

Filament Maker TWO

User manual

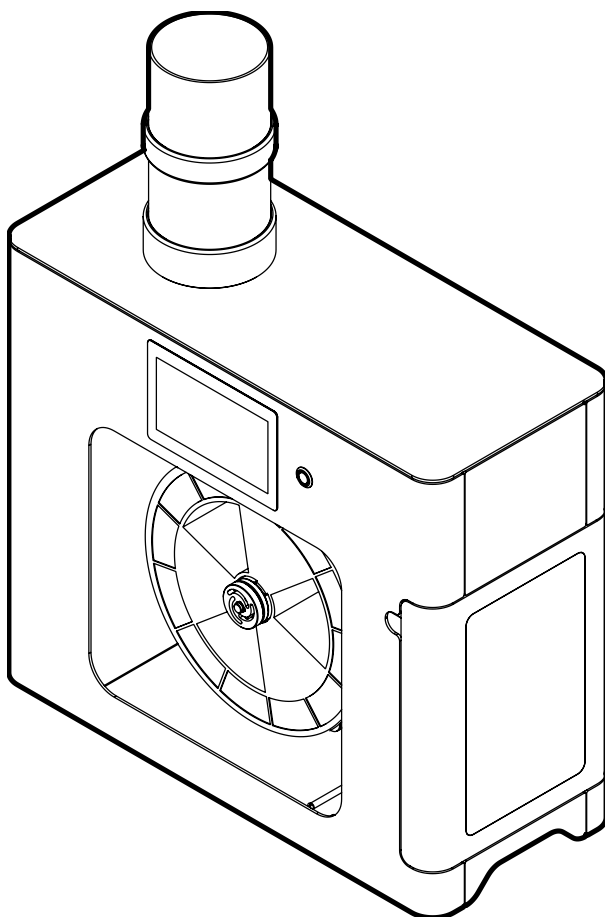


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1. Disclaimer

This manual sets out the instructions on how to install and operate the Filament Maker TWO. Please read through the contents of this installation and user manual carefully. Failure to read the manual may lead to personal injury, inadequate extrusion results, or damage to the machine and its accessories. 3devo does not guarantee specific extrusion results from using the Filament Maker TWO.

The user of the Filament Maker TWO must be at least 18 years old and have sufficient knowledge of polymer extrusion. The user understands that improper use of the machine may lead to potential hazards, damage or personal injury, and always follows all safety regulations instructed in this manual.

3devo is not liable for any damages or injuries resulting from: improper placement, misuse, unauthorized modifications, use of third-party equipment; or unauthorized repairs of the Filament Maker TWO. Repair procedures may only be performed with specific authorization by 3devo in writing, by an official service partner or by 3devo. A detailed overview of 3devo's warranty policy can be found at: www.3devo.com/warranty.

While every effort has been made to ensure the accuracy and reliability of the information provided in this user manual, 3devo cannot be held responsible for typographical errors or inaccuracies. This manual may be updated, and it is the user's responsibility to ensure to have the latest version. Details can be found in [Chapter 4.1 – Documentation](#).

2. Intended use

The Filament Maker TWO is designed for the production of filament used in 3D printing applications. Its primary function is: to melt raw thermoplastic polymers with a melting point in the range of the machine's heating capabilities (0–450 degree Celsius); extrude the molten material through a precision nozzle; and spool the resulting filament onto a reel. It enables users to create customized filament of various diameters and colors, offering flexibility in material selection and ensuring compatibility with a wide range of 3D printers. The machine is intended to be used by professionals with sufficient knowledge of polymer extrusion, in a suitable laboratory environment. See [Chapter – 6.3 Placement](#).

Inadvisable use

The Filament Maker TWO is intended to extrude primarily thermoplastic material. Additives must be processed carefully with a limited ratio, such as, but not limited to: metals, minerals, ceramics, colorants, or other suitable additives.

The Filament Maker TWO is not suitable for extruding incompatible materials, such as, but not limited to: liquids, corroding materials, polluted materials, flammable materials and toxic materials.

For a list of recommended polymers, and further advice, please see [Chapter 7.1 – Input Materials](#).

3. Safety instructions

Read and adhere to all safety instructions and user instructions carefully before using the machine. This machine is not intended for users with a low reaction response time, physical or intellectual impairments. The manufacturer is not liable for any damage or other problems caused by the user's failure to observe these instructions.

3.1. Safety messages

The Filament Maker TWO contains clear warnings on the relevant surface areas to prevent injury. Ensure to familiarize yourself with the overview of the warnings listed below.



Manual (ISO 7010-M002) Read the user manual before starting the procedure.



Lift with two persons This machine is heavy, always lift the machine with two persons.



Ensure continuous ventilation (ISO 7010-M057) Advisory to place the machine in a room with proper ventilation.



Wear eye protection (ISO 7010-M004) Advisory to wear eye protection when operating the machine.



Wear protective gloves (ISO 7010-M009) Advisory to wear protective gloves when operating the machine.



Wear respiratory protection (ISO 7010-M017) Advisory to wear a respirator when operating the machine.



Disconnect mains plug from electrical outlet (ISO 7010-M006) This machine uses mains power, disconnect the power plug when instructed. Found next to the power socket.



Warning (ISO 7010-w001) Warns of a situation that may cause material damage or injuries if safety instructions are not followed.



Electricity hazard (ISO 7010-W012) This machine uses mains power, contact with live electrical components can cause severe injury or death. Found on the power socket, power plug and near the heaters on the mainboard.



Hot surface (ISO 7010-W017) Multiple surfaces of the machine are hot during operation. Found in the extrusion area; near the heater connectors and at the exposed barrel when top plate is removed.






Crushing of hands (ISO 7010-W024) This warning is found at the inside-front of the machine, between the positioner axles.









Rotating auger This machine has a rotating auger when operating, found next to the opening of the machine that leads to the auger.

3.2. Safety notices



General safety

-  Do not leave the Filament Maker TWO unattended. Continuous supervision is crucial to promptly address any issues and prevent accidents.
-  Wear protective equipment when operating the Filament Maker TWO, especially when working with new materials and when the door to the extrusion area is open.
-  Make sure the Filament Maker TWO is placed in a room with at least ten air changes per hour. It is also advised to use a fume hood or mobile fume extraction system.



Electrical safety

-  The Filament Maker TWO power components are located behind the back panel of the machine. Always turn OFF the machine and remove the power plug when performing maintenance and repair procedures unless instructed otherwise.
-  The Filament Maker TWO must be connected to a mains socket with earth/ground terminal, supplied with over-current and short-circuit protection.
-  The Filament Maker TWO is powered by mains voltage. The power supply is located behind the back panel of the machine. Do not touch any components that are powered while the machine is turned on and the power cable is connected.
-  The back panel of the Filament Maker TWO may only be removed by skilled and trained users who are instructed to do so.
-  Always reinstall the back panel after performing maintenance and repair procedures, before continuing machine operation.
-  The heaters of the Filament Maker TWO are connected to the mains power directly. Do not touch the heater components and connectors on the mainboard, when the machine is turned on and the power cable is connected.

Mechanical safety

-  Never bypass the safety screen or safety mechanism on the hopper of the machine. While operating, contact with the extrusion screw can cause serious injuries.
-  Do not touch the positioner while the machine is operating, this may lead to the crushing of hands or other serious injuries.

Risk of burns

-  Do not touch the extrusion nozzle. The nozzle can reach temperatures up to 450°C. Prevent contact with the nozzle and the surrounding hot areas during operation at all times.
-  Do not touch the barrel or heaters when the top plate of the machine is removed for maintenance purposes.



When starting an extrusion experiment or purging the machine, molten plastic with degraded polymer might be extruded from the nozzle. This extrusion can cause splashing, hissing and smoke. Ensure to wear eye protection when close to the nozzle and wear protective gloves to prevent getting in contact with molten polymer.



Do not set temperatures too high for the material. When temperatures are 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 continue. Make sure you know the specific melting temperature and decomposition temperature of the material you are using.



Always wear heat resistant gloves when performing maintenance on the machine. Exposed parts such as the barrel have a high risk of burns.



Always wear heat resistant gloves when guiding molten plastic through the puller wheel and positioner of the machine.

Emissions



Do not use materials in the Filament Maker TWO that are not meant for extrusion. Only use materials when having extensive knowledge of material properties.



Experimental use is done at own risk. Some plastics may cause health hazards. Pay attention to the Materials Safety Data Sheet and the handling instructions of the materials you are using before extruding them.



Setting temperatures too high can cause degrading plastic releasing potential toxic fumes.



You are free to insert any material into the machine that is meant for extrusion and is compatible with the Filament Maker TWO, see [Chapter 7. – Material Compatibility](#). 3devo cannot guarantee safety regarding toxic fumes coming from the melting process of the input materials. We advise to place the machine under a fume hood or mobile fume extraction system and wear respiratory protection.



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



Harmful materials such as hydrogen cyanide or styrene may be released when extruding certain plastics. Pay attention to the Materials Safety Data Sheet and the handling instructions of the materials you are using.



3.3. Personal protective equipment

We strongly recommend using appropriate personal protective equipment when performing extrusion experiments and maintenance tasks:

- **Pliers and tweezers**, to remove polymer residue and grab hot materials and surfaces.
- **Heat resistant gloves**, to handle hot materials and surfaces by hand.
- **Eye protection goggles**, to ensure eye safety when near the nozzle opening.

