UNI-T®



UT715

Multifunction Loop Process Calibrator

P/N:110401109797X

Preface

Thank you for purchasing this brand new product. In order to use this product safely and correctly, please read this manual thoroughly, especially the safety notes.

After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

Limited Warranty and Liability

Uni-Trend guarantees that the product is free from any defect in material and workmanship within one year from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination or improper handling. The dealer shall not be entitled to give any other warranty on behalf of Uni-Trend. If you need warranty service within the warranty period, please contact your seller directly.

Uni-Trend will not be responsible for any special, indirect, incidental or subsequent damage or loss caused by using this device.

Content

1. Overview ---- 3
2. Features ---- 4
3. Accessories ---- 4
4. Operation ---- 5
5. Symbol ---- 7
6. Specification ---- 7
7. Structure ---- 8
8. LCD Display ---- 11
9. Operation ---- 11
10. Measurement Mode ---- 13
11. Source ---- 16
12. Remote mode ---- 19
13. Advanced application ---- 20
14. Indicator ---- 22
15. Maintenance ---- 24

1. Overview

UT715 is a high-performance, high-accuracy, handheld, multifunctional loop calibrator, which can be used in loop calibration and repair. It can output and measure direct current and voltage with a high accuracy of 0.02%, it has the functionalities of automatic stepping and automatic sloping output, these functionality help you to rapidly detect the linearity, the storage functionality facilitates the system setup, the data transferring functionality help the customers to rapidly test the communication.

Chart 1 Input and output function

Function	Input	Output	Remark
DC millivolt	-10mV - 220mV	-10mV - 110mV	
DC Voltage	0 – 30V	0 – 10V	
DC Current	0 – 24mA	0 – 24mA	
	0 – 24 mA (LOOP)	0 – 24mA (SIM)	
Frequency	1Hz - 100kHz	0.20Hz - 20kHz	
Pulse		1-10000Hz	The pulse quantity and range can be compiled.
Continuity	500Ω		The buzzer beeps when the resistance is less than 250Ω.
24V Power		24V	

2. Features

a) The output accuracy and measurement accuracy reach up to 0.02%.
b) It can output “Percentage”, users can easily get different percentage values by pressing button.
c) It has the functionality of automatic stepping and automatic sloping output, these functions help you to rapidly detect the linearity.
d) It can measure mA at the same time of providing the loop power to the transmitter.
e) It can save frequently-used setting status.
f) The data transferring function helps you to rapidly test the communication.
g) Adjustable screen brightness.
h) Rechargeable Ni-MH battery.

3. Accessories

If any of accessories is missing or damaged, please contact your supplier.

1. UT715 ---------- 1 piece
2. Probes ---------- 1 pair
3. Alligator clips ---------- 1 pair
4. Use Manual ---------- 1 piece
5. AA NI-MH battery ---------- 6 pieces
6. Adaptor ---------- 1 piece
7. USB cable ---------- 1 piece
8. Cloth bag ---------- 1 piece

4. Operation

Please use the calibrator according to the user manual. “Warning” refers to potential hazard, “Attention” refers to the situation where would damage the calibrator or tested devices.

⚠ Warning

To avoid electric shock, damage, explosive gas ignition, please follow bellows:

- Please use the calibrator according to this manual.
- Check before use, please do not use a damaged calibrator.
- Check the connectivity and insulation of the test leads, replace any exposed test leads.
- When using the probes, user only hold the protection end of the probe.
- Do not exert a voltage with more than 30.0V on any terminals and earth line.
- If a voltage with more than 30.0V is applied on any terminals, the factory certificate will be out of effect, moreover, the device will be damaged permanently.
- Correct terminals, modes, ranges must be used when it is on output status.
- To prevent the tested device from being damaged, choose a correct mode before connecting the testing lead.
- When connecting the leads, first connect the COM test probe and then connect the other probe. While disconnecting the lead, first disconnect the conducted probe and then disconnect the COM probe.
- Do not open the calibrator case.
- Before using the calibrator, please ensure that the battery door is tightly closed. Please refer the “Maintenance and Repair”.
- When the battery power is insufficient , replace or charge the battery as soon as possible to avoid wrong reading value which may cause electric shock. Before opening the battery door, first remove the calibrator from “Dangerous Zone”. Please refer “Maintenance and Repair”.
- Disassemble the test leads of the calibrator before opening the battery door.

