stratasys®

Origin One®
3D Printing System
Version 2.7

stratasys

ORIGIN ONE

DOC-30001 Rev. C

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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	FEB 2022	Initial Release
B	MAR 2022	Deleted the Anchoring Your Printer for CE Compliance section and associated fasteners. Changed references from "customer hub" to "support center".
C	OCT 2022	Updated T-handle size to 6Nm 5mm. Added Origin Local Hub information. Added GrabCAD Print information. Added additional accessories. Added a pre-print checklist. Updated images from v2.6 to current v2.7 images in Chapter 1. Added Adjusting Dreve programs for Origin One Dental

Contents

1 SERVICE AND SUPPORT

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

Service and Software Support

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 hardware serial number available (see "Identifying Your Printer" (page 10)).

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

General Precautions

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- Before handling resins and solvents, fully read and understand the appropriate Safety Data Sheets (SDS).

- Printers should be installed in a controlled environment with all necessary safety precautions.

- Use printer in a well-ventilated area. If used within an enclosed area, proper air-changes, ventilation, and exhaust systems are required. Please reach out to a Stratasys representative to determine requirements for your specific application.

- Keep printer and material resins away from direct and indirect sunlight.

- When using chamber heating, surface temperature of metal components inside the chamber may exceed 60C (140F). Use appropriate precautions such as gloves to avoid burns.

- Use caution when accessing the print chamber. Build head operation can pinch or crush.

- Do not look directly at projected UV light during operation, as UV exposure can cause eye damage.

- ONLY operate with 110V, 3-prong, or 220V, 2-Prong, Grounded Power Connectors. DO NOT replace detachable power supply cord with an inadequately rated cord.

Proper Personal Protective Equipment (PPE)

Proper PPE should be worn at all times while working around the print bench or handling resins, solvents and cleaners, hazardous waste, etc. PPE should include but is not limited to:

• Nitrile gloves

• Lab coat

• Safety glasses

Please refer to the appropriate Safety Data Sheets for additional safety precautions and required PPE.

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
ⓘ	Information		Provides additional information that is helpful to properly use the printer.
⚠	Warning		Exclamation mark: This icon is used for other instances and items for which a standard symbol does not exist.
⚠ WARNING Pinch point. Keep hands clear.	WARNING: Pinch Point		This icon identifies instances where moving parts of the machine create a hazard for hands and fingers while the machine is in operation.
⚠ WARNING Burn hazard. Hot surface inside. Allow to cool before servicing.	WARNING: Burn Hazard		Surface temperature of metal components may exceed 60C (140F). Use appropriate precautions to avoid burns.
⚠ WARNING Hazardous chemicals located within this enclosure.	WARNING: Hazardous Chemicals		The photocured resins inside the machine must be handled with the appropriate precautions, in accordance with the SDS of the resin.
⚠ WARNING UV LIGHT. Do not look directly at light.	WARNING: Ultraviolet Radiation		This icon identifies instances where damaging levels of ultraviolet radiation may be present. Personnel should be required to wear eye protection with UV certified lenses while the machine is in operation.

Warning Symbols	Meaning	Location	Comments
⚠ WARNING Do Not Open While machine is in operation.	WARNING: Do Not Open		Opening the door while the machine is in operation will introduce additional hazards. To reduce the overall hazard level, do not open the door while the machine is in operation.

Product Safety Label Locations

Figure 1: Front door safety label locations
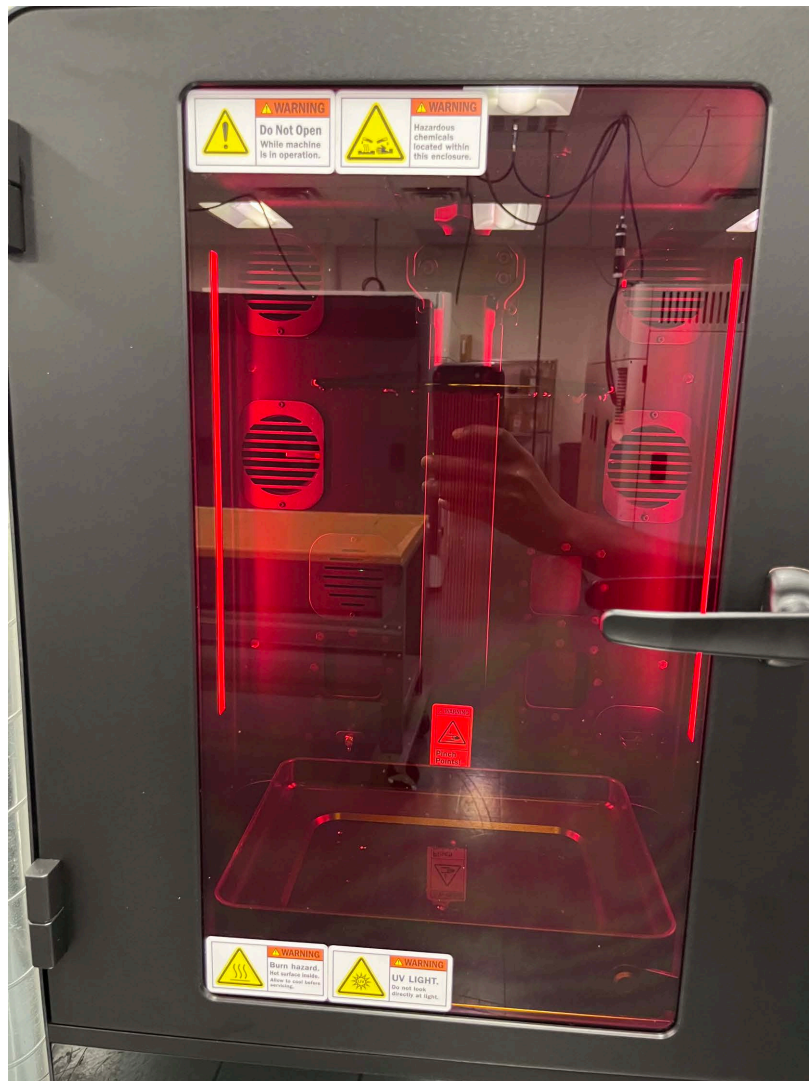
Figure 2: Linear drive safety label location

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.

Build Chamber

Warning: Hot Surfaces.

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

Z Stage

Warning: Moving Parts.

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

Keep hands clear of the area between the build head and the resin tray/glass while the printer is powered on.

Door Locks

A reed switch is used to communicate the status of the build chamber door. The build chamber door interlocks must be disabled on the printer user interface (UI) before the door can be opened. Z stage motion is possible with the build chamber door open. Use caution when accessing the build chamber.

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

General

- Model: Origin One
- Process type: P3 (Programmable Photopolymerization)
- Materials: Photocurable materials from the Stratasys ecosystem materials partners
- Build Dimensions (W x D x H) (May be slightly reduced to increase dimensional accuracy)
- 192mm × 108mm × 370mm
- 7.56" × 4.25" × 14.57"
- Feature Resolution: Typically <50µm (material and design-dependent)
- Process Energy: UV (385nm) and Thermal
- Resin Tray Capacity: 15 - 65 fl oz (2 liters max)
- Supported File Types: STL and Zip of PNG images

Physical

- System Dimensions (W x D x H)
- Printer Crated 250 pounds (113.5 kg) Width: 30 inches (762 mm)
- Depth: 35 inches (889 mm)
- Height: 55 inches (1397 mm)
- Printer Uncrated 180 pounds (81.6 kg) Width: 19 inches (483 mm)
- Depth: 20 inches (508 mm)
- Height: 44 inches (1118 mm)
- Power Requirements: 90 - 264 VAC, 50 - 60 HZ, 700 W, 1 phase
- Connectivity: Ethernet

Environmental

The Origin One printer operating temperature shall be in the range of 59°F to 86°F (13°C to 30°C), with relative humidity range of 30% to 70% non-condensing.

2   PRINTER SETUP

This chapter describes basic setup of the Origin One.

General Information

Welcome

Congratulations on receiving your Origin One! This user manual covers the specifications and relevant components of your printer. Recommended procedures are explained to ensure your parts are printed safely and efficiently. Additional sections on cleaning, troubleshooting, and maintenance will help provide proper care for your printer.

Product Overview

The Origin One is a manufacturing-grade printer that enables additive mass production of end-use parts. Programmable Photopolymerization (P³) precisely orchestrates light, temperature, and other conditions, automatically optimizing prints in real-time for the best possible results. Origin One can produce detailed featured parts with high-accuracy materials that can be post-processed in minutes.

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.
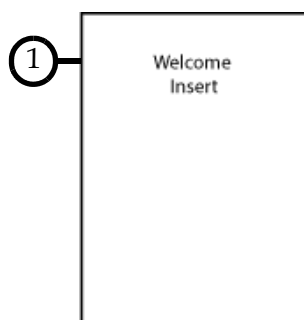
Figure 1: Welcome Kit Contents

Table 1: Key for Figure 1

#	Item	Description
1	Welcome Insert Document	Contains instructions for downloading the Origin One User Guide (this document).

Table 2: Accessories

#	Item	Description
1	Resin Tray	The resin tray will contain the resin used to print parts. It is used to secure the tray sheet which is instrumental in releasing cured layers.
2	Build Platform (2x)	The build platform is the substrate on which the printed model will be attached and anchored during the build process.
3	Tubing	570mm tube for pump tubing replacement. See Chapter 6 Maintenance (page 52).
4	Fan Filters (4x)	Replacement fan filters. See Chapter 6 Maintenance (page 52).
5	Linear Drive Grease Kit	3ml syringe, grease, and tip cover for lubricating the z linear drive. See Chapter 6 Maintenance (page 52).
6	Torque Driver, 6Nm 5mm	Torque driver set to 6Nm use to secure the tray sheet to the resin tray. See Chapter 6 Maintenance (page 52).
7	Torque Driver, 10Nm 5mm	Torque driver used to calibrate the build platform. See Chapter 5 Operating the Printer (page 27).
8	Cable, Main Power	Power cable used to provide power from the wall receptacle to the printer. US and EU spec cables are provided.
9	Cable, Ethernet	Used to connect the printer to the Origin Cloud App. or Origin Local Hub via facility network.
10	Tray Gaskets, Replacement	These gaskets create the seal between the tray and the tray sheet.
11	Accessories, L-keys	A set of L-keys to remove fasteners holding covers to customer serviceable components is included.
12	T-handle, T10 Torx Driver	A T10 Torx driver is included for the fasteners on the side panels.
13	Disassembly tool, Tray	A thumb tool is included to assist in pulling the tray halves apart during tray sheet replacement.

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, perform the following setup tasks.

Identifying Your Printer

Use the printer nameplate to identify your printer. The printer nameplate contains the serial number. Refer to the serial number when requesting service. The printer's model number and power requirements are also shown on the nameplate.

The nameplate is located on the back side of the printer near the bottom, and is typically placed near the printer's power connection. Use the information on the nameplate when identifying your printer with Customer Support.

Figure 2: Nameplate Location
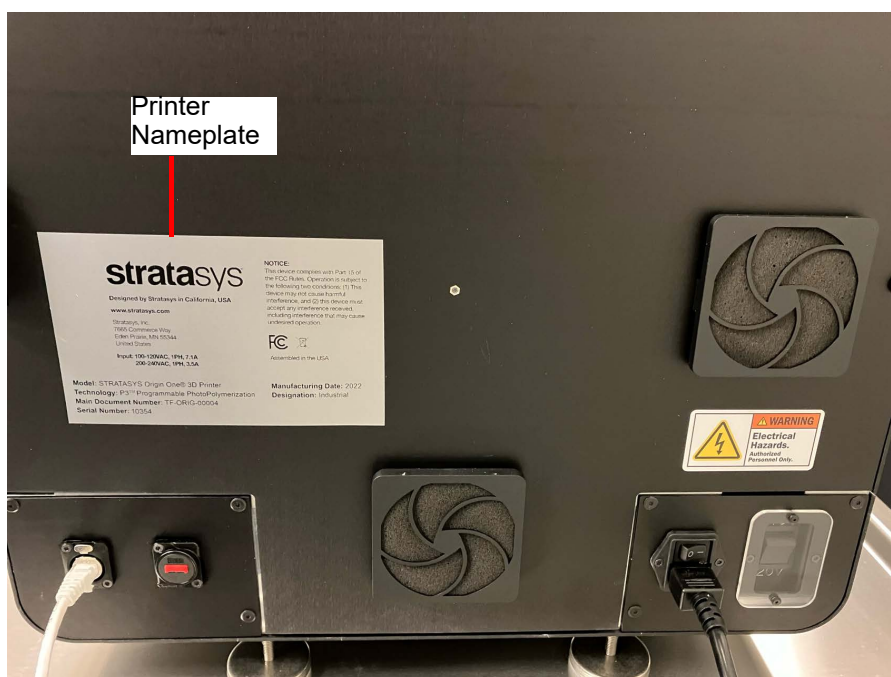
Making the Network Connection

The Origin One Industrial and Origin One Dental printers require connection to the Origin Cloud through the facility's network. The Origin One Local printer also requires connection to the facility's network to reach the Origin Local Hub. An RJ45 network connector is located on the right rear corner of the printer (as viewed from the rear). See Figure 3 for the network connection location.

1. Remove the Ethernet cable from the Tools and Cables Accessory Box.

2. Connect the Ethernet cable. See Figure 3.

> (i) 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. The maximum Ethernet cable length is 25 meters.

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.

1. Remove the power cable from the Tools and Cables Accessory Box.

2. Plug the receptacle end of the power cable into the rear of the printer and the three-prong (US) or two-prong (EU) end into a grounded outlet. See Figure 3.

