

3devo



Composer & Precision series filament maker user guide

- Composer 350
- Composer 450
- Precision 350
- Precision 450



Version 2

December 2018

English user guide

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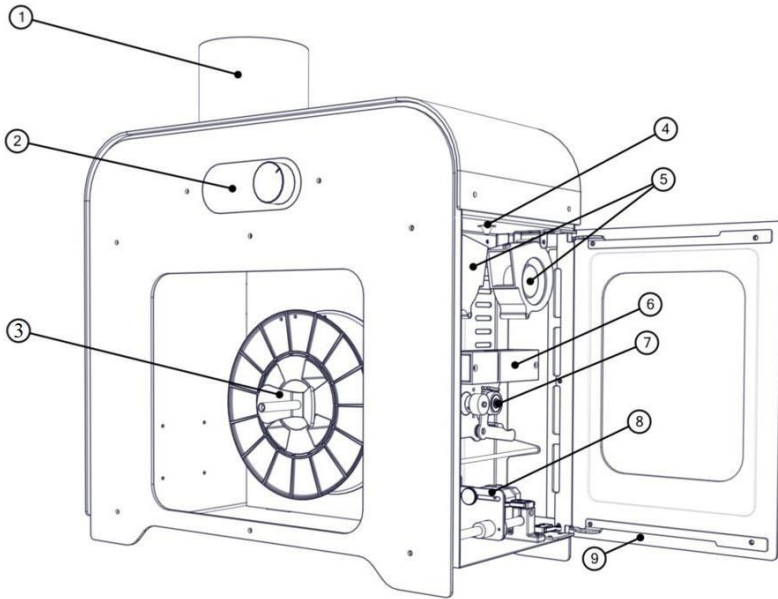
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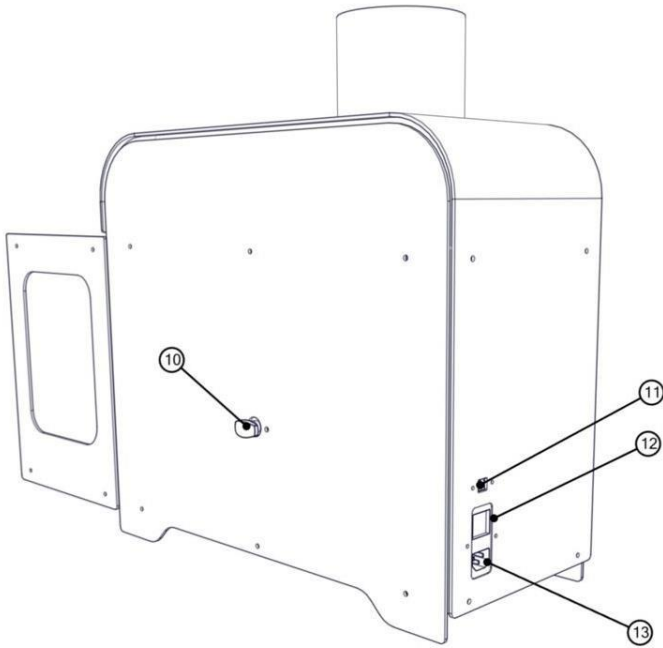
1. OVERVIEW filament maker

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1. Hopper
2. User interface
3. Spool holder
4. Filament nozzle
5. Filament cooling fans

6. Optical diameter sensor
7. Puller
8. Positioner
9. Door



10. Winder slipper clutch

11. USB port

12. Power switch

13. Power socket

2. SAFETY INSTRUCTIONS

The manufacturer is not liable for any problems caused by the user's failure to observe these instructions.

Read the instructions below and save this document for future questions.

CAUTION

Make sure the filament maker is placed in a room with at least ten air changes per hour. It is also advised to use a fume hood or laminar flow cabinet.

When polymers are heated, melted, and degraded in different ways volatile organic compounds (VOCs) are released into the air, though amounts can vary dramatically based on polymer composition, heating duration, maximum temperature, and other environmental factors. Current research associates VOCs with indoor air pollution which might lead to minor skin and eye irritations, respiratory distress and cancer. Harmful materials such as hydrogen cyanide or styrene may be released when extruding certain plastics.

In some cases it is unknown what the effects of some colorants and plasticizers during extrusion are.

Pay attention to the Materials Safety Data Sheet and the handling instructions of the materials you are using.

CAUTION

- Experimental use is at own risk. Some plastics may cause health hazards. Learn about the material you are using, before extruding them.
- Do not set the temperature too high for the material, this can cause degradation and burning of the materials and the release of toxic gasses VOCs.
- Do not set temperature too low for the material, when the temperature is too low the material will be too solid and might push the nozzle out of the machine.
- Wear protective equipment (work gloves, safety glasses, protective clothing) when operating the filament maker, especially when working with new materials and when the door at the front is opened.
- Do not leave the filament maker unattended.
- Do not use materials in the filament maker that are not meant for extrusion. Only use materials when having extensive knowledge of material properties.

CAUTION

Do not set temperature too high for the material. When temperature is too high the material will turn into a liquid. This liquid can come out of the nozzle and might cause burns. When you go even higher the material will decompose and the extrusion process will not be able to be continued. Make sure you know the specific melting temperature and decomposition temperature of the material you are using.

CAUTION

Do not touch hot parts, as there is a potential risk of burns, the nozzle can reach a temperature up to 450 degrees Celsius. The remaining parts can reach a temperature of 100 degrees Celsius:

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Do not touch hot parts, as there is a potential risk of burns, the nozzle can reach a temperature up to 450 degrees Celsius. The remaining parts can reach a temperature of 100 degrees Celsius:

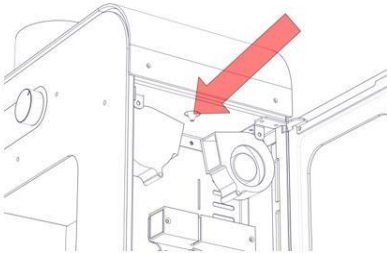


Image: Nozzle

⚠ CAUTION

This part of the chassis above the filament fans can be very hot, especially the nozzle cover during the extrusion process. Do not touch these parts while the filament maker is heated or extruding.

