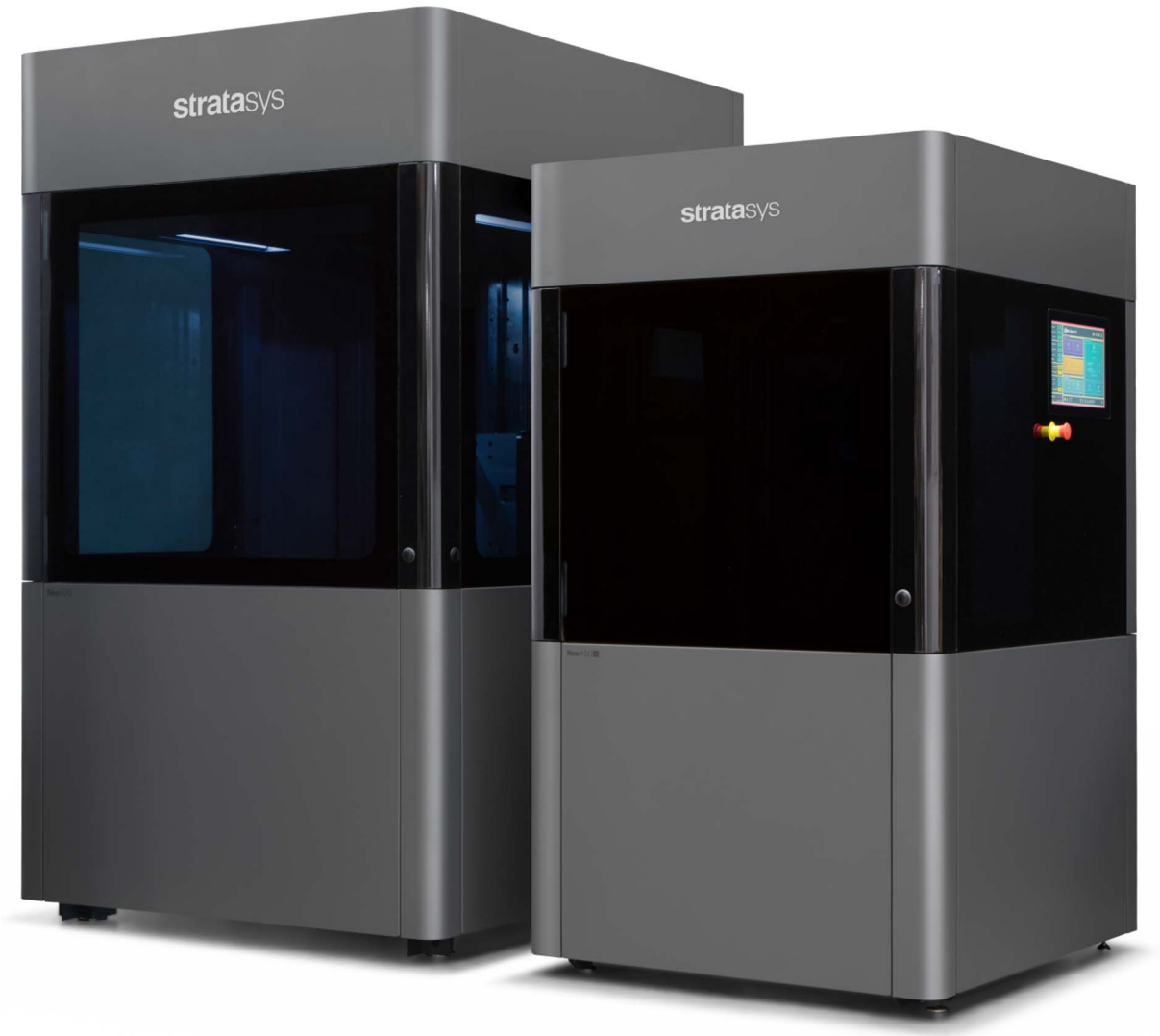
goengineer

User Guide

Neo®450/800/800+
3D Printing System



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About This Guide

This guide is your introduction to building prototypes and end-use parts using a Stratasys 3D production, rapid prototype system. It is designed as a learning and reference tool that explains system operation in an easy to understand, step-by-step, process.

How to Use This Guide

This guide is divided into easy-to-follow chapters. You can read this guide chapter by chapter or use the Table of Contents when you need to quickly find specific information. Keeping this guide close to your printer will efficiently allow you to troubleshoot and maintain the printer.

Revision Log

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

The following table lists the main changes in each revision of this document.

Revision	Date	Description of Changes
A	June 2025	First release of this document. Supersedes DOC-60017 Rev. E
B	----	Not released
C	Nov. 2025	Correction to Z-Stage motor for Neo800+ in *System Components* chapter
D	Dec. 2025	Added LayerControl+ information in the *Printer Operation* chapter.

Contents

1 Service, Support, and Safety

This user guide describes the Neo®450, Neo®800, and Neo®800+ 3D printers.

Please read these instructions carefully before operating the printer. Always observe all the safety guidelines in this manual. If you have any questions regarding the contents of this manual, please contact Stratasys (see “Getting Help” on page 233).

Keep the manual available for servicing, repairs, and product disposal.

This chapter provides information on service and support for the Neo®450 and Neo®800 3D printers as well as safety information and safety label locations.

Intended Use

Use the printer only for their designed purpose as described in “Printer Overview” on page 44. Only suitable accessories can be used with the product.

The printers are intended for use in an industrial environment.

Service

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

When calling in for service, always have your printer’s software version and hardware serial number available.

Software Support

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

When calling in for service, always have your printer’s software version and printer serial number available.

Safety Instructions

To reduce the risk of injury, read these instructions carefully before using the printer. Always observe the safety guidelines listed in this manual. Protection of the user is impaired if safety instructions are ignored, or used in a manner not specified in this document.

Hazard Classifications

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

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

Warning:

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

Caution:

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

Also instructions that:

- Warn of reduced product performance
- Recommend best practice

- **Notes** follow the relative paragraph.

Indicates additional information relative to the current topic.

Safety Warnings

Laser Safety

Table 1: Laser specifications

Property	Unit	Neo450e	Neo450s, Neo800	Neo800+
Wavelength	nm	355	355	355
Nominal Power[a]	W	1	2	4
Minimum PRF	kHz	40	40	40
Nominal PRF[b]	kHz	100	80	80
Maximum PRF[b]	kHz	300	500	500
Maximum Power	W	4	6	6
Maximum Pulse Energy	mJ	0.1	0.2	0.2
Minimum Pulse Duration	ns	2	1	1
Leakage @ 1064 nm	mW	< 20	< 1	< 1
Leakage @ 808 nm	mW	< 20	< 1	< 1
Leakage @ 532 nm	mW	< 20	< 1	< 1

a At nominal PRF
b PRF: Pulse Repetition Frequency

During normal operation, and with all panels installed, the printers are Class I laser products to BS EN 60825-1:2014. Class I products are not considered harmful and require no special safety precautions under normal operating conditions. The laser beam is completely confined. The viewing windows block the UV laser radiation from exposure outside of the device.

Stray radiation can also be dangerous. This radiation can cause fire or explosion and the generation of toxic gases or vapors.

The observance of laser safety must be ensured at all times.

Never stare directly into a laser beam, nor into any beam reflection, whether diffused or from a highly reflective surface.

Safety regulations may differ from country to country. The customer bears sole responsibility for compliance with all applicable safety regulations of their respective regulatory jurisdiction.

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure

Caution:
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

By engineering design no laser radiation exceeding Class 1 accessible emission limits are present or accessible during operation of this laser-based 3D printing system.

Material Safety

The Neo range is an open material platform. Any commercially available 355 nm photopolymer materials (resins), can be used.
Verify you have the necessary safe handling guidelines from your material supplier.

General material safety guidelines:

IRRITANT:
Always wear chemical-resistant gloves, goggles, and protective clothing when handling material, containers, or partially cured parts.

100% nitrile gloves offer best hand protection. Latex gloves are not chemically resistant, and are not recommended.

Always ensure good ventilation, and avoid breathing vapors.

Wipe-up any spills immediately, using paper towel dampened with isopropyl alcohol (IPA).

Use soap and cold water to wash material in contact with skin. Never use IPA or hot water, as this will increase absorption.

Use care when handling IPA used for cleaning materials. IPA is highly flammable.

Electrical Safety

Please refer to the “Printer Specifications” on page 25 section for electric supply specification.

Always observe the following guidelines:

Installation of the printer must not restrict the main power isolation switch at the rear of the Neo. Please refer to the Site Preparation Guide.

Do not overload a wall outlet, extension cord or adapter as this may result in an electric fire or shock.

Never use an inadequate rated power cord to supply the device.

Inspect the power cord for damage before use.

Do not bend or twist the power cord.

Do not touch the power plug with wet hands.

Do not remove covers as hazardous voltages are present inside.

Product Safety Signs

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

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

Table 2: Product safety signs

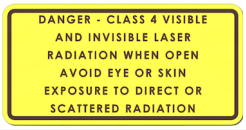
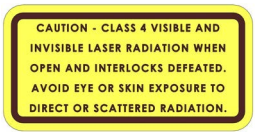
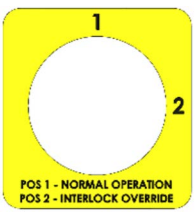
Warning Symbols	Meaning	Location	Comments
	Danger, high voltage	Roof panels, power input cover, and high voltage electrical door.	Risk of electric shock.
	High voltage	Ceiling power supply units, trunking on frame, front cross members, left hand cross members, trunking on ceiling cable tray, trunking on optics late, and high voltage electrical panel trunking.	Risk of electric shock.
	Pinch point	Z-stage motor coupling cover, side of peristaltic pump, and top face of coupling housing.	Risk of injury from moving parts.
	Belt drive	Face of side support frames and in line with recoater spindles.	Risk of injury from moving parts.
	Class 4 visible and invisible laser radiation when open	Face of left-hand door frame and in the center of the top face of side support frames	Exposure to Class 4 laser possible when open and/or cover removed.
	Warning, laser radiation	Level sensor cover plate	Do not stare directly into laser beam.

Table 2: Product safety signs (Continued)

Warning Symbols	Meaning	Location	Comments
	Class 4 visible and invisible laser radiation when open and interlocks defeated.	Doors, optics cover, and scanner shroud side plate.	Exposure to Class 4 laser possible with interlocks defeated.
	Sensitive electronic device.	Left hand and right hand recoater substrate	Avoid contact with strong magnets.
	Warning, laser radiation	Laser optics plate	Exposure to Class 4 laser possible with interlocks defeated
	Warning, laser radiation	Laser optics plate	Exposure to Class 4 laser possible with interlocks defeated
	Warning, laser radiation	Laser optics plate	Exposure to Class 4 laser possible with interlocks defeated
	Warning, laser radiation	Laser optics plate	Exposure to Class 4 laser possible with interlocks defeated
	Danger, isolate from electrical supply before opening panel	Power input	Risk of electric shock
	Warning, hazardous material	Peristaltic pump	Risk of hazardous material
	Interlock override key; key position displays if interlocks are over-ridden.	Electrical cabinet	Risk of disabling safety features

Product Safety Label and Interlock Locations

Figure 1: Neo450 front safety label locations

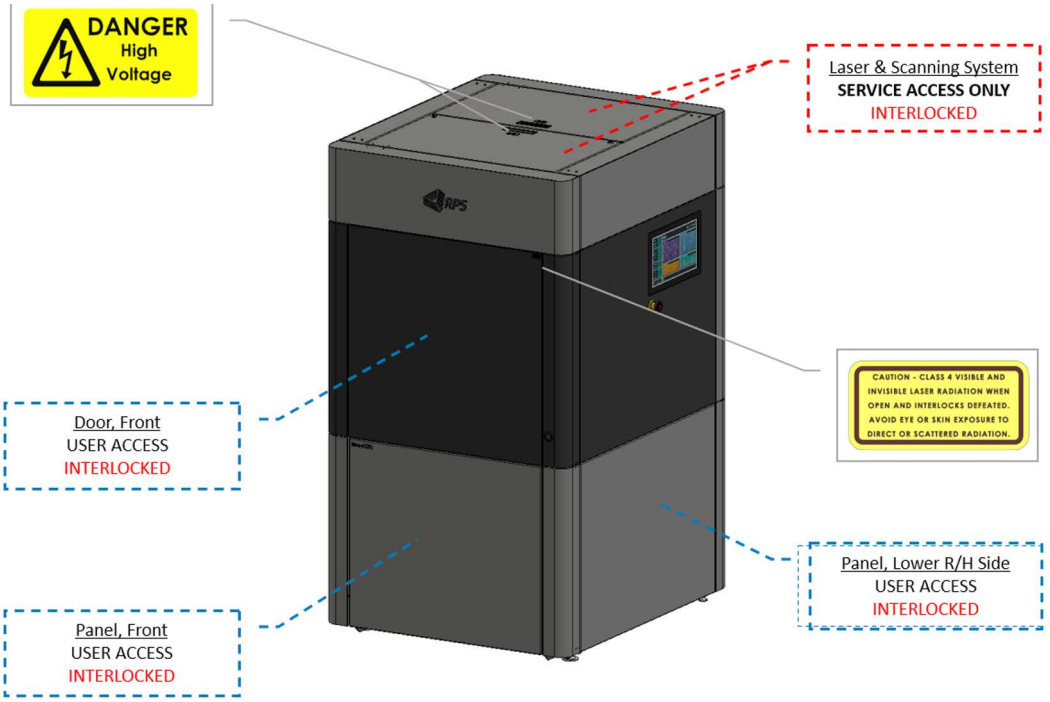


Figure 2: Neo450 rear safety label locations

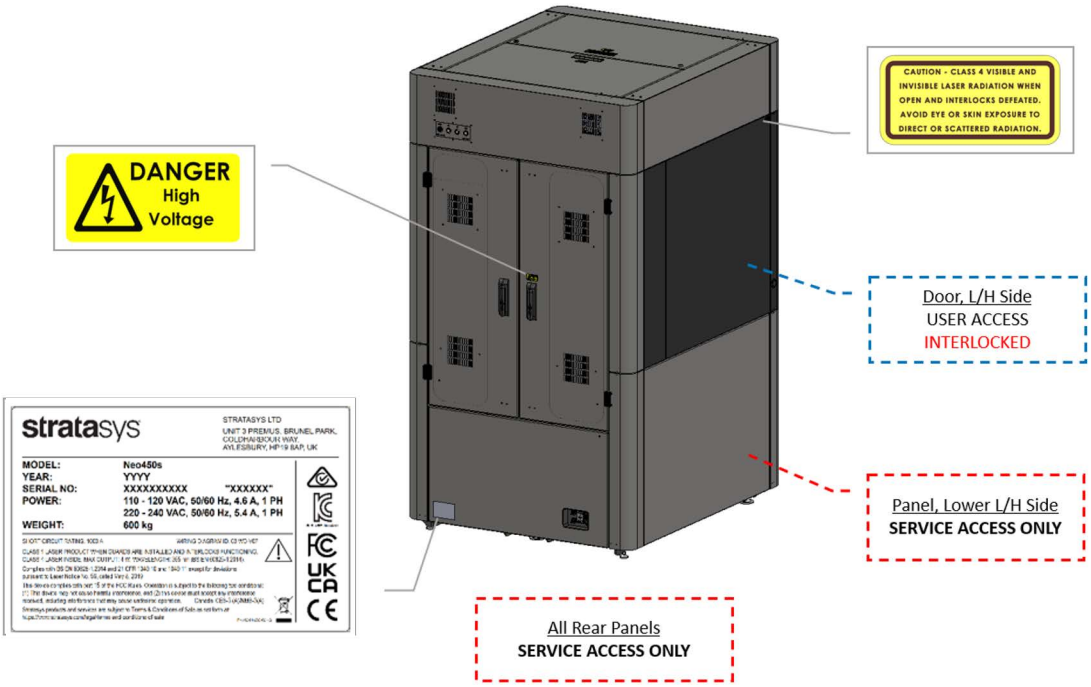


Figure 3: Neo450 Internal optics enclosure safety label locations

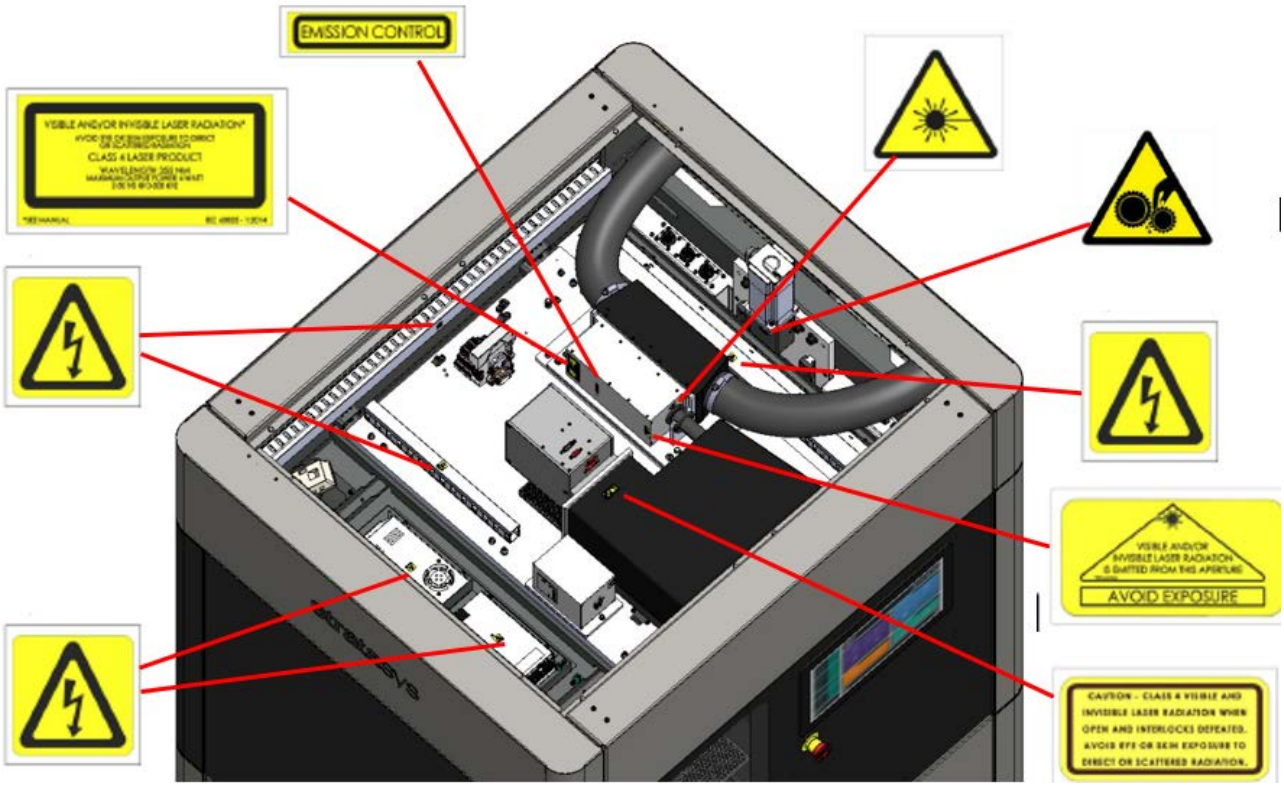


Figure 4: Neo450 Internal right side safety label locations

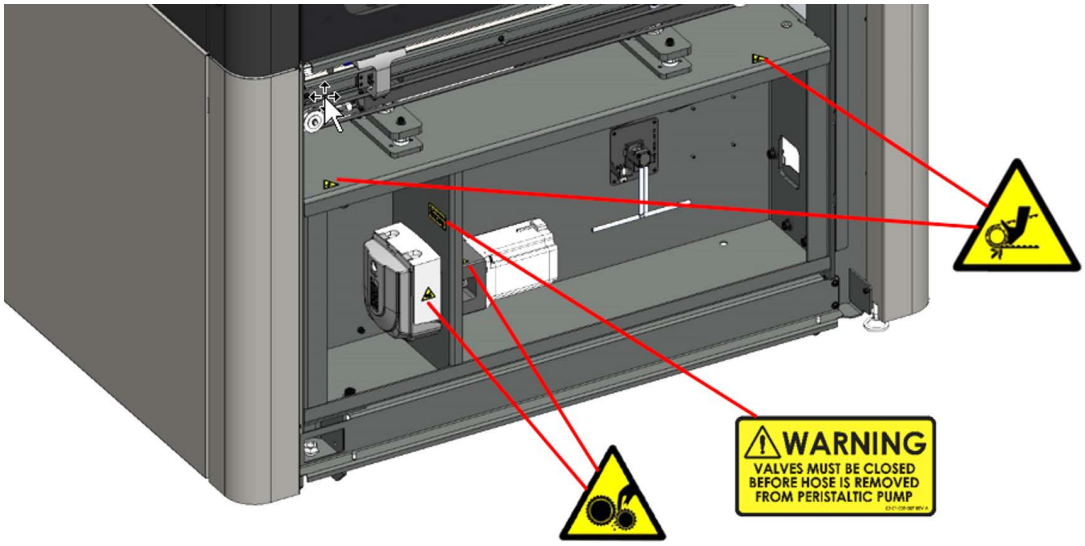


Figure 5: Neo450 Internal left side safety label locations

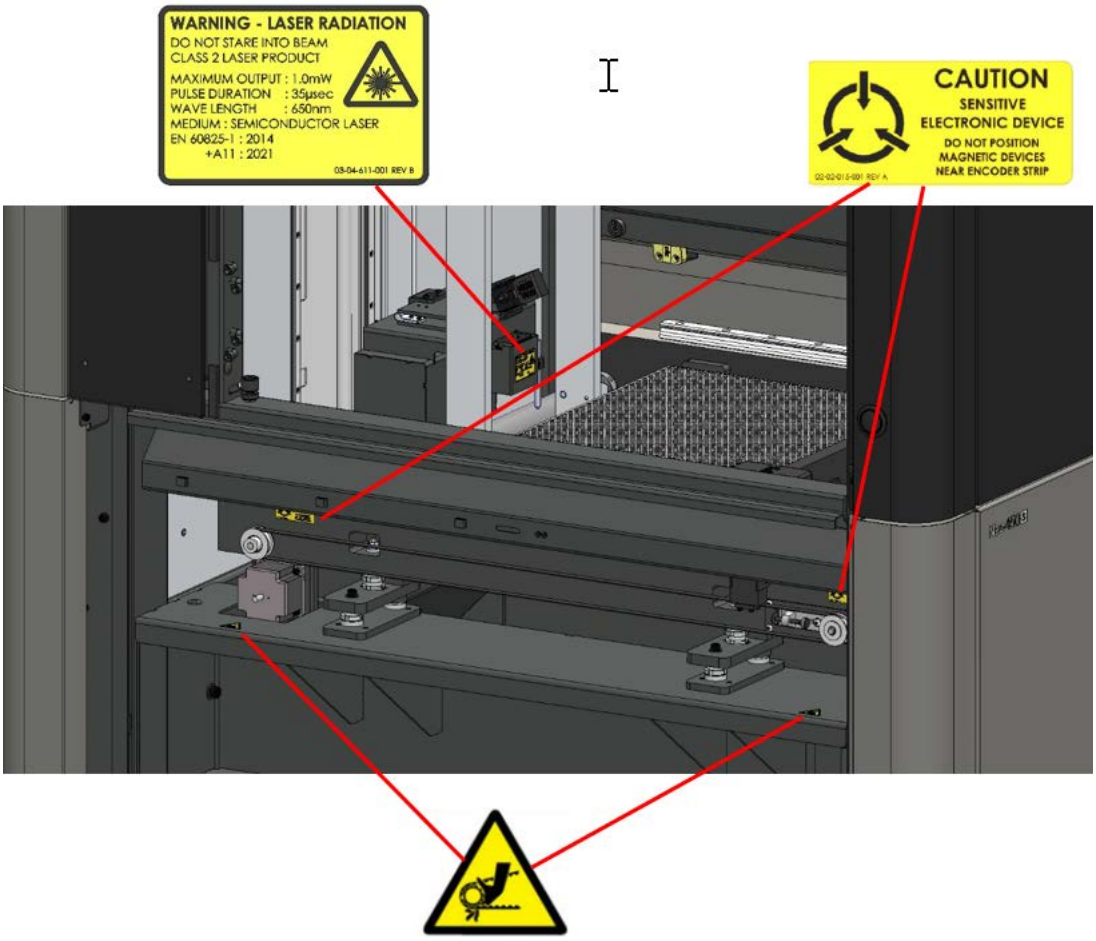


Figure 6: Neo450 Internal electrical panel safety label locations

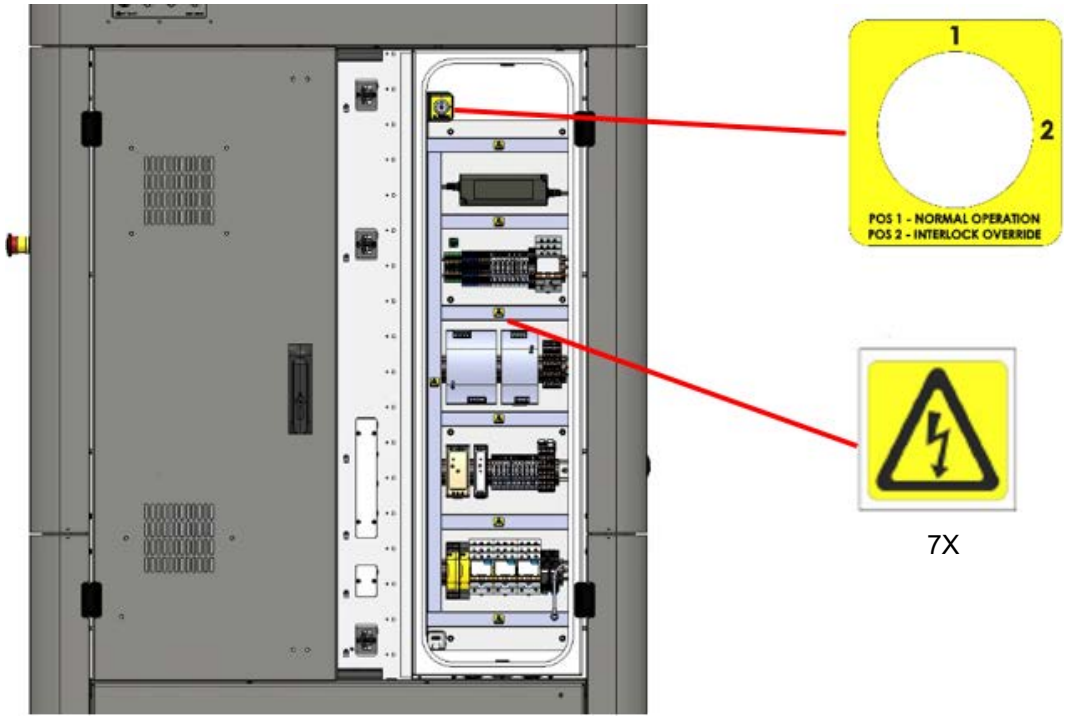


Figure 7: Neo450 Power Input safety label location

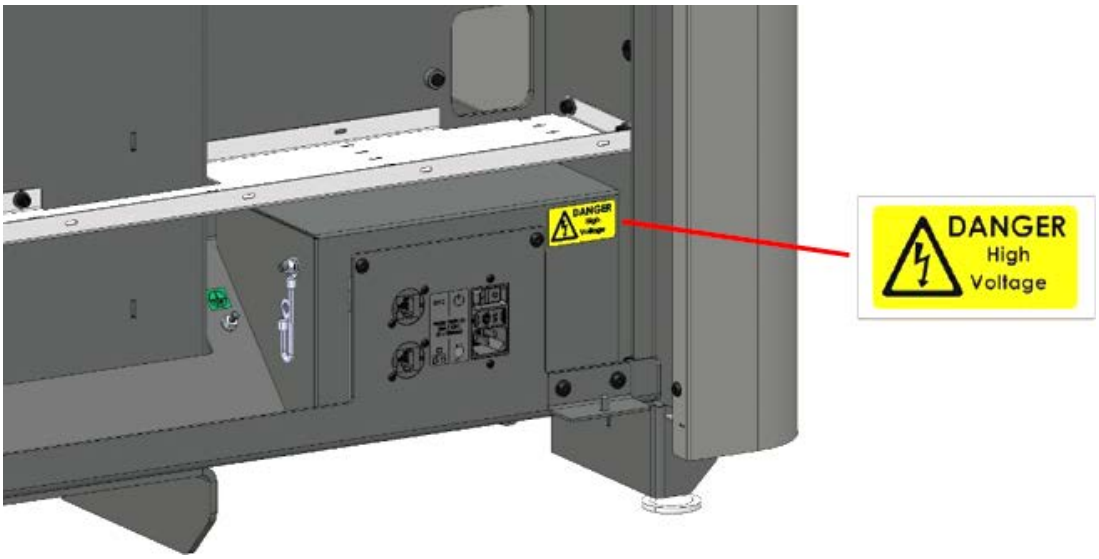


Figure 8: Neo800 front safety label locations

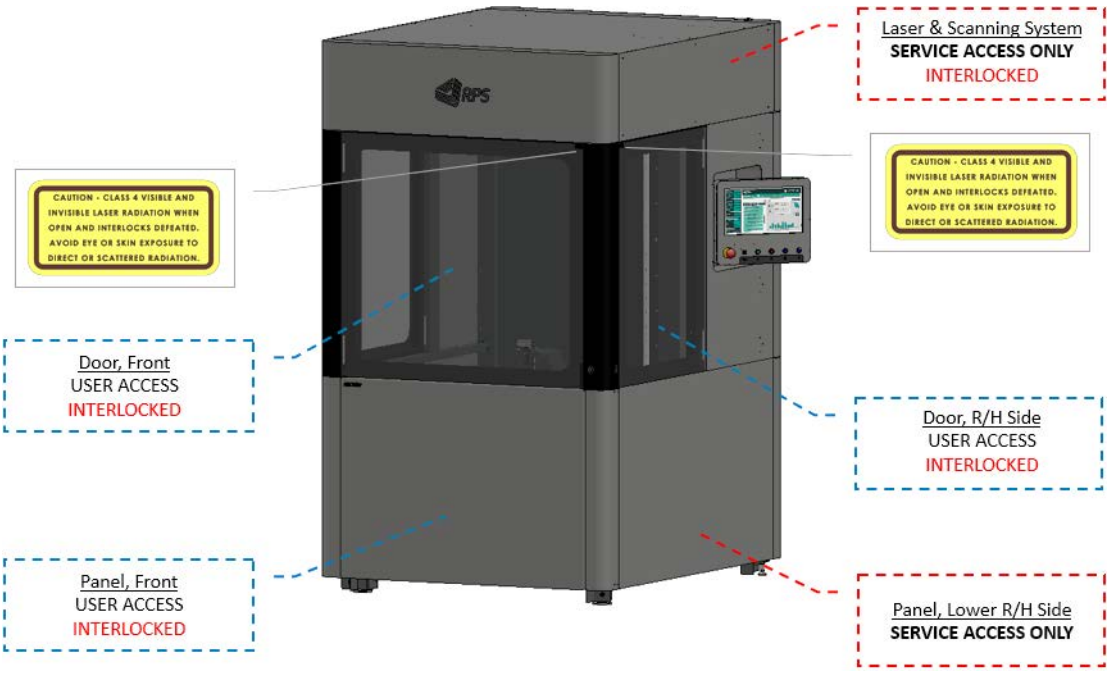


Figure 9: Neo800 rear safety label locations

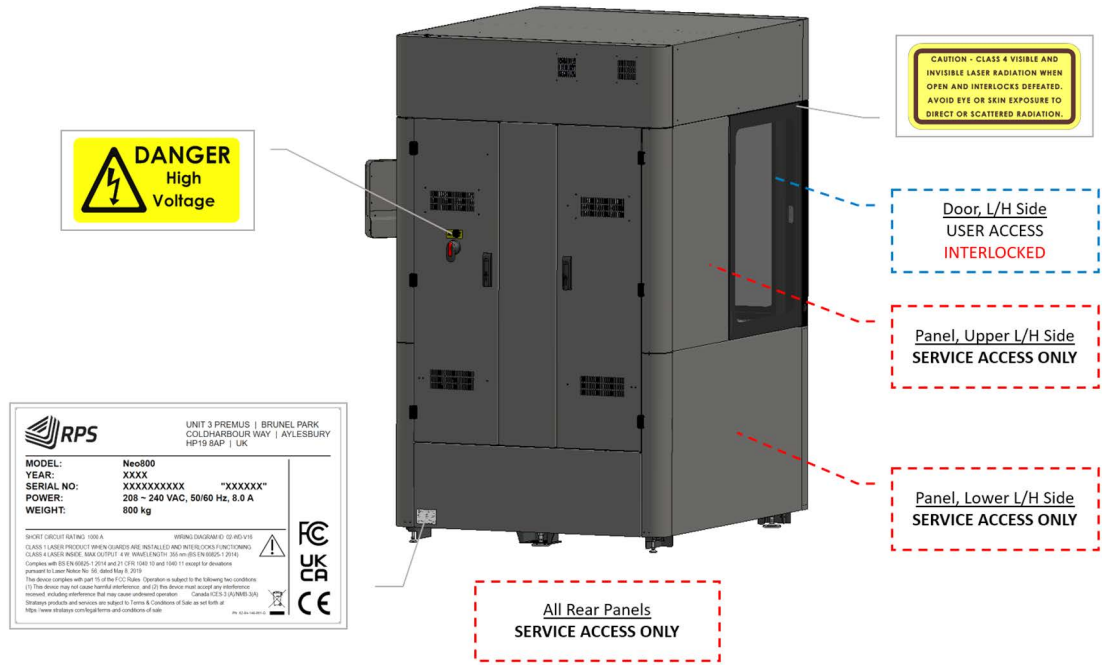


Figure 10: Neo800 Internal optics enclosure safety label locations

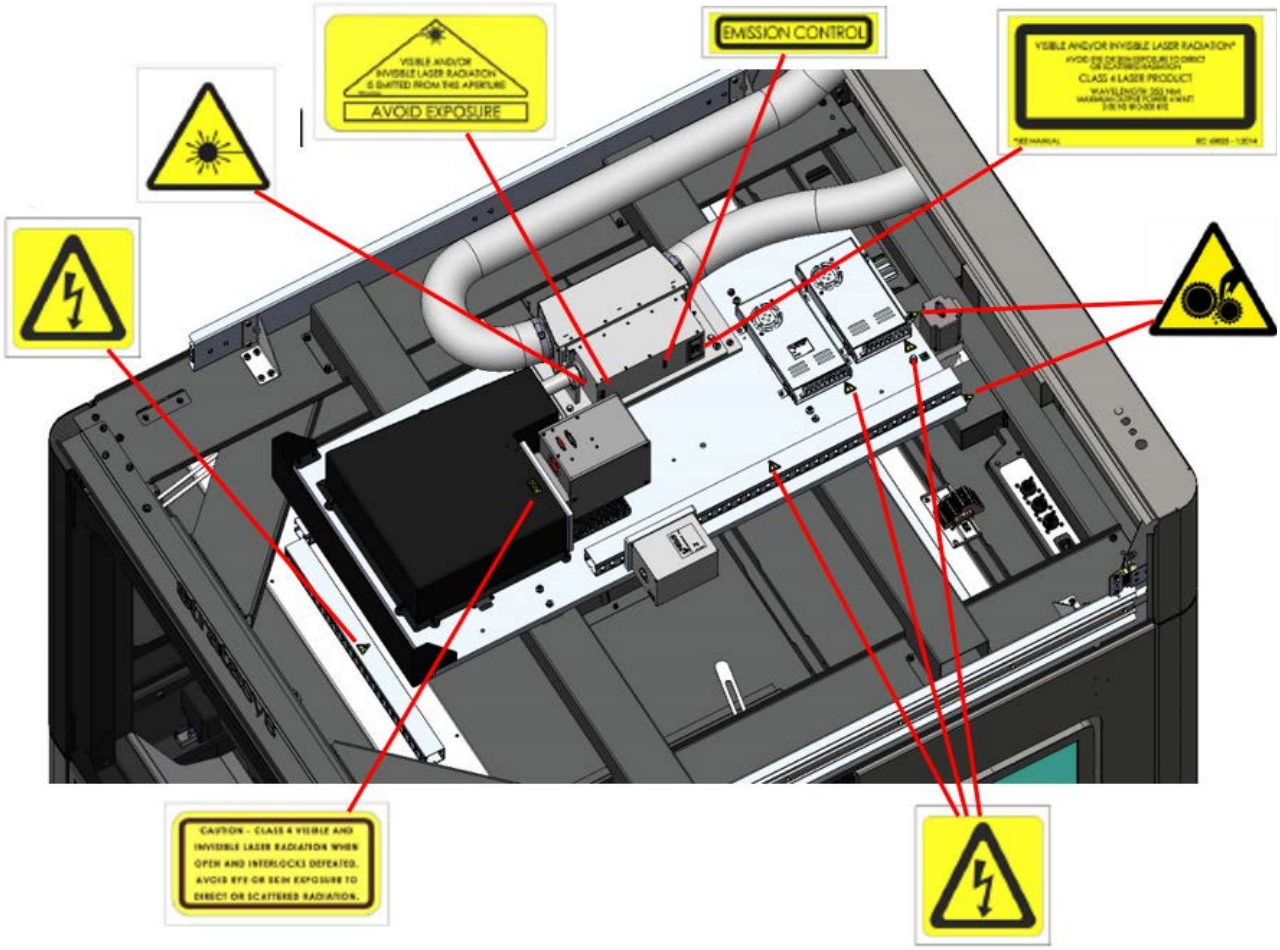


Figure 11: Neo800 Internal right side safety label locations

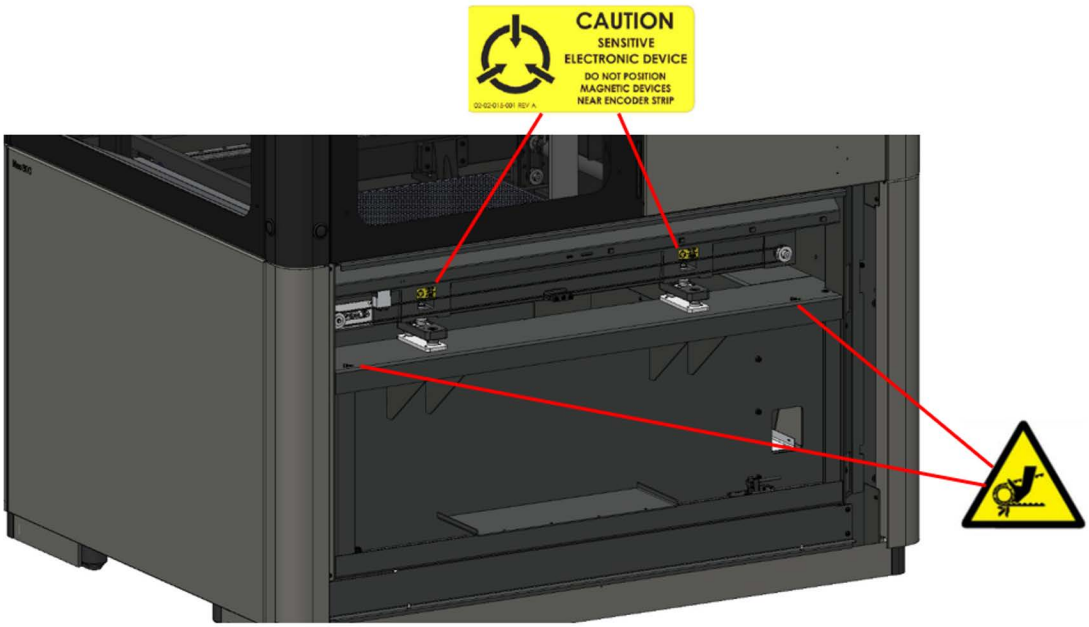


Figure 12: Neo800 Internal left side safety label locations

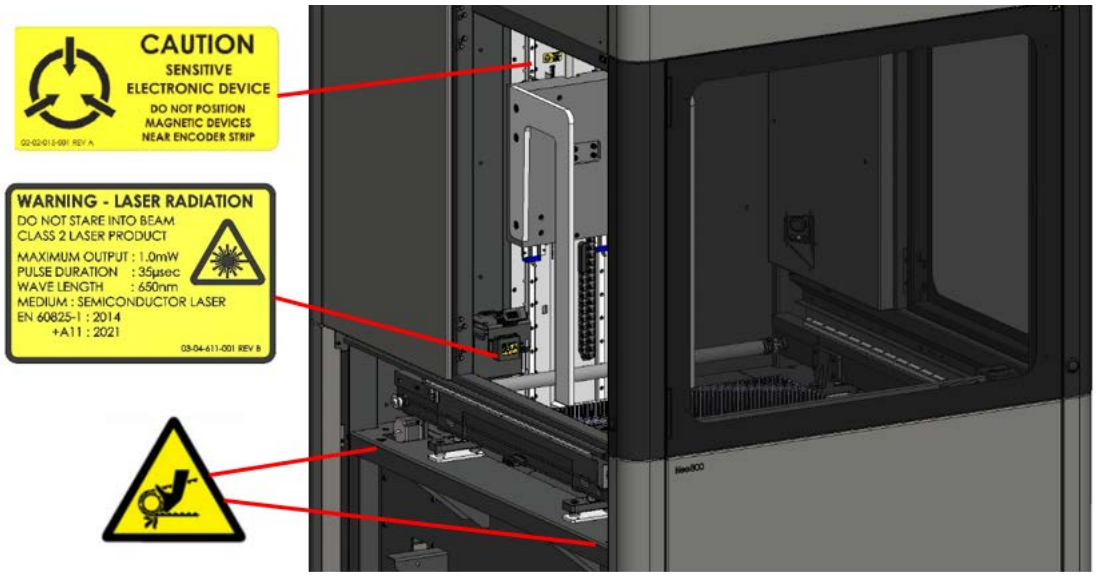


Figure 13: Neo800 Internal electrical panel safety label locations

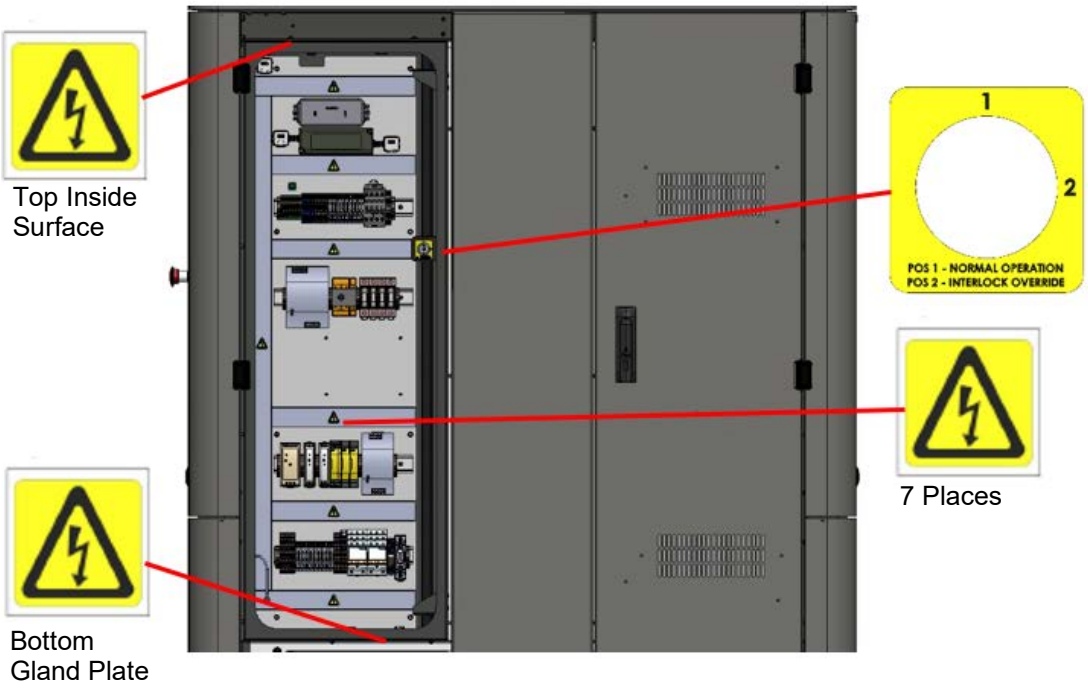


Figure 14: Neo800+ front safety label locations

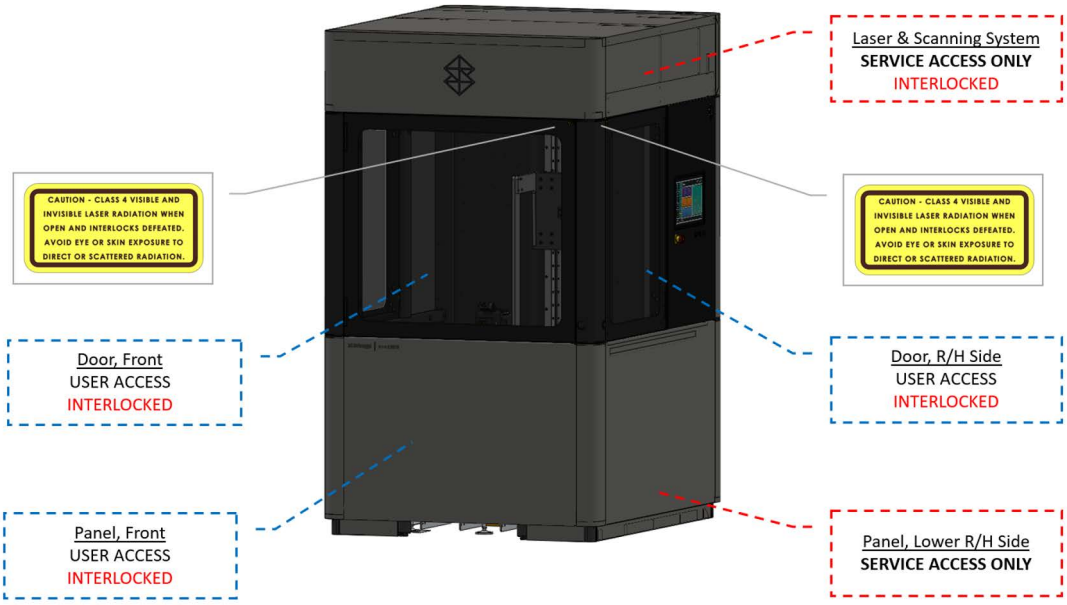


Figure 15: Neo800+ rear safety label locations

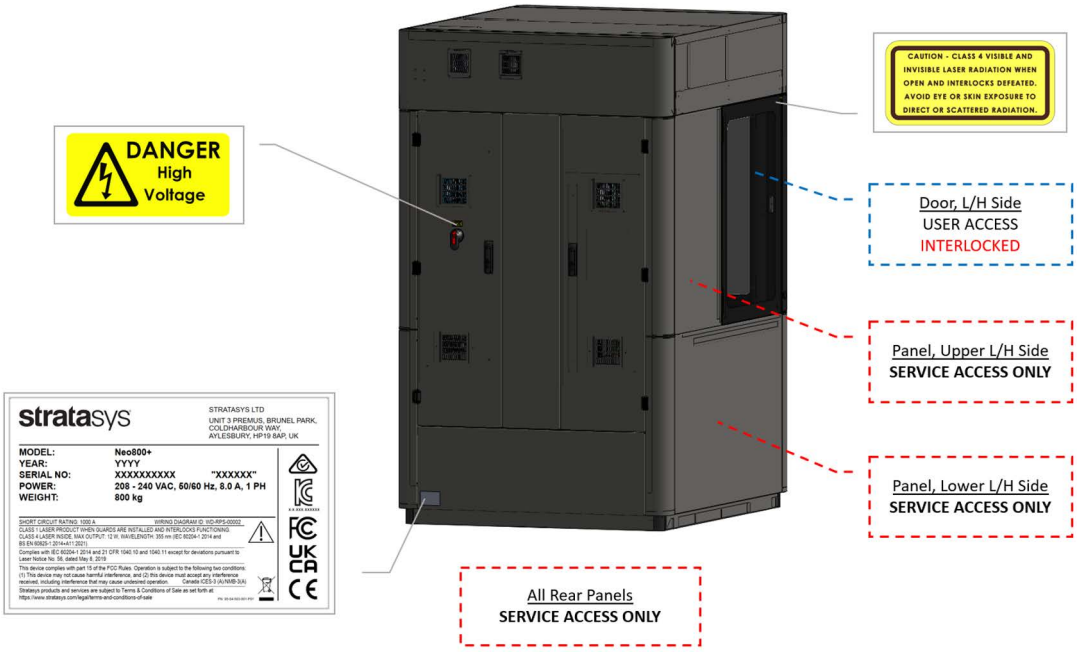


Figure 16: Neo800+ Internal optics enclosure safety label locations (image 1 0f 2)

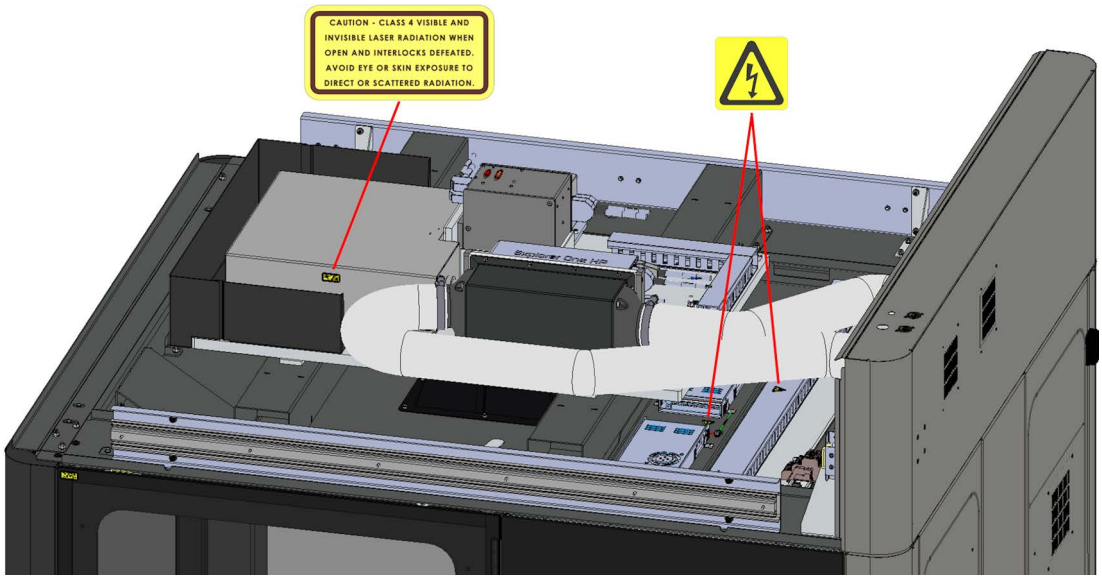


Figure 17: Neo800+ Internal optics enclosure safety label locations (image 2 of 2)

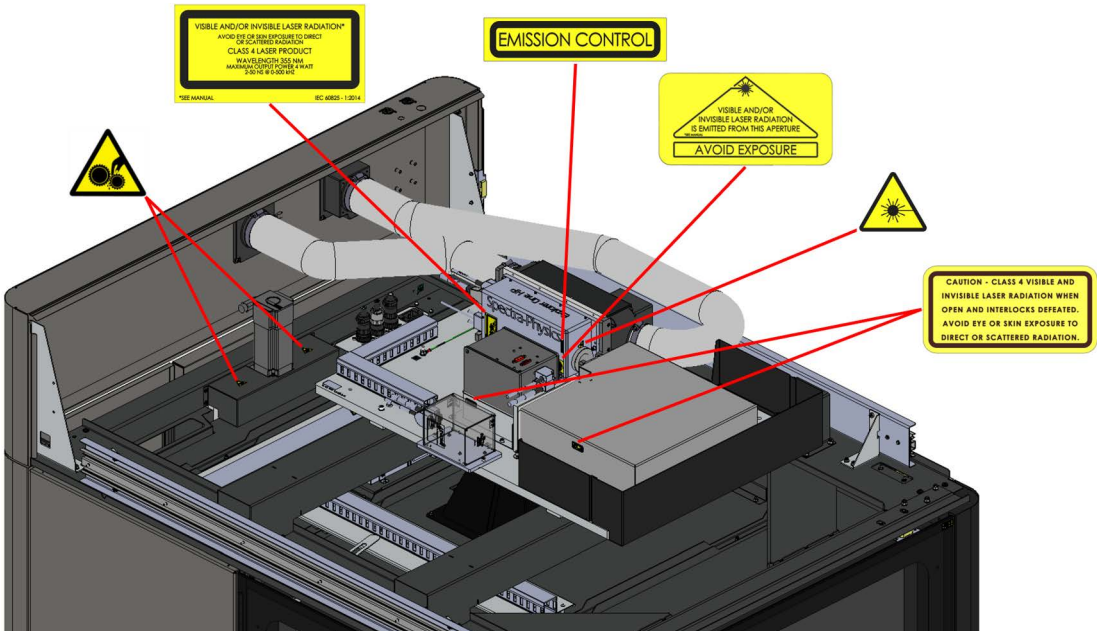


Figure 18: Neo800+ Internal right side safety label locations

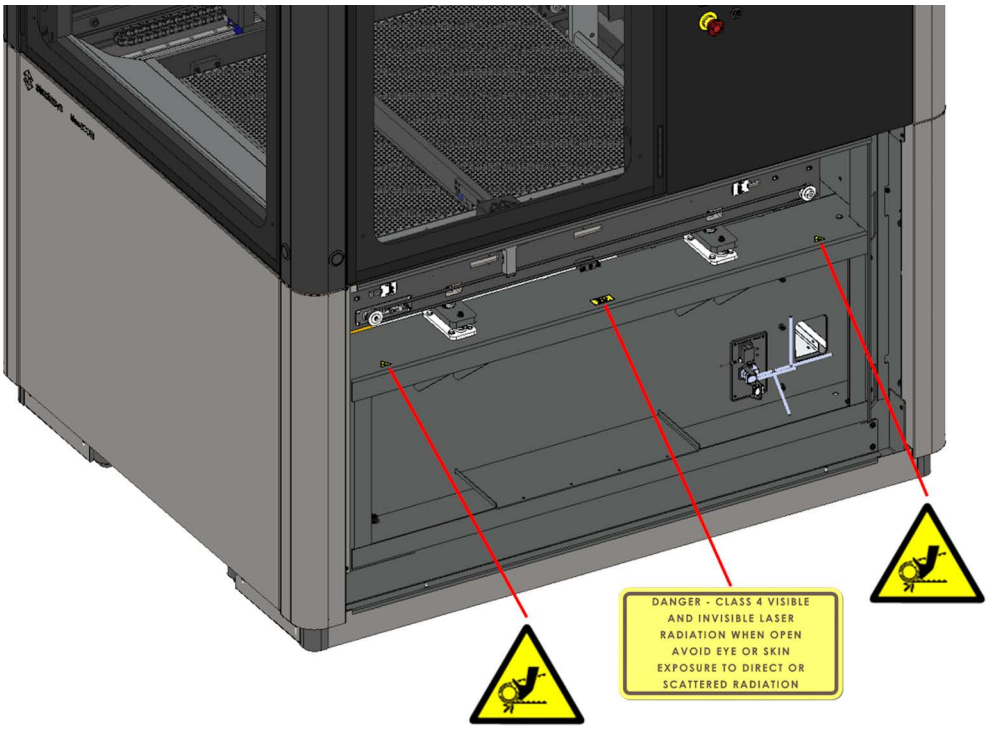


Figure 19: Neo800+ Internal left side safety label locations (image 1 of 2)

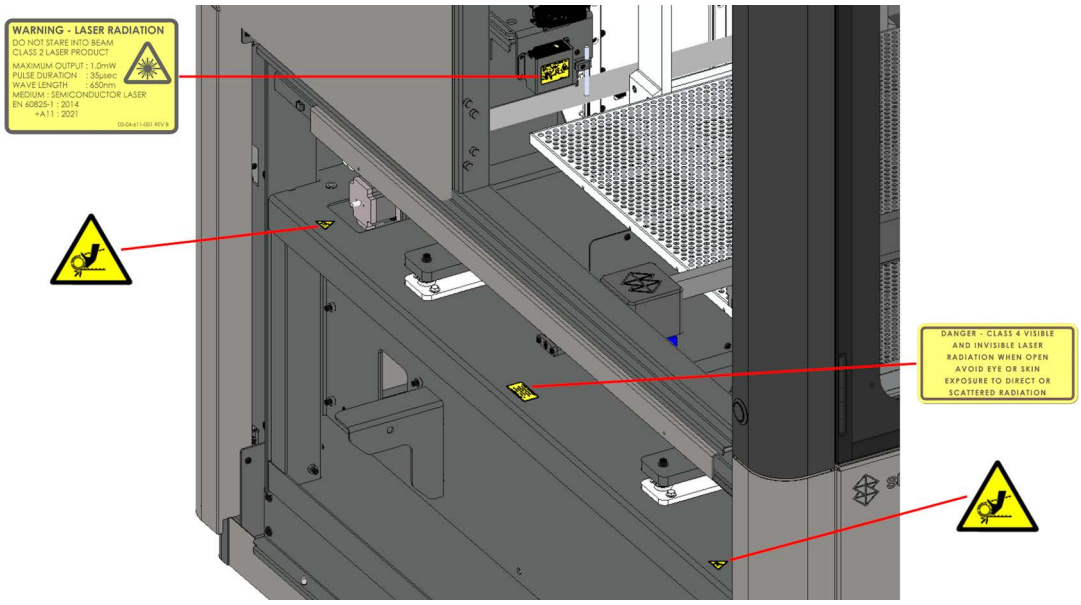


Figure 20: Neo800+ Internal left side safety label locations (image 2 of 2)

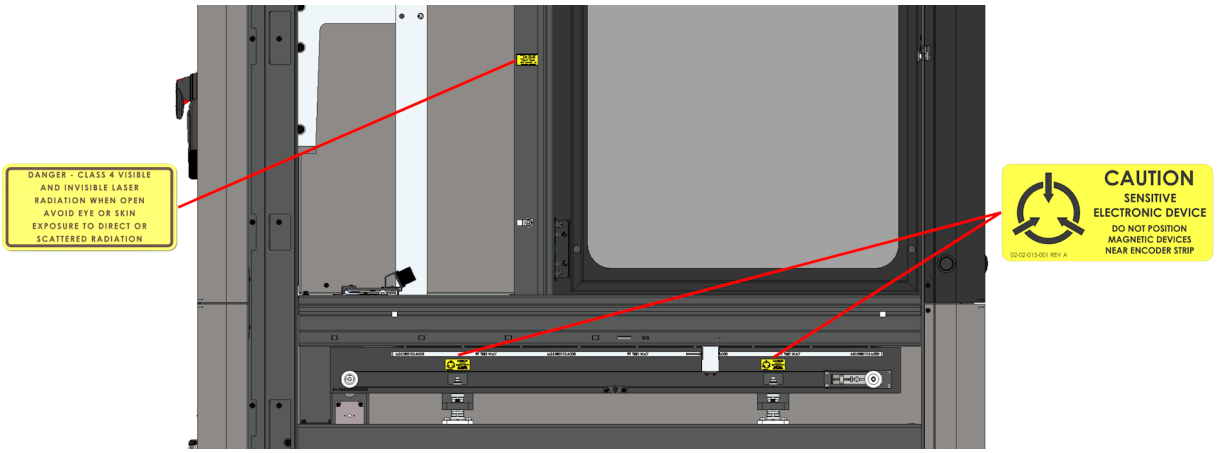
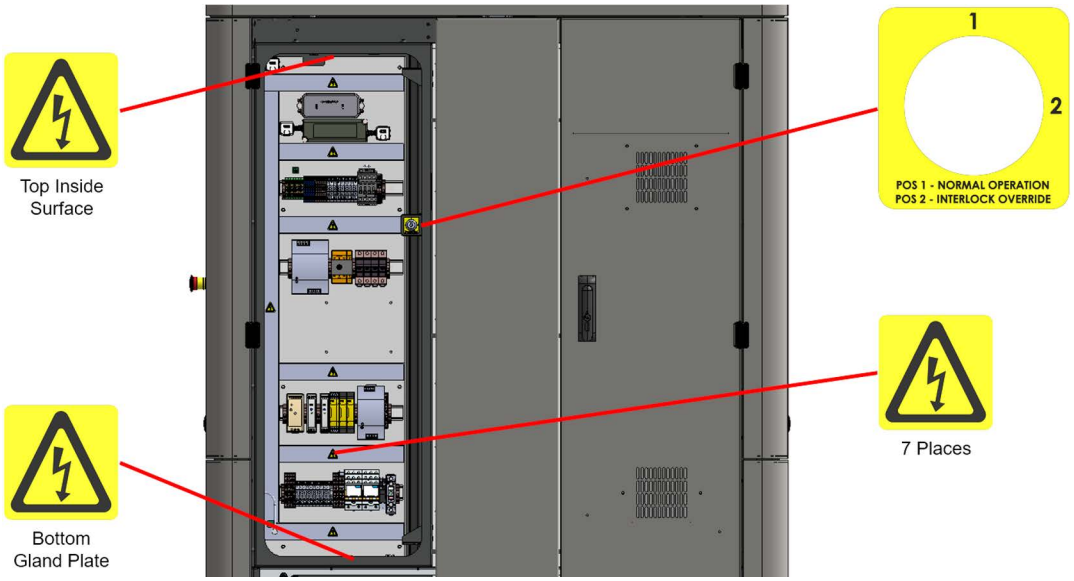


Figure 21: Neo800+ Internal electrical panel safety locations



Potential Safety Hazard Areas

The build chamber, recoater, elevator, and vat lift are highlighted as potential safety hazards that may cause printer failure or reliability problems if proper safety procedures are not followed.

The printer's motors are disabled by interlock switches when any door is open. Use caution.

Warning: Chemical Exposure.

Always wear safety gloves and long sleeves when working in the build area and vat enclosures.

Warning: Moving Parts.

Never wear a tie, loose clothing or dangling jewelry when working around moving components of the printer. The build chamber, recoater, and elevator contain mechanical drive components that can cause severe injury. Hazards are minimized by interlock switches but caution should be used around any moving part. Use extreme caution whenever accessing these areas of the printer.

Interlock System

Safety interlock sensors on each door and lower front panel protect the user from possible UV laser radiation exposure. By opening a door or removing the front panel the interlock system is triggered, closing the safety shutter which physically blocks the output of the laser.

The top panel(s) of the printer employ an additional interlock which ensures that the laser cannot be switched on when the top cover remains open.

If the interlock system is active the user will be unable to initiate any move operation, and will be unable to start a job. If the interlock system is triggered while the printer is performing an operation or job, the shutter will close, the laser emissions will be ceased, and other activity halted.

The interlock system may be defeated by trained service personnel in order to perform onsite service procedures.

The Titanium™ Software User Interface indicates interlock status as shown below.

Figure 22: Interlock system

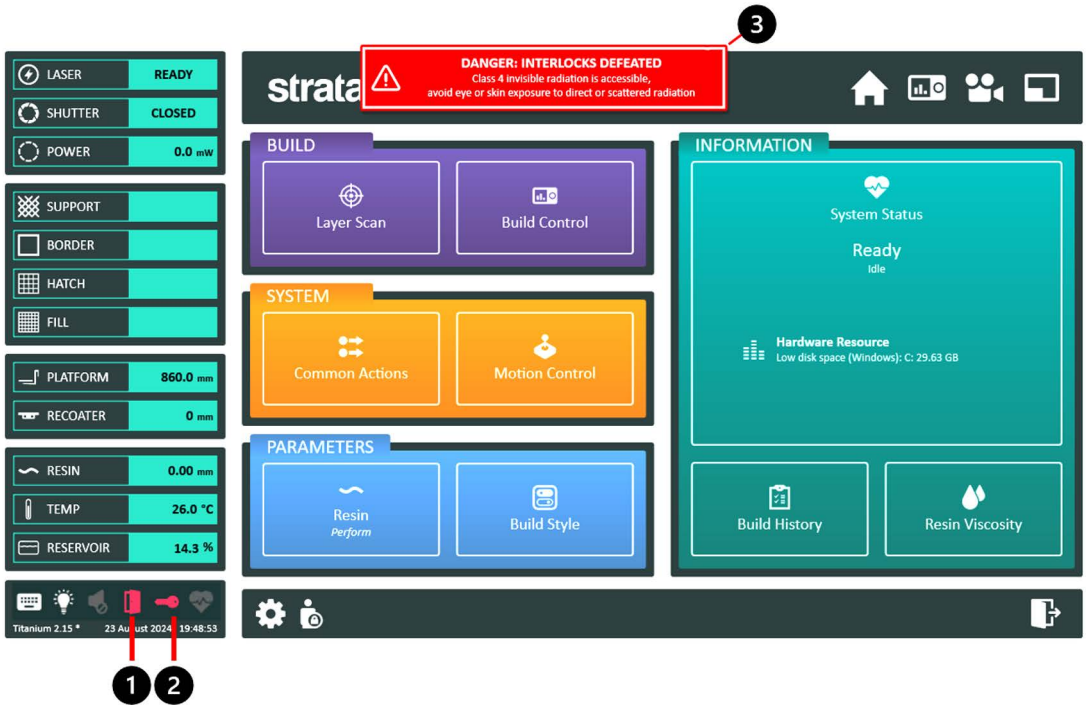


Table 3: Key to above figure

#	Description	Action
1	Door icon flashing red: Interlock active: door, lid, or panel open	Check doors, lid, and panels
2 and 3	Key Symbol, flashing red and DANGER: INTERLOCKS DEFEATED Warning Notice: Interlock Defeated: Service key override	Do not operate the printer.

If any of the interlocks are defeated, the printers become Class IV devices. Eye or skin damage can occur by direct or reflected laser beam interaction.

Interlocks are to be defeated only by trained personnel when needed during service procedures.

A user must not operate a printer which is displaying the Interlock Defeated symbol.

General Safety Practices

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

Warning: High Voltage.

High voltage is present in the printer.

Warning: Falling Hazard.

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

Warning: Chemical Exposure.

Always wear safety gloves and long sleeves when working in the build area.

Warning: Chemical Exposure Eyewear.

Always wear safety glasses when working in the build area.

Warning: Laser Exposure Eyewear.

Always wear LASER protective safety glasses that protect against 355 nm, 532 nm, 1064 nm, and 808 nm wavelengths when working on the laser. Glasses must meet ANSI 136.1 standards. A minimum optical density of 4 is required at 355nm. (+OD4 @355nm).

Warning: Laser Exposure Clothing.

Always wear safety gloves and long sleeves when working on the laser.

Warning: Laser Exposure.
Do not open the printer door when the Shutter Status is Open. This may lead to exposure of Class 4 laser radiation.

Lockout Tagout (LOTO)

Customer site procedures regarding lockout tagout always take precedence over the Stratasys service procedure.

Environmental Requirements

When operating the printer, always follow these guidelines:

- The ventilation ducts must be left uncovered to allow proper airflow into the printer.
- The printer should not be exposed to liquids other than to top up the vat with resin.
- Wipe off any resin spills immediately using a cloth dampened with isopropyl alcohol.
- Temperature range: 20-23 ˚C
- Maximum temperature rate change: +/- 1 °C/hour
- Relative humidity: 20-50% (non-condensing)
- Protect the printer from dust and corrosive vapors to avoid damage to the mirrors, optics, and electronics.
- Avoid strong electromagnetic fields and static electricity. These can damage the electronics of the interface and amplifier boards.
- For further details refer to “Printer Specifications” on page 25.

Table 4: Neo450 environmental requirements

Category	Requirement
Operating Temperature Range	20 ~ 23°C (68 ~ 74°F)
Temperature Maximum Rate of Change	±1°C/hr (±2°F/hr)
Non-Condensing Relative Humidity	20% ~ 50%
Environment Pollution	Degree 2
Maximum Working Altitude	2000 m (6562 ft)
Heat Dissipation Max (110 ~ 120 VAC)	550 W (1900 btu/hr)
Heat Dissipation, Typical (110 ~ 120 VAC)	300 W (1050 btu/hr)
Heat Dissipation Max (220 ~ 240 VAC)	1300 W (4450 btu/hr)
Heat Dissipation, Typical (220 ~ 240 VAC)	700 W (2400 btu/hr)

Table 5: Neo800/800+ environmental requirements

Category	Requirement
Operating Temperature Range	20 ~ 23°C (68 ~ 74°F)
Temperature Maximum Rate of Change	±1°C/hr (±2°F/hr)
Non-Condensing Relative Humidity	20% ~ 50%
Environment Pollution	Degree 2
Maximum Working Altitude	2000 m (6562 ft)
Heat Dissipation Max	1900 W (6500btu/hr)
Heat Dissipation, Typical	900 W (3100btu/hr)

Caution:
Any variances outside these parameters will adversely affect part quality and/or accuracy.

Caution:
Additional air conditioning capacity would be required to remove heat dissipated by any other equipment in the same area.

Caution:
The printer should not be exposed to direct air flow from the air conditioning or heating systems. Part quality will be adversely affected if air flow is directed at the printer.

Caution:
The area should be well ventilated. In accordance with standard practices, the air in the room should change approximately 2 to 5 times per hour.

Caution:
The printer should be placed in a clean, non-smoking environment. Dust and smoke must be kept at a minimum, as they may contaminate the resin and cause deterioration of the optical surfaces.

2 Setup and Installation

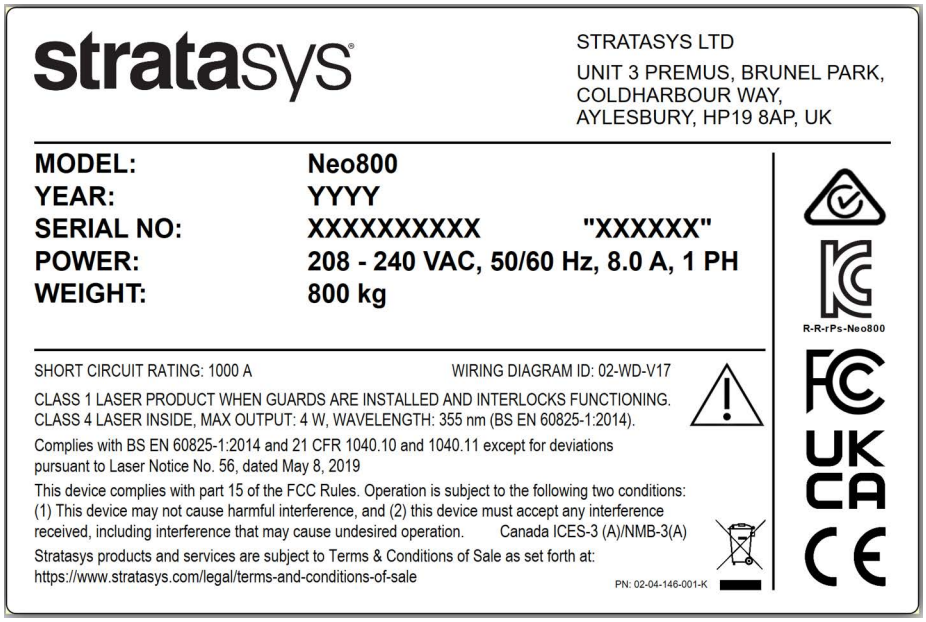
This chapter describes basic setup of the printers.

General Information

ID Plate

The ID plate which includes the printer serial number is found on the lower rear panel. A copy is also located on the frame when the lower rear panel is removed.

