

zortrax_{M200}

MANUAL

ENTER AN ENVIRONMENT OF
PROFESSIONAL 3D PRINTING

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INTRODUCTION

Thank you for choosing Zortrax M200®

Zortrax M200® manual allow you to easily and securely install and configure our product. Keep it in a safe place so you can use it if needed.

In the Contents you will find a description of the solutions used in Zortrax M200® 3D printer. To use current software version, download latest updates from www.zortrax.com

Lear more about all Zortrax® products. Contact us via email sales@zortrax.com or go to www.zortrax.com

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SAFETY

Before you start working with Zortrax M200® read safety tips:

- Never touch the model, hotend or platform during printing process – there is a risk of burns and deformation of model. Remember to always wait until the printer parts cool down (~30min.).
- Stay away from workspace during printing process – do not put hands or any other parts of your body inside the workspace - it may cause burns and printer damage.
- Always use safety gloves when removing the platform.
- Wear safety glasses when removing the model from the platform.
- Never touch heated extruder – even with safety gloves.

SAFETY SIGNS USED IN THIS TEXT:



Caution – these actions may harm you if you won't follow the instruction.



Wear safety glasses - risk of injury to eyes.

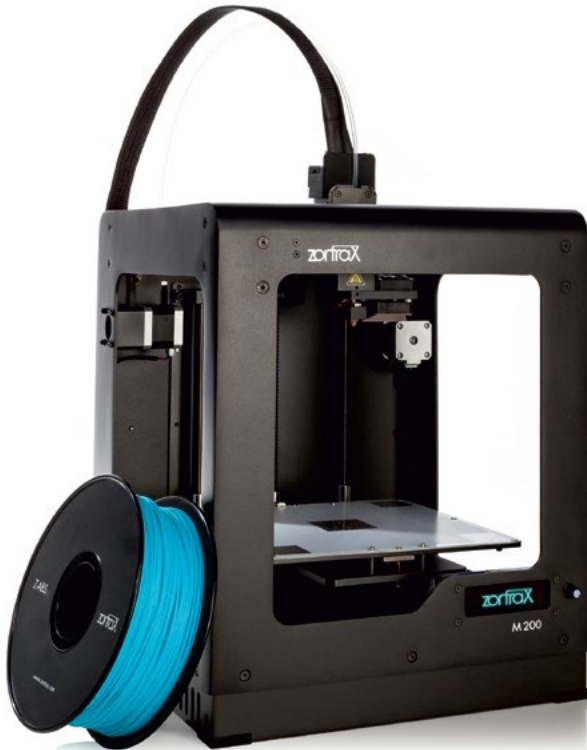


Wear safety gloves - risk of burns.

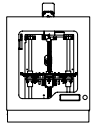
ZORTRAX M200

3D printing is a technology for industry and design. Using 3D printer in technical and design studios lowers the costs of prototyping.

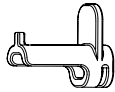
The integration of key elements of the printer - dedicated Z-Suite® software and composition of the Z-Filaments™ let us create new 3D printing technology – Layer Plastic Deposition (LPD™). With LPD™ technology you can create precisely projected model. Precise layered process of the filament application makes printed elements suitable for prototyping models in molding technology.



