Site Preparation Guide

stratasys

Fortus® 380/450mc and 380mc Carbon Fiber Edition 3D Production System
K1, K6 and K7 Series

Part No. 400219-0004_REV_G

Copyright

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Part No. 400219-0004_REV_G

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Revision Log

Revision	Date	Description of Changes
400219-0001_REV_A	November 2015	Initial release.
400219-0002_REV_A	November 2015	Revised the information pertaining to moving the printer.
400219-0003_REV_A	January 2016	Revised the information pertaining to removing shipping materials.
400219-0004_REV_A	October 2016	Added Optional UPS information.
400219-0004_REV_B	June 2017	Updated Line Connections Diagram.
400219-0004_REV_C	September 2017	Added lockout tagout statement.
400219-0004_REV_D	July 2018	Added Carbon Fiber Edition, K7 Series.
400219-0004_REV_E	July 2019	Changed operating humidity range from 30-70% to 20-80%
400219-0004_REV_F	July 2022	Updated SABIC trademarks and statement
400219-0004_REV_G	December 2022	Updated footer

Safety

The following basic safety tips are given to ensure safe installation, operation, and maintenance of Stratasys equipment and are not to be considered as comprehensive on matters of safety. Although the printers are designed to be safe and reliable, access to areas of the printer are potentially dangerous.

Safe Environment

- Connect equipment to a grounded facility power source. Do not defeat or bypass the ground lead.
- Know the location of equipment branch circuit interrupters or circuit breakers and how to turn them on and off in case of emergency.
- Know the location of fire extinguishers and how to use them. Use only ABC type extinguishers on electrical fires.
- Know local procedures for first aid and emergency assistance at the customer facility.
- Use adequate lighting at the equipment.
- Maintain the recommended range of temperature and humidity in the equipment area.
- Do not use this product in an environment containing volatile or flammable compounds.

About the Fortus 380mc & 450mc

The 380mc and 450mc printers incorporate the latest in innovative technologies to provide you with precise prototypes from a CAD design. Stratasys' Fused Deposition Modeling (FDM) technology provides prototype parts, including internal features, that can be used to field-test form, fit, and function. Direct Digital Manufacturing (DDM) allows for the creation of customized end-use parts straight from 3D CAD data. The 380mc/450mc features a servo/belt driven XY gantry with multiple high temperature modeling material capability.

Components

- The 380mc or 450mc Printer (depending on model purchased)
- Consumable materials
- Welcome Kit containing Insight application CD and common tools for maintaining the printer.
- A computer workstation (not sold by Stratasys)

380mc Highlights

- Maximum build area of 14 x 12 x 12 inch (356 x 305 x 305 mm)
- Material Canister Bays: 1 model, 1 support
- Touchscreen Graphical User Interface

450mc Highlights

- Maximum build area of 16 x 14 x 16 inch (406 x 356 x 406 mm)
- Material Canister Bays: 2 model, 2 support
- Touchscreen Graphical User Interface

How to Use This Guide

This guide provides information for selecting an appropriate location for the Fortus 380mc/450mc. Instructions and specifications pertain to both the 380mc and 450mc model, unless otherwise stated. This guide also provides instructions for unpacking and preliminary set-up. Information of particular importance is presented in one of three formats:

A WARNING indicates a procedure that may cause injury to an operator if the procedure is not followed.
A WARNING will precede the paragraph of instruction to which it relates.

A CAUTION indicates a procedure that may cause damage to equipment if the procedure is not followed.
A CAUTION will precede the paragraph of instruction to which it relates.

A NOTE is used to highlight a specific point or to provide an operational tip. While useful, a NOTE does not indicate a procedure that can cause injury or damage if it is not followed.
A NOTE will follow the paragraph of instruction to which it relates.

Site Prep Tasks

Selecting the Site

Decide where to install the printer based on the following:

1. Space Requirements
2. Environmental Requirements
3. Electrical Requirements
4. LAN Requirements

The 380mc and 450mc are capable of generating vibrations depending mainly on part build geometry and material characteristics. This consideration will need to be taken into account if locating the printer near vibration sensitive equipment.

Space Requirements

Dimensions and Weights

Make sure that the installation site floor space can accommodate the printer's weight and dimensions, plus required clearances.

Status	Dimensions/Weights
Crated	Width: 60.0 inches (152.40 cm) Depth: 45.9 inches (116.59 cm) Height: 87.0 inches (220.98 cm)
Uncrated	Width: 51.0 inches (129.5 cm) Depth: 35.5 inches[1] (90.2 cm) Height: 78.1 inches[2] (198.4 cm)
Shipping Weight	1500 pounds (680 kg)
Printer Weight	1325 pounds (601 kg)

