



Closed Cycle Cryostat for Para Hydrogen Experiments

The ARS Parahydrogen Cryostat, powered by the CS-204AE cryocooler, offers robust and convenient generation of parahydrogen in volumes up to 4 Standard Liters per-minute 500-750psi in the adsorber chamber.

Hydrogen is precooled on 1st stage to 30K– 40K, then it enters the <10K– 25K chamber to interact with an iron oxide or charcoal catalyst. The new parahydrogen exits the chamber through a short tube directly connected to the exit fitting for use in the end user's experiments.

Features

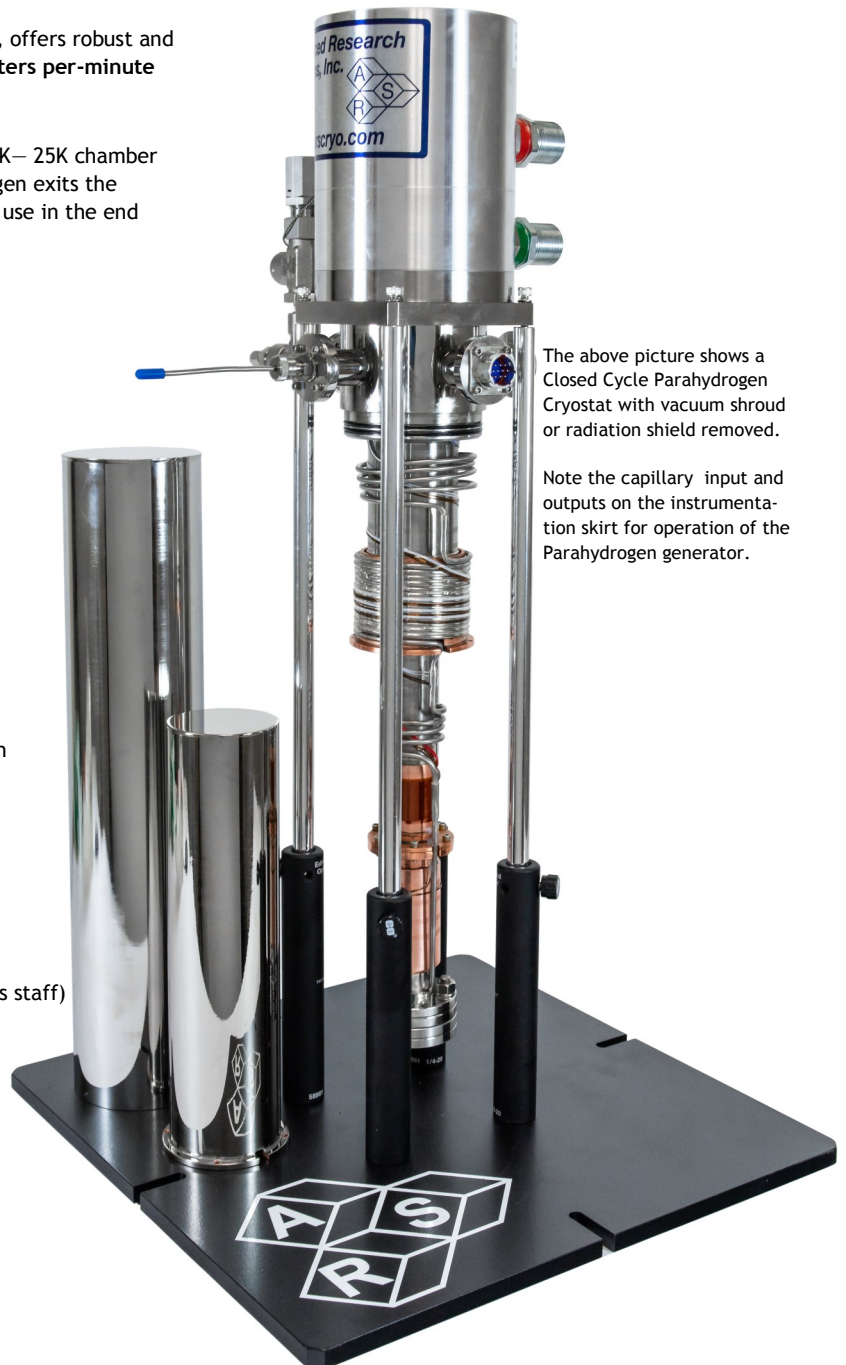
- Cryogen Free
- Can operate in any orientation
- Fast cooldown and generation times

