G9102
Modern Digital Multimeter User Manual

1. Introduction
The G9102 digital multimeter meets CAT III 600V/CAT II 1000V requirement. These meters are designed with overvoltage and overcurrent alarm, with all modes withstanding 1kV overvoltage shock. G9102 is suitable for electricians and G9102 is perfect for HVAC technicians.

2. Features
Ergonomic design, comfortable and solid.
Can withstand a drop of 2 meters height.
3 times/second sampling rate.
Full protection which can withstand overvoltage shock up to 1kV, and designed with overvoltage and overcurrent alarm.
Fast capacitance measurement, response time is within 6s when capacitance ≦10mF.
Audio/visual alarm in continuity and NCV modes.
Low power consumption, automatic power saving prolongs battery life up to 500 hours.

3. Accessories
Open the package box and take out the device. Please check whether the following items are deficient or damaged:
1) User manual ---------- 1 pc
2) Test leads ---------- 1 pair
3) Temperature probe ---------- 1 pc
If any of the above item is missing or damaged, please contact your supplier immediately.
⚠ **Warning: Before using the instrument, please read the "Safety operation guidelines" carefully.**

4. Safety Operation Guidelines
1) Safety Certification
Design according to IEC61010-1: 2010, 61010-2-030:2010, 61010-2-033:2012, 61326-1:2013, 61326-2-2:2013.
2) Safety Instructions and Precautions
- Do not use the device if the rear cover is not covered up or it will pose a shock hazard.
- Do not use the device if the device or test leads appear damaged or if you suspect that the device is not operating properly. Pay particular attention to the insulation layer.
- Keep the fingers behind the finger guard during operation.
- Do not input voltage over 1000V between the instrument terminal and ground to prevent electric shocks or damages to the instrument.
- Be cautious to prevent electric shock if the measured DC voltage > 60V or AC voltage > 30Vrms.
- Do not input overrange value.
- Functional dial should be switched to proper position.
- Do not switch the functional dial during measurement.
- Do not change the internal circuit of the device in order to avoid the damage to the device and users.
- Use the same specification fast-acting fuse for replacement.
- To avoid false reading, replace the battery when the battery indicator "▭" appears.
- Do not use or store the device in high temperature and high humidity environment, the performance of the device may deteriorate after exposure to moisture.
- Use damp cloth to clean the case; do not use detergent containing solvents or abradants.

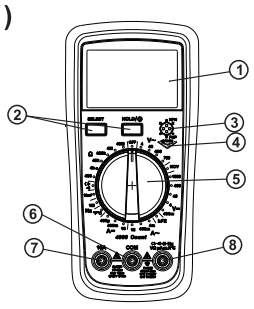
5. Electrical Symbols

▭	Low battery	⊣⊢	Fuse	⚠	High voltage hazard	~	AC
⏚	Ground	▣	Double insulation	⚠	Warning	⎓	DC

6. General Specifications
1) Max voltage between input terminal and ground: 1000Vrms.
2) ⚠10A terminal: Fuse 10A H 250V fast-acting fuse Φ5x20mm.
3) ⚠mA/uA terminal: Fuse 500mA H 250V fast-acting fuse Φ5x20mm.
4) Max Display Value: 3999; Overrange display "OL", sampling rate 3 times/second.
5) Measuring range: Manual range
6) Backlight: Manual ON/OFF. Automatic turn off backlight when 30s inactive.
7) Polarity: Negative input display "—" symbol.
8) Data hold indicator: "H" at LCD upper left corner.
9) Low battery indicator: "▭" at LCD lower left corner.
10)Audio/visual alarm: During the continuity measurement and NCV measurement , the device will make sounds along with a red LED light indicator.
11)Battery: AA battery (zinc manganese) 1.5V x 2
12)Operating temperature: 0˚C~40˚C (32˚F~104˚F)
Storage temperature: -10˚C~50˚C (14˚F~122˚F)
Relative humidity: 0˚C~below 30˚C ≤75%; 30˚C~40˚C ≤50%.
Operating altitude: 0~2000m
13)Weight: About 328g (including batteries).
14)Electromagnetic compatibility:
RF≤1V/m, overall accuracy=specified accuracy+5% of range.
RF>1V/m, no specified calculation.

