

PORTABLE FIELD CALIBRATOR MODEL PFC-5001

BULLETIN PFC-1

$$p = \frac{pRT}{m}$$

$$S(\lambda) = S_0(\lambda)e^{-\alpha(\lambda)}$$

$$B(T) = bT^4$$

Overview

The Model PFC-5001 Portable Field Calibrator is a highly stable irradiance light source for performing absolute characterization of field-calibrating narrow band spectroradiometers *in-situ*. While it is optimized for use with the Model RSS1024 and Model UVRSS-1024 spectroradiometers, it can be readily setup and adapted to a wide variety of optical detectors both in the laboratory and in the field.

Principle of Operation

The PFC-5001 is a computer-controlled stabilized single lamp light source. An internal *stabilized* current regulation circuit ensures precise current regulation to the rugged 200 watt tungsten filament lamp, providing constant optical power output under all environmental temperatures.

Two internal independent fans maintain the internal air that surrounds the lamp envelope at a nearly constant temperature. Current monitoring resistive shunt temperatures as well as housing temperatures can be monitored during operation. An exit aperture provides precise positioning of the spatially uniform light flux to the device under test (DUT). Custom mechanical alignment fixtures are typically built to order to mate the system to a variety of radiometers.

Features

- Portable, highly stable optical source
- Heavy filament 200 watt low voltage lamp provides ultra-stable light
- Built-in temperature-regulated air cooling
- Each system contains a unique electronic serial number
- RSS-1024/UVRSS-1024 interface provides automatic "hands off" user-friendly operation
- Operates from standard AC line voltages
- Ruggedly designed for rapid set-up and operation in the field or in the lab
- Design performance was independently verified and tested by NIST and field tested by USDA on several field campaigns



PFC-5001 Portable Field Calibrator

Software Control

The system is operated and monitored via a GUI built with Lab-View™. It runs on either a Windows PC or Macintosh and can operate simultaneously with other software such as radiometer control applications. All system settings and performance logging is controlled by software, including lamp power, cooling fan and pre-heater. It provides continuous independent verification of optical output through 3 thermally-stabilized internal optical detectors.

Applications

The PFC-5001 is a cost-effective field calibration irradiance source that is well suited to many applications:

- In-situ absolute calibration/characterization of field radiometers used in ground-truthing of satellites
- ISO-9000/Q-9000 compliance/laboratory testing
- Environmental climate change research
- Government standards laboratories



Instrument Specifications

A discussion on system design can be found in these peer-reviewed papers:

- Johnson, B.C. et al. "Radiometric and Engineering Performance of the SeaWiFS Quality Monitor (SQM): A Portable Light Source for Field Radiometers." *Journal Of Oceanic and Atmospheric Technology*, pp.1008-1022, Vol 15 (1998).
- Hooker, S.B., Aiken, J. "Calibration Evaluation and Radiometric Testing of Field Radiometers with the SeaWiFS Quality Monitor (SQM)." *Journal Of Oceanic and Atmospheric Technology*, pp.995-1007, Vol 15 (1998). *Journal Of Oceanic and Atmospheric Technology*, pp.995-1007, Vol 15 (1998).

Specifications

Output Power	≈200w
Operating Temperature	-30°C to +34°C
Weight/Size	Lamp Housing: 50 lbs. (23 kg); dimensions: Power supply: 16" x 30" (41cm x 76cm); height is 28" (71cm)
Power Requirements	115/230 VAC 50/60Hz; Heater duty cycle varies with air temp; approx. 250W with heater on
Software	LabView™ application; Windows 9x/NT, Mac

Sensor Mount

The device under test is mechanically interfaced to the lamp housing via an included kinematic mount. A universal optics table option is recommended to accommodate a wide variety of radiometers.

Development History

Initially developed by the State University of New York's Atmospheric Sciences Research Center, the PFC-5001 supports field stability checks of ground-level radiometers critical to verifying the stability performance of crucial remote sensing platforms.

Reusable Flight Case

A reusable flight case option is recommended to protect your system.



YANKEE ENVIRONMENTAL SYSTEMS, INC.
 Airport Industrial Park
 101 Industrial Blvd., Turners Falls, MA 01376 USA
 Tel: (413) 863-0200 Fax: (413) 863-0255
 E-mail: info@yesinc.com <http://www.yesinc.com>