

Getting Started Guide for the RoboxPRO

Getting Started with the RoboxPRO

Thank you for purchasing a RoboxPRO FFF 3D Printer. This information will help you get started using your new printer. Please follow the unboxing and setup guide to get your printer out of the box and set up for use.

Installing AutoMaker

AutoMaker is the software that allows you to load models, slices those models, and sends the resulting file to the printer. The file is then stored on the printer so that the printer can be disconnected for the remainder of the print if you so desire.

You will need to download AutoMaker from the following website: www.cel-robopro.com/downloads

Please select the appropriate version for your computer. Once the file is downloaded, you will need to install the software by running the installation program. You can run the program just as any other program on your computer.

Connecting RoboxPRO

The 3D printer will require two connections: one AC power connection and one network connection. Please note that the power supply on the 3D printer is non-switching so please make sure the power supply is set to the proper voltage value to avoid damaging the printer. 3D printers sold in Europe are preset to 230 VAC. Those sold in the USA or shipped to the USA from a European provider are preset to 115 VAC and will need to be changed. The power supply is on the bottom of the printer; a small switch inset in the side of the power supply will allow you to select the proper voltage.

Plug the power cable into the socket on the back of the RoboxPRO next to the power switch. Plug the other end into a high quality surge protector or battery backup unit. Please note that 3D printer damage caused by power problems is not covered under warranty.

If you will use the RoboxPRO on a wired network, plug the CAT5e network cable into the network jack on the back of the 3D printer. Plug the other end into your network outlet.

For WiFi operation, see the WiFi setup section.

Choose the print head you would like to use and install it. RoboxPRO comes with three print heads: the single material QuickFill V2 print head (black), the DualMaterial print head (gray), and the SingleX with Olsson Ruby nozzle print head (clear). Install the print head by inserting its tail into the opening in the X-Carriage and tightening the retaining screw on the back of the X-Carriage until the screw can't be turned, usually 4-5 full turns. Please remember to turn off the printer before changing the print head. See the section on Print Heads to help choose the print head appropriate for the project you are running.

Once the RoboxPRO is connected to power, and a print head is installed, you can turn the 3D printer on with the switch on the back of the printer. Please note that this is also the emergency shutoff, which will immediately cancel any operation in progress. The printer will not retain the current status of any running operation and will have to be restarted.

The printer will take about 4-5 minutes to boot and be completely ready for operation.

Loading Filament

Before you can print, you will need to load filament. Filament must be kept dry, so if you aren't using the filament make sure it is put away where it can't absorb water from the air. Before loading, cut the end of the filament flat and square to prevent a sharp end from damaging the RoboxPRO. Insert the cut end into the filament inlet on the front face of the filament reel housing (it is easiest to feed with one hand while holding the reel of filament in the other). After feeding a long length of filament into the 3D printer, the RoboxPRO will make its loading noise. At this point, you will need to keep pushing the filament into the printer until the 3D printer pulls the filament in on its own and the print head moves to one side. Please note that there is a point of resistance near the end of the loading cycle that you will need to push past; it is best to use short pushes at this point to prevent the filament bending. When the filament has loaded, install the SmartReel onto the appropriate reel hub in the filament compartment and check that the 3D printer has detected the material type.

Filament that is larger than 1.80 mm in diameter, smaller than 1.60 mm in diameter, brittle, kinked, damaged, or dirty should not be used in the RoboxPRO as it can cause filament motion errors and/or other undesirable behavior.

Ejecting Filament

If you need to remove the filament, you can either use the eject button in AutoMaker, the eject symbols in the touchscreen, or press and hold the eject button on the lower left corner of the front panel for about 3 seconds. It is advised to manually turn the reel backward to keep the filament tight during ejection before pulling the filament out of the printer feed tube. Filament should be tucked through the spokes of the spool to keep it from unravelling. If you see strings or "feathers" on the end of the filament, please turn off the printer after the head cools off and check the head inlets, as filament debris in the Bowden tube can lead to filament jams. Also remember to cut the end of the filament flat and square before loading it back into the printer.

