4400-1-SD002_1.0

Installation Procedure

Cryostation

CryoAdvance-50 | CryoAdvance-100 | s200

Version: 1.0
February 2024

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MONTANA INSTRUMENTS®

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Specifications and product information listed in this document are accurate at the time of publishing for a standard system. Options, custom designs, and other modifications may cause slight differences. Future design changes to the system, including software updates, may change.

Table of Contents

Section 1 - Preface

⚠ WARNING

Read all instructions before using this product
All users must read and understand this manual and all other safety instructions before using the equipment. Retain these instructions for future reference.

This manual is intended for users of the Montana Instruments products and systems described herein. Users include anyone who may physically interact with the system or peripheral equipment, including installing, setting up, or configuring the system or anyone who may operate system components via operating panels, the supplied user interface, or remote interfaces.

This manual may be used by facilities personnel for determining infrastructure requirements in the room or building where the equipment will be installed.

This manual should be referenced by authorized service personnel for important safety and hazard information and other product restrictions.

1.1 Conventions Used in this Manual

The following style conventions are used in this document:

- A vertical bar (|)
  - Indicates alternative selections. The bar may be used in place of “and” or “or.”
- Alphanumeric List (1., 2., 3…| a., b., c…)
  - Indicates instructions or actions which should be completed in a specific ordered sequence.
- Bulleted List (• | ◦ | -)
  - Indicates instructions, commands, or additional information about an action.
  - May alternatively be used for unordered lists of materials or additional reference notes.
- `Courier Font`
  - Indicates a label or indicator on a physical product or part.
  - Indicates a system output, such as a display reading.
  - May also be used for URLs, file paths, file names, scripting language, prompts, or syntax.

1.1.1 Abbreviations

The following abbreviations may be used:

- CAN: Controller Area Network
- DMM: Digital Multimeter
- HDMI: High Definition Multimedia Interface

- MI: Montana Instruments
- PCB: Printed Circuit Board
- TCM: Temperature Control Module
- UI: User Interface
- UPS: Uninterruptible Power Supply
- USB: Universal Serial Bus
- VNC: Virtual Network Computing

1.1.2 International System of Units (SI) Symbols

- C: Celsius
- cm: Centimeter
- K: Kelvin
- kg: Kilogram
- m: Meter
- mK: Millikelvin
- MPa: Megapascal
- mTorr: Millitorr
- mW: Milliwatt
- s: Second

1.1.3 System of Imperial Units Symbols

- ft, ’ : Foot
- in, ” : Inch

1.1.4 Explanation of Safety Warnings

Safety and hazard information includes terms, symbols, warnings, and instructions used in this manual or on the equipment to alert users to precautions in the care, use, and handling of the system. The following hazard levels and information are considered:

⚠ DANGER
Serious personal injury Imminent hazards which, if not avoided, will result in serious injury or death.

⚠ WARNING
Serious personal injury Potential hazards which, if not avoided, could result in serious injury or death.

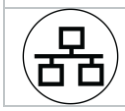
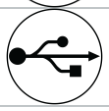
⚠ CAUTION
Possible personal injury Potential hazards which, if not avoided, could result in minor or moderate injury.

NOTICE
Command or Product Safety Notice Potential hazards which, if not avoided, could result in product damage.

» NOTE
Points of particular interest for more efficient or convenient equipment operation; additional information or explanation.

1.1.5 Graphical Symbols

The following symbols may be used in diagrams, supporting text, and on physical parts:

	Hazard Alert: General Warning		Hazard Alert: High Voltage
	Hazard Alert: Laser Radiation		HDMI port
	CAN bus module		USB port

1.2 General Hazard & Safety Information

The following descriptions are of general hazards and unsafe practices that may result in product damage, severe injury, or death.

- The products, parts, and components in this manual are to be serviced by authorized Montana Instruments service representatives only. Failure to do so will void the warranty and may damage the product and/or create a safety hazard.
- Only use all components provided for the intended purpose described herein.
- If the equipment or any component is used or modified in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The following hazards may be typical for this product:

⚠ WARNING

Risk of injury when lifting or moving system components

System components, including standalone equipment and installed assemblies, may be heavy.

- Use caution when lifting or moving equipment or assemblies. Ensure proper lifting principles are used to avoid injury.
- Equipment or assemblies >20 kg should always be lifted by two or more people or with a suitable lifting device.

Risk of injury due to sharp edges

- The interior of the enclosure contains sheet metal parts that may have sharp edges.
- When working inside the enclosure (authorized service personnel only), exercise caution to avoid getting cut by these edges.

⚠ WARNING

High voltage: danger of electric shock

Electric shocks and burns from capacitor discharge or power circuits could lead to serious injury or death.

- Before turning on any power supply, the ground prong of the power cord plug must be properly connected to the ground connector of the wall outlet. The wall outlet must have a third prong or must be properly connected to an adapter that complies with these safety requirements.
- Only use replacement power cords or power plugs with the same polarity and power rating as that of the original ones. Do NOT use inadequately rated cables.
- If the equipment or the wall outlet is damaged, the protective grounding could be disconnected.
- Do NOT use damaged equipment until its safety has been verified by authorized personnel.
- Do NOT disconnect or tamper with the operation of the protective earth terminal inside or outside the apparatus.
- Before accessing the enclosure or when otherwise servicing the unit (authorized service personnel only), completely power down the system and unplug the power cable.
- If power must be applied to diagnose issues or otherwise, a grounding strap must be applied to the arm interfacing internal components.

NOTICE

Only clean exterior surfaces with acceptable fluids

- Only use deionized water, glass cleaner, or isopropyl alcohol to clean the exterior surfaces of any enclosure. Do NOT use any volatile chemicals other than isopropyl alcohol.
- Apply fluid to a clean, lint-free cloth and wipe the surface with a cloth. Do NOT apply fluid directly to any surfaces or enclosures.

⚠ WARNING

Risk of serious injury due to hazards associated with cryocooling

All personnel working with the system must be aware of the potential hazards associated with cryocooling.

- Personnel working with the system should be trained in emergency measures that may be required in the event of an accident.

Risk of suffocation due to potential asphyxiates.

Nitrogen (N_2) and Helium (He) are potential asphyxiates if released into an enclosed area with poor ventilation. A decrease in air oxygen content can be caused by leaks.

