Optical Cryostat — High Power

The **CS204*I-FMX-1SS** is our standard intermediate cooling power cryostat for optical and electrical measurements. This high performance system offers and all stainless steel constructed vacuum shroud along with a welded stainless steel instrumentation skirt. This system is capable of achieving vacuum levels of 10^{-7} Torr with an appropriate vacuum system.

Applications

- Optical
- Raman
- UV, VIS, IR
- FTIR
- Electro & Photoluminescence
- Resistivity/Hall Probe Experiments
- Diamond Anvil Cell
- Magneto-Optical
- PITS / DLTS
- Thermal, Electrical and Magnetic Susceptibility
- Magneto Optical Kerr Effect (MOKE)

Features

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

Typical Configuration

- Cold head (DE-204AI)
- Compressor (ARS-4HW)
- 2 Helium Hoses
- Stainless Steel vacuum shroud with 5 window ports for optical and electrical measures Nickel Plated OFHC Copper Radiation Shield.
- 2 High purity quartz windows
- Instrumentation for temperature measurement and control:
  - 10 pin hermetic feed through
  - 50 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

Options and Upgrades

- 4K Coldhead (0.2W @ 4.2K)
- 5.5K Coldhead (2W @ 10K)
- 450K High Temperature Interface
- 800K 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)

The above picture shows the FMX-1SS Vacuum Shroud.

The above picture shows a coldhead, vacuum shroud, and radiation shield.

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Cooling Technology

DE-204	Closed Cycle Cryocooler
Refrigeration Type	Pneumatically Driven GM Cycle
Liquid Cryogen Usage	None, Cryogen Free

Temperature*

DE-204AI	< 9K - 350K
DE-204SI	< 4K - 350K
DE-204PI	< 5.5K - 350K
With 800K Interface	(Base Temp + 2K) - 700K
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	41 mm (1.63 in.)
Height	39 mm (1.55 in.)
Sample Holder Attachment	1/4 - 28 screw
Sample Holder	www.arscryo.com/Products/SampleHolders.html

Optical Access

Window Ports	5 - 90° Apart
Diameter	41 mm (1.63 in)
Clear View	32 mm (1.25 in)
#/F	1
Window Material	www.arscryo.com/Products/WindowMaterials.html

Temperature Instrumentation and Control (Standard)

Heater	50 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	3
Instrumentation Wiring	Contact sales staff for options

Vacuum Shroud

Material	Welded, Stainless Steel
Length	338 mm (13.3 in)
Diameter	80 mm (3.15 in) at the sample space
Width	63.5 mm (2.5 in) at the sample space

Radiation Shield

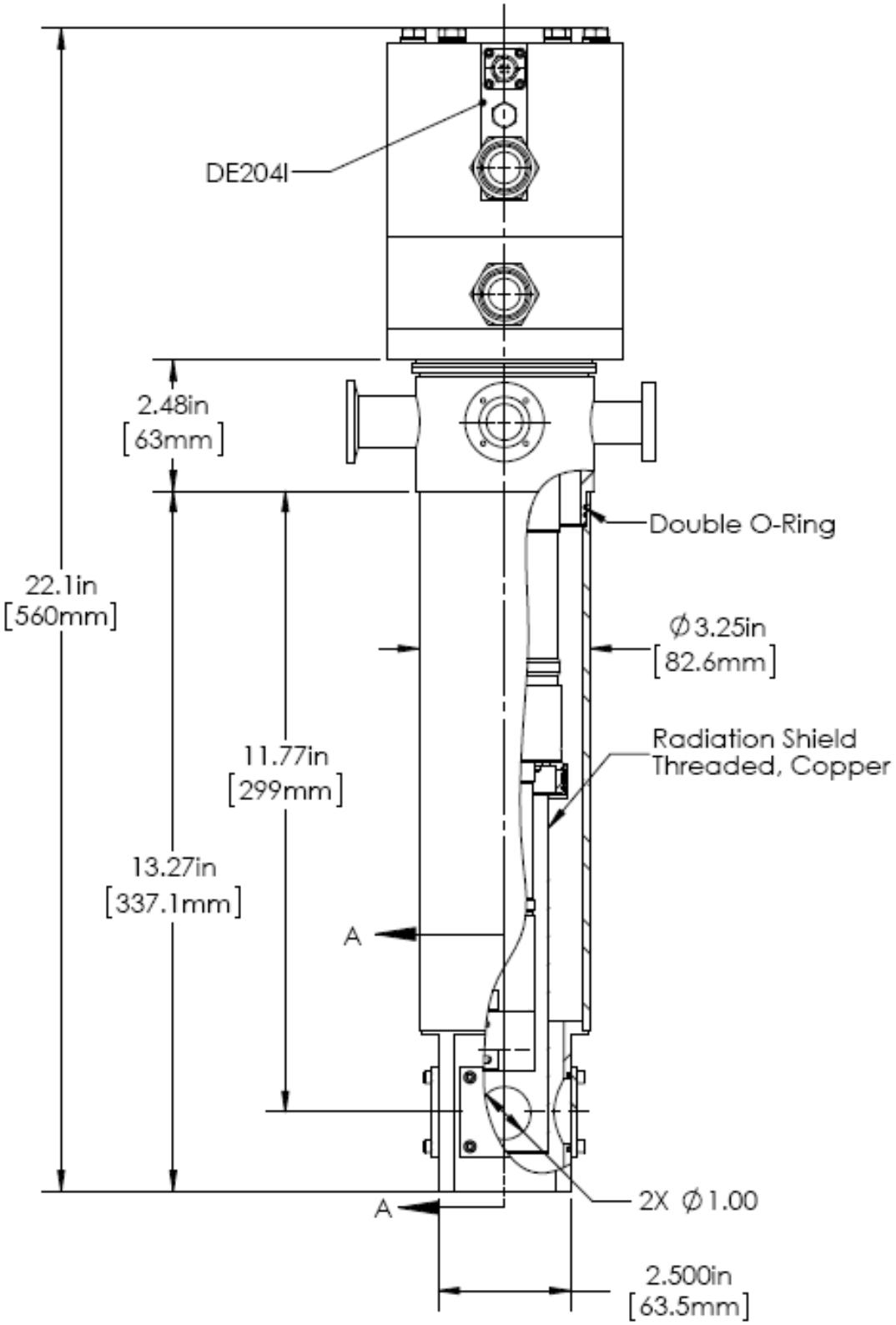
Material	OFHC Copper, Nickel Plated
Attachment	Threaded
Optical Access	0, 2, or 4 (customer specified)

