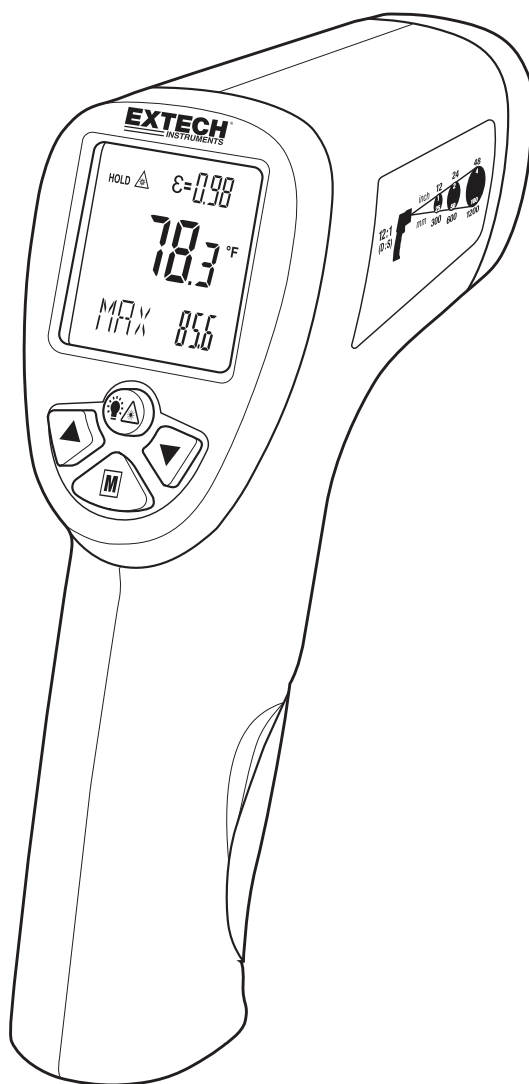# EXTECH®
INSTRUMENTS

User Manual

InfraRed Thermometer

With Laser Pointer and High/Low Alarms

Model IR270

Introduction

Thank you for selecting the Extech IR270 IR Thermometer. The IR270 makes non-contact (infrared) surface temperature measurements and includes a laser pointer for convenient targeting. The meter switches ON and starts scanning surface temperatures as soon as you pull the trigger. This device is shipped fully tested and calibrated and, with proper use, will provide years of reliable service. Please visit our website (www.extech.com) to check for the latest version and translations of this User Manual and Customer Support.

Features

- Measures non-contact surface temperature up to 650°C (1202°F)
- Automatic ranging
- 12:1 Distance to Spot Ratio (Field of View)
- Laser pointer targeting
- Automatic Data Hold when trigger is released
- High/Low temperature alarms
- Maximum, Minimum, Average, and Differential displays
- 20-memory datalogger
- Selectable emissivity
- Display backlight
- Selectable temperature units (°F / °C)
- Battery status indication

Safety

International Safety Symbols

⚠ This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information

Warnings

o   Do not directly or indirectly point the laser at the eyes of a person or an animal

o   Inspect for damage or for any shortage of parts or accessories before use

o   Replace the battery immediately after the battery indicator flashes

o   Do not use the thermometer near explosive gases, steam, or dust

o   Note that an object with high reflectivity will normally cause the measured temperature value to read much lower than the actual temperature

o   Use the device only as described in this User Manual

CAUTION

LASER RADIATION
DO NOT STARE INTO BEAM
DIODE LASER
<1mW Output at 650nm
CLASS II LASER PRODUCT

Cautions

To avoid thermometer damage, please avoid the following hazards:

o   EMF from welding equipment or electro-induction heaters

o   Static electricity

o   Thermal shock caused by large or abrupt environmental temperature changes; wait 30 minutes to allow the thermometer to stabilize to new environmental conditions

