

# 72-10390A Palm Size Digital Multimeter User Manual







Please read this manual before operating the equipment.

Keep manual in accessible place for future reference.

# What's Included

Multimeter	1 No.
Test Lead	1 Set.
K Type Temperature Probe	1 No.
User Manual	

### 1. Overview

72-10390A multimeter is a hand-held 3-1/2 digital display digital multimeter with advanced design, multiple entire functions, novel figurations and reliable performance. This meter is fully capable to measure voltage both AC and DC, DC current, resistance, capacitance, inductance, temperature and forward voltage drop of diode, transistor, continuity test and square wave output etc. This operating manual covers information on safety and cautions to full fill CE mark standard. Please read the relevant information carefully and observe all the warnings

# ▲ Warning: To avoid electric shock or personal injury, read the "Safety Information" and "Rules for Safe Operation" carefully before using the Meter.

# 2. Safety Information

This meter complies with the standard IEC/EN 61010-1, 61010-2-033 in pollution degree 2, over voltage category (CAT III 600V) and double insulation.

CAT. II: Local level, appliance, PORTABLE EQUIPMENT etc., with smaller transient voltage over voltage than CAT. III CAT. III: Distribution level, fixed installation, with smaller transient over voltage than CAT. IV

Use the meter only as specified in this operating manual, otherwise the protection provided by the meter may be impaired.

- 1. Before using the meter inspect the case. Do not use meter if it is damaged the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connections.
- 2. Inspect the test leads for damaged insulation or exposed metal. Replace damaged test leads with identical model number or electrical specifications before using the meter.
- 3. Replace the battery as soon as the battery indicator "" appears. With a low battery, the meter might produce false readings that can lead to electric shock and personal injury.
- 4. When measurement is on / off against the correct testing position.
- 5. Do not apply more that the rated voltage, as marked on the meter in order to avoid possible electric shock or personal injury and avoid possible damage to the meter.
- 6. Do not change the measuring range during the testing as it causes to damage the meter.
- 7. When each measurement has been completed, disconnect between the test leads and the circuit under test connection, then turn the meter power off and remove the test leads away from the input terminals of the meter. It is a vital for the high current measurement.
- 8. When the meter working at an effective voltage over 60V in DC and 30Vrms in AS, special care should be taken.
- 9. When servicing the meter, use only the replacements parts, such as the test leads, with the same model or identical electrical ratings.
- 10. Do not use or store the meter in an environment of high temperature and humidity. The performance of the meter may deteriorate after dampened.





- 11. The internal circuit of the meter shall not be altered that will avoid damages of the meter and any accident Soft cloth and mild detergent should be used to clean the surface of the meter when servicing. No abrasive and solvent should be used to prevent the surface of the meter from corrosion, damage and accident.
- 12. Please check whether the instrument is in good condition before use, such as test the voltage which is known and confirm the reading are accurate.

# 3. International Electrical Symbols

	Deficiency of Built in Battery
느	Grounding
⚠	Warning: Refer to the Operating Manual
~	AC (Alternating Current)
	DC (Direct Current)
	Double Insulated
CE	Conforms to Standards of European Union

# 4. The Meter Structure (see diagram 1)

- 1. LCD Display
- 2. Power Button
- 3. Rotary Switch
- 4. Input Terminals
- 5. Hold Button



# 5. Measurement Operation

First check on 9V battery, then turn rotary switch to the measuring position. If the low battery, """ sign will be displayed on LCD panel. Nearly to """ sign on the meter front panel terminal input which also not exceed the testing voltage and current input value limitation.

#### 1. DC or AC Voltage Measurement (See Diagram 2)

- 1) Turn rotary switch to V~ or V- voltage measurement.
- 2) Insert the red test lead into the "V" terminal and the black test lead into the "COM" terminal, connect the test leads across with the object being measured. The measured value show on the display AC Voltage measurement shows on True root mean square value stability period.
- 3) In each range, the meter has an input impedance of  $10M\Omega$ . V ~ Input impedance is about  $4.5M\Omega$ . This loading effect can cause measurement errors in high impedance circuits. In the circuit impedance is less than or equal to  $10k\Omega$ , the error is negligible (0.1% or less).
- ▲ Warning: To avoid possibly damages to the meter, please do not attempt to input higher than 600V. To avoid electrical shock, please pay attention during the high voltage measurement.







#### 2. DC Current Measurements (see diagram 3)

- 1. Turn rotary switch to "A --- " current measurement.
- 2. Insert the red test lead into the "mA" or "10A" terminal, and the black test lead into the "COM" terminal, Connect the test leads across with the object being measured. The measured value shows on the display.

#### **∆Warning**:

- Pre-requisites: Turn off power to the circuit before the connections between the test leads across with the object being measured.
- Selecting the correct terminal input and turn the rotary switch to select the measuring function. In case of no any idea on the value input of the current, just simply test from the high value to low one.
- Fuses are located on mA and 10A terminal input.
- Never attempt the test lead connect to any circuits especially on the power supply terminal and may be hurt.
- For the safety purpose, less than 10 seconds is for each measurement duration and keep 15 minutes duration for next measurement during the current measurement over 5A

#### 3. Resistance Measurements (see diagram 4)

- 1. Turn rotary switch to " $\Omega$ "ohm measurement.
- 2. Insert the red test lead into the " $\Omega$ " terminal, and the black test lead into the "COM" terminal, Connect the test leads across with the object being measured. The measured value shows on the display.
- The LCD displays "OL" indicating open-circuit for the tested resistor or the resistor value is higher than the maximum range of the meter.
- To maintain the resistance measurement accuracy, discount circuit power and discharge all the high voltage capacitors during the measuring resistance.
- The test leads cause 0.1Ω ~ 0.2Ω resistance variation during the measurement, in order to obtain precision reading in low-resistance measurement. Need to make the short circuit on the test leads and mark the measurement value which show on LCD display. Then deduct this variation value on the measurement value which come the meter, measurement value obtained from LCD display-Variation value on test leads = The actual measuring value.
- If Ω reading with shortened test leads is not less than or equal to 0.5Ω, check for loose test leads, incorrect functions election or others.
- For high-resistance measurement greater than 1MΩ, it is normal to take several seconds to obtain a stable reading with short test leads for measurements.
- Do no input the higher than DC 60V and AC 30V voltage to prevent any damage and accident.