Figure 23: Printer ID plate



Printer Specifications

Table 6: Printer specifications

Laser & Scanning System	Unit	Neo450e	Neo450s	Neo800	Neo800+
Laser[a]	W	1	2	2	4
Beam Focus		Dynamic	Dynamic and Variable	Dynamic and Variable	Dynamic and Variable
Beam Size	µm	250	80 to 750	150 to 600	120 to 750
Scanning Speed	m/s	Up to 10	Up to 10	Up to 10	Up to 20
	in./s	Up to 400	Up to 400	Up to 400	Up to 800
Layer Resolution[b]	µm	50 to 200	50 to 200	50 to 200	50 to 200
Build Modes		SD	HD, SD	HD, SD	HD, SD
Minimum Feature Size					
X & Y[c]	mm	0.30	0.15	0.20	0.17
	in.	0.012	0.006	0.008	0.007
Z[c]	mm	0.40	0.40	0.40	0.40
	in.	0.016	0.016	0.016	0.016
Accuracy					
Dimension <100mm / 3.94 in.[c]	mm	±0.1	±0.1	±0.1	±0.1
	in.	±0.004	±0.004	±0.004	±0.004
Dimension >100mm / 3.94 in.[c]	%	±0.10	±0.10	±0.15	±0.15
Build Capacity					
Full Vat (XYZ)	mm	450 x 450 x 400	450 x 450 x 400	800 x 800 x 600	800 x 800 x 600
	in.	17.72 x 17.72 x 15.75	17.72 x 17.72 x 15.75	31.50 x 31.50 x 23.62	31.50 x 31.50 x 23.62
Half Vat (XYZ)	mm	450 x 450 x 200	450 x 450 x 200	800 x 800 x 300	800 x 800 x 300
	in.	17.72 x 17.72 x 7.87	17.72 x 17.72 x 7.87	31.50 x 31.50 x 11.81	31.50 x 31.50 x 11.81
Short Vat (XYZ)	mm	450 x 450 x 50	450 x 450 x 50		
	in.	17.72 x 17.72 x 1.97	17.72 x 17.72 x 1.97		

a 355 nm, solid-state frequency tripled Nd: YVO4
b Layer thickness range is material dependent
c Accuracy & minimum feature size will vary depending on material, parameters, part geometry and size, pre & post-processing methods and environment.

Neo450 Weights and Dimensions

Table 7: Neo450 weight and dimensions

Status	Dimensions/Weights
Crated	Width: 1220 mm / 48.0 in. Depth: 1400 mm / 55.1 in. Height: 2200 mm / 86.6 in.
Uncrated (Closed Panels and Touchscreen)	Width: 1050 mm / 41.3 in. Depth: 1225 mm / 48.2 in. Height: 1900 mm / 74.8 in.
Shipping Weight (crated)	860 kg /1896 lb
Printer Weight (uncrated, without vat)	600 kg / 1323 lb

All Neo printers and vats have been designed to be moved with a low-profile pallet jack/truck.

Table 8: Neo450 low-profile pallet jack/truck dimensions

Category	Dimension
Capacity	> 1200 kg / ≥ 2646 lb
Minimum Fork Height	50 ~ 60 mm / 2.0 ~ 2.4 in.
Maximum Fork Height	≥ 150 mm / ≥ 5.9 in.
Fork Width	160 mm / 6.3 in.
Width Across Forks	540 mm / 21.3 in.
Fork Length	≥ 1100 mm / ≥ 43.3 in.

Neo450 Vat Dimensions, Weights, and Fill Capacities

Table 9: Neo450 Vat weights and dimensions

Dimension	Short	Half	Full
Build Volume (X x Y x Z)	450 x 450 x 50 mm 17.72 x 17.72 x 1.97 in.	450 x 450 x 200 mm 17.72 x 17.72 x 7.87 in.	450 x 450 x 400 mm 17.72 x 17.72 x 15.75 in.
External Dimensions (W x D x H)		710 x 800 x 730 mm 28.0 x 31.5 x 28.7 in	
Net Weight		100 kg / 221 lb	
Gross Weight @1.12 kg/L[a]	143 kg / 315 lb	192 kg / 423 lb	258 kg / 569 lb
Gross Weight @1.17 kg/L[a]	145 kg / 320 lb	196 kg / 432 lb	265 kg / 584 lb
Gross Weight @1.61 kg/L[a]	161 kg / 355 lb	232 kg / 511 lb	327 kg / 721 lb

a Material density based on a temperature of 26°C / 78.8°F

Table 10: Neo450 vat fill capacities

Category	Short	Half	Full
Material Fill Volume	38 L / 10 US Gal	82 L / 22 US Gal	141 L / 37 US Gal
Material Fill Weight @1.12 kg/L[a]	43 kg / 95 lb	92 kg / 203 lb	158 kg / 348 lb
Material Fill Weight @1.17 kg/L[a]	45 kg / 99 lb	96 kg / 212lb	165 kg / 364 lb
Material Fill Weight @1.61 kg/L[a]	61 kg / 134 lb	132 kg / 291 lb	227 kg / 500 lb

a Material density based on a temperature of 26°C / 78.8°F

Neo800/800+ Weights and Dimension

Table 11: Neo800/800+ weight and dimensions

Status	Dimensions/Weights
Crated	Width: 1640 mm / 64.6 in. Depth: 1870 mm / 73.6 in. Height: 2525 mm / 99.4 in.
Uncrated (Closed Panels and Touchscreen)	Width: 1350 mm / 53.2 in. Depth: 1630 mm / 64.2 in. Height: 2300 mm / 90.6 in.
Shipping Weight (crated)	1000 kg / 2205 lb
Printer Weight (uncrated, without vat)	800 kg / 1764 lb

All Neo printers and vats have been designed to be moved with a low-profile pallet jack/truck.

Table 12: Neo800/800+ low-profile pallet jack dimensions

Category	Dimension
Capacity	> 1200 kg / ≥ 2646 lb
Minimum Fork Height	50 - 60 mm / 2.0 - 2.4 in.
Maximum Fork Height	≥ 150 mm / ≥ 5.9 in.
Fork Width	160 mm / 6.3 in.
Width Across Forks	540 mm / 21.3 in.
Fork Length	≥ 1100 mm / ≥ 43.3 in.

Neo800/800+ Vat Dimensions, Weights, and Fill Capacities

Table 13: Neo800/800+ vat weights and dimensions

Dimension	Short	Half	Full Versions 1 and 2
Build Volume (X x Y x Z)	800 x 800 x 120 mm 31.50 x 31.50 x 4.72 in.	800 x 800 x 300 mm 31.50 x 31.50 x 11.81 in.	800 x 800 x 600 mm 31.50 x 31.50 x 23.62 in.
External Dimensions (W x D x H)	908 x 1300 x 870 mm 35.75 x 51.18 x 34.25 in.	908 x 1300 x 870 mm 35.75 x 51.18 x 34.25 in.	908 x 1300 x 870 mm 35.75 x 51.18 x 34.25 in.
Net Weight	240 kg / 529 lb	240 kg / 529 lb	240 kg / 529 lb
Gross Weight @1.12 kg/L[a]	434 kg / 957 lb[b]	594 kg / 1309 lb	**Version 1:** 870 kg / 1918 lb **Version 2:** 865 kg / 1907 lb
Gross Weight @1.17 kg/L[a]	442 kg / 975 lb[b]	610 kg / 1344 lb	**Version 1:** 889 kg / 1960 lb **Version 2:** 893 kg / 1969 lb
Gross Weight @1.61 kg/L[a]	519 kg / 1143 lb[b]	749 kg / 1651 lb	**Version 1:** 1134 kg / 2499 lb **Version 2:** 1138 kg / 2510 lb

a Material density based on a temperature of 26°C / 78.8°F
b Estimated

Table 14: Neo800/800+ vat fill capacities

Category	Short	Half	Full Versions 1 and 2
Material Fill Volume	173 L / 46 US Gal[f]	316 L / 83 US Gal	**Version 1:** 555 L / 147 US Gal **Version 2:** 558 L / 147 US Gal
Material Fill Weight @1.12 kg/L[a]	194 kg / 428 lb[b]	354 kg / 780 lb	**Version 1:** 622 kg / 1371 lb **Version 2:** 625 kg / 1378 lb
Material Fill Weight @1.17 kg/L[a]	202 kg / 445 lb[b]	370 kg / 815 lb	**Version 1:** 649 kg / 1431 lb **Version 2:** 653 kg / 1440 lb
Material Fill Weight @1.61 kg/L[a]	279 kg / 615 lb[b]	509 kg / 1122 lb	**Version 1:** 894 kg / 1971 lb **Version 2:** 899 kg / 1982 lb

a Material density based on a temperature of 26°C / 78.8°F
b Estimated

Electrical Requirements

Neo450 Electrical Requirements

Table 15: Neo450 electrical requirements

Electrical Requirements	Units		
Related Voltage (1 Phase)	VAC	110-120 ± 10%	220-240 ± 10%
	Hz	50/60	50/60
Over Voltage Category		II	II
Fuse (Power Outlet)	A	10.0	10.0
Short Circuit Rating	A	1000	1000
Peak Power	W	550	1300
Peak Current	A	4.6	5.4
Typical Power	W	300	700
Typical Current	A	2.4	2.8
Power Rating	VA	750	1500

Warning: Electrical Hazard

Equipment installed in all regions other than Europe must be connected to a dedicated 4 mm^2 ground/earth. This is in addition to a ground/earth connection within the supply socket

Warning: Electrical Hazard

Connection should be made in accordance with local regulations.

Warning: Electrical Hazard

In some regions an AC/AC transformer will be required to meet the specified input voltage. Using the specification above, Stratasys recommends the transformer is sourced locally, ensuring it meets the local regulations.

Warning: Electrical Hazard

Stratasys recommends the printer is supplied on a dedicated, surge protected circuit.

Warning: Electrical Hazard

Stratasys recommends that all electrical supply work is undertaken by a qualified electrician.

Neo800/800+ Electrical Requirements

Table 16: Neo800/800+ electrical requirements

Electrical Requirements	
Related Voltage (1 Phase)	208-240 VAC ± 10%
	50/60 Hz
Over Voltage Category	II
Fuse (Power Outlet)	10 A
Short Circuit Rating	1000 A
Peak Power	1900 W
Peak Current	8.0 A
Typical Power	900 W
Typical Current	3.8 A
Power Rating	2200 VA

Warning: Electrical Hazard

Equipment installed in all regions other than Europe must be connected to a dedicated 4 mm^2 ground/earth. This is in addition to a ground/earth connection within the supply socket.

Warning: Electrical Hazard

Connection should be made in accordance with local regulations.

Warning: Electrical Hazard

In some regions an AC/AC transformer will be required to meet the specified input voltage. Using the specification above, Stratasys recommends the transformer is sourced locally, ensuring it meets local regulations.

Warning: Electrical Hazard

Stratasys recommends the printer is supplied on a dedicated, surge protected circuit.

Warning: Electrical Hazard

Stratasys recommends that all electrical supply work is undertaken by a qualified electrician.

Warning: Electrical Hazard

Power should be routed to the printer from above.

UPS Information

Supplying power to the printer via a suitable UPS offers two advantages:

- Maintaining operation during a short power outage
- Additional power supply quality protection

Caution:
For the highest printer functionality and protection, Stratasys recommends the printer is supplied via an Stratasys certified UPS.

When connected to a Stratasys certified UPS, the printer will benefit intelligent UPS control functionality. Intelligent UPS control offers further advantages:

- Controlled shutdown

  Uncontrolled printer shutdowns pose a risk of damage to electronic components. In the event of an power outage, the remaining up-time is monitored and the printer will initiate a controlled shut down before the UPS is unable to maintain supply.

- Minimal UPS capacity requirement

  In the event of a power outage non-critical vat heating is suspended to minimize the UPS capacity specification requirement.

- Ensures build restart

  Titanium is often able to recover and restart a build following an uncontrolled shut down, however this is not guaranteed due to the nature of the event. A controlled shut down ensures a build restart is possible when the power is resumed.

- UPS status monitoring

  The UPS is continuously monitored by Titanium. UPS faults and health status are reported in Titanium.

A “Certified UPS” has been tested for communication compatibility. Alternative UPS brands and models may be compatible if they offer serial communication using the SHUT Protocol.

Neo450 Connecting to a Certified UPS

All necessary cables and connectors are supplied with the Neo450.

Table 17: Neo450 certified UPS

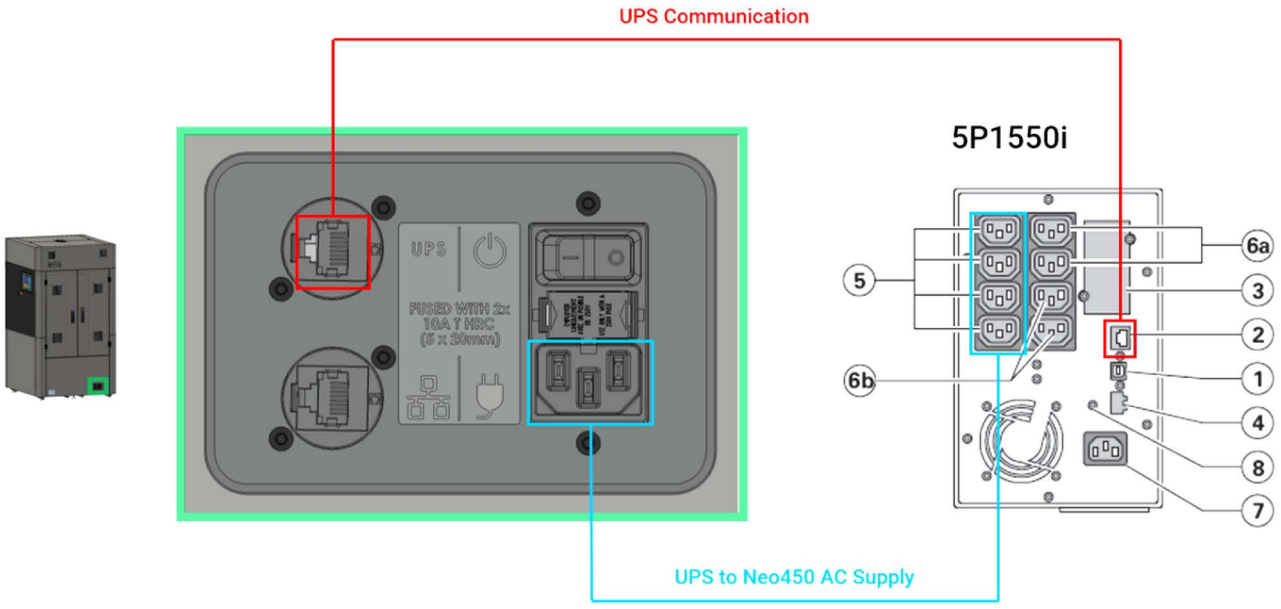
Region	110~120 VAC	220~240 VAC
Europe, Israel, South Korea, Russia	N/A	Eaton 5P1550i
USA[a], Canada	Eaton 5P1500*	N/A

a Not available in Colorado, Vermont or Washington State

Eaton 5P1550i (Europe)

- **Communication Cable:** 5m Cat 5e
- **AC Supply:** 5m European AC Supply Cable with IEC Plug E Connector

Figure 24: UPS connections (Europe)

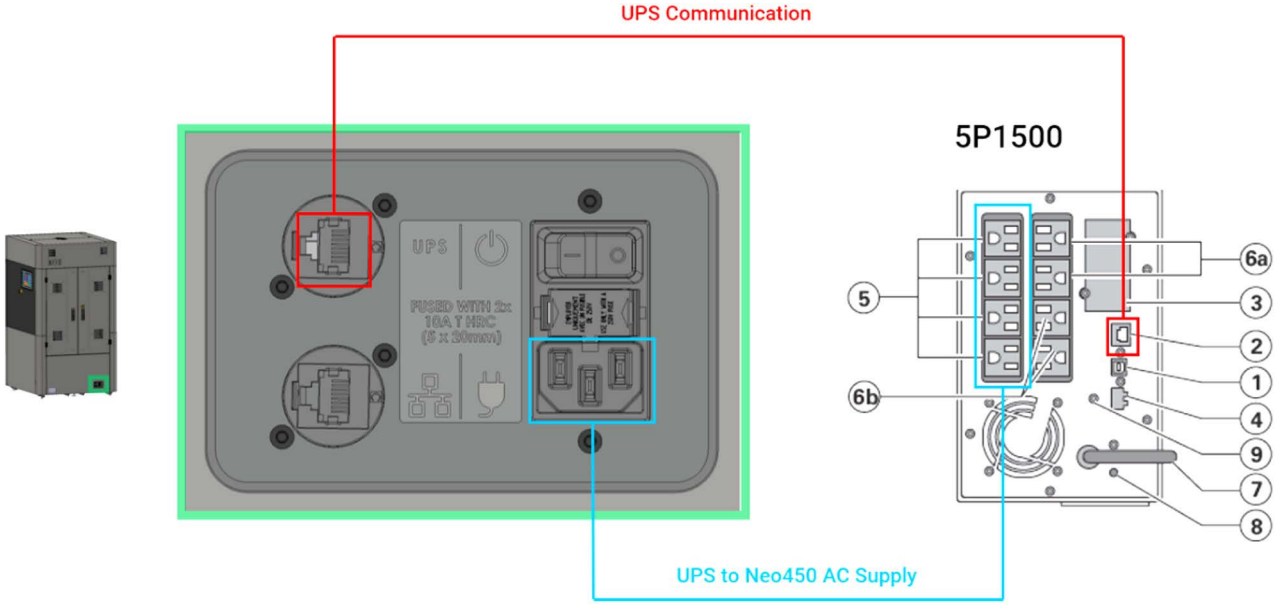


(1) USB communication port
(2) RS232 communication port
(3) Slot for optional communication card
(4) Connector for ROO (remote ON/OFF) or RPO (Remote Power Off) control
(5) Outlets for connection of critical equipment (Primary group)
(6a) Group 1: programmable outlets for connection of equipment
(6b) Group 2: programmable outlets for connection of equipment
(7) Socket for connection to AC-power source
(8) Ground screw

Eaton 5P1500 (USA and Canada)

- **Communication Cable:** 5m Cat 5e
- **AC Supply:** 5m USA & Canada AC Supply Cable

Figure 25: UPS connections (USA & Canada)

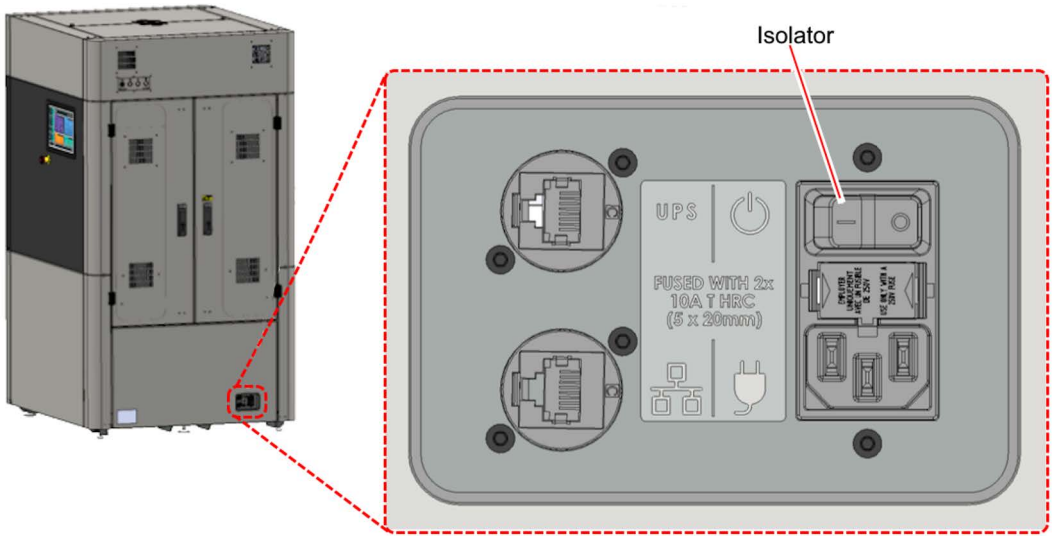


(1) USB communication port
(2) RS232 communication port
(3) Slot for optional communication card
(4) Connector for ROO (remote ON/OFF) or RPO (Remote Power Off) control
(5) Outlets for connection of critical equipment (Primary group)
(6a) Group 1: programmable outlets for connection of equipment
(6b) Group 2: programmable outlets for connection of equipment
(7) Socket for connection to AC-power source
(8) Ground screw

Warning: Electrical Hazard

Although the Power ON/OFF is an isolator, it must be used with a lockout device: BRADY 148081 to meet EN60204 standards.

Figure 26: Neo450 main power isolation switch location



Neo800/800+ UPS Information

Table 18: Neo800/800+ certified UPS

Region	208 VAC	220~240 VAC
Europe, Israel, South Korea, Russia	N/A	9SX3000I
USA, Canada	9SX3000G	N/A

Figure 27: Neo800/800+ UPS connections

Table 19: Component description

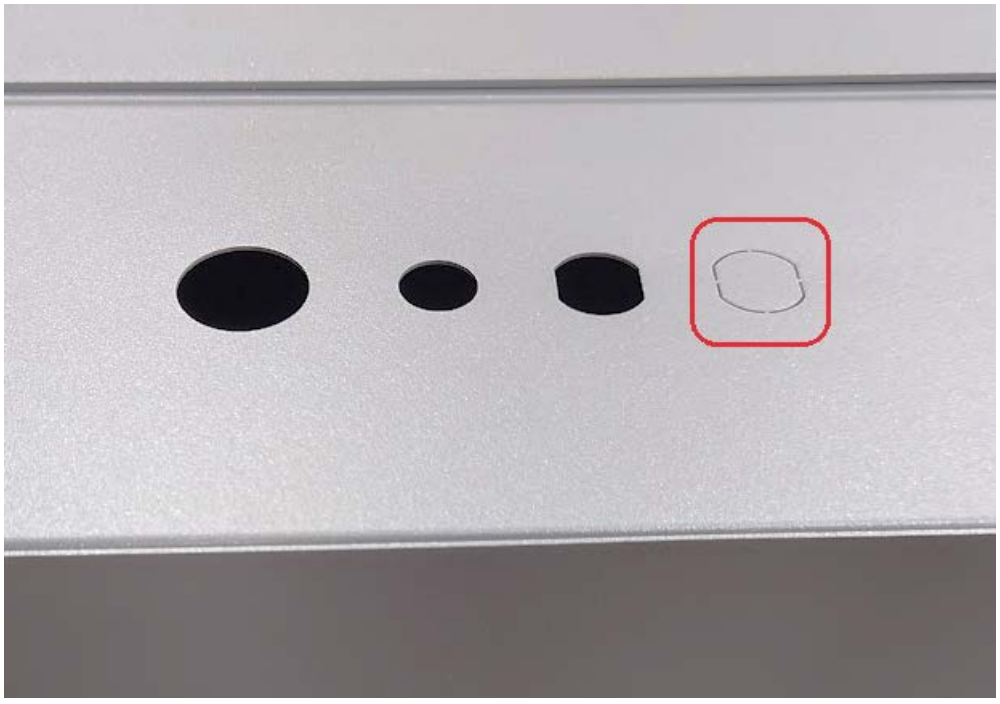
#	Description
1	RJ45 to RS232 serial connection
2	Output connection to printer (C20 plug end supplied with Shipping Kit)
3	Input power (mains)

A factory-installed internal Cat 5e communication cable is routed behind the right hand panel.

Figure 28: Cat 5e communication cable

Using a newly supplied 10m Cat 5e cable and a female-to-female RJ45 connector, an engineer will re-route and extend the cable along the back of the printer and through the roof. On printers shipped subsequent to the release of this user guide, an additional punch-out tab for the external UPS communication cable has been added.

Figure 29: Additional punch-out tab

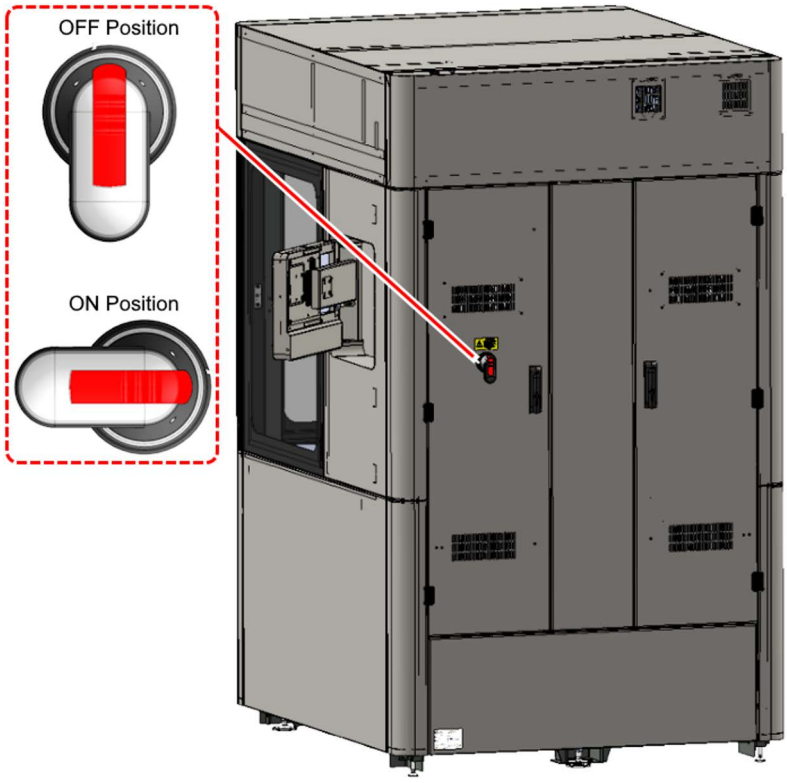


Installation

Installation of the printer should be performed by trained personnel.

For installation requirements, please refer to the printer Site Preparation guide.

Figure 30: Neo800/800+ main power isolation switch location



Safe Start-up and Shutdown Sequences

To assure safety during start-up, perform the following steps:

1. Apply power to the printer from the customers electrical supply switch on the main isolator.
2. Turn on the printer by pressing the On/Off button on the UI.
3. Turn on the computer.
4. After logging into windows wait 30 seconds.
5. Start up the Titanium control software.

Follow instructions in reverse when shutting down the printer

Initialization

When the Titanium software is started, it verifies communication and status of the various sub-systems: laser, scanning system, etc. If Titanium has been started following a printer power cycle, this process may take up to 2 minutes. Titanium will report sub-system verification progress. If the platform and recoater positions are unknown, you will be asked to initialize the printer. Acknowledging this request will send the platform and recoater to their home positions.

Neo450 Network Connection

The Neo450 is equipped with an on-board Ethernet switch. The switch links the application PC and on-board camera to the LAN port at rear of printer. Where possible the Neo450 should be connected via the LAN port (wired connection). Upon connection to a LAN the Neo450 PC can be connected by the network administrator.

Caution:

Windows has been configured for reliable Neo operation.

Modification of Windows configuration should be avoided.

No modification to windows configuration should be made, locally or via group policies, to the following:

- Power and Screen Options
- Fast Start-up
- Windows Updates

The on-board camera should also be connected with a fixed IP address.

A network and Internet connection will be required for certain functions, including but not limited to:

- Remote diagnosis
- Remote monitoring
- Webcam access
- Process update email facility

Please contact Stratasys for more details on network connection options.

The Neo450 conforms to the following standards:

Ethernet

- IEE 802.3
- IEEE 802.3u
- IEEE 802.3ab

Neo800/800+ Network Connection

Where possible the Neo800/800+ should be connected with a wired LAN connection. Upon connection to a LAN the Neo800/800+ PC can be connected by the network administrator.

Caution:

Windows has been configured for reliable Neo operation.

Modification of Windows configuration should be avoided.

No modification to windows configuration should be made, locally or via group policies, to the following:

- Power and Screen Options
- Fast Start-up
- Windows Updates

A network and Internet connection will be required for certain functions, including but not limited to:

- Remote diagnosis
- Remote monitoring
- Webcam access
- Process update email facility

Please contact Stratasys for more details on network connection options.

The Neo800/800+ conforms to the following standards:

Ethernet

- IEE 802.3
- IEEE 802.3u
- IEEE 802.3ab

Installing Virus Protection Software

Caution:

Please contact Stratasys Customer Services before installing third party software

Caution:

Installing virus protection software without the correct modification to settings, will typically result in a non-operational printer.

There are numerous virus protection software vendors. Virus protection software differs in design and operation, it is therefore not possible for Stratasys to validate each vendor and subsequent software releases.
Discuss the installation of any third party software with Stratasys Customer Services prior to installation.

Stratasys Online Resources

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

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

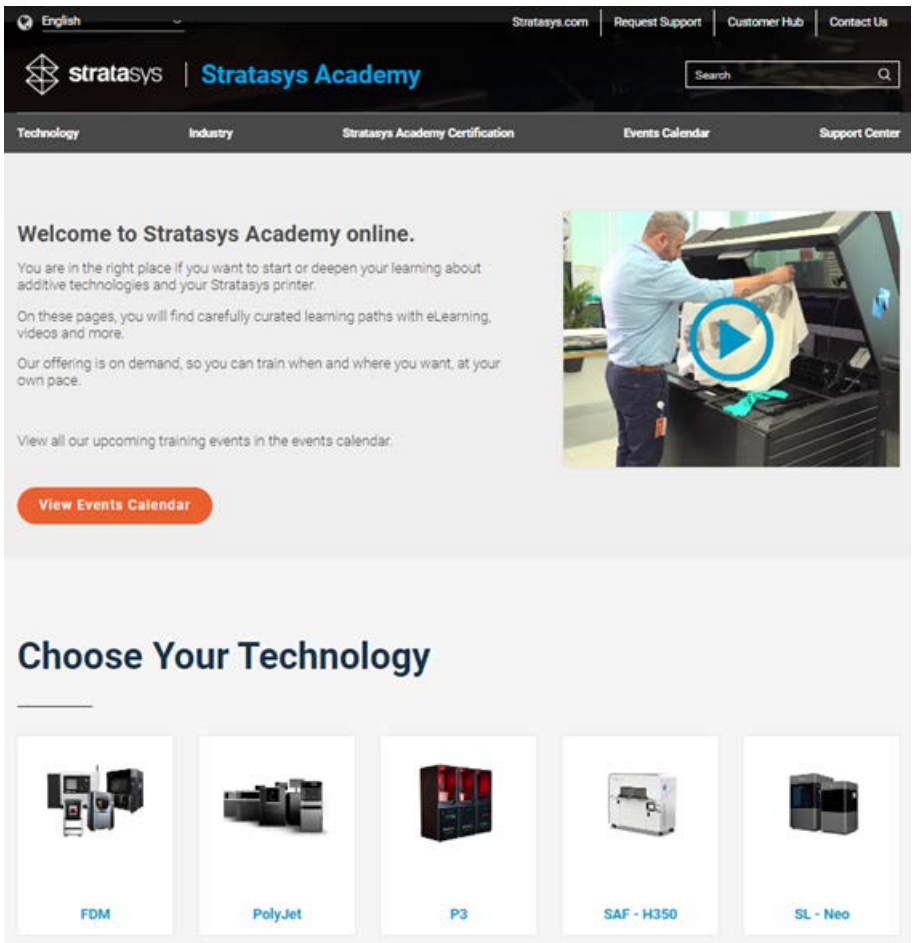
Stratasys Academy

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

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

Start your learning journey today.

Figure 31: Stratasys Academy



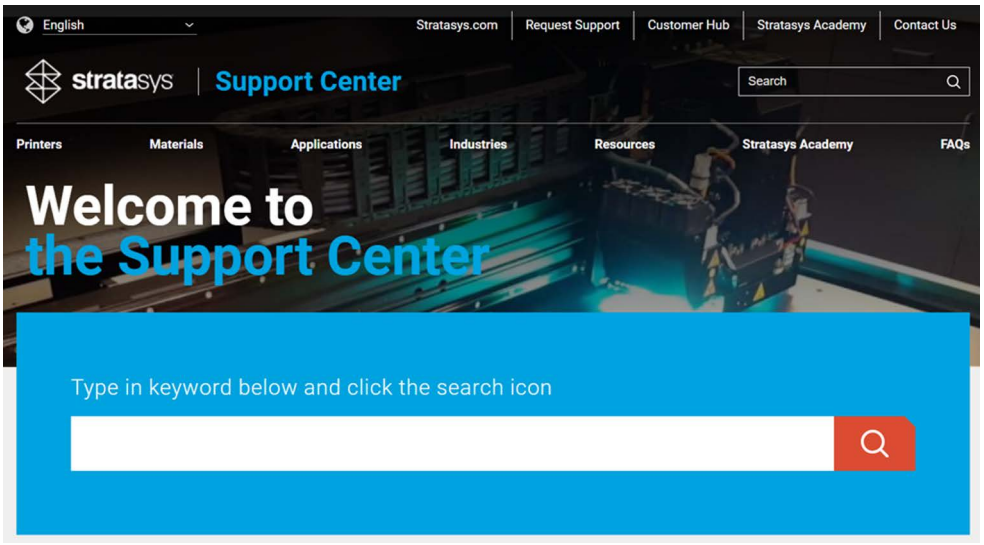
Stratasys Support Center

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

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

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

Figure 32: Support Center

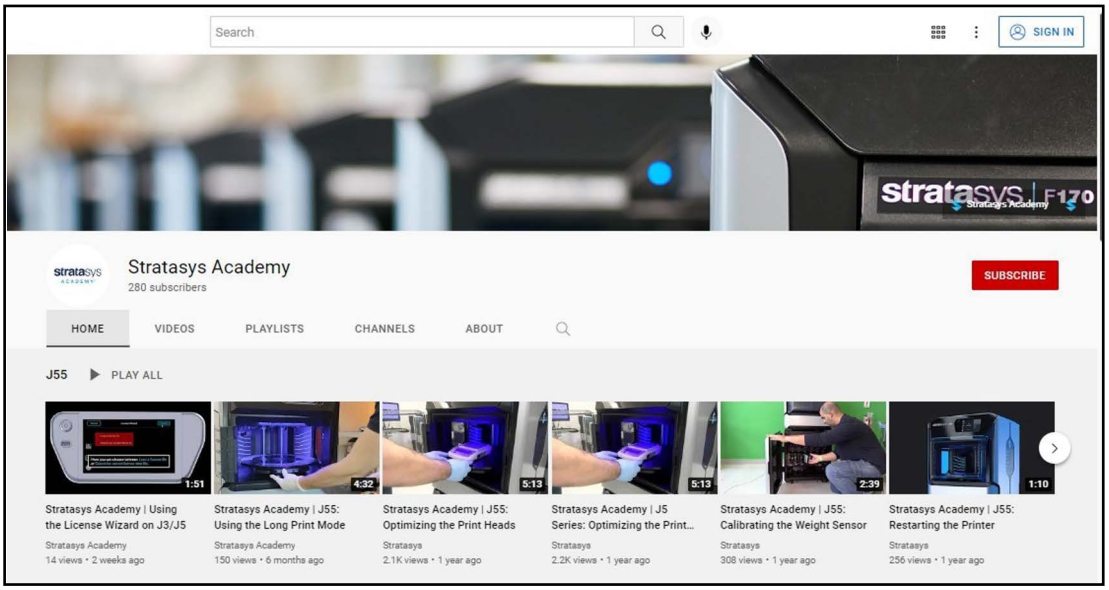


Stratasys Academy YouTube Channel

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

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

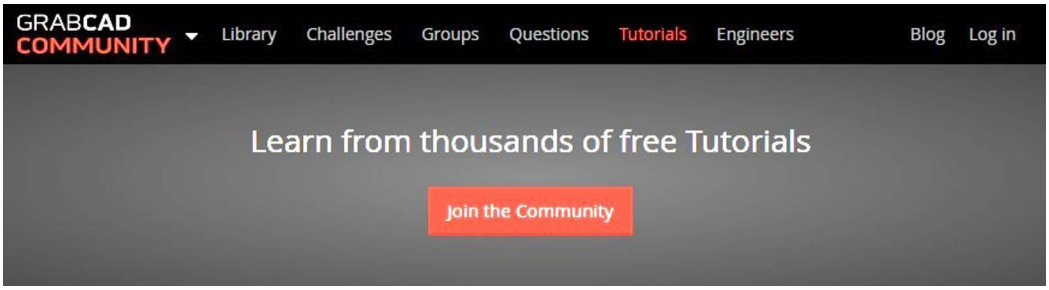
Figure 33: Stratasys Academy YouTube channel



GrabCAD Community

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

Figure 34: GrabCAD Community



3 System Components

This chapter describes the components of the printers.

Printer Overview

The printers are designed for building 3D models using the technique of stereolithography. Stereolithography is a form of 3D printing technology used for creating models, prototypes, patterns, and production parts in a layer-by-layer process, using photopolymerization, a process by which light causes chains of molecules to link together, forming polymers. Those polymers then make up the body of a three-dimensional solid.

- The Neo800/800+ 3D printer has a maximum build volume of 800 x 800 x 600 mm / 31.5 x 31.5 x 23.6 in. in size, using stereolithography technology.
- The Neo450 3D printer has a maximum build volume of 450 x 450 x 400 mm / 17.7 x 17.7 x 15.7 in. in size, also using stereolithography technology.

The printer's open resin system allows it to be used with any commercially available 355 nm UV curing resin. When paired with GrabCAD Print™ software, job files may be adapted to build parts with any resin. The Neo800/800+ and Neo450 printers are controlled by PC-based Titanium machine-control software, which is accessed via a touch-screen interface.

Printer Highlights

- Open resin system with pre-qualified materials
- Built for production
- Stratasys infrastructure
- Multiple vat configurations (Full, Half, Short)
- Minimum feature sizes X/Y;
  - Neo450e: 0.3 mm,
  - Neo450s: 0.15 mm
  - Neo800: 0.2 mm
  - Neo800+: 0.17 mm
- Minimum feature sizes in Z (all printers): 0.4 mm
- X/Y resolution dependent on build mode (SD/HD) and material choice
- Z layer resolution (all printers): 0.05 mm to 0.2 mm
- Touchscreen graphical user interface

Neo450

The following section contains images and description of the main components and assemblies of the Neo450 Printer.

Figure 35: Neo450 functional components

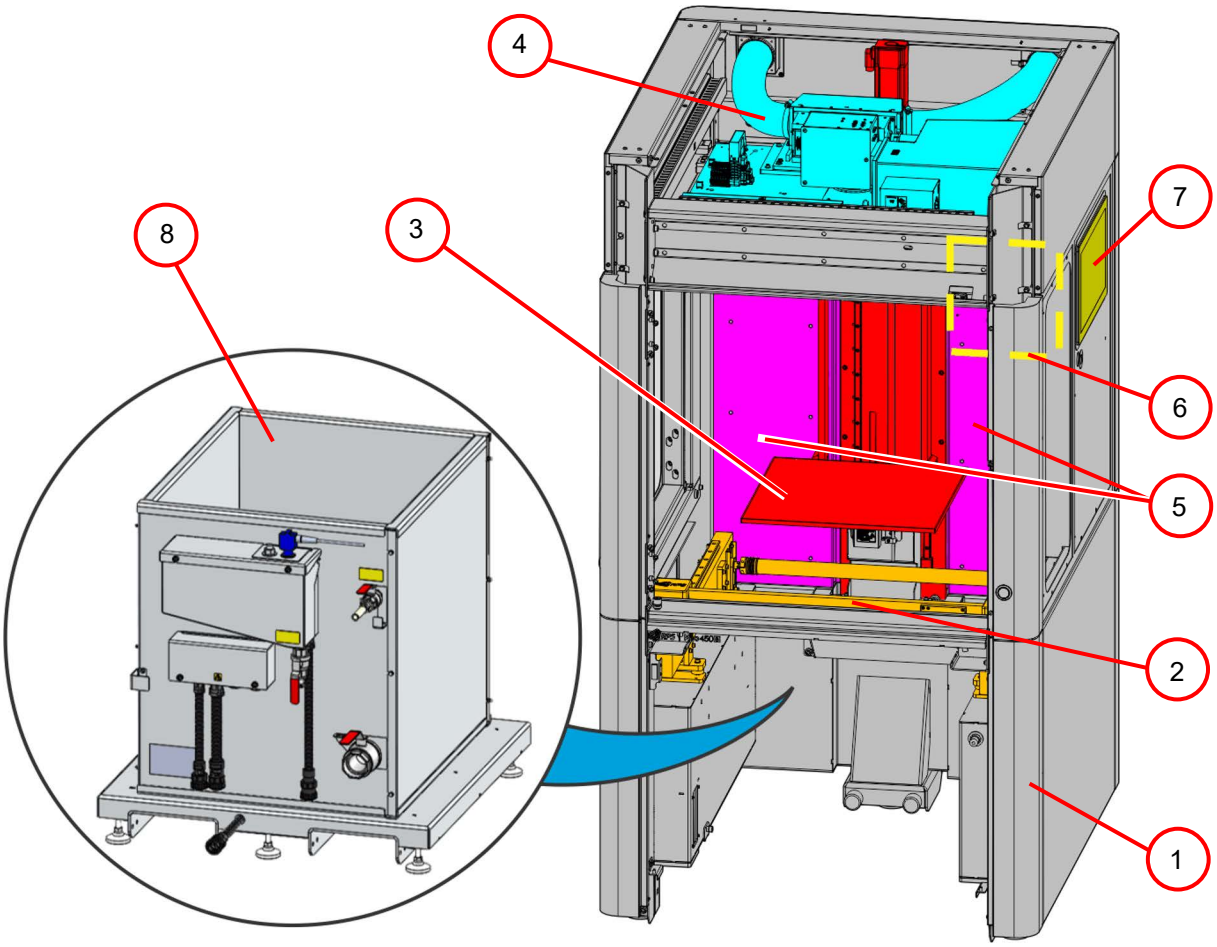


Table 20: Neo450 components list

ID	Description	ID	Description
1	Frame	5	Electrical Panels (rear)
2	Recoater Assembly	6	PC (rear)
3	Z-Stage Assembly	7	Touchscreen Interface
4	Optics Assembly	8	Resin Vat

Recoater Assembly

The recoater blade travels from front-to-back over the resin on the linear rails of the recoater assembly. The recoater blade may be removed for cleaning and will maintain the proper gap after installation as long as the securing bolts are tightened properly.

Figure 36: Recoater assembly components

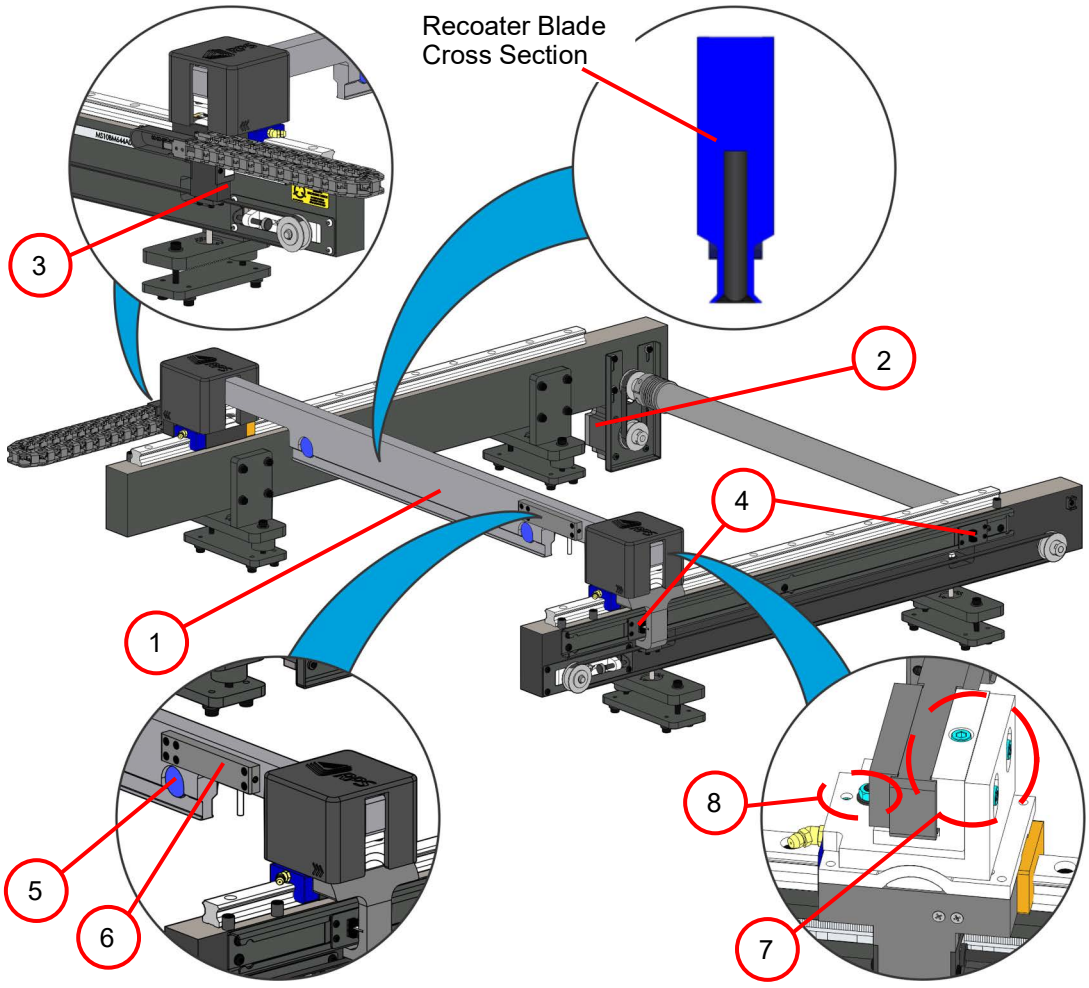


Table 21: Recoater assembly components list

ID	Description	ID	Description
1	Recoater Blade	5	Vacuum Level Window
2	Stepper Motor (48 VDC, PLC controlled)	6	Vacuum Port
3	Incremental Linear Encoder	7	Recoater Blade Height Adjustment Screws
4	Limit Sensors (Photo-sensors)	8	Recoater Blade Rake Adjustment Screws

Z Stage

The Z stage lowers the build platform into the resin during the build process and raises the build platform out of the vat when the build is complete. The platform support structure is mounted to four bearings that travel up and down on two linear rails. The Z stage is driven by a servo motor connected to a ball screw assembly.

Figure 37: Z stage components

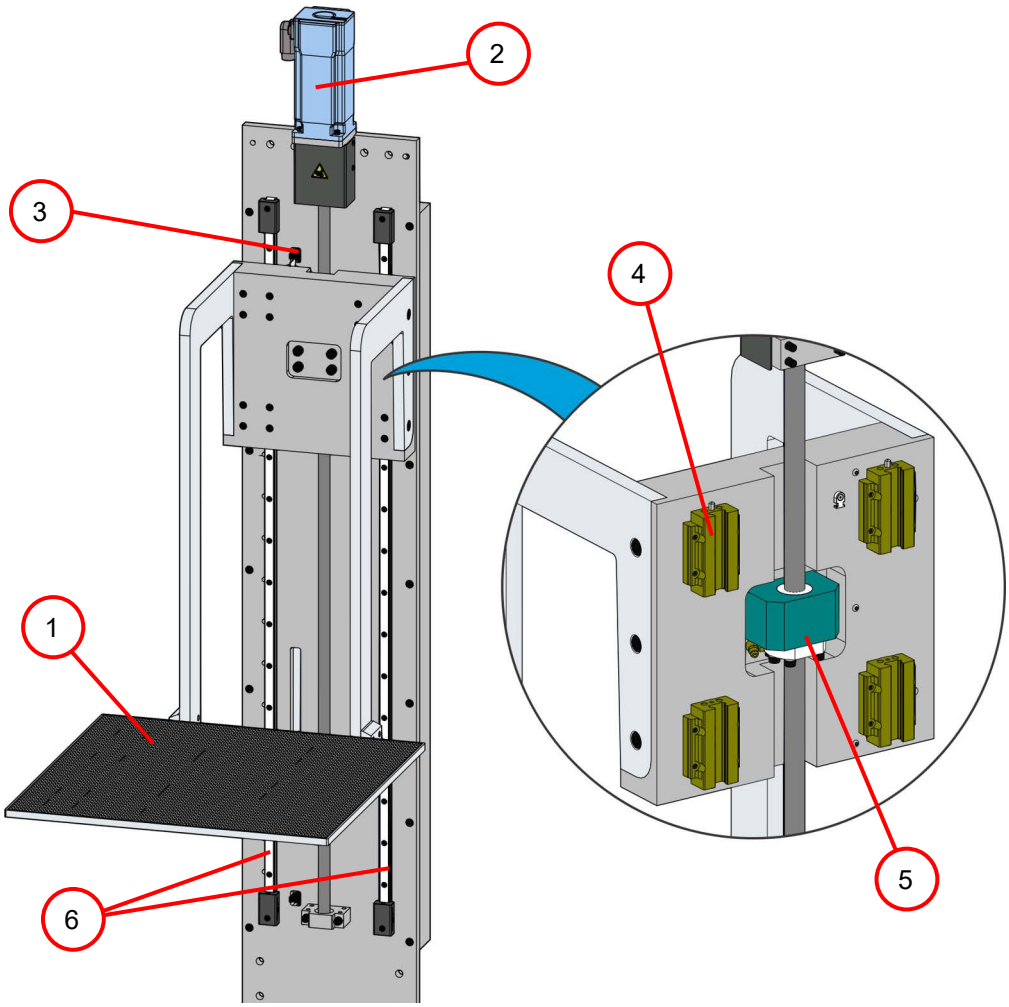


Table 22: Z stage assembly components list

ID	Description	ID	Description
1	Build Platform	4	Bearing (Qty 4)
2	Servo Motor (48 VDC, PLC controlled)	5	Ball Screw Assembly
3	Limit Sensor (Photo-sensors)	6	Linear Rails

Resin Vat

The resin vat contains resin that is used to build 3D parts. It is generally placed inside the Neo450 build chamber and then leveled. The customer must purchase resin to fill the vat.

Spare or secondary vats may be purchased by the customer for use with secondary materials which can be used after cleaning the build platform and elevator assembly which contact the new resins.

Figure 38: Resin vat components

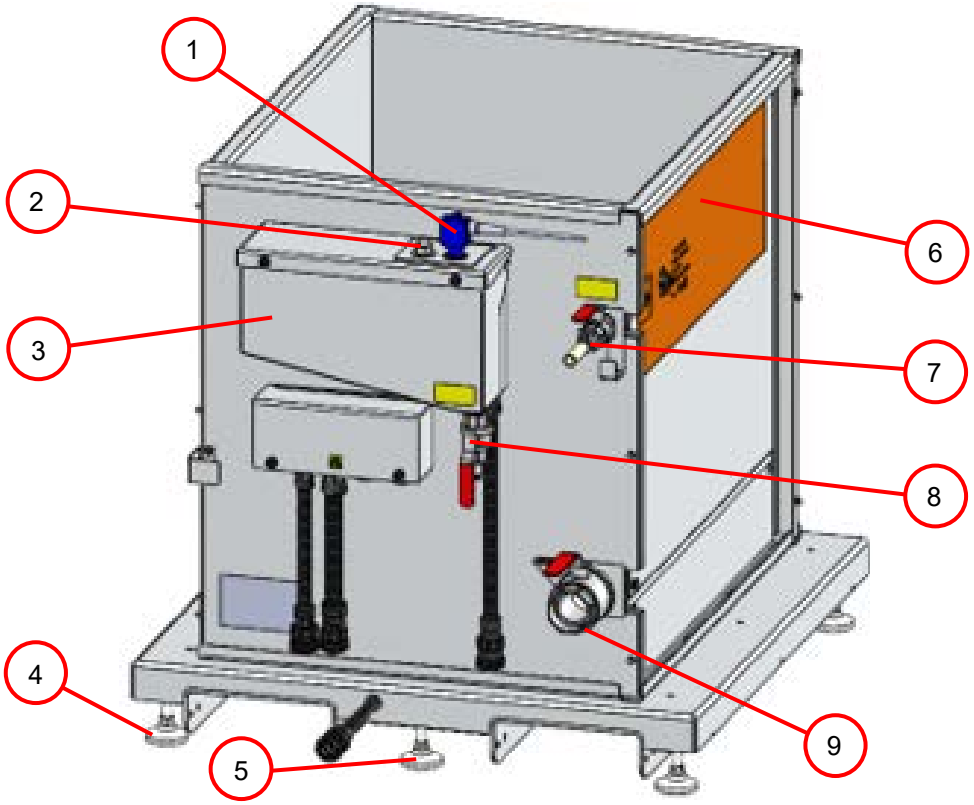


Table 23: Vat components list

ID	Description	ID	Description
1	Ultrasonic Sensor (Distance)	6	Heater (behind side panel and insulation)
2	Float Sensor (High Limit)	7	Resin Leveling Valve
3	Reservoir	8	Reservoir Valve
4	Stabilizing Foot	9	Drain Valve
5	Leveling Foot		

Optics

The optics enclosure is located above the printer build chamber and houses the laser, scanners and supporting optics components. The enclosure can be accessed through a sliding top cover.

Warning: Laser Exposure.
Do not open the optics enclosure. This should only be performed by trained service personnel only.

The laser beam first passes through the beam expander. It is then directed by two turning mirrors through the Z Galvo and into the X/Y-axis scanner. The beam is directed downward through the scanner output window into the build chamber. A mechanical shutter blocks the laser beam if the doors are opened during a build operation.

Figure 39: Optics components

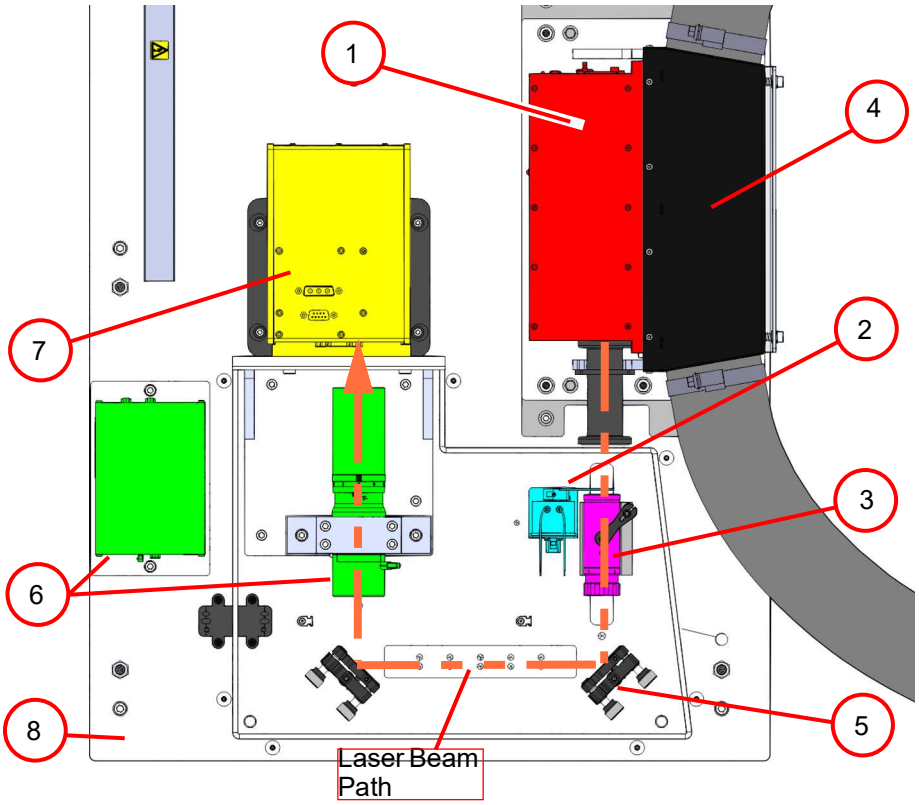


Table 24: Optics components list

ID	Description	ID	Description
1	Laser	5	Turning Mirrors (Qty 2)
2	Safety Shutter	6	Z Galvo and Controller
3	Beam Expander	7	X/Y Scanners / Galvos
4	Heat Exchanger	8	Optics Plate

Frame

The printer frame serves as the mounting location for various resin related components.

Figure 40: Frame components

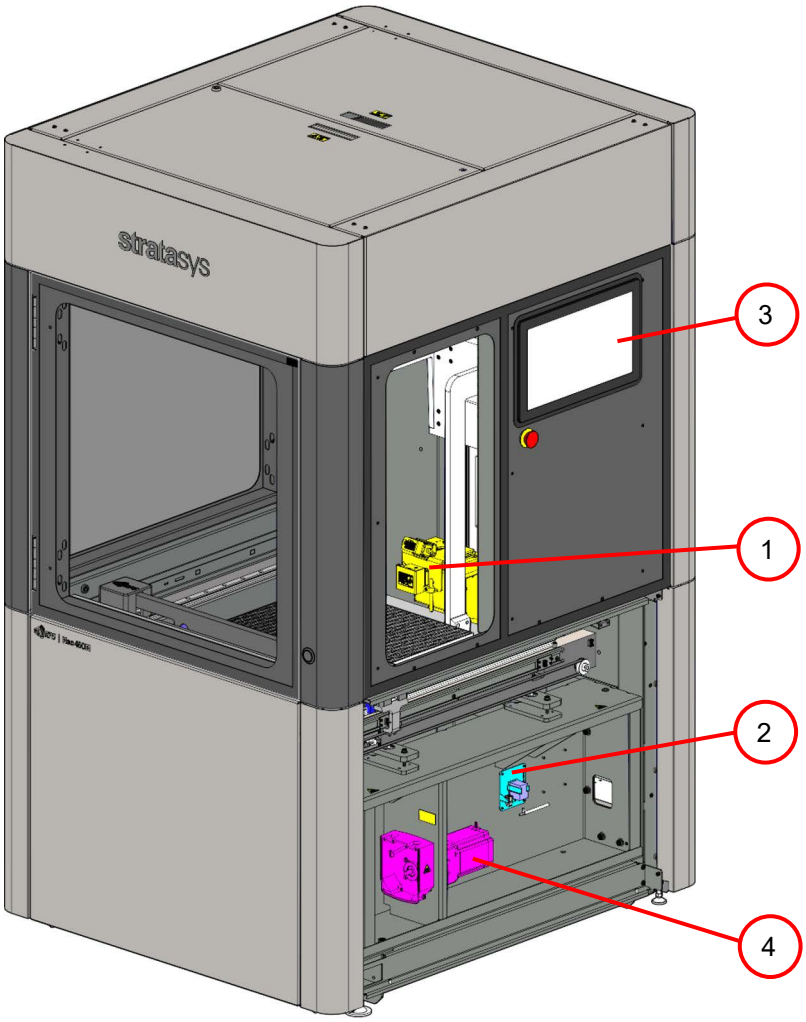


Table 25: Frame components list

ID	Description	ID	Description
1	Resin Level Sensor	3	Touchscreen User Interface
2	Vacuum Pump	4	Peristaltic Resin Pump

Electrical Panels

The electrical panels can be accessed from the rear of the printer. The area contains high and low voltage components as well as the PC.

Warning: High Voltage.
Do not open the electrical panels. This should only be performed by trained service personnel only.

Figure 41: Electrical panel components

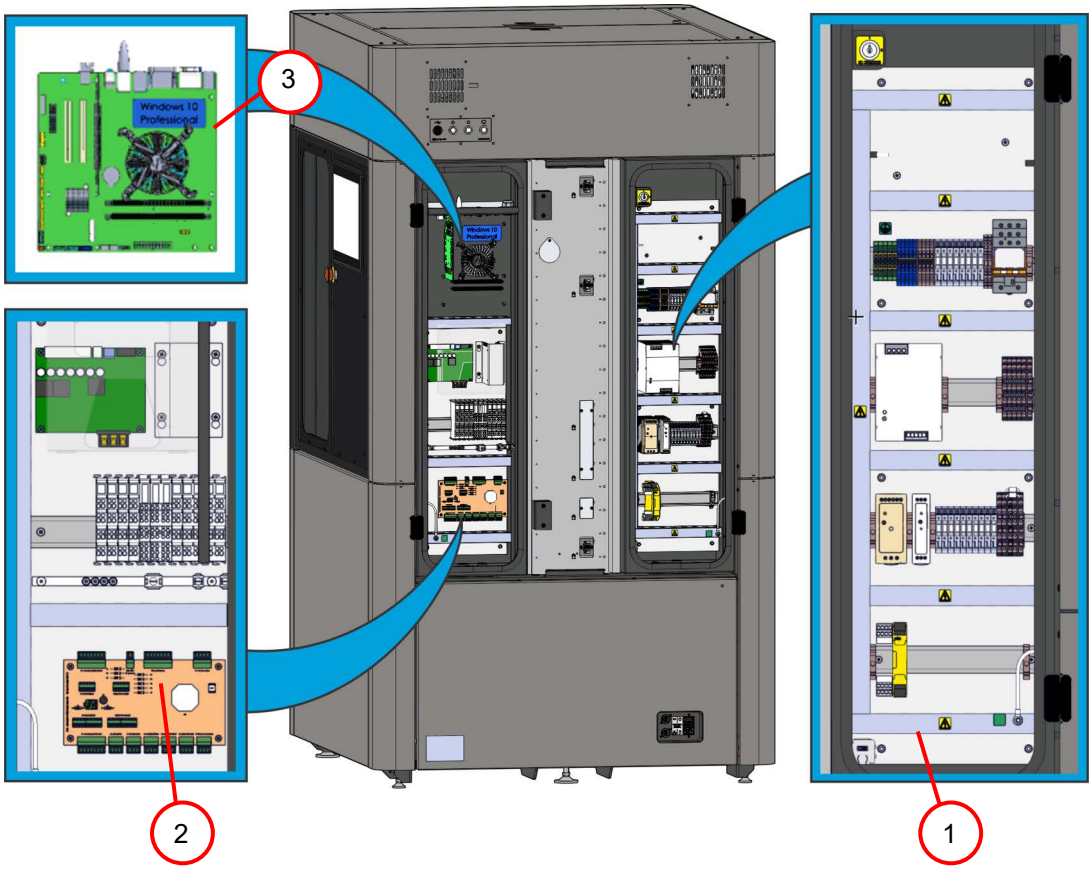


Table 26: Electrical panel components list

ID	Description	ID	Description
1	High Voltage Components	3	PC
2	Low Voltage Components		

Neo800

The following section contains images and descriptions of the main components and assemblies of the Neo800 printer.

Figure 42: Neo800 functional components

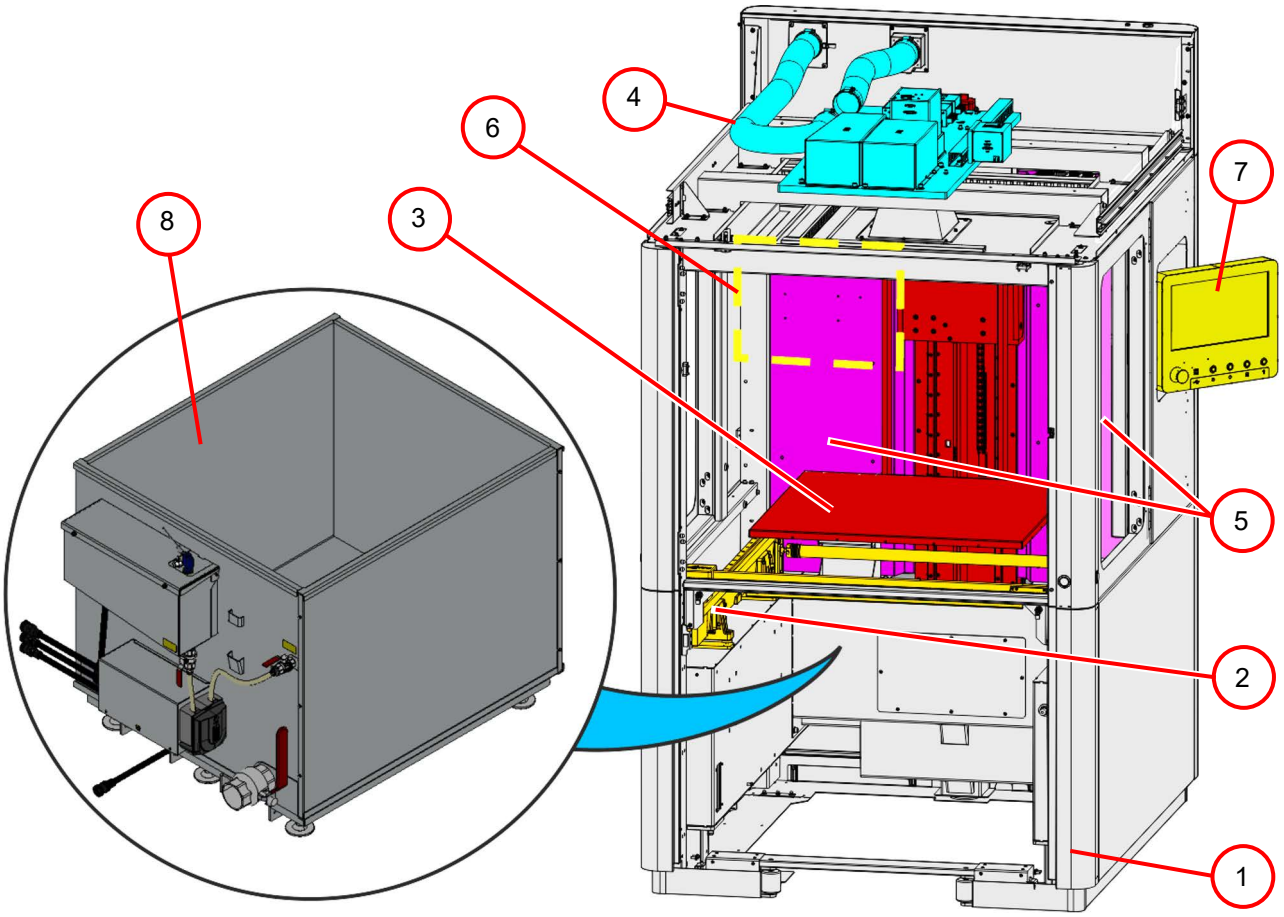


Table 27: Neo800 components list

ID	Description	ID	Description
1	Frame	5	Electrical Panels (rear)
2	Recoater Assembly	6	PC
3	Z-Stage Assembly	7	Touchscreen Interface
4	Optics Assembly	8	Resin Vat

Recoater Assembly

The recoater blade travels from front-to-back over the resin on the linear rails of the recoater assembly depositing the required thickness of resin on the printed parts. The recoater blade may be removed for cleaning and will maintain the proper gap after installation as long as the securing bolts are tightened properly.

Figure 43: Recoater assembly components

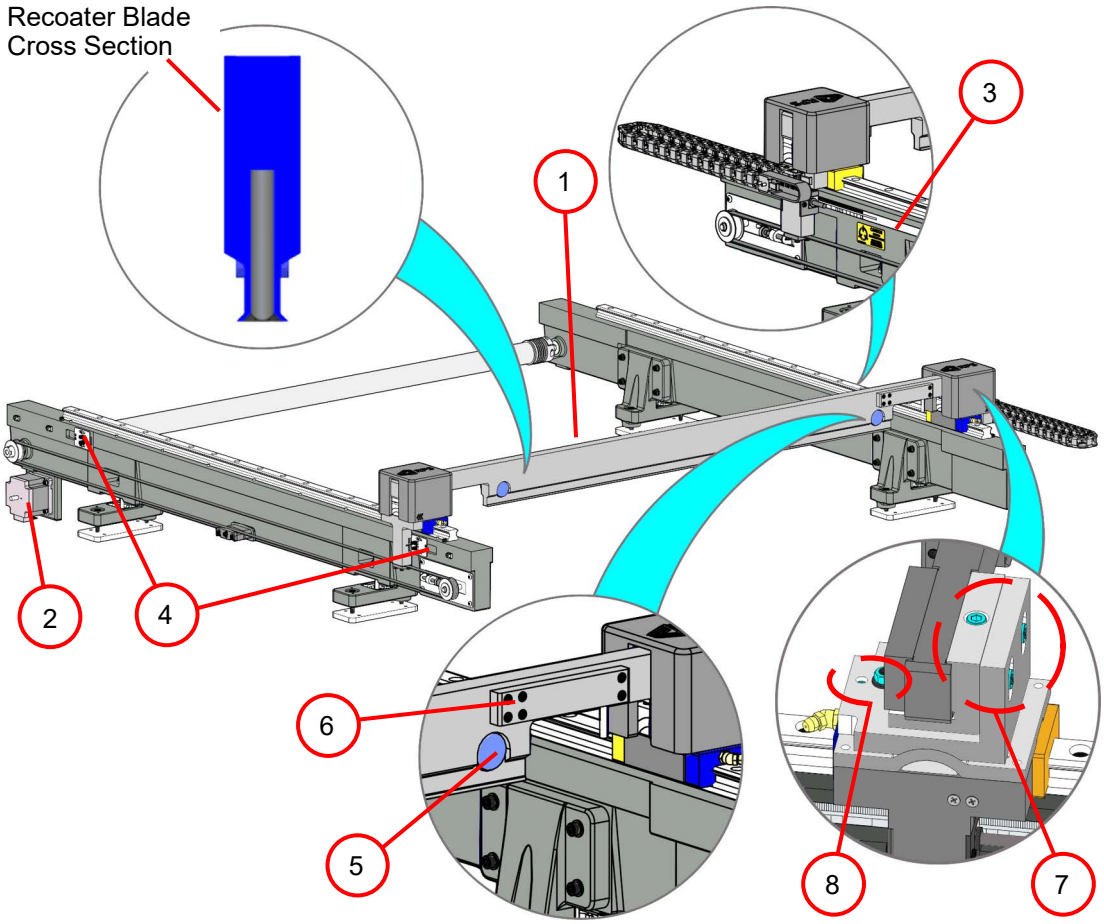


Table 28: Recoater assembly components list

ID	Description	ID	Description
1	Recoater Blade	5	Vacuum Level Window
2	Stepper Motor (48 VDC, PLC controlled)	6	Vacuum Port
3	Incremental Linear Encoder	7	Recoater Blade Height Adjustment Screws
4	Limit Sensors (Photo-sensors)	8	Recoater Blade Rake Adjustment Screws

Z Stage

The Z stage lowers the build platform into the resin during the build process and raises the build platform out of the vat when the build is complete. The platform support structure is mounted to 4 bearings that travel up and down on 2 linear rails. The Z stage is driven by a stepper motor connected to a ball screw assembly.

