

# DESIGNER PRO



User manual

# INTRODUCTION

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## Dear Customer

We are happy to welcome you among the owners of Designer XL PRO. Your 3D printer has a user-friendly interface and up-to-date printing control functions. Therefore, it can be used both by experienced engineers and those who are just discovering the world of additive technologies.

3D printing is a sophisticated process that involves many factors. We have prepared a detailed User Manual to make your interaction with the printer as easy, intuitive, and safe as possible. It describes all main components, 3D printer's functions, and menu settings; the principles and fundamentals of working with various materials, as well as recommendations for using the device. Key information is highlighted with frames:



This frame highlights important warnings about working with Designer XL PRO.



This frame highlights notes and useful references for working with Designer XL PRO.

This Manual uses [hyperlinks](#) or quick and easy access to sections.

Please, read the entire User Manual before using Designer XL PRO. For any technical issues, please contact us by e-mail [eu.support@picaso-3d.com](mailto:eu.support@picaso-3d.com).

**We wish you success in the implementation  
of your ideas and projects!**

**PICASO<sup>3D</sup>**

The pictures used herein are part of the product's graphical image and may differ from the actual appearance of the device.

The description of the menu contents, the list of errors, and the device's features may vary depending on the 3D printer firmware version used.

The manufacturer is not responsible for any actions deviating from those described in this Manual.

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# SAFETY AND PRECAUTIONS

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- ! Designer XL PRO complies with European Parliament Directives 2014/35/EU on low-voltage equipment and 2014/30/EU on electromagnetic compatibility.
- ! Do not use Designer XL PRO to store foreign objects. Foreign objects in the printer's working area can damage Designer XL PRO's components.
- ! Do not use Designer XL PRO to heat up food or other items.
- ! Do not expose Designer XL PRO to external temperature effects and/or liquids, gases, electric and/or magnetic fields, which can damage the device's electronic or mechanical components.
- ! Do not use the 3D printer in a humid or dusty environment. Follow the requirements for the [workplace](#).
- ! During its operation, the device may produce a specific smell of molten filament. This is a feature of the printing process. We recommend using the 3D printer in a well-ventilated area. Do not leave the working printer unattended.
- ! Designer XL PRO is not intended for use by the disabled, unless they are supervised by a person who is responsible for their safety.
- ! It is forbidden to use Designer XL PRO by persons under the influence of alcohol, drugs and/or other intoxicants.
- ! Handle the 3D printer carefully – it includes electronic components and mechanical parts that can be damaged if hit or dropped.
- ! Some 3D printer's parts operate at a high temperature. To avoid burns, be careful not to touch heated surfaces while printing and servicing the device. Wait at least 10-15 minutes for the unit's heating elements to cool down before opening the lid.

# SAFETY AND PRECAUTIONS

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Some 3D printer's parts are moving. To avoid personal injury and device malfunction, do not interfere with the movement of the 3D printer units during its operation.



Do not use non-original spare parts and do not attempt to repair it on your own: this can lead to device failure.



Do not seek third party's advice on the operation of the 3D printer. Our official contact details are:

[eu.support@picaso-3d.com](mailto:eu.support@picaso-3d.com) — technical support

[sales@picaso-3d.ru](mailto:sales@picaso-3d.ru) — sales department

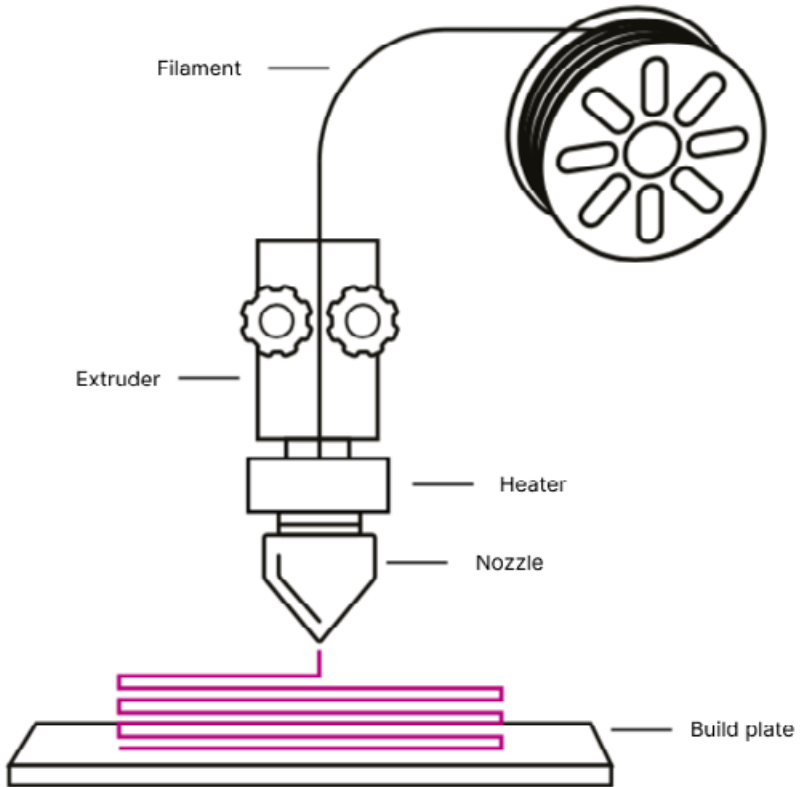
[marketing@picaso-3d.ru](mailto:marketing@picaso-3d.ru) — media enquiries

[info@picaso-3d.ru](mailto:info@picaso-3d.ru) — for general enquiries

# HOW DESIGNER XL PRO WORKS

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Designer XL PRO operates under the FFF technology (fused filament fabrication). The principle of the technology is to melt a thermoplastic polymer filament and to build a layer-by-layer model based on a previously prepared task.

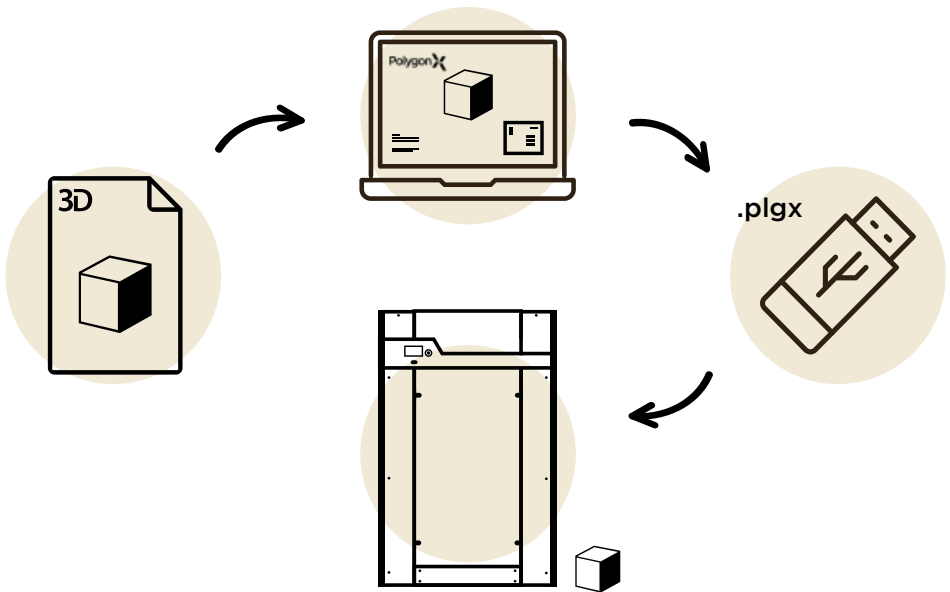


# HOW DESIGNER XL PRO WORKS

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Designer XL PRO is a 3D printer which is in the X platform-based product line. When you master it, you will be able to work with any devices based on the X platform.

To get started, you need a 3D model in one of the following formats: .stl, .obj, .3ds or .amf. The model should be uploaded into the software on a personal computer (PC) — Polygon X (supplied free of charge), which converts it to a printing task file in .plgx format with a set of control commands to operate PICASO 3D printers. To start printing on Designer XL PRO, you should save the .plgx file to a USB stick (supplied in the starter kit). File recording can be made remotely using Polygon X via Ethernet connection.

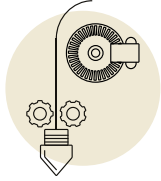




# X PLATFORM

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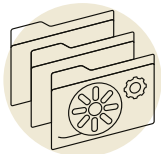
X Platform is a complex of software and hardware solutions for 3D devices by PICASO 3D designed for additive manufacturing purposes.



**End-of-Filament and Filament Flow Control systems with built-in sensors** detect the filament availability and the flow. Based on the data obtained, Designer XL PRO carries out **self-testing** and, in case of an abnormal situation due to the filament absence or uneven flow, automatically starts the problem-solving algorithm. If the abnormal situation persists, the printing process is suspended and the printer waits for user's actions.

Example: the filament is run short of on the spool or broke off during the printing; Designer XL PRO pauses its operation, reports lack of material, waits to filament reloading and continues printing.

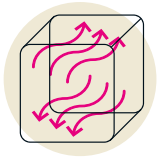
If the nozzle is completely or partially clogged during printing, the material flow is stopped or impeded: Designer XL PRO will detect a change in the uniform flow, pause printing, and start an automatic nozzle high-temperature cleaning algorithm. If the nozzle cleaning is successful, printer continues printing; otherwise, printing is paused, and Designer XL PRO informs the user about the problem.



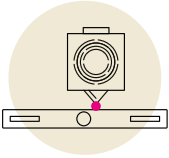
**The Profile System** stores parameters for working with materials in the printer memory. The profile settings are used **to control the layer time**, which allows to maintain surface high quality when printing small models; as well as **to control the temperature** of radiators, which allows to avoid overheating of the filament above the thermal barrier and protects the material in the feed channel from degradation. To start printing, the user selects a material profile based on the filament loaded. The profile system provides for using one and the same task in .plgx format to print with any thermoplastic filament used without preparing a new printing task.

# X PLATFORM

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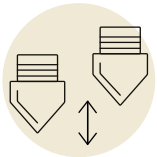
An adaptive air **circulation system** uses data from material profiles to create optimal conditions for printing and to avoid the temperature gradient inside the 3D printer chamber.



**The printing surface control system** in most cases provides for possibility to detect the weakening of adhesion of the printed model to the platform or the presence of a foreign object when printing the current layer in a timely manner. If an item comes unstuck or the printed layer has a wrong shape, the printer will pause printing until the user's intervention.



Integrated **high-speed print modes**. Before the printing starts, the user selects a speed mode in accordance with the expected result. It provides for one and the same task in .plgx format being printed at different speeds without preparing a new printing task.



**The nozzles height control system** (only for PRO-series printers) automatically allows for the difference in the height of nozzles relative to each other in case of dual-material printing and makes an appropriate amendment to the platform height. This system allows to reach high quality of dual-material printing.



Printer status can be monitored both from the printer display and through the **local network** via Ethernet network connection. There is one software used to control all X Platform devices — **Polygon X**. When connecting several printers via a LAN router, you can monitor all connected printers and control the printing process on one window tab of Polygon X.



The **notification system** allows to define the device status remotely, even on a PC screen when working via network.

# EQUIPMENT SPECIFICATIONS

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## PRINTING

### Printing technology

Fused Filament Fabrication (FFF)

### Nozzle-switching technology

Jet Switch™

(2 nozzles at 1 extruder)

### Build Volume

360 x 360 x 610 mm

(14 x 14 x 24 inch)

### Extruder maximum printing temperature

410 °C (770 F)

### Heated bed maximum temperature

150 °C (302 F)

### Print speed

up to 100 cm<sup>3</sup>/h

### Minimum Layer Thickness

10 microns (0.01 mm)

### Layer Resolution

0.01 – 0.8 (depending on the nozzle diameter)

### Positioning Resolution

11 x 11 x 1.25 microns

### Filament diameter

1.75 ± 0.1 mm

### Nozzle diameter

0.2 – 0.8 mm (0.5 in starter kit)

## MECHANICS

### Casing

Aluminium composite

### Frame

Steel (3 mm)

### Heated bed construction

Aluminium, glass

### Guides

XY rail (steel)

Z cylindrical (steel)

## FEATURES

### Primary systems

Filament Flow Control

End-of-Filament Sensor

First Layer Control

Built-in Profile System

Network Printing

### Additional features

Filament drying mode

Printer status notification system

Auto-control workability of all systems

Surface print control system

### Table Leveling

Auto-leveling

## ELECTRICITY

### Networking

220 ± 15%, 50 Hz (option 110 ± 15%, 60 Hz)

### Maximum Power Consumption

1.3 kW

### Interfaces

Ethernet, USB 2.0

(USB stick in starter kit)

## PRINTING MATERIALS

Formax (ABS + CF), Ultrax (PA + CF), PEEK, PA, PC, TPU, TPE, PP, ASA, SBS, PETG, ABS, PLA, PVA, HIPS and others

## SOFTWARE

### Software

Polygon X

### File Types

\*.stl, \*.obj, \*.3ds, \*.amf, \*.plgx, \*.ppf,

\*.ppl, \*.plgs

## PHYSICAL CHARACTERISTICS

WITHOUT BOX

### Printer dimensions

985 x 645 x 565 mm

### Weight

75 kg

DESIGNER  PRO

**UNPACKING**

# WORKPLACE

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The workplace for 3D printer installation must satisfy the following requirements:

- Ambient temperature: 15 to 30 °C (59 to 86 F).
- Relative humidity: 30 to 65%.
- Atmospheric pressure: 720 to 790 mm Hg.
- Ventilation availability
- Solid horizontal surface to withstand at least 30 kg load.
- Lack of direct sunlight on the 3D printer.
- Power supply 220 V  $\pm$  15% (50 Hz) with grounding.

Leave the 3D printer unpacked at the prepared workplace for at least 24 hours — do not plug it to power supply prematurely.

