CONVIRON®

A2000 Chamber

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

278061-ENG R01

A2000 Chamber

Installation, Operation, and Maintenance Manual

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

Conviron Document Number 278061-ENG, Revision R01

Published by:

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

www.conviron.com

October 2018

EU declaration of conformity available upon request

Printed in Canada

PREFACE

The A2000 Chamber Installation, Operation, and Maintenance Manual describes the features and use of the Conviron A2000 plant growth chamber.

This manual has been designed to provide sufficient detail for the installation and use with step-by-step instructions. Clients will find sufficient detail for a typical installation including figures, diagrams, and graphics to operate the chamber without issue. However, given that each installation may have unique requirements, additional information or assistance from Conviron may be required.

This equipment is only to be used by authorized personnel - that is, personnel who have been trained in the proper use of the equipment and who have read this manual.

Functional Description

The A2000 reach-in growth chamber is designed to provide a controlled environment for plant production and scientific experiments including, but not limited to, plant science, biotechnology, and tissue culture.

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.

Document Conventions

Wherever possible, textual descriptions are accompanied by photographs or line drawings of the A2000 Chamber to assist the reader in understanding the material.

Frequent reference is made to left and right sides throughout this manual. Left is considered as the left hand side while facing the equipment.

Call outs and red circles are used on many of the line drawings to highlight important assembly or disassembly details, or to show important small parts in an otherwise large assembly.

Italicized text is used to introduce instructions.

Conviron maintains a policy of continual improvement and reserves the right to change the product without prior notice. Due to the variations in chamber design for individual markets, the images used in this manual may differ from the actual configuration. Although the images may differ, the instructions for assembly and operation are accurate.

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

SERVICE & TECHNICAL SUPPORT

Before contacting Conviron, please check the following:

- Read this document, *A2000 Chamber Installation, Operation, and Maintenance Manual* and the accompanying control system manual in their entirety.
- If you are having a problem using your chamber(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 chamber, 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 operator manual.
  - The configuration of the chamber, as described in Section 6.1
  - A description of the problem
  - A description of what you were doing before the problem occurred

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Please visit www.conviron.com/contact-us for global service contact information.

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1 PRECAUTIONS

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

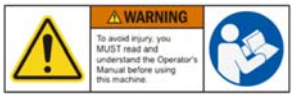
The following precautions are intended to help guide users in the safe operation of Conviron chambers.

1.1 Hazard Identification Symbols

The following symbols in Table 1-1 are used throughout this manual, on the equipment, or both to draw your attention to important warnings, guidelines, and product information.

Table 1-1 Hazard Identification Symbols

Symbol	Description
	The "**HAZARD WARNING**" symbol is used whenever a hazard exists which could cause personal injury or potential equipment damage, and requires correct procedures/practices for prevention.
	The "**IMPORTANT INFORMATION**" symbol is used to identify operating procedures that must be followed to ensure smooth and efficient equipment operation.
	The "**PLEASE NOTE**" symbol is used to draw attention to additional information that may assist in the operation of the equipment.
	The **"ELECTRICAL SHOCK/ELECTROCUTION"** symbol is used to identify a source of potentially dangerous electrical current.
	The "**ELECTROSTATIC DISCHARGE**" symbol is used to identify equipment that is sensitive to electrostatic discharge.
	The "**BURN HAZARD/HOT SURFACE**" symbol is used to identify surfaces that are hot enough to cause personal injury.
	The **"SLIPPERY SURFACE"** symbol is used to identify a potential hazard caused by a slippery surface.

Symbol	Description
	The **"MOVING PARTS"** symbol is used to identify a potential hazard from moving parts inside the machine compartment.
	The "**HAND CRUSH/FORCE FROM BELOW**" symbol is used to identify a potential hazard from moving parts inside the chamber.
	The "**PROTECTIVE EARTH-GROUND-MANDATORY ACTION**" symbol is used to identify the protective earth connection.
	The "**PROTECTIVE EARTH-GROUND**" symbol is used to identify the protective earth connection.
	The **"WEAR EYE PROTECTION-MANDATORY ACTION"** symbol is used to identify areas where eye protection is mandatory.
	The "**OPTICAL RADIATION**" symbol is used to identify areas where exposure to ultraviolet (UV) and infrared radiation may be possible.
	The "**FALL HAZARD**" symbol is used to identify a potential hazard of failing from elevated surfaces.
	The **"READ THE OPERATOR MANUAL"** label is intended to remind the user to have a thorough understanding of the equipment *before* use.