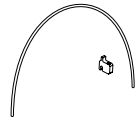
IN THE BOX



Zortrax M200®
3D Printer



Filament Spool
Holder



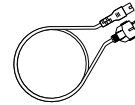
Filament Guide



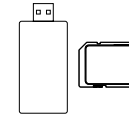
Filament
Spool



Build
Platform



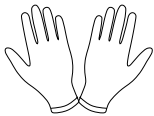
Power Cable



SD Card
&
SD Card Reader



Z-Suite®*
&
Quick Start Guide



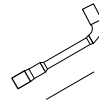
Safety
Gloves



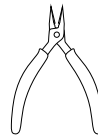
Cutting Knife
&
Scalpel



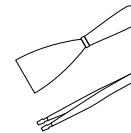
Allen Keys



Nozzle Key
&
Nozzle Needle



Pliers



Spatula
&
Tweezers



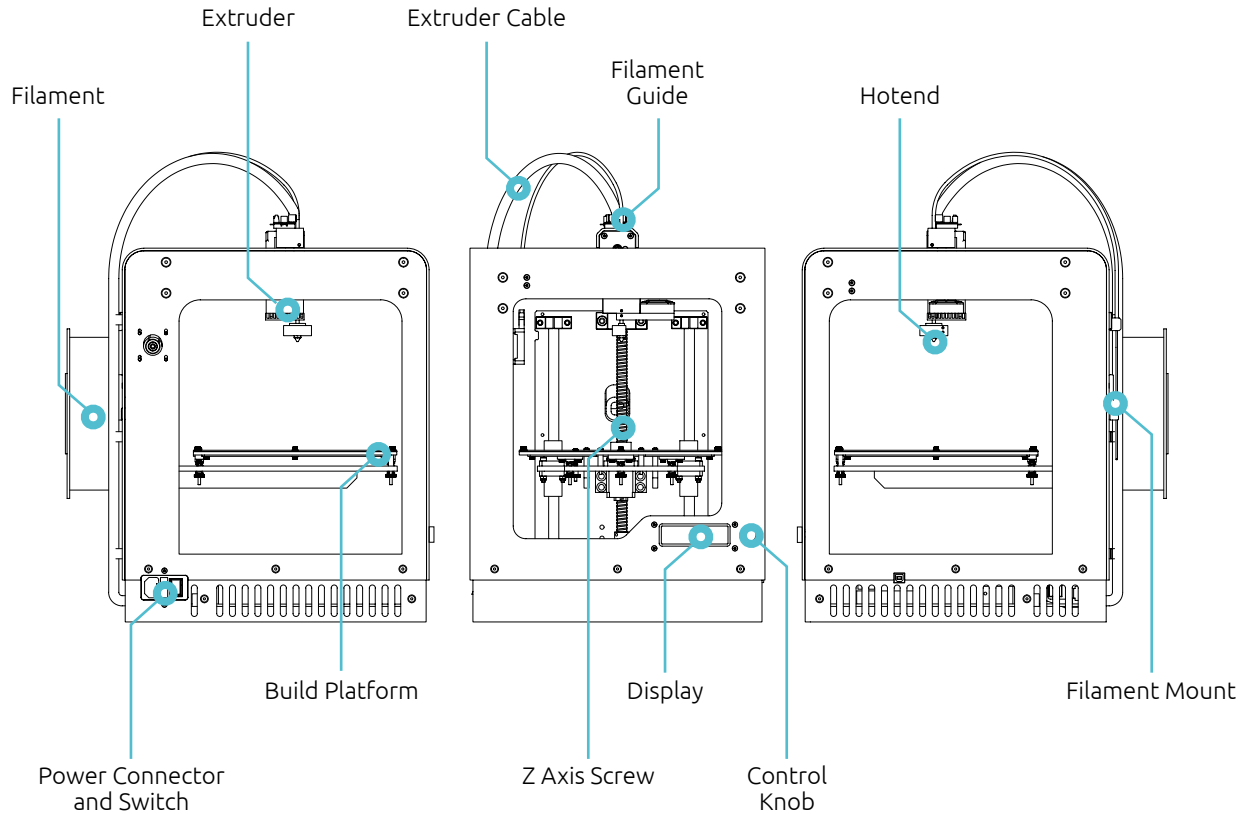
Service Grease



Safety Glasses

* online

OVERVIEW



PRINTING MATERIALS OVERVIEW

For Zortrax M200® we use high quality thermoplastic material – filaments. All our materials have carefully selected composition and properties. We advise you to print with dedicated filaments only. Only Z-Filaments™ guarantee safe and high quality prints.

USING OTHER FILAMENTS THAT DEDICATED

Unlike inkjet printers, printing materials for 3D printers need to be prepared strictly for a particular model of the machine. Filaments from all manufacturers have different physical and chemical properties, even at similar terminology.

Using filaments from different manufacturers you risk printing problems and extruder clogging – even if you use high quality filaments. Zortrax M200® is adjusted to work with Z-Filaments™ only. Only Z-Filaments™ guarantee safely and trouble-free operation of your printer. Using filaments from other store, than Zortrax Store, you automatically loose Z-Care 1-st Year Service Program™. To buy dedicated filaments please go to www.zortrax.com/store



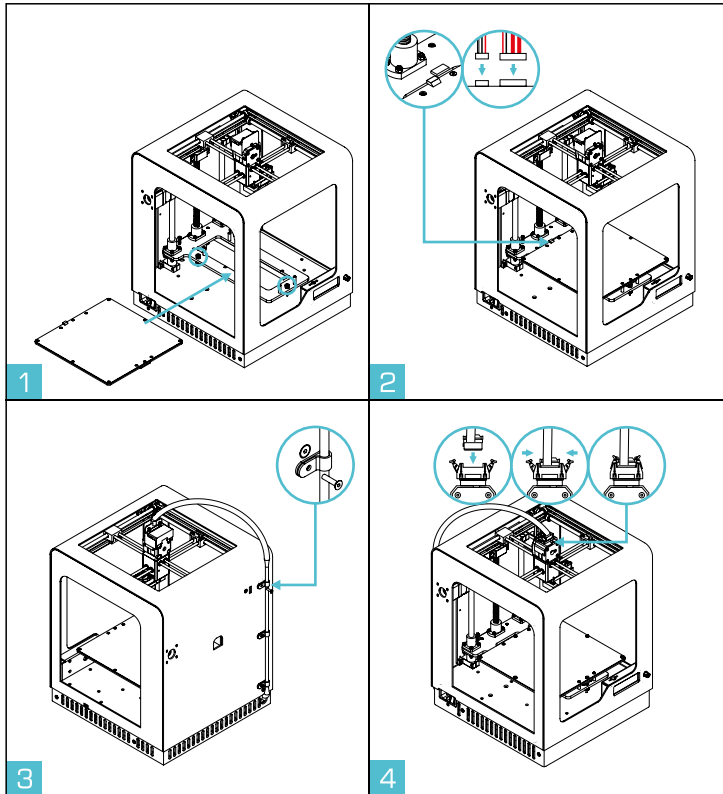
PRINTING MATERIALS OVERVIEW

MATERIAL PROPERTIES

Z-ABS™	Suitable for mechanical treatment	High printing precision	Available in a wide range of colors	Suitable for utility models
Z-ULTRAT™	Suitable for mechanical treatment	Durable	High quality prints	Suitable for large prints
Z-FLEX™*	Suitable for mechanical treatment	Elastic	Models are flexible and elastic	For malleable models e.g. seals
Z-PCABS™*	Resistant to cracking	Highly durable	Resistant to high temperature	Used for automotive parts
Z-GLASS™*	Suitable for mechanical treatment	Fragile	Transparent	Used for decorative parts
Z-ALU™*	Suitable for mechanical treatment	Fragile	Unique texture of prints	Imitates metal
Z-NYLON™*	Elastic, extensible	Highly durable	Bendable	For elements subjected to load

* available soon

PREPARATION FOR FIRST USE



PREPARE YOUR PRINTER TO WORK

1. Place the platform inside M200® and match magnets (you can see them in the picture).
2. Carefully connect both connectors to the platform.
3. Place the cables using fastening clamps. Attach clamps to the cables and cables to the printer housing.
4. Plug the cable into the connector.

