



# stratasys®

F770®  
3D Printer



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## Revision Log



Translations of this guide are updated periodically. If you are consuming a translated version, please check the English version for latest revision and list of updates.

Revision	Release Date	Description of Changes
A	JUN 2021	Initial Release
B	JUN 2021	Replaced Figure 44 in Chapter 5.
C	JUL 2021	Added GrabCAD Print server information.
D	OCT 2021	Updated part numbers for the print heads and build sheets. Added vacuum functionality information. Added Support Head Extrusion Speed Warning and Model Head Extrusion Speed Warning to the Warning and Errors section. Added Support Engine Spinout Warning and Model Engine Spinout Warning. Made numerous, small changes mostly to do with extrusion temperature. Added Tip Calibration Reminders section. Updated the Removing a Part from the Printer section. Updated the Manual Tip Calibration procedure.
E	FEB 2022	Added procedure for installing build sheet. Made several, minor changes due to review comments.
F	MAY 2023	Added new colors for ASA.

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# 1 SERVICE AND SUPPORT

This chapter provides information on service and support for the F770 as well as safety information and safety label locations.

## Service

If you have a problem with your printer that is not covered in this guide, please contact Stratasys Customer Support. Contact information is available from the Stratasys website at: <https://support.stratasys.com/en/contact-us>.

When calling in for service, always have your printer's software version (see "Software Version" (page 151)) and hardware serial number available (see "Identifying Your Printer" (page 15)). You may also need to provide a configuration file from your hardware (see "Exporting System Configuration (.CFG) File" (page 183)).

## Software Support

If you have a software problem that is not covered in this guide, please contact Stratasys Customer Support. Contact information is available from the Stratasys website at: <https://support.stratasys.com/en/contact-us>.

When calling in for service, always have your printer's software version (see "Software Version" (page 151)) and printer serial number available (see "Identifying Your Printer" (page 15)). You may also need to provide a configuration file from your hardware (see "Exporting System Configuration (.CFG) File" (page 183)).

## Safety Instructions

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. The F770 printer is designed to be safe and reliable rapid prototyping printers. Access to areas of the printer are potentially dangerous.

## Hazard Types

Stratasys recommends that all services be performed by qualified personnel. All personnel working on or around the printer should be knowledgeable of what the following hazard classifications mean throughout this guide.



- **Warnings** and **Cautions** precede the paragraph to which they pertain.

**Warning:**

Indicates a potentially hazardous situation which, if not avoided, may result in injury or death.

**Caution:**

Indicates a situation which, if not avoided, could result in damage to equipment.

- **Notes** follow the relative paragraph.



Indicates additional information relative to the current topic.





## Product Safety Signs





Always read and adhere to safety statements, and be aware of the following safety signs when you see them on the printer.

Stratasys makes every effort to ensure that our printers are safe and reliable at all times. However, there will be times when you must access areas of the printer where potentially high voltages, hot temperatures, and/or moving mechanical components could cause severe injury.

Warning Symbols	Meaning	Location	Comments
	Hot surface	Beneath the oven door	Risk of burns. Do not touch this surface after printing.
	High voltage	On the electrical panel access doors, on the AC board cover, and next to the power inlet	Risk of electric shock.
	Arc flash	Next to the power inlet	Energy levels exist such that there is the potential for an arc flash occurring.

Warning Symbols	Meaning	Location	Comments
	Moving parts	Beneath the oven door, behind all top access doors, behind the left and right upper side panels, and on the right side of the Ybridge pan	Risk of injury from moving parts.
	Magnetic hazard warning	On the left and right on both sides of the system above the side skin under the side lids.	Warning! Danger from strong magnetic fields! Strong magnetic fields around linear motor components pose a health risk to persons with implants (e.g. cardiac pacemakers) that are affected by magnetic fields. Persons with implants that are affected by magnetic fields should maintain a safe distance of at least 1m from linear motor components.
	Magnetic hazard warning	On the left and right on both sides of the system above the side skin under the side lids.	Attention! Risk of physical damage to watches and magnetic storage media. Strong magnetic forces may destroy watches and magnetizable data storage media near to the linear motor components! Do not bring watches or magnetizable data storage media into the vicinity (<300mm) of the linear motors!
	Gloves	Beneath the oven door	Risk of burns. Wear safety gloves and sleeves approved for high temperatures.

Warning Symbols	Meaning	Location	Comments
	Confined spaces	Beneath the oven door	Never enter the oven with your entire body.
	Refer to manual	Next to the top front and top rear access door locking screws	To prevent injury and/or damage to the printer, refer to the printer manuals before accessing the front and rear gantry areas.

## Product Safety Label Locations

Figure 1: Oven safety label locations

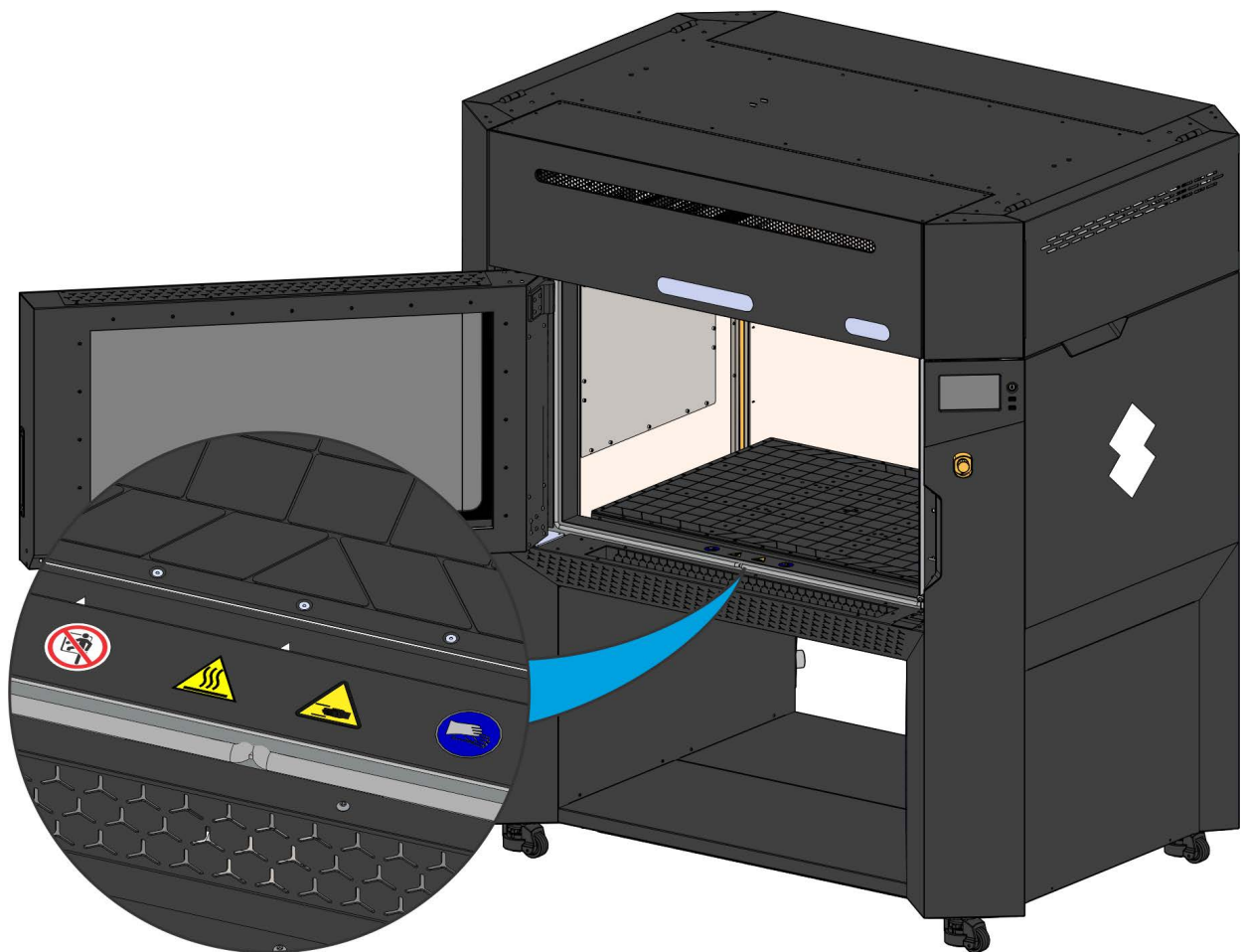


Figure 2: Right rear lower safety label locations

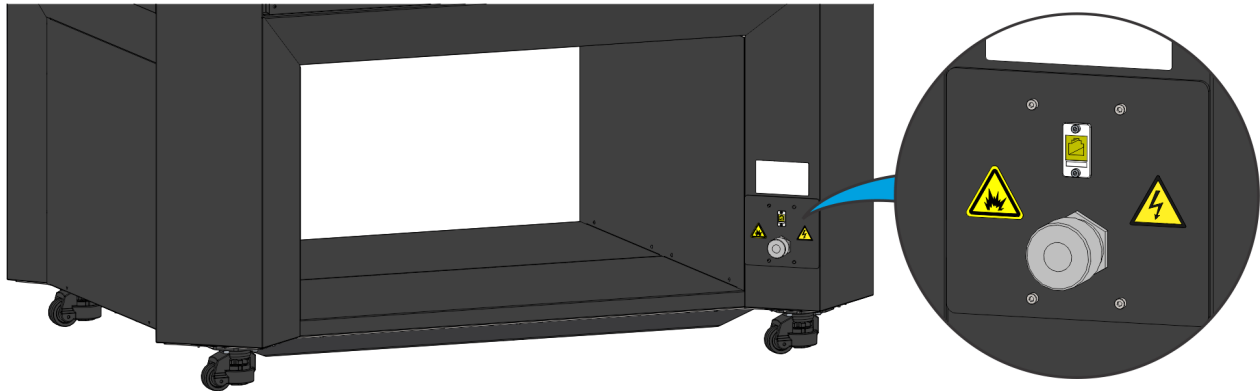


Figure 3: Electrical panel safety label locations

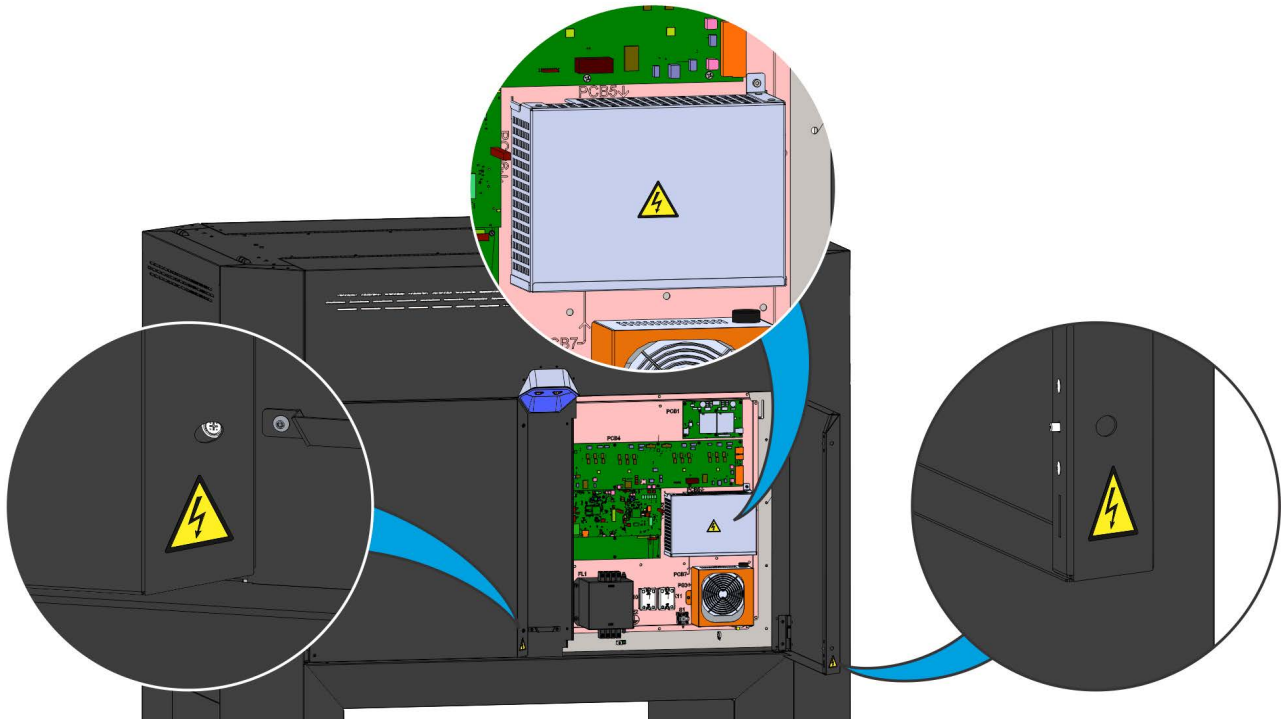


Figure 4: Front cover safety label locations

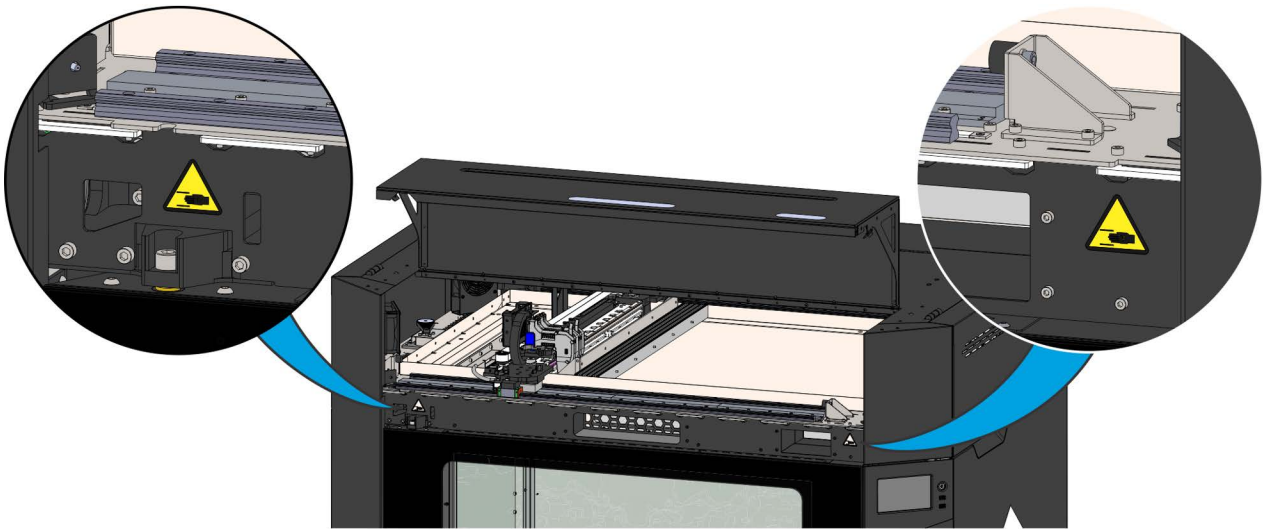


Figure 5: Upper side panel safety label locations

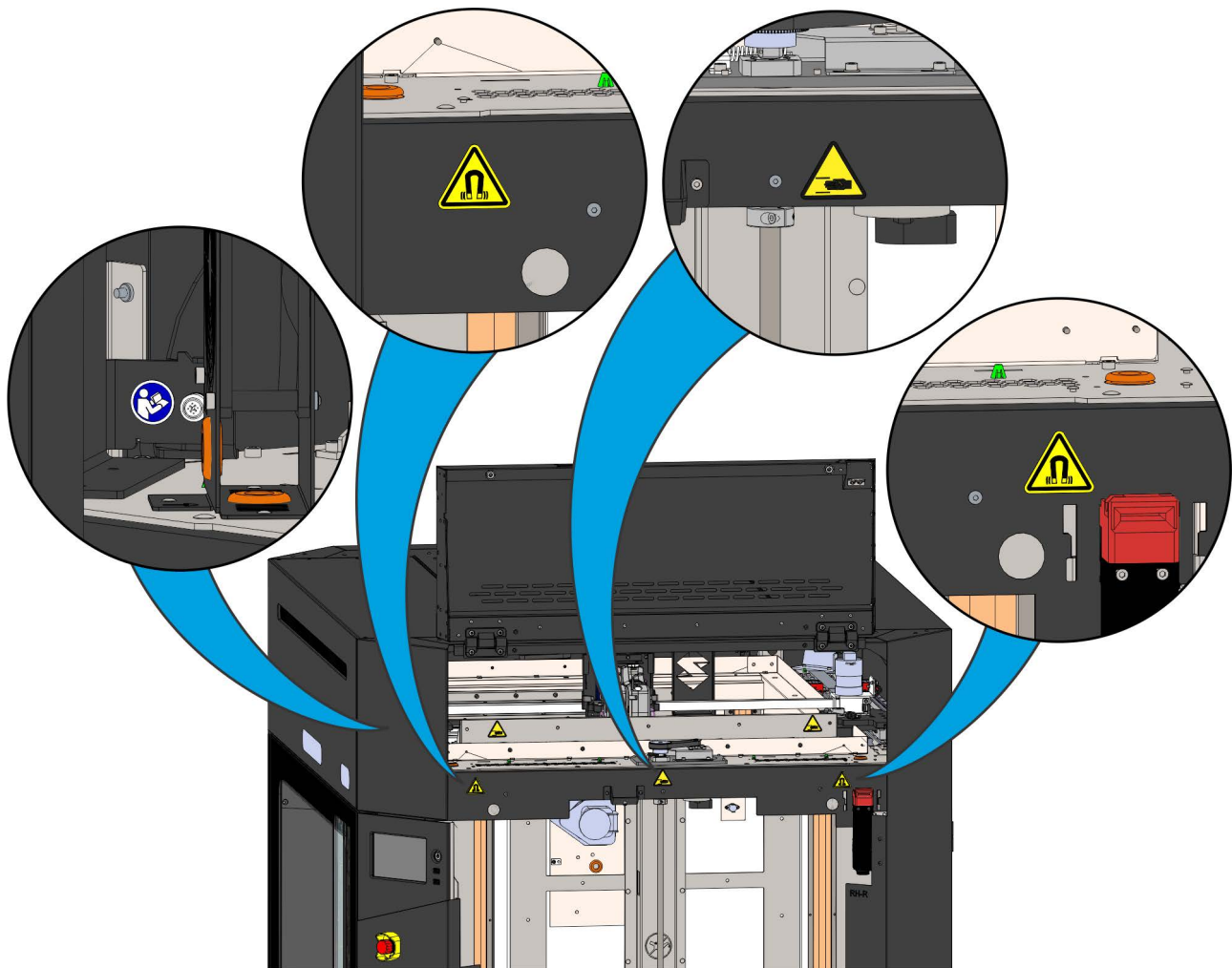


Figure 6: Lower side panel safety label locations

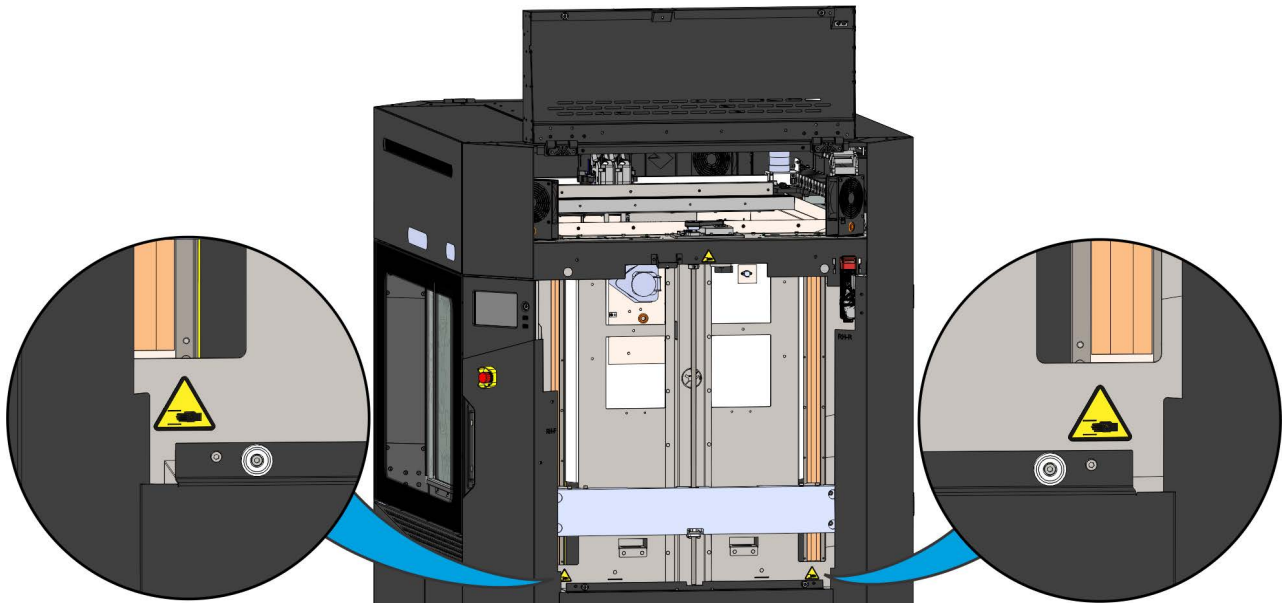


Figure 7: Gantry safety label locations

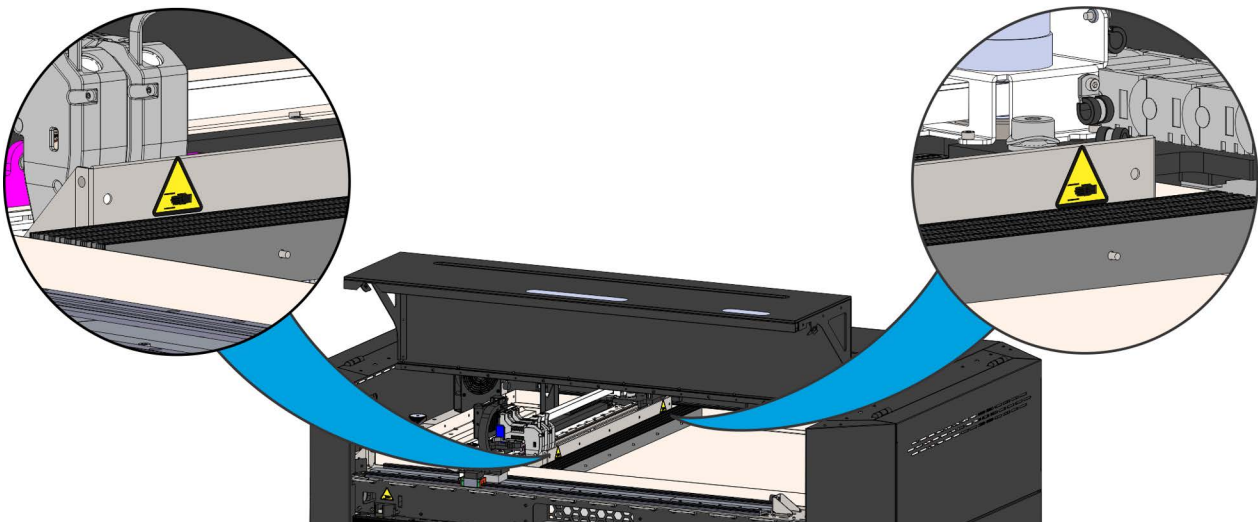
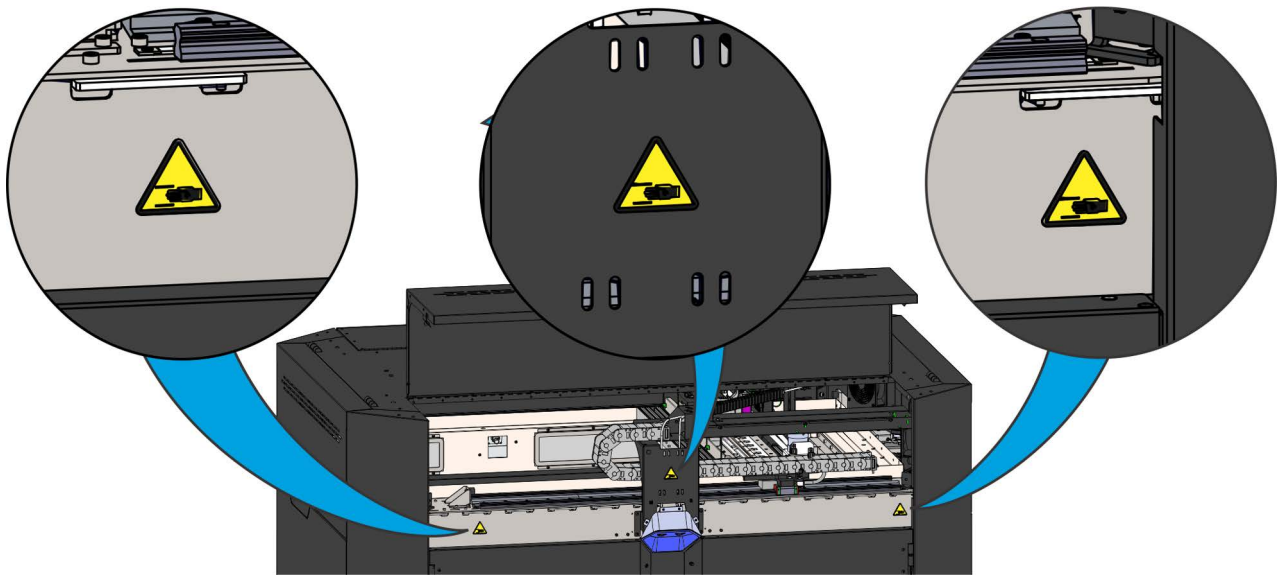




Figure 8: Inside rear safety label locations



## Potential Safety Hazard Areas

The following components and areas of the printer are highlighted as potential safety hazards that may cause system failure or reliability problems if proper safety procedures are not followed.

### Oven

**Warning: Hot Surfaces.**

Always wear safety gloves and long sleeves when working inside the oven. Components are hot.



Opening the oven door shuts the oven heaters off.



## Gantry

**Warning: Moving Parts.**

Never wear a tie, loose clothing or dangling jewelry when working around moving components of the printer.

Beneath the top cover of the printer is the gantry. This area houses the mechanical drive components of the X and Y axes. Use extreme caution whenever accessing this area of the printer.



The printer's servo motors are disabled when the oven door and/or top right cover are open. The XY pinch hazard between the timing belts and pulleys is minimized by locking the oven door and top right cover while building and disabling the motors when the oven door and top cover are open. The oven door and top right cover automatically lock when the printer is building and cannot be opened while the printer is building. You cannot start a build if the oven door or top right cover are open. Confirm all top covers are closed before beginning a build.

## Z Stage

**Warning: Moving Parts.**

Never wear a tie, loose clothing or dangling jewelry when working around moving components of the printer.

The drive belt, pulleys and Z stage servo motor can cause severe injury. The Z stage crushing hazard is minimized by locking the oven door during Z stage moves and disabling the Z motor when the oven door is open.

## Door Locks

Interlock switches are used to communicate the status of the oven door and the top right cover to the printer. For safety reasons, the oven door and top right cover must be closed before the X, Y, and Z motors will operate.

## General Safety Practices

Abide by these general safety practices when working with this printer.

**Warning: High Voltage.**

High voltage is present in the printer.

**Warning: Falling Hazard.**

Only use an OSHA or CE approved step stool when accessing the area under the top cover of the printer.

**Warning: Hot Surfaces.**

Always wear safety gloves and long sleeves when working inside the oven. Components are hot.

## Environmental Requirements

- The F770 printer is 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.
- System operating temperature shall be in the range of 59°F to 86°F (15°C to 30°C), with relative humidity range of 30% to 70% non-condensing.
- System storage temperature shall be in the range of 32°F to 95°F (0°C to 35°C), with relative humidity range of 20% to 90% non-condensing.
- Altitude shall not exceed 6561.68 feet (2000 m).
- Material storage shall be in the range of 55°F to 86°F (13°C to 30°C), with relative humidity less than 70%. Noise emission (acoustic):
  - <65dBA when idle
  - <65dBA when building

# 2 PRINTER SETUP

This chapter describes basic setup of the F770.

## General Information

### Welcome Kit Contents

The printer's Welcome Kit contains the Welcome Insert document and common tools you will need to maintain the printer. Use the following figures and tables to identify the contents of the Welcome Kit.

Figure 1: Welcome Kit Contents - Documents and Cables

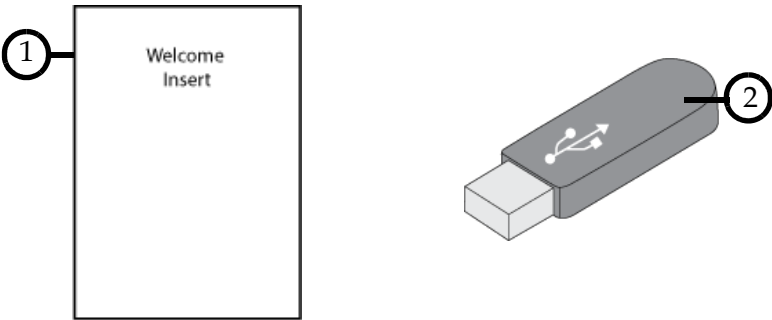


Table 1: Key for Figure 1

#	Item	Description
1	Welcome Insert Document	Contains instructions for downloading the F770 User Guide (this document).
2	USB Flash Drive	The printer features 3 USB ports (see <a href="#">Figure 3 (page 32)</a> for port locations). As an alternate method to sending job files to the printer via Insight, this flash drive can be used to store processed job files which you build frequently (see “ <a href="#">Adding a Job to the Job Queue</a> ” (page 59)).

Figure 2: Welcome Kit Contents - Tools

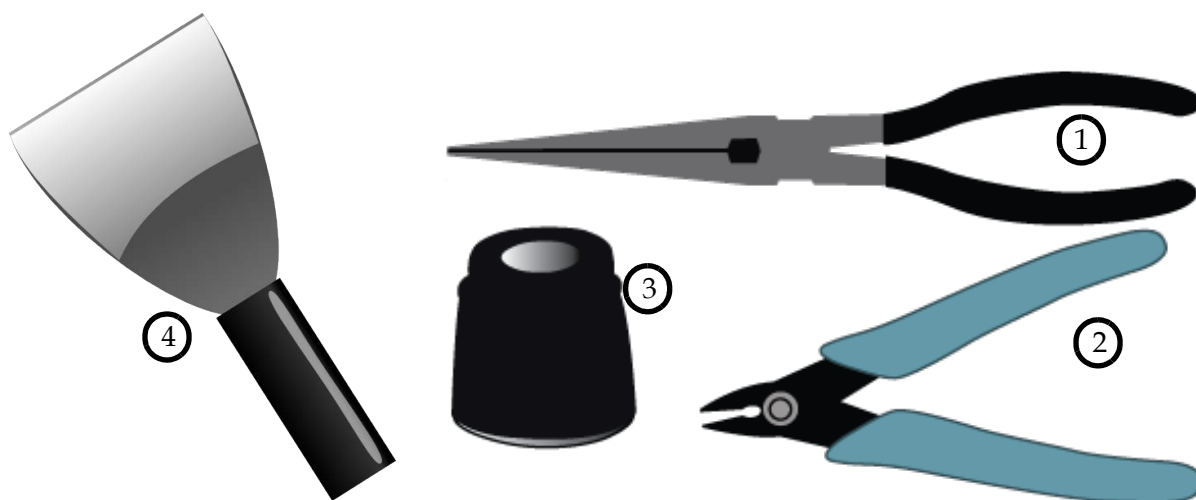


Table 2: Key for Figure 2

#	Item	Description
1	Needle Nose Pliers (extra slim)	Occasionally, you may need to use pliers to aid in the clearing of debris which have accumulated on the head and/or tips (see “Clean/Inspect Tip Wipe Assemblies” (page 189)).
2	5” Cutter	These are used to cut a material coil box’s filament when unloading and removing materials from the printer. See “Unloading Material” (page 127).
3	Loupe Magnifier	This tool is included to aid you with performing a Manual Tip Calibration which requires you to view small toolpath relationships. See “Manual Tip Calibration” (page 163).
4	Scraper	This tool is used to scrape parts or material off the substrate.

## Basic Setup

Follow the Site Preparation Guide to ensure that your facility is effectively and safely prepared for printer installation. Do not proceed with the following sections until the “Unpacking the Printer” section of the Site Preparation Guide has been completed. When installation is complete, open all four top covers to access and remove tie wraps securing the gantry against X and Y travel. See “Opening Top Access Doors Left/Right” (page 194) and “Opening Top Access Doors Front/Rear” (page 195).



If any of the tie wraps are found broken, please contact Stratasys customer support.

## Stabilizing the Printer

**Caution: Unstable Object.**

The stability pads are used to stabilize the printer after it has been moved to its desired operating location. The stability pads must be set prior to printer operation.

To stabilize the printer:

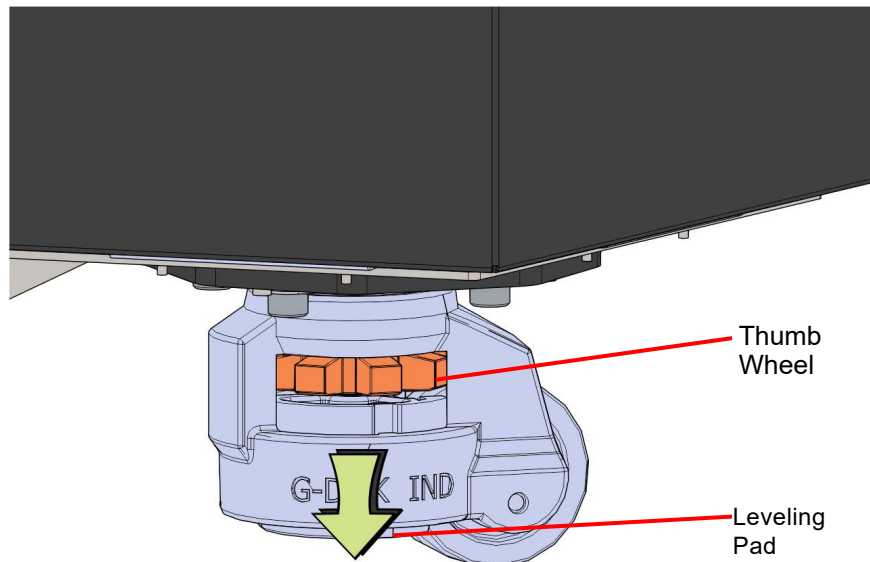
1. Roll the printer to its desired operating location and verify that minimum space requirements have been met.

Table 3: Printer Clearances

Side	Clearance
Side Clearance	Minimum 36 inches (91.4 cm) on each side
Rear Clearance	Minimum 36 inches (91.4 cm)
Front Clearance	Minimum 60 inches (152.4 cm)
Overhead Clearance	Minimum 20 inches (50.80 cm)

2. Rotate the thumb wheel on each of the four printer casters to lower the leveling pads to the floor. (see Figure 3).

Figure 3: Stability Pad Jackscrew Adjustment



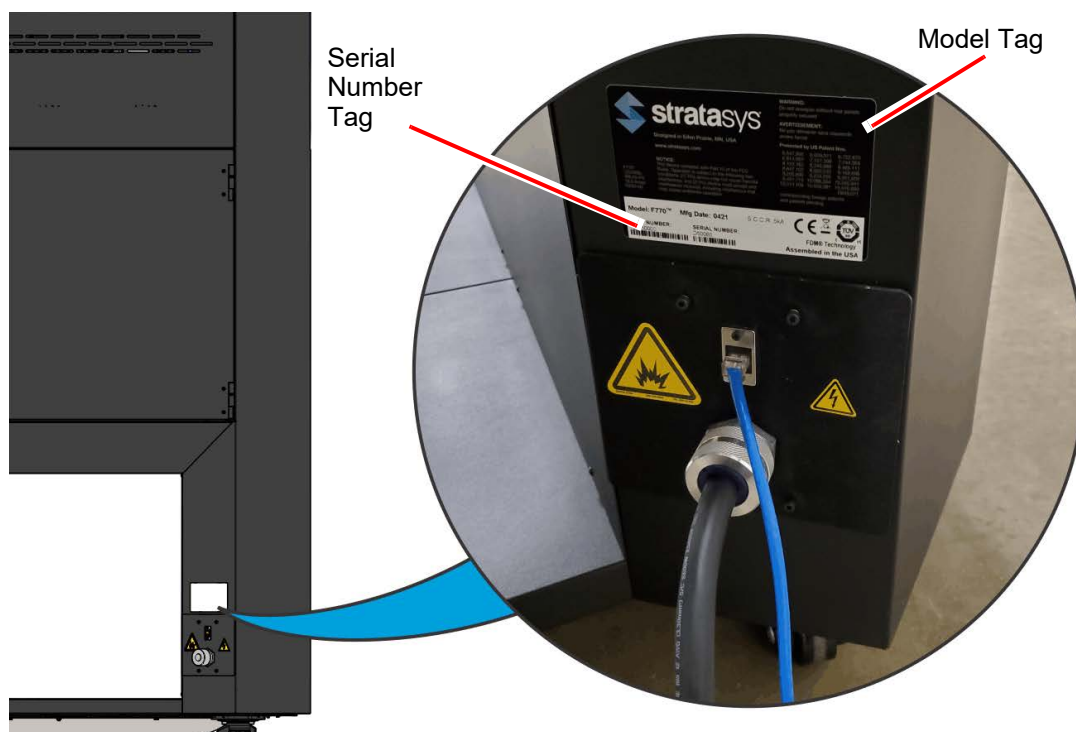
## Identifying Your Printer

Use the following tags to identify your printer:

- **Serial Number Tag** - Refer to this number when requesting service. You can also locate the printer's serial number via the Maintenance page of the User Interface (see "[System Odometers](#)" (page 104) for more information).
- **Model Tag** - The printer's model number, part number and power requirements are given on this tag. This tag also lists all patent numbers associated with the printer, some FCC compliance information, voltage warnings, and the Stratasys web address.

Both tags are located on the back side of the printer near the bottom, and are typically placed near the printer's power connection. Use the information on these tags when identifying your printer with Customer Support.

Figure 4: ID Tag Locations



## Making the Network Connection

Processed job files can be transferred from Insight to the F770 printer through your facility's Ethernet network. An RJ45 network connector is located on the right, rear corner of the printer (as viewed from the rear). See [Figure 5](#) for the network connection location.



A 15 foot (4'.6m) network patch cable is supplied with the printer and located in the welcome kit. Facilities having network connection points further from the printer than can be reached by the supplied cable are responsible for the procurement of an appropriate cable.

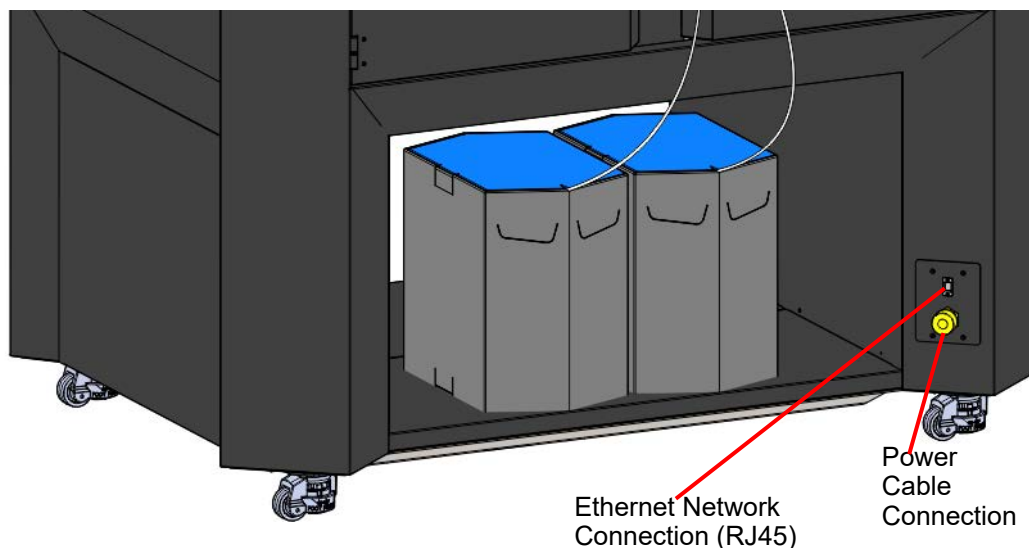
## Connecting the Power Cable

**Warning: Electrical Shock Hazard.**

A licensed electrician must perform all wiring from the service connection to the system - including all connectors, cables, and proper strain relief.

Comply with all applicable local and national electric codes.

Figure 5: Rear Connections



## Configuring the Network

This section is provided in case you need to change your network settings. Within the Network page you can set your printer's address type to Static, Dynamic (DHCP), or Wi-Fi; Dynamic is selected by default.

- Static address - you must enter an IP address, subnet mask, and gateway address for the printer (provided by the system administrator). Once entered, the address will not change.
- Dynamic address (DHCP) - a network server or PC will generate an IP address for the printer. A different IP address may be generated from time to time by the server or PC.
- Wi-Fi address - the printer will scan for and allow you to connect to an available Wi-Fi network (if the Wi-Fi dongle has been installed).

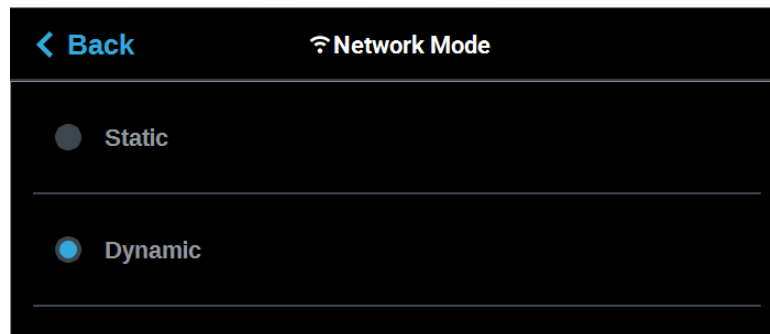
### Network Address Configuration

To configure your printer's network address settings:

1. Power ON the printer, see "Powering ON the Printer" (page 114).
2. Open the Tools page by pressing the **Tools** button within the Navigation Menu (see Table 1 (page 47)).

3. Open the Network page by pressing the **Network** button within the Tools page (see Figure 38 (page 85)).
4. The **Connection Type** row allows you to select between a wired or wireless network. The option selected will determine the configurable settings displayed within the Network page.
  - Selecting the **Wired** option will allow you to select between a Dynamic or Static network mode.
  - Selecting the **Wireless** option will configure the pinter to use a Wi-Fi network. You will need to scan for a wireless network and enter the security settings for the selected network (if required) to complete the configuration. Please note that the availability of the Wireless option depends upon the configuration purchased with your printer.
5. After selecting the radio button corresponding to the connection type you'd like to use (wired or wireless) press the **Back** button in the upper-left corner of the page to return to the Network page.
6. For wired networks:
  - a. The **Network Mode** row will be displayed. Press anywhere within this row.
  - b. Select either the **Static** or **Dynamic** radio button to enable that network address type. Depending on the option selected, you may need to configure additional information within the Network page.

Figure 6: Wired Network Selection





- If the **Static** option is enabled, you must manually configure the IP Address, Subnet Mask, and Gateway Address fields. To configure this information simply touch a field on the screen to select it and then use the keypad displayed to enter address information.
  - i. Touch anywhere on the screen outside of the keypad to exit and close the keypad.

Figure 7: Static Network Configuration

- ii. Scroll to the bottom of the page and press the **Apply** button when finished to save the network configuration.
- iii. Press the **Back** button in the upper-left corner of the page to return to the Network page.

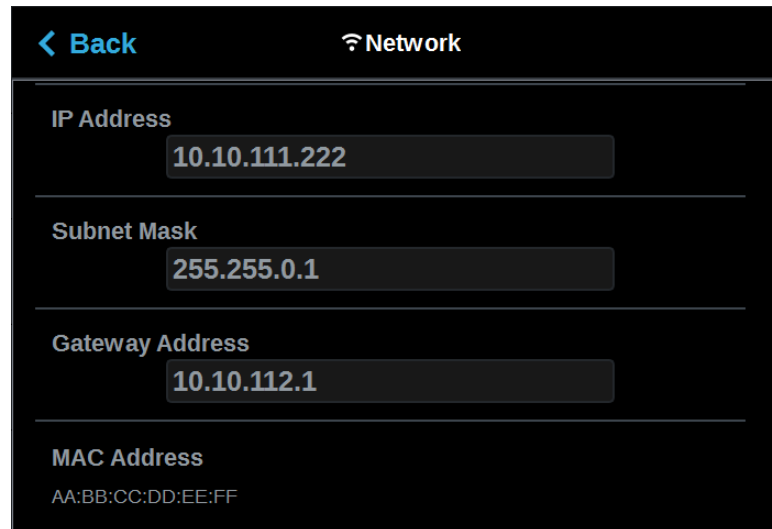
Figure 8: Apply Changes Button



- If the **Dynamic** option is enabled, no additional configuration is necessary as a network server or PC will automatically generate an IP address for the printer. A different IP address may be generated from time to time by the server or PC; the generated IP address will be displayed within the IP Address field of the Network page, and corresponding Subnet Mask and Gateway Address information will also be displayed.

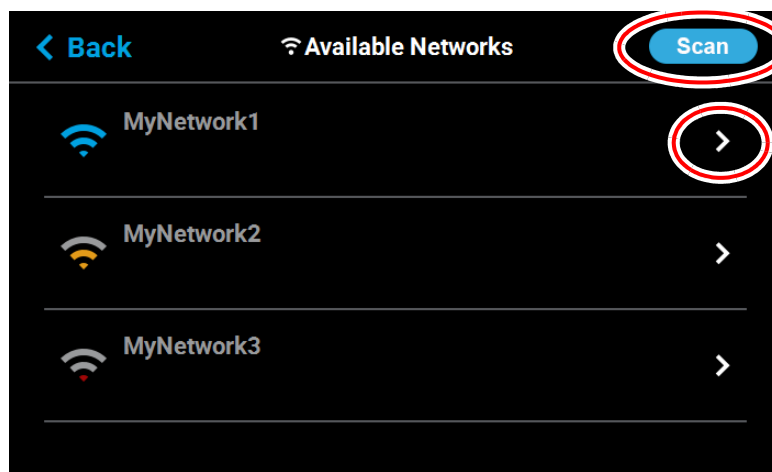
- Press the **Back** button to exit the page and return to the Tools page.

Figure 9: Dynamic Network Configuration



7. For wireless networks:
  - a. The **Available Networks** row will be displayed (Wi-Fi dongle must be installed). Press anywhere within this row.
  - b. Press the **Scan** button; the printer will scan for an available wireless (Wi-Fi) network.

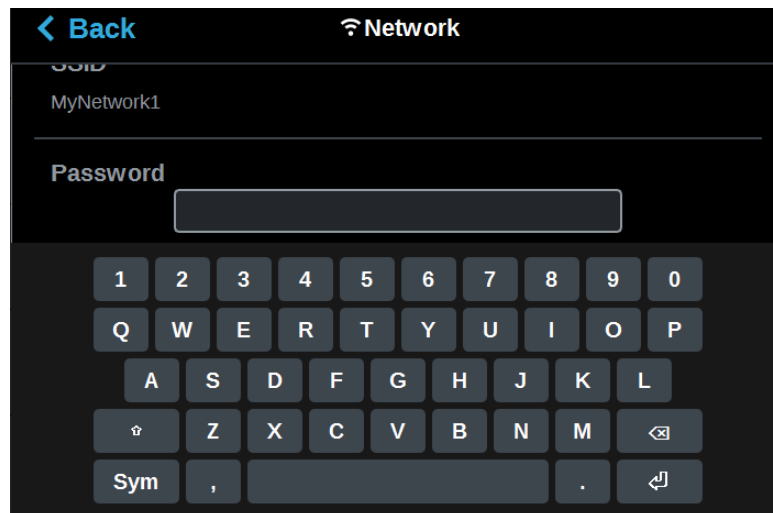
Figure 10: Scan for Wireless Network



- c. A list of available networks will be displayed; select the wireless network you'd like to connect to by pressing anywhere within the row.

- d. A page will be displayed containing the details of the selected Wi-Fi network. Within this page use the keyboard to enter the password and/or username required to connect to the network.

Figure 11: Enter Wi-Fi Network Information



The screenshot shows a mobile application interface for configuring a Wi-Fi network. At the top, there is a navigation bar with a blue arrow and the word 'Back' on the left, and a Wi-Fi icon followed by the word 'Network' on the right. Below the navigation bar, the SSID 'MyNetwork1' is displayed. Underneath the SSID is a 'Password' label and a text input field. A virtual keyboard is overlaid on the screen, featuring a standard QWERTY layout with additional keys for symbols, a comma, and a return key.

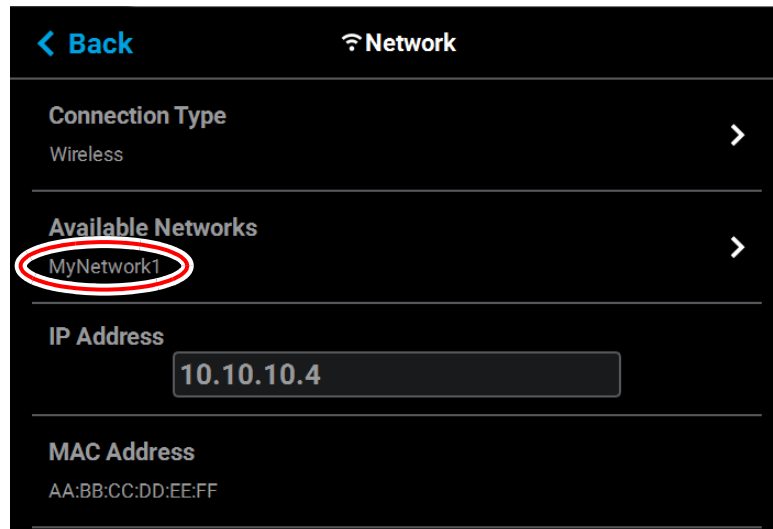
- e. When finished, touch anywhere on the screen outside of the keypad to exit and close the keypad.
- f. Scroll to the bottom of the page and press the **Connect** button to save the network configuration.

Figure 12: Connect Button



The screenshot shows the bottom portion of the network configuration screen. It features a text input field at the top, followed by a horizontal line. Below the line is a large, rounded blue button with the word 'Connect' in white text.

- g. Press the **Back** button to exit the page and return to the Network page. The name of the selected wireless network will be displayed within the Available Networks row.



- h. Press the **Back** button to exit the page and return to the *Tools* page. The Network button will refresh and a blue indicator will be displayed indicating that the printer is configured for a Wi-Fi network.

Figure 13: Enter Network Settings Dialog



## Installing GrabCAD Print

Install the GrabCAD Print software on a facility workstation. Navigate to <http://help.grabcad.com/article/197-sign-up-download-and-install> and follow the on-screen instructions.

The GrabCAD Print server extends the features of GrabCAD Print to allow printer status monitoring via a mobile app, remote monitoring and printing via the desktop application, and material usage, job history, utilization analytics via the desktop application and web reports. The GrabCAD Print server is an optional component that runs as a Windows service on a customer-controlled machine in the customer network and connects to web services running in the GrabCAD cloud.

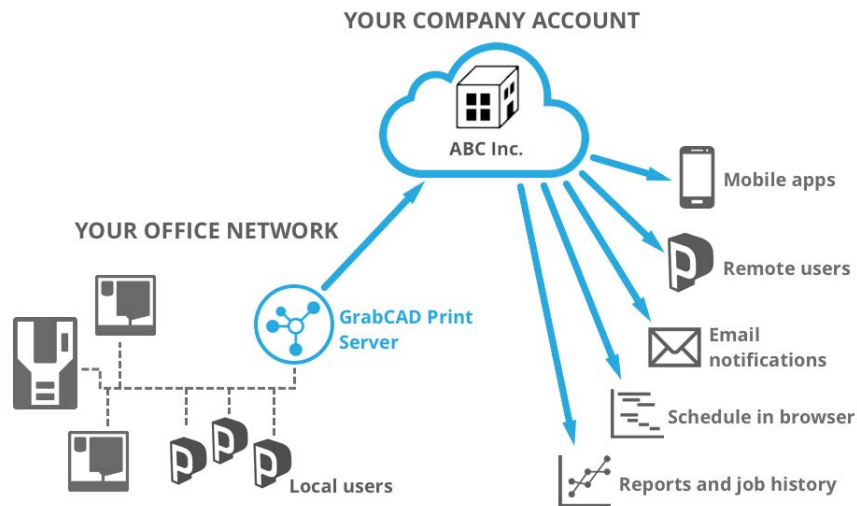
The GrabCAD Print server serves five purposes:

1. Monitoring print queues from the iOS, Android, and Alexa mobile apps.
2. Logging into GrabCAD Print from any computer and connecting to the office printers.
3. Getting email notifications for print jobs and changing settings.

4. Logging into [print.grabcad.com](http://print.grabcad.com) from anywhere to see the same Schedule View as in the desktop app.
5. Accessing reports which are powered by data collected from the GrabCAD Print server.

A company account links to all of the features of the GrabCAD Print server as shown in the image below.

Figure 14: GrabCAD Print server



## Set up the GrabCAD Print server on a network.

A computer that is connected to the network at all times is a requirement for GrabCAD Print server. Further system requirements are available here: <https://help.grabcad.com/article/195-system-requirements-for-grabcad-print#server>

Once you install the GrabCAD Print server, log in and select the company account.

The GrabCAD Print server will run in the background as long as the computer is running. This will happen even if the current Windows user logs out. The GrabCAD Print server starts in the background when a user logs in after the computer is rebooted.

GrabCAD provides many controls to allow users and administrators to share data. Additionally GrabCAD has put in place General Data Protection Regulation (GDPR) controls allowing for greater data control. Contact [support@grabcad.com](mailto:support@grabcad.com) with any further questions.

## GrabCAD and GDPR

GrabCAD complies with the European Union's General Data Privacy Regulation. For any questions, please contact [support@grabcad.com](mailto:support@grabcad.com).

## Connecting to the F770 Printer

Add the F770 Series printer to the GrabCAD Print application. Navigate to <http://help.grabcad.com/article/198-connect-your-printers> and follow the on-screen instructions.

## Insight Software

(Insight and related software are an alternative to GrabCAD Print and GrabCAD Print Server)

**NOTE:**

For detailed information and instructions on using Insight, see the associated Help file within the Insight application (available by selecting the Help option within the Insight toolbar).

Insight software is installed on your workstation PC as part of the initial installation and setup process (performed by your authorized service representative). Insight is the software used to process job files and then transfer them to the printer to be built. The F770 builds parts by processing the original STL job file into a Stratasys CMB file that is downloaded to the printer. To build a job, you must send the job file to the F770 using the Insight application.

**NOTE:**

FDM Control Center is an application that connects with Insight software to send jobs to the printer to be built. For detailed information about using FDM Control Center, use the associated Help file within the application.

Jobs are sent to the printer in CMB format and are placed into the Job Queue (stored on the printer's SD memory card). The header of the CMB file contains the processed job's basic information (material type, approximate material amounts required for the build, tip size, etc.). This information is used to verify job compatibility with the printer's materials/tips configuration.

To start Insight, navigate to **All Programs > Insight (installed version) > Insight (installed version)** from your workstation's Start Menu or double-click on the Insight desktop shortcut (if available).

Insight STL file processing consists of:

1. Configuring the modeler (printer).
2. Orienting the STL model.
3. Slicing the STL model.
4. Creating support curves (defining where temporary supports will be built).
5. Creating toolpath fill for model and support curves.
6. Saving a toolpath file (CMB file).
7. Downloading the toolpath file to the modeler (printer), via FDM Control Center, to be built.

## FDM Control Center Software

FDM Control Center is an application that connects with Insight software to send jobs to the printer to be built. Control Center is designed to be used with your network-based Stratasys printer. Insight performs the model processing to prepare a CMB file and Control Center connects to the printer to build the job and monitor the printer's status.

**NOTE:**

For detailed information about using FDM Control Center, see the associated Help file within the application (available by selecting the Help option within the Control Center toolbar).

Control Center software is packaged together with Insight software, and is installed on your workstation PC as part of the initial installation and setup process (performed by your authorized service representative). During the software installation process, your printer's network information should have been configured within Control Center allowing you to send CMB files to the printer. If you find that you are unable to select your printer from the drop-down menu within Control Center, you will need to add your modeler (printer) to your list of available FDM systems.

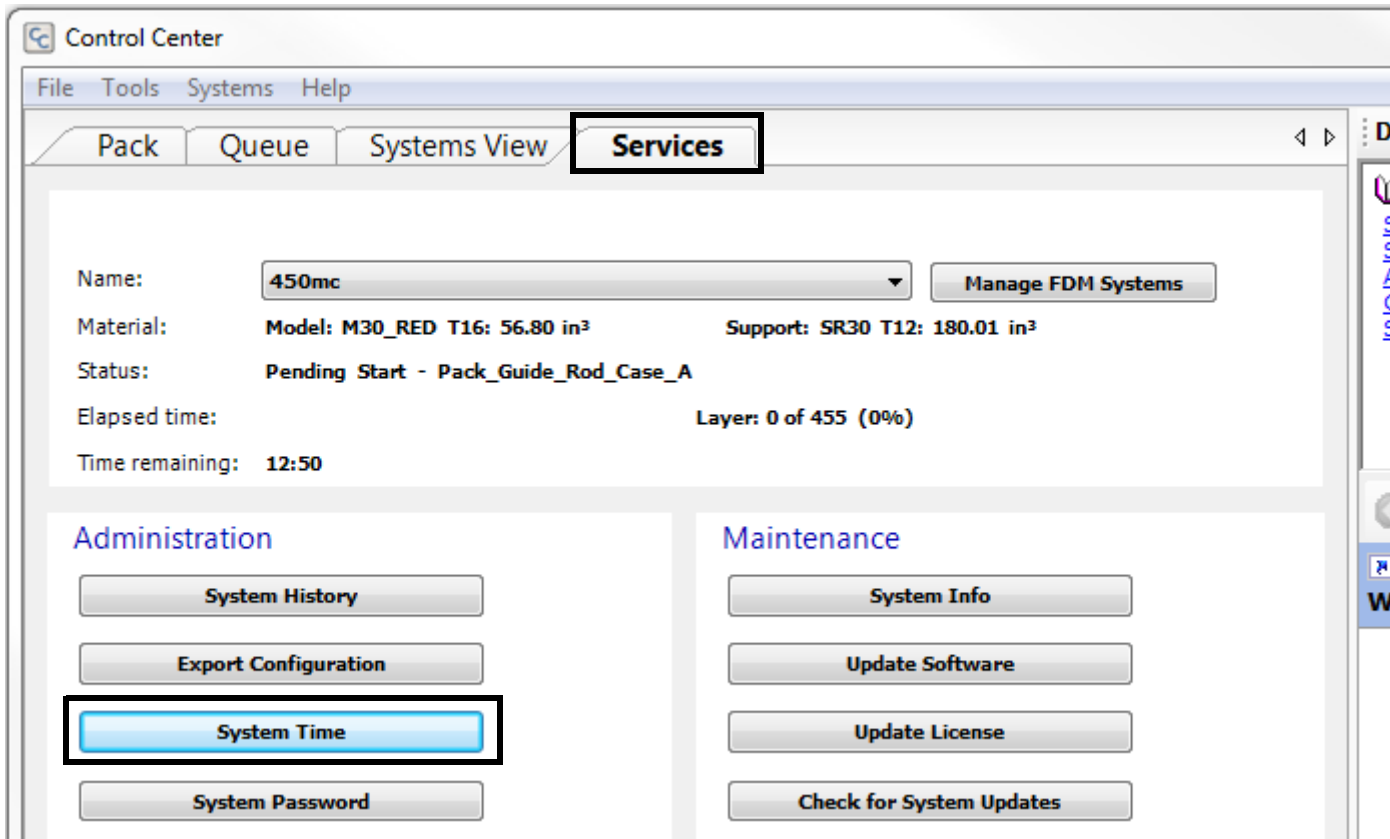
## Setting the Printer's Date and Time

In order to ensure accurate build times, the printer's clock must be set. This is done within the FDM Control Center application which was installed on your workstation PC as part of the installation process (see ["FDM Control Center Software" \(page 23\)](#)). Perform the following steps to set the printer's date and time:

1. Open FDM Control Center by navigating to **All Programs > Insight (installed version) > Control Center (installed version)** or double-clicking the Control Center shortcut (if available).
2. Select the Services tab, and ensure that your printer is selected from the Name: drop-down menu. If your printer is not available from the drop-down menu, you will need to add the printer within Control Center.

3. Click the **System Time** button.

Figure 15: System Time Button Location

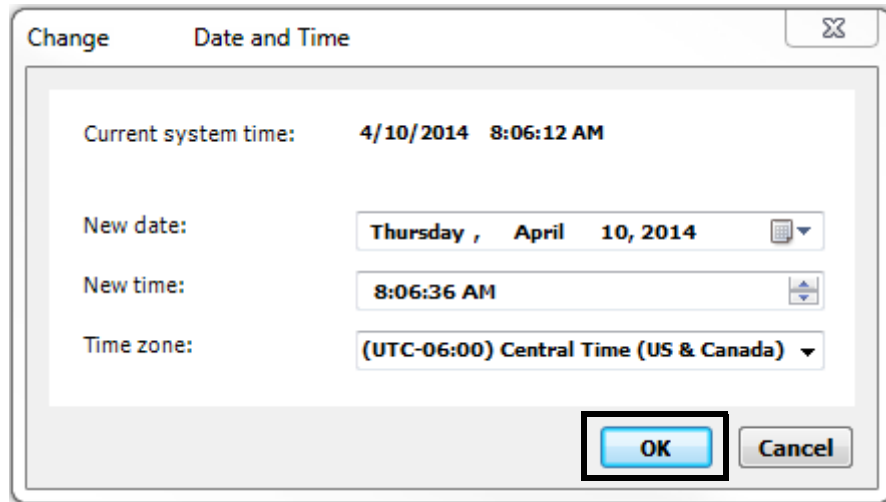


4. The Change Date and Time dialog will be displayed. The date and time settings within this dialog are automatically configured based on the workstation PC's date and time settings.



5. Adjust the date and/or time setting if needed, then click **OK** to close the dialog.

Figure 16: Change Date and Time Dialog



## Updating the Controller Software Version

Update the controller software if necessary. See “Updating Controller Software” (page 178).

## Adjusting the Tip Wipe Height

If necessary, adjust the tip wipe height. See “Tip Wipe Height Adjustment” (page 176).

## Stratasys Online Resources

Stratasys encourages you to learn more about additive technologies and your Stratasys printer. A wealth of information is available on our online platforms.

Subscribe to our customer newsletter for quarterly updates on Stratasys knowledge and training. You can learn about the release of new documentation and learning resources.

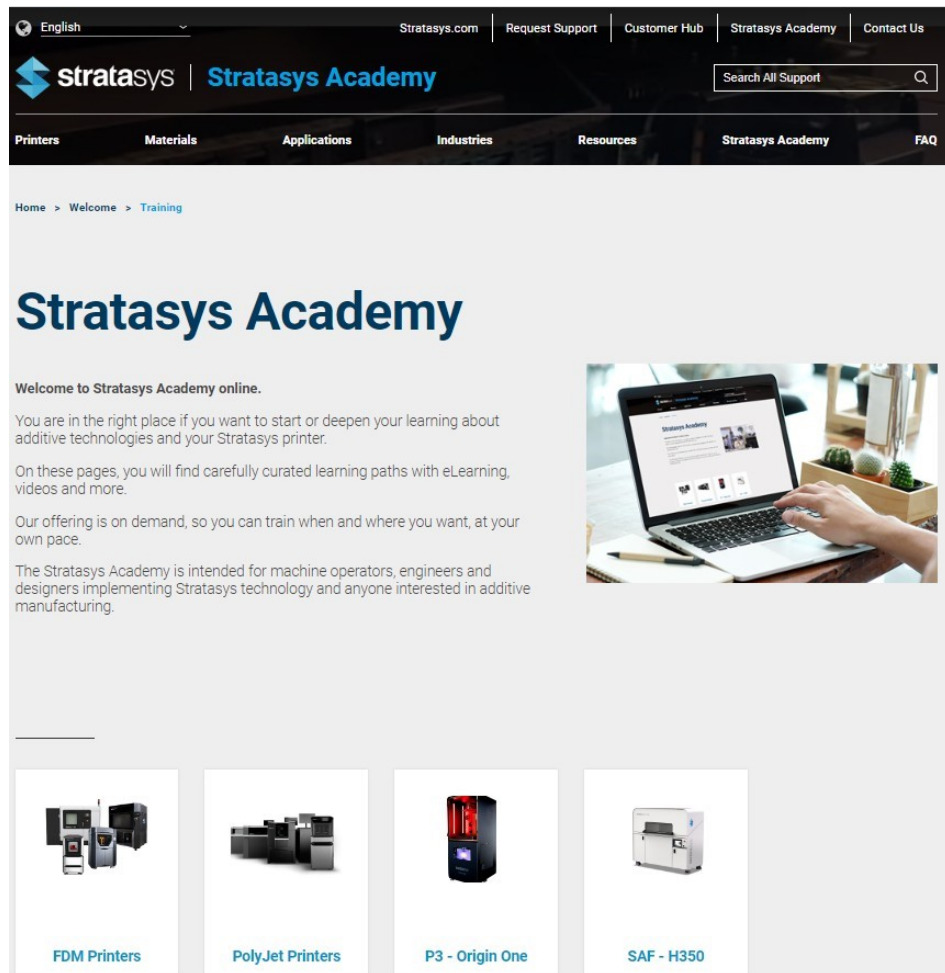
## Stratasys Academy

[Stratasys Academy](#) is your online learning platform where you can quickly learn and acquire skills on additive technologies and your Stratasys printer.

To guide you in your learning, our online academy provides a variety of resources such as an extensive library of videos and eLearning modules. We periodically update the site with new content.

Start your learning journey today.

Figure 17: Stratasys Academy



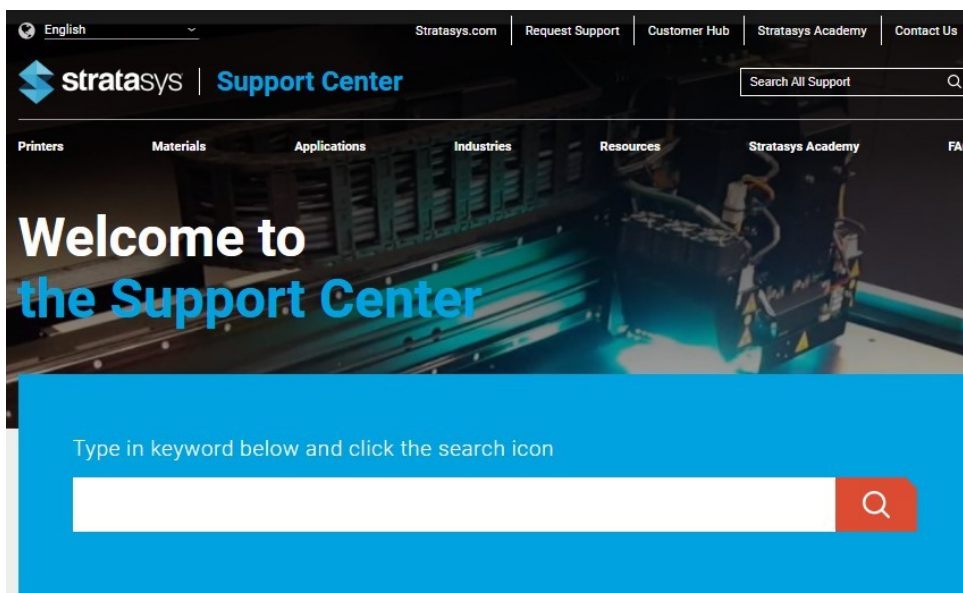
## Stratasys Support Center

The [Support Center](#) is a knowledge base that includes information about design, applications, printing material, and links to many other resources.

In addition, you can check the latest revision of the user guide for your Stratasys 3D printer and download documents in different languages.

The Support Center is available in multiple languages. You can change the display language using the language drop-down menu in the top-left corner of the homepage.

Figure 18: Support Center

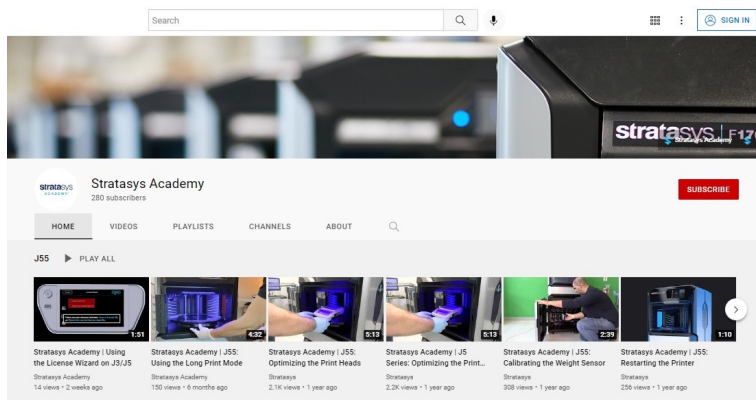


## Stratasys Academy YouTube Channel

The Stratasys Academy YouTube Channel features instructional videos about how to operate and maintain Stratasys printers. The channel includes dedicated playlists for different printers and special topics like post-processing.

Make sure to check out this new Stratasys Academy Channel and remember to subscribe!

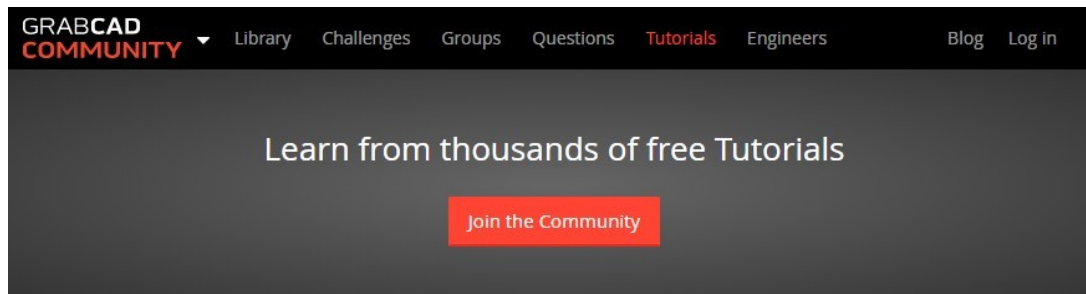
Figure 19: Stratasys Academy YouTube Channel



## GrabCAD Community

The Tutorials section of the GrabCAD Community portal is a valuable resource for Stratasys-sponsored and user-generated 3D printing tips. You can also ask 3D-related questions on the portal and download free CAD files.

Figure 20: GrabCAD Community



# 3 SYSTEM COMPONENTS

This chapter describes the components of the F770 printer. Information regarding the materials and tips that can be used by the printer is also included in this chapter.

## Printer Overview

### Access Doors and Panels



Do not energize when the rear panel is not secured in place.

This printer has been designed to allow easy access to the most frequently accessed areas on the system. Doors and panels are highlighted in Figure 1 and Figure 2.

Figure 1: Access Doors and Panels - Front View

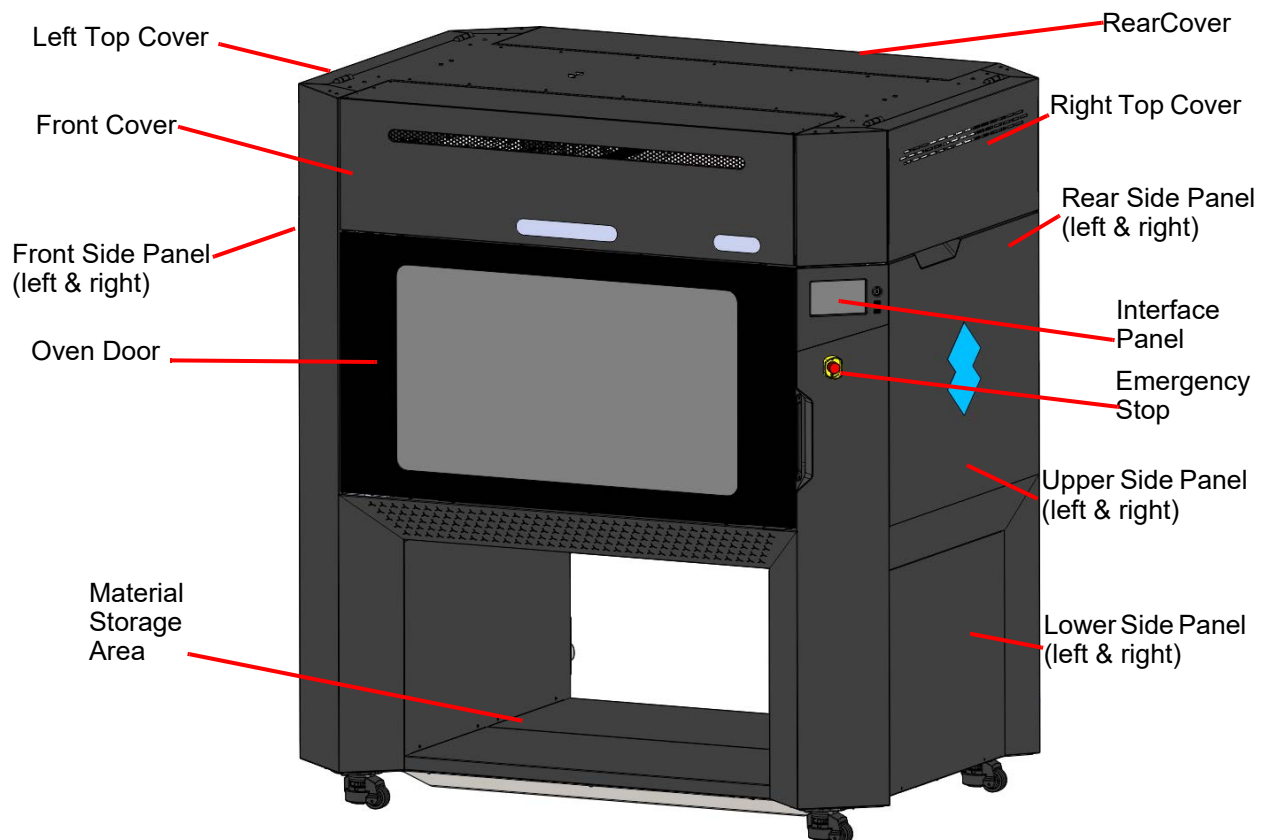
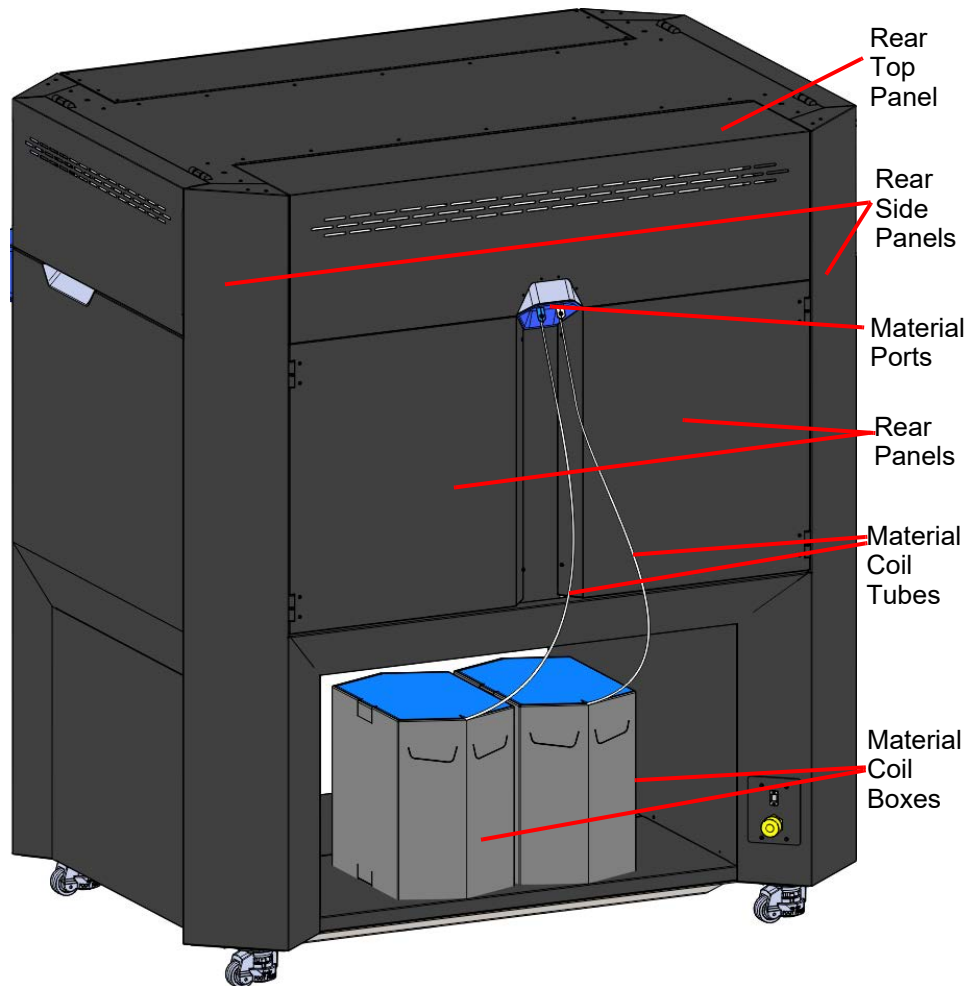


Figure 2: Access Doors and Panels - Rear View



## Top Covers

Allow access to the gantry and head assemblies.