7. External Structure (picture 1)

1	LCD display
2	Functional buttons
3	Transistor input terminal
4	Audio/visual alarm indicator
5	Functional switch
6	COM input terminal
7	10A current input terminal
8	Other measurement input terminal



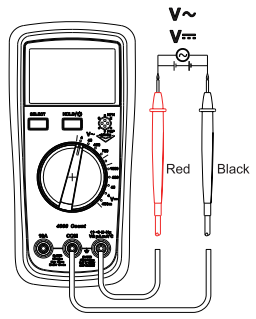
picture 1

8. Functional Buttons
*. **SELECT/REL:** Press to switch the range mode to diode/continuity, Celsius/Fahrenheit temperature. When measuring the capacitance, voltage, current, and resistance (400Ωscale), press this button can clear the base values.
*. HOLD/☼:Press the button to perform data hold/ cancel data hold. Press this button ≥2s to turn on/off the backlight.

9. Measurement Instructions
Please confirm the batteries have been installed first. To avoid false reading, replace the battery if the battery low power symbol "▭" appears. Also pay special attention to the warning sign "⚠" besides the test lead plug, it indicates that the tested voltage or current must not exceed the values listed on the device.

1) AC/DC Voltage Measurement (see picture 2)
- Switch the dial to AC voltage position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured voltage (parallel to the load).

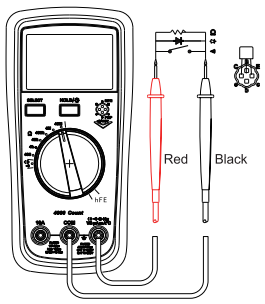
⚠Notes:
*. Do not input voltage over 1000Vrms, or it may pose shock hazard. If the measured voltage range is not known before the measurement, set the switch to the highest range, and then gradually reduce the measuring range according to the actual reading (LCD display 0L indicates over-range, need to increase the measuring range). Measurement accuracy might be affected when large circuit impedance is present.
*. Be cautious when measuring high voltage.
*. Before using the device, it is suggested to measure a known voltage for verification.



picture 2

2) Resistance Measurement (see picture 3)
- Switch the dial to resistance position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured resistor (parallel to the measured resistor).

⚠Notes:
*. To avoid instrument damage and injury to users, before measuring the resistance online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.
*. If the resistance when shorted is more than 0.5Ω, please check if test leads are loosened or damaged.
*. If the resistor is open or over the range, the "OL" symbol will be displayed on the screen.
*. When measuring low resistance, the test leads may produce 0.1Ω~0.2Ω measurement error. To obtain accurate measurement, please measure at the 400Ω scale, the device will automatically subtract the resistance of test leads.
*. When measuring high resistance, it may take a few seconds to stabilize the reading, which is a normal phenomenon.
*. Do not input over 60V DC or 30V AC.



picture 3

3) Continuity Measurement (see picture 3)
- Switch the dial to continuity position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both measured ends.
- When measured resistance > 51Ω, circuit is in open status and the buzzer will make no sound. When measured resistance ≤10Ω, circuit is in good conduction status and the buzzer will be beeping continuously, along with a red LED light indicator.

⚠ Notes:
*. To avoid instrument damage and injury to users, before measuring the continuity online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.

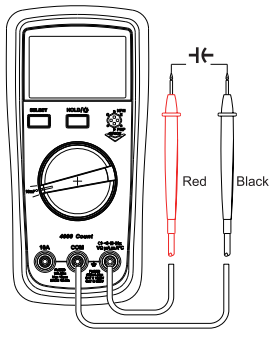
4) Diode Measurement (see picture 3)
- Switch the dial to diode position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the PN junction.
- "OL" symbol appears when the diode is open or polarity is reversed. For silicon PN junction, normal value: 500 ~ 800mV (0.5 ~ 0.8V).