- For CAT I, the standard definition of measurement is applicable to the circuit that does not directly connect to a power source.
- Specific replacement parts must be used when repairing the calibrators.
- The inside of the calibrator must be free from water.
- Before using the calibrator, input a voltage value to check if the operation is normal.
- Do not use the calibrator wherever there is explosive powder nearby.
- For battery, please refer to “Maintenance”.
- Remove the test leads before switching to other outputs.

⚠ Attention

To prevent the calibrator or the test device from being damaged：

- The correct terminals, modes, ranges must be used when it is on output status.
- When measuring and outputting current, correct earplug, functionality and ranges must be used.

5. Symbol

⧈	Double insulated
⚠	Warning

6. Specification

1. The maximum voltage between the terminal and earth line, or any two terminals is 30V.
2. Range: manually
3. Operating Temp.: -10℃ ~ 55℃
4. Storage Temp.: -20℃ ~ 70℃
5. Relative Humidity: ≤95%(0℃ ~ 30℃), ≤75%(30℃ ~ 40℃), ≤50%(40℃ ~ 50℃)
6. Altitude: 0 ~ 2000m
7. Battery: AA Ni-MH battery1.2V×6 pieces
8. Drop test: 1 meter
9. Dimension: 224×104×63mm
10. Weight: About 650g (Including batteries)

7. Structure

1. Input terminal and Output terminal

Fig.1 and Fig. 2 Input and output terminal.

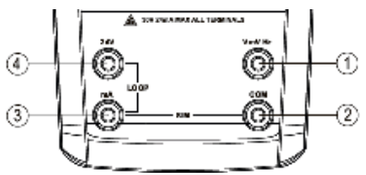


Figure 1

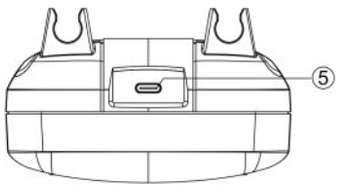


Figure 2

No.	Name	Instruction
①②	V, mV, Hz, •)) , PULSE Measurement/Output Port	①Connect red probe, ②Connect black probe
②③	mA, SIM Measurement/Output Port	③Connect red probe, ②Connect black probe.
③④	LOOP Measurement Port	④Connect red probe, ③Connect black probe.
⑤	Charge/Data Transfer Port	Connect to 12V-1A adaptor for recharging, or computer for data transmission

2. Button

Fig.3 Calibrator button, Chart 4 Description.

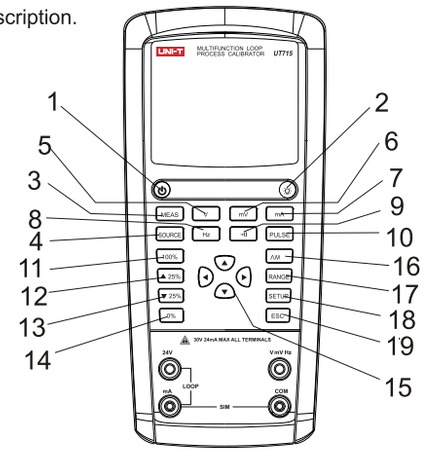


Figure 3

1	⏻	Power on/off. Long press the button for 2s.
2	☼	Backlight adjustment.
3	MEAS	Measurement Mode.

4	SOURCE	Mode selection.
5	V	Voltage measurement/output.
6	mV	Millivolt measurement/output.
7	mA	Milliampere measurement/output.
8	Hz	Short press the button to choose frequency measurement/output.
9	·)))	“Continuity Test”.
10	PULSE	Short press the button to choose pulse output.
11	100%	Short press to output the 100% value of the currently-set range, long press to reset the 100% values.
12	▲25%	Short press to increase 25% of the range.
13	▼25%	Short press to decrease 25% of the range.
14	0%	Short press to output 0% value of the currently-set range, long press to reset the 0% value.
15	◄ ▲ ▼ ►	Arrow key. Adjust the cursor and parameter.
16	∧M⌐	Cycle selection: ∧ Constantly output 0%-100%-0% at low slope (slow), repeat automatically. M Constantly output 0%-100%-0% at high slope (fast), repeat automatically. ⌐ At 25% of the step, step output 0%-100%-0%, repeat automatically.
17	RANGE	Switch range.
18	SETUP	Short press to set up the parameter, long press to enter Menu.
19	ESC	ESC

8. LCD Display

Symbol	Description	Symbol	Description
SOURCE	Source output mode		Battery power
MESUER	Measurement mode	LOAD	Overload
▲	Data adjustment prompt		Progress output, slope output, step output
SIM	Transmitter output simulation	PC	Remote control
LOOP	Loop measurement	APO	Auto power off

9. Operation

This part introduces how to operate the UT715 calibrator.