## Oven Door

Allows access to the platen, tip wipe assemblies, purge area, and completed parts for removal. The printer's camera is also housed within the oven door.

## Upper Right & Upper Left Side Panels

The upper right and Upper left side panels provide access to the oven chamber fans.

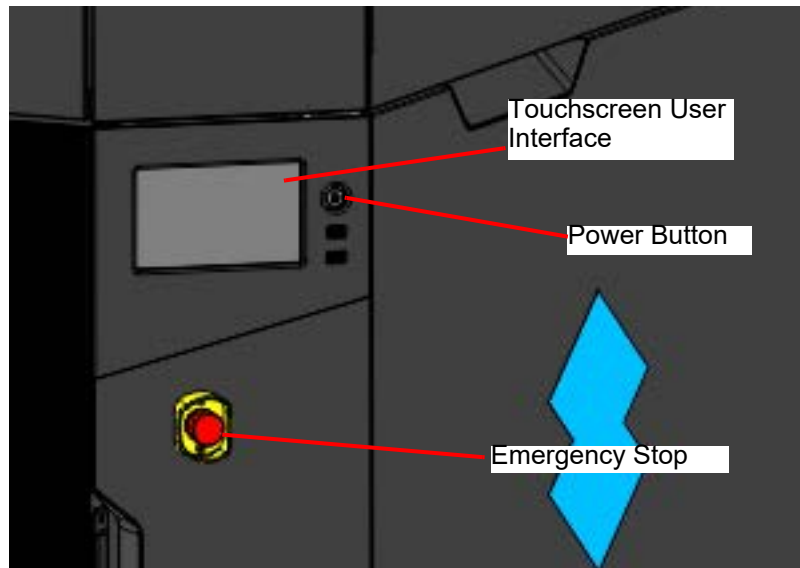
## Rear Panels

The rear panels provides access to the electronics bay.

## Interface Panel

The interface panel houses the printer's touchscreen user interface, power button, and USB ports.

Figure 3: Interface Panel



### Touchscreen User Interface

Allows for user control of the printer. From the User Interface you can access various screens to select jobs for building, control jobs in the process of being built, change materials, perform calibrations, and configure your printer's settings and maintenance options. The touchscreen visually displays the operational state of the printer as well as any warning information available.

See [Chapter , 4 User Interface \(page 46\)](#) for detailed information on the components and pages of the user interface.

### Power Button

Allows you to power the printer ON and OFF (see [“Powering ON the Printer” \(page 114\)](#) and [“Powering OFF the Printer” \(page 115\)](#) more information).

### USB Ports

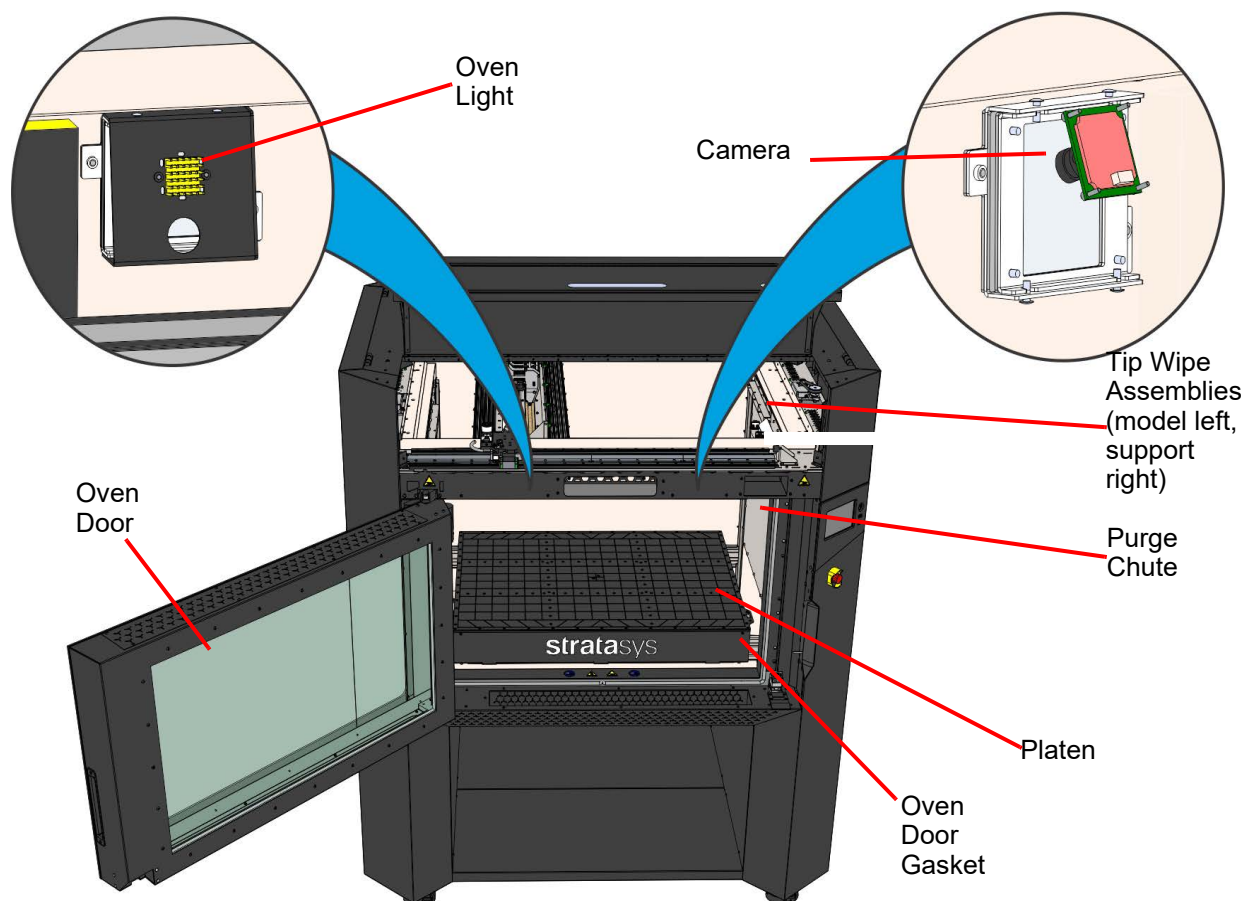
The printer's USB ports allow you to easily upload job files to be built. After plugging a USB flash drive into any of the USB ports you can access the flash drive's contents via the Queue page (see [“Working with the Queue Page” \(page 58\)](#) for details).



# Oven Components

The oven consists of the oven door and everything that you see through the oven door window, including the platen, tip wipe assemblies, purge chute, and oven heaters. The printer's camera is housed within the frame of the oven door.

Figure 4: Oven Components



## Oven Door

The oven door (see [Figure 4](#)) utilizes an electromagnetic lock along with optical sensors. The oven door remains locked while the printer is building and automatically unlocks when it is safe for you to access the components of the oven. You cannot open the oven door when the printer is building. The top cover will automatically unlock in conjunction with the oven door, allowing you to manually open the top cover. The oven door gasket, which runs around the perimeter of the oven door frame, helps to provide an airtight seal when the oven door is closed.

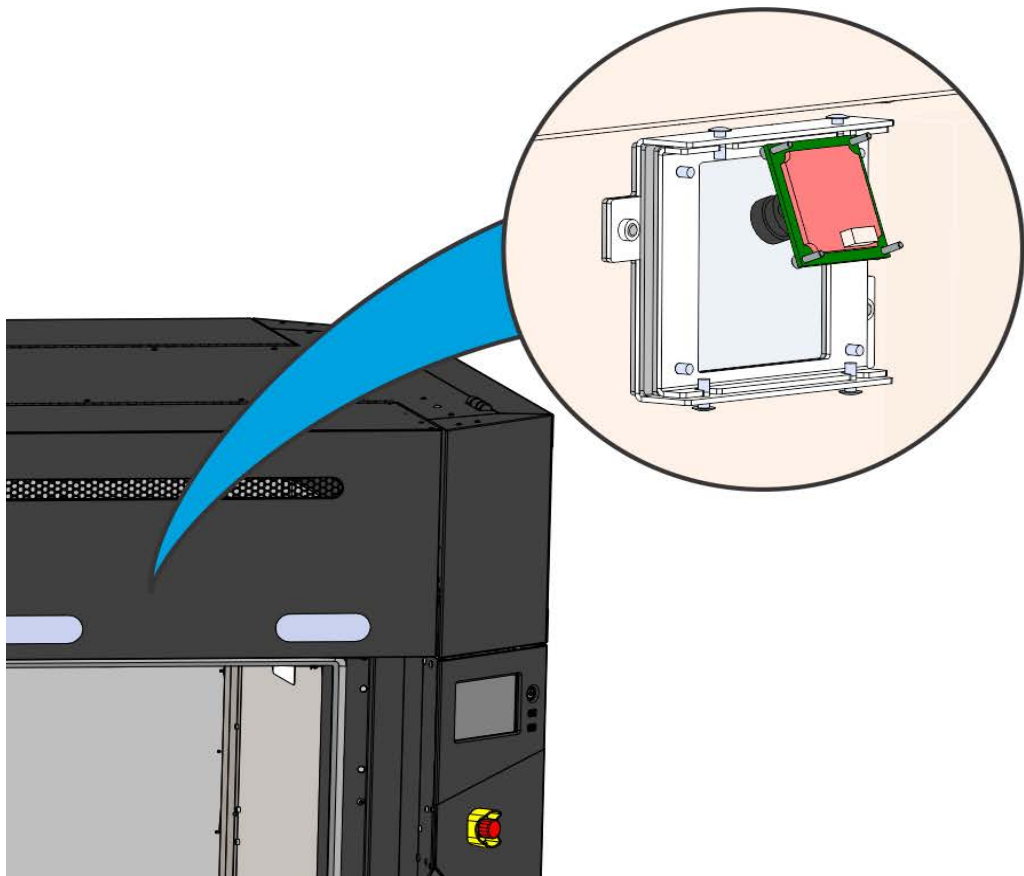
The oven door window is composed of two panes of tempered glass.



## Camera

The printer's camera is housed within the frame of the oven door and provides remote monitoring capabilities while a part is building. Using the GrabCAD Print application installed on your workstation PC, you can view the part as it is building allowing you to remotely monitor part build quality. Pictures are automatically taken at a set interval via GrabCAD Print. Please note that the camera image displayed will include some reflection as a result of the oven door's glass.

Figure 5: Camera Location

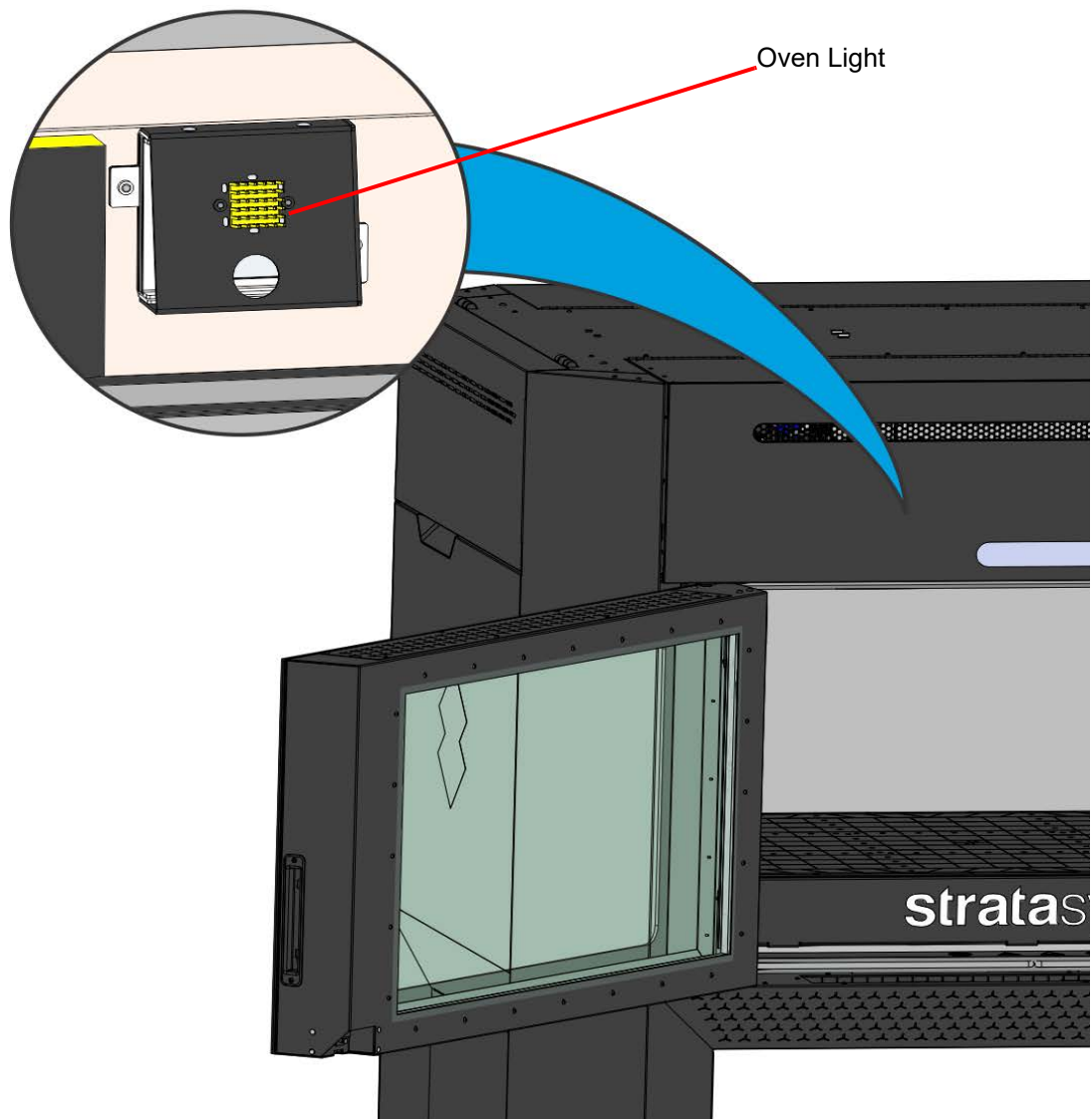


## Oven Light

A single light pipe is mounted on the front upper edge of the oven and is used to illuminate the oven chamber (Figure 6). The light pipe consists of nine high-temperature LEDs; each LED is rated at 1-watt. The oven light is powered by 32 VDC.

The Light button within the Tools page indicates the current state of the oven light and allows you to manually turn the light ON or OFF (see “Light” (page 113)).

Figure 6: Oven Light Location

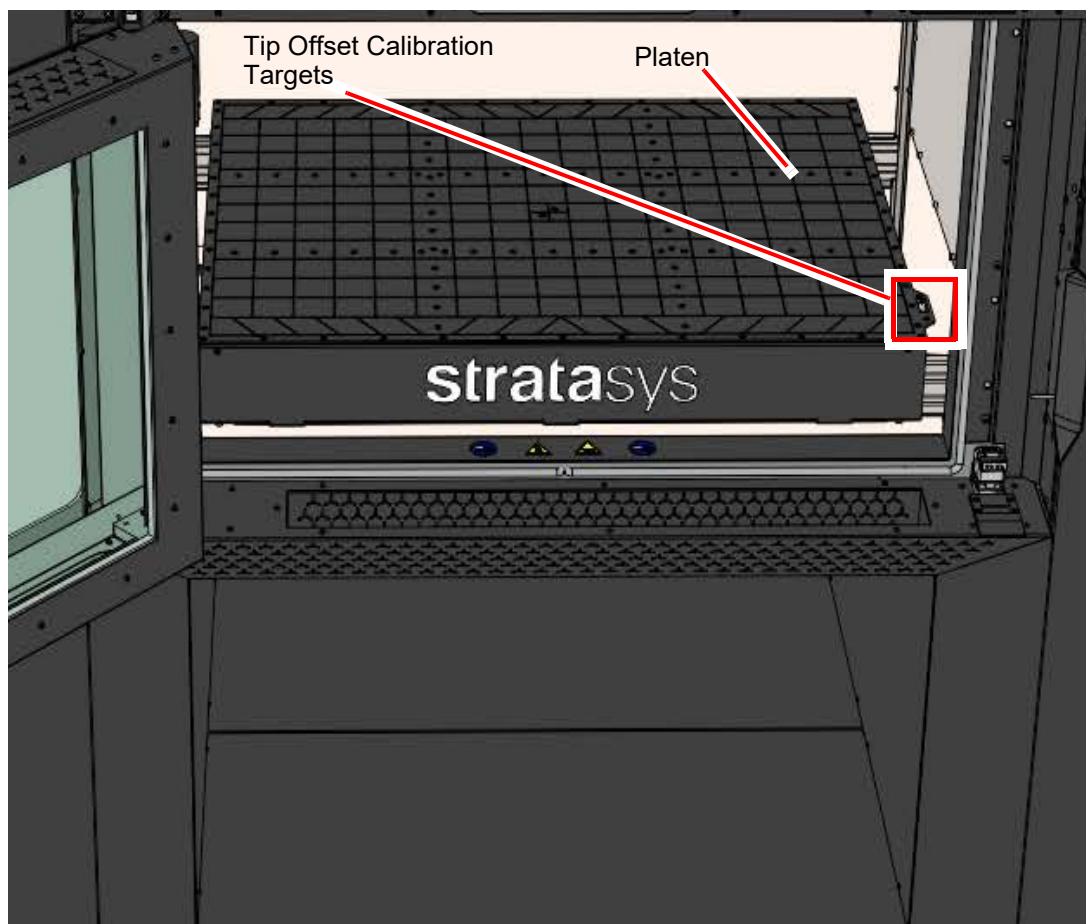


## Platen

The aluminum platen provides the level surface on which parts are built. A build sheet is securely affixed to the platen using a vacuum system. After placing a build sheet on the platen with the smooth side down, turning On the vacuum control system will cause the build sheet to attach to the platen. Turning the vacuum control system Off allows the build sheet to be easily removed.

The tip offset calibration targets are located on the rear center portion of the platen. These targets are used when determining the X and Y offset between model and support tips after either head has been replaced (during an automatic Tip Offset Calibration).

Figure 7: Platen Components

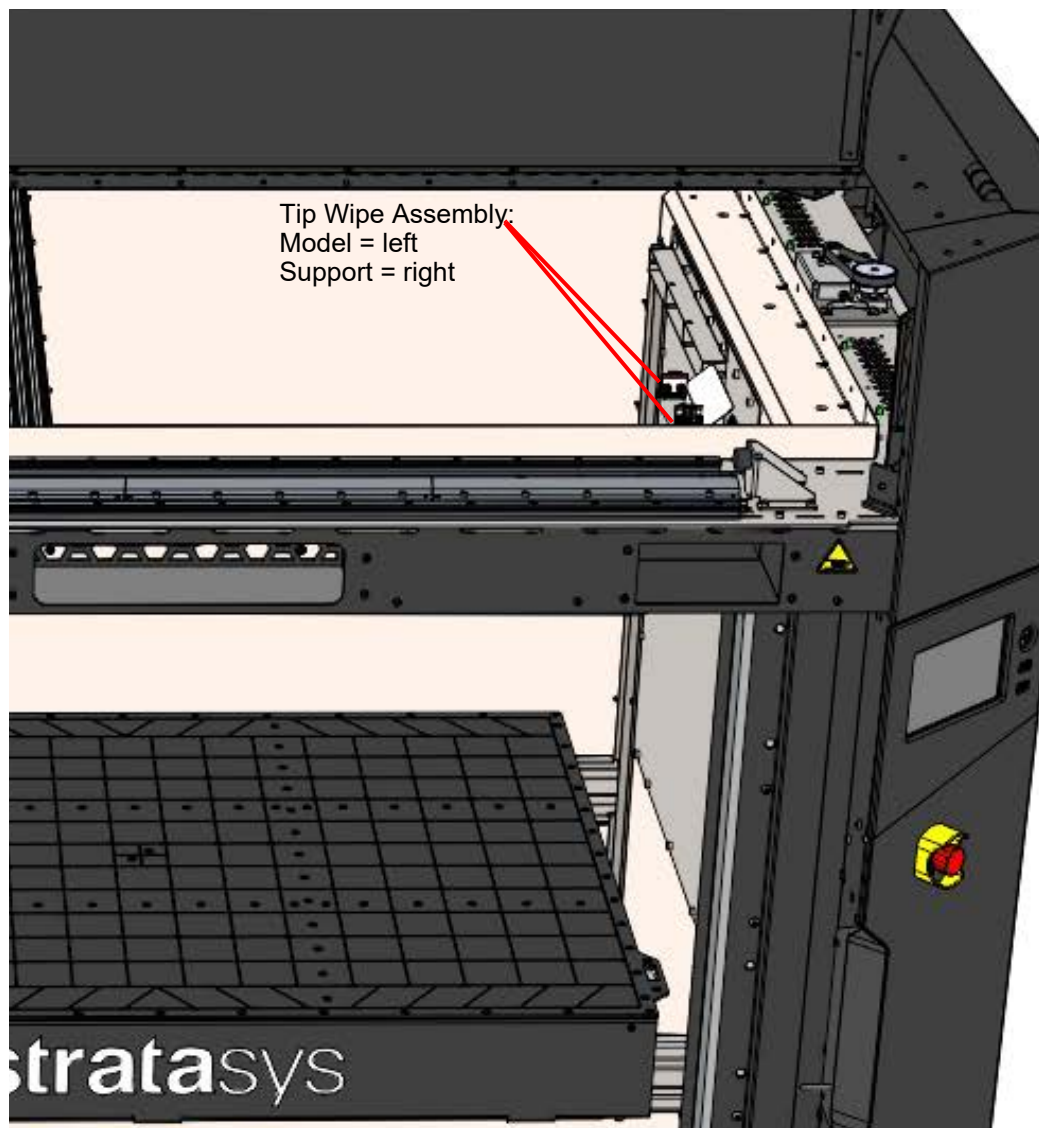


## Tip Wipe Assemblies

Two tip wipe assemblies are located on the right side of the oven, one for model and one for support. Each assembly consists of a flicker and a brush. The tip wipe assemblies keep the printer's tips and tip shields free of purged material debris and material buildup. The tip wipe assemblies are mounted behind the purge chute and extend through the purge chute via two slots cut into the chute's exterior.

After material is purged from a tip, the tip passes across the tip wipe assembly. The flicker cuts the purged material from the end of the tip and knocks it into the purge chute. The brush cleans the tip and tip shield. Purged material debris is guided down from the tip wipe assemblies to the bottom of the oven chamber via the purge chute.

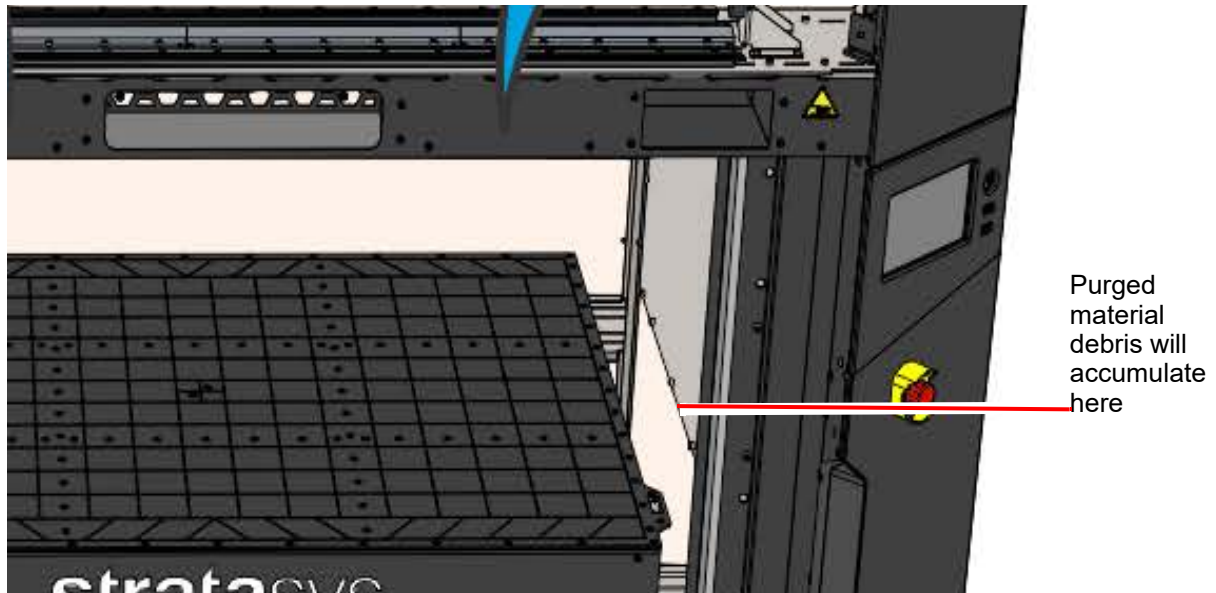
Figure 8: Tip Wipe Assemblies



## Purged Material

Purged material collects on the right side of the oven. Purged material debris falls from the tip wipe assemblies to the bottom of the oven chamber. Accumulated material debris should always be cleaned on a weekly basis, or as needed if excessive accumulation occurs, see “Cleaning the Oven Chamber” (page 189) for instructions.

Figure 9: Oven Chamber Cleaning Location

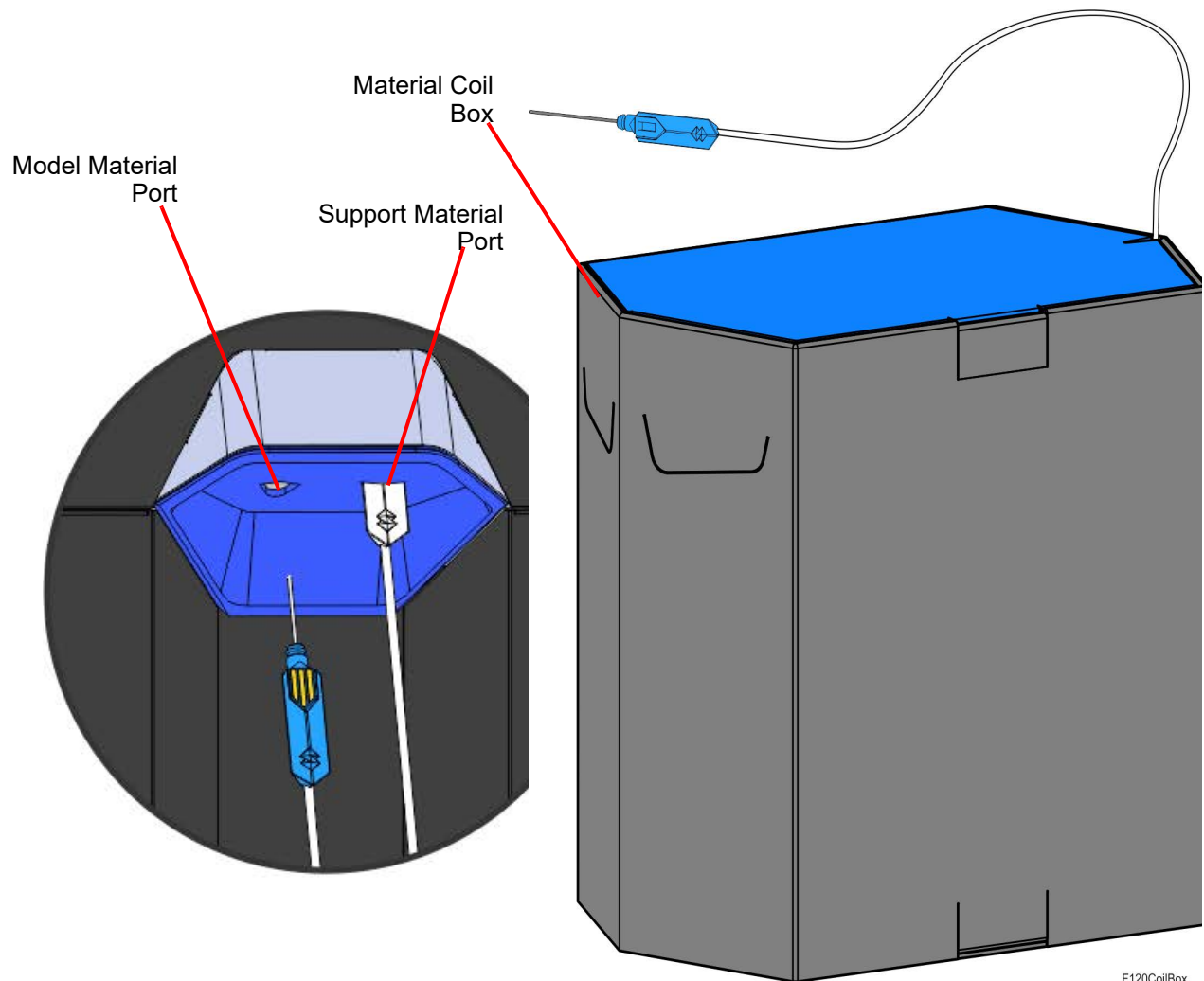


## Material Coil Box

The F770 printer uses a material coil box (Figure 10) to supply both model and support material to the printer. The material coil box is external to the F770 printer and must be manually loaded to one of the printer filament ports (Figure 10). Each material coil box has a filament key which interfaces with the system at the filament port. Within each filament port is a

filament key reader chip which interfaces with the filament key to communicate each material coil box's material type and the quantity of material within the box. The F770 require two material coil boxes: one for model material and one for support material.

Figure 10: Material Coil Box and Material Port



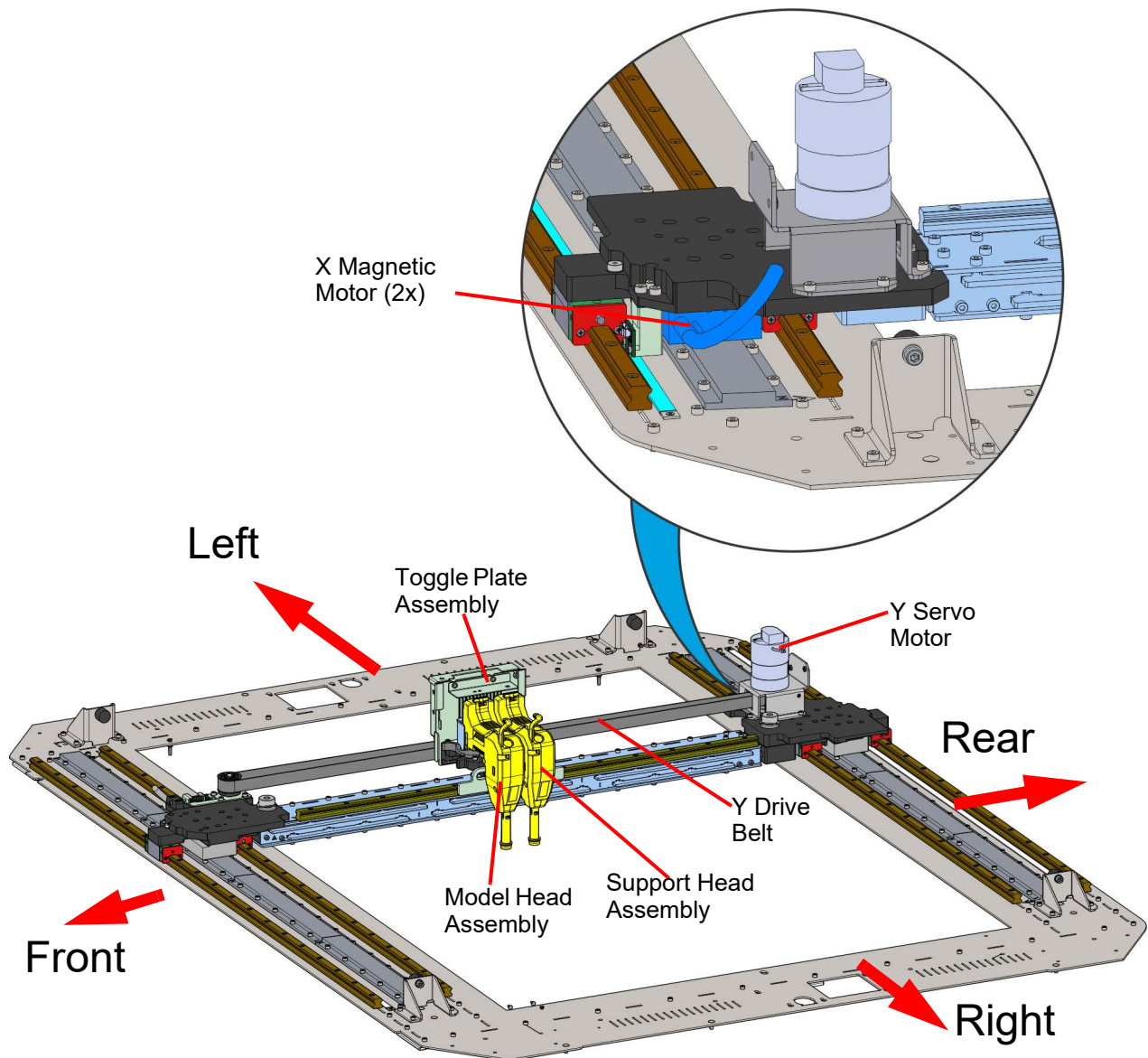
## Gantry

To access the gantry or the heads, you must first open the side access cover. The side access cover utilizes a mechanical locking mechanism. The top cover remains locked while the printer is building and automatically unlocks in tandem with the oven door. The printer cannot resume building if the side access cover and/or oven door are open.



The gantry moves the head in the X and Y directions when building a part. The gantry assembly is located under the top cover. The entire gantry is outside of the oven; only the bottom of the head protrudes into the oven. The gantry and its drive motors are thermally shielded from the oven via flexible heat shields (oven bellows). Two directly-coupled, X-linear motors and one Y servo motor, which is attached to a timing belts.

Figure 11: Gantry Assembly

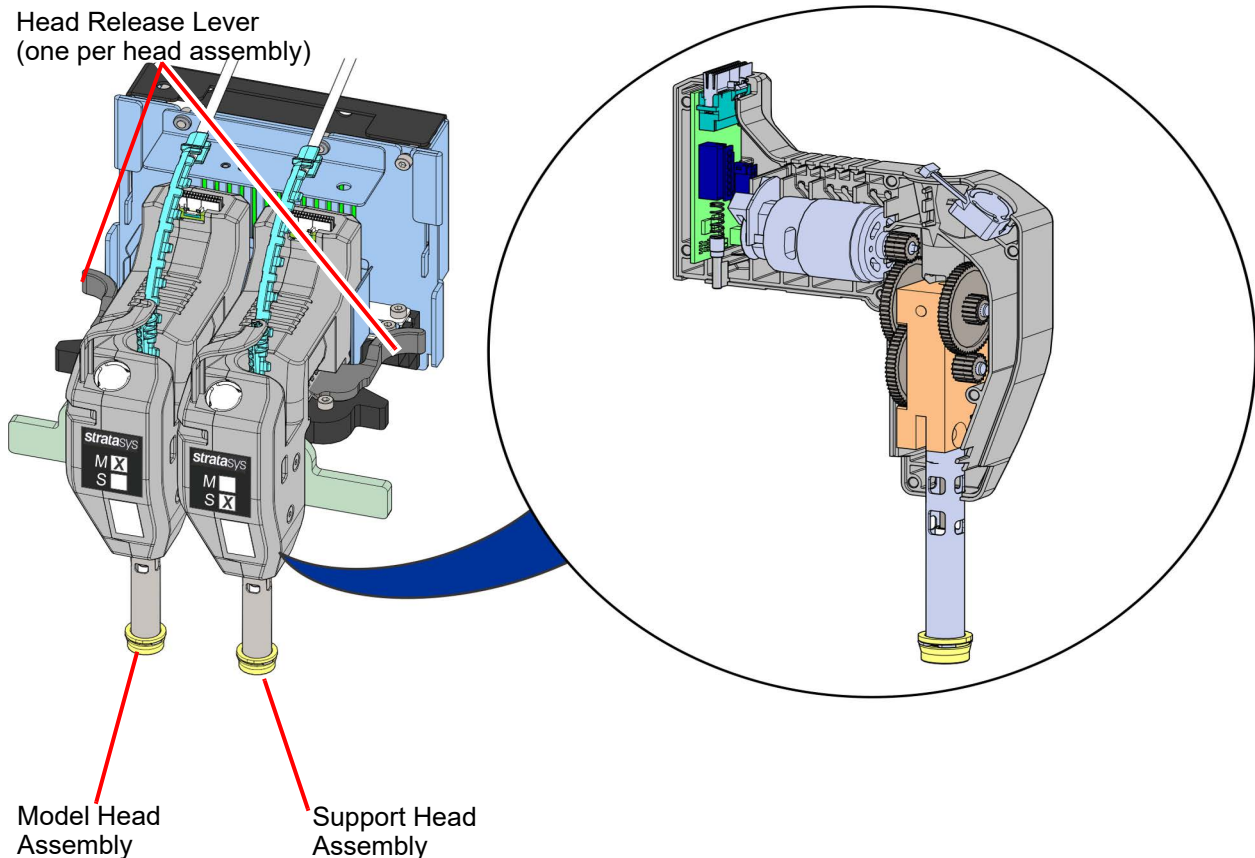


## Print Heads

The F770 printer utilizes one print head assembly for model and support material. The model and support heads are black. Once a head has been used for model or support, it can only be used for that designated material (model or support) thereafter. The heads extrude model material and support material with two identical liquefiers. A single blower fan, mounted above the tip liquefier entrances, cools the incoming material at the liquefier entrances.

Head life is directly related to the amount of build time for the head. Heads are a replaceable consumable item and should be changed once the head's odometer reaches 1500 build hours (see [“Viewing Head Details”](#) (page 69) for information on head odometers). You will receive a warning when the head's odometer reaches 1350 build hours, reminding you to order a replacement head as the head is nearing its odometer limit. You can continue using a head which has exceeded its odometer limit, but it is highly recommended that you change the head as part quality will be unpredictable. The corresponding Head Status Icon will be displayed in its warning state on the User Interface (see [Table 6](#) (page 67) for icon states). The entire model or support head assembly is replaced as a single unit (see [“Head Replacement”](#) (page 130) for instructions). The Head Release Lever locks and unlocks the associated head into or out of its seated position.

Figure 12: Head Assemblies





# Modeling Materials

## Materials Used

The F770 printer can use ABS and ASA modeling materials. SR-30 Soluble Release support material is used in conjunction with all model materials.

Table 1 (page 42) lists the material types available for use with each printer model.

Table 2 (page 42) lists color availability by model material type.

Table 1: Available Materials

Printer Model	Available Materials
F770	ABS and ASA

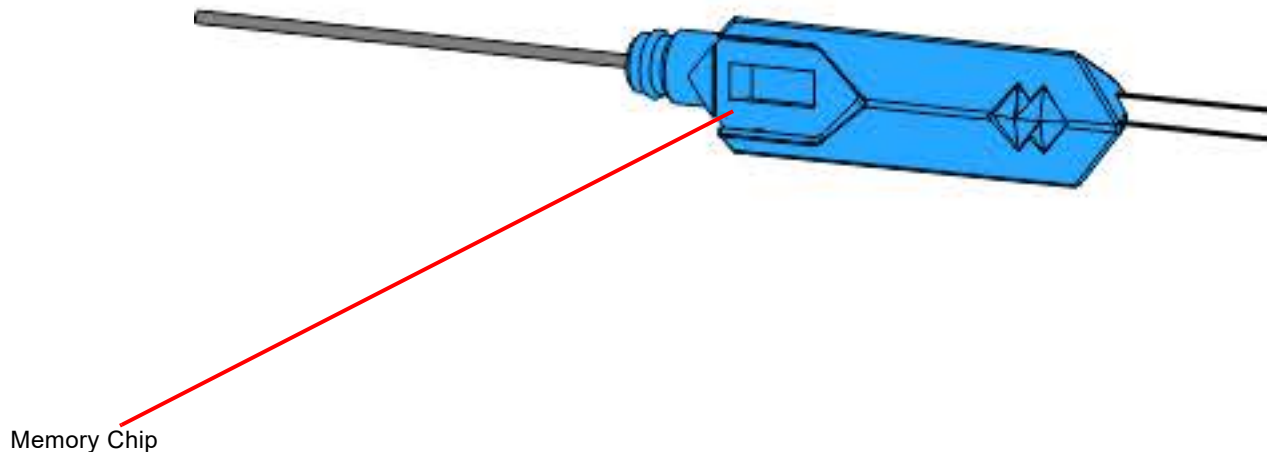
Table 2: Color Options

Material Type	Solid Color Options
ASA	Ivory, Black, White, Light Gray, Red, Blue, and Yellow
ABS	Black

## Material Coil Box Memory Chip

Each material coil box has a memory chip; this memory chip recognizes the box's material type and tracks the box's volume. The F770 printer utilizes a different memory chip than other Stratasys materials and as a result, only F770 printer compatible material coil boxes can be used to build parts on the printer.

Figure 13: Material Coil Box Memory Chip Location



When a material coil box is connected, its memory chip is read and the box's information is reported to the printer. The material coil box's material type and volume are displayed within the Materials page of the User Interface (see [“Working with the Materials Page”](#) (page 66) for more information). If a non-compatible material coil box is connected, an error will be displayed on the User Interface.

Each build file contains an estimate of the amount of model and support material required to complete the build. When initiating a build, this estimate is compared to the amount of material available on each material coil box. If there is not enough material available to complete the build, you will be warned and given the option to change material coil boxes before starting the build.



A specific prompt will only be displayed if a material coil box volume related issue is detected. See [“Warnings and Errors”](#) (page 244) for details.

## Tips, Slice Height, and Build Sheets

The F770 printer utilizes a T14 tip for all model and support materials. Tips are a component of the associated head assembly and cannot be changed individually. Instead, the entire head assembly is replaced as a single unit.

Table 3 lists the types of model material available for use with the printer, their corresponding support material, and their corresponding build sheets.

Table 4 lists available slice heights.

Table 3: Available Material Types

Model Material	Support Material	Build Sheet
ASA	SR30	Standard
ABS	SR30	Standard

Table 4: Slice Height

Model Tip	Slice Height (in)	Slice Height (mm)	Material
T14	0.007	0.178	ABS, ASA
	0.010	0.254	ABS, ASA
	0.013	0.330	ABS, ASA

# Software

## Controller Software

Controller Software is installed during the manufacturing process, and can be updated as new versions become available (see “[Updating Controller Software](#)” (page 178) for instructions). Controller Software is the software used to control the printer.

## GrabCAD Print Software

The printer builds parts by processing an original CAD or STL file into a Stratasys CMB file which is then downloaded to the printer. GrabCAD Print is the software used to process files and then transfer them to the printer to be built. As part of the initial installation and setup process, you must download and install GrabCAD Print software. You must download this software before you will be able to build a part on the printer. To download GrabCAD Print navigate to <http://help.grabcad.com/article/197-sign-up-download-and-install> and follow the on-screen steps.

Jobs are sent to the printer in CMB format and placed into the Job Queue (see “[Working with the Queue Page](#)” (page 58) for information on the Job Queue.) The header of the CMB file contains the processed job’s basic information.

The GrabCAD Print Help documentation includes detailed information on how to connect to your printer, process parts, edit the Job Queue, etc. The Help file can be accessed from either the application’s Help Menu or directly from the GrabCAD website.

## Insight Software

Insight is a software application used for processing STL files. Insight provides the user with the ability to utilize advanced features and manipulate numerous parameters within the file. For most applications, GrabCAD Print software will provide sufficient capabilities. Insight can be used as a standalone software, or launched as an App within GrabCAD Print. However, in some cases, the advanced capabilities of Insight may be required.

When using Insight with the F770 printer, use the following process:

1. Open and process the STL file.



Insight will only process STL files.

2. When completed, save the CMB file to a known location.
3. In GrabCAD Print, navigate to **File > Import File** and select the CMB file you wish to import.
4. Continue with normal work flow using GrabCAD Print.

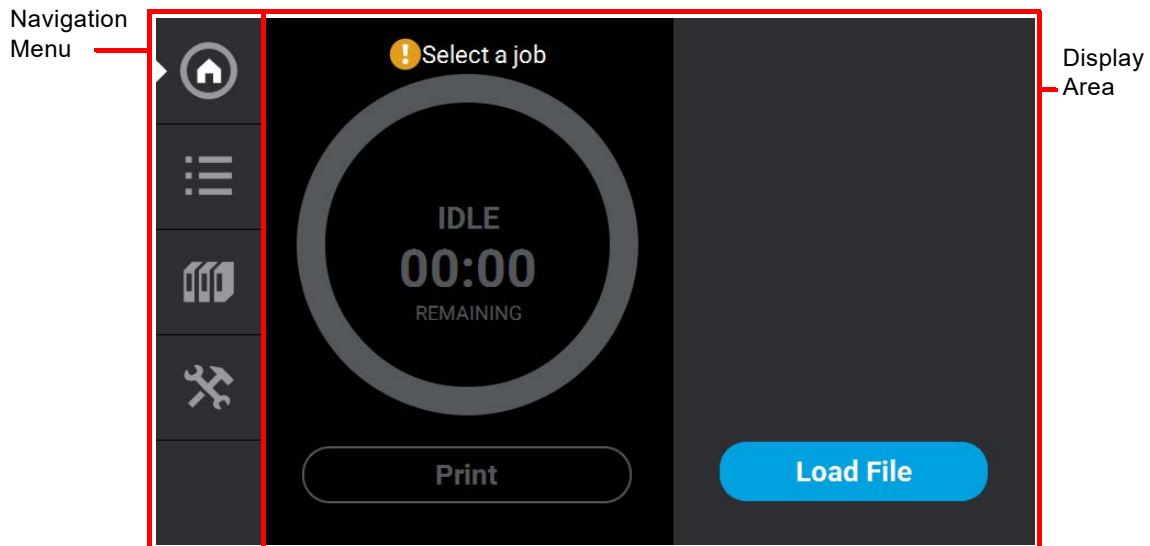
# 4 USER INTERFACE

This chapter provides an overview of the F770 printer User Interface (UI). Specific printer operation information and procedures can be found in [Chapter , 5 Operating the Printer](#) (page 114). You must power ON the printer prior to using the touchscreen (see “Powering ON the Printer” (page 114) for instructions).

## Overview

The User Interface is composed of a touchscreen located on the front right face of the printer (see [Figure 1](#) (page 30)). Each page of the UI is composed of two main areas of functionality; these items are highlighted in [Figure 1](#).

Figure 1: User Interface Overview



The touchscreen is designed to reduce glare; therefore, it is best to view the touchscreen when standing in front of the printer with the screen to your right. Viewing the touchscreen from any other angle may inhibit a clear view of the screen's display. The touchscreen is easy to use and allows you to:

- Access material load, unload, and calibration functions.
- Monitor printer status.
- Monitor material/head statuses (types loaded/installed, material volumes, head odometers, etc.) and change materials and/or heads when necessary.
- Monitor build progress (name of job being built, materials usage information, estimated completion time, etc.).
- Access network configuration information and change printer defaults.
- Access the Job Queue and Sample Queue (internal storage).

## Navigation Menu

The Navigation Menu provides one-touch access to the Build, Queue, Materials, and Tools functions of the printer (see [Figure 1](#) for details). The User Interface is broken up into several pages of related functionality. Selecting a button from the Navigation Menu will open the button's corresponding page, allowing you to perform tasks within that page. If a page contains sub-pages, additional buttons corresponding to these items will be displayed within the page's Display Area.

The buttons in the Navigation Menu are mutually exclusive, meaning only one button may be selected at a time. In some cases, a notification badge will be displayed within the button indicating a warning related to the functionality of the corresponding page. Buttons can appear as follows:



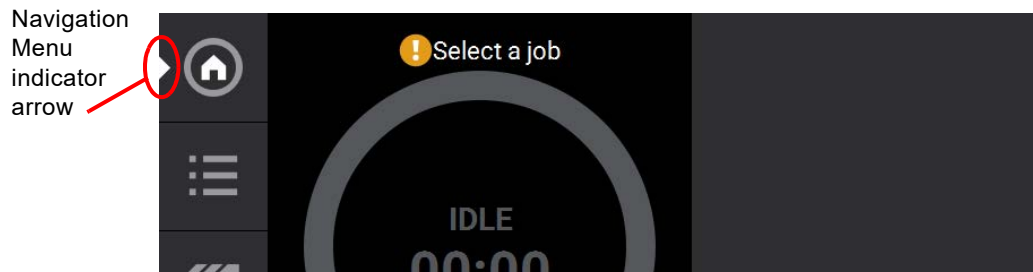
The bottom-most button in the Navigation Menu is non-functional.

Table 1: Navigation Menu - Button States

Button Name	Selected State	Unselected State	Warning State		Error State	
Build Button			 Unselected	 Selected	 Unselected	 Selected
Queue Button			N/A	N/A	N/A	N/A
Materials Button			 Unselected	 Selected	N/A	N/A
Tools Button			N/A	N/A	N/A	N/A

After selecting a button from the Navigation Menu, a white indicator arrow is displayed along the left-center edge of the button. This arrow indicates which Navigation Menu item is currently selected, making it easy for you to recognize which page of the UI you are viewing.

Figure 2: User Interface Overview



## Display Area

The Display Area contains the body portion of each page of the User Interface; this is where you can select from available functions and view current status. After selecting a button from the Navigation Menu, the Display Area will refresh and the main page corresponding to the selected button will be displayed. The information and buttons/icons shown within the Display Area will vary depending on which main page of the UI was selected.

## Working with the Build Page

The Build page is composed of the three main areas of functionality that are necessary for building parts on the printer; these items are highlighted in [Figure 3](#). Within the Build page you can start, pause, and abort a job, view a build time estimate for the selected job, see status and estimated action points for a job in progress, and view a visual representation of the completed part. Please note that you must load a job file to the printer and select the file to be built before the job's details will be displayed within the Build page.

The Build page also contains the Notifications Display. Depending on the state of the printer a variety of notifications/warnings will be displayed within this area of the page. Touching the text on the screen will open a dialog indicating the reason(s) for the notification, and in some cases, steps to correct the notification (see [Figure 4](#)). Once all notifications have been corrected, press the **Close** button within the dialog to exit the dialog.

To access the Build page, press the **Build** button within the Navigation Menu; a screen similar to the one in Figure 3 will be displayed.

Figure 3: Build Page

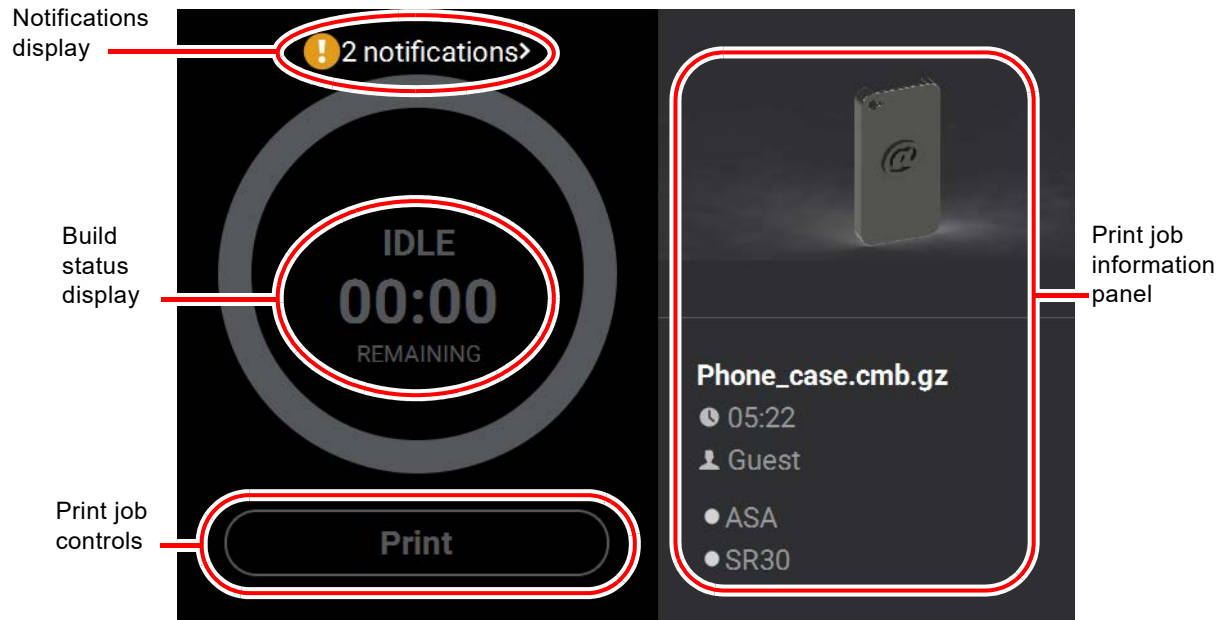
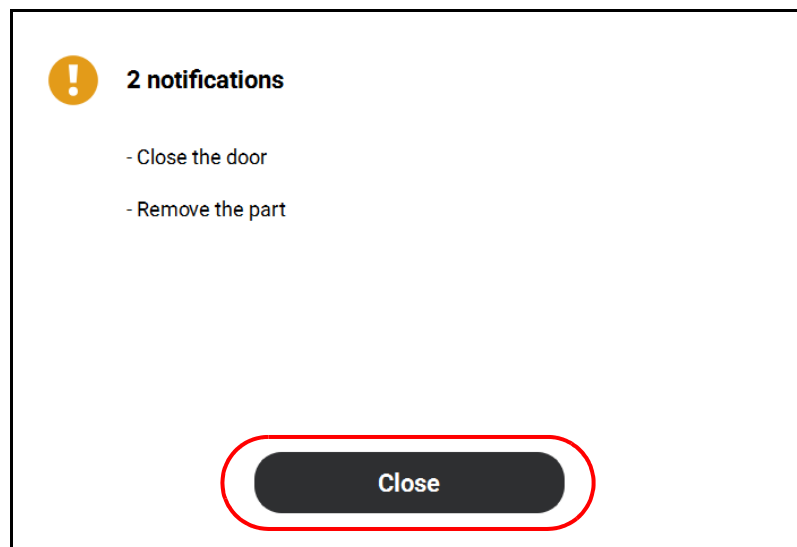


Figure 4: Notification Details





## Loading a File



A job file must be loaded onto the printer and selected for building before the job's details will be displayed within the *Build* page.

The Print Job Information Panel is empty upon initial startup and the *Build Status Display* reflects its idle state. When there are no job files available within the Job Queue, the *Load File* button will be displayed within the *Build* page. Visibility of this button is dependent upon the method used to load job files to the printer.

A job must be selected for building before the job's details will be displayed within the *Build* page. In order to build a job, you must first load the job's corresponding job file to the printer. Job files can be loaded via network transfer (Ethernet or Wi-Fi) using the GrabCAD Print application on your workstation PC or by plugging a USB flash drive into one of the printer's USB ports and navigating to the job file via the *Queue* page (see [“Adding a Job to the Job Queue” \(page 59\)](#) for details). The job file you wish to build must be the first item listed in the *Job Queue*. Job files can be sorted as needed within the *Queue* page allowing you to select the job you'd like to build (see [“Editing the Job Queue” \(page 62\)](#) for details).

- If you send a single job file to the printer via network transfer using GrabCAD Print, the job's details will automatically be displayed within the *Build Status Display* once the job file is received by the printer, as this job will be the only item in the Job Queue. The *Load File* button will be hidden from view once the job file is received by the printer via network transfer.
- If you send two or more job files to the printer via network transfer using GrabCAD Print, the job details of the first file sent will automatically be displayed within the *Build Status Display* once the job file is received by the printer, as jobs are built in the order they're sent to the printer. The *Load File* button will be hidden from view once the first job file is received by the printer via network transfer.
- If you do not send files to the printer using GrabCAD Print and instead plug a USB flash drive into one of the printer's USB ports, the *Load File* button will be visible within the *Build* page. You can use this button to select a single job file you'd like to build directly from the flash drive.



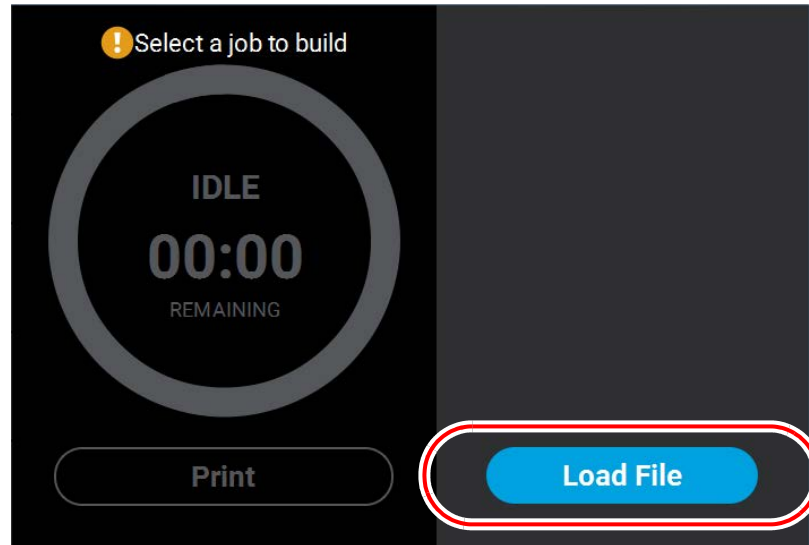
The Load File button within the Build page allows you to quickly select a single file to build off of a USB flash drive. The selected file will automatically be queued for building. If you'd like to populate the Job Queue with multiple job files, follow the instructions within [“Adding a Job to the Job Queue” \(page 59\)](#).

To load a file:

1. Plug a USB flash drive into one of the available USB ports on the front of the printer (see [Figure 3 \(page 32\)](#) for USB port locations).

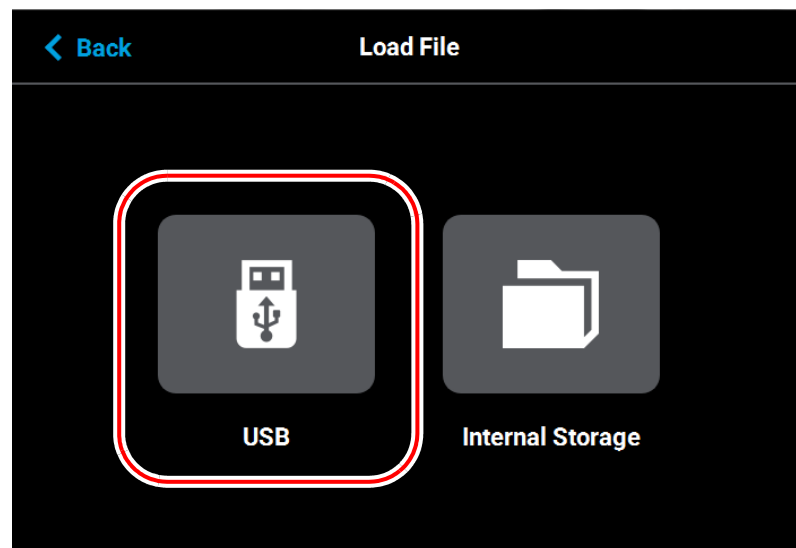
2. Press the *Load File* button within the *Build* page.

Figure 5: Load File Button



3. The *Load File* page will be displayed; press the *USB* button within this page.

Figure 6: Load File Page - USB Option



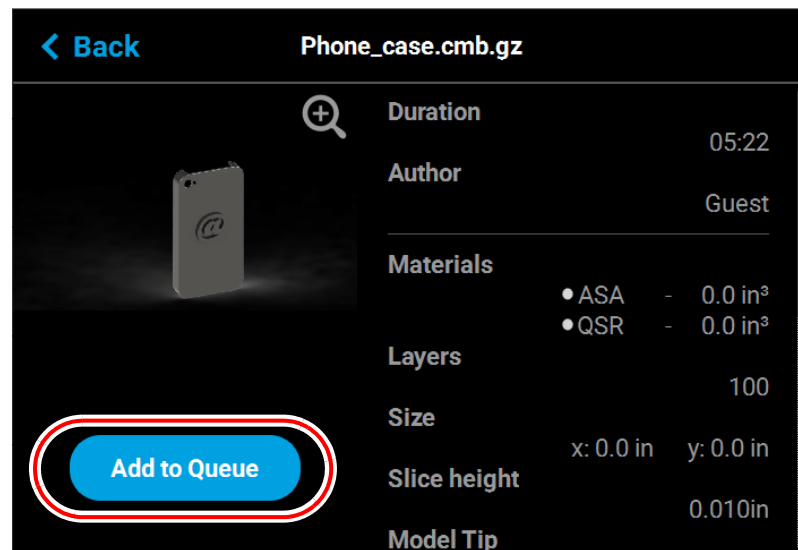
4. The *Load File* page will display the contents of the USB flash drive. Locate the desired job and select it by touching its row on the screen; doing so will open its *Job Details* page.



If both USB ports contain a flash drive individual folder graphics will be displayed on the screen representing each flash drive and its contents. Touching the folder graphic on the screen will drill down into the folder and display its contents. If a single flash drive is installed the job files located on the flash drive will be displayed in individual rows.

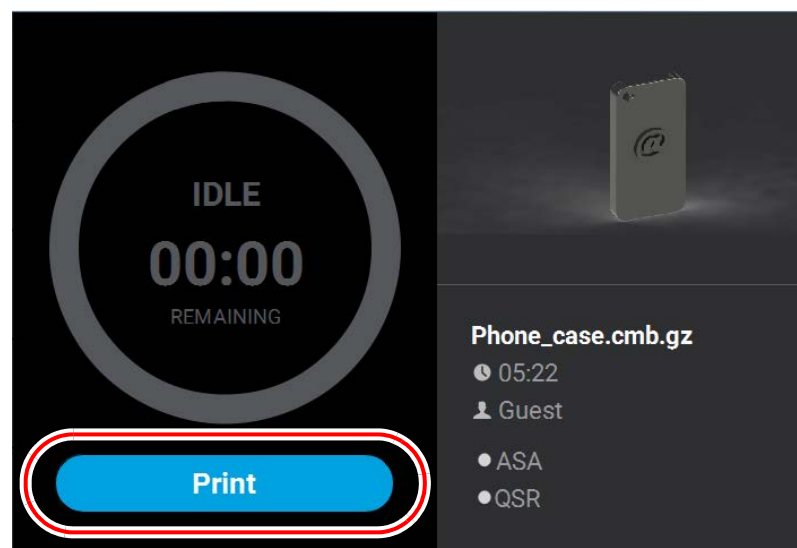
5. Within the Job Details page press the **Add to Queue** button; this will load the job into the Job Queue.

Figure 7: Add File to Queue



6. After pressing the *Add to Queue* button you will be returned to the *Build* page. The *Load File* button will no longer be visible. Instead, the details of the selected job file will be displayed within the Print Job Information Panel.
7. Pressing the *Print* button within the *Build* page will initiate the build. Build progress will be displayed within the Build Status Display, see “*Build Status Display*” (page 54) for details.

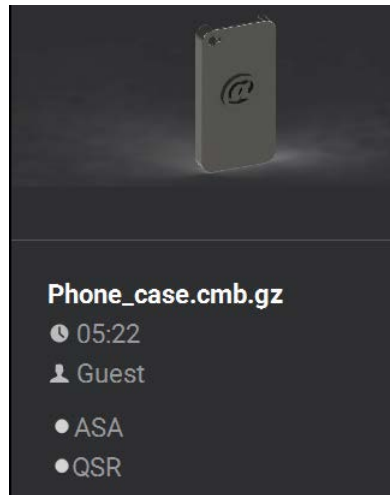
Figure 8: Build Page with Job Information



## Viewing Print Job Information

Information pertaining to a selected job is displayed within the right half of the *Build* page, within the Print Job Information Panel. This information is static and represents the details of the job file.

Figure 9: Print Job Information Panel



Information displayed within this panel is divided into the two sections:

The top-most section displays a visual representation of what the selected job will look like after it is successfully built.

The bottom-most section displays a variety of information pertaining to the selected job, including:

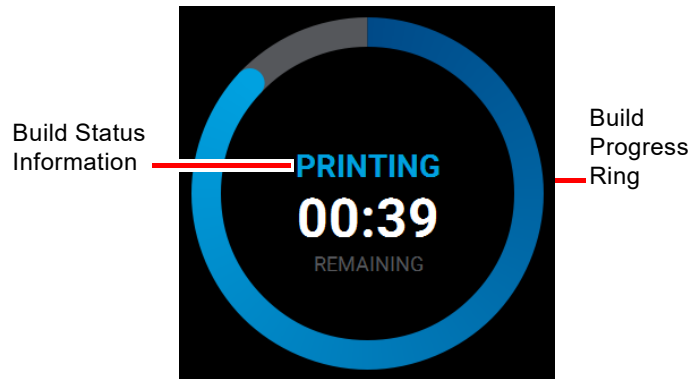
- Name of the job.
- Estimated build time for the job.
- Name of the user that submitted the job.
- Model and support materials associated with the job.

Touching anywhere within this portion of the screen will open a page displaying additional details pertaining to the selected job (see “[Viewing Job Details](#)” (page 63)).

## Build Status Display

The Build Status Display section of the Build page is composed of a two-part graphic. The center portion provides information on a selected and/or building job while the outer progress ring corresponds with the build information displayed; the information displayed will vary depending on the state of the printer.

Figure 10: Build Status Display Overview



### Idle

When the printer is idle, "IDLE" will be displayed within the center of the Build Status Display. This indicates that the printer is in a state where it is ready to start a build. No progress is indicated within the outer build progress ring and the time remaining is displayed as zero.

Figure 11: Build Status Display - Idle



## Building

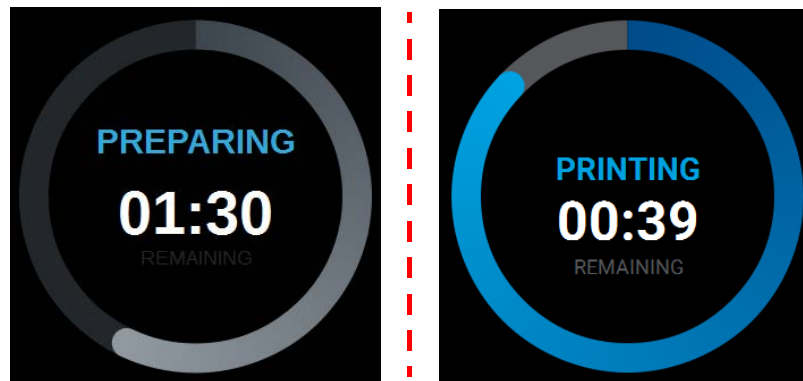


A job file must be loaded onto the printer and selected for building before build information will be displayed within the Build Status Display. See “Loading a File” (page 50) for details.

After pressing the **Print** button to start a build, "PREPARING" is briefly displayed within the Build Status Display, and the outer progress ring will fill, in gray, in a clockwise direction. This indicates the amount of time the printer requires to prepare for the start of the build, including the amount of time required for a Z Zero Calibration to occur (see “Z Zero Calibration” (page 176) for details).

Once build preparation is complete, "BUILDING" will be displayed within the center of the Build Status Display along with the amount of time remaining until the build is complete. As build progress is made, the amount of time remaining will get smaller until zero is reached, indicating that the build is complete. The build's percentage of completion is also displayed by radially filling in the outer progress ring, in blue, in a clockwise direction.

Figure 12: Build Status Display - Building

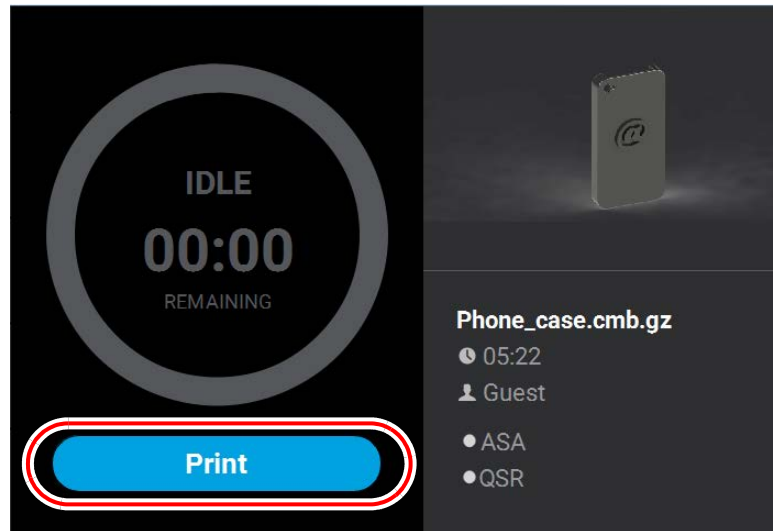


Touching the screen within the center of the Build Status Display while a part is being built will toggle the information displayed. After touching the screen the time estimation information will be hidden from view and instead the Build Status Display will show the number of completed layers as compared to the total number of layers in the build. Touching the screen again, will toggle back to the time estimation information displayed initially.

## Print Job Controls

A button is displayed within the Build page, just beneath the Build Status Display. This button is used to start, pause, or abort a build, depending on the status of the printer. The Print button option will become selectable after you've performed the steps necessary to load a file (see [“Loading a File” \(page 50\)](#)) and the printer is in a state where it is ready to build a part. This button will toggle to display the Pause and Abort button options when a build is in process.


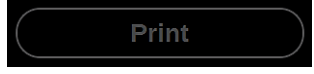
Figure 13: Print Job Controls



### Print Button

The Print button allows you to start a build (see [“Selecting a Job to Build” \(page 135\)](#) for more information). The Print button can appear in the following states:




Table 2: Print Job Controls - Print Button States

Button State	Description
	<ul style="list-style-type: none"> <li>Printer is in a buildable state AND a selected job is available to build.</li> <li>Selecting the Print button will begin the build.</li> </ul>
	<ul style="list-style-type: none"> <li>Print button is disabled and not selectable.</li> <li>Printer is not in a buildable state OR a job is not selected/available to build (i.e. queue is empty).</li> <li>To troubleshoot this issue, touch the text displayed on the screen within the Notifications Display. This will open a dialog allowing you to view the reason(s) for the current build state, including any issues impeding your ability to start a build (i.e. no build sheet, etc.). See <a href="#">“Warnings at Build Start” (page 245)</a> and <a href="#">“Errors Preventing a Build from Starting” (page 246)</a> for more information.</li> </ul>

## Pause Button

The Pause button allows you to pause an active build. The Pause button can appear in the following states:



Table 3: Print Job Controls - Pause Button States

Button State	Description
	<ul style="list-style-type: none"> <li>Printer is actively building. Selecting the Pause button in this state will pause the build.</li> <li>When the printer is paused, "PAUSED" is displayed within the Build Status Display.</li> </ul>
	<ul style="list-style-type: none"> <li>Pause button is disabled and not selectable.</li> <li>Printer is preparing for a build, there is no job currently building on the printer.</li> </ul>
	<ul style="list-style-type: none"> <li>Printer is paused. The Pause button toggles to display the Play button.</li> <li>Selecting the Play button will resume the build.</li> <li>If the build was automatically paused as the result of an error, a notification will be indicated on the screen. Touching the notification text displayed will provide additional details pertaining to the current build state. See <a href="#">"Build Warnings"</a> (page 137) and <a href="#">"Build Pause Warnings"</a> (page 250) for more information.</li> </ul>

## Abort Button

The Abort button allows you to abort an active build. The Abort button can appear in the following states:

Table 4: Print Job Controls - Abort Button States

Button State	Description
	<ul style="list-style-type: none"> <li>Printer is actively building.</li> <li>Pressing the Abort button in this state will initiate an abort of the build and will display a prompt asking you to acknowledge the abort. <ul style="list-style-type: none"> <li>If accepted, the build will be aborted.</li> <li>If canceled, the build will be unaffected (i.e. revert to its previous state).</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>Abort button is disabled and not selectable.</li> <li>There is no job currently building on the printer.</li> </ul>



# Working with the Queue Page

The Queue page contains the list of files (jobs) which have been downloaded to the printer and are queued for building; this list is referred to as the Job Queue. By default, jobs are added to the Job Queue in the order they were sent to the printer via GrabCAD Print and/or transferred from a USB flash drive. Individual jobs are listed in numbered rows with row one corresponding to the first job in the Job Queue. Each row displays the name of the job, estimated build time for the job, and name of the user that submitted the job. From the Queue page you can add files to the Job Queue, select a file to build, sort jobs within the Job Queue, view additional details associated with a selected job, and access the Sample Queue.

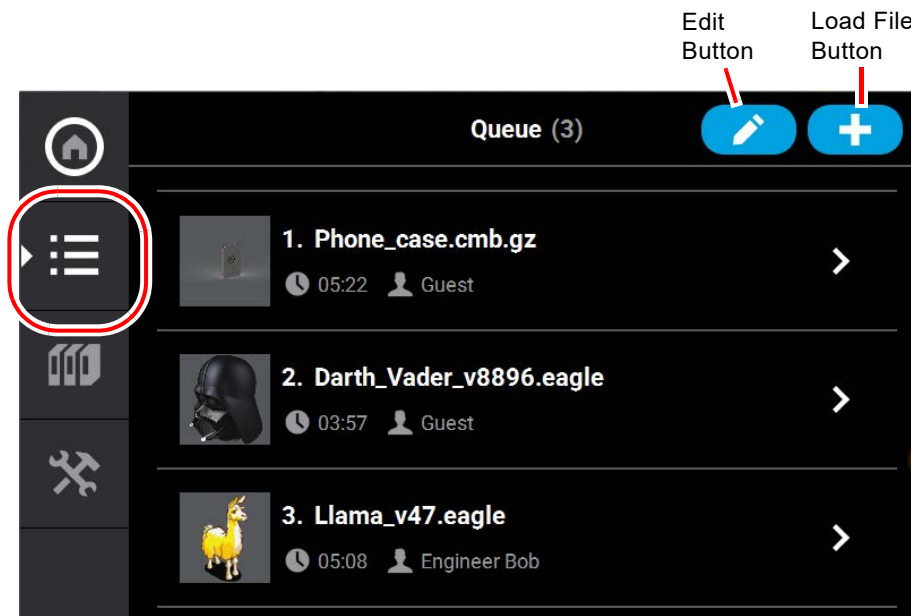
To access the Queue page, press the **Queue** button within the Navigation Menu; a screen similar to the one in

**Figure 14** will be displayed. Please note that the Job Queue is empty upon initial startup.

The heading of the Queue page lists the number of jobs currently loaded into the Job Queue. Up to three jobs are displayed within the Job Queue list at a given time. If the Job Queue contains more than three jobs, use the scrollbar (to the right of the Job Queue list) to scroll up or down through the list of available jobs.