When performing extrusion experiments, we strongly encourage research into the material being extruded. Volatile Organic Compounds (VOCs) or materials that contain Ultra Fine Particles (UFPs) are pollutants that could cause serious health problems.

- **Respirator**, to prevent inhaling harmful fumes, dust vapors and gases, like VOCs and UFPs.
- **Fume hood**, to prevent inhaling harmful fumes, dust vapors and gases, like VOCs and UFPs.
- **Eye protection goggles**, to prevent aerosol UFPs making contact with eyes.

3.4. Incident

If you fail to follow the safety instructions correctly and an incident occurs, please follow the steps below to prevent further damage to the machine;

1. Please turn OFF the machine and keep a safe distance to assess the situation.
2. Inform your supervisor or colleague and determine if assistance is required to prevent further damages of any kind.
3. When all health and safety concerns are resolved, try to recover and purge the machine, see [Chapter 10.2. – Purge the extrusion system](#), and inform the 3devo support team at support.3devo.com.

3.5. Support

If the intended use or any of the safety regulations stated in this manual are unclear, please visit our support platform or contact support for assistance at support.3devo.com.

4. Package contents

The Filament Maker TWO is delivered on its own pallet. The package contents are listed below.

Note: It is advised to keep the packaging of the Filament Maker TWO after unboxing. More information found in [Chapter 6.1. - Unboxing](#).

4.1. Documentation

The Filament Maker TWO contains the following printed documentation to start your extrusion experience in the best way possible:

- Quick Start Guide
- User Manual



Note: The user manual is a printed version, which might be updated in the future. The online user manual can be found on www.3devo.com/fm2-manual, or by scanning the QR code.

4.2. Accessories

The Filament Maker TWO is supplied with a list of accessories including the installation and maintenance kits, spool, and materials.

Installation kit

1. Hopper
2. Extrusion bib
3. Spool Holder
4. Power cable
5. LAN cable
6. USB cable
7. 2x Spool

Maintenance kit

1. Nozzle 2mm
2. Nozzle 3mm
3. Nozzle 4mm
4. Nozzle adapter
5. 10x Nozzle gasket ring
6. 5x Nozzle cover
7. Puller wheel & puller bearing
8. Sensor calibration kit
9. Wrench 21mm
10. Allen key (1.5mm, 2.5mm, 5mm)

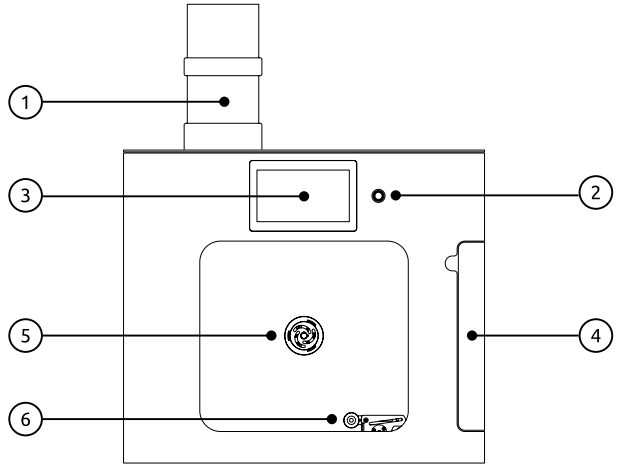
Materials

1. PLA – 1200g
2. HDPE – 4000g
3. DevoClean MidTemp – 4000g
4. DevoClean HighTemp – 1200g

5. Machine overview

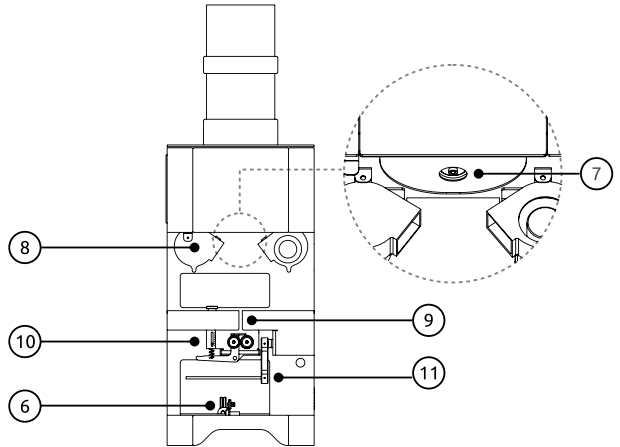
Spooling and touchscreen

- 1. Hopper
- 2. ON / OFF Button
- 3. Touchscreen
- 4. Door
- 5. Spool holder
- 6. Positioner



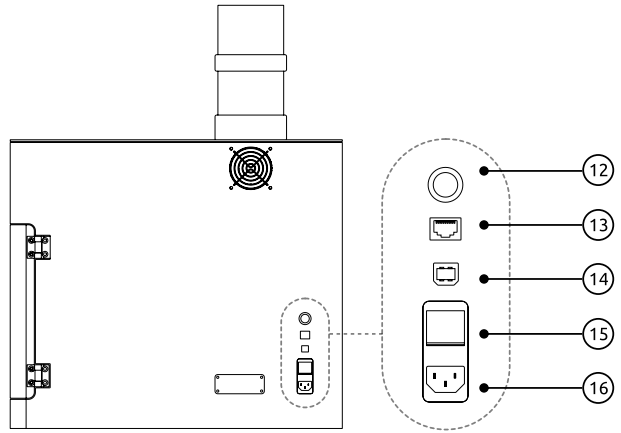
Extrusion area

- 7. Nozzle
- 8. Fans
- 9. Filament Sensor
- 10. Puller Wheels & Puller Tensioner
- 11. Tensioning Arm

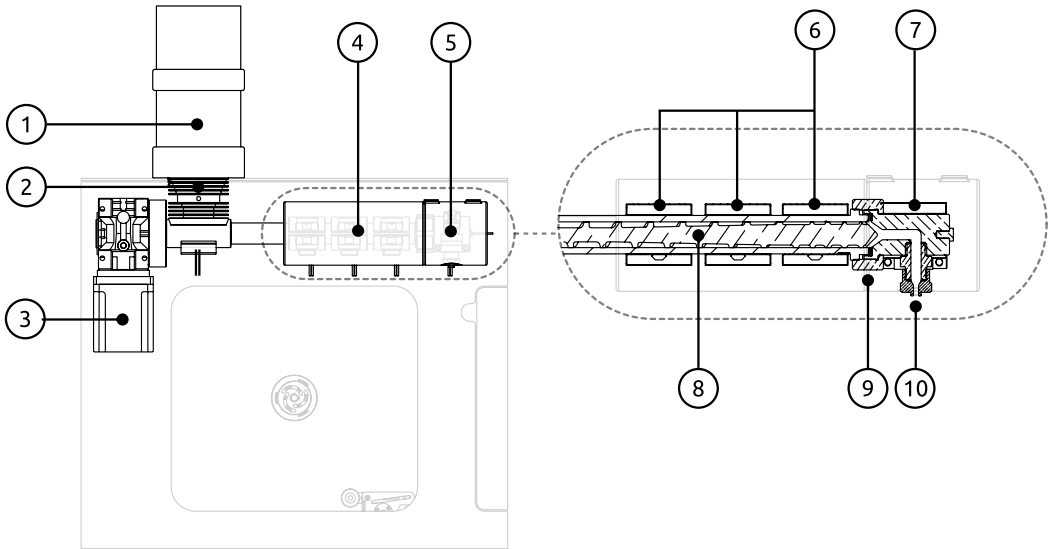


Back view

- 12. CAN-Bus Port
- 13. Ethernet Port
- 14. USB-B Port
- 15. Power Switch
- 16. Power Socket



Extrusion system overview



- 1. Hopper
- 2. Hopper Funnel
- 3. Extruder Motor
- 4. Barrel heaters insulation sleeve
- 5. Nozzle heater insulation sleeve

- 6. Barrel heaters
- 7. Nozzle heater
- 8. Screw
- 9. Die head lock nut
- 10. Nozzle

6. Set up for first use

6.1. Unboxing

Tip: The instructions for the Filament Maker TWO are printed on the outside of the box.

1. Cut off the straps and the tape on the top of the box.
2. Remove the top polyurethane foam.
3. Slide the cardboard box upwards and take out the 4 side foams.
4. Remove the packages and foam block from the inside of the machine.
5. Unscrew the 4 screws from the middle and front of the pallet, use the 4mm Allen key from the maintenance kit.

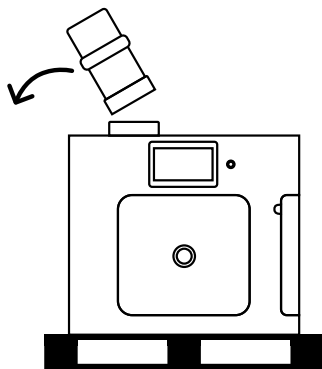
Packaging materials: It is advised to keep the packaging of the Filament Maker TWO after unboxing. This is for return shipment purposes when leasing the machine, or when the machine requires shipping for repair purposes. To save space, fold the packaging material and store it in a dry environment. It contains: 6 pieces of polyurethane foam (1 top, 4 sides, 1 inside to protect the Positioner), cardboard box, 4 screws, 1 pallet.

