1 YEAR WARRANTY

CE

User's Guide

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TM

WITH BUILT-IN PATENTED LASER CIRCLE SIGHTING

OSXL685 and OSXL689 High Performance Infrared Thermometer

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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, pull and hold the measuring trigger until the temperature is read. Make sure the target area is larger than the unit's Field of View. For large target objects make sure you are within target distance.

1-1 Features

- Patented Laser Circle Sighting
- 30:1 Field of View - OSXL685
- 50:1 Field of View - OSXL689
- 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 LCD display.
- ℃ or ℉ selectable.
- Electronic trigger lock.
- Temperature Data Storage
- High & Low Audible Alarms
- K Type Thermocouple Input - OSXL689
- USB PC Interface - OSXL689

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.

1-3 Warnings and Cautions

CAUTION

You may receive harmful laser radiation exposure if you do not adhere to the warnings listed below:

- **Use of controls or adjustments or performance of procedures other than those specified here may result in hazardous radiation exposure.**
- **Do not look at the laser beam coming out of the lens or view directly with optical instruments - eye damage can result.**
- **Use extreme caution when operating the laser sighting.**
- **Never point the laser beam at a person.**
- **Do not attempt to open the thermometer. There are no user serviceable parts.**
- **Keep out of the reach of all children.**

Refer to the inside back cover for product warning label.

2.Safety Information ⚠

Read the following instruction manual carefully before attempting to operate the thermometer. Only qualified personnel should perform repairs which are not covered in this manual.

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 CE Certification.

This instrument conforms to the following standards:

EN61326 : Electrical equipment formeasurement , control and laboratory use.

IEC61000-4-2 : Electrostatic dischargeimmunity test.

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

IEC61000-4-8 : Power frequency magneticfield 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

	OSXL685	OSXL689
Temperature Range	-50 to 1000°C (-58 to 1832°F)	
Accuracy	±3.0℃(±5℉) From -50 to -20°C (-58 to -4°F) ±2.0℃(±3℉) From -20 to 100°C (-4 to 212°F) ±2% From 100 to -1000°C (212 to 1832°F)	
Thermopile	8 to 14 μm	
Repeatability	±1℃ or ±2°F	
Resolution	0.1℃ (0.1℉)	
Response Time	500 ms.	
Emissivity	Adjustable 0.1 to 1.0	
Distance/Spot Ratio	30:1	50:1
Supply Voltage	9V	
Operating Temp.	0 to 50°C, 10 to 90% RH	
℃/℉ Switchable	YES	
Auto Power Off	Automatically after approx 6 sec.	
Backlight	YES	
Laser Sight Switchable	YES - Laser Circle	
Max/Min/Avg.	YES	
Data Storage	10 Points	
Alarms	High and Low	
K Type TC	——	-200/1300°C
TC Input Accuracy	——	0.5% Rdg+1°C
USB Port	——	YES
Auto Measuring	YES	
Daul Display	YES	
Tripod mount	YES	
Size	127×47×200mm	
Weight	330g Approx.	

3.Specifications con't.

