D30+ | D30+ ortho
P30+
SheraPrint 30

Original operating instructions

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EN

About these Operating instructions

These operating instructions enable the safe and efficient use of the machine. The operating instructions are part of the product and must be kept accessible to the personnel in its immediate vicinity at all times.

Personnel must carefully read and understand these instructions before starting any work. Compliance with the safety instructions and handling instructions specified in this manual is the prerequisite for safe working practices.

In addition, the local health and safety regulations and general safety regulations apply to the area of application of the machine.

After the editorial deadline of this documentation, the product may have changed. We expressly reserve the right to make changes to the technical data or design as well as changes to the scope of delivery.

The original operating instructions were created in German.
Our general terms and conditions apply.

Product type:

These instructions are valid for the following models:

- D30+
- D30+ ortho
- P30+
- SheraPrint 30

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1 Safety

1.1 Symbols in this manual

Safety instructions

The safety instructions in this manual are marked with symbols. The safety instructions are introduced by signal words that express the extent of the hazard.

DANGER!

This combination of symbol and signal word indicates an imminently dangerous situation which may lead to death or severe injury if not avoided.

WARNING!

This combination of symbol and signal word indicates a potentially dangerous situation which may lead to death or severe injury if not avoided.

CAUTION!

This combination of symbol and signal word indicates a potentially dangerous situation which may lead to minor or slight injuries if not avoided.

NOTE!

This combination of symbol and signal word indicates a potentially dangerous situation which may lead to material damage if not avoided.

NOTE!

This combination of symbol and signal word indicates a potentially dangerous situation which, if eye protection (UV goggles) is not worn, may result in eye damage.

NOTE!

This combination of symbol and signal word indicates a potentially dangerous situation which, if gloves are not worn, may result in hand injuries.

ENVIRONMENTAL PROTECTION!

This combination of symbol and signal word indicates potential dangers to the environment.

Special safety instructions

In order to draw attention to particular dangers, the following symbols are used in safety notices:

Warning: dangerous electrical voltage

Warning: hand injuries

Warning: UV radiation

Warning: sharp objects

Tips and recommendations

This symbol highlights useful tips and recommendations, as well as information for efficient and trouble-free operation.

1.2 Intended use

The 3D printing system is designed for the printing of three dimensional objects with wavelength and DLP suitable printing materials (flash point >80°C) in additive production (DLP-processing). The digital workflow (→ Chapter 1.2.1) is to be observed.

The printer system is designed for temperature controlled interiors. (→ Chapter 12)

Proper use requires compliance with all information in this manual.

Any use going beyond the intended use or otherwise is deemed to be improper. The operator is exclusively liable for any resulting damage.

Use contrary to the intended use includes, but is not limited to the following actions:

- Operation within potentially explosive areas
- Operation with explosion-hazardous printing materials
- Outdoor operation
- Operation in tropical climates
- Operation in wet, damp rooms
- Operation without sufficient instruction
- Operation without material reservoir and without building platform
- Operation with defective or modified safety devices
- Operation without mandatory safety equipment
- Operation with unauthorised spare parts
- Operation with non-wavelength and printing materials not suitable for DLP processing.
- Remove or change the attached safety markings
- Improper conversions, modifications, repairs and maintenance

1.2.1 Digital Workflow

1	2	3	4	5	6
Creation of 3D data	Processing the 3D data	Preparation of 3D data for the printer system	Printing the 3D components	Post-processing	Use of the component

The 3D printer system described in this manual is part of the digital workflow and is used in steps 3 and 4.

1.3 Safety equipment

General

WARNING!

Danger with non-functioning or dismantled safety devices!

Safety equipment must be checked for function each time the printer is turned on. These may not be removed or changed. Improperly functioning or removed safety devices can lead to life threatening injuries.

- All safety equipment must be checked for function each time the printer is turned on.
- If the safety devices are not functioning correctly, the operation must be stopped immediately. Defective safety devices must be replaced immediately.

Safety covers (Protective hood)

The protective covers of the printer protect against direct contact with the live electrical equipment of the printer and direct exposure to UV radiation. They must not be removed or opened during operation.

Check that all safety covers are firmly installed and can be completely closed.

1.4 Attached safety markings

WARNING!

Danger from illegible signs!

Over time, stickers and signs may become dirty or otherwise unrecognisable, so that dangers cannot be detected and necessary operating instructions cannot be followed. Thereby a risk of injury arises.

- All safety, warning and operating instructions must always be in a legible state.
- Damaged labels and signs must be renewed.

The following stickers and signs are in the work area. They refer to the immediate environment in which they are attached.

Live components

The areas marked with this symbol can be live. Work in these areas may only be carried out by qualified electricians.

Hand injuries

The building space of the machine marked with this symbol consists of moving parts among others. Work in the building space of the machine may only be carried out with the machine in an inactive state. There is a danger of hand injuries.

UV radiation

Working in the area of the machine marked with this sign may result in exposure to UV radiation. Work in this area may only be carried out when wearing UV protection goggles.

Wear UV protective goggles

It is recommended to wear protective goggles to protect the eyes from direct UV radiation.

1.5 Residual risks

The machine is designed and manufactured according to the state of the art and according to current safety requirements. Nevertheless, residual risks remain, which require prudent action. The following lists the residual risks and the resulting behaviour and measures.

1.5.1 Electrical current

DANGER!

Danger to life due to electric current!

Incorrect connection, insulation faults, foreign objects (dust, liquid due to inappropriate installation environment) or lack of grounding can lead to housing parts being live. There is an imminent danger of electrocution in the event of contact with live parts.

- Work on the electrical equipment may only be carried out by qualified electricians and in compliance with the relevant safety and VDE regulations.
- Machines with damage to the power cord, insulation or lack of earthing must be disconnected from the mains immediately. Repairs are to be made immediately.
- Before starting work on active parts of the electrical equipment and operating material, make sure that it is de-energised and secure for the duration of the work.
- Fuses must never be bypassed or put out of service.
- Connect the mains plug to the nearest and correctly grounded socket of the machine.
- Only operate the machine with the mains voltage specified for the machine.
- The mains plug must be freely accessible at all times. A complete separation of the machine from the mains in an emergency by pulling out the power plug (→ Chapter 5).
- Disconnect the machine in case of prolonged absence and in the case of storms.
- Keep moisture away from live parts. This may lead to short circuiting.

1.5.2 Mechanical dangers

CAUTION!

Risk of injury due to moving parts!

The machine consists in part of accessible parts that can easily cause hand injuries through
crushing or getting caught.

- The machine may only be operated with the protective hood closed.
- During the printing process and the manual procedure of the building platform, no fingers or hands may be inserted into the building space of the machine.

CAUTION!

Risk of injury due to sharp objects!

The blade of the integrated peel-off device has a sharp edge that can cause slight hand injuries through direct contact.

- The blade must never be touched directly on the cutting edge.

1.5.3 UV radiation

CAUTION!

Risk of injury from UV radiation!

The printing process, as well as the calibration of the exposure unit, take place under the influence of UV radiation. UV radiation can cause eye and skin damage in the case of very long and direct exposure, as well as without the wearing of prescribed protective equipment.

