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Model UT90C: OPERATING MANUAL

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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 Safe Operation” carefully before using the Meter.

The **Model UT90C** (hereafter referred to as “the Meter”) is a 4000 counts, 3 3/4 digits environment protected auto ranging electrical tester with stabilized functions, safe design, and reliable performance.

In addition to the conventional measuring function, such as DC/AC voltage, DC/AC current, resistance, diode, data hold and continuity, it is equipped with capacitance test, frequency test, relative mode and advanced design of charging power through 220V AC or 12-36V AC/DC or solar energy. With such design, the Meter can be used without battery, therefore it will not cause chemical pollution. This is also a highly applied digital electrical tester of good performance with full icons display LCD, overload protection and streamline outlook.



Model UT90C: OPERATING MANUAL

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	English Operating Manual	1 piece
2	Test Lead	1 pair
3	Holster	1 piece

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

Safety Information

Safety Information

This Meter complies with standards IEC61010: 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 8.

Rules For Safe Operation (1)













 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:

- 1 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.
- 1 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.
- 1 When using the test leads, keep your fingers
- 1 Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.
- 1 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.
- 1 Use the proper terminals, function, and range for your measurements.
- 1 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.
- 1 Disconnect circuit power and discharge all high-voltage capacitors before testing current, resistance, diodes, continuity or capacitance.
- 1 Start charging as soon as the power indicator  appears. With a low battery, the Meter might

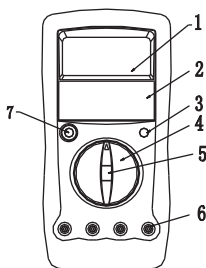
Rules For Safe Operation (2)

- produce false readings that can lead to electric shock and personal injury.
- 1 **When servicing the Meter, use only the same model number or identical electrical specifications replacement parts.**
 - 1 **The internal circuit of the Meter shall not be altered at will to avoid damage of the Meter and any accident.**
 - 1 **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.**
 - 1 **Turn off the Meter when it is not in use**
 - 1 **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.**
 - 1 **The Meter is suitable for indoor use.**

International Electrical Symbols

	AC (Alternating Current).
	DC (Direct Current).
	AC or DC.
	Grounding.
	Double Insulated.
	Deficiency of Built-In Battery.
	Continuity Test.
	Diode.
	Capacitance Test
	Fuse.
	Warning. Refer to the Operating Manual.
	Conforms to Standards of European Union.

The Meter Structure (see figure 1)



(figure 1)

- ① LCD Display.
- ② Solar Panel.
- ③ **SELECT** Button.
- ④ Rotary Switch.
- ⑤ **HOLD** Button.
- ⑥ Input Terminals
- ⑦ **Relative Mode & RESET** Button










Rotary Switch

Below table indicated for information about the rotary switch positions.

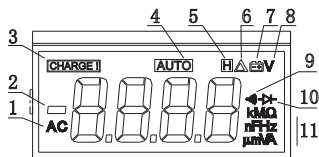
Rotary Switch Position	Function
OFF	Power is turned off.
$V \sim$	AC/DC voltage measurement.
$\rightarrow \dashv$	$\rightarrow \dashv$: Diode test.
$\cdot \cdot \cdot \cup$	$\cdot \cdot \cdot \cup$: Continuity test.
$\dashv \leftarrow$	$\dashv \leftarrow$: Capacitance test.
Ω	Ω : Resistance measurement.
Hz	Frequency Test.
$A \mu \sim$ $A \sim$ $A \sim$ $A \sim$	AC or DC Current Measurement
CHARGE	1 230V \sim MAX: Charge at 220VAC. 1 12-36V \sim : Charge at 12-36V \sim .

Functional Buttons

Below table indicated for information about the functional button operations.

Button	Measuring Function	Operation Performed
 RESET	Any rotary switch position except Hz and CHARGE	Press △ RESET to enter and exit the △ mode in any measuring mode except in frequency and charge mode; the Meter beeps.
SELECT	 	Switches between AC and DC voltage/current; the Meter beeps. DC is default.
	     Ω	Switches between resistance, diode, continuity and capacitance measurements; the Meter beeps. Resistance is default.
 H	Any rotary switch position	Press to enter and exit the Hold mode in any mode, the Meter beeps.

