CIA CRYO Industries of America, Inc.

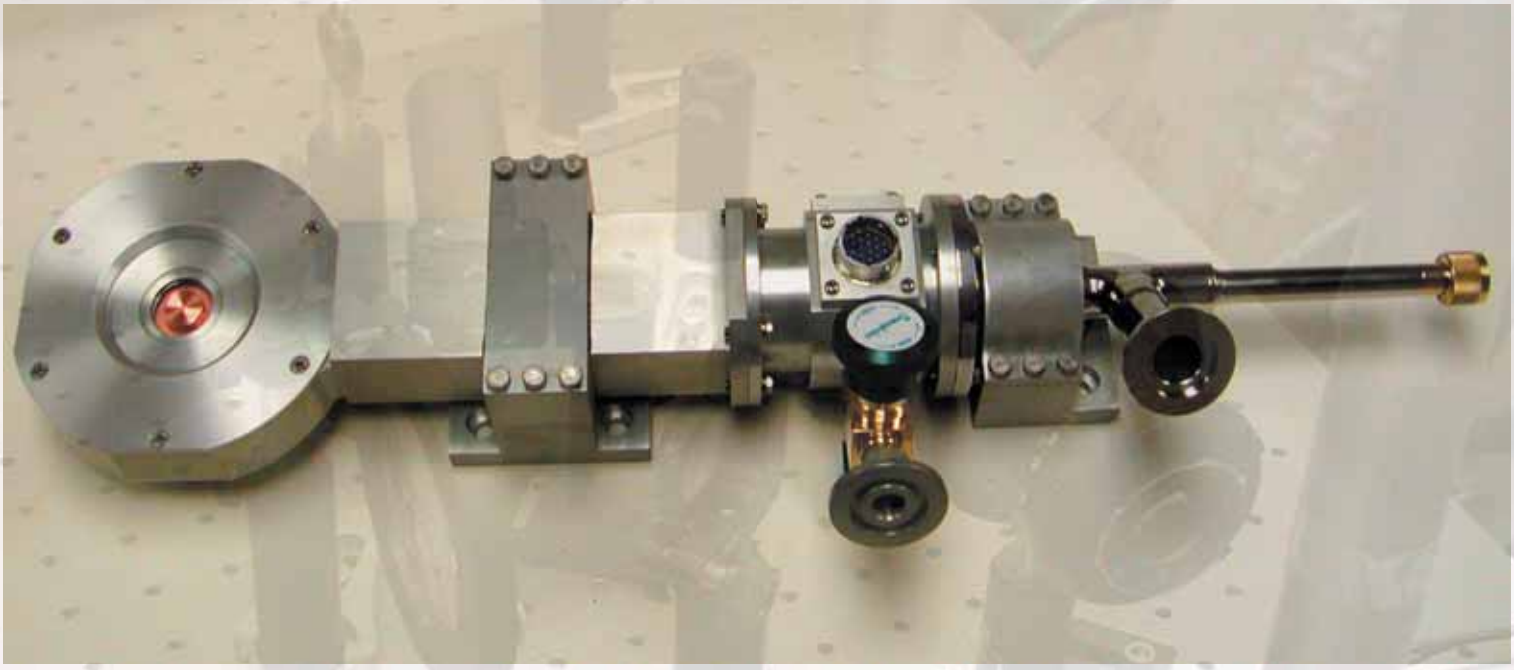
21 YEARS OF MAKING CRYOGENICS FOR RESEARCHERS
www.cryoindustries.com

Microscopy Cryogenic WORKSTATION

Optical cryostat for use in microscopy, spectroscopy, wafer probing, IC testing and more.

