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INTRODUCTION

The UT93 is a kind of Green Meter which is particular designed to meet the requirement of protecting the natural environment. It is equipped with a special feature which is ecologically beneficial. A so called High Capacity (High Cap) is used for power supply in this multi-meter instead to batteries or accumulators. The meter has a built-in convertor which transforms the alternating current into necessary current which charges the High Cap. It is also possible to charge the High Cap directly with Direct Current, therefore the multi-meter can work continuously.

The meter's tooling is made by non-poisoned and recycled material, therefore no chemical pollution may cause. Green multi-meter is a new generation multi-meter which will be widely used in the coming future. It can be used for laboratory testing, different workshops, industry repairing, etc.

1 SAFETY RULES AND WARNING

- 1.1 Do not operate the unit before the cabinet has been closed and screwed safely as terminal can carry voltage.
- 1.2 Make sure before each measurement the unit is set to the right range.
- 1.3 Check before each measurement the measuring unit & your test leads to make sure they are not damaged.
- 1.4 Put the red and black test probes in the correct measuring socket to ensure connection is fine.
- 1.5 Do not input the value over the maximum range of each measurement, otherwise the unit may be damaged!
- 1.6 Never turn the rotary function switch during Voltage and Current measurement, as otherwise the measuring unit could be destroyed and this could be dangerous to life.
- 1.7 Make sure to use new fuses of the proper rating. Do not use repaired fuses and do not bridge the fuse holders.
- 1.8 To avoid an electrical shock or damage, do not apply more than 500VDC/VACrms between the V/ Ω terminal of the measuring unit and the earth ground.
- 1.9 Pay special caution when working with voltage above 50V (DC) and 36V(AC).
- 1.10 Charging is necessary & immediately to make sure the accuracy of the unit when the LCD displays “”.
- 1.11 Turn off the unit once measuring is finished.
- 1.12 Do not use this measuring unit in environments or rooms with adverse environmental conditions especially misty area.
- 1.13 To avoid damage and dangerous, don't change the circuit.

2 GENERAL FEATURES

- 2.1 Maximum Display: 3260 (3 3/4 digits), bargraph display with 65 segments.
- 2.2 Accuracy of DC Current: $\pm 0.8\%$
- 2.3 Manual range or Auto range Display.
- 2.4 Overrange Display: 0. L
- 2.5 Max. Measurement Rate: 2 Measurements per second
- 2.6 Low Battery Voltage Display: “”
- 2.7 Overload protection
- 2.8 Operating Temperature: 0°C–40°C (32°F–104°F)
Relative Humidity: <75%
Storing Temperature: -10°C–50°F (14°F–122°F)
Relative Humidity: <80%

2.9 Energy: Solar Energy.

2.10 Dimension: 17.8×8.3×3.3cm(L×W×H)

2.11 Weight: Approximately 250 grams (exclude testing probes)

3 ELECTRICAL

Accuracy: +(a% reading + digits), One Year Warranty.

Operating Temperature: 23°C+5°C, Relative Humidity<75%.