# STARTER KIT<sup>1</sup>

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Examine the starter kit. It must comprise:

## **Available in the Designer XL PRO:**

- 0.5 mm steel nozzle (x2)
- Temperature unit 400 (x2)
- 8 mm glass

## **Toolkit:**

- Screwdriver Torx TX-TR
- Slotted screwdriver
- Nippers
- Box cutter
- Pliers
- Nozzle change key
- Hex key 1.5
- Hex key 2
- Hex key 2.5
- USB drive
- 0.5 mm steel nozzle (x2)

## **Power cable**

## **Filament spool**

## **Adhesion glue**

If there are any discrepancies or lack of a transportation part and ties, please take a photo and send it to us by e-mail [eu.support@picaso-3d.com](mailto:eu.support@picaso-3d.com). Please do not forget to include the serial number of your 3D printer.

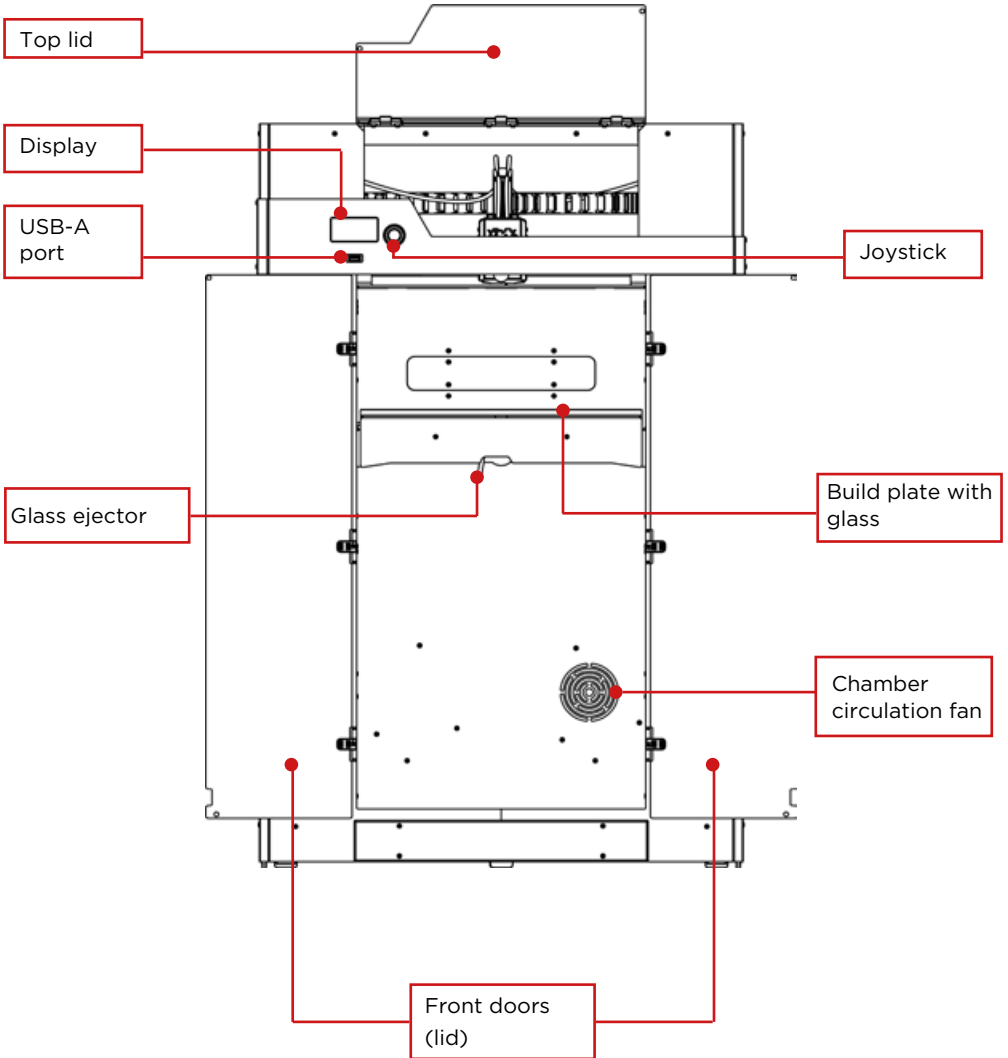
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<sup>1</sup> The type and configuration may be changed by the manufacturer without user's consent, which shall not affect the declared device specifications.

# MAIN COMPONENTS OF DESIGNER XL PRO

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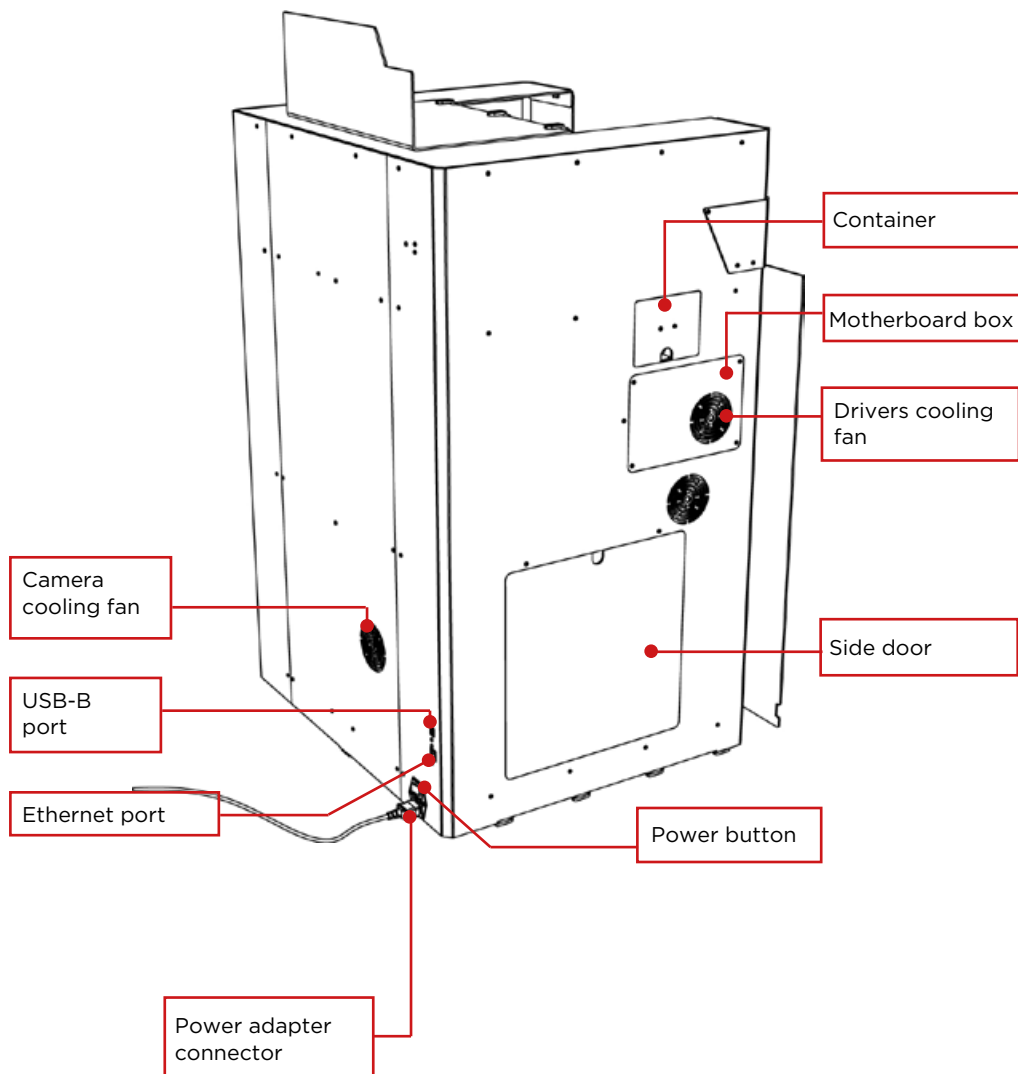
## Front view



# MAIN COMPONENTS OF DESIGNER XL PRO

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## Side rear view

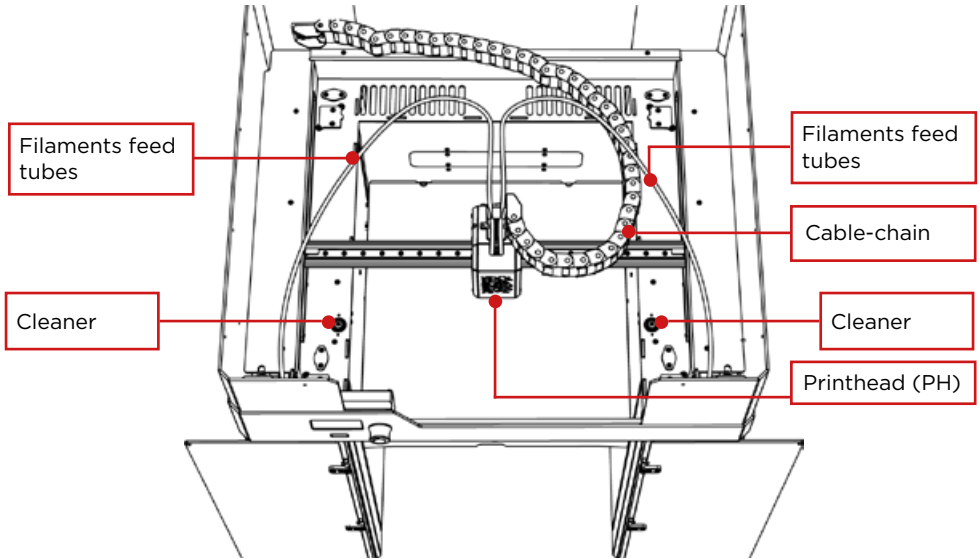




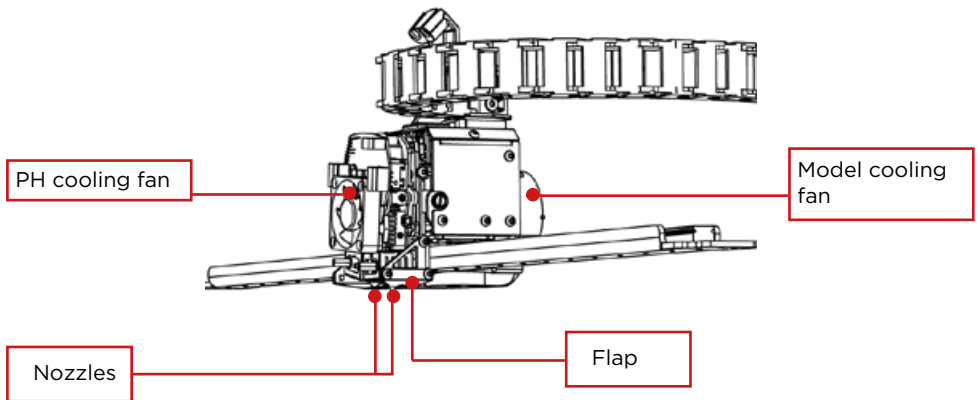
# MAIN COMPONENTS OF DESIGNER XL PRO

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## Inside view



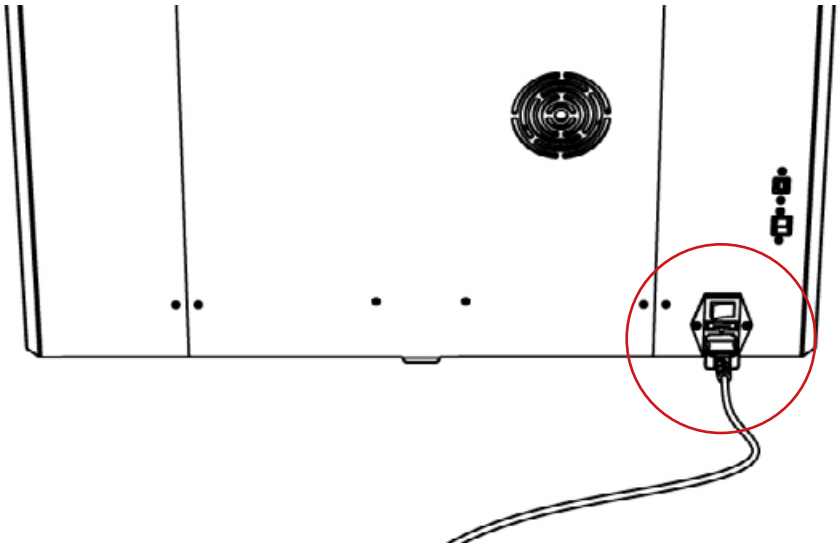
## Printhead (PH)



# POWER CONNECTION

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Make sure all plastic locking clip parts and ties are removed. Take the printhead (PH) into your hands and make sure that it moves freely. Plug the power cable into the power adapter connector **against the stop** then plug it into a power socket 220 V  $\pm$  15%, 50 Hz or 110  $\pm$  15%, 60 Hz (in compliance with used electricity network standard).



Never plug the Designer XL PRO into a power socket without grounding<sup>2</sup>.

Switch the power button to position 1 — the display and lighting turns on, the printer beeps.

We recommend to keep the original box and pallet for further possible transportation of the printer.

<sup>2</sup> *PrinterName* has a heating components with a 220 V supply. Also it equipped a residual-current device (RCD), which secure the safety only if the socket has a ground.

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DESIGNER  PRO

**PRINTER  
MANAGEMENT**

# DESIGNER XL PRO MENU

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The 3D printer is controlled through the display menu<sup>3</sup>. To navigate through the menu items, rotate the joystick clockwise or counterclockwise: the joystick does not have an extreme position. To select a menu item, press the joystick.



## PRINT

### Files

Displays folders and files in .plgx, .gcode<sup>4</sup> formats in the USB stick inserted to the printer. Allows to select a file to start printing.

### Printlists

Displays a list of tasks in the active printlist<sup>5</sup> with ability of browsing all printlists uploaded to a USB drive, to alternately start printing (tasks in the printlists folder).

## FILAMENT

### Filament loading

Starts algorithm for filament loading in the PH using the flow motor along with heating up the nozzle to the operating temperature in compliance with the settings of the selected profile.

### Filament unloading

Starts the algorithm for filament unloading out of the PH using the flow motor at the unloading temperature in compliance with the settings of the selected profile.

### Hot unloading

Starts the algorithm for filament unloading out of PH using the flow motor with heating the nozzle up to the operating temperature in compliance with the settings of the selected profile.

### Filament replacement

Alternately runs filament unloading and loading algorithms.

<sup>3</sup> The Menu Interface may vary depending on the firmware in use on the 3D printer.