AutoMaker Workflow

AutoMaker has three sections: the left side information bar, the command bar, and the main window area. The left side information bar is always visible. From the top to bottom, this bar contains the following information:

1. **Printer status and colour.** Double-click on this box to rename the printer or change the colour. If you have more than one Robox 3D printer connected to the computer, this allows you to quickly identify the 3D printer that is active.
2. **Print head identification area.** Robox print heads are programmed to be recognised by the AutoMaker software so that the software can adapt the available features to the unique properties of each print head. This box will tell you the type of print head: QuickFill V2, DualMaterial, or SingleX. It also identifies the size of the nozzle(s) and which material is assigned to each nozzle.
3. **Material identification area.** Your RoboxPRO will accept two individual filament feeds, Material 1 and Material 2. The QuickFill V2 and SingleX heads will each accept only one filament, loaded into Material 1, whereas the DualMaterial head will accept two filaments. When you install a SmartReel onto the 3D printer, RoboxPRO and the AutoMaker software will detect the filament type programmed onto the SmartReel and display this in the filament identification area. When filament is correctly loaded, a coloured checkmark will appear in the middle of the reel symbol on the right side of each material identifier. If there is not a checkmark, please make sure filament is properly and fully loaded into the 3D printer.
4. **Printer Temperature Monitor.** This graph shows you the current temperature and temperature targets for each sensor in the printer. There is an ambient temperature sensor located on the X-carriage behind the

print head, a nozzle temperature sensor for each material, and the bed temperature. Abrupt changes in these temperature graphs mean there is a problem with the RoboxPRO, so you should stop using it and open a support ticket. Note that connecting the printer to AutoMaker during a print will cause an abrupt change, but this is the only time it is normal.

The command bar shows the available command buttons and will change to reflect the mode and operations that can be performed corresponding to the main window area. Information or error messages will also appear from this area.

The main window area will show one of several different screens:

Main Status Screen

This screen shows the status of the RoboxPRO at the given time. It has a picture of the 3D printer which will change if a different colour of filament is loaded, if the head is installed or removed, or if the printer door is open. It will also show the selected colour of the internal lighting on the printer. During a print, information on the job in progress is shown in the upper right corner of the screen.

Print Layout Screen

The Print Layout screen is where you load a model, position the model for printing, and assign the materials. Once a model is loaded, you can click on the model to change its position on the bed. While a model is selected, you can manually fine tune its position, scale, and orientation, and assign materials using the control panel in the left upper corner of the layout screen. For dual material prints, double-click on the individual bodies to select them and assign materials. You will see that the colour of the model will be blue or orange depending on the material that is assigned to that body. Click anywhere away from the model to deselect the body. When you are happy with the layout of the screen, you can progress to the Setup screen. If you would like to rename the setup for later use, double-click on the time stamp label in the blue tab at the top of the layout window. To close the layout project and start a new one, click on the X at the end of the project name, and then click on the + symbol. If you would like to import a project, use your file browser to go to Documents/CEL Robox/Projects and drag the .robox file for your project into the AutoMaker main status screen. Note that you may need to close any other open projects before doing this.

Setup Screen

The Setup Screen is where you assign parameters for the print itself, with controls in the upper right corner of the screen. There are three built-in settings for prints defining the layer height and infill percentage: Draft, Normal, and Fine. The fourth setting is to select a custom profile. The estimated print time, material use, and cost of the material is displayed to the right of each setting.

Draft – 300-micron layers, 20% infill. This setting provides a fast print and is good for models that do not have a lot of detail.

For the QuickFill V2 print head, this profile prints the first later with the 0.3 mm nozzle and then all subsequent layers with the 0.8 mm nozzle.

The Dual Material head switches nozzles only to change colours or materials.

For the SingleX head the same nozzle is used for all operations.

Normal – 200-micron layers, 30% infill. This setting is good for everyday prints, providing both detail creation and acceptable print times.

While using this profile, the QuickFill V2 head uses only the 0.3 mm nozzle.

Fine – 100-micron layers, 40% infill. This setting provides the smoothest surface and best detail creation but takes the longest. Overhangs may show a lower quality surface finish due to curling of the thin edge of the feature.

Custom – Custom profiles are created in the Library section.

The lower box profiles the custom profile selection and additional print settings options:

Raft: This option creates a layer of material under the model. It is usually not required with the RoboxPRO, but is often used with other 3D printers to reduce warping.

Support: Parts of models that overhang the bed with nothing beneath them must be printed with support. This option instructs the AutoMaker program to generate a support pattern for these overhanging sections. The default is a linear pattern along the Y axis with a spacing appropriate to the layer height.

Support Gap: This option enables or disables the air gap between the support pattern and the model surface. For single material prints, this should be enabled to allow the support to be removed more easily. When using a second material for support, this option can be disabled to make the model face more accurate.

Brim: A brim is an additional extension of the first layer. This is used for models that are prone to warping or to promote bed adhesion. The setting sets the number of nozzle diameters for the width of the brim.

Raft/Brim/Support: This assigns the material for the Raft, Brim, and Support options.

Spiral Print: The spiral print setting ignores the top surface of a closed solid model and prints the result in a single spiral path. This makes for a clean surface finish and a single wall print. It is most often used for vase-type prints.

Fill Density (Text and Slider): This option overrides the profile infill density setting. More infill results in a stronger model, less in a lighter weight model and less material used.