1.2 Precautions

Read and understand these precautions before proceeding with installation, operation, and maintenance.

1.2.1 General

Only authorized personnel, who have been trained on the proper operation and/or maintenance of the equipment and who have read and understood this manual set, should operate and maintain this equipment.

Contact the responsible party, or Conviron, immediately if in doubt about safe operation and/or maintenance of the equipment.

1.2.2 Installation

Only qualified trades-people, i.e. electricians, plumbers, refrigeration mechanics, etc. should perform installation work as required, according to local codes and regulations.

Do not attempt to install or maintain this equipment without the appropriate knowledge and expertise.

Use extreme caution when moving the chamber. Heavy components located in the machine compartment can cause the chamber to tip. Conviron recommends a minimum of two people to move the chamber.

Do not tilt the cabinet when moving it. Heavy components located in the machine compartment can cause the cabinet to tip.

Ensure that the drain connections are secure before operation if the chamber is equipped with a separate coil dehumidifier.

Ensure that the chamber is raised off the casters and secured to the floor before operating.

Inspect all connections in the top compartment before connecting the equipment to the building utilities.

Shipping vibration can cause electrical and plumbing connections to loosen. Inspect all connections before connecting to main building services.

Ensure that power to the chamber line is off, and locked out or tagged out, before making any electrical connections at the chamber.

Ensure that the control panel and top-cover lids are properly closed and screwed shut, and that no one is in contact with the equipment before powering up.

1.2.3 Operation

	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 cabinet. 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 to come into contact with electrical components while watering. Water contacting live circuits will damage both high and low voltage circuits.
	Do not touch the heaters. The hot surface presents a burn hazard.
	Alert service personnel immediately if a slip hazard is detected.
	Do not look directly at the lamps while in operation. Use adequate eye protection for the concerned wavelengths of Actinic UV, Blue Light, and Infrared. Wear protective clothes and gloves.

1.2.4 Maintenance

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

Take all appropriate safety precautions when using and maintaining this equipment – including wearing appropriate safety apparel, and using appropriate tools and fall protection equipment if working on elevated areas.

Use only original replacement parts when maintaining and servicing the equipment.

Conviron recommends waiting at least 10 minutes after powering off the equipment before servicing the heater elements or related components.

Do not service the control panel without using proper ESD procedures, including the use of a grounding strap and/or anti-static mat.

2 CHAMBER INSTALLATION REQUIREMENTS

2.1 Chamber Placement

Conviron recommends installing the chamber in a well-ventilated area with circulating air and maintaining the operating environment between a minimum temperature of 20°C (68°F) and a maximum temperature of 25°C (77°F). The ideal temperature around the equipment is 21°C (70°F).

It is important to ensure that the room in which the chamber is located adheres to these environmental conditions.

A2000 products will dissipate up to 8100 W to ambient.

2.1.1 Power Supply

The A2000 chamber uses the three-phase electric power with one of the two options:

- 208Y/120Vac, 3Ph, N, PE 60 Hertz, 30A overcurrent protection
- 400Y/230Vac, 3Ph, N, PE 50 Hertz, 20A overcurrent protection

This unit will tolerate ±10% voltage fluctuation from the rated voltage on the serial plate. A voltage stabilizer must be used if the fluctuation is greater than ±10%. Failure to do so can result in serious damage to the compressor and electronic components, and will void warranty.

The 3-pole circuit breaker, installed in the building circuit panel, must be sized and installed by a qualified electrician.

2.1.2 Water Supply

Table 2-1 Water Supply Parameters

Parameter	Measurement
Flow	0.26 gallons / hour (1 Liter / hour) purified water
Pressure	Max. – 60 psi (4 bar), Min. – 5 psi (0.3 bar)
pH	7.0 ± 0.5
Filtration	< 0.00008 inch (2 microns)
Resistance	0.5 to 5.0 Megaohm
Conductivity	2.0 to 0.2 µS

It is important to use a water source with the quality stated above, as failure to do so will void the product warranty.

2.1.3 Condensate Drain

A 1/2” drain is provided underneath the chamber, located in the center. The drain consists of 1/2” drain tubing with p-trap and includes a drain pan for collection of condensate. This 1/2” drain may be extended to a nearby floor drain, as required.

Install the drain pan if the connection to a floor drain is not required.