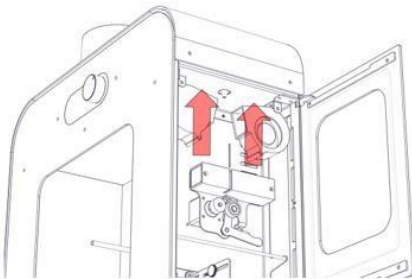


Image: Nozzle cover plate

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⚠ CAUTION

The top of the hood is being cooled during the extrusion process by the filament fan at the back. However this still means that it can be hot and you should be careful touching it.

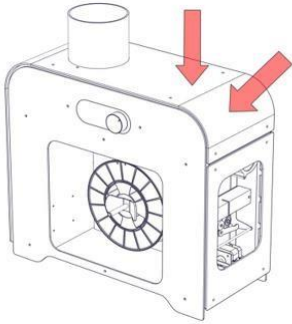


Image: Top of the hood

⚠ CAUTION

The top plate above the winder is located directly underneath the extrusion part of the machine, the barrel, screw and heaters. This part can become very hot during high temperature extrusion processes.

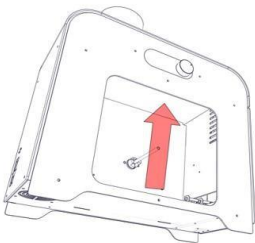


Image: Top plate

⚠ CAUTION

The positioner stepper is a part that will be hot during the extrusion process. Avoid touching it.

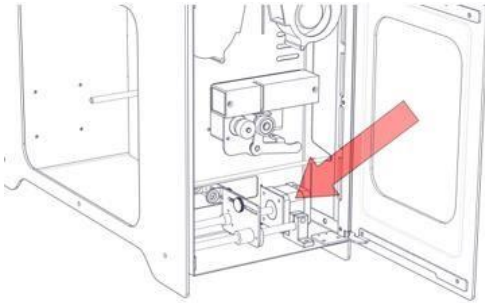


Image: Positioner stepper

⚠ CAUTION

The puller stepper is located behind the puller and mounted on the chassis. This stepper will definitely be hotter than the positioner stepper. Avoid touching it.

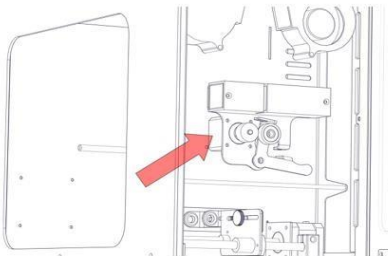


Image: Puller stepper

CAUTION

The puller bearing and puller wheel will both directly get their heat from the filament and therefor can become hot and reach temperatures above 100 degrees Celsius. Do not touch these parts.