Figure 3: Rear Connections

Ethernet Network Connection (RJ45)

Power Cable Connection

Power Switch
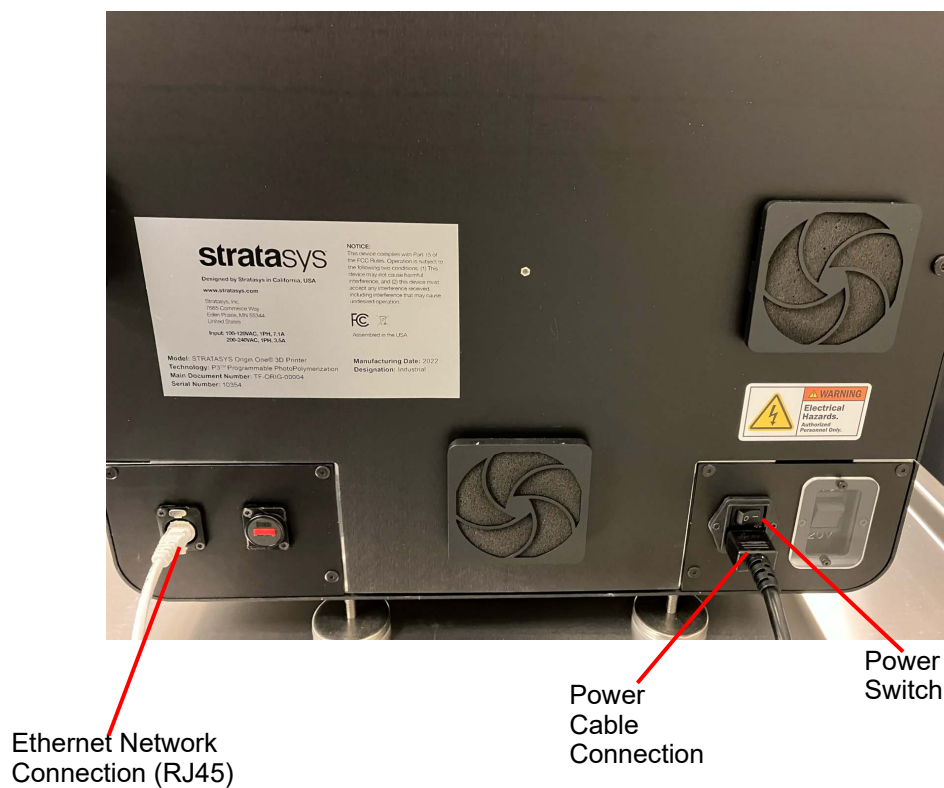
Stratasys Online Resources

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 4: Stratasys Academy
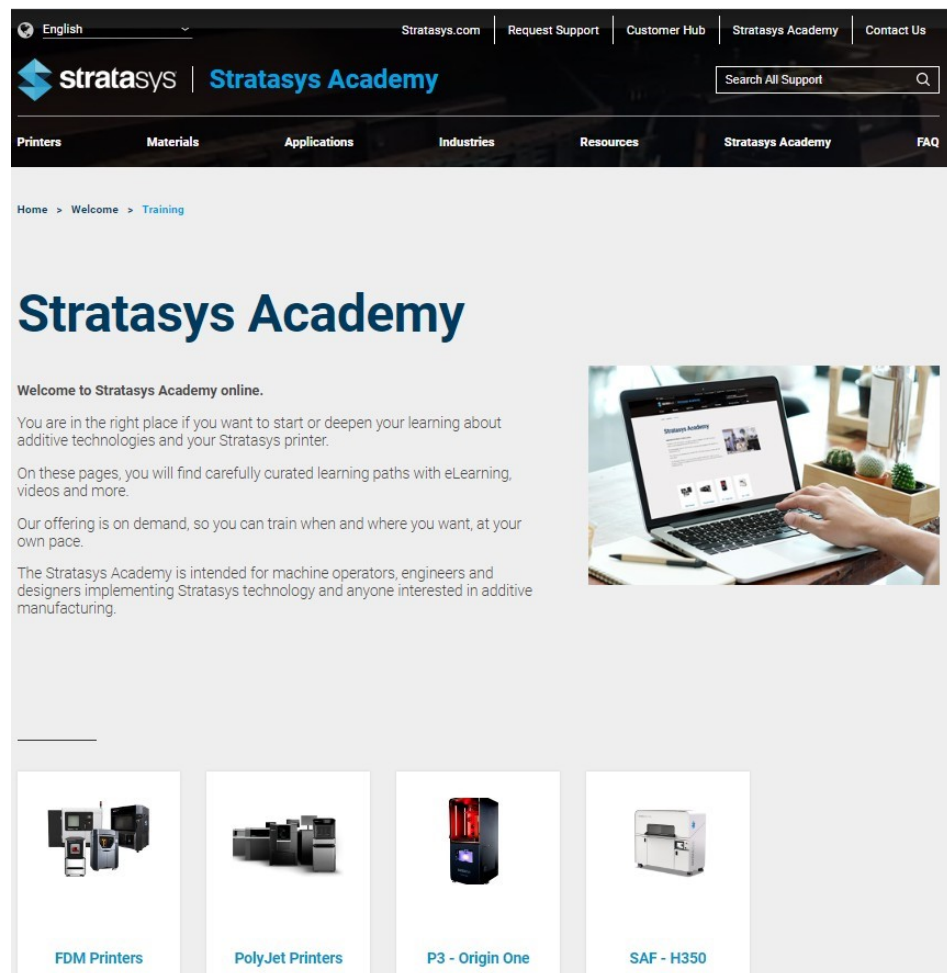
Stratasys Support Center

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 5: Support Center
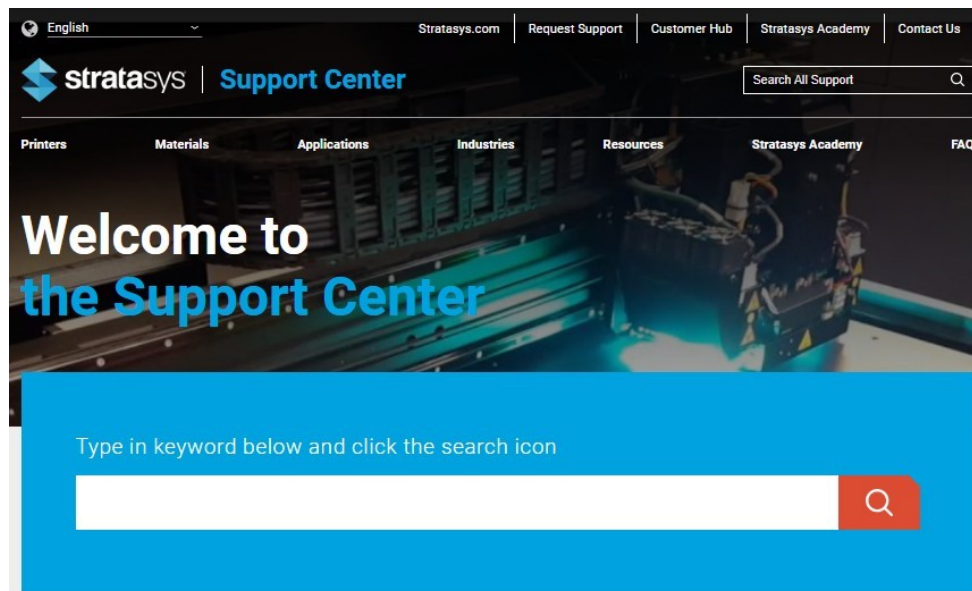
Stratasys Academy YouTube Channel

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 6: Stratasys Academy YouTube Channel
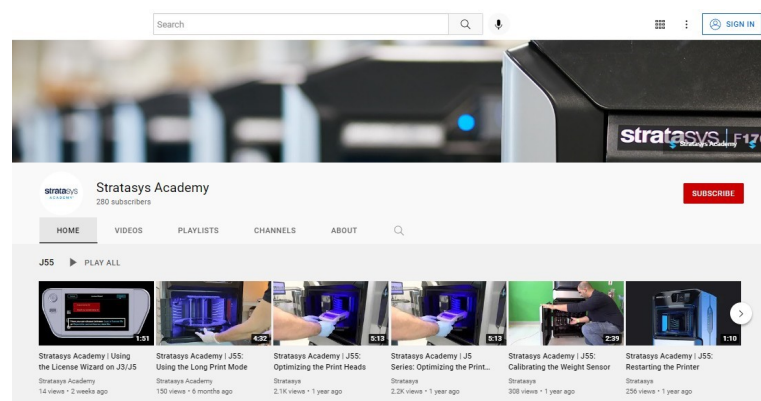
GrabCAD Community

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 7: GrabCAD Community
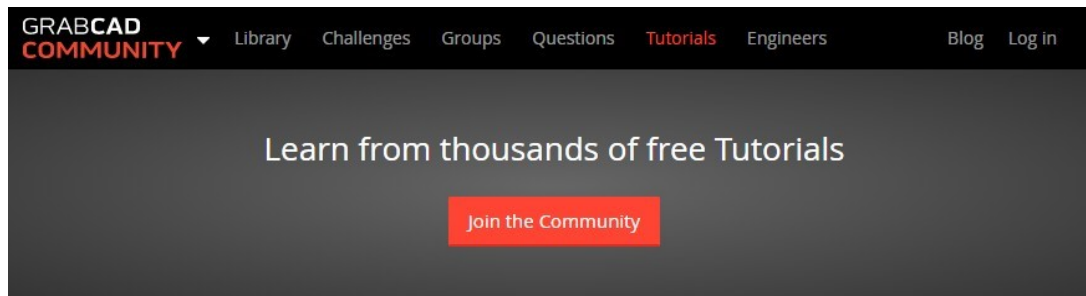
3 SYSTEM COMPONENTS

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

Printer Overview

Main Components

> ⚠️ 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. System components are highlighted in Figure 1 and described in Table 1.

Figure 1: System Components
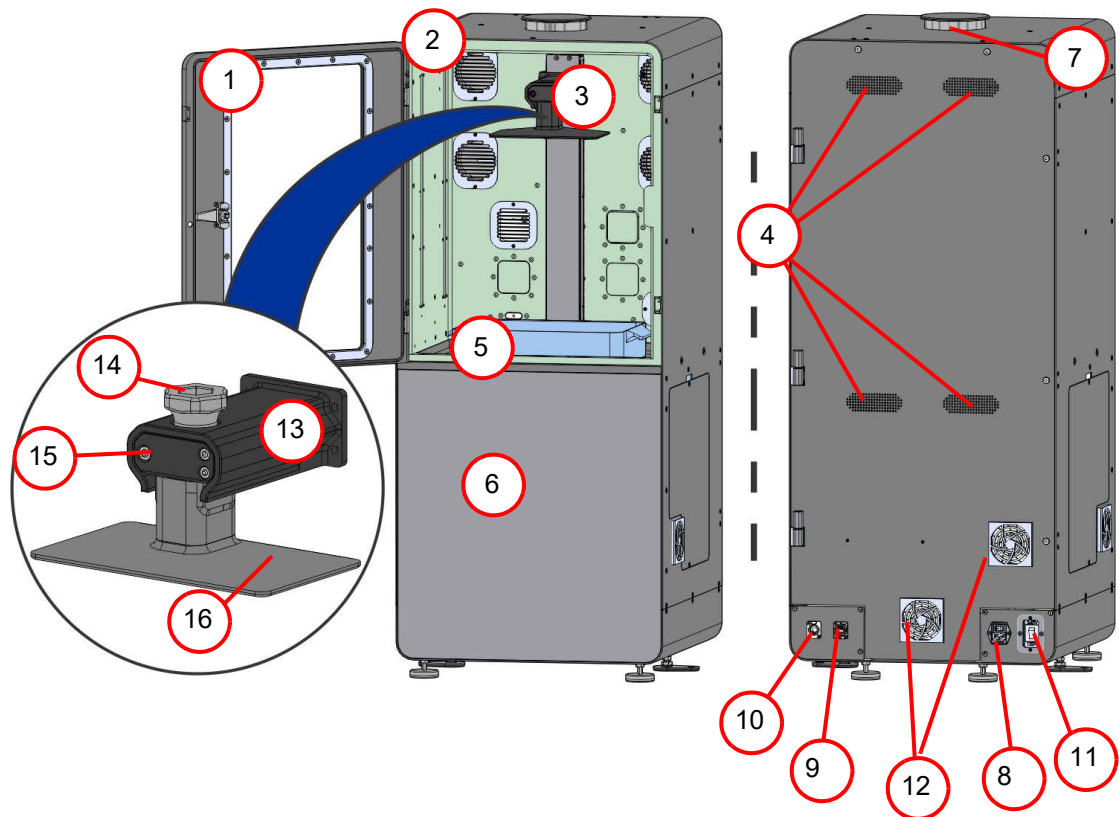
Table 1: System Components

Item Number	Description	Item Number	Description	Item Number	Description
1	Door	2	Hood	3	Build head assembly (see enlarged view)
4	Vents (4 total)	5	Resin tray (shipped separately)	6	Touch screen display
7	Exhaust cap	8	Power switch	9	USB port
10	Ethernet port	11	AC power input	12	Fans
13	Build arm	14	Thumbscrew	15	Calibration bolt
16	Build platform				

Software

Firmware

The Origin One Printer runs on a high-performance and secure Linux embedded computer platform. Upgrades and updates are pushed automatically as required, and take effect after a system reboot. Origin One Local receives quarterly updates which require manual download.

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. After installing GrabCAD Print, navigate to **File|Preferences |P3 DLP** and login or create an Origin account. If a new account was created, please contact your Stratasys representative to complete registration. For more information on GrabCAD Print for Origin, view the user guide at https://help.grabcad.com/article/283-grabcad-print-for-origin.

GrabCAD Print for Origin One Local will be supported at a later date. See "Origin Platform" (page 47) for information on the Origin Platform for Origin One Local.

GrabCAD and GDPR

GrabCAD complies with the European Union's General Data Privacy Regulation. For any questions, please contact support@grabcad.com.

Connecting to the Origin One Printer

Origin One printers associated with your Origin account will automatically populate in GrabCAD Print once your accounts are connected via the P3 DLP settings.

Netfabb® Software

Netfabb is a third party software application that is required to pack, arrange, orient, and create supports for more complex parts. Access to a one year Netfabb Premium license is included with each printer purchase. Once a part or pack of parts is prepared, it can be exported as an STL and uploaded to GrabCAD Print to process and print on the Origin One Printer. Please contact Stratasys Customer Support to arrange access for Netfabb.

4   USER INTERFACE

This chapter provides an overview of the Origin One printer User Interface (UI). Specific printer operation information and procedures can be found in Chapter 5 Operating the Printer (page 27). You must power ON the printer prior to using the touchscreen (see "Powering ON the Printer" (page 27) for instructions).

Overview

The touchscreen grants access to several aspects of the printer.

*   To interact with the printer, tap anywhere on the UI screen. This activates the home screen. The home screen displays several buttons, sensor readings, and shows the progress of a print.

*   If the strike bars are installed on the door, press **Open Door** to release the door locks so that the printer may be opened. For printers without strike bars installed, this button is not used.

*   To magnetically release a tray from the printer, press **Release Tray**.

*   Three buttons on the side of the screen lead to additional sections of the printer interface: **Select Job**, **System**, and **Analytics**. See Figure 1.

Figure 1: User Interface Overview
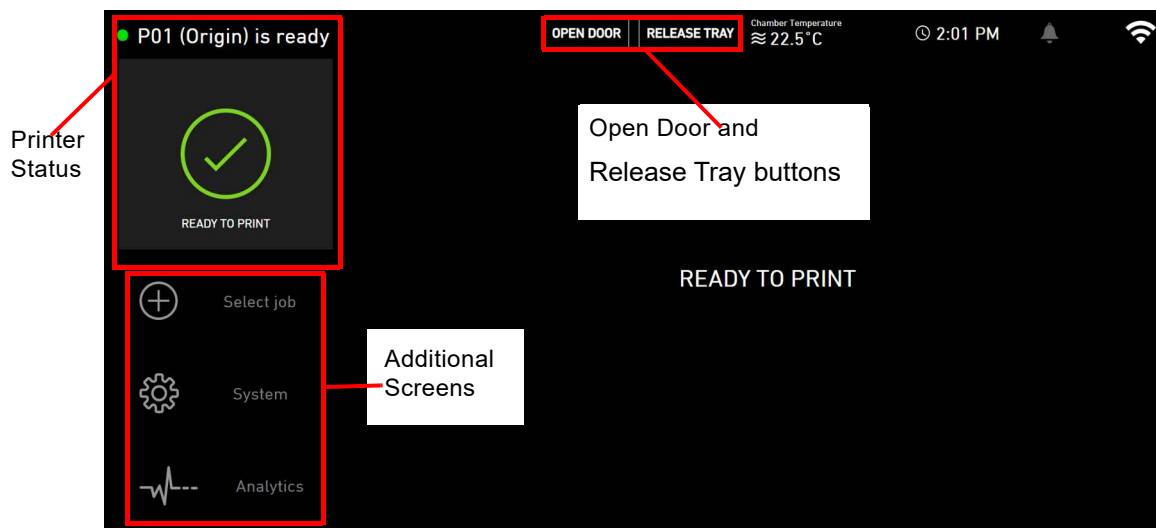
> ℹ️ If the included strike bars are installed and the machine is actively printing, system locks will prevent the door from releasing.

Job Selection

The Select Job button opens the job selection interface, which displays a list of all models uploaded to the printer starting with the most recently uploaded file. Newly submitted jobs take some time to process. A loading icon will appear next to the print until it is ready.

Press on any file to view a thumbnail and specifications of the print. When the printer is prepared and ready to print a file, press the **Start** icon to begin the print.

