

# 20 Series

## INSTALLATION MANUAL

280338-ENG-R01

# 20 Series

## INSTALLATION MANUAL

**Please read these instructions carefully and completely before operating the chamber.**

Conviron Document Number 280338-ENG, Revision 01  
Published by:

CONVIRON 590 Berry Street  
Winnipeg, Manitoba  
Canada, R3H 0R9

**[www.conviron.com](http://www.conviron.com)**

February 2021

EU declaration of conformity available upon request

Printed in Canada

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## PREFACE

Welcome to the 20 Series Installation Manual. This manual provided for the initial uncrating and installation of the Conviron ATC40, ATC60, PGC20, and PGCFlex chambers, and is provided to all clients who have purchased a 20 square foot chamber(s).

Clients will find sufficient detail for a typical installation including figures, diagrams, and graphics to install the chamber without issue. However, given that many installations are specific to each facility and that facilities may have unique requirements, additional information or assistance from Conviron may be required. In such cases, local contact information is provided on the Conviron website.

### Functional Description/Intended Use

This series of chambers is designed to provide a controlled environment for plant production and scientific experiments including, but not limited to, plant science, biotechnology, and entomology.

### WEEE and RoHS Compliance Statements

CONVIRON is committed to meeting all requirements of the WEEE directive (2012/19/EU).



Products labeled with the WEEE symbol (a crossed out “waste bin”) indicate that the final user should not discard this product along with other household waste, but that it must be collected and treated separately.

Please contact Conviron, or your Conviron distributor, for proper handling and disposal instructions.

CONVIRON is committed to meeting all requirements of the RoHS directive (2011/65/EU). The RoHS directive requires that manufacturers eliminate or minimize the use of lead, mercury, hexavalent chromium, cadmium, polybromated biphenyls and polybromated biphenyl ethers in electrical and electronic equipment sold in the EU after July 1, 2006.

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## Document Conventions



The “**PLEASE NOTE**” symbol is used to draw attention to additional information which may assist in the installation of the equipment.

Conviron maintains a policy of continual improvement and reserves the right to change the product without prior notice. Therefore, the images used throughout this manual may differ slightly from the actual configuration due to updates and product changes.

- Wherever possible, textual descriptions are accompanied by photographs or line drawings of the chambers to assist the reader in understanding the material.
- Frequent reference is made to left and right sides throughout this manual. Left is considered to be the left-hand side while facing the equipment.
- Italicized text is used to introduce instructions.
- Red arrows are used to show the required movement of a part, or movable parts during assembly or disassembly.
- Red circles are used to highlight important assembly or disassembly details, or to show important small parts in an otherwise large assembly.
- Highlights are used to outline the location of major assemblies or optional equipment.

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## SERVICE & TECHNICAL SUPPORT

Before contacting Conviron, please check the following:

- Read this document, the Control System Manual, and the Operation, Maintenance, and Troubleshooting Manual completely before attempting to operate the chamber.
- If you are having a problem using your cabinet(s), pay particular attention to the relevant section and the pertinent information in this manual, and use the information to diagnose and correct the problem.
- If the problem persists and/or you require additional assistance please collect the following information prior to contacting Conviron:
  - The serial number of the cabinet, located on the rating plate
  - The software version of the control system. Instructions for obtaining the software version of your control system are provided in the Control System Manual.
  - A description of the problem
  - A description of what you were doing before the problem occurred.

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# 1 PRECAUTIONS








The equipment is intended to be installed, operated, maintained, and serviced by trained personnel, according to the instructions and precautions described in the manuals provided by Conviron.

The following precautions are intended to help guide users in the safe installation of Conviron chambers. These precautions should be read and understood before proceeding with installation, operation, and maintenance.