- Ensure that proper tubing is used and good connections are made at each connection point to prevent the release of these gases.

Risk of explosion due to high pressure if the system is not allowed to vent properly.

- Never bolt or otherwise fasten the lid of the sample chamber closed. The lid acts as a safety pressure release in the event of high-pressure accumulation in the Cryostation.

Risk of cold contact burns.

- Parts of this system are very cold and may cause severe burns to the skin.
- Allow components to warm up to room temperature before touching. If contact occurs, consult a physician immediately.

NOTICE

Take care when moving the Cryostation

- Do NOT tilt the Cryostation more than 45 degrees. Inverting the Cryostation will cause damage.
- The Cryostation and sample chamber are a single unit. The attached sample chamber must be supported at all times. Do NOT lift the Cryostation by the sample chamber.
- Do NOT lift the Cryostation by the cryocooler tube or the top of the main body enclosure.
- The Cryostation ships with red locking plugs and a shipping support to prevent damage to sensitive components. Do NOT remove these until after the unit has been attached to the table.

Take care when moving the compressor

- Do NOT tilt the compressor. Doing so may damage the unit.
- The compressor is on casters for moving. Ensure casters are locked before operating.

Risk of product damage due to improper use

- Never disconnect the vacuum hose while the temperature of any stage of the Cryostation is below 285 K.
- Never open the case or vent valves when the temperature of any stage is below 285 K.
- Only use dry nitrogen gas with the Cryostation. Do NOT substitute other gases for system venting.
- Avoid using any material in the sample chamber that may outgas or otherwise contaminate the optical windows and Cryostation surfaces.
- When manually operating heaters, monitor the Stage 1 and Stage 2 temperatures to ensure these temperatures do NOT rise above 350 K. Temperatures above 350 K may damage critical components within the system.

Peripheral cards must not exceed 600 W to avoid product damage

- The system control unit can supply a maximum power of 600 W across all installed peripheral cards. Ensure the cumulative power of all installed peripheral cards (maximum power rating of all cards added together) does not exceed 600 W.

Transportation and installation

- When not in a rack unit, the enclosure should not be stacked on any other equipment nor should other equipment be placed on it.
- Allow 8 cm minimum clearance from any ventilated face (sides, front) and 20 cm clearance in the rear for cables and hoses.
- Do NOT move the unit while operational. Remove all cables prior to moving. Lift the enclosure by using both handles on the front face.

1.3 Technical Support Information

Any technical questions or issues with the system that cannot be resolved with the information in this manual should be referred to an authorized Montana Instruments service representative.

1.3.1 Warranty & Repairs

If the system or parts need to be returned to the Montana Instruments factory or an authorized service center for repair or service, contact an authorized service representative for a return merchandise authorization (RMA) number and instructions on returning the unit.

For a copy of the Limited Warranty Agreement, visit:
https://www.montanainstruments.com/support/warranty-information

1.3.2 Accessories & Replacement Parts

Only use cables, hoses, accessories, and parts provided or approved by the manufacturer. Follow all instructions for proper installation or replacement.

- To order spare or replacement parts, please contact your local service representative.
- To order new accessories or options, or for more information on other Montana Instruments products and technologies, please contact your local sales representative.

1.3.3 Contact Details

For a complete list of sales and service centers visit: www.montanainstruments.com/Contact

North American Authorized Service

- M-F 8:30am-5pm MST | Call: +1.406.551.2796
- Email: support@montanainstruments.com

North American Sales

- M-F 8:30am-5pm MST | Call: +1.406.551.2796
- Email: sales@montanainstruments.com

International Sales & Authorized Service

- Visit https://www.montanainstruments.com/contact for contact information for your local representative.

Section 2 - System Installation & Handling

2.1 Shipping Weights & Dimensions

The system will arrive on 3 pallets. The typical weights and dimensions of the standard system, as packed, are listed in the table below.

	Pallet 1	Pallet 2	Pallet 3
Components	Compressor	System Control Unit Vacuum Control Unit	Cryostation Accessories
Pallet Dimensions (L x W x H)	26 x 23 x 43 in. [66 x 59 x 109 cm]	40 x 48 x 38 in [102 x 122 x 97 cm]	40 x 48 x 38 in [102 x 122 x 97 cm]
Weight	180 - 245 lbs [82 - 111 kg]	120 lbs [54 kg]	140 – 180 lbs [63 – 82 kg]

⚠ WARNING

Use extreme caution when handling the shipment

Refer to the appropriate system user manual for important instructions regarding the safe handling of system components.

2.2 Packaging Contents

The system will arrive on 2-4 pallets, depending on the options purchased. Depending on the configuration, the items below may differ. Additional purchased options may be pre-integrated in the sample chamber or packaged separately. Refer to the shipment packing list for more details.

Compressor Box – Pallet 1

- Helium Compressor
- Helium Hoses (2): `SUPPLY & RETURN`
- Vacuum Hose

System Control Box – Pallet 2

- System Control Unit with pre-installed peripheral cards (depending on the configuration ordered)

Vacuum Control Box – Pallet 2

- Vacuum Control Unit

Cryostation Box – Pallet 3

- Cryostation and Sample Chamber (single unit) with pre-installed options (depending on the configuration ordered)

Accessory Box – Pallet 3

- User Interface Touchscreen Display

All Cables & Hoses

- (Qty1) Power Cord, NEMA L6-20P to wall plug for Compressor.
- (Qty2) Power cord, IEC320-C13 to wall plug for System Controller Unit (ECA24)and Vacuum Control Module (VCM24).
- Cable, CIRC-6(SKT)-to-CIRC-6(PIN) for cooler drive routed from the Compressor to the Cryostation.
- Cable, DSUB9(PIN)-to-DSUB9(PIN) for serial communications routed from the System Controller Unit (ECA24) to the compressor.
- Cable, Modular RJ9-to-CIRC-4(SKT) connector for compressor ON/OFF control routed from the System Controller Unit (ECA24) to the Compressor.
- Cable, HDSUB44(PIN)-to-HDSUB44(SKT) for control I/O routed from the System Control Unit (ECA24) to the Vacuum Control Module (VCM24).
- Cable, DSUB37(PIN)-to-DSUB37(SKT) for routing from the System Control Unit (ECA24) to the Cryostation.
- Cable, CIRC-7(PIN)-to-CIRC-7(SKT) to route from Vacuum Control Unit (VCM24) to Edwards Pneumatic Valve (if using the Vacuum Control Module Turbo Option).
- USB & HDMI cables pre-connected to the User Interface Touchscreen Display
- Cable, RJ45-to-RJ45, Ethernet

