VENLAB VM600A Digital Multimeter User Manual

Multimeter
User Manual

Contents

VM600A Digital Multimeter

VM-600A
READ AND UNDERSTAND THIS MANUAL BEFORE USING THE INSTRUMENT
Failure to understand and comply with the WARNING and operating instructions can result in serious or fatal injuries and/or property damage.
Contact us: support@venlabtools.com

MADE IN CHINA

Safety Information

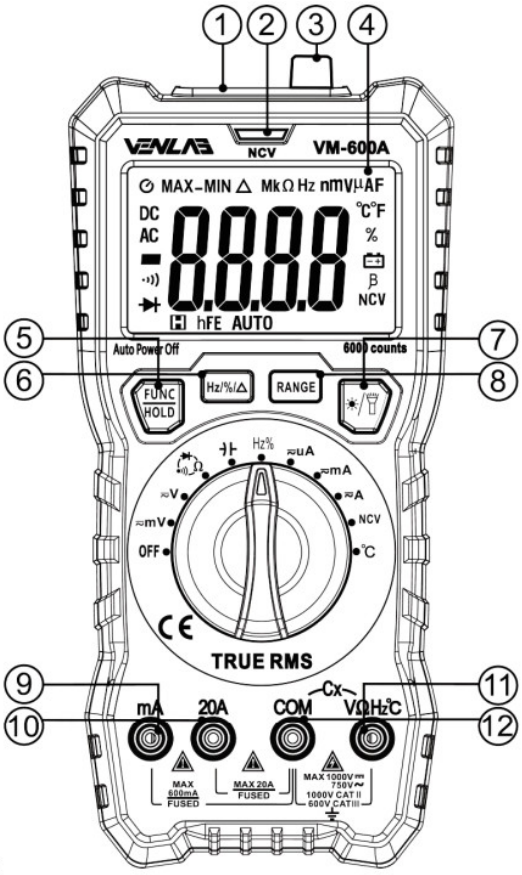
The Meter conforms to IEC61010-1 CAT Ill 600V, 1000V CAT II 1EC61010 and pollution level Il.
A Waming identifies conditions and procedures that are dangerous to the user.
To prevent possible electrical shock, fire, or personal injury:

- Do not alter the Product and use only as specified, or the protection supplied by the Product can be compromised.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.
- Do not apply more than the rated voltage, between the terminals or between each terminal and earth ground.
- Do not use test leads if they are damaged. Examine the test leads for damaged insulation, exposed metal, or if the wear indicator shows. Check test lead continuity.
- Use the correct terminals, function, and range for measurements.
- The range switch should be placed in the correct range position.
- The input signal is not allowed to exceed the specified limit vaiue to prevent electric shock and damage to the instrument.
- When measuring televisions or switching power supplies, be aware that there may be pulses in the circuit that can damage the circuit.
- Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50°C.

Symbol	Description	Symbol	Description
	WARNING. Risk of danger.		AC or DC
	High voltage warning		Double insulated
	DC (Direct Current)		Fuse
	AC (Alternating Current)		Ground
	Conforms to European Union directives.		
CAT.II	Measurement Category II is applicable to test and measuring circuits connected directly to util ization points (socket outlets and similar points) of the low-voltage MAINS installation.		
CAT.II	Measurement Category III is applicable to test circuits connected to the distribution part of the building’s low-voltage MAINS installation.		

Product Familiarization

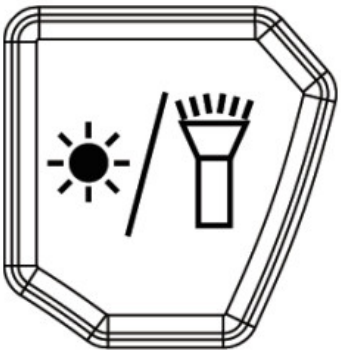
Overview



1. Flashlight
2. Alarm Indication Light
3. NCV Sensor
4. LCD Screen
5. Function Switching & Lock Button
6. Frequency/ Duty Cycle /Capacitance ZERO
7. Flashlight & Backlight Button
8. Manual/Auto-ranging Switch
9. mAInput Socket (MAX 600mA)
10. 20A Input Socket (MAX 20A)
11. VΩHz℃socket
12. COM Socket

Backlight / Flashlight

Push' ☀/ ' button to toggle the backlight on and off.



