



Narrow Gap Magnet Cryostat: Non-Optical

The CS204*E-FMX-3AL offers a wide range of flexibility at a low cost, making it an excellent choice for most sample and device testing. This system is well suited for optical, electrical, and magnetic sample testing.

Applications

- Resistivity/Hall Probe Experiments
- Thermal, Electrical and Magnetic Susceptibility
- Heat Capacitance
- Seebeck Effect
- DLTS

Features

- Cryogen Free, Low Power
- Low cost aluminum construction
- Can operate in any orientation
- Fully customizable

Typical Configuration

- Cold head (DE-204AE)
- Compressor (ARS-4HW)
- 2 Helium Hoses
- Aluminum vacuum shroud with 4 window ports for electrical experiments (FMX-3)
- 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.
- Wiring for electrical experiments:
 - 10 pin hermetic feed through
 - 4 copper wires
- Sample holder for 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 a cryocooler with no vacuum shroud or radiation shield. A bulkhead with 2 SMA connectors are shown. This has the upgrade instrumentation skirt.



The above picture shows the vacuum shroud and radiation shield for the cryostat.



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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 | |

Sample Space

| | |
|--------------------------|--|
| Diameter | 60.2 mm (2.37 in.) |
| Height | 96.7 mm (3.81 in.) |
| Sample Holder Attachment | 1/4 - 28 screw |
| Sample Holder | www.arscryo.com/sample-holders |

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 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 | 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) at the sample space |
| Width | 32.5 mm (3.25 in) at the sample space |

Radiation Shield

| | |
|----------------|----------|
| Material | Aluminum |
| Attachment | Bolt On |
| Optical Access | N/A |

Cryostat Footprint

| | |
|------------------------|--------------------------------------|
| Overall Length | 602 mm (23.7 in) |
| Motor Housing Diameter | 114 mm (4.5 in) |
| Rotational Clearance | 200 mm (8 in) with "G" Configuration |

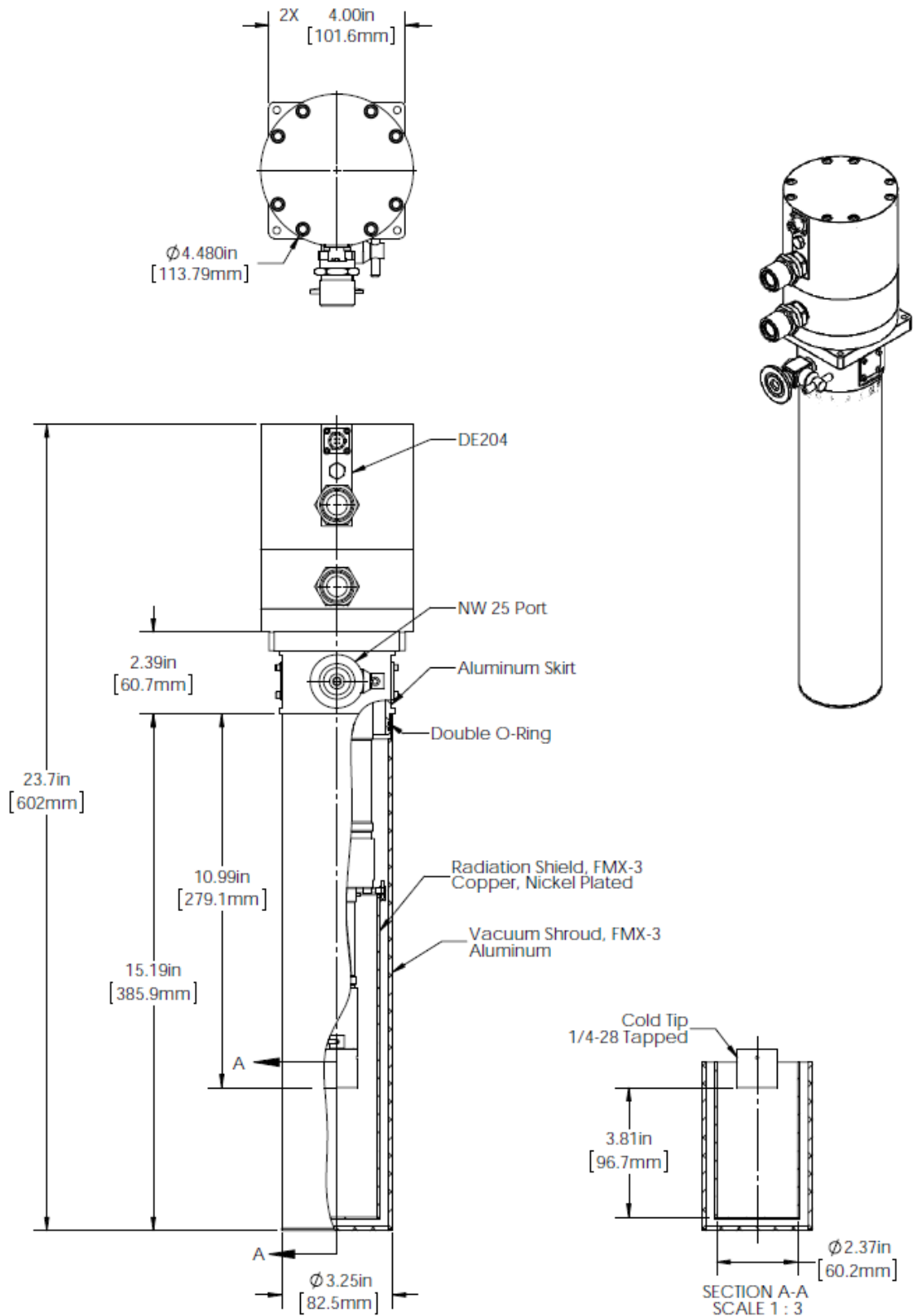
Cryocooler Model

| | | DE-204AE | | DE-204A(T)E | | DE-204PE | | DE-204SE | |
|-----------------------------------|------------------|--------------|--------|-------------|--------|--------------|---------|--------------|---------|
| | 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 | |



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DE204AE-FMX-3AL Outline Drawing



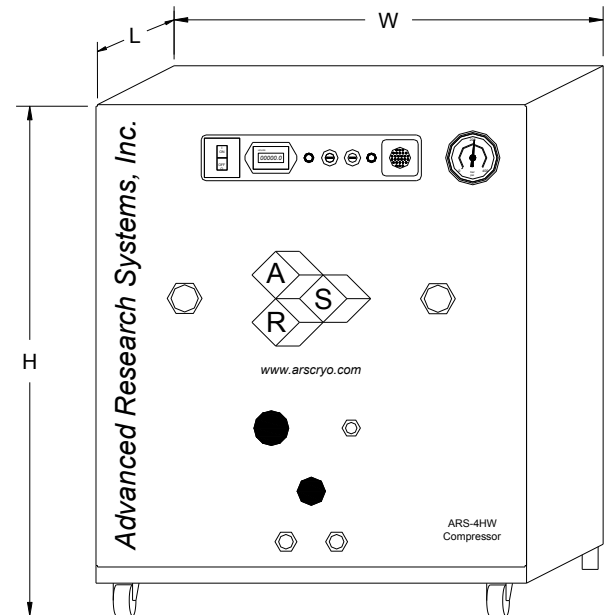


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Narrow Gap Upgrade



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 | |