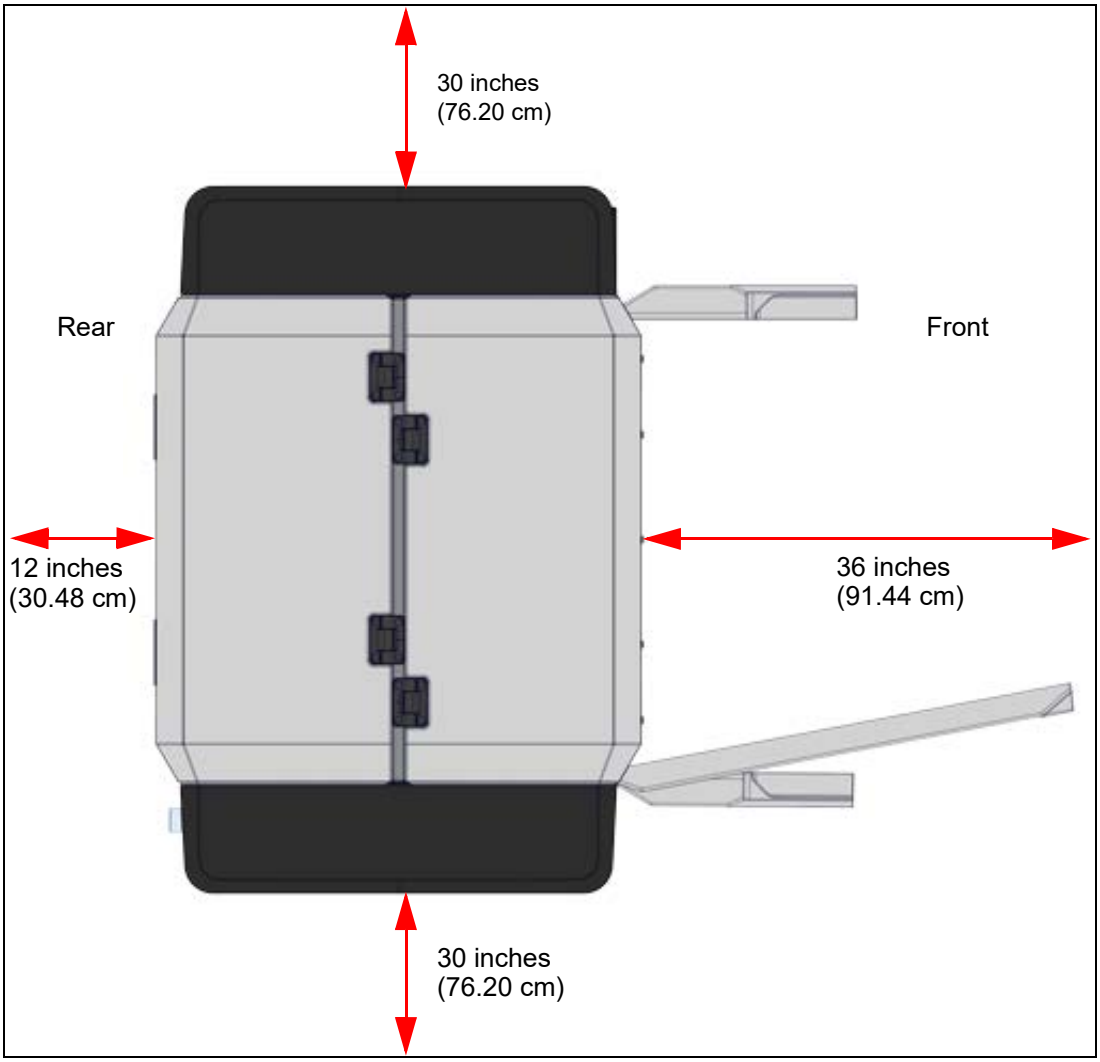
1. The printer can be moved through a standard 36 inch (91.44 cm) door opening with exterior panels and covers installed. An absolute minimum depth of 34 inches (86.36 cm) can be achieved through removal of the rear service access panels and top cover. See "Removal of Rear Panels and Cover" (page 15) for instructions.
2. An absolute minimum printer height of 73 inches (185.42 cm) can be achieved through the removal of several structural components by a qualified 380/450mc Service Representative. Refer to Service Bulletin SB00254 for details of required disassembly.

Minimum Clearances

Side Clearance	Minimum 30 inches (76.20 cm) on each side
Rear Clearance	Minimum 12 inches (30.48 cm)
Front Clearance	Minimum 36 inches (91.44 cm)
Overhead Clearance	Minimum 24 inches (60.96 cm)

Figure 1: Minimum Clearances

24 inches (60.96 cm) minimum for overhead clearance



Environmental Requirements

- The 380mc and 450mc are for indoor use only.
- Air quality conditions with excessive solid particulates (conductive or non-conductive) may result in system damage.
- Air quality conditions in which airborne oils are allowed to accumulate on or within the printer can damage the plastic components.
- Operating temperature shall be in the range of 65°F to 86°F (18°C to 30°C), with relative humidity range of 20% to 80% non-condensing.
- Storage temperature shall be in the range of -40°F to 129.2°F (-40°C to 54°C), with relative humidity range of 10% to 85% non-condensing.
- Altitude shall not exceed 6561.68 feet (2000 m).
- Noise emission (acoustic):
  - <65dBA when idle
  - <66dBA when building

Heat Output

Heat dissipation occurs mostly through the top of the printer. Heat output is material dependent due to the various temperatures maintained in the build chamber.

Material Type	Heat Output (while building)	Heat Output (while idle)
ABS	~8,000 BTU/hr	~7,000 BTU/hr
PC	~12,500 BTU/hr	~11,500 BTU/hr
ULTEM™ 9085 resin	~15,500 BTU/hr	~14,500 BTU/hr
ULTEM 1010 resin	~19,900 BTU/hr	~18,550 BTU/hr

Power Consumption

Power consumption is material dependent due to the various temperatures maintained in the build chamber.

Material Type	Power Consumption (while building)	Power Consumption (while idle)
ABS	2250W	2050W
PC	3550W	3000W
ULTEM 9085 resin	4500W	4200W
ULTEM 1010 resin	5850W	5450W

Electrical Requirements

AC Power Requirements

- 50/60 Hz dedicated circuit.
- 120/208 V, 3W + N+ PE.
- Current: 18A.
- In-rush: 50 Amps max for less than 10 milliseconds, 21 Amps max for less than 20 seconds.
- Maximum input voltage variation: ±10% of nominal.
- Leakage (touch) current: <1.0mA (under all conditions), 0.0mA (when OFF).
- Site must be equipped with appropriate lockout/tagout kit for equipment.

Operation of the printer outside this range is not recommended; degradation of performance and shortened component life expectancy will be experienced. The printer is to be operated on a 3-phase service meeting the recommendations for power quality given in IEEE Standard *141-1993. Facilities who are unsure of their power quality should contact their service provider.

* IEEE Standards licensing rules prohibit Stratasys from distributing the Standard. End users who wish to review the Standard are responsible for its individual purchase.

Optional UPS Connectivity

A connector at the rear of the printer is provided allowing an external UPS to initiate the safe shutdown of the printer. At a minimum the external UPS should meet the following minimum requirements:

- Output power rating: ≥10KVA
- Output waveform: sine-wave
- Run time: UPS must be rated to provide a minimum of 7 minutes of battery operation.

