

DIGITAL MULTIMETER VC9808+

OPERATION MANUAL

1. GENERAL

This Highly stable multimeter uses a 26mm high figure LCD display for clear reading and good performance. It is powered by a 9V battery source. It has features like unit symbol display, backlight and overload protection to make operations more convenient.






The instrument can test DCV, ACV, DCA, ACA, resistance, capacitance, inductance, temperature, frequency, diode, and triode and continuity test. It adopts a dual-integral A/D converter, to make it an excellent tool for everyday use.

2. SAFETY NOTES

This series meter is designed to meet IEC1010 standard. Please read following notes carefully before operation.


- To avoid electric shock and damage to meter, do not apply voltage which is over RMS DC 1000V or AC 750V.
- Voltage lesser than 36V is considered as safety voltage. When measuring voltage higher than DC 36V or AC 25V, check the connection and insulation of test lead to avoid electric shock.
- Be sure to keep the test leads off the testing points when changing function and ranges.
- Select correct functions and range to avoid shock and faulty operation.
- When measuring current, do not apply current over 20A.

6. Safety symbols

"" high voltage exists, "" GND, "" dual insulation, "" refer to manual, "" low battery indication.

3. SPECIFICATION

1) GENERAL

- 1-1. Display: 26mm LCD
- 1-2. Max. Display: 1,999 (3 1/2), auto polarity indication
- 1-3. Measuring method: dual slope A/D Converter
- 1-4. Sampling rate: approx. 3 times/sec
- 1-5. Over range indication: MSD displays "OL" or "-OL"
- 1-6. Low battery indication: "" symbol displays
- 1-7. Operation: 0~40°C, relative humidity <80%
- 1-8. Storage: -10~50°C, relative humidity <80%
- 1-9. Power: one 9V battery (6F22 or equivalent)
- 1-10. Size: 185×93×35 mm
- 1-11. Weight: approx.290g (including a 9V battery)
- 1-12. Accessories: Operation Manual, holster, gift box, and test leads, TP-01 thermocouple probe, 9V battery.

2) TECHNICAL DATA

2-1. Accuracy: ± (a% × reading + digits) at 23 ± 5°C, relative humidity <75%. One year guarantee since production date.

2-2. TECHNICAL DATA

2-2-1. DC Voltage

Range	Accuracy	Resolution
200mV	±(0.5%+3)	0.1mV
2V		1mV
20V		10mV
200V		100mV
1000V	±(1.0%+5)	1V

Input resistance: 10MΩ for all ranges

Overload protection: Range 200mV: DC 250V or AC peak value
Other ranges: DC 1000V or AC peak value

2-2-2. AC Voltage

Range	Accuracy	Resolution
200mV	±(0.8%+5)	0.1mV
2V		1mV
20V		10mV
200V		100mV
750V	±(1.2%+5)	1V

Input resistance: is 1MΩ at range 200mV or 2V, and 10MΩ at others.

Overload protection: DC 250V or AC peak value at range 200mV
DC 1000V or AC peak value at others

Frequency response: Range less than 200V: 40~400Hz
Range 750V: 40~100Hz

Displaying: RMS of sine wave (mean value response)

2-2-3. DCA

Range	Accuracy	Resolution
2mA	±(0.8%+3)	1uA
20mA		10uA
200mA	±(1.2%+4)	100uA
20A	±(2.0%+5)	10mA

Max. Measuring voltage drop: 200mV.

Max. Input current: 20A (for 10 seconds).

Overload protection: 0.2A / 250V fast-blown fuse, range 20A infused.

2-2-4. ACA

Range	Accuracy	Resolution
2mA	±(1.0%+5)	1uA
20mA	±(2.0%+5)	10uA
200mA		100uA
20A	±(3.0%+10)	10mA

Max. Measuring voltage drop: 200mV.

Max. Input current: 20A (for 10 second) .

Overload protection: 0.2A / 250V fast-action fuse, Range 20A infused.

Frequency response: 40~200Hz

Displaying: RMS of sine wave (mean value response)

2-2-5. Resistance (Ω)

Range	Accuracy	Resolution
200Ω	± (0.8%+3)	0.1Ω
2kΩ		1Ω
20kΩ		10Ω
200kΩ		100Ω
2MΩ	± (1.0%+15)	1kΩ
20MΩ		10kΩ
2000MΩ		± [5% (reading -10) + 20]

Open voltage: less than 3V

Overload protection: DC 250V or AC peak value.

NOTE:

A: At range 200 Ω, short the test leads to measure the wire resistance, and then subtracts this reading from the actual value while measuring.

B: At range 2000 MΩ, when the test leads are short, LCD displays 10MΩ, this is normal and doesn't affect the accuracy. Please deduct the value from the actual measurement. For example: if the test resistance is 1000 MΩ, the reading should be 1010 MΩ, and the correct value is to reduce 10 from the LCD reading value, i.e.: 1010-10=1000MΩ;

C: The reading will be displayed slowly when the measuring range is more than 1

MΩ. Please wait till the reading is stable.