Pressing the **Edit** button within the heading of the page will display the Job Queue Control buttons; these buttons allow you to sort and /or delete the jobs within the Job Queue as needed. Pressing the **Load File** button within the heading of the page will allow you to add additional files to the Job Queue. Touching one of the rows listed within the Job Queue will open that job's Job Details page; this page contains additional information pertaining to the selected job (material configuration, tip size, etc.). After selecting either of these buttons or opening a job's details page a "Back" button will be displayed within the heading of the page; press this button to return to the main Queue page.

Figure 14: Queue Page



## Adding a Job to the Job Queue

The Job Queue is empty by default. To populate the Job Queue you must first load individual job files to the Job Queue using one of two methods:

1. Network transfer via the GrabCAD Print application on your workstation PC. See [“GrabCAD Print Method” \(page 59\)](#) for detailed instructions. This is the preferred method for adding jobs to the Job Queue.
2. USB method via a USB flash drive inserted into one of the available USB ports on the front of the printer. See [“USB Method” \(page 59\)](#) for detailed instructions. This method can be used as a backup to the GrabCAD Print method if you are unable to transfer job files to the printer via your Ethernet connection (due to poor connectivity, a network outage, etc.) or Wi-Fi connection. This method also provides a convenient option for you to reprint a common job, as you can store the processed job file on the USB flash drive and access it repeatedly.

### GrabCAD Print Method

As part of the printer’s installation and setup process, you should have downloaded and installed the GrabCAD Print application onto your workstation PC (see [“GrabCAD Print Software” \(page 45\)](#) for details). GrabCAD Print is the software used to process job files and then transfer them to the printer (via your facility’s Ethernet connection or via Wi-Fi) to be built.

Jobs are sent to the printer in CMB format and are placed directly into the Job Queue. No additional steps are required to add a job to the Job Queue when sending job files directly to the printer via GrabCAD Print. After sending the job file to the printer navigate to the Queue page by pressing the **Queue** button within the Navigation Menu. The transferred job file will be displayed within the Job Queue list. Jobs will appear within the Job Queue in the order they’re sent to the printer from GrabCAD Print. To build a specific job, that job must be listed as the first item in the Job Queue. You can sort jobs within the Job Queue as needed to select the job you’d like to print (see [“Editing the Job Queue” \(page 62\)](#) for details).

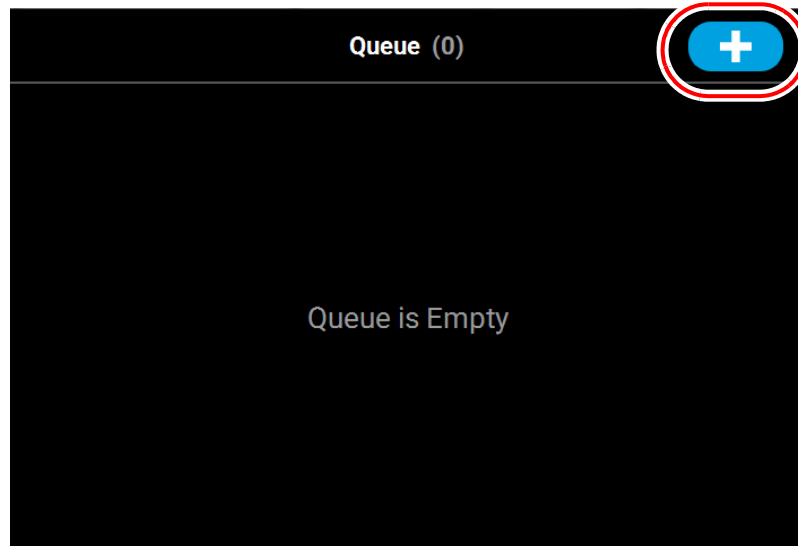
### USB Method

The printer features three USB ports. A USB flash drive can be inserted into any of these ports and job files contained on the flash drive can be added to the Job Queue. Please note that job files should be processed using GrabCAD Print or Insight before they are placed onto the flash drive and subsequently added to the Job Queue. Once the flash drive is plugged into one of the printer’s USB ports, you will need to perform the following steps to add the desired job file to the Job Queue:

1. Plug a USB flash drive into one of the available USB ports on the printer (see [Figure 3 \(page 32\)](#) for USB port locations).
2. Navigate to the Queue page by pressing the **Queue** button within the Navigation Menu.

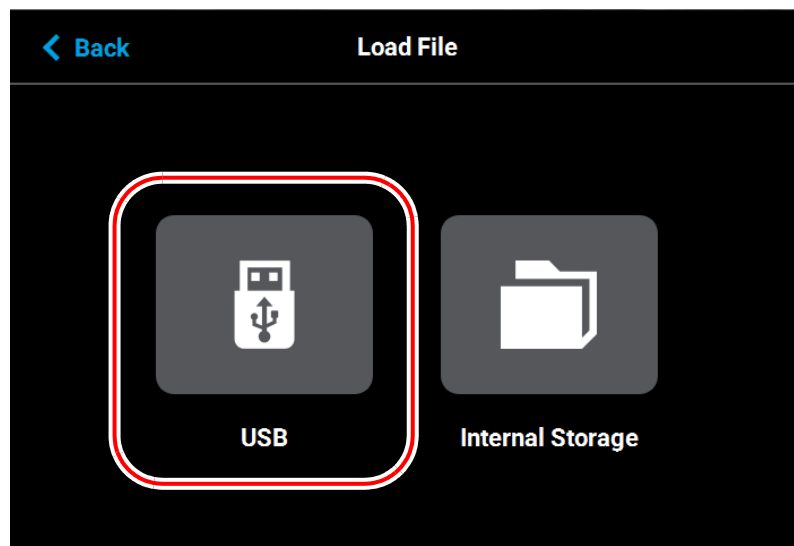
3. Press the **Load File** button in the upper-right corner of the touchscreen.

Figure 15: Load File Button Location



4. The Load File page will be displayed; press the **USB** button within this page.

Figure 16: Load File Page - USB Option

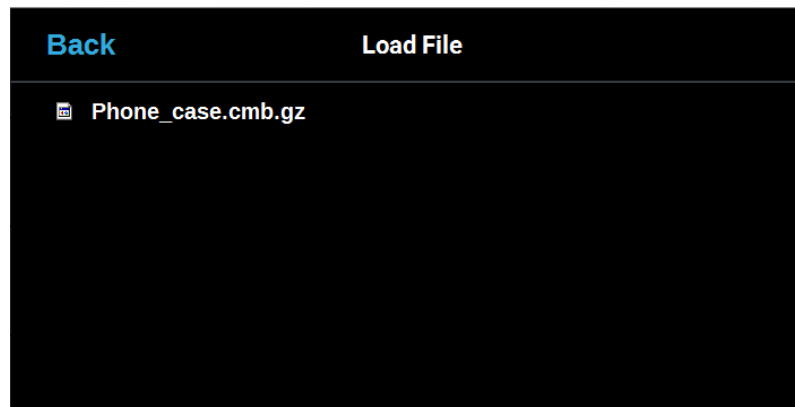


- The Load File page will display the contents of the USB flash drive. Locate the desired job and select it by touching its row on the screen; doing so will open its Job Details page.



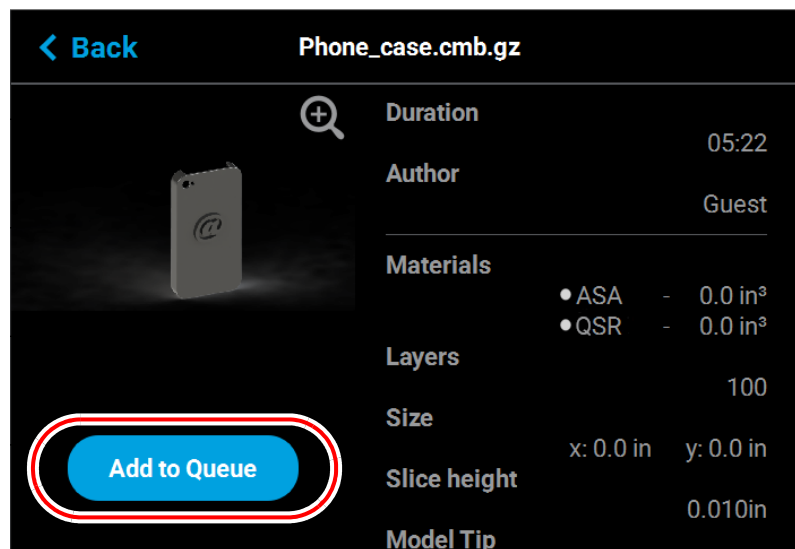
If any USB port contain a flash drive, individual folder graphics will be displayed on the screen representing each flash drive and its contents. Touching the folder graphic on the screen will drill down into the folder and display its contents. If a single flash drive is installed the job file(s) located on the flash drive will be displayed in individual rows.

Figure 17: Select File to Load



- Within the Job Details page press the **Add to Queue** button; this will load the job into the Job Queue.

Figure 18: Add File to Queue



7. The file will load into the Job Queue. Once loading is complete the file will be added to the Job Queue list.

Figure 19: File Loading to Job Queue

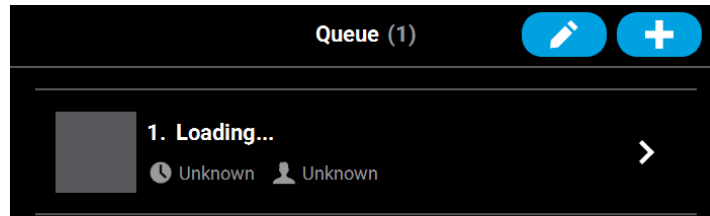
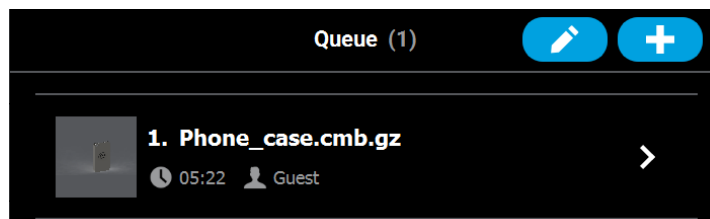


Figure 20: File In Job Queue

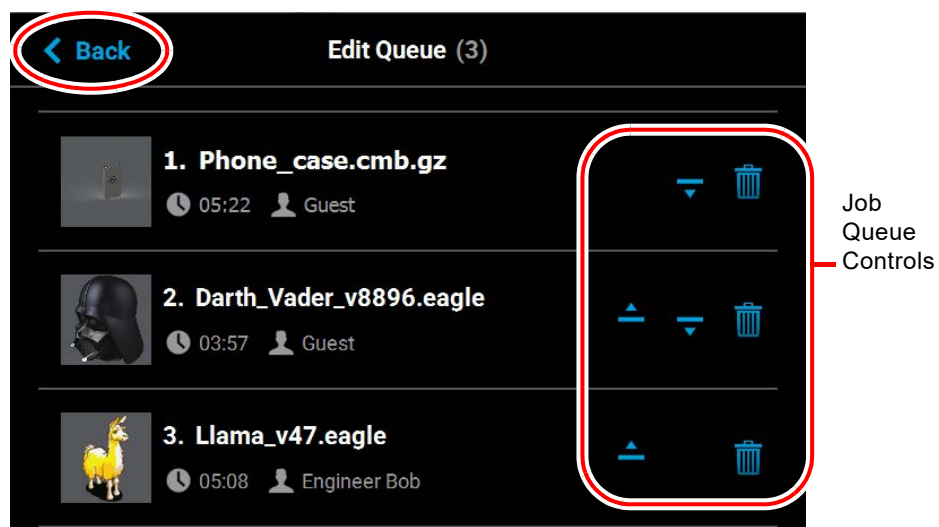


## Editing the Job Queue

By default, jobs are built in the order in which they appear within the Job Queue. To build a specific job, that job must be listed as the first item in the Job Queue. Pressing the **Edit** button within the Queue page will open the Edit Queue page. Using the Job Queue Control buttons found within this page you can sort and /or delete the jobs within the Job Queue as needed, to ensure the job you wish to build is the first item listed within the Job Queue.

Pressing the **Back** button will allow you to exit the Edit Queue page and return to the main Queue page.






Figure 21: Edit Queue Page



## Job Queue Controls

After opening the Edit Queue page three Job Queue Control buttons will be displayed within each row of the Job Queue list (one set of buttons per entry in the list). These buttons will allow you to rearrange the jobs in the Job Queue as needed. These buttons have the following functionality:

Table 5: Job Queue Control Buttons

Name	Button States		Description
Move Up		Selectable	<ul style="list-style-type: none"> <li>When selectable, moves the selected job up one position in the job Queue list.</li> </ul>
		Disabled	<ul style="list-style-type: none"> <li>To move a job to the top of the Job Queue list, press this button repeatedly until the job appears at the top of the list.</li> <li>There is not an option to move a job directly to the top of the list.</li> </ul>
Move Down		Selectable	<ul style="list-style-type: none"> <li>When selectable, moves the selected job down one position in the Job Queue list.</li> </ul>
		Disabled	<ul style="list-style-type: none"> <li>To move a job to the bottom of the Job Queue list, press this button repeatedly until the file appears at the bottom of the list.</li> <li>There is not an option to move a job directly to the bottom of the list.</li> </ul>
Delete		Selectable	<ul style="list-style-type: none"> <li>Removes the selected job from the Job Queue list.</li> <li>You will not be asked to confirm this action prior to the job being deleted from the Job Queue.</li> </ul>

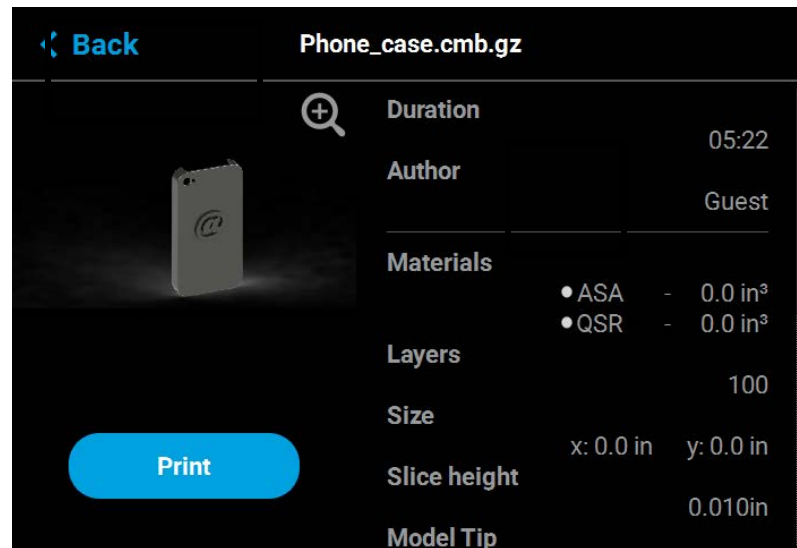
## Viewing Job Details

To view additional details regarding a particular job in the Job Queue, select the desired job by touching its row on the screen. Doing so will open its Job Details page; this page displays the following:


- Duration: amount of time required to complete the build.
- Author: name of the user that submitted the job.
- Materials: model and support materials associated with the job.
- Layers: number of layers in the job.
- Slice height: slice height associated with the job.
- Version: Insight version that the part was compiled with.

Use the scrollbar (along the right side of the page) to scroll up or down within the page. To close this page and return to the main Queue page, press the **Back** button within the header of the page.

Figure 22: View Job Details



The left portion of the Job Details page displays a visual representation of what the part will look like once the build is complete.

Pressing the **Zoom In** button  within the upper-right corner of this portion of the page will hide the job details information and instead zoom in on the representation of the completed part (as shown in Figure 23).

Press the **Zoom Out** button in the upper-right corner of the expanded view display to close the expanded view and return to the Job Details page.

Figure 23: View Job Details - Expanded View

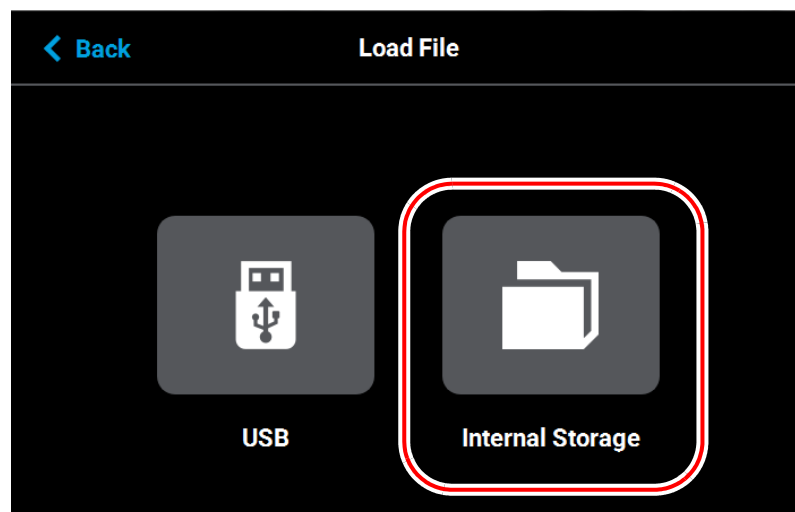


## About the Sample Queue

The printer comes with several sample job files permanently installed on its hard drive. These files are accessible via the Sample Queue. This queue is composed of a few sample part files as well as a variety of other files that are helpful for testing the printer. The majority of the files within the Sample Queue will be utilized only by authorized service representatives when performing maintenance on the printer. To access the Sample Queue:

1. Navigate to the Queue page by pressing the **Queue** button within the Navigation Menu.
2. Press the **Load File** button in the upper-right corner of the touchscreen (see [Figure 15 \(page 60\)](#) for button location).
3. The Load File page will be displayed; press the **Internal Storage** button within this page. The list of sample jobs contained within the Sample Queue will be displayed.

Figure 24: Load File Page - Internal Storage Option



Overall, the functionality of the Sample Queue is the same as that of the Job Queue:

- Additional details for a job can be viewed by opening its Job Details page.
- Within the Job Details page you can view the specifics of the job including build time, author, material requirements, number of layers, slice height, and Insight version that the job was compiled with.
- Pressing the Zoom In button within the page will provide a detailed view of what the job will look like once it has been successfully built. Pressing the Zoom Out button will close this view and return you to the Job Details page.
- Pressing the Print button within the Job Details page will select the job for building.

However, the following functionality differences exist for the Sample Queue:

- “[Job Queue Controls](#)” ([page 63](#)) are disabled for the Sample Queue, and therefore these job files cannot be deleted.
- Jobs in the Sample Queue cannot be sorted (as described in “[Editing the Job Queue](#)” ([page 62](#))).

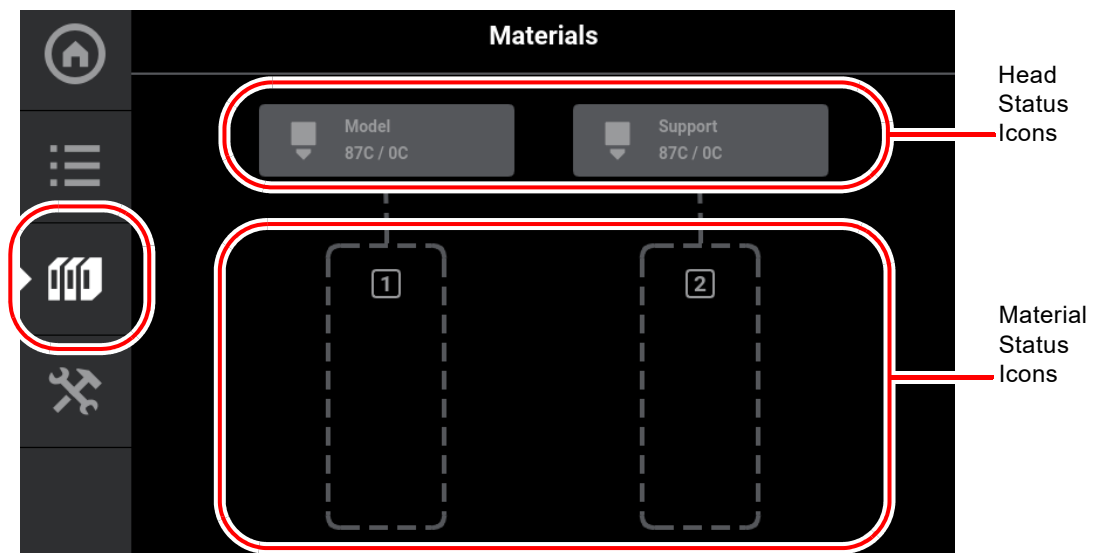


# Working with the Materials Page

The Materials page displays a detailed representation of the printer's current materials configuration. Within this page you can view the printer's current materials configuration including material types and colors, view material coil box volumes and load statuses, load and unload materials, view current and set point head temperatures, and perform a variety of head related maintenance functions.

To access the Materials page, press the **Materials** button within the Navigation Menu; a screen similar to the one in Figure 25 will be displayed.

Figure 25: Materials Page



Two “[Head Status Icons](#)” are displayed within the upper portion of the Display Area. These icons display load status information as well as the current temperature as compared to the set point temperature of each of the printer's heads (temperatures are predetermined and based on material type loaded to the head). The right-most icon pertains to the printer's support head while the left-most icon pertains to the printer's model head. Touching one of these icons on the screen will open that head's Head Details page; this page contains additional information pertaining to the selected head as well as a button for initiating a variety of head maintenance functions. Icons will be solid gray or solid blue depending on their status.

Two “[Material Status Icons](#)” are displayed within the lower portion of the Display Area. These icons represent the model and support materials loaded/installed within the printer. The right-most icon indicate the status of the printer's support material while the left-most icon indicate the status of the printer's model material. These icons will take on a variety of colors and highlighted states depending on their status. Material coil boxes whose material is loaded to the head, are indicated by a blue border. Touching one of these icons on the screen will open that material's Material Details page; this page contains additional information pertaining to the selected material as well as buttons for performing a material load or unload.

After selecting any icons or opening a details page a "Back" button will be displayed within the heading of the page; press this button to return to the main Materials page.

## Head Status Icons

The two Head Status Icons within the Materials page display load status information as well as the current temperature as compared to the set point temperature of each of the printer's heads. The right-most icon pertains to the printer's support head while the left-most icon pertains to the printer's model head. Touching one of these icons on the screen, unless otherwise indicated in [Table 6](#), will open that head's Head Details page. Various graphics will be displayed within the left portion of the Head Status Icons, depending on the state of the head. The Head Status Icons can appear in the following states (color usage, highlighting, and descriptions apply to both icons):

Table 6: Head Status Icons - Icon States



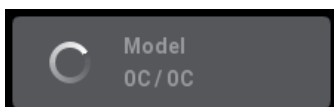
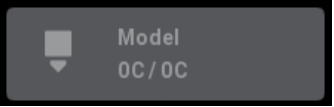
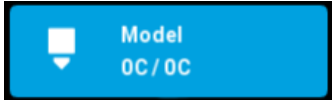
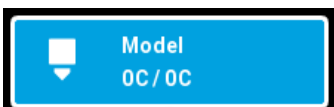
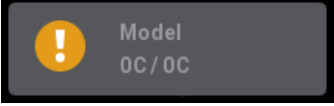

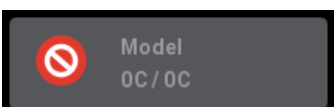

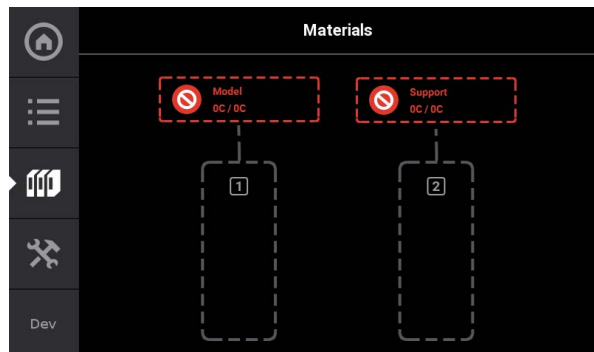
Icon State	Description
 Empty (gray dashed border)	<ul style="list-style-type: none"> <li>Indicates that the associated head is not installed.</li> <li>User action required to install head. See <a href="#">“Head Replacement”</a> (page 130) for instructions.</li> <li>Touching the icon in this state will not display the head's Head Details page.</li> </ul>
 Invalid (red dashed border)	<ul style="list-style-type: none"> <li>Indicates that the associated head is invalid.</li> <li>User action required to replace head with a valid head. See <a href="#">“Head Replacement”</a> (page 130) for instructions.</li> <li>Touching the icon in this state will not display the head's Head Details page.</li> </ul>
 Initializing	<ul style="list-style-type: none"> <li>Indicates that the printer is initializing the head. This state will be displayed until the initialization process is complete following installation of a new head.</li> <li>Touching the icon in this state will not display the head's Head Details page.</li> </ul>
 Unloaded (solid gray)	<ul style="list-style-type: none"> <li>Indicates that material is not loaded to the head.</li> <li>User action required to load material. See <a href="#">“Loading Material”</a> (page 116) for instructions.</li> </ul>
 Loaded (solid blue)	<ul style="list-style-type: none"> <li>Indicates that material is loaded to the head.</li> <li>If a build has been initiated, the current temperature will increase until it reaches the set point temperature for the loaded material. Once temperature is reached, the tip will purge a small amount of material and the printer will begin building.</li> </ul>
 Active (solid blue with white border)	<ul style="list-style-type: none"> <li>Indicates that the head is actively performing a task other than building.</li> <li>This state will be displayed whenever the head is purging or material is being unloaded from the head.</li> </ul>

Table 6: Head Status Icons - Icon States (Continued)

Icon State	Description
 Warning (head unloaded)	<ul style="list-style-type: none"> <li>Yellow coloring and an associated notification badge indicates a head related warning (see “<a href="#">Head Warnings</a>” (page 255)).</li> <li>Additional information regarding the warning and possible correction information is displayed by opening the associated head’s Head Details page (see “<a href="#">Viewing Head Details</a>” (page 69)).</li> <li>When the head’s odometer reaches 1350 build hours a warning will be displayed reminding you to order a replacement head as the head is approaching its odometer limit.</li> </ul>
 Warning (head loaded)	
 Error (head unloaded)	<ul style="list-style-type: none"> <li>Red coloring and an associated notification badge indicates a head related error (see “<a href="#">Head Errors</a>” (page 255)).</li> <li>Additional information regarding the error and possible correction information is displayed by opening the associated head’s Head Details page (see “<a href="#">Viewing Head Details</a>” (page 69)).</li> <li>When the head’s odometer reaches 1500 build hours an error will be displayed. The printer is still able to build with this head, but you will be reminded before starting each build that the head’s odometer limit has been reached and part quality may be negatively affected. User action is required to replace head. See “<a href="#">Head Replacement</a>” (page 130) for instructions.</li> <li>If the associated head is incompatible with the location where it is installed (i.e. if the model head is installed in the support head location), an error will be displayed. After clicking on the error icon, a message will display with instructions to replace whichever head (model or support) was incorrectly installed.</li> </ul>
 Error (head loaded)	



## Viewing Head Details

To view additional details regarding the printer's model or support head, select the desired head by touching its Head Status Icon on the screen. Doing so will open its Head Details page. If the head is in a warning or error state additional information pertaining to the warning/error will be displayed within the page (see ["Head Warnings"](#) (page 255) and ["Head Errors"](#) (page 255) for details).

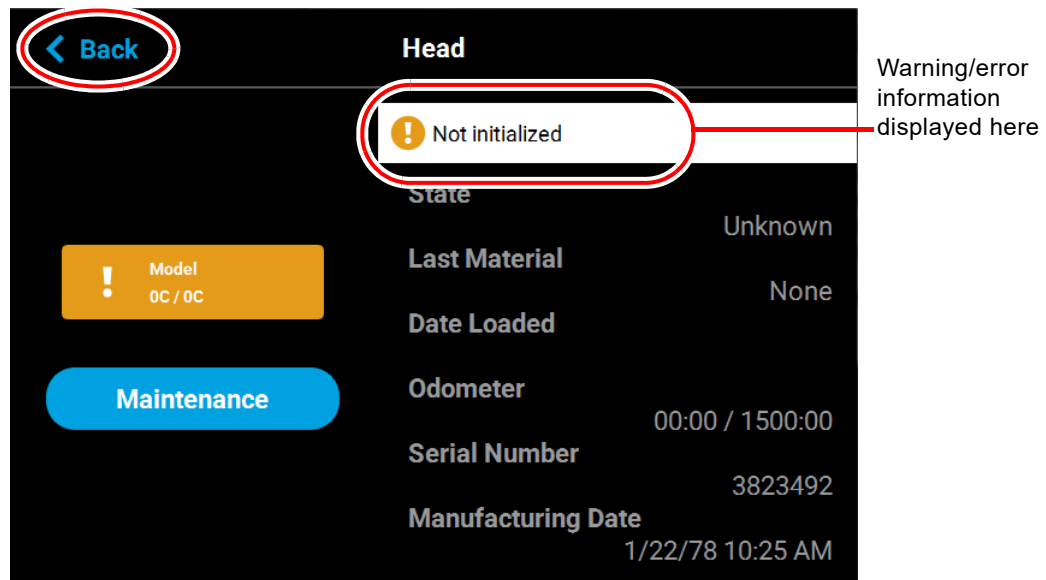
The right portion of the screen displays status information pertaining to the selected head:

- **State:** displays the load status of the corresponding head.
- **Last Material:** displays the type of material last loaded to the head.
- **Date Loaded:** displays the date that material was last loaded to the head.
- **Odometer:** displays the amount of build time for the selected head. This value is important as the printer will display different errors depending on the amount of build time for a head.
  - When a head's odometer reaches 1350 build hours the Head Status Icon will be displayed in its warning state, and you will be prompted to order a replacement head.
  - When a head's odometer reaches the 1500 build hours odometer limit, the Head Status Icon will be displayed in its error state, and you will be prompted to replace the head. You can continue to build using the head, but part quality will be unpredictable. It is recommended that you immediately change a head which has exceeded its odometer limit (see ["Head Replacement"](#) (page 130) for instructions).
- **Serial Number:** displays the head's unique serial number.
- **Manufacturing Date:** displays the date that the head was manufactured.

The left portion of the screen displays the same Head Status Icon as is displayed on the Materials page (see [Figure 25 \(page 66\)](#)). This icon displays the current temperature as compared to the set point temperature of the head. The Maintenance button directly below the Head Status Icon will display a menu allowing you to perform a variety of head maintenance functions.

To close this page and return to the main Materials page, press the **Back** button within the header of the page.

Figure 26: Head Details Page



## Head Maintenance

Pressing the **Maintenance** button within the Head Details page will open the Head Maintenance page. The buttons within this page will allow you perform a variety of head maintenance functions. The buttons displayed in the menu within the right half of the screen will vary depending on whether the Enable button has been pressed. After pressing the Maintenance button the button will toggle and instead display the Details button. Pressing the **Details** button will close the Head Maintenance page and return you to the Head Details page.

### Enable

Pressing the Enable button puts the corresponding head into a maintenance state when the top right cover has been opened. Before you can perform any of the head maintenance functions available within the Head Maintenance page, you must put the head into this state by pressing the **Enable** button. After pressing the Enable button, the menu will refresh and display

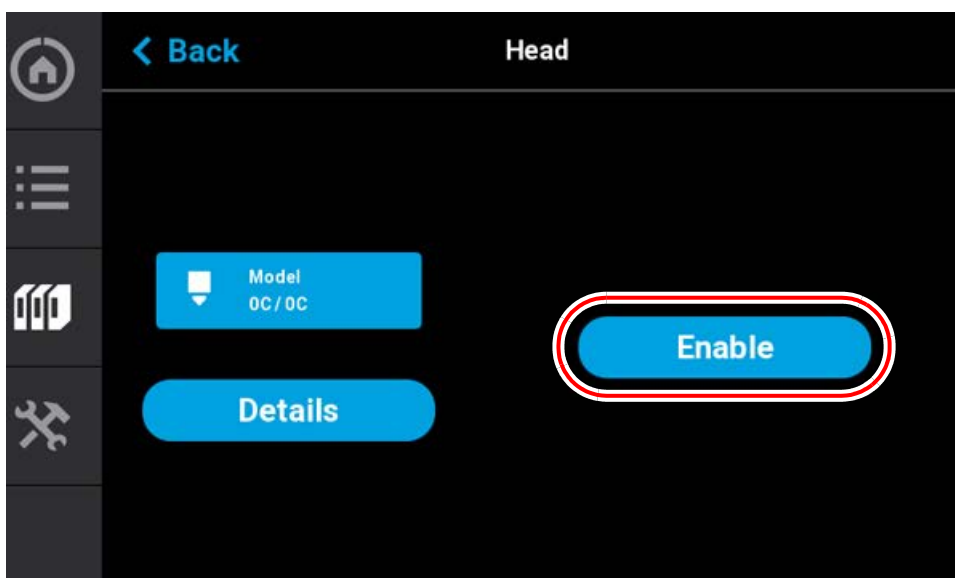
buttons corresponding to the additional head maintenance functions available within this page. The Enable button will toggle and instead display the Disable button. Pressing the **Disable** button at any time when the head is not in use will take the head out of the maintenance state.



#### Caution: Damage to Equipment

Disconnecting the head ribbon cable while the heads are enabled can cause severe damage to the head or printer electronics. Do not remove the head ribbon cable with the heads enabled.

Figure 27: Head Maintenance Page - Main View



### Purge

Pressing the **Purge** button instructs the printer to perform a long purge. After pressing this button, the head will move to the purge position and will heat to a predetermined set point temperature. Once the head reaches this set point, material will be purged from the tip for about 10 seconds. When changing to or from colored material it is beneficial to perform multiple purges as this will remove all material remaining within the liquefier tips and/or tubes to ensure that color mixing doesn't occur. The Purge button is selectable (i.e. a Purge can be initiated) when the button is solid blue, and disabled (i.e. a Purge is in process or cannot be initiated) when gray. A notification badge will be displayed within the button if any preconditions exist preventing the purge from occurring.

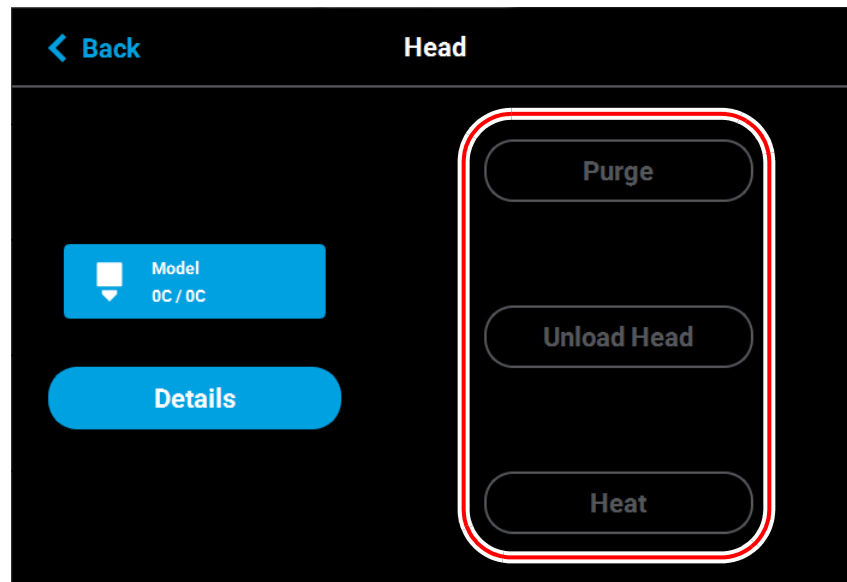
### Load Head/Unload Head

Depending on the load status of the selected head, either the Load Head or Unload Head button will be displayed. Pressing the **Load Head** button instructs the printer to load material to the corresponding head; the button will toggle to display the Unload Head button. Pressing the **Unload Head** button instructs the printer to unload material from the corresponding head; the button will toggle to display the Load Head button. A notification badge will be displayed within the button if any preconditions exist preventing the load/unload from occurring (see “Load/Unload Errors” (page 248)).

### Heat/Cool

Depending on the state of the printer, either the Heat or Cool button will be displayed. Pressing the **Heat** button instructs the printer to heat the corresponding tip to extrusion temperature for no longer than 2 minutes; the button will toggle to display the Cool button. Pressing the **Cool** button will instruct the printer to begin cooling the corresponding tip back to the 0 set point; the button will toggle to display the Heat button. The tip will also begin to cool automatically if the heat option exceeds the 2 minute time allotment and the Cool button is not pressed.

Figure 28: Head Maintenance Page - Menu View



## Material Status Icons

The Material Status Icons within the Materials page represent the model and support material coil boxes loaded in the printer. Either two icons will be displayed. Each icon displays a number corresponding to the material coil box, colored bars indicating the color of the material currently installed, the name of the material currently installed, and a percentage indicating the current volume of material on that material coil box. Touching one of these icons on the screen, unless otherwise indicated in [Table 7](#), will open that material's Material Details page. Various graphics

will be displayed within the center of the Material Status Icons, depending on the state of the material coil box. The Material Status Icons can appear in the following states (color usage, highlighting, and descriptions apply to all icons):

Table 7: Material Status Icons - Icon States

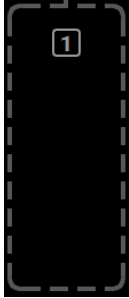





Icon State	Description
 Empty (gray dashed border)	<ul style="list-style-type: none"> <li>Indicates the filament key is not inserted.</li> <li>User action required to load material and insert the filament key. See <a href="#">“Loading Material”</a> (page 116) for instructions.</li> <li>Touching the icon in this state will display the Material Details page.</li> </ul>
 Unusable (semi-solid red)	<ul style="list-style-type: none"> <li>Indicates that an error occurred when checking the data on the material coil box’s memory chip. The material coil box is unusable.</li> <li>User action required to replace the current material coil box with a valid one. See <a href="#">“Handling/Storing Materials”</a> (page 130) and <a href="#">“Connecting Material Coil Box To Printer”</a> (page 118) for instructions.</li> <li>Touching the icon in this state will not display the material’s Material Details page.</li> </ul>
 Invalid (red border)	<ul style="list-style-type: none"> <li>Indicates that the material coil box is invalid. Invalid materials are materials not licensed or not compatible with the associated head type.</li> <li>Material from the invalid material coil box cannot be loaded. User action required to replace the current material coil box with a valid one. See <a href="#">“Handling/Storing Materials”</a> (page 130) and <a href="#">“Connecting Material Coil Box To Printer”</a> (page 118) for instructions.</li> </ul>



Table 7: Material Status Icons - Icon States (Continued)

Icon State	Description
 <p>Loaded (blue border)</p>	<ul style="list-style-type: none"> <li>Valid material coil box connected. Material name, color, and current volume displayed.</li> <li>Material from the material coil box is loaded to the head and is selected to be used for building.</li> <li>See <a href="#">“Selecting a Job to Build”</a> (page 135) for instructions on starting a build. See <a href="#">“Unloading Material”</a> (page 127) for instructions on unloading material.</li> </ul>
 <p>Empty Material Coil Box (solid yellow)</p>	<ul style="list-style-type: none"> <li>Material coil box is empty - a volume of 0% is displayed.</li> <li>User action required to replace the empty material coil box. See <a href="#">“Unloading Material”</a> (page 127) for instructions.</li> </ul>
 <p>Error (solid red)</p>	<ul style="list-style-type: none"> <li>Indicates that communication with the material coil box is not possible. Please note that this state differs from the unusable state as the icon is solid red in this state and the bars within the center of the icon are not visible.</li> <li>Contact Customer Support or your regional Stratasys office if you experience this icon state (see <a href="#">“Getting Help”</a> (page 244) for contact information).</li> </ul>

## Viewing Material Details

To view additional details regarding a particular material, select the desired material by touching its Material Status Icon on the screen. Doing so will open its Material Details page. If the material coil box is in a warning or error state additional information pertaining to the warning/error will be displayed within the page (see [“Load/Unload Errors”](#) (page 248) for details).

The right portion of the screen displays detailed information about the material coil box including:

- State: load state.

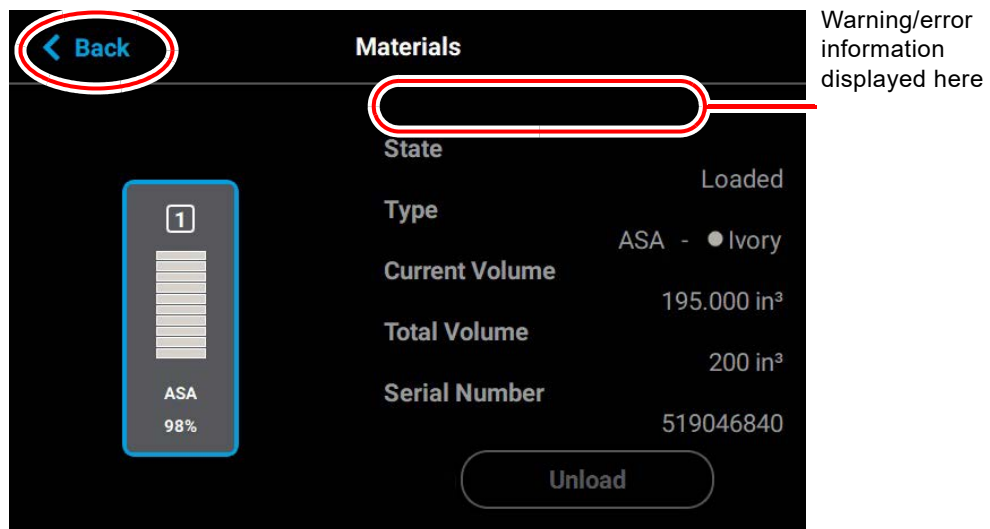
- **Type:** the type of material in the material coil box. If applicable, material color is also indicated (material color is also indicated within the center of the Material Status Icon within the left portion of the screen).
- **Current Volume:** current volume of material in the material coil box. This is also indicated via the percentage displayed within the Material Status Icon within the left portion of the screen.
- **Total volume:** total volume of material available when the material coil box was initially installed.

The buttons directly below this information allow you to load or unload material as needed or cancel a load/unload in process (see “[Material Load Controls](#)” (page 76) for details). Please note that the functionality and visibility of these buttons will depend on the material load status.

The left portion of the screen displays the same Materials Status Icon as is displayed on the Materials page (see [Figure 25](#) (page 66)). The number displayed within the top of the icon indicates which material port the material is loaded into. The colored bars (displayed within the center of the icon) and percentage (displayed at the bottom the icon) indicate the current volume and color of the material in the material coil box. As material is used to build a part, the number of colored bars and the percentage will decrease to indicate the amount of material consumed. The name of the type of material in the box is displayed at the bottom of the icon.

To close this page and return to the main Materials page, press the **Back** button within the header of the page.

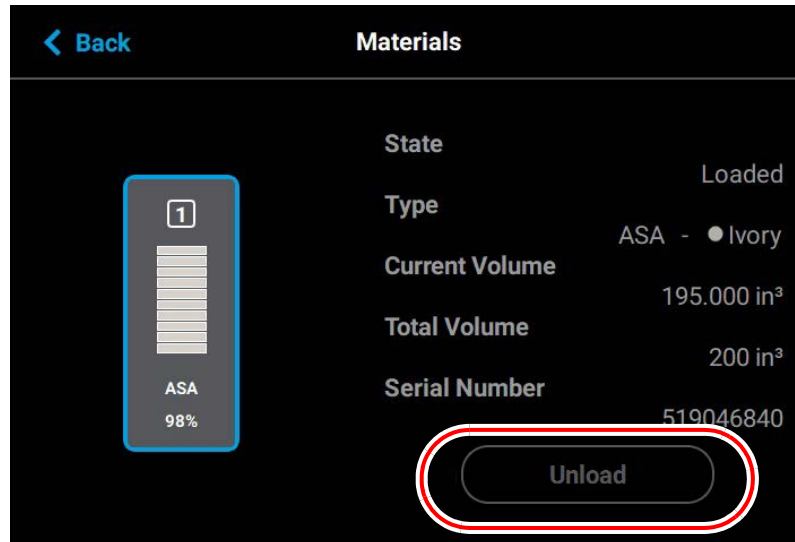
Figure 29: View Material Details



## Material Load Controls

The Material Load Control buttons are used to load and unload material to the liquefier within the head, as well as cancel a material load or unload in process. The Material Load Control buttons are displayed in the lower-right portion of the Material Details page; however, the visibility of these buttons is dependent upon the material coil box's load status. Button states are explained within the tables below.

Figure 30: Material Load Control Buttons



Pressing the Load button initializes the load wizard. The load wizard instructs the user on the steps necessary to load material into the F770 (see “[Loading Material](#)” (page 116) for details). If the corresponding head is already loaded with material, the Load button will appear in its disabled state.

Pressing the Unload initializes the unload wizard. The unload wizard instructs the user on the steps necessary to unload material from the F770 (see “Unloading Material” (page 127) for details).

Table 8: Material Load Control Buttons - Load Button States



Button State	Description
	<ul style="list-style-type: none"> <li>The load button is accessed from the Materials page.</li> <li>Pressing the Load button in this state will initialize the load wizard for the corresponding head.</li> </ul>
	Load button is disabled and not selectable.

Table 9: Material Load Control Buttons - Unload Button States


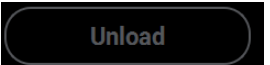
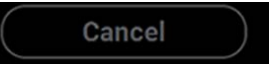
Button State	Description
	<ul style="list-style-type: none"> <li>The Unload button is only selectable once a material filament is loaded to the corresponding head.</li> <li>Pressing the Unload button in this state will initialize the unload wizard for the corresponding head.</li> </ul>
	Unload button is disabled and not selectable.

Table 10: Material Load Control Buttons - Cancel Button States

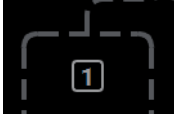


Button State	Description
	<ul style="list-style-type: none"> <li>The Cancel button is never selectable.</li> </ul>

## Load Wizard States

The pathway between the Material Status Icon and corresponding Head Status Icon will take on a variety of colors and display various graphics, depending on the load state of the associated material coil box's filament. The pathway of the empty filament port will be dashed gray. Only one material type can be loaded/unloaded at a time (i.e. a model and support

material coil box cannot be loaded/unloaded simultaneously). Filament pathways can appear in the following states (color usage, highlighting, and descriptions apply to both model and support):

Table 11: Filament Pathway States

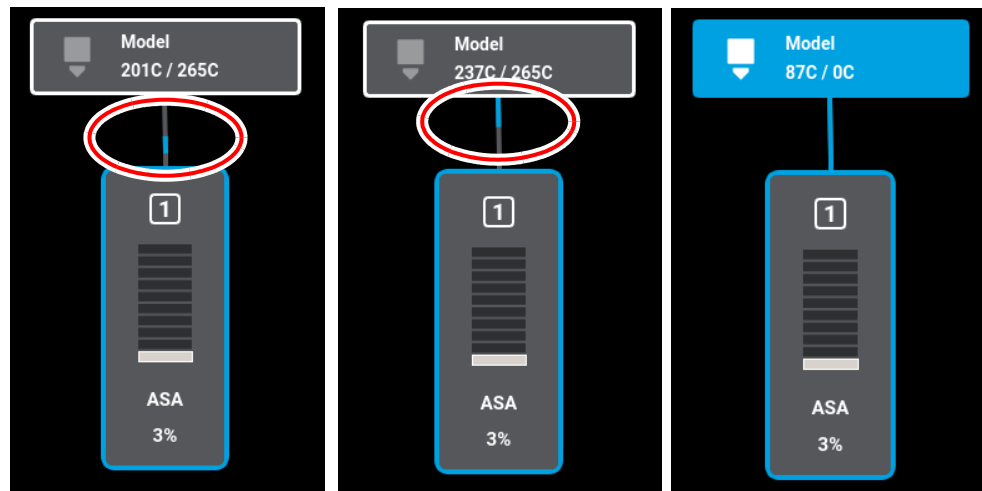
Icon State	Description
 Empty	<ul style="list-style-type: none"> <li>Indicates that a material is not loaded into the corresponding filament port.</li> <li>After connecting a material coil box to the printer, the filament pathway will refresh and indicate that filament needs to be inserted into the drive mechanism.</li> </ul>
 Loading/ Unloading	<ul style="list-style-type: none"> <li>Indicates that filament from the corresponding material coil box is in the process of being loaded to the head.</li> <li>The pathway between the Material Status Icon and the Head Status Icon will fill, in blue, in the direction that the material coil box's filament is traveling (towards the head).</li> <li>Once the load process is complete, the filament pathway will refresh and display in its loaded state.</li> </ul>
 Loaded	Indicates that filament from the corresponding material coil box is loaded to the head and is selected to be used for building.

As materials are loaded and unloaded, the pathway between the Material Status Icon and the Head Status Icon will become colored, and will fill in the direction that the material coil box's filament is traveling (towards the head or away from the head). [Figure 31 \(page 79\)](#) depicts the functionality displayed when a material coil box's filament is being loaded to the head, while [Figure 32 \(page 80\)](#) depicts the functionality displayed when a material coil box's filament is being unloaded from the head. Opening the Material Details page for the material being loaded/unloaded will provide additional control over the load/unload. The Cancel button will be displayed within this page, giving you the option to cancel the material load/unload if necessary.

Material load progress will display the same functionality regardless of whether a model or support material coil box is being loaded. Once a box's material is loaded to the head, the pathway between the Material Status Icon and the corresponding Head Status Icon will be solid blue, the Head Status Icon will turn solid blue, and the Material Status Icon will display a blue

border. This indicates that the material coil box is connected and in position to be used to build parts on the printer. The Unload button will be displayed within the Material Details page, indicating that material can be unloaded, if needed.

Figure 31: Material Load Progress - Loading

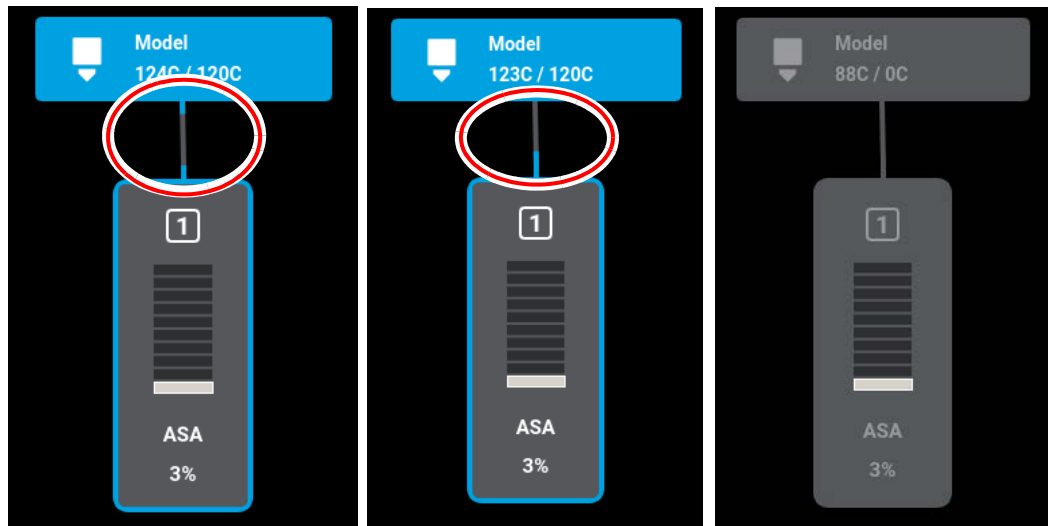


Material unload progress will display the same functionality regardless of whether a model or support material is being unloaded. As material is being unloaded from the head, the pathway between the Head Status Icon and Material Status Icon will be highlighted in yellow and the Head Status Icon will turn solid gray indicating that material is no longer loaded to the head. A yellow notification badge will be displayed within the center of the Material Status Icon to indicate that user action is required to complete the unload process.

Opening the Material Details page for the material being unloaded will provide additional details regarding the unload process. The Load button will be displayed within the Material Details page once the filament has been completely retracted indicating that the material can be reloaded, if needed.

Once material is fully unloaded, filament pathway and Material Status Icon coloring will remain in their unloading states until the corresponding material key is removed from its slot. Once the key is removed, which disconnects the material coil box, the filament pathway and Material Status Icon will refresh and display in their empty states.

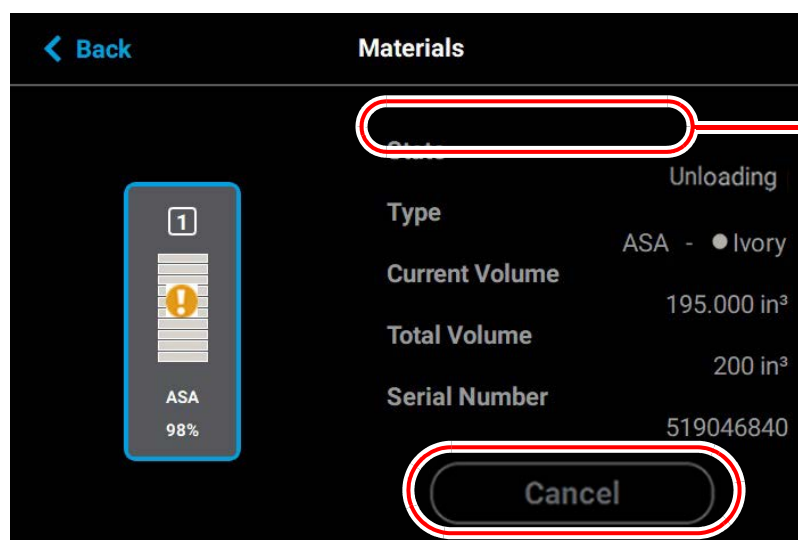
Figure 32: Material Load Progress - Unloading



## Material Load/Unload Cancellation

The Cancel button will only be displayed within the Material Details page for a material that is in the process of being loaded/unloaded. This button allows you to cancel a material load or unload already in process. Depending on your printer's configuration, a warning may be generated after selecting the Cancel button. In the event of a warning, text will be displayed on the screen to indicate the cause of the warning.

Figure 33: Cancel Button



Warning/error information will be displayed here

## Platen Vacuum Control

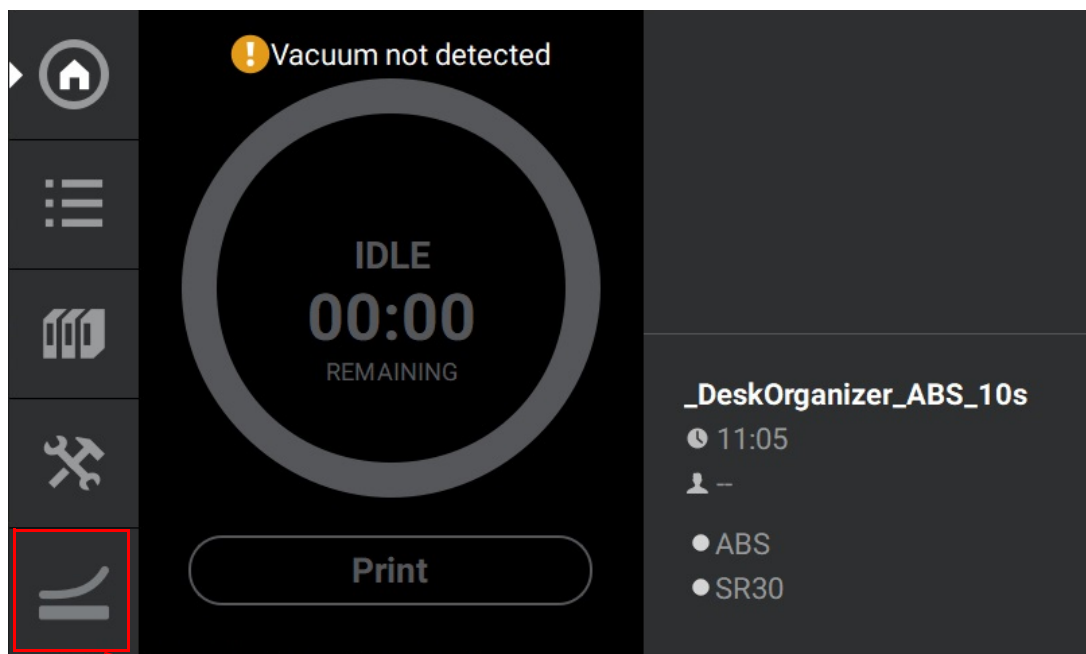


Note: The system cannot be in Energy Save mode while stabilizing the build sheet.

The F770 printer uses a vacuum system to hold down the build sheet. Achieving vacuum is required before building a part can begin. If not properly heat stabilized, the expansion stresses when heated can cause the build sheet to buckle and lose vacuum during the build process. This is caused by the differing rates of expansion between the aluminum platen and the polycarbonate build sheet and typically happens when the platen is raised up into the high temperature oven air stream.

To combat this issue, the system software detects when a build sheet is removed from the system and turns off platen vacuum. After installing a new build sheet, vacuum must be re-enabled using a button located on the UI.

Figure 34: Platen vacuum button



Platen vacuum button toggles vacuum pump on/off  
Button disabled when vacuum switch is closed

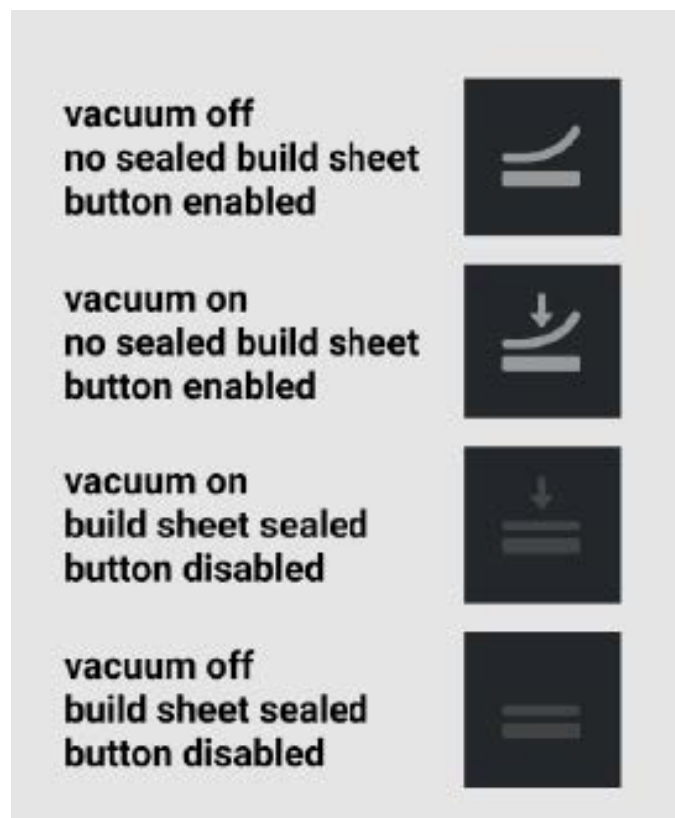
When the platen vacuum button is pressed, the system software determines whether the platen and build sheet are thermally stabilized before turning on the vacuum pump. If the platen and the build sheet are not thermally stable, the system will wait for the system to heat before turning on the vacuum pump.



If no build sheet is present, the system turns off the vacuum pump after 15 seconds of continuous loss of vacuum. The system will not turn off the vacuum during part build or pause.

Before turning on the vacuum pump, the system software analyzes oven temperature history over the previous 30 minutes to determine whether additional stabilization time is required. Typically, if the average is above 80C, the vacuum button will immediately turn on the vacuum pump. If the system is starting from room temperature, the system will need to stabilize for 30 minutes before the vacuum will turn on.

Figure 35: Vacuum control button states



The screen below displays if the vacuum pump is off or the build sheet needs to stabilize.

Figure 36: Chamber too cold



### Chamber too cold.

Wait for build sheet stabilization.  
Stabilization time = 20:29

Dismiss

Force Vacuum On

If the door is open, the message displays as shown below

Figure 37: Chamber too cold (door open)



### Chamber too cold.

Wait for build sheet stabilization.  
Stabilization time = ??.  
Close the door.

Dismiss

Force Vacuum On

These screens can be dismissed if any of the following occur:

- The timer elapses. This closes the window and turns on the vacuum.
- **Force vacuum on** is pressed. This causes the window to close and turns on the vacuum.
- **Dismiss** is pressed. This causes the window to close. The vacuum remains off.
- The door is open. This causes the stabilization time to recalculate.
- A different menu button is pressed. This causes the window to close. The vacuum remains off.

See “Installing a Build Sheet” (page 134) for instructions on how to properly install an F770 build sheet.

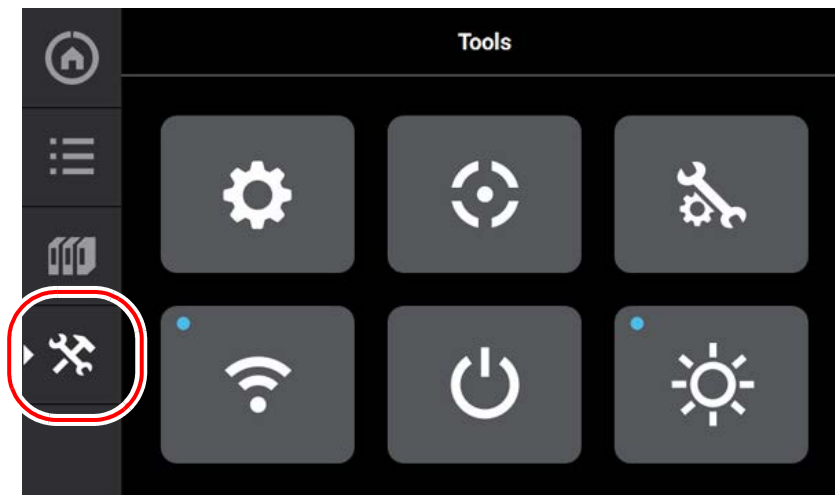
## Working with the Tools Page

The options within the Tools page are organized into 6 categories: Settings, Calibration, Maintenance, Network, Power, and Light. The Display Area of the Tools page contains a button corresponding to each of these categories. With the exception of the Light button, pressing the button corresponding to each of these categories will open an individual page containing printer information that can be viewed as well as printer settings and preferences which can be configured for that particular category. After selecting any of the buttons within the Tools page a *Back* button will be displayed within the heading of the page; press this button to return to the main Tools page.

Within this page you can turn a variety of printer settings on/off (including part placement, standby mode, etc.), select your printer's address type (dynamic, static, or Wi-Fi), adjust the brightness of the touchscreen display and turn the printer or the oven light on/off. As a part of its initial installation and setup (performed by your authorized service representative) your printer's network settings will be configured within this page (as described within "[Configuring the Network](#)" (page 16)). Once those settings are configured you may need to occasionally access this page in order to adjust printer preferences.

To access the Tools page, press the **Tools** button within the Navigation Menu; a screen similar to the one in [Figure 38](#) will be displayed.







Figure 38: Tools Page



## Tools Page Menu

The Display Area of the Tools page contains 6 buttons. With the exception of the Light button, pressing each of these buttons will open an individual page containing printer information that can be viewed as well as printer settings and preferences which can be configured.

Table 12: Tools Page Menu

Icon State	Description
 Settings	Pressing the Settings button opens the Settings page. From this page you can configure and adjust several of the printer's default settings. See <a href="#">"Settings" (page 88)</a> for details.
 Calibration	Pressing the Calibration button opens the Calibration page. From this page you can preform various printer calibration procedures. See <a href="#">"Calibration" (page 99)</a> for details.
 Maintenance	Pressing the Maintenance button opens the Maintenance page. From this page you can perform various printer maintenance procedures. See <a href="#">"Maintenance" (page 102)</a> for details.
 Network	Pressing the Network button opens the Network page. From this page you can configure the printer's network connection. See <a href="#">"Network" (page 106)</a> for details.
 Power	Pressing the Power button opens the Power page. From this page you can shutdown or restart the printer. See <a href="#">"Power" (page 112)</a> for details.
 Light	The Light button is the only option within the Tools page that does not open a new page after being pressed. Instead, the Light button allows you to turn the oven light ON and OFF. An indicator within the upper-left corner of the button displays the current state of the oven light (ON or OFF). See <a href="#">"Light" (page 113)</a> for details.

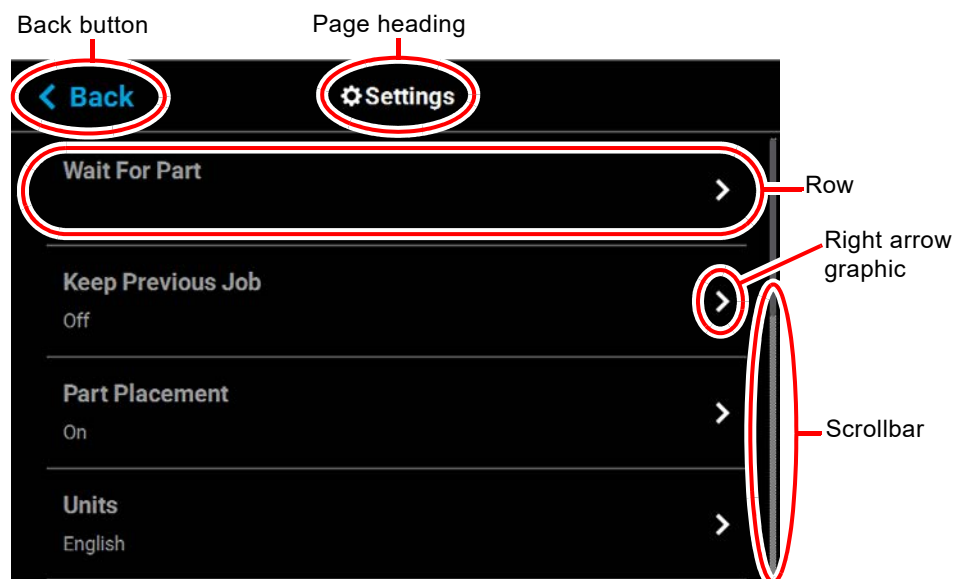
## Navigation Overview

After selecting one of the buttons within the Tools page the touchscreen will refresh to display the details of the page selected (i.e. selecting the Settings button will open the Settings page). Depending on the options available for configuration within the selected page, the Display Area of the page may contain more options than can be displayed at one time. In this case, a scrollbar is displayed along the right-hand side of the page. To scroll up or down within a page simply touch the scrollbar displayed on the screen and pull the scrollbar in the direction you'd like to scroll.

A heading is displayed at the top of each page, indicating the name of the page. Each page contains a variety of settings and preferences that can be configured. Items are organized into individual rows within the Display Area of the page. The name of the setting/preference to be configured is displayed in bold within the left side of the row. For some items, current configuration information is displayed directly below the setting/preference name within the row (for reference purposes).

The graphic displayed within the right side of a row will vary depending on the configuration options available for that row. Rows containing a right arrow graphic will open a new page allowing you to configure that row's settings/preferences. Rows which do not contain a right arrow graphic do not have any configurable options. After making the necessary adjustments to a row's settings/preferences, press the **Back** button in the upper-left corner of the page to exit the page.

Figure 39: Settings Page Content List

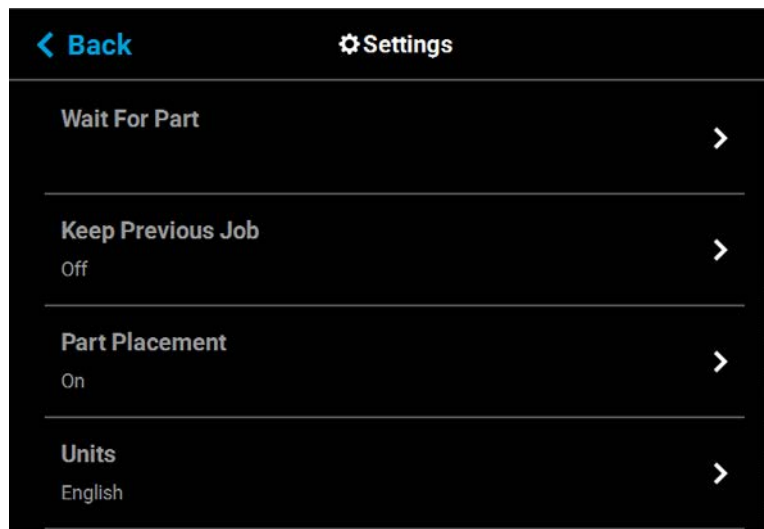


## Settings

The *Settings* page allows you to turn a variety of printer settings on/off (including part placement, standby mode, etc.), configure the language and units the printer/UI is configured for, and adjust the brightness of the touchscreen display.

To access the *Settings* page, press the Settings button within the Tools page; a screen similar to the following will be displayed. Use the scrollbar (along the right side of the page) to scroll up or down through the list of available options.

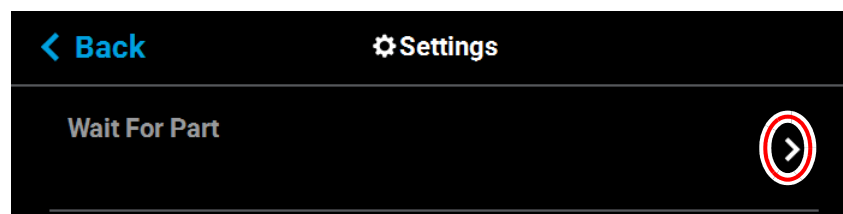
Figure 40: Settings Page



### Wait for Part

After sending a job file to the printer you would typically need to navigate within the User Interface in order to select the job from the Queue and start the build. The wait for part setting will instead allow you to send a job file to the printer which will then immediately start building once received by the printer.

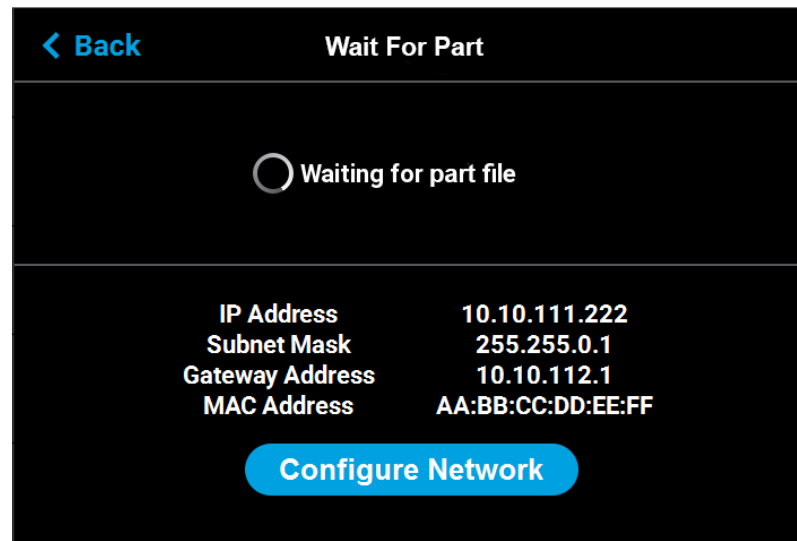
Figure 41: Wait for Part



Pressing anywhere within the row will open the Wait For Part page. Opening this page will automatically put the printer into a state where it will wait to receive a job file to build immediately. After putting the printer into this state, you must send the processed job file to the

printer via GrabCAD Print. Once the job file is received by the printer, the job will automatically start building. As such, ensure that the printer has been properly prepared for the start of a build (see “Before a Build” (page 133) and “Installing a Build Sheet” (page 134) for details).

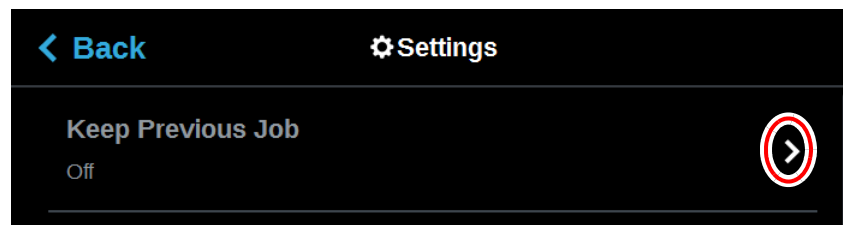
Figure 42: Waiting for Part



## Keep Previous Job

For privacy reasons, you have the option of choosing whether or not the printer's previous job is stored within the Job Queue. If you're concerned about other users of your printer seeing what you've built, this setting allows you to prevent other users from accessing the printer's previous job. When this setting is set to On, the printer will store its previous job file making it available for re-selection within the Job Queue. When this setting is set to Off, the printer's previous job file will be deleted from the Job Queue upon completion of the build. The job's file will need to be resent to the printer in order to be built again.

Figure 43: Keep Previous Job





To configure this setting, press anywhere within the row; the Keep Previous Job page will be displayed. Use the radio buttons within the page to turn the setting On and Off as needed; On is selected by default.

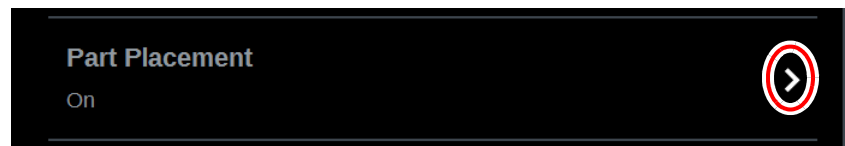
Figure 44: Configure Keep Previous Job



## Part Placement

The Part Placement setting gives you the ability to select a job's placement on a build sheet. By default, single part jobs are built in the center of a build sheet while packs are built according to their selected placement within GrabCAD Print. Therefore, when this setting is set to Off, single part jobs will automatically be built in the center of the build sheet and packs will be built according to their selected placement within GrabCAD Print. To configure this setting, press anywhere within the row; the Part Placement page will be displayed. Use the radio buttons within the page to turn the setting On and Off as needed.

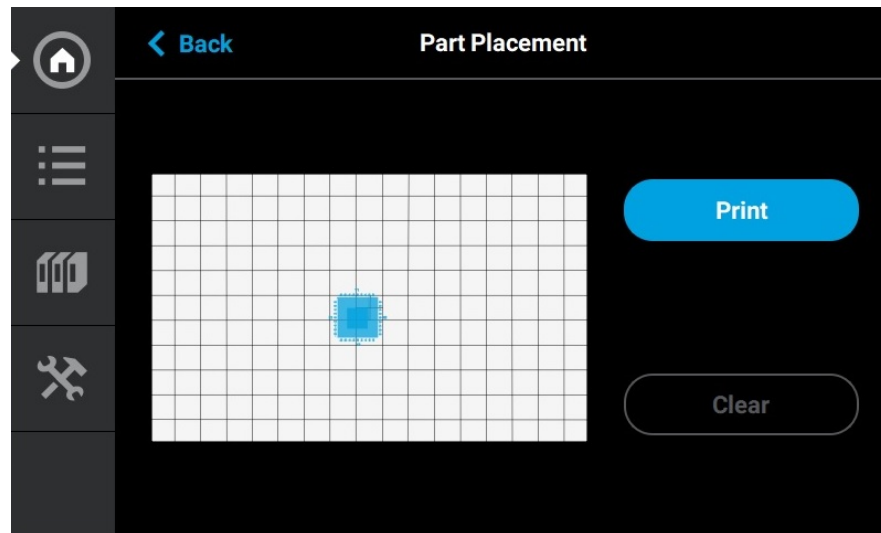
Figure 45: Part Placement



When this setting is set to On, you will be able to select a job's location on the build sheet prior to starting the build (see [“Selecting a Job to Build” \(page 135\)](#)). At the start of a build a dialog will be displayed asking you to select the part's build location (see [Figure 46](#)). The dialog will contain a graphic representing your printer's platen as well as a blue bounding box graphic (the imaginary box surrounding the part).

