Optical Cryostat — Narrow Gap

The **CS202*I-DMX-12** is an optical cryostat specially constructed for use with narrow gap magnets. As always, the challenge in magnet systems is to shrink the vacuum shroud dimensions to fit inside the small magnet pole spacing to maximize the field. The profile of the vacuum shroud has been reduced to fit the cryocooler like a glove and the optical block has been reduced to allow for the smallest pole spacing.

The above picture shows a cryocooler with a vacuum shroud, radiation shield, and sample holder installed.

Applications

- Magnetic Susceptibility
- Electro-Optical
- Magneto-Optical
- Hall Measurements
- UV, Vis, IR
- Electro and Photoluminescence
- DLTS
- Resistivity

Features

- Cryogen Free, Low Power
- High Performance Stainless Steel Construction
- Large clear view optical windows (1 in)
- Large sample viewing angle for optical collection (F/1.25)
- Can operate in any orientation
- Fully customizable

Typical Configuration

- Cold head (DE-202AI)
- Compressor (ARS-2HW)
- 2 Helium Hoses
- Aluminum vacuum shroud with 2 window ports for optical and electrical measurements (DMX-12)
- Non-Nickel Plated Polished OFHC radiation shield
- 2 High purity quartz windows
- Instrumentation for temperature measurement and control:
  - 10 pin hermetic feed through
  - 36 ohm thermofoil heater
  - Silicon diode sensor curve matched to (±0.5K) for control
  - Calibrated silicon diode sensor (±12 mk) with 4 in. free length for accurate sample measurement.
- Wiring for electrical experiments:
  - 10 pin hermetic feed through
  - 4 copper wires
- Sample holder for optical and electrical experiments
- Temperature Controller

The above picture shows a complete system (minus the vacuum pump and temperature controller)

Options and Upgrades

- 4K Coldhead (0.1W @ 4.2K)
- 5.5K Coldhead (1W @ 10K)
- 450K High Temperature Interface
- Turbo upgrade for faster cooldown times
- Custom temperature sensor configuration (please contact our sales staff
- Custom wiring configurations (please contact our sales staff)
- Window material upgrades (custom materials available)
- Sample holder upgrades (custom sample holders available)

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Cooling Technology

DE-202	Closed Cycle Cryocooler
Refrigeration Type	Pneumatically Driven GM Cycle
Liquid Cryogen Usage	None, Cryogen Free

Temperature*

DE-202AI	< 10K - 350K
DE-202PI	< 5.5K - 350K
DE-202SI	< 4.2K - 350K
With 800K Interface	N/A
With 450K Interface	(Base Temp + 2K) - 450K
Stability	0.1K

*Based on bare cold head with a closed radiation shield, and no additional sources of experimental or parasitic heat load

Sample Space

Diameter	**DMX-12** 28.4 mm (1.12 in.) **DMX-12B** 27.18 mm (1.07 in.)
Height	30 mm (1.18 in.)
Sample Holder Attachment	1/4 - 28 screw
Sample Holder	www.arscryo.com/Products/SampleHolders.html

Optical Access

Window Ports	2 - 180° Apart
Diameter	38 mm (1.5 in)
Clear View	25 mm (1 in)
#/F	1.25
Window Material	www.arscryo.com/Products/WindowMaterials.html

Temperature Instrumentation and Control (Standard)

Heater	36 ohm Thermofoil Heater anchored to the coldtip
Control Sensor	Curve Matched Silicon Diode installed on the coldtip
Sample Sensor	Calibrated Silicon Diode with free length wires

Contact ARS for other options

Instrumentation Access

Instrumentation Skirt	Welded Stainless Steel
Pump out Port	1 - NW 25
Instrumentation Ports	2
Instrumentation Wiring	Contact sales staff for options

Vacuum Shroud

Material	Stainless Steel
Length	338 mm (13.3 in)
Diameter	70 mm (2.75 in) (at the sample space)
Width	**DMX-12** 41.1 mm (1.62 in) **DMX-12B** 34.8 mm (1.37 in)

Radiation Shield

Material	Non Nickel Plated OFHC Copper
Attachment	Threaded
Optical Access	0, 2 (customer specified)

Cryostat Footprint

Overall Length	566 mm (22.29 in)
Motor Housing Diameter	114 mm (4.5 in)
Rotational Clearance	200 mm (8 in) with “G” Configuration

