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Model UT60H: 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.

Digital Multimeter **UT60H** (hereafter referred to as “the Meter”) is a 39999 counts and 4 3/4 digits with steady operations, fashionable structure and auto ranging instrument. The Meter has analogue bar graph, True RMS and full range overload protection.

The Meter not only can measure AC voltage and current, DC voltage and current, Resistance, Capacitance, Temperature, Frequency, Diodes, Continuity, 4~20mA Loop, EF Function, Max/Min, Relative Mode but also has Low Battery Display, Data Hold and Sleep Mode features.

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 | K-Type (nickel chromium ~ nickel silicon) Point Contact Temperature Probe | 1 piece |
| 4 | Multi-Purpose Socket | 1 piece |
| 5 | Alligator Clip | 1 piece |
| 6 | 0.5A, 250V, Fast Type Fuse, \varnothing 5x20mm | 1 piece |
| 7 | 10A, 250V, Fast Type Fuse, \varnothing 5x20mm | 1 piece |
| 8 | 9V Battery (NEDA 1604, 6F22, 006P) | 1 piece |

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

Safety Information

This Meter complies with the standards IEC61010 safety measurement requirement: in pollution degree 2, overvoltage category (CAT. III 1000V, CAT.IV 600V) and double insulation.

CAT. III: Distribution level, fixed installation, with smaller transient overvoltage than CAT. IV

CAT.IV: Primary supply level, overhead lines, cable systems etc.

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 may 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 to.

International electrical symbols used on the Meter and in this Operating Manual are explained on page 9.

Rules For Safe Operation (1)



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:

- 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 Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.
- 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 When the Meter working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken for there is danger of electric shock.
- 1 Use the proper terminals, function, and range for your measurements.
- 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 When using the test leads, keep your fingers behind the finger guards.







Rules For Safe Operation (2)

- 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 Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.
- 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 When the Meter working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken for there is danger of electric shock.
- 1 Use the proper terminals, function, and range for your measurements.
- 1 If the value to be measured is unknown, use the maximum measurement position.
- 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 When using the test leads, keep your fingers behind the finger guards.
- 1 Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes.

Rules For Safe Operation (3)

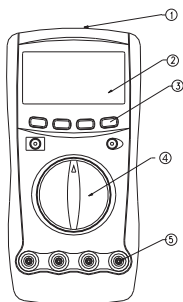
- 1 Before measuring current, check the Meter's fuses and turn off power to the circuit before connecting the Meter to the circuit.
- 1 Replace the battery as soon as the battery indicator  appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.
- 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 The Meter is suitable for indoor use.
- 1 Turn the Meter off when it is not in use and take out the battery when not using for a long time.
- 1 Constantly check the battery as it may leak when it has been using for some time, replace the battery as soon as leaking appears. A leaking battery will damage the Meter.

International Electrical Symbols

| | |
|---|--|
|  | AC or DC. |
|  | Grounding. |
|  | Double Insulated. |
|  | Warning. Refer to the Operating |
|  | Manual. Deficiency of Built-In Battery. |
|  | Conforms to Standards of European Union. |

The Meter Structure (see figure 1)










1. EF Sensor (front part of the housing)
2. LCD Display
3. Functional Buttons
4. Rotary Switch
5. Input Terminals



(figure 1)

Rotary Switch

Below table indicated for information about the rotary switch positions.

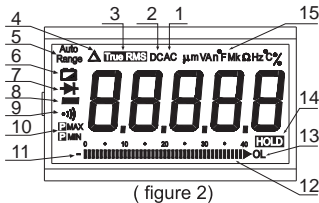
| Rotary Switch Position | Function |
|--|--|
| V  | AC or DC voltage measurement |
| Ω   | Ω : Resistance measurement  : Diode test  : Continuity test |
|  | Capacitance measurement |
| Hz | Frequency measurement |
| °C | Temperature measurement (UT60G only) |
| % | 4~20mA percent measurement |
| EF | Sensor Test AC 50-400V AC signal |
| μ A  | AC or DC current measurement (0.1 μ A ~4000 μ A) |
| mA  | AC or DC current measurement (0.01mA ~ 400.0mA) |
| A  | AC or DC current measurement range from 10mA to 10.00A |

Functional Buttons

Below table indicated for information about the functional button operations.


