ARS Cryocooler Series

Advanced Research Systems, Inc. manufactures its own series of Closed Cycle Solvay Cryocoolers. These are pneumatically driven cryocoolers that are offered as both single and two-stage units.

Solvay Cryocoolers are a good alternative to Liquid Helium (a nonrenewable resource) for cooling applications. These cryocoolers are environmentally friendly and economical.

The single stage units are used for applications where fast cooldown and high cooling capacities are needed. These systems have been optimized for high cooling capacities above 30 K. The single stage units reach base temperatures of < 25 K. The cooling power at 77 K ranges from **16 W** to **240 W.**

The above picture shows the ARS Cryocooler Family

The two-stage units are designed for applications where very low temperatures are needed. These system come available at 10 K, < 5.5 K, and < 4 K cryocoolers. The cooling power at 4.2 K are **0.1 W**, **0.2 W, 1.1 W, 1.5W** and **1.65W**.

Features

- Cryogen Free
- Displex, Pneumatically driven Solvay, closed cycle cryocooler designed for low sample vibrations
- Simple, efficient design with only 3 moving components for high reliability
- Easy field maintenance with no need to break vacuum
- Low life cycle cost
- Water cooled compressor for quite and clean operation

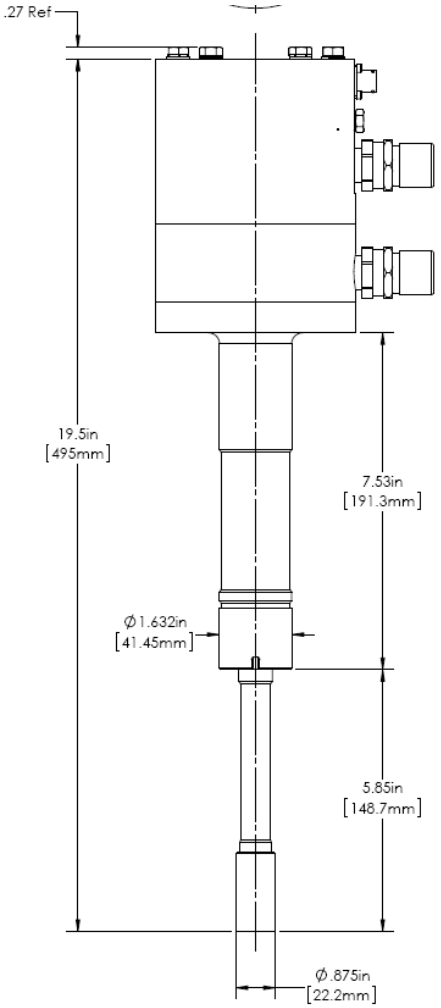
Standard Components

- Cold head (**DE102, DE104, DE110, DE202, DE204, DE210 and DE215**)
- Compressor (**ARS-2HW, ARS-4HW, ARS-10HW and ARS-20HW)**
- 2 Helium Hoses: available from 10 ft. to 50 ft. lengths

Options and Upgrades

- Turbo upgrade for faster cooldown
- Multiple heads operating with one compressor

