Biospherical Instruments Inc.

PRR-2600 Profiling Reflectance Radiometer

BSI's original PRR-600 was designed to meet the need for a hand-lowered profiling radiometer, capable of measuring downwelling and upwelling light in seven wavelengths. Building on this successful design, the new PRR-2600 offers researchers a number of significant improvements. The radiometer is now features eight wavelengths per array and combines a high-speed data acquisition system with high-resolution electronics, within the same compact package.

The PRR-2600 is battery powered and measures eight channels each of downwelling cosine irradiance and upwelling radiance. Water temperature and pressure/depth are also measured. This proven design provides a low-cost ground truth or aquatic research system that is lightweight, compact and easily deployed.

The PRR-2600 is available in a variety of special configurations, including a split housing variant (PRR-2600S) ideal for use in low-profile towed bodies or studying turbid intercoastal waters. A free-fall deployment system and an irradiance-only instrument (PER-2700) are also available.

The basic PRR-2600 profiling system includes an underwater radiometer, battery-powered deckbox, Windows®-based operating and data-acquisition software, AC adapter/charger, and RS-232 cable. Custom-length waterproof cable (PSC-805) and stainless-steel lowering-frame must be ordered separately. Other PRR-2600 options include a free-fall deployment system, dual-axis instrument clinometers and a 0-60 m high-resolution depth channel for use in shallow water research.

*Specifications subject to change without notice

Key Features

- ■ Measures eight channels each of downwelling irradiance and upwelling radiance
- ■ Nearly 30 specialized, highly accurate, low-noise detector channels are available
- ■ High-speed sampling of downwelling and upwelling signals minimizes aliases in calculated references
- ■ The PRR-2600 has a compact design and battery power, making the system easily transportable
- ■ Underwater (PRR-2600) and surface (PRR-2610) instruments can be radiometrically matched
- ■ Integral temperature and depth/pressure transducers operate to 300 m
- ■ Fully integrated and microprocessor-controlled
- ■ Windows®-based, PROFILER operating and data-acquisition software is included

Optical Characteristics

The PRR-2600 optical arrays can be assembled in any configuration of eight channels, selected from a list available wavelengths (consult factory). The PRR-2600 uses a single cosine irradiance collector. This collector design is formed from Teflon®, backed with a quartz support and optimized for excellent cosine response in water. Similarly, the PRR-2610 surface reference collector is optimized for use in air. Filter photodetectors in the PRR-2600 and PRR-2610 are specified to 10 nm FWHM ±1 nm. Both the irradiance and radiance detector geometries have been designed to limit the half-angle to 10° and the filter design has been specified to compensate for this solid angle in arriving at the center wavelengths and bandwidths in the assembled instrument.

PRR-2610 Reference Radiometer

PRR-2610 Reference Radiometer

If both profiling and surface measurements are required, PRR-2600 systems can be ordered with a radiometrically matching PRR-2610 Reference Radiometer, cosine-corrected for surface irradiance. With the PRR-2600 and 2610 operating in unison, underwater and surface measurements may be compared to monitor possible interference from shadows cast by boats or clouds and to assist in the development of atmospheric corrections.

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Sensor Interface

The signals from all sensors are digitized and available as a single RS-232 output. Data are presented as 12-bit mantissa plus 2-bit exponent plus sign. Software is provided for decoding the binary data to ASCII files. RS-232 requirements are 9600 baud, 8 data bits, 1 stop bit, no parity, no hand-shaking.

Calibration

Optical calibrations are performed in accordance with the methods outlined by the National Institute of Standards and Technology (NIST), National Bureau of Standards (U.S.) Technical Note 594-13 and NBS Special Publication 250-20. For radiance calibrations, we employ a Spectralon® (Labsphere) plaque functioning as a near-perfect "Lambertian" diffuser with a NIST-traceable working Standard Of Spectral Irradiance. The protocol has no formal NIST reference, but was systematically reviewed in the context of the NASA-sponsored SeaWiFS Round Robin Intercomparison Experiment (SIRREX).

Deckbox

The PRR-2600 radiometer is equipped with a compact deckbox that provides RS-232 computer interface and battery power for the radiometers. Deckbox components include a 12Volt / 6 AH rechargeable gel-cell battery with an LED indicator for low battery voltage. A Universal (85-264 VoltsAC, 47-63 Hz) adapter/charger is also included. One 2-meter RS-232 cable is provided with the PRR-2600 deckbox.

Cables

Power and data communications with underwater and surface instruments are via cable (PSC-805). This custom-manufactured cable, has 6-conductors with dual-shielding and multiple Kevlar® strength members. This cable is rated at 450kg and intended to support total weight of the instrument package. PSC-805 cable is available in custom lengths up 300m .

PRR-2600 In "Free-Fall" configuration

Deployment of PRR-2600 in optional "Split" configuration

Software

The PRR-2600 utilizes our new Windows-based, PROFILER® operating and data-acquisition software. Profiler is fully compatible with Windows 98, 2000, NT or XP, allowing the host PC to acquire and display data in real time. This custom software offers full-color graphical display with multiple, user-selected channels and allows a high degree of interaction and customization. This software includes user-specified configurations to speed, profile setup. When profiling, the user can view three plots (Time, Profile, and Spectral Plots), as well as a live-channel display and a large, easy-to-read instrument depth, inclination, and record number display. The software allows the user to annotate plots, such as to mark the beginning or end of an upcast or downcast or to define dark segments, facilitating dark corrections.
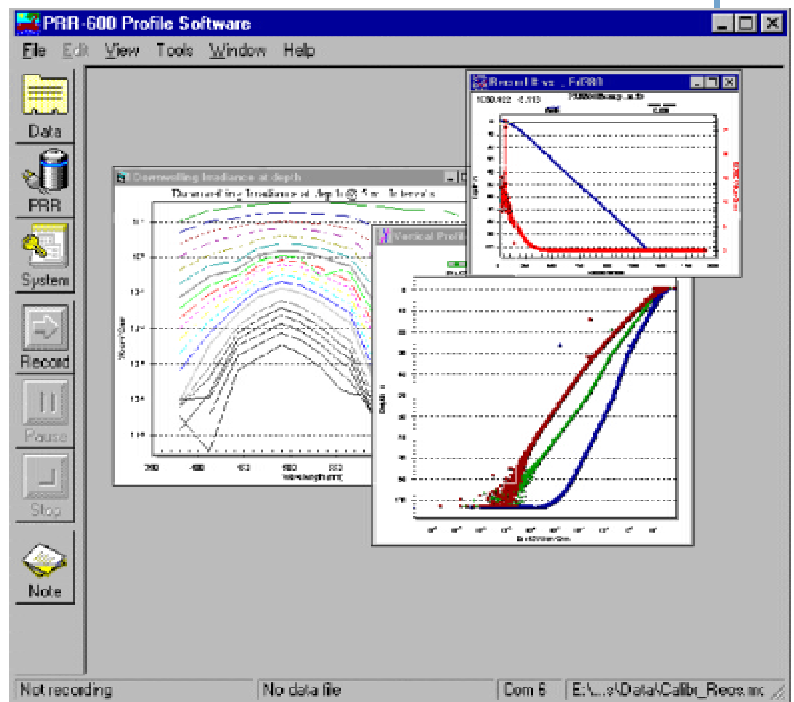
Sample of "PROFILER" Software Display

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