| Button | Operation Performed |
|----------------------|--|
| Max/Min | Press MAX MIN to select the maximum and minimum value. |
| REL Δ | Press REL Δ to enter and exit the REL mode. |
| SELECT | Press SELECT button to select different functional measurements mode in one rotary switch position. |
| Low imp. 200k | Press Low imp.200k to select 200k Ω measurement mode. |
| HOLD | Press HOLD to enter and exit the Hold mode. |
| POWER | Turn the Meter on or off. |
| SELECT | Press SELECT to switch over between different functions when there is more than one functions in one measurement position on the rotary switch. |

Display Symbols(1) (see figure 2)



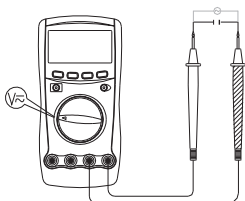
| Number | Symbol | Meaning |
|--------|-------------------|--|
| 1 | AC | Indicator for AC voltage or current |
| 2 | DC | Indicator for DC voltage or current |
| 3 | True RMS | Indicator for AC true rms value |
| 4 | △ | The relative mode is on to display the present value minus the stored value. |
| 5 | Auto Range | The Meter is in the auto range mode in which the Meter automatically selects the range with the best resolution. |
| 6 | | 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. |
| 7 | | Diode test |
| 8 | — | Indicates negative reading |
| 9 | •) | Continuity test |
| 10 | MAX MIN | Maximum and Minimum readings are displayed |

Display Symbols(2) (see figure 2)

| Number | Symbol | Meaning |
|--------|---|--|
| 11 |  | Polarity indicator for the analogue bar graph display, no display for positive. |
| 12 | Analogue Bar Graph | Provides an analog indication of the present input, quick response. |
| 13 | OL | The input value is too large for the selected range. |
| 14 | HOLD | Data hold mode is active |
| 15 | °C | The unit of temperature: Centigrade temperature |
| | nF, μF, mF | Farad. The unit of capacitance nF: Nanofarad. 1×10^{-9} or 0.000000001 farads. μF: Microfarad. 1×10^{-6} or 0.000001 farads. mF: Millifarad. 1×10^{-3} or 0.001 farads. |
| | μA, 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. |
| | mV, V | V: Volts. The unit of voltage. mV: Millivolt. 1×10^{-3} or 0.001 volts |
| | Ω, kΩ, MΩ | Ω: Ohm. The unit of resistance. kΩ: Kilohm. 1×10^3 or 1000 ohms MΩ: Megaohm. 1×10^6 or 1,000,000 ohms |
| | Hz, kHz, MHz | Hz : Hertz. The unit of frequency in cycles/second. kHz: Kiloherzt. 1×10^3 or 1000 hertz MHz: Megahertz, 1×10^6 or 1,000,000 hertz. |
| | % | 4mA~20mA Loop (Percent) |

Measurement Operation(1)

A. DC 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 1000V, although readings may be obtained.

The DC Voltage ranges are: 4V, 40V, 400V and 1000V;
To measure DC voltage, connect the Meter as follows:

1. Insert the red test lead into the **V** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to **V** with a horizontal line; 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 The Meter has an input impedance of 10M. This can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10k, the error is negligible (0.1% or less).
- 1 Special care should be taken when measuring high voltage.
- 1 When DC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals of the Meter.

Measurement Operation(2)

B. AC 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, although readings may be obtained.

The AC Voltage ranges are:4V, 40V, 400V and 750V;
To measure AC voltage, connect the Meter as follows:

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

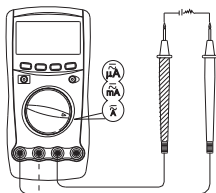
The measured value shows on the display (True rms value).

Note

- The Meter has an input impedance of 10M Ω . This 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).
- Special care should be taken when measuring high voltage.
- When AC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals of the Meter.

Measurement Operation(3)

C. DC Current Measurement (see figure 4)



(figure 4)



Warning

Never attempt an in-circuit current measurement where the open circuit voltage between terminals and ground is greater than 60V DC or 30V rms. 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. Before the Meter is connected in serial to the in-circuit being tested, turn off the power of the in-circuit..

The DC Current ranges are: 400 μ A, 4000 μ A, 40mA, 400mA, 10A

To measure DC Current, connect the Meter as follows:

1. Insert the red test lead into the μ A, mA or A terminal and the black test lead into the COM terminal.
2. Set the rotary switch to A, and press SELECT button to select DC measurement mode.
3. Connect the test leads in serial with the object being measured.