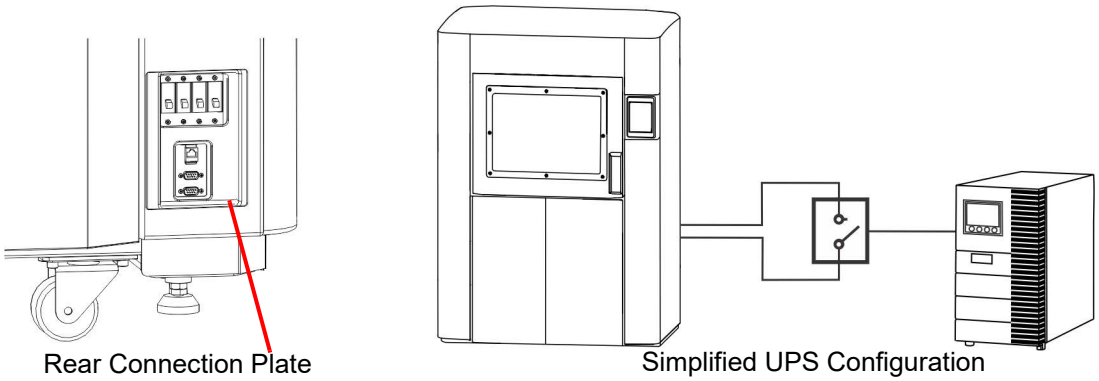
Stratasys does not recommend external UPS makes or models. Additionally, the cable and connector interfacing the UPS to the printer is the responsibility of the UPS supplier and/or end user.

About the printer UPS connector:

- The UPS connector is located in lower most position of the rear connection plate. See Figure 2 (page 7).
- The printer's connector profile is female D-Sub 9 pin; this is NOT a serial communication port.
- Only pins 7 and 9 of the connector are used with remaining pins having no internal connections.
- When the circuit between pins 7 and 9 is open (>5000ohms) the printer operates normally.

- Closing the circuit (<400ohms) between pins 7 and 9 initiates a safe shutdown process as if the front red stop button was depressed.

Figure 2: UPS Connections



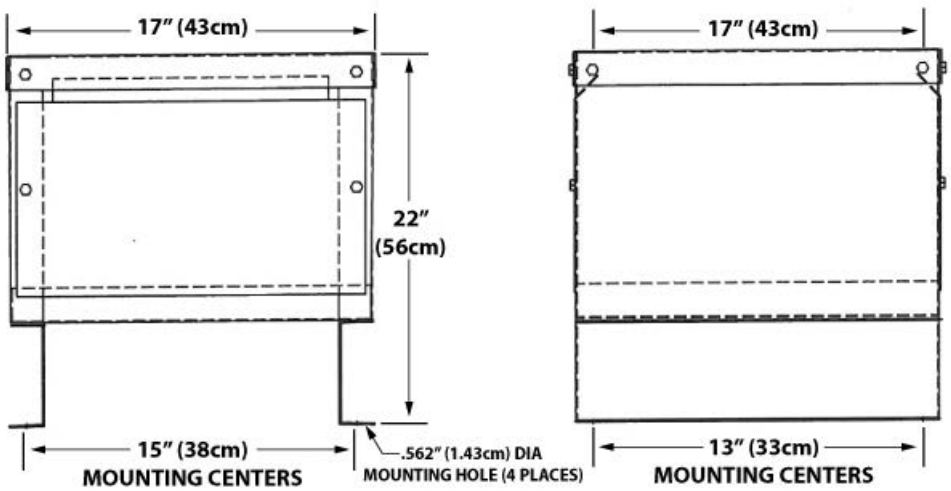
Optional AC Transformers

Two optional AC transformers are available from Stratasys for facilities with AC electrical services outside of the 208 VAC specification. The transformers meet applicable electrical and safety standards and carry both the CE Mark and the Mark of a Nationally Recognized Test Laboratory (NRTL) for North America.

A transformer electrical wiring diagram, for use by a qualified electrician, is located within the transformer.

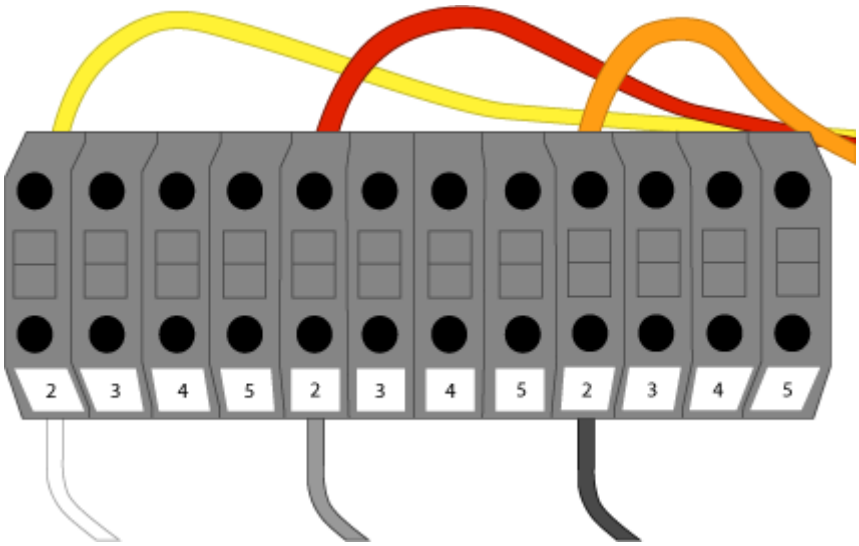
Transformer PN	Specifications	Weight
155-01200	8.0 KVA 200-240 VAC 50/60 Hz Delta-Wye	195 pounds (88 kg)
155-01400	8.0 KVA 380-480 VAC 50/60 Hz Delta-Wye	200 pounds (90 kg)

Figure 3: Transformer Dimensions & Mounting Specifications (applicable to both transformers)



When configuring the transformer for different input voltages, the internal tap 1 connection wires (typically colored yellow, red and orange) must be moved to the appropriate tap position (terminal block number) shown on the connection diagram attached to the inside cover of the transformer. 3 phase input is connected to the same terminal block positions as the tap 1 connection wires, per the connection diagram (see Figure 4 for an example).

Figure 4: Internal Jumper Configuration



LAN Requirements

A LAN connection is required for communication and file transfer functions.

The LAN connection is a 100 base T, Ethernet protocol, RJ45 connector. One 25 foot (7.62 m) CAT5, 10/100 base T cable is supplied with the printer, located in the Startup Kit.

The printer will function in either DHCP or Static IP configurations.

Printers configured with a network option of UPnP=ON will occasionally broadcast a unique system identifier across the network for use by the Insight FDM Control Center software application.
Refer to Insight's user information for workstation requirements.

Receiving the Printer

Inspect Crate for Damage

Before opening the shipping crate, inspect the crate for signs of exterior damage.

Report evidence of excessive damage to Stratasys and the shipping company.

