UNI-T

UT120C
Operating Manual



Pocket Size Type Digital Multimeter

I. Introduction

UT120C is 4000 count notebook type auto-ranging digital multimeter with following advantages: complete functions, stable performance, high accuracy, low power consumption, novel structure, high degree of safety and reliability. It is capable of measuring AC/DC voltage and current, frequency, duty cycle, resistance, capacitance, diode forward voltage drop and continuity, and becomes an ideal choice for measurement.

This manual specifies safety information and notes related to this meter, please read the manual carefully before use and strictly follow all warnings and notes during the operation.

⚠ **Warnings:**

Please read "rules for safe operation" before operating the meter.

II. Safety Information

Pay attention to ⚠ warning symbol and its corresponding contents

A Warning states situations or actions that may cause potential risks to users or damage to the meter or measured equipments.

UT120C is designed and manufactured in accordance with safety standards IEC61010, Double Insulation and CAT Ⅱ 600V as well as Pollution Degree 2.

⚠ **Warnings:**

Operate the meter as specified in the manual; otherwise the protection offered the meter will be impaired.

1. Please ensure test leads are good and no insulation damage or broken wires before use. If test lead or meter housing is found with any obvious damage or undetermined failure, do not use the meter.
2. Keep your hands behind the finger guards during the operation.
3. To avoid electric shock or damage to the meter do not apply voltage above 600V between meter terminals and grounding
4. Please use caution when working voltages above DC60V and AC 42 Vrms so as to prevent electric shock.
5. The meter is prohibited to use when back cover is not well placed, otherwise, it may cause electric hazard.
6. Do not exceed the specified limit value in order to avoid shock hazard or meter damage
7. Function switchover is not allowed during measurement so as to protect the meter.
8. Do not change internal wiring without authorized permission which may endanger the meter or users.
9. To ensure accurate readings, please change batteries timely if 🔋 icon appears.
10. Do not use the meter in environments exposed to high temperature and humidity, especially for stored meter which may not run normally after moisture-affected.
11. Clean the meter housing with soft cloth damped with mild detergent, any abrasive or corrosive is prohibited.

● International Electrical Symbols

Low Battery Display	Earth Ground	Warning
AC(Alternating Current)	DC (Direct Current)	Double Insulation
Buzzer Continuity	Diode	Capacitance
Conformity with Europe Demand		

III. Meter Description (See Figure 1)

1. LCD Display
2. DC&AC Voltage and Current, Resistance, Capacitance, Diode, Continuity measurement selector (SELECT Button)
3. Relative Measurement (REL Button)
4. Function Selection Switch
5. Hz/% Measurement (V, uA, mA and Hz/% Functions)
6. Data Hold (Hold Button)
7. Positive Input End (Red Test Lead)
8. Negative Input End (Black Test Lead)

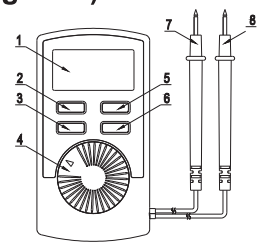


Figure 1

IV. Button Functional Description

1. SELECT Button

Used for switchover between DC & AC voltages, DC&AC Currents as well as among resistance, capacitance, buzzer continuity and diode measurements, indicated by beeping during the operation. Pressing this button can wake up the meter from sleep mode, which however will cancel the auto sleep function.

2. REL Button (Relative Measurement)

With this button pressed down, current reading is set as reference value which will be subtracted from subsequent readings. Press again to exit this mode and return to normal measuring status This function is not available under frequency and duty cycle measurements.

3. HOLD Button (data hold)

Press this button to lock displayed values, release it to unlock this status and return to normal measuring mode.

4. Hz/% Measurement

The meter can switch into Hz or % measurement with this button pressed down if currently under V/uA/mA function (also used for frequency and duty cycle selection); when Hz/% operation is finished, the meter will return to V/uA/mA status with fixed range 400mA for DCV or 4V for ACV and meanwhile "AUTO" icon on LCD disappears. If high voltage is under test at the moment, set rotary switch to desired range or turn the meter off to reset auto-ranging for V/uA/mA function before starting the measurement.

Under Hz/% mode, press down Hz/% button to switch between frequency and duty cycle measurements

V. Operating Instructions

Switch on the meter to check if there is 🔋 icon on the LCD, if any, it indicates the power supply falls low. To ensure high accuracy for measurement, please change batteries. You should also take notice of ⚠ warnings, which indicates not to exceed maximum input limit when measuring voltage.

1. Measuring DC Voltage(See Figure 2)

(1) Set rotary switch to V position, AUTO and DC icons appear on LCD;
(2) Connect test leads to the power under test (Black to cathode, red to anode);
(3) Read measuring results displayed on LCD;
(4) Reverse test leads, then LCD will display negative readings.

2. Measuring AC Voltage (See Figure 2)

(1) Set rotary switch to V position and press SELECT button, then LCD will display AUTO, AC icons;
(2) Connect test leads to the power under test (Black to cathode, red To anode);
(3) Read measuring values indicated on LCD;
(4) If reversing rest lead connection, LCD will indicate negative readings.

