

Radiamatic II Infrared Temperature Sensor

Specification

Overview

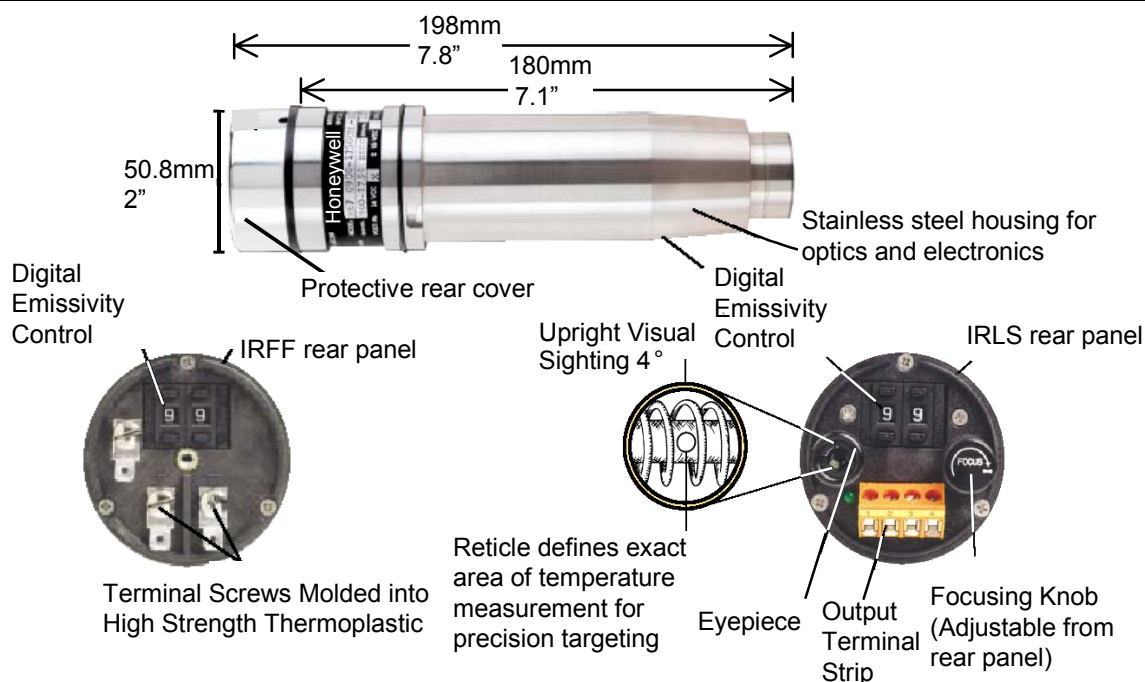


Figure 1 Overview

Optical Resolution – Fixed Focus IRFF

The fixed focus optical system determines the target size by the distance between the target area and the sensor. The field of view of the sensor is determined by the spectral response and temperature range that you have already specified and has been pre-determined for you. The sensor is factory focused for the most frequently used distances and follows its corresponding field of view diagram depicted in Figure 3.

Close focus distances are available to facilitate accurate measurements of target areas smaller than 1" (25 mm). Minimum target size is determined by the formula:

$$\text{Min. Target Size} = \frac{\text{Focused distance (sensor to target)}}{\text{Field of View Ratio}}$$

A typical close focusing example and corresponding field of view diagram are shown to the right.

Example: Determine minimum target size for a focus distance at 6" and FOV of 30:1

$$\text{Min. Target Size} = 6"/30" = 0.2" \text{ or } 15\text{cm}/75\text{cm} = 5\text{mm}$$