o   Do not use this device in excessively high temperature environments

Description

Meter Description

1. Backlit multifunction LCD
2. Laser/Backlight/Log button
3. Up arrow button
4. Secondary display mode button
5. Laser pointer lens
6. IR thermometer lens
7. Down arrow button
8. Trigger (pull and hold to scan surfaces)
9. Battery compartment (9V)
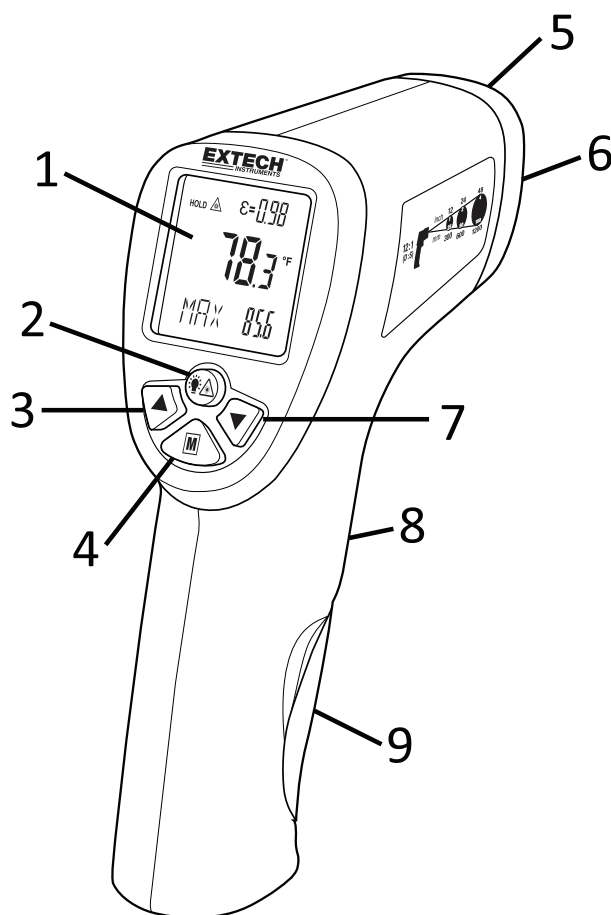
Display Description

1. Measurement Scan mode. The icon flashes while the trigger is pulled. The displayed reading represents the temperature of the scanned surface
2. Data hold mode. Reading is held after trigger is released
3. Primary display. Surface temperature reading
4. Datalogger mode
5. Secondary display mode icons (EMS, MAX, MIN, DIF, AVG, HAL, LAL)
6. Secondary Display value
7. Battery status icon. Flashes when battery voltage is critically low.
8. Temperature units (selectable)
9. Emissivity. Selectable from 0.10~1.00
10. Laser pointer icon. Appears when laser is enabled
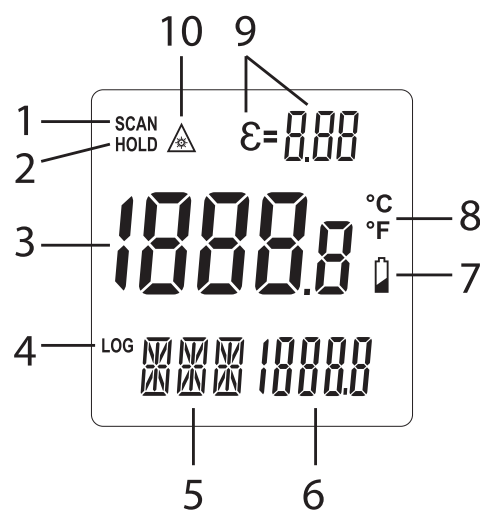
Operation

Meter Power

One 9V battery powers the meter. Pull the meter trigger to switch the meter ON. If the meter does not switch ON, please check the battery (located in the meter handle); refer to the Maintenance section for more information. The battery icon provides battery status; replace the battery as soon as the battery icon flashes. The meter switches OFF seven seconds after you release the trigger (during the seven-second period the last reading freezes on the display).

Surface Temperature Measurements

1. Hold the meter by its handle and point it toward the surface under test.

2. Pull and hold the trigger to turn the meter ON and to scan surface temperatures. With the trigger pulled the SCAN icon flashes in the upper left area of the display. Read the measured temperature in the primary display area.

3. If 'HI' appears on the main LCD digits, the temperature reading exceeds the high range of the meter.

4. Release the trigger; the reading will hold for approximately 7 seconds, and then the meter will automatically shut off.

5. Refer to the Field of View section for distance to target (spot) ratio considerations.

6. The meter defaults to the programmed conditions in use when the meter was last switched OFF. For example, if the laser is set to default to ON and the temperature units are set to ᵒF at the time the unit is switched OFF, the unit will switch ON and use the same settings.

Laser Pointer and LCD Backlight Default Modes

Press the **M** button or pull/release the trigger to turn the meter ON. Now, press and release the ☀⚠ button to step through these default conditions:

- Laser ON/Backlight OFF

- Laser ON/Backlight ON

- Laser OFF/Backlight OFF

- Laser OFF/Backlight ON

When you enable the laser, the laser icon ⚠ appears on the upper left. To use the laser, pull and hold the trigger and aim the laser approximately one half inch above the point of test.