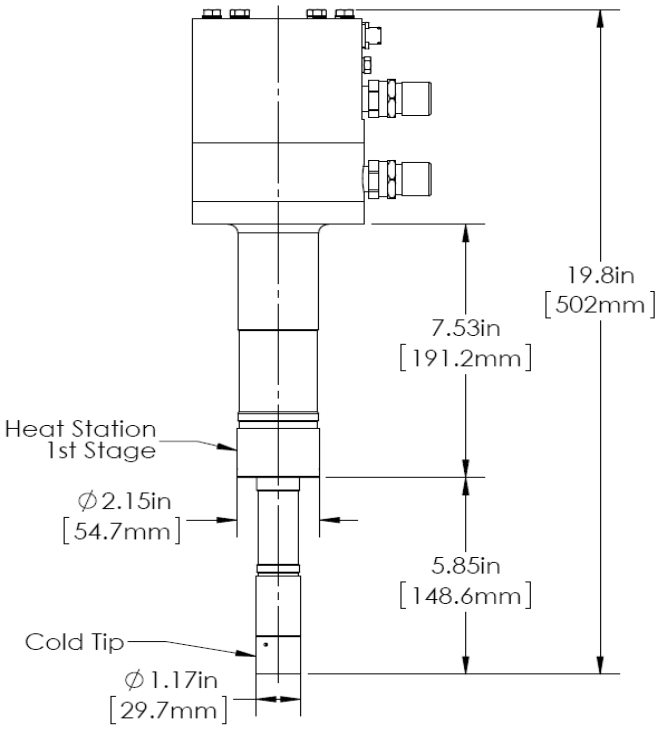
DE-202 Cryocooler

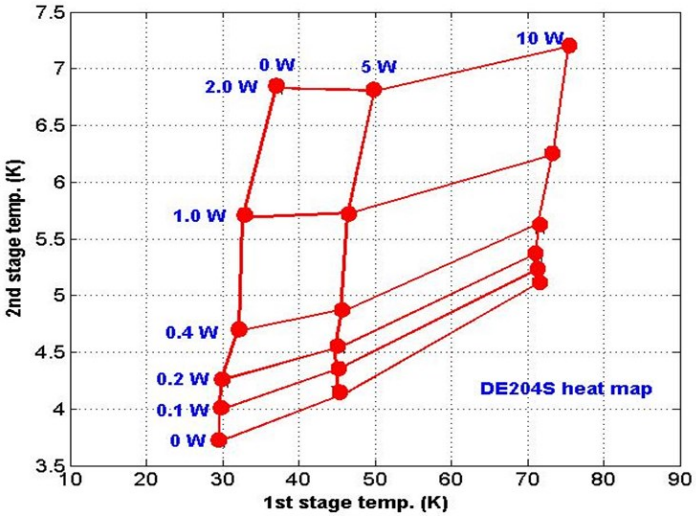


Cryocooler Model		DE-202A		DE-202P		DE-202S	
Base Temperature		< 9 K		< 5.5 K		< 4.2 K	
Power Frequency		60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz
Cooling Capacity*	2nd Stage	0.5 W @ 10 K	0.4 W @ 10 K	1.0 W @ 10 K	0.8 W @ 10 K	0.1 W @ 4.2 K	0.08 W @ 4.2 K
	1st Stage	10 W @ 77 K	8 W @ 77 K	10 W @ 77 K	8 W @ 77 K	10 W @ 77 K	8 W @ 77K
Cooldown Time		70 min to 10 K	84 min to 10 K	90 min to 6 K	108 min to 6 K	90 min to 4.2 K	108 min to 4.2 K
Cryocooler Weight		7.1 kg (16 lbs)		7.1 kg (16 lbs)		7.1 kg (16 lbs)	
Compressor Model		ARS-4HW		ARS-4HW		ARS-4HW	
Power Consumption at Steady State		3.6 kW	3.0 kW	3.6 kW	3.0 kW	3.6 kW	3.0 kW
Cooling Water Flow Rate		0.6 gal/min (T < 75°F, 25 psig supply)		0.6 gal/min (T < 75°F, 25 psig supply)		0.6 gal/min (T < 75°F, 25 psig supply)	
Compressor Weight		72.6 kg (160 lbs)		72.6 kg (160 lbs)		72.6 kg (160 lbs)	

**Cooling Capacities are based on closed radiation shield. Actual sample temperature depends upon final configuration, experimental and parasitic heat loads. Ambient and cooling water temperature.*