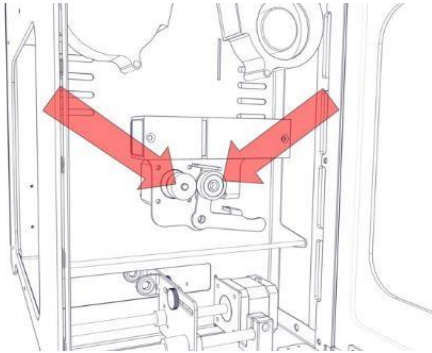


Image: Puller bearing + puller wheels

CAUTION

Do not touch moving parts

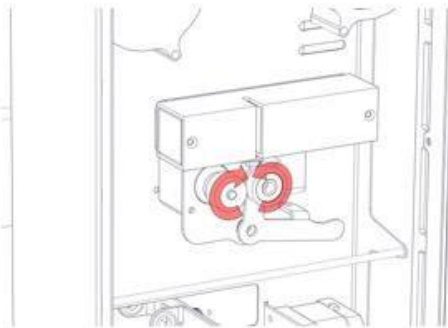


Image: Puller wheels

⚠ CAUTION

Be aware of moving winder parts

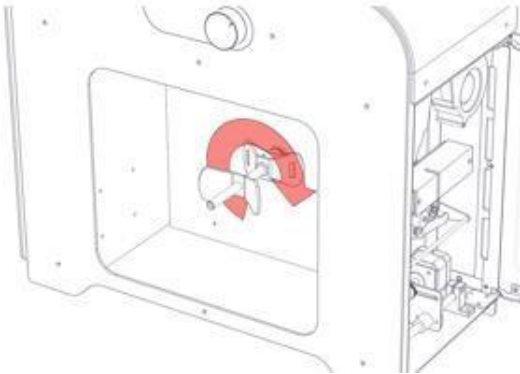


Image: Winder

⚠ CAUTION

Do not touch moving positioner parts

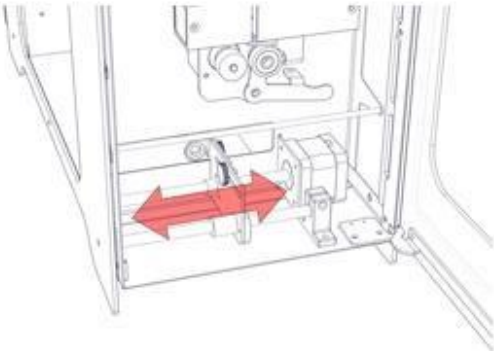


Image: Positioner



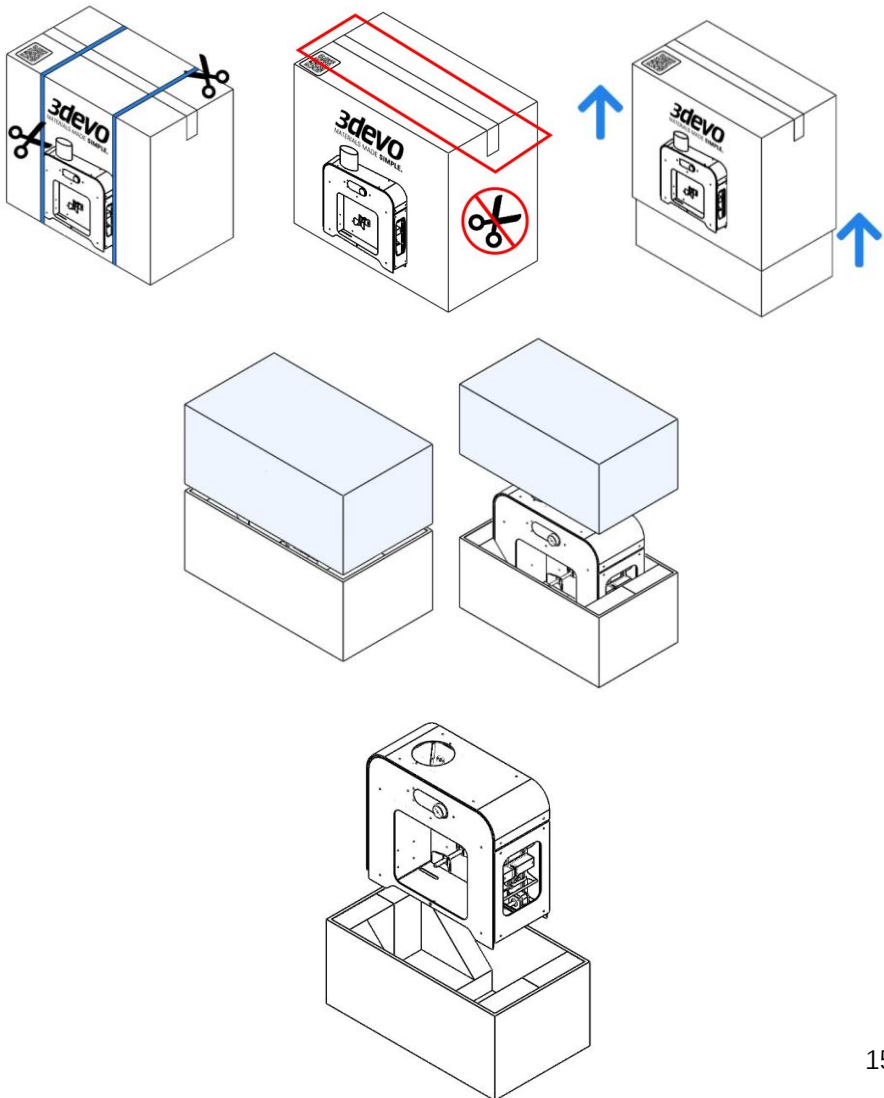
3. SAFETY INSTRUCTIONS – GENERAL

- Place the filament maker on a flat and stable surface.
- Do not use the machine if it is not compatible with the mains electricity in your country. Consult the sticker on the machine.
- Only lift if you are sure you are capable; the machine is heavy. Ask for help or use tools when moving.
- Use the filament maker in a ventilated area and preferable in a working temperature of 20 degrees Celsius. Area should not be too bright, the light could interfere with the optical sensor.
- Minimum age for use of the filament maker is age 18.
- Do NOT put your hands into the extrusion area when the filament maker is in use.
- Maintenance and repair by certified workers only. Please contact 3devo or reseller.
- The filament maker has been extensively tested, but if a failure occurs please contact service@3devo.com.

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4. UNBOXING

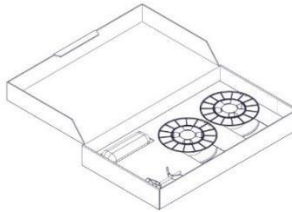
Follow the unboxing tutorial on our website: <https://3devo.com/unpacking>



5. ACCESSORIES

Besides your filament maker you will find in the box:

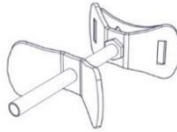
Composer & Precision Series filament makers – accessory box



Spool



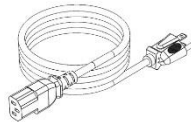
Spool holder



Hopper



power cable (type dependent on your country)



PLA Granulate
1200gram



Devoclean Standard
350 gr.



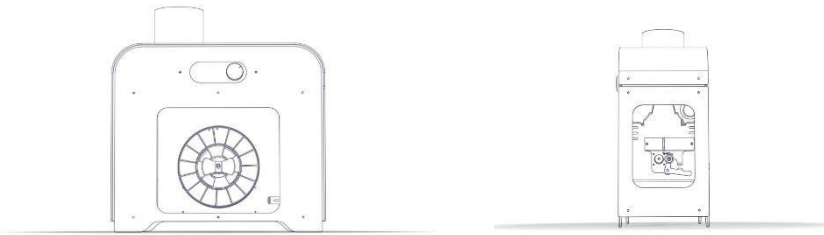



6. QUICK START GUIDE

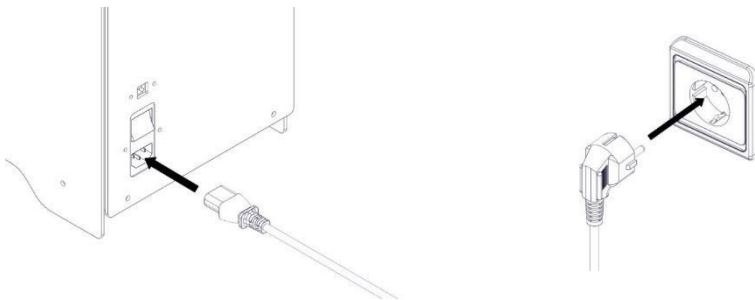
For the fast starters out there we have made a short and simple out of the box quick start guide. This is shipped in your filament maker accessory box, or you can download it from www.3devo.com/manuals

7. INSTALLING EXTRUDER

- 1) Place filament maker on a flat and stable surface. Ensure the working station is free from liquids. Electrical shock, fire or other hazards may result.



