

APOGEE PAR-FAR SENSORS | S2-141-SS & S2-441-SS

Two-band radiometer to measure PAR and Far-red radiation

Overview

Apogee PAR-FAR sensors combine two photodetectors that measure photosynthetically active and far-red radiation. The PAR sensor is the same as the Apogee model SQ-500 full-spectrum quantum sensor and is designed to measure photosynthetic photon flux density (PPFD, 400-700 nm). The far-red sensor is a quantum sensor that measures photons in the 700-760 nm range. See the spectral response below.

Features

Typical Applications

- Monitoring plant light environments
- Research plant morphogenic activity
- Photobiology studies

Key Features

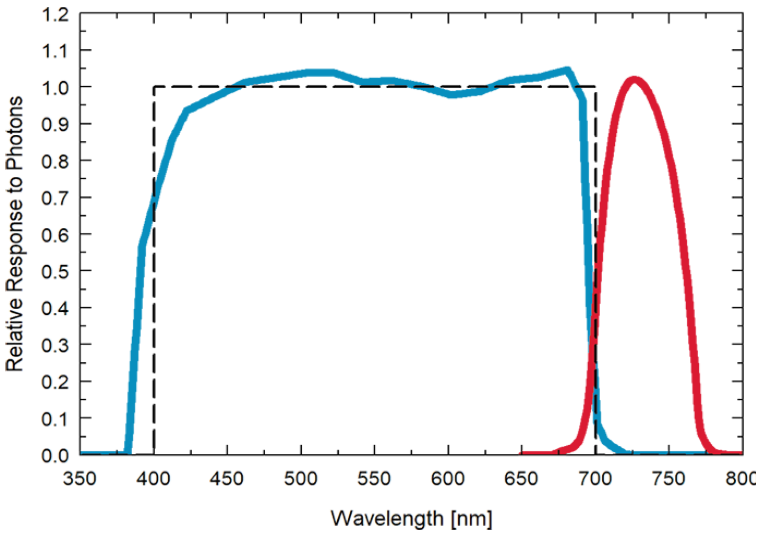
Digital SDI-12 output is standard with analog options available. A domed diffuser promotes self-cleaning to minimize errors from dust and debris.

High Quality Cable

Pigtail-lead sensors feature on IP68, marine-grade stainless-steel cable connectors attached directly to the sensor head to simplify sensor removal for maintenance and recalibration.