<sup>4</sup> .plgx is a print task file prepared by the Polygon X, adapted for printing on X Platform printers; .gcode is a print task file prepared by third-party slicers. When printing such tasks, some features of X Platform printers are inactive.

<sup>5</sup> Printlist is a list of tasks for alternate printing. It is prepared by the Polygon X software in .ppl format with network connection available.

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# DESIGNER XL PRO MENU

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## PH cleaning

Starts the algorithm for loading filament in the PH using the flow motor along with the heating up the nozzle to the operating temperature in compliance with the settings of the selected profile. If you select "Continue" after the algorithm runs to completion, the temperature is increased by 10 degrees and the loading algorithm is repeated. You can repeat the algorithm increasing temperature not more than 3 times. In some cases this function allows to eliminate nozzle clogging during printing.

## Low-temperature PH cleaning

Starts the algorithm for filament unloading out of PH without using the flow motor at the unloading temperature in compliance with the settings of the selected profile. In some cases this function allows the feed channel to be cleared from residues of previously loaded materials. It is suitable for PLA, PVA, and PA filaments.

## Profiles

### Select profile

*Allows to select a material profile from the list of profiles uploaded to the 3D printer.*

### Edit profile

*Allows to change user profile settings.*

### Export profile

*Allows to select a profile and save it to a USB drive.*

### Delete profile

*Removes a selected profile from the list.*

### Import profile

*Allows to select a profile in .ppf<sup>6</sup> format from the USB drive and to upload it to the 3D printer.*

### Cloud profiles base

*Allows to download material profiles from the official cloud base. If Ethernet-connection is available and data exchange is switched on.*

## SERVICE

### Nozzle service

Starts the nozzle service algorithm with heating up the nozzle to the operating temperature in compliance with the settings of the selected profile and moving the PH to the nozzle replacement position.

### Build plate leveling

Starts the build plate leveling algorithm with heating up the nozzle and the build plate to the operating temperature in compliance with settings of the selected profile.

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<sup>6</sup> Material profiles prepared by means of Polygon X are always saved in .ppf format.

# DESIGNER XL PRO MENU

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## **Z offset adjustments**

### **Value**

*Allows to adjust the initial position of the nozzle relative to the build plate in the vertical plane.*

### **Print the template**

*Starts the template printing with different values of z offset. Allows to set up an optimal Z offset by selecting number of the best-printed template (selected*

## **XY offset adjustments**

Allows to adjust position of nozzle 2 relative to nozzle 1 in XY plane.

## **Auto XY offset adjustments**

Starts the automatic nozzles XY offset adjustment algorithm with printing the template. For the correct work of the algorithm, load the same filaments into both nozzles.

## **PH cleaning system calibration**

Allows to verify the nozzle position and to adjust it relative to the nozzle cleaner.

## **Flap test**

Allows to check operation of the nozzle switching mechanism.

## **Service position of the PH**

Switches the printhead to the middle position.

## **Errors list**

Displays 10 latest errors recorded by the 3D printer.

## **Reset errors**

Clears the errors list.

## **Update firmware**

Starts the printer firmware update algorithm.

## **Build plate position**

Allows to move the printing platform (build plate) to one of the three positions: upper (10 mm from the nozzle), middle (305 mm from the nozzle), transporting (405 mm from the nozzle) and lower (600 mm from the nozzle).

## **Filament drying**

Starts filament drying algorithm displaying temperature and timing. Once drying parameters are selected, the platform is moved to the middle position.

## **Diagnostics**

Configured by default. Use it in the event of lighting or blower systems failure and only in compliance with instructions by technical support service.

### **Tapes checking**

*Alternately turns on the main colours of lighting: red, green, and blue.*

### **Fans checking**

*Alternately starts the fans: model cooling, printhead cooling, chamber circulation, and chamber cooling.*

# DESIGNER XL PRO MENU

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- **Set the tapes**  
*Allows to select the main colors of lighting.*
- **Ball screws movements check**  
*Starts ball screws functional test algorithm moving the printing platform to the lower position.*
- **Ball screws sensors check**  
*Displays connection status of ball screws sensors.*

## SETTINGS

- **About**  
Displays the main printer data.
- **Nozzles size**  
Opens the menu for selecting the size of the nozzle.
- **Main settings**
  - **Filament flow control**  
*ON (by default): activates the filament flow control system.*
  - **Check for non critical errors**  
*Check for non critical errors: if ON, 3D printer starts response to non critical errors algorithms. If OFF, information about errors are saved in the printer memory without running the algorithms.*
  - **Error indication**  
*ON (by default): if ON, 3D printer displays an error code with its description.*
  - **End-of-Filament control**  
*ON (by default): activates end-of-filament control system.*
  - **Fast switching**  
*OFF (by default): if ON, nozzle switching is carried out without additional cleaning.*
  - **Jet Switch checking**  
*OFF (by default): if ON, activates the Jet Switch monitoring. If any switching obstacles are detected, task is suspended.*
  - **Print surface control**  
*ON (by default): activates the print surface control system. If any obstacles on the print surface are detected, the task is suspended and the message "Check the model" is displayed.*
  - **Leveling before printing**  
*OFF (by default): if ON, the successful build plate leveling is verified before printing a tasks.*
  - **Sound**  
*OFF (by default): if ON, the 3D printer beeps when a user is moving the joystick, starts, pauses or finishes the task printing process.*
- **Encoders settings**
  - **Tolerance**  
*Sets a percentage value of the tolerance restrictions for the filament flow control coefficient value, obtained during calibration. It is calculated automatically after encoders calibration is completed. By default this value is 25.00%.*

# DESIGNER XL PRO MENU

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## Encoders calibration<sup>7</sup>

Calibrated by default. Use it only in case of factory reset when updating the firmware. Starts the encoder calibration algorithm for filament flow control system with heating the nozzle up to the operating temperature in compliance with settings of the selected profile. For the correct work of the algorithm, load filament with the stable diameter of  $1.75 \pm 0.1$  mm.

## Night mode settings

### Speed reduction

*ON: reduces print speed when night mode is on.*

### Travels slowdown

*ON: reduces speed at which PH moves between the printing elements.*

## Save settings to file

Saves the main printer settings to a file on the USB drive.

## Restore settings from file

Allows to restore the main printer settings from a file on the USB drive.

## Network settings

### LAN

*Allows users to enter network connection settings manually or get them automatically via DHCP.*

### Cloud connection

#### Data exchange

*OFF (by default): if ON, official cloud profile base can be used. Available in case if Ethernet-connection is used.*

### Verification code

*Displays verification code and printer serial number for access via LAN.*

## Auto settings for heating system

Calibrated by default. Use it only if the heating unit is replaced or in case of factory reset when updating the firmware. Starts the temperature calibration algorithm of the heating element for stable operation of the heating system.

## Reset printer settings

Restores all printer settings by default.<sup>8</sup>

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<sup>7</sup> The required accuracy during calibration is obtained only under the condition that the feed channel and the nozzle have no obstacles in the filament passage.

<sup>8</sup> After restoring the default settings you should set up the printer systems:

Assign the material profile for each nozzle on the menu "Filament > Profile > Select profile";

Select the size of the nozzles on the menu "Settings > Nozzles size";

Set up the Z offset on the menu "Service > Z offset adjustments";

Calibrate the cleaning system from the menu "Service > PH cleaning system calibration";

Calibrate the encoders from the menu "Settings > Encoders calibration";

Set up the XY offset from the menu "XY offset adjustments" or "Auto XY offset adjustments".



# CONTROL DURING PRINTING

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## PREHEAT

Starts heating the nozzle up to the standby temperature, and the printing platform, to the operating temperature in compliance with settings of the selected profile. This function helps to reduce timing required for heating up before starting to print.

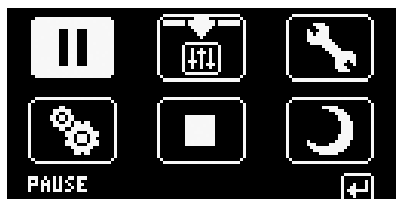
## READY FOR PRINTING

If ready for printing, it can be remotely launched through the Polygon X.

## DEBUG SCREEN

```
T1:23 T2:35 T&L:23 RAD:23
DX:9.60 DY:0.00 OX:0.60 OY:0.00
Z:0.00 Z_OFF:0.21
FILAMENT1:1 FILAMENT2:1
X:1.00/Y:1.00 Z:-0.00 Z:-0.00
CUR LAYER:-1
PLP:0 LPP:0
ST1:BLOCK400 ST2:BLOCK400
```

During printing, the menu changes its structure, only required items are displayed. Some menu items remain unchanged. To switch to the menu while printing, press the joystick.



## PAUSE / CONTINUE

Suspends printing with the ability to resume printing at the same point.

### CHANGE PRINT SETTINGS

*(available for printing .plx files only)*

- **Change [speed mode](#)**  
Allows to change print speed mode.
  - **Change profile settings**  
Allows to make amendment to profile settings. After the current task is completed, there is an option to save the amended profile.
  - **Adjust z-offset**  
Allows to adjust the nozzle z-offset while printing the first layer. Use if unoptimized z-offset is noticed.
-

# CONTROL DURING PRINTING

---

## SERVICE

*(available only when pause mode is on)*

- Nozzle service
- Load filament
- Replace filament
- Hot unload
- Error list
- Reset errors

## SETTINGS

### STOP

Stops printing without ability to resume.

### NIGHT MODE

Turns off the printer lighting and reduces the display brightness. Activates the night mode settings.

### DEBUG screen

To switch to the debug screen while printing, turn the joystick clockwise.

DESIGNER  PRO

**BASICS OF WORKING  
WITH DESIGNER XL PRO**

# BUILD PLATE AUTO-LEVELING

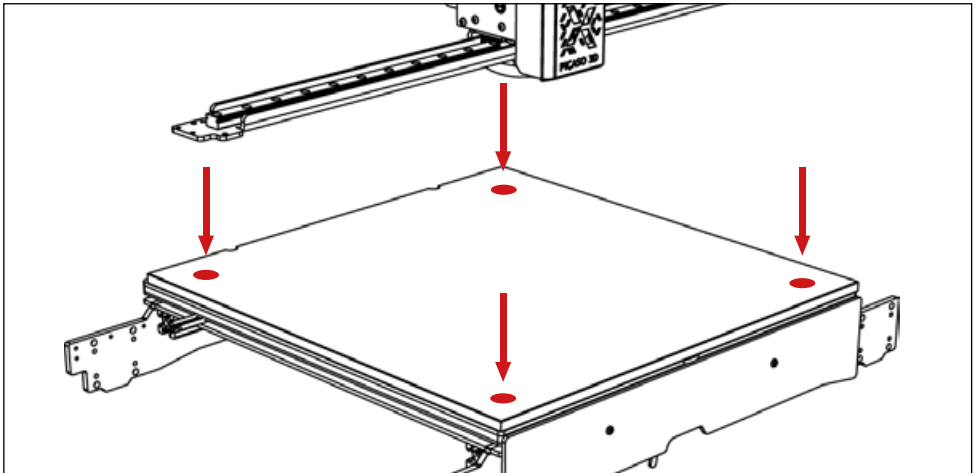
---

Designer XL PRO features the printing platform auto-leveling function (auto-level), which allows to fix the horizontal position with accuracy of up to 80 microns. Leveling is carried out at 4 points.



Level the build plate each time the printer is moved or transported. You don't need to adjust it before each printing.

Make sure the glass is fixed rigidly on the platform: the far groove is under clamp; the central magnet is in the hole; there is no air gap and foreign objects between glass and platform.



Magnets on the glass have different sizes. The large magnet is centering; it is designed for the correct glass positioning on the platform. The small one is fixing; it fixes the glass and evenly distributes the load.

# BUILD PLATE AUTO-LEVELING

---

1. Select "Service > Build plate leveling" on the printer menu.



2. The printer starts an algorithm for heating up the platform and nozzle to the operating temperature in compliance with settings of the selected profile. Heating is necessary to eliminate the effect of filament residue on the build plate leveling result. When the operating temperature is reached, the printhead starts an algorithm to measure the platform level at four points in the corners of the workspace.



**!** Do not interfere with PH and platform movements during operation. The operation is fully automatic, and no additional steps are required.

3. If the height difference of any pair of measured points exceeds 80 microns, Designer XL PRO adjusts the level of the build plate and starts measurements again. After alignment of the platform, a corresponding message appears.



4. The build plate leveling is completed. Press the joystick to enter the main menu.

# FILAMENT LOADING

---

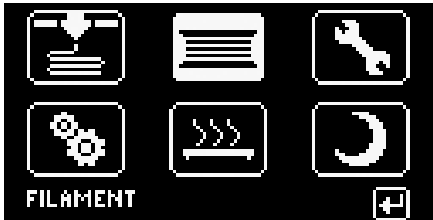
The Designer XL PRO is designed to operate with thermoplastic polymeric materials in the form of filament with diameter  $1.75\pm 0.1$  mm at printing temperature of up to  $410\text{ }^{\circ}\text{C}$ .



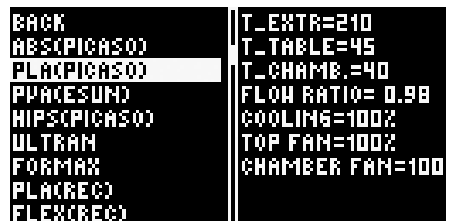
Do not use low-quality filaments by non-certified manufacturers: this can cause the 3D printer operation to become unstable and additional maintenance and repair costs.

To load the filament into Designer XL PRO, follow the step-by-step instructions:

1. Make sure the filament feed tube is fixed in the side holder.
2. Select “Filament > Load filament” on the printer menu. To load the material into both nozzles, select “1+2”.



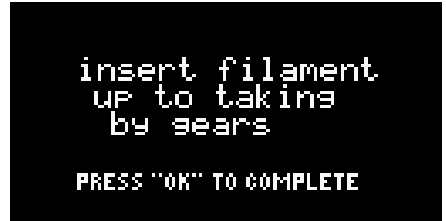
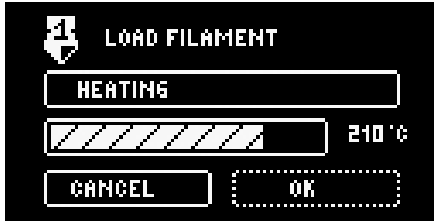
3. Select the material profile(s) based on the filament(s) to be loaded and press “OK”.