## 1.1 Hazard Identification Symbols

Table 1-1 Hazard Identification Symbols

Symbol	Description
	The “ <b>HAZARD WARNING</b> ” symbol is used whenever a hazard exists which could cause personal injury or potential equipment damage, and requires correct procedures/practices for prevention.
	The “ <b>IMPORTANT INFORMATION</b> ” symbol is used to identify operating procedures which must be followed to ensure smooth and efficient equipment operation.
	The “ <b>ELECTRICAL SHOCK/ELECTROCUTION</b> ” symbol is used to identify a source of potentially dangerous electrical current.
	The “ <b>ELECTROSTATIC DISCHARGE</b> ” symbol is used to identify equipment which is sensitive to electrostatic discharge.
	The “ <b>BURN HAZARD/HOT SURFACE</b> ” symbol is used to identify surfaces which are hot enough to cause personal injury.
	The “ <b>MOVING PARTS</b> ” symbol is used to identify a potential hazard from moving parts inside the machine compartment.
	The “ <b>HAND CRUSH/FORCE FROM BELOW</b> ” symbol is used to identify a potential hazard from moving parts inside the chamber.

Symbol	Description
	The “ <b>PROTECTIVE EARTH-GROUND-MANDATORY ACTION</b> ” symbol is used to identify the protective earth connection.
	The “ <b>PROTECTIVE EARTH-GROUND</b> ” symbol is used to identify the protective earth connection.
	The “ <b>WEAR EYE PROTECTION-MANDATORY ACTION</b> ” symbol is used to identify areas where eye protection is mandatory.
	The “ <b>OPTICAL RADIATION</b> ” symbol is used to identify areas where exposure to ultraviolet (UV) and infrared radiation may be possible.
	The “ <b>FALL HAZARD</b> ” symbol is used to identify a potential hazard of falling from elevated surfaces.
	The “ <b>SLIP HAZARD</b> ” symbol is used to identify a potential hazard of falling due to slippery surfaces.
	The “ <b>READ THE OPERATOR MANUAL</b> ” label is intended to remind the user to have a thorough understanding of the equipment <b>BEFORE</b> use.

## 1.2 General Precautions



Conduct a visual inspection of the equipment and surrounding area by walking around the unit to ensure no debris or obstacles are present that could pose a safety hazard *before* operating the chamber.

Operate your Conviron equipment for a minimum of five days *before* introducing any research material to ensure proper and stable operation.

Avoid direct contact with any broken fluorescent lamps. Fluorescent lamps are extremely fragile and may emit harmful vapors when broken.

Follow all applicable local environmental regulations and guidelines for disposal of hazardous material. If in doubt, contact local authorities for proper disposal procedures.



*Do not* allow water or liquids to contact any electrical components.

Ensure that there are no obstacles in the path of the canopy before moving it.

Take all appropriate safety precautions when using and maintaining this equipment including wearing appropriate safety apparel and using appropriate tools.

Use only original replacement parts when maintaining and servicing the equipment. If in doubt about safe operation and/or maintenance of the equipment, contact Conviron immediately.



Working with high voltage will be required when installing the equipment. *Do not* attempt this work unless you have the appropriate knowledge and experience.

Disconnect and lock out the main power before servicing the equipment.

The main terminal in the control panel has live voltage unless the external breaker is OFF. Use extreme caution when working on the control panel to prevent injury.

Water coming into contact with the electrical components presents a high voltage hazard. Avoid these conditions. If you have any doubt about safe watering practices, contact Conviron.

The control system may come equipped with an optional Uninterrupted Power Supply (UPS) and power will remain live for a period of time even if the power supply is turned OFF. Use extreme caution when working on the control panel to prevent injury.

If you have any doubts as to whether your unit comes equipped with a UPS, contact Conviron.



Do not touch the lamps. Fluorescent lamps operate at high temperatures and present a burn hazard.





Do not touch the lamp holders. The heated metal and glass presents a burn hazard. Ceramic metal halide and high-pressure sodium lamps operate at very high temperatures.

Do not touch the heaters. The hot surface presents a burn hazard.



Refrigeration lines can be very hot when the chamber is operating. For safe operation, insulate hot gas lines on site to prevent inadvertent contact, i.e., exposed refrigeration lines.



Keep all body parts out of the path of any canopy in motion.