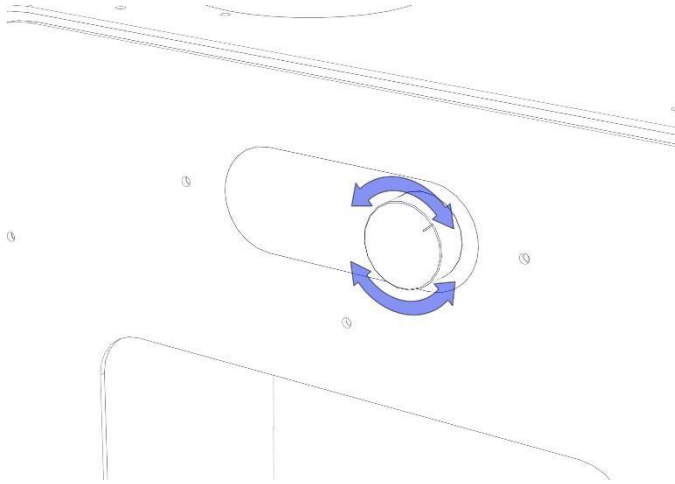
- 2)  Check that the voltage in your working station corresponds to the purchased product. Do not operate with a different cord or plug, if it is not working properly, or if it has been damaged.
- 3) Make sure the power button is in the 'OFF' position and plug the power cable into the filament maker.
- 4) Plug the other end of the cable in a grounded outlet.



- 5) Switch the power button in the ON position.

8. USER INTERFACE

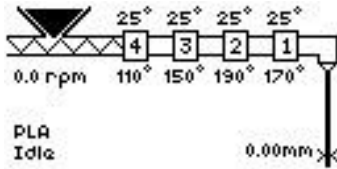
The interface chapter explains the usage of the filament maker menu's and its options.



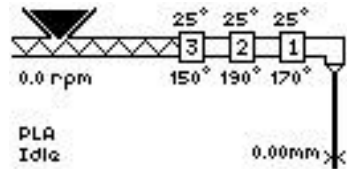
Switch on the filament maker and wait until the main screen appears. Control the filament maker by turning the button to navigate and press the button to select menu items or edit settings.

To change a setting, rotate the button until your selection is highlighted. Push the button to select the value. Again rotate the button to edit the value. Once done, push the button to confirm the value.

8.1 STATUS SCREEN



Status screen Advanced

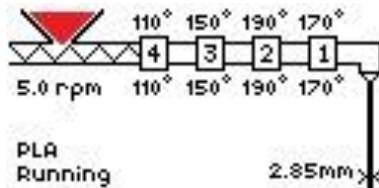


Status screen Regular

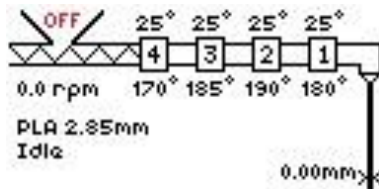
The status screen provides information about the extrusion process and the filament. The status screen for the Advanced version has an extra icon for the extra heater.

The status screen information can be changed before and during the extrusion process, such as the hopper status (black triangle), the current temperature of the heaters, the set temperatures, the selected material type ('PLA'), extruder status ('Idle'), the extrusion speed in RPM and the average filament thickness.

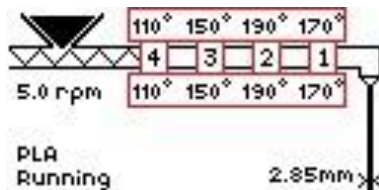
- In the manual we will use the Advanced version as an example.
- The manual is written with software version 1.1.3 in mind. Features, menu's or user texts may be slightly different when using newer or older software versions.



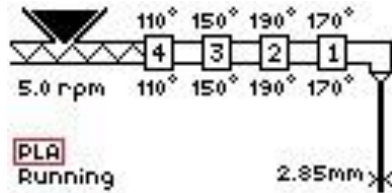
The highlighted area represents the hopper sensor activity. When granulate is inserted in the hopper, the sensor will detect its presence. This will be visible in the status screen, the hopper area will fill up. The sensor can only detect the presence of granulate, not the amount.



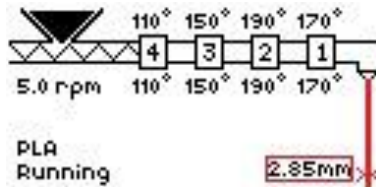
⚠ Caution: When hopper sensor is disabled, the text in the hopper will be shown as 'OFF'. Keep in mind that the machine will continue without stop even if the hopper is empty all the way.



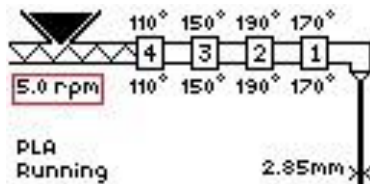
The highlighted area represents the band heaters. The Regular version has 3 heaters, the Advanced has 4 heaters. Each heater is shown separately. The set Celsius degrees are shown below the heater, the measured Celsius degrees are shown above the heater.



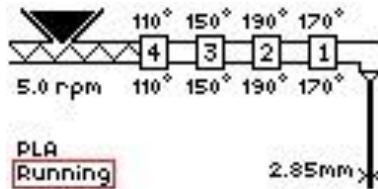
The highlighted area shows you what type of material you have selected to extrude.