# FILAMENT LOADING

---

4. The printer starts the algorithm for heating the nozzle up to the operating temperature in compliance with settings of the selected profile. After reaching the operating temperature, the printhead moves to the filament load position. A ready message is displayed.



Do not interfere with movements of the 3D printer mechanisms during operation: this can result in personal injury or damage to the device.



Do not touch the nozzle or platform during operation: they heat up to high temperatures. Touching them can cause burns.

5. Unpack the spool and fix the end of the filament in the side holes of the spool.



Please make sure the filament end is not deformed; otherwise, cut part of the filament with the pliers.

# FILAMENT LOADING

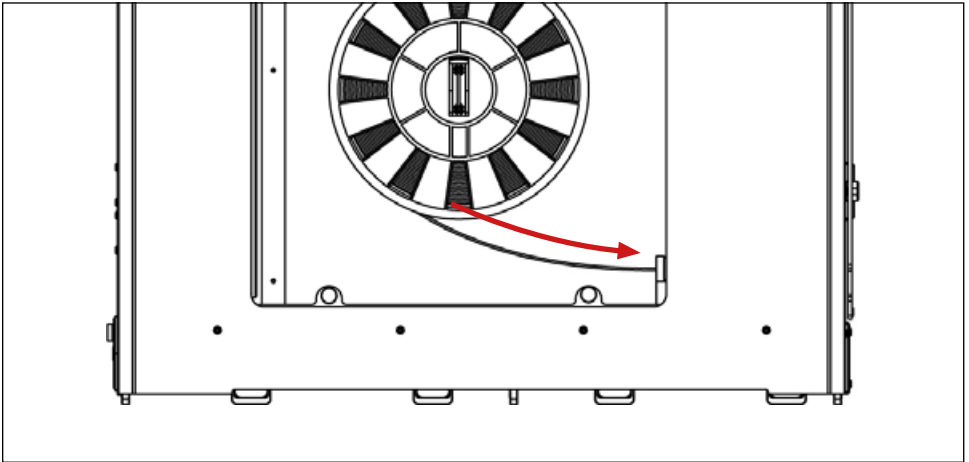
---

6. Push out the side door and place the filament spool with its center hole on the holder. Install the side door with the spool in the 3D printer.



Do not use spools wider than 100 mm.

7. Remove the filament end from the spool holes and insert the filament into filament feed tube.



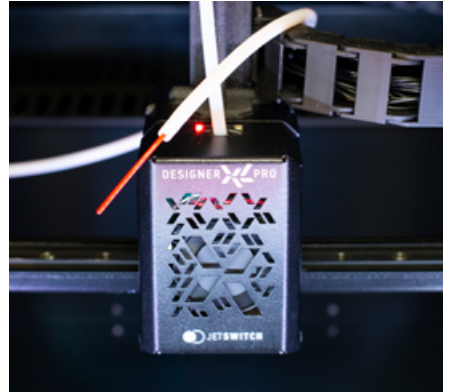
Always hold and fix the filament end when installing and removing the spool into/out of the printer. Prevent filament tangling in the spool: this can cause an abnormal stop during printing and damage the printer.



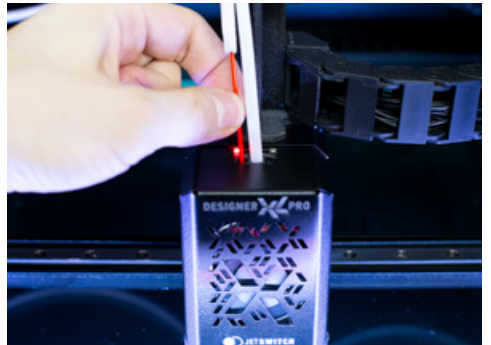
# FILAMENT LOADING

---

- 8. Make sure the spool and the side door are installed correctly: the center hole of the spool is on the holder, and the spool itself is pressed against the printer wall.
- 9. Push the filament through the tube until it appears at the printhead side.



- 10. Insert the filament end into the extruder hole against the stop. Hold the filament until you feel it is loaded inside.



**i** When the filament availability is detected by the end-of-filament sensor, the load algorithm starts.

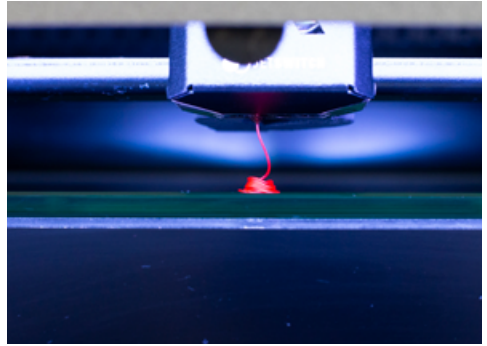
The loading status is displayed on the screen. This procedure takes approximately one minute.



# FILAMENT LOADING

---

- 11.** When load is completed, a small amount of filament comes out of the nozzle. Remove it carefully from the build plate.



- 12.** Pull the filament feed tube through the guide hole and insert it into the PH against the stop. Make sure that the tube is completely inside the printer and press the joystick.
- 13.** In case the material is loaded into both nozzles, the printhead moves to the position for loading it into the second (right) nozzle. To load the second material, repeat all the steps from 5 to 12.
- 14.** The printhead moves to the parking position: the far left corner. The filament loading is completed.

# PRINTING

---

In order to enhance adhesion, apply special glue you can find in the starter kit before each printing. It is required for the model not to detach from the build plate during printing.



**PICASO 3D brand glue is thermosetting: it features the necessary adhesive properties at temperatures from 45 °C (113 F). When cooled to 30 °C (86 F), the adhesion decreases.**

Put some glue on a paper or cloth napkin and wipe the cooled glass. There is no need to apply glue in a thick layer.



**Do not spray glue inside the printer. This will result in premature wear and damage to the mechanical components of the printer.**

To start printing, do as follows:

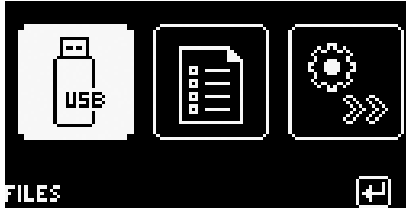
1. Insert the supplied USB stick into the USB-A port.



# PRINTING

---

2. Open the printer menu “Print > Files” and select the task “TEST<sup>8</sup>.plgx” from the list of files on the USB stick.



The TEST.plgx task comprises a nozzle key holder model. About 1 meter of material is required for test printing. This is approximately 1/360 of a standard spool.

3. Select a [material profile](#) based on the filament loaded.
4. Select a [printing speed mode](#). For the first start, “Standard» mode is suitable. Press “Print”.



The nozzle and the platform are heated up to the operating temperature. The printer starts an automatic calibration of the workspace coordinates and starts printing a model, such printing takes no more than an hour. The current status and estimated print timing will be displayed on the screen.



Pay special attention to first layer printing. The optimal [z-offset](#) and sufficient adhesion are the keys to high-quality printing.

---

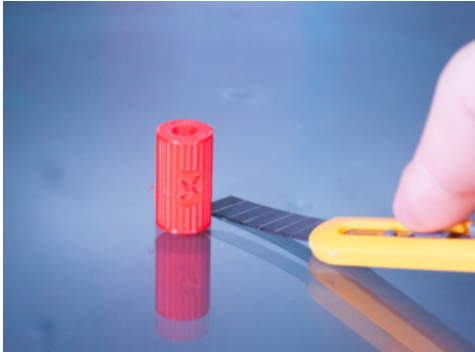
<sup>8</sup> This is a test printing task. When starting subsequent tasks, select the file from the printer menu by the name you have assigned.

# PRINTING

---

When printing is completed, the printhead moves to the parking position; the build plate lowers.

After printing wait for 15 - 20 minutes until the glass cools down. Lift the ejector(s) and remove the glass together with the model out of the printer.



Carefully take off the model from the glass. If you can't take off the model with your hands, use the box cutter supplied with the starter kit.



**Hold the glass while removing it with the printed model.**



**Do not take off the model from the hot glass.**

**Do not use tough tools to take off the model. This may cause damage to the glass.**



When the model is taken off install the glass back into Designer XL PRO. Make sure the glass is firmly fixed on the platform: the far grooves is under clamps; the central magnet is in the hole; there is no air gap and there are no foreign objects between the glass and platform.

Insert the nozzle change key into the printed holder.

Use Polygon X software to prepare new print tasks. The current version of the software is available on the official website.



**Some X Platform features are inactive for tasks with extension .gcode, as such tasks were created by third-party software.**

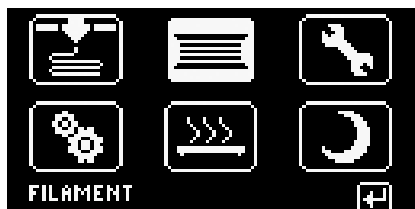
# FILAMENT UNLOADING

---

To prepare Designer XL PRO for printing with other materials or for a long period of non-use, unload the filament. There is no need to unload the filament after each printing.

To unload the filament from the 3D printer, follow the step-by-step instructions and menu-prompts on the printer display:

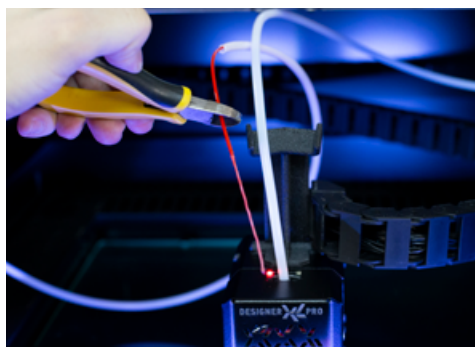
1. Select "Filament > Unload filament" on the printer menu.



2. The printer starts the algorithm for unloading the material out of the PH along with heating up to the unload temperature in compliance with settings of the selected profile.



3. Remove the filament feed tube and filament out of the extruder. Cut the filament end with the pliers supplied. It is needed to prepare for loading the filament next time.



Do not try to force the threaded filament out of the PH. The mechanism pushes the filament itself; just pull it up slightly.

# FILAMENT UNLOADING

---

4. Open the side door and roll up the filament by rotating the spool on the holder. While doing it, hold the filament end and then fix it in the spool holes.



Always hold and fix the filament end while installing and removing the spool into/out of the printer. Prevent filament entangling in the spool. This can cause an abnormal stop during printing and damage to the printer.

5. Remove the filament spool and close the side door.
6. Press the joystick to complete the filament unload algorithm.



For quick material change, select «Filament > Replace filament» on the menu — the material is unloaded and [loaded](#) alternately.

Store filament spools which are not used separately . For more details on storage conditions, see "[Questions and Answers](#)".

# CONNECTION TO PC <sup>9</sup>

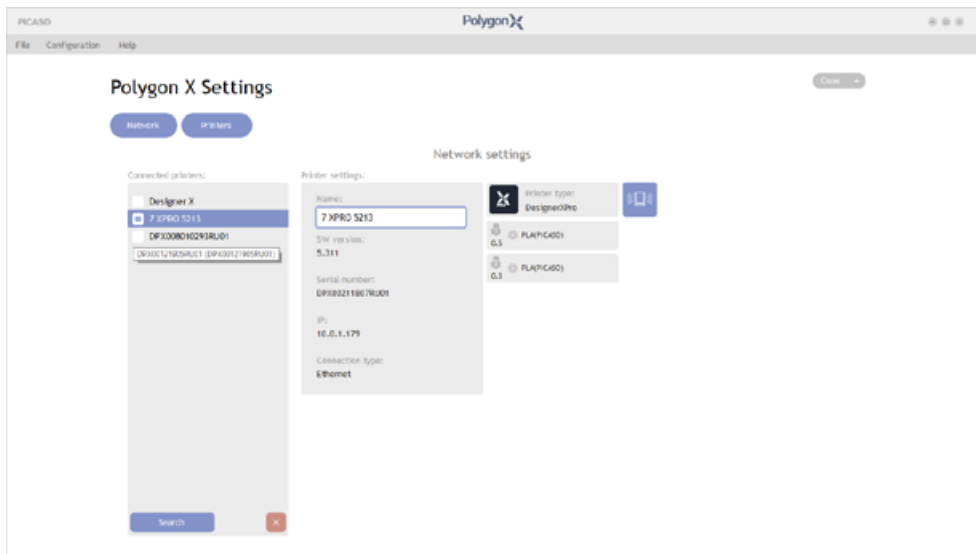
To connect Designer XL PRO to a PC via network, insert an Ethernet cable both into the Ethernet port of the 3D printer and into the corresponding port on the PC or on the router.



Designer XL PRO and PC must be in one and the same LAN.

Next, follow the step-by-step instructions:

1. Select «Settings > Network settings» on the printer menu, enable «DHCP» to automatically assign IP addresses or set the IP address manually. If DHCP is active, the IP address is obtained within 2-5 minutes.
2. Select the «Network» tab on the «Settings > Appearance and Network > Network» menu in Polygon X. Click «Search». Polygon X shows a list of all 3D printers connected to this subnet.



3. Select «check box» next to the used 3D printers. Press «Close».

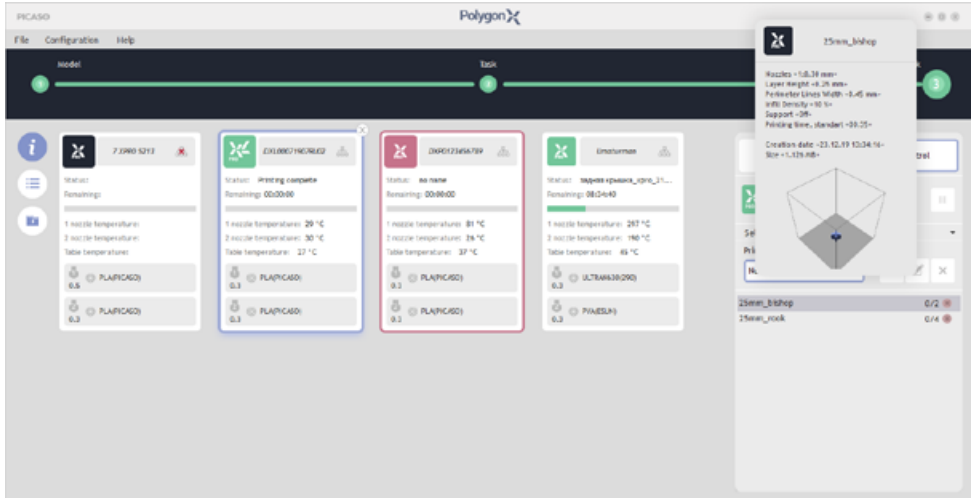
<sup>9</sup> The connection algorithm is in compliance with Polygon X software version 1.3 and with the printer firmware version 5.2.09



# CONNECTION TO PC

---

4. Open the Polygon X Network tab to track the status of connected 3D printers. In this window you can pause printing and start new printing tasks.