6.2. Boxing

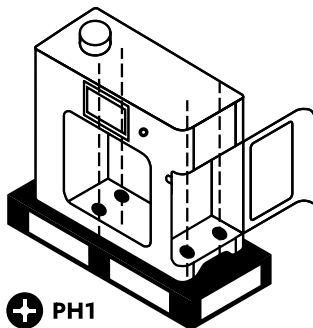
The boxing instructions can be found via the QR code on the outside of the Filament Maker TWO box, or online at www.3devo.com/fm2-boxing. To box the machine for return purposes, please follow these steps:

1. Put the machine on its pallet and remove the hopper.
2. Screw back the 4 screws on the middle and front part of the pallet
3. Place the packages inside the machine
4. Slide the cardboard box with the foam inside downwards
5. Add the top polyurethane foam and close the box
6. Put tape on the top and wrap two straps vertically around the box and through the pallet

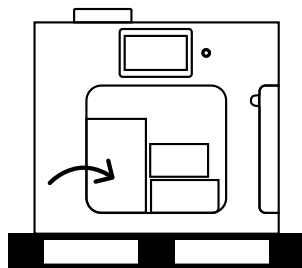
1.



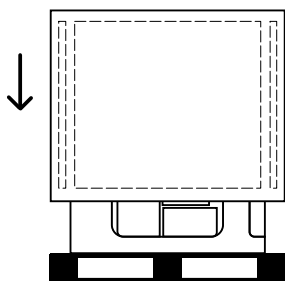
2.



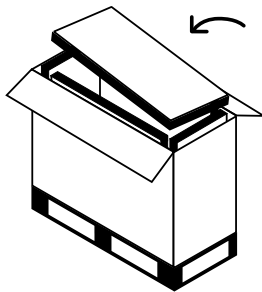
3.



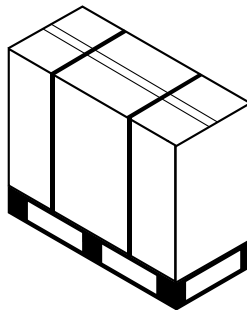
4.



5.



6.



6.3. Placement



This machine is heavy (45kg), always lift the machine with two persons.

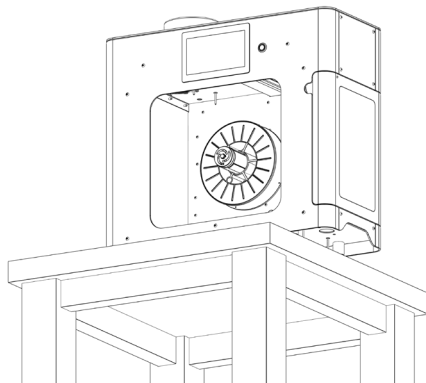
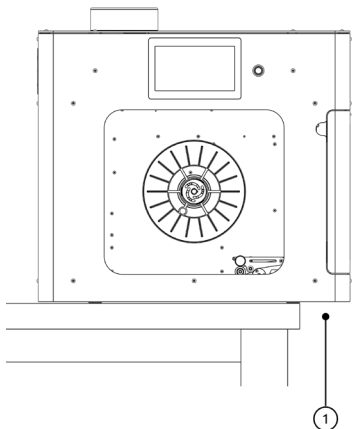


Ensure to read [Chapter 3. - Safety instructions](#) to reduce any safety risks involved while placing and operating the machine.

Workstation

Place the Filament Maker TWO on a stable workbench or table (about 70–90cm height), with an even surface. The surface must be strong enough to support the weight of the machine and prevent unnecessary shaking, swaying or other movement. The machine needs a minimum of 1m³ space to operate in (excluding a connected PC).

The machine is also designed to be placed on the edge of a table for purging purposes, with a maximum overhang of 95mm (1). It features secure legs that ensure stability and prevent it from falling. Please verify that the legs are properly positioned before use.



Ambient Conditions

Operate the machine at room temperature (20–25°C) at a 30–60% relative humidity (RH).

Keep the Filament Maker TWO out of direct sunlight to prevent UV light and external heat from affecting the machine. Strong direct light can still affect the Filament Sensor's readings, this is why the machine door glass is tinted.

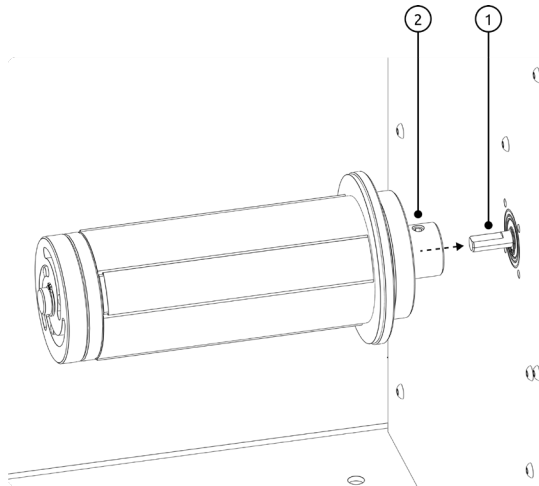


The Filament Maker TWO is intended for indoor use only, and must be operated in a well-ventilated room that is capable of 10 air changes per hour (ACH). It is also advised to use a fume hood or laminar flow cabinet to guarantee the room's air quality.

6.4. Installation

Once the Filament Maker TWO is in place, it is time to install various components. Unpack the installation kit and proceed with the following:

1. Place the black hopper base onto the metallic funnel located on top of the machine. Screw hopper in clockwise until it cannot rotate any further.
2. Slide the spool holder onto the motor shaft located in the middle of the spooling area. Align the set screw (2) with the flat side of the motor shaft (1). Tighten the screw with the 2.5mm Allen key from the maintenance kit.
3. Plug the machine in a grounded socket that matches the power requirements (230V or 110V) mentioned on machine information plate on the back of the machine.



4. Connect the LAN cable to the back of the machine, and plug it into your local area network.
5. Supply the machine with power by switching the power button on at the back.
6. Press display button to "boot up" the system.
7. If the machine is network connected it will automatically check for the latest firmware version. When prompted, install the latest firmware version.

7. Material compatibility

7.1. Input materials

The Filament Maker TWO supports thermoplastic polymers that have a melting point in the range of the machine's heating capabilities (0–450 degrees Celsius), as described in [Chapter 2. – Intended use](#). The machine supports the following polymers including but not limited to: PLA, ABS, PC, PS, PETG, TPU, TPE, PPS, PVA, PE, PET, PA6, PA12, PA66, PEEK, PEKK, PAEK, PEI, PSU.

Please note that with all mentioned and unmentioned thermoplastics, the extrudability of a material is highly dependent on the material's properties. This is often indicated by a specific grade, and is usually detailed in the material's Technical Data Sheet.



The machine supports mixing of colorants as an additive to the main polymer, to color the output material.

Particles of input materials should be no larger than 4mm in diameter, to prevent insufficient melting or clogging. It is advised to use material in pellet, shredded, ground or powder form.

Extruding polymers and additives that are not on this list is done at your own risk! Extensive online documentation can be found at www.3devo.com/fm2-input.



Inert additives, such as but not exclusive to: metal, minerals and glass, must be processed carefully. It is advised to contact a 3devo representative before processing any percentage of additive materials at support.3devo.com.



It is strictly forbidden to insert liquids, corroding materials, polluted materials, flammable materials or toxic materials to the hopper of the Filament Maker TWO, as this causes irreversible damage and voids warranty.

7.2. Material spool

The Filament Maker TWO supports material spools with the following specifications:

- Maximum spool outer diameter 300mm
- Maximum spool width 100mm
- Maximum spool weight 3kg
- Maximum and minimum Spool core diameter Between 49 and 55mm

8. Operation

8.1. Power and physical button

Power switch: The power switch at the back of the machine is used to supply the machine with power. Pressing this switch connects the machine to the main power supply allowing it to turn ON. If the power switch is OFF, the machine will immediately lose power and shut down regardless of the state of the ON/OFF button. This abrupt shutdown can disrupt ongoing extrusion and potentially cause data loss if the switch is pressed accidentally.

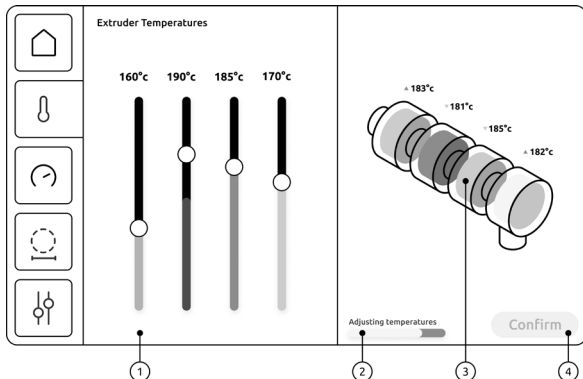
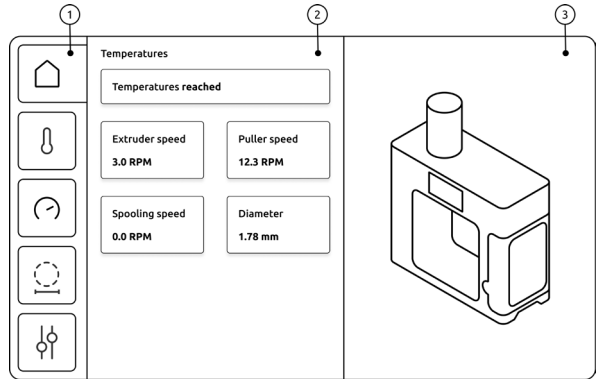
ON/OFF button: The ON/OFF button, located next to the touchscreen, is used to turn the Filament Maker TWO ON or OFF. This button only functions when the Power switch at the back is ON. Pressing the ON/OFF button when the machine is OFF initiates the startup sequence, while pressing it when the machine is on begins the shutdown sequence.

