



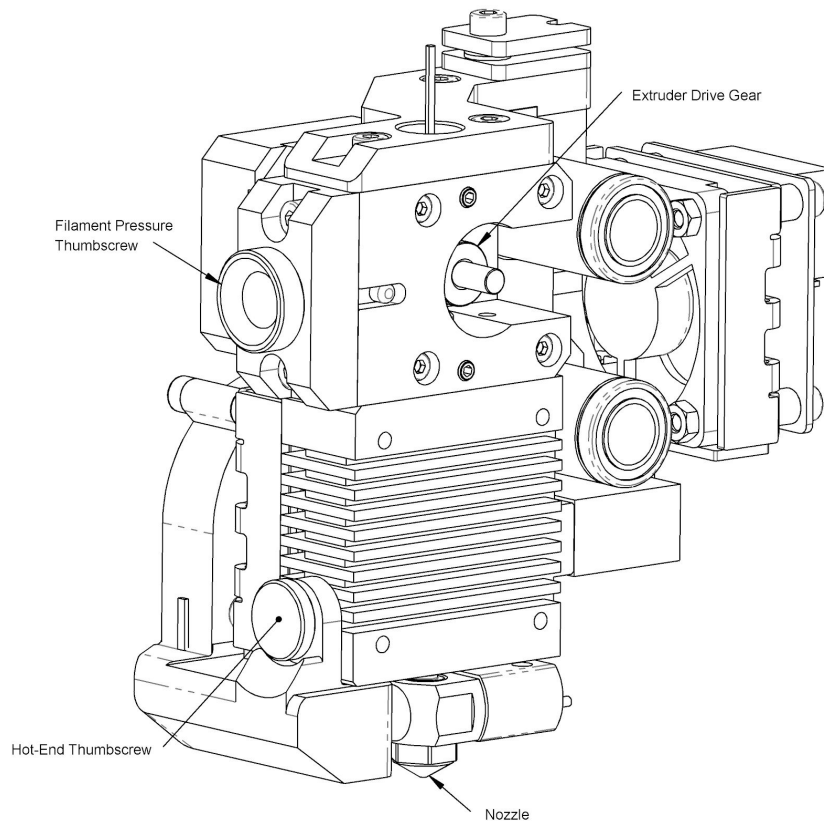
Title	Unclog a blocked Nozzle
Models	Bolt and Bolt Pro
Version	1.1
Revision date	30-07-2018
Expected duration	30 minutes

Description
<p>This manual explains how to unclog a blocked Nozzle. When the Nozzle is clogged little to no filament can flow through the Nozzle. This is usually caused by dirt, carbonized filament or a build up of a previously used filament with a higher melting temperature.</p> <p>Remember to use protective gloves, glasses and clothing for each of these activities.</p>

Guideline
<p>Leapfrog recommends to have a dedicated Hot End for each filament type.</p> <ul style="list-style-type: none"> <li>• Use the standard Hot End for printing with PLA, E-PLA, ABS, PETG, Flex, Nylon, HIPS, Hybrid, Scaffold and PP.</li> <li>• Use a stainless steel Nozzle for printing with carbon, wood or other abrasive filaments.</li> <li>• The High temperature Hot Ends are intended to work with filaments requiring temperatures upwards of 265°C. The High Temp Hot End is not intended for use with PLA or similar filaments, it is therefore strongly recommended not to use PLA or similar filaments with the High Temp Hot Ends.</li> </ul>

Tools
Allen key size 2, 3
Scissors
Spatula
<b>Tips &amp; Tricks:</b> Needle (size depended on Nozzle), Acetone, Wrench size 8, 12, 18, Pliers

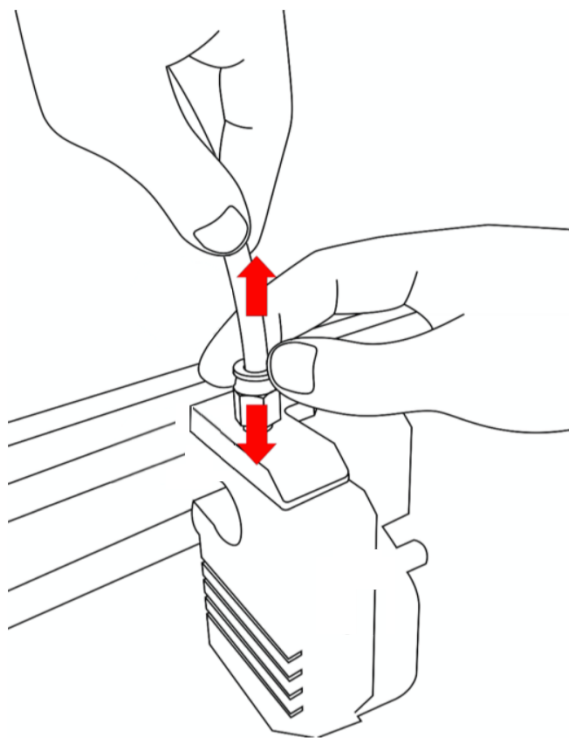
## Step 1 Preparations



Before starting this procedure. Make sure your machine is switched off and the Hot End has cooled.


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| a. | Ensure the Hot End Thumbscrew is tightened. For newer machines without Thumbscrews use a 3mm Allen key to tighten the retaining screw. |
| b. | Remove the Filament Pressure Thumbscrew. The pressure spring inside may also be pulled out.  |

Step 2 Disconnecting the Filament Tube



- a. Disconnect the filament tube from the printhead.

Step 3 Creating a new material profile



Operational

- Printer
- Materials
- Webcam
- Users
- Update
- RGB lighting
- Languages
- Logs

