



# Optical Cryostat - Moderate Power

The CS204\*I-FMX-4SS provides the same high performance as our CS204\*I-FMX-1SS with all stainless steel construction and welded stainless steel instrumentation skirt, but provides a larger than standard sample space. The vacuum shroud comes standard with four window ports, and a fifth port can be added at the top. The system is powered by our DE-204 series of closed cycle cryocoolers. These liquid helium free cryostats use a pneumatically drive Gifford-McMahon cycle to cool the sample.

## Applications

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

## Features

- Cryogen Free, Moderate Power
- Welded Stainless Steel Construction
- Large clear view optical windows (1.5 in)
- Large sample viewing angle for optical collection (F/1.25)
- Can operate in any orientation
- Fully customizable

## Typical Configuration

- Cold head (DE-204AI)
- Compressor (ARS-4HW)
- 2 Helium Hoses
- Stainless Steel vacuum shroud with 4 window ports for optical and electrical measurements.
- Nickel Plated OFHC Copper Radiation Shield.
- 2 High purity quartz windows
- Instrumentation for temperature measurement and control:
  - 10 pin hermetic feed through
  - 50 ohm thermfoil heater
  - Silicon diode sensor curve matched to ( $\pm 0.5K$ ) for control
  - Calibrated silicon diode sensor ( $\pm 12$  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 (3.5W @ 10K)
- High Temperature Interface (450K or 800K)
- 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-4SS 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	60 mm (2.38 in.)
Height	90 mm (3.54 in.)
Sample Holder Attachment	1/4 - 28 screw
Sample Holder	<a href="http://www.arscryo.com/Products/SampleHolders.html">www.arscryo.com/Products/SampleHolders.html</a>

## Optical Access

Window Ports	4 - 90° Apart
Diameter	50.8 mm (2 in)
Clear View	38.1 mm (1.5 in)
#/F	1.25
Window Material	<a href="http://www.arscryo.com/Products/WindowMaterials.html">www.arscryo.com/Products/WindowMaterials.html</a>

## 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	378 mm (14.88 in)
Diameter	83 mm (3.25 in) at the sample space
Width	108 mm (4.25 in) at the sample space

## Radiation Shield

Material	OFHC Copper, Nickel Plated
Attachment	Bolt On
Optical Access	0, 1, 2, 3, or 4 (customer specified)

## Cryostat Footprint

Overall Length	600 mm (23.7 in)
Motor Housing Diameter	114 mm (4.5 in)
Rotational Clearance	200 mm (8 in) with "G" Configuration