Once the settings are as desired for the model, click the Make button. The model is sliced, the settings are applied, and the file is sent to the printer. AutoMaker will then return to the Main Status Screen automatically.

LIBRARY

The library button is located in the upper right corner of the AutoMaker software and is the leftmost of the four buttons there. Shaped like steps next to half of a material reel, this button will take you to the library of materials and profiles.

Filaments: The materials library is a database of all the materials that are fully supported by the RoboxPRO. If it is on this list, CEL has tested it for functionality in the 3D printer and has developed a material profile that should provide optimal results. These materials can usually be purchased on a SmartReel, depending on local availability, but can also be purchased without a SmartReel and loaded into the 3D printer separately, typically using the DryBox™ accessory. If the material does not appear in this library, a custom filament profile must be created. Since the material and profile will not have been tested by CEL, you must enable Advanced Mode before creating a custom material profile.

Profiles: This is a list of the profiles that set the layer height and other settings for the print job. To create a new profile, select the existing profile you wish to use as the basis for the new profile and click Save As. You will then need to provide a name and adjust the parameters. Click Save to save your changes. Note that each print head uses unique profiles, so a profile created for the QuickFill V2 head will not work for the SingleX head. The head type selection is to the left of the profile selection.

PREFERENCES

The preferences menu sets the program preferences for AutoMaker and also provides access to the Timelapse and Network functions. The menu is accessed by clicking on the gear icon in the upper right corner of AutoMaker and is divided into seven sections:

Head EEPROM: This displays the information specific to the print head currently installed on the 3D printer. Please do not use the Reset function without having access to the print head serial number and knowing what print head is installed, as improperly resetting the print head will cause damage.

Environment: This submenu sets environmental variables. For the most part, set the exchange rate and the currency symbol and leave the rest on default, unless instructed otherwise by support.

Printing: Sets the slicer type (Cura or Cura4), enables or disables safety features, and bypasses the filament detection. The safety feature bypass allows the print job to be started with the door open and disables the cooldown cycle at the end of the print. Bypassing the filament detection is used to troubleshoot certain situations and must be kept enabled during normal use, or the print head will be damaged.

Timelapse: AutoMaker is able to control GoPro WiFi-enabled cameras by allowing the connection and configuration of a GoPro timelapse print. Please leave it disabled for prints that are not being timelapse recorded.

Network: This section allows connection to any RoboxPRO or Robox Root/Mote devices on the same network. The devices are identified by their unique IP addresses, which can be found on the front touchscreen panel of the RoboxPRO or on Mote. Enter the PIN and click Connect to enable AutoMaker to control the specified device.

Maintenance: This section contains testing and maintenance functions for the Robox and RoboxPRO.

Advanced: The Advanced section allows the AutoMaker software Advanced Mode to be enabled. This will allow direct control of the printer through g-code and will enable the use of non-tested materials. Please read the warranty before enabling this functionality, as misuse can damage your printer.

There are two additional buttons in the upper right corner of the program. The question mark opens the About page, which shows the serial number of the printer and installed print head. If you click on the copy icon at the end of one serial number, it will copy that serial number into your computer clipboard to be pasted as needed. There is also a link to the AutoMaker version Readme file. The “i” button opens your default web browser to the latest CEL information articles. If there are articles that you have not yet read, a red circle with a white number will show up on the “i” showing how many unread articles there are.

RoboxPRO Software Interface Touchscreen

The front panel touchscreen of the RoboxPRO allows standalone control without being connected to AutoMaker. Please see www.cel-roboxcom/root for the interface guide. There is a stylus included with the printer in the event that you have trouble with the resistive touchscreen buttons, or need a smaller point for activities like typing.

WiFi Setup

The printer can be connected to WiFi by tapping the Settings button and then the Network button. Turn on WiFi if needed and then enter the WiFi settings menu. Select the network you wish to connect to and enter the key. Tap save and a confirmation dialog will show. Turn off the printer and turn it back on once the confirmation dialog shows up. You can also connect via Ethernet and use the Device Manager option to connect remotely to the printer to set up WiFi; this is often easier than using the touchscreen. The printer will need to be rebooted after the WiFi is entered even when using the Device Manager.

Remote Access

The RoboxPRO can be accessed from any web-enabled device on the same local area network by going to a browser and entering the following address, where XXX.XXX.XXX.XXX is the IP address of the printer as displayed on the front panel of the printer:

<http://XXX.XXX.XXX.XXX:8080/home.html>

Front Panel Eject Button

The physical eject button in the lower left corner of the front panel of the Robox allows several operations:

Click once: Pause and resume the ongoing print/operation. The printer will not pause immediately but will pause as soon as it is safe to do so.

Click and hold: Ejects the material in Material 1.