2.1.4 Prepare the Chamber for Installation

The A2000 weighs 890 kilograms (~1960 pounds) and is designed to be removed from the shipping pallet with a forklift truck.

Ensure that a forklift truck capable of lifting 1000 kilograms is available to lift the A2000 off the shipping pallet on the day of installation.

To prepare the chamber for installation:

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

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.

2. Remove the locking bolts (Figure 2-1) securing the chamber to the shipping pallet.

Figure 2-1 Locking Bolts

3. Position the fork lift truck to place the forks under the camber floor in the location shown in Figure 2-2.

Figure 2-2 Fork Placement

4. Raise the forks high enough to lift the chamber free of the shipping pallet and remove the pallet
5. Lower the chamber to the floor and push the chamber into position for installation.

3 CHAMBER INSTALLATION

Once a suitable location is chosen and prepared, the required utilities connections can be made.

3.1 Electrical Connections

> Ensure that proper grounding practices are implemented, and comply with the local codes and regulations. Contact a local qualified electrical technician to check that the power supply system of your facility is properly grounded.

Before connecting the chamber to the building electrical service, verify that the service matches the specified rating on the chamber serial plate (see Figure 3-1 or Figure 3-2). The serial plate is located on the upper-right corner on the right side of the chamber.

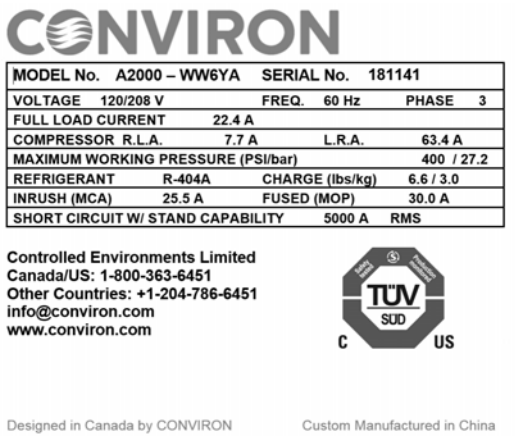


Figure 3-1 Sample Serial Plate for 120/208V Chamber

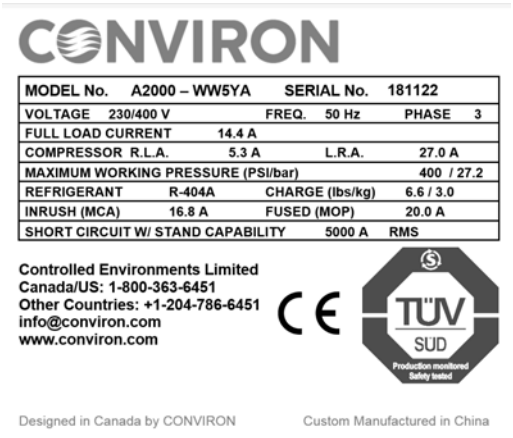


Figure 3-2 Sample Serial Plate for 230/400V Chamber

The A2000 chamber uses the following connections on the upper portion of the back of the chamber (Figure 3-3):

1. Purified water supply connection for the humidification system.
2. An Ethernet communication port.
3. A Central Alarm Contact connection to monitor the chamber through the building LAN.
4. A condensate pump – power connector.
5. An optional Argus access point connector for the control system network, not shown.
6. A mounting point for an optional exhaust collar for chamber exhaust air.
7. The mains power supply connection.

Figure 3-3 Rear Wall Chamber Connections

3.1.1 Additional Connections

The A2000 chamber also has a connector for the optional CO_2 supply.

Figure 3-4 shows the optional exhaust collar installed onto the upper right corner at the back of the chamber.

Figure 3-4 Optional Exhaust Collar Installed

3.2 Leveling the Chamber

The A2000 chamber is equipped with four caster wheels with integral levelers.

Lowering the leveler footpads will prevent the chamber from rolling on its casters once installed. The leveling footpads also compensate for any variations in an uneven floor (Figure 3-5).

The footpads must be adjusted to take the weight of the unit off the casters. Once the chamber is moved into position, adjust the footpads until they are in firm contact with the floor and the chamber is level.

To adjust the leveling casters:

1. To lower the leveler footpad, turn the thumb-wheel counterclockwise until the footpad is in firm contact with the floor.