You can select the part's build location by dragging and dropping the bounding box on the touchscreen; the bounding box cannot be placed outside the limits of the platen. Pressing the Print button will confirm your selected placement and start a build. "Ghost box" graphics are also displayed; a "ghost box" represents the location where a part was built previously. Clicking the Clear History button will clear the display, removing all "ghost box" items.

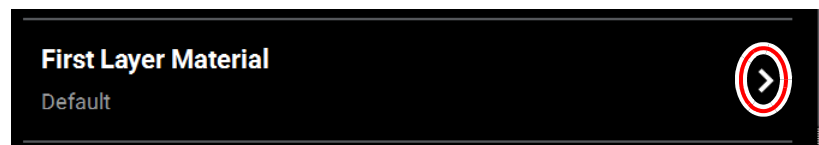
Figure 46: Part Placement Dialog



## First Layer Material

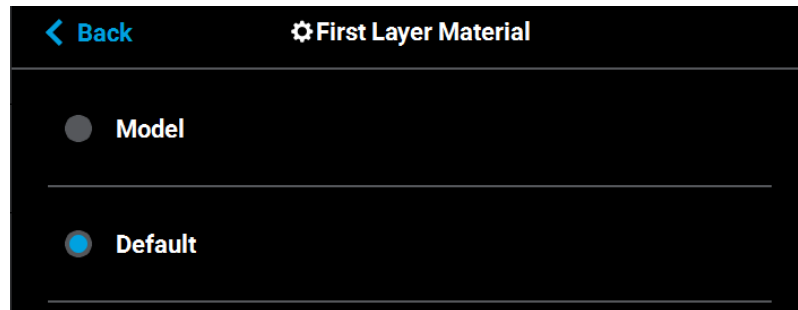
The First Layer Material row displays the material type to be used for the first build layer, Model or Default.

Figure 47: First Layer Material



To configure this setting, press anywhere within the row; the First Layer Material page will be displayed. Use the radio buttons within this page to select between Model and the Default material, which could be either model or support material. If ABS or ASA material and .005" slice height are selected, model material is automatically used for the first layer of material.

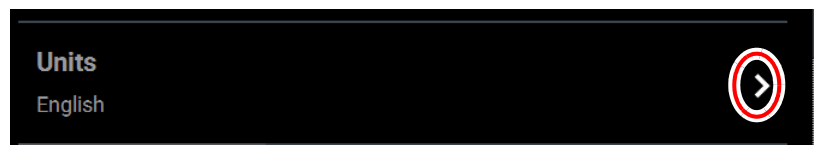
Figure 48: Configure First Layer Material



## Units

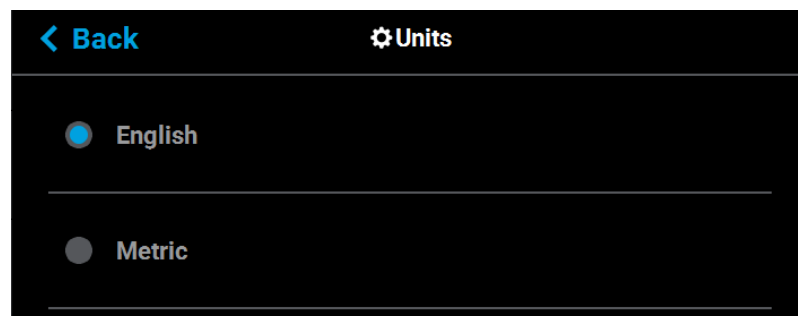
The Units row displays the type of units the printer is configured for, English (inches) or Metric.

Figure 49: Units



To configure this setting, press anywhere within the row; the Units page will be displayed. Use the radio buttons within this page to select between English and Metric units; English is selected by default.

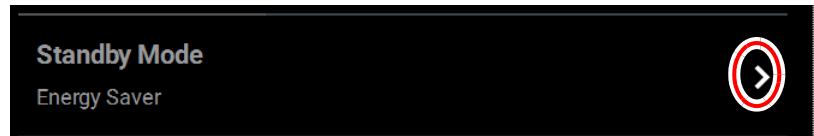
Figure 50: Configure Units



## Standby Mode

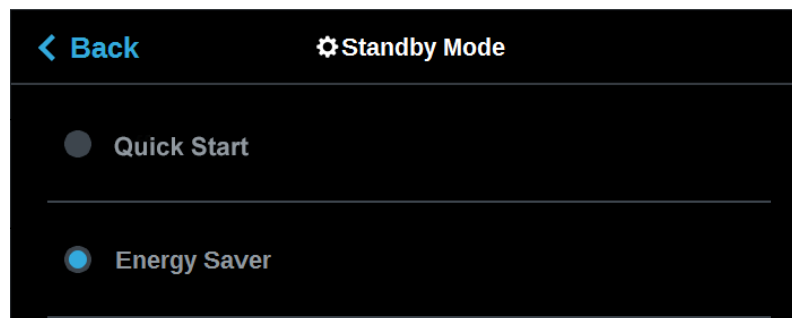
The Standby Mode setting gives you the ability to put the printer into an energy saving state after the completion of a build. When the Energy Saver radio button is selected (i.e. Standby Mode is turned On) the printer's oven will automatically shut off 2 hours after the completion of a build, thus saving energy. When the Quick Start radio button is selected (i.e. Standby Mode is turned Off) the printer's oven will remain On at the material's build temperature.

Figure 51: Standby Mode



To configure this setting, press anywhere within the row; the Standby Mode page will be displayed. Use the radio buttons within the page to select between the Energy Saver and Quick Start options as needed. The Quick Start radio button is selected by default (i.e. Standby Mode is set to Off by default).

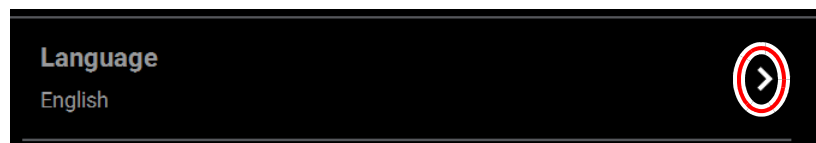
Figure 52: Configure Standby Mode



## Language

The Language row displays the language that the User Interface is configured for. Language options include English (default), Spanish, French, German, Italian, Russian, Chinese (traditional or simplified), and Japanese.

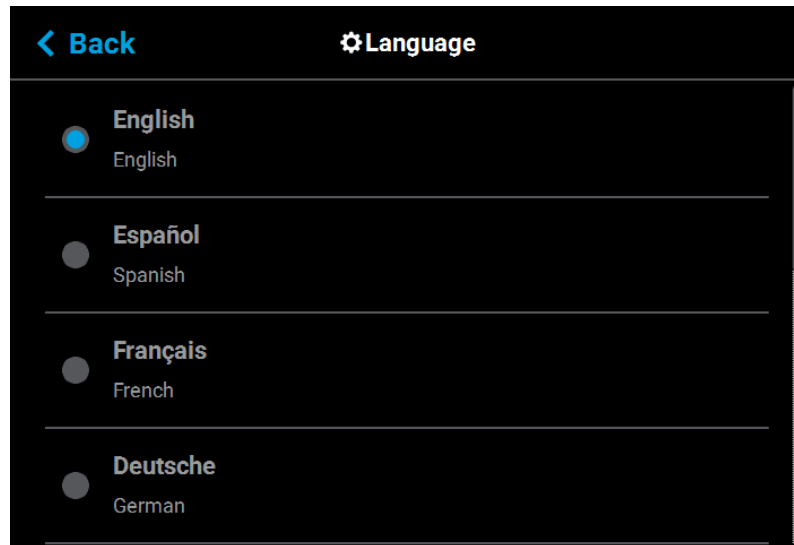
Figure 53: Language



To configure this setting, press anywhere within the row; the Language page will be displayed. Use the scrollbar (along the right side of the page) to view the list of available languages. Select the radio button corresponding to your desired language.

Additionally, the first time the printer is powered ON, a dialog will be displayed asking you to select your desired language. Once you've set your desired language following initial power up, this selection will be retained and can only be changed by navigating to the Language page and adjusting your language selection.

Figure 54: Configure Language



## Screen Brightness

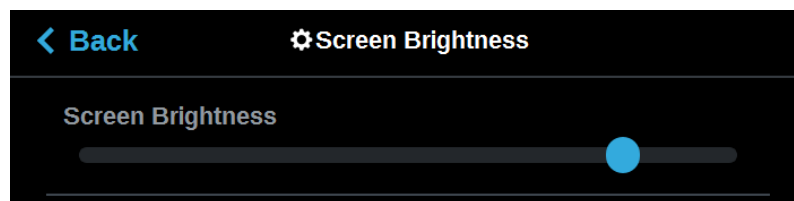
The Screen Brightness setting allows you to adjust the brightness of the touchscreen display. This setting is displayed as a percentage with 100% percent representing the greatest amount of brightness available.

Figure 55: Screen Brightness



To configure this setting, press anywhere within the row; the Screen Brightness page will be displayed. Within this page use the slider graphic to adjust brightness as needed. Sliding to the right will increase brightness while sliding to the left will dim brightness. Please note that you cannot set screen brightness to 0% (completely dim).

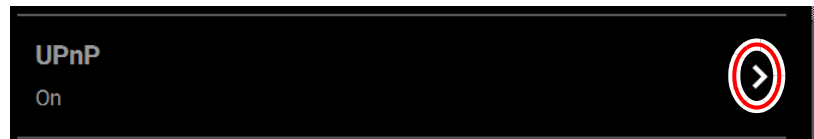
Figure 56: Configure Screen Brightness



## UPnP

UPnP allows the printer to broadcast its Unique Device Name (UDN) address across the network. When this setting is set to On, the printer will broadcast its UDN across the network allowing GrabCAD Print to automatically detect the IP address of the printer for communication. When this setting is set to Off, the printer will not broadcast its IP address across the network and GrabCAD Print will need to be manually configured to communicate with the printer.

Figure 57: UPnP



To configure this setting, press anywhere within the row; the UPnP page will be displayed. Use the radio buttons within the page to turn the setting On and Off as needed; On is selected by default.

Figure 58: Configure UPnP



## Wifi

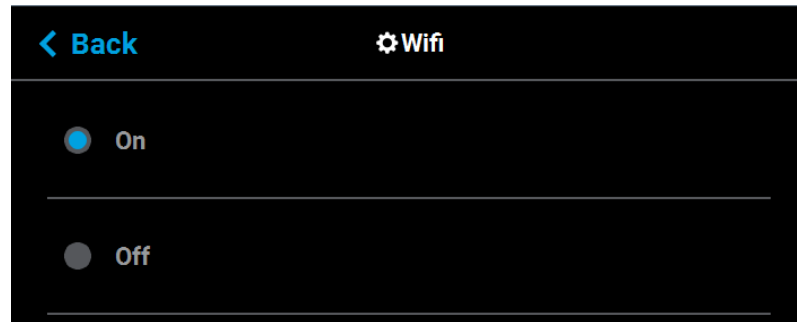
The Wifi setting gives you control over the printer's Wi-Fi capabilities. Please note that the functionality of this setting is dependent upon the use of a Wi-Fi dongle purchased for use with the printer. When this setting is set to On, you will be able to configure the printer to scan for and connect to an available Wi-Fi network. You will then be able to send part files to the printer via this network. When set to Off, Wi-Fi capabilities will be disabled and you will instead need to send part files to the printer via your facility's Ethernet connection or through the use of a USB flash drive (see "Configuring the Network" (page 16) for details).

Figure 59: Wifi



To configure this setting, press anywhere within the row; the Wifi page will be displayed. Use the radio buttons within the page to turn the setting On and Off as needed; On is selected by default.

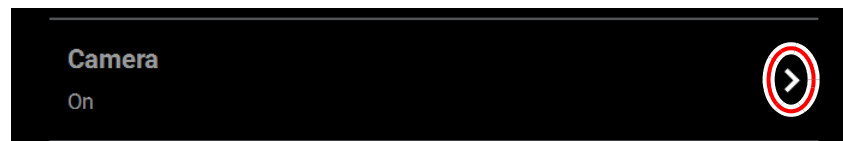
Figure 60: Configure Wifi



## Camera

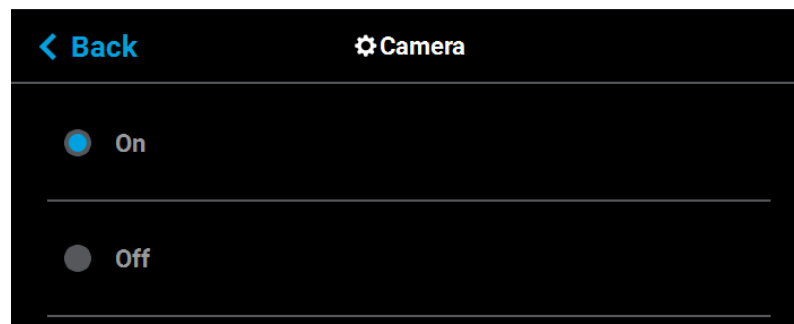
The Camera setting gives you control over the printer's camera. When this setting is set to On, the printer's camera will automatically provide remote monitoring capabilities while a part is being built. When this setting is set to Off, the camera will be turned off and remote monitoring capabilities will be disabled.

Figure 61: Camera



To configure this setting, press anywhere within the row; the Camera page will be displayed. Use the radio buttons within the page to turn the setting On and Off as needed; On is selected by default.

Figure 62: Configure Camera



## Diagnostics Interface

This feature is for future use and is presently not supported. Stratasys will provide more information and training for its use and capabilities in the near future.

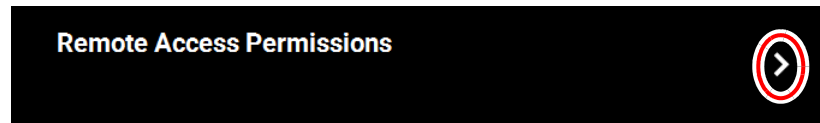
Figure 63: Diagnostics Interface



## Remote Access Permissions

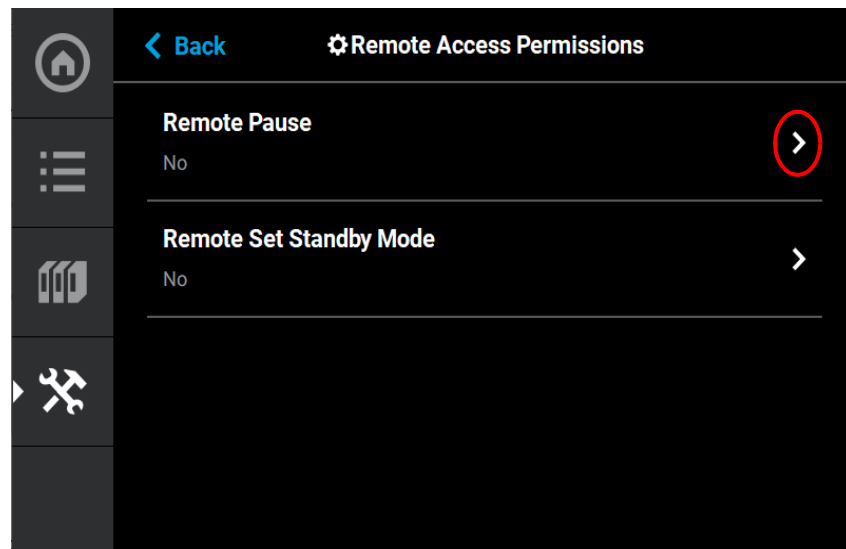
The Remote Access Permissions settings allow the user to pause the current build or set the printer to standby mode. This feature is used in conjunction with the GrabCAD Print mobile application and a cellular phone.

Figure 64: Remote Access Permissions



To configure this setting, press anywhere within the row; the Remote Access Permissions dialog displays.

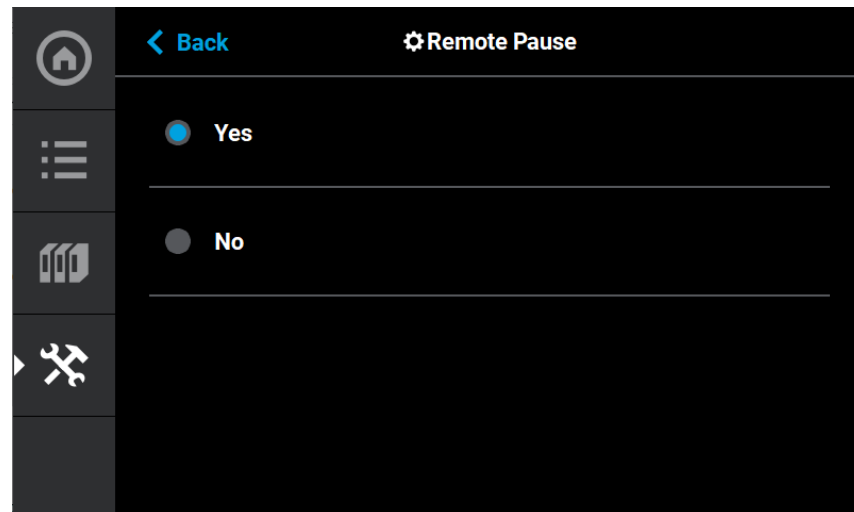
Figure 65: Remote Access Permissions Dialog





Both the Remote Pause and the Remote Set Standby Mode are set to No at the factory. To change the Remote Pause setting to Yes, press anywhere within the row; the Remote Pause dialog displays.

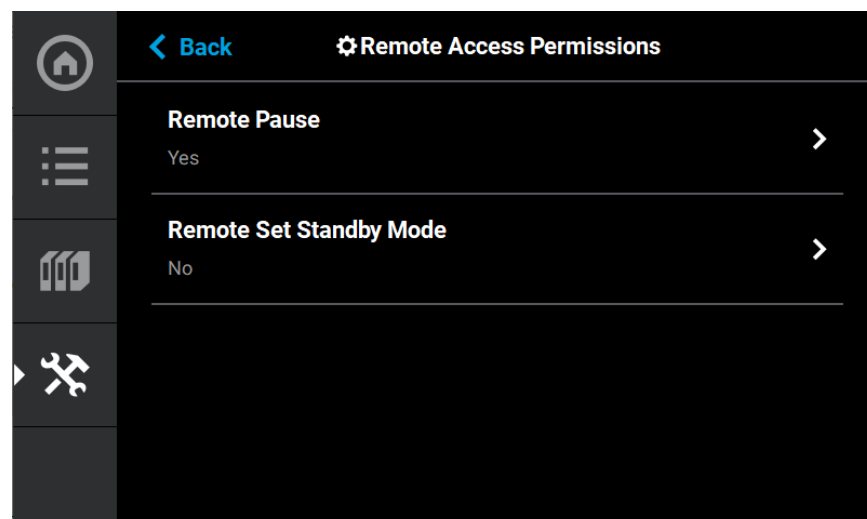
Figure 66: Remote Pause



Setting the Remote Pause radio button to Yes allows for pausing the build via the GrabCAD Print mobile application and a cellular phone. Once the build is paused, it cannot be restarted remotely. The build restart must be physically performed on the printer.

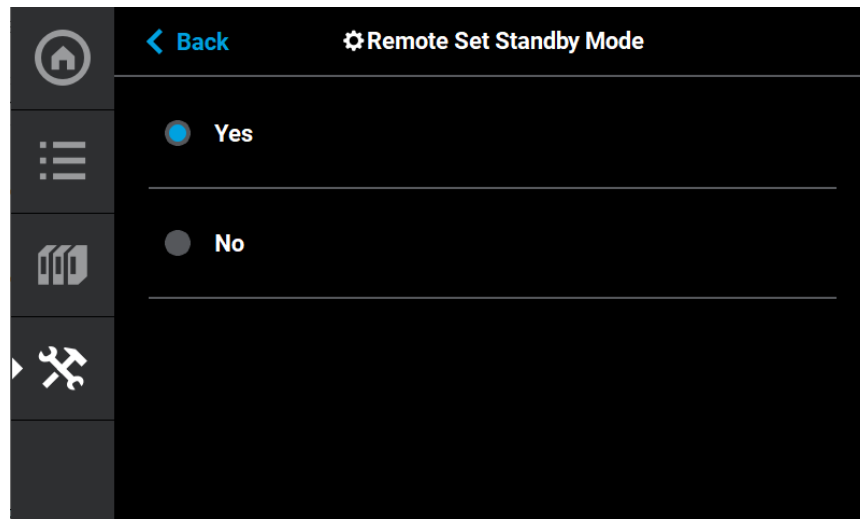
The printer can also be remotely set to Standby mode using the Remote Set Standby screen and the GrabCAD Print mobile application.

Figure 67: Remote Access Permissions Dialog



To change the Remote Set Standby setting to Yes, press anywhere within the row; the Remote Set Standby dialog displays.

Figure 68: Remote Set Standby



Setting the Remote Set Standby radio button to Yes allows for setting the printer to Standby mode via the GrabCAD Print mobile application and a cellular phone. Once the printer is set to Standby mode, the printer mode cannot be changed remotely.

## Calibration



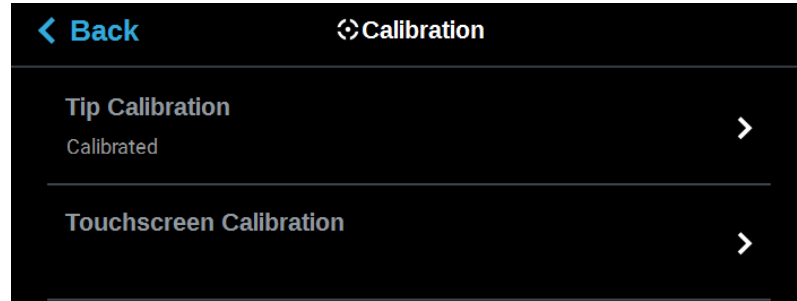
This section provides an overview of the Calibration page and its features, but does not go into detail regarding calibration procedures. See “[6 Calibration and Adjustments](#)” (page 159) for detailed calibration procedure information and instructions.

The Calibration page allows you to perform a variety of calibration procedures on the printer, including:

- Tip Calibration
- Touchscreen Calibration

To access the Calibration page, press the **Calibration** button within the Tools page; a screen similar to the following will be displayed.

Figure 69: Calibration Page

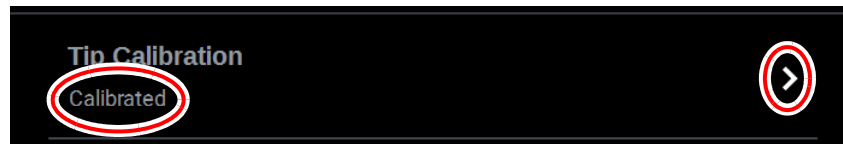


## Tip Calibration

The printer's calibration status will be displayed within the Tip Calibration row. Calibrated or Not Calibrated will be displayed depending on the printer's Calibration status.

Pressing anywhere within the Tip Calibration row will open a page allowing you to select from a variety of tip calibration options.

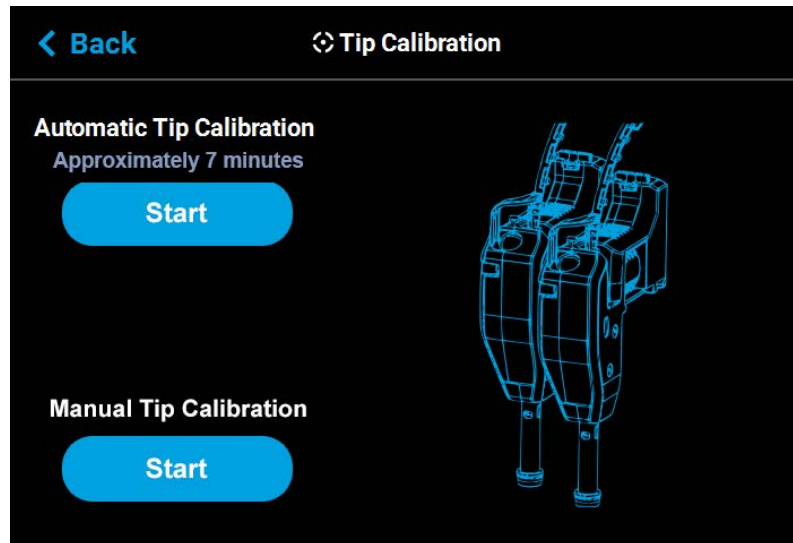
Figure 70: Tip Calibration



The Tip Calibration page contains an option for performing an Automatic Tip Calibration as well as a Manual Tip Calibration. Pressing the **Start** button associated with either of these options will allow you to perform that particular calibration procedure. Each calibration procedure is

delivered in the form of a wizard which will guide you through the process of performing the calibration procedure. See “Automatic Tip Calibration” (page 160) and “Manual Tip Calibration” (page 163) for detailed instructions.

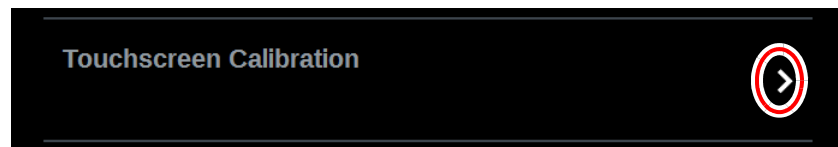
Figure 71: Tip Calibration Options



## Touchscreen Calibration

Pressing anywhere within the Touchscreen Calibration row will open a dialog allowing you to recalibrate the touchscreen display. See “Touchscreen Calibration” (page 173) for detailed instructions.

Figure 72: Touchscreen Calibration



# Maintenance

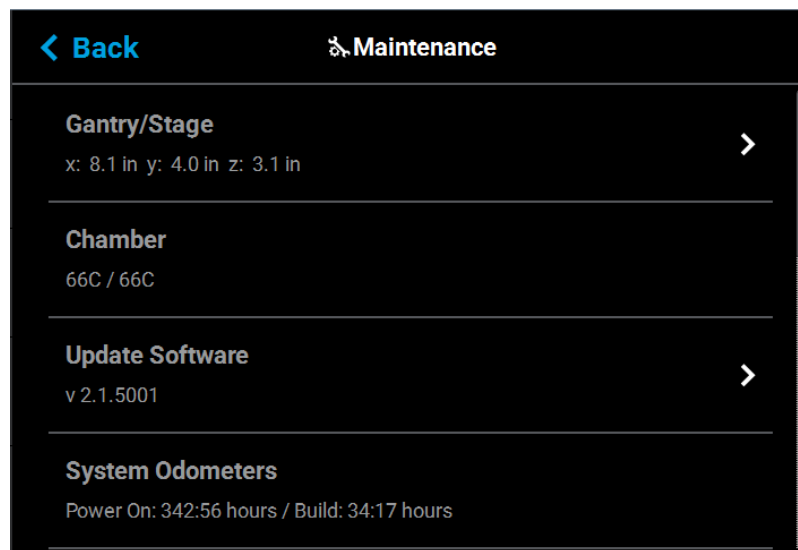


This section provides an overview of the Maintenance page and its features, but does not go into detail regarding printer maintenance procedures. See [Chapter , 7 Maintenance \(page 178\)](#) for detailed maintenance information.

From this page you can perform a variety of maintenance procedures on the printer, and view diagnostic/printer state information. Please note that advanced maintenance must be performed by an authorized service representative only.

To access the Maintenance page, press the Maintenance button within the Tools page; a screen similar to the following will be displayed.

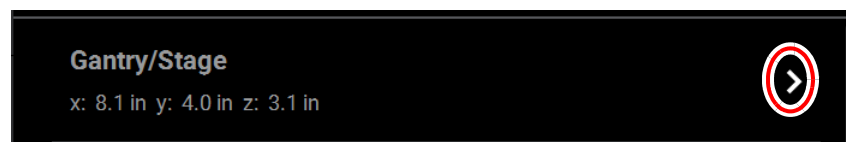
Figure 73: Maintenance Page




## Gantry/Stage

Position information for the X, Y and Z axes is displayed within the Gantry/Stage row. Pressing anywhere within the Gantry/Stage row will open the Gantry/Stage page.


Figure 74: X, Y, Z Position




The single directional arrow button within the Gantry: section allows you to move the head in

the X and Y axis. Pressing  moves the head assembly to the front of the gantry.

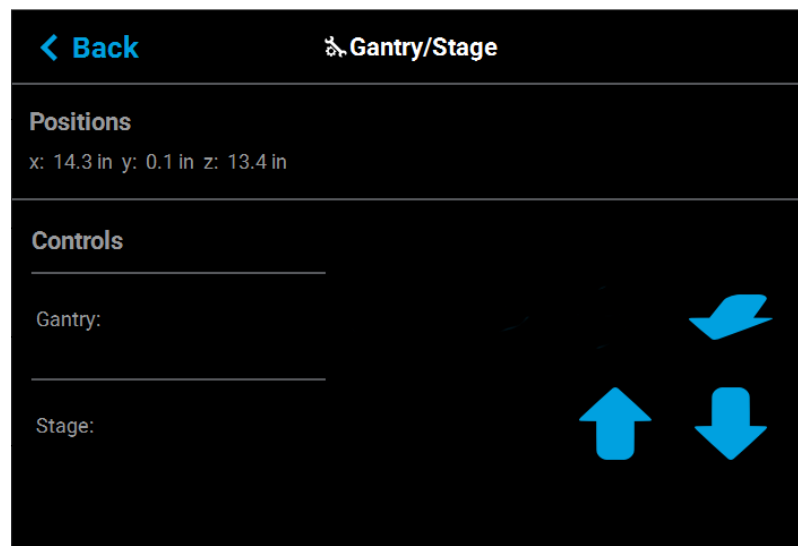
The two directional arrow buttons within the Stage: section allow you to move the platen (Z) up or down.

- Up: pressing  moves the Z stage to the mid-Z position.

- Down: pressing  moves the Z stage to the lower-Z position.

The information displayed within the Positions portion of the page will update to reflect X, Y, and Z positioning changes made using the directional arrow buttons.

Figure 75: Gantry/Stage Page



## Chamber

The Chamber row displays the current temperature as compared to the set point temperature of the oven chamber.

Figure 76: Chamber Temperature



## Update Software

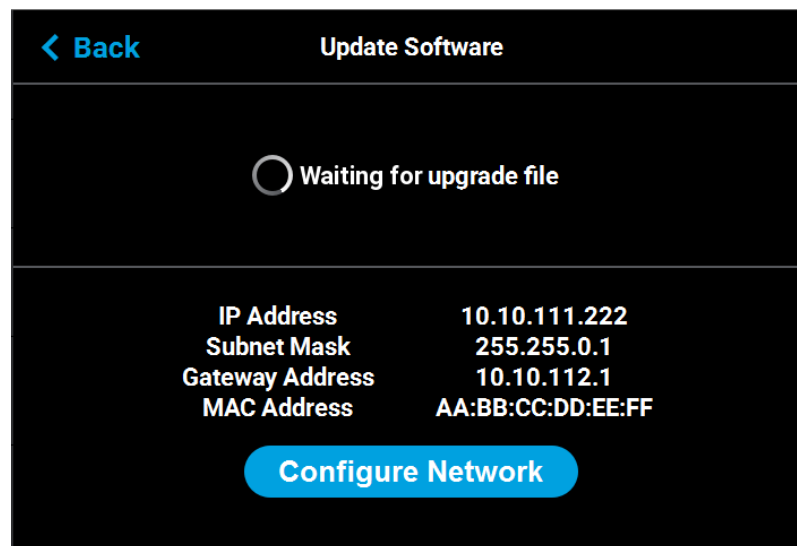
The Update Software row displays the version of Controller Software installed on the printer.

Figure 77: Update Software



Pressing anywhere within the Update Software row will open a page allowing you to upgrade the printer's Controller Software version (see "Updating Controller Software" (page 178) for details).

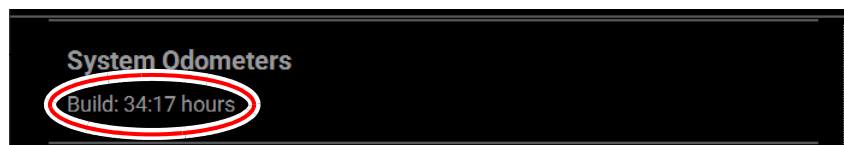
Figure 78: Update Controller Software Page



## System Odometers

The System Odometers row displays the number of hours in which the printer has been building.

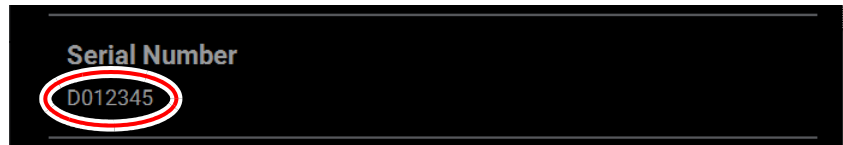
Figure 79: System Odometers



## Serial Number

The Serial Number row displays the printer's unique serial number. This number can also be found on the label on the exterior surface of the printer (see [Figure 4 \(page 15\)](#) for serial number tag label placement).

Figure 80: Serial Number



## Open Source Licenses

Pressing anywhere within the Open Source Licenses row will open a page displaying legal information pertaining to the open source software running on the printer. The files displayed are read-only.

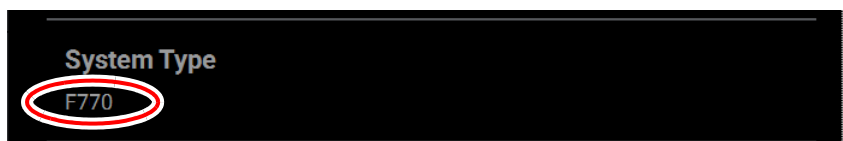
Figure 81: Open Source Licenses



## System Type

The System Type row displays the printer's model type information.

Figure 82: System Type



## USB Tools

Pressing anywhere within the USB Tools row will open a page allowing you to:

- upgrade the printer's Controller Software version from an installed USB Flash drive (see ["Updating Controller Software" \(page 178\)](#) for details).
- export the system configuration file to an installed USB Flash drive (see ["Exporting System Configuration \(.CFG\) File" \(page 183\)](#) for details).

Figure 83: Update Software





## Network

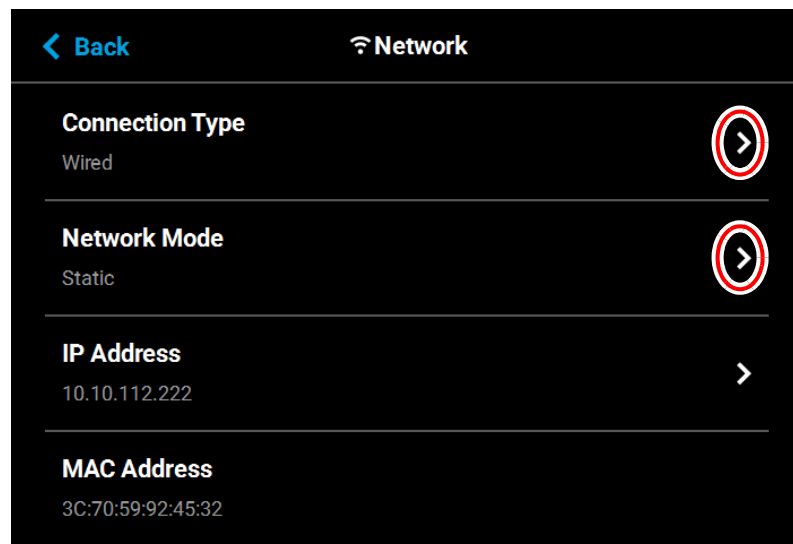


Your printer was configured for your network as a part of its initial installation and setup (see “Configuring the Network” (page 16)). The information within this section is provided to help you understand the functionality of the Network portion of the Settings page.

Within the Network page you can configure your printer’s network connection, options include Static, Dynamic (default), or Wi-Fi. The network type selected will determine the rows and configurable settings displayed within the Network page.

To access the Network page, press the **Network** button within the Tools page; a screen similar to the following will be displayed.

Figure 84: Network Page



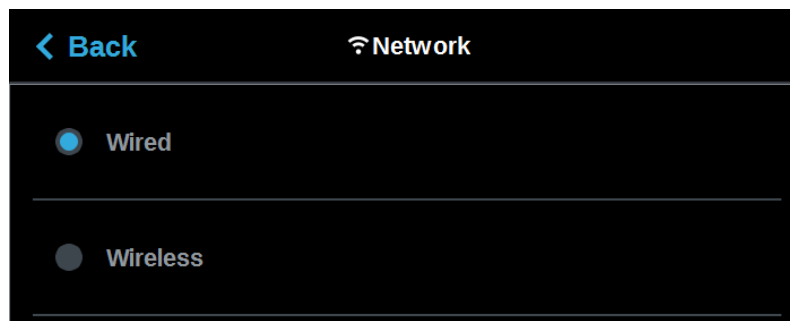
Pressing anywhere within the Connection Type row will allow you to select between a wired (Static or Dynamic) or wireless (Wi-Fi) network; Wired is selected by default. Use the **Wired** and **Wireless** radio buttons to select a connection type. After selecting a connection type press

the **Back** button to exit and return to the Network page; the selected connection type will be indicated within the Connection Type row (see [Figure 86 \(page 108\)](#) and [Figure 87 \(page 108\)](#) as a reference).



The Wireless connection type option will only be displayed if a Wi-Fi dongle has been installed and the printer's Wifi setting is set to On (see "Wifi" ([page 95](#)) for details). If a dongle has not been installed, or if a dongle has been installed but the printer's Wifi setting is set to Off, this row will be hidden from view and you will not have the option of configuring a Wi-Fi network.

Figure 85: Select Connection Type



Depending on the Connection Type selected (Wired or Wireless) the second row displayed within the Network page will vary.

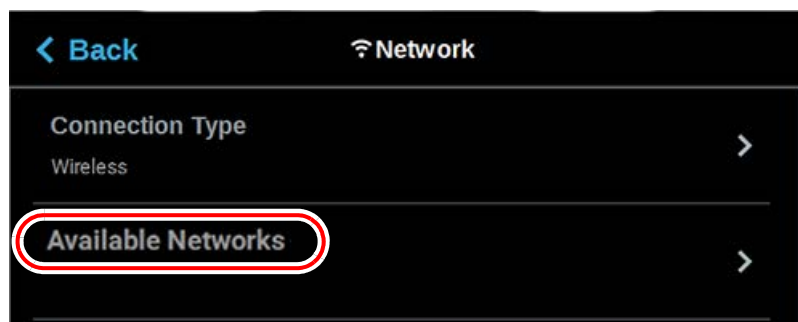
- If the Wired connection type is selected, the Network Mode row will be displayed.
- If the Wireless connection type is selected, the Available Networks row will be displayed.

See the detailed information in the sections below for specific information on the available connection types.

Figure 86: Network Page - Network Mode Row

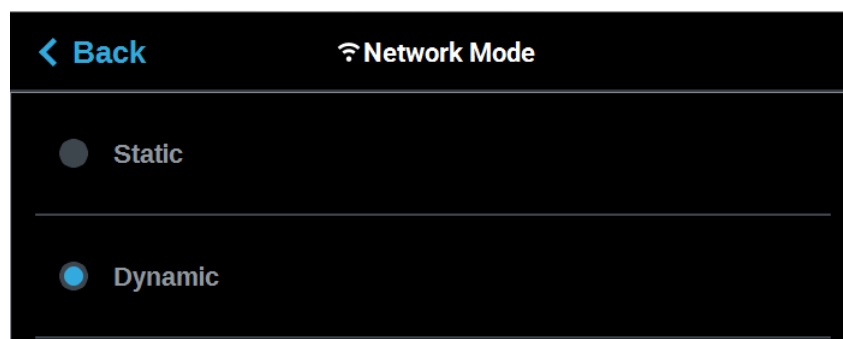


Figure 87: Network Page - Available Networks Row



If the Wired connection type is selected, the Network Mode row will be displayed (see [Figure 86 \(page 108\)](#) as a reference). Pressing anywhere within this row will allow you to select between a Static or Dynamic network mode; Dynamic is selected by default. Use the **Static** and **Dynamic** radio buttons to select a network mode. After selecting a network mode press the **Back** button to exit and return to the Network page; the selected network mode will be indicated within the Connection Type row.

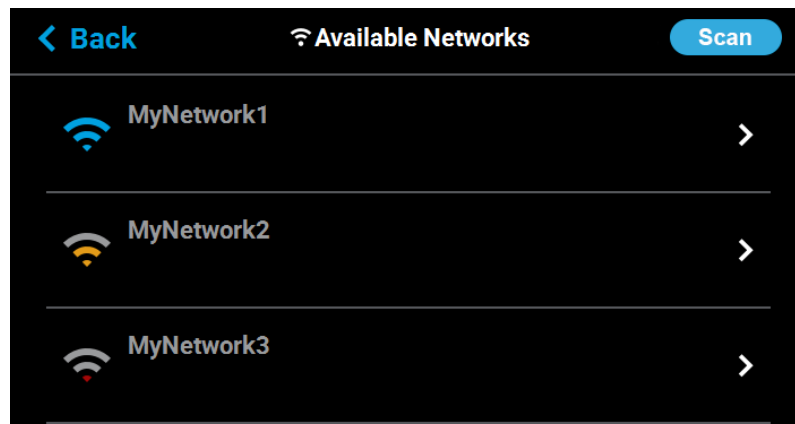
Figure 88: Select Wired Network Mode



If the Wireless connection type is selected, the Available Networks row will be displayed (see [Figure 87 \(page 108\)](#) as a reference). Pressing anywhere within this row will open a page allowing you to scan for and connect to an available Wi-Fi network. After selecting an available

network, entering the password and/or username required to connect to the network (if applicable), and saving the network configuration, press the **Back** button to exit and return to the Network page; the name of the selected wireless network will be indicated within the Available Networks row.

Figure 89: Select Wireless Network Mode

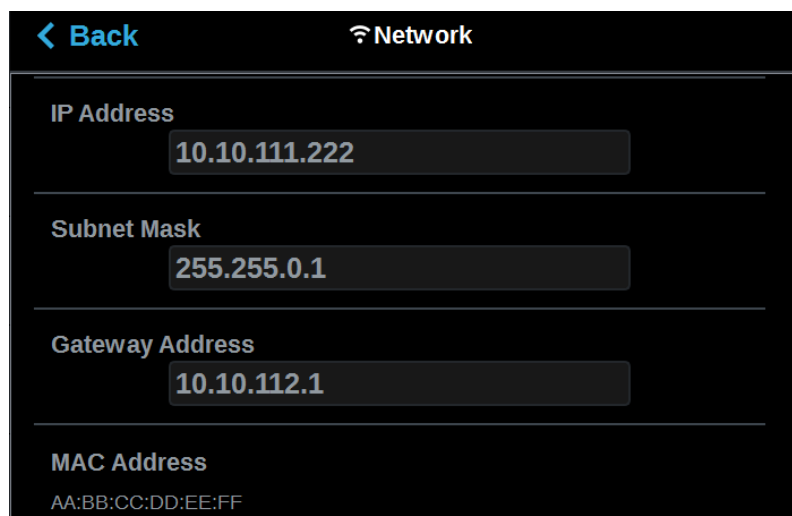


### Dynamic Network Configuration

When the **Dynamic** (DHCP) wired network option is enabled a network server or PC will generate an IP address for the printer. A different IP address may be generated from time to time by the server or PC. The generated IP address will be displayed within the IP Address field, and corresponding Subnet Mask, Gateway Address, and MAC Address information will also be displayed.

When finished, press the **Back** button to exit and return to the Tools page.

Figure 90: Dynamic Network Configuration



### Static Network Configuration

When the **Static** wired network option is enabled you must manually configure the IP Address, Subnet Mask, and Gateway Address fields for the printer (provided by the system administrator). Use the keypad to configure this information; simply touch a field on the screen to select it and then use the keypad displayed to enter network information. Touch anywhere on the screen outside of the keypad to exit and close the keypad. Press the **Apply** button to save the network information configured. Once the Apply button has been pressed and network information is saved, network information will not change.



See your system administrator if you do not know the IP address, Subnet Mask, or Gateway Address.

When finished, press the **Back** button to exit and return to the Tools page.

Figure 91: Static Network Configuration

Static Network Configuration screen showing the following fields:

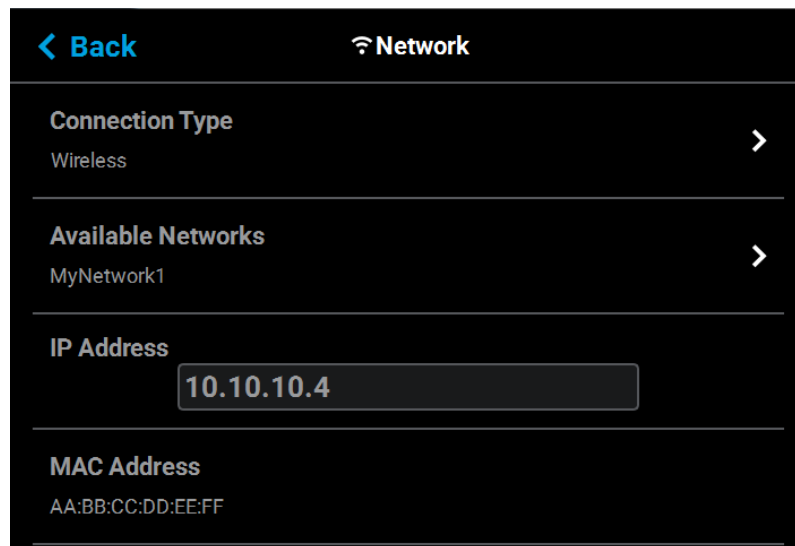
- IP Address: 10.10.112.222
- Subnet Mask: 255.255.255.0
- Gateway Address: 10.10.112.1

### Wi-Fi Network Configuration

When the wireless network option is enabled you can scan for and connect to the printer via your local **Wi-Fi network** (see [Figure 89 \(page 109\)](#)). Depending on the network's security requirements you may need to enter a password and/or username in order to connect to the network. Use the keypad to configure this information; simply touch a field on the screen to select it and then use the keypad to enter network security information. Touch anywhere on the screen outside of the keypad to exit and close the keypad. Press the **Connect** button to save the network information configured. Once the Connect button has been pressed and network information is saved, network information will not change.

Press the **Back** button to exit the page and return to the Network page; the The name of the selected wireless network will be displayed within the Available Networks row.

Figure 92: Wi-Fi Network Page

A screenshot of a mobile application interface for Wi-Fi settings. At the top, there is a header bar with a blue back arrow and the text 'Back' on the left, and a Wi-Fi icon followed by the text 'Network' on the right. Below the header, there are four sections: 1. 'Connection Type' with the value 'Wireless' and a right-pointing chevron. 2. 'Available Networks' with the value 'MyNetwork1' and a right-pointing chevron. 3. 'IP Address' with a text input field containing '10.10.10.4'. 4. 'MAC Address' with the value 'AA:BB:CC:DD:EE:FF'.

Press the **Back** button to exit the page and return to the Tools page. The Network button will refresh and a blue indicator will be displayed indicating that the printer is configured for a Wi-Fi network.

Figure 93: Enter Network Settings Dialog

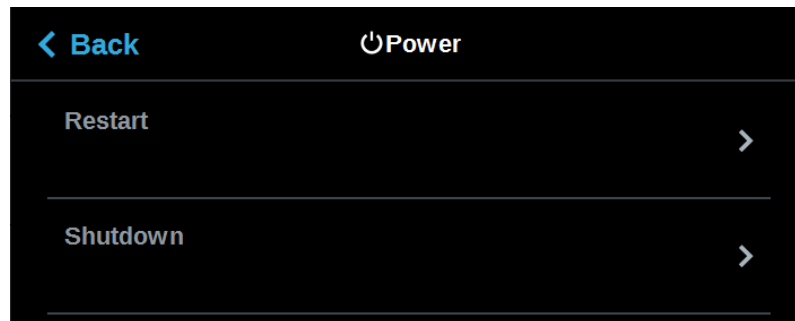


## Power

Within the Power page you can restart or shutdown the printer. It is recommended that you use the Shutdown option within this page to power the printer Off, rather than simply pressing the Power ON/OFF button located on the front of the printer.

To access the Power page, press the **Power** button within the Tools page; a screen similar to the following will be displayed.

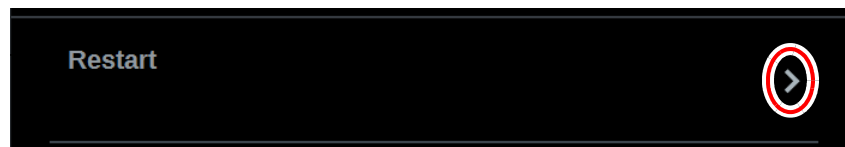
Figure 94: Power Page



## Restart

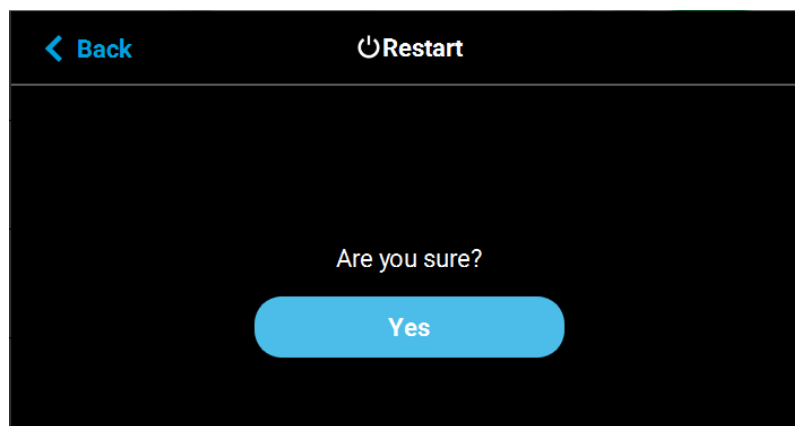
Pressing anywhere within the Restart row will open a dialog allowing you to manually restart the printer.

Figure 95: Restart



Pressing the **Yes** button within this dialog will cause the printer to restart automatically. Press the **Back** button to exit the page and return to the Power page.

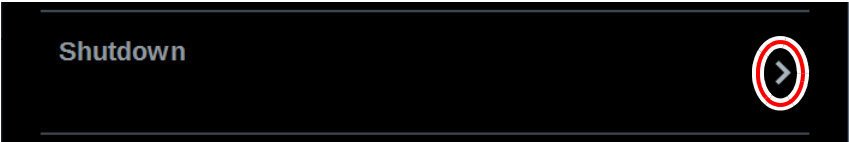
Figure 96: Restart Confirmation Dialog



Shutdown

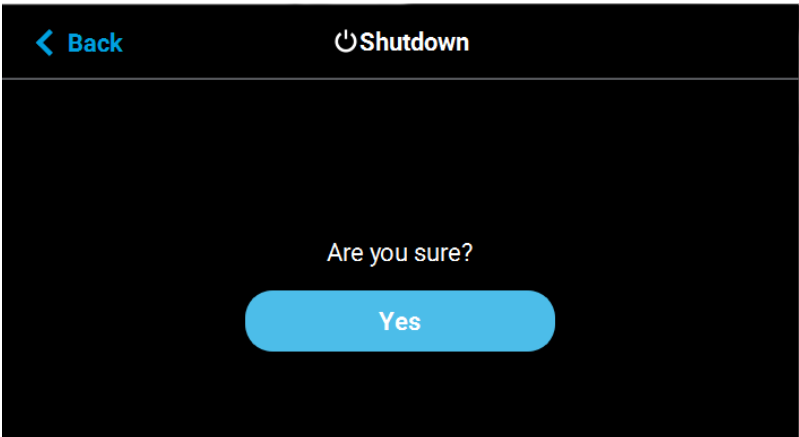
Pressing anywhere within the Shutdown row will open a dialog allowing you to power the printer down.

Figure 97: Shutdown



Pressing the **Yes** button within this dialog will cause the printer to power down. Press the **Back** button to exit the page and return to the Power page.



Figure 98: Restart Confirmation Dialog



Light

The light button is the only option within the Tools page that does not open a new page after being pressed. Instead, the light button allows you to turn the oven light ON and OFF. An indicator within the upper-left corner of the button displays the current state of the oven light (ON or OFF). The light button can appear in the following states:

Table 13: Light Button - Button States

Button State	Description
	Oven light is ON. Selecting the light button in this state will turn the oven light OFF.
	Oven light is OFF. Selecting the light button in this state will turn the oven light ON.



# 5 OPERATING THE PRINTER

This chapter explains basic steps in operating the F770 printer

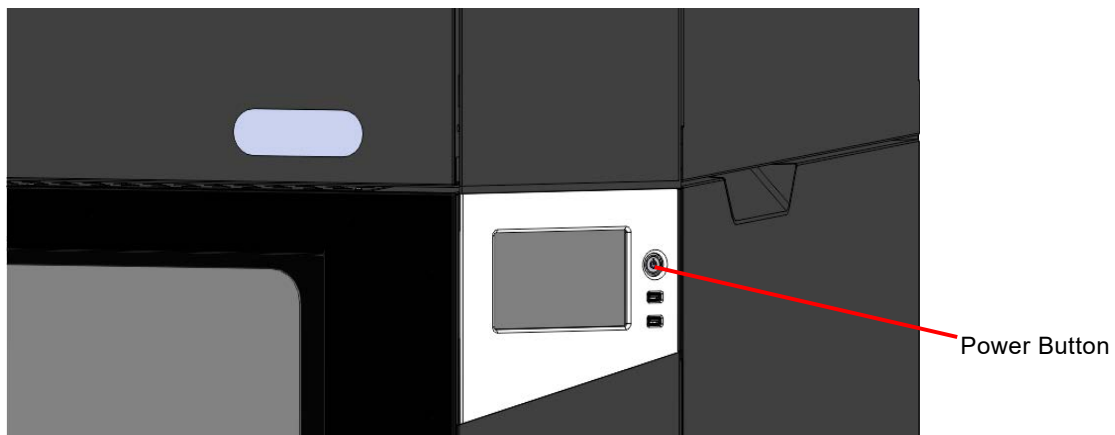
## Basic User Operations

### Powering ON the Printer

To power the printer ON:

1. Connect the power cord directly into a grounded electrical outlet.
2. Press the power button located on the front of the printer.

Figure 1: Power Button Location



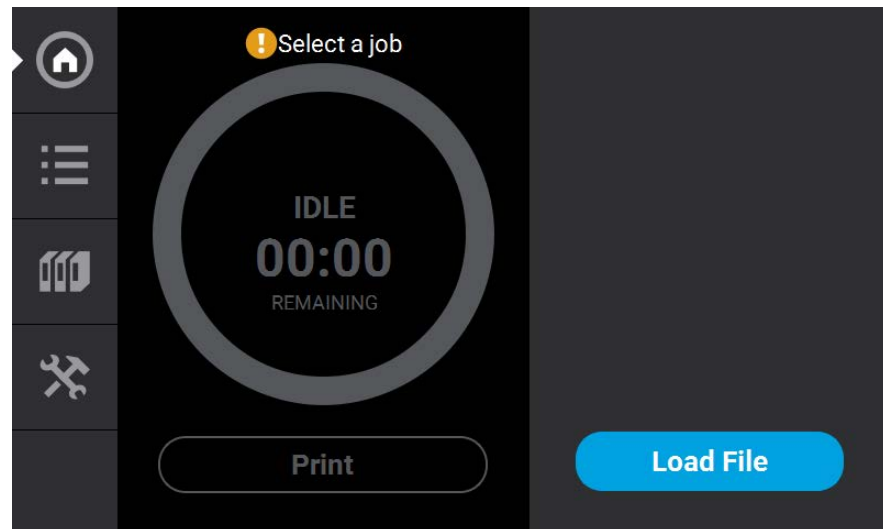
3. The printer will begin to boot. The touchscreen will turn on and begin initializing.
4. The first time the printer is powered ON a dialog will be displayed asking you to select your desired language. Select the radio button corresponding to your desired language by touching its row on the screen, then confirm your selection.

Figure 2: Initializing Start Up Screen



5. After the initialization and start up process is complete, the touchscreen will refresh to display the Build page and the printer will automatically perform an XY Gantry Calibration (see “XY Gantry Calibration” (page 175) for details).

Figure 3: Build Page



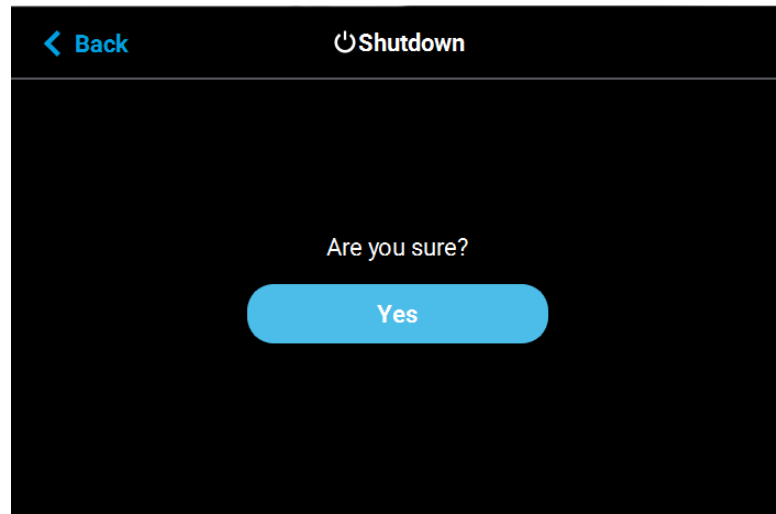
## Powering OFF the Printer

To power the printer OFF:

1. Ensure that the printer is stopped (idle) and is not building.
2. Press the power button located on the front of the printer (see [Figure 1](#) for button location) or access the **Shutdown** option in the **Power** menu of the **Tools** page [Figure 97](#) (page 113).

3. A dialog will be displayed asking you to confirm the power OFF; press **Yes** to power OFF.

Figure 4: Power OFF Confirmation



4. After a couple of minutes the printer will shutdown.

Please note that this procedure only powers down the electronics. To completely disengage power to the printer, you must unplug the power cord located at the rear of the printer.



For extended non-use periods greater than 72 hours, unload the material, store the material in an air tight bag and power OFF the system.

## Loading Material

The information within this section will walk you through the process of loading material to the model and support heads. As you complete the required steps, be sure to observe the status information displayed on the touchscreen.

### Caution:



If the printer remains idle for more than 72 hours, leaving material in the filament tubes could result in a part quality issues due to wet filament. failed build. To prevent this:

- Remove filament from the tubes.

Or

- Unload filament and cut six feet of material from the material coil box.



Loading material can only be done when the printer is stopped (idle) and is not building.

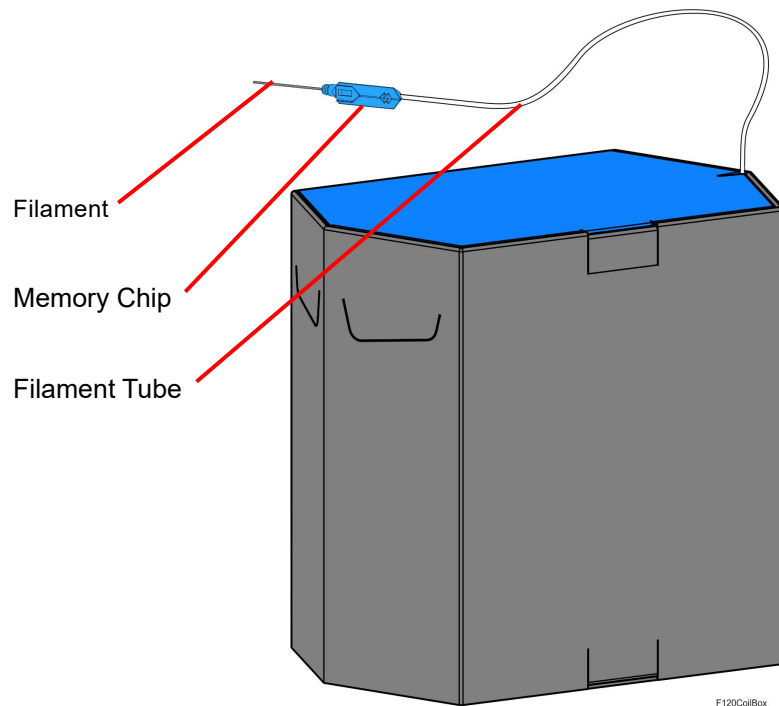
The “[Material Coil Box Preparation](#)” (page 117) section describes the steps necessary to prepare a material coil box for use, and highlights the components of the material coil box. Once a material coil box has been prepared for use, the steps within the “[Connecting Material Coil Box To Printer](#)” section will guide you through the process of connecting a material coil box and loading material to the head.

Two material coil boxes, one for model and one for support, must be connected to the F770 in order for it to build.

## Material Coil Box Preparation

When preparing a material coil box, open the box and route the material tube and filament key through the material routing notches. Close the box. Once the filament tube and key are routed, pull the end of the filament until approximately 1.2 meters of material are outside the material tube. Cut the 1.2 meters of filament using the 5” cutter included in the Welcome Kit. This length of material is removed for moisture control. Refer to [Figure 5](#) for material coil box details.

Figure 5: Material Coil Box Details



The material coil box is ready to be connected to the printer. Follow the steps in “[Connecting Material Coil Box To Printer](#)” (page 118) to connect the material coil box and load material to the head.

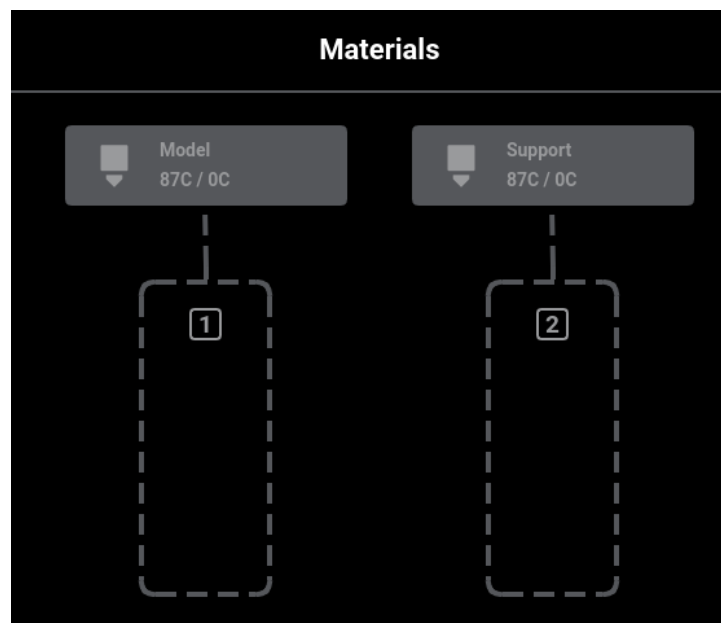
## Connecting Material Coil Box To Printer

Once you've properly prepared a material coil box, you can begin the process of loading material. Pre-loading filament to the drive wheels places the filament into position to be loaded to the liquefier tip within the head.

To connect and load material from a material coil box:

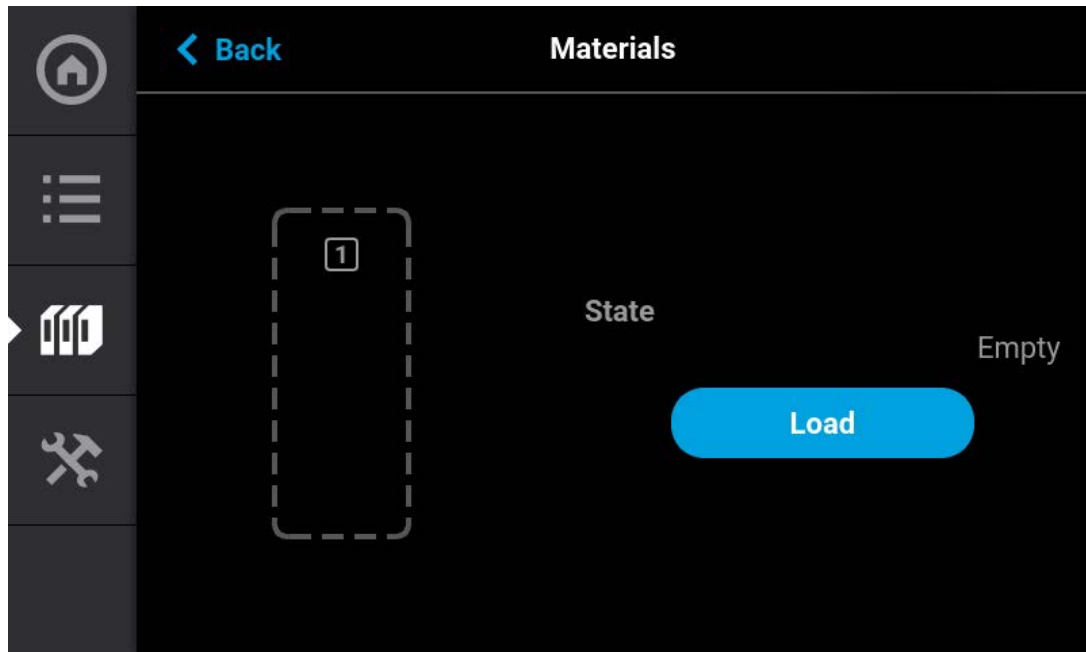
1. Ensure that the printer is stopped (idle) and is not building.
2. Select the **Materials** button from the Navigation Menu; a screen similar to [Figure 6 \(page 118\)](#) will be displayed. The information displayed represents the current configuration of your printer.

Figure 6: Current Configuration - Load Material



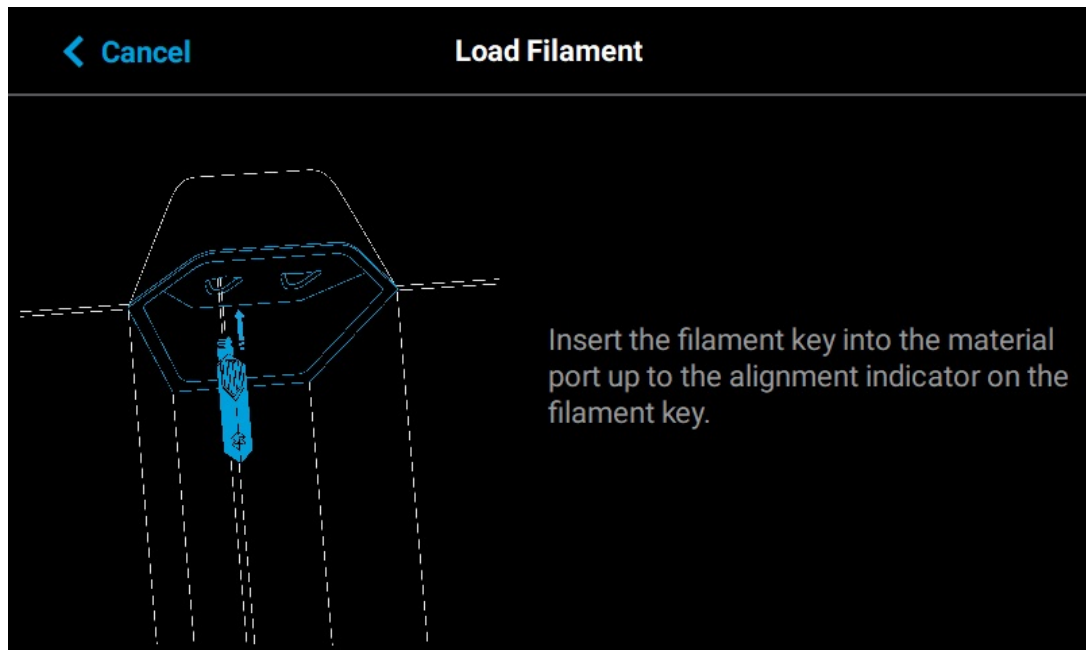
3. Click inside the grey outlined box for the material type (Model or Support) you wish to load. A screen similar to displays. Click the Load button.

Figure 7: Current Configuration - Load Model Material



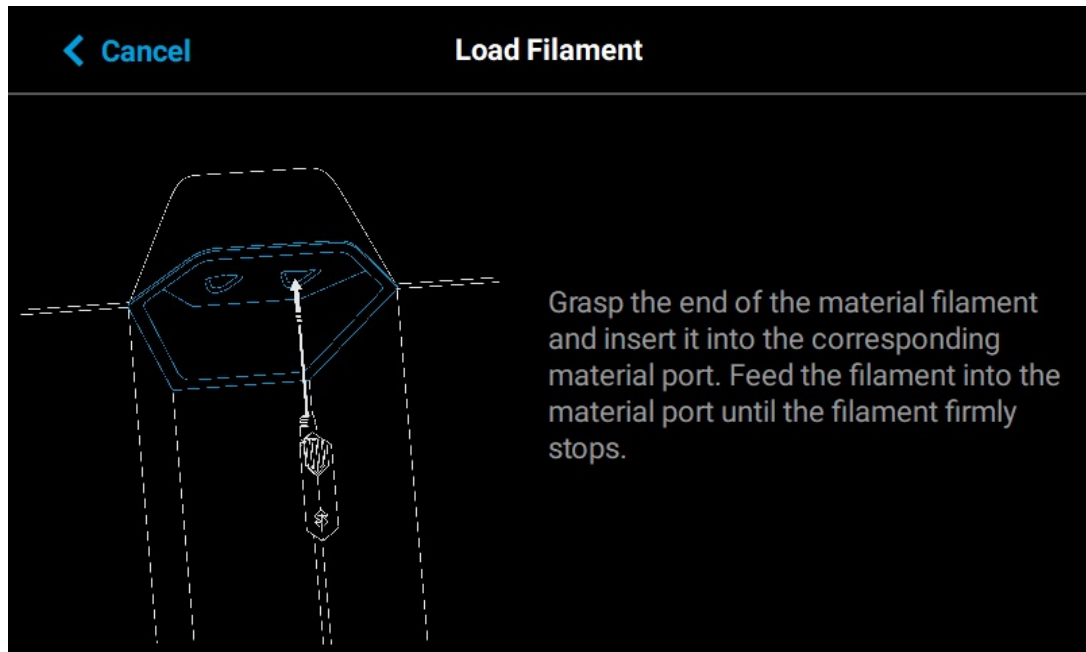
4. Clicking the Load button activates the F770 Material Load Wizard. If loading model material, the screen below displays and a blue LED located near the material port begins blinking rapidly.

Figure 8: Load Material Wizard Screen (model)



5. If loading support material, the screen below displays and the LED located near the material port displays blue and begins blinking rapidly.

Figure 9: Load Material Wizard Screen (support)

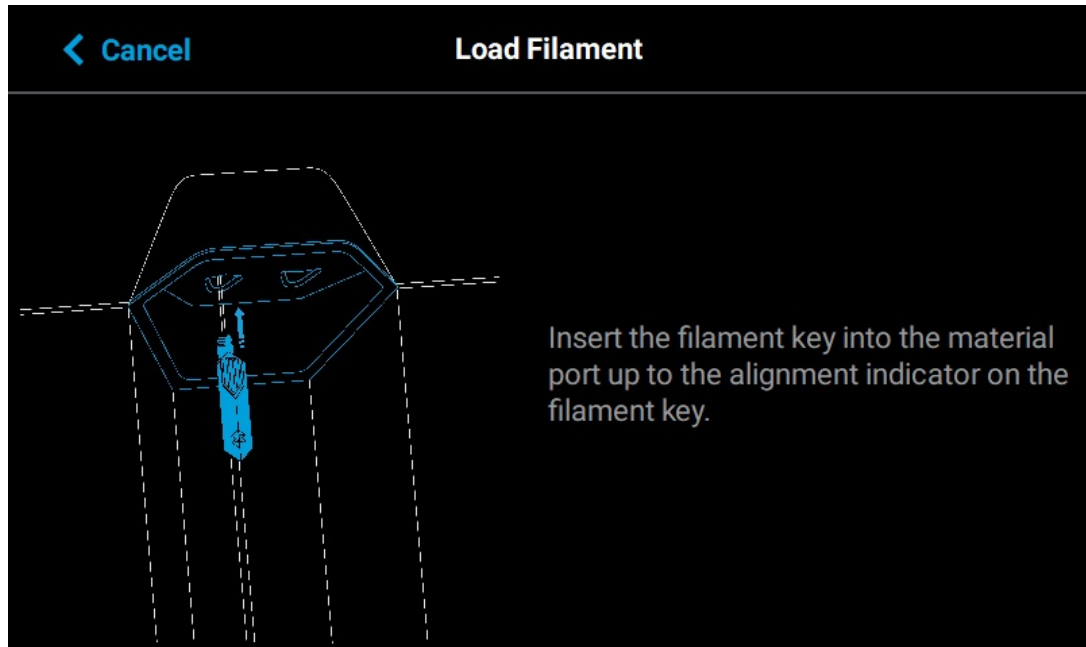


If a time out condition occurs while attempting to load either support or model material, the corresponding LED will display solid red.



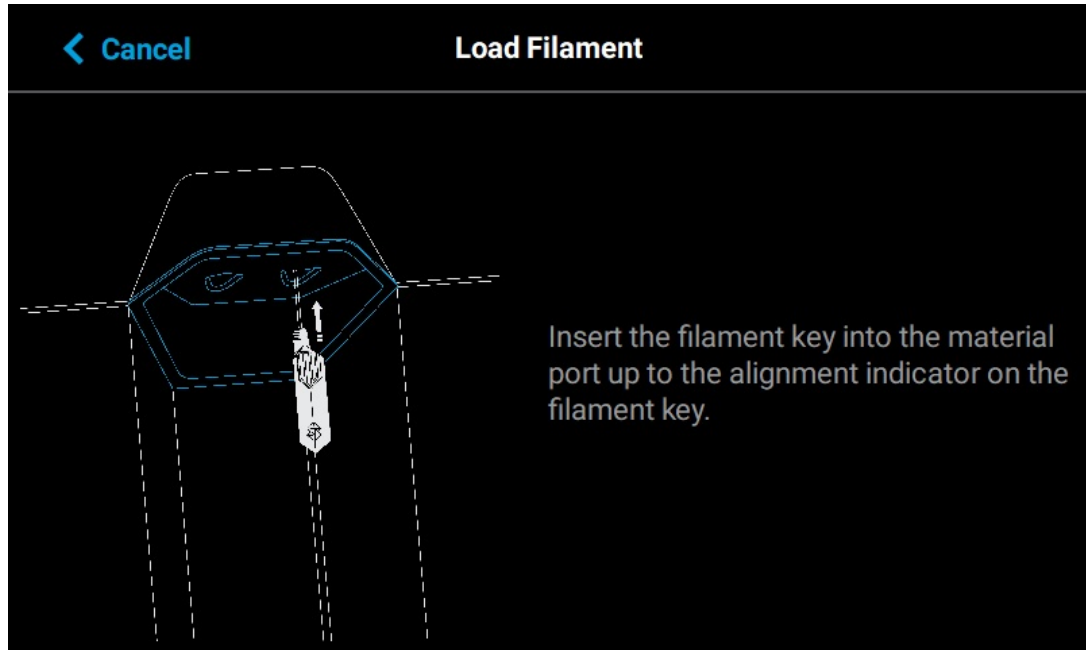
6. Grasp the end of the material filament and insert it into the corresponding material port. Feed the filament into the material port until the filament firmly stops. When the model material reaches the print head, the following screen displays and the LED begins blinking slowly while remaining colored blue.

Figure 10: Insert filament key (model)



- When the support material reaches the print head, the following screen displays and the LED begins blinking slowly while remaining colored blue.

