



DETECTORS

Intelligent Cryo-Cycle™

Hybrid Cryostat



FEATURES

- Low-vibration/low electrical noise even at low energies (no spectral resolution degradation)
- Low audible noise (<50 dB(A) at 1 m)
- LN₂ redundancy
- Non-CFC/non-flammable refrigerant
- Same footprint as standard LN₂ Dewar
- Low power demand (130 W nominal for typical detector configuration)
- Local (via LCD Screen) and remote State-of-Health monitoring
- Four years of onboard system memory for State-of-Health storage
- Lab-Pulse™ Ready
- No maintenance required

BENEFITS

- Low operating cost
- Designed for maximized detector uptime
- Field installable (dipstick version)
- Extremely quiet (<50 dB(A) at 1 m)
- No compromise on detector specifications

DESCRIPTION

The Mirion Intelligent Cryo-Cycle Cryostat is the latest enhancement of the “hybrid” cryostat combining the advantages of electric cooling with the reliability of liquid nitrogen. The cryocooler is used to condense the boil-off N₂ gas back into the 25-liter Dewar. This unique capability provides the convenience of operating a detector for up to two years before LN₂ needs to be added, but at the same time keeps the detector cold in case of power failure. With the Intelligent Cryo-Cycle Cryostat, the LN₂ supply keeps the detector cold for up to seven days without power. There is no interruption of cooling and, as a result, there is no down time due to partial warm up as long as LN₂ is maintained. In addition, there is no risk of detector failure because of temperature cycling. LN₂ lost during power outages may be replenished at any time.

The Intelligent Cryo-Cycle Cryostat is designed with the combined focus on optimal reliability and serviceability. Since the cooler is the critical part determining the reliability of the complete unit, Mirion does not compromise in this area. Proven with the unprecedented lifetime of the Cryo-Pulse® 5 Plus cooler as demonstrated in the field since 2006, Mirion had the new cooler developed by the same cryocooler supplier. Apart from State-of-Health (SoH) parameters already tracked in previous Cryo-Cycle versions, such as Dewar pressure and cooler power, even more parameters are now monitored and all of them are automatically logged in onboard memory. The monitoring and automatic logging of all the parameters will enable efficient servicing of the Intelligent Cryo-Cycle Cryostat.

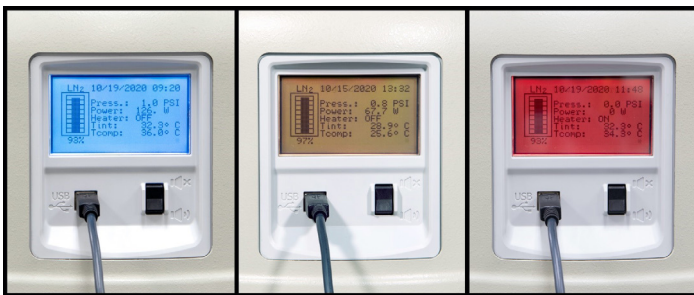
Description Continued

Furthermore, the Intelligent Cryo-Cycle Cryostat is Lab-Pulse Ready like the iPA™ Intelligent Pre-amplifier, which means that the unit can be readily connected to the optional Lab-Pulse monitoring service. By remotely monitoring the SoH data from both the Intelligent Cryo-Cycle unit and the detector, health status of the complete detector system can be known at any time allowing for predictive service to be performed before a problem becomes more serious.

The critical hardware parameters are directly displayed on the integrated LCD display on the front panel:

- LN₂ level enabling to better schedule periodic refill;
- N₂ gas pressure, cooler power, heater status, internal air temperature and cooler compressor temperature as monitor for the state of health.

In case of a warning or alarm condition, the LCD screen will respectively light up yellow or red and the corresponding warning/alarm message is displayed on the screen. This will help the user in making a prompt and correct diagnosis.



