

# 2-Stage 4K Closed Cycle Refrigerators

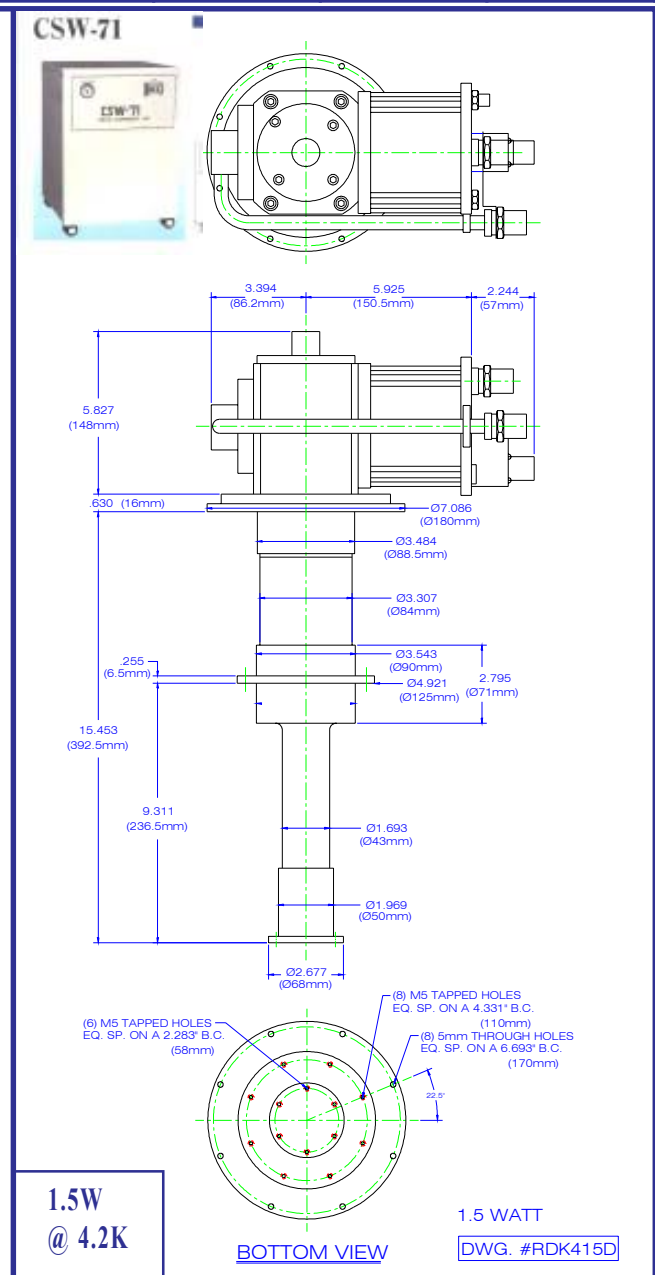
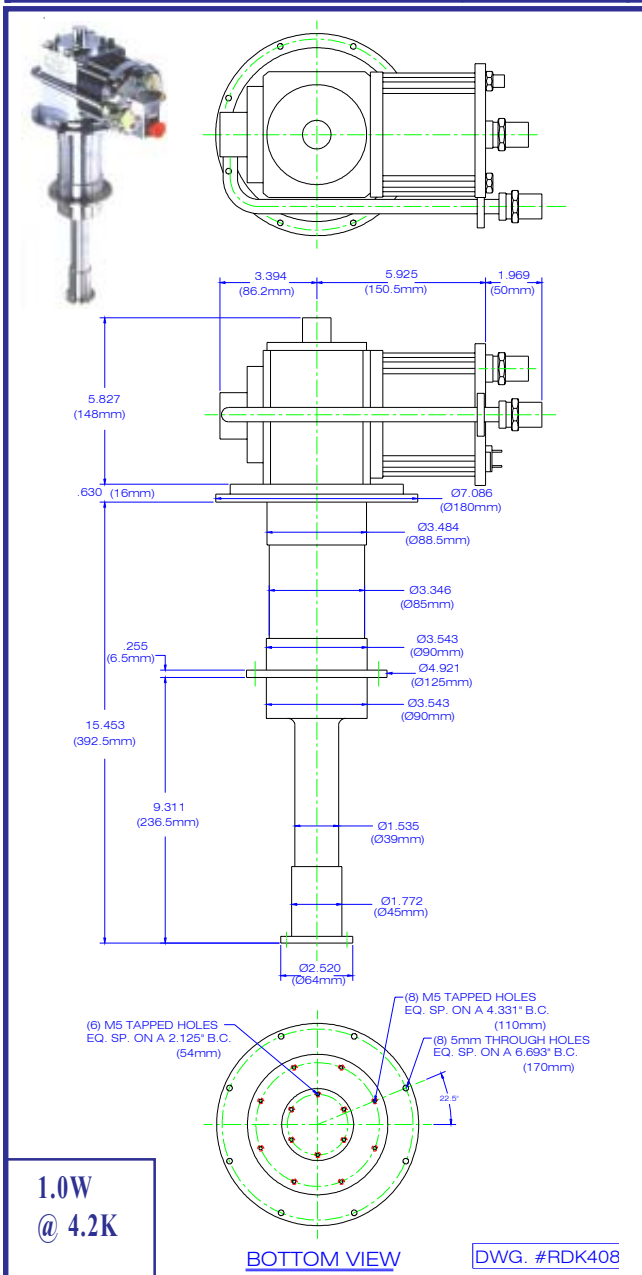