Figure 44: Z stage components

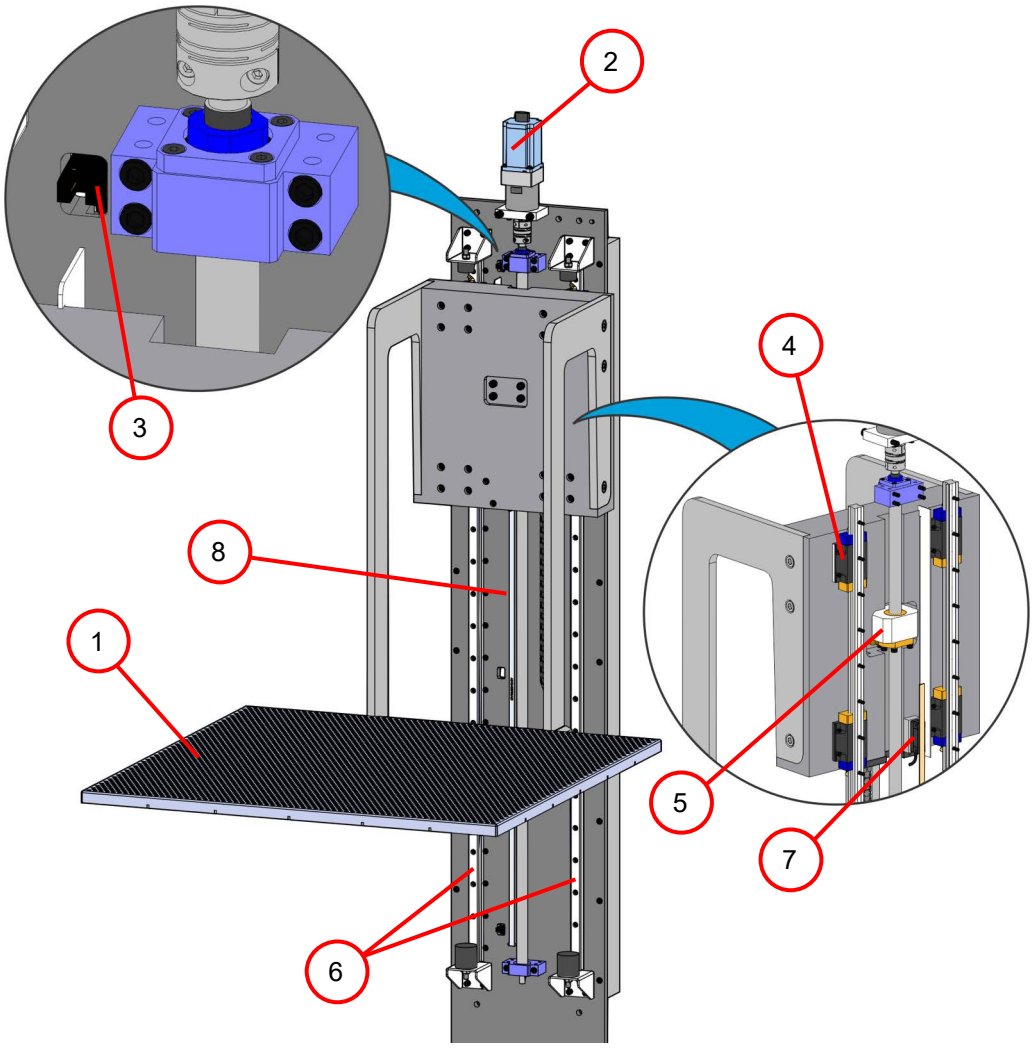


Table 29: Z stage assembly components list

ID	Description	ID	Description
1	Build Platform	5	Ball Screw Assembly
2	Stepper Motor (48 VDC, PLC controlled)	6	Linear Rails
3	Limit Sensor (Photo-sensors)	7	Encoder Sensor
4	Bearing (Qty 4)	8	Encoder Strip

Resin Vat

The resin vat contains resin that is used to build 3D parts. It is generally placed inside the Neo800 build chamber and then leveled. The customer must purchase resin to fill the vat.

Spare or secondary vats may be purchased by the customer for use with secondary materials which can be used after cleaning the build platform and elevator assembly which contact the new resins.

Figure 45: Resin vat components

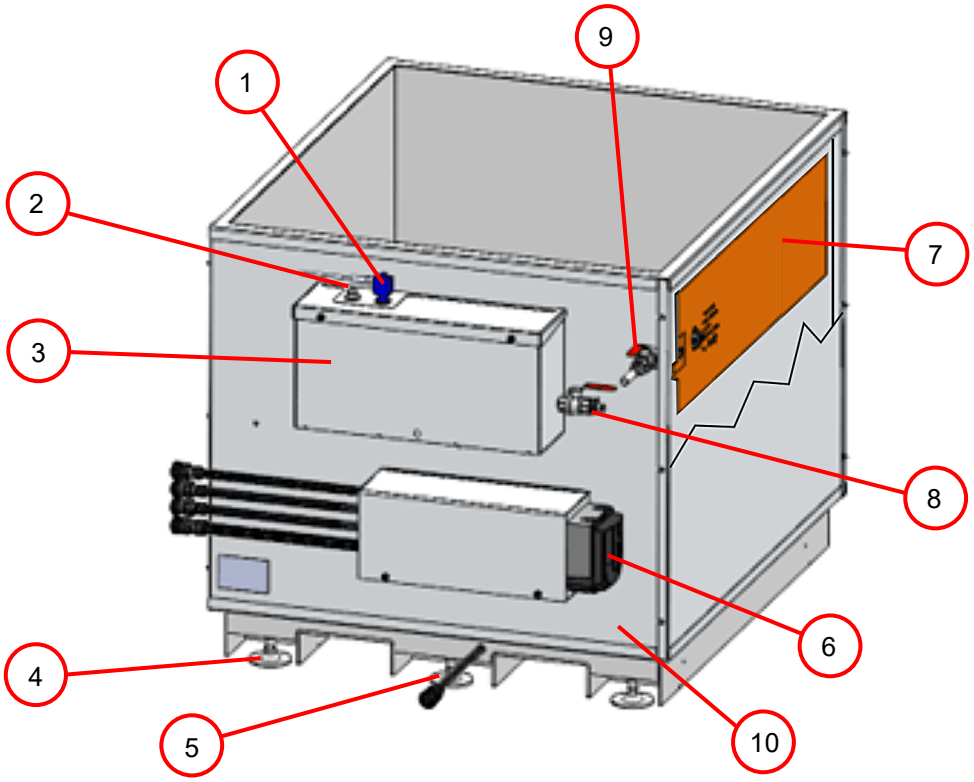


Table 30: Vat components list

ID	Description	ID	Description
1	Ultrasonic Sensor (Distance)	6	Peristaltic Resin Pump
2	Float Sensor (High Limit)	7	Heater (behind side panel and insulation)
3	Reservoir	8	Reservoir Valve
4	Stabilizing Foot	9	Resin Leveling Valve
5	Leveling Foot	10	Drain Valve (Not Shown)

Optics

The optics enclosure is located above the printer build chamber and houses the laser, scanners and supporting optics components. The enclosure can be accessed through a sliding top cover.

Warning: Laser Exposure.
Do not open the optics enclosure. This should only be performed by trained service personnel only.

The laser beam first passes through the collimating lens. It is then directed by 2 turning mirrors through the Z scanner and into the X/Y-axis scanner. The beam is directed downward through the scanner output window into the build chamber. A mechanical shutter blocks the laser beam if the doors are opened during a build operation.

Figure 46: Optics components

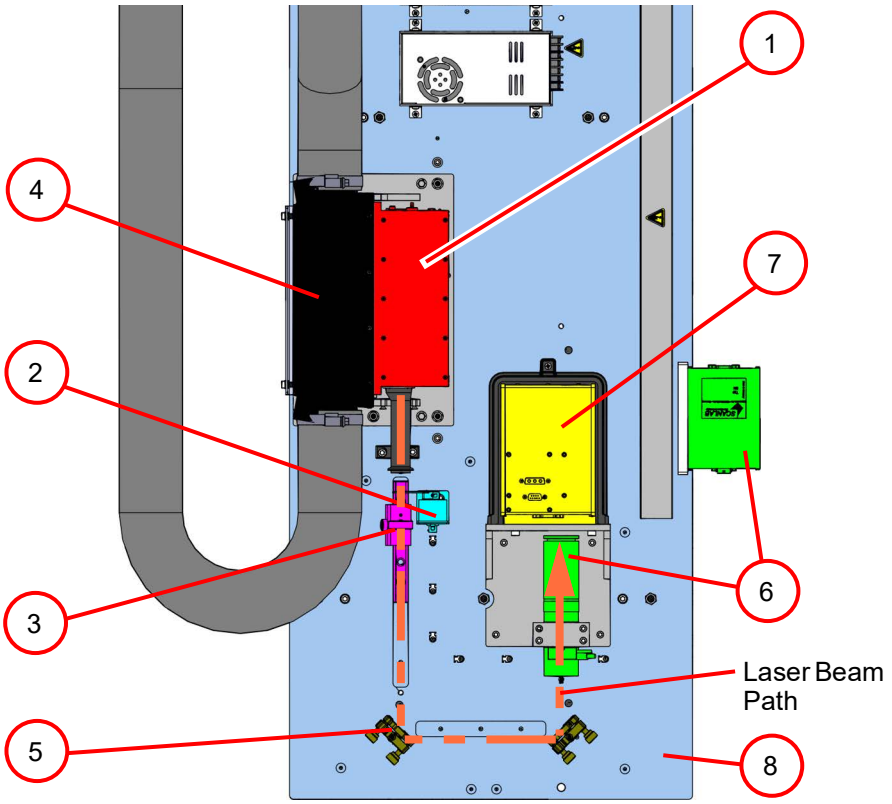


Table 31: Optics components list

ID	Description	ID	Description
1	Laser	5	Turning Mirrors (Qty 2)
2	Safety Shutter	6	Z Galvo and Controller
3	Collimating Lens	7	X/Y Scanners / Galvos
4	Heat Exchanger	8	Optics Plate

Frame

The printer frame serves as the mounting location for various printer components.

Figure 47: Frame components

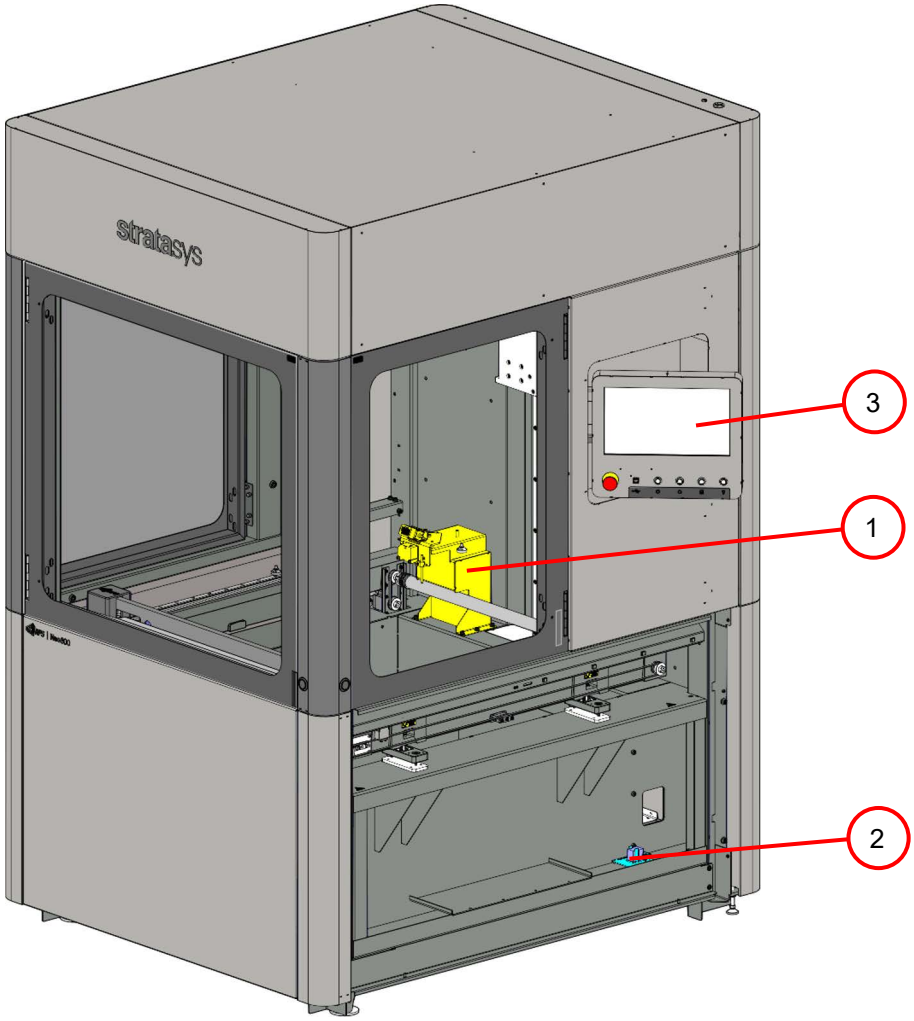


Table 32: Frame components list

ID	Description	ID	Description
1	Resin Level Sensor and Mounting Bracket	3	Touchscreen User Interface
2	Vacuum Pump for Recoater Blade		

Electrical Panels

The electrical panels can be accessed from the rear of the printer. The area contains high and low voltage components as well as the PC.

Warning: High Voltage.
Do not open the electrical panels. This should only be performed by trained service personnel only.

Figure 48: Electrical panel components

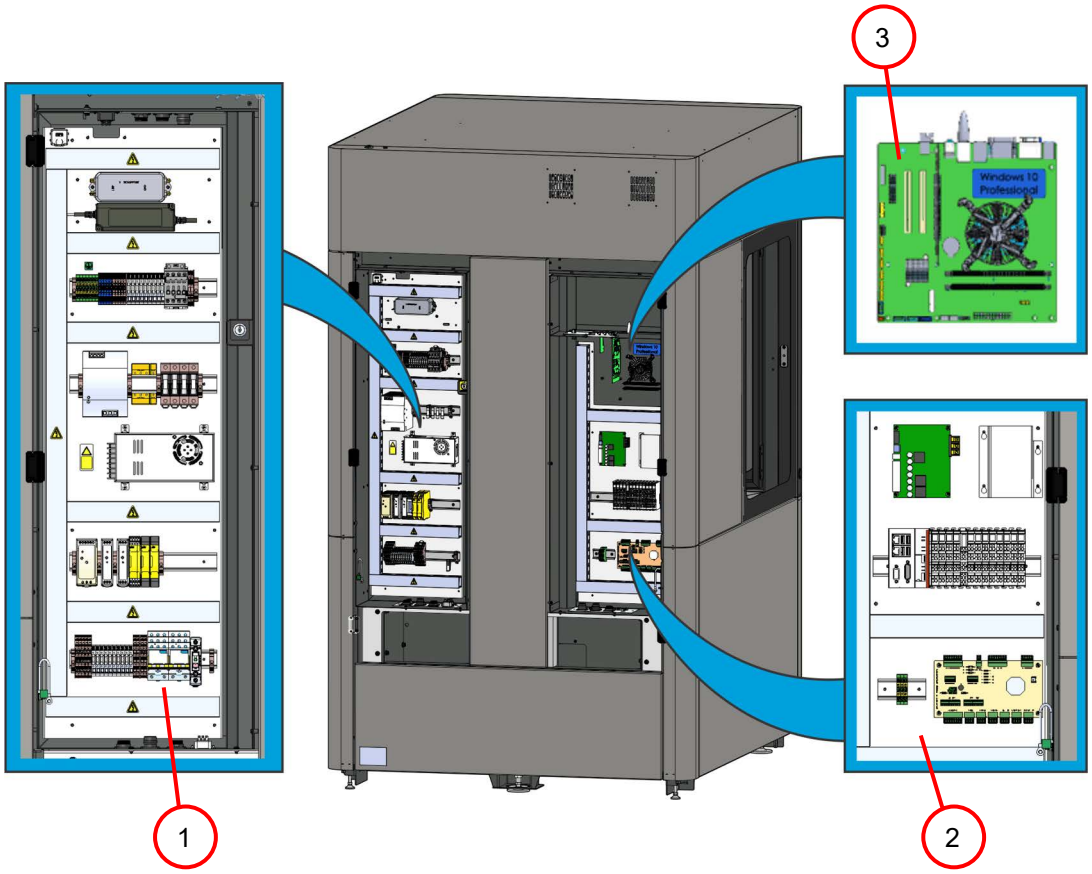


Table 33: Electrical panel components list

ID	Description	ID	Description
1	High Voltage Components	3	PC
2	Low Voltage Components		

Neo800+

The following section contains images and descriptions of the main components and assemblies of the Neo800+ printer.

Figure 49: Neo800+ functional components

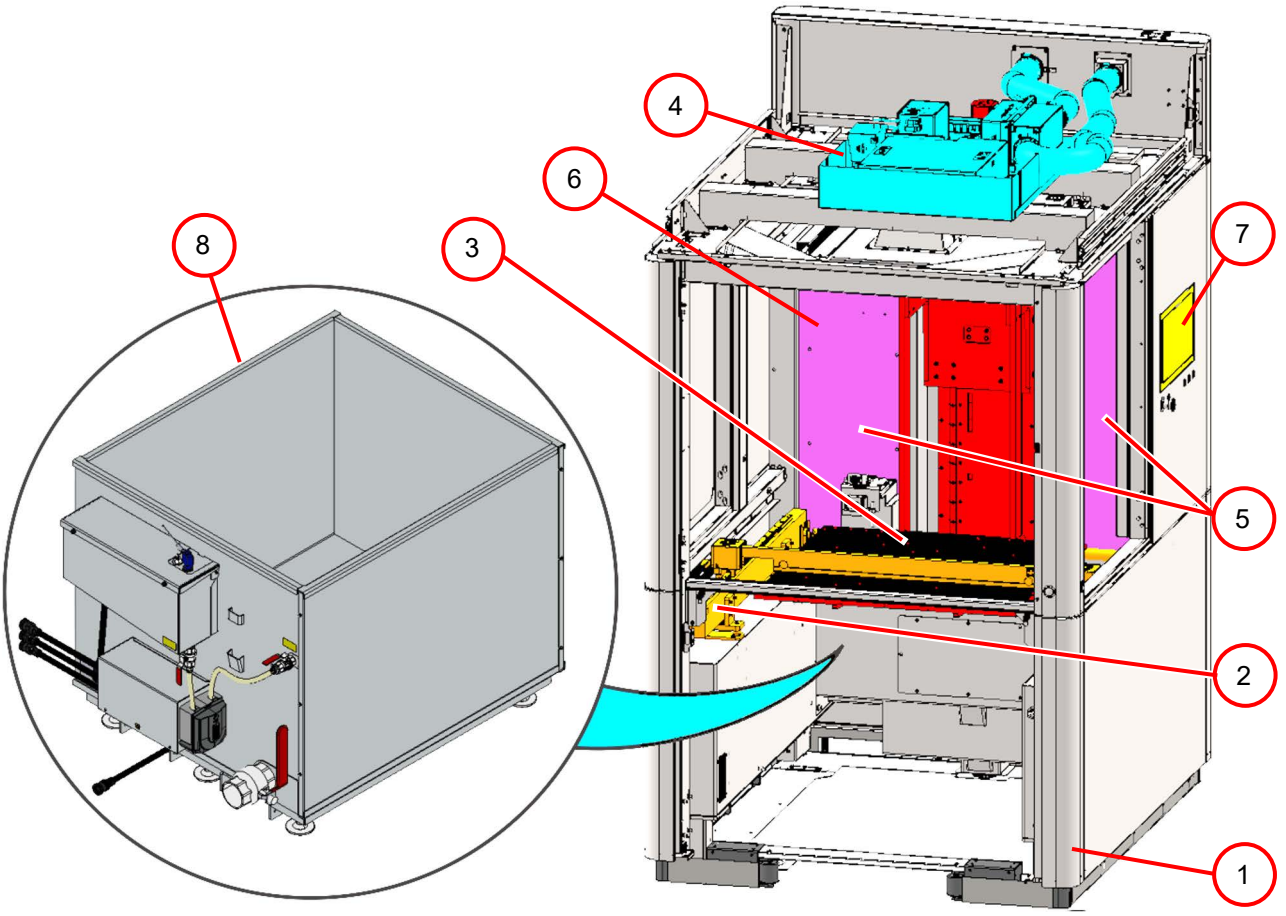


Table 34: Neo800+ components list

ID	Description	ID	Description
1	Frame	5	Electrical Panels (rear)
2	Recoater Assembly	6	PC
3	Z-Stage Assembly	7	Touchscreen Interface
4	Optics Assembly	8	Resin Vat

Recoater Assembly

The recoater blade travels from front-to-back over the resin on the linear rails of the recoater assembly depositing the required thickness of resin on the printed parts. The recoater blade may be removed for cleaning and will maintain the proper gap after installation as long as the securing bolts are tightened properly.

Figure 50: Recoater assembly components

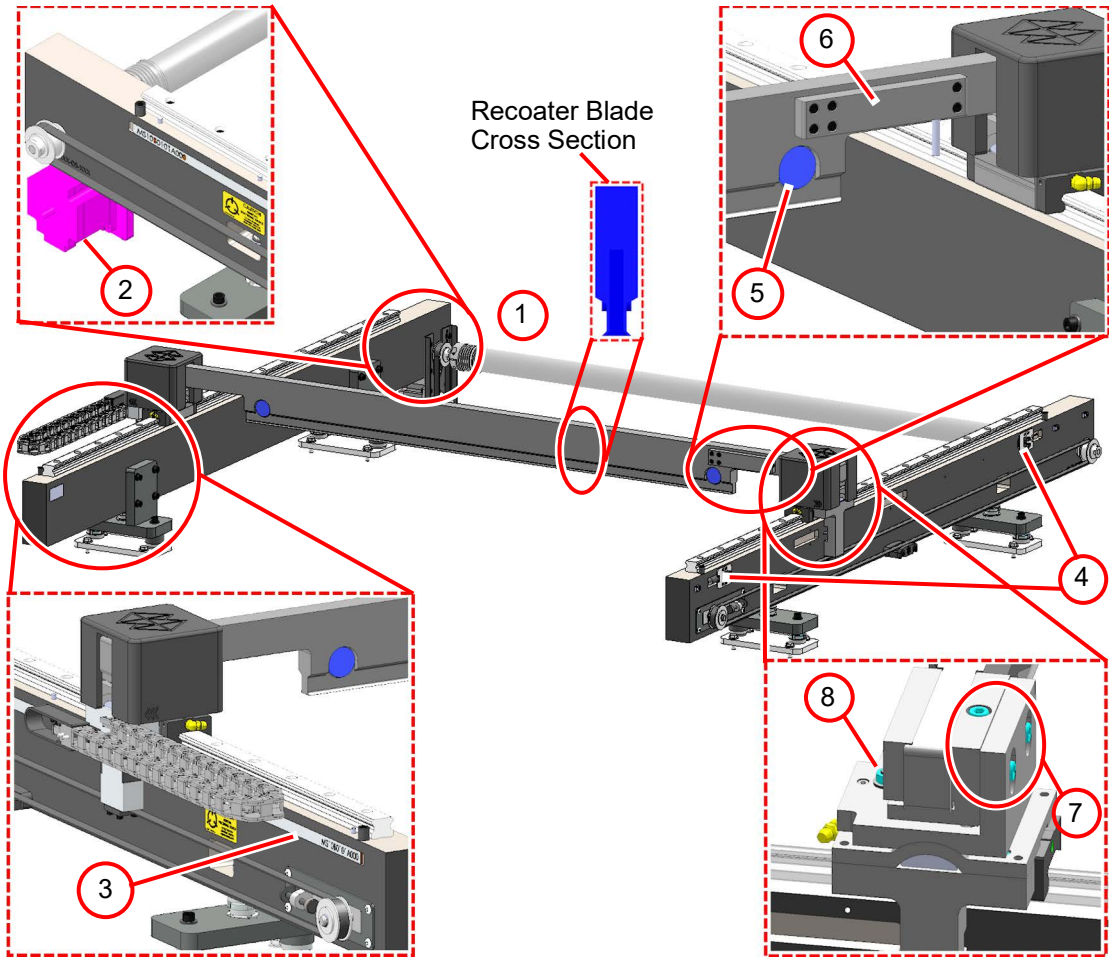


Table 35: Recoater assembly components list

ID	Description	ID	Description
1	Recoater Blade	5	Vacuum Level Window
2	Stepper Motor (48 VDC, PLC controlled)	6	Vacuum Port
3	Incremental Linear Encoder	7	Recoater Blade Height Adjustment Screws
4	Limit Sensors (Photo-sensors)	8	Recoater Blade Rake Adjustment Screws

Z Stage

The Z stage lowers the build platform into the resin during the build process and raises the build platform out of the vat when the build is complete. The platform support structure is mounted to 4 bearings that travel up and down on 2 linear rails. The Z stage is driven by a servo motor connected to a ball screw assembly.

Figure 51: Z stage components

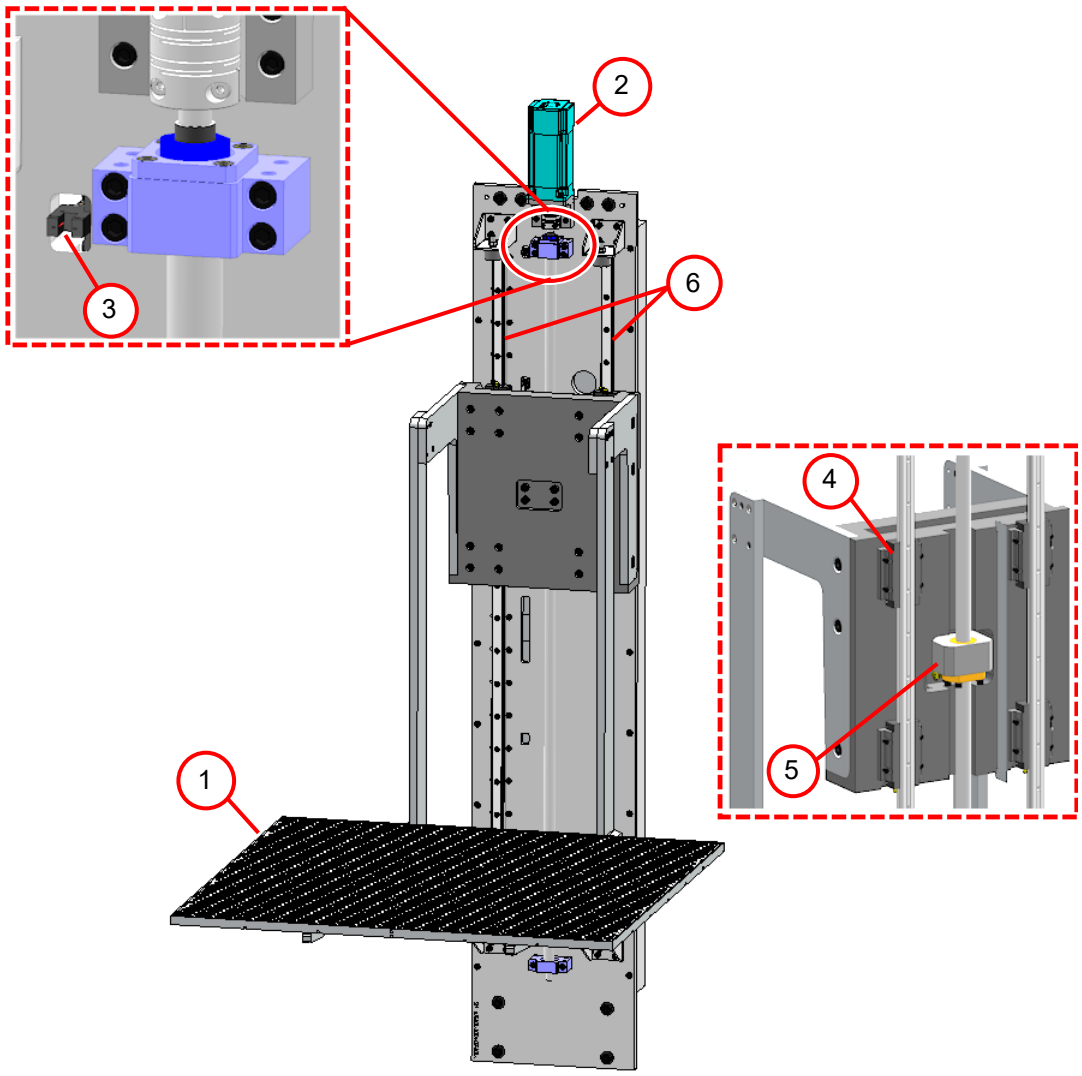


Table 36: Z stage assembly components list

ID	Description	ID	Description
1	Build Platform	4	Bearing (Qty 4)
2	Servo Motor (48 VDC, PLC controlled)	5	Ball Screw Assembly
3	Limit Sensor (Photo-sensors)	6	Linear Rails

Resin Vat

The resin vat contains resin that is used to build 3D parts. It is generally placed inside the Neo800 build chamber and then leveled. The customer must purchase resin to fill the vat.

Spare or secondary vats may be purchased by the customer for use with secondary materials which can be used after cleaning the build platform and elevator assembly which contact the new resins.

Figure 52: Resin vat components

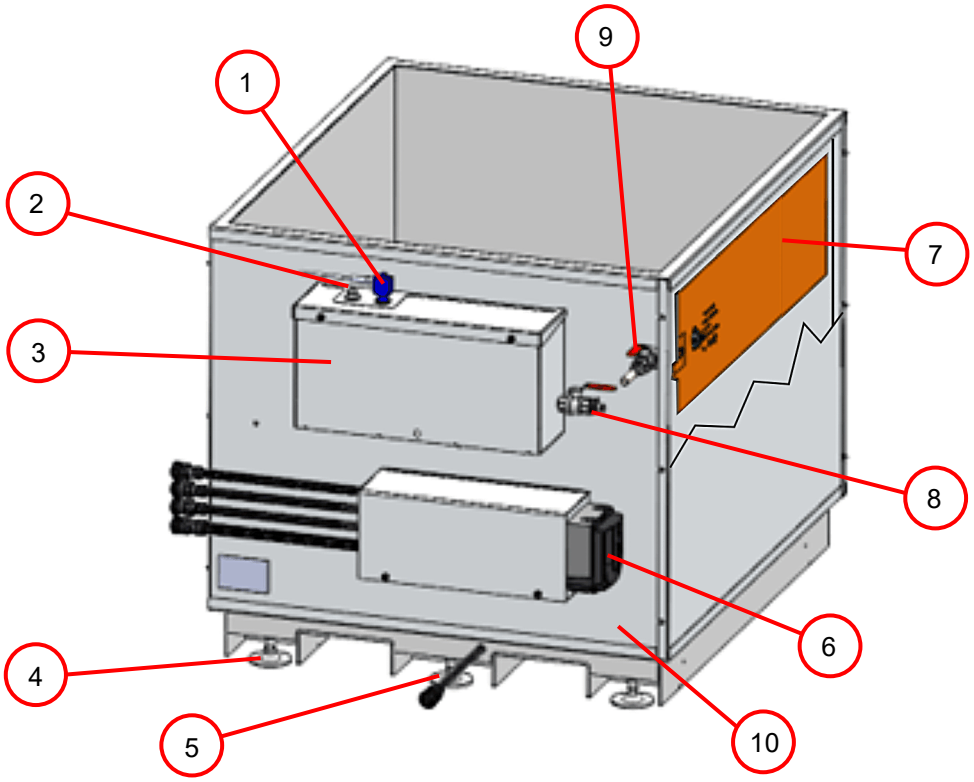


Table 37: Vat components list

ID	Description	ID	Description
1	Ultrasonic Sensor (Distance)	6	Peristaltic Resin Pump
2	Float Sensor (High Limit)	7	Heater (behind side panel and insulation)
3	Reservoir	8	Reservoir Valve
4	Stabilizing Foot	9	Resin Leveling Valve
5	Leveling Foot	10	Drain Valve (Not Shown)

Optics

The optics enclosure is located above the printer build chamber and houses the laser, scanners and supporting optics components. The enclosure can be accessed through a sliding top cover.

Warning: Laser Exposure.
Do not open the optics enclosure. This should only be performed by trained service personnel only.

The laser beam first passes through the collimating lens. It is then directed by 2 turning mirrors through the Z scanner and into the X/Y-axis scanner. The beam is directed downward through the scanner output window into the build chamber. A mechanical shutter blocks the laser beam if the doors are opened during a build operation.

Figure 53: Optics components

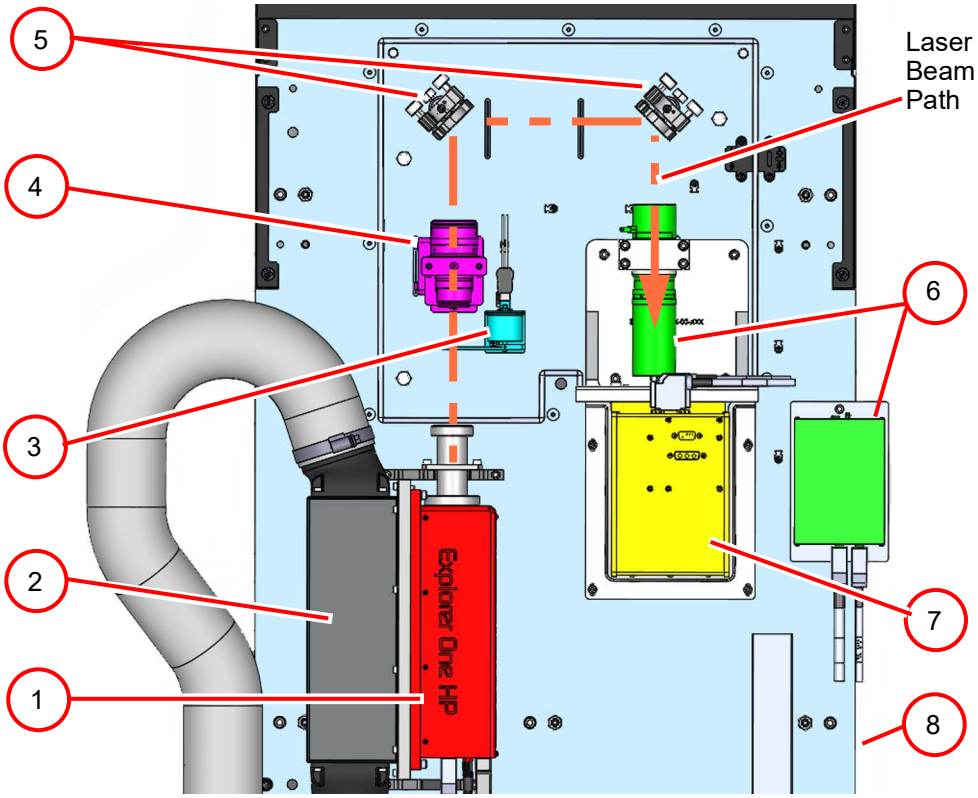


Table 38: Optics components list

ID	Description	ID	Description
1	Laser	5	Turning Mirrors (Qty 2)
2	Heat Exchanger	6	Z Galvo and Controller
3	Safety Shutter	7	X/Y Scanners / Galvos
4	Collimating Lens	8	Optics Plate

Frame

The printer frame serves as the mounting location for various printer components.

Figure 54: Frame components

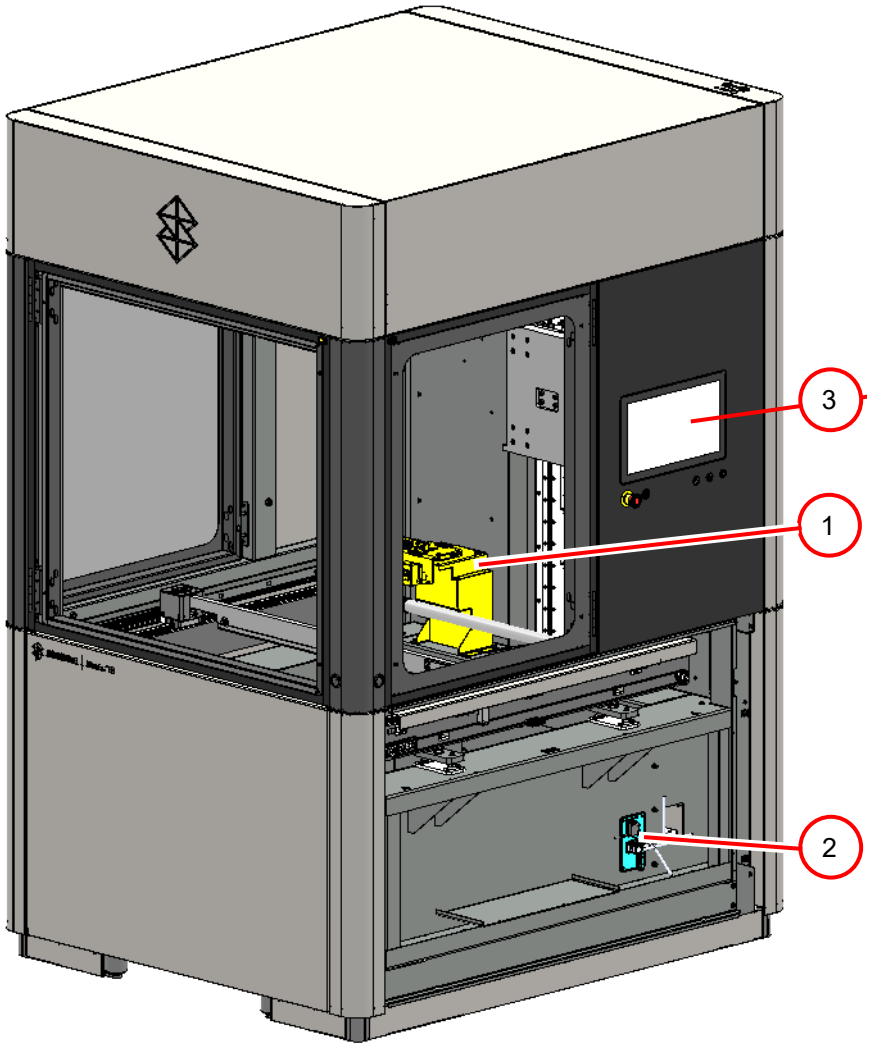


Table 39: Frame components list

ID	Description	ID	Description
1	Resin Level Sensor and Mounting Bracket	3	Touchscreen User Interface
2	Vacuum Pump for Recoater Blade		

Electrical Panels

The electrical panels can be accessed from the rear of the printer. The area contains high and low voltage components as well as the PC.

Warning: High Voltage.
Do not open the electrical panels. This should only be performed by trained service personnel only.

Figure 55: Electrical panel components

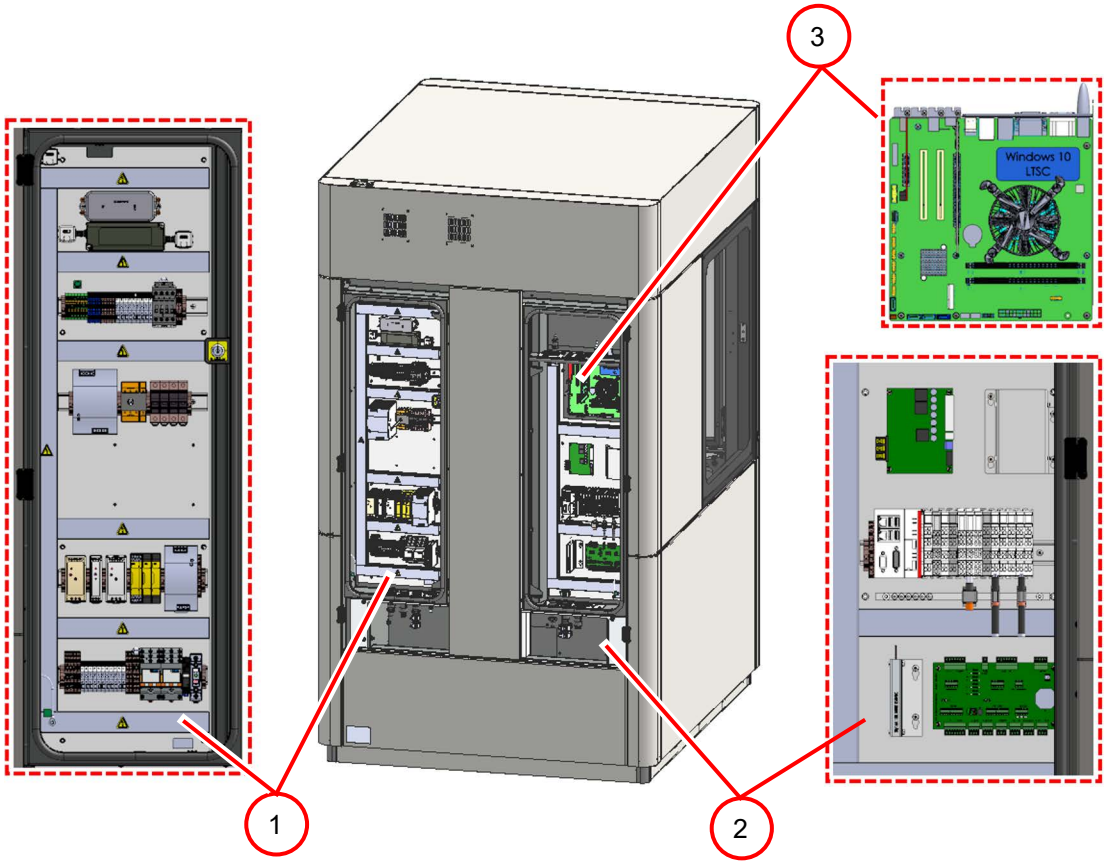


Table 40: Electrical panel components list

ID	Description	ID	Description
1	High Voltage Components	3	PC
2	Low Voltage Components		

4 User Interface And Titanium Overview

This chapter provides an overview of the printer User Interfaces (UI) as well as all other user controls. These controls include buttons, key switches, and a touch-screen graphical user interface. Specific printer operation information and procedures can be found in Chapter 5, Operating the Printer on page 158. You must power ON the printer prior to using the touchscreen, see “Powering On the Neo800/800+ Printer” on page 158 for instructions.

User Interface (UI)

Figure 56: Neo450 UI

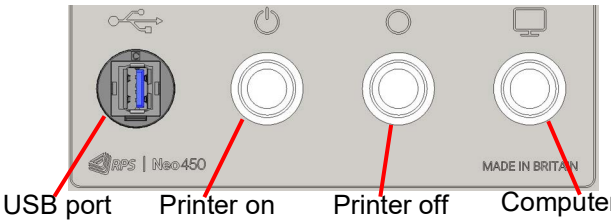


Figure 57: Neo800 UI

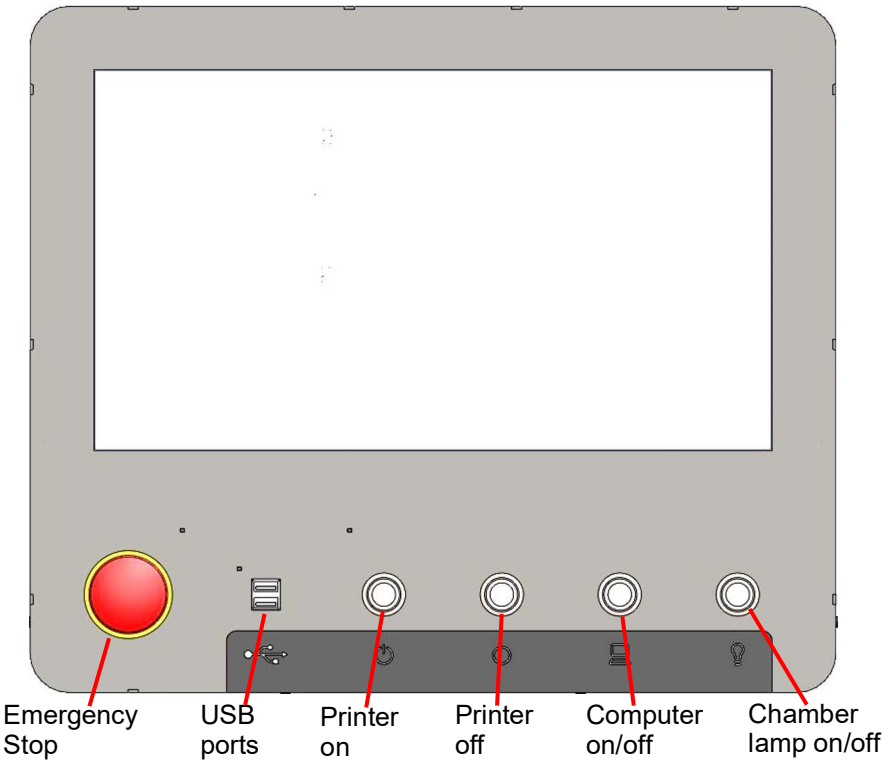
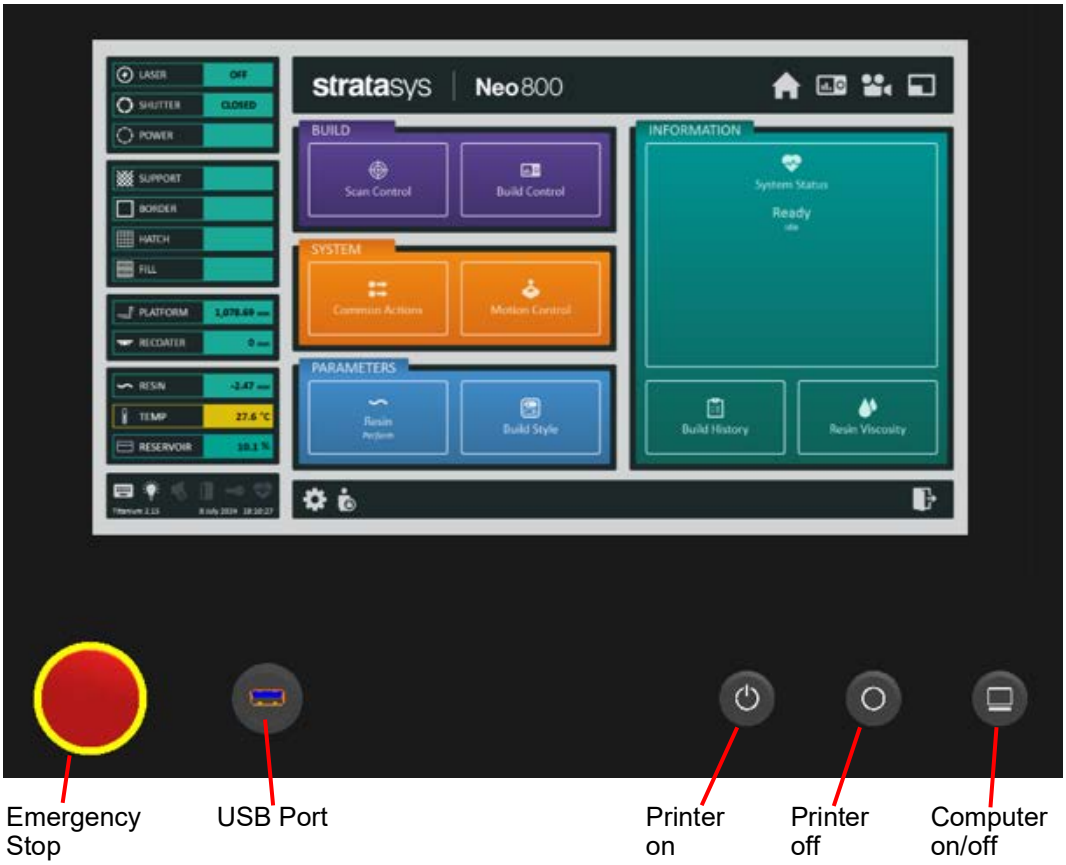


Figure 58: Neo800+ UI



Emergency Stop

Press the emergency stop button to disconnect power to all of the printer components, thereby stopping all printer activity.

The button locks in the depressed position when pressed fully down. Turn the button clockwise to release the button from the depressed position.

USB Ports

USB port(s) for data transfer via a USB storage device.

Printer-On

Press and release: Activates/powers-up all sub-systems. When ON, the ON and OFF buttons will be lit. Note: The printer can not be switched ON when the Emergency Stop is in the depressed position.

Printer Power-Off

Press and release: deactivates/powers-down all sub-systems.

Computer On/Off

The status of the button indicates the status of the printer computer:

- **Unlit:** indicates that the computer is off.
  Press and release to start the computer/Windows™
- **Lit:** indicates that the computer is on.
  Press and release to shut down Windows™/computer

Verify that the computer is fully shutdown before switching off the printer and/or the main power isolation.

Chamber Lamp Button

- **Unlit:** chamber lamp off.
  Press and release to turn the chamber lamp on.
- **Lit:** chamber lamp on.
  Press and release to turn the chamber lamp off.

Graphical User Interface

Home Screen

The Titanium application window contains 2 permanent regions:

- Status pane - located on the left
- Control pane - located across the top

The remaining regions vary with the selected activities. The opening Home screen is shown below.

Figure 59: Home screen

The Home screen is split into the following functional panes, described in the following sections:

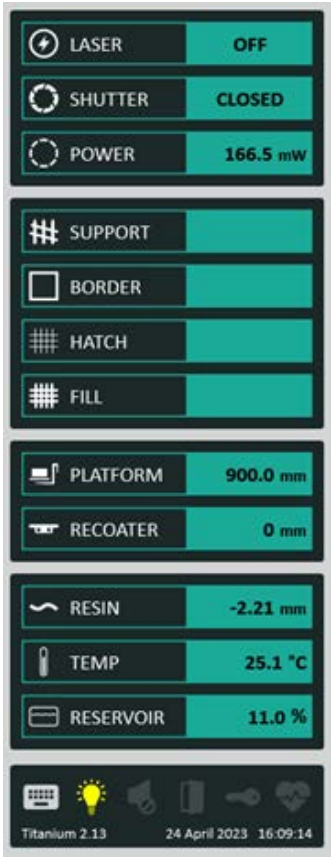
- The *Build* pane contains buttons to switch to the build control screens.
- The *System* pane contains buttons to switch to the common actions and manual motion control screens.
- The *Settings* pane contains buttons to access the main configuration settings for the printer.
- The *Information* pane contains buttons to switch to the system information screens.

The bottom service bar contains buttons to switch users, exit, and access further settings.

Status Pane

The status pane, located on the left, is divided into five sections: the laser status section, the scan speeds section, the positions section, the resin section, and the printer state section.

Table 41: Status pane and description

Status Pane	Description
	The **Laser Status** indicates: • The current laser state (on/off) • The current shutter state (open/closed) • The latest measurement of the laser power output
	The **Scan Speeds** indicate: • The scanning speeds of the supports • The scanning speeds of the borders • The scanning speeds of the hatches • The scanning speeds of the fills
	The **Positions** indicates: • The current position of the elevator • The current position of the recoater
	The **Resin** indicates: • Resin level • Resin temperature • Reservoir fill level

	The **State** contains buttons and state indicators:
	• On-screen keyboard toggle button
	• Chamber light toggle button
	• Sound mute button
	• Door open warning (refer to “Interlock System” on page 20)
	• Engineer key warning (refer to “Interlock System” on page 20)
	• Status warning button (heart-shaped):
	  • **Unlit:** no issues are currently being tracked
	  • **Yellow flashing:** a non-critical issue. Correct at the next convenient time
	  • **Red flashing:** an issue that requires immediate attention. This may include errors that prevents the printer from building the tray

Control Bar

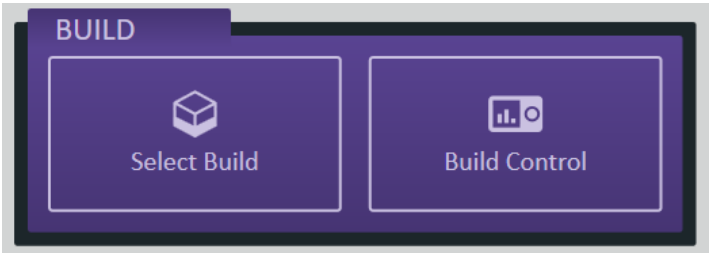
Figure 60: Control bar

Table 42: Control bar icon descriptions

Icon	Description
	The **Home** button takes you back to the home screen.
	The **Build** monitor button displays the standard build monitor screen.
	The **Camera** view button displays the web camera build monitor screen.
	The **Minimize** button minimizes Titanium to the Windows taskbar.
	The **USB** button ejects the currently inserted USB memory stick.

Build Pane

Figure 61: Build pane



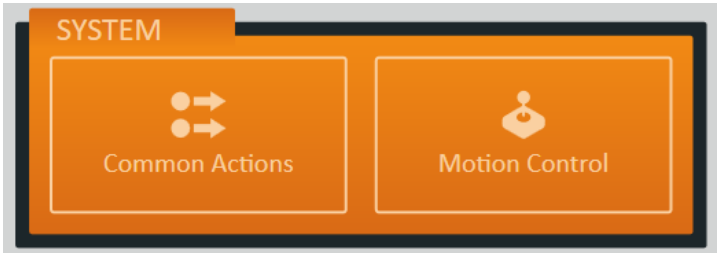
The *Select Build* button switches to the *Select Build* tab used for loading a new build job.

The *Build Control* button opens the relevant build tab, depending on the printer status:

- If no job is currently loaded, then the select build screen is opened
- If a job is loaded but not started, then the *Build Style* tab opens
- If a job is currently in progress, then the *Build Monitor* tab is opened.

System Pane

Figure 62: *System* pane



The *Common Actions* button switches to the *Common Actions* tab where a set of printer management activities are available: for example prepare resin, resin stirring, and others.

The *Motion Control* button switches to the *Motion Control* tab where the platform, recoater blade, and resin pump can be manually controlled.

Parameters Pane

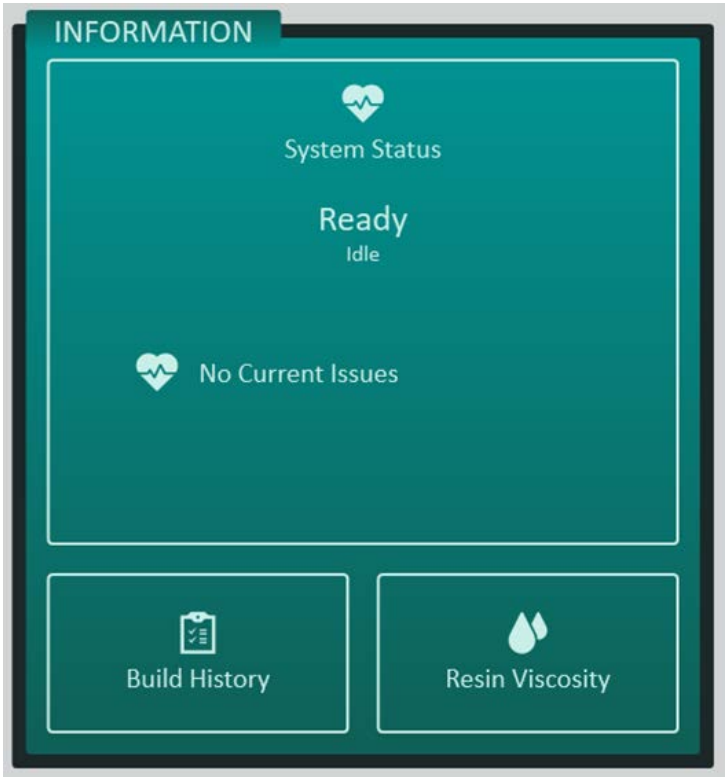
Figure 63: Parameters pane

The *Resin* button switches to the *Resin Management* tab where the active resin can be selected, and the resin parameters adjusted.

The *Build Style* button switches to the *Build Style Management* tab. This tab is used to define the standard build style settings for the current resin, that are applied when a new build job is loaded.

Information Pane

Figure 64: Information pane



The *System Status* button displays a brief summary of the current printer activity and status. Tap this to open the *System Status* tab.

The *Build History* button opens the *Build History* tab.

The *Resin Viscosity* button opens the *Resin Viscosity* management and reporting tab.

Service Bar

The service bar provides buttons to access specific printer actions.

The buttons that are present depend on the current user access level.

Figure 65: Standard-user service bar

The following buttons are available to a standard user:

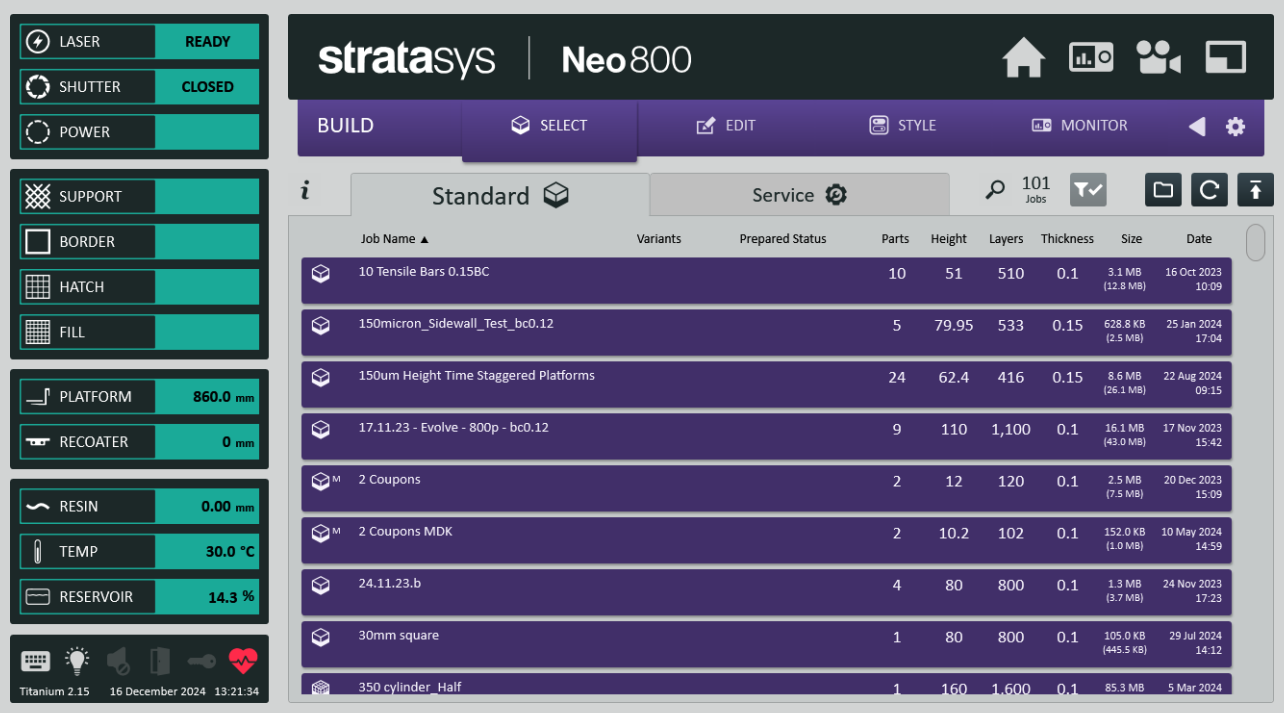
Table 43: Service bar icon descriptions

Icon	Description
	Switch to the printer *Settings* tab.
	Switch the active user level.
	Exit Titanium.

Build Screen Tabs

Select Tab

Figure 66: *Build* screen > *Select* tab

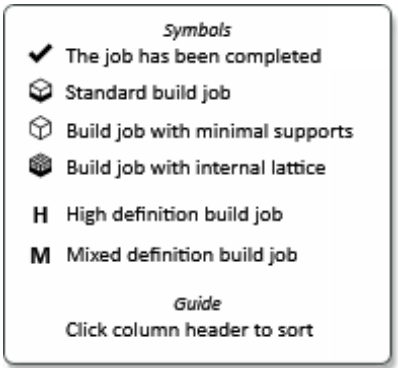


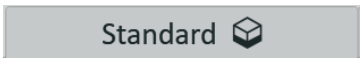
This tab is used to select the build job to load. When you select the build job, the parts are loaded and displayed in the *Build* screen > *Style* tab.

Build jobs that have been previously prepared using Titanium Assistant are indicated with the *Prepared Status* column.

The following buttons are available:

Table 44: *Build* screen > *Select* tab icon descriptions

Icon	Description
	Displays a popup help window with descriptions of the symbols used: 
	Click the title of each column to sort the column in ascending or descending order.
	Enables you to search for a job name.
	Hides successfully built jobs.
	Open a browser to the Build File directory.
	Refreshes the job list to display external changes.
	Returns to the top of the job list.



The *Standard* tab displays a list of the jobs found in the configured build folder (see “Build Load Settings” on page 105).

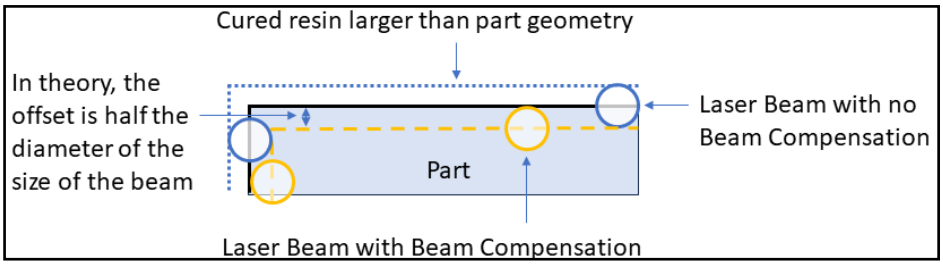
The *Service* tab displays a list of the jobs available in the *Service Builds* folder. The service builds include the following types, each described below:

- **Blade Gap Builds:** This service build loads several small hollow blocks spread around the platform. When the build has finished, you measure the gap between the recoater blade and the top of the blocks with a feeler gauge.
  Select this service build to measure and correct the gap, which is necessary to build good quality parts.

- **Scale Bar Builds:** During polymerization, the resin shrinks slightly. Use this service build to compensate for resin shrinkage, and build parts slightly larger than required so that they shrink to the correct size.

  Scale bars are built with no shrinkage factors and no beam compensation. Once the bars are measured, the measured values can be compared to the correct values to calculate resin shrinkage and beam compensation.

  Figure 67: Beam compensation illustration

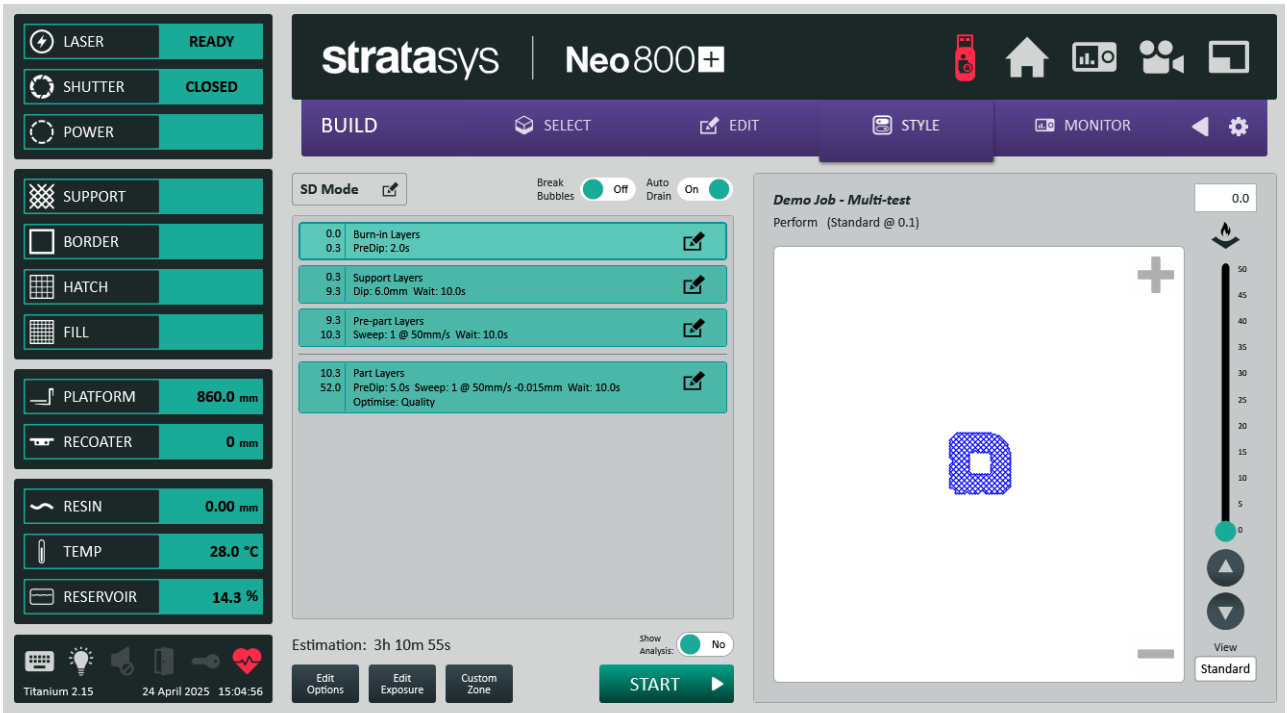


  In the *Service Builds* folder, you will find a Microsoft® Excel™ spreadsheet that can help you calculate resin shrinkage and beam compensation.

- **Accuracy Assessment Builds:** A cause of inaccuracy is the beam width. If the beam were to trace the border of the part, then the beam would extend beyond the part border by half the beam width as shown in the diagram. Select this service build to build accurate parts by compensating for the beam width during slicing.

Style Tab

Figure 68: *Build* screen > *Style* tab



Use this tab to adjust the build zone and exposure settings for the currently loaded build job. When you finish configuring the build style changes, tap the **START** button to start the build and open the *Build* screen > *Monitor* tab.

Figure 69: *Build* screen > *Style* tab control options

The quality selector button (shown as **SD Mode** in the above figure) can be used to select one of the three build qualities:

- **SD Mode:** Standard Definition mode: a larger beam diameter is used for each part on the build platform
- **HD Mode:** High Definition mode: a smaller beam diameter is used for each part on the build platform
- **Auto:** each part is built at the resolution defined by the suffix attached to the build file:
  - A part ending in the suffix **_s** is built as a support structure to the model.
  - A part ending in the suffix **_h** is built in a high-definition mode.
  - A part ending with no suffix is built in the standard definition mode.

The control-option switches on the right are:

- **Break Bubbles:** includes a bubble-breaking process at the start of the build. Turn this on when you see small bubbles on the surface of the resin.
  Before the build begins the recoater blade sweeps the length of the vat, moving the bubbles away from the build platform area.
- **Auto Drain:** when On this causes the platform to rise to the unload position at the end of the build, allowing the uncured resin on the parts to drain back into the vat.
  Turning Auto Drain off causes the platform to remain in the resin at the end of the build.

Build Zones

The build zones define the actions of the elevator and recoater during different layers of the build, and are present in each build.

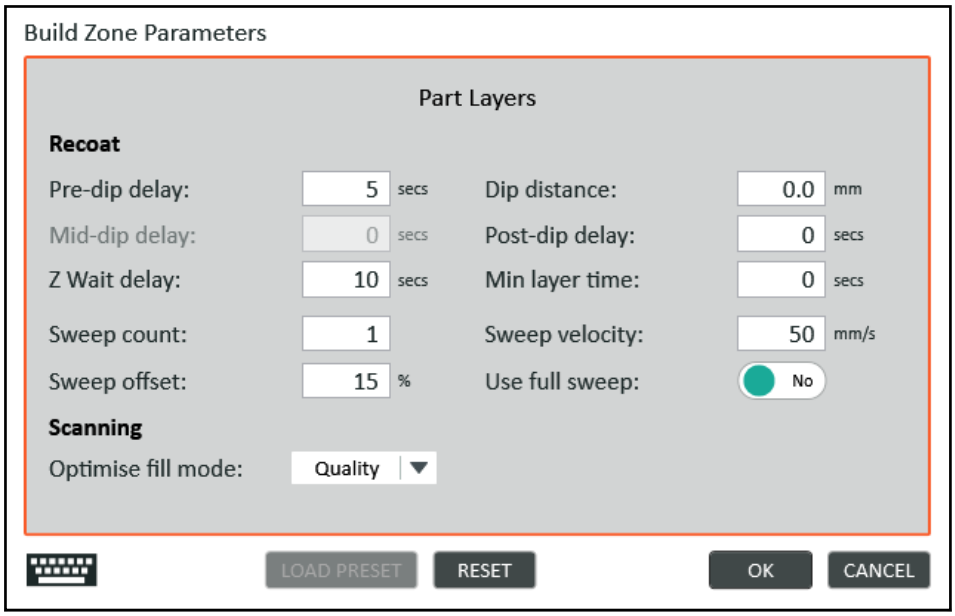
There are 4 system default build zones/layers, as shown in Figure 71 on page 81:

- **Burn-in Zone:** This applies a higher exposure to the initial layers of the build to ensure bonding with the platform.
- **Support Zone:** The support layers are built by dipping the platform into the resin and returning for the next layer. No sweeps are performed.
- **Pre-part Zone:** The pre-part zone is available to sweep bubbles from the resin surface before the part layers start to build.
- **Part Zone:** The part layers form most of the build and typically consist of one sweep.

Build Zone Parameters

The *Build Zone Parameters* dialog box can be accessed by taping  in each of the build zones.

Figure 70: Build Zone Parameters



For each zone, the following settings can be adjusted:

- **Pre-dip delay**: A delay that is applied before the dip phase. It is required for the chemical reaction of the resin changing from liquid to solid to fully complete. This varies depending upon which resin is being used. This delay occurs regardless of whether the dipping is enabled.
- **Dip distance**: The distance that the elevator dips into the resin before moving to the next layer.
- **Mid-dip delay**: A delay that is applied at the bottom of the dip movement before rising to complete the dip. (This delay occurs only if dipping is enabled).
- **Post-dip delay**: A delay that is applied after the dip phase and before the sweep phase.

  This delay occurs regardless if dipping is enabled.

- **Z Wait time**: The time after recoating has completed and before the next layer is scanned. It is required to allow the resin to settle to a flat surface and varies depending on factors such as resin viscosity.
- **Min layer time**: Enforces a minimum elapsed time between laser scanning start events.

- **Sweep count**: Sets the number of sweeps.

  - You can increase the number of sweeps due to factors such as resin viscosity, area to recoat, and the presence of trapped volumes.
  - Only increase this number in odd-numbered increments, for example 1, 3, 5, or 7, to prevent a “bow wave” lip forming on parts.

- **Sweep velocity**: The velocity of the recoater.
  Note: You can change the velocity of the recoater to take account of factors such as resin viscosity and trapped volumes.
- **Sweep offset**: Lowers the platform by this value while sweeping.

  For the part-zones, enter the offset as a percentage of the layer thickness.

- **Use full sweep:** The recoater blade sweeps the full Y axis of the build volume for this zone.

  Enabling this feature can significantly increase build time.

For part-zones, the **Scanning** section provides an additional property that can be set. The **Optimise fill mode** determines how the top surface layers of the build job are filled. **Quality** is the default build zone setting. The options are:

- **Speed**: surface fill is prioritized for speed.
- **Quality**: surface fill is prioritized for quality.
- **Auto**: surface fill for each layer is automatically determined. The sensitivity for the detection can be adjusted in the *Build Style Options* dialog box.

Layer Viewing Options

In the lower-right corner of the *Build* > *Style* tab, shown in Figure 68 on page 77, the layer drawing has an additional option to display the fill detail:

Select *Fill* to display the areas with the following colors:

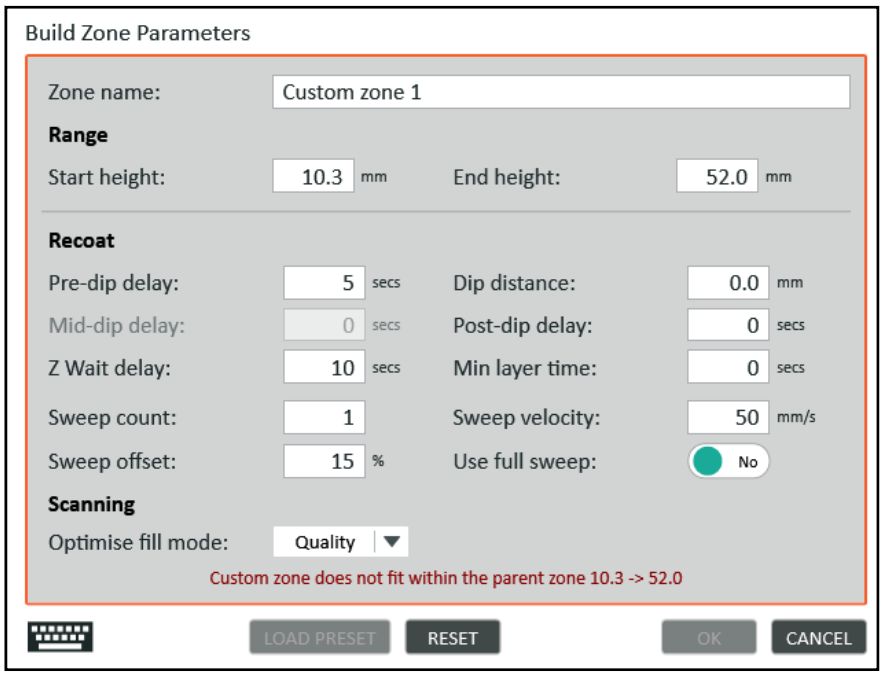
- **Yellow:** an upward facing surface with Quality fill.
- **Bright red:** an upward facing surface with Speed fill.
- **Dark red:** a downward facing surface.
- **Pale red:** internal areas.