DE-204 Cryocooler





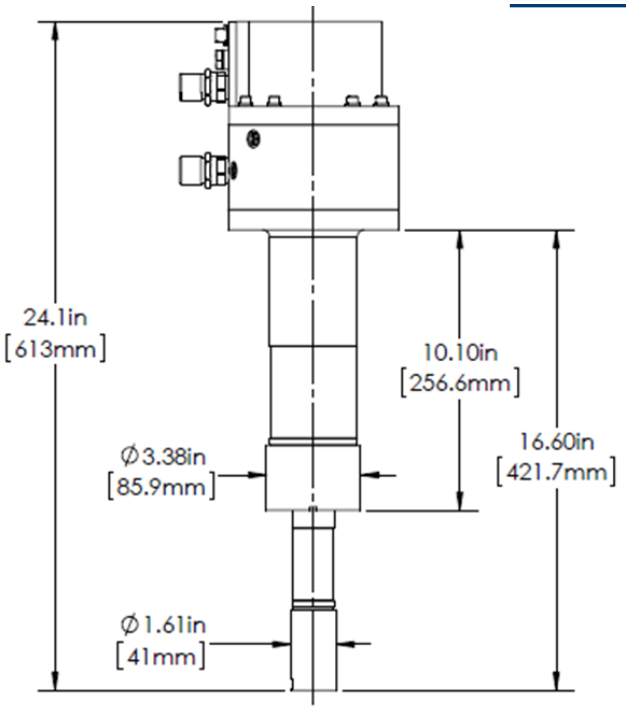
DE204S Cooling power map. Simultaneous loading. 60 Hz.

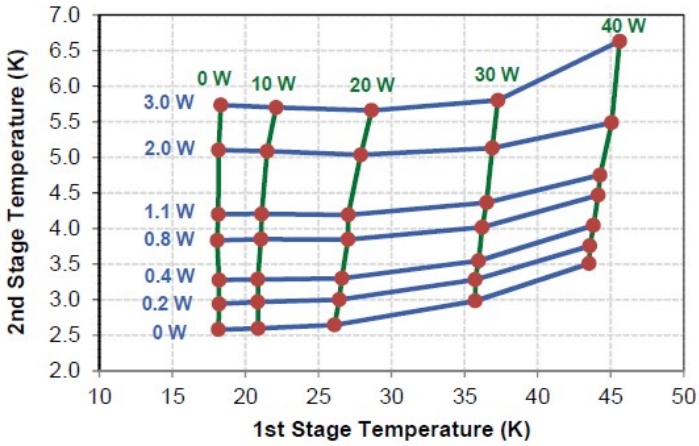
Note: Cooling power map is for reference only

Cryocooler Model		DE-204A		DE-204P		DE-204S	
Base Temperature		< 9 K		< 5.5 K		< 4.2 K	
Power Frequency		60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz
Cooling Capacity*	2nd Stage	2 W @ 10 K	1.6 W @ 10 K	3 W @ 10 K	2.4 W @ 10 K	0.2 W @ 4.2 K	0.16 W @ 4.2 K
	1st Stage	18 W @ 77 K	14 W @ 77 K	18 W @ 77 K	14 W @ 77 K	18 W @ 77 K	14 W @ 77K
Cooldown Time		60 min to 10 K	72 min to 10 K	80 min to 6 K	96 min to 6 K	90 min to 4.2 K	108 min to 4.2 K
Cryocooler Weight		7.1 kg (16 lbs)		7.1 kg (16 lbs)		7.1 kg (16 lbs)	
Compressor Model		ARS-4HW		ARS-4HW		ARS-4HW	
Power Consumption at Steady State		3.6 kW	3.0 kW	3.6 kW	3.0 kW	3.6 kW	3.0 kW
Cooling Water Flow Rate		0.6 gal/min (T < 75˚F, 25 psig supply)		0.6 gal/min (T < 75˚F, 25 psig supply)		0.6 gal/min (T < 75˚F, 25 psig supply)	
Compressor Weight		72.6 kg (160 lbs)		72.6 kg (160 lbs)		72.6 kg (160 lbs)	

**Cooling Capacities are based on closed radiation shield. Actual sample temperature depends upon final configuration, experimental and parasitic heat loads. Ambient and cooling water temperature.*

