multicomp PRO

Temperature Calibrator

Model No. MP780002

IMPORTANT SAFETY INFORMATION

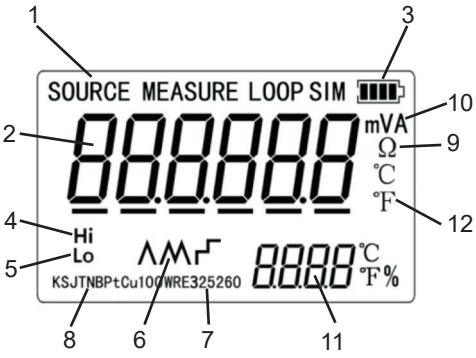
Read all instructions before using the appliance and retain for future reference.

- Please follow all safety operation instructions.
- Check the test leads, probes and case insulation before using. If you find any breakage or abnormality, or you consider the device is broken, stop using the device immediately.
- Output a test voltage to confirm the calibrator is working properly before use.
- Select the proper function and range according to the measurement requirements.
- Before using the calibrator, make sure the battery cover is closed.
- When using the probes, do not touch the metal part of the probes. Keep your fingers behind the finger guards on the probes.
- Always connect the common test lead first then the live test lead. Remove the live test lead first when disconnecting.
- Disconnect the test leads before switching to other measurements or outputs.
- Children should be supervised to ensure that they do not play with the product.
- Do not use the product for any purpose other than that for which it is designed.
- Do not operate the product around explosive gas, vapour, or dust.
- Do not operate or store in an environment of high humidity or where moisture may enter the product as this can reduce insulation and lead to electric shock.
- Turn the meter off when not in use to save the battery.
- Remove the battery if the meter is not to be used for long periods.
- Remove the test leads on the calibrator before opening the battery cover.
- Replace the battery as soon as the low battery warning appears on the display to avoid possible electric shock or personal injury caused by incorrect readings.

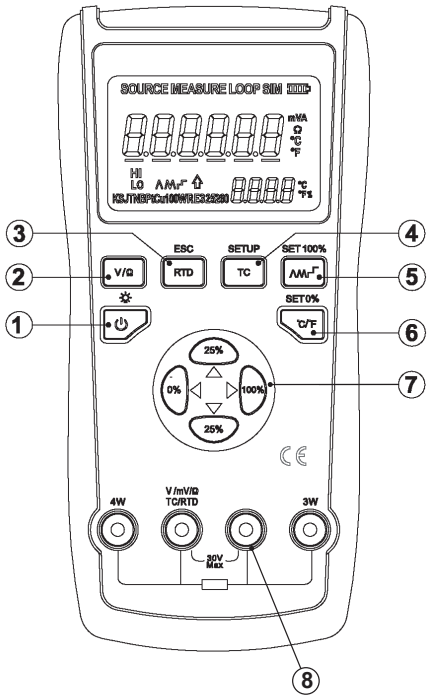
WHAT'S INCLUDED

- Calibration meter
- Battery.
- Instruction manual.
- Test leads.
- Alligator clip.

PRODUCT OVERVIEW



1. Source/Measure/Loop/Sim indicator
2. Main display
3. Low battery indicator
4. Excitation current too high
5. Excitation current too low
6. Ramp/Step indicator
7. Thermocouple output indicator
8. RTD output indicator
9. Resistance unit
10. Voltage unit
11. Percentage of source/measurement value
12. Temperature unit

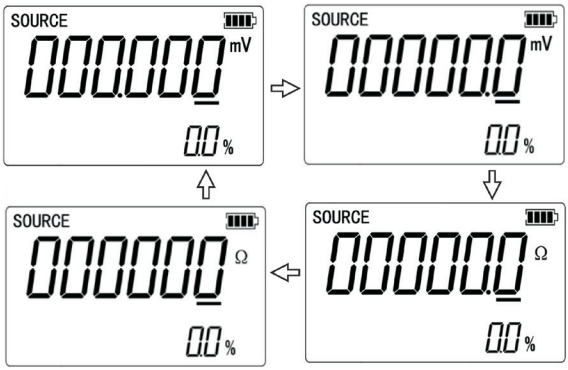


1. Power ON/OFF button
2. Mode button V/Ω
3. RTD output button
4. Thermocouple output mode button
5. SLOPE/STEP mode button
6. C/F Temperature scale button
7. Value setting buttons
8. Test lead connection terminals