Custom Zones

If a range of the build requires changes to the recoating style, you can add a custom range by taping 

at the bottom of the *Build* > *Style* tab, shown in Figure 68 on page 77.

Figure 71: *Build Zone Parameters* dialog box: creating a custom zone



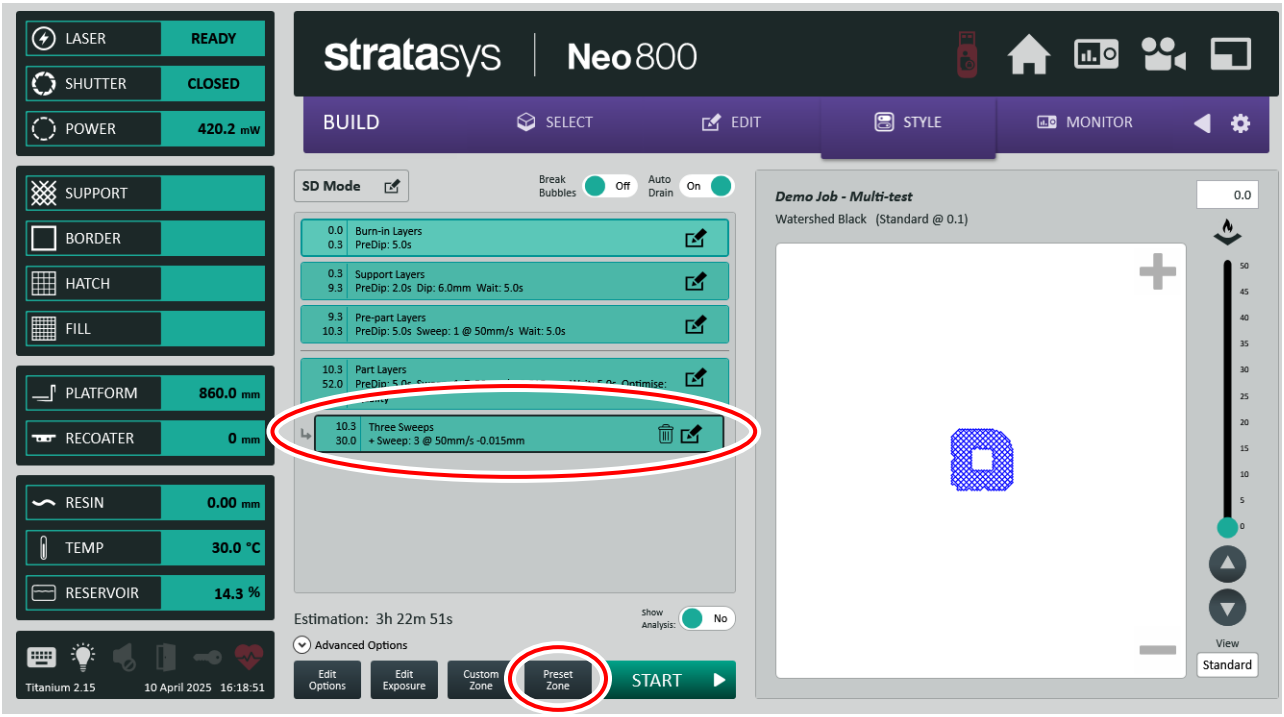
You can create pre-defined custom zone settings by tapping 

in the *Parameters* screen > *Build Style* tab, shown in Figure 84 on page 93.

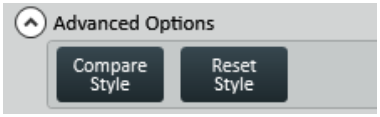
You can load these by tapping 

at the bottom of the *Build* screen > *Style* tab below. **For example:** you can create a custom zone with a sweep count of three and a slow sweep velocity.

Figure 72: *Build* screen > *Style* tab with a custom zone



The following options are present at the bottom of the screen for users with Administrator access:



- **Compare Style:** Compare the current build style with one of the following:
  - the factory default build style
  - this Neo's default build style
- **Reset Style:** Reset the current build style to one of the following:
  - this Neo's default build style
  - the factory default build style.

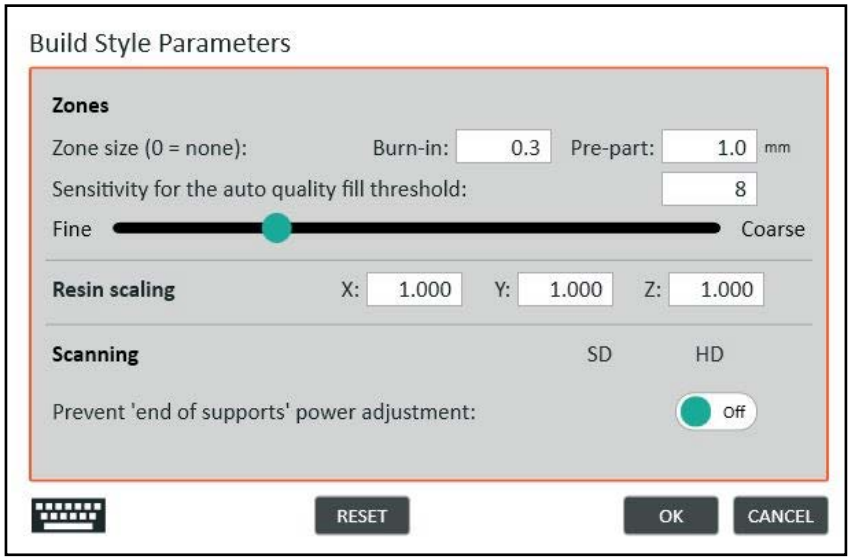
These changes are only applied to the currently loaded build.

Build Style Options

Edit Options

The EDIT OPTIONS button on the bottom of the screen allows you to change the sizes of the burn-in and pre-part layers and the resin scaling for the build job currently loaded.

Figure 73: *Build Style Parameters* dialog box



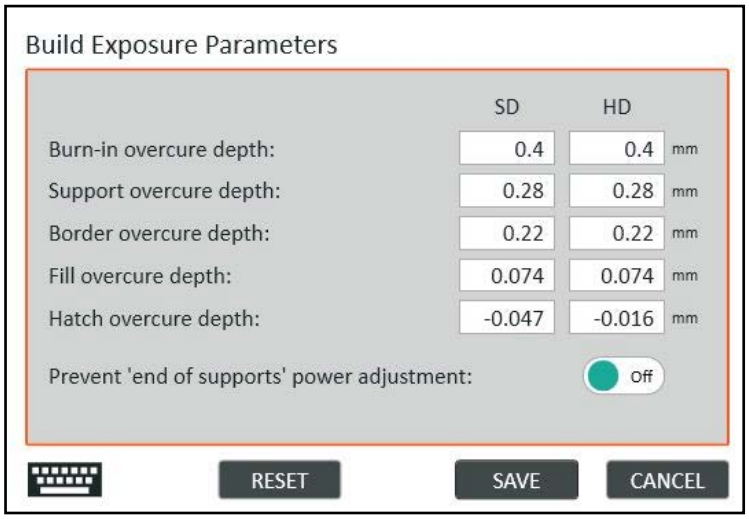
- **Zones:** The zones section allows the size of the burn-in and pre-part zones to be defined. For the part zones there is a scale for adjusting the **Sensitivity for the auto quality fill threshold**.
- **Resin scaling:** The scaling factors can be changed for the current build.
  For more information on scaling, see the *Build* screen > *Select* tab, *Service* tab section for *Scale Bar Builds*, illustrated in Figure 67 on page 77 and described in the text above the illustration.
- **Scanning:** the toggle *Prevent end of supports power adjustment* prevents recalculation of the exposure settings when the last support layer is reached.

> **Important:**
> Do not change this toggle unless directed to do so by a Stratasys support representative.

Exposure Options

Tap EDIT EXPOSURE on the bottom of the *Build* screen > *Style* tab (Figure 72 on page 82) to change the exposure parameters for the build job currently loaded.

Figure 74: *Build Exposure Parameters* dialog box



- **Exposure:** The exposure value defines the penetration depth of the beam into the resin. The exposure values are highly dependent on the resin being used. A higher value will cause the laser to scan with a slower speed, or a higher power, or a combination of both.

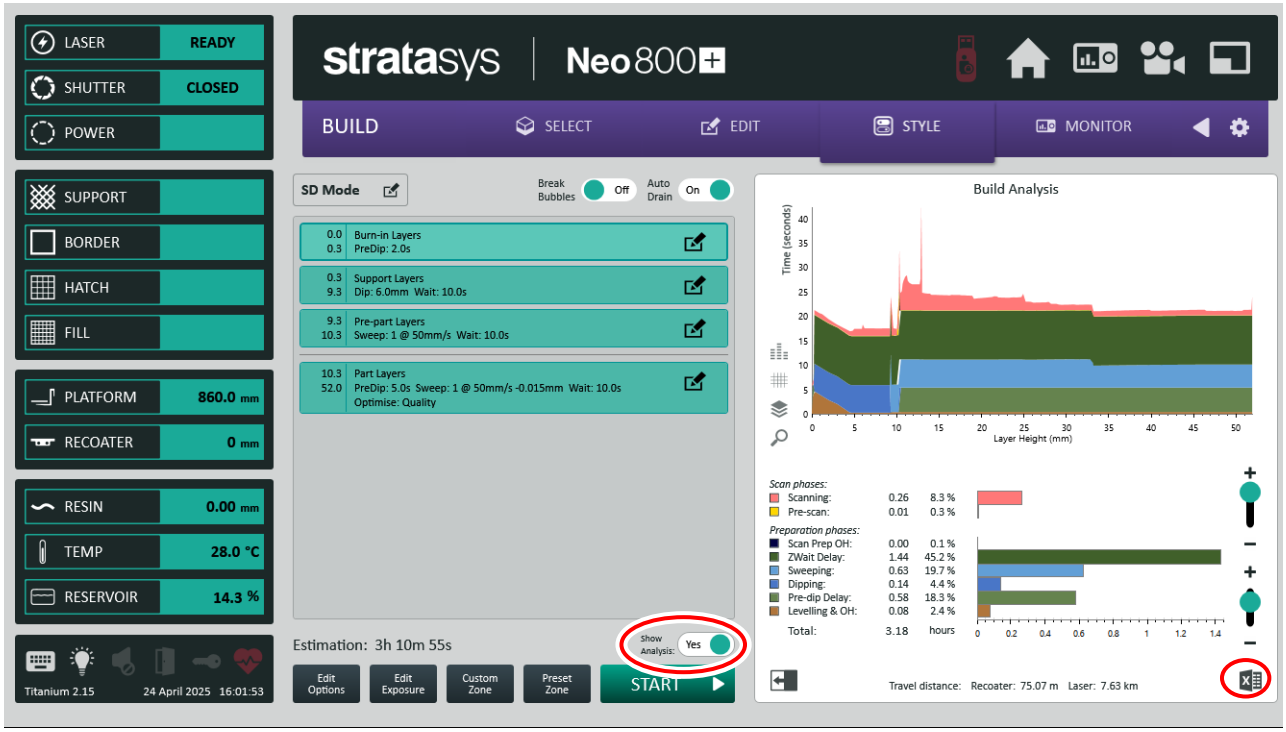
Style Tab Analysis View

The *Build Analysis* screen shows a graphic breakdown of the build time estimate. Any impact caused by changes to the build style parameters can be reviewed here.

Tap 

to switch between the layer drawing area and the *Build Analysis* view.

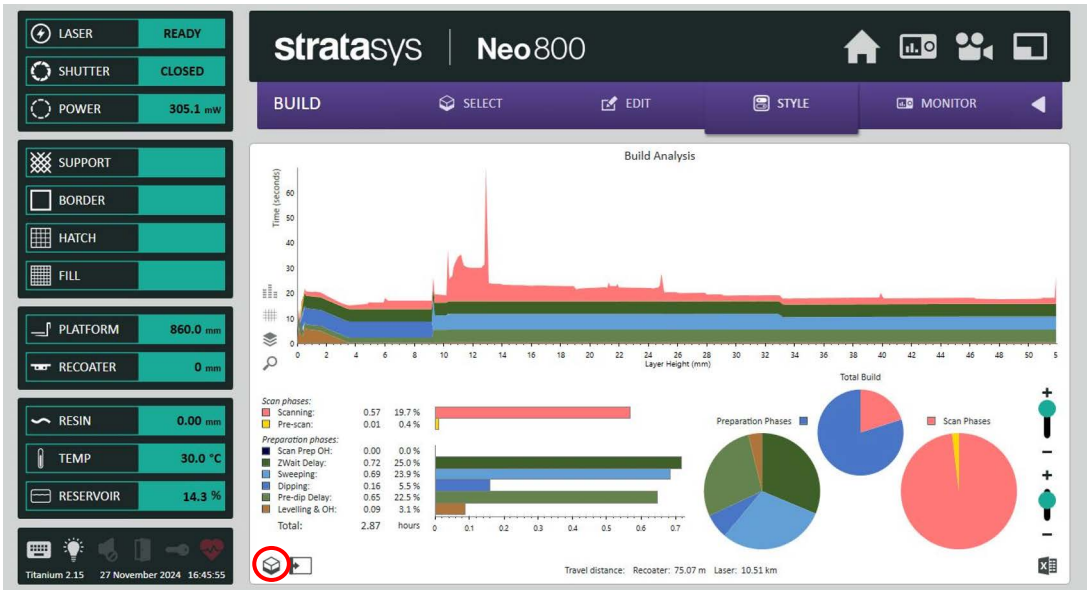
Figure 75: *Build Analysis* view on right



Tap  (on the bottom-right of the screen) to create an export of the analysis data and charts to a Microsoft Excel spreadsheet.

Tap  and  (bottom-center) to toggle between the standard and expanded analysis views.

Figure 76: Expanded *Build Analysis* view

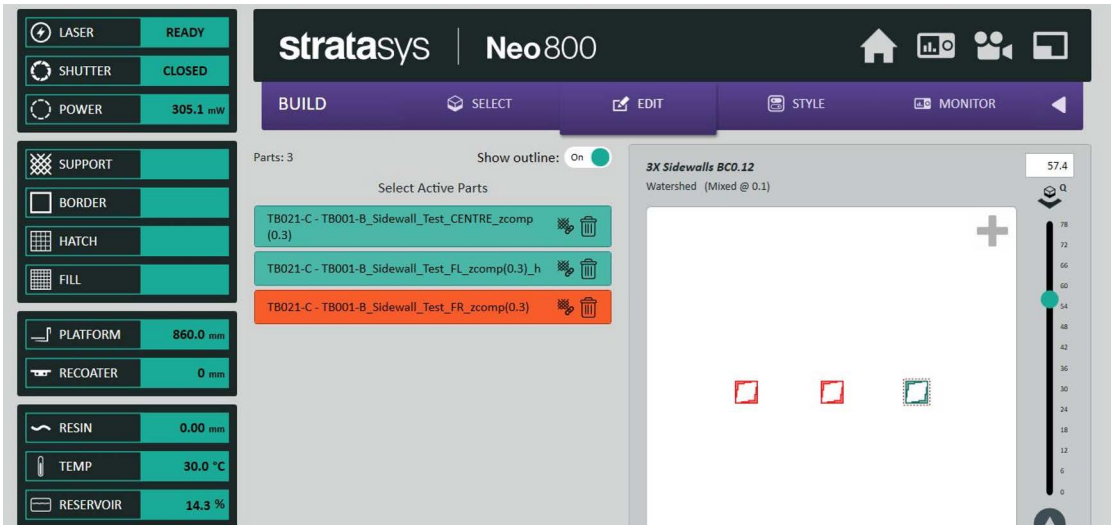


Tap  (on the bottom-left of the *Build Analysis* view) to return to the layer drawing view.

Edit Tab

The *Build* screen > *Edit* tab is used to delete individual parts from the current build job.

Figure 77: *Build* screen > *Edit* tab

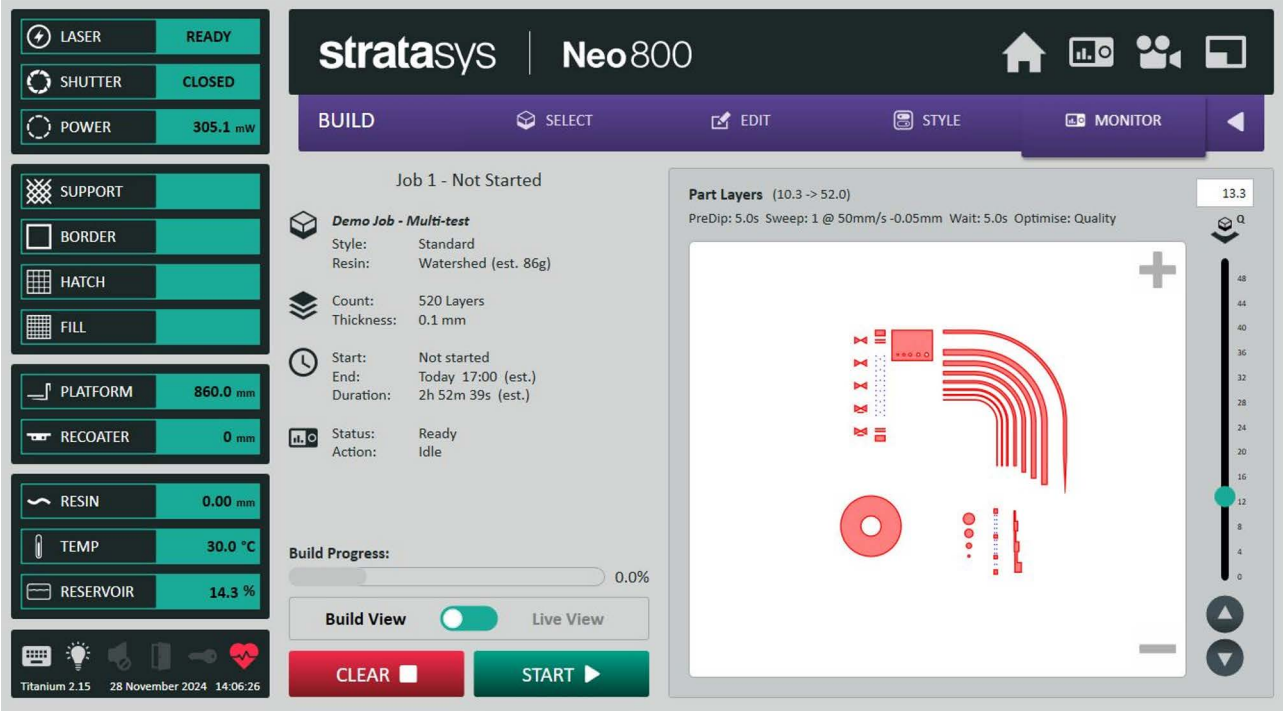


Select the part to delete either by tapping on the part listed on the left, or by tapping on the part in the layer drawing.

Monitor Tab

The *Build* screen > *Monitor* screen displays information about the current build job.

Figure 78: *Build* screen > *Monitor* tab



On the left, the build name, number of layers, build time estimate, and current printer activity is displayed.

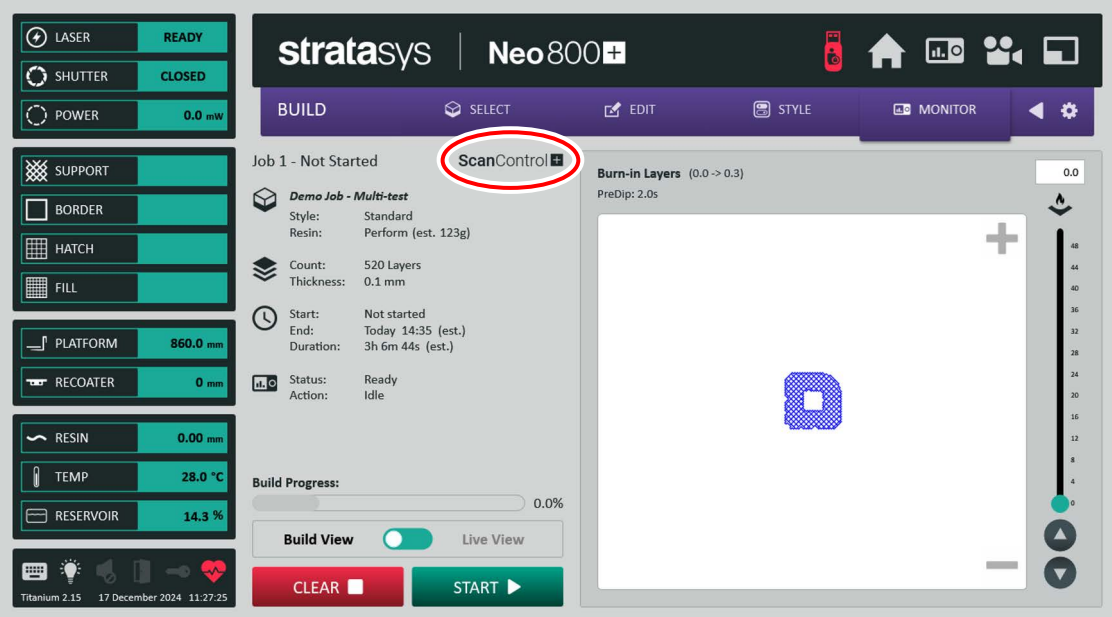
On the right, a drawing of the current layer is displayed.

The vertical slider bar on the right can be used to view layers other than the current layer. The up and down buttons can be used to increment the layer view. The layer view resets to the current layer when the next layer is loaded for scanning.

Tap  to toggle the view between the layer display and the live view from the webcam.

When compatible materials are loaded, the ScanControl+ logo displays. This indicates that build is can use the enhanced scanning strategies available with the Neo800+

Figure 79: *Build* screen > *Monitor* tab with ScanControl+ displayed (Neo800+ only)

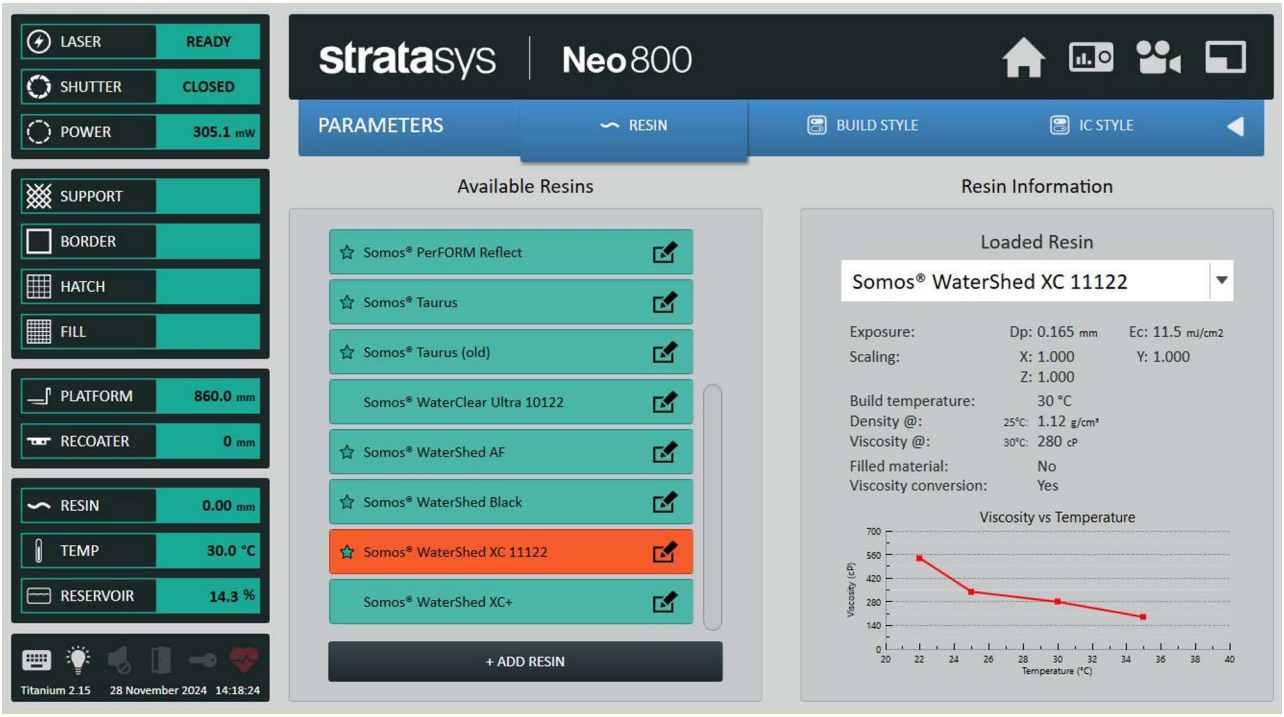


Parameters Screen Tabs

Resin Tab

The *Parameters* screen > *Resin* tab is used to manage and select the resins available on the printer.

Figure 80: *Parameters* screen > *Resin* tab



The left-hand side of the screen contains a list of the available resins. Depending on the resin, and the current user's access level, resins can be added, edited, or deleted.

The right-hand side of the screen is used to specify and summarize the properties of the resin loaded into the printer.

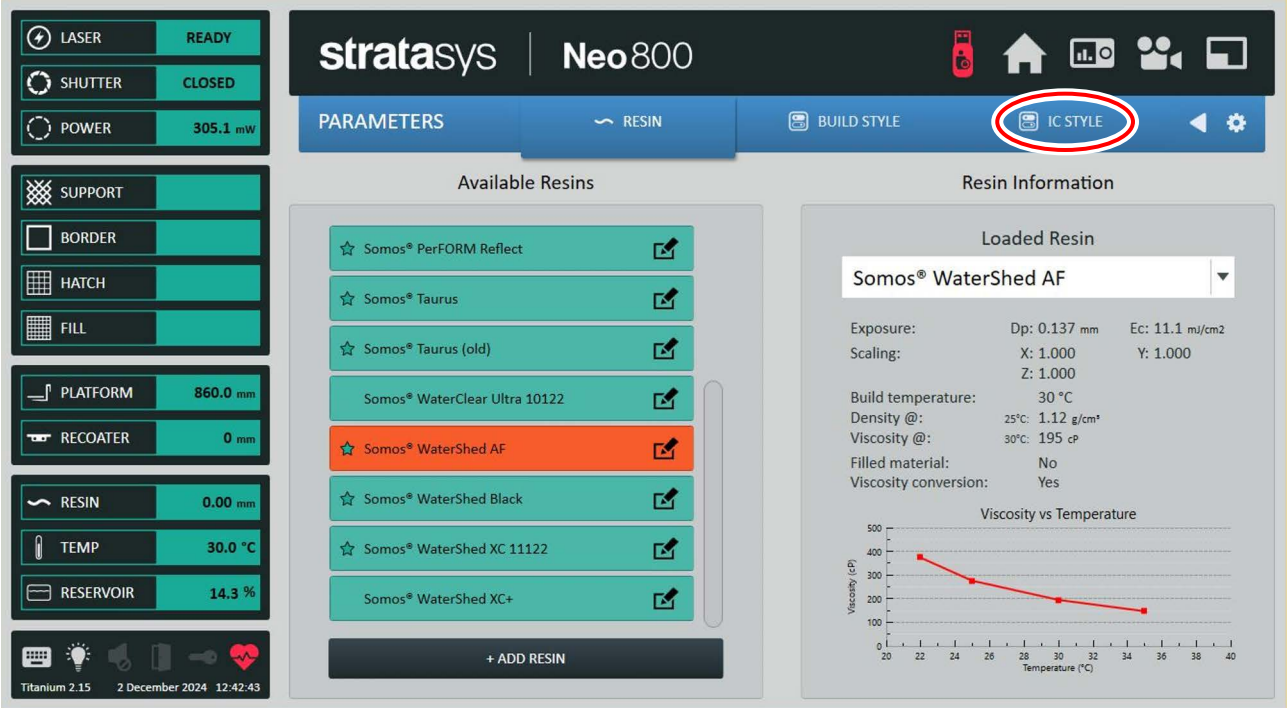
Table 45: *Resin* tab icons

Icon	Description
	Resin has validated build style settings for at least one layer thickness.
	Edit a resin. The properties that can be edited depend on whether the resin is custom or predefined.
	Delete a resin that has been manually added.

IC Style Tab (Neo800+ Only)

When certain materials are loaded, the *IC* (Investment Casting) *Style* tab is displayed.

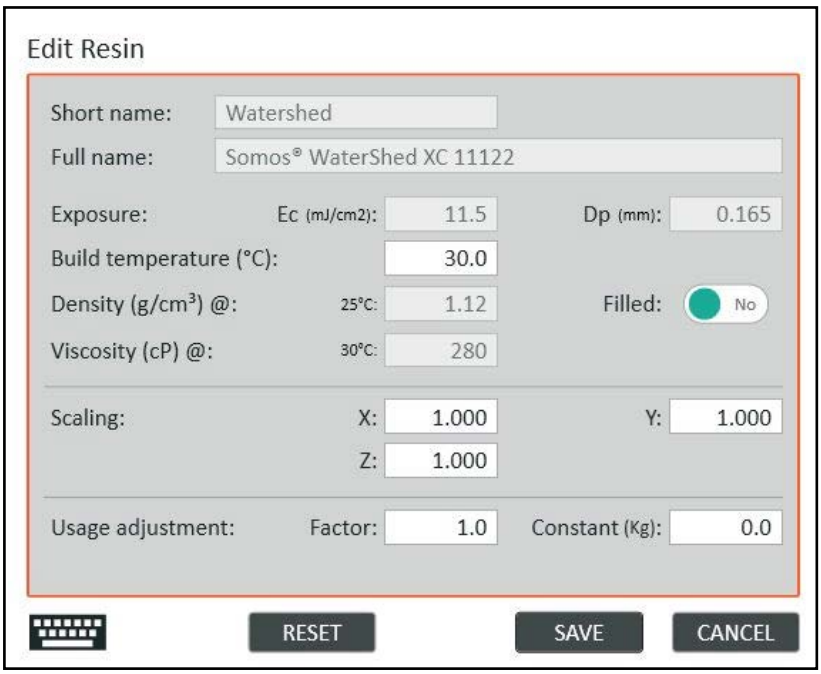
Figure 81: *Parameters* screen > *IC Style* tab (Neo800+ only)



Resins can be added, edited, and deleted in the **Resin** tab. Exposure values should be supplied by the manufacturer of the resin.

Select a resin, and tap  to edit its parameters.

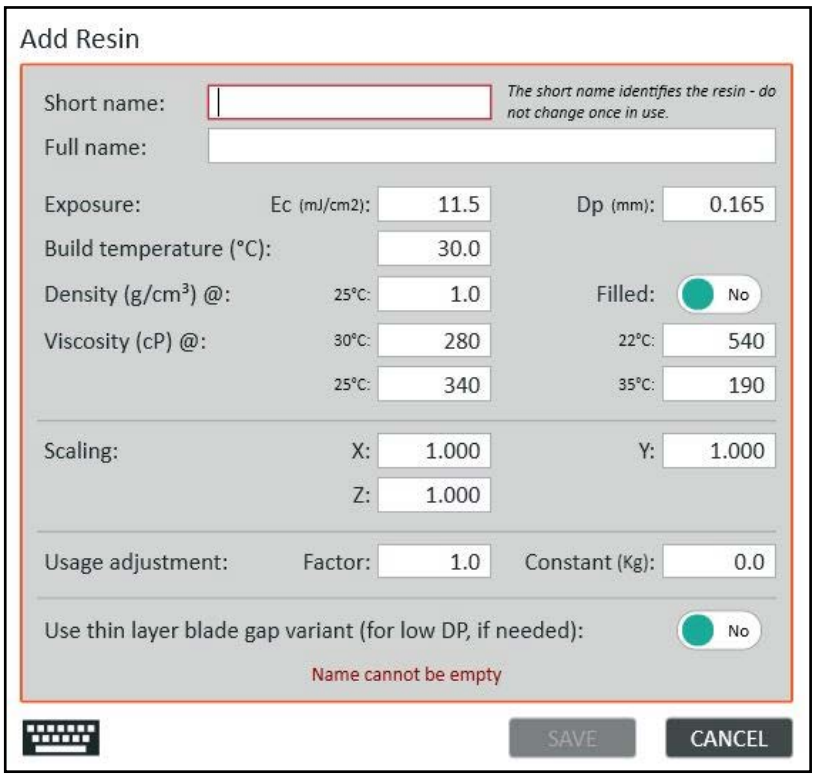
Figure 82: *Edit Resin* dialog box



After editing a resin, you must reload a loaded job for the changes to take effect.

Tap + ADD RESIN to add a custom resin.

Figure 83: *Add Resin* dialog box



- Make the **Short name** a concise name for the resin, as this is used on the display when limited space is available. This name is also used internally to manage the resin and should not be changed once the resin has been used for a build.
- *Exposure* values should be supplied by the manufacturer of the resin.
- The *Use thin layer blade gap variant (for low DP, if needed)* option dictates the behavior of the Blade Gap service build.
  Note: Some resins may require the Blade Gap service build to be built at a finer layer resolution for better accuracy. Consult with your Stratasys service representative for more information.

Build Style Tab

The *Build Style* tab is where default parameters can be entered or modified. The build style parameters control the scanning and recoat operations. The recoat parameters can be set independently for each of the 4 build zones.

Standard build style parameters are set independently for each layer thickness.

Figure 84: *Parameters* screen > *Build Style* tab

Build Style Status

The build style settings are monitored, and differences to a reference set are indicated on the display.

For a predefined resin, the reference settings are pre-set in the software. These reference settings can either be certified or uncertified. The settings are certified for an individual layer thickness through an evaluation and testing process. Uncertified settings are provided as a starting point for refining the optimum build parameters.

The following symbols are used in the style selector tab to indicate the status of the build style for an individual layer thickness:

Table 46: *Build Style* tab icons

Icon	Description
	The reference build style settings for the layer thickness are factory defined – and have been certified.
	The reference build style settings for the layer thickness are factory defined – but have not been certified.
	The current layer thickness build style settings contain one or more accessible properties that differ from the reference set.
	A colored circle is used to indicate that the style contains settings that require engineering level access (red) or developer level access (purple).

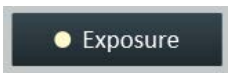
Validated settings do not guarantee successful builds for all geometry types. Assessment of a build, and subsequent adjustment to recoat parameters need to be made on a case-by-case basis.

Adjustments to Validated exposure parameters are rarely required. Unless directed, adjustments to exposure parameters are not recommended.

Validated settings have been established through testing. This assumes that the resin has been correctly maintained, and in good condition.

Within the *Build Style* tab, a pale-yellow dot indicates the set that contains the non-reference settings. For example:

or



And within the configuration dialogs, the individual field that does not match the reference set is highlighted with a pale-yellow background. For example:

Build Style Settings

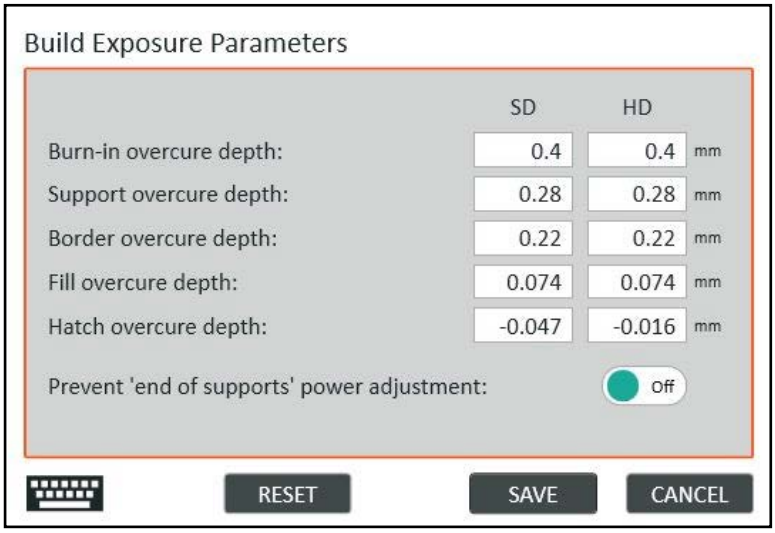
Tap 

to restore the settings to the reference set.

Tap 

to set the standard exposures.

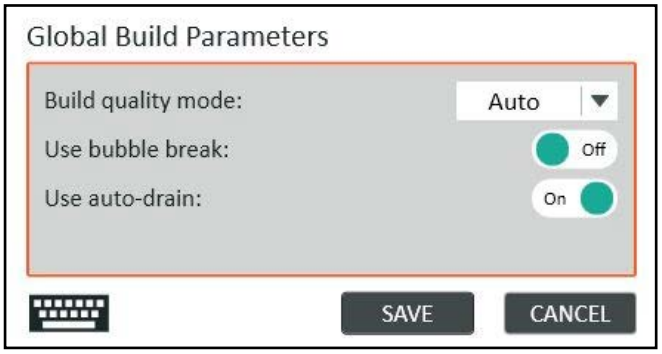
Figure 85: *Build Exposure Parameters* dialog box



Tap 

to set the global build preferences:

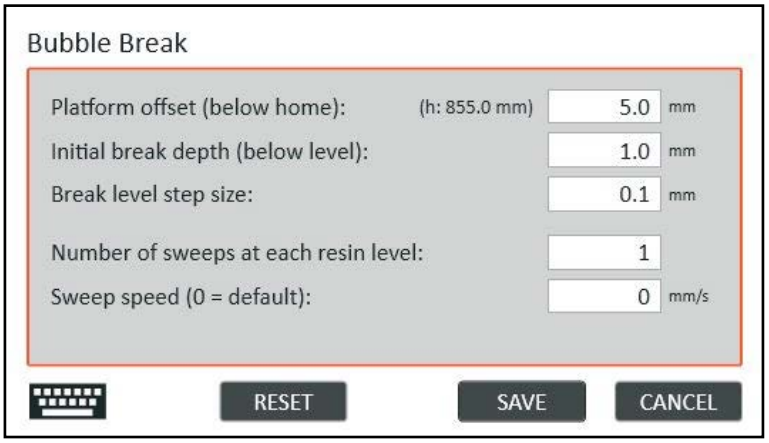
Figure 86: *Global Build Parameters* dialog box



Tap 

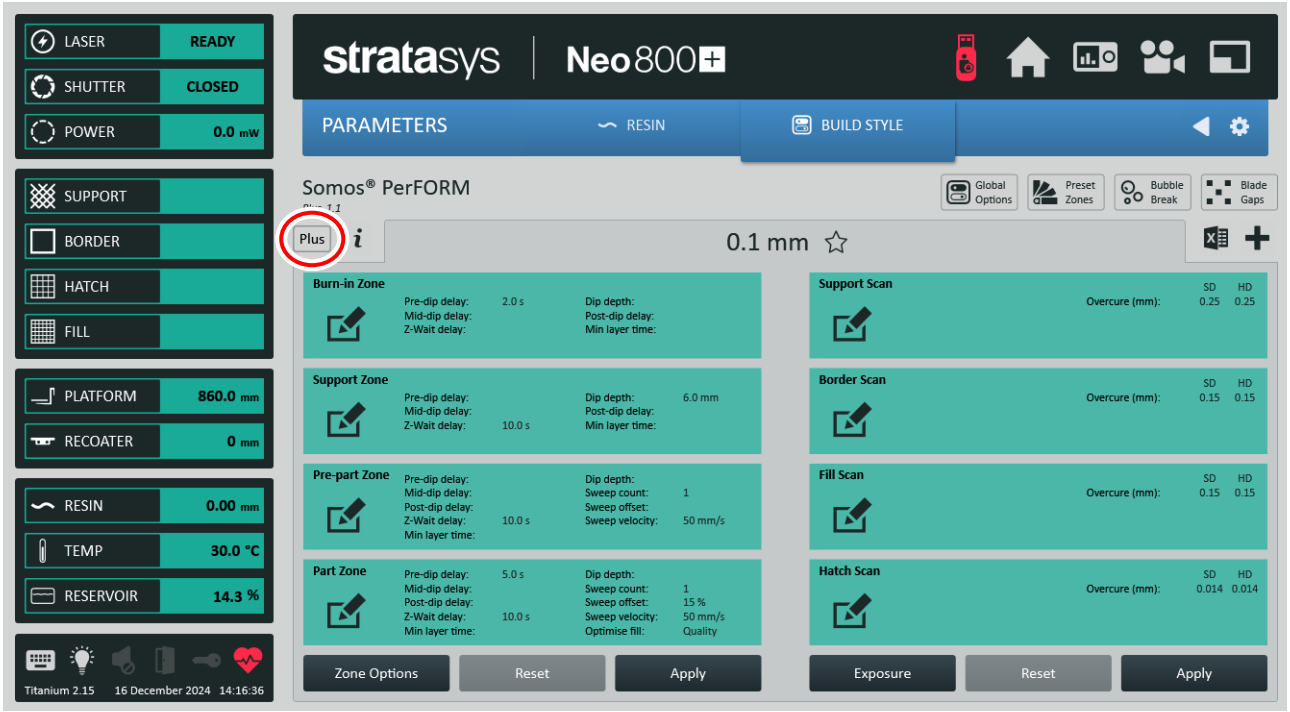
to set the preferences for the bubble break operations used during the build process. The bubble break process moves the elevator to a lower position, which allows the recoater to clear bubbles. Bubbles may cause areas of a layer to remain without resin as the laser scans over them, from the resin surface. The elevator then returns to the home position. A build should not be started if bubbles are visible on the resin surface.

Figure 87: Bubble break parameters



When compatible materials are loaded, the *Plus* build styles are available. The parameters in this mode work the same as the standard build style parameters, but use the enhanced scanning strategies available with the Neo800+.

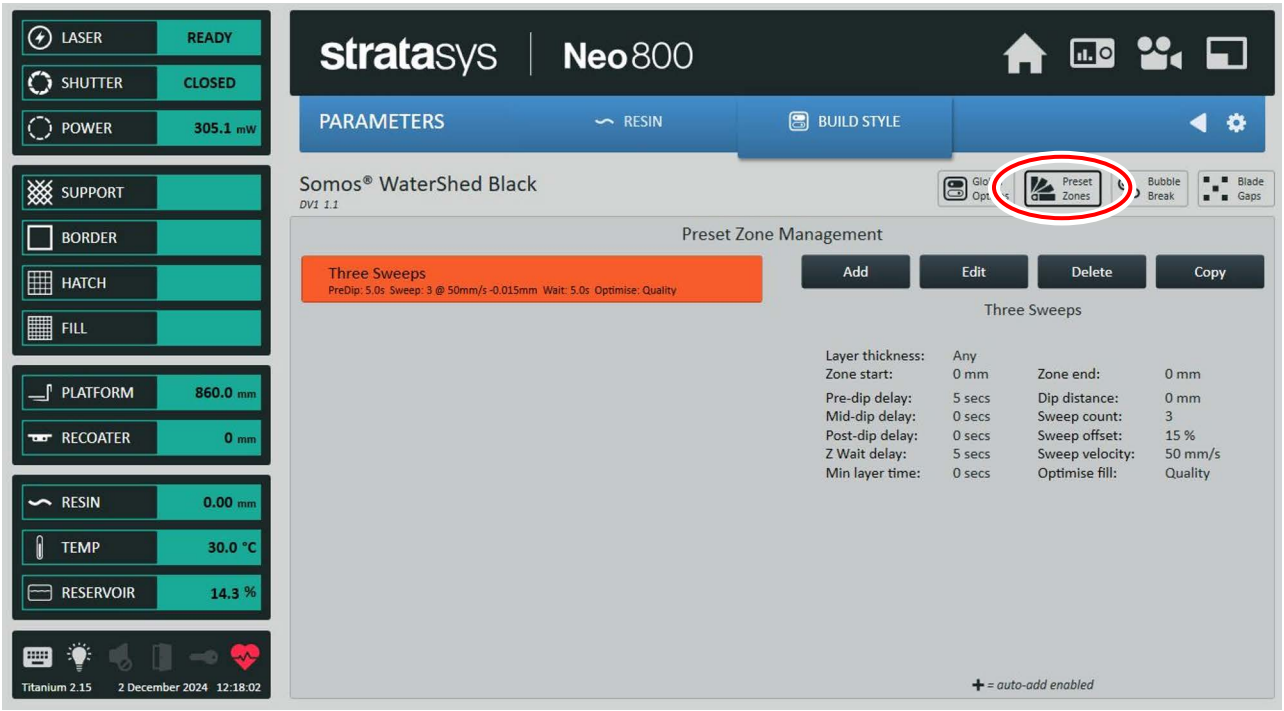
Figure 88: *Parameters* screen > *Build Style* tab with **Plus** feature displayed



Tap 

to edit the pre-set zone settings. Editing these settings changes the *Build Style* tab layout to reflect the current set of pre-set zones.
Tap **Preset Zones** a second time to close the *Edit Preset Zones* window.

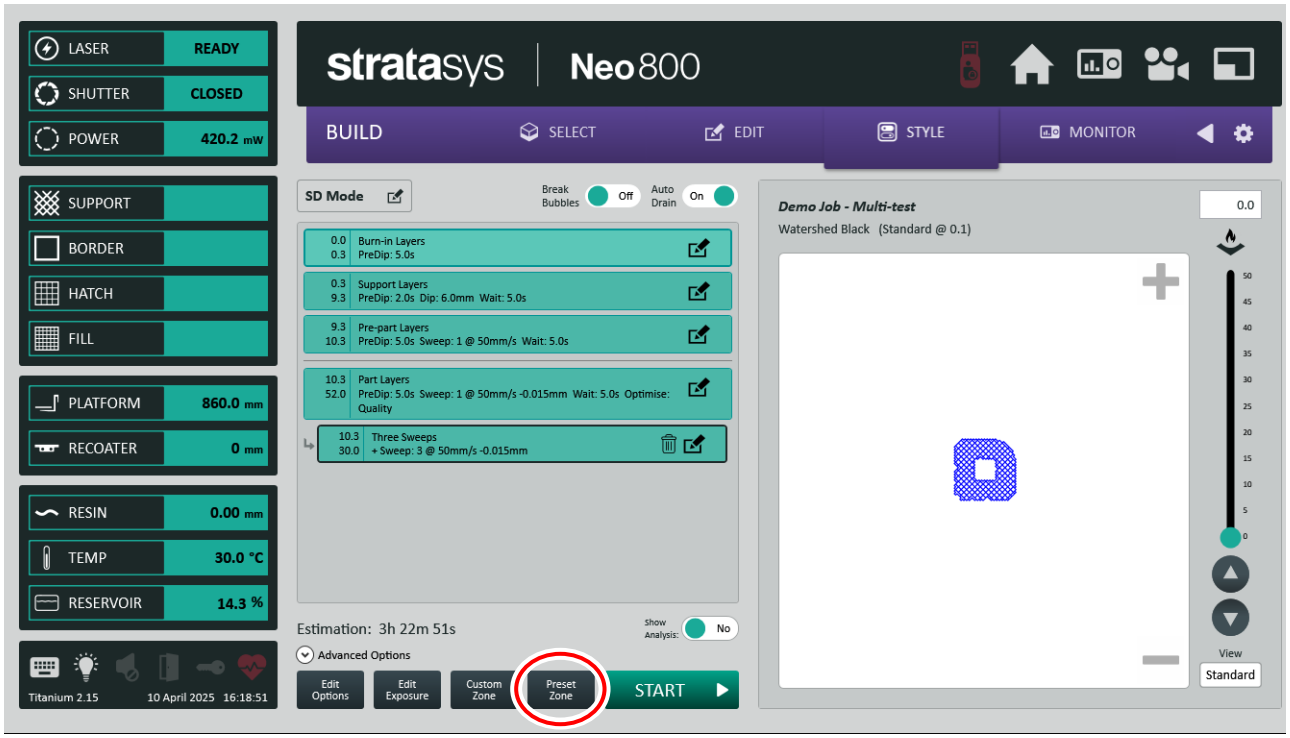
Figure 89: *Parameters* screen > *Build Style* tab, **Preset Zones** button



You can load the preset zones into the current build job as **Custom Zones**.

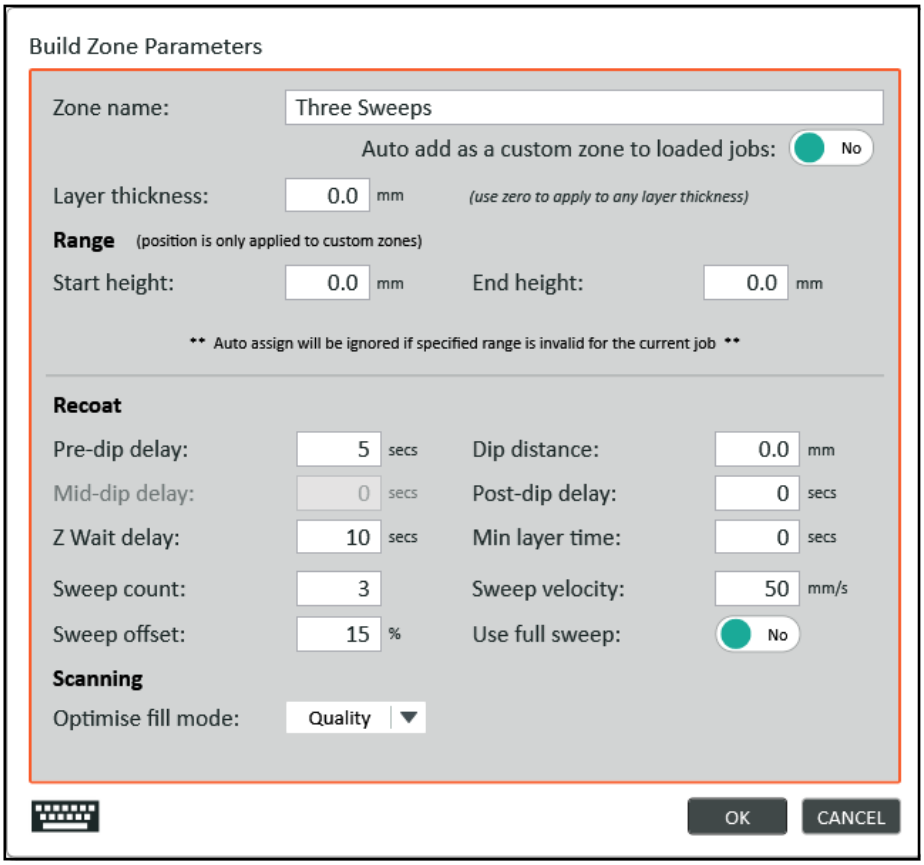
The Preset Zone button is only visible if you have created preset zones.

Figure 90: *Build* screen > *Style* tab, Preset Zones button



The preset zones have similar editable fields as the standard zones. Additionally, there is a *Zone name* field, and the option for the preset to be automatically applied when a job is loaded. For more details, see “Build Zone Parameters” on page 79:

Figure 91: Build Zone Parameters

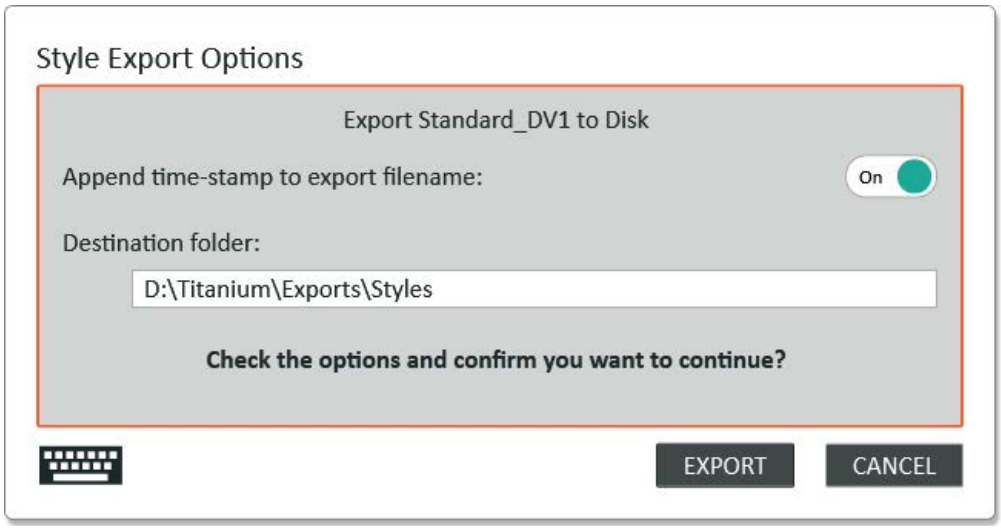


For the administrator user there are two additional buttons available: **Import Styles** and **Export Styles**.

Figure 92: *Parameters* screen > *Build Style* tab, **Import** / **Export Styles** button

Tap **Export Styles** to create a saved copy of the current build style settings for all layer thicknesses. These can be saved locally, to a USB memory stick, or sent via email.

Figure 93: Style Export Options

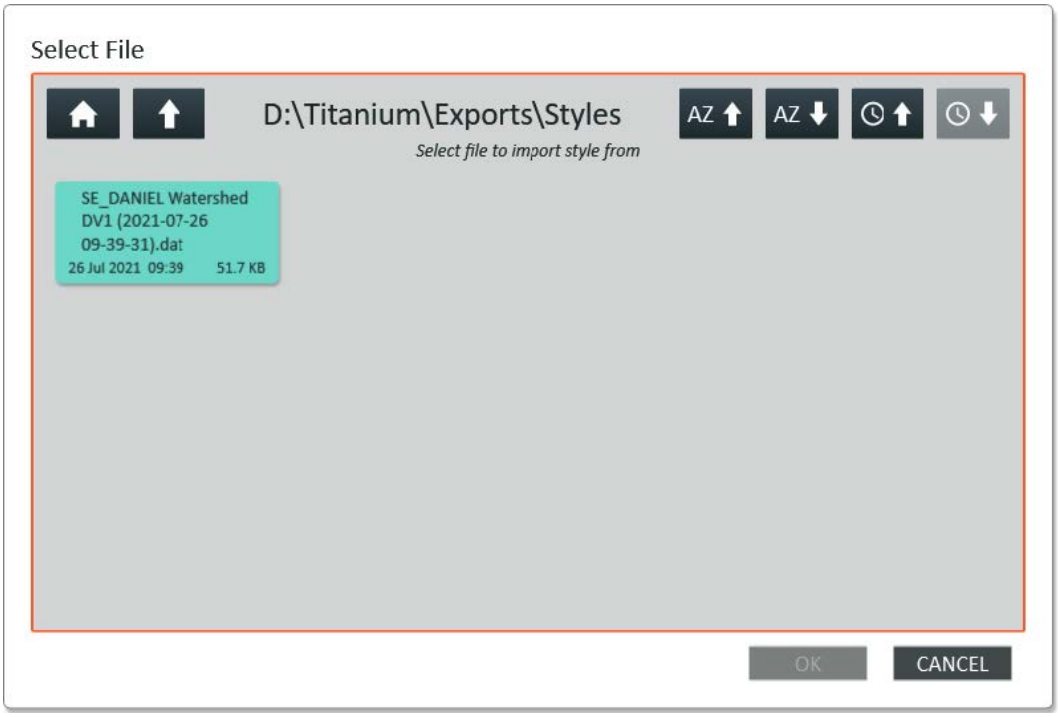


Tap **Import Styles** to import the settings previously saved with the *Export Styles* button. This allows the import of all layer thicknesses or the selection of individual layer thickness.

To import a style:

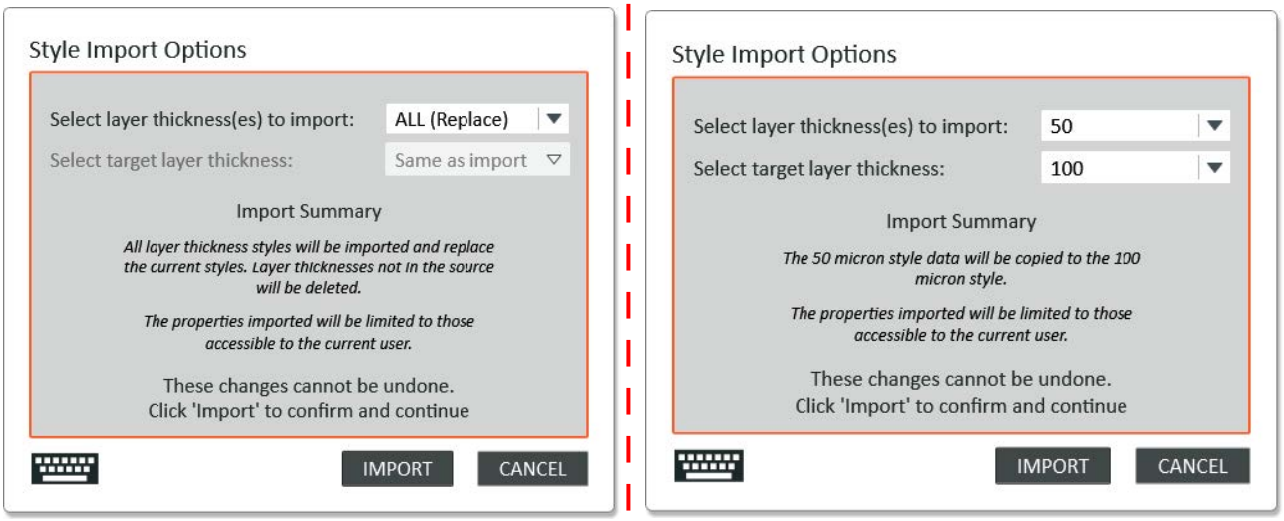
1. Select the file to import.

Figure 94: Select File



2. Select the layer thicknesses.

Figure 95: *Style Import Options* dialog box



Build Style Management

The following buttons provide additional functionality for managing the *Build Style* settings:

Table 47: *Build Style* management icons

Icon	Description
	Exports the current style settings to an Excel spreadsheet.
	Adds a set of style parameters for a new layer thickness.
	Deletes the style parameter set for the selected layer thickness. This applies only to sets added by a user.
	Restores a previous set of style settings.
Note: For custom resins, the following 2 additional buttons are available that allow an administrator user to save the current settings as a reference set that is available for the Reset action and for the Style Status reporting.	
	Saves the current style settings as the reference settings for the current layer thickness.
	Clears the saved reference settings.

Printer *Settings* Tab

Figure 96: *Management* screen > *Settings* tab

The printer settings control the general configuration of the printer. Some of the editable fields are only available to service engineers and may be grayed-out or not shown in this manual.

Setup Service Bar

The *Settings* tab service bar (bottom) contains buttons to further access information or settings. The contents of the service vary with the current user.

Standard User

Table 48: Standard user buttons

Icon	Description
	Show the *About* information dialog.
	Switch the active user level.

Admin User

Figure 97: Service control bar - Admin user

An admin user has access to the standard user buttons, plus the following:

Table 49: Admin user buttons

Icon	Description
	Apply the Titanium feature license.
	Change the Admin user password.
	Delete the Admin user password.

Neo ID Settings

The Neo ID settings are used to set the name and location of the printer. Most of these settings are only available to a service engineer.

Figure 98: Neo ID Settings

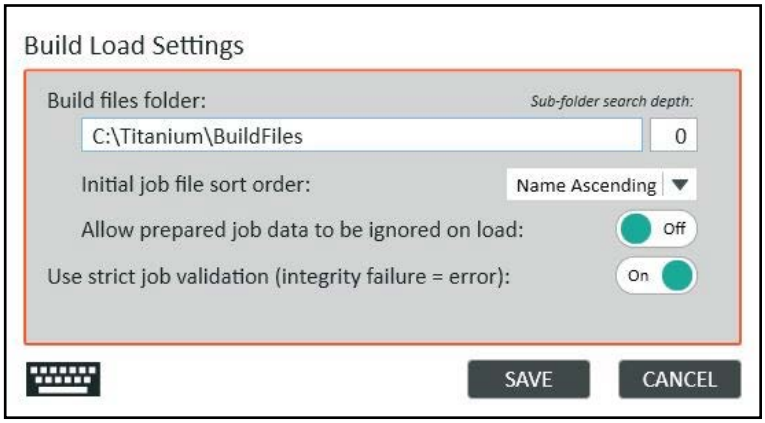
The *Machine Name (Stratasys | Custom)* field allows the customer to assign the printer a unique name. Ask the customer is they have a preferred name.

This name will be used to identify the printer in emails and export files. If left empty, the Stratasys printer name is used.

Build Load Settings

The build load settings can be used to adjust the build load preferences:

Figure 99: *Build Load Settings* dialog box



- *Build files folder* sets the folder that is used by the **Select Build** tab.
- *Use strict job validation* toggles the job validation checks to stop some validation errors that are preventing a build from starting.

Build Start Settings

The build start settings are used to control the behavior when the **Start** button is tapped.

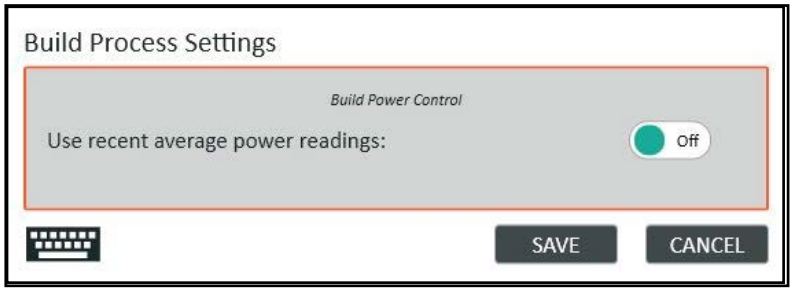
Figure 100: *Build Start Settings* dialog box

- *Auto-accept resin level:* controls the behavior when manual resin level adjustment is normally required.
- When the *Make the delayed start option available* is enabled, the option for a scheduled start is available.

Build Process Settings

The build process settings provide options that affect build process behavior.

Figure 101: *Build Process Settings* dialog box



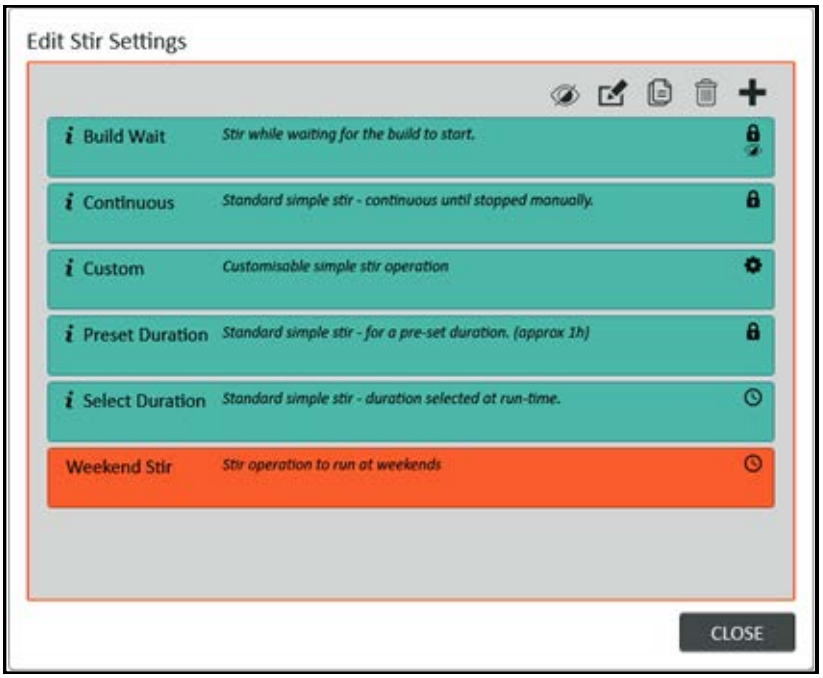
The build power control options provide an alternative means of handling the laser power. The *Use recent average power readings* option is an alternative to standard behavior.

Important:
Do not change this toggle unless directed to do so by a Stratasys support representative.

Stir Settings

The *Edit Stir Settings* allows for editing and defining stirring operations.

Figure 102: Edit Stir Settings



Titanium contains a default set of stirring options that can be edited or hidden. Custom definitions can be added.

Only the options marked as **visible** are presented when the platform stir action is requested.

If these options are not commonly used, you can set them to be hidden. Since they are system definitions, they can not be deleted.

The following buttons are used to manage the stirring definitions:

Table 50: Stirring definition toolbar buttons

Icon	Description
	Shows or hides the selected resin when the stir resin action is initiated.
	Edits the selected definition. **Note:** For system-defined definitions, only certain fields are editable.
	Creates a new definition using a copy of a selected definition as a starting point.
	Deletes the selected definition. **Note:** This button may be disabled.
	Creates a new definition.

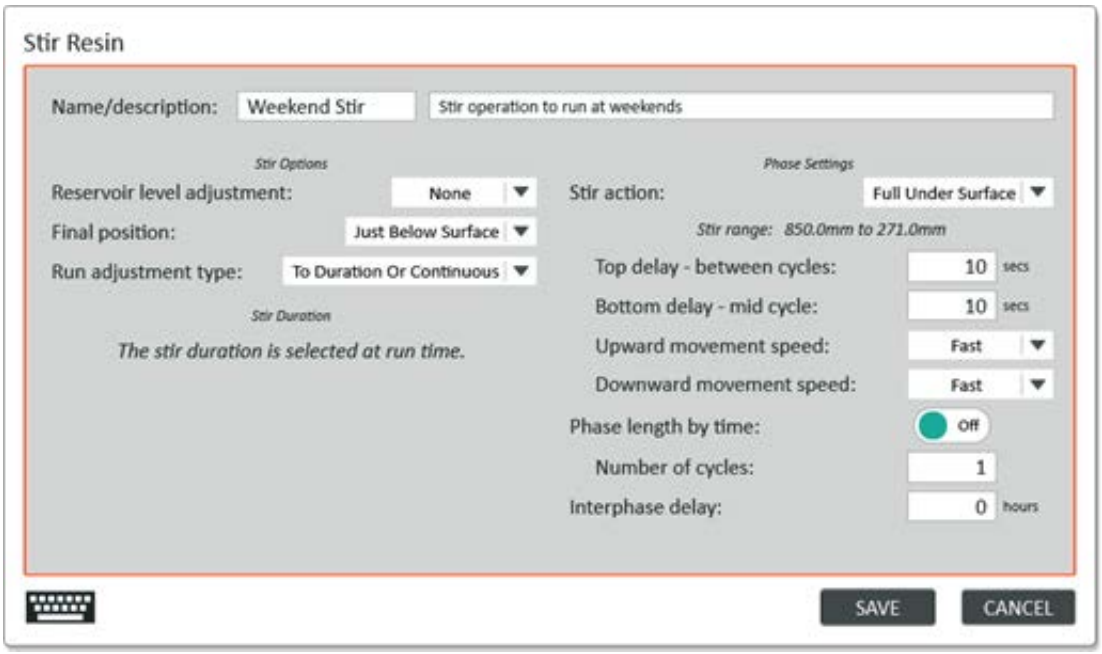
Within the definition entries the following symbols are used:

Table 51: Symbols used in stirring definition entries

Icon	Description
	Indicates that this definition is an internal printer default and cannot be deleted.
	Indicates that this definition is marked as hidden and does not appear as an option when stirring is initiated.
	Indicates that the stir duration is either externally controlled or fixed by the definition and cannot be adjusted at run time.
	Indicates that the definition is a custom definition that can be adjusted at run time.
	Indicates that the stir definition is for a variable duration and is selected at run time.

The following dialog box shows the options available when creating a stirring definition:

Figure 103: *Stir Resin* settings dialog box

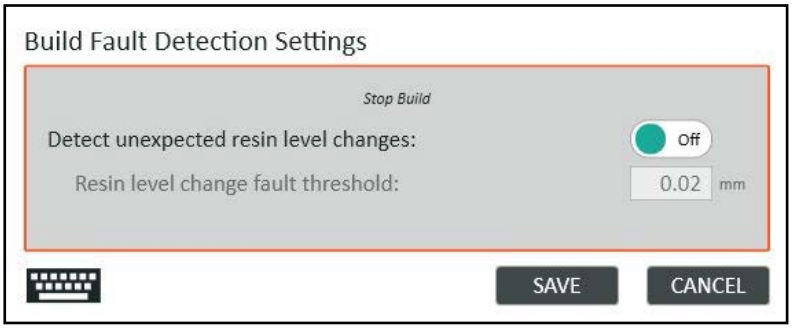


- **Reservoir level adjustment:** provides options for adjusting the resin level at the start of a stirring operation. The options are Fill, Empty, and Prime the reservoir.
- **Final position:** specifies the position where the platform is positioned when stirring is completed. The platform does not move to the final position if the stirring is stopped manually before completion.
- **Run adjustment type:** specifies the duration of the stir operation. The options available are:
  - **Fixed** - The duration is specified within the definition.
  - **To duration** - The duration is selected by the operator at run time.
  - **To duration or continuous** - The duration is selected by the operator at run time.
  - **Custom** - The duration is selected by the operator at run time.
- **Stir Duration** settings can be specified by time, cycle count, or continuous, where a stir cycle is a single up and down movement pair.
- **Phase Settings** settings control the limits of the platform movement, the movement speed, and the delay between movements.
- **Interphase delay:** can be used to group a series of cycles together either by time or count and apply a delay between sets.
  For example: where there is a phase of 10 cycles, an elongated pause occurs after each set of 10.

Build Fault Detection

The options displayed below provide additional fault detection. If triggered, these cause the printer to stop the build. These are disabled by default.

Figure 104: *Build Fault Detection Settings* dialog box

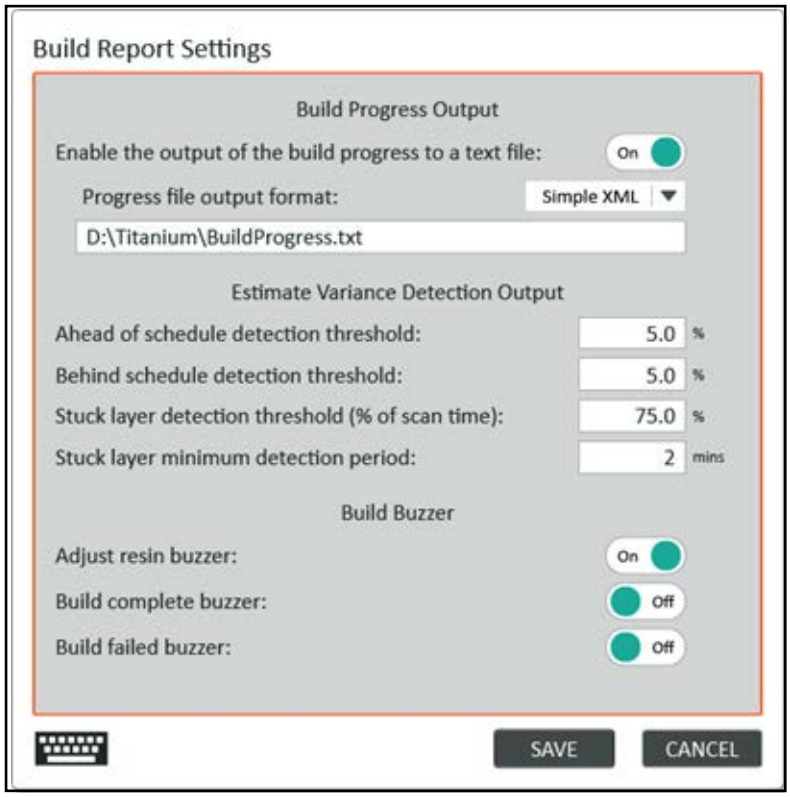


Detect unexpected resin level changes: can be triggered by a bubble passing under the resin level sensor and causing a problem with the resin level.

