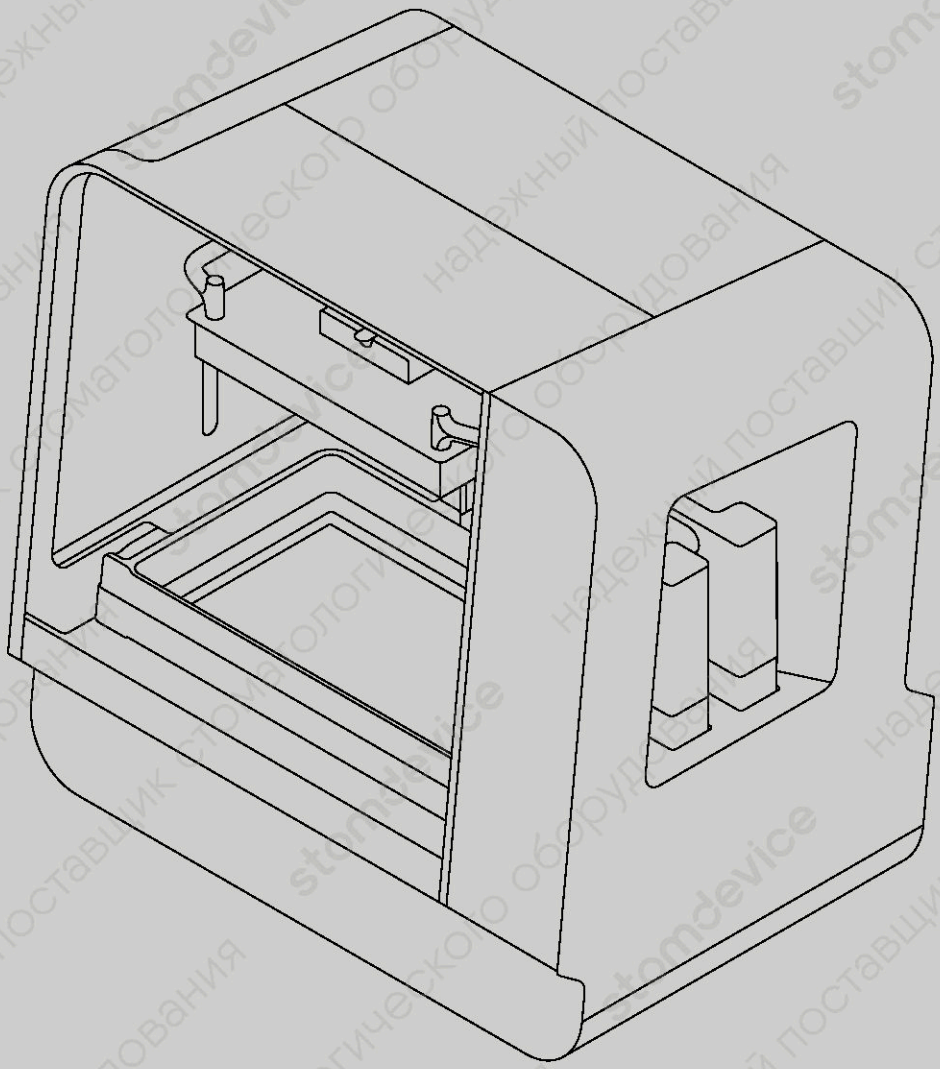
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Manual | Form 3BL



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Installation and Usage Instructions

Form 3BL

Large-format Low Force Stereolithography (LFS)™ 3D printer

Original English instructions
Read this manual carefully and keep it for future reference.
December 2021
REV 02
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WARNING

Read and understand this manual and its safety instructions before using the Form 3BL. Failure to do so can result in serious injury or death.

DISCLAIMER

Formlabs has made every effort to make these instructions as clear, complete, and correct as possible. The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation, and testing of the products with respect to the relevant specific application or use thereof. Neither Formlabs nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information that is contained herein. Notify us if you have any suggestions for improvements or amendments or have found errors in this publication.

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Dec 2021	REV 02	Minor text updates

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1 Preface

Congratulations on purchasing the Form 3BL. On behalf of the Formlabs team, we thank you for your purchase. The Form 3BL is a large-format Low Force Stereolithography (LFS)™ 3D printer. The Form 3BL fabricates fully-supported parts by converting a 3D object into 2D slices that can be traced layer by layer with two lasers. This manual explains how to set up, use, and properly maintain the Form 3BL, as well as provides design guidance for optimizing print results. The manual is intended for anyone who is installing, operating, maintaining, or otherwise interacting with the Form 3BL. Supervise young or inexperienced users to ensure enjoyable and safe operation.

1.1 Read and retain instructions

Read and understand this manual and its safety instructions before using the Form 3BL. Failure to do so can result in serious injury or death. Keep all safety information and instructions for future reference and provide them to subsequent users of the product.

Follow all the instructions. This will avoid fire, explosions, electric shocks, or other hazards that may result in damage to property and/or severe or fatal injuries.

The Form 3BL shall only be used by persons who have fully read and understand the contents of this manual. Ensure that each person who uses the Form 3BL has read these warnings and instructions and follows them. Formlabs is not liable for cases of material damage or personal injury caused by incorrect handling or non-compliance with the safety instructions. In such cases, the warranty will be voided.

1.2 Obtaining documentation and information

Visit formlabs.com to:

- Access your Formlabs store (formlabs.com/store) and Dashboard accounts (formlabs.com/dashboard).
- Find certified service providers in your region (formlabs.com/company/partners).
- Access the Terms of Service (formlabs.com/terms-of-service) and the Privacy Policy (formlabs.com/privacy-policy).

Visit support.formlabs.com to:

- Access the latest version of all Formlabs product documentation.
- Contact Formlabs Support to request documentation, usage instructions, repair guides, and technical information.
- Submit any comments or feedback regarding what is good and what can be improved. Formlabs values comments from its users.
- Request additional training.

1.2.1 Support and service

Retain a record of the original purchase to request warranty services. Service options depend on the status of the specific product's warranty. Include the serial name of the product when contacting Formlabs Support or a certified service provider for product support.

Instead of a serial number, Formlabs products have a serial name, which is a unique identifier to track the history of manufacturing, sales, and repair, and to distinguish usage when connected to a network. The serial name is on the back panel of the machine in the format AdjectiveAnimal.

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Service providers of Formlabs products also provide support and service. To the extent that Formlabs or a certified service provider offers other or extended warranties, the terms of the separate offer may apply. For products purchased from certified service providers, contact the original service provider for assistance before contacting Formlabs Support.

For any support or service requests, including product information, technical assistance, or assistance with instructions, contact Formlabs Support:

support.formlabs.com	**USA** Formlabs, Inc. 35 Medford St. Somerville, MA, USA, 02143	**Germany** Formlabs GmbH Nalepastrasse 18-50 12459 Berlin, Germany

1.2.2 Warranty

This product is protected under warranty. Formlabs offers a warranty for all Formlabs branded hardware. Unless otherwise expressly stated, the Terms of Service, including the Warranty, constitute the entire agreement between you and Formlabs with respect to the Service and any product you purchase from Formlabs and supersedes all prior or contemporaneous communications, proposals, and agreements, whether electronic, oral, or written, between you and Formlabs. Read the warranty for more details on the Formlabs warranty for your region:

US	**formlabs.com/support/terms-of-service**
EU (EN)	**formlabs.com/eu/terms-of-service**
EU (DE)	**formlabs.com/de/support/terms-of-service/eu**
EU (FR)	**formlabs.com/fr/support/terms-of-service/eu**
EU (ES)	**formlabs.com/es/terms-of-service/eu**
EU (IT)	**formlabs.com/it/terms-of-service/eu**

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2 Introduction

2.1 Intended use

The Form 3BL is a commercial, precision tool intended for use in the additive manufacture of end-user supplied designs from photopolymer resin. The final performance characteristics of cured photopolymer resin may vary according to your compliance with the instructions for use, application, operating conditions, material combined with, end use, or other factors.

NOTICE

In some cases, the additive manufacturing process may inherently result in variable performance characteristics between manufacturing runs or within a specific part. Such variances may not be apparent and may result in unexpected defects in additively fabricated parts.

WARNING

You shall independently verify the suitability of additive manufacturing, stereolithography (SLA), the Form 3BL, and any specific designs or materials employed for the application and intended purpose before use. In no event shall Formlabs be liable for any loss, death, or bodily injury that you suffer, or that you cause to any third party, in connection with your use of Formlabs products. To the fullest extent legally permitted Formlabs EXPRESSLY DISCLAIMS ANY IMPLIED OR EXPLICIT WARRANTY OF FITNESS for a particular usage, the particular nature and circumstances of said usage being unforeseen and unforeseeable to Formlabs.

WARNING

Formlabs is not a manufacturer of medical devices. Formlabs provides tools and materials that may be used in many applications, but makes no claims as to the safety or effectiveness of any specific devices made using Formlabs products. Certain Formlabs products, such as those commonly known in the industry as “biocompatible” materials, have been engineered to comply with relevant industry standards. The specific standards and most relevant technical specifications may be identified within the technical data sheets and have been tested according to relevant testing protocols for those standards and specifications. Biocompatible materials are a speciality product, developed for use by medical professionals, and should be used in accordance with the instructions for use.

WARNING

Do not modify. The Form 3BL is intended for use as-is. Modifying the machine without explicit approval and directions from Formlabs will invalidate the warranty, and could potentially ruin the machine and cause you bodily harm.

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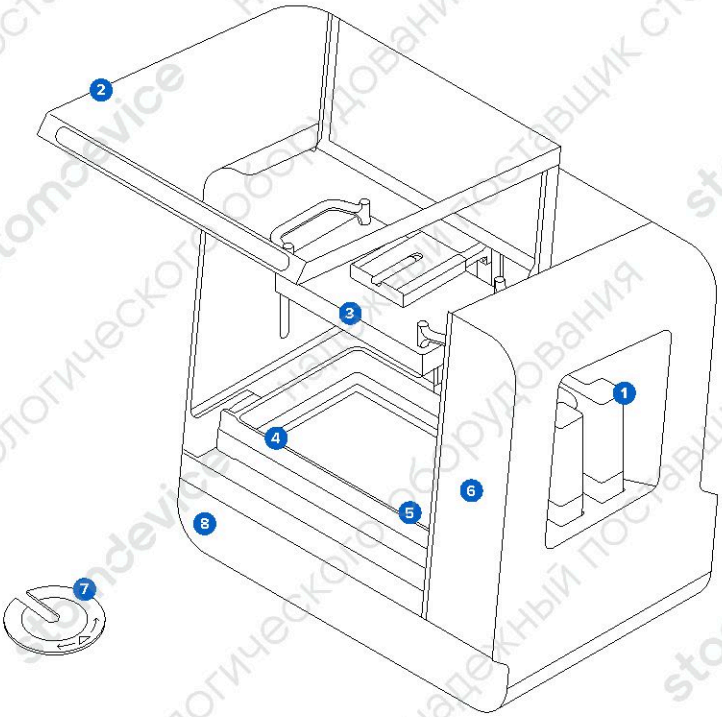
2.2 Technical specifications

Parameter	Unit
Printer	Form 3BL
3D printing technology	Low Force Stereolithography (LFS)™
Minimum dimensions for convenient access (W × D × H)	90 × 96 × 104 cm I 35.4 × 37.8 × 41 in
Printer dimensions (W × D × H)	77 × 52 × 74 cm I 30.3 × 20.5 × 29.1 in
Printer weight	54.4 kg I 120 lb
Build volume (W × D × H)	33.5 × 20 × 30 cm I 13.2 × 7.9 × 11.8 in
Layer thickness (Axis resolution)	25–300 microns I 0.001–0.012 in
XY resolution	25 microns I 0.001 in
Laser spot size (FWHM)	85 microns I 0.0033 in
Resin cartridges	2
Resin dispensing system	Automated
Biocompatible materials	Yes
Supports	Auto-generated, Light-touch removal
Operating environment	18–28 °C I 64–82 °F Low ambient humidity
Operating temperature	Auto-heats to 35 °C I 95 °F
Temperature control	Air heated print chamber
Power requirements	100–240 VACMaximum 8.5 A 50/60 Hz 650 W
Laser specifications	IEC 60825-1:2014 I EN 60825-1:2014 Class 1 laser product 2 Light Processing Units (LPUs) **In each Light Processing Unit (LPU):** 405 nm violet laser I Maximum 250 mW
Radiation information	The Form 3BL is a Class 1 laser product. Accessible radiation is within Class 1 limits.
Connectivity	**Wi-Fi:** 2.4, 5 GHz **Ethernet:** 1000 Mbit **USB:** 2.0
Wi-Fi connectivity	**Protocol:** IEEE 802.11 b/g/n **Frequency:** 2.4 GHz, 5 GHz **Supported security:** WPA/WPA2
Ethernet connectivity	RJ-45 Ethernet (10BASE-T/100BASE-TX/1000BASE-T) LAN Port Connect with a shielded Ethernet cable (not included): minimum Cat5, or Cat5e or Cat6 for 1000BASE-T.
USB connectivity	USB (rev 2.0) B port with a USB A-B cable
Sound emission	Does not exceed 70 dB(A).
Printer control	Interactive touchscreen
Alerts	Touchscreen alerts, SMS/email via Dashboard,Two LED status indicators, Speaker for audio alerts
Print preparation	PreForm desktop software
File type	STL or OBJ