8.2. Touchscreen interface

The Filament Maker TWO is primarily controlled through its touchscreen interface, allowing users to easily navigate and operate its various functions.

Home

- 1. Main menu.** Navigate all dashboards: Home, Extruder temperatures, Extruder speed, Material diameter, and Settings.
- 2. Control panel.** Set machine parameters.
- 3. Data panel.** Review and confirm machine parameters.

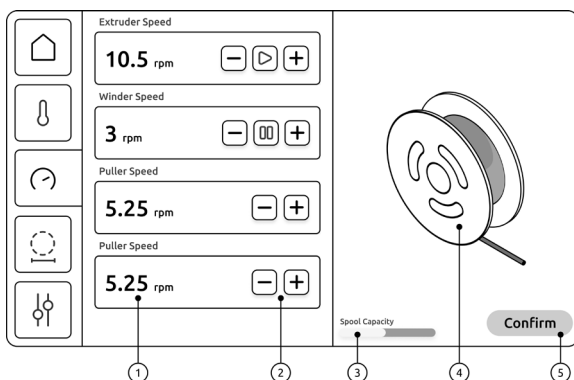


Extruder temperatures

- 1. Temperature control.** Adjust heater temperatures individually.
- 2. Heat-up status.** Displays heating-up status.
- 3. Temperature visualization.** Color indicated temperature per heating zone.
- 4. Confirm.** Apply set temperatures.

Extruder speed

1. **Speed indicator.** Displays the current speed of the machine components.
2. **Speed controls.** Use the “+” and “-” icons to change speeds, or play and pause completely.
3. **Spool capacity.** Displays the current estimated spool capacity.
4. **Spool.** Visually shows the spool operation.
5. **Confirm.** Apply set speeds.



Note: The firmware of the Filament Maker TWO has the ability to receive future updates and the information below might become outdated. The most recent information about it can be found in our online manual on support.3devo.com.

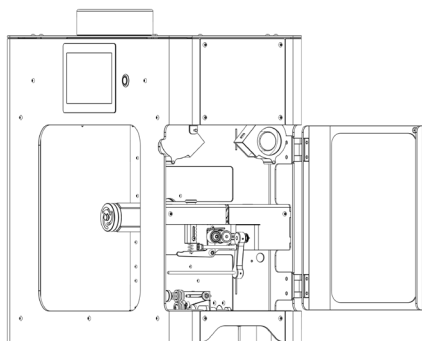
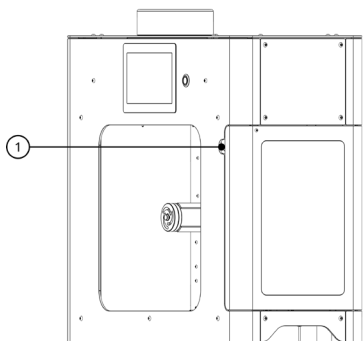
Diameter and machine settings

The diameter overview allows to closely monitor the roundness and diameter of the extruded filament that passes through the filament sensor. The settings menu allows firmware updates and accessing machine information.

8.3. Physical parts operation

A summary of all the moving parts of the Filament Maker TWO that can be adjusted manually to aid in the different phases of the extrusion process.

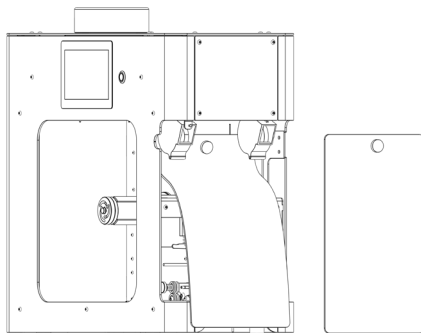
Door: Secured with small magnet in the top left corner, opens with metal notch (1) to 180° horizontally. SVG



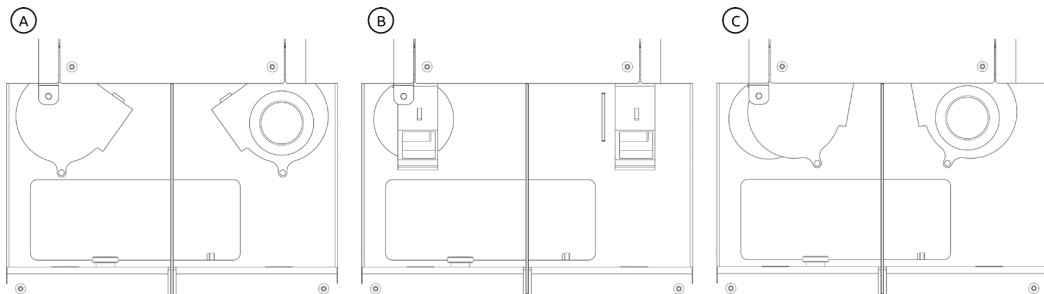
1. Close the door to protect the extrusion area from external air flow.
2. Open the door to access the nozzle and extrusion area.

Extrusion bib: Silicone rubber mat (18x36cm) with magnetic handle.

1. Attach the bib to prevent any hot filament, output, or liquid material from damaging the filament sensor and puller wheels. Place the magnet on the back plate under the nozzle between the cooling fans.
2. Remove the bib to start turning the output into filament.

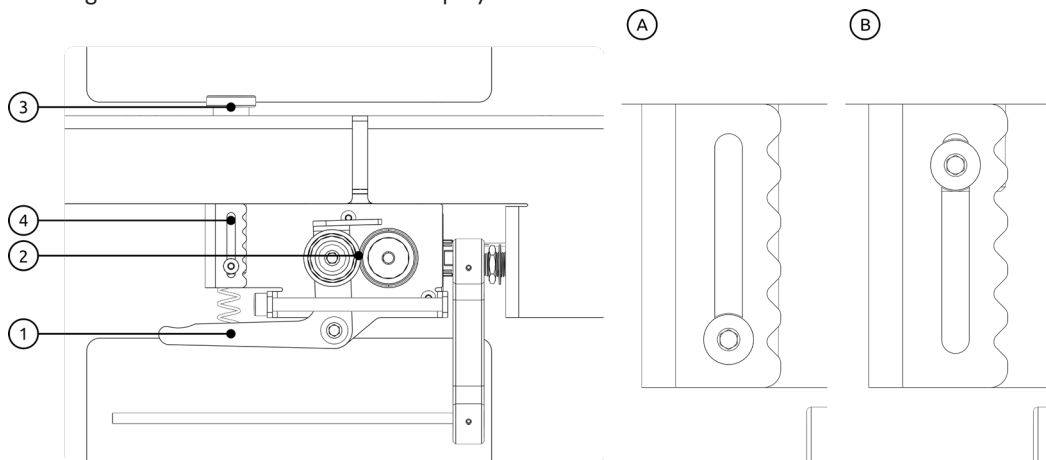


Fans: Two identical cooling fans with 60 degrees vertical, and 100 degrees horizontal rotational freedom.



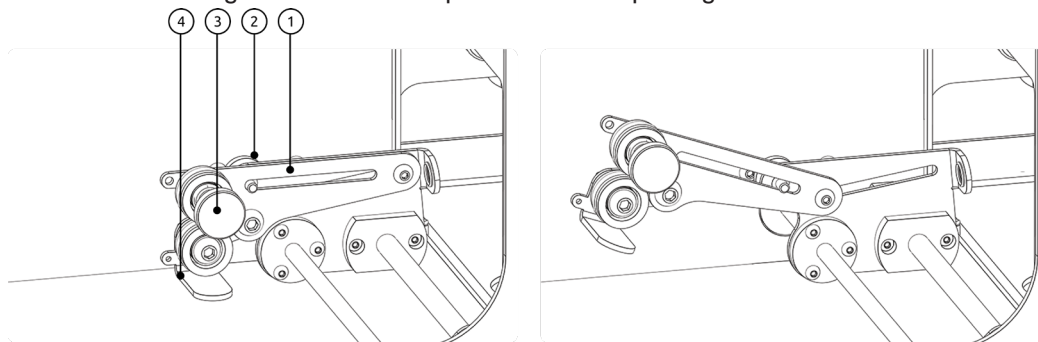
1. Turn the fans in to cool the hot output which helps turn it into solid filament. When aimed at the filament, the fans aim at each other and down (A).
2. Turn the fans out and away from the nozzle (B) when purging.
3. The fans must not point at the nozzle (C), or they can cause clogging!

Puller wheels: Made from high temp silicone rubber A60. Adjust speed in the Speed Settings menu on the touchscreen display.



