



Cryogenic Radiometer CryoRad III

Overview

The CryoRad III is the next generation universal cryogenic electrical substitution radiometer, designed for convenient detector calibrations with both laser and lamp or monochromator illumination. Its novel cavity design enables use with beams as fast as $f/8$ without changing or moving the receiver. Its fast cavity time response removes background drifts and provides noise thresholds below 2 nW, even with an $f/8$ entrance aperture and viewing an ambient-temperature window. The highest accuracy ($< 0.005\%$) is achieved in laser beam measurements with a Brewster-angled window. In monochromator measurements, the sensitivity and accuracy are a factor 5 – 10 better than achieved with room temperature ESR's. CryoRad versions are available optimized for laser, monochromatic, synchrotron, or low-background IR applications. Custom versions have been developed to cover full scale optical power ranges from 100 mW down to 1 nW.

Features

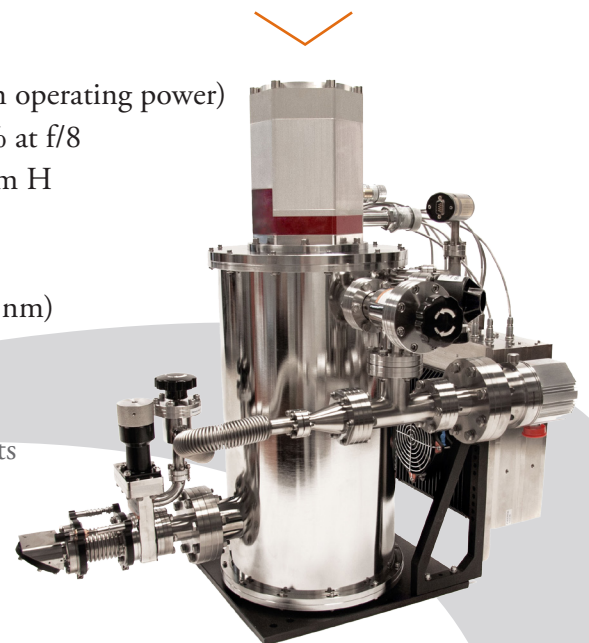
- Accepts laser, lamp or monochromator sources — no need to change receivers
- Active receiver response increases measurement speed and helps to remove drift in lamp & monochromator inputs
- Low-noise AC-bridges for high signal to noise operation
- Germanium resistance thermometry (GRT) for superior sensitivity
- LabVIEW based control software via Ethernet interface

Standard Specifications*

Spectral range	0.20 – 30 μm
Receiver thermal response time (1/e)	(1/e) < 8 seconds
Servo settling time (to 0.01% of signal)	40 seconds
Receiver responsivity	2 ± 0.25 K/mW
Minimum Dynamic range	1 μW to 1 mW
Noise (rms for 30 samples over)	< 2 nW (varies with operating power)
Absolute accuracy	$< 0.005\%$; $\sim 0.01\%$ at $f/8$
Cryostat dimensions	~ 30 cm D X ~ 70 cm H
Cavity aperture	6 mm – 8 mm
Cavity operating temperature	4 K – 9 K
Cavity absorptance	> 0.9999 (at 632.8 nm)
Initial cool down time	12 hrs
Run Time after cool down	Continuous

*nominal values — modifications upon request to meet other requirements

The CryoRad III offers cryogenic radiometer accuracy and sensitivity in radiative flux measurements with both coherent and incoherent sources.



Contact Information

For additional technical information & pricing, please visit www.L-1.biz or contact Dr. Steven Lorentz at sales@L-1.biz

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CryoRad III Equipment

Cryostat with:

- 45 K and 4 K radiation shields
- Conflat flanges for evacuation & mounting to other vacuum hardware/systems such as a window mount
- High-absorptance horizontal receiver cavity for collimated & divergent light
- Germanium resistance thermometer (GRT) & superconducting leads
- Thermally stabilized (<3 μ K rms) heat sink assembly with heater & GRT
- Vacuum pressure gauge assembly including controller, Cold Cathode type gauge tube, cable and thermal-couple gauges for low vacuum

TC-04 electronic controller system including:

- 100 MB Ethernet interface electronics
- Receiver & heat sink AC bridge thermometry electronics
- Independent receiver and heat sink heater supply & power measurement modules
- Microprocessor control modules for receiver & heat sink channels
- Temperature control circuit for the printed circuit boards
- Silicon diode thermometry readout for cryostat
- Two separate low-noise power supplies in 19" rack chassis

PC Compatible multi-core computer with LED monitor including:

- Windows 7 Pro, Dual Ethernet interfaces
- LabVIEW-based control and calibration software for TC-04 electronics operation

Additional Accessories:

- Brewster's angle (UV or IR-grade fused silica) window for laser measurements, including kinematic mount & o-ring sealed window
- Monochromator-based measurement equipment with vacuum bellows assembly & stage for radiometer
- Windows for operation outside fused silica transmission range
- Turbo-molecular pumping system for cryostat evacuation
- Laser power controller for power stabilized measurements
- Mobile optical platform
- Multiple Lasers available to cover a wide spectral range

