

FIXstruder FB (feedback diameter control)

Model/Type: FIXstruder FB 2.0

Desktop extruder machine for 3D printer's filament

Pre-installed nozzle 1.75 mm

info@fixstruder.eu

INSTRUCTION MANUAL

(translation of the original instructions)

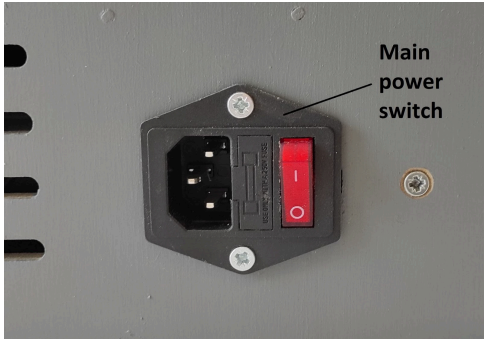


SAFETY WARNINGS AND SAFETY INSTRUCTIONS

For successful plastic recycling, FIXstruder FB operates at high temperature, high pressure, and high torque. At the same time, some processed polymers can be potentially toxic during thermal decomposition. Therefore, when working with FIXstruder FB, follow the safety rules:

- Work in a ventilated area.
- Install smoke and carbon monoxide sensors.
- Wear protective glasses, gloves, and clothing.
- Do not open the working FIXstruder FB.
- Do not touch the rotating parts of the working FIXstruder FB.
- Always turn off the power supply if you need to check the internal parts of the FIXstruder FB.
- **Do not leave the working FIXstruder FB unattended!**
- Learn the basics of working with the materials that you recycle.
- **Always use a grounded socket!**

use ground wire



top view

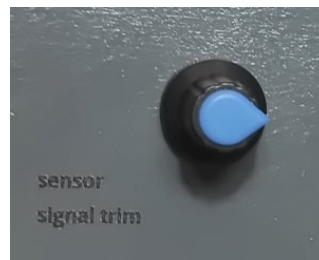
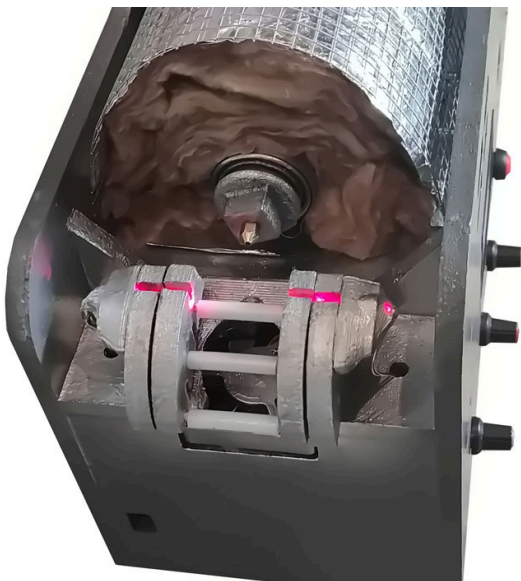


sensor signal trim

Fan speed

Encoder

Motor switch



The sensor signal setting is used to adjust the brightness of the laser relative to the brightness of the environment. Before starting, set the signal between (date: 1010-900)



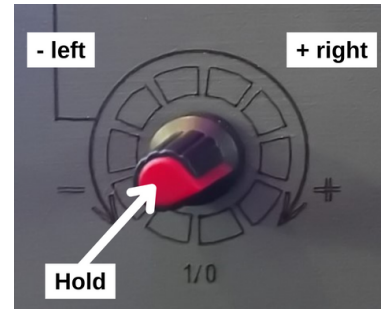
mini USB port for firmware upgrade

OPERATING INSTRUCTIONS

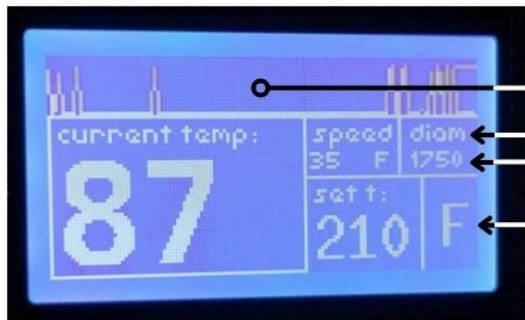
To ensure proper operation of the feedback principle, which decreases speed as the diameter increases, it is recommended to use this product together with the FIXwinder winding device or with winding devices that have adjustable tension.

