



Cryogenic Radiometer CryoRad II

Overview

The CryoRad II is the first 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 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. The CryoRad II is now in use at metrology laboratories throughout the world, for a wide range of photo-detector calibrations. CryoRad versions are available for laser, monochromatic, synchrotron, or low background IR applications.

Features

- Accepts laser, lamp or monochromator sources — no need to change receivers
- Absolute accuracy 0.005% with laser illumination and $\sim 0.01\%$ with incoherent sources
- 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
- ASCII command control via 100MBaud Ethernet interface
- Modular electronics for easy in-house calibration

Specifications*

Spectral range	0.25 – 50 μm
Receiver thermal response time (1/e)	(1/e) < 8 seconds
Servo settling time (to 0.01% of signal)	40 seconds
Receiver responsivity	2 $\pm 0.25\text{K/mW}$
Dynamic range	to 1 mW
Noise (rms over 30 sec)	< 2 nW (varies with operating power)
Absolute accuracy	0.005%
Cryostat dimensions	27 cm (D) X 55 cm (H)
Cavity absorptance	> 0.9999 (at 632.8 nm)
LHe hold time	> 72 hrs

*nominal values — modifications upon request to meet other requirements

The CryoRad II 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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Equipment *CryoRad versions available optimized for laser, monochromator, synchrotron or low-background IR applications*

Cryostat with:

- LN2 (2.5L capacity) & LHe (5L capacity) cooled radiation shielding
- Conflat flanges for evacuation & 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 & electronic liquid nitrogen level gauge

TC-04 electronic controller system including:

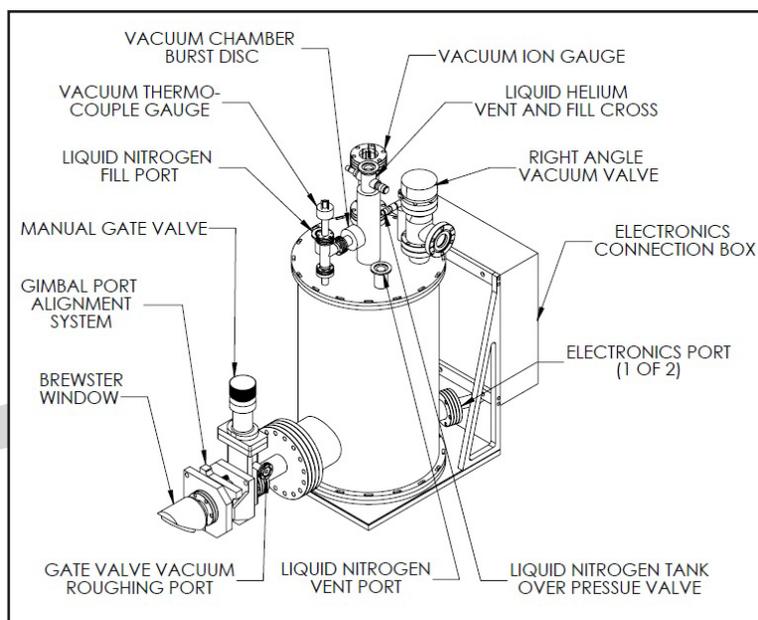
- 100 MB Ethernet interface electronics
- Receiver & heat sink AC bridge thermometry electronics
- Independent receiver and heat sink heater supply & power measurement modules
- Microprocessor control modules for receiver & heat sink channels
- Temperature control circuit for the printed circuit boards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

PC Compatible PC with LED monitor including:

- Windows 7 Pro, Dual Ethernet interface
- LabVIEW based 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
- Custom LHe & LN2 transfer lines
- Multiple Lasers available to cover a wide spectral range



*Illustration is for example only.
Actual instrument may look
different depending on
specifications and model.*