	Alert service personnel immediately if a slip hazard is detected.
	Ensure that appropriate fall protection equipment and fall arrest system is in place before starting work above the chamber.
	<p><i>Do not</i> look directly at the ceramic metal halide lamps while in operation.</p> <p>Use adequate eye protection for the concerned wavelengths of Actinic UV, Blue Light and Infrared. Also wear protective clothes and gloves.</p> <p>Alternatively, the operator may turn off the ceramic metal halide lamps through the control panel user interface while accessing the cabinet.</p>
	<p><i>Never</i> check evaporator fans for free movement while power remains ON. Perform visual and auditory checks to ensure circulating fans are operating.</p>

### 1.3 Installation Precautions

	<p><i>Do not</i> attempt to install or maintain this equipment without the appropriate knowledge and expertise.</p> <p>Use extreme caution when moving the cabinet. Conviron recommends a minimum of two people to move the cabinet.</p> <p><i>Do not</i> tilt the cabinet when moving it. Heavy components located in the machine compartment can cause the cabinet to tip.</p> <p><i>Do not</i> over-tighten the cam locks. The cam locks could be rotated to the point where they no longer properly engage their receptacles.</p> <p>Ensure that the drain connections are secure <i>before</i> operation if the cabinet is equipped with a separate coil dehumidifier.</p> <p>Ensure that the cabinet is leveled and secured to the floor <i>before</i> operating the unit.</p> <p>Inspect all connections in the machine compartment <i>before</i> connecting the equipment to the building utilities.</p>
	<p>Ensure that power to the chamber line is off, and locked out or tagged out, <i>before</i> making any electrical connections at the chamber.</p> <p>Ensure that all electrical boxes and panels are closed and that no one is in contact with the equipment <i>before</i> powering up.</p>

---

## 2 INSTALLATION



Only qualified trades-people, i.e. electricians, plumbers, refrigeration mechanics, etc. who have read and completely understand these instructions should perform the required installation work. This work must be done in accordance with local codes and regulations.

Contact Conviron immediately if in doubt about safe and proper installation of the equipment.

### 2.1 Installation Overview

The following is an overview of the steps required to install the chamber in its final location. Each step on the list is covered in detail in the subsequent sections.

1. Determine the chamber location.
2. Uncrate and unpack the cabinet, machine compartment, and lifting kits.
3. Move the parts to the assembly location (if not in the final location).
4. Assemble the machine compartment onto the cabinet.
5. Move assembled chamber to the final location and level the chamber.
6. Make all required external and utility connections.
7. Start the system.

### 2.2 Determining Chamber Location

The following considerations must be addressed before an appropriate location for the chamber can be determined:

- Ambient environmental requirements.
- Clearances required for operation and service.
- Access to required utility connections.

#### 2.2.1 Ambient Environment Requirements

The chamber requires a conditioned ambient environment to achieve the performance specifications. It is important to ensure that the room in which the growth cabinet is located adheres to these environmental conditions.

##### 2.2.1.1 Temperature

Conviron guarantees performance of the growth chamber for ambient temperature conditions between 59°F to 95°F (15°C and 35°C). Recommended ambient conditions are 70°F (21°C) at 50%RH.

### 2.2.1.2 Humidity

The chamber will tolerate a range of ambient relative humidity conditions; however, performance will be limited by the following factors:

- Humidity is not controlled in chambers that are not equipped with the optional humidification and/or dehumidification devices. The resulting internal humidity will be a combination of the ambient conditions and internal conditions within the cabinet.
- The lowest achievable relative humidity in the growth cabinet with a dehumidification option will be a resultant dew point determined by the capability of the chamber. Ambient humidity conditions above the equivalent moisture content of 70°F (21°C) at 50%RH may cause a reduction in dehumidification performance.
- The highest achievable relative humidity in the growth chamber with a humidification option is resultant to a dew point of 77°F (25°C) unless stated otherwise. Ambient humidity conditions below the equivalent moisture content of 70°F (21°C) at 50%RH may cause a reduction in additive humidification performance. The range of operational ambient humidity is up to 90%RH (non-condensing).

### 2.2.1.3 Altitude

The maximum altitude is specified to be 7000ft. (2134 m) above sea level.

## 2.2.2 Clearance Requirements

The chamber is shipped in three main pieces, the cabinet, the machine compartment and control panel.

