zortrax

3D Printers User Guide

M Series

Table of Contents

Introduction

Read this User Guide carefully and thoroughly before operating Zortrax products for the first time. The User Guide includes basic information about the 3D printer, safety and protection guidelines as well as advice on preparing the machine for the first printing and basic maintenance work. Ignorance and non-compliance with these instructions may result in property damage, injuries, device failures or lower quality of 3D prints. It is also necessary to ensure that every 3D printer user knows, fully understands and follows the instructions provided in this User Guide.

The Manufacturer makes every effort to ensure that Zortrax products are safe in transportation, installation, usage, storage and disposal.
However, due to the lack of direct and ad hoc control as well as other conditions influencing the device and those that are beyond the Manufacturer's knowledge, the Manufacturer is not responsible for damages, injuries, failures and costs resulting from improper transportation, installation, usage, storage and disposal.
Furthermore, the users should take into consideration the risk of possible faults of the device resulting from material and production defects.

Intended Use of Zortrax Printers

Zortrax devices 3D print in Layer Plastic Deposition (LPD) technology which allows to apply previously melted material one layer after another on a given surface in order to form a predesigned shape. The extruder is equipped with three heating points which makes it possible for the liquid material to flow through the nozzle onto the heated platform without causing blockages in it. Zortrax 3D printers together with Z-SUITE and dedicated materials guarantee achieving high quality prints. However, the users are responsible for qualifying and determining the intended use of the 3D printed models. The Manufacturer takes no responsibility for any use of the printed objects, especially, when these objects constitute a part of safety equipment or strictly regulated medical, military or space science equipment.

Due to the size and specificity, Zortrax devices are not intended for use by children under the age of 14 and by people with reduced manual, motor and psychomotor skills. The Manufacturer recommends providing assistance and guidance to people with disabilities and older adults who wish to operate Zortrax printers.

General Safety Information

This User Guide contains important safety directions that should be followed during installation and operation of Zortrax 3D printers. It also mentions situations which require special attention and includes warnings against negligence and misuse that could cause damages or injuries.

Always read safety data sheets available at: https://zortrax.com/materials/zortrax-m-series/. They are a source of basic information and safety procedures for the equipment you bought. It is essential to **update the firmware** so as to avoid any kind of failures. Visit our website: https://zortrax.com/ regularly to see the latest news and updates.

Zortrax 3D printers operate at high temperatures and have easily accessible movable components, therefore, you must be particularly careful when handling or operating the devices. While operating the printer, it is extremely important to avoid situations that may lead to burns or interference in proper functioning.

Do not leave the machine **unattended** during the print job - check it periodically for proper functioning in order to avoid potential accidents or breakdowns. Turn off the printer once the print job is finished. Monitor your device for wear and tear regularly. Contact our **Support Center** at: http://support.zortrax. com/ for assistance while replacing worn or broken parts.

Keep the printer away from heat sources, fire, flammable materials, humidity as well as water and other liquids. Place the machine away from any equipment emitting radiation. To prevent any inadvertent use, keep the device out of reach of children and animals. It is forbidden to shake or drop the printer as it may cause breakdowns. The equipment is not intended for use in a potentially explosive environment.

Health and Safety at Work

All service and maintenance activities as well as device operation require wearing safety gloves included in the Starter Kit. Wearing safety gloves is also advised while removing the finished print from the platform.

The vapors released during the printing process are not hazardous, however, it is important to ensure proper ventilation in the print room.

Food and beverages should be kept away from both the 3D printers and 3D printed objects.

While operating Zortrax devices, all measures regarding health and safety provided in this User Guide as well as in separate regulations should be taken into account.

Electrical Safety

Zortrax M Series 3D printers have been tested for compliance with Low Voltage Directive. In order to ensure the highest safety standards, including protection against short circuit, overload, overvoltage and printer overheating, do not attempt to modify the printer and do not use electronic replacement parts other than those recommended by the Manufacturer.

Replace electronic units according to the instructions and be particularly careful while using the tools supplied with the printer.

Before plugging the power cable into the outlet, make sure that the power supply voltage in the outlet matches the required value provided on the nameplate at the back of the printer. Avoid overloading the outlet with too many devices.

The printer must be well-grounded. Always make sure that the ground complies with local and national regulations.

Use only the original power cable supplied with the printer. Do not damage, cut or repair the cable. A damaged cable should be immediately replaced with a new one.

All maintenance and repair work should be carried out while the device is off and unplugged. Do not expose the device to moisture and liquids. Modifications such as soldering of electronic subunits are forbidden.

Mechanical Safety

Zortrax 3D printers have movable components, such as the drive belts, Z-axis screw, extruder or platform. Therefore, it is forbidden to reach into the printer or put anything inside the printer when it is running, about to start running or at rest. This may lead to serious injuries or damages.

Tools and accessories from the Starter Kit box should be used with special care for intended purposes only. Improper use may cause serious injuries.

While following post-processing procedures, wear safety gloves and glasses in order to avoid injuries that may be caused by sharp edges and fragile elements.

Removing the prints from the platform should be dealt with very carefully so as to avoid injuries. Moreover, special care should be taken so as not to damage the small connector placed at the edge of the platform with the blade of the spatula.

Risk of Burns

There is a high risk of burns while operating Zortrax printers as the extruder's temperature may reach up to 380^0C [716^0F]. Do not touch the extruder with bare hands. Be extremely careful during maintenance and repair work of heated units. If it is necessary to touch a heated component, use the pliers which are specially adapted for this purpose. Cooling of components should not take less than 30 minutes.

The platform's temperature can reach up to 110^0C [230^0C], therefore, special care should be taken while operating the printer or while removing the finished print.

Do not ignore the warning labels placed on the devices.

Moreover, constructional modifications of the printer's operating temperature are not permitted as it may cause serious injuries or bring damage to the device.

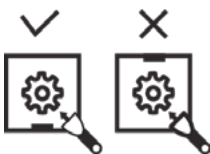# Warning and Safety Labels on Zortrax Devices

Hot surface. Allow to cool before touching
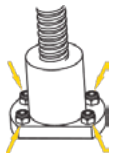
Due to design characteristics, the screws securing the Z-axis screw nut cannot be fully tightened

Do not attempt to modify or remanufacture the product

Removing the print from the platform should be handled with extreme care

Wear safety gloves

This warning symbol indicates that special care should be taken when repairing the device. Also, it points out an important step to carry out.

The printer needs to be placed on a flat and stable surface to ensure proper quality of the prints.

Hot surface. Do not touch.

Never reach into moving elements.

Safe Storage and Transport Guidance

Zortrax devices must be stored between 0 and 35 ^{0}C. The storage space should be free of moisture and other extreme conditions.

<u>Transport Instructions</u>

When stacking several devices on a pallet, follow the instructions provided on the packaging. One device may weigh more than 20kg [44lbs]. It is therefore advisable to provide safe pallet storage but not higher than 1,7m [5'7"]. It should be noted that the packages must not project beyond the outline of the pallet. Packages stacked on the pallet should be then bound together and wrapped in foil. The pallet prepared as above can be then forwarded to the shipping company.

Pallet stacking and destacking should be carried out by two people. The package with the device should be lifted or moved using special handles. In case of M300, the device should not be carried by one person as it may cause injury or other damage to health.

Electromagnetic Compatibility (EMC)

Each Zortrax printer 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.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Learn More About Zortrax M Series

Zortrax M Series includes two 3D printer models – M200 and M300, which together with Z-SUITE and dedicated materials constitute the whole 3D printing ecosystem. Thanks to these devices, it is possible to turn digital projects into three-dimensional objects. Zortrax 3D printers can be used in many industries while designing and prototyping for instance automotive parts, mechanical elements, everyday objects or decorative elements.

How does the Zortrax 3D Printer Work?

Everything begins with preparing a model. The work on the model can be started in any program which creates 3D models and generates .stl, .obj, .3mf or .dxf files. These are the standard file formats supported by most 3D modeling software – the model is saved as a set of three-dimensional triangles (triangle mesh).

The next step is to open the .stl file (or other) in Z-SUITE – the application created specifically for Zortrax devices. Z-SUITE prepares the model by slicing it into individual layers and saving it as a .zcode. Each layer represents the extruder's motion (vertical and horizontal) while building the whole object. Z-SUITE also allows to change and adjust the necessary print settings, such as the size of the model, layer thickness, a type of infill or what the support structures will look like. The file is then ready to be printed.

Once your model is prepared, save the .zcode onto the hard drive and then onto an SD card. In order to transfer the model, insert the SD card into the card reader in the printer.

Next, prepare the material which you are going to use to print your model. The full material offer is available at: https://zortrax.com/materials/zortrax-m-series/.

To start the print, turn on the printer and place the spool with the material on the spool holder at the back of the printer and load the material into the extruder. Turn the knob to select the model to be printed, push it to begin the printing process.
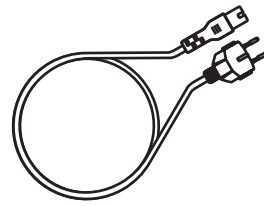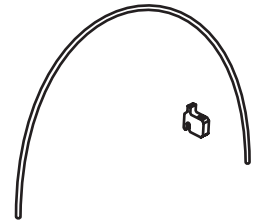
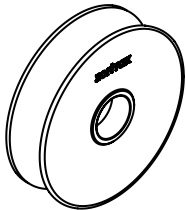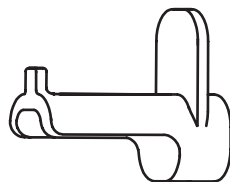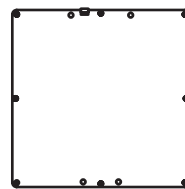## What's in the box
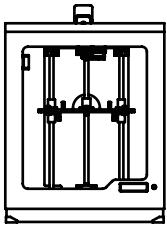
3D Printer
Zortrax M Series
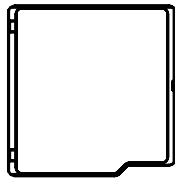
Side
Covers*
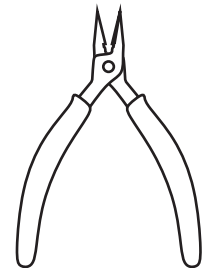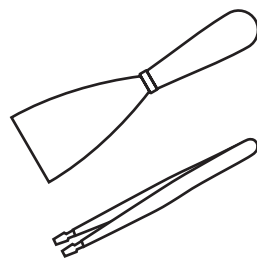
Power
Cable

Material
Guide

Material
Spool
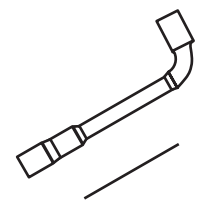
Spool
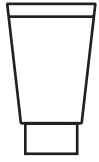Holder