Accessory Kit

Tweezers & pick tool
Hex Wrenches: *1.27mm, 1.5mm, 2mm, 2.5mm, 4mm, 5mm, and 3/16"*
Apiezon® N-grease: *for cryogenic thermal connections only*
Apiezon® L-grease: *for lubricating O-rings only*
GE Varnish Adhesive (VGE): *for wires or samples within 4 K space*
Kapton® Tape: *for wire insulation*
Unwaxed Dental Floss: *for wire management*
Spare VCO O-rings
Fischer Connector Strip: *for custom connections*
Assortment of spare screws
Window tool: *for removing vacuum window retaining rings*
Helium purge adaptor and recharge adaptor
Coax SMP extraction tool
Additional custom components (if purchased)

2.3 Component Placement and Layout Plan

Before unpacking the system, it is recommended to pre-plan the placement of components in the lab space. Component dimensions are outlined in the System User Manual for each product model which can be found on the Montana Instruments product documentation webpage.

- The Cryostation (including the sample chamber) should be mounted to an optical table for best performance. The main housing can typically be oriented at either 45° or 90° to the hole pattern in the optical table. Allow 60 cm clearance in the back of the unit for the helium and vacuum hoses.
- The compressor must remain upright and sit on the floor. Recommended a 24 inches (600mm) in front from compressor for access to electrical, water (if applicable) and gas connections. For air-cooled compressor a minimum of 39 inches (100cm) is required above the compressor for airflow and minimum of 12 inches (30cm) around the fan.
- The system control unit (4U) and vacuum control unit (6U) can be rack-mounted in a standard 19" rack unit or placed on a nearby shelf. Allow 8 cm clearance on the front, sides, and rear.
- The user interface touchscreen can be placed on any nearby work surface.

Please consider the allowable distance between components, as outlined in the cable diagram and table below. The helium hoses between the Cryostation and compressor require a minimum bend radius of 9 in. (23 cm) for the 30 ft. hoses, with a 4 in. (10 cm) straight section at each end (Fig. 1).

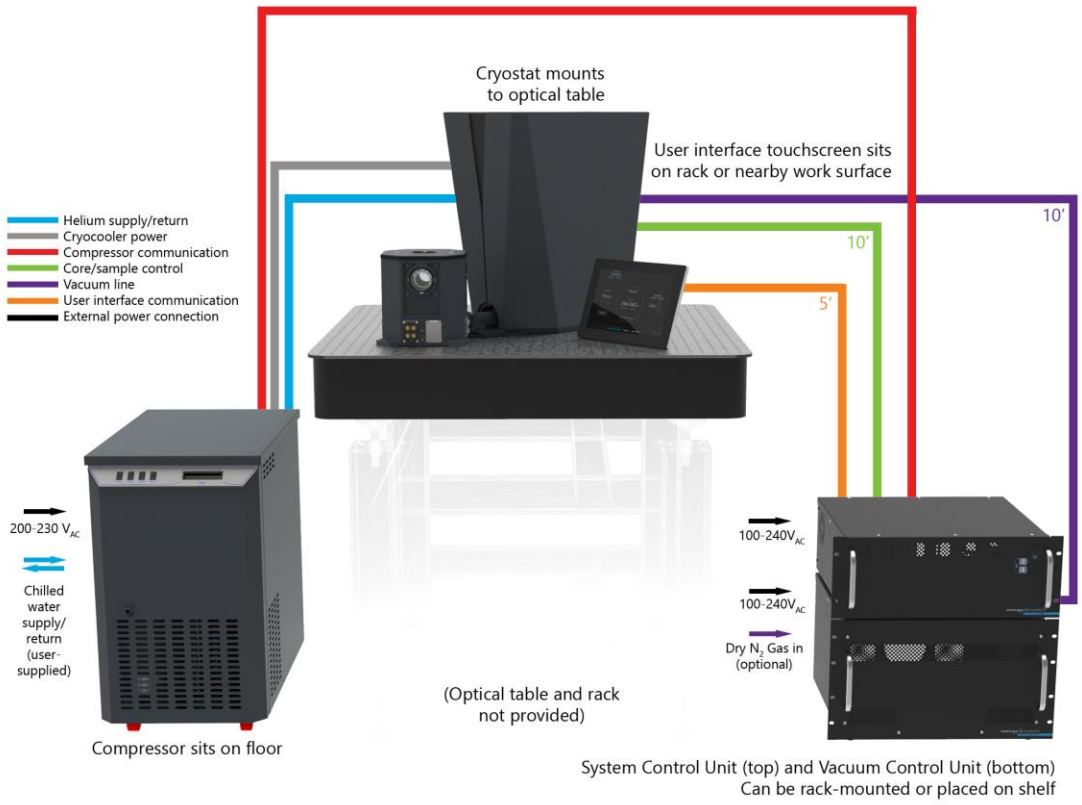


Figure 1: *Cryostation system layout.*

*Compressor & Cryostation models shown here are representative, the products you receive may be cosmetically different, but interconnection and functionality are identical.