Figure 2: Select Print screen
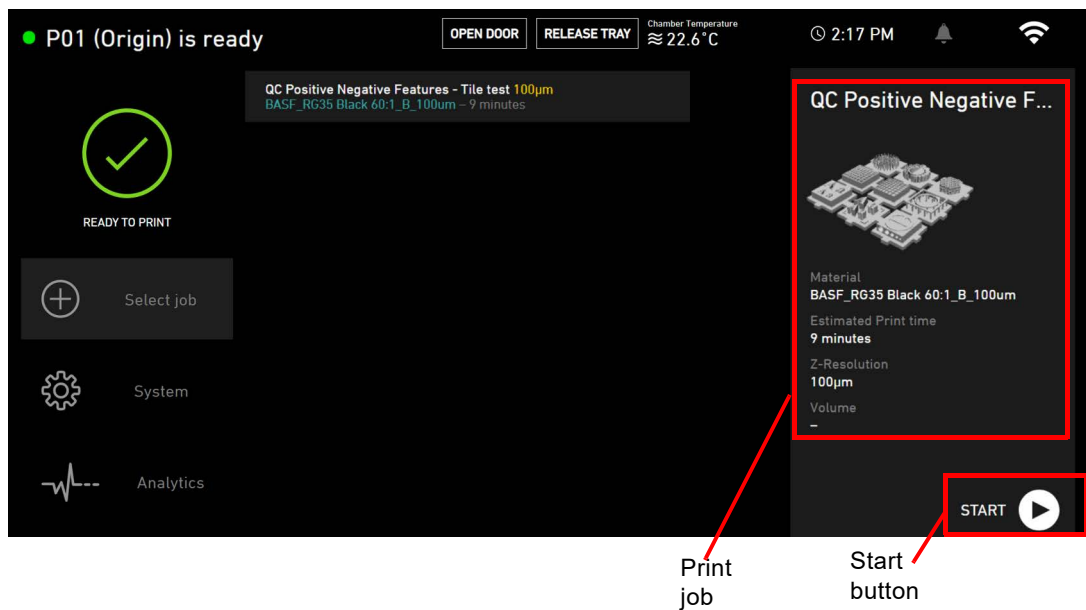
System Settings

The System button opens the system settings interface, which displays general system specifications as well as system utilities such as:

- Chamber light controls
- Build platform calibration
- Projector controls
- Heating controls

- Other diagnostics

Figure 3: System Settings screen

System utility controls

System Utility Controls

- Chamber Lights: To turn the print chamber's interior lights on/off, tap the button with the lightbulb icon.

- Calibration: This button is used to calibrate the build platform. For more on calibration, see "Build Head Calibration" (page 43).

- Project Light Engine: Two buttons can be selected here: Project Full Area and Project Test Pattern. Tapping Project Full Area will cause the projector to illuminate its maximum area which can be used to check function or during troubleshooting. Tapping Project Test Pattern will display a test pattern which can be used to check the focus of the projector.

- Print Heating: The slider bars here allow you to adjust the heat settings for the chamber heater as well as the interface glass heater.

Analytics

The Analytics button activates an interface that provides sensor data, plots, and other system analytics for monitoring of the print process.

Figure 4: Analytics screen
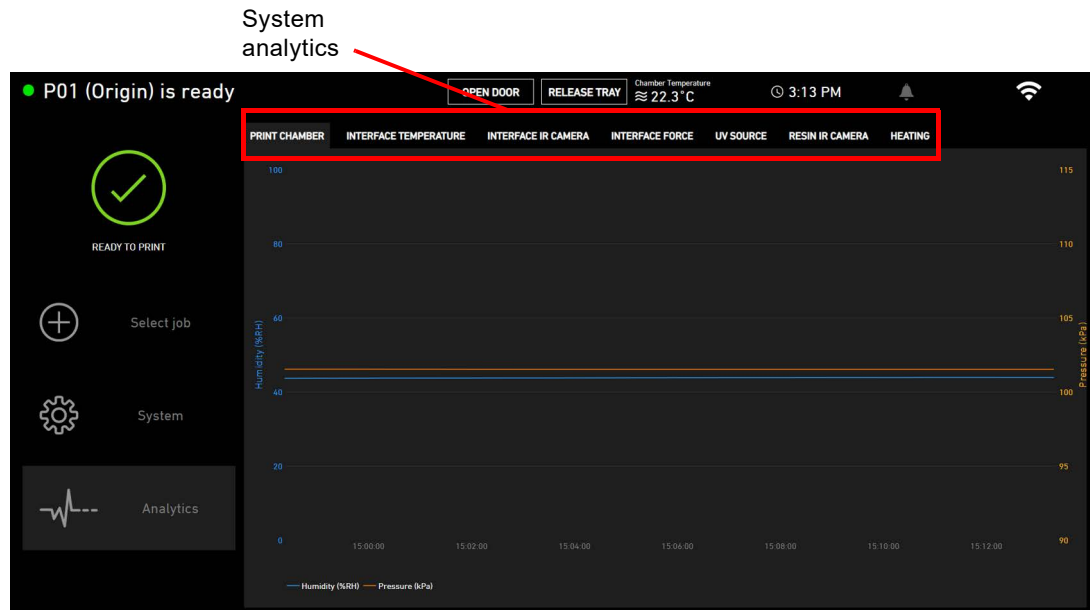
System Analytics

- Print Chamber: The Print Chamber button displays readings for both the humidity and pressure of the print chamber.

- Interface Temperature: The Interface Temperature button displays the average and maximum temperatures that the IR camera reads from the glass.

- Interface IR Camera: The Interface IR Camera button displays a thermal image of the glass. Print layers can be viewed here in real time as heat from the exothermic reaction of cured resin is transferred to the glass.

- Interface Force: The Interface Force button displays the measured current (proportional to force) being sent to the vertical linear drive to move the build arm.

- UV Source: The UV Source button displays the temperature of LED light from the projector. It also displays the readings from the internal light sensor.

- Heating: The Heating button displays the measured temperature of the chamber and glass interface.

Viewing Print Job Information

Figure 5: Print Job Information Panel
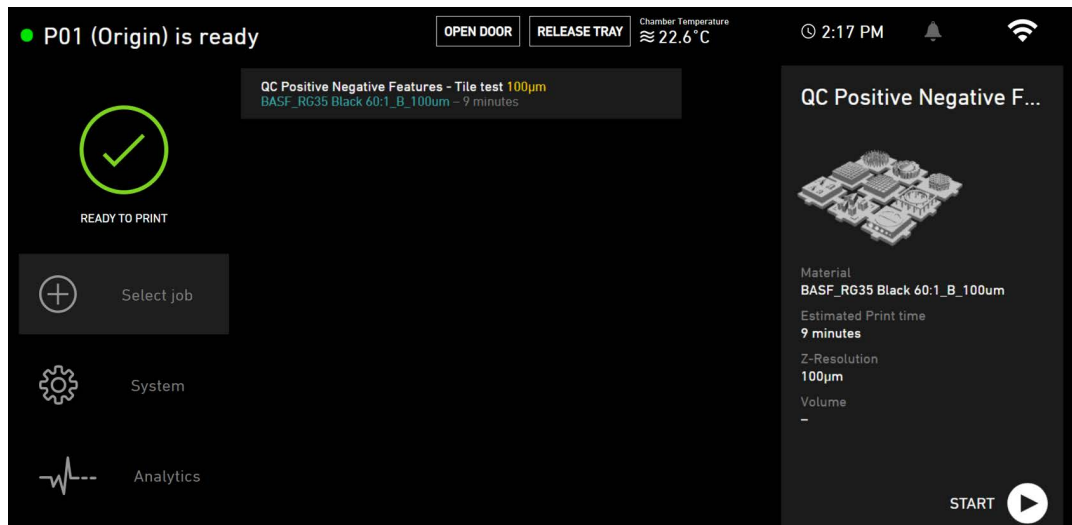
Print Status Display

Idle

Figure 6: Print Status Display - Idle

Printing

Figure 7: Print Status Display - Printing

Network Configuration

Each Origin One printer has specific network configuration requirements that must be met to ensure printer functionality. Please reference the Origin One site preparation guide.

Static IP Configuration

A static IP address can be used for your Origin One network configuration. To set up a static IP address the following information is required:

- Static IP address
- Router prefix
- Gateway

1. To configure a static IP address, navigate to the Network tab on the printer UI and select
   Static IP.

Figure 8: Select Static IP
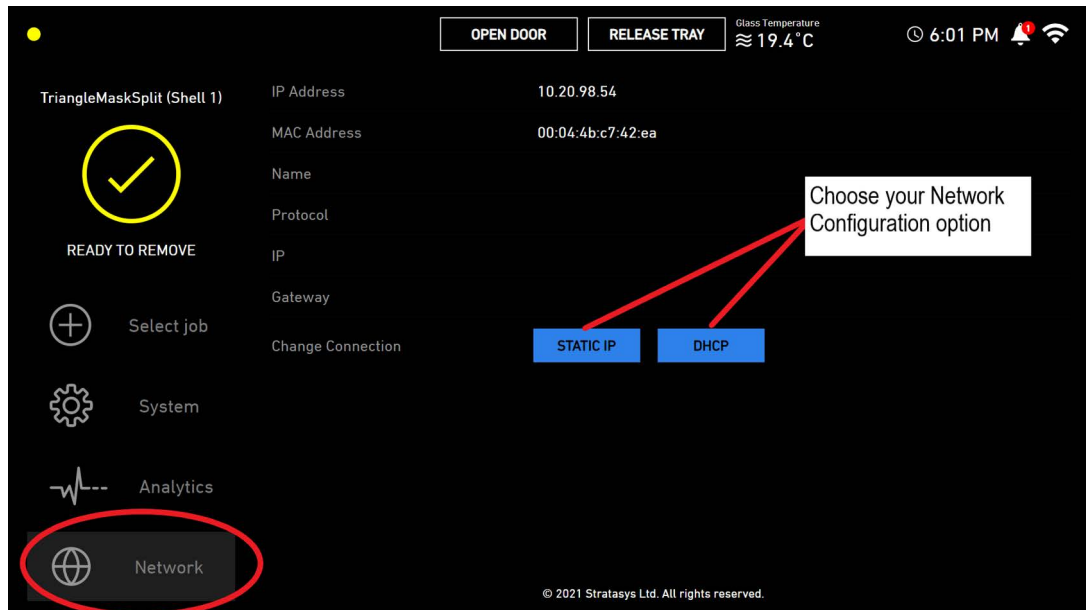
2. After selecting **Static IP**, enter the **Static IP** address, **Router Prefix**, and **Gateway**
   information.

Figure 9: Static IP setup
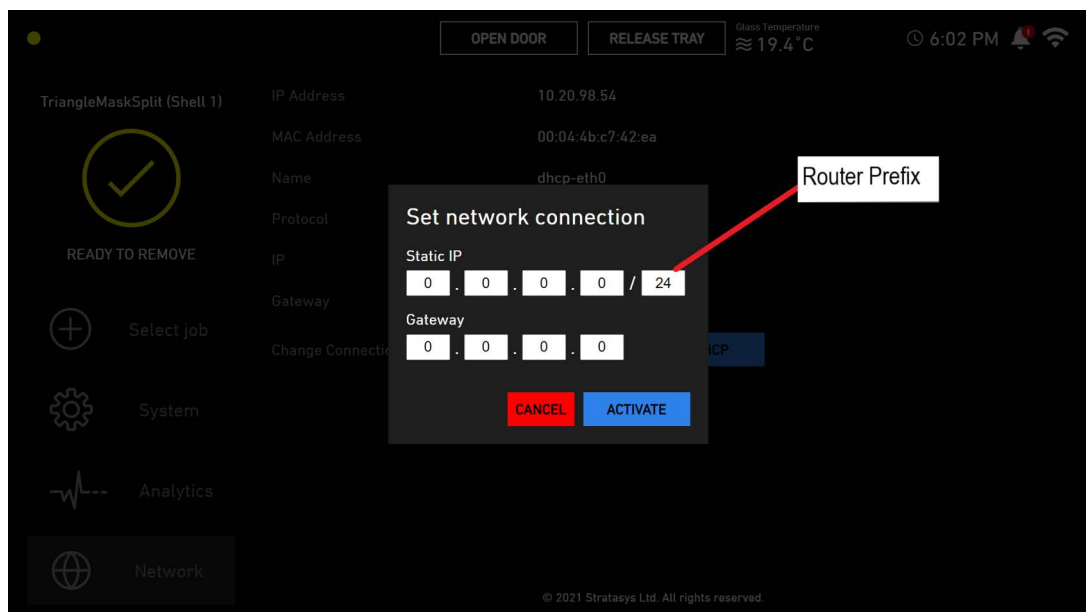
3. Press **Confirm** after entering each bit segment of the address.

Figure 10: Press Confirm
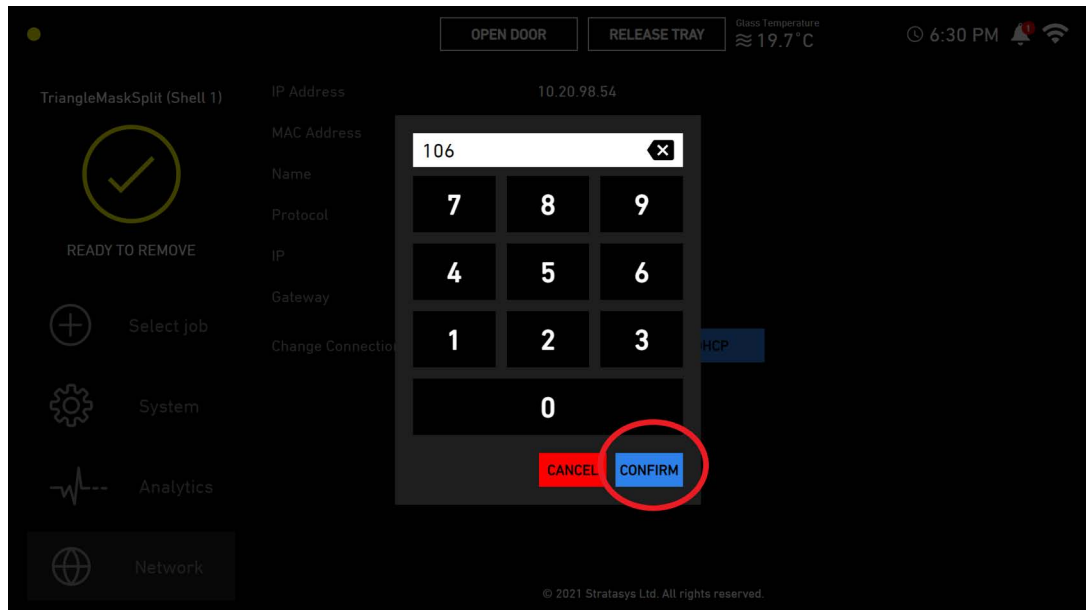
4. Once the static IP information is entered, select **Activate** to enable the new network configuration. The Static IP address assignment is now complete.