'Performance by Design'

RC102-CFM Microscopy Cryostat offers fast cooldown, high efficiency, lowest thermal drift, excellent temperature stability and ultra low vibration



RC102-CFM

- Large clear view windows
  Reflection and transmission
- Sample height adjustment up to the window
- 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 operation
- Sturdy strong stable support
- Ultra low drift and sample vibration
- Go THIN - 30 mm thick
  'THIN' fits more microscopes
- 'HiRes-NOMOVE' option provides
  Low vibration space flight type strapping
  - no direct contact with cold finger
  Near zero movement due to thermal contraction

Interchangeable sample holders provide height adjustment and optimize the cryostat for varying samples and different experimental configurations. The sample can be set to be very close to the window.

Easy to operate and 'Performance by Design'.
Open the flow valve; insert the transfer line into a storage dewar and cooling commences. Operates with liquid helium or nitrogen.

The highly efficient detachable stainless steel flexible transfer line connects the microscopy WORKSTATION to a storage (transport) dewar.

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

√ **Lowest Vibration and drift** - rigid front and rear supports

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

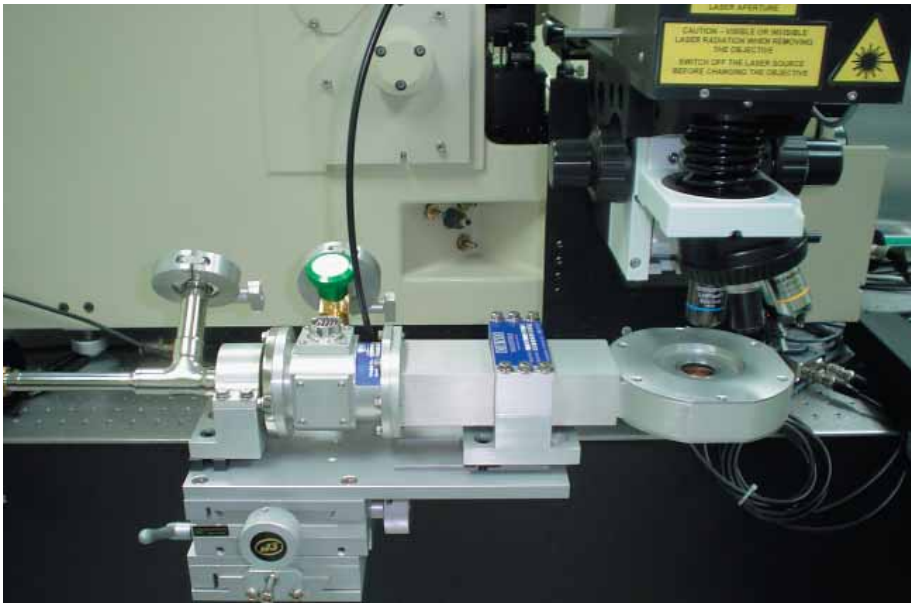
√ **Efficient** - lower cryogen consumption, economical operation and fast cooldown

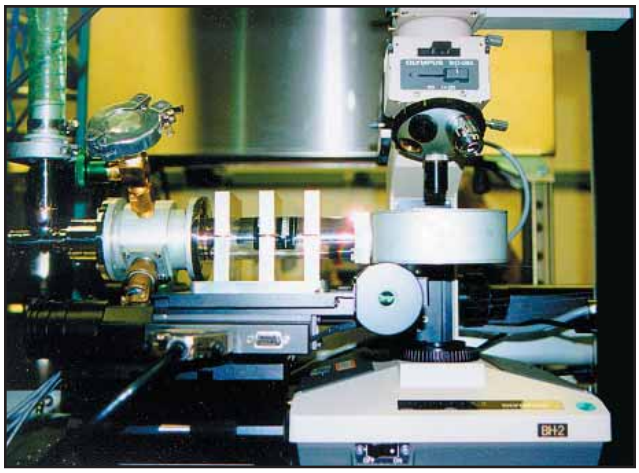
√ **Reliable** - no diaphragm pump required - based on our popular and proven RC102 Cryogenic Workstation

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

√ **Versatile** - Use either liquid helium or nitrogen

√ **Flexible** - operates in any orientation





The MICROSCOPY WORKSTATION

The RC102-CFM is a 'sample in vacuum' cryostat. The sample holder is located in vacuum and can be adjusted away from or very close to the window using vari-height thread in sample holders. A flow of liquid helium or nitrogen cools the sample. For high rigidity, the sample is supported on opposite sides by opposing tension supports.