Whenever possible, install the machine compartment once the cabinet has been moved to its final location area. If it is necessary to fully assemble the growth chamber before moving it to its final location, ensure that all hallways, doorways, elevators, and other obstacles along the route to the final location can accommodate the cabinet dimensions of 100"W x 35½"D x 101"H (2540mmW x 900mmD x 2565mmH) (106"H [2692mm] with the service cover opened).

In order to ensure normal operation and adequate space for servicing, the cabinet requires the following minimum clearances when installed:

- 39" (1000mm) above the cabinet with the lid closed.
- 2" (50mm) from the back of the cabinet.
- 2" (50mm) between cabinets (for side-by-side installations).

### 2.2.3 Utility Connection Requirements

**Table 2-1 Utility Connection Requirements**

Connection	Used by	Connection at Cabinet	Specifications	Standard/Optional
Electrical	All electrical components	Terminal block	Refer to rating plate attached to the chamber.	Standard
Water	Water cooled DX refrigeration system	1/2" OD copper pipe	Water @ 50psi (3.45 Bar) minimum	Standard
Drain	Cabinet drain	1" sch40 PVC	Drain must not be elevated above cabinet drain connection.	Standard
Purified Water	Humidification System	1/4" push-in fitting	Water Quality: <ul style="list-style-type: none"> <li>• RO Water</li> <li>• filtration: &lt;2 microns or 0.00008"</li> <li>• resistivity: 0.01 to 0.02 Meg ohm-cm</li> </ul> Pressure and flow rate: 60 psi (4.2 bar) Maximum water usage: 1.06 US Gal/min (4 l/min)	Optional
Glycol/Water	Hydronic refrigeration system	3/4" copper	Designed to work with central chiller refrigeration system.	Optional
CO <sub>2</sub>	Additive CO <sub>2</sub> control system	1/4" push-in fitting	CO <sub>2</sub> @ 0.04 – 0.5 LPM	Optional
Refrigeration	Remote outdoor air-cooled (DXRAC) and outdoor air-cooled (OACU) condensing units	Dependent on placement of cabinet and condensing unit	Dependent on refrigeration system specifications and placement of cabinet and condensing unit	Optional
Alarm Contacts	Central alarm contacts	Terminal block	Normally Open, Dry Contact, 5A maximum	Standard
Ethernet	Communication (COMM) option: Central Management System	RJ45 Ethernet port	Straight Through Cable: For CM or building network connection  Crossover Cable: For direct computer connection	Standard

### 2.3 Installation Procedure

The 20 Series growth chambers are shipped in two crates. The larger crate contains the cabinet (Figure 2-1), and the smaller crate contains the machine compartment and the control panel.



Only qualified trades-people, i.e. electricians, plumbers, refrigeration mechanics, etc. who have read and completely understood these instructions should perform the required installation work and according to local codes and regulations. Contact Conviron immediately if in doubt about safe and proper installation of the equipment.

### 2.4 Uncrate and Remove the Pallet

The crate is attached to the shipping pallet with staples and screws. Dismantle and remove the crate from the shipping pallet.



Figure 2-1 Cabinet Crate



Do not leave any nails, staples, or screws protruding from the crating material to eliminate potential puncture injuries. Recycle, or properly dispose of, the crating material and shipping pallet.





The following instructions describe removing the crating material for a chamber equipped with castors and for a shipping pallet constructed with lag bolts. Other chamber and pallet configurations differ slightly.

***If using a fork lift:***

1. Remove the four lag screws, two on each side (Figure 2-2), that secure the shipping bracket to the pallet.

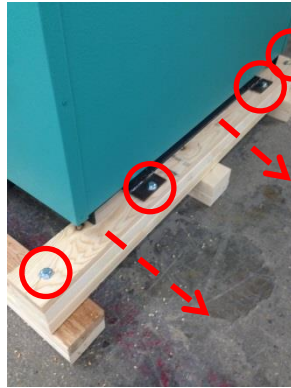


**Figure 2-2 Shipping Bracket Lag Screws**

2. Position the fork lift centered with the center of the cabinet.
3. *Slowly* lift the cabinet off the shipping pallet, ensuring the cabinet is balanced on the forks and the cabinet is rising evenly.
4. Remove the shipping pallet and then proceed with installing the machine compartment.