Typical Configuration

- Cold head (DE-204AE)
- Compressor (ARS-4HW)
- 2 Helium Hoses
- Aluminum vacuum shroud
- Aluminum radiation shield
- Instrumentation for temperature measurement and control:
 - 10 pin hermetic feed through
 - 36 ohm thermofoil heater
 - Silicon diode sensor curve matched to ($\pm 0.5K$) for control
 - Calibrated silicon diode sensor (± 12 mk) with 4 in. free length for accurate sample measurement.
- Temperature Controller

Options and Upgrades

- 4K Cold head (0.2W @ 4.2K)
- 5.5K Cold head (2W @ 10K)
- Turbo upgrade for faster cooldown times
- Custom temperature sensor configuration (please contact our sales staff)
- Custom wiring configurations (please contact our sales staff)
- Air cooled chiller and compressors available



The above picture shows a Closed Cycle Parahydrogen Cryostat with vacuum shroud or radiation shield removed.

Note the capillary input and outputs on the instrumentation skirt for operation of the Parahydrogen generator.



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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-204AE	< 9K - 350K
DE-204SE	< 4.2K - 350K
DE-204PE	< 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	

Adsorber Volume

Diameter	22.2 mm (0.87 in.)
Height	85.5 mm (3.25 in.)
Adsorber Access	Modified Half Nipple CF Flange
Capillary Tubing Size	1/8" Inch, inlet and Outlet Max 750 PSI

Optical Access

Window Ports	N/A
Diameter	N/A
Clear View	N/A
#/F	N/A
Window Material	N/A

Temperature Instrumentation and Control (Standard)

Heater	50 ohm Thermofoil Heater anchored
Control Sensor	Curve Matched Silicon Diode installed on the cold tip
Sample Sensor	Calibrated Silicon Diode with free

Contact ARS for other options

Instrumentation Access

Instrumentation Skirt	Bolt-On, Aluminum
Pump out Port	1 - NW 25
Instrumentation Ports	2
Instrumentation Wiring	Contact sales staff for options

Vacuum Shroud

Material	Aluminum
Length	385 mm (15.19 in)
Diameter	82.5 mm (3.25 in)
Width	32.5 mm (3.25 in)

