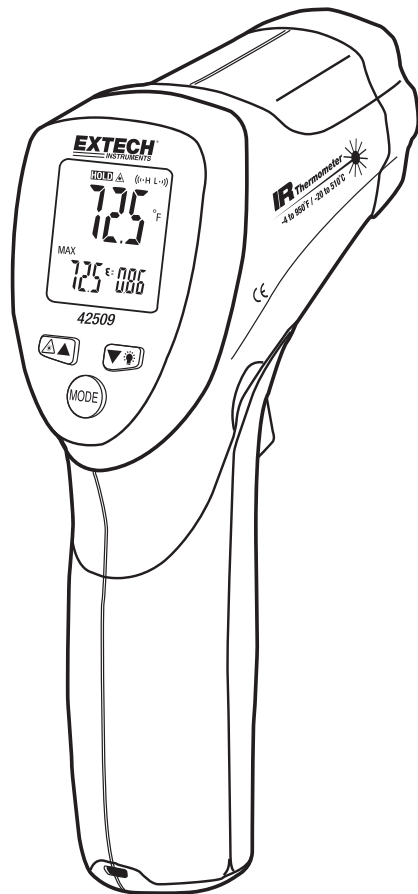


User Manual

EXTECH[®]
INSTRUMENTS
A FLIR COMPANY

**Dual Laser InfraRed (IR) Thermometer
with Color Alert**

MODEL 42509



Introduction

Congratulations on your purchase of the Model 42509 IR Thermometer with Color Alert. This Infrared thermometer measures and displays non-contact temperature readings up to 950°F (510°C). Dual laser pointers ensure accurate targeting and temperature measurement. The Color Alert feature indicates when High or Low set points are exceeded. The adjustable emissivity feature allows the IR thermometer to measure the temperature of virtually any surface. Proper use and care of this meter will provide years of reliable service.

Warranty

EXTECH INSTRUMENTS CORPORATION (A FLIR COMPANY) warrants this instrument to be free of defects in parts and workmanship for three years from date of shipment (a six month limited warranty applies on sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website at www.extech.com (click on 'Contact Extech' and go to 'Service Department' to request an RA number). A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

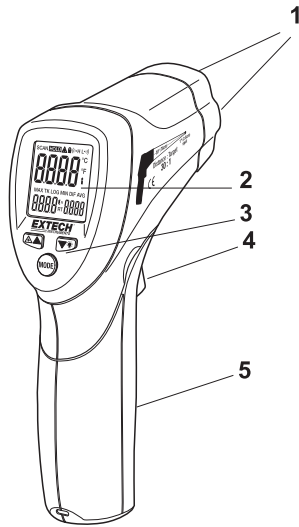
Safety

- Use extreme caution when the laser pointer is on
- Do not point the beam toward anyone's eye or allow the beam to strike the eye from a reflective surface
- Do not use the laser near explosive gases or in other potentially explosive areas



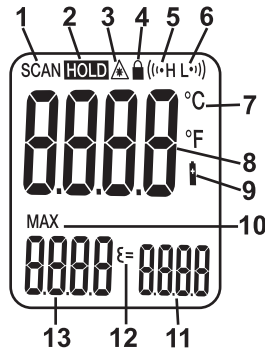
Meter Description

1. Dual Laser pointers
2. LCD Display
3. Function Buttons
4. Measurement Trigger
5. Battery and F/C Switch compartment



DISPLAY

1. SCAN, measurement in progress
2. HOLD, last measurement locked in display
3. Laser pointer active
4. Power locked ON
5. High limit alarm
6. Low limit alarm
7. C or F temperature units
8. Main temperature display
9. Low battery icon
10. MAX icon
11. Emissivity setting
12. Emissivity icon
13. Max temperature display



Operating Instructions



Temperature Measurements

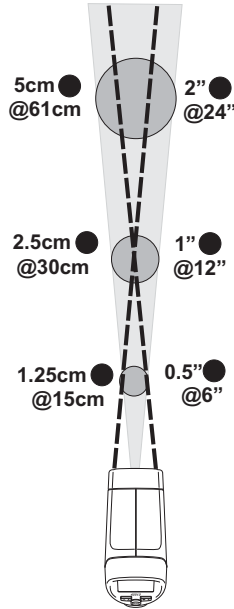
1. Hold the meter by its handle and point it toward the surface to be measured.
2. Pull and hold the trigger to turn the meter on and begin testing. The temperature reading, MAX temperature reading, the 'SCAN' icon, the emissivity value, and the unit of measure will appear.
3. Release the Trigger and the reading will hold for approximately 7 seconds (HOLD will appear on the LCD) after which the meter will automatically shut off. If LOCK mode is enabled, the unit will not automatically shut off.