The highlighted area represents the filament diameter. The measured diameter is shown below in millimeters.



The highlighted area tells you the measured speed of the screw in rotations per minute.



The highlighted area tells you the current status of the extruder. The following status types may occur during operation:

Status type:	Information:
Idle	Initial startup state of the extruder
Homing positioner	Resets the positioner to a known state before use.
Heating	Heats up the barrel to the set temperatures after the positioner homing is completed
Prepared	Only shown when the 'manual start' option is used. The extruder is on temperature and ready to start until the timeout of X minutes is reached.
Running	The heaters have reached their set point, the extruder motor is started.
Error	Only shown when an error has occurred before or during the extrusion process.

8.2 MAIN MENU

```
Main menu
-----
Start extrusion
Settings
Material presets
Spooling
About this machine
Back
```

To open the 'Main menu', press the button once when the status screen is visible and the main menu screen will appear. From here you can navigate through different settings.

```
When heating is done, start:
-----
Automatically (recommended)
Manually
Back
```

When choosing 'Start extrusion' a new menu will open. The menu is called 'When heating is done, start:' and has the options 'Automatically (recommended)' and 'Manually'.

8.2 START AUTOMATICALLY(RECOMMENDED)

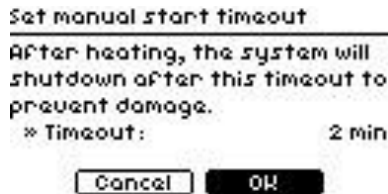
Automatic start gives the user the option to start the extruder automatically with the current material and extrusion settings. This is the recommended process of starting, since the extruder will not wait after the set points of the heaters has been reached. It automatically starts extruding whenever the extruder is ready. will be redirected to the status screen.

8.3 START MANUALLY

Manual start gives the user the option to postpone the extrusion process until a certain time limit has been reached. The time limit is set by user and has a range between 1 and 10 minutes at maximum.

⚠ Caution: Manual starting is not recommended, since the quality of the stationary material in the barrel degrades over time. It may also happen that the material overheats and affects the material flow. The longer the material is on temperature in the barrel the longer it takes to stabilize the flow afterwards. Therefore this process is only recommended when cleaning the extruder of residual material in the barrel with cleaning material like DevoClean. Use of this functionality is at own risk!

The manual start process starts with a warning message, for users who are unknown to the manual start process.



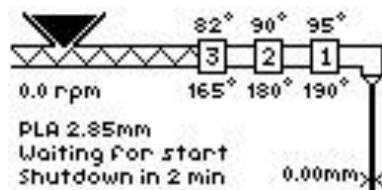
When the user acknowledges the warning, a new prompt will ask the user to input the timeout delay that will be used as safety measure after the heater temperatures has been reached. Rotate the navigation button to select the timeout and edit the timeout at will or continue by pressing Ok.

Manual start - heating done

Heating is complete, the extrusion process can be started.

Start now **Start later**

After setting the timeout, the machine will start as usual with the heating status. When the heaters are on temperature, the status will be set to 'Prepared'. During this period the timeout is applied. The user will again be asked to 'Start now' or 'Start later' in a user prompt.



Extruding will be started directly when start now is used. With the start later the user will be returned to the status screen, while showing a timeout countdown during this period. See picture 'Waiting for start status screen'. Within the set timeout period it is possible to go to the main menu and press the 'Start extrusion' to start extruding or 'Stop extrusion' to cancel the manual start process and return to the Idle state.

Manual start - timeout reached

The manual start timeout was reached. To prevent problems, the system was shut down.

OK

When the extruder is not started within the set timeout period, the extruder will be stopped and set to its Idle state. The user will receive a message prompt regarding the timeout being reached as shown above.

8.4 SETTINGS

Settings	
Heater 1	180°
Heater 2	190°
Heater 3	185°
Heater 4	170°
Extruder speed	5.0RPM
Filament fan speed	70%
Filament diameter	2.85mm
Empty spool diameter	105mm
Full spool diameter	200mm
Spool width	45.0mm
Positioner height	5.0mm
Spooling speed	Automatic
Hopper empty check	on
Reset to defaults	
Apply	
Cancel	

In the settings menu you can apply your own settings, reset to defaults and enable or disable the hopper sensor check. After choosing 'Apply', the machine will save these settings until you edit and apply new settings or until choosing a new material. Scroll down in this screen for all options. The 'Cancel' button restores the settings to the state before entering the menu and the main menu will be shown.

- Please note, we have included default settings for the first use.

The list below is summary of the settings functionality:

Setting name:	Information:
Heater [n]	The heater setpoints of the active material profile are the default settings of the heaters. In the settings menu the user can edit the temperature temporary without editing the selected material profile.
Extruder speed	Screw rotation speed in RPM
Filament fan speed	Filament cooling fans, speed in percentage.
Filament diameter	Filament extrusion diameter in millimetres.
Empty spool diameter, full spool diameter, spool width and positioner right	Spooling related settings, see spooling - running chapter.
Spooling speed (toggle)	Automatic for calculated winding and Manual for fixed positioner and winder speed. Automatic is recommended as settings.
Hopper empty check	Hopper sensor enabled when 'on', sensor disabled when 'off' is applied.

8.5 MATERIAL PRESETS



When choosing 'Material presets' this screen will appear. Here you can choose your material. Some material presets are built-in, but this list also shows custom materials you have added. From here you can also create a new custom preset. Custom materials can be deleted by selecting 'Delete', built-in materials cannot be deleted. Built-in materials can be modified, but can only be save as a new custom material.

After choosing a material you can 'Load' or 'Modify' the material in the following screen. When choosing 'Load', you will return to the main menu.

The type of material displayed on the status screen will have '(modified)' behind it, when material preset related settings are different from the standard material preset. This occurs, for example, when the temperature settings are edited in the settings menu.

