Wahl Instruments,Inc.

High Performance Infrared Thermometer

with High D:S Ratio, Adjustable Emissivity, and Built-in Laser Sighting

DHS235XEL

Instruction Manual

WD1048 Rev A
04/10/10

CE RoHS COMPLIANT

Table of Contents

1. Product Introduction

Thank you for purchasing the Wahl DHS235XEL non-contact infrared thermometer. To measure a temperature, simply point the unit at the object, pull the trigger and read the display. Releasing the trigger will put the unit into hold mode, which will display the captured reading for approximately 6 seconds before powering off. 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

The DHS235XEL features a wide temperature range, and high D:S (Distance to Spot) ratio, allowing the user to measure high temperature objects from a safe distance.

- High DS ratio.
- Adjustable emissivity from 0.1 to 1.00 in 0.01 steps.
- Ultra low power consumption in shutdown mode.
- Extended long time measuring reliability.
- Backlit Liquid Crystal Display (LCD).
- °C or °F selectable.
- Electronic trigger lock.

1-2 Applications

- Electrical troubleshooting.
- Automotive repair and maintenance.
- 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 instrument. Only qualified personnel should perform repairs or service not covered in this manual.

⚠ Do not point laser directly at eye. Use caution around reflective surfaces. Keep out of reach of children.

2-1 Warning

- DO NOT submerge the instrument in water
- This product is not designed for use in medical evaluations.
- This product is intended for use in industrial, scientific and educational purposes only.

2-2 Safety symbols

⚠ Dangerous, refer to this manual before using the meter.

CE 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°C (±1.0°F) at 3V/m throughout the spectrum. However, between 781-1000MHz at 3V/m, the instrument may not meet its stated accuracy.

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

When your instrument has reached the end of its useful life and you wish to dispose of it, do NOT place in your trash, or send it to a landfill. Please dispose of it in accordance with local, state and federal regulations.

3.Specifications

Distance/Spot Ratio	50:1
Temperature Range	-58° to 2732°F (-50° to 1500°C)
Accuracy (Assumes Operation Ambient Temperature of 25°C/77°F)	±5.4°F (±3°C) From -58° to -4°F (-50° to -20°C) ±3°F (±2°C) From -4° to 212°F (-20° to 100°C) ±2% From 212° to 2732°F (100° to 1500°C)
Spectral Range	8 to14μm
Repeatability	±2°F (±1°C)
Resolution	0.1°F or °C
Response Time	500 mS.
Operation Temp.	32° to 122°F(0° to 50°C) 10 to 90%RH
Auto Power Off	Automatically after approx. 6 seconds
Emissivity	Adjustable 0.10 to 1.00
°F/°C Switchable	YES
Backlight	YES
Laser Sight Switchable	YES
Max/Min/Avg./ Δ T	YES
Auto-Measuring	YES
Dual Display	YES
10 Point Memory	YES
Audio Alarm	YES
Tripod Mount	YES
Battery Type/Life	9V (006P, IEC6F22, NEDA1604)
Dimensions	6.7" x 5.2" x 1.8" (2170 x 132 x 45mm),
Weight	6.6 oz. (330g) approx.
Included Accessories	9V Battery, Instruction manual, Carrying case.