The measured value shows on the display.

Measurement Operation(4)

Note

- 1 If the value to be measured is unknown, use the maximum measurement position and reduce the range step by step until a satisfactory reading is obtained.
- 1 When the measured current is $\leq 5A$, continuous measurement is allowed.
- 1 When the measured current is between 5A-10A, continuous measurement ≤ 10 seconds and interval more than 15 minutes.
- 1 When DC current measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals of the Meter.

D. AC Current Measurement (see figure 4)



Warning

Never attempt an in-circuit current measurement where the open circuit voltage between terminals and ground is greater than 60V DC or 30V rms.

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.

Before the Meter is connected in serial to the in-circuit being tested, turn off the power of the in-circuit..

Measurement Operation(5)

The AC Current ranges are: $400\mu\text{A}$, $4000\mu\text{A}$, 40mA , 400mA , 10A

To measure AC Current, connect the Meter as follows:

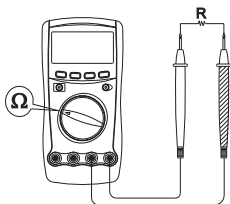
1. Insert the red test lead into the μA , mA or A terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to A , and press **SELECT** button to select AC measurement mode.
3. Connect the test leads in serial with the object being measured.
The measured value shows on the display (True RMS value).

Note

- 1 If the value to be measured is unknown, use the maximum measurement position and reduce the range step by step until a satisfactory reading is obtained.
- 1 When the measured current is $\leq 5\text{A}$, continuous measurement is allowed.
- 1 When the measured current is between $5\text{A}-10\text{A}$, continuous measurement ≤ 10 seconds and interval more than 15 minutes.
- 1 When AC current measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals of the Meter.

Measurement Operation(6)

E. Measuring Resistance (see figure 5)



(figure 5)



Warning

To avoid harms to you, please do not attempt to input voltage higher than 60V DC or 30V rms 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.

The resistance ranges are:400Ω, 4kΩ, 40kΩ,400kΩ, 4MΩand 40MΩ.

To measure resistance, connect the Meter as follows:

1. Insert the red test lead into the Ω terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to $\Omega \rightarrow \rightarrow$; 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.

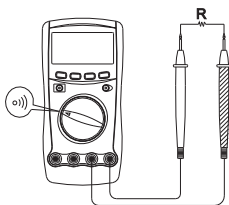
Measurement Operation(7)

Note:

- When measuring low resistance, the test leads can add 0.1Ω to 0.2Ω of error to resistance measurement. To obtain precision readings in measuring low resistance, short-circuit the test leads first and press the **REL** button, the Meter automatically subtracts the short-circuit value and then proceed the low resistance measurement.
- For high-resistance measurement ($>1M\Omega$), it is normal taking several seconds to obtain a stable reading. In order to obtain precision readings, use the test lead as short as possible.
- If Ω reading with shorted test leads is not $\leq 0.5\Omega$, check for loose test leads, wrong function selected or other causes.
- The LCD displays **OL** indicating open-circuit or the tested resistor value is higher than the maximum range of the Meter.
- When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals.

Measurement Operation(8)

F. Testing for Continuity (see figure 6)





(figure 6)

Warning

To avoid harms to you, please do not attempt to input voltage higher than 60V DC or 30V rms 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 continuity.

To test for continuity, connect the Meter as follows:

1. Insert the red test lead into the Ω terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω , press **SELECTION** button to select  measurement mode and connect the test leads across with the object being tested.
3. The buzzer sounds continuously if the resistance of a circuit under test is $\leq 50\Omega$ which indicates the circuit is in good situation.

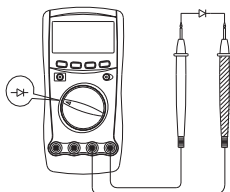
The loaded resistance value of the measured circuit shows on the display, the unit is Ω .

Note

- 1 Open circuit voltage around $-1.2V$ and range is 400Ω measurement range. When continuity testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals.

Measurement Operation(9)

G. Testing Diodes (see figure 7)



(figure 7)



Warning

To avoid harms to you, please do not attempt to input voltages higher than 60V DC or 30V rms AC. To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before testing diodes.