Helium Supply / Return	Cryocooler Power	Compressor Communication
3.3 Meter (10 Feet)	3.6 Meter (12 Feet)	3.6 Meter (12 Feet)
10 Meter (33 Feet)	9.1 Meter (30 Feet)	9.1 Meter (30 Feet)
20 Meter (66 Feet)	20 Meter (66 Feet)	20 Meter (66 Feet)

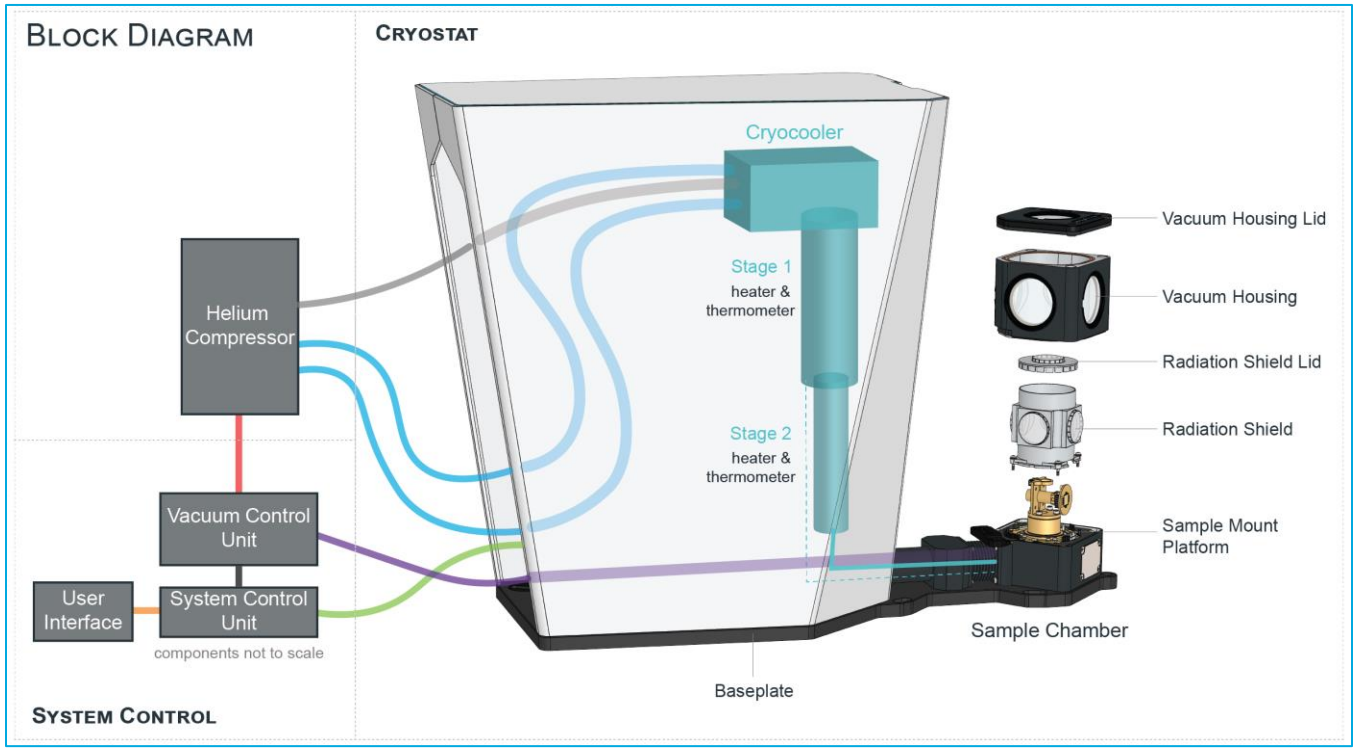


Figure 2: Cryostation connections overview

2.4 Unpacking the Components

If an installation was ordered, we recommend leaving the system packed until a service representative arrives.

NOTICE

Inspect shipment upon receipt

Before unpacking the system, please note the condition of the boxes, shock watch sensors, and tilt watch sensors. The boxes should be intact and strapped to the pallets. If there is any visible damage or if the sensors have been tripped, contact an authorized service representative immediately and do NOT proceed with unpacking.

Shock watch

Tilt watch

Retain equipment packaging for future use

We recommend saving the original equipment packaging (foam, box, and pallets). The packaging is specially designed to support and stabilize the equipment and will be required if the unit needs to be transported in the future. Some components must be packed upright on a pallet to avoid damage.

2.4.1 Unpacking the Compressor

Locate the compressor pallet.

1. Cut the bands securing the box to the pallet.
2. Carefully remove the box surrounding the unit. Lift directly up and over the surrounding foam.
3. Remove the top piece of foam to locate the hoses. Remove the hoses and set them aside.
    a. If you ordered long or oversized hoses, they will be in a separate box.
4. Using two people, lift the compressor off the pallet and gently set it on the floor. Take care not to tilt the compressor.
5. The compressor has casters for moving it. Remove the plastic wrap and roll the unit to its desired location.

Step 1: Compressor on pallet with bands cut

Step 2: Removing compressor box

Step 3: Compressor unboxed and hoses removed

2.4.2 Unpacking the Cryostation

Locate the Cryostation box.

1. Remove the box wrap and cut the bands securing the box to the pallet. Carefully lift the box off the pallet and set it on a nearby surface.
2. Open the side of the box and slide out the Cryostation and foam onto an adjacent surface.
3. Liftoff the top piece of foam.
4. Reach under the unit and grasp the main structure below the baseplate and sample chamber. Supporting the system at the front and back, carefully lift the system out of the foam and onto the table, taking care not to tilt more than 45°. A second person can assist with this step.
5. Carefully remove the plastic wrap around the main body and sample chamber. Leave the window covers in place.
6. Gently slide the unit to the desired location on the optical table.

Step 2: Sliding out the Cryostation

Step 4: Support and lift the unit out of the foam

Step 5: After removing plastic wrap, use the handhold on the back panel to move the system

2.4.3 Unpacking the Control Units

Locate the control unit boxes.

1. Remove the box wrap and cut the bands securing the box to the pallet. Carefully lift the box off the pallet and set it on the floor or a nearby surface.
2. Open the top of the box and remove the top piece of foam.
3. Reach inside and grasp the underside of the unit. Lift the unit up and out of the box. Keeping the unit in the same orientation, set onto an adjacent surface.
4. Carefully remove the plastic wrap around the enclosure.
5. Move the unit to the desired location.

2.5 Installing the Cryostation

2.5.1 Mounting the Cryostation to the Optical Table

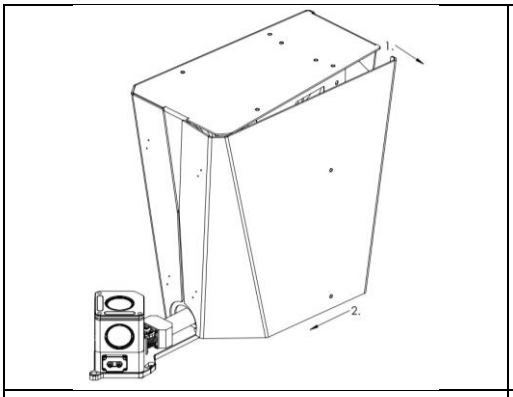
The Cryostation can be mounted at either 45° or 90° to the hole pattern in an imperial or metric optical table. When aligning the system, make sure you can still reach and access the sample chamber.