Preparing for Installation

Required Tools and Equipment

- Basic hand tools (powered screwdriver or drill with Phillips bit).

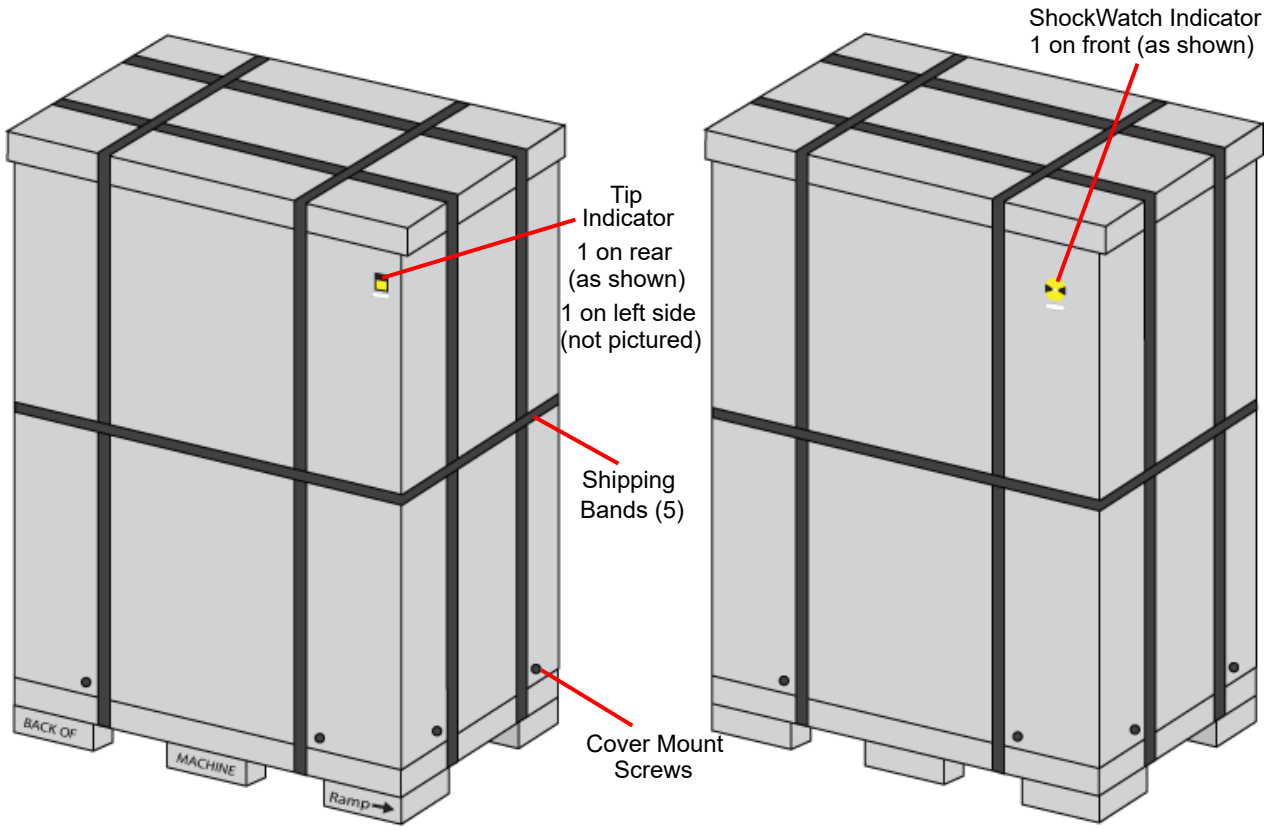
Unpacking the Printer

If you intend to remove the printer from its shipping base via the ramp, ensure that there is sufficient clearance for the ramp to be lowered before you begin the process of unpacking the printer. The printer's shipping base indicates the location of the ramp.

Remove Shipping Materials

1. Inspect the Tip Indicators (2) and ShockWatch indicator affixed to the exterior of the cardboard box. If possible, take a picture of these indicators to share with your installation representative. If damage is detected upon installation, this photo will assist your installation representative in determining the cause of damage (Figure 5).
2. Using a Phillips screwdriver, remove the cover mount screws from the base of the crate (Figure 5).

Figure 5: Shipping Crate Detail

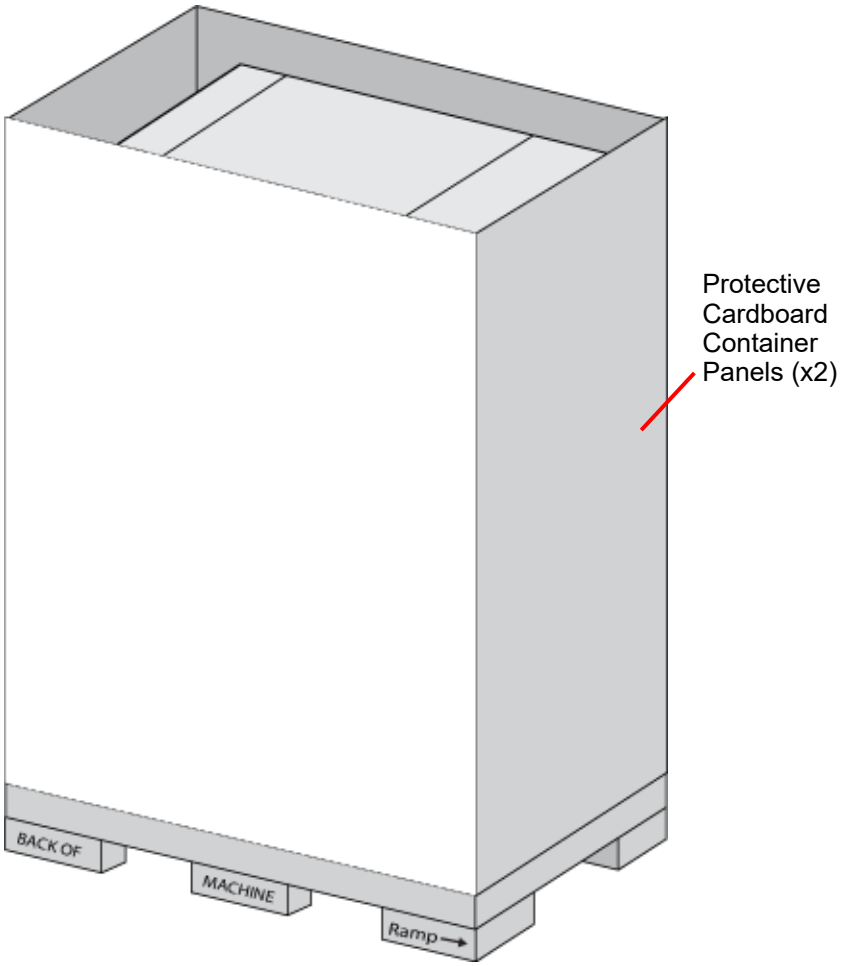


Shipping bands are very tight; when cutting shipping bands they may pop open with force. Wear safety glasses when removing the shipping bands.