Perforated
Plate

Pliers

Cutting Knife
& Scalpel

Spatula
& Tweezers

Allen
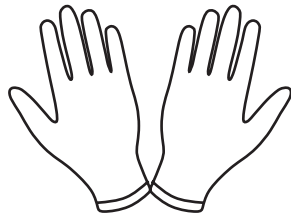Keys

Nozzle Key
&
Nozzle Needle

Service
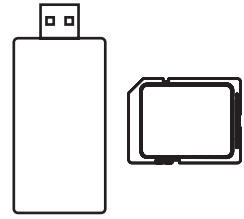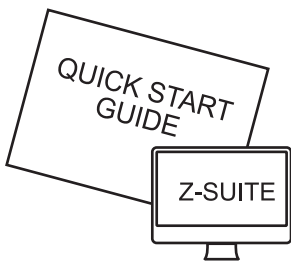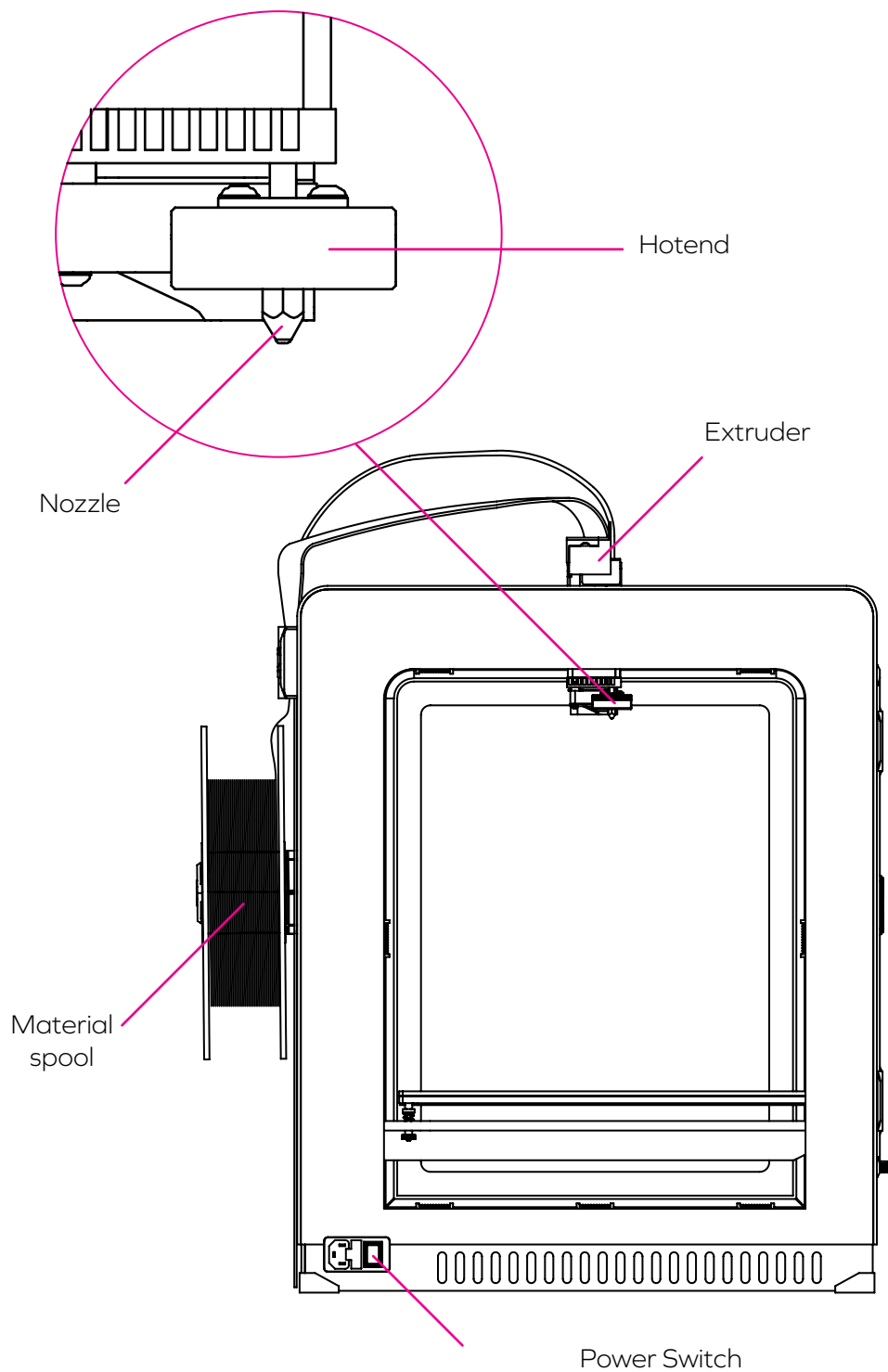Grease

Safety
Gloves

Safety
Glasses

SD Card &
SD Card Reader

Z-SUITE &
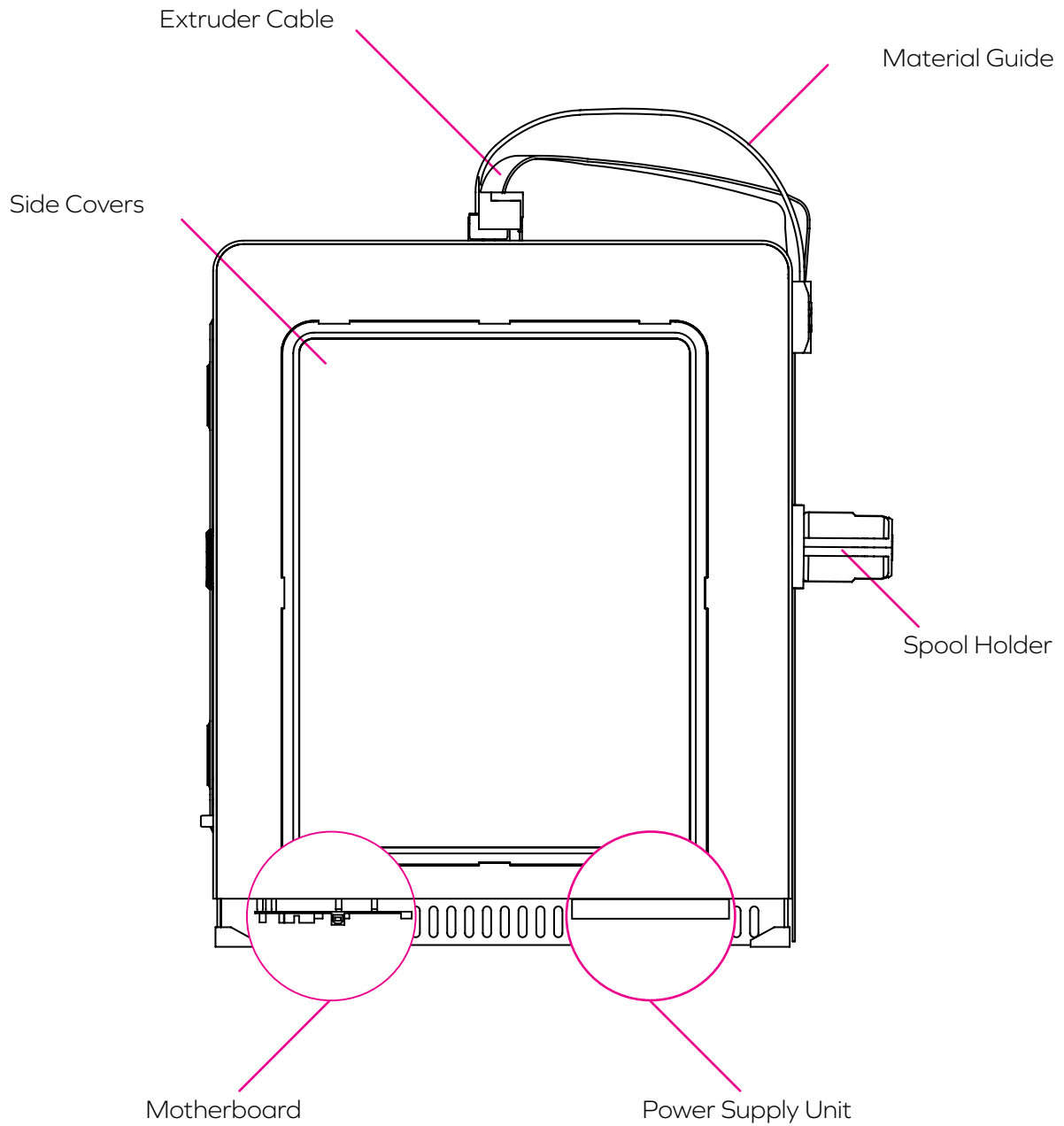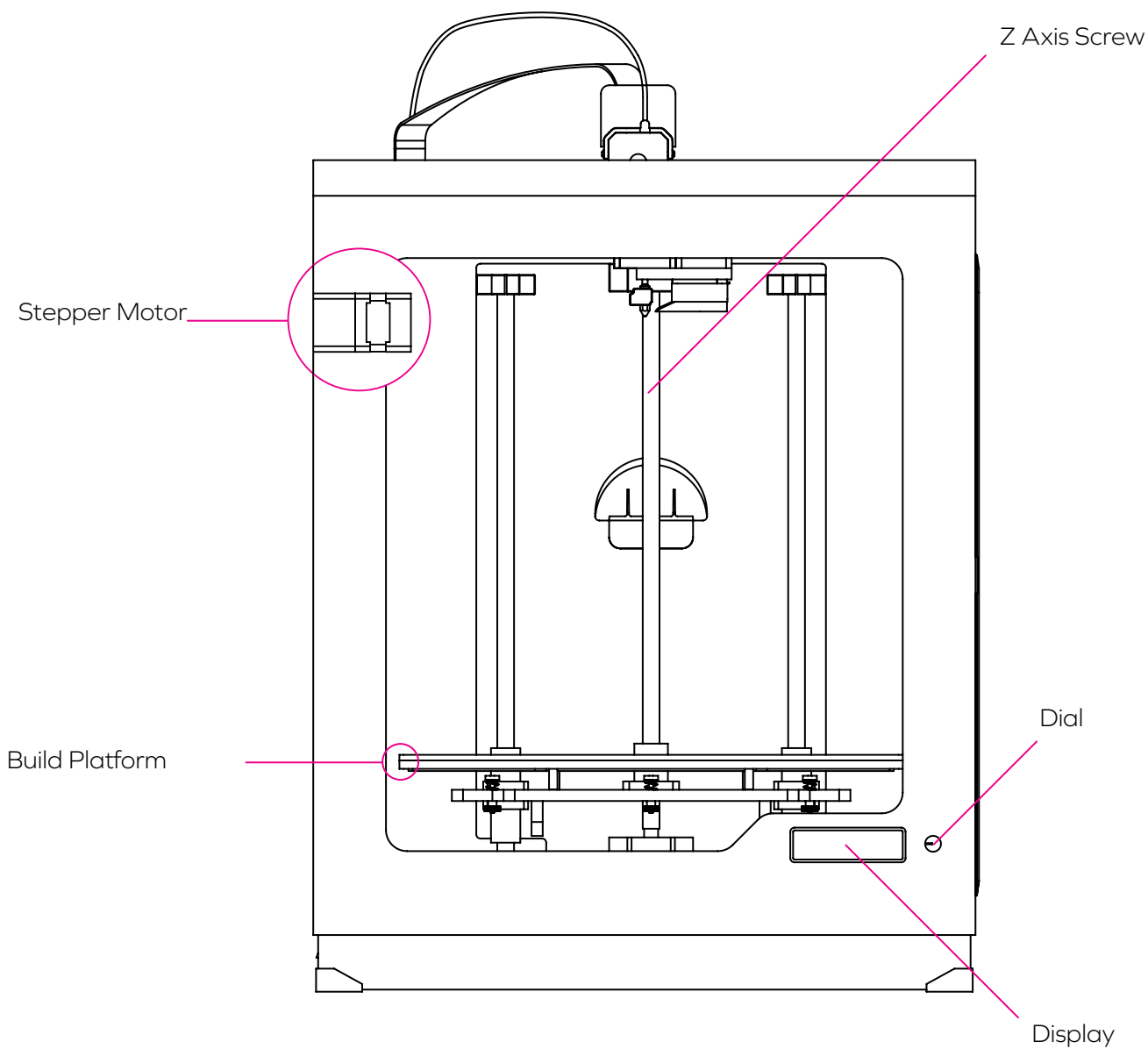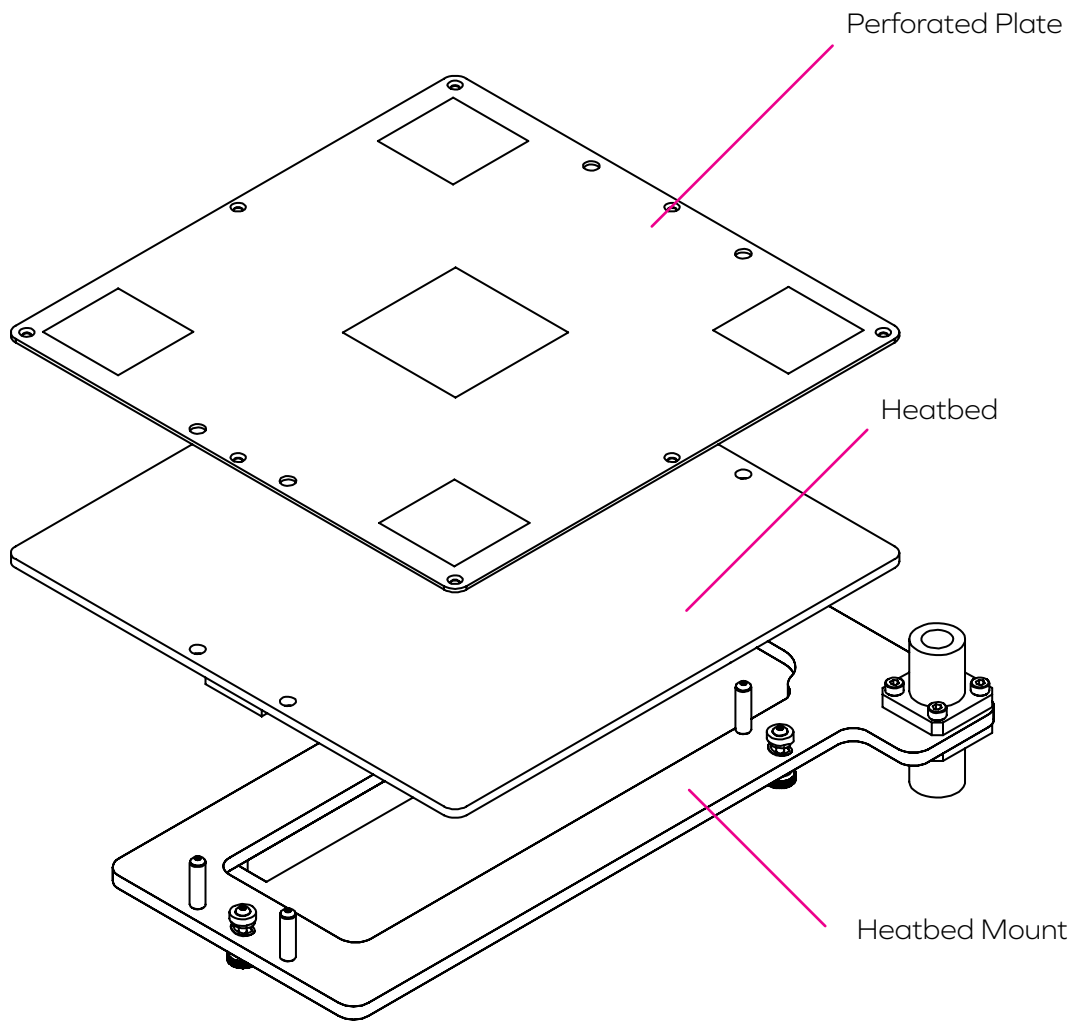Quick Start Guide

