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UT309D Professional Infrared Thermometer User Manual

Overview

UT309 series professional non-contact infrared thermometer can determine surface temperature through measuring infrared energy radiated by the target surface.

Safety Instructions

⚠ **Warning:**

- To avoid eyes or personal injury, please read the following safety instructions before using this product:
- Please do not irradiate people or animals with laser directly or indirectly.
- Please do not look at the laser directly or through other optical tools (telescope, microscope, etc).
- Before using the product, if battery symbol on LCD display is flashing, replace batteries at immediately to avoid inaccurate measurements.
- Before using the product, check the product for damages. If the surface has cracks or lacks rubber parts, do not use the product.
- Please refer to the radiation coefficient (emissivity chart at the end of the manual) to get the actual temperature. Reflective objects will cause the measured value to be lower than the actual temperature value. When measuring these objects, please be aware not to touch high temperature surfaces.
- Do not use this product in explosive gas and steam environment.
- To ensure measurement accuracy, place this product in test environment temperature for more than 30 minutes before using it.
- Avoid keeping the thermometer near high temperature objects for a long time.

Specifications

Functions	UT309D
Measurement Range	-35℃~650℃（-31℉~1202℉）
Accuracy 21℃~25℃ (70℉~ 77℉)	⩾0℃：±1.8℃ or ±1.8% of reading, whichever greater. < 0℃:±(1.8℃+0.1℃/℃)
	⩾32℉:±3.6℉ or ±1.8% of reading, whichever greater. < 32℉:±(3.6℉+0.1℉/℉)
Temperature Coefficient	0.1℃/℃ (0.1℉/℉) or ±0.1% of reading per degree, whichever greater
D:S Ratio	12:1 (calculated when energy is 90%)
Emissivity	0.1~1.0 adjustable
Response Time	250ms (95% of reading)
Spectral Response	8um~14um
Display Resolution	0.1℃ (0.1℉)
Repeatability	±1.0℃ (1.8℉) or 0.8% of reading, whichever greater.
Laser Quantity	Dual Laser
Laser Type	CLASS II
Laser Wavelength	630nm~670nm
Laser Power	<1mW
Battery Type	9V Alkaline Battery (6F22)
Battery Life	⩾6h (Work continuously with backlight on)
Product Size	189mm*118mm*55mm
Weight	292g
Operating Temperature	0℃~50℃ (32℉~104℉)
Storage Temperature	-20℃~60℃ (-4℉~140℉)
Operating Humidity	< 90% RH (non-condensing)
Operating Altitude	2000m
Storage Altitude	12000m
Protection Level	According to IEC60529, complies with IP65
Drop Test	3m

Safety Standards

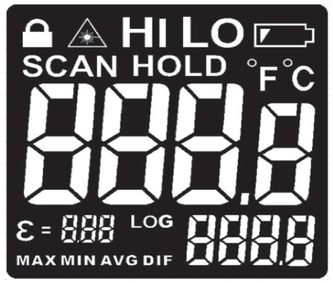
CE Identification: EN61326: 2013 EN61326-2-2: 2013
Laser Safety Standard: EN60825-1: 1994+A2: 2001+A1: 2002

Product Features

Strong and Durable: Passed 3m drop test
Dustproof and Waterproof: Passed IP65 level dustproof and waterproof tests.
Ergonomic Design: Comfortable handheld, simple and convenient operation.
MAX/AVG/DIF/MIN: Can quickly display the maximum, minimum, average and difference value (between maximum and minimum) during measurement.
Large Backlight Screen: Large screen, bold fonts, and uniform white backlight combined makes it an attractive display.
Alarm Function: High and low temperature alarm is displayed with flashing LED and screen, to easily observe measurement results when alarm is triggered.
Dual Laser: Dual wavelength laser indication to enhance measurement area accuracy.
Data Storage: Up to 20 groups data for measurement analysis

Function Description

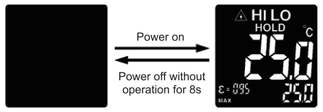
🔒	Temperature measurement lock trigger
⚠	Laser on
HI LO	High and low limit alarm
	Low battery
SCAN	Temperature measurement trigger
HOLD	Measurement data hold
℉℃	Unit
888.8	Measurement value on main display
MAX MIN AVG DIF	Mode
ε=0.88	Emissivity
8888	Measurement value on secondary display
LOG	Data storage symbol



Operations

Power On and Off

1. Gently pull the trigger to power on thermometer, LCD screen and backlight will be on.
2. The thermometer will power off automatically without operation in 8s.



