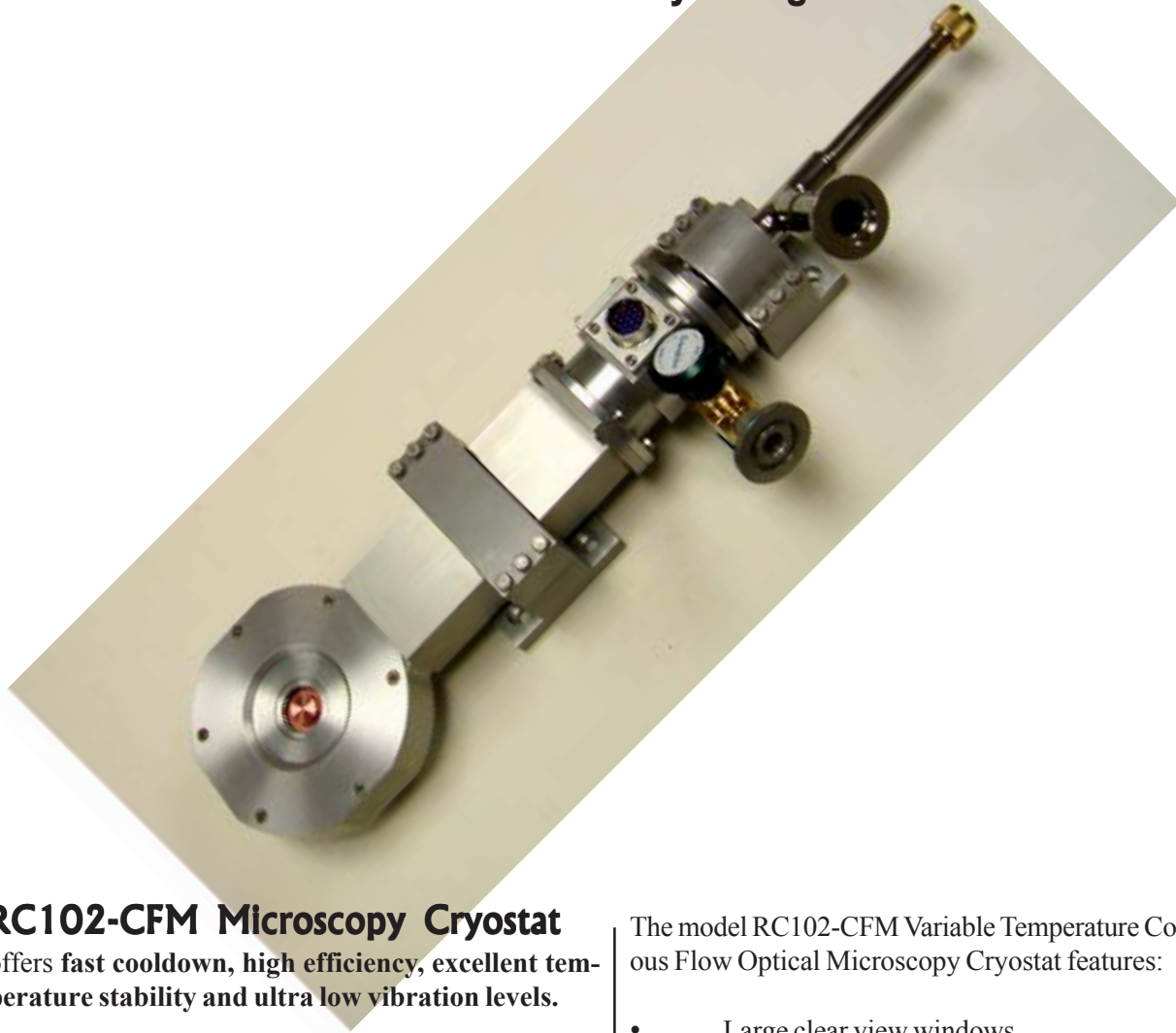


CRYO

Microscopy Cryogenic WORKSTATION

Optical cryostat for use in microscopy and spectroscopy

'Performance by Design'



RC102-CFM Microscopy Cryostat

offers **fast cooldown, high efficiency, excellent temperature stability and ultra low vibration levels.**

The sample can be set to be very close to the window. Interchangeable sample holders optimize the cryostat for different samples and different optical configurations.