- Please note these settings won't be automatically saved as custom.

```
Material: PLA
Heater 1      170°
Heater 2      190°
Heater 3      150°
Heater 4      110°
Extruder speed 5.0RPM
Fan speed      75%
Filament diameter 2.85mm
Save as CUSTOM2
Cancel
```

When choosing 'Modify' on a built-in preset material, this screen will appear which gives you the option to modify different settings. When you have changed the settings to meet your needs, you can save the settings as a 'custom preset'. Choose 'Save as CUSTOM#'.

```
Material: CUSTOM1
Heater 1      170°
Heater 2      190°
Heater 3      150°
Heater 4      110°
Extruder speed 5.0RPM
Fan speed      75%
Filament diameter 2.85mm
Overwrite CUSTOM1
Save as CUSTOM2
Cancel
```

When choosing 'Modify' on a custom material, you will also be able to adjust the settings. After making adjustments you can save these as a new CUSTOM# or you can overwrite the old settings by choosing Overwrite CUSTOM#. Scroll down this screen for all options.

After choosing and/or modifying your settings you may start the extrusion process by choosing 'Start extrusion' in the Main menu. Material pre-sets can also be loaded during the extrusion process.

8.6 SPOOLING - IDLE

```
Spooling
-----
* Filament length:      0m
* Filament volume:     0cm3
Positioner settings
Back
```

The spooling menu is only used as status menu at the moment the extruder is not running. When the user has made a spool using the spooling wizard before, the spooling menu will still show the data from that time. It is also possible to change the positioner settings when the machine is not yet running in the 'Positioner settings' menu. More regarding the spooling settings in the 'Spooling – running section in chapter 8.10.

- Note that if the machine has not been started with 'Start extruding', it will home the positioner first before continuing with the selected preview position.

8.7 ABOUT THIS MACHINE

Information about the extruder, mostly useful for support and maintenance of the extruder. The information shown are as following:

Setting name:	Information:
Serial	The serial number given to the extruder at 3devo. This is the same serial number on the sticker filament maker to the power switch of the filament maker.
Production date	Extruder assembly date.
Software version	The software version of the software which is installed by the manufacturer or user.
Motor hours	Amount of running state hours.
More details (button)	Opens the hardware version section of the 'About this machine' menu.
EEPROM version	EEPROM settings version
Factory info version	Extruder hardware version
Devoboard version	Main board version
Interfaceboard version	Display board version

8.8 RUNNING MENU

```
Main menu
-----
Stop extrusion
Settings
Material presets
Speed tuning
Spooling
About this machine
Back
```

The Main menu has extra options available while the machine is running. Summarized these options are; Stop extruding, Modify settings, use the 'Speed tuning' menu to edit the puller speed and start spooling. The following chapters explains more about the menu's while the extruder is in the running state.

8.9 SPEED TUNING

```
Speed tuning
-----
Measured diameter: 2.85mm
Start puller
Puller speed:      Automatic
Back
```

The speed tuning menu gives the possibility to the user to actively edit the puller rotation speed while the extruder is extruding. The current 'measured diameter' shows the measured filament thickness, which is the same value as shown on the status screen. The user also has the possibility to start or stop the puller at will.

- Keep in mind that when the puller stops, the filament is still extruded and might build up all the way up to the nozzle.

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At default the puller settings is set to 'Automatic ' puller speed. The puller control will calculate the optimum puller speed of the measured filament thickness and will adjust the speed according to the set filament thickness. This process typically takes a few minutes to adjust to a stable puller speed.

If the filament sensor cannot measure the filament thickness, because it needed correcting by user or instability of the filament thickness, then the puller control will hold the puller speed value equally. This may sometimes not be feasible when starting with the extrusion process.

If you experience trouble applying the filament between the puller wheels, because the puller control moves too slowly or too fast, then it is possible to set the puller speed setting temporary to 'Manual'. This way the user can edit the rotation speed of the puller to a workable speed, placing the filament between the puller wheels and return the puller speed to automatic again.

- When tuning the puller speed manually, the changes are effective instantly.

8.10 SPOOLING MENU - RUNNING

```
Spooling
-----
* Filament length:      15m
* Filament volume:     121cm3
Start spooling
Positioner settings
Advanced
Back
```

In this chapter the spooling menu settings will be explained, the 'Start spooling' option, which starts the 'Spooling wizard', will be explained in the 'Start extruding' chapter.

The 'positioner settings' are settings related to the used size of the spool. The calculations used for spooling are dependent on the measurements of the spool itself. Measure the sizes using a calliper or other tool and change the settings of the 'Empty spool diameter', 'Full spool diameter', 'Spool width' and the offset distance of the positioner end-switch to the beginning of the spool as 'Right position'. Because of the precision, input the lengths in millimetres. The 'Empty spool diameter' and 'Full spool diameter' settings are available in the settings menu.

It is possible to do this step without calliper, by using the 'Preview positions' options. This moves the positioner to the locations set using the width settings.

- Note that if the machine has not been started with 'Start extruding', it will home the positioner first before continuing with the selected preview position.

```
Advanced spooling
Start positioner
Start winder
Start winder & positioner
Reset spool
Move positioner
  * to left of spool
  * to right of spool
Back
```

The 'Advanced' menu under the 'Spooling' menu, contains options useful while spooling. It is possible to start or stop both the winder and positioner manually. When a spool is full, the user is also able to manually stop the motors while replacing the spool and move

Do not forget to use the 'Reset spool' option when replacing the spool, since the extruder assumes that the old spool is still getting filled. The winder and positioner speed will continue to be reduced otherwise. Pressing the reset spool option returns the winder and positioner speed to the initial speed. The recommended way of replacing the spool is to make use of the spooling wizard once again after pressing 'Stop spooling'.

