GENERAL®

6:1 POCKET INFRARED THERMOMETER

USER'S MANUAL

IRT102

Please read this manual carefully and thoroughly before using this product.

INTRODUCTION

The IRT102 is a small and lightweight non-contact thermometer that measures the surface temperature of an object from a distance by using an IR sensor to measure its thermal radiation. A laser pointer indicates the target area (spot) whose temperature is being measured.

SAFETY INSTRUCTIONS

The IRT102's targeting laser is a Class 2 type that emits less than 1mW of power at a wavelength of 655nm. Avoid direct eye contact with laser light radiation. U.S. law prohibits pointing a laser beam at aircraft; doing so is punishable by a fine of up to $10,000 and imprisonment.

WHAT'S IN THE BLISTER PACK

The IRT102 comes in a plastic blister pack with two CR2032 batteries, a wrist strap and this user's manual.

PRODUCT OVERVIEW

Figure 1 shows the locations of the controls, indicators and physical features of the IRT102.
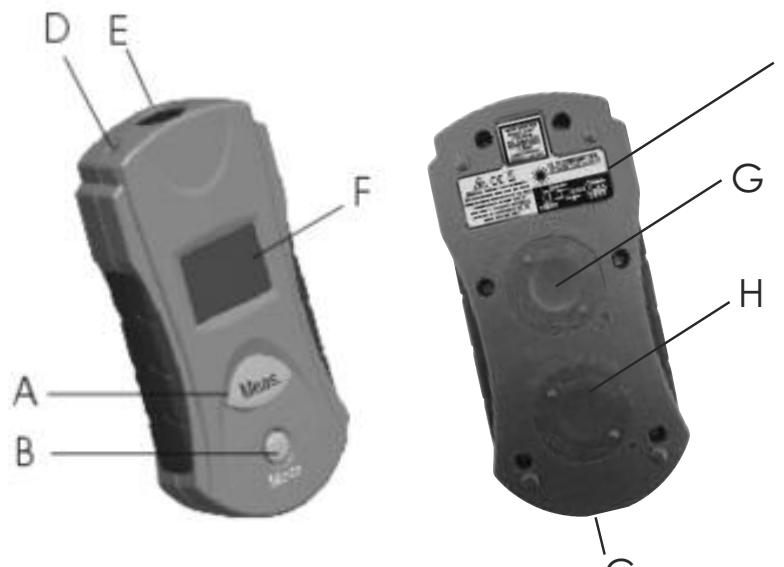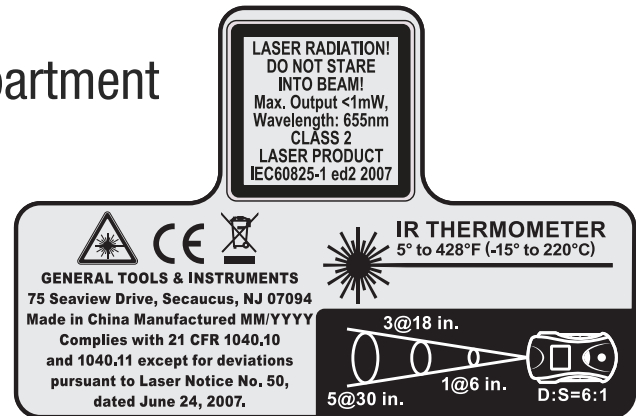
Fig. 1. The IRT102's controls, indicators and physical features

A. **Meas**. (measure) button   B. **Mode** button

C. Wrist strap attachment bar

D. Laser pointer   E. IR sensor window

F. Liquid-crystal display

G. Thermometer battery compartment

H. Laser battery compartment

I. Laser Identification/
   Certification/Warning/
   Safety Labels (on left side)

LASER RADIATION!
DO NOT STARE
INTO BEAM!
Max. Output <1mW,
Wavelength: 655nm
CLASS 2
LASER PRODUCT
IEC60825-1 ed2 2007

GENERAL TOOLS & INSTRUMENTS
75 Seaview Drive, Secaucus, NJ 07094
Made in China Manufactured MM/YYYY
Complies with 21 CFR 1040.10
and 1040.11 except for deviations
pursuant to Laser Notice No. 50,
dated June 24, 2007.

