



UNI-T UT305S Infrared Thermometer User Manual

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UNI-T®

UNI-T UT305S Infrared Thermometer



Overview

UT305S is a high-accuracy, high-D:S ratio (50:1), wide range (-50°C~2000°C), high repeatability, durable and easy-to-operate infrared thermometer (hereinafter referred to as the thermometer) designed according to the user's field needs. The thermometer can quickly and accurately determine the surface temperature of the target by measuring the infrared energy radiated by the target surface, which is suitable for non-contact temperature measurement.

Safety Instructions

Warning:

In order to prevent eye damage or personal injury, please read the following safety instructions before using the product:

1. Do not point the laser directly at persons or animals or indirectly through reflective surfaces.
2. Do not look directly at the laser or with optical tools (binoculars, microscopes, etc.).

Caution:

- If the laser irradiates the user's eyes, please close the eyes immediately and turn the head away.
- Do not disassemble or refit the product and laser without permission.
- To ensure its safety and accuracy, this product should only be repaired by professional maintenance personnel

using original replacement parts.

- Replace the batteries when the low battery indicator shows to prevent incorrect measurements.
- Please check the product before using it. If it is damaged, cracked on the surface or missing plastic parts, do not use it.
- Please refer to the emissivity information for the actual temperature. Highly reflective objects or transparent materials will make the actual temperature higher than the measured temperature. When measuring these objects, pay attention to the risk
- of burns.
- Do not use the product in an environment with flammable and explosive liquid, gas or dust.
- Do not use the product around the environment with steam, dust, or large temperature fluctuations. It may bring inaccurate results and risks.
- Put the product in the current environment for more than 30 minutes before using it to ensure measurement accuracy.
- Do not leave the thermometer on or near objects of high temperature.

Technical Indexes

MAX/MIN/AVG/DIF	√
Lock measurement	√
Laser	Single laser, wavelength: 630nm~670nm, output power <1mW, type: class 2
Operating temperature	-5°C~50°C (23°F~122°F)
Storage temperature	-20°C~60°C (-4°F~140°F)
Operating humidity	<90%RH (non-condensing)
Drop proof	1m
Battery type	1*1604A 9V alkaline battery
Battery life	10 hours (continuous measurement mode with laser and backlight on)
Product color	Red + grey
Product weight	325g
Product size	179.00×126.50×53.00mm

Model	UT305S
Optical resolution	50:1
Measurement range	-50°C~2000°C (-58°F~3632°F)
LCD size	35*35mm
LCD display	High-contrast color EBTN
Accuracy	-50°C~0°C: $\pm(1.0^{\circ}\text{C}+0.1^{\circ}\text{C}/^{\circ}\text{C})$ 0°C~2000°C: $\pm 1.0^{\circ}\text{C}$ or $\pm 1.0\%$ (take the larger value) -58°F~32°F: $\pm(2.0^{\circ}\text{F}+0.1^{\circ}\text{F}/^{\circ}\text{F})$ 32°F~3632°F: $\pm 2.0^{\circ}\text{F}$ or $\pm 1.0\%$ (take the larger value)
Temperature index	$\pm 0.1^{\circ}\text{C}/^{\circ}\text{C}$ or $\pm 0.1\%/^{\circ}\text{C}$ take the larger value ($\pm 0.1^{\circ}\text{F}/^{\circ}\text{F}$ or $\pm 0.1\%/^{\circ}\text{F}$ take the larger value)
Repeatability	0.5°C or 0.5% take the larger value (1.0°F or 0.5% take the larger value)
Emissivity	0.1~1.0 (adjustable, stores 5 sets of preset values)
Response time	$\leq 250\text{ms}$ (95% of reading)
Spectral response	8 μm ~14 μm
Auto power off	15s
Low battery indication	✓
High/low temperature LED alarm	✓
High/low temperature sound alarm	✓
Data hold	✓
Unit conversion (°C/°F)	✓

Safety Standards

CE certification: EN61326-1 :2013; Safety standards of laser products: EN60825-1 :2014 FDA: Class 2; IEC: Class 2