Figure 11: Select Activate
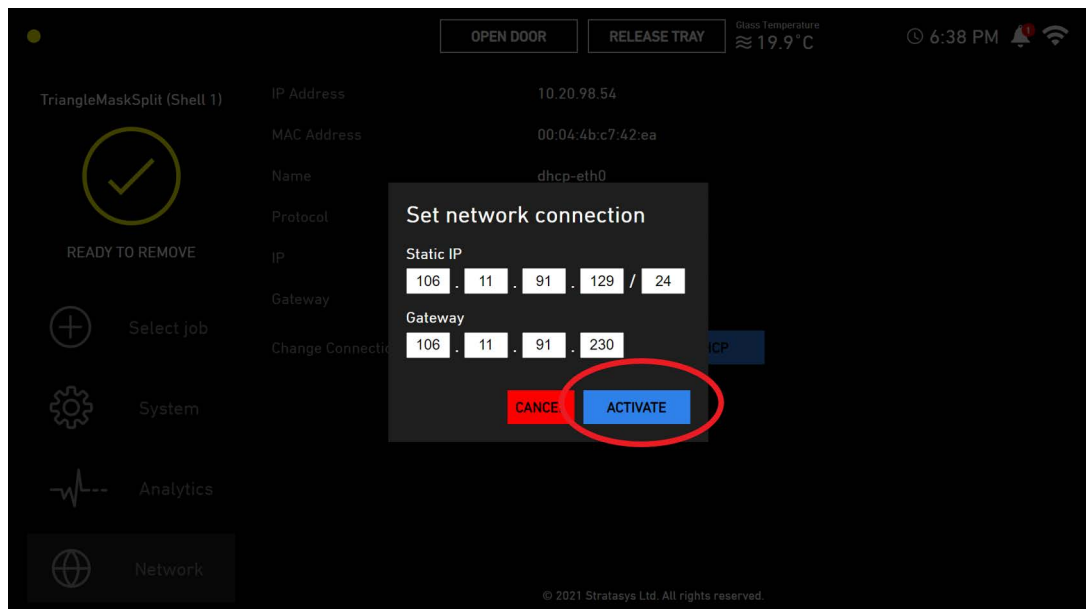
5   OPERATING THE PRINTER

This chapter explains basic steps in operating the Origin One printer.

Basic User Operations

Powering ON the Printer

To power the printer ON:

1. Confirm the power and Ethernet cables are connected. See "Making the Network Connection" (page 10) and "Connecting the Power Cable" (page 11).

2. Position the power switch to ON.

Figure 1: Power Button Location and Rear Connections

Ethernet Port

Power Cable
Connection

Power Switch
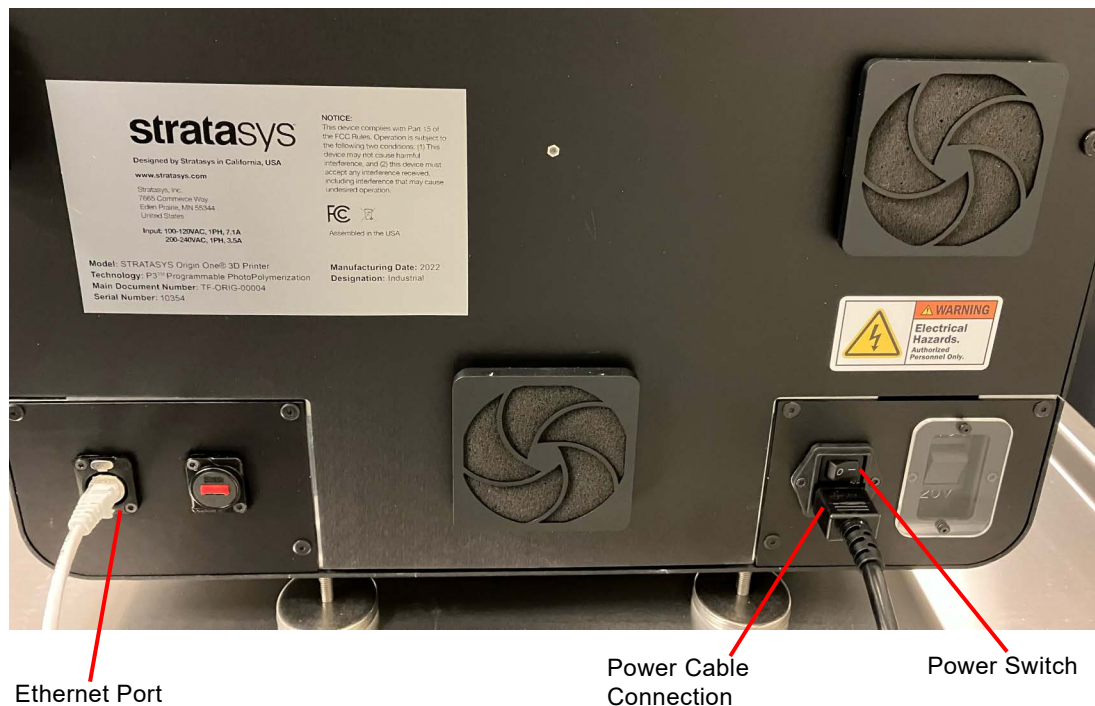
3. The system boot cycle takes approximately 30 seconds. After the boot cycle is complete, a green check mark and the printer name displays on the user interface screen (see Figure 2). This indicates the printer is powered on and connected.

4. If you are seeing an "unable to connect" message (see Figure 3), confirm the Ethernet cable is plugged into an active port and that the network and firewall are properly configured.

> **i** If your printer has been powered off for several hours, wait 20-30 minutes for the printer to establish network connection.

5. Contact Stratasys support if network issues persist or if the screen displays any other message.

Figure 2: Boot screen display message (successful)
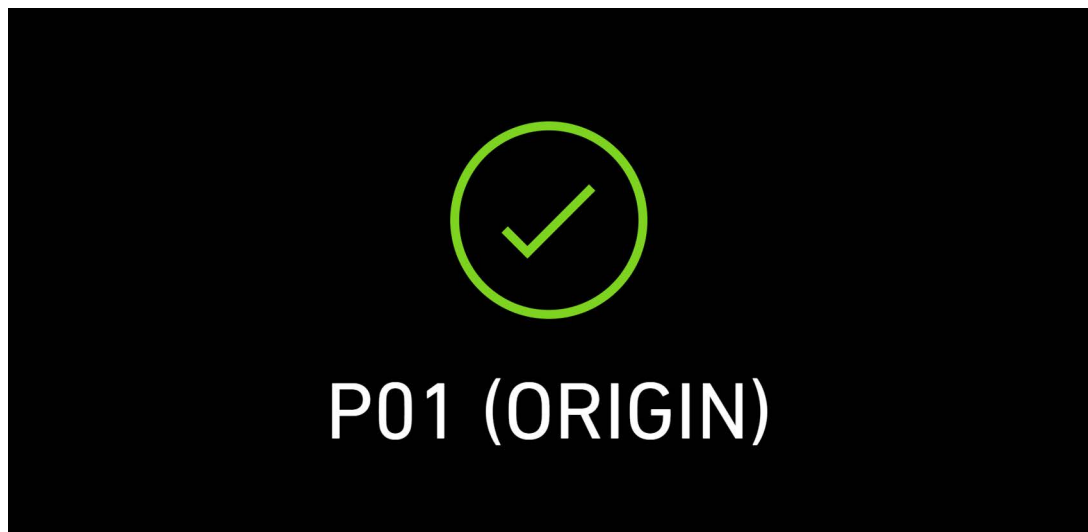
Figure 3: Boot screen display message (error)
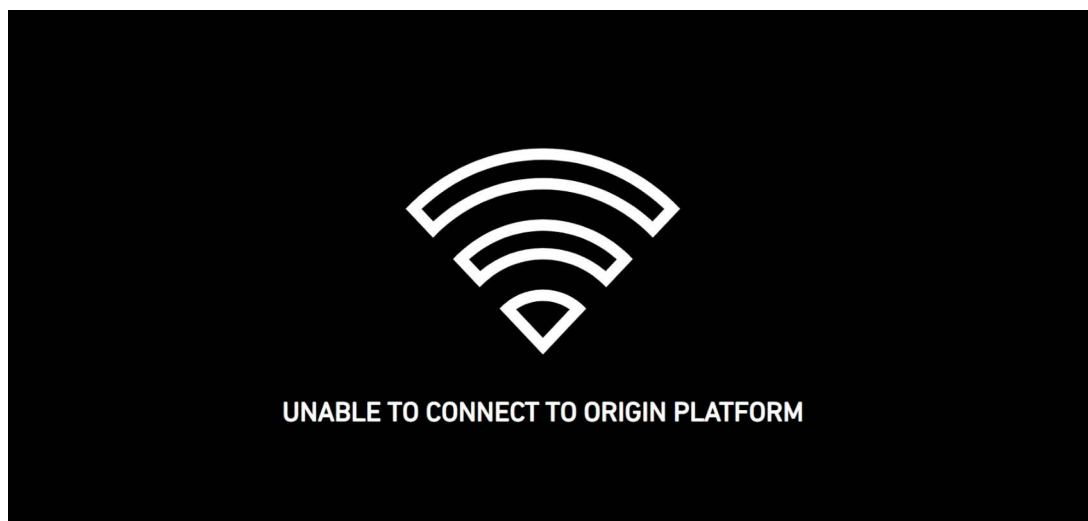
Pre-Print Procedures

Installing the Build Head

1. While lifting the thumbscrew, slide the build head into the build arm.

> ⚠️ **Warning: Crushing hazard**
> Keep one hand on the build head until the thumbscrew is completely engaged.

Figure 4: Install build head
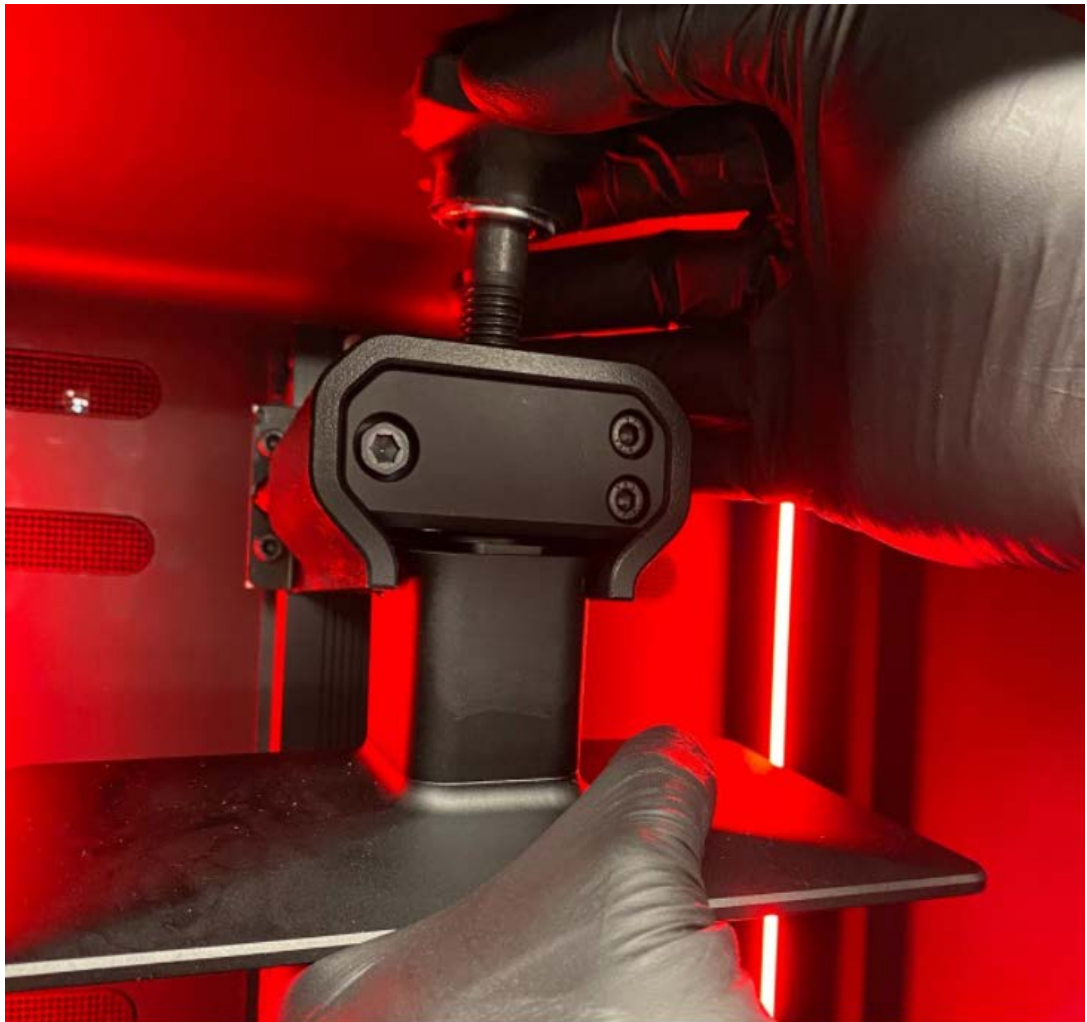
2. Tighten the thumbscrew firmly.

Figure 5: Build head installed

Refer to "Build Head Calibration" (page 43) to calibrate the build head.

Pre-Build Checklist

File preparation

- Model is supported sufficiently.
- Correct material settings are applied.
- First layer image verified on printer UI.

Printer preparation

- Build head is properly installed.
- Build head calibration has successfully completed (since last build head change or weekly).
- Build head is clean and smooth. Use acetone, when possible to clean the build head.
- Midplate glass and midplate magnets are cleaned.

- Tray sheet is free of wrinkles or defects.

- Tray sheet sanitation was performed if a previous print failed.

- Resin is well-mixed. Shake the resin bottle before pouring or stir the resin in tray.

- Resin in tray matches resin selected for the print.

- There is enough resin in the tray to complete the print.

- Thumbscrew is tight.

Filling and Installing a Tray Into the Printer

1. Inspect the O-ring on the bottom of the tray for dust or debris, and wipe it with a solvent wipe if needed.

Figure 6: Empty tray
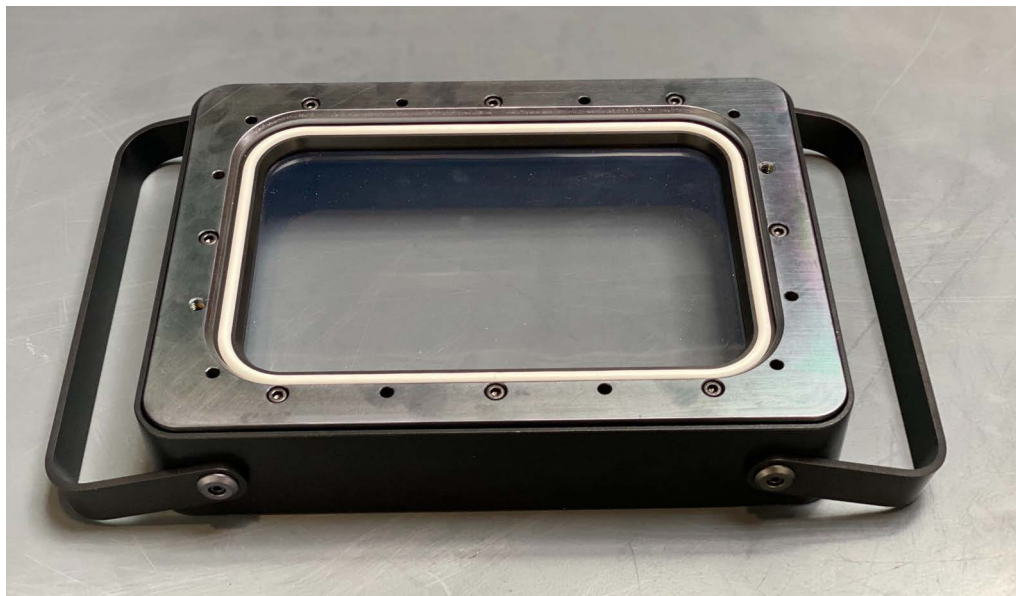
2. Place a clean tray right side up on a flat surface and pour the desired resin into the middle of the tray. It is recommended to fill the tray to at least 300 mL. Larger prints may need more resin.The standard safety margin is to add the volume of your build +20% to the tray. Wipe off the lip of the resin container when finished pouring and return to its storage area.

3. Lift the tray using the provided handles and install it in the print chamber. Take extra care to avoid contact with the inner walls of the printer as well as the glass window. The magnetic clamp will automatically engage. Pressing the **Release Tray** button on the printer UI will assist in adjusting the tray to its secure location. The magnetic locks will disengage and, after five seconds, reengage automatically. Once properly secured, the tray should not move when pulled.