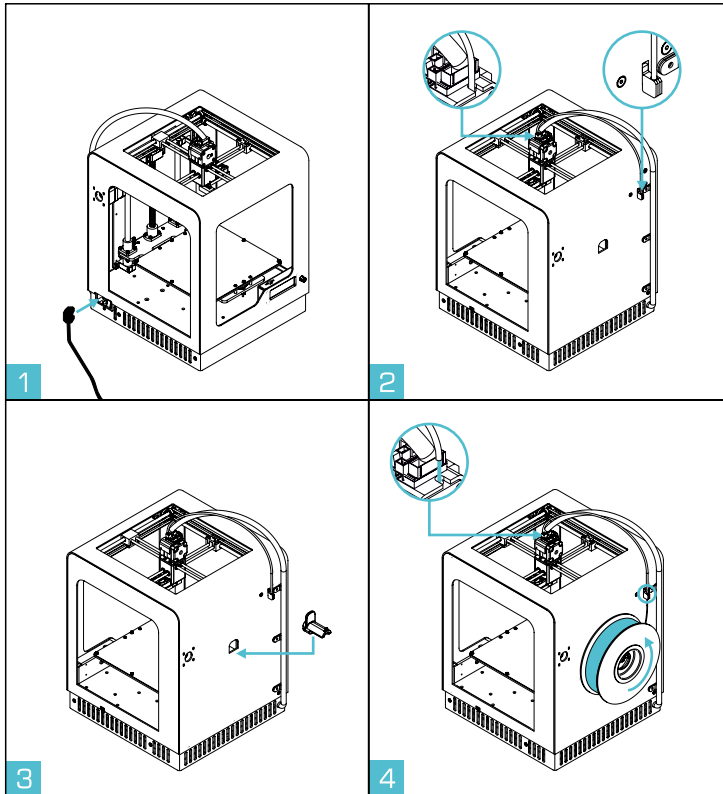


CAUTION! Wear safety gloves!



CAUTION! Disconnect platform connectors before removing the platform!

PREPARATION FOR FIRST USE



PREPARE YOUR PRINTER TO WORK

1. Attach power supply cable.
2. Mount filament guide.
3. Mount filament spool holder.
4. Mount spool of the Z-ABS™ on the spool holder. Spool should rotate anti-clockwise. Lead the filament through the filament guide to the printer.



CAUTION! Always connect the power cable into a grounded outlet.

PREPARATION FOR FIRST USE

LOADING FILAMENT

```
Models
Maintenance
>Filament
  Settings
  Information
  WiFi
```

Select "Filament" option from the main menu.

```
Back
Unload filament
>Load new filament
```

To load the filament, select "Load filament" option.

```
Heating... 15%      39>/260>
extruder:
████████████████████
```

Zortrax M200@ is heating the extruder.

```
Please insert filament and wait.
```

When the display shows the message "Please insert filament", insert the end of the filament into the extruder. When Zortrax M200@ finishes loading filament, printer is ready to print. Remove filament remains using tweezers.

PREPARATION FOR FIRST USE

AUTO-CALIBRATION

```
Models
>Maintenance
  Filament
  Settings
  Information
  WiFi
```

Select "Maintenance" option from the main menu.

```
Back
>Platform auto calibration
  Heat the extruder
  Move platform down [5mm]
  Move platform up [5mm]
```

Now select "Platform auto-calibration" option.

```
WARNING!!! PLEASE USE GLOVES!
Please tight three calibration
knobs at bottom of the platform
and then push the button
```

Tighten 3 pcs screws on the bottom of the platform.

```
Checking points at backside...
```

Zortrax M200® is checking level of the back part of the platform.

```
[Back left side is too low]
Please turn BACK RIGHT knob
at clockwise direction
and push the button
```

Zortrax M200® is showing information which screw should be tighten and which should be loosen. Follow the instruction on the display.

PREPARATION FOR FIRST USE

AUTO-CALIBRATION

```
Checkine points at front...
```

When the back of the platform is levelled, Zortrax M200® checks level of the front part of the platform.

```
[Front side is too low]
```

```
Please turn FRONT knob  
at clocwise direction  
and push the button
```

Zortrax M200® displays the message which way to tighten the front screw.

```
[Front side is too high]
```

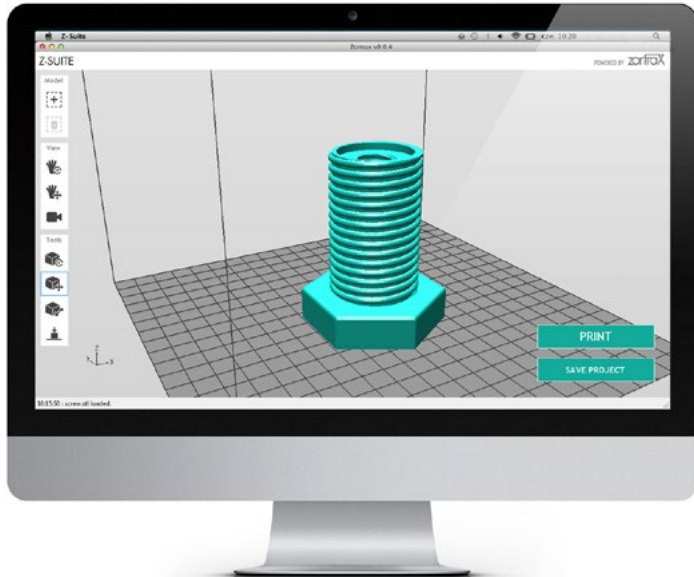
```
Please turn FRONT knob  
at counter clocwise direction  
and push the button
```

If the level is incorrect, Zortrax M200® will check the level of the front part of the platform and displays information in which way the screw should be tighten.

```
FRONT LEFT - OK: [-0.1]  
FRONT RIGHT - OK: [0.0]  
CENTER - OK: [0.2]  
BACK LEFT - OK: [0.0]  
BACK RIGHT - OK: [0.0]
```

When the auto-calibration is finished, Zortrax M200® displays the information about calibration points survey.

SOFTWARE & FIRMWARE



Z-FIRMWARE™ UPDATE

Information about latest version for the firmware can be found at www.zortrax.com and through our newsletter. Download the latest update for Z-Firmware™ at www.zortrax.com/downloads.

To update the firmware, upload Update.bin file to SD card, insert the card into the printer and run the machine. Z-Firmware™ updates automatically.