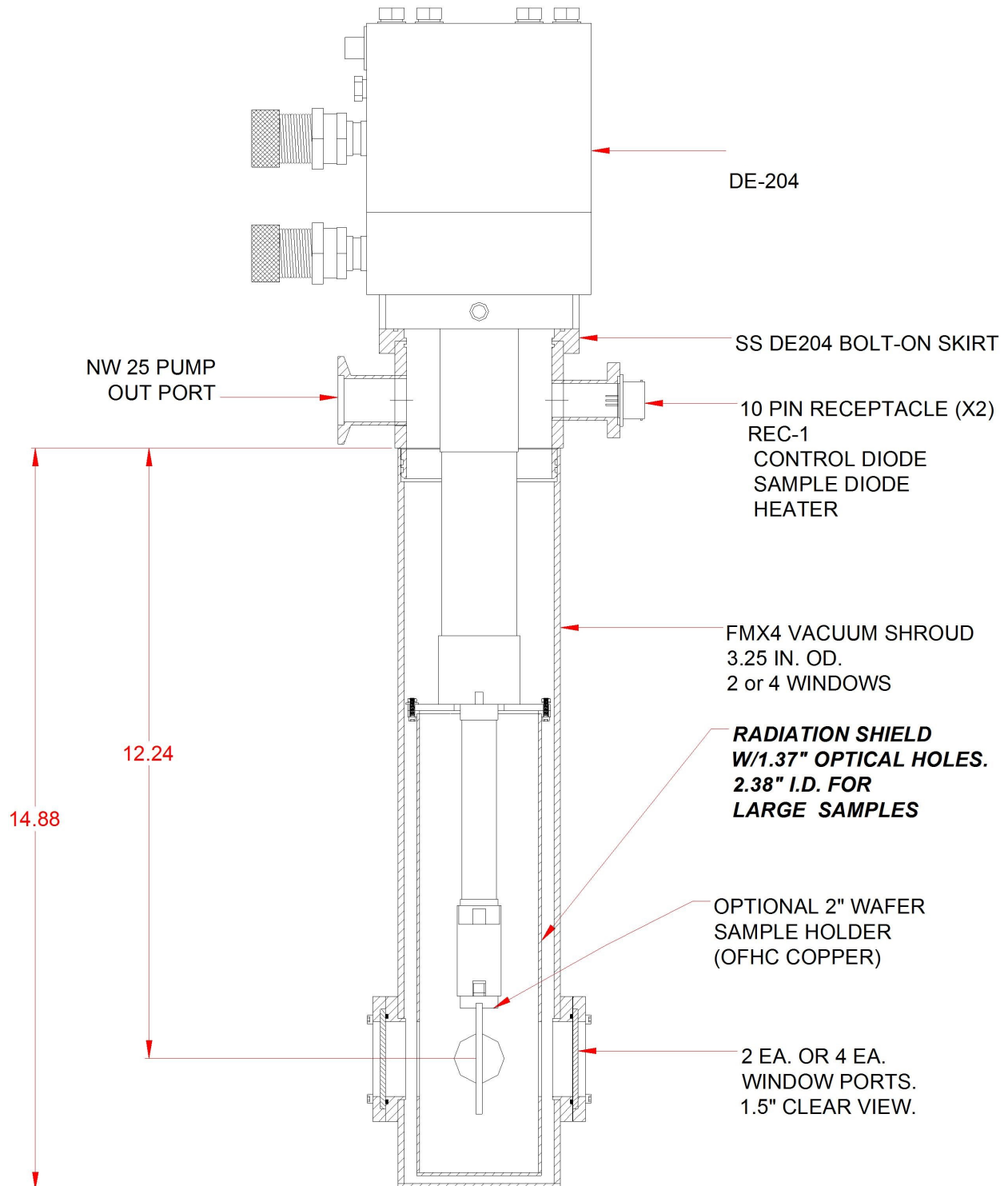
## Cryocooler Model

		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		12,000 hours		12,000 hours		12,000 hours	



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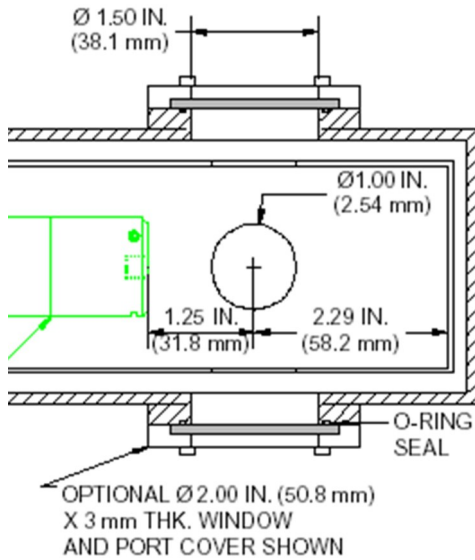
DE204\*I-FMX-1SS Outline Drawing



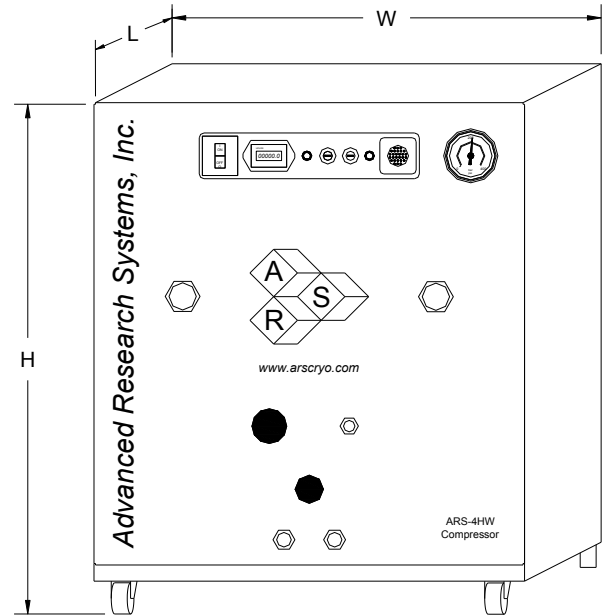


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Sample Space



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	