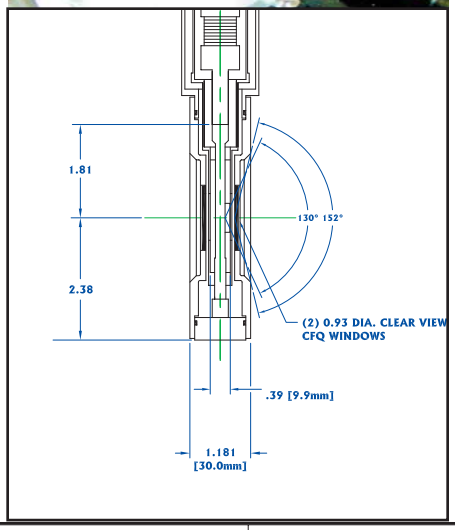
Front and rear sample supports provides high rigidity with ultra-low vibration and drift.

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 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.

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 a low pressure nitrogen dewar, maintaining excellent vacuum during extended periods of operation. The transfer line quick disconnects to and from the microscopy WORKSTATION.

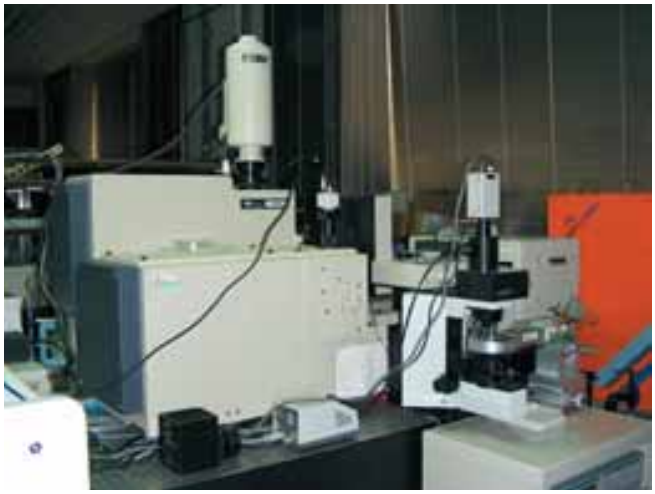
The typical setup consists of the RC102-CFM cryostat, a liquid helium (or nitrogen) storage dewar, helium gas cylinder with pressure regulator and a vacuum pump. A stainless steel flexible transfer line is supplied with the system.



Temperature range	3.5 to 325K,
Cool down time	20 minutes typical
Temperature stability	Better than +/- 50 mK
Weight	3.2 kg
Vibrational amplitude	25 nm
Drift (over 1/2 hour)	+/- 150 nm
LHe usage	~1.0 l/hr at 5K ~0.5 l/hr at 20K

