



*Omni***RAM**[®]
Installation
Manual

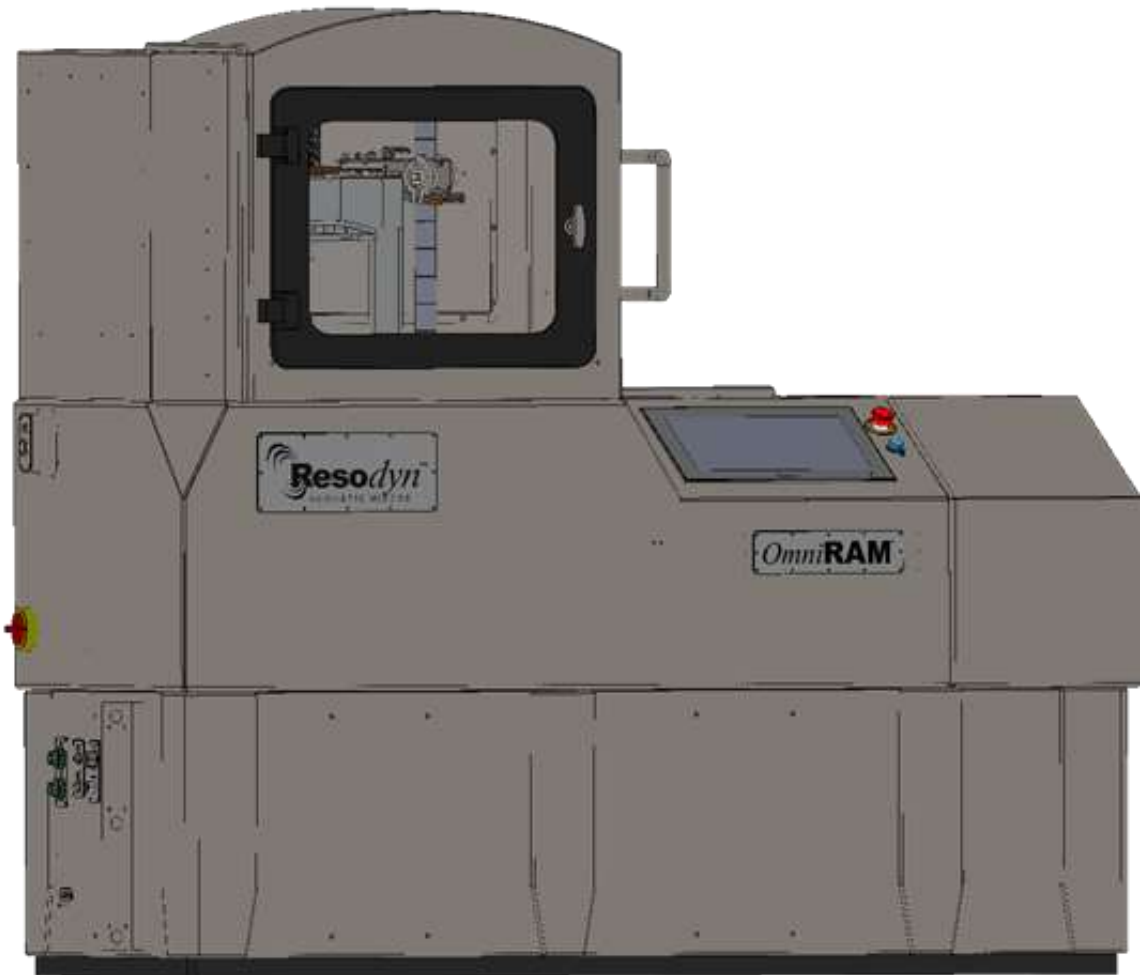


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1.0 INSTALLATION MANUAL REVISION MANAGEMENT

Periodically, as required, this document will be updated to correct errors and document any additional features. Table 1-1 documents the revision, changes, and release date.

Table 1-1: Manual Revision History

Revision	Description	Date
00	Initial Release	04/21/2023
01	Update with skirt installation instructions	11/27/2023

2.0 SAFETY





Every effort has been made to ensure that the *OmniRAM* is easy to use, reliable, and safe. This section outlines the general safety considerations and defines caution and warning symbols used throughout this manual. For safe operation, the *OmniRAM* must be operated only within the limits outlined in the system specifications. Acceptable use of the *OmniRAM* follows:

- Indoor use only
- Main supply voltage fluctuations do not exceed $\pm 10\%$ of the nominal supply voltage
- Equipment is suitable for continuous operation

2.1 Warnings and Cautions


Table 2-1 identifies the symbols used throughout this manual to identify warnings and cautions.

Table 2-1: Warning and Caution Symbols

Warning and Caution Symbols	
	Caution symbol indicates a potentially hazardous situation that could result in injury to personnel or damage to the product.
	High-voltage symbol indicates the possibility of electrical shock. Turn OFF the electrical supply before removing any cover with this symbol attached. Failure to do so may cause exposure to electrical shock hazard. Access to electrical components should only be carried out by a licensed electrician or qualified electrical engineer. NEVER attempt to modify any electrical components or circuits. This may affect the safe operation of the machine.
	Electrostatic-discharge sensitive (ESD) components.
	Only trained, qualified personnel should remove the access panels. This equipment should only be operated by trained and qualified personnel. Do NOT use sharp objects on the touch screen. Do NOT disable or tamper with any safety items (e.g., safety interlock switches).

2.2 Component Replacement

The *OmniRAM* is designed with components that are specifically rated for use with the *OmniRAM* machine. Replace worn, or damaged components only with direct factory replacement parts, or parts approved by Resodyn Acoustic Mixers. Incorrect component replacement can impair the safety of the equipment and risk injury to personnel.

	<p>Do NOT replace components with non-factory components. Non-factory replacement parts may not meet <i>OmniRAM</i> operating requirements, which may compromise the safety of operating personnel and may cause equipment damage.</p>
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2.3 Technical Support for Mixer Installation

The *OmniRAM* System should be installed as outlined in this Installation Manual. If the system shows any signs of visible damage during unloading or installation, or fails to operate as outlined in the User Manual, the system should not be operated.

For installation questions and troubleshooting, see Table 2-2 for Resodyn Acoustic Mixers Technical Support contact information.

Table 2-2: Technical Support for Mixer Installation

Technical Support		
Phone:	+1-406-497-5333	Address: Resodyn Acoustic Mixers 130 North Main, Suite 630 Butte, MT
Fax:	+1-406-497-5206	
Email:	service@resodynmixers.com	

3.0 SYSTEM INSTALLATION OVERVIEW

The *OmniRAM* is a ResonantAcoustic® Mixer for use in industrial mixing and processing applications. The *OmniRAM* consists of an Upper Enclosure, Lower Enclosure and Side Enclosure. Major subsystems include the Remote Human-Machine Interface (HMI) Unit, and Purge and Power Distribution Assembly (see Figure 3-1 and Figure 3-2). Optional subsystems that attach to the enclosure include the Hoist, Vacuum Module, and Process Control Module. The Main Enclosure and optional attached subsystems ship assembled, with the exception of the Hoist.

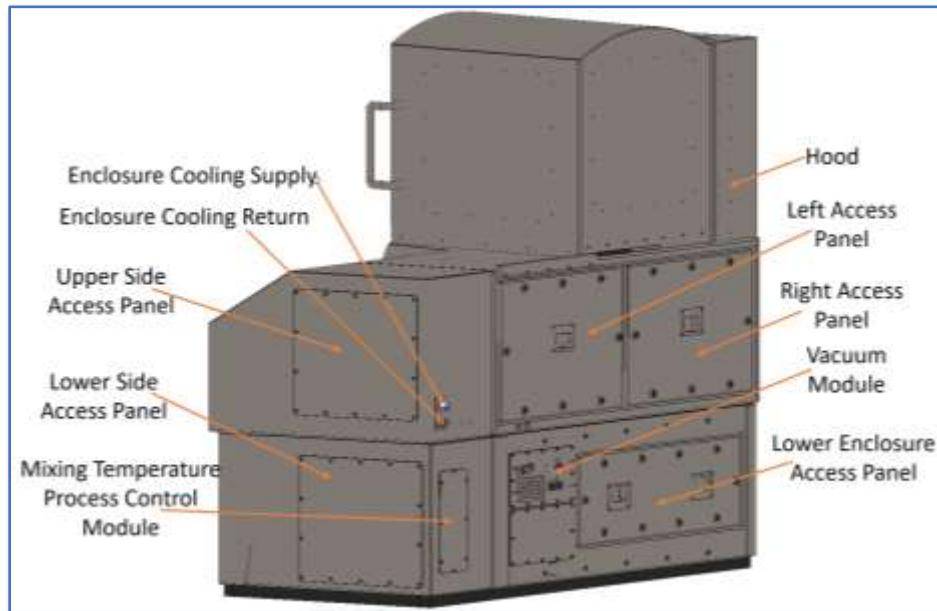


Figure 3-1: *OmniRAM* Mixer, Rear View

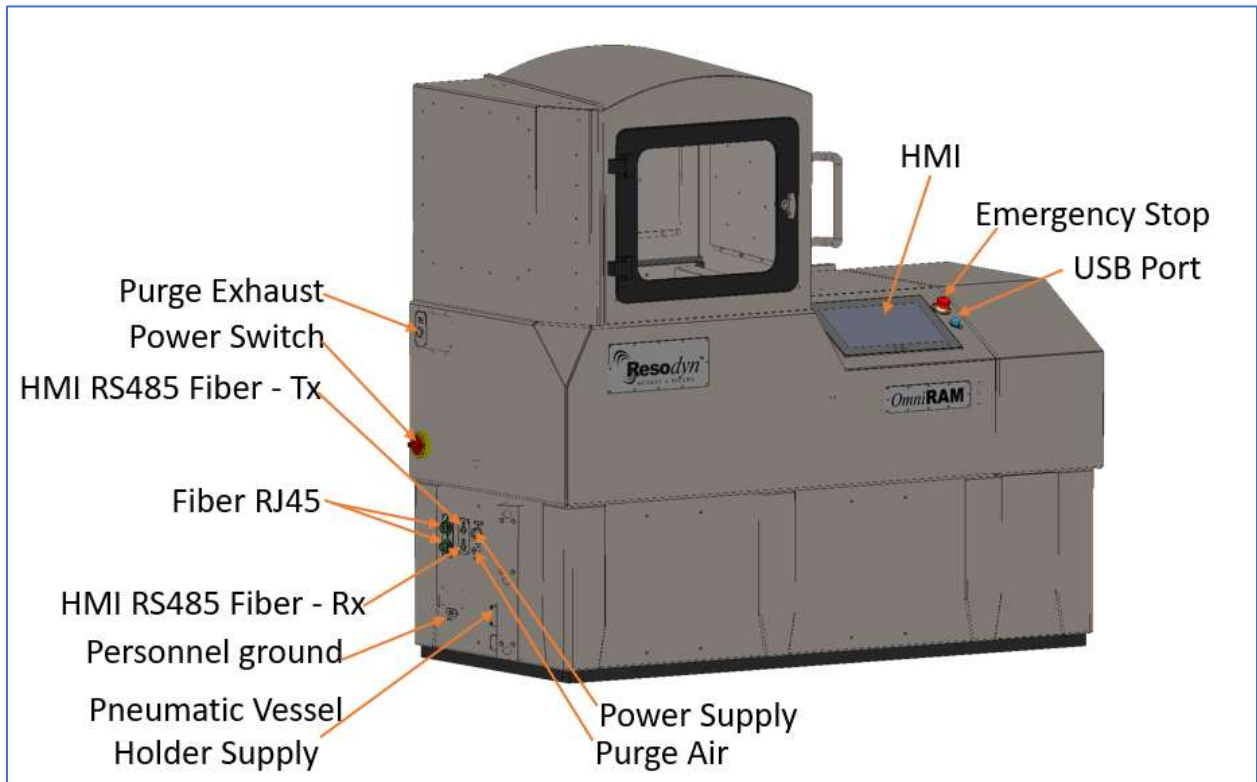


Figure 3-2: OmniRAM Mixer, Front View

The *OmniRAM* enclosure requires clear areas around the machine that are necessary for hookups, maintenance, and machine usability. Components and relative location (including clear areas, connections, Hazardous Room, and Safe Room) are depicted in. **Error! Reference source not found..** Table 3-2 identifies plumbing and cables associated with **Error! Reference source not found..**