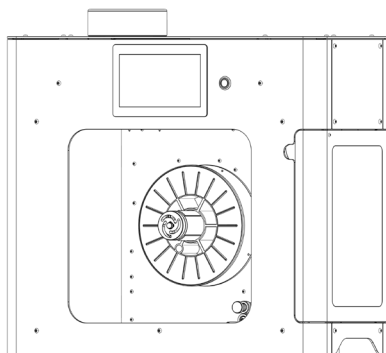
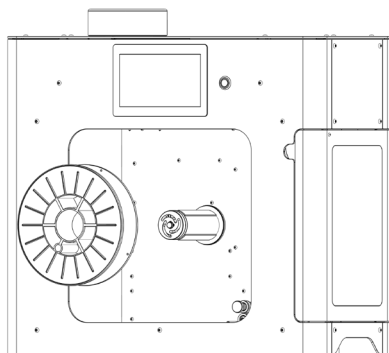
1. **Lever:** press down gently on the lever (1) to separate the puller wheels (2) and thread the filament.
2. **Tensioner:** Rotate the thumb screw (3) clockwise to increase or anticlockwise to reduce the force the puller wheels have on the filament. Use the tension indicator (4) to get repeatable results. Lowest force (A) and highest force (B).

Positioner: Guiding mechanism to help with filament spooling.



1. **Guiding arm:** Using the lever (4), slide the positioner guiding arm (1) back and forth to the desired position and tighten with small knob (2).
2. **Friction wheel:** Tighten large knob to increase or decrease tension on the filament friction wheel (3).

Spool holder: The spool holder automatically turns continuously clockwise when the machine is on.



1. To attach a spool, ensure the 3 chuck jaws are retracted into the main spool holder. You can rotate it clockwise manually.
2. Slide the spool all the way to the back and press down onto the rotating spool holder. The jaws will extend and grip the spool.
3. When the filament is threaded and spooling, the tension will keep the spool in place.

Nozzle: Allows for the molten output to be formed into a filament. Can be configured to a 4mm, 3mm, and 2mm nozzle diameter. Read instructions in [Chapter 10.3. – Configuration changes.](#)

8.4. Software and Data Management

The Filament Maker TWO records and stores all processed data by the machine automatically on the built-in storage. This data is accessible through an internal server that is hosted by the Filament Maker, as soon as it is turned on and connect to the Local Area Network (LAN). Alternatively, a direct connection can be made to a PC/Laptop via ethernet cable for a simplified setup.

Accessibility and safety

The Filament Maker TWO communicates within the Local Area Network (LAN) and can be accessed directly through the IP-address provided by the machine. The machine can be controlled and read remotely and does not share any information outside the LAN.

The Filament Maker TWO uses the following ports to communicate:

- 8086: InfluxDB dashboard
- 8000: Filament sensor video stream
- 80: Interface and remote control



Note: If your Filament Maker TWO is connected to the network, ensure that the network is secure and that you regularly update passwords to prevent unauthorized access.

Tip: Access your router's admin panel to assign a static IP address to the Filament Maker TWO. This will simplify access from other devices on the network.

Setup LAN connection

The steps below are all performed on the Filament Maker TWO:

1. Power the machine and wait for it to complete the booting procedure.
2. Connect an ethernet cable between the machine and to the local area network.
3. Go into machine settings, and take a note of the following information:
 - a. The IP address of the Filament Maker TWO
 - b. The login credentials for the influxDB dashboard

Direct connection to PC (optional)

The Filament Maker TWO can establish a direct connection to a PC or laptop, to simplify the monitoring and remote control capabilities. Follow these steps to create a direct connection:

1. Power the machine and wait for it to complete the booting procedure.
2. Go into machine settings, and change the connection type from "DHCP" to "Static".
3. Connect an ethernet cable between the machine and the PC or laptop.

Show the dashboard

To monitor extrusion experiments and review collected data by the Filament Maker TWO, visit the interactive dashboard. Follow these steps below on the PC/laptop:

1. Open your preferred internet browser.
2. Type the following in the address bar: "<IP address FMTWO>:8086", and hit ENTER.
Example: 192.168.1.123:8086
3. A window will open showing "influx login".
4. Login to the dashboard using the login credentials noted before.

Monitor and remote control the interface

The interface of the Filament Maker TWO can be shown and interacted with remotely. This is useful to monitor the system in a simplified way. Perform these steps on your PC or laptop:

1. Open your preferred internet browser.
2. Type the following in the address bar: "<IP address FMTWO>:80", and hit ENTER.
Example: 192.168.1.123:80
3. The interface of the Filament Maker TWO will be displayed.



It is advised to control the Filament Maker TWO while physically monitoring it, remote interactions are performed instantly and could damage your machine.

Filament sensor data feed

The filament sensor constantly collects data and has a high quality camera that captures the extrusion process. To view the camera and data directly, perform these steps on your PC or laptop:

1. Open your preferred internet browser.
2. Type the following in the address bar: "<IP address FMTWO>:8000", and hit ENTER.
Example: 192.168.1.123:8000
3. The data feed of the filament sensor will be shown, including a video stream.



The software provided with the Filament Maker TWO will be updated regularly. More recent and detailed information about the use of the influxDB dashboard can be found on www.3devo.com/fm2-connect.

9. Extruding filament

Before starting the extrusion process, it is important to have a clear plan. Determine what is currently in the machine and how you will transition to the extrusion material.

It is important to understand how to purge the machine afterwards by reading [Chapter 10. – Maintenance](#) carefully. Ensure you have sufficient purging material before starting your extrusion experiment.

Tip: It is recommended to familiarize yourself with the extrusion basics. Detailed guides with photos and videos can be found at: www.3devo.com/fm2-extrusion.

9.1. Material preparation

Feeding only the correct type of materials into the Filament Maker TWO is essential to reach good extrusion results and prevent unnecessary damage or injury.

Thermoplastic polymers: Verify that your polymer is supported for extrusion. Please read [Chapter 7. – Material compatibility](#) carefully.

Clean and Dry: Ensure that all materials are clean and dry before extrusion. Moisture and contaminants can cause material degradation and clogging.

Shred to Uniform Size: Use virgin polymer granulates, powder, or reduce recycled materials to a uniform size for consistent extrusion. Particles should be no larger than 4mm in diameter.

9.2. Considerations before you start

Please familiarize yourself with these considerations. These are the most common user errors that prevent successful extrusion, and cause damage or injury.

Consistent feed rate: Always ensure to feed sufficient material into the extruder. Avoid sudden surges or interruptions to ensure uniform filament quality.

Patience and monitoring: Adjusting extrusion parameters may lead to extrusion changes up to 30 minutes after implementation. Ensure to be patient and carefully monitor extrusion results for any signs of clogging or irregularities before making more changes.



Prevent premature melting: Setting the temperatures of the extruder heater too hot near the hopper can cause premature melting and stop material flow. If this occurs, lower the temperature near the hopper and force feed the hot material to ensure sufficient material pressure inside the barrel. Never reach into the hopper opening by hand or any tool that can damage the machine.



Early pulling: Take care when running the material through the puller wheels for the first time. Even if the filament quality appears good, the pulling might cause the molten polymer to curl up, causing a chance of burns.



Do Not Leave Unattended: Never leave the machine unobserved during operation, see [Chapter 3.2. – Safety notices](#).

Emergency Procedures: Familiarize yourself with emergency shutdown procedures, see [Chapter 3.4. – Incident](#).

9.3. Start extrusion

Start

1. Power ON the Filament Maker TWO and wait for the machine's touchscreen to display the main menu.
2. Open the "Extruder temperatures" via the main menu. Set the temperatures for the current material inside the machine. Hit "confirm".



Hot nozzle: The machine will heat up the extrusion system, including the nozzle, be careful when accessing the extrusion area.

3. The system will indicate it's heating up in the status bar in the bottom right corner.
4. Install the extrusion bib to prevent any (degraded) material from damaging the sensor and puller wheel in the extrusion area.

Flow

5. When the heat-up procedure is completed, the machine will automatically start extruding material to prevent material degradation inside the machine.



Automatic extrusion: Extruding materials has a risk of burns, keep away from the extrusion area when the extrusion procedure starts.

6. Monitor the extrusion and make adjustments to the machine parameters until the extrusion is constant and stable for 5 full minutes.

Finetuning

7. Remove the extrusion bib to gain access to the sensor and puller system.
8. Guide the material through the filament sensor. Separate the puller wheels by pushing the lever down and guide the material through the puller system.

Tip: The Filament Maker TWO has a hole in the bottom plate to guide material through while finetuning the extrusion process.



Extrusion area: Extruded materials and the nozzle are hot, always wear protective equipment and use tools when handling material in the extrusion area.

9. The puller wheel system will adjust its speed automatically, keep monitoring the material puller speed in the "Extruder Speed" menu on the machine display.
10. Monitor the extrusion through the puller wheel and adjust the system parameters until the extrusion is constant and stable for 5 full minutes.

Spooling

11. Start the spooling procedure on the display. Guide the filament through the positioner hole and through the tensioner arm friction wheel.
12. Pull the filament through the hole in the core of an empty spool and bend the filament to lock it in place, while keeping slight tension on the filament.
13. Verify the filament runs through the entire system correctly and place the spool on the spool holder of the machine, the spool should start rotating.
14. When the machine is spooling successfully, close the extrusion door to ensure the system can operate under stable conditions.
15. End the spooling procedure when the spool is full. Cut the material and remove the spool from the spool holder. Ensure to perform the post extrusion steps, before turning OFF the machine.

9.4. Post extrusion

Purging: After each extrusion experiment, it is important to leave the machine in a safe state for the next extrusion experiment. It is advised to purge the machine with DevoClean MidTemp after each extrusion experiment. Please read [Chapter 10.2. – Purge the extrusion system](#) for detailed purging instructions.



Never leave the machine empty: The Filament Maker TWO cannot extrude without material in the hopper or barrel. Trying to run the machine dry will damage the internals of the machine.