FUNCTIONS

Source

- Connect the red test lead to V terminal, black to COM terminal, and connect the red probe to the positive terminal of voltmeter, black to negative terminal.
- Press the POWER button (>2s) to turn on the calibrator and it will perform self-test, which includes the internal circuit and LCD display testing. The LCD screen will display all symbols for 1s during self-test.
- Press V/Ω button to switch between mV low range and high-range output, press again to switch to resistance output, low and high ranges.



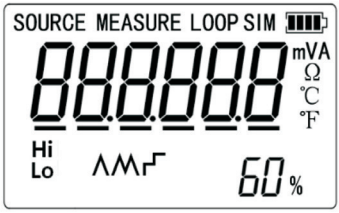
- Briefly press the UP or DOWN (25%) value buttons to add or subtract 1 for the value above the underline (the value is automatically carried and the position of the underline remains unchanged) and press LEFT (0%) or RIGHT (100%) to change the position of the underline.
- Long press C/F button until the buzzer beeps, 0mV can be used as the value of 0%.
- Similarly, use the four value buttons to increase the output to 100.0mV
- Long press SLOPE/STEP button until the buzzer beeps, 100mV can be used as the value of 100%.
- Long press UP or DOWN (25%) value buttons to increase or decrease the output between 0% and 100% in 25% steps as shown:

Auto Power Off

- The calibrator will automatically shut down if there is no button or communication operation within the 30min (factory setting), which is enabled by default and is displayed for about 2s during the booting process.
- To disable auto power off, press down LEFT (0%) value button while turning on the calibrator until the buzzer beeps.
  To enable auto power off, press down RIGHT (0%) value button while turning on the calibrator until the buzzer makes a “beep” sound.
- To adjust the auto power off time, press down RIGHT (0%) value button while turning on the calibrator until the buzzer beeps, then adjust the time between 1-30 min with the UP or DOWN (25%) value buttons, then short press TC button to save the setting (if the time is not saved, the calibrator will exit settings mode automatically in 5 seconds) and then enter the operating mode.

Backlight Brightness Control

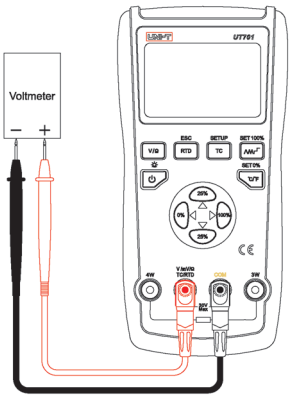
- Press down UP (25%) value button while turning on the calibrator until the buzzer makes a “beep” sound.
- Then adjust the backlight brightness by using the UP or DOWN (25%) value buttons, the brightness value is displayed on the screen as shown:
- Long press TC button to save the setting (if the settings are not saved, the calibrator will exit settings mode automatically in 5 seconds) and then enter the operating mode.