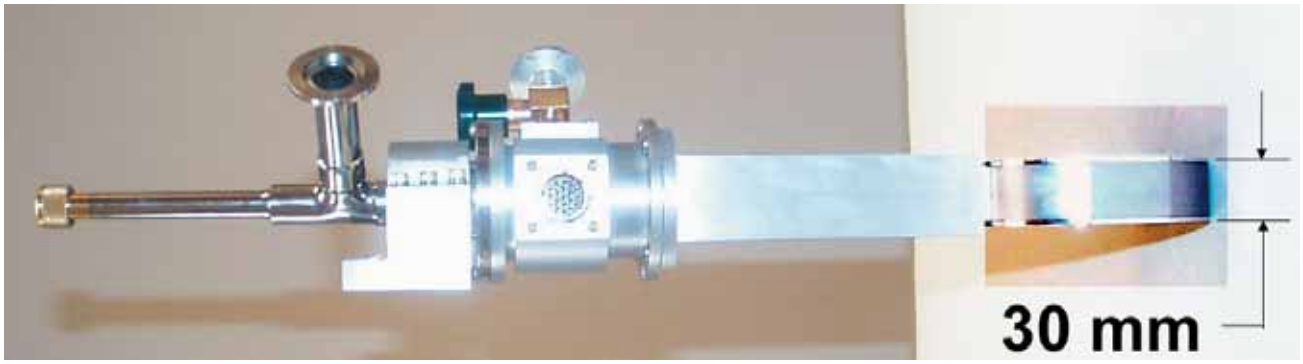
RC102 CFM

Windows at 0 and 180 degrees provide optical access. For reflection, the total angle of acceptance is 130 - 152 degrees, depending on sample position. For transmittance, the angle from center is 117 degrees. Standard window material is clear fused quartz, 1.5 mm thick (0.5 mm thick option is available); suprasil, ZnSe and other window materials can be selected. The standard clear view aperture is 24 mm diameter (13 mm for 0.5 mm thick windows).



GO THIN

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



Variable temperature is automated using an electronic temperature controller. Heaters are attached to the sample holder and cold finger. Set the temperature into the controller and obtain the desired temperature. Operation below 4.2K is achieved by reducing the flow pressure by pumping on the helium vent.

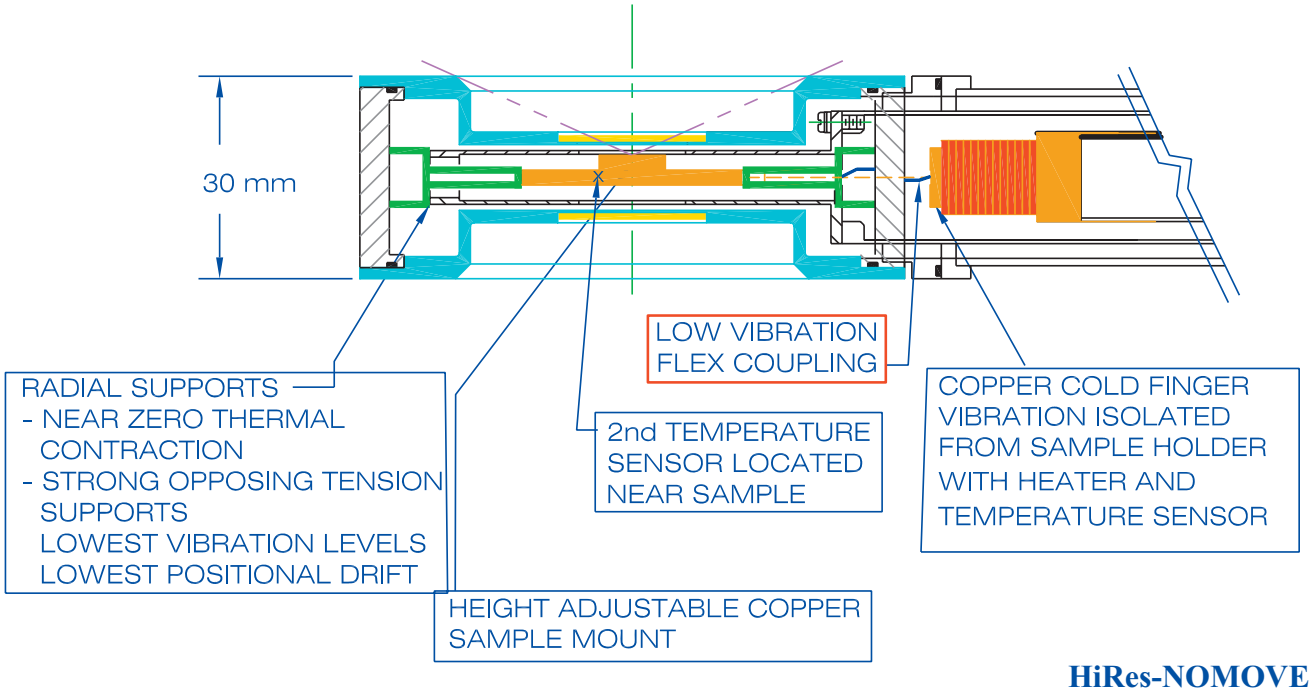
Electrical connections to the sample are made through the o-ring sealed ports located on the instrumentation housing. A spare port is provided for future requirements.