4. Ensure that the tray is properly seated by performing the following:

   a. Attempt to lift the tray handles at each corner of the tray (one at a time), and ensure that each corner is firmly engaged.

b. Press down firmly on each corner of the tray (one at a time), and ensure that the tray does not move or rock.

Figure 7: Position tray

Sending Jobs to the Printer

1. After uploading is completed, click the thumbnail to select your model for printing.

2. After selecting the model thumbnail, the model information displays and the print option is enabled.

3. Press the **Print** button. A dialog box opens prompting you to select **Printer** and **Material**.

4. Before clicking **Submit** to send the model to an Origin printer, the Origin platform print dialogue displays the total volume of material that will be used to create the part(s). This can be used to estimate resin usage beyond the minimum of 300 mL.

Figure 8: Submit for printing

| | Note: 1cm3 = 1mL |

Post-Print Procedures

Removing Parts From Build Head

> ⚠️ **WARNING: Physical injury**
>
> Keep one hand on build head when thumbscrew is not completely engaged to avoid dropping build head into glass.

> ⚠️ **WARNING: Skin contact hazard**
>
> Prolonged contact with resin can cause skin irritation. Do not continue before putting on protective gloves.

1. Loosen the thumbscrew until the build head can be removed from the printer.

Figure 9: Remove build head

2. Place the build head with attached part(s) on a tray and carry it over to the part staging/ cleaning area.

> **i** Using a tray to transfer the build head to the cleaning area is not required, but will prevent any uncured resin from dripping onto unwanted areas.

Detaching Printed Parts

1. Using a razor blade or small scraper, firmly and carefully scrape along the face of the build head to remove the printed part(s). Increase pressure until the part separates from the build

head. Hold the build head firmly while keeping fingers and hand clear of the build surface.

Figure 11: Remove part from build head
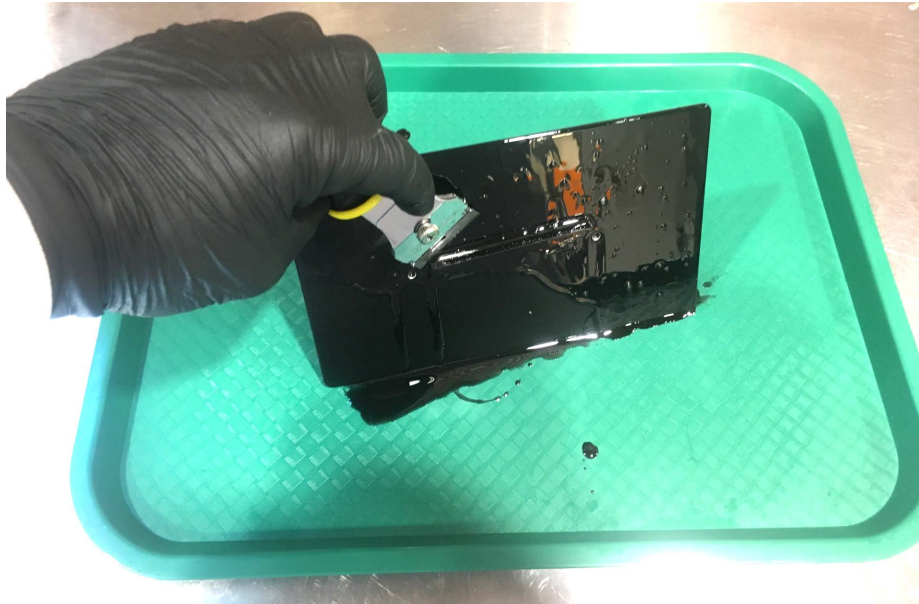
2. Remove attached support structures and place parts aside for cleaning.

Figure 12: Part removed from build head
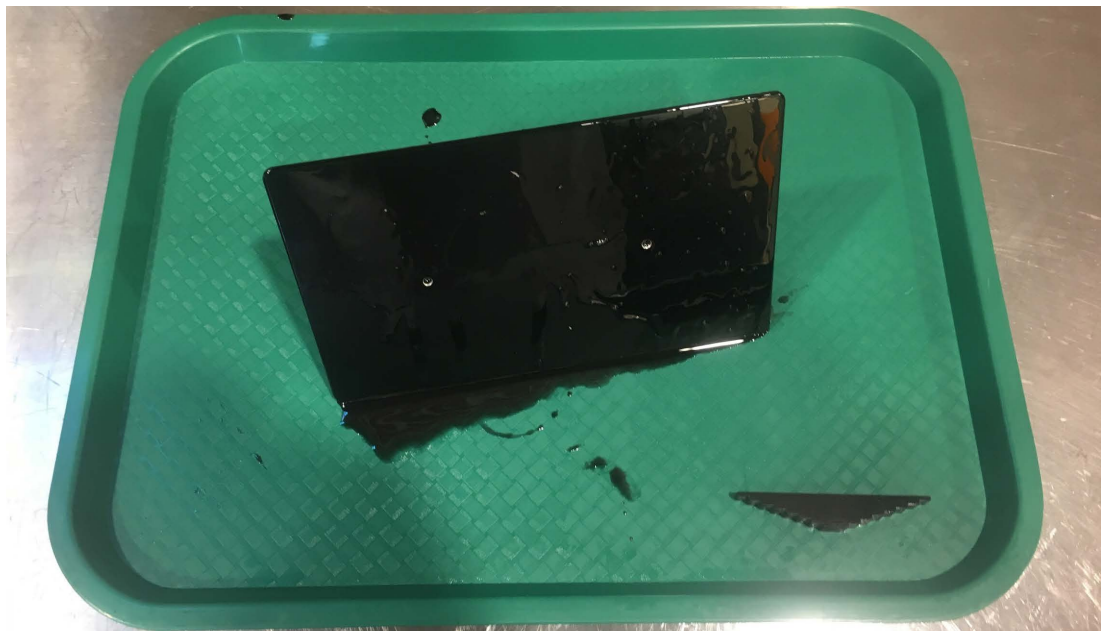
Cleaning Printed Parts

> ⚠️ **WARNING: Skin contact hazard**
> Prolonged contact with resin can cause skin irritation. Do not continue before putting on protective gloves.

> ℹ️ Each material requires a unique cleaning process. Detailed material post-processing information for each Origin One certified resin can be found on the Stratasys Support Center.

Clean the parts by soaking them sequentially in each solvent bath container, using the sonicator as desired:

- BATH 1 - Dirtiest Solvent - Recommendation: Glycol Ether TPM or 99% IPA

- BATH 2 - Cleaner Solvent - Recommendation: 99% IPA

- BATH 3 - Fresh Solvent - Recommendation: 99% IPA

Two minutes in each bath in the sonicator is usually adequate for most resins, but this will vary based on part geometry and resin type. After the parts have been soaked in BATH 3, wipe clean and let air dry, or blast with compressed air to clean deep crevices. Be sure to let parts fully dry before moving onto post curing to avoid print defects caused by any remaining solvents.

Figure 13: Multiple baths

Post-Print Curing

> Each material requires a unique post-curing process. Detailed material post-processing information for each Origin One certified resin can be found on the Stratasys Support Center.

Place parts in the UV curing equipment and run until fully cured. The entire surface of the part should receive light from the UV curing machine. The part may need to be rotated during the cure process to ensure all sides are fully cured. A radiometer should be used to ensure the part is receiving a full dosage according to the material TDS or Stratasys recommendation.

Figure 14: Curing parts

Removing/Emptying the Resin Tray

> ⚠️ **WARNING: Skin contact hazard**
> Prolonged contact with resin can cause skin irritation. Do not continue before putting on protective gloves.

Resin can be left in the tray between prints. However, if a part fails or if you need to switch to another resin, the tray should be removed and cleaned. The resin can be filtered and reused.

1. To release the tray, tap **Release Tray** on the touchscreen. This will disable the magnets for 5 seconds.

2. Gently remove the tray with uncured resin from the printer and carry over to the cleaning area.

3. Using a 190 μm paint filter, pour any remaining resin through the filter and into a small plastic container. See Figure 15.

Figure 15: Empty resin tray

4. Pour the filtered resin back into its original container using a funnel.

Cleaning Resin Tray and Build Head

1. Spray IPA over the build head and tray and wipe clean with delicate wipes or paper towels.

> ⚠️ **WARNING: Skin contact hazard**
> Prolonged contact with resin can cause skin irritation. Do not continue before putting on protective gloves.

Figure 16: Clean parts with IPA
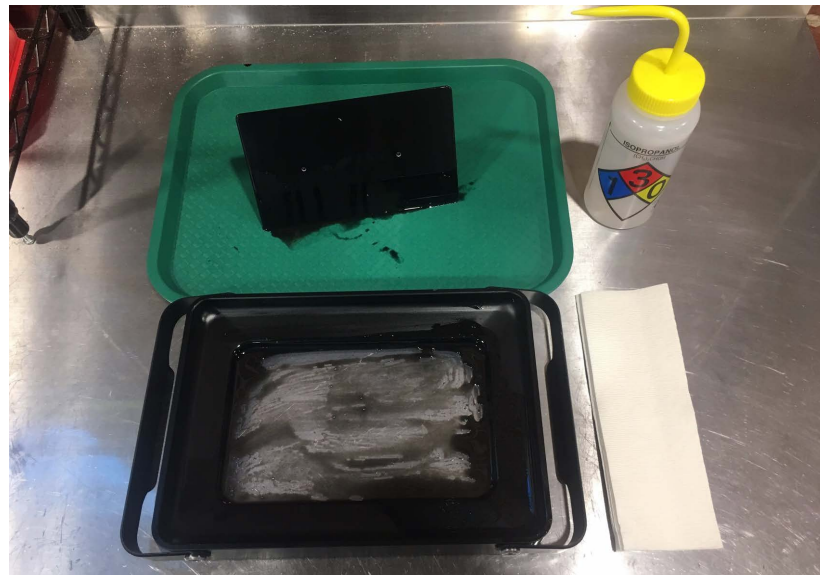
2. Repeat until all resin has been removed from the build head and print tray.

Figure 17: Cleaned build head and print tray

3. Any material that comes into contact with uncured resin (support structures, wipes, gloves, etc.) should be properly disposed of as hazardous material.

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 rear of the printer (see Figure 1 for button location).

Figure 18: Power Button Location and Rear Connections

Ethernet Port   Power Cable   Power Switch
                       Connection
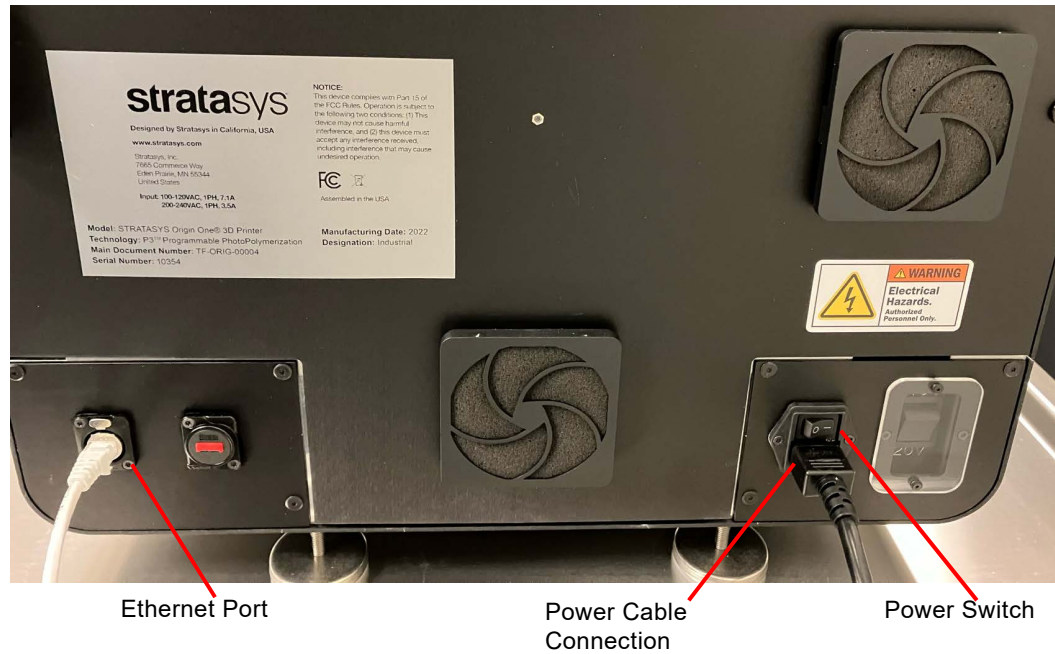
Adjustments and Calibrations

Build Head Calibration

A build head calibration is only required if:

- Switching between build heads.

- Build head is determined to be no longer in calibration (i.e. first layer inconsistency or failure).

- The tools required for this procedure are a 10 Nm torque driver with 5 mm bit, and copy paper (0.05 mm to 0.1 mm thick).

> **i** Residue and debris build-up can cause poor calibration. Ensure the build head and midplate glass are completely cleaned.

1. Clean the build head and midplate glass.

2. Place the build head into the build arm and tighten the thumbscrew. Ensure that there is no tray in the printer.

3. Use the 5 mm torque driver to loosen the calibration bolt until the build head can move freely in all directions.

Figure 19: Build Head Calibration Bolt Location

4. Press **System** to open the printer configuration controls.

Figure 20: Printer Configuration Controls
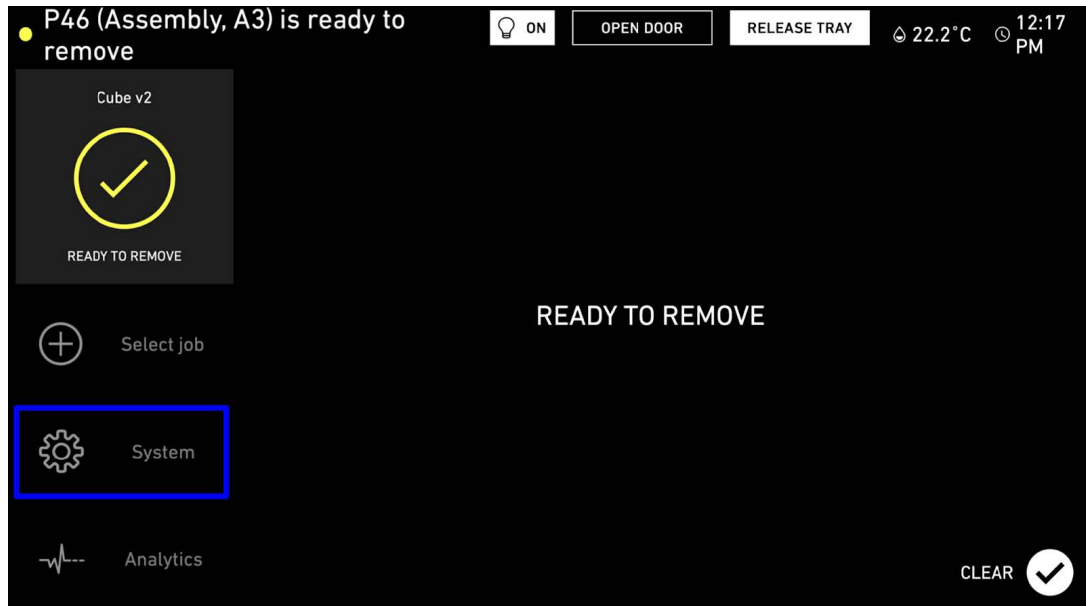
		Warning: Pinch point
		Keep hands clear of the build head while it is moving.