Build Report Settings

The options displayed below control the reporting of the build progress.

Figure 105: *Build Report Settings* dialog box

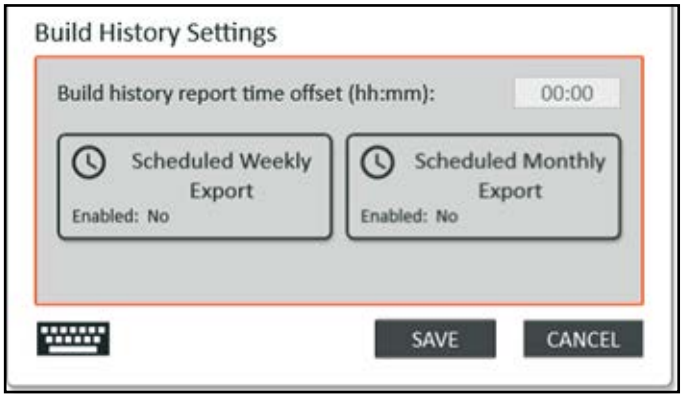


- **Enable the output of the build progress to a text file:** creates a text file that can be used by Titanium Assistant or a customer application to monitor the build progress.
- The **Estimate Variance Detection Output:** control how the actual build time is reported, and the alerts raised if taking longer than expected.
  - **Ahead of schedule detection threshold:** the percentage of overall build time to alert when the build is ahead of schedule. If this threshold is exceeded, an email alert is sent, provided email alerts have been enabled (see “Email Send Options” on page 114).
  - **Behind schedule detection threshold:** the percentage of overall build time to alert when the build is behind schedule. If this threshold is exceeded, an email alert is sent, provided email alerts have been enabled (see “Email Send Options” on page 114).
  - **Stuck layer detection threshold:** the percentage of the estimated scan time to allow being overdue before issuing an alert. If this threshold is exceeded, an email alert is sent, provided email alerts have been enabled (see “Email Send Options” on page 114).
  - **Stuck layer minimum detection period:** the minimum overdue period to allow. If this threshold is exceeded, an email alert is sent, provided email alerts have been enabled (see “Email Send Options” on page 114).

    The **Stuck** status is an assessment based on predicted layer times. A layer may take longer than predicted for a valid reason. Therefore, after a **Stuck** status appears you should visually inspect the build to confirm if a problem has arisen.
- The **Build Buzzer** settings allow you to set additional buzzer notifications for events during a build:
  - **Adjust resin buzzer:** the buzzer sounds when the resin level needs adjusting.
  - **Build complete buzzer:** the buzzer sounds when the build is complete.
  - **Build failed buzzer:** the buzzer sounds if the build job fails.

Build History Settings

Figure 106: *Build History Settings* dialog box



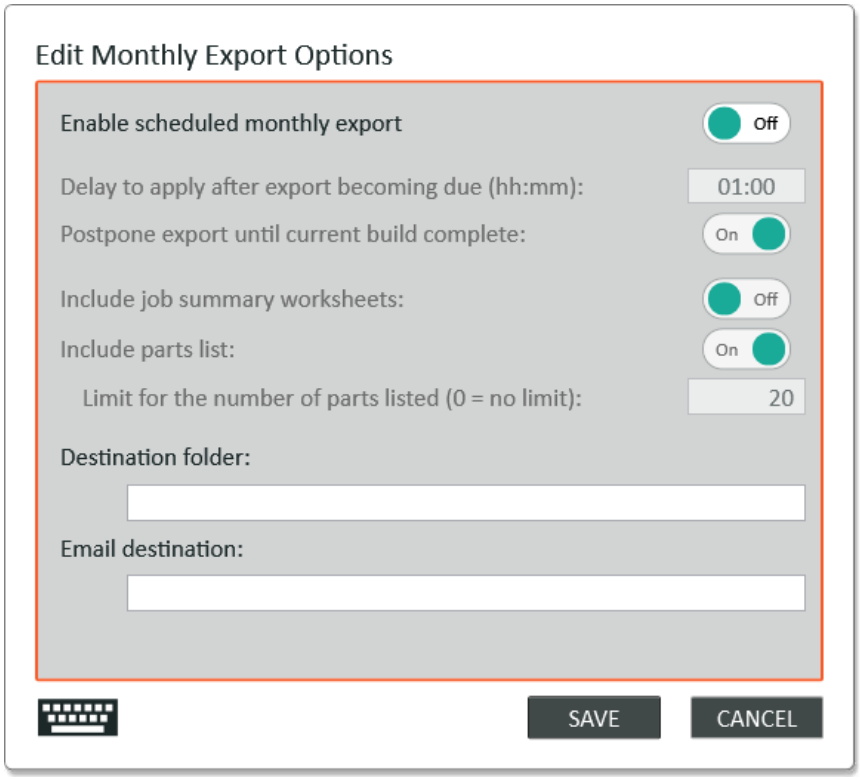
Build history report time offset sets the history reporting time period. By default, the history reports the job statistics for whole days starting at midnight. The build history report time offset allows you to set the daily report start time to a more relevant time of day.

Scheduled Exports

Scheduled exports generate regular exports of the recent build history, collated weekly or monthly. The data is exported to an Excel file soon after the completion of the report period.

The export content options are similar to those available in the *Build History* screens.

Figure 107: Scheduled exports



The scheduled export options are:

- **Delay to apply after export becoming due:** delays the generation of the report by a period up to 24 hours.
  For example: a normal weekly report would be due at midnight at the start of a Monday. This delay could be used to have the report generated at 8:00 am on Monday.
- **Postpone export until current build complete:** ensures that a build started within the previous period gets properly included within the report.
- **Include job summary worksheets:** enable if needed.
- **Include parts list:** enable if needed.
- **Destination folder:** (Optional) specifies the folder where the exported file is stored.
- **Email destination:** (Optional) specifies the email addresses to send the export data file. If you want to enter more than 1 email address, use a semi-colon to separate the addresses.

Edit Security Settings

The security settings contain options relative to the access level of the user that is currently logged-on. These are settings that an Admin-level user or above can control.

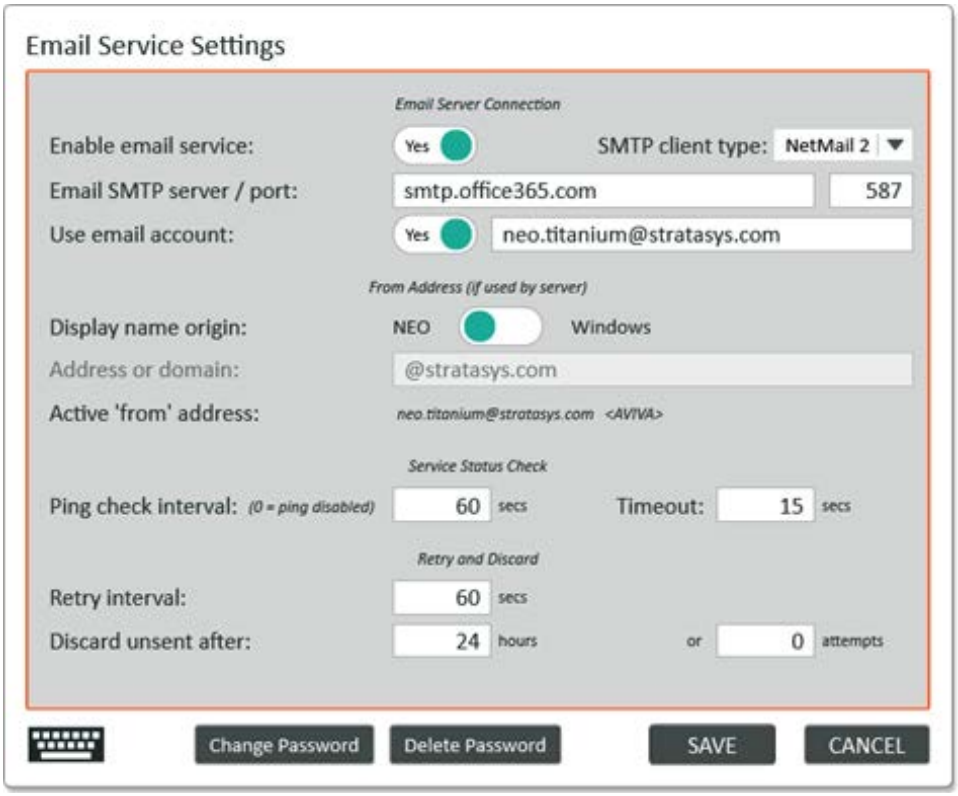
Figure 108: *Edit Security Settings* dialog box

- **Admin user timeout period:** the length of time the admin user access level remains active if not logged off manually.
- **Standard user style access:** the level of access to the Style settings when a standard level user is logged on.
  This allows an admin user to prevent style changes by a standard user.

Email Service Settings

Email service settings set the email service that is used, and control the message retry settings.

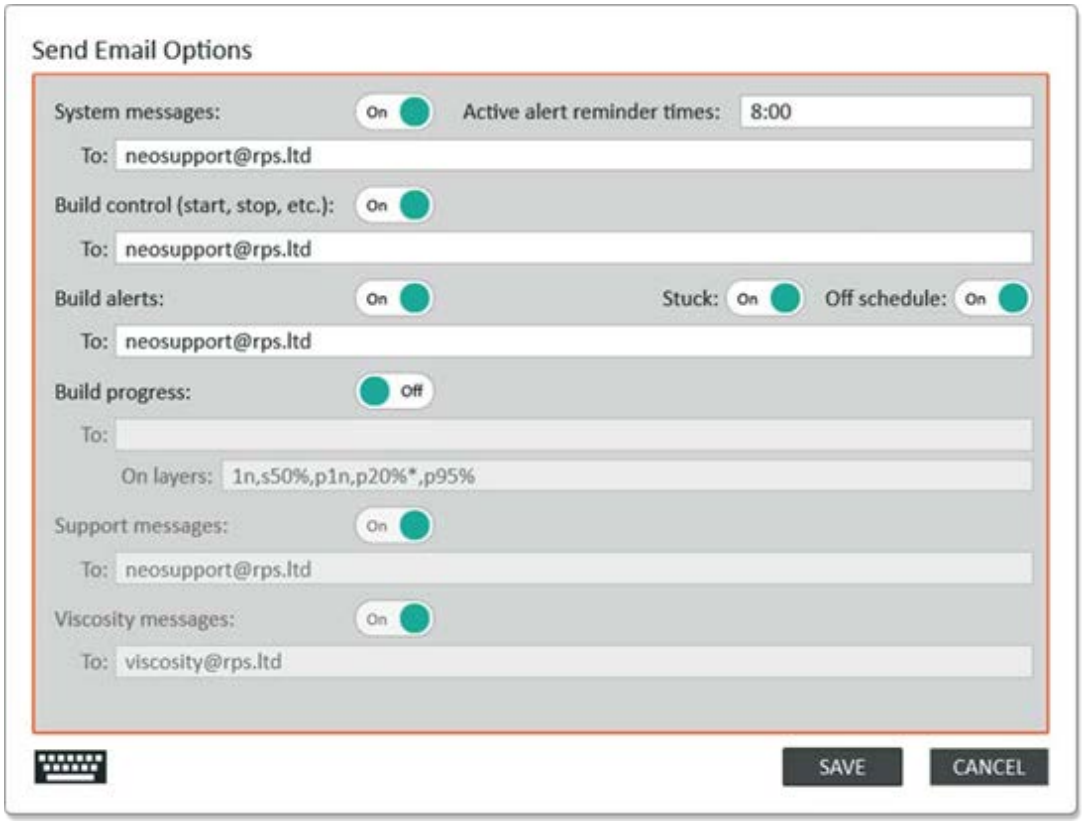
Figure 109: *Email Service Settings* dialog box



The email *From Address* settings can be used with some email services to set the email From address contained in the email. Some email servers force the 'From' address, preventing these settings from being effective.

Email Send Options

Figure 110: *Send Email Options* dialog box



These settings configure the printer to send emails when the following events occur:

- **System messages:** printer alerts and faults.
- **Build control:** major build events: start, stop, pause, resume, etc.
- **Build alerts:** warnings during the build, for example: overdue layer.
- **Build progress:** build progress (see "Build Progress Emails" on page 115).
- **Support messages:** email messages that will be sent to Stratasys, for example: snapshot emails.
  Note: Configure this to the relevant Stratasys email address.
- **Viscosity messages:** email messages relating to the resin viscosity reporting mechanism.
  Note: Configure this to the relevant Stratasys email address.

- You can enter several email addresses, separated by semi-colons.
- The support and viscosity email addresses should be set to a Stratasys address.
- The printer email messages should be set to a customer administrator.
- The printer messages include printer error emails and build warning emails.

Build Progress Emails

You can define how the printer sends build progress emails.

Each definition is made up of a number and some optional characters, for example:

- 50
- s50%
- p1n
- p30%

Separate each individual definition with a comma, for example:

- 1n,s50%,p1n,p30%

Character definitions:

- A number alone specifies a build height (in millimeters).
- **n** indicates the number relates to a specific layer number.
- **%** indicates the number relates to a percentage progress of the build.
- **s** indicates the number relates only to the support zone.
- **p** indicates the number relates only to the part zone.
- ***** indicates a repeating definition.

The position of the special characters is not relevant – but, as a convention:

- **s** or **p** should be placed before the number.
- **n** or **%** should be placed after the number.
- ***** should be last.

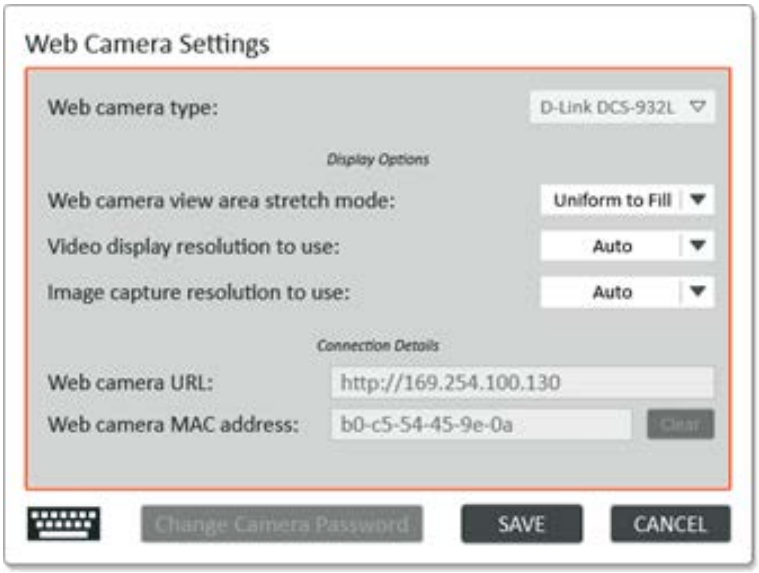
Examples:

- **50** – sends an email at build height 50mm
- **50n** – sends an email at layer 50
- **50%** – sends an email at 50% of total build
- **1n** – sends an email at layer 1
- **s1n** – sends an email at first layer of the support zone
- **p1n** – sends an email at first layer of the part zone
- **50*** – sends an email every 50mm
- **50n*** – sends an email every 50 layers
- **30%*** – sends an email every 30% of build (i.e. 30%, 60%, 90%)
- **p30%*** – sends an email every 30% of the part zone (i.e. p30%, p60%, p90%)

Web Camera Settings

Web camera settings control the camera properties.

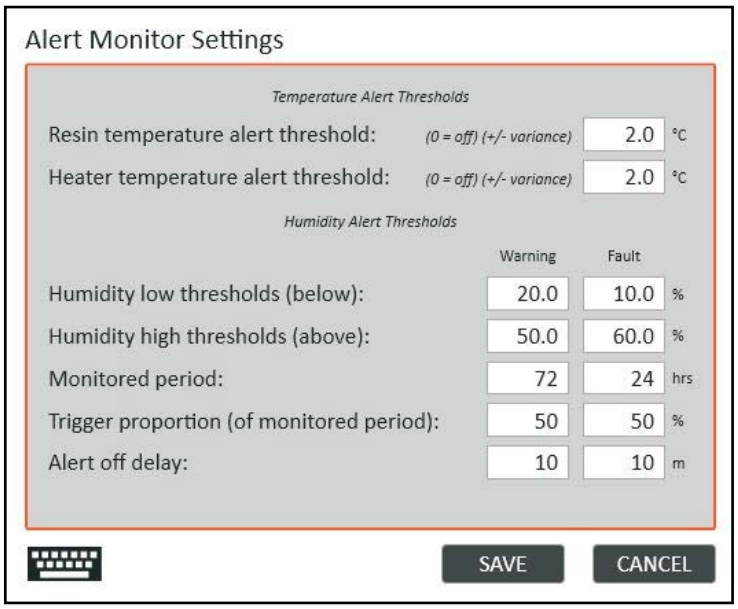
Figure 111: *Web Camera Settings* dialog box



- **Web camera type:** select from the list.
- **Web camera area view stretch mode:** adjusts how the web camera images are viewed in the allocated display area. Consider the area viewed by the camera and the set resolution when changing this setting.
- **Video display resolution to use:** adjust to modify the level of detail displayed.
  Note: Sometimes, due to network settings, increasing the resolution can have an adverse effect on performance.
- **Image capture resolution to use:** adjust to modify the level of detail captured.
  Note: Sometimes, due to network settings, increasing the resolution can have an adverse effect on performance.
- **Web camera URL:** the full URL of the camera, including **http://**
- **Web camera MAC address:** the complete MAC address of the camera

Alert Monitor Settings

Figure 112: *Alert Monitor Settings* dialog box



The alert monitor settings are used to set the thresholds when you receive alerts.

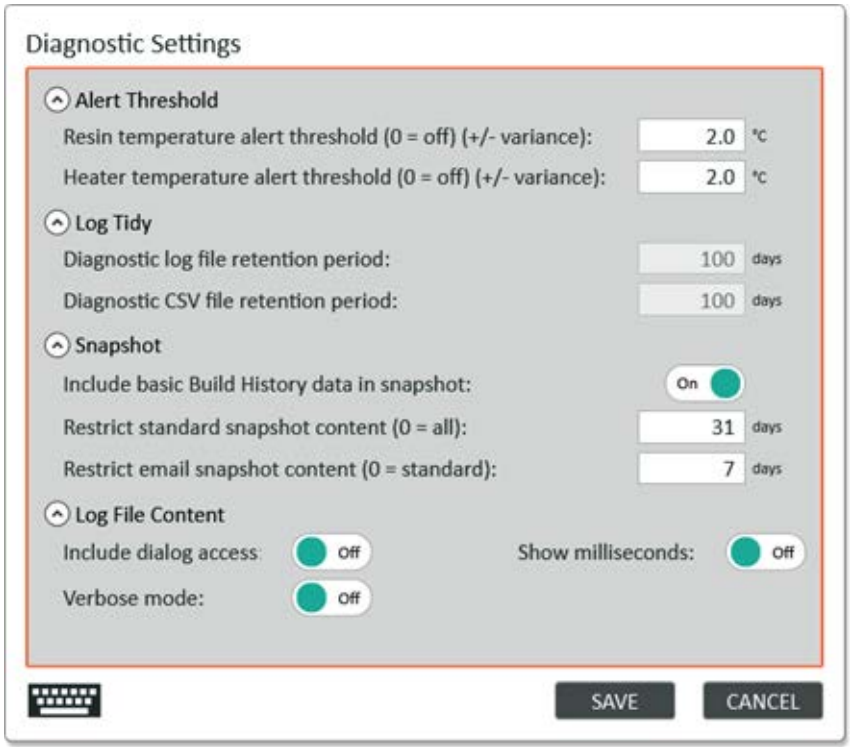
- **Resin temperature alert threshold:** alerts if the resin temperature varies from the setpoint by the specified amount
- **Heater temperature alert Threshold:** alerts if the heater temperature varies from the setpoint by the specified amount
- **Humidity low thresholds (below):** displays a warning or a fault if the relative humidity falls below the specified amount
- **Humidity high thresholds (above):** displays a warning or a fault if the relative humidity increases above the specified amount
- **Monitored period:** sets the period of time over which the humidity thresholds are measured.
- **Trigger proportion:** the percentage of the monitored period that is above or below the threshold before displaying a warning.

  For example: Humidity high warns that the humidity reading is above **50** for more than **50%** (= *Trigger proportion*) of **72 hours** (= *Monitored period*) - i.e. more than 36 hours within 72. **Note:** The 36 hours in not necessarily continuous and could be made up of many periods during the 72 hours being monitored
- **Alert off delay:** delay for a specified time before a warning is produced. This prevents warnings from being produced because of short periods where a reading is too high or low, such as when a chamber door is opened.

Diagnostic Settings

The printer records all software activity and saves the data to a set of text and CSV files. The daily text log records printer actions as they occur, and the daily CSV files record statistics that are collated into short periods during the day, such as the processor usage, memory used, and resin temperature.

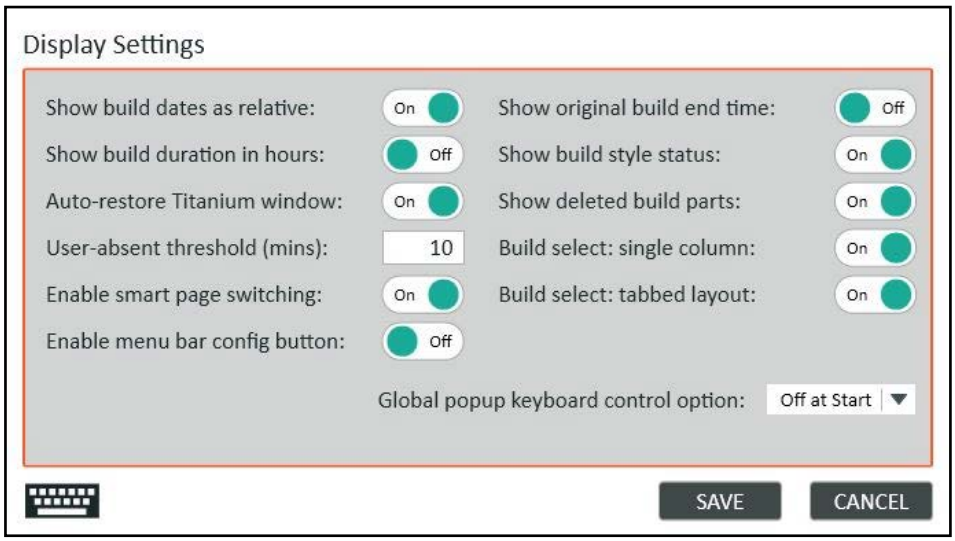
Figure 113: *Diagnostic Settings* dialog box



- **Alert Threshold:** the variance from the threshold to alert
- **Log Tidy:** set the number of days to retain the daily log and CSV files
- **Snapshot:** which information to include
- **Log File Content:** these settings should be **Off** unless directed to enable them by a support technician.

Display Settings

Figure 114: *Display Settings* dialog box

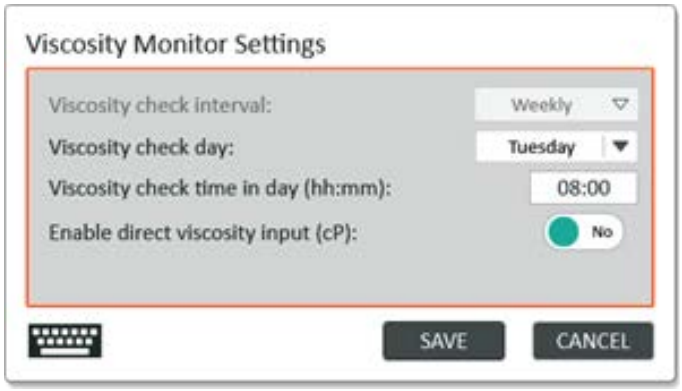


- **Show build dates as relative:** uses *Today*, *Yesterday,* and *Tomorrow* instead of the calendar date when displaying the build start and end times
- **Show original build end time:** displays an additional field on the *Build* screen > *Monitor* tab to report the originally estimated build end time in addition to the dynamic estimated end time field
- **Show build duration in hours:** use *Hours* as the highest unit of time when displaying the build duration
- **Show build style status:** highlights the non-default style settings on the *Style* configuration tab
- **Auto-restore Titanium window:** the Titanium window is displayed as the active window after no user activity has been detected for a threshold period.
- **Show deleted build parts:** display parts that were deleted from a build in the *Build* > *Edit* tab. The deleted parts are shown in grey.
- **User-absent threshold:** the threshold for a user-timeout period.
- **Build select: single column** and **Build select: tabbed layout:** sets the layout for selecting the job to load.
- **Enable smart page switching:** enables the smart page switch feature which allows you to quickly move between the last two screens (located near the top-right of the screen: ).
- **Enable menu bar config button:** enables visibility of the *Printer Settings* button on the tab selection bar
- **Global popup keyboard control option:** sets the behavior of the popup or on-screen keyboard.

Viscosity Monitor Settings

Viscosity monitor settings enable you to specify the day and time when the viscosity check reminders are provided.

Figure 115: *Viscosity Monitor Settings* dialog box



- **Viscosity check interval/day/time:** set these as needed.
- **Enable direct viscosity input:** changes the viscosity input dialog to allow direct input of the viscosity rather than timed values.

PLC Settings

Service engineer accessible area.

Resin Tank Settings

The resin tank settings provide the means to select the type of resin tank that is fitted to the printer. The tank bottom protection zone is provided to prevent the platform from entering the lower part of the vat. This may be useful if there is a build-up of settled resin that needs to be avoided.
This reduces the maximum build height that is available.

Caution
Changing these settings is not recommended unless directed by a support technician.

Figure 116: *Resin Tank Settings* dialog box

Resin Heater Settings

Service engineer accessible area.

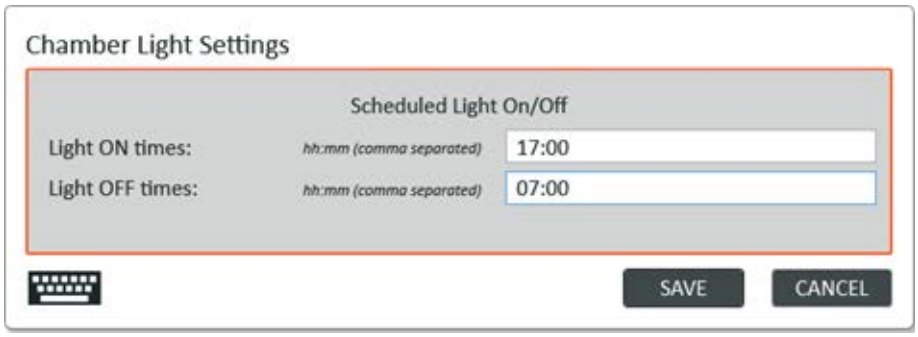
Resin Heaters

Service engineer accessible area.

Chamber Light Settings

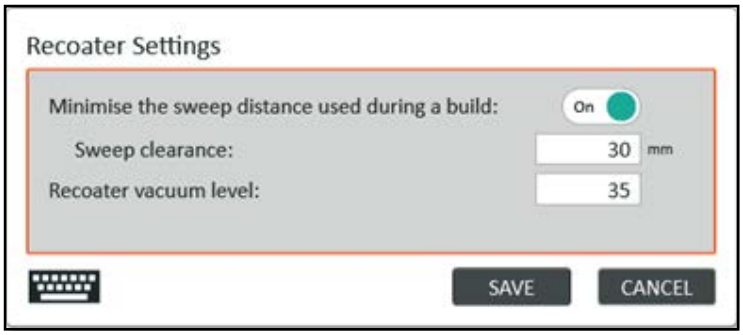
The chamber light settings allow the times when the chamber light will be switched on or off to be specified. These actions are applied when the specified time occurs, although subsequent user actions will take priority. Multiple time entries can be submitted in a comma delineated list. If left blank, the chamber lights remain manually controlled.

Figure 117: Chamber Light Settings



Recoater Settings

Figure 118: Recoater Settings



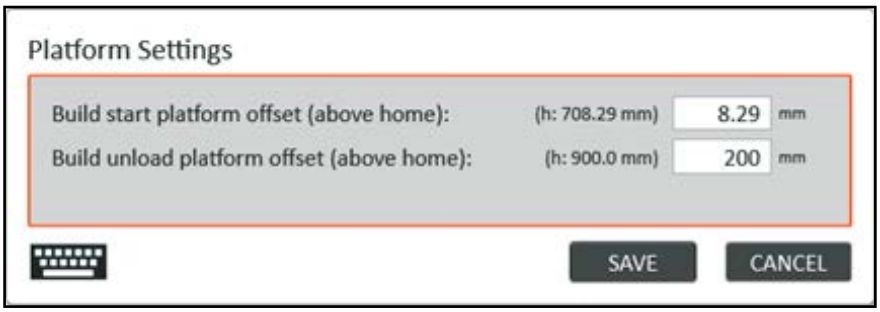
- **Minimise the sweep distance used during a build:** restricts the recoater movement to the minimum necessary, thereby reducing the build time. When disabled a full sweep of the platform is used during builds. By default, this is enabled.
- **Sweep clearance:** determines the space either side of the build job that the recoater blade will move to ensure that the build layer has been cleared.
- **Recoater vacuum level:** adjusts the resin level within the recoater blade.

Caution

Changing any of these settings is not recommended unless directed by a support technician.

Platform Settings

Figure 119: Platform Settings



- **Build start platform offset (above home):** the position of the platform at the start of a build.
  This must be set accurately to a specific level for the current printer.
- **Build unload platform offset (above home):** the height to which the platform rises at the end of a build as part of the auto-drain process.

Caution
Changing any of these settings is not recommended unless directed by a support technician.

Laser Settings

Service engineer accessible area.

Power Settings

Service engineer accessible area.

UPS Monitor Settings

Service engineer accessible area.

Laser Port Settings

Service engineer accessible area.

Power Meter Port Settings

Service engineer accessible area.

UPS Port Settings

Service engineer accessible area.

System Screens

Common Actions Tab

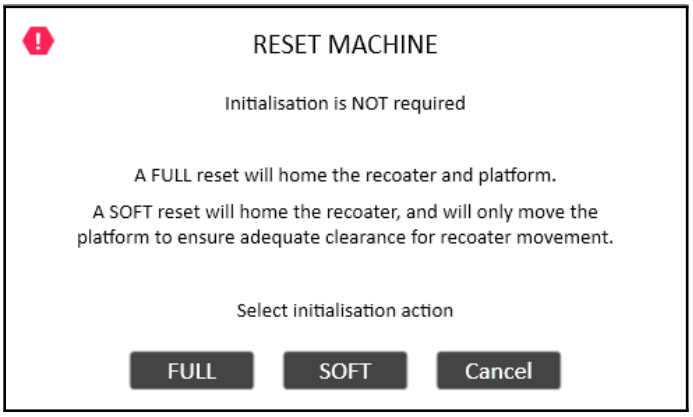
Figure 120: *System* > *Common Actions* tab

This tab allows you to easily perform common tasks:

- **Prepare Resin** simulates the conditions required for a build start. The printer fills the reservoir to 10%, moves the platform to the start position and levels the resin, prompting you to add or remove resin if necessary.
- **Drain Build** moves the platform to the unload position.
- **Platform Stir** starts the platform stirring operation. In situations where multiple stirring definitions are available, these options are presented. If a single run-time option is available, it is automatically selected.
- **Paddle Stir** indicates to the printer that an external paddle stirring operation is in progress. This prevents other printer actions while this is active.
- **Break Bubbles** displays a dialogue box which prompts for the bubble-break settings. Taping **Start** begins the bubble-break process.
- **Clean Recoater** lowers the vat resin level as much as possible and moves the recoater blade to a set position for cleaning.

- **Reset Machine** moves the recoater to the home position and then moves the platform to the home position. When the *Reset Machine* button is pressed, a prompt appears to select between a FULL reset and a SOFT reset.
  - **FULL** –moves the recoater and platform to the home position.
  - **SOFT** – moves the recoater to the home position, and moves the platform to a position that provides adequate clearance for recoater movement.

Figure 121: Reset Machine options



Motion Control Tab

This tab allows you to manually move the platform, recoater and resin.

Figure 122: *System* > *Motion Control* tab

Platform

Table 52: Platform buttons and icons

Icon	Description
	Indicates that the platform is unable to move because the recoater is not in the home position.
	Raises the platform until the button is released.
	Lowers the platform until the button is released.
	Moves the platform to the top position.
	Move the platform to the unload position.
	Moves the platform to the build start position.
	Moves the platform to the home position.
	Move the platform to the bottom of the vat.
	Cancels the current movement.
	Sets the current position as the build start position. **Note:** This is only accessible to an Admin user.

Advanced Movement Options

- Change the velocity of the platform by selecting an option in the *Up and Down* drop-down menu.
- To move the platform to an absolute position, enter the position in the *Move Absolute* field, then tap **GO**.
- To move the platform relative to its current position, enter the distance in the *Move Relative* field, then tap **GO**.

Recoater

Table 53: Recoater buttons and icons

Icon	Description
	Indicates that the recoater is unable to move because the platform is too high.
	Recoater moves towards the back of the vat until the button is released.
	Recoater moves towards the front of the vat until the button is released.

Table 53: Recoater buttons and icons (Continued)

Icon	Description
FRONT	Moves the recoater to the front of the vat.
BACK	Moves the recoater to the back of the vat.
STOP	Cancels the current movement.

Advanced Movement Options

- Change the velocity of the recoater by entering a new velocity in the field.
- To move the platform to an absolute position, enter the position in the *Absolute* field and tap **GO**.
- To move the platform relative to its current position, enter the distance in the *Relative* field and tap **GO**.
- Tap **HOME** to move the recoater to the Home position.

Resin Movement

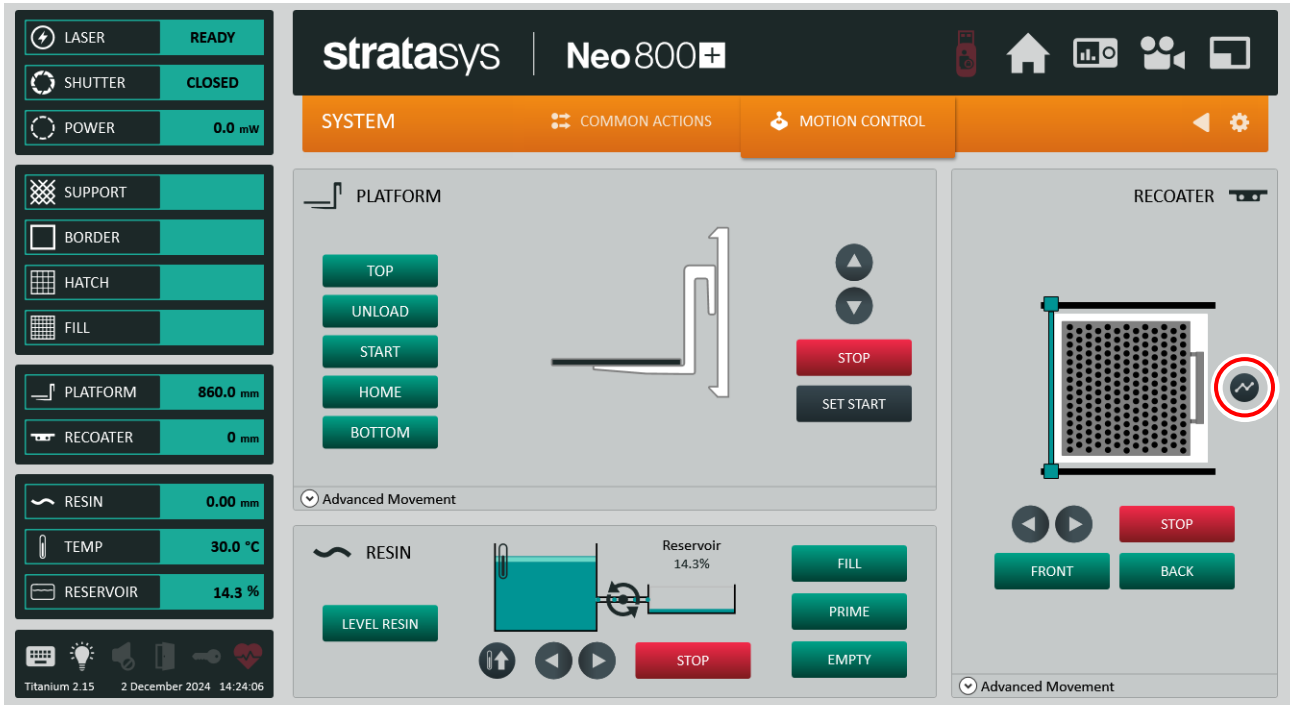
Table 54: Resin buttons and icons

Icon	Description
LEVEL RESIN	Moves the resin in or out of the reservoir to achieve the correct building level. **Note:** There must be enough resin in the printer for this to occur.
	Causes the printer to ignore temperature readings from the temperature probe. This is typically only used when the printer is undergoing maintenance, as the printer requires resin temperature data to build parts successfully.
	Moves the resin from the vat to the reservoir. Resin movement stops when you release the button.
	Moves the resin from the reservoir to the vat. Resin movement stops when you release the button.
FILL	Moves resin from the vat to the reservoir until the reservoir is full.
PRIME	Empties the resin or fills the reservoir to 10% capacity. This action is also performed automatically when a build starts.

Calibrate Recoater Vacuum (Neo800+ Only)

When logged in as an Admin user the *Calibrate Recoater Vacuum* ( ) tool is available to set the correct resin level in the recoater blade and allow Titanium to monitor this level.

Figure 123: *System* screen > *Motion Control* tab (Neo800+)



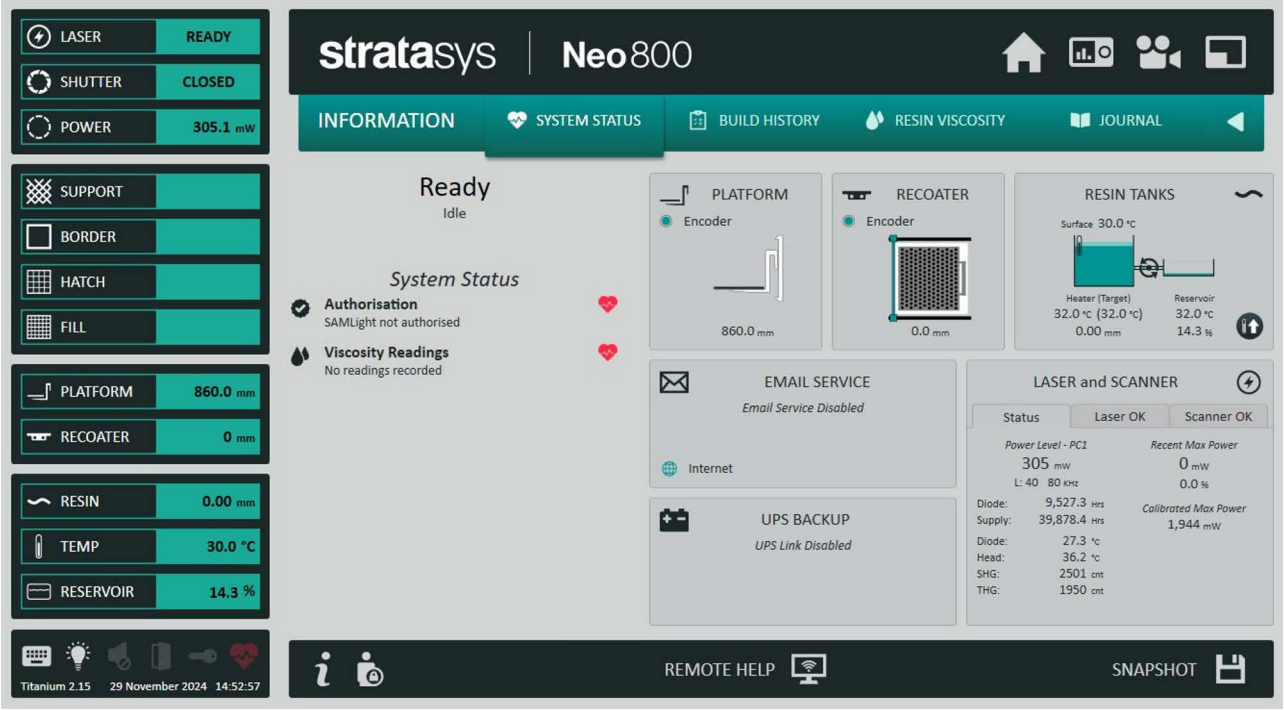
Information Screens

System Status Tab

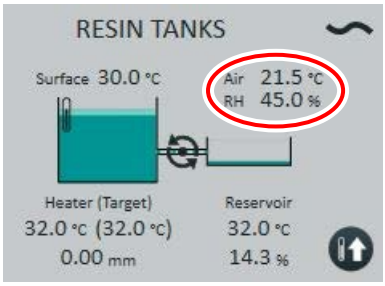
This tab displays the current status of the printer.

- The left side of the tab shows the current activity of the printer, and reports any issues detected.
- The right side of the tab shows a visual representation of the status of the platform, recoater blade, resin tanks, laser, email service, and UPS.

Figure 124: *Information* > *System Status* tab



Neo800+ only: the Resin Tanks pane also displays the air temperature and humidity:



The service bar buttons provide the following:

Table 55: Service bar buttons

Icon	Description
	Displays the About information dialog.
	Changes the active user level.
	Creates a system snapshot and saves it to the local disk. A snapshot is a single **.zip* file that contains the current configuration settings and diagnostic log files. These are for use by a service engineer.
	Creates a system snapshot, saves it to the local disk, and sends it via email.
	Creates a system snapshot and saves to a removable USB drive (visible if a USB drive is present).

Build History Tab

The *Build History* tab shows the builds that have been started on the printer. Each build is given a unique number, shown in the left column. Previous months can be seen by pressing the **PREVIOUS** button.Monthly total usage is shown on the right.

Figure 125: *Information* > *Build History* tab

Selecting an individual build job on the left displays the details for that job on the right.

Figure 126: *Build History* details

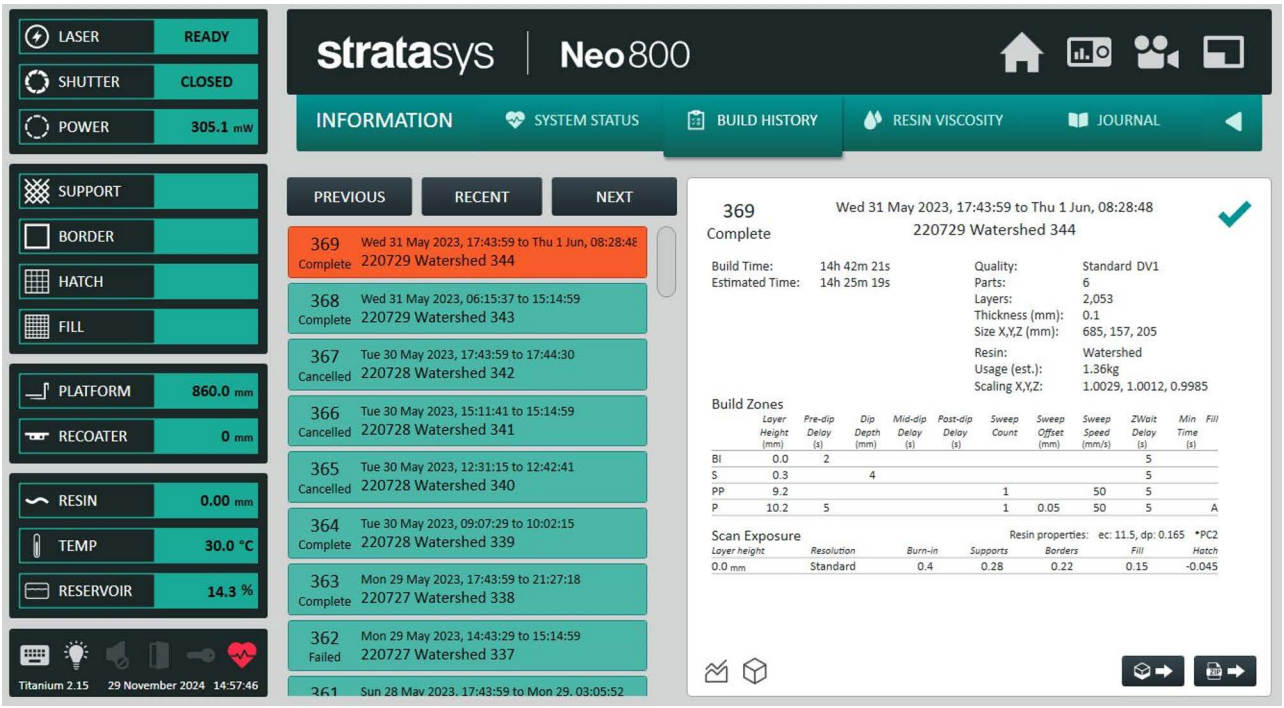


Table 56: *Build History* buttons

Icon	Description
	Creates an Excel spreadsheet summarizing the job data, and exports it to an external USB or email.
	Creates a job diagnostic pack for the selected job, and exports it to a USB or email. The job diagnostic pack includes the Excel spreadsheet as well as additional log and configuration data that may be useful in investigating build issues.
	Displays the list of parts included in the build job.
	Displays the build analysis view.
	Reloads the build job using the same build style settings used for the previous build job. This option is only available if the original loaded job *.zip file and resin are still available.
	Expands the build analysis view to fill the history panel. This is only available in build analysis view.
	Shrinks the expanded build analysis view. This is only available in expanded build analysis view.
	Returns to the build details view from the build analysis view.

Export Destinations

The destination of the export is selected once the export type has been selected. The destination is either selected via a popup selection (for the direct exports) or via the export options dialog (for the custom period export).

The available export destinations are the local disk drive, an email recipient, or a locally installed USB drive (if present).

Export Types

The export options are:

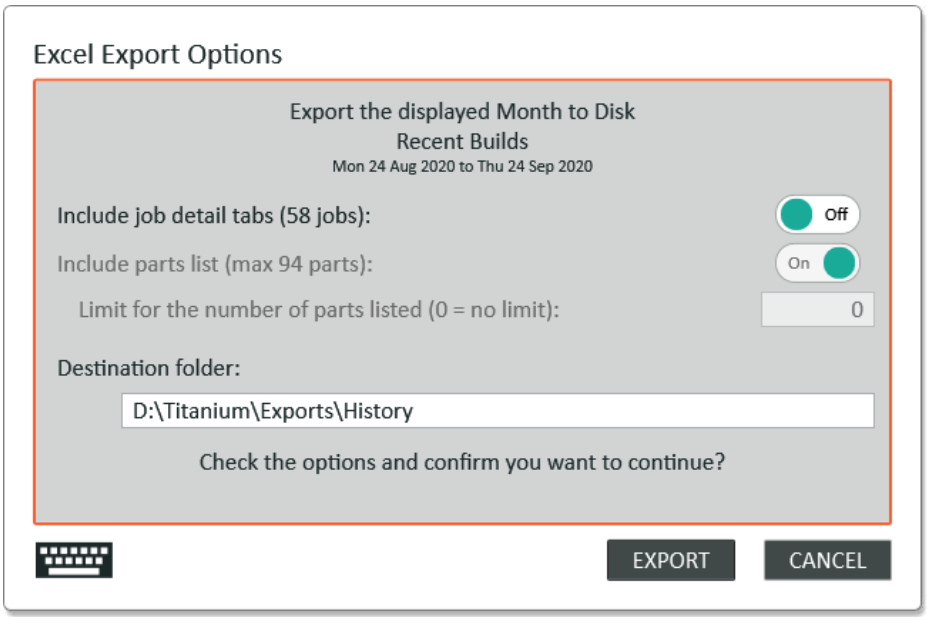
- Export a 12-month summary.

   This contains a summary tab and a tab for each individual month within the reporting period. The exported period will be that displayed on the *Build History* tab bar graph.

- Export a month summary.

   This contains a summary tab containing a list of the build jobs for the month including details of the job's start times and duration. An option allows for additional tabs to be included, one for each individual build job. The exported month is the month currently displayed on the *Build History* tab.

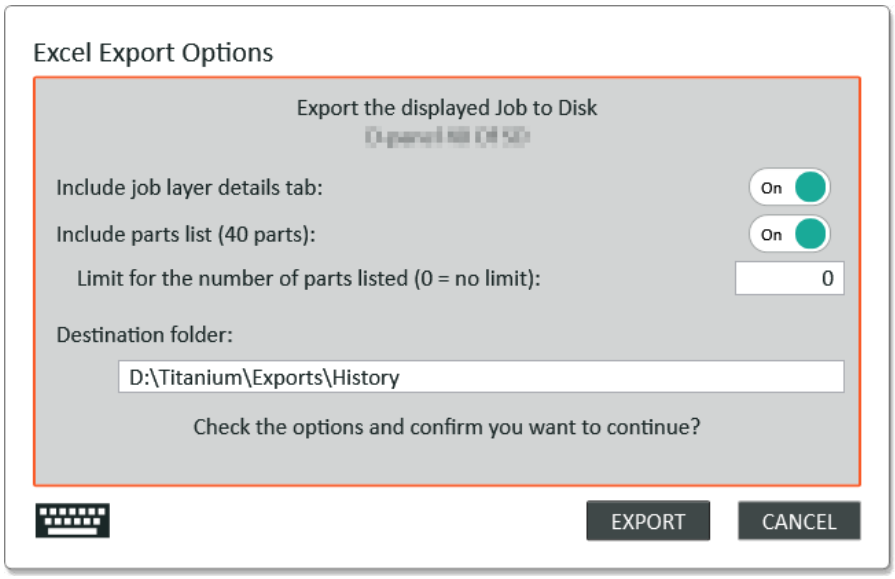
Figure 127: *Excel Export Options* dialog box



- Export an individual build job.


This contains a summary tab for the build job containing details of the exposure and zone settings used. An option allows for an additional tab to be generated that contains recorded data for each individual layer within the build. The exported job is the one currently displayed on the *Build History* tab.

Figure 128: *Excel Export Options* dialog box for individual job



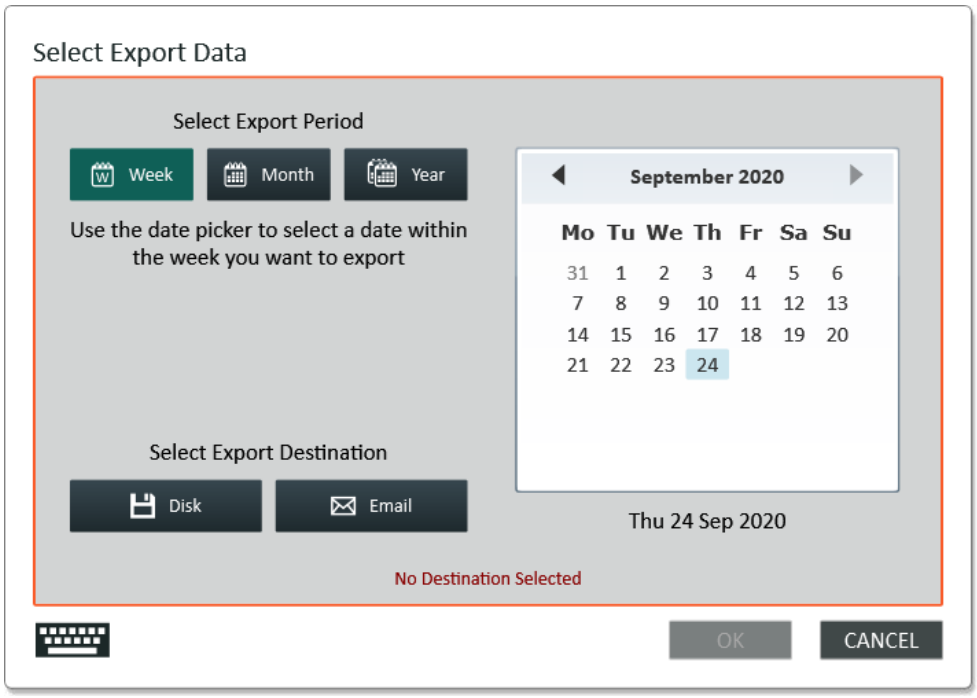
- Export a diagnostic pack for an individual build job.


This export puts together a *.zip file containing the standard job export spreadsheet along with additional files that could be useful in diagnosing issues occurring during a build. The exported job is the one currently displayed on the *Build History* tab.

- Custom period export.

This option allows the user to select the period to be exported: week, month, or year. Report formatting is controlled in the *Build History* settings located in the *Settings* menu.

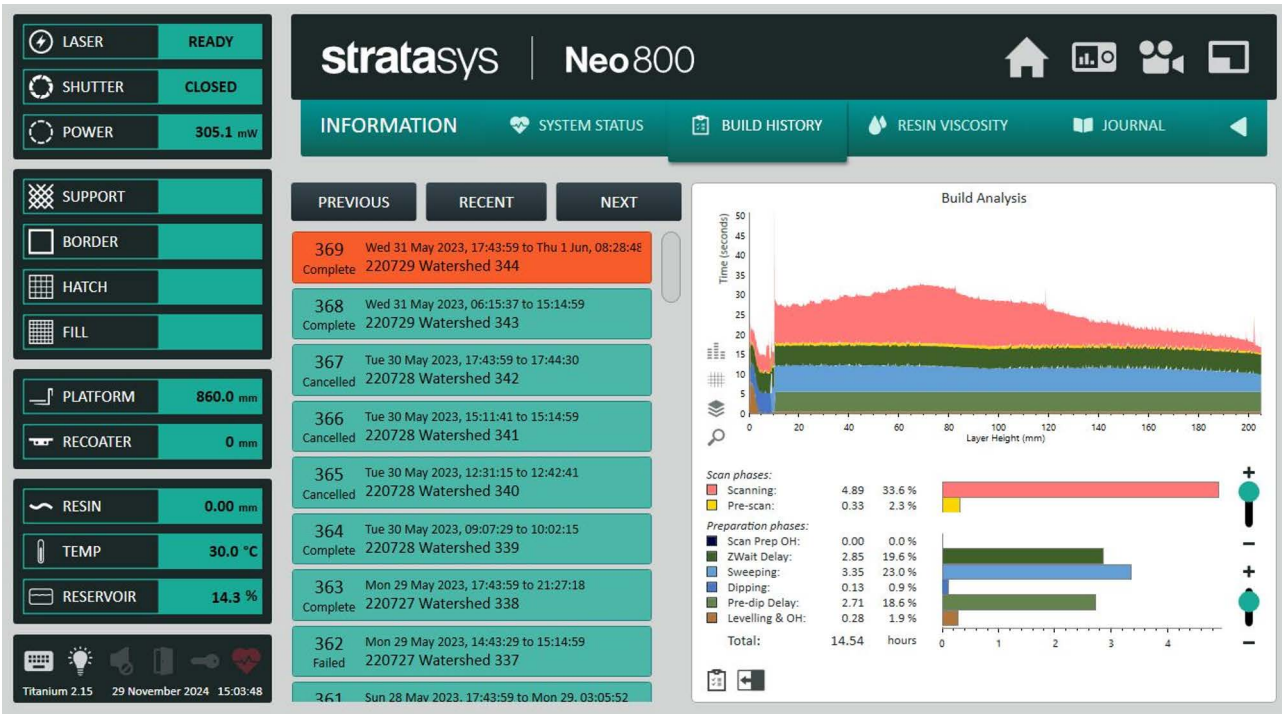
Figure 129: *Select Export Data* dialog box - custom period export



Build Analysis View

For the currently displayed job, tap  to display the *Build Analysis* view. This is similar data to what is provided by the build analysis for loaded jobs. This analysis reports the actual build times recorded and not the predicted times displayed when a job is loaded.

Figure 130: *Build History* tab > *Build Analysis* view

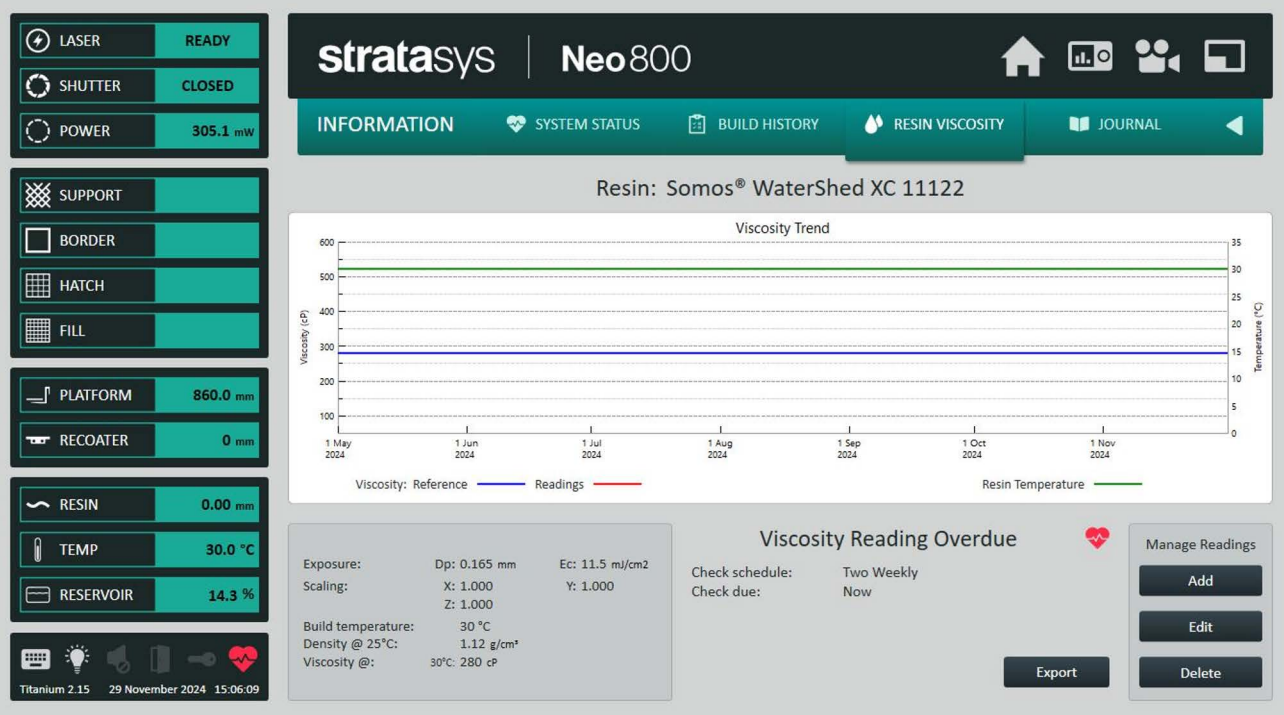


Resin Viscosity Tab

The *Resin Viscosity* tab displays the condition of the resin. The information displayed on this tab is created by using user-added readings that are updated at regular intervals.

The resin type currently being used in the printer is displayed above the graph.

Figure 131: *Resin Viscosity* tab

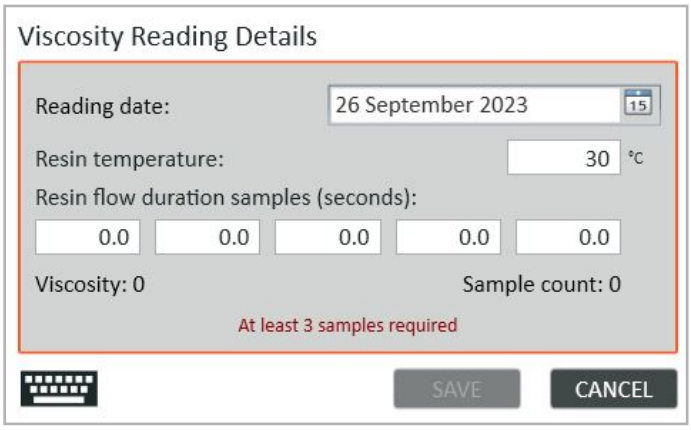


The parameters for the resin currently being used are displayed in the left grey box beneath the graph. These parameters are set in the *Resin Viscosity* tab.

- **Viscosity Reading** section displays information about when the next viscosity reading is due.
- **Export** button exports an Excel spreadsheet of the viscosity log.
- **Add** button allows the addition of a new viscosity reading.

- **Edit** button enables you to edit an existing reading.

Figure 132: Viscosity Reading Details

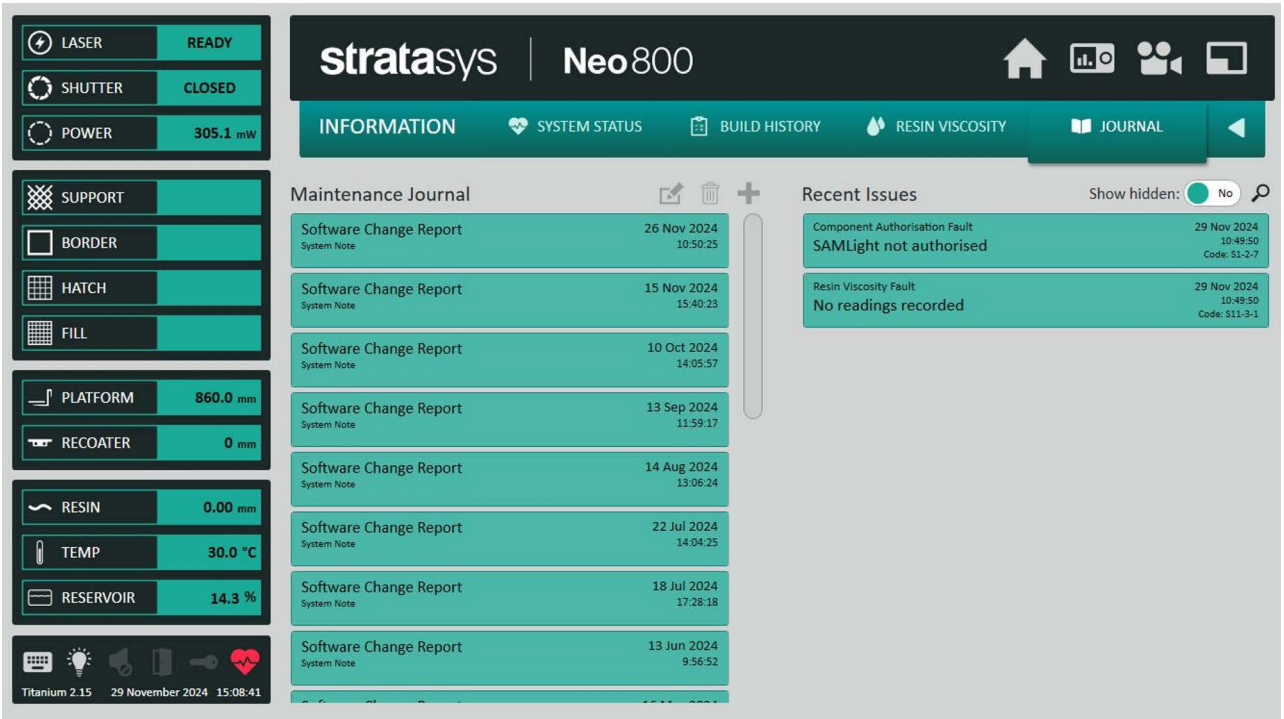


- **Delete** button deletes an existing reading.

Printer *Journal* Tab

The *Journal* tab provides a record of automatic and manually submitted journal entries. This tab also reports and explains recently encountered issues.

Figure 133: *Information* > *Journal* tab

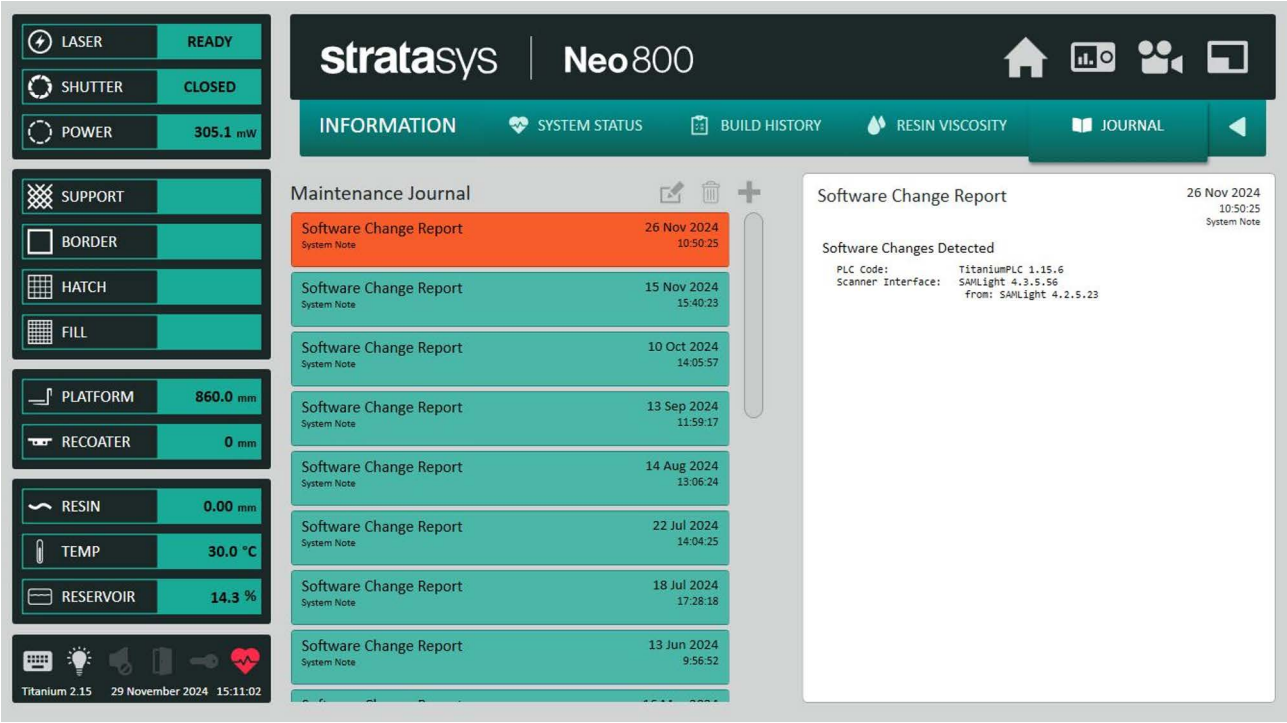


Maintenance Journal Entry Information

Titanium automatically adds journal entries for software updates as well as changes to major components. Service engineers or local administrators can add manual entries.

Selecting and individual entry displays further details.

Figure 134: Maintenance Journal – selected entry view



The maintenance journal entries are saved to the disc and are reloaded when Titanium is restarted.

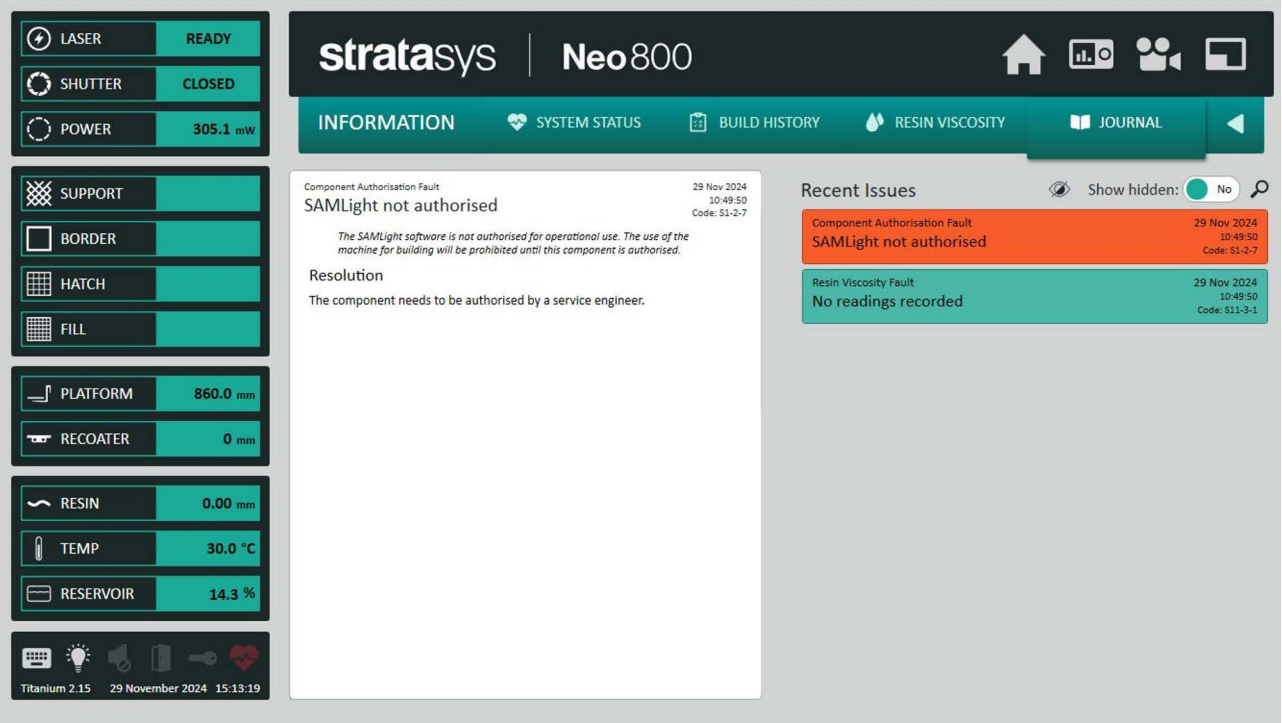
Recent Issues

The *Recent Issues* section displays 2 types of entries:

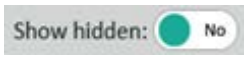
- **Issue States:** active issues as reported on the *Journal* tab.
- **Issue Events:** temporary issues that have been detected.

For both types, individual entries can be selected to display further details:

Figure 135: Recent Issues



When issues have been viewed, the  button is used to hide and unhide those events.

The 

toggle enables or disables the display of hidden issues.

The *Recent Issues* data is only valid for the current Titanium instance and is lost if Titanium is restarted.

Titanium Assistant

Titanium Assistant is a companion application to Titanium. It helps assess and prepare build jobs on a computer other than the printer.

Titanium Assistant offers the following features:

- Preparation of the build style settings ahead of building.
- Independent build time estimates.
- Uploading of prepared build jobs to a local printer.

Titanium Assistant can be used in two ways:

- **Stand-alone:** a build job can be loaded, and style settings prepared using virtual Neo printer settings. You need to transfer manually the prepared job to the Neo printer using a USB memory stick.
- **Connected:** a build job can be loaded, and style settings prepared using the printer settings of the target Neo printer retrieved via a local network connection. You can transfer the prepared job to the Neo printer via the network link, or manually using a USB memory stick.

To use the *Connected* mode, Titanium Assistant requires that the Titanium data folder of the Neo printer be shared on the local network, and is available to Titanium Assistant as a mapped drive.