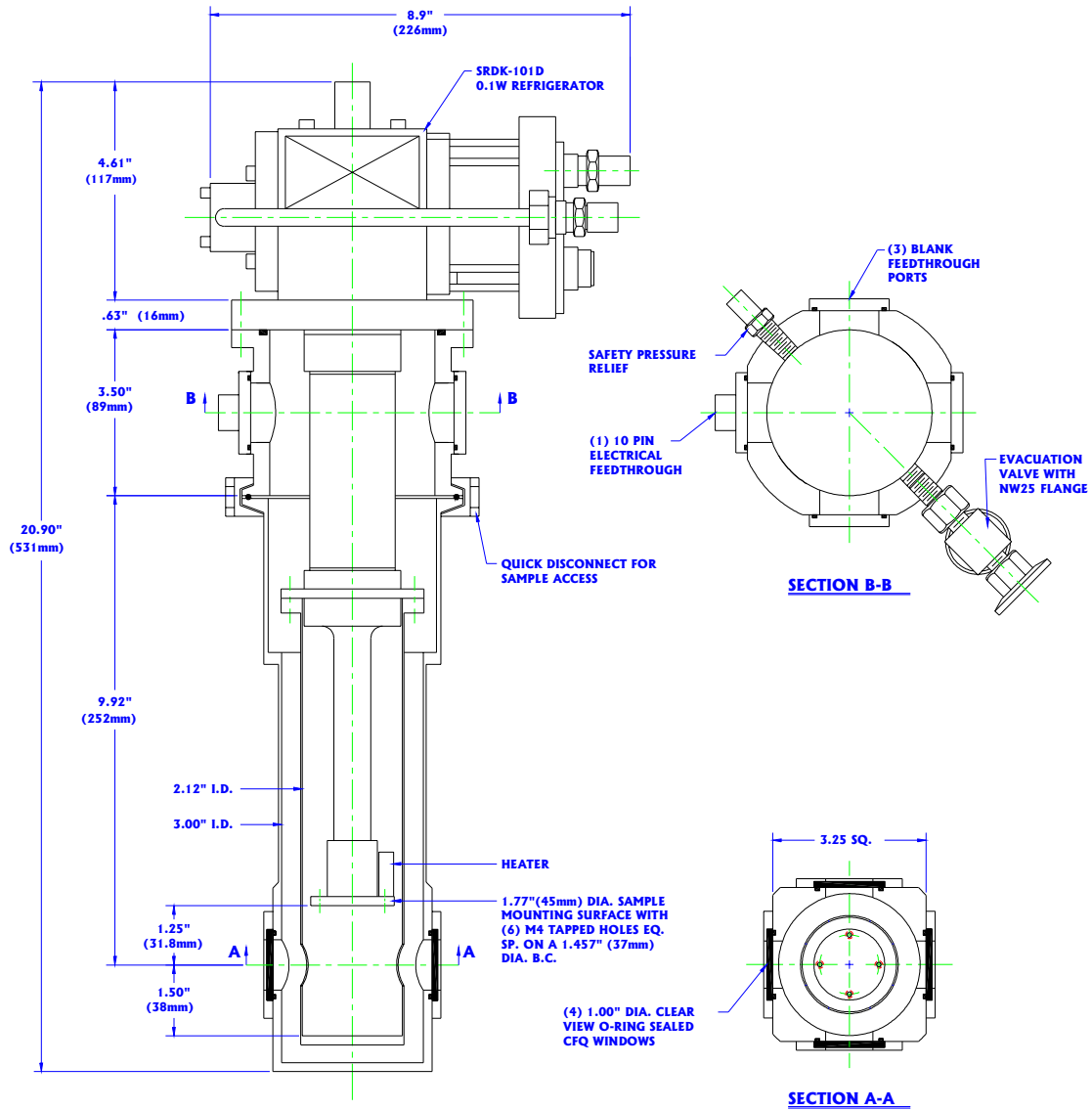
**CRYO**

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# 0.1W to 1.5W - cooling power at 4.2K

Model	REF-4K-0.1W	REF-4K-0.5W	REF-4K-04W20	REF-4K-1W	REF-4K-1.5W
Cooling Power - second stage at 4.2K - first Stage (50/60Hz)	<b>0.1W</b> 3/5W at 60K	<b>0.5W</b> 3/4W at 50K	<b>0.4W</b> 15/20W at 40K	<b>1.0W</b> 31/37W at 40K	<b>1.5W</b> 35/45W at 50K
Terminal Temperature (No external heat loads)	<3.0K	<3.5K	<3.5K	<3.5K	<3.5K
Power Consumption (50/60Hz)	1.2/1.3kW	2.7/3.5kW	3.8/4.5kW	6.5/7.5kW	7.5/8.5kW
Weight (Cold Head)	7.2kg	14kg	16kg	18kg	18.5kg