1. Press ⏻ for more than 2s to power on, LCD will display the model number.
2. Long press SETUP to enter system setup menu. Press the arrow key to set parameter, short press ESC to exit the setup menu.



Figure 4 system setup

1) Auto power off:

Press ▼▲ to AUTO POWER OFF, press ◀▶ to set up the auto power off time. The AUTO POWER OFF time will start when no button is pressed, the counting will restart if any button is pressed. The max. AUTO POWER OFF time is 60 minutes, “0” means auto power off is disabled.

2) Brightness:

Press ▼▲ to select the BRIGHTNESS, press ◀▶ to adjust the screen brightness. Press ☼ on setup menu to rapidly adjust the brightness.

3) Remote Control

Press ▼▲ to select REMOTE CONTROL, press ◀▶ to set up for remote PC control.

4) Button beep control

Press ▼▲ to select BEEP CONTROL, press ◀▶ to set up button sound. ”Beep” once enables button sound, “Beep” twice disables button sound.

10. Measurement mode

If the calibrator is on 'Output' status, press **MEAS** to switch to measurement mode

1. Millivolt

Press **mV** to measure the millivolt. Measurement page shown in figure 5. Connection shown in Figure 6.



Figure 5 millivolt measurement

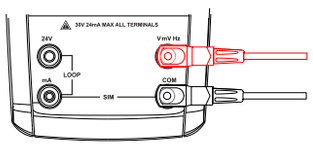


Figure 6 Connection

2. Voltage

Press **V** to measure the voltage. Measurement page shown in figure 7. Connection shown in Figure 8.



Figure 7 voltage measurement

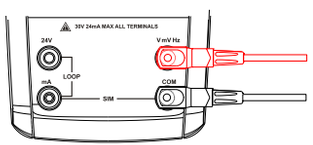


Figure 8 Connection

3. Current

Constantly press **mA** until it is switched to measure the milliampere. Measurement page shown in figure 9. Connection shown in Figure 10.



Figure 9 Continuity measurement

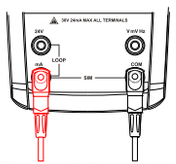


Figure 10 Connection

Note: The buzzer beeps once the resistance is less than 250Ω.

4. Loop

Constantly press **mA** until it is switched to measure the loop. Measurement page shown in figure 11. Connection shown in Figure 12.



Figure 11 Resistance measurement



Figure 12 Connection

5. Frequency

Press Hz to measure the frequency. Measurement page shown in figure 13. Connection shown in Figure 14.



Figure 13 Frequency measurement

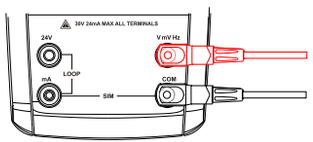


Figure 14 Connection

6. Continuity

Press to measure the continuity. Measurement page shown in figure 15. Connection shown in Figure 16.



Figure 15 Continuity Measurement

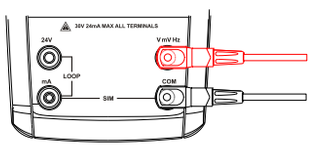


Figure 16 Connection

Note: The buzzer beeps once the resistance is less than 250Ω.

11. Source

Press SOURCE to switch to “Output Mode”.

1. Millivolt

Press mV to select millivolt output. Millivolt output page shown in figure 17. Connection shown in figure 18.
Press the arrow key (right & left) to choose output digit, press the arrow key (up & down) to set the value.



Figure 17 millivolt output

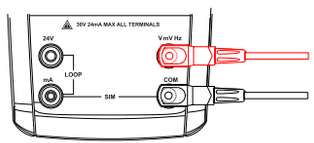


Figure 18 Connection

2. Voltage

Press V to select voltage output. Voltage output page shown in figure 19. Connection shown in figure 20.
Press the arrow key (right & left) to choose output digit, press the arrow key (up & down) to set the value.