Press and hold this button for 2 seconds to turn on the flashlight and backlight at the same time, press again to turn them off.

The backlight / flashlight automatically turns off after 30 seconds.

Auto Power Off

The Auto Power Off function by default at boot and' (⏻) * symbol will be displayed.
Without any operation in about 15 minutes, the Meter will automatically turn off.
Press and hold both' FUNC/HOLD 'to tum on meter, the auto power off function will be canceled.

Display HOLD

In the Display HOLD mode, the Meter freezes the display and' H ' shows on the display.
Push the' HOLD * button for 2S to activate/deactivate Display HOLD.

To avoid electric shock, when Display HOLD is activated, be aware that the display will not change.

Manual and Autoranging

The Meter defaults to the Auto-range and ' AUTO ' shows on the display.

Short-push the ' RANGE ' button to enter the Manual range. In the Manual Range mode, you push the ' RANGE ' button to increment the range. After the highest range, the Meter wraps to the lowest range.
Push the '' RANGE ' button for 2 seconds to enter the Auto-range mode. In the Auto-range mode, the Meter automatically selects the range with the best resolution.

Measurement

- Check the battery first, if' ⊟+ 'is displayed, the battery needs to be changed.
- ⚠ "signal besides sockets warns the maximum input voltage and current.
- Switch to the right range before measurement.
- The red lead mentioned in this manual is positive in polarity, the black lead is negative.

DC/AC Voltage Measurement

1. Put the black lead into the 'COM' port and the red lead into the' VΩHz℃ " port.
2. Switch to the' ≈mV 'or' ≈V 'ranges and ' DC ' signal will be displayed, indicating DC voltage test. Press ' FUNC/HOLD ' button to **ACV** test. **'AC** ' shows on the screen.
3. Put the test leads to the loaded circuit.

Note:

- The voltage above DC1000V or AC750V can't be measured; otherwise the instrument may be damaged.
- Inthe AC/DC 600mvV and AC 6V ranges, the Meter will display some numbers even with no input or test leads

connected. In this case, short-circuit the ‘ VΩHz℃ * port and‘ **COM** ‘ port. If the meter display returns to zero, it indicates that the meter is normal.

Resistance Measurement

1. Put the black lead into the’ **COM** ‘ port and the red lead into the’ VΩHz℃ ◦ port.
2. Switch to the’ “**(MQ** ‘ shows on the display.)
3. Connect the test leads to the resistor to be tested.

Note:

- **‘OL’** means overload, please switch to a higher range.
- **‘OL’** will also be displayed if open-circuited.
- If the tested resistor > GOMQ, it may take a few seconds to read.
- Before testing a resistor in the circuit, please make sure the circuit is powered off and the high-voltage capacitor is completely discharged.
- When measuring low resistance, in order to measure accurately, please short-circuit the two test leads and read the resistance value of the short circuit of the test leads. After measuring the measured resistance, the resistance value needs to be subtracted.

Diode Measurement

1. Put the black lead into the ‘COM ‘ port and the red lead into the’ VΩHz℃ * port.
2. Switch to the’ ‘and press ‘ FUNC HOLD ‘ button 2 times. (‘ ▶| * shows on the display.)
3. Touch the diode anode with the red probe, the black probe contacts the diode cathode.

Note:

- **‘OL** ‘ will be displayed if open-circuited.
- Ifthe test leads are connected reversely with the diode polarity, ‘ **OL‘** will also be displayed.
- In the circuit, a normal diode will produce a forward voltage drop of 0.5V to 0.8V; but the reverse bias depends on the resistance value change of other channels between the two test leads (the influence of parallel capacitance)

Continuity Measurement

1. Put the biack lead into the **‘COM** ‘ port and the red lead into the’ VΩHz℃ * port .
2. Switch to the’ ‘and press ‘ FUNC HOLD. button.
3. (‘ •))) * shows on the display.)
4. Contact the probe to the measured circuit or resistance.
5. The Meter will buzz and the indicator light is yellow if the resistance between the two points is less than 40Q. When the resistance is >40Q and <60Q, the buzzer does not ring, the indicator light is red.

Note:

- Before continuity testing, please make sure the circuit is powered off and the high-voltage capacitor is completely discharged.

