User Manual

⟨D⟩ DIGI-SENSE.
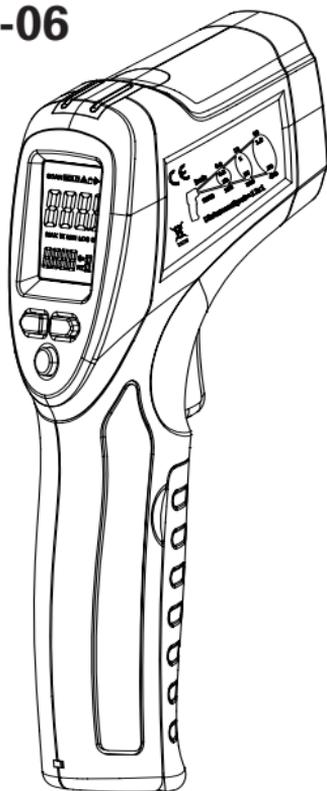
Infrared Thermometer
with 20:1 Distance-to-Sight Ratio
and Temperature Alarm

with NIST-Traceable Calibration

Model 20250-06

CE

THE STANDARD IN PRECISION MEASUREMENT

Introduction

The Digi-Sense Infrared Thermometer (Model 20250-06) with 20 to 1 distance-to-sight ratio and temperature alarm offers fast response and high accuracy. Advanced features include temperature alarm, adjustable emissivity, data Hold, Min/Max readings, and auto power-off. The instrument is fully tested and calibrated to NIST-traceable standards. Careful use of this meter will provide years of reliable service.

Unpacking

Check individual parts against the list of items below. If anything is missing or damaged, please contact your instrument supplier immediately.

1. Meter

2. One 9 V battery

3. User manual

4. NIST-traceable calibration report with data

Key Features

• 20:1 Distance-to-sight ratio

• 1% basic accuracy

• Adjustable emissivity from 0.10 to 1.0

• Rapid detection function

• Precise noncontact measurements

• Laser sighting

• User-selectable °C or °F units

• Automatic data Hold

• MAX/MIN temperature displays

• Automatic selection range and display resolution

• High and low alarms (visual and audible)

• Trigger lock

• Backlight LCD

• Automatic power-off to conserve battery life

__Meter Description__

1. IR sensor
2. Laser pointer beam
3. LCD
4. **Down ▼** button
5. **Up ▲ / Laser** button
6. **MODE** button
7. Measurement trigger
8. Battery cover
9. Handle grip
10. Temperature alarm indicator light
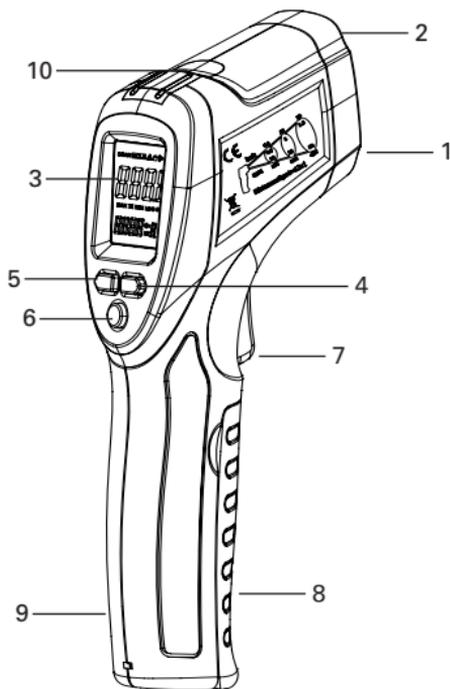
Display Layout