Figure 19 Voltage output

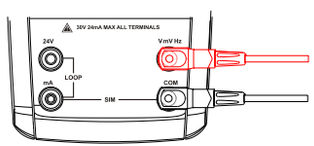


Figure 20 connection

3. Current

Press mA to select current output. Current output page shown in figure 21. Connection shown in figure 22.' Press the arrow key (right & left) to choose output placement, press the arrow key (up & down) to set the value.



Figure 21 Current output

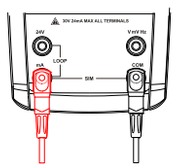


Figure 22 Connection

Note: If overload, the output value will flicker, the character “LOAD” will display, in this situation, you should check if the connection is correct for safety.

4. SIM

Press mA until the calibrator is switched to SIM Output. Passive current output shown in figure 23. Connection shown in 24, press the arrow key (right & left) to choose output placement, press the arrow key (up & down) to set the value.



Figure 23 Passive current output

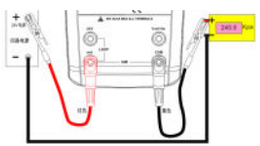


Figure 24 Connection

Note: The output value will flicker and the character “LOAD” will display when the output is overload, please check if the connection is correct for safety.

5. Frequency

Press Hz to select frequency output. Frequency output shown in figure 25, connection shown in 26, press the arrow key (right & left) to choose output placement, press the arrow key (up & down) to set the value.

1) Press “RANGE” to choose different ranges (200Hz, 2000Hz, 20kHz).
2) Short Press SETUP to display frequency modification page, as figure 25, in this page, you can modify the frequency by pressing the arrow key. After modification, if you short press SETUP again, the modification will become effective. Short press ESC to give up the modification.



Figure 25 Frequency output

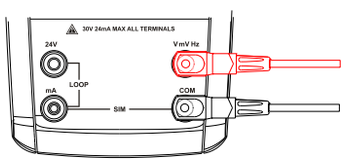


Figure 26 Connection

6.Pulse

Press PULSE to select frequency output, pulse output page shown in figure 27, connection shown in figure 28, press the arrow key (right & left) to choose output placement, press the arrow key (up & down) to set the value.

1）Press RANGE to choose different ranges (100Hz, 1kHz, 10kHz).

2）Short press SETUP, it will be on the status of editing pulse quantity, then press the arrow key to edit the pulse quantity, short press SETUP again to complete pulse quantity setting, soon after that, it will be on the status of editing pulse range, then you can press the arrow key to edit the pulse range, short press SETUP to complete pulse range modification. The calibrator will output a specific quantity of pulse at a set frequency and range.



Figure 27 Pulse output

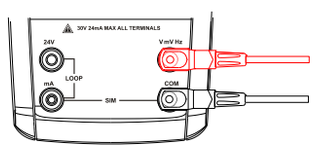


Figure 28 Connection

12. Remote mode

Based on the instruction, turn on the PC Control Functionality, set the parameter of serial interface on PC and send the protocol command to control UT715. Please refer “UT715 Communication Protocol”.

13. Advanced application

1. Percentage

When the calibrator is on output mode, short press [0%], [100%], [▲25%], [▼25%] to rapidly output percentage value accordingly, the [0%] or [100%] value of each output functionality is as below:

Output Functionality	0%value	100%value
Millivolt 100mV	0mV	100mV
Millivolt 1000mV	0mV	1000mV
Voltage	0V	10V
Current	4mA	20mA
Frequency 200Hz	0Hz	200Hz
Frequency 2000Hz	200Hz	2000Hz
Frequency 20kHz	2000Hz	20000kHz

The [0%] or [100%] value of each output can be reset by the following methods:

1) Press the arrow key to adjust the value and long press [100%] until the buzzer beeps, a new [100%] value will be set as output value.

2) Long press [0%] until the buzzer beeps, a new [0%] value will be set as output value.

Note: The 100% value must not be less than the 0% value.

Short press ▲25%, the output value will add 25% of the range between 100% value and 0% value.

Short press ▼25%, the output value will decrease 25% range between 100% value and 0% value.

Note: If you short press ▲25% or ▼25% to adjust the value of output functionality, the output value shall not be greater than the 100% value and not be less than 0% value.

