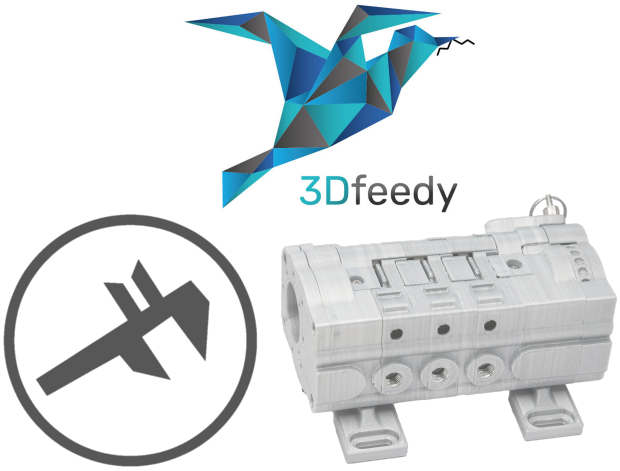

3DFEEDY CALIBRATION INSTRUCTION MANUAL

(Supplement to 3Dfeedy Instruction Manual)

Version 1.0

April 29, 2021

3DBIZZ UG (haftungsbeschränkt)

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TABLE OF CONTENTS

GENERAL INFORMATION

1. Read and keep the operation instructions

This instruction manual is additionally to the main instruction manual “3Dfeedy Instruction Manual” and has to be taken into account for calibrating the extruder steps.

For different languages and the most resent version of this document please visit: www.3dbizz.com/manuals

For the most recent version of the main instruction manual “3Dfeedy Instruction Manual” in different languages please visit: www.3dbizz.com/manuals.

2. Legend of Symbols

The following symbols and signal words are used in this instruction manual:

Keep out of the reach of children.

CHOKING HAZARD – Small parts not for children under 3 years or any individuals who have a tendency to place inedible objects in their mouths.

⚠ Warnings require your attention. Failure to follow the instructions for proper set up, use and care for your device can increase the risk of serious personal injury, death or property damage.

ⓘ The symbol indicates additional information for assembling and further tips.

- Colors in the image description correspond to the illustration for better comprehensibility.
- Parts in the illustration relevant for the work step are colored green.

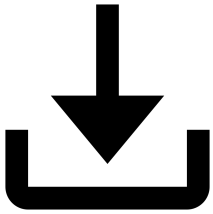
CALIBRATION WITH SOFTWARE

The following steps show the calibration of the extruder steps using an external software for performing the commands.

These steps are visualized using the freeware Pronterface, however it can be done by using other software just like Repetier Host, Octoprint, Simplify3D, which is able to send commands to the 3D-printer.

If this method is not applicable to your 3D-printer, go to the chapter “Calibration with G-Code” or “Calibration in General”.

1. Download and install Software



- Download and install the freeware Pronterface.

ⓘ If you already installed Pronterface or another software, that is able to send commands to your 3d-printer, you can skip this step.

ⓘ If you prefer another software, you can use it, if it is possible to send commands to your 3d-printer (e.g. Repetier Host, Octoprint, Simplify3D, etc.), however all the steps are visualized in Pronterface.

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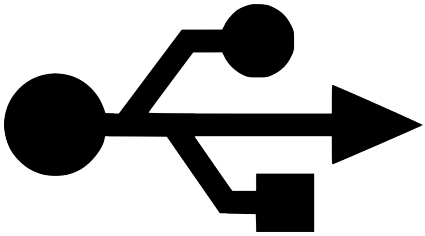
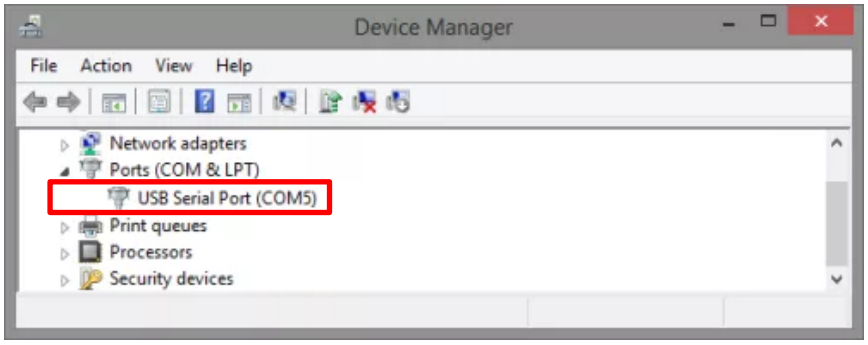
2. Connect 3D-Printer to Computer



- Connect your 3D-printer via USB to the Computer.

ⓘ To make it work, you probably have to install the correct driver of your 3D-printer.

3. Find out Port of 3D-Printer



- Open the device manager on your computer.

ⓘ You can open the device manager by clicking the Windows Symbol on the lower left side and typing in “Device Manager”.

- Search for “Ports > USB Serial Port (COM*)” and find out the number of the port. (in this case the port number is 5).

ⓘ If more than one USB Serial Port devices are connected, the easiest way to find out the correct number of the 3D-printer port is to unplug and replug the USB connection of your 3D-printer and observe the number of the new device connected.

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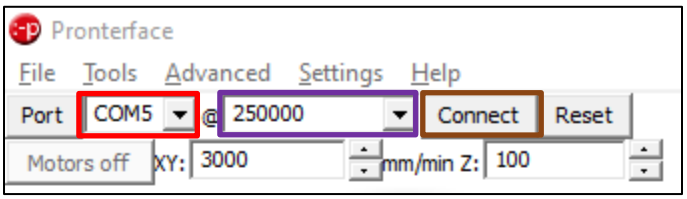
4. Connect 3D-Printer to Pronterface



- Open Pronterface on your computer.
- Select the com port number determined in Step 3.

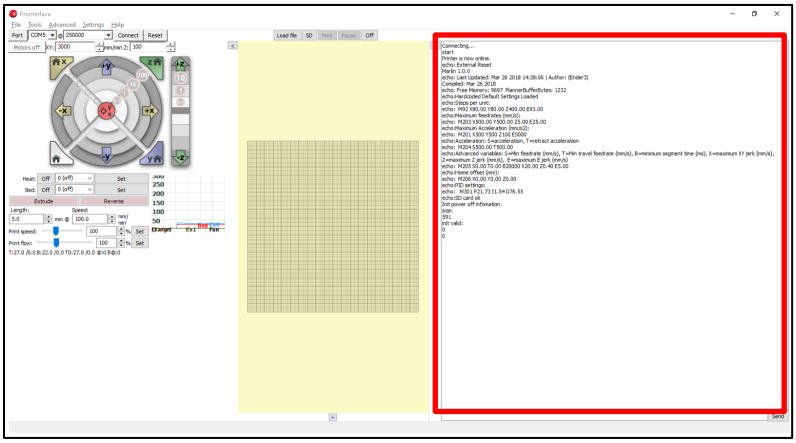
ⓘ Make sure your 3D-printer is not connected to any other software (e.g. Cura), otherwise close these software tools.