Note: Select the temperature units (°F/°C) using the switch inside the battery compartment

Dual Laser Pointer

The meter has a distance to target ratio of 12:1. The dual laser pointers are designed to indicate the 12" distance when the laser points are 1" apart. The spot size at this distance is a 1" diameter. This is the recommended distance for most measurements. To turn the lasers on/off:


1. Press and release the Trigger
2. While HOLD is on the display, press the laser button  once to turn the lasers on or off. The new status will appear with the next trigger pull.
3. The laser icon  will appear in the LCD when the laser function is enabled.
4. The status of the laser will be stored in memory and will remain as the "turn-on" condition until changed.



MAX (maximum) temperature display

The highest reading encountered during a single measurement scan is displayed in the MAX display

Backlight

1. Press and release the Trigger
2. While HOLD is on the display, press the backlight button  once to turn on the backlight on or off.
3. The backlight will illuminate in the LCD when the feature is enabled.
4. The status of the backlight will be stored in memory and will remain as the “turn-on” condition until changed.
5. Note: The backlight will shorten the battery life. Only use this feature when required.

The MODE button options

The MODE button is used to access the Emissivity, Lock, High alarm and Low alarm features of the instrument.

1. Press and release the Trigger
2. While HOLD is on the display, press the MODE button to step through and program the following features. A blinking icon indicates the feature is selected.
3. The meter will shut off and save any changes if no button is pressed for approximately 8 seconds.

(Emissivity Value)

Press the ▲ or ▼ buttons to change the emissivity value.



(Lock mode On/Off)

Press the ▲ or ▼ buttons to turn the lock feature ON or OFF.

(High Alarm On/Off)

Press the ▲ or ▼ buttons to turn the High Alarm feature ON or OFF.

(High Alarm setting)

Press the ▲ or ▼ buttons to set the high alarm limit value in the main display

(Low Alarm On/Off)

Press the ▲ or ▼ buttons to turn the High Alarm feature ON or OFF.

(Low Alarm setting)

Press the ▲ or ▼ buttons to set the Low alarm limit value in the main display.

Color Alert High and Low Alarm Feature

The meter has a programmable high and low alarm feature. When either alarm point is reached the meter will alert the user via a flashing red LED backlight, as well as an audible beep and a blinking LCD display icon. The alarm limit is set and the feature is enabled/disabled using the MODE button. The setting is stored in memory and will remain as the "turn-on" condition until changed.

Temperature Units

The temperature units can be set to °F or °C using the switch located in the battery compartment.


Lock feature

The LOCK feature disables the Auto Power Off feature for a single period of use after the Lock mode is selected. The feature is useful for long term temperature monitoring and hands free use. The meter will revert to auto power off if the trigger is pressed during a locked scan.

Over-range Indication

If the temperature measurement exceeds the specified temperature range, the thermometer will display dashes in place of a temperature reading.

Battery Replacement

When the low battery symbol  appears on the display, replace the meter's battery (9V). The battery compartment is located behind the panel that surrounds the meter's trigger. Open the compartment by pulling the panel down from the trigger area. Replace the 9V battery and close the battery compartment cover.



IR Measurement Notes

1. The object under test should be larger than the spot (target) size calculated by the field of view diagram (printed on the side of the meter and in this guide).
2. Before measuring, be sure to clean surfaces that are covered with frost, oil, grime, etc.
3. If an object's surface is highly reflective, apply masking tape or flat black paint to the surface before measuring. Allow time for the paint or tape to adjust to the temperature of the surface it is covering.
4. Measurements through transparent surfaces such as glass may not be accurate.
5. Steam, dust, smoke, etc. can obscure measurements.
6. The meter automatically compensates for deviations in ambient temperature. However, it can take up to 30 minutes for the meter to adjust to extremely wide changes.
7. To find a hot spot, aim the meter outside the area of interest then scan across (in an up and down or side to side motion) until the hot spot is located.

