



A1000

INSTALLATION, OPERATION, & MAINTENANCE MANUAL

256574-ENG R01

A1000

INSTALLATION, OPERATION, & MAINTENANCE MANUAL

PLEASE READ THESE INSTRUCTIONS
CAREFULLY AND COMPLETELY
BEFORE OPERATING.

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PREFACE

The A1000 INSTALLATION, OPERATION, & MAINTENANCE MANUAL describes the features and use of Conviron's A1000 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 A1000 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 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.

Document Conventions

Wherever possible, textual descriptions are accompanied by photographs or line drawings of the A1000 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.

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, *A1000 INSTALLATION, OPERATION, & MAINTENANCE MANUAL* and the accompanying controller 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 controller. Instructions for obtaining the software version of your controller are provided in the controller operator 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 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 are used throughout this manual and/or on the equipment 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 which must be followed to ensure smooth and efficient equipment operation.
	The “ ELECTROSTATIC DISCHARGE ” symbol is used to identify equipment which is sensitive to electrostatic discharge.
	The “ BURN HAZARD/HOT SURFACE ” symbol is used to identify surfaces which are hot enough to cause personal injury.
	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.

1.2 Precautions

These precautions should be read and understood 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.

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, leveled, and secured to the floor BEFORE operating the unit.

Inspect all connections in the machine 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.

1.2.3 Operation



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

Operate your Conviron equipment for a minimum of 5 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 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 allow water to come into contact with electrical components while watering. Water contacting live circuits presents an electrocution hazard.



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.

1.3 Maintenance



The main terminal in the control panel has live voltage unless the external breaker is OFF.

Ensure that the building power supply to the chamber is off, and locked out or tagged out, prior to performing maintenance on the control panel.



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

2 KIT INSTALLATION

If the chamber has a kit installed, locate the installation instructions in this manual for that kit and reverse the steps to remove the existing kit before proceeding with a new installation.

2.1 Preparation

Read and understand these instructions before proceeding with unpacking and installing the new A1000 chamber.

The A1000 chambers are generally shipped in two crates – one for the chamber and another for the kit. To avoid damage, keep the chamber crated until it is ready for placement within the facility.

Before moving the chamber to its final location, ensure there is enough clearance through doorways, hallways, and elevators, and along the route to the installation site. You may need to uncrate it before moving it. The door may be removed from the chamber if absolutely necessary. Contact Conviron for door removal instructions.



Figure 2-1 Empty A1000 Chamber

2.1.1 Unpacking

1. Remove the wooden crate by removing the screws, starting at the top of the crate.
2. Using a utility knife, carefully remove the cardboard packing around the chamber.
3. Check the shock indicator on the back of the chamber for indications of damage during shipping. Contact Conviron immediately if the shock indicator is red.
4. Remove the chamber from the shipping pallet following the instructions included on the pallet.
5. Verify receipt of all components per the packing list. Notify your Dealer or Conviron Sales member immediately of any missing components.
6. Ensure all doors are locked before moving the chamber to the installation location.



Keep the caps on the unused lamp receptacles at all times.
A1000 chambers can operate at high temperature and humidity creating an electrocution hazard if the receptacle is exposed.
When replacing kits, ensure all unused receptacles are capped when not in use.

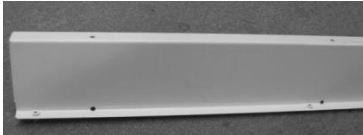


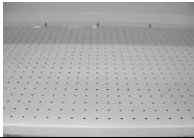







The finish and color of the parts received with this kit may not exactly reflect the parts shown in these instructions, due to product updates. However, the installation instructions are accurate.

2.2 Tissue Culture – TC Kit

The TC Kit is designed for tissue culture applications. Depending on order options, the chamber may be delivered with the kit installed. The kit is easy to install using only a Phillips screwdriver.

2.2.1 TC Kit Parts List

Item	Qty.	Description	Photo
A	1	Back Wall Plenum Bottom Support	
B	1	Back Wall Plenum	
C	52	Screw M4 x 8mm, Pan Head	
D	4	Air Shelf	
E	8	Air Shelf Support Clip	
F	8	Lamp Canopy Support	
G	4	Lamp Canopy	
H	16	Wire Shelf Support Bracket	
J	4	Wire Shelf	

2.2.2 TC Kit Installation

Open the chamber door, remove the kit package, and inspect the chamber and kit parts. Contact Conviron immediately if any damage is found, or if any parts are missing.

2.2.2.1 Installing the Back Wall Plenum Bottom Support



The back wall plenum bottom support and the back wall plenum may be installed at the factory



Install the support with the large flange pointing upward as shown in Figure 2-2.

This support is very important since it closes off the bottom of the chamber plenum and directs the airflow to the four air shelves at equal pressure. If this support is installed upside down, the airflow will not reach the bottom air shelf. If the support is installed too loosely, the airflow will not be evenly distributed between the four shelves.

To install the back wall plenum bottom support:

Install the support, Item A, onto the back wall of the chamber with four (4) screws, Item C (Figure 2-2) and tighten the screws to full resistance.

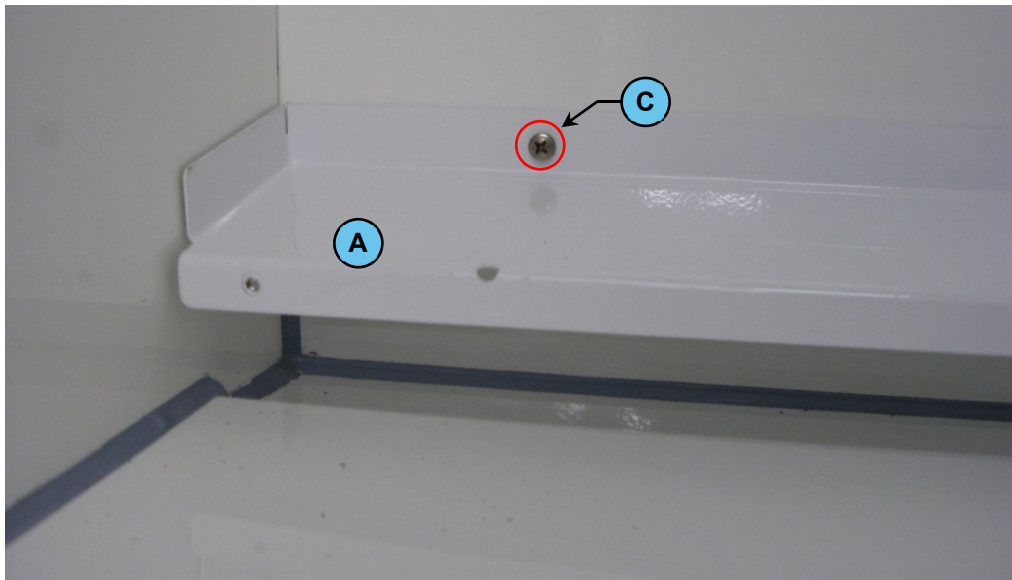


Figure 2-2 TC Back Wall Plenum Bottom Support Installed

2.2.2.2 Installing the Back Wall Plenum

The back wall plenum supports the rear edge of the air shelves and closes the front of the chamber plenum to distribute air to the shelves.

To install the back wall plenum:

1. Remove the rubber instrumentation port plug from the inside wall and temporarily re-install it in the port on the outside wall.
2. With the plenum handle at the top and the four rows of air slots towards the bottom, gently slide the back wall plenum, Item B, into the chamber.
3. Position the plenum at a slight angle to clear the protruding lamp receptacles and the aspirator and push it into place against the chamber back wall.
4. Engage the locating pins above the handle on the top of the plenum into the holes in the top of the chamber.
5. Secure the plenum to the chamber with twelve (12) screws, Item C (Figure 2-3).
 - a. Install the eight (8) vertical screws loosely to hold the plenum in place.
 - b. Gently pry the back wall plenum upwards to align the four (4) bottom holes in the plenum with the holes in the bottom support and install the screws.
 - c. Tighten all screws to full resistance.