- Select the correct baud rate for your 3D-printer.

ⓘ Usually, the correct baud rate is 250000 or 115200.

- Choose “Connect” to connect your 3D-printer to Pronterface.

5. Check Connection of your 3D-printer



- If the correct com port and baud rate were selected, you will find a message on the right side of Pronterface showing “Printer is now online” among others.

ⓘ If in this red region an error message is shown, go back to step 4 and select another com port or baud rate or make sure the 3D-printer is correctly connected to the computer.

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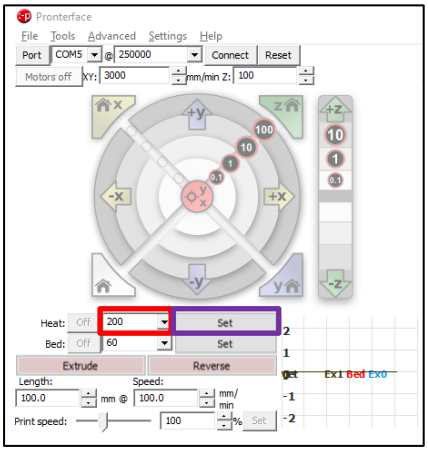
6. Heat up Nozzle



- Select 200 for heating up the nozzle to 200°C.

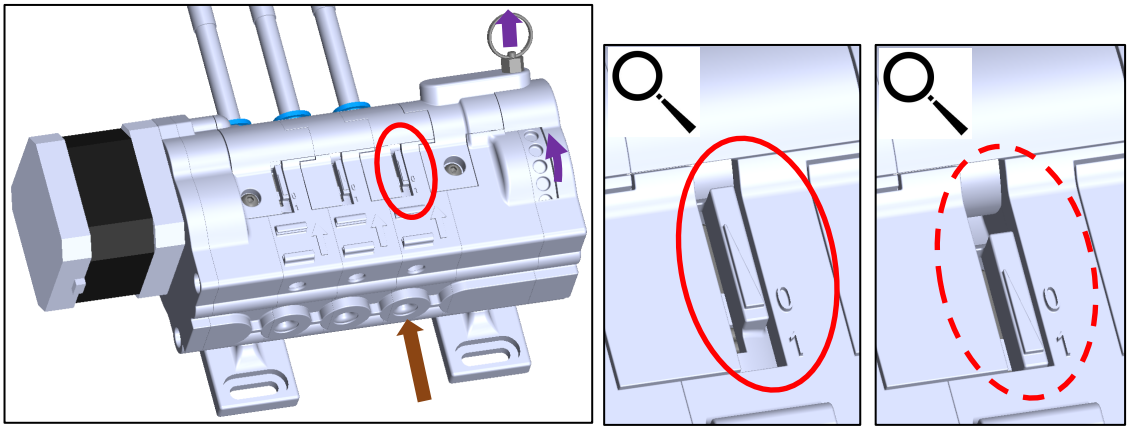
ⓘ You can also select another temperature necessary to allow extrusion.

- Select “Set” to heat up the nozzle to the preselected temperature.

ⓘ If heating up the nozzle should be avoided, the command <M302 S0> to allow extrusion at any temperature is applicable for some Firmware. For the RepRap Firmware the command <M302 P1> is used to allow cold extrusion.

⚠ After finishing the calibration use <M302 S***> and replace the * with the temperature value (e.g. 170 for 170 °C) for some firmware or use <M302 P0> for RepRap Firmware to prohibit cold extrusion to prevent the printer from damage due to cold extrusion.

7. Insert Filament to First Filament Unit



- Make sure the first filament unit is not under tension, as this would make it impossible to insert the filament.

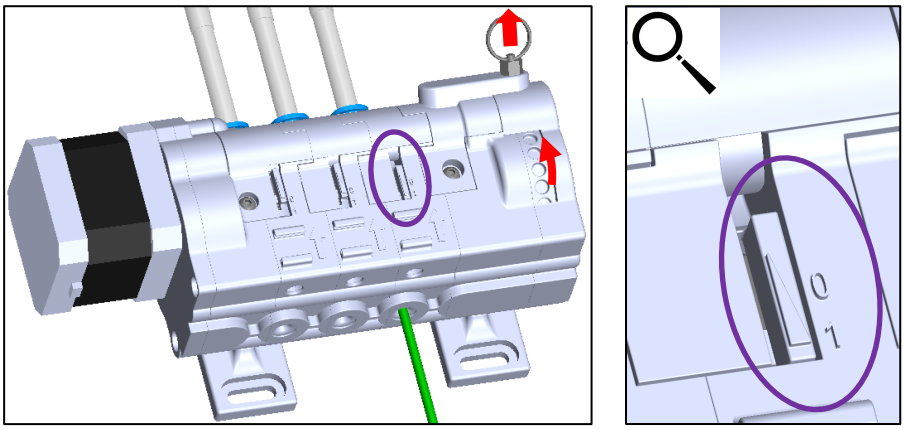
ⓘ The first filament unit is under tension, if that display is pointing to the number 1, which is shown within the red dashed circle. If the display is pointing to the number 0, which is shown within the solid red circle, the first filament unit is not under tension.

- If the first filament unit is under tension, pull the manual adjustment fixture and rotate the manual adjustment wheel until the tension is released at the first filament unit.
- Insert the filament to the first filament unit inlet, until the filament reaches the end of the PTFE tubes.

ⓘ If insertion of the filament is not possible, cut the filament end diagonally.

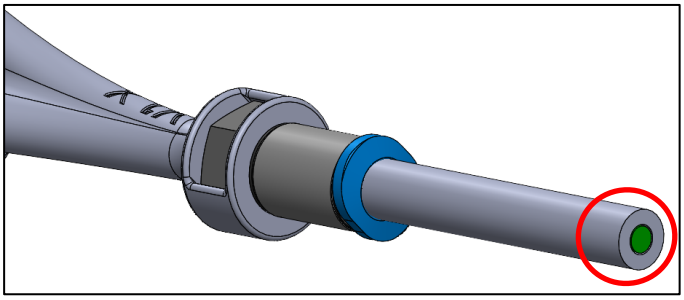
---

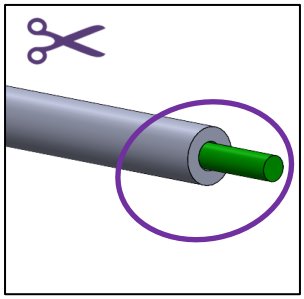
8. Select First Filament Unit



- Pull the manual adjustment fixture and rotate the manual adjustment wheel until the first filament unit is selected.
- The first filament unit is selected, when the first display is pointing towards 1.