For network operation, you also need to install a USB stick into the printer.

DESIGNER  PRO

**SERVICE  
FUNCTIONS**

# NOZZLE REPLACEMENT

---

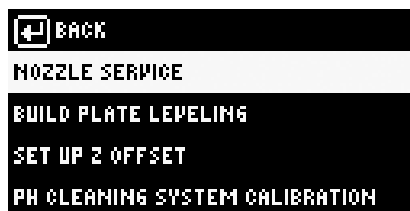
By default, Designer XL PRO is equipped with a steel nozzle with a diameter of 0.5 mm. It is used for printing with main types of filament. There is no need to change nozzle before each printing.

Replace the nozzle in the following cases:

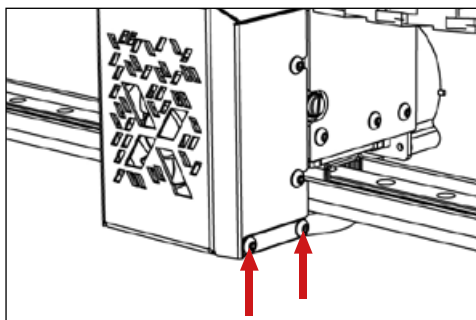
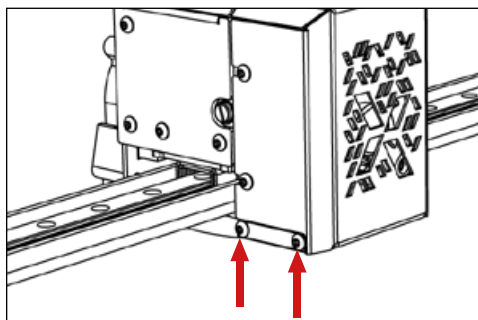
- Lack or insufficient filament flow during printing, subject to optimal material profile settings.
- Visible damages to the nozzle hole, which distort the filament flow.
- If you require a nozzle of a different diameter or made of a different material.<sup>10</sup>

To replace the nozzle, follow the step-by-step instructions:

1. Select «Service > Nozzle service» on the menu. The printer starts algorithm for the nozzle heating up to the operating temperature in compliance with settings of the selected profile.



2. Follow the menu prompts on the screen to loosen 2 screws on each of the side walls of the PH and remove the flap.



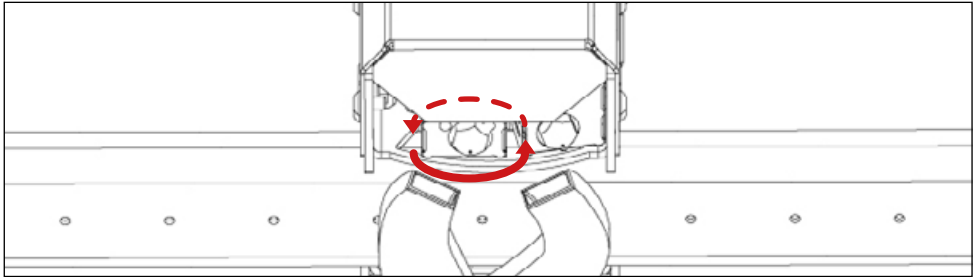
---

<sup>10</sup> Designer XL PRO can be equipped with steel and brass nozzles with a diameter of 0.2 to 0.8 mm

# NOZZLE REPLACEMENT

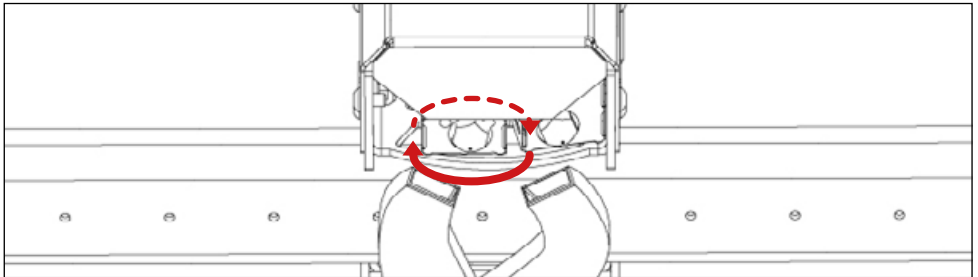
---

3. Use the key from the starter kit to unscrew the nozzle off the heating unit as shown in the sketch.



The removed nozzle is hot. Be careful!

4. Install a new nozzle in the key and screw it into the heating unit **against the stop** as shown in the sketch.



Do not unscrew the cooled nozzle. This can damage the heating unit.

5. To replace the second nozzle, turn the joystick: the PH switches to the corresponding position for service.



Do not perform replacement procedures beyond the PH service position for the corresponding nozzle. During replacement, the nozzle key must be installed vertically from the bottom.



Do not use additional tools to tighten the nozzle. Tighten the nozzle against the stop, but without excessive efforts. An insufficiently tightened nozzle causes filament to get into functional parts of the heating unit.

# NOZZLE REPLACEMENT

---

6. Press the joystick. Designer XL PRO checks the height difference of the installed nozzles; the result is displayed on the screen. In case of a big difference, you need to correct it, following the tips on the screen. If the height difference is acceptable, press the joystick.
7. Follow the tips on the screen, install the flap and tighten the 2 screws on each of the PH side walls.
8. Select the diameter of the installed nozzle from the list on the screen. Press «OK».

# SET UP Z-OFFSET

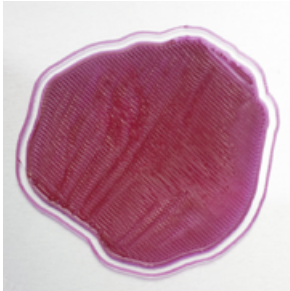
---

The nozzle z-offset is an additional distance to the layer height between the nozzle and the build plate while printing the first layer, which allows to print the first layer most accurately. There is no need to configure the z-offset on a new 3D printer and before each printing.

Adjust the z-offset in the following cases:

- After a factory reset to update the printer firmware.
- In case of too weak or too strong adhesion of the first printed layer.
- If there is no flow on the first printed layer.

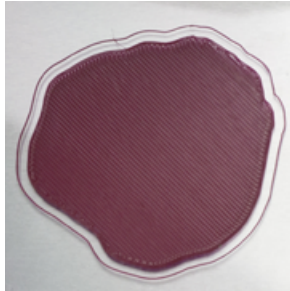
The optimal value is set individually for each 3D printer. Improper z-offset settings affect the printing quality, and printing with using materials with high shrinkage can damage the glass of the platform.



### ***Low z-offset:***

strong adhesion, the first layer is translucent with too wide printing lines.

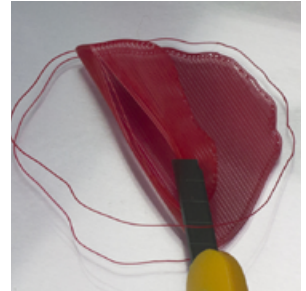
Results in nozzles, clogging, glass damage, and poor printing quality.



### ***Optimal z-offset:***

printing lines are without visible defects and have a steady contact with each other.

Provides for the correct adhesion of the first layer to ensure high printing quality.



### ***Weak z-offset:***

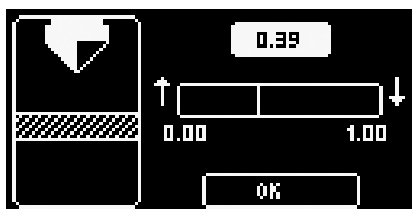
weak adhesion, lack of contact between printing lines.

Causes the model to detach off the platform and poor printing quality.

## SET UP Z-OFFSET

---

To change z-offset value switch to the menu «Service > Set up z-offset > Value», press the joystick and manually adjust the z-offset value. The recommended change pitch is 0.03.



The numerical value weakens the z-offset, and vice versa: the lower the value, the stronger the pressure.



Z-offset can be optimized by printing of templates rank from the menu «Service > Set up z-offset > Print the template». In this case, you have to select a number of the best-printed template.

# CALIBRATION OF THE CLEANING SYSTEM

---

Designer XL PRO is equipped with a nozzle cleaning system that prevents outer shell defects during printing. A special container is used to collect filament residues from under the cleaner (not included in the starter kit). There is no need to set up the cleaning system on a new 3D printer and before each printing.



If you use a container, check its contents after at least every 2 printing procedures and clear if necessary.

Calibrate the cleaning system in the following cases:

- If the cleaning system does not work properly. Filament does not enter the hole of the silicone cleaner and accumulates on the nozzle, which leads to defects in printed models.
- After a factory reset to update the printer firmware. During such an update, calibration values are reset. The system needs new values to be set.

To calibrate, you need to print «Cleaner calibration template.plg» file from the supplied USB drive.





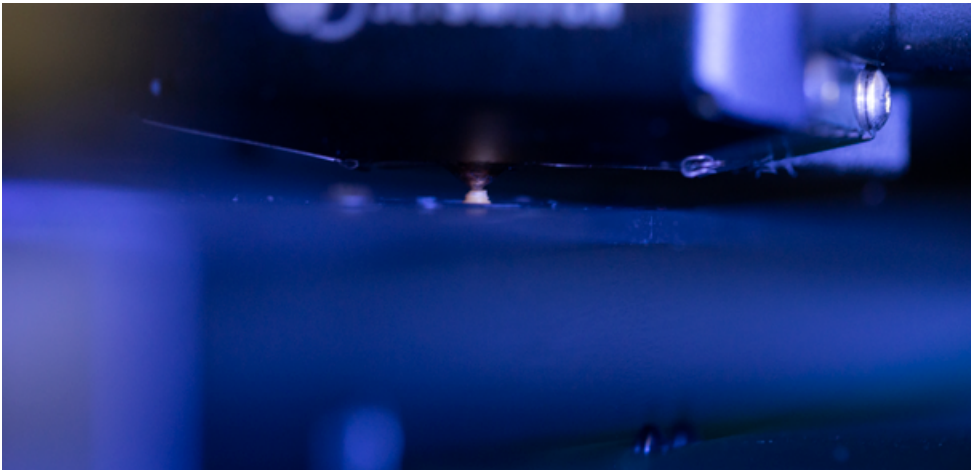
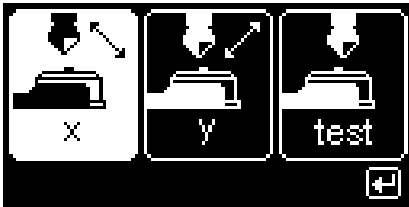
# CALIBRATION OF THE CLEANING SYSTEM

---

Before calibrating, make sure that the container is removed and wait until the nozzle cools down to a temperature of no more than 50 °C: it's approximately 10 or 15 minutes after the latest heating.

Follow step-by-step instructions to complete the calibration:

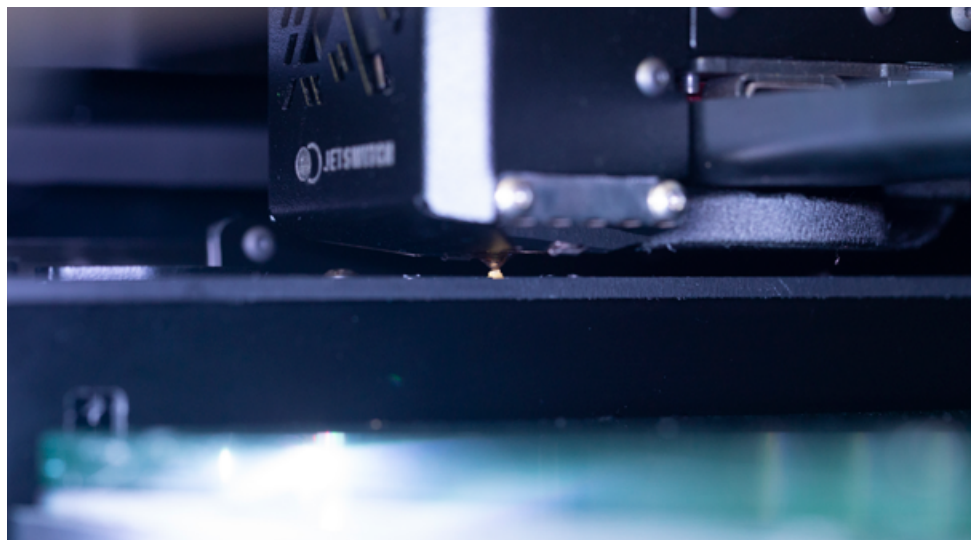
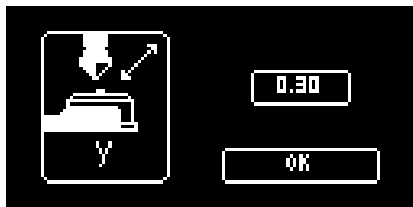
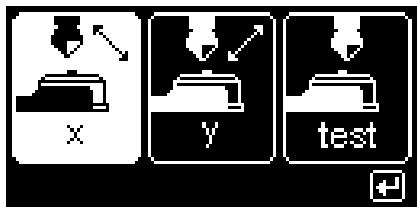
1. Replace a silicone cleaner for the printed cleaner calibration template.
2. Select «Service > PH cleaning system calibration > 1 or 2 > X» on the menu.
3. The printhead moves to the adjustment position and stops above the template. Rotate the joystick to adjust the position of the nozzle along the X axis so that the nozzle end is exactly above the template pointer. Press the joystick.