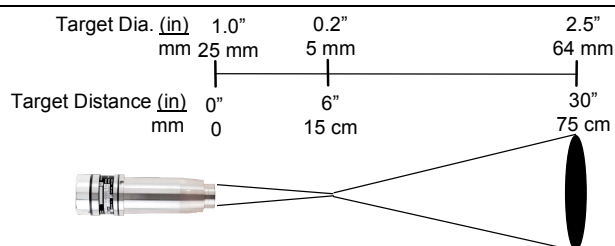
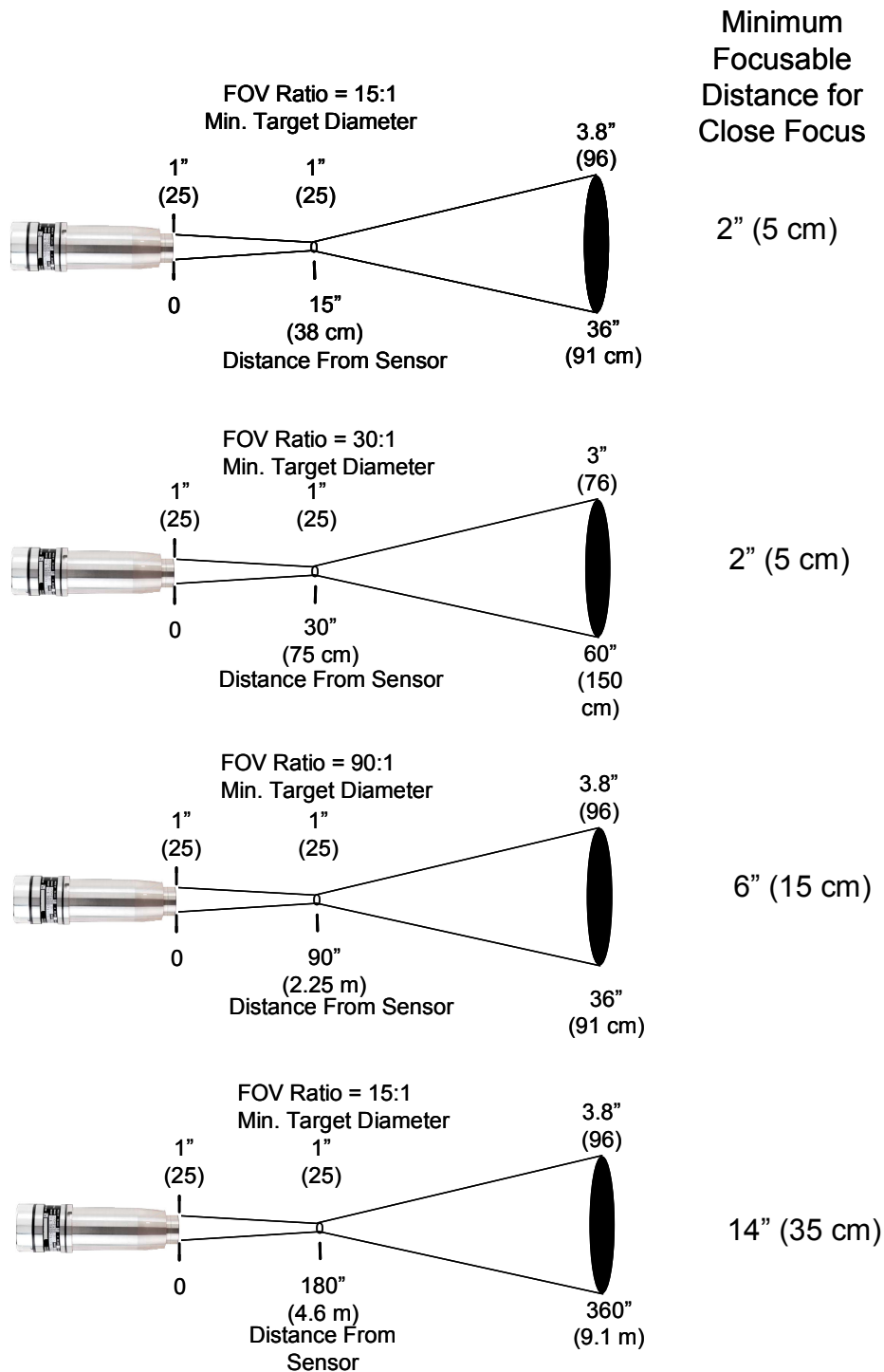


Figure 2 Sample FOV

Minimum focusable distance for each FOV is shown in Figure 3.

Standard Field Of View (FOV) Diagrams**Figure 3 Standard FOV diagrams**

Optical Resolution – Variable Focus IRLS

Three different lenses are available for the IRLS. The one you should choose depends on the desired working distance of the unit. The first version is designed to measure temperature at distances of 14" to infinity. The second version has a working distance of 6" to 14". The third version is fixed to measure temperatures at a 2" distance. Proper focusing is achieved by mounting the unit at the desired distance and adjusting the focusing knob on the rear panel of the instrument until the target comes into clear view in the reticle. When the target is in focus to the eye, it is also in focus to the detector. Should you wish to move the instrument, remember to stay within the prescribed working distance, and simply refocus upon the target after mounting the instrument in its new location. A typical field of view diagram is shown in Figure 4.