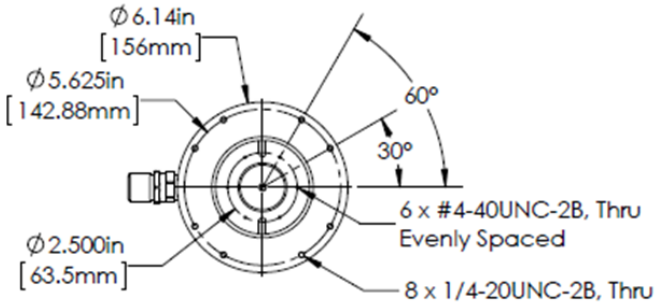
DE-210 Cryocooler





DE210Sg Cooling power map. Simultaneous loading.. 50/60 Hz.

Note: Cooling power map is for reference only

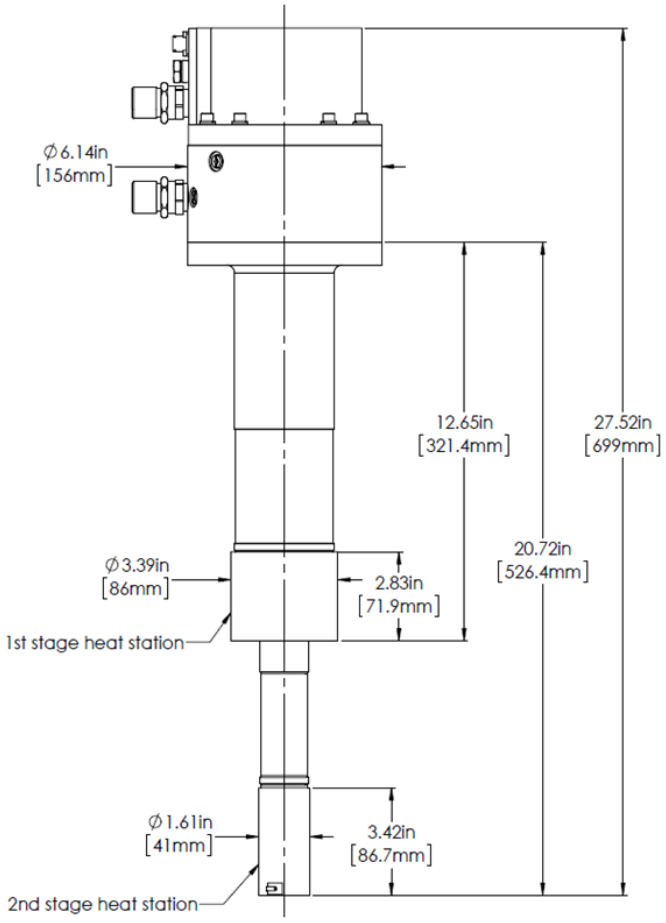


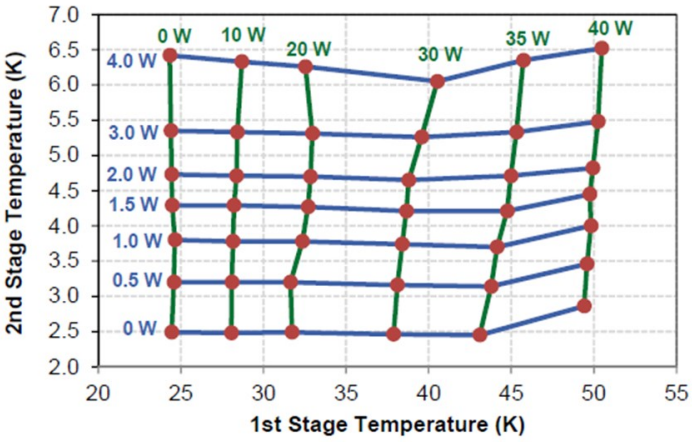
DE-210S cold head with the Universal Mounting Arrangement.