* delivered only with Zortrax M300

Main Components

Hotend

Nozzle

Extruder

Material
spool

Power Switch

Extruder Cable

Material Guide

Side Covers

Spool Holder

Motherboard

Power Supply Unit

Z Axis Screw

Stepper Motor

Dial

Build Platform

Display

Perforated Plate

Heatbed

Heatbed Mount

Zortrax 3D Printing Technology Glossary

DISPLAY PANEL
a high contrast screen displaying information about the current printing process, the printer's menu and other information concerning the printer.

EXTRUDER
the mechanism which ensures material feeding, heating and extruding as well as cooling of the print. Its main components include the hotend and the nozzle. The material is melted in the hotend and then pushed through to the nozzle. The melted thermoplastic is deposited layer by layer to form a previously designed shape. Additionally, there are two fans on the extruder which cool the whole mechanism and the print.

EXTRUDER CABLE
a ribbon cable which connects the extruder with the motherboard. It supplies the extruder with electricity and allows to regulate the printing process.

HOTEND
a basic heating system which consists of the aluminium block and the heater & thermocouple. The hotend is responsible for heating and melting the material as well as for providing the proper temperature of the material during the whole printing process.

KNOB
a round, rotating button used to navigate through the printer's menu and control its basic settings.

LAYER PLASTIC DEPOSITION (LPD)
the technology in which a melted material is deposited on a given surface. This technique involves applying one layer of material after another in order to form a predesigned shape – an accurate representation of a virtual design. This technology is applied by Zortrax devices – the printer starts to print from the bottom and builds the object until it is fully formed. The model and the support structures are created using the same material.

MATERIAL GUIDE
a tube which feeds the material from the spool to the extruder at the proper angle. The material guide in Zortrax printers has to be attached to the extruder cable and the back of the printer with special buckles.

MATERIALS
specially dedicated Zortrax printing materials which maximize the benefits of 3D printing. These thermoplastic materials are in the filament form wound on a spool. There is a wide choice of materials in the Zortrax product offer which is available at: https://zortrax.com/materials/zortrax-m-series/. Each mate-

rial has different properties, therefore a given material can be easily adopted to a wide range of needs and applications. Moreover, most materials are suitable for mechanical and chemical post-processing.

MODEL LIBRARY

the collection of ready-made models available within Z-SUITE. All models are divided into categories, for instance art. & design, education or robotics. You can find many useful and attractive models there that were uploaded by the Zortrax printers' users. Moreover, there is also one category called Zortrax Parts where you can find models of parts useful while printing with Zortrax printers, for example the spool holder or the extruder top cover.

MOTHERBOARD

the main part of every Zortrax printer to which all the necessary components are connected. It is the main printed circuit board that makes it possible for other parts of a printer to communicate with each other. The motherboard is placed under the bottom plate along with the cooling fan and the power supply unit.

NOZZLE

the final element of the extruder. It is used to direct the material throughout the entire printing process.

PLATFORM

an integral part of the 3D printer on which the model is created. It consists of two parts: the heatbed and the perforated plate. The heatbed provides proper platform heating, whereas the perforated plate guarantees full adhesion to its surface. The platform can be easily removed from the printer as well as installed back in its place.

PLATFORM CALIBRATION

the procedure which ensures a problem-free printing process. Platform calibration basically involves the procedure of checking the distance between the nozzle and five points on the platform and tightening/loosening the calibration screws.

POST-PROCESSING

all procedures of mechanical and chemical treatment that improve the final look of the model. Post-processing techniques include: polishing, sanding, smoothing, painting or gluing two or more parts together.

POWER OUTLET AND MAIN SWITCH

the switch enables turning the printer off and on. Next to the switch, there is a power outlet where you plug the power cable in.

RAFT

first few layers of material which begin the whole printing process. This element is always printed before

the main object and has a larger area than the target model. Once the printing is done, both need to be removed together from the platform. The RAFT enhances adhesion of the whole print and reduces the risk of warping.

SIDE COVERS

plastic panels that can be easily attached to the casing of the printer. They've been designed so as to provide protection from drafts and temperature differences that can take place in the printing room. Constant temperature inside the printing chamber is very important to avoid cracks on the model and the problem of warping. Therefore, thanks to the use of side covers, the model is being protected during the printing process and at the same time it adheres to the platform more tightly. The set consists of side covers, 1 front cover, magnets and hinges. The front panel is fixed to the casing with two hinges and closed by hidden magnets, whereas the side panels are snap-on. We recommend using the side covers especially for large-sized prints and prints made of materials with high or medium shrinkage level like Z-ABS.

SPOOL HOLDER

an element used to secure the spool of material at the back of the printer.

STARTER KIT

several pieces of equipment that are put together in one set. Apart from the perforated plate, the set contains tools and protective elements. The Starter Kit is what you need to perform your maintenance and repair work of Zortrax printers easier and more efficient. Each printer is delivered with equipment including, for example, a set of nozzle keys or a pair of safety gloves.

STEPPER MOTOR

a type of electric motor in which the power supply does not cause full rotation of the motor shaft, but instead, a series of steps. There are four stepper motors in each Zortrax printer: two that are responsible for the extruder's motion, one which allows the platform's vertical motion and one which enables material loading.

SUPPORT STRUCTURES

if your model has any overhanging or protruding parts, they have to be supported with special structures so that they don't fall down. Without these structures, the model may lose its predesigned shape. The support is printed with the same material as the model. Once the printing is done, it is necessary to carefully remove the support by hand or using pliers.

Z-AXIS SCREW

the screw which is responsible for platform's vertical motion. It is driven by a stepper motor placed under the bottom plate. The Z-axis screw constitutes an integral part of the platform moving system.

ZCODE

the type of file which contains a model prepared for 3D printing with previously selected print settings

(such as layer thickness, infill type, etc.). All print settings can be managed in Z-SUITE before generating the .zcode. The .zcode format can only be created by saving an .stl / .dxf / .obj / .3mf file in Z-SUITE.

Z-FIRMWARE

the software programmed into the Zortrax printers which controls and monitors all the data in the device. It also gives the possibility to enable/disable the printer's options. Whenever there is a technical issue, the firmware immediately informs you about it by displaying an error message on the screen. The whole list of firmware error messages along with the possible causes and solutions is available in this user guide.

We systematically update our firmware. The latest update is available in the Downloads section at: http://support.zortrax.com/downloads/. Simply download the file, upload it on the SD card, insert the card into the slot in the printer and turn on the printer. The firmware will be automatically installed.

Z-SUITE

the application created specifically for Zortrax devices. Z-SUITE prepares a model for 3D printing by generating a project and saving it in the .zcode format. Z-SUITE allows changing and adjusting the print settings, such as the size of the model, layer thickness, a type of infill or how many support structures will be generated. Once the .zcode file is generated, the print settings cannot be changed. The last step is to save the .zcode onto an SD card and then the model is ready to be printed.
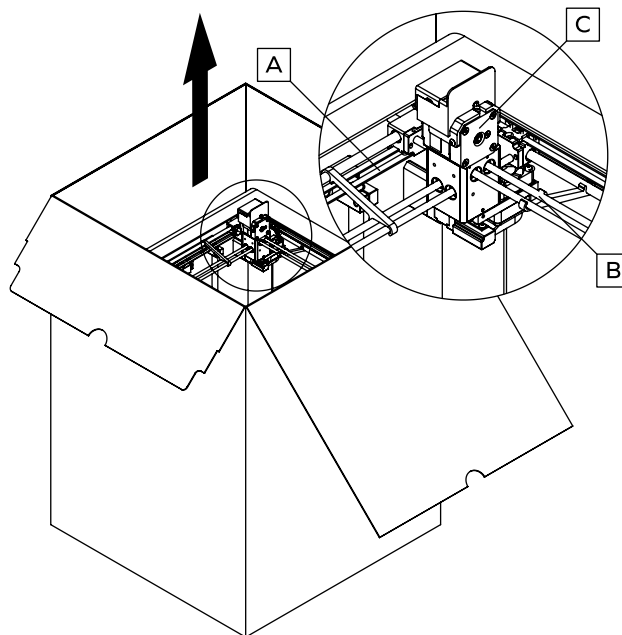
First Use Preparations

1. Open the box and remove the cushioning material.
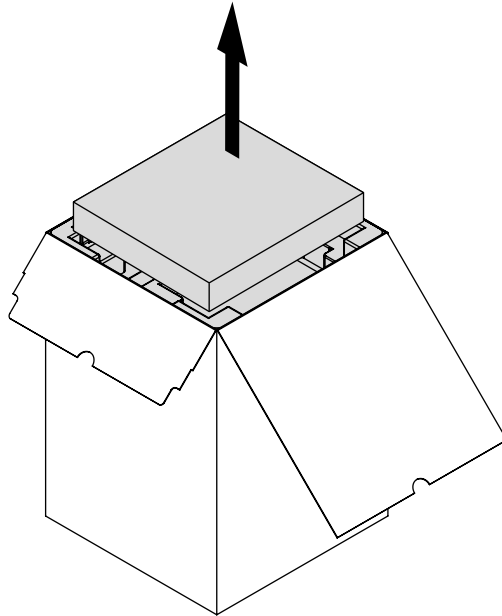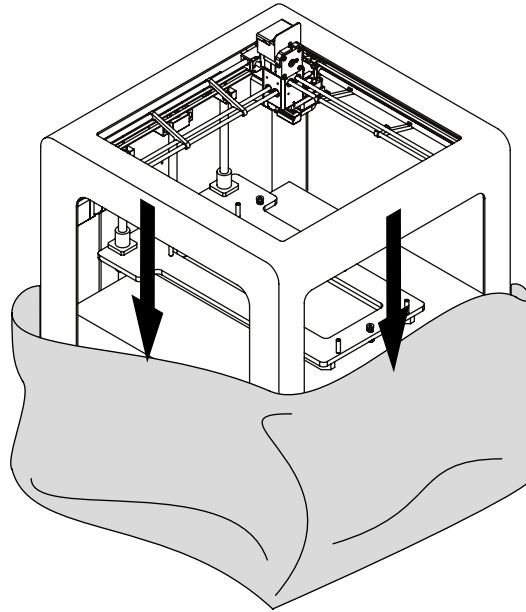

2. Take the 3D printer out of the box*.

When lifting or moving the printer, do not grab:
a.   the belts,
b.   the shipping clips,
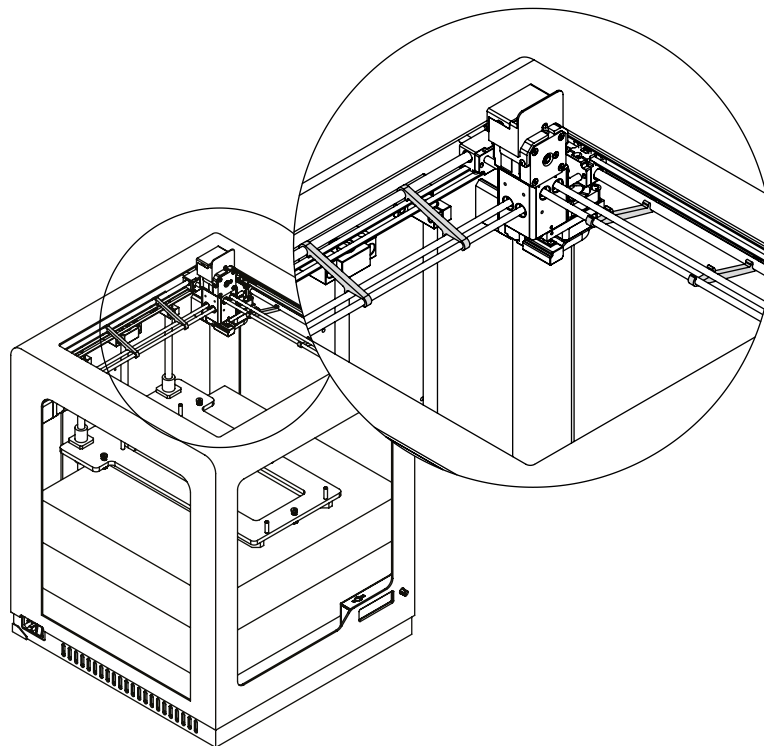**c.**   the extruder.

