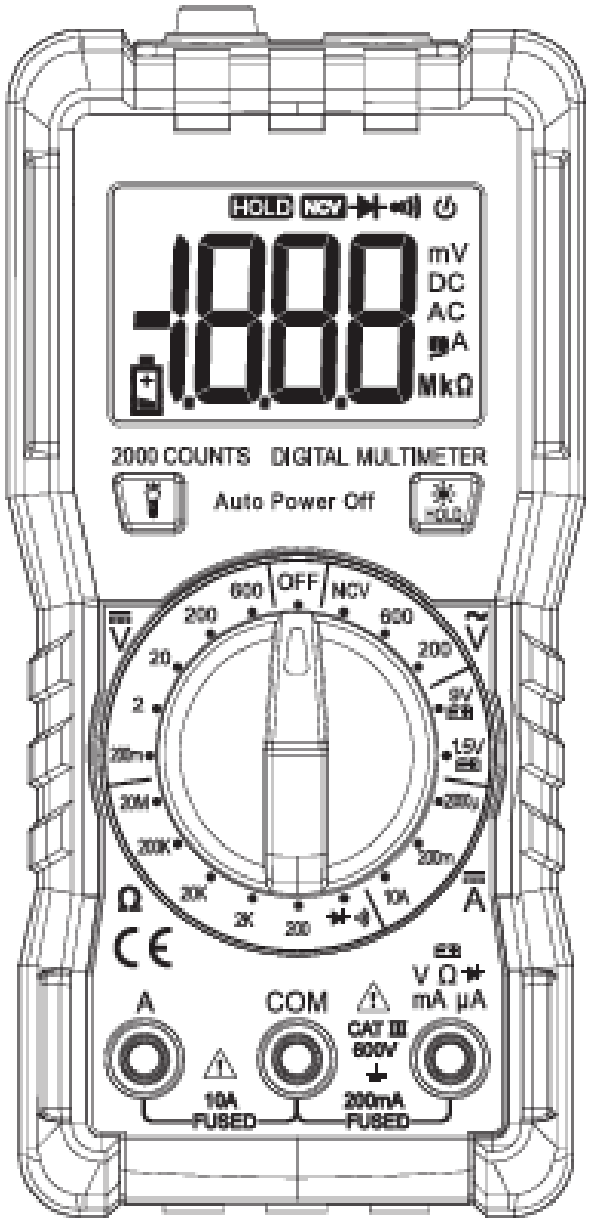
USERS MANUAL



DIGITAL MULTIMETER

Before using the instrument,please read this manual carefully,and save it well for future using.

CONTENTS

1. GENERAL	1
2. SAFETY INFORMATION	1
3. PRODUCT OVERVIEW	2
3.1 Product Appearance Image and Description	2
3.2 Function Buttons	3
3.3 LCD Display	3
4. TECHNICAL INDICATORS	4
4.1 General Features	4
4.2 Accuracy Indicators	4-6
5. MEASUREMENT OPERATION	6
5.1 AC and DC Voltage Measurement	6
5.2 Resistance Measurement	6
5.3 AC and DC Current Measurement	6
5.4 Diode Test	6
5.5 Continuity Test	7
5.6 Frequency Measurement	7
6. MAINTENANCE	7-8
6.1 Battery Replacement	8
6.2 Fuse Replacement	8-9
6.3 Maintenance	9

1. GENERAL

The DM 91A Digital Multimeter is an innovative,high performance, highly reliable,full-featured,large-screen display,handheld,4-digit true RMS digital multimeter.

The meter sets the kernel on the integrated circuits and A/D converter,and is provided with overload protection circuit and fuse disconnection prompt circuit, which can be used to measure DC and AC voltage, AC and DC current,resistance,capacitance,frequency,live wire,battery voltage,NCV non-contact AC voltage sensing, diode and circuit continuity, and can be widely used in schools, research institutes, factories, companies and other social areas.

2. SAFETY INFORMATION

The DM91A Digital Multimeter is designed according to IEC61010-1 600V (CATIII) and Level 2 Pollution. To ensure correct and safe use of the meter please read the User Manual carefully.

Avoid personal injury caused by electric shock and damage to the meter, please pay attention to the following safety tips.