1. Turn on the Main power switch.
2. The controller is controlled by rotating the encoder.

	Action →	→ Result
1	Long press and hold on the encoder button for 3-5 seconds	Transition to the settings and back from the settings to the main screen
	Hold	Enter / exit settings
2	Carried out by pressing and holding the encoder button and turning left and right (hold + turn)	Transition between the parameters in the settings
3	Rotation left / right (rotation)	Changing the parameters of the menu item



3. Main screen





graph diam/time
 diam/raw data
 depends on F/S function
 select function
F/S/T

Change the function value by holding and rotating (hold + turn) the encoder between F/S/T functions.



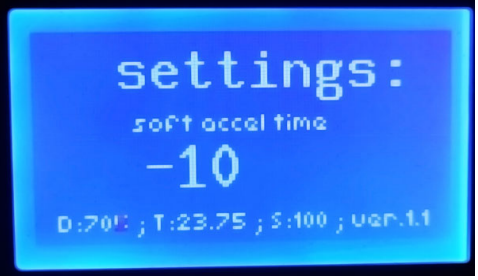

When **F (feedback)** function selected, left/right rotated, calibration is performed for the diameter placed on the filament sensor (the actual sensor data is equivalent to a filament with a diameter of 1.75 conventionally) and the text **diam/1750** appears. The sensitivity of the feedback response depends on **Feedback react** variable (see the Settings paragraph).



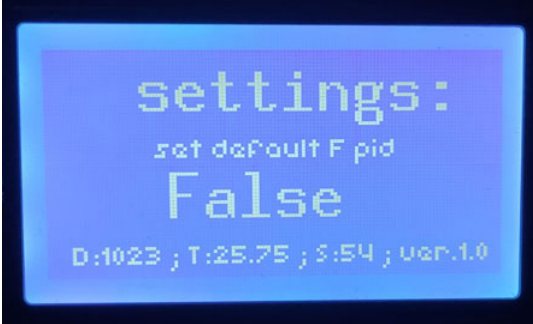
If an unexpected diameter change occurs, the extruder goes into emergency **feedback recovery control mode**. This is a slowdown and a smooth increase in speed until the calibrated signal is restored.

	<p>When S (speed) function is selected, the speed change is manual, and it occurs when the encoder is rotated left/right. In other words, changing the speed is done by manual control.</p>
	<p>If T (temperature) is selected, temperature selection (fine temperature setting). For adjustment in increments of 50 values, see the variable set temp settings, and for PLA and ABS temperature presets, see the corresponding settings menu items.</p>

4. Set the desired temperature:
 - * Approximate temperatures are: ABS - 210-240°C, PLA - 210°C. **(Due to the high moisture content of PLA plastic, you need to dry it well in an oven for 4 hours or more or add pellets from vacuum sealed in a 50/50 ratio.)**
 - * When switching from one type of plastic to another, remove the remaining plastic from the barrel, clean the nozzle, and change the mesh.
5. Avoid high temperatures. Select the temperature individually for each type of plastic.
6. After the nozzle reaches the desired temperature, wait for about 5-10 minutes for the plastic remaining inside the nozzle to completely melt.
7. Fill the plastic into the hopper.
8. Turn on the motor.
9. Turn on the cooling fan.
 - * Some types of plastic may not require cooling during extrusion.
10. At the end of the work, try to empty the nozzle tube from the plastic as much as possible by allowing FIXstruder FB to work empty for about 20 minutes, and then turn it off.

