TENMA®

72-9390 Pen Type Meter Operating Manual

Overview

This Operating Manual covers information on safety and cautions. Please read the relevant information carefully and observe all the **Warnings** and **Notes** strictly.

⚠️Warning

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

The Tenma 72-9390 (hereafter referred to as "the Meter") are 3000 counts pen type digits millimeters. The Meter uses large scale of integrated circuit with professional multimeter IC as its core and has full range overload protection.

The Meter measures or tests the following:

- AC/DC voltage
- Resistance
- Diode
- Continuity
- Capacitance

Unpacking Inspection

Open the package case and remove the Meter. Check the following items carefully to see any missing or damaged part:

Item	Description	Qty
1	English Operating Manual	1 piece
2	Test Lead	1 pair

In the event you find any missing parts or damage, please contact your dealer immediately.

Safety Information

This Meter complies with standards EN61010: in pollution degree 2, over voltage category (CATIII 300V) and double insulation.
CAT.III: Distribution level, fixed installation, with smaller transient over voltages than CAT. IV
Use the Meter only as specified in this operating manual, otherwise the protection provided by the Meter may be impaired.
In this manual, a **Warning** identifies conditions and actions that pose hazards to the user, or may damage the Meter or the equipment under test.
A **Note** identifies the information that user should pay attention on.

Instructions for Safe Operation

⚠️Warning

To avoid possible electric shock or personal injury, and to avoid possible damage to the Meter or to the equipment under test, adhere to the following rules:

・Before using the Meter inspect the case. Do not use the Meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.
・Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads with identical type and electrical specifications before using the Meter.
・When using the test leads, keep your fingers behind the finger guards.
・Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.
・When the Meter is being used on voltage over 60V DC or 30V AC, special care should be taken for there is danger of electric shock.
・Use the proper function, and range for your

measurements.
・Disconnect circuit power and discharge all high voltage capacitors before testing current, resistance, diodes or continuity.
・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.
・The internal circuit of the Meter shall not be altered at will; doing so will damage the Meter and may cause personal injury.
・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.
・Do not use or store the Meter in an environment of high temperature, humidity, explosives, flammable mateirals and strong magnetic field. The performance of the Meter may deteriorate after dampened.

International Electrical Symbols

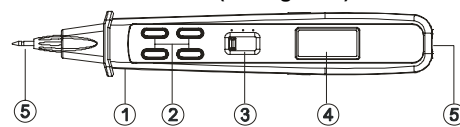|			
⊟➕	Deficiency of Built-In Battery	⏚	Grounding
∼	AC (Alternative Current)	▬	DC (Direct Current)
▣	Double Insulated	•)))	Continuity Test
≋	AC or DC	⯈⊢	Diode
CE	Conforms to Standards of European		
⚠️	Warning. Refer to the Operating Manual		

The Meter Structure (see figure 1)

Figure 1

1. Front Housing
2. Functional buttons
3. Switch
4. LCD Display
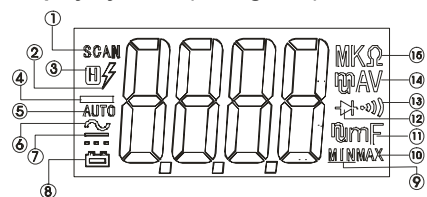5. Input Terminals

Display Symbols (see figure 2)

Figure 2

1. Auto scan mode
2. High voltage indicator
3. Data hold
4. Negative reading
5. Autorange mode
6. AC voltage
7. DC voltage
8. Low battery

⚠️ **Warning:** To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator appears.

9. Minimum reading
10. Maximum reading
11. Capacitance
12. Diode test
13. Continuity buzzer
14. mv/V : Volts
15. Ω ：Ohm. (resistance)
kΩ: kilohm; MΩ: Megaohm.

Button function and auto power off

1. **SELECT**

Press **SELECT** to switch between resistance, AC/DC voltage, continuity buzzer and diode measurement modes. Press and hold to exit "sleep" mode.

2．HOLD

Press **HOLD** to enter and exit hold mode (except under auto scan mode).
Press and hold the **HOLD** button, the meter automatically holds the value which obtains at 6 seconds later, at this time, 🄷 is displayed.
If the Meter enters "sleep" mode with hold mode, the meter will still be in the hold mode when it is turned on.

