

SENTRY
SENTRY®

SENTRY OPTRONICS CORP.

**Broad Temp
Infrared Thermometer**

MODEL: ST 663

CE



**Instruction
Manual**

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Infrared Thermometer**

Instruction Manual

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1. Product Introduction

Thank you for purchasing this infrared thermometer. The Infrared Thermometer is a non-contact infrared temperature measuring instrument. To measure a temperature, point the unit at the object until the temperature is read, pull the measuring trigger and hold. Make sure the target area is larger than the unit's spot size. For large target objects assure you are within target distance.

1-1 Features

- Adjustable emissivity from 0.1 to 1.00 in 0.01 steps.
- Ultra low power consumption in shutdown mode.
- Extended long time measuring reliability.
- Laser sighting On/Off is switchable.
- Backlit LCD display.
- °C or °F selectable.
- Electronic trigger lock.
- Temperature data storage.
- Audible alarms


1-2 Applications

- Electrical troubleshooting.
- Automotive repair and maintenance.
- Air conditioner.
- Science experiment.
- Manufacturing processes of semiconductor technology.
- Test terminals on circuits.
- Food safety and processing.
- Perform HVAC energy audits.

2. Safety Information

Read the following safety information carefully before attempting to operate or service the meter. Only qualified personnel should perform repairs or servicing not covered in this manual.


Laser Warning Note!

 Do not aim laser spot directly at human eye, keep it away from the area that children can fetch.

2-1 Cautions!

- DO NOT submerge the unit in water.
- This product is not designed for use in medical evaluations. The product can only be used to measure body temperature simply for reference. They are meant for industrial and scientific purposes.

2-2 Safety symbols

 Dangerous, refer to this manual before using the meter.

 CE Certification.

This instrument conforms to the following standards:

EN61326:Electrical equipment for measurement, control and laboratory use.

IEC61000-4-2:Electrostatic discharge immunity test.

IEC61000-4-3: Radiated, radio-frequency, electromagnetic field immunity test.

IEC61000-4-8: Power frequency magnetic field immunity test.

Tests were conducted using a frequency range of 80-1000MHz with the instrument in three orientations. The average error for the three orientations is $\pm 0.5^{\circ}\text{C}$ ($\pm 1.0^{\circ}\text{F}$) at 3V/m throughout the spectrum. However, between 781-1000MHz at 3V/m, the instrument may not meet its stated accuracy.

3. Specifications

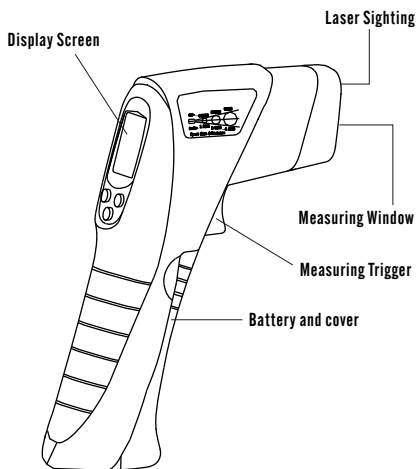
Distance/Spot Ratio	12:1
Temperature Range	-50~999°C(-58~1830°F)
Accuracy (Assumes Operation Ambient Temperature of 25°C/77°F)	±3°C(±5°F) From -50~-20°C(-58~-4°F) ±2°C(±3°F) From -20~100°C(-4~212°F) ±2% From 100~999°C(212~1830°F)
Thermopile	8~14 μm
Repeatability	±1°C(±2°F)
Resolution	1°C(1°F)
Response Time	500 ms.
Operation Temp.	0~50°C(32~122°F), 10~90%RH
Emissivity	Adj. 0.1~1.0
Auto Power Off	YES
°C/°F Switchable	YES
Backlight	YES
Laser Sight Switchable	YES
Max/Min/Avg./ΔT	YES
Auto-measuring	YES
10 point memory	YES
Audio Alarm	YES
Battery Type	9V(006P, IEC6F22, NEDA1604)
Battery Life	16 hrs.
Dimensions	170x133x45mm (6.69"x5.23"x1.77")
Weight	187g Approx.
Accessory	9V Battery, Instruction manual, Carrying case.

