# Optical Cryostat - Very High Power

The **CS210*E-GMX-1SS** offers very high cooling power for fast cool downs and low base temperatures. This system is ideal when characterizing large materials with high heat loads or when the lowest possible temperature wants to be achieved. The system is capable of vacuum levels of $10^{-7}$ Torr with an appropriate vacuum pump. The lower vacuum reduces the sample surface contamination such as water molecules, which can be particularly detrimental to IR Spectroscopy.


The above picture shows a cryocooler with a vacuum shroud, radiation shield, and sample holder installed.

## Applications

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

## Features

- Cryogen Free, High Power
- High Performance Stainless Steel Construction
- Large clear view optical windows (1.25 in)
- Large sample viewing angle for optical collection (F/1.6)
- Can operate in any orientation
- Fully customizable

## Typical Configuration

- Cold head (DE-210SE)
- Compressor (ARS-10HW)
- 2 Helium Hoses
- Stainless Steel vacuum shroud with 4 window ports for optical and electrical measures (GMX-1SS)
- Nickel Plated OFHC radiation shield
- 2 High purity quartz windows
- Instrumentation for temperature measurement and control:
  - 10 pin hermetic feed through
  - 50 ohm thermofoil heater
  - Silicon diode sensor curve matched to (±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 optical and electrical experiments
- Temperature Controller


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

## Options and Upgrades

- 4K Coldhead (0.8W @ 4.2K)
- 450K High Temperature Interface
- 800K High Temperature Interface
- 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)

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## Cooling Technology

| | |
|---|---|
| DE-210 | Closed Cycle Cryocooler |
| Refrigeration Type | Pneumatically Driven GM Cycle |
| Liquid Cryogen Usage | None, Cryogen Free |

## Temperature*

| | |
|---|---|
| DE-210AE | < 9K - 350K |
| DE-210SE | < 3K - 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 | 79 mm (3.1 in.) |
| Height | 49 mm (1.9 in.) |
| Sample Holder Attachment | 1/4 - 28 screw |
| Sample Holder | www.arscryo.com/Products/SampleHolders.html |

## Optical Access

| | |
|---|---|
| Window Ports | 4 - 90° Apart |
| Diameter | 41 mm (1.63 in) |
| Clear View | 32 mm (1.25 in) |
| #/F | 1.6 |
| Window Material | www.arscryo.com/Products/WindowMaterials.html |

## 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 Stainless Steel |
| Pump out Port | 1 - NW 25 |
| Instrumentation Ports | 3 |
| Instrumentation Wiring | Contact sales staff for options |

## Vacuum Shroud

| | |
|---|---|
| Material | Stainless Steel |
| Length | 508 mm (20 in) |
| Diameter | 144 mm (5.66 in) at sample space |
| Width | 102 mm (4.0 in) at sample space |

## Radiation Shield

| | |
|---|---|
| Material | Nickel Plated OFHC Copper |
| Attachment | Threaded |
| Optical Access | 0, 2, or 4 (customer specified) |

## Cryostat Footprint

| | |
|---|---|
| Overall Length | 784 mm (30.84 in) |
| Motor Housing Diameter | 156 mm (6.14 in) |

| Cryocooler Model | | DE-210AE | | DE-210SE | |
|---|---|---|---|---|---|
| | Frequency | 60 Hz | 50 Hz | 60 Hz | 50 Hz |
| **Base Temperature** | | <9K | <9K | <9K | <9K |
| **Cooling Capacity*** | 4.2K | - | - | 0.8W | 0.8W |
| | 10K | 4W | 4W | 9W | 9W |
| | 20K | 17W | 17W | 16W | 16W |
| | 77K | 25W | 25W | 25W | 25W |
| **Radiation Shield Cooling Capacity** | | 60W | 60W | 60W | 60W |
| **Cooldown Time** | 20K | 35 min | 35 min | 40 min | 40 min |
| | Base Temperature | 70 min | 70 min | 80 min | 80 min |
| **Compressor Model** | | ARS-10HW | | ARS-10HW | |
| **Typical Maintenance Cycle** | | 12,000 hours | | 12,000 hours | |