Maintenance Interval	10,000 hours	10,000 hours	10,000 hours	10,000 hours	10,000 hours



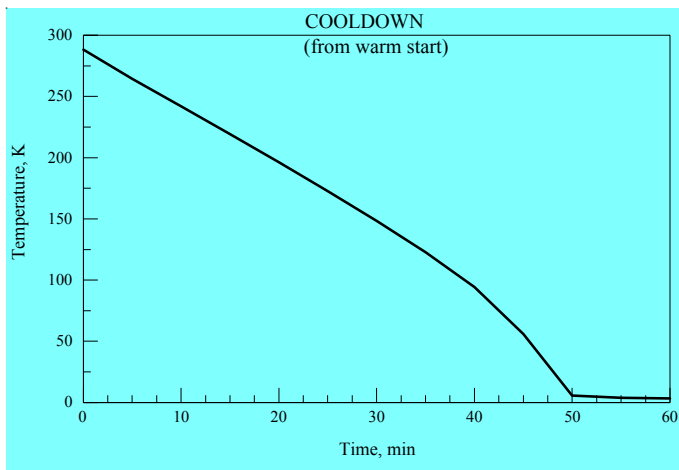


Model	REF-4K-0.1W
Compressor	CNA-11C (Air Cooled)
Cooling capacity - 1st Stage (50/60Hz) - 2nd Stage (50/60Hz)	3/5W @ 60K 0.1 W @ 4.2K
Terminal Temperature at zero heat load	< 3.0K
Cooldown time (2nd Stage)	~ 2.5 Hours
Power Requirements	100-240v AC single phase 1.3 kW Power consumption- Steady 1.5 kW Power consumption- Cooldown Operating current - Steady (60 Hz) 13 A (Max) Power Requirement 2.5 kVA
Standard flexline length	3 meters
Weight - Coldhead (Bare) - Compressor	8.2kg 70kg
Maintenance interval (Coldhead)	10,000hrs

