

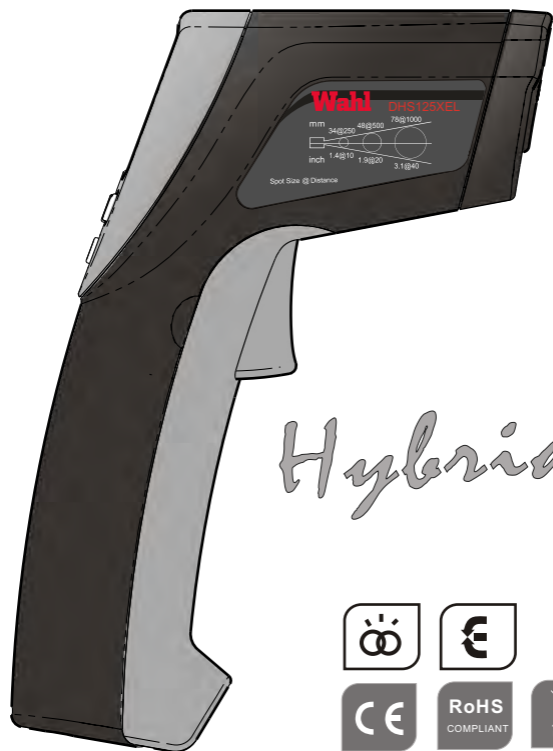
# Wahl

Wahl Instruments, Inc.

## INFRARED THERMOMETER

Intelligent Infrared Thermometer with Emissivity  
Smart and Color Identification Signal Technology

# DHS125XEL



Hybrid





# Hybrid

## Infrared Thermometer Instruction Manual



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# 1. Product Introduction

Thank you for purchasing this infrared thermometer. The Infrared Thermometer is an intelligent non-contact infrared temperature measuring instrument. To measure a temperature, point the unit at the object, pull the measuring trigger and hold until the temperature is displayed. Beyond the conventional functions, two novel features are built in. With the E-smart function users can measure the target temperature without knowing the Emissivity of the target. Also, the multi color display alerts the user when alarm temperatures are reached.

## 1-1 Features

It features a broad temperature range and high DS ratio. These allow the user to monitor the target temperature over a long distance, away from potential risk.

- E-smart: Smart Emissivity automatic measurement.
- CIS: Multi color display alerts the user when alarm temperatures are exceeded.
- Ultra low power consumption in shutdown mode.
- Extended long time measuring reliability.
- User switchable laser sighting.
- °C or °F selectable.
- Electronic trigger lock function.

## 1-2 Applications

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

## 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 around 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. It is 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.

**RoHS** Restrict the use of six substances within electrical and electronic equipment(EEE), thereby contributing to the protection of human health and the environment.



The device may not be disposed of with the trash. It promotes the re-use recycling and other forms of recovery of used materials and components, and to improve the environmental performance of all operators (manufacturers, traders, treatment facilities) involved in the life cycle of products. Dispose of the product appropriately in accordance with the regulations in force in your country.



### 3. Specification

Distance/Spot Ratio	12:1
Temperature Range	-32~760 °C(-25~1400°F)
Accuracy (@ ambient temperature of 25°C/77°F)	±3°C(±5°F) within -32~-20°C(-25~-4°F) ±2°C(±3°F) within -20~100°C(-4~212°F) ±2% within 100~760°C(212~1400°F)
Thermopile	5~14µm
Repeatability	±1 °C (±2 °F)
Resolution	0.1°C (0.1 °F)
Response Time	500 ms.
Operation Temp.	0~50°C(32~122°F), 10~95%RH
Auto Power Off	Automatically after approx. 6 sec.
Emissivity	Adjustable 0.1~1.0
E-Smart	YES
Thermocouple K Type	YES
Thermocouple Range	-200 ~1380°C
Thermocouple Accuracy	±1.5%+1degree
°C/°F Switchable	YES
LCD Backlight	YES
CIS	YES
Laser Sight Switchable	YES
Audio Alarm	YES
Dual Display	YES
Lock Function	YES
Max/Min/Avg	YES
10 point Memory	YES
Dimensions	180x130x40mm (7.09"x5.12"x1.57")
Battery Type	9V(006P, IEC6F22, NEDA1604)
Weight	195g Approx.
Accessory	9V Battery, Instruction manual, Carrying case.

## 4. Operations of Instrument

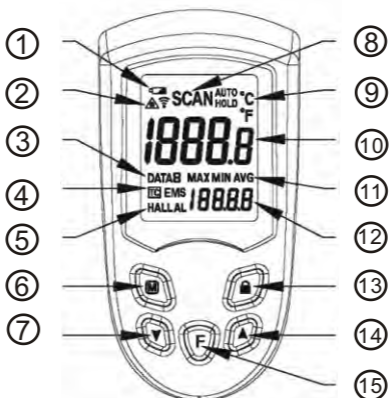
### 4-1 Quick Start

To measure a temperature, point the unit at the target you want to measure, pull the trigger and hold. Be sure to consider the target area inside the angle of vision of this instrument. The single spot of laser is used for aiming only.