⚠ Notes:
*. To avoid instrument damage and injury to users, before measuring the PN junction online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.
*. diode's test voltage range is about 4.0V/1.4mA

5) hFE Measurement (see picture 3)
- Switch the dial to "hFE" position.
- Insert the transistor (PNP or NPN type) poles (B, E, C) into the corresponding socket, the hFE value will be displayed on the screen.

6) Capacitance Measurement (see picture 4)
- Switch the dial to capacitance position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured capacitor.
- When there is no input, the screen will also show a fixed reading which is the inherent capacitance value of the device. For small capacitance measurement, the measured value must subtract the inherent capacitance value to ensure the measurement accuracy, please use the relative measurement function (REL) to measure (The device will automatically subtract the inherent value for easier reading).

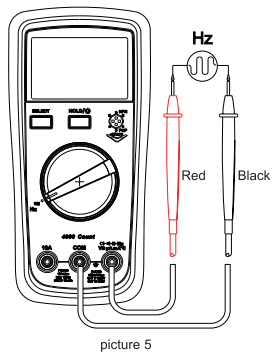
⚠Notes:
*. If the tested capacitor is shorted or its capacitance is over the specified range, "OL" symbol will be displayed on the screen.
*. When measuring large capacitance, it may take a few seconds to obtain steady readings.
*. Please fully discharge the capacitors before measuring. This is extremely important for capacitors with high voltage to avoid shock hazard.



picture 4

7) Frequency Measurement (see picture 5)
- Switch the dial to Hz position.
- Insert the red test lead to the "VΩmA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured signal source.

⚠Notes:
- When there is no input, the device may be influenced by the strong power frequency. There may be a reading of 50Hz or 60Hz which will not affect the measurement accuracy.
- Do not input over 60V DC or 30V AC.



picture 5

8) DC Current Measurement (see picture 6)

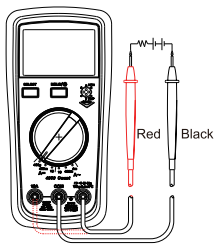
- Switch the dial to DC current position.
- Insert the red test lead to the "VΩmA" jack or the "10A" jack, black to the "COM" jack, then connect the test leads with the circuit in series.

⚠Notes:

- Before measuring, switch off the power supply of the circuit, and carefully check the input terminals and the dial position.
- If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
- If the "VΩmA", "10A" input is overloaded, the internal fuses will break and must be replaced.

a. VΩmA terminal fuse specification: Fuse 0.5A/250V Φ5x20mm.
b.10A terminal fuse specification: Fuse 10A/250V Φ5x20mm.

- To avoid instrument damage and injury to users, do not connect the test leads in parallel to any voltage circuit during the current test.
- If the tested current is close to10A, each measurement time should be less than10 seconds and the next test should be after 15 minutes.



picture 6

9) AC Current Measurement (see picture 6)

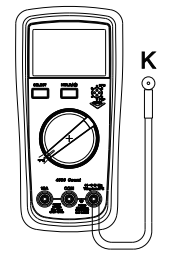
Similar to the DC current measurement.

10) Temperature Measurement (Celsius/ Fahrenheit, see picture 7)

- Switch the dial to temperature position.
- Plug the K-type thermocouple into the device and put the sensing probe on the object. Read the temperature on the screen after the value is stable.

⚠Notes:

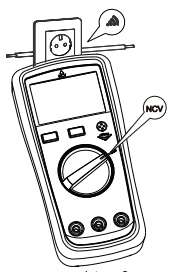
The device will display "0L" when it turns on. And it is only suitable for the K type (Ni-Cr~Ni-Si) thermocouple, which is a temperature sensor. The measured temperature should be less than 250˚C/ 482˚F (˚F=˚C*1.8+32).



picture 7

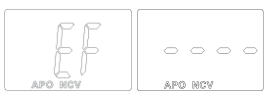
11) NCV Measurement (see picture 8)

- To sense whether there is AC voltage or electromagnetic field in the space, please switch the dial to the NCV position.
- Place the front end of the device near the measured object. When the voltage of the electric field >100Vac, LCD displays the electric field intensity by "-" symbol. More "-" (up to 4 segments) and the higher the electric field intensity, the higher the frequency of buzzer beeping and red LED flickering, and vice versa.
- Display of electric field intensity.



picture 8

- When electric field intensity is 0~50mV, LCD displays "EF".
- When electric field intensity is 50~100mV, LCD displays "-".
- When electric field intensity is 100~150mV, LCD displays "--".
- When electric field intensity is 150~200mV, LCD displays "---".
- When electric field intensity is >200mV, LCD displays "----".