Z-SUITE® SOFTWARE INSTALLATION

Use .stl, .obj or .dxf format files to work with your Zortrax M200®. Most CAD and 3D modeling software allows you to convert 3D files to this format. To prepare a file for 3D printing (in the .zcode format) install Z-Suite™ on your computer. The newest software version and the Z-Suite® can be found at www.zortrax.com

To install Z-Suite® software, you need a serial number. The serial number is provided with the printer.

PRINTING

START PRINTING

```
Models
Maintenance
> Filament
  Settings
  Information
  WiFi
```

Insert SD card with prepared models into the printer. Models should be placed in the main catalog (next to the Update.bin file). To choose the model for printing, select “Models” option from the main menu.

```
Back
Files:
> model_name.zcode
  model_name2.zcode
  model_name3.zcode
  model_name4.zcode
```

Select the model in the a .zcode™ format file.

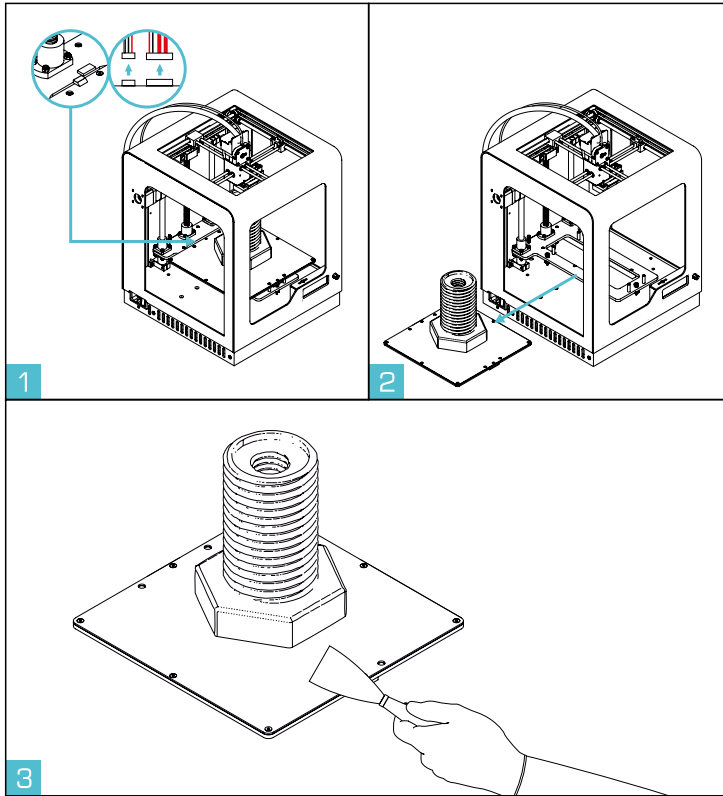
```
Heating... 15%
extruder: 39/260
```

Now the printing procedure will run automatically. The display shows information about extruder and platform heating level.

```
Printing...
model_name.zcode 10%
```

After heating elements, M200® starts printing. Progress bar shows the percentage of print advancement.

PRINTING



REMOVING PRINT

1. When the printing process ends, turn off your Zortrax M200®. Disconnect the cables from the platform.
2. Remove the platform.
3. Remove the models using spatula. Wear safety glasses and gloves. Place the platform inside the M200® and plug the connectors. To prevent the deformation, wait until M200® and model cool down (~30min.)



CAUTION! Wear safety gloves.



CAUTION! Disconnect platform connectors before removing the platform.

PRINTING



REMOVING SUPPORT

Models printed on Zortrax M200® composed of bottom part (raft), support and the print. Remove raft and support. Remember to wear safety gloves and glasses.

Removing raft is easy – simply detach it from the model with your hands. In places where raft is strongly connected to the model, use spatula and cutting knife.

Be careful when removing support, especially from models with many small and thin elements. Support generated with SES™ technology is designed to be easily removed. Usually you can remove it with your hands. In spots where elements are gently supported, use cutting knife or pliers. From hard to reach places, remove support using tweezers.



CAUTION! Wear safety gloves.



CAUTION! Wear safety glasses.

SUPPORT & MAINTENANCE

Keep your M200® efficient and safe – run maintenance regularly.

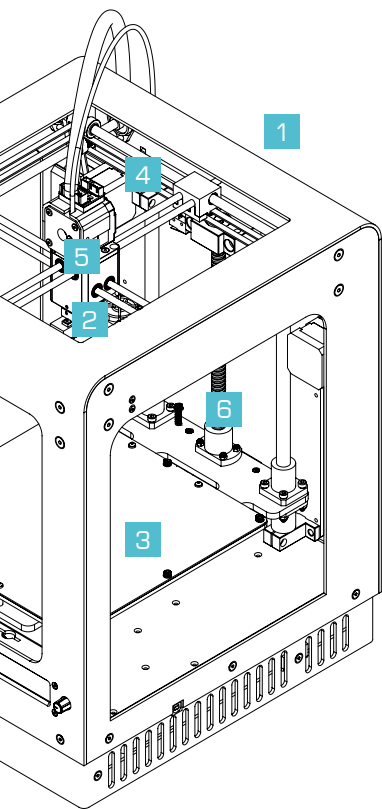


CAUTION! Turn off the power and unplug connectors when carrying maintenance tasks.



CAUTION! Never use compressed air to clean your printer. It can damage bearings and guides.