4. Operation of Instrument

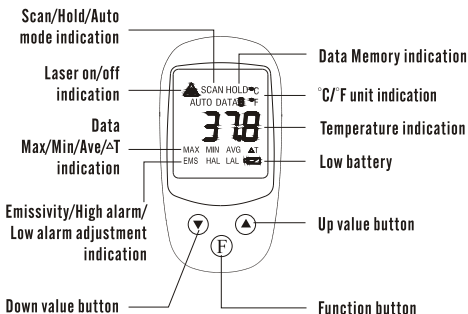
4-1 Quick Start

To measure a temperature, point the unit at the target you want to measure, pull the trigger and hold. In **SCAN** mode, the LCD displays the current temperature in Celsius or Fahrenheit. The unit will **HOLD** the last reading for about 6 seconds after the trigger is released; the word **HOLD** appears. Be sure to consider the target area inside the angle of vision of this instrument. The laser is used for aiming only. For small targets at short distances the aim should be adjusted respectively.


4-2 Unit Diagram



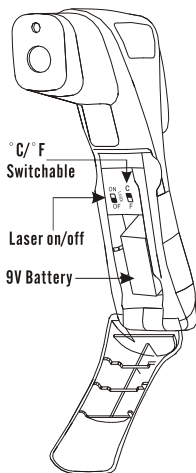
LCD Display



4-3 $^{\circ}\text{C}/^{\circ}\text{F}$ and Battery Change

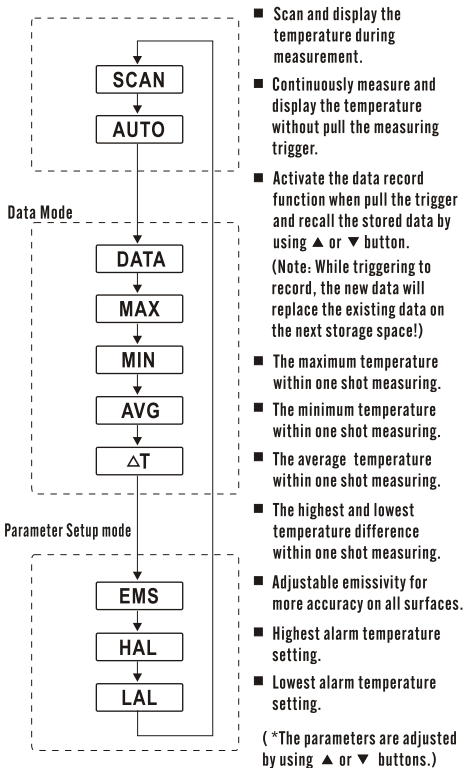
The unit is powered by 9V battery and displays temperatures in either $^{\circ}\text{C}$ or $^{\circ}\text{F}$. The user has to replace the battery when the battery voltage drops below the voltage for reliable operation and at the same time the low battery symbol  will appear.

To change the 9V battery, pull open the unit's handle by using the finger. Change the 9V battery with a new one and push the battery cover back.



4-4 Advance Function

To operate more advance functions, it is simply by using "F" button to change. The sequential operations and the corresponding explanations are shown in the following flow-chart.



Remarks

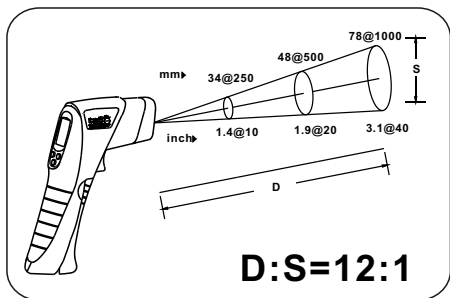
If you want to know more details of our tender considerations for users on the operations, please read the following contents.