For the CryoAdvance:

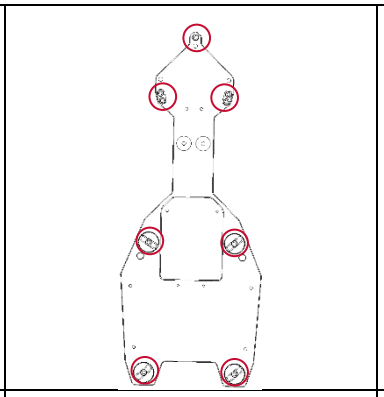
1. Remove the exterior side covers surrounding the cryocooler. First, remove the two thumbscrews at the back of the top panel. Next, pop the side panel directly out to the side, then slide it forward to remove it. Remove the covers on both sides.
2. Adjust the cryostat so the mounting holes around the sample chamber are directly aligned with holes in the optical table.

The baseplate contains four additional mounting locations, two on either side of the black vertical cryocooler cylinder, and two at the back of the unit. These locations each have a slotted disk for fine adjustment.

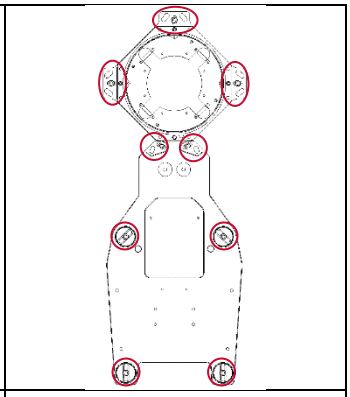
3. Turn the slotted disks at each remaining baseplate location until a table hole is aligned with the slot.
4. Starting at the front of the sample chamber, insert a short hex screw in each mounting location. Start by loosely starting each screw, turning just enough to hold the screw in place. Minor positioning adjustments may still be required.
5. After placing a screw at each location, tighten all screws securely, moving front to back.



Removing side covers from CryoAdvance 50 and 100



CryoAdvance-50: seven mounting locations



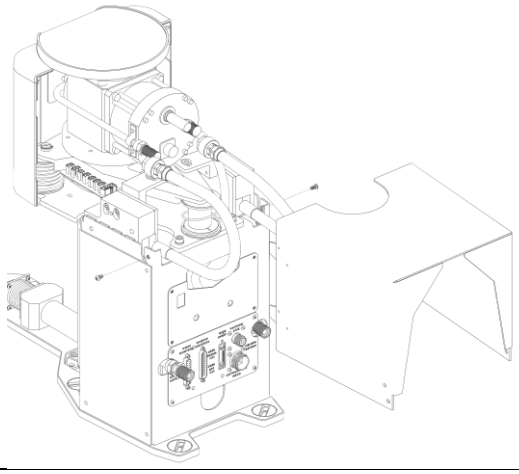
CryoAdvance-100: nine mounting locations

For the s200 Cryostation:

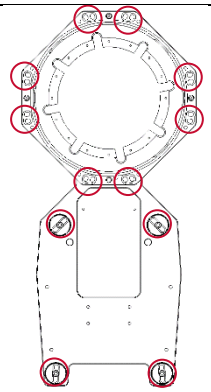
1. Adjust the cryostat so the mounting holes around the sample chamber are directly aligned with holes in the optical table.

The baseplate contains four additional mounting locations, two on either side of the black vertical cryocooler cylinder, and two at the back of the unit. These locations each have a slotted disk for fine adjustment.

2. Turn the slotted disks at each remaining baseplate location until a table hole is aligned with the slot.
3. Starting at the front of the sample chamber, insert a short hex screw in each mounting location. Start by loosely starting each screw, turning just enough to hold the screw in place. Minor positioning adjustments may still be required.
4. After placing a screw at each location, tighten all screws securely, moving front to back.



Removing the top cover of the s200



s200: Twelve mounting locations

On some models, the operational cable may be shipped disconnected:

5. Locate the MDR26 cable coming out of the front of the Cryostation tower.
6. Connect the cable to the lower MDR26 connector on the base side panel of the sample chamber at the location labeled: `OPERATIONAL`

2.5.2 Removing the Shipping Supports

Once the Cryostation is secured to the table, the shipping supports can be removed. These should be removed for optimal performance.

1. Locate the red C-spacers on either side of the connection point between the sample chamber and cryocooler (two total). Unscrew the M3 screws.
2. Remove the red caps then pull out the red tab.

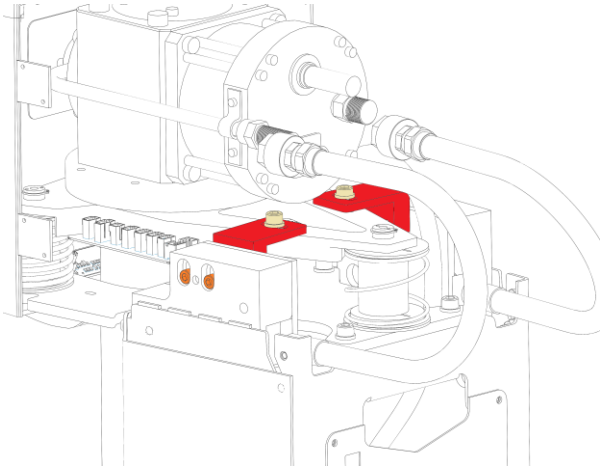
C-spacer locations

C-Spacer cap and tab

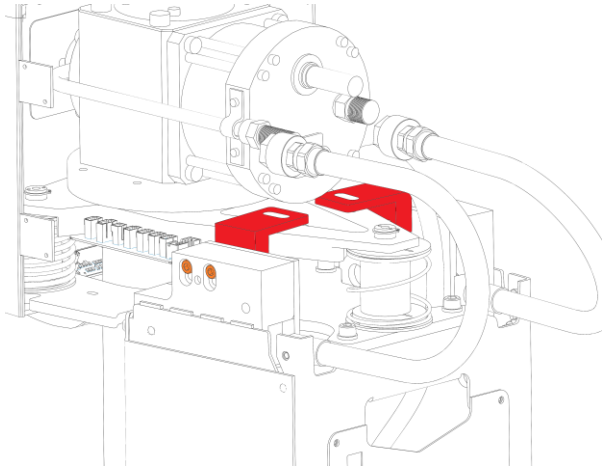
» NOTE
If it is difficult to remove the C-spacer. Remove both caps first. Follow the steps below to remove the cryocooler shipping support. Gently lift the black cylinder surrounding the cryocooler and pull on the red tabs to remove it.

