

Spherical PAR Light Sensor



Aqutation's **Spherical PAR Sensor** measures omnidirectional light both in air or underwater. It is used in aqueous media with highly scattered and diffuse light (e.g. dense cell cultures) as well as clear waters both in the lab and field. The miniature design (19 mm diameter) enables operation in small volumes.

Features

- Scalar 4π sensors measure omnidirectional light
- Continuous measurements, logged data
- Sphere diameter: 19 mm/ $\frac{3}{4}$ inch
- Submersible
- Non-corrosive plastic
- WiFi links controller to your network
- PAR (400-700nm) to $\sim 4000 \mu\text{mol quanta m}^{-2} \text{ s}^{-1}$
- Adjustable range for low and high-light applications
- Single sensor USB unit also available

Benefits

- Small size suitable for thin photobioreactors
- Spherical design ideal for dense cultures, turbid waters
- Multiple sensors = more data; can characterise water clarity in natural waters

Aqutation's **Spherical PAR Sensors** are scalar sensors that measure irradiance as PAR from all directions, enabling you to determine how much light is available at a single point in waters with significant upwelling, scattered and diffuse light.

Omnidirectional light measurements are useful when calculating light use efficiency in cell cultures (e.g. electron transport and growth rates), and light availability in natural systems including turbid estuaries or coral reefs with highly reflective sands.

Up to four Aqutation **Spherical PAR Sensors** are connected to a single controller. The controller logs data continuously and makes this available to the host network via a WiFi link. The controller can be solar powered or operated from mains power.

A single sensor option is also available, operated via PC with a USB link.



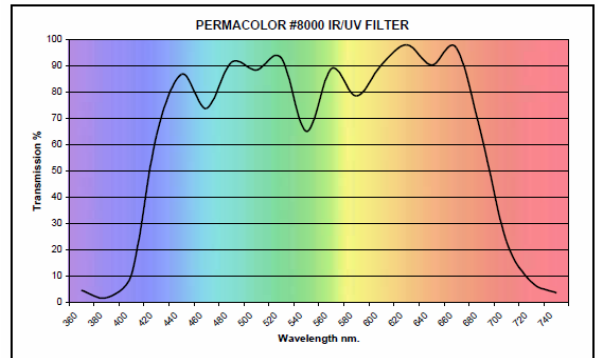
Single Spherical PAR sensor with interface box.

Specifications

Range	0-3900 $\mu\text{mol PAR m}^{-2} \text{ s}^{-1}$
Precision	0.1 $\mu\text{mol PAR m}^{-2} \text{ s}^{-1}$
Precision (optional)	0.005 $\mu\text{mol PAR m}^{-2} \text{ s}^{-1}$
Accuracy	~5% of full scale
Medium	air or water
Power (WiFi)	110-240 V AC or 12-24 V DC
Power (USB)	5 V DC (USB)
Communications	WiFi or USB
Detection range	400-700 nm
Detection Limits	0.1 $\mu\text{mol PAR m}^{-2} \text{ s}^{-1}$
Interface	Computer
Connector	Bulgin IP67
Sensor Housing	19 mm diameter acetal diffuser
Cable length	2 or 4 m
Operating temperature	0 - 45° C
Maximum Depth	2.5 m
Weight	WiFi 4 kg, USB 1 kg
Size	WiFi 27 x 25 x 12cm USB 28 x 23 x 8 cm

Spectral filtering

The bandpass filter allows Photosynthetically Active Radiation (PAR) to reach the detector. UV and IR light are excluded.

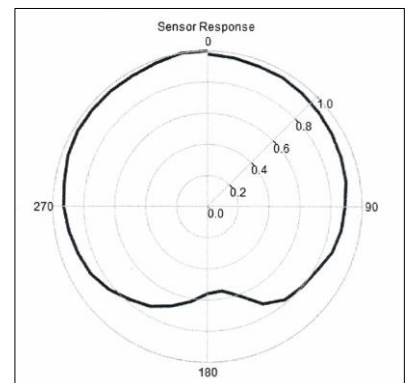


Angular response

The acetal sphere collects light from all directions, with less light at the base due to shading by the sensor stem. The polar plot describes sunlight received by a miniature Scalar PAR sensor when the top of the sphere faces the sun (0 degrees, at 1 x full sunlight) and when the sphere is inverted 180 degrees (180 degrees, ~0.6 or 60% full sunlight t.

Left to right:

- Single Spherical Sensor
- Calibrating Scalar PAR sensors;
- Polar plot showing typical angular response of sensor



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