- No matter you push the measuring trigger or not, when the unit's power is on, you can change the functions or adjust the parameters.
- To avoid dummy operations, the setup of functions can be performed, only after the unit wakes up by the measuring trigger to make sure the correct operations.
- To avoid careless touch, some power management designs have to be implemented.
 - **Auto** function allows you continuously measure the target temperature and you don't have to keep pulling the measuring trigger all the time.
 - **Auto** function can be only setup when both the measuring trigger and the **F** function button are pressed at the same time.
 - The unit is totally power off, no more standby current when storage, to keep battery last much longer.

5. Techniques Of Infrared Thermometer

5-1 Field of view(FOV) ratio =Distance to diameter (DS) ratio

The field of view is the angle of vision at which the instrument operates, and is determined by the optics of the unit. The FOV is the ratio of the distance from the target to the target diameter. The smaller the target, the closer you should be to it. When the target diameter is small, it is important to bring the thermometer closer to the target to insure that only the target is measured.



5-2 Emissivity

Emissivity is the ability of an object to emit or absorb energy. Perfect emitters have an emissivity of 1, emitting 100% of incident energy. An object with an emissivity of 0.8 will absorb 80% and reflect 20% of the incident energy. Emissivity is defined as ratio of the energy radiated by an object at given temperature to the energy emitted by a perfect radiator at the same temperature. All values of emissivity fall between 0.1 and 1.0.

(PS. Please refer to the chart next page.)

Non-contact temperature sensors measure IR energy emitted by the target, have fast response, and are commonly used to measure moving and intermittent targets, targets in a vacuum, and targets that inaccessible due to hostile environments, geometry limitations, or safety hazard. The cost is relatively high, although in some cases is comparable to contact devices.

6. Maintenance

Cleaning the lens: Blow off loose particles using clean compressed air. Gently brush remaining debris away with a camels hair brush. Carefully wipe the surface with a moist cotton swab. The swab may be moistened with water.

NOTE:

DO NOT use solvents to clean the lens.

Cleaning the housing:

Use soap and water on a damp sponge or soft cloth.

Material	Temp °C/°F	Emissivity
Gold(pure highly polished)	227/440	0.02
Aluminum foil	27/81	0.04
Aluminum disc	27/81	0.18
Aluminum household(flat)	23/73	0.01
Aluminum (polished plate 98.3%)	227/400	0.04
	577/1070	0.06
Aluminum(rough plate)	26/78	0.06
Aluminum(oxidized @599°C)	199/390	0.11
	599/1110	0.19
Aluminum surfaced roofing	38/100	0.22
Tin(bright tinned iron sheet)	25/77	0.04
Nickel wire	187/368	0.1
Lead(pure 99.95-unoxidized)	127/260	0.06
Copper	199/390	0.18
	599/1110	0.19
Steel	199/390	0.52
	599/1110	0.57
Zinc galvanized sheet iron(bright)	28/82	0.23
Brass(highly polished):	247/476	0.03
Brass(hard rolled-polished w/lines):	21/70	0.04
Iron galvanized(bright)	-	0.13
Iron plate(completely)	20/68	0.69
Rolled sheet steel	21/71	0.66
Oxidized iron	100/212	0.74
Wrought iron	21/70	0.94
Molten iron	1299-1399/3270-2550	0.29
Copper(polished)	21-117/70-242	0.02
Copper(scraped shiny not mirrored)	22/72	0.07
Copper(Plate heavily oxidized)	25/77	0.78
Enamel(white fused on iron)	19/66	0.9
Formica	27/81	0.94
Frozen soil	-	0.93
Brick(red-rough)	21/70	0.93
Brick(silica-unglazed rough)	1000/1832	0.8
Carbon(T-carbon 0.9% ash)	127/260	0.81
Concrete	-	0.94
Glass(smooth)	22/72	0.94
Granite(polished)	21/70	0.85
Ice	0/32	0.97
Marble(light gray polished)	22/72	0.93
Asbestos board	23/74	0.96
Asbestos paper	38/100	0.93
	371/700	0.95
Asphalt(paving)	4/39	0.97

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