SETTINGS

	<p>Soft time acceleration (ver 1.1)</p> <p>Used in F mode. The time during which the speed changes from one value to another in milliseconds. The default parameter is -10. The higher the value, the slower the extruder will respond to changes in PID speed.</p>
	<p>Push timing FB (ver 1.1)</p> <p>Used in F mode. Duration of speed restoration in seconds in case of failure. The default value is 3 seconds.</p>

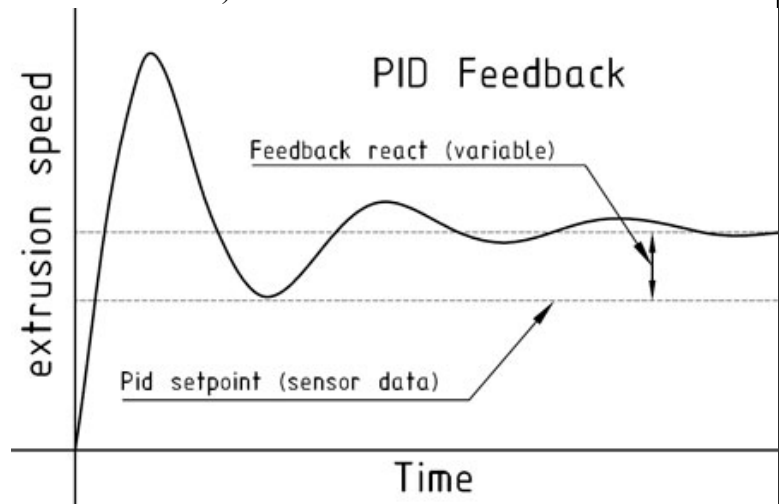
 <p>settings: Feedback P 11 D:1023 ; T:26.50 ; S:54 ; Ver:1.0</p>	<p>Set P variable (default 10)</p>
 <p>settings: Feedback I 5 D:1023 ; T:26.00 ; S:54 ; Ver:1.0</p>	<p>set I variable (default 5)</p>
 <p>settings: Feedback D 1 D:1023 ; T:26.25 ; S:54 ; Ver:1.0</p>	<p>set D variable (default 0)</p>
 <p>settings: set default F pid False D:1023 ; T:25.75 ; S:54 ; Ver:1.0</p>	<p>Set Feedback PID to default values. When True, all settings will be reset to default parameters (P-10, I-5, D-1, Feedback react-5). If this parameter is set to True, then manual modification will not be possible, in which case reset them back to False.</p>



Set the signal change response parameter (**Feedback react**) (default 5). With larger values, there will be more accelerations when the sensor signal changes.

When the raw data of the sensor is read and equal to the diameter of the measured bar and automatically the controller considers that at the moment there is a bar of 1.75 mm (see function F on the main screen). This is affected by the type of filament: white, transparent, gray - they all show through the color of the laser in different ways, so the data may differ.

→**When starting work**, first of all, perform a **calibration**. (see function F text diam/1750 on the main screen)

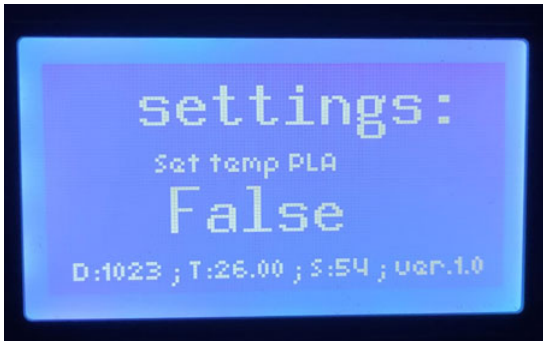


Temperature setting. 1 step 50 values.



Set default ABS temperature.

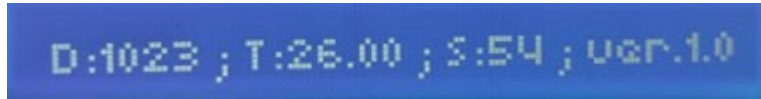
If this parameter is set to **True**, then manual modification will not be possible, in which case reset them back to **False**.



Set default PLA temperature.

If this parameter is set to **True**, then manual modification will not be possible, in which case reset them back to **False**.

Additional information for setup



Raw sensor data; current temperature: current speed; current firmware version

MOTOR OVERLOAD PROTECTION

By default, the extruder motor is configured for safe operation. Any increase in the output voltage power can cause a breakdown of the gearbox or the connection of the feed screw.