4. Operation Instructions

4-1 Quick Start

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

4-2 Unit Diagram

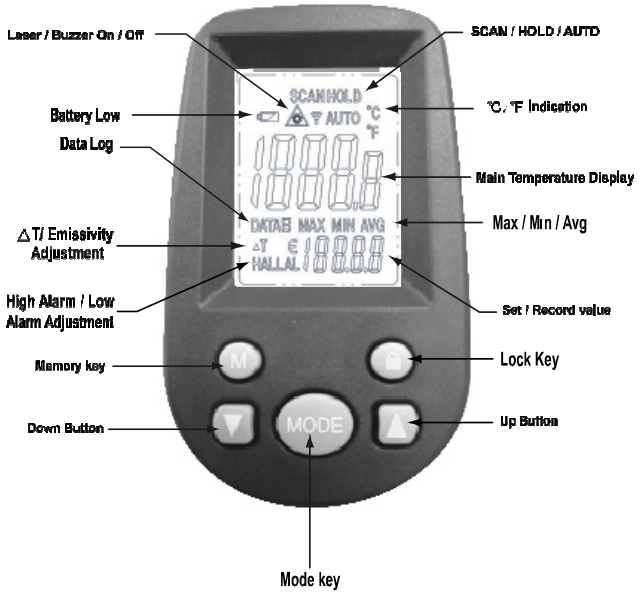
4.3 Displays and Controls

4-3.1 Displays – In SCAN mode, the instrument displays the current temperature, in Celsius or Fahrenheit, on the Main Temperature Display. Selected Advanced Function Data is displayed on the Secondary display. The unit will HOLD the last reading for 6 seconds after the trigger is released.

4-3.2 Lock – Push the 🔒 button to continuously measure and display the temperature without pulling the measuring trigger.

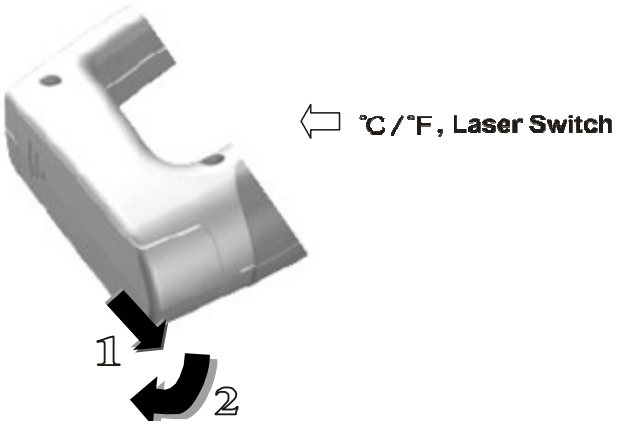
4-3.3 °C/°F Switch – the °C/°F switch is located in the battery compartment and is accessed by following steps 1 and 2 on pg 6.

LCD & Control Panel



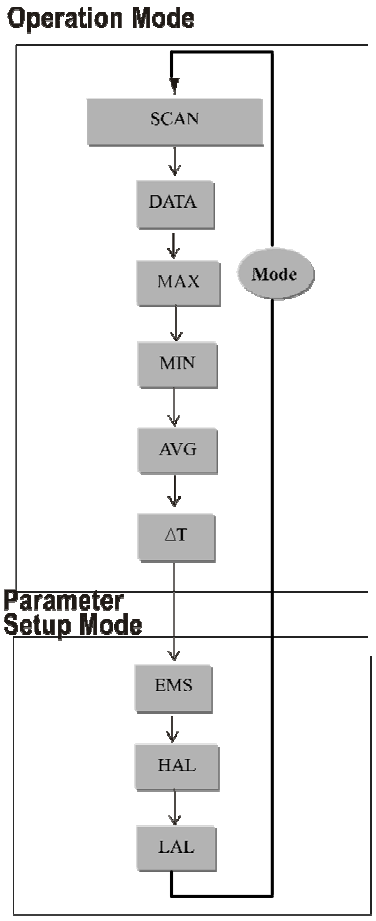
4-3.4 ⚠ Laser On/Off Switch – the Laser On/Off Switch is located in the battery compartment and is accessed by following steps 1 and 2 below.

4-3.5 Battery – Battery is located in the battery compartment and is accessed by following steps 1 and 2 below. Replace battery when indicated by Low Battery symbol.



4-4 Advanced Functions

To operate advanced functions, pull the trigger and use the **MODE** button to select the desired function. Advanced function data is displayed on the Secondary Display. Mode button also works with unit in Hold mode. The sequential operations are shown in the following flow-chart.