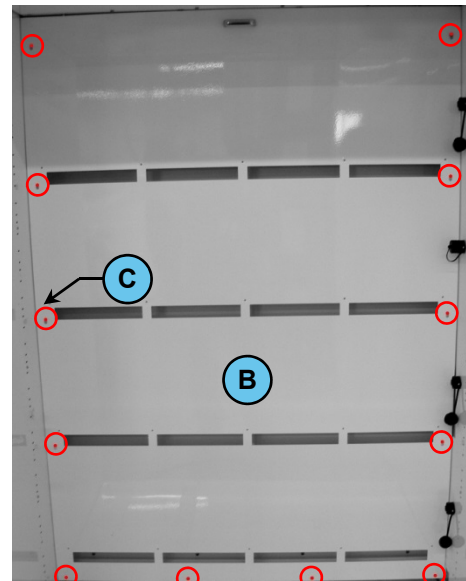
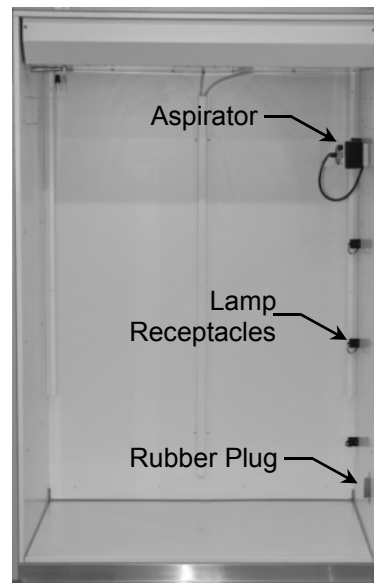


Figure 2-3 TC Back Wall Plenum Installed

2.2.2.3 Installing the Air Shelves

The air shelves connect to the back wall plenum to complete the internal air distribution system. It is recommended to install the bottom shelf first.



Use a stubby Phillips screwdriver or a Phillips driver on a socket wrench to install the screws into the support clip for the lowest shelf.

To install the air shelves:

1. Tilt the front of the air shelf, Item D, upwards and install the flange on the back of the shelf into the lowest slot in the back wall plenum, Item B.
2. Install the air shelf support clip, Item E, into the corresponding slot in the chamber wall and secure the clip to the shelf with two (2) screws, Item C (Figure 2-4). Repeat to install the clip on the other side of the shelf. Tighten the screws to full resistance.
3. Secure the air shelf, Item D, to the back wall plenum, Item B, with five (5) screws, Item C (Figure 2-5).
4. Tighten the screws to full resistance.
5. Continue to install the remaining air shelves.

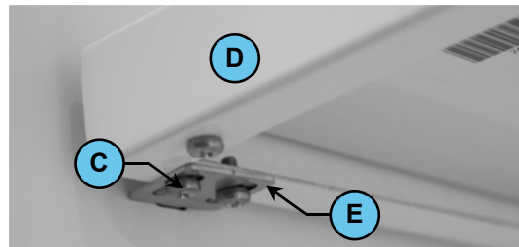


Figure 2-4 TC Air Shelf Support Clip Installed

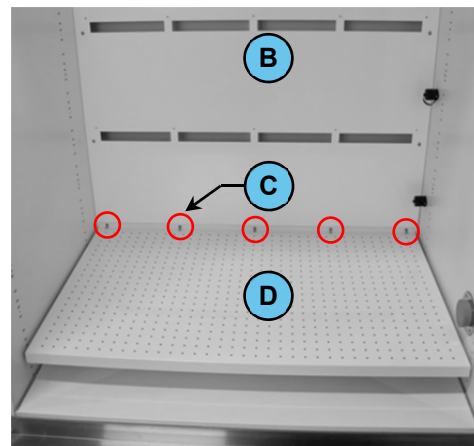


Figure 2-5 TC Bottom Air Shelf Installed

2.2.2.4 Installing the Lamp Support Canopies

The four lamp canopies are held in place by a full length bracket attached to the chamber wall. Install the lamp canopy supports into the chamber wall slots, starting at the top of the chamber.

To install the lamp canopy supports:

1. Install the first lamp canopy support, Item F, into the third and fourth set of slots from the top of the chamber wall.
 - a. Install the support with the flat side up by hooking the upper tab into the third set of slots. The flat side has an oval hole in it to locate the canopy in position.
 - b. Press lightly on the bottom side snapping it into the corresponding slot approximately 1" (25 mm) below the top one into the fourth set of slots.



Figure 2-6 TC Lamp Canopy Supports Detail

2. Install the lamp canopy, Item G, onto the supports and gently push it into the chamber (Figure 2-6). Ensure the cable is on the right side of the chamber to connect it to receptacle. The screw heads on the bottom of each side of the canopy will slip into the center hole of the canopy support when the canopy is in the correct position.
3. Unscrew the receptacle protective cap below the canopy, insert the canopy connector, and tighten to secure the connection.
4. Continue to install the remaining lamp canopies.

2.2.2.5 Installing the Wire Shelf Supports

The four wire shelves are held in place by four support brackets attached to the chamber wall. Install the wire shelf support brackets into the chamber wall slots, starting at the top of the chamber.

To install the wire shelf support brackets:

1. Install the wire shelf support brackets, Item H into the first and second set of slots above the top air shelf.
 - a. Install the support with the flat side up by hooking the upper tab into the second slots.
 - b. Squeeze the bottom of the support to insert the lower tab into the slot directly above the air shelf.
2. Place the wire shelf, Item J, over the support brackets and ensure it sits between the chamber wall and the vertical tab (Figure 2-7).
3. Continue installing the remaining wire shelves.

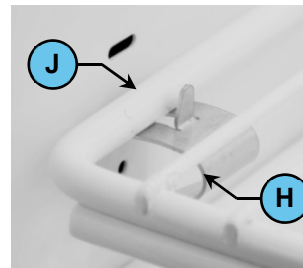


Figure 2-7 TC Wire Shelf Supports Detail

The chamber is now ready to operate. Read the startup Instructions carefully before proceeding with the start up.



Figure 2-8 TC Kit Installed



The maximum operating levels of light for this kit must be set at the controller. To edit the factory default setting, refer to the included controller Operator's Manual.

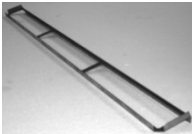
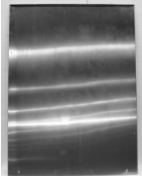




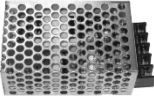

2.3 Plant Growth – PG Kit



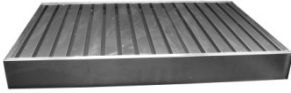




Ensure at least 4" (100mm) of free space around the exterior side walls of the chamber to facilitate proper air circulation. Inadequate air circulation and cooling inside the chamber will result if this space is not provided.

Depending on order options, the chamber may be delivered with the kit installed. The kit is easy to install using only a Phillips screwdriver.

2.3.1 PG Kit Parts List

Item	Qty.	Description	Photo
A	1	Back Wall Plenum Bottom Support	
B	1	Back Wall Plenum	
C	24	Screw M4 x 8mm, Pan Head	
D	8	Screw M3 x 40mm, Pan Head	
E	2	Canopy Cooling Fan	
F	2	Cooling Fan Wiring Harness	
G	1	AC/DC Converter	
H	2	Screw, M3 x 16mm, Pan Head	

Item	Qty.	Description	Photo
J	2	Lamp Canopy Support	
K	1	Lamp Canopy	
L	1	Unifloor Cassette	
M	16	Wire Shelf Support Bracket	
N	4	Wire Shelf	

2.3.2 PG Kit Installation

Open the chamber door, remove the kit package, and inspect the chamber and kit parts. Contact Conviron immediately if any damage is found, or if any parts are missing.