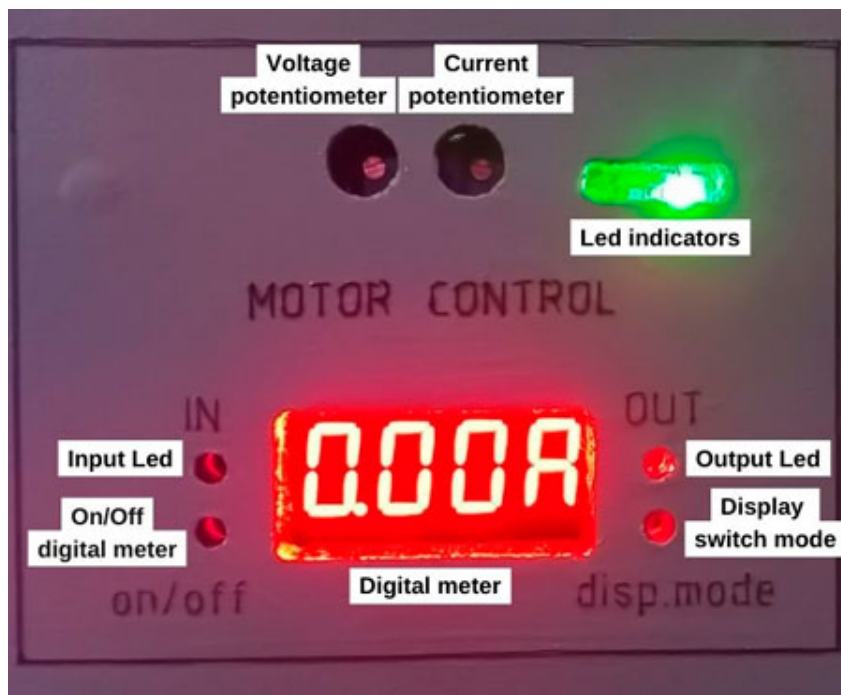
Please note that we are not responsible for any breakdowns that may occur if you change the settings.

LED color codes:

- Red: The motor protection has triggered, indicating that something is blocking the auger. Check what is blocking the auger. You may need to clean the nozzle. Also, verify if the temperature is too low to heat the plastic.
- Blue: normal operation of the motor.
- Green: This is possible if the motor is not driving a load.

In normal condition, the motor protection should not be triggered. If this happens, then try:

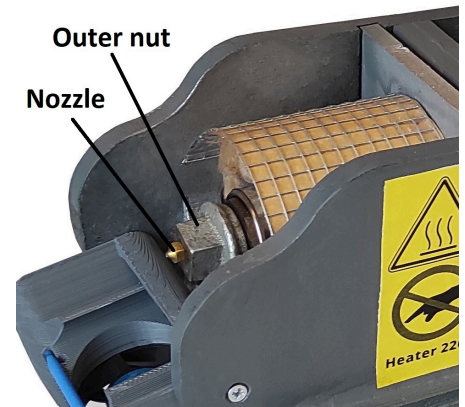
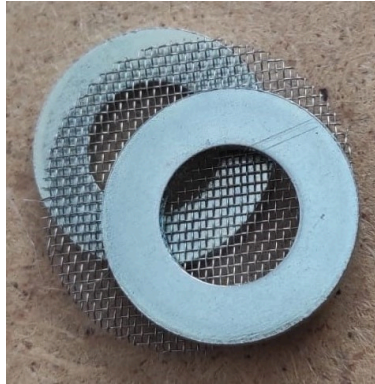
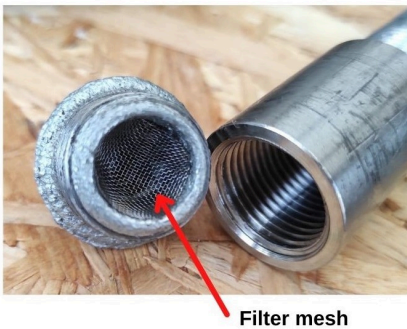
- Add half or one turn clockwise (voltage and current potentiometers)
- If 1 didn't help, then it may be necessary to clean the nozzle, because something is blocking the auger.



CHANGING THE NOZZLE

To replace the nozzle, follow these steps:

1. Wait until it heats up, and then, using a wrench, unscrew the outer nut.
2. Pull out the filter mesh.
3. Unscrew the nozzle.
4. Clean the channel.
5. When extruding PLA plastic, it is recommended to use 2 washers so that the mesh is not pushed inward.