9. Align Filament with PTFE Tube





- Align the tip of the filament with the end of the PTFE tube.

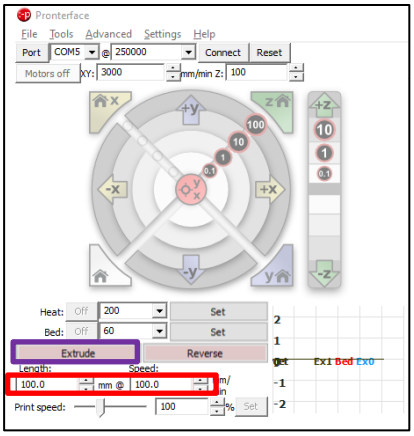
ⓘ The closer it is aligned, the better will be the calibration result.

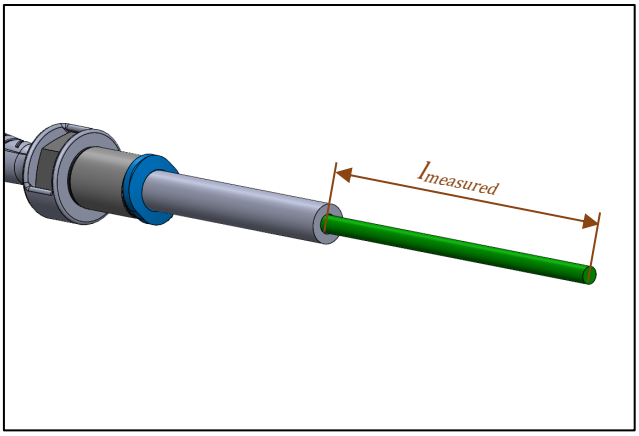
- If the tip of the filament is not aligned with the end of the PTFE tube, move the filament until it is aligned or cut off the protruded filament at the end of the PTFE tube.

ⓘ You can move the filament via Pronterface or in the menu of your 3D-printer.

---

10. Extrude the Filament





- Insert at the “Length” 100 and at the “Speed” 100 to set the length for extrusion to 100mm with a velocity of 100mm/min.
- Select “Extrude” to extrude the filament.

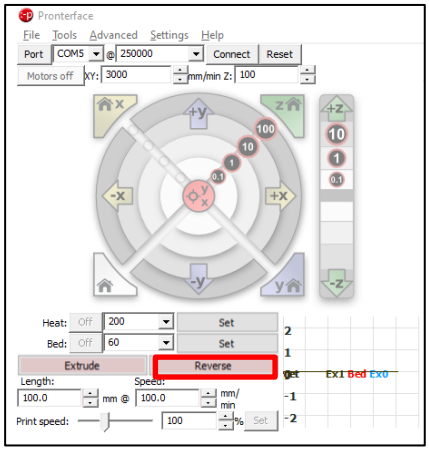
⚠ Make sure the PTFE tube is not installed to the printhead, as this would influence the extruded length due to backpressure, as well as the measurement of the extruded length.

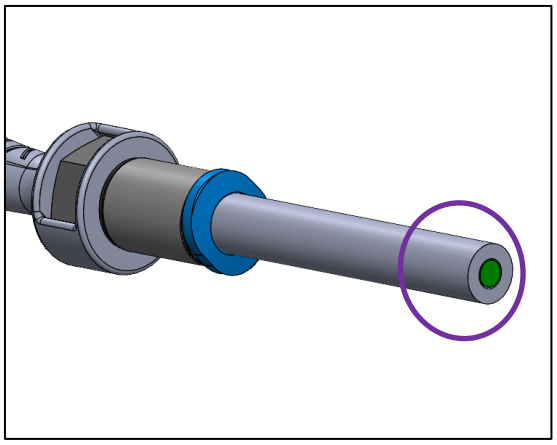
ⓘ If the filament is pulled back, the rotation direction is set incorrectly. The change of direction of rotation is shown below in several different types depending on your printer configuration.

- Measure the extruded length ($l_{measured}$).

ⓘ If the extruded length is very close to 100mm, the calibration is finished here. Otherwise continue with the next steps.

11. Reverse the Filament



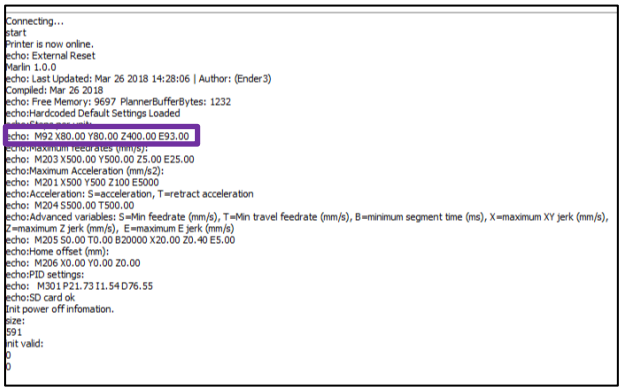


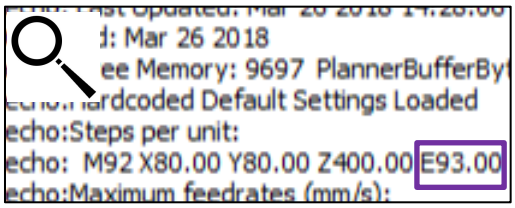
- Select “Reverse” to reverse the filament to the original state.
- Here you can see the original state.

---

12. Determine current E-Steps

<M503>





- Send the command <M503> to your 3D-printer to report the current settings.
- Search for the line starting with <M92> and search in that line for the value after E (E_{old}).

ⓘ In this case the current E-steps are 93.00.

ⓘ On some printers the command shown above is not possible. In this case the current E-steps have to be determined directly on the 3D-printer or in the firmware.

13. Calculate and Store new E-Steps

$$E_{New} = E_{Old} \cdot \frac{100}{l_{measured}}$$

- Calculate the new E-steps with the formula shown above.
- Store the new E-steps settings with a method shown below.

ⓘ As there are several different methods to store the E-steps to your printer, these methods are shown in individual chapters.

---

14. Repeat Measurement

- Go back to step 10 and repeat all the steps.

ⓘ Repeat all the steps until the extruded distance is sufficiently close to 100mm.

ⓘ The closer the extruded distance to 100mm, the better the printing results afterwards.

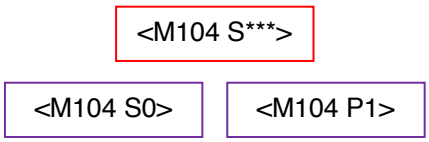
⚠ Do not forget to perform the command <M302 S***> and replace the * with the temperature value (e.g. 170 for 170 °C) for some firmware or use <M302 P0> for RepRap Firmware after finishing the calibration to prohibit cold extrusion to prevent the printer from damage due to cold extrusion.