- The machine may only be operated with the protective hood closed.
- During the printing process and manual process of the building platform, as well as any other work with and on the 3D printing system, the UV protective goggles supplied must be worn.
- It is recommended to wear UV protective goggles whenever working on the machine.

1.5.4 Chemical dangers

WARNING!

Risk of injury due to harmful substances!

The chemical substances required for production and post-processing can release harmful vapours and cause dizziness and irritation of the respiratory tract. Direct skin contact may cause skin
irritation.

- It is necessary to provide sufficient fresh air.
- Wear appropriate protective clothing and carry out the work with ventilation if necessary.
- Follow the dosing instructions of the respective manufacturer.
- Read the appropriate safety data sheets carefully.

1.5.5 Danger of material damage

Overheating

NOTE!

Material damage due to overheating!

Too high ambient temperatures and a disabled air outlet may overheat the overall system.

- The air outlet must never be covered.
- Maintain the specified ambient temperature (→ Chapter 12.1).
- Never install the machine in a closed cabinet.
- Keep a minimum distance of 20 cm behind the machine so that the heat generated can be dissipated without hindrance.

Environmental conditions

NOTE!

Material damage due to environmental conditions!

Separate environmental conditions may result in property damage to the machine.

- Protect the machine from moisture, dripping water and splashing water.
- Protect the machine from dust in excessive quantities.
- Protect the machine from heat and direct sunlight.
- Keep open flames away from the machine.
- Do not place objects filled with liquids (such as drinks) in the immediate vicinity of the machine.

1.6 Personnel requirements

WARNING!

Risk of injury in case of inadequate qualification of personnel!

If unqualified personnel carry out work on the machine, dangers arise which can cause injuries and material damage.

- All activities must be carried out by qualified personnel only.

The following are the required qualifications of the personnel to work with the machine:

Operator

The operator is the person who operates the equipment for commercial or economic purposes or loans it to a third party for operation and bears legal product responsibility during the operation for the protection of the user, the personnel or third parties.

The operator has been trained by the manufacturer in handling the machine and the necessary accessories and can recognise possible dangers independently and avoid hazards.

Operator obligations

The operator

- is obligated to read these operating instructions fully before using the system for the first time.
- is obligated to ensure that all persons working with the machine have read and fully understood the contents of these operating instructions.
- is obligated to provide these operating instructions for the personnel at a fixed location near the machine.
- is obligated to inform regularly all persons who work with the machine about the current general accident protection guidelines. must ensure that precautionary safety measures at work are respected.
- is obligated to inspect regularly and keep up-to-date first aid facilities and fire protection.
- is obligated to provide the prescribed safety equipment to all persons working with the machine.
- is obligated to check all safety devices and safety equipment regularly for their functionality.

Qualified electricians

Due to their professional training, knowledge and experience as well as knowledge of the relevant standards and regulations, electricians are able to carry out work on electrical systems and to recognise and avoid possible dangers independently. The qualified electrician has been specially trained in the working environment in which he or she is active.

Basic requirements of the personnel

Only persons who can be expected to perform their work reliably are eligible as qualified personnel. People whose response capacity has been affected, e.g. through drugs, alcohol or medication, may not work on the machine.

Personnel who are being trained, instructed, taught or undergoing general apprenticeships should only be allowed to work on the machine under the constant supervision of the operator.

1.7 Personal protective equipment

Description of the personal protective equipment

Personal protective equipment helps protect people from negative impacts on their safety and health.

Personnel must wear personal protective equipment while working on and with the machine, as referred to in the individual sections of this manual.

The personal protective equipment must be provided by the operator and must be checked for function before starting work on the machine. The following describes the personal protective equipment:

UV protective goggles

Wearing UV goggles protects the eyes from harmful UV radiation.

Protective gloves

Wearing protective gloves protects the skin from contact with skin damaging materials.

Miscellaneous

We recommend tying up long open hair and wearing under a hair protector.

1.8 Environmental protection

ENVIRONMENTAL PROTECTION!

Danger to the environment through incorrect disposal of materials!

Improper disposal of printing materials and cleaning agents can cause considerable damage to the environment.

— Dispose of all materials according to local waste disposal regulations. Please take note of the safety data sheets of the respective materials.

2 Overview

2.1 Machine assembly / Operating elements

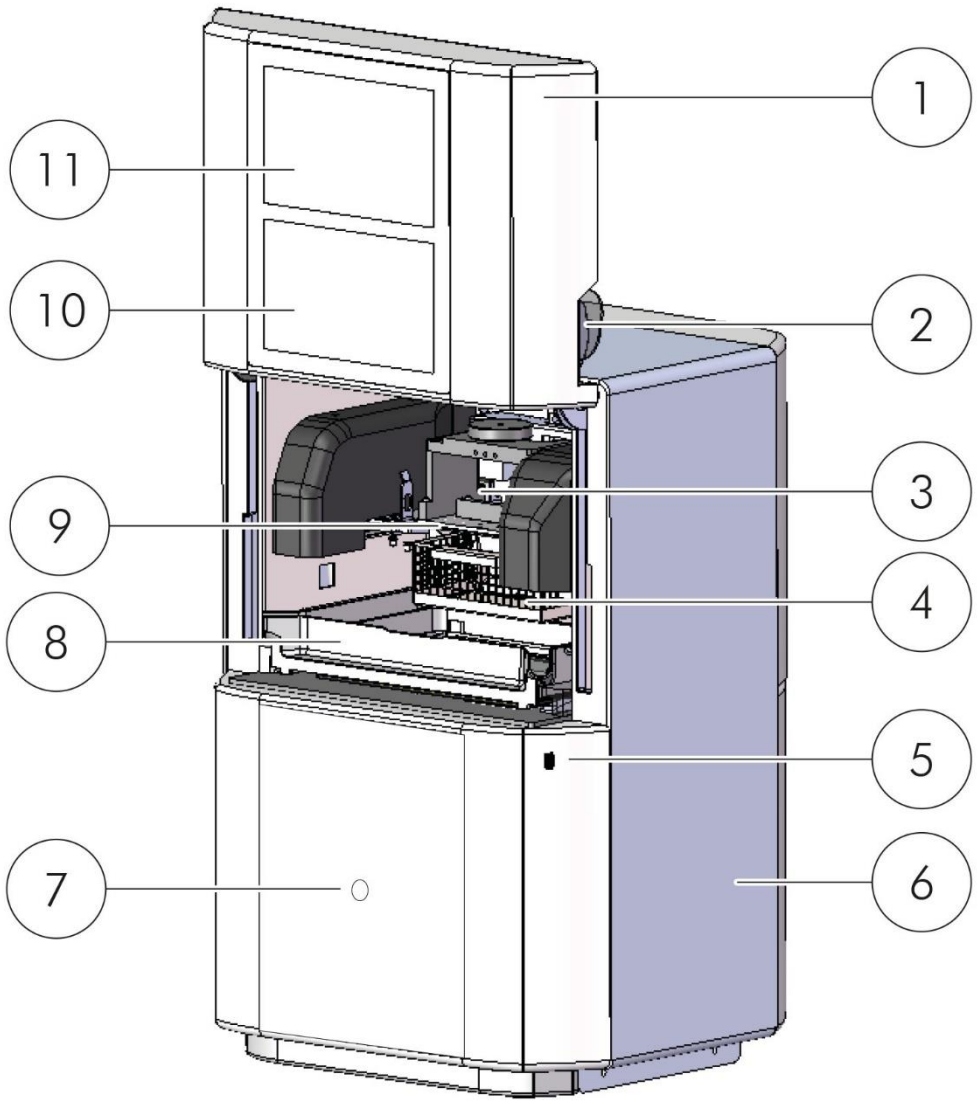

Figure 1: Machine overview

1. Hood
2. Hood handle
3. Building platform
4. Collecting basket
5. USB port
6. Frame
7. Touch point hood opening
8. Material reservoir
9. Blade (peel-off device)
10. Viewing window
11. Touch display

2.2 Serial plate

The serial plate is situated on the machine rear It shows the most important technical data and the serial number of the machine.