10. Maintenance and configuration adjustments

The Filament Maker TWO is required to be maintained correctly, to guarantee its filament extruding capabilities and quality. Ensure to follow the maintenance schedule and instructions below to keep your machine in optimal condition.



The maintenance kit delivered with the machine contains consumables to prevent machine down time. Additional spare parts, supplies and cleaning materials can be purchased online at www.3devo.com/fm2-parts.

10.1. Maintenance schedule

Every extrusion (or when necessary)	Purge the extrusion system	Keep the extrusion system clean by performing a purge with 3devo cleaning materials.
	Clean the extrusion area	Remove polymer residue and dust from all components inside the extrusion area.
Every 3 months (or every 10 extrusion experiments)	Check the nozzle	Visually inspect the nozzle for excessive residue. Replace the nozzle when worn, to prevent clogging and nozzle build-up.
	Check the nozzle cover	Visually inspect the nozzle cover. Replace it when it shows signs of heat damage, to guarantee insulation.
	Check the puller wheel	Visually inspect and feel the puller wheel smoothness. Replace the part when significantly worn.
Every year (Or every 100 extrusion experiments)	Calibrate the filament sensor	Perform the sensor calibration procedure. If the calibration fails, clean the sensor.
	Lubricate the tensioner arm	Apply a drop of sewing machine oil to the moving parts of the tensioner arm.
	Lubricate the positioner guiding axle	Apply a drop of sewing machine oil to the guiding axle of the positioner.

Note: The maintenance schedule is an indication, perform maintenance more frequently if you observe any unexpected wear and tear. Always ensure to follow the maintenance procedures with care and in a safe manner.

10.2. Purge the extrusion system

Tip: Additional information, videos and instructions on purging the machine can be found online at: www.3devo.com/fm2-purging.

Purging is the technical term for cleaning the inside of your extruder's screw, barrel and nozzle, by extruding a certain "purging material". This material pushes the residue of the previously used polymer and cleans the inside of the machine, ready to be used again later. The goal is to leave the machine with any of these safe materials in the system:

- PLA (4043D by NatureWorks, supplied by 3devo)
- HDPE (KS 10100 UE by Dow, supplied by 3devo)
- DevoClean MidTemp (Dyna-Purge D2 by Dyna-Purge, supplied by 3devo)

It is recommended to purge the extrusion system of the Filament Maker TWO at the end of every extrusion experiment (before the flow of material is stopped) to prevent degraded material residue build-up inside the system.

Preparation

Before purging your extruder there are a few preparation steps that should be taken for best results and safety manners.

1. Gather 350 grams of purging material, choose one:
 - a. DevoClean MidTemp, for temperatures of 190°C–320°C
 - b. DevoClean HighTemp, for temperatures above 300°C**Note:** When using DevoClean HighTemp material, it is required to transition to DevoClean MidTemp as a final step.

2. In the Filament Maker TWO settings menu, "turn OFF the hopper sensor".



Never run the machine completely empty: Ensure to continuously monitor the material level in the hopper to prevent damage to the extrusion system.

3. Open the door and install the extrusion bib.
4. Turn the fans outward or disable them in the settings menu.



Extrusion area: Extruded materials and the nozzle are hot, always wear protective equipment and use tools when handling material in the extrusion area.

Purging process

1. Keep the temperatures of the machine to match the material currently being extruded. These temperatures should be in the thermal range of the purging material used and ensure both can melt properly.
2. Let the hopper run almost empty, add 60 grams of purging material.
3. Let the hopper run almost empty again, which takes approximately 15 minutes. Visually verify that there is still a very small amount of material left in the hopper.
4. Add 200 grams more of the purging material.

5. Monitor the extrusion at the nozzle, you may change the screw speed to improve the purging process:
 - a. 5–10 RPM is a recommended and safe purging speed for all materials.
 - b. Additionally, Disco Purge can be introduced to help the efficiency of residue removal. For 15 minutes, manually vary the screw RPM once a minute. This provides a highly fluctuating environment of pressure and agitation that allows a purging compound to work at its best. Read more at www.3devo.com/fm2-disco.
6. Continue to purge until the purging material extrudes from the nozzle in a clean and pure form, this indicates that the old material has completely been removed from the barrel. This process can take about 15–25 minutes.
7. (Optional) If the purge was performed with DevoClean HighTemp, and transition to DevoClean MidTemp, and repeat this process.
8. “Turn ON the hopper sensor” via the settings menu for future extrusion experiments.

Note: The purging efficiency will depend on what materials have been processed before, and what material is being purged currently. Therefore, the purge results, including amount of purging material used, time taken for purging, can all vary from session to session. Effective and regular purging can prevent degraded build up in your machine over time.

10.3. Configuration changes

Change the nozzle

Tools required

- Heat resistant gloves (x2)
- 2.5mm (7/64”) Allen key (x1)
- 21mm (13/16”) wrench (x2)

Parts required

- Nozzle (x1)
- Nozzle gasket (x1)
- Nozzle cover (optional) (x1)

Prepare the procedure

1. Stop the extrusion process with one of the safe materials inside: 3devo PLA, 3devo HDPE, or DevoClean MidTemp.
2. Set the temperature of all heaters to “0”, to ensure the machine is in a non-extruding state.
3. On the touchscreen of the machine, navigate to the “Speed Settings” and set the following values to zero: puller wheel, screw RPM, fans and spooling.




Heat resistant gloves: Ensure to always wear heat resistant gloves when accessing the extrusion area while the machine is turned on.


4. Open the door to access the extrusion area.
5. Rotate the fans to direct away from the nozzle.
6. Insert the bib to prevent any material from falling into the extrusion area.

Start the procedure


7. Unscrew the hopper from the top of the machine by turning it anticlockwise.

8. Remove 6 of the 8 screws from the top panel. Leave the two front screws attached. Place the removed screws in a tray to prevent misplacement.
9. Remove the 2 bottom screws from the front panel, so that the top and front panel remain attached to each other.
10. Remove the panel assembly and place it in a safe area.


 **Warning:** The extrusion barrel is exposed in various areas and is hot, do not touch the part without wearing heat resistant gloves.

 **Warning:** The heaters near the back panel of the machine carry 230v or 110v of current, do not touch the part when the machine is turned on.


11. Remove the nozzle panel by sliding it out in a forward direction.
Note: The nozzle cover might fall off, check the quality of the part. If necessary, proceed with the nozzle cover change procedure by following the steps from “Nozzle cover” in the next section of [Chapter 10.3. – Configuration changes](#).
12. Open the two velcro straps of the barrel above the nozzle. Slide the nozzle insulation sleeve forward slightly and down. The nozzle sticks through it, ensure to move it slightly down to ensure it is loosened.

 **Warning:** The thermocouple is connected to the front of the barrel through the insulation sleeve and must be treated with care.


13. The heater and thermocouple cable remain attached, place the sleeve carefully on top of the back side of the barrel, while preventing stress on the cables.

 **Note:** Prevent placing the insulation sleeve close to the touchscreen display to prevent possible damages.


14. Set the temperature of H4 (nozzle heater) based on the material: 3devo HDPE: 120–180°C, 3devo PLA: 110–180°C, DevoClean MidTemp: 130–180°C.

 **Note:** Heaters 1, 2 and 3 must remain turned OFF to prevent material degradation in the barrel.


15. Start with the lowest temperature within the temperature range of your material. If the nozzle is stuck, gradually increase by 10°C until you can successfully unscrew the nozzle.

 **Hot material:** Be careful of hot material extruding from the nozzle. If the temperature for the material is too high, it might become liquid and drip from the nozzle.


16. Wait for Heater 4 to reach the set temperature.
17. The nozzle assembly consists of two parts: the nozzle adapter at the top and the nozzle at the bottom. Hold the nozzle adapter with one 21mm wrench and turn the nozzle anticlockwise with the other wrench.

 **Note:** Hold the nozzle adapter tightly to prevent it from being loosened out of the barrel and prevent lateral forces on the entire assembly.

18. When the nozzle is loosened, continue untightening until you can remove the nozzle by hand wearing the heat protective gloves.
19. Carefully pull the leftover material from the nozzle with pliers and place it in a heat-resistant area.
20. Remove any residue from the nozzle adapter opening to prevent leaking. The machine is now ready for the new nozzle to be installed.
21. Insert the copper gasket into the new nozzle. Ensure it is aligned properly and sits tightly on the inside of the nozzle.
22. Screw it in first by hand (wearing heat resistant gloves), followed by tightening it with the 21mm wrench, with 25Nm strength.

 **Note:** It is not required to hold the nozzle adapter when tightening the nozzle, as there is no risk of loosening the nozzle adapter.

23. [Place back the insulation sleeve by aligning the nozzle hole on the bottom of the sleeve with the nozzle.

 **Warning:** Align the front metal ring over the thermocouple, being careful not to put any stress on the thermocouple cable.

24. Reattach the two velcro straps while tightening the insulation sleeve.
25. Press the nozzle cover against the bottom side of the nozzle.
26. Slide the nozzle plate in place. Ensure the nozzle cover is properly aligned, and does not block the nozzle output.
27. Place the front and top plate assembly and reattach all 8 screws holding it in place.
28. Reattach the hopper to the top of the machine.
29. Remove the bib.
30. Set the temperature of Heater 4 back to zero.
31. Close the door and turn OFF the machine fully.