12) Others:

- The device enters normal measurement status in 2 seconds after start-up.
- The device automatically shuts down if there is no operation for 15 minutes. You can wake up the device by pressing any key, the buzzer will beep once. To disable auto shutdown, switch the dial to OFF position, long press SEL/REL button and turn on the device.
- The buzzer will beep once (about 0.25s) at any valid press or switch of the dial.
- Buzzer alarm prompt during measurement:

a. When the input voltage ≥1000V (AC/DC), the buzzer will beep continuously indicating that it is at the range limit.
b. When the current > 10A (AC/DC), the buzzer will beep continuously indicating that it is at the range limit.

- The buzzer will make 5 consecutive beeps about 1 minutes before automatic shutdown, and make one long beep when it shuts down.
- Low voltage detection: Battery voltage < 2.5V, "▭" under-voltage symbol appears, but it can still work normally, and "▭" flickers for 3s in every 3s. If the voltage < 2.2V, turn on the device will only show the under-voltage symbol, the device can not work.

10. Technical Specifications

- Accuracy: ±(a% of reading + b numerical value in least significant digit slot), 1 year warranty.
- Ambient temperature: 23˚C±5˚C (73.4˚F±9˚F), relative humidity: ≤75%

Notes:

- To ensure accuracy, operating temperature should be within 18˚C~28˚C and fluctuation range should be within ±1˚C. Temperature Coefficient= 0.1*(specified accuracy)/˚C (<18˚C or >28˚C).

1) DC Voltage Measurement

Measuring Range / Scale	Resolution	Accuracy
400.0mV	0.1mV	±(0.5%+5)
4.000V	0.001V	
40.00V	0.01V	
400.0V	0.1V	
1000V	1V	±(0.7%+3)

⚠Input impedance:

- Input impedance: About 10MΩ. Results might be unstable at mV range when no load is connected. The value becomes stable once the load is connected (Least significant digit ≤±3).
- Max input voltage: ±1000V, when the voltage ≥1010V, "OL" symbol appears.
- Overload protection: 1000Vrms (AC/DC).

2) AC Voltage Measurement

Measuring Range / Scale	Resolution	Accuracy
4.000V	0.001V	± (1.0%+2)
40.00V	0.01V	± (0.8%+3)
400.0V	0.1V	
750V	1V	

- Input impedance: about 10MΩ.
- Frequency response: 40Hz~400Hz, display sine wave true RMS (average response).
- Max input voltage: ±750V, when the voltage ≥760V, "OL" symbol appears.
- Overload protection: 1000Vrms (AC/DC).

3) Resistance Measurement

Measuring Range / Scale	Resolution	Accuracy
400.0Ω	0.1Ω	± (1.0%+2)
4.000kΩ	0.001kΩ	± (0.8%+2)
40.00kΩ	0.01kΩ	± (0.8%+2)
400.0kΩ	0.1kΩ	± (0.8%+2)
4.000MΩ	0.001MΩ	± (1.0%+2)
40.00MΩ	0.01 MΩ	± (1.2%+3)

- Measurement result = reading of resistor – reading of shorted test leads
- Overload protection: 1000Vrms (AC/DC).

4) Continuity and Diode

Position	Resolution	Remark
•))	0.1Ω	Set Value: Open circuit: resistance > 50Ω, no beep. Well-connected circuit: resistance ≤10Ω, continuous beeps.
▶|	0.001V	Open circuit voltage is about 4V, test current is about 1.4mA. Silicon PN junction normal voltage: 0.5 ~ 0.8V.

⚠ Overload protection: 1000Vrms (AC/DC).