* Bearing in mind the printer's weight (30kg/66lbs), Zortrax M300 should be taken out of the box or moved by two people.
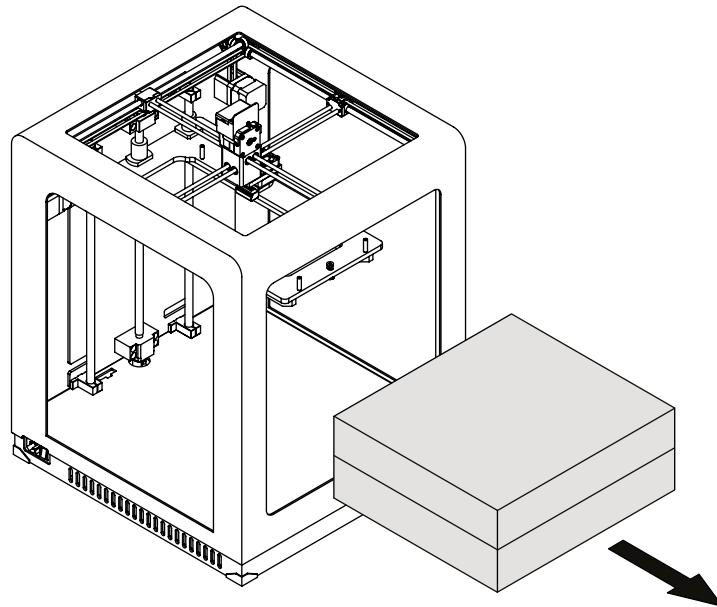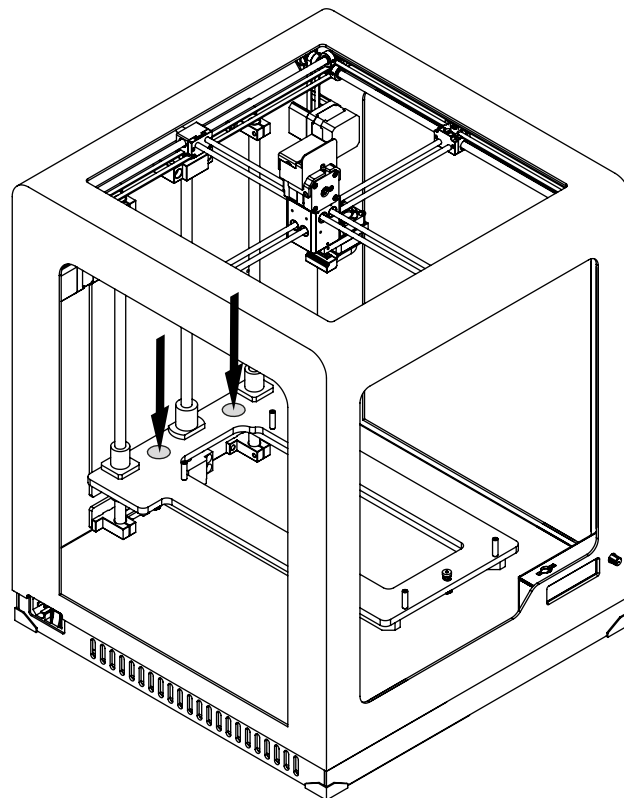
3. Remove the foil and fillers.

4. Remove the shipping clips.

5. Remove the foams/boxes with accessories.

6. Lower the heatbed mount by pressing the places marked in the picture.

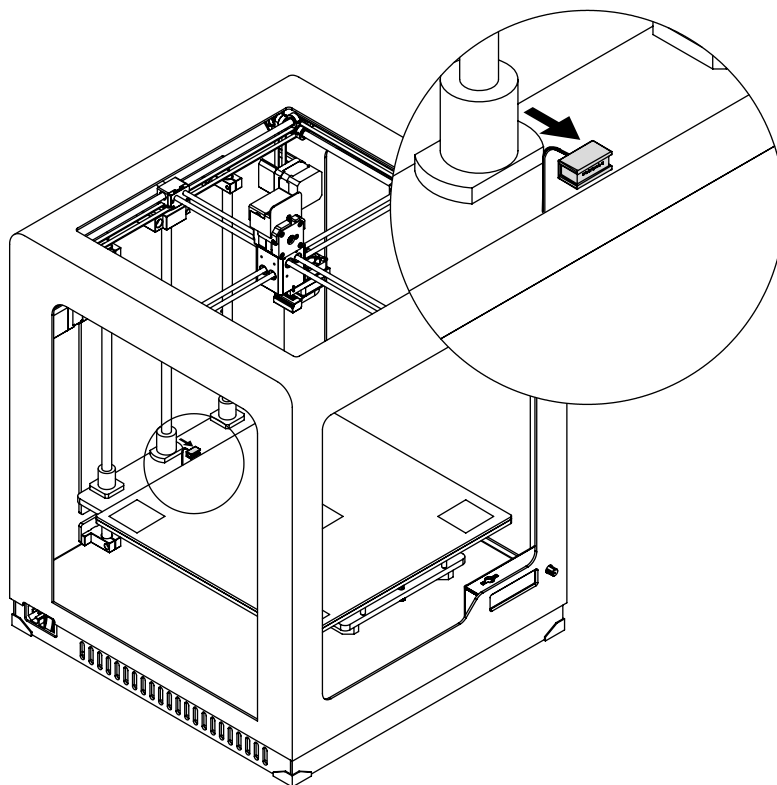**7.** Install the platform onto the bolts marked in the picture.

NOTE! REMEMBER THAT THE PLATFORM SHOULD BE INSTALLED IN YOUR DEVICE WITH THE PERFORATED PLATE AND ITS FIVE SILVER CALIBRATION SQUARES DIRECTED UP.
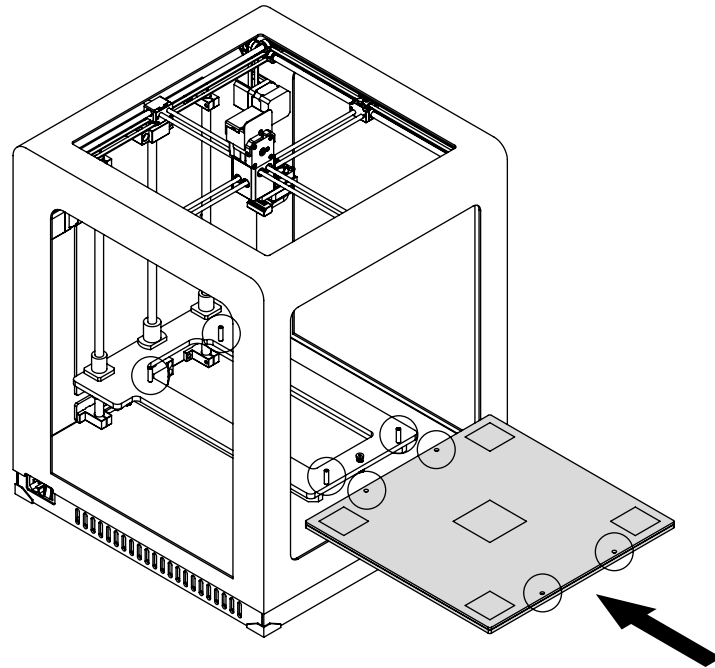
8. Plug the heatbed cable in.

9. Attach the extruder cable clamps at the back of the printer and place the cable in them.
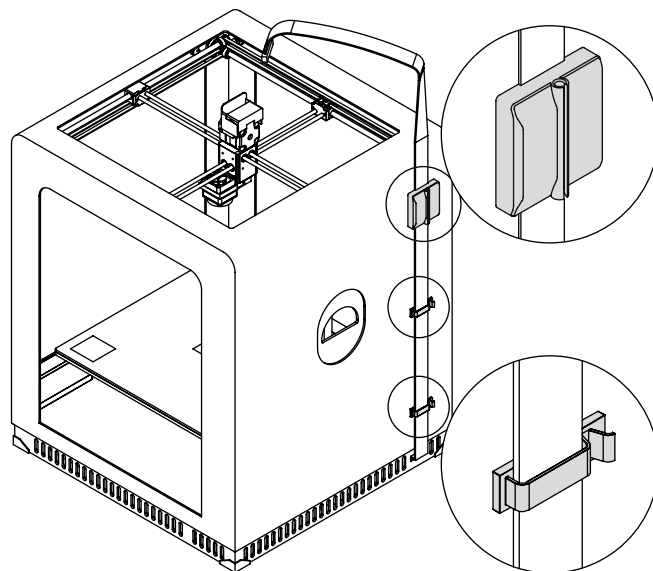
10. Plug the extruder cable in.
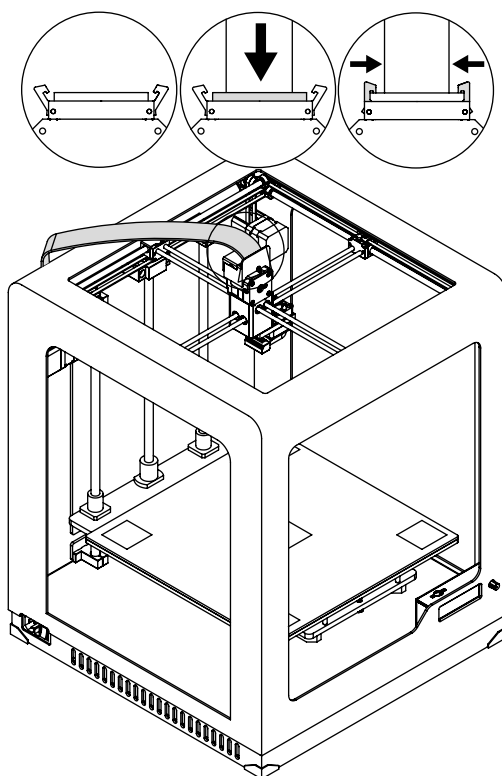
11. Attach the spool holder at the back of the printer. Using the buckles, attach the material guide to the extruder cable.
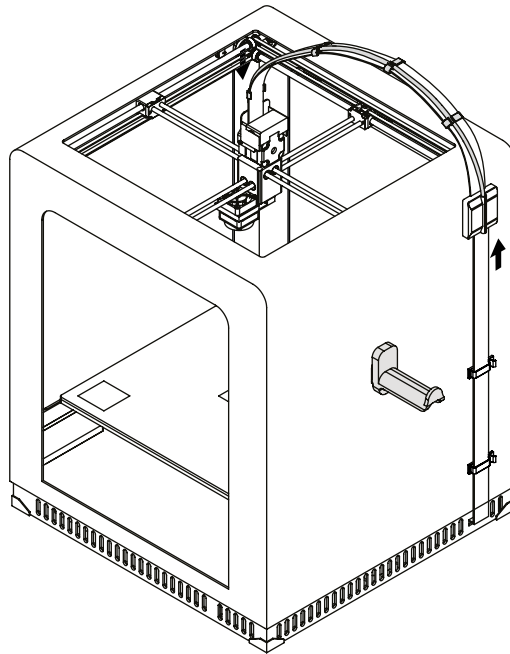
12. Place the material spool onto the holder so that the marking on the spool is visible. The spool should rotate anti-clockwise. Next, feed the material into the extruder through the material guide.
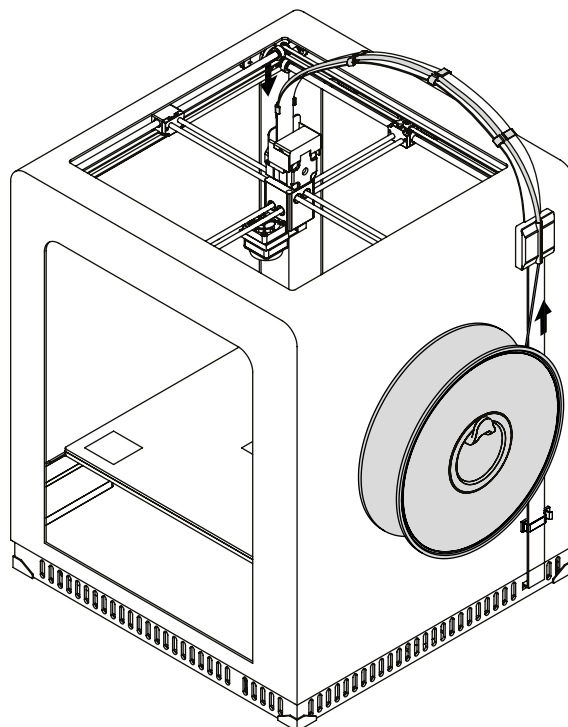
13. Place the printer on a flat and stable surface.
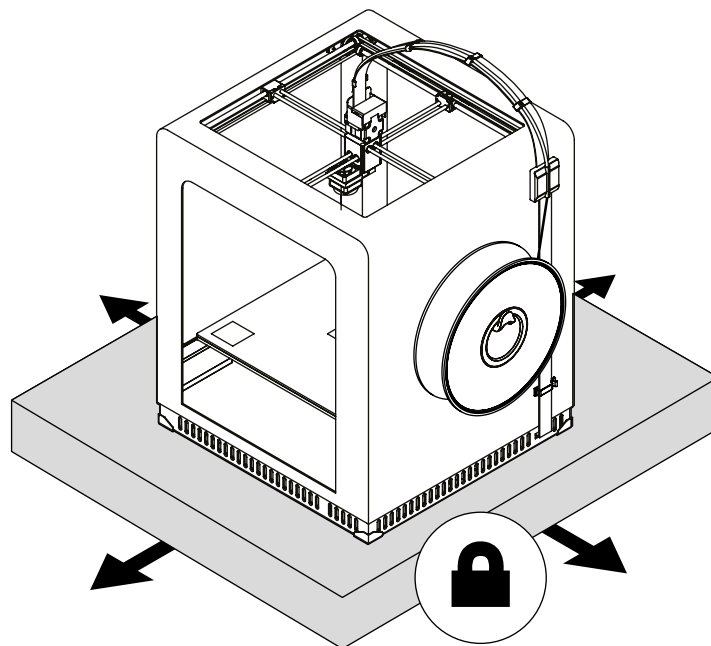
14. Plug the power cable in.
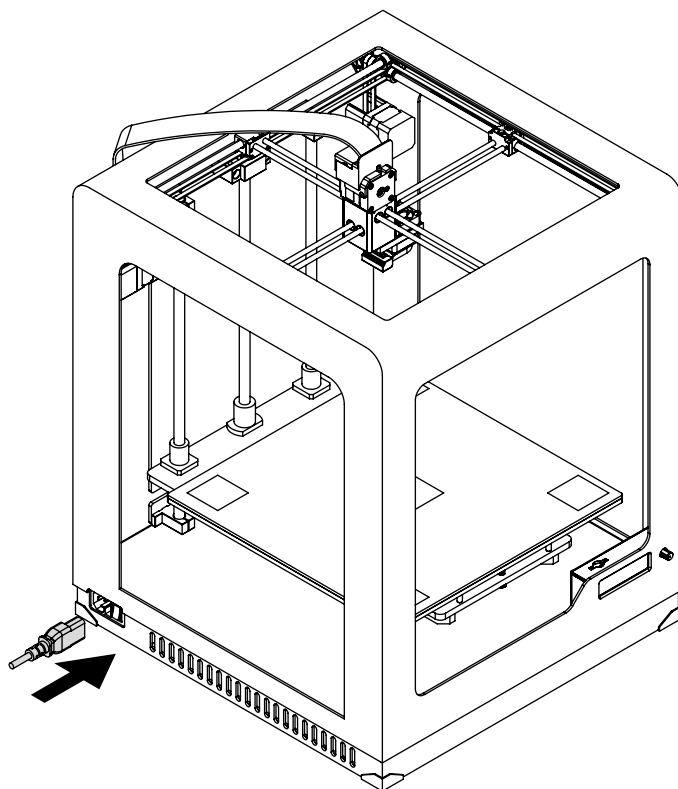
zortrax