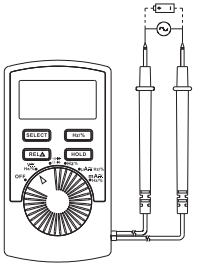


Figure 2

⚠ **Warnings:**

- Do not input voltage above 600V, you may get desired values, however, which causes hazard to internal wiring.
- To avoid electric shock use extreme caution when measuring high voltage.
- Disconnect test leads with measured circuits after finishing all the operations

3. Measuring Resistance(See Figure 3)

(1) Set rotary switch to Ω 🔊 ⊣⊢ position;
(2) Connect test leads to the resistor under test;
(3) Read measured results on the LCD.

⚠ **Warnings:**

- Please ensure to turn off the power and discharge all capacitors before measuring online resistor so as to avoid meter damage.
- As for resistance 400Ω range measurement test leads will cause error 0.1Ω∽0.3Ω to readings. In order to get accurate readings, the final results should subtract the value when two test leads short circuit. It is suggested performing the operation under relative measurement mode.
- The meter should display "OL" if no signal is input, for instance, open circuit.
- For measurement≥1MΩ, it normally takes several seconds to get stable readings

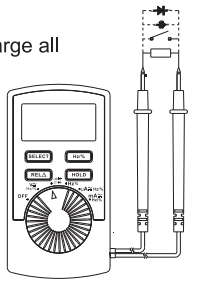


Figure 3

4. Measuring Frequency and Duty Cycle (See Figure 4)

(1) Set rotary switch to Hz/% or V/uA/mA position;
(2) Press Hz/% button to access frequency measurement;
(3) Connect test leads to frequency signal source under test;
(4) Read results on LCD;

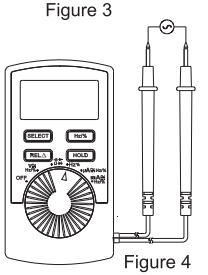


Figure 4

(5) Press Hz/% button again to access % measurement.

⚠Warnings:

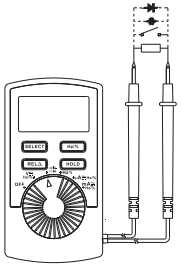
- The measuring resolution will vary slightly based on frequency and waveform that have been input, and resolution for this meter is set with reference to sine wave.

5. Testing Diodes and Continuity(See Figure 5)

(1) Set rotary switch to Ω •)) ⊣◂ position;
(2) Press SELECT button to access diode measurement mode (repress to go into continuity testing);
(3) Connect test leads to measured diode (red to anode, black to cathode), then LCD reading is approximate value for diode forward voltage drop (if resistance between two terminals of circuits under test is≤60Ω, the meter will beep and display resistance value on LCD).

⚠ Warnings:

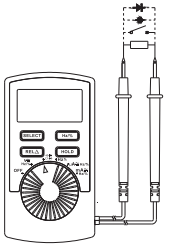
- If measured diode is under open circuit status or reversing the polarity (namely, black to anode, red to cathode), the meter displays "OL" on LCD.
- This function can also measure PN voltage drop of diode or semiconductor. The reading of forward voltage drop should be within 0.5∽0.8V for a normal silicon semiconductor.
- Turn the circuit power off and discharge the capacitor before measuring online diode so as to avoid meter damage.


Figure 5

- Do not input voltages above DC60V or AC 30Vrms to prevent damage to the meter or personal injury.

6. Measuring Capacitance(See Figure 6)

(1) Set rotary switch to Ω •)) ⊣◂ position;
(2) Press SELECT button three times to access capacitance status;
(3) Given there is still readings under open circuit, choose relative measurement mode;
(4) Press REL button one time;
(5) Connect test leads to capacitance under test, then read data on LCD.

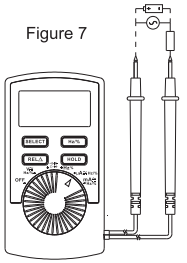

Figure 6

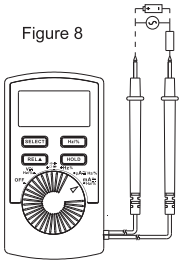
⚠ Warnings:

- Completely discharge all capacitors before measurement.
- As for online capacitor measurement, it must cut off all power supply of measured circuits and discharge completely all capacitors.
- When measuring capacitance with polarity distinction, ensure right connection between test leads and capacitor (red to anode, black to cathode).
- It normally takes several seconds to display readings when measuring more than 10μF capacitance.
- To avoid damage to the meter or personal injury do not apply voltages above DC60V or AC 30Vrms.