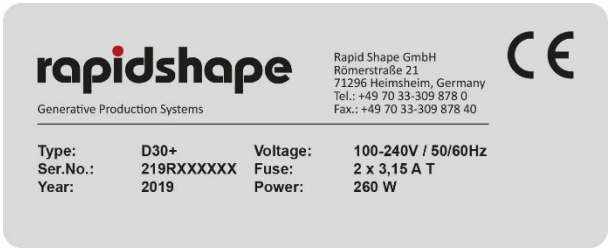

Figure 2: Serial plate D30+ (sample)

3 Transport & storage

3.1 Safety during transport

Heavy packages

CAUTION!

Risk of injury due to heavy loads!

The machine weighs up to 50 kg. Improper transport can result in back problems.

- Always lift and transport the machine with two people.
- Use suitable lifting and transport equipment.

CAUTION!

Risk of injury due to falling loads!

If the machine falls, there is a risk that body parts can be crushed.

- When transporting the machine, wear suitable protective clothing.
- Before starting the transport, it must be checked that the machine is secured to the lifting and transporting equipment with transport safety devices.
- Before starting the transport check that the transport route is clear of obstacles.

NOTE!

Material damage caused by improper transport!

Improper transport may cause the machine to fall. This can cause material damage.

- The machine may only be transported by trained qualified personnel.
- Always lift and transport the machine with two people.
- In the event of subsequent transport of the machine, it must be ensured before the start of transport that no auxiliary materials are present in the machine interior.

3.2 Transporting the machine

Transport damage

Check the transport packaging and the attached shock indicator (ShockWatch®) immediately upon receipt for visible damage. Damage must be recorded in written and image form and then immediately reported to the transport company and Rapid Shape.

Transport

Lift the machine by two people and carry it to the destination. When using lifting and transport means, these must be designed for the weight of the machine. (→ Chapter 12)

3.3 Unpacking the machine

For unpacking the machine please proceed as follows:

1. Open the lid of the transport box.
2. Remove all transport box brackets and set them aside.
3. Remove all side panels from the transport box.
4. Remove the foam protective cover on the top of the machine.
5. Loosen the transport belt around the machine with a pair of scissors or a blade. When doing so, be careful not to damage the machine.
6. Set up the machine. → Chapter 4.2.2

Store all parts of the transport box safely for future transport of the machine. Returns without original packaging cannot be accepted.

3.4 Scope of delivery

The standard delivery includes the following parts:

- 3D printing system
- Starter package

Optionally, additional accessories can be supplied. For more information, please contact Rapid Shape.

3.5 Storing the machine

Store the machine

- in a dry, dust-free and frost protected room.
- on a horizontal base.
- with closed protective hood.
- ideally in the original packaging.

Also make sure that no consumables residues remain in the machine.

4 Installation

4.1 Installation safety

DANGER!

Danger to life due to electric current!

Incorrect connection, insulation faults, foreign objects (dust, liquid due to inappropriate installation environment) or lack of grounding can lead to housing parts being live.
There is an imminent danger of electrocution in the event of contact with live parts.

- Work on the electrical equipment may only be carried out by qualified electricians and in compliance with the relevant safety and VDE regulations.
- Machines with damage to the power cord, insulation or lack of earthing must be disconnected from the mains immediately. Repairs are to be made immediately.
- Only operate the machine with the mains voltage specified for the machine.
- The mains plug must be freely accessible at all times. A complete separation of the machine from the mains in an emergency by pulling out the power plug (→ Chapter 5).
- Keep moisture away from live parts. This may lead to short circuiting.

4.2 Setting up

4.2.1 Requirements for the installation location

For the smooth functioning of the machine, please note the following requirements at the installation location:

- dust protected room
- a room separate from other work
- sufficient fresh air supply
- protection against direct sunlight (window equipped with UV protection film)
- UV-protected exposure
- stable base (table)
- Internet connection (LAN/WLAN)

The following optional requirements are recommended:

- Sink with fresh water
- Compressed air supply
- Air conditioned environment

4.2.2 Setting up the machine

For setting up the machine please proceed as follows:

1. Prerequisite: The machine has already been unpacked.
   → Chapter 3.3
2. Lift the machine to the desired installation location with the help of a second person and put it down.
3. Remove the protective film from the machine.
4. Make sure that the four feet of the machine are completely resting on the ground. The four rubber pads must all be present.

4.3 Connecting

For connecting the machine please proceed as follows:

1. Prerequisite: The machine has already been set up.
   → Chapter 4.2.2
2. Connect the mains cable to the power connector (back of the machine).
3. Connect the opposite end of the mains cable to the nearest, properly grounded outlet. Be careful not to trip over cables lying around.
4. *Recommended: Connect the network cable to the Ethernet port on your machine (back of the machine) and to your network interface.*

5 Emergency shut down

In an emergency, proceed as follows:

1. Unplug the mains plug.

6 Preparation

6.1 Required accessories

To start a print job, as well as for the post-processing of the component, you need the following accessories:

- PC (for the creation of print data, (→ Chapter 6.3)
- Print accessories (→ Chapter 6.2)
- Cabinet (lockable, storage of material bottles)
- Reservoir box (lockable, storage of material reservoirs)
- Washing/cleaning unit with isopropanol
- Post-exposure unit
- Disposable gloves (various sizes)
- Cleaning cloths
- Waste container (lockable)
- Working surface (flat, sufficient space)

The following optional accessories are recommended:

- Compressed air supply with compressed air pistol (2 bar)

6.2 Print Accessories

To start a print job, you need the following print supplies:

- 1 disposable building platform
- 1 disposable reservoir
- 1 material bag

Up-to-date information on printing materials, such as safety data sheets, technical data sheets and manuals, can be found in our Knowledge Centre: www.rapidshape.de/kc

6.3 IT requirements

Hardware

To create the print data (CAD design, nesting and slicing) you need a PC with the following requirements:

- Quad core CPU (Intel Core i5 or i7) @ 2.50 GHz
- 4 GB of main memory (min.) // 8 GB recommended
- 1 GB + free hard disk space
- upwards of Windows 7 32-bit / 64-bit
- WLAN/LAN connection
- Network connection between PC - machine (for example via router)

Software

For the production of print data (CAD design, nesting and slicing), as well as for service purposes, you need the following software on your PC:

- netfabb Rapid Shape (→ USB stick or www.rapidshape.de/kc)
- TeamViewer Host (→ www.teamviewer.com)

IP address

By default, the 3D printer system is set to DHCP (dynamic IP address). If you want to use a static IP address, it can be set in the 'Settings' menu of your machine.

