

User guide for Micron 3DP extruders (REV-4)

<http://micron3dp.com/>

<https://www.facebook.com/pages/Micron-3DP/232940990225863?fref=ts>

Thank you for choosing Micron 3DP extruder. Each extruder is tested after final assembly on a special test station and delivered with inspection report.

The extruder's performance depends on several factors such as the quality of your filament, your software parameters setting, your power supply performance, and more. This guide aims to minimize false alarms and mistakes. Please read it carefully and follow it step by step before trying to print.

Mechanical:

The "DFGNM"

The "DFGNM" is made from ST316 guide and a brass nozzle. Because of thermal issues considerations, the wall thickness at certain points is very thin. Do not try to take apart the nozzle, most likely you will break the guide. We consider the "DFGNM" as single replaceable unit. We believe that this concept dramatically minimize the frustration of users dealing with stuck nozzles.

Mechanical installation

Micron 3DP provides assembly files for easy installation design. Please feel free to send us mail and we will reply with the solid files.

Micron 3DP single extruder has 4 x M3 mounting screws assembled at the bottom.

Micron 3DP dual extruder has 3 x M4 mounting screws assembled at the bottom.

Fig-1 and Fig-2 are drawings for reference design installation plates for both products. Those reference plates are sold separately.

On all of our extruders, it is possible to install the motor from both sides.

Depend on your specific design it might be that you will have to take apart the "DFGNM" in order to attach your mounting plate to the extruder housing.

We have some more installation plates that we made for specific machines like vertical installation for the ORD BOT. feel free to contact us.

Electrical:

Step motor connections

Connect the motor wires according to the attached motor spec.

If you are working with 24V Power supply, reduce the driver (pololu or similar) to about 50% current. This can be done by: disconnect PS, rotate the current pot fully counterclockwise and then about 1/8 of a turn clockwise, connect the PS and check if the extruder stepper motor able to extrude the filament without losing steps (don't forget to turn on the heater).

Another approach to reduce the current is in the firmware configuration, this can be done only if you have a controller and drivers that support this (like Rambo controller). <http://reprap.org/wiki/Rambo>

NTC thermistor

The thermistor type is: [100K ohm EPCOS B57560G104F NTC THERMISTOR](#)

Polarity for the NTC is not important. Connect it to the Temperature input on the Ramps/Sanguilolu/Smoothieboard/Etc.

For Marlin firmware, the thermistor number is type 1.

Heaters

Micron 3DP extruder's heaters are rated for 12V and about 60W (120W for the dual extruder). Make sure your board fuse can handle that.

It is possible to operate the heaters using 24V PS. In this case, reduce the power to 60 % by changing the heaters parameters in the firmware. In case of using Marlin firmware, you should look for #define PID_MAX 255 in configuration.h file and change it to #define PID_MAX 155

Polarity for the heater is not important; just connect it to the heater exit

Fan

In order to cool the heatsink, the fan must work **continuously!**

Set the fan to 80% up to 100% for the extruders delivered with 40mm x 40mm x 20mm.

Extruder calibration

Step/mm calculation:

The motor have 200 full steps per revolution (1.8 deg per full step)

The gear ratio is 1:13.76 so the number of full step per revolution is $13.76 \times 200 = 2752$ full

steps The hobbed gear diameter is 12mm so the Circumference is $3.14 \times 12 = 37.68$ mm

If your motor works with full step than the steps/mm is $2752 / 37.68 = 73.03$ step/mm

Most likely that your driver works at 1/16 step so $16 \times 73.03 = 1168$ steps/mm

Retraction amount per material:

PLA – 1mm, ABS-2mm, Polycarbonate-0.5mm

If a 'strings' occure – try to increase the retraction amount (each time by 0.5 mm).

If the guide get clogged, try to decrease the retraction (start with 0.5mm and go up by 0.5mm incensements until there's no 'strings')

Controller PID set up

Under configuration.h file (marlin) change to:

```
define DEFAULT_Kp 24.54#
```

```
    define DEFAULT_Ki 4.3#
```

```
define DEFAULT_Kd 34.97#
```

You can also do an automatic PID tuning, using this procedure:

http://www.soliwiki.com/PID_tuning

Manual testing your extuder

Before you continue to calibrate your extruder please make that simple hand extrusion test:

Open the service door. Set temperature to the recommended temperature for the material you are using. Make sure that the temperature stabilize and try extruding material by pushing it manually.

On this simple test you just verify that the nozzle is not clogged and that the required force to push the material thru the nozzle is reasonable. If you feel that you need to push too hard try raising the temperature.

Final extruder calibration

We recommend that at this point you will follow the attached calibration link:

<http://richrap.blogspot.co.il/2012/01/slic3r-is-nicer-part-1-settings-and.htm>

Recommended printing temperatures for different materials

PLA-----210-230 C deg

ABS-----235-270 C deg

Polycarbonate-----260-290 C deg

HIPS-----210-240 C deg

PVA-----175-220 C deg

FAQ:**Filament jamming at the hobbed gear**

Does it happened after few minutes of printing and the step motor is very hot (hot=can't touch it for more than a second)?

If this is the case, most likely your step motor driver is set to too high current that causes the motor and the hobbed gear to get too hot and melt/soften the filament.

- 1) Reduce the current to the motor on your driver.
- 2) If this still does not solve the problem, reduce the idler bearing preload (the bearing that press the filament against the hobbed gear) using the 2 x set screws.

Does it happen even when the step motor is not very hot?

If this is the case, there are few options:

- 1) Reduce the speed dramatically to verify that at low speed it works and to eliminate other problem like clogged nozzle.
- 2) Follow our recommendation for temperature for the specific material and adjust it to the higher level to reduce the resistance.
- 3) Reduce the idler bearing preload (the bearing that press the filament against the hobbed gear) using the 2 x set screws.
- 4) Replace "DFGNM".

I cannot get temperature of 290 C deg on my hot end

Check the voltage of your power supply, it should be 12V. If it is less than 11.5V this means you lose about 10% power. If you can, adjust the voltage or get better power supply.

Cheap ATX PS is not a good choice since the voltage drop when they get warm. We recommend this PS that is available on eBay or similar:

Getech 12V 29A DC single switching power supply S-350-12. Alternatively, you could get a stronger PS – 24V.

Set the fan voltage to 80% if your controller supports it.

How to replace the "DFGNM"

- 1) **While the "DFGNM" clamp screw still close, rotate the heatsink counterclockwise just to unlock it from the STST guide.**
- 2) **Open the M4 "DFGNM" clamp screw, while holding the nozzle in one hand, unscrew the heatsink.**
- 3) **Assembly the new "DFGNM" is reversing the same process. Never tighten the heatsink strong. Rotate it until it stops on the bottom shoulder of the "DFGNM"**