### 4-2 Unit Diagram



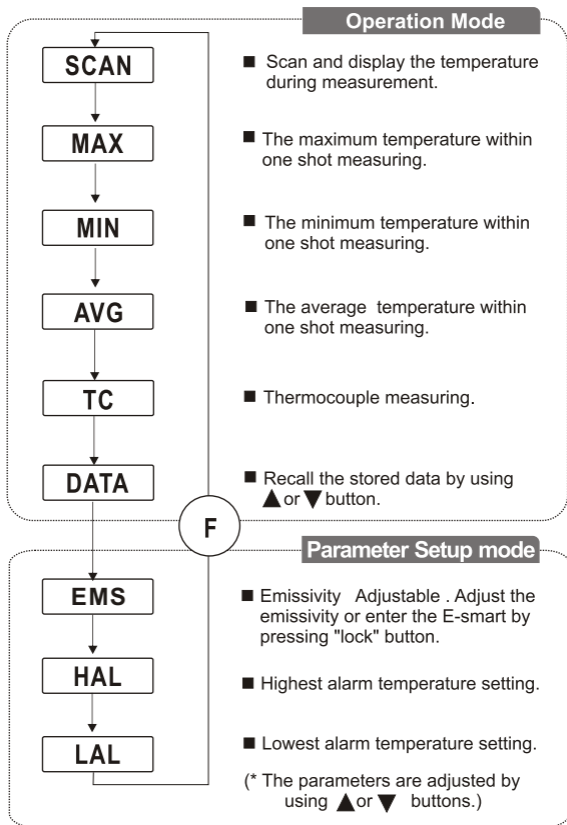
## LCD & Control panel



- |                             |                      |
|-----------------------------|----------------------|
| ① Low Battery               | ⑧ SCAN / HOLD / AUTO |
| ② Laser / Buzzer On / Off   | ⑨ °C / °F Indication |
| ③ Data Log                  | ⑩ Primary Display    |
| ④ Thermocouple / Emissivity | ⑪ Max / Min / Avg    |
| ⑤ High / Low Alarm          | ⑫ Secondary Display  |
| ⑥ Memory Key                | ⑬ Lock Key           |
| ⑦ Down Button               | ⑭ Up Button          |
|                             | ⑮ Function           |


## 4-3 Operation Functions

To select the advanced functions, press the “F” button to scroll through them. The sequential operations and the corresponding explanations are shown in the following flow-chart.





# Operation Remarks

**Thermocouple:** Connect a Type "K" T/C probe to the connector and select TC via the "F" Function Switch.

- E-smart:**
1. In Emissivity mode, push the  button to enter the E-smart function.
  2. Contact the target surface with thermocouple (recommended target temperature over 100°C to derive correct emissivity).
  3. Point the infrared thermometer at the target and push the measuring trigger till the buzzer beeps. The cross-reference Emissivity value will be set in the unit.
  4. Press the "F" button to leave the E-smart function.

**CIS:** The color of the backlight will change when the target temperature exceeds the alarm set point.

**Memory:** Activate the record function by pushing the "M" button. To delete all the records, press up or down button to DATA 0 and press "M" button.

**Lock:** Lock with unit in Scan Mode, press the  button. "Auto" appears on display. Release trigger, unit will continue to operate. Press  again to exit "Auto".

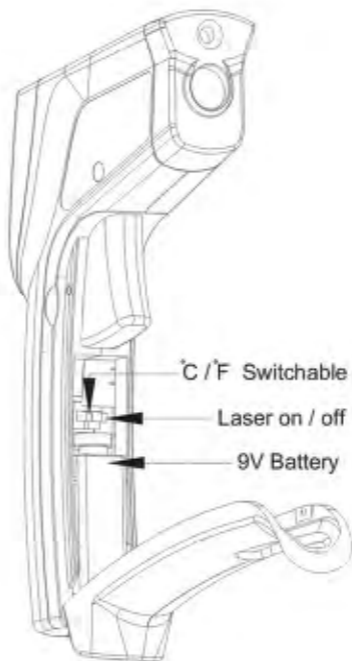
**Function:** The above functions can be activated from any step of operations mode in flow-chart.

**Scan/Hold:** In SCAN mode, the LCD displays the current temperature in Celsius or Fahrenheit. The unit will HOLD the last reading for 6 seconds when the trigger is released. When the battery is low, the battery icon shows and the unit will continue to function.

**Data:** With DATA# flashing the ▲ and ▼ keys can be used to select the desired register number (1-10). Then the displayed value may be stored by pressing the "M" button.

## 4-4 °C/°F , Laser Switch and Battery Change

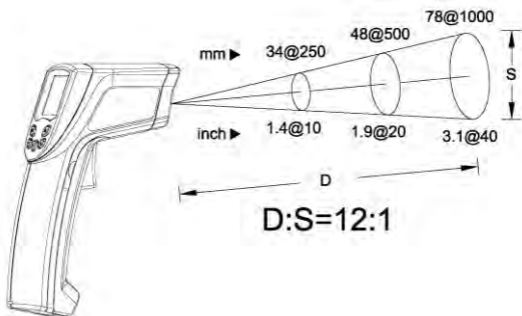
The laser on/off and °C/°F switches are located in the battery compartment. When the battery voltage drops below the voltage for reliable operation, the low battery symbol will appear. It is recommended the battery be changed as soon as possible. To change the battery, open the compartment by pulling on the top of the handle front; remove the used battery and replace, paying attention to the polarity.



## 5. Techniques of Infrared Thermometer

### 5-1 Field of View (FOV) ratio =Distance to Spot Ratio

Field of View is the size of the measurement area at a specified distance. This is determined by the angle of the optics in the unit. The D:S ratio is the nominal ratio of the distance to the target to the target size. For Example, with a D:S ratio of 12:1 the unit will have a 6" diameter measure spot at a distance of 72".



## 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 the ratio of the energy radiated by an object at a given temperature to the energy emitted by a perfect radiator at the same temperature. All values of emissivity fall between 0.0 and 1.0.

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 are inaccessible due to hostile environments, geometry limitations, or safety hazard.

## 6. Maintenance

Cleaning the lens: Blow off loose particles using clean compressed air. Gently brush remaining debris away with a camel's 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.



# Emissivity Table (for reference)

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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