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1. Overview

This model of digital multimeter is designed and manufactured according to the safety requirements of the safety standard IEC-61010 of International Electrotechnical Commission for electronic measuring instruments and handheld digital multimeters. This product meets the requirements of IEC 61010-1: 600 V CAT III, Pollution Degree 2. Before using this instrument, please read the instruction manual carefully and pay attention to the guidelines for safe use.

1.1 Safety Information

1.1.1 Safety Instructions

- When using this instrument, the user must comply with all standard safety procedures regarding the following two points:
 - A. Safety procedures for preventing electric shock
 - B. Safety procedures for preventing misuse of the instrument
- To ensure your personal safety, use the test pen provided with the multimeter. Check and make sure they are in good condition before use.

1.1.2 Safety Precautions

- When the multimeter is used near equipment with relatively large electromagnetic interference, the reading of the multimeter will be unstable and may even produce a large error.
- Do not use them when the multimeter or probe is damaged in appearance.
- If the multimeter is not used properly, the safety functions provided by the multimeter may fail.
- When working around bare conductors or buses, you must be extremely careful.
- It is forbidden to use the instrument near explosive gases, vapors or dust.
- The correct input jack, function, and range must be selected for measurement.
- The input value must not exceed the input limit value specified for each range to prevent damage to the instrument.
- Never touch an unused input jack when the multimeter is connected to the wire to be measured.
- When the voltage to be measured exceeds the effective value of 60Vdc or 30Vac, operate carefully to prevent electric shock.
- When measuring with the multimeter probe, keep your fingers behind the finger guards on the probe.
- Make sure the probe is out of the circuit under test before switching ranges.
- For all DC functions, in order to avoid the risk of electric shock due to possible incorrect readings, use the AC function first to confirm the presence of any AC voltage. Then, select a DC voltage range that is equal to or greater than the AC voltage.
- Before performing resistance, diode and continuity tests, you must first cut off the power supply of the circuit under test and discharge all high-voltage capacitors in the circuit under test.
- Do not measure resistance or perform continuity tests on a live circuit.
- Before measuring current, check the fuse of the multimeter. Before connecting the multimeter to the circuit under test, cut off the power supply of the circuit under test.
- When repairing a TV set or measuring a power conversion circuit, you must be careful of high-amplitude voltage pulses in the circuit under test to avoid damage to the multimeter.
- The multimeter is powered by two 1.5V AAA batteries, which must be properly installed in the battery holder of the meter.
- When the battery undervoltage symbol " " appears, the batteries should be replaced immediately. Low battery will cause the multimeter to display incorrect readings, which may result in electric shock or personal injury.
- The voltage must not exceed 600V when performing CAT.III voltage measurements.
- Do not use the multimeter when its casing (or part of the casing) is removed.

1.1.3 Safety Symbols

Symbols used on the multimeter and in the instruction manual:

	Warning, important safety symbol, please refer to the instruction manual before use. Incorrect use can result in damage to multimeter or components.
	AC (alternating current)
	DC (direct current)
	AC or DC
	Grounding
	Double insulation
	Fuse
	Compliant with European Union directives
CAT. III	CAT III 600V overvoltage protection

1.1.4 Safe Maintenance Habits

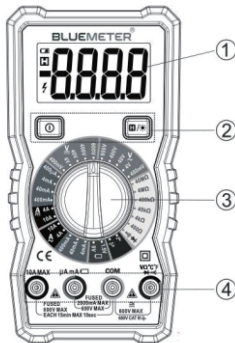
- When opening the multimeter housing or removing the battery cover, pull out the test probes first.
- When repairing the multimeter, you must use the specified replacement parts.
- Before disassembling the multimeter, you must disconnect all related power supplies. At the same time, you must ensure that there is no static electricity on your body to avoid damage to the components of the multimeter.
- The calibration and maintenance of the instrument should only be performed by qualified personnel.
- When opening the housing of the multimeter, it must be noted that some capacitors in the multimeter retain dangerous voltage even after it is powered off.
- If any abnormality of the multimeter is observed, stop using the multimeter immediately and send it for repair. And make sure it cannot be used until it passes the inspection.
- When the multimeter is not used for a long time, please remove the battery and avoid storing it in a place with high temperature and high humidity.

1.2 Input Protection Measures

- When performing voltage measurements, the multimeter can withstand a maximum input voltage of 600V DC or 600V AC.
- When performing resistance, continuity and diode tests, it can withstand an effective voltage not exceeding 600V AC or equivalent.
- When measuring μA current and mA current, it is protected by a fuse (2000mA/600V).