2.3.2.1 Installing the Canopy Filter and Fans



Chambers ordered for the North American markets will come with the canopy fans pre-installed by Conviron.

The PG kit uses ambient air to cool the light canopy. Air is drawn through the filter on the left side of the chamber and through the light canopy by the fans on the right side of the chamber. The air absorbs the heat generated by the canopy lamps and it is then expelled back to atmosphere.

This circulation enables the maximum light output throughout the entire temperature range, since the lamps are cooled by ambient air, and eases the heat load on the refrigeration system.

To Install the canopy filter:

1. Remove the air inlet cover located in the left side wall and the insulated fans covers located in the right side wall (Figure 2-9). Ensure these three cavities are empty and clean.
2. Install the air filter into the air inlet using two (2) screws, Item C.
 - a. Ensure the filter mesh sits flush with the inside wall.
 - b. Tighten the screws to full resistance (Figure 2-10).



Figure 2-9 PG Fan and Air Inlet Cavities



Figure 2-10 PC Canopy Air Inlet Filter Installed



Ensure the fan is installed in the correct orientation. Arrows are molded into the fan housing (Detail a, Figure 4-12) show the correct orientation. Install the fans such that the air flows from inside the chamber to the outside.

To install the canopy fan:

1. Install four (4) screws, Item D, through the mounting holes of each canopy cooling fan, Item E (Figure 2-11).
 - a. Install the fans into the fan cavities on the right side wall (Figure 2-12) and tighten the screws to full resistance.
 - b. Push the leads of the wiring harness, Item F, up through the bushing above the fan (Detail b, Figure 2-12) and into the equipment compartment above the chamber for later connection to the power supply.
 - c. Connect the wiring harness to the fan (Detail c, Figure 2-12) and ensure the connections 'snap' together tightly

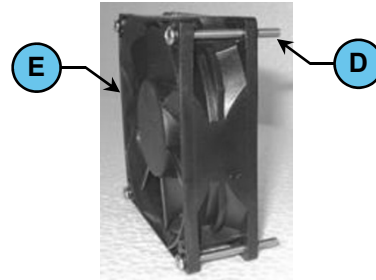


Figure 2-11 PG Canopy Fan Pre-installation

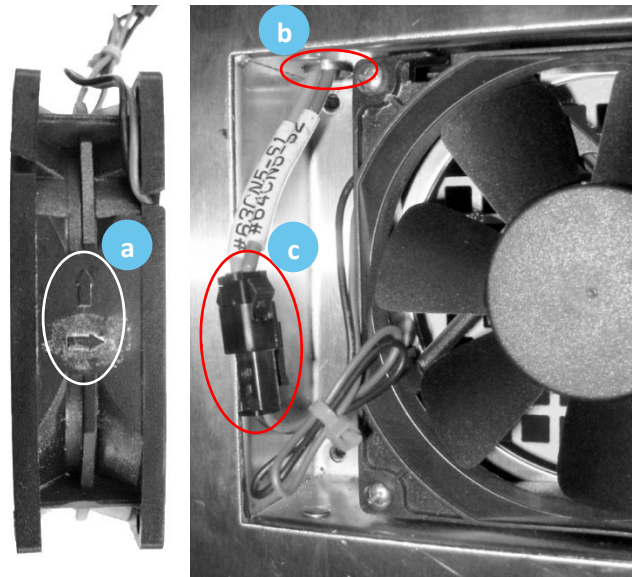


Figure 2-12 PG Canopy Fans Installed

2.3.2.2 Connecting the Canopy Fans to the Control System

The canopy fans must be connected to the control system to adjust the airflow through the controller. The top cover must be removed to access connections.



The top cover is connected to the main ground connection of the chamber by a ground wire. Do not damage the ground wire or the connector while removing the top cover.

To remove the top cover:

1. Remove the three (3) screws securing the top cover to the unit and lift the cover towards the rear of the chamber.
2. Unplug the top cover ground wire from the connection on the cover and carefully remove the top cover from the chamber.

To connect the fans to the controller:

1. Remove the clear cover from the AC/DC converter, Item G.
2. Connect the fan wires, ground, and power wires (Figure 2-13).
3. Reinstall the clear cover onto the AC/DC converter.
4. Install the AC/DC converter onto the right side wall using the two (2) screws, Item H, provided (Figure 2-14).
5. Reinstall the ground wire onto the top cover and reinstall the cover.

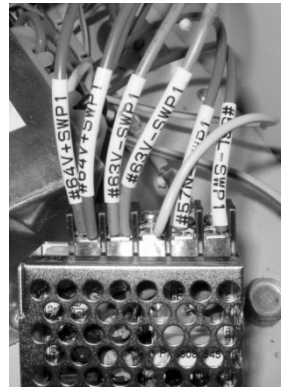


Figure 2-13 PG AC/DC Converter Electrical Connections

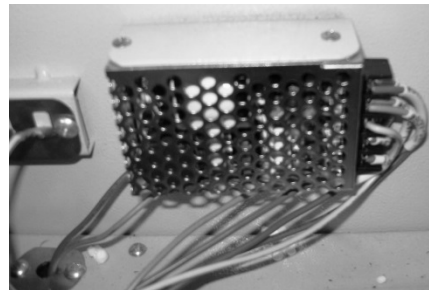


Figure 2-14 PG AC/DC Converter Installed

2.3.2.3 Installing the Back Wall Plenum Support



The back wall plenum bottom support and the back wall plenum may be installed at the factory.



Note the position of the four (4) holes, shown as dots in Figure 2-15, in the front of the support where the back wall plenum will be fastened to the support. These holes must face the front of the chamber.

This support is very important because it directs the airflow to the Unifloor™, which in turn distributes the airflow upwards through the plants.

To install the back wall plenum bottom support:

1. Install the support, Item A, onto the back wall of the chamber with four (4) screws, Item C (circled in Figure 2-15).
2. Install the screws through the rear plate of the support and tighten these screws to full resistance.

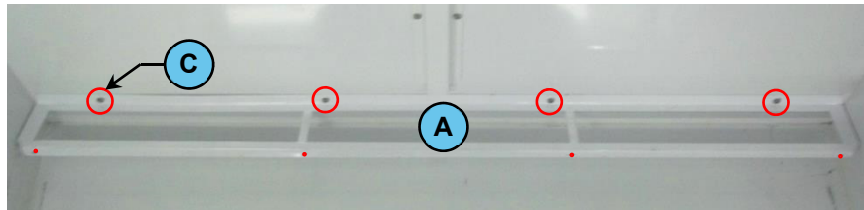


Figure 2-15 PG Back Wall Plenum Bottom Support Installed

2.3.2.4 Installing the Back Wall Plenum

The back wall plenum directs airflow down towards the Unifloor™.

To install the back wall plenum:

1. Remove the rubber instrumentation port plug from the inside wall and temporarily re-install it in the port on the outside wall.
2. With the plenum handle at the top, gently slide the back wall plenum, Item B, into the chamber.
3. Position the plenum at a slight angle to clear the protruding lamp receptacles and the aspirator and push it into place against the chamber back wall.
4. Engage the locating pins above the handle on the top of the plenum into the holes in the top of the chamber.
5. Secure the plenum to the chamber with twelve (12) screws, Item C (Figure 2-16).
 - a. Install the eight (8) vertical screws loosely to hold the plenum in place.
 - b. Gently pry the back wall plenum upwards to align the four (4) bottom holes in the plenum with the holes in the bottom support and install the screws.
 - c. Tighten all screws to full resistance.