6.4 Netfabb

The slicing software 'netfabb' is needed for the further processing of your print file.

For further information on the operation of netfabb, refer to the separately available operating instructions.
→ netfabb 🕮

7 User interface

7.1 General

The machine has a touch display. By pressing the buttons, you can switch through the user interface and open menu levels.

A standard computer keyboard or computer mouse can be connected to the printer for adjustment or service purposes. To do this, plug in the USB connector of the keyboard/mouse into the USB port of the printer. The device will be recognized automatically, the functions can be used immediately.

The following explains each menu level.

7.2 Main Menu

After switching on the machine (→ Chapter 8.2) the Home screen is displayed. (→ Figure 3) Starting from the Home screen, you can switch to the individual user interfaces or switch off the machine.

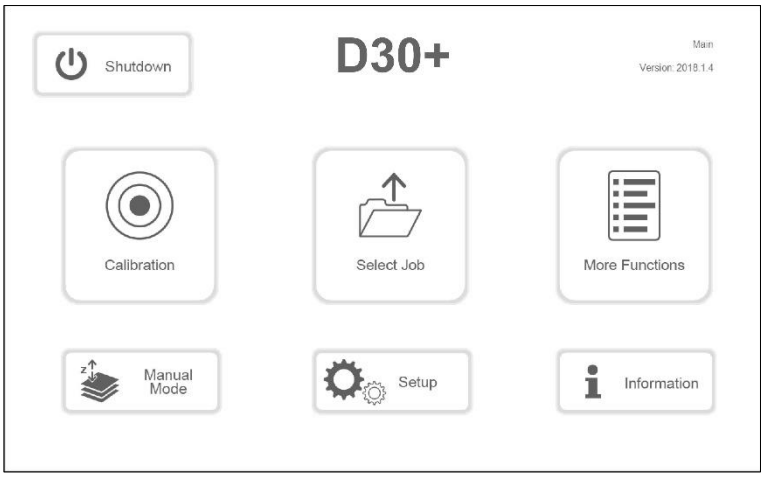

Figure 3: Main menu

7.3 Select Job

In the menu level 'Select Job' you can start your print jobs.
(→ Figure 4)

1. Main menu: Change directly to the menu level by pressing the 'Select Job' button. The job selection opens.
2. Choose your print job.
   Pressing the 'Preview' button displays a preview image of the selected job. Start a print job at a later date by pressing the 'Start Delayed' button. Enter the day and time for the delayed start. Equip the machine with a material reservoir with sufficient printing material and a clean building platform. Leave the machine switched on.
3. Start your job selection by pressing the 'Start' button.

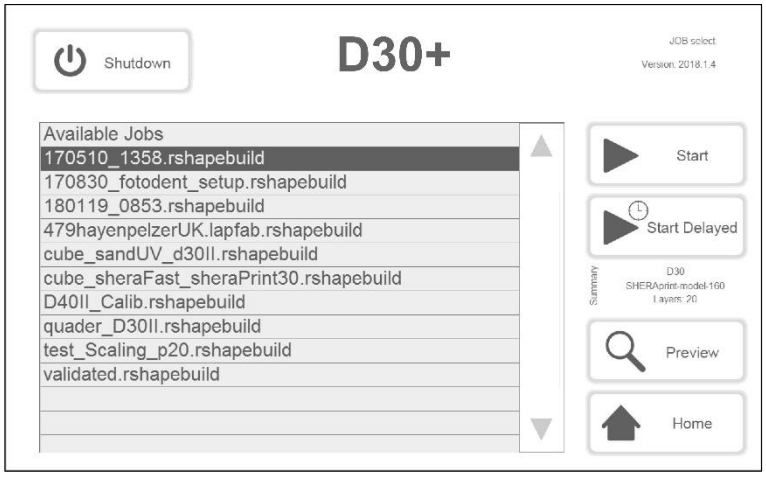

Figure 4: ‚Select Job'

7.4 More Functions

In the menu level 'More Functions' (→ Figure 5) you can carry out the automatic reservoir cleaning (removal of hardened particles at the bottom of the reservoir).

1. Main menu: Change directly to the menu level by pressing the 'More Functions' button.
2. Press the 'Clean Reservoir' button to start the reservoir cleaning. → Chapter 10.2.5

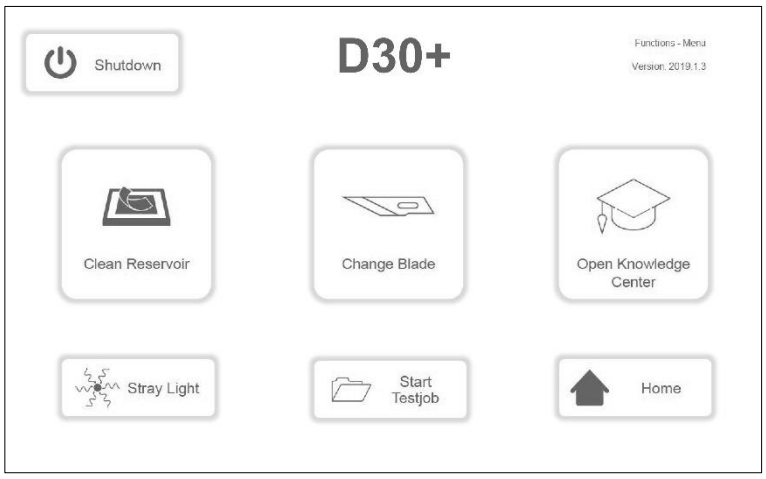

Figure 5: ‚More Functions'

7.5 Calibration

In the menu level 'Calibration' you can calibrate the exposure unit of the machine. (→ Figure 6)

1. Main menu: Change directly to the menu level by pressing the 'Calibration' button.
2. Perform the calibration according to the instructions in this manual and the instructions on the machine.

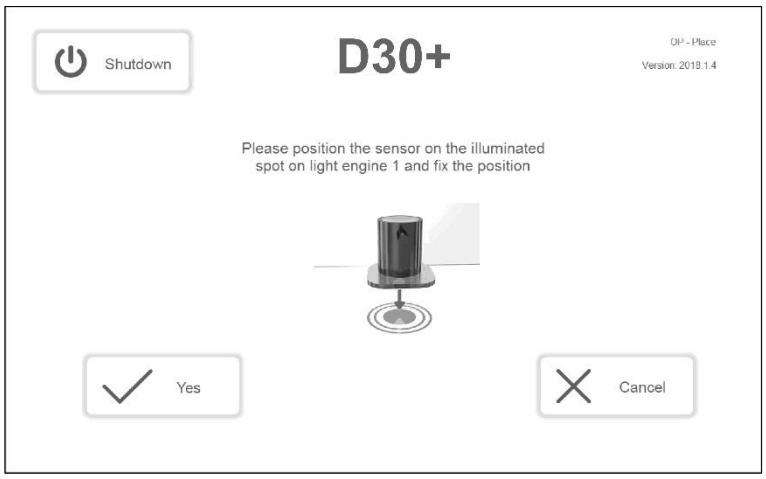

Figure 6: ‚Calibration'

7.6 Setup

In the menu level 'Setup' (→ Figure 7) you can manage all print jobs on the machine, make network settings and open the service menu.