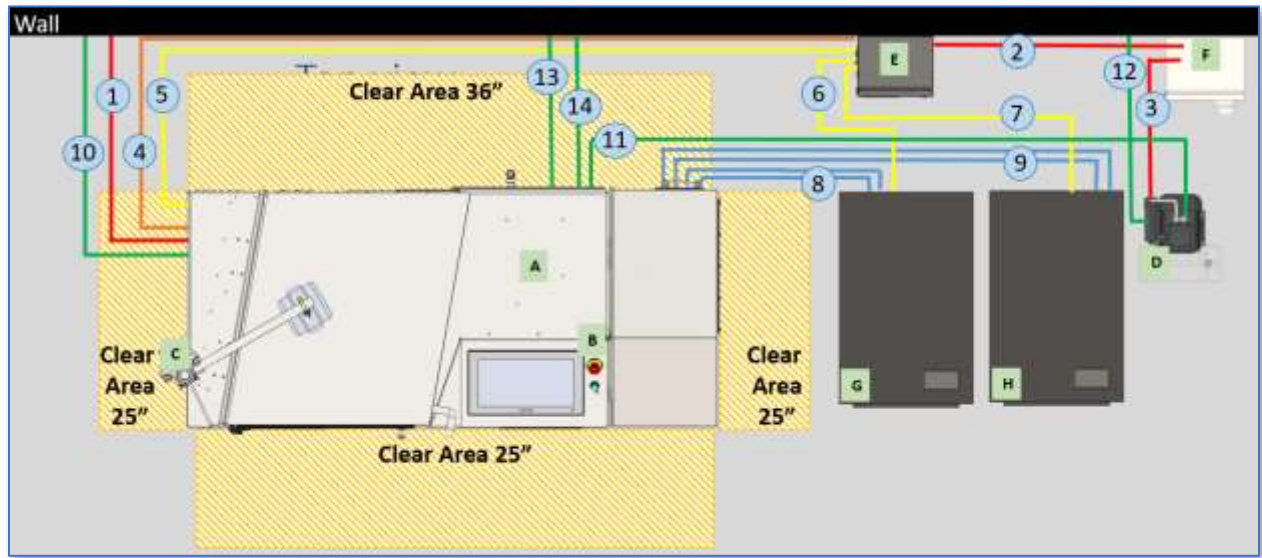


Figure 3-3: OmniRAM Room Layout

ID	Description
A	OmniRAM
B	E-Stop
C	Hoist
D	Vacuum Pump
E	Auxiliary Equipment COM Enclosure
F	Vacuum Pump Starter Box
G	Machine Chiller
H	Process Chiller

Table 3-1: Letter Code for Figure 3-3

Table 3-2: Plumbing and Cable List

Color	ID	Description	Notes
Red	1	Machine Power Cable	Customer-Supplied Cable
	2	Vacuum Starter Box Power Supply	Customer-Supplied Cable
	3	Process Vacuum Power Cable	Customer-Supplied Cable
Orange	4	Serial Fiber Optic Cables (x2)	Supplied by Resodyn, Customer Must Specify Cable Length
Yellow	5	Vacuum Starter Communication Cable	Supplied by Resodyn, Customer Must Specify Cable Length
	6	Machine Chiller Communication Cable	Supplied by Resodyn
	7	Jacketed Vessel Heater/Chiller Communication Cable	Supplied by Resodyn
Blue	8	Machine Cooling Supply and Return Hoses	Customer-Supplied Plumbing
	9	Jacketed Vessel Heating/ Cooling Supply and Return Hoses	Customer-Supplied Plumbing
Green	10	OmnRAM H Purge Air Supply	Customer-Supplied Plumbing
	11	Vessel Vacuum Supply Hose	Customer-Supplied Plumbing
	12	Optional Vacuum Exhaust Hose	Customer-Supplied Plumbing
	13	Optional Vessel Bleed Exhaust Hose	Customer-Supplied Plumbing
	14	Vacuum Controller Compressed Air Supply	Customer-Supplied Plumbing

3.1 Specifications

OmniRAM Mixer specifications are outlined in Table 3-3.

Table 3-3: OmniRAM Mixer Specifications

OmniRAM Mixer Specifications	
General	
Dimensions:	70" H x 35" W x 75" L (approx.) [177.8 cm x 88.9 cm x 190.5 cm]
	95" H x 35" W x 75" L with Hoist (approx.) [241.3 cm x 88.9 cm x 190.5 cm]
Mass:	3000 lbs. [1361 kg] (approx.)
Material:	304L Stainless-steel, with 5 removable panels
Cooling:	Air-to-liquid cooling
Electrical	
Power supply:	1 Phase, 220 to 240 VAC, 40 A, 50/60 Hz
Power consumption:	9.6 kW D(under maximum operating conditions)
Circuit Breaker:	40 A, two-pole
Electrical Enclosure:	Stainless-steel; IP 65 Rated
	3 removable panels for access
	Air-to-liquid cooling
Main Power Disconnect Switch location:	Lower electrical cabinet
Control fuses for protection and isolation of the control circuits	
Performance	
Maximum acceleration:	100 g
Maximum mix capacity:	11 lb. [5 kg]
Vacuum rating:	Minimum 10 Torr
Controls:	Digital
Data logging capabilities:	1 sample per second
Data recorded includes (but is not limited to):	Acceleration, Power, Frequency, Vessel Vacuum, Vessel Temperature, and Time
Controls	
Mixer acceleration control (0 g - 100 g)	
Configurable mix log data collection for logging custom information entry like lot number, batch, etc.	
Machine parameter display and control	
Recipe definition and control	
Manual mix timer	
Setup and configuration screens for supervisors and administrators	
Interlocked Acoustic Enclosure Panels	

OmnRAM Mixer Specifications	
Cooling system control monitoring	
HMI:	PC, with Windows 10 operating system
Alarm display and logging:	Log file records, triggered time, recovered time, and acknowledged time
User management:	Multiple operator users
	User must be logged in to operate the <i>OmnRAM</i>
	Log file tracks login attempts
Auxiliary Communications Enclosure	
Material:	Stainless-steel; IP 40 Rated enclosure
Dimensions:	12 in [305 mm] H × 10 in [250 mm] W × 8 in [200 mm] L (approx.)
Mass:	20 lb. [9 kg] (approx.)
Electrical power supply:	110-240V / 1Φ / 50/60 Hz / 1.0/2.1 A

4.0 INSTALLATION

This Installation Manual details the installation process for the *OmnRAM* and all standard options. Instructions pertaining to machine options will be clearly identified and, if not purchased, can be skipped. Prior to installation, ensure the facility is prepped and ready for the *OmnRAM* and all external components. Contact Resodyn (see Table 2-2) if an installation team, or offsite support, is needed to work with the customer's facility team during the installation process.

4.1 Shipping

The machine is shipped stripped down and crated. The Mixing Vessel(s), RTD Bridge, Hoist, and associated equipment are shipped in separate crates.

4.2 Moving the Equipment

All pallets and crates can be moved with a standard forklift. The mass of the crated machine is approximately 3800 lbs. [1730 kg]. The *OmnRAM* base includes four locking wheels for moving the unit small distances once removed from the crate. Figure 4-1 shows the *OmnRAM* forklift access points.



Figure 4-1: Crated *OmnRAM*

4.3 Leveling the *OmnRAM* and Installing the Skirt

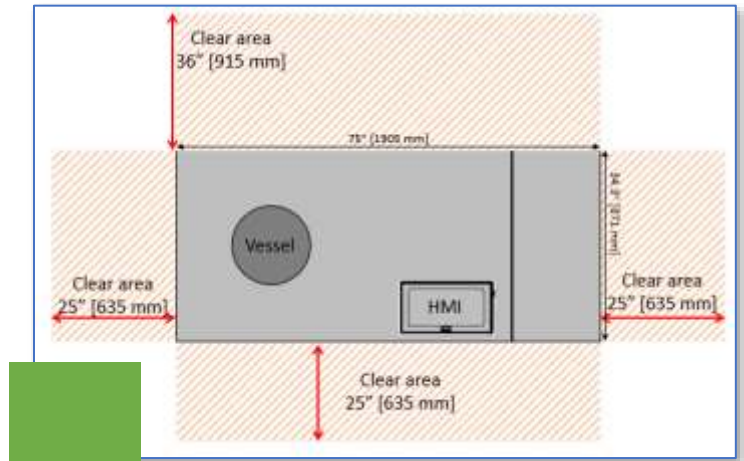
Adjust the eight leveling feet until all wheels are off the ground and the machine is level.


NOTE	<i>OmnRAM</i> is equipped with casters at all four corners to facilitate movement and positioning. Leveling feet are provided at each corner to raise the machine wheels and allow for floor variations.
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Step 1:

Move the *OmnRAM* enclosure into its final operating position. Make sure to adhere to the required clearance areas around *OmnRAM*, as seen at left.

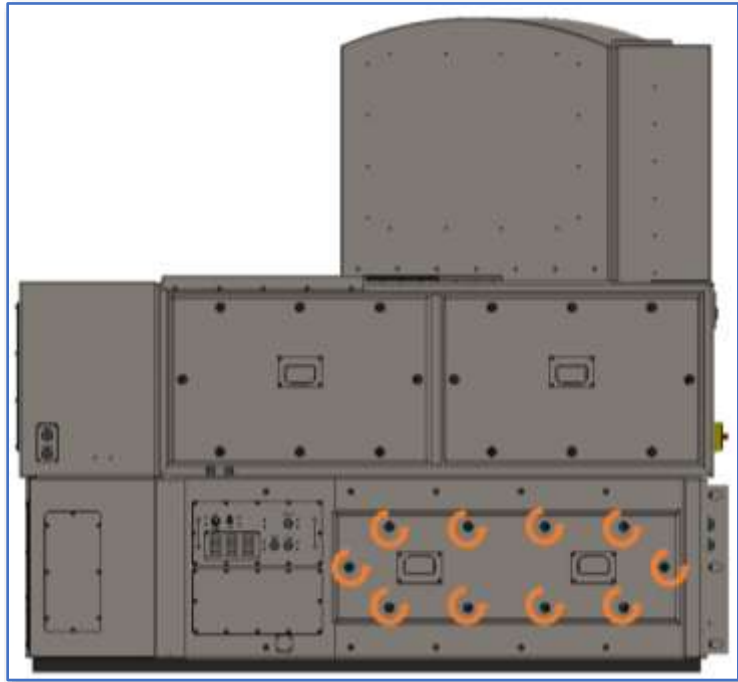
NOTE: If a hoist is attached, it will transit into the area marked in green.



	Clear areas around <i>OmnRAM</i> are required to meet operational, safety, and maintenance needs. Deviation from clear-area requirements may compromise the safety of operating personnel and/or cause downtime and equipment damage.
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Step 2:

Using a 5/16" Allen wrench and a half-turn, remove the Lower Enclosure Access Panel.

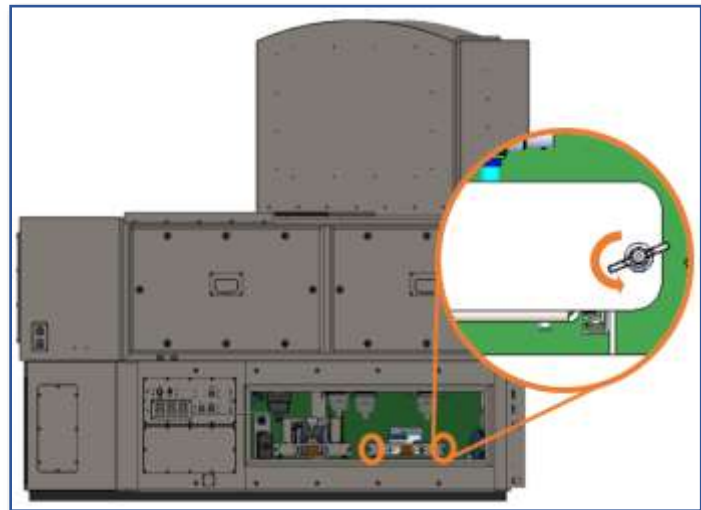


Step 3:

NOTE: The wing nuts are located on the front left and front right side of the rightmost module.

Remove the two (2) wing nuts from the Electrical Module.

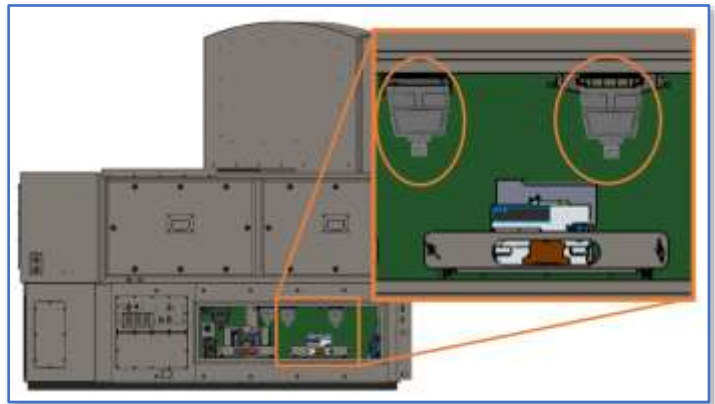
Place the wing nuts in a safe location (they will be required when reinstalling the Electrical Module).



Step 4:

Disconnect the two (2) connections to the Electrical Module.

Pushing up on the tab, disconnect the two (2) I/O connections.



Step 5:

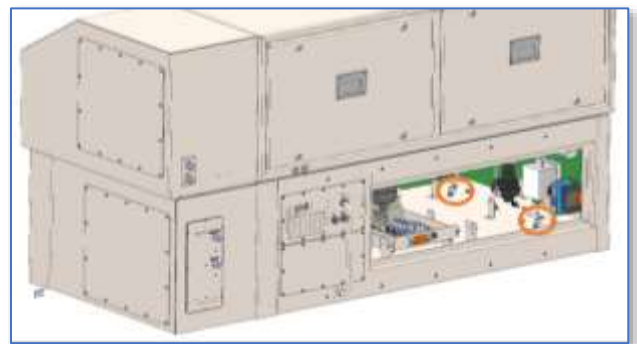
Without removing it completely, slide the Electrical Module tray to its outmost position.