IR THERMOMETER
5° to 428°F (-15° to 220°C)

3@18 in.
1@6 in.
5@30 in.   D:S=6:1

Fig. 2. All possible display indicators and their meanings

A. Low Battery icon

B. Laser Enabled icon

C. Displaying highest measurement

D. Displaying lowest measurement

E. Operating in emissivity setting mode

F. Operating in measurement lock mode

G. Celsius unit selected

H. Fahrenheit unit selected

 I. Measured value
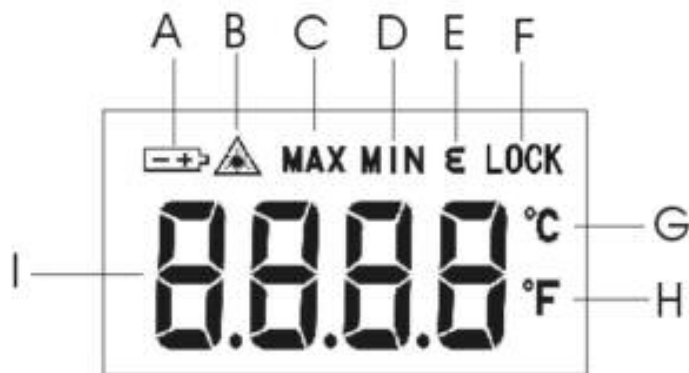
OPERATING INSTRUCTIONS

MAKING BASIC MEASUREMENTS

Point the front of the unit at a surface, press the **Meas**. (measure) button, hold it for at least one second, and then release. The temperature of the surface will be displayed instantly on the LCD. Note that when you release **Meas**. the reading will be held for 15 seconds and then disappear as the IRT automatically powers off (to extend battery life).

By default, the laser pointer turns on when the **Meas**. (measure) button is pressed and turns off when the button is released. The laser's current state is indicated by the presence or absence of the Laser Enabled icon (callout B of Fig. 2). To turn the laser off, hold down **Mode** and **Meas**. simultaneously while in the off position. The laser will reset to its default (on) state when the unit is restarted.

To temperature-scan the surfaces of a room or any environment, press **Meas**. and keep pressing it as you point the IRT in various directions. Note that the display tracks the different temperatures of different surfaces in real time. **To power off the IRT102**, either press and hold the **Mode** button or let the auto power off function turn the IRT off after 15 seconds of inactivity.

ADVANCED MEASUREMENT MODES AND FUNCTIONS

The **Mode** button is the gateway to the IRT102's five advanced measurement and selection modes (see Figure 3).

Fig. 3. The Mode button provides access to the IRT102's five advanced measurement and selection modes

MAX - Displays the maximum temperature recorded during one continuous measuring session.

MIN - Displays the minimum temperature recorded during one continuous measuring session.

LOCK - Measurement feature stays on without holding **Meas**. and displays real time temperature readings. The laser pointer automatically shuts off in this mode. (Note: The Auto Power Off feature is disabled in this mode.)

°C/°F - Toggle between Fahrenheit and Celsius by pressing the **Meas**. button.

ε - Press the **Meas**. button to choose the desired emissivity level, then press **Mode** to return to measurement mode. Upon restart, the emissivity value will return to the factory default of 0.95.
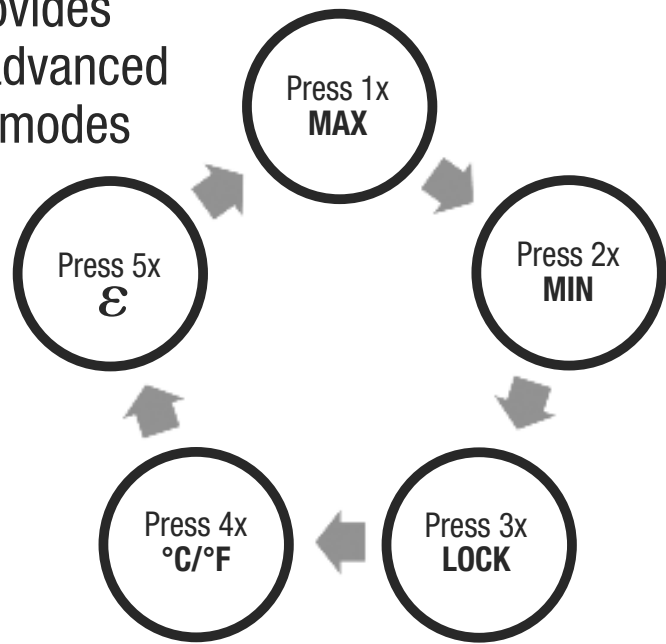
ACCOUNTING FOR EMISSIVITY

