



QSP-2000, Quantum Scalar Sensors Measuring Downwelling Irradiance over PAR(400-700nm)

Scalar PAR sensors in our new QSP-2000 series, feature Biospherical's patented spherical collector. This unique design ensures uniform directional response over 3.7 pi steradians. A stainless-steel encased, optical light-pipe funnels flux from the collector to a silicon photodetector that has a flat quantum response over PAR (Photosynthetically Active Radiation; 400 – 700 nm).

The most noteworthy improvement in this new series is the capability of direct connection to a PC or laptop computer. Our **QSP-2100** sensors contain imbedded calibration information and data are transmitted directly into the computer. This new low-power circuitry requires no batteries, relying instead upon power from the host computer's serial comport.

QSP-2200 linear output models, feature high-quality, low-drift, electrometer-grade amplifiers and are compatible with most commercially available dataloggers. When equipped with an optional depth transducer, (**QSP-2200D**) and a matching surface reference sensor (**QSR-2200**) the QSP series offers researchers a truly low-cost, scalar irradiance profiling system.

QSP-2300, a logarithmic output version is also available. This sensor was designed specifically for integration with CTD systems and dataloggers requiring a limited-range of signal input.



The new QSP-2000 is rugged and compact.

Key Features

- *Designed to measure downwelling PAR (400-700 nm) irradiance to depths of 2000 meters*
- *1.9 cm (3/4") diameter solid Teflon® spherical irradiance collector*
- *Compact, rugged, and low-cost*
- *QSP-2100 includes operating software allowing direct connection to a PC workstation or laptop computer*

Specifications

Optical Features

Scalar Irradiance Collector: 1.9 cm (3/4") diameter solid Teflon® sphere optically connected to the main housing by a 4.0 cm stainless-encased quartz light pipe.

Photodetector: Blue-enhanced, high-stability silicon detector with dichroic blocking filters.

PAR Spectral Response: Equal (better than ±10%) quantum response from 400 nm to 700 nm with response sharply attenuated above 700 nm and below 400 nm. Spectral response-induced errors will cause less than 5% errors in naturally occurring light fields.

Directional Response: Each instrument's directional response is optimized before final calibration. Front-to-side (approximately 85° from head on) response over all angles is equal (± 6%). Individual detector response plots are available as an option.

Optical Features (Cont.)

Sensitivity: When purchased alone, the sensor is calibrated in quanta/(cm²·sec)/volt. Nominal sensitivity is 1 volt = 1x10¹⁷ quanta/(cm²·sec) (slightly less than full sunlight). Noise level is typically less than 1 millivolt, temperature coefficient of the dark signal is less than 10 microvolts/°C, and response temperature coefficient is less than 0.15%/°C.

Electronic Features

Measured Signals: PAR Dynamic Range: 1.4x10⁻⁵ μE/(cm²·sec) to 0.5 μE/(cm²·sec)

Environmental

Temperature Range: -2°C to 35°C

Calibration

Each QSR-2000 sensor is calibrated using a National Institute of Standards and Technology- (NIST) traceable 1000-watt type FEL Standard of Spectral Irradiance using procedures recommended by NIST. Annual recalibration is strongly recommended.

Mechanical Features

Collector: Solid PTFE sphere, epoxy mounted to a machined aluminum base

Housing:

Hard-anodized aluminum, rated to 2000 meters

Dimensions:

Diameter: 5.0 cm

Height: 15.0cm

Weight: 1.1 kg

Fully calibrated with lamps traceable to NIST, each digital sensor contains imbedded calibration factors.

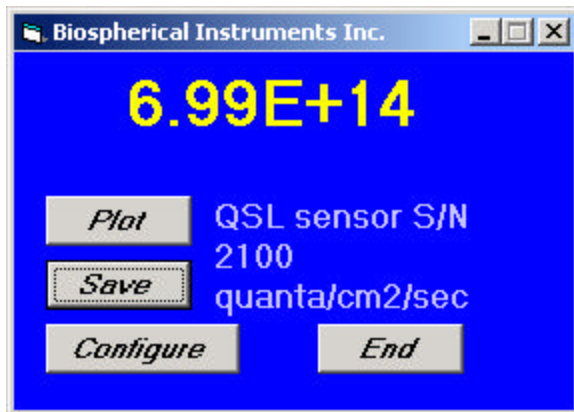
The screenshot shows a software window titled "Probe Details" with two sections: "Factory Set Factors" and "Field Adjustable Factors".

Factory Set Factors:

- Serial Number: 2100
- Model: QSL
- Calibration Date: 9 / 00
- Immersion Coefficient: 1
- Sensitivity Factor: 6.86E-18
- Buttons: "Unlock Protected Info"

Field Adjustable Factors:

- Measurement Units: uEinstein/cm2/sec
- Tag Number: 1
- Offset value: 8.605004E-
- Buttons: "Save All", "AutoZero", "Exit"
- Checkbox: Use Immersion Coefficient



BSI's new operating software, *LOGGER-2100* logs and displays calibrated data in either Quanta or μEinstein .



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*Specifications subject to change without notice