## Selecting the Temperature Unit of Measure (°C/°F)

With the meter ON, long press the **M** button to switch the temperature units. The display beeps and switches between °C and °F.

Locating Hot or Cold Spots

To locate a hot or cold spot while scanning, aim the meter outside the area of interest then scan (in an up and down motion) until the spot is located.

Distance to Spot Ratio (Field of View)

The meter's field of view is 12:1 (distance to spot ratio). For example, if the meter is 12 inches from the target (spot), the diameter of the target must be at least 1 inch. Refer to the field of view diagram printed on the meter and reproduced here.
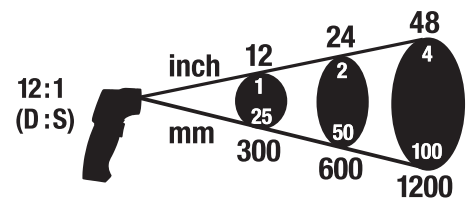
Measure surfaces from a maximum distance of 2 feet whenever possible. The meter can measure from further distances but external sources of light may interfere with the readings and the spot size may be so large that it encompasses unintended surface areas.

It is necessary to ensure that the size of the target is larger than the spot size. The smaller the target, the closer the distance should be.

Measurement Considerations

1. The object under test should be larger than the spot (target) size (refer to the field of view section above).

2. Remove frost, oil, grime, etc., from surface before taking measurements.

3. If an object's surface is highly reflective, apply masking tape or flat black paint to the surface before measuring.

4. The meter may not make accurate measurements through transparent surfaces such as glass.

5. Steam, dust, smoke, etc. can obscure measurements.

6. The meter compensates for deviations in ambient temperature but it can take up to 30 minutes for the meter to adjust to wide ambient temperature changes.

7. To find a hot spot, aim the meter outside the area of interest then scan (in an up and down motion) until the hot spot is located.

Secondary Display Modes

The secondary display area is located on the bottom of the meter's LCD. You can step through the secondary display modes by simply short pressing the MODE (**M**) button from a powered ON or powered OFF condition.

The mode icon appears on the lower left and its associated value appears on the lower right (except for emissivity; its value appears on the upper right). Use the ▲▼ arrow buttons to make changes to a setting where applicable. Refer to the sections, below, for detailed information for each mode.

For best results, pull and release the trigger to switch the meter ON, use the **M** button to select the desired mode, and then pull the trigger to begin measuring with the desired mode now active.

Maximum Reading (MAX)

Use the **M** button to step to the **MAX** parameter, then pull and hold the trigger to start scanning surface temperatures. The reading on the lower right represents the highest reading recorded during the current measurement scan. When pressing **M** from a powered OFF condition, the value shown on the lower right is the highest reading recorded during the last measurement scan performed.

Minimum Reading (MIN)

Use the **M** button to step to the **MIN** parameter, then pull and hold the trigger to start scanning surface temperatures. The reading on the lower right represents the lowest reading recorded during the current measurement scan. When pressing **M** from a powered OFF condition, the value shown on the lower right is the lowest reading recorded during the last measurement scan performed.

Differential Reading (DIF = MAX minus MIN)

Use the **M** button to step to the **DIF** parameter, then pull and hold the trigger to start scanning surface temperatures. The reading on the lower right represents the difference between the MAX and the MIN readings recorded during the current measurement scan. When pressing **M** from a powered OFF condition, the value shown on the lower right represents the difference between the MAX and the MIN readings recorded during the last measurement scan performed.

Average Reading (AVG)

Use the **M** button to step to the **AVG** parameter, then pull and hold the trigger to start scanning surface temperatures. The reading on the lower right represents the average of all readings recorded during the current measurement scan. When pressing **M** from a powered OFF condition, the value shown on the lower right is the average of all readings recorded during the last measurement scan performed.

High Alarm Limit (HAL)

Use the **M** button to step to the **HAL** parameter. Use the arrow buttons to set the High Alarm limit. While measuring, the meter beeps when the displayed reading is higher than the high alarm setting. If the backlight is on, the backlight color will turn red in a high alarm condition.

Low Alarm Limit (LAL)

Use the **M** button to step to the **LAL** parameter. Use the arrow buttons to set the Low Alarm limit. While measuring, the meter beeps when the displayed reading is lower than the low alarm setting. If the backlight is on, the backlight color will turn blue in a low alarm condition.