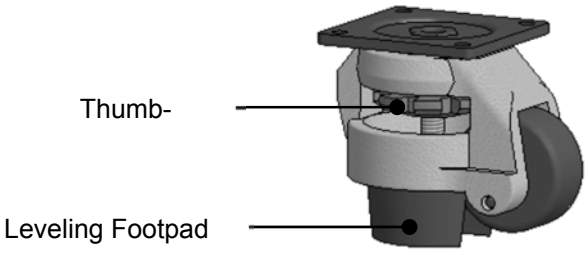


Figure 3-5 Leveler Unit

2. Adjust the height of the footpads on the two front leveling casters so that the chamber is perfectly level (side-to-side), and the doors close easily.

   An out-of-level condition on the front leveling casters can cause the doors to bind due to misalignment.

Use jacks, or long pry bars, to lift the corner of the chamber so that the thumb-wheels turn easily.

3. Adjust the height of the footpads to ensure the chamber is level in both the side-to-side and front-to-back directions for proper drainage.
4. To retract the leveling footpad, turn the hand-wheel clockwise until it is tight against the chamber frame.

3.3 Installing the Drain Pan

A plastic drain pan and a metal drain pan bracket come shipped with the chamber.

To install the drain pan:

1. Place the plastic drain pan inside the metal drain pan bracket.
2. Locate the metal runners under the center of the chamber (Figure 3-6).

Figure 3-6 Metal Runners

3. Attach the metal drain pan bracket on the outer flange of the metal runners, and then slide the metal bracket forward.

3.3.1 Mounting the Optional Drain Pump into the Drain Pan

To mount the optional drain pump:

1. Lay down the drain pan on a flat surface away from the chamber.
2. Check that the drain pan does not have any debris.
3. Mount the drain pump on the drain pan, with the tubes of the drain pump facing outwards from the chamber.
4. Position the drain pump so that it does not touch the walls of the drain pan.
5. Ensure that the cable and tubing are not sharply bent in any way.
6. With the drain pump mounted in the drain pan, slide the drain pan between the metal runners located under the chamber.
7. Connect the cable to the condensate pump port (Figure 3-3).
8. Route the tubing to the floor drain of the building.

4 CHAMBER START-UP AND OPERATION

4.1 Start-up

Before starting the chamber for the first time, check the following:

- The drain pan is installed.
- The condensate pump, if so equipped, is properly connected into the drain pan.
- The water line is connected.
- The CO_2 hose and tank, if so equipped, are properly installed at the back of the chamber.
- The circuit breaker, located in the remote panel, is in the ON position.
- The optional exhaust vent is connected to the building HVAC system or vented directly outside.
- The optional LAN connection is in place and configured.

Once these checks are complete, the A2000 chamber is ready to operate.

The main power switch is located on the left hand portion of the front, above the doors. To power on the chamber, rotate the main power switch knob to ON (Figure 4-1).

Figure 4-1 Main Power Switch

In a few seconds, the control system will boot up.

The control system is already configured at the factory according to pre-agreed conditions.

To adjust the parameters in the control system, refer to the included *CMP 6060 Control System Operator's Manual*.

4.2 Operation

To ensure no damage has incurred during transportation, operate your Conviron equipment for a minimum of five days before introducing any research material.

4.2.1 Drain Pan

Check the drain pan under the chamber daily, and empty as required, to ensure the collected condensation does not overflow.

4.2.2 Fresh and Exhaust Air Connections

A2000 reach-in chambers are equipped with a damper for fresh and exhaust air exchange (Figure 4-2). A single knob, located on the left side of the top panel, controls both the intake and exhaust air simultaneously. Check and adjust the damper, as required, before every experiment.

Figure 4-2 Air Exchange Adjustment Knob

A grill on top of the A2000 chamber draws inlet air from the ambient air around the chamber. Exhaust air exits through a round hole at the top right corner of the back panel. A ducting adapter is also available, which allows easy connection to the 4-inch diameter exhaust ducting.

4.2.3 Additive Humidity

All A2000 reach-in chambers offer added humidity as a standard feature. The mist is generated using ultrasonic humidifiers capable of providing a fine mist without the need for high-pressure systems.

When additive humidity is required, use the connection to a purified water source (Figure 4-3).

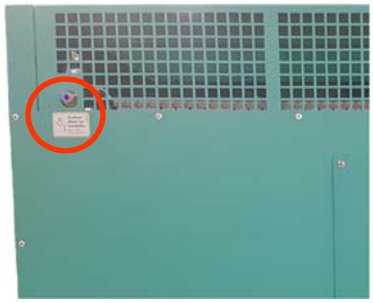


Figure 4-3 Water Connection

When using Additive Humidity, rotate the Bypass Damper knob, located on the upper portion of the right side of the chamber, to 'Close' (Figure 4-4). When the damper blocks the bypass air passage, all the air flows through the evaporator coil. Refer to the included control system manual or instructions to adjust the system's humidity set point in the controller.