1. Do not measure any voltage that exceeds the measuring range specified for this meter.
2. Despite of the internal protection circuit for the resistance measurement field, do NOT add a voltage of 100V or more to the input terminal in the field of resistance measurement.
3. Check the integrity of the probes.
4. Avoid using the meter under direct sunlight or extreme high temperature conditions as far as possible.
5. Avoid electric shock hazard when measuring voltages exceeding 30V AC or 60C DC.
6. Before measuring current, turn off the power supply, and disconnect it from its circuit before measuring it.
7. Pay attention to the polarity of the battery when replacing it.

Electrical symbols:

⚠	Dangerous voltage	⏚	Grounding
~	AC (alternating current)	⚠	Warning, check the Manual for relevant instructions.
⎓	DC (direct current)	⧈	Double insulation
≂	AC or DC	⊟	use

3. PRODUCT OVERVIEW

3.1 Product Appearance Image And Description

Figure 1 Panel layout

①NCV, continuity and live wire indicator ②Liquid Crystal Display (LCD)
③ "SEL/V.F.C" function selection and variable-frequency voltage measurement button
④ "RANGE" range switching button
⑤ "HZ/🔦" frequency switching and flashlight control button
⑥ "HOLD/☀"data hold and backlight control button
⑦Function range selection knob
⑧"V/Ω/mA/μA/Cap/Battery/Live" input terminal
⑨10A input terminal

3.2 Function Buttons

Button	Function
SEL/V.F.C	Press "SEL" button to switch the function and measurement unit; in AC voltage field, hold down this button for 2 seconds will make the meter enter into V.F.C measurement mode. When the knob is at OFF position, hold down the SEL button and rotate the knob to turn on the meter, this cancels the automatic shutdown function.
RANGE	**Press "RANGE" button to select auto/manual range. In auto range mode, press this button to enter manual range mode; when pressing each time, a higher range is activated, but when reaching the highest range,it will go back to the lowest range, then it cycles in the same order. When this button is held down for 2 seconds in manual range mode, it returns to auto range mode.**
HZ/🔦	Press "RANGE" button to select auto/manual range. In auto range mode, press this button to enter manual range mode; when pressing each time , a higher range is activated , but when reaching the highest range,it will go back to the lowest range, then it cycles in the same order. When this button is held down for 2 seconds in manual range mode,it returns to auto range mode.
HOLD/☀	To maintain the reading during the measurement, you can press the "HOLD" button, then the measurement reading will be locked on the display.Press the "HOLD" button again, the reading-hold state is released.Hold down this button for about 2 seconds to turn on the flashlight , which turns off automatically after 15 seconds ; it can be turned off by holding down the button again.

3.3 LCD Display

Figure 2 LCD display

No.	Symbol	Description
1	**DC**	Direct current
2	**AC**	Alternating current
3	▶|	Diode
4	•))	Continuity
5	**NCV**	Non-contact AC voltage sensing
6	**VFC**	Variable-frequency voltage measurement
7	**Live**	Live wire test
8	⏻	Automatic shut-down
9	⎓	Fuse disconnected
10	**HOLD**	Data hold
11	▭	Low battery voltage will trigger this symbol, prompting to replace the battery right soon.
12	**MKΩ**	Resistance unit: Ω. KΩ, MΩ
13	**numF**	Capacitance unit: nF, μF, mF
14	**Auto**	Automatic range
15	**Manual**	Manual range
16	**μmVA**	Voltage unit: MV,V Current unit: μA, mA, A
17	▭	Stand for "negative"

4. TECHNICAL INDICATORS

4.1 General Features

- Automatic range.
- Display: '9999' 4-digit, true RMS
- Fuse disconnection alarm function
- Maximum voltage to ground at the voltage input terminal: 600V CAT III
- Data hold function
- AC voltage/current frequency measurement
- Over-range indication: OL
- Low battery voltage indication: ▭
- Automatic shutdown time: 15 Minutes

- Working environment: 0 ~ 40°C (32 ~104 °F); < 80% RH
- Storage conditions: -10 ~ 50°C (14 ~ 122 °F); <70% RH
- Power supply: 2×1.5V AAA batteries
- Safety level: IEC61010-1, CAT III 600V
- Dimensions (150 x 70 x 50mm) and weight: 195G

Accessories:

1. User Manual	1 copy
2. Probes	1 set
3. 1.5V AAA Battery	2 pieces

4.2 Accuracy Indicators

Accuracy:% Reading digits,one year warranty since the date of shipment.
Ambient temperature: 18°C to 28°C. Environment humidity: < 80%.

