



# MVC 97

## Digital Multimeter

### Instruction Manual



#### Disclaimer

The manufacturer assumes no responsibility for any consequences resulting from the use or misuse of this product. Product specifications and manual content are subject to change without prior notice.

**Part Number:** 7603261  
**GTIN:** 6298043998345



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## Introduction

Marmonix MVC 97 is a high-precision, reliable, and safe instrument, designed for professional engineers, maintenance personnel, and educational use. Carefully read this operation manual and follow all safety guidelines before use to ensure accurate measurements and safe operation.

## Safety information

Before operating this meter, the operator must follow all standard safety procedures in two key areas:

- Protection Against Electric Shock
- Prevention of Unintended Use

For personal safety, always use the test leads supplied with the meter and verify that they are intact and free from damage before use.

### (1) Safety considerations

- When used near equipment generating strong electromagnetic interference, meter readings may become unstable or inaccurate.
- Do not operate the meter or pen-type meters with visible damage.
- Improper use can disable the meter's safety functions.
- Exercise extreme caution near exposed conductors or bus lines.
- Do not use the meter in the presence of explosive gases, vapors, or dust.
- Always use correct input terminals, functions, and remain within the specified measuring range.
- Do not exceed the maximum input limits to prevent meter damage.
- Never touch inactive input terminals while the meter is connected to a circuit.
- Exercise caution when measuring voltages above 60V DC or 30V AC to avoid electric shock.
- When using test leads, keep fingers behind protective rings.
- Remove test leads from the circuit before switching measurement ranges.
- For DC measurements, first verify absence of AC voltage using AC functions, then select an equal or higher DC voltage range.
- Before testing resistance, diodes, or continuity, disconnect power and discharge all high-voltage capacitors.
- Resistance and continuity measurements must never be performed on live circuits.

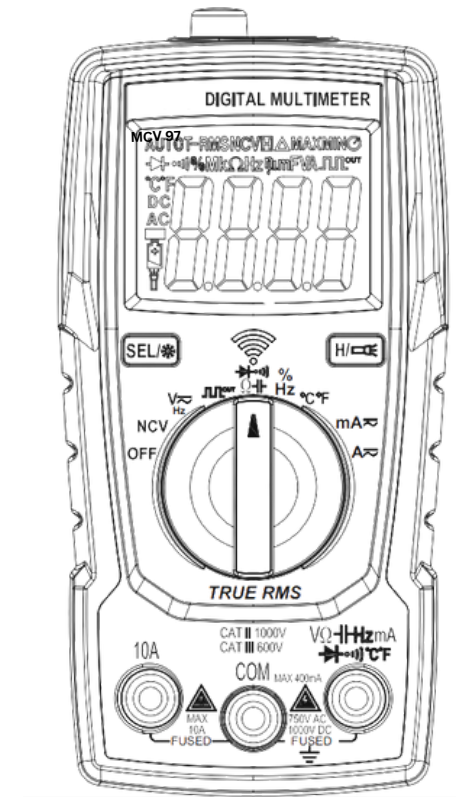
- resistance and continuity measurements must never be performed on live circuits.
- Prior to current measurements, inspect the protective tube, and ensure the circuit is powered off before connection.
- When servicing TVs or switching power circuits, take precautions against high-voltage impulses that could damage the meter.

This meter is powered by 2 × 1.5V AAA batteries, which must be installed correctly in the battery compartment.

Replace batteries immediately when the low-battery indicator appears. Weak batteries can cause inaccurate readings, increasing the risk of electric shock or personal injury.






For measurements, Category II voltage must not exceed 1000V.

Do not operate the meter if its case or any part of the case has been removed or tampered with.



## (2) Safety symbols

The safety symbols that appear on the meter's body and in this Operation Manual:

	Warning, an important safety symbol. The operator must consult this Operation Manual before using the meter. Unintended use may lead to the damage to the device or its components.
	High voltage warning
	Equipment with double insulation or reinforced insulation protection
	DC (direct current) or AC (alternating current)
	Ground
<b>CAT. II 1000V</b>	Over-voltage protection

## (3) Maintenance practices for safety

- Always disconnect the test leads before opening the meter's case or removing the battery cover.
- Use only designated replacement parts during maintenance.
- Ensure all relevant power sources are disconnected before opening the meter, and take precautions against static discharge to prevent damage to internal components.
- Calibration, repair, and maintenance must be performed exclusively by qualified professionals.
- Be aware that some internal capacitance may retain dangerous voltages even after the meter is powered off.
- If any abnormality is observed, discontinue use immediately and maintain the meter; it must not be operated until verified as safe and functional.
- For long-term storage, remove the batteries and keep them in a cool, dry environment.