5) Capacitance Measurement

Measuring Range	Resolution	Accuracy
4.000nF	0.001nF	In REL mode: ±(4%+10)
40.00nF	0.01nF	In REL mode: ±(4%+10)
400.0nF	0.1nF	± (4%+5)
4.000μF	0.001μF	± (4%+5)
40.00μF	0.01μF	± (4%+5)
400.0μF	0.1μF	± (4%+5)
10.00mF	0.01mF	±10%

⚠ Overload protection: 1000Vrms (AC/DC).
When the capacitance ≤200nF, to ensure accuracy, please use the relative measurement function (REL) to measure.

6) Temperature Measurement

Range			Resolution	Accuracy
℃	-40～1000℃	-40～40℃	1℃	±4℃
		>40～500℃		±(1.0%+4)
		>500～1000℃		±(2.0%+4)
℉	-40～1832℉	-40～104℉	1℉	±5℉
		>104～932℉		± (1.5%+5)
		>932～1832℉		± (2.5%+5)

⚠ Overload protection: 1000Vrms (AC/DC).
Remark: The K-type (Ni-Cr~Ni-Si) thermocouple is only applicable for temperature less than 250˚C/482˚F.

7) DC Current Measurement

Measuring Range / Scale	Resolution	Accuracy
400.0μA	0.1μA	± (0.8%+3)
400.0mA	0.1mA	± (0.8%+3)
10.00A	0.01A	± (1.2%+5)

- Alarm when input current ≥10A; when input current > 10.10A, "OL" symbol appears.

⚠Overload protection: 250Vrms
μA mA range: F1 Fuse 0.5A/250V Φ5x20mm.
10 A range: F2 Fuse 10A/250V Φ5x20mm.

8) AC Current Measurement

Measuring Range	Resolution	Accuracy
4.000 mA	0.001mA	± (1.0%+2)
400.0mA	0.1mA	± (1.0%+2)
10.00A	0.01A	± (1.5%+3)

- Frequency response: 40 ~ 400Hz.
- Display: RMS. Accuracy guarantee range: 5 ~100% of the range, shorted circuit allows least significant digit < 2.
- Alarm when input current ≥10A; when input current > 10.10A, "OL" symbol appears.
- Overload protection: Refer to DC current measurement.

9) Frequency Measurement

Measuring Range	Resolution	Accuracy	Description
10.00Hz~1.000MHz	0.01Hz~1kHz	±(0.1%+4)	Measurement sensitivity:10Hz~1MHz ≤100kHz: 200mVrms ≤Input amplitude ≤30Vrms >100kHz~1MHz: 600mVrms ≤Input amplitude ≤30Vrms

⚠Overload protection: 1000Vrms (AC/DC).

11. Maintenance

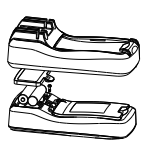
⚠Warning: Before opening the rear cover, switch off the power supply (remove test leads from the input terminal and the circuit).

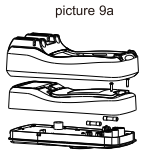
1) General Maintenance

- Clean the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- If there is any malfunction, stop using the device and send it to maintenance.
- The maintenance and service must be implemented by qualified professionals or designated departments.

2) Replace Battery or Fuse (see picture 9a, picture 9b)

- To avoid false reading, replace the battery when the battery Indicator "▭" appears.
  Battery Specification: AA 1.5Vx2
- Switch the dial to "OFF" position, remove the test leads from the input terminal, remove the protective cover also.
- Loosen the screw on battery cover (top), remove the cover to replace the battery. Please identify the positive and negative pole.
- When the fuse is burned out due to wrong measurement of voltage or over-current, some functions may not work properly, and the fuse should be replaced immediately.
- Switch the dial to "OFF" position and remove the test leads from the input terminal, remove the protective cover also.
- Loosen the both screws on the rear cover, and then remove the rear cover to replace the fuse.
- Fuse specification: F1 Fuse 0.5A/250V Φ5x20mm ceramic tube
  F2 Fuse 10A/250V Φ5x20mm ceramic tube


picture 9a


picture 9b