Step 6:

Locate the two (2) interior leveling feet hardware in the upper and lower right-hand side of the machine.

Complete steps 7 and 8 for both leveling feet.



Step 7:

Using a 5/16" Allen wrench, loosen the center bolt.

NOTE: This will allow the raising/lowering of the leveling foot at the end of the threaded rod.



Step 8:

Using a 5/16" wrench, adjust the leveling foot to raise the caster off the floor.

IMPORTANT: This step will be repeated for all eight (8) OmniRAM wheels until they are off the ground.

Level the machine with additional adjustments to the feet, until the machine is level within 5/8" [15.9 mm] front-to-back, and 3/4" [19 mm] side-to-side.

When complete, tighten the bolt to lock the leveling feet.

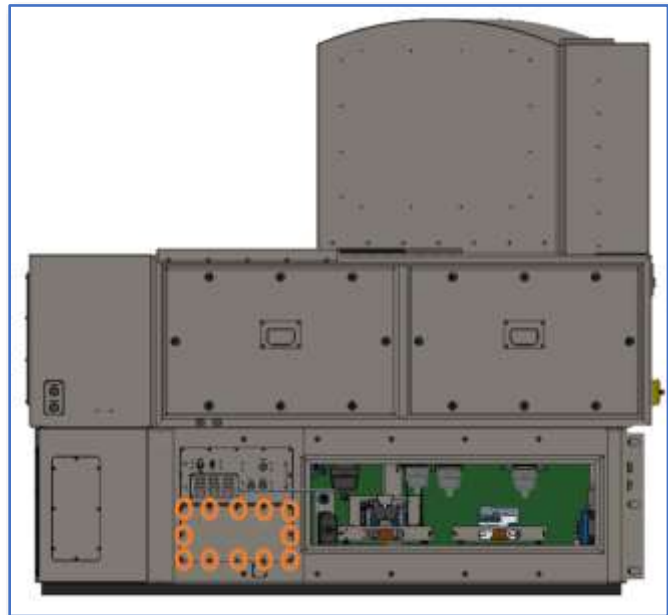


Step 9:

Moving to the opposite side of the *OmnRAM*, use a 5/16" Allen socket to loosen the twelve (12) outside bolts on the Cover Plate.

Remove the Cover Plate.

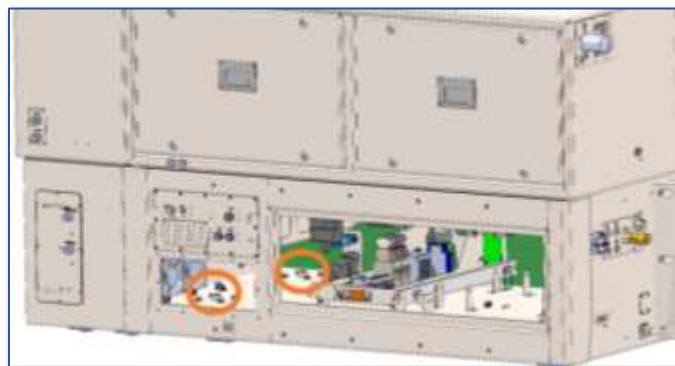
NOTE: Do NOT lose attachment hardware. The bolts and washers will be required when reinstalling the Cover Plate.



Step 10:

Locate the two (2) interior leveling feet hardware in the upper and lower left-hand side of the machine.

Complete steps 11 and 12 for both leveling feet.



Step 11:

Using a 5/16" wrench, loosen the center bolt made visible by the removal of the Mix Process Control Module.

NOTE: This will allow the raising/lowering of the leveling foot at the end of the threaded rod.



Step 12:

Using a 5/16" Allen wrench, adjust the leveling foot to raise the caster off the floor.



Step 13:

Moving to the side cabinet of the *OmnRAM*, use a 5/16" Allen socket to loosen the fourteen (14) outside bolts on the side cabinet access panel.

NOTE: Do NOT lose attachment hardware. The bolts and washers will be required when reinstalling the Access Panel.



Step 14:

NOTE: The Process Control Module is an optional accessory, if it hasn't been purchased, a Cover Plate will be in its place, and step 14 and 15 can be skipped.

On the back side of the side cabinet of the *OmnRAM*, use a 5/16" Allen socket to loosen the eight (8) outside bolts on the Process Control Module.

IMPORTANT: Do NOT remove the Process Control Module yet.



Step 15:

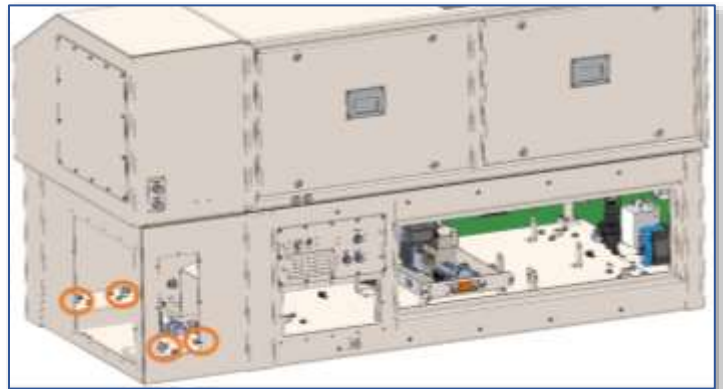
Disconnect the one (1) I/O connection, and the two (2) coolant quick-connects to the Process Control Module.



Step 16:

Locate the four (4) interior leveling feet hardware in the machine.

Complete steps 17 and 18 for all four (4) leveling feet.



Step 17:

Using a 5/16" wrench, loosen the center bolt made visible by the removal of the Mix Process Control Module.

NOTE: This will allow the raising/lowering of the leveling foot at the end of the threaded rod.



Step 18:

Using a 5/16" Allen wrench, adjust the leveling foot to raise the caster off the floor.



Step 19:

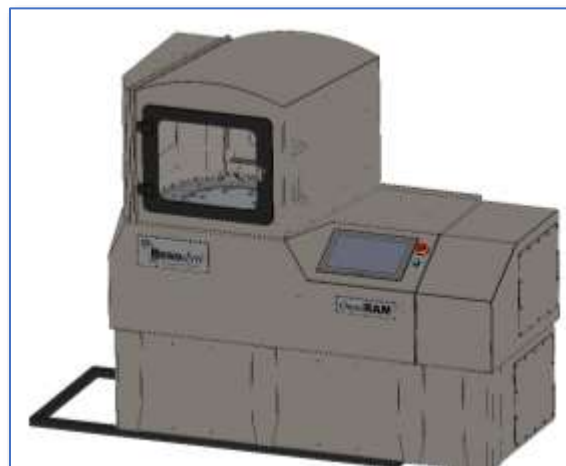
When all eight (8) caster wheels are off the ground the skirt can be installed.

Interlock a short edge piece with the two longer front and back pieces.



Step 20:

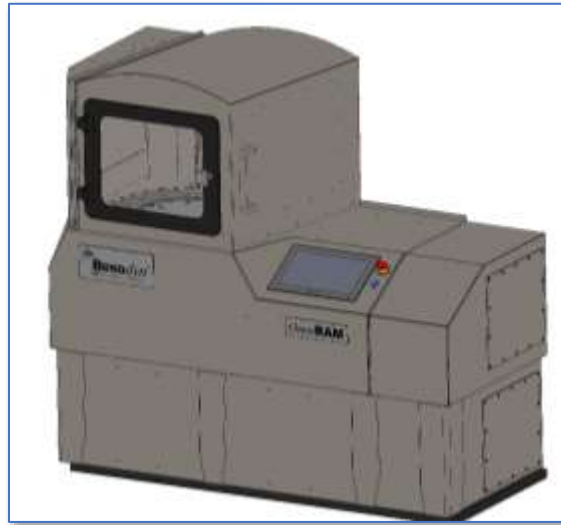
Slide the connected three pieces under the OmniRAM and push the skirt as far to the right as possible for access to the open end.



Step 21:

Interlock right side skirt piece.
And center the skirt under the
machine.

Note: The skirt should be
positioned such that the machine
overhangs the skirt on all sides.



Step 22:

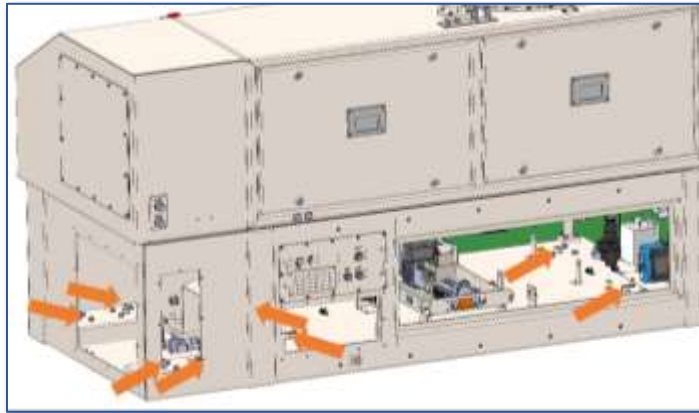
Using a 5/16" Allen wrench,
adjust the leveling foot to lower
the machine enough to make
contact with the skirt. The skirt
should be firmly in place, with the
machine still resting on the
leveling feet.

Note: the machine must be
supported by the leveling feet
NOT the skirt, when adjusting the
leveling feet there needs to
always be resistance.



Step 23:

Once the skirt is in place level the machine with additional adjustments to all eight (8) leveling feet until the *OmniRAM* is level within 5/8" [15.9 mm] maximum front-to-back and 3/4" [19 mm] side-to-side.



Step 24:

When the machine leveling is complete, tighten the leveling foot bolt on all four corners to lock the leveling feet.

Tighten the locking nuts after leveling machine.



Step 25:

Install the Mix Process Control Module by using a 5/16" Allen socket to install the eight (8) outside bolts and washers on the Mix Process Control Module.

Tighten to 27 in-lb [3 nm].



Step 26:

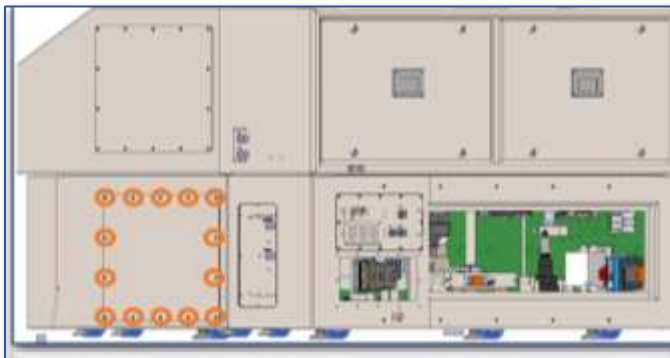
Reconnect the connections to the Mix Process Control Module by connecting the one (1) I/O connection, and the two (2) coolant quick-connects (red hoses).



Step 27:

Install the side cabinet lower access panel by using a 5/16" Allen socket to install the fourteen (14) outside bolts and washers on the access panel.

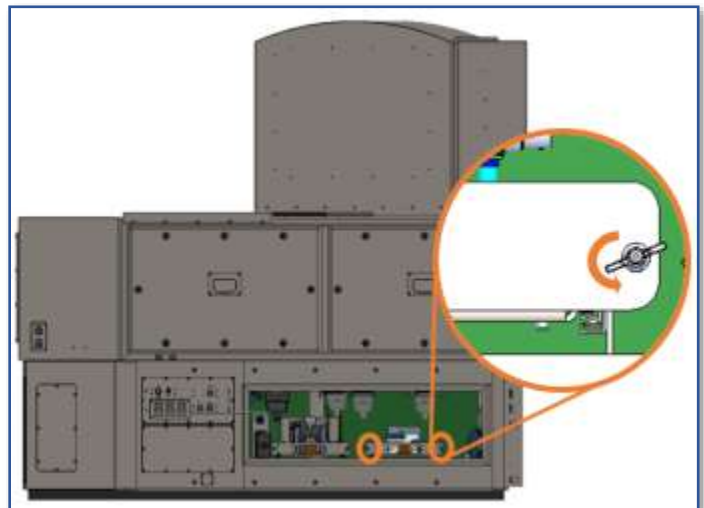
Tighten to 27 in-lb [3 nm].



Step 28:

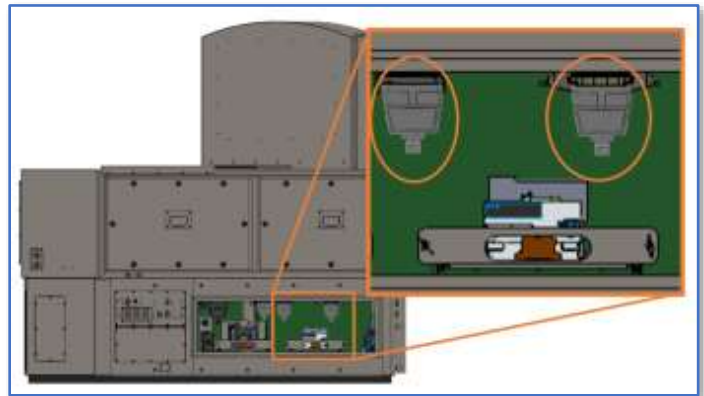
Slide the Electrical Module back into place.