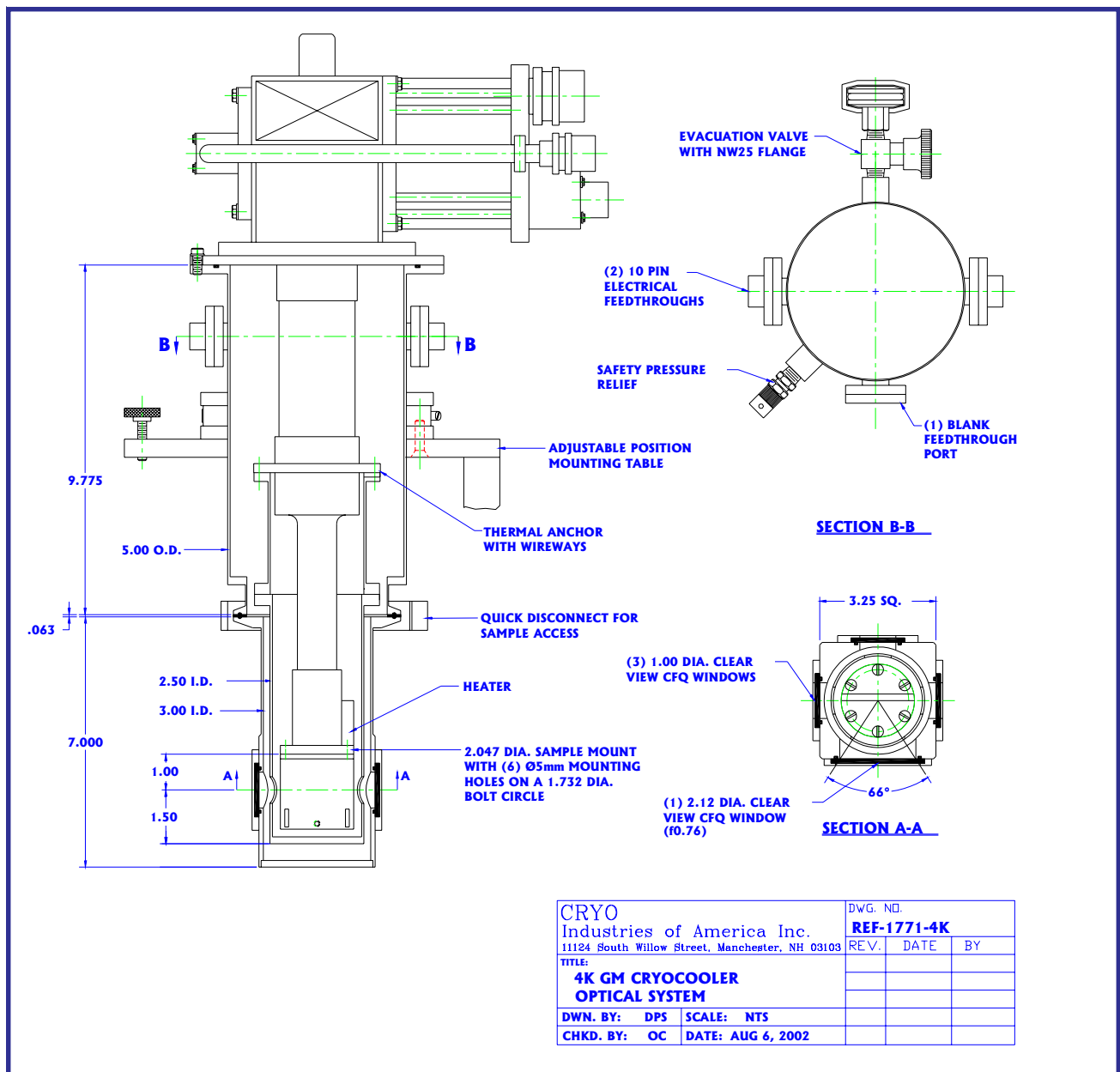
CRYO Industries of America Inc. 11124 So. Willow St., Manchester N.H. 03103		DWG. NO. <b>REF-1754-SUM</b>	
TITLE: <b>MODEL SRDK-101D OPTICAL 4K REFRIGERATOR SYSTEM</b>		REV.	DATE
DWN. BY: GJS	SCALE: NTS		BY
CHKD. BY: OC	DATE: 4-22-02		