OPERATION

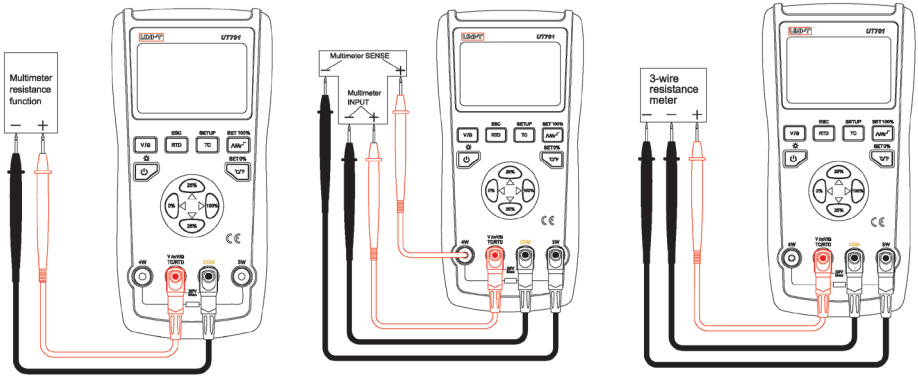
Voltage Output

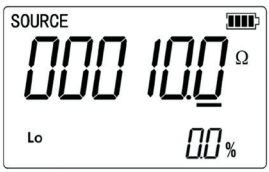
- Short press V/Ω and select voltage output, LCD displays ‘mV’ unit, then select the corresponding range as required.
- Connect the red test lead to V terminal, black to COM terminal.
- Connect the red probe to positive end of the voltmeter, black to negative end of the voltmeter.
- Select an output digit by LEFT (0%) or RIGHT (100%) buttons, and adjust its value with UP or DOWN (25%) buttons.
- Read the data on the voltmeter.



Resistance Output

- Short press V/Ω and select resistance output, LCD displays ‘Ω’ unit, then select the corresponding range as required.
- Connect the red test lead to V terminal, black to COM terminal.
- Connect the red probe to positive end of the voltmeter, black to negative end of the voltmeter.
- Select an output digit by LEFT (0%) or RIGHT (100%) buttons, and adjust its value with UP or DOWN (25%) buttons.



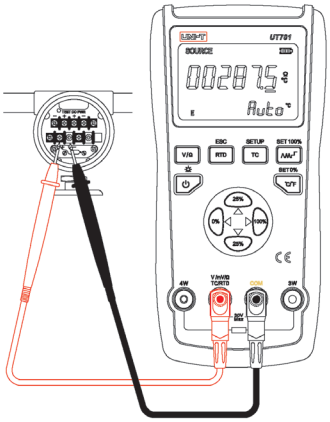


Lo symbol indicates that the excitation current is too small and the main display value will flash.

Hi symbol indicates that the excitation current is too great and the main display value will flash.

Simulating Thermocouples

- Connect the calibrator output to the instrument being measured with thermocouple wires and simulate the thermocouple as follows:
- Short press T/C button to choose the thermocouple function, LCD will display °C unit. Keep pressing this button to select the required thermocouple type (°C or °F)
- Connect the thermocouple wires to the calibrator. Connect the red test lead to TC terminal, black to COM terminal.
- Select an output digit by pressing LEFT (0%) or RIGHT (100%) buttons, and adjust its value with the UP or DOWN (25%) value buttons.



Thermocouple Cold Junction Temperature Compensation

Simulating thermocouples includes auto and manual cold junction temperature compensation.

- The auto cold junction compensation directly adopts the cold junction temperature of the device; and for the manual compensation, users can input the custom cold junction temperature through buttons.

Auto Cold Junction Temperature Compensation

- When entering the thermocouple output mode for the first time, the default method of cold junction temperature compensation is Auto, as shown in the figure above.
- To view the current value of auto cold junction temperature compensation, long press RTD button, and the Auto symbol is replaced by the current value which will display for 2 seconds and then automatically return to Auto display.

Manual Cold Junction Temperature Compensation

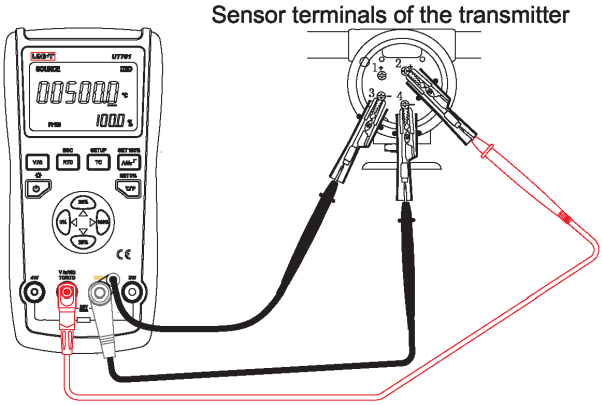
- Users can enter the required cold junction temperature through buttons. The specific steps are as follows:
- Long press TC button to enter the manual cold junction compensation setting mode.
- Adjust the manual compensation using the LEFT (0%) or RIGHT (100%) and the UP or DOWN (25%) buttons.
- Long press TC to save the manual compensation value, device will automatically return to the thermocouple output mode.
- To return to Auto compensation mode, press and hold RTD.