Secure by reinstalling the two (2) wing nuts.



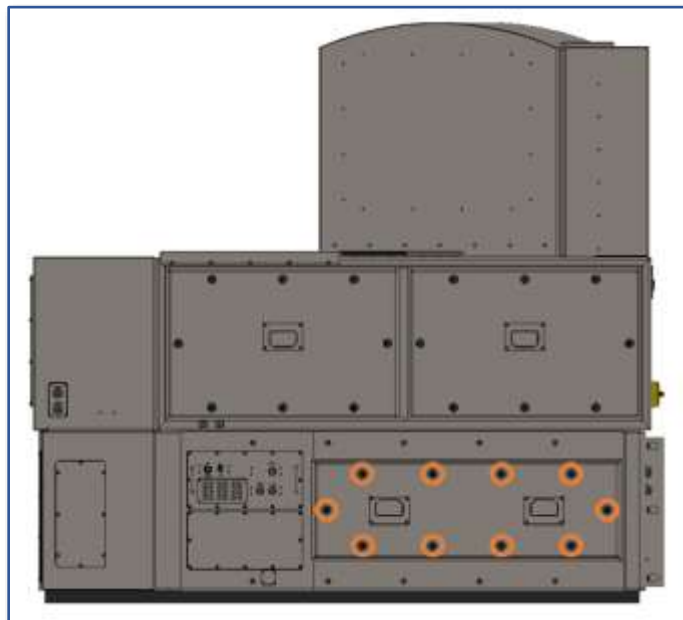
Step 29:

Reconnect the two (2) connections to the Electrical Module by connecting the two (2) I/O connections.



Step 30:

Using a 5/16" Allen wrench and a half-turn, reinstall the Lower Enclosure Access Panel.



Step 31:

If desired run a bead of silicone along the top and bottom edge of the skirt all around the machine.



4.4 Installing the Hoist (Optional Accessory)

The *OmniRAM* can be purchased with a Manual or Pneumatic Hoist attachment (Figure 4-1) that ships separately from the machine. The installation instructions outline the steps to mount the Hoist on the *OmniRAM*, and apply to both the Manual and Pneumatic Hoists. Additional installation steps specific to pneumatic installation are addressed in Section 4.4.2.

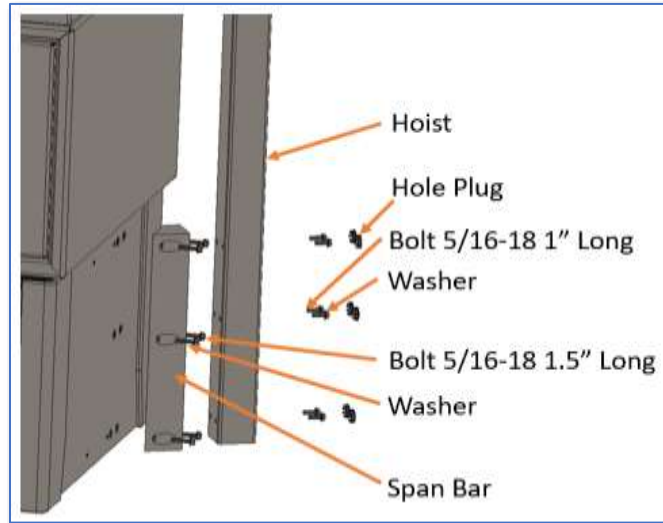


Figure 4-1: *OmniRAM* Hoist Attachment

4.4.1 General Hoist Installation Steps

Before installing the Hoist, verify the *OmniRAM* is level, as outlined in Section 0. These steps apply to both the Manual and Pneumatic Hoist. **Note:** Do not remove the Span Bar, as the machine will lose its IP65 rating.

CAUTION: The mass of the Hoist is 110 lb. [50 kg]. Multiple technicians are required to lift the Hoist frame to avoid possible injury.

Step 1:

NOTE: If Span Bar is already installed, skip this step.

Place the Spacer against the Lower Enclosure.

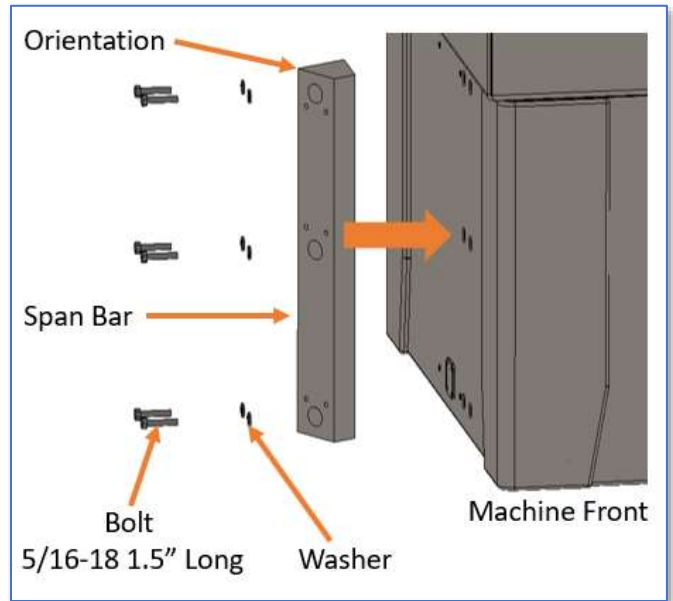
Line up the bolt holes in the Spacer with the holes in the Lower Enclosure.

Apply 243 Loctite®, or equivalent, to the bolts.

Secure the Spacer in place using the six (6) washers and bolts.

NOTE: Orientation of spacer: The Spacer's angled face should be towards the front of the machine.

Use a 1/2" wrench to torque the bolts to 11 ft-lbf [14.9 Nm].



Step 2:

Place the Hoist Vertical Member against the Spacer.

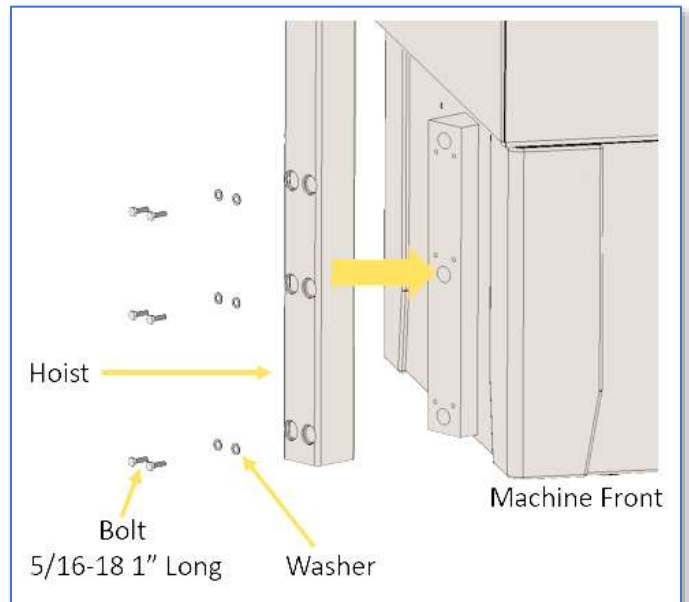
Line up the bolt holes between the Vertical Member and the Spacer.

Apply 243 Loctite, or equivalent, to the bolts.

Secure the Hoist in place by using the six (6) washers and bolts.

NOTE: Before tightening the bolts, verify the Hoist Vertical Member is plumb.

Use a 1/2" wrench to torque the bolts to 11 ft-lb [14.9 Nm].

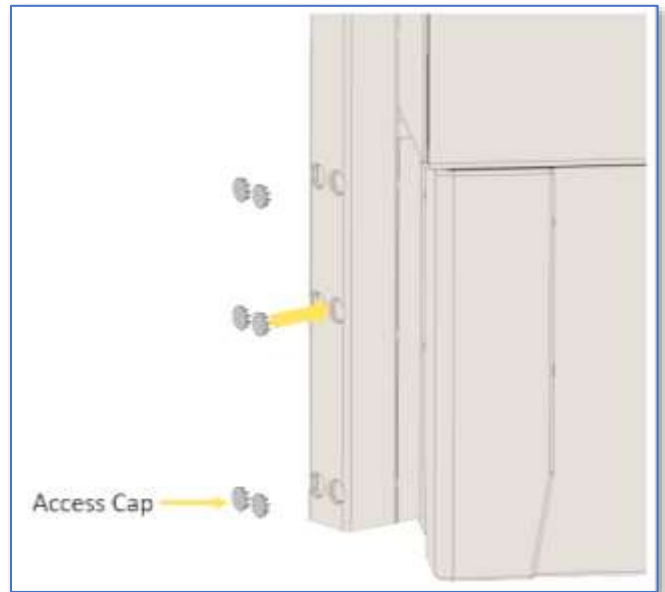


Team lifting is required when manually carrying or holding the Hoist frame. Single-person lifting or holding may lead to personal injury.

Step 3:

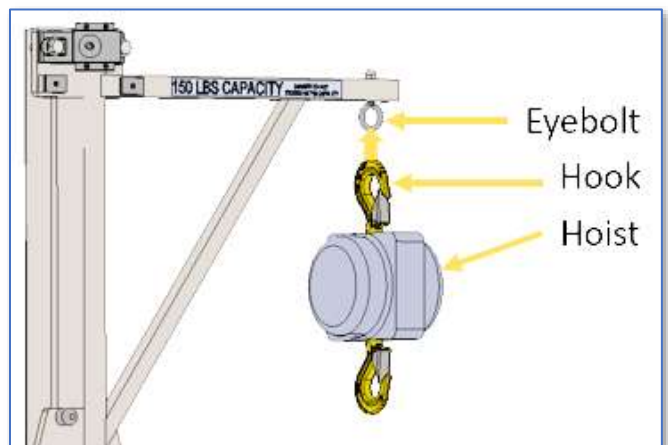
Install the bolt access caps.

Push the six (6) caps into place to cover the bolt access holes in the Hoist beam.



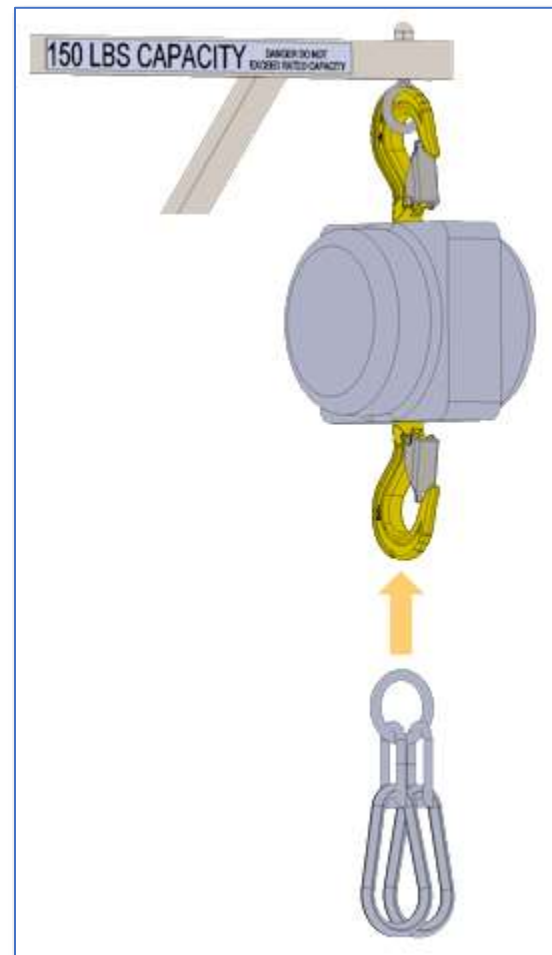
Step 4:

Using the fixed hook, attach the Hoist to the eyebolt on the Hoist frame.



Step 5:

Attach the lifting sling to the Hoist.



4.4.2 Pneumatic Hoist Installation (Optional accessory)

The Pneumatic Hoist includes the:

- Hoist
- Jib Crane Structure
- Lifting Hooks

When installing the Pneumatic Hoist, first install the Hoist as outlined in Section 4.4.1 before starting the specific Pneumatic Hoist. Pneumatic Hoist specifications are outlined in Table 4-1.