EXTRUSION OF LOW-TEMPERATURE PLASTICS WITH HIGH FLOW PROPERTIES SUCH AS PLA, PET

1. It's recommended to turn off the hopper cooling (this reduces temperature fluctuation).
2. To further adjust the stability and rod diameter, change the tilt of the cooler, it is also recommended to increase the speed of the cooler to the maximum.
3. It is important to wait until the extruder temperature stabilizes.

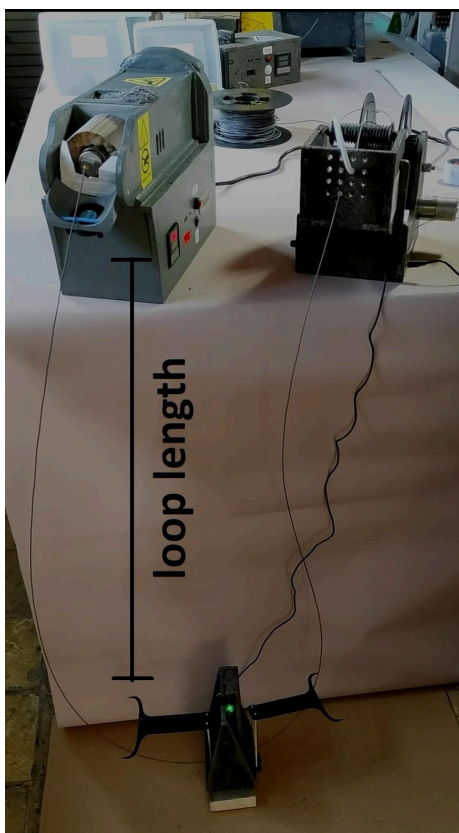
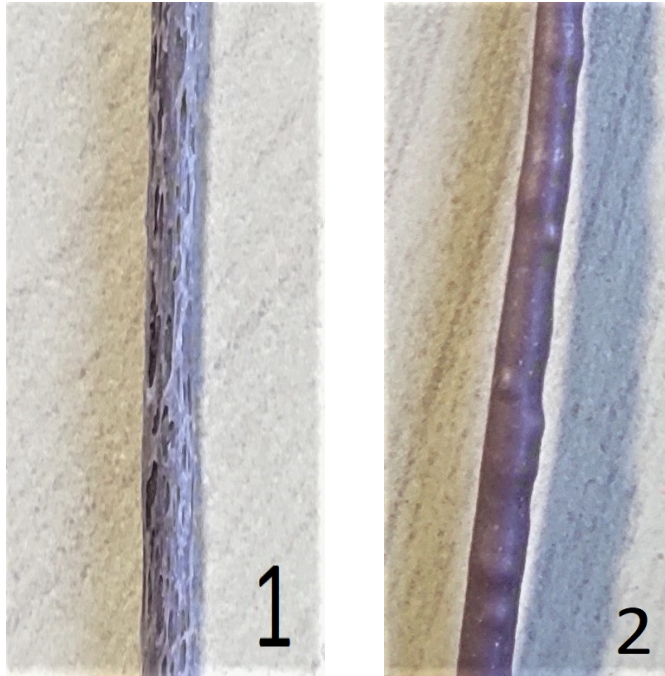
Temperature for PLA is about 210 °C (Add PLA pellets to shredded PLA plastic about 50/50).

SPECIFICATIONS

1. Size 40*25*16 cm
2. Attention! The heater operates at 220V
3. Heater power 145W
4. Maximum peak power consumption 200W (with heater)

TROUBLESHOOTING

- The speed and quality of the extruded rod can be affected by the uniformity of the crushed material spilling into the hopper. If the extruded rod is thin and has a sponge-like texture, and if the extrusion speed has decreased (as shown in photo 1), it may indicate that the material is stuck in the hopper.
- A blockage in the nozzle can also cause a similar extrusion defect. In such cases, replacing the metal mesh filter may be necessary.
- Defects in the rod at the beginning of extrusion (photo 2) can result from air accumulating inside the extruder barrel during the melting of the material.
- Increasing temperature due to the boiling of the plastic can also cause this problem. In such cases, it is recommended to lower the temperature.



- The diameter of the extruded rod is determined by the relationship between the temperature of the melted material and the tension of the loop length being fed into the winder.
- For automatic production, the extruder and winding machine should be set up in their default placement.