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2.3 Product elements

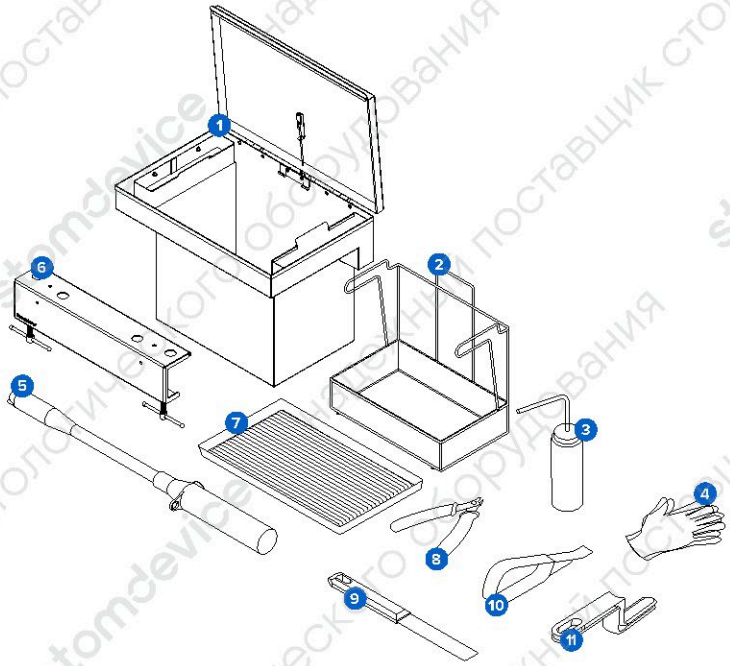
2.3.1 Form 3BL



1. **Resin cartridge:** Two containers hold the resin before dispensing into the resin tank. Shake the resin cartridges periodically to keep resin well mixed.
2. **Cover:** The printer lid, made of metal and a strong, orange-tinted material, blocks exposure to the lasers and protects the resin from curing due to ambient light.
3. **Build platform:** The aluminum base provides a surface for prints to attach to.
4. **Resin tank:** Resin is dispensed out of the resin cartridges into the resin tank. During a print, two lasers pass upwards through the flexible film and cure resin onto the build platform to form a printed part.
5. **Mixer:** Each resin tank includes a mixer that improves print consistency by clearing the build area and circulating the resin.
6. **Touchscreen:** The LCD capacitive touch user interface displays print information, settings, and error messages.
7. **Leveling disc:** Slide the leveling disc included around one of the leveling feet and rotate to raise or lower the printer.
8. **Status light:** Two interior lights (vertical strips along the left and right walls) and an illuminated logo (on the front panel) that pulse to indicate the printer is active, a print has completed, or the printer has encountered an error.

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2.3.2 Form 3BL Finish Kit



1. **Rinse bucket:** Fill the rinse bucket with solvent to the FILL TO HERE marking before washing prints. The rinse bucket includes a ground wire to prevent static discharge. Formlabs recommends isopropyl alcohol or tripropylene glycol monomethyl ether.
2. **Rinse basket:** Place prints in the rinse basket, place the rinse basket into the rinse bucket, and agitate to clean.
3. **Rinse bottle:** Remove resin trapped in cavities and internal channels of prints. Use clean solvent. Formlabs recommends isopropyl alcohol.
4. **Non-reactive nitrile gloves:** Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.
5. **Battery operated solvent pump:** Fill and empty the rinse bucket.
6. **Build platform jig:** Stabilize the build platform for the secure removal of prints.
7. **Drying tray:** Place washed prints on the drying tray to drip dry.
8. **Flush cutters:** Snip to separate prints from their supports. Cut with the flat side on the prints' surface for minimal support marks.
9. **Scraper:** Remove prints from the build platform. Do not use the scraper to clean the resin tank interior.
10. **Removal tool:** Pry under the raft to remove prints from the build platform. Do not use the removal tool to clean the resin tank interior.
11. **Tank tool:** A two-part scraper for inspecting and cleaning the resin tank interior. Separate tool for scraper function or combine for tongs.

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2.4 Understanding the display

The Form 3BL's display includes a touchscreen and speaker for audio notifications. The touchscreen displays print information (job name, time remaining, layers printed), settings, and error messages. The touchscreen serves as the user interface for the printer. The audio notifications indicate the printer's state. Refer to messages on the printer's touchscreen to understand the meaning of the audio notifications. For detailed guidance and visual assistance, visit **support.formlabs.com**.

Tap the home icon in the left sidebar to access the Home screen. Current or upcoming print jobs appear here.

Tap the collapsed menu icon in the left sidebar from Home to access the Queue screen. A list of print jobs that have been uploaded to the printer appears here.

Tap the printer icon in the left sidebar from Home to access the printer status screen. Information about the inserted consumables, such as resin types, resin cartridge levels, and resin tank temperature appear here.

Tap the wrench icon in the left sidebar from Home to access the Settings screen. Network connectivity, maintenance, and other options can be accessed here.

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3 Safety

WARNING

Read and understand this manual and its safety instructions before using the Form 3BL. Failure to do so can result in serious injury or death.

Supervise young or inexperienced users to ensure enjoyable and safe operation.
The instructions contain warnings and safety information, as explained below:

DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates information considered important, but not hazard-related.

DANGER: Isopropyl alcohol is a flammable chemical.

WARNING: The laser beam is harmful to the eyes. Avoid direct contact.

ENVIRONMENTAL HAZARD: Uncured photopolymer resin is classified as hazardous to aquatic life.

3.1 Component and subsystem safety

3.1.1 General

CAUTION

Lifting hazard: Due to its size and weight, do not move or reposition the Form 3BL alone. If the machine needs to be moved, at least two individuals should use the lifting straps provided with the Form 3BL.

NOTICE

Do not lift or reposition the Form 3BL:

- By the cover or any other movable part of the printer.
- When the printer is connected to a power source.
- When the printer is connected to an Ethernet or USB cable.

NOTICE

The Form 3BL requires an operating environment that is low in ambient humidity and static electricity. Due to the sensitive nature of its components and the printing mediums, system reliability and print quality may fluctuate if the ambient temperature and moisture are outside the recommended ranges. Refer to section 4.1 Location and

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environs for the recommended operating environs.

3.1.2 Laser

Radiation exposure: The laser beam is extremely harmful to the eyes and skin, capable of causing permanent blindness. Avoid direct contact at all times. The Form 3BL contains an interlock system to automatically shut off the lasers when the cover is open. If this system is tampered with or fails, there is a risk of exposure to Class 3B laser light. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

WARNING

Unauthorized maintenance: Class 1 laser product. Only remove the shells of the printer with authorization from Formlabs Support or a certified service provider. Disconnect the machine from its power source before removing the shells.

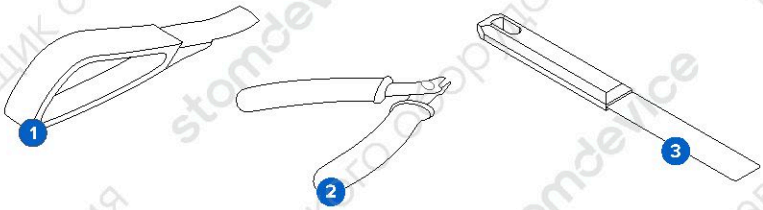
Accessible radiation is within Class 1 limits. The laser diodes used inside the device have the following specifications:

Diode	Violet (405 nm)
Maximum output	250 mW
Certification	IEC 60825-1:2014 EN 60825-1:2014 FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019.

3.1.3 Sharp tools

CAUTION

Cutting hazard: Using sharp tools on slippery surfaces (such as a resin-coated build platform) can result in sudden movement. Orient sharp tools away from yourself, especially when cutting or scraping.



The accessories include sharp tools such as: a removal tool 1, flush cutters 2, and a scraper 3.

3.1.4 Resin

WARNING

Poison hazard: Never ingest resin in liquid or solid form. If swallowed, immediately call a poison center or medical professional. Contact Chemtrec at +1 800 424 9300 for global 24-hour emergency assistance.

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Refer to the safety data sheet (SDS) and local authorities for guidance on disposing of resin and solvent. Liquid resin (whether pure liquid, dissolved in solvent, or partially cured) may be classified as hazardous waste in your region and shall be disposed of with care.



ENVIRONMENTAL HAZARD:
Uncured photopolymer resin is classified as hazardous to aquatic life.



Consult the safety data sheet (SDS) as the primary source of information to understand safety and handling of Formlabs materials. Respect Formlabs resin like any household chemical. Follow standard chemical safety procedures and Formlabs resin handling instructions. In general, Formlabs resin is not approved for use with food, drink, or medical applications on the human body. However, biocompatible resins, such as Dental SG Resin, are biologically safe for specific types and lengths of exposure to the human body. Refer to the safety data sheet (SDS) for each specific resin as well as **support.formlabs.com** for more detail.

3.1.5 Radio interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to CFR Title 47, Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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. Changes or modifications to this product not authorized by Formlabs could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product. This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, televisions, and other electronic devices.

3.1.6 Isopropyl alcohol (IPA)



Fire hazard: Isopropyl alcohol is a flammable chemical. Keep away from ignition sources, including open flames, sparks or concentrated sources of heat.



Formlabs does not manufacture isopropyl alcohol. Consult the chemical manufacturer or supplier for detailed safety information. Carefully follow the safety instructions provided with the isopropyl alcohol that you purchase. Isopropyl alcohol can be flammable, even explosive, and should be kept away from heat, fire, or sparks. Any containers holding isopropyl alcohol should be kept closed or covered when not in use. We also recommend that you wear protective gloves and have good ventilation when working with isopropyl alcohol.

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3.1.7 Tripropylene glycol monomethyl ether (TPM)

NOTICE

Formlabs does not manufacture tripropylene glycol monomethyl ether. Consult the chemical manufacturer or supplier for detailed safety information. Carefully follow the safety instructions provided with the tripropylene glycol monomethyl ether you purchase. We also recommend that you wear protective gloves when working with tripropylene glycol monomethyl ether.

3.2 Personal protective equipment (PPE)

Safe operation of the Form 3BL can be achieved by implementing the following equipment:

- Non-reactive nitrile gloves
- Safety glasses

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

CAUTION

Risk of eye injury: Some methods of support removal may cause small pieces of supports to break away. Beware of flying debris. Wear eye protection and gloves to protect the skin and eyes.

3.3 Specifications of tools to be used

The Form 3BL shall only be used with supplied accessories and additional tools recommended by Formlabs. Third-party accessories and materials may cause damage. Refer to sections 3.1 Personal protective equipment (PPE) and 6.1. Tools and supplies for more information.

Purchase additional supplies:

- **Cotton swabs**
  For cleaning the cartridge ID chips.
- **General purpose cleaner (e.g., glass cleaner)**
  For cleaning the printer's cover, outer shells, and display.
- **Isopropyl alcohol (IPA), 90% or higher**
  - Recommend washing solvent for rinsing prints.
  - For cleaning the printer's optical components, build platform, and cartridge ID chips.
  - For cleaning the work surface and tools.
- **Lithium grease for ball bearings**
  For lubricating the X-and Z-axis screws.
- **Low-fiber paper towels**
  - For cleaning the work surface and tools.
  - For protecting sensitive components.
  - For wiping residue grease, resin, or solvent.
- **Non-abrasive microfiber cloth**
  For cleaning the printer's cover, outer shells, and display.

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- **PEC*PADs**
  Disposable lint-free, non-woven microfiber cloths for cleaning the printer's optical components. Do not reuse a PEC*PAD; dispose of after each use.
- **Rubber bulb air blower**
  For removing dust from the glass optical window.
- **Tripropylene glycol monomethyl ether (TPM)**
  Alternative washing solvent to isopropyl alcohol for rinsing prints.

3.4 Sensitive components

The Form 3BL has multiple sensitive components that are vulnerable to permanent damage if not periodically inspected and properly maintained. Using any tools, cleaning agents, or methods not mentioned in this manual may result in permanent damage to these components. Follow the maintenance instructions outlined in this manual and on **support.formlabs.com** when servicing the following components or any other internal component of the machine. For detailed guidance and visual assistance, visit **support.formlabs.com**.

- **Glass optical window**
  A narrow piece of anti-reflective coated glass that is surrounded by the roller holder. It protects the sensitive mirrors inside the LPUs from dust and other contamination. Maintain a clean glass optical window to prevent print failures. Refer to section 6.6.5 Cleaning the glass optical window for more information.
- **Light Processing Units (LPUs)**
  These interchangeable assemblies each contain a laser and mirrors the control the path of the laser, ensuring a clean, crisp laser spot. The Form 3BL has two Light Processing Units , which are secured in the LPU housing. Refer to section 8 Disassembly and repair for more information.
- **Platform lock**
  A lever that is part of the locking mechanism that secures the build platform. Contact Formlabs Support or a certified service provider before adjusting the platform lock, as improper adjustment can lead to damage to the machine.
- **Roller holder**
  A metal surface that allows for smooth movement of the LPU housing across the flexible film interior. The roller holder surrounds the glass optical window. A clean roller holder protects the flexible film and preserves print quality. To inspect and clean the roller holder, refer to section 6.6.4 Cleaning the roller holder.
- **X-axis ball screw**
  Controls the horizontal (X-axis) motion of the Light Processing Unit (LPU) housing. Keep the X-axis ball screw clean and well-lubricated so that the LPU housing can move smoothly and accurately. To inspect and lubricate the ball screw, refer to section 6.5.5 Maintaining the X- and Z-axis screws.
- **Z-axis lead screw**
  Controls the vertical motion of the build platform carriage. Keep the lead screw clean and well-lubricated so that the build platform carriage can move smoothly and accurately. To inspect and lubricate the lead screw, refer to section 6.5.5 Maintaining the X- and Z-axis screws.