Cryostat Footprint

Overall Length	576 mm (22.67 in)
Motor Housing Diameter	114 mm (4.5 in)
Rotational Clearance	200 mm (8 in) with “G” Configuration

Cryocooler Model		DE-204AI		DE-204A(T)I		DE-204PI		DE-204SI	
	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	-	-	-	-	-	-	0.2W	0.16W
	10K	2W	1.6W	2.7W	2.2W	3.5W	2.8W	4W	3.2W
	20K	9W	7.2W	12W	9.6W	8W	6.4W	8W	6.4W
	77K	17W	14W	23W	18.4W	14W	11W	14W	11W
Radiation Shield Cooling Capacity		18W	14W	24W	19W	18W	14W	18W	14W
Cooldown Time	20K	30 min	36 min	25 min	30 min	40 min	48 min	40 min	48 min
	Base Temperature	60 min	72 min	50 min	60 min	80 min	102 min	90 min	108 min
Compressor Model		ARS-4HW		ARS-4HW		ARS-4HW		ARS-4HW	
Typical Maintenance Cycle		12,000 hours		8,000 hours		12,000 hours		12,000 hours	

DE204*I-FMX-1SS Outline Drawing



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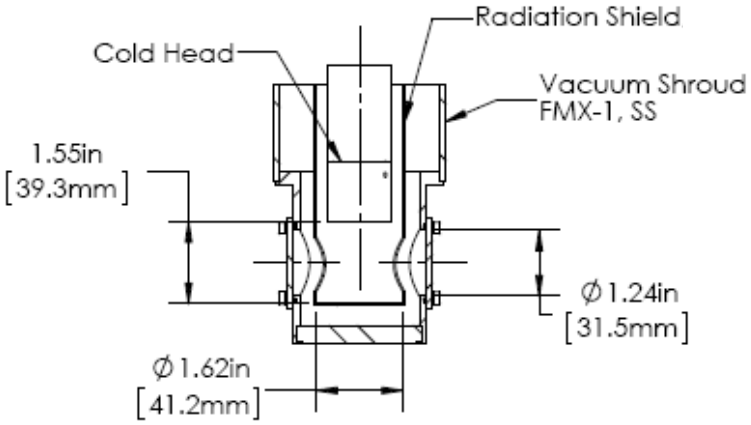
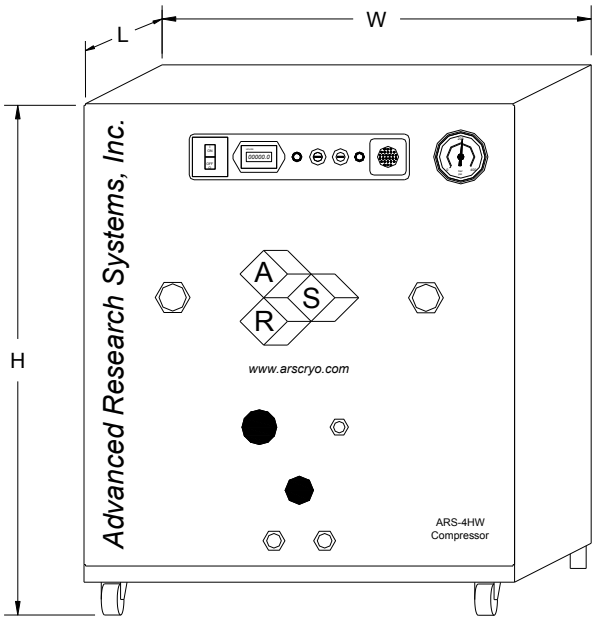
Sample Space