Reference Standard

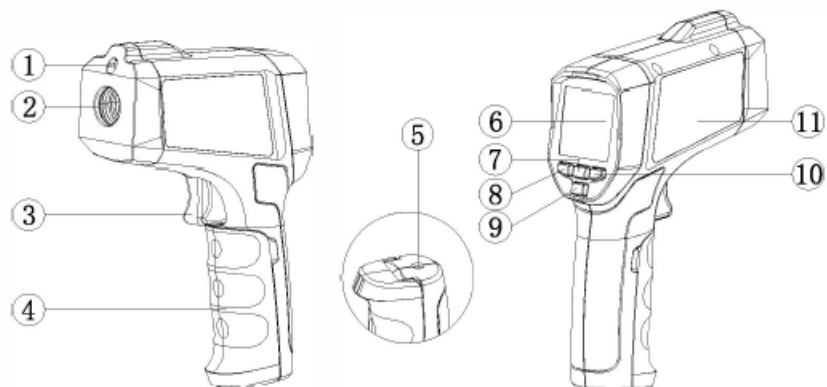
JJG 856-2015

Characteristics

1. With single-laser and high-accuracy laser adjustment technology.
2. Bright, easy-to-read and high-contrast color EBTN display.
3. MAX/MIN/AVG/DIF hold.
4. Store 5 sets of preset values (high and low temperature alarm and emissivity) for quick setting.
5. With red, green and blue LED and buzzer sound alarm, can quickly find abnormalities.
6. Trigger lock, suitable for processes that require temperature monitoring.
7. Equipped with a tripod mounting hole.

Appearance

1	Laser
2	Infrared receiving window
3	Trigger
4	Battery cover
5	Tripod mounting hole
6	LCD display
7	SET button
8	MODE button
9	Laser switch button
10	HI/LO button
11	Laser warning label



LCD Indicators

	Trigger lock
	Buzzer
HI OK LO	Temperature measurement alarm
	Low battery
SCAN	Temperature measurement
HOLD	Temperature hold
°C °F	Temperature unit
8888	Temperature main display
8888	Temperature secondary display
$\epsilon = 0.88$	Emissivity
	Laser
MAX MIN AVG DIF	Measurement mode



Startup and Shutdown

Startup

Short press (less than 0.5s) the trigger to turn on the thermometer, and the measured value before the last shutdown will be displayed. Pressing MODE button can view MAX/MIN/AVG/DIF.

Shutdown

The thermometer will automatically shut down after 15 seconds without any operation in the HOLD mode, and save the current measured value.

Manual Measurement

1. After aiming at the measured object, press the trigger and hold it. When the SCAN symbol is flashing, it means that the temperature is being measured, and the measurement result will be updated on the LCD.
2. Release the trigger, the SCAN symbol will disappear while the HOLD symbol will be displayed. The thermometer will stop measuring the temperature and keep the last measured value.