1. Main menu: Change directly to the menu level by pressing the 'Setup' button.
2. Manage your print jobs by going to the 'File Management' menu level.
3. Change to the network settings by pressing the 'Network Settings' button.
4. For further settings, and for service purposes, you can log into the service menu.
   Some settings can only be done by Customer service (password protected).

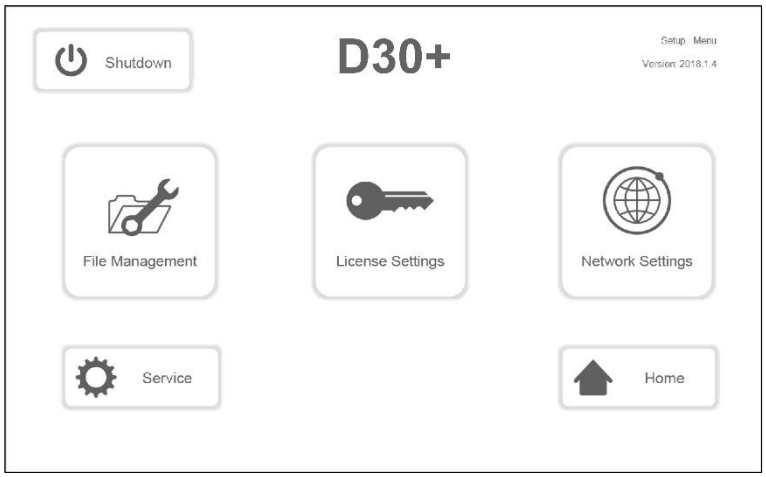

Figure 7: ‚Setup'

7.7 Information

In the menu level 'Information' (→ Figure 8), you can see general information about your machine as well as network information or the ACCS sensors currently registered on the machine (needed for the calibration of the LED).

1. Main menu: Change directly to the menu level by pressing the 'Information' button.
2. Switch between the 'General Info', 'Network Info' and 'Light Sensor' displays by pressing the respective buttons.

Figure 8: ‚Information'

8 Operation

8.1 Safety during operation

CAUTION!

Risk of injury due to moving parts!

The machine consists in part of accessible moving parts which can cause minor hand injuries from crushing and getting caught.

- The machine may only be operated with the protective hood closed.
- During the printing process and the manual procedure of the building platform, no fingers or hands may be introduced into the building space of
 the machine.

CAUTION!

Risk of injury due to sharp objects!

The blade of the integrated peel-off device has a sharp edge that can cause slight hand injuries through direct contact.

- The blade must never be touched directly on the cutting edge.

CAUTION!

Risk of injury from UV radiation!

The printing process takes place under the influence of UV radiation. UV radiation can cause eye and skin damage in the case of very long and direct exposure, as well as without the wearing of prescribed protective equipment.

- The machine may only be operated with the protective hood closed.
- It is recommended to wear UV protective goggles whenever working on the machine.

NOTE!

Wearing UV goggles protects the eyes from harmful UV radiation. During work steps in which the exposure unit is active, we always recommend wearing UV protection goggles.

NOTE!

Wearing protective gloves protects the skin from contact with skin damaging materials. During work steps in which you work with printing materials, we therefore always recommend the wearing of protective gloves.

8.2 Switching on the machine

To switch on the machine, please proceed as follows:

1. Prerequisite: The machine has already been fully connected. → Chapter 4.3
2. Switch on the machine using the main switch.
   - The machine is started, the display shows 'starting machine'.
   - The Z-axis carries out a reference run in the direction of the upper end position.
   - The user interface of the display starts, the Home screen is displayed. → Chapter 7

In order to make the operation of the machine even more comfortable, supporting messages appear at some operating points. For an optimisation of your printing processes and printing results, every message with a recommendation for action is displayed.

When starting the machine, the following supporting messages appear:

- If inserted, information about the material reservoir
- Available updates for the machine
  The available updates will not be displayed if the 'Automatic Updates' function is disabled.
  ('Setup' → 'Service' → 'Customer')
- Basic information about your machine
  (for example license status)

8.3 Open and close the machine

The machine has an automatic or manually opening/closing hood.
To open/close this, please proceed as follows:

Automatic:

1. Press on the touch point of the automatic hood opening.
   If the hood is in the closed position, the machine now opens automatically.
   If the hood is in the open position, the machine closes.

Manual:

1. Grasp the lateral grips of the hood with both hands.
2. To open the machine, pull and push the hood upwards until it is located in its end position.
3. To close the machine, pull and push the hood down until the hood is closed flush with the housing.

Automatic hood closure

To protect the printing material against the effects of light and dust, the machine automatically closes after a preset time (During printing after 30 seconds, in the main menu after 60 seconds.)

If the touch point of the automatic hood opening is pressed during the automatic hood closing, the hood moves back to its upper end position immediately.

The function of the automatic hood closure is factory set by default. The function can be disabled in the menu level 'Setup' → 'Service' → 'Customer'.

During user interactions, e.g. during calibration and during a reservoir change, no automatic hood closure takes place, although the function is active.

8.4 Prepare the machine for printing

8.4.1 Material reservoir

The material reservoir has an integrated heating function. The reservoir can be operated with the heating function both switched on or off. Whether a material is operated with or without heating function, is stored in the material database in netfabb. The activation takes place automatically with appropriate material selection.

For the possibility of traceability and compliance with a validated process, the reservoir is equipped with an RFID tag.

NOTE!

To avoid unnecessary wear, make sure that the contact surfaces of the reservoir (contact area) are always dry and clean. We recommend removing the reservoir from the machine when not in use.

Warming up the printing materials optimises the printing times, but does not affect the print quality.

Preparing the material reservoir

To prepare the material reservoir, please proceed as follows:

1. Wear protective gloves on your hands.
2. Check the protective glass for cleanliness. → Chapter 10.2.1
3. Check the material reservoir for cleanliness and damage. → Chapter 10.2.2
4. If you are using a fresh material reservoir, fill the reservoir with the appropriate printing material.
5. If you want to use an already filled material reservoir, check that the level is sufficient. If necessary, refill with fresh material.
6. After filling in the reservoir, carefully mix the material with a silicone spatula.

NOTE!

Never use sharp objects to mix the material in the reservoir. This can lead to damage to the silicone surface.

NOTE!

The maximum filling capacity of the reservoir is approx. 680 ml. To avoid overflow of the printing material during printing, the maximum filling level of approx. 11 ml must not be exceeded (see also the maximum filling level marking in the reservoir, if applicable).

