REED

Model ST-616CT

Infrared Thermo-Hygrometer

Instruction Manual

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Safety

- Use extreme caution when the laser beam is turned on.
- Do not point the laser beam to your eye, another person's eye or the eye of an animal.
- Do not point the laser beam toward a reflective surface that can strike your eye.
- Do not point the laser beam towards an explosive gas.

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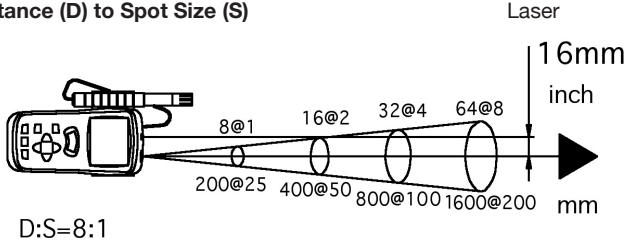
Features

- An easy-to-use infrared thermometer and humidity meter in one compact unit
- User selectable °F or °C
- Large, easy to read, backlit LCD with dual display
- Max and Hold function, Auto shut off
- Fixed 0.95 emissivity covers 90% of surface applications
- Includes battery and carrying case

Wide range of applications
Food preparation, safety and fire inspectors, plastic molding, asphalt, marine, screen printing, measure ink, dryer temperature, diesel and fleet maintenance.

Field of View
The meter's field of view is 8:1, meaning that if the meter is 8 inches from the target, the diameter of the object being tested must measure at least 1". Other distances are shown below in the field of view diagram. Refer to the chart printed on the meter for more information.

Distance (D) to Spot Size (S)



Specifications

General Specifications

Temperature Range:	-58 to 932°F (-50 to 500°C)
Resolution:	0.1 up to 200°; 1° over 200°
Accuracy:	±2% of reading
Humidity Range:	0 to 100% RH
Resolution:	0.1% RH
Accuracy:	±3.5% RH
Optical Resolution:	8:1 Distance to Spot Size Ratio
Emissivity:	Fixed at 0.95
Response Time:	< 1 second
Display:	Dual backlit LCD
IR Spectral Response:	6 to 14um
Sample Rate:	2.5 times/second
Operating Temp.:	32 to 122°F (0 to 50°C)
Operating % RH:	Max. 80% RH
Over Range Indication:	LCD will show “OL”
Power Off:	Automatic shut offf after 10 minute, approx.
Battery Life:	1 x 9V alkaline battery
Dimensions:	5.9 x 3 x 1.6” (150 x 75 x 40mm)
Weight:	7.1 oz (200g)
Optional Accessories:	Tripod (Model BS-6)

Infrared Thermometer Specifications

Range		Resolution	Accuracy
-50.0 to 200.0°C	-50.0 to -20.0°C	0.1°C	+ 5°C
	-20.0 to 200.0°C		± 2% of reading or + 2°C
200 to 500°C		1°C	± 2% of reading or + 2°C
-58.0 to 200.0°F	-58.0 to -4.0°F	0.1°F	+ 9°F
	-4.0 to 200.0°F		± 2% of reading or + 4°F
200°F to 932°F		1°F	± 2% of reading or + 4°F

Notes

Accuracy is given at 18 to 28°C (64°F to 82°F), less than 80 % RH.
Accuracy specified is for emissivity of 0.95
Emissivity settings: 0.95 fixed
Distance Factor: D:S is approx. 8:1 (D=distance, S=spot)

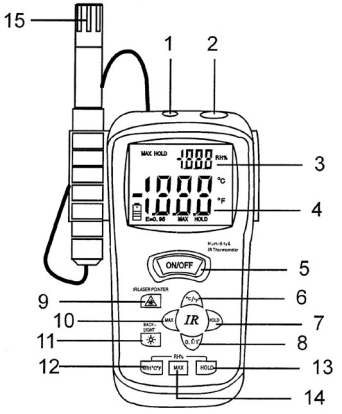
Relative Humidity / Air Temperature Specifications

Range	Resolution	Accuracy
5.0%RH to 95.0%RH	0.1%RH	+ 3.5%RH
-20.0 to 60.0°C	0.1°C	+2°C
-4.0 to 140.0°F	0.1°F	+ 3°F

Notes

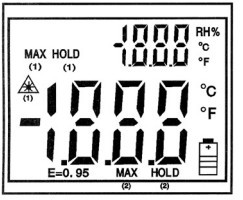
1. Accuracy is given at 18 to 28°C (64 to 82°F), less than 80% RH.
2. Reaction time humidity is about 80 sec., windstill
3. The measuring range is from 0% to 100%, however above 95% and below 5% the deviation is not specified.