Emissivity is the ability of an object to reflect or absorb IR radiation (energy). Because the IRT102 measures the amount of infrared energy emitted by a surface, the IRT's measurements are most accurate when they take into account the characteristic emissivity of the target material. As a rule, the shinier the surface, the lower its emissivity. The default emissivity setting of the IRT102 is 0.95.

The table on the next page lists the emissivities of many common materials.

Table 1. Emissivities of common materials

Material	Emissivity	Material	Emissivity
Aluminum	0.30	Glass	0.90 to 0.95
Asphalt	0.95	Iron Oxides	0.78 to 0.82
Concrete	0.95	Paint	0.80 to 0.95
Asbestos	0.95	Plastic	0.85 to 0.95
Ceramics	0.95	Paper	0.70 to 0.94
Brass	0.50	Plaster	0.80 to 0.90
Brick	0.90	Rubber	0.95
Carbon	0.85	Wood	0.90
Sludge	0.94	Textile	0.94
Frozen Food	0.90	Lead	0.50
Hot Food	0.93	Marble	0.94
Ice	0.98	Cloth (black)	0.98
Snow	0.90	Sand	0.90
Human Skin	0.98	Water	0.93

MAKING ACCURATE MEASUREMENTS

The IRT102 has a distance-to-spot (D:S) ratio of 6:1. This means that the target area (spot) whose infrared radiation (temperature) is being measured increases in diameter by 1 inch for every 6 inches you move away from the target. Conversely, the diameter of the target area measured decreases by 1 inch for every 6 inches you move closer to the target.
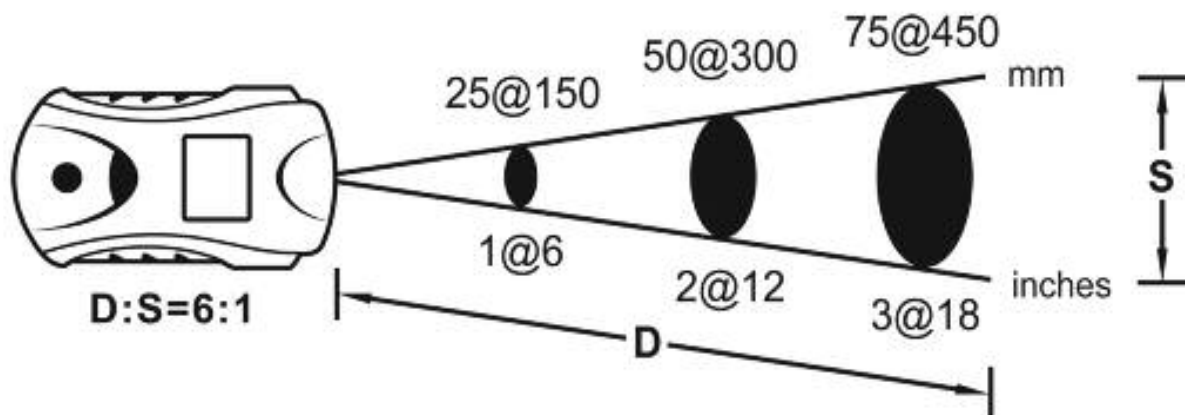
Fig. 4. The IRT102's field of view