Cryocooler Model	DE210A		DE210Sg	
Base Temperature, 2nd Stage	< 9K		< 2.7K	
Power Frequency	60 Hz	50 Hz	60 Hz	50 Hz
Cooling Capacity, 2nd Stage Compressor dependent	4W @10K		1.1W @ 4.2K	
Cooling Capacity, 1st Stage	60W @ 77K		20W @ 27K	
Cooldown Time	70 Min. to 10K		60 Min to 4.2K	
Cryocooler Weight	13.6 kg (30 lbs)		13.6 kg (30 lbs)	
Typical Maintenance – Cryocooler	10,000 hours		10,000 hours	
Compressor Model	ARS-10HW		ARS-10HW	

**Cooling Capacities are based on closed radiation shield. Actual sample temperature depends upon final configuration, experimental and parasitic heat loads. Ambient and cooling water temperature.*

DE-215S Cryocooler





DE215S (ARS10) Cooling power map. Simultaneous loading. 50/60 Hz.

Note: Cooling power map is for reference only

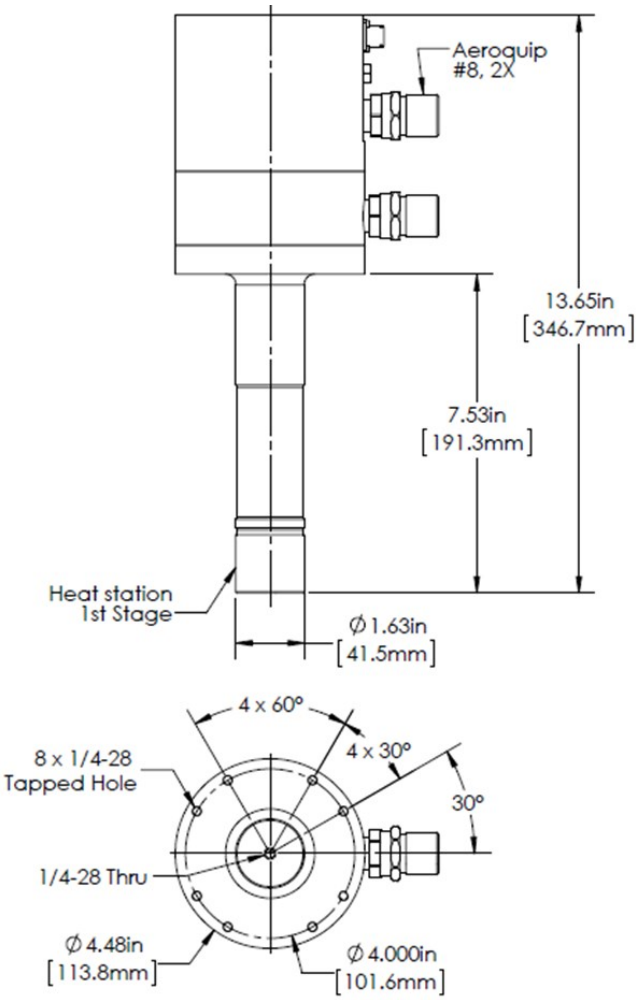
DE-215S cold head with the Universal Mounting Arrangement for drop in replacement

Cryocooler Model	DE215S			
Base Temperature, 2nd Stage	< 2.7K			
Power Frequency	60 Hz	50 Hz	60 Hz	50 Hz
Cooling Capacity, 2nd Stage	1.5W @ 4.2K	1.5W @ 4.2K	1.65W @ 4.2K	1.65W @ 4.2K
Cooling Capacity, 1st Stage	30W @ 45K	25W @ 45K	40W @ 45K	35W @ 45K
Cooldown Time to 4.2K	70 min.		70 min.	
Cryocooler Weight	13.6 kg (30 lbs)			
Typical Maintenance	10,000 hours			
Compressor Model	ARS-10HW		ARS-20HW	