Figure 4-4 Damper Adjustment Knob

The maximum humidity that may be achieved is determined by both the conditions inside the chamber and by the conditions outside the chamber. Generally, cooler and darker conditions allow higher humidity, while warmer and brighter conditions limit maximum humidity levels. The presence of plants and moist soil increases the achievable humidity level.

High humidity and temperature outside the chamber favor higher humidity inside the chamber. The effect of outside conditions is increased with the opening of the Fresh Air damper. Since chambers are generally operated in lab facilities with conditioned, indoor air, the humidity performance range of the chambers are listed with ambient conditions of 21°C and 50% RH.

For more information, refer to Section 7.3, Humidity and Temperature Ranges on page 32.

4.2.4 Dehumidification

For full dehumidification, set the Bypass Damper knob to the 'Open' position. Opening the bypass damper allows much of the air to go around the coil, which results in a smaller amount of air moving more slowly through the cooling coil. This air becomes colder and reaches a lower dew point temperature, which results in improved dehumidification.

The CMP 6060 Control System will adjust the cooling coil temperature to cause dehumidification when the actual humidity is higher than the set point. The system will automatically use heating coils to reheat the air to compensate for over-cooling used to dehumidify the air.

For combined operation of additive humidification and dehumidification, the optimum position of the Bypass Damper depends on the relative amount of dehumidification and additive humidification that is required for the programed range of set points. The relative amount of humidification/dehumidification depends on the evaporation and/or transpiration rate of the test media. The ability of the chamber to reach the full range of relative humidity set points will need to be confirmed with a preliminary test run.

Run one test program cycle with the desired test media (and any irrigation procedure) and the Bypass Damper in the 'middle' position, between 'open' and 'close'. If the measured humidity values, for the additive humidification conditions, cannot reach the highest humidity set point values, then set the Bypass Damper to 'close' and re-run the test cycle. If the measured humidity values, for the dehumidification conditions, cannot reach the lowest humidity set point values, then set the Bypass Damper to 'open' and re-run the test cycle. If the chamber still cannot reach the desired humidity set points, then the set points will need to be adjusted to the minimum or maximum measured humidity level.

4.2.5 Fluorescent Light Level

The fluorescent-light levels are set at the Conviron facilities to match the installed canopies. The default levels should never need to be changed, unless the lamp canopies are retrofitted with a different type of Conviron lamp canopy.

Administrator level access is required to change the settings on the **Fluorescent Level** screen; refer to the *CMP 6060 Control System Operator's Manual* for more information.

To change the fluorescent light levels:

1. On the control system display, from the Main Menu Bar, tap **Control** > **Fluorescent Level**.

   The Fluorescent Level screen appears (Figure 4-5).

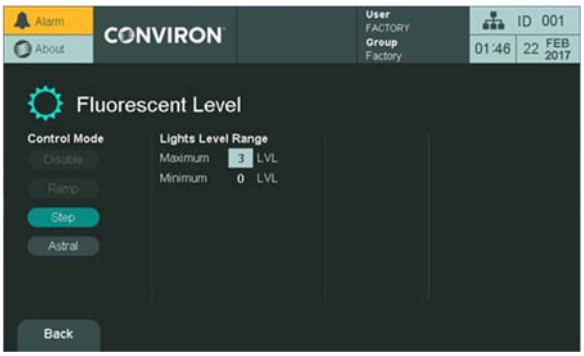


Figure 4-5 Fluorescent Level Screen

2. In the **Lights Level Range** section, tap the **Maximum** field. A numeric keypad appears.
3. Use the keypad to enter the desired value.

   Refer to the values in the orange box at the top left of the keypad to check the valid range. Invalid values will be ignored.
4. Tap **Enter** to save your changes or **Esc** to cancel the entry.

5 MAINTENANCE

The A2000 chamber requires regular maintenance in order to continue performing to specifications.

To prevent any electric shock hazard, *never* spray water directly into the chamber. The A2000 chamber contains sensors and other electrical components that will be damaged by direct contact with liquids.