Capacitance Measurement

1. Put the black lead into the * **COM** ‘ port and the red lead into the ‘ VΩHz℃ ‘port .
2. Switch to the’ ⊣⊢‘ranges and put the test leads to the circuit to be tested.

Note:

- Before testing a capacitor in the circuit, please make sure the circuit is powered off and the high-voltage capacitor is completely discharged.
- Ifthe capacitance is large, it may take a long time for the reading to stabilize.
- Take note of the polarities of the capacitor to connect correctly to protect the meter.

Frequency/Duty Measurement

1. Put the black lead into the “COM ‘ port and the red lead into the’ VΩHz℃ * port .
2. Switch to the H2% and switching Frequency or Duty Ratio by’ Hz/%/Δ ‘ button.
3. Put the test leads to the circuit to be tested.

Note:

- Do not test any voltage higher than 250V to prevent electric shock or damage to the instrument.

DC/AC Current Measurement

1. Put the black lead into the **‘COM** ‘ port and red lead into the ‘ mA‘ port if the current is under 600mA and put the red lead into the ‘ 20A ‘ port if the current is between 600mA ~ 20A.
2. Switch to the’ **≂uA**: **≂mA**: or’ ≂A ‘ ranges.
3. ‘DC ‘ signal will be displayed, indicating DC current test. Press ‘ FUNC/HOLD ‘button to AC current test. (‘ AC ‘ shows on the display.)
4. The circuit to be tested is disconnected, the black test pen is connected to the disconnected circuit, the lower voltage end thereof, and the red test pen is connected to the disconnected circuit at the higher voltage end. Then connect the test leads to the loaded circuit.

Note:

- ‘‘OL’ means overload, please switch to a higher range.
- Do not attempt current measurement on the circuit when the voltage between the open circuit voltage and ground exceeds 250 volts. The fuse of the meter must be checked to ensure that it is intact before current

measurement. Before connecting the multimeter to the circuit under test, the power to the circuit under test should be tumed off. otherwise the instrument may be damaged.

- Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.
- Test the known current with the meter before use.

NCV Test

1. Tum the knob to the **NCV.**
2. Then NCV probe gradually approaches the detected point.
3. When the meter senses weak AC signals, the yellow indicator lights up and the beeps send out slowly.
4. When the meter senses strong AC signals, the red indicator lights up and the beeps send out quickly.

Note:

- Even if there is no indication that the voltage may exist, do not rely on non-contact voltage detectors to determine if there is a voltage present, which may be affected by factors such as socket depth, insulation thickness, type, etc.
- When the voltage is input to the instrument, the indicator may light up due to the presence of induced voltage.
- Interference sources in the external environment, such as flashlights, motors, etc., may accidentally trigger non-contact voltage detection.

Temperature Measurement

1. Tum the knob to the' C '. (The meter will display the ambient temperature)
2. Switching ' 'C 'or' F 'by' FUNC/HOLD 'button.
3. Insert the thermocouple into the instrument, the positive (red) is inserted into the ' VΩHz℃ ' input, and the negative end (black) is inserted into the **'COM'** input.
4. Contact the measured object with the thermocouple probe.When measuring temperature with thermocouples, the probe of thermocouples can't touch the charged object, otherwise, it may damage the instrument and may suffer electric shock or personal injury.

Specifications

Operating conditions	600V CAT.III and 1000V CAT.II
Maxim Display	6000 counts
Pollution grade	II
The biggest voltage between measurement end and ground	1000VDC or 750VAC
Conversion rate	About 3 Times/Second
Low Battery Indication	“  ‘ displayed
Height	Under 2000m
Operation Temperature	0’C-40’C (<80%RH, not considered <10t)
Storage Temperature	-10*C-60°C (<70%RH, batteries removed)
Battery Type	4. 1.5V AAA Batteries
Fuse	F 600mA/250V, F 20A/250V
Overload display	‘ OL ‘ displayed
Input polarity indicator	‘ -‘ shown automatically
Size	195mm (L)*92mm (W)*52mm (H)
Weight	About 397g (battery included)

AC Voltage

Range	**Resolution**	**Accuracy**
600mV	0.1mV	± (1%+4)
6V	1mV	
60V	10mV	
600V	100mV	
750V	1V	± (1.2%+4)
Input Impedance: 10M0 Maximum input voltage: 1000VDC or 750VAC RMS Frequency Response: 40Hz-1 KHz; T-RMS		