1. Max or Min reading
2. Temperature readout
3. SCAN measuring indicator
4. Data hold icon
5. Laser pointer indicator
6. Trigger lock indicator
7. High alarm indicator
8. Low alarm indicator
9. °C temperature icon
10. °F temperature icon
11. Low-battery indicator
12. Emissivity readout
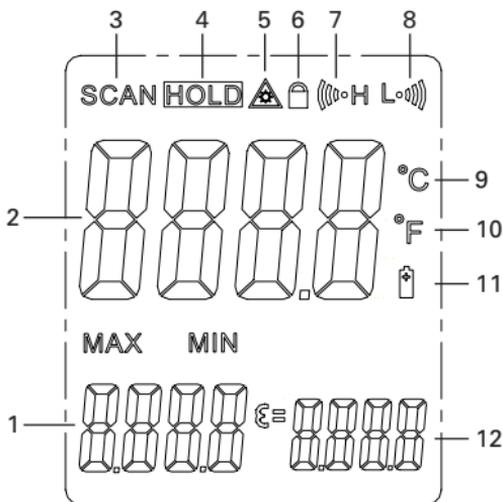
How it Works

Infrared thermometers measure the surface temperature of an object. The unit's optics sense emitted, reflected, and transmitted energy, which is collected and focused onto a detector. The unit's electronics translate the information into a temperature reading which is displayed on the unit. The laser is used for aiming purposes only.

Field of View

Make sure that the target is larger than the unit's spot size. The smaller the target, the closer you should be to it. When accuracy is critical, make sure the target is at least twice as large as the spot size.

Distance and Spot Size

As the distance (D) from the object increases, the spot size (S) of the area measured by the unit becomes larger.

Locating a Hot Spot

To find a hot spot, aim the thermometer outside the area of interest, then scan across with an up-and-down motion until you locate hot spot.

How it Works (continued)

Emissivity

Emissivity is a term used to describe the energy-emitting characteristics of materials. Most (90% of typical applications) organic materials and painted or oxidized surfaces have an emissivity of 0.95 (preset in the unit). Inaccurate readings will result from measuring shiny or polished metal surfaces. To compensate, cover the surface to be measured with black tape or flat black paint. Allow time for the tape to reach the same temperature as the material underneath it. Measure the temperature of the tape or painted surface. (Refer to table on page 8.)

Good Measuring Practices

Holding the meter by its handle, point the IR sensor toward the object whose temperature is to be measured. The meter automatically compensates for temperature deviations from ambient temperature. Keep in mind that it will take up to 30 minutes for the IR sensor to stabilize if going from ambient temperatures to a much higher (or lower) temperature measurement.

Reminders

- The unit is not recommended for measuring shiny or polished metal surfaces (stainless steel, aluminum, etc.). See **Emissivity** above.

- The unit cannot measure through transparent surfaces such as glass. It will measure the surface temperature of the glass instead.

- Steam, dust, smoke, etc. can prevent accurate measurement by obstructing the unit's optics.

Emissivity Values

Substance	Thermal emissivity	Substance	Thermal emissivity
Asphalt	0.90 to 0.98	Cloth (black)	0.98
Concrete	0.94	Human skin	0.98
Cement	0.96	Lather	0.75 to 0.80
Sand	0.90	Charcoal (powder)	0.96
Earth	0.92 to 0.96	Lacquer	0.80 to 0.95
Water	0.92 to 0.96	Lacquer (matte)	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

Setup and Operation

1. Hold the meter by its handle grip and point it toward the surface to be measured.

2. Pull and hold the trigger to turn the meter on and begin testing. The display will light if the battery is good. Replace the battery if the display does not light. Meter automatically powers down after 10 seconds once the trigger is released.

3. While measuring, the **SCAN** icon will appear in the upper left-hand corner of the LCD.

4. Release the trigger and the **HOLD** icon will appear at the top of the LCD, indicating that the reading is being held.

5. Press the **Up ▲ / Laser** button to turn on the laser pointer. When the laser is on, the **Laser** icon will appear at the top of the LCD. Press the **Up ▲ / Laser** button again to turn laser off.