Frequent material changes are laborious. We therefore recommend using a separate reservoir for each material.

Push the material reservoir into the machine

To insert the material reservoir into the machine, proceed as follows:

1. Open the machine. → Chapter 8.3
2. Push the filled material reservoir into the machine until the stop.
3. Once the reservoir is inserted, hold the used material bottle (if equipped with RFID) to the RFID spot of the machine.
   The material name and the expiry date of the material appear on the display.
4. Press the 'Yes' button to assign the material to the reservoir.
5. If applicable, the 'Reservoir Check' message appears on the display. Check the message. Then acknowledge the message by pressing the 'Confirm' button.
6. Finally, the 'Reservoir Inserted' action buttons appear. Enter the status of the reservoir and the material:
   - 'Material Mixed': By pressing the button, you indicate that the material has been mixed.
   - 'Material Filtered': By pressing the button, you indicate that the material has been filtered.
   - 'Reservoir Checked': By pressing the button, you indicate that the material has been checked.

The 'Reservoir-Check' message shows possible errors, e.g. exceeding the useful life of the material.

With the 'Reservoir Inserted' action button, you can confirm that you have performed the respective actions. Depending on the selected actions, the 'Reservoir-Check' messages are displayed the next time the reservoir is inserted.

8.4.2 Building platform

Preparation of the building platform

To prepare the building platform, please proceed as follows:

1. Check the building platform for cleanliness. → Chapter 8.4.2

Insert the building platform into the machine

To insert the material reservoir into the machine, please proceed as follows:

1. Orient the building platform with the mark 'Front' towards the machine opening.

2. Turn the rotary knob of the platform to loosen it.
   Do not completely loosen!
3. Place the platform on the guide rail of the platform mounting.
   When doing so, make sure that the pins of the mounting fit perfectly in the mounting of the platform.
4. Fix the platform with the rotary knob.
5. Close the machine. → Chapter 8.3

8.5 Print job

Print job (single)

To print your print job please proceed as follows:

1. Prerequisite: The machine was equipped with a building platform and a material reservoir. → Chapter 8.4
2. Main menu: Press the 'Select Job' button. The job selection opens.
3. Choose your print job.
4. Press the 'Start' button. The print job starts. The progress summary is displayed.

Print multiple jobs (Job-Queue)

Alternatively, you can print multiple print jobs in series.
To prepare the print job, please proceed as follows:

1. Go to the menu 'Start Job-Queue'
2. Select all jobs to be printed. → Figure 9
3. The list shows you which jobs can be printed fully automatically and for which an operator action is required. (Emptying the collecting basket or changing the reservoir).
   In this menu you can also confirm the emptying of the collecting basket. During operation, you can switch to the Job-Queue at any time and add new jobs to the list.

When starting a print job, supporting messages may appear, such as compatibility information for the job regarding the selected material.

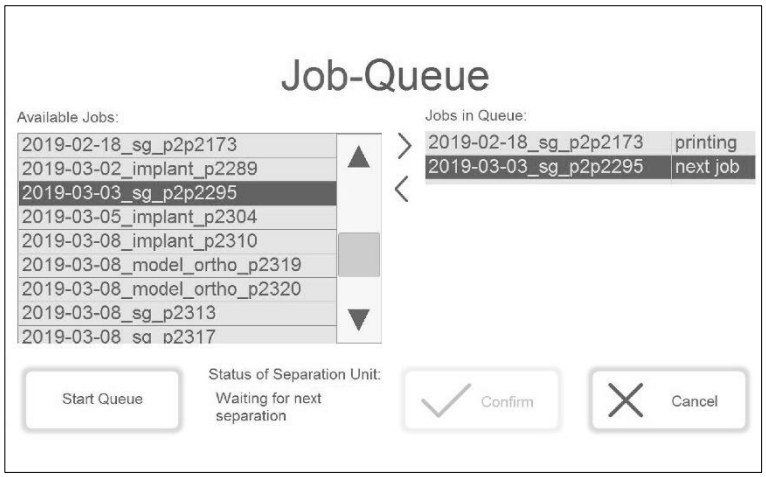

Figure 9: ‚Job-Queue'

Pause/end job

You can pause or prematurely end a running print job at any time (for example, in the case of a failed or incorrect job). To pause/end a job please proceed as follows:

1. Progress summary: Press the 'Pause' button to pause the current print job.
   The last layer is cured, then the printing process is stopped.
2. Press the 'Continue' button to resume the paused printing process.
3. By pressing the 'Cancel' button, you can end a print job early.

We do not recommend pausing the print job as the interrupted layer may not adhere properly due to too much exposure to oxygen.

8.6 Peel off job

The peeling of the components from the building platform occurs automatically after each print job. After completion of the job, the machine locks the hood and the platform moves to the peeling position. The collection basket is positioned under the platform.
As soon as the platform stops moving, the blade moves below the platform and peels off the components. The components fall into the collecting basket. The blade moves back to the safe parking position. The hood is unlocked and the components can be removed. If already included in the job list, the next print job starts.

8.7 Remove job

To remove your components from the machine, please proceed as follows:

1. Prerequisite: The print job was peeled off the building platform → Chapter 8.6
2. Wear protective gloves on your hands.
3. Open the machine.
4. Lift the collection basket with the components from the basket holder and remove the basket from the machine.
   Make sure that dripping material does not lead to soiling of the surroundings
5. Start now with the post-processing of your job. → Chapter 8.8
6. As soon as possible, put the basket back into the machine and confirm that the basket has been put back into the machine (empty). Then the machine is ready for the next peeling process.

Avoid negative effects on your print job due to too long subsequent UV radiation. This can polymerise liquid residue and affect the quality of your job.

8.8 Post-process job

8.8.1 Clean/wash job

For the washing of your print job please proceed as follows:

1. Wear protective gloves on your hands.
2. Open the drawer of the RS wash cleaning unit.
3. Position the collection basket with your components, or alternatively individual components, in the inner container.
   The components must never touch the rotors and cover each other. The maximum filling level must not be exceeded.
4. Close the drawer.
5. Select the operating mode and start the cleaning process.

For more information, please refer to the separately available operating instructions of the RS wash.
→ RS wash 🕮

8.8.2 Job post-exposure

For the post-exposure of your print job please proceed as follows:

1. Wear protective gloves on your hands.
2. Open the lid of the RS cure post-exposure unit.
3. Place the cleaned components (→ Chapter 8.8.1) in the exposure chamber.
   The components must not be stacked on top of each other and should not cast shadows over each other. The maximum component height must not be exceeded.
4. Close the lid
5. Select the operating mode and start the exposure/curing process.

For more information, please refer to the separately available operating instructions of the RS cure.
→ RS cure 🕮

8.9 Check the job

After the cleaning and curing process, check the component for the desired result. If you notice that the print result deviates from the desired result, please repeat the workflow or contact Customer service.

9 Decommissioning

9.1 Switching off the machine

To switch off the machine, please proceed as follows:

1. Go to the Home screen.
2. Press the 'Shut Down' button. The shutdown countdown will appear. The machine counts for 10 seconds until the switch off happens automatically.
3. Press the 'Shutdown' button in the lower right display to switch it off sooner. If you want to stop switching off the machine, press the 'Cancel' button.
4. Wait for the machine to shut down completely.
5. Switch off the machine using the main switch.