Figure 11: Insert filament key (support)



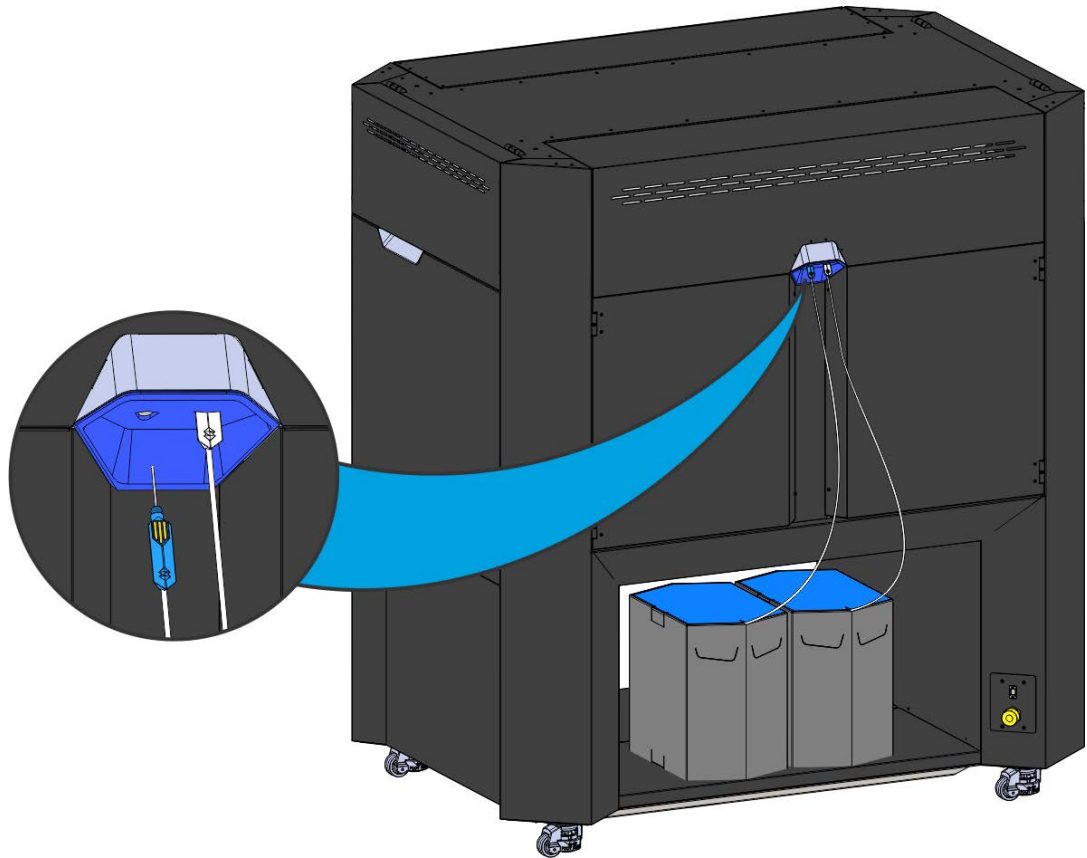
If an invalid key is inserted into the material port, the LED color changes to red and begins to blink slowly.

- Insert the filament key into the corresponding slot (model or support) located on the rear of the printer (see [Figure 12](#)). At this point, the machine will begin to feed the material into the liquefier. After a successful purge cycle, the corresponding LED displays solid blue. Place the material coil box in its corresponding position on the bottom shelf of the printer.



If during the purge process an error occurs, the corresponding LED will display solid red.

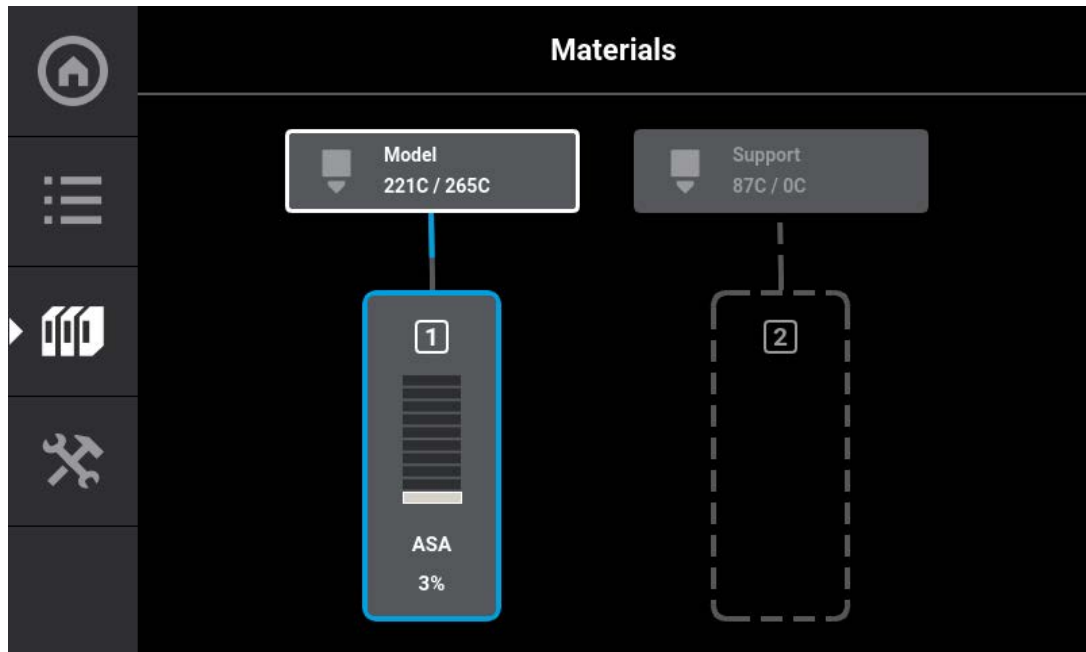
Figure 12: Material Ports



9. Material begins to load to the liquefier tip within the head. The pathway displayed between the Material Status Icon and the corresponding Head Status Icon becomes highlighted to indicate load progress (see [Figure 13 \(page 125\)](#)).
10. When filament reaches the head, it enters the liquefier tip and begins to warm to the material operating temperature (automatic - based on material coil box memory chip data). This step also sets the oven temperature to the correct value for the material being loaded
11. Once the tip is within three degrees of the set point temperature the head moves to the purge area and the tip purges a small amount of material.

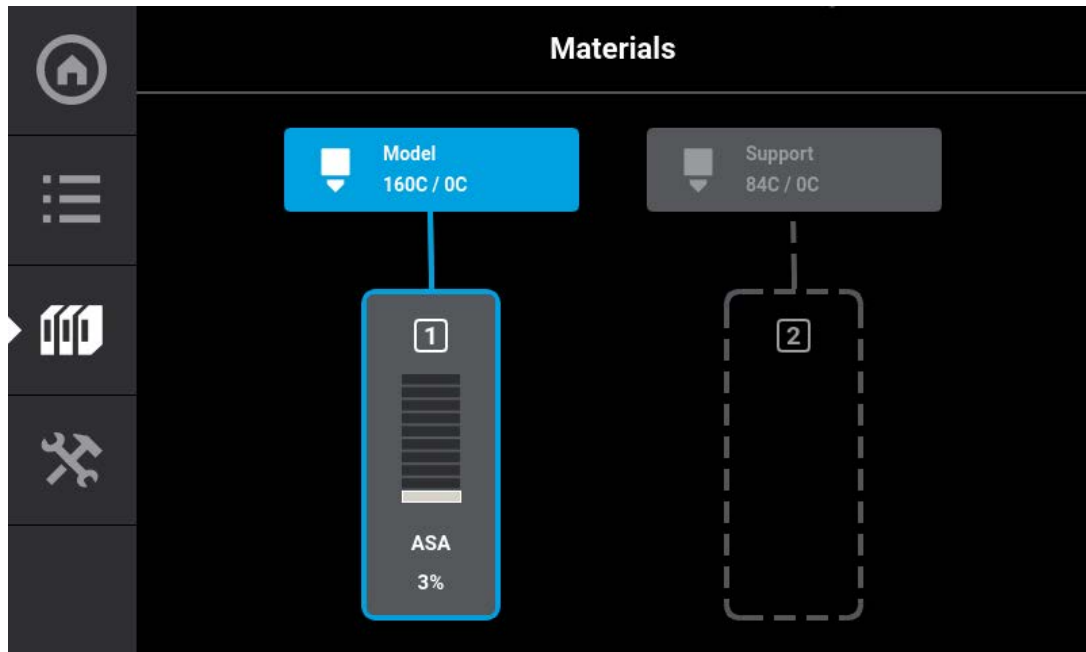
12. Insert the filament key into the corresponding slot. While the material is loading, a screen similar to the one shown below will display.

Figure 13: Material Loading



13. When the load process is complete, a screen similar to the one shown below will display. Material is now loaded to the print head.

Figure 14: Material Loaded



Only one material can be loaded at a time.

14. Press the **Back** button within the Material Details page to exit and return to the Materials page.
15. If necessary, perform this procedure for the support material
16. Once material is loaded, the filament pathway between the Material Status Icon and the corresponding Head Status Icon will be solid blue, the Head Status Icon will turn from gray to blue, and the Material Status Icon will display a solid blue border.

You are now ready to select a job to build, see “[Basic Job Build Tasks](#)” (page 133) for information on selecting and starting a job.

# Unloading Material

**Caution:**

If the printer remains idle for more than 72 hours, leaving material in the filament tubes could result in a part quality issues due to wet filament. To prevent this:

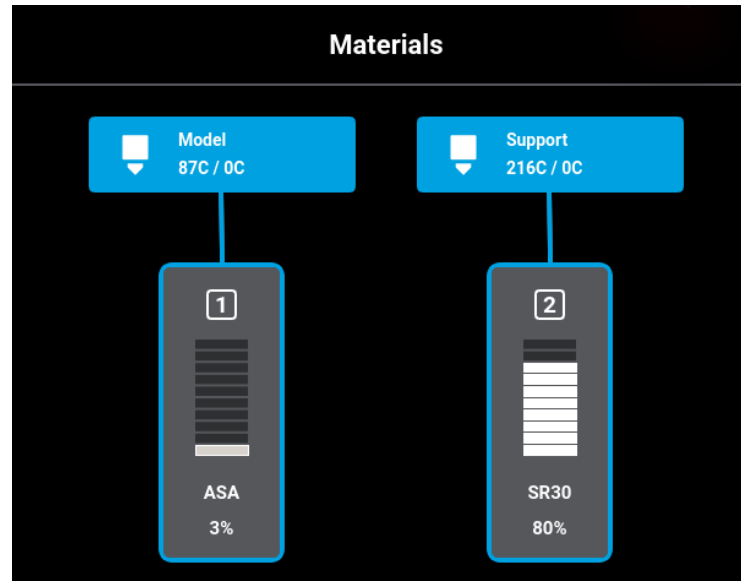
- Unload filament and cut 1.2 meters of material from the material coil box
- Cut the filament approximately 5 centimeters from the end of the filament key. Bend the filament 90 degrees to prevent filament from retracting into the key.
- When re-loading material, pull the end of the filament until approximately 1.2 meters of material are outside the material tube and cut the filament at this point.

Perform the following steps to unload material:

1. Ensure that the printer is stopped (idle) and is not building.
2. Select the **Materials** button from the Navigation Menu; a screen similar to [Figure 15 \(page 128\)](#) will be displayed. The information displayed represents the current configuration of your printer.

3. Observe the status information displayed for each of the Materials Status Icons. For a loaded material, the pathway between the material's Material Status Icon and corresponding Head Status Icon will be solid blue, the Head Status Icon will be blue, and the Material Status Icon will display a solid blue border.

Figure 15: Current Configuration - Unload Material



4. Open the Material Details page corresponding to the material you want to unload by touching its Material Status Icon on the screen.
5. Press the **Unload** button within the Material Details page.

Figure 16: Unload Button

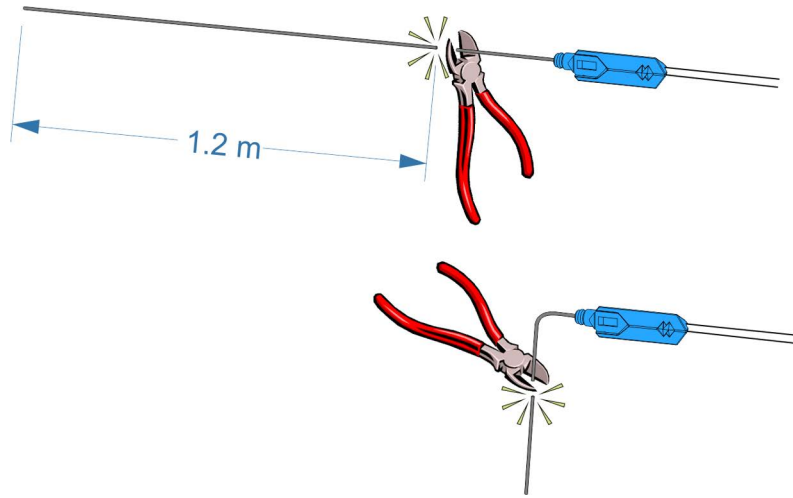


Only one material can be unloaded at a time. If during the unload cycle a time out condition occurs, the corresponding LED will display solid red.

6. The F770 unload material wizard initializes and material begins to unload from the head. The unload process will take several minutes; please be patient. During this process, the corresponding LED will blink red.
  - The pathway displayed between the Material Status Icon and the corresponding Head Status Icon becomes highlighted to indicate unload progress.
  - The Head Status Icon will refresh and become solid gray, indicating that material is no longer loaded to the head.
7. When the material is unloaded from the head and the F770 material unload wizard has completed its process. See Figure 18 (page 129).

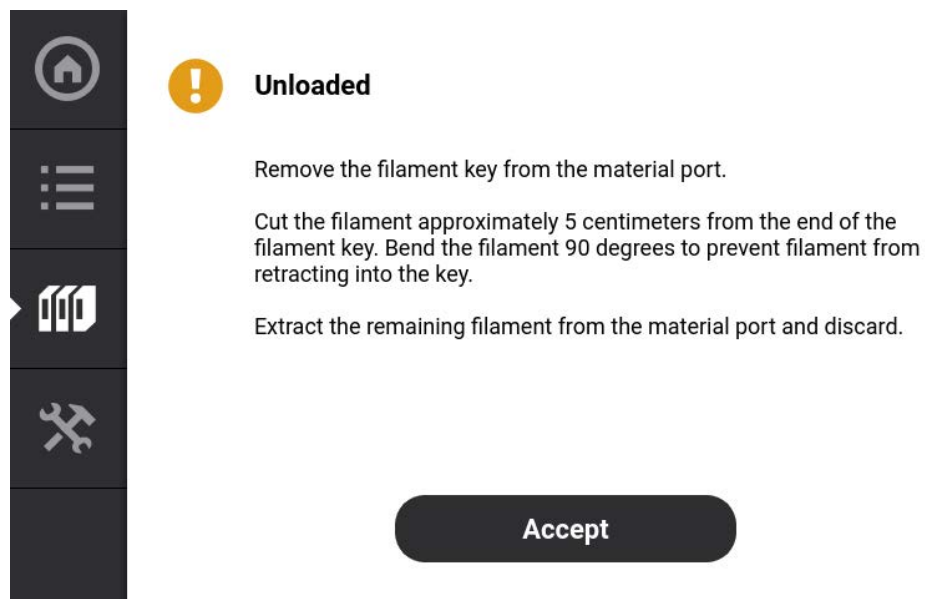
- Remove the filament key from the material port. At this point the corresponding LED will no longer illuminate.
- Cut the filament approximately 5 centimeters from the end of the filament key. Bend the filament 90 degrees to prevent filament from retracting into the key. See Figure 17 (page 129).
- Extract the remaining filament from the material port and discard.

Figure 17: Cut Filament After Unloading



8. Open the material coil box and insert the filament key and filament tube. Close the material coil box.

Figure 18: Material Unloaded Screen





At this point you have the option of loading a different material into the printer or reloading the material you just unloaded (see “Loading Material” (page 116) for detailed instructions).



Empty material coil boxes may have a small, unusable volume of material remaining. The leftover material allows for manufacturing tolerances.

## Handling/Storing Materials

Stratasys FDM thermoplastic materials will maintain proper product performance over an extended period of time, when handled and stored according to recommended procedures. Like other thermoplastics, the filament can absorb moisture when exposed to ambient humidity. Stratasys material coil boxes are designed to minimize moisture exposure while unopened and opened. When a filament absorbs moisture a finished part's surface quality, seam quality, and overall part aesthetics can be affected. Care should be taken to ensure filament remains dry.



**Caution:**

Material storage shall be in the range of 55°F to 86°F (13°C to 30°C), with relative humidity less than 70%.

The model and support material coil boxes hold 200 in<sup>3</sup> (3277 cc) of filament.

Material coil boxes also contain desiccant material; the desiccant is designed to maintain proper moisture levels within the material coil box. Once the desiccant is exposed to ambient air, it can become saturated and ineffective for moisture control. Proper handling of the material coil box is essential to maximizing material life.

## Head Replacement

When a head reaches the 1500 build hours odometer limit, a warning will be displayed on the User Interface and the head's Head Status Icon will be highlighted in red on the Materials page. You can continue using a head which has exceeded its odometer limit, but it is highly recommended that you change the head as part quality will be unpredictable.

## Replacing a Head

The information within this section is meant to guide you through the process of changing a head. Although the instructions below depict the replacement of the model head, the same procedure applies to the support head.



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

When a print head reaches 1500 build hours (odometer limit), a warning will be displayed on the User Interface and the head's Head Status Icon will be highlighted in red on the Materials page. You can continue using a head which has exceeded its odometer limit, but it is highly recommended that you change the head as part quality will be unpredictable.



The following procedure depicts the model head only. The support head procedure is identical to the model head.



The model head is in the front; the support head is in the back.

### Removing the Head



Make sure to disconnect the head ribbon cables while the printer is powered ON to ensure that auto-calibration occurs after re-installation.

1. Unload material from the head to be replaced.
2. With the printer powered on, open the top right access door. See [“Opening Top Access Doors Left/Right” \(page 194\)](#).

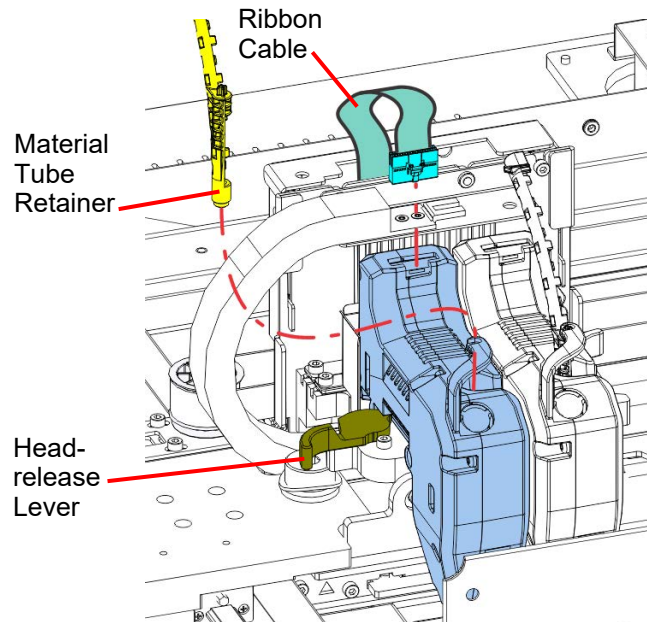


Power is automatically removed from the head and all motors when the top right access door is opened. During maintenance procedures, the top right access door must remain open to ensure that the interlock is disengaged.

3. Move the head carriage to the right side of the gantry enclosure.
4. Depress the release tab and unclip the head ribbon cable from the top of the head. See [Figure 19](#).
5. Remove the material tube and retainer from the head. See [Figure 19](#).

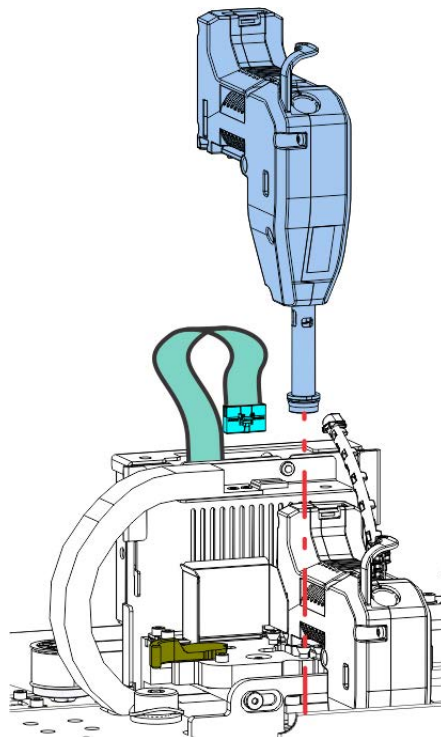
6. Unlock the head-release lever on the toggle assembly. See Figure 19.

Figure 19: Head Connections



7. Lift the head out of the gantry enclosure and remove it from the printer. See Figure 20.

Figure 20: Head Detail



### Installing the Head

1. Insert the new head into the unlocked head carriage assembly. See [Figure 20](#).
2. Lock the head into place using the head release lever. Press the lever securely closed to ensure the head is properly seated. See [Figure 19](#).
3. Connect the material tube and retainer to the new head. See [Figure 19](#).
4. Insert the head ribbon cable connector into the new head and ensure it is fully seated and the connector retention latch engages. See [Figure 19](#).
5. Close the top right access door.
6. Perform an Automatic Tip Calibration. See “Automatic Tip Calibration” (page 160) for details. Please note that the printer must be powered ON before calibration can occur.
7. Perform a Manual Tip Calibration. See “Manual Tip Calibration” (page 163).

## Basic Job Build Tasks

### Before a Build

To build a job, you must first download job files to the printer and then load individual job files to the Job Queue using one of two methods:

1. Network transfer via the GrabCAD Print application on your workstation PC. This is the preferred method for adding jobs to the Job Queue. See “[GrabCAD Print Method](#)” (page 59) for detailed instructions.
2. USB method via a USB flash drive inserted into one of the available USB ports. See “[USB Method](#)” (page 59) for detailed instructions.

The GrabCAD Print option allows you to select a job which was processed and sent to the printer (via your facility’s Ethernet connection or via Wi-Fi) using the GrabCAD Print application on your workstation PC. Jobs are sent in CMB format and placed directly into the Job Queue (stored on the printer’s hard drive). The CMB file contains the processed job’s basic information; this information is used to verify job compatibility with the printer’s existing configuration. For information on using GrabCAD Print, see the associated Help file within the GrabCAD Print application.

The USB option allows you to select a job file which is stored on a USB flash drive inserted into one of the available USB ports (see [Figure 3 \(page 32\)](#) for port locations). This method can be used as a backup to the GrabCAD Print method if you are unable to transfer job files to the printer via your network connection (due to poor connectivity, a network outage, etc.) and provides a convenient option for you to reprint a common job. Alternatively, you have the option of selecting a single job file off of a USB flash drive and printing it directly within the Build page. This option is only available if the Job Queue is empty. See “[Loading a File](#)” (page 50) for details.

## Installing a Build Sheet

To install a build sheet and prepare the printer for a build:

1. Power ON the printer (see “Powering ON the Printer” (page 114) for instructions).

**Warning: Hot Surface Hazard**

Always wear proper heat protective gloves and clothing when handling items inside the oven, as surfaces within the oven can be very hot.

**Caution:**

To ensure a successful build, allow the oven to reach thermal stabilization and idle temperature before turning on platen vacuum. It will take approximately one 1 hour for the printer oven to reach thermal stabilization when starting from room temperature.

**Caution**

Do not bypass the printer warning screen to turn on platen vacuum.

2. Open the oven door and clean the platen, as needed, to remove any debris. Make sure that the tip wipe assembly's brushes as well as the printer's tips are clean and that the purge area is free of purged material debris. Close the oven door.
3. Prepare the build sheet by removing the build sheet from its packaging.



Install the build sheet as quickly as possible to prevent the oven temperature from dropping below the stabilization point. This process should be completed in less than two minutes.

4. Once the oven has stabilized, open the door and install the build sheet with the smooth side down. Ensure the build sheet is centered on the platen before closing the door.
5. Allow the build sheet to thermally stabilize for 20 seconds and then turn on the platen vacuum by pressing the Vacuum Control icon on the User Interface.
6. Confirm a good vacuum seal between the platen and the build sheet.



A properly installed build sheet does not need to be adjusted between successive builds.



Never print multiple build jobs in the same location on a build sheet. Using build sheets not provided by Stratasys may impact part quality and printer reliability.

## Selecting a Job to Build

1. Populate the Job Queue as described within “Before a Build” (page 133).
2. Select the **Queue** button within the Navigation Menu; the Queue page will open to display the Job Queue.
3. Within the Job Queue list, locate the job you’d like to build and select it by touching its row on the screen; doing so will open its Job Details page.



Jobs are built in the order in which they appear within the Job Queue. To build a specific job, that job must be listed as the first item in the Job Queue. Use the Job Queue Control buttons to sort job files as needed (see “Editing the Job Queue” (page 62) for details).

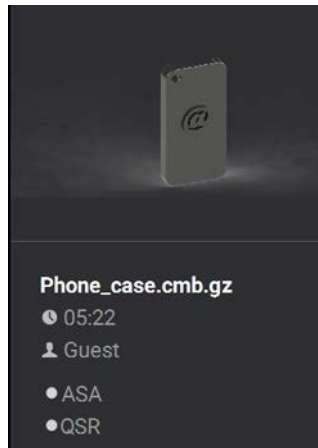
4. Within the Job Details page press the **Print** button; this will queue the job for printing. Depending on your printer’s part placement setting configuration a dialog may be displayed (see “Part Placement” (page 90)).
  - If the Enable Part Placement setting is set to Off (default setting), a dialog will not be displayed and the job will automatically be built in the center of the build sheet.
  - If you set the Enable Part Placement setting to On, a dialog will be displayed allowing you to select the job’s build location (see [Figure 29 \(page 145\)](#)). The dialog contains a graphic representing your printer’s platen as well as a blue bounding box graphic (the imaginary box surrounding the part). Select the job’s build location by dragging and dropping the bounding box on the touchscreen. When finished, press the **Print** button within the dialog to confirm your selected placement and start the build.
5. The Build page will open and the oven will begin to heat to a set point temperature determined by the material types specified for the job. Please be patient.
6. After the oven and liquefier tips reach temperature the printer performs a Z Zero Calibration. "PREPARING" is displayed within the Build Status Display while this calibration occurs.
7. Once Z Zero Calibration is complete the printer begins building the job. "BUILDING" is displayed within the Build Status Display as the part is being built (see “[Information Available During a Build](#)” (page 136)).
8. When finished, text is displayed on the touchscreen indicating that the completed part can be removed from the printer (see “[After a Build is Complete](#)” (page 141)).

## Information Available During a Build

During a build, information pertaining to that build is displayed within two areas of the Build page:

The Print Job Information Panel displays the details of a job, as submitted to the printer from the workstation PC. This information is static and is for reference purposes only. See “[Viewing Print Job Information](#)” (page 53) for detailed information.

Figure 21: Print Job Information Panel - Building



Information displayed within this panel for a selected job includes:

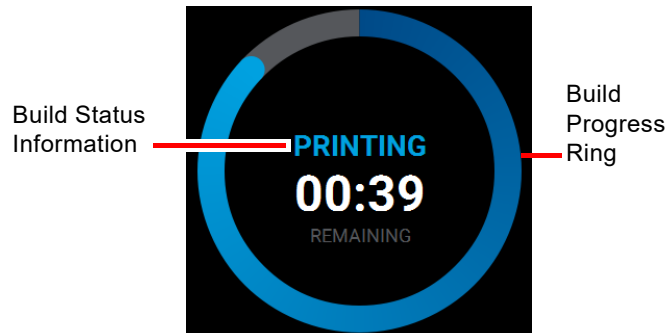
- Name of the job.
- Estimated build time for the job.
- Name of the user that submitted the job.
- Model and support materials associated with the job.

The Build Status Display section of the Build page is composed of a two-part graphic which provides information on a building job. See “[Build Status Display](#)” (page 54) for detailed information.

- The Build Status Information portion of this graphic provides information on a selected and/or building job. Text pertaining to the current status of the build is displayed within the upper portion of the graphic, while the amount of build time remaining is displayed within the lower portion of the graphic.
- The outer Build Progress Ring corresponds with the build information displayed. As build progress is made, the build’s percentage of completion is also displayed by radially filling in the outer progress ring, in blue, in a clockwise direction.

- Touching the screen within the center of the Build Status Display while a part is being built will toggle the information displayed. After touching the screen the time estimation information will be hidden from view and instead the Build Status Display will show the number of completed layers as compared to the total number of layers in the build. Touching the screen again, will toggle back to the time estimation information displayed initially.

Figure 22: Print Job Status Overview



## Build Warnings

If the printer detects an issue that may affect a build, it will be indicated within the Notifications Display portion of the “Build Page” (page 49). A yellow or red notification badge icon will be displayed, depending on the severity of the warning/error, along with text indicating the reason(s) for the warning. Touching the text on the screen will open a dialog indicating the reason(s) for the notification, and in some cases, steps to correct the notification (see Figure 4 (page 49)).

Depending on the type of warning, a notification badge icon may also be displayed within the “Material Status Icons” (page 72) of the “Materials Page” (page 66). Touching the notification badge icon on the screen will open the corresponding material’s Materials Details page and provide information indicating the cause of a warning/error.

- When loading and unloading materials you may encounter load related warnings which need to be resolved prior to starting a build.
- When starting a build you may encounter a variety of warnings pertaining to the printer’s current materials configuration. If the printer has not been calibrated, the materials installed within the printer do not match the requirements of the build, or the printer does not contain enough material to complete the build, you will receive a warning instructing you to resolve this issue.



You can choose to ignore the warning and continue the build, but part build quality will be unpredictable. A warning generated from a mis-match of model/support material cannot be bypassed.

- In some cases, the warning will prevent you from starting a build and will need to be corrected before the printer can build a part.



- While the printer is building, various pause and abort related warnings may be displayed. Some of these warnings may be due to a manual pause or abort, while others may be the result of the printer automatically pausing or aborting a build. Depending on the severity of the warning you may or may not be able to resume building.

See “[Warnings and Errors](#)” (page 244) for a detailed list of the warnings you may encounter, and instructions on how to correct them.

## Pausing a Build

During a build the Pause button within the Build page becomes selectable (see “[Pause Button](#)” (page 57) for details). The printer can pause automatically, or be manually paused using this button:

- An automatic pause occurs when a material coil box runs out of material, a failure is detected, etc.
- A manual pause occurs whenever the **Pause** button is pressed.

When the printer is directed to pause:

1. The current toolpath is completed, the Z stage is lowered slightly, and then the head assembly is parked. "PAUSED" is displayed within the Build Status Display (see [Figure 23](#)).

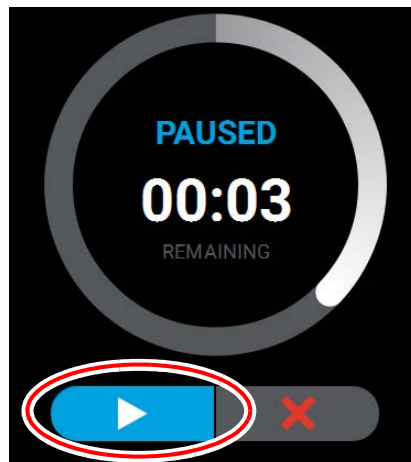
If an automatic pause occurs, text will be displayed within the Notifications Display portion of the Build Page. Touching the text on the screen will open a dialog indicating the reason for the pause condition (i.e. empty material coil box). Correct this condition and then press the **Close** button to exit the dialog. (See “[Build Pause Warnings](#)” (page 250) for a list of pause related warnings/errors and resolution instructions.)

2. The Pause button will toggle and instead display the Play button. To resume building, press the **Play** button. A resume command will be sent to the printer instructing it to resume the build (see [Figure 23](#)).



The printer will not resume building instantaneously, please be patient. If the oven door is open the part will not resume building immediately. Touch the text displayed within the Notifications Display portion of the Build page to check for any errors in order to troubleshoot this situation.

Figure 23: Build Paused



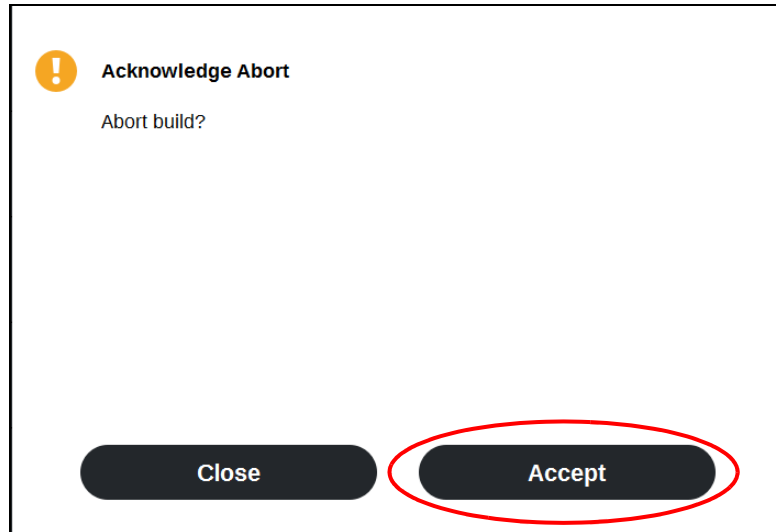
3. Once the build resumes, "BUILDING" will be displayed within the Build Status Display and the Pause button will be displayed in its unselected state (see [Table 3 \(page 57\)](#)).

## Aborting a Build

When the printer is building, you have the option of directly aborting the build. To do so:

1. The Abort button within the Build page will be selectable (see “Abort Button” (page 57) for details), press the **Abort** button.
2. A dialog will be displayed allowing you to confirm or cancel the abort; press the **Accept** button within the dialog to confirm the abort.

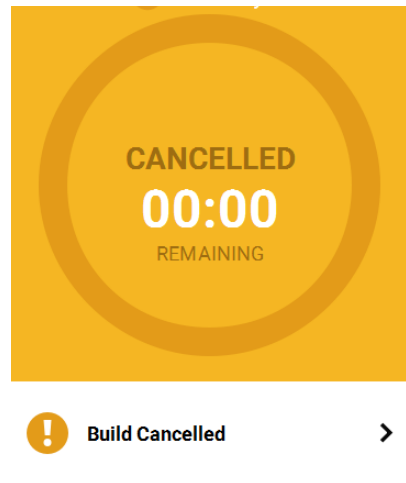
Figure 24: Abort Confirmation Dialog



3. An abort command will be sent to the printer and the confirmation dialog will close.
4. The Z stage will move to its end of travel. Once the Z stage reaches its end of travel the Build page will refresh and display a confirmation of the aborted build; "CANCELLED" will be displayed within the Build Status Display (see Figure 25 (page 141)).

5. The Print Job Control buttons will be hidden and instead "Build Cancelled" will be displayed within this portion of the Build page. Touching this text on the screen will open a dialog with instructions on how to remove the aborted build and prepare for your next build (see Figure 25).

Figure 25: Build Page Build Canceled



## After a Build is Complete

After the completion of a build, the printer performs the following actions:

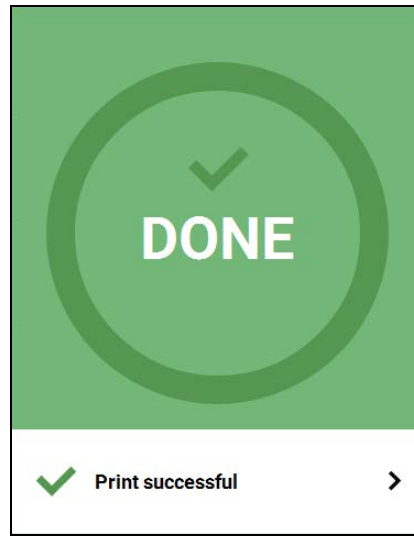
- The Z stage is lowered and the head assembly is parked.
- "DONE" is displayed within the Build Status Display (Figure 26 (page 142)).
- The Print Job Control buttons will be hidden and instead "Print successful" will be displayed within this portion of the Build page. Touching this text on the screen will open a dialog with instructions on how to prepare for your next build.

- The Build button will display a green checkmark icon indicating that the build completed successfully.



If the build was terminated abnormally, a warning indicator will be displayed on the screen. See “Build Abort Errors” (page 253) for a list of abort related warnings/errors and resolution instructions.

Figure 26: Print Successful Dialog



## Removing a Part from the Printer



### Warning: Hot Surface Hazard

Always wear proper heat protective gloves and clothing when handling items inside the oven, as surfaces within the oven can be very hot.

To remove a part from the printer:

1. Open the oven door.
2. Lift a corner of the build sheet to release vacuum.



### Caution: Damage to Equipment

Use caution if removing a part from the build sheet while the build sheet is on the platen. Damage to the platen or the platen level can result.

3. Remove the build sheet from the platen.
4. Carefully remove the part from the build sheet.

# Changing Printer Defaults

Several factory presets can be changed via the options within the Tools page. To access this page, press the **Tools** button within the Navigation Menu.

The options within the Tools page are organized into 6 categories: Settings, Calibration, Maintenance, Network, Power, and Light. The defaults specified within the following instructions are accessible via the Settings page. To open this page press the **Settings** button within the Tools page.

After making the necessary adjustments to a default setting, press the **Back** button in the upper-left corner of the page to exit and return to the main Settings page.

## Job Storage

The Keep Previous Job setting determines whether or not the printer's previous job is stored within the Job Queue once a build is complete (see [“Wait for Part” \(page 88\)](#)). If you're concerned about other users of your printer seeing what you've built, this setting will prevent the printer's previous job from being accessible after the build is complete. By default this setting is set to On, meaning that the printer's previous job file is stored within the Job Queue making it available for re-selection upon completion of the build.

When this setting is set to Off, the printer's previous job file will be deleted from the Job Queue upon completion of the build. The job's file will need to be resent to the printer in order to be built again.

To configure this setting, press anywhere within the Keep Previous Job row; the Keep Previous Job page will be displayed. Use the radio buttons within this page to turn the setting On and Off as needed.

Figure 27: Keep Previous Job



## Part Build Location

The Part Placement setting determines whether or not you can select a job's placement on a build sheet prior to starting the build (see [“Part Placement” \(page 90\)](#)).

To configure this setting, press anywhere within the Part Placement row; the Part Placement page will be displayed. Use the radio buttons within this page to turn the setting On and Off as needed.

Figure 28: Configure Part Placement

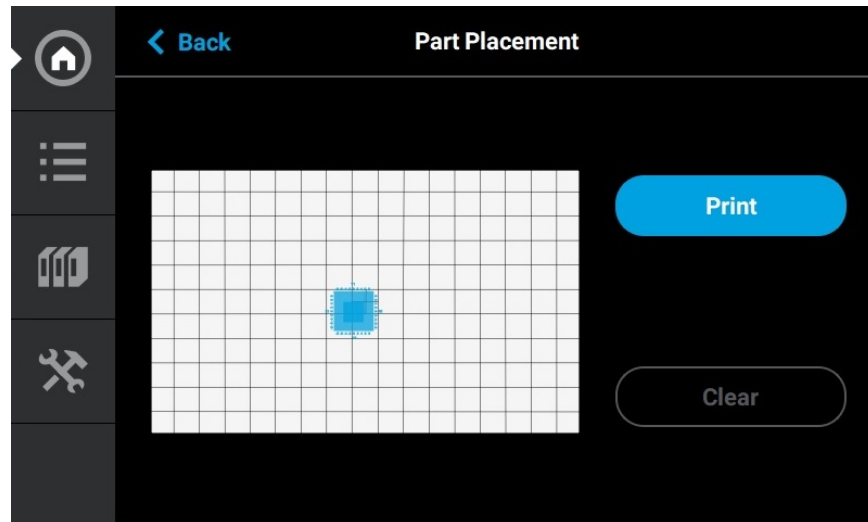


By default this setting is set to On, meaning you will be able to select a job's location on the build sheet prior to starting the build (see [“Selecting a Job to Build” \(page 135\)](#)). At the start of a build the Part Placement dialog will be displayed asking you to select the part's build location (see [Figure 29 \(page 145\)](#)). The dialog will contain a graphic representing your printer's platen as well as a blue bounding box graphic (the imaginary box surrounding the part). You can select the part's build location by dragging and dropping the bounding box on the touchscreen; the bounding box cannot be placed outside the limits of the platen. Pressing the **Print** button will confirm your selected placement and start a build.

"Ghost box" graphics are also displayed; a "ghost box" represents the location where a part was built previously. Pressing the **Clear History** button will clear the display, removing all "ghost box" items.

When this setting is set to Off the Part Placement dialog will not be displayed prior to the start of a build. Single part jobs will be built in the center of a build sheet while packs will be built according to their selected placement within GrabCAD Print.

Figure 29: Part Placement Dialog

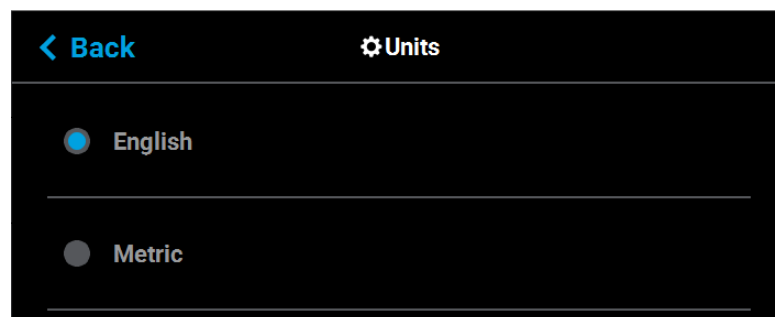


## Display Units

By default the UI is configured to display English units (inches). However, you can adjust this setting as needed to have the UI display metric units.

The Units setting determines the type of units that the printer is configured for, English or Metric. To configure this setting, press anywhere within the Units row; the Units page will be displayed. Use the radio buttons within this page to select between English and Metric units.

Figure 30: Configure Units





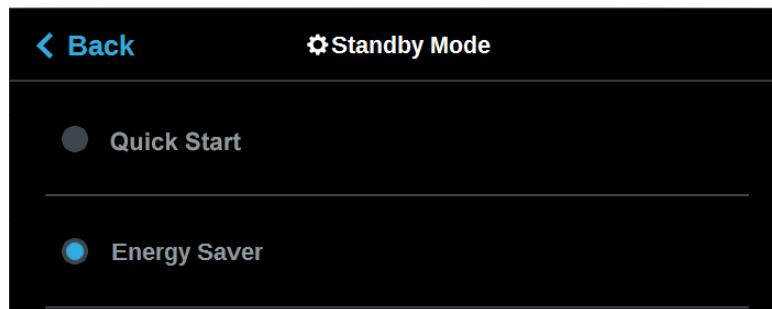
## Oven Temperature Control

Oven modeling temperature is determined by the material type (model and support) loaded within the printer. It is controlled by the printer's software and cannot be modified; however, you do have control of some oven temperature functions.

The Standby Mode setting gives the ability to put the printer into an energy saving state after the completion of a build (see [“Standby Mode” \(page 93\)](#)). When the Energy Saver option is selected (i.e. Standby Mode is turned On) the printer's oven will automatically shut off 2 hours after the completion of a build, thus saving energy. When the Quick Start radio button is selected (i.e. Standby Modes is turned Off) the printer's oven will remain On at the material's build temperature.

To configure this setting, press anywhere within the Standby Mode row; the Standby Mode page will be displayed. Use the radio buttons within this page to turn the Energy Saver option On and Off.

Figure 31: Configure Standby Mode

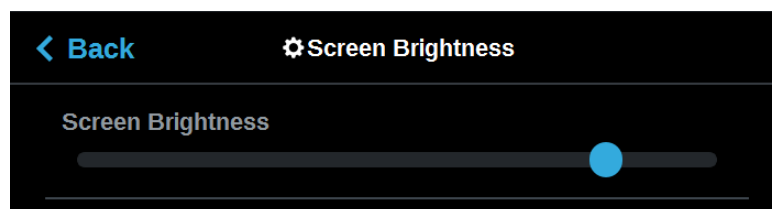


## Touchscreen Display Brightness

The Screen Brightness setting allows you to adjust the brightness of the touchscreen display (see [“Screen Brightness” \(page 94\)](#)). By default, the touchscreen display is configured to be at approximately 80% brightness.

To configure this setting, press anywhere within the Screen Brightness row; the Screen Brightness page will be displayed. Use the slider graphic to adjust brightness as needed; sliding to the right will increase brightness, while sliding to the left will dim brightness. Please note that you cannot set screen brightness to 0% (completely dim). After exiting the Screen Brightness page the configured brightness will be displayed as a percentage within the Screen Brightness row.

Figure 32: Adjust Screen Brightness



## Display Language

By default the text within the UI is displayed in English. However, you can adjust this setting as needed to have the UI exhibit a different language. In addition to English the display language can be set to Spanish, French, German, Italian, Russian, Chinese, and Japanese.

The Language setting determines the language that the UI is configured for. To configure this setting, press anywhere within the Language row; the Language page will be displayed. Use the scrollbar (along the right side of the page) to view the list of available languages. Select the radio button corresponding to your desired language.

Figure 33: Configure Language



## Printer Status

The various pages of the User Interface display each of the following:

- Head odometer status
- Material status
- Temperature status
- Controller Software version
- Other printer information

## Head Odometer Status

The printer tracks and displays the total amount of material extruded through a head since it was last replaced. Head odometer values can be determined via the head's Head Details page. To locate this information press the **Materials** button within the Navigation Menu, the Materials page will be displayed. Two “[Head Status Icons](#)” (page 67), one corresponding to the model head and the other corresponding to the support head, are displayed within the upper

portion of the Display Area of the page. Touching one of these icons on the screen will open that head's Head Details page (see [“Viewing Head Details” \(page 69\)](#)). Odometer information for the selected head is displayed within the right half of the Head Details page (see [Figure 26 \(page 70\)](#)).

The Head Status Icons can become yellow or red based on the head's odometer (see [Table 6 \(page 67\)](#)). An accompanying warning/error notification will be displayed within the Materials page when a head is in a warning or error state resulting from odometer related information (see [“Head Warnings” \(page 255\)](#) and [“Head Errors” \(page 255\)](#)). An icon with yellow coloring indicates a warning, reminding you that the head is reaching its odometer limit. An icon with red coloring indicates an error, reminding you that the head has exceeded its odometer limit. You can continue using a head which has exceeded its odometer limit, but it is highly recommended that you change the head as part quality will be unpredictable. Warning and error states will be indicated on the User Interface until the head is replaced, and you will be required to acknowledge the notification associated with these states prior to the start of each build.

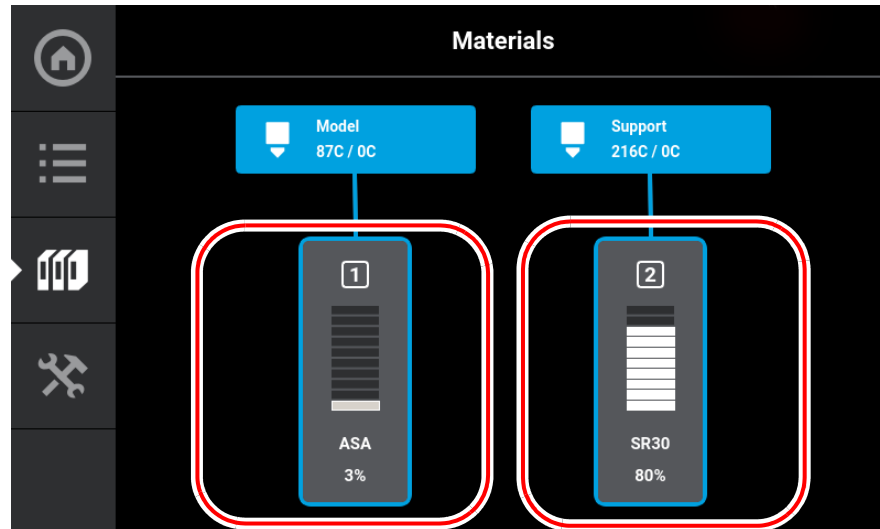
## Materials Status

The current status of each of the material coil boxes connected to the printer can be viewed via the Materials page. To locate this information:

1. Press the **Materials** button within the Navigation Menu; the Materials page will be displayed.
2. The Display Area of this page contains two material status icons ([Figure 34 \(page 149\)](#)). The left icon pertains to the printer's model material while the right icon pertains to the printer's support material. The number displayed within the top of the icon indicates which material slot the material coil box is connected to (1 or 2). The colored bars (displayed within the center of the icon) and percentage (displayed at the bottom the icon) indicate the current volume of material in the box. The name of the type of material in the box is displayed at the bottom of the icon.

3. Touching one of these icons on the screen will open that material's Material Details page (see "Viewing Material Details" (page 74)).

Figure 34: Materials Status Locations



Icons and filament pathways will take on a variety of colors and highlighted states, depending on their status (see [Table 7 \(page 73\)](#) for detailed status explanations). Coloring pertains to both model and support Material Status Icons:

- Blue border - indicates that a valid material coil box is connected to the corresponding material slot, the blue filament pathway indicates that material from the box is loaded to the head and is selected to be used for building.
- Gray (dashed border) - an icon that is blank in the center with a gray dashed border and gray dashed filament pathway indicates that a material coil box is not connected to the printer.
- Yellow - an icon with yellow coloring indicates an issue/warning (see "Warnings and Errors" (page 244) for more information).
  - A volume of 0% accompanied by solid yellow coloring indicates an empty material coil box.
- Red - an icon with red coloring indicates an error (see "Warnings and Errors" (page 244) for more information).
  - A red border with a notification badge in the center of the icon indicates that the material coil box is invalid (i.e. not licensed or not compatible with the associated head type).
  - A red border with a notification badge within the center of the filament pathway indicates a load related error.
  - A semi-solid red icon indicates that an error occurred when checking the data on the material coil box's memory chip and the box is unusable.
  - A solid red icon indicates that communication with the material coil box is not possible.

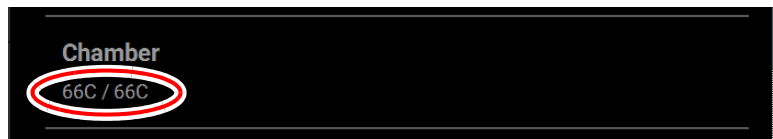
# Temperature Status

## Oven Temperature

The oven's temperature can be viewed via the Maintenance page. To locate this information:

1. Press the **Tools** button within the Navigation Menu; the Tools page will be displayed.
2. Press the **Maintenance** button within the Tools page; the Maintenance page will be displayed.
3. Locate the Chamber row within the page. The printer's current and set point oven chamber temperatures are displayed within this row.

Figure 35: Maintenance Page Oven Chamber Temperature



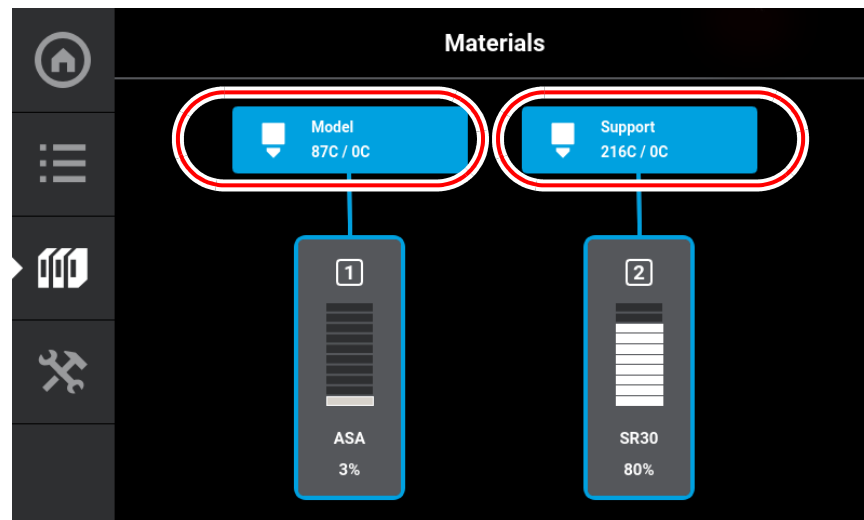
## Head Temperature

To view temperature information pertaining to the model and support heads within the Materials page:

1. Press the **Materials** button within the Navigation Menu; the Materials page will be displayed.
2. The Display Area of this page contains two Head Status Icons, one corresponding to the model head and the other corresponding to the support head. (See [“Head Status Icons” \(page 67\)](#) for details). The head's current temperature as compared to its set point temperature is displayed within the lower portion of the icon.

3. Touching one of these icons on the screen will open that head's Head Details page. The same temperature information is displayed within this page for both the model and support heads.

Figure 36: Materials Page Head Temperatures



## Software Version

Version information for the software used to control the printer (Controller Software) can be accessed via the Maintenance page:



Controller Software is installed on a flash device located on the Controller board and should not be confused with GrabCAD Print software, which is installed on the workstation PC.

1. To access the Maintenance page, press the **Maintenance** button within the Tools page (see “Working with the Tools Page” (page 85)).
2. Locate the Update Software row within the page (see “Maintenance” (page 102)).
3. The printer's Controller Software version information is displayed within the Update Software row.

Figure 37: Controller Software Version Information



## MTConnect System Activation

Activating the MTConnect system enables the MTConnect data exchange protocol between the printer and an MTConnect client for the purpose of tracking printer defined metrics. MTConnect is available for all F123 Series systems and requires firmware Version 2.2.5940 or later.

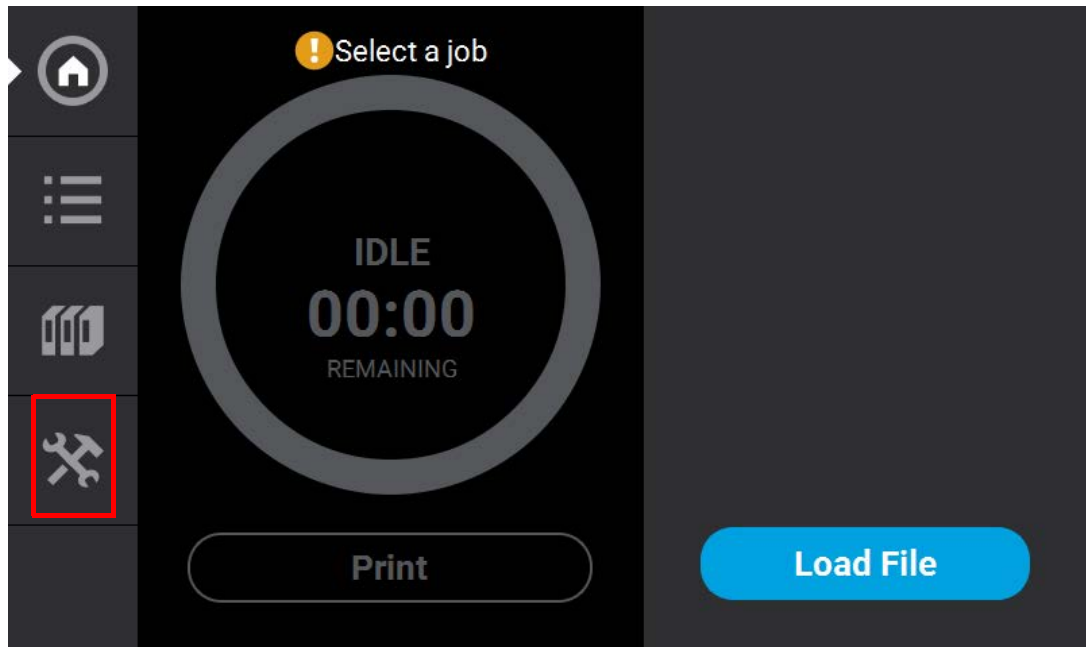


Firmware version 2.2.5940 (or later) is recommended for all systems.

MTConnect must be enabled on the printer. To do this from the Home Screen:

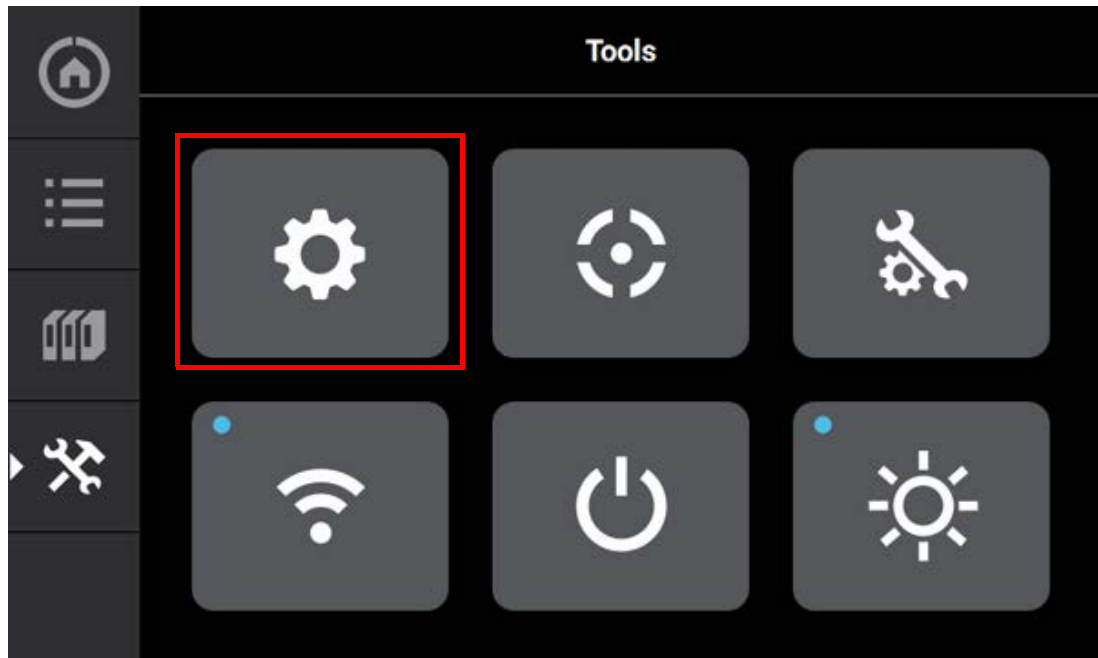
1. Select the Tools screen.

Figure 38: Home Screen



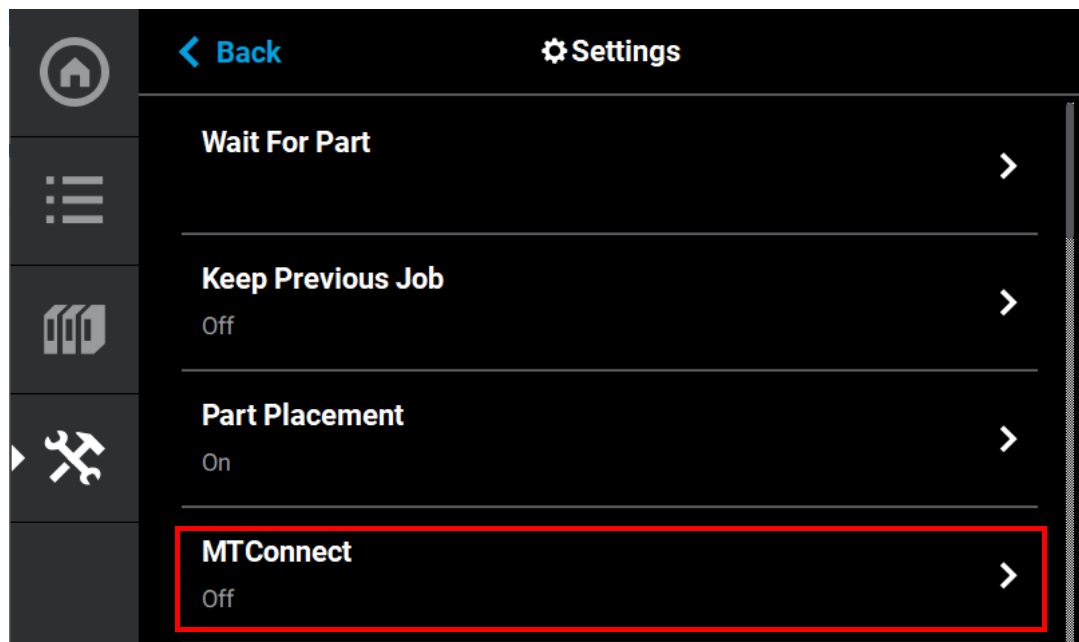
- From the Tools screen, select the Settings screen.

Figure 39: Access Setting screen



- On the Settings screen, scroll down to the MTConnect setting. Select MTConnect.

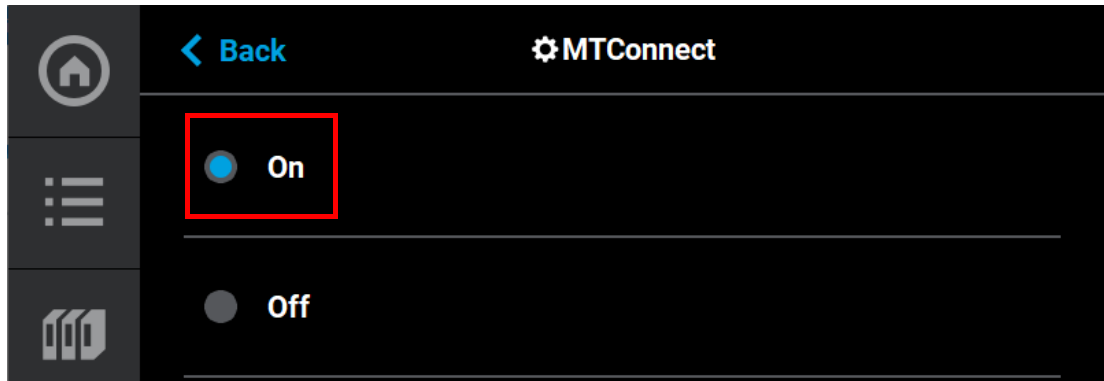
Figure 40: MTConnect





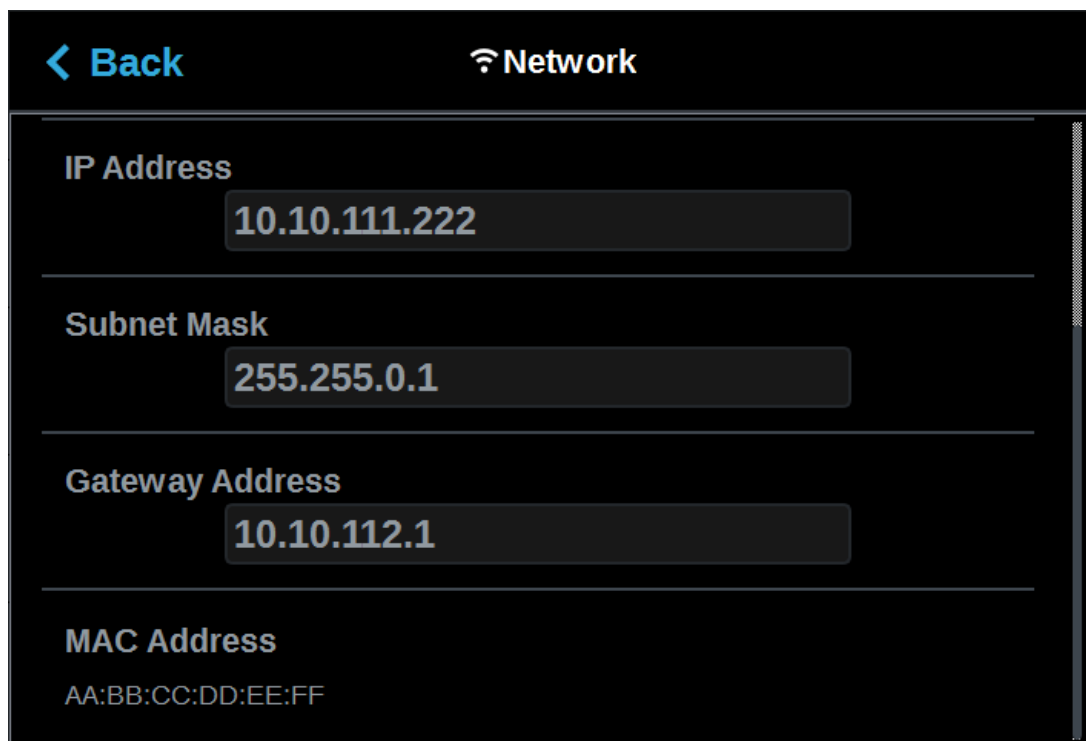
- On the MTConnect screen, touch the On button to turn MTConnect ON.

Figure 41: Turn ON MTConnect



- If the printer is connected to a network, you can view the device information and current MTConnect data by using a web browser as a client and the system's IP address. The IP address can be obtained via the Network Window.

Figure 42: Network Information



- To verify the system is on the network, open a web browser and type `http://xxx.xxx.xxx.xxx:5000/probe` replacing the "xxx.xxx.xxx.xxx" with the obtained IP address. The device information is returned.



The IP address need not be in 3 digit segments. Do not use leading zeros. For Example: IP Address = 10.40.202.149, use http://10.40.202.149:5000/probe, NOT http://010.040.202.149:5000/probe