CALIBRATION WITH G-CODE

The following steps show the calibration of the extruder steps using your 3D-printer and G-code commands. These G-code commands can be transformed to a SD-card or sent directly to the 3D-printer via an additional Software.

If this method is not applicable to your 3D-printer, go to the chapter “Calibration with Software” or “Calibration in General”.

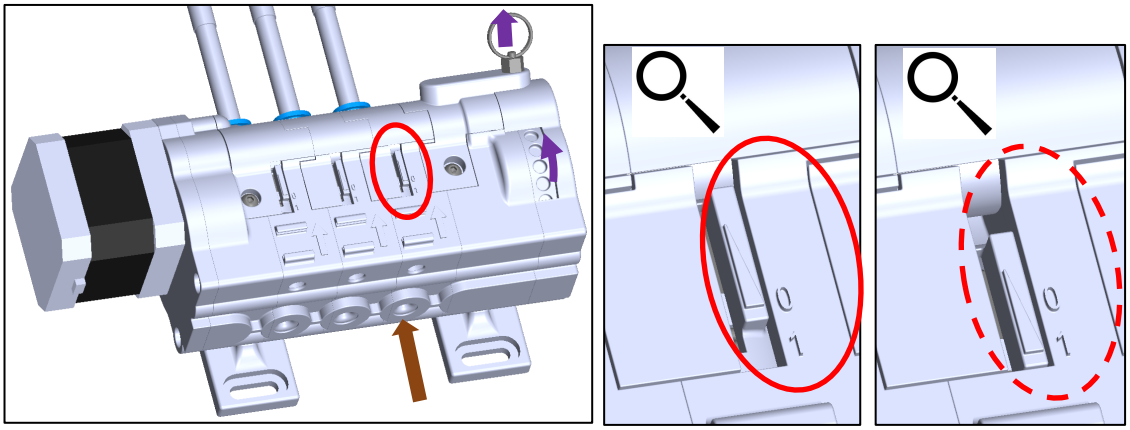
1. Heat up Nozzle



- One possibility for heating up the nozzle is using the menu directly on your 3D-printer to set the nozzle temperature and heat up the nozzle.
- Another possibility for heating up the nozzle is to use the command <M104 S***> and replace the * with the actual temperature (e.g. 200 for 200°C) for heating up the nozzle.
- If heating up the nozzle should be avoided, the command <M302 S0> to allow extrusion at any temperature is applicable for some Firmware. For the RepRap Firmware the command <M302 P1> is used to allow cold extrusion.

⚠ After finishing the calibration use <M302 S***> and replace the * with the temperature value (e.g. 170 for 170 °C) for some firmware or use <M302 P0> for RepRap Firmware to prohibit cold extrusion to prevent the printer from damage due to cold extrusion.

2. Insert Filament to First Filament Unit



- Make sure the first filament unit is not under tension, as this would make it impossible to insert the filament.

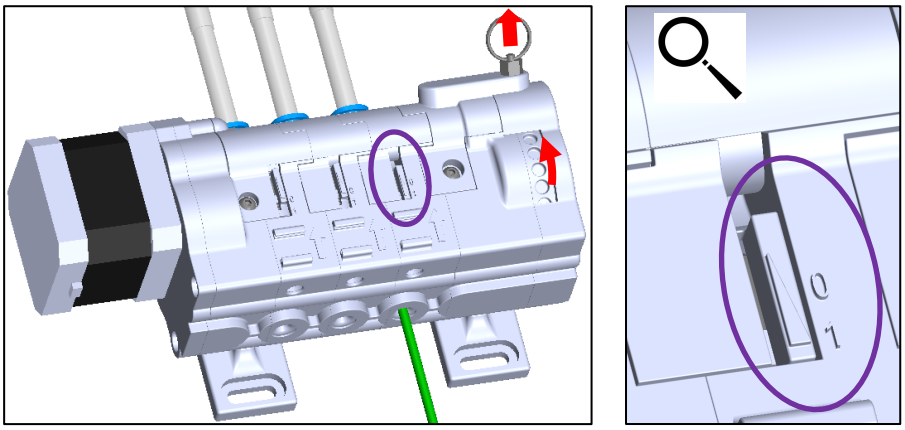
ⓘ The first filament unit is under tension, if that display is pointing to the number 1, which is shown within the red dashed circle. If the display is pointing to the number 0, which is shown within the solid red circle, the first filament unit is not under tension.

- If the first filament unit is under tension, pull the manual adjustment fixture and rotate the manual adjustment wheel until the tension is released at the first filament unit.
- Insert the filament to the first filament unit inlet, until the filament reaches the end of the PTFE tubes.

ⓘ If insertion of the filament is not possible, cut the filament end diagonally.

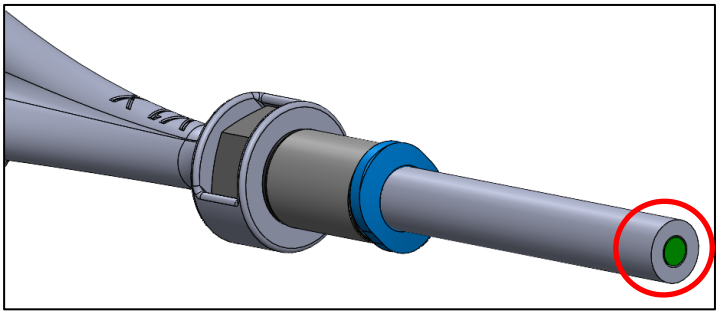
---

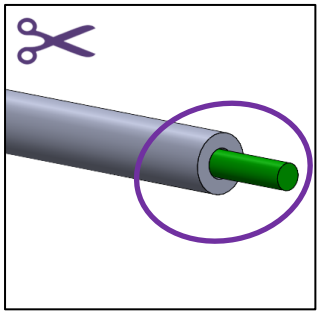
3. Select First Filament Unit



- Pull the manual adjustment fixture and rotate the manual adjustment wheel until the first filament unit is selected.
- The first filament unit is selected, when the first display is pointing towards 1.

4. Align Filament with PTFE Tubes





- Align the tip of the filament with the end of the PTFE tube.

ⓘ The closer it is aligned, the better will be the calibration result.

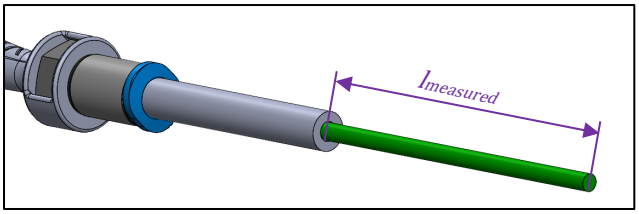
- If the tip of the filament is not aligned with the end of the PTFE tube, move the filament until it is aligned or cut off the protruded filament at the end of the PTFE tube.