***If not using a fork lift:***

1. Remove the eight lag screws, four on each side (Figure 2-3), from the ends of the pallet.



**Figure 2-3 Shipping Bracket & End Board Lag Screws**

2. Remove the pallet end boards.
3. Position lifting devices, such as pallet jacks or small scissor jacks, under the shipping bracket and raise the cabinet slightly.
4. Remove the remains of the pallet.
5. Lower the cabinet and proceed with installation.

## 2.5 Install the Machine Compartment

Every order includes a lifting frame for use with a lifting device, such as a fork lift truck, to lift the machine compartment onto the cabinet and a set of handles to assist in positioning the machine compartment in its final position.

Refer to the included Conviron document number 275733, *Operation and Maintenance of the MC-20 Lift Frame*, for the safe usage of the lifting frame.

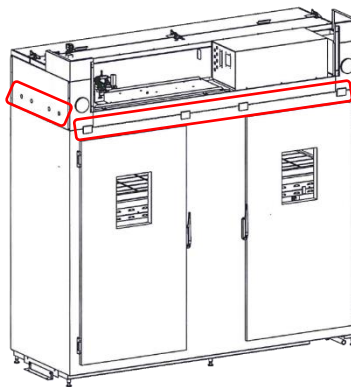
1. If installing an ATC type chamber, connect the canopy wires before lowering the machine compartment completely.

If installing a PGC chamber, plug the wire harness into the canopy after the machine compartment is installed.



**Figure 2-4 Canopy Wire Harness Connection**

2. Install the plastic plug covers into the holes used to attach the lifting frame, four on each side.



**Figure 2-5 Plug Covers & Draw Latches**

3. Close all eight draw latches, four on the front and four on the rear, to secure the machine compartment to the chamber.

## 2.6 Install the Control Panel

1. Lift the Control Panel onto the chamber and rest the bracket (Figure 2-6 , Figure 2-7) on the back of the panel on the edge of the cabinet.
2. Secure the bracket to the cabinet with the included 8-32 x 1/2" screws.

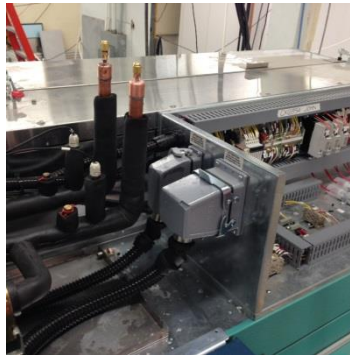


**Figure 2-6** Flush Mount Bracket



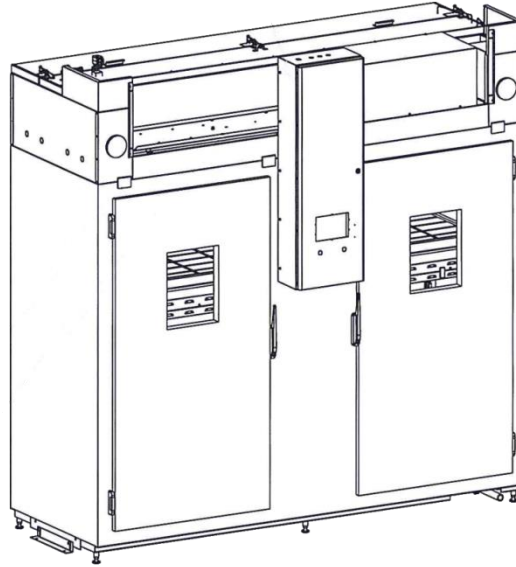
**Figure 2-7** Extended Height Bracket

3. Open the Control Panel door, locate and align the four mounting holes, and then install the 1/4 - 20 x 3/4" bolts.
4. Connect the cables from the Control Panel to the machine compartment (Figure 2-8).



**Figure 2-8** Control Panel Electrical Connections

5. Install the front covers onto the machine compartment with the included 8-32 x 1/2" screws to complete the installation of the Control Panel (Figure 2-9).