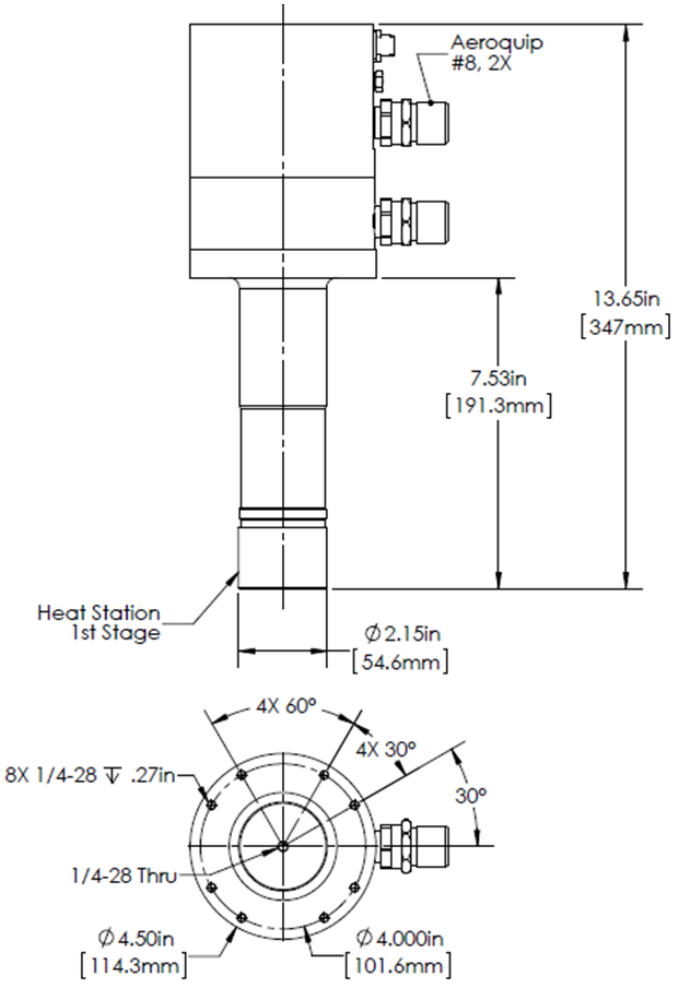
**Cooling Capacities are based on closed radiation shield. Actual sample temperature depends upon final configuration, experimental and parasitic heat loads. Ambient and cooling water temperature.*