Manual Measurement

1. Pull and hold the trigger after aiming at the target. SCAN icon will be flashing indicating target object temperature is being measured.
2. Release trigger and SCAN icon disappears, HOLD icon appears, indicating measurement has stopped and the last measured value is kept.

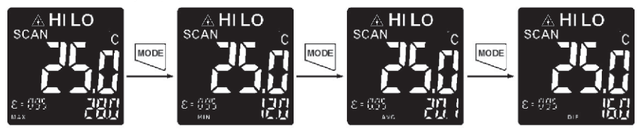
Temperature Locking (Trigger Free Measurement)

1. During temperature locking, pull trigger to enable function. 🔒 icon will appear on thermometer screen and SCAN icon flash. Thermometer keep continuous measurement target temperature, and backlight is auto off after 2 minutes.
2. Pull trigger again, 🔒 and SCAN icons will disappear, HOLD icon will appear. Thermometer stop measurement and keeps the last measured value.

Note: During measurement, target must be larger than the light spot to ensure accuracy. Please refer to the D:S values.

MAX/MIN/AVG/DIF Value Reading

Short press MODE button to change MAX/MIN/AVG/DIF modes respectively, temperature value of corresponding modes are shown in the secondary display area.



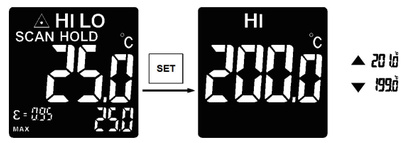
HIGH Alarm ON/OFF

Short press SET button to switch to HIGH alarm ON/OFF setup (as shown below), use up and down buttons to switch between ON/OFF. Device will exit setup after 5 seconds without any operation.
When HIGH alarm is ON, HI symbol and red backlight will flash when temperature exceeds high alarm limit.



HIGH Alarm Limit Setup

Short press SET button to switch to HIGH alarm limit setup (as shown below), use up and down buttons to set values. Short press up or down buttons to add or subtract 1, long press up or down button to add or subtract 10. Device will exit limit setup after 5 seconds without any operation.



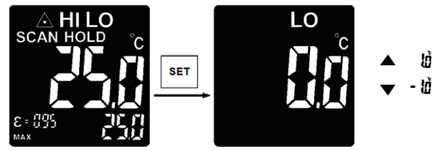
LOW Alarm ON/OFF

Short press SET button to switch to LOW alarm ON/OFF setup (as shown below), use up and down buttons to switch between ON/OFF. Device will exit setup after 5 seconds without any operation.
When LOW alarm is ON, LO symbol and BLUE backlight will flash when temperature exceeds high alarm limit.



LOW Alarm Limit Setup

Short press SET button to switch to LOW alarm limit setup. Please use HIGH alarm setup procedure to setup LOW alarm.



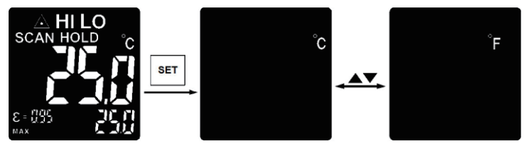
Emissivity Setup

UT309D emissivity can be adjusted from 0.01 to 1.0. Short press SET button to enter emissivity setup interface (as shown below). Use up and down function buttons to set values. Short press up button or down button to add or subtract 0.01 unit, long press up button or down button to add or subtract 0.1. Thermometer will exit setup after 5 seconds of no operation.



Unit Setup

Short press SET button to switch to unit setup interface (as shown in the following figure), use up and down function buttons to change ℃ and ℉ units. Thermometer will exit setup after 5 seconds of no operation.



Laser ON/OFF

Short press SET button to enter laser on or off setup interface (as shown below), use up and down function buttons to open or close laser. Thermometer will exit setup after 5 seconds of no operation.



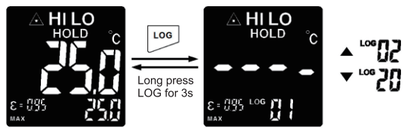
Lock Measurement ON/OFF

Short press SET button to switch to ON/OFF setup interface (as shown in the following figure), use up and down function buttons to open or close laser. Thermometer will exit setup after 5 seconds of no operation.