ⓘ You can move the filament in the menu of your 3D-printer.

---

5. Extrude the Filament

<G91>
<G1 F100 E100>



- Use the command <G91> to set the extrusion mode to relative and the command <G1 F100 E100> to extrude the filament 100mm with a velocity of 100mm/min.

⚠ Make sure the PTFE tube end is not installed to the printhead, as this would influence the extruded length due to backpressure, as well as make it difficult to measure the extruded length.

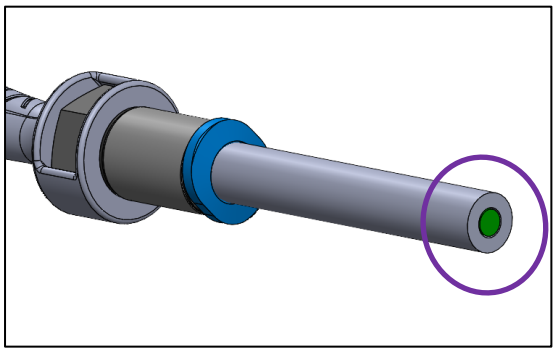
ⓘ If the filament is pulled back, the rotation direction is set incorrectly. The change of direction of rotation is shown below in several different types depending on your printer configuration.

- Measure the extruded length ($l_{measured}$).

ⓘ If the extruded length is very close to 100mm, the calibration is finished here. Otherwise continue with the next steps.

6. Reverse the Filament

<G91>
<G1 F100 E-100>

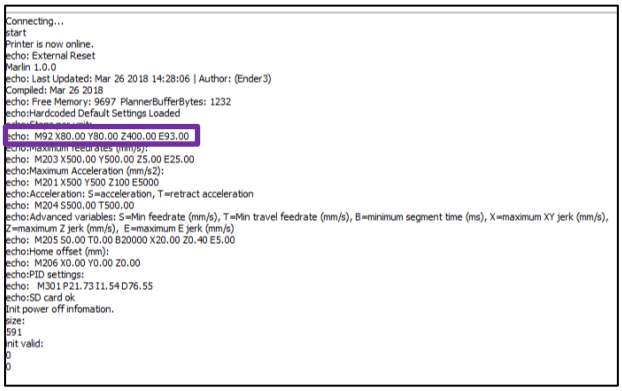


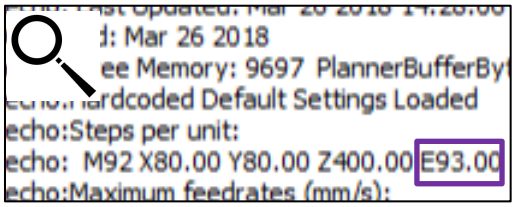
- Use the command <G91> to set the extrusion mode to relative and the command <G1 F100 E-100> to reverse the filament 100mm with a velocity of 100mm/min.
- Here you can see the original state.

---

7. Determine current E-Steps

<M503>





ⓘ On some printers the current E-steps can be determined directly on the 3D-printer.

ⓘ Sometimes the current E-steps can be determined in the firmware.

- If the methods listed above are not possible, use an external software and send the command <M503> to your 3D-printer to report the current settings.
- Search for the line starting with <M92> and search in that line for the value after E (E_{old}).

ⓘ In this case the current E-steps are 369.00.

8. Calculate and Store new E-Steps

$$E_{New} = E_{Old} \cdot \frac{100}{l_{measured}}$$

- Calculate the new E-steps with the formula shown above.
- Store the new E-steps settings with a method shown below.

ⓘ As there are several different methods to store the E-steps to your printer, these methods are shown in individual chapters.

---

9. Repeat Measurement

- Go back to step 5 and repeat all the steps.

ⓘ Repeat all the steps until the extruded distance is sufficiently close to 100mm.

ⓘ The closer the extruded distance to 100mm, the better the printing results afterwards.

⚠ Do not forget to perform the command <M302 S***> and replace the * with the temperature value (e.g. 170 for 170 °C) for some firmware or use <M302 P0> for RepRap Firmware after finishing the calibration to prohibit cold extrusion to prevent the printer from damage due to cold extrusion.

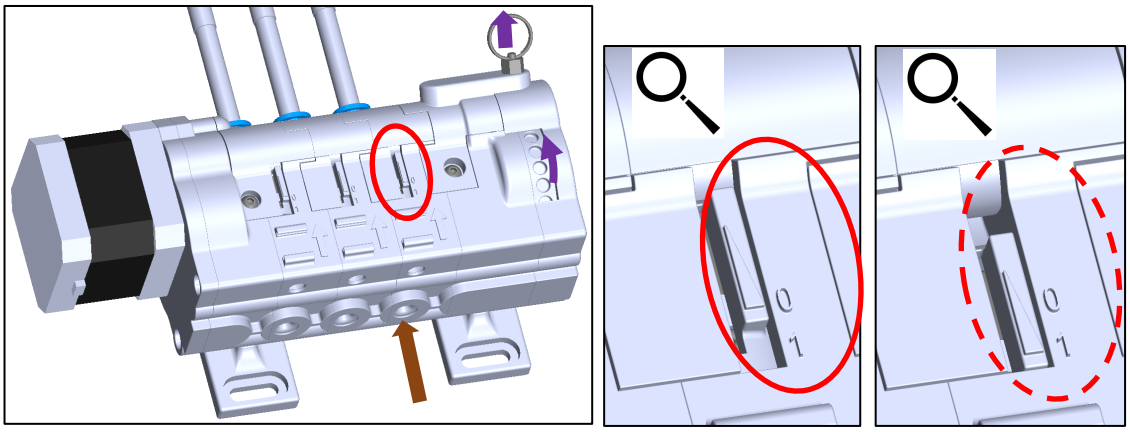
CALIBRATION IN GENERAL

The following steps show the calibration of the extruder steps in general. Usually, all the methods are included in the two methods shown above: “Calibration with Software” or “Calibration with G-Code”.

If you have to use that general method, please inform us and tell us your settings and if possible how to do it in your specific case, to include that method in later versions of that document or to complete one method.
If you have problems in performing the calibration steps, please inform us and we will give our best to find a solution for your specific case.

More detailed descriptions for the calibration are shown in the chapters “Calibration with Software” and “Calibration with G-Code”. Use the general method for the calibration of the E-steps just in case the methods shown above are not applicable.