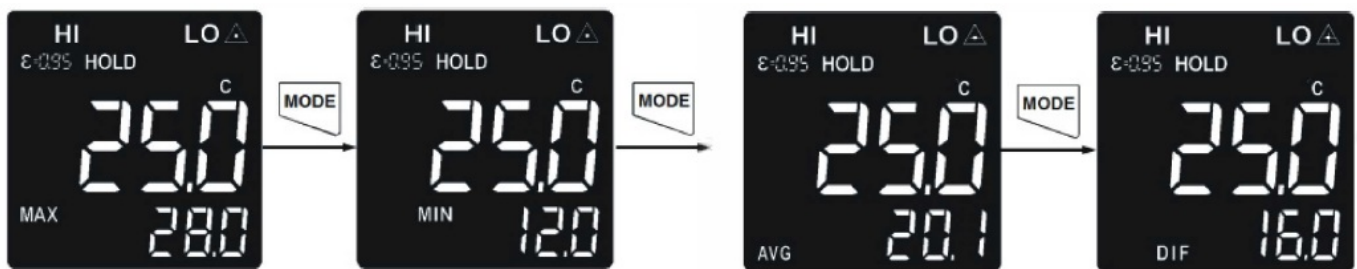
Lock Measurement

1. When lock measurement is turned on, short pressing the trigger can trigger this function. The Q symbol will be displayed on the LCD and the SCAN symbol will flash. The thermometer will measure the target temperature continuously without pressing the trigger all the time.
2. Press the trigger again, the Q and SCAN symbols will disappear while the HOLD symbol will appear. The thermometer will stop measuring and keep the last measured temperature.
3. In the lock measurement setting interface, the user can set the lock measurement time (1 m~5h). After the lock function is triggered, the timing starts. When the set time is reached, the thermometer will automatically shut down and save the last measured value. The user can view the measured value by short pressing (less than 0.5s) the trigger (Caution: the measured value will be cleared if the user long presses the trigger). This operation is suitable for processes that require regular temperature monitoring.

Caution: The measured target should be greater than 2 times the thermometer light spot diameter (S), and then the test distance (D) can be determined according to the D: S relationship diagram.

MAX/MIN/AVG/DIF Value

Short press the “MODE” button to switch among “MAX→MIN→AVG→DIF” measurement modes in sequence, and the temperature of the corresponding mode will be displayed in the secondary display position (as shown below).



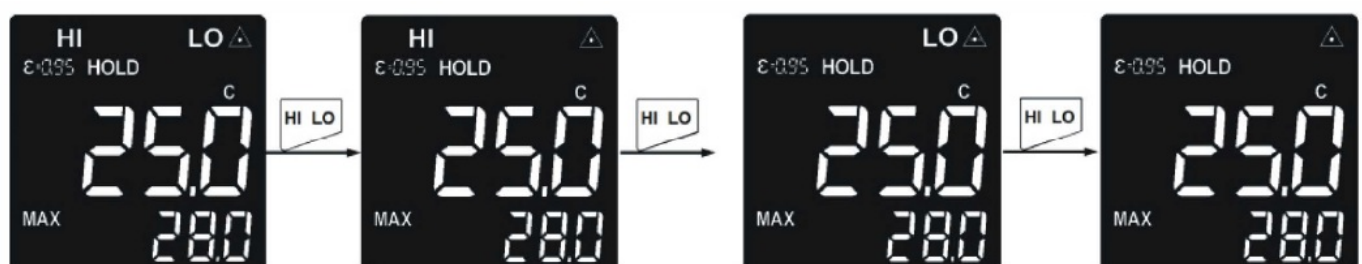
Laser Indicator

Pressing the & button can turn on/off the laser indication function. When it is turned on, the laser symbol & will display on the LCD, and the laser will accurately indicate the measured position.

Note: Please follow the cautions when turning on the laser to avoid eyes injury.

High/Low Temperature Alarm

Pressing the “HI/LO” button can turn on/off the high and low limit alarm function in sequence. The sequence is: HI/LO limit alarm functions are turned on at the same time→HI limit alarm is turned on→LO limit alarm is turned on→HI/LO limit alarm functions are turned off at the same time (as shown below). When the HI alarm is turned on, if the measured temperature is higher than the set high alarm limit, the red LED and the HI symbol on the display will flash. If the sound alarm is turned on, the buzzer will beep. When the LO alarm is turned on, if the measured temperature is lower than the set low alarm limit, the blue LED and the LO symbol will flash. If the sound alarm is turned on, the buzzer will beep. When either HI/LO alarm is turned on, if the measured temperature value is within the range of high and low alarm limit, the green LED and the OK symbol will flash.



Function Settings

In the HOLD interface, pressing the “SET” button can enter the high alarm limit→low alarm limit→emissivity→\ temperature unit→sound alarm→lock measurement and other function settings. Under these setting interfaces, the user can return to the HOLD interface by pressing the trigger or no operation for 1 0s.

