شرکت پتروفرهان گستر جنوب

UNI-T

UT890C+/D

Operating Manual

I. General Introduction

This brand new UT890C+/D Operating Manual is a handheld 3-5/6 digit True RMS Digital Multi-meter featuring stable performance and high reliability. Its whole circuit design utilizes a large scale integrated circuit that uses ∑△ADC converter as its core and is further equipped with full function overload protection, making it an ideal tool for users to measure the followings: DC and AC voltage, electric current, resistance, capacitance, frequency, temperature (UT890D/C+), diode, triode and continuity test.

Safety Rules and Instructions

- This unit is designed and produced in strict accordance with GB4793, Safety Requirements for Electronic Measuring Instrument and Safety Standards coded as IEC61010-1 and IEC1010-2-032. It complies with safe standards, such as double insulation, over voltage (CAT II 1000V, CAT III 600V) and class of pollution II. Please follow the instructions contained in this manual, otherwise the protection provided by this unit may be impaired.
- You should not use this unit unless its back cover is properly secured in place, otherwise you are exposed to shock hazard.
- The range switch should be switched to a correct range.
- Check the insulation layer of the test leads to ensure no damaged or broken cable.
- The red and black test leads should be well inserted into the jacks that are in compliance with the measurement requirements to ensure good contact.
- The input signal should not exceed the specified limit value to avoid shock or unit damage.
- It is prohibited to change range when measuring voltage or electric current so as to avoid unit damage.
- Damaged fuse must only be replaced with fuse with identical specification.
- To avoid electric shock, the potential difference measured between "COM" and earth " ⏚ " should be no more than 1000V.
- To avoid electric shock, test with great caution in case the voltage to be measured maybe higher than DV 60V or AC 30Vrms.
- Battery should be replaced in time so as to ensure measurement accuracy when the LCD displays " ⊏▮ ".
- Power should be turned off immediately upon the test is completed and battery should be taken out if it may not be used for a long period of time.
- Do not use the unit under an environment with high temperature and high humidity, especially not store it in a wet place as the dampened unit may perform badly.
- Please do not change the circuit of the unit arbitrarily so as to avoid unit damage or safety hazard.
- Maintenance: Please use wet cloth and mild detergent rather than abrasive material or solvent for the cleaning of its exterior housing.

II. Symbol Description

Low battery	Auto shut off	Double Insulation	DC		
Buzzer	Grounding	Relative Measurement	Diode		
Fuse	AC	Warning			

III. Characteristics

- More than 30 functional ranges are available.
- LCD display, visible area 63×29mm.
- Over range display "OL".
- Maximum displayed value 5999.
- Overload protection for all ranges.
- Auto power off.
- Temperature scope:
  Working temperature: 0℃~40℃ (32℉~104℉)
  Storage temperature: -10℃~50℃ (14℉~122℉)
- Low battery indicator: The symbol " ⊏▮ " will be displayed at top left of the LCD.
- It has functions, including data hold, measurement of maximum/ minimum value, relative measurement, backlight, etc.

IV. Technical Indexes

Accuracy: ± (α% reading plus figure) , 1 year warranty period
Environment Temperature: 23℃±5℃
Relative humidity: <75%

1. DC Voltage

Range	Resolution	Accuracy
600mV	0.1mV	±(0.5%+4)
6V	0.001V	±(0.5%+2)
60V	0.01V	
600V	0.1V	±(0.7%+10)
1000V	1V	

Input impedance: 1GΩfor the range of 600mV while 10MΩ for all other ranges.

⚠ Overload protection: 750Vrms or at a peak value of 1000Vp-p.