Instrument Description



1 - Laser pointer beam
2 - IR sensor
3 - %RH and Probe temperature measurement reading
4 - Infrared thermometer measurement reading
5 - Power (ON/OFF) button
6 - °C/°F (IR TEMP.) button
7 - IR measurement data hold button
8 - 0.1°/1°(IR TEMP.) button
9 - IR temperature Laser pointer button
10 - IR measurement MAX hold button
11 - Backlight button
12 - %RH/°C/°F (Probe temperature) button
13 - %RH/°C/°F (Probe temperature) measurement data hold button
14 - %RH/°C/°F (Probe temperature) measurement MAX hold button
15 - Humidity and Probe temperature sensor

LCD Display



1 - 188.8 %RH°C°F	%RH and probe temperature measurement reading
2 - **MAX (1**)	%RH and probe temperature MAX Hold
3 - **HOLD (1)**	%RH and Probe temperature MAX Hold
4 - −1888 °C°F	IR measurement reading
5 - °C	Temperature °C (Celsius)
6 - °F	Temperature °F (Fahrenheit)
7 - MAX (2)	IR MAX Hold
8 - HOLD (2)	IR Data Hold
9 -	IR Laser Point
10 - ε=0.95	IR Fixed emissivity (0.95)
11 -	LOW battery indicator

Operating Instructions

ON/OFF button
Read the measured IR Temperature (°C/°F) and Relative Humidity simultaneously on the LCD of the meter. The meter automatically turns itself off approximately 10 minutes after not being used.

%RH /°C/°F (probe temperature) button
Select the Relative Humidity units (%RH) or the probe temperature (air temperature) units (°C or °F) using the°C/°F buttons.

Selecting infrared thermometer range (0.1°/ 1°)
Use the 0.1°/1° button to select the temperature range.

Selecting the display resolution
The thermometer allows two resolution choices:
High resolution: 0.1°C or 0.1°F
Low resolution: 1°C or 1°F

Overload display (OL)
The digital display will indicate OL when the input exceeds the measurement range selected. If measuring above 199.9°, change the resolution to 1°.

Data Hold button
Press the Data Hold button to freeze the reading on the display. “HOLD” will appear on the display. Press the button again to release the display.

MAX Hold button
To hold the highest reading on the LCD, press the MAX hold button. The meter reading will not change as readings change, rather it will only display the highest reading encountered since the MAX hold button was pressed. Press the MAX hold button again to return to normal operation.

Backlight button
Press the Backlight button to turn the display backlight function on and off.

Laser Pointer
Press the laser pointer button to turn the laser pointer function on and off. Only available for infrared thermometer measurements and not the relative humidity measurements.

Infrared thermometer measurement considerations
Holding the meter, point the IR sensor toward the object being measured. The meter automatically compensates for temperature deviations from ambient temperatures. Keep in mind that it will take up to 30 minutes to adjust to wide ambient temperatures. Several minutes is required after the low and before the high temperature measurements are taken.
This is due to the cooling process which must take place for the IR sensor.

Relative humidity measurement and air temperature considerations
Always operate the instrument in such a position that you can read read the liquid crystal display (LCD) or that the digital display is directed upwards.

Infrared thermometer notes:
How it Works
Infrared thermometers measure the surface temperature off an object. The intrument's optic reflected sense and transmitted energy is collected and focused onto a detector. The instrument's electronics translate the information into a temperature reading which is displayed on the display. The laser is used for aiming purposes only.

Field off View
Make sure that the target is larger than the instrument'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 & Spot Size
As the distance (D) from the object increases, the spot size (S) off the area measured becomes larger. See diagram on Page 3.

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 the hot spot.

Reminders
1. Not recommended for use in measuring shiny or polished metal surfaces (stainless steel, aluminum, etc). See emissivity chart on Page 10.
2. The instrument cannot measure through transparent surfaces such as glass. It will measure the surface temperature of the glass instead.
3. Steam, dust, smoke, etc., can prevent accurate measurements by obstructing the unit's optics.

Emissivity

Most (90% of typical applications) organic materials and painted or oxidized surfaces have an emissivity of 0.95 (pre-set in the instrument). Inaccurate readings will result from measuring shiny or polished metal surfaces. To compensate, cover the surface to be measured with masking 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.

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	Leather	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 (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	Lron oxides	0.78 to 0.82
Brick	0.93 to 0.96	Textiles	0.90

Battery Replacement

1. As battery power is no longer sufficient, the display will show  indicating that it's time to replace the current battery with a new battery (9V).
2. Open the battery cover, remove the old battery from the instrument and replace with the new 9-Volt battery. Place the battery cover back onto the instruments.

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Notes

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