4.2.1 DC voltage

Range	Resolution	Accuracy
999.9mV	0.1mV	± (0.7% Reading + 3 digits)
9.999V	0.001V	
99.99V	0.01V	
600V	0.1V	± (0.8% Reading + 2 digits)

Overload protection: PTC 600V DC or AC RMS.

4.2.2 AC voltage

Range	Resolution	Accuracy
0.999V	0.001V	± (1.0% Reading + 3 digits)
9.999V	0.01V	
99.99V	0.1V	
600V	0.1V	± (1.2% Reading + 3 digits)

It shows the true RMS when the input impedance is about 10MΩ;
frequency response: 45~1000HZ
Maximum input voltage: 600V AC (effective value)

4.2.3 Resistance

Range	Resolution	Accuracy
999.9Ω	0.1Ω	± (1.0% Reading + 2 digits)

9.999KΩ	0.001kΩ	± (1.0% Reading + 2 digits)
99.99kΩ	0.01kΩ	
999.9kΩ	0.1kΩ	
9.999MΩ	0.001MΩ	
99.99MΩ	0.01MΩ	± (2.0% Reading + 3 digits)

4.2.4

Range	Function
Live	Insert only one probe into the voltage input terminal, and use it to test the power socket to determine the neutral and live wires.

4.2.5 Diode and circuit continuity

Range	Function
	Continuity test and diode measurement are executed in smart mode without the need to press any switching button; when the measured resistance is less than about 30 ohm, it displays the on-resistance value,while the internal buzzer beeps, and the continuity indicator (green) lights; When measuring a diode, it displays the approximate forward voltage of the diode.

Open circuit voltage is about 3.3V

4.2.6 DC current

Range	Resolution	Accuracy
999.9μA	0.1μA	± (0.8% Reading + 3 digits)
9999μA	1μA	
99.99mA	0.01mA	
600.0mA	0.1mA	
10A	0.01A	± (1.2% Reading + 3 digits)

Overload protection: μA/mA range: F600mA/250V fuse (fast fusing-off),
10A range: F10A/250V fuse (fast fusing-off),
Maximum input current: mA jack: 600mA, 10A jack: 10A.

4.2.7 AC current

Range	Resolution	Accuracy
999.9μA	0.1μA	± (1.0% Reading + 3 digits)
9999μA	1μA	
99.99mA	0.01mA	
600.0mA	0.1mA	
10.00A	0.01A	± (1.5% Reading + 3 digits)

Overload protection: μA/mA range: F600mA/250V fuse (fast fusing-off),
10A range: F10A/250 fuse (fast fusing-off),
Maximum input current: mA jack: 600mA, 10A jack: 10A.
Frequency response: 45~1000HZ

4.2.8 Capacitance

Range	Resolution	Accuracy
9.999nF	0.001nF	± (4.0% Reading + 30 digits)
99.99nF	0.01nF	± (4.0% Reading + 3 digits)
999.9nF	0.1nF	
9.999μF	0.001μF	
99.99μF	0.01μF	
999.9μF	0.1μF	
9.999mF	0.001mF	
99.99mF	0.01mF	± (5.0% Reading + 30 digits)

4.2.9 NCV non-contact AC voltage sensing

Range	Description
Low field	Display - L, NCV indicator (green) lights, and the buzzer gives out the alarm
High field	Display--H, NCV indicator (two red LEDs) lights, while the buzzer gives out the alarm

4.2.10 Battery Voltage Measurement

Range	Description
1.5V	The load resistance is about 30 ohm, and it shows the battery voltage
9V	The load resistance is about 300 ohm, and it shows the battery voltage

5. MEASUREMENT OPERATION

Note: The meter has a fuse disconnection alarm function.