3. Carefully cut the shipping bands (Figure 5).
4. Remove the cardboard cover from the top of the crate and then remove the foam restraining insert (Figure 6).
5. Remove the 2 protective cardboard container panels (Figure 6).

6. Carefully tear away all clear plastic wrapping.

Figure 6: Unpacking the Printer (cover removed)



7. Remove the printer from the shipping base, this can be done using a fork lift (see “Remove Printer from Shipping Base - Fork Lift Instructions” (page 12)) or manually via the use of a ramp (see “Remove Printer from Shipping Base - Ramp Instructions” (page 13)).

Remove Printer from Shipping Base - Fork Lift Instructions

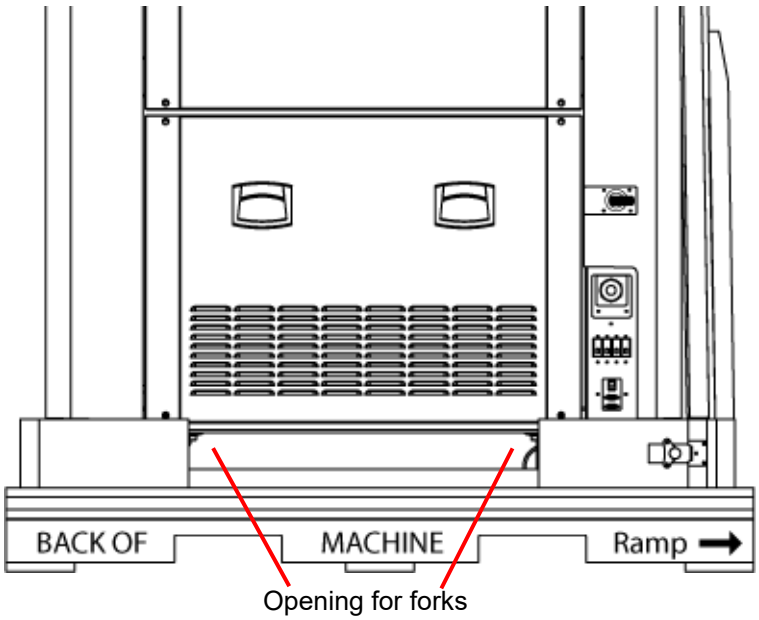
Use care when cutting the plastic bag to avoid scratching the printer's surfaces.

1. Remove all tape and carefully cut the plastic bag encasing the printer. Unwrap the printer by pulling the plastic bag downward.
2. Ensure that the bag is not blocking the fork lift openings or the printer's casters. If needed, cut away the plastic bag's material from these locations.

Access the fork lift openings from the back of the printer (Figure 7).

3. Using a forklift, carefully raise the printer vertically and remove the shipping base.

Figure 7: Opening for Forks



4. Gently lower the printer, until it rests on its casters.
5. Inspect the printer's exterior for dents and scratches. Immediately report any damage to Stratasys and the shipping company.
6. Roll the printer into its approximate operating location.

Position the printer to allow at least three feet of clearance on all sides until the installation process is complete, see "Space Requirements" (page 3). Final installation and setup must be accomplished by a qualified service representative.

Remove Printer from Shipping Base - Ramp Instructions

Before removing the printer via the ramp, ensure that you have enough manpower to remove the printer from the shipping base, as the printer is heavy (see "Dimensions and Weights" (page 3)). A minimum of 3 capable adults should be used to remove the printer from the shipping base.

1. Unlatch the two link locks securing the ramp in a vertical position (Figure 8), and gently lower the ramp onto a level surface (Figure 9).

Figure 8: Ramp Hardware (viewed from side)