Figure 43: Computer Information

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<MTConnectDevices xmlns:mtconnect="urn:mtconnect.org:MTConnectDevices:1.5" xmlns="urn:mtconnect.org:MTConnectDevices:1.5" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:mtconnect.org:MTConnectDevices:1.5 http://schemas.mtconnect.org/schemas/MTConnectDevices_1.5.xsd">
  <Header creationTime="2021-05-07T15:13:56Z" sender="F770D50034" instanceId="1620310197" version="1.4.0.12" assetBufferSize="1024" assetCount="0" bufferSize="131072"/>
  <Devices>
    <Device id="dev" iso841Class="6" name="F770" sampleInterval="10" uuid="D50034">
      <Description manufacturer="Stratatsys" model="F770">F123 FDM Additive Manufacturing Machine</Description>
      <DataItems>
        <DataItem category="EVENT" id="avail" name="Availability" type="AVAILABILITY"/>
        <DataItem category="EVENT" id="printerSerial" name="SerialNumber" type="SERIAL_NUMBER"/>
        <DataItem category="EVENT" id="dev_asset_chg" type="ASSET_CHANGED"/>
        <DataItem category="EVENT" id="dev_asset_rem" type="ASSET_REMOVED"/>
      </DataItems>
      <Components>
        <Axes id="axes" name="Axes">
          <Components>
            <Linear id="s1" name="ModelExtruder">
              <DataItems>
                <DataItem category="EVENT" id="s1SerialNumber" name="SerialNumber" type="SERIAL_NUMBER"/>
                <DataItem category="EVENT" id="s1Material" name="CurrentMaterial" type="MATERIAL"/>
                <DataItem category="EVENT" id="s1MaterialId" name="CurrentMaterialId" type="PART_ID"/>
                <DataItem category="EVENT" id="s1Tip" name="Tip" type="TOOL_ASSET_ID"/>
                <DataItem category="SAMPLE" id="s1TipOdometer" name="Odometer" nativeUnits="CUBIC_MILLIMETER" subType="ACTUAL" type="VOLUME_SPATIAL" units="CUBIC_MILLIMETER"/>
                <DataItem category="SAMPLE" id="s1TCom" name="CommandedTemperature" nativeUnits="CELSIUS" subType="COMMANDED" type="TEMPERATURE" units="CELSIUS"/>
                <DataItem category="SAMPLE" id="s1LowerHeatCurrent" name="LowerHeatCurrent" nativeUnits="AMPERE" subType="TARGET" type="AMPERAGE" units="AMPERE"/>
                <DataItem category="SAMPLE" id="s1FlowRateCom" name="FlowRateCommanded" nativeUnits="CUBIC_MILLIMETER/SECOND" subType="COMMANDED" type="DEPOSITION_RATE_VOLUMETRIC"
units="CUBIC_MILLIMETER/SECOND"/>
                <DataItem category="SAMPLE" id="s1FlowRateAct" name="FlowRateActual" nativeUnits="CUBIC_MILLIMETER/SECOND" subType="ACTUAL" type="DEPOSITION_RATE_VOLUMETRIC"
units="CUBIC_MILLIMETER/SECOND"/>
                <DataItem category="SAMPLE" id="s1AxisCurrent" name="AxisCurrent" nativeUnits="AMPERE" subType="TARGET" type="AMPERAGE" units="AMPERE"/>
                <DataItem category="SAMPLE" id="s1AxisExtCurrentAvg" name="ExtrusionCurrentAverage" nativeUnits="AMPERE" statistic="AVERAGE" subType="TARGET" type="AMPERAGE"
units="AMPERE"/>
                <DataItem category="SAMPLE" id="s1Follow" name="FollowingError" nativeUnits="DEGREE" subType="ACTUAL" type="ANGLE" units="DEGREE"/>
                <DataItem category="SAMPLE" id="s1UpperHeatCurrent" name="UpperHeatCurrent" nativeUnits="AMPERE" subType="TARGET" type="AMPERAGE" units="AMPERE"/>
              </DataItems>
            </Linear>
            <Linear id="s1" name="SupportExtruder">
              <DataItems>
                <DataItem category="EVENT" id="s1SerialNumber" name="SerialNumber" type="SERIAL_NUMBER"/>
                <DataItem category="EVENT" id="s1Material" name="CurrentMaterial" type="MATERIAL"/>
                <DataItem category="EVENT" id="s1MaterialId" name="CurrentMaterialId" type="PART_ID"/>
                <DataItem category="EVENT" id="s1Tip" name="Tip" type="TOOL_ASSET_ID"/>
                <DataItem category="SAMPLE" id="s1TipOdometer" name="Odometer" nativeUnits="CUBIC_MILLIMETER" subType="ACTUAL" type="VOLUME_SPATIAL" units="CUBIC_MILLIMETER"/>
                <DataItem category="SAMPLE" id="s1TCom" name="CommandedTemperature" nativeUnits="CELSIUS" subType="COMMANDED" type="TEMPERATURE" units="CELSIUS"/>
                <DataItem category="SAMPLE" id="s1TCom" name="CommandedTemperature" nativeUnits="CELSIUS" subType="COMMANDED" type="TEMPERATURE" units="CELSIUS"/>
              </DataItems>
            </Linear>
          </Components>
        </Axes>
      </Components>
    </Device>
  </Devices>
</MTConnectDevices>
```

- Change “probe” to “current” (<http://xxx.xxx.xxx.xxx:5000/current>) will return the current MTConnect data for the system.

Figure 44: MTConnect Data

**Device: f770; UUID: D50060****Controller : Controller**

Events

Timestamp	Type	Sub Type	Name	Id	Sequence	Value
2021-06-29T15:40:51.725567Z	SerialNumber		Build	swBuildVersion	153	6042
2021-06-29T15:40:51.725567Z	SerialNumber		Version	swVersion	155	3.2

**Enclosure : Cover**

Events

Timestamp	Type	Sub Type	Name	Id	Sequence	Value
2021-06-29T15:40:51.725567Z	DoorState		OpenState	coverOpenState	120	CLOSED

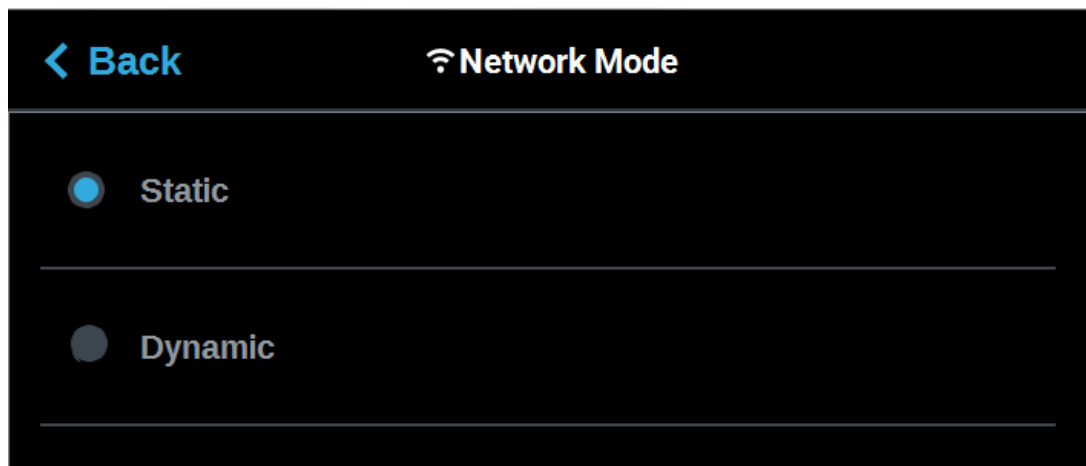
**Device : f770**

Events

Timestamp	Type	Sub Type	Name	Id	Sequence	Value
2021-06-29T15:40:51.725567Z	Availability		Availability	avail	234	AVAILABLE
2021-06-29T15:40:51.022967Z	AssetChanged			dev_asset_chg	7	UNAVAILABLE
2021-06-29T15:40:51.022967Z	AssetRemoved			dev_asset_rem	8	UNAVAILABLE
2021-06-29T15:40:51.725567Z	SerialNumber		SerialNumber	printerSerial	154	D50060

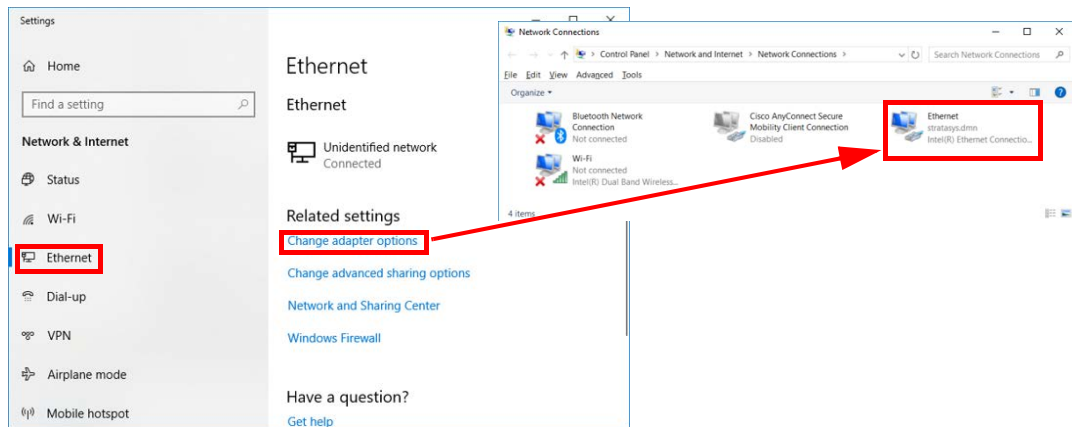
- You can still view the device information and current MTConnect data by using a web browser as a client and the system's IP address even if the printer is not on a network. You can do this by directly connecting a computer to the printer with a Crossover Cable connected to the Ethernet Ports. Ensure the Static radio button is selected on the Network Mode window.

Figure 45: Static Network



9. Connect a computer to the printer at the ethernet ports using a crossover cable.
10. Navigate to the computer's Ethernet Network Settings and select "Change Adapter Options".
11. Right click on Ethernet and select Properties.

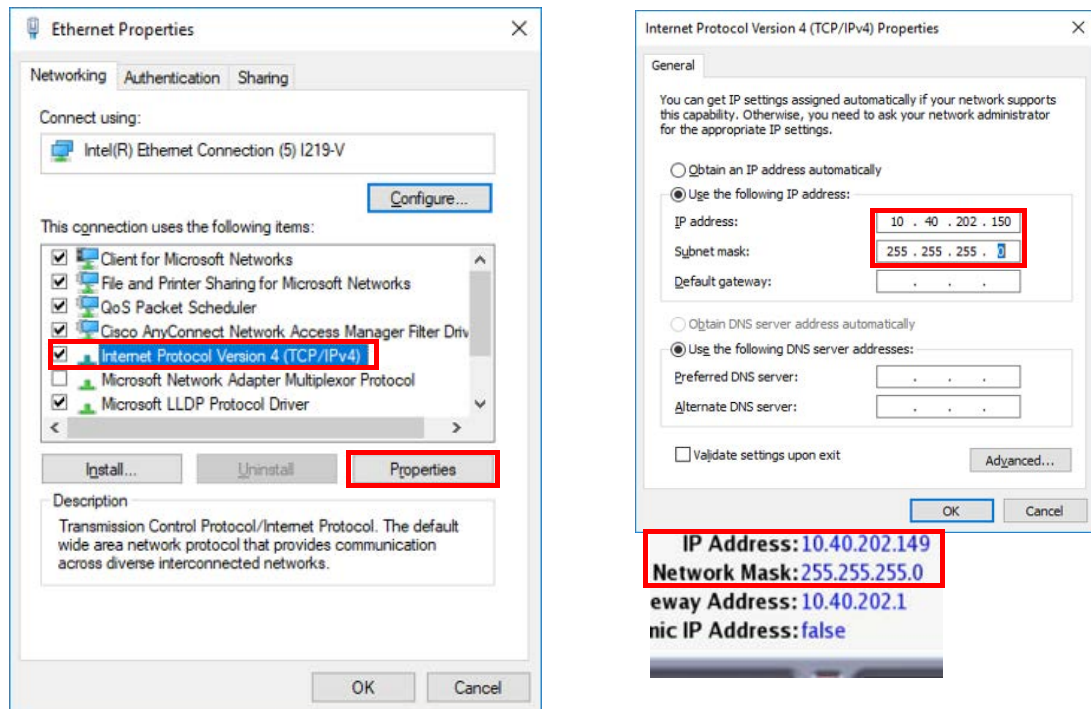
Figure 46: Locate Ethernet Settings



12. In the Ethernet Properties screen, using the images below as a general guide, set the "IP address" to match the printer's, EXCEPT change the last triplet to another number between 1 and 255.
13. Set the "Subnet mask" to match the printer and click OK.

14. The computer and your printer can now communicate like an “isolated” network. The previously explained method of using a browser as a client will work.

Figure 47: Ethernet Properties

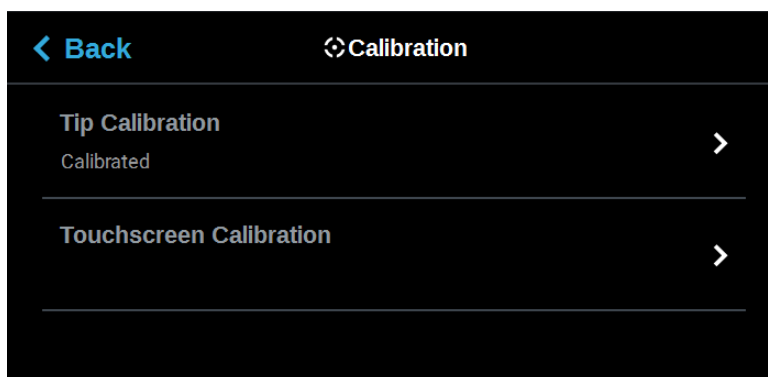


# 6 CALIBRATION AND ADJUSTMENTS

This chapter describes basic calibration and adjustment procedures for the F770 printer. The buttons/pages described within this chapter are accessible via the *Calibration* page.

To open the Calibration page, press the **Tools** button within the *Navigation Menu*; the *Tools* page will be displayed (see “Working with the Tools Page” (page 85)). Within the *Tools* page select the **Calibration** button; the *Calibration* page will be displayed.

Figure 1: *Calibration* page

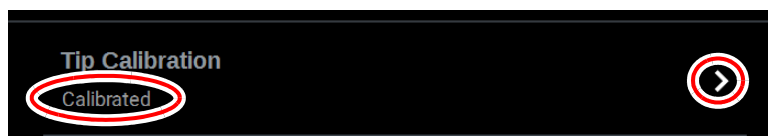


## Tip Calibration

The printer's calibration status will be displayed within the *Tip Calibration* row. **Calibrated** or **Not Calibrated** will be displayed depending on the printer's calibration status.

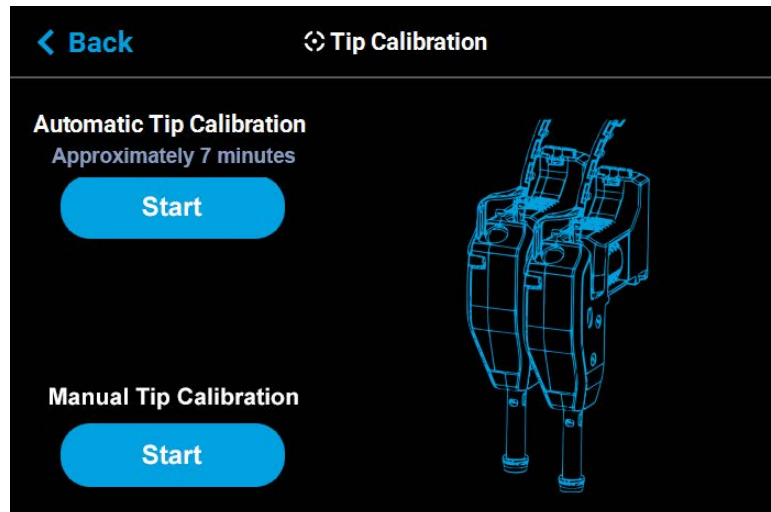
Pressing anywhere within the *Tip Calibration* row will open a page allowing you to select from a variety of tip calibration options. You cannot build parts on the printer until the printer's tips are calibrated. In addition to performing a tip calibration after head changes, It is also recommended to perform both an automatic and a tip calibration in the following circumstances: Before a long or critical build, when a change in model-to-support adhesion is observed, when there is difficulty removing the model from the base layers of support, or once per week on a printer that experiences heavy use.

Figure 2: *Tip Calibration*



The *Tip Calibration* page contains an option for performing an Automatic Tip Calibration as well as a Manual Tip Calibration. Pressing the **Start** button associated with either of these options will allow you to perform that particular calibration procedure. Each calibration procedure is delivered in the form of a wizard which will guide you through the process of performing the calibration procedure.

Figure 3: Tip Calibration Options



## Automatic Tip Calibration

Tip offset values are the distance between the model and support tips in the X, Y and Z directions. Accurate tip offset values ensure that support toolpaths are accurately located in reference to model toolpaths. Inaccurate tip offset values can cause part quality issues, such as support material embedded in a part or improperly supported parts.

Automatic Tip Calibration registers the support tip relative to the model tip, ensuring that positioning of the head and Z axis is correct when changing between model and support material during a build. This calibration is automatically performed whenever either of the printer's heads is replaced; please note that the printer must be powered ON before calibration can occur. Calibration will occur prior to the start of the next build following the head replacement. If either head cable is unclipped and fully detached from the corresponding head, this will trigger the occurrence of an Automatic Tip Calibration. Calibration will occur following the reattachment of the cable to the head and prior to the start of the next build.

To Perform an Automatic Tip Calibration:

1. Place a new build sheet onto the platen and turn the vacuum control system On to firmly attach the build sheet to the platen. Ensure build sheet is installed with the smooth side down.

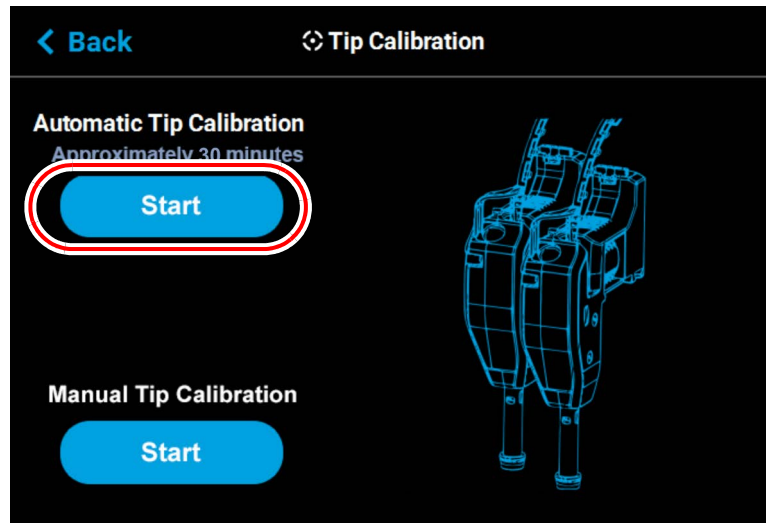


**Caution:**

Always wear gloves when installing the build sheet. Hand oils on the build sheet surface will result in poor part adhesion.

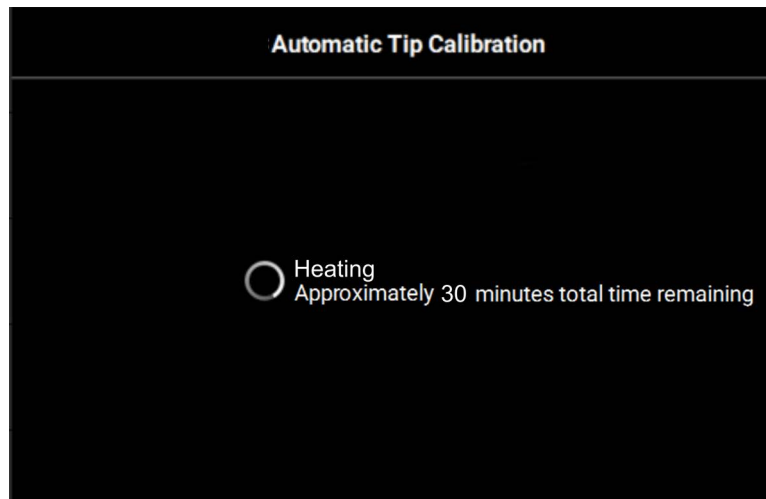
2. Open the Tip Calibration page by navigating to *Tools > Calibration > Tip Calibration*. A page similar to Figure 4 will be displayed.
3. Press the **Start** button for the Automatic Tip Calibration option.

Figure 4: Automatic Tip Calibration Option



4. The printer will perform an Automatic Tip Calibration. This process includes heating up or cooling down the oven to reach the required calibration temperature. Completion times will vary depending on the material used and the initial chamber temperature. The status and time remaining will continually update on the screen.

Figure 5: Calibrating Tip Offsets



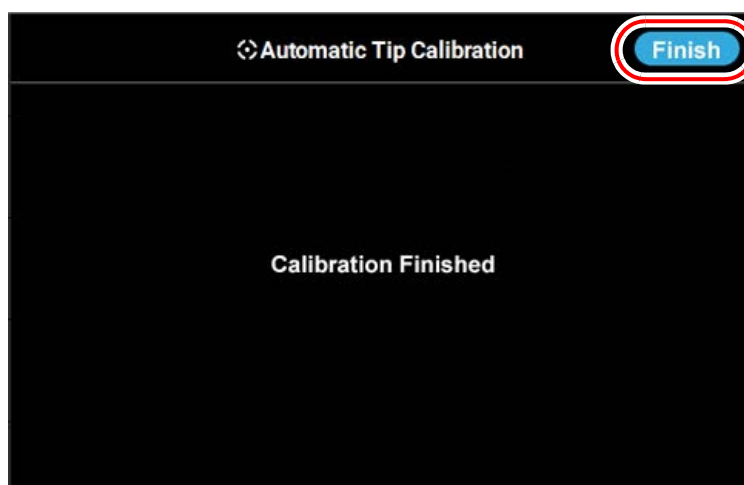


5. Completion of the calibration process will be indicated on the screen; press the **Finish** button within the header of the page when complete.



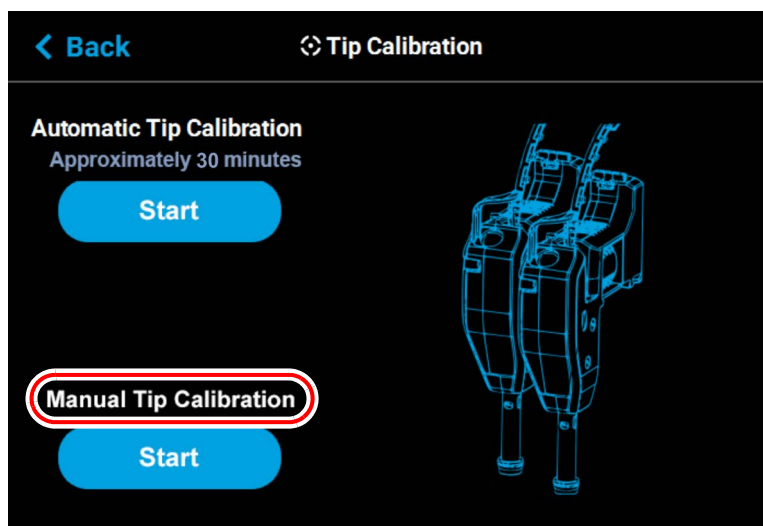
If calibration fails, "Failed to calibrate tip offsets" will be displayed on the screen. You cannot build a part on the printer until the tips have been calibrated. Ensure that nothing is blocking the tip or covering the calibration targets and reattempt the Automatic Tip Calibration. If calibration fails again, perform a Manual Tip Calibration (see "Manual Tip Calibration" (page 163) for instructions).

Figure 6: Automatic Tip Calibration Complete



6. The main Tip Calibration page will display again. Proceed with the Manual Tip Calibration as described in "Manual Tip Calibration" (page 163).

Figure 7: Automatic Tip Calibration Option



## Manual Tip Calibration

Tip offset values are the distance between the model and support tips in the X, Y and Z directions. Accurate tip offset values ensure that support toolpaths are accurately located in reference to model toolpaths. Inaccurate tip offset values can cause part quality issues, such as support material embedded in a part or improperly supported parts.

Manual Tip Calibration sets the X, Y and Z distance between the model and support tips. This calibration requires you to analyze a calibration part once it's built, and manually supply the printer with correction values, as needed, in order to calibrate the printer.



ABS or ASA material can be used for manual calibration.

To Perform a Manual Tip Calibration:

1. Print a calibration part; you will analyze this part in order to determine correction values.
  - a. Place a new build sheet onto the platen and turn the vacuum control system On to firmly attach the build sheet to the platen. Ensure build sheet is installed with the smooth side down.

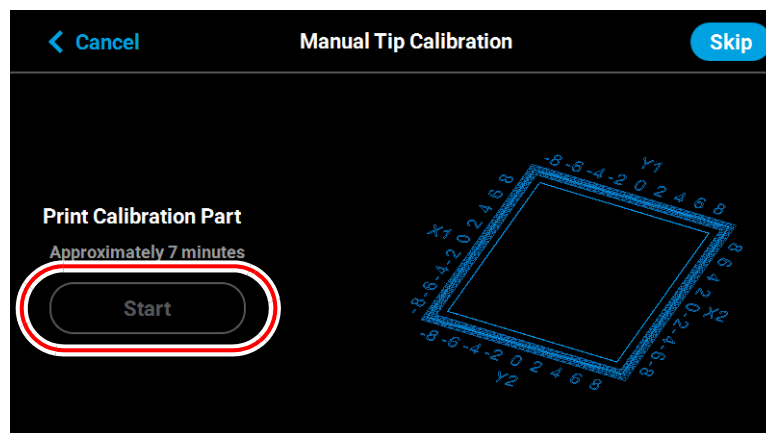


**Caution:**

Always wear gloves when installing the build sheet. Hand oils on the build sheet surface will result in poor part adhesion.

- b. Navigate to *Tools > Calibration > Tip Calibration*. Press the **Start** button for the Manual Tip Calibration option (see Figure 3 (page 160) for button location).
  - c. The Print Calibration Part page will be displayed (as shown in Figure 8) and the printer will automatically select the calibration part. Press the **Start** button.

Figure 8: Print Calibration Part Page (need new screen)



- d. If your printer's part placement setting is On (see "Part Placement" (page 90)), the Part Placement page will display. The calibration part location is fixed and can not be moved. Press the **Print** button (pressing the **Clear** button will clear the display, removing all "ghost box" items).

- e. The calibration part will begin the print process and display the current status on the User Interface. "HEATING" or "COOLING" is followed by "PREPARING" and then "PRINTING".
  - The Heating/Cooling status displays the current temperature as well as the target set point.



The amount of time that the printer remains in the Heating/Cooling stage may vary depending on the current oven chamber temperature.

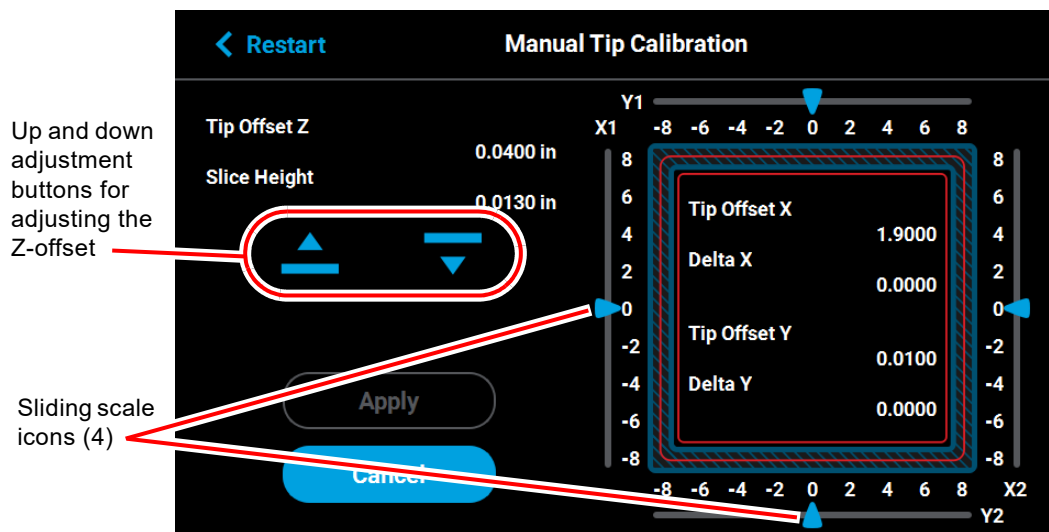
- The Preparing status will display as the system purges material and detects the tray level.
  - The Printing status displays the number of build layers complete or the amount of time remaining. Tap the screen to toggle between layers or time.
- f. Once the calibration part is complete "DONE" will be displayed on the User Interface. Remove the build sheet from the platen. You will analyze the part on the build sheet to determine correction values.



After removing the build sheet containing the calibration part and closing the oven door, a message is displayed stating "Is the tray ready for another job?". Press **No** to return to the *Manual Tip Calibration* screen.

- g. Press the **Next** button in the upper-right corner of the page; the Manual Tip Calibration page will be displayed.

Figure 9: Manual Tip Calibration Page




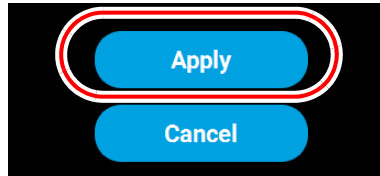
 The **Apply** button will become active when you modify an offset value by dragging the sliding scale icons or pressing the up and down adjustment buttons.

Figure 10: Apply button active



2. Determine the XY Offset Adjustment needed for your printer.
  - a. Using a magnifier (included in the Welcome Kit), view the relationship between the support calibration toolpath and the alignment indicators to determine the X and Y axis calibration.
  - b. Determine where on each side (X1, X2, Y1, and Y2) the support toolpath is most centered between the X-Y alignment indicators (see Figure 11 or Figure 12). The numbers on the calibration part represent thousandths of an inch (e.g., 4 = 0.004 in.).

Figure 11: Calibration Part

Magnified single side of a calibration part with a reading of 0.

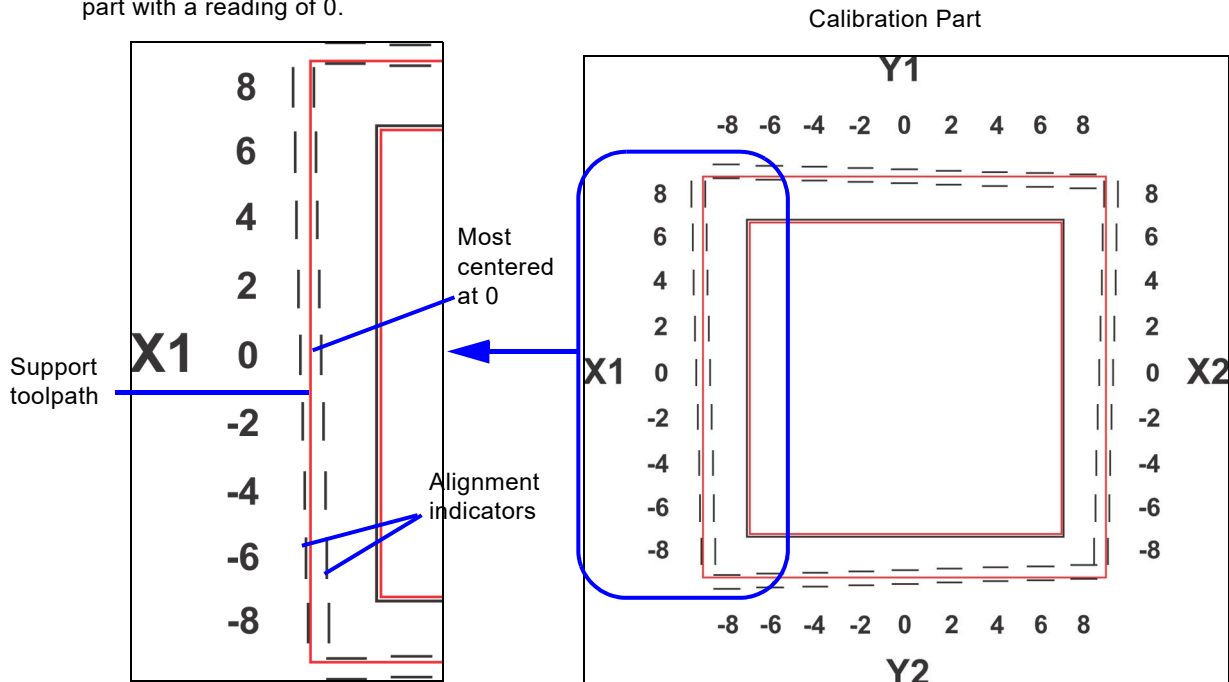
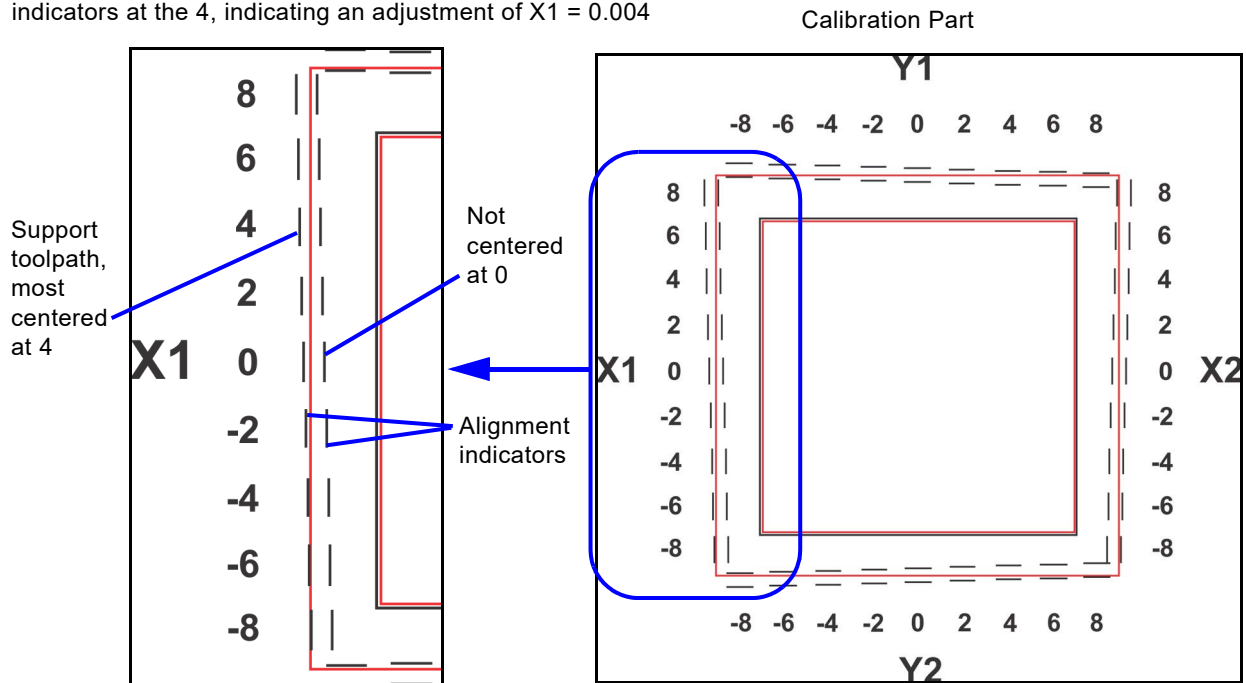


Figure 12: Calibration Part

Support toolpath is most centered between the alignment indicators at the 4, indicating an adjustment of  $X1 = 0.004$



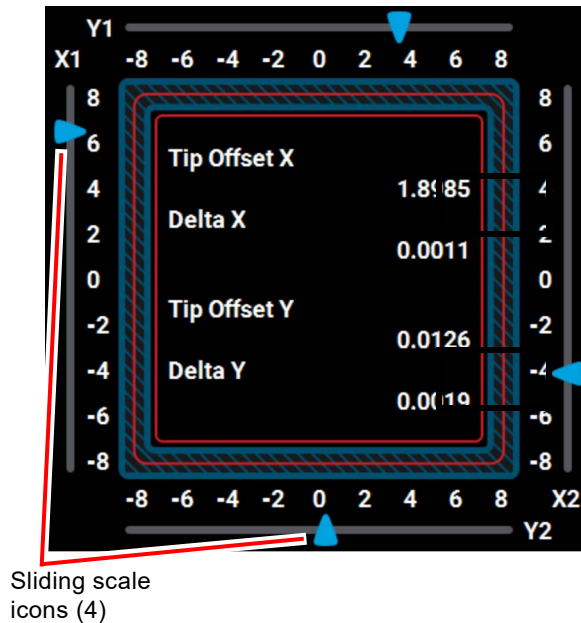
- c. Within the Manual Tip Calibration page, slide all four of the scale icons on the screen to match where the support toolpath is most centered between the alignment indicators. The Delta X and Delta Y fields will change to reflect adjustments made.



One offset value must be selected for each side (X1, X2, Y1, and Y2).

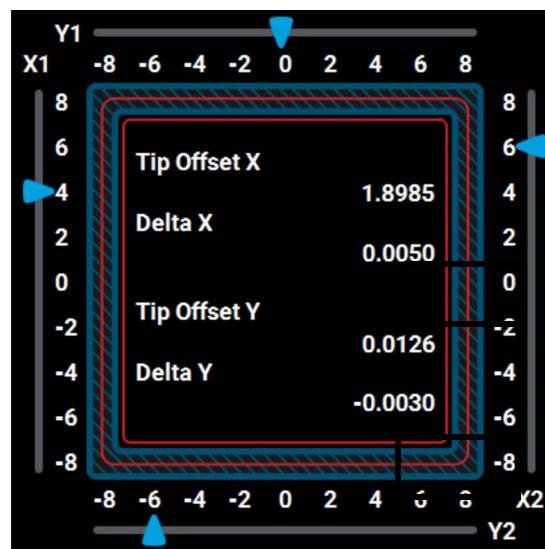
- If the Delta X and the Delta Y values are both within the range of -0.002 to +0.002 in., the printer is calibrated and an adjustment is not required. The following figure shows an XY offset within tolerance, requiring no adjustments. Proceed to step 3.

Figure 13: XY Offset - No Adjustment Required



- If either of the Delta X or Delta Y values are outside the range of -0.002 to +0.002 in., the printer requires an adjustment. The following figure shows the Delta X value of 0.0050 in. and the Delta Y value of -0.0030 in. are both outside of the acceptable range.

Figure 14: XY Offset - Adjustment Required



d. If an adjustment is required, you will need to rebuild the calibration part. To do so:

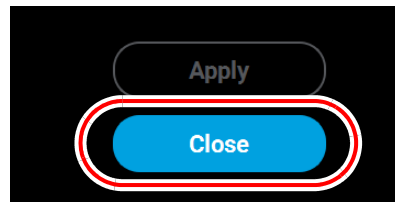
- After entering your adjustment value(s) press the **Apply** button within the Manual Tip Calibration page (see [Figure 9 \(page 164\)](#) for button location). Your calibration adjustment(s) will be saved. If you continue to change the adjustment values, you must press the **Apply** button again to save the changes.



The *Cancel* button can be used to reset an adjustment value entered prior to pressing the **Apply** button. Once the **Apply** button is pressed, values will be saved and the printer's calibration settings will reflect the adjustment value entered. Use caution when entering an adjustment value to ensure it is correct prior to pressing the **Apply** button.

- After pressing the **Apply** button, the **Close** button will appear. Press the **Close** button to return to the initial Tip Calibration page.

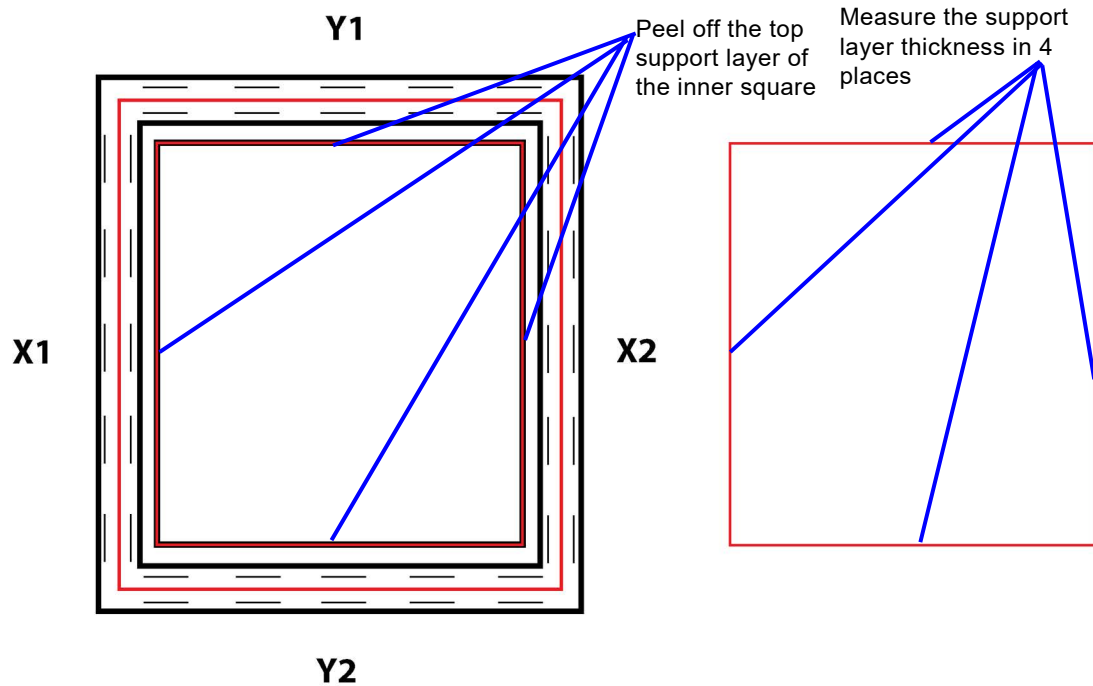
Figure 15: Close Button Location



- Repeat [step 1](#) above to build a calibration part.
  - Repeat the instructions in [step 2](#). Continue to check and adjust for XY offset. Readjust until both of the Delta X and Delta Y values are within tolerance, which is within -0.002 to +0.002 in.
- e. Proceed to the Z offset adjustment ([step 3](#) below) once the calibration toolpath for X and Y is within tolerance.
3. Determine the Z Offset Adjustment.
- Peel off the top support layer of the inner square as shown in [Figure 16 \(page 169\)](#).
  - Measure the thickness of the support layer in the middle of each side using a caliper or micrometer.

- c. Take the average value of the four measurements. This is the number you will enter for the Z offset adjustment.

Figure 16: Remove and Measure Support Layer

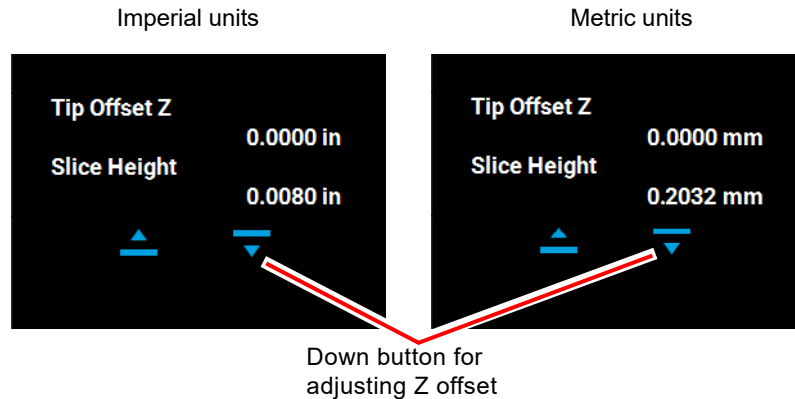


- d. If the value measured in [step c](#) above is within  $\pm 0.0005$  in. (0.01 mm) of the slice height of 0.010 in. (0.254 mm), the printer is calibrated for the Z axis and an adjustment is not required. Proceed to [step 4](#).
- e. If the value measured in [step c](#) above is not within  $\pm 0.0005$  in. (0.01 mm) of the slice height you will need to enter a Z offset adjustment using the **Up** and **Down** buttons within the Manual Tip Calibration page. Each button press equates to one ten thousandths of an inch.



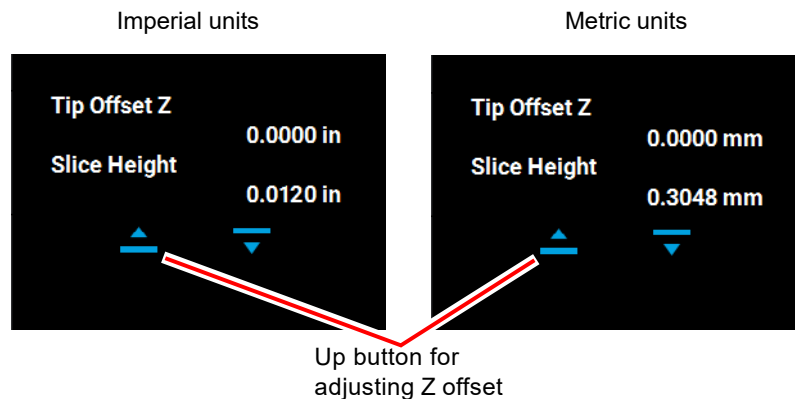
- Use the **Down** button to enter the value obtained in [step c](#) above if this value is less than the tip's slice height. For example, if you measured an average of 0.0080 in. (0.2032 mm) for a tip with a slice height of 0.010 in. (0.254 mm), press the **Down** button until 0.0080 (0.2032) is displayed within the *Slice Height* field.

Figure 17: Z Offset Adjustment



- Use the **Up** button to enter the value obtained in [step c](#) above if this value is greater than the tip's slice height. For example, if you measured an average of 0.0120 in. (0.3048 mm) for a tip with a slice height of 0.010 in. (0.254 mm), press the **Up** button until 0.0120 (0.3048) is displayed within the *Slice Height* field.

Figure 18: Z Offset Adjustment



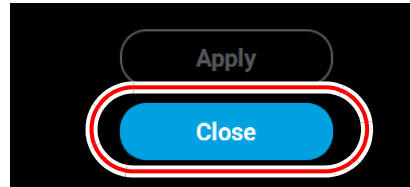
- If a Z offset adjustment is required you will need to rebuild the calibration part. To do so:
  - After entering your Z offset adjustment press the **Apply** button within the Manual Tip Calibration page (see [Figure 9 \(page 164\)](#) for button location). Your calibration adjustment(s) will be saved. If you continue to change the adjustment values, you must press the **Apply** button again to save the changes.



The **Cancel** button can be used to reset an adjustment value entered prior to pressing the **Apply** button. Once the **Apply** button is pressed, values will be saved and the printer's calibration settings will reflect the adjustment value entered. Use caution when entering an adjustment value to ensure it is correct prior to pressing the **Apply** button.

- After pressing the **Apply** button, the **Close** button will appear. Press the **Close** button to return to the initial Tip Calibration page.

Figure 19: Close Button Location



- Repeat [step 1](#) above to build a calibration part.
  - Repeat the instructions in [step 3](#) above. Continue to check and adjust for Z offset until the support layer matches the model tip slice height  $\pm 0.0005$  in. (0.01 mm).
4. Once you're finished adjusting for XY and Z, press the **Apply** button within the *Manual Tip Calibration* page and your calibration adjustment(s) will be saved. Press the **Close** button to exit the page.

## Tip Calibration Reminders

The system software tracks the number of build hours and days since the last successful tip calibration. Tip calibration reminders are displayed in two ways:

1. A maintenance notification is created with an exclamation mark added to the tools menu button. When the tools menu button is pressed, a maintenance warning screen displays similar to the one shown below. If there are other maintenance notifications, they will also be displayed on the same screen. The notifications are acknowledged with the **Accept** button.

Figure 20: Maintenance warning screen



### Maintenance Warning

Perform tip calibration.

Time since last tip calibration:  
286 days, 1405 build hours

Accept

2. The second way a tip calibration reminder appears is after **PRINT** is pressed. A build warning window displays similar to the one shown below asking to perform an automatic tip calibration before the build begins. Pressing **Yes** marks the tip as uncalibrated and performs an automatic tip calibration followed by the part build. Pressing **No** will build the part without calibrating the tips.

Figure 21: Build warning screen



### Build Warning

Regular tip calibration is important for print quality and head life. Time since last calibration:

286 days, 1405 build hours

Include automatic tip calibration before build?

No

Yes

## Touchscreen Calibration



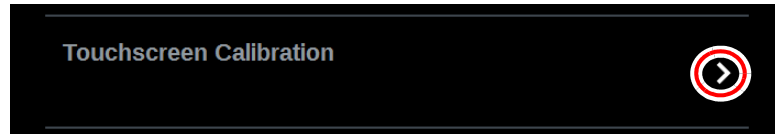
A stylus pen should be used when performing this calibration to ensure precise calibration. Do not use your fingertip to perform this calibration. If a stylus pen is not available, a pencil eraser may be used.

You have the option of recalibrating the printer's touchscreen display. Extreme care must be taken when performing this calibration as an improperly calibrated touchscreen can lead to button accuracy issues.

To recalibrate the touchscreen:

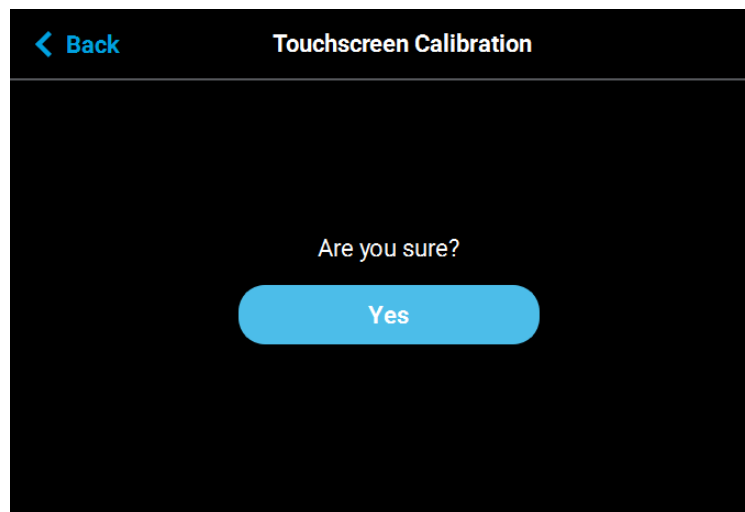
1. Open the Calibration page by selecting the **Calibration** button within the *Tools* page.
2. Press anywhere within the Touchscreen Calibration row.

Figure 22: Touchscreen Calibration Row



3. A dialog will be displayed asking you if you want to recalibrate the touchscreen, press the **Yes** button to confirm.

Figure 23: Recalibrate Touchscreen Confirmation Page



4. A dialog is displayed with instructions for recalibrating the touchscreen. Using a stylus, touch the screen in the center of the calibration point displayed. Repeat this process for the remaining calibration points (1 point for each of the 4 corners of the screen).

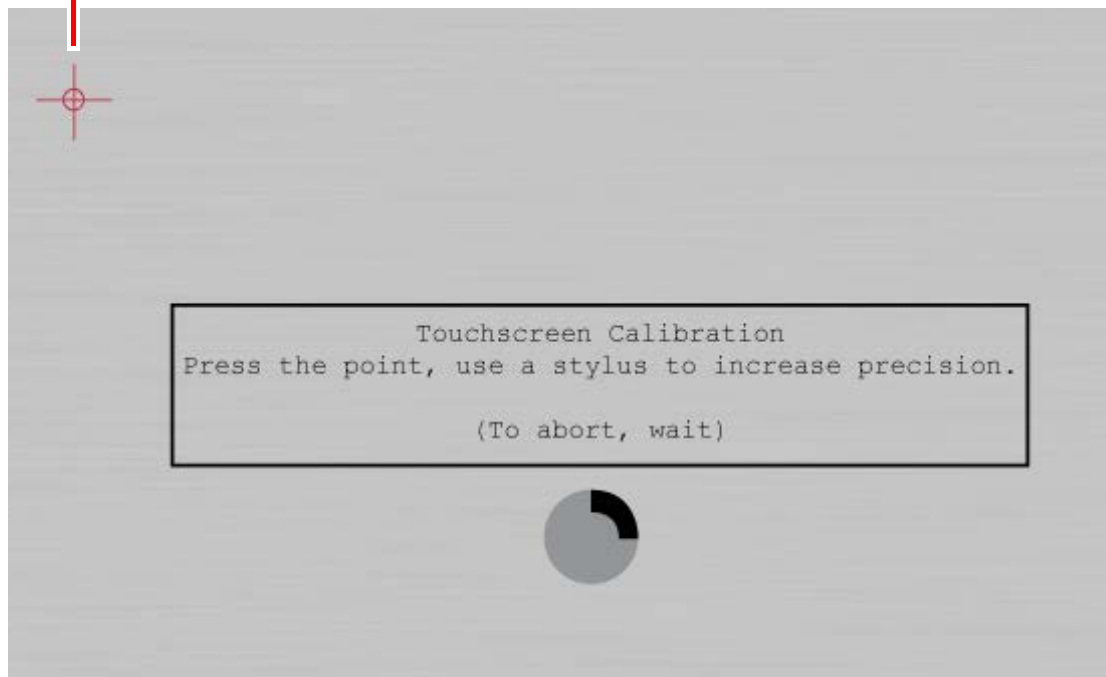


The graphic displayed within the center of the dialog represents the time remaining before the touchscreen calibration times out. The black portion will fill the perimeter of the gray circle in a clockwise direction. You must touch the calibration point displayed within the screen before the black portion of the graphic completes a full circle. The timer will reset for each of the 4 calibration points displayed. If you wish to exit the page without calibrating the screen simply wait until the black portion of the graphic completes a full circle; the dialog will close and you will be returned to the *Calibration* page.

5. Once finished, your calibration settings will be saved and the dialog will close. You will be returned to the *Calibration* page.

Figure 24: Touchscreen Calibration procedure

Calibration point



## XY Gantry Calibration

The printer is designed to automatically perform an XY Gantry Calibration as part of its initialization and startup process. This calibration moves the gantry to ensure it can travel properly throughout the build envelope and determines the gantry's reference in relation to the platen. Each time the printer is powered ON, it will automatically perform this calibration. The XY Gantry Calibration is responsible for finding the home position for the X and Y axes. The home position is a set location the printer references for all movements.

When performing the XY Gantry Calibration the printer will move the head at a low velocity to the full extents of travel in the X and Y axis. The homing process uses mechanical hard stops in conjunction with commanded motion control while actively monitoring servo motor following error. After XY gantry homing has completed, the extent of travel in X and Y is compared against an upper and lower limit, and an error is generated if travel is outside of those limits.

The commanded motion used to determine all four gantry hard stop locations is identical. The controller sets upper time and distance limits for each hard stop location. These limits are used to ensure hard stop engagement occurs within expected parameters.

# Z Zero Calibration

The printer automatically initiates a Z Zero Calibration before each job is built; "PREPARING" will be displayed within the Build Status Display of the User Interface while this process is occurring (see "Build Status Display" (page 54)). Z Zero Calibration must complete successfully before a build will begin. This calibration requires no user interaction and sets the reference point between the model tip and the build sheet to ensure proper positioning for the first layer of a build.

When performing the Z Zero Calibration a purge of the model tip will be performed. The head will then be positioned over the back of the platen and the Z stage will move upward until the model tip is deflected; this deflection is used to calibrate the toggle sensor. The printer will then cool the model tip to a temperature below 200°C (392°F). Once cooled, the printer will perform five tip touches, one per each of the five quadrants of the build tray, by moving the Z stage upward within that quadrant until the model tip is deflected. Z Zero positioning is then determined based on the average Z stage position of the five tip touches; the printer will set the Z Zero position.



If any of the five or nine tip touches used to determine Z Zero is greater than 0.01" away from the average, homing will fail and the build will be aborted with a "Build Sheet Not Level" error.

## Tip Wipe Height Adjustment

### Required Tools

- 3 mm hex wrench

### Adjusting Tip Wipe Height



Always wear gloves when performing maintenance within the oven enclosure or other high temperature areas.

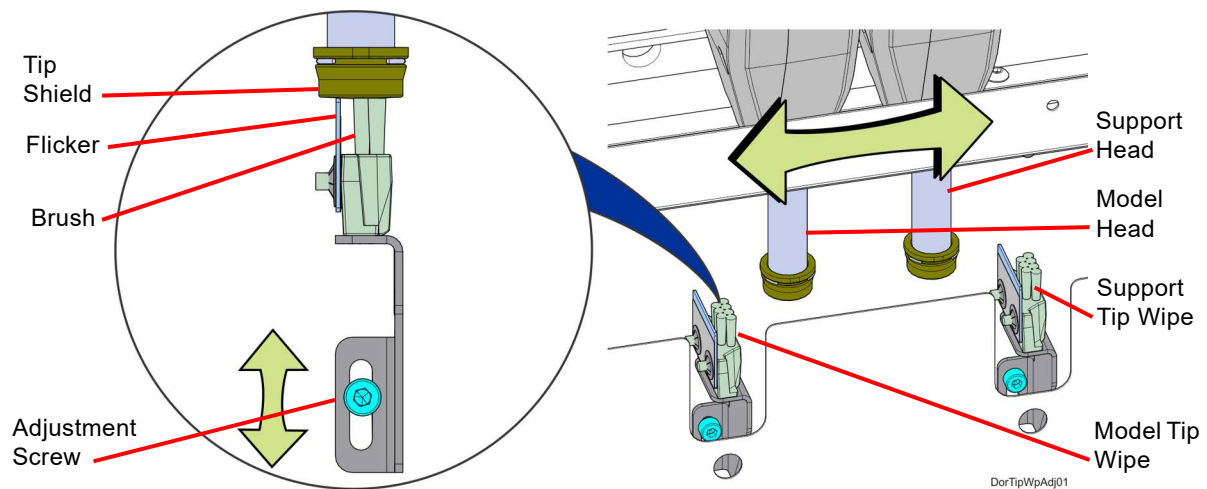
1. Power OFF the printer. See "Powering Off" (page 193).
2. Open the front top cover.
3. Open the oven door.
4. Manually move the model head (left side) back and forth above the model tip wipe assembly (left side). Verify that the brush and flicker both make contact with the tip shield.
5. If necessary, adjust the tip wipe height.
  - a. Using a 3mm hex wrench, loosen the tip wipe mounting screw at the back of the oven enclosure. See [Figure 25](#)
  - b. Adjust the height of the tip wipe so that the tops of the brush and flicker just contact the bottom of the head tip shield.

- c. Tighten the tip wipe assembly mounting screw.
- d. Manually move the head back and forth to verify that the brush and flicker are contacting the tip shield without extreme resistance.
6. Repeat [step 4](#) and [step 5](#) above for the support head (right side) and support tip wipe assembly (right side).



Make sure that the toggle bar is in the lower position (toggle bar to the right) when verifying/adjusting the height of the support tip wipe assembly.

Figure 25: Tip Wipe Detail





# 7 MAINTENANCE

This chapter describes various maintenance tasks that will routinely need to be performed on the F770 printer.

## Updating Controller Software

Controller Software can be updated using one of the following three methods:

- Installing from a USB Flash drive that contains the software update file
- Navigating to the update file on your workstation PC with the Insight software application; After placing the printer into upgrade mode (see “Update Software” (page 104)), navigate to and install the upgrade file from its saved location on your workstation PC.
- Selecting push notifications automatically sent via GrabCAD Print; After receiving a notification from GrabCAD Print that a software upgrade is available, follow the on-screen prompts and instructions to install the upgrade.

You have the option of updating Controller Software via either of these methods; however, the USB Flash drive method is the preferred method.

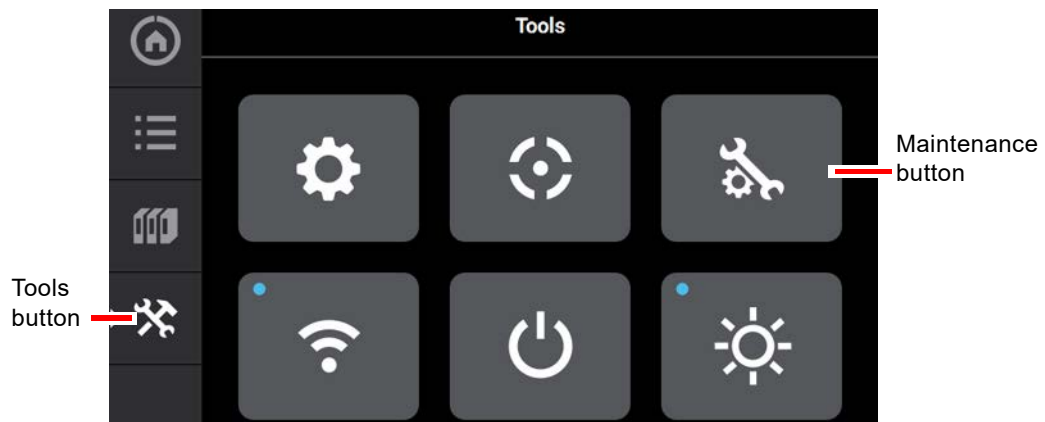


Updating Controller Software will erase all job files from the Job Queue (files within the Sample Queue (Internal Storage) will be retained). After completing the software upgrade, you will need to resend jobs to the printer.

## USB Flash Drive Method

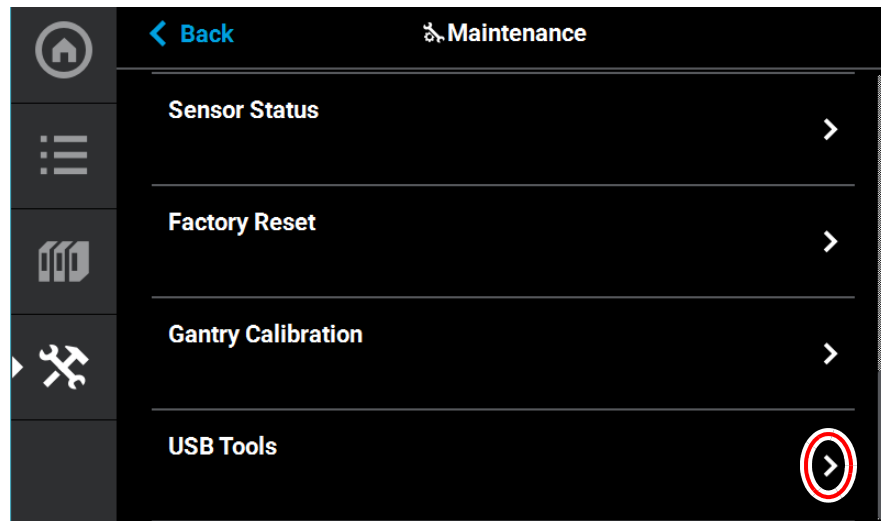
1. Save the software upgrade file to a USB flash drive.
2. Insert the USB flash drive into one of the available USB ports on the F770 printer.
3. On the printer touchscreen, open the Tools page by pressing the **Tools** button within the Navigation Menu.

Figure 1: Tools Page



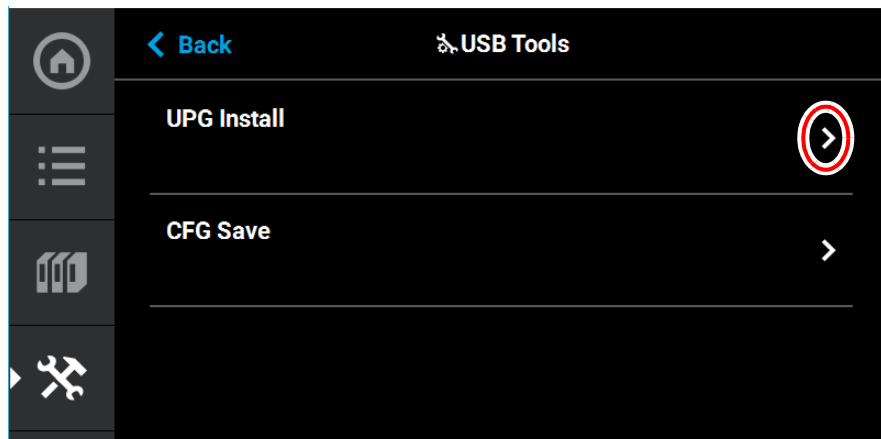
4. Open the Maintenance page by pressing the **Maintenance** button within the Tools page.

Figure 2: Maintenance Page



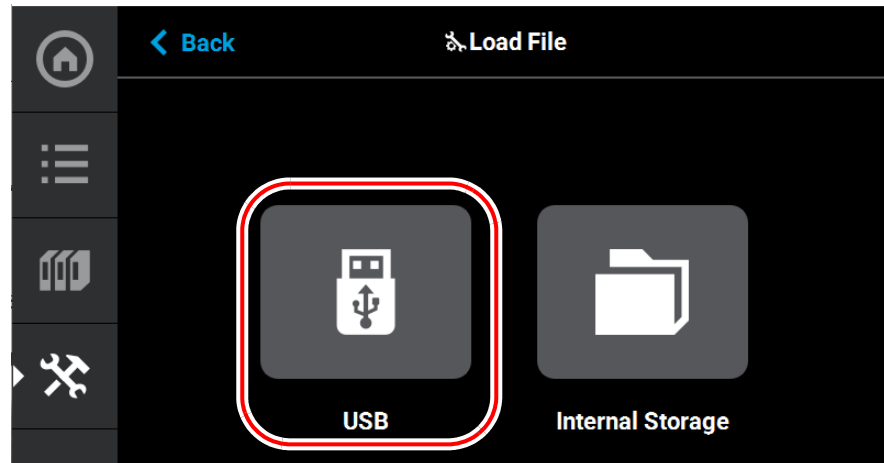
5. From the Maintenance Page, select **USB Tools** and then select **UPG Install**.

Figure 3: USB Tools



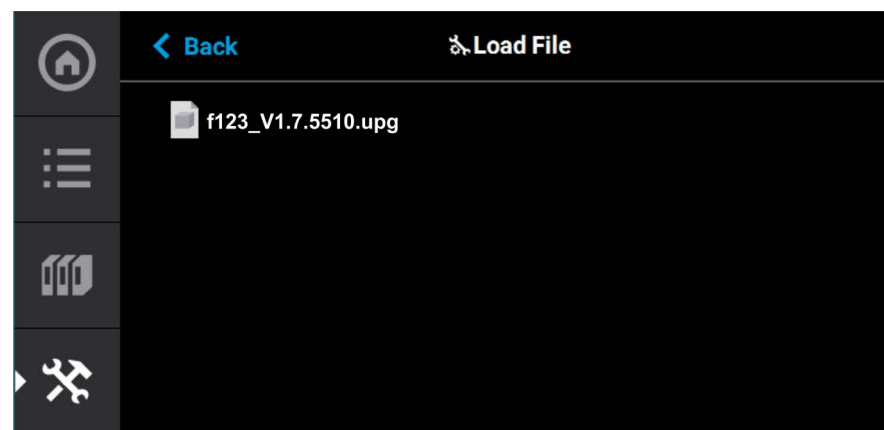
6. Select **USB**.

Figure 4: Load File



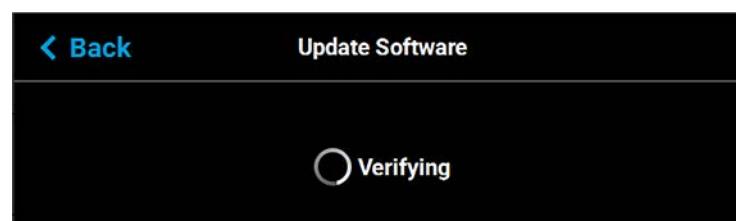
7. Navigate to and select the upgrade file from its saved location on the USB drive.

Figure 5: Upgrade File Location



8. The upgrade file will install. The screen will display the status until the upgrade is complete.

Figure 6: Upgrade Status



Updating Controller Software will erase all job files from the Job Queue (files within the Internal Storage will be retained). After completing the software upgrade, you will need to resend jobs to the printer.

## GrabCAD Print Method

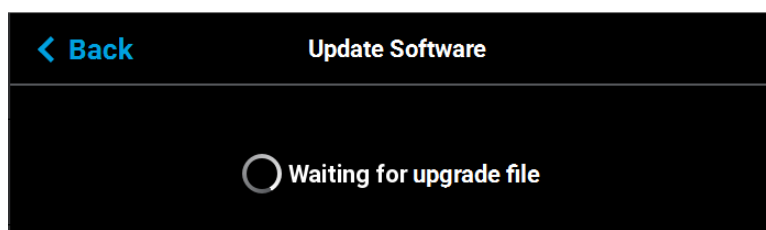
To update Controller Software via GrabCAD Print, navigate to <http://help.grabcad.com/article/196-printer-firmware-management> and follow the procedure for “Updating the printer’s firmware”.

## Insight Software Method

If the printer has a weak network connection or does not allow for automatic updates, you can manually download Controller Software updates by performing the following steps:

1. Open the Maintenance page by pressing the **Maintenance** button within the Tools page (see [Figure 38 \(page 85\)](#)).
2. Locate the Update Software row within the page. Press anywhere within the row to open the Update Software page (see [Figure 77 \(page 104\)](#)).
3. The Update Software page will open and the printer will automatically be put into software upgrade mode, allowing it to receive the software upgrade. The following is displayed on the touchscreen while the printer is in software upgrade mode.

Figure 7: Printer In Software Upgrade Mode

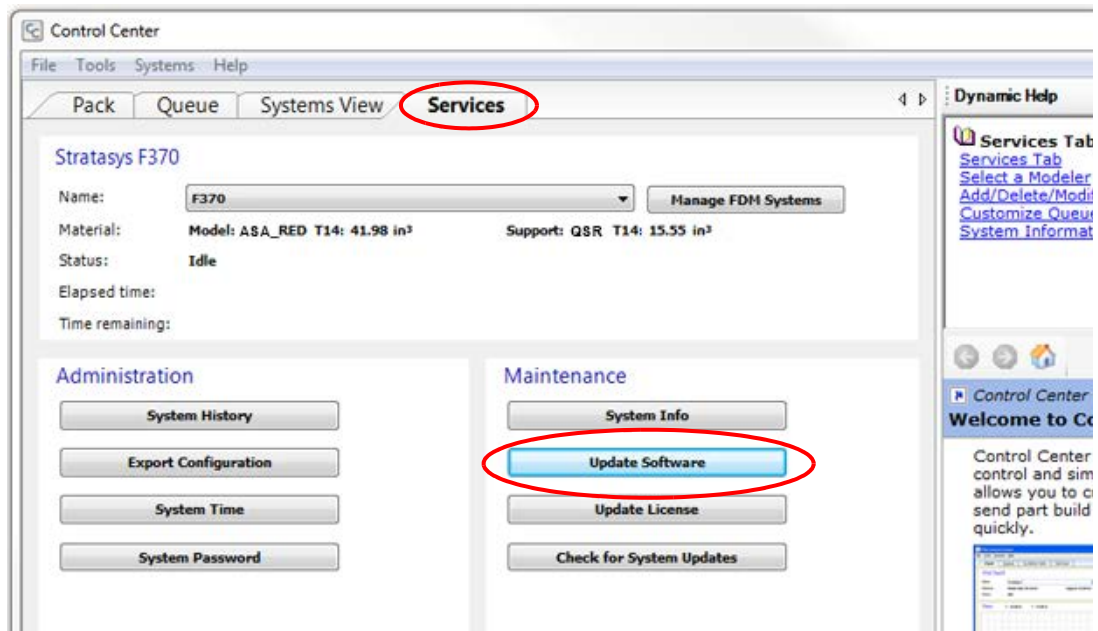


All recent calibration data (i.e. tip offset values) as well as printer settings and configurations are automatically retained during the software upgrade process. Files sent to the Job Queue via Ethernet or Wi-Fi connection or transferred to the printer from a USB flash drive are not retained.

4. From your workstation PC's Start Menu, navigate to *All Programs > Insight (installed version) > Control Center (installed version)* or double-click the Control Center shortcut (if available).

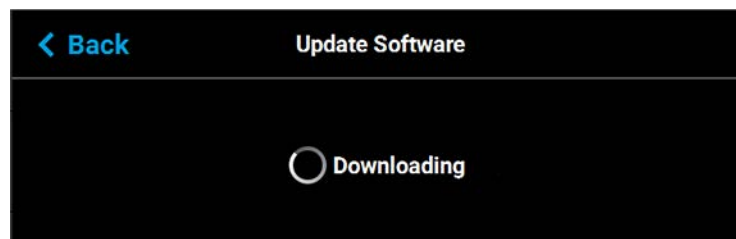
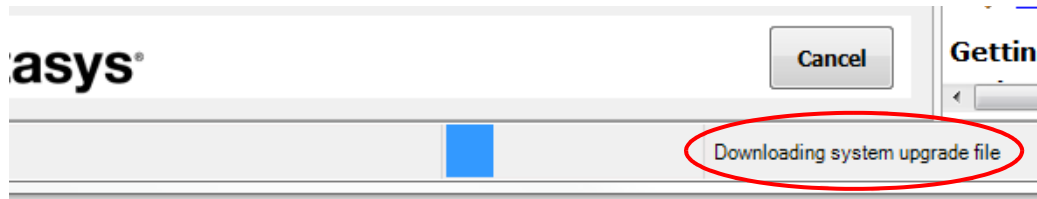
5. Within Control Center, select the **Services** tab. Ensure that your F770 printer is selected from the drop-down menu then click the **Update Software** button.

Figure 8: Control Center Update Software



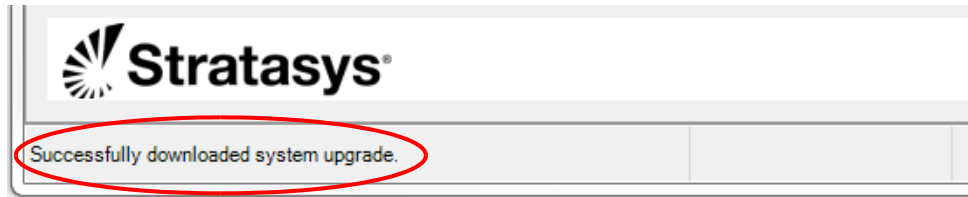
6. Control Center will begin establishing a connection with the printer. Once a connection is established, the workstation PC's file explorer will open.
7. Browse to the location of the *.upg* software upgrade file.
8. Select the *\*.upg* file to be downloaded and then click **Open**. Control Center will begin sending software to the printer. Progress is indicated within the bottom of the Control Center window as well as on the touchscreen.

Figure 9: Software Download Progress



9. Once the software upgrade is successfully downloaded to the printer an indicator will be displayed within the bottom of the Control Center window.

Figure 10: Software Upgrade Successfully Downloaded



10. The touchscreen will refresh to indicate that the printer is verifying the upgrade file.

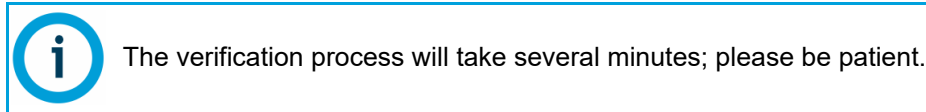
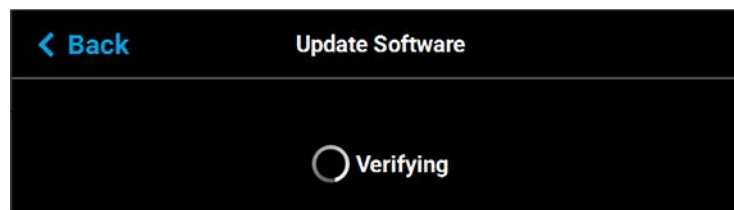
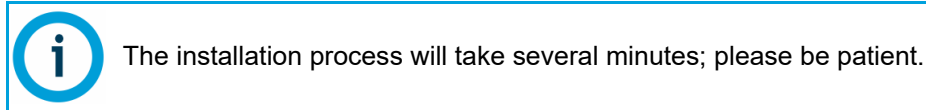


Figure 11: Verifying Software Upgrade



11. Once the verification process is complete, the printer will automatically reboot and begin installing the upgrade file. A variety of output will be displayed on the touchscreen during the installation process.



12. Once the Controller Software upgrade is installed the printer will conduct its regular startup process and automatically perform an XY Gantry Calibration (see "Powering ON the Printer" (page 114) for details).

## Exporting System Configuration (.CFG) File

If your system is receiving fault determination codes, you may need to export a configuration (.cfg) file from your system to send to Customer Support. System configuration files can be exported using one of the following three methods:

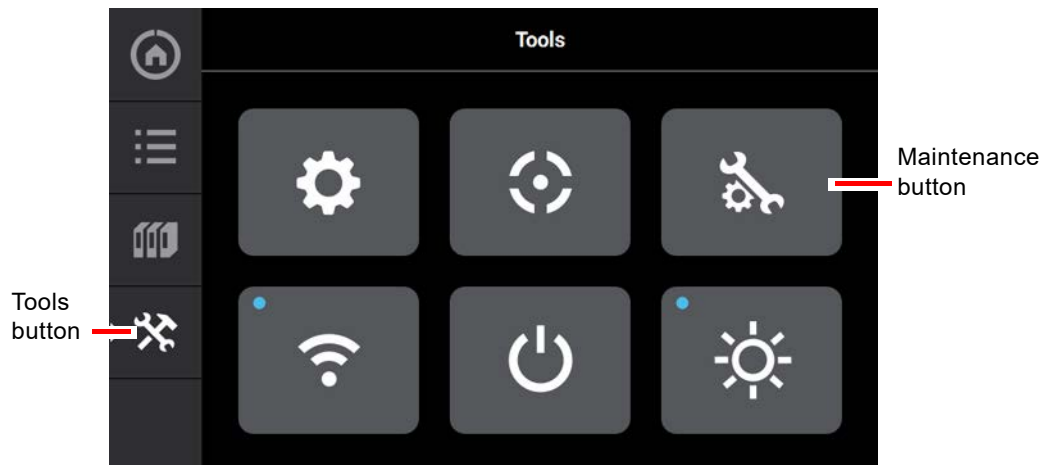
- Saving to a USB Flash drive directly from the F770 printer
- Saving to a location on your workstation PC using the Insight software application
- Saving via GrabCAD Print

You have the option of exporting system configuration files via any of these methods; however, the USB Flash drive method is the preferred method.

## USB Flash Drive Method

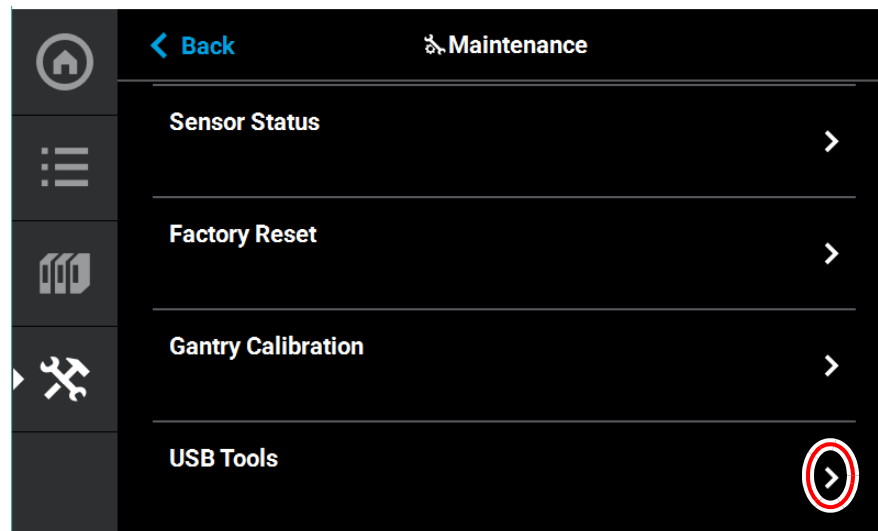
1. Insert the USB flash drive into one of the available USB ports on the F770 printer.
2. On the printer touchscreen, open the Tools page by pressing the **Tools** button within the Navigation Menu.

Figure 12: Tools Page



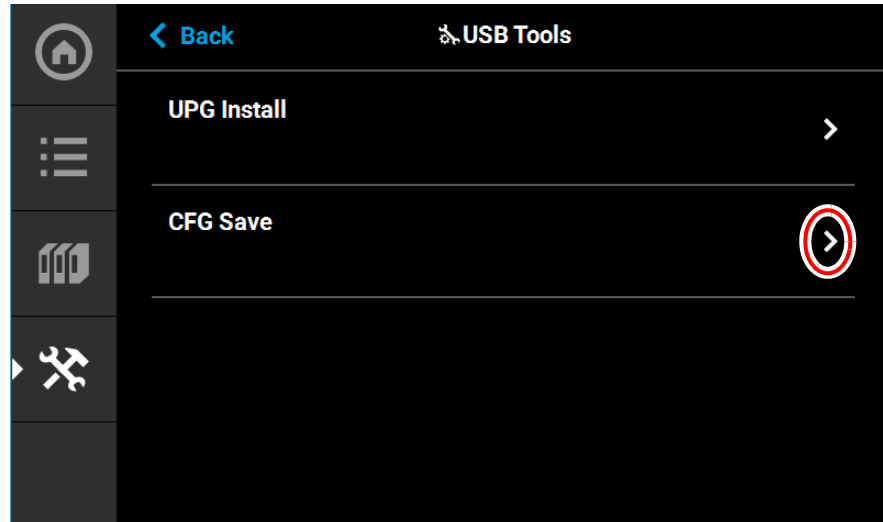
3. Open the Maintenance page by pressing the **Maintenance** button within the Tools page.

Figure 13: Maintenance Page



- From the Maintenance Page, select **USB Tools** and then select **CFG Save**.

Figure 14: USB Tools



- Select **USB**.

Figure 15: CFG Save





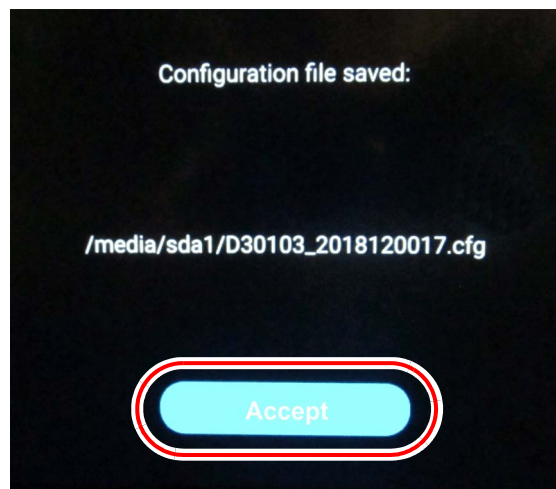
6. Navigate to a save file location on the USB drive and select the **Download** button.

Figure 16: Save File Location



7. The configuration file will download to the USB flash drive. Select **Accept** when the file download is complete.

Figure 17: Configuration File Saved



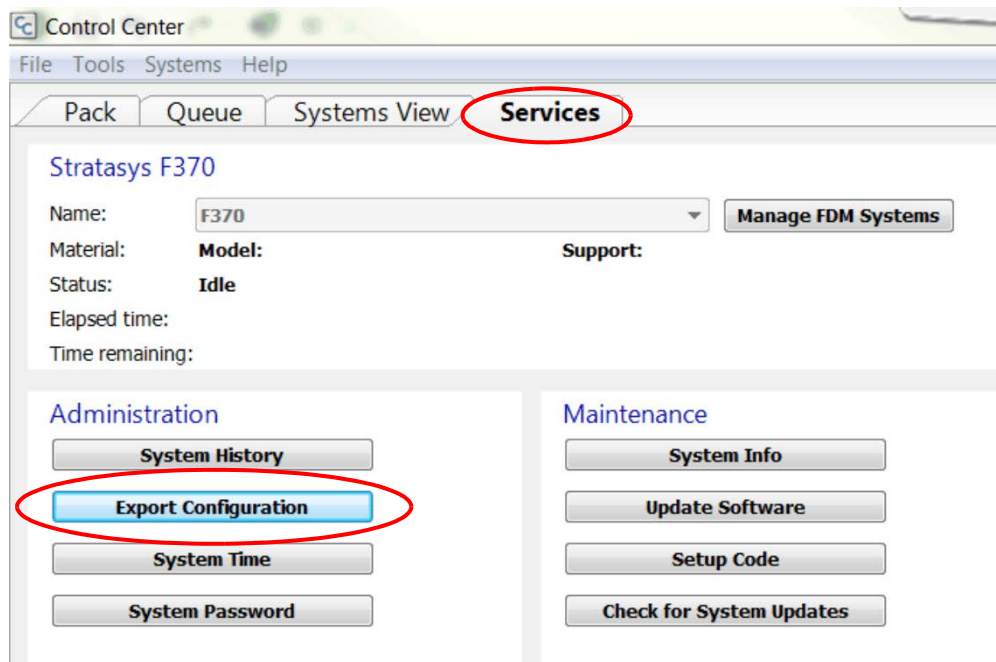
## GrabCAD Print Method

For detailed instructions on exporting a system configuration file navigate to: <http://help.grabcad.com/article/196-printer-firmware-management> and follow the procedure for 'Exporting the printer configuration'.

## Insight Software Method

1. From your workstation PC's Start Menu, navigate to **All Programs > Insight (installed version) > Control Center (installed version)** or double-click the Control Center shortcut (if available).
2. Within Control Center, select the **Services** tab. Ensure that your F770 printer is selected from the drop-down menu then click the **Export Configuration** button.

Figure 18: Control Center Export Configuration



3. Browse to the directory where you wish to save the configuration file.
4. Click on the **Save** button.
5. Close Control Center.

# Maintenance Schedule



## Warning: Hot Surface Hazard

Always wear proper heat protective gloves and clothing when handling items inside the oven, as surfaces within the oven can be very hot.

Maintenance tasks must be performed on a regular basis in order to maintain optimal system operation. [Table 1](#) outlines the general maintenance schedule for the F770 printer. Detailed instructions for each task make up the rest of this chapter.

[Table 2](#) lists part numbers for various replacement consumable items. Use the part numbers listed in this table when ordering replacement parts from Stratasys or your regional Stratasys office.

Table 1: Maintenance Schedule

Weekly	Monthly	As Needed	Maintenance Task
X			"Cleaning the Oven Chamber" (page 189)
X			"Cleaning the Platen" (page 189)
	X		"Clean/Inspect Tip Wipe Assemblies" (page 189)
		X	"Cleaning the Exterior Surface of the Printer" (page 192)
		X	"Cleaning the Touchscreen Display" (page 192)

Table 2: Replacement Consumables

Part Number	Description
123-00401-S	Model Head (standard)
123-00401-S	Support Head (standard)
123-50100-S	F770 build sheets 1 box of 16
123-00305	Tip shield kit - 4 sets
123-00306	2-pack of tip wipe assemblies (see "Clean/Inspect Tip Wipe Assemblies" (page 189)).

# Weekly Maintenance

## Cleaning the Oven Chamber

**Warning: Hot Surface Hazard**

Always wear proper heat protective gloves and clothing when handling items inside the oven, as surfaces within the oven can be very hot.

Do not allow excess material debris to accumulate in the oven chamber as this could cause damage to the printer. Clean the oven chamber on a weekly basis to remove build material debris and dust. A standard vacuum can be used to clean this area if needed. If excessive accumulation occurs vacuum the oven chamber as needed.

## Cleaning the Platen

The aluminum platen provides the level surface on which parts are built (see [Figure 7 \(page 36\)](#) for platen overview). A build sheet is securely affixed to the platen by controlled vacuum. If debris collects on the platen, it can adversely affect build sheet adhesion.

1. Remove the build sheet from the platen.
  - Turn the vacuum control Off.
  - Slide the build sheet off the platen.
2. Carefully remove purged material debris that have fallen into the openings and vacuum channels of the platen.
  - A standard vacuum can be used to clean the platen.

# Monthly Maintenance

## Clean/Inspect Tip Wipe Assemblies

The tip wipe assemblies should be cleaned once a month. While cleaning the assemblies, inspect the flicker/brush assemblies for wear and replace as necessary when wear is detected.

Once material is purged from a tip, the flicker portion of the tip wipe assembly passes across the tip's opening, cutting purged material off in small segments. The brush portion of the tip wipe assembly then passes across the tip's opening cleaning the tip and its tip shield. As a result, the flicker will wear at the location where the tip contacts its surface and eventually develop a notch large enough for the tip to completely pass through the flicker; a notched flicker cannot properly cut purging material. Similarly, material can become embedded within the bristles of the brush resulting in clumping; clumped bristles cannot properly clean a tip or its tip shield. The tip wipe assembly should be replaced once a significant notch develops within the flicker portion of the assembly or whenever bristle clumping (which cannot be removed with a brush) is apparent within the brush portion of the assembly. The tip wipe assembly is replaced as a single unit.

To clean the tip wipe assembly and inspect its components:

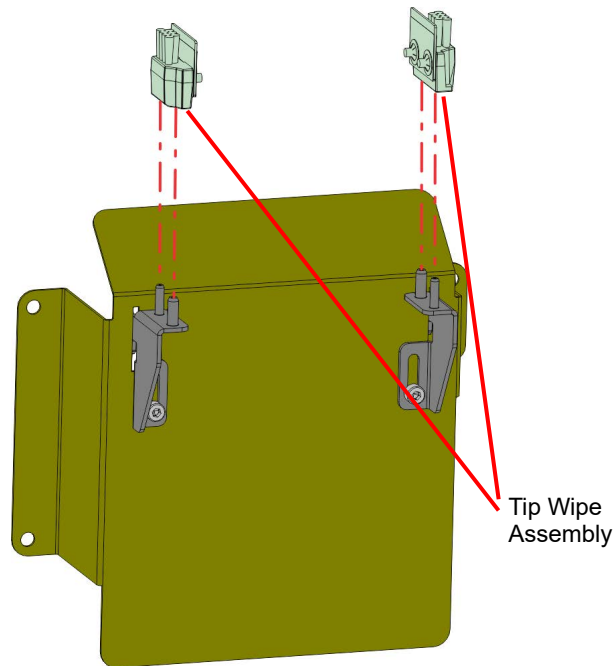
1. Ensure that the printer is stopped (idle) and is not building.
2. Open the oven door.

**Caution:**

Depending on how long the oven has been allowed to cool, components may be hot. Wear the safety gloves provided in the Welcome Kit to perform all remaining steps.