8.11 SOFTWARE ERRORS

This section describes the most general errors, which could occur during the extrusion process. If none of the steps below seems to concern your extruder's situation. For additional questions, please contact us via

Service@3devo.com

Error name:	Information
"The external supply voltage is too low or absent."	This occurs when only the USB-cable is connected or none at all. Please turn on the mains electricity of the extruder with the 'On' button on the back and check the power cable.
"Reset signal received."	This message is shown when the USBconnection is opened on the PC. This reset is necessary for us to upgrade the firmware.
"Extruder motor too hot."	This occurs when the extruder motor has run to hot due to too much friction generated by the screw or extruding for a very long period with high RPM settings.
"Extruder motor current limit reached."	This occurs due to too much friction generated by the screw. The temperature settings might not be correct.
"Positioner endstop hit unexpectedly."	End-stop hit by user or with the positioner.
"Hopper is empty for too long."	This occurs when the hopper sensor detects a low amount of granulate in the hopper.

9. GRANULATE

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Step 1: Place the tube on the hopper.

Step 2: Insert the granulate into the hopper. The hopper icon should now be active on the main screen. Do not use granules larger than 4.5 mm.



Image: Step 1



Image: Step 2

10. MATERIALS

What materials can be extruded?



The extruder design is developed to handle almost any plastic that is compatible with your FDM 3D-printer. The extrusion heating system is able to extrude materials up to 350/450 degrees Celsius (REGULAR/ADVANCED). And with the added mixing zone in the ADVANCED model you can get mixed plastic compounds.

10.1 WHAT MATERIALS NOT TO USE?

Some materials are not fit for extrusion and 3D-printing. Extruding plastics that release poisonous gasses when heated for example PVC (Polyvinyl chloride) is ill advised. Before extruding any kind of material with the filament maker, find out if the material is safe for use. Materials with a high hardness (for example metals, fibers and ceramics) or melting temperature higher than 450 Degrees Celsius must always be extruded mixed with plastics, and can never be processed in its pure form. Materials with a high hardness and/or melting temperature need to be extruded with care, extruding these materials with the filament maker might cause excessive wear to the extruder and can shorten the lifespan significantly.

10.2 MORE INFORMATION OR MATERIAL REQUESTS

On our webshop we will be offering a variety of base materials that can be used with your filament maker. <https://3devo.com/shop-materials/materials/>



10.3 STANDARD SET MATERIALS

Pre-programmed in the filament maker firmware we have set several material indicational presets, which can be used as an indication for fine tuning your own material of choice.

Material presets on the filament maker: PLA, ABS, PA12, PC, PEEK and PS.

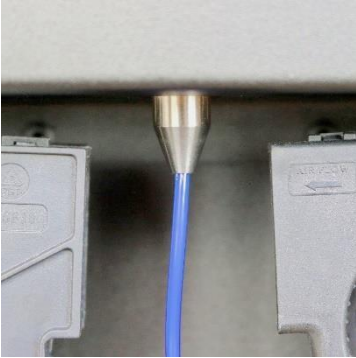
(Firmware version 1.1.3 – August 2017)

For the latest Firmware version and an overview of the latest added material preset: <https://3devo.com/firmware-updates/>

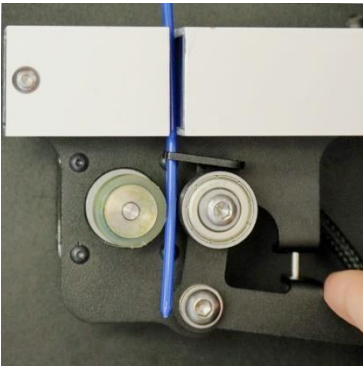
You can also add your own material settings through the user interface (CUSTOM #).

11. START EXTRUDING

When the machine is running, the filament will extrude out of the extruder nozzle.

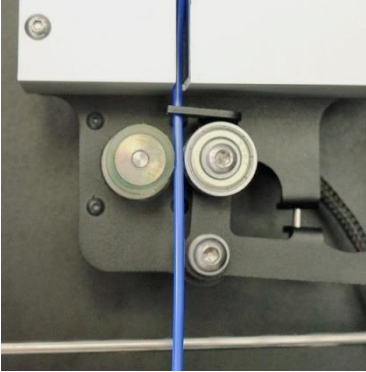


Place the filament between the puller wheels – when the filament is not too warm any more. In case of being too warm; this will warn off the puller wheels and will not show a stable filament diameter thickness.



12. START EXTRUDING

Let it run for a couple minutes until it works properly. The filament is ready to be wound on the spool when the measured value of the optical sensor is the same as the set value.



While waiting, prepare the spool on the spool holder.



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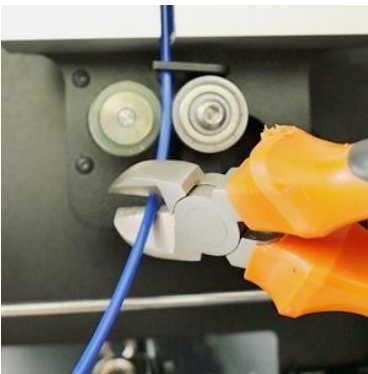
Place spool holder on winder by sliding the metal rod into the tube.



Press the button on the status screen, select Spooling in the Main menu > Start Spooling and follow the steps shown on the display of the filament maker.

When the set diameter is reached, cut filament below puller.

While guiding the filament through the filament maker following the screen instructions, fasten the filament on the spool.



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To install the slipper clutch, mount the spool on the winder and make sure the magnets attach properly.