5. Press **Calibration Procedure**, then wait while the build head moves to the calibration position. Press firmly and uniformly down on the build head to ensure that the surface of the build head is uniformly making contact with the midplate glass.

Figure 21: System Screen
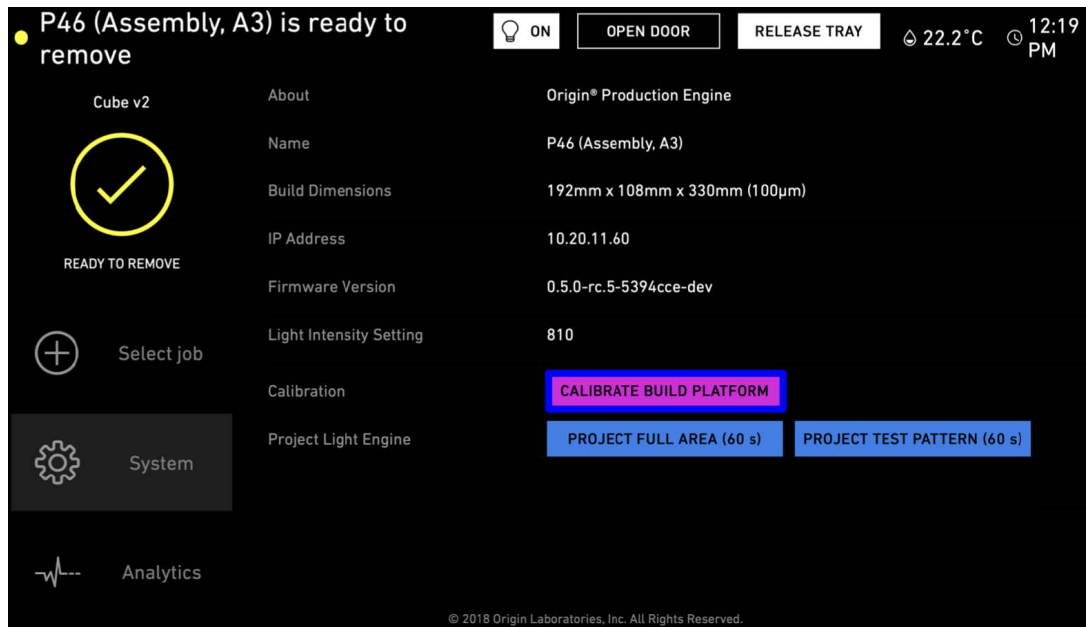
6. Use the 5 mm torque driver to tighten the calibration bolt. Torque to 86 in-lbs (10 Nm) while pressing down on the build head.

7. Slide the copy paper under each corner of the build head to confirm the build head is flush with the midplate glass.

   a. If the paper slides more than 0.5 inch under any corner, contact your regional support center.

   b. If the paper slides more than 0.25 inch further under any one corner than another, finish this procedure then rerun the procedure while ensuring firm, even pressure on the build head while tightening the calibration bolt.

8. Press **Confirm** to finish the calibration process and return the Z-axis to its starting position.

Adjusting Dreve Programs for Origin One Dental

Most Origin One Dental materials are validated using the Dreve PCU LED post-curing unit. Follow the below instructions to update the curing settings.

1. Retrieve the latest .TXT file from the Guides section in https://support.stratasys.com/en/materials/p3/origin-one-dental-materials.

2. Load the .TXT file onto a blank USB flash drive. Do not change the name of the file.

> **i** If the USB flash drive contains any files other than the .TXT file, the import may fail.

3. Power on the Dreve PCU LED while pressing down on the **Operation** button.

4. Enter access code **217**.

5. Connect the USB flash drive to the back of the Dreve PCU LED.

6. Import the TXT file by selecting **Config Import** under **Data Exchange.**

Origin Local Hub

The Origin One Local Hub is designed for customers that are unable to connect to the Origin Cloud due to government contracts, specific IP requirements, or HIPPA restrictions. The printer is identical to the Origin One Industrial with two exceptions:

1. It contains no transmitting components, and

2. It is configured to connect through local area network to the Origin Local Hub rather than the Origin Cloud.

The Origin Local Hub as well as up to 10 Origin One Local printers must be connected to the same network switch and subnet as the computer workstation sending print jobs. The network switch is not required to be connected to the Internet, as the devices only communicate locally.

Connecting to the Origin Local Hub

The Origin One Local printer and Origin Local Hub are connected through a facility network at installation. Interactions with the Origin Local Hub are performed through a workstation browser.

Origin Platform

Uploading Models

1. Access the Origin platform: http://<**Origin Local Hub IP Address**>/web. The **Origin Local Hub IP Address** is found on the **Network** page of the printer UI.

> (i) Before uploading to the platform for processing and building, the files must have supports already generated in a software application such as Netfabb. The files also must be in the proper orientation.

2. In the **Models** tab, create a new collection by clicking **Create collection**.

Figure 22: Create collection
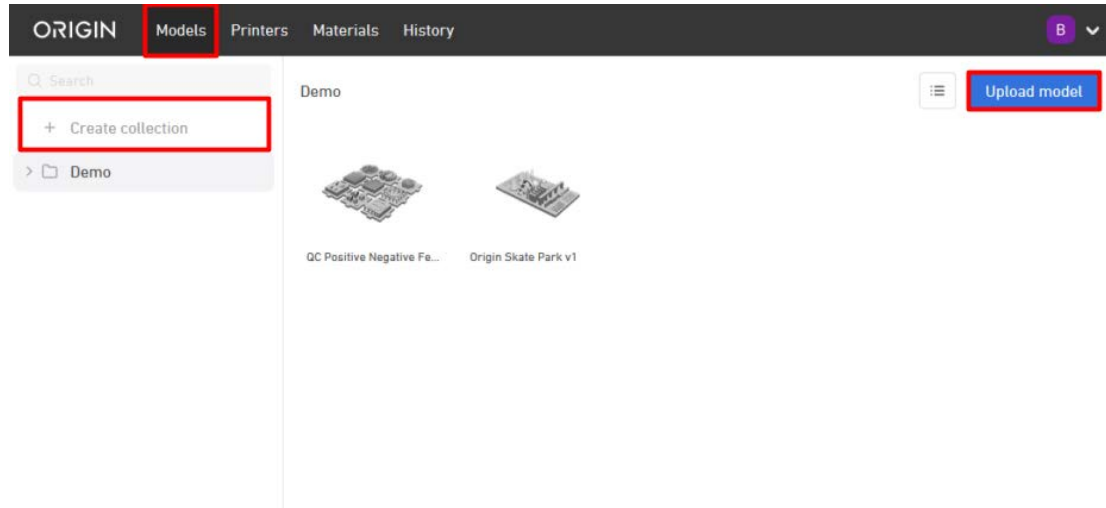
3. In the new collection, click **Upload model** and choose an STL, or ZIP file.

Material Settings

For every layer, the build head moves through a cycle of three main stages: approach, exposure, and separation. There are eight user defined settings that adjust either the duration, distance, or speed of some part of the print process for three regions: First Layer, Transition, and Model.

- The **First Layer** settings apply specific settings to only the first layer to ensure build head adhesion and accuracy.

- The **Transition** region is a user defined number of layers after the first layer where specific settings are applied to improve build head adhesion and accuracy.

- The **Model** region consists of all consecutive layers beyond the **Transition** region where specific settings are applied to improve print speed.

Figure 23: Material settings theory
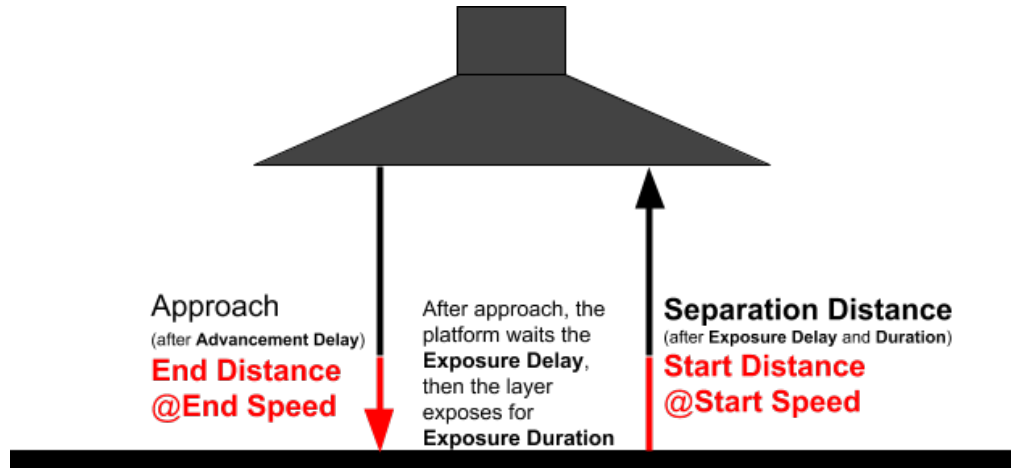
- **Exposure Delay**: After the build head has completed its approach, the printer waits this duration before turning on the projector
- **Exposure Duration**: The amount of time the projector turns on and projects each layer.
- **Separation Distance**: After Exposing, the build head moves upward this amount to separate the part from the tray window.
- **Advancement Delay**: After the build head has completed its separation, it waits this amount of time at the top of travel before advancing.
- **Start Distance**: After exposure delay and duration, the build head raises this distance in millimeters before continuing to the full separation distance.
- **Start Speed**: The speed at which the build head moves upward during the start distance region of separation.
- **End Distance**: After reaching the separation distance and waiting the advancement delay, the build head slows down this distance from the tray window in millimeters.
- **End Speed**: The speed at which the build head moves downward during the end distance region of approach.

After the printer and material options have been selected, the **Submit** option is available.
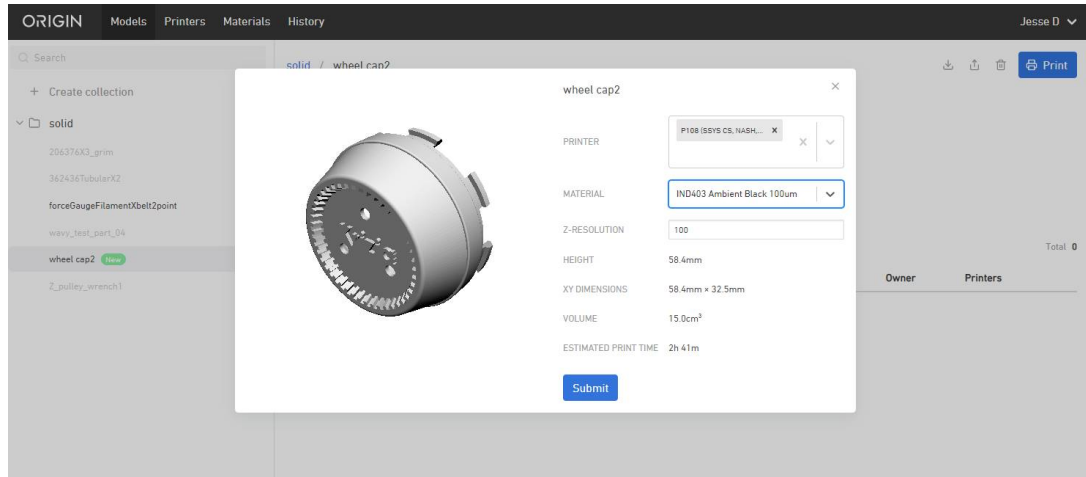
Select **Submit** to send the file to the printer.

At the printer, select the job sent and select **Start** if build head is installed and calibrated.

Admin Tools

An administrative section is built in to the Origin Local Hub to assist in modifying printer settings and upgrading firmware without requiring connection to the cloud.

Navigate to http://<**Origin Local Hub IP Address**>/admin to access the **Admin Tools** page. The top of the page displays all available tabs.

Printers tab

The **Printers** tab displays a list of the printers connected to the Origin Local Hub as well as their status. Clicking on the printer name displays advanced printer settings. These settings should only be modified under the direction of your regional support center.

Firmware tab

Figure 26: Firmware tab

The **Firmware** tab displays a list of the firmware versions uploaded to the Origin Local Hub. Click on **Upload New Firmware** to browse the available files and select a new version provided by your regional support center.

Projectors tab

Projector calibration files can be uploaded for new or compromised projectors.

Tags

Firmware tags can be created to run separate firmware versions on different printers. This is not yet supported.

6 MAINTENANCE

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

Overview

Origin One was designed to reduce the need for frequent maintenance or replacement of consumables. This section will help you to identify and plan for situations where a printer may require operator-performed maintenance.

Rebooting

To increase printer reliability, it is recommended to reboot the Origin One printer weekly. Additionally, the Origin Local Hub must be rebooted monthly to reset its framework.

Cleaning

Cleaning the Mid Plate Glass Window

Frequency

Check before every print

Required Tools

Nitrile gloves

Single-use, lint free wipe

Acetone

Procedure

> ⚠️ **Warning: Skin contact hazard**
> Prolonged contact with solvents can cause skin irritation. Do not continue before putting on protective gloves.

1. Fold a single-use, lint-free wipe (such as a Kimtech wipe).
2. Soak the single-use wipe liberally in acetone.
3. Draw the wipe lightly across the surface of the glass, taking care not to apply any pressure.
4. Dispose of the single-use wipe.

5. Repeat steps 1-4 until the entire glass surface is wiped, ensuring that no smudges or residue remains.

Cleaning Printer Components

Frequency

Check before every print

Required Tools

Nitrile gloves

Single-use, lint free wipe

IPA

Procedure

> ⚠️ **Warning: Skin contact hazard**
> Prolonged contact with solvents can cause skin irritation. Do not continue before putting on protective gloves.

Printer components that routinely come into contact with resin should be cleaned with IPA after each print job. The interior and exterior of the printer may be cleaned with IPA as needed.

Tray Sanitation

Frequency

After any build failure

Required Tools

Nitrile gloves

Playing card or similar thin flexible object

Procedure

> ⚠️ **Warning: Skin contact hazard**
> Prolonged contact with solvents can cause skin irritation. Do not continue before putting on protective gloves.

1. Select **Project full area** on the printer UI.
2. Put on nitrile gloves.
3. Use a playing card, or similar thin flexible object, to lift one corner of the cured image.
4. Remove the cured image from the tray.

Replacing Fan Filters

Frequency

Check after 1 month, repeat as necessary for your print environment.

Required Tools

Replacement Fan Filters (SKUB-00024-000) or (ORIG-00039-S)

Towelette / KimTech Wipe

Procedure

1. Locate fan filter on the back panel of the printer.

Figure 1: Fan filter
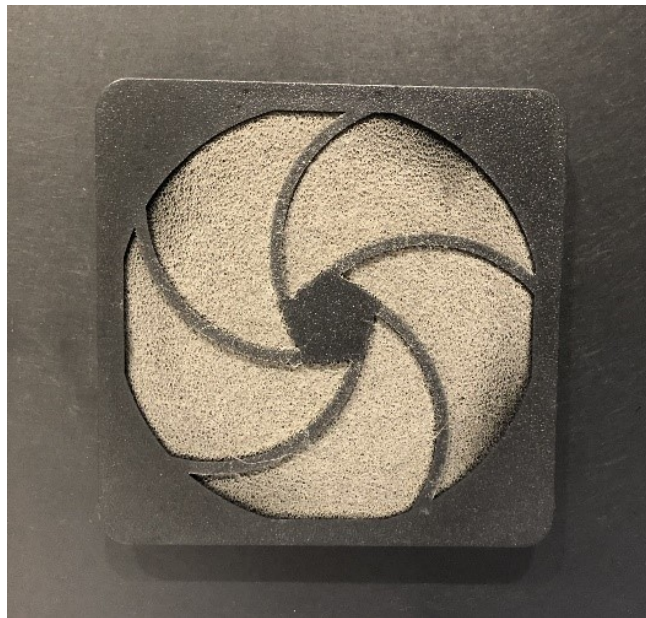
> ⓘ Note: The fan filters are held in place by the fan filter cover. The fan filter cover is attached to the back panel by a clip on either side.