1. Insert Filament to First Filament Unit



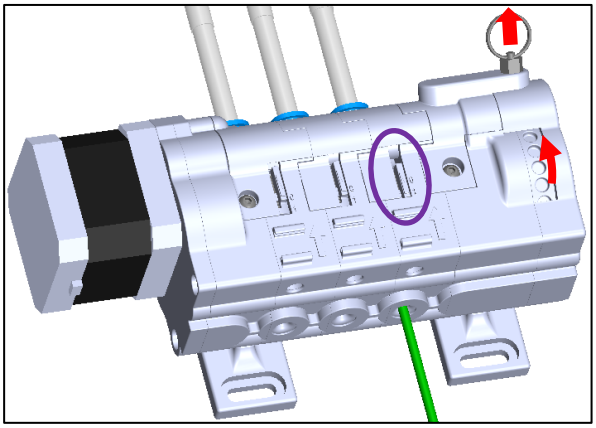
- Make sure the first filament unit is not under tension, as this would make it impossible to insert the filament.

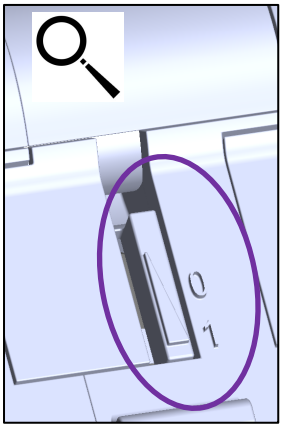
ⓘ The first filament unit is under tension, if that display is pointing to the number 1, which is shown within the red dashed circle. If the display is pointing to the number 0, which is shown within the solid red circle, the first filament unit is not under tension.

- If the first filament unit is under tension, pull the manual adjustment fixture and rotate the manual adjustment wheel until the tension is released at the first filament unit.
- Insert the filament to the first filament unit inlet, until the filament reaches the end of the PTFE tubes.

ⓘ If insertion of the filament is not possible, cut the filament end diagonally.

2. Select First Filament Unit

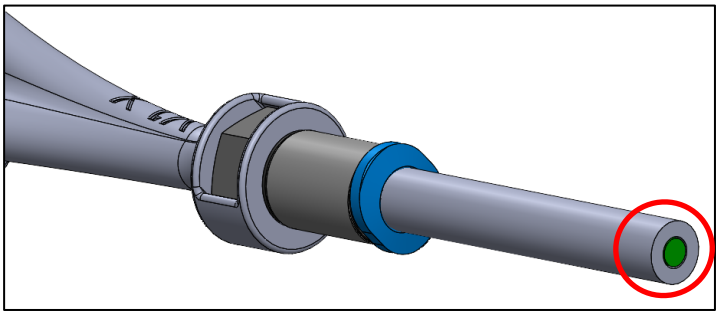


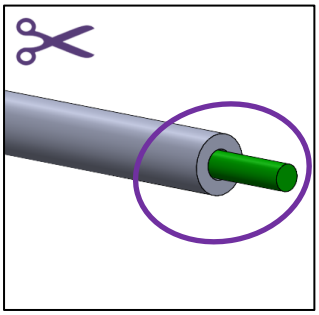


- Pull the manual adjustment fixture and rotate the manual adjustment wheel until the first filament unit is selected.
- The first filament unit is selected, when the first display is pointing towards 1.

---

3. Align Filament with PTFE Tubes



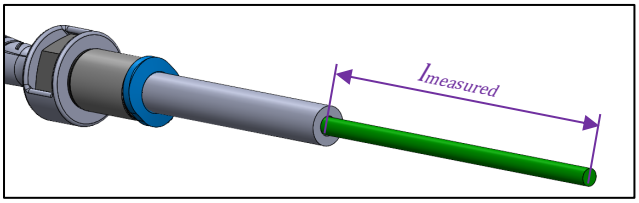


- Align the tip of the filament with the end of the PTFE tube.

ⓘ The closer it is aligned, the better will be the calibration result.

- If the tip of the filament is not aligned with the end of the PTFE tube, move the filament until it is aligned or cut off the protruded filament at the end of the PTFE tube.

4. Extrude the Filament



- Extrude the filament 100mm with a velocity of max. 100mm/min.

ⓘ If necessary, heat up the nozzle or allow cold extrusion to make movements possible.

⚠ Make sure the PTFE tube end is not installed to the printhead, as this would influence the extruded length due to backpressure, as well as make it difficult to measure the extruded length.

ⓘ If the filament is pulled back, the rotation direction is set incorrectly. The change of direction of rotation is shown below in several different types depending on your printer configuration.

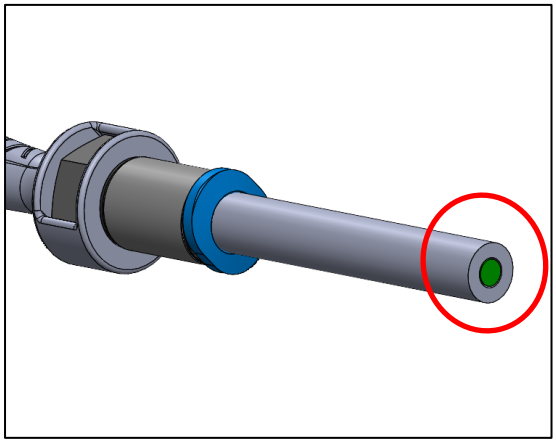
- Measure the extruded length ($l_{measured}$).

ⓘ If the extruded length is very close to 100mm, the calibration is finished here. Otherwise continue with the next steps.

⚠ Do not forget to prohibit cold extrusion if necessary, to prevent the printer from damage due to cold extrusion after finishing the calibration.

---

5. Reverse the Filament



- Reverse the filament 100mm with a velocity of max. 100mm/min.
- Here you can see the original state.

6. Determine current E-Steps

ⓘ Usually the current E-steps can be determined directly on the 3D-printer, in the firmware or by using the command <M503>, searching for the line starting with <M92> and searching for the value after E.

---

7. Calculate and Store new E-Steps

$$E_{New} = E_{Old} \cdot \frac{100}{l_{measured}}$$

- Calculate the new E-steps with the formula shown above.
- Store the new E-steps settings with a method shown below.

ⓘ As there are several different methods to store the E-steps to your printer, these methods are shown in individual chapters.

---

8. Repeat Measurement

- Go back to step 4 and repeat all the steps.

ⓘ Repeat all the steps until the extruded distance is sufficiently close to 100mm.

ⓘ The closer the extruded distance to 100mm, the better the printing results afterwards.

⚠ Do not forget to prohibit cold extrusion command if necessary, to prevent the printer from damage due to cold extrusion after finishing the calibration.

SAVING NEW SETTINGS

The following steps show different methods for saving the determined results from calibration to your 3D-printer. Depending on your 3D-printer, some methods are applicable and others are not.

Although we have done our best to provide all methods, there may be other ways to store the E-steps especially for some specific printers or firmwares.
If you have any method not listed in this document, please inform us and we will include that method in later versions of that document.

⚠ After uploading a new firmware these settings usually have to be renewed.

