SI-111

Precision Infrared Radiometer

CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

The SI-111* is a precision, infrared radiometer that makes continuous measurements in field conditions. Infrared temperature sensors provide a non-contact means of measuring the surface temperature of an object or surface by sensing the infrared radiation given off by the subject. This unique sensor is manufactured by Apogee Instruments Inc. (Logan, UT).

Typical applications include:

- Road surface temperature
- Plant canopy temperature for irrigation scheduling and crop water stress
- Soil, snow, and water surface temperatures

The SI-111 is comprised of a thermopile, which measures surface temperature, and a thermistor, which measures sensor body temperature. The two temperature probes are housed in a rugged aluminum body that contains a germanium window. When compared with the silicon window of its predecessor, the germanium window facilitates correction of target emissivity, reduces the effect of atmospheric humidity, and allows the sensor to be used at greater distances from the target.

Both the thermopile and the thermistor output a millivolt signal. Our dataloggers measure the millivolt signals and apply the Stefan-Boltzman equation, which corrects for the effect of sensor body temperature on the target temperature. Use of the Stefan-Boltzman equation allows the SI-111 to achieve an absolute accuracy of ±0.2°C from -10° to 65°C.



Mounting

The SI-111 is often mounted to a CM202, CM204, or CM206 crossarm, a tripod or tower mast, or a user-supplied pole via a CM220 Right Angle Mount or CM230 Adjustable Inclination Mount. The SI-111 should be mounted perpendicular to the target surface. Therefore, the CM230 mount is recommended when the target surface is on an incline. The SI-111 may also be mounted directly to a user-supplied camera tripod.



The SI-111 is mounted to a CM204 crossarm via the CM230; the CM230 allows the sensor to be pointed at the surface of interest.

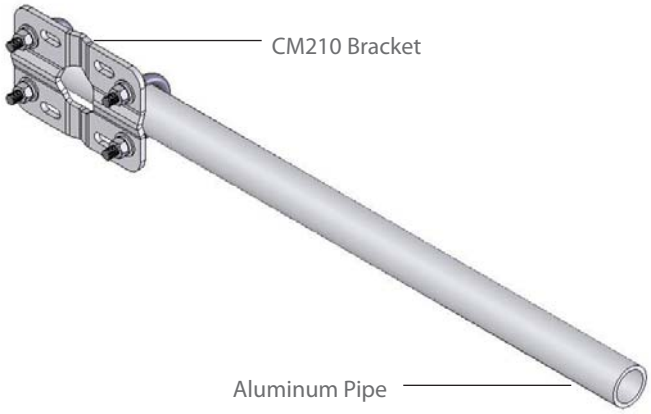


The SI-111 is mounted to a CM204 crossarm via the CM220 Right Angle Mount.

**Prior to November 2008, the SI-111 was named the IRR-P.*

Ordering Information

Model	Description
SI-111	Precision Infrared Radiometer with 15-ft cable
SI-111-PW	Precision Infrared Radiometer with 15-ft cable and connector for attaching sensor to a prewired enclosure.
Mounting Hardware	
CM220	Right Angle Mount
CM230	Adjustable Angle Mounting Kit that allows the SI-111 to be pointed at the surface of interest
CM202	Two-foot crossarm that attaches the CM220 or CM230 to a tripod or tower
CM204	Four-foot crossarm that attaches the CM220 or CM230 to a tripod or tower
CM206	Six-foot crossarm that attaches the CM220 or CM230 to a tripod or tower



The CM202 (shown), CM204, and CM206 crossarms consist of a 1" IPS anodized aluminum pipe and a CM210 bracket that attaches to the tripod or tower.

Specifications

Datalogger Channels:
one differential (thermopile) and one single-ended (thermistor); please note that our CR200-series dataloggers are not compatible.

Input Power:
2.5 V excitation for thermistor

Absolute Accuracy:
±0.2°C @ -10° to +65°C; ±0.5°C @ -40° to +70°C

Uniformity:
±0.1°C @ -10° to +65°C; ±0.3°C @ -40° to +70°C

Repeatability:
±0.05°C @ -10° to +65°C; ±0.1°C @ -40° to +70°C

Response Time:
<1 s to changes in target temperature

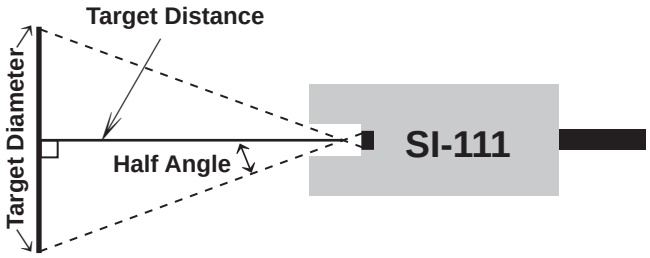
Target Temperature Output Signal:
60 µV per °C difference from sensor body

Body Temperature Output Signal:
0 to 2500 mV

Optics:
Germanium lens

Wavelength Range:
8 to 14 µm (corresponds to atmospheric window)

Field of View (FOV):
22° half angle. The FOV is reported as the half-angle of the apex of the cone formed by the target (cone base) and the detector (cone apex). The target is a circle from which 98% of the radiation viewed by the detector is being emitted.



Operating Range: -55° to +80°C; 0 to 100% RH

Cable Description:
15' (4.5 m) twisted, shielded 4-conductor wire with Santoprene casing, ending in pigtails.

Dimensions:
0.9" (2.3 cm) diameter, 2.4" (6 cm) length

Weight:
6.7 oz. (190 g)

815 W. 1800 N. | Logan, Utah | 84321-1784 | USA | (435) 753-2342 | www.campbellsci.com
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