Nozzle cover

Tools required

Parts required

- 2.5mm (7/64") Allen key (x1)
1. Ensure the machine is turned OFF and the extrusion area is cool and safe to access. The temperature can be verified in the "temperature settings".
 2. Open the door.
 3. Remove the front panel by removing all 4 screws.
 4. Slide out the nozzle plate.
Note: The nozzle cover might fall off or remain seated on the nozzle.
 5. Verify the quality of the nozzle cover and if worn, replace it.

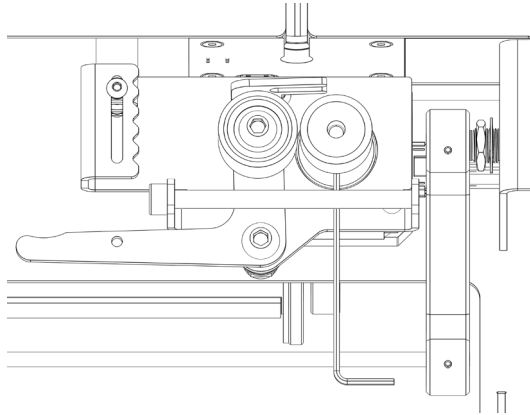
6. Press the new nozzle cover against the bottom side of the nozzle with the markings facing up.
7. Slide the nozzle plate in place and check if the nozzle, nozzle cover, and nozzle plate are correctly aligned.
8. Reattach the front panel by the 4 screws.

Puller wheel

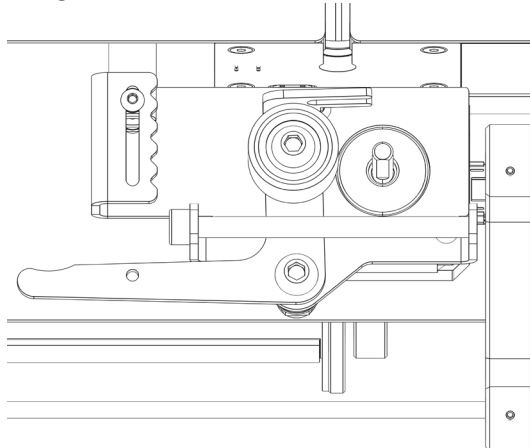
Tools required

Parts required

- 1.5mm (0.06") Allen key (x1)
1. Ensure the machine is off and the extrusion area is cool and safe.
 2. Open the door.
 3. Align the set screw facing east/3 pm.
 4. Loosen the set screw with the Allen key, and then loosen it with two additional turns.
Note: The screw should remain in place, and does not need to be fully removed.



5. Slide the puller wheel OFF in a forward motion.
6. Slide the replacement puller wheel on the shaft.
Note: Make sure to align the set screw with the flat surface of the puller shaft.



7. Align the puller wheel with the other wheel, to ensure material can run through it.
8. Tighten the puller wheel set screw, it should be able to handle some resistance.

10.4. Cleaning procedures

Clean the extrusion area

1. Turn OFF the Filament Maker TWO and allow the extrusion area to cool completely to avoid burns or damage to components.
2. Remove any filament from the extrusion area by carefully cutting it away with a clean, sharp tool like pliers.
3. Remove polymer residue and dust from all components inside the extrusion area using a soft and non-abrasive microfiber cloth and a chemical- and lotion-free cleaning solution to remove any remaining residue.
4. Visually inspect the fans to ensure they are free of debris. If debris is present, carefully clean with a soft brush to maintain optimal airflow and cooling.

Check the nozzle and nozzle cover

1. Turn OFF the Filament Maker TWO and allow the extrusion area to cool completely to avoid burns or damage to components.
2. Remove the front panel by removing the 4 screws.
3. Slide out the nozzle plate.
4. Remove the nozzle cover and inspect for visual damage and excessive residue. Replace the nozzle cover if it appears worn by following instructions in [Chapter 10.3. – Configuration changes](#).
5. Visually inspect the extrusion nozzle for excessive residue, clogs or buildup.
6. Replace the nozzle if it appears worn to prevent clogging and nozzle build-up by following instructions in [Chapter 10.3. – Configuration changes](#).

Check the puller wheel

1. Turn OFF the Filament Maker TWO and allow the extrusion area to cool completely to avoid burns or damage to components.
2. Visually inspect and feel the puller wheel for smoothness or any material residue.
3. Replace the part if it is significantly worn by following instructions in [Chapter 10.3. – Configuration changes](#).

Filament sensor cleaning

The Filament sensor only requires cleaning when the sensor calibration fails. Perform the procedure by following the instructions in [Chapter 10.6. – Calibrations](#). To resolve a failed sensor calibration, follow these instructions:

1. Turn OFF the Filament Maker TWO and allow the extrusion area to cool completely to avoid burns or damage to components.
2. Remove the cover plate by carefully unscrewing and removing it to access the sensor.
3. Check the mirrors to ensure they are clean, and if they are dirty, gently clean them using a soft and non-abrasive microfiber cloth and a chemical- and lotion-free cleaning solution.

4. Verify that the backlight is clean and functions properly. If necessary, clean the backlight to ensure optimal performance.

10.5. Optional cleaning procedures

The Filament Maker TWO screw can be removed completely to clean the extrusion system internally. The cleaning procedure requires the cleaning kit, which needs to be purchased separately. The cleaning procedure is completely optional and is not considered a maintenance procedure. Additional details about the kit, the procedure and the advantages can be found online at www.3devo.com/fm2-screw.

10.6. Calibrations

Filament sensor calibration

The Filament sensor of the Filament Maker TWO, is an open system that is prone to dust and polymer residue during operation. To verify the system behaves as expected, there is a dedicated sensor calibration procedure.

The sensor has to be calibrated in the following cases:

- a. The measured filament diameter does not equal the physical diameter of the produced filament.
- b. The sensor performance requires to be checked every year, according to the schedule in [Chapter 10.1 Maintenance schedule](#).

Tools required

The maintenance kit shipped with the Filament Maker TWO, contains the sensor calibration kit. The kit contains multiple rods with different diameters to accurately calibrate the sensor.

Procedure

The sensor calibration procedure is performed via the software capabilities of the machine. A clear description of the procedure can be found in our online manual by visiting www.3devo.com/fm2-calibration.

If the calibration is unsuccessful, follow the cleaning procedure at [Chapter 10.4. – Cleaning procedures](#).

10.7. Update the firmware

It is important to keep the firmware of the machine up to date, to maintain machine safety, privacy and security protection.

The firmware of the Filament Maker TWO can be updated in multiple ways. The update can be performed via Ethernet, or as an offline alternative via USB.

Update via Ethernet

The easiest way to update the Filament Maker TWO firmware is via Ethernet. The LAN cable must be connected to a network router, supplying an active internet connection. The machine will automatically search for firmware updates at each restart, but the update can also be performed manually:

1. Go to the "settings" in the main menu.
2. Select "firmware".
3. Select "check latest firmware version".
4. Wait for the machine to find the firmware file and install the update.

Update via USB

When there is no active internet connection available, the firmware can be updated via USB with the latest firmware file available from our online platform:

1. Go to www.3devo.com/fm2-firmware and follow the instructions to download the latest firmware file to your computer.
2. Put the firmware file into the root folder of a USB drive.
3. Insert the USB drive into the USB port located in the extrusion area of the machine.
4. The machine will look for the update file on the USB drive, and install it.

Disclaimer

Any software provided with the device is for use only with the device and subject to the software license agreement. 3devo reserves the right to update software and firmware of the machine without prior notice.

11. Troubleshooting

Most common issues

When encountering a common issue, please refer to the table below. Find the issue description, the symptoms and recommended troubleshooting steps to prevent further damage to the machine.

If your issue cannot be resolved by the information below, please visit our support platform or contact our support team for assistance at support.3devo.com.

DESCRIPTION	SYMPTOM	TROUBLESHOOTING
My machine does not turn ON	<ul style="list-style-type: none">No lightsBlank screenNo sound	<ul style="list-style-type: none">Check power cable and switchTest outlet with another deviceInspect power cable for damage
My machine turns OFF unexpectedly	<ul style="list-style-type: none">Powers down during useIntermittent power loss	<ul style="list-style-type: none">Check power cable and switchCheck for overheatingCheck for error messages before shutdown
Connectivity issues (Ethernet, USB)	<ul style="list-style-type: none">Inability to connect to the networkData transfer interruptions	<ul style="list-style-type: none">Verify Ethernet/USB cables are securely connectedTest cables with another deviceRestart machine and connected devicesCheck network/device settings
My touchscreen is unresponsive	<ul style="list-style-type: none">Touchscreen unresponsiveScreen is frozen	<ul style="list-style-type: none">Restart the machineClean the screenCheck for software updates
Calibration issue(s)	<ul style="list-style-type: none">Inaccurate filament measurementsFalse filament absence/presence alerts	<ul style="list-style-type: none">Recalibrate the filament sensorClean the sensorVerify sensor firmware is up to dateTest sensor with different filament type
Hopper feeding issue	<ul style="list-style-type: none">Material feeding issuesHoper sensor errors	<ul style="list-style-type: none">Check the input material (and compatibility)Avoid hopper overfillAvoid empty hopperInspect sensor cables
Early melting	<ul style="list-style-type: none">Low or thin outputMaterial sticking inside the hopper	<ul style="list-style-type: none">Verify H1 and/or H2 temperaturesLower H1 and/or H2 temperaturesVerify thermocouple connection

