



Type(s)

Project

Date

Notes

GENERAL INFORMATION

The RAYN Multi-Sensor (RMS) measures Photosynthetically Active Radiation (PAR) intensity, spectrum, humidity, temperature, CO₂, atmospheric pressure, and has an optional input for leaf temperature to provide Vapor Pressure Deficit (VPD) measurements. The RMS reports photosynthetically active radiation (PAR 400–700 nm) from 0–4000.0 photosynthetic photon flux density (PPFD) (μmol/m²/s) to a connected RAYN controller over a wireless EnOcean® signal. Sensor reports are logged by the RAYN controller or the Syrcadia software for graphical trending over time and data export.

The sensor is powered by an integral solar panel and batteries are not required for everyday use due to the advanced solar energy harvesting and power management features of the sensor. After installation, the sensor will operate with the exposure to light as little as 50 lux (10 μmol) for 5 minutes. The RAYN Multi-Sensor can operate over 48 hours in darkness from maximum charge levels. An optional battery assist can be fitted when the sensor will be in a dark environment for longer periods.

The RAYN Multi-Sensor is enclosed in a weather resistant aspartated enclosure. The local display allows for direct readout of the measured data.

PRODUCT FEATURES

- Solar powered wireless photo sensor for monitoring of PPFD
- Works in conjunction with RAYN controllers and Syrcadia software
- Measures 0–4000 PPFD (μmol/m²/s)
- Reliable radio reception range within a 24 m (80 ft) unobstructed view of the controller
- Up to 48 hours operation in complete darkness
- Quick start operation at low light level with minimal charging time
- Batteries not required but available for longer data transmission in dark environments
- Mounted inside an ingress protection IP67-rated enclosure

ORDERING INFORMATION

MODEL*	DESCRIPTION
RMS	RAYN Multi-Sensor
RMS-LT	RAYN Multi-Sensor leaf temperature sensor accessory

PRODUCT SPECIFICATIONS

EnOcean Radio Equipment Profile

EEP D2-14-5E: Greenhouse Sensor	DB0 .. DB2.0 : 0–4000.0 $\mu\text{mol}/\text{m}^2/\text{s}$
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Hardware

Power supply	Integrated solar cell (optional battery assist)
Battery - start assist	CR1632 (optional - not included)
Operational light level	1 $\mu\text{mol}/\text{m}^2/\text{s}$ (50 lux) minimum
Minimum charge time to begin operation	5 minutes in 1 $\mu\text{mol}/\text{m}^2/\text{s}$ (50 lux)
Maintain charge time	3 hours per 24 hours at 10 $\mu\text{mol}/\text{m}^2/\text{s}$ (480lux)
Maximum charge time	7.5 hours at 20 $\mu\text{mol}/\text{m}^2/\text{s}$ (960 lux)
Operating life at full charge	48 hours in full darkness at 0 lux
Input	Teach button for assignment to receiver
Wireless connection indicators	Red, green (teach), and blue (screen)
User interface	E-ink display

Temperature Sensor

Measurement range	-25°C to 65°C (-13°F to 149°F)
Accuracy at 25°C (77°F)*	+/- 0.3°C (0.6°F)
Resolution temperature	+/- 0.1°C (0.2°F)
Drift	<1%
Response time (airflow 1 m/s)	1.0 minute

*Note: Maximum deviation from reference air temperature around the sensor within 10 Minutes under conditions such as full solar radiation on sensor as well as low and high airflow and entire humidity range.

CO₂ Sensor

Proposed technology	Ultra-low power, LED based nondispersive infrared (NDIR)
Measurement range	400–2,000 ppm
Calibration time	10 minutes minimum at 50 μmol
Resolution	10 ppm
Accuracy	5% or +/- 50 PPM (whichever is higher)
Altitude/pressure compensation	Built-in correction
Self-calibration	ABC - automatic background calibration

*Note: Maximum deviation from reference CO₂ concentration around the sensor within 10 Minutes under conditions such as full solar radiation on sensor as well as low and high airflow and the entire temperature range.

PPFD (minimum requirements, ok to be exceeded)

Spectral range	400–700 nm
Measurement range	0–4,000 $\mu\text{mol}/\text{m}^2/\text{s}$
Accuracy	+/- 10%
Response time	Within five seconds upon change of light levels above 10 μmol
Field of view	170°
Cosine correction accuracy	3% at 45°, 7% at 80°

PRODUCT SPECIFICATIONS

Communications

Radio frequency	902 MHz (U) (North America) 868 MHz (Y) (Europe)		
Antenna	Integrated antenna		
Transmission range	24 m (80 ft) – free field, up to 100 m (330 ft) line of sight		
	Light level	Heartbeat reporting interval	Direct reporting on changes
	> 10 µmol	upon change	> 5% of reading
	< 10 µmol	2 minutes	NA

Mechanical

Operating temperature	-10°C to 50°C (14°F to 122°F)
Relative humidity	5%–100% (condensing)
Weight	563 g (1.3 lb) (sensor, enclosure, bracket)
Dimensions	<p>With mounting bracket: 148x12x98 mm (5.8x4.7x3.9 in)</p> <p>Without mounting bracket: 148x120x60 mm (5.8x4.7x2.4 in)</p>
Mounting	Sensor is mounted inside an IP67 rated enclosure and includes an attached mounting bracket for mounting to user-provided structure or camera type tripod with standard 1/4 20 UNC screw.

Agency Listings

902 MHz models (North America)	FCC Part 15.231 - Remote Control Transmitter IC RSS-210
868 MHz models (Europe)	CE Radio Equipment Directive

Energy Code Compliance

Approved standards	California Energy Commission Title 24 Washington State Energy Code ASHRAE 90.1-2013 IECC 2015 RoHs Compliant
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PHYSICAL

Multi-Sensor Dimensions

Model	Length		Width		Height	
	mm	in	mm	in	mm	in
Multi-Sensor (with mounting bracket)	148	5.8	120	4.7	90	3.9
Multi-Sensor (without mounting bracket)	148	5.8	120	4.7	60	2.4