Double-click: Provided the last print has been completed with a SmartReel, the last print will be reprinted. Please note that this feature is still in testing and does not work consistently; it is easier to use the Reprint function in AutoMaker or on the RoboxPRO touchscreen.

Print Heads

The RoboxPRO comes with three print heads. Each head has a specific set of advantages and disadvantages, so choosing the proper print head for your project is critical. Please remember that the print heads do wear out as consumable items with limited warranty coverage. Also, please note that they are not user-serviceable. Disassembling the print head will void the head warranty.

QuickFill™ Print Head: This print head is intended for use with one material at a time. The print head has two nozzles, heated at the same time and fed from the same material reel. Both nozzles have needle valves installed to control the flow of material through the nozzle. The nozzle on the left side of the print head is 0.3 mm in diameter and is used for detailed prints. The nozzle on the right side of the print head is 0.8 mm in diameter and is used for prints that do not need detail. The larger diameter allows the model to be printed much faster. This print head is not for use with so-called “filled” filaments as the nozzles and needle valves will be damaged by the abrasive fill material.

DualMaterial™ Print Head: This print head is intended for use with two colours of the same material, or two different materials, in the same print job. The print head is equipped with two nozzles, each 0.4 mm in diameter with needle valves installed for material flow control. The 0.4 mm nozzle size allows a good mix of detail and speed. As with the QuickFill head, however, this print head is not for use with so-called “filled” filaments as the nozzles and needle valves will be damaged by the abrasive fill material. Please also note that you cannot use PLA with another material that uses a bed temperature higher than that of PLA, as doing so will cause the PLA to swell and jam in the

print head. ABS and PLA should never be used together. The exception is Polymaker PolySupport™ PLA. This material can be used with almost any other material, regardless of bed temperature.

SingleX™ Print Head: This print head is intended for use with one material at a time and has only one nozzle, a 0.6 mm diameter Olsson Ruby nozzle. The nozzle does not have needle valve control, so it will leak and string during printing normal operation to about the same extent as with a traditional 3D printer nozzle. This print head can be used with any material, including filled materials, as the ruby nozzle will not wear out.

General Print Head Maintenance

The print head nozzles should be purged periodically. When using PLA, HIPS, or ABS, you should purge every 10-20 print hours. This prevents degraded material buildup in the print heads. When using PETG or other materials that degrade more slowly than PLA, HIPS or ABS, you should purge every 50-100 print hours. If you are changing materials, you should purge after you install a new material to clean out the old material. The head should be purged using the print temperature of the hotter of the two materials. For example, ABS prints at 235°C and PLA prints at 195°C. When purging between ABS and PLA, therefore, it is advised to manually input 235°C.

The print heads do not need to be calibrated as they are calibrated as part of the initial testing process. If you are not happy with the quality of your print, please open a support ticket for assistance before calibrating as an improper calibration or calibration of an incorrectly operating head will lead to further issues.

Please do not allow the print heads to sit at a temperature for more than a few minutes at a time without printing. This will cook the material in the print head, leading to material clogs.

Please remember not to drop the print heads as this will break the nozzle on the SingleX head and will damage the Single and Dual Material print heads. Impact damage is not covered under warranty.

Cleaning the Print Head Nozzles – Outer Surface

The print head nozzles will build up a black crust of burned filament over time. The DualMaterial and QuickFill print heads can be cleaned using the instructions on our support page. The SingleX head can be cleaned with the instructions at <https://support.3dverkstan.se/article/66-the-olsson-ruby-instructions-for-use>. If your Olsson Ruby starts leaking between the heat block and the nozzle, you can tighten it with the instructions on that page. Please make sure that you remove the silicone sleeve from the heat block and hold the heat block in place to prevent the heat bridge from being bent or broken during tightening. Heat bridge damage is not covered under warranty.

Print Bed

The print bed surface is a flexible steel plate with either a LokBuild™ polycarbonate print bed or ThermoSurface™ polyetherimide print bed, depending on when your RoboxPRO was purchased. To preserve the life of either surface, please wait until the bed temperature has dropped below 40°C to remove the print. When using the LokBuild surface, we suggest carefully sliding a thin tool between the edge of the print and the print surface of the to loosen it first. When removing large prints, the entire LockBuild or ThermoSurface bed sheet can be removed and flexed to pop the print loose. Although print beds are replaceable, they can last indefinitely if adequate care is taken when removing prints. Please contact us for instructions and replacements.

To remove either print surface, pull up in the middle of the sheet until the front corners are released from under the corner retainers, then pull the sheet straight out of the printer. To replace it, locate the back corners under the back retainers and then flex the center of the sheet up to get the front corners under the retainers. Snap the front center hole over the front center pin.