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3.5 Emergency and exceptional situations

Formlabs has made every effort to provide updated safety data sheets (SDS) for every resin product, in accordance with the latest government guidelines. Always consult the safety data sheet (SDS) as the primary source of information to understand safety and handling of Formlabs materials and required accessories.

3.5.1 Isopropyl alcohol (IPA)

Fire hazard: When handling isopropyl alcohol, always consult the safety data sheet (SDS) from the isopropyl alcohol supplier as the primary source of information. Handle isopropyl alcohol with gloves in a well-ventilated area. Keep away from heat, sparks, and open flame. Isopropyl alcohol evaporates rapidly, so keep the rinse tub and bottles closed whenever possible.

3.5.2 Resin

WARNING

Poison hazard: Never ingest resin in liquid or solid form. If swallowed, immediately call a poison center or medical professional. Contact Chemtrec at +1 800 424 9300 for global 24-hour emergency assistance.

NOTICE

Promptly clean and inspect the printer after a resin spill to minimize any cosmetic or functional damage to the printer. If you have experienced an accidental resin spill, document the problem with photos and clean the printer as best as possible. Contact Formlabs Support or a certified service provider as soon as possible.

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4 Preparation and setup

4.1 Location and environs

Prepare a space to install and operate the Form 3BL and house the necessary accessories and consumables.

- Choose a location separate from any machinery or tooling that generates dust or sparks, such as wood or metal working equipment.
- Reserve the following minimum dimensions for the most convenient access:
  - **Form 3BL**: 90 × 96 × 104 cm (35.4 × 37.8 × 41 in)
  - **Form 3BL Finish Kit**: 55 × 85 × 90 cm (21.7 × 33.5 × 35.4 in)
  - **Additional space for other post-processing tools** (e.g., Form Wash L, Form Cure L, or Formlabs-approved third-party devices)
- Purchase additional supplies:
  - Isopropyl alcohol (90% or higher) and/or tripropylene glycol monomethyl ether
  - Low-fiber paper towels
  - Non-abrasive microfiber cloth
  - Non-reactive nitrile gloves
  - PEC*PADs
  - Safety glasses

4.2 Networking

For uploading prints to the Form 3BL and remotely monitoring the printer, ensure that the Form 3BL maintains a constant connection to a secure network. Refer to section 4.6 Connecting the printer to a network for more information. For detailed guidance and visual assistance, visit **support.formlabs.com**.

4.3 Unboxing the printer

Removing the Form 3BL from its packaging requires at least two people that are comfortable lifting large and heavy objects. Prior to unboxing the printer, prepare a suitable workspace according to section 4.1 Location and environs. For detailed guidance and visual assistance, visit **support.formlabs.com**.

CAUTION

Lifting hazard: The Form 3BL is a heavy object. A two person lift is required to prevent injury and avoid damage to the machine.

4.3.1 Form 3BL package

The standard Form 3BL package ships with multiple boxes: the Form 3BL printer, Form 3BL Finish Kit, resin tank, resin cartridges, and build platform. Additional resin cartridges and accessory boxes ship separately from the Form 3BL's packaging.

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	Form 3BL printer	Form 3BL Finish Kit	Form 3BL resin cartridge	Form 3BL resin tank	Form 3BL build platform
Shipping dimensions	94.6×69.2×88.9 cm 37.3×27.3×35.0 in	Rinse bucket: 61×51×51 cm 24×20.1×20.1 in Tools: 53×42×16 cm 20.9×16.5×6.3 in	24×20×8 cm 9.5×8×3 in	72.4×42.7×15.2 cm 28.5×16.75×6 in	12.7×24.8×51.4 cm 5.0×9.8×20.3 in
Shipping weight	67.1 kg | 148 lb	Rinse bucket: 9 kg | 19.8 lb Tools: 5 kg | 11.0 lb	1.5–1.75 kg 3.3–3.9 lb	4.2 kg | 9.2 lb	3.2 kg | 7 lb
Product weight	54.4 kg | 120 lb	Rinse bucket: 8 kg | 17.6 lb Tools: 4 kg | 8.8 lb	1.35–1.6 kg 3.0–3.5 lb	3.5 kg | 7.8 lb	2.5 kg | 5.6 lb

4.3.2 Unboxing the Form 3BL

The custom packaging the Form 3BL arrives in is specially designed to protect the machine during shipping. During unboxing, inspect the product for any damage or missing items. In the case of damage or missing items, contact Formlabs Support or a certified service provider.

To unbox the printer:

1. Position the Form 3BL's packaging near the designated location, leaving enough room for two people to comfortably maneuver throughout the area. Stand the Form 3BL's packaging upright to ensure it is level.
2. Lift the outer cardboard box off of the lower carrier tray.
3. Remove the two foam inserts from the top of the printer.
4. Use the provided handles on the lifting straps to lift the printer out of its carrier tray.
5. Carefully move the printer onto its workspace.

CAUTION

If you need to readjust the Form 3BL, use the lifting straps to pick the machine back up. Do not pick up the Form 3BL without the lifting straps.

6. Tilt each side of the printer up slightly to remove the lifting straps.
7. Lift the printer cover.
8. Remove any additional wrapping and packaging from outside of the printer before connecting the machine to power.

NOTICE

Save the Form 3BL's packaging including any inserts for transporting the machine. Original packaging is required for warranty service and designed to be kept and reused for transportation or shipping.

4.4 Serial name

The serial name is a unique identifier used to track the history of manufacturing, sales, and repair. The serial name for the Form 3BL is located on a sticker next to the A/C input on the back panel in the format **AdjectiveAnimal**. For a Form 3BL, the serial name is also available on the printer's touchscreen.

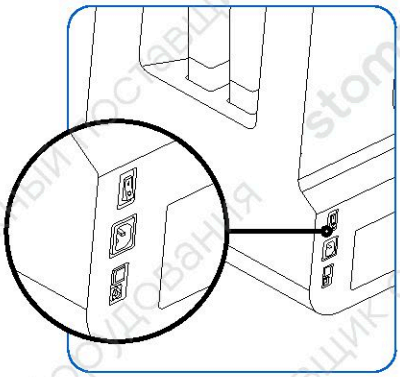
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To access the serial name the printer's touchscreen:

1. Tap the printer icon on the **Home** screen. The printer status screen appears.
2. The serial name is listed in the top-left corner.

4.5 Installing the printer

After selecting a location for the Form 3BL, connect the power supply and turn on the printer. Depending on your internet setup, you may need to connect the included Wi-Fi antenna to establish an internet connection on the printer.



4.5.1 Connecting the cables

Connect the power cable to the printer and to the power supply. Files can be uploaded via Wi-Fi, Ethernet, or USB. For USB, connect the printer to a nearby computer. For Ethernet, connect the printer to your LAN. Refer to section 4.6. Connecting the printer to a network for more information.

4.5.2 Installing the Wi-Fi antenna

Install the Wi-Fi antenna to connect the printer to a wireless network.

To install the Wi-Fi antenna, screw the Wi-Fi antenna onto the jack on the back of the machine, next to the power, USB, and Ethernet ports.

4.5.3 Turning on the printer

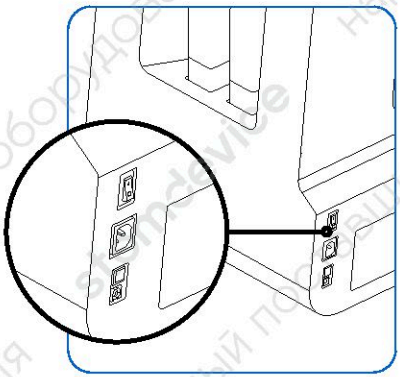
To turn on the printer:

1. Plug the included power cable into the power port on the back of the machine and connect the power cable to a power outlet.
2. The printer initiates automatically.

To put the printer into sleep mode or turn off completely, refer to section 5.6.5 Turning off the printer.

4.6 Connecting the printer to a network

Connect the Form 3BL to a secure network via Wi-Fi, Ethernet, or USB, providing it internet access for remote printing, remote troubleshooting, and sending diagnostic logs. The Form 3BL can connect directly to a computer with a USB cable. For detailed guidance and visual assistance, visit **support.formlabs.com**.



For remote uploading and monitoring, the Form 3BL supports both wired (Ethernet) and wireless (Wi-Fi) connections. Connect PreForm print preparation software to the same local-area network (LAN) as the printer in order to send a print job.

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For a Windows operating system, after installing PreForm, check to ensure that Bonjour is properly installed. Bonjour is third-party software that is required to connect over Wi-Fi or Ethernet. Visit support.apple.com for assistance with Bonjour. The USB connection can still be used while the Form 3BL is connected to a LAN.

When the Form 3BL is connected to a LAN, its current status and print progress can be monitored with Dashboard: formlabs.com/dashboard.

4.6.1 Connecting with Wi-Fi

The Form 3BL's built-in Wi-Fi (IEEE 802.11 b/g/n) supports WPA/WPA2 security. Use the printer's touchscreen to configure a wireless network connection.

To connect with Wi-Fi:

1. Tap the wrench icon on the Home screen. The **Settings** screen appears.
2. Tap **Connectivity** > **Wi-Fi**. The **Wi-Fi** screen appears.
3. Toggle **Use Wi-Fi** to **ON**. The toggle turns blue.
4. Tap the desired wireless network.
5. If prompted, enter your network password and tap the checkmark to confirm.

4.6.2 Connecting with Ethernet

The rear of the unit is equipped with a RJ-45 Ethernet (10BASE-T/100BASE-TX/1000BASE-T) 1000 Mbit LAN Port. Use a shielded Ethernet cable (not included): minimum Cat5, or Cat5e or Cat6 for 1000BASE-T.

To connect with Ethernet:

1. Plug one end of the Ethernet cable into the Ethernet port on the back of the machine
2. Connect the other end of the Ethernet cable to your LAN.

4.6.3 Connecting with a manual IP configuration

When connected to an active Ethernet connection or available Wi-Fi network, the Form 3BL can be configured with a static IP address. Use the printer's touchscreen to configure a manual IP connection.

To connect with Wi-Fi or Ethernet using a manual IP configuration:

1. With an established Ethernet or available Wi-Fi connection, tap the wrench icon on the **Home** screen. The **Settings** screen appears.
2. Tap **Connectivity**. The **Connectivity** screen appears.
   - For Wi-Fi networks, tap **Wi-Fi**, then the desired wireless network. The **Wi-Fi** screen appears.
   - For Ethernet connections, tap **Ethernet**. The **Manual IP Settings** screen appears.
3. Toggle **Use Manual IP** to **ON**. The toggle turns blue.
4. Enter the appropriate **IP Address**, **Subnet Mask**, **Default Gateway**, and **Name Server**.

4.6.4 Connecting with USB

Use the included USB cable for connecting a computer directly to the printer.

To connect with USB:

1. Plug one end of the USB cable into the USB port on the back of the machine.
2. Connect the other end of the USB cable to a computer's USB port.

4.7 Leveling the printer

The Form 3BL must be completely level before printing can begin. If prompted, use the leveling disc to raise or lower each foot of the printer.

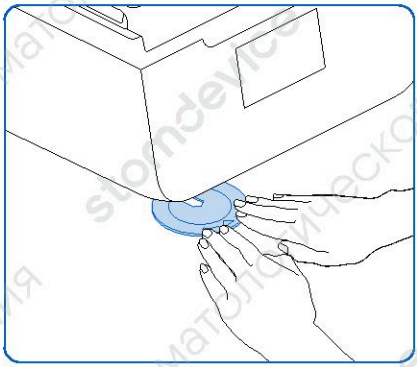
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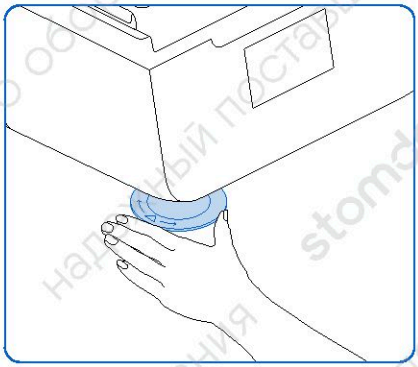
NOTICE

It is important that the printer sits level so resin does not overflow from the resin tank during printing. All four leveling feet must rest on a solid surface to ensure optimal print accuracy.

To level the printer:

1. Connect the printer to power. If necessary, the printer's touchscreen prompts use of the leveling disc.
   - The initial printer setup includes the leveling procedure.
2. Follow the on-screen instructions to adjust the feet under the printer.
3. Insert the round leveling disc under the designated corner. Push until the leveling disc clicks onto the leveling foot.
4. Rotate the leveling disc clockwise to raise and counter-clockwise to lower the height of the printer.
   - The printer ships with each leveling foot fully retracted. The height of the feet can only be raised during the initial printer setup.
5. Adjust the feet until the printer's touchscreen indicates the printer is level.





4.8 Inserting the resin tank and mixer

Resin is dispensed out of the resin cartridges into the resin tank. During a print, two lasers pass upwards through the flexible film of the resin tank and cure resin onto the build platform to form a printed part. Each resin tank includes a mixer that improves print consistency by clearing the build area and circulating the resin.

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

NOTICE

Spill hazard: Resin may spill over the tank walls if the resin tank tilts more than 5–10 degrees. Hold the resin tank level with two hands. To inspect and clean the resin tank's underside, empty the resin tank and/or take care to avoid spilling resin outside the resin tank.

