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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 Safety Operation" carefully before using the Meter.

The **Model UT90A** (hereafter referred to as "the Meter") is a 1999 counts low power waste electrical tester with and stabilize functions, safety operations, and reliable performance.

In addition to the conventional measuring function, such as DC/AC voltage, resistance, diode and continuity and power voltage test, it is also a highly applied digital electrical tester of good performance with big size full functions symbols indication, full overload protection and special appearance.

Unpacking Inspection

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

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

3	certificate	1 piece

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

Safety Information

This Meter complies with GB4793 standard for safety electrical measuring and test equipment, and IEC61010-1: in pollution degree 2, overvoltage category (CAT II 1000V, CAT III 600V) and double insulation.

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.

International electrical symbols used on the Meter and in this Operating Manual are explained on page XXX.

Rules 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 model number or 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 working at an effective voltage over 60V in DC or 30V in AC, special care should be taken from there is danger of electric shock.**
- **Use the proper terminals, function, and range for your measurements.**
- **The rotary switch should be placed in the right position and no any changeover of range shall be made during measurement is conducted to prevent damage of the Meter.**
- **Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, diodes or continuity.**
- **Charge as soon as the Meter indicator**  **appears to keep precision of the**

readings.

- **Remove test leads from the test circuit before changeover of range. Turn the Meter power off before connect the Meter to circuit and check the fuse before measuring current.**
- **When servicing the Meter, use only the same model number or identical electrical specifications replacement parts.**
- **The internal circuit of the Meter shall not be altered will to avoid damage 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.**
- **Turn off the Meter when it is not in use for a long time.**
- **Do not use or store the Meter in an environment of high temperature, humidity, explosive, inflammable and strong magnetic field. The performance of the Meter may deteriorate after dampened.**

International Electrical Symbols

~	AC (Alternating Current).
⎓	DC (Direct Current).
⏚	Grounding.
⧈	Double Insulated.

	Deficiency of Built-In Battery.
	Warning. Refer to the Operating Manual.
MC	China Technology Supervision Bureau, license for measuring instrument Manufacture
CE	Conforms to Standards of European Union.

The Meter Structure (see figure 1)

? LCD Display.
? Impedance changeover button.
? Rotary Switch.
? Input Terminals.
? Power Button.

LCD indicators(see figure 2)

? ~ appear at AC measurement, disappear at DC measurement.
? display the minus readings.
? high voltage indicator.
? battery deficiency indicator.
? continuity measurement indicator.
? diodes measurement indicator.
? Connect Terminal terminal connect indicator.
?

O? KO? MO	Resistance unit
MV? V	Voltage unit
μA? mA? A	Current unit

Rotary Switch

Below table indicated for information about the rotary switch positions.

Rotary Switch Position	Function
⎓ V	DC voltage measurement range from 200.0mV to 1000V.
V ~	AC voltage measurement range from 2.000V to 750.0V.
Ω	ΩResistance measurement range from 200.0Ω to 20.00MΩ.
⊣◁⊢	Diode test.
)))	Continuity test.
⎓ A	DC current measurement range from 200.0mA to 20.00A.
A ~	AC current measurement range from 200.0μA to 20.00A.
⊣⊢	Power voltage measurement
⏻	Turn on/off the Meter.

Functional Buttons

Below table indicated for information about the functional button operations.

Button	Measuring Function	Operation Performed

Impedance change over button	AC/DC voltage range	It is used to inspect the resistance of supply power under 250V MAX.(??????)
⏻	Any rotary switch position	Turn the power of the Meter on or off.

Measurement Operation

A. AC/DC Voltage Measurement (see figure 3)

 **Warning**

To avoid harms to you or damages to the Meter from electric shock, please do not attempt to measure voltages higher than 1000V DC/750V AC although readings may be obtained.

Impedance Changeover Button turn on time should=3 seconds. To avoid damages to the Meter, please do not use the Impedance Changeover Button when the measured voltage is higher than 250V.

The DC voltage ranges are: 200.0mV, 2.000V, 20.00V, 200.0V, 1000V; The AC voltage ranges are: 2.000V, 20.00V, 200.0V, 750.0V. To measure

AC/DC voltage, connect the Meter as follows:

1. Insert the red test lead into the"VO)" terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to"**V⎓**"or"**V∿**",and Connect the test leads across with the power or load being measured.
3. The measured value shows on the display, which is an effective value of sine wave (mean value response).
4. In each range, the Meter has an input impedance of 10MΩ. This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10kΩ, the error is negligible (0.1% or less).
5. Manual Impedance Changeover Button"10MΩ/400kΩ"can be used to check inside impedance of supply power under 250V MAX.

Note

- When AC/DC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test.
- Pay attention to avoid harms to you from electric shock during high voltages measurement.

B. AC/DC Current Measurement (see figure 4)

Warning

To avoid damages to the built-in fuse and the Meter, please do not attempt parallel connect the test leads with any circuit while the test leads are inserted into the current terminal.