- Scan and display the current temperature.
- Store data when flashing. Recall data when steady. Use ▲ or ▼ button to select.
- Dislays the maximum temperature obtained in current measurement cycle.
- Displays the minimum temperature obtained in current measurement cycle.
- Displays the average temperature of current measurement cycle, (approx 73 seconds.)
- Displays the maximum temperature difference obtained in current measurement cycle.

- Allows emissivity adjustment for correction of different materials.
- Adjust High alarm temperature setting setpoint.
- Adjust Low alarm temperature setting setpoint.
- Alarm setpoints are adjusted by using ▲ or ▼.

4-5 Memory

4-5.1 Memory Read – Press **MODE** switch until **DATA (0-A)** is on steady. Unit is now in Data Read mode for memory locations **DATA (1-A)** or Memory Erase mode when displaying **DATA0**. (See Memory Erase section below). Pressing the ▲ or ▼ arrows will scroll the DATA location and display the corresponding data on the secondary display. The specific parameter, such as Actual, Max, Min, Etc, will also be displayed. No parameter displayed indicates the data is the Actual measurement.

4-5.2 Memory Erase – when **DATA0** is selected, the secondary display will display "-**CL**-". This is only used for erasing all the memory locations. To Erase, press and hold the M Button until you hear a quick double beep.

Note: Data cannot be saved into DATA0 location.

4-5.3 Memory Record – the following temperature parameters may be saved into memory: Actual reading, MAX, MIN, AVG, and ΔT. To select which one will be saved, press the **MODE** switch until the desired parameter is selected with the **DATA (1-A)** icon flashing. The flashing **DATA (1-A)** icon indicates the unit is in Data Save mode and which memory location is currently selected.

To select a specific memory location, press the ▲ or ▼ arrows until the desired location is displayed. To save the displayed data into memory, press the M button until a single beep is heard.

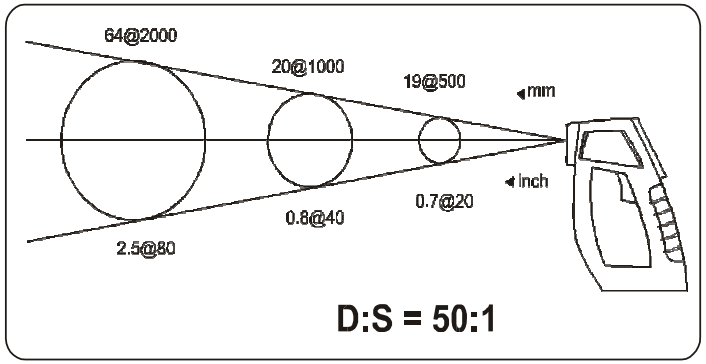
The unit will:

- Save the data that is displayed on the lower secondary display.
- Write new data over any previously saved data in that memory location.
- Increment the memory location to the next location.

5. Technical Information

5-1 Distance to Spot Ratio

The D:S Ratio is the ratio of the distance from the target to the target diameter (spot). This is determined by the optics of the unit. The smaller the target, the closer you should be to it. For an accurate measurement, the target must completely fill the spot. Failure to fill the spot will result in an inaccurate measurement, due to the averaging of the target with the surrounding areas.



5-2 Emissivity

Emissivity is the relative ability of an object to emit energy by radiation. 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 1.00.

Emissivity Table

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

6. Maintenance

6-1 Lens – clean the lens by blowing off loose particles using clean compressed air. Gently brush remaining debris away with a camel hair brush. Use a cotton swab moistened with distilled water to carefully wipe the lens surface.

Note: DO NOT use solvents to clean the lens.

6-2 Housing – Clean by wiping with a damp soft cloth. Mild detergent may be used as needed.

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 limitation, or safety hazards. The cost is relatively high, although in some cases is comparable to contact devices.

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