Very easy to operate and 'Performance by Design'. The highly efficient detachable stainless steel flexible transfer line connects the WORKSTATION to the storage dewar. Uses either liquid helium or nitrogen.

The liquid cryogen is delivered to the sample mount through the vacuum insulated transfer line. An adjustable needle valve provides flow rate control. Connect the heater on the sample mount to the temperature controller for automatic variable temperature operation.

The model RC102-CFM Variable Temperature Continuous Flow Optical Microscopy Cryostat features:

- Large clear view windows
Reflection or transmission
- Extra thin windows available
0.5 mm (0.020"), 1.5 mm (0.06") is standard.
- Operating range (<4 to 325K)
- Use either liquid helium or nitrogen
- Efficient with Push or Pull operational modes
- Sturdy, strong stable support structure
- Ultra low drift and sample vibration
- Compact design (45 mm thick)
Go THIN option (30 mm thick)
'THIN' fits the popular Olympus BX41
- 'NOMOVE' option provides near zero movement due to thermal contraction

✓ **Compact** - lightweight and portable, easily integrated into microscopes and spectrometers

✓ **Efficient** - lower cryogen consumption, economical operation and fast cooldown

✓ **Flexible** - operates in any orientation

✓ **Optimized** - adjustable close working distance to sample allows proper positioning of high power lens

✓ **Reliable** - no diaphragm pump required
- based on our popular and proven RC102 Cryogenic Workstation

✓ **Variable temperature** - <4K to 325K
(500K optional)

✓ **Versatile** - Use either liquid helium or nitrogen
- 'push-or-pull' operation



The WORKSTATION

The RC102-CFM is a 'sample in vacuum' cryostat. The sample holder is located in vacuum. A flow of liquid helium or nitrogen cools the sample, which can be adjusted away from or very close to the window. For high rigidity, the sample is supported on both sides (not shown in drawings).

Front and rear sample supports provides high rigidity and ultra-low vibration and drift.

The WORKSTATION can be operated in any orientation. The standard system includes a six (6) foot (*8 foot optional*) flexible transfer line with a 48 inch (*60 inch optional*) storage dewar leg.

The typical setup consists of the RC 102-CFM cryostat, a liquid helium (or nitrogen) storage dewar, helium gas cylinder with pressure regulator and a vacuum pump. A stainless steel flexible transfer line is supplied with the system.

The transfer line leg inserts into the liquid cryogen. A small pressure is used to transfer the liquid out of the storage dewar, through the transfer line and directly to the sample mount. A flow control valve regulates the cryogen flow. Pressure inside the storage dewar can be adjusted using a helium gas cylinder. An activated charcoal cryopump built into the transfer leg will automatically pump when inserted

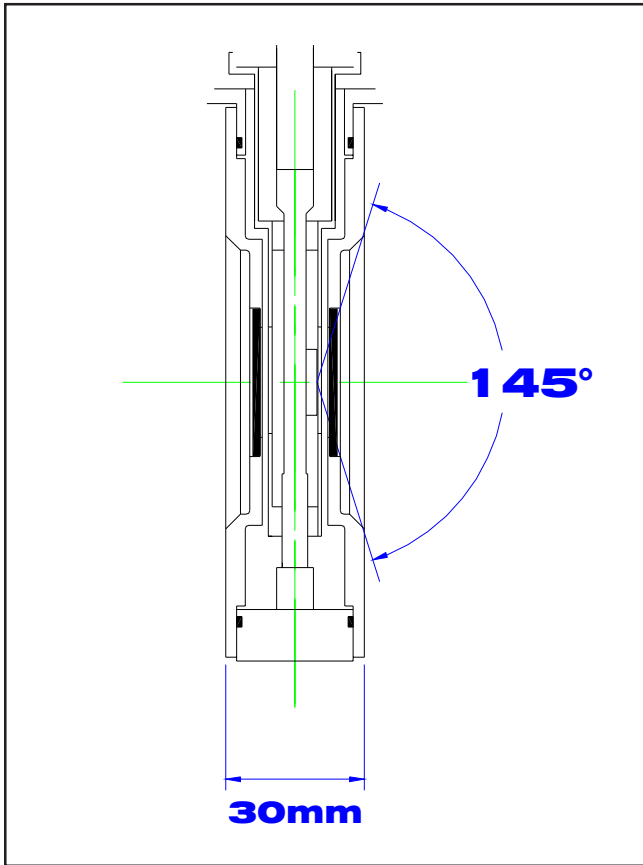
into liquid helium or nitrogen, maintaining excellent vacuum during extended periods of operation. The transfer line quick disconnects to and from the microscopy WORKSTATION.