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4.8.1 **Inserting the resin tank**

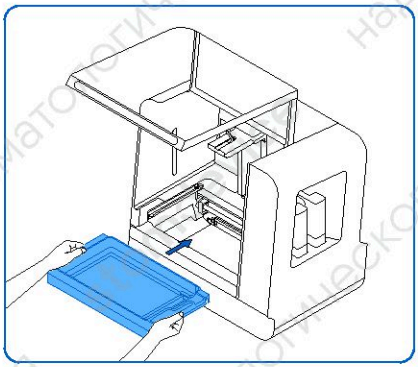
To insert the resin tank:

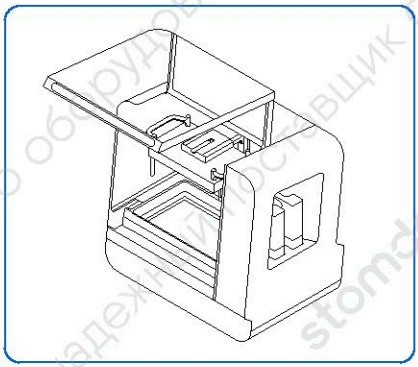
1. Open the printer cover.
2. Open the lid of the tank case.
3. Remove packaging materials from the resin tank.
4. Lift the resin tank with one hand on each side.

NOTICE

Avoid contaminating the resin tank's underside with fingerprints or liquid resin.

5. With the tank spout facing right, rest the front edge of the resin tank on the rails in the printer.
6. Push the resin tank forward until the resin tank reaches the back of the machine. The resin tank magnetically clicks into place. A sensor detects the resin tank, and the status lights pulse.

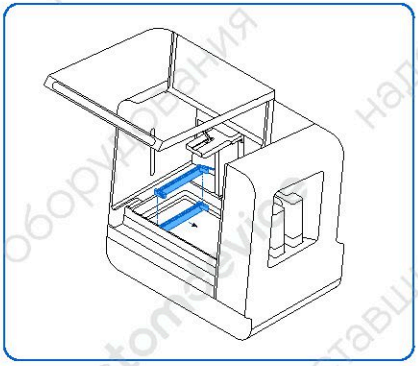




4.8.2 **Inserting the mixer**

To insert the mixer:

1. Open the printer cover.
2. Orient the mixer with its arms facing upward and toward the right side of the resin tank.
3. Place the mixer flat in the resin tank.
4. Push the mixer to the right edge of the resin tank until the magnets engage.



4.9 Inserting the build platform

The build platform is the surface onto which parts are printed. It is secured in place on the build platform carriage during a print with the platform lock.

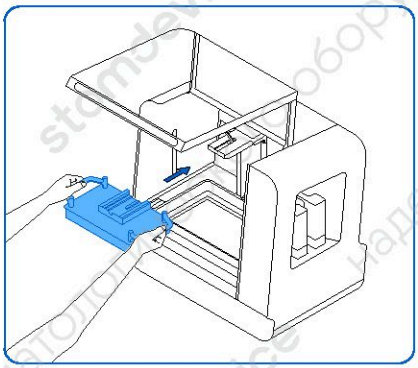
NOTICE

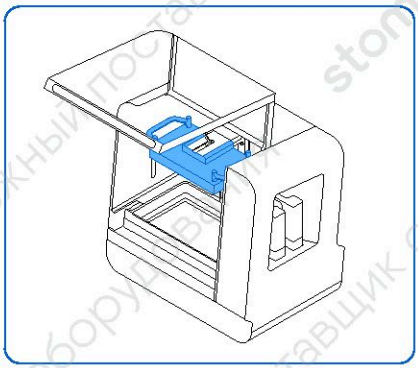
Hold the build platform by both handles when inserting it into or removing it from the printer.

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To insert the build platform:

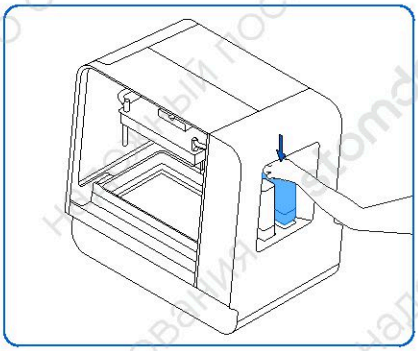
1. Raise the platform lock.
2. Align the build platform with the build platform carriage.
3. Push the build platform onto the build platform carriage. A sensor detects the build platform, and the status lights pulse.
4. Lower the platform lock to secure the build platform.





4.10 Inserting the resin cartridges

Resin cartridges hold liquid resin before it is dispensed into the resin tank. Given the Form 3BL's build volume and the size of the resin tank, it uses two resin cartridges at once.



NOTICE

A print can be started with only one resin cartridge inserted. Monitor the printer to ensure it does not run out of resin during the print.

To insert the resin cartridges:

1. Close the printer cover.
2. Shake the resin cartridges before each print to ensure the resin is mixed thoroughly. Shake each resin cartridge approximately every two weeks during storage to keep resin well mixed for the best print quality.
3. Remove the orange protective valve cover from the bottom of each resin cartridge. Formlabs recommends saving the valve covers to protect the bite valves when storing the resin cartridges.

NOTICE

Spill hazard: Do not remove the flexible, rubber bite valves at the bottom of the resin cartridges. These bite valves control the release of the resin. Removing the bite valves allows resin to continuously flow and causes extreme damage to the printer. This damage is not covered by the warranty.

4. Align the resin cartridge with one of the two cartridge slots on the right side of the printer.

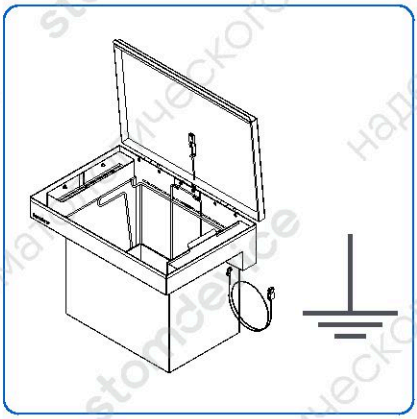
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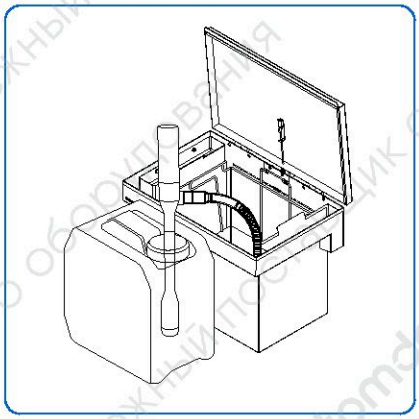
5. Place the resin cartridge into the slot. The resin cartridge fits into the slot in one orientation. A sensor detects the resin cartridge, and the status lights pulse.
6. Press the vent cap open, so that the resin tank fills correctly.
7. Place a second resin cartridge, with the same resin type and version, into the other slot.

4.11 Installing the Form 3BL Finish Kit

The Form 3BL comes with a finishing kit that includes a variety of post-processing tools. After printing, use the tools to remove prints from the build platform, wash prints in solvent, and remove supports.

4.11.1 Installing the rinse bucket





NOTICE

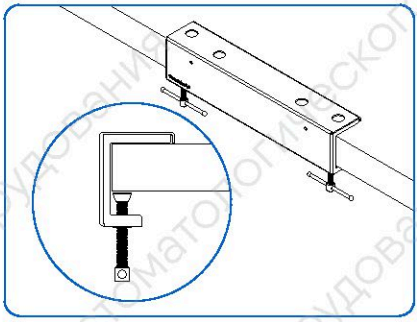
Connect the rinse bucket ground wire to a grounded piece of metal. If you store solvent in a metal container, electrically connect it to the grounded rinse bucket.

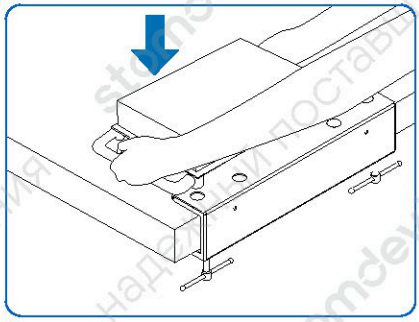
To fill the rinse bucket with solvent:

1. Place the pump intake into the solvent container.
2. Securely place the flexible pump hose into the rinse bucket.
3. Press and hold the pump switch to pump solvent into the rinse bucket.

Ensure that you have sufficient solvent (isopropyl alcohol or tripropylene glycol monomethyl ether) to wash your prints. For more information about solvent handling, visit **support.formlabs.com**.

4.11.2 Installing the build platform jig





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The build platform jig is designed to stabilize the build platform for the secure removal of prints. Secure the build platform jig to the edge of your work surface by tightening the jig screw clamps underneath the work surface. The build platform jig can also be secured to the work surface using the two screw holes on the front of the jig. Ensure that there is enough space in front of the jig for the build platform.

4.12 Transporting the printer

Refer to the section 4.3 Form 3BL package for product weight and dimensions. Keep the packaging for transportation or shipping. For detailed guidance and visual assistance, visit **support.formlabs.com**.

The printer's complete packaging kit consists of:

- 1 outer carton, cardboard
- 1 carrier tray, cardboard
- 1 carrier tray insert, foam
- 2 lifting straps, cardboard
- 2 upper inserts, foam
- 1 X-stage brace, cardboard
- 1 microfiber printer sleeve

4.12.1 Preparing the printer for transportation

To prepare the printer:

1. Always remove the build platform, resin tank, and resin cartridges before moving or packaging the printer.
2. Wipe residual resin from the build platform and store the platform away from sunlight.

NOTICE

Do not ship the printer with any resin inside. Resin left inside the machine can leak during transit, which may result in additional fees or void the warranty. Do not ship the printer with the resin tank, resin cartridges, or build platform inserted into the printer. Consumables left inside the machine can become loose during transit and damage sensitive components, which may result in additional fees or void the warranty.

3. Store the resin tank in the tank case.
4. Store the resin cartridges with the vent caps pressed closed and the valve covers installed.

NOTICE

When shipping a printer to Formlabs or a certified service provider for replacement or repair, the build platform, resin tank, resin cartridges, power and USB cables, and other accessories should not be shipped and will not be returned after service. Original packaging is required for warranty service. Contact Formlabs Support or a certified service provider for unique guidance on shipping requirements.

4.12.2 Packaging the printer

To package the printer:

1. If the printer's outer cardboard carton has been collapsed, start by reassembling and securely taping the box.
2. Open the printer cover.

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3. Insert the cardboard X-stage brace into the printer cavity. Press the brace against the rear wall of the printer cavity, beneath the X-axis linear rail.
4. Close the printer cover.
5. Slide the printer sleeve over the printer.
6. Tilt one side of the printer up and slide a lifting strap underneath. Repeat with a second sling under the other side of the printer.
7. Place the foam carrier tray insert into the cardboard carrier tray.
8. Use the provided handles on the lifting straps to lift the printer into its carrier tray.



Lifting hazard: The Form 3BL is a heavy object. A two person lift is required to prevent injury and avoid damage to the machine.

9. Place the two foam inserts on the top edges of the printer.
10. Lower the outer box onto the printer.
11. Seal each edge of the opening with adhesive packing tape.

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5 Printing

5.1 Operational environment

The operating temperature for the Form 3BL is 18–28 °C (64–82 °F), with low ambient humidity. For optimal printing, do not exceed this range.

5.2 Designing for SLA

A successful 3D print starts with a well-designed model. Follow these best practices to optimize designs and reduce print failures. For detailed guidance and visual assistance, visit **support.formlabs.com**.

5.2.1 Printing specifications

Parameter	Unit
Build volume (W × D × H)	33.5 × 20 × 30 cm 13.2 × 7.9 × 11.8 in
Layer thickness	25–300 microns 0.001–0.012 in

5.2.2 Feature design guidelines

Feature type	Recommended value
Minimum supported wall thickness	0.2 mm (0.008 in)
Minimum unsupported wall thickness	0.2 mm (0.008 in)
Maximum unsupported overhang length	5.0 mm (0.2 in)
Minimum unsupported overhang angle	10° from level
Maximum horizontal support span length	29 mm (1.14 in)
Minimum vertical-wire diameter	For a 7 mm-tall (0.3 in) wire: 0.2 mm (0.008 in) diameter For a 30 mm-tall (1.2 in) wire: 1.5 mm (0.06 in)
Minimum embossed detail	0.1 mm (0.004 in)
Minimum engraved detail	0.15 mm (0.006 in)
Minimum clearance	0.5 mm (0.02 in)
Minimum hole diameter	0.5 mm (0.02 in)
Minimum drain hole diameter	2.5 mm (0.1 in)

5.3 Setting up a print

Form 3BL print jobs can be set up using PreForm, Formlabs' print preparation software. To start, open OBJ or STL files in PreForm, orient and layout multiple models into a complete build, then upload the print job to the printer. For detailed guidance and visual assistance, visit **support.formlabs.com**.

5.3.1 Downloading or updating PreForm

Visit the PreForm product webpage to download the latest version: **formlabs.com/software**. Learn how to use PreForm from the tutorials available in the software. Click **Help > Show Onboarding Tutorial** from PreForm's menu bar.

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5.3.2 Preparing the file for printing

Use PreForm software to process STL or OBJ files. Prepare, save, and upload FORM files to the printer.

5.3.2.1 Adding a model

Import multiple part files into PreForm to print multiple parts on a single build platform.

To add a model:

1. In the menu bar, click **File > Open**. The **Open File** window opens.
2. Select at least one file.
3. Click **Open**. The selected models appear in PreForm.

5.3.2.2 Orienting a model

Orienting a model within the build volume consists of two components: moving a model and rotating a model. Position a model to prevent suction cups and reduce minima.

To move a model to a different location:

1. Select the model in PreForm. Manipulators are overlaid on the model.
2. To move:
   - Click-and-drag the **Move** manipulator to a new location on the build platform.
   - Click-and-drag the selected model to a new location on the build platform.