**4K 0.1 W Closed Cycle  
Refrigerator Cryostat  
(Style 1b)**

# 4K 0.5 W Closed Cycle Optical Cryostat



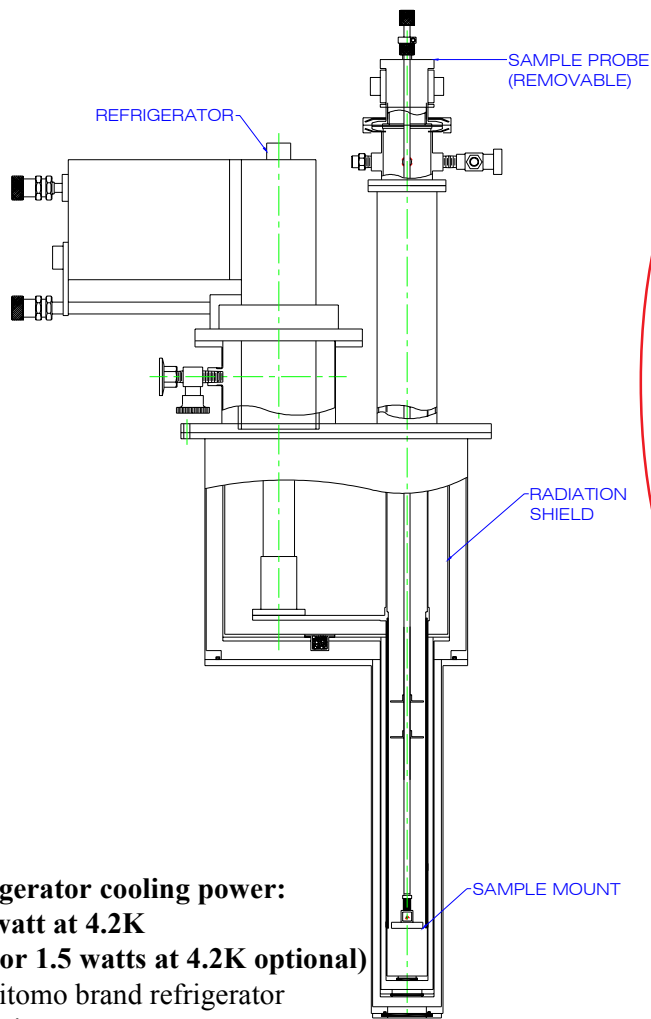
Model	REF-4K-0.5W	REF-4K-0.4W20
Compressor	CNA-11C (Air Cooled) CKW-21A (water Cooled)	CNA-31C (Air Cooled)
Cooling capacity - 1st Stage (50/60Hz) - 2nd Stage (50/60Hz)	3/4W @ 50K 0.5 W @ 4.2K	15/20W @ 40K 0.5 W @ 4.2K
Terminal Temperature at zero heat load	<3.5K	<3.5K
Cooldown time (2nd Stage)	~60 min	~60 min
Power Requirements (50/60 Hz)	200v AC 3 - phase	200v AC 3 - phase
Power consumption- Steady (50/60 Hz)	2.7/3.5 kW	3.8/4.5 kW
Power consumption- Cooldown	3.3/4.0 kW	4.6/5.4 kW
Operating current - Steady (60 Hz)	11 A (Max)	16 A (Max)
Power Requirement	6.0 kVA	8.5 kVA
Standard flexline length	10 meters	6 meters
Weight - Coldhead (Bare) - Compressor	14 kg 70kg	16 kg 95kg
Maintenance interval (Coldhead)	10,000hrs	10,000hrs