5.1 Cleaning

Dampen a clean towel or rag outside the chamber, and carefully wipe the interior and exterior surfaces. Do not use abrasive cleaners. Mild detergents in low proportions are suitable for most cleaning requirements; refer to the Cleaning & Maintenance section of the Chambers Maintenance and Troubleshooting manual for complete cleaning instructions.

Use glass cleaner on both the interior and the exterior of the glass window.

5.2 Water Reservoir

If the water system will be unused for a long period, purge the water tank located in the mechanical compartment.

To purge the water tank:

1. To power off the chamber, rotate the main power switch knob to OFF. Ensure that the LED light on the control system display is red, indicating that the chamber is powered off.
2. If the chamber is connected to an Uninterruptible Power Supply (UPS) equipment, then check that it is in the OFF state.
3. Lift the top cover, turn off all the circuit breakers, and then disconnect the ground wire at the back of the top cover.
4. Carefully remove the top cover, and then place it on the floor.
5. Open the water reservoir lid.
6. Remove the water plug located in the middle of the interior of the USH box.
7. Wait for all the water to completely drain out of the tank.
8. Clean the water tank.
9. Ensure there is no hard water residue on the ultrasonic discs.

10. Return the water reservoir lid to its original position. This is important; otherwise, air from the unit will be damped into the ambient at all times, and water may be splashed over electrical components.
11. Reconnect the ground wire at the back of the top cover, and then turn on all the circuit breakers.
12. Return the top cover to its original position, and then rotate the main power switch knob to ON.

5.3 Replacing Lamps

Periodically check to ensure all lamps are functioning properly. Replace poorly lit or flickering lamps to ensure optimal unit performance.

To replace a fluorescent lamp:

1. Identify the lamps to be replaced.
2. Disconnect the power supply to the lamp canopy by unplugging it from its receptacle before replacing lamps.

Figure 5-1 Unplug the Lamp Canopy

3. Unlock the lamp to be replaced by rotating it ¼ turn in its socket and remove with care to avoid breaking it.
4. Install the new lamp.
5. To ensure the newly-installed lamp is locked in its socket, rotate the lamp ¼ turn.

Dispose of the lamps in deteriorated condition, following the requirements in your area or contacting your local authorities for procedures.

6 TROUBLESHOOTING

Conviron Technical Support is available to all users at no charge, either to assist with troubleshooting or to order parts, for the life of the equipment.

6.1 Before Contacting Conviron Technical Support

There may be times that the Conviron Technical Support asks for information about the chamber factory settings. To view information about the chamber factory settings, use the control system display.

To view the chamber factory settings:

1. From the Main Menu Bar, tap **Settings**, and then tap **Factory** (Figure 6-1).

Figure 6-1 CMP Control System Settings Screen

The Factory Settings – Temperature screen appears, showing information about the factory-set temperature settings of the chamber (Figure 6-2).

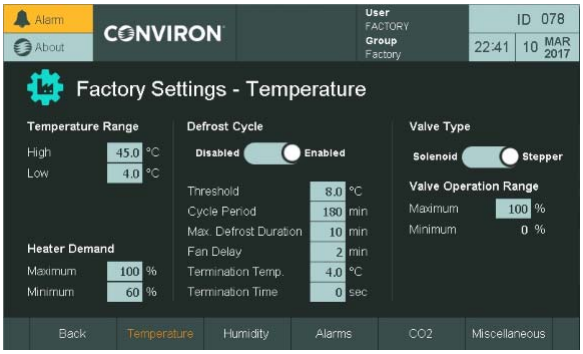


Figure 6-2 Sample Factory-Set Temperature Settings Screen

2. To view information about the other settings, on the bottom bar of the display of the control system, tap one of the following:

- **Humidity** – View information about the factory-set humidity range and sensor type of the chamber.

Figure 6-3 Sample Factory-Set Humidity Settings Screen

- **Alarms** – View information about the factory-set defrost tracking and water level switch alarm settings of the chamber.

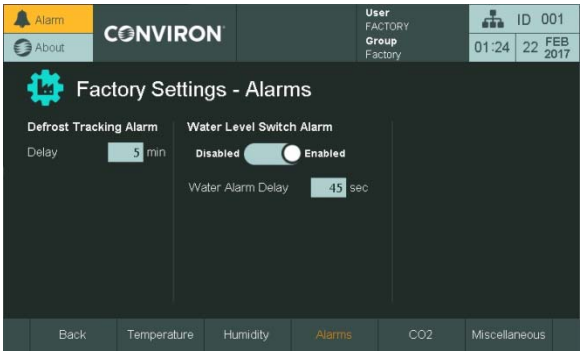


Figure 6-4 Sample Factory-Set Alarm Settings Screen

- **CO_2** – View information about the factory-set CO_2 sensor and CO_2 additive settings of the chamber (Figure 6-5).