**Figure 2-9** Installed Control Panel

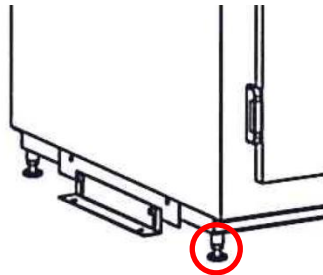


Make all the mechanical connections to the ventilation, water and drainage systems, and then re-install the covers before making any external electrical connections.

## 2.7 Level the Chamber

When in position in its final location, it is critical that the chamber is leveled for stability and proper operation before making the utility connections. Levelers are located in each corner of the cabinet, and in the middle, both front and back (Figure 2-10).

Use an open ended wrench on the flats near the base of the threaded levelers to level the cabinet.



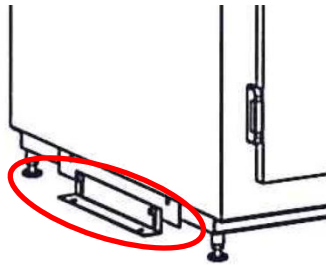
**Figure 2-10** Chamber Levelers

## 2.8 Install the Floor Anchors



The floor anchors are only intended to prevent the chamber from moving during normal operation and maintenance. They are not rated for seismic protection. Concrete floor anchors must be installed according to the manufacturer's instructions

Once the chamber is positioned and leveled, the floor anchors, located at both ends of the chamber, must be bolted to the floor.



**Figure 2-11 Floor Anchors**

1. Remove the angled floor plate, and then mark and drill the anchor holes.
2. Re-install the angled floor plate, and then bolt the plate to the floor.



Make all the mechanical connections to the ventilation, water and drainage systems and re-install the covers **BEFORE** making any electrical connections.

## 2.9 Connect the Drain Line

The chamber is equipped with a drain, terminating in a 1" (2.5 cm) ID hose fitting located in the right front corner of the cabinet.

Connect this drain to a building floor drain or drainage system.

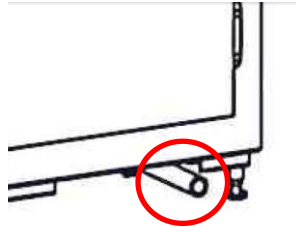


Figure 2-12 Drain Line



Low temperature chambers are equipped with an additional ½" (12.25 cm) SCH40 PVC drain located behind the machine compartment. Connect this drain to a building floor drain or drainage system.

## 2.10 Connect the Cooling Lines

1. Remove any caps installed on the copper water lines.
2. Connect the supply water line to the Water IN copper pipe.
3. Connect the return water line to the Water OUT copper pipe.
4. Ensure the bypass valve is closed by turning the handle clockwise.

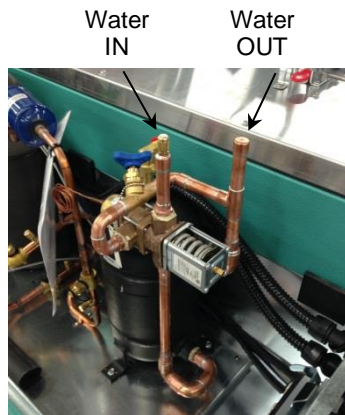


Figure 2-13 Cooling Lines

## 2.11 Connect the Internal Wiring Harnesses

### 2.11.1 Aspirator

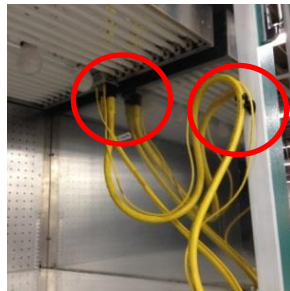
1. Attach the cable to bottom of the aspirator.
2. Ensure the other end of the cable is connected to the chamber wall outlet.



**Figure 2-14 Aspirator Connections**

### 2.11.2 Flex Canopy

1. Attach the canopy power cables to the bottom of the canopy.
2. Ensure the other ends of the cables are secured to the clip on the front wall.



**Figure 2-15 Flex Canopy Connections**



## 2.12 Connect the Option Systems (if so equipped)

### 2.12.1 Auto Watering Irrigation System Line

Attach the water supply line to the ½" schedule 40 PVC inlet on the shut-off valve.