High Alarm Limit Setting

In the HOLD interface, pressing the “SET” button once will enter the high alarm limit setting interface, and then pressing the “&” button can quickly select the preset values (P1-P5). If there is no wanted value among the preset values, the user can use “T” or “.” to adjust at any of the preset values that is closest to the wanted one. Short pressing will add or subtract 1 to the value each time, and long pressing will add or subtract 1 0 each second.



Low Alarm Limit Setting

In the HOLD interface, pressing the “SET” button twice will enter the low alarm limit setting interface. The user can use “f” or “.” to adjust the value. Short pressing will add or subtract 1 to the value each time, and long pressing will add or subtract 10 each second.



Emissivity Setting

In the HOLD interface, pressing the “SET” button three times will enter the emissivity setting interface, and then pressing the “_&” button can quickly select the preset values (P1-P5). If there is no wanted value among the preset values, the user can use “f” or “.” to adjust at any of the preset values that is closest to the wanted one. Short pressing will add or subtract 0.01 to the value each time, and long pressing will add or subtract 0.1 each second.



Temperature Unit Setting

In the HOLD interface, pressing the “SET” button four times will enter the temperature unit setting interface. The

user can use “f” or” .6.” to convert the unit ‘C/F.

Sound Alarm Setting

In the HOLD interface, pressing the “SET” button five times will enter the sound alarm setting interface. The user can use “.a.” or” T” to turn on / off this function. When the function is on, the symbol “ will be displayed on the HOLD screen. and when the function is off, the symbol “ will disappear.

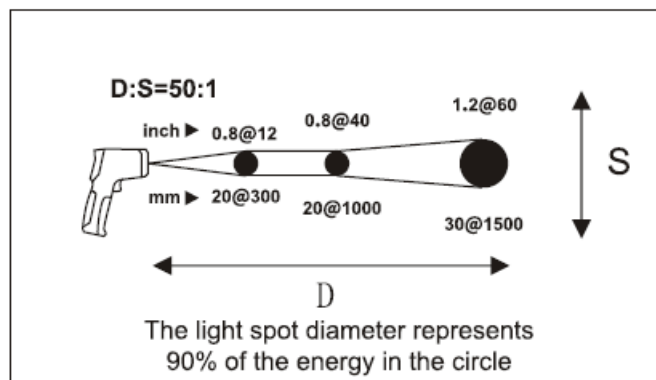
Lock Measurement Setting

In the HOLD interface, pressing the “SET” button six times will enter the lock measurement setting interface. The user can use “T” or” .6.” to turn on/off this function. When the function is turned on, pressing & button can set the lock measurement liming “00:00”, and the selected time position will flash. The user can use “T” or” .a.” to adjust the value. If the user needs to turn off the timing function, set it to “00:00” and then it will jump to display “-:-”.



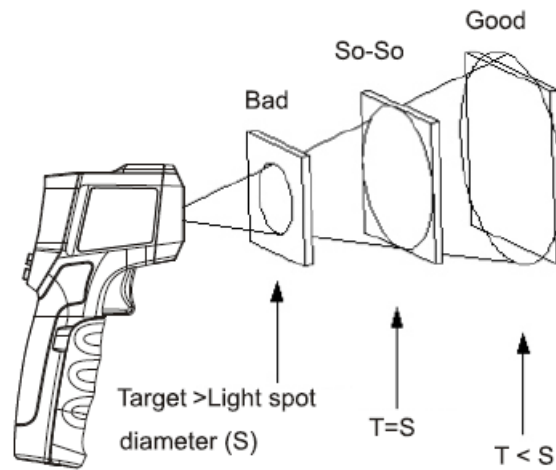
D: S (Distance to Spot Ratio)

As the distance (D) between the thermometer and the measured target increases, the light spot diameter (S) of the measured area also increases. The relationship between measurement distance and light spot diameter is shown in the figure below.



Field of View

When measuring, make sure that the measured target is larger than the light spot diameter. The smaller the target, the closer the test distance should be (refer to D: S for the detailed light spot diameter). It is recommended that the measured target be larger than twice the light spot diameter of the thermometer.