Radiation Shield

Material	Aluminum
Attachment	Bolt On
Optical Access	N/A

Cryostat Footprint

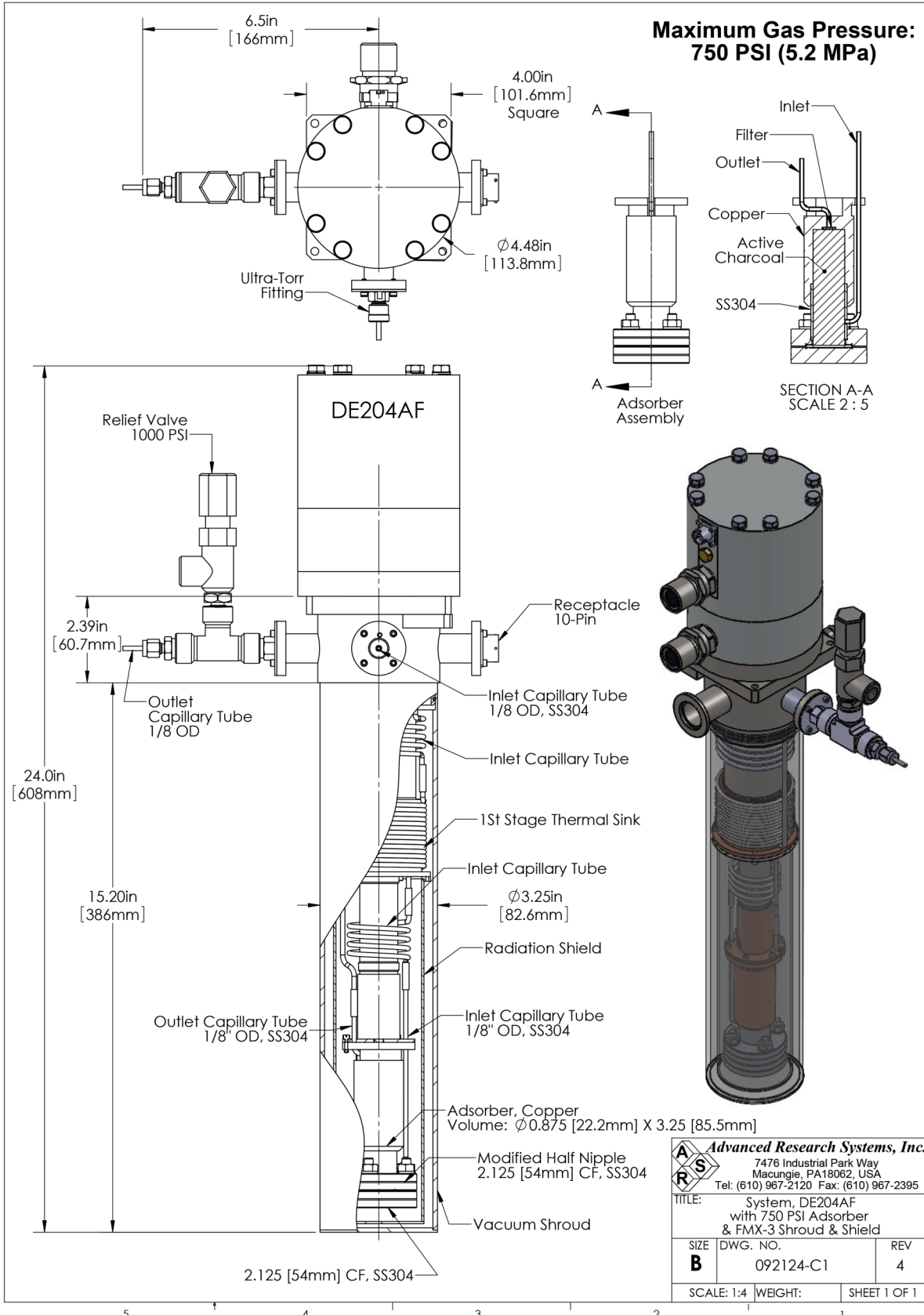
Overall Length	608 mm (24 in)
Motor Housing Diameter	114 mm (4.5 in)
Rotational Clearance	N/A

Cryocooler Model		DE-204AE		DE-204A(T)E		DE-204PE		DE-204SE	
		60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz
Base Temperature	Frequency	<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	



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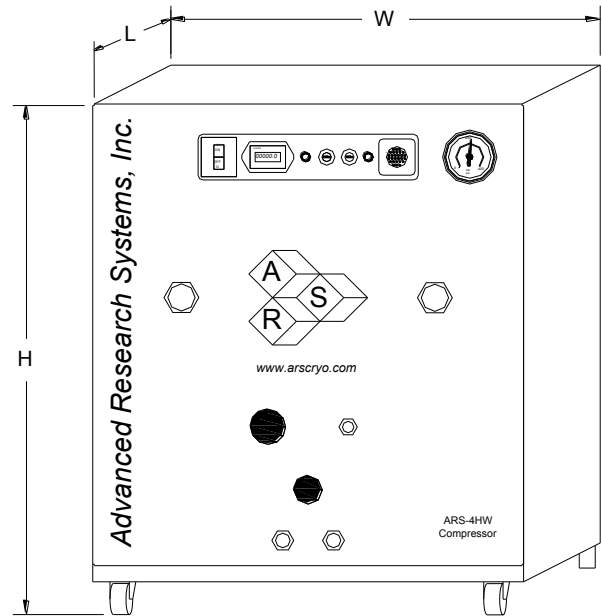
DE204AE-FMX-3AL Para Hydrogen Customer Drawing





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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,	