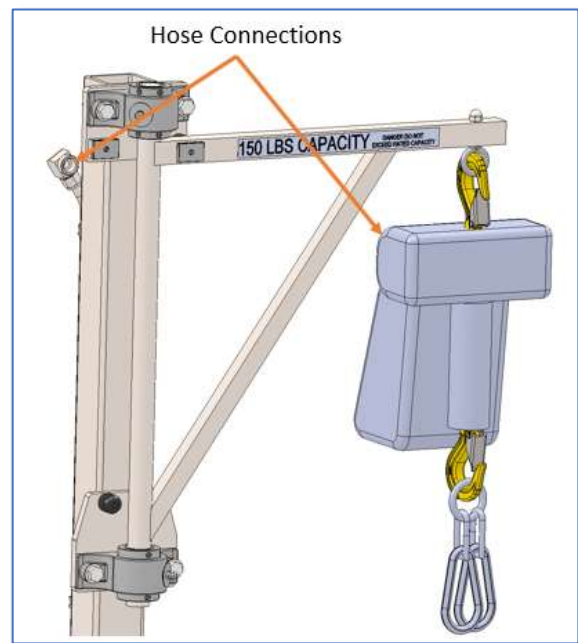
Table 4-1: OmnRAM Pneumatic Hoist Specifications

Equipment	Specification	Description
Jib Crane	Capacity:	150 lb. [68 kg]
	Overall span:	28 in. [0.71 m]
	Overall height:	95" [2.41 m]
	Surface finish:	304-L stainless-steel, DA sanded
	Mounting:	Mixer Enclosure/Frame
Hoist	Capacity:	100 lb. [45.4 kg]
	Speed:	Up to 65 fpm [19.8 m/minute]
	Air:	33.5 cfm @ 87 psi [.95 m ³ /minute @ 600 kPa]
	Control:	Pendant
	Chain material:	Stainless-steel

Step 1:

NOTE: Complete the general Hoist installation steps above before proceeding.

Apply Teflon tape to both ends of the three-foot [91 cm] hose. Then connect the Hoist to the elbow on the upper portion of the Hoist Vertical Member.

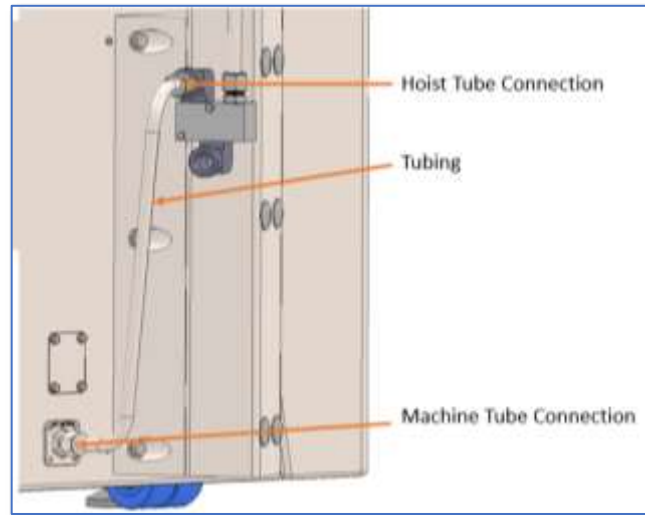


Step 2: (Attachment to Optional Vacuum System):

NOTE: Steps 2 and 3 can be skipped if the optional Vacuum System was not purchased.

NOTE: There are two (2) tube connections at the bottom of the Hoist to attach the Pneumatic Hoist to the Vacuum System.

Connect the provided tubing to both the Hoist tube connection and machine tube connection, then tighten.

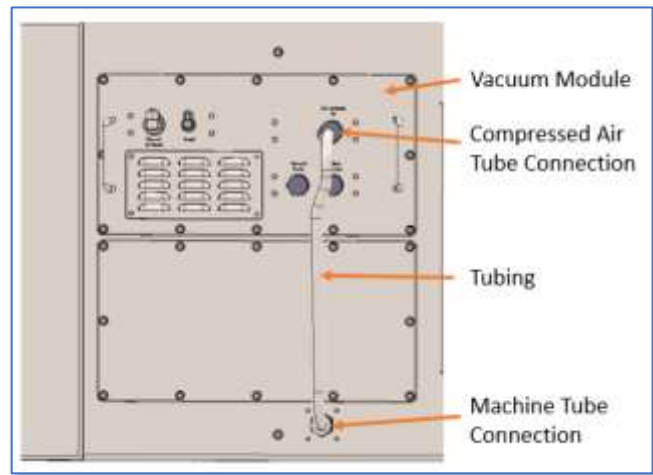


Step 3: (Attachment to Optional Vacuum System):

NOTE: Steps 2 and 3 can be skipped if the optional Vacuum System was not purchased.

NOTE: There are two (2) tube connections on the back of the machine to attach the tubing to the Vacuum System.

On the Vacuum Module, connect one end of the provided tubing to the machine tube connection, and the other end of the tubing to the compressed air tube connection.

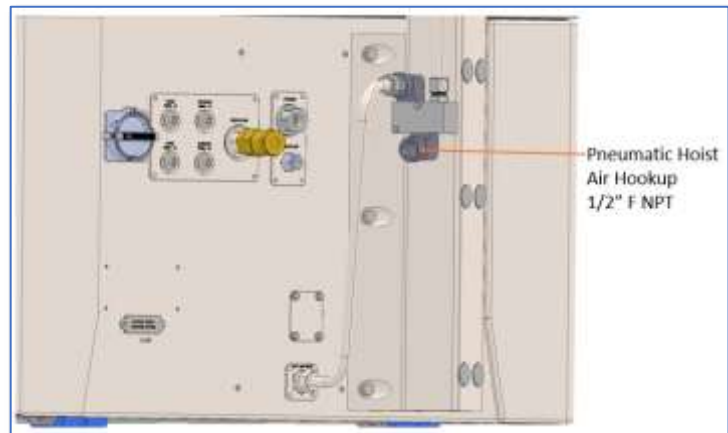


Step 4:

Apply Teflon tape to both ends of the hose before installing.


Remove the plug, if necessary.

Connect the client-provided Pneumatic Air Line 1/2" (Female NPT Connection) to the Lower Hoist Air Connection.



4.5 Mounting the Auxiliary Communications Enclosure (ACE)

The ACE is designed to be wall mounted. To properly mount it to the wall, it must be connected directly to the structure of the wall and not just drywall. The bolt pattern for the ACE is shown in Figure 4-2. Unistrut or another structural member can be bolted into the wall structure, and the ACE can be bolted to the Unistrut. The customer is responsible for providing the necessary hardware and materials to properly mount the ACE and ensuring the mounting complies with company, local, and national regulations.

	<p>The customer is responsible for ensuring the ACE is mounted in such a way that it complies with all company, local, and national regulations.</p>
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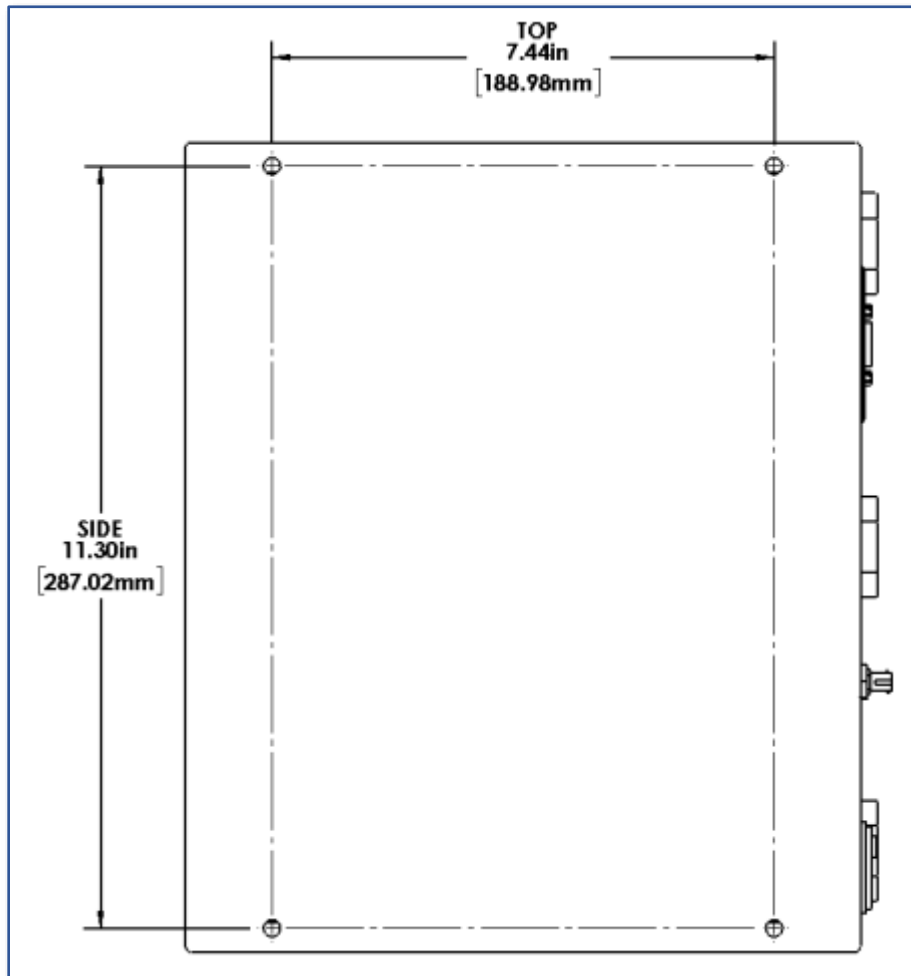


Figure 4-2: ACE Bolt Locations

Step 1:

Transport the ACE to the location it will be installed.

Step 2. Mounting the Unistrut to the Wall (if necessary):

Mount the Unistrut strips to the wall, so that it is bolted into the structure of the wall and works with the bolt pattern called out in Figure 4-2.

Secure the Unistrut to the wall using 1/4" lag bolts and wall anchors, or the customer-supplied hardware, required by company, local, and national regulations.

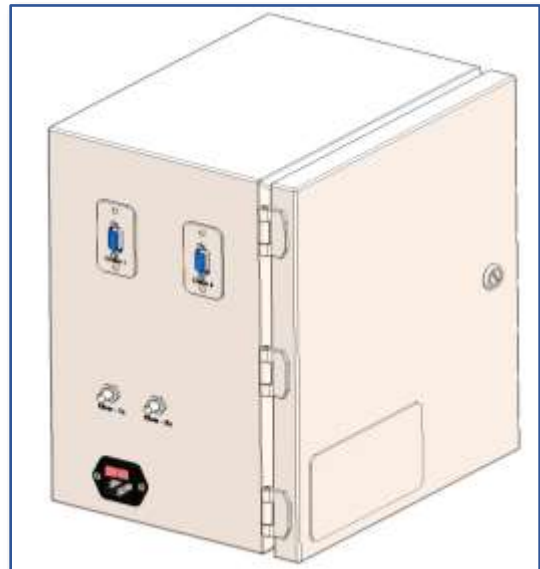



Step 3:

Mount the enclosure in place.

Have one technician align the mounting holes and hold the panel in place, while a second technician secures the panel.

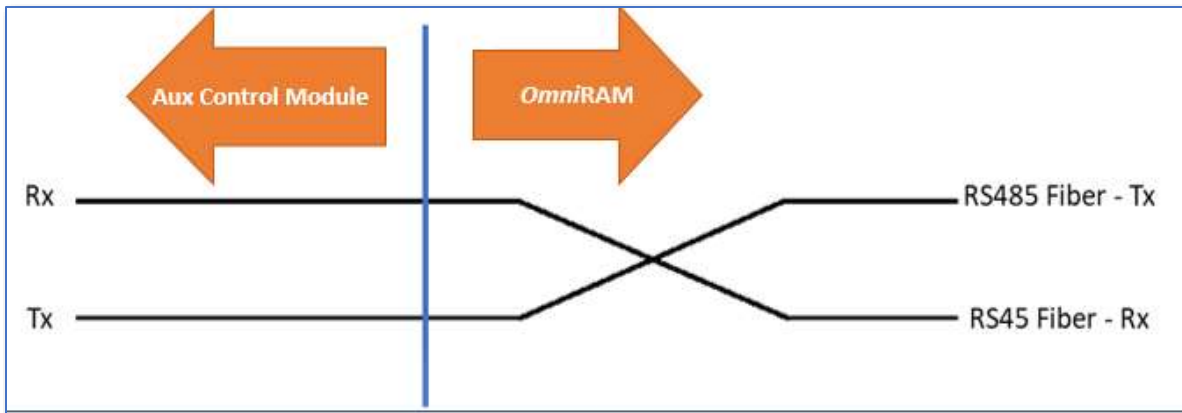
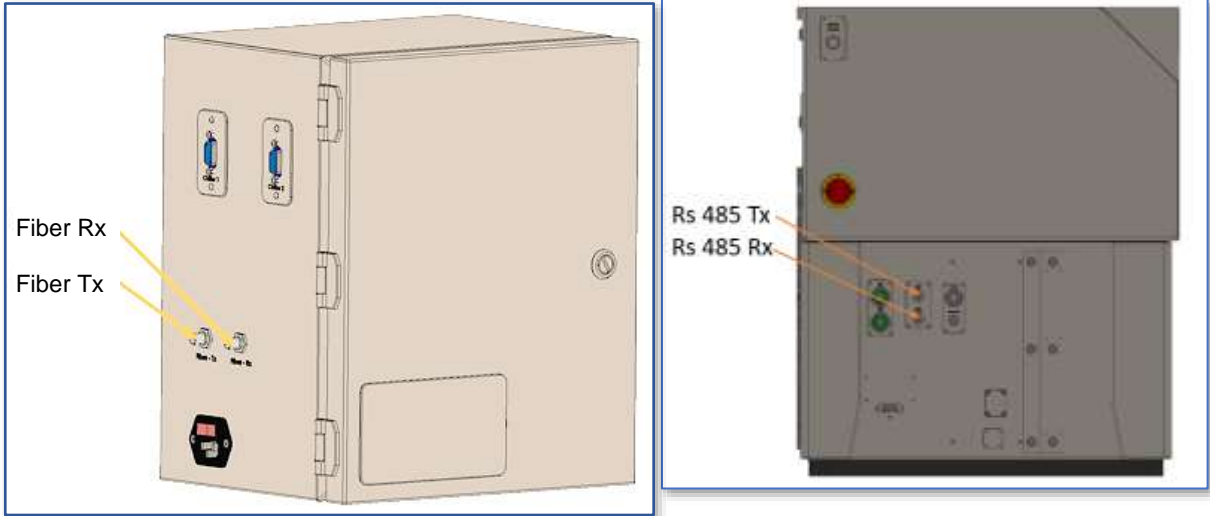
Secure the ACE in place using 3/8" [10 mm] or larger diameter bolts, or the customer-supplied hardware required by company, local, and national regulations.