Laser Sighting

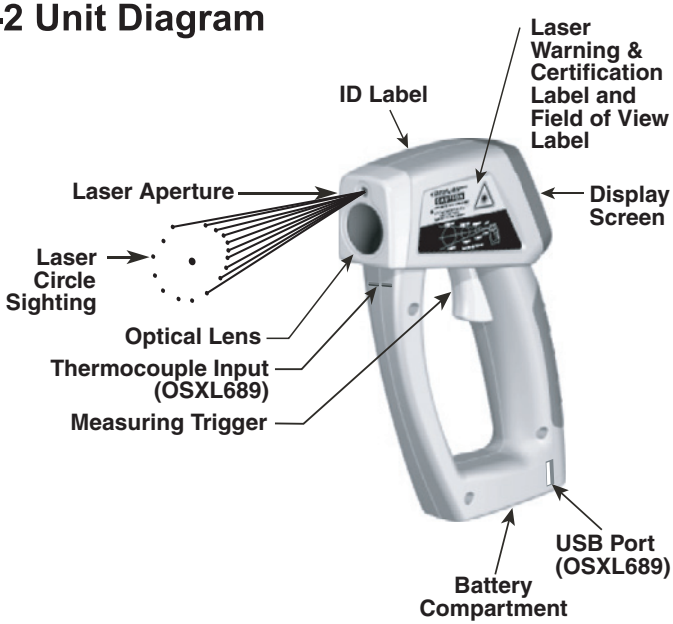
Wavelength (Color):	630 to 670 nanometers (red)
Operating Distance:	Up to 10 ft.
Max. Output Optical Power:	<1mW at 75°F ambient temperature, Class II Laser Product
European Classification:	Class 2, EN60825-1
FDA Classification:	Complies with 21 CFR Chapter 1, Subchapter J
Beam Diameter:	5 mm
Beam Divergence:	<2mrad
Laser Configuration:	Dot and Circle
Power Switch:	Slide switch, ON-OFF
Power Indicator:	Laser icon on display
Power:	Supplied by the thermometer
Identification Label:	Located on the right side of the thermometer
Warning and Certification Label:	Located on the left side of the thermometer

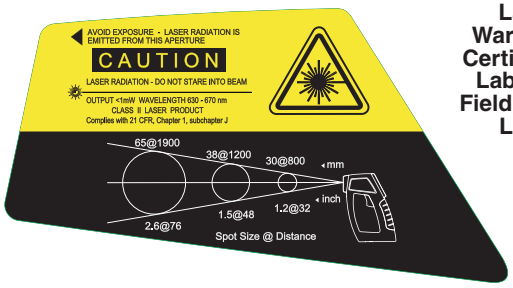
4. Operations Of Instrument

4-1 Quick Start

To measure a temperature, point the unit at the target, pull the trigger and hold. Make sure the target area is within the field of view of the instrument. The laser circle sighting is used to indicate the perimeter of the instrument's field of view.

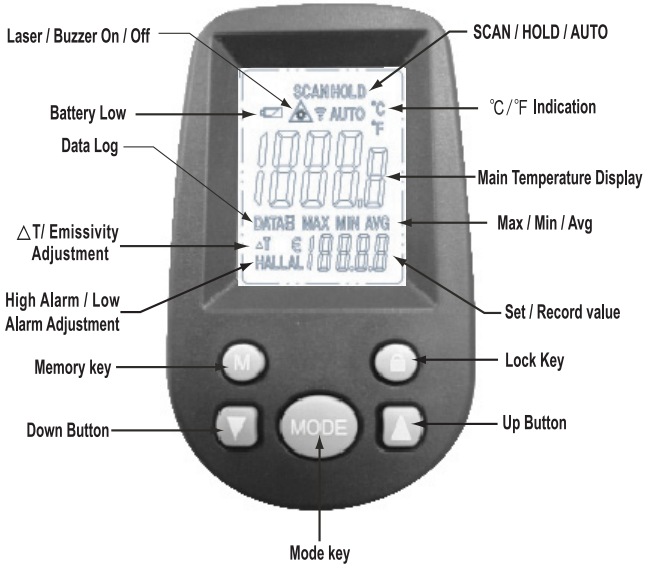
4-2 Unit Diagram





Laser Warning & Certification Label and Field of View Label

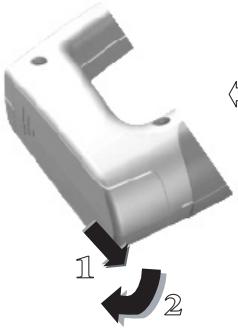
LCD & Control Panel



4-3 °C/°F, Laser Switch and Battery Replacement

The unit is powered by a 9V battery and displays temperatures in either ℃ or ℉. Pull the cover at the buttom of the unit and open the cover by following the step 1 and 2.

There are two slide switches in front of the battery compartment. One is for °F/°C display and the other is for laser sighting. To change the battery, directly place the battery in the battery compartment.