9.2 Shut down the machine for a long time (> 1 month)

For the long-term shutdown of the machine, please proceed as follows:

1. Switch off the machine. → Chapter 9.1
2. Disconnect the power supply.
3. Store the machine in a dry, dust-free and frost protected room. → Chapter 3.5

10 Cleaning & maintenance

10.1 Safety during cleaning and maintenance

CAUTION!

Risk of injury due to moving parts!

The machine consists in part of accessible moving parts which can cause minor hand injuries from crushing and getting caught.

- Before carrying out maintenance work that does not require an active power supply, switch off the machine at the main switch. Secure the main switch against unauthorised restart.
- Maintenance work may only be carried out by personnel instructed in this work. The protective equipment prescribed must always be worn.

CAUTION!

Risk of injury due to sharp objects!

The blade of the integrated peel-off device has a sharp edge that can cause slight hand injuries through direct contact.

- The blade must never be touched directly on the cutting edge.

CAUTION!

Risk of injury from UV radiation!

The calibration of the exposure unit takes place under the influence of UV radiation. UV radiation can cause eye and skin damage in the case of very long and direct exposure, as well as without the wearing of prescribed protective equipment.

- During the calibration process, the UV protective goggles supplied in the scope of delivery must be worn.

NOTE!

Wearing UV goggles protects the eyes from harmful UV radiation. During work steps in which the exposure unit is active, we always recommend wearing UV protection goggles.

10.2 Overview of the cleaning and maintenance work

Interval	What	How
Before each print	Clean protective glass	→ Chapter 10.2.1
Before each print	Clean reservoir	→ Chapter 10.2.2
Before each print	Clean building platform	→ Chapter 10.2.3
1×/week	Calibration of the LED	→ Chapter 10.2.4
As required	Automatic reservoir cleaning	→ Chapter 10.2.5
At every material change	Change and clean blade	→ Chapter 10.2.6
For (partially) non adherent building jobs	Check parallelism	→ Chapter 10.2.710.2.4

The cleaning and maintenance of the machine is an integral part of a properly functioning machine. It is therefore essential to observe the prescribed cleaning and maintenance work.

All other maintenance work may only be carried out by Rapid Shape Customer service. For further information please contact Customer service.

10.2.1 Clean protective glass

To prevent components from sticking incorrectly to the building platform, the protective glass must always be clean, free from streaks, dust and grease.

Required accessories & personnel

Protective gloves, microfibre cloth, Isopropanol, glass cleaner | Operator

Procedure

For cleaning the protective glass, please proceed as follows:

1. Wear protective gloves on your hands.
2. Open the machine. → Chapter 8.3
3. If a material reservoir is installed in the machine, pull the reservoir out of the machine. Store the reservoir in a reservoir box.
4. Check the protective glass for dust, streaks and fingerprints.
5. Clean the protective glass with a microfibre cloth soaked in isopropanol.
6. Then clean the protective glass with a microfibre cloth soaked in glass cleaner.

NOTE!
Do not use paper towels under any circumstances. These can scratch the glass surface.

10.2.2 Clean material reservoir

To prevent the print result from being distorted by a material reservoir that is not clean, the underside of the reservoir must always be completely clear and free of streaks.

The material reservoir is a wearing part and must be replaced in case of damage to the silicone surface, e.g. in case of blistering, scratches and clouding.

Always grasp the material reservoir with the side handles provided for this purpose to avoid fingerprints on the glass bottom.

Required accessories & personnel

Protective gloves, microfibre cloth, Isopropanol, glass cleaner, material bottle, fine sieve, collecting container | Operator

Procedure

For cleaning a **filled** material reservoir, please proceed as follows:

1. Wear protective gloves on your hands.
2. Clean the underside of the material reservoir with a microfibre cloth soaked in isopropanol.
3. Then clean the underside of the reservoir with a microfibre cloth soaked in glass cleaner
4. If present, remove any cured particles in the printing material with automatic reservoir cleaning. → Chapter 10.2.5

To clean an **empty** material reservoir, or for the complete cleaning of a **filled** material reservoir, please proceed as follows:

1. Wear protective gloves on your hands.
2. Empty the material in the reservoir over one of the filling openings into a material bottle. On this occasion it makes sense to filter the material at the same time.
3. Fill isopropanol in the reservoir.
4. Carefully mix the isopropanol with a silicone spatula to loosen the material residues from the bottom of the reservoir and to bind them in isopropanol.
5. Then empty the mixture of isopropanol and material via one of the filling openings in a collecting container.
   If necessary, repeat this procedure with fresh isopropanol.
6. Dab dry the reservoir gently with a microfibre cloth.
   Never rub!
7. Clean the underside of the material reservoir with a microfibre cloth soaked in isopropanol.
8. Then clean the underside of the reservoir with a microfibre cloth soaked in glass cleaner

HINWEIS!
Never use hard and pointed objects. These can damage the silicone surface of the reservoir.

10.2.3 Clean building platform

In order to prevent components from sticking to the building platform incorrectly, it must always be clean, free from residues and free of grease.

Required accessories & personnel

Protective gloves, Isopropanol, paper towels, scalpel | Operator
optional: RS wash (cleaning unit)

Procedure

For the cleaning of the building platform, please proceed as follows:

1. Wear protective gloves on your hands.
2. Clean the platform with isopropanol.
   Alternatively, set the platform in RS wash and start the automatic washing process.
3. Then dry the platform with paper towels.
4. For stubborn and hardened material residues, use a scalpel to remove residues from the platform.
5. At the end, check that the holes in the platform are free of residue.

10.2.4 LED calibration

To prevent components from sticking to the building platform incorrectly, the light intensity must always be set correctly.

The calibration of the LED (exposure unit) is automatic. Only the sensor registered in the machine can be used for calibration.

Manage your ACCS sensors in the menu level 'Setup' → 'Service' → 'Light Sensor'.

Required accessories & personnel

UV protective goggles, calibration plate, calibration device, ACC sensor | Operator

Preparation

To prepare the calibration procedure, please proceed as follows:

1. If not already switched on, switch on the machine.
   → Chapter 8.2
2. Open the machine. →Chapter 8.3
3. If a material reservoir is installed in the machine, pull the reservoir out of the machine. Store the reservoir in a reservoir box.
4. Check the calibration plate for cleanliness (dust, streaks, fingerprints). If necessary, clean the plate with a microfibre cloth soaked in isopropanol followed by glass cleaner.
5. Insert the calibration plate into the machine.
6. Insert the calibration device into the machine.
7. Insert the sensor head into the calibration device.

8. Plug the USB connector of the sensor into the USB port on the front of the machine.
9. Put on the UV safety goggles.
10. Main menu: Press the 'Calibration' button.

Procedure

For the calibration of the LED, please proceed as follows:

1. Follow the individual steps on the display. Confirm the steps with the button 'Yes'.
2. Save the new values at the end of the calibration.
3. After completing the process, disconnect the USB connector from the USB port.
4. Remove the sensor head out of the device and put it back into the packaging.
5. Remove the calibration device from the machine.
6. Pull the calibration plate out of the machine and put it back safely into the packaging. The calibration is finished.