3. Remove the model side tip wipe assembly by lifting it upward until it clears its locating pins.

Figure 19: Tip Wipe Assembly Removal



4. Repeat [step 3](#) above to remove the support side tip wipe assembly.



If the head is positioned above the purge area it may impede your ability to remove the tip wipe assemblies. Open the top right cover and manually move the head away from the purge area.

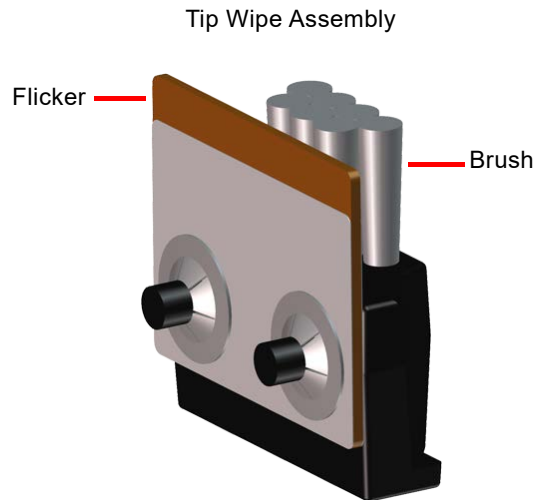
5. Clean and inspect the surface around the locating pins. Make sure that the tip wipe assemblies can sit flush on the surface.
6. Inspect the flicker portion of the tip wipe assemblies. The top edge of the flicker should be straight and must not contain excessive notching/wear.
7. Inspect the brush portion of the tip wipe assemblies. Brush bristles must not show evidence of wear (i.e. no notches in bristle pattern) and should not contain significant bristle clumping. Frayed bristles are acceptable as long as the top edge is even across all of the bristles.

8. Replace one or both of the tip wipe assemblies if excessive wear is present. See Table 2 (page 188) for information on ordering replacement assemblies.



The components of the assembly cannot be replaced individually. The entire tip wipe assembly must be replaced if excessive wear is present on the flicker or the brush.

Figure 20: Tip Wipe Assembly Details



9. Reinstall the support side tip wipe assembly by placing the assembly onto its locating pins and sliding the assembly downward.
10. Repeat [step 9](#) above to reinstall the model side tip wipe assembly.

# As Needed Maintenance

## Cleaning the Exterior Surface of the Printer

The printer's exterior surfaces (doors and panels) may accumulate dust and periodically require cleaning. Exterior doors and panels, with the exception of the touchscreen display, can be cleaned using a slightly damp microfiber cloth (supplied in the Welcome Kit). The cloth should be only slightly damp to ensure that water does not enter the printer. Excess water can cause damage to interior components.

## Cleaning the Touchscreen Display

**Caution:**

Using a cleaner which contains ammonia and/or alcohol can damage the touchscreen. Only a suitable LCD cleaning solution and microfiber cloth (included in the Welcome Kit) should be used to clean the touchscreen display.

As needed, to remove smudge marks and buildup, clean the touchscreen display using the LCD cleaner and microfiber cloth provided in the Welcome Kit.

Apply an adequate amount of LCD cleaning solution to the provided microfiber cloth and then gently wipe the exterior surface of the touchscreen display to clean its surface. It is recommended that you apply LCD cleaner to the microfiber cloth rather than applying cleaner directly to the touchscreen display, as excess moisture may damage the display.

## Inspecting and Cleaning the Tip Shields

The tip shields may accumulate purged material or debris. As required, this material can be removed by manually wiping the tip shields with a clean cloth. If the tip shields require replacement, see ["Tip Shield"](#) (page 213).

# Customer Replaceable Units

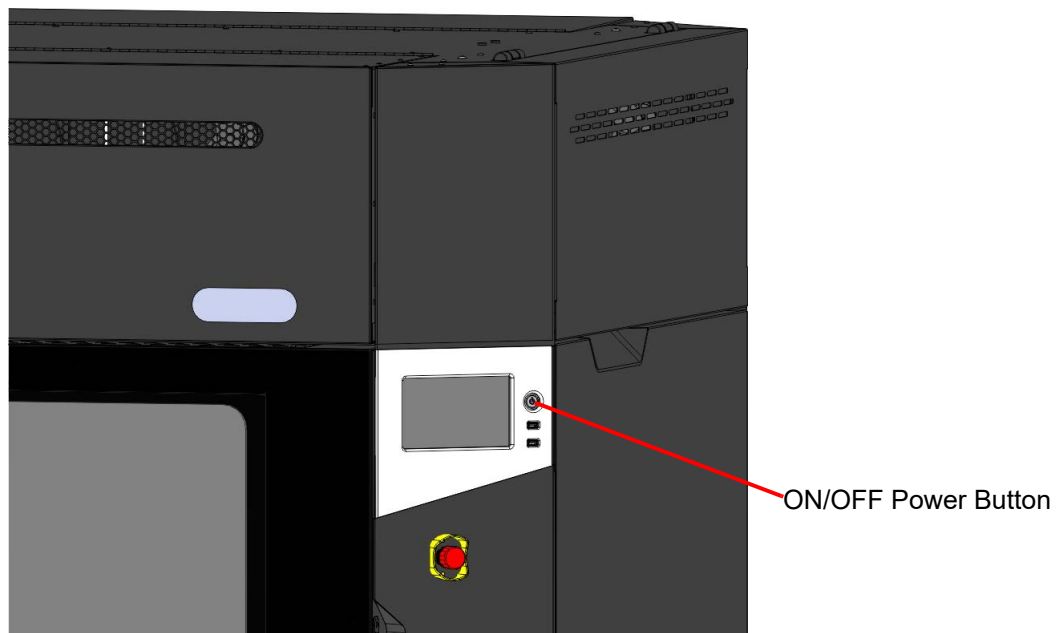
The following service procedures outline the replacement instructions for the customer replaceable units of the F770 printer.

## Powering Off

### Powering Off the Printer

1. Depress the blue ON/OFF power button beneath the touchscreen display.

Figure 21: ON/OFF power button location



2. Press **Accept** on the touchscreen display.
3. Wait approximately 25 seconds for the printer to power down.
4. Disconnect the AC power cord from the power source.
5. Perform lockout-tagout of the AC power cord in accordance with customer site procedures.

## Exterior Panels and Access Doors

### Top Access Doors Left/Right

#### Required Tools

- #2 Phillips Screwdriver
- Step Ladder (optional)



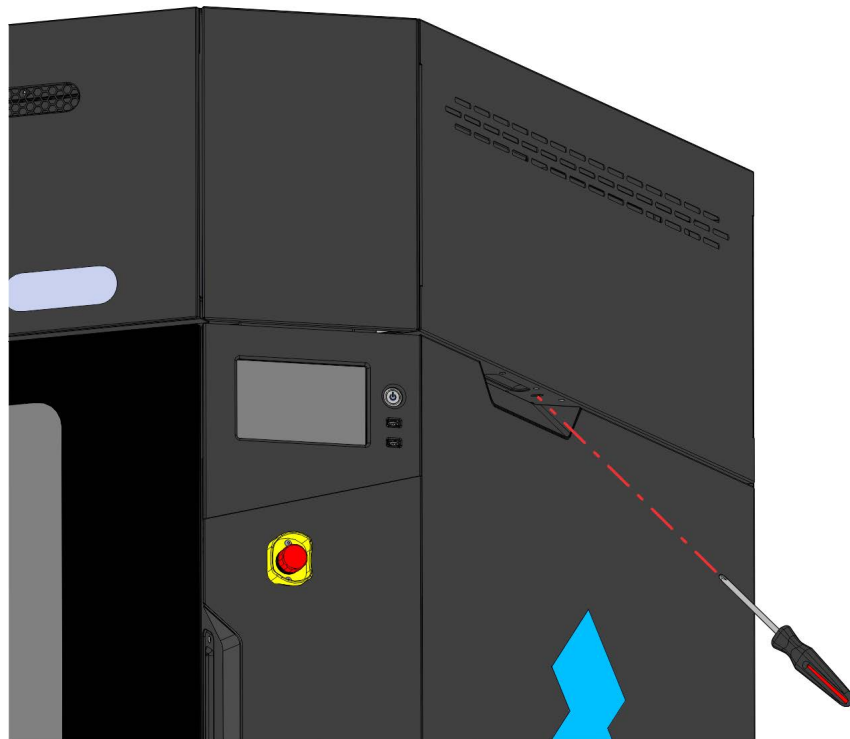
## Opening Top Access Doors Left/Right



The following procedure depicts the top right access door only. This procedure is identical for the top left access door.

1. Using a # 2 Phillips screwdriver, loosen the single captive screw that secures the top right access door. See Figure 22.

Figure 22: Top Right Access Door Captive Screw Location



2. Lift the top access door. The friction hinge will prevent the door from falling.



When performing maintenance procedures inside the gantry area, the top right access door must remain open to ensure that the interlock is disengaged.

## Top Access Doors Front/Rear

### Required Tools

- #2 Phillips Screwdriver
- Step Ladder (optional)

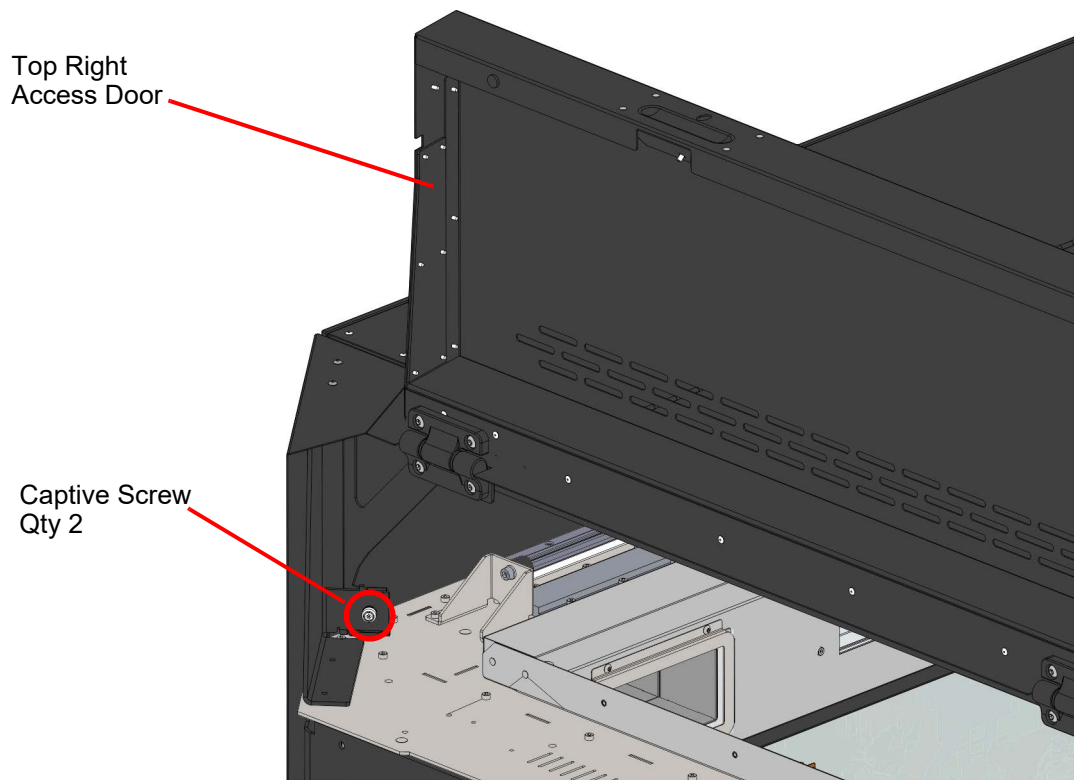
## Opening Top Access Doors Front/Rear



The following procedure depicts the top front access door only. This procedure is identical for the top rear access door.

1. Open the top left access door and the top right access door. See “Top Access Doors Left/Right” (page 193).
2. Using a # 2 Phillips screwdriver, loosen the captive screws (2) that secure each end of the top front access door. See Figure 23.

Figure 23: Top Front Access Door Captive Screw Location



3. Lift the top front access door fully, to a vertical position.



The top front and rear access doors do not contain friction hinges. Make sure the door is fully open before releasing.

## Electronics Bay Access Doors

### Required Tools

- #2 Phillips Screwdriver

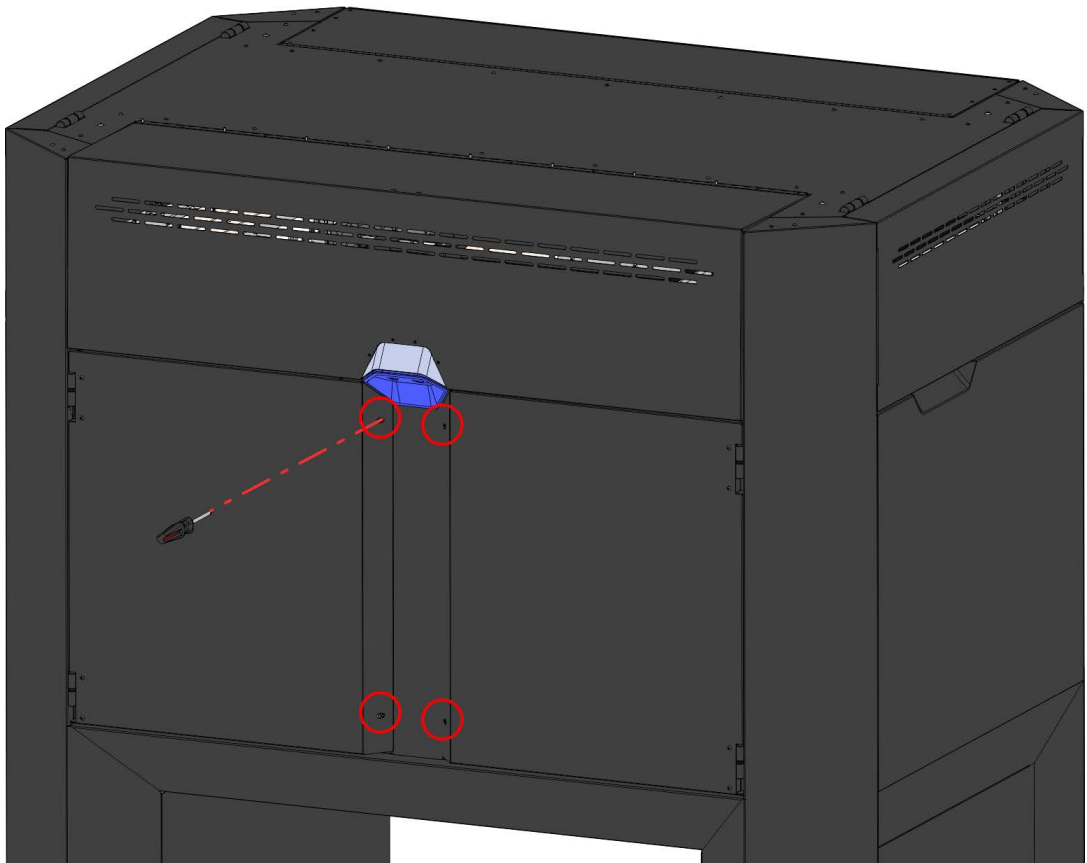
## Opening and Removing Electronics Bay Access Doors



The following procedure depicts the right electronics bay access door only. This procedure is identical for the left electronics bay access door.

1. Using a # 2 Phillips screwdriver, loosen the captive screws (2) that secure the electronics bay access door. See Figure 24.

Figure 24: Electronics Bay Access Door Captive Screw Locations



2. Open the electronics bay access door.
3. Gently lift the access door and remove it from the hinge.



Move the access doors to a location where surface scratches can be prevented.

## Upper Side Panels Left/Right

### Required Tools

- 2.5 mm Hex Wrench

## Removing Upper Side Panels Left/Right



The following procedure depicts the upper right side panel only. This procedure is identical for the upper left side panel.

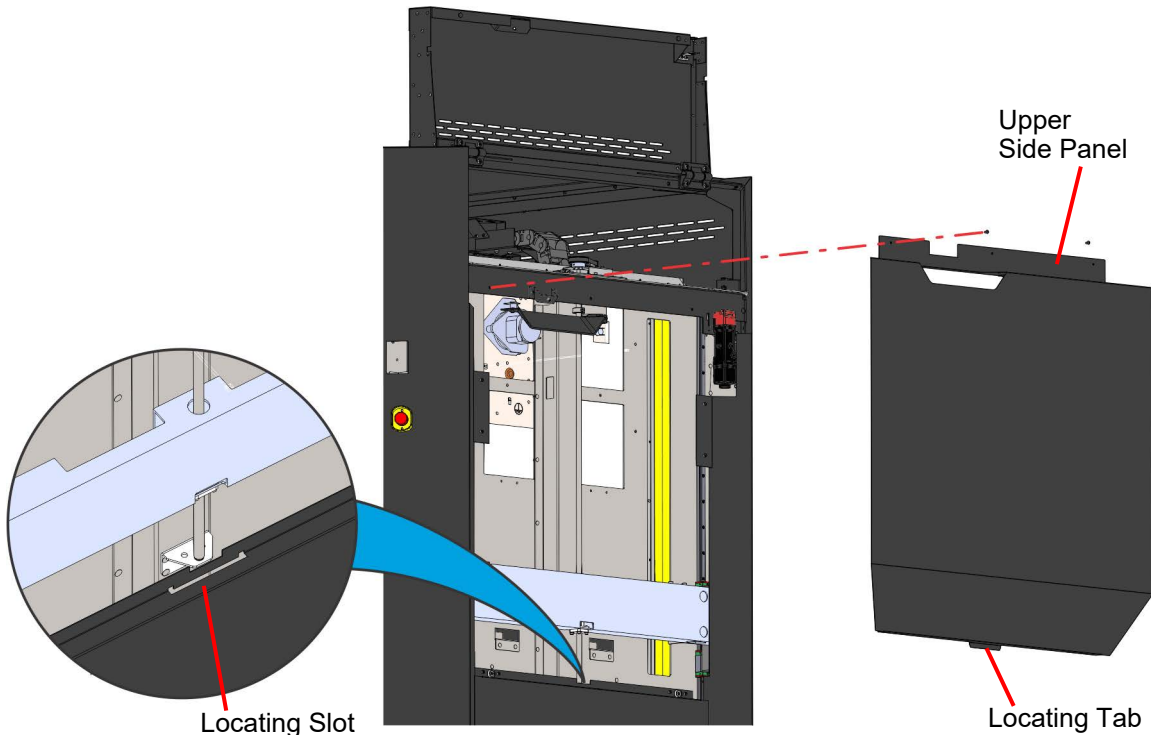
1. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the top right access door. See “Top Access Doors Left/Right” (page 193).
3. Using a 3 mm hex wrench, remove the screws (3) that secure the upper side panel to the printer frame. See Figure 25.

Figure 25: Upper Side Panel Mounting Screws



4. Lift the upper side panel to disengage the bottom locating tab from the lower side panel.
5. Remove and set aside the upper side panel.



Move the upper side panel to a location where surface scratches can be prevented. Orient the panel to prevent bending or damage to the panel's locating tab.

**Installing the Upper Side Panels Left/Right**

1. Gently insert the locating tab on the bottom of the upper side panel into the slot at the top of the lower side panel. See [Figure 25](#).
2. While aligning the upper side panel with its mounts, use a 3 mm hex wrench to loosely install the upper side panel mounting screws (3).
3. Tighten the upper side panel mounting screws (3). See [Figure 25](#).
4. Close the top access door.

# Carriage Board

## Required Tools

- 3 mm hex wrench
- Phillips screwdriver

## Removing the Carriage Board

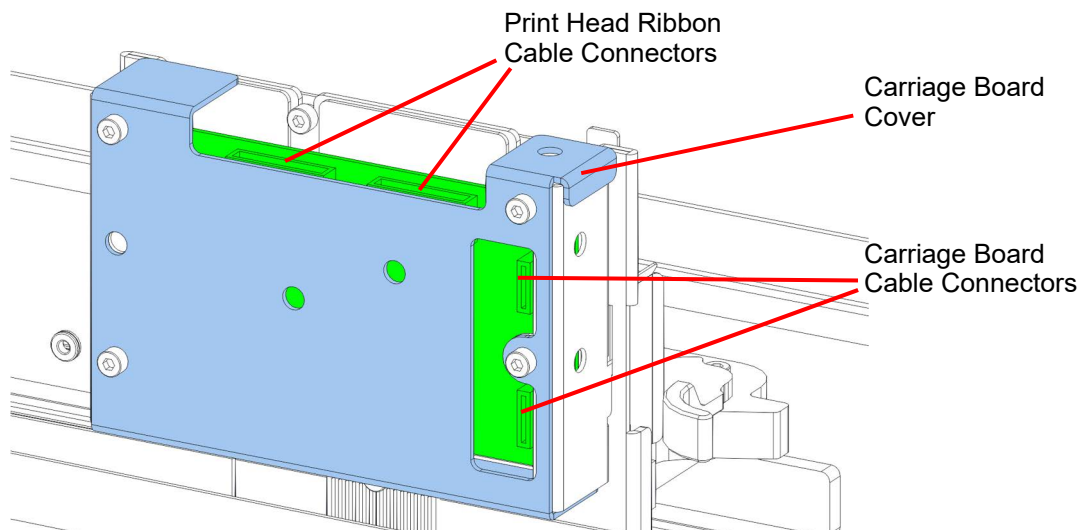
1. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the top front access door. See “Opening Top Access Doors Front/Rear” (page 195).
3. Move the head carriage to the front of the gantry.
4. Disconnect the model and support head ribbon cables from the top of the carriage board.
5. From the front of the gantry, disconnect the carriage board cables (2) from the carriage board (J4, J7).

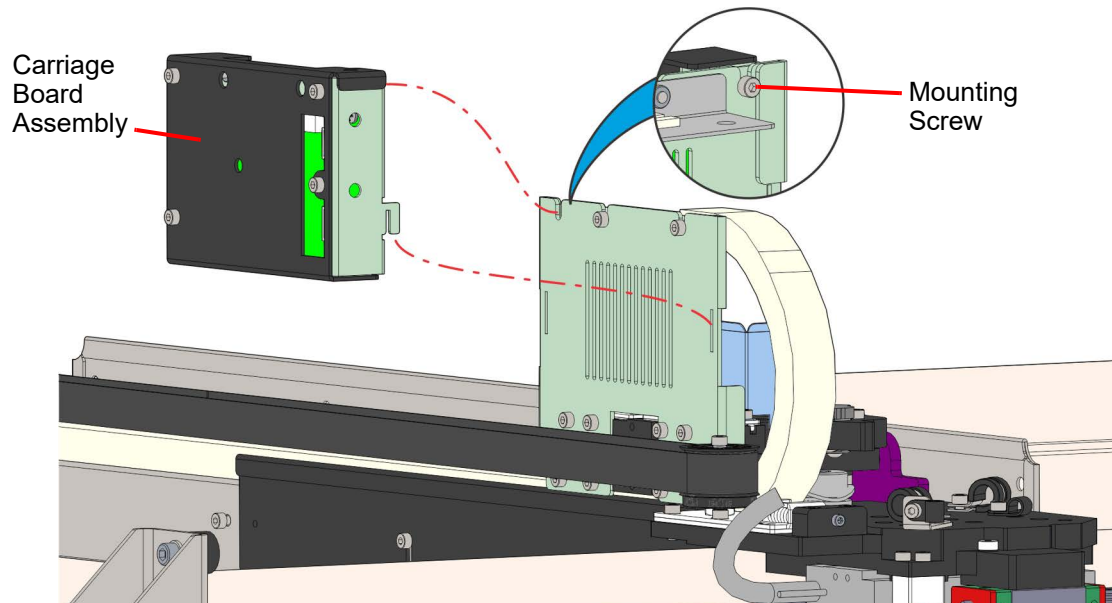
Figure 26: Head Board Connector Locations



6. Remove the reusable cable ties (2) securing the cables to the carriage board assembly.

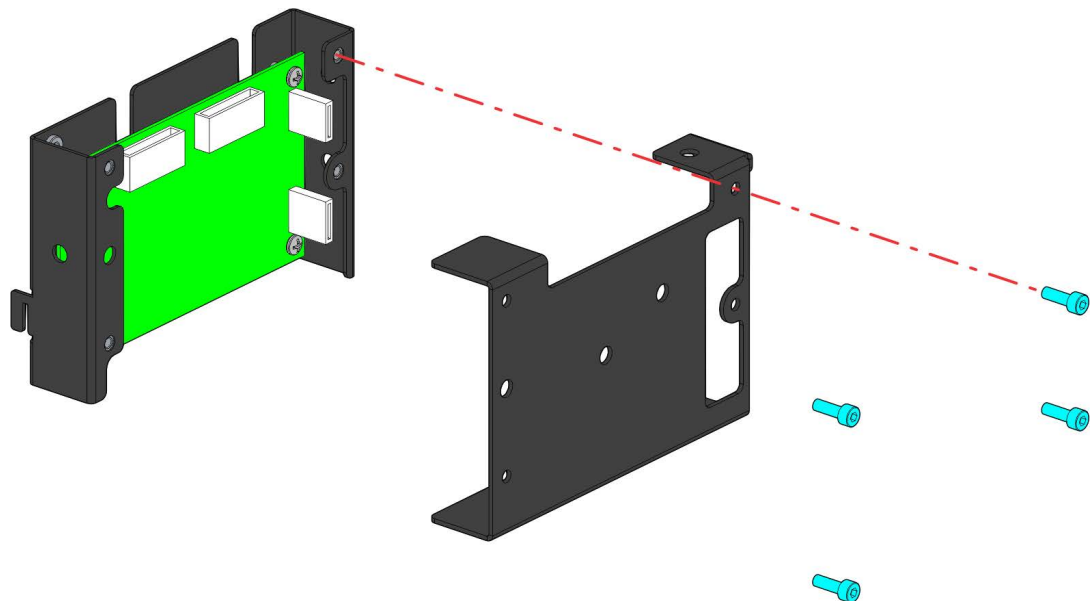
7. Use a 3 mm hex wrench to loosen the mounting screw that secures the carriage board assembly to the carriage assembly. Lift and remove the carriage board assembly from the gantry enclosure.

Figure 27: Head Board Assembly Mounting Location



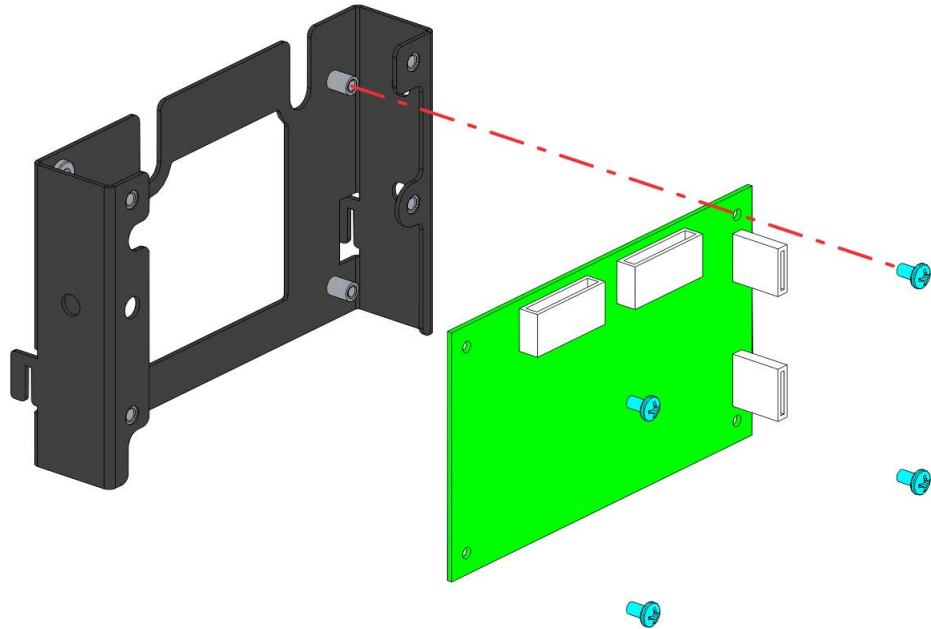
8. Using a 3 mm hex wrench, remove the screws (4) securing the cover to the carriage board mounting bracket. Remove the cover.

Figure 28: Carriage board cover detail



9. Using a Phillips screwdriver, remove the screws (4) securing the carriage board to the mounting bracket. Remove the carriage board.

Figure 29: Carriage board and mounting bracket detail



### Installing the Carriage Board

1. Using a Phillips screwdriver, install the screws (4) securing the carriage board to the mounting bracket. See [Figure 29](#).
2. Using a 3 mm hex wrench, install the screws (4) securing the cover to the carriage board mounting bracket. See [Figure 28](#).
3. Insert the tabs of the carriage board assembly into the slots on the back of the carriage. Use a 3 mm hex wrench to install the mounting screw that secures the carriage board assembly to the carriage. See [Figure 27](#).
4. From the front of the gantry, connect the carriage board cables (2) to the carriage board (J4, J7).
5. Reconnect the reusable cable ties (2) securing the cables to the carriage board assembly.
6. Connect the model and support head ribbon cables to the top of the carriage board.
7. Close the top access doors.
8. Power ON the printer.
9. Load material to the model and support heads.



## 3.3/5/12 VDC ATX Power Supply

### Required Tools

- 3 mm hex wrench

### Removing the 3.3/5/12 VDC ATX Power Supply

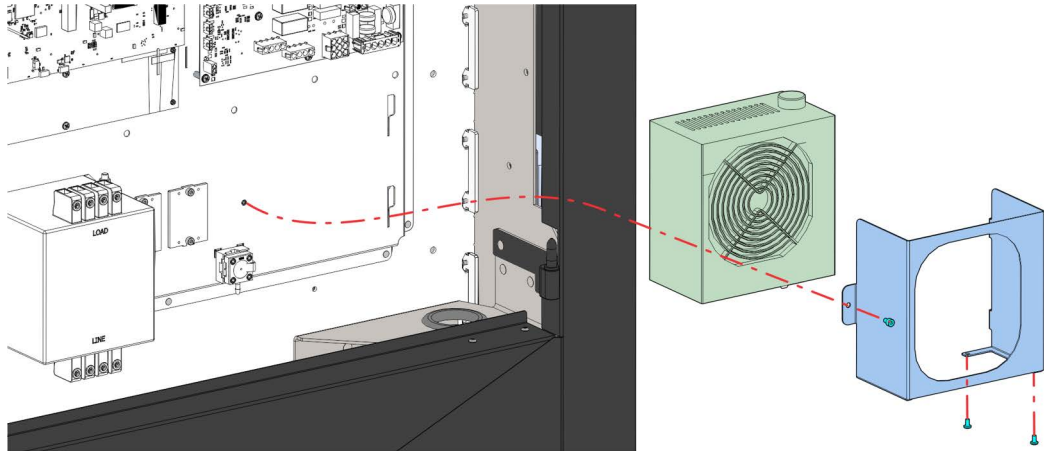
1. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the electronics bay access doors, see “Electronics Bay Access Doors” (page 195).
3. Disconnect the input power cable from the power supply.
4. Disconnect the power supply cables from the I/O board (J16, J19, J20, J29).
5. Using a 3mm hex wrench, remove the power supply bracket mounting screw. See Figure 30.
6. Lift the bracket slightly to disengage it and remove the power supply from the electronics bay.
7. Remove the power supply from the bracket.

Figure 30: 3.3/5/12 VDC ATX power supply mounting location



**Installing the 3.3/5/12 VDC ATX Power Supply**

1. Transfer the mounting bracket to the new power supply.
2. Insert the tabs of the power supply bracket into the slotted holes of the electronics bay panel. Align the power supply and bracket with the mounting screw location.
3. Use a 3mm hex wrench to reinstall the single mounting screw on the power supply bracket.
4. Connect the power supply cables to the I/O board (J16, J19, J20, J29).
5. Reconnect the cable to the 3.3/5/12 VDC ATX power supply.
6. Make sure that the switch on the power supply is in the ON position.
7. Close the electronics bay doors.

## Replacing a Head

When a head reaches the 1500 build hour odometer limit, a warning will be displayed on the User Interface and the head's Head Status Icon will be highlighted in red on the Materials page. You can continue using a head which has exceeded its odometer limit, but it is highly recommended that you change the head as part quality will be unpredictable. See [“Replacing a Head” \(page 130\)](#) for instructions on replacing a head.

# Oven Door Gasket

## Required Tools

- Screwdriver or similar instrument

## Removing the Oven Door Gasket

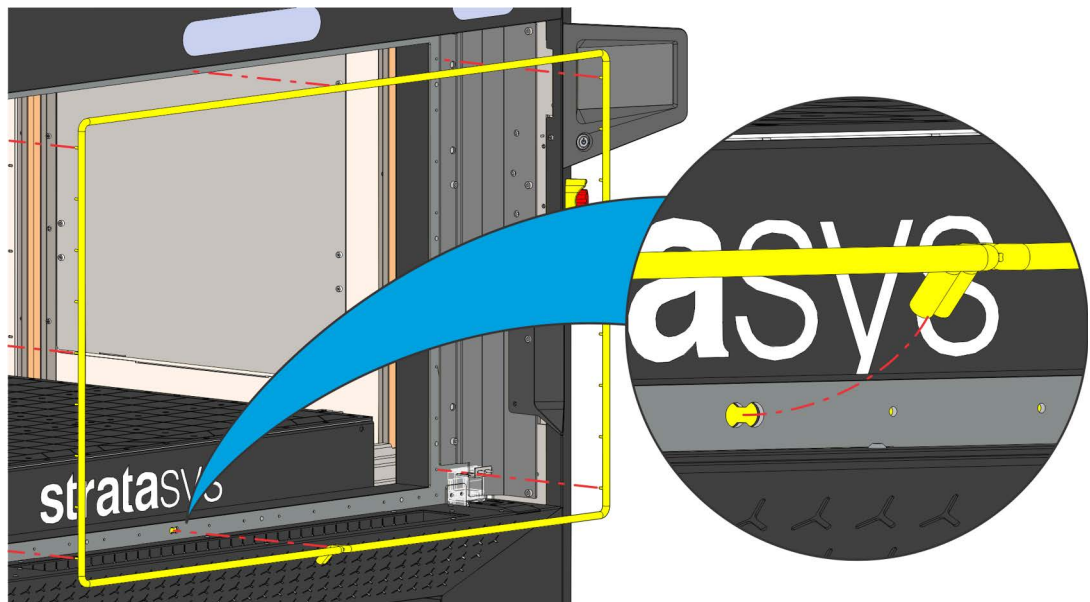
1. Power off the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the oven door.
3. Extract the gasket pins out of the holes around the entrance to the oven enclosure. See Figure 31.
4. Pull the ends of the gasket out of the hole below the entrance to the oven enclosure. See Figure 31.
5. Remove the oven gasket from the printer.

Figure 31: Oven door gasket detail (door removed for clarity)



## Installing the Oven Door Gasket

1. Insert the gasket pins into the holes around the perimeter of the entrance to the oven enclosure. See Figure 31.
2. Use a screwdriver or sharp instrument to poke the ends of the gasket into the hole below the entrance to the oven enclosure. See Figure 31.
3. Close the oven door.

## X Encoder Strip

**Caution:**

Magnetizing the encoder strip will guarantee failure. Do not allow the encoder strip to contact the magnetic plates in the gantry, or any other magnetic components.



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

**Tools Required**

- Small Phillips head screw driver
- Marker
- Razor blade

**Removing the X Encoder Strip**

1. Power OFF the printer. See [“Powering Off”](#) (page 193).

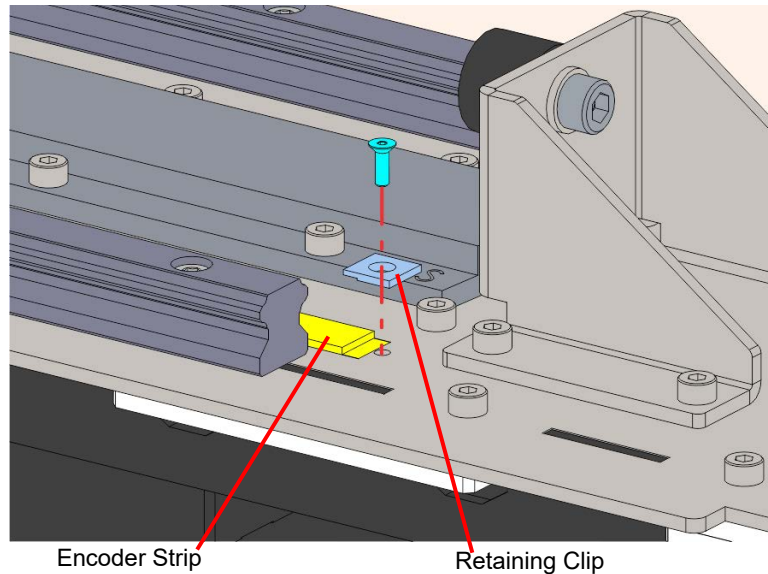


Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the appropriate front or rear top access doors. See [“Opening Top Access Doors Front/Rear”](#) (page 195).
3. Manually move the Y-bridge to the center of the gantry.
4. Using a marker, trace 1 side of the existing encoder strip to provide an alignment guide for re-installation.

5. Using a small Phillips head screwdriver, remove the screws (2) which secure both ends of the encoder strip to the frame. Remove the encoder strip from the printer. Keep the retaining clips for re-installation.

Figure 32: Encoder strip mounting detail



6. Use a razor blade to remove any remaining adhesive residue on top of the printer frame.

### Installing the X Encoder Strip



**Caution:**

Do not allow the encoder strip to contact the magnetic plates in the gantry, or any other magnetic components.

1. Move the Y bridge to either end of the gantry.
2. Using a small Phillips head screwdriver, install a screw to loosely secure one end of the encoder strip (with a single retaining clip) to the frame. See [Figure 32](#).
3. Starting at the secured end of the encoder strip, remove a small amount of the adhesive backing at a time as you apply the encoder strip to the top of the printer frame. Align the strip with the existing marker line until you reach the opposite end of the gantry. Move the Y bridge as necessary to access the encoder strip.
4. Using a small Phillips head screwdriver, install a screw to secure the loose end of the encoder strip (with a single retaining clip) to the frame. See [Figure 32](#).
5. Tighten the screws at both ends of the encoder strip.
6. Close the top access doors.
7. Power ON the printer.
8. Verify that auto-home is successful.

## X Encoder Sensor



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Tools Required

- 3 mm hex wrench

### Removing the X Encoder Sensor

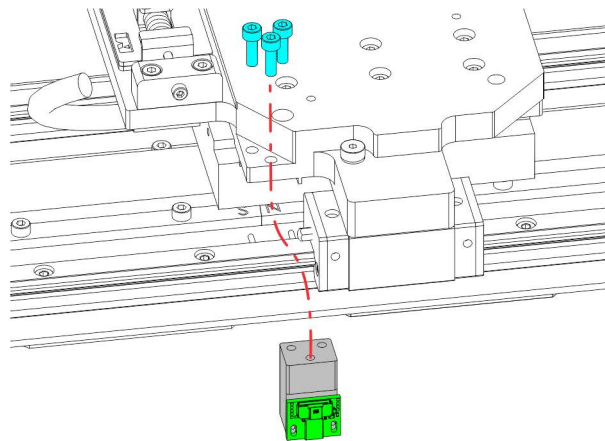
1. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the front and rear top access doors. See “Opening Top Access Doors Front/Rear” (page 195).
3. Manually move the Y bridge to the center of the gantry.
4. From the front of the gantry, disconnect the front X encoder sensor cable.
5. Use a 3 mm hex wrench to remove the screws (3) that secure the X encoder sensor and mounting bracket to the front of the Y bridge. Remove the sensor and bracket.

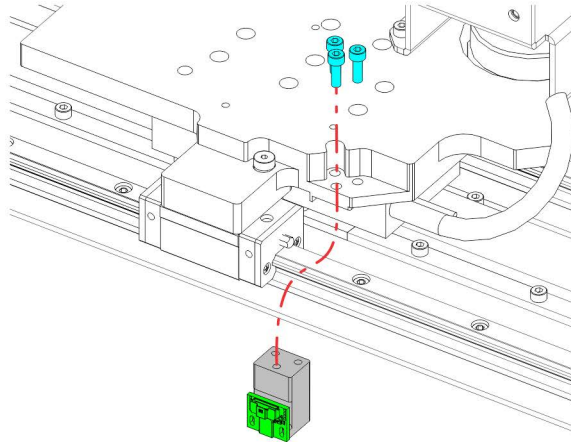
Figure 33: Front X Encoder Sensor Mounting Screw Locations



6. From the rear of the gantry, disconnect the rear X encoder sensor cable.

7. Use a 3 mm hex wrench to remove the screws (3) that secure the X encoder mounting bracket to the rear of the Y bridge. Remove the sensor and bracket.

Figure 34: Rear X Encoder Sensor Mounting Screw Locations



### Installing the X Encoder Sensor

1. From the rear of the gantry, use a 3 mm hex wrench to install the screws (3) that secure the X encoder mounting bracket to the rear of the Y bridge. See [Figure 34](#).
2. Connect the rear X encoder sensor cable.
3. From the front of the gantry, use a 3 mm hex wrench to install the screws (3) that secure the X encoder mounting bracket to the front of the Y bridge. See [Figure 33](#).
4. Connect the front X encoder sensor cable.
5. Close the top access doors.
6. Power ON the printer.
7. Verify that auto-home is successful.

## Bellows, Right/Left



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Required Tools

- 3 mm hex wrench

### Removing the Bellows



The following procedure depicts the right side bellows only. This procedure is identical for the left side bellows.

1. Power OFF the printer.



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the appropriate top side access door. See “Opening Top Access Doors Left/Right” (page 194).
3. Open the oven door.



#### **Warning: Hot Surfaces**

Allow the interior of the printer's oven enclosure to cool down before continuing this procedure.

4. From inside the oven enclosure, use a 3 mm hex wrench to remove the screws (5) securing the bellows to the Y bridge.

5.

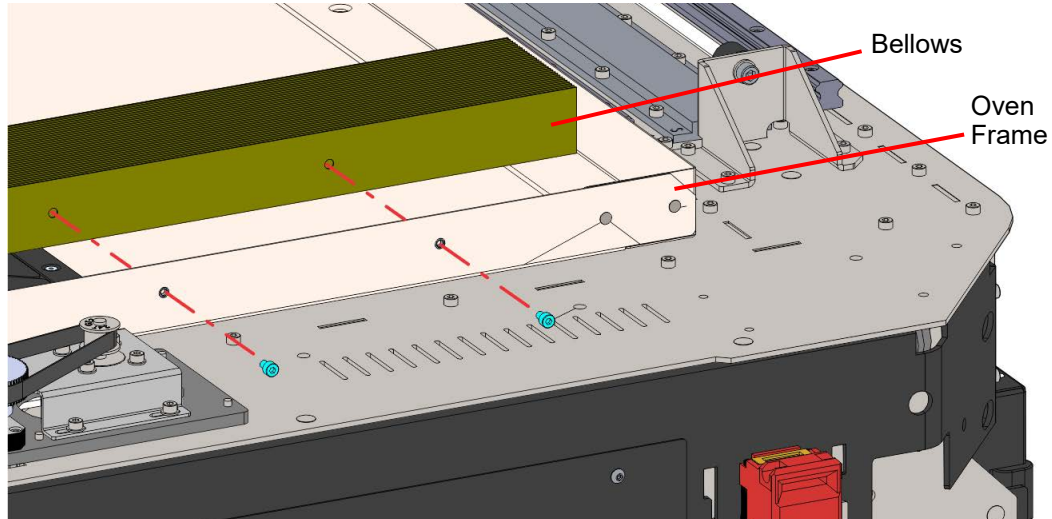


Move the Y-bridge as necessary to access bellows mounting screws.



6. From the top side access door, use a 3 mm hex wrench to remove the screws (5) securing the bellows to the side of the oven frame. See [Figure 35](#).

Figure 35: Bellows Detail



7. Remove the bellows from the gantry.

### Installing the Bellows

1. From the top side access door, use a 3 mm hex wrench to install the screws (5) securing the bellows to the side of the oven frame. See [Figure 35](#).
2. From inside the oven enclosure, use a 3 mm hex wrench to install the screws (5) securing the bellows to the Y bridge.



Move the Y-bridge as necessary to access bellows mounting screw locations.

4. Close the oven door.
5. Close the top side access door.

## Head Ribbon Cables



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Removing the Head Ribbon Cables



Make sure to disconnect the head ribbon cables while the printer is powered ON to ensure that auto-calibration occurs after re-installation.

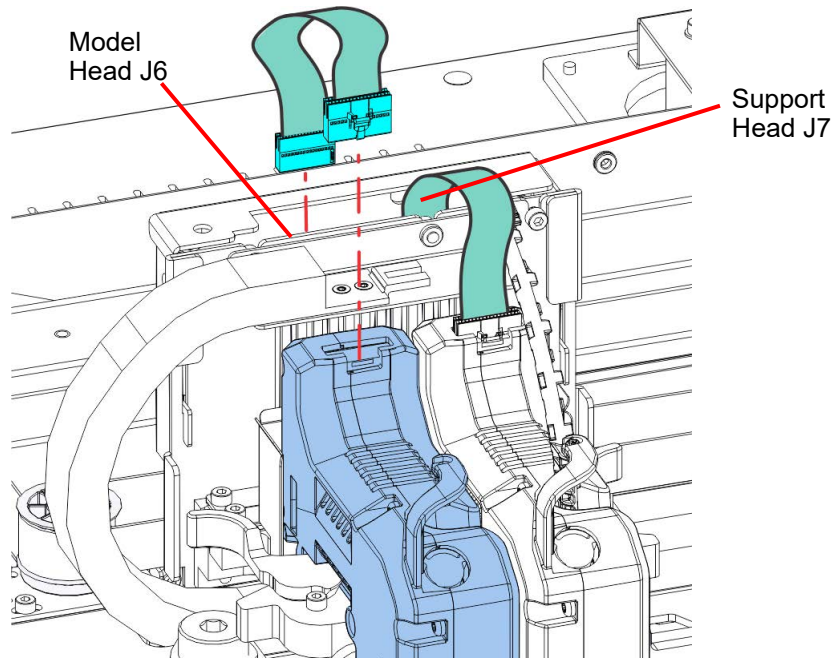
1. With the printer powered ON, open the top right access door. See “Opening Top Access Doors Left/Right” (page 194).
2. Move the Y-bridge to the right side of the gantry enclosure.
3. Disconnect the head ribbon cable connectors (2) from the tops of the material and support heads. See Figure 36.
4. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

5. Disconnect the head ribbon cable connectors (2) from the connectors on top of the head board (J6 and J7). See Figure 36.

Figure 36: Head ribbon cable connections



6. Remove the head ribbon cables from the printer.

### **Installing the Head Ribbon Cables**

1. Connect the rear head ribbon cable connectors (2) to the top connectors on the head board (J6 and J7). See [Figure 36](#).
2. Connect the front head ribbon cable connectors (2) to the material and support heads. See [Figure 36](#).
3. Close the top access door.

## Tip Shield

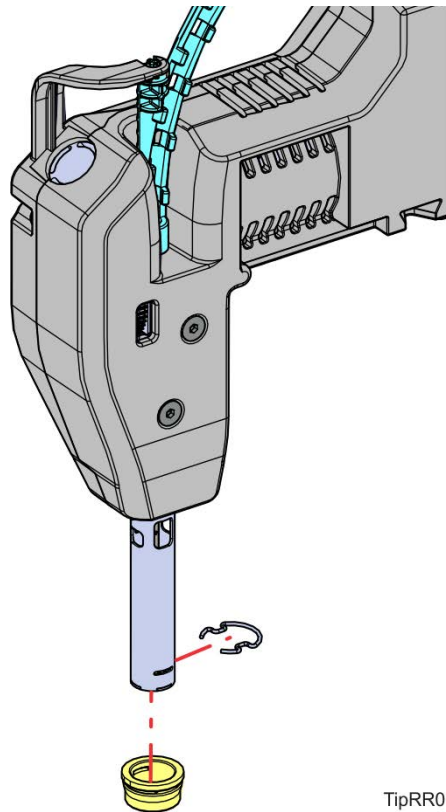


When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Removing the Tip Shield

1. Remove the head on which the tip shield to be replaced is located. See “Replacing a Head” (page 130).
2. Remove the tip shield retaining clip from the head. See Figure 37.

Figure 37: Tip Shield



TipRR01

3. Remove the tip shield from the head.

**Installing the Tip Shield**

1. Place the new tip shield on the head.
2. Align the slots in the tip shield with the slots in the head.
3. Slide the tip shield retaining clip onto the head. Ensure the notches in the tip shield retaining clip are seated in the slots in the tip shield and head.
4. Install the head. See [“Installing the Head” \(page 133\)](#).
5. Perform the Automatic Tip Calibration as described in [“Automatic Tip Calibration” \(page 160\)](#).
6. Perform the Manual Tip Calibration as described in [“Manual Tip Calibration” \(page 163\)](#).

## Y-Drive Belt



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Required Tools

- 2.5 mm hex wrench
- 3 mm hex wrench

### Removing the Y-Drive Belt

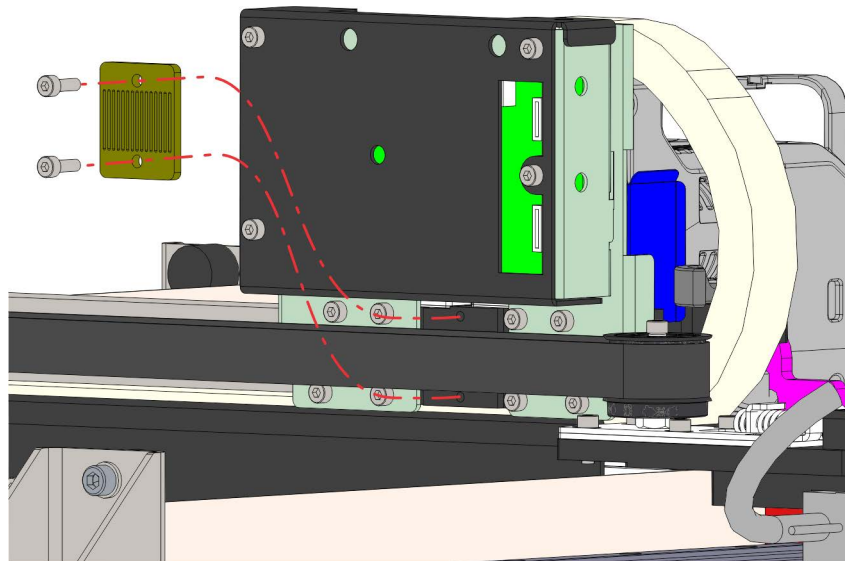
1. Open all of the top access doors. See “Opening Top Access Doors Left/Right” (page 194) and “Opening Top Access Doors Front/Rear” (page 195).
2. Move the head carriage to the front of the gantry enclosure.
3. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

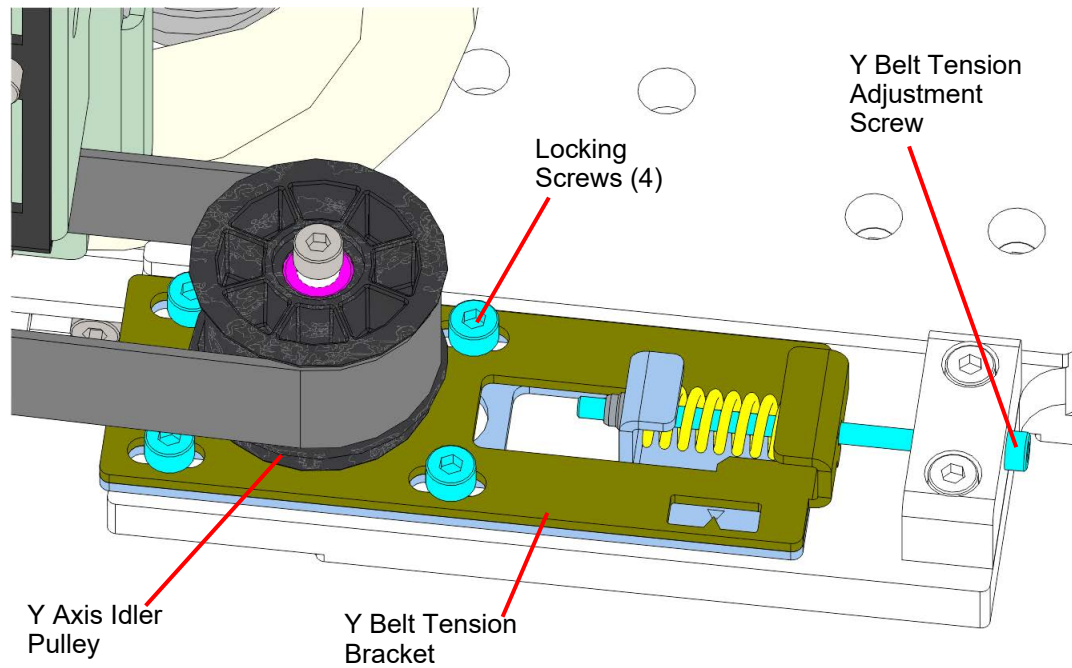
4. Use a 3 mm hex wrench to remove the 2 screws (2) that secure the Y belt clamp. Set aside the Y belt clamp. See [Figure 38](#)

Figure 38: Y Belt Clamp Removal



5. Using a 3 mm hex wrench, loosen the locking screws (4) that secure the Y belt tension brackets. See Figure 39.
6. Use a 2.5mm hex wrench to loosen the Y belt tension adjustment screw to relax the belt tension. See Figure 39.

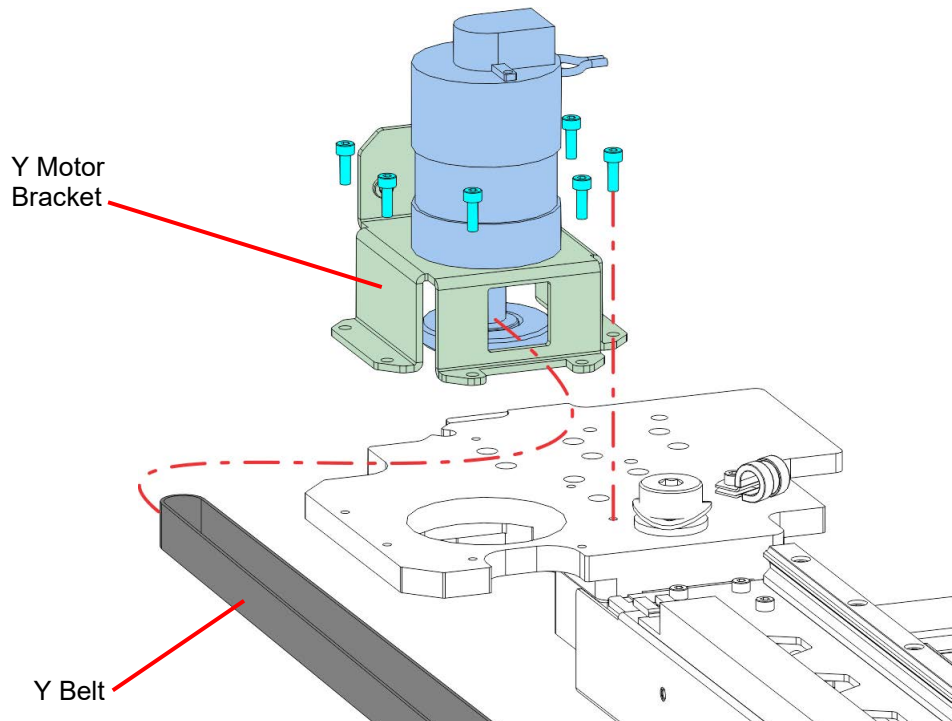
Figure 39: X drive belt adjustment bracket location



7. Remove the Y belt from the Y axis idler pulley.

8. Using a 3 mm hex wrench, remove the Y motor bracket mounting screws (6) to access the motor pulley. See Figure 40.

Figure 40: Y motor mounting screw locations



9. Extract the Y belt from the Y motor pulley and motor bracket. Remove the belt from the printer.



## Installing the Y Drive Belt

1. Insert the end of the Y drive belt through to the hole in the Y motor bracket and loop it around the motor pulley.
2. Using a 3 mm hex wrench, install the Y motor bracket mounting screws (6) to secure the Y motor and bracket to the Y bridge. See [Figure 40](#).
3. Install the loose end of the Y drive belt to the Y-axis idler pulley. See [Figure 39](#).
4. Adjust the Y drive belt tension. See [“Adjusting the Y-Belt Tension”](#) (page 226).
5. Use a 2.5 mm hex wrench to install the 2 screws (2) that secure the Y belt clamp. See [Figure 38](#).



Align the slots in the clamp with the belt teeth before tightening the clamp screws.

6. Close the top access door.
7. Power ON the printer.
8. Perform the Automatic Tip Calibration as described in [“Automatic Tip Calibration”](#) (page 160).
9. Perform the Manual Tip Calibration as described in [“Manual Tip Calibration”](#) (page 163).

## Y Motor



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Required Tools

- 2.5 mm hex wrench
- 3 mm hex wrench

### Removing the Y Motor

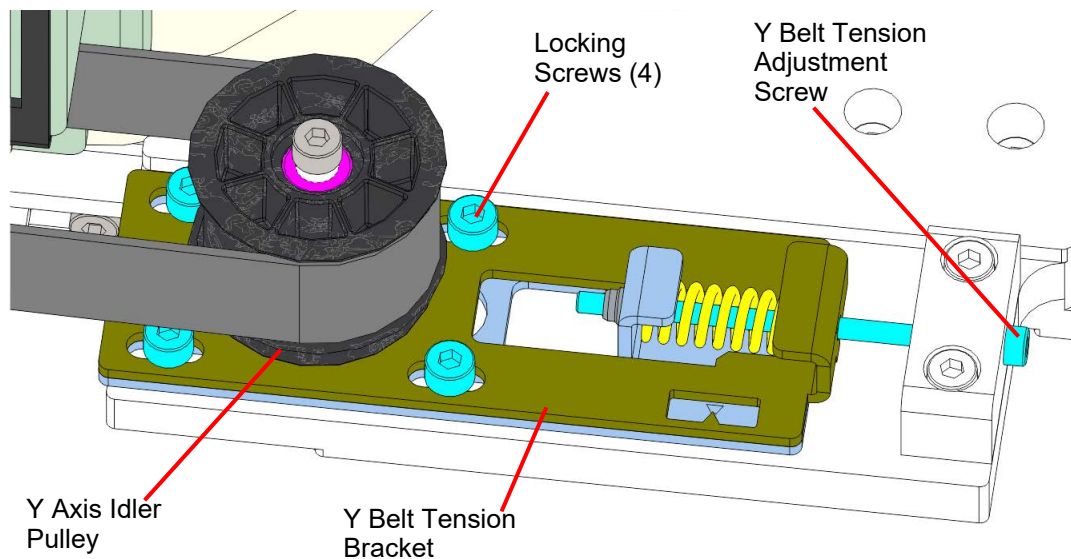
1. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

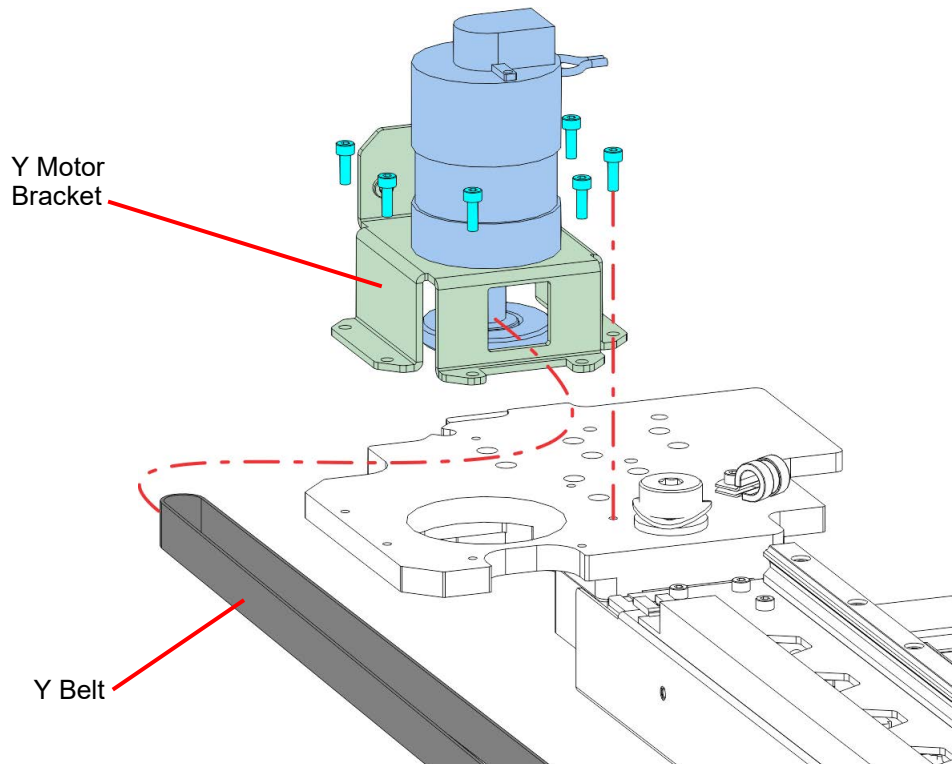
2. Open all of the top access doors. See “Opening Top Access Doors Left/Right” (page 194) and “Opening Top Access Doors Front/Rear” (page 195).
3. Move the Y bridge to the left side of the filament tube guide bracket.
4. Disconnect the Y motor encoder cable on top of the motor.
5. Disconnect the Y motor cables (2) connected to the cable harness.
6. From the front of the gantry, use a 3 mm hex wrench to loosen the locking screws (4) that secure the Y belt tension brackets. See Figure 41.
7. Use a 2.5mm hex wrench to loosen the Y belt tension adjustment screw to relax the belt tension. See Figure 41.

Figure 41: Y drive belt adjustment bracket location



8. Remove the Y belt from the Y axis idler pulley.
9. From the rear of the gantry, use a 3 mm hex wrench to remove the screws (6) securing the Y motor and bracket to the Y bridge. See Figure 42.

Figure 42: Y motor mounting screw locations



10. Extract the end of the Y belt from the Y motor pulley and motor bracket..
11. Remove the Y motor assembly from the printer.

## Installing the Y Motor

1. Install the end of the Y drive belt to the Y axis idler pulley.
2. Install the other end of the Y drive belt through the hole in the Y motor bracket to the Y motor drive pulley (above the flywheel).



Make sure that a flywheel is present on the new Y motor assembly. If a flywheel is not installed, transfer the flywheel from the defective X-motor assembly.

3. Using a 3 mm hex wrench, install the Y motor bracket mounting screws (6), securing the Y motor and bracket to the Y bridge assembly. See [Figure 42](#).
4. Use a 2.5 mm hex wrench to adjust the Y belt tension screw. See “Y Belt Tension” (page 226).
5. Using a 3 mm hex wrench, tighten the locking screws (4) that secure the Y belt tension adjustment bracket. See [Figure 41](#).
6. Reconnect the Y motor and encoder cables (3).
7. Close the front top access doors.
8. Power ON the printer.
9. Perform the Automatic Tip Calibration as described in “Automatic Tip Calibration” (page 160).
10. Perform the Manual Tip Calibration as described in “Manual Tip Calibration” (page 163).

## Y-Belt Idler Pulley



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Required Tools

- 2.5 mm hex wrench
- 3 mm hex wrench

### Removing the Y Belt Idler Pulley

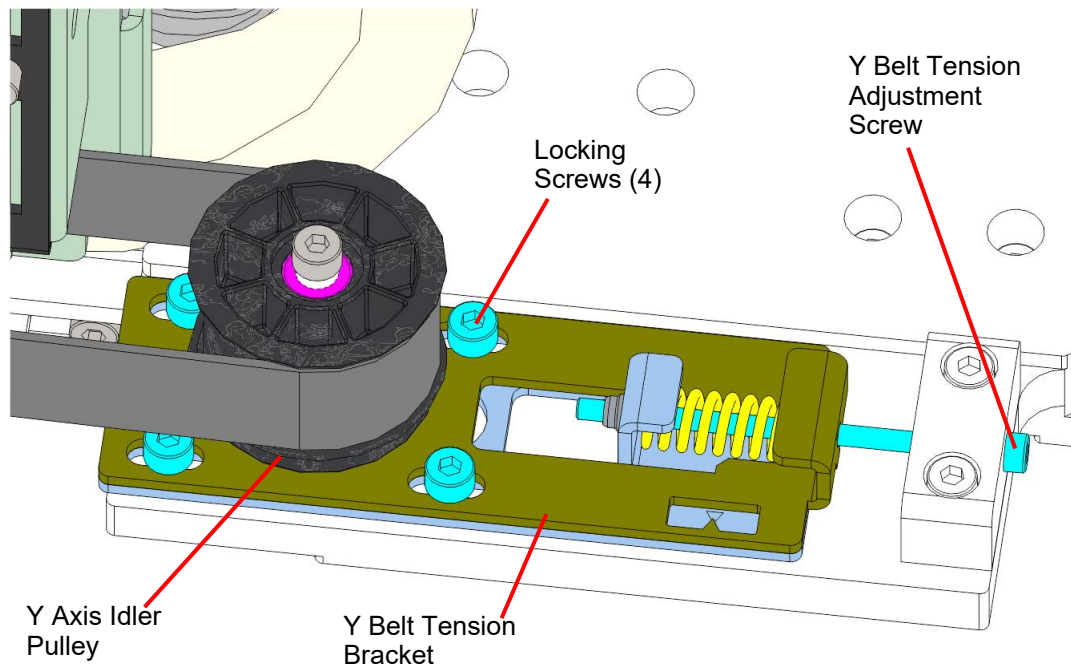
1. Power off the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the top front access door. See “Opening Top Access Doors Front/Rear” (page 195).
3. Using a 3 mm hex wrench, loosen the locking screws (4) that secure the Y belt tension brackets. See Figure 43.
4. Use a 2.5mm hex wrench to loosen the Y belt tension adjustment screw to relax the belt tension. See Figure 43.

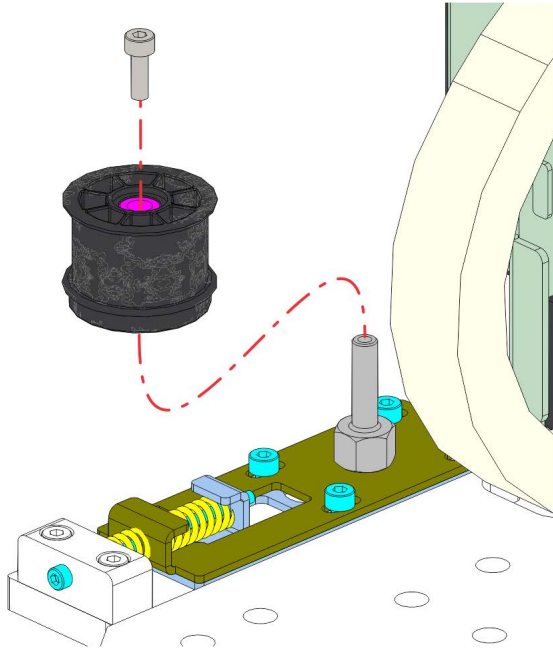
Figure 43: Y belt tension adjustment bracket location



5. Remove the Y drive belt from the Y axis idler pulley.

6. Using a 3 mm hex wrench, remove the Y belt idler pulley mounting screw. See [Figure 44](#).
7. Remove the pulley from the idler shaft. See [Figure 44](#).

Figure 44: Y Belt idler pulley detail



### Installing the Y Belt Idler Pulley

1. Using a 3 mm hex wrench, install the Y belt idler pulley to the idler shaft. See [Figure 44](#).
2. Reinstall the screw securing the pulley to the idler shaft. See [Figure 44](#).
3. Install the Y drive belt to the Y axis idler pulley.
4. Use a 2.5 mm hex wrench to adjust the Y belt tension screw. See [“Y Belt Tension”](#) (page 226).
5. Using a 3 mm hex wrench, tighten the locking screws (4) that secure the Y-belt tension adjustment bracket. See [Figure 43](#).
6. Close the top front access door.
7. Power ON the printer.
8. Perform the Automatic Tip Calibration as described in [“Automatic Tip Calibration”](#) (page 160).
9. Perform the Manual Tip Calibration as described in [“Manual Tip Calibration”](#) (page 163).

## Y Belt Spring Retainer Plates



When performing maintenance procedures inside the gantry area, power must be removed from the printer, or the top right access door must remain open to ensure that the interlock is disengaged.

### Required Tools

- 2.5 mm hex wrench
- 3 mm hex wrench

### Removing the Y Belt Spring Retainer Plates

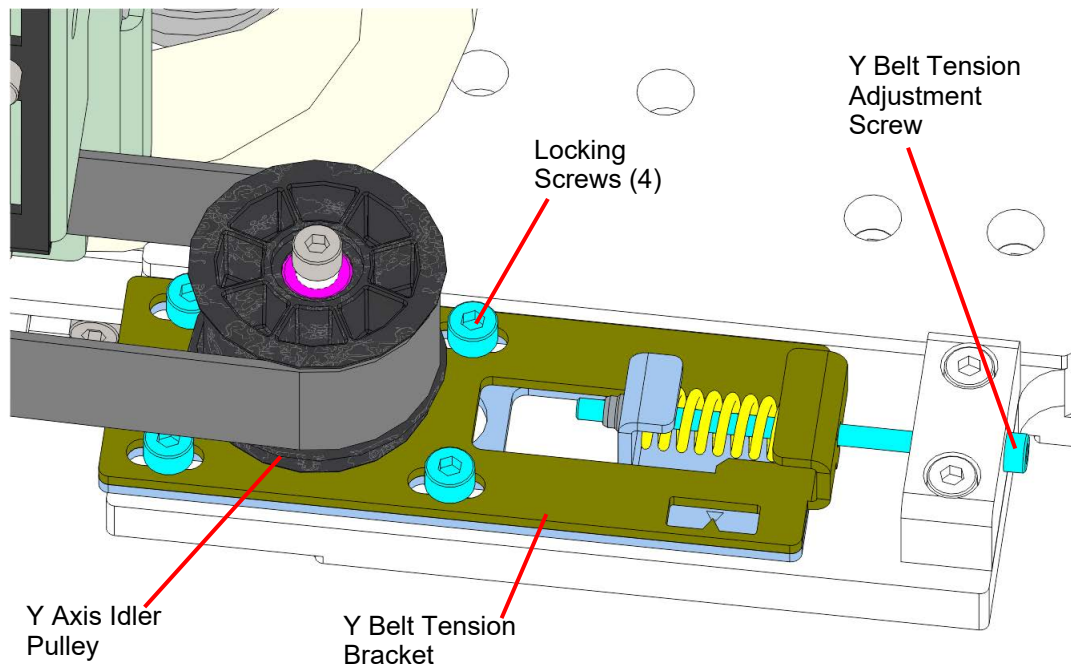
1. Power off the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the top front access door. See “Opening Top Access Doors Front/Rear” (page 195).
3. Using a 3 mm hex wrench, remove the locking screws (4) that secure the spring retainer plates (Y belt tension brackets). See Figure 45.
4. Use a 2.5mm hex wrench to remove the Y belt tension adjustment screw and to relax the belt tension. See Figure 45.

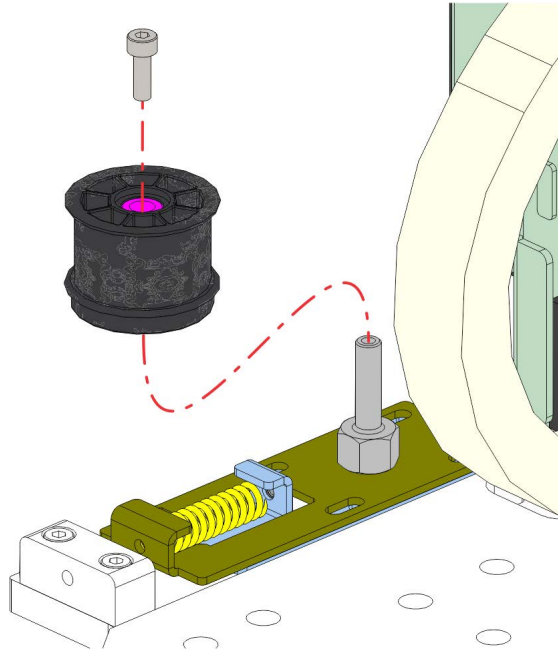
Figure 45: Y belt tension adjustment bracket location



5. Remove the Y drive belt from the Y axis idler pulley.

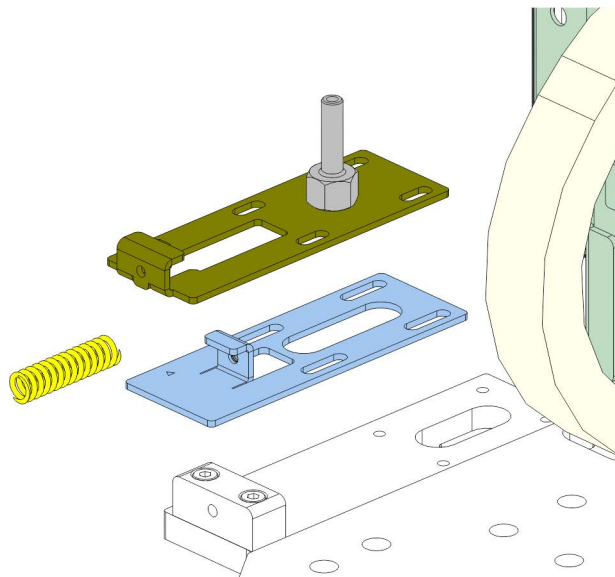
6. Using a 3 mm hex wrench, remove the Y belt idler pulley mounting screw. See [Figure 46](#).
7. Remove the pulley from the idler shaft.

Figure 46: Y Belt idler pulley detail



8. Remove the retainer plates and spring from the Y bridge.

Figure 47: Spring Retainer Plates Detail





### Installing the Y Belt Spring Retainer Plates

1. Re-install the retainer plates and compression spring to the Y bridge. See [Figure 47](#).
2. Using a 3 mm hex wrench, install the Y belt idler pulley to the idler shaft. See [Figure 46](#).
3. Reinstall the screw securing the pulley to the idler shaft. See [Figure 46](#).
4. Install the Y drive belt to the Y axis idler pulley.
5. Use a 2.5 mm hex wrench to adjust the Y belt tension screw. See “Y Belt Tension” (page 226).
6. Using a 3 mm hex wrench, tighten the locking screws (4) that secure the Y-belt tension adjustment bracket. See [Figure 45](#).
7. Close the top front access door.
8. Power ON the printer.
9. Load material.
10. Perform the Automatic Tip Calibration as described in “Automatic Tip Calibration” (page 160).

Perform the Manual Tip Calibration as described in “Manual Tip Calibration” (page 163).

## Y Belt Tension

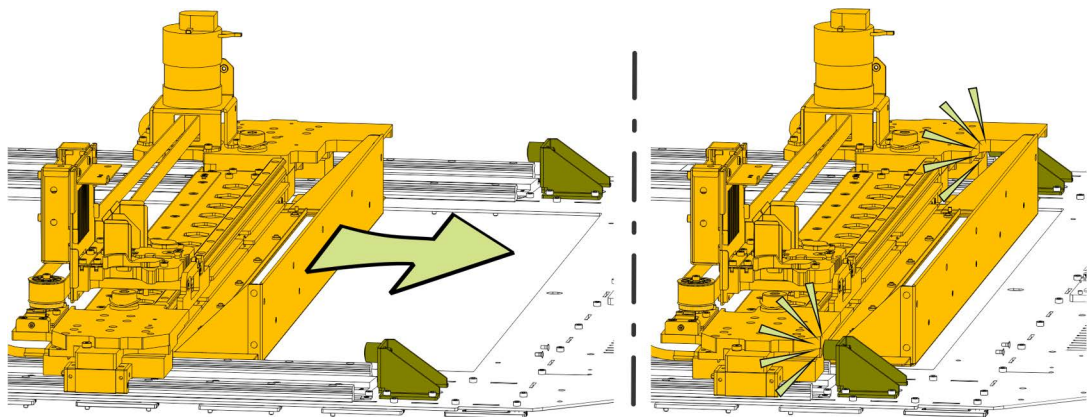
### Required Tools

- 2.5 mm hex wrench
- 3 mm hex wrench

### Adjusting the Y-Belt Tension

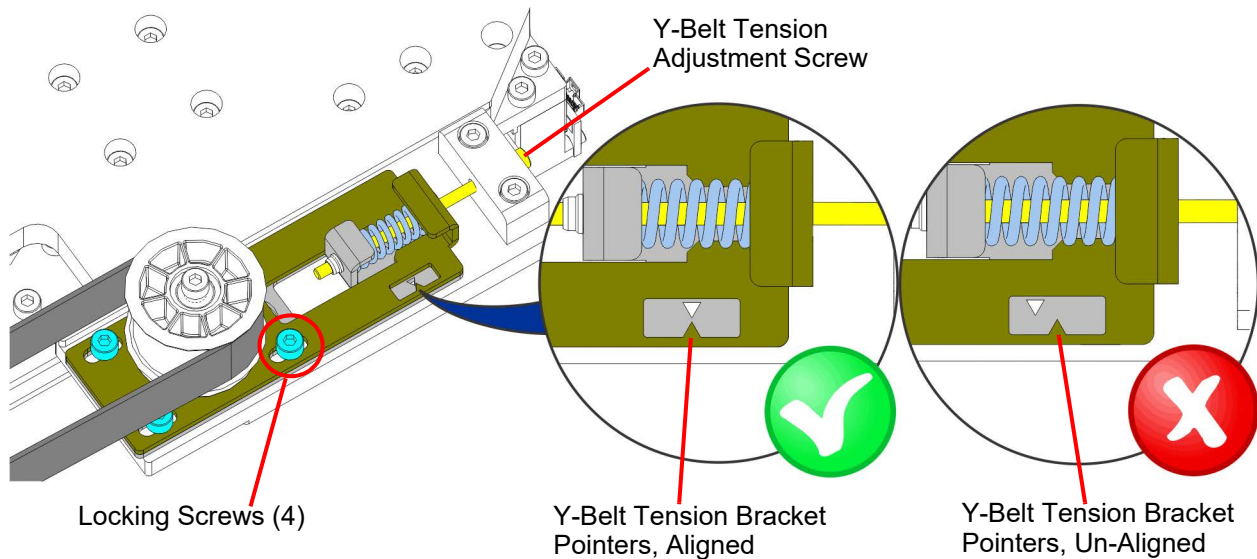
1. Power OFF the printer. See “Powering Off the Printer” (page 193).
2. Open the top front access door. See “Opening Top Access Doors Front/Rear” (page 195).
3. Move the Y bridge to the hard stops at the end of the X linear rails on the right side of the gantry. See [Figure 48](#).

Figure 48: Squaring the Y-bridge against the X rail hard stops



4. Using a 3 mm hex wrench, loosen the locking screws (4) that secure the Y belt tension brackets. See [Figure 49](#).
5. Use a 2.5mm hex wrench to loosen or tighten the Y-belt tension adjustment screw. See [Figure 49](#).
6. While holding the Y-bridge firmly against the hard stops, adjust the Y-belt tension until the pointers on both of the tension brackets are aligned. See [Figure 49](#).
7. Using a 3 mm hex wrench, tighten the Y-belt tension bracket locking screws (4). See [Figure 49](#).

Figure 49: Y-Belt adjustment bracket detail



8. Perform the Automatic Tip Calibration as described in “[Automatic Tip Calibration](#)” ([page 160](#)).
9. Perform the Manual Tip Calibration as described in “[Manual Tip Calibration](#)” ([page 163](#)).
10. Close the top access doors.

## Z-Drive Belt

### Required Tools

- 3 mm hex wrench

### Removing the Z-Drive Belt



The following procedure depicts the right side Z drive belt only. The left side Z drive belt procedure is identical to the right.

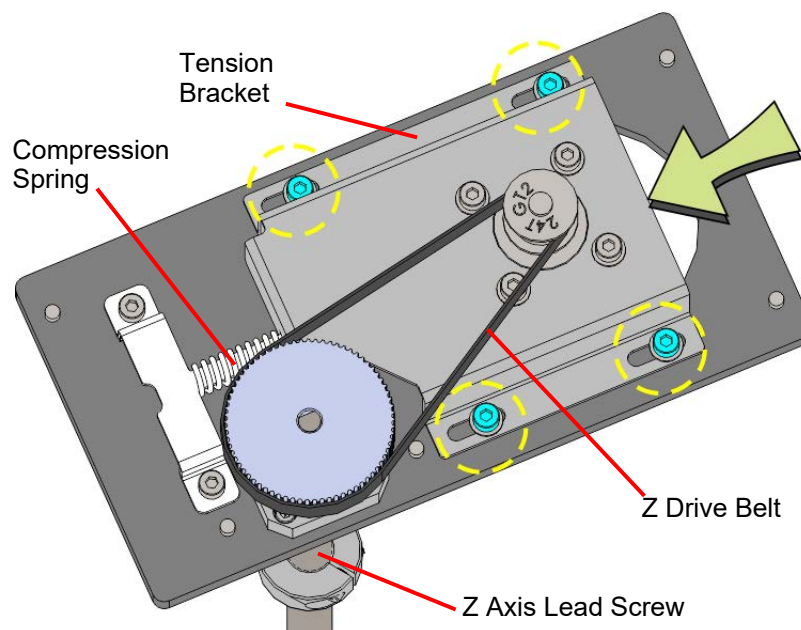
1. Using the touchscreen, move the Z-stage to its lower limit.
2. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

3. Open the appropriate top side access door. See “Opening Top Access Doors Left/Right” (page 194).
4. Use a 3 mm hex wrench to loosen the Z motor tension bracket screws (4). See Figure 50.
5. Relax the Z drive belt tension by pushing the Z-motor tension bracket against the compression spring. See Figure 50.

Figure 50: Z-Motor tension bracket screw locations



6. While the belt tension is relaxed, remove the Z-drive belt from its pulleys and extract it from the printer.

**Installing the Z-Drive Belt**

1. Push and hold the Z-motor tension bracket against the compression spring to lessen belt tension and use a 3mm hex wrench to tighten the tension bracket screws (4).
2. Install the Z drive belt to the Z motor pulley and the Z axis lead screw pulley. See [Figure 50](#).
3. Using a 3 mm hex wrench, loosen the tension bracket screws (4).
4. Rotate the lead screw pulley two revolutions to align the Z-drive belt on both pulleys.
5. Using a 3mm hex wrench, tighten the Z motor tension bracket screws (4). See [Figure 50](#).
6. Close the top side access door.

# Z-Motor

## Required Tools

- 3 mm hex wrench

## Removing the Z Motor



The following procedure depicts the right side Z-motor only. The left side Z-motor procedure is identical to the right.

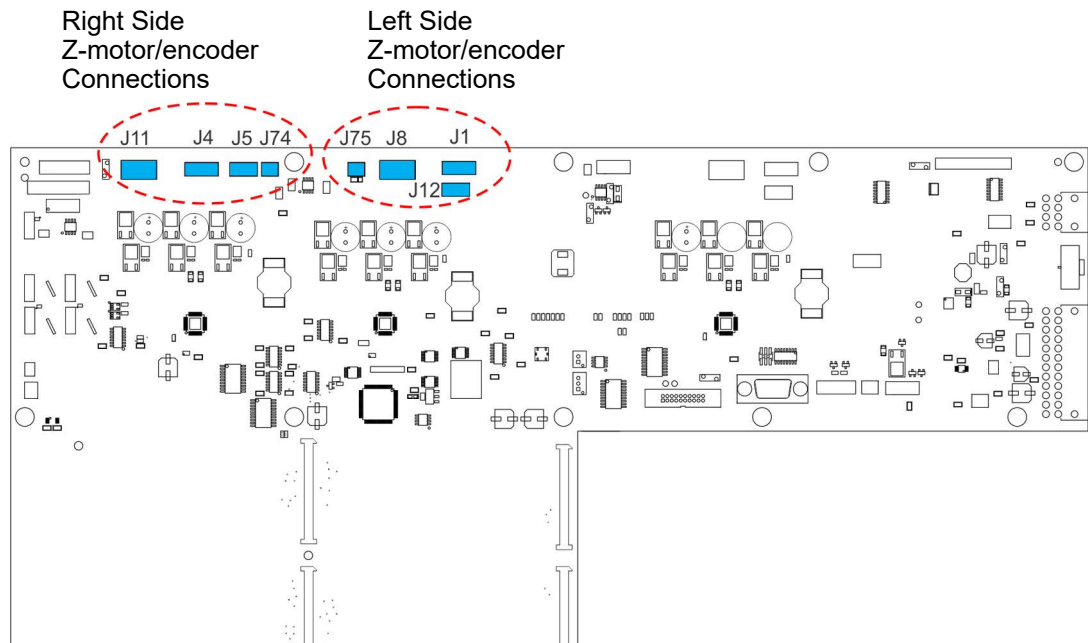
1. Using the touchscreen, move the Z-stage to its lower limit.
2. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

3. Open the appropriate top side access door. See “Opening Top Access Doors Left/Right” (page 194).
4. Remove the corresponding upper side panel. See “Removing Upper Side Panels Left/Right” (page 197).
5. Open the electronics bay access door.
6. Disconnect the four Z stage motor/encoder cables from the I/O Board set. (Left Side - J1, J8, J12, J75/Right side - J4, J5, J11, J74)

Figure 51: I/O Board, Z Motor Connectors



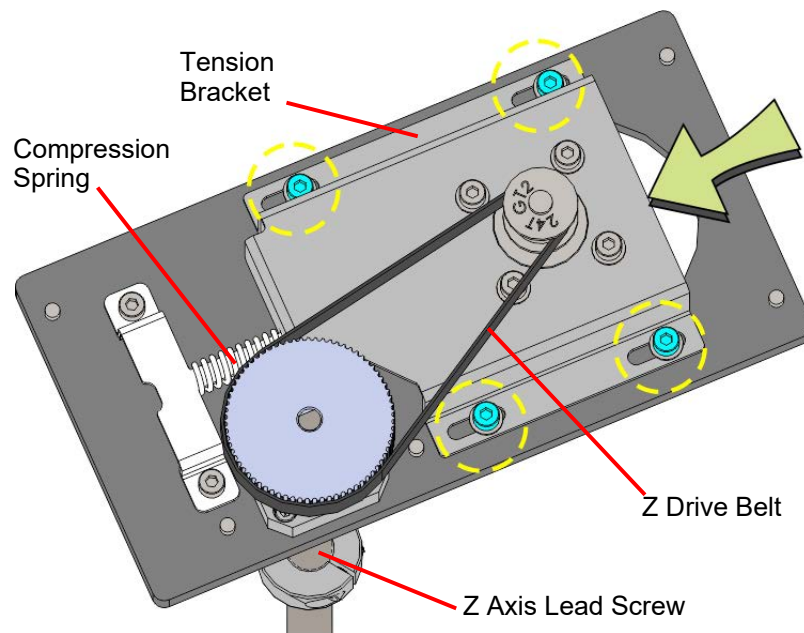
7. Release the reusable cable ties that secure the Z motor cables to the upper frame.



Note cable routing and the original locations of cable ties to aid in re-installation.

8. Pull the loose ends of the Z motor cables through the frame until they hang freely below the Z motor.
9. Use a 3 mm hex wrench to loosen the Z motor tension bracket screws (4). See [Figure 52](#).
10. Relax the Z drive belt tension by pushing the Z-motor tension bracket against the compression spring. See [Figure 52](#).

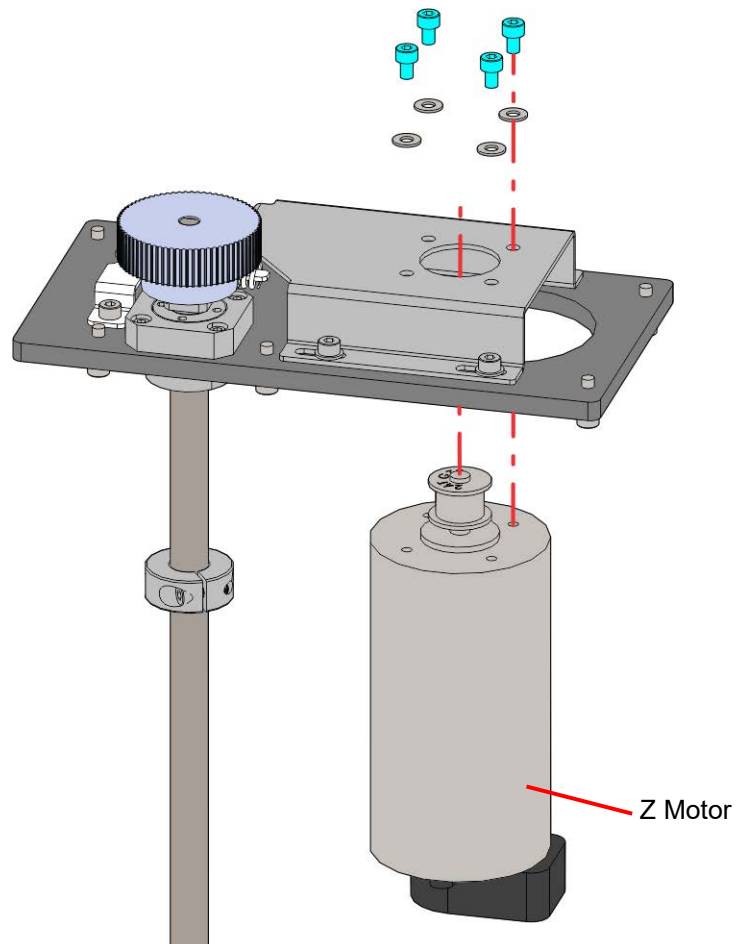
Figure 52: Z-Motor tension bracket screw locations



11. While the belt tension is relaxed, remove the Z-drive belt from its pulleys. Set aside the Z-drive belt.

12. Use a 3 mm hex wrench to remove the screw and washer sets (4) that secure the Z motor to the tension bracket. Remove the Z motor from the printer. See [Figure 53](#).

Figure 53: Z Motor Mounting Screw Locations



### Installing the Z Motor

1. Use a 3 mm hex wrench to install the screws and washer sets (4) that secure the Z motor to the tension bracket. See [Figure 53](#).
2. Push and hold the Z-motor tension bracket against the compression spring to lessen belt tension and use a 3 mm hex wrench to tighten the tension bracket screws (4). See [Figure 52](#).
3. Install the Z drive belt to the Z motor pulley and the Z axis lead screw pulley.
4. Using a 3 mm hex wrench, loosen the tension bracket screws (4).
5. Rotate the lead screw pulley two revolutions to align the Z-drive belt on both pulleys.
6. Using a 3mm hex wrench, tighten the Z motor tension bracket screws (4). See [Figure 52](#).
7. Route the motor/encoder cable through the upper frame to the I/O board set while securing with the existing reusable cable ties.
8. Connect the four cables to the I/O board set (Left Side - J1, J8, J12, J75/Right side - J4, J5, J11, J74). See [Figure 51](#).
9. Close the electronics bay access door.
10. Reinstall the upper side panel. See “Installing the Upper Side Panels Left/Right” (page 198).
11. Close the top side access door.

## Oven Light

### Required Tools

- 2.5 mm Hex Wrench
- 3 mm Hex Wrench

### Removing the Oven Light

1. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the oven door.

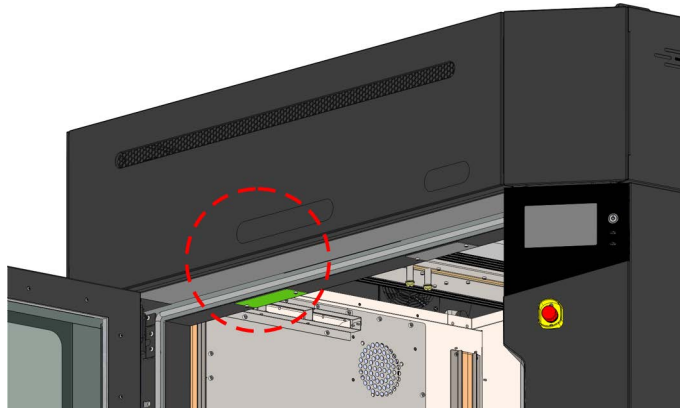


Allow the oven to cool for approximately 30 minutes before performing procedures inside the oven chamber



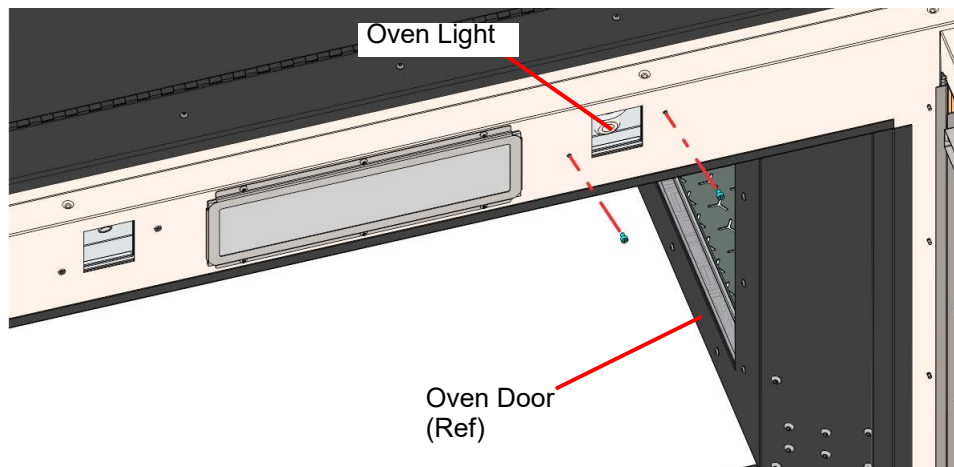
- Using a 3 mm hex wrench, remove the screws (2) that secure the oven light cover plate to the bottom of the oven frame above the oven enclosure entrance. Support the plate to prevent it from falling.

Figure 54: Oven Light Location



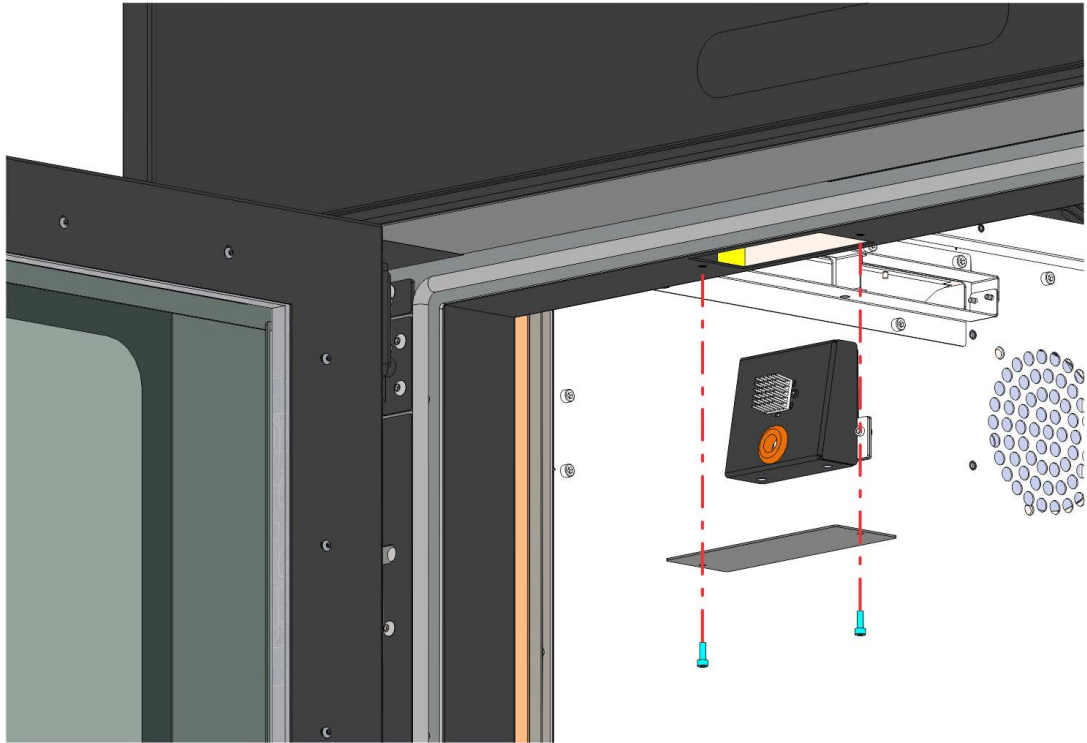
- From inside the oven, use a 2.5 mm hex wrench to remove the screws (2) that secure the oven light inside the oven frame above the oven enclosure entrance.

Figure 55: Oven Light Mounting Screw Locations



5. Extract the oven light and cable connector from inside the oven frame and disconnect the cable connector.

Figure 56: Oven Light Mounting Detail



6. Remove the oven light from the printer.

### Installing the Oven Light

1. Connect the oven light cable to the connector inside the oven frame cutout above the oven enclosure entrance.
2. Insert the oven light into the cutout and align it with its mounts inside the oven frame.
3. From inside the oven, use a 2.5 mm hex wrench to install the screws (2) that secure the oven light inside the oven frame. See [Figure 55](#).
4. Using a 3 mm hex wrench, install the screws (2) that secure the oven light cover plate to the bottom of the oven frame above the oven enclosure entrance. Support the plate to prevent it from falling. See [Figure 56](#).
5. Close the oven door.
6. Power ON the printer.

# Camera

## Required Tools

- 3 mm Hex Wrench

## Removing the Camera

1. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

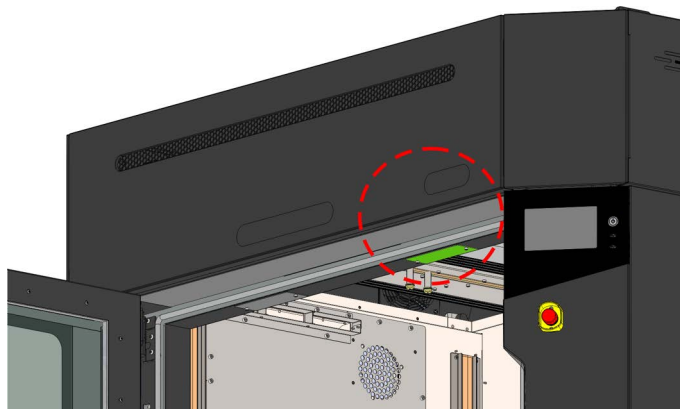
2. Open the oven door.



Allow the oven to cool for approximately 30 minutes before performing procedures inside the oven chamber

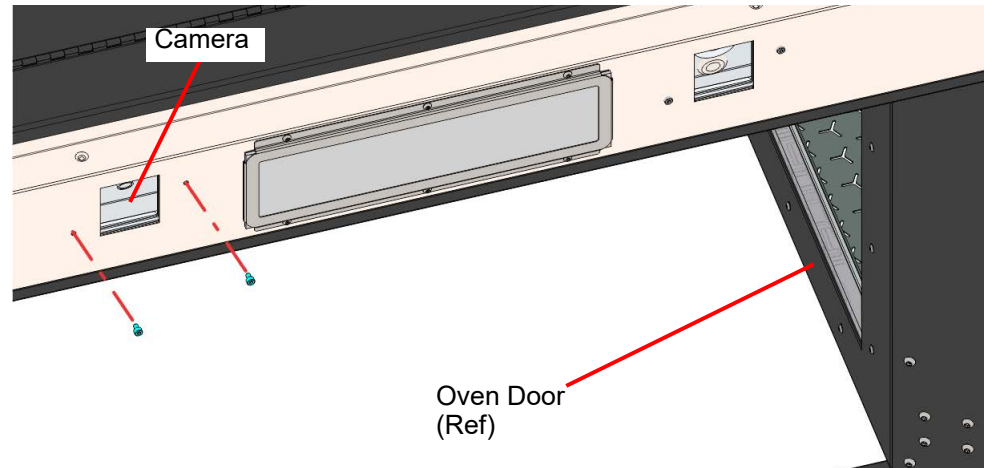
3. Using a 3 mm hex wrench, remove the screws (2) that secure the camera cover plate to the bottom of the oven frame above the oven enclosure entrance. Support the plate to prevent it from falling.

Figure 57: Oven Camera Location



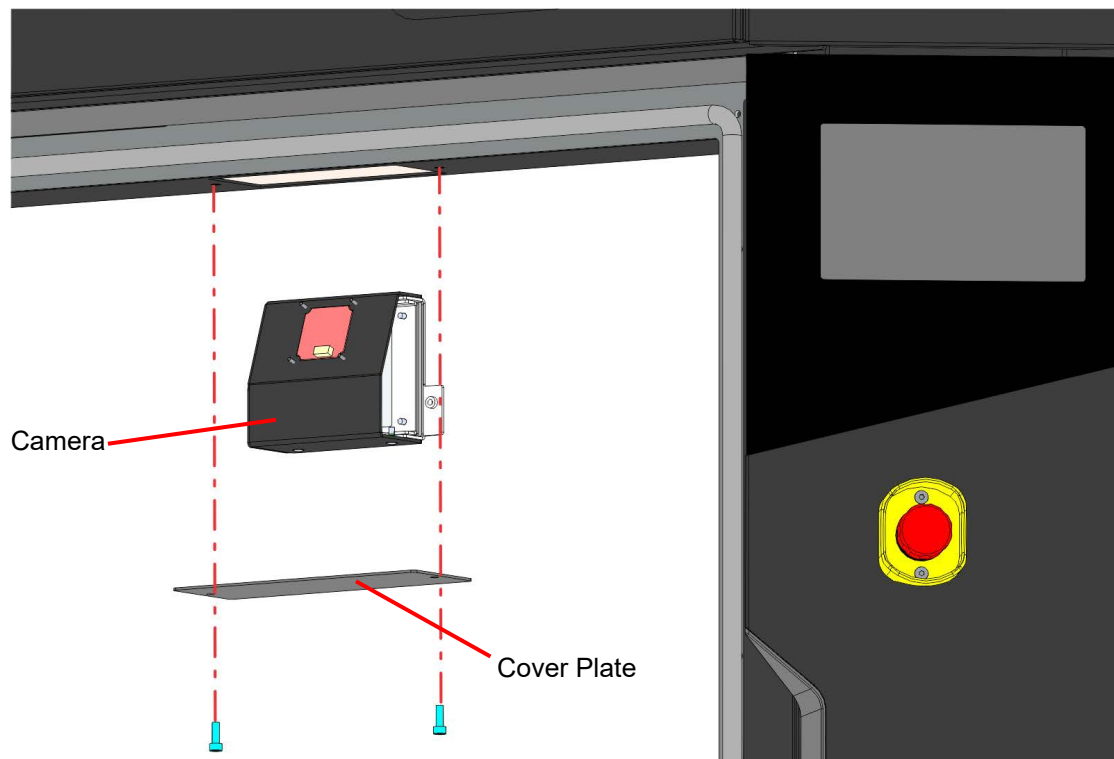
4. From inside the oven, use a 3 mm hex wrench to remove the screws (2) that secure the camera inside the oven frame above the oven enclosure entrance.

Figure 58: Camera Mounting Screw Locations



5. Extract the camera from inside the oven frame while being careful not to damage the cable connector.

Figure 59: Removing the Camera



6. Disconnect the cable connector and remove the camera from the printer.

**Installing the Camera**

1. Connect the camera cable to the connector inside the cutout in the oven frame above the oven enclosure entrance.
2. Insert the camera into the cutout and align it with its mounts inside the oven frame.
3. From inside the oven, use a 3 mm hex wrench to install the screws (2) that secure the camera inside the oven frame. See [Figure 58](#).
4. Using a 3 mm hex wrench, install the screws (2) that secure the camera cover plate to the bottom of the oven frame above the oven enclosure entrance. Support the plate to prevent it from falling. See [Figure 59](#).
5. Close the oven door.

# Oven Door Interlock Switch

## Required Tools

- 3 mm hex wrench

## Removing the Oven Door Latch

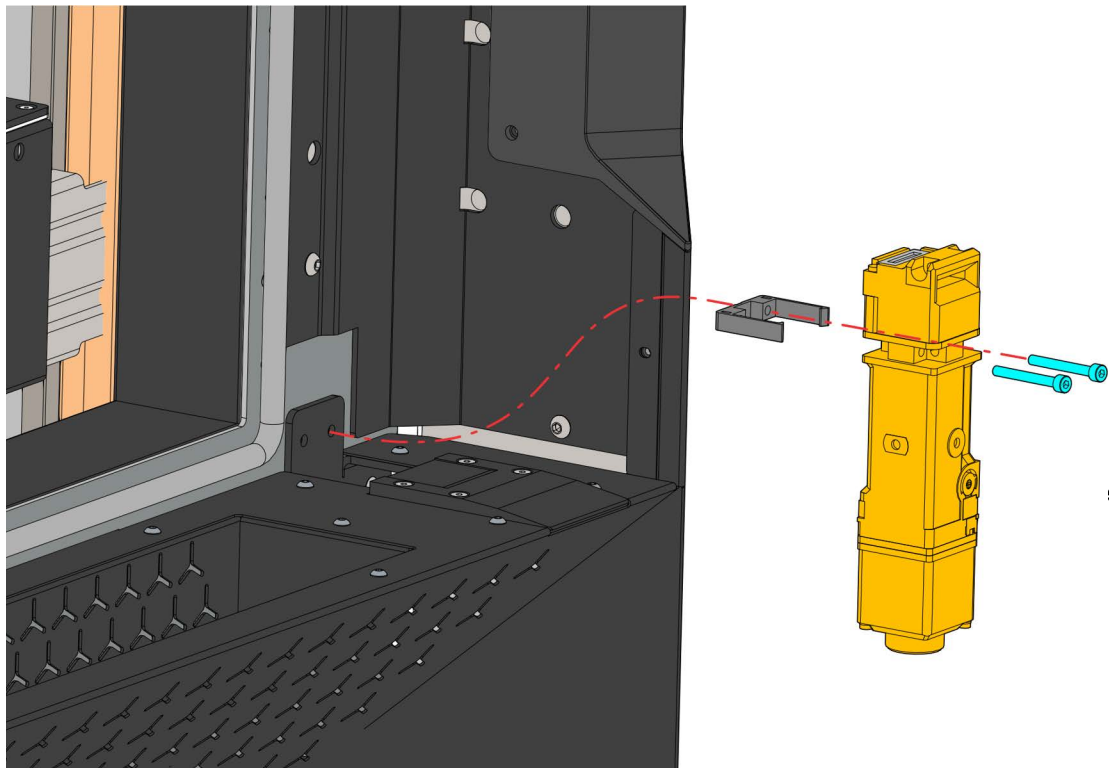
1. Power off the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

2. Open the oven door.
3. Disconnect the interlock switch cable. Ensure the cable does not fall into the switch recess.
4. Use a 3 mm hex wrench to remove the interlock switch mounting screws (2). See Figure 60.
5. Remove the interlock switch and the mounting bracket.

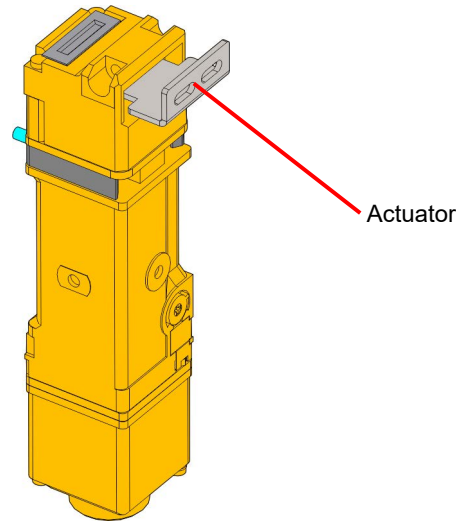
Figure 60: Oven door interlock switch mounting screw locations



### Installing the Oven Door Interlock

1. Use a 3 mm hex wrench to loosely reinstall the mounting screws (2) that secure the interlock switch and mounting bracket to the right side of the oven chamber entrance. See [Figure 60](#).
2. Make sure that the interlock switch actuator is fully inside the switch port when the oven door is closed. Tighten the interlock switch mounting screws.

Figure 61: Interlock Switch Detail



3. Reconnect the interlock switch cable.
4. Close the oven door.
5. Power ON the printer.
6. Verify operation by opening and closing the oven door.
7. If the touchscreen indicates that the oven door is not closed, adjust the position of the actuator.

## Filament Ports Assembly

### Required Tools

- 3 mm hex wrench
- T20 Torx wrench

### Removing the Filament Ports Assembly

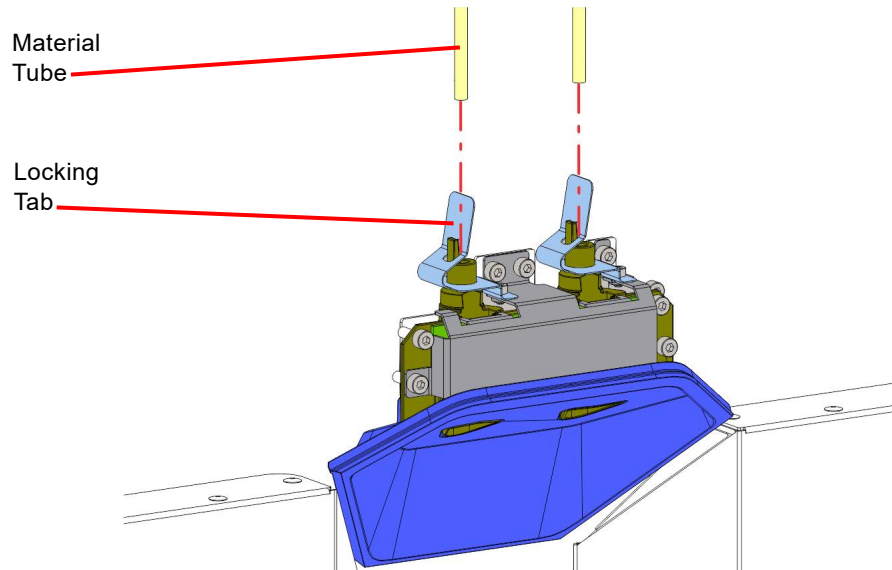
1. Unload material.
2. Power OFF the printer. See “Powering Off” (page 193).



Always perform lockout-tagout of the AC power cord in accordance with customer site procedures.

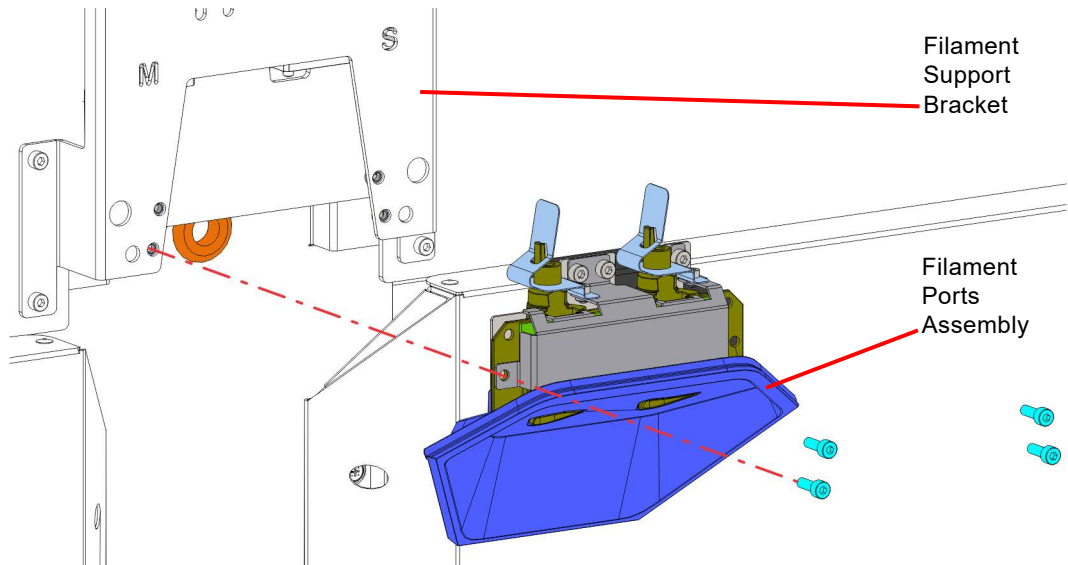
3. Open the top rear access door. See “Top Access Doors Front/Rear” (page 194).
4. Remove the material tubes (2) from the filament ports. Depress the locking tabs on the filament ports housing to release the ends of the material tubes.

Figure 62: Connecting/Disconnecting material tubes



5. Use a 3 mm hex wrench to remove the mounting screws (4) that secure the filament ports assembly to the filament support bracket. Gently pull the assembly away from the printer to access the cables on the back side. See Figure 63.

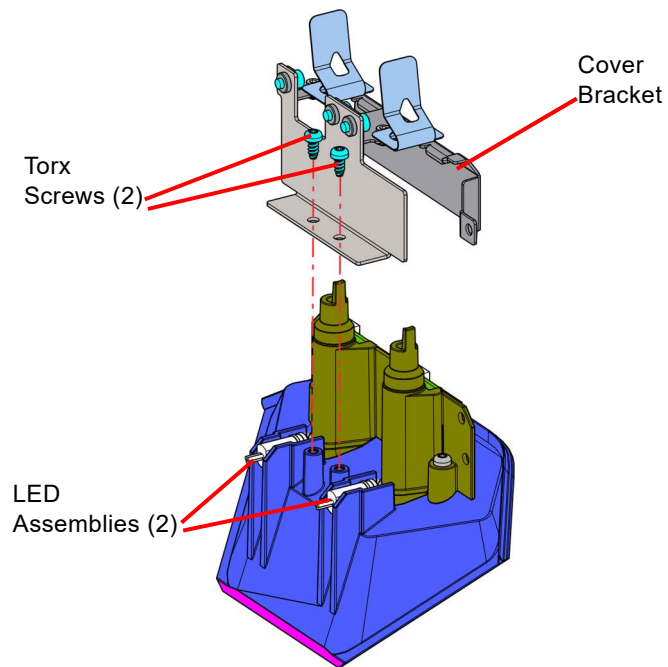
Figure 63: Filament ports assembly mounting screw locations





6. Using a T20 Torx wrench, remove the screws (2) securing the cover bracket to the filament ports assembly.

Figure 64: Removing the Filament Ports Assembly Cover Bracket

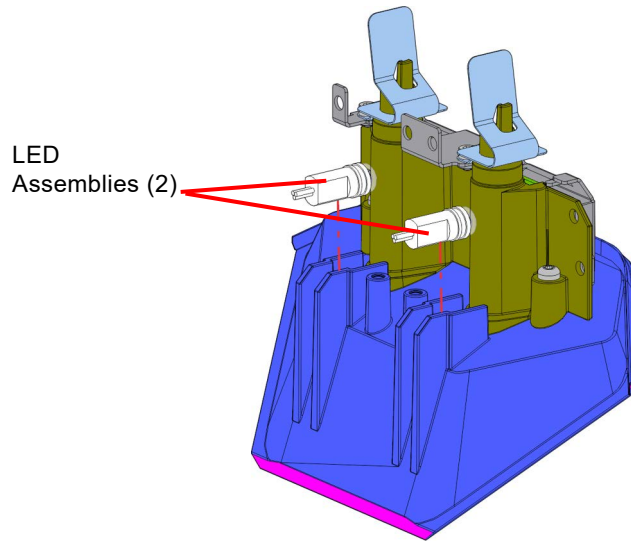


7. Disconnect the cables from the filament key reader boards.
8. Remove the LED assemblies from the filament ports assembly.
9. Remove the filament ports assembly from the printer.

## Installing the Filament Ports Assembly

1. Insert the LED assemblies into the appropriate (model or support) recessed feature of the filament ports assembly housing.

Figure 65: Filament Port Housing LED Locations



2. Connect the cables to the appropriate (model or support) filament key reader boards.
3. Using a T20 Torx wrench, install the screws (2) securing the cover bracket to the filament ports assembly. See [Figure 64](#).
4. Use a 3mm hex wrench to install the mounting screws (2) that secure the filament ports assembly to the filament support bracket. See [Figure 63](#).
5. Press and hold the locking tabs on the filament ports housing.
6. Reconnect the material tubes to the filament ports. Push the tubes as far as possible (0.6 inch/16 mm) into the holes inside the locking tabs. See [Figure 62](#).



Verify that tubes are going to the correct model and support connections.

7. Release the locking tabs to secure the material tubes.
8. Close the top rear access door.
9. Power ON the printer.
10. Verify proper operation by loading material to the head.