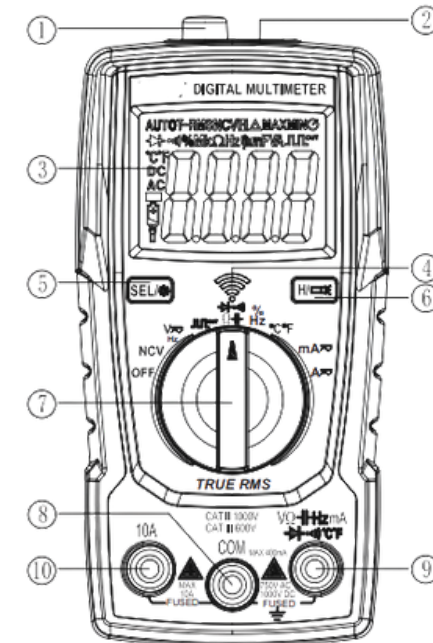
## (4) Input protection measures

- The meter can sustain the maximum input voltage of 600V (DC/AC) at the moment of voltage measurement.
- The limit voltage is 250V AC or the equivalent RMS voltage when the resistance, continuity or diode is measuring.
- The protective tube (GR256/400) is used for protection purposes when mA current measurements are carried out. The protective tube (F 10A/250V) is used for protection purpose when A current measurements are carried out.

## Schematic Diagram of the meter

### (1) A Schematic Diagram

- ① Non-contact voltage detector
- ② LED light
- ③ LCD screen
- ④ LED Indicator
- ⑤ Selection/Backlight key
- ⑥ Hold/LED key
- ⑦ Rotary switch
- ⑧ COM socket
- ⑨ Voltage/Resistance/Capacitance/Frequency/mA Current/Temperature/Diode/Continuity/Input socket and Square wave output socket
- ⑩ 10A Input socket



## (2) Description of the symbols on the display unit

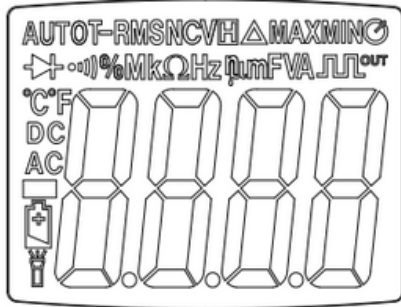


Table.1 Symbols

Symbol	Description
	Low Battery Indicator ⚠ To avoid electric shock or personal injury as a result of incorrect reading, promptly replace the battery when the battery under voltage indicator appears.
	Auto power off indicator
	Negative input polarity indicator

	Diode test mode
	Continuity test mode
	Data hold mode
	Non-contact AC voltage detection mode
	Unit of temperature (°C: Celsius; °F: Fahrenheit)
	Duty cycle
	V: the unit of volt; mV: Millivolt, $1 \times 10^{-3}$ or 0.001 volt.
	A: Ampere, the unit of current; mA: Milliampere, $1 \times 10^{-3}$ or 0.001 ampere.
	Ω: Ohm, the unit of electric resistance; kΩ: Kilohm, 1000 Ohm MΩ: Megaohm, 1,000,000 ohm.
	Hz: the unit of frequency; kHz: $1 \times 10^3$ Hz. MHz: $1 \times 10^6$ Hz or 1000 kHz.
	F: Farad, the unit of capacitance. mF: Millifarad, $1 \times 10^{-3}$ or 0.001 farad. uF: Microfarad, $1 \times 10^{-6}$ or 0.000001 farad. nF: $1 \times 10^{-9}$ or 0.000000001 farad.
	True RMS
	Square wave output
	LED light
	Automatic range measurement mode

## (3) Description of functional keys

Key	Description of functions
	Voltage measurement position: Short press the key to select DC voltage or AC voltage measurement mode. Current measurement position: Short press the key to select DC current or AC current measurement mode. ⊠ position: Short press the key to select Resistance, Diode, Continuity or Capacitance measurement mode. Hz/% position: Short press the key to select Hz or % mode. °C/°F position: press the key to select °C or °F mode. □□□□ <sup>OUT</sup> position: Short press the key to select the output of pulse signals of different frequencies: 50Hz/100Hz/200Hz/300Hz/400Hz/500Hz/600Hz/700Hz/800Hz/900Hz/1000Hz/2kHz/4kHz/5kHz. Long press the key to turn on backlight and long press again to exit. It turns off automatically with no operation for 30s.
	Short press this key, hold the measurement value of the moment, press the key again short, cancel the holding function; long press this key about 3 seconds, auxiliary lighting on, again long press can turn off the lighting.