 **Do NOT** attach any electrical or mechanical power to any equipment until all equipment has been properly secured in place.

Step 4:

Run the Rx and Tx Fiber from the ACE to the connections on the right side of the *OmnRAM* Enclosure.



4.6 Connect the Machine Chilling System

Machine chilling is required for proper temperature control of the enclosure. Liquid cooling hookups are located on the enclosure and a Machine Chiller is recommended. The steps below outline hooking up with the Resodyn Machine Chiller. Specifications are outlined in Table 4-2.

Table 4-2: OmniRAM Machine Chiller Specifications

Item	Description
Dimensions (L x W x H)	30" x 19" x 26" [76.2 cm x 48.3 cm x 66 cm]
Mass	340 lb. [154.2 kg]
Install Environment	Ambient Temperature: 61 - 95 °F [16.1 to 35 °C]
	Max Humidity 80% (non-condensing)
Electrical Power supply	208 - 230 VAC / 1Φ / 60 Hz/ 30A
	240 VAC / 1Φ / 50 Hz/ 30A
Coolant type	70% Water / 30% Glycol Glycol must have corrosion inhibitors and water must be distilled.
OmniRAM Connection	2X 1/2" Compression Tube

Step 1:

Install the Machine Chiller.

Allow 24 inches [61 cm] of clearance away from walls or vertical surfaces.

NOTE: See the Machine Chiller Manual for additional information.

Step 2:

Connect the facility water inlet and outlet lines located on the back of the Chiller.

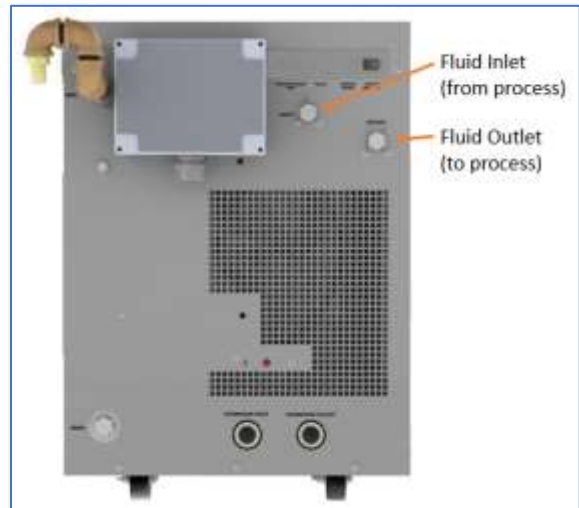
NOTE: See the Machine Chiller Manual for additional information.



Step 3:

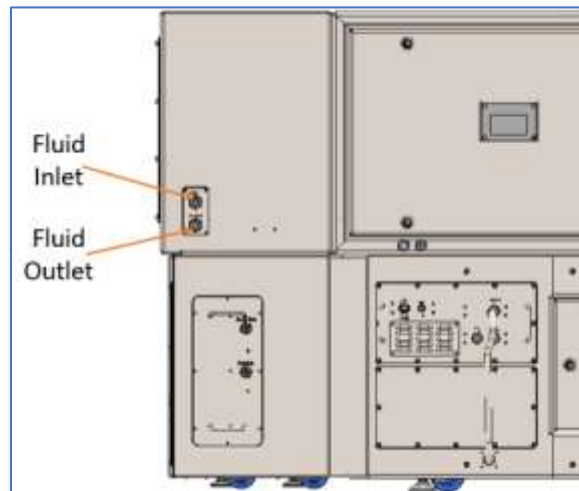
Connect the inlet and outlet lines that will run from the Chiller to the *OmniRAM* enclosure to the back of the Chiller.

NOTE: See the Machine Chiller Manual for additional information.



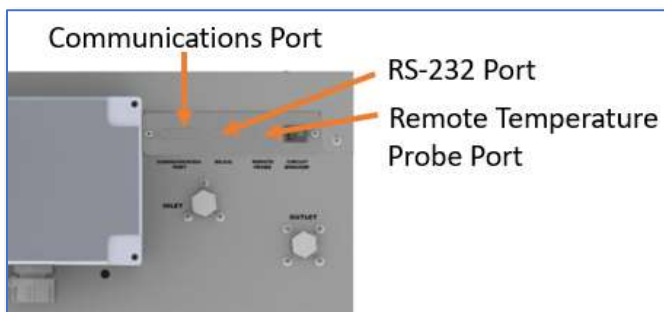
Step 4:

Connect the Chiller process fluid inlet and outlet lines to the *OmniRAM* Enclosure via 1/2" tube connection.



Step 5:

Using the supplied DB9 cable, connect the Chiller communication line on the back of the Chiller to the Chiller 1 port on the Auxiliary Communication Enclosure.



4.7 Connect Process Heater/Chiller and Process Module (Optional Systems)

The Process Heater/Chiller and Process Module are optional upgrades that permit Jacketed Vessel heating and cooling during mix processing. Temperature-control hookups are located on the enclosure, and the Resodyn Process Heater/Chiller is recommended for seamless interfacing with the system mix processing. The steps below outline Heater/Chiller installation and hookup to the *OmniRAM* enclosure. Heater/Chiller specifications are outlined in Table 4-3.

Table 4-3: *OmniRAM* Process Heater/Chiller Specifications

Item	Description
Dimensions (L x W x H)	30" x 19" x 26" [76.2 cm x 48.3 cm x 66 cm]
Mass	340 lb [154.2 kg]
Install Environment	Ambient Temperature: 61 - 95°F [16.1 to 35 °C]
	Max Humidity 80% (non-condensing)
Electrical	208-230V / 3Φ / 50-60 Hz / 45 A
Coolant type	70% Water / 30% Glycol Glycol must have corrosion inhibitors and water must be distilled.
<i>OmniRAM</i> Connection	2 X 1/2" Female NPT
Chiller Connection	2 X 1/2" Female NPT

Step 1:

Install Process Heater/Chiller.

Allow 24" [61 cm] of clearance away from walls or vertical surfaces.

NOTE: See the Process Heater/Chiller Manual for additional information.

Step 2:

Connect the Facility Water Inlet and Outlet Lines located on the back of the Heater/Chiller.

NOTE: See the Process Heater/Chiller Manual for additional information.

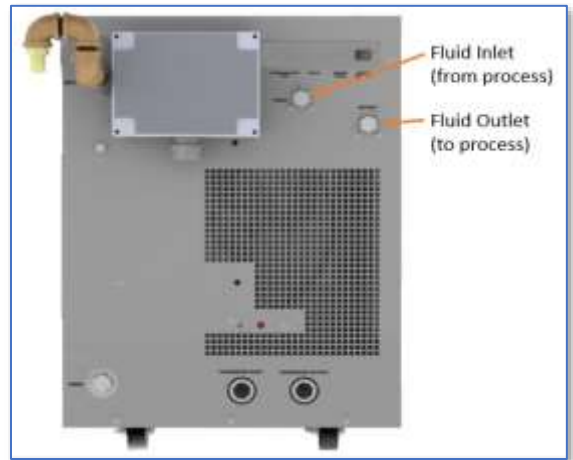


Step 3:

Connect the Inlet and Outlet Lines to the back of the Heater Chiller.

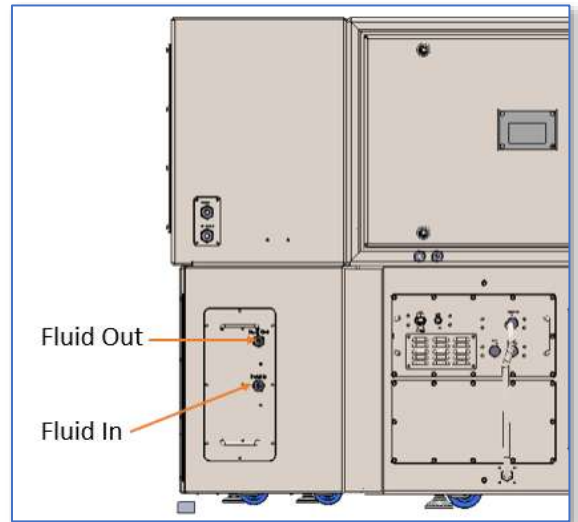
NOTE: These lines will run from the Heater/Chiller to the Process Control Module on the back of the *OmniRAM*.

NOTE: See the Process Heater/Chiller Manual for additional information.



Step 4:

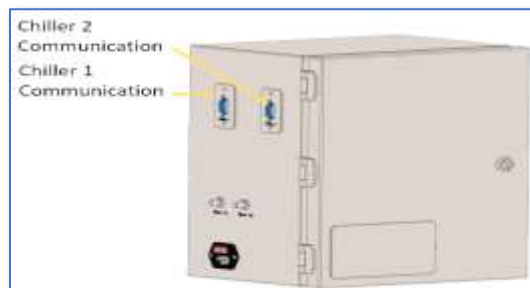
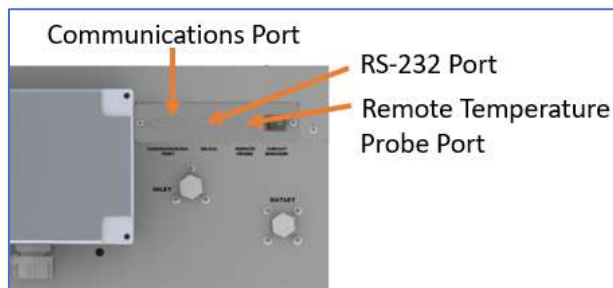
Connect the Heater/Chiller Process Fluid Inlet and Outlet Lines to the *OmniRAM* Enclosure via 1/2" F NPT connections.



Step 5:

Using the supplied DB9 cable, connect the Heater/Chiller Communication Line on the back of the Heater/Chiller to the Chiller 2 port on the Auxiliary Communication Enclosure.

NOTE: If the user did not purchase the Machine Chilling system, attach the DB9 cable to the Chiller 1 port.



Step 6:

Wire the Heater/Chiller power.

NOTE: The user will need to supply and install a power plug for the Process Heater Chiller.

4.8 Connect Vacuum Module (Optional System)

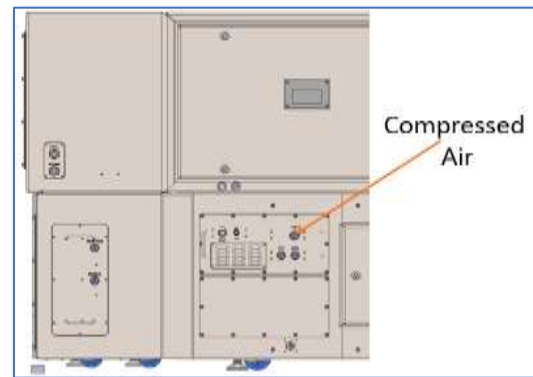
The Vacuum Module is an optional system used to pull vacuum on Vessels as part of the mix process. The Vacuum Module comes installed in the *OmniRAM* and can be accessed from the back of the machine.

Step 1:

Remove the compressed air plug.

Attach the compressed air hookup with a 1/2" M NPT fitting.

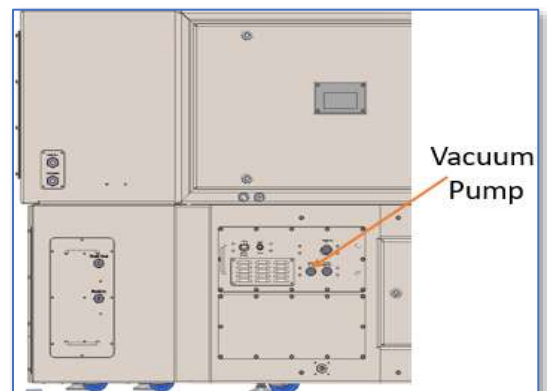
NOTE: If the optional Pneumatic Hoist was purchased, attach per the instruction in Section 4.4.2, step 3.



Step 2:

Remove the Vacuum Pump plug.

Attach the Vacuum Pump line with a 1/2" M NPT.