For example, when using the IRT102 to measure the temperature of a motor with an area of 1 ft^2, the optimal measurement distance would be 6 ft. To eliminate error, the IRT must be moved close enough so the motor is the only object in the target area (see Fig. 5 bottom).
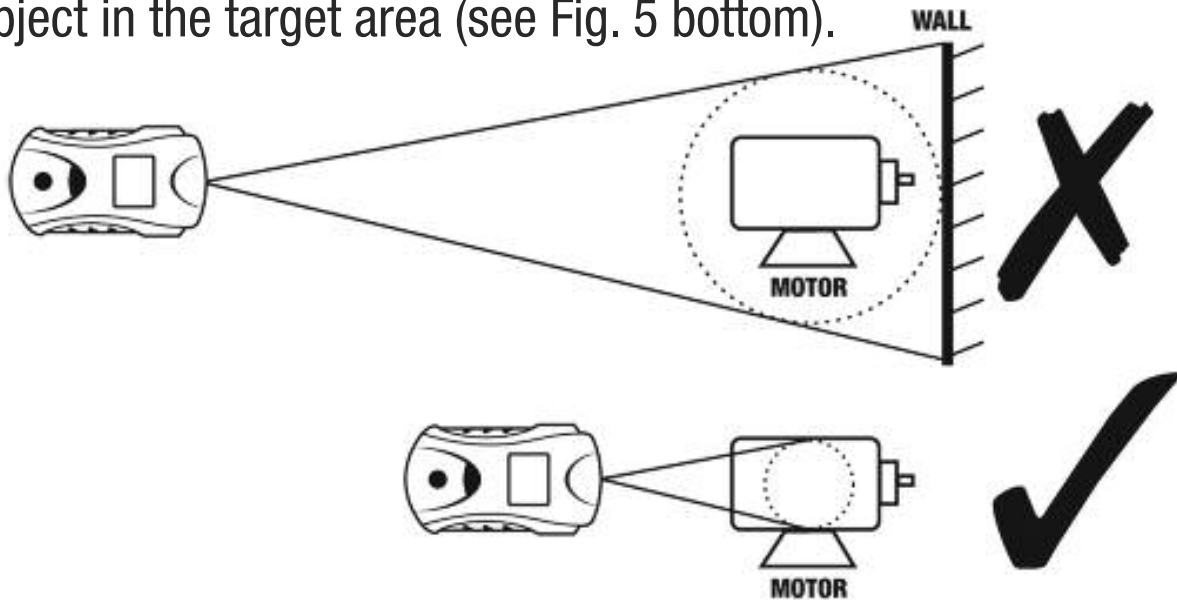

Fig. 5. Measuring a motor's temperature from the wrong (top) and right (bottom) distance.

SPECIFICATIONS

Measurement Range	5° to 428°F (-15° to 220°C)
Measurement Accuracy	±3.6°F (2°C) or 2% of reading (whichever is greater) above 32°F (0°C); ±5.4°F (3°C) or 2% of reading (whichever is greater) below 32°F
Measurement Repeatability	1% of reading or 1°C
Distance-To-Spot (D:S) Ratio	6:1
Emissivity	Adjustable from 0.1 to 1 in 0.01 increments (factory set to 0.95)
Response Time	500 msec for 95% response
Display Type/Size/Resolution	LCD/1.0 x 0.8 in. (25 x 19mm)/±0.1°C

Laser Class/Power/Wavelength	Class 2/<1mW/655nm
Response Wavelength	8 to 14 um
Auto Power Off	After 15 seconds of inactivity
Thermometer Battery Life	50 hours, typical
Current Consumption	<5mA w/laser off
Operating Temperature	32° to 104°F (0° to 40°C)@<75% R.H.
Storage Temperature	-4° to 140°F (-20° to 60°C)@<85% R.H.
Dimensions	4.25 x 2.05 x 0.98 in. (108 x 52 x 25mm)
Weight	1.41 oz. (40g)
Power Source	Two CR2032 (3V) non-rechargeable Lithium-ion cells

WARRANTY INFORMATION

In the U.S., General instruments and accessories are warranted against defects in material or workmanship for one year from date of purchase. General will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the product.

Any implied warranties arising from the sale of a General product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. General shall not be liable for loss of use of the product or other incidental or consequential damages, expenses, or economic loss, or for any claim of such damage, expenses, or economic loss.