If the rotary switch is turned to the 9V battery, 1.5V battery, μA or mA fields when the 600mA/250V fuse on the V/mA/μA input end is disconnected, the screen will display "FUSE","mA" and "⎓" symbols,while the buzzer gives out the alarm, prompting that the fuse at the mA input end is disco nnected. Now it is the time to replace with a similar fuse in order to cond uct measurement; If the rotary switch is turned to the 10A field when the 10A/250V fuse on the 10A input end is disconnected,the screen displays "FUSE","A"and "⎓" symbols,and the buzzer gives out the alarm,prompting that the fuse on the 10A current input end is disconnected. it is also nece ssary to replace with a similar fuse in order to conduct the measurement.

5.1 AC and DC Voltage Measurement

⚠	Do not measure any voltage higher than DC 600V or AC 600V RMS to prevent electric shock and/or damage to the meter. Do not apply more than DC 600V or AC 600V RMS voltage between the common terminal and earth to prevent electric shock and/or damage to the meter.

Measurement steps:

1. Turn the rotary witch to the Ṽ field.
2. Connect the black probe to the "COM" input socket and red probe to the "V" input socket, respectively.
3. The default position in the field is DC voltage.Press the SEL button to switch to AC voltage.In the AC voltage field,hold down the SEL/VFC button for about 2 seconds,the meter will enter into the variable-frequency voltage measurement mode, which allows measuring the variab le-fre quency voltage stably. Press the button again, it will exit the VFC mode.

4. Use the two probe tips to measure the voltage of the circuit under test. (In parallel with the circuit under test) Get the measured voltage value on the display.When measuring DC voltage, the display will show the polarity of the voltage to which the red probe is connected. When measuring AC voltage, press HZ button to display the voltage frequency value for now.

Note:

In the DC mV or AC 9.999V range, even if there is no input or connection to the probes, sometimes the meter will display several digits, which is normal. In this case, by short-circuiting the “V” and “COM” terminals, the meter will can be reset to zero.

5.2 Resistance and Capacitance Measurement

⚠	To avoid damage to the meter or the device under test, disconnect the power supply of the circuit under test and fully discharge all high-voltage capacitors before measuring the resistance.

Resistance measurement:

1. Turn the rotary switch"⊣⊢Ω" field. The meter displays “OL” at the beginning, showing that the input is open-circuit, i.e. no resistance has been connected.
2. Connect the black probe to the "COM" input socket and red probe to the "V" input socket, respectively.
3. Use the probe tips to measure the resistance of the circuit under test.
4. Read the measured resistance value on the display.

Capacitance measurement:

1. Turn the rotary switch " ⊣⊢Ω " field. Press the SEL key to switch to capacitance measurement mode.
2. Connect the black probe to the "COM" input socket and red probe to the "V" input socket, respectively.
3. Use the probe tips to measure the capacitance of the capacitor under test.
4. Read the measured capacitance value on the display.

Note:

When measuring low resistance, in order to measuring accurately, please short-circuit the two probes to get the short-circuit resistance value, then it shall be reduced from the measured resistance value.

When measuring the resistance in the 99.99M field,in certain cases,it will take several seconds to get the reading stabilized.This is normal for high resistance measurements.
In the capacitive measurement mode,it will display "OL" when the maxim um range is exceeded.
When measuring a large - capacity capacitor, it is normal to take several seconds to measure it.
Before measuring the capacitor, it is necessary to release the residual charge, which is especially important for the capacitor with high voltage in order to avoid damage to the meter and personal hazards.

5.3 AC and DC Current Measurement

⚠	Do not attempt measuring the current on the circuit when the voltage between the open circuit voltage and earth exceeds 250V. If the fuse is blown during measurement, it may cause damage to the meter or personal injury. When the fuse is disconnected, in order to avoid damage to the meter or equipment, please replace the fuse with the same one before measuring. Use the correct input socket and function field for the measure ment. When the probe is plugged into the current input socket, do not connect the probe tip to any circuit in parallel mode.

Measurement steps:

1. Cut off the power of the circuit under test. Discharge all high voltage capacitors on the circuit under test.
2. Rotate the rotary switch to the appropriate current field.Use the "SEL" button to select DC or AC measurement mode.
3. Insert the black probe to the "COM" input socket and the red probe to the corresponding current input socket.
4. Disconnect the circuit under test . Connect the black probe to the low potential end of the circuit that has been disconnected,and connect the red probe to the high potential end of the circuit that has been disconn ected.(Reversing the probes will give you a negative reading value,but it will not damage the meter.)
5. Turn on the power the circuit under test and then get the displayed reading.If the display only shows "OL",it means that the input exceeds the range.