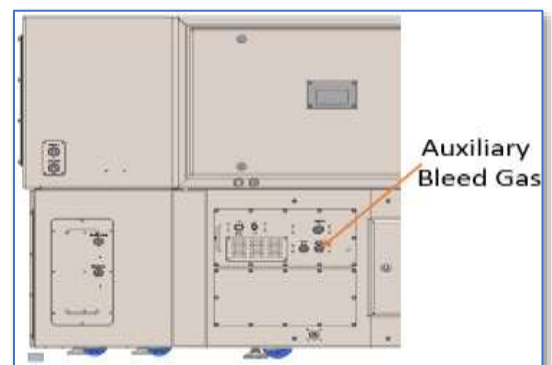


Step 3: (Optional Bleed Routing):

NOTE: Users can opt to route bleed gas to an alternate location via the Auxiliary Bleed Gas hookup.


To route bleed gas, remove the Auxiliary Bleed Gas plug.

Attach a 1/2" M NPT line routed to the desired bleed location.



4.9 Vacuum Pump and Starter Box (Optional System)

The Vacuum Pump and Starter Box are optional systems that work with the Vacuum Module to seamlessly pull vacuum as part of the mix process. The Starter Box is designed to be wall mounted (see Figure 4-3) and comes attached to the ACE with a 10-foot cable. To properly mount it to the wall, it must be connected directly to the structure of the wall and not just drywall. The bolt pattern for the Vacuum Starter Box is shown in Figure 4-3. If needed, Unistrut or another structural member can be bolted into the wall structure, and the Starter Box can be bolted to the Unistrut. The customer is responsible for providing the necessary hardware and materials to properly mount the Starter Box and ensuring the mounting complies with company, local, and national regulations.

	<p>The customer is responsible for ensuring the Starter Box is mounted in such a way that it complies with all company, local, and national regulations.</p>
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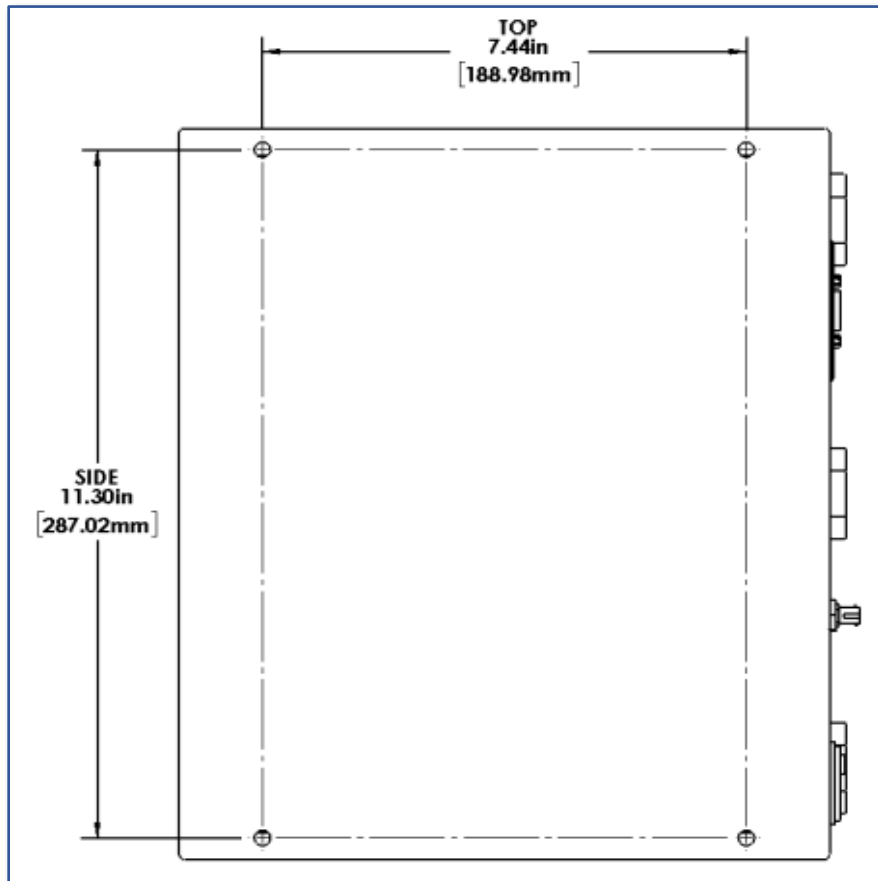


Figure 4-3: Vacuum Pump Starter Box Enclosure Bolt Locations

Step 1:

Transport the Vacuum Pump Starter Box to the location it will be installed.

Step 2: Mounting the Unistrut to the Wall (if necessary):

Mount the Unistrut strip to the wall so that it is bolted into the structure of the wall and works with the bolt pattern called out in the Figure 4-3.

Secure the Unistrut to the wall using 1/4" lag bolts and wall anchors, or the customer-supplied hardware required by company, local, and national regulations to secure the Unistrut to the wall.

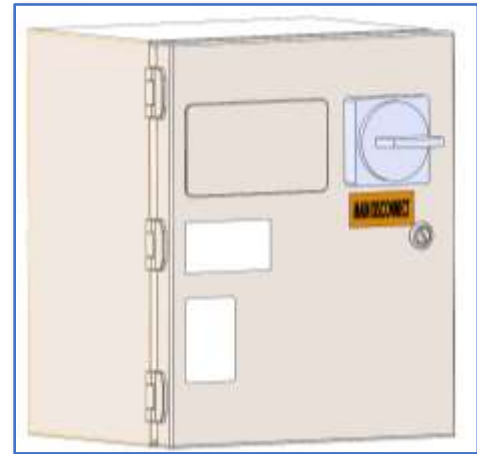


Step 3:

Mount the enclosure in place.

Have one technician align the mounting holes and hold the panel in place, while a second technician secures the panel.

Secure the Vacuum Pump Starter Box in place using 3/8" [10mm] or larger diameter bolts, or the customer-supplied hardware required by company, local, and national regulations.



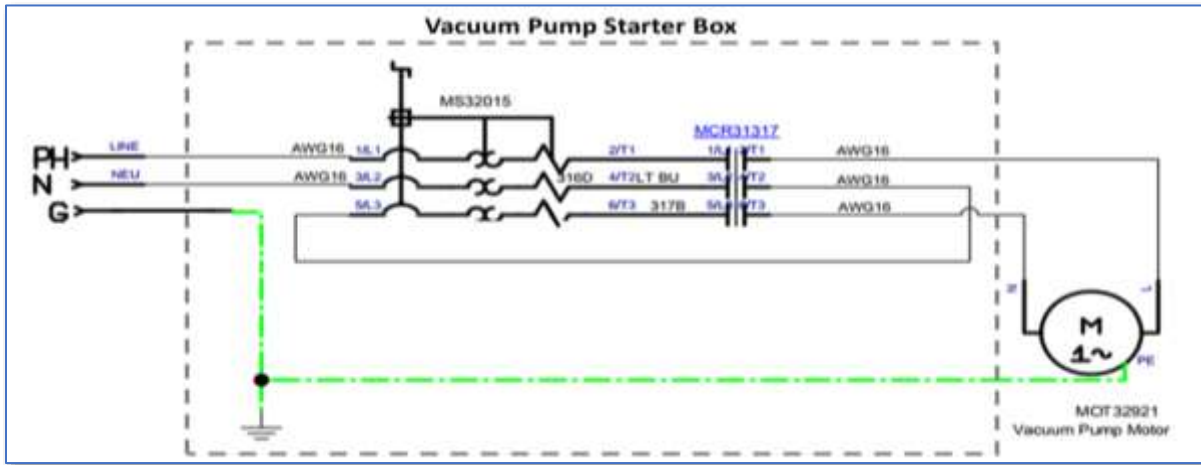
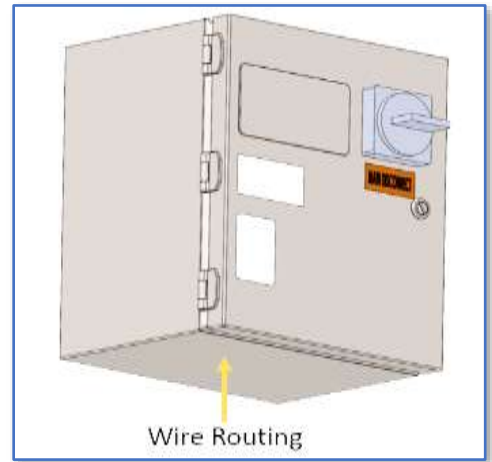
Do NOT attach any electrical or mechanical power to any equipment until all equipment has been properly secured in place.

Step 4:

The customer will need to drill holes in the enclosure as required for the Vacuum Pump power supply lines.

Step 5:

Connect the Vacuum Pump power supply and power lines to the Starter Box.



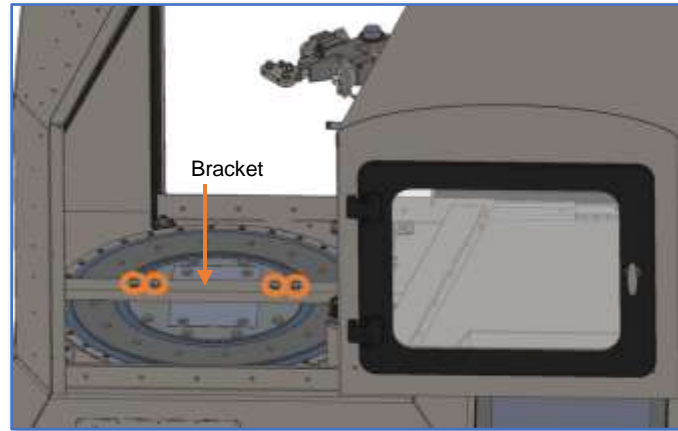
4.10 Removing the Shipping Bracket

The shipping bracket minimizes movement of the Resonator during transport. It must be removed before the machine can enter service.

Step 1:

Using a 9/16" wrench, remove the four (4) bolts (circled in orange) securing the shipping bracket in place.

NOTE: Store the shipping bracket in the event the machine needs to be moved.

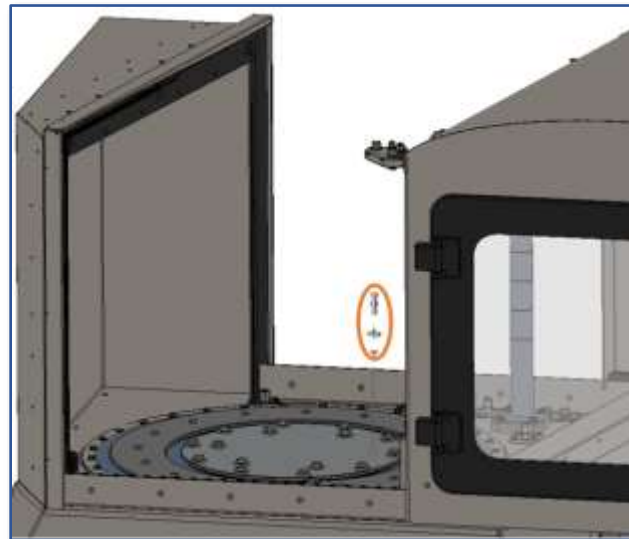



Step 2:

Install an O-Ring, washer, and bolt (included) in each of the four (4) holes resulting from the removal of the shipping bracket.

Apply Loctite 243 to the threads of each bolt.

Using a 9/16" wrench, torque the bolts to 88 in-lbf [9.9 Nm].

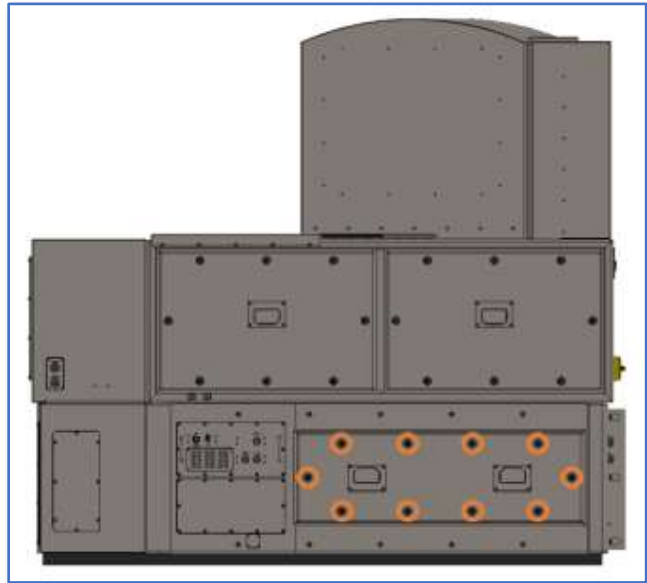


	<p>Do NOT move the <i>OmniRAM</i> once the Resonator brackets have been removed. Moving the machine after the brackets have been removed may lead to equipment damage.</p> <p>Do NOT operate the <i>OmniRAM</i> with the shipping bracket still installed. Doing so may damage the machine.</p>
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4.11 Connecting Facility Power to the *OmnRAM*

Step 1:

Using a 5/16" Allen wrench and a half-turn, remove Lower Enclosure Access Panel.

