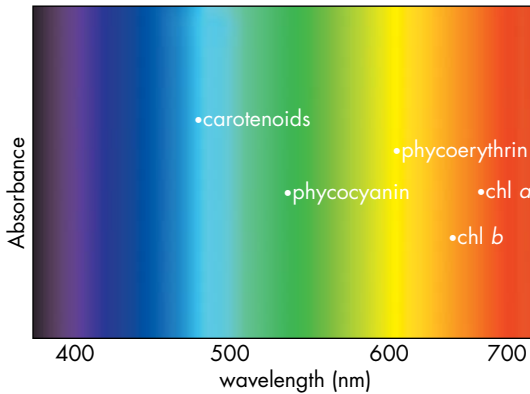




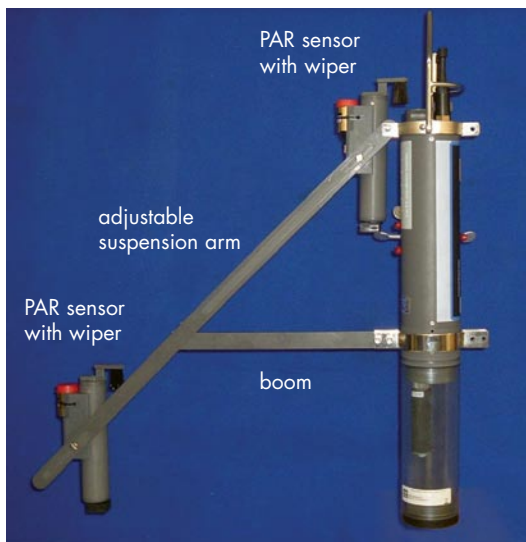
Photosynthetically Active Radiation (PAR) Sensor



Peak absorption of PAR by the primary algal pigments

Photosynthetically Active Radiation (PAR) is the spectral range of solar light from 400 to 700 nanometers that is used by aquatic plants and algae in photosynthesis. PAR measurements are important because the rate of photosynthesis directly relates to the penetration of light throughout the water column. Also, high levels of PAR can indicate photoinhibition (limiting photosynthesis in shallow waters). PAR levels vary due to the natural attenuation by water and the presence of absorbing algal pigments, dissolved organic material, and scattering by particles.

YSI offers several PAR systems that can be directly integrated into existing or new 6600 multiparameter sondes. PAR sensors are powered by the sonde and PAR data is added to the data stream of the water quality sonde. *This eliminates a separate data logger for PAR and enables long-term studies without requiring a surface data logger.*



YSI 6600 V2-4 sonde and wipped dual-PAR sensor system for unattended monitoring

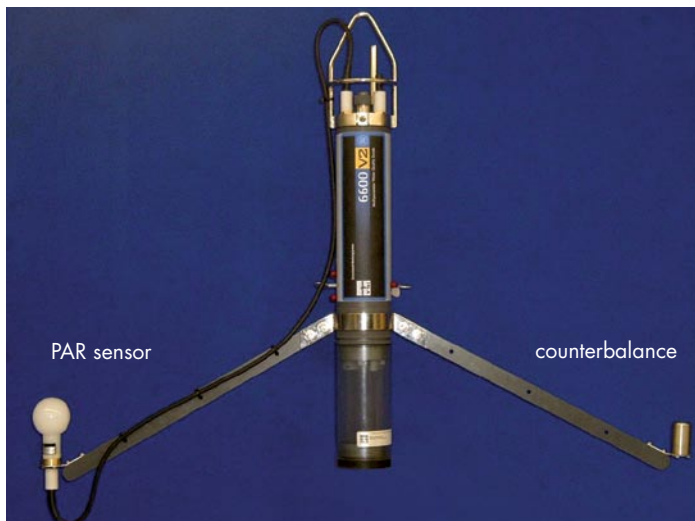
Why measure PAR?

- Measurement of light attenuation
- Primary productivity studies
- Development of Photosynthesis-Irradiance (P-I) curves
- Photoinhibition studies
- Submerged Aquatic Vegetation (SAV) studies
- Measurement of the euphotic zone
- Investigate absorbing material such as DOM, pigments, or gelbstoff
- Measurement of Photosynthetic Photon Flux Density (PPFD)

PAR configurations

Unattended long-term deployment:

- Dual-PAR system uses a 0.5m angled mounting arm to secure two LI-COR® 2 π PAR sensors to prevent shading effects and allow for attenuation calculations. The PAR Wiping System is recommended to prevent biofouling from impacting the sensors and extend deployment.
- Single-PAR system uses the same 0.5m mounting arm. The PAR Wiping System is also available.



Discrete sampling for manual profiling:

- Single PAR: Choose between spherical LI-COR 4 π or LI-COR 2 π PAR sensors. The mounting system uses two support arms, one for the PAR sensor and the other for counterbalance.
- Dual-PAR system uses LI-COR 2 π PAR sensors, typically mounted with one up-looking and one down-looking sensor. Sensors are mounted on collapsible arms on either side of the sonde.

Single-PAR Profiling System with spherical PAR sensor. PAR sensor is integrated directly into YSI sonde via a wet-pluggable connector and PAR data is logged directly with the sonde data set.



PAR Wiping System

The Wiping System is an excellent option that extends maintenance intervals by significantly retarding the impacts of biofouling on the PAR sensors. Longer maintenance intervals will reduce operations costs and improve data quality. YSI strongly recommends the PAR Wiping System for any continuous monitoring application.

To order, or for more information, contact YSI Integrated Systems & Services

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Comparison of non-wiped LI-COR 2π PAR (left) vs. wiped LI-COR 2π PAR (center) after an eight-day deployment. Close-up of integrated wiping system (right).

PAR Sensor Specifications

Maximum operating depth	100 ft
Compatibility	New or existing YSI 6600*, 6600EDS, or 6600V2 sondes
Measurements	Averaged over a 60-second time period, filter time user-adjustable
Units	Millivolts or $\mu\text{moles}/\text{sec}/\text{m}^2$
Absolute calibration	$\pm 5\%$
Sensitivity	Typically 3 μA per 1000 $\mu\text{mol s}^{-1} \text{m}^{-2}$ in water
Linearity	Maximum deviation of 1%
Stability	$< \pm 2\%$ change over one-year period
Response time	10 μs
PAR systems	Unattended monitoring: Upper and lower stainless steel mounting brackets, sensor mounting arm bracket set for 0.5 meter sensor separation, 2 PAR sensor electronics, 2 five-pin wet-pluggable PAR connectors with dummy plugs Manual profiling: Stainless steel mounting brackets, sensor/counterbalance mounting arms and collapsible brackets, 2 channel PAR sensor electronics, 2 PAR connectors with dummy plugs

*On standard YSI 6600 sondes with three ISE ports, two ISE ports are deactivated after installing PAR

ISO 9001
ISO 14001

(Yellow Springs facility)

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How to Order

Item Number	Description
Unattended:	Asymmetrical Mounting System
200680	Dual LI-COR 2π PAR on one-sided mounting bar
200690	Single LI-COR 2π PAR with wiping system on one-sided mounting bar
200700	Dual LI-COR 2π PAR with wiping system on one-sided mounting bar
Profiling:	Symmetrical Mounting System
131041510	Single LI-COR 2π PAR with mounting and counterbalance bar
131041530	Single LI-COR 4π PAR with mounting and counterbalance bar
131041520	Dual LI-COR 2π PAR (up/down) with opposing mounting bars