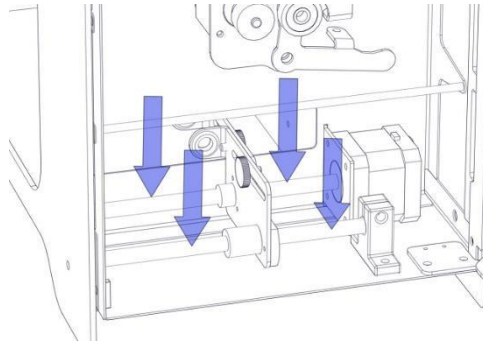


When the machine is on, turn the slipper clutch knob until the clutch tightens and the spool starts turning. Adjust the traction as needed by turning the knob.

How to do this? See the instruction video: <https://3devo.com/support/>

13. MAINTENANCE

To keep the positioner moving smoothly, apply some sewing machine oil on the trapezium wire and the linear guide as seen in the areas shown above.



13.1 COMMON SPARE PARTS

All our commonly used spare parts, such as the puller wheels and nozzle package, can be found in our webshop. <https://3devo.com/shop-sparehttps://3devo.com/shop-spare-parts/parts/>

Use cleaning filament to clean the machine when you are done with extruding or to switch material types.

Other maintenance should only be performed by a certified worker, contact service@3devo.com for servicing.

For additional questions, please contact us via Service@3devo.com

14. TROUBLESHOOTING

This is an overview of the problems that are most likely to occur in the beginning and/or are good to know before experimenting. For any other issue, please consult our support page <https://3devo.com/support/>. If the support page is not able to provide a solution then please contact our service team service@3devo.com.

Too cold	Too hot
Filament contains pieces of solid granulate.	Bubbles in filament, steam might come out of the nozzle.
Nozzle is pushed out of the machine.	Filament is too thin, low viscosity and may contain air bubbles.
The flow of the material will reduce.	Only a small amount of filament comes out of the nozzle.
The filament cannot be pulled or will be ripped by the puller.	Filament is not round

Problem	Solution
1. Puller wheel does not work properly.	1a. Fasten spring. 1b. Replace puller wheel. Contact service@3devo.com
2. Filament winds too loose on the spool.	2. Tighten winder slipper clutch.
3. Filament contains black spots.	3a. Use Devoclean Standard or Devoclean Pro to clean the barrel and screw. 3b. You can also try to clean the machine by using a different material, e.g. HDPE, to get all the contaminated material out of the barrel.
4. Diameter filament not manageable	4. Loosen winder slipper clutch.

15. SPECIFICATIONS

Composer 350 filament maker:

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Type	Composer 350
Color	Silver powder coated aluminum
Weight	24 kg
Dimension with hopper	506 L X 216 W X 540 H MM [19.9 X 8.5 X 21.3 IN]
Dimension without hopper	506 L X 216 W X 448 H MM [19.9 X 8.5 X 17.6 IN]
Operating temperature	Up to 350 degrees Celsius
Extruder screw	Hardened nitride steel with compression zone + build in mixing section
Extrude diameter	0,5 – 3,0 mm [0.019" – 0.118"]
Diameter sensor accuracy	43 micron
Tolerance	0.05 mm
Power	110 – 240 V, 50 – 60 Hz
Connectivity	USB, stand-alone filament extruder
Build	2019

Composer 450 filament maker:

Type	Composer 450
Color	Silver powder coated aluminum
Weight	24 kg

Dimension with hopper	506 L X 216 W X 540 H MM [19.9 X 8.5 X 21.3 IN]
Dimension without hopper	506 L X 216 W X 448 H MM [19.9 X 8.5 X 17.6 IN]
Operating temperature	Up to 450 degrees Celsius
Extruder screw	Hardened nitride steel with compression zone + build in mixing section
Extrude diameter	0,5 – 3,0 mm [0.019” – 0.118”]
Diameter sensor accuracy	43 micron
Tolerance	0.05 mm
Power	110 – 240 V, 50 – 60 Hz
Connectivity	USB, stand-alone filament extruder
Build	2019

Precision 350 filament maker:

Type	Precision 350
Color	Black powder coated aluminum
Weight	24 kg

Dimension with hopper	506 L X 216 W X 540 H MM [19.9 X 8.5 X 21.3 IN]
Dimension without hopper	506 L X 216 W X 448 H MM [19.9 X 8.5 X 17.6 IN]
Operating temperature	Up to 350 degrees Celsius
Extruder screw	Hardened nitride steel with compression zone
Extrude diameter	0,5 – 3,0 mm [0.019” – 0.118”]
Diameter sensor accuracy	43 micron
Tolerance	0.05 mm
Power	110 – 240 V, 50 – 60 Hz
Connectivity	USB, stand-alone filament extruder
Build	2019

Precision 450 filament maker:

Type	Precision 450
Color	Black powder coated aluminum
Weight	24 kg
Dimension with hopper	506 L X 216 W X 540 H MM [19.9 X 8.5 X 21.3 IN]



Dimension without hopper	506 L X 216 W X 448 H MM [19.9 X 8.5 X 17.6 IN]
Operating temperature	Up to 450 degrees Celsius
Extruder screw	Hardened nitride steel with compression zone
Extrude diameter	0,5 – 3,0 mm [0.019" – 0.118"]
Diameter sensor accuracy	43 micron
Tolerance	0.05 mm
Power	110 – 240 V, 50 – 60 Hz
Connectivity	USB, stand-alone filament extruder
Build	2019

16. SOFTWARE

Our software is continually being developed and improved. Firmware updates are available on our website:

<https://3devo.com/firmware-updates/>

Third Party Licenses

The FE Filament maker contains compiled versions of some third-party software. This file is intended to be distributed along with new machines and compiled software updates, and contains information regarding the copyright and licensing



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<https://github.com/arduino/Arduino/tree/master/hardware/arduino/avr/cores/arduino>. It is licensed under the following conditions:

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<https://github.com/arduino/Arduino/tree/master/hardware/arduino/avr/libraries/SPI> It is licensed under the following conditions:

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SPI Master library for arduino.

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LUFA USB FIRMWARE

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