To rotate a model along the X-, Y-, and Z-axes:

3. Select the model in PreForm. Manipulators are overlaid on the model.
4. Click **Orientation**. A dialogue box opens.
5. To rotate:
   - Click-and-drag along the sphere manipulator to spin the model freely.
   - Click-and-drag on a ring to move the model along that axis.
   - Enter a specific angle into an axis field.
   - Click on an axis arrow.
   - Hover the pointer over an axis field and use the scroll wheel.

5.3.2.3 Supporting a model

Supports reinforce overhangs and other delicate features for maximum printability. They should be removed after the print is complete. Supports can be auto-generated en masse or individually placed by hand.

To auto-generate supports:

1. Select the model in PreForm.
2. Click **Supports**. A dialog box opens.
3. Click **Auto-Generate All**. Supports are added to all models on the build platform.

To manually add and edit supports:

1. Select the model in PreForm. Manipulators are overlaid on the model.
2. Click **Supports**. A dialog box opens.
3. Click **Edit...**. The model turns gray and supports are shown as white touchpoints.
4. Click on the under-supported areas in red to add a support. White touchpoints appear where clicked.
5. Click **Apply**. Supports are regenerated and remaining under-supported areas are highlighted in red.
6. Repeat until the model is fully supported.

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5.3.2.4 Uploading a print

After orienting and supporting your model(s), and saving your FORM file, upload your print job to the printer. Both the printer and the computer running PreForm must be connected via USB or on the same network in order to upload a print job. Refer to section 4.6 Connecting the printer to a network for more information. Once transferred, print jobs must be confirmed on the printer's touchscreen to begin. Refer to section 5.4.2 Starting a print for more information.

To upload a print job from PreForm to the printer:

1. Click the orange printer icon on the **Home** screen. The **Print** window opens.
2. Click the **Select Printer** arrow to select a printer. The **Printer List** window opens.
3. Click the name of a printer you wish to select. The **Printer Details** window opens.
   - If the printer does not automatically appear in the **Printer List**, click **Add** to manually enter the printer's IP address.
4. Click **Select**. The **Job Setup** window opens.
5. Click **Apply**. The selected printer appears in the **Job Info** dialog box.
6. Enter or update the **Job Name**.
7. Click **Upload Job** to send the print job to the printer. Once the progress bar fills and the **Print** window closes, the upload is complete.

5.4 Preparing the printer for printing

Before a print job can begin, the Form 3BL must be set up to match the correct material settings. Insert the resin tank, build platform, and resin cartridge(s). Confirm the print job on the printer's touchscreen and wait for the print chamber inside the Form 3BL to preheat. For detailed guidance and visual assistance, visit **support.formlabs.com.**

5.4.1 Automatic consumables checks

The Form 3BL checks the following before each print:

- **Accessories:** Sensors check for the proper installation of the build platform, resin tank, and resin cartridges.
- **Temperature:** The print chamber and resin heat to around 35 °C (95 °F). Two heating fans blow air across the heater into the resin tank to heat the resin.
- **Resin:** Resin flows from each resin cartridge into the resin tank when the cartridge dispense arm squeezes the bite valve of each resin cartridge open. The Form 3BL regulates the volume of resin in the resin tank through a sensor called the LevelSense, which is located above the rear right-hand corner of the resin tank. The printer begins to fill the resin tank once a print starts and maintains the level of resin in the resin tank during the print. Printing begins automatically when LevelSense detects the proper amount of resin in the resin tank.

5.4.2 Starting a print

Once a print job is uploaded to the Form 3BL, the printer's touchscreen displays the next print job in the queue. To start the print, tap **Print** on the printer's touchscreen. If the file is not the next print job in the queue, tap the collapsed menu icon from **Home** to access the **Queue** screen.

To start a print on the printer's touchscreen:

Tap the print job on the **Home** screen, or from **Queue**. The print job screen appears.

Tap **Print** to confirm. A new screen appears.

Follow the prompts on the touchscreen to check the resin tank and cartridge(s) are inserted correctly, then tap **Confirm**. The print starts once the print chamber has reached around 35 °C (95 °F).

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5.4.3 Stopping a print

To stop a print in progress, tap **Pause > Abort** on the printer's touchscreen.

CAUTION

Moving parts. Do not open the printer cover until the printer's touchscreen indicates the print is complete. Moving parts present crushing and tangling hazards.

5.5 Finishing and post-processing a print

Finishing and post-processing includes all steps after printing. Bring a 3D model from a digital file to a functional print with the following steps. For detailed guidance and visual assistance, visit **support.formlabs.com**.

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

To finish and post-process a print:

1. Put on a new, clean pair of nitrile gloves.
2. When the print is complete, open the printer cover and lift up the platform lock.
3. Use both hands to grip the handles and remove the build platform from the printer.
4. Close the printer cover.
5. Wash the print in the Form Wash, Form Wash L, Form 3BL Finish Kit, or a Formlabs-approved third-party large-format ultrasonic cleaner. Formlabs products, such as the Form Wash L, can be used with either isopropyl alcohol or tripropylene glycol monomethyl ether as a washing solvent.

DANGER

Fire hazard: Isopropyl alcohol is a flammable chemical. Keep away from ignition sources, including open flames, sparks, or concentrated sources of heat.

6. Remove the solvent from the print.
   - If your solvent evaporates readily (e.g., isopropyl alcohol), allow at least 30 minutes for the solvent to fully evaporate after washing.
   - If your solvent does not evaporate readily (e.g., tripropylene glycol monomethyl ether), wash the prints with water to remove excess solvent.
7. Dry your prints. Ensure all prints are fully dry and free of excess solvent, resin, and other liquids before post-curing.
8. Post-cure your print with the Form Cure, Form Cure L, or a Formlabs-approved third-party large-format SLA post-curing unit to achieve a part's full mechanical properties.
9. Post-process your print by removing supports, sanding down blemishes, and adding paint.

5.6 Managing the printer

During and between prints, you can track your printer's usage, manage print jobs, and prepare for future print jobs. For detailed guidance and visual assistance, visit **support.formlabs.com**.

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5.6.1 Connecting the printer to Dashboard

Dashboard (formlabs.com/dashboard) allows individuals and teams to remotely monitor Formlabs printers, track material usage, and explore past and future Formlabs purchases. Register the Form 3BL to Dashboard through the printer's touchscreen. Once the printer is registered to Dashboard and Dashboard logging is enabled on the printer, the Form 3BLs sends data to Dashboard as long as the printer's Wi-Fi or Ethernet connections are able to access the internet.

5.6.2 Starting an uploaded print

To start an uploaded print job on the printer's touchscreen:

1. Confirm the resin tank, build platform, and one or two resin cartridges have been inserted into the printer.
2. Tap the print job from **Queue**.

Refer to section 5.4.2 Starting a print for more information.

5.6.3 Deleting an uploaded print

To delete an uploaded print job on the printer's touchscreen:

1. Tap the print job from **Queue**.
2. Tap **Delete**. If prompted, tap **Delete** again to confirm.

5.6.4 Changing resin types between prints

When changing resin types, always change both the resin tank and resin cartridges. Remove the resin cartridges before removing the resin tank to prevent the bite valves from dripping resin into the printer cavity. Refer to sections 6.7.3 Replacing the resin tank and 6.6.3 Replacing the resin cartridges for more information.

5.6.5 Checking and maintaining the resin temperature

The Form 3BL heats resin to a set temperature before starting a print. View the print chamber's current temperature on the printer's touchscreen.

The print chamber is heated by hot air blown from the right side of the printer, next to the resin cartridges. The warm air in the print chamber heats the resin, and the air temperature is measured by a thermal sensor at the air intake. The Form 3BL automatically preheats and maintains a consistent print chamber temperature before and between prints.

5.6.6 Turning off the printer

The Form 3BL is designed to be left powered on when not in use. Depending on your printer's firmware version, there is an option, accessible through the printer's touchscreen, that places the printer into sleep mode immediately or after a set period of inactivity.

Tap the printer's touchscreen, insert or remove consumables, or otherwise interact with the printer to wake it from sleep mode. For detailed guidance and visual assistance, visit **support.formlabs.com**.Turn off the machine completely when moving or storing the printer, and to conserve power.

To turn off the printer completely:

1. Press the power switch on the back of the machine, next to the power cord.
2. The printer turns off.

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6 Maintenance

Formlabs provides instructions to advise in installing, operating, and maintaining the machine. It shall only be maintained by a qualified and trained person. Unauthorized disassembly or repair procedures may damage the machine. There are two groups of maintenance procedures: regular, which should be done after every print, and intermittent maintenance, which only needs to be done occasionally. Please keep a log detailing when each intermittent maintenance procedure was last performed. For detailed guidance and visual assistance, visit **support.formlabs.com**.

WARNING

- Formlabs provides instructions to advise skilled and unskilled persons in installing, operating, and maintaining the Form 3BL. The Form 3BL shall only be maintained by a qualified and trained person.
- Do not open the machine and/or investigate internal components unless under the guidance of Formlabs or a certified service provider. Contact Formlabs Support or a certified service provider for any additional guidance.
- Unauthorized disassembly or repair procedures may damage the machine and void the warranty.
- Wear personal protective equipment (PPE) when performing maintenance tasks. Use tools only as described.
- Disconnect the machine from its power source before maintenance. Moving parts present crushing and tangling hazards.

6.1 Tools and supplies

Only use tools, chemicals, or procedures to maintain the Form 3BL that are outlined in this manual, by prompts on the printer's touchscreen, and **support.formlabs.com**.

Do not use any unapproved tools, chemicals, or procedures with the Form 3BL unless otherwise instructed to do so by Formlabs Support or a certified service provider.

- **Cleaning mesh**
  For cleaning the flexible film interior.
- **Cotton swabs**
  For cleaning the cartridge ID chips.
- **General purpose cleaner (e.g., glass cleaner) and/or soapy water**
  For cleaning the printer's cover, outer shells, and display.
- **Isopropyl alcohol (IPA), 90% or higher**
  - For cleaning the printer's optical components, build platform, and cartridge ID chips.
  - For cleaning the work surface and tools.
- **Lithium grease for ball bearings**
  For lubricating the X- and Z-axis screws.
- **Low-fiber paper towels**
  - For cleaning the work surface and tools.
  - For protecting sensitive components.
  - For wiping residue grease, resin, or solvent.

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- **Non-abrasive microfiber cloth**
  For cleaning the printer's cover, outer shells, and display.
- **PEC*PADs**
  For cleaning the printer's optical components and cartridge ID chips.
- **Rubber bulb air blower**
  For removing dust from the glass optical window.
- **Tank tool**
  For inspecting and cleaning the flexible film interior.

6.2 Inspecting and maintaining the printer

Inspect and maintain your printer and consumables to ensure that your printer continues to function properly and produce high print quality. For detailed guidance and visual assistance, visit **support.formlabs.com**.

6.2.1 Before each use

Inspect	Refer to	Section
Installation environment	Operational environment	4.1
Build platform	Cleaning the build platform	6.3.1
Resin cartridge bite valves	Inspecting the bite valves	6.3.2
Resin tank interior	Inspecting the resin tank	6.7.1

6.2.2 Monthly maintenance

Inspect	Refer to	Section
Resin cartridge ID chips	Inspecting the cartridge ID chips	6.4.1
Resin tank exterior	Inspecting the resin tank	6.7.1
Resin tank frame	Inspecting the resin tank	6.7.1

6.2.3 Periodic maintenance

Inspect	Refer to	Section
Cover	Inspecting the cover	6.5.1
Display	Inspecting the display	6.5.2
Drip catcher	Inspecting the drip catcher	6.5.3
Shells	Inspecting the shells	6.5.4
X- and Z-axis screws	Maintaining the X- and Z-axis screws	6.5.5

6.3 Tasks between uses

Perform the following maintenance tasks between each print. For detailed guidance and visual assistance, visit **support.formlabs.com**.

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

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6.3.1 Cleaning the build platform

The build platform is the aluminum base that provides a surface for prints to attach to. Avoid exposing a resin-covered build platform to light directly after a print completes. Liquid resin cures in ambient light, and resin left on the surface of a build platform renders it unusable.

Required supplies		
Isopropyl alcohol	Low-fiber paper towels	Non-reactive nitrile gloves

When switching to a different resin type between prints or storing the build platform for future use, clean the surface and edges of the build platform with isopropyl alcohol and low-fiber paper towels. If you are starting a new print immediately using the same resin type, there is no need to remove liquid resin.

6.3.2 Inspecting the bite valves

The bite valve is located on the underside of each resin cartridge. This flexible seal regulates resin dispensing. Resin flows out of the opening in the center of the bite valve when the cartridge dispense arm squeezes the bite valve open. When switching to a different resin cartridge, inspect the bite valve for any cured resin or damage.

6.3.3 Inspecting the resin tank interior

Refer to section 6.7.1 Inspecting the resin tank.

6.4 Monthly maintenance

Perform the following maintenance tasks on a monthly basis. For detailed guidance and visual assistance, visit **support.formlabs.com**.

6.4.1 Inspecting the cartridge ID chips

The ID (identification) chip is located on the bottom of each resin cartridge near the bite valve. The cartridge ID chips detect, track, and match the resin type in the resin tank with the proper resin cartridge.

Protect the cartridge ID chips and spring fingers from cured resin, contamination, or damage. Cured resin or contamination prevents the printer from properly identifying the resin cartridges during insertion or use. Avoid exposing the cartridge ID chips to liquid resin.



Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

Required supplies		
Cotton swabs	Isopropyl alcohol	Non-reactive nitrile gloves

To clean the cartridge ID chips:

1. Put on a new, clean pair of nitrile gloves.
2. Dampen a new cotton swab with clean isopropyl alcohol.
3. Rub the tip of the cotton swab onto the two silver pads on the cartridge ID chips until the resin or contamination has dissolved completely.