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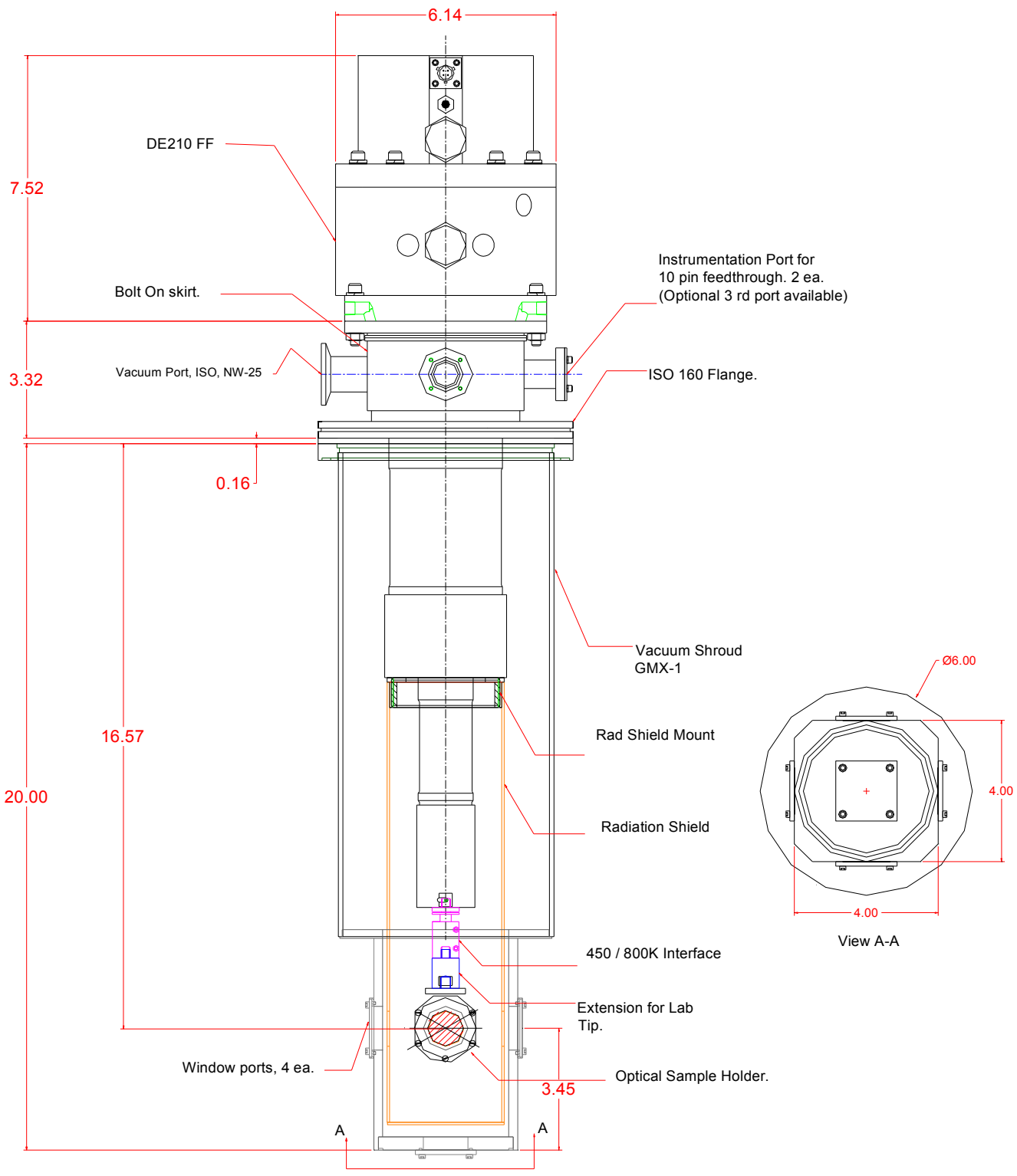
## DE210*E-GMX-1SS Outline Drawing



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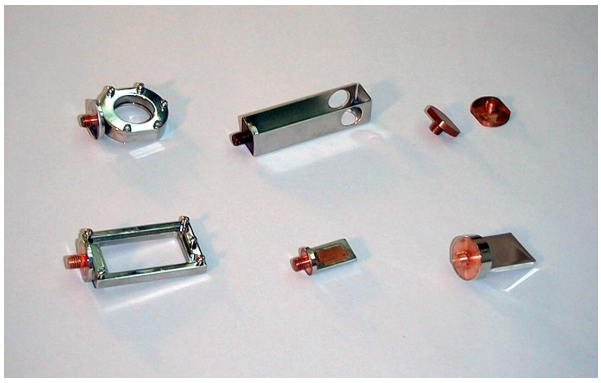
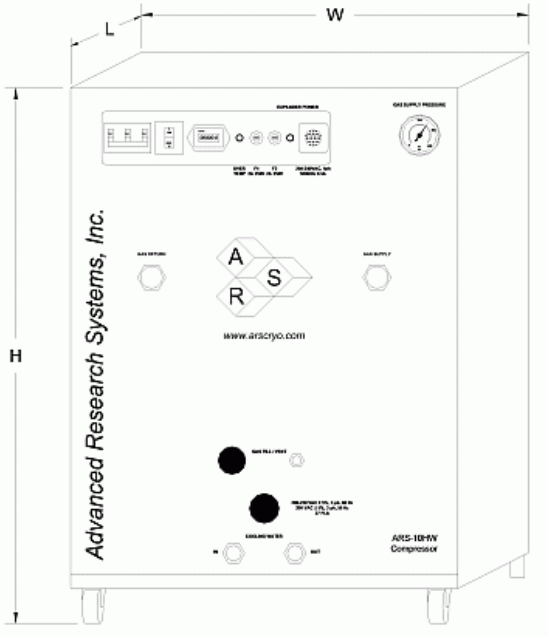
## Optional Sample Holders



A wide range of sample holders are available for large bulk, thin film or liquid samples. Backscattering, reflection and transmission experiments.

See selection guide for more details.

## ARS-10HW Compressor




| Compressor Model | | ARS-10HW | |
|---|---|---|---|
| | Frequency | 60 Hz, 3 Phase | 50 Hz, 3 Phase |
| **Standard Voltage** | Min | 208 V | 190 V |
| | Max | 230 V | 210 V |
| **High Voltage** | Min | 380 V | 440 V |
| | Max | 415 V | 480 V |
| **Power Usage** | Three Phase | 7.7 kW | 7.7 kW |
| **Refrigerant Gas** | | 99.999% Helium Gas, Pre-Charged | |
| **Ambient Temperature** | | 5 - 40 C (40—104 F) | |
| **Cooling Water** | Consumption | 5.7 L / min (1.5 Gal. / min) | |
| | Temperature | < 20 C (68 F) | |
| | Connection | 1/2 in. Swagelok Fitting | |
| **Dimensions:** | L | 483 mm (19 in) | |
| | W | 533 mm (21 in) | |
| | H | 617 mm (24.3 in) | |
| **Weight** | | 105 kg (230 lbs) | |
| **Typical Maintenance Cycle** | | 12,000 hours | |