2. Slope

The automatic output functionality of the slope can constantly provide a dynamic signal to the transmitter. If pressing ⋀⋀⌐, the calibrator will produce a constant and repeated slope (0%-100%-0%). There are 3 kinds of slope:

1) ⋀ 0%-100%-0% 40 seconds, smooth slope.
2) ⋀ 0%-100%-0% 15 seconds, smooth slope.
3) ⌐ 0%-100%-0% 25% progress slope, each step keeps for 5 seconds.

If you want to exit the slope functionality, please press any key except for the slope key.

14. Indicator

Unless otherwise specified, the calibration period of all indicators is one year, the applicable temperature is +18℃ to +28℃, the warm-up time is assumed as 30 minutes.

1. Input Indicator

Indicator	Range	Resolution	Accuracy
DC voltage	200mV	0.01mV	±(0.02%+ 5)
	30V	1mV	±(0.02%+2)
DC current	24mA	0.001mA	±(0.02%+2)
	24mA (LOOP)	0.001mA	±(0.02%+2)
Frequency	100Hz	0.001Hz	±(0.01%+1)
	1000Hz	0.01Hz	±(0.01%+1)
	10kHz	0.1Hz	±(0.01%+1)
	100kHz	1Hz	±(0.01%+1)
Continuity detection	500Ω	1Ω	≤250Ω It beeps

NOTE:

1) For those temperatures that are not within +18°C~+28°C, the temperature coefficient of -10°C~18°C and +28°C~55°C is ±0.005%FS/°C.
2) The sensitivity of frequency measurement: Vp-p≥1V, waveform: Rectangular wave, sine wave, triangular wave, etc.

2. Output indicator

Indicator	Range	Resolution	Accuracy
DC voltage	100mV	0.01mV	±(0.02% + 10)
	1000mV	0.1mV	±(0.02% + 10)
	10V	0.001V	±(0.02% + 10)
DC current	20mA @ 0 - 24mA	0.001mA	±(0.02%+2)
	20mA(SIM) @ 0 - 24mA	0.001mA	±(0.02%+2)
Frequency	200Hz	0.01Hz	±(0.01%+1)
	2000Hz	0.1Hz	±(0.01%+1)
	20kHz	1Hz	±(0.01%+1)
Pulse	1-100Hz	1cyc	
	1-1000Hz	1cyc	
	1-10000Hz	1cyc	
Loop power supply	24V		±10%

NOTE:

1) For those temperatures that are not within +18°C~+28°C, the temperature coefficient of -10°C~18°C and +28°C~55°C is 0.005%FS/°C.

2) The max load of DC voltage output is 1mA or 10kΩ, the smaller load shall prevail.

3) The max resistance of DC output: 1000Ω@20mA.

15. Maintenance

Warning: Make sure that the power is off before opening the rear cover of the calibrator or battery cover, and that he probe is away from input terminal and tested circuit.

1. General maintenance and repair

Clean the case by damp cloth and mild detergent, do not use abrasives or solvents.

If there is any malfunction, stop using the calibrator and send it for repair.

Please ensure that the calibrator is repaired by professionals or designated repair center.

Calibrate the meter once a year to ensure its performance.

If the meter is not in use, turn off the power. If the meter is not in use for a long time, please take out the batteries.

Ensure that the instrumentation is free from moisture, high temperature and strong electromagnetic fields.

2. Install or replace the battery (Figure 29)

NOTE: When the battery power display , it means the rest of battery power is less than 20%, to ensure that the calibrator can work normally, please replace the battery in time, otherwise the measurement accuracy might be affected. Please replace the old battery by 1.5V alkaline battery or 1.2V NI-MH battery.

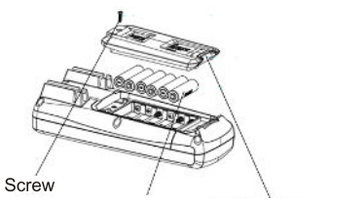


Figure 29

Instructions are subject to change without prior notice.

UT715 User Manual

UNI-T®
UNI-TREND TECHNOLOGY (CHINA) CO., LTD.
No. 6, Gong Ye Bei 1st Road,
Songshan Lake National High-Tech Industrial
Development Zone, Dongguan City,
Guangdong Province, China
Made in China