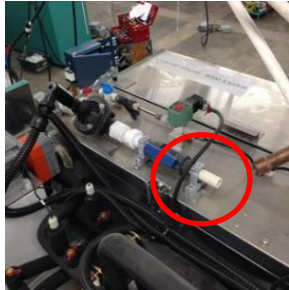


Figure 2-16 Auto-Watering Irrigation

### 2.12.2 Spray Nozzle Humidifier Line

Install ¼" OD tubing from the water supply to the inlet on the shut-off valve.

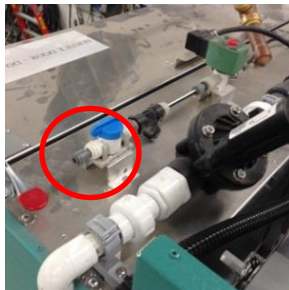


Figure 2-17 Spray Nozzle Humidifier

### 2.12.3 CO<sub>2</sub> Supply Line

Install ¼" OD tubing from the CO<sub>2</sub> supply to the inlet on the regulator.

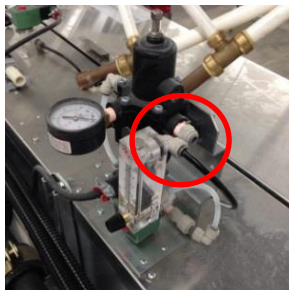
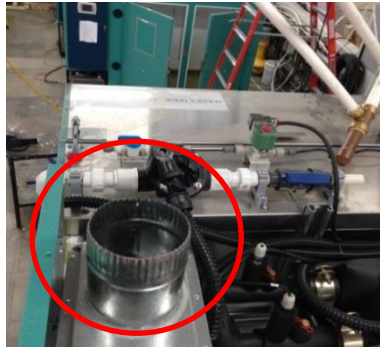


Figure 2-18 CO<sub>2</sub> Supply

#### 2.12.4 Exhaust Vent

The external exhaust collar is located in the right rear corner of the machine compartment

Install a 4" (100mm) sheet metal duct from the exhaust collar to the building ventilation system, or to an external vent.



**Figure 2-19**      **Exhaust Vent**

## 2.13 Connect the Electrical Lines



Ensure that power to the cable from the main breaker panel to the chamber is OFF, and locked out or tagged out, before making any electrical connections at the chamber.



Check all wire connections inside the control panel to ensure the connections have not come loose in transit. Tighten any loose connections to the torque specifications of each component listed on the electrical drawings.

1. Ensure the main power disconnect switch is OFF.
2. Open the control panel door, and then install the power cable into the cabinet.
3. Install ferrules onto the ends of the power, neutral, and ground wires.
4. Connect the ground wire to the ground terminal block.
5. Connect the neutral wire to the neutral terminal block
6. Connect the 3 $\phi$  wires to the L1, L2, and L3 terminals on the main power disconnect switch.
7. Connect the UPS internal red battery wire (for the UPS Option only).

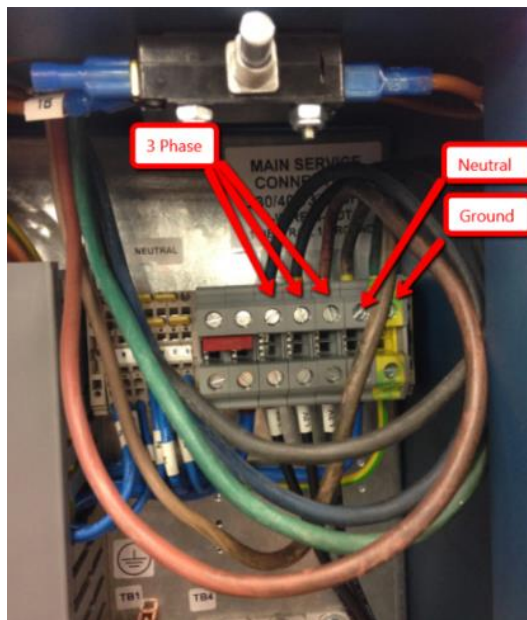




Figure 2-20 Electrical Connections



[info@conviron.com](mailto:info@conviron.com)

[WWW.CONVIRON.COM](http://WWW.CONVIRON.COM)

  Management System Certified to ISO9001

280338-ENG-R01, February 2021

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