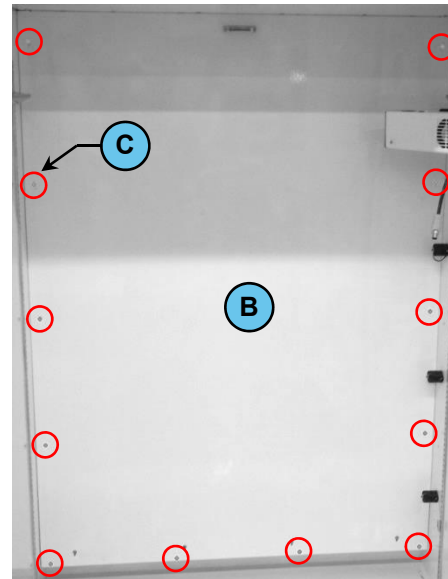
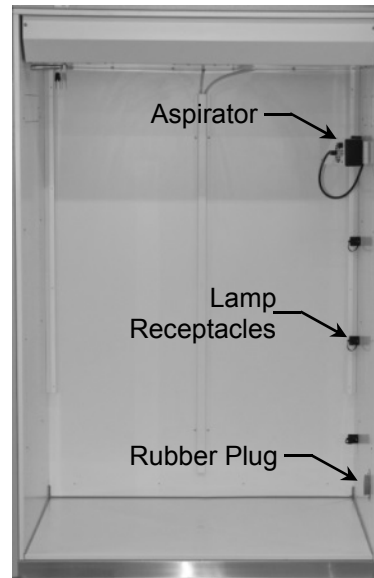


Figure 2-16 PG Back Wall Plenum Installed

2.3.2.5 Installing the Lamp Canopy Supports and Lamp Canopy



Incorrect installation may result in user injury due to overheating of the canopy or significantly reduced chamber performance. The canopy must be installed so the intake and fan cavities align with the ports on the sides of the canopy.



Ensure at least 2" (50mm) of free space around the side walls of the chamber interior to facilitate proper air circulation.

The lamp canopy location in the PG kit is predetermined by the position of the air intake and cooling fan cavities in the side walls.

To install the lamp canopy supports and lamp canopy:

1. Position the lamp canopy supports, Item J, directly below the cavities in each side wall (Figure 2-17).
 - a. Install the support with the flat side up by hooking the upper tab into the slots. The flat side has an oval hole in it to locate the canopy in position.
 - b. Press lightly on the bottom side, snapping it into the corresponding slot approximately 1" (25 mm) below the top one.

2. Carefully slide the canopy, Item K, onto the supports with the canopy plug located on the right hand side of the chamber.



Figure 2-17 PG Lamp Canopy Supports

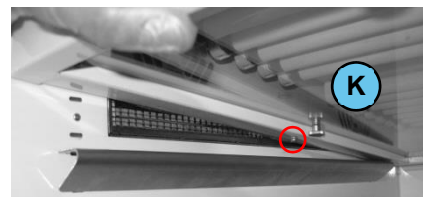


Figure 2-18 PG Lamp Canopy Installed

3. Push the canopy towards the back of the chamber. The screw heads on the bottom of each side of the canopy (Figure 2-18) will slip into the center hole of the canopy support when the canopy is in the correct position.



4. Remove the cap from the receptacle under the canopy support and connect the canopy plug to the receptacle on the wall (Figure 2-19).



Figure 2-19 PG Lamp Canopy Plug Connection



Keep all unused receptacles capped to prevent an electric shock hazard. Only the top receptacle is used with this kit.

2.3.2.6 Installing the Unifloor

The floor has multiple profiles, which collectively configure it as a single piece called a 'cassette'. The rear of the cassette has an opening that allows conditioned air to be distributed evenly up through the floor and into the chamber.

To install the Unifloor® cassette:

1. Partially install four (4) screws, Item C, into the upper edge above the opening of the cassette, Item L, before placing it into the chamber (Panel A, Figure 2-20). Leave a gap between the screw head and the cassette (Panel B, Figure 2-20) of approximately 1/8" (3mm) so the cassette can lock into the key holes (Panel C, Figure 2-20) in the back wall plenum.
2. Carefully slide the Unifloor cassette, Item L, into the chamber with the opening facing the back wall plenum.
3. Lift the back edge slightly and push the cassette into contact with the back wall plenum to engage the screws.

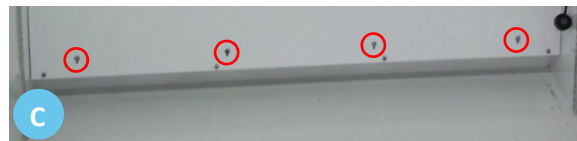
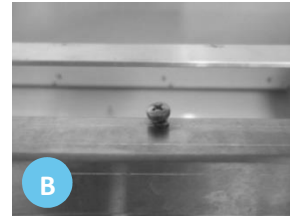
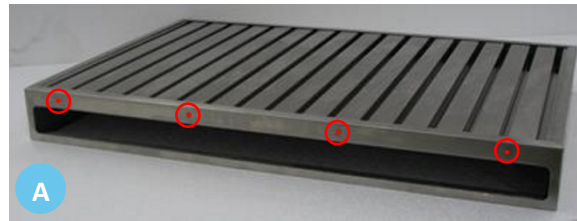


Figure 2-20 PG Unifloor Screw Installation

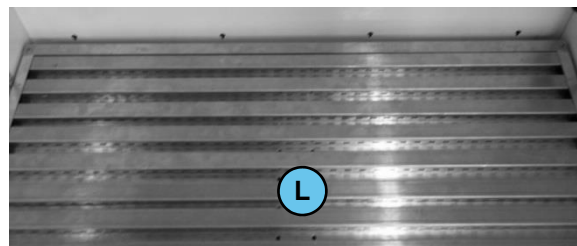


Figure 2-21 PG Unifloor Installation

2.3.2.7 Installing the Wire Shelf

The wire shelf can be installed in any position within the chamber, depending on the experiment requirements. However, the shelf must be installed in the lowest position if maximum plant height growth is required within the chamber.

To install the wire shelf:

1. Place the four (4) bottom shelf supports, Item M into the slots in the side wall by inserting the top part of the clip into the desired slot and press lightly on the bottom to snap it into position.
2. Place the wire shelf with the lamp supports, Item N, over the clips (Figure 2-22).

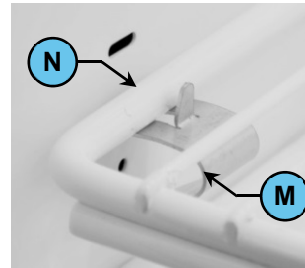


Figure 2-22 PG Wire Shelf Supports Detail



Figure 2-23 PG Kit Installed

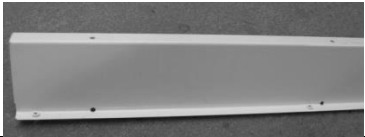
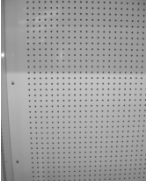


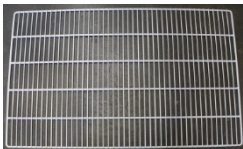
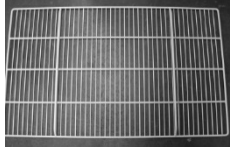




The maximum operating levels of light for this kit must be set at the controller. To edit the factory default setting, refer to the included controller Operator's Manual.

2.4 Incubation – IN Kit

Depending on order options, the chamber may be delivered with the kit installed. The kit is easy to install using only a Phillips screwdriver.

2.4.1 IN Kit Parts List

Item	Qty.	Description	Photo
A	1	Back Wall Plenum Bottom Support	
B	1	Back Wall Plenum	
C	16	Screw M4 x 8mm, Pan Head	
D	16	Wire Shelf Support Bracket	
E	4	Wire Shelf (without lamp support)	
F	1	Wire Shelf (with lamp support)	
G	4	Lamp Fixture	
H	8	Lamp Fixture Support	

2.4.2 IN Kit Installation

Open the chamber door, remove the kit package, and inspect the chamber and kit parts. Contact Conviron immediately if any damage is found, or if any parts are missing.