2-2-6. Capacitance

Range	Accuracy	Resolution
20nF	±(2.5%+20)	10pF
200nF		100pF
2uF		1nF
20uF		10nF
2000uF	±(5.0%+5)	1uF

Test frequency: 100Hz

Overload protection: DC 36V or AC peak value

2-2-7. Inductance (L)

Range	Accuracy	Resolution
2mH	±(2.5%+20)	1uH
20mH		10uH
200mH		100uH
2H		1mH
20H		10mH

Test frequency: 100Hz

Overload protection: DC 36V or AC peak value

2-2-8. Temperature

Range	Accuracy	Resolution
(-40 ~ 1000)°C	±(0.8%+4) < 400°C ±(1.5%+15) ≥ 400°C	1°C

K-type thermocouple (banana shape plug)


2-2-9. Frequency

Range	Accuracy	Resolution
2kHz	±(0.5%+4)	1Hz
20kHz		10Hz
200kHz		100Hz
2000kHz		1kHz
10MHz		10kHz

Input sensitivity: 1V RMS

Overload protection: DC 250V or AC peak value (within 10 seconds).

2-2-10. Diode and continuity testing

Range	Reading	Condition
	Forward voltage drop of diode	Forward DCA is approx. 1mA, the backward voltage is approx 3V
	Buzzer makes a long sound while resistance is less than 30Ω±10Ω	Open voltage is approx. 3V

Overload protection: DC 250V or AC peak value

CAUTION: DO NOT APPLY VOLTAGE AT THIS RANGE!

2-2-11. Transistor hFE DATA TEST



Range	Displaying range	Test condition
hFE NPN or PNP	0 ~ 1000	Basic current is approx. 10uA , Vce is about 3V

4. OPERATION

4-1. Panel description

1. LCD: display the measured value and unit.

2-1. POWER switch: to Turn the meter on/off.

2-2. PK HOLD key: the max.of measured value is held on LCD and  display is show on the LCD. Press again  symbol disappears, and the meter will exit the

hold mode.

2-3. DC/AC key: sets DC or AC working mode.

3. hFE socket: to measure hFE of triode.

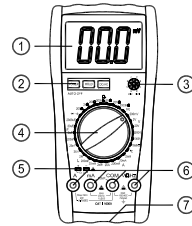
4. Range knob: to select measuring function and range.

5. Capacitance (Cx) or inductance (Lx) COM

6. Voltage, resistance and frequency COM

7. Battery Cover

SEE THE FIG.



4-2. Voltage measurement

1. Apply the black test lead to "COM" terminal and the red one to V/Ω/Hz terminal.
2. Set up the Knob on a proper "V" range. If the voltage range is not sure please select the max. range, then change the range to reach a resolute value.
3. Press the DC/AC key to measure DC Voltage or AC Voltage mode.
4. Connect the test leads to the test point. The voltage value will be displayed on LCD. While testing a DC voltage, LCD will display polarity and voltage of the test point connected by the red lead.

NOTE:

1. If LCD displays OL, the voltage is higher than the present range. Please select a higher range.
2. Do not apply a voltage over DC 1000V or AC 750V. Please keep the test leads away from the circuit while changing the functions or range.
3. Be carefully while measuring a high voltage. DO NOT touch the circuit.

4-3. Current measurement

1. Apply the black test lead to "COM" terminal and the red lead to "mA" or "20A" terminal.
2. Select a proper range. If the current under tested is not sure, please select the max value, and then change the range to reach a resolute value.
3. Press the DC/AC key to measure DC Amp or AC Amp mode.
4. Connect the leads with the tested circuit in series; the current value is displayed on LCD. While testing a DC voltage, LCD will display polarity and voltage of the test point connected by the red lead.

NOTE:

1. If the LCD displays "OL", the current is higher than the present range. Please select a higher range.
2. Max. input current is 200mA or 20A (subject to where the red test lead is connected, if current is higher than 20 A the fuse will blow. Be sure the testing time is less than 10 seconds. Please keep the test leads away from the circuit while changing the functions or range.

4-4. RESISTANCE MEASUREMENT

1. Insert the black test lead to COM terminal and the red to V/Ω/Hz terminal.
2. Set the knob to a proper resistance range, and connect the leads across the resistor under test.

NOTE:

1. If the LCD displays "OL", the resistance is over the selected range. Please change to a higher range.
2. If the test lead terminals are open, overload displays.
3. When measuring in line resistor, make sure the power is off and all capacitors are discharged before testing.
4. Do not apply any voltage at resistance range.
5. While measuring high resistance, if the measuring value over 1MΩ, the reading will take a few seconds to be stable.

4-5. CAPACITANCE MEASUREMENT

1. Select the proper capacitance range, and insert the capacitor under tested into "Cx" terminal. Connect the test lead with the two points of capacitor; take care of the polarity.

NOTE:

1. If the capacitance under tested is over the max. value of selected range, LCD displays "OL". Please select a higher range.
2. It is normal if the LCD does not show '0' before capacitance measurement, this will not affect the reading under test.
3. When measuring large capacitance range, if capacitor is crept badly or broken, LCD displays an unstable value.
4. Discharge the capacitor completely before measuring.