6. Cut off the power of the circuit under test. Discharge all high-voltage capacitors. Remove the meter probes and restore the circuit to its original condition .

Note:

1. When measuring a large current of 5-10A,the power-on time should not exceed 10 seconds so as to avoid instable test data due to the heat.
2. When measuring multiple times,the interval between two measurements should be 3-5 minutes.

5.4 Continuity and Diodes Test

⚠	To avoid damage to the meter or the device under test, it is nec essary to disconnect the power of the circuit under test and dis charge all high-voltage capacitors before measuring the diodes.

Measurement steps:

1. Turn the rotary switch to the →|•)) field and connect the probe tips to both ends of the measured object.
2. Connect the black probe to the " COM " input socket and red probe to the "V" input socket, respectively.
3. If the resistance of the measured object is less than 30 ohm,the meter will automatically switch to the Continuity field. The green indicator of the on/off indicator lights up and the buzzer sounds, indicating that the two points are connected,while the LCD displays the resistance value.
4. If the object to be measured is a diode, the meter will automatically switch to the diode field when it is in forward continuity, and the LCD screen displays the approximate forward voltage of the diode. When the diode is in open circuit or in reverse polarity,the screen will display "OL".

A normal diode in the circuit should still produce a forward voltage drop of 0.5V to 0.8V; however, the reverse bias reading varies from the resistance of the other channels between the two probes.

5.5 Live Wire Test

Measurement steps:

1. Turn the rotary switch to the Live field. The screen displays"−−".
2. Only connect the red probe to the V input socket.

3. Plug the red probe tip into the power socket L jack,or near the live wire, if the meter detects the AC voltage, the screen will show LIVE; the two red LEDs on the right top side of panel will light up, and the buzzer will give out the alarm, prompting the line is a live wire.

5.6 NCV Test

⚠	The detection operation may be affected by factors such as so cket design,insulation thickness and type. Even it is not indicat ed as Live, voltage may still exist in there. Do not rely solely on non-contact voltage detector to determine if a voltage is present on the wire. When the input voltage is led to meter input terminal,the voltage -sensing indicator may light up due to the presence of induced voltage. But the interference sources in the external environment (such as flashlights, motors, etc.) may accidentally trigger non-contact voltage detection.

Measurement steps:

1. Set the function range switch to the NCV field.To determine the presence of an AC voltage or electromagnetic field on the object,place the probe with the mark "NCV" on the front of the meter near the object being measured.
2. When AC voltage is sensed, the screen, NCV indicator and buzzer will indicate the voltage level simultaneously. When the induced voltage is low, the display shows "–L".The green LED on the left side of the NCV indicator lights up and the buzzer gives out alarm continuously.
3. When the induced voltage is high, the display shows "--H".The two red LEDs on the left side of the NCV indicator light up and the buzzer gives out alarm continuously at a higher frequency.

5.7 Battery Measurement

1. Plug the black probe into the COM jack and the red probe into the "VmA" jack.
2. Set the function range switch to the 9V or 1.5V battery measurement field according to the measured battery type,use the red probe to touch the "+" pole of the measured battery, and the black probe to touch the "-" pole, then you can get the measured battery voltage from the LCD screen.

6. MAINTENANCE

6.1 Battery replacement

If the  symbol appears on the LCD during use of the meter,the battery must be replaced to prevent the meter from working abnormally.

①Unplug the test lines. Turn off the power.

②Use a screwdriver to open the battery cover on the back, then remove the battery.

③Place a similar battery and fix the cover.

6.2 Fuse replacement

①First remove the test lines and shut down the meter.

②Use a screwdriver to open the back cover, then remove the bad fuse.

③Insert a similar fuse, relocate the back cover, and fix it with the screws.

6.3 Maintenance

If necessary, use a soft cloth to wipe off the surface of the meter. Do not use organic solvents or abrasives that can corrode or dissolve the case.

USERS MANUAL

MADE IN CHINA

CE RoHS

Before using the instrument,please read this manual carefully,and save it well for future using.