SUPPORT & MAINTENANCE



LP.	MIEJSCE	CZYNNOŚCI	CZĘSTOTLIWOŚĆ
1	Main	Cleaning the machine and its environment, especially bottom plate of the printer	Before each printing
2	Head	Check if the head is not clogged with the filament remains	Before each printing
		Remove the filament remains	Before each printing
3	Build plate	Cleaning perforated platform	Before each printing
		Checking perforated platform deformation	Before each printing
		Levelling the platform	Each 50 working hours
		Cleaning the bottom of perforated platform	Each 100 working hours
		Perforated platform straightening	Each 100 working hours or if necessary
4	X, Y axes	Checking if axes are not contaminated with filament remains	Before each printing
		Remove filament remains from XY axes	Before each printing
		Checking the drive belt tension on XY axis	Each 100 working hours
		Checking the drive belt tension between XY motors and the axes	Each 100 working hours
		Checking if screws blocking pulleys on XY axis and pulleys on motor axis are tighten	Each 100 working hours
		Checking if the extruder moves freely when printer is off	Each 100 working hours
		Lubricating XY axes	Each 250 working hours
5	Extruder	Checking if screws blocking heating block are tighten	Each 100 working hours
		Removing the filament remains and solids from the extruder	Each 100 working hours
		Checking if the fan is working	Each 250 working hours
6	Lifting mechanism	Checking if vertical line shafts and propulsion screw are not contaminated with filament remains	Before each printing
		Checking if ball screw and ball nut are tighten	Each 100 working hours
		Propulsion screw lubricating	Each 100 working hours
		Linear shafts lubricating	Each 250 working hours

SUPPORT & MAINTENANCE

CHANGING THE FILAMENT

```
Back
>Unload filament
Load New filament
```

To change the filament, from the “Filament” menu select “Unload filament” option.

```
Heating...
extruder: 15%      39/260>
```

Zortrax M200@ is heating the extruder.

```
Withdrawins filament.
```

The display shows the message “Withdrawing filament”. Filament begins to withdraw from the extruder. When the process is complete –remove the filament. To load new filament, follow the instruction on page 13.

CLEANING THE NOZZLE

Nozzle contaminate with filament remains with time. It can cause black coating on the nozzle. Remove the coating so black spots will not appears in your prints.



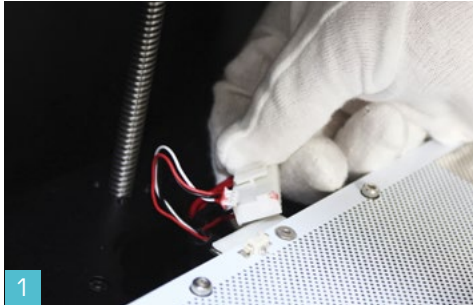
CAUTION! Wear safety gloves.



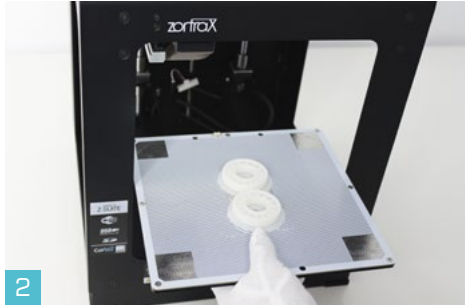
CAUTION! Clean the nozzle when it's cooled.

SUPPORT & MAINTENANCE

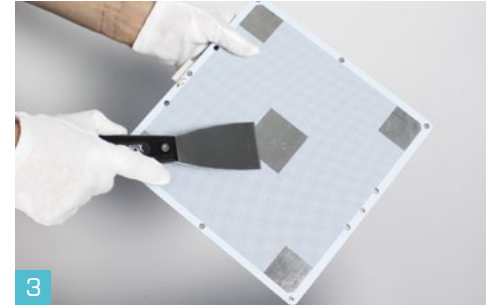
CLEANING THE PLATFORM



1 Turn off the printer and detach the platform connectors.



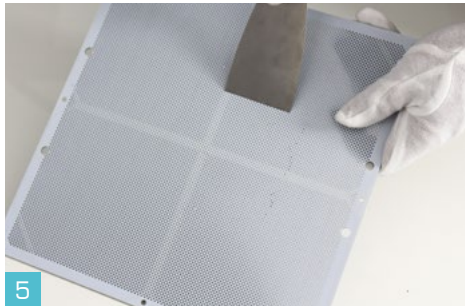
2 Carefully remove the platform.



3 Clean the perforated platform using spatula.



4 Unscrew screws mounting platform. Use allen key included in the set.



5 Clean the bottom part of the perforated platform using spatula. It is not necessary to clean the perforation.



6 Remove remains from the aluminum plate.

SUPPORT & MAINTENANCE



STRAIGHTENING PERFORATED PLATE

If between the center of the perforated plate and aluminum heated plate you can sense space, it means platform has deformed. This is a result of normal use. To straighten the platform, please bend it as you can see in the photo. Repeat for both directions. Mount the perforated plate to the aluminum heated plate – use screws and allen key. Attach the connectors and run the printer.

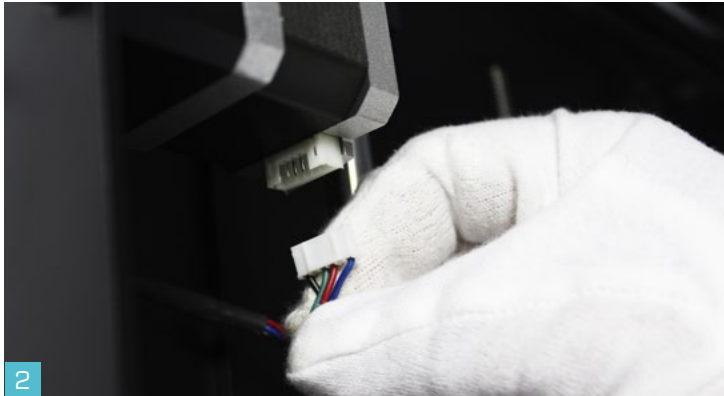


CAUTION! Wear safety gloves.



CAUTION! Do not use too much strength - it could damage the platform.