7. Measuring DC & AC Current(See Figure 7,8)

(1) Set rotary switch to "μA" or "mA" position, and press SELECT button to choose desired DC or AC range, then Connect test leads in series to measured loop.
(2) Read current readings on LCD
(3) It is RMS value displayed by UT120C when measuring AC current (Sine wave)


Figure 7


Figure 8

⚠ Warnings:

(1) Cut off the current before connecting the meter to the loop, otherwise spark hazard occurs
(2) Please ensure right input terminals and functions are selected during measurement; start from higher range if not sure about current flow under test.
(3) UT120C is not expected to measure current higher than 400mA.
(4) Do not connect test leads in parallel to any circuit, otherwise it may burn internal fuse and damage the meter.
(5)Cut off the power supply and then disconnect test leads with circuits under test after finishing all operations, which is particularly important when measuring large current

VI. Technical Specifications

General Specifications

1. Max. Input Voltage between Voltage Terminal and Grounding: 600VRMS or 600DCV
2. Range Selection: Auto-ranging
3. Measuring Speed Rate: 3 times per second
4. Max. Display: 3999, 3¾ digits
5. Over-Load Display: "OL"
6. Polar Indication: "-" icon for negative input
7. Low Battery Display: 🔋 on LCD
8. Battery: one Lithium-manganese button cell, 3V, model: CR2032
9. Operating Temperature: 0℃∽40℃ (32℉∽104℉)
   Humidity: ≤75%
   Storage Temperature: -10℃∽50℃ (14℉∽122℉)
   Operating Altitude Height:≤2000m
10. Dimensions: 109.8mm×58.2mm×10.8mm
11. Weight: about 76 g(test leads & batteries included)
12. Auto Power Off
    The meter goes into sleep mode after 30 minutes of inactivity of rotary switch and buttons It can restore the operation (working mode) using rotary switch or any button on the front panel. This function will be canceled if pressing SELECT button to power on

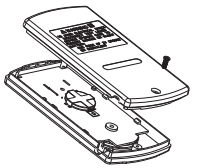
Accuracy Specifications

Accuracy: ±(a% readings+ b digits), warranty period: one year;
Ambient Temperature: 23℃±5℃;
Relative Humidity : ≤75%;

Functions	Range	Resolution	Accuracy ±(a% readings+ b digits)	Input Protection	Description
DC Voltage DCV	400mV	0.1mV	±(0.8%+3)	600V DC 600 V AC	Input Impedance ≥10MΩ
	4V	1mV	±(0.8%+1)		
	40V	10mV			
	400V	100mV			
	600V	1V	±(1%+3)		
AC Voltage ACV	4V	1mV	±(1.2%+3)	600V DC 600 V AC	Input Impedance ≥10MΩ Frequency Response: 40Hz∽400Hz; Display: RMS of Sine wave (Mean Value Response)
	40V	10mV			
	400V	100mV			
	600V	1V	±(1.5%+5)		
Resistance Ω	400Ω	0.1Ω	±(1. 2%+2)	600 V AC	0.45V for open circuit status
	4KΩ	1Ω	±(1%+2)		
	40KΩ	10Ω			
	400KΩ	100Ω			
	4MΩ	1KΩ	±(1. 2%+2)		
	40MΩ	10KΩ	±(1. 5%+2)		
Capacitance CAP(F)	4.000nF	0.001nF	±(4%+3)	600 V AC	For reference
	40.00nF	0.01nF			Measured under relative measurement 0.45V for open circuit Just for reading reference when measured capacitance above"100μF"
	400.0nF	0.1nF			
	4.000μF	0.001μF			
	40.00μF	0.01μF			
	100 μF	0.1 μF	±(5%+10)		
Frequency Hz	99.9Hz	0.1Hz	±(0.5%+3)	600 V AC	Input sine wave 10Hz∽10kHz: ≥1Vrms 10kHz∽100kHz: ≥30V rms
	0.999kHz	0.001kHz			
	9.99kHz	0.01kHz			
	99.9kHz	0.1kHz			
Duty Cycle	0.1%∽99.9%	0.10%		600V AC	Press DUTY button to switch into DUTY measuring mode if under AC/DC mode (just for reading reference)
Diode	⊣◂	1mV	0.5V∽0.8V	600V AC	1.5 V for open circuit status
Buzzer Continuity	•))	0.1Ω	About ≤60Ω	600V AC	Continuity Resistance ≤60Ω: buzzer beeps; >60Ω: not necessary beep, resistance approximate value displays, unit is Ω
Low Battery Display			About <2.4V		🔋 Icon appears
DC Current DCA	400 μA	0.1 μA	±(1.0%+3)	Fuse 400mA, 600V	
	4000 μA	1 μA			
	40mA	10 μA	±(1.2%+5)		
	400mA	100 μA			
AC Current ACA	400 μA	0.1 μA	±(1.5%+5)	Fuse 400mA, 600V	
	4000 μA	1 μA			
	40mA	10 μA	±(2%+5)		
	400mA	100 μA			

VII. Battery Replacement (See Figure 9)

If 🔋 icon appears on LCD, please change batteries and do as below:
1. Disconnect test leads with circuits under test, set rotary switch to OFF position, then power off the meter.
2. Unscrew the back housing and remove it.
3. Replace old batteries with the new 3V.


(Figure 9)

END

The Operating Manual will change without notice!

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