CDI Electronics

511-0300

Operating Manual

Non-contact Infrared Thermometer

Introduction

The Model UT300A and UT300B Infrared Thermometer (hereafter, the "Thermometer") can determine the surface temperature by measuring the amount of infrared energy radiated by the target's surface. They have different distance to spot (D:S) figure and different temperature range, details see the contents.

The Thermometers are non-contact infrared thermometer with low consumption design so that they can be used for a longer time, which can solve the frequently changing battery and low battery issues during measurement. Intelligent design can make measurement easier and quicker. The Thermometer can intelligently select battery or USB power source.

Safety Information

⚠ Warning

A warning identifies conditions and actions that pose hazards to the user. To avoid electrical shock or personal injury, follow these guidelines:

- ⚠ Do not point laser directly at eye or indirectly off reflective surfaces.
- Before using the Thermometer inspect the case. Do not use the Thermometer if it appears damaged. Look for cracks or missing plastic.
- Replace the battery as soon as the battery indicator appears.
- Do not use the Thermometer if it operates abnormally. Protection may be impaired. When in doubt, have the Thermometer serviced.
- Do not operate the Thermometer around explosive gas, vapor, or dust.
- To avoid a burn hazard, remember that highly reflective objects will often result in lower than actual temperature measurements.
- Do not use in a manner not specified by this manual or the protection supplied by the equipment may be impaired.

Figure 1. Symbols and Safety Markings

Caution

To avoid damaging the thermometer or the equipment under test protect them from the following:

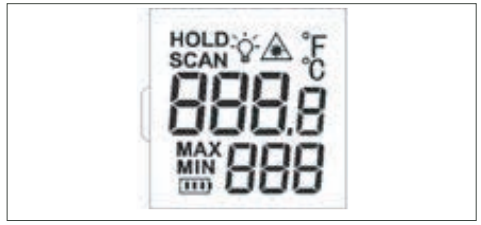
- EMF (electro-magnetic fields) from arc welders, induction heaters, etc.
- Static electricity.
- Thermal shock (caused by large or abrupt ambient temperature changes – all 30 minutes from the Thermometer to stabilize before use).
- Do not leave the Thermometer on or near objects of high temperature.

Features

The Thermometer includes:

- Single-spot Laser Sighting
- White color Backlit Display
- Current Temperature Plus MIN and MAX Temperature Displays
- Degree Celsius and Fahrenheit Temperature Selectable
- Battery power monitoring
- Low Battery Display

Display



⚠	Laser "On" Symbol
HOLD SCAN	SCAN or HOLD
MAX/MIN	Temperature values for the MAX and MIN
	Battery indication
	Display backlit
°C / °F	°C / °F Symbol (Celsius/Fahrenheit)

How the Thermometer Works

Infrared thermometers measure the surface temperature of an opaque object. The Thermometer's optics sense infrared energy, which is collected and focused onto a detector. The Thermometer's electronics then translate the information into a displayed temperature reading which appears on the display. The laser is used for aiming purposes only.

Operating the Thermometer

The Thermometer turns on when you press the trigger. The Thermometer turns off when no activity is detected for 8 seconds.

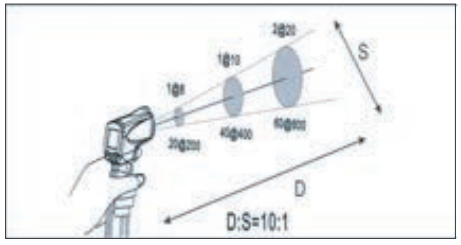
To measure temperature, aim the Thermometer at the target, pull and hold the trigger. Release the trigger to hold a temperature reading.

Be sure to consider distance-to-spot size ratio and filed of view. The laser is used for aiming only.

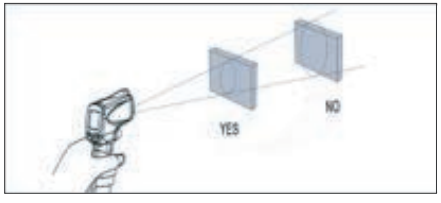
Button / Connector	Description
°C / °F	Press to toggle between Celsius and Fahrenheit.
MAX/MIN	Press to toggle between MAX and MIN options. MAX and MIN values are displayed on the secondary display.
/ ⚠	Press to toggle between turning on the laser and display backlight. The sequence is: , , ⚠ , none.

Locating a Hot or Cold Spot
To find a hot or cold spot, aim the Thermometer outside the target area. Then, slowly scan across the area with an up and down motion until you located the hot or cold spot. See Figure 5.

Distance and Spot Size
As the distance (D) from the target being measured increases, the spot size (S) of the area measured by the unit becomes larger. The spot size indicates 90% encircled energy. The maximum D:S is obtained when the Thermometer is 1000mm (100 in) form the target resulting in a spot size of 20mm (2 in).



Field of View
Make sure that the target is larger than the spot size. The smaller the target, the closer you should be to it. Suggested distance less than 75% of the theory value.



Emissivity
Emissivity describes the energy-emitting characteristics of materials. Most organic materials and painted or oxidized surfaces have an emissivity of about 0.95.

If possible, to compensate for inaccurate readings that may result from measuring shinymetal surfaces, cover the surface to be measured with masking tape or flat black paint (<150 ℃/ 302℉) and use the high emissivity setting. Allow time for the tape or paint to reach the same temperatures as the surface beneath it. Measure the temperature of the tape or painted surface.

Maintenance

Changing the Battery
To install or change the 9V battery, open the battery compartment the battery.

Cleaning the Lens
Blow off loose particles using clean compressed air. Carefully wipe the surface with a moist cotton swab. The swab may be moistened with water.

Cleaning the Housing
Use soap and water on a damp sponge or soft cloth. To avoid damage to the Thermometer, do not soak the unit into water.

⚠ Caution
To avoid damaging the Thermometer, do NOT submerge it in water.

Troubleshooting

Symptom	Problem	Action
OL (on display)	Target temperature is over range	Select target with specifications
-OL (on display)	Target temperature is under range	Select target with specifications
🔋	Low Battery	Replace Battery
Blank Display	Possible dead battery	Check and / or replace battery
Laser does not work	• Low or dead battery • Ambient temperature above 40℃ (104℉)	• Replace battery • Use in area with lower ambient temperature.

CE Certification

The Thermometer conforms to the following standards:

- EN61326: 2006
- EN60825-1: 1994+A2: 2001+A1: 2002 Laser Safety Standard

Certification testing was conducted using a frequency range of 80 to 100MHz with instrument in three orientations.

Specifications

Function	511-0300
Auto Power off	✓
HOLD	✓
SCAN	✓
MIN	✓
MAX	✓
Laser turn off	✓
℃/℉ Selectable	✓
Emissivty	0.95
Temperature Range	-18℃ ~ 280 ℃
Maximum Measuring Accuracy	±2℃ or ±2%. Assumes ambient operating temperature of 23℃ ±2℃ .
Repeatability	<±0.5 ℃ or <±0.5%
Resolution	0.1
Response Time	500mS
White Display Backlit	✓

Typical Temp Readings		
OUTBOARDS		
Location	Max Degrees	
	F	C
Heads	180	82.2
Stator	280	137.8
Exhaust Plate	180-230	82.2-110
Thermostat Hsg	180	82.2
Regulator	180	82.2
Inboards		
Heads	180	82.2
Exhaust Manifold	180.230	82.2-110
Exhaust Risers	180.230	82.2-110
Thermostat Hsg	180	82.2
Regulator where applicable	180	82.2