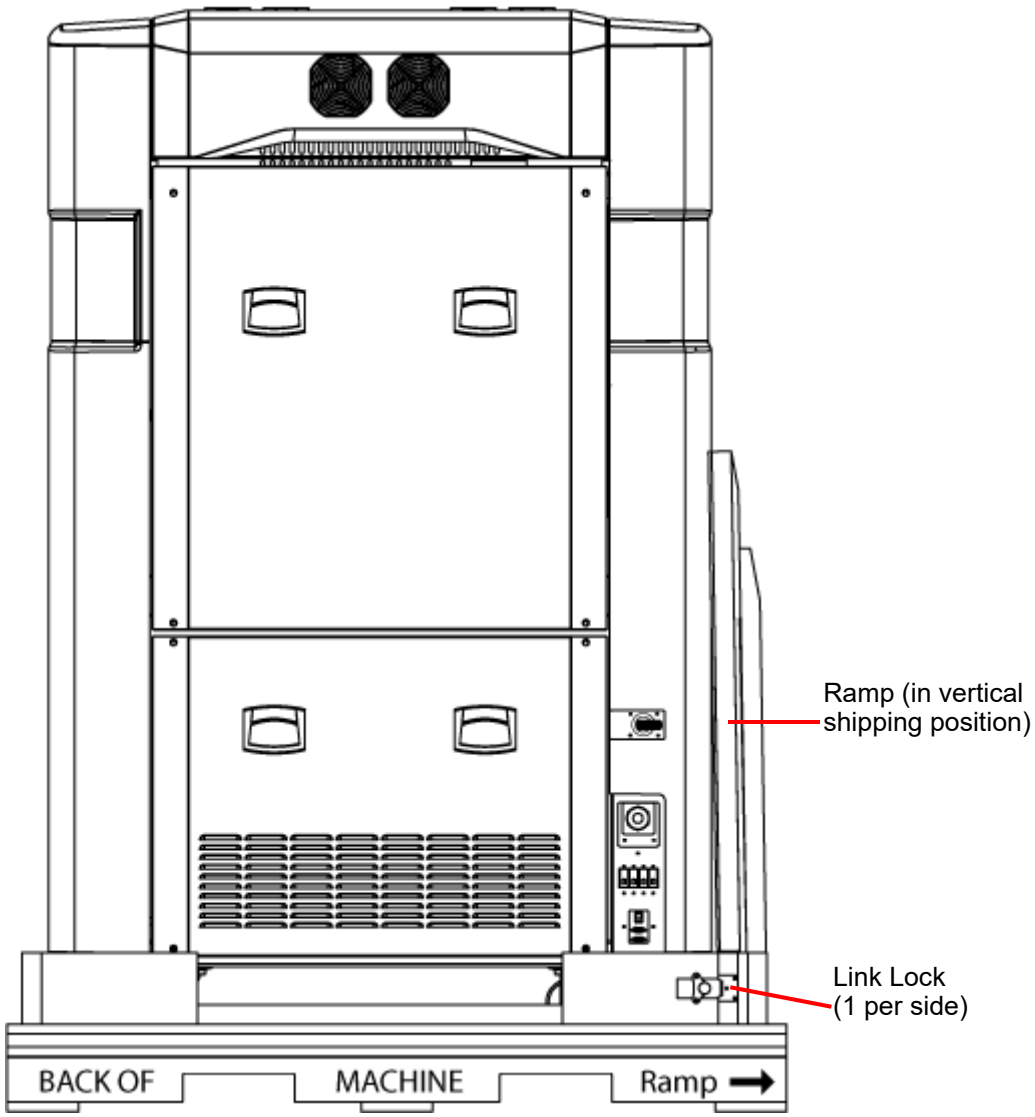
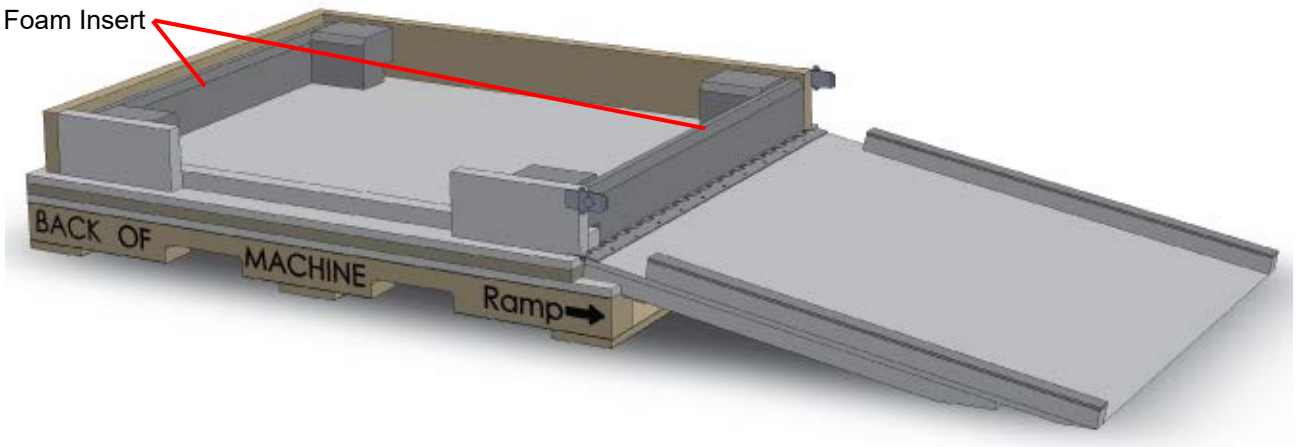


Figure 9: Ramp Down Detail



2. Remove the foam restraining insert between the ramp and the printer (Figure 9).

> Use care when cutting the plastic bag to avoid scratching the printer's surfaces.

3. Remove all tape and carefully cut the plastic bag encasing the printer. Unwrap the printer by pulling the plastic bag downward.
4. Ensure that the bag is not blocking the ramp or the printer's casters. If needed, cut away the plastic bag's material from the exit side of the ramp to ensure that the printer can roll freely down the ramp.
5. Carefully roll the printer from the shipping base using the ramp.

> When removing the printer it is recommended that one person guide each side, while a third person support the front of the printer (to ensure that the oven door and canister bay doors do not open).

6. Inspect the printer's exterior for dents and scratches. Immediately report any damage to Stratasys and the shipping company.
7. Roll the printer into its approximate operating location.

> Position the printer to allow at least three feet of clearance on all sides until the installation process is complete, see "Space Requirements" (page 3) Final installation and setup must be accomplished by a qualified service representative.

Removal of Rear Panels and Cover

The rear service access panels and top cover can be removed in order to reduce the printer depth to an absolute minimum of 34 inches (86.36 cm). If absolute minimum printer depth is not required, proceed to “Service Connections” (page 18).

To remove the rear service access panels:

1. Using a 5 mm Allen wrench, loosen but do not remove the 4 fasteners securing the upper rear panel (see Figure 10).
2. Set the panel aside.
3. Using a 5 mm Allen wrench, loosen but do not remove the 4 fasteners securing the lower rear panel (see Figure 10).
4. Set the panel aside.