4-6. INDUCTANCE MEASUREMENT

Set the knob to a proper inductance range and insert the inductor to 'LX' terminal.
NOTE: 1. If the Inductance under tested is over the max. value of selected range, LCD displays "OL". Please select a higher range.

2. The inductance value may be different due to different resistance on a same inductor.
3. At 2mH range, short the test leads and measure the inductance of lead wires, and subtract it from the actual reading.

4-7. TEMPERATURE MEASUREMENT

Select °C range, insert the black plug of thermocouple into mA com and the red plug to V/Ω/Hz com. use the loose end to measure the temperature in °C .

- NOTE: 1. When input terminal is in open circuit, and the ambient temperature is over 18°C, the display shows the ambient temperature. If ambient temperature is lower than 18°C, the display will show random temperature.
2. If the thermocouple is changed, the accuracy cannot be guaranteed.
 3. Do not apply any voltage at a temperature range.

4-8. FREQUENCY MEASUREMENT

1. Input the test leads or shield cable to COM and V/Ω/Hz terminal.
2. Select frequency range, connect test leads or cable across to signal source or tested load.

NOTE:

1. When input over 10V RMS, reading is workable but accuracy is not guaranteed.
2. It is better to use shielded cable to measure small signals in noisy environment.
3. Be careful when measuring high volt circuit.
4. Do not apply voltage over DC 250V or AC peak value.

4-9. TRANSISTOR hFE

1. Select hFE range.
2. Verify the transistor under tested is NPN or PNP, insert emitter, base and collector to proper jack.

4-10. DIODE AND CONTINUITY TEST

1. Apply the black test lead to "COM" terminal and the red one to V/Ω/Hz terminal (the polarity of red lead is "+") .
2. Select $\rightarrow \cdot \cdot \cdot |$ range, connect test leads to the diode under tested, the red test connect to diode positive polarity, the reading is the approx. value of diode forward voltage drop.
3. Forward testing: connect the red test lead to the anode of diode, and apply the black test lead to the cathode of diode, and LCD will display the approx. value of forward voltage drop of diode.
4. Backward testing: Apply the red test lead to the cathode of diode, and apply the black test lead to the anode of diode, and LCD will display "OL".
5. Whole diode test including the forward and backward test, if the test result doesn't indicate the above, it means the diode doesn't work.
6. Apply test leads to two points of tested circuit, if the inner buzzer sounds, the resistance is less than $(30 \pm 10) \Omega$.

4-11. PEAK VALUE HOLD

Press to hold the max. of measured value on LCD. Press again to cancel the function.

4-12. AUTO POWER OFF

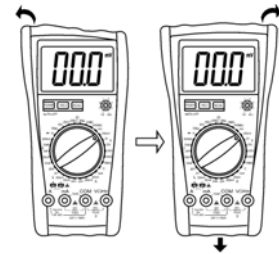
The meter will enter in sleeping mode when it works for 20±10 minutes. Press "POWER" key twice to come out of sleep mode.

5. MAINTENANCE

Do not try to modify the electric circuit.

NOTE:

- 5-1. The voltage should be not higher than DC1000V and AC750V RMS.
- 5-2. Do Not test the voltage in the Ω range.
- 5-3. Do Not test without inserting the battery and close the battery door properly.
- 5-4. Please remove the test leads and turn off the power of the meter before changing the battery and fuse.
- 5-5. Keep the meter away from water, dust and shock.
- 5-6. Do Not store or operate the meter under the high temperature, high humidity, combustible, explosive and strong magnetic places.
- 5-7. Wipe the case with a damp cloth and mild detergent. Do not use abrasives and alcohol.
- 5-8. If you do not operate the meter for a long time, please remove the battery to avoid leakage.
- 5-9. When \pm signal is displayed, please replace the battery as below:
 - 5-9-1. Take off the holster. (See fig. 2)
 - 5-9-2. Unlock the screw and remove the battery case.
 - 5-9-3. Replace the old battery with a new one. It's better to use alkaline battery for long life.
 - 5-9-4. Fix the battery case and lock the screw.
 - 5-9-5. Fit on the holster as the opposite way (see fig.2)
 - 5-10. Please replace the Fuse with the same size.
 - 5-10-1. Take off the holster, then unlock the screw and remove the battery case.
 - 5-10-2. Replace the old fuse with a new one.
 - 5-10-3. Fit the battery case and lock the screw and fit on the holster.
6. If the meter does not work properly, check the meter as following:



Fault	Solution
No reading on LCD	■ Turn on the power ■ Set the HOLD key to a correct mode ■ Replace battery
\pm signal appears	■ Replace battery
No current or temperature reading	■ Replace fuse
Big error Value	■ Replace battery

- Specifications are subject to change without notice.
- The content of this manual is regarded as correct. Please contact the factory for more details.
- Manufacturer will not be responsible for any accident or damage caused by improper operation.
- The function stated in this User Manual is not a reason for special usage.