15. To calibrate the platform, from the menu select "Maintenance" and then "Autocalibration." Follow the instructions displayed on the screen.

```
Models
Maintenance
Material
Settings
Information
```

```
Back
Autocalibration
Heat the extruder
Move the platform up
Move the platform down
```
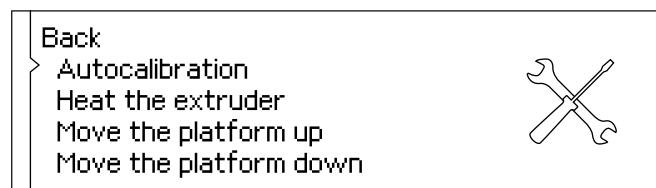
16. Install the side covers*.
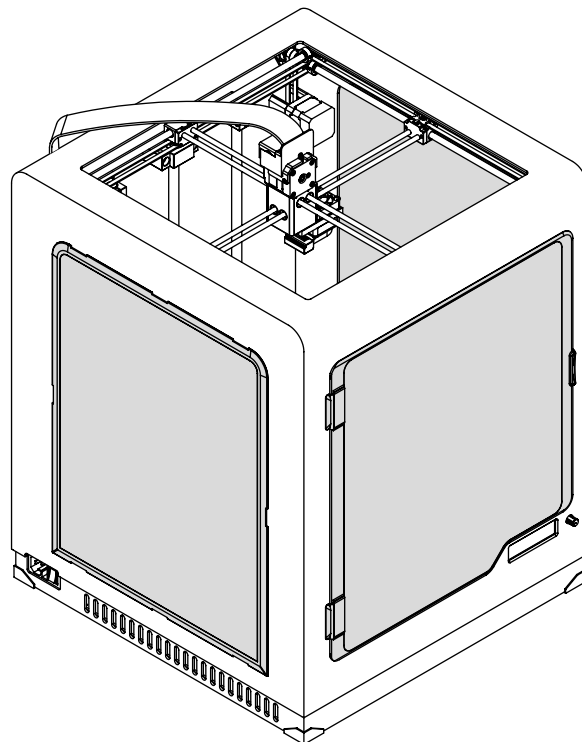
*Delivered only with Zortrax M300

Z-Firmware Installation

17. Download the latest Z-Firmware update from: http://support.zortrax.com/downloads/. To install the firmware in your printer, upload the Update.bin on an SD card. Next, insert the card into the slot in the printer and turn it on. The program will be installed automatically.

```
Zortrax Bootloader v1
```

```
Memory Card Connected.
```

```
Update.bin found.
```

```
zortrax
```

```
Models
Maintenance
Material
Settings
Information
```

Navigating through the Zortrax Printer Menu

The printer's functions can be activated or deactivated through the main menu.

The menu, current processes and all relevant information are shown on the display panel situated in the bottom right corner of the printer. Navigating through the menu and adjusting the basic settings is possible with the use of a knob. To select a given function, turn the knob, to confirm, press it.

Main menu is divided into 5 main submenus: models, maintenance, material, settings, information. Each category is discussed in detail below.

Models: This menu includes all models saved on the SD card. You can store all of your files in one or several folders.

Maintenance: this menu lists all functions useful when taking actions connected with keeping the printer in good condition.

Autocalibration - the function which activates the procedure of autocalibration.

Heat the extruder – the function which heats up the extruder to operating temperatures. It is very useful while replacing the nozzle and performing other extruder maintenance activities.

Move the platform up/down – this function allows to change the position of the platform. Move up the platform if you want to access the bottom plate in order to clean it.

Material: this menu contains two options that are particularly helpful during the printing process.

Unload the material – choose this option to change the material for a different color or type.

Load the material – choose this option before starting the print or after changing the material.

Settings: this menu allows to adapt the printer's operation to individual requirements.

Light – the function which enables switching on the dynamic light – a different color of light for a different mode (heating mode, sleep mode, stand-by mode), the white light for all modes or disabling the light at all.

Buzzer – the function which enables/disables the sounds in the device.

Sleep mode – the function activating the sleep mode which reduces power consumption and noises. It also turns off the heating, motors and fans.

Language – this option can be used to change the language of the menu and printer messages.

Models sorting – the function which allows to organize models saved in folders by the date and time of saving or the file size.

Information: this tab provides all information about the device and its current state.

Firmware version – the tab which displays currently installed Z-firmware version.

Printer information – the tab containing information which identifies the printer model, its hardware version, serial number and total printing time.

Help - the section providing Customer Support contact details.

The menu in Zortrax devices allows to activate the pause option during the printing process. In order to pause the printing, press the knob for 10 seconds. The display will show the options related to the pause mode: Resume the print (the function which continues the printing process), Change the material (the function which allows to unload the material and load a different one) or Stop the print (the function which finishes the printing process).

Modes and Signal Tones of Zortrax Devices

Zortrax printer indicates its current mode by the LED lights as well as informative and alert sounds. When the printer enters a given mode, the color of LED lights changes into a different one. Also, while changing to some modes, the device may emit a sound. Therefore, working with Zortrax devices becomes easier and more convenient because there is no need to read the printer's present mode from the display.

Heating Mode
When the light turns red, it is a sign that the platform or the extruder is heating up.

Sleep Mode
Purple light indicates the sleep mode.

This mode turns off the heating, motors and fans every time the printer is not used for 15 minutes. The sleep mode has been introduced so as to save power consumption and reduce noises.

Other Modes
White light signifies other modes: printing mode, autocalibration mode and stand-by mode.

While working with Zortrax printer, you can hear two types of sounds: long and short ones.

All activities that involve preparing the device for printing, such as heating the extruder or loading and unloading the material, begin with a short sound. The printing process is initiated with a short sound and it ends with a double short sound.

A long sound indicates malfunctions, failures or the user's negligence. Also, the long sound points out the need to update the firmware.

Material Loading

18. From the main menu select "Material" and then "Load the material." At this point the printer will begin to heat up the extruder.

WARNING! The extruder will be hot. Don't touch it. Wear safety gloves.

Once the extruder heating is done, insert the material into the extruder and push the knob to continue.

When the material is loaded, the device is ready to begin the printing process. Remove the excess material using the tweezers.

WARNING: Hot printhead Insert
new material into the extruder
and press the button to continue

WARNING: Hot printhead
Loading material Please wait
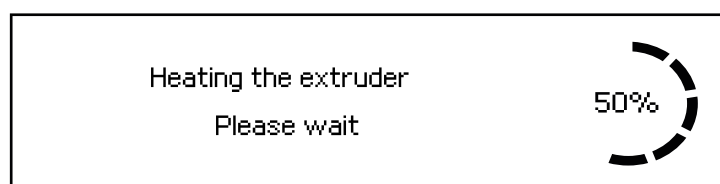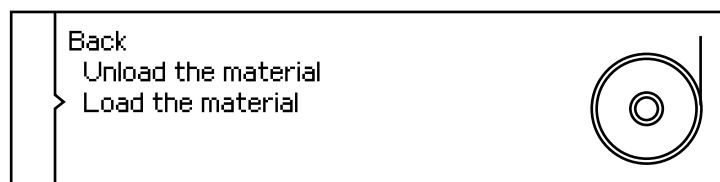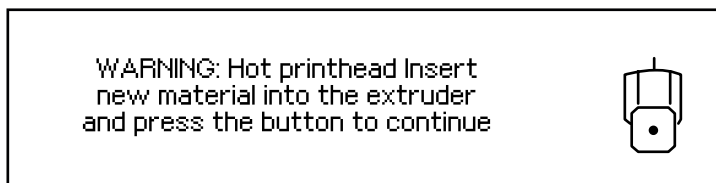
Platform Calibration

19. Platform calibration involves the procedure of checking the distance between the nozzle and five silver points on the platform and tightening/loosening the calibration screws.
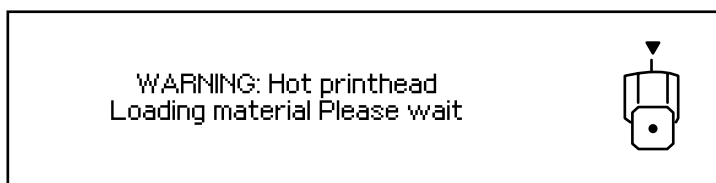
From the main menu select "Maintenance" and then "Autocalibration." At this point the printer will begin to heat up the extruder.

WARNING! The extruder will be hot during the autocalibration. Don't touch it. Wear safety gloves.