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NOTICE

Avoid getting isopropyl alcohol on other parts of the resin cartridge. Ensure that any isopropyl alcohol on the cartridge ID chips dries completely before inserting the resin cartridges.

6.4.2 Inspecting the resin tank exterior

Refer to section 6.7.1 Inspecting the resin tank.

6.5 Periodic maintenance

Perform the following maintenance tasks periodically or as needed. For detailed guidance and visual assistance, visit **support.formlabs.com**.

6.5.1 Inspecting the cover

Visually inspect the cover for traces of resin, cracks, or other damage. Clean the cover with a non-abrasive microfiber cloth and soapy water or a general purpose cleaner, such as glass cleaner. In the case of a crack that allows light to pass through the cover, install a new cover. Refer to section 8 Disassembly and repair for more information.

6.5.2 Inspecting the display

Visually inspect the display for any traces of resin. Clean the display with a non-abrasive microfiber cloth and general purpose cleaner, such as glass cleaner.

6.5.3 Inspecting the drip catcher

Visually inspect the drip catcher for any traces of resin. Clean the drip catcher with isopropyl alcohol and low-fiber paper towels.

WARNING

Moving parts. Disconnect the machine from its power source. Moving parts present crushing and tangling hazards.

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

Required supplies		
Isopropyl alcohol	Low-fiber paper towels	Non-reactive nitrile gloves

To inspect and clean the drip catcher:

1. Put on a new, clean pair of nitrile gloves.
2. Disconnect the printer from its power source.
3. Remove the build platform, resin tank, and resin cartridges to access the drip catcher, which is the area below the tank spout or under the cartridge dispense arm.
4. Visually inspect the drip catcher.
5. Clean any traces of resin or contamination with isopropyl alcohol and low-fiber paper towels.

6.5.4 Inspecting the shells

Visually inspect the rear, front, side, and top shells for traces of resin or other damage. Clean any traces of resin or contamination with soapy water and low-fiber paper towels.

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6.5.5 Maintaining the X- and Z-axis screws

The Light Processing Unit (LPU) housing and the build platform carriage ride along the X-axis ball screw and Z-axis lead screw, respectively. Both screws must be lubricated for these X- and Z-axis components to move smoothly and quietly.



Moving parts. Disconnect the machine from its power source. Moving parts present crushing and tangling hazards.

6.5.5.1 Inspecting the X- and Z-axis screws

Visually inspect the X- and Z-axis screws to ensure that the LPU housing and build platform carriage move smoothly and that there is no debris built up in the screw threads.

Required supplies		
Microfiber cloth or low-fiber paper towels	Lithium grease for ball bearings	Non-reactive nitrile gloves

To inspect the X-axis screw:

1. Put on a new, clean pair of nitrile gloves.
2. Rotate the X-axis screw. Depending on your printer's firmware version, there is a maintenance option, accessible through the printer's touchscreen, that moves the build platform carriage or LPU housing along their respective screws. For detailed guidance and visual assistance, visit **support.formlabs.com**.
3. As the LPU housing moves right and left, listen, look, and feel to check for areas that emit noise or where the tank carrier sticks or moves less smoothly.
4. Visually inspect the ball screw to ensure that no debris or foreign objects obstruct the ball screw or path of motion.
5. Visually inspect the ball screw to ensure that lubricant covers the full length of the screw threads.
6. In the case that the screw is missing lubricant or if the X-axis emits intermittent noises when printing, lubricate the ball screw using the instructions below.

To inspect the Z-axis screw:

1. Put on a new, clean pair of nitrile gloves.
2. Rotate the Z-axis screw. Depending on your printer's firmware version, there is a maintenance option, accessible through the printer's touchscreen, that moves the build platform carriage or LPU housing along their respective screws. For detailed guidance and visual assistance, visit **support.formlabs.com**.
3. As the build platform carriage moves up and down, listen, look, and feel to check for areas that emit noise or where the build platform carriage sticks or moves less smoothly.
4. Visually inspect the lead screw to ensure that no debris or foreign objects obstruct the lead screw or path of motion.
5. Visually inspect the lead screw to ensure that lubricant covers the full length of the screw threads.
6. In the case that the screw is missing lubricant or if the Z-axis emits intermittent noises when printing, lubricate the lead screw using the instructions below.

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6.5.5.2 Lubricating the X- and Z-axis screws

To lubricate the X- and Z-axis screws:

1. Put on a new, clean pair of nitrile gloves.
2. Disconnect the printer from its power source.
3. Remove the build platform and resin tank.
4. Place a clean low-fiber paper towel over the LPU housing and roller holder.
5. Remove old and dirty grease from the screw using a paper towel.
6. Apply a light layer of lithium grease specifically intended for use with ball bearings evenly along the screw. Apply the lubricant directly from the container or by dabbing lubricant onto the screw with a gloved hand.
7. Rotate the screw.
   - Depending on your printer's firmware version, there is a maintenance option, accessible through the printer's touchscreen, that moves the build platform carriage or LPU housing along their respective screws. For detailed guidance and visual assistance, visit **support.formlabs.com**.
   - **X-axis**: As the LPU housing moves right and left, listen, look, and feel to check for areas that emit noise or where the tank carrier sticks or moves less smoothly.
   - **Z-axis**: As the build platform carriage moves up and down, listen, look, and feel to check for areas that emit noise or where the build platform carriage sticks or moves less smoothly.
8. Wipe the screw with a microfiber cloth or low-fiber paper towel to remove excess lubricant.

6.6 Planned maintenance

Perform the following maintenance tasks at the frequency specified in the table below. For detailed guidance and visual assistance, visit **support.formlabs.com**.

Maintenance tasks shall be done according to the following plan:

Task	Frequency	Refer to	Section
Updating the firmware	When PreForm indicates a new firmware version is available.	Updating the firmware	6.6.1
Filtering the resin	When a cleaning mesh does not sufficiently remove particles from the resin tank.	Filtering the resin	6.6.2
Replacing the resin cartridges	When the resin cartridges are empty, after 1 liter of printing each.	Replacing the resin cartridges	6.6.3
Cleaning the roller holder	Every 30,000 layers printed.	Cleaning the roller holder	6.6.4
Cleaning the glass optical window	When the glass optical window is smudged or contaminated.	Cleaning the glass optical window	6.6.5
Replacing the resin tank	When wear on the flexible film begins to affect print quality. When the printer indicates that the resin tank has reached the end of its usable lifetime.	Replacing the resin tank	6.7.3

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Task	Frequency	Refer to	Section
Lubricating the X- and Z-axis screws	Every 12 months, if the LPU housing or build platform carriage does not move smoothly, or emit intermittent noises when printing.	Maintaining the X- and Z-axis screws	6.5.5

6.6.1 Updating the firmware

Formlabs regularly releases updated firmware to fix bugs and improve functionality. Review the PreForm and firmware release notes to learn more about the improvements that come with each version's release. For detailed guidance and visual assistance, visit **support.formlabs.com**.

6.6.2 Filtering the resin

Filter resin to remove contamination and very small particulates of partially cured resin. For detailed guidance and visual assistance, visit **support.formlabs.com**.



Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

Required supplies			
Non-reactive nitrile gloves	Opaque container suitable for storing resin	Paint or oil filters ("fine" or 190 micron mesh size)	Tank tool

To filter the resin:

1. Put on a new, clean pair of nitrile gloves.
2. Suspend the paint or oil filter (with a "fine" or 190 micron mesh size) above an opaque container suitable for storing resin. Use a ring stand to reduce the risk of spilling resin.
3. Remove the resin tank and mixer. Place the mixer aside on a protected surface.
4. Hold the edge of the resin tank, taking care not to touch the resin tank's underside.
5. Tilt the resin tank with the tank spout aligned directly above the filter.
6. Pour the resin through the filter, into the opaque plastic container.
7. Gently scrape the flexible film with the tank tool to pull resin toward the tank spout.
8. Once all resin passes through the filter, pour the resin back into the resin tank.
9. To dispose of the used filter, refer to section 9.1 Disposal of resin and accessories.

6.6.3 Replacing the resin cartridges

Replace the resin cartridges to change materials between prints or when a resin cartridge is empty.

To replace the resin cartridges:

1. Press the vent caps closed.
2. Hold the resin cartridge by their handles.
3. Lift the resin cartridges out of the printer.
4. Store or dispose of the resin cartridges. For detailed guidance and visual assistance, visit **support.formlabs.com**.
5. To install new resin cartridges, refer to section **4.10 Inserting the resin cartridges**.

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NOTICE

Store the resin cartridges upright with the valve covers installed to protect storage surfaces from resin.

6.6.4 Cleaning the roller holder

The roller holder is mounted on top of the Light Processing Unit (LPU) housing and allows for smooth movement of the LPU housing across the flexible film interior. The roller holder also houses the glass optical window. A clean roller holder protects the flexible film and preserves print quality. For detailed guidance and visual assistance, visit **support.formlabs.com**.

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

Required supplies		
Isopropyl alcohol	Non-reactive nitrile gloves	PEC*PADs or low-fiber paper towels

To clean the roller holder:

1. Put on a new, clean pair of nitrile gloves.
2. Add a small amount of clean isopropyl alcohol to a PEC*PAD or low-fiber paper towel.
3. Wipe the PEC*PAD or paper towel across the roller holder to remove any dust or debris that has accumulated. Do not wipe the dust or debris into the printer cavity containing the glass optical window.

If dust or debris has fallen onto the glass optical window, use compressed air to clean in and around the glass optical window to avoid scratching it. If the glass optical window is smudged, refer to section **6.6.5 Cleaning the glass optical window**.

6.6.5 Cleaning the glass optical window

The glass optical window is embedded in the roller holder and mounted on top of the Light Processing Unit (LPU) housing. During a print, laser light from the LPUs passes through the glass optical window and into the resin tank. A clean glass optical window preserves print quality. For detailed guidance and visual assistance, visit **support.formlabs.com**.

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

Required supplies			
Isopropyl alcohol	Non-reactive nitrile gloves	PEC*PADs	Rubber bulb air blower

To clean the glass optical window:

1. Put on a new, clean pair of nitrile gloves.
2. Use a rubber bulb air blower to gently remove any visible dust from the glass optical

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window. Make sure to remove any large particles that may scratch the glass surface.
3. Use a new PEC*PAD to remove any remaining dust from the glass surface with a dry wipe. Wipe slowly, pulling the PEC*PAD toward you, repeating until you have cleaned the entire glass surface.
4. Apply a small amount of isopropyl alcohol to a new PEC*PAD.
5. Wipe the glass surface slowly with the PEC*PAD, pulling the PEC*PAD toward you. Repeat this step until you have cleaned the entire glass surface.
6. Dry wipe the glass surface again with a new PEC*PAD to remove any remaining streaks.

6.7 Maintaining the resin tank

The resin tank is the primary container for holding resin after it is dispensed from the resin cartridges. Resin is cured onto the build platform when the laser passes through the flexible film of the resin tank. Be sure to handle and maintain the resin tank properly between each print. For detailed guidance and visual assistance, visit **support.formlabs.com**.

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

NOTICE

Spill hazard: Resin may spill over the tank walls if the resin tank tilts more than 5–10 degrees. Hold the resin tank level with two hands. To inspect and clean the resin tank's underside, empty the resin tank and/or take care to avoid spilling resin outside the resin tank.

NOTICE

Sharp and metal tools can damage the dual-layer, flexible film and affect print quality, leading to print failures and/or a resin spill. Do not use sharp or metal tools like the removal tool, scraper, or flush cutters to inspect or clean the resin tank. Only use the tank tool to inspect and remove cured resin from the flexible film inside the resin tank.

6.7.1 Inspecting the resin tank

For the best results, inspect resin tanks regularly and, if necessary, clean them. Dirty optical surfaces and damage to the flexible film may cause print failures.

Required supplies	
Non-reactive nitrile gloves	Tank tool

To inspect the resin tank interior:

1. Put on a new, clean pair of nitrile gloves.
2. Use the tank tool to inspect the resin and the resin tank interior. Refer to section 7.3 Cleaning after a failed print, **Steps 1–3**.
3. Check for the following issues that may lead to print failures or any excessive wear that requires switching to a new resin tank:
   - Cured resin on the flexible film
   - Debris or failed prints in the resin

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- Punctures, cuts, or gouges in the flexible film

4. Check that the mixer and float are properly installed in the tank case. Refer to section 4.8 Inserting the resin tank and mixer for more information.
5. If necessary, follow cleaning instructions to remove cured resin, failed prints, debris, and settled pigment on the flexible film.
   - For moderate wear or scratches on the flexible film interior, use the **Layout** tool in PreForm to move the model outside the worn or scratched area.
   - In the case of excessive wear or scratches on the flexible film interior, switch to a new resin tank. Refer to section 6.7.3 Replacing the resin tank.

To inspect the resin tank exterior:

1. Put on a new, clean pair of nitrile gloves.
2. Visually inspect the resin tank exterior for fingerprints, dust, contamination, and scratches, which cause the laser light to diffuse and lead to print failures or inaccuracies.
3. If necessary, use the cleaning instructions to remove any fingerprints, dust, or contamination on the flexible film.
   - For moderate wear or scratches on the flexible film exterior, use the Layout tool in PreForm to move the model outside the worn or scratched area.
   - In the case of excessive wear or scratches on the flexible film exterior, switch to a new resin tank. Refer to section 6.7.3 Replacing the resin tank.