2. Remove the fan filter cover by disengaging the fan filter cover clips.

Figure 2: Disengage cover clips
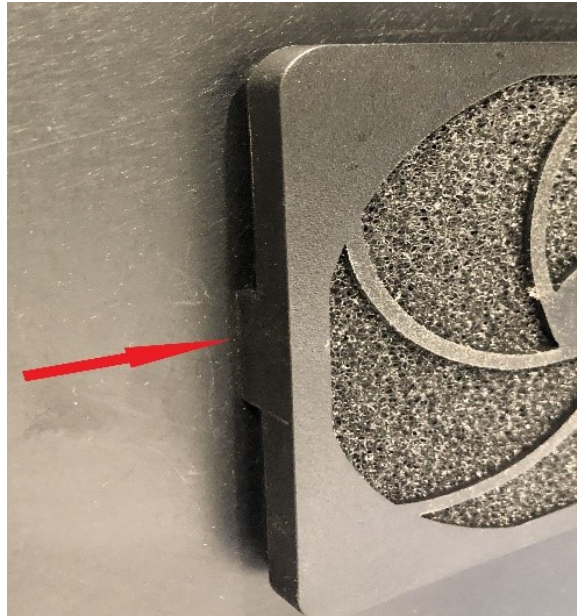
3. Replace the old filter with a new filter from the accessory tools box.

4. Prior to installing the replacement filter, use a towelette to remove any dust and debris from the fan filter cover.

Figure 3: Replacement fan filter

5. Reinstall the fan filter cover and replacement filter. Engage both fan filter cover clips to secure the fan filter cover to the back panel.

Figure 4: New fan filter

Lubricating the Linear Drive

Frequency

Every 12 months

Required Tools

Syringe with Linear Drive Grease

Flashlight

Screwdriver

Procedure

1. Open the printer door and remove the resin tray, if installed. Leave the door open.

2. Locate the linear drive grease kit within the accessory tools box.

Figure 5: Linear drive grease kit

3. Remove the blue cap from the grease syringe.

4. Using the gap between the linear drive (PMEC-10015-000) and cover, access the ball screw shaft. Using the grease syringe, apply grease directly to the ball screw shaft.

5. Apply a 0.1 ml bead of linear drive grease every 2 inches along the ball screw shaft.

6. Run the build platform calibration procedure. The calibration procedure causes the ball nut to evenly spread grease on the ball screw shaft.

7. Repeat the calibration procedure an additional two times.

Tray Maintenance

Replacing Tray Sheets

Frequency

Replace as needed. Additionally, Stratasys recommends replacing tray sheets when changing from a dark material to a light material or when changing from an industrial material to a medical-grade material.

Required Tools

- Nitrile goloves

- 5mm hex 6Nm T-handle driver

> ℹ Some older systems use a different tray style with a 4mm hex 4Nm T-handle driver. Reference images below show the older style.

- Resin tray thumbscrew

Procedure

> ⚠️ **Warning: Skin contact hazard**
> Prolonged contact with solvents can cause skin irritation. Do not continue before putting on protective gloves.

1. Using a 5mm hex 6Nm T-handle driver, remove 8 screws from the bottom of the tray.

Figure 6: Tray and tools
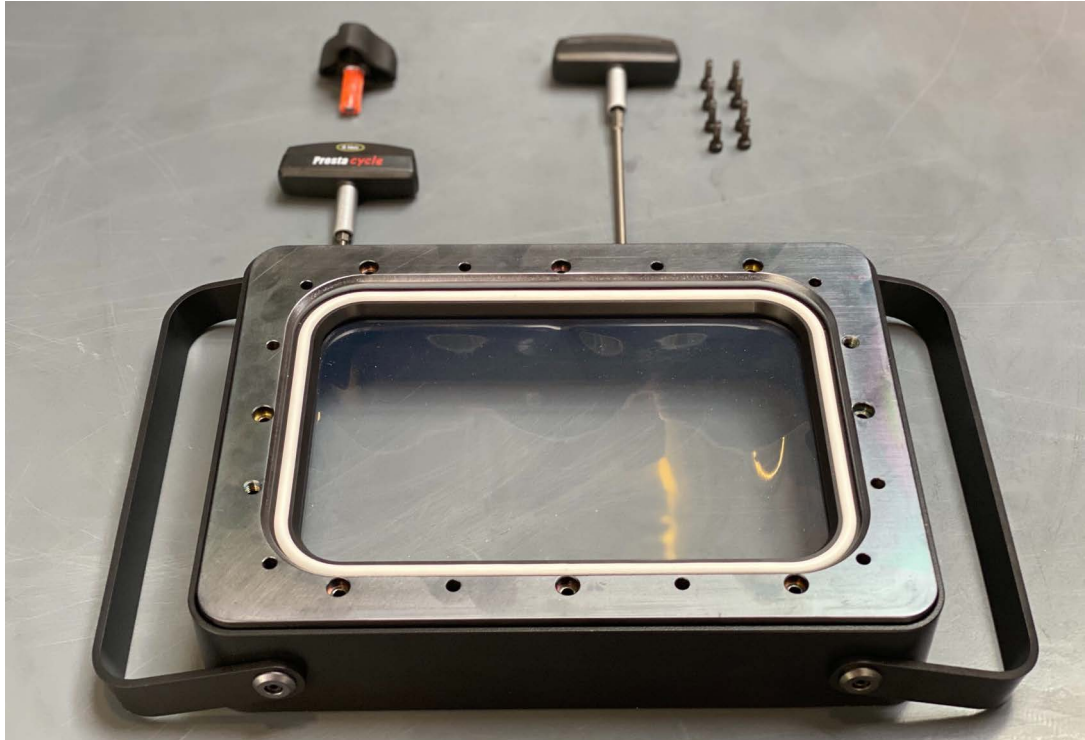
2. Remove the tray bottom by inserting the thumbscrew into the threaded hole on either side of the tray and lifting the tray bottom out of the tray.

Figure 7: Remove tray bottom

3. Remove the two black tray gaskets and the tray sheet from the tray.

Figure 8: Remove tray gaskets and tray sheets

4. Dispose of the used tray sheet in a hazardous waste receptacle.

5. Retain the tray gaskets for cleaning.

6. Use clean paper towels and solvent (acetone or isopropyl alcohol) to clean resin from the tray top. Use isopropyl alcohol (IPA) to clean the tray bottom.

⚠️ Do not use acetone to clean the tray bottom. Damage to the O-rings will result.

7. Use acetone to remove resin from the tray threads. Remove any remaining residue from the tray threads with compressed air or paper towels.

Figure 9: Clean tray components

8. Remove any remaining resin from gaskets using paper towels and IPA. If needed, sonicate the gaskets in an IPA bath.

> **i** Sonicate gaskets in an IPA bath for no more than 30 seconds per cleaning.

> **⚠** Do not use acetone to clean the tray bottom. Damage to the O-rings will result.

9. Dry gaskets using an air compressor or paper towels. Ensure that the gaskets are wiped clean before setting aside to dry.

Figure 10: Cleaned Gaskets
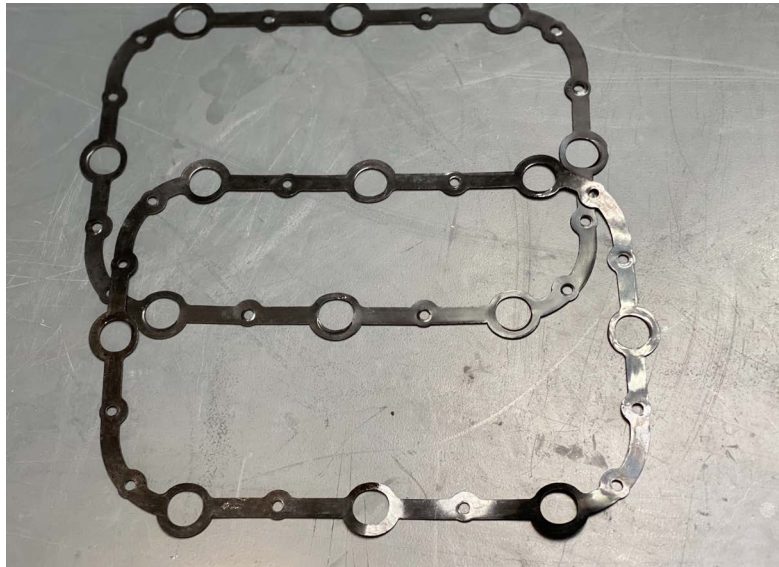
10. After thoroughly drying, insert a clean gasket into the tray top. Ensure that all the pins are inserted through the gasket holes and that the gasket is laying flat.

Figure 11: Gasket on tray

11. Insert a new tray sheet over the gasket and into the tray top. Confirm that all the pins are inserted through the holes in the sheet.

Figure 12: Tray sheet

12. Insert the second gasket over the tray sheet. Confirm that all the pins are inserted through the gasket holes and that the gasket is laying flat over the tray sheet surface.

Figure 13: Second gasket

13. Place the tray bottom onto the sheet and press down gently.

> ⚠️ **Caution**
> Thumbscrew must be removed before tightening the tray bolts to prevent interference between the thumbscrew and the tray bottom.

14. Remove the thumbscrew from the tray bottom.

Figure 14: Tray on sheet

15. Insert the 8 tray bolts into the tray bottom.

Figure 15: Tray bolts inserted into the tray bottom

16. Using the 6 Nm torque drive, tighten the 8 bolts in a star pattern until the bolt heads are flush with the tray bottom.

Figure 16: Tighten bolts
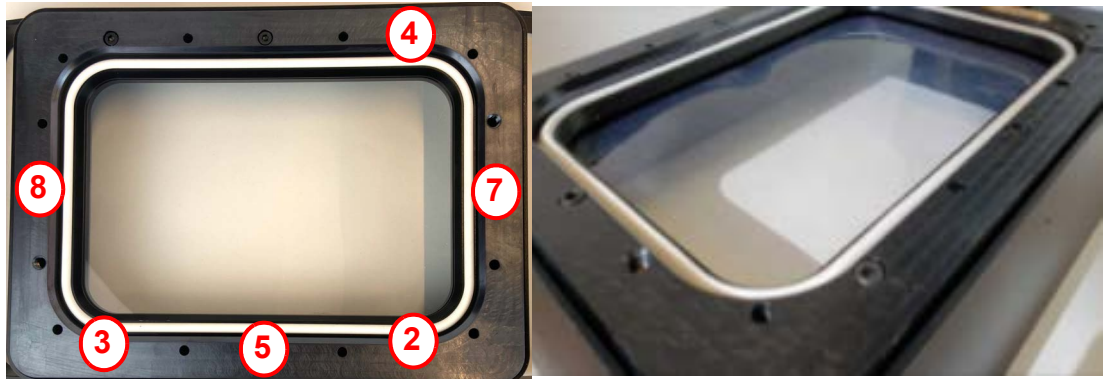
17. Tighten the tray bolts, using the same star pattern shown above, by holding the torque driver shaft with the index finger, middle finger, and thumb. Tighten the bolts until they are finger tight.

Figure 17: Finger tighten tray bolts

18. When all eight bolts are finger tight, use the 4Nm torque driver, in the same star pattern, to torque all bolts to 6 Nm.

19. Repeat tightening all bolts to 6 Nm in a circular pattern two times.

Part Replacement Procedures

Replacing the Resin Ingress Tube

Required Tools

Nitrile gloves

Wire cutters

Nylon tube

Tube plugs

Two zip ties

4 mm hex driver

T10 Torx driver

Procedure

1. Open the printer door and remove the resin tray, if installed.
2. With the door open, power down and unplug the printer.
3. Using a T10 Torx driver, remove the two fasteners securing the access panel on the left side of the printer.
4. Remove the interlocks from the back panel.
5. Using a 4mm hex wrench, loosen the five captive fasteners securing the back panel door.
6. Open the back panel door and, if required, brace the door open for easy access.

> ⚠️ **WARNING:**
> Do not pull the back panel all the way back. There is a cable attached to it from the inside.

7. Locate the resin ingress tube. The resin ingress tube is surrounded by an orange grommet where it passes through the pump plate. See Figure 18.

Figure 18: Resin ingress tube and zip ties

8. Cut the two zip ties holding the resin ingress tube to the sensors, which are viewable from the side panel, shown in Figure 18.

⚠️ **CAUTION:**
Do not damage the sensors.

9. Disconnect the tube from the T-Connector shown in Figure 18 in a yellow box.

⚠️ **Warning: Skin contact hazard**
Prolonged contact with solvents can cause skin irritation. Do not continue before putting on protective gloves.

10. Plug the open resin ingress tube to prevent resin from spilling.

11. Disconnect the resin ingress tube from the midplate glass by reaching through the left access panel.

12. Pull resin ingress tube through the grommet and remove it from the printer.

ℹ️ Do not spill any resin inside the printer. If any resin is spilled clean it immediately.

13. Before connecting the new resin ingress tube, take a clean dry wipe and apply IPA. Use this wipe to clean any remaining resin on the connectors.

14. Remove the replacement resin ingress tube from the accessory tool kit.

15. Route the replacement resin ingress tube through the orange grommet.

16. Connect one side of the resin ingress tube to the midplate connector.

17. Route the resin ingress tube through resin ingress sensors.

18. Connect the resin ingress tube to the T-Connector.

19. Anchor the replacement resin ingress tube to both sensors with zip ties as shown in Figure 18.

20. Ensure both ends of the resin ingress tube are fully seated into the connectors.

21. Reinstall the printer back panel and access panel door.

7 TROUBLESHOOTING

This chapter describes troubleshooting steps that can be performed to correct basic problems with the Origin One 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 serial number (see Figure 2 (page 10) for information on locating the printer's serial number).

- If your printer stops functioning or any components become damaged, please contact Stratasys Support and provide the following information:

  - Date and time

  - Printer Serial number (found on the product label in the rear of the machine)

  - Description of part and damage

  - Description of events leading to part damage

  - Print parameters used (if fault occurs during print)

  - Job Information

- Open the **Schedule** view in GrabCAD Print. Navigate to the job and click on it to display the job details. Copy the **Job ID** and **Print ID** and send this information to your regional support center.