Mode	Auto/Manual	Range	Resolution	Accuracy + (a% reading + digits)	Max. Protection	Comment
V — —	Auto or Manual	326mV	0.1mV	±(0.8%+3)	230Vrms	Input Resistance ≥ 100MΩ
		3.26V	1mV	±(0.8%+1)	1000VDC 750VAC	Input Resistance ≥ 10MΩ
		32.6V	10mV			
		326V	0.1V			
		1000V	1V	±(1%+3)		
V ~	Auto or Manual	3.26V	1mV	±(1%+5)	1000VDC 750VAC	Input Resistance>10MΩ Frequency:40~400Hz Display: VAC rms
		32.6V	10mV			
		326V	0.1mV			
				750V	1V	±(1.2%+5)
μA — —	Auto or Manual	326 μA	0.1 μA	±(1%+2)	Fuse 0.3A 250V	
		3260 μA	1 μA			
mA — —	Auto or Manual	32.6mA	10 μA	±(1.2%+3)	Fuse 0.3A 250V	
		326mA	0.1mA			
20A	Manual	20A	10mA	±(1.5%+5)	20A 250V	Measurement not last more than 15 seconds
mA ~	Auto or Manual	326 μA	0.1 μA	±(1.5%+5)	Fuse 0.3A/250V	Frequency: 40~400Hz Display: V (AC rms) Measurement of 20A not more than 15 seconds
		3260 μA	1 μA			
mA ~	Auto or Manual	32.6mA	10 μA	±(2%+5)	Fuse 0.3A/250V	
		326mA	0.1mA			
20A	Manual	20A	10mA	±(2.5%+5)	Fuse 20A/250V	
Ω	Auto or Manual	326 Ω	0.1 Ω	±(1.2%+2)	230Vrms	Voltage at the open circuit about 0.7V
		3.26k Ω	1 Ω			
		32.6k Ω	10 Ω			
		326k Ω	100 Ω	±(2%+2)		
		3.26M Ω	1k Ω			
		32.6M Ω	10k Ω	±(3%+5)		
→ ⌚	Manual	→	1mV		230Vrms	Voltage at the open circuit about 3V Audible signal for resistance <100 Ω
		⌚	0.1 Ω			
Hz	Auto or Manual	3kHz-1MHz		±(0.5%±1)	230Vrms	Sensitivity 0.4Vrms For<500kHz 1.5Vrms For ≥500kHz
Auto Power off						Unit switches off if the DMM is not used for 10 mins.

4 FUNCTIONAL PANEL

- 4.1 LCD..... ①
- 4.2 Solar Energy Panel..... ②
- 4.3 On/Off Switch..... ③
- 4.4 VΩ: V ~, Ω, →, ~) Hz input socket..... ④

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- 4.5. COM:Test Probes Socket..... ⑤
 - 4.6 20A: 300mA~20A current input socket.....⑥
 - 4.7 mA: Below 300mA current input socket..... ⑦
 - 4.8 DATA-H: First Press, Hold the measuring data. Second Press, Switch off the Data Hold function.....⑧
 - 4.9 RANGE-H: Switch off the auto-range function = manual range.....⑨
 - 4.10 \tilde{V} , \rightarrow , β With this key you can switch from DC measurement to AC measurement not or from diode test to continuity..... ⑩

5 MEASURING PROCEDURE

If there is no display or “” is shown on the LCD after connecting, then go to the Charging Section of this manual to re-charge the measuring unit or charging of the High-Cap (High Capacity Capacitor)

The  display next to the test probes socket is a warning to you not to input the value of Voltage and Current higher than the maximum.

Besides, please set the rotary function to proper position you want to do measurement before switching on. When the unit is on, all the displayed will be shown for 1 second and follows a beep. It means the unit is ready for measurement.

5.1 *Charging of the ‘high cap’ capacitor*

5.1.1 220V AV Source (Wall Socket).

- a) Set rotary function switch to position ‘CHARGE 230VAC MAX’.
- b) Connect the black test probe to the “COM” socket and the red test probe to the “V/ Ω ” socket.
- c) Connect the test probes to the AC sockets.
- d) Please wait! LCD displays negative value and this value is increasing until near-5V. Then re-charging is done. The total recharging time is around 5 mins.

5.1.2 9~12VAC or VDC source.

- a) Set rotary function switch to position ‘CHARGE AC, DC 9 TO 12 V’.
- b) Connect the black test probe to the “COM” socket and the red test probe to the “V/ Ω ” socket.
- c) Connect the test probes to 9 to 12V AC/DC voltage source. Please wait! LCD displays negative value and this value is increasing unit near-6V. Then re-charging is done.

5.1.3 Choose either of these two re-charging methods. The unit can be operated continuously up to one hour after totally re-charged.