2. Multimeter Description

2.1 Appearance Description



Appearance of the multimeter

- ①. LCD display ②. Buttons
③. Rotary knob ④. Input jacks

2.2 LCD Display



4000-count LCD display with backlight function.

⚡	Symbol for low battery voltage
📄	Symbol for data logging
⚡	Symbol for danger of high voltage

2.3 Button Description

Power button:

Press the "🔌" button once to turn on the multimeter, and press again to turn it off. After about 15 minutes of inactivity, it will automatically sleep.

Data logging button:

Press the "📄" button during the measurement, the multimeter display will keep the last reading of the measurement and display the "📄" symbol; press this button again, the multimeter will return to the normal measurement mode.

Press and hold the "📄" button, the backlight lights up; press and hold the button again, the backlight goes out, or the backlight turns off automatically after about 15 seconds. (Note: When the battery voltage is low, the backlight will not be bright enough).

2.4 Input Jack

④ The positive input jack for 400mA-10A current measurement (connected to the red test lead).

-  The positive input jack for current and battery measurement within 400mA (connected to the red test lead).
-  Common input jack for all measurements (connected to the black test lead).
-  The positive input jack for voltage, resistance, diode, buzzer, and temperature (connected to the red test lead).

3. Technical Specifications

3.1 DC Voltage

Range	Resolution	Accuracy
400mV	100uV	$\pm 0.5\% \pm 2$
4V	1mV	
40V	10mV	
400V	100mV	
600V	1V	$\pm 0.8\% \pm 2$

3.2 AC Voltage

Range	Resolution	Accuracy
400mV	100uV	$\pm 1.2\% \pm 10$
4V	1mV	
40V	10mV	
400V	100mV	
600V	1V	

Frequency range: 40Hz to 1000Hz. Display: RMS value of a sine wave.

3.3 DC Current

Range	Resolution	Accuracy
400uA	0.1uA	$\pm 1.0\% \pm 2$
4mA	1uA	
40mA	10uA	
400mA	100uA	$\pm 1.5\% \pm 2$
4A	1mA	$\pm 3.0\% \pm 2$
10A	10mA	

Overload protection: F2A/600V fuse, F10A/600V fuse.

3.4 AC Current

Range	Resolution	Accuracy
4mA	1uA	$\pm 0.8\% \pm 2$
40mA	10uA	
400mA	100uA	$\pm 1.0\% \pm 2$
4A	1mA	$\pm 1.0\% \pm 5$
10A	10mA	

Frequency range: 40Hz to 1000Hz. Display: RMS value of a sine wave.
Overload protection: F2A/600V fuse, F10A/600V fuse.

3.5 Resistance

Range	Resolution	Accuracy
400Ω	0.1Ω	±0.8%±2
4KΩ	1Ω	
40KΩ	10Ω	
400KΩ	100Ω	
4MΩ	1KΩ	±1.0%±2
40MΩ	10KΩ	±1.0%±5

Maximum open circuit voltage: 1.2V.

Overload protection: RMS value of PTC 600V DC or AC.

3.6 Diode and Continuity

Range	Description
•••)	On-resistance is approximately less than 50Ω, and the buzzer in the meter beeps
➔	It displays approximate forward voltage drop of a diode.

Maximum open circuit voltage: 2.1V.

3.7 Temperature

Celsius:

Range	Resolution	Accuracy
-20℃~1000℃	1℃	±1.0%±3

Fahrenheit:

Range	Resolution	Accuracy
-4℉~1832℉	1℉	±1.0%±3

3.8 Battery Measurement

Range	Description
1.5V	Approximately 43Ω resistance load is connected to the meter
9V	Approximately 620Ω resistance load is connected to the meter

4. Operating Instructions

Ensure that the meter is complete, that its back housing and battery cover are installed and fully fixed, and that the meter is dry and used in an environment where the humidity is not greater than 80%.

4.1 Current Measurement

⚠ Warning: Do not attempt to make current measurements on a circuit when the voltage between the open circuit voltage and ground exceeds 250V. If the fuse is blown during the measurement, you may damage the meter or injure yourself. To avoid damage to the meter or the device under test, check the fuse of the meter before measuring current. When making measurements, use the correct input jack, function and range.

⚠ Note: If the magnitude of the current is unknown, the maximum current capability should be selected. After preliminary understanding of the current magnitude, change to the appropriate capability for measurement to avoid unnecessary damage to personnel and device.

