SENTRY

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SENTRY OPTRONICS CORP.

Gun-Type Professional Infrared Thermometer

MODEL: ST 653

CE

Instruction Manual

Gun-Type Professional Infrared Thermometer

Instruction Manual

Table Content

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 point laser directly at eye. Use caution a round reflective surfaces. Keep out of reach of children.

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.

$C\epsilon$ 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 ±0.5℃ (±1.0℉) at 3V/m throughout the spectrum. However, between 781-1000MHz at 3V/m, the instrument may not meet its stated accuracy.
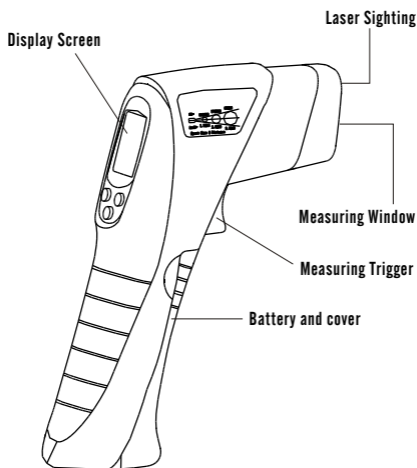
3.Specifications

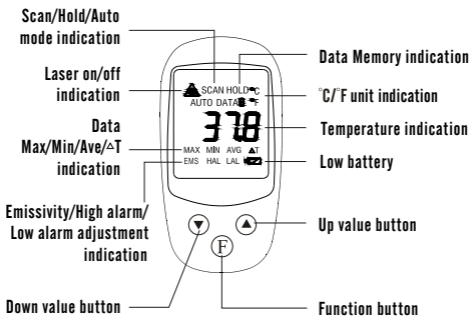|	
Distance/Spot Ratio	12:1
Temperature Range	-32~535℃ (-25~999℉)
Accuracy (Assumes Operation Ambient Temperature of 25℃/77℉)	±3℃(±5℉) From -32~-20℃(-25~-4℉)
	±2℃(±3℉) From -20~100℃(-4~212℉)
	±2% From 100~535℃(212~999℉)
Spectral Response	5~14 μ m
Repeatability	±1 ℃ (±2 ℉)
Resolution	0.1 ℃ (0.1 ℉)
Response Time	500 ms.
Operation Temp.	0~50℃(32~122℉),10~90%RH
Auto Power Off	Automatically after approx. 6s.
Emissivity	Adj. 0.1~1.0
℃/℉ Switchable	YES
Backlight	YES
Laser Sight Switchable	YES
Max/Min/Avg./△T	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

Display Screen

Laser Sighting

Measuring Window

Measuring Trigger

Battery and cover

LCD Display

Scan/Hold/Auto mode indication

Laser on/off indication

Data Max/Min/Ave/△T indication

Emissivity/High alarm/ Low alarm adjustment indication

Down value button

Data Memory indication

°C/°F unit indication

Temperature indication

Low battery

Up value button

Function button

4-3 °C/°F and Battery Change

The unit is powered by 9V battery and displays temperatures in either °C or °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 under the trigger. After replacing the battery push back and snap in place.

°C/°F Switchable

Laser on/off

9V Battery
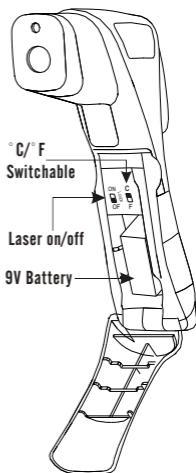
4-4 Advance Function

To configure advance functions, simply use the "F" button to set parameters. The sequential operations and the corresponding explanations are shown in the following flow-chart.

```
┌─────────────────────┐
│        SCAN         │
│          ↓          │
│        AUTO         │
└─────────────────────┘

Data Mode
┌─────────────────────┐
│        DATA         │
│          ↓          │
│        MAX          │
│          ↓          │
│        MIN          │
│          ↓          │
│        AVG          │
│          ↓          │
│        △T           │
└─────────────────────┘

Parameter Setup mode
┌─────────────────────┐
│        EMS          │
│          ↓          │
│        HAL          │
│          ↓          │
│        LAL          │
└─────────────────────┘
```
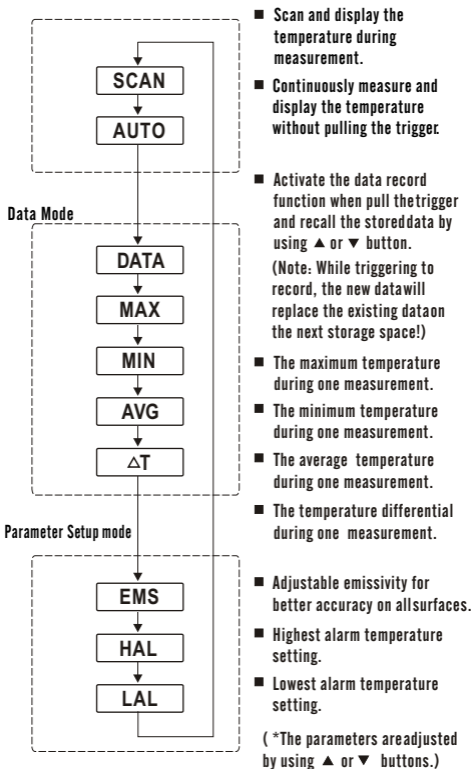
- Scan and display the temperature during measurement.
- Continuously measure and display the temperature without pulling the trigger.

- Activate the data record function when pull the trigger and recall the stored data by using ▲ or ▼ button.
  (Note: While triggering to record, the new data will replace the existing data on the next storage space!)
- The maximum temperature during one measurement.
- The minimum temperature during one measurement.
- The average temperature during one measurement.
- The temperature differential during one measurement.

- Adjustable emissivity for better accuracy on all surfaces.
- Highest alarm temperature setting.
- Lowest alarm temperature setting.

(*The parameters are adjusted by using ▲ or ▼ buttons.)

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.

D:S=12:1
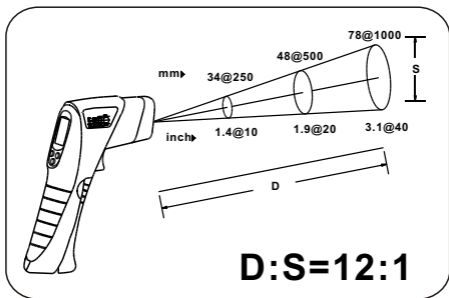
5-2 Emissivity

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.

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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 (polisned prate 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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