**Model REF-1771-4K Variable Temperature Optical Closed Cycle Cryogenic Refrigerator System:**

- <4 to 325K operating temperature range
- Two stage GM (Gifford-McMahon) coldhead Sumitomo model SRDK-205DW
- Air or Water Cooled Sumitomo compressor AC 200v 3 phase
- 10 m interconnecting hoses and control cable
- Initial cooldown time: 60 minutes to 4.2K
- Subsequent recool time from 300K: <45 minutes
- Cooling power: 0.50 Watts at 4.2K  
4 Watts at 50K (60 Hz), 3 Watts at 50K (50 Hz) or (optional)  
0.40 Watts at 4.2K with 20 Watts at 40K (60 Hz), 15 Watts at 40K (50 Hz)
- (1) 2.12 inch dia. clear optical quartz window large 66 degree clear view (f0.76)
- (3) 1.00 inch dia. clear optical quartz windows
- First-stage removable radiation shield
- Quick Release optical outer vacuum shroud
- 55 mm diameter refrigerator sample mount
- Optical and resistivity sample holders
- 50 ohm Hi Power 50W heater on cold finger
- (2) 10-pin electrical feedthrough with mate
- (1) Spare blank feedthrough ports
- Temperature sensors installed on cold finger and 'T' holder
- 24 bits A/D Autotune PID Temperature controller

# TOP LOADING SAMPLE IN EXCHANGE GAS



- **Refrigerator cooling power:**  
**0.5 watt at 4.2K**  
**(1.0 or 1.5 watts at 4.2K optional)**  
 Sumitomo brand refrigerator
- Operating temperature range:  
 1.5K to 325K, up to 500K or 800K optional  
 one shot operating mode below 4.2K (standard unit)
- Air or water cooled compressor
- Greater than 1.25 inch (31mm) inside diameter sample tube  
 Larger sample tubes optional
- Top loading sample positioner assembly with vertical and rotational adjustment
- Two 10-pin electrical connectors with mates for sample tube
- 'T' style copper sample holder
- (3) matching silicon diode temperature sensors  
 installed on refrigerator 2nd stage, sample mount and sample holder or Cernox sample sensor for use in narrow gap electromagnets
- Three way exchange gas valve
- Optional ball or gate valve for sample exchange and isolation
- Cryostat and sample tube safety pressure reliefs
- Reliable bellows style evacuation valve
- Optical ports, horizontal &/or vertical  
 Select up to 4-horizontal window ports or 1-vertical