1. When the current to be measured does not exceed 400mA, insert the red test lead into the uA, mA jack; when the battery to be measured is greater than 400mA and less than 10A, insert the red test lead into the 10A jack. Insert the black test lead into the COM jack. At this time, the polarity of the red test lead is "+".
2. When measuring DC current, turn the function range knob to the "DC current" range position. When measuring AC current, turn the function range knob to the "AC current" range position.
3. Cut off the power of the circuit to be tested and ensure that the circuit to be tested is not charged, and then connect the red and black test leads in series to the circuit to be tested.
4. After the safety test of the circuit, turn on the power of the circuit to be tested, and read the current value from the display.

4.2 Temperature Measurement

1. Insert the black test lead of the temperature sensor into the COM jack and the red test lead into the "V" jack.
2. Turn the function range knob to the "C" range position (the measurement unit is degrees Celsius);
Turn the function range knob to the "F" range position (the measurement unit is degrees Fahrenheit);
3. Place the temperature sensor probe at the point to be measured so that it is in full contact with the object to be measured. Leave it for a short period of time, wait for the sensor probe and the object to be measured at the same temperature, and read the temperature value from the display.

4.3 Battery Measurement

 **Warning:** To avoid damage to the meter or the device under test, before measuring the battery, all circuits connected to the battery under test should be cut off. The meter has two battery measurement levels: BAT1.5V and BAT9V.

BAT1.5V: Measure batteries with a rated voltage of 1.5V (such as AA, AAA, and D batteries), and the internal resistance of the meter is 430Ω;

BAT9V: Measure batteries with a rated voltage of 9V (such as 6F22 battery), and the internal resistance of the meter is 620Ω. How to measure:

1. Insert the black test lead into the COM jack and the red test lead into "mA" jack. At this time, the polarity of the red test lead is "+".
2. Turn the function range knob to the "1.5V" or "9V" range position according to the nominal voltage of the battery to be measured.
3. Connect the red test probe to the positive electrode of the battery and the black test probe to the negative electrode of the battery, and read the voltage value of the battery on the display after it is loaded.

5. Replacement of Fuse and Battery

 To avoid electric shock or personal injury due to incorrect readings, replace the battery as soon as the "B" symbol appears on the meter display. To avoid electric shock or personal injury, switch off the meter and check that the test probe is disconnected from the circuit to be measured before opening the battery cover and replacing the battery with a new one.

Maximum voltage between voltage input jack and ground: CATIII 600V

Fuse: F2A/600V F10A/600V

Power supply: 1.5V AAA battery x 2

5.1 Replacement of Fuse

1. First unplug the test lead and turn off the meter.
2. Open the battery compartment with a screwdriver and take out the broken fuse.
3. Insert the fuse of the same specification, reinstall the battery cover, and fix the screws.

5.2 Replacement of Battery

1. Turn off the meter.
2. Pull out all test leads from the input jacks.
3. Use a screwdriver to loosen the screws that secure the battery cover.
4. Remove the battery cover.
5. Replace the old batteries with two new batteries.
6. Install the battery cover and tighten the screws.

6. General Specifications

Environmental conditions for use:

- 600V CAT. III, Pollution Degree: 2
- Altitude < 2000m.
- Temperature and humidity of working environment: 0~40°C (<80%RH, <10°C not applicable)
- Temperature and humidity of storage environment: -10~60°C (<70%RH, remove the battery)
- Temperature coefficient: (0.1x accuracy)/°C (<18°C or >28°C)
- The maximum voltage between the object to be measured and the ground: 600V DC or 600V AC RMS value.

7. Multimeter Maintenance

This section provides basic maintenance information, including instructions for replacing the fuse and replacing the battery. Do not attempt to service this meter unless you are an experienced service technician and have relevant information on calibration, performance testing, and repair.

7.1 General Maintenance



To avoid electric shock or damage to the meter, do not get the inside of the meter wet. Before opening the housing or battery cover, the connecting wires between the test probes and the input jacks must be removed.

Clean the meter housing regularly with a damp cloth and a small amount of detergent, do not use abrasives or chemical solvents.

If the measurement input jack is dirty or wet, it may affect the reading.

Clean the input jack:

1. Turn off the meter and pull out all test leads from the input jacks.
2. Remove all the dirt on the jacks.
3. Dip a new cotton ball with detergent or lubricant to clean each jack. The lubricant can prevent the jack from being contaminated by moisture.