## (4) Description of input sockets

Input socket	Description
	All public input terminals to be measured are connected to test leads in black or the public output plugs of exclusive multi-function test sockets.
	Positive input terminals (connected to a test lead in red) for voltage, current (mA), resistance, capacitor, diode, continuity test, temperature, frequency, duty ratio measurement and square wave output.
	10A positive input terminal (connected to a test lead in red).

## Accessories

1. Operation Manual x 1
2. Test leads x 1 pair
3. K-Type thermocouple x 1

## Operational guidelines

### (1) General Operation

#### Auto Power Off

If no operation is performed within 15 minutes after initialization, the meter will emit a sound and automatically cut off the power supply, entering a dormant state. In auto power-off mode, pressing any key will reboot the meter. When restarting the system, press and hold the SEL key to disable the Auto Power-off function.

### (2) Measurement Guidelines

#### Measurement of AC Voltage and DC Voltage

1. Turn the rotary switch to the  $\overline{V}$  position and press the "SEL\*" key to select DCV or ACV.
2. Connect the black test lead and the red test lead to the COM input socket and  $\overline{V}$  input socket respectively.
3. Use the other two ends of the test leads to measure the voltage of the circuit under test (in parallel with the circuit being measured).
4. Read the measured voltage value on the LCD screen. When measuring DC voltage, the display will show the voltage polarity of the circuit connected to the pen-shaped meter in red.
5. When measuring AC voltage, briefly press the "SEL\*" key to display the frequency of the measured AC signal.

#### Electric resistance measurement

1. Turn the rotary switch to the position and press to choose  $\Omega$ .
2. Connect the test lead in black and test lead in red to COM input socket and input socket respectively.
3. Use another two ends of the test lead to measure the electric resistance of the circuit to be measured.
4. Read the measured electric resistance value on LCD screen.

**⚠ To avoid the meter or the measured equipment from damage, do not attempt a resistance measurement unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors.**

#### Notes:

- The measured resistance of a circuit may slightly differ from its nominal value.
- For accurate low-resistance measurements, first short the test leads and record the reading; subtract this value from subsequent measurements.
- When the meter detects an open circuit, the display shows "OL," indicating the measured value exceeds the selected range.

#### Diode test

**⚠ To avoid the meter or the measured equipment from damage, do not attempt a diode test unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors.**




#### Diode test outside the circuit

1. Turn the rotary switch to the  $\overline{D}$  position and press SEL\* to choose
2. Connect the test lead in black and test lead in red to COM input socket and  $\overline{D}$  input socket respectively.
3. Connect the test leads in black and in red to the positive and negative poles of the diode to be tested respectively.
4. The meter displays the forward bias value of the diode to be tested. If the polarity of the test lead is reversed, the meter will display "OL".


#### Beep continuity test



**⚠ To avoid the meter or the measured equipment from damage, do not attempt a diode test unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors.**

## Steps for a continuity test

- Turn the rotary switch to the  and press **SEL/** to choose  .
- Connect the test lead in black and test lead in red to COM input socket and  input socket respectively.
- Use another two ends of the test lead to measure the resistance of the circuit to be measured. If the measured resistance is less than  $50\Omega$ , the beeper will sound continuously, and the LED will be on.

## Capacitance measurement


 **To avoid the meter or the measured equipment from damage, do not attempt a capacitance measurement unless the operator has already cut off all power sources for the circuit to be measured and fully discharged all high-voltage capacitors. Use the DC voltage position to determine that all capacitors have been discharged.**

- Turn the rotary switch to the  and press **SEL/** to choose  .
- Connect the test leads in black and in red to COM input socket and input socket respectively.
- Use another two ends of the test lead to measure the capacitance of the capacitor to be measured, and capture the measured value on LCD screen.


### Note:

- The measurement of a large capacitance requires a given period of stabilization of reading.
- To avoid damage to the meter, the measurement of a capacitor with polarities requires much attention to its polarity.