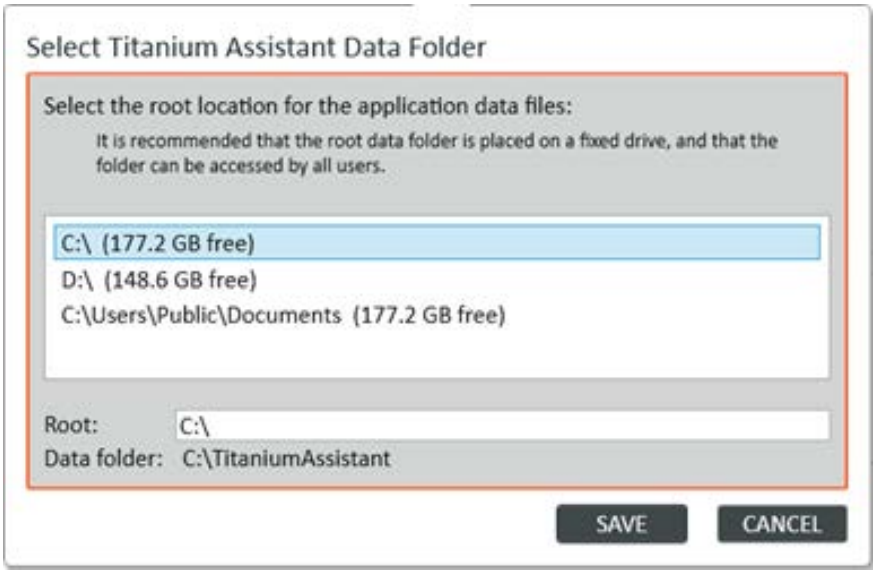
Installation

Titanium Assistant is an application developed for a Microsoft Windows® operating system. The software is provided as a standard Windows Installer package and can be installed like any other Windows application.

Data Folder

When Titanium Assistant is first started it has to be configured with a data folder. This should be a fixed local drive with plenty of free storage. The following dialog is displayed with a recommended option already selected:

Figure 136: *Select Titanium Assistant Data* Folder

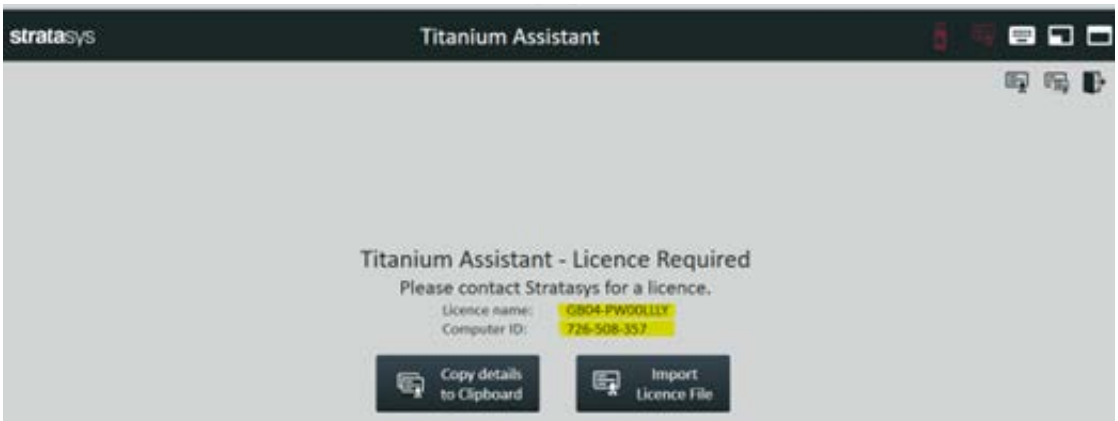


The drives displayed depend on those available on the local computer. Select the root folder within which the data folder will be created.

License

Once installed, Titanium Assistant requires a license file to enable its operation. This is provided by Stratasys after the application has been installed and run for the first time.

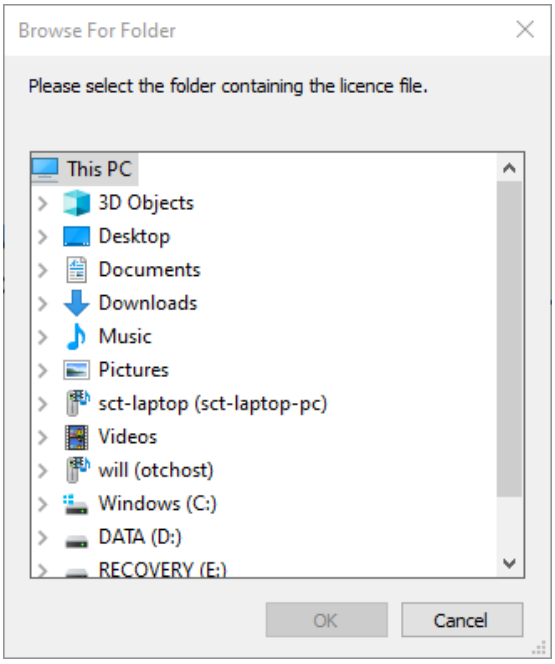
Figure 137: Titanium Assistant license request screen



1. Provide the *License name* and *Computer ID* (highlighted above) to Stratasys to create the license file. When you receive the license file, you need to import and activate it.

2. To import and activate the license, tap  , located near the top-right of the Titanium Assistant main screen. This launches a Windows folder selection dialog to navigate to the location where you saved the license file.

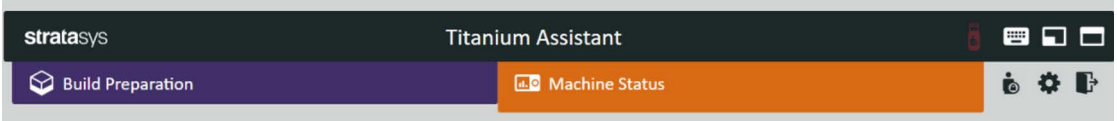
Figure 138: License folder selection dialog



3. Restart Titanium Assistant after importing the license. After which, the standard screen header is be displayed.

Main Application

Figure 139: Titanium Assistant header



The header bar allows the user to switch between the main operational states: **Build Preparation** and **Machine Status**. The other buttons provide access to specific actions:

Table 57: Main screen icons and descriptions

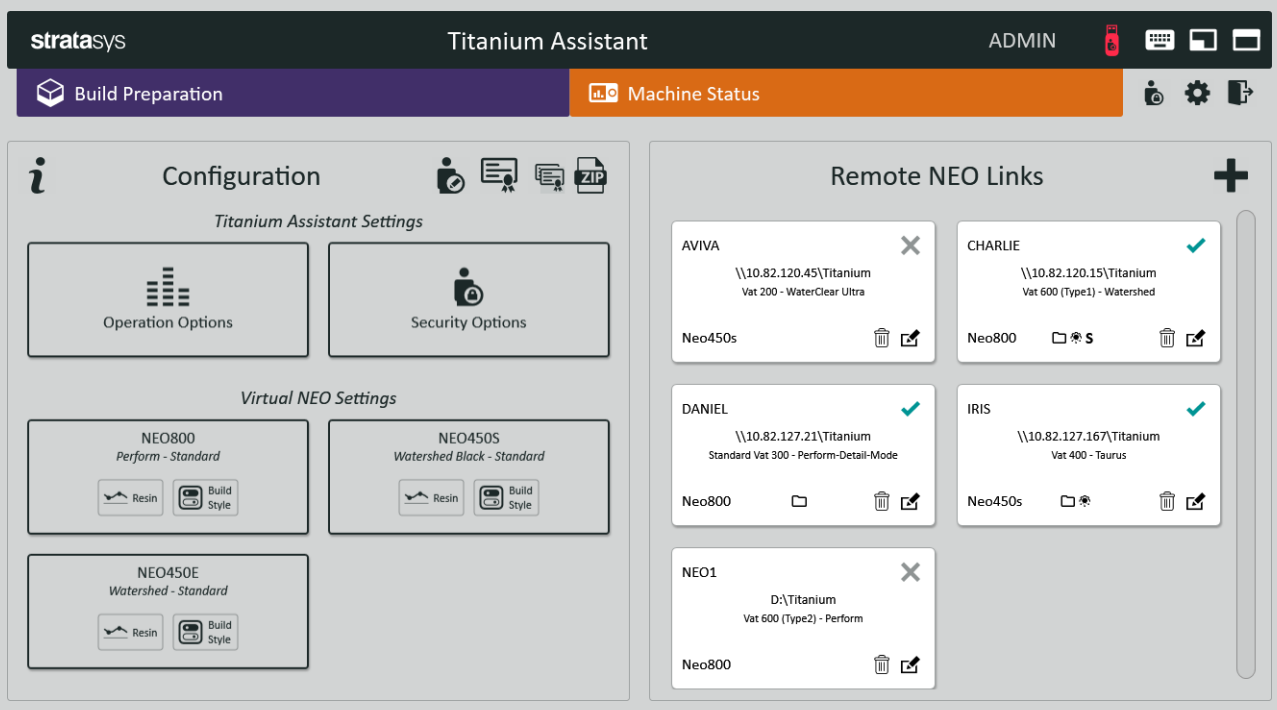
Icon	Description
	Switch user mode between ‘standard’, ‘admin’ and ‘engineer’.
	Open the *Configuration* tab.
	Exit Titanium Assistant.
	Maximize Titanium Assistant.
	Minimize Titanium Assistant.
	Enable the internal popup keyboard.
	Eject USB memory stick.

Many of the operations within Titanium Assistant are the same as within Titanium, and it is assumed that the reader is already familiar with them.

Configuration

The *Configuration* pane in the *Machine Status* tab enables you to adjust the operation and settings of Titanium Assistant, and to create the links to the local Neo printers.

Figure 140: Titanium Assistant Configuration pane



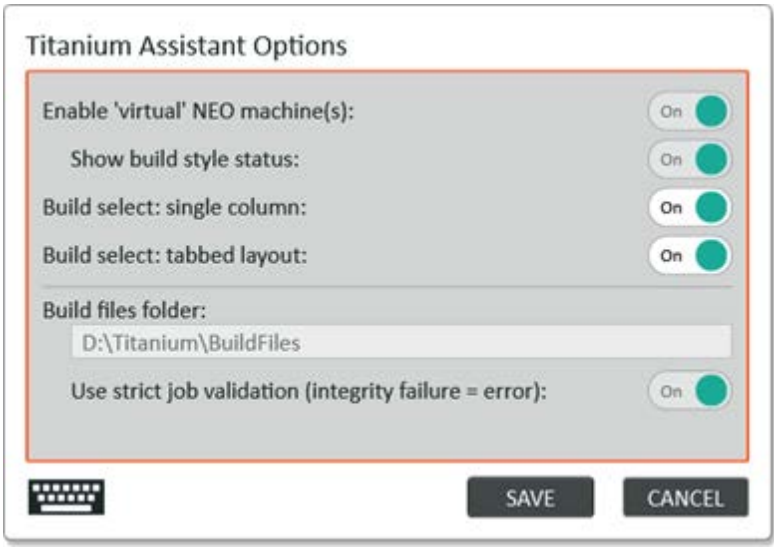
Some configuration settings are only available when logged on as an ‘Admin’ level user.

Titanium Assistant Settings

These settings control the operation of Titanium Assistant.

Operation Options

Figure 141: *Titanium Assistant Options* dialog box



- **Enable ‘virtual’ NEO machine(s):** can be used to control whether the virtual Neo printers are made available within Titanium Assistant. A virtual Neo printer is one that represents a non-specific printer. Turning this off may be useful when Titanium Assistant is used with remote Neo printer links and the virtual Neo printers are not required.
  - **Show build style status:** is available for the virtual Neo printers that enables the use of the non-standard build style indicators (as described for Titanium).
- **Build select** options for Single Column and tabbed layout allow the *Build Job* > *Selection* tab appearance to be reverted to the older tile form.
- **Build files folder:** specifies the location where Titanium Assistant looks for build jobs to be loaded.
- **Use strict job validation:** determines whether some load issues are reported as errors or warnings.

Security Options

Figure 142: *Edit Security Settings* dialog box

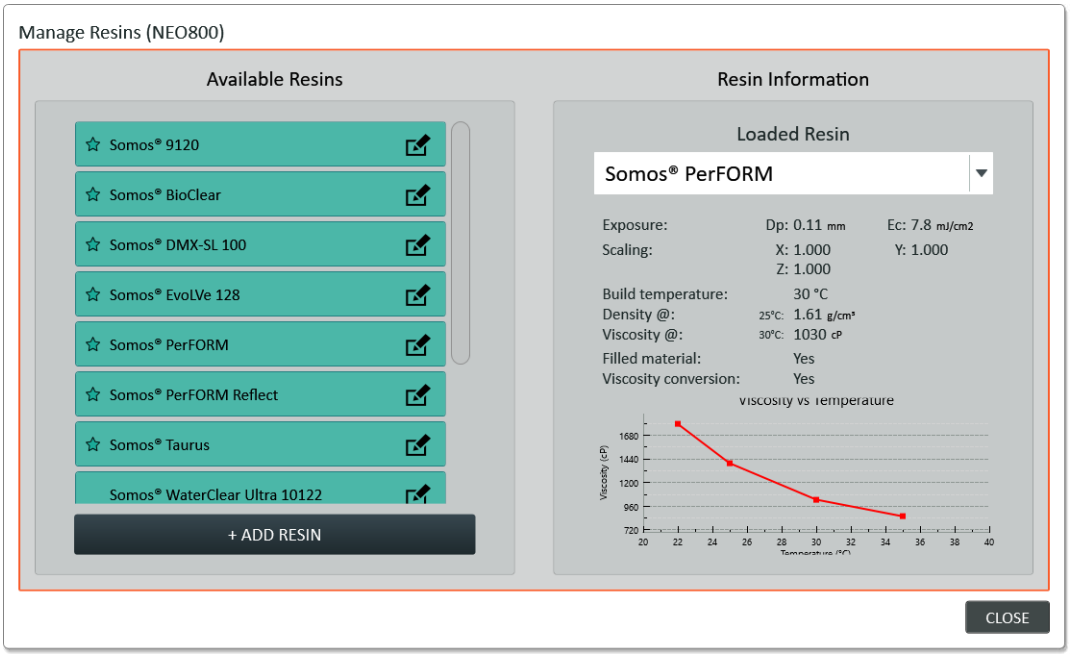
- The automatic **Admin user timeout period** can be adjusted.
- The **Standard user style access** options prevents users from being able to make changes to the build style on loaded jobs.The available levels of access depend on the printer and license properties.

Virtual Neo Settings

These settings control the configuration of the resin and build style settings used when preparing a build job for a 'virtual' Neo printer.

Use the *Manage Resin* dialog to select and define the resin used by the virtual Neo printer. Select the resin before editing the build style.

Figure 143: *Manage Resins* dialog box



The *Edit Build Style* dialog box enables you to edit the style settings for the currently selected resin.

Figure 144: Edit Build Style dialog

These dialogs mirror the equivalent screens and fields in Titanium.

Remote Neo Links

Printer Connection

Before Titanium Assistant can connect to a Stratasys Neo printer, the printer must be manually prepared for the installation.

> System administrator permissions may be required to perform the following procedures. It is best practice to perform these tasks when the printer is integrated with the local network.

Printer Preparation

Perform the following tasks on the Neo printer before installing Titanium Assistant:

- Create a shared folder. This is used to store details about the Neo, and to transfer prepared build jobs to the Neo.
- Prepare the Neo API. This is used for monitoring pinter status.
- Enable build progress output. This is used for retrieving the current build status.

Shared Folder Preparation

Share the following Neo folder with full access permissions for Titanium Assistant users:
`D:\Titanium`

On the PC running Titanium Assistant, confirm access to the folder using Windows Explorer by entering the Neo TCP/IP address followed by the folder name in the Windows Explorer navigation bar.
For example: `\\10.82.120.15\Titanium` or `\\<Device_name>\Titanium`

The Titanium data folder on the printer opens.

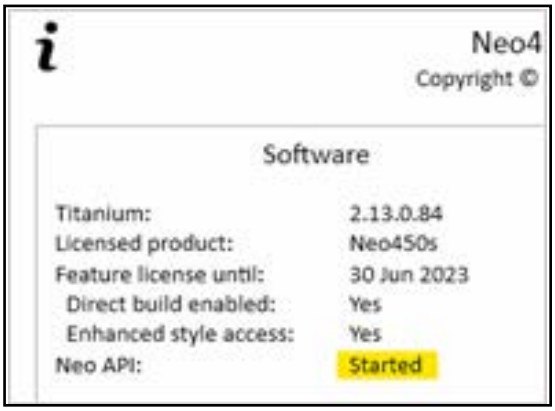
> User authentication information may be required at this point.

Neo API Preparation

The Neo API is enabled by default within Titanium. However, Titanium may need permission from Windows to open the port used for connecting, and access to the port must available through the Network firewall.

Confirm the Neo API has started successfully by accessing the *About Titanium* dialog box from the *Settings* tab and confirming **Neo API: Started** is displayed.

Figure 145: Titanium About dialog box



If starting the Neo API is unsuccessful, the URL required may need to be registered in Windows. There are two ways to register the URL:

- Automatic: Sometimes the URL registration attempt is automatically identified by Windows and presented with a raised access privilege confirmation message. If this occurs, simply confirm. The URL will register and the Neo API will start.
- Manual: The following section provides manual registration details.

Manually Register the URL used by the API

Titanium creates a pair of Windows command batch files that can be used to register and remove the URL. Local administrator access is required to run the command files.

The two files are:

- **`RestApiUrlRegister.bat`** which is used to register the required URL.
- **`RestApiUrlRemove.bat`** which is used to remove the URL registration if it is no longer needed.

To run the batch file:

- Open a Windows command prompt and navigate to the folder: **`C:\RPS\Titanium\API`**
- At the prompt, type the name of the required file and press enter.
- Check that the command reports success.

When these steps are completed, Titanium must be restarted to activate the API.

If problems occur during this process, work with a local network administrator to solve them.

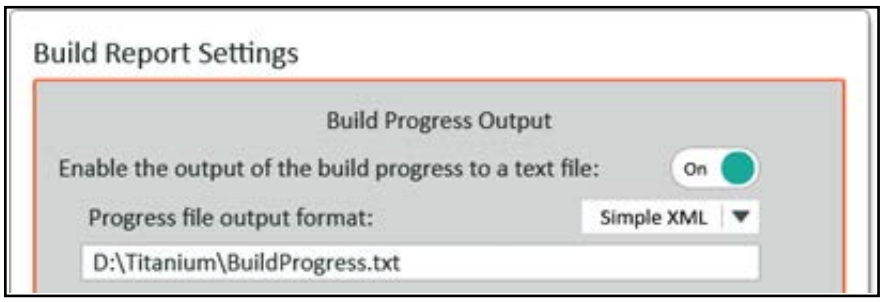
Enable Access Through the Firewall

If a firewall is active on the Neo printer, then the firewall needs to be configured by a local administrator to ensure that Titanium Assistant can access the HTTP TCP/IP port (80).

Enable Build Progress Output

The build progress output can be enabled from within the *Build Report Settings* dialog box, which is accessed from the *Machine Status* tab > *Configuration* pane.

Figure 146: *Build Report Settings* dialog box

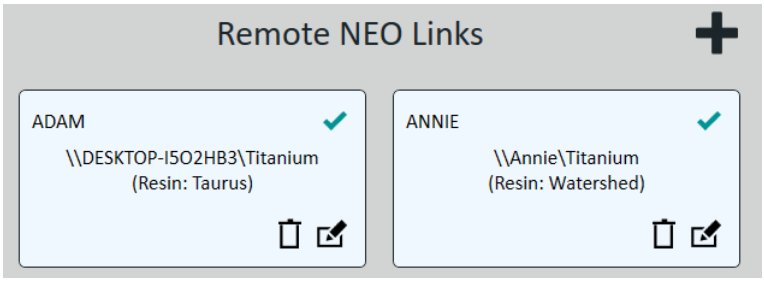


Confirm that the build progress output filename and format match the default values shown. If different, Titanium Assistant will not find or recognize it.

Link Configuration

Once the preparation process is completed, Titanium Assistant can be configured to access the Neo printer.

Figure 147: Remote Neo Links



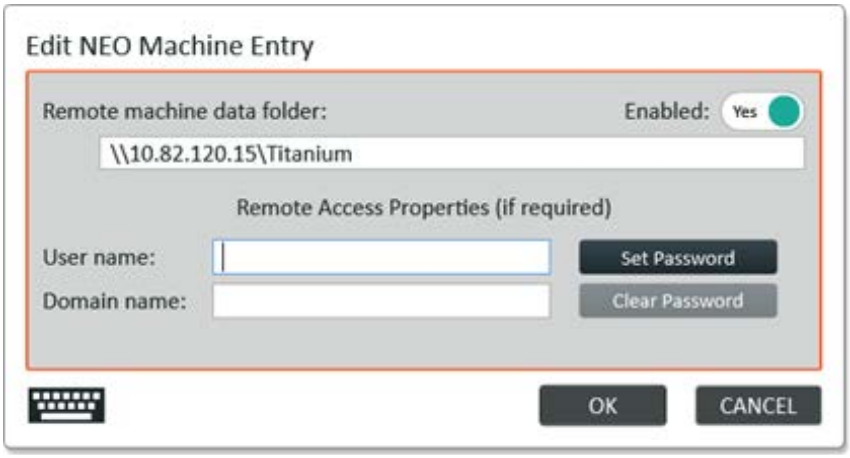
The button can be used to add a link to a remote Neo printer. Each printer that has been added will be displayed as a panel in the *Machine Status* tab > *Configuration* pane.

Table 58: Link configuration icons and description

Icon	Description
	The tick indicates that the link to the remote Neo printer has been verified.
	The cross indicates that there is a problem with the remote link.
	Edit the remote Neo printer link.
	Delete the selected remote Neo printer link.

From the *Machine Status* tab > *Configuration* pane, add a new printer entry. Set the **Remote machine data folder** to the required network path to access the prepared share folder, as shown below.

Figure 148: Edit NEO Machine Entry dialog



The path to the remote folder can be specified with a TCP/IP address, as shown above, or using the Neo printer PC hostname, provided the hostname can be resolved to the TCP/IP address.

The hostname or TCP/IP address is also used for the Neo API connection. If the Titanium folder has been mapped as a drive letter, this may be just a drive letter reference.
For example: `T:\`.

If authentication details are needed to access the shared folder, enter these as well.

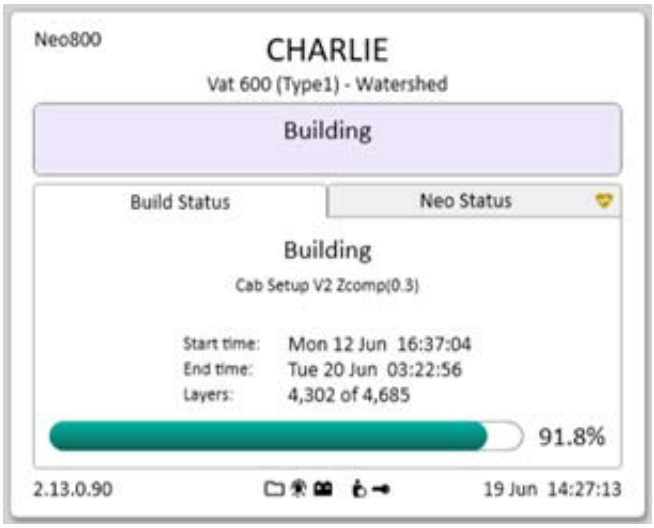
The remote folder data path, as well as the access properties, should be the same as those used in Windows Explorer to access the folder. If the folder can be accessed via Windows Explorer it should be available to Titanium Assistant.

Local IT support may be required to establish the remote Neo connection.

Link Verification

The remote link status to the Neo printer can be seen on the *Machine Status* tab, as shown below.

Figure 149: Remote Neo status panel



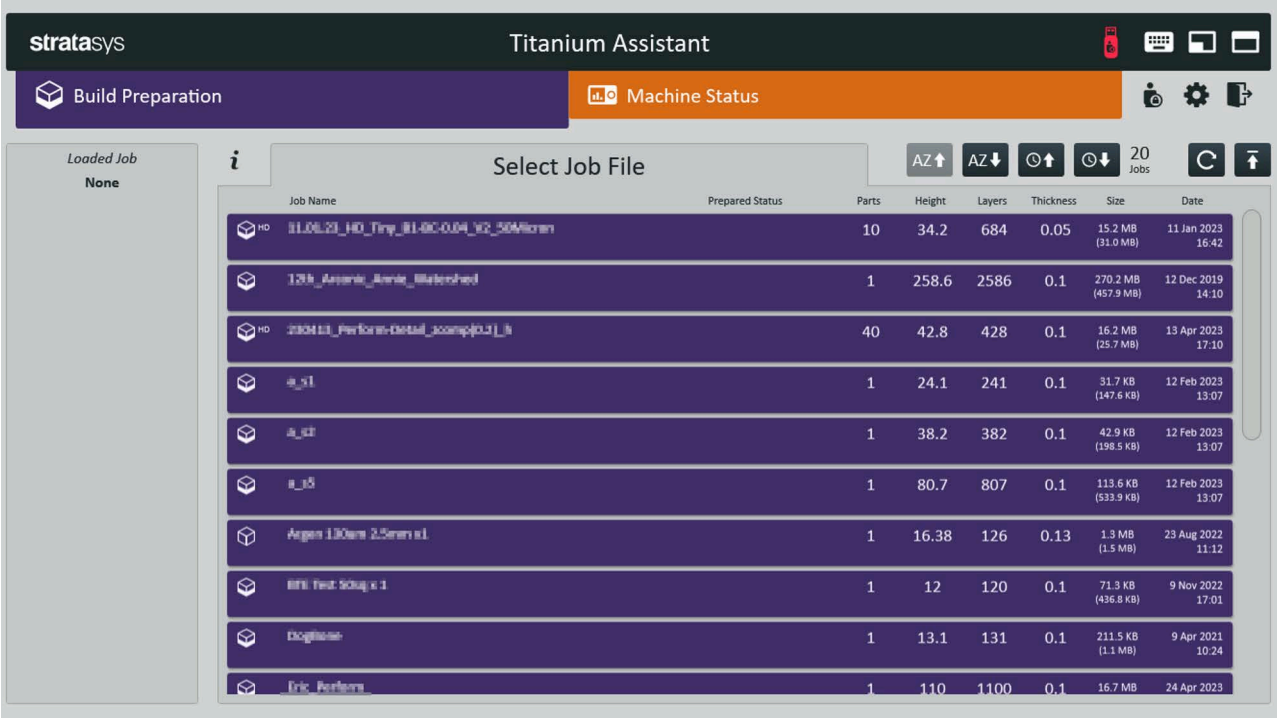
The following symbols indicate the status of the shared folder and Neo API:

Table 59: Machine status icons and description

Icon	Description
	Indicates that the remote Neo folder is accessible.
	Indicates that the Neo API is successfully responding.

Using Titanium Assistant

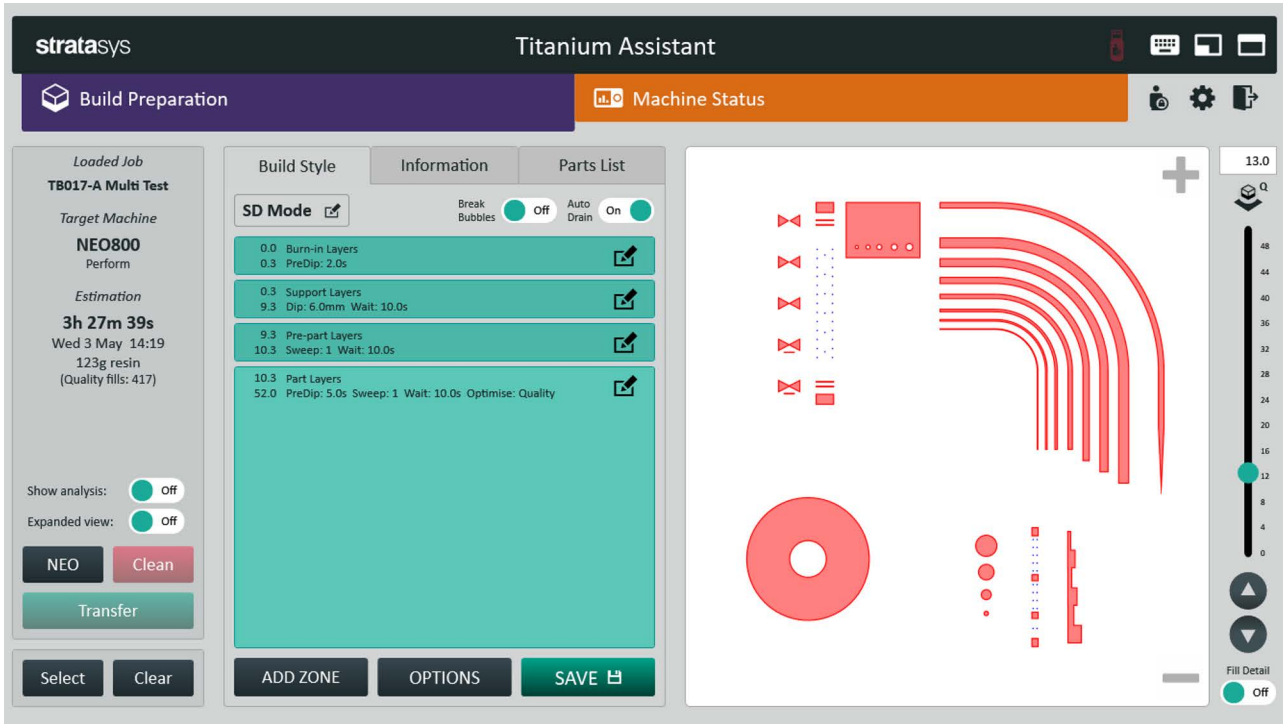
Figure 150: *Build Preparation* tab - job selection



The **.zip* file is copied to the *BuildFiles* directory of Titanium Assistant. The default path is *(D:\)TitaniumAssistant\BuildFiles*. The file can then be loaded into Titanium Assistant by selecting the build file from the select job file list.

By using Titanium Assistant, build parameters such as the recoater settings, scale factors, and quality mode can be changed. In addition, the slider allows for viewing of each individual layer as it will be drawn. As such, any glitches can be caught early in the process. The following screen is shown when the build is loaded.

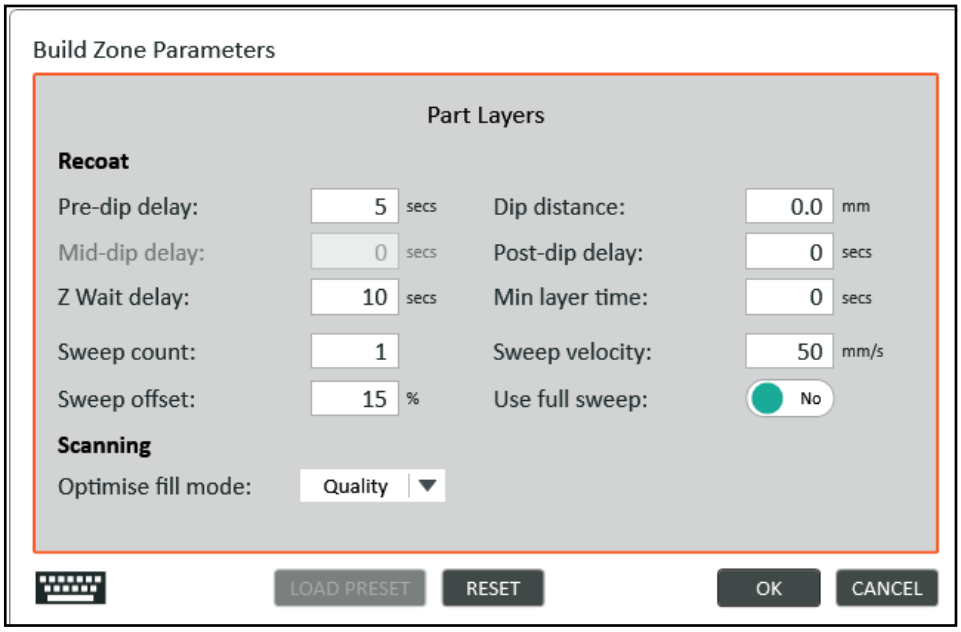
Figure 151: *Build Preparation* tab - job Build Style editing



Tap  to change the recoater settings for the selected build zone.

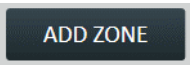
The build time *Estimation* on the left side panel will update in real time as modifications to the parameters are made.

Figure 152: *Build Zone Parameters* dialog box



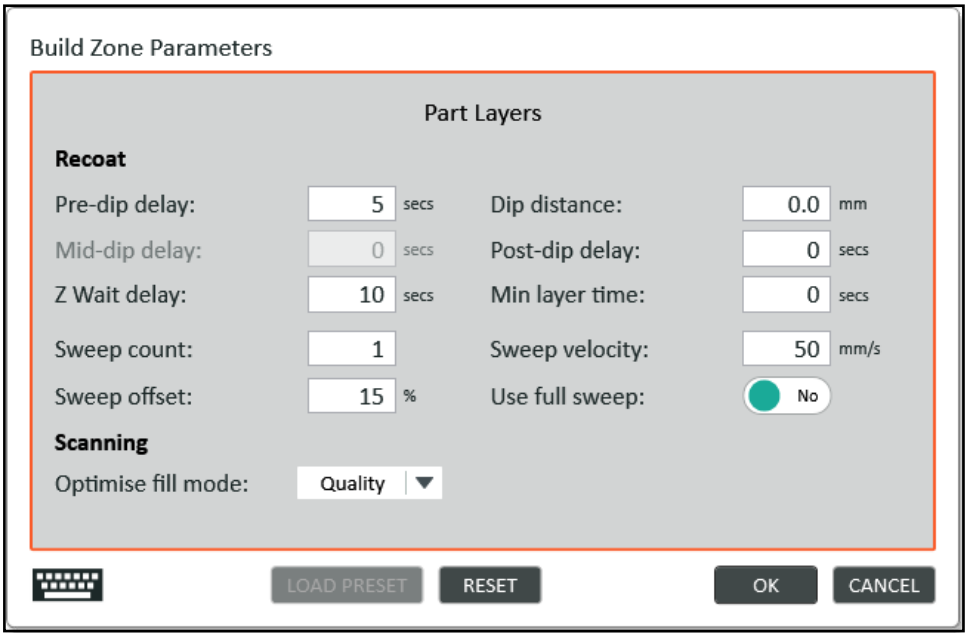
- **Pre-dip delay**: Applied before the dip phase. It is required for exposure to complete and will vary depending upon the requirements of the resin in use. (This delay occurs regardless of whether dipping is enabled).
- **Dip distance**: The distance that the elevator dips into the resin before moving to the next layer.
- **Mid-dip delay**: Applied at the bottom of the dip movement before rising to complete the dip. This delay occurs only if dipping is enabled.
- **Sweep count**: Increase the number of sweeps to account for factors such as resin viscosity, area to recoat, and the presence of trapped volumes. This should only be increased in odd-numbered increments, for example 1, 3, 5, or 7, to prevent a “bow wave” lip forming on parts.
- **Post-dip delay**: Applied after the dip phase and before the sweep phase.
- **Sweep offset**: Lowers the platform by the offset value while sweeping. For the part-zones, the offset is entered as a percentage of the layer thickness.
- **Z Wait delay**: The time after recoating has completed and before the next layer is scanned. It is required to allow the resin to settle to a flat surface, and will vary depending on factors such as resin viscosity.
- **Sweep velocity**: Changes the velocity of the recoater to account for factors such as resin viscosity and trapped volumes.
- **Min layer time**: Enforces a minimum elapsed time between laser scanning start events.

- **Optimise fill mode:** Adjusts the scanning strategy for top surface layers. This can affect the look of the top surface and remove potential visible artifacts. Quality is the default setting. The other options are:
  - **Speed**: The surface fill is prioritized for speed.
  - **Quality**: The fill is prioritized for quality.
  - **Auto**: The surface fill mechanism is automatically determined.



Additional builds zones can be added by pressing the **Add Zone** button. This can be used to mitigate problem areas within a part such as large flat surfaces or trapped volumes. The fields are the same as those shown in Figure 152 on page 154 with the addition of the **Range** setting. The **Range** setting controls the layer height where this build zone will start and end. In Figure 153 on page 155, the added zone will begin at 90 mm and end at 120 mm.

Figure 153: Add Zone Build Zone Parameters



Options cover parameters which are setup with the printer installation.Once settings have been applied, they are saved to the build file.

Once all recoater parameter modifications have been completed the build must be saved to capture all parameter settings. This is done by pressing the **Save** button. Once the build is saved it can then be transferred to the Neo printer.

If Titanium Assistant has a remote connection to the Neo printer, the **Transfer** button will replace the save button after a save has been completed.

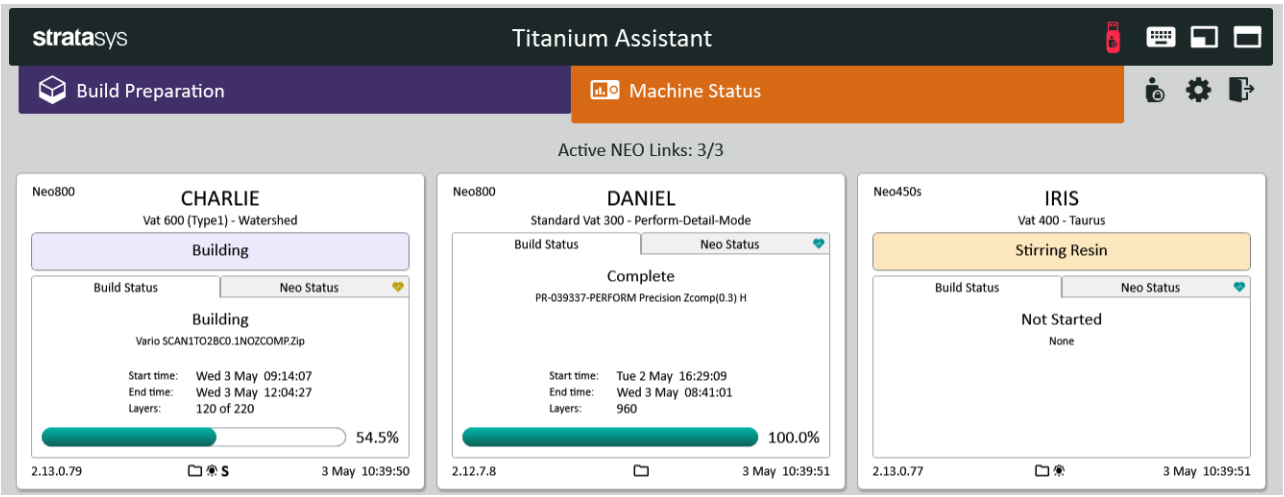
If Titanium Assistant does not have a remote connection, the build folder can be copied from the **TitaniumAssistant\BuildFiles** directory onto a USB storage drive.

Titanium assistant is also used for monitoring printer status.

Machine Status Tab

The *Machine Status* tab reports the current status of the links to the configured remote Neo printers.

Figure 154: *Machine Status* tab



The link is ‘inactive’ when Titanium Assistant cannot establish a link to the shared Titanium folder of the remote printer. In this instance the state of the remote Neo printer is simply unknown.

If a link is established, the status of the Neo printer is displayed on the Neo Status tab. This status includes current Neo status and any known issues. The following features may also be available:

- Current printer activity, which requires the Neo API enabled on Titanium 2.13 or higher.
- Build progress, which requires the build progress output or Neo API to be enabled in Titanium.

The following symbols may also be present:

Table 60: Machine Status icons and description

Icon	Description
	The remote Neo folder is accessible.
	The Neo API is successfully responding.
S	The presence of a letter indicates that the Neo has a raised access level active: • **A** for admin • **S** for service • **D** for developer. This is only available with Neo API.
	The Neo API has detected user interface activity within the last 10 minutes. This is only available with the Neo API.
	The Neo API has detected that one or more of the doors are open. This is only available with the Neo API.
	The engineering key is present. This is only available with the Neo API.
	The UPS monitoring module is enabled. This is only available with the Neo API.

5 Operating the Printer

This chapter explains basic steps in operating the printers.

Principle of Operation

Stereolithography is an additive manufacturing process using a vat of liquid ultraviolet (UV) curable photopolymer resin and a UV laser to build parts one layer at a time. For each layer, the laser beam scans the cross-section of the parts on the surface of the liquid resin. Exposure to the UV laser light solidifies the cross-section and adheres it to the layer below.

After one complete layer has been scanned, the platform descends by a single layer thickness, typically 0.1 mm. Then, a resin-filled blade moves across the vat applying another layer of resin on the parts. On this new liquid surface, a next layer is scanned, adhering to the previous layer.

The process continues until all layers of all parts have been scanned. After building, parts are cleaned in a cleaning solution and then cured in a UV oven.

Basic User Operations

Powering On the Neo800/800+ Printer

1. On the rear panel, turn the Main Power Isolator switch to the ON position.

Figure 155: Power isolator in the ON position

2. Press the ON button on the touch screen display control panel. If the printer does not power up and illuminate the ON button, verify the E-stop is not pressed.

3. Press the Computer ON/OFF button. It should light up blue.

Figure 156: Neo800 control panel buttons

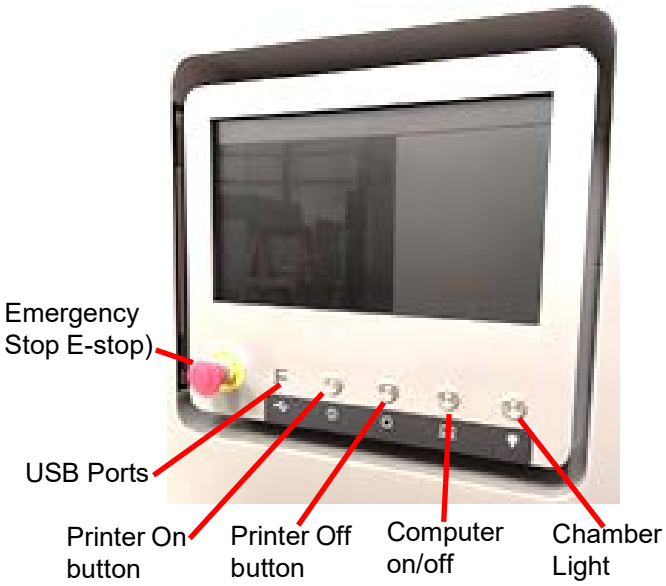
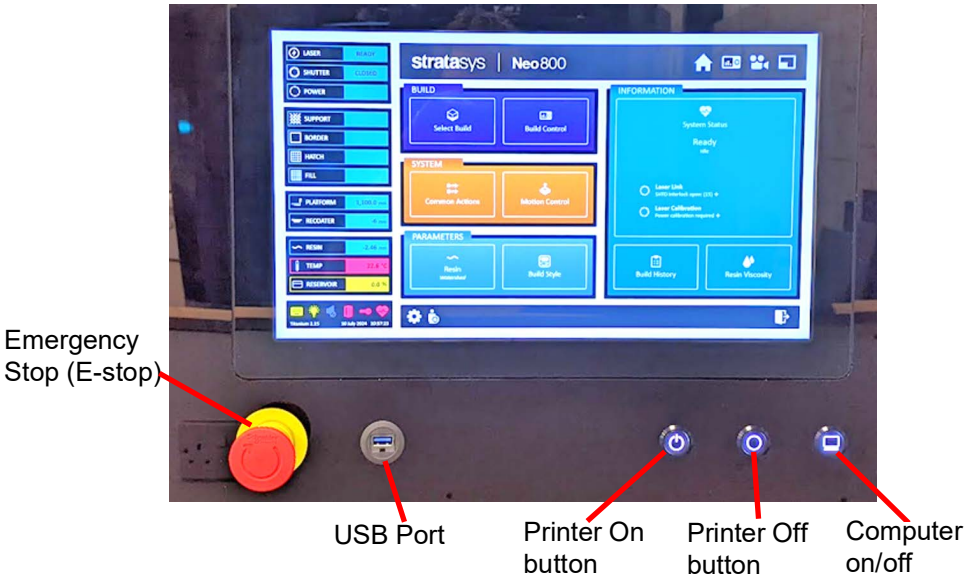


Figure 157: Neo800+ control panel buttons



4. After the computer comes ON, swipe up on the touch screen display.
   The login screen appears.
5. Type **`rpsupport`** to log in.
   The Windows desktop appears.
6. Confirm TwinCAT has loaded by checking the Windows systems icons on the right of the taskbar.

7. Double-click the Titanium icon to start Titanium.
8. The Titanium start screen will display. After Titanium starts and establishes communication with hardware, initialize the printer as requested.

Figure 158: Titanium Start screen

Powering Off the Neo800/800+ Printer

1. From the Main menu in Titanium, tap  on the lower right corner of the screen.

Figure 159: Main menu exit

2. When Titanium has closed, select **Shut down from the Windows Start menu.**

Figure 160: Neo800 control panel buttons

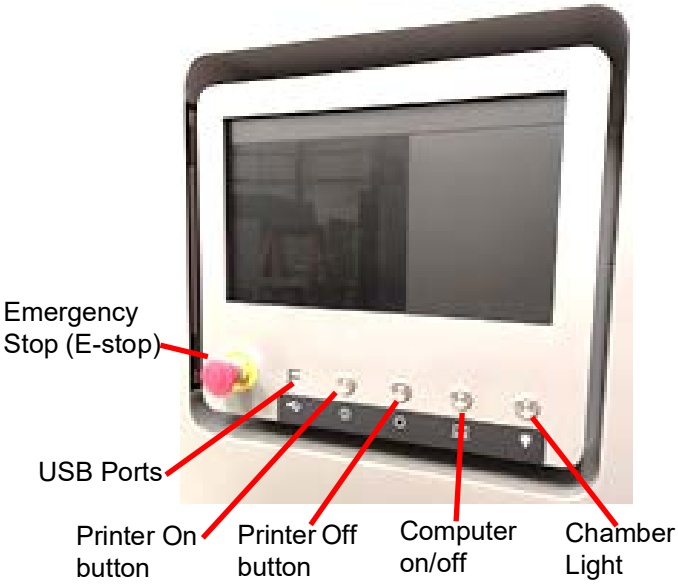
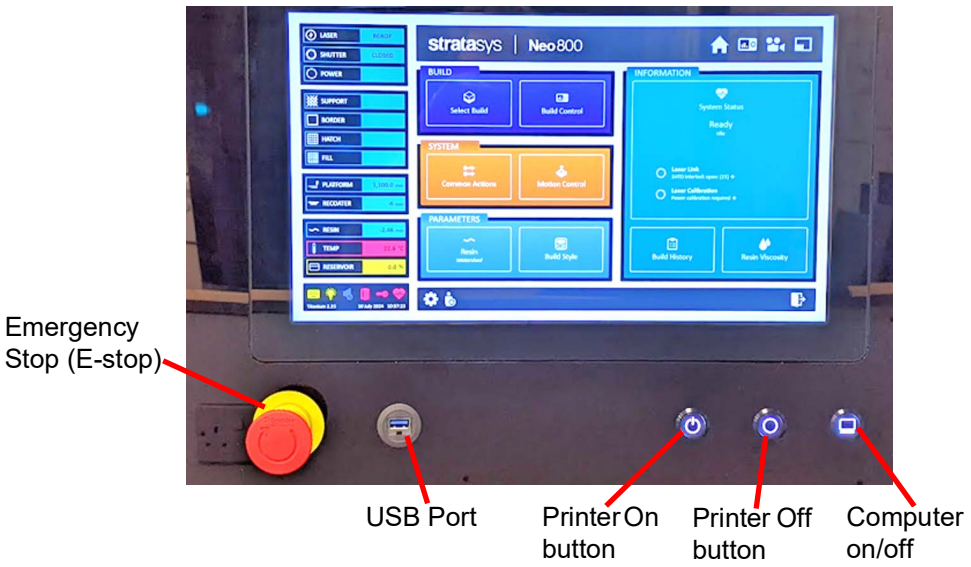


Figure 161: Neo800+ control panel buttons



3. Press the Off button.
4. On the rear panel, turn the main power Isolation to the OFF position (counter-clockwise rotation).
5. Turn Off the main power switch.
6. Disconnect the printer from incoming AC power in accordance with site lock-out tag-out procedures.

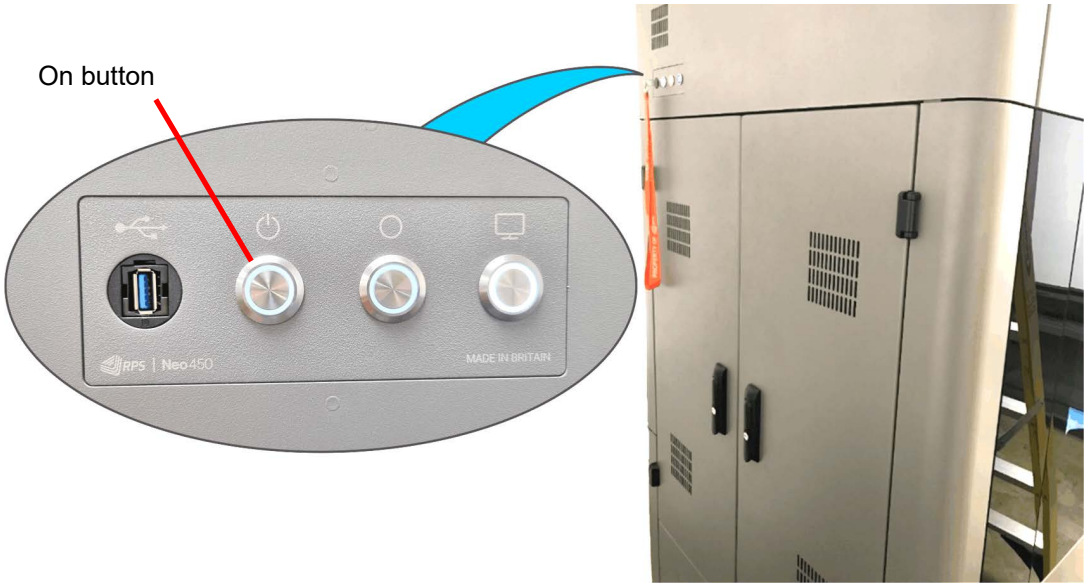
Powering On the Neo450 Printer

1. Verify that main power switch at the rear of the printer is set to ON (illuminated green).

Figure 162: Neo450 main power switch

2. On the rear top panel, press the printer On button. The button will illuminate white. Confirm the E-stop is not pressed.

Figure 163: Neo450 control panel



3. After the computer comes ON, the Windows desktop will display.
4. Confirm TwinCAT has loaded by checking the Windows systems icons on the right of the taskbar.

5. Double-click the Titanium icon to start Titanium.
6. The Titanium start screen will display. After Titanium starts and establishes communication with hardware, initialize the printer as requested.

Figure 164: Titanium Start Screen

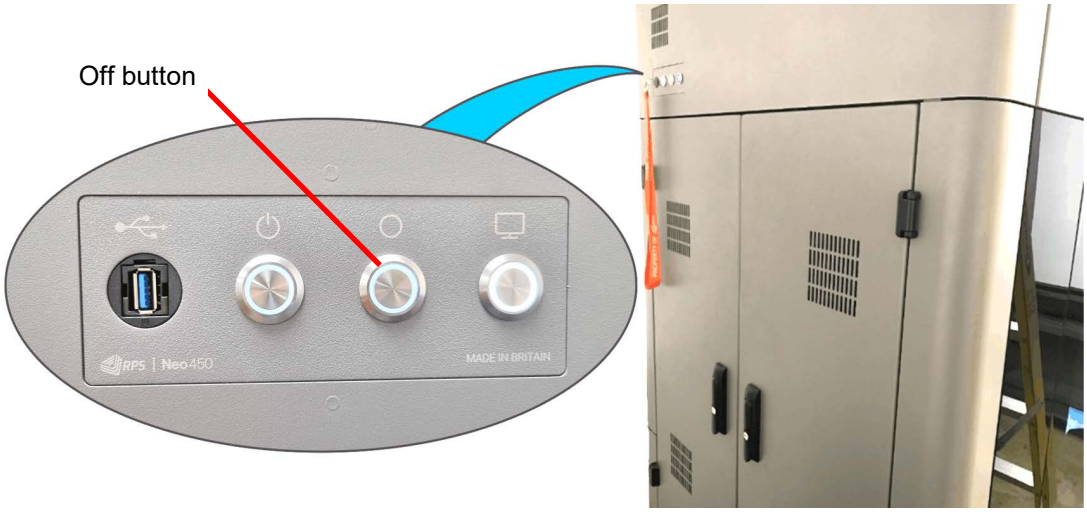
Powering Off the Neo450 Printer

1. From the main menu in Titanium, select the exit icon in the lower right corner of the screen.

Figure 165: Main menu exit

2. When Titanium has closed, select **Shut down from the Windows Start menu.**
3. After the computer shuts down, press the printer Off button.on the rear top panel,

Figure 166: Neo450 control panel



4. Turn Off the main power switch.
5. Disconnect the printer from incoming AC power in accordance with site lock-out tag-out procedures.

Emergency Stop (E-Stop) Operation

The emergency stop button is located on the touchscreen display control panel. See Figure 167. Pressing the red E-stop button removes power from all printer components. The button will latch in the depressed position when pressed fully down. The button is released from the depressed position by rotating it clockwise.

Figure 167: Emergency stop button

Basic Part Preparation

The workflow of the Neo stereolithography printers involves taking a CAD model and converting it into an **.stl* file. The **.stl* file is further processed into slice files that consist of the data for each layer that is to be printed. Once this process is completed, the file is sent to the printer and printed. During the printing process, different parameters are applied depending on which printer is used.

Prerequisites

- GrabCAD Print software

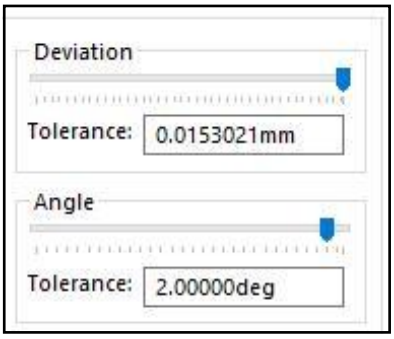
  Or-
- Materialise Magics base software and modules:
  - Materialise Magics RP
  - Materialise Magics RP Slicing
  - Materialise Magics RP SG (required if Materialise Magics e-Stage is not purchased)
  - Materialise Magics e-Stage (recommended, essential for new users)
- Titanium Assistant (optional, but recommended)

CAD File

The part is first designed using a CAD package. From the CAD software, the 3D models are exported as an **.stl* file. File export parameter settings are important, as a low or poor resolution part file will be very faceted and will create a poor surface finish.

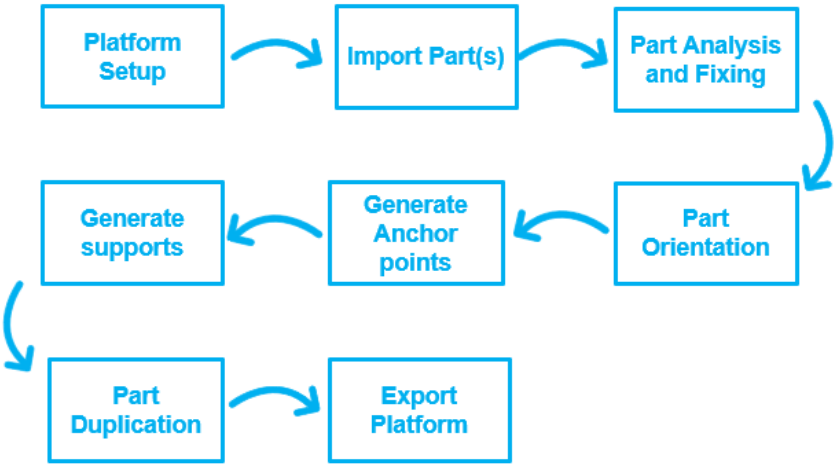
An example setting for exporting in SolidWorks™ is maximum deviation, and an angle tolerance of 2 degrees.

Figure 168: Deviation and angle settings



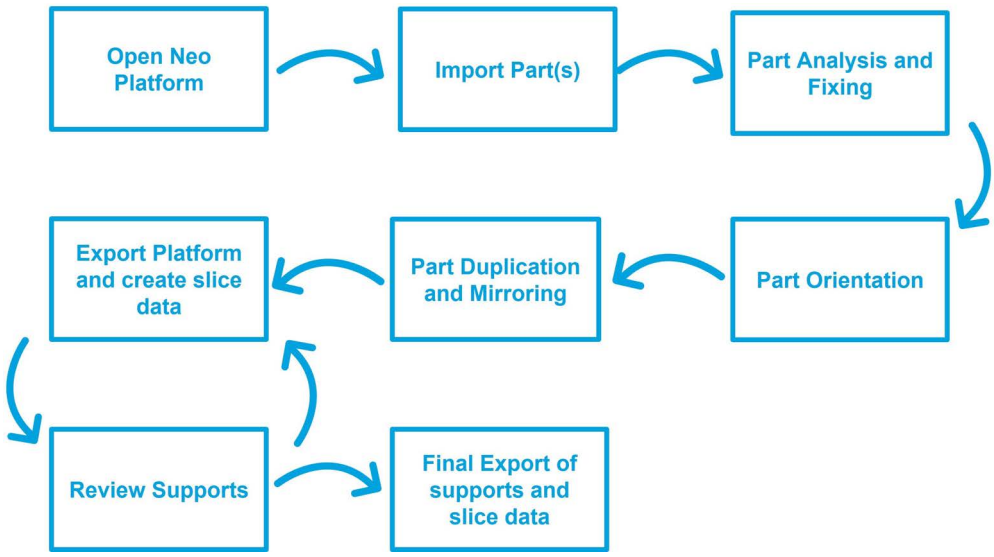
GrabCAD Print Workflow

Figure 169: GrabCAD Print workflow



Materialise Magics Workflow

Figure 170: Materialise Magic workflow



Procedure

1. In the build preparation software, open a platform for the Neo printer on which the parts will be processed.
2. Create a platform that contains the following:
   - X, Y, Z build envelope dimensions
   - Beam compensation, with a typical example for the Neo800 being: 0.09 SD, 0.07 HD
   - Z compensation, which is typically 0.3mm
   - Slice files set to the desired layer thickness, which is typically 0.1 mm
3. Import high resolution **.stl* files from whichever CAD program is being used.
4. Analyze each part to ensure the part can be built successfully. Parts should be free from bad edges and triangles. Parts should be free from erroneous shells and should have thicker wall sections than the size of beam, which is typically 0.6mm.

Part Orientation

Part orientation is critically important to a successful build, but it is almost always a compromise. There are multiple factors and principles that need to be considered when determining part orientation. Understanding part application and how part orientation affects part performance will dictate which principles take priority.

Considerations include:

- Trapped volumes
- Large flat areas
- Support requirements

- Surfaces finish
- Thin features
- Part repeatability
- Build time
- Part assembly
- Accuracy and warping
- Mechanical properties
- Platform space
- Orientation to blade
- Intelligent sweep use
- Risk mitigation.

Part Positioning

Parts must be placed a minimum of 10 mm above the platform, and must also fit within the perimeter of the platform.

Part Duplication and Mirroring

Parts may be duplicated or mirrored as required.

Export Platform and Create Slice Data

Each part must have a support structure to anchor it to the platform. If supports are automatically generated, the supports must be reviewed before the start of a build. If the supports are manually generated be sure to consider the following:

- Resin drainage
- Support structure orientation to recoater blade
- Additional teeth as start points
- Bracing structure used on taller parts

Review the build after orienting the part and generating supports. Using the section tool, simulate the part building in the Z axis. Look for areas where best practice build principles are not being followed, and, as necessary, make adjustments to parts and supports.

The **.slc* files are can now be compiled into 1 zipped folder.

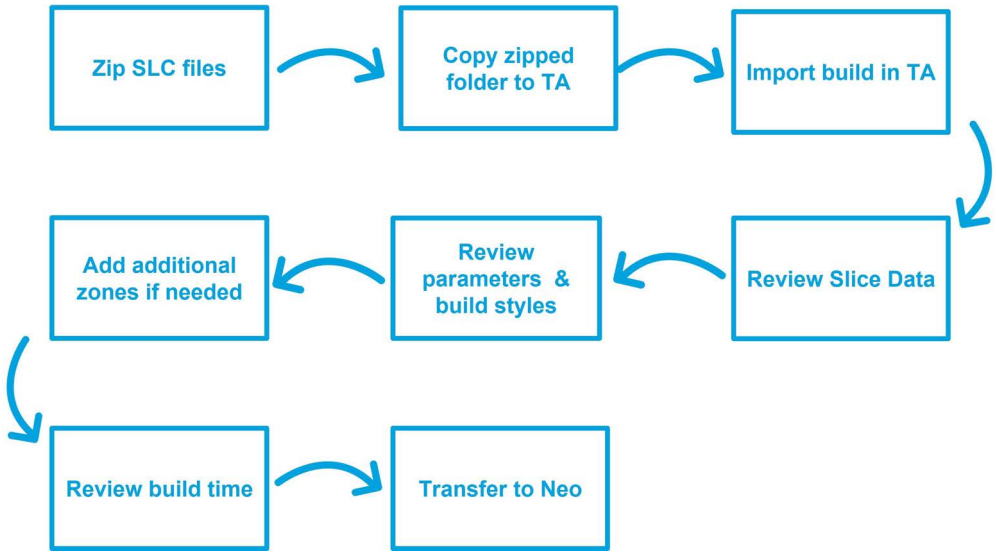
- Ensure there is one **.slc* file for each part on the platform.
- Ensure there is an **.slc* for the support. This could be one support file for the whole platform, or one support **.slc* per part depending on the export settings.

With all **.slc* files selected, right-click and select **Send to | zip folder**.

If the build is being transferred to the printer using a USB drive, copy this zipped folder onto the USB drive.

Titanium Assistant Workflow

Figure 171: Titanium Assistant workflow



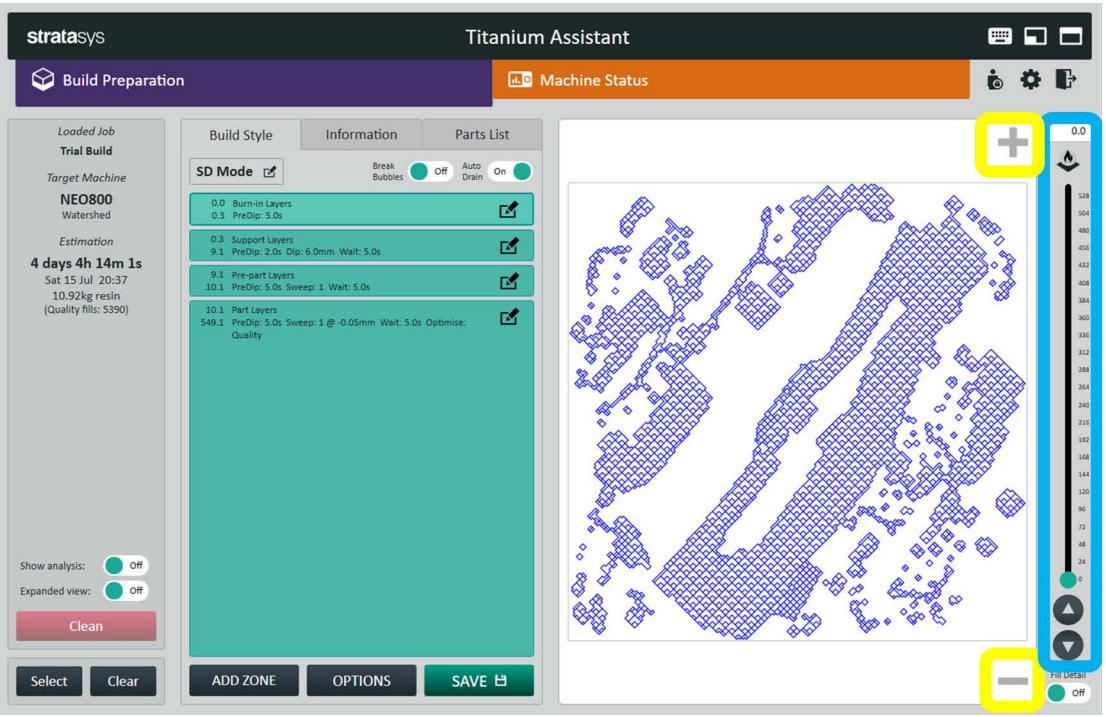
Import Build into Titanium Assistant

1. Copy the newly created zip folder into the **Titanium Assistant\BuildFiles** folder.
2. Open Titanium Assistant and select the build from the Build Preparation List.
3. Select **Yes** to load the build job.

Reviewing Slice Data

Before starting a build, it is a best practice to review the slice file. At this stage, all the final data, including Beam Compensation and Z Compensation, along with the applied printer parameters, can be reviewed. As such, it is possible to see issues here that may not have been easily visible in build preparation software. Discovering issues here and addressing them accordingly will greatly increase the build success rate.

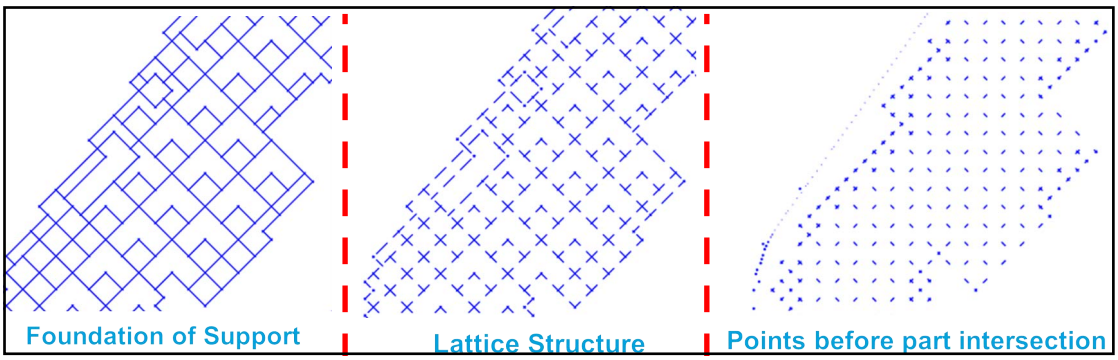
Figure 172: Reviewing slice data



Use the **+** and **–** icons (shown in yellow above) to zoom into the scan data view. Use the slider bar on the right-hand side of the screen (shown in blue) to scroll through the layers.

In the visualizer, the supports are displayed in blue. The first 10 mm of the build should be support geometry only. This area should show a strong foundation design that moves into the lattice structure and then tapers to points where the support structure intersects with the parts.

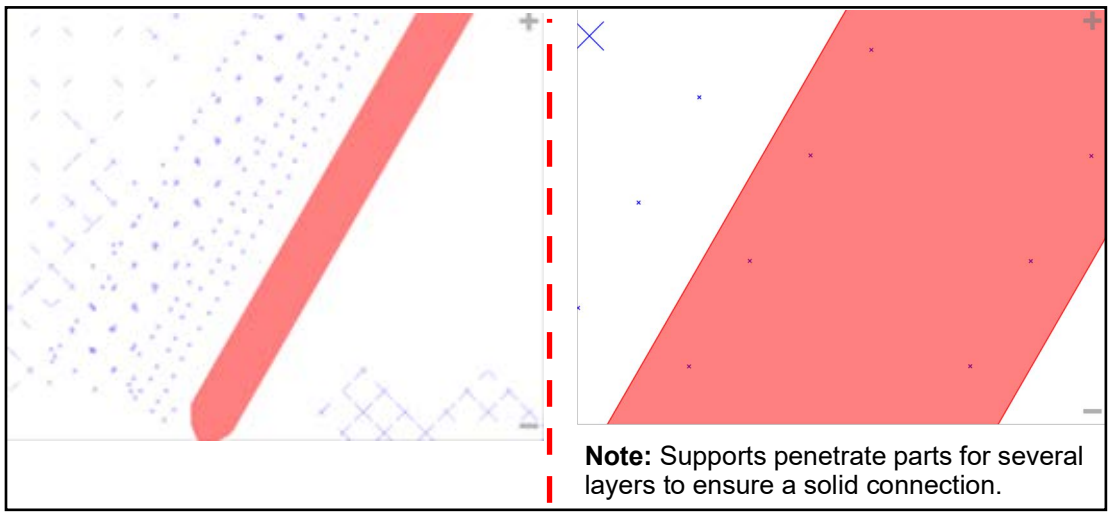
Figure 173: Foundation Supports, lattice Structure, and points at intersection



In the visualizer, the parts are displayed in pink. The point where the part meets the supports is the most vulnerable point of the build. If this is not a solid connection, every subsequent layer will not have a strong surface with which to bond.

Confirm all downward facing, starting point surfaces are part of a support structure. Look for features appearing without supports beneath them.

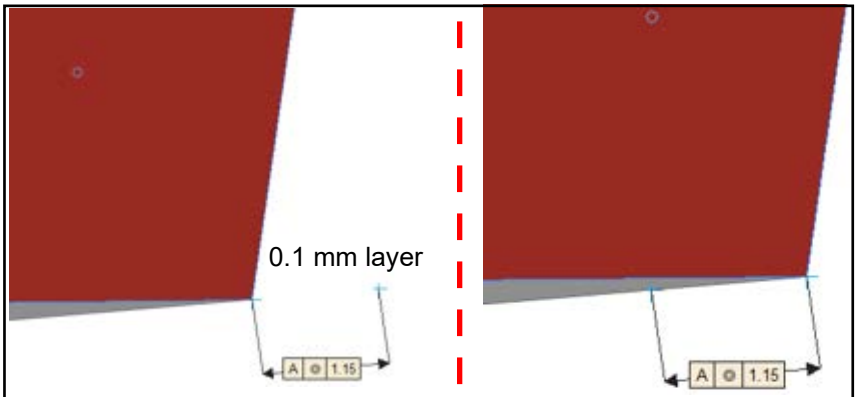
Figure 174: Proper initial support structure



Note: Supports penetrate parts for several layers to ensure a solid connection.

During the review process, look for surfaces that move at a different rate from the build as a whole. This is an indication of shallow surfaces that may need additional support. Typically layers that increase in distance over 1 mm per 0.1 mm layer thickness will need to be supported. These will appear to grow faster when reviewing slice files.

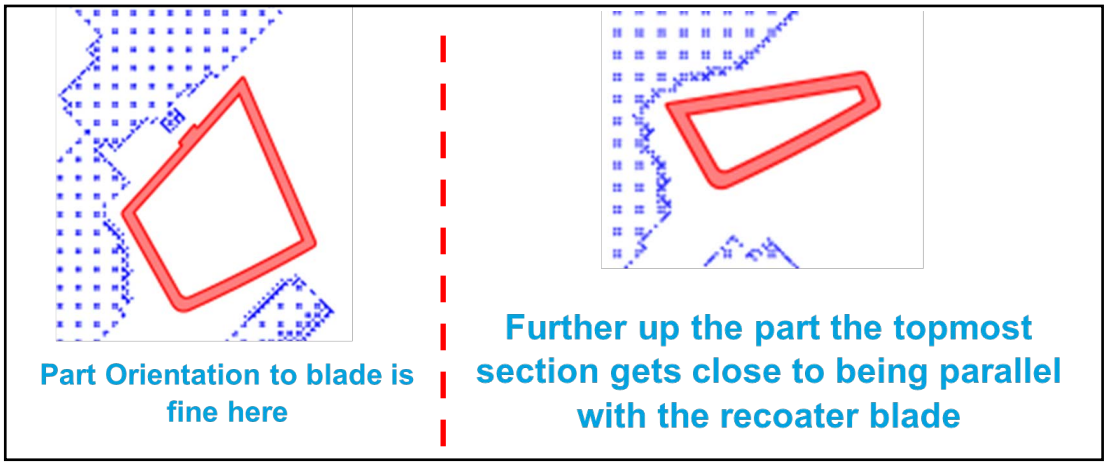
Figure 175: Layer steps



Note: If a geometry is stepping out more than 1 mm per 0.1 mm layer, this will show up in the slice file as growing faster as it progresses through the layers.