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

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

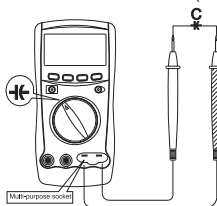
1. Insert the red test lead into the Ω terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to $\Omega \rightarrow \rightarrow$ and press **SELECT** button to select \rightarrow measurement mode.
3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode. The red test lead polarity is "+" while the black test lead polarity is "-". The measured value shows on the display.

Measurement Operation(10)

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.
- 1 Connect the test leads to the proper terminals as said above to avoid error display.
- 1 The LCD will display **OL** indicating either open circuit or wrong polarity connection.
- 1 The unit of diode is volt (V), displaying the positive-connection voltage-drop value.
- 1 Open circuit voltage approximate 2.8V.
- 1 When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals.

H. Capacitance Measurement (see figure 8)



Warning (figure 8)

To ensure accuracy, the Meter inside is discharged against the tested capacitor. **DIS.C** will be shown on the display when it is under discharging, this process will be quite slow. 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.

Measurement Operation(11)

The Meter capacitance ranges are:40nF, 400nF, 4μF, 40μF, 400μF , 4mF and 40mF.

Connect the Meter as follows:

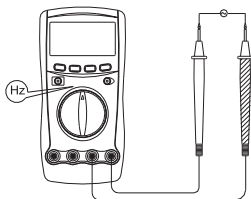
1. Insert the red test lead into the ⚡ terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to ⚡ measurement mode, the Meter may display a fixed reading which is a internal distributed capacitor value. For testing less than 10nF capacitor, the tested value must subtract the internal distributed capacitor value in order to maintain the accuracy. It is possible to use relative mode feature during measurement. Press REL Δ button to automatically subtract the open circuit display value, then carrying out small capacitor value measurement.
3. When testing capacitor with lead's diameter less than ϕ 0.6mm, it is recommended to use the included multi-purpose socket to carry out the measurement instead of testing leads to eliminate the effect the distributed capacitor. Insert the multi-purpose socket into the ⚡ °CHzVΩ and COM terminals as per the attached picture.

Note

- 1 The LCD displays **OL** indicating the tested capacitor is shorted or it exceeds the maximum range.
- 1 Analogue bar graph will be disabled when measuring capacitance.
- 1 It is normal to take a while when measuring high capacitor 400 μF. The analogue bar graph at this time will show the time left before finishing the measurement.
- 1 When capacitance measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals of the Meter.

Measurement Operation(12)

I. Frequency Measurement (see figure 9)



(figure 9)

Warning

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

The measurement ranges are:40Hz, 400Hz, 4kHz, 40kHz, 400kHz, 4MHz, 40MHz and 400MHz.

To measure frequency, connect the Meter as follows:

1. Insert the red test lead into the **Hz** 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.

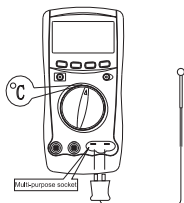
The measured value shows on the display.

Note

- 1 The requirement of Input amplitude "a" is as follows:
When 10Hz~40MHz: $200\text{ mV} \leq a \leq 30\text{Vrms}$; 40MHz:
Un-specified
- When Hz measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals.

Measurement Operation(13)

J. Temperature Measurement (see figure10)



(figure 10)



Warning

To avoid harms to you, please do not attempt to input voltages higher than 60V DC or 30V rms AC.

The temperature measurement range is $-40^{\circ}\text{C}\sim 400^{\circ}\text{C}$.

To measure temperature, connect the Meter as follows:

1. Set the rotary switch to $^{\circ}\text{C}$, the LCD displays room temperature.
2. Insert the multi-purpose socket into the Meter as the figure 10.
3. Insert the point contact temperature probe into the multi-purpose socket
4. Place the temperature probe to the object being measured.

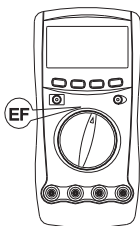
The measured value shows on the display after several seconds.

Note

- 1 Place the Meter in an environment of $18\sim 23^{\circ}\text{C}$ otherwise false reading may be obtained especially in testing low temperature.
- 1 When temperature measurement has been completed, remove the temperature probe away from the multi-purpose socket, and remove the multi-purpose socket away from the Meter.