Field of View

The meter's field of view is 12:1. For example, if the meter is 12 inches from the target (spot), the diameter of the target must be greater than 1 inch. Other distances are shown in the field of view diagram. Measurements should normally be made as close as possible to the device under test. The meter can measure from moderate distances but the measurement may be affected by external sources of light. In addition, the spot size may be so large that it encompasses surface areas not intended to be measured.

Calibration and Repair Services

Extech offers repair and calibration services for the products we sell. Extech also provides NIST certification for most products. Call the Customer Service Department for information on calibration services available for this product. Extech recommends that annual calibrations be performed to verify meter performance and accuracy.

Emissivity and IR Measurement Theory

IR Thermometers measure the surface temperature of an object. The thermometer's optics sense emitted, reflected, and transmitted energy. The thermometer's electronics translate the information into a temperature reading which is then displayed on the LCD.

The amount of IR energy emitted by an object is proportional to an object's temperature and its ability to emit energy. This ability is known as emissivity and is based upon the material of the object and its surface finish. Emissivity values range from 0.1 for a very reflective object to 1.00 for a flat black finish. For this model, the emissivity is adjustable from 0.1 to 1.00. Most organic materials and painted or oxidized surfaces have an emissivity factor of 0.95. When in doubt, set the emissivity to 0.95.

Emissivity Factors for Common Materials

| Material under test | Emissivity | Material under test | Emissivity |
|---------------------|--------------|---------------------|--------------|
| Asphalt | 0.90 to 0.98 | Cloth (black) | 0.98 |
| Concrete | 0.94 | Skin (human) | 0.98 |
| Cement | 0.96 | Leather | 0.75 to 0.80 |
| Sand | 0.90 | Charcoal (powder) | 0.96 |
| Soil | 0.92 to 0.96 | Lacquer | 0.80 to 0.95 |
| Water | 0.92 to 0.96 | Lacquer (matt) | 0.97 |
| Ice | 0.96 to 0.98 | Rubber (black) | 0.94 |
| Snow | 0.83 | Plastic | 0.85 to 0.95 |
| Glass | 0.90 to 0.95 | Timber | 0.90 |
| Ceramic | 0.90 to 0.94 | Paper | 0.70 to 0.94 |
| Marble | 0.94 | Chromium Oxides | 0.81 |
| Plaster | 0.80 to 0.90 | Copper Oxides | 0.78 |
| Mortar | 0.89 to 0.91 | Iron Oxides | 0.78 to 0.82 |
| Brick | 0.93 to 0.96 | Textiles | 0.90 |

Specifications

| | |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range | -4 to 950°F (-20 to 510°C) |
| Resolution | 0.1° |
| Accuracy | -4°F to 28°F (-20°C to -2°C) ±9°F/4°C 28°F to 200°F (-2°C to 94°C) ±4.5°F/2.5°C 200°F to 400°F (94°C to 204°C) ±(1.0%rdg + 2°F/1°C) 400°F to 800°F (204°C to 426°C) ±(1.5%rdg + 2°F/1°C) 800°F to 950°F (426°C to 510°C) ±(4%rdg + 2°F/1°C) Note: Accuracy is specified for the following ambient temperature range: 73 to 77°F (23 to 25°C) |
| Emissivity | 0.10 to 1.00 adjustable |
| Field of View | D/S = Approx. 12:1 ratio (D = distance; S = spot or target) |
| Laser pointer | Dual, Class 2 laser < 1mW power; Wavelength is 630 to 670nm |
| IR Spectral response | 8 to 14 μm (wavelength) |
| Repeatability | ± 0.5% of reading or ± 1.8°F (1°C) whichever is greater |

General Specifications

| | |
|-----------------------|----------------------------------------------|
| Display | Backlit LCD display with function indicators |
| Response time | 150ms |
| Over range indication | "-----" |
| Operating Temperature | 32°F to 122°F (0°C to 50°C) |
| Operating Humidity | 10% to 90%RH operating, <80%RH storage. |
| Storage Temperature | 14 to 140°F (-10 to 60°C) |
| Power Supply | 9V battery |
| Automatic Power Off | 7 seconds, with LOCK to disable |
| Weight | 5.7 oz. / 163g |
| Dimensions | 5.7 x 4 x 1.6" (146 x 104 x 43mm) |



Support line (781) 890-7440
 Technical support: Extension 200; E-mail: support@extech.com
 Repair & Returns: Extension 210; E-mail: repair@extech.com

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