Models
Maintenance
Material
Settings
Information

Back
Autocalibration
Heat the extruder
Move the platform up
Move the platform down

Heat the extruder

Please wait

8%
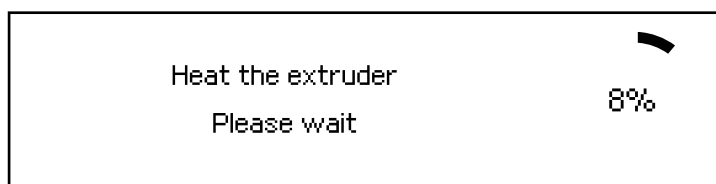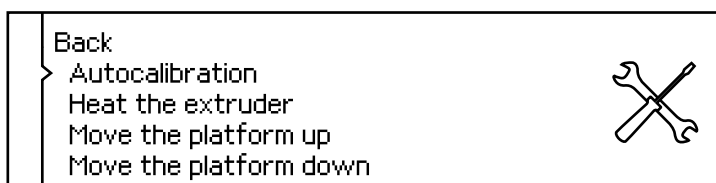
20. Once the extruder heating is done, push the knob to continue.

Follow the instructions displayed on the screen.

At this moment the printer will lift up the platform and check the distance between the nozzle and the center point of the platform. Next, the display will show a message indicating that the three calibration screws placed under the platform need to be tightened. Once you've tightened the screws, push the knob to continue.

The printer will begin to check the distance between the nozzle and five silver points on the platform: two points at the front of the platform, two points at the back and the center point.

If the printer detects an incorrect distance in any of these points, the display will show instructions on what adjustments should be made. Follow the instructions and tighten or loosen the screw indicated in the message. Turn the screw slightly, only by a few degrees. Once you finish, push the knob and the printer will recheck a given point on the platform.

If the distance between the nozzle and five points is set within the acceptable limits, the printer will finish the calibration procedure. Additionally, the display will show the calibration results.
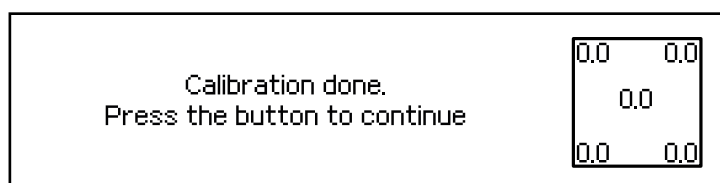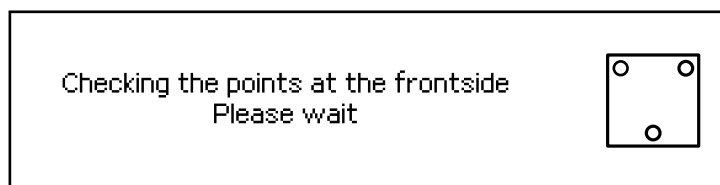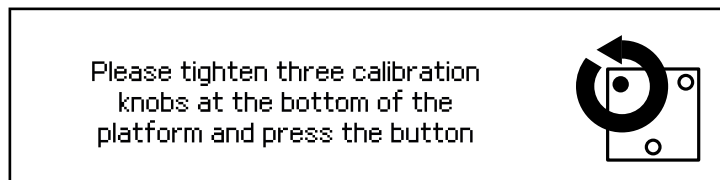
Z-SUITE Installation

21. Download the latest Z-SUITE update from: http://support.zortrax.com/downloads/. In order to download and install Z-SUITE on your computer, you need to enter the serial number of your device. The serial number can be found in the printer's menu in "Information" section and on the nameplate on the back of the printer.

Z-SUITE is a program created specifically for Zortrax devices. Thanks to this application it is possible to prepare a 3D model for printing by generating a project and saving it in a .zcode format. The program allows changing and adjusting the print settings, such as the size of the model, the layer thickness, a type of infill or how much support structure should be generated.

Remember to update Z-SUITE regularly. All updates are available at: http://support.zortrax.com/down-loads/.

Starting and Removing a Print

Once your model has been prepared for 3D printing in Z-SUITE, you need to save it on your hard drive and then on an SD card. Next, insert the card into the card reader in the printer.

Use the "Models" option from the main menu to choose the model you want to print.
From all the models saved on the SD card select the one to be printed by turning the knob and press it.

At this point the printer begins to heat up the extruder.

WARNING! The extruder will be hot. Don't touch it. Wear safety gloves.

The printing process will start automatically.

Removing the print needs to be dealt with very carefully because there are some elements of the printer that can get damaged in the process. The following instructions show the correct procedure of removing the print from the platform.

1. Turn off the platform and unplug the power cable.

WARNING! WAIT 30 MINUTES UNTIL THE PLATFORM AND THE PRINT COOL DOWN.
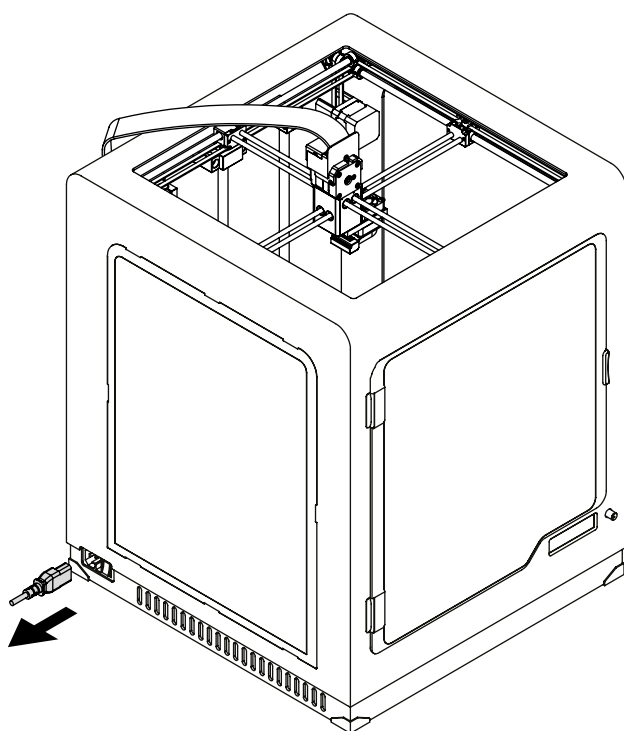
2. Open the front cover.
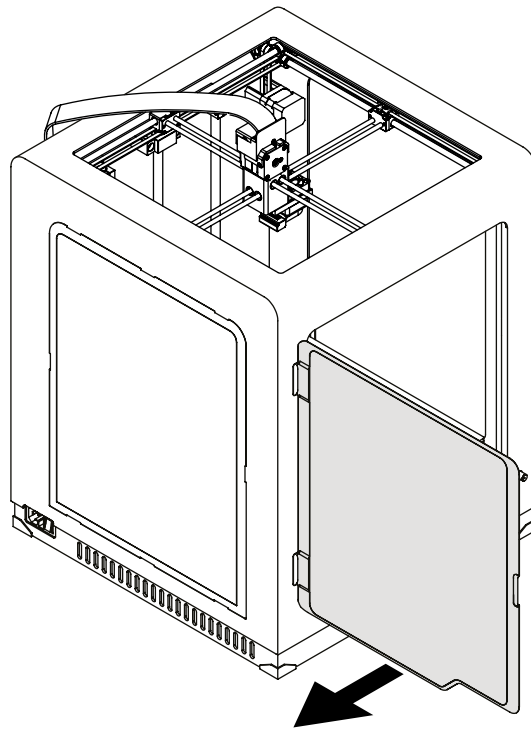
3. Unplug the heatbed cable from the platform. Both the big and small connector need to be unplugged.
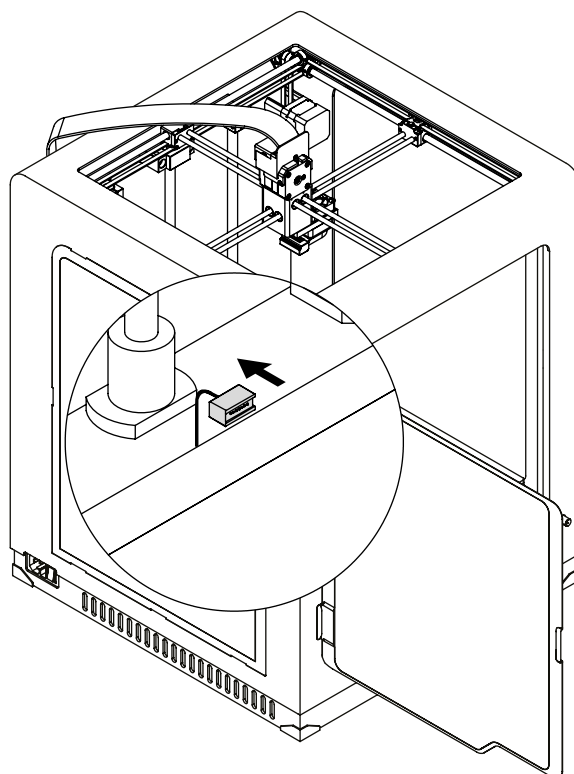
4. Remove the platform from the printer.
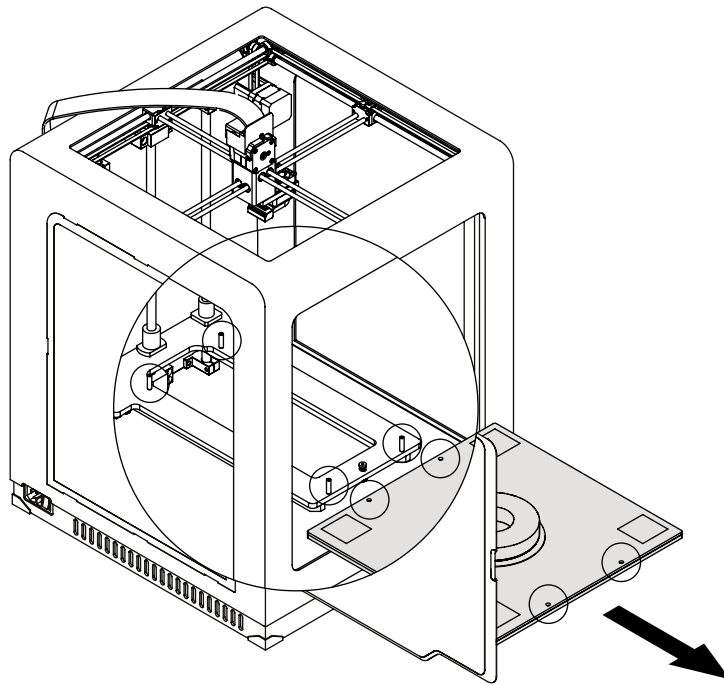
5. Use the spatula to remove the print.