Measurement Operation(14)

K. EF Function (see figure 11)



(figure 11)

The EF function can detect AC 50~400V.

To use EF function, connect the Meter as follows:

1. Set the rotary switch to °C/EF and press **SELECT** to select EF measurement mode.
2. Place the housing front part near the object being measured.
3. The LCD displays "EF". The Analogue bar graph indicates the AC signal between 50~400V. The buzzer also beeps in 4 different sounds grading according to the detected signal

L. 4~20mA Loop


To use 4~20mA Loop feature, connect the Meter as follows:

1. Set the rotary switch to Hz%, and press **SELECT** to select % measurement mode.
2. The rest procedure, please follow DC current measurement (figure 4).
3. According to the percentage within the range of 4~20mA displaying: <4mA display LO; 4mA display 0% 20mA display 100%;>20 mA display HI

Sleep Mode

To preserve battery life, the Meter automatically turns off if you do not turn the rotary switch or press any button for around 30 minutes. The Meter enters into sleep mode

The Meter can be activated by turning the rotary switch or pressing any button except **POWER** and **Low imp. 200K Ω** button.

To disable the Sleep Mode function, press **MAX MIN** or **REL**  button while turning on the Meter.

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.

To use Hold mode, follow the following procedure:

- 1 Press **HOLD** to enter Hold mode; the Meter beeps.
- 1 Press **HOLD** again or **RANGE** or **Hz %** or turn the rotary switch to exit Hold mode; the Meter beeps.
- 1 In Hold mode, **HOLD** is displayed.
- 1 Press and hold **HOLD** button when turning on the Meter to display and keep full icons, and entering Hold mode.

The Use of Relative Value Mode

The REL mode subtracts a stored value from the present measurement value and displays the result.

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 REL mode:

- 1 Press **REL** Δ to enter REL mode, auto ranging turns off, and the present measurement range is locked and display the present measurement value as the stored value. The present measurement value obtained later on is the difference of the stored value.
- 1 Press **REL** Δ again to display the REL value, Δ is displayed on the LCD.
- 1 Press **REL** Δ again to step the display through the above sequence.
- 1 Press **REL** Δ for more than 1 second to exit REL mode. The Meter back to the Auto or Manual ranging measurement mode before entering REL mode.

MAX MIN Mode

To enter or exit MAX MIN Mode, follow the following procedures:

1. Press **MAX MIN** to start recording of maximum and minimum values. Steps the display through the sequence of high(MAX) and low(MIN) readings
2. Press **MAX MIN** for more than 1 second to exit Max Min Mode.

Low Impedance 200k Ω Button



Warning

This button can only apply on testing voltages lower than 250Vmax and press down the button not more than 3 seconds.

When the Meter is under $V\sim$ measurement ranges, press **Low imp. 200 k Ω** button to switch over the input impedance from 10M Ω to around 200k Ω .





POWER

This is a self-lock button use to turn on or off the power of the Meter

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.

General Specifications

- Maximum Voltage between any Terminal and Grounding: Refer to different range input protection voltage.
-  Fused Protection for μAmA input terminal : 0.5A, 250V, fast type fuse, ϕ 5x20mm
-  Fused Protection for **A** input terminal : 10A, 250V, fast type fuse, ϕ 5x20mm
- Maximum Display : 39999
- Measurement Speed : Updates 2-3 times/second.
- Range : Auto Ranging
- 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~30°C below;
 $\leq 50\%$ @30°C~40°C:
- Automatically display Polarity
- Overloading : Display **OL**
(except at 4~20mA Loop range which display **HI** or **LO**)
- Battery Type : 9V NEDA 1604 or 6F22 or 006P.
- Battery Deficiency : Display 
- Electromagnetic Compatibility: In a radio field of 1 V/m, Overall Accuracy = Specified Accuracy + 5% of Range; in a radio field of more than 1 V/m, no assigned accuracy is specified.
- Dimensions (H x W x L) : 177 x 85 x 40mm.
- Weight: Approx.340g (including battery)
- Safety/ Compliance: IEC 61010 CAT.III1000V, CAT.IV600V overvoltage and double insulation standard.
- Certification : 

Accuracy Specifications(1)