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.

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**" - 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.

Model RC102-CFM
Variable Temperature Continuous Flow Optical Microscopy Cryostat:

- 3.5 K to 325 K operating temperature range
- Operates with either LHe or LN_2
- Operates in Push or 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)
  Windows top and bottom
- Adjustable sample holder
  Can be adjusted right up to the window
- 50 ohm heaters installed on sample mount
  Dual heaters for more uniform heating
- 19-pin hermetic electrical feedthrough
- Spare blank feedthrough port
- NW25 vapor pumping port & vacuum valve with safety pressure relief
- Flexible stainless steel transfer line with flow control valve
- Silicon diode temperature sensors installed on cold finger and next to sample
- 30 mm thin
- Solid - internal spacer



HiRes-NOMOVE

NOMOVE OPTION

What is a HiRes-NOMOVE?

The sample holder is supported radially with opposing support forces and no physical support from the cold finger. The sample is physically decoupled from the cold finger. The only contact between the sample holder and the cold finger is through a low vibration flexible coupling.

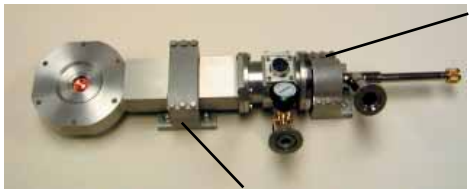
Any thermal contraction is toward the center of the sample, resulting in the lowest movement design. The supports are designed to operate in the elastic region; supports are rigid and under tension.

Also, movement toward or away from the window is virtually zero† because there is no support component in this direction.

Temperature range	4 to 325K,
Cool down time	20 minutes typical
Temperature stability	Better than +/- 50 mK
Weight	3.2 kg
Vibrational amplitude	20 nm
Drift (over 4 hours)	+/- 150 nm
LHe usage	~1.1 l/hr at 5K ~0.5 l/hr at 20K

RC102-CFM-HiRes-NOMOVE

Lowest Vibration
High Resolution
No direct contact between the flowing helium and the sample holder!
With the NOMOVE option the sample does not make direct contact with the cold finger. Flexible copper/silver low vibration strapping connects the sample holder to the cold finger.



Easy Mounting - adjustable position support

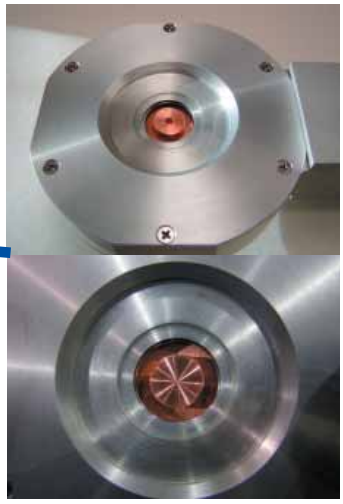
Adjust close to the microscope for more rigidity or move to fit your needs

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

† Note: Sample was watched through a 1 micron opening, no movement was observed.

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.