10.2.5 Automatic reservoir cleaning

When printing a print job, pieces of polymerised material may come loose from the component or platform and remain in the material reservoir. To prevent these pieces from damaging the reservoir, they must be removed.

Small pieces of polymerised material cannot be removed manually from the reservoir without damaging it. For safe removal, you can filter the material or perform automatic reservoir cleaning. → see below

During the automatic reservoir cleaning, the bottom layer of material in the reservoir is exposed and cured. In this way, the particles contained in it are bound. By means of subsequent removal of the cured layer from the bottom of the reservoir, the particles are removed.

Required accessories & personnel

UV protective goggles, protective gloves, paper card, paper towels | Operator

Procedure

For the automatic reservoir cleaning, please proceed as follows:

1. If not already switched on, switch on the machine. → Chapter 8.2
2. Open the machine. → Chapter 8.3
3. Push the material reservoir into the machine Then close it again.
4. Put on the UV safety goggles.
5. Main menu: Press the 'More Functions' button.
6. Press the 'Clean Reservoir' button. By pressing the 'Start' button the reservoir cleaning starts. The remaining time is shown on the display.
7. After the time has elapsed, open the machine and remove the reservoir.
8. Use a corner of the paper card to release the hardened layer on the bottom of the reservoir and remove it from the reservoir.

10.2.6 Change and clean blade

In order to avoid a mixing of materials, the blade must be cleaned with every change of material. In addition, it is recommended to clean the blade before a longer standstill period.

Required accessories & personnel

Blade removal device, brush, Isopropanol, paper towels | Operator

CAUTION!

Risk of injury due to sharp objects!

The blade of the integrated peel-off device has a sharp edge that can cause slight hand injuries through direct contact.

— The blade must never be touched directly on the cutting edge.

NOTE!

To prevent soiling of the machine, the blade must always be removed first before removing the reservoir from the machine and be cleaned if it is wet with material.

Procedure

For cleaning the blade, please proceed as follows:

1. Spread a paper towel on the work surface.
2. Start the removal wizard under 'More Functions' → 'Change Blade'. Follow the instructions.
3. Carefully remove the blade from the machine with the removal device and place it on the paper towel prepared.
4. Clean the blade with a brush and isopropanol. Then dab it dry with a paper towel.
5. Put the blade back into the machine.
6. Finish the removal wizard on the machine.

In order to avoid polymerisation of material residues on the blade, the blade that has not been cleaned may only be transported in a UV-protected room or covered.

10.2.7 Check & adjust parallelism

To prevent components from sticking to the building platform incorrectly, the building platform mounting must always be adjusted correctly to the projection surface.

Required accessories & personnel

Building platform, calibration plate, microfibre cloth, Isopropanol, glass cleaner, hexagon wrench (Allen key) set, paper card | Operator

Preparation

To prepare the parallelism adjustment, please proceed as follows:

1. If not already switched on, switch on the machine. → Chapter 8.2
2. Open the machine. → Chapter 8.3

3. If a material reservoir is installed in the machine, pull the reservoir out of the machine. Store the reservoir in a reservoir box.
4. Check the calibration plate for dust, streaks, fingerprints. If necessary, clean the plate with a microfibre cloth soaked in isopropanol. Then clean the plate with a microfibre cloth soaked in glass cleaner.
5. Slide the calibration plate into the machine until the stop.
6. Insert the building platform. → Chapter 8.4.2
   The platform must be in the reference position.

Procedure

To check the parallelism (card check) please proceed as follows:

1. Main menu: Press the 'Manual' button.
2. Press the 'Find Zero' button. The platform now moves to the zero point. Wait until the platform stops moving.
3. Take a paper card and try to slide it under each of the four corners of the platform.
   - If you **cannot** push the card under any of the corners, then the platform is sufficiently well adjusted. No further settings are required. Run the platform back to its original position.
   - If you can slide the card under one or more corners, the parallelism must be adjusted again.

To **adjust** the parallelism, please proceed as follows:

1. Identify the corners that need to be readjusted.
2. Run the platform a few centimetres upwards with the 'Move Up' button.
3. Loosen the four (inner) fastening screws on the platform top.
4. Now turn the (outer) threaded bolts at the identified corners in the respective direction (tighten/loosen).
5. Tighten the four fastening screws again.
6. To check the parallelism again, repeat steps 2-3.

To **end** the adjustment please proceed as follows:

1. If you cannot slide a paper card under the corners of the platform, then the parallelism adjustment is sufficient.
2. Run the platform back up to its reference point.
3. Pull the calibration plate out of the machine and put it back safely into the packaging.

11 Disassembly & disposal

11.1 Safety instructions for disassembly & disposal

Electrical accessories

DANGER!

Danger to life due to electric current!

There is an imminent danger of electrocution in the event of contact with live parts.

— Before starting disassembly work, the power supply must be finally disconnected.

Improper disassembly

WARNING!

Risk of injury due to improper disassembly!

Stored residual energy, sharp, pointed components and tools can cause injuries.

— Disassembly work may only be carried out by qualified personnel.
— Sufficient space must be ensured before the disassembly work begins.
— Wear appropriate protective clothing.
— Disassemble components properly.
— Handle edged and pointed components carefully.
— If necessary, secure components so that they can not fall down during work.
— In case of doubt, please contact the Customer service.

CAUTION!

Risk of injury due to sharp objects!

The blade of the integrated peel-off device has a sharp edge that can cause slight hand injuries through direct contact.

— The blade must never be touched directly on the cutting edge.

11.2 Disassemble the machine

To disassemble the machine, please proceed as follows:

1. Switch off the machine. → Chapter 9.1
2. Disconnect the power supply.
3. If necessary, remove any remaining accessories from the machine, e.g. building platform, reservoir with printing material.
4. If present, remove any soiling.
5. Disassemble the machine properly.

11.3 Dispose of the machine

Dispose of the machine as intended via your recycling agent or approved specialist companies. For a list of materials used, please contact Rapid Shape.

ENVIRONMENTAL PROTECTION!

Incorrect disposal of electronic waste, electronic components, lubricants and other additives can be hazardous to the environment. Therefore, please dispose of machine components and auxiliary materials as intended via your waste disposal company or authorised specialist companies.

12 Technical details

12.1 Operating data

Power	[W]	260
Noise level	[dB(A)]	<61
Ambient temperature	[°C]	+15 to +40
Storage temperature	[°C]	-15 to +70
Max. humidity	[%]	70

* All values are approximate.

12.2 Dimensions and weights

Width	[mm]	480
Height	[mm]	690/1000 (closed/open)
Depth	[mm]	410
Weight	[kg]	45

* All values are approximate.

12.3 Connections

Electrical systems	[V AC]	100-240
	[Hz]	50/60
Ethernet	[Mbit/s]	10/100
Media	[-]	USB-Ports USB 2.0

* All values are approximate.

12.4 Serial plate

→ Chapter 2.2