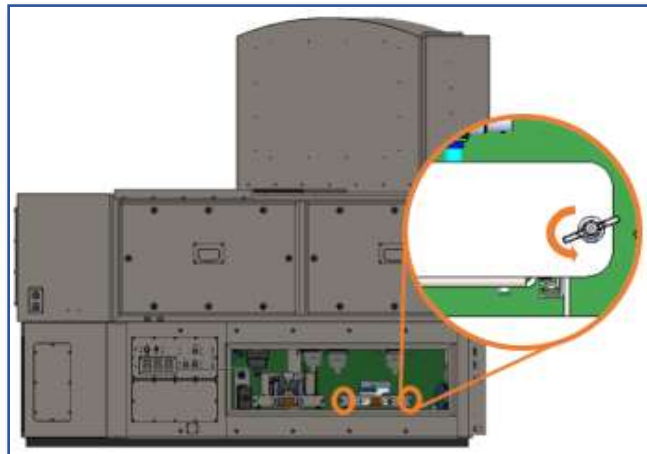


Step 2:

The wing nuts are located on the front left and right side of the rightmost module.

Remove the two (2) wing nuts from the Power Module.

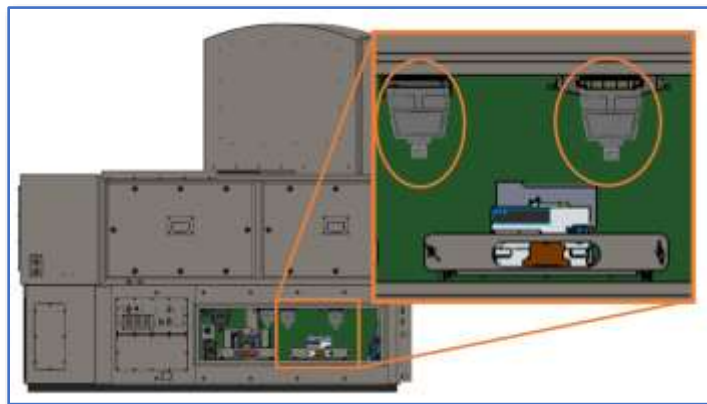
NOTE: Place the wing nuts in a safe location. The wing nuts will be required when reinstalling the Power Module.



Step 3:

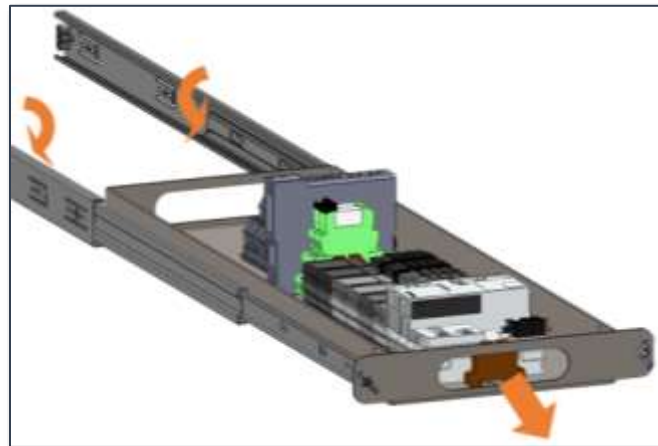
Disconnect the two (2) connections to the Power Module.

Pushing up on the tab, disconnect the two (2) I/O connections.



Step 4:

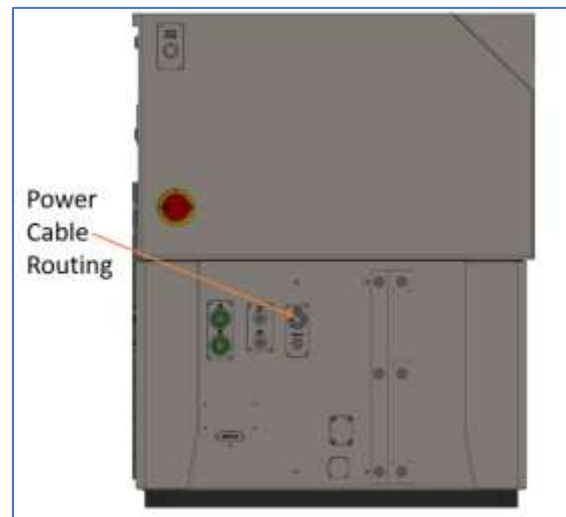
Remove the Power Module.



Step 5

Locate the Power Cable routing hole on the right side of the enclosure.

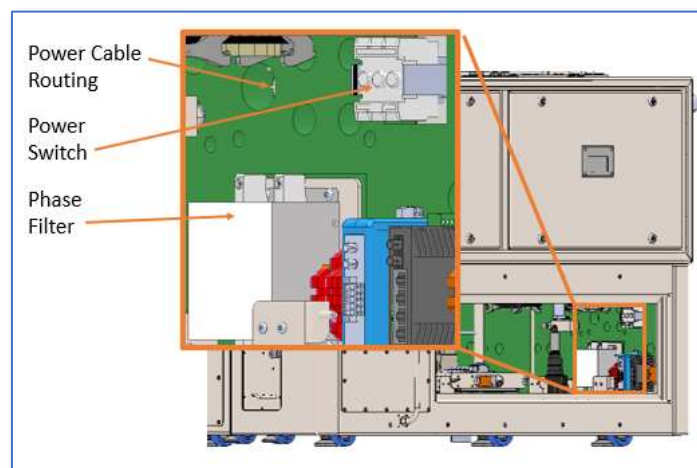
Route the input power line.



Step 6

Route the Power Cable inside the machine to the Power Switch, as outlined in Figure 4-4 below.

NOTE: For additional information see electrical Schematic 905170-XX.



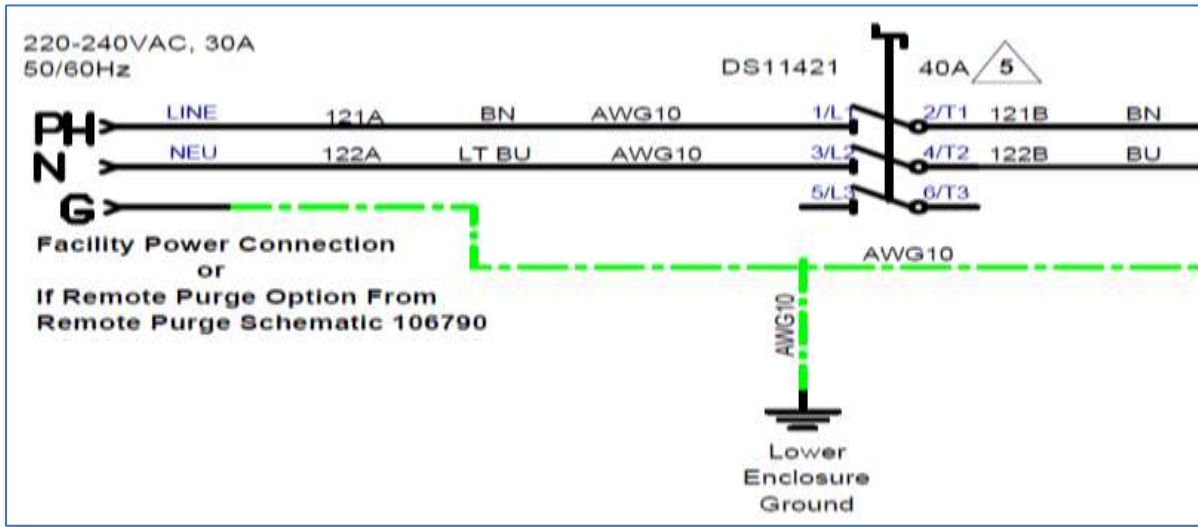
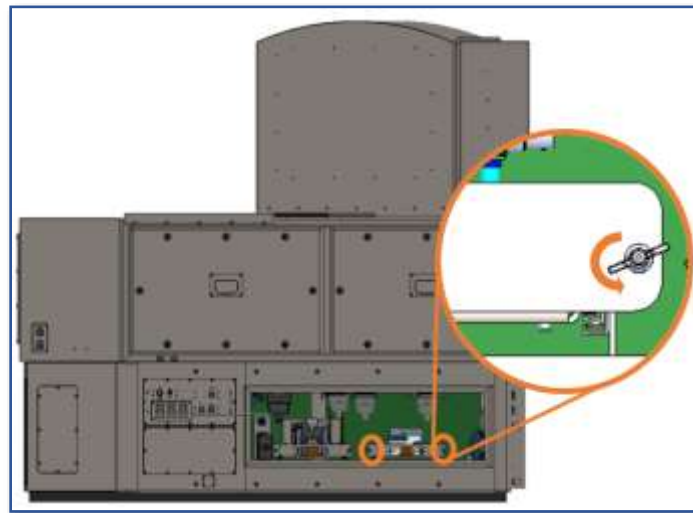


Figure 4-4: Facility Power Connection

Step 7

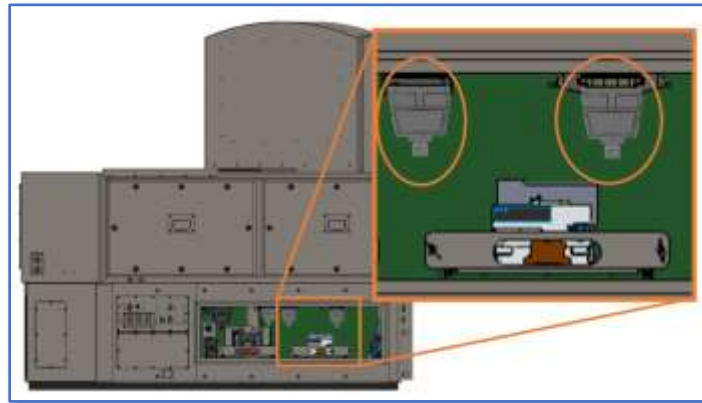
Slide the Power Module back into place and secure with the two (2) wing nuts.



	<p>Only trained and qualified personnel should connect Power Cables to the machine.</p>
	<p>Observe recommended ESD-mitigation best practices.</p>

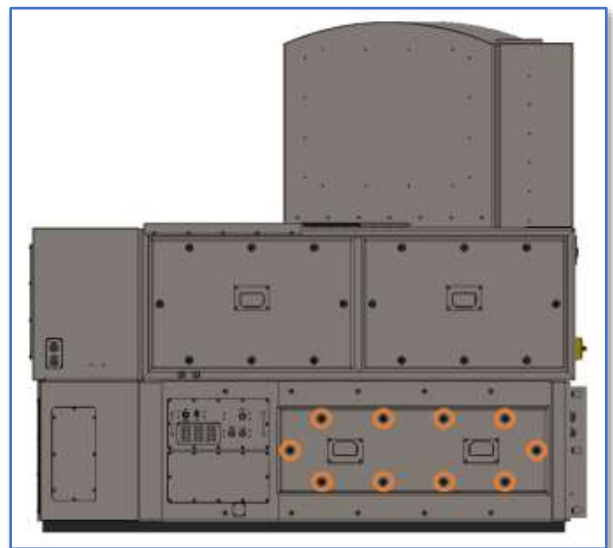
Step 8

Reconnect the two (2) connections to the Power Module by connect the two (2) I/O connections.



Step 9:

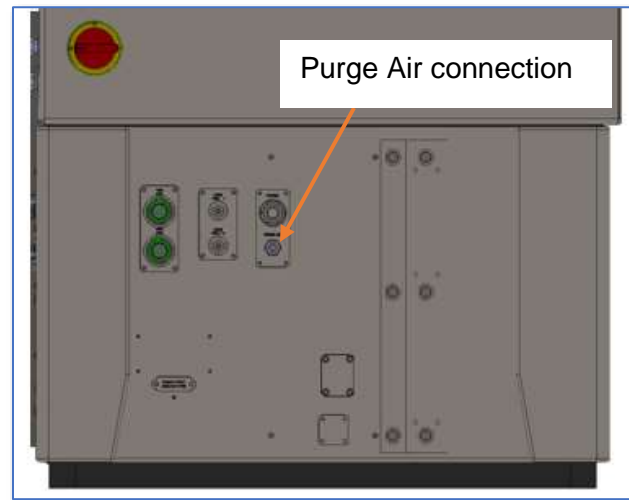
Using a 5/16" Allen wrench and a half-turn, reinstall the Lower Enclosure Access Panel.



4.12 Connecting Air to the *OmnRAM*

Step 1:

Locate the connection, labeled "Purge Air". It is on the same side of the machine as the power supply.



Step 2:

Hook the air line to the connection.

5.0 RAM BASICS

RAM is an advanced technology that uses low-frequency acoustic energy to drive mixing and processing applications. The *OmnRAM* is an innovative approach to multiple mixing applications, from pilot to production scale. These applications include powder-powder systems, powder-liquid systems, liquid-gas systems, as well as combinations thereof. RAM technology has also been adopted for use in many processing functions, such as coating, degassing, grinding, and sieving.

RAM Technology provides:

- An exceptionally uniform mixing and/or processing of virtually any materials.
- Significantly faster mixing and processing times compared to traditional methods.
- A completely sealed, dust-free process for cleanliness and enhanced operator safety.
- Highly-repeatable results, ensuring batch-to-batch product consistency and quality.
- The ability to process materials not possible by other methods.

5.1 Operating the *OmnRAM*

This installation document is NOT a user manual, See the *OmnRAM* User Manual for detailed operating instructions. It is the customer's responsibility to ensure all operators receive the correct training and have read and understand the User Manual before operating the equipment.