2. AC Voltage

Range	Resolution	Accuracy
6V	0.001V	±(0.8%+3)
60V	0.01V	
600V	0.1V	±(1.0%+10)
750V	1V	

Input impedance: 10MΩfor all the ranges.
Frequency scope: 40Hz ~ 1KHz (Only applicable to sine wave and triangular wave, but only being referable for other waves whose frequencies are equal or higher than 200Hz.)
Guaranteed Accuracy: within 5~100% of its range and allow less t han 5 figures of remaining reading in case of short circuit.
Overload Protection: 750Vrms or at a peak value of 1000Vp-p.
Display: True RMS

3. DC Current

Range	Resolution	Accuracy
60μA	0.01μA	±(0.8%+8)
6mA	0.001mA	
60mA	0.01mA	
600mA	0.1mA	±(1.2%+5)
20A	0.01A	±(2.0%+5)

⚠ Overload prote ction: Fuse F1-630mA/250V, F2-20A/250V
⚠ Maximum input current: 20A (measuring electric current between 5A and 20A, testing time ≤10 seconds, Interval≥15 mins)
Measuring voltage drop: 600mV when at its full range.

4. AC Current

Range	Resolution	Accuracy
60mA	0.01mA	±(1.0%+12)
600mA	0.1mA	±(2.0%+3)
20A	0.01A	±(3.0%+5)

⚠ Overload protection: Fuse F1-630mA/250V, F2-20A/250V
Frequency scope: 40Hz ~ 1KHz (Only applicable to sine wave and triangular wave, but only being referable for other waves whose frequencies are equal or higher than 200Hz.)
Guaranteed Accuracy: within 5~100% of its range and allow less than 2 figures of remaining reading in case of short circuit.
⚠ Maximum input current: 20A (measuring electric current between 5A and 20A, testing time ≤10 seconds, Interval≥15 mins) Measuring voltage drop: 600mV when at its full range
Display: True RMS

5. Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	±(0.8%+5)
6kΩ	0.0010kΩ	
60kΩ	0.010kΩ	±(0.8%+3)
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	
60MΩ	0.01MΩ	±(1.0%+25)

Range of 600Ω: measured value=displayed value - value shown when test leads are short connected Open circuit voltage: About 1V
⚠ Overload protection: 600Vrms.

6. Capacitance

Range	Resolution	Accuracy
9.999nF	0.001nF	±(5.0%+35)
99.99nF ~ 999.9μF	0.01nF ~ 0.1μF	±(2.5%+20)
9.999mF	1μF	±(5.0%+10)
99.99mF	10μF	10mF<C≤20mF: ±(10.0%+5) >20mF:reading is for reference only

Range: Auto (Reading for distributed capacitance of test leads may be shown when the unit is in open circuit. It is recommended to use REL mode to measure for any capacitance of less than 1μF)
⚠ Overload protection: 600Vrms.

7. Frequency

Range	Resolution	Accuracy
0.999Hz ~ 10. 00MHz	0.001Hz ~ 0. 01MHz	±(0.1%+5)

Range: Auto
Input frequency:
≤100KHz: 100mVrmsσInput frequency≤30Vrms;
> 100kHz~1MHz: 200mVrmsσInput frequency≤30Vrms;
>1MHz, 600mVrmsσInput frequency≤30Vrms;
Overload protection: 600Vrms

8.Diode & Buzzer Continuity Test

Range	Description
	Display forward voltage of the diode under test (approximate value) and the range scope is 0 ~3V.
	If it is equal or less than 10Ω, the buzzer beeps, indicating circuit is closed; if it is equal or more than 100Ω, the buzzer remain silence, indicating open circuit with a voltage of approximately 1V.

Overload protection: 600Vrms .

9. hFE Test for Transistors

Range	Description	Test Condition
hFE	It can be used to test hFE specifications for Transistors of NPN or PNP type. Display range: 0-1000β	Base current is about 10μA, Vce is about 1.2V

10. Temperature Test (Only for UT890C+)

Function	Range	Resolution	Accuracy
Temperature ℃	-40 ~ 0℃	1℃	±3
	>0 ~ 100℃		±(1.0%+3)
	>100 ~ 1000℃		±(2.0%+3)
Temperature ℉	-40 ~ 32℉	1℉	±5
	>32 ~ 212℉		±(1.5%+5)
	>212 ~ 1832℉		±(2.5%+5)

V. How to Use it:

Instructions before operating
(1). Once the unit is powered up, please check the 9V battery contained in this unit, and if the battery voltage is insufficient, there will be a symbol " ⊏▮ " being displayed on the screen, then the battery should be replaced to ensure measurement accuracy.