Removing the final shipping support requires removing the side covers of the cooling tower assembly.

3. Locate the red shipping support brackets (two pieces, shown red). Using a 5mm Allen key, remove the M6 x 14mm screws on the top of each bracket (shown yellow). Store these screws and washers in the accessory kit.



Bracket bolted in the lower position (for shipping)



Bracket locked in an upward position (for operation)

4. On the side of the shipping support, locate the two M5 screws holding the bracket in place (shown orange). Using a 4mm Allen key, loosen these screws but do not remove them.
5. Slide the shipping bracket (red) up so it is no longer touching the silver tri-flange. Holding it in place, re-tighten the two M5 screws (orange) to secure it in this unlocked position.
6. Repeat steps 4-5 on the other shipping support.
7. Replace the exterior side covers. Insert the front tab (sample chamber side) and rotate and snap the cover back into place.

NOTICE
Keep the C-spacers, shipping supports, and screws. These should be reattached and locked in place any time the Cryostation needs to be moved in the future.

2.6 Connecting System Cables and Power

NOTICE
Only use cables and hoses provided or approved by the manufacturer Only use the cables and hoses in the manner described below.

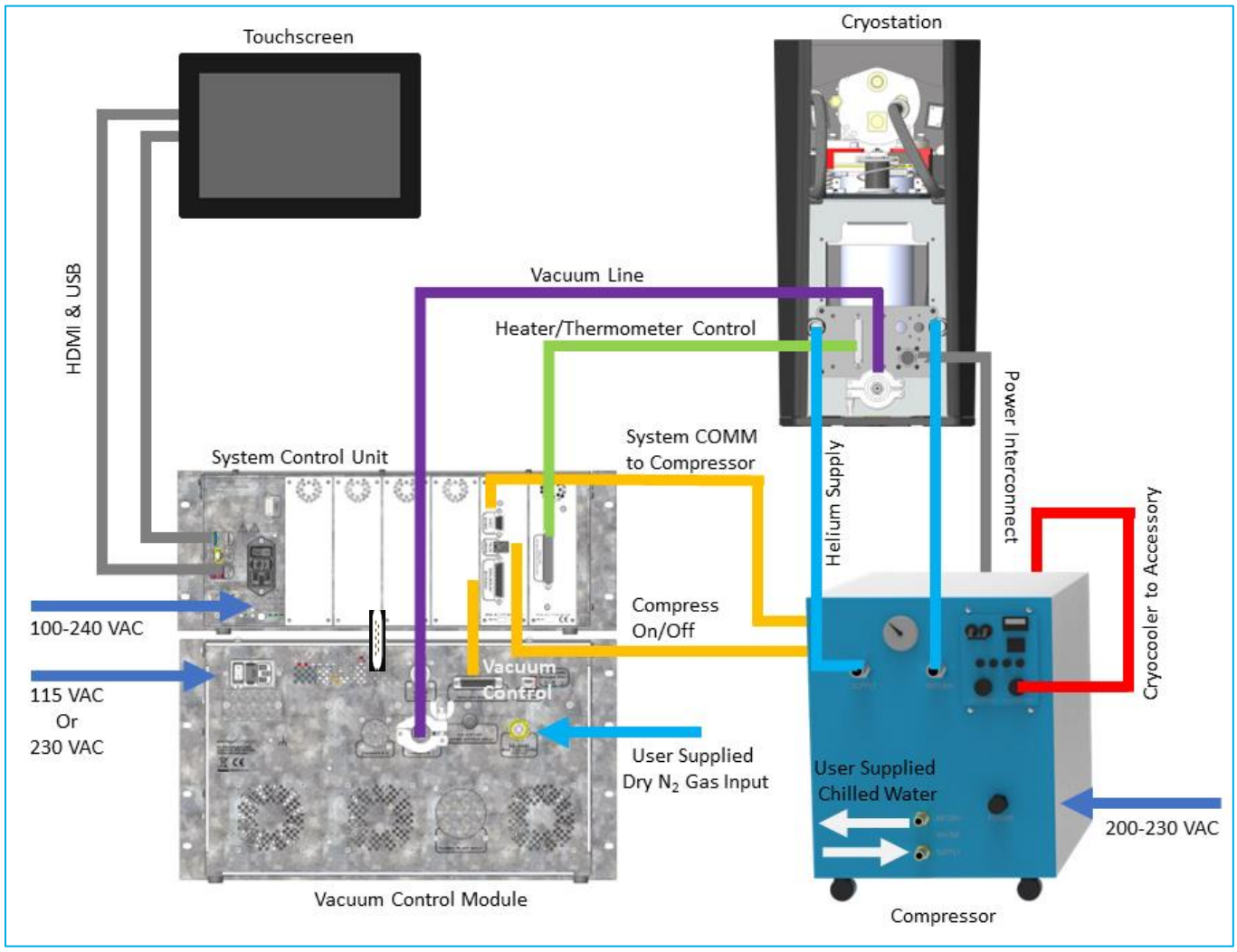


Figure 3*: *Cryostation interconnect diagram*

*Compressor model shown here is representative, the product you receive may be cosmetically different. Montana Instruments offers a water cooled or air-cooled version, water-cooled must be connected to chilled water (facility or chiller).