#### 4. Diodes Measurement (see diagram 5)

- 1) Turn rotary switch to "+..."
- 2) Insert the red test lead into the "+" terminal and the black test lead into the "COM" terminal. Red test lead is "+" Black test lead is "-".
- 3) In a circuit, a good diode should still produce a forward voltage drop reading of 500 ~ 800mV. However, the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.

#### **∆Warning**:

- The LCD display "OL" indication open-circuit of the tested diodes or the testing the diodes with polarity.
- To maintain the diodes measurement accuracy disconnect circuit power and discharge all the high voltage capacitors during the measuring resistance.
- The open circuit of diodes is 2.3V.
- Do not input higher than DC 60V and AC 30V voltage to prevent any damage and accident.

#### 5. Temperature Measurements (see diagram 7)

- 1. Turn rotary switch to "C"
- 2. K-type point contact temperature probe can only be used in the measurement below 230°C, you need to separately buy another temperature probe.
- 3. The LCD displays "OL" indicating point contact temperature probe which take off. When short circuit between terminal and COM terminal, the meter show the value of room temperature.

#### **∆Warning**:

- Maintain clean the point contact temperature probe and do not let the probe contact point to have any serious influence.
- Take off and well keep the point contact temperature after the measurement.



Diagram 7

# 6. Accuracy Specifications

Accuracy	: ± (a% reading + b digits)
Operating Temperature	: 23°C ±5°C
Relative Humidity	: <75%

#### 1. DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	
2000mV	1mV	L (0 E% Deading L 2 Digita)
20V	0.01V	$\pm (0.5\%$ Reading + 2 Digits)
200V	0.1V	
600V	1V	± (0.8% Reading + 2 Digits)





#### 2. AC Voltage

Range	Resolution	Accuracy
200V	0.1V	1/1 20/ Deading 0/ 12 Digita)
600V	1V	

Input Impedance	: about 4.5MΩ
Frequency	: 45Hz ~ 400Hz
Display	: Effective value of sine wave (average value) each measurement is applicable from 5% of range as reference.

Maximum Input Voltage : 600V AC

#### 3. DC Current

Range	Resolution	Accuracy	
2000µA	1µA	±(1% Reading + 2 Digits)	
20mA	0.01mA	±(1% Reading + 2 Digits)	
200mA	0.1mA	±(1.2% Reading + 2 Digits)	
10A	0.01A	±(2% Reading + 5 Digits)	

Overload Protection:

mA Range	: F2 fuse Ø6.35 x 31.8mm, F 0.5A H 600V (C	E)

10A Range : F1 fuse Ø6.35 x 31.8mm, F 10A H 600V (CE)

#### **∆Warning**:

- When ≤5A Continuous measurement is allowed.
- When >5A Continuous measurement less than 10 seconds at an interval more than 15 minutes

#### 4. Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(0.8% Reading + 5 Digits)
2000Ω	1Ω	
20kΩ	0.01kΩ	
200kΩ	0.1kΩ	
2000kΩ	1kΩ	
20MΩ	0.01MΩ	±(1% Reading + 5 Digits)
200MΩ	100kΩ	±(5% Reading -10) + 10 Digits)

Overload Protection : 600V AC or DC





\*Measuring Value = Reading Value - Open Circuit Value (should be <20 digits) 5. Temperature Measurement

Range	Resolution	Accuracy
-40 ~ 20°C	1°C	- (8% Reading + 5 Digits)
>-20 ~ 0°C		±4
>0 ~ 100°C		±(1.0% Reading + 3 Digits)
>100 ~ 1000°C		±(2.5% Reading + 2 Digits)

Overload Protection : 600V AC or DC.

Enclosed point contact K-type thermocouple can only be on less than 230°C temperature measurement.

#### 6. Diode, Transistor

Function	Range	Resolution	Remark
Diode	*	1mV	Display positive voltage decline

#### **Continuity Test**

Function	Range	Resolution	Remark
Continuity Test	•11)	1Ω	<10Ω Buzzer beep continuously

Overload Protection : 600V AC or DC.

# 7. Maintenance and Service

#### **∆Warning**:

Make sure the test leads take off the terminal and the circuit as well as power off the meter if want to open the meter cover.

- 1. General Service and Maintenance
- Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- · Any abnormal on the meter, stop use the meter and return to service center.
- When need to have calibration on the meter, please allow certified engineer or specific service center for the service maintenance
- 2. Replacing the battery and fuse, see diagram



#### **∆**Warning

LCD Display """ sign indicating battery will be run out and need to replace a new battery, if fail to do that. It causes the variance of the measuring result.

**Battery Specification** 

: 9V 6F22 or NEDA 1604 or 006P





#### **Operating Steps:**

- 1. Turn the power in "off" situation, then remove the test lead out of the meter.
- 2. Use screwdriver to take off the screw on the battery cover. Then you can take off old battery for replacing
- 3. User screwdriver to take off two pieces of screws, then you can replacing the burned fuse(s) as replacement.

Fuse Specification : F1 Fuse Ø6.35 × 31.8mm, F 10A H 600V F2 Fuse Ø6.35 × 31.8mm, F 0.5A H 600V

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