Electrical connections to the sample are made through the o-ring sealed ports located on the instrumentation housing. A spare port is provided for future requirements. For safety, the shroud and transfer line are protected against overpressure by pressure reliefs.

The evacuation valve for the transfer system is located above the valve control knob. The evacuation valve for the sample region is on the instrumentation housing. The vacuums are completely independent.

Variable temperature is automated using an electronic temperature controller. A heater is attached to the heat exchanger. Simply, set the desired temperature into the temperature controller and obtain the desired temperature. Operation below 4K is achieved by reducing the flow pressure by pumping on the helium vent.

Windows at 0 and 180 degrees provide optical access. Standard window material is clear fused quartz, 1.5 mm thick (0.5 mm thick option is available); suprasil and other window materials can be selected. The standard clear view aperture is 23 mm diameter (13 mm for 0.5 mm thick windows). For reflection, the total angle of acceptance is 145



degrees. For transmittance, the angle from center is 117 degrees. The adjustable holder allows the sample to be moved right up to the window. Samples can be mounted through the radiation shield opening or half the radiation shield is removable to allow full access.

PUSH OR PULL?

CRYO Industries flow cryostats can be operated in 'push' or 'pull' operating modes - a feature not offered by some of the competitive brands.

Liquid cryogen helium or nitrogen can be drawn from the main reservoir into the sample region by either:

"Pushing" - A small pressure in the storage dewar 'pushes' the cryogen from the storage dewar into the transfer line to the sample mount.

Or,

"Pulling" - Sucking liquid from the main storage dewar to the cold finger by using a small pump. The liquid helium is drawn from the main reservoir of the storage dewar into the sample mount using a small diaphragm (gas flow) pump, while maintaining the storage dewar near one atmosphere.

'Pushing' is

- simpler and easier to do.
- quieter - no external pump is required
- less prone to icing

'Pulling' -

- allows storage dewar reservoir to remain at atmosphere.
- is slightly more efficient at 4K
- provides lower terminal temperature
- offers more constant flow rate.

RC102-CFM Specifications

Temperature range	3.5 to 325K, up to 500K optional
Cool down time	20 minutes typical
Temperature stability	Better than +/- 50 mK
Weight	3.2 kg
Vibrational amplitude (nominal, with vibration isolated manipulator support)	25 nm
Drift (after thermal equilibrium)	+/- 150 nm
LHe usage	~1.1 l/hr at 5K ~0.5 l/hr at 20K



GO THIN

MICROSCOPY CRYOSTAT GOES THIN - Fits into the popular Olympus BX41 and more brands of microscopes