Emissivity

Emissivity represents the material energy radiation. The emissivity of most organic materials, painted or oxidized surfaces is about 0.95. The user can use masking tapes or flat paints to cover the metal surface, use the high emissivity setting, and then wait for a period of time to make the surface temperatures of the tapes/flat paints and the covered object the same. At this point, the surface temperature of the tapes/flat paints is equal to the metal surface temperature. The following table shows the total emissivity E of some metals and non-metals.

Measured surface	Emissivity
Metals	
Aluminum Oxide	0.2-0.4
A3003 Alloy Oxide Crude	0.3 0.1-0.3
Brass Polishing Oxide	0.3 0.5
Cuprum Oxide Electrical terminal board	0.4-0.8 0.6
Hastelloy Alloy	0.3-0.8
Inconel Oxide Abrasive blasting Electropolishing	0.7-0.95 0.3-0.6 0.15
Ferrum Oxide Rusting	0.5-0.9 0.5-0.7
Ferrum (casting) Oxide Non-Oxide Casting	0.6-0.95 0.2 0.2-0.3
Ferrum (forging) Passivating	0.9
Plumbum Crude Oxide	0.4 0.2-0.6
Molybdenum Oxide	0.2-0.6
Nickel Oxide	0.2-0.5
Platinum Black	0.9

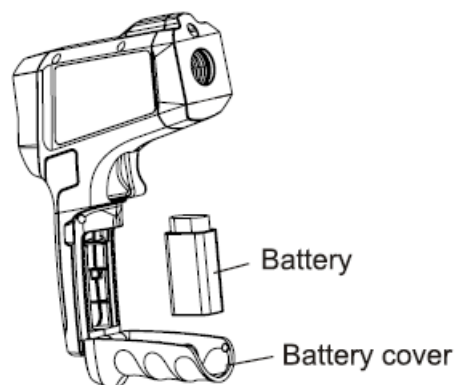
Steel	
Cold rolling	0.7-0.9
Burnishing	0.4-0.6
Polishing	0.1
Zinc	
Oxide	0.1
Non-Metals	
Asbestos	0.95
Asphalt	0.95
Basalt	0.7
Carbon	
Non-Oxide	0.8-0.9
Graphite	0.7-0.8
Carborundum	0.9
Ceramic	0.95
Clay	0.95
Concrete	0.95
Cloth	0.9
Glass	
Convex glass	0.76-0.8
Smooth glass	0.92-0.94
Nonex	0.78-0.82
Sheet material	0.96
Gypsum	0.8-0.95
Ice	0.98
Limestone	0.98
Paper	0.95
Plastic	0.95
Water	0.93
Soil	0.9-0.98
Wood	0.9-0.95

Maintenance

Cleaning

Blow away the fallen particles with clean compressed air, carefully wipe the lens surface with a moist swab, and clean the shell with a moist sponge or soft cloth. Be careful not to rinse with water or immerse it in water.

Replace Battery



Install or replace a 9V battery (1604A) according to the following steps:

1. Remove the battery cover

2. Install the battery (pay attention to the polarity)
3. Close the battery cover


Troubleshooting

Phenomenon	Cause	Measure
Display OL	Measured value > maximum range	Stop measuring
Display -OL	Measured value < minimum range	Stop measuring
Display Err (startup)	Exceed the minimum or maximum operating temperature	Place the thermometer at -5°C-50°C (23°F-122°F) for 30 minutes
Battery symbol flashes	Low battery	Replace batteries
Laser is not working or dark	Low battery	Replace batteries
Inaccurate measurement	Unmatched emissivity, too far measurement distance, diameter of the measurement target<20mm	Refer to Field of View, D:S and other instructions in this manual

UNIT UNI-TRENC TECHNCLCGV (CHINA) CC.1 LTC.

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Documents / Resources

	<p>UNI-T UT305S Infrared Thermometer [pdf] User Manual UT305S Infrared Thermometer, UT305S, Infrared Thermometer</p>
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