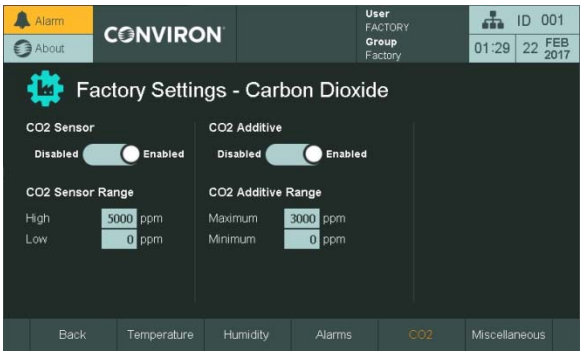


Figure 6-5 Sample Factory-Set CO2 Settings Screen

- **Miscellaneous** – View the Customer Name, Product Name, Product Serial Number, and Control System Name of the chamber (Figure 6-6).

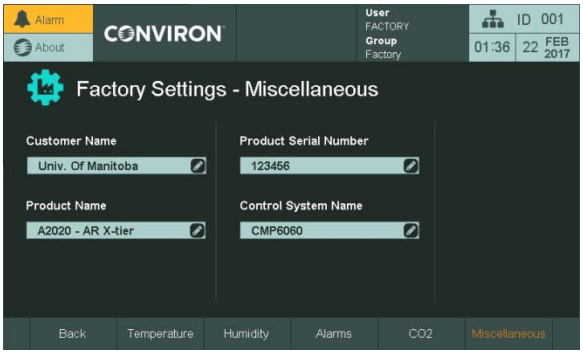


Figure 6-6 Sample Factory-Set Miscellaneous Screen

Even if service is close by, a few troubleshooting steps can significantly reduce the time to diagnose and correct a fault. Make careful notes of the faulty symptoms, the chamber serial number, and the ambient conditions. This could help to determine the cause of the problem.

6.2 Chamber Does Not Start

1. Check that the main power switch knob is in the ON position.
2. Check the circuit breaker at the building electrical panel.
3. Ensure the program is set and running in the control system and the start/stop switch is ON.
4. Check the temperature limit settings and ensure they are outside the program range.

If the chamber still does not start, then contact Conviron Service.

6.3 Chamber Does Not Cool

1. Check that the ambient temperature is below 25°C.
2. Ensure that the door is firmly closed.
3. Ensure that the fresh air intake is closed.
4. Ensure that the temperature sensor is in the correct position.

If the chamber still does not cool, then contact Conviron Service.

6.4 Chamber Does Not Heat

1. Check that the ambient temperature is above 20°C.
2. Ensure that the door is firmly closed.
3. Ensure that the fresh air intake is closed.
4. Ensure that the temperature sensor is in the correct position.

If the chamber still does not heat, then contact Conviron Service.

6.5 Chamber Does Not Make Humidity

1. Ensure that the door is firmly closed.
2. Ensure that the fresh air intake is closed.
3. Check the water supply to the rear of the chamber.

If the chamber still does not make humidity, then contact Conviron Service.

6.6 Chamber Does Not Dehumidify

Notes:

- The A2000 chamber is equipped with additive %RH and dehumidification systems.
- Achievable %RH is a function of either ambient %RH and additive moisture, or ambient %RH and dehumidification capability (based on dew point and chamber heat load).
- Fresh air intake can humidify or dehumidify the chamber, depending on ambient conditions.
- Use a psychometric chart to determine operating parameters.
- Ensure the water supply valve is on and the supply line is not clogged.
- Ensure that the damper adjustment knob is unobstructed. To view a photo of the damper adjustment knob, see Figure 4-2, Air Exchange Adjustment Knob, on page 20.
- Adjust the bypass damper to control how much air bypasses the evaporator coil. Open the bypass damper for dehumidification, or close the bypass damper for additive humidity.

If the chamber still does not dehumidify, then contact Conviron Service.

6.7 Chamber Lights Not Working

1. Ensure that the chamber is plugged into the wall outlet and that the main power switch is rotated to the ON position.
2. Ensure the lamp canopy is plugged into the chamber wall.
3. Check and replace the dark bulb(s).
4. Check the light level settings on the control system.