°C or °F Temperature Display

- In temperature mode short press C/F button to switch modes between °C or °F.

Simulating Resistance Temperature Detectors (RTD)

- Connect the calibrator to the instrument being measured according to the figure as shown, and simulate the RTD as follows:



- Press RTD button to select the RTD type.
- Connect the thermocouple wires to the calibrator as shown above: connect the red test lead to TC terminal, black to COM terminal.
- Select an output digit by pressing LEFT (0%) or RIGHT (100%) buttons, and adjust its value with the UP or DOWN (25%) value buttons.

Note: The calibrator can simulate a 2-wire RTD output on the front panel. To connect to a 3-wire or 4-wire transmitter, use stacking cables to provide additional wiring.

ADVANCED APPLICATIONS

Setting 0% and 100% Output Parameters

- Users need to set the values of 0% and 100% for the step operation and percentage display. Some values of the calibrator have been set as default.
- The table below lists the factory settings.

Output Functions	0% value	100% Value
mV (100mV)	0,000mV	100.000mV
mV (1000mV)	0.0mV	1000.0mV
Resistance 500Ω	0.0Ω	500.0Ω
Resistance 5000Ω	0.0Ω	5000Ω
Thermocouple type J	0.0°C	1000.0°C
Thermocouple type K	0.0°C	1000.0°C
Thermocouple type T	0.0°C	400.0°C
Thermocouple type E	0.0°C	800.0°C
Thermocouple type R	0.0°C	1500°C
Thermocouple type S	0.0°C	1500°C
Thermocouple type B	600°C	1800°C
Thermocouple type N	0.0°C	1000.0°C

Output Functions	0% value	100% Value
WRe526	0.0°C	2000.0°C
WRe325	0.0°C	2000.0°C
Pt100	0.0°C	500.0°C
Pt1000	0.0°C	400.0°C
Cu50	0.0°C	150.0°C
Cu100	0.0°C	150.0°C

- These factory settings may not be suitable for your work, you can reset them according to your requirements so that you can use the step or ramp output function and get the percentage display.
- Adjust the output value with four VALUE buttons, long press C/F or SLOPE/STEP until the buzzer makes a “beep” sound to set the new values of 0% and 100%. The newly set range is automatically saved in the calibrator storage area, and it is still valid after restarting.
- Now you can use the settings to do the following:
- Long press UP or DOWN (25%) to manually step (increase or decrease) the output in 25% increments.
- Long press LEFT (0%) or RIGHT (100%) to switch the output between 0% and 100% range.

Auto Ramping (inc/dec) the Output

- The auto ramping function allows you to continuously apply a varying signal from the calibrator to the transmitter and view the calibrators response.
- Press the SLOPE/STEP button and the calibrator will generate a continuous and repeating 0% - 100% ramping output.
- Three types of ramping waveforms are available:

1. 0%-100%-0% 40 second smooth ramp
2. 0%-100%-0% 15 second smooth ramp
3. 0%-100%-0% 25% step ramp pausing for 5 seconds at each step

- Press any key to exit the ramping output function.

Restore Factory Settings

- Long press the RTD button while powering on the calibration until the buzzer sounds. After the factory reset is completes the calibrator will automatically enter into the operating mode.
- The following factory settings are restored:

1. Operating mode: voltage output mode
2. Auto power off time: 30 mins (enabled)
3. LCD backlight brightness: 60%
4. Output range

SPECIFICATIONS

- All specifications are based on a one year calibration period and applied to a working temperature range of +18°C~+28°C unless otherwise specified. All specifications are obtained after a 30 minute period of operation.