3．MAX/MIN

The **MAX/MIN** mode stores minimum (MIN) and maximum (MAX) input values (except under auto scan mode). Manual ranging comes when you select this function.
Press **MAX/MIN** button MAX ➡ MIN ➡ MAX/MIN and vice versa.
Under hold mode and max/min mode, should exit hold mode first then press and hold **MAX/MIN** more than 1 second to exit max/min mode.

4.☼ (BACKLIGHT & LED)

Press once to turn the display backlight and test lead LED on and press again to turn the display backlight and test lead light off. It will automatically turn off after a minute.

5. AUTO POWER OFF

To preserve battery life, the Meter automatically goes into a "sleep" mode if you do not press any button for around 10 minutes. The Meter can be activated by pressing any button, then it returns to the display for the function selected previously

Measurement Operation

Before measurement, pull down and twist the red cover counter-clockwise to expose the input terminal.
When all the measurement has been completed, twist the red cover clockwise to protect the input terminal. (see figure 3)
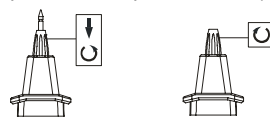

Figure 3

1. AC / DC Voltage Auto Measurement

⚠️ Warning

To avoid damage to the Meter, never input greater than 300V voltage.
To measure Voltage, connect the Meter as follows:

・Set the switch to V∼,
・Auto measuremeng mode is the default. This mode can measure AC voltage and DC voltage.
・Connect the test leads with the object being measured. The measured value shows on the display.
・When voltage measurement has been completed, disconnect the connection from the test leads and the circuit under test, and remove the testing leads from the input terminal of the meter.
Note: The threshold voltage of AC voltage is around 400mV

2.DC Voltage Measurement

⚠️ Warning

To avoid harm to the Meter, never input higher

than 300V voltage although it is possible to measure higher voltage.
・Set the switch to V∼,
・Press **SELECT** to select DC voltage measurement mode
・Connect the test leads with the object being measured. The measured value shows on the display.
・When voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test, and remove the testing leads from the input terminal of the meter.

3.AC Voltage Measurement

⚠️ Warning

To avoid damage to the Meter, never input higher than 300 V.

・Set the switch to "V∼ ",
・Press **SELECT** to select AC voltage measurement mode
・Connect the test leads across with the object being measured. The measured value shows on the display.
・When voltage measurement has been completed, disconnect the testing leads from the circuit under test, and remove the testing leads from the input terminal of the meter.
Note:
The threshold voltage of AC voltage is around 400mV.

5. Ω•)) ⯈⊢ ⊣⊦ Auto measurement

⚠️Warning

To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measurement.

・Set the switch to Ω•)) ⯈⊢ ⊣⊦
・Auto measurement mode is the default, in which the meter can measure Resistance, Diode, Continuity and Capacitance automatically.
・For berst accuracy, remove the component being measured from the circuit before measurement.

- When voltage measurement has been completed, disconnect the testing leads from the circuit under test.

Note:
Under auto measurement mode, when input
Resistance: <15Ω or >10MΩ
Capacitance: <400pF or >1mF
Will get an irresponsible value.

6.Resistance Measurement

⚠️ **Warning**
To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.
To measure resistance, do the following:
- Set the rotary switch to Ω·))·→·⊣⊢.
- Press **SELECT** to select Ω measurement mode
- Connect the test leads with the object being measured.
- When resistance measurement has been completed, disconnect the testing leads from the circuit under test, and remove the testing leads from the input terminals of the Meter

7. Continuity Test

⚠️ **Warning**

To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before continuity test.
To measure resistance, do the following:
- Set the rotary switch to Ω·))·→·⊣⊢.
- Press **SELECT** to select ·)) measurement mode
- Connect the test leads with the object being measured.
- The buzzer sounds continuously if the resistance of a circuit under test is≤30Ω, it indicates the circuit is in good connection.

Note:
When continuity measurement has been completed, disconnect the testing leads from the circuit under test, and remove the testing leads from the input terminals of the Meter

8. Diodes Test

⚠️ **Warning**
To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring diodes.
To measure diode, do the following:
- Set the rotary switch to Ω·))·→·⊣⊢.
- Press **SELECT** to select →⊢ measurement mode
- For better accuracy, separate the component being measured from the circuit before measurement.
- When diodes measurement has been completed, d disconnect the testing leads from the circuit under test, and remove the testing leads from the input terminals of the Meter

9. Capacitance Measurement

⚠️ **Warning**
To avoid damage to the Meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance. Use the DC Voltage function to confirm that the capacitor is discharged.
To measure capacitance, connect the Meter as follows:
- Set the rotary switch to Ω·))·→·⊣⊢.