SUPPORT & MAINTENANCE



DRIVE BELTS MAINTENANCE

Properly tensioned belts guarantee correct work of your machine. Provided machine has properly tensioned belts. Check if none of them is loose. To check, gently tug. Properly tensioned belt vibrates making sounds. If belts are loose please visit our Support Centre at www.zortrax.com/support-center

SUPPORT & MAINTENANCE



DRIVE BELTS MAINTENANCE

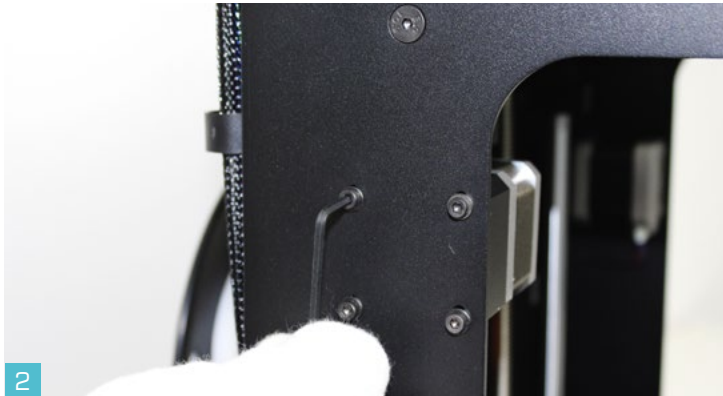
Loosen 4 pcs screws mounting motor (pic. 3). Press the motor down, make sure that the belt is tighten (pic.4). Tighten the screws mounting motor, keep the belts tighten. Attach motor connectors.

SUPPORT & MAINTENANCE



DRIVE PULLEYS MAINTENANCE

Check if the XY axes pulleys working with short motor belt are tighten. To check if pulleys are tighten, remove XY axes motor. Unplug motor connector (pic. 1) and unscrew 4 pcs screws mounting motor (pic. 2).



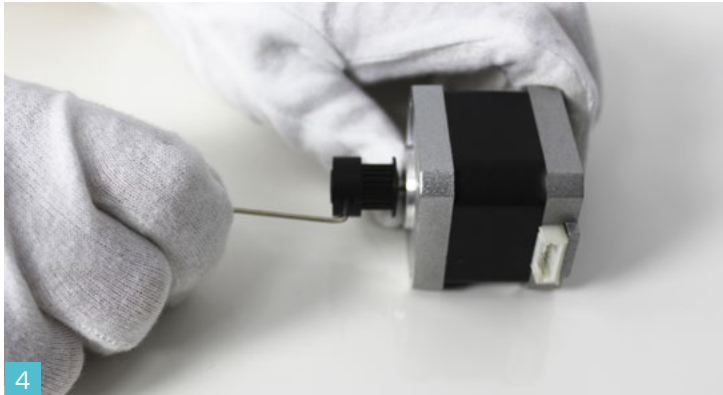
SUPPORT & MAINTENANCE



3

DRIVE PULLEYS MAINTENANCE

Remove the motor and spacer (pic. 3). Tighten screws mounting pulley (pic. 4).



4

SUPPORT & MAINTENANCE



DRIVE PULLEYS MAINTENANCE

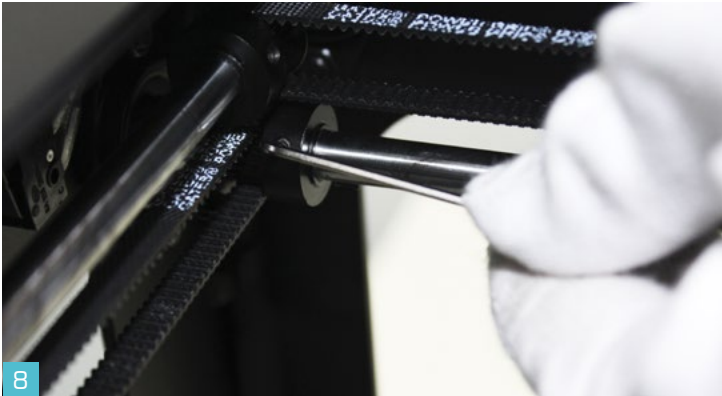
Mount the motor, spacer and tighten the screws (partly). Motor should move vertically on screws (pic. 5). Press the motor down, so that the belt is tightened (pic. 6). Keep tense, tighten screws mounting motor and attach connector.

SUPPORT & MAINTENANCE

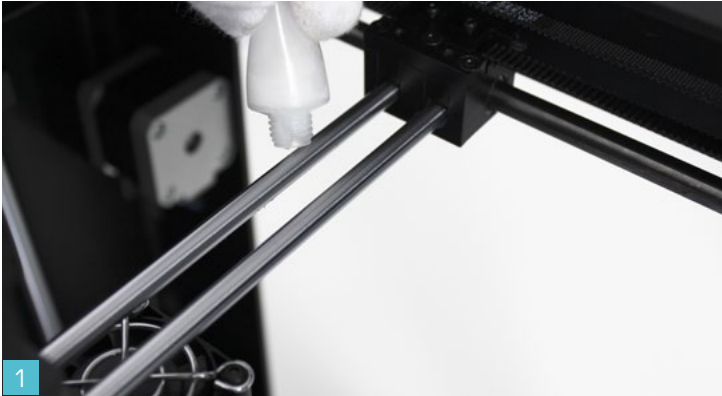


DRIVE PULLEYS MAINTENANCE

Please check if blocking pulleys are tighten when maintaining your M200®. There are 2 screws on each pulley. First check the tightness of the rack on the X axis and the Y axis which cooperates with a short drive belt on the motor X or Y (pic. 7). Also, check if 8 pulleys on XY axes working with long drive belt are tighten.