6. While in the **HOLD** mode, press the **MODE** button to access and set emissivity (EMS) value, temperature units (°C or °F), Max/Min readings, trigger lock (on/off), high alarm (on/off and set point), and low alarm (on/off and set point). Each time you press the **MODE** button, you advance through each option. Refer to the flow chart on page 11 to see the sequence of functions in the mode cycle.

   a. **Emissivity (EMS)**. When the **Emissivity** icon is flashing, use the **Up ▲** and **Down ▼** buttons to adjust from 0.10 to 1. Then press the **MODE** button again to enter setting.

b. **Trigger Lock**. Use for continuous monitoring of temperatures. When the **Lock** icon is flashing, use the **Up ▲** or **Down ▼** button to turn "on". Then press the **MODE** button again to enter setting. Once you press the measurement trigger, the **Lock** icon is shown, confirming the lock measurement mode. The meter will continuously display the temperaure until the measurement trigger is pressed again.

c. **High Alarm**. When the **High alarm** icon is flashing, use the **Up ▲** or **Down ▼** button to turn "on". Then press the **MODE** button again to enter setting. The **High alarm** icon will still be flashing, allowing you to set the alarm trigger temperature set point from –31 to 1472°F (–35 to 800°C) using the **Up ▲** and **Down ▼** buttons. Press **MODE** button again to enter setting.

d. **Low Alarm**. When the **Low alarm** icon is flashing, use the **Up ▲** or **Down ▼** button to turn "on". Then press the **MODE** button again to enter setting. The **Low alarm** icon will still be flashing, allowing you to set the alarm trigger temperature set point from –31 to 1472°F (–35 to 800°C) using the **Up ▲** and **Down ▼** buttons. Press **MODE** button again to enter setting.

Setup MODE Flow Chart

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        ┌──────────────────────────────────┐
        ▼                                  │
┌─────────────────┐                        │
│  EMS adjustment │                        │
└─────────────────┘                        │
        │                                  │
        ▼                                  │
┌─────────────────┐                        │
│      C/F        │                        │
└─────────────────┘                        │
        │                                  │
        ▼                                  │
┌─────────────────┐                        │
│    MAX/MIN      │                        │
└─────────────────┘                        │
        │                                  │
        ▼                                Mode
┌─────────────────┐                        │
│  LOCK on/off    │                        │
└─────────────────┘                        │
        │                                  │
        ▼                                  │
┌─────────────────┐                        │
│   HAL on/off    │                        │
└─────────────────┘                        │
        │                                  │
        ▼                                  │
┌─────────────────┐                        │
│ HAL adjustment  │                        │
└─────────────────┘                        │
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        ▼                                  │
┌─────────────────┐                        │
│   LOW on/off    │                        │
└─────────────────┘                        │
        │                                  │
        ▼                                  │
┌─────────────────┐                        │
│      LOW        │                        │
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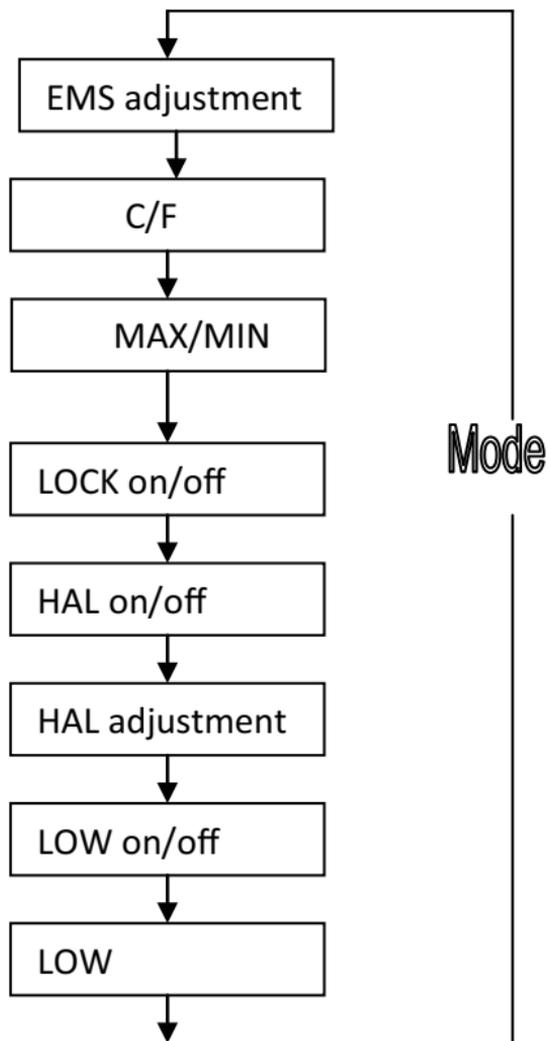
Specifications