(see Fig. 1)

(2). The symbol " ⚠ " located beside the jacks for test leads warns that for the prevention of internal circuit from being damaged, the input voltage or current should not exceed the rated value.
(3). Before measuring, the range switch should be switched into the range needed.
(4). Instrument Introduction (see Fig. 1):
① Combination keys: HOLD/ ☼ /SELECT(UT890C+)
② LCD
③ Combination keys: MAX MIN/ △
④ Range switch
⑤ Jack for transistor testing
⑥ Input Jack

1. DC Voltage Measurement

(1). Insert the black test lead into "COM", while insert the red test lead into "V".
(2). Switch the range switch into the range " V⎓ ". Then connect the test leads in parallel with the power or load under test, the polarity shown by the unit is the polarity of the terminal connected by the red test lead.

⚠ Notes

1) If the voltage being measured remains unknown, turn the range switch into the maximum range first and then gradually adjusting it downward.
2) If "OL" is shown on the LCD, it indicates that it has exceeded the range, so the range should be switched into a higher one.
3) The symbol " ⚠ " besides the "V" jack indicates that no voltage higher than 1000V should be input into the unit, as though it is possible to display a higher voltage, but this may incur a risk of damaging internal wiring!
4) In case the input impedance is around 10MΩ, it may result in measurement error if such load is connected into a circuit with high impedance. Under most circumstances, if the circuit impedance is less than 10kΩ, then the error is ignored (0.1% or even lower).
5) Especially be cautious to avoid shock when measuring high voltage.

2. AC Voltage Measurement

(1) Insert the black test lead into "COM", while insert the red test lead into "V".

(2) Switch the range switch into the range " V~ ". Then connect the test leads in parallel with the power or load under test.

⚠ Notes

1) Refer to the No. 1, 2, 4 and 5 of notes for DC voltage measurement.
2) The symbol " ⚠ " besides the V jack indicates that no voltage higher than 750V should be input into the unit, as though it is possible to display a higher voltage, but this may incur a risk of damaging internal wiring!

3. DC Current Measurement

(1) Insert the black test lead into "COM" first, then when measuring current equal or less than 600mA, insert the red test lead into "mAμA", otherwise, insert the red test lead into the jack for 20A.
(2) Switch the range switch into the range " A⎓ ". Then connect the test leads in series with the load under test, the polarity shown by the unit is the polarity of the terminal connected by the red test lead.

⚠ Notes

1) If the current being measured remains unknown, turn the range switch into the maximum range first and then gradually adjusting it downward.
2) If "OL" is shown on the LCD, it indicates that it has exceeded the range, so the range should be switched into a higher one.
3) The symbol " ⚠ " besides the "mAμA" jack indicates that no voltage higher than 600mA should be input into the unit, otherwise F1 fuse may be blown. The symbol " ⚠ " besides the "A" jack indicates that no voltage higher than 20A should be input into the unit, otherwise F2 fuse may be blown.

4. AC Current Measurement

1) Insert the black test lead into "COM" first, then when measuring current equal or less than 600mA, insert the red test lead into "mAμA", otherwise, insert the red test lead into the jack for 20A.
2) Switch the range switch into the range " A~ ". Then connect the test leads in series with the load under test.

⚠ Notes

Refer to No. 1), 2) and 3) of the Notes for DC current measurement.

5. Resistance

(1) Input the black test lead into "COM", while insert the red test lead into "Ω".
(2) Switch the range to range "Ω" and connect the test leads in parallel with the resistance under test.