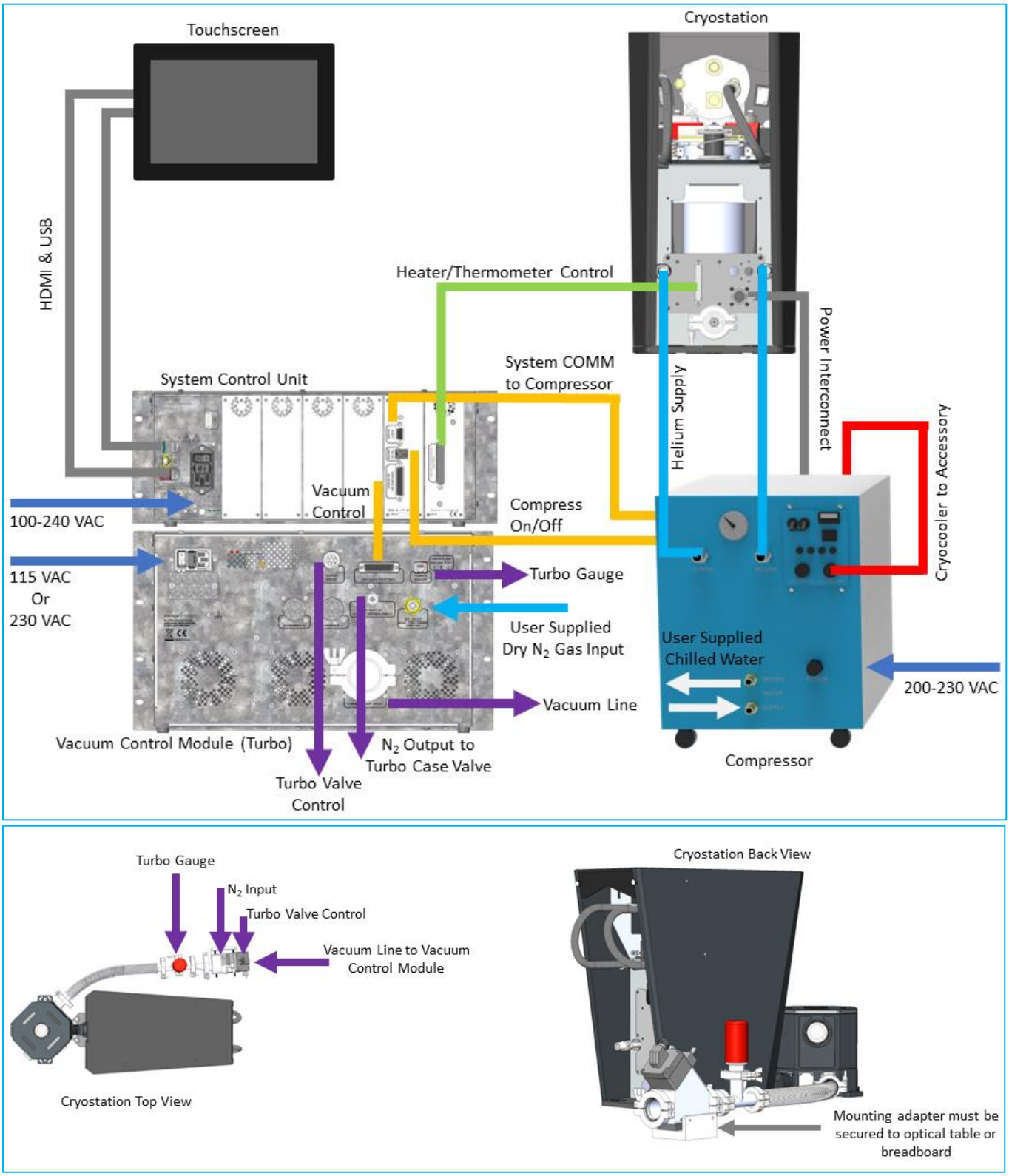


Figure 4*: *Cryostation interconnect diagram – Turbo Vacuum Control Module Option*

*Compressor model shown here is representative, the product you receive may be cosmetically different. Montana Instruments offers a water cooled or air-cooled version, water-cooled must be connected to chilled water (facility or chiller).

Chilled Water Connections:

Refer to the appropriate Sumitomo compressor Technical Manual for detailed instructions on connecting the chilled water supply and return hoses to your chilled water source.

Compressor Type	Document Title	Original Manufacturer
Air-cooled	FA-20L Helium Compressor	Sumitomo
Water-cooled	F-20L Helium Compressor	Sumitomo

1. Remove any plastic covers from the connector locations on the back of the compressor, the Cryostation, the system control unit, and the vacuum control unit.

Helium Hoses:

Verify Hose Fittings

Improper attachment or missing O-rings on the helium hose fittings can cause a loss in helium pressure and hinder the cooling performance. To inspect fittings on the back of the compressor and cryostat:

- Ensure the fittings are straight.
- Ensure there is a **single** O-ring at each end of the hose and at each connection point. The O-rings tend to dislodge from the hose and stay on the fitting (or vice versa).
    - If this happens, the errant O-ring must be carefully removed and replaced in the correct location before reconnecting, otherwise it will not seat properly.

Hose with extra O-ring

Extra O-ring removed

Left: Fitting missing O-ring
Right: proper O-ring fitment

Helium hoses should first be tightened by hand. Use a crescent wrench to continue to tighten the fitting, stopping as soon as force is required. Do not overtighten.

2. Locate the helium hose labeled `SUPPLY`. Connect one end to the `SUPPLY` location on the back of the compressor. Connect the other end to the `SUPPLY` location on the back panel of the Cryostation.

3. Locate the helium hose labeled RETURN. Connect one end to the RETURN location on the back of the compressor. Connect the other end to the RETURN location on the back panel of the Cryostation.