To inspect the tank frame:

1. Put on a new, clean pair of nitrile gloves.
2. Visually inspect the tank frame for contamination or resin. Resin on the tank frame may result in print failures and/or damage to the roller holder. If the roller holder is contaminated, refer to section 6.6.4 Cleaning the roller holder.

6.7.2 Cleaning the resin tank

Keep the resin tank—especially the top and underside surfaces of the flexible film—clean and free of cured resin and other debris to ensure print quality and extend the lifetime of the printer.

Required supplies

Resin tank interior	Resin tank exterior	Tank frame
Cleaning mesh Non-reactive nitrile gloves Tank tool	Isopropyl alcohol Non-reactive nitrile gloves PEC*PADs	Low-fiber paper towels Non-reactive nitrile gloves

To clean the resin tank interior:

- **Print failures:**
  - Refer to section 7.3 Cleaning after a failed print.
  - Clean the resin tank interior using a cleaning mesh or manually with the tank tool.
- **Debris or contamination in the resin:**
  - Refer to section 6.6.2 Filtering the resin.
  - Clean, debris-free resin helps avoid print failures, which may damage the resin tank.
- **Settled pigment in the resin:**
  - Resin pigment can settle onto the flexible film interior. To supplement the mixer's function, slide the tank tool against the flexible film to remove settled pigment.

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To clean the resin tank exterior:

1. Put on a new, clean pair of nitrile gloves.
2. Empty the liquid resin from the resin tank into an opaque container.
3. Apply a small amount of clean isopropyl alcohol to a PEC*PAD.
4. Wipe the flexible film exterior to remove contamination or resin.

To clean the tank frame:

1. Put on a new, clean pair of nitrile gloves.
2. Wipe the tank frame with a low-fiber paper towel to remove contamination or resin.

6.7.3 Replacing the resin tank

Replace the resin tank to change materials between prints or when a resin tank is damaged or needs to be cleaned.

To replace the resin tank:

1. Put on a new, clean pair of nitrile gloves.
2. Remove the build platform from the printer.
3. Hold the side walls of the resin tank.
4. Gently slide the resin tank away from and out of the printer.
5. Store the resin tank in the tank case with the lid closed.
6. To install a new resin tank, refer to section 4.8 Inserting the resin tank and mixer.

To dispose of the old resin tank, refer to section 9.1 Disposal of resin and accessories.

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7 Troubleshooting

7.1 Collecting diagnostic logs

The Form 3BL maintains diagnostic logs to provide detailed information about the machine that may expedite issue investigation. After experiencing any error or unusual behavior on the Form 3BL, include the diagnostic logs with other relevant observations and details when contacting Formlabs Support or a certified service provider. The options for sharing diagnostic logs vary depending on the machine's connection type. For detailed guidance and visual assistance, visit **support.formlabs.com**.

7.2 Performing a factory reset

On some occasions, a factory reset may correct unusual printer behavior. Unusual behavior may include unknown error messages, incomplete firmware updates, an unresponsive touchscreen, or trouble connecting to PreForm. For detailed guidance and visual assistance, visit **support.formlabs.com**.

NOTICE

Do not perform a factory reset immediately before contacting Formlabs Support or a certified service provider. The stored diagnostic information may be helpful to Formlabs Support or a certified service provider to assist with troubleshooting. A factory reset erases diagnostic information and custom settings, including uploaded print jobs and networked connections.

7.3 Cleaning after a failed print

Occasionally, a print may fail to complete. A failed print may leave small, partially-cured pieces of resin floating in the resin tank or hard cured resin stuck to the flexible film interior. Inspect the resin tank after every print. Remove debris after a failed print. For detailed guidance and visual assistance, visit **support.formlabs.com**.

WARNING

Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

NOTICE

Sharp and metal tools can damage the dual-layer, flexible film and affect print quality, leading to print failures and/or a resin spill. Do not use sharp or metal tools like the removal tool, scraper, or flush cutters to inspect or clean the resin tank. Only use the tank tool to inspect and remove cured resin from the flexible film inside the resin tank.

7.3.1 Removing cured resin with the cleaning mesh

Formlabs Low Force Stereolithography (LFS)™ printers can print a cleaning mesh, which is a thin, flat printed part that binds loose debris together. The cleaning mesh adheres to the flexible film interior for removal using the tank tool. Print a cleaning mesh after a failed print to more easily remove cured resin and other debris.

Required supplies		
Non-reactive nitrile gloves	Paper towels	Tank tool

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To remove cured resin with the cleaning mesh:

1. Put on a new, clean pair of nitrile gloves.
2. Tap the wrench icon on the **Home** screen. The **Settings** screen appears.
3. Tap **Maintenance**. The **Maintenance** menu appears.
4. Tap **Cleaning Mesh**. The **Print Cleaning Mesh** screen appears.
5. Tap **Clean**. The cleaning mesh begins printing.
6. Once the cleaning mesh is complete:
   a. Remove the build platform and resin cartridges from the printer.
   b. Remove the resin tank from the printer. Place the resin tank in the tank case on a clean, flat surface.
7. Separate the top and bottom parts of the tank tool. Place the top part aside.
8. Prepare several paper towels nearby to collect cured and uncured resin.
9. To remove the cleaning mesh:
   a. Slide the long edge of the tool under the edge of the cleaning mesh.
   b. Pry with moderate pressure. Slide or pry from different angles or increase pressure to detach the cleaning mesh from the film surface. Do not press directly into the flexible film with the edge of the tank tool.
   c. Rest the cleaning mesh on the blade of the tank tool.
   d. Lift the cleaning mesh out of the resin tank.
      i. If the tank tool cannot hold the cleaning mesh:
         - ☐ Attach the top part of the tank tool to the bottom part.
         - ☐ Squeeze the cleaning mesh between the two ends.
   e. Rest the cleaning mesh on paper towels.
10. To dispose of the cleaning mesh, refer to section 9.1 Disposal of resin and accessories.
11. Clean the tank tool and work surface.

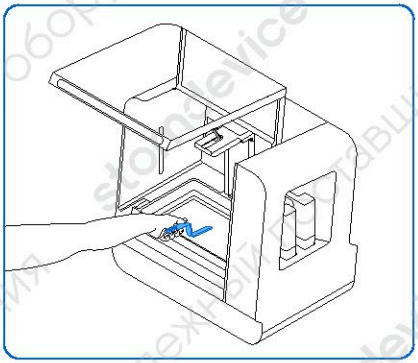
7.3.2 Removing cured resin manually

The Form 3BL comes with a tank tool, which is a custom two-part scraper and tweezers. The tank tool is made of plastic and has rounded edges to protect the flexible film interior. Remove individual pieces of cured resin from the resin tank with the tank tool.

Required supplies		
Non-reactive nitrile gloves	Paper towels	Tank too

To manually remove cured resin:

1. Put on a new, clean pair of nitrile gloves.
2. Remove the build platform and resin cartridges from the printer.
3. Remove the resin tank from the printer. Place the resin tank in the tank case on a clean, flat surface.
4. Separate the top and bottom parts of the tank tool. Place the top part aside.
5. Prepare several paper towels nearby to collect cured and uncured resin.



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6. Rest the long edge of the tank tool on the flexible film interior. Skim the film surface. Search for obstructions that indicate cured resin stuck to the flexible film.
7. To remove cured resin:
   a. Slide the long edge of the tool under the edge of the cured resin.
   b. Pry with moderate pressure. Slide or pry from different angles or increase pressure to detach cured resin from the film surface. Do not press directly into the flexible film with the edge of the tank tool.
   c. Rest the cured resin on the blade of the tank tool.
   d. Lift the cured resin out of the resin tank.
      i. If the tank tool cannot hold the cured resin:
         1. Attach the top part of the tank tool to the bottom part.
         2. Squeeze the cured resin between the two ends.
   e. Rest the cured resin on paper towels.
8. To dispose of cured resin, refer to section 9.1 Disposal of resin and accessories.
9. Clean the tank tool and work surface.

7.3.3 Cleaning the tank tool

Clean the tank tool after each use to remove excess liquid resin and prevent contamination.

Required supplies	
Wiping	**Washing**
Isopropyl alcohol Low-fiber paper towels Non-reactive nitrile gloves	Form Wash L or Form 3BL Finish Kit Isopropyl alcohol Non-reactive nitrile gloves

To wipe the tank tool:

1. Put on a new, clean pair of nitrile gloves.
2. Apply clean isopropyl alcohol to a clean low-fiber paper towel.
3. Wipe the surface of the tank tool to remove resin.
4. Allow the tank tool to air dry after wiping.

To wash the tank tool:

1. Put on a new, clean pair of nitrile gloves.
2. Rest the tank tool in the wash basket of the Form Wash L or rinse bucket of the Form 3BL Finish Kit.
3. Wash the tank tool for five minutes. Increase the wash time for heavily-used solvent.
4. Allow the tank tool to air dry after washing.

7.4 Troubleshooting errors or abnormal activity

In the case of errors, abnormal activity, or print failures with the Form 3BL, reference the following errors, causes, and proposed solutions. Complete the initial troubleshooting steps and carefully document all results. For detailed guidance and visual assistance, visit **support.formlabs.com**.

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7.4.1 Resolving abnormal functions during print setup

Error	Cause	Solution
The bite valve does not dispense resin.	• The silicone material has sealed itself. • Resin may cure over the bite valve opening.	1. Press the vent cap closed and remove the resin cartridge from the printer. 2. Turn the cartridge upside down to inspect the bite valve. 3. Squeeze the bite valve a few times to open up the seal and enable resin flow. 4. If squeezing the bite valve does not enable resin flow, carefully use the tip of the tweezers from the Form Wash L or Form 3BL Finish Kit to push through the opening to enable resin flow. 5. If the bite valve seal remains closed after troubleshooting, contact Formlabs Support or a certified service provider for additional help. Submit photos of the bite valve seal with your request.
The orange **Print** icon is not available in PreForm.	The printer may not be properly connected to the same LAN.	• Check for other open instances of PreForm. • Save any files before restarting PreForm. • Disconnect your printer from the LAN and reconnect to establish a proper connection.
Error messages • Missing Resin Tank • Missing Cartridge	The printer cannot sense the inserted resin tank and/or cartridge.	1. Fully remove the resin tank and/or cartridge. 2. Reinsert the resin tank and/or cartridge.

7.4.2 Resolving print failures and errors

Print failures can manifest in different ways and originate from different causes. Check the model configuration in PreForm, the cleanliness of the optical surfaces, and the machine's operating condition according to section 6 Maintenance, including the proposed solutions below.

If print failures persist after following these steps, contact Formlabs Support or a certified service provider for additional guidance. In order to introduce a known good variable to isolate any printing issues, run a Formlabs test print, for which the file is available on **support.formlabs.com**. Provide clear, focused photographs of the test print to help diagnose the issue.

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Error	Cause	Solution
Delamination • Peeling or separation between printed layers OR • Pieces of cured parts float in the resin tank	• Model orientation, layout, and/or support issues • A print that has been paused for a long time • An older resin tank • A loose build platform • Contaminated optical surfaces	• Check the model in PreForm • Check for pauses in printing • Check the resin tank for debris or damage • Check the cleanliness of optical surfaces • Check the stability of the build platform
Non-adherence • Prints partially attached to the build platform OR • Prints completely non-existent on the build platform	• Printing without supports • The first layer of the part on the build platform is too small to withstand peel forces • Debris/damage in resin tank • Contaminated optical surfaces • Build platform height requires adjustment	• Print with a base and supports • Check that the first layer's surface area is sufficiently large • Check the resin tank for debris or damage • Check the cleanliness of optical surfaces • Check the build platform height
Overcompression The base printed onto the build platform is thinner than expected and/or very difficult to remove.	The initial layers fail to cure properly, due to insufficient space between the build platform and the flexible film.	• Increase the base height in PreForm's advanced settings • Check the build platform height
Poor surface finish • Cured or partially cured resin forms thin, shelf-like structures that hang horizontally from a print OR • A rough, uneven, or bumpy surface texture forms on one or both sides of an otherwise successful print	Diffused laser light spreads the cure area beyond the appropriate limits for each layer outline, due to: • Expired resin • Debris/damage in the resin tank • Contaminated optical surfaces • Restricted resin flow due to improper model orientation or overly dense supports	• Check the resin's shelf life • Check the resin tank for debris or damage • Check the cleanliness of optical surfaces • Check for restricted resin flow
Undeveloped feature A void of missing material forms within a print and widens as the print builds away from the build platform.	• Debris/damage in resin tank • Model orientation, layout, and/or support issue • Contaminated optical surfaces	• guideCheck the resin tank for debris or damage • Check the model in PreForm • Check the cleanliness of optical surfaces
Holes or lines Models have linear cuts or holes.	Obstructions in the optical path block the laser from curing resin in a specific part of the model.	• Check the resin tank's underside for debris or damage • Check the cleanliness of optical surfaces

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8 Disassembly and repair

WARNING

All steps that involve opening the machine and/or investigating internal components should be done by skilled persons under the guidance of Formlabs Support or a certified service provider.

Contact Formlabs Support or a certified service provider to receive repair instructions and authorization, including how to disassemble or remove the shells.

Task	Frequency
Replacing the roller holder	When the roller holder is damaged and does not move smoothly or after 300,000 layers.
Replacing the Light Processing Units (LPUs)	When advised by Formlabs Support or a certified service provider.
Replacing the display assembly	When the display becomes inoperable or does not respond to touch inputs.

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9 Recycling and disposal

9.1 Disposal of resin and accessories



Skin irritant: Resin and solvent may cause skin irritation or an allergic skin reaction. Wear gloves when handling liquid resin, resin-coated surfaces, or solvent. Wash skin with plenty of soap and water.

9.1.1 Liquid resin

To dispose of pure resin (resin that has not been cured or dissolved in solvent), add this waste to your chemical waste stream.