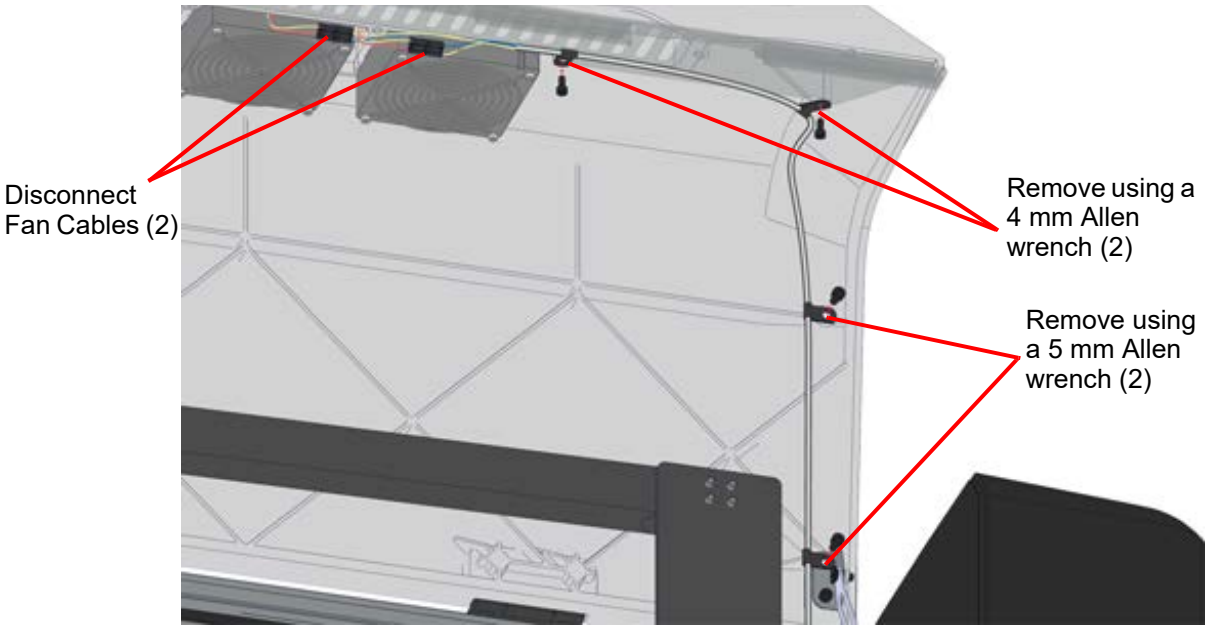
Figure 10: Rear Panel Removal

To remove the rear top cover:

1. Open the rear top cover. Disconnect the electrical wiring for the rear top cover cooling fans by pulling the connectors apart (Figure 11).
2. Using a 4 mm Allen wrench, remove the p-clamp mounting screws (2) from the upper p-clamps (Figure 11).

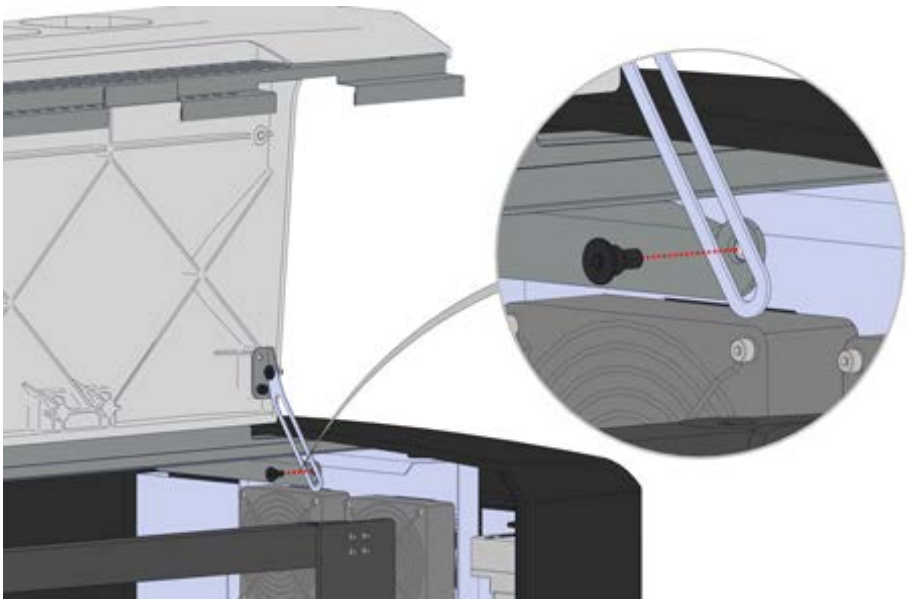
3. Using a 5 mm Allen wrench remove the p-clamp mounting screws (2) from the lower p-clamps (Figure 11).

Figure 11: Disconnect Fan Wiring & P-Clamps



4. Using a 4 mm Allen wrench, remove the rear top cover slider stop bolt (1) (Figure 12).

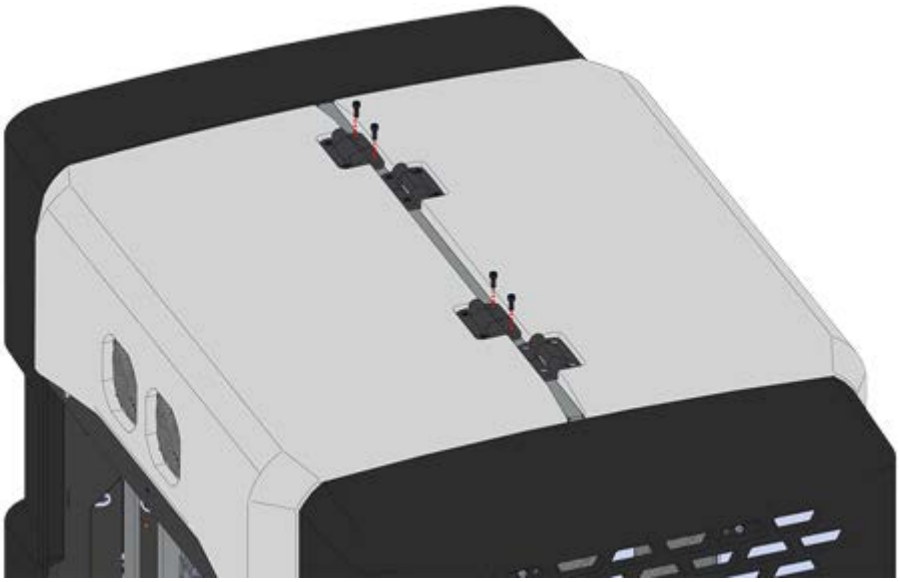
Figure 12: Disconnect Stop Bolt



5. Close the rear top cover. Using a 5 mm Allen wrench, remove the hinge mounting screws (4) from the crossbar (Figure 13).