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			
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	

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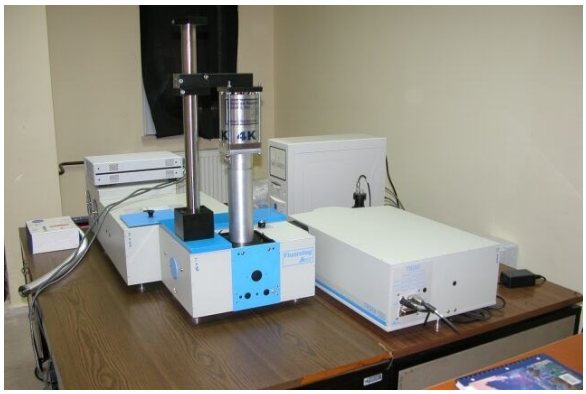
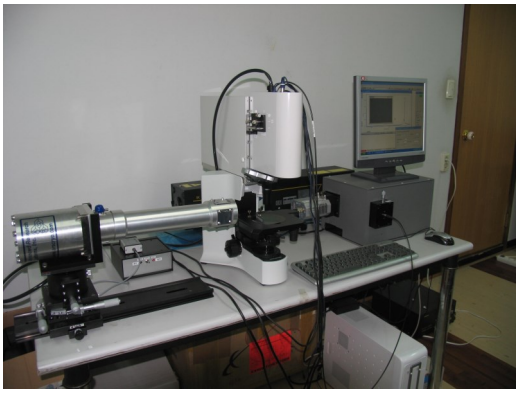
Optical Spectroscopy



CS202SE-DMX1-AL Installed on Jobyn Yvon Spectrometer.

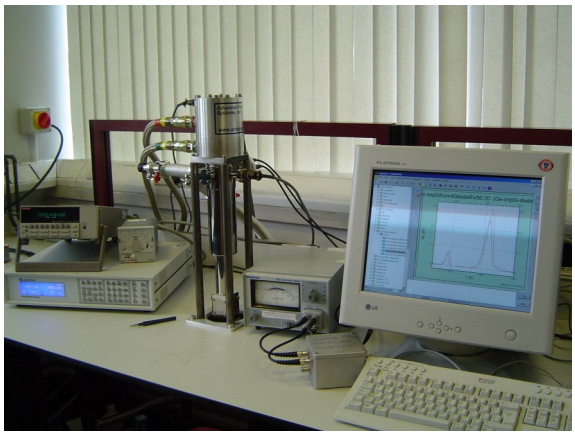
Courtesy: Prof. Dr. Suleyman, Gazi University



Micro PL. Adjustable sample to window distance for short focal length experiments.

Courtesy: Mr. DongHyun Kim

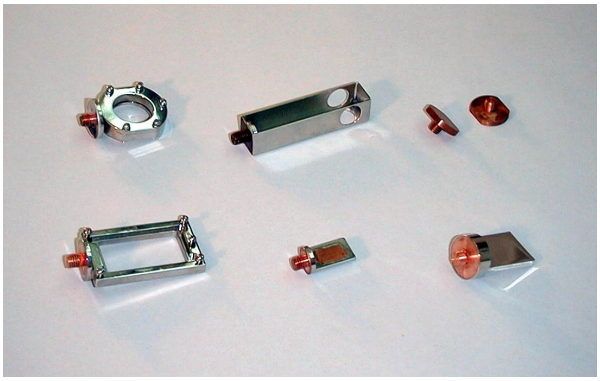
High Performance Stainless Steel Upgrade



Displex installed for spectroscopy.

Courtesy: Dr. M. Gad , Sheffield Hallam University

Optional Sample Holders



A wide range of sample holders are available for large bulk, thin film or liquid samples. Backscattering, reflection and transmission experiments.

See selection guide for more details.