# CALIBRATION OF THE CLEANING SYSTEM

---

4. Select «Service > PH cleaning system calibration > 1 or 2 > Y» on the menu. Rotate the joystick to adjust the position of the nozzle along the Y axis so that the nozzle end is exactly above the template pointer. Press the joystick.



Open the menu «Service > PH cleaning system calibration > 1 or 2 > test» and choose a test without heating and pushing; the printhead moves to the position above the template. Check the nozzle position relative to the template pointer. If the positions do not match, repeat the calibration; otherwise, replace the template for the silicone cleaner and continue using Designer XL PRO.



Additionally, you can perform a test with heating and punching the filament; in this case, the PH starts the filament loading algorithm at the point of being above the cleaner. If the system is calibrated correctly, thin and even filament comes out from under the cleaner.

# X/Y OFFSET ADJUSTMENTS

---

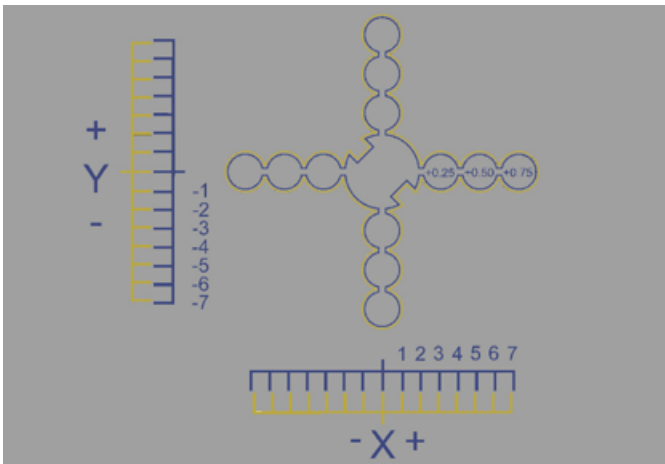
To provide for correct operation when printing with two materials, nozzle alignment feature is available on Designer XL PRO. It allows to align the both grids layouts on the XY plane. There is no need for such alignment on a brand new 3D printer and before each printing.

Align nozzles in the following cases:

- To align nozzles if there are offsets when printing with two materials. The filament from the second nozzle is overlapping or is overlapped with the filament from the first one, which can result in a defect on the model outer surface.
- To set nozzles offset coordinates after printer firmware update with a factory reset . After such an update, the x/y offset coordinates will be reset.
- To align grids outlets after replacing the nozzle. The hole of the new nozzle can slightly offset relative to the previous one.

Before X/Y offset adjustment is started, load two identical materials of different colors (e.g., red and blue PLA). To adjust the offset, follow the step-by-step instructions:

1. Start printing «XY offset.plgx» file. It takes about 5 minutes.
2. When printing is complete, remove the glass out of the printer and examine the printed template in bright light.



# X/Y OFFSET ADJUSTMENTS

---



The template has «X» and «Y» ranks for rough adjustment (step 0.1 mm) and circles for precise adjustment (step 0.025 mm).

### 3. Determine the aligned lines on «X» and «Y» ranks.

- If the lines aligned at any coordinate except zero, enter values of coinciding divisions into the menu «Service > Set Up X/Y offset» and re-print the template.



For example, on the printed template the lines along the «X» rank aligned in coordinate 4, and along the «Y» rank, in coordinate -2. Enter X = 4.000 and Y = -2.00 into the menu «Service > Set Up X/Y offset». The printer stores these coordinates as zero values. Therefore, when you open the menu next time, the values X = 0.000 and Y = 0.000 will be displayed.

- If the lines aligned in the zero coordinates, turn your attention to the printed circles.

### 4. Look for the pair where the distance between the outer and inner circles is most even.

- If the big central circles have an offset enter values of «coinciding» circles into the menu «Service > Set Up X/Y offset» and re-print the template.
- If the distance between the outer and inner big central circles is even, adjustment is complete.

# PRINTER FIRMWARE UPDATE<sup>12</sup>

*The update algorithm is available in the software version 5.300*

---

Before you start updating, unload the filament through the menu «Filament > Unload filament». Make sure that all previously created material profiles (except standard ones) are saved in the Polygon X window «Settings > Filament profile manager».

To update the 3D printer firmware, follow the instructions:

- 1.** Download the actual firmware version from our website.
- 2.** Format the USB stick (FAT32 file system, the recommended size is up to 16 GB).
- 3.** Save the update file image.bin to the USB stick in the root folder.
- 4.** Insert the USB stick into the USB-A port.
- 5.** Select «Service > Update software» on the printer menu.
- 6.** You are prompted to restore the default settings. Select «Yes».
- 7.** The 3D printer saves the basic settings into a separate file on the USB stick and starts updating the system. Make sure that operations «Cleaning ROM» and «Loading» pass without interruption.<sup>12</sup>
- 8.** After the software update is completed, the printer menu opens.
- 9.** Select «Settings > Restore settings from file» on the printer menu. 3D printer restores the previous settings.

<sup>11</sup> *The updating procedure may vary depending on the firmware version installed. The actual version of the update instructions is available on the official website.*

<sup>12</sup> *If operations «Cleaning ROM» or «Loading» ended prematurely or did not end, repeat the update algorithm using another USB stick.*

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# ERROR LIST<sup>13</sup>

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Designer XL PRO records errors during its operation. Each error has a unique code. If an error occurs during printing, its code and description will be displayed at the end of the task. Depending on error severity, Designer XL PRO can start a self-test algorithm, suspend, or end printing. The last 10 recorded errors are displayed on the menu «Service > Error list» in the chronological order: new ones from below.

List of errors that may require user's actions:

| Code        | Designation                       | Color | Actions   |
|-------------|-----------------------------------|-------|---|
| 0           | No error                          |       | -   |
| -1          | Turning on the printer            |       | -   |
| 111/<br>112 | No filament in nozzle 1/2         |       | Check for filament in the extruder. Unload the filament, inspect the bar for a break; measure its diameter at several points.<br>Cut filament end and re-load the filament.   |
| 113/<br>114 | Filament flow error in nozzle 1/2 |       | None. The error starts the algorithm for filament flow control system for fix it.   |
| 115/<br>116 | Filament slippage in nozzle 1/2   |       | If the filament flow control system does not fix the error, unload the filament and measure its diameter at several points. Make sure that the spool is easily unwound and filament threaded into the PH without difficulty.  |
| 117/<br>118 | Nozzle 1/2 blockage               |       | If the filament flow control system does not fix the error, replace the nozzle and load the filament twice.   |
| 123         | Filament slippage during printing |       | -   |
| 124         | Continuous nozzle cleaning        |       | -   |
| 241         | Print surface defect              |       | Check whether the model has been detached off the platform and inspect its top layer for defects. If everything is OK, continue printing. In case of poor adhesion: remove the model, adjust the build plate, and check the z-offset. Apply adhesive glue, and repeat printing. In case of defects on the model top surface and the inability to continue printing: remove the model, calibrate the PH cleaning system, and restart printing. |

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<sup>12</sup> The error list may vary depending on the installed version of the 3D printer firmware.

# ERROR LIST

|     |                                     |  |  |
|-----|-------------------------------------|--|--|
| 500 | USB drive is removed                |  | Insert a USB stick into the the USB-A  |
| 441 | USB reading error                   |  |  |
| 443 | Defective file                      |  |  |
| 501 | Unable to open file                 |  | Format (in FAT32 system) or replace the USB stick. Save and run the task again.  |
| 502 | Unable to read file                 |  |  |
| 503 | File is damaged                     |  |  |
| 504 | Unable to create the file           |  |  |
| 888 | The task has an unsupported symbols |  | For .plgx files: generate a new task file. For .gcode files: send the task file to <a href="mailto:eu.support@picaso-3d.com">eu.support@picaso-3d.com</a> indicating the software by which the file was created. |

In case of following errors, do not take independent actions. Contact the technical support by e-mail [eu.support@picaso-3d.com](mailto:eu.support@picaso-3d.com):

| Code        | Designation                             | Color | Code | Designation               | Color |
|-------------|---|-------|------|---------------------------|-------|
| 101/<br>102 | Full break of temperature sensor 1/2    |       | 402  | Y axis driver failure     |       |
| 103/<br>104 | Breakage of heater 1/2 circuit          |       | 403  | Z axis driver failure     |       |
| 105/<br>106 | Weak contact of temperature sensor 1/2  |       | 404  | E axis driver failure     |       |
| 107/<br>108 | Partial break of temperature sensor 1/2 |       | 411  | X axis driver overheating |       |
| 121/<br>122 | Breakage of end-of-filament sensor 1/2  |       | 412  | Y axis driver overheating |       |
| 141         | Radiator overheating                    |       | 413  | Z axis driver overheating |       |

# ERROR LIST

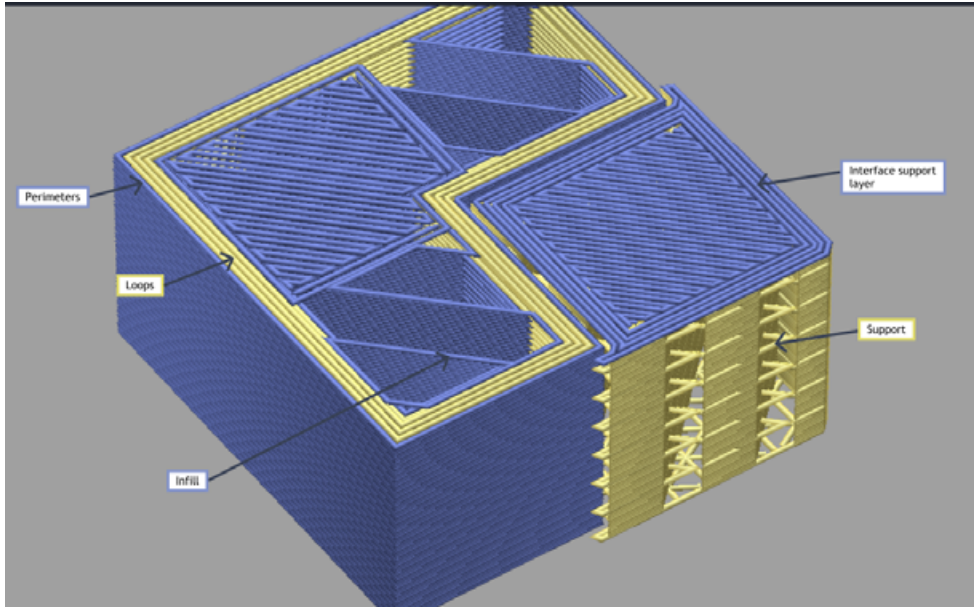
|      |  |  |      |   |  |
|------|--|--|------|---|--|
| 142  | Breakage of radiator sensor                        |  | 414  | E axis driver overheating                         |  |
| 143  | Partial breakage of radiator sensor                |  | 415  | Failure due to X overheating                      |  |
| 144  | Printhead overheating                              |  | 416  | Failure due to Y overheating                      |  |
| 145  | Defect of radiator temperature sensor              |  | 417  | Failure due to Z overheating                      |  |
| 151  | Filament fixing system issue                       |  | 418  | Failure due to E overheating                      |  |
| 152  | Switching system issue                             |  | 421  | Short circuit on X driver                         |  |
| 201  | Build plate temperature sensor breakage            |  | 422  | Short circuit on Y driver                         |  |
| 202  | Build plate heater key defect                      |  | 423  | Short circuit on Z driver                         |  |
| 203  | Build plate heater breakage                        |  | 424  | Short circuit on E driver                         |  |
| 204  | Partial breakage of build plate temperature sensor |  | 431  | Nozzle heater key 1 defect                        |  |
| 205  | Defective build plate temperature sensor           |  | 433  | Controller failure                                |  |
| 211  | Z zero sensor issue                                |  | 2891 | Temperature of the 1st/2nd nozzle is out of limit |  |
| 212  | Z zero sensor failure                              |  | 2893 | Temperature of the build plate is out of limit    |  |
| 221  | Error of nozzle height calibration                 |  | 2894 | Exceeding the max. temperature of the radiator    |  |
| 231  | Build plate calibration error                      |  | 1050 | Possible short circuit on heater 1                |  |
| 301  | Difficult movement in mechanisms                   |  | 4000 | Supply voltage drops during printing              |  |
| 401  | X axis driver failure                              |  | 4001 | Supply voltage drops                              |  |
| 3001 | Strain gauge voltage is out of limit               |  | 3100 | Too much deviation while build                    |  |
| 3002 | The strain gauge is jammed                         |  | 3020 | Ball screws is out of sync                        |  |
| 3010 | Zboard is not responding                           |  | 3021 | The Z1 encoder error                              |  |
| 3011 | The Z1 encoder failure                             |  | 3022 | The Z2 encoder error                              |  |
| 3012 | The Z2 encoder failure                             |  | 3023 | The Z3 encoder error                              |  |
| 3013 | The Z3 encoder failure                             |  | 3024 | The Z4 encoder error                              |  |
| 3014 | The Z4 encoder failure                             |  | 3015 | Weak magnetic field of the Z1 encoder             |  |
| 600  | Z-data exchange error                              |  | 3016 | Weak magnetic field of the Z2 encoder             |  |
| 3003 | The strain gauge doesn't release                   |  | 3017 | Weak magnetic field of the Z3 encoder             |  |
|      |  |  | 3018 | Weak magnetic field of the Z4 encoder             |  |



# PRINT SPEED MODES

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When printing starts, besides material profile selection, Designer XL PRO provides for speed mode selection. There are 4 speed modes by default: «Slow», «Standard», «Fast», and «Draft». Speed mode is selected in accordance with the desired result, task features, and print material properties. The task file divides the model into 5 areas:



**Perimeters:** the outer layers of the model shell.

**Loops:** all layers of the model shell, except for the outer ones.

**Support:** supporting legs for overhanging parts of the model.

**Interface layers:** the top layer of supporting legs with full filling.

**Infill:** the interior area of the model.

# PRINT SPEED MODES

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In the preset modes, the speed is adjusted as follows<sup>14</sup>:

| Areas/<br>Mode | Perimeters | Loops | Support | ISP | Infill | Recommendations  |
|----------------|------------|-------|---------|-----|--------|--|
| Slow           | 20         | 20    | 20      | 20  | 20     | Printing small objects or objects with complex geometry. High-quality outer surface.               |
| Standard       | 20         | 60    | 60      | 20  | 60     | Printing objects with complex geometry. High-quality outer surface.                                |
| Fast           | 30         | 80    | 80      | 30  | 80     | Printing products with medium details. The best combination for printing models with 100% filling. |
| Draft          | 60         | 80    | 80      | 60  | 80     | Fast printing of large models with simple geometry.  |

*All values are in mm per sec.*

Designer XL PRO allows you to set speeds yourself by selecting the «Manual» mode when starting a print task. Use manual settings only if absolutely necessary. For recommended print speeds, contact your filament manufacturer.