WARNING! REMOVE THE PRINT VERY CAREFULLY. WEAR SAFETY GLOVES. DO NOT POINT THE BLADE OF THE SPATULA TOWARDS THE PLATFORM CONNECTORS.
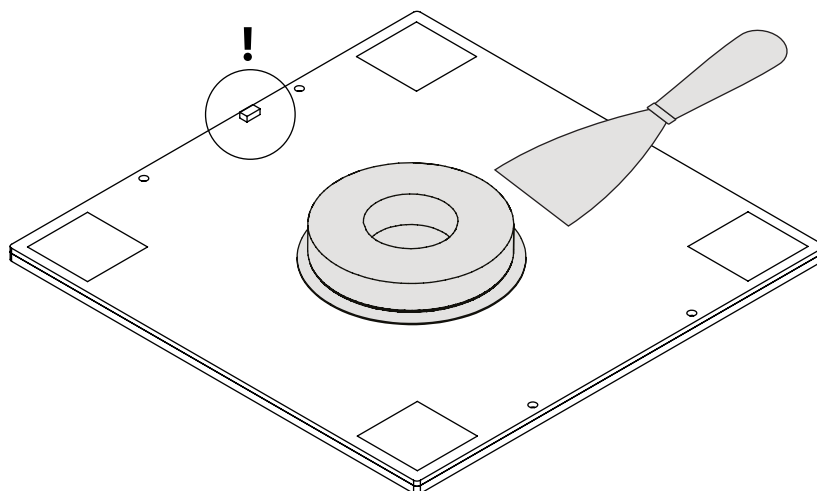
6. Put the platform back in the printer.
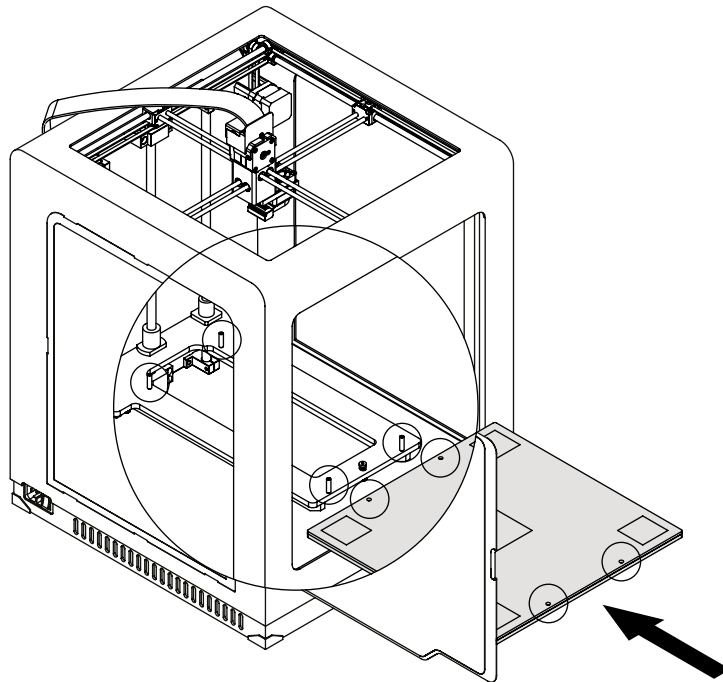
7. Plug the heatbed cable in. Both the big and small connectors need to be plugged in.
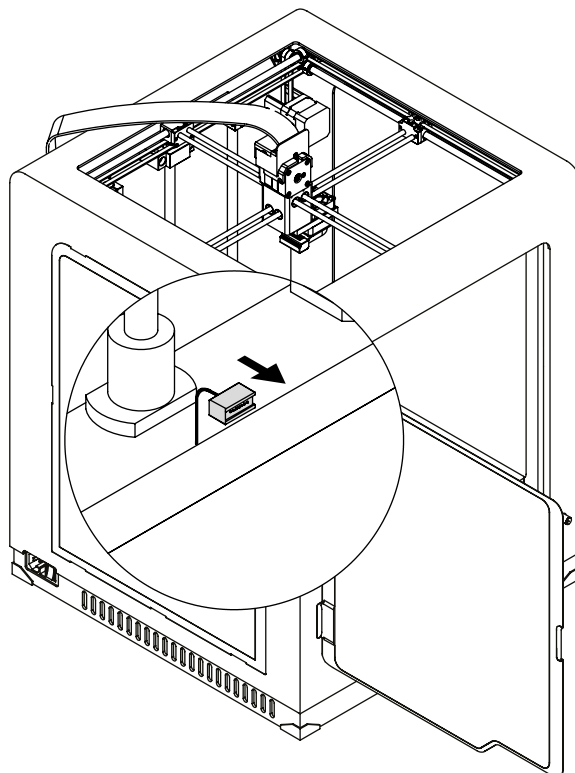
8. Close the front cover and plug the power cable in.
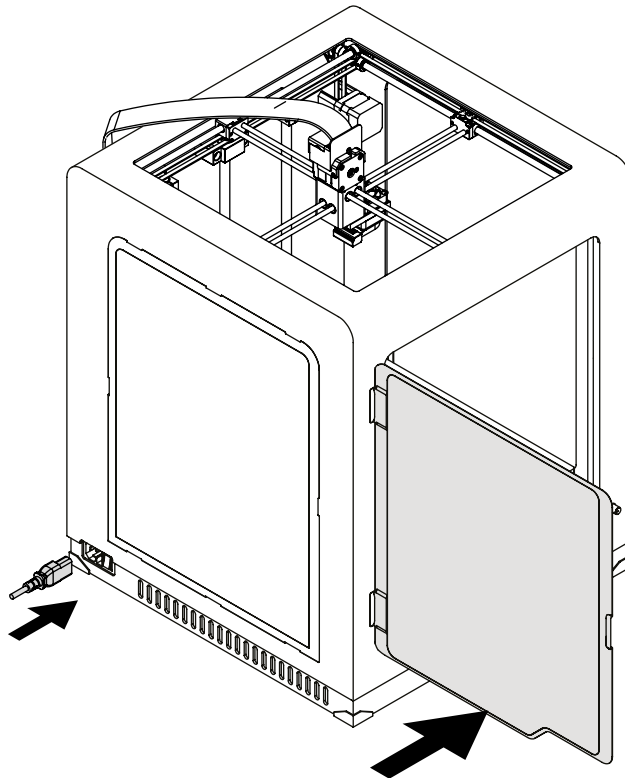
NOTE! ONCE THE PRINTING PROCESS IS FINISHED, UNLOAD THE MATERIAL AND TAKE THE SPO- OL OFF OF THE SPOOL HOLDER, SECURE THE END OF THE MATERIAL AS IT IS SHOWN IN THE PICTURE TO AVOID HAVING TANGLED THREADS OF MATERIAL ON THE SPOOL.
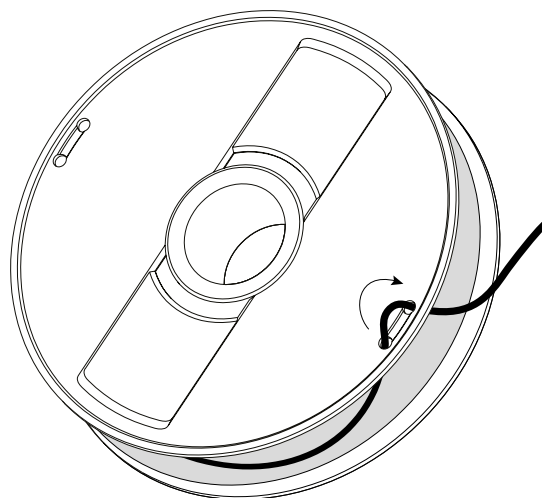
Available Materials

Zortrax certified materials increase the benefits of 3D printing with Zortrax devices. The complete offer of different materials is available at: https://zortrax.com/materials/zortrax-m-series/. There is a wide choice of colors to choose from. Technical and safety data sheets are available on the same website.

When 3D printing with Zortrax devices, it is recommended to use Zortrax certified materials so as to acquire the best possible quality of the prints.

Basic Maintenance and Service Work

Maintenance work should be regular in order to keep the printer in good condition and achieve high quality prints every time. Some parts require maintenance before each print and some every few hundred working hours. All maintenance activities do not take much time and they are not complicated. Before commencing any repair it is extremely important to turn off the printer and let it cool down. Remember to always wear safety gloves and glasses.

The printer is delivered with a full set of tools needed to carry out maintenance and service work.

The following tables present maintenance and repair guidelines connected with each section of Zortrax 3D printer, together with specific check points, necessary activities and their frequency.

1. Main

Activity	Frequency	Solution to problems	Necessary accessories
Cleaning the machine, its interior and surroundings, especially the bottom plate under the platform	Before each printing	The user is responsible for keeping the machine clean. To remove material remains from the interior of the device, use a vacuum cleaner or compressed air	Vacuum cleaner, cleaning products with a high evaporation rate

(!) Lack of proper care of the machine can cause inevident damage or improper operation of the drive units.

2. Hotend
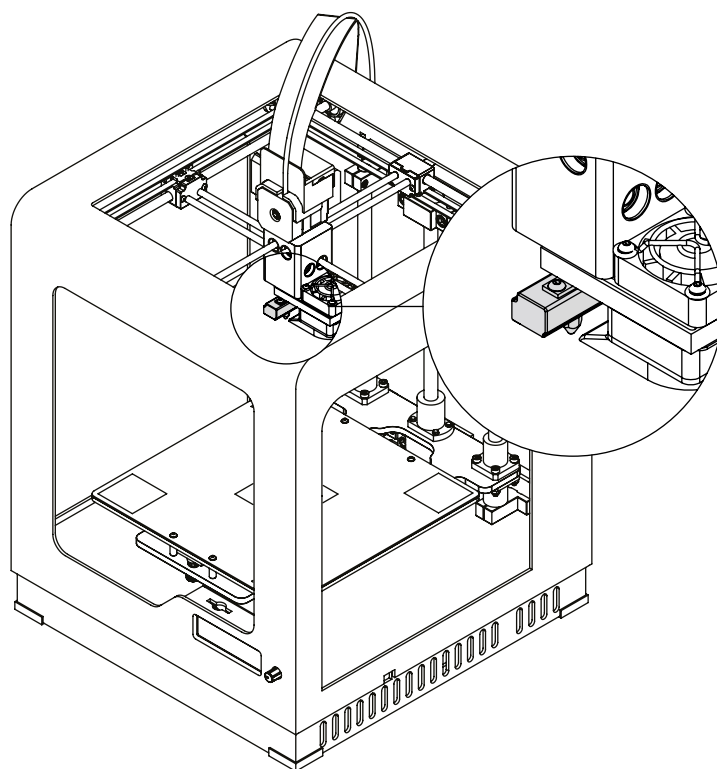
Activity	Frequency
Checking if the hotend and the nozzle are not clogged and if they are clean from material residues	Before each printing
Cleaning the nozzle	After finishing one spool of material
Checking if the screws securing the heater and thermocouple are tightened	Every 300 working hours

(!) Lack of proper care of the machine can cause inevident damage or improper operation of the drive units.

3. Platform

Activity	Frequency	Solution to problems	Necessary accessories
Cleaning the perforated plate	Before each printing	To remove material remains from the surface of the perforated plate, use a spatula	Spatula
Checking the perforated plate for deformation	Before each printing	-	-
Autocalibration	Every 200 working hours	If the platform autocalibration fails, move on to the next step	-
Cleaning the heatbed and the underside of the perforated plate	Every 300 working hours	Unscrew the screws securing the perforated plate and remove the residues from the underside of the plate using a spatula. The heatbed needs to be cleaned with a piece of cloth damped in acetone	Spatula, piece of cloth, acetone

⚠ While cleaning the perforated plate, be careful not to damage the small connector placed at the edge of the platform.

4. X/Y axes; extruder guide rails

Activity	Frequency	Solution to problems	Necessary accessories
Checking if the axes and the extruder guide rails are clean from material remains and dust	Before each printing	It is possible to feel slight resistance while checking if the extruder moves freely on the guide rails. In such case you should check if the X/Y axes and the extruder guide rails are covered with black grime. The axes and guide rails should be cleaned with a cloth damped in acetone and then lubricated with grease supplied in the Starter Kit	-
Checking the tension of the drive belts on the X/Y axes	Every 300 working hours	In order to check the tension of the drive belts on the X/Y axes, move the extruder to the central point and gently tug the belts. If the belts are loosened, tighten the screws placed on the top part of the X/Y axes blocks	-
Checking the tension of the drive belts between the motors and the X/Y axes	Every 300 working hours	-	-
Checking if the screws on the X/Y axes and the motors pulleys are tightened	Every 300 working hours	-	-
Checking if the extruder moves freely when the printer is off	Every 300 working hours	-	
Lubricating the X/Y axes and the extruder guide rails	Every 200 working hours	-	Teflon or graphite grease

⚠ Lack of proper maintenance of the X/Y axes can influence the final look of the print and cause the effect of shifted layers. Cleaning and lubricating the axes can help you save the material used for 3D printing as well as the time for preparing the device for printing.