## 8 TROUBLESHOOTING

This chapter describes troubleshooting steps that can be performed to correct basic problems with the F770 printer.

### Getting Help

If you have a problem with your printer or the printer's materials that is not covered in this guide, or if you need to order replacement parts, please contact Customer Support for your region. Contact information is available from the Stratasys website at:  
<http://www.stratasys.com/customer-support/contact-customer-support>.

If needed, you can write to Customer Support North America at:

Stratasys, Inc.  
Customer Support  
7665 Commerce Way  
Eden Prairie, MN 55344 USA

Before calling for service or supplies, always have the following information ready:

- Your printer's software version (see "Software Version" (page 151) for instructions on obtaining this information).
- Your printer's serial number (see Figure 4 (page 15) or "System Odometers" (page 104) for information on locating the printer's serial number).
- Access to your GrabCAD Print workstation in order to provide a configuration file, if necessary (see "Exporting System Configuration (.CFG) File" (page 183) for instructions on obtaining this information).

### Warnings and Errors

If the printer detects an issue that may affect a build, it will be indicated within the Notifications Display portion of the "Build Page" (page 49). A yellow or red notification badge icon will be displayed, depending on the severity of the warning/error, along with text indicating the reason(s) for the warning. Touching the text on the screen will open a dialog indicating the reason(s) for the notification, and in some cases, steps to correct the notification (see Figure 4 (page 49)).

Depending on the type of warning/error, a notification badge icon may also be displayed within the "Materials Page" (page 66). The Materials button will be displayed in its warning state within the Navigation Menu to indicate the warning (see Table 1 (page 47)). Within the Materials page a notification badge icon will be displayed over the center of the Material Status Icon experiencing the warning/ error (see Table 7 (page 73)). Touching the notification badge icon on the screen will open the corresponding material's Materials Details page and provide information indicating the cause of a warning/error (see Figure 29 (page 75)).

## Warnings at Build Start

### **Model material does not match selected job**

- The model material currently installed does not match the model material configuration of the selected job.
- Correct condition - unload incorrect model material and load the correct model material for the selected job. See [“Unloading Material” \(page 127\)](#) and [“Loading Material” \(page 116\)](#) for instructions.

### **Support material does not match selected job**

- The support material currently installed does not match the support material configuration of the selected job.
- Correct condition - unload incorrect support material and load the correct support material for the selected job. See [“Unloading Material” \(page 127\)](#) and [“Loading Material” \(page 116\)](#) for instructions.

### **Insufficient model material for part build**

- The amount of model material currently installed in the printer is not sufficient for the selected build.
- Correct condition - connect a material coil box to the printer that contains a sufficient amount of model material. See [“Loading Material” \(page 116\)](#) for instructions.

### **Insufficient support material for part build**

- The amount of support material currently installed in the printer is not sufficient for the selected build.
- Correct condition - connect a material coil box to the printer that contains a sufficient amount of support material. See [“Loading Material” \(page 116\)](#) for instructions.

### **Order new model head**

- The model head has reached 1350 build hours, and is near its odometer limit. Build hours are available within the head's Head Details page (see [“Viewing Head Details” \(page 69\)](#)).
- Correct condition - you are still able to build using this head, but part quality may be affected. Once the head's odometer limit is reached, you will be prompted to change the head (see [“Head Replacement” \(page 130\)](#)).

### **Order new support head**

- The support head has reached 1350 build hours, and is near its odometer limit. Build hours are available within the head's Head Details page (see [“Viewing Head Details” \(page 69\)](#)).
- Correct condition - you are still able to build using this head, but part quality may be affected. Once the head's odometer limit is reached, you will be prompted to change the head (see [“Head Replacement” \(page 130\)](#)).

### **Replace model head**

- The model head has reached 1500 build hours (odometer limit). Build hours are available within the head's Head Details page (see [“Viewing Head Details” \(page 69\)](#)).

- Correct condition - you are able to continue building using this head but it is recommended that you change the head prior to starting a new build (see [“Head Replacement”](#) (page 130)).

**Replace support head**

- The support head has reached 1500 build hours (odometer limit). Build hours are available within the head’s Head Details page (see [“Viewing Head Details”](#) (page 69)).
- Correct condition - you are able to continue building using this head but it is recommended that you change the head prior to starting a new build (see [“Head Replacement”](#) (page 130)).

## Errors Preventing a Build from Starting

**Printer busy**

- Indicates that the printer is in the process of completing another task and a build cannot be started until the task is complete.
- Correct condition - wait a couple of minutes and then attempt to restart the build.

**Close the door**

- Indicates that the oven door is open.
- Correct condition - close the oven door.

**Close the cover**

- Indicates that the top cover is open.
- Correct condition - close the top cover.

**Remove the part**

- Indicates that the completed part from the previously built job is still in the printer’s oven chamber.
- Correct condition - open the oven door and remove the completed part. See [“Removing a Part from the Printer”](#) (page 142) for instructions.

**Select a job**

- Indicates that a job has not been selected for building.
- Correct condition - select the job you’d like to build from the Job Queue. See [“Selecting a Job to Build”](#) (page 135) for instructions.

**No vacuum detected**

- Indicates that the build sheet is not tightly secured to the platen.
- Collect condition - Ensure build sheet is installed smooth side down, that no debris is under the build sheet (especially under outer row of gridlines), and that the build sheet is completely covering all platen grid lines. If this doesn't work, try a new build sheet.

**Insert a model head**

- Indicates that a model head has not been installed into the printer.

- Correct condition - install model head. See [“Head Replacement” \(page 130\)](#) for instructions.

**Insert a support head**

- Indicates that a support head has not been installed into the printer.
- Correct condition - install support head. See [“Head Replacement” \(page 130\)](#) for instructions.

**Model head not communicating**

- Indicates that model head is not enabled/communicating. This will only be displayed when the top right cover is closed.
- Correct condition - open the top right cover and unclip the head cable from the model head. Wait a few seconds and then reconnect the head cable to the model head and close the top right cover (see [“Head Replacement” \(page 130\)](#) for details). If the error persists there is likely a problem with either the head or the head cable; please contact Stratasys Customer Support or your regional Stratasys office for further assistance (see [“Getting Help” \(page 244\)](#) for contact information).

**Support head not communicating**

- Indicates that support head is not enabled/communicating. This will only be displayed when the top right cover is closed.
- Correct condition - open the top right cover and unclip the head cable from the support head. Wait a few seconds and then reconnect the head cable to the support head and close the top right cover (see [“Head Replacement” \(page 130\)](#) for details). If the error persists there is likely a problem with either the head or the head cable; please contact Stratasys Customer Support or your regional Stratasys office for further assistance (see [“Getting Help” \(page 244\)](#) for contact information).

**Model head not initialized**

- Indicates that head data is not ready. This is only displayed when the printer is initializing a newly installed head, or if the initialization process failed.
- Correct condition - wait at least 60 seconds after the error is first displayed. If the error persists, open the top right cover and unclip the head cable from the model head. Wait a few seconds and then reconnect the head cable to the model head and close the top right cover (see [“Head Replacement” \(page 130\)](#) for details). If the error persists there is likely a problem with either the head or the head cable; please contact Stratasys Customer Support or your regional Stratasys office for further assistance (see [“Getting Help” \(page 244\)](#) for contact information).

**Support head not initialized**

- Indicates that head data is not ready. This is only displayed when the printer is initializing a newly installed head, or if the initialization process failed.

- Correct condition - wait at least 60 seconds after the error is first displayed. If the error persists, open the top right cover and unclip the head cable from the support head. Wait a few seconds and then reconnect the head cable to the support head and close the top right cover (see [“Head Replacement”](#) (page 130) for details). If the error persists there is likely a problem with either the head or the head cable; please contact Stratasys Customer Support or your regional Stratasys office for further assistance (see [“Getting Help”](#) (page 244) for contact information).

**Load model material**

- Indicates that model material has not been loaded into the printer.
- Correct condition - load model material. See [“Loading Material”](#) (page 116) for instructions.

**Load support material**

- Indicates that support material has not been loaded into the printer.
- Correct condition - load support material. See [“Loading Material”](#) (page 116) for instructions.

**Replace invalid model spool**

- Indicates that the material coil box is invalid. Invalid materials are materials not licensed or not compatible with the associated head type.
- Correct condition - disconnect the invalid material coil box and replace it with a valid material coil box. See [“Handling/Storing Materials”](#) (page 130) and [“Connecting Material Coil Box To Printer”](#) (page 118) for instructions.

**Replace invalid support spool**

- Indicates that the material coil box is invalid. Invalid materials are materials not licensed or not compatible with the associated head type.
- Correct condition - disconnect the invalid material coil box and replace it with a valid material coil box. See [“Handling/Storing Materials”](#) (page 130) and [“Connecting Material Coil Box To Printer”](#) (page 118) for instructions.

**Replace empty model spool**

- Indicates that the material coil box has run out of material.
- Correct condition - disconnect the empty material coil box and replace with a new material coil box. See [“Handling/Storing Materials”](#) (page 130) and [“Connecting Material Coil Box To Printer”](#) (page 118) for instructions.

**Replace empty support spool**

- Indicates that the material coil box has run out of material.
- Correct condition - remove the empty material coil box and replace with a new material coil box. See [“Handling/Storing Materials”](#) (page 130) and [“Connecting Material Coil Box To Printer”](#) (page 118) for instructions.

## Load/Unload Errors

**Timed out**

- Indicates that filament was not detected at the head within 5 minutes of a load's initiation.

- Correct condition - disconnect the material coil box and ensure that it is properly prepared for installation and load. See [“Handling/Storing Materials” \(page 130\)](#) and [“Connecting Material Coil Box To Printer” \(page 118\)](#) for details. Reload the material coil box (see [“Loading Material” \(page 116\)](#)).

**Purge failed**

- Indicates that filament is currently in the head, but the load failed.
- Correct condition - unload model and support material (see [“Unloading Material” \(page 127\)](#)) and then reload these materials (see [“Loading Material” \(page 116\)](#)). Once loaded, verify that material purges from the tips by performing a manual purge of each tip using the purge buttons within the Tip Maintenance page (see [“Head Maintenance” \(page 70\)](#)).

**Resource not available**

- Indicates that the printer is in the process of completing another task and a load/unload cannot be started until the task is complete.
- Correct condition - wait a couple of minutes and then attempt to load/unload material.

**Task already running**

- Indicates that the printer is in the process of loading or unloading another bay. Only one material bay can be loaded or unloaded at a time.
- Correct condition - wait until the load/unload in process is complete before attempting to load material to or unload material from another material bay.

**Invalid material**

- Indicates that the installed material is not licensed for use with the printer.
- Correct condition - to adjust your printer’s material license please contact Stratasys Customer Support or your regional Stratasys office (see [“Getting Help” \(page 244\)](#) for contact information).

**Cannot load model in to support head**

- Indicates that you have inserted a model material coil box’s filament key into the wrong filament port in the printer.
- Correct condition - Remove the material key from its current location and insert it into the upper filament port. See [Figure 10 \(page 39\)](#) for details.

**Cannot load support in to model head**

- Indicates that you have installed a support material coil box’s filament key into the wrong filament port in the printer.
- Correct condition - Remove the material key from its current location and insert it into the lower filament port. See [Figure 10 \(page 39\)](#) for details.

**Cannot change material type during build**

- Indicates that the printer is currently in the process of building and you are attempting to change model or support material during the build.
- Correct condition - you cannot change material types while the printer is in the process of building a part. Wait until the build is complete before changing materials.



## Build Pause Warnings



Any pause not initiated by the operator will display a warning which must be acknowledged on the User Interface before the printer can resume building.

### **User requested**

- Indicates that a pause was initiated by the operator or inserted within the job's file.
- Correct condition - resume the build by pressing the **Play** button within the Build page (see [Table 3 \(page 57\)](#) for button details).

### **Out of model material**

- The printer has run out of model material.
- Correct condition - disconnect the empty material coil box and replace as needed. See ["Handling/Storing Materials" \(page 130\)](#) and ["Connecting Material Coil Box To Printer" \(page 118\)](#) for instructions.

### **Out of support material**

- The printer has run out of support material.
- Correct condition - disconnect the empty material coil box and replace as needed. See ["Handling/Storing Materials" \(page 130\)](#) and ["Connecting Material Coil Box To Printer" \(page 118\)](#) for instructions.

### **Active model spool removed**

- Indicates that the printer lost contact with the model material coil box's memory chip.
- Correct condition - ensure that the filament key is seated correctly within its filament port. If so, disconnect and then reconnect the material coil box (see ["Handling/Storing Materials" \(page 130\)](#) and ["Connecting Material Coil Box To Printer" \(page 118\)](#)). If this does not correct the error, disconnect the current material coil box and connect a new one.

### **Active support spool removed**

- Indicates that the printer lost contact with the support material coil box's memory chip.
- Correct condition - ensure that the filament key is seated correctly within its filament port. If so, disconnect and then reconnect the material coil box (see ["Handling/Storing Materials" \(page 130\)](#) and ["Connecting Material Coil Box To Printer" \(page 118\)](#)). If this does not correct the error, disconnect the current material coil box and connect a new one.

### **Model head removed**

- Indicates that the printer lost contact with the model head.
- Correct condition - ensure that the head is seated correctly within the gantry. If so, remove the head and then reinstall it (see ["Head Replacement" \(page 130\)](#)). If this does not correct the error, remove the head and install a new head.

**Support head removed**

- Indicates that the printer lost contact with the support head.
- Correct condition - ensure that the head is seated correctly within the gantry. If so, remove the head and then reinstall it (see [“Head Replacement” \(page 130\)](#)). If this does not correct the error, remove the head and install a new head.

**Model Head Extrusion Speed Warning**

- Indicates that the model head motor is operating a speed higher than requested for more than 2 seconds. This can indicate that a “spin out” condition (the drive gears are spinning without advancing the filament) exists.
- Correct condition - open the top right cover. Access the Head Maintenance page (see [“Head Maintenance” \(page 70\)](#)) to perform a purge while manually feeding filament into the model head. If unsuccessful, attempt a full unload of model material (see [“Unloading Material” \(page 127\)](#)). Reload model material (see [“Loading Material” \(page 116\)](#)). If the warning persists, replace the material coil box (see [“Material Coil Box Preparation” \(page 117\)](#)). Replace the model head if no resolution is found (see [“Head Replacement” \(page 130\)](#)).

**Model Engine Spinout Warning**

- Indicates that the model head is spinning with less current draw than expected.
- Correct condition - open the top cover. Access the Head Maintenance page (see [“Head Maintenance” \(page 70\)](#)) to perform a purge while manually feeding filament into the model head. If unsuccessful, attempt a full unload of model material (see [“Unloading Material” \(page 127\)](#)). Reload model material (see [“Loading Material” \(page 116\)](#)). If the warning persists, replace the material coil box (see [“Material Coil Box Preparation” \(page 117\)](#)). Replace the model head if no resolution is found (see [“Head Replacement” \(page 130\)](#)).

**Support Head Extrusion Speed Warning**

- Indicates that the support head motor is operating a speed higher than requested for more than 2 seconds. This can indicate that a “spin out” condition (the drive gears are spinning without advancing the filament) exists.
- Correct condition - open the top right cover. Access the Head Maintenance page (see [“Head Maintenance” \(page 70\)](#)) to perform a purge while manually feeding filament into the model head. If unsuccessful, attempt a full unload of model material (see [“Unloading Material” \(page 127\)](#)). Reload model material (see [“Loading Material” \(page 116\)](#)). If the warning persists, replace the material coil box (see [“Material Coil Box Preparation” \(page 117\)](#)). Replace the model head if no resolution is found (see [“Head Replacement” \(page 130\)](#)).

**Support Engine Spinout Warning**

- Indicates that the support head is spinning with less current draw than expected.
- Correct condition - open the top right cover. Access the Head Maintenance page (see [“Head Maintenance” \(page 70\)](#)) to perform a purge while manually feeding filament into the model head. If unsuccessful, attempt a full unload of model material (see [“Unloading Material” \(page 127\)](#)). Reload model material (see [“Loading Material” \(page 116\)](#)). If the warning persists, replace the material coil box (see [“Material Coil Box Preparation” \(page 117\)](#)). Replace the model head if no resolution is found (see [“Head Replacement” \(page 130\)](#)).

**Y motor jam**

- Indicates that the Y motor was unable to fully complete a move.
- Conect condition - inspect the build chamber for obstructions. If none, open the right head access cover, move the head carnage by hand and look for obstructions. If nothing is evident, resume the build and watch to see if the error repeats. If no solution is found, reboot the system.

**X motor jam**

- Indicates that the X motor was unable to fully complete a move.
- Collect condition - inspect the build chamber for obstructions. If none, open the right head access cover and look for obstructions. If nothing is evident, resume the build and watch to see if the error repeats. If no solution is found, reboot the system.

## Build Abort Errors



All abort related errors must be acknowledged on the User Interface before the printer is put into an aborted state.

### **Aborted by user**

- Indicates that the abort was initiated by the operator.
- Correct condition - remove the aborted build from the printer, see [“Removing a Part from the Printer” \(page 142\)](#) for instructions.

### **Failed to find Z zero**

- Indicates that the Z stage failed to find its home position.
- Correct condition - verify that there is nothing obstructing the calibration targets on the platen, see [“Cleaning the Platen” \(page 189\)](#) for instructions.

### **Failed to process the part**

- An error occurred when attempting to translate the CMB file into commands for the printer.
- Correct condition - often the result of a corrupted or outdated CMB file. Ensure that your printer’s software version is up to date (see [“Updating Controller Software” \(page 178\)](#)) and that you are using the correct version of GrabCAD Print software. Reprocess, reorient, and resend the job file to the printer using GrabCAD Print (see [“GrabCAD Print Software” \(page 45\)](#)) and then restart the build (see [“Basic Job Build Tasks” \(page 133\)](#) for instructions).

### **Failed to load toolpaths**

- Printer unexpectedly lost job information during the build.
- Correct condition - reprocess, reorient, and resend the job file to the printer using GrabCAD Print (see [“GrabCAD Print Software” \(page 45\)](#)). If you encounter the same error when rebuilding with the reprocessed file, attempt to build a different file to see if the error occurs again. If so, contact Stratasys Customer Support or your regional Stratasys office (see [“Getting Help” \(page 244\)](#) for contact information).

### **Failed to calibrate tip offsets**

- Indicates that the printer failed to calibrate tip offsets.
- Correct condition - perform an automatic tip calibration ([“Automatic Tip Calibration” \(page 160\)](#)). If calibration fails, perform a manual tip calibration ([“Manual Tip Calibration” \(page 163\)](#)). If calibration fails again, contact Stratasys Customer Support or your regional Stratasys office (see [“Getting Help” \(page 244\)](#) for contact information).

### **Active spool removed**

- Indicates that the active material coil box was disconnected. This is only displayed when the printer is preparing for a build.
- Correct condition - install a material coil box and load model material. See [“Connecting Material Coil Box To Printer” \(page 118\)](#) and [“Loading Material” \(page 116\)](#) for instructions.

**Loss of vacuum during build**

- Indicates that the build sheet has separated from the platen during build.
- Correct condition - Ensure build sheet is installed smooth side down, that no debris is under the build sheet (especially under outer row of gridlines), and that the build sheet is completely covering all platen grid lines. If this doesn't work, install a new build sheet.

**Model head removed**

- Indicates that the printer lost contact with the model head.
- Correct condition - ensure that the head is seated correctly within the gantry. If so, remove the head and then reinstall it. If this does not correct the error, remove the head and install a new head.

**Support head removed**

- Indicates that the printer lost contact with the support head.
- Correct condition - ensure that the head is seated correctly within the gantry. If so, remove the head and then reinstall it. If this does not correct the error, remove the head and install a new head.

**File not found**

- Indicates that the printer was unable to locate the job file that was selected for building. This error pertains to job files loaded via USB flash drive only.
- Correct condition - ensure that the USB flash drive containing the selected job file is securely inserted into one of the USB ports within the interface panel (see [Figure 3 \(page 32\)](#) for port locations). Once the flash drive is securely inserted into one of the printer's USB ports select the file you'd like to build by loading it to the Job Queue (see ["USB Method" \(page 59\)](#)).

**Unknown error**

- An unexpected error occurred in which the printer was unable to map the cause of the error to a known abort reason.
- Correct condition - attempt to restart the build, see ["Basic Job Build Tasks" \(page 133\)](#) for instructions. If the error persists, contact Stratasys Customer Support or your regional Stratasys office (see ["Getting Help" \(page 244\)](#) for contact information).



The warnings and errors listed below are displayed within the notifications area of the Head Details page. See ["Viewing Head Details" \(page 69\)](#) for details.

## Head Warnings

### **Not initialized**

- Indicates that head data is not ready. This is only displayed when the printer is initializing a newly installed head, or if the initialization process failed.
- Correct condition - wait at least 60 seconds after the error is first displayed. If the error persists, open the top right cover and unclip the head cable connected to the corresponding head. Wait a few seconds and then reconnect the head cable to the head and close the top right cover (see [“Head Replacement” \(page 130\)](#) for details). If the error persists there is likely a problem with either the head or the head cable; please contact Stratasys Customer Support or your regional Stratasys office for further assistance (see [“Getting Help” \(page 244\)](#) for contact information).

### **Order new model head**

- Indicates that the model head is near its odometer limit. This warning is displayed as a reminder to order a replacement head for the one that is approaching its odometer limit. Build hours are available within the head’s Head Details page (see [“Viewing Head Details” \(page 69\)](#)).
- Correct condition - you are still able to build using this head, but part quality may be affected. Once the head’s odometer limit is reached, you will be prompted to change the head (see [“Head Replacement” \(page 130\)](#)).

### **Order new support head**

- Indicates that the support head is near its odometer limit. This warning is displayed as a reminder to order a replacement head for the one that is approaching its odometer limit. Build hours are available within the head’s Head Details page (see [“Viewing Head Details” \(page 69\)](#)).
- Correct condition - you are still able to build using this head, but part quality may be affected. Once the head’s odometer limit is reached, you will be prompted to change the head (see [“Head Replacement” \(page 130\)](#)).

## Head Errors

### **Replace model head**

- Indicates that the model head has reached its build hour odometer limit. This error message is displayed as a reminder that you should replace the head before starting another build. Build hours are available within the head’s Head Details page (see [“Viewing Head Details” \(page 69\)](#)).
- Correct condition - you are able to continue building using this head but it is recommended that you change the head prior to starting a new build (see [“Head Replacement” \(page 130\)](#)).

**Replace support head**

- Indicates that the support head has reached its build hour odometer limit. This error message is displayed as a reminder that you should replace the head before starting another build. Build hours are available within the head's Head Details page (see [“Viewing Head Details”](#) (page 69)).
- Correct condition - you are able to continue building using this head but it is recommended that you change the head prior to starting a new build (see [“Head Replacement”](#) (page 130)).

# Finding a Remedy

The following table lists various troubleshooting scenarios you may encounter when operating the printer and methods for resolving these scenarios.

Condition	Possible Cause	Remedy
Material coil box will not load	Empty material coil box (zero volume).	Remove and replace empty material coil box (see <a href="#">“Handling/Storing Materials”</a> (page 130) and <a href="#">“Connecting Material Coil Box To Printer”</a> (page 118)).
	Incorrect material coil box connected.	The F770 printer utilizes a different material coil box memory chip than other Stratasys printers. As a result, only F770 material coil boxes can be used to build parts on the printer. Ensure that an F770 material coil box is installed.
	Material coil box memory chip circuit failed.	View the material coil box’s associated Material Status Icon within the Materials page. If the icon is red, there may be an issue with the material coil box’s memory chip. Disconnect and then reconnect the material coil box. If the error persists, replace the material coil box with a new one. See <a href="#">“Unloading Material”</a> (page 127), <a href="#">“Handling/Storing Materials”</a> (page 130), and <a href="#">“Loading Material”</a> (page 116).
	Filament snagged within material coil box.	Unload material. Open the material coil box and remove bag and patch disc. Taking care not to shake or drop the material coil bag, set the material coil bag gently on side its side. Make a 20cm (8 in.) X-shaped incision into the material coil bag. Locate and cut out snagged filament. If it is necessary to remove the desiccant pouches from the material coil bag to find the snagged filament, retain them. Remove remaining filament from tube. Feed approximately meters of filament through tube to confirm material feeds properly. Trim excess material. Apply patch to material coil bag. While holding the material coil bag from the sides, reinsert the material coil bag into material coil box. Keep filament tube oriented 45° to box slot. Trim any excess filament as required. Load material. See <a href="#">“Unloading Material”</a> (page 127), <a href="#">“Handling/Storing Materials”</a> (page 130), and <a href="#">“Loading Material”</a> (page 116).
	Filament does not reach head (load time-out reached)	Disconnect the material coil box and replace with a new box (see <a href="#">“Handling/Storing Materials”</a> (page 130) and <a href="#">“Loading Material”</a> (page 116)). If the error persists, contact Customer Support or your regional Stratasys office (see <a href="#">“Getting Help”</a> (page 244) for contact information).



Condition	Possible Cause	Remedy
Model or support engine spinout warning on user interface	Filament snagged within material coil box.	Unload material. Open the material coil box and remove bag and patch disc. Taking care not to shake or drop the material coil bag, set the material coil bag gently on side its side. Make a 20cm (8 in.) X-shaped incision into the material coil bag. Locate and cut out snagged filament. If it is necessary to remove the desiccant pouches from the material coil bag to find the snagged filament, retain them. Remove remaining filament from tube. Feed approximately meters of filament through tube to confirm material feeds properly. Trim excess material. Apply patch to material coil bag. While holding the material coil bag from the sides, reinsert the material coil bag into material coil box. Keep filament tube oriented 45° to box slot. Trim any excess filament as required. Load material. See <a href="#">“Unloading Material” (page 127)</a> , <a href="#">“Handling/Storing Materials” (page 130)</a> , and <a href="#">“Loading Material” (page 116)</a> .
Cannot pull material out of the material coil box	Filament snagged within material coil box.	Unload material. Open the material coil box and remove bag and patch disc. Taking care not to shake or drop the material coil bag, set the material coil bag gently on side its side. Make a 20cm (8 in.) X-shaped incision into the material coil bag. Locate and cut out snagged filament. If it is necessary to remove the desiccant pouches from the material coil bag to find the snagged filament, retain them. Remove remaining filament from tube. Feed approximately meters of filament through tube to confirm material feeds properly. Trim excess material. Apply patch to material coil bag. While holding the material coil bag from the sides, reinsert the material coil bag into material coil box. Keep filament tube oriented 45° to box slot. Trim any excess filament as required. Load material. See <a href="#">“Unloading Material” (page 127)</a> , <a href="#">“Handling/Storing Materials” (page 130)</a> , and <a href="#">“Loading Material” (page 116)</a> .
Filament jam error displayed on user interface	Filament snagged within material coil box.	Unload material. Open the material coil box and remove bag and patch disc. Taking care not to shake or drop the material coil bag, set the material coil bag gently on side its side. Make a 20cm (8 in.) X-shaped incision into the material coil bag. Locate and cut out snagged filament. If it is necessary to remove the desiccant pouches from the material coil bag to find the snagged filament, retain them. Remove remaining filament from tube. Feed approximately meters of filament through tube to confirm material feeds properly. Trim excess material. Apply patch to material coil bag. While holding the material coil bag from the sides, reinsert the material coil bag into material coil box. Keep filament tube oriented 45° to box slot. Trim any excess filament as required. Load material. See <a href="#">“Unloading Material” (page 127)</a> , <a href="#">“Handling/Storing Materials” (page 130)</a> , and <a href="#">“Loading Material” (page 116)</a> .

Condition	Possible Cause	Remedy
System paused with <b>No material detected at head</b> error	Material spinout	Unload and reload material. See <a href="#">“Unloading Material”</a> (page 127) and <a href="#">“Loading Material”</a> (page 116).
	Material coil box is cross-wound	Pull material from the material coil box until the point where the cross-winding is reached. Re-load material. See <a href="#">“Loading Material”</a> (page 116).
	Calibration performed incorrectly	Perform an <a href="#">“Automatic Tip Calibration”</a> (page 160). Next perform a <a href="#">“Manual Tip Calibration”</a> (page 163). Enter the results using the touch screen GUI.
	Filament snagged within material coil box.	Unload material. Open the material coil box and remove bag and patch disc. Taking care not to shake or drop the material coil bag, set the material coil bag gently on side its side. Make a 20cm (8 in.) X-shaped incision into the material coil bag. Locate and cut out snagged filament. If it is necessary to remove the desiccant pouches from the material coil bag to find the snagged filament, retain them. Remove remaining filament from tube. Feed approximately meters of filament through tube to confirm material feeds properly. Trim excess material. Apply patch to material coil bag. While holding the material coil bag from the sides, reinsert the material coil bag into material coil box. Keep filament tube oriented 45° to box slot. Trim any excess filament as required. Load material. See <a href="#">“Unloading Material”</a> (page 127), <a href="#">“Handling/Storing Materials”</a> (page 130), and <a href="#">“Loading Material”</a> (page 116).
	Broken material clogging filament tube	Locate broken material by manually feeding material to the head from the material port.
	Confirm the blue elbow of the material tube is properly seated	If elbow is not properly seated, call reseller to order the bracket designed to prevent this issue.
Loss of extrusion (head will not extrude material)	Plugged Tips	Verify that material purges by initiating a purge using the model and/or support purge buttons. See <a href="#">“Head Maintenance”</a> (page 70). Replace head with new head and recalibrate. See <a href="#">“Head Replacement”</a> (page 130).
	Printer not calibrated	Perform a Tip Offset Calibration. See <a href="#">“Tip Calibration”</a> (page 159).
Support material is difficult to remove from part	Support material is embedded in the vertical surfaces of the part.	Adjust the Tip Offset Calibration. See <a href="#">“Manual Tip Calibration”</a> (page 163).

Condition	Possible Cause	Remedy
Model material surface finish is poor on downward facing surfaces Support material removes too easily	The tip to tip calibration is not set correctly.	Repeat Tip Offset Calibration. See <a href="#">“Manual Tip Calibration” (page 163)</a> .
Material oozing	Moisture in the material coil box.	Contact Customer Support or your regional Stratasys office (see <a href="#">“Getting Help” (page 244)</a> for contact information).
Oven not maintaining temperatures	Blown AC board fuse.	Contact Customer Support or your regional Stratasys office (see <a href="#">“Getting Help” (page 244)</a> for contact information).
	Oven door open.	Close the oven door; the heater turns off while the door is open.
	Oven door not sealing.	Check oven door seal and verify that it is securely affixed to oven door frame and does not exhibit cuts/tears. If excessive wear is visible, Contact Customer Support or your regional Stratasys office (see <a href="#">“Getting Help” (page 244)</a> for contact information).
Vacuum not detected	Used build sheet	Residuals from previous parts can cause the build sheet to distort and lose vacuum. If this happens, try using a new build sheet.
	Debris under build sheet	Inspect underneath build sheet, particularly around the edges, and remove all debris. Even a small strand of extruded material can prevent the sheet from forming a vacuum.
	Build sheet not allowed to heat up	After installing a build sheet, allow it to heat up for a minute before starting a part.
Failure to achieve vacuum	Ripples or air bubbles under the outer edge(s) of the build sheet	Wait until the build chamber is hot and thermally stabilized. Lift one corner of the build sheet to break vacuum. This will instantly relieve the expansion stresses that may be causing the issue. Set the corner of the build sheet back down and allow it to reach vacuum again. <b>Note:</b> A properly installed build sheet does not need to be adjusted between successive builds. This issue only applies to newly installed build sheets.

## 9 SUPPLEMENTARY INFO

### Declaration of Conformity

Declaration of Conformity information is available from your Stratasys representative. Please contact your local regional office for a copy of this document.

### Regulatory and Environmental Information

#### EMC Class A Warning

**Warning:**

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

#### FCC Statements (U.S.A.)

The U.S. Federal Communications Commission (in 47 cfr1 5.105) has specified that the following notices be brought to the attention of users of this product.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Stratasys contact information is available from the [Stratasys Support Center](#).

**Caution:**

Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this equipment not expressly approved by Stratasys, Ltd. may cause harmful interference and void the FCC authorization to operate this equipment.



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

## UK Conformity Assessed (UKCA) Marking



This conformity mark indicates that the printer conforms with the applicable requirements for products sold within Great Britain.

## Canada Electromagnetic compatibility (EMC)

### Normes de Sécurité (Canada)

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

### DOC Statement (Canada)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

## MSDS (Material Safety Data Sheet)

You can obtain current Material Safety Data Sheets for printer materials from the Stratasys website at: <http://www.stratasys.com/materials/material-safety-data-sheets>.

## Disposal of Waste Equipment by Users in Private Households in the European Union



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