⚠ Notes

1) To ensure measurement accuracy, for the range of 600Ω: measured value=displayed value - value shown when test leads are short connected.
2) If the resistance under test is higher than the range selected, the unit will display "OL". Then a higher range should be selected. For any resistance higher than 1MΩ or even higher, it may take a few seconds for the reading to become stable, which is normal when measuring high resistance.
3) The red test lead can also be used to check whether or not F1 or F2 has been blown. If the "mAμA" jack is tested to be 1MΩ and "A" jack is tested to be 0Ω, then the fuse acts good. If the unit displays "OL", then the fuse has been blown.
4) In case of no input, i.e. the case of open-circuit, the unit displays "OL".
5) When checking the impedance of an internal circuit, the circuit under test must be cut off from all power sources and all capacitors charge must be discharged.

6. Capacitance Measurement

The unit may display a reading even if there is no input at all, which is the distributed capacitance of the test leads. For the measurement of a resistance less than 1μF, this value has to be deducted from the final measured value to ensure measurement accuracy. Therefore, the relative measurement function of this unit can be used to have it automatically deducted for the convenience of checking reading.

⚠ Notes

1) The unit will display "OL" in case the capacitance to be measured has been short connected or exceeds the maximum range of the unit, the displayer will show "OL".
2) For the measurement of large capacitance, it is normal for the unit to take several seconds to stabilize its reading.
3) To avoid unit damage or harm to the personal safety, the capacitor to be tested must have all its residual charge discharged before the test, which is especially the case for capacitor with high voltage.

7. Frequency Test

1. Insert the red test lead into "Hz" jack, while insert the black test lead into "COM" jack.
2. Switch the range switch into the range "Hz". Then connect the test leads in parallel with the frequency source, frequency value can thus be read directly from its displayer.

⚠ Notes

The input frequency must comply with the requirements stipulated by the Technical Indexes.

8. Test of Diode

Insert the black test lead into "COM" jack, while insert the red test lead into "V" jack (the polarity of red test lead is "+"). Switch the range switch into the range " ⇥ ". Then connect the test lead with the diode under test, the reading is the forward voltage drop of the diode. If the diode under test is in open circuit or its polarity is reverse connected, the unit will display "OL". For silicon p–n junction, approximately 500~800mV is generally considered normal.

⚠ Notes

1) When measuring a connected diode, the circuit under test must be first cut off from all power sources and all capacitors must have all their residual charge discharged.
2) Only a diode with approximately 0~3V voltage can be measured.

9. Buzzer Continuity Test

Insert the black test lead into "COM", while insert the red test lead into "V". Switch the range switch into the range " ⇥ " and then connect the test leads into the circuit under test. If both ends of the circuit has a resistance higher than 100Ω, it is considered that the electric circuit is disconnected and the buzzer remains silence. If the resistance between both ends is found to be equal or less than 10Ω, it is then considered that the electric circuit is well connected and the buzzer will beep continuously.

⚠ Notes

When measuring an energized circuit, the circuit under test must first be cut off from all power sources and all capacitors must have all their residual charge discharged.

10. hFE Test for Transistors

(1) Switch the range switch to the range "hFE".
(2) Once the transistor has been confirmed whether to be a NPN or PNP type, insert its base, emitter and collector separately into corresponding jacks on the panel.
(3) Approximate hFE value will be displayed on the displayer. Test condition: Ib≈10μA, Vce≈1.2V.

11. Temperature Measurement (only for UT890C+)

Temperature sensor: only applicable to K type temperature sensor. In case the input end remains open, the unit displays "OL". Once it is short connected, it displays ambient temperature. The unit can perform temperature measurement in Celsius degree or Fahrenheit degree once a K type temperature sensor is connected to it in a way that the black pin connects to "COM" while the red pin connects to " ℃ " T≈1.8℃+32.