2.4.2.1 Installing the Back Wall Plenum Support



The back wall plenum bottom support and the back wall plenum may be installed at the factory.



Install the support with the large flange pointing upward as shown in Figure 2-24

This support is very important since it closes off the bottom of the chamber plenum and directs the airflow through the back wall plenum and into the chamber at equal pressure. If this support is installed upside down, the back wall plenum will not fit. If the support is installed too loosely, the airflow will not be evenly distributed through the back wall plenum.

To install the back wall plenum bottom support:

Install the support, Item A, onto the back wall of the chamber with four (4) screws, Item C (Figure 2-24) and tighten the screws to full resistance.

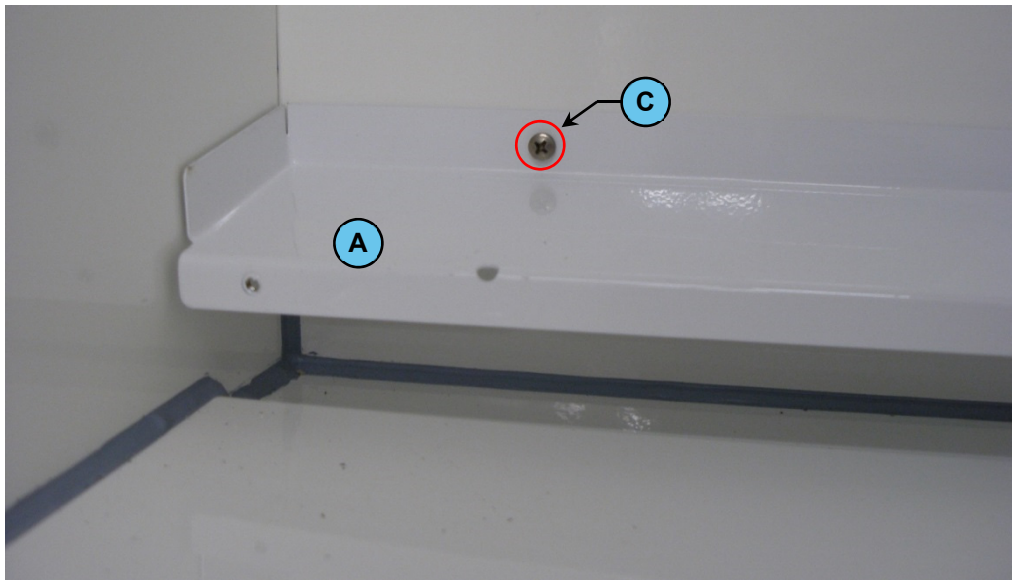


Figure 2-24 IN Back Wall Plenum Bottom Support Installed

2.4.2.2 Installing the Back Wall Plenum

The back wall plenum closes the front of the chamber plenum to distribute air evenly throughout the chamber.

To install the back wall plenum:

1. Remove the rubber instrumentation port plug from the inside wall and temporarily re-install it in the port on the outside wall.
2. With the plenum handle at the top and the short flanges towards the back wall, gently slide the back wall plenum, Item B, into the chamber.
3. Position the plenum at a slight angle to clear the protruding lamp receptacles and the aspirator and push it into place against the chamber back wall.
4. Engage the locating pins on the top of the plenum into the holes in the top of the chamber.
5. Secure the plenum to the chamber with twelve (12) screws, Item C (Figure 2-25).
 - a. Install the eight (8) vertical screws loosely to hold the plenum in place.
 - b. Gently pry the back wall plenum upwards to align the four (4) bottom holes in the plenum with the holes in the bottom support and install the screws.
 - c. Tighten all screws to full resistance.

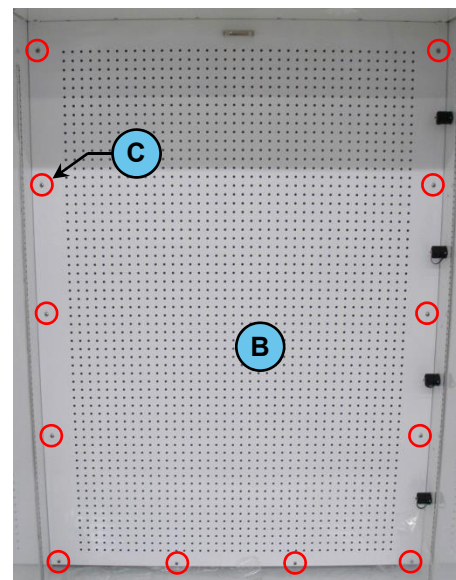
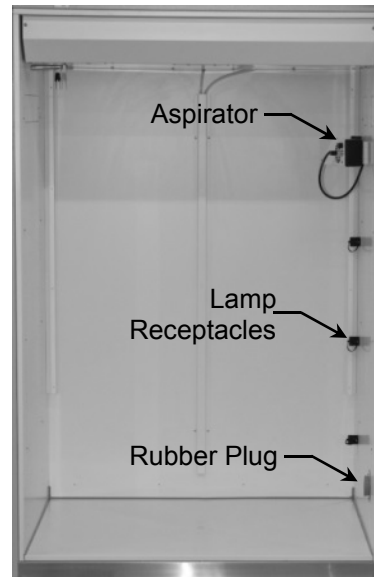


Figure 2-25 IN Back Wall Plenum Installed

2.4.2.3 Installing the Wire Shelves



The wire shelf without the lamp supports must be installed at the bottom of the chamber. The shelves with the lamp supports must be installed above the bottom shelf.

The shelves must be installed from the bottom to the top. The lowest possible position for the bottom shelf, Item F, is above the bottom row of holes in the back wall plenum, as shown in Figure 2-26.

To install the wire shelves:

1. Place the four (4) bottom shelf supports, Item D into the slots in the side wall by inserting the top part of the clip into the desired slot and press lightly on the bottom to snap it into position.
2. Place the wire shelf without the lamp supports, Item E, over the clips (Figure 2-27).
3. Continue to install the rest of the shelf supports in each side wall at the desired height.
4. Place the wire shelf with the lamp supports, Item F, over the clips.



Figure 2-26 IN Bottom Shelf Installed

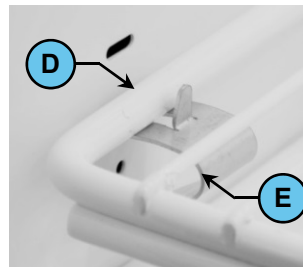


Figure 2-27 IN Wire Shelf Supports Detail

2.4.2.4 Installing the Lamp Fixtures



Contact Conviron to order additional lamp fixtures. Some limitations to minimum temperature and maximum humidity apply.



The lamp supports must be installed in the orientation shown in Figure 2-28, with the opening in the support facing the end of the fixture with the connection cord.

Single Lamp Fixtures per Shelf

The IN kit will support one, two, or three lamp fixtures per shelf. The basic kit provides a total of four lamp fixtures.

The fixtures in the IN kits are referred to as lamps fixtures without connectors, and the additional fixtures are referred to as lamp fixtures with connectors. Fixtures with connectors have a female receptacle to allow daisy chain connection of all the lamp fixtures in one shelf.

Two supports are required per fixture.

To install a single lamp fixture per shelf:

1. Install the lamp fixture supports, Item H, onto the lamp fixture, Item G, using two (2) screws, Item C, per support (Figure 2-28).
2. Continue to install the lamp supports onto the remaining fixtures.
3. Install the lamp fixture by hanging it from the wire support below the shelf. The lamp fixture can be hung at any point along the shelf with the fixture plug located on the right-hand side
4. Remove the cap from the receptacle and connect the fixture plug into the receptacle on the wall.
5. Continue to install the remaining fixtures.



Figure 2-28 IN Lamp Supports Installed onto the Fixture



Figure 2-29 IN Single Lamp Fixture per Shelf Installed

Multiple Lamp Fixtures per Shelf

Install the lamp fixture with the cable closest to the back wall of the chamber.