Display Symbols(1) (see figure 2)



(figure 2)

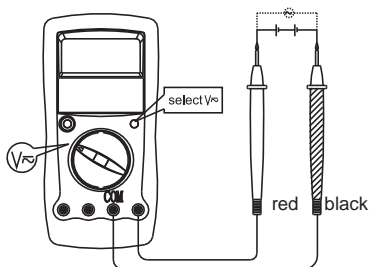
No.	Symbol	Meaning
1	AC	Indicator for AC voltage or current. The displayed value is the mean value.
2	—	Indicates negative reading.
3	CHARGE	Charge indicator.
4	AUTO	The Meter is in the auto range mode in which the Meter automatically selects the range with the best resolution.
5	H	Data hold is active.
6	Δ	The Δ mode on, which display the present value minus the stored value.
7	⊖	The battery is low. ⚠ 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.
8	V	The voltage unit when charging is on.

Display Symbols(2) (see figure 2)

No.	Symbol	Meaning
9	•••)	The continuity buzzer is on.
10	→ ←	Test of diode.
11	$\Omega, k\Omega, M\Omega$	Ω : Ohm. The unit of resistance. k Ω : kilohm. 1×10^3 or 1000 ohms. M Ω : Megaohm. 1×10^6 or 1,000,000 ohms.
	$\mu F, nF$	F: Farad. The unit of capacitance. μF : Microfarad. 1×10^{-6} or 0.000001 farads. nF: Nanofarad. 1×10^{-9} or 0.000000001 farads.
	Hz, kHz, MHz	Hz: Hertz. The unit of frequency in cycles/second. kHz: Kilohertz. 1×10^3 or 1,000 hertz. MHz: Megahertz. 1×10^6 or 1,000,000 hertz.
	mV, V	V: Volts. The unit of voltage. mV: Millivolt. 1×10^{-3} or 0.001 volts.
	$\mu A, mA, A$	A: Amperes (amps). The unit of current. mA: Milliamp. 1×10^{-3} or 0.001 amperes. μA : Microamp. 1×10^{-6} or 0.000001 amperes.

Measurement Operation(1)

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



(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 1000VDC / 750VAC RMS although readings may be obtained.

AC voltage measurement

The AC voltage ranges are: 4.000V, 40.00V, 400.0V and 750.0V. To measure AC Voltage, connect the Meter as follows:

1. Insert the red test lead into the **HzVΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **V~** and press **SELECT** button to select **AC** measurement mode.
3. Connect the test leads across with the object being measured.

The measured value shows on the display, which is effective value of sine wave (mean value response).

Measurement Operation(2)

Note

- 1 At 400mV range, the Meter has an input impedance of 4000M Ω All other ranges the Meter has an input impedance of 10M Ω This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10k Ω , the error is negligible (0.1% or less).
- 1 When AC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

DC voltage measurement

The DC Voltage ranges are: 400.0mV, 4.000V, 40.00V, 400.0V and 1000V. To measure DC voltage, connect the Meter as follows:

1. Insert the red test lead into the **H_zV Ω** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to $\sqrt{\sim}$; DC measurement is default or press **SELECT** button to select DC measurement mode.
3. Connect the test leads across with the object being measured.
The measured value shows on the display.

Note

- 1 At 400mV range, the Meter has an input impedance of 4000M Ω Except at 400mV range, all other ranges the Meter has an input impedance of 10M Ω . This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10k Ω , the error is negligible (0.1% or less).
- 1 When DC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

Measurement Operation(3)

B.Measuring Resistance, Diodes, Continuity & Capacitance

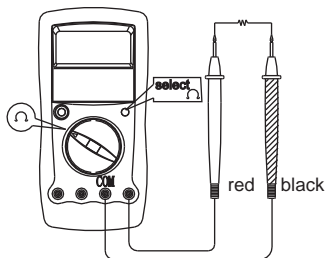
Warning

To avoid harms to you, never attempt to input over 60V in DC or 30V rms in AC.

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, diodes, continuity & capacitance

For testing capacitance, use the DC Voltage function to confirm that the capacitor is discharged.

Resistance Measurement (see figure 4)




(figure 4)


The resistance ranges are: 400.0 Ω , 4.000k Ω , 40.00k Ω , 400.0k Ω , 4.000M Ω and 40.00M Ω . To measure resistance, connect the Meter as follows:

1. Insert the red test lead into the **H Ω V** terminal and the black test lead into the **COM** terminal.

Measurement Operation(4)

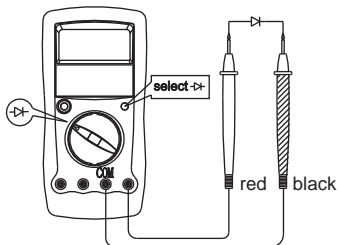
2. Set the rotary switch to Ω  resistance measurement (Ω) is defaults or press **SELECT** button to select Ω measurement mode.
3. Connect the test leads across with the object being measured.
The measured value shows on the display.