For the safety requirement, when measure high current, every measure time should< 10 seconds and the time between two measurements should > 15 minutes.

The measurement ranges of DC current are: 200mA,2mA,20mA,200mA,20A; The measurement ranges of AC current are: 200.0μA,2.000mA,20.00mA,200.0mA and 20.00A. To measure current, do the following:

1 Insert the red test lead into the"μA mA⊣⊢"or"20A"terminal and the black test lead into the **COM** terminal.
2 Set the rotary switch to"**A⎓**"or"**A∿**",and Connect the test leads across with the circuit being measured.
3. The measured value shows on the display, it is an effective value of sine wave (mean value response).

Note

- Turn off the power of circuit being measured before series connection between the Meter and the circuit.
- Use proper terminals and ranges for the measurement.
- Please use the ranges from high to low if the current not being confirmed.
- When current measurement has been

completed, disconnect the connection between the test leads and measured circuit.

C. Resistance Measurement(see figure 5)

Warning
To avoid injury to the user, please do not attempt the voltage higher than 60V/DC or 30V/AC.

The resistance ranges are: 200.0Ω, 2.000kΩ, 20.00kΩ, 200.0kΩ, 2.000MΩand 20.00MΩ. To measure resistance, connect the Meter as follows:

1. Insert the red test lead into the **VΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to**Ω**, parallel connect the test leads across with the object being measured.
3. The measured value shows on the display.

Note

- The LCD will display "**1**" indicating open-circuit for the tested resistor or the resistor value is higher than the maximum range of the Meter.
- To measure online resistance, please turn off power of the circuit and discharge all capacitors.
- The test leads can add 0.1Ωto 0.2Ω of error to resistance measurement. To obtain

precision readings in low-resistance measurement, that is the range of 200.0O, short-circuit the input terminals beforehand and record the reading obtained (called this reading as X). (X) is the additional resistance from the test lead.

Then use the equation:
measured resistance value (Y) - (X) = precision readings of resistance.

- When the resistance reading=0.5Oin the shorten-circuit, please check for loose test leads or other reasons.
- For high-resistance measurement (>1MO), it is normal taking several seconds to obtain a stable reading, and it is better to choose short measuring cable.
- When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

D. Diodes Measurement (see figure 6)

Warning
To avoid injury to the user, please do not attempt the voltage higher than 60V/DC or 30V/AC.

Use the diode test to check diodes, transistors, and other semiconductor devices. The diode test sends a current through the semiconductor junction, then measures the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V.

To test a diode out of a circuit, connect the Meter as follows:

1. Insert the red test lead (anode "+") into the **VO** terminal and the black test lead (cathode "-") into the **COM** terminal.
2. Set the rotary switch to , place the red test lead on the component's anode and place the black test lead on the component's cathode.
3. For forward voltage drop readings on any semiconductor component, the measured value shows on the display and the unit of diodes measurement is **mV**.

Note

- In a circuit, a good diode should still produce a forward voltage drop reading of 500mV to 800mV.
- Connect the test leads to the proper terminals as mentioned above to avoid error display. The LCD will display **"1"** indicating open-circuit or polarity for wrong connection.
- Open-circuit voltage of diodes measurement is about 3V.
- To measure online capacity, please turn off power of the circuit and discharge all capacitors.
- When diode testing has been completed,

disconnect the connection between the testing leads and the circuit under test.

E. Continuity Measurement(see figure 7)

Warning
To avoid injury to the user, please do not attempt the voltage higher than 60V/DC or 30V/AC.

To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the capacitors before measuring continuity.

To test for continuity, connect the Meter as below:

1. Insert the red test lead into the **VO** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to , connect the test leads across with the power being measured.
3. The resistance of a open circuit under test is> 100**O.**
4. The buzzer sounds continuously if the resistance of a circuit under test is =10**O**, and that shows the circuit is well connected.
5. The measured approximate circuit resistance value shows on the display, the unit **O.**

Note

- To measure online capacity, please turn off power of the circuit and discharge all

capacitors.

- Open-circuit voltage of continuity measurement is about 3V.

- When continuity testing has been completed, disconnect the connection between the testing leads and the circuit under test.

F. Power Voltage measurement(see figure 8)

Warning
To avoid damage to the inside fuse and the Meter, please do not attempt using battery and power of any other specification to measure except prescribed as Note.

The measure the power voltage, connect the Meter as follows:

1. Insert the red test lead into the μA mA terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to , place the red test lead on the anode of the power under test and place the black test lead on the cathode of the power under test.
3. The measured value shows on the display.