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

Operating temperature: 18°C~28°C

Relative humidity: $\leq 75\%RH$

A. DC Voltage

| Range | Resolution | Accuracy | Overload Protection |
|-------|------------|----------------|---------------------|
| 4V | 0.0001V | $\pm(0.1\%+5)$ | 1000V |
| 40V | 0.001V | | |
| 400V | 0.01V | | |
| 1000V | 0.1V | $\pm(0.2\%+5)$ | |

Remarks:

1 Input impedance: Approx. 10M Ω .

B. AC Voltage

| Range | Resolution | Accuracy | Overload Protection |
|-------|------------|----------------|---------------------|
| 4V | 0.001V | $\pm(1\%+4)$ | 1000V |
| 40V | 0.01V | | |
| 400V | 0.1V | | |
| 750V | 1V | $\pm(1.5\%+4)$ | |

Remarks:

1 Input impedance: Approx 10M Ω .

1 Display:

a) True rms value (suitable on range's 10%~100%)

b) AC wave peak factor:3.0 (1.5 in 1000V range)

c) Input short circuit allows *10 digits remaining reading.

1 Frequency response: 45Hz~1kHz

Accuracy Specifications(2)

C. DC Current

| Range | Resolution | Accuracy | Overload Protection |
|--------------|--------------|-----------------|---|
| 400 μ A | 0.01 μ A | $\pm(0.5\%+10)$ | 0.5A, 250V, fast type fuse, ϕ 5x20mm |
| 4000 μ A | 0.1 μ A | | |
| 40mA | 0.001mA | | |
| 400mA | 0.01mA | $\pm(0.8\%+10)$ | |
| 10A | 0.001A | $\pm(1.5\%+20)$ | 10A, 250V, fast type fuse, ϕ 5x20mm |

Remarks:

At 10A range:

- When the measured current is $\leq 5A$, continuous measurement is allowed.
- When the measured current is between 5A-10A, continuous measurement ≤ 10 seconds and interval more than 15 minutes.

D. AC Current

| Range | Resolution | Accuracy | Overload Protection |
|--------------|-------------|----------------|---|
| 400 μ A | 0.1 μ A | $\pm(1.2\%+4)$ | 0.5A, 250V, fast type fuse, ϕ 5x20mm |
| 4000 μ A | 1 μ A | | |
| 40mA | 0.01mA | | |
| 400mA | 0.1mA | | |
| 10A | 0.01A | $\pm(2.0\%+3)$ | 10A, 250V, fast type fuse, ϕ 5x20mm |

Remarks:

- Frequency Response: 45Hz~1KHz
- Display:
 - a) True rms value (suitable on range's 10%~100%)
 - b) AC wave peak factor:3.0 (1.5 in 1000V range)
 - c) Input short circuit allows *10 digits remaining reading.

Accuracy Specifications(3)

- **At 10A range:**
 - a) When the measured current is $\leq 5A$, continuous measurement is allowed.
 - b) When the measured current is between 5A-10A, continuous measurement ≤ 10 seconds and interval more than 15 minutes.

E. Resistance

| Range | Resolution | Accuracy | Overload Protection |
|---------------|------------------|--|---------------------|
| 400 Ω | 0.01 Ω | $\pm(0.8\%+10)$ +test leads short circuit resistance value | 1000V |
| 4k Ω | 0.0001k Ω | $\pm(0.5\%+10)$ | |
| 40k Ω | 0.001k Ω | | |
| 400k Ω | 0.01k Ω | | |
| 4M Ω | 0.0001M Ω | | |
| 40M Ω | 0.001M Ω | $\pm(1.5\%+20)$ | |


F. Continuity Test

| Range | Resolution | Overload Protection |
|-------|--------------|---------------------|
| ••)) | 0.1 Ω | 1000V |

Remarks:

- Open circuit voltage approximate -1.2V.
- The buzzer does not beep at $>50\Omega$.
The buzzer beeps at $\leq 10\Omega$ which indicates the circuit is in good condition.