Note

- 1 The test leads can add 0.1 Ω to 0.2 Ω of error to resistance measurement. To obtain precision readings in low-resistance measurement, that is the range of 400.0 Ω , short-circuit the input terminals beforehand, using the relative value function button  **RESET** to automatically subtract the value measured when the testing leads are short-circuited from the reading.
- 1 For high-resistance measurement (>1M Ω), it is normal taking several seconds to obtain a stable reading.
- 1 If Ω reading with shorted test leads is not $\leq 0.5\Omega$, check for loose test leads, incorrect function selection, or enabled Data Hold function.
- 1 The LCD displays **OL** indicating open-circuit for the tested resistor or the resistor value is higher than the maximum range of the Meter.
- 1 When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

Measurement Operation(5)

Testing Diodes (see figure 5)



(figure 5)

Use the diode test to check diodes, transistors, and other semiconductor devices. The diode test sends a current through the semiconductor junction, and 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 into the **HzVΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω \rightarrow \rightarrow \rightarrow \rightarrow and press **SELECT** button to select \rightarrow measurement mode.
3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode.

The measured value shows on the display.

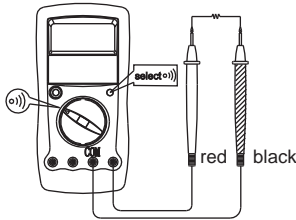
Note

- 1 In a circuit, a good diode should still produce a forward voltage drop reading of 0.5V to 0.8V; however, the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.

Measurement Operation(6)

- 1 Connect the test leads to the proper terminals as said above to avoid error display. The LCD will display **OL** indicating open-circuit for wrong connection. The unit of diode is Volt (V), displaying the positive-connection voltage-drop value.
- 1 When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test.

Continuity Measurement (see figure 6)



(figure 6)

To test for continuity, connect the Meter as below:

1. Insert the red test lead into the **HzVΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω \rightarrow \rightarrow \rightarrow and press **SELECT** button to select \rightarrow measurement mode.
3. The buzzer does not sound if the circuit is disconnected with resistance value is $> 100\Omega$
The buzzer sounds continuously if the circuit is in good condition with resistance value $\leq 10\Omega$.
4. The nearest circuit resistance value shows on the display, the unit is Ω .

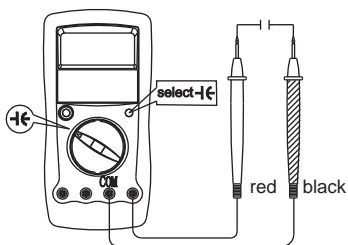
Note

- 1 The LCD displays **OL** indicating the resistance of the circuit being tested is higher than 400Ω .
- 1 The buzzer sounds once if the **ΔRESET**, **SELECT** or **□** is pressed on.

Measurement Operation(7)

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

Capacitance Measurement (see figure 7)



(figure 7)

The Meter's capacitance ranges are: 40.00nF, 400.0nF, 4.000 μ F, 40.00 μ F, and 100.0 μ F. To measure capacitance, connect the Meter as follows:

1. Insert the red test lead into the **HzV Ω** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω \rightarrow \rightarrow \rightarrow \rightarrow and press **SELECT** button to select \rightarrow measurement mode. The existing of the Meter built-in equalized capacitance will affect the accuracy. To increase the accuracy of capacitance measurement, press Δ button before measuring to make the LCD display 0.
3. Connect the test leads across with the object being measured.

The measured value shows on the display.

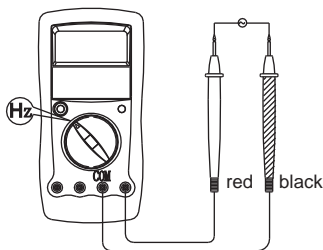
Note

- 1 The LCD displays **OL** indicating the capacitor is short-circuited or the capacitor value being tested is overload.