ARS Cryocooler Series

DE102 Cryocooler



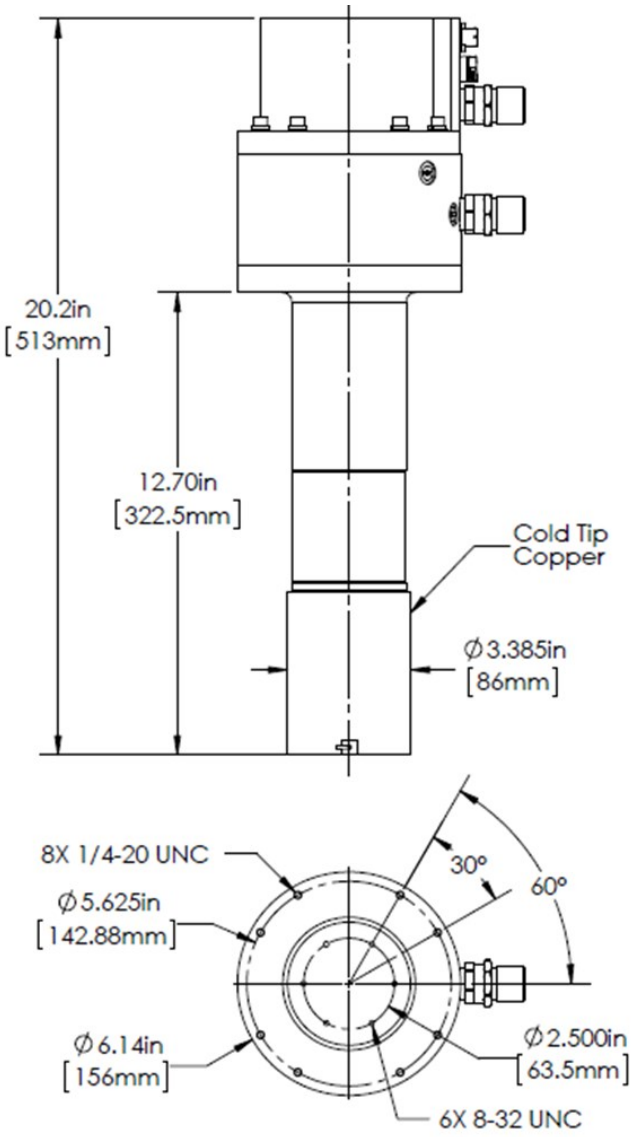
DE104 Cryocooler

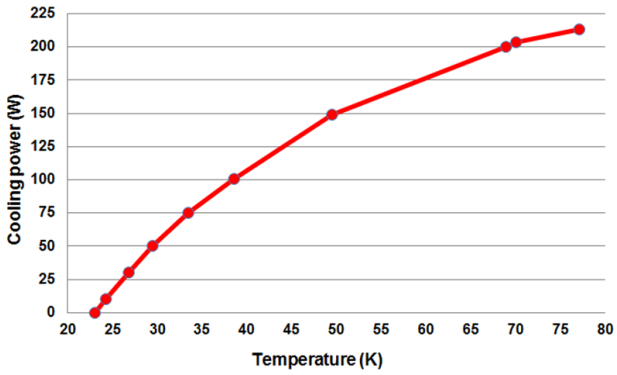


Cryocooler Model		DE-102F	DE-102(T)F	DE-104F	DE-104(T)F
Frequency		60 Hz	60 Hz	60 Hz	60 Hz
Base Temperature		<25K	<25K	<25K	<25K
Cooling Capacity*	77K	16W	25W	35W	60W
	150K	25W	38W	50W	90W
Maximum Cylinder Temperature		355K	355K	355K	355K
Cooldown Time	77K	20 min	15 min	15 min	10 min
Cryocooler Weight		6 kg (13 lbs)	6 kg (13 lbs)	7.5 kg (17 lbs)	7.5 kg (17 lbs)
Compressor Model		ARS-4HW	ARS-4HW	ARS-4HW	ARS-4HW
Typical Maintenance Cycle		12,000 hours	8,000 hours	12,000 hours	8,000 hours

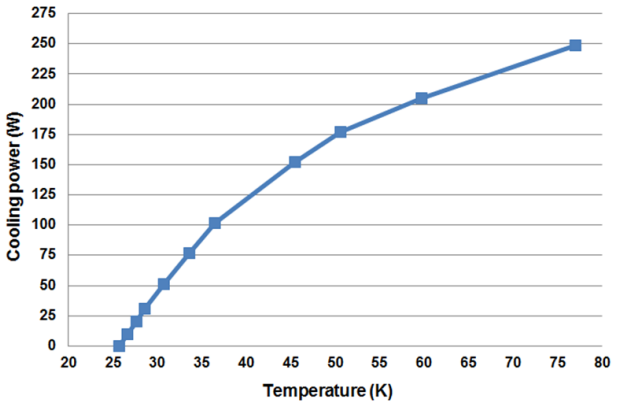
**Cooling Capacities are based on closed radiation shield. Actual sample temperature depends upon final configuration, experimental and parasitic heat loads. Ambient and cooling water temperature.*

DE110 Cryocooler





DE110 Cooling power (ARS-20, 60 Hz)



DE110 Cooling power (ARS-20, 60 Hz)