Temperature range	–31 to 1472°F (–35 to 800°C)
Resolution	0.1°F/C below 1000°, 1°F/C above 1000°
Accuracy	From –58 to 68°F (–35 to 20°C): ±4.5°F (2.5°C) From 68 to 572°F (20 to 300°C): ±1.0% ±1 of reading From 572 to 1472°F (300 to 800°C): ±1.5% ±1 of reading
Response time	300 ms
Emissivity	Adjustable from 0.10 to 1.0
Distance-to-sight ratio (field of view)	D/S = approximately 20:1 ratio (D = distance, S = spot)
Laser	Single Class 2 (II) Laser
Spectral range	8 to 14 μm
Out-of-range indication	LCD will show "----"
Operating temperature	32 to 122°F (0 to 50°C)
Storage temperature	–14 to 140°F (–10 to 60°C)
Power	One 9 V battery

Field of View

The meter's field of view is 20:1, meaning that if the meter is 20 inches from the target, the diameter of the object under test must be at least 1 inch. Other distances are shown in the diagram below. Make sure that the target is larger than the unit's spot size. The smaller the target, the closer you should be to it.

When accuracy is critical, make sure the target is at least twice as large as the spot size.
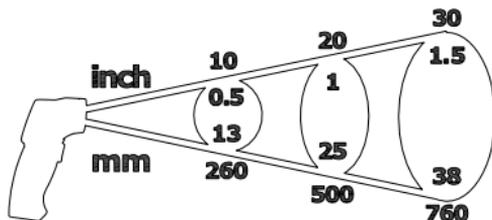
Safety

- Use extreme caution when the laser beam is turned on.

- Do not let the laser beam enter your eye, another person's eye or the eye of an animal.

- Be careful not to let the laser beam on a reflective surface strike your eye.

CAUTION

LASER RADIATION
DO NOT STARE INTO BEAM

<1mW Output at 675nm
CLASS II LASER PRODUCT

- Do not allow the laser light beam to impinge on any gas which can explode.

Maintenance, Recalibration, and Repair

Cleaning and Storage

- The meter should be cleaned with a damp cloth and mild detergent when necessary. Do not use solvents or abrasives.

- Store the meter in an area with moderate temperature and humidity (refer to the operating and storage temperatures on page 12).

Battery Replacement

If the battery power is insufficient, the **Low Battery** icon will appear on the LCD. Open the battery cover and replace the 9 V battery. Securely close the cover.

9V battery

Open the battery cover
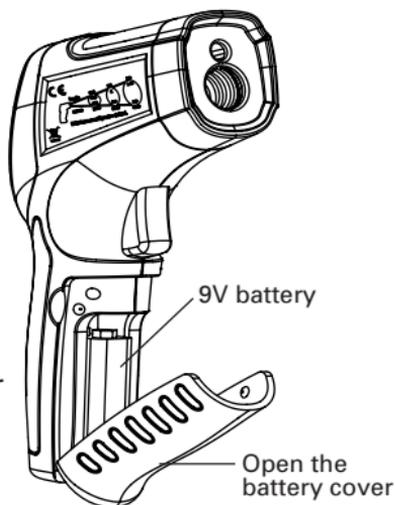
<u>Maintenance, Recalibration, and Repair</u> (continued)

It is recommended that Digi-Sense products are calibrated annually to ensure proper function and accurate measurements; however, your quality system or regulatory body may require more frequent calibrations. To schedule your recalibration, please contact InnoCal, an ISO 17025 calibration laboratory accredited by A2LA.

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