Measurement Operation(8)

- 1 For testing the capacitor with polarity, connect the red test lead to anode & black test lead to cathode instead of using test leads as mentioned above.
- 1 It takes a longer time when testing a capacitor value which is higher than $10\mu\text{F}$ range.
- 1 When capacitance measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

C.Frequency Measurement (see figure 8)



(figure 8)

Warning

To avoid harms to you, please do not attempt to input frequency voltage being tested higher than 30V.

The measurement ranges are from 10Hz to 10MHz.
To measure frequency, connect the Meter as follows:

1. Insert the red test lead into the **HzVΩ** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **Hz**.
3. Connect the test leads across with the object being measured.

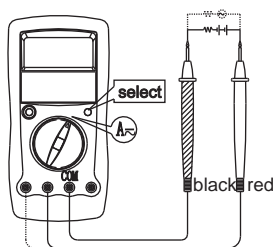
The measured value shows on the display.

Measurement Operation(9)

Note

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

D.AC & DC Current Measurement (see figure 9)



Warning

Never attempt an in-circuit current measurement where the open-circuit voltage between the circuit and ground is greater than 60V.

If the fuse burns out during measurement, the Meter may be damaged or the operator himself may be hurt. Use proper terminals, function, and range for the measurement. When the testing leads are connected to the current terminals, do not parallel them across any circuit.

The current measurement has 3 measurement positions on the rotary switch: $\mu\text{A}\sim$, $\text{A}\sim$ and $\text{mA}\sim$.

The $\mu\text{A}\sim$ has a 400.0 μA and 4000 μA range, with auto ranging; the mA has a 40.00 mA and 400.0 mA range, with auto ranging; $\text{A}\sim$ position has a 4.000 A and 10.00 A range, with auto ranging.

Measurement Operation(10)

To measure current, do the following:

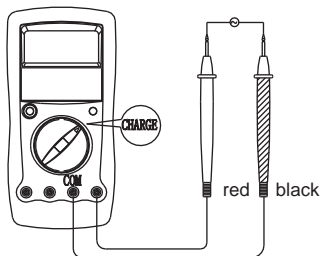
1. Turn off power to the circuit. Discharge all high-voltage capacitors.
2. Insert the red test lead into the μA mA or 10A terminal and the black test lead into the COM terminal. Use the 10A terminal and A \sim range if the current value to be tested is an unknown.
3. Set the rotary switch to μA \sim , mA \sim or A \sim .
4. The Meter defaults to DC current measurement mode. To toggle between DC and AC current measurement function, press **SELECT** button. AC current is displayed as an mean value (calibrated against sine wave effective value).
5. Break the current path to be tested. Connect the red test lead to the more positive side of the break and the black test lead to the more negative side of the break.
6. Turn on power to the circuit.
The measured value shows on the display.

Note

- 1 For safety sake, the measuring time for high current should be less than 10 seconds for each measurement and the interval time between 2 measurements should be greater than 15 minutes.
- 1 When current measurement has been completed, 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.

Measurement Operation(11)


E.Power Charging (see figure 10)



(figure 10)



Warning

Start charging as soon as the power indicator  appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.

To avoid damage to the Meter, please do not attempt to changeover the rotary switch during charging.

To set up charging as follows:

1 Charge at 220V AC

1. Insert the red test lead into the **HzVW** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **230V~MAX.**
3. Insert the test leads' probe tip into the 220V AC power supply respectively.
4. **CHARGE** shows on the display.
5. The charging time is around 15 mins.
6. Take the DC Voltage range as an example, the continuous working time is ≥ 90 mins

Measurement Operation(11)

1 Charge at 12-36V $\bar{\sim}$

1. Insert the red test lead into the **HzV Ω** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to 12-36V $\bar{\sim}$.
3. Place the test leads' probe tip onto the 12-36V power supply respectively.
4. **CHARGE** shows on the display.
5. The charging time is more than 30 mins.
6. Take the DC Voltage range as an example, the continuous working time is ≥ 90 mins

1 Charge by Solar Power

Charging through the solar panel from sunshine.

Remarks:

- 1 Indicator "0.7V" on the display is rated charge voltage(comparative value)
- 1 The LCD will be closed when the power is low. When the LCD is first opened or charging after 5 minutes during charging, press **RESET** to display the correct current charging voltage.
- 1 When power charging has been completed, disconnect the connection between the testing leads and the supply power.

Operation of Hold Mode



Warning

To avoid possibility of electric shock, do not use Hold mode to determine if circuits are without power. The Hold mode will not capture unstable or noisy readings.