<sup>14</sup> The settings for the preliminarily set speed modes may differ depending on the installed 3D printer firmware version.

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# REMOVING AND REPLACEMENT THE HEATING UNIT

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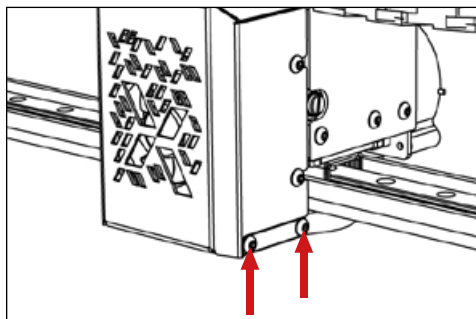
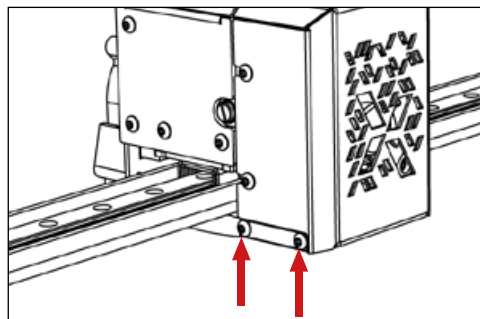
By default, Designer XL PRO is equipped with a heating unit 400. It is designed to print using most materials at operating temperatures of up to 410 °C. There is no need to remove the heater after each printing.

Remove it in the following cases:

- Before printing using PLA, PETG, and flexible materials from certain manufacturers, when you need to replace «unit 400» for «unit 250».
- If there is any visible or hidden damage to the heater, which impedes the filament flow or results in an improper operation of the heater. In this case, you shall replace the heater with a new one.
- When the feed channel is clogged, so that nozzle replacement does not help, remove the heating unit and clean the channel manually.

To remove, install or replace the heating unit, follow the step-by-step instructions:

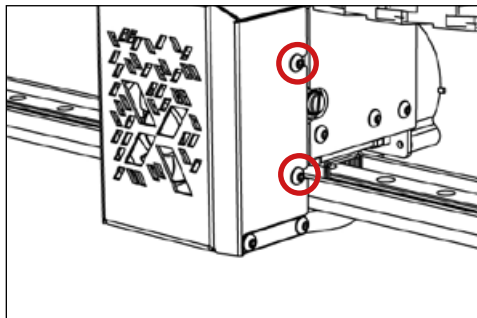
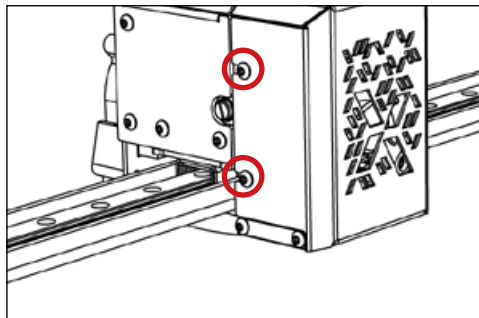
- 1.** Unload the filament through the menu «Filament > Unload filament».
- 2.** Select «Service > PH service position» on the menu. The printhead switches to middle (service) position.
- 3.** Set the printer power button to 0. The printer turns off.
- 4.** Move the printhead towards yourself.
- 5.** Unscrew the 2 screws on each of side walls of the PH; remove the flap.



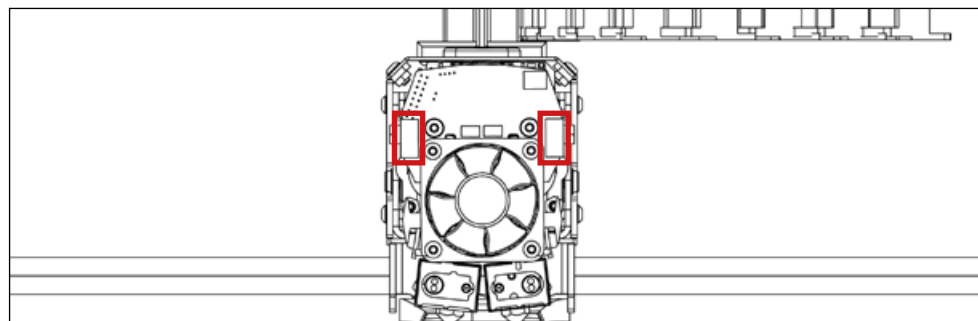
# REMOVING AND REPLACEMENT THE HEATING UNIT

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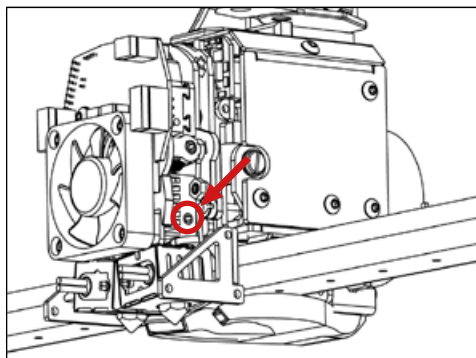
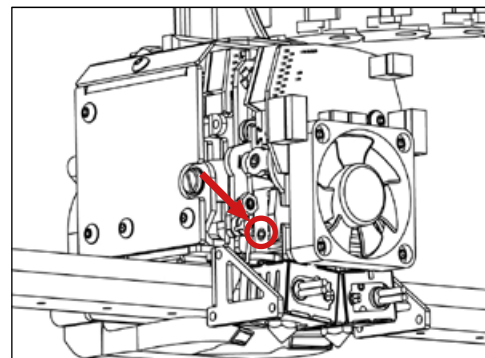
6. Unscrew the 4 screws on the PH left and right walls and remove the PH upper cover towards yourself.



7. Disconnect the heating unit contacts from the connector on the PH board.



8. Loosen the recessed screw in the radiator by 3 or 4 turns of the screwdriver supplied



# REMOVING AND REPLACEMENT THE HEATING UNIT

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9. Gently pull the heating unit down.
10. Perform the desired operation: clean the flow channel or replace the heating unit.
11. Check for the availability of thermal paste on the outside of the thermal barrier (tube) and, if it is absent, apply it again (not supplied). Assemble in the reverse order.



12. Set the printer power button to 1. The printer turns on.
13. Launch printing a small task to check the functionality of the installed heating unit.



For stable operation of the heating system during printing calibrate it through the menu «Settings > Auto settings for heating system» after installing a new heating unit.

If you faced any problems or have any questions, contact us by e-mail [eu.support@picaso-3d.com](mailto:eu.support@picaso-3d.com).

# QUESTIONS AND ANSWERS

## How does the Designer XL PRO notification system work?

During operation, the printer can be in various operation states or waiting for user's action. Each state turns on the corresponding color and lighting mode:

| Status  | Color | Lighting mode               |
|---|-------|-----------------------------|
| Printing or waiting to print  |       | Constant light or pulsation |
| Service operations or operation of the filament flow control system |       | Pulsation                   |
| Successful completion of printing                                   |       | Pulsation                   |
| Pause while printing  |       | Pulsation                   |
| Warning error occurred  |       | Constant light              |
| Critical error with stopping printing                               |       | Pulsation                   |

## What is the debug screen?

This is one of the menu screens that displays data from various Designer XL PRO sensors. You can open it by rotating the joystick clockwise during printing or in standby mode.

```
T1:116 T2:122 TBL:30/41 RAD:37 CH:0
OX:9.23 OY:0.23 OX:-0.80 OY:5.80
Z2:0.00 Z_OFF:0.31
FILAMENT1:1 FILAMENT2:1
X:0.00/Y:0.000 1:1.62 2:1.61
CUR LAYER:-1 VLENZ:1.26
MF01:536880136 MF02:536880180
```

Parameter description:

**T1** — Temperature of the nozzle 1  
**T2** — Temperature of the nozzle 2  
**TBL** — Build plate temperature  
**RAD** — Radiator temperature  
**OX** — Cleaner X-coordinate  
**OY** — Cleaner Y-coordinate  
**DX** — X-coordinates for nozzle 1 alignment  
**DY** — Y-coordinates for nozzle 2 alignment  
**DZ** — Nozzle height difference  
**Z\_OFF** — Z-offset value  
**FIL1** — Presence of filament in nozzle 1  
**FIL2** — Presence of filament in nozzle 2  
**N1** — Size of the nozzle 1  
**N2** — Size of the nozzle 2  
**K** — Flow encoder coefficient (current/averaged)  
**1** — Calibrated parameter of encoder 1  
**2** — Calibrated parameter of encoder 2

**CUR LAYER** — Number of the current print layer  
**VLENZ** — Strain gauge voltage  
**ST1** — Name of the heating unit of nozzle 1  
**ST2** — Name of the heating unit of nozzle 2  
**BK1** — Quantity of encoder coefficient's outs from the tolerance in nozzle 1  
**BK2** — Quantity of encoder coefficient's outs from the tolerance in nozzle 2  
**SC1** — Quantity of flow control's activations in nozzle 1  
**SC2** — Quantity of flow control's activations in nozzle 2  
**CHF** — Chamber circulation fan power  
**RF** — PH cooling fan power  
**MF** — Model cooling fan power  
**COF** — Camera cooling fan power

# QUESTIONS AND ANSWERS

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## ***How to find the printer serial number?***

Through the menu “Settings > About”. The number is printed on the back of the printer, next to the power button.

## ***What operations can I perform during printing?***

To open the menu while printing, press the joystick. Without stopping printing, you can change the speed mode and the nozzle z-offset (only when printing the first layer). In the pause mode, you can change the material profile and perform some service operations: filament replacement and load, hot filament unload, and nozzle service.

## ***What is the material profile?***

Material profile is a set of parameters for working with material. It includes printing temperature, load and unload temperatures, flow ratio, as well as the operation level of the Designer XL PRO blower and cooling fans during operation . A complete list of profile parameters is available on the Polygon X menu «Configuration > Filament profile manager».

A print task prepared in Polygon X describes only the geometric parameters of the future model, excluding the material used and the print speed. Therefore, the same task can be printed with various filaments using different speed modes.

The basic set of profiles is stored in the Designer XL PRO and Polygon X memory by default. Each profile has been pre-tested by our print engineers. When upgrading the Polygon X software or the Designer XL PRO firmware, the list of standard profiles can be changed.



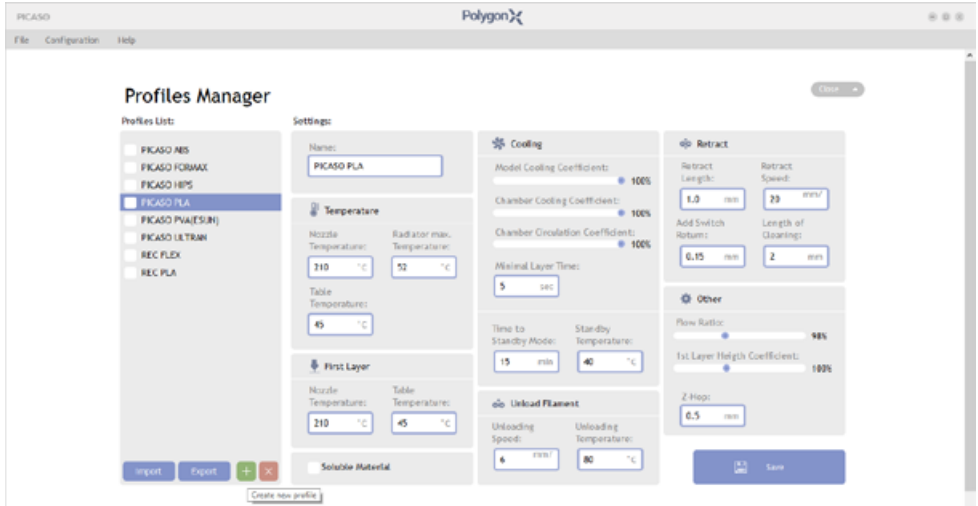
Identical materials from different manufacturers may require different profiles. Create a new profile for each filament you use. For detailed profile parameters contact your filament manufacturer.

# QUESTIONS AND ANSWERS

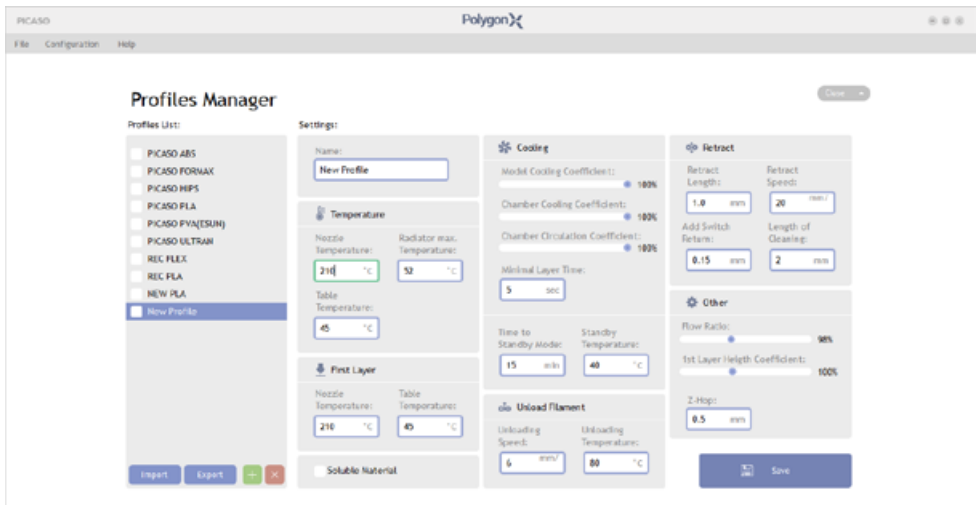
## How to create a new profile?<sup>15</sup>

To create and upload a new profile into Designer XL PRO, follow the step-by-step instructions:

1. Select any profile on the Polygon X menu «Configuration > Filament profile manager», and click on «+».



2. Change the profile name and parameters according to the recommendations by the filament manufacturer. Click on «Save».