The fixtures without a cable must always be installed closer to the door to enable correct daisy chain connections.

To install multiple lamp fixtures per shelf:

1. Install the lamp fixture supports and install the fixtures onto the shelves, following the instructions on page 2-24.
2. Ensure that the fixture with the plug is at the back of the chamber and plug the front fixture into the back fixture (Figure 2-30).
3. Remove the cap from the receptacle and connect the back fixture plug into the receptacle on the wall.
4. Repeat with all the remaining fixtures.



Figure 2-30 IN Multiple Lamp Fixture Installation Detail



Figure 2-31 IN Kit Installed

The chamber is now ready to operate. Read the startup instructions carefully before proceeding with the start up.

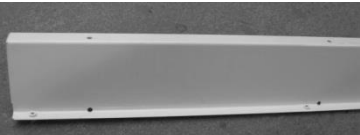
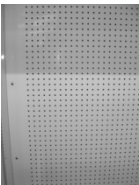







The maximum operating levels of light for this kit must be set at the controller. To edit the factory default setting, refer to the included Operator's Manual.

2.5 Arabidopsis – AR Kit

Depending on order options, the chamber may be delivered with the kit installed. The kit is easy to install using only a Phillips screwdriver.

2.5.1 AR Kit Parts List

Item	Qty.	Description	Photo
A	1	Back Wall Plenum Bottom Support	
B	1	Back Wall Plenum	
C	16	Screw M4 x 8mm, Pan Head	
D	2	Lamp Canopy Support	
E	2	Lamp Canopy	
F	8	Wire Shelf Support Bracket	
G	2	Wire Shelf	

2.5.2 AR Kit Installation



The back wall plenum bottom support and the back wall plenum may be installed at the factory.



Install the support with the large flange pointing upward as shown in Figure 2-32.

This support is very important because it directs the airflow through the back wall plenum at equal pressure. A loose installation will not distribute the airflow evenly.

To install the back wall plenum bottom support:

Install the support, Item A, onto the back wall of the chamber with four (4) screws, Item C (Figure 2-32) and tighten the screws to full resistance.

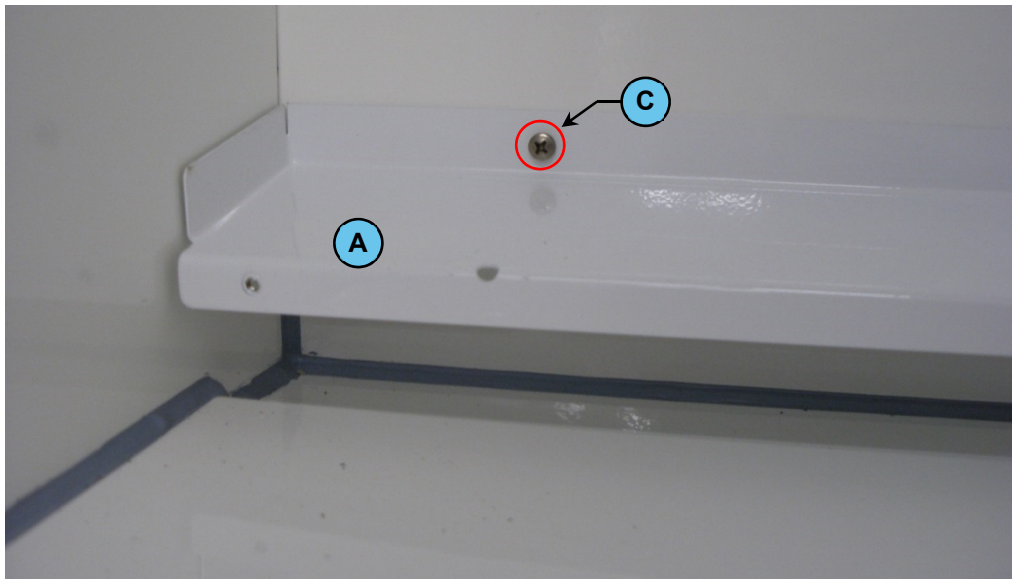


Figure 2-32 AR Back Wall Plenum Bottom Support Installed

2.5.2.1 Installing the Back Wall Plenum Support

The back wall plenum closes the front of the chamber plenum to distribute air evenly throughout the chamber.

To install the back wall plenum:

1. Remove the rubber instrumentation port plug from the inside wall and temporarily re-install it in the port on the outside wall.
2. With the plenum handle at the top and the short flanges towards the back wall, gently slide the back wall plenum, Item B, into the chamber.
3. Position the plenum at a slight angle to clear the protruding lamp receptacles and the aspirator and push it into place against the chamber back wall.
4. Engage the locating pins on the top of the plenum into the holes in the top of the chamber.
5. Secure the plenum to the chamber with twelve (12) screws, Item C (Figure 2-32).
 - a. Install the eight (8) vertical screws loosely to hold the plenum in place.
 - b. Gently pry the back wall plenum upwards to align the four (4) bottom holes in the plenum with the holes in the bottom support and install the screws.
 - c. Tighten all screws to full resistance.

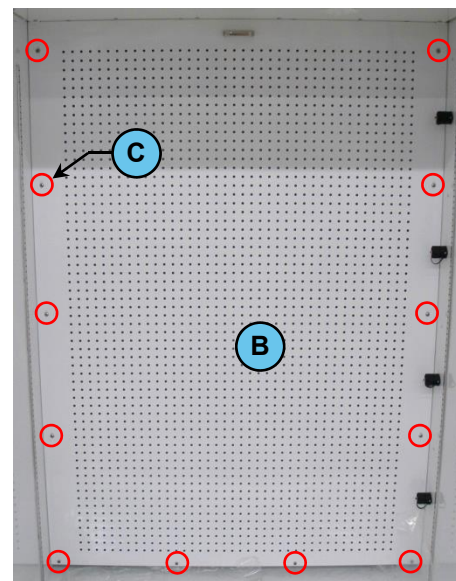
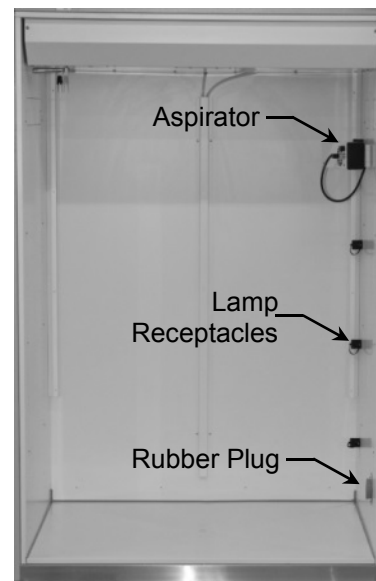


Figure 2-33 AR Back Wall Plenum Installed

2.5.2.2 Installing the Lamp Canopies



Do not install the top canopy closer than 3" (75mm) from the air vent located in the top of the chamber.



Keep all unused receptacles capped to prevent an electric shock hazard. Only two receptacles are used with this kit.

The AR kit provides two adjustable lamp canopies to accommodate the specific requirements. However, there is a limitation determined by the distance from the top canopy to the fan housing. If the canopy is installed too close, the airflow may be significantly reduced, affecting the unit's performance.

The maximum growth height for the AR kit is 18" (450mm). The growth height is adjustable according to the requirements of the experiment.

Another option is to have different growth heights between the two tiers, or to install a single canopy with one large growth height. Figure 4 34 shows a chamber configured for the maximum growth height between canopies of 18" (450mm).



Figure 2-34 AR Shelf Supports Installed for Maximum Growth Height

To install the lamp canopy supports and lamp canopy:

1. Position the lamp canopy supports, Item D, at the required location on each side wall.
 - a. Install the support with the flat side up by hooking the upper tab into the slots. The flat side has an oval hole in it to locate the canopy in position.
 - b. Press lightly on the bottom side snapping it into the corresponding slot (approximately 1" [25 mm] below the top one).