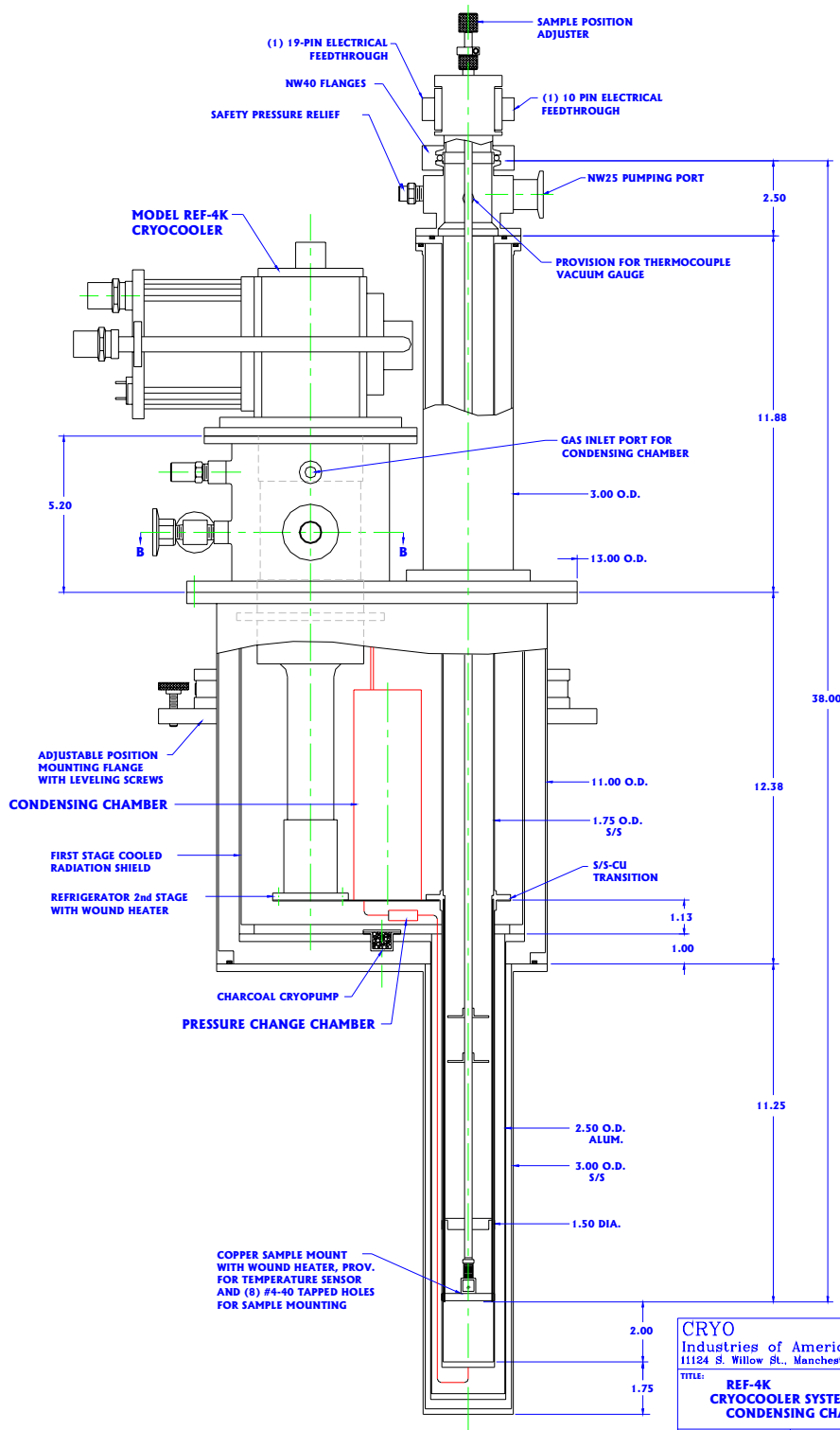
*Note: radiation shield windows are needed to block radiative heat load*

The **Model REF-1810-4KN (4K Top Load)** closed cycle variable temperature optical cryogenic refrigerator system features quick sample change while operating. Samples are located in 'static' exchange gas for efficient cooling. Do your experiments require frequent sample changing? Are your samples difficult to cool when mounted to a cold finger in vacuum? If so, Top Loading cryostats are the way to go. The sample inserts from the top and goes in and out easily.



**CRYO's unique design provides temperatures below 1.5K! The operating temperature range is an unmatched 1.5K to 325K.**

# TOP LOADING SAMPLE IN EXCHANGE GAS



1.5K  
continuous  
operating  
temperature  
using internal  
condensing  
chamber

4.2K - 325K  
operation using  
static  
exchange gas

CRYO Industries of America Inc. 11124 S. Willow St., Manchester, NH 03103		DWG. NO. <b>REF-1809-4KC</b>
TITLE: <b>REF-4K CRYOCOOLER SYSTEM WITH CONDENSING CHAMBER</b>	REV.	DATE BY
DWN. BY: GJS	SCALE: NTS	
CHKD. BY: OC	DATE: 3-14-03	

Refrigerator cooling power: 0.5 watt, 1.0 watt or 1.5 watts at 4.2K

# CRYO

**Some other CRYO Products**

**10K Closed Cycle Refrigerator Systems**

**Cryogen Free Superconducting Magnet  
with variable temperature inserts**

**Continuous Flow Cryostats**

**sample in vacuum**

**& sample in vapor**

**LHe Variable temperature Reservoir**

**Cryostats**

**Liquid Nitrogen Variable Temperature**