The Hold mode is applicable to all measurement functions.

- 1 Press **H** to enter Hold mode; the Meter beeps.
- 1 Press **H** again to exit Hold mode; the Meter beeps.
- 1 In Hold mode, **H** is displayed.

The Use of Relative Value Mode

The Δ mode applies to all measurement functions except frequency and charge function, it subtracts a stored value from the present value and displays the relative value (Δ) as the result

The definition is as follows:

- 1 Relative value (Δ) = present value – stored value
For instance, if the stored value is 20.0V and the present measurement value is 22.0V, the reading would be 2.0V. If a new measurement value is equal to the stored value then display 0.0V.

To enter or exit Δ mode:

- 1 Use rotary switch to select the measurement function before selecting Δ RESET. If measurement functions change manually after Δ RESET is selected, the Meter exits the Δ mode.
- 1 Press Δ RESET to enter Δ mode, and the present measurement range is locked and display the last measurement value as "0" as the stored value.
- 1 Press Δ RESET again to reset the stored value and exit Δ Mode.
- 1 Turn the rotary back and forth one time to return to auto ranging mode. This only applies to those functions having auto ranging.

Pressing **ON/OFF** in any modes makes the Meter stop updating.
Pressing **ON/OFF** again to resume updating.

The RESET button

The RESET mode applies only to the charge function. The LCD will be closed when the power is low. When the LCD is first opened or charging after 5 minutes during power charging, press RESET to display the correct current charging voltage.






The SELECT button

It uses for selecting the required measurement function when there is more than one function at one position of the rotary switch.

Sleep Mode

- To preserve battery life, the Meter automatically turns off if you do not turn the rotary switch or press any button for about 30 minutes.
- The Meter can be activated by turning the rotary switch or pressing any button
- To disable the Sleep Mode, press **SELECT** while turning on the Meter.

General Specifications(1)

- Maximum Voltage between any Input Terminals and grounding Terminal: Refer to different range input protection voltage.
-  Fuse Protection of μA mA terminal : 500mA, 250V, fast type, \varnothing 5x20mm
-  Fuse Protection of 10A terminal : 10A, 250V, fast type, \varnothing 5x20mm
- Measurement Speed : Updates 3 times /second.
- Maximum Display : 3999.
- Temperature : Operating: 0°C~40°C(32°F ~104°F).
Storage: -10°C~50°C(14°F ~122°F).
- Relative Humidity : $\leq 75\%$ @ 0°C to below 30°C;
 $\leq 50\%$ @ 31°C to 40°C.
- Altitude : Operating : 2000m.
Storage: 10000m.
- Power : Charge at 220VAC/50Hz/
0.35W or 12-36V  or solar panel.
- Electro-Magnetic : When it is under 1V/m frequency:
total accuracy = assigned accuracy + 5% of the range.
When it is over 1V/m frequency: there is no assigned accuracy.
- Battery Deficiency : Display  .
- Negative reading : Display  .
- Overloading: Display : OL
- Equipped with full icons display.
- Manual / Auto ranging.
- Polarity: Automatically display.
- Dimensions (HxWxL) : 179 x 88 x 39mm.
- Weight : 380g. (including holster and battery)

General Specifications(2)

- I Safety/Compliances : IEC61010: CAT. II 1000V,
CAT. III 600V overvoltage
and double insulation
standard.
- I Certification : **CE**

Accuracy Specification(1)

Accuracy: \pm (a% reading + b digits), guarantee for 1 year.

Operating temperature: $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

Relative humidity: $< 75\%$.

Temperature coefficient: $0.1 \times$ (specified accuracy) / 1°C .

A.AC Voltage

Range	Resolution	Accuracy	Overload Protection
4V	1mV	$\pm(1\%+5)$	1000V DC or 750V AC continuous.
40V	10mV		
400V	100mV		
750V	1V	$\pm(1.2\%+5)$	

Remarks:

- 1 Input impedance: approx. $10\text{M}\Omega$.
- 1 Frequency response: 40Hz ~ 400Hz.
- 1 Displays effective value of sine wave (mean value response).

B. DC Voltage

Range	Resolution	Accuracy	Overload Protection
400mV	0.1mV	$\pm(0.8\%+3)$	1000V DC or 750V AC continuous.
4V	1 mV	$\pm(0.8\%+1)$	
40V	10 mV		
400V	100mV		
1000V	1V	$\pm(1\%+3)$	

Remark:

- 1 Input impedance:
At 400mV range: above $4000\text{M}\Omega$.
All other ranges: approx. $10\text{M}\Omega$.