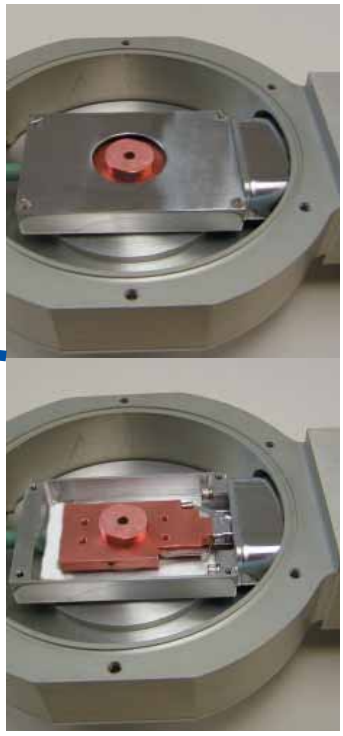
Sample distances are customer



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

Full sample access

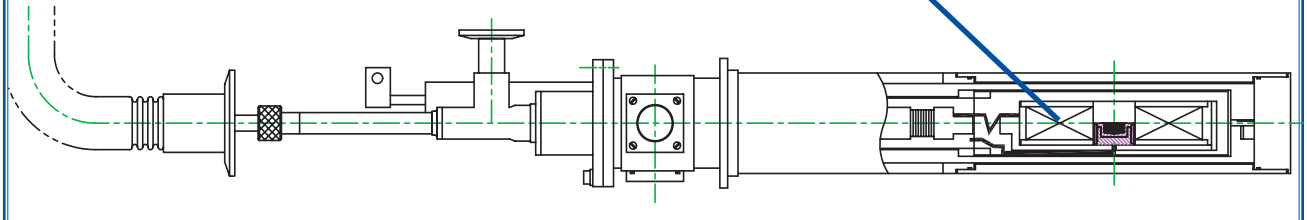
Remove the full size cover. The sample can be quickly accessed through the radiation shield. Plus, the radiation shield splits in half to allow fast full access to the sample mount.