Datalog Memory (LOG)

The meter has twenty memory locations (1~20) in which to stored temperature readings.

1. From a powered ON or OFF condition, short press the **M** button to step to the **LOG** mode (the LOG display icon is much smaller than the other mode icons)
2. Use the ▲ ▼ arrows to select a memory location in which to store a reading
3. Pull and hold the trigger to scan surface temperatures
4. Press the ☀△ button at any time to store the reading in the selected memory location. Note that you can press the ☀△ button after the trigger is released in order to store the held reading into the selected memory location
5. Use the arrow buttons to step through and view the readings stored in each location. Dashes indicate that a memory location is empty
6. A reading will remain in a memory location until the user overwrites that memory location

Emissivity Adjust (EMS)

Use the **M** button to step to the **EMS** parameter. Use the arrow buttons to set the desired emissivity value (shown on the upper right). The emissivity can be adjusted between 0.10~1.00. Refer to the Emissivity Considerations section for more information.

Emissivity Considerations

Emissivity represents the reflectivity of a material. For this meter, the emissivity can be adjusted from 0.10~1.00 (see Emissivity Adjust section above). Most organic materials and painted or oxidized surfaces have an emissivity of approximately 0.95. If possible, masking tape or flat black paint should be applied to cover the measured surface.

Wait a period of time to allow the tape or paint to reach thermal equilibrium with the surface of the covered object. Measure the temperature of the surface covered with tape or paint only.

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

Maintenance

Cleaning

Use compressed air to clear dust and other particles from the meter lenses, and then carefully clean with a moistened (clean water) cotton swab.

To clean the meter housing, wipe with a damp, soft cloth. Do not use solvents or abrasives. Do not immerse the IR270 in water or in other liquids.

Troubleshooting

Symptom	Problem	Action
'HI' display icon	Target temperature over-range	Select a target within range
Battery icon flashes	Low battery power	Replace battery
Out-of-focus or 'cloudy' display screen	Low battery power	Replace battery
Laser pointer does not appear when enabled	Defective laser	Return the meter for service

Replacing Batteries

When the battery icon flashes, or when the meter does not switch ON, replace the battery.

The battery compartment is located in the meter handle. The battery compartment cover is located just below the trigger. Pry the compartment cover loose (from the top of the compartment) to open the compartment.

Replace the 9V battery following correct polarity and then close the battery compartment before using the meter.

Never dispose of used batteries or rechargeable batteries in household waste.

As consumers, users are legally required to take used batteries to appropriate collection sites, the retail store where the batteries were purchased, or wherever batteries are sold.

Disposal: Do not dispose of this instrument in household waste. The user is obligated to take end-of-life devices to a designated collection point for the disposal of electrical and electronic equipment.

Specifications

Infrared Thermometer Specifications

Range / Resolution	Auto range -20 ~ 650ºC (-4 ~ 1202ºF) / Resolution 0.1°
Accuracy	-20 ~ -2ºC (-4 ~ 28ºF): ± 4°C (8°F)
	-2 ~ 94ºC (28 ~ 200ºF): ± 2.5°C (4.5°F)
	94 ~ 204ºC (200 ~ 400ºF): ± (1.0%rdg + 1°C/2°F)
	204 ~ 426ºC (400 ~ 800ºF): ± (1.5%rdg + 1°C/2°F)
	426 ~ 650ºC (800 ~ 1202ºF): ± (3%rdg + 1°C/2°F)
	Note: Accuracy is specified for the following ambient temperature range: 23 ~ 25°C (73 ~ 77°F), <80%RH
Emissivity	0.10 ~ 1.00 adjustable
Field of View	12:1 (approx.) Distance to Spot ratio
Laser power	Class 2 < 1mW, 650nm ±10nm
IR Spectral response	8 ~ 14 μm
Repeatability	±0.5%rdg or ±1°C (1.8°F); whichever is greater

General Specifications

Display	Backlit LCD with multifunction indicators
Response time	150ms
Out-of-range indicator	'HI' for over-range
Operating temperature	0°C ~ 50°C (32°F ~ 122°F)
Operating relative humidity	10 ~ 90% RH
Storage temperature	-10°C ~ 60°C (14°F ~ 140°F)
Storage relative humidity	80% RH maximum
Power supply	One 9V battery
Automatic power OFF	After approx. 7 seconds of trigger release
Weight	150g (5.3 oz.)
Dimensions	180 x 107 x 40mm (7.1 x 4.2 x 1.6")