⚠ Notes

The K type point contact thermocouple temperature sensor (nickel-cadmium or nickel-silicon) that comes with this unit as its accessory is only applicable to the measurement of temperature below 230℃/446℉. Another model of K type point contact temperature sensor that is suitable for the range may be chosen in case it needs to measure any higher temperature.

12. Funetion of Keys

(1) MAX MIN/ △ key: Press this key to enter into "MAX MIN Data Record Mode" automatically, the auto power off function will be cancelled, the unit will display MAX value.
Press again, the unit will display MIN value, then again press it, it again displays MAX value, repeating in this pattern. Press this key as usual for two seconds or more or switch the range, the "Data Record Mode" will exit (only applicable to V⎓、Ω、⇥、℃/℉).
For example, when the unit is in the capacitance range for 6000μF, once press this key, the unit will enter into "Relative Measurement Mode", which is to set the value currently displayed as the reference value and then displays automatically the result of "measured value – reference value". Press this key again to exit "Relative Measurement". This function is especially suitable for the measurement of any capacitance less than 1μF as it ensures the measurement accuracy.
(2) HOLD/ ☼ /SELECT(Only applicable to UT890C+)
① Except for buzzer continuity, diode, triode and frequency, once this key is pressed, the value being displayed will be locked and held, and the symbol " ⊡ " will be displayed by the LCD. Press againto unlock it and enter into normal measurement mode.
② Press this key for two seconds or more to power on the backlight, which will be automatically powered off after around 15 seconds. If this case is again press for two seconds or more, the backlight will be turned off.
③ This key can be pressed for functional switch when the unit is in the "buzzer continuity" or "temperature" range (only for UT890C+).

13. Other function:

(1) Auto power off:
In the process of measurement, if the range switch has not been switched for 15 minutes, the unit will auto power off in order to save power. While the unit is in auto power off state, it can be "waken up" either by pressing any key or by switch the range switch to "off" position and then restart the unit.
Press hold key when the unit is restarting from power off state, the buzzer will then beep for 3 consecutive times, indicating auto power off function has been cancelled, but the function maybe resumed once the unit is restarted.
(2) Buzzer:
The buzzer beeps for a short time (approximately 0.25 second) when any key or the range switch is pressed or rotated, indicating this function is effective.
When measuring voltage or current, in case the AC/DC voltage is higher than 600V or the AC/DC current is higher than 10A, the buzzer will beep now and then in a continuous manner to give over range warning.
At 1 minute before the unit is auto powered off, the buzzer will beep for 5 consecutive times, and will also beep for a longer time before the unit is powered off. When the auto power off function is cancelled, the buzzer will beep for 5 consecutive times for every 15 minute

6. Instrument Maintenance

⚠ Warning: Before open the back cover of the unit, please make sure the power has been turned off. The test leads have been removed from input jacks or circuit under test.

General Maintenance & Repair:

1) Please use wet cloth and mild detergent rather than abrasive material or solvent for the cleaning of its exterior housing.
2) In case any abnormity is found with the instrument, please stop using it and send it for repair.
3) Whenever it is necessary to calibrate or repair the unit, it has to be done by a qualified professional or a designated maintenance department.

7. Battery/Fuse Installation or Replacement

This unit contains: battery / 6F22-9V
Fuse / F1 0.63A/250V (φ5×20mm) Fast-acting
Glass Tube Fuse/F2 20A/250V (φ5×20mm) Fast-acting Ceramic Tube Fuse. Please refer to Fig. 2 for the installation and replacement of battery/fuse.
(1) Shut off the unit and remove the test leads inserted into Jacks.
(2) Turn the unit around to have its back on top, then screw off the screw that secures the battery case so as to remove the battery cover and replace the battery inside.
(3) To replace the fuse, screw another 2 screws off to take out the back cover and replace the fuse inside.

Fig. 2

8. Accessories

1. Operating Manual----------1 Copy
2. Test Leads----------1 Pair
3. Temperature Probe----------1 Pair (UT890C+)

+982165565901
+982144584619
+989034119385
Tehran, Tehransar