Figure 1: Job information

JOB STATUS	Success

PRINT TIME
0m

JOB DETAILS

Submitted Time	10/03/2022, 11:34 AM
Start Time	10/03/2022, 11:34 AM
End Time	10/03/2022, 11:35 AM
Job ID	1e9ab12a-4339-11ed-a24e-c79700017e3a
Print ID	50b8d204-4339-11ed-a1e6-770732627cf1

OWNER
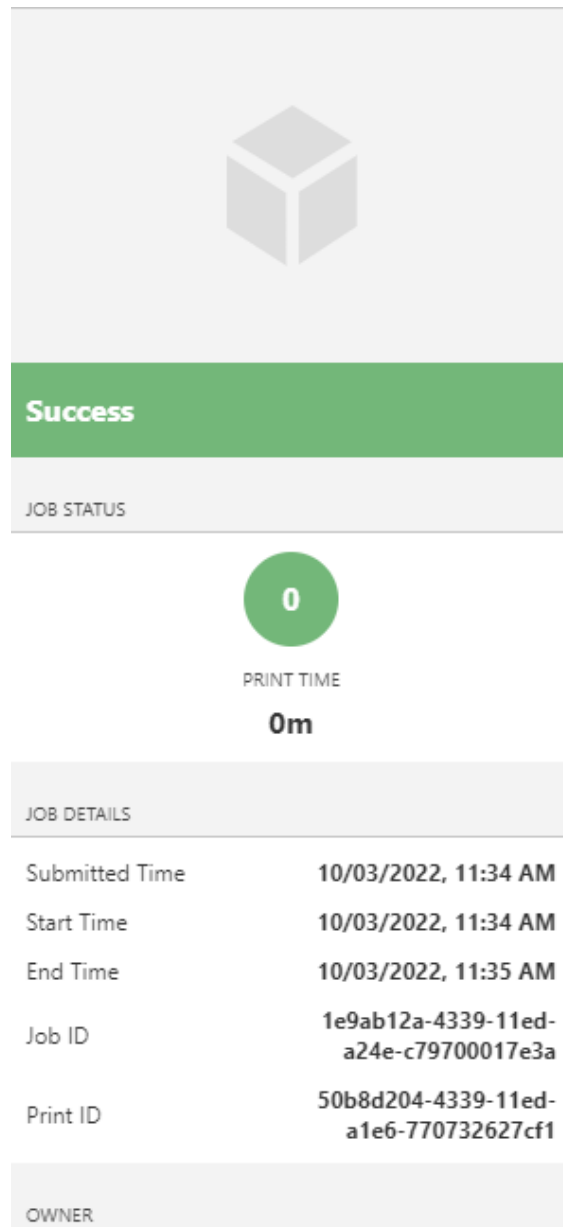
Finding a Remedy

The following table lists various troubleshooting scenarios you may encounter when operating the printer and methods for resolving these scenarios.

Symptom	Possible Solution
The printer crashes or becomes unresponsive	Power cycle the printer.
Parts are failing	Use a radiometer to check the irradiance of the projector (irradiance can drop over time).
Parts are failing even though irradiance is fine	Increase exposure duration.
Parts aren't sticking to the build platform	Increase exposure delay for the first layer and/or increase exposure duration for the first layer. Recalibrate the build head.
Parts are warping during post-cure	Lower the light intensity of the UV curing apparatus or do multiple lower intensity post cures.
Top flat surfaces of parts look dimpled or wrinkled	Check the tray sheet for creases or dimples and replace it if present.
Vertical walls have thin vertical lines	Check for dust between the interface glass and tray sheet.
Vertical walls have obvious horizontal layer lines	Replace the tray sheet; contact your regional support center if the problem continues.
The printer encounters resin ingress	Contact your regional support center for further instruction.
The tray gaskets tear or deform	Contact your regional support center to order new gaskets.
Missing features at the edge of the build area	While wearing UV safety glasses, verify the image is centered by pressing **Project Full Area** on the **System** tab. Contact your regional support center if adjustment is necessary.

Troubleshooting Issues and Solutions

Stuck Build Head Mitigation Procedure

The following is the step-by-step procedure for mitigation when a build head is stuck in the resin tray and unable to home.

Procedure

1. Contact Stratasys Customer Support to enable the printer's Dev Mode.

2. Reboot the printer by using the power button located on the back of the printer.

3. Select the **System** tab on the printer UI.

Figure 2: System tab
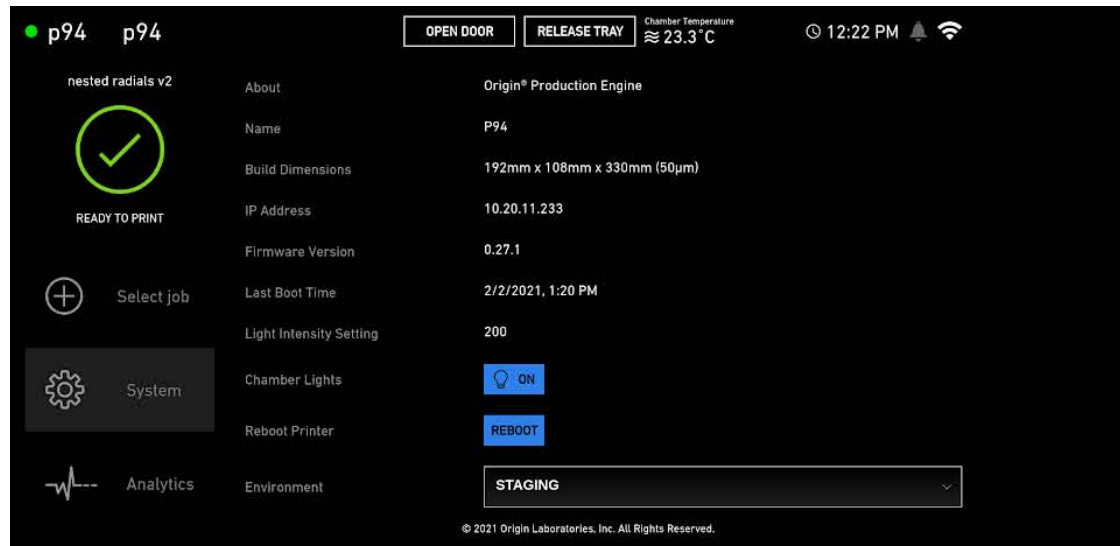
4. Locate the pneumatic controls: **Force Separation**, **Inflation**, and **Deflation** buttons.

Figure 3: Pneumatic controls

5. Deflate by pressing **2s** using the **Deflation** controls. Wait two seconds before moving onto the next step.

6. Two seconds after deflating, inflate by pressing **0.8s** two times using the **Inflation** controls.

7. Repeat the deflation and inflation process three times.

8. After inflating and deflating three times, press **AGGRESSIVE** in the **Force Separation** controls.

9. Reboot the printer.

10. If the build head homes, clean the build head and sanitize the tray.

11. If the build head does not home, repeat the procedure.

12. Contact Stratasys Customer Support to disable the printer's Dev Mode.

Solutions for First Layer Adhesion Issues

Issue: The part fails to adhere to the build head or the part detaches from the build head mid print.

Possible root causes include the following: Insufficient first layer projector exposure duration, Insufficient first layer projector exposure delay time, build head calibration issues, separation forces are too high, irradiance degradation issues, build job not properly oriented to the platform (build prep error).

1. Insufficient first layer projector exposure duration.

    • Parts require sufficient first layer projector exposure duration to ensure adhesion to the build head. If the first layer projector exposure duration is too low, then parts will not adhere properly.

    • Solution: Increase first layer projector exposure duration.

2. Insufficient first layer projector exposure delay time.

    • Projector exposure delay times affect the thickness of any given layer. Lower projector exposure delay times result in thicker layers, while longer projector exposure delay times will result in thinner layers down to a minimum thickness. If the first layer projector exposure delay time is too short, first layer adhesion issues resulting in a thicker first layer which is unable to be cured through may occur.

    • Solution: Increase the first layer projector exposure delay time.

3. Build head calibration not performed or performed incorrectly.

    • The purpose of the build head calibration procedure is to ensure that the build head is parallel to and in contact with the interface glass. This is critical to first layer performance as this will effectively dictate your first layer thickness (along with exposure delay). Like the insufficient first layer exposure delay issue mentioned above, having too thick of a first layer will cause first layer adhesion issues due to the inability to cure through that thickness.

    • Solution: Recalibrate the build head following the procedure described in "Filling and Installing a Tray Into the Printer" (page 31).

4. Separation forces are too high.

- Three major factors play into separation forces: the viscosity of the resin, the stickiness of the resin in its green state, and the proximity of the part or build head to the interface glass. Separation forces are generally the highest on the first few layers, and decrease as the number of layers increases. If separation forces are too high on the first layer, it is possible that the layer can detach from the platform.The only exception to this general trend is if a full build area "brick" part is being built, in which case the separation force will remain fairly consistent throughout the print.

- Solution: Decrease separation start speed of the first layer. Alternatively, use a CSV override to carefully control settings on a per layer basis. This allows for controlling layer thicknesses and separation speeds which are directly related to experienced forces.

5. Irradiance Degradation

- Ensuring the projector is at the correct irradiance is crucial to ensuring the success of any print regardless of material. If the projector irradiance has degraded to such a point that it is unable to reach the minimum threshold required for the initiation of polymerization for a given material, then the build job will fail.

- Solution: Measure and adjust projector irradiance such that the projector is 5 mW/cm^2 at center point. Contact a Stratasys representative for the proper procedure for measuring and adjusting projector irradiance.

Solutions for Transition Region Adhesion Issues

Issue: The first layer adheres to the platform, but the transition region does not adhere to the first layer.

Possible root causes: Insufficient transition region projector exposure duration, Insufficient transition region projector exposure delay time, separation forces are too high, or irradiance degradation issue.

1. Insufficient transition region projector exposure duration.

- Any given layer requires sufficient projector exposure duration to ensure adhesion to the previous layer.

- Solution: Increase transition region projector exposure duration.

2. Insufficient transition region projector exposure delay time.

- Projector exposure delay times affect the thickness of any given layer. Lower projector exposure delay times result in thicker layers while longer projector exposure delay times result in thinner layers until a minimum thickness is reached. Thus, interlayer adhesion issues will occur if the projector exposure delay time is too short. The resulting overly thick layers will be unable to be properly cured.

- Solution: Increase transition region projector exposure delay time.

3. Separation forces are too high.

- Three important factors in separation force are the viscosity of the resin, the stickiness of the resin in the green state, and the proximity of the part or build head to the interface glass. Separation forces are generally highest on the first few layers, and they decrease as the layers advance. The only exception to this general trend is if a full build area "brick" is being printed. In this case, the separation force remains fairly consistent throughout the build job. If separation forces are too high on the first layer, it is possible that the layer will detach from the platform.

- Solution: Decrease the separation start speed of the transition region. Alternatively, a CSV override is used to carefully control settings on a per layer basis. This allows for effective control of layer thicknesses, and separation speeds which are directly related to experienced forces.

4. Irradiance Degradation

- Correct projector irradiance is a key component in ensuring the success of a build job. If projector irradiance degrades to the point that it is unable to reach the minimum threshold required to initiate the polymerization for the material, then the build job will fail.

- Solution: Measure and adjust projector irradiance such that the projector is 5 mW/cm^2 at centerpoint. Contact a Stratasys representative for the procedure to measure and adjust the projector irradiance.

Solutions for Unwanted Material Layer Lines on Parts

Issue: Printed parts exhibit unwanted material layer lines.

Possible root causes: Improper tray seal, deformed teflon membrane, layer shifts due to build head movement, changing print settings or pausing mid print, teflon and interface glass cleanliness, or solid or cured residue in tray.

1. Improper tray seal.

- The tray must be properly sealed for a successful build job. A good tray seal prevents resin from leaking into the printer. This also ensures the teflon membrane is laminated flat against the interface glass during printing. If the teflon membrane does not laminate flat against the interface glass, unwanted material layer lines on the part may occur due to a deformed layer.

- Solution: Ensure the tray seals correctly by using the procedure described in "Filling and Installing a Tray Into the Printer" (page 31). If the tray does not seal properly, take the corrective steps to ensure a good seal.

2. Deformed Teflon membrane.

- The teflon membrane is a consumable part. After repeated printing, it will show signs of deformation. Like the improper tray seal issue discussed above, a deformed teflon membrane can cause unwanted material layer lines on the part due to a deformed layer.

- Solution: Disassemble the tray, clean the tray and gaskets, and replace the teflon membrane according to the procedure described in "Replacing Tray Sheets" (page 58).

3. Layer shifts due to unwanted build head movement.

- The build head and build arm must remain as rigid as possible during a print. If the build head or build arm moves during print, layer shifts on the part will result. This typically occurs due to improper build head installation or calibration.

- Solution: Confirm the build head is properly installed by attempting to move it manually. If it can be moved, confirm the thumbscrew as well as the three calibration block screws are properly tightened.

4. Changing print settings or pausing the system mid-print.

- Changing print settings or pausing a build will result in unwanted material layer lines.

- Solution: Avoid pausing build jobs unless absolutely necessary. Currently, there are three defined build job regions in the material settings: First layer, Transition region, and Model region. As such, there will always be at least two material layer lines per part. A csv override in the transition regions can mitigate the prominence of the layer lines.

5. Teflon and interface glass cleanliness.

- Clean teflon and interface glass is critical to printer performance. Performing a print on a dirty interface glass or with a dirty sheet of teflon (bottom surface) can cause the teflon to stick to the interface glass and not delaminate completely. This can result in the layer becoming deformed.

- Solution: Inspect the interface glass and the teflon membrane. If dirty, clean them using the procedure described in "Cleaning the Mid Plate Glass Window" (page 52).

6. Solid or cured residue in the tray.

- Solid material within the resin tray can affect build job quality and result in part failures. When the size of the solid pieces exceeds the build job layer height (which is generally the case as we default to 100um layers) the pieces can become wedged between the interface glass and the build job. This will prevent the build head from driving down to the desired position. The result is an increase in layer thickness that can cause unwanted material layer lines if the projector exposure duration is able to cure through the additional thickness. Complete or partial delamination can result if the projector exposure duration is unable to cure through the additional thickness.

- Solution: Inspect the tray for any solid residue. Filter the resin if any is found.

Solutions for Part Delamination Issues

Issue: Printed part has complete or partial delamination. Delaminations is defined as a clean break at the interface of two layers. Delaminations always have a clean, straight, or non-jagged break.

Possible Root Causes: Insufficient projector exposure duration in the model region, Insufficient projector exposure delay in the model region, Insufficient separation distance in the model region, separation forces are too high, or solid or cured residue in tray.

1. Insufficient model region projector exposure duration.

- Any given layer requires sufficient projector exposure duration to ensure adhesion to the previous layer.

- Solution: increase model region projector exposure duration.

2. Insufficient model region projector exposure delay time.

- Projector exposure delay times affect the thickness of any given layer. Lower projector exposure delay times result in thicker layers, while longer projector exposure delay times will result in thinner layers down to a minimum thickness. If the first layer projector exposure delay time is too short, first layer adhesion issues resulting in a thicker first layer which is unable to be cured through may occur.

- Solution: Increase model region projector exposure delay time.

3. Insufficient separation distance in the model region.

- The separation distance allows for proper separation of the layer from the Teflon while also permitting proper resin to flow into the area previously occupied by the cured layer. If the separation distance is too low, partial separation from the Teflon membrane may result. This can then result in either a partial or complete delamination.

- Solution: Increase separation distance in the model region.

4. Separation forces too high.

- Three important factors in separation force are the viscosity of the resin, the stickiness of the resin in the green state, and the proximity of the part or build head to the interface glass. Separation forces are generally highest on the first few layers, and they decrease as the layers advance. The only exception to this general trend is if a full build area "brick" is being printed. In this case, the separation force remains fairly consistent throughout the build job. If separation forces are too high on the first layer, it is possible that the layer will detach or delaminate from the previous layer.

- • Solution: Decrease the separation start speed of the transition region. Alternatively, a CSV override is used to carefully control settings on a per layer basis. This allows for effective control of layer thicknesses, and separation speeds which are directly related to experienced forces.

5. Solid or cured residue in tray.

- • Solid material within the resin tray can affect build job quality and result in part failures. When the size of the solid pieces exceeds the build job layer height (which is generally the case as we default to 100um layers) the pieces can become wedged between the interface glass and the build job. This will prevent the build head from driving down to the desired position. The result is an increase in layer thickness that can cause unwanted material layer lines if the projector exposure duration is able to cure through the additional thickness. Complete or partial delamination can result if the projector exposure duration is unable to cure through the additional thickness.

- • Solution: Inspect the tray for any solid residue and filter the resin if any is found.

8   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

Compliance

The Origin One printer has been tested and found to comply with the limits for an FCC Class A digital device. It also conforms to various EU directives, including Machinery Directive 2006/42/EC, Electromagnetic Compatibility Directive 2014/30/EU, and RoHS Directive 2015/863/EU.

Please refer to the appropriate appendices for the respective formal declarations.

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.

> ℹ 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.

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 réglement 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.

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