Figure 2-35 AR Lamp Canopy Installed

2. Carefully slide the canopy, Item E, onto the supports with the plug located on the right hand side of the chamber.
3. Push the canopy towards the back of the chamber. The screw heads on the bottom of each side of the canopy will slip into the center hole of the canopy support when the canopy is in the correct position.
4. Continue to install the remaining supports and the other canopy, as required.
5. Remove the cap from the receptacle under the canopy support and connect the canopy plug to the receptacle on the wall.

2.5.2.3 Installing the Wire Shelves

The wire shelves must be installed according to the desired growth height. The lowest possible position for the bottom shelf, Item G, is above the bottom row of holes in the back wall plenum, as shown in Figure 2-36.

To install the wire shelves:

1. Place the four (4) bottom shelf supports, Item F into the slots in the side wall by inserting the top part of the clip into the desired slot and press lightly on the bottom to snap it into position.
2. Continue to install the rest of the shelf supports in each side wall at the desired height.
3. Place the wire shelf with the lamp supports, Item G, over the clips (Figure 2-36).
4. Repeat for the remaining shelf.

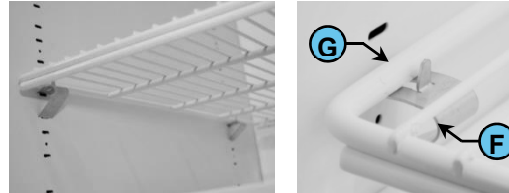


Figure 2-36 AR Bottom Shelf Location and Supports Detail



Figure 2-37 AR Kit Installed

The chamber is now ready to operate. Read the startup Instructions carefully before proceeding with the start up.



The maximum operating levels of light for this kit must be set at the controller. To edit the factory default setting, refer to the included controller Operator's Manual.

3 CHAMBER INSTALLATION REQUIREMENTS

A1000 units must be placed in ventilated areas. The ideal temperature around the equipment is 21°C. Although it will perform at higher ambient temperatures, it is recommended that the product be placed in areas that have circulating air.

3.1 Chamber Placement

Convion guarantees performance of the chamber for ambient temperature conditions between 15°C and 30°C. It is important to ensure that the room in which the chamber is located adheres to these environmental conditions.

A1000 products will dissipate up to 2400 W to ambient.



Ensure at least 4" (100mm) of free space around the exterior side walls of a chamber with a PG kit to facilitate proper air circulation. Inadequate air circulation and cooling inside the chamber will result if this space is not provided.

3.1.1 Chamber Clearance

- At least 1 ft. (300 mm) must be left clear behind the back wall.
- At least 1 ft. (300 mm) must be left clear above the unit.
- At least 2" (50 mm) must be left clear on each side of the A1000 when the PG Kit is installed. Note – if any kit other than the PG Kit is installed, no side clearance is required.

3.1.2 Power Supply

All A1000 products are single phase and delivered to the market with one of two options.

- 120VAC-1Ø-60 Hz – 2 wire plus ground – 20 Amp overcurrent protection
- 230VAC-1Ø-50Hz - 2 wire plus ground – 16 Amp overcurrent protection

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

Disconnect switch must be sized by a qualified, local electrician.

3.1.3 Water Supply

Flow	0.26 gallons / hour (1 Liters / 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 Mega Ohms
Conductivity	2.0 to 0.2µSiemens



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

3.1.4 Condensate Drain

A ½” drain is provided underneath chamber, located in the center. The drain consists of ½” tubing with p-trap and includes a drip pan for collection of condensate. This ½” drain may be extended to a nearby floor drain, as required.

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

4 CHAMBER INSTALLATION

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

4.1 Connecting the Chamber

The A1000 is provided with the following connections on the top right rear corner of the chamber (Figure 4-1);

1. a Communication Port
2. a Central Alarm Contact connection to monitor the chamber through the building LAN
3. a 10ft. (3M) power cord, with wall plug
4. a female M6 (or 1/4 inch for the North American market) compression fitting for a purified water supply line connection to the humidifier

Before connecting the chamber to building electrical service, verify that the service matches the specified rating on the chamber serial plate (Figure 4-2), located on the left hand side of the chamber.

The connections for the optional exhaust collar and the condensate pump are located in the top left corner rear corner of the chamber (Figure 4-3).

Figure 4-4 shows the optional exhaust collar installed onto the rear of the chamber.

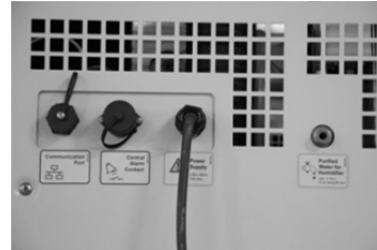


Figure 4-1 Chamber Connections

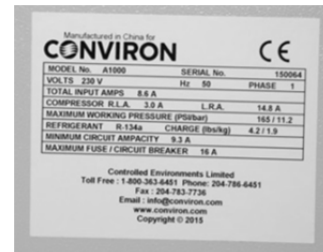


Figure 4-2 Chamber Serial Plate Example

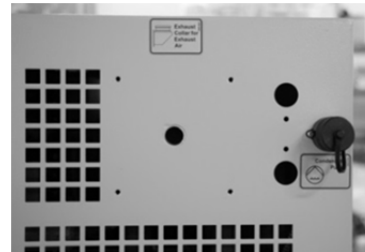


Figure 4-3 Exhaust Collar and Condensate Pump Connections - Optional



Figure 4-4 Optional Exhaust Collar Installed

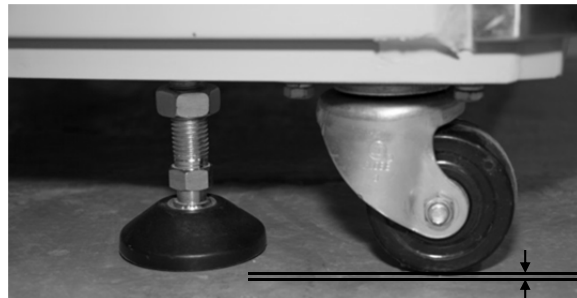
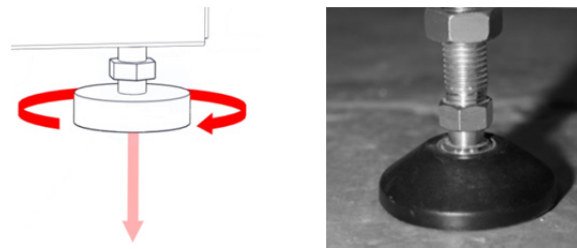
4.2 Leveling the Chamber

The A1000 is equipped with four (4) levelers to prevent the unit from rolling on its casters once installed, and to compensate for any variations in the floor level (Figure 4-5). The levelers are M24 x 120mm bolts inserted at the four corners at the bottom of the base. The unit must be tilted or lifted in order to thread the bolts in.

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

To adjust the levelers:

1. Turn the levelers under the back wall of the chamber clockwise until they are in firm contact with the floor.
2. Adjust the levelers on the side walls until the gap between the caster and the floor is at least 1/8" (3mm) and no more than 1/4" (6 mm), as shown in Figure 4-5.
3. It is important that the two front levelers are perfectly level (side to side) so the door closes easily. An out-of-level condition on the front levelers can cause the door to bind due to misalignment.
4. Ensure the chamber is level in both the side to side and front to back directions for proper drainage.



1/8" (3mm) to 1/4" (6 mm) above the floor

Figure 4-5 Chamber Levelers

5. Turn the upper locknut counterclockwise until it is tight against the chamber frame to secure the levelers in position (Figure 4-6).