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| Blue LCD backlight:
Unit operates normally, no action is required. | Yellow LCD backlight:
Unit operates but requires attention, see error message for details. | Red LCD backlight:
Unit does not operate properly, see error message for details. |
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A USB connector is provided below the integrated LCD display, so that a connection can be established to a local PC/laptop on a desk or tablet in front of the lead shield for monitoring the SoH data with the Intelligent Cryo-Cycle Display Application. Operating system requirements for the application are Windows 7 (64-bit), Windows 8.1 (64-bit) or Windows 10 (64-bit). The Intelligent Cryo-Cycle Display Application is also used to:

- Set date and time according to the correct time zone;
- Set a customized name;
- Download the internally stored log file. Thanks to the onboard memory, the user always has access to a complete log file of all hardware parameters even though the device was not connected to a PC.

The Intelligent Cryo-Cycle Cryostat can be connected to the optional Lab-Pulse service. One Lab-Pulse license will monitor the Intelligent Cryo-Cycle unit and also the detector pre-amplifier. The data availability to both systems on the same monitoring platform provides valuable and complete information about the SoH of the full measurement system. With the Lab-Pulse service, Mirion improves awareness and understanding of the radiation measurement instrumentation, enabling you to be proactive in keeping the measurement system operating.

The audible noise has been considerably reduced to less than 50 dB(A) below 35 °C (95 °F), measured at 1 m distance, making the Intelligent Cryo-Cycle Cryostat well suited for use in quiet laboratory environments.

Any vibrations originating from the cryocooler are controlled to such a level that, when the Intelligent Cryo-Cycle unit is sold with a new Mirion detector, there will be NO degradation of the detector's resolution performance as stated on the detector's specification sheet. If the dipstick version is installed on older Mirion detectors, some degradation of resolution performance may occur, depending on the age and configuration of the detector. Mirion guarantees no resolution degradation at energies above 500 keV and a maximum of 10% between 100 and 500 keV. Performance is not guaranteed below 100 keV. For detectors not manufactured by Mirion, resolution performance cannot be guaranteed.

The Intelligent Cryo-Cycle Cryostat is provided with a highly reliable and efficient cryocooler. The cooler is hermetically sealed containing a CFC-free and non-flammable gas, which does not require gas refills. The compressor does not contain oils or lubricants which eliminates contamination of the refrigerant. This means that you do not need to perform any maintenance. The total nominal power consumption is very low (130 W for a typical configuration), with a maximum of 285 W in transient operation. The Intelligent Cryo-Cycle Cryostat is designed to operate between 5 °C and 35 °C.

Mirion's confidence in the Intelligent Cryo-Cycle product is demonstrated by the two-year warranty on the complete system, except for the collar part.

SPECIFICATIONS

Performance

- Mirion guarantees detector performance as warranted by detector model with cooler in operation (on new detectors purchased with the Intelligent Cryo-Cycle Cryostat)
- LN₂ loss rate <4 liters/day typically (with cryostat installed and cryocooler OFF)
- LN₂ level and SoH monitoring: LCD screen on front panel

Connectors

- USB 2.0: Remote status read-out

Cooling

- Forced air (internal fans)

Power Requirements

- 100–240 V ac, 50–60 Hz, 140 VA typical, 300 VA max (auto-ranging power supply)
- Fuse: 100-240 V (2) T 10A H 250 V

PHYSICAL

Cold Head (Excluding detector chamber)

- Dimensions: 43.2 cm (17 in.) diameter x 61.0 cm (24 in.) high
- Weight: 30 kg (66 lb) empty without detector chamber
- Dewar-capacity: 25 liters

Environmental

- Operating temperature: +5 to +35 °C (41 to 95 °F) on standard models and configurations
- Operating humidity:
 - Range: 20% to 80% relative non-condensing

Software

- System Requirements: Windows 7 (64-bit), Windows 8.1 (64-bit), Windows 10 (64-bit)

Available Detector Models

- Intelligent Cryo-Cycle Cryostats can be ordered with all standard GC-, GX-, GR-, BE-, and GSW-detector models (see applicable detector specification sheets for details)

ORDERING INFORMATION

Model Description

- iCC-VD Intelligent Cryo-Cycle for model 7500SL or 7500
- iCC-HD Intelligent Cryo-Cycle for model 7600SL or 7600