1. Save new Settings in Printer Settings

- On some 3D-printers it is possible to directly adjust the E-steps value in the menu.
- Adjust the value for the E-steps to reach the determined result for E_{New}.

⚠ Some 3D-printers don't save these settings when restarting the 3D-printer.

---

2. Save new Settings with Commands

<M92 E***>

<M500>

- Send the command <M92 E***> and replace the * with the value of E_{New} using a dot as a decimal separator by an external software (e.g. Pronterface) to the 3D-printer to set the E-axis steps per mm.

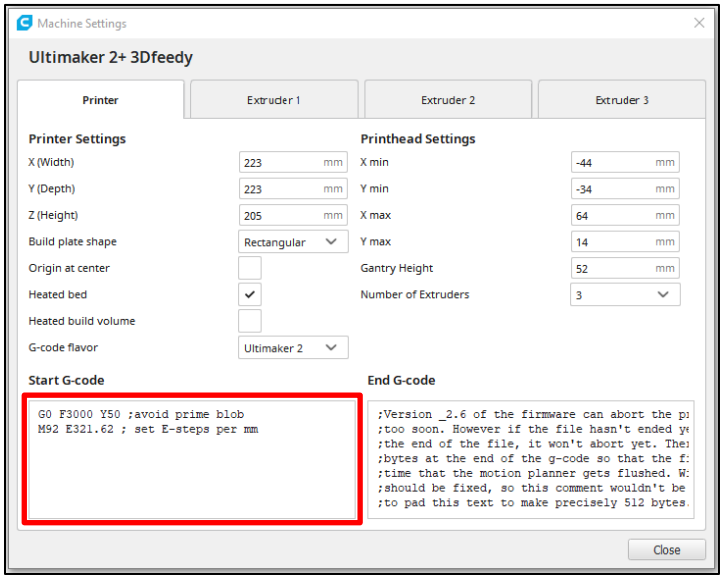
ⓘ If the value of E_{New} is 321.62, send the command <M92 E321.62> to your 3D-printer.

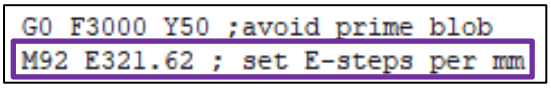
- Send the command <M500> with an external software (e.g. Pronterface) to store the value for the E-steps.

⚠ Some 3D-printers don't accept the command <M500>, which makes it impossible to save results to the 3D-printer using that method.

ⓘ You can check if the results have been saved to the 3D-printer switching the 3D-printer off and on and sending the command <M503> to your printer. If the value after E of the line starting with <M92> is equal to the determined value of E_{New}, the storing of the value was successful.

3. Save new Settings in Slicer Command





- If the methods shown above are not applicable you can insert the command for changing the E-steps in the Start G-Code in your slicer.

ⓘ This method is visualized in Cura, however it can usually be applied in any other slicer software.

- Insert the line with the command <M92 E***> and replace the * with the value of E_{New} using a dot as a decimal separator to the Start G-code.

ⓘ The Example above is shown for an E-steps value of 321.62 steps/mm

---

4. Save new Settings in Firmware

ⓘ The new settings for the extruder steps can be upgraded directly in the firmware.

ⓘ As there are a large number of different firmware, some have been selected and will be treated individually.

ⓘ Please choose the current firmware version of your 3D-printer and upgrade that firmware with the settings determined in the calibration.

⚠ Make sure all the settings in the firmware fit to your 3D-printer and to the previous settings.

4.1. Firmware Klipper

$$Rotation\_Distance = \frac{Full\_Steps\_per\_Rotation \cdot Microsteps}{Steps\_per\_mm}$$

```
[extruder]
step_pin: PL7
dir_pin: PL6
enable_pin: !PC0
microsteps: 16
rotation_distance: 33.500
```

- Calculate the value for the rotation distance.

⚠ Do not enter the value of E_{New} to the firmware. Calculate and insert the value for the rotation distance instead!

ⓘ The value “Full_Steps_per_Rotation” is dependendent on your stepper motor and usually 200, if the stepper motor has a step angle of 1.8° or 400 if the step angle is 0.9°. The value “Microsteps” is dependent on the microstep settings and the value “Steps_per_mm” is dependent on the determined values of E_{New}.

- Search for the line starting with “rotation_distance:” in the chapter “[extruder]” and insert the value of “Rotation_Distance” calculated above.

ⓘ The other values may differ significantly from those shown.

4.2. Firmware Sprinter

```
//// Calibration variables
// X, Y, Z, E steps per unit - Metric Prusa Mendel with Wade extruder:
#define _AXIS_STEP_PER_UNIT {80, 80, 3200/1.25, 700}
```

- Search for the line starting with “#define _AXIS_STEP_PER_UNIT” and replace the very last value in this line with the value of E_{New} determined in the calibration.

ⓘ The other values may differ significantly from those shown.

4.3. Firmware sjfw

```
#define A_HOME_DIR      0
#define A_STEPS_PER_UNIT 729.99
#define A_MAX_FEED      24000
```

- Search for the line starting with “#define A_STEPS_PER_UNIT” and insert the value of E_{New} determined in the calibration.

ⓘ The other values may differ significantly from those shown.

4.4. Firmware Marlin

```
 * Default Axis Steps Per Unit (steps/mm)
 * Override with M92
 *                                      X, Y, Z, E0 [, E1[, E2...]]
 */
#define DEFAULT_AXIS_STEPS_PER_UNIT   { 80, 80, 400, 500 }
```

- Search for the line starting with “#define DEFAULT_AXIS_STEPS_PER_UNIT” and replace the very last value in this line with the value of E_{New} determined in the calibration.

ⓘ The other values may differ significantly from those shown.

4.5. Firmware MK4duo

```
// Default steps per unit                X,  Y,  Z
#define DEFAULT_AXIS_STEPS_PER_UNIT   {80, 80, 3200}
// Default steps per unit                 E0, ...(per extruder)
#define DEFAULT_AXIS_STEPS_PER_UNIT_E {625, 625, 625, 625}
```

- Search for the line starting with “#define DEFAULT_AXIS_STEPS_PER_UNIT_E” and replace every value in this line with the value of E_{New} determined in the calibration.

ⓘ The other values may differ significantly from those shown.

4.6. Firmware RepRap

```
29  M569 P5 S0                  ; Reverse the extruder motor (T2)
30  M92 E660                    ; Set extruder steps per mm
31  M558 P2                     ; Use a modulated Z probe
```

- Search for the line starting with “M92 E” and replace the value with the value of E_{New} determined in the calibration.

ⓘ The other values may differ significantly from those shown.

ⓘ This value can also be overwritten by the command <M92 E***> shown at Save new Settings with Commands or Save new Settings in Slicer Command.