⇦ ℃/℉, **Laser Switch**

4-4 Advanced Functions

4-4-1 AUTO Mode-Continuous Operation

From the SCAN mode (Trigger is pulled), you can lock the trigger electronically and measure temperature continuously (AUTO mode) by pressing the **LOCK** key. The AUTO icon will appear on the display. Pressing the **LOCK** key again will disable the AUTO mode. AUTO icon will disappear from the display. If the trigger is pulled, the unit stays in the SCAN mode. If the trigger is released, the unit will go to HOLD mode and will shut itself off after about 6 seconds.

The following table shows an overall functional flow chart of the thermometer:

Mode	Press Mode Key	Press Up Key	Press Down Key
SCAN	SCAN→AUTO	----	----
AUTO	AUTO→DATA Record	----	----
DATA RECORD	DATA RECORD→DATA RECALL (Press **M** key to record)	+ Memory Location (Flashing)	- Memory Location (Flashing)
DATA RECALL	DATA RECALL→Max Temp	+ Memory Location Display Data Memory	- Memory Location Display Data Memory
Max Temp	Max Temp→Min Temp	+ Memory Location (Flashing)	- Memory Location (Flashing)
Min Temp	Min Temp→Avg Temp	+ Memory Location (Flashing)	- Memory Location (Flashing)
Avg Temp	Avg Temp→ΔT	+ Memory Location (Flashing)	- Memory Location (Flashing)
ΔT	ΔT→TC	+ Memory Location (Flashing)	- Memory Location (Flashing)
TC	TC→ Emissivity (OSXL689)	+Memory Location (Flashing)	–Memory Location (Flashing)
Emissivity	Emissivity→High Alarm	+ Emissivity	– Emissivity
HAL	High Alarm→Low Alarm	+ Alarm Set Point	– Alarm Set Point
LAL	Low Alarm→SCAN/HOLD	+ Alarm Set Point	– Alarm Set Point

4-4-2 Max, Min, Avg, ΔT Temperature

You can review the Maximum, Minimum, Average, and differential (Max - Min) temperatures on the display by pressing the **Mode** key. If the trigger is pulled at the same time, the display will show SCAN icon and all the values are in real time. If the trigger is released, the display will show the HOLD icon and all the values are the last readings before the trigger is released.

4-4-3 Temperature Data Storage & Recall - DATA Mode

You can store up to 10 temperature data points (Memory Location 1 thru A). When you are in DATA RECORD mode, set the memory location using the Up or Down arrow keys, then press the **M** key. The unit will store the temperature data in the current memory location.
You can review (recall) the stored data by going to the DATA RECALL mode using the **Mode** key and pressing the Up/Down keys. You can then review memory locations 1 thru A.

NOTE

The unit stores all temperature data, emissivity value, high and low alarm set points in the non-volatile memory. Changing the battery will not affect these values.

Remarks

* **LOCK**: Push the button to continuously measure and display the temperature without pull the measuring trigger.
* The above functions can be activated always in any step of operations mode in flow-chart.
* In Data Record Mode, pressing the **M** key will record the data in the corresponding memory location.
* In Data Recall Mode, you can delete all recorded data by going to DATA ø memory location and pressing the **M** key.
* Pulling the Trigger or pressing any of the keys will turn on LCD backlight.

NOTE

A 6" Surface Probe (Model SPHT-K-6) is included with Model OSXL689.

5. PC Interface (OSXL689)

This infrared thermometer has a USB PC interface. It comes with a USB cable and CD software. Install the PC software before connecting the thermometer to the PC USB port. The minimum PC system requirements are:

- Windows XP
- 64 MB of RAM
- 5 MB of Disk space

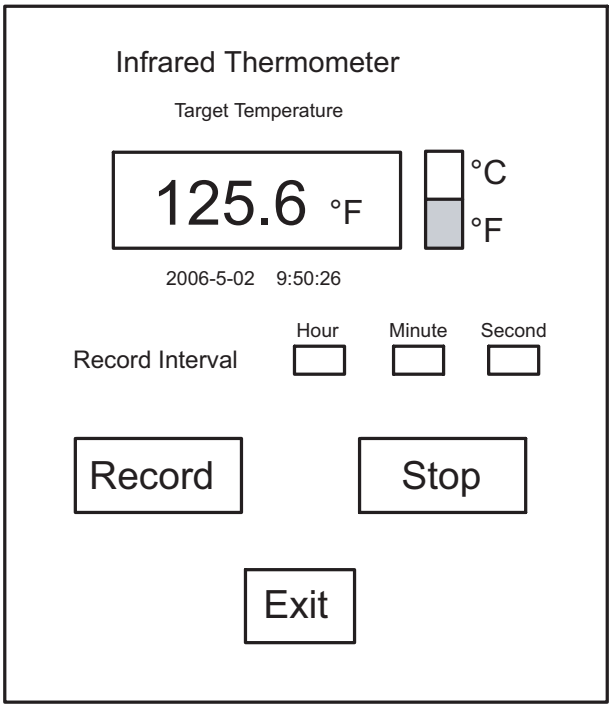
After completing the software installation, run the program and connect the thermometer to the PC using the USB port. Turn on the thermometer by pulling the trigger. After a few seconds the PC recognizes the thermometer connection and a USB icon appears on the thermometer's display. The PC now shows the same target temperature as what is displayed on the thermometer. The thermometer's trigger is locked by the USB connections so there is no need to continue pulling the trigger. The following picture is what you see on the PC.

The target temperature is displayed in either °F or °C. Then the Date (yy-mm-dd) and Time (Hour:Minute:Second) are displayed. You can switch between °F and °C temperature display by clicking on the unit of measurement (°F or °C).

5-1 Recording Temperature Data to a File

Set your recording interval in terms of Hours, Minutes, Seconds. This is the time interval between every temperature data point. Than check on **Record** key. A selection file text box opens. Enter a text file name, and click on **Save** key to start the recording process. Now temperature data are being saved in the text file at the specified recording interval. You can determine the recording process by clicking the **Stop** key. Now you can go back and review the data text file.

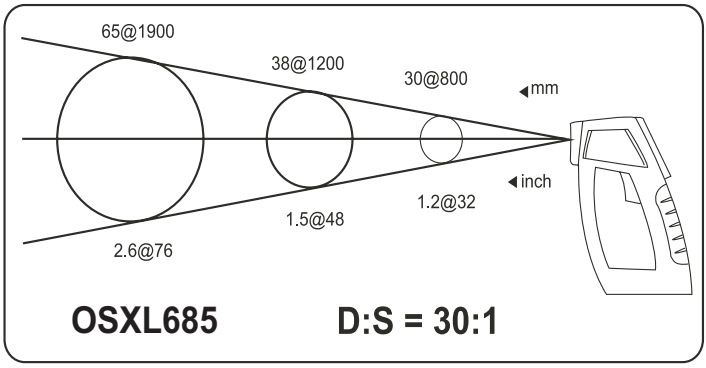
You can exit the program by clicking the **Exit** key.

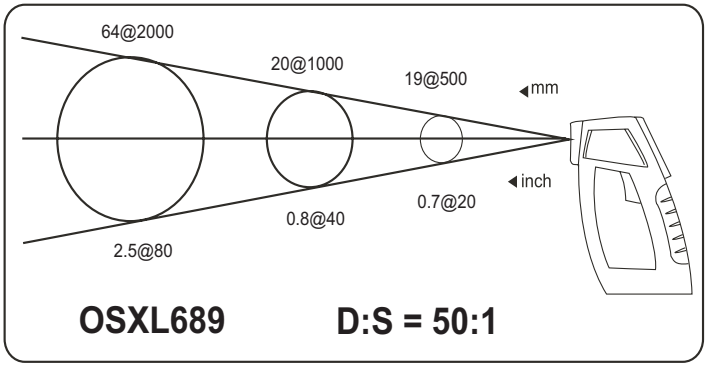


5. Techniques Of Infrared Thermometer

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 ensure that the target area is larger than the optical field of view.





6-2 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 0.0 and 1.0.

7. 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.

8. Emissivity Table

Material	Temp ℃/℉	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 @599C)°	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

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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