G. Diode Test

| Range | Resolution | Overload Protection |
|---|------------|---------------------|
|  | 0.001V | 1000V |

Remarks:

- Open circuit voltage approximate 2.8V.
- A good silicon junction drops between 0.5V and 0.8V

Accuracy Specifications(4)

H. Capacitance

| Range | Resolution | Accuracy | Overload Protection |
|-------------|----------------|---|---------------------|
| 40nF | 0.001nF | $\pm(2.5\%+20)$ + capacitance value of open circuit test leads | 1000V |
| 400nF | 0.01nF | $\pm(2\%+20)$ | |
| 4 μ F | 0.0001 μ F | | |
| 40 μ F | 0.001 μ F | | |
| 400 μ f | 0.01 μ F | | |
| 4mF | 0.0001mF | $\pm(5\%+20)$ | |
| 40mF | 0.001 mF | Unspecified | |

I. Frequency

| Range | Resolution | Accuracy | Overload Protection |
|--------|------------|-----------------|---------------------|
| 40Hz | 0.001Hz | $\pm(0.01\%+3)$ | 1000V |
| 400Hz | 0.01Hz | | |
| 4kHz | 0.0001kHz | | |
| 40kHz | 0.001kHz | | |
| 400kHz | 0.01kHz | | |
| 4MHz | 0.0001MHz | | |
| 40MHz | 0.001MHz | | |
| 400MHz | | | |

Remarks:

- Input amplitude "a" as follows; (DC electric level is zero)
When 10Hz~40MHz : $200\text{mV} \leq a \leq 30\text{Vrms}$;
When 40MHz : Unspecified

Accuracy Specifications(5)

J. Temperature

| Range | Resolution | Accuracy | Overload Protection |
|-------|------------|--------------------------|---------------------|
| °C | 0.1°C | -40~40°C: $\pm(2\%+25)$ | 1000V |
| | | >40~400°C: $\pm(1\%+15)$ | |

Remarks:

- Included is a K-Type (nickel chromium ~ nickel silicon) point contact temperature probe which could only measure temperature below 230°C. If you want to measure temperature higher than 230°C, you must use another rod contact temperature probe.

K. 4~20mA Loop

| Range | Resolution | Accuracy | Overload Protection |
|-----------|------------|--------------|--|
| (4~20mA)% | 0.1% | $\pm(1\%+2)$ | 0.5A, 250V, fast type fuse, $\phi 5 \times 20 \text{mm}$ |

Remarks:

- According to the percentage within the range of 4~20mA displaying: 4mA display LO; 4mA display 0% 20mA display 100%; >20 mA display HI

MAINTENANCE(1)

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

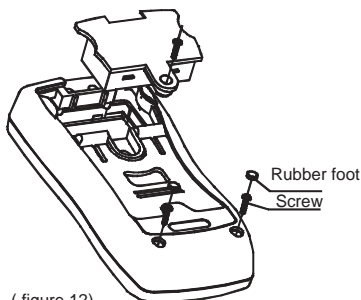
Warning

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.

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 power off when it is not in use.
- 1 Take out the battery when it is not using for a long time.
- 1 Do not use or store the Meter in a place of humidity, high temperature, explosive, inflammable and strong magnetic field.

B. Replacing the Fuses (see figure 12)



(figure 12)

MAINTENANCE(2)



Warning

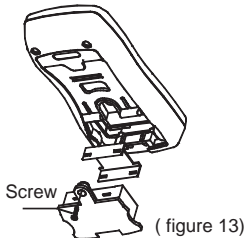
To avoid electrical shock or arc blast, or personal injury or damage to the Meter, use specified fuses ONLY in accordance with the following procedure.

To replace the Meter's fuse:

- 1 Press the **POWER** to turn the Meter off and remove all connections from the terminals.
- 1 Remove the fixed rubber feet and 5 screws from the case bottom.
- 1 Remove the fuse by gently prying one end loose, then take out the fuse from its bracket.
- 1 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: 0.5A, 250V, fast type fuse, $\phi 5 \times 20$ mm
 Fuse 2: 10A, 250V, fast type fuse, $\phi 5 \times 20$ mm
- 1 Rejoin the case bottom and case top, and install the 5 screws and the rubber feet.

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


C. Replacing the Battery (see figure 13)



MAINTENANCE(3)



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.

Make sure the test leads are disconnected from the circuit being tested before opening the case bottom.

To replace the battery:

- 1 Press the **POWER** to turn the Meter off and remove all connections from the terminals.
- 1 Remove the screw from the battery compartment, and separate the battery compartment from the case bottom.
- 1 Remove the battery from the battery compartment.
- 1 Replace with a new 6F22 9V battery .
- 1 Rejoin the case bottom and battery compartment, and reinstall the screw.

**** END ****

This operating manual is subject to change without notice.

UNI-T®

Model UT60H: OPERATING MANUAL

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