Note

- The range of 1.5V only fit for the measure of 1.5V Battery, inside load resistance is 38**O.**

- The range of 9V only fit for the measure of 9V Battery, inside load resistance is 38**O.**

General Specifications

- Maximum Voltage between any Input Terminals and COM Terminal: 1000Vp.
- Fuse protection of μA mA terminal: 300mA 250V fast melt fuse.
- Fuse protection of 20A terminal: 20mA 250V fast melt fuse.
- Equipped with full icons display.
- Maximum Display: Display: 1999.
- Measurement Speed: Updates 2-3 times /second.
- Range: Manual.
- Polarity: Automatically display.
- Over load indicator: "1".
- Battery Deficiency: Display  .
- Temperature:
  Operating: 0**?** ~40**?** (32**?** ~104**?**).
  Storage: -10? ~50? (14? ~122?).
- Relative Humidity: =75% @ 0? - 30? ;
  =50% @ 31 - 40? .
- Supply Power: 6F229V.
- Dimensions (HxWxL): 179 x 88 x 39mm.
- Weight: ? g.
- Safety/Compliances:
  IEC61010: CAT II 1000V? CAT III 600V.
- Certification: CE
  CMC(94) 03000148

Accuracy Specifications

Accuracy: ±(a% reading + b digits), guarantee for 1 year.
Operating temperature: 18 - 28? .
Relative humidity: =75%RH.

A.DC Voltage

Range	Resolution	**Accuracy:** ±(a% reading + b digits)
200mV	0.1mV	±(0.5%+2)
2V	1mV	
20V	10mV	
200V	100mV	
1000V	1V	±(0.8%+3)

Remark:
?Input impedance: 10MO.
?Overload Protection: 1000V DC or 750V AC continuously measure(except 200mV 230V AC).

B.AC Voltage

Range	Resolution	**Accuracy:** ±(a% reading + b digits)
2V	1mV	±(0.8%+5)
20V	10mV	
200V	100mV	
750V	1V	±(1.0%+5)

Remarks:
?Input impedance: 10MO.
?Overload Protection: 1000V DC or 750V AC continuously measure.
?Frequency response: 40Hz ~ 400Hz.
?Displays effective value of sine wave (mean value response).

C.DC Current

Range	Resolution	Accuracy: ±(a% reading + b digits)
200mA	0.1μA	±(0.8%+2)
2mA	1μA	
20mA	10μA	
200mA	0.1mA	
20A	10mA	±(1.2%+5)

Remarks:

?Overload Protection:

AtμA mA range: Fuse 5×20mm F0.3A 250V.

At A range:

Fuse 6×25mm F20A 250V.

continuous measure time< 10 seconds.

time between two measurements> 15 minutes.

D. AC Current

Range	Resolution	Accuracy: ±(a% reading + b digits)
200μA	0.1μA	±(1.0%+5)
2mA	1μA	
20mA	10μA	
200mA	0.1mA	
20A	10mA	±(2.0%+5)

Remarks:

?Frequency response: 40Hz – 400Hz.

?Overload Protection:

AtμA mA range: Fuse 5×20mm F0.3A 250V.

At A range:

Fuse 6×25mm F20A 250V.

continuous measure time< 10 seconds.

time between two measurements> 15 minutes.

E. Resistance

Range	Resolution	Accuracy: ±(a% reading + b digits)
200O	0.1O	±(0.8%+3)
2kO	1O	
20kO	10O	
200kO	100O	
2MO	1kO	
20MO	10kO	±(1.2%+5)

Remarks:

?Overload Protection: 230V rms.

F. Diodes Test

Range	Resolution	Remark
	1mV	Open-circuit voltage is about 3V; transistor PN normal voltage is about 0.5~0.8V.

Remarks:

?Overload Protection: 230V rms.

G. Continuity Test

Range	Resolution	Remark

⚡	1O	Open circuit voltage is about 3V; Set the resistance of a open circuit> 100**O,** buzzer will not sound; Set the resistance of a well connected circuit=10**O**, buzzer sounds continuously.

Remark:
?Overload Protection: 230V rms.

Fuse Replacement(see figure 9)

Warning
To avoid electrical shock or injury to the user because of wrong readings of the Meter, please inspect the damage of fuse inside when there is not any response on the display during current measurement. Replace the damaged fuse with identical model number or electrical specifications.

To replace the fuse as follows:
1. Turn the Meter to OFF position, and remove the test leads from terminals.
2. Take off the holster as figure 9 shows.
3. Remove the 3 screws from the case bottom, separate the case bottom, then replace the damaged fuse.

MAINTENANCE

This section provides basic maintenance information including battery replacement instruction.

Warning

Before remove the case bottom, make sure the power is off, remove the test leads from terminals and test circuit.

- Periodically wipe the case with a damp cloth and a little mild detergent. Do not use chemical abrasives or solvents.
- Please stop any operation of the Meter and sent it outside to repair or service if there is anything wrong.
- Do not attempt to repair of service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service information.

** END **

This operating manual is subject to change without notice.

Manufacturer:
Uni-Trend International Limited
Rm901, 9/F, Nanyang Plaza
57 Hung To Road
Kwun Tong
Kowloon, Hong Kong
Tel: (852) 2950 9168
Fax: (852) 2950 9303
Email: info@uni-trend.com
http://www.uni-trend.com