Unexpected temperatures	<ul style="list-style-type: none"> • Fluctuating temperature readings • Overheating/ Insufficient heating • Heater not reaching set temperatures 	<ul style="list-style-type: none"> • Check thermocouples and heaters connections • Inspect for any visible damage • Ensure right temperature settings
Firmware update issue	<ul style="list-style-type: none"> • Machine does not respond • Error message during update • Incomplete update 	<ul style="list-style-type: none"> • Retry the firmware update • Ensure the latest firmware version • Ensure stable power connection
Poor extrusion quality (CTA to Extrusion basics)	<ul style="list-style-type: none"> • Inconsistent filament diameter • Bubbles inside the filament • Rough or uneven surface 	<ul style="list-style-type: none"> • Review Extrusion basics guidelines • Adjust extrusion temperatures, speed, and fans • Check for blockages • Check the input material (confirm expected)
Incidents	<ul style="list-style-type: none"> • Smoke • Spluttering hot material • Liquid output • No output, or suspected clog 	<ul style="list-style-type: none"> • Empty the hopper • Feed a safe material into the machine • Shut machine OFF and contact support
Alignment	<ul style="list-style-type: none"> • Uneven spooling • Tension inconsistency • Tangling of filament 	<ul style="list-style-type: none"> • Realign positioner • Adjust tensioner arm

Error messages

The Filament Maker TWO has built-in error messages to assist the user when unexpected behavior occurs. A comprehensive list of error messages can be found online at www.3devo.com/fm2-errors.

When an error message is presented by the machine, follow these steps:

1. Scan the QR code or visit the weblink on the display, to reach the support article containing more information about the specific error.
2. Follow the troubleshooting steps on the support article to try and resolve the issue at hand.
3. If the issue cannot be resolved, or the support article does not cover a solution, please contact the support team directly at support.3devo.com.

General recommendations

To ensure optimal performance and longevity of your Filament Maker TWO, please follow these general recommendations:

- Perform maintenance as in the maintenance schedule.
- Keep the machine's firmware up to date.
- Check for wear and tear and replace consumables timely.
- Only feed high quality, non-polluted polymers into the machine.
- Use the extrusion bib to protect the extrusion area when experimenting.
- Clean your extruder regularly with our purging guidelines.

By following these recommendations, you can help maintain your Filament Maker TWO performance and extend its useful life.

Support platform

Our support team is available to help you resolve any concerns and provide answers to your inquiries or connect you to other 3devo teams.

When you encounter any questions or issues, please do not hesitate to visit the support platform and reach out to our support team at support.3devo.com.

12. Technical specifications

	DESCRIPTION	SPECIFICATIONS
Model information	Model name Model version	Filament Maker TWO Version 1.0
Measurements	Dimensions Weight Shipping dimensions Shipping weight	606 x 258 x 526 mm 42 kg 716mm*308mm*685mm 50.5 kg
Energy	Consumption average Consumption Max. Voltage Frequency	300 – 400 W 1300 W 230 V or 110 V 50 – 60 Hz
Ambient conditions	Temperature Relative humidity Sound – Normal operation Sound – Peak	20°C–25°C (room temperature) 30% – 60% RH 55 dB 76 dB
Machine interface	Touchscreen Screen size Resolution Technology	Capacitive touch 7,2" (inch) 1024 x 600 pixels @ 60hz TFT LCD
Extrusion Drive	Max. torque RPM range RPM accuracy Speed measurement Nozzle sizes	50 Nm 0–20 RPM 0.1 RPM Motor drive – Trinamics TMC 5160 open-loop control system with fault detection 2mm / 3mm / 4mm
Hopper System	Volume Temperature control Input material detection	2.6 L Active cooling fan Material runout sensor
Band Heaters	Max. Temperature Heating zones Heater power Temperature accuracy	450 °C 4 230W (per heater) 0.25 °C
Compression Screw	Screw Material Hardening treatment Compression Screw Design	High Chromium and Molybdenum steel alloy Nitrided 3 stages Interchangeable
Filament sensor	Resolution Framerate Measurements Measurements axis Thermal sensor	10 µm 5 fps > 25 per second 3 Yes
Puller	Low Temp High Grip Max. High Temp Nonstick Max. Puller Tensioner	100 °C 380 °C Stepless

Spooling	Max. Spool outer diameter	300 mm
	Max. Spool width	100mm
	Max. Spool weight	3 kg
	Max./Min. Spool core diameter	49mm – 55mm
	Automatic Tensioner	hall effect sensor and friction wheel
	Spooling system	Spool holder with integrated chuck
Electronics	Operating system	Linux, custom firmware
	CPU specs	4x ARM Cortex A53 @ 1.8 Ghz
	RAM specs	4GB
	Storage memory	64GB
Connectivity	CAN-bus	3 ports
	Networking	Ethernet
	Power plug	Schuko male to C13
	USB	USB – B
Accessories included	Documentation	Quick start guide, user manual
	Installation kit	Hopper, spool holder, power cable
	Maintenance kit	Spare parts, calibration kit, tooling
Safety and warranty	Warranty	12 months
	Hardware safety features	Watchdog electronic circuit Extrusion safety door
	Software safety features	Heater protection Maximum motor current protection
Certifications and compliance	EC declaration of conformity	2006/42/EG Machine Directive 2014/30/EU Electromagnetic Compatibility Directive NEN EN ISO 13857:2008 Safety distances to prevent hazard zones being reached by upper and lower limbs
Compatible materials	PLA, ABS, PC, PS, PETG, TPU, TPE, PPS, PVA, PE, PET, PA6, PA12, PA66, PEEK, PEKK, PAEK, PEI, PSU, PES, PTFE, PVD+	

13. Declaration of conformity

The Filament Maker TWO adheres to the CE 2006/42/EG Machine Directive and 2014/30/EU Electromagnetic Compatibility Directive. The machine complies with European safety, health, and environmental requirements. The CE declaration of conformity can be found online at www.3devo.com/fm2-doc.

14. Glossary

This is a list of essential terms that help users familiarize themselves with the language and definitions associated with filament extrusion and material processing. Note: FM as the shorthand for the Filament Maker TWO.

TERM	DEFINITION	ASSOCIATED TERMS
additive	An additive is an additional material (can be plastic or non-plastic) added to the thermoplastic to create a unique filament.	composite, filler, mixing, pre-compounding, feeding
contamination	Unwanted particles (dust, paint, other polymers) entering the FM, negatively affecting the produced filament and the machine health.	contaminants, degradation, recycling
cooling	The process of heated material releasing temperature to cool down (aided by the filament cooling fans) and solidifying into a filament.	filament cooling fans, cooling path, crystallization
degradation	In extrusion, this is the negative change in properties of a material when exposed to heat above its thermal range or exposed to appropriate heat for too long.	degraded residue, burnt, carbonized material
diameter	The measured width of a produced filament, often produced to the 3d printing industry standards of 1.75mm or 2.85mm.	filament thickness, F_{Tavg} , filament sensor
experiment	A single extrusion session from turning on the FM to turning it off with a safe material inside. For the purposes of first material testing, filament extrusion, spooling, purging, etc.	extrusion run, session
feeding	The process of putting material into the FM hopper. Often an important factor when handling powdered and shredded materials or additives.	hopper, mixing, particle size, flow

flow	The continuous movement of material from feeding at the hopper to extruding at the nozzle. A stable, steady flow allows for quality filament.	pressure, back-pressure, feeding, output
output	Material exiting the nozzle before it is processed. This output becomes filament as soon as it is actively cooled, measured, pulled, and spooled.	filament, nozzle, visual evidence
parameters	Adjustable machine settings (screw speed, heater temperatures, fan cooling etc.). Different settings can be set on the FM touchscreen for spooling, purging, and filament extrusion.	machine settings, presets
polymer	In extrusion, polymer refers to the material, exclusively thermoplastic, that is being processed in the FM.	thermoplastic, processing material
pulling	The process of regulating the speed of filament to allow for a consistent filament diameter within certain tolerances.	puller wheels, filament diameter, filament sensor
purge	In extrusion, the process of cleaning the screw and barrel of the FM. A purging material is used to push out the previously processed material.	purging, cleaning, maintenance, safe materials, MidTemp
spool	The process of winding up the produced filament, as well as the cylinder that the filament winds onto.	spooling, winder, winder mechanism, positioner
temperatures	Relating to the heat of the extrusion heaters, as well as the material. Each material has its own range of operating temperatures in which they can be melted and extruded.	thermal range, thermal window
transition	The process of changing the input from one material to another. This occurs between any combination of processing, purging, or transitioning materials.	pressure, mixing, contamination
viscosity	The measure of a material's flow when it is in a liquid state. In extrusion, this is an important property of thermoplastics directly connected to their extrudability.	Melt Flow Index (MFI), melting temperature, melting point, glass transition temperature (T _g)

Acknowledgements

We at 3devo are proud that the Filament Maker TWO is designed and manufactured in the Netherlands. It is a machine that delivers cutting edge technology that we know can positively impact your projects and enable your innovations.

Thank you for believing in our goal to enable one million 3D printing innovations by 2032, and for being an integral part of it. We are delighted to see how our services and products in 3D printing materials have sparked ideas, realized projects, and made an impact that has gone beyond our expectations.

If you would like to learn more about our 3devo story and the team behind the Filament Maker, you can check out our About Us page at: www.3devo.com/about-3devo.

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