- Press **SELECT** to select ⊣⊢ measurement mode
- For better accuracy, it better separate the object being measured from the circuit before measurement.
- When diodes measurement has been completed, disconnect the testing leads from the circuit under test, and remove the testing leads from the input terminals of the Meter

General Specifications
- Maximum voltage between red Terminals and Grounding: 300Vrms.
- Maximum Display: 3000. Updates 4 times/second
- Temperature:
    Operating: 0℃~40℃ (32℉~104℉);
    Storage: -10℃~50℃(14℉~122℉).
- Relative Humidity: ≤75% @ 0℃~30℃;
    ≤ 50% @ 31℃~40℃
- Altitude: Operating: 2000m;
    Storage: 10000m.
- Battery Type: 3V Li-MnO2 Button cell
- Battery Deficiency: Display "🔋".
- Dimensions(HxWxL): 20.18x26.5x181.5mm
- Weight: Approx.90g (battery included).

Accuracy Specifications
Accuracy: ±（a% reading + b digits）, guaranteed for 1 year.
Operating temperature：18℃ ~ 28℃.
Relative humidity：<75%.

A. AC Voltage

Range	Resolution	Accuracy	Overload Protection
3V	0.001V		
30V	0.01V	± (1%+4)	300Vrms
300V	0.1V		

Remarks: Input Impedance: ≥10MΩ
Frequency Response: 40Hz ~ 400Hz

B .DC Voltage

Range	Resolution	Accuracy	Overload Protection
3V	0.001V		
30V	0.01V	± (1%+3)	300Vrms
300V	0.1V		

Remarks: Input Impedance: ≥10MΩ

C. Resistance

Range	Resolution	Accuracy	Overload Protection
300Ω	0.1Ω	± (1%+3)	300Vrms
3kΩ	1Ω		
30kΩ	10Ω		
300kΩ	100Ω		
3MΩ	1kΩ	± (1.5%+5)	
30MΩ	10kΩ		

Remarks: Under auto scan mode the max range is 3MΩ

D. Continuity Measurement

Range	Resolution	Remark
•·)))	0.1Ω	Open Circuit Voltage around -1.2V Buzzer beeps at resistance ≤10Ω. Buzzer not sound when resistance > 70Ω

F. Diodes Measurement

Range	Resolution	Overload Protection
→⊢	1mV	300Vrms

Remark: Open Circuit Voltage around 3V, Displays approximate forward voltage drop.

G. Capacitance

Range	Resolution	Accuracy	Overload Protection
3nF	0.001nF	±(3%+5)	300Vrms
30nF	0.01nF		
300nF	0.1nF		
3µF	1nF		
30µF	10nF		
300µF	100nF	±(5%+5)	
3mF		reference	

Remarks:
1.Under auto scan mode the max range is 300µF
2. There is a residual reading when the circuit is open. To measure a small value of capacitance, subtract it to ensure accuracy.

Maintenance (see figure 4)
This section provides basic maintenance information and battery replacement instruction.
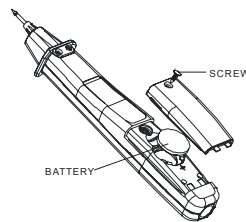

Figure 4

⚠️**Warning**
Do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service information.   To avoid electrical shock or damage to the Meter, do not get water inside the case.

A. General Service
- Periodically wipe the case with a damp cloth and mild detergent.   Do not use abrasives or solvents.
- Clean the terminals using a cotton swab with mild detergent or contact cleaner, as dirt or moisture in the terminals can affect readings.
- Turn the Meter off when it is not use and take out the battery when not using for a long time.
- Do not store the Meter in a place of humidity, high temperature, explosive, inflammable and strong magnetic field.

B. Replacing the Battery

⚠️**Warning**
To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator appears.
To replace the battery:
1. Turn the Meter off . Disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminals of the Meter.
2. Remove the screw from battery compartment and separate the battery compartment from the case bottom.
3. Remove the battery from the battery compartment.
4. Replace the battery with a new 3V battery
5. Rejoin the case bottom and the battery compartment, and reinstall the screw

===END===