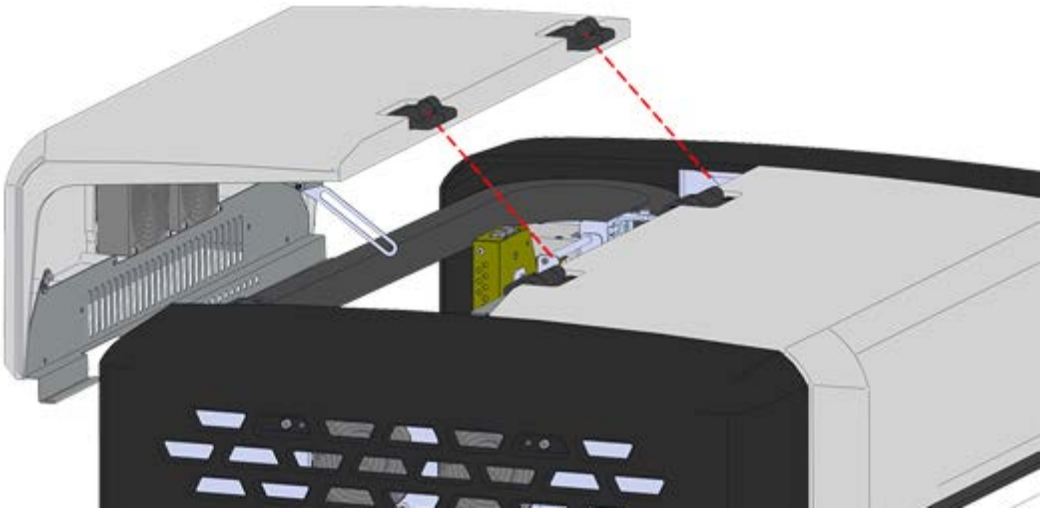
> Only remove the hinge screws from the crossbar, which secure the top cover to the printer. Do not remove the hinge screws within the top cover itself.

Figure 13: Hinge Mounting Screw Locations



6. Lift the top cover up and away from the printer to remove, and set aside (Figure 14).

Figure 14: Rear Top Cover Removal



The rear top cover and rear service access panels can be set aside for the installation service representative to reinstall.

Service Connections

A licensed electrician must perform all AC electrical service connections to the printer.
Consult a licensed electrician to comply with all applicable local and national electric codes.
Do not apply power to the printer until the installation service representative has verified that AC service connections have been made correctly.

Perform the following steps to connect the printer to the electrical disconnect switch:

1. Using a 5 mm Allen wrench, remove the 6 mounting screws securing the AC disconnect panel. Gently pull the AC disconnect panel away from the printer. (Figure 15).

Use care when pulling the AC disconnect panel away from the printer as the printer's electrical cabling is connected to the panel. The panel can only be pulled away from the printer at a minimal distance.

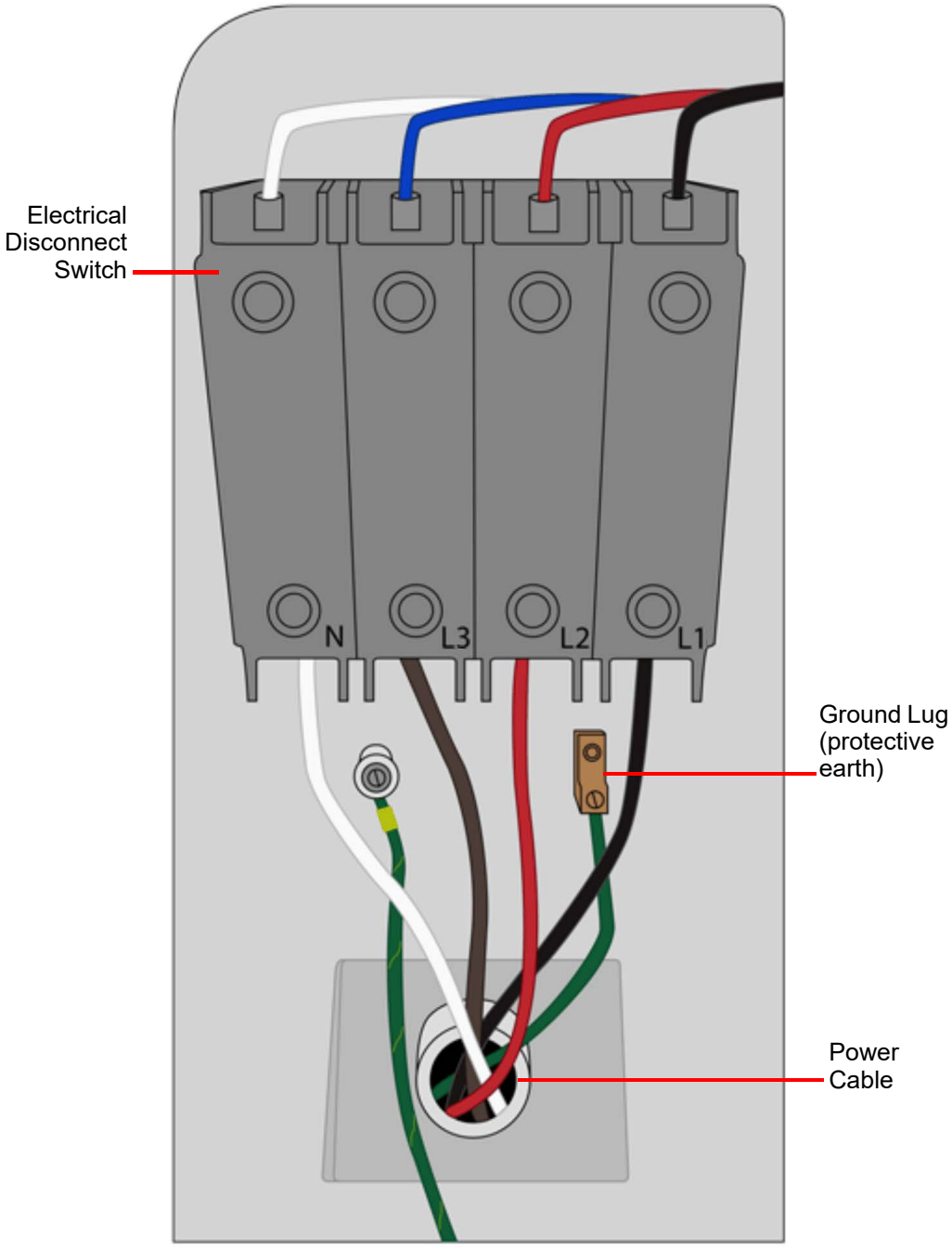
Figure 15: AC Disconnect Panel Removal

2. Connect the printer to the electrical disconnect switch as follows (Figure 16):

- N is neutral.
- Line 1 connects to terminal L1.
- Line 2 connects to terminal L2.
- Line 3 connects to terminal L3.

- Ground wire connects to the ground lug (protective earth).

Figure 16: Line Connections



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