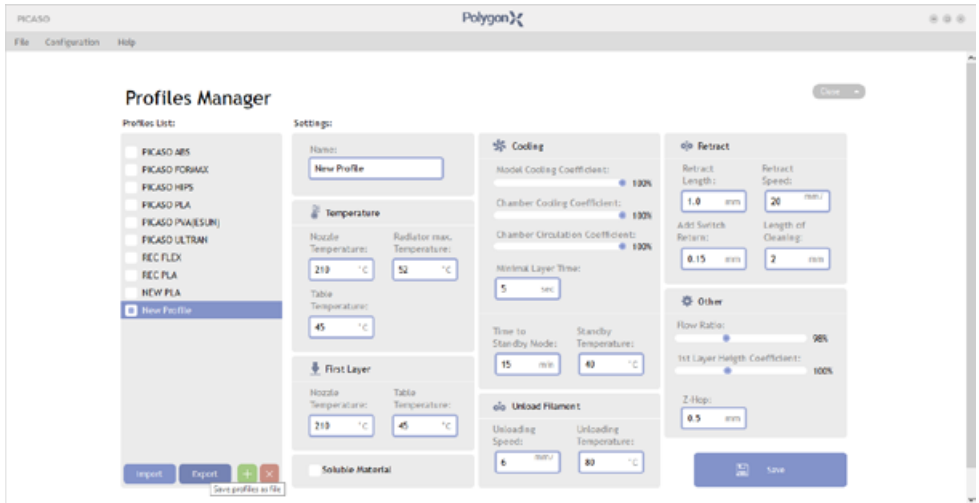
<sup>15</sup> The profile creation algorithm in Polygon X may vary depending on the software version.



# QUESTIONS AND ANSWERS

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3. Check the box next to the profile name and click on “Export”.



4. Save the profile file with extension.ppf to the USB stick.
5. Insert the USB flash into the printer and open the menu «Filament > Profiles > Import profile».
6. The contents of the USB stick are displayed on the screen; select the desired file. Please note that profile files have the extension .ppf.

After uploading the file, the new profile can be used.

# QUESTIONS AND ANSWERS

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## ***How to store and dry filament?***

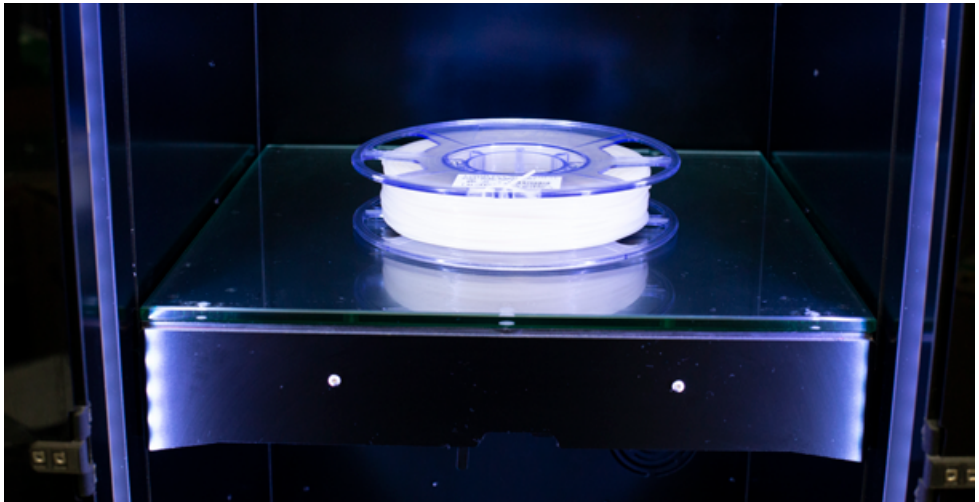
Between use, we recommend you to store spools with filament in sealed packages with silica gel.

Some filaments are hygroscopic and absorb moisture from the atmosphere. Wet filament can clog the feed channel during printing, which affects the quality of the printed models and the 3D printer functionality. If necessary, filament can be dried in a special dryer or through the menu function «Service > Filament drying». For example, Designer XL allows to dry PVA filament. To do this:

- 1.** Select «Service > Filament drying» on the menu.
- 2.** Set the parameters. Temperature: 90 °C, time: 180 minutes.
- 3.** The platform moves to the middle position. Place the PVA spool on the print platform.
- 4.** Close the front door.



The filament drying function, which is integrated in the 3D printer does not guarantee reaching the required moisture level for some materials.



The spool material is generally not intended for use at high temperatures. For drying at above 100 °C, use a special oven. Contact the filament manufacturer for more detailed drying conditions.

# QUESTIONS AND ANSWERS

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## ***What materials are compatible with each other?***

The compatibility of two different materials is determined by a combination of their physical and chemical properties in terms of adhesion and shrinkage. Among the popular pairs of materials are PLA+PVA, ABS+HIPS, UltraX+PVA, and FormaX+HIPS.

For more information on the compatibility of various materials, contact your filament manufacturers.



The platform temperature is constant during printing. When printing with two materials, the lower of the two temperatures shall be set from the selected profiles. For example, if you start printing with an incompatible pair of ABS+PVA, the build plate temperature will be taken from the PVA profile (45 °C) as the lowest one; this will not be enough for the ABS adhesion to the platform.

## ***What is a printlist? <sup>16</sup>***

Printlist is a list of several print tasks. It can include up to 20 different tasks; the repetition number of each task is arbitrary.

After creating a task in Polygon X, you can add it to the «Local folder»: this is a local task base on your PC. To create a print list, right-click in the section area «Local folder» and select the appropriate item on the menu.

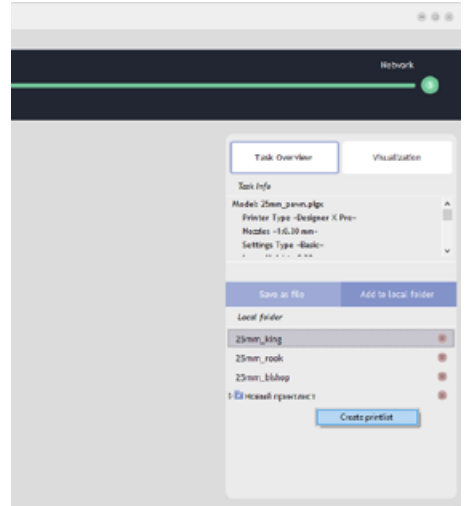
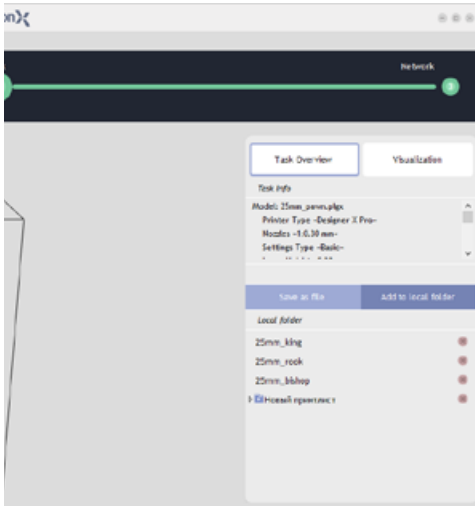


In terms of the operation principles, a printlist is similar to a standard file folder. The difference is that it is a separate file with the extension .ppl that can be run only on PICASO 3D printers.

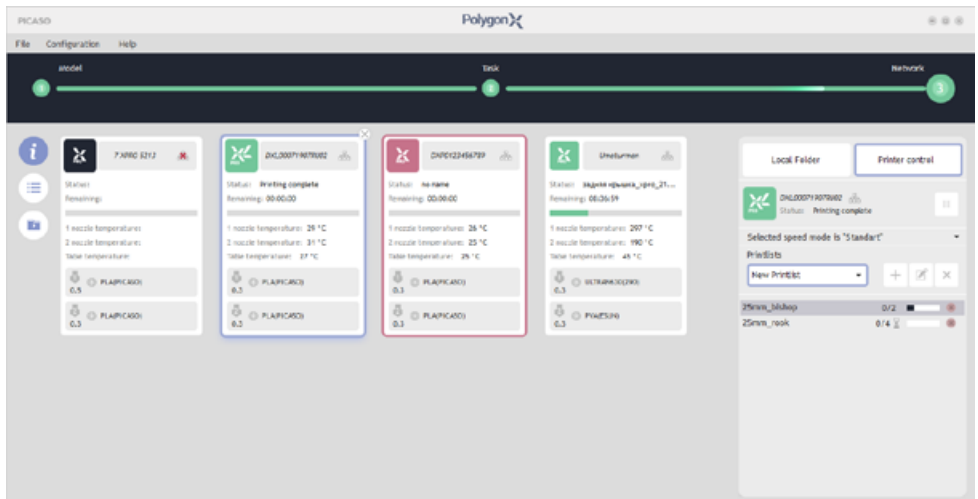
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<sup>17</sup> Algorithms for creating a printlist and starting printing in Polygon X may vary depending on the software version.

# QUESTIONS AND ANSWERS



To save a single task or a whole printlist to the 3D printer, drag it from the Polygon X task database to the card of the connected printer in the «Network» section.



# QUESTIONS AND ANSWERS

---

## ***What should I do if there is no filament flow and/or I hear clicks in the printhead?***

If you hear clicks when printing the first layer, loosen the [nozzle z-offset](#) by 0.05. If this happens when printing other model layers, check the profile settings, [replace the nozzle](#), and [load the filament](#) twice.

The filament flow control system monitors the main possible problems in the filament flow. However, not all of them can be fixed by automatic algorithms. When the filament flow control system is frequently activated, or when the flow control is turned off, pay attention to the following:

- 1.** The print profile shall match the threaded filament. The same material produced under the brand of different manufacturers has different characteristics; each of them requires an individual printing profile.
- 2.** Filament shall have a uniform diameter of  $1.75 \pm 0.1$  mm along the entire length of the spool. An uneven filament diameter is a sign of poor-quality material; this can cause printing problems.
- 3.** The filament flow channel shall be clean. During printing, filament residues can accumulate on the inner walls of the nozzle, which results in clogging. In addition, the printing process may wear out the nozzle over time. You should have some spare nozzles.



For printing with abrasive materials (such as FormaX or UltraX), use a steel nozzle. For working with PLA or ABS, a brass nozzle can be used. For detailed printing conditions, contact the filament manufacturer.

## ***What shall I do if the filament cannot be loaded?***

Make sure that the filament is fully inserted into the extruder. Note that the extruder hole has a stepped shape. Make sure that the filament enters the PH through the smaller diameter hole.

Make sure that the selected profile matches the filament being loaded. [Replace the nozzle](#) with a new one and repeat [the load](#).

# QUESTIONS AND ANSWERS

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## ***What shall I do if the filament has run out, and how to replace it during printing?***

The filament control system tracks the filament end and pauses printing. After that, you open the side door on the side of the finished material and remove the empty spool. Replace the spool and perform the load operation. In the menu, select «Service > Load filament», and Designer XL PRO will squeeze a small amount of filament in front of the build plate. Remove the squeezed filament from the nozzle and select «Continue» from the menu. Printing resumes at the stop point.



When replacing filament for another material, check compatibility data from the filament manufacturers.

If the spool did not end, but it requires replacement, follow the step-by-step instructions:

1. Pause printing.
2. In the menu, select «Service > Replace filament»; Designer XL PRO sequentially starts filament [unload](#) and [load](#) algorithms. Remove and install the spool through the side
3. In the menu, click on «Continue». Printing resumes at the stop point.

## ***What printer parts are consumable?***

Nozzles, flap, silicone cleaners, glass, and filament feed tube.

## ***What type of USB drives can I use?***

Drives with the FAT32 file system. Recommended size: up to 16 GB.

## ***Why do I need to calibrate the cleaning system?***

When [calibrating the cleaning system](#), Designer XL PRO remembers the position above the cleaner, relative to which the working area of the 3D printer is built up. Before printing a model, short cleaning is performed to maintain the layer surface quality and the outer shell of the model.

# QUESTIONS AND ANSWERS

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## ***Why does Designer XL PRO often pause for a short time?***

This usually happens when printing small models. The print status bar displays “Pause” with a countdown to the operation completion to maintain surface quality, as the material needs some time to cool. This algorithm is associated with the material profile parameter. “Minimum layer time”. If you reduce this parameter, there is a risk of surface defects on the model due to overheating.



To avoid such pauses, several models can be printed at once to increase the total layer time.

The operation of the filament flow control system is similar. If the system detects deviation from the stable flow, Designer XL PRO starts the flow channel cleaning algorithm: the printhead is pulled away from the model, and the extruder feeds some filament for cleaning. If it's not possible to restore the flow during the first cleaning, the algorithm starts again with increased temperature. If the flow is not restored in three iterations, Designer XL PRO pauses printing until user's intervention.



If the filament flow control system often detects errors in the filament flow, pay attention to the profile settings and the quality of the filament used.

## ***Why are magnets of different sizes?***

This is done for an easier and better fixation of the glass on the platform. The large magnet is centering; it provides the correct position of the glass on the platform. The small ones are fixing; they hold the glass.

## ***What kind of service is required for the printer?***

Guides, electronic boards of the control unit, fans in the printer casing, and the thermal barrier of the heating element need inspection and maintenance. All lubricant cleaning or oil change operations must be performed while the Designer XL PRO is off.

Do not allow lubricant to change its color to red-brown; prevent stains and traces from adhesion agents, as well as corrosion on the guides surface. For replacement use filament lubricant as per DIN 51825, class KPOOK.

# QUESTIONS AND ANSWERS

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Use a special brush and a portable vacuum cleaner (not supplied with the printer) to clean the control unit and the casing fans from dust and fine dirt.

The maintenance frequency depends on operating conditions. Check the condition of the printer units and perform appropriate maintenance as necessary, at least once a year.