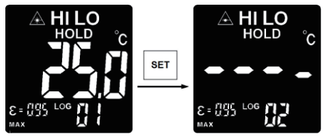
Storage mode

Under measurement mode (HOLD), short press LOG to enter into storage mode. Under storage mode, press up and down button to scan storage data (max.20 groups). '----' indicates there is no storage data. Long press LOG to return to measurement mode.



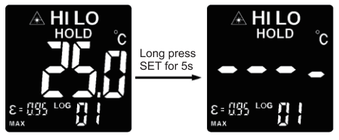
Data storage

Under storage mode, press SET, data flashes 3 times and is saved in current data group.



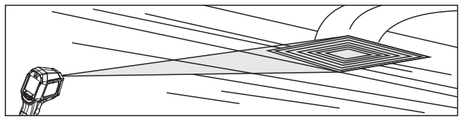
Delete data

Under data storage mode, long press SET for 5s to delete all data (20 groups)

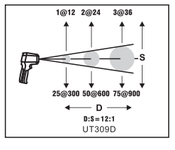


Find Heat Point and Cold Point

Aim at target area with thermometer, then move up and down slowly to sweep the whole area until find the heat point and cold point.

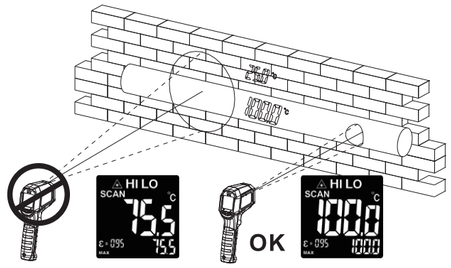


D:S ratio (Distance to measurement surface: Diameter of temperature measurement area)
S increases with the increase of D. Optimum result is obtained when D=30cm.



Visual Field

Ensure that the target is larger than S. The smaller the target is, the closer is the measurement distance should be. Optimum result is obtained when diameter of the target is more than 2.5 times of S.



Emissivity

Emissivity characterization reflects the material's radiated energy. Emissivity for most organic materials, paints or oxidized surfaces are about 0.95. Total emissivity of selected metals and non-metals are listed in the following table.

Measured Surfaces	Emissivity
Metal	
Aluminum	
Oxidization	0.2-0.4
A3003 Alloy	
Oxidization	0.3
Rough	0.1-0.3
Brass	
Burnishing	0.3
Oxidization	0.5
Copper	
Oxidization	0.4-0.8
Electric Terminal Board	0.6
Hastelloy	
Alloy	0.3-0.8
Inconel	
Oxidization	0.7-0.95
Sand-Blasting	0.3-0.6
Electro Burnishing	0.15
Iron	
Oxidization	0.5-0.9
Rusting	0.5-0.7
Iron (Casting)	
Oxidization	0.6-0.95
Non-Oxidization	0.2
Casting	0.2-0.3
Iron (Forging)	
Passivation	0. 9
Lead	
Rough	0.4
Oxidization	0.2-0.6
Molybdenum	
Oxidization	0.2-0.6
Nickel	
Oxidization	0.2-0.5
Platinum	
Black	0.9
Steel	
cold rolling	0.7-0.9
Steel Plate Burnishing	0.4-0.6
Steel Plate Rubbing	0.1
Zinc	
Oxidization	0.1

Non-Metal	
asbestos	0.95
asphalt	0.95
basalt	0.7
Carbon	
Non-Oxidization	0.8-0.9
Graphite	0.7-0.8
Silicon Carbide	0.9
ceramics	0.95
Clay	0.95
concrete	0.95
Cloth	0.9
Glass	
Convex Glass	0.76-0.8
Smooth Glass	0.92-0.94
Lead-Boron Glass	0.78-0.82
Plates	0.96
Stone Products	0.93
Plaster	0.8-0.95
Ice	0.98
Limestone	0.98
Paper	0.95
Plastics	0.95
Water	0.93
Soil	0.9-0.98
Wood	0.9-0.95

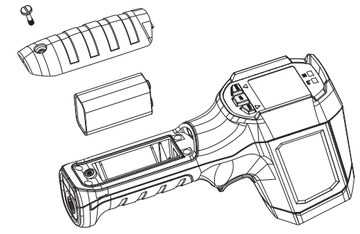
Maintenance

Clean

Use clean compressed air to blow away falling particles.
Use wet cotton swab to carefully wipe lens surface.
Use wet sponge or soft cloth to clean product exterior.

Battery Replacement

Install or replace 1604A 9V battery according to the following figure.



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