Formula to determine Minimum Target Size:

$$(MTS) = \frac{\text{Focussed Distance (D) (IRLS to target)}}{\text{Field of View Ratio}}$$

Example: IRLS, version 1 with 30:1 FOV focussed at 15"

$$(MTS) = D = 15 = 0.50" \text{ FOV } 30$$

Minimum target sizes are shown below.

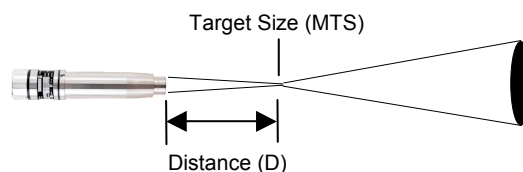


Figure 4 Typical FOV

Field of View	Version 1 Focus 14" to infinity	Version 2 Focus 6" to 14"	Version 3 Focus at 2"
15:1	Min target of 0.93" at 14" distance	Min target of 0.40" at 6" distance	Min target of 0.13" at 2" distance
30:1	Min target of 0.47" at 14" distance	Min target of 0.20" at 6" distance	Min target of 0.06" at 2" distance
90:1	Min target of 0.16" at 14" distance	Min target of 0.07" at 6" distance	Not Available
180:1	Min target of 0.07" at 14" distance	Not Available	Not Available

General Specifications

Accuracy*	+/-0.50% of full scale or 1.0 ⁰ C (1.8 ⁰ F) whichever is greater
Resolution	+/- 0.1% of full scale span (FSS)
Repeatability	+/- 0.2% of full scale span (FSS)
Emissivity	Digital setting 0.10 to 0.99 with 0.01 step
Optical System	IRLS: Non-paralex refractive optics focusable from rear panel.
Field of View	IRLS: Visual sighting 40. Infrared measurement definition MTS see FOV diagram (spec. sheet) for IRFF and optical resolution for IRLS
Focusing Distance	IRLS: 3 different versions cover 2" to infinity (adjustable for sharp focussing on target).
Eyepiece	IRLS: Diopter type
Input voltage	24 Vdc nominal
Input voltage Range	18-40 Vdc
Output Current Span	4-20 mA linear standard Minimum Output Current 3.8 mA Maximum Output Current 32 mA
Response Time	50mS for Spectral Response of 0.78-1.6 microns 100 mS for all others. Response time defined as time required for output to reach 95% of its final value.
Load Resistance Max	400 ohms for 24 Vdc input voltage, 1200 ohms for 40 Vdc input voltage.
Electrical Connections	IRFF: Two terminal screws molded into high strength, high temperature thermoplastic. IRLS: Four terminal compression type.
Operating Ambient Temperature	Without Cooling Jacket: 0 ⁰ to 60 ⁰ C (32 ⁰ to 140 ⁰ F) Without Air Purge Assembly: 120 ⁰ C (250 ⁰ F) rated for water cooling. With Cooling Jacket: Up to 315 ⁰ C (600 ⁰ F).
Storage Ambient Temperature	-30 ⁰ to 80 ⁰ C (-20 ⁰ to 160 ⁰ F).
Relative Humidity	90% Non-condensing.
Vibration	3 g's any axis continuous.
Shock	50 g's
Housing Material	Stainless Steel.
Dimensions	IRFF: 2.0" dia. x 7.8" long (50 mm x 200 mm) IRLS: 2.0" dia. x 8.0" long (50 mm x 203 mm).
Weight	1.9 lbs. (0.9 kg)
Mounting	Support block with four 0.200" (5 mm) dia. Holes and "U" clamp. For more secure mounting, use of protective jacket is recommended.
Optional Features	NIST Traceable Calibration Certificate: Minimum of five points on instrument temperature scale. Additional points as required at extra cost per point.
Peak/Valley Picker	See accessories (electrical)

* Accuracy is stated for target emissivity of 1.0 at specified focussed distance and target having sufficient diameter to eliminate background influence.

* Accuracy is stated for input voltage of 24 Vdc and load resistance of 250 ohms.

* For a narrow band Spectral Response centered at 3.86 microns the accuracy is limited to 0.75% FS

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