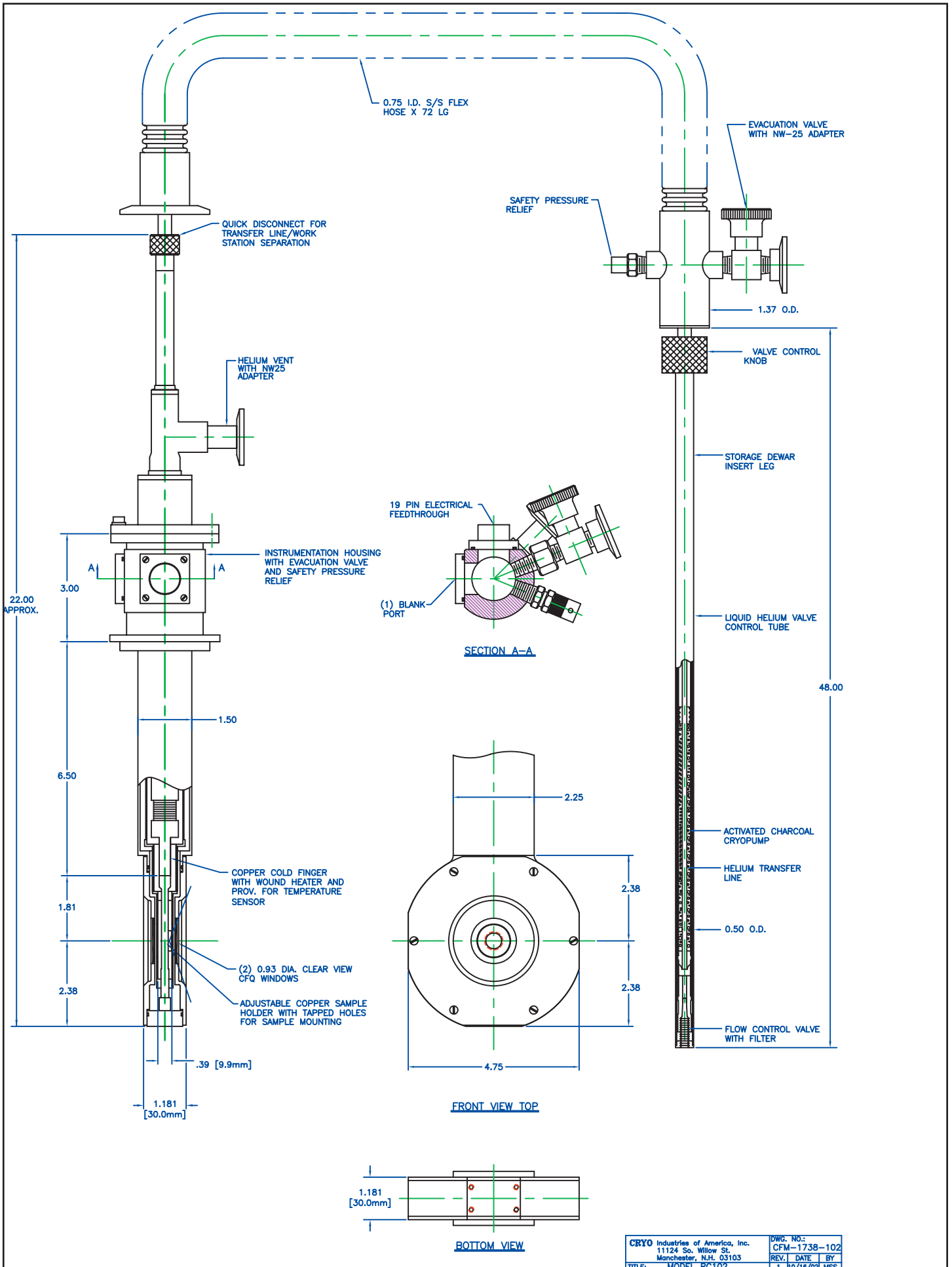


Add a magnetic field

HTS (High Temperature Superconductor) Magnet!

LHe flow or cryogen free systems!





CRYO Industries of America, Inc. 11124 So. Willow St. Manchester, N.H. 03103		DWG. NO.: CFM-1738-102	
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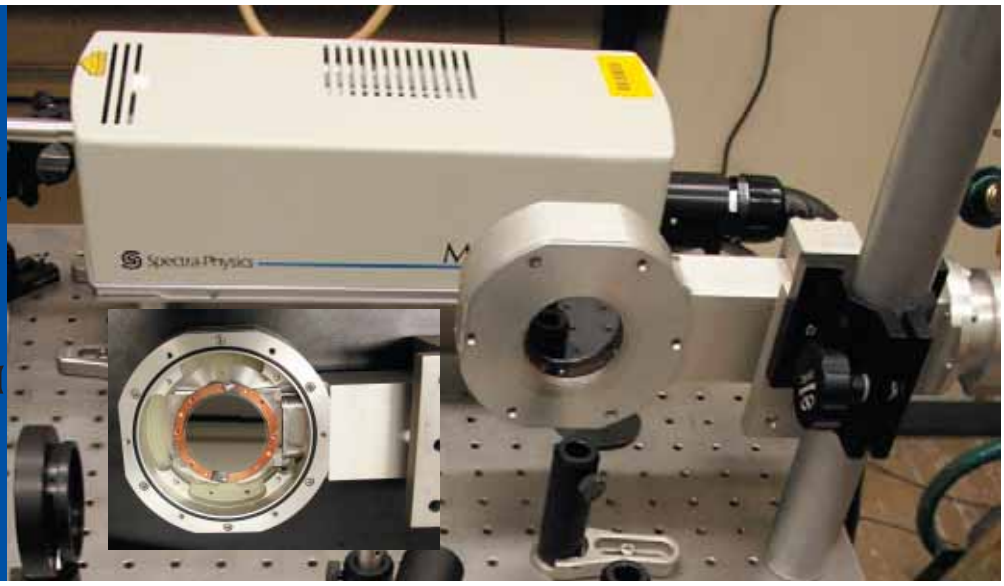
TITLE: MODEL RC102 OPTICAL MICROSCOPY CRYOGENIC WORKSTATION		1	10/16/02	MSS
DWN. BY: MSS	SCALE: NTS			
CHKD. BY: GJS	DATE: 11/21/01			

ACCESSORY
Wafer Probing Kit for 2 inch wafers

Dual or single wafer mounting.

Dual mounting allows probing one side, flip it over and probe the second wafer.



ACCESSORY - DIP IC TESTING