

LI-193 Spherical Quantum Sensor



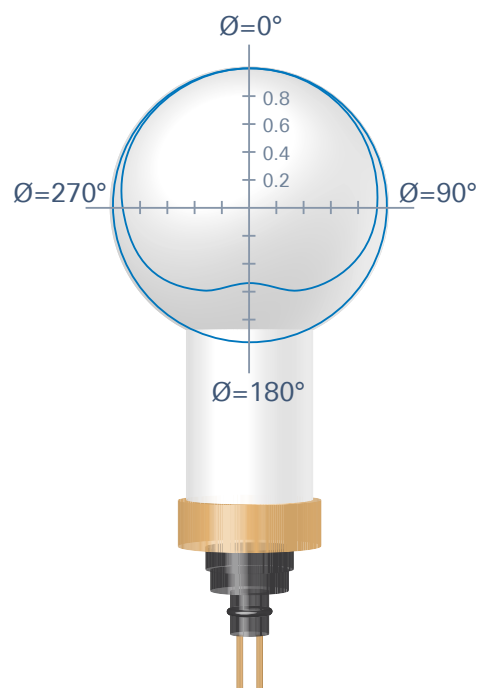
The LI-193 Spherical Quantum Sensor measures PAR in air or underwater from all directions at depths up to 350 meters. This sensor is useful for studies of phytoplankton, which uses radiation from all directions. The measurement is referred to as Photosynthetic Photon Flux Fluence Rate (PPFFR) or Quantum Scalar Irradiance.

Why choose the LI-193?

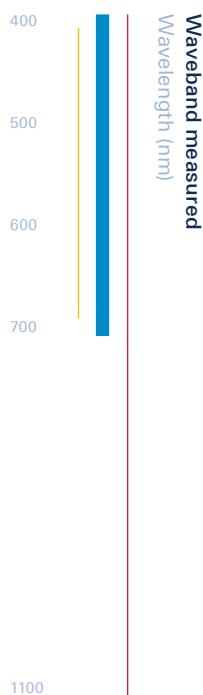
- Designed for immersion
- Measures PAR from all directions
- Ideal for oceanography, limnology, turbidity, and vertical profiling

How does it work?

The LI-193 uses a diffusive sphere to direct light through glass optical filters to the silicon photodiode. The filters create nearly uniform sensitivity to light between 400 and 700 nm, which closely corresponds to light used by most terrestrial and aquatic plants and algae. The angular response of a typical LI-193 is slightly lower in the direction of the cable connection. When mounted, the low response is usually not significant due to the small proportion of upwelling radiation compared to the total.



Typical angular response of the LI-193.



LI-193 Specifications

- Absolute Calibration: $\pm 5\%$ in air traceable to NIST
- Sensitivity: Typically $7 \mu\text{A}$ per $1,000 \mu\text{mol s}^{-1} \text{m}^{-2}$ in water
- Linearity: Maximum deviation of 1% up to $10,000 \mu\text{mol s}^{-1} \text{m}^{-2}$
- Stability: $< \pm 2\%$ change over a 1 year period
- Response Time: $10 \mu\text{s}$
- Temperature Dependence: $\pm 0.15\%$ per $^{\circ}\text{C}$ maximum
- Angular Response: $< \pm 4\%$ error up to $\pm 90^{\circ}$ from normal axis (see Angular Response chart)
- Azimuth: $< \pm 3\%$ error over 360° at 90° from normal axis
- Operating Temperature Range: -40°C to 65°C
- Detector: High stability silicon photovoltaic detector (blue enhanced)
- Sensor Housing: Corrosion resistant metal for both saltwater and freshwater applications with an injection molded, impact resistant, acrylic diffuser. Units have been tested to $3,400 \text{ kPa}$ (500 psi), 350 meters.
- Size:
 - Globe: 6.1 cm diameter ($2.4''$)
 - Housing: 3.18 cm diameter ($1.25''$)
 - Overall Height: 10.7 cm ($4.2''$)
- Weight: 142 g (0.31 lbs.)
- Mounting: Three $6-32$ mounting holes are tapped into the base for use with the 2009S Lowering Frame or other mounting devices.
- Cable: Requires 2222UWB Underwater Cable (available in 3 , 10 , 30 , 50 , 100 meter lengths)

Specifications subject to change without notice.