Display count:	200000
Range:	manual
Operating temperature:	0°C~50°C (32°F~122°F)
Storage temperature:	-20°C~70°C (-4°F~158°F)
Relative humidity:	0°C~below 30°C:<75%; 30°C~40°C: <50%
Operating altitude:	0~2000m
Battery:	9Vx1
Dimension:	about 96x193x47mm
Weight:	about 370g (including battery)
EMC:	RF field (3V/m): overall accuracy= specified accuracy+ 5% of range RF field (>3V/m): no specified calculation

DC mV Output

Range	Max output range	Resolution	Accuracy ±(% reading + digits)
100mV	-10.00~125.00mV	0.001mV	0.05%+3
1000mV	0~1100.0mV	0.1mV	0.05%+3
-10°C~18°C, +28°C~55°C temperature coefficient: ±0.005%FS/°C Max load: 1mA or 1kΩ, select a small load			

Resistance Output

Range	Max output range	Resolution	External Excitation Current	Accuracy ±(% reading + digits)
500Ω	0.0~500.0Ω	0.1Ω	0.075mA~3.0mA	0.05%+2
5000Ω	0.0~5000.0Ω	1Ω	7.5mA~0.3mA	0.05%+2
-10°C~18°C, +28°C~55°C temperature coefficient: ±0.005%FS/°C				

Temperature RTD

Range	Range	Resolution	Accuracy ±(% reading + digits)
Pt100	-200°c~850°c	0.1°C/ 0.1°F	0.05%+0.6°C
Pt10	-200°c~850°c		0.5%+6°C
Cu50	-50°c~150°c		0.05%+0.6°C
Cu100	-50°c~150°c		0.05%+0.6°C
External excitation current allowed at output: please refer to the resistance output function.			

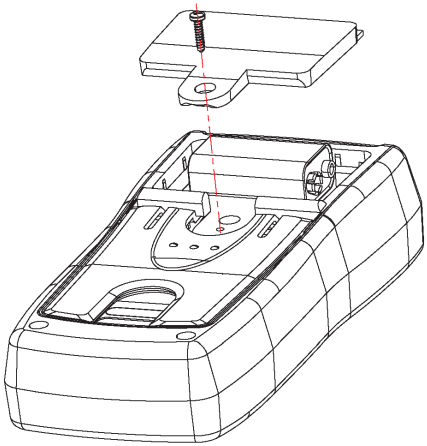
Temperature Thermocouple

Range	Max output range	Resolution	Accuracy ±(% reading + digits)
J	-200°c~0°c	0.1°C/0.1°F	1.0°C
	0°c~1200°c		0.7°C
K	-200°c~0°c	0.1°C/0.1°F	1.2°C
	0°c~1370°c		1°C
T	-200°c~0°c	0.1°C/0.1°F	1.2°C
	0°c~400°c		0.8°C
E	-200°c~0°c	0.1°C/0.1°F	0.9°C
	0°c~950°c		0.7°C
R	-20°c~0°c	1°C/1°F	2.5°C
	0°c~500°c		1.8°C
	500°c~1750°c		1.4°C
S	-20°c~0°c	1°C/1°F	2.5°C
	0°c~500°c		1.8°C
	500°c~1750°c		1.5°C
B	-600°c~800°c	1°C/1°F	2.2°C
	800°c~1000°c		1.8°C
	1000°c~1800°c		1.4°C
N	-200°c~0°c	0.1°C/0.1°F	1.5°C
	0°c~1300°c		0.9°C
Wre325	0°c~2000°c	0.1°C/0.1°F	1.8°C
Wre526	0°c~2300°c	0.1°C/0.1°F	1.8°C
The error in this table does not include the error of cold junction temperature compensation. Cold junction temperature compensation accuracy: 1.5°C			

MAINTENANCE

Warning: Before opening the rear cover or the battery cover, power the instrument down and remove the test leads from any device or circuit under test and remove the test leads from the input terminals

- If the low battery symbol illuminates on the LCD, this indicates that the battery power is less than 20%.
- Please replace the 9V battery with the same type of battery, noting correct polarity, otherwise the measurement accuracy might be affected.



CLEANING

- Clean the meter with a clean, soft cloth.
- Do not use any chemicals, abrasives or solvents that could damage the meter.

INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT.

These symbols indicate that separate collection of Waste Electrical and Electronic Equipment (WEEE) or waste batteries is required. Do not dispose of these items with general household waste. Separate for the treatment, recovery and recycling of the materials used. Waste batteries can be returned to any waste battery recycling point which are provided by most battery retailers. Contact your local authority for details of the battery and WEEE recycling schemes available in your area.

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