It is a best practice at this stage to also look for unseen trapped volumes and thin surfaces caused by beam compensation.Additionally, check the part orientation to the blade throughout its cross section.

Figure 176: Part orientations to blade (good vs. bad)



Reviewing Parameters, Build Styles, and Build Time

See “Using Titanium Assistant” on page 152 for information regarding adjusting parameters.

Loading a Job

Before starting a job, install a clean and dry build platform.

Warning: Laser Exposure.

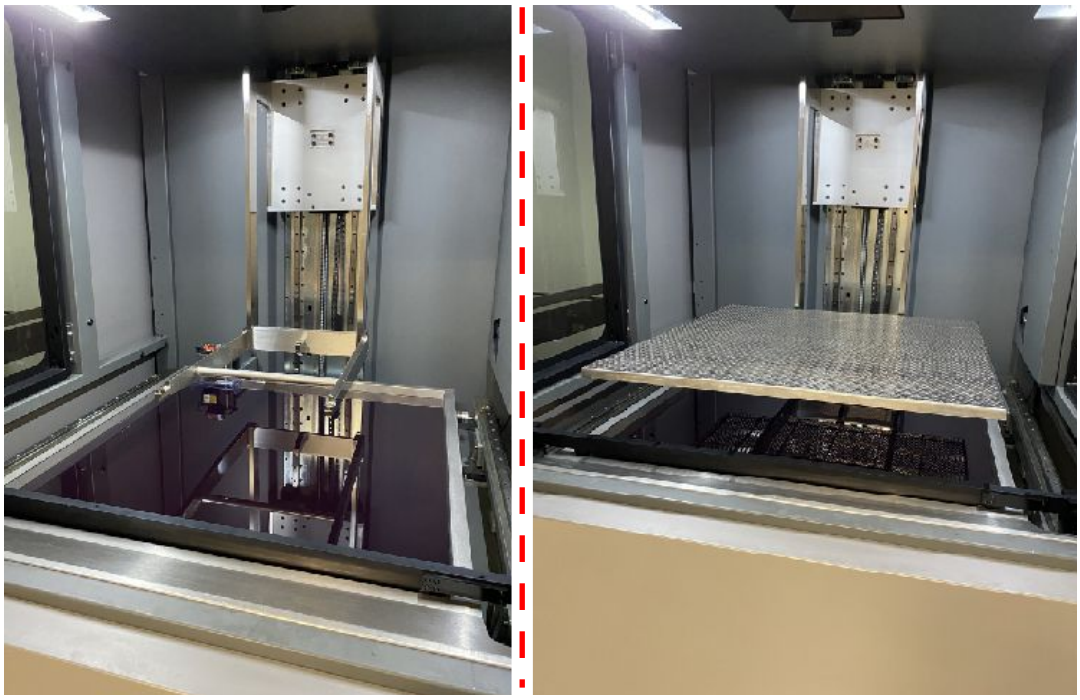
Do not open the printer door when the Shutter Status is Open. This may lead to exposure of Class 4 laser radiation.

Warning: Laser and Moving Parts Exposure.

Do not open the printer door when the printer is not in an IDLE state. Opening the door when the printer is not IDLE may lead to:

- Radiation exposure
- Moving parts

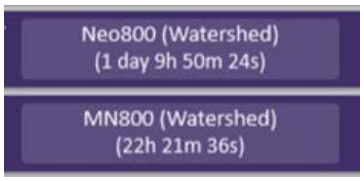
Figure 177: Installing the build platform



Once a job has been prepared in Magics, has been oriented, and supports have been generated, it can be loaded onto the printer via the LAN or through a USB drive.

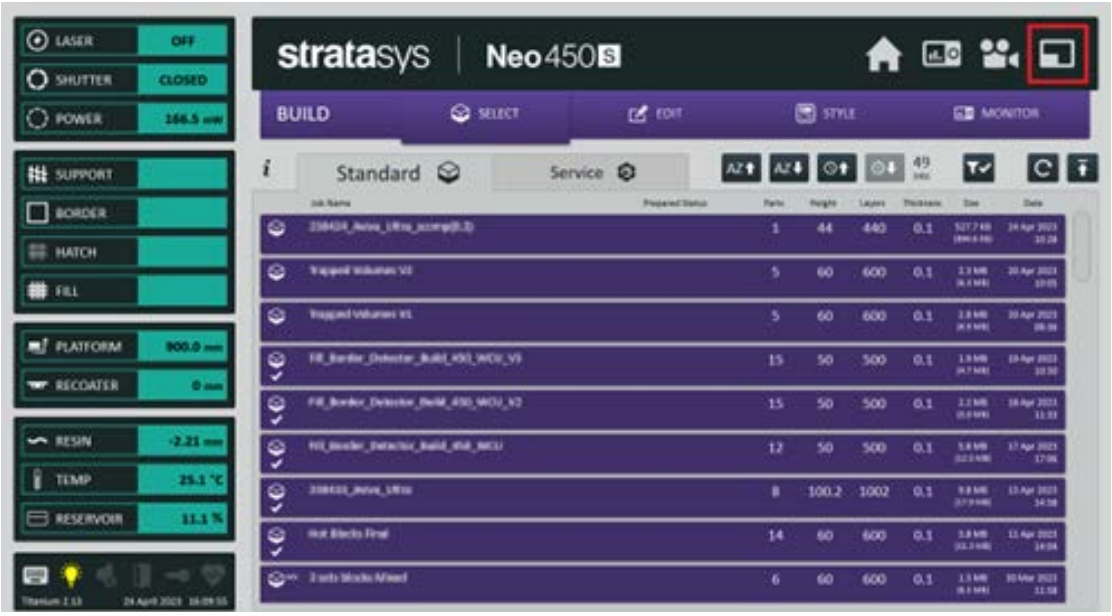
USB Method

1. Insert a USB drive into one of the USB ports on the printer display assembly.
2. Click **Minimize Titanium**, which is accessible from most Titanium menus. See Figure 178 on page 175.
3. When a build is prepared using Titanium Assistant, it displays which printer the parameters have been set for and the build time estimate.



4. Once a build is loaded on the printer, it can be further modified before starting as well as dynamically while printing.

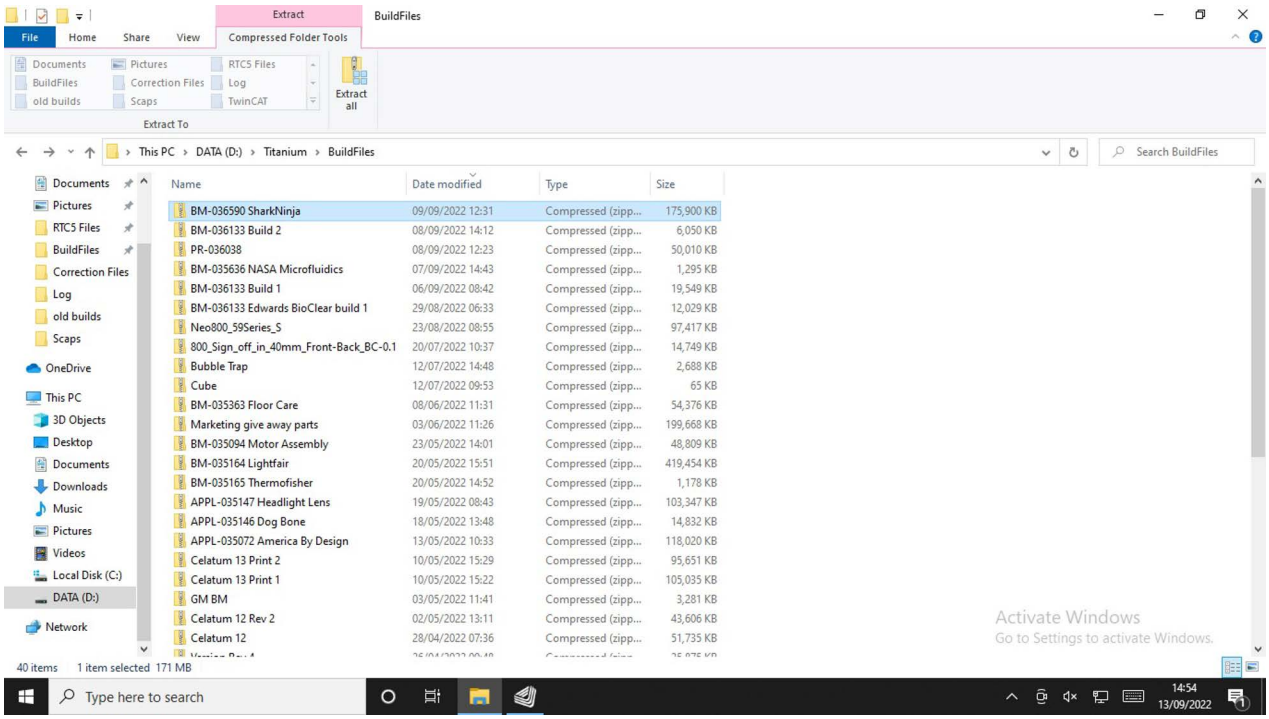
Figure 178: Minimizing Titanium



5. Open a **File Explorer** window.
6. Copy the file from the USB drive and navigate to the Titanium working directory.

7. Paste or drop the **.zip* file in the directory. In the example shown below, the directory is *D:\Titanium\BuildFiles*.

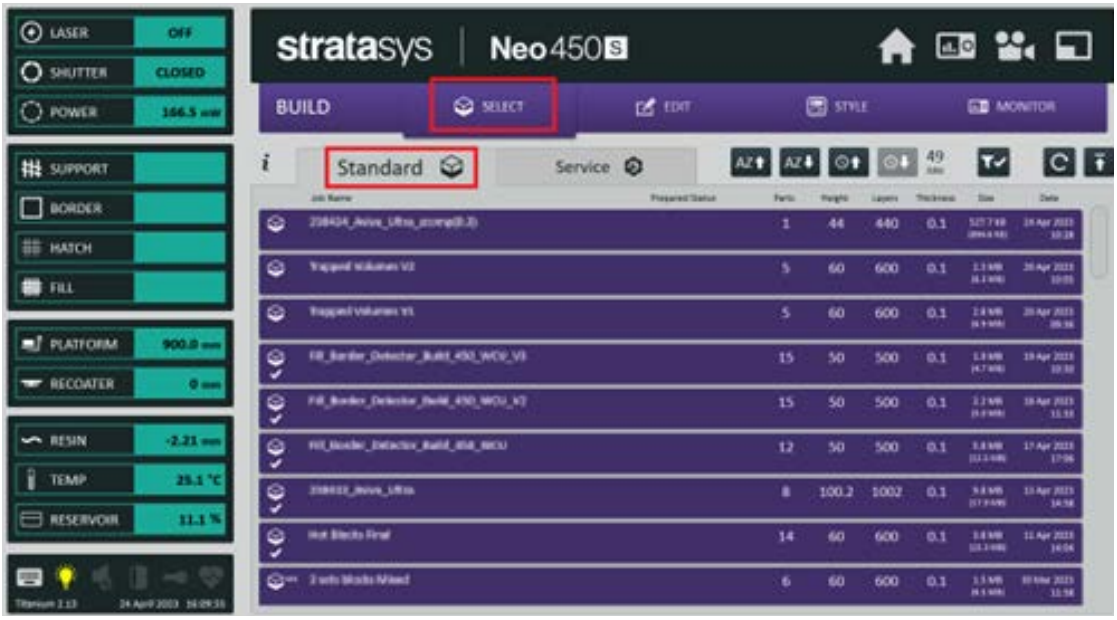
Figure 179: Queue directory



Starting a Build

1. In Titanium, select **Build Control** from the **Home** menu.
2. In the **Build Control** menu, click the **Select** tab and ensure that **Standard** is grayed out. This displays the folder into which the jobs are placed.

Figure 180: *Build* screen > *Select* tab > *Standard* tab



3. Select the job from the menu. A dialog box displays asking for confirmation.

Figure 181: Build load dialog

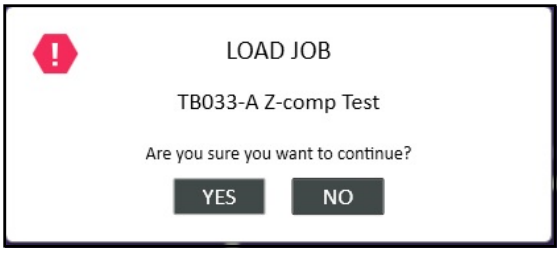


Figure 182: Build job file loaded

4. Press **Start**. The elevator lowers the build platform to the start position and verifies the resin level.

5. A dialog box displays requesting resin be added to the vat.

Warning: Laser Exposure.
Do not open the printer door until you are prompted to add resin. This may lead to exposure of Class 4 laser radiation.

Warning: Laser Exposure.
Do not open the printer door when the Shutter Status is Open. This may lead to exposure of Class 4 laser radiation.

Figure 183: *Add Resin* message

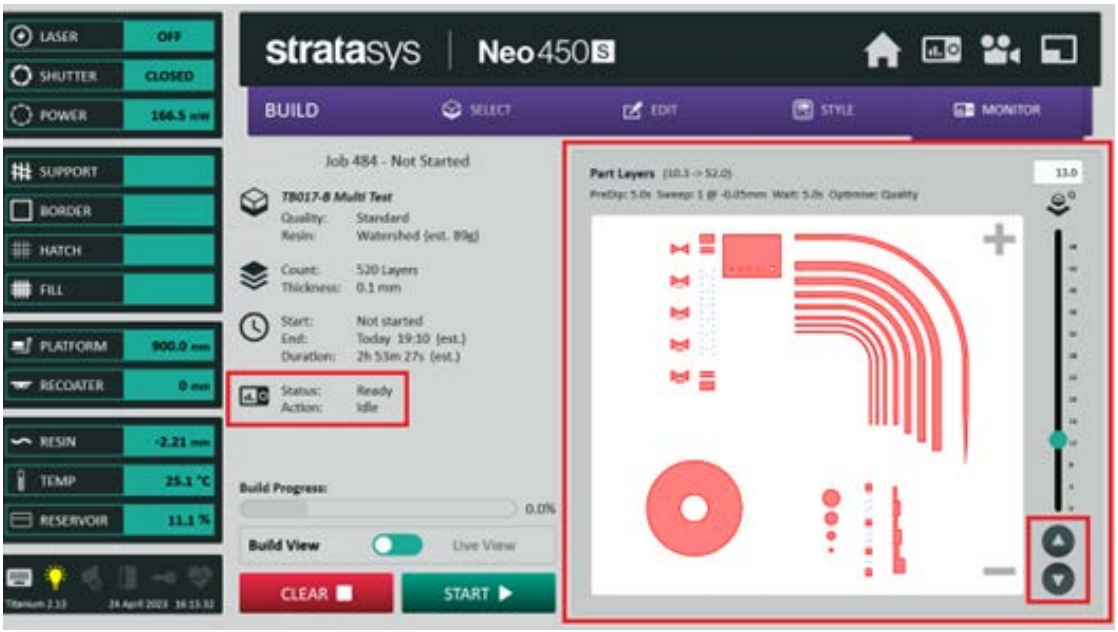
Warning: Skin Irritation
Ensure proper PPE is worn when adding resin to the vat.

Fill the vat from the front chamber door over the spill tray. Filling from another location can result in resin getting on the recoater rails.

6. Open one of the build chamber doors, and add resin to the vat. A beep sounds indicating when enough resin has been added.
7. Close the build chamber door, and select **OK** on the dialog box.

8. The build continues. The **Status** and **Action** sections indicates current build status and activity. The part layer window shows the current build layer.

Figure 184: Status and Action sections



9. Tap the arrow buttons and slider on the right to see future build layers. This section reverts to the current build layer when the next layer starts.

Pausing the Build

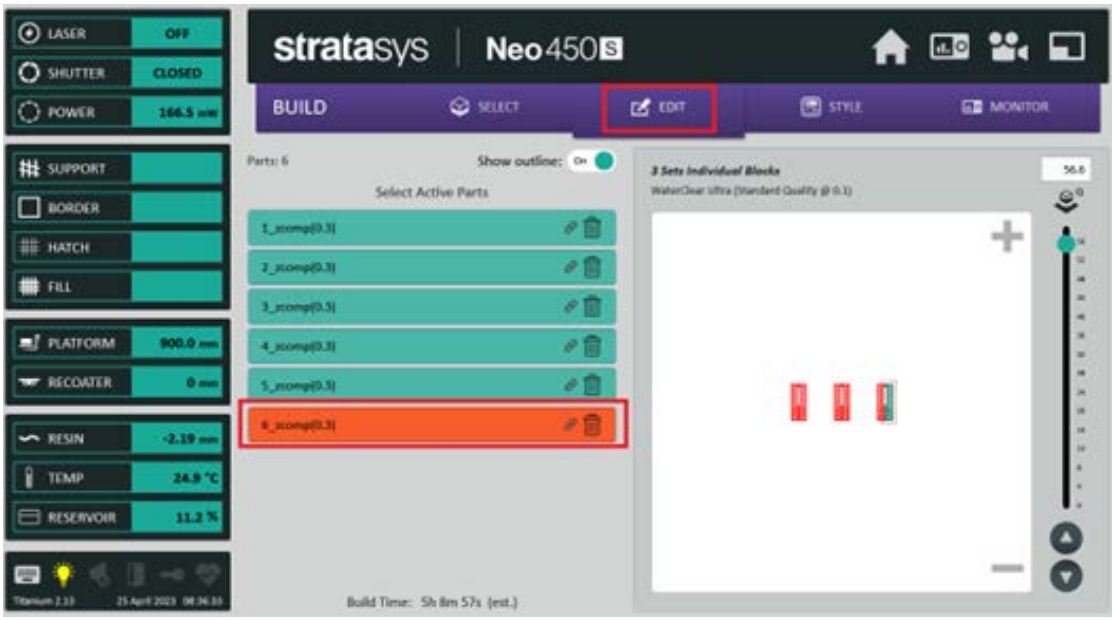
The current build can be paused at any time by pressing the **Pause** button.

If one part is failing in a multiple part build, it may be removed without affecting the rest of the build. To do this:

1. First pause the build and tap to accept the **Pause** in the pop-up dialog box.
2. Next, select the **Edit** tab and select the part that will be deleted.
3. Once selected, the corresponding part will highlight in the layer preview window.

4. Confirm the correct part is selected.

Figure 185: Deleting a part from a paused build



5. After deleting the part from the build, the build can be resumed.

> After deleting, builds prepared using the one-platform support option for e-Stage continue to build the support structure.

Stopping a Build

There may be occasions when it may be necessary to stop a build. The printing of the build can be stopped by tapping STOP.

A Titanium prompts you to verify the Stop action.

Figure 186: Stop Build confirmation message

Titanium then confirms the build has been stopped.

Figure 187: Build Stopped message

Warning: Laser Exposure.
Do not open the printer door when the Shutter Status is Open. This may lead to exposure of Class 4 laser radiation.

Warning: Laser and Moving Parts Exposure.
Do not open the printer door when the printer is not in an IDLE state. Opening the door when the printer is not IDLE may lead to:

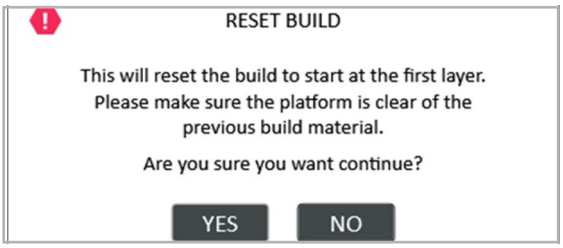
- Radiation exposure
- Moving parts

Restarting a Build

If a build has been paused or stopped, it is possible that the build can be restarted by tapping START. This continues the build from the last previous layer.

If RESET is tapped, Titanium notifies that this action starts the job from the first layer.

Figure 188: Reset Build message



Warning: Laser Exposure.
Do not open the printer door when the Shutter Status is Open. This may lead to exposure of Class 4 laser radiation.

Warning: Laser and Moving Parts Exposure.
Do not open the printer door when the printer is not in an IDLE state. Opening the door when the printer is not IDLE may lead to:

- Radiation exposure
- Moving parts

Changing the Build Style

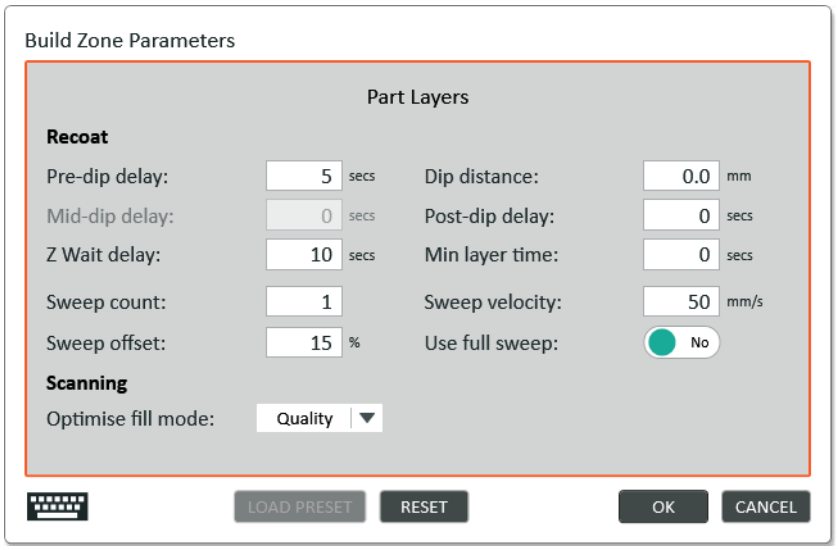
The **Build Style** may also be changed after a build has started. This is accomplished by pausing the part and selecting **Style**. Selecting Style displays different part sections.

Figure 189: Changing the build style

Build Zone Parameters

Selecting one of the build zones will display the **Build Zone Parameters** dialog box. Here, recoater parameters may be changed to compensate for when resin is not recoating the entire layer. For example, changing the **Sweep count** from **1** to **3** will add three recoating sweeps. This will help to ensure proper resin recoat.

Figure 190: Build Zone Parameters



Using LayerControl+

LayerControl+ is an advanced feature available only on Neo800+ printers.
When LayerControl+ is enabled, Titanium predicts thermal variations and automatically adjusts layer times. This significantly reduces surface defects and build failures, while maintaining optimized print speed and part quality.

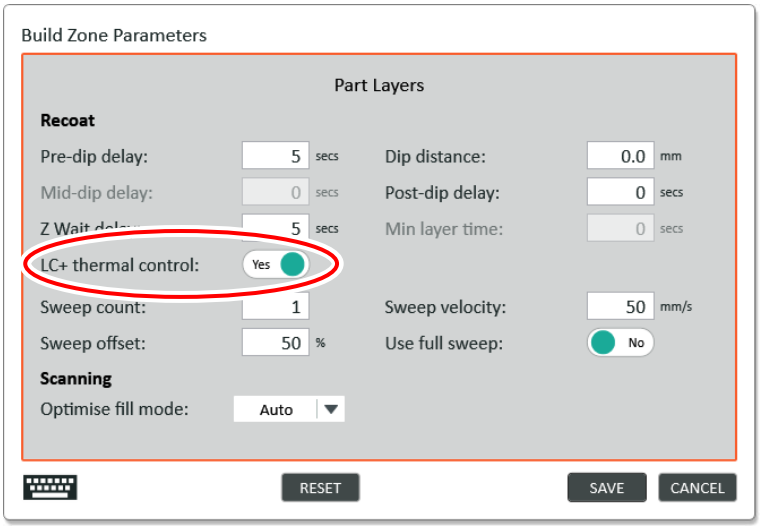
Enabling LayerControl+

LayerControl+ is only available when a validated material is used, and **Neo800+ Standard Mode** is enabled.
Refer to the material user guides for material validation information.

Figure 191: *Parameters* > *Resin* screen, *Resin Information* with *LayerControl+ Enabled*

When LayerControl+ is enabled, the *LC+ thermal control* option is visible in the *Part Layers* > *Build Zone Parameters* dialog box.

Figure 192: *Build Zone Parameters* dialog box with *LC+ thermal control* option



Disabling LayerControl+

You can disable LayerControl+ for individual resins or individual builds, as described below.

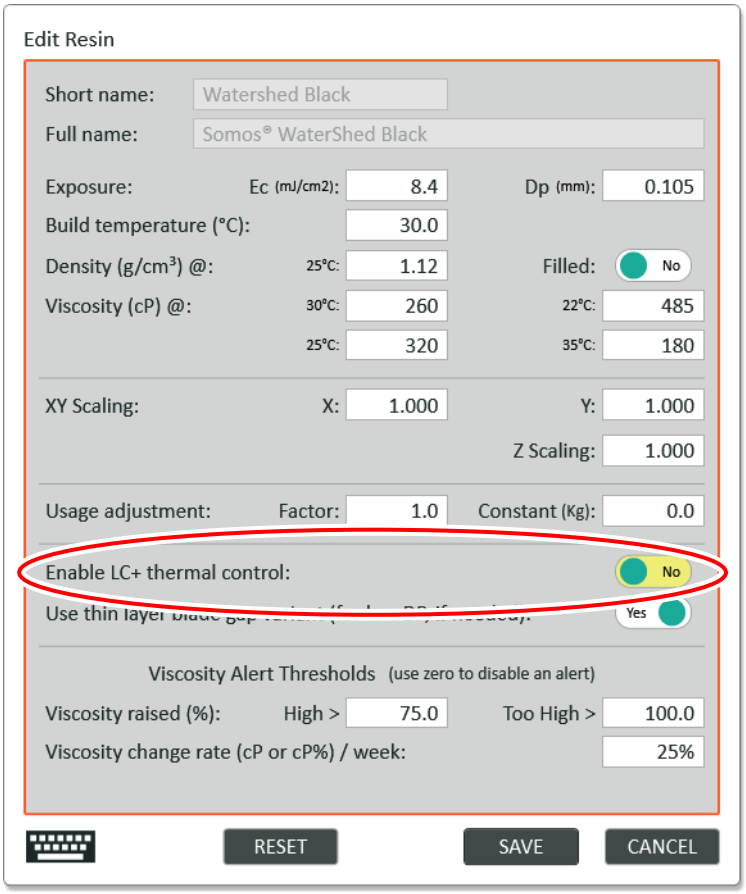
To disable and then re-enable LayerControl+ globally, Admin user permissions are required.

Disabling for Individual Resins

1. In the *Parameters* > *Resin* tab, click  to edit the specific resin.
   The *Edit Resin* dialog box opens.
2. Toggle the *Enable LC+ thermal control* to **No**.

This disables LayerControl+ and stops temperature calculations when loading builds with the current resin.

Figure 193: *Edit Resin* dialog box with *Enable LC+ thermal control*

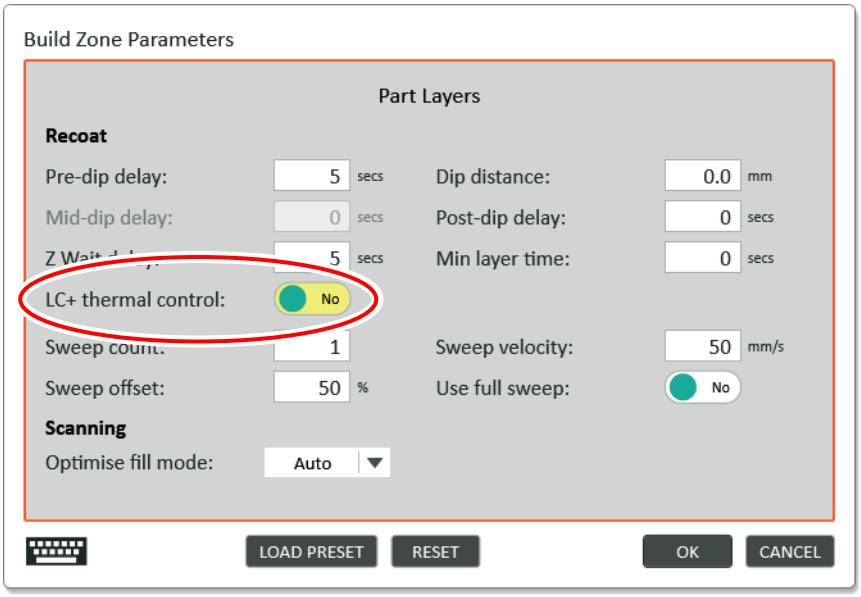


Disabling for Individual Builds

1. In the *Build* > *Style* tab, click  to edit the specific build.
   The *Build Zone Parameters* dialog box opens.
2. Toggle the *LC+ thermal control* to **No**.

> Temperature calculations remain enabled, but no adjustment to the build time are made.

Figure 194: *Build Zone Parameters* dialog box with LC+ thermal control

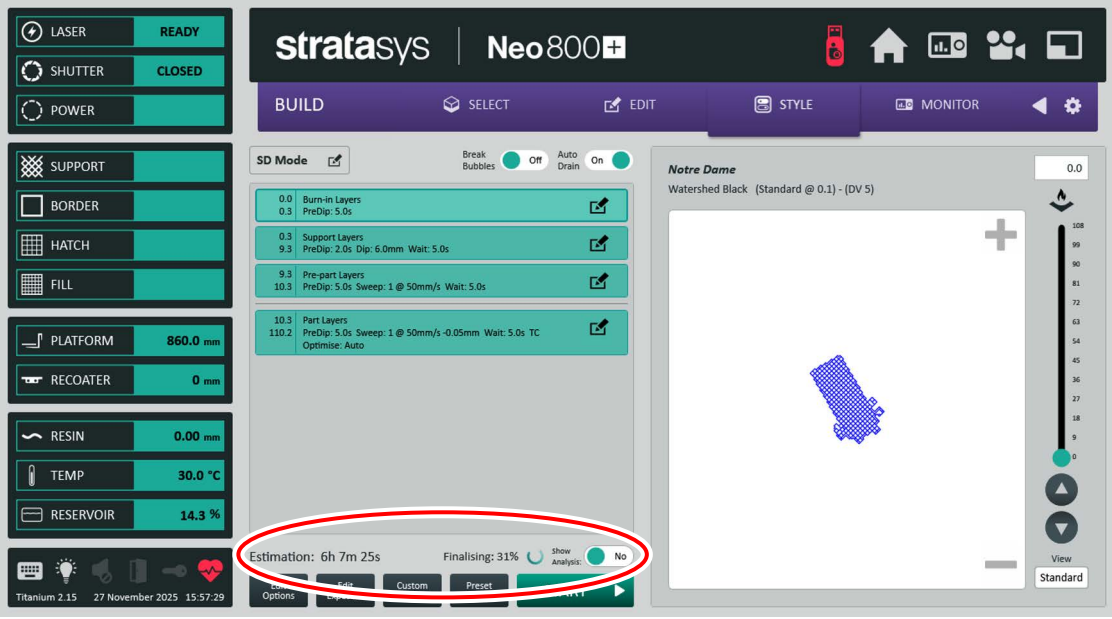


Using LayerControl+

LayerControl+ requires no additional user input after it is enabled. After a build is loaded, an additional thermal analysis is performed.

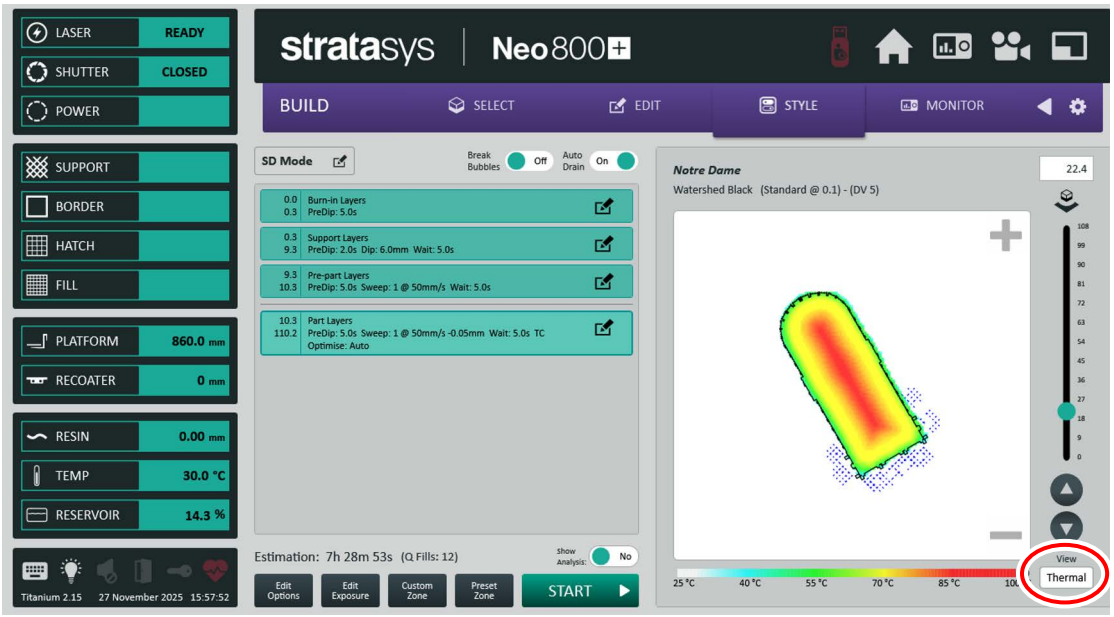
For larger build files, this thermal analysis can take from several minutes to much more to complete.
Build functionality is still available during this analysis, therefore a build job can still be started while the analysis is being completed.
If this happens, the *Estimation* value of the build time can change when the analysis is completed.

Figure 195: *Build* > *Style* screen, showing *Estimate* and *Finalizing*



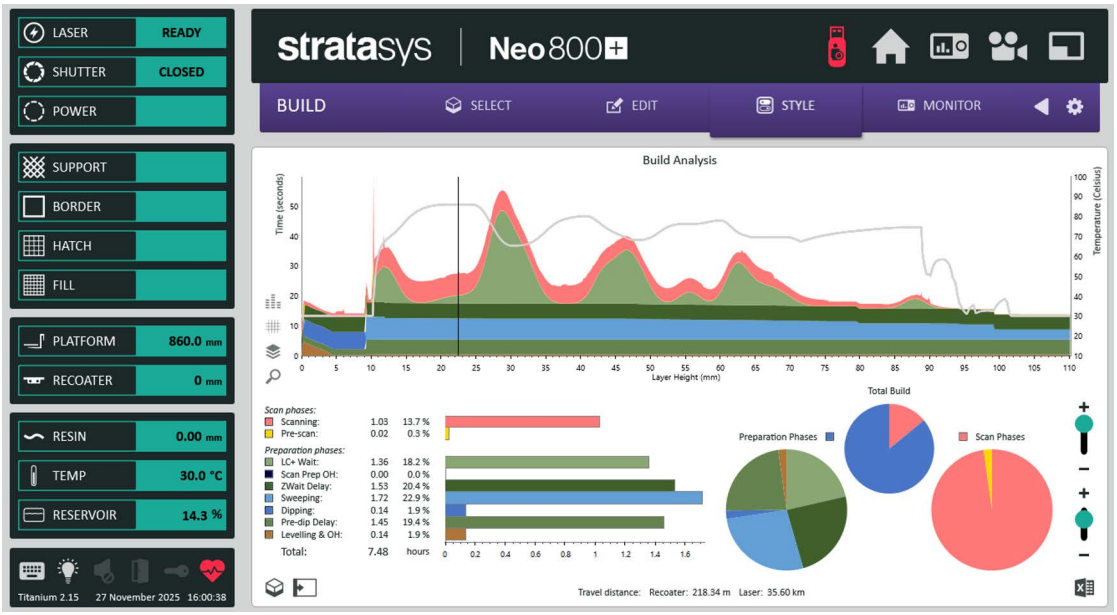
After the analysis is completed, the build visualization window provides a thermal visualization of the build job. This visualization shows where the analysis predicts there will be a thermal build up.

Figure 196: *Build* > *Style* screen, showing thermal visualization



Toggle  to **Yes** to display a detailed predicted part temperature graph (depicted by a gray line), and the **LC+ Wait** times (depicted in light green) that are applied.

Figure 197: *Build* > *Style* screen, showing *Build Analysis* expanded



Titanium Assistant

All the features shown above are available in Titanium Assistant, enabling the thermal analysis and visualization to be performed on the build preparation computer.

Removing a Completed Part

Warning: Laser and Moving Parts Exposure.

Do not open the printer door when the printer is not in an IDLE state. Opening the door when the printer is not IDLE may lead to:

- Radiation exposure
- Moving parts

Warning: Laser Exposure.

Do not open the printer door when the Shutter Status is Open. This may lead to exposure of Class 4 laser radiation.

1. After the part completes, the elevator raises the build platform above the vat. This allows superfluous resin to drain.
2. Manually remove the build platform from the Neo450.
3. To remove the build platform from the Neo800/800+, use the unload trolley, shown in Figure 198.
4. Open the front door of the Neo800/800+ and position the Unload Trolley in front of the printer.

The printer has a slot, marked below in red, to enable the legs of the unload trolley to slide under the printer and the vat.

Figure 198: Unload trolley

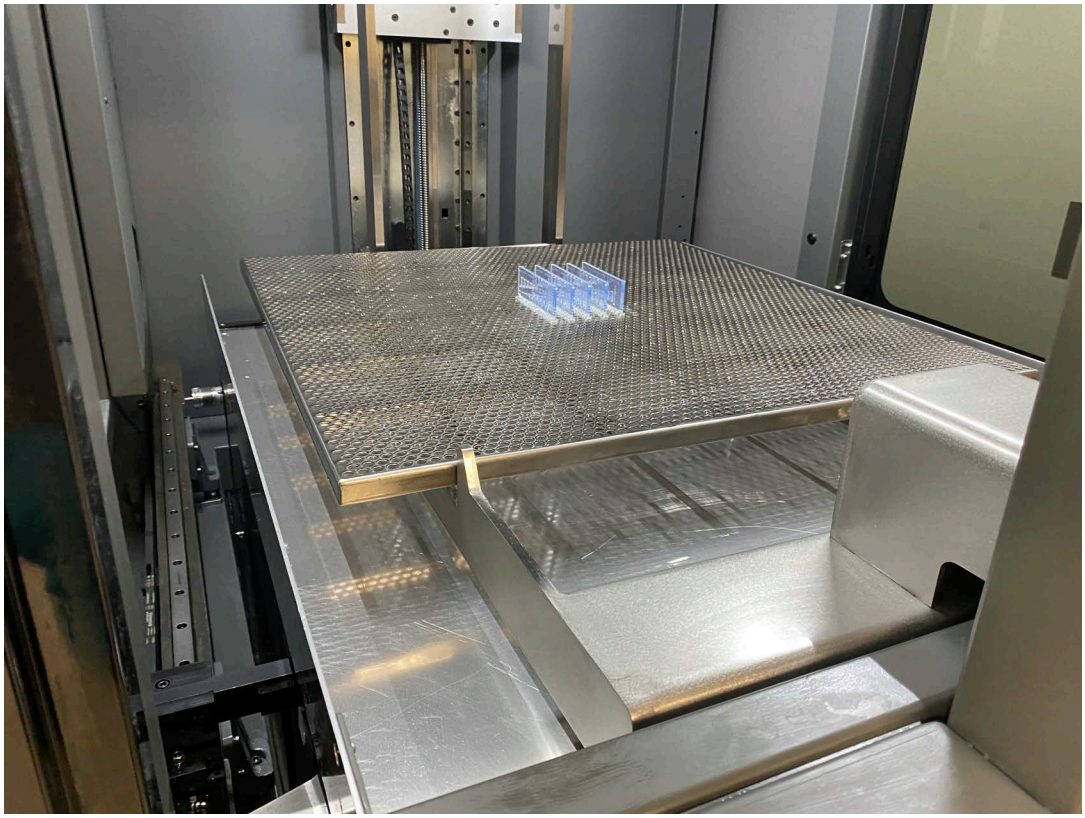
5. Move the unload trolley into position slowly.

Important:
Rotate the crank arm clockwise to lower the platform removal arms on the trolley, until they are below the height of the build platform on the elevator arm inside the printer.

Figure 199: Positioning the unload trolley

6. After the unload trolley is positioned under the build platform, rotate the crank arm counter-clockwise to raise the build platform from the elevator arms.

Figure 200: Removing the build



7. After the build platform is raised from the elevator arms, pull the unload trolley away from the printer.
8. Removed the parts from the platform.
9. Clean the platform using an appropriate method dependent on local codes.

Swapping the Vat

This procedure describes the task of swapping the currently installed resin vat for another vat. It can take 1-3 hours to complete this task depending on the cleanliness of the printer and the preparation level. Once the new resin vat is installed, it takes up to 24 hours to allow the resin to warm up and de-gas.

Important:
Swapping the vat may affect calibrations, therefore it is recommended to perform accuracy builds after completion of this procedure.

Required Tools

- Metric hex wrenches
- Metric spanners
- Side and Roof Panel Key (Southco E3-26-819-15)
- Low level (or low profile) pallet truck
- Disposable gloves
- Isopropyl alcohol
- Rag or lint free paper towels

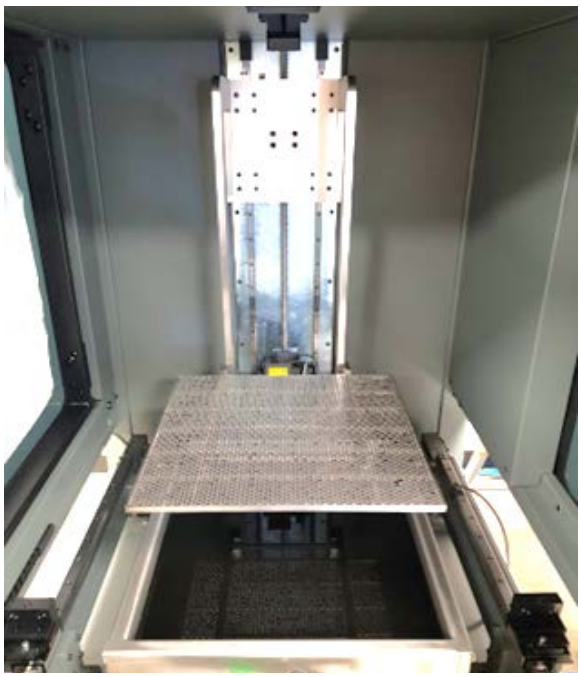
Removing the Vat

1. From the control panel in Titanium, Motion Control, select **Top** to move the platform to the top so that the vat can move freely, without obstruction.

Figure 201: Motion control top

2. Remove the platform and clean it thoroughly.

Figure 202: Neo platform



3. Allow the remaining resin to drain off the elevator arms and wipe them clean to avoid dripping.

4. In the Titanium *System* screen > *Motion Control* tab, select **Fill** to remove the resin from the vat and add it to the reservoir. This minimizes resin spills from the vat.

Figure 203: *System* > *Motion Control* tab, Fill button

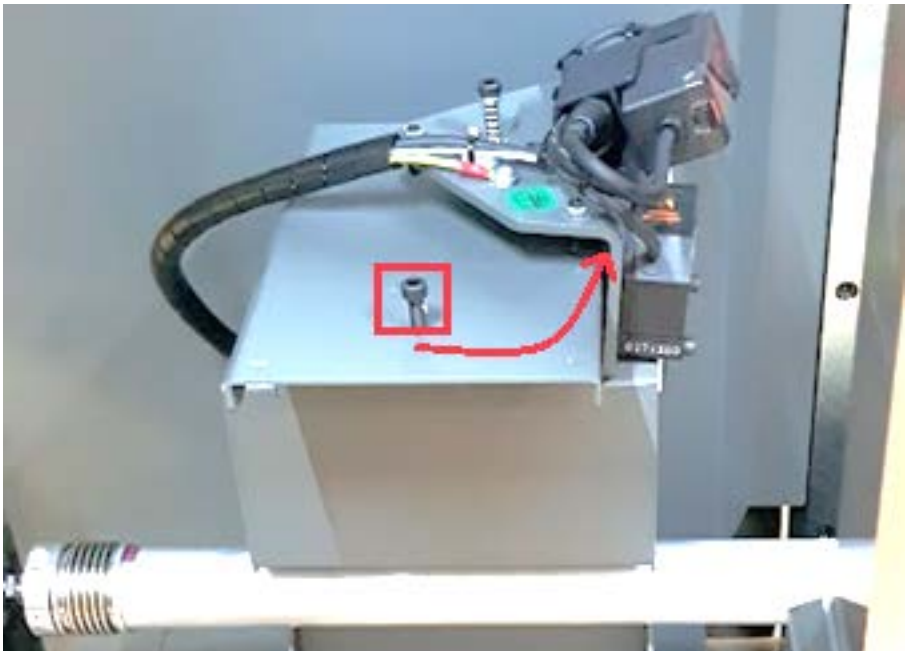
Caution: Damage to Equipment
Resin will leak over time if the valves are not closed.

Figure 204: Vat and reservoir valves (closed position)

5. Remove and clean the recoater blade. See “Cleaning the Recoater Blade” on page 216.
6. Close Titanium and power OFF the printer. See “Powering Off the Neo800/800+ Printer” on page 161.
7. Depending on your printer, perform one of the following:
   - **For some Neo800 printers:** use a hex wrench to remove the retention screw for the leveling sensor bracket and turn the bracket 90 degrees counter-clockwise so that the vat is able to move without striking the temperature probe. Reinstall the retention screw to its mount so that it is not lost.

> Do not adjust the sensor bracket grub/set screws.

Figure 205: Resin leveling sensor, rotated



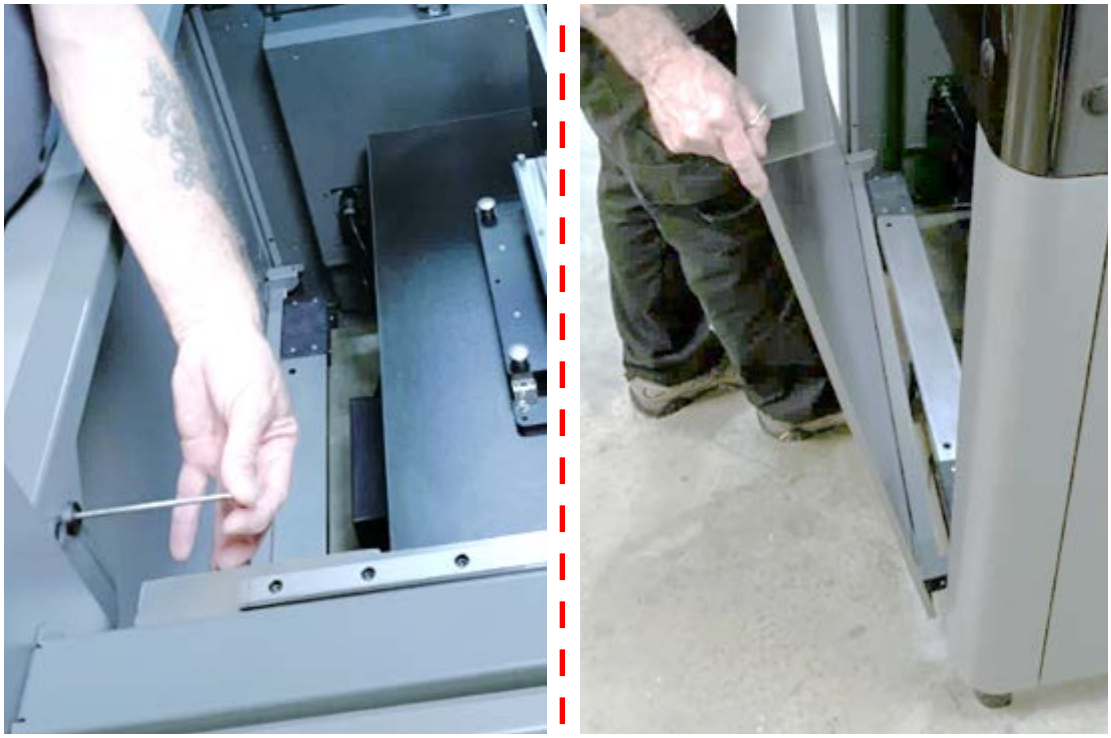
8. **For the Neo450, Neo800+, and other Neo800 printers:** use a hex wrench to remove the retention screw for the leveling sensor bracket. Next, lift the bracket straight back on its hinge. Reinstall the retention screw to its mount as to avoid losing it.

Figure 206: Neo450 resin leveling sensor, rotated up

9. Confirm the temperature probe is clean.
10. Lift off the resin drip guard.

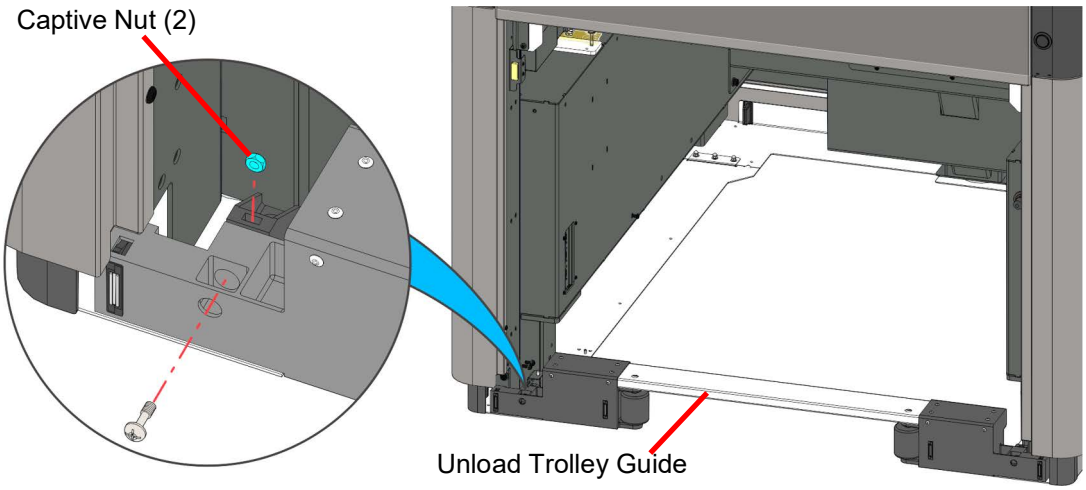
11. Use a 4 mm hex wrench to release the front cover. Rotate the hex bolts (2) on the left and right sides 1/2 turn to release the cover. Lift and remove the cover off the locating pins at the bottom.

Figure 207: Removing the front cover



12. For the Neo800/800+ only, use a 4 mm hex wrench to remove the screws (2) securing the Unload Trolley guide to the captive nuts at the front of the floor tray assembly. Set aside the Unload Trolley guide.

Figure 208: Unload trolley guide detail



13. Disconnect the vat connectors and position them so that they do not obstruct movement of the vat.

Figure 209: Neo800/800+ vat connectors

Figure 210: Neo450 vat connectors

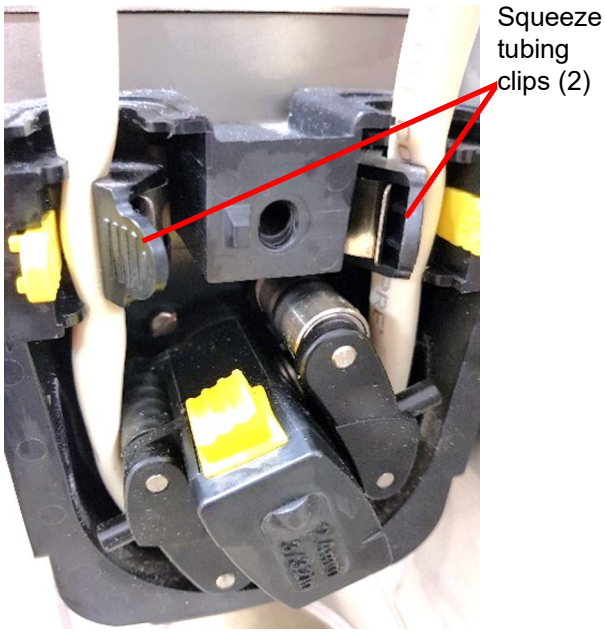
14. Close off the valves connecting the peristaltic pump to the reservoir and vat.
15. For Neo450, perform step 16 to step 20 below.
    For Neo800/800+, see step 21 below.

16. Use a flathead screwdriver to rotate the cover locking screw 45 degrees. Remove the cover.

Figure 211: Pump Cover

17. Note the tubing orientation.
18. Apply pressure to the brackets securing the tubing at the inlet and outlet of the pump casing while pulling the tubing out.

Figure 212: Pump tubing and clips



19. Push on the pump roller assembly to release it so it freely spins by hand.

Figure 213: Pump release button

20. Rotate and pull out the tubing as it rotates.

21. Make sure that any excess peristaltic tubing is tucked so that it does not obstruct movement of the vat.

Figure 214: Peristaltic tubing on Neo800/800+ vat (Type 1 and Type 2)

Vat Type 1
(Drain valve in back)

Vat Type 2
(Drain valve in front)

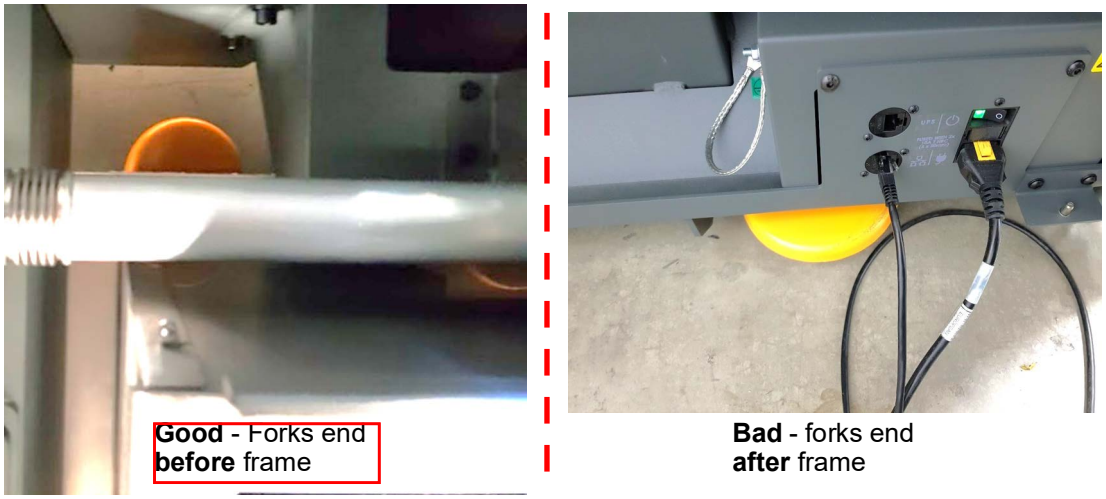
Figure 215: Peristaltic tubing on Neo450 vat

22. Note that the position of the vat stabilizer feet are located through the floor tray to aid in alignment of the new vat. For the Neo450, to aid in positioning new vat, use a marker to indicate the location of the vat stabilizer feet.

Figure 216: Locating the vat feet

23. Insert the forks of the low profile pallet jack beneath the lifting channels of the vat. Make sure that the ends of the forks do not extend beneath the printer frame.

Figure 217: Viewing the positioning of the pallet-jack forks from above (good on left)



24. Lift the vat so that it is free to move. Make sure that the top of the vat will not strike the printer frame as it is pulled through the front of the enclosure.

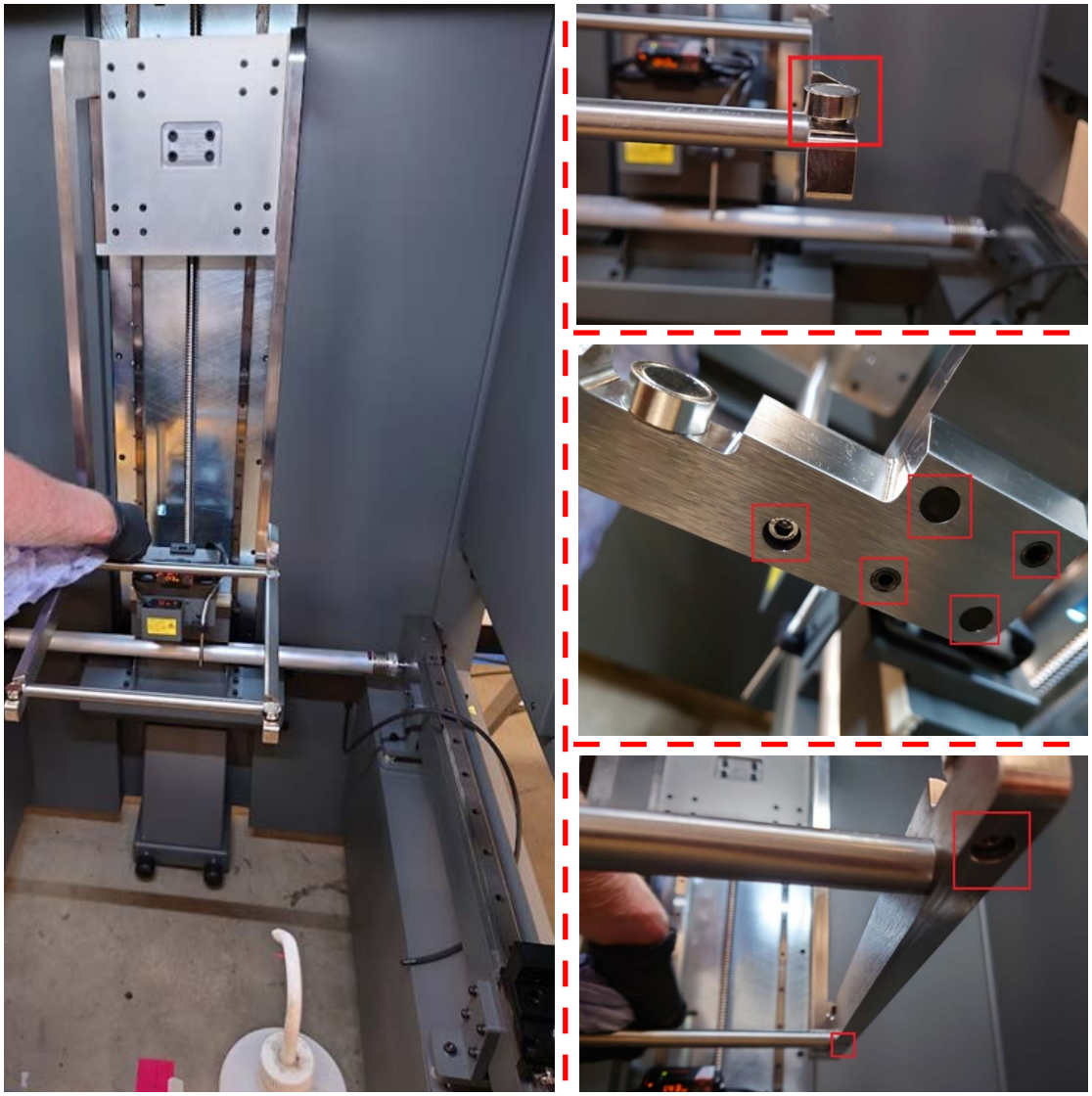
Figure 218: Lifting the vat

25. Make sure there is a clear path for the vat and pallet jack to move. Slowly pull the vat straight out of the printer.
26. Place a piece of cardboard underneath the platform to catch any drops of resin and aid in clean-up.

Figure 219: Cardboard under platform

27. Clean the inside of the printer and the surrounding area. Use isopropyl alcohol to fully clean resin from the Z-stage arms, taking care to clean the screw holes, and underside, around the magnets etc.

Figure 220: Cleaning the Z stage arms



Installing the Vat

1. Set the height of the new vat so the lowest point is as follows:
   - 7 mm off the floor for a Type 1 Neo800 vat
   - 15 mm off the floor for a Type 2 Neo800/800+ vat
   - 15 mm off the floor for a Neo450 vat (unless this is a vat that has been previously set up for the printer and floor position)
2. Remove the piece of cardboard beneath the build platform.
3. Make sure a clear path exists to the front of the printer.
4. Lift the new vat with the low-level pallet jack. Make sure that the ends of the pallet jack forks do not extend past the back side of the tank so they will not contact the printer frame.
5. Align the vat with the front of the build enclosure. Position the vat left to right so an even gap exists on both sides in relation to the printer frame.
6. Slowly move the vat straight into the front of the enclosure avoiding contact with the rear of the printer. Position the vat above the foot positions in the floor tray.

Warning: Lifting Hazard

The vat is extremely heavy, especially when it is filled with resin.

7. Slowly release the handle of the pallet jack and lower the vat to the floor. Gently readjust the position of the vat as required until the feet rest on the floor inside the foot locations in the floor tray.
8. Remove the pallet jack from the printer.
9. Level the vat using the clean recoater bar and a coarse level.

Caution: Possible Printer Shutdown

The vat heaters are powered by mains voltage. When resin is detected in the vat, a sudden spike in current can trip the fuses and cause the printer to shutdown unexpectedly.

10. Connect the flexible conduits, ensuring that the lugs are lined up with the slots in the sockets.

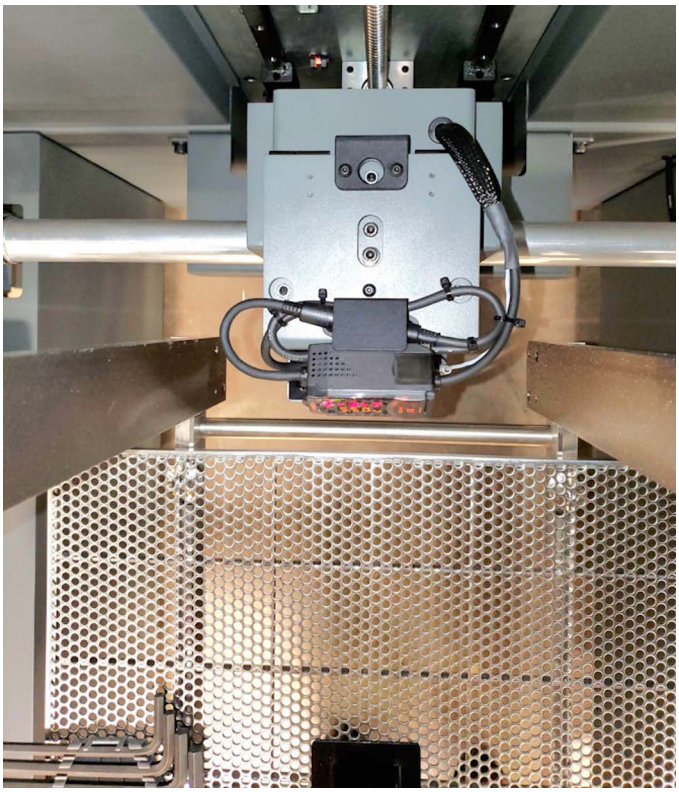
Conduit connectors are keyed on top.

11. Reposition the resin level sensor and thermistor over the vat.
    a. Rotate the sensor to locate the set screws into the indentations on the mounting bracket.

b. Use a hex wrench to fasten the sensor bracket retaining bolts.

Figure 221: Neo800/800+ leveling sensor in place

Figure 222: Neo450 leveling sensor in place



12. Make sure that the temperature probe does not have any of the old resin on it as it will contaminate the new vat.
13. Power ON the printer and launch Titanium. See “Powering On the Neo450 Printer” on page 163. Do not initialize the printer, but make sure that the recoater flag is in the home position.
14. In Titanium, select *System* > *Motion Control*, and tap  to lower the Z stage arms.

Figure 223: .Motion control down arrow

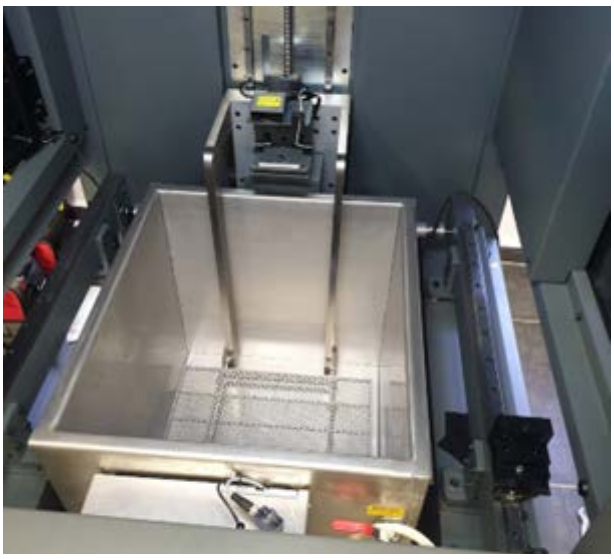
15. Slowly lower the Z stage arms until they are at or near the vat rim level. Verify that a 5 mm gap exists between the back of the vat and the back of the Z stage arms.
16. Stop movement of the arms before contact can occur. Readjust the position of the vat if necessary.

Figure 224: Vat to Z stage clearance

17. Install a platform to the Z stage arms.

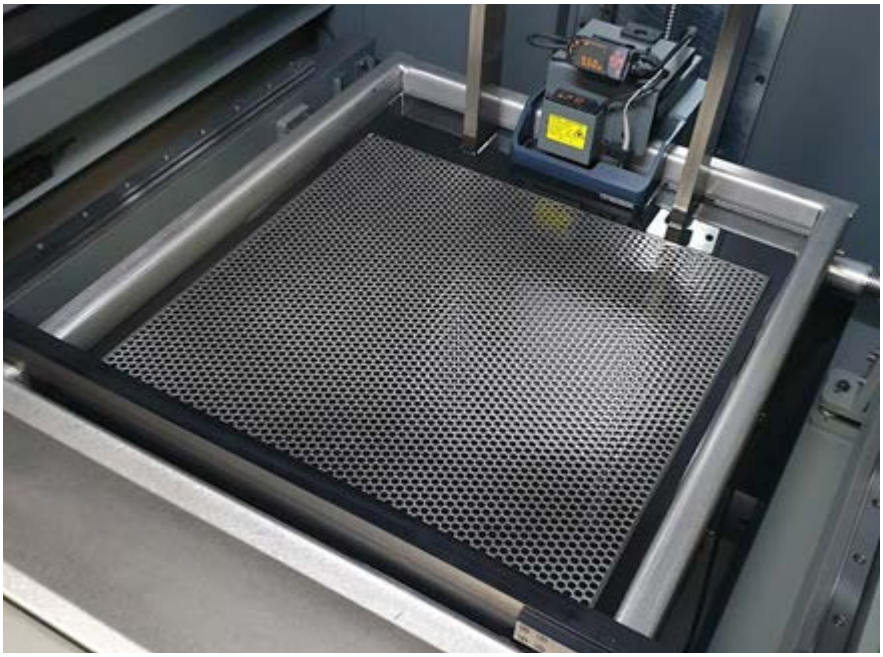
18. Check that the platform is square in the vat. Use the pallet jack to adjust the vat position as necessary.
19. Replace the resin drip guard.

Figure 225: Squaring the vat to the platform



20. Place the recoater blade back into position on the printer, aligned with the clamp mounts while the flag is in the home position. Ensure that the recoater blade has space between the platform and the front of the vat or drip guard. If not, it could indicate the vat is too far back. Use the pallet jack to adjust the vat position as necessary.

Figure 226: Checking the blade to vat spacing



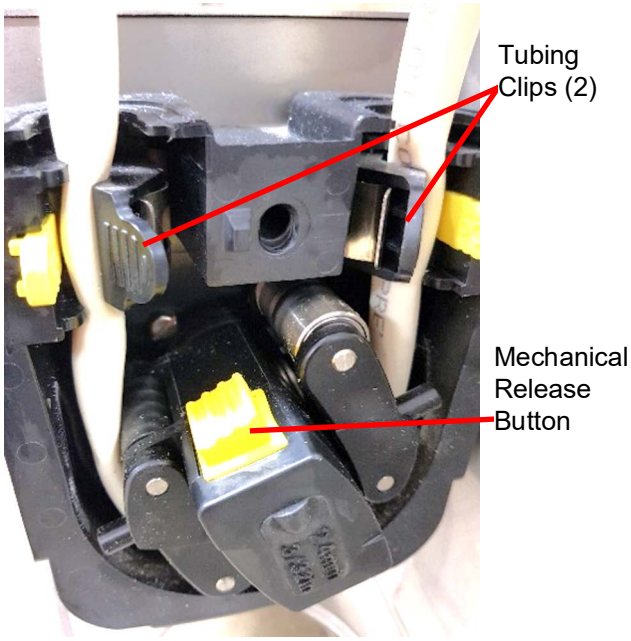
21. Use a 3 mm hex wrench to fasten the hex bolts (4) that secure the clamps to both ends of the recoater blade.

    The clamping pieces are tapered. The wider end must be on top.

22. Install the recoater blade mount covers to both sides of the printer.
23. Install the vacuum pump tube to the recoater blade and adjust the vacuum air valve fully counter-clockwise.
24. Reinitialize the machine and carefully move the platform to its top and bottom limits.
25. Install the front cover to the bottom locating pins. Use a 4 mm hex wrench to rotate the hex bolts (2) on the left and right sides 1/2 turn to secure it in place.
26. Use a 4 mm hex wrench to fasten the screws (2) securing the Unload Trolley guide to the captive nuts at the front of the floor tray assembly.
27. For Neo450, perform step 28 to step 31. For Neo800/800+, see step 32.
28. Install the tube securing clips (2) on to the ends of the new tubing.
29. Insert both ends of the tubing into the valves while squeezing the clips to open and slide over the valve.
30. Install the peristaltic tubing into the pump at the front of the vat. Orient the tubing so that the resin flow is going from the tank to the reservoir.
    a. Push the clip open where the tube enters the pump at one side and insert the tube.
    b. Press the yellow mechanical release button on the pump body to disengage it from the motor. This will allow hand rotation of the pump body.
    c. Feed the tube around the pump by rotating the pump body.
    d. Push the second clip open and insert the tube into it.

e. Release the mechanical release button and rotate the pump until it latches.

Figure 227: Peristaltic pump with tube installed (cover removed)



31. Close and lock the door.
32. Reopen the vat and reservoir valves.
33. If necessary, fill the vat with resin and pump resin into the reservoir until 10% full.
    - If the vat is already full of resin it will require time to warm up.
    - If the resin has not been poured in yet, do so now as per installation. Set the platform to start position and fill up to 1 mm under level. The resin will need to warm up and de-gas overnight. It will expand.
34. Adjust the resin level in the recoater blade as described in “Vacuum Level Adjustment” on page 231.
35. Perform blade gaps and accuracy assessments for the new material. See “Recoater Blade Gap Procedure” on page 219.

> If the recoater blade gap is off significantly, call your regional service representative. The resin level will need to be set with tools specific to this procedure.

6 Maintenance

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

Maintenance Schedule

CAUTION: Damage to Equipment

The printer optics must be cleaned every six months by a trained technician. Failure to do so will result in a catastrophic failure.

Maintenance tasks must be performed on a regular basis in order to maintain optimal printer operation. Table 61 outlines the general maintenance schedule for the printers. Detailed instructions for each task make up the rest of this chapter.