DC Voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.5%+5)
6V	1mV	
60V	10mV	
600V	100mV	
1000V	1V	± (0.8%+5)
Input Impedance: 10MD Maximum input voltage: 1000VDC or 750VAC RMS		

AC Current

Range	Resolution	Accuracy
600pA	0.1pA	± (1.5% + 5)
60mA	0.01mA	
600mA	0.1mA	
20A	10mA	± (2.0% + 5)
Overload protection: mA range with F600mA/250V and 20A range with F20A/250V Max input current: mA: 600mA RMS 20A :20A RMS When the current is more than 5 A, the test time should be less than 10 mints and one min should be given to st op testing after such measurement. Frequency response: 40HZ to 1KHZ T-RMS		

DC Current

Range	Resolution	Accuracy
600pA	0.1pA	± (t2% + 5)
60mA	0.01mA	
600mA	0.1mA	
20A	10mA	± (2.0% + 5)
Overload protection: mA range with F600mA/250V and 20A range with F20A/250V Max input current: mA: 600A RMS 20A :20A RMS When the current is more than 5 A, the test time should be less than 10 mints and one min should be given to st op testing after such measurement.		

Frequency

Range	Resolution	Accuracy
9.999Hz	0.001Hz	± (1.5% + 5) Input voltage range: 200mV – 10V AC RMS Overload protection: 250V DC/AC
99.99Hz	0.01 Hz	
999.9Hz	0.1Hz	
9.999KHz	0.001KHz	
99.99KHz	0.01KHz	
999.9KHz	0.1KHz	
9.999MHz	0.001MHz	

Capacitance

Range	Resolution	Accuracy
6nF	0.001nF	± (4.0% + 5)
60nF	0.01nF	
600nF	0.1nF	
6pF	1nF	
60pF	10nF	
600pF	100nF	
6mF	1pF	
100mF	10pF	± (5.0% + 5)
Overload protection: 250V DC/AC		

Resistance

Range	Resolution	Accuracy
6000	0.10	± (0.8% + 5)
6K0	10	
60K0	100	
600K0	1000	
6M0	1K0	
60M0	10K0	± (1.2%+ 5)
Open circuit voltage: 2.4V Overload protection:250V DC/AC		

Diode / Continuity

Function	Range	Resolution	
	0-3V	0.001V	Forward direct current: about imA. OCV about 3.2V
	6000	0.10	Resistor<400, buzz with yellow light 40<resistor<600, buzz with red light. OCV about 1V

Temperature

Range	Resolution	Temperature	Accuracy
`C	1'C	-20'C-1000'C	± (1.0%+ 3)
T	1°F	-4T-18329′	± (1.0% + 3)

Maintenance

- Check the battery first, if  'is displayed, the battery needs to be changed.
- Only use the specified fuse (600mA / 250V, 20A/ 250V fast melt fuse) to avoid electric shock or personal injury.
- Tur offand check that the test has been disconnected from the measured circuit before opening the battery cover and replacing the new battery.

Cleaning

Tur off the power to the Meter and remove the test leads.
Wipe the case with a damp cloth and mild detergent.
Dirt or moisture in the terminals can affect readings.
If there is any abnormality, stop using the meter immediately.
Install Batteries & Replace Fuses

1. Tum off the meter.
2. Pull out all test leads from the input sockets.
3. Use a screwdriver to loosen the screws securing the battery cover or back cover.
4. Remove the battery cover or back cover.

5. Remove the old battery or damaged fuse.
6. Replace with new 4 X 1.5V AAA batteries or new fuse.
7. Install the battery cover or back cover, and tighten the screws.

Three Years Warranty
3
For further detail of warranty coverage and warra repair information, send email to support@venlabtools.com

https://www.youtube.com/channel/UCnN3Z2FPIXPCbDdNe5m4z7w/featured

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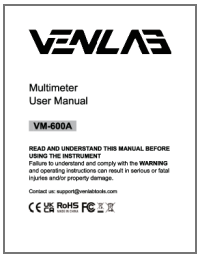
Documents / Resources

	VENLAB VM600A Digital Multimeter [pdf] User Manual VM600A Digital Multimeter, VM600A, Digital Multimeter, Multimeter

References

- User Manual