Cryocooler Model		DE-202AI		DE-202A(T)I		DE-202PI		DE-202SI	
	Frequency	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz
Base Temperature		<9K	<9K	<9K	<9K	<5.5K	<5.5K	<4.2K	<4.2K
Cooling Capacity*	4.2K	-	-	-	-	-	-	0.1W	0.08W
	10K	0.5W	0.4W	0.7W	0.56W	1W	0.8W	1.2W	1W
	20K	2.5W	2W	3.7W	3W	3.5W	2.8W	4W	3.2W
	77K	4W	3.2W	6W	4.8W	3.5W	2.8W	4W	3.2W
Radiation Shield Cooling Capacity		10W	8W	15W	12W	10W	8W	10W	8W
Cooldown Time	20K	50 min	60 min	35 min	42 min	60 min	72 min	60 min	72 min
	Base Temperature	70 min	84 min	50 min	60 min	90 min	108 min	90 min	108 min
Compressor Model		ARS-4HW		ARS-4HW		ARS-4HW		ARS-4HW	
Typical Maintenance Cycle		12,000 hours		12,000 hours		12,000 hours		12,000 hours	

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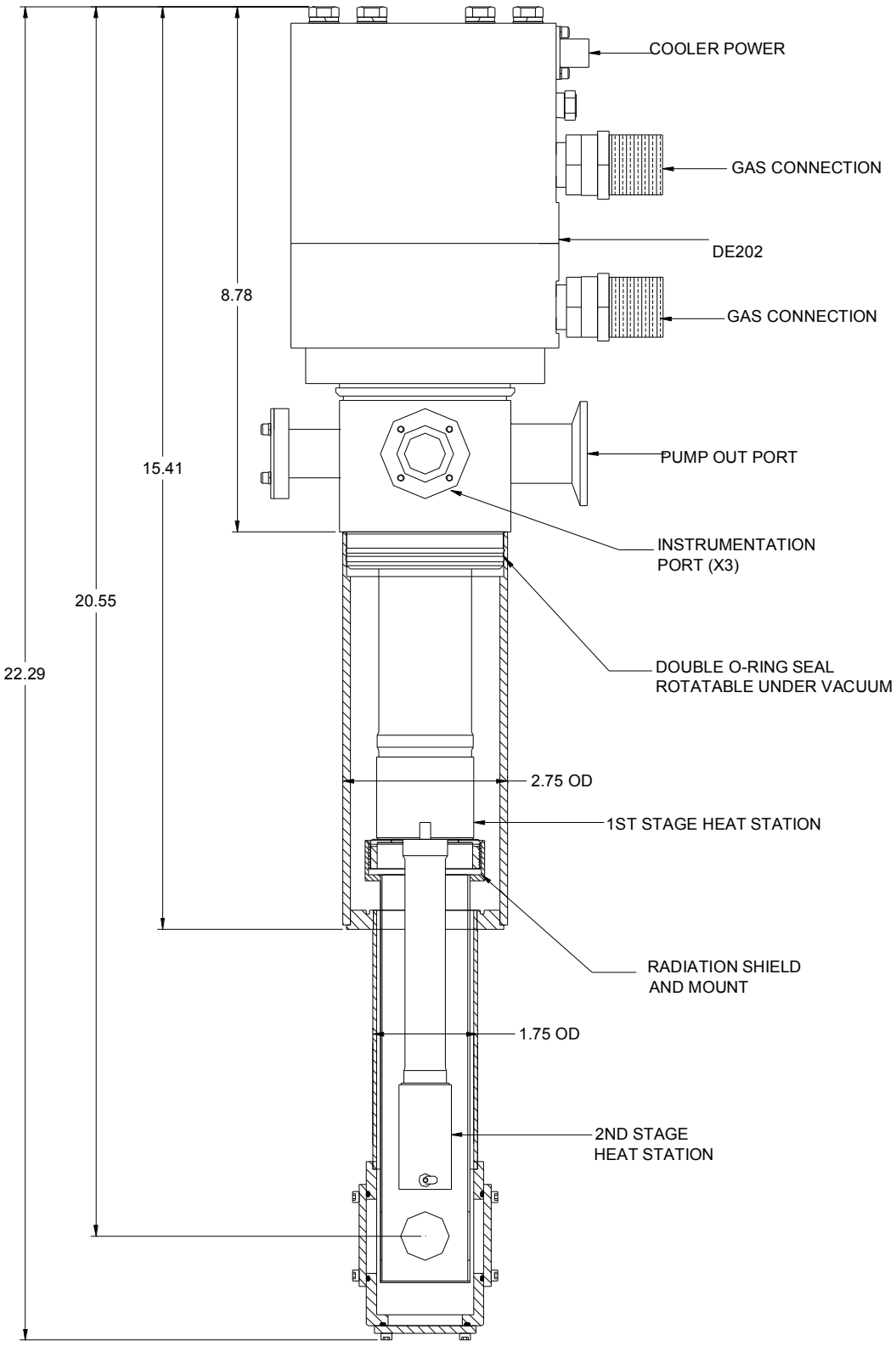
DE202*I-DMX-1SS Outline Drawing