Table 61: Maintenance schedule

Bi-Weekly	As Needed	Maintenance Task
X		“Resin Viscosity Test” on page 212
	X	“Cleaning the Recoater Blade” on page 216
	X	“Recoater Blade Gap Procedure” on page 219
	X	“Vacuum Level Adjustment” on page 231

Bi-Weekly Maintenance

Resin Viscosity Test

Required Tools

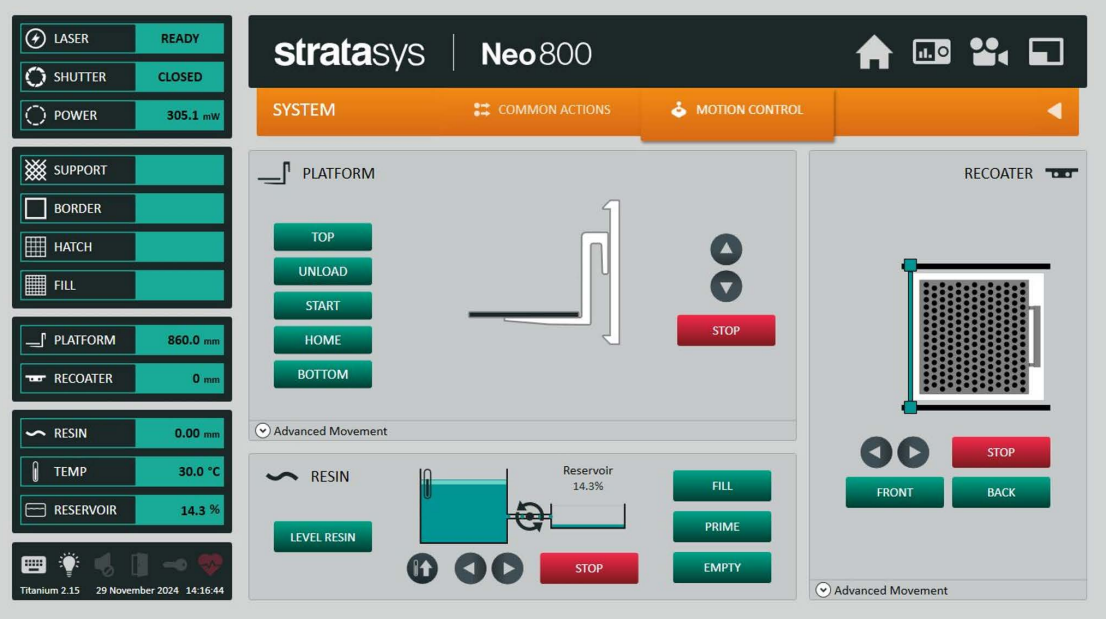
Stopwatch (either mechanical or phone app)

Zahn cup specified for the material that is being tested. This will be detailed in the material user guide.

Procedure

1. Access the System > *Motion Control* tab.

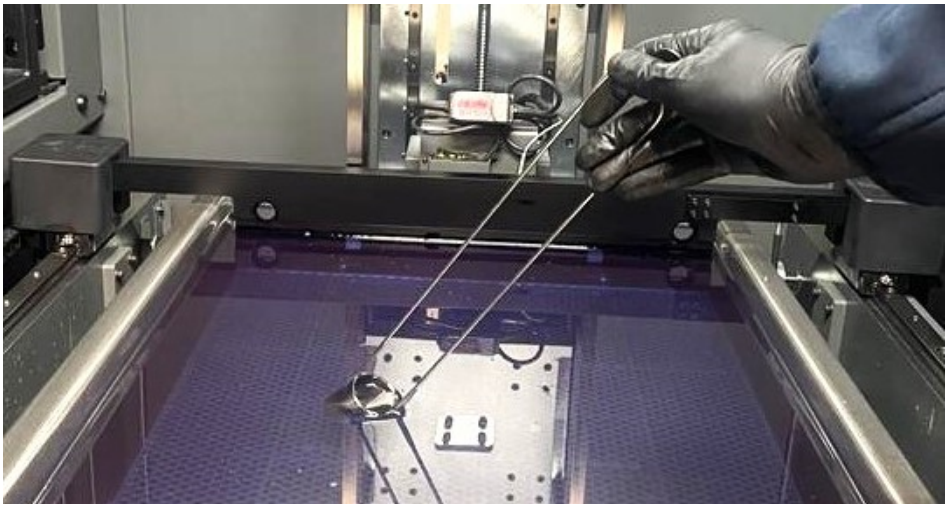
Figure 228: *System* > *Motion Control* tab



2. Press **PLATFORM** | **HOME** to place the platform in the home position.
3. Press **Advanced Movement** and enter **-100** in the **Relative** box.
4. Press **Go** to lower the platform 100 mm.

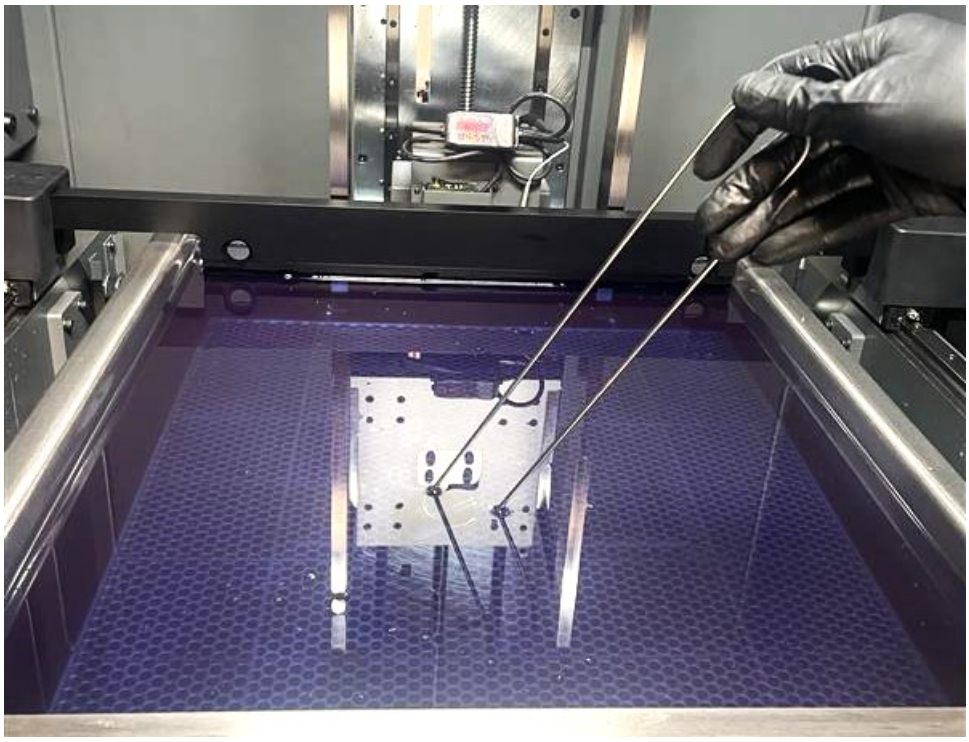
5. While preventing bubbles from forming in the resin and preventing the Zahn cup from falling into the resin, slowly immerse the Zahn cup at a 45° angle into the vat of resin. See Figure 229 on page 213.

Figure 229: Immerse the Zahn cup



6. Submerge the Zahn cup in resin for two minutes to normalize the temperature of the cup.

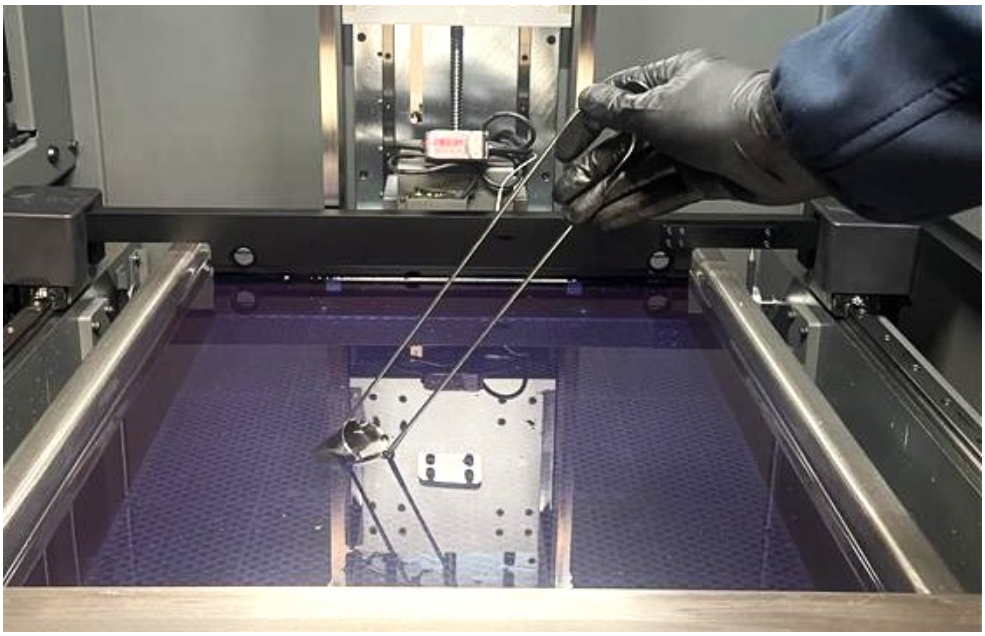
Figure 230: Submerge for 2:00 minutes



7. Record the resin temperature.

8. Slowly raise the Zahn cup completely out of the resin. When the top of the cup is free of the resin, start the stopwatch. See Figure 231 on page 214.

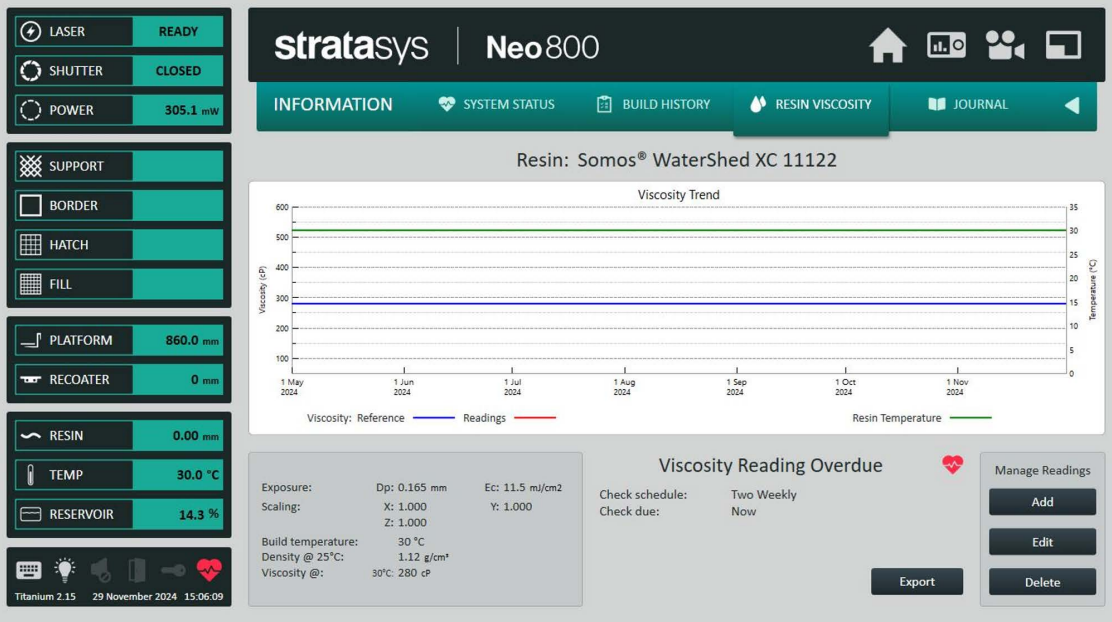
Figure 231: Raise the Zahn cup



9. Observe the resin flowing from the hole at the bottom of the Zahn cup. When the flow changes from continuous to individual drops, stop the stopwatch and record the time for this iteration.
10. Repeat steps 5 through 9 at least two more times.
11. Allow the Zahn cup to drain all excess resin back into the vat.
12. Clean the Zahn cup thoroughly with propylene carbonate (PC) or tripropylene glycol monomethyl ether (TPM), Water, and isopropyl alcohol (IPA).
13. Confirm the Zahn cup is completely dry.

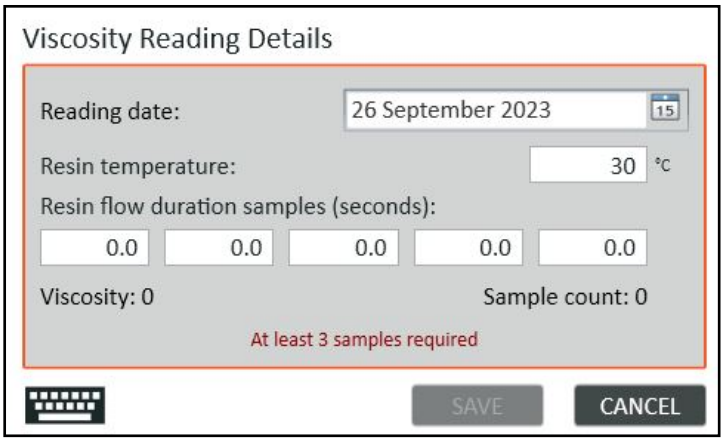
14. On the printer, access the **Resin Viscosity** screen. See Figure 232 on page 215.

Figure 232: Resin Viscosity



15. In the bottom right, select **Add**.
16. The **Viscosity Reading Details** screen displays.

Figure 233: Viscosity Reading Details



17. Enter the time (in seconds) recorded for each iteration.
18. Confirm the resin temperature is correct and press **Save**.
19. The new readings are plotted on the graph.

As Needed Maintenance

Cleaning the Recoater Blade

Required Tools

- 2.5 mm hex wrench
- Low-range torque wrench
- Disposable gloves
- Lint free fabric or paper towels
- Isopropyl alcohol
- Plastic scraper

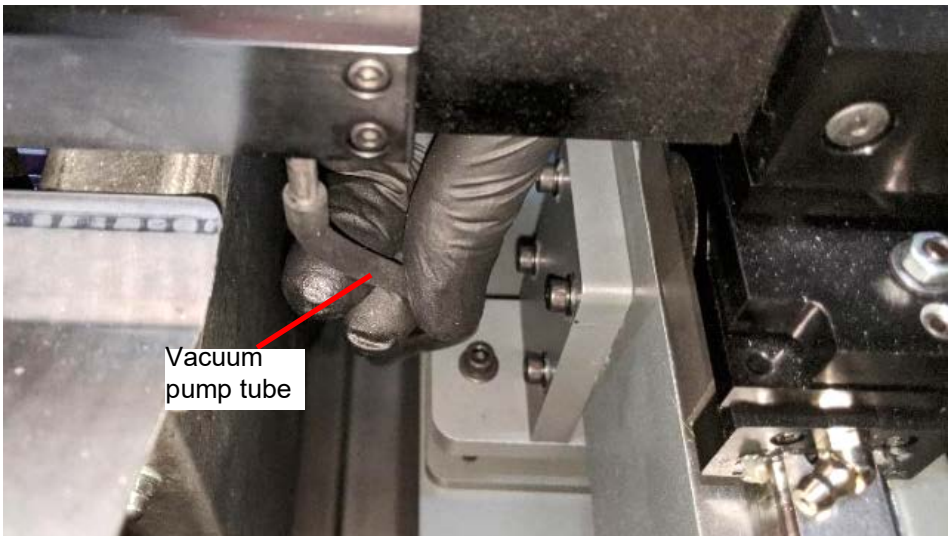
Removing and Cleaning the Recoater Blade

1. Using a gloved finger, check the underside of the recoater blade for debris or built up resin. Check the entry to the vacuum cavity as well.
2. If debris is present on the underside of the recoater blade, attempt to remove it using a gloved finger. If the debris cannot be removed, the recoater blade will need to be removed from the printer. A plastic scraper or wooden tongue depressor may then be used to clean the recoater blade.

> **Caution: Damage to Equipment.**
> Never use metal (for example, a scalpel blade), to clean debris from the recoater blade. Metal can damage the flat surface of the recoater blade resulting in a burr that will mark a line into parts.

3. Remove the vacuum pump tube.

Figure 234: Vacuum pump tube



4. Remove the recoater mount covers from both sides of the printer.

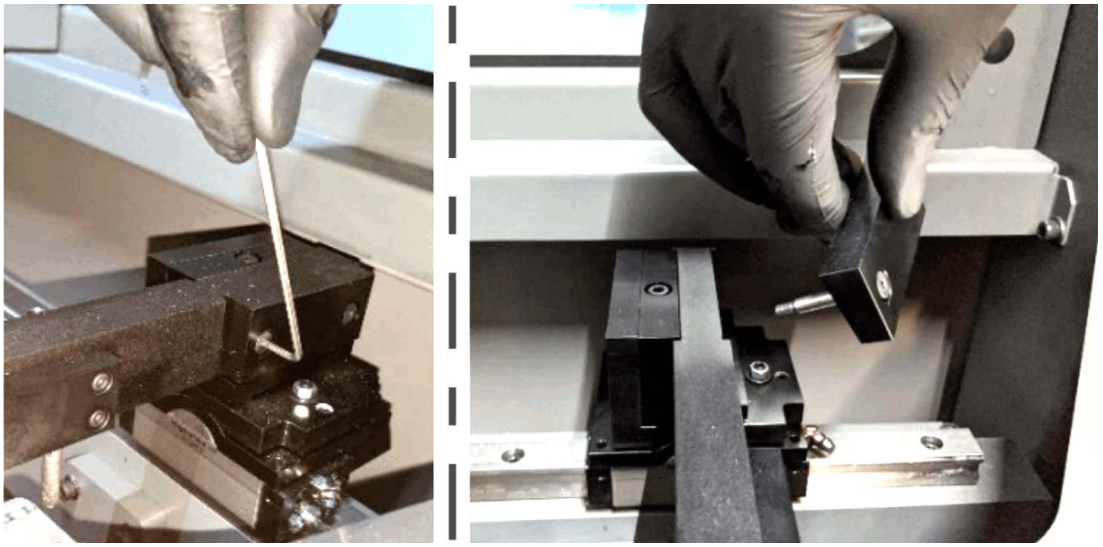
Figure 235: Removing the recoater mount covers

5. Use a 2.5 mm hex wrench to remove the hex bolts (4) that secure the clamps to both ends of the recoater blade. Retain the clamps (2).

Caution: Damage to Equipment

Do not use the ball end of the hex wrench when loosening or tightening the bolt as it is can cause rounding.

Figure 236: Removing the recoater blade clamps



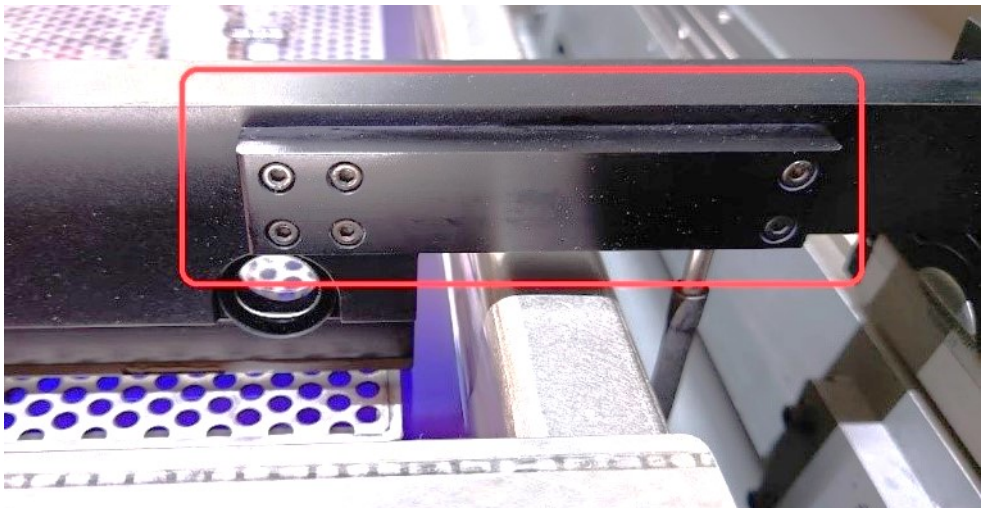
6. Remove the recoater blade from the printer.

Caution: Damage to Equipment
Care must be taken when removing the recoater blade to avoid damaging the precision edges.

Figure 237: Removing the recoater blade

7. Drain any excess resin from the recoater blade.To avoid resin entering the vacuum inlet, keep the recoater blade positioned in an upright orientation. While keeping the recoater blade upright, clean the inside of the recoater blade using lint free paper towels and isopropyl alcohol.

Figure 238: Recoater blade vacuum port



8. Use a plastic scraper or wooden tongue depressor to remove any difficult resin deposits.

Caution: Damage to Equipment.
Never use metal (for example, a scalpel blade), to clean debris from the recoater blade. Metal can damage the flat surface of the recoater blade resulting in a burr that will mark a line into parts.

Figure 239: Removing resin deposits

Installing the Recoater Blade

1. Place the recoater blade back into position on the printer, aligned with the clamp mounts.
2. Use a 2.5 mm hex bit in a torque wrench set to 4Nm to fasten the hex bolts (4) that secure the clamps to both ends of the recoater blade. See Figure 236.

The clamping pieces are tapered. The wider end must be on top.

3. Install the recoater mount covers to both sides of the printer. See Figure 235.
4. Install the vacuum pump tube to the recoater blade. See Figure 234.

Recoater Blade Gap Procedure

To ensure reliable builds and accurate parts, the distance between the bottom of the recoater blade and the top of the built parts must be set properly. This procedure provides a detailed explanation on how to perform that task. The procedure is comprised of the following sub tasks, all of which must be performed in sequence to gap the recoater blade.

1. Build blade gap blocks and check recoater blade height.
2. Measure and adjust the recoater blade rake.
3. Measure and adjust the recoater blade height, including across all platforms.

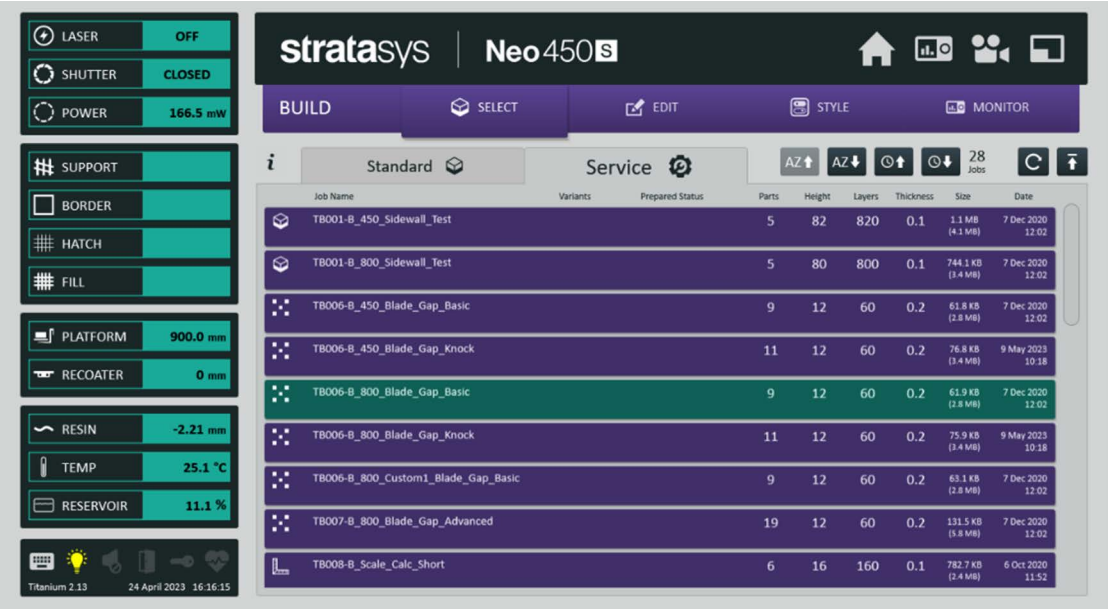
Required Tools

- 2.5 mm hex wrench
- 4.0 mm hex wrench
- 8.0 mm wrench
- Low-range torque wrench
- 4.0 mm hex drive bit for torque wrench
- 8.0 mm socket for torque wrench
- Disposable gloves
- Lint free fabric or paper towels
- 0.125 mm feeler gauge
- 0.150 mm feeler gauge

Build blade gap blocks and check recoater blade height

1. From the control panel, select Home/Build/Service, and load the blade gap part file as shown. Press **OK**.

Figure 240: Selecting the blade gap part file



2. Press **Start** and add or remove resin as prompted. The Neo printer will now build blade gap blocks for approximately 45 minutes. After the blocks are built, the printer pumps resin from the vat into the reservoir, exposes the blocks, and notifies the user that the build is complete.

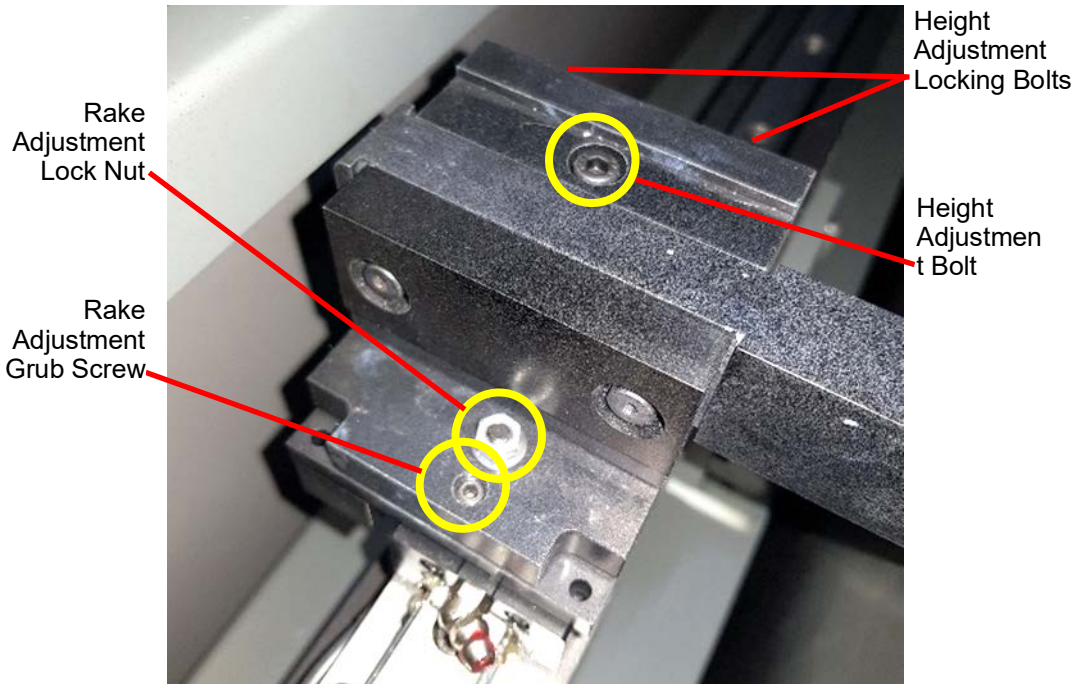
3. Ensure that the blade gap blocks are free of bumps or defects. Rebuild if required.
4. When the build is complete, remove the two black plastic recoater mount covers. The stepper motor that drives the recoater blade will be de-energized. This will allow the recoater blade to move freely.
5. Manually move the recoater blade slowly forward approximately 100 mm and determine the amount of resistance in the de-energized motor.
6. Gently move the recoater blade over the front blade gap blocks.
7. If the recoater blade touches the side of the blade gap blocks:
   a. Adjust the height of the recoater blade by using a 4 mm hex wrench to loosen the four locking bolts located on the left and right recoater blade mounting brackets.
   b. Raise the recoater blade by using a 4 mm hex wrench to turn the height adjustment bolt clockwise until the recoater blade closely passes over the blade gap block.If necessary, lower the recoater blade by turning the height adjustment bolt counter-clockwise.

Caution: Damage to Equipment

Failure to loosen both pairs of locking bolts during recoater blade height adjustments will cause tension in the opposite bearing block.

8. Once the recoater blade has been adjusted to closely clear the front row of blade gap blocks, hand tighten the height adjustment locking bolts. After tightening, confirm proper adjustment.
9. Clean any resin from the top of the blade gap blocks with a clean, lint free tissue.

Figure 241: Recoater blade adjustment



Measure and Adjust the Recoater Blade Rake

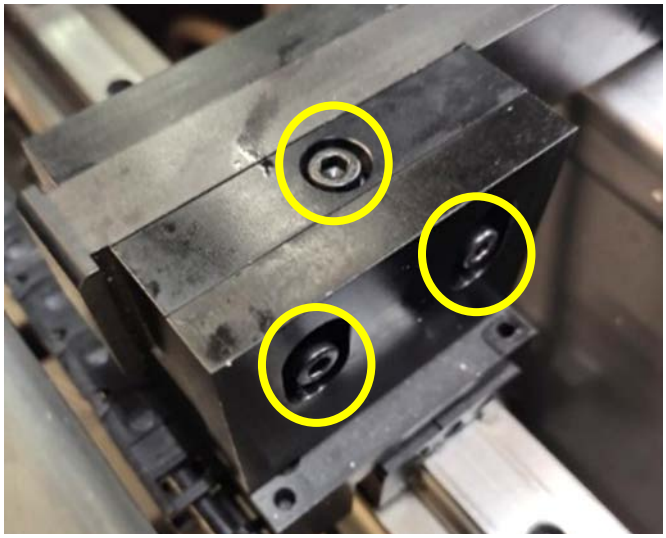
1. Align the back edge of the recoater blade with the middle of the front corner blade gap blocks.
2. Using a feeler gauge, measure the gap between the underside of the back edge of the recoater blade and the top of both of the front corner blade gap blocks. The gap must be 0.125 mm with no resistance.

   A good way to verify the gap isn't too tight is to watch the resin surface around the blade gap block when the feeler gauge is gently removed from under the recoater blade. There should be no movement seen on the resin surface.

3. Verify the recoater blade gap is not too wide by placing a 0.150 mm feeler gauge on both front corner blade gap blocks. A slight resistance should now be felt and a movement on the surface of the resin should now be seen when the feeler gauge is gently removed from under the recoater blade.

Figure 242: Checking the recoater blade height with a feeler gauge

Figure 243: Recoater blade height adjustment and locking bolts



4. If adjustment is required:
   a. Adjust the height of the recoater blade by using a 4 mm hex wrench to loosen the four locking bolts located on the left and right recoater blade mounting brackets.
   b. Raise the recoater blade by using a 4 mm hex wrench to turn the height adjustment bolt clockwise until the recoater blade closely passes over the blade gap block.If necessary, lower the recoater blade by turning the height adjustment bolt counter-clockwise.

CAUTION: Damage to Equipment

Failure to loosen both pairs of locking bolts during recoater blade height adjustments will cause tension in the opposite bearing block.

5. Once the recoater blade has been adjusted, hand tighten the height adjustment locking bolts. After tightening, confirm proper adjustment.
6. Repeat steps 1 through 5 until the 0.125 mm gap is established. Lightly tighten the locking bolts.
7. Position the recoater blade so that front edge of the recoater blade is in the middle of the front corner blade gap blocks.
8. Using a feeler gauge, measure the gap between the underside of the front edge of the recoater blade and the top of both of the front corner blade gap blocks. The gap must be 0.125 mm with no resistance.
9. If the gap is not 0.125mm or is different from the back edge of the recoater blade, the rake must be adjusted.
10. To adjust the rake:
    a. Using an 8 mm hex wrench, loosen the rake adjustment lock nuts on the appropriate bearing blocks.
    b. Using a 2.5 mm hex wrench, turn the rake adjustment grub screw. Turning the grub screw clockwise will raise the front edge of the recoater blade. Turning it counter-clockwise will lower the front edge of the recoater blade.

Do not over adjust the rake of each end of the recoater blade in opposite directions. Although a small amount of adjustment in opposing directions is common, the recoater blade is machined to tight tolerances and should not need to be twisted.

11. Lightly tighten the rake adjustment lock nuts and measure the front and rear edge recoater blade gaps.The recoater blade gap should be 0.125 mm with no resistance on both front corner blade gap blocks.
12. Verify the recoater blade gap is not too wide by inserting a 0.150 mm feeler gauge on both front corner blade gap blocks. A slight resistance should now be felt and a movement on the surface of the resin should now be seen when the feeler gauge is gently removed from under the recoater blade.
13. Using an 8 mm socket on a low range torque wrench, tighten the two rake adjustment lock nuts to 2 Nm.

Measure and Adjust the Recoater Blade Height

1. Gently push the recoater blade to the back of the vat so that it is over the two rear corner blade gap blocks.

   During this procedure, all feeler gauge measurements should now be taken from the front edge of the recoater blade. This ensures that any imperfections in rake are not factored in the recoater blade height measurement.

2. Using a feeler gauge, measure the gap between the underside of the edge of the recoater blade and the top of both rear corner blade gap blocks. The gap must be 0.125 mm with no resistance.

   A good way to verify the gap isn't too tight is to watch the resin surface around the blade gap block when the feeler gauge is gently removed from under the recoater blade. There should be no movement seen on the resin surface.

3. If adjustment is required:

   a. Adjust the height of the recoater blade by using a 4 mm hex wrench to loosen the four locking bolts located on the left and right recoater blade mounting brackets.

   b. Raise the recoater blade by using a 4 mm hex wrench to turn the height adjustment bolt clockwise until the recoater blade closely passes over the blade gap block.If necessary, lower the recoater blade by turning the height adjustment bolt counter-clockwise.

4. Hand tighten the four locking bolts after adjusting.

5. Repeat this procedure until the correct recoater blade gap is achieved across both of the rear corner blade gap blocks.

6. Push the recoater blade over the rest of the blade gap blocks while checking that the correct clearance is maintained across the whole platform.

   - Some recoater blades are not completely flat and can dip slightly in the middle. This will cause all the center blade gaps to be slightly smaller than the rest of the gaps. If this occurs, adjust the recoater blade evenly to clear the tightest block correctly.
   - If the center recoater blade gap is smaller in only one place, it is likely that the recoater mounting brackets are twisting in and distorting the recoater blade. If this occurs, please contact Stratasys customer service.

7. Repeat the above procedures until an even 0.125 mm gap is achieved across all blade gap blocks and the rake is correct.

8. Using a low range torque wrench and 4 mm hex bit, tighten the four height adjustment locking bolts to 4 Nm.

9. Install the two black plastic recoater mount covers by sliding and clipping them on top of the mounts.

Figure 244: Recoater mount cover installed

Recoater Vacuum Calibration Procedure

The Neo800+ comes with the ability to monitor the resin level inside the recoater blade. This ensures the correct and consistent level of resin is available for recoating during a build, while also protecting the printer from pulling resin into the vacuum pump.

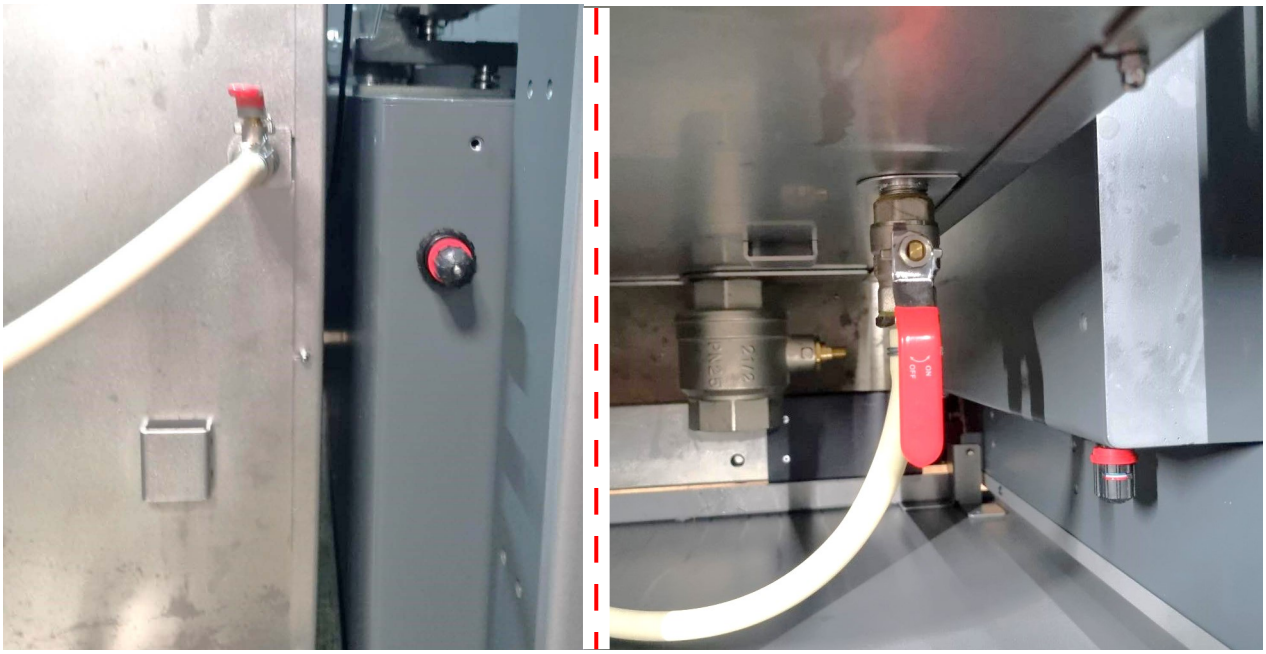
It is recommended that you recalibrate the recoater blade whenever it is removed/replaced from the printer, to ensure that recoater vacuum is able to function optimally.

Set-Up Procedure

1. Remove the front panel of the Neo800+ to gain access to the vacuum bleed-valve, located on the right side of the frame.

> You can access the bleed valve from above after you remove the resin-drip tray, however it is easier to access via the front panel.

Figure 245: Vacuum bleed valve: view from front (left) and top (right)



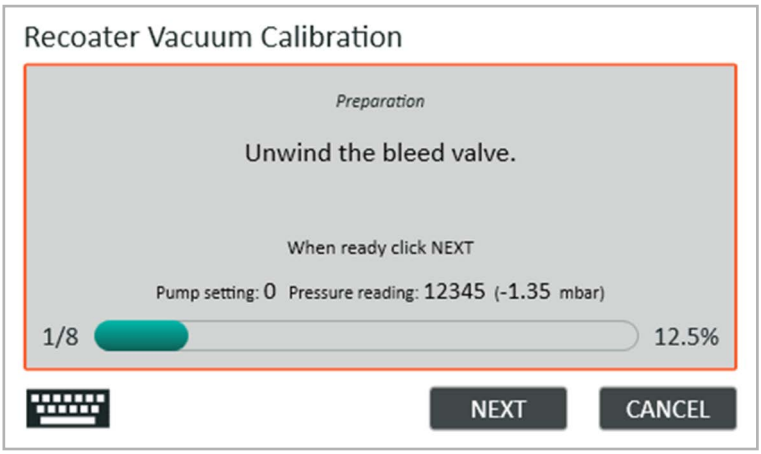
2. Change the user privileges to ‘Admin’ and navigate to the *System* > *Motion Control* tab.

3. Tap  in the **Recoater** section of the *Motion Control* tab.

Figure 246: *System* screen > *Motion Control* tab (Neo800+)

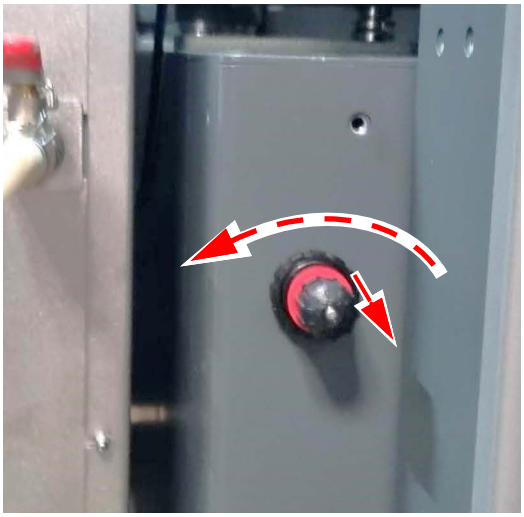
4. Follow the on-screen prompts until the following screen appears.

Figure 247: *Recoater Vacuum Calibration* screen



5. Unlock the bleed valve by pulling the red locking-ring forward, and then turn the bleed valve counter-clockwise as far as possible.

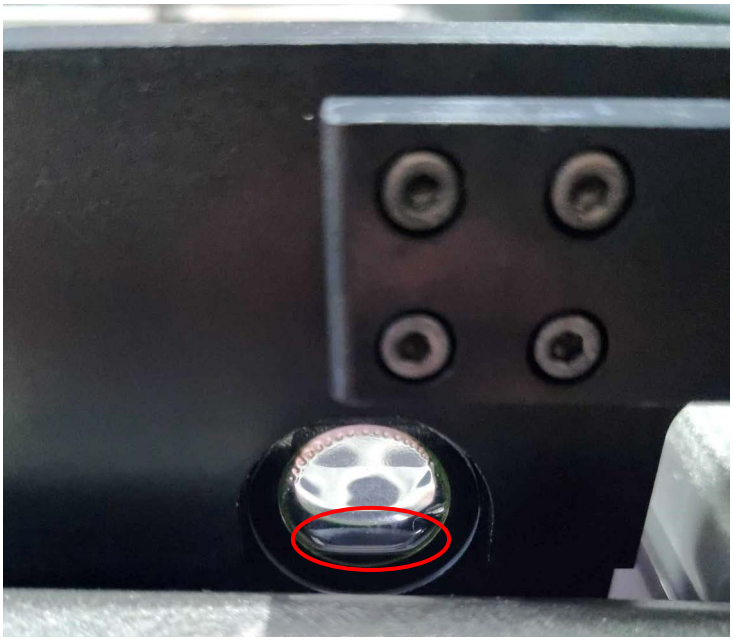
Figure 248: Pulling the red ring and then turning the bleed valve



6. Tap **Next** on the *Recoater Vacuum Calibration* screen (Figure 247 on page 227).
7. On the bleed valve, pull the red locking-ring forward to unlock it, then slowly turn the bleed valve clockwise until you see resin at the bottom of the recoater view window.

Make small adjustments and wait for the resin to respond. There can be a short period of time before you see the effects of your adjustments.

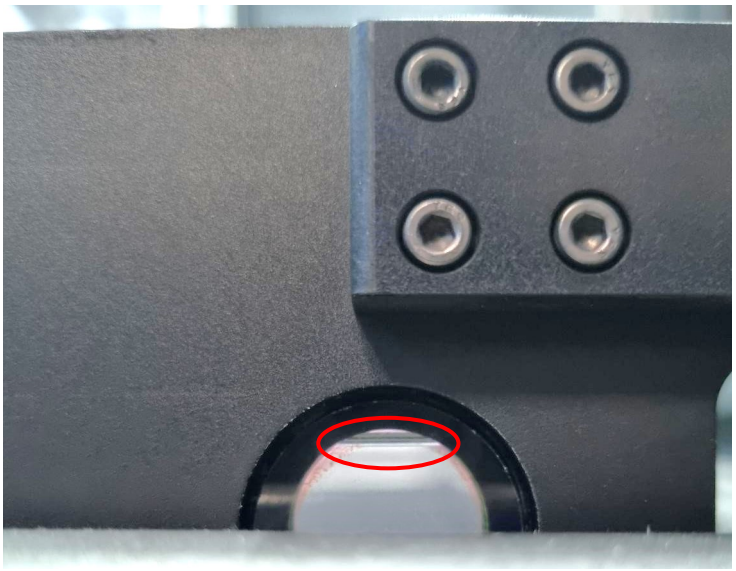
Figure 249: Resin appears on the bottom of the view-window



8. After the resin level is stable near the bottom of the view window, tap **Next** and wait for the pressure in the recoater blade to settle.
9. When prompted, begin slowly turning the bleed valve clockwise until the resin level approaches 1-2 mm below the top of the view window.

> Make small adjustments and wait for the resin to respond. There can be a short period of time before you see the effects of your adjustments.

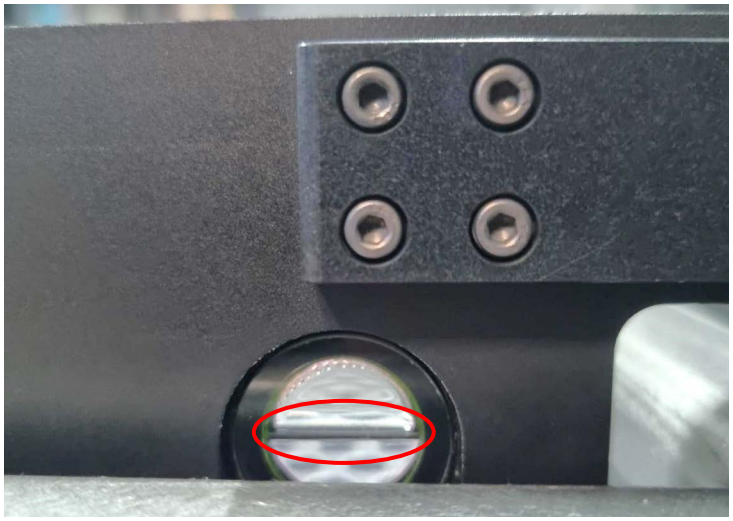
Figure 250: Resin level appears near the top of the view-window



Once the resin is stable and sitting 1-2 mm below to top of the sight glass, press next and wait for the pressure in the recoater blade to settle.

When prompted turn the bleed valve counter clockwise until the resin level reaches approximately the center of the view window. Make small adjustments and wait for the resin to react, there can be a short period of time to see the effects of adjustments.

Figure 251: Resin level appears in the middle of the view-window



Once the resin is stable at the center of the sight glass, press next and wait for the pressure in the recoater blade to settle.

The calibration will now report that it is complete. Press Finish to close the procedure,

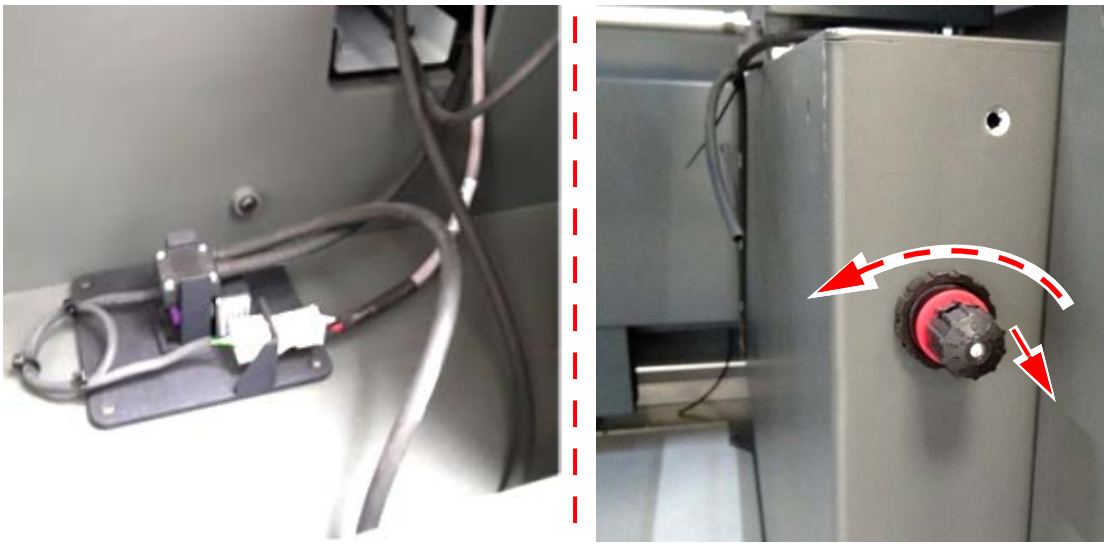
Press the red lock ring on resin control valve into its locked position and replace the front panel.

Vacuum Level Adjustment

Procedure

1. From the control panel, navigate to Motion Control and select **Level Resin**.
2. On the frame to the right of the vat, locate the resin level bleed valve, pull the red lock ring forwards.

Figure 252: Vacuum pump and adjustment valve



3. Turn the resin-level control valve, bring the resin level in the window to approximately the middle of the window. Clockwise will raise the level, counter-clockwise will lower it.

> Allow several minutes for the level to settle after each adjustment.

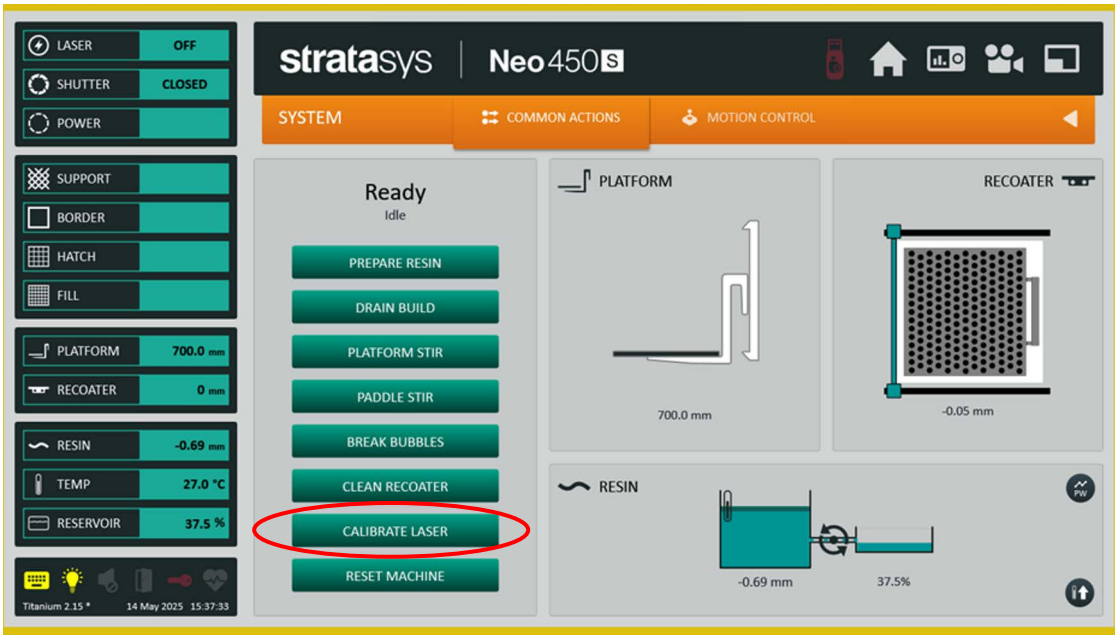
Figure 253: Resin level view-window

Laser Calibration Procedure

When instructed by a trained service provider, it may be required to perform a laser power calibration. This procedure is accessed by logging into Titanium as an ADMIN user.

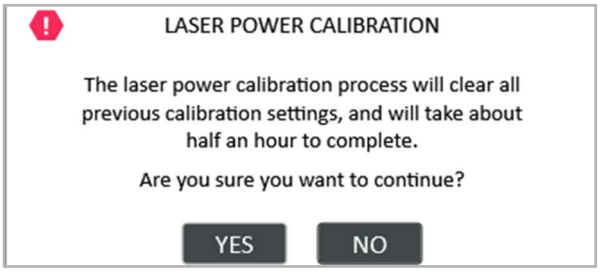
The CALIBRATE LASER button is then visible near the bottom of the *System* screen, *Common Actions* tab.

Figure 254: *System* > *Common Actions* tab, using Admin permission



Titanium then requests verification to proceed:

Figure 255: *Laser Power Calibration* confirmation



The printer begins the calibration procedure. This can take approximately 30 minutes. No further user interaction is needed.
Do not interrupt this procedure or open any doors on the printer during this time.

Warning: Laser Exposure.
Do not open the printer door when the Shutter Status is Open. This may lead to exposure of Class 4 laser radiation.

When the procedure is complete, Titanium returns to the standard screen.

7 Troubleshooting

This chapter describes troubleshooting steps that can be performed to correct basic problems with the printers.

Getting Help

If you have a problem with your printer or the printer's materials that is not covered in this guide, or if you need to order replacement parts, please contact Customer Support for your region. Contact information is available from the Stratasys website at: https://support.stratasys.com/en/Contact-Us.

Before calling for service or supplies, always have the following information ready:

- Your printer's software version.
- Your printer's serial number.

Neo450 Fuses

Always contact Stratasys support before replacing fuses.

Figure 256: Neo450 fuse locations (part 1)

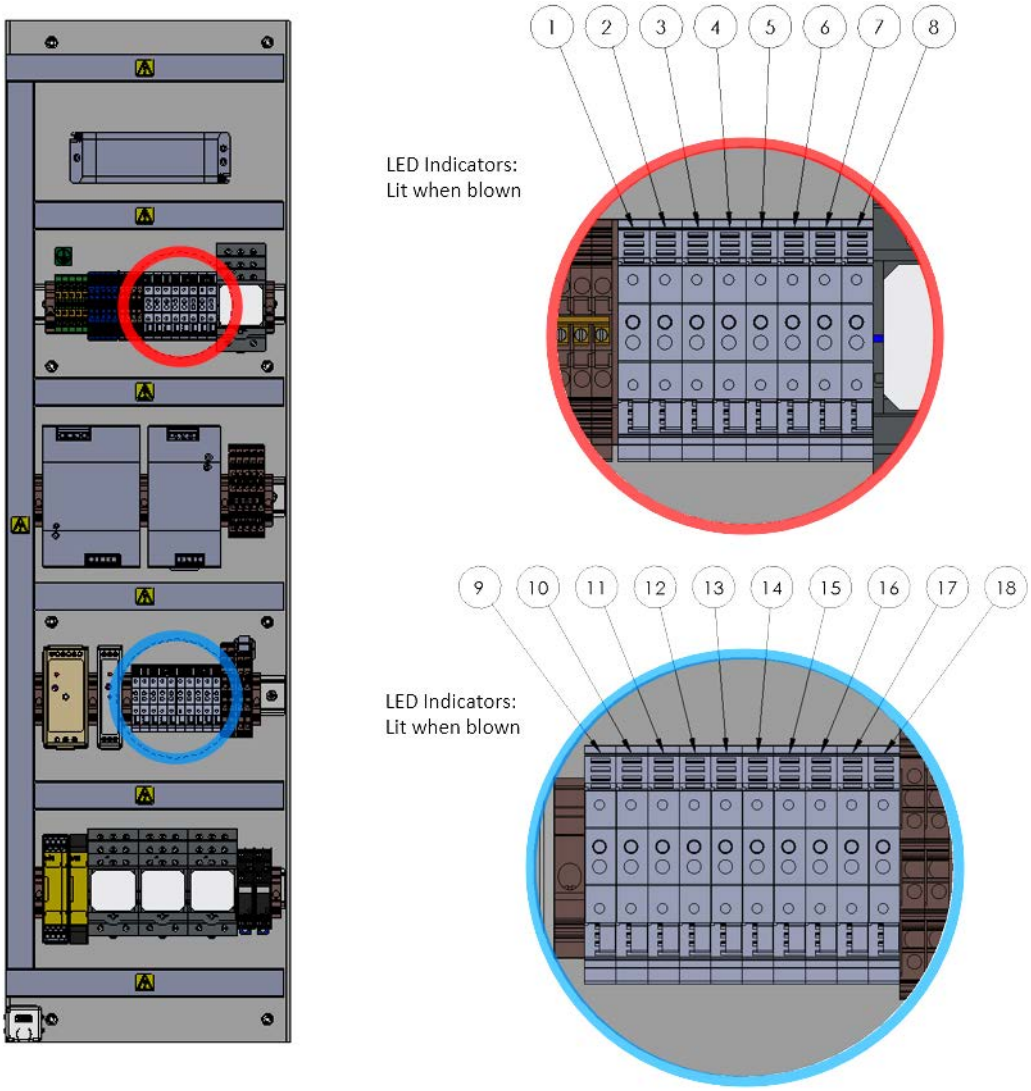


Figure 257: Neo450 fuse locations (part 2)

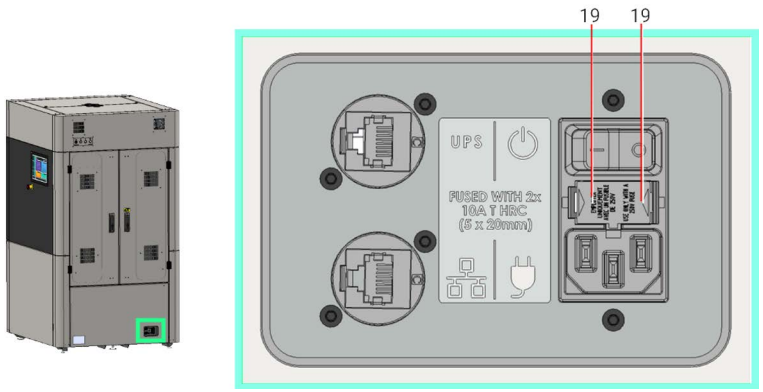


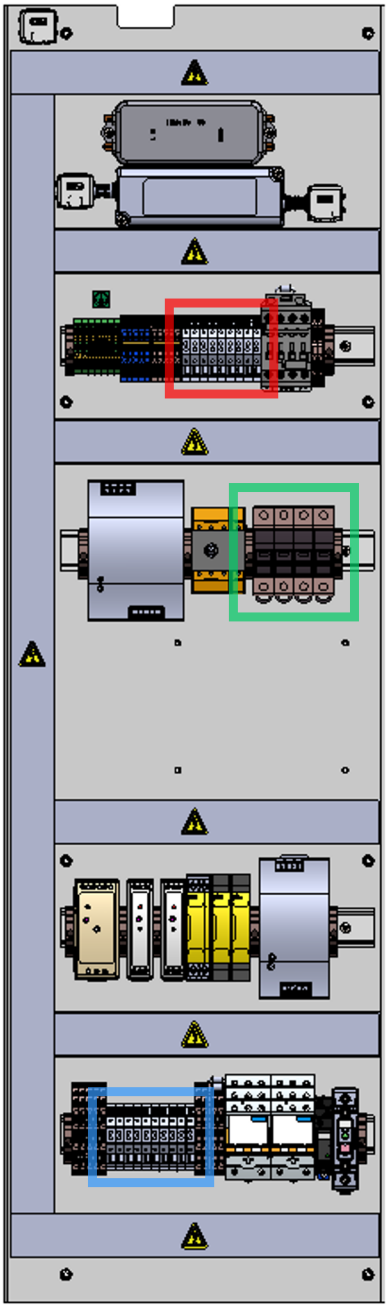
Table 62: Neo450 fuse specifications

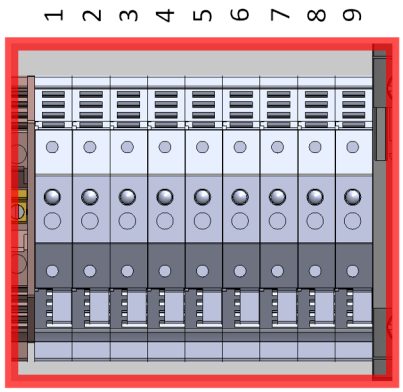
AC Fuses	ID	Rating	Specification	Size (mm)
PSU1	1	1.0 A	Anti-Surge, T	5 x 20
PSU2	2	1.0 A	Anti-Surge, T	5 x 20
PSU4	3	2.5 A	Anti-Surge, T	5 x 20
PSU5	4	2.5 A	Anti-Surge, T	5 x 20
PSU6, LED Driver	5	2.0 A	Anti-Surge, T	5 x 20
PSU7	6	2.0 A	Anti-Surge, T	5 x 20
Vat Heater	7	6.3 A	Anti-Surge, T	5 x 20
Reservoir Heater	8	2.0 A	Anti-Surge, T	5 x 20
DC Fuses	**ID**	**Rating**	**Specification**	**Size (mm)**
Safety Relay, Heater Safety Relay	9	630 mA	Quick Blow, F	5 x 20
SIB, PLC BUS	10	1.6 A	Quick Blow, F	5 x 20
User Interface Control Lamps	11	630 mA	Quick Blow, F	5 x 20
Interlock Safety Relays	12	630 mA	Quick Blow, F	5 x 20
Vacuum Pump, Vacuum Sensor	13	630 mA	Quick Blow, F	5 x 20
Monitor	14	1.6 A	Quick Blow, F	5 x 20
Cabinet Fan	15	630 mA	Quick Blow, F	5 x 20
Stepper Motor PLC Supply	16	6.3 A	Quick Blow, F	5 x 20
Computer PSU	17	6.3 A	Quick Blow, F	5 x 20
PLC Processor	18	6.3 A	Quick Blow, F	5 x 20
Main Isolator Fuses	**ID**	**Rating**	**Specification**	**Size (mm)**
Live	19	10.0 A	HRC, Anti-Surge, T	5 x 20
Neutral	19	10.0 A	HRC, Anti-Surge, T	5 x 20

Neo800 Fuses

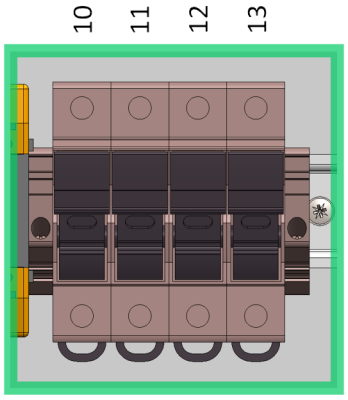
Always contact Stratasys support before replacing fuses.

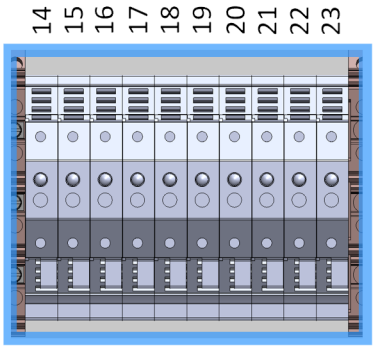
Figure 258: Neo800 fuse locations





LED Indicators: Lit when blown





LED Indicators: Lit when blown

Table 63: Neo800 fuse specifications

AC Fuses	ID	Rating	Specification	Size (mm)
PSU1	1	1.0 A	Anti-Surge, T	5 x 20
PSU2	2	1.0 A	Anti-Surge, T	5 x 20
PSU3	3	2.5 A	Anti-Surge, T	5 x 20
PSU4	4	2.5 A	Anti-Surge, T	5 x 20
PSU5	5	2.0 A	Anti-Surge, T	5 x 20
PSU6, LED Driver	6	2.0 A	Anti-Surge, T	5 x 20
PSU7	7	2.0 A	Anti-Surge, T	5 x 20
Vat Heater	8	6.3 A	Anti-Surge, T	5 x 20
Reservoir Heater	9	2.0 A	Anti-Surge, T	5 x 20
Main Isolator Fuses	**ID**	**Rating**	**Specification**	**Size (mm)**
Live	10	10.0 A	HRC, Anti-Surge, T	10 x 38
Neutral	11	10.0 A	HRC, Anti-Surge, T	10 x 38
UPS Live (Optional)	12	6.0 A	HRC, Anti-Surge, T	10 x 38
UPS Neutral (Optional)	13	6.0 A	HRC, Anti-Surge, T	10 x 38
DC Fuses	**ID**	**Rating**	**Specification**	**Size (mm)**
Safety Relay, Heater Safety Relay	14	630 mA	Quick Blow, F	5 x 20
SIB, PLC BUS	15	1.6 A	Quick Blow, F	5 x 20
User Interface Control Lamps	16	630 mA	Quick Blow, F	5 x 20
Interlock Safety Relays	17	630 mA	Quick Blow, F	5 x 20
Vacuum Pump, Vacuum Sensor[a]	18	630 mA	Quick Blow, F	5 x 20
Monitor	19	1.6 A	Quick Blow, F	5 x 20
Cabinet Fan	20	630 mA	Quick Blow, F	5 x 20
Stepper Motor PLC Supply	21	6.3 A	Quick Blow, F	5 x 20
Computer PSU	22	6.3 A	Quick Blow, F	5 x 20
PLC Processor	23	6.3 A	Quick Blow, F	5 x 20

Neo800+ Fuses

Always contact Stratasys support before replacing fuses.

Figure 259: Neo800+ fuse locations

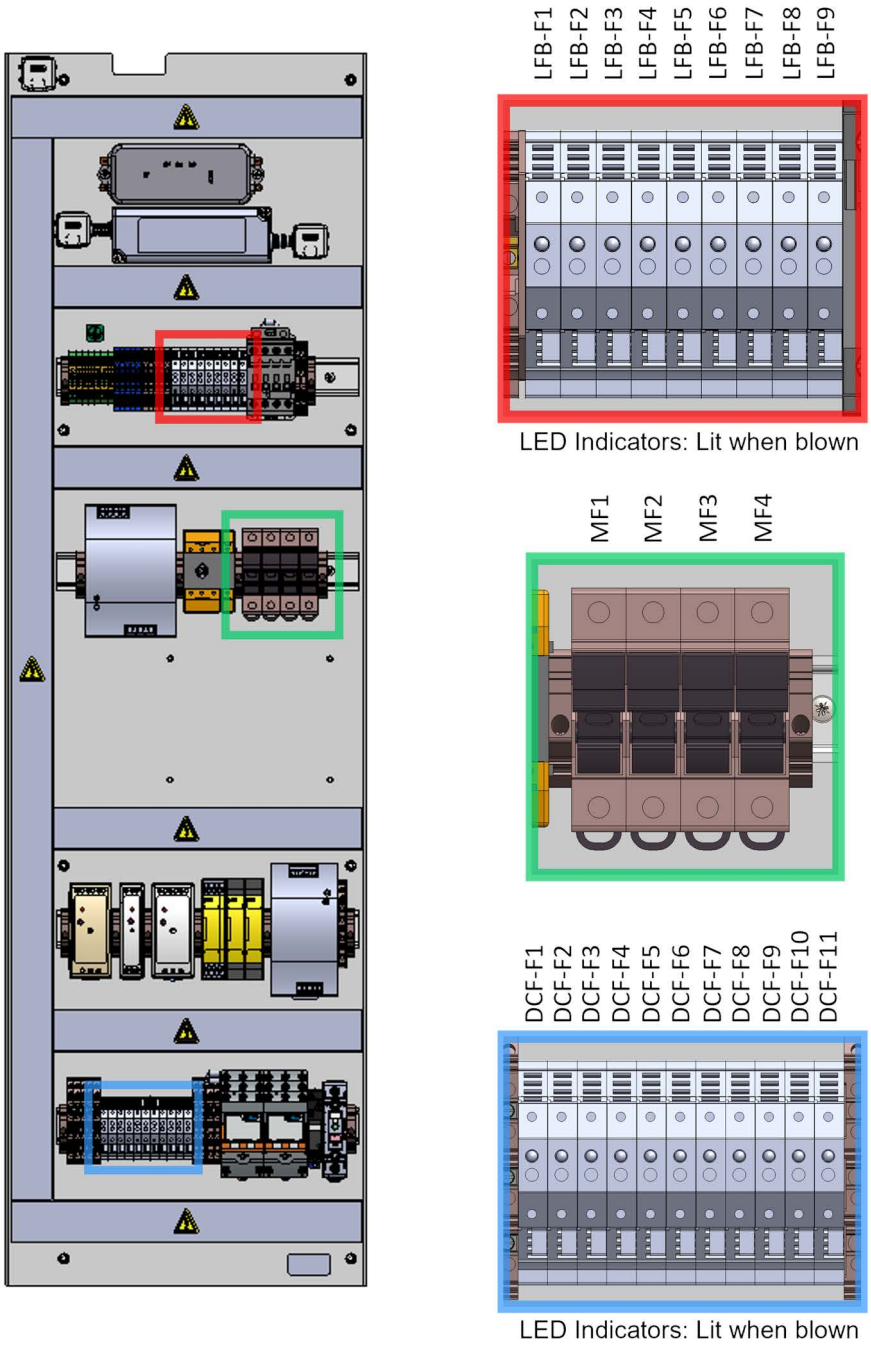


Table 64: Neo800+ fuse specifications

AC Fuses	ID	Rating	Specification	Size (mm)
PSU1	LFB-F1	1.0 A	Anti-Surge, T	5 x 20
PSU2	LFB-F2	1.0 A	Anti-Surge, T	5 x 20
PSU3	LFB-F3	2.5 A	Anti-Surge, T	5 x 20
PSU4	LFB-F4	2.5 A	Anti-Surge, T	5 x 20
PSU5	LFB-F5	2.0 A	Anti-Surge, T	5 x 20
PSU6, LED Driver	LFB-F6	2.0 A	Anti-Surge, T	5 x 20
PSU7	LFB-F7	2.0 A	Anti-Surge, T	5 x 20
Vat Heater	LFB-F8	6.3 A	Anti-Surge, T	5 x 20
Reservoir Heater	LFB-F9	2.0 A	Anti-Surge, T	5 x 20
Main Isolator Fuses	**ID**	**Rating**	**Specification**	**Size (mm)**
Live	MF1	10.0 A	HRC, Anti-Surge, T	10 x 38
Neutral	MF2	10.0 A	HRC, Anti-Surge, T	10 x 38
UPS Live (Optional)	MF3	6.0 A	HRC, Anti-Surge, T	10 x 38
UPS Neutral (Optional)	MF4	6.0 A	HRC, Anti-Surge, T	10 x 38
DC Fuses	**ID**	**Rating**	**Specification**	**Size (mm)**
Safety Relay, Heater Safety Relay	DCF-F1	630 mA	Quick Blow, F	5 x 20
SIB, PLC BUS	DCF-F2	1.6 A	Quick Blow, F	5 x 20
User Interface Control Lamps	DCF-F3	630 mA	Quick Blow, F	5 x 20
Interlock Safety Relays	DCF-F4	630 mA	Quick Blow, F	5 x 20
Vacuum Pump, Vacuum Sensor[a]	DCF-F5	630 mA	Quick Blow, F	5 x 20
Monitor	DCF-F6	1.6 A	Quick Blow, F	5 x 20
Cabinet Fan	DCF-F7	630 mA	Quick Blow, F	5 x 20
Stepper Motor PLC Supply	DCF-F8	6.3 A	Quick Blow, F	5 x 20
Computer PSU	DCF-F9	6.3 A	Quick Blow, F	5 x 20
PLC Processor	DCF-F10	6.3 A	Quick Blow, F	5 x 20
Filtration System	DCF-F11	630 mA	Quick Blow, F	5 x 20

8 Regulatory and Environmental Information

Declaration of Conformity

Declaration of Conformity information is available from your Stratasys representative. Please contact your local regional office for a copy of this document.

Electromagnetic Compatibility (EMC)

EMC Class A Warning

Warning:
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Statements (U.S.A.)

The U.S. Federal Communications Commission (in 47 cfr1 5.105) has specified that the following notices be brought to the attention of users of this product.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Stratasys contact information is available from the Stratasys Support Center.

Caution:
Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this equipment not expressly approved by Stratasys, ltd. may cause harmful interference and void the FCC authorization to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Models:

Neo450e

Neo450s

Neo800

Neo800+

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Conformité Européenne (CE) Marking

This European conformity mark indicates that the printer conforms with European health, safety, and environmental protection standards.

UK Conformity Assessed (UKCA) Marking

This conformity mark indicates that the printer conforms with the applicable requirements for products sold within Great Britain.

Canada Electromagnetic compatibility (EMC)

Normes de Sécurité (Canada)

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le réglement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

DOC Statement (Canada)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

GrabCAD and GDPR

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

MSDS (Material Safety Data Sheet)

You can obtain current Material Safety Data Sheets for printer materials from the Stratasys website at: http://www.stratasys.com/materials/material-safety-data-sheets.

Waste Electrical and Electronic Equipment Directive (WEEE) Symbol

In the European Union (EU), this symbol indicates that when the last user wishes to discard a product, it must be sent to appropriate facilities for recovery and recycling. For information about proper disposal, check your purchase contract, or contact the supplier of the equipment.

www.stratasys.com

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c-support@stratasys.com

DOC-60028 Rev. B