ENVIRONMENTAL HAZARD: Refer to the safety data sheet (SDS) and local authorities for guidance on disposing of resin and solvent. Liquid resin (whether pure liquid, dissolved in solvent, or partially cured) may be classified as hazardous waste in your region and shall be disposed of with care.

If you do not have a chemical waste stream:

1. Put on a new, clean pair of nitrile gloves.
2. Pour a small amount of resin into a labeled container suitable for storing resin.
3. Leave the container outside, exposed to sunlight to cure for 1–10 days. Expose resin to 405 nm light and heat for the most effective curing. The liquid resin cures to solid material when exposed to light and heat.
4. Dispose of the fully cured resin and container in the household waste.

9.1.2 Cured resin or cleaned prints

Dispose of cleaned prints and cured (hardened) resin in the household waste. Cleaned prints and cured resin cannot be recycled.

9.1.3 Empty resin cartridges

In the United States, empty resin cartridges are considered RCRA empty by EPA standards and can be disposed of as household waste. Regulations that control waste are often regional and vary by jurisdiction. Check with applicable local agencies to ensure that you are disposing of empty resin cartridges properly.

OPTIONAL: Triple rinse resin cartridges with clean solvent to remove traces of excess resin from the resin cartridge interior. Add the resulting used solvent to your chemical waste stream in accordance with all applicable regulations.

9.1.4 Resin tanks

Dispose of a resin tank when it is damaged, has reached the end of its lifetime, or is otherwise unsuitable for use.

To dispose of a resin tank:

1. Put on a new, clean pair of nitrile gloves.
2. Remove the build platform from the printer.
3. Hold the side walls of the resin tank.
4. Gently slide the resin tank away from and out of the printer.

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5. Transfer or dispose of the remaining resin.
   - Pour the resin from the old resin tank to a new resin tank or another container.
   - If there is debris or cured parts in the resin, filter the resin before transferring it to a new resin tank. Refer to section 6.6.2 Filtering the resin for more information.

NOTICE

Pouring resin back into the original resin cartridge may risk contaminating the resin cartridge with cured resin pieces or debris, which can cause print failures.

6. Use a paper towel to wipe any remaining resin off the old resin tank.
7. Place the old resin tank in sunlight (a window sill is fine) or UV light to cure excess resin, and dispose of properly once cured.

9.2 Disposal of solvent

Safe and appropriate disposal methods of used solvent vary by location.

To safely dispose of used solvent:

1. Consult the safety data sheet (SDS) from the solvent supplier as the primary source of information.
2. Research the approved methods of disposal for your area. This will most likely involve hiring a waste disposal service. For smaller amounts, check with a hazardous disposal service to see if they have any suggestions for removal.
3. Inform your waste disposal service that your bottle contains solvent with small amounts of methacrylated monomers and oligomers (unpolymerized plastic resin) and trace amounts of photoinitiator. Have a copy of the Formlabs resin safety data sheet (SDS) on hand in case the disposal service attendant needs more information.

9.3 Recycling of solvent

For large volumes of solvent, consider using a solvent recycling system, which offers a cost-effective and more environmentally responsible alternative to paying for waste solvent disposal services. Solvent recycling systems use distillation and fractionation processes to remove solutes from waste solvents, making it possible to reuse the solvent to wash prints. The recycled solvent may still have small amounts of monomers in it. Recycling solvent reduces waste disposal costs, emissions that are required to produce solvents, and the cost of purchasing solvent.

9.4 Disposal of electronic components

The symbol on the product, the accessories, or packaging indicates that this device shall not be treated as nor disposed of with household waste. When you decide to dispose of this product, do so in accordance with environmental laws and guidelines. Dispose of the device via a collection point for the recycling of waste electrical and electronic equipment. By disposing of the device in the proper manner, you help to avoid possible hazards for the environment and public health that could otherwise be caused by improper treatment of waste equipment. The recycling of materials contributes to the conservation of natural resources. Therefore do not dispose of your old electrical and electronic equipment with the unsorted municipal waste.

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9.5 Disposal of packaging waste

The packaging is made of cardboard and plastic-based materials. Dispose of packaging through waste and recycling facilities. By disposing of the packaging waste in the proper manner, you help avoid possible hazards for the environment and public health.



Save the Form 3BL's packaging including any inserts for transporting the machine. Original packaging is required for warranty service and designed to be kept and reused for transportation or shipping.

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11 Glossary

Term	Meaning
Bite valve	A flexible, rubber seal that regulates resin dispensing. Resin flows out when the cartridge dispense arm squeezes the bite valve open.
Build platform–see also, platform lock	The aluminum base provides a surface for prints to attach to.
Build platform carriage	The metal arm that the build platform slides onto.
Build platform jig	Stabilize the build platform for the secure removal of prints. Secure the build platform jig to the edge of your work surface by tightening the jig screw clamps underneath the work surface.
Build platform sensor	Each Form 3BL build platform has an RFID sticker. The printer senses the RFID sticker to detect when the build platform is properly installed.
Cartridge dispense arm	Plastic hooks press against the bite valve to dispense resin out of the resin cartridge into the resin tank.
Cartridge ID chip	An Electrically Erasable Programmable Read-Only Memory (EEPROM) chip programmed with the resin type is attached to each cartridge skirt. This chip communicates to the printer via spring fingers on the cartridge floor.
Cartridge spring fingers	Two electrical contacts comprise the spring fingers located on the cartridge floor. The physical contact establishes an electrical connection with the cartridge ID chip to detect the resin cartridge.
Cleaning mesh	A thin, flat printed part that binds loose resin and other debris together in the resin tank for removal and disposal. Together with the tank tool it is the only tool to clean the resin tank interior.
Cover	The printer lid, made of metal and a strong, orange-tinted material, blocks exposure to the lasers and protects the resin from curing due to ambient light.
Display assembly	The display assembly contains the touchscreen and the display circuit board. A ribbon cable connects the display assembly to the motherboard.
Display cable	A flat, flexible cable connects the display assembly to the motherboard.
Display PCB	This circuit board, separated from the main motherboard, controls the touchscreen.
Drying tray	Place washed prints on the drying tray to drip dry.
Ethernet port	The Form 3BL can connect to a network via Ethernet. The port is connected to the motherboard and can be accessed from the back of the machine.
Fans	Two heating fans blow air across the heater into the resin tank. Cooling fans pull warm air away from electronic components.
Flexible film	A durable, dual-layer film comprises the resin tank's underside. Parts print in the resin-filled gap between the flexible film and the build platform. The print quality depends on the flexible film being clean and clear of damage and debris.

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Term	Meaning
Film tensioner	A motor pulls outward on the tank side walls to create a taut film surface in the resin tank.
Flush cutters	Snip to separate prints from their supports. Cut with the flat side on the prints' surface for minimal support marks.
Glass optical window	A narrow piece of anti-reflective coated glass that is surrounded by the roller holder. The glass optical window protects the sensitive mirrors inside the LPUs from dust and other contamination. Maintain a clean glass optical window to prevent print failures.
Heater	The resin in the resin tank is heated by hot air blown out of the right side of the printer, next to the resin cartridges. The warm air in the print chamber heats the resin, and the air temperature is sensed by a thermal sensor at the air intake.
Interlock magnets	The interlock sensor detects these magnets to determine when the cover is closed. This safety mechanism triggers the **Cover Open** message on the touchscreen and disables the lasers when the cover is open.
Laser	Short for "Light Amplification" via "Stimulated Emission of Radiation." The lasers are the source of curing energy in the printer with a wavelength of 405 nm, and a maximum output of 250 mW per laser. The Form 3BL is a Class 1 laser product.
Leveling disc	Slide the leveling disc included around one of the leveling feet and rotate to raise or lower the printer.
Leveling feet	Each corner of the printer is supported by a rubber foot that is threaded into the bottom of the machine. When prompted by the touchscreen, use the leveling disc to raise or lower each foot to ensure that the printer is acceptably level.
LevelSense	An ultrasonic sensor, located above the rear right-hand corner of the resin tank detects the amount of resin in the resin tank.
Light Processing Units (LPUs)	These two interchangeable assemblies contain the lasers and the mirrors that control the path of the laser, ensuring a clean, crisp laser spot. The LPU housing holds two LPUs.
Light Processing Unit (LPU) cable	A flat, flexible cable that connects the LPU to the motherboard.
Light Processing Unit (LPU) housing	The aluminum housing for the optics engine moves left and right, traveling along the X-axis ball screw. The LPUs, roller holder, and mixer are all controlled within the LPU housing.
Low Force Stereolithography (LFS)™	An advanced form of stereolithography (SLA) with integrated image processing to deliver an ideal laser spot and cure solid isotropic parts from liquid resin.
Mixer	Each resin tank includes a mixer that improves print consistency by clearing the build area and circulating the resin. The mixer moves with the LPU housing via magnetic coupling and rests at the right side of the resin tank when not in use. Scrapers on the top and bottom of the mixer clear the build platform and flexible film, respectively.
Motherboard	The main circuitry through which all systems in the printer communicate.

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Term	Meaning
PEC*PAD	Disposable lint-free, non-woven microfiber cloths for cleaning the printer's optical components. Do not reuse a PEC*PAD; dispose of after each use.
Platform lock	A lever that is part of the locking mechanism that secures the build platform. Contact Formlabs Support or a certified service provider before adjusting the platform lock, as improper adjustment can damage the machine.
Platform lock spring	The spring mechanism inside the build platform carriage allows the platform lock to move up and down. It also mechanically locks and unlocks the build platform.
Power supply	The Form 3BL utilizes a 100–240 VAC power supply. The internal power supply converts line power to +24V DC.
Removal tool	Pry under the raft to remove prints from the build platform.
Resin cartridge	Two containers hold the resin before dispensing into the resin tank. Shake the resin cartridges periodically to keep resin well mixed.
Resin tank	Resin is dispensed out of the resin cartridges into the resin tank. During a print, two lasers pass upwards through the flexible film of the resin tank and cure resin onto the build platform to form a printed part. Only use approved materials and procedures to clean the resin tank.
Resin tank RFID sticker	Each resin tank has an RFID sticker attached to the back wall of the tank frame. The printer reads the RFID sticker to detect the unique tank ID and current resin type.
Rinse basket	Place prints in the rinse basket, place the rinse basket into the rinse bucket, and agitate to clean.
Rinse bottle	Remove resin trapped in cavities and internal channels of prints. Use clean solvent. Formlabs recommends isopropyl alcohol.
Rinse bucket	Fill the rinse bucket with solvent to the FILL TO HERE marking before washing prints. The rinse bucket includes a ground wire to prevent static discharge. Formlabs recommends isopropyl alcohol or tripropylene glycol monomethyl ether.
Roller holder	The roller holder is a metal surface that allows for smooth movement of the LPU housing across the flexible film. The roller holder surrounds the glass optical window. A clean roller holder protects the flexible film and preserves print quality.
Scraper	Remove prints from the build platform.
Shell	Six protective external casings protect the printer's internal components: • **Right shell:** metal casing for the right side of the printer; also includes the display assembly. • **Left shell:** metal casing for the left side of the printer. • **Top shell:** metal casing to protect the top of the printer, above the Z-tower. • **Rear shell:** metal casing that covers the back face of the printer. • **Cover:** printer lid, made of metal and orange-tinted material; hinged to top and left shell. • **Front shell:** metal casing that covers the bottom of the front face of the printer (below the cover).

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Term	Meaning
Solvent pump	Fill and empty the rinse bucket.
Status light	Two interior lights (vertical strips along the left and right walls) and an illuminated logo (on the front panel) that pulse to indicate the printer is active, a print has completed, or the printer has encountered an error.
Tank carrier	The tank carrier holds the resin tank and tensions the flexible film.
Tank carrier rails	The resin tank side walls sit on rails on each side of the tank carrier. While printing, the tank carrier rails pull the tank walls and the flexible film into tension.
Tank case	Each resin tank includes a container and a lid for storing the resin tank when not in use.
Tank handles	Handles on each side of the resin tank allow for easy insertion, removal, and carrying of the resin tank. Use the tank handles to avoid touching the resin tank's underside, as fingerprints leave smudges that obstruct the optical path.
Tank spout	A spout at the right of the resin tank sits underneath the cartridge dispense hole and receives resin from the resin cartridge.
Tank tool	A two-part scraper for inspecting and cleaning the resin tank interior. Separate tool for scraper function or combine for tongs. Together with the cleaning mesh, this is the only tool to clean the flexible film inside the resin tank.
Touchscreen	The LCD capacitive touch user interface displays print information, settings, and error messages.
USB port	The Form 3BL can connect to a computer via USB. The port is connected to the motherboard and can be accessed from the back of the machine.
Vent cap	The lid at the top of the cartridge allows for air interchange, enabling proper resin dispensing. Press the vent cap open prior to printing.
Wi-Fi antenna	The Wi-Fi antenna enables the Form 3BL's wireless connectivity.
X-axis ball screw	The X-axis ball screw controls the horizontal motion of the LPU housing.
Z-axis lead screw	The Z-axis lead screw controls the vertical motion of the build platform carriage.
Z-tower	This vertical tower at the back of the machine provides support for many components of the Form 3BL. The build platform is raised and lowered along the Z-axis, inside the Z-tower.

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12 Product compliance

The Form 3BL complies with the following electrical and laser safety standards:

Electrical

- UL 62368-1 2nd Edition, 2014-12-01
- CAN/CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12-01
- IEC 62368-1:2014
- EN 62368-1:2014 + A11:2017
- IEC 62471:2006

Laser

- IEC 60825-1:2014
- EN 60825-1:2014

FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019

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