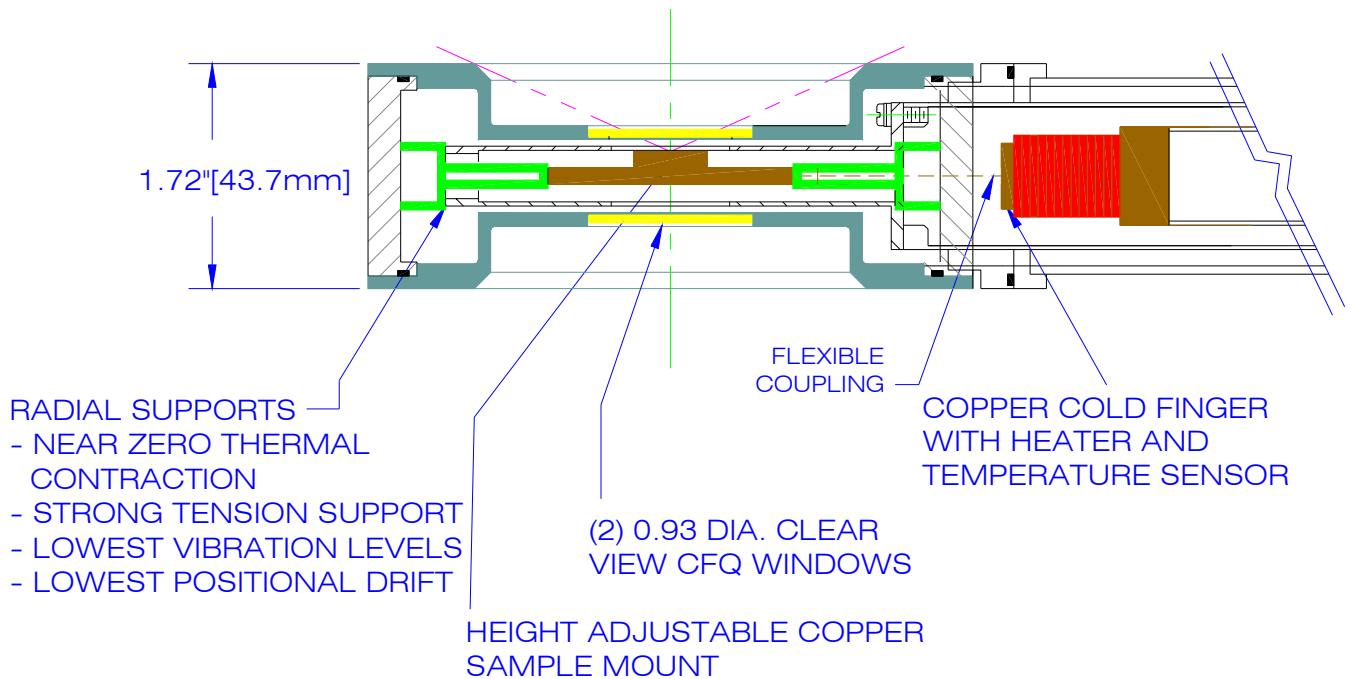
Model RC102-CFM-THIN

Variable Temperature Continuous Flow

Optical Microscopy Cryostat:

- 2.2K to 325K operating temperature range
- Operates with either liquid helium or nitrogen
- Operates in *Push Pull* modes
Push - storage dewar overpressure push
Pull - diaphragm pump pull
- (2) 0.93 inch diameter x 0.062 inch (1.59 mm) thick optical quartz windows (0.5 mm thick window option)
- **Adjustable sample holder**
Can be adjusted right up to the window
- 50 ohm heaters installed on sample mount
Dual heaters for more uniform heating
- 10-pin hermetic electrical feedthrough
- Spare blank feedthrough port
- NW25 vapor pumping port
- NW25 evacuation valve with safety pressure relief
- Flexible stainless steel transfer line with flow control valve
- Silicon diode temperature sensor installed on cold finger
- Silicon diode temperature sensor installed near sample
- **30 mm thin**
- Solid - internal spacer

More universal compact design (30 mm thick) and still with fast cooldown, high efficiency, excellent temperature stability and ultra low vibration levels.



NOMOVE OPTION

What is a **NOMOVE** support?

The sample holder is supported radially with opposing support forces and no physical support from the cold finger. The thermal contraction is toward the center of the sample, resulting in the lowest movement design. The supports are designed to operate in the elastic region; supports are rigid and under tension.

Further, movement toward or away from the window is theoretically zero because there is no support component in this direction.

RC102-CFM-NOMOVE

Temperature range	4 to 325K
Cool down time	25 minutes typical
Temperature stability	Better than +/- 50 mK
Weight	3.2 kg
Vibrational amplitude (nominal, with vibration isolated manipulator support)	less than 20 nm
Drift (after thermal equilibrium)	+/- 50 nm
LHe usage	~1.3 l/hr at 5K ~0.5 l/hr at 20K

Easy Mounting

with adjustable position support



Adjust close to the microscope for more rigidity or move to fit your needs

Standard Models

RC102-CFM (popular standard)

RC102-CFM--THIN (30 mm thick, MicThin)

RC102-CFM-NOMOVE

RC102-CFM-THIN+NOMOVE

Add a magnetic field!

Apply 2 Tesla to your samples

Email us today for information on these microscopy models with magnetic fields

cryo@cryoindustries.com

A
 flow of liquid helium or nitrogen cools the sample, which can be adjusted away from or very close to the window. For high rigidity, the sample is supported on both sides. Sample distances are customer selectable.



Interchangeable single thread sample holders allow for quick sample change, adjustable distances and selectable diameters and apertures.