## DC current and AC current measurement


 **Do not attempt a measurement on the current in a circuit, if when the voltage between the open-circuit voltage and the ground is over 250V. If the fuse is blown at the moment of measurement, you are likely to damage the meter or get yourself hurt.**

**To avoid any damage to the meter or equipment to be measured, do not attempt a current measurement unless you have examined the meter's protective tube. In attempting a measurement, you should use the correct input sockets, function positions and measuring ranges. When a test lead is inserted into the current input socket, do not put the other end of the test lead in parallel connection with any circuit.**

- Turn the rotary switch to the appropriate position and press **SEL/** to choose DC or AC current measurement.
- Connect the test lead in black to COM input socket. Connect the test lead in red to  input socket when the measured current is less than 400mA; connect the test lead in red to 10A input socket when the measured current is 400mA~10A.
- Disconnect the circuit to be measured. Connect the black test lead to the lower-voltage side and the red test lead to the higher-voltage side.
- Connect the power to the circuit and capture the displayed reading. If the display unit only shows "OL," it means the input is over the selected measuring range. At this moment, turn the rotary switch to a higher measuring range.

## Frequency and Duty cycle measurement

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

1. Turn the switch to HZ%.
2. Connect the black test pen to the COM jack and the red pen to the  jack
3. Measure the frequency value of the circuit under test with the other two ends of the test pens.
4. Press the **SEL/** button to select Frequency or Duty cycle measurement, display shows the readings of the test result.

## Temperature measurement

1. Turn the rotary switch to the °C/°F position and press **SEL/** to choose °C or °F.
2. Insert the red plug of the thermocouple into jack, and insert the black plug into COM jack.
3. Directly read the temperature value from the display screen after the reading is stable.

## NCV test (non-contact voltage detection)

- Rotate the switch to the NCV position and bring the meter tip close to the conductor.
- When AC voltage is detected, the buzzer emits variable-frequency alarms, and the indicator flashes.

### Note:

- Absence of indication does not confirm zero voltage. Do not rely solely on the NCV function to verify voltage presence. Detection can be influenced by socket design, insulation type and thickness, and other environmental factors.
- Voltage applied to the input terminals may cause the sensor LED to illuminate due to induced voltage.
- External interference, such as from flashlights or motors, can trigger NCV detection.

## Technical parameters

### (1) Overall parameters

- **Operating Environment:** 600V CAT II, Pollution Level 2; Altitude < 2000m; Operating temperature 0°C–40°C (accuracy not guaranteed below 10°C or RH < 75%); Storage -10°C–50°C (remove batteries if RH > 80%).
- **Maximum Allowable Voltage:** Between any terminal and ground: 1000V DC or 750V AC (true RMS).

- **Fuse Protection: mA range:** GR256/400; A range: F10A/250V.
- **Display:** 4000-count LCD with automatic unit symbols.
- **Out-of-Range Indication:** LCD displays "OL".
- **Low Battery Indication:** " " appears when voltage drops below operational threshold.
- **Input Polarity:** Negative polarity indicated by "-".
- **Power Supply:** 2 × 1.5V AAA batteries.
- **Dimensions:** 138mm (L) × 68mm (W) × 35mm (H).
- **Weight:** Approximately 158g (excluding batteries and test leads).

### (2) Precision indicator

Accuracy: ±(% reading + digit) The accuracy warranty will run for 1 year upon the ex-factory date. Reference conditions: ambient temperature is between 18°C and 28°C and relative humidity is no more than 75%.

### DC voltage Measurement

Measuring range	Resolution	Accuracy
400mV	0.1mV	±(0.5%Reading+8digits)
4V	1mV	
40V	10mV	
400V	100mV	
1000V	1V	

Input impedance: 10MΩ / Maximal input voltage: 1000V DC or 750V AC valid value

### AC voltage Measurement

Measuring range	Resolution	Accuracy
400mV	0.1mV	±(1% readings +10 digits)
4V	1mV	
40V	10mV	
400V	100mV	
750V	1V	

Input impedance:10MΩ / Maximal input voltage: 1000V DC or 750V AC valid value  
Frequency response: 40Hz–2kHz True-Rms

### Duty Cycle Measurement

Measuring range	Resolution	Accuracy
1%~99%	0.1%	± (2.5%Reading +5 digits)

### Frequency Measurement

Measuring range	Resolution	Accuracy
9.999Hz	0.001Hz	± (1.5%Reading +5 digits)
99.99Hz	0.01Hz	
999.9Hz	0.1Hz	
9.999KHz	0.001KHz	
99.99KHz	0.01KHz	
999.9KHz	0.1KHz	
9.999MHz	0.001MHz	

