frequency Range: 40 to 400Hz
- Response: Average, calibrated in rms of sine wave.
- Max. Input Voltage: 750V rms AC

Diode

Range	Resolution	Function
⊳|	0.001V	Display :read approximate forward voltage of diode

- Forward DC Current: approx. 1mA
- Reversed DC Voltage: approx.2.8V
- Overload Protection: 250V DC or rms AC

DC Current

Range	Resolution	Accuracy
200μA	0.1μA	±(1.0% of rdg + 2 digits)
2mA	0.001mA	
20mA	0.01mA	±(1.5% of rdg + 2 digits)
200mA	0.1mA	
10A	0.01A	±(3.0% of rdg + 2 digits)

- Overload Protection: μA, mA ranges: F 200mA/250V fuse (quick acting), 10A range: unfused.
- Max. Input Current: mA Jack: 200mA, 10A Jack: 10A
- voltage drop: 200mV

Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(1.0% of rdg + 3 digits)
2kΩ	0.001kΩ	±(1.0% of rdg + 2 digits)
20kΩ	0.01kΩ	
200kΩ	0.1kΩ	
2MΩ	0.001MΩ	

- Open Circuit Voltage: 2.8V
- Overload Protection: 250V DC or rms AC

Transistor hFE

Range	Function
hFE	Display: read approximate hFE value (0-1000) of transistor under test (ALL TYPE)

- Base Current: approx. 2μA, Vce: approx. 2.8V

Operating Instruction

• Data Hold

If you need data hold when measuring, you can put on "H" button, it will hold the reading; if you put the button again, data hold is not continue.

• Preparation For Measurement

- Turn on the meter. If the battery voltage is less than 3.6V, display will show " ", the battery should be changed at this time.
- The " ⚠" besides the input jack shows that the input voltage or current should be less than specification on the sticker of the meter to protect the inner circuit from damaging.
- Select a function and a range for the item to be measured through rotating the transform switch accordingly. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
- When connection, first connect to the public testing line, then to the electriferous testing line. When you'll remove it, you should remove the elecriferous one.

• Measuring DC Voltage

⚠ Warning

You can't input the voltage which more than 1000V DC, it's possible to show higher voltage, but it's may destroy the inner circuit. Pay attention not to get an electric shock when measuring high voltage.

- Connect the black test lead to the COM jack and the red test lead to the V jack.
- Set the transform switch at the V range position.
- Connect test leads across the source or load under measurement.
- You can get a reading from LCD display. The polarity of the red test lead connection will be indicated.

• Note:

- When only the figure '1' is displayed, it indicates overrange situation and the higher range has to be selected.
- When the value scale to be measured is unknown beforehand, set the range selector at the highest position.

• Measuring AC Voltage

- Connect the black test lead to the COM jack and the red test lead to the V jack.
- Set the transform switch at the V range position.
- Connect test leads across the source or load under measurement.
- You can get reading from LCD.

• Measuring AC Voltage

⚠ Warning

You can't input the voltage which more than 750V rms AC, it's possible to show higher voltage, but it's may destroy the inner circuit. Pay attention not to get an electric shock when measuring voltage.

• Note:

- When only the figure '1' is displayed, it indicates overrange situation and the higher range has to be selected.
- When the value scale to be measured is unknown beforehand, set the range selector at the highest position.

• Measuring DC Current

⚠ Warning

Shut down the power of the tested circuit, then connect the meter with the circuit for measurement.

- Connect the black test lead to the COM jack and the red test lead to the mA jack for a maximum of 200mA current. For a maximum of 10A, move the red lead to the 10A jack.
- Set the transform switch at the A range position.
- Connect test leads across the source or load under measurement.
- Connect test leads in series with the load under measurement.
- You can get reading from LCD. The polarity of red test lead will be indicated.

• Note:

- When only the figure 'OL' is displayed, it indicates over range situation and the higher range has to be selected.
- When the value scale to be measured is unknown beforehand, set therange selector at the highest position.
- " ⚠" means the socket of INPUT maximum current is 200mA, over current will destroy the fuse. 10A's maximum current is 10A, no fuse protection.

• Measuring Resistance

⚠ Warning

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

- Connect the black test lead to the COM jack and the red test lead to the Ω jack.
- Set the transform switch at the Ω range position.
- Connect test leads across the resistance under measurement.
- You can get reading from LCD.

• Note:

- When only the figure '1' is displayed, it indicates overrange situation and the higher range has to be selected.
- When the input is not connected, i.e. at open circuit, the figure '1' will be displayed for the overrange condition.

• Testing Diode

- Connect the black test lead to the COM jack and the red test lead to the Ω jack. (The polarity of red lead is "+")

- Set the transform switch at the ⊳| range position.
- Connect the red lead to the anode, the black lead to the cathode of the diode under testing.
- You can get reading from LCD.

• Note:

- The meter will show the approximate forward voltage drop of the diode.
- If the lead connection is reversed, only figure'1'will be displayed.
- When the input is not connected, i.e. at open circuit, the figure '1' will be displayed.

• Testing Transistor

- Set the transform switch at the hFE range position.
- Identify whether the transistor is NPN or PNP type and insert emitter, base and collector leads into the proper holes of the transistor on the socket for testing.
- You can get reading from LCD.

Maintenance

• Battery Replacement

⚠ Warning

Before attempting open the battery cover of the meter, be sure that test leads have been disconnected from measurement circuit to avoid electric shock hazard.

- Loosen the screw fixing the battery cover and remove it.
- Replace the exhausted battery with a new one.
- Put the battery cover as its origin.

• Fuse Replacement

- Loosen the screw fixing the battery cover and remove it.
- Replace the blown fuse with ratings specified.
- Put the battery cover as its origin.

⚠ Warning

Before attempting open the battery cover of the meter, be sure that test leads have been disconnected from measurement circuit to avoid electric shock hazard.
For protection against fire, replace fuses only with specified ratings: F 200mA/250V (quick acting).

• Test Leads Replacement

⚠ Warning

Full in compliance with safety standards can be guaranteed only if used with test leads supplied. If necessary, they must be replaced with the same model or same electric ratings. Electric ratings of the test leads: 1000V 10A.

You must be replaced the test leads if the lead is exposed.

Accessories

1	Test Leads: Electric Ratings 1000V 10A	one piece
2	Battery:1.5V, AAA	three pieces
3	Instruction Manual	one piece

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