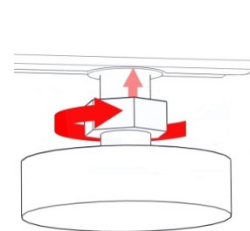


Figure 4-6 Tighten the Locknut

4.3 Installing the Drip Pan

Slide the plastic drip pan between the metal runners located under the center of the chamber.

5 CHAMBER START-UP AND OPERATION

5.1 Start-up

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

- The drip pan is installed.
- The water line is connected.
- The electrical cord is plugged into a wall outlet.
- The breaker, located in the machine compartment 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 A1000 is now ready to operate.



The main power switch is located on the left hand side of the unit above the door. The switch is backlit and turns red when the power is ON (Figure 5-1).

In a few seconds the Controller will boot up.

The user now has to configure a few parameters in the controller to tailor the controller's response to the specific model being setup.

Refer to the included controller manual for instructions to adjust these parameters.

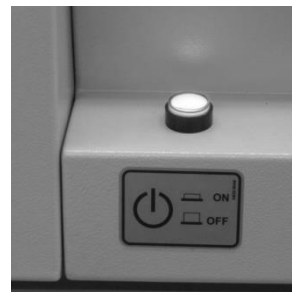


Figure 5-1 Power ON

5.2 Operation



To ensure no damage was incurred during transportation, operate your CONVIRON equipment for a minimum of 5 days before introducing any research material.

5.2.1 Drip Pan

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

5.2.2 Fresh & Exhaust Air Connections

A1000 reach-in chambers are equipped with a damper for fresh and exhaust air exchange (Figure 5-2). A single lever located inside the chamber chamber adjusts both the intake and exhaust air simultaneously. Check and adjust the damper, as required, before every experiment.

A1000 chambers require adapters to the mechanical dampers located on the chamber roof. Connect to a building central exhaust or fresh air supply.



Figure 5-2 Damper Adjustment Lever

5.2.3 Additive Humidity

All A1000 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 that require maintenance.

A connection to a purified water source is required when additive humidity is to be used (Figure 5-3).

Refer to the included controller manual for instructions to adjust the humidity, and to the Technical Specifications section for details.



Figure 5-3 Water Connection

5.2.4 Fan Speed Control

A1000 chambers are equipped with a fan speed control to work with the internal damper for fresh and exhaust air exchange (Figure 5-4).

The fan speed control is located on the right hand side of the unit above the door. Turn the knob clockwise to increase the fan speed.



Figure 5-4 Fan Speed Control

6 TROUBLESHOOTING



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

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 fault symptoms and the chamber and ambient conditions. This could help to determine the cause of the problem.

Chamber won't start

1. Check that the chamber is plugged into the wall outlet and that the main disconnect switch is ON.
2. Check the circuit breaker at the building electrical panel.
3. Ensure the program is set and running in the controller and the start/stop switch is ON.
4. Check the temperature limit settings and ensure they are outside the program range.

Still won't start Contact service or Conviron.

Chamber won't cool

1. Check that the ambient temperature is below 30°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.

Still won't cool Contact service or Conviron.

Chamber won't 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.

Chamber won't 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.

Still no humidify Contact service or Conviron.

Chamber lights not working

1. Ensure that the chamber is plugged into the wall outlet and that the main disconnect switch is ON.
2. Ensure the lamp canopy is plugged into the chamber wall.
3. Check and replace the dark bulb(s).
4. Check the light levels settings on the controller.

Still no lights Contact service or Conviron.

7 MAINTENANCE

The A1000 chamber requires regular maintenance in order to continue performing to specifications.



Never spray water directly into the unit using a hose.

The A1000 contain sensors and other electrical components that will be damaged by direct contact with liquids.

7.1 Cleaning

For interior cleaning please damp a clean towel or rag outside the unit, and carefully wipe the unit down. Do not use abrasive cleaners. Detergents in low proportions are suitable for most cleaning requirements.

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

7.2 Water Reservoir

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

To purge the water tank:

1. SHUT THE CHAMBER OFF (with the switch button located between the door and front support).
1. Lift the top cover, turn the breaker off, and disconnect the ground wire at the back of the top cover.
2. Carefully remove the top cover.
3. Open the water reservoir lid.
4. Clean the water tank.
5. Ensure there is no water residue on the ultrasonic discs.
6. Replace the water reservoir lid (this is very important otherwise air from the unit will be damped into the ambient at all times, and water may be splashed over electrical components).

7.3 Replacing Lamps

Periodically check to ensure all lamps 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. Completely disconnect the power supply to the unit by unplugging it from its receptacle before replacing lamps.
3. Unlock the lamp to be replaced by rotating it $\frac{1}{4}$ turn in its socket and remove with care to avoid breaking it.
4. Install the new lamp.
5. Ensure it is locked in its socket by rotating it $\frac{1}{4}$ turn.
6. Dispose unused lamps, following the requirements in your area or contact your local authorities for procedures.

7.4 Ultrasonic Humidity System

When not in use, the humidity box (located inside the machine compartment), must be drained and cleaned. Close the water supply valve while not in use.

Conviron recommends setting a moderate RH value in all programs to keep the USH feature operable without significantly affecting the experiment.

8 TECHNICAL SPECIFICATIONS

Convion maintains a policy of continual improvement and reserves the right to change the technical characteristics of the A1000 without prior notice.

Specifications	A1000			
	PG Kit	AR Kit	TC Kit	IN Kit
Kit Crated Weight (lbs./kg)	286/130	286/130	506/230	286/130
Chamber Crated Weight (lbs./kg)	790 / 360			
Exterior Dimensions				
Height (in./mm)	79 / 2005			
Width (in./mm)	41 / 1040			
Depth (in./mm)	32.5 / 825			
Interior Dimensions				
Height (in./mm)	52.5 / 1334			
Width (in./mm)	37 / 940			
Depth (in./mm)	25 / 635			
Power Requirements				
60Hz	120VAC, 20A, 1Ø			
50Hz	220V / 240V, 16A, 1Ø			
Cooling Requirements				
Direct Expansion Air Cooled	40°F to 85°F (4.4°C to 29.4°C) at 150 psi maximum with 10 psi pressure differential			

Environmental Requirements	
Temperature	68°F to 86°F (20°C to 30°C)
Humidity	Up to 55% RH, non-condensing
Altitude	7000 ft. (2134m) above sea level

Temperature and Humidity Rages				
	PG Kit	AR Kit	TC Kit	IN Kit
Additive Humidity (lights on)	75%	75%	75%	75%
Light intensity (μmol : @25°C)	700	500	225	125
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	±0.05°C			

Specifications	A1000			
	PG Kit	AR Kit	TC Kit	IN Kit
Lighting				
# of Light Canopies / Fixtures	1 canopy	2 canopies	4 canopies	4 fixtures (1 per shelf)
Lamps per Canopy / Fixture	14	6	4	2 per fixture
Airflow Direction	Uniform Upward	Uniform Horizontal	Uniform Vertical	Uniform Horizontal
Growth Envelope				
Shelves	1 adjustable	2 adjustable	4 adjustable	4 adjustable
Total Growth Area (ft ² / m ²)	5.65 / 0.5	11.3 / 1.05	22.6 / 2.1	22.6 / 2.1
Growth Height (in. / mm)	42 / 1065	18 / 460	6 / 122	10 / 250
Growth Volume (ft ³ / Litres)	29.2 / 826			

8.1 Terms & Definitions

Table 8-1 Terms and Definitions

Term	Definition
%RH	Humidity level expressed as a percentage of the maximum 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
GR	Ground
Hz	Hertz
ID	Inside Diameter
IN	Incubator
l/hr	Liter per hour
lpm	Liter per minute
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

Term	Definition
USH	Ultrasonic humidifier
V	Volts
WC	Water cooled condenser unit
WEEE	Waste Electrical and Electronic Equipment

8.2 Consumables

Replacement consumable parts can be ordered from Conviron.



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

8.3 Disposal



The A1000 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.



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Management System Certified to ISO9001



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