If the chamber lights are still not working as intended, then contact Conviron Service.

7 ADDITIONAL INFORMATION

7.1 Technical Specifications

Conviron maintains a policy of continual improvement and reserves the right to change the technical characteristics of the A2000 chamber without prior notice. Contact Conviron for more information regarding the technical specifications of your chamber.

7.2 Fuse Schedules

Table 7-1 list the fuse information for both 60Hz rated and 50 Hz rated chambers. Page numbers in Table 7-1 refer to either Conviron electrical schematic 277329 for 60Hz or 277330 for 50Hz chambers.

Conviron electrical schematics, 277329 for 60Hz or 277330 for 50Hz chambers, are available upon request. Please visit www.conviron.com/contact-us for global service contact information.

All fuses follow the GMD characteristic curve.

Table 7-1 Fuse Schedule

Fuse	Circuit Protected	Current Rate		Circuit Name/Function	Page
		60Hz	50Hz		
F1	CTRL-PRIM	0.75A	0.50A	Control Power Supply	1
F2	GRAL-PRIM	0.50A	0.30A	General Devices Power Supply – High Voltage Side	1
F3	USH-PRIM	0.75A	0.50A	Ultrasonic Humidifier Power Supply – High Voltage Side	1
F4	GRAL-DC-PRIM	0.50A	0.50A	General DC Power Supply	1
F5	CO2-DC-PRIM	N/A	N/A	Not Used	N/A
F6	CTRL-SEC	2.00A	2.00A	PLC Analog Power	1
F7	GRAL-SEC	2.00A	2.00A	General Devices Power Supply – Low Voltage side	1
F8	USH-SEC	2.00A	2.00A	Ultrasonic Humidifier Power Supply – Low Voltage side	1
F9	COND-PUMP	1.00A	1.00A	Condensate Pump	3
F10	C-ALARM	1.00A	1.00A	Central Alarm – Building Connection (Dry Contact)	2

7.3 Humidity and Temperature Ranges

Table 7-2 shows the humidity and temperature ranges for various configurations of the A2000 chamber.

Table 7-2 Humidity and Temperature Ranges

	PG Kit	AR Kit	TC Kit
Additive Humidity, (lights on)	75%	75%	75%
Light intensity, (µmol: @25°C)	700	500	225
Additive Humidity, (lights off)	Resultant to 90% RH – limited by +25°C dew point		
Additive Humidity Tolerance	± 6%		
Temp (lights on)	10°C – 45°C		
Temp Tolerance	±0. 5°C		

7.4 Terms & Definitions

Table 7-3 lists the common abbreviations, symbols, and terms used through this manual and provides a brief description of each..

Table 7-3 Term and Definitions

Term	Definition
%RH	Humidity level expressed as a percentage of the relative humidity level
∅	Greek letter Phi – SI prefix for electrical phase
µ	Greek letter Mu – SI prefix for micro
°C	Celsius Degrees
A	Amperes
AC	Air cooled condenser unit
AR	Arabidopsis
CFC	Chlorofluorocarbon
ESD	Electrostatic Discharge
EU	European Union
°F	Fahrenheit Degrees
GMD	Glass Medium Delay
GR	Ground
Hz	Hertz
ID	Inside Diameter
l/hr	Liter per hour
lpm	Liter per minute

Term	Definition
LT	Low temperature
mA	milliAmperes
mm	millimeter
OD	Outside Diameter
PG	Plant growth, for use with tall plants
psi	Pounds per square inch
PVC	Polyvinyl Chloride
RoHS	Restriction of Hazardous Substances Directive
TC	Tissue Culture
UPS	Uninterruptable Power Supply
USH	Ultrasonic humidifier
WC	Water cooled condenser unit
WEEE	Waste Electrical and Electronic Equipment

7.5 Consumables

Contact Conviron for replacement parts.

Always replace lamps with the same or equivalent lamp.

Item	Description	Part No
Fluorescent Lamps	39W, T5, HO, 840 -- Osram Sylvania	227426
	21W, T5, 840	232760
USH Disc	Humidifier replacement discs	236411

7.6 Disposal

The A2000 plant growth chamber is made up of metal and plastic parts, and electronic components in compliance to the European Union Directive 2002/96EC issued on January 27th, 2003. Please contact Conviron, or your Conviron distributor for proper handling and disposal instructions.

CONVIRON®

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Management System Certified to ISO9001

278061-ENGR01, October 2018