



# Cryogenic Gas Trap

The **CS204\*E-FMX-19 NGA** is a Cryogenic Gas Trap. This system interfaces to the Mass Spectrometer line via a Swagelok or 1.33" Mini Conflat Flange. The system cools down a stainless steel canister (trap) that is either bare polished or containing activated charcoal. The cryogenic trap line is constructed for UHV environments and is made out of welded stainless steel.

## Applications

- Noble Gas Analysis
- Cryo-Adsorption of Gases
- Separation of He and Ne
- Separation of Ar from Kr and Xe

## Features

- Cryogen Free, Low Power
- UHV Construction of the Cryogenic Gas Trap
- Traps can be supplied with or without charcoal adsorber
- Fully customizable

## Typical Configuration

- Cold head (DE-204AE)
- Compressor (ARS-4HW)
- 2 Helium Hoses
- Noble Gas Interface
- VCR or 1.33" Mini Conflat Interface
- Instrumentation for temperature measurement and control:
  - 10 pin hermetic feed through
  - 50 ohm thermofoil heater
  - Silicon diode sensor curve matched to ( $\pm 0.5K$ ) for control
- 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)



The above picture shows a cryocooler with a the Noble Gas Analysis Interface



The above picture shows a complete system (minus the vacuum pump and temperature controller)

DS-CS204\*E-NGA-R1



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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                                                                                                                  | < 4K - 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 |                         |

## Radiation Shield-

|            |             |
|------------|-------------|
| Material   | OFHC Copper |
| Attachment | Bolt On     |

## Cryostat Footprint -

|                        |                  |
|------------------------|------------------|
| Overall Length         | 881 mm (34.7 in) |
| Motor Housing Diameter | 114 mm (4.5 in)  |

## Temperature Instrumentation and Control - (Standard) -

|                               |                                                      |
|-------------------------------|------------------------------------------------------|
| Heater                        | 50 ohm Thermfoil Heater anchored to the coldtip      |
| Control Sensor                | Curve Matched Silicon Diode installed on the coldtip |
| Free Length 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 | Stainless Steel                  |
| Length   | 881mm (34.7 in)                  |
| Diameter | 77 mm (3. n) at the sample space |
| Width    | 77 mm (3in) at the sample space  |

## Sample Compartment Interface -

|              |       |
|--------------|-------|
| VCR          | 1/4"  |
| Mini Conflat | 1.33" |

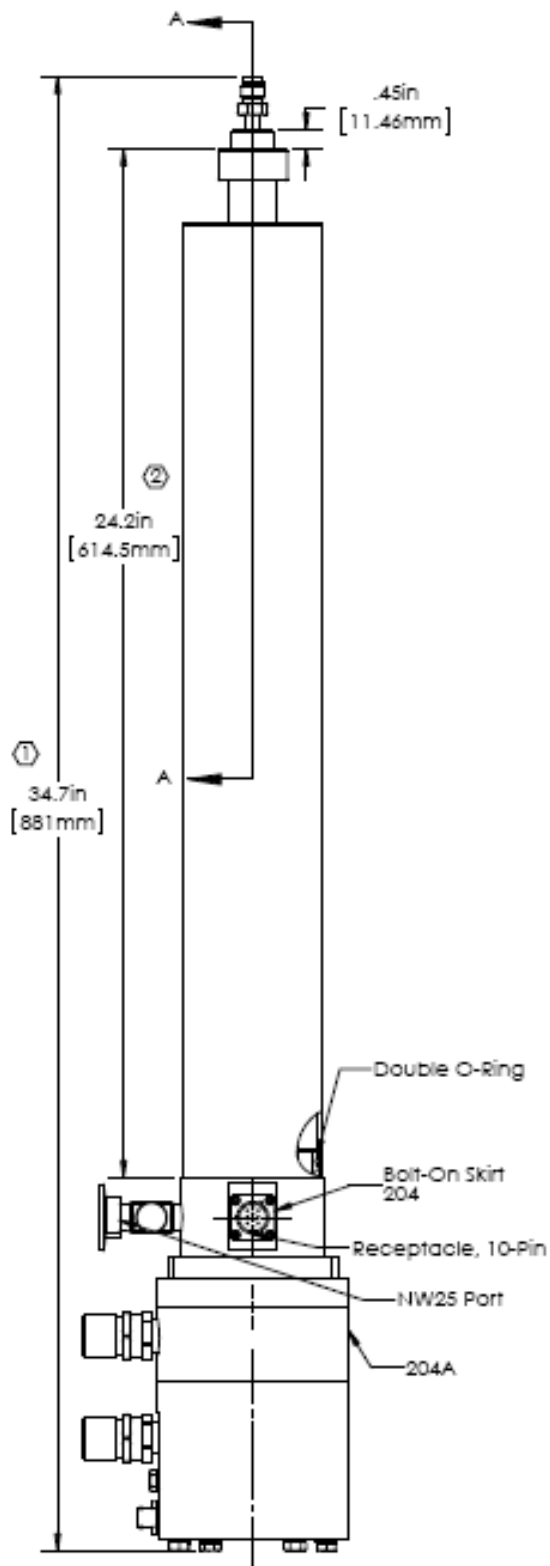
| Cryocooler Model                  |                  | DE-204AE     |        | DE-204A(T)E |        | DE-204PE     |         | DE-204SE     |         |
|-----------------------------------|------------------|--------------|--------|-------------|--------|--------------|---------|--------------|---------|
|                                   | 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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## DE204\*E-FMX-19 NGA Outline Drawing

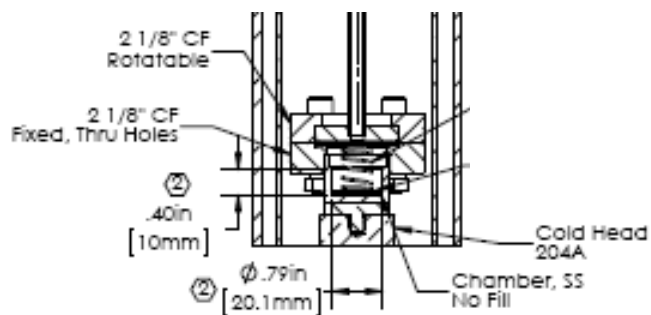


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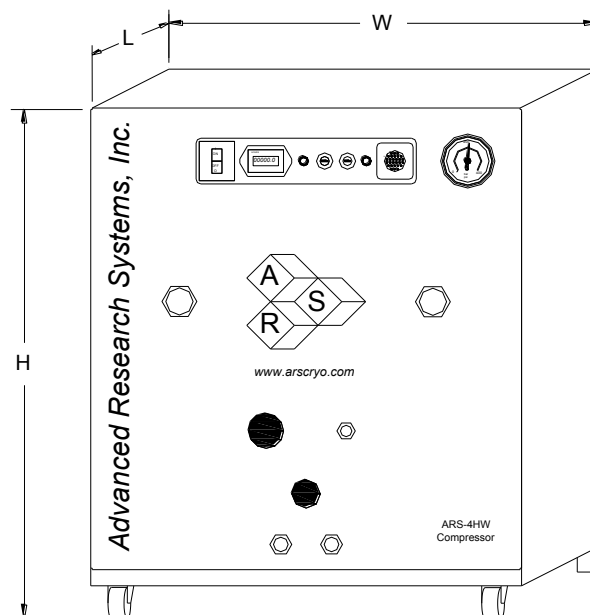


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**Sample Space**



**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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