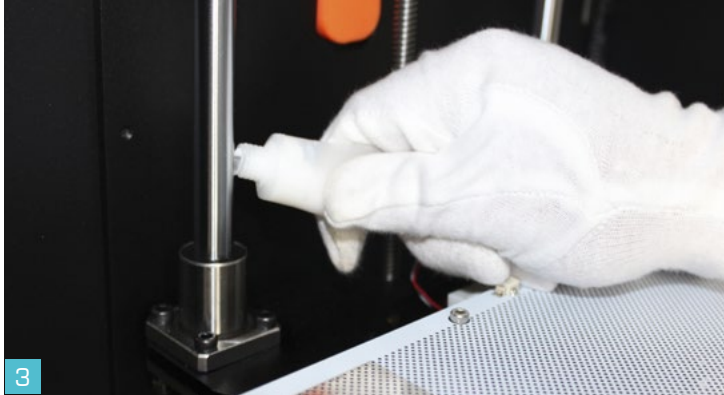
SUPPORT & MAINTENANCE



LUBRICATING

Use service grease to lubricate the linear guide on XY axes (pic. 1 and pic. 2) – you can find grease in the set that came with the printer (white tube). Apply a thin layer on each guide. You can also use silicone grease.

SUPPORT & MAINTENANCE



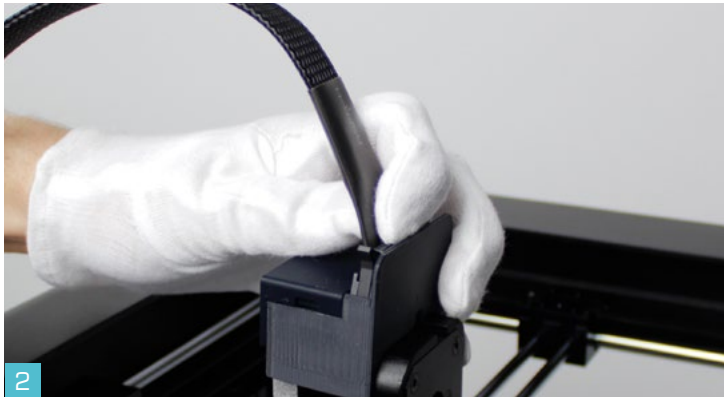
LUBRICATING

Remember to regularly lubricate linear guide of Z axis (pic. 3) and Z axis screw (picture 4 shows trapezoidal screw). Apply thin layer of the service grease, which came with the printer (white tube). You can also use silicone grease*.



* you can find trapezoidal screw in HX2 version of Zortrax M200®. Version HW1 and HW3 do not require smearing of Z axis screw.

SUPPORT & MAINTENANCE



EXTRUDER MAINTENANCE

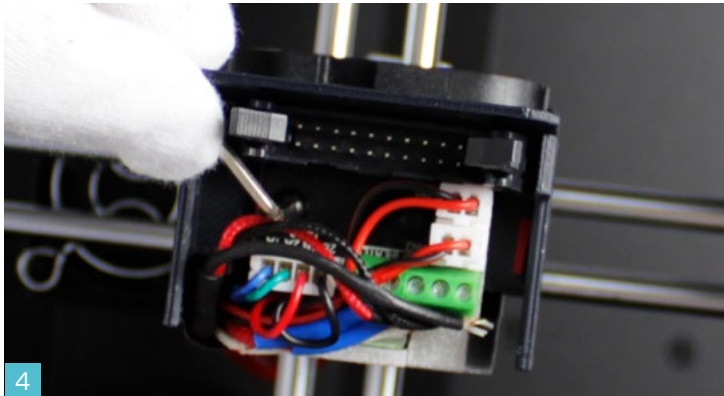
Extruder maintenance allows you to print high quality models. To start, please withdraw filament from the extruder (pic. 1). Turn on your M200® and select "Filament" -> "Unload filament" option from main menu. Zortrax M200® is withdrawing the filament and the LCD display shows "Withdrawing filament" option. When action is complete – please withdraw the filament. Now you can turn off your machine and disconnect the extruder connectors (pic.2).

SUPPORT & MAINTENANCE

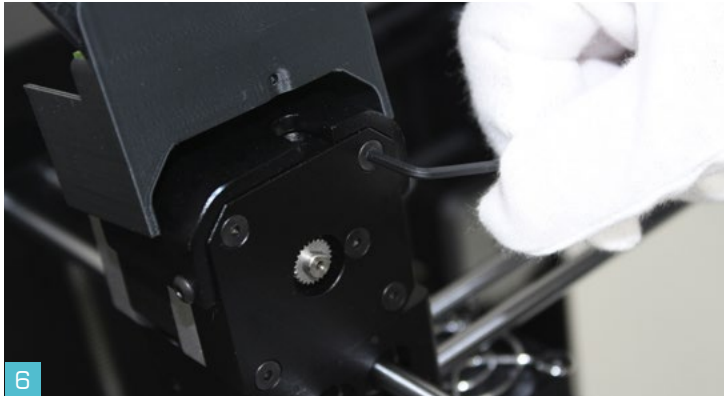
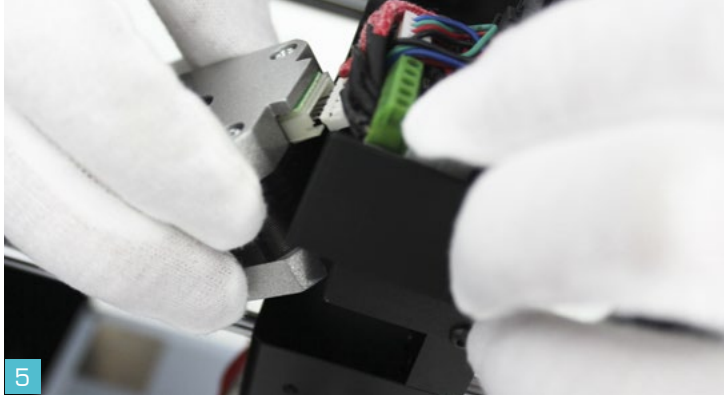


EXTRUDER MAINTENANCE

Remove top part of the plastic cover - cover is mounted on latches (pic. 3). Unscrew 2 pcs screws mounting platform (pic. 4).



SUPPORT & MAINTENANCE



EXTRUDER MAINTENANCE

Disconnect motor plug (pic. 5) and remove the motor – unscrew 4 pcs screws from the front of the extruder (pic. 6).