Overload protection: 250V DC/AC

### Capacitance Measurement

Measuring range	Resolution	Accuracy
40nF	0.01nF	± (4%Reading +5 digits)
400nF	0.1nF	
4μ	0.001μF	
40μF	0.01μF	
400μF	0.1μF	
4mF	0.001mF	± (4%Reading +10 digits)
40mF	0.01mF	

Overload protection: 250V DC/AC

### Temperature Measurement

Measuring Range	Resolution	Accuracy
-20°C ~ 1000°C	1°C	± (1% readings +3 digits)
-4°F ~ 1832°F	1°F	± (1% readings +3 digits)

Overload protection: 250V DC/AC

### Resistance Measurement

Measuring range	Resolution	Accuracy
400Ω	0.1Ω	±(0.8% Reading + 5 digits)
4kΩ	1Ω	
40kΩ	10Ω	
400kΩ	100Ω	
4MΩ	1kΩ	
40MΩ	10kΩ	

Overload protection: 250V DC/AC

### Diode Measurement

Functions	Testing conditions
Diode test ➔	Forward DC current: approximately 1.2mA; Open-circuit voltage: approximately 4V. The display unit shows the approximate value of the diode's forward voltage drop.
• )	The buzzer beeps when the resistance is less than 50Ω

Overload protection: 250V DC/AC

### DC current Measurement

Measuring range	Resolution	Accuracy
40mA	0.01mA	±(1.2% Reading + 5 digits)
400mA	0.1mA	
10A	10mA	±(3% Reading + 5 digits)

#### Overload Protection:

- mA range: GR256/400 fuse
- 10 A range: F10A/250 V fuse

#### Maximum Input Current:

- mA position: 400 mA DC/AC (valid value)
- 10 A position: 10 A DC/AC (valid value)

**Continuous Measurement Limitation:** For currents above 5 A, continuous measurement must not exceed 10 seconds.

Allow at least 1 minute before performing the next high-current measurement.

## AC current Measurement

Measuring range	Resolution	Accuracy
40mA	0.01mA	±(1.5% Reading + 5 digits)
400mA	0.1mA	
10A	10mA	±(3% Reading + 5 digits)

**Overload protection:** Protective tube for mA measuring range (GR256/400) ; Protective tube for 10A measuring range (F10A/250V) .

**Maximal input voltage:** mA position: 400mA DC/AC (valid value); 10A position: 10A DC/AC (valid value) When the measured current is over 5A, the duration of continuous measurement shall not be over 10 seconds. The current measurement shall be carried out 1 minute after the completion of previous measurement. Frequency response: 40Hz~2kHz True RMS

### Meter maintenance

This section provides the basic information on maintenance, including the descriptions about replacement of protective tubes and batteries. Do not attempt the meter maintenance unless you are experienced in maintenance and have read the information on calibration, performance test and maintenance.

#### (1) General maintenance and cleaning

**⚠ To avoid any electric shock or damage to the meter, do not attempt to clean the inside of the meter. You must remove the line connecting a test lead to input signals, before opening the case or battery cover.**

- Regularly clean the meter's exterior with a damp cloth and a small amount of mild detergent.
- Do not use abrasive materials or chemical solvents.
- Dirty or damp input sockets can affect measurement accuracy.
- Procedure for Cleaning Input Sockets:
- Power off the meter and remove all test leads from the sockets.
- Remove any visible dirt or debris from the sockets.
- Use a fresh cotton swab lightly moistened with detergent or a protective lubricant to clean each socket. Lubricant helps protect the sockets from moisture and contamination.

#### (2) Battery & fuse replacement

**⚠ To avoid any electric shock or personal injury as a result of incorrect reading, replace batteries once the symbol "🔋" appear on the display unit.**  
**To avoid any electric shock or personal injury, don't attempt to open the battery cover to replace batteries, unless you have already powered off the device and carried out an examination to ensure that the test lead has been disconnected from the circuit to be measured.**

#### Battery replacement

1. Turn off the meter power.
2. Disconnect all test leads from the input socket.
3. Use a screwdriver to remove the screw on the battery cover.
4. Remove the battery cover.
5. Carefully remove the old batteries and replace them with 2 new 1.5 V AAA batteries.
6. Reinstall the battery cover.

#### Fuse replacement

When the fuse is blown, replace it with the same type of fuse.

1. Turn off the meter power and remove the holster.
2. Use a screwdriver to remove the back-cover screw.
3. Remove the back cover.
4. Remove the blown fuse and replace it with the same type of fuse (Ø5×20mm, F 10A/250V).
5. Tighten the back cover screw.
6. Put the holster back.