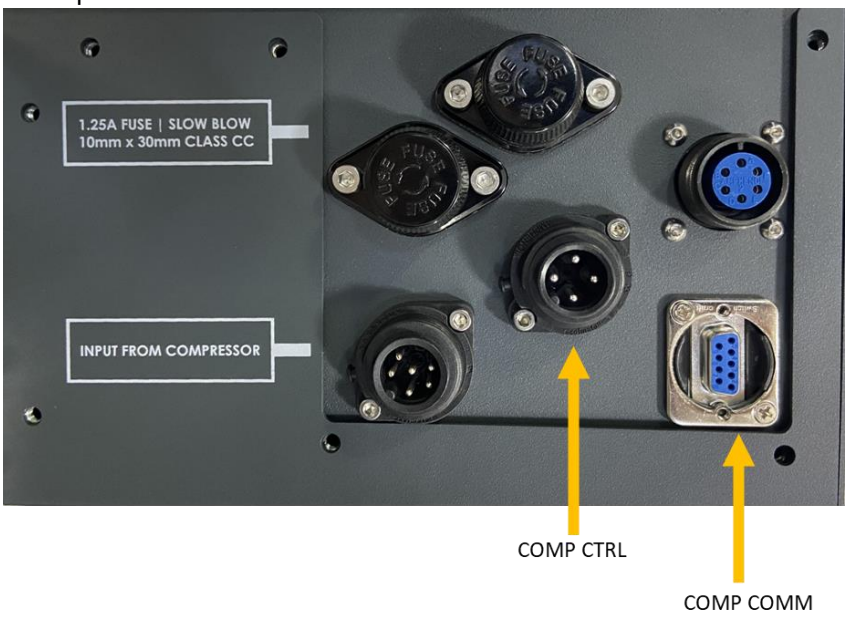
NOTICE
Check cable connections • Be sure to connect the supply to supply and return to return. Do NOT switch the supply and return hoses, as the return hose may have internal contamination from extended use. • Before connecting, ensure there is a single O-ring at each connection point and hose end. • Keep the fittings straight to avoid any loss of helium as the hose is attached. • Damage may result if the helium supply and return lines do not have room to expand and contract. Ensure the tubing runs straight from the back of the unit and makes loose gentle bends between connections. The minimum bend radius is 9 inches (23 cm) for 30 foot (9m) hoses. • Do not let the helium hoses contact or rest on the optical table, as this can introduce vibrations.

Cryocooler Power Interconnect:

4. Locate the 6-socket to 6-pin circular M-F connector cable. Connect the M end to the back of the compressor. Connect the F end to the CRYOCOOLER HEAD location on the back panel of the Cryostation.

Compressor Communication:

5. Locate the DSUB9(PIN)-to-DSUB9(PIN) series cable. Connect one end to the COMMPRESSOR ACCESSORY location on the back of the compressor. Connect the other end to the COMP COMM location on the back of the system control unit. Tighten both connections with the thumbscrews to secure.
6. Locate the RJ9 cable to CIRC-4(SKT). Connect one end to the COMP CTRL location. Connect the other end to the compressor 4 Pin Connector on the COMPRESSOR ACCESSORY.



Vacuum Hose:

7. Locate the vacuum hose. Connect one end to the VACUUM LINE location on the back of the vacuum control unit. Connect the other end to the VACUUM LINE location on the back panel of the Cryostation. The O-ring seal only needs to be compressed, so take care not to overtighten.

NOTICE

Check cable connections

- Do NOT overtighten the vacuum hose, as this can spin the fitting and cause a vacuum leak.
- Make sure the vacuum tube fitting has a single O-ring in it. The O-rings occasionally come loose and fall out.

Control Cables:

8. Locate the DSUB37 F – split cable. Connect the DSUB37 F end to the HEATER/THERMOMETER CONTROL location on the TCM peripheral card in the system control unit. Where the cable splits, attach the DSUB25 F end to the SAMPLE CONTROL location, the DSUB25 M end to the CORE CONTROL location, and the MDR26 to the USER INPUT locations on the back panel of the Cryostation. Tighten connections with the thumbscrews to secure.
9. Locate the HDSUB44 M-M series cable. Connect one end to the VACUUM CONTROL location on the back of the vacuum control unit. Connect the other end to the VACUUM CONTROL location on the vacuum control peripheral card in the system control unit.

User Interface:

10. Locate the USB and HDMI cables. Connect these cables from the back of the system control unit to the user interface touchscreen display.

Nitrogen:

To keep the sample space clean, a dry clean nitrogen connection is highly recommended (optional on standard non-turbo vacuum control module), especially in humid climates. Nitrogen will help rid the system of moisture and decrease the initial pump down time.

11. Connect a ¼ in (6mm) tube to your nitrogen source (this tubing is not supplied).
12. Start the nitrogen supply at a low flow rate.
13. Verify that the nitrogen is flowing through the tube and does not contain any water vapor. Allow some nitrogen to flow through the tube to remove impurities.
14. Connect this tube to the N2 INLET fitting on the back of the vacuum control unit by pressing in.
15. Set the nitrogen pressure to 10-50 psi for standard vacuum control module and for the turbo vacuum control module 50-100 psi MAX is required to operate the pneumatic turbo case valve.

To disconnect the tubing, push the green circle on the fitting inwards and pull the tubing out.

» NOTE

This system uses nitrogen during a `VENT`, `COOLDOWN`, or `PULL VACUUM` operation if a "dry nitrogen purge" is enabled.

For the Turbo Vacuum Control Module the Nitrogen output is used to control the pneumatic turbo gate valve.

Turbo Vacuum Control Module Connections:

- Locate on Vacuum Control Module the RJ45 Turbo Guage and connect it to the Edwards WRG200 Gauge.
- Locate the CIRC-7(PIN)-to-CIRC-7(SKT) cable and on the Vacuum Control Module the Turbo Valve and connect it to the turbo case valve.
- Connect (user supplied) high or ultra-high purity nitrogen to the N2 Inlet with pressure between 50-100 psi.
- Locate the N2 Outlet *Turbo Option* only connection and connect to the turbo case valve.

System Power:

Be sure to connect all other cables and hoses before connecting system power.

16. Locate one of the C13 main power cords. Ensure the rocker switch on the back of the system control unit is off (o).
17. Connect the main power cord to the C14 inlet located on the rear of the enclosure.
18. Connect the power plug to the appropriate 100 – 240 VAC wall outlet power source.

19. Locate the other C13 main power cord. Ensure the rocker switch on the back of the vacuum control unit is off (o).
20. Connect the main power cord to the C14 inlet located on the rear of the enclosure.
21. Connect the power plug to the appropriate 100 – 240 VAC wall outlet power source.
22. Locate the C19 compressor main power cord. Ensure the power switch on the compressor is off (o).
23. Connect the main power cord to the compressor power inlet.
24. Connect the power plug to the appropriate 200 – 240 VAC wall outlet power source.

» NOTE

The helium hoses have a minimum bend radius that should never be exceeded. If you need to bundle the hoses, please consult a Montana Instruments representative before doing so.

2.7 Initializing the Cryostation

You are now ready to power on your system!

Please refer to the "System Usage & Operation" section of the appropriate User Manual for your product model to find detailed instructions on how to do this.

All manuals can be found on the Montana Instruments product documentation page.