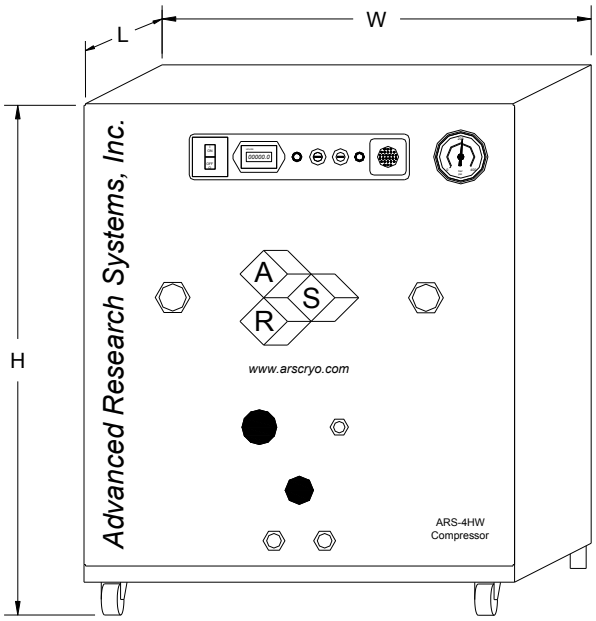
Cryocooler Model	DE-110	
Base Temperature, 2nd Stage	< 25K	
Power Frequency	60/50 Hz	60/50 Hz
Cooling Capacity, Watts @ 77K	200W	240W
Cooldown Time to 77K	10 Min	10 Min
Cryocooler Weight	13 kg (28 lbs)	
Typical Maintenance	12,000 hours	
Compressor Model	ARS-10HW	ARS-20HW

**Cooling Capacities are based on closed radiation shield. Actual sample temperature depends upon final configuration, experimental and parasitic heat loads. Ambient and cooling water temperature.*

ARS Cryocooler Series

CoolPac

ARS Compressors



Compressor Model		ARS-4HW		ARS-10HW		ARS-20HW	
Electrical	Frequency	60 Hz, 1 Phase	50 Hz, 1 Phase	60 Hz, 3 Phase	50 Hz, 3 Phase	60 Hz, 3 Phase	50 Hz, 3 Phase
Standard Voltage	Min	208 V	190 V	208 V	190 V	440 V	380 V
	Max	230 V	210 V	230 V	210 V	480 V	415 V
Transformer Options	10%		220 V, 230 V	440 V	380 V		
	15%		240 V	480 V	415 V		
Power Usage		3.6 kW	3.0 kW	7.7 kW	7.7 kW	11.6 kW	10.0 kW
Refrigerant Gas		99.999% Helium Gas, Pre-Charged		99.999% Helium Gas, Pre-Charged		99.999% Helium Gas, Pre-Charged	
Noise Level		60 dBA	60 dBA				
Ambient Temperature		12 - 40 C (54 - 104 F)		5 - 40 C (40—104 F)		5 - 40 C (40—104 F)	
Cooling Water	Consumption	2.3 L / min (0.6 Gal. /		5.7 L / min (1.5 Gal. / min)		8.5 L / min (2.25 Gal. / min)	
	Temperature	10 - 35 C (50—95 F)		< 20 C (68 F)		< 20 C (68 F)	
	Connection	3/8 in. Swagelok Fitting		1/2 in. Swagelok Fitting		1/2 in. Swagelok Fitting	
Dimensions:	W	483 mm (19 in)		483 mm (19 in)		521 mm (20.5 in)	
	L	434 mm (17.1 in)		533 mm (21 in)		622 mm (24.5 in)	
	H	516 mm (20.3 in)		617 mm (24.3 in)		851 mm (33.5 in)	
Weight		72 kg (160 lbs)		105 kg (230 lbs)		177 kg (390 lbs)	
Typical Maintenance Cycle		30,000 hours		30,000 hours		30,000 hours	
Water Recirculation Option		CoolPac Compatible		Chiller Available		Chiller Available	