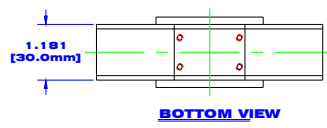
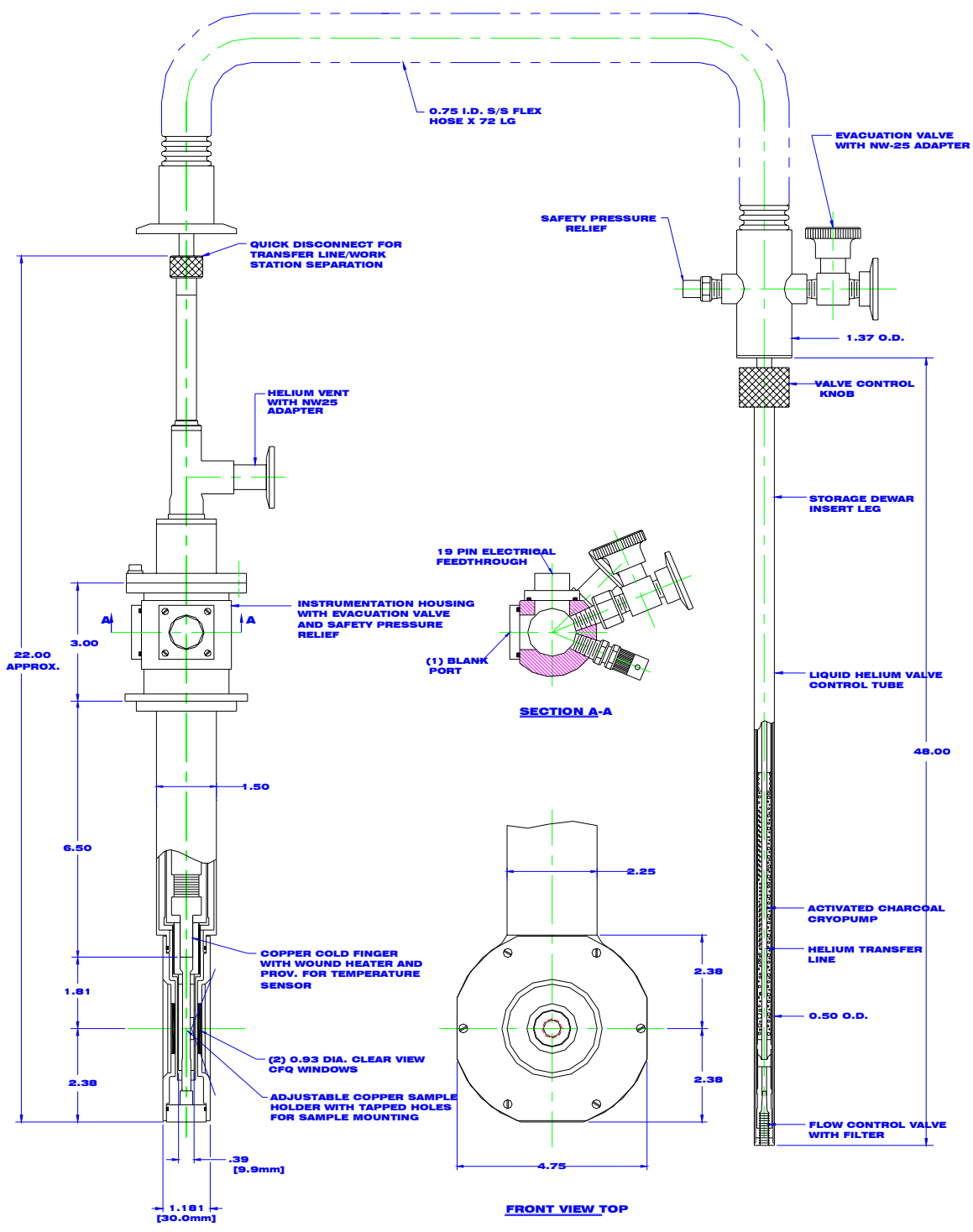
Full sample access
 Remove the full size cover. The sample can be quickly accessed through the radiation shield. And, the radiation shield is split in half to allow fast full access to the sample mount.



Interchangeable Narrow Gap Magnet Kit
- Converts standard microscope cryostat to Narrow Gap design for use in electromagnets

- Compact vacuum jacket
- Fits narrow 1.0 inch gap
- Radiation shield
- Changeable thread in sample holders
- Strain free window mounting (top window)

INTERCHANGEABLE NARROW GAP SHROUD KIT



CRYO Industries of America, Inc. 11 Industrial Way Atkinson, N.H. 03079	DWG. NO.: CFM-1738-1 02
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