4.7. Firmware Smoothieware

```
extruder.hotend.enable              true        # Whether to activate the extruder module at all. All c
extruder.hotend.steps_per_mm        140         # Steps per mm for extruder stepper
extruder.hotend.default_feed_rate   600         # Default rate ( mm/minute ) for moves where only the e
```

- Search for the line starting with “extruder.hotend.steps_per_mm” and replace the value with the value of E_{New} determined in the calibration.

ⓘ The other values may differ significantly from those shown.

CHANGING THE DIRECTION OF ROTATION

The following steps show different methods for changing the direction of rotation of the extruder on your 3D-printer if necessary. Depending on your 3D-printer, some methods are applicable and others are not.

Although we have done our best to provide all methods, there may be other ways to store the E-steps especially for some specific printers or firmwares.
If you have any new method not listed in this document, please inform us and we will include that method in later versions of that document.

⚠ After uploading a new firmware these settings usually have to be renewed.

1. Change Direction of Rotation in Firmware

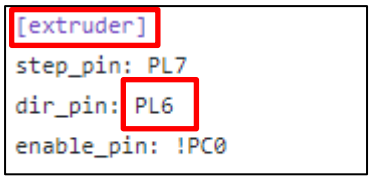
ⓘ The direction of rotation of the extruder can be changed directly in the firmware.

ⓘ As there are a large number of different firmwares, some have been selected and will be treated individually.

ⓘ Please choose the current firmware version of your 3D-printer and upgrade that firmware with the settings determined in the calibration.

⚠ Make sure all the settings in the firmware fit to your 3D-printer and to the previous settings.

1.1. Firmware Klipper



- Search for the line starting with “dir_pin:” in the chapter “[extruder]” insert an exclamation mark before the pin number.

ⓘ In the example shown above, the direction of rotation is changed by inserting “!PL6” instead of “PL6” or vice versa.

ⓘ The other values may differ significantly from those shown.

1.2. Firmware Sprinter

```
//------------------------------------------------------------------------
// Inverting axis direction
//------------------------------------------------------------------------
const bool INVERT_X_DIR = false;
const bool INVERT_Y_DIR = false;
const bool INVERT_Z_DIR = true;
const bool INVERT_E_DIR = false;
```

- Search for the line starting with “const bool INVERT_E_DIR = ” and replace the setting from false to true or vice versa.

ⓘ The other values may differ significantly from those shown.

1.3. Firmware sjfw

```
#define A_ENABLE_PIN    Pin(PortC, 7)
#define A_INVERT_DIR    false
#define A_HOME_DIR      0
```

- Search for the line starting with “#define A_INVERT_DIR” and replace the setting from false to true or vice versa.

ⓘ The other values may differ significantly from those shown.

1.4. Firmware Marlin

```
// For direct drive extruder v9 set to true, for geared extruder set to false.
#define INVERT_E0_DIR false
#define INVERT_E1_DIR false
#define INVERT_E2_DIR false
#define INVERT_E3_DIR false
```

- Search for the line starting with “#define INVERT_E0_DIR” and replace the setting from false to true or vice versa.

ⓘ The other values may differ significantly from those shown.

1.5. Firmware MK4duo

```
#define INVERT_X_DIR false
#define INVERT_Y_DIR false
#define INVERT_Z_DIR false
#define INVERT_E0_DIR false
#define INVERT_E1_DIR false
```

- Search for the line starting with “#define INVERT_E0_DIR” and replace the setting from false to true or vice versa.

ⓘ The other values may differ significantly from those shown.

1.6. Firmware RepRap

```
26  M569 P0 S1                          ; Reverse the X motor
27  M569 P3 S0                          ; Reverse the extruder motor (T0)
28  M569 P4 S0                          ; Reverse the extruder motor (T1)
29  M569 P5 S0                          ; Reverse the extruder motor (T2)
```

- Search for the line starting with “M569 P3 S” and replace the setting from 0 to 1 or vice versa.

ⓘ The other values may differ significantly from those shown.

1.7. Firmware Smoothieware

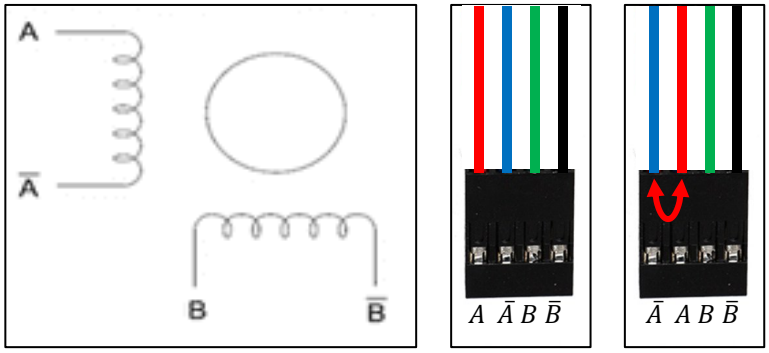
```
extruder.hotend.step_pin              2.3          # Pin for extruder step signal
extruder.hotend.dir_pin               0.22         # Pin for extruder dir signal ( add '!' to reverse direction )
extruder.hotend.en_pin                0.21         # Pin for extruder enable signal
```

- Search for the line starting with “extruder.hotend.dir_pin” in the chapter “[extruder]” insert an exclamation mark before the number.

ⓘ In the example shown above, the direction of rotation is changed by inserting “!0.22” instead of “0.22” or vice versa.

ⓘ The other values may differ significantly from those shown.

2. Change Direction of Rotation by Reversing Polarity on Plug



- Proof the plug for continuity with a multimeter and determine two crimps having continuity.
- Swap these two wires to change the direction of rotation of the stepper motor in the plug.

ⓘ The position of the different plugs may be different to the visualization shown above.

ⓘ The colors of the wires may be different to the visualization shown above.

ⓘ The plug structure may be different (e.g. 6 pins) to the visualization shown above.

⚠ Use a sharp tool to lift the plastic tabs of the connector for being able to gently pull the crimping contact out of the housing. Be carefully not to break the connector or the cable.

⚠ Use that method just if you are familiar with electronics as you might destroy the stepper motor or the mainboard.

---

3. Change Direction of Rotation by Turning the Plug

- Turn around the plug of your extruder drive motor on the mainboard to change the rotation direction.

⚠ If the plug doesn't fit in the mainboard, don't break the pins and use another method for changing the direction of rotation of the extruder motor.

SERVICE AND MAINTENANCE

1. Further Information

For detailed information, please visit the following links:

Feedy Converter	www.3dbizz.com/downloads
All manuals (multilingual)	www.3dbizz.com/manuals
All user guides (multilingual)	www.3dbizz.com/guides
FAQs	www.3dbizz.com
PDF-version of all manuals and guides	www.3dbizz.com/downloads
Warranty	www.3dbizz.com/warranty

Have fun with your 3Dfeedy

and don't hesitate to ask us if you have any questions

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