

## Precision Filter Radiometer

### Short Description



The Precision Filter Radiometer (PFR) is a research grade instrument to measure direct solar irradiance in 4 narrow spectral bands centered at wavelengths recommended by World Meteorological Organization for the determination of atmospheric aerosol optical depth (AOD).

The PFR consists of an optical sensor head with signal amplifiers and an electronic box with power supply and data logger. Both units are designed for automated operation under harsh weather conditions when the sensor is mounted on a suitable solar tracker. The data logger communicates over a serial or optional Ethernet link with software available for Windows PC's and has a data storage capacity of 1 month.

The instrument was designed for radiometric stability. The detectors are operated in a controlled environment and are exposed to solar radiation only during actual measurements. A Peltier thermostat maintains the ion-assisted deposition filters and silicon detectors at a constant ( $\pm 0.1^\circ\text{C}$ ) temperature of 20 degrees over an ambient temperature range from  $-20^\circ\text{C}$  to  $+35^\circ\text{C}$ ; an internal shutter shades the detector between measurements and the vacuum tight sensor head is filled with dry nitrogen gas. The instrument has a built-in pressure sensor to allow tightness monitoring. At PMOD/WRC, the PFR spectral characteristics and radiometric sensitivity can be calibrated against an absolute trap detector traceable to a primary cryogenic radiometer at Physikalisch-Technische Bundesanstalt, Berlin.

An electronic pointing sensor plus a complementary set of housekeeping parameters, including an optional barometric sensor support evaluation and quality control of the measurements.

## PFR Specifications

**Optical:** Spectral characteristics

	Ch1	Ch2	Ch3	Ch4	unit
Standard version N	862	500	412	368	nm
Special version E	719*	675	610	450	nm
Special version F	1024	946*	817*	778	nm
FWHM bandwidth	5.0	5.0	5.0	5.0	nm

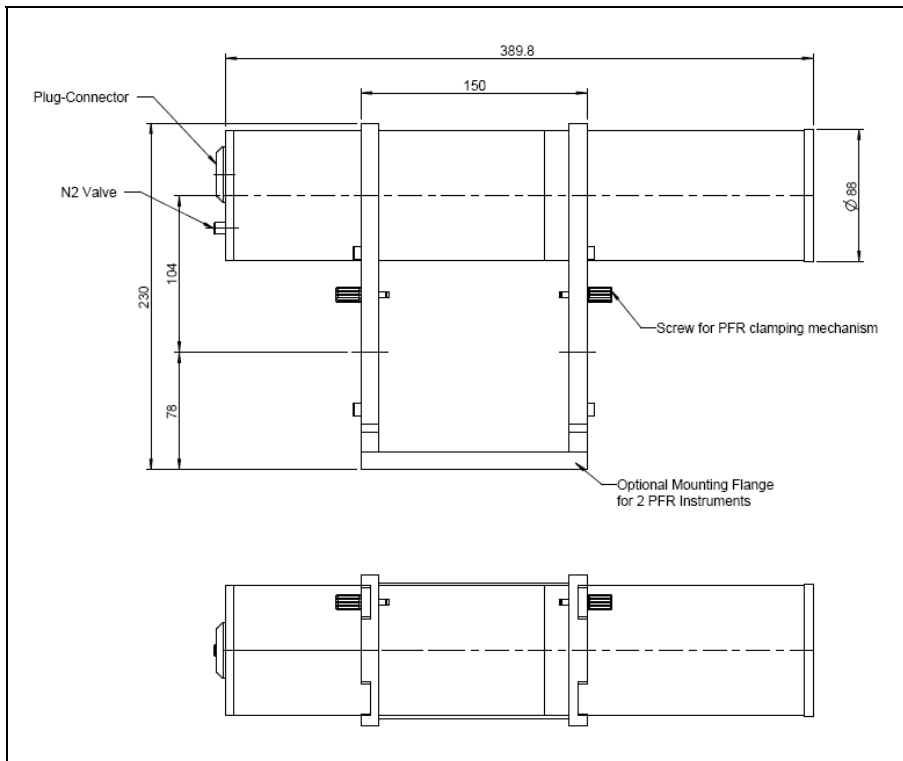
Special versions are offered with limited calibration service only, please contact PMOD/WRC for further details.

Field of view                                opening angle 2.5°  
    slope angle 0.7°  
Entrance window                           3mm fused silica  
Pointing monitor                           ±0.75° in two axes

**Mechanical:** Instrument dimension                    Ø x L: 88 x 390mm  
Instrument mass                             3 kg

Control box dimension                    H x L x W: 300 x 300 x 150 mm  
Control box mass                           8.250 kg + cables

Cable length                                standard 10 m instrument cable  
   < 30m to PC and mains



<b>Electrical:</b>	Power requirement Data Logger Serial data link Ethernet (optional) Instrument cable	85 ... 264 VAC, 40..400 Hz, 20 W max Campbell Scientific CR1000 RS232C, 9600bd, 8/1/0 bits Campbell Scientific NL115 option Teflon isolation, UV resistant
<b>Software:</b>	Data Logger	LoggerNet 4.0 (free download at Campbell Scientific Inc.)
<b>Environm.:</b>	Operating temperature Non-operating temperature (incl. shipping)	-20°C to +35°C -20°C to +55°C
<b>Maintenance:</b>	2 years (interval)	re-calibration of the PFR Instrument, Instrument Check Up (Contains a functional test – housekeeping data will be evaluated and checked, purging gas refill)
	8 years (interval)	replacement of both Peltier elements, Small Service or individual maintenance (depending on condition)

The recommended maintenance intervals mentioned above are based on experience and are not mandatory.

**Warranty:** 18 months  
According to the official PMOD/WRC sales document “General Conditions of Trade for instruments and calibration”.