SUPPORT & MAINTENANCE



EXTRUDER MAINTENANCE

Clean the pulley on the motor shaft. Remove filament remains (pic. 7). Assemble everything following the steps in a reverse order.

TROUBLESHOOTING

PROBLEM	SOLUTION
No power	Check if power cord is connected firmly
Hotend is not heating up	Check if wide strip connector is plugged firmly – if hotend is not heating up, please contact our Support Center
Platform is not heating up	Check if 2 platform connectors are plugged firmly – if they are but platform is still not heating up, please contact our Support Center
Printer stops working during printing process	Check: <ul style="list-style-type: none">• if printer is connected to the power supply;• if there wasn't any power outage;• if the filament spool rotate freely;• if the filament is not finished;• if the nozzle is not blocked
Nozzle does not provide filament or provides it discontinuously	Please go to support.zortrax.com
Printed models are deformed	Please go to support.zortrax.com
Printer has troubles printing small models	Increase speed fan. If that won't help, please go to support.zortrax.com
Nozzle hits model when printing / black spots on a model	Please go to support.zortrax.com
Model lifts on platform during printing process	Please go to support.zortrax.com
Fan stopped working	Please go to support.zortrax.com
The printer is making strange noises while printing (clicking)	Please go to support.zortrax.com
The LCD display is not working correctly	Please go to support.zortrax.com
Other	Please go to support.zortrax.com

DICTIONARY

.dxf – Vector file format that allows you to save your 2D draught with 3D elements

.obj – Universal format file, describing solid as a mesh of triangles

.stl – Universal format file for 3D printing, describing solid as a mesh of triangles

.zcode™ – Format file used to save the models prepared for 3D printing

Auto-leveling – Activities performed automatically before each printing which compensates for the curvature of platform and allows first layer to be printed on optimal height

Heating block – Part of hotend responsible for heating the material. Inside heating block you will find thermistor and the heater

Lower extruder fan – Fan providing additional cooling to filament. Controlled manually using the Additional fan speed slider in Z-Suite®. It turns on when the raft is printed.

DRS™ – Dual Raft Support – technology for forming first double base layer which allows for a stable seating of the model on the build plate.

Nozzle – The lowest part of hotend which applies filament to the model.

Extruder – Movable part of Zortrax M200® which provides filament to the hotend.

Upper extruder fan – The fan cooling extruder. It helps in maintaining filament temperature during printing process.

Hotend – The set of heating block, nozzle and filament supply slot. This is the most important part of M200® - here the material is heated to the required temperature, plasticized and applied layer after layer to the platform.

LPD™ – Layer Plastic Deposition - 3D technology from Zortrax®. It involves precise deposition of the plasticized material on a perforated platform layer after layer.

XYZ axes – Directions in which the extruder (X axis – “left-right”, Y axis – “front – back”) and build plate (Z axis – “up-down”) are moving.

Control panel – OLED display with knob and SD card slot which allows machine to work without participation of the computer. Standalone mode.

Build platform – Removable plate. Model is secured to the platform during the printing process. The platform has its own heater, thermistor and system which allows for automatic calibration.

Perforated plate – Part of the build platform. Model sticks directly to the perforated plate. It requires maintenance.

Levelling the platform – Action carried out periodically by the user. It ensures the parallelism between the build plate and the extruder. Levelling is important for printing large models.

Filament guide – Teflon tube leads the filament from spool to the extruder.

Linear guides – Smooth bars which guides the extruder. Require periodic lubrication.

Raft – Removable print base. Model is attached to the raft.

SES™ – Single Extruder Support – Technology which generates easy to remove supporting material. Support is made of the same filament as the model.

DICTIONARY

Support – Supporting material generated with model which let you print difficult models. Zortrax M200® is using SES™ technology which means that support is removable.

Z axis screw – Screw which allows the platform to move up and down. It requires maintenance.

Z-Firmware™ – Printer software which stores information about parameters of the machine.

Z-Filament™ – Plastic printing material in the form of cord. It is used as a base for 3D models.

Z-Suite® – Software used for three-dimensional model preparation on Zortrax M200®.

Extruder pulley – Element settled on the extruder motor axis responsible for filament movement.

SPECIFICATIONS

PHYSICAL DIMENSIONS

Without Spool	345 x 360 x 430 mm [13.6 x 14 x 17 in]
With Spool	345 x 430 x 430 mm [13.6 x 17 x 17 in]
Shipping Box	460 x 470 x 570 mm [18 x 18.5 x 22.4 in]
Weight	13 kg [28.7 lbs]
Shipping weight	20 kg [44 lbs]

TEMPERATURE

Ambient Operation Temperature	15°-35° C [60°-95° F]
Storage Temperature	0°-35° C [32°-95° F]

ELECTRICAL

AC input	110/240V ~ 2 A 50/60 Hz
Power requirements	24 V DC @ 11 A
Power consumption	~ 190W
Connectivity	SD card (included), WiFi*

SOFTWARE

Software bundle	Z-Suite®
File types	.stl, .obj, .dxf
Supports	Mac OS X / Windows XP, Windows Vista, Windows 7, Windows 8

PRINTING

Print technology	LPD™ - Layer Plastic Deposition
Build volume	200 x 200 x 185 mm [7.87 L x 7.87 W x 7.28 H in]
Layer resolution settings	Advanced: 25-50* microns [0.000984-0.0019685 in]
	Standard: 90-400 microns [0.003543-0.015748 in]
Wall thickness	Minimal: 400 microns Optimal: 800+ microns
Resolution of single printable point	400+ microns
Filament Diameter	1.75 mm [0.069 in]
Filament Type	Z-Filaments™
Nozzle diameter	0.4 mm [0.015 in]
Minimum single positioning	1.5 microns
Positioning precision X/Y	1.5 microns
Z single step	1.25 microns
Extruder maximum temperature	380° C [716° F]
Heated platform maximum temperature	110° C [230° F]

* available in future update

CONTACT

Technical Support: zorfrax.com/support-center