5.1.4 If there is no source of energy, place the unit

under sunshine. After a while, the current from the solar cell can provide energy to operate the unit.

 **ATTENTION**

To avoid the LCD damaged from fierce sunshine, block part of the LCD when re-charging.

5.2 Voltage Measurement VDC

5.2.1 Connect the black test probes to the “COM” socket and the red test probes to the “V/Ω” socket.

5.2.2 Set the rotary switch to ‘V  AUTO’

5.2.3 Connect the test probes across the object to be measured.

The measuring unit has a switch which automatically displays the correct voltage type and the red test probe polarity sign also displays. Press ‘RANGE-H’, the range can be selected manually until the satisfactory reading obtained.

 **ATTENTION**

Do not exceed the maximum input limits—Maximum 1000VDC.

5.3 Current Measurement

5.3.1 Connect the black test probe to “COM” Socket. If measuring below 300mA, then connect the red test probe to the mA socket.

Connect to the 20A Socket if measuring is between 300mA and 20A.

5.3.2 Set the rotary function switch to current measurement, press “V  ,  ,  ” to select ACA or ADC measurement.

5.3.3 Connect the test probes in series with the object to be measured, the LCD displays the measuring value. The polarity sign of ADC also displays. Range is automatically switched, apart from 20A. Press ‘RANGE-H’, the range can be selected manually until the satisfactory reading obtained.

 **ATTENTION**

- a) If magnitude of the current is unknown, always start with the highest range and then to lower range until satisfactory reading is obtained.
- b) Current measurement of “mA” should not be overloaded, otherwise 0.3A fuse will burn. It needs to be replaced with a new fuse with specification of 0.3A (5×20mm)
- c) Current measurement of “20A” should not be overloaded, otherwise 20A fuse will burn. it needs to be replaced

with a new fuse with specification of 20A(6×30mm)
Current measurement of 20A may not last more than 15
seconds.

5.4 Resistance Measurement

- 5.4.1 Connect the black test probe to “COM” socket and the red test probe to “V/Ω” socket.
- 5.4.2 Set the rotary function switch to ‘Ω’
- 5.4.3 Connect the test probes to the device being measured. The polarity sign of red probe is positive. Range is automatically switched. Press ‘RANGE-H’, the range can be selected manually until the satisfactory reading obtained.

ATTENTION

Make sure all objects, circuits and componets to be measured are without voltage supplied.

5.5 Frequency Measurement

- 5.5.1 Connect the black test probes to the “COM” socket and red test probes to “V/Ω” socket.
- 5.5.2 Set the rotary function switch to ‘Hz’.
- 5.5.3 Connect the test probes to the object to be measured. LCD displays the measuring value.

5.6 Continuity Check and Diode Test

- 5.6.1 Connect the black test probes to the COM socket and the red test probes to “V/Ω” socket.
- 5.6.2 Set the rotary function switch to “ Ω ”. Press “ ”
 Ω ” to select “ or Ω ” measurement method.
- 5.6.3 Connect the test probes to the object to be measured.
- 5.6.4 If the line resistance is less than 20 Ω, an acoustic signal is emitted. It is used to check if the circuit is open or short quickly.

ATTENTION

Never measure capacitors which carry voltage, as a possible discharge could destroy your measuring unit.

5.7 Auto-Off

The unit will be off automatically if the unit is not used for 10 mins. By pressing “DATA-H” or “RANGE-H”, the unit will be turned on.



SAFE USE OF MULTITESTER

Be sure to follow the WARNINGS in this manual. Erroneous use may put human bodies in danger. The following legend applies to this manual:



Dangerous voltage (Take care not to get an electric shock in voltage measurement).



Ground (Allowable applied voltage range between the input terminal and earth).



Refer to instruction Manual (Very important description for safe use).



Direct current (DC)



Alternating current (AC)



Fuse