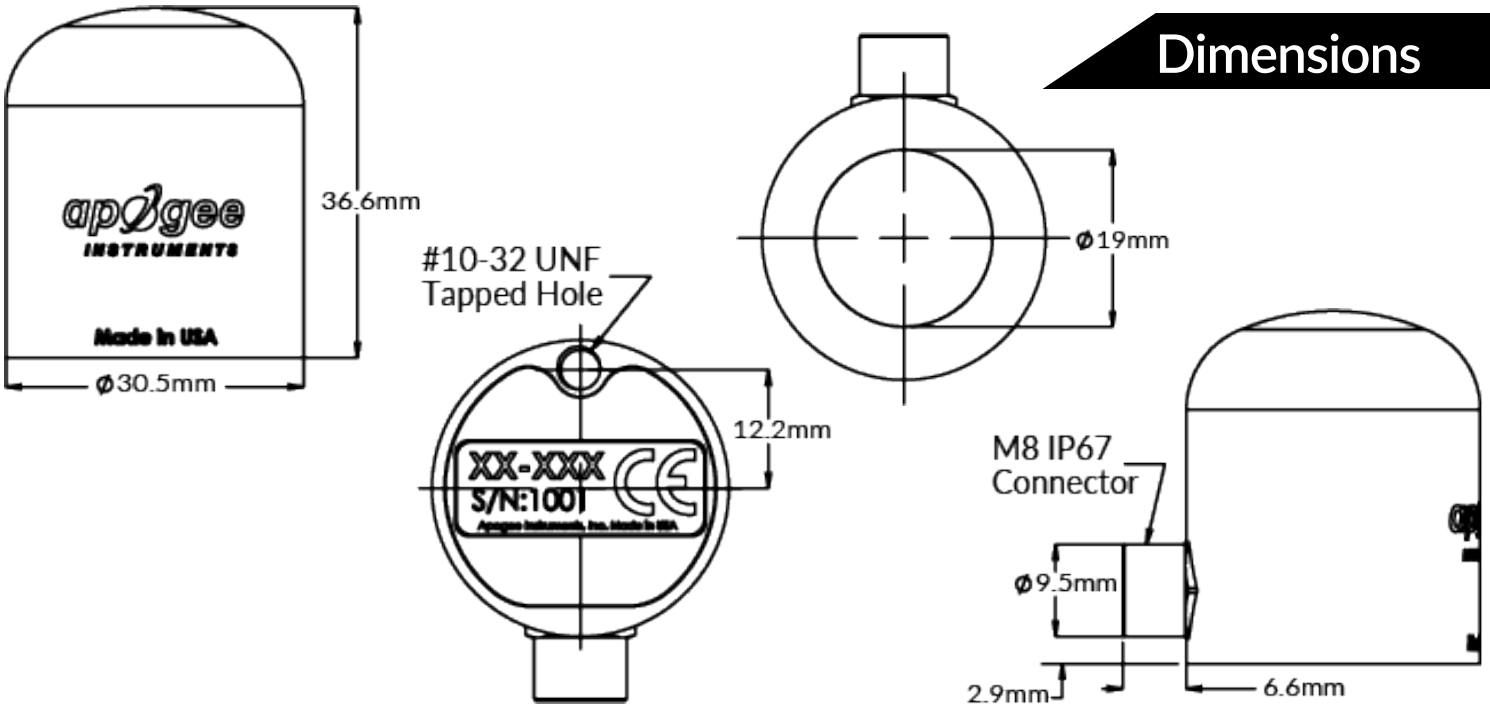


Spectral Response



Above: Spectral response of PAR detector (blue) and Far-red detector (red) compared to defined response of plants to radiation (dashed).

Dimensions



Product Specifications

	S2-141-SS	S2-441-SS
Power Supply	Self-powered	5.5 to 24 V DC
Current Draw	–	1.4 mA (quiescent), 1.8 mA (active)
Output (sensitivity)	0.01 mV per µmol m^{-2} s^{-1} (PAR) 0.02 mV per µmol m^{-2} s^{-1} (Far-red)	–
Calibration Factor (reciprocal of sensitivity)	100 µmol m^{-2} s^{-1} per mV (PAR) 50 µmol m^{-2} s^{-1} per mV (Far-red)	Custom for each sensor and stored in firmware
Calibration Uncertainty	± 5 %	
Output Range	0 to 40 mV (PAR) 0 to 20 mV (Far-red)	SDI-12
Measurement Repeatability	Less than 1 %	
Long-term Drift	Less than 2 % per year	
Non-linearity	Less than 1 % (up to 4000 µmol m^{-2} s^{-1}) (PAR) Less than 1 % (up to 1000 µmol m^{-2} s^{-1}) (Far-red)	
Response Time	Less than 1 ms	Less than 0.6 s
Field of View	180°	
Spectral Ranges (see graph)	389 to 692 nm ± 5 nm (PAR) 702 to 761 nm ± 5 nm (Far-red)	
Directional (Cosine) Response	± 2 % at 45°; ± 5 % at 75° zenith angle	
Temperature Response	Less than 0.1 % per C	
Housing	Anodized aluminum body with acrylic diffuser	
IP Rating	IP68	
Operating Environment	-40 to 70 C; 0 to 100 % relative humidity	
Dimensions	30.5 mm diameter, 37 mm height	
Mass (with 5 m of cable)	140 g	
Warranty	4 years against defects in materials and workmanship	