5. Extruder
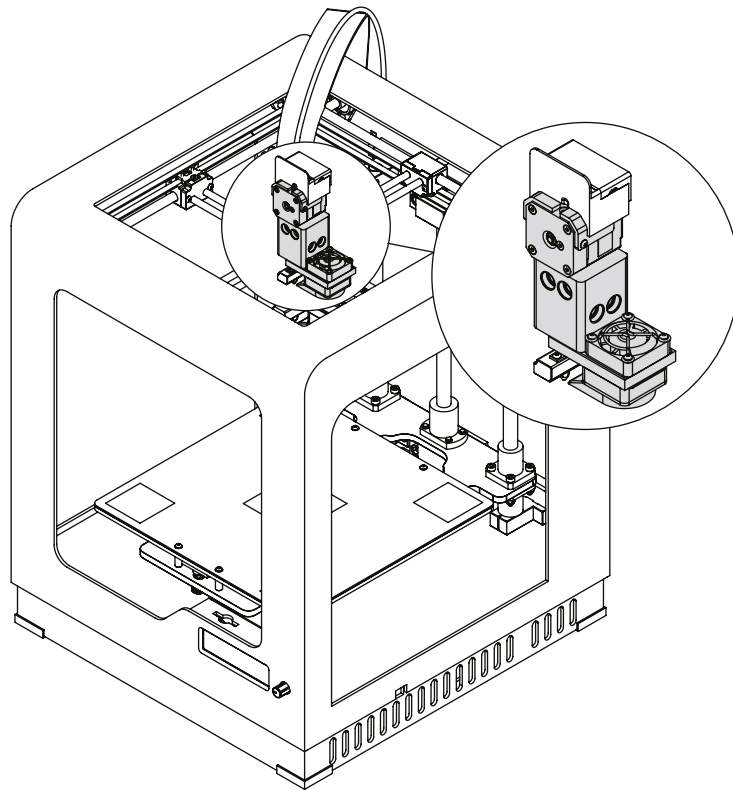
Activity	Frequency
Checking if the screws securing the hotend are not loose and, if necessary, tightening them	Every 300 working hours
Removing the material remains and lumps from the extruder	Every 300 working hours
Checking if the fans are working	Every 300 working hours

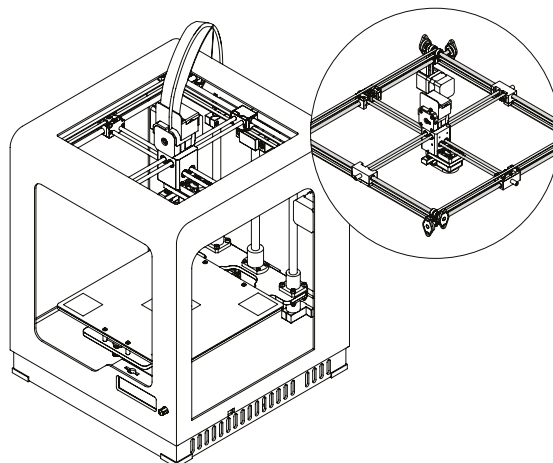(!) Lack of proper care of the machine can cause inevident damage or improper operation of the drive units.

6. Z axis
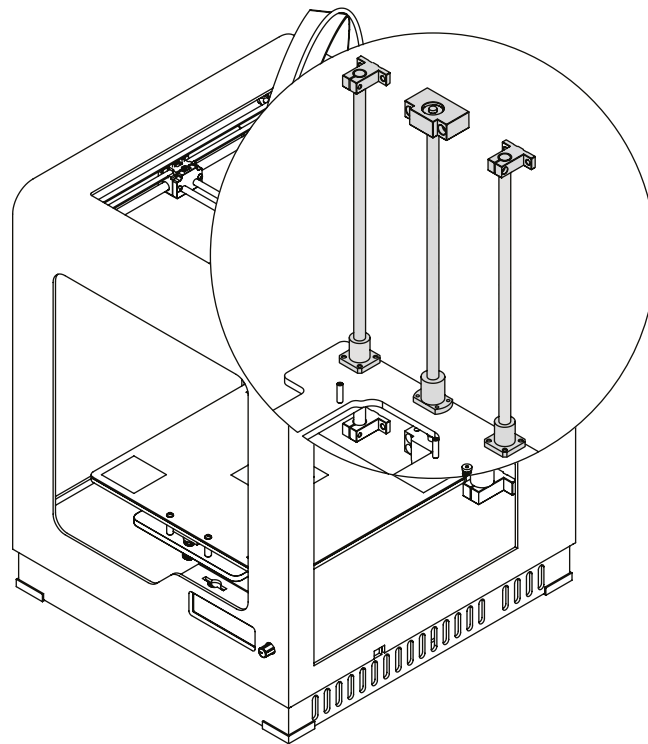
Activity	Frequency
Checking if the Z-axis screw and rails are clean from material remains	Before each printing
Checking if the screws and nuts are properly secured **NOTE:** Due to design characteristics, the screws securing the Z-axis screw nut cannot be fully tightened	Every 300 working hours
Lubricating the Z axis and rails	Every 200 working hours

(!) Lack of proper care of the machine can cause inevident damage or improper operation of the drive units.

Support and Troubleshooting

In order to ensure safety of every 3D printer's user, the Manufacturer provides various support while identifying and solving technical problems independently.

In case of difficulties with operating Zortrax 3D printer, at first you should seek guidance in this User Guide, check the manuals available at: http://support.zortrax.com/ or consult our technical specialists

through the Support Form available at: http://support.zortrax.com/support-form/.

The most common problems are listed below along with the list of possible solutions.

<u>The printer does not load the material into the extruder or the material is not extruded from the nozzle:</u>

1. Make sure that the material has not run out. If so, use a new spool and restart the printing process.

2. Check if the material is not tangled on the spool or blocked near the inlet of the material guide. If so, unload the material using options from the menu. Cut off the tangled or blocked fragment of the material. Reload the material and restart the printing process.

3. Check if the spool is properly secured on the spool holder. The spool may be impossible to rotate if it has been incorrectly installed.

4. Make sure that the material is not faulty or irregular, that is, it does not have swells on its surface. If so, unload the material using options from the menu. Use a different spool.

5. Make sure that the extruder and hotend are clean from material remains. Especially check the extruder motor rack and the nozzle. Remove the material remains from the nozzle using the supplied tools.

6. Make sure that the end of the material loaded into the extruder has been cut at a right angle. Cut the end of the material at an acute angle to make material loading easier.

7. For further help, visit our Support Center at: http://support.zortrax.com/.

<u>The print cracks and does not adhere to the platform (it warps):</u>

1. If the print does not adhere to the platform:
   a. carry out platform calibration again,
   b. make sure that the side covers are installed,
   c. make sure that the model is correctly designed and arranged in the workspace,
   d. try adjusting the print settings differently by changing the level of infill and the model's arrangement in the workspace,
   e. provide proper temperature in the printing room,
   f. before starting the printing process, make sure that the platform is sufficiently clean.

2. If the print cracks:
   a. make sure that the side covers are installed,
   b. make sure that the model is correctly designed and arranged in the workspace,
   c. try adjusting the print settings differently by changing the level of infill and the model's arrangement in the workspace,
   d. provide proper temperature in the printing room.

3. For further help, visit our Support Center at: http://support.zortrax.com/.

Whenever there is a technical issue caused by a hardware failure, negligence or inappropriate use of Zortrax printers, the firmware immediately displays an error message on the screen. The following list explains all error messages and provides potential causes and suggested solutions.

zortrax

Error Message	Potential Cause	Suggested Solution
Error #002 SD card reading error	The SD card is unreadable or damaged	-Save the file again on the SD card -Safely remove the card and use another one
Error #003 File error. Please prepare your model again	The file cannot be read or the SD card is damaged	-Save the file again on the SD card -Safely remove the card and use another one
Error #004 Print stopped due to SD card timeout. Check SD card contacts or format/replace your card	The SD card is unreadable or damaged	-Save the file again on the SD card -Safely remove the card and use another one
Error #101 No models on SD card	The card is unreadable or damaged; There are no models on the SD card	-Save the file again on the SD card -Safely remove the card and use another one
Error #010 Extruder heating error	The thermocouple cannot detect an increase in temperature	-Extruder cable / heater and thermocouple / extruder PCB replacement
Error #011 Extruder temperature is too high	The thermocouple has detected too high extruder temperature	-Extruder cable / heater and thermocouple / extruder PCB replacement
Error #012 Heatbed temperature is too high	The heatbed thermistor has detected too high heatbed temperature	-Heatbed / heatbed cable replacement
Error #013 Unexpected extruder temperature drop	The thermocouple has detected a decrease in temperature during the printing process	-Make sure that the heater and thermocouple haven't been disconnected from the hotend -Extruder cable / heater and thermocouple / extruder PCB replacement
Error #014 Heatbed thermistor error	No signal coming from the heatbed thermistor	-Heatbed / heatbed cable replacement
Error #030 Check build platform small connector and restart the printer	No connection / short circuit between the perforated plate and the heatbed	-Check the connection between the perforated plate and the heatbed cable -Perforated plate / heatbed cable replacement
Error #031 Check the platform large connector and restart the printer	No connection / short circuit between the heatbed and the heatbed cable	-Check the connection between the heatbed and the heatbed cable -Heatbed / heatbed cable replacement
Error #032 Check the main extruder cable and restart the printer	No connection / short circuit between the extruder cable and the extruder	-Check the connection between the extruder and the extruder cable and restart the printer -Extruder cable / extruder PCB replacement
Error #033 Check the perforated plate contacts and restart the printer	No connection between the perforated plate and the heatbed or short circuit on the perforated plate (on calibration points)	-Check the heatbed cable for proper connection -Perforated plate / heatbed cable replacement

Error #034 Check the endstops and restart the printer	No signal from the endstops when the extruder moves into the „home" position (front left corner)	-Check the endstops for proper connection -Carry out X/Y axes maintenance
Error #040 Please, update the Firmware to print	Z-SUITE blocks the printing process for previous versions of firmware due to safety reasons,	-Update the firmware
Error #075 Please prepare the file using a newer Z-SUITE version	Z-SUITE is not up to date	-Update the Z-SUITE to the latest version and prepare the file again
Error #076 This zcode file was exported for a different printer model	The model has been prepared for a different printer model	-Choose the proper printer model while exporting the file in Z-SUITE

⚠	If the device begins to operate in an unidentified way, safely unplug the printer from the power supply and immediately contact the Support Center specialists via the support form at: http://support.zortrax.com/support-form/.
⚠	While shipping the device to the Manufacturer's technical service, it is extremely important to pack the printer properly. Use the original packaging. Detailed instructions on how to pack the device are available at: M200 http://support.zortrax.com/packing-m200/, M300 http://support.zortrax.com/m300-packing/.

More manuals and tips & tricks articles are available at our Support Center.

www.zortrax.com

Specifications

Weight and Physical Dimensions		
	M200	**M300**
Without a Spool	345 x 360 x 430mm [13.6 x 14 x 17 in]	490 x 490 x 590mm
With a Spool	345 x 430 x 430mm [13.6 x 17 x 17 in]	490 x 560 x 590mm
Shipping Box	460 x 470 x 570mm [18 x 18.5 22.4 in]	576 x 576 x 842mm
Shipping Weight	25kg [55 lbs]	56kg [124 lbs]
Net Weight	16kg [35 lbs]	30kg [66 lbs]
Printing		
Printing Technology	LPD (Eng. Layer Plastic Deposition)	
Layer Resolution	90-400 microns	140-300 microns
Wall Thickness	Optimal: 800 microns	
Positioning Precision X/Y	1,5 microns	
Z Single Step	1,25 microns	
Dimensional Accuracy	+/- 0,2%*	
Angle Accuracy	+/- 0,2%**	
3D Printer		
Workspace	200 x 200 x 180mm [7.87 x 7.87 x 7.086 in]	300 x 300 x 300mm [11.81 x 11.81 x 11.81 in]
Material Container	Spool	
Material Diameter	1,75mm [0.069 in]	
Nozzle Diameter	0,4mm [0.015 in]	
Support Structures	Removed mechanically – printed with the same material as the model	
Extruder	Single	
Connectivity	SD card [included]	
Available Materials	Full offer is available at: https://zortrax.com/materials/zortrax-m-series/	
Additional Information	each delivered printer may have worked up to 50 hours during the quality control test prints	each delivered printer may have worked up to 90 hours during the quality control test prints
Temperature		
Extruder Maximum Temperature	380˚ C [716˚ F]	
Platform	Heated	
Platform Maximum Temperature	110˚C [230˚ F]	
Ambient Operating Temperature	20˚ - 35˚C [68° - 95° F]	
Storage Temperature	0˚ - 35˚C [32 - 95° F]	

Electrical		
AC Input	110/240V ~ 2 A 50/60Hz	
Power Requirements	24 V DC @ 11 A	
Power Consumption	max 300W	max 500W
Software		
Software Package	Z-SUITE®	
Supported File Formats	.stl, .obj, .dxf, .3mf	
Supported Operating Systems	Mac OS X / Windows 7 and newer versions	

*It should be noted that the model's dimensions strongly depend on the technical condition of the printer as well as the shape, form and size of a print, the material used and the printing process conditions. The accuracy in Z axis does not include a tolerance of +/- one layer. Bear in mind errors of measurement and measuring equipment.

**measurements were taken with an angle of 90˚

Recycling

Disposal of paper and plastic packaging

In order to protect the environment, it is recommended to place used paper and plastic packaging in specially designated containers, according to your local recycling guidelines.

Waste electrical and electronic equipment

This symbol placed on the device indicates that it is electrical and electronic equipment which must not be disposed of with household waste. Substances contained in the equipment may be harmful to the natural environment. Waste electrical and electronic equipment cannot be disposed of in landfills and must be recycled. For information on where to dispose of waste equipment, contact the seller, the Manufacturer or the importer of the product. Disposing of waste electrical and electronic equipment along with other waste is prohibited by the EU Directive 2012/19/UE.

Certification

The Manufacturer ensures that the equipment complies with all relevant standards. In case of questions and problems contact the Manufacturer through the support form: http://support.zortrax.com/support-form/.