Accuracy Specification(2)



C. Resistance

Range	Resolution	Accuracy	Overload Protection
400Ω	0.1Ω	±(1.2%+2)	600Vp
4kΩ	1Ω	±(1%+2)	
40kΩ	10Ω		
400kΩ	100Ω		
4MΩ	1kΩ	±(1.2%+2)	
40MΩ	10kΩ	±(1.5%+2)	



Remarks:

1 Open circuit voltage: approx. 0.45V

D. Diode & Continuity

Range	Resolution	Overload Protection
	1mV	600Vp
	1Ω	

Remarks:

- **At  Range:**
Open circuit voltage approximate 1.48V.
- **At  Range:**
Open circuit voltage approximate 0.45V.
The buzzer does not sound when the resistance value is >100Ω. The circuit is disconnected.
The buzzer sounds continuously when the resistance value is ≤10Ω. The circuit is in good condition.

E. Capacitance Test

Range	Resolution	Accuracy	Overload Protection
40nF	10pF	±(3%+10)	600Vp
400nF	100pF	±(3%+5)	
4μF	1nF		
40μF	10nF		
100μF	100nF	±(4%+5)	

Accuracy Specification(3)

F. Frequency Test

Range	Resolution	Accuracy	Overload Protection
10Hz~10MHz	0.01Hz~10kHz	$\pm(0.1\%+3)$	600Vp

Remarks:

- Minimum input amplitude :
when 1MHz: $\geq 300\text{mV}$.
when $\geq 1\text{MHz}$: $\geq 600\text{mV}$.
- Maximum input amplitude: $< 30\text{V rms}$

G. AC Current

Range	Resolution	Accuracy	Overload Protection
400 μA	0.1 μA	$\pm(1.5\%+5)$	Fuse 500mA, 250V, fast type, ○ 5x20mm
4000 μA	1 μA		
40mA	10 μA	$\pm(2\%+5)$	
400mA	0.1mA	$\pm(2.5\%+5)$	
4A	1mA		Fuse 10A, 250V, fast type, ○ 5x20mm
10A	10mA		

Remarks:

- Frequency response: 40Hz □ 400Hz.
- **At 10A Range:**
For continuous measurement ≤ 10 seconds and interval not less than 15 minutes.

H. DC Current

Range	Resolution	Accuracy	Overload Protection
400 μ A	0.1 μ A	$\pm(1\%+2)$	Fuse 500mA, 250V, fast type, ○ 5x20mm
4000 μ A	1 μ A		
40mA	10 μ A	$\pm(1.2\%+3)$	
400mA	0.1mA		
4A	1mA	$\pm(1.5\%+5)$	Fuse 10A, 250V, fast type, ○ 5x20mm
10A	10mA		

Remarks:

- **At 10A range:**

For continuous measurement ≤ 10 seconds and interval not less than 15 minutes.

Maintenance(1)

This section provides basic maintenance information including battery and fuse replacement instruction.

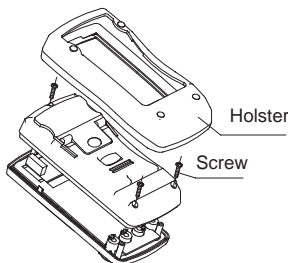
Warning

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

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

B.Replacing the Fuses (see figure 11)



(figure 11)

Maintenance(2)



To avoid electrical shock or arc blast, or personal injury or damage to the Meter, use specified fuses ONLY in accordance with the following procedure.

To replace the Meter's fuse:

1. Turn the Meter off.
2. Remove the holster from the Meter.
3. Remove all connections from the Meter's terminals.
4. Remove the 3 screws from the case bottom, and separate the case top from the case bottom.
5. Remove the fuse by gently prying one end loose, then take out the fuse from its bracket.
6. Install ONLY replacement fuses with the identical type and specification as follows and make sure the fuse is fixed firmly in the bracket.
Fuse 1: 10A, 250V, fast type, 5x20 mm.
Fuse 2: 500mA, 250V, fast type, 5x20 mm.
7. Rejoin the case bottom and case top, and reinstall the 3 screws.

Replacement of the fuses is seldom required. Burning of a fuse always results from improper operation.

** END **

This operating manual is subject to change without notice.

UNI-T®

Model UT90C: OPERATING MANUAL

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