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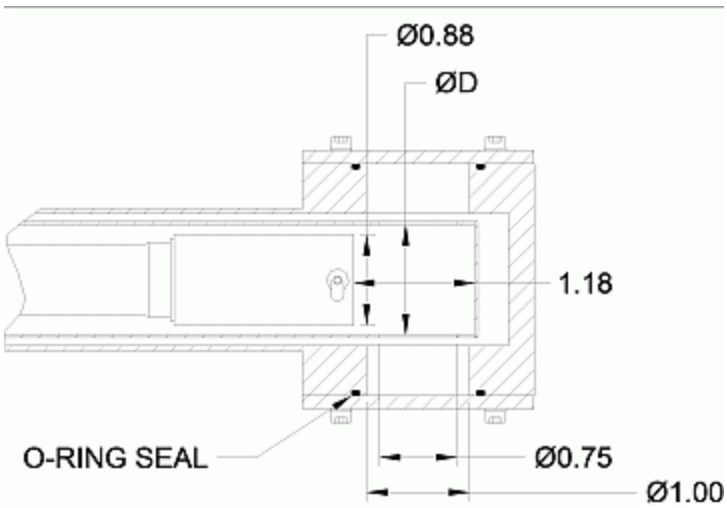
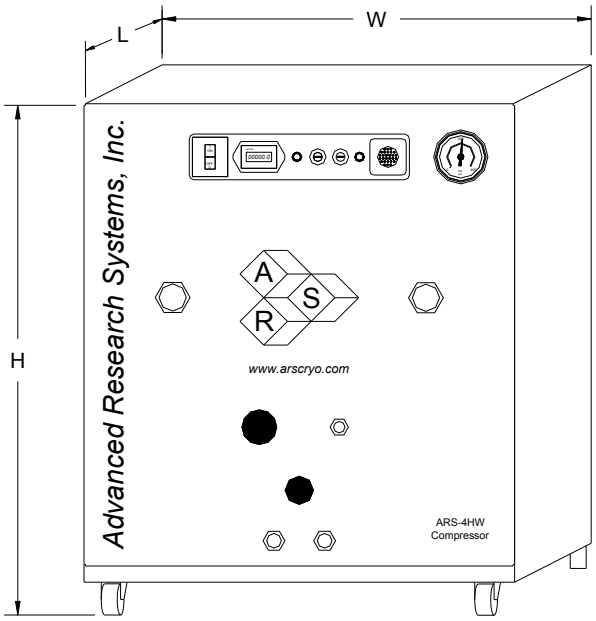
Sample Space



ARS-4HW Compressor



Compressor Model		ARS-4HW	
	Frequency	60 Hz	50 Hz
Standard Voltage	Min	208 V	190 V
	Max	230 V	210 V
Transformer Options	10%		220 V, 230 V
	15%		240 V
Power Usage	Single Phase	3.6 kW	3.0 kW
Refrigerant Gas		99.999% Helium Gas, Pre-Charged	
Noise Level		60 dBA	
Ambient Temperature		12 - 40 C (54 - 104 F)	
Cooling Water	Consumption	2.3 L / min (0.6 Gal. / min)	
	Temperature	10 - 35 C (50—95 F)	
	Connection	3/8 in. Swagelok Fitting	
Dimensions:	L	483 mm (19 in)	
	W	434 mm (17.1 in)	
	H	516 mm (20.3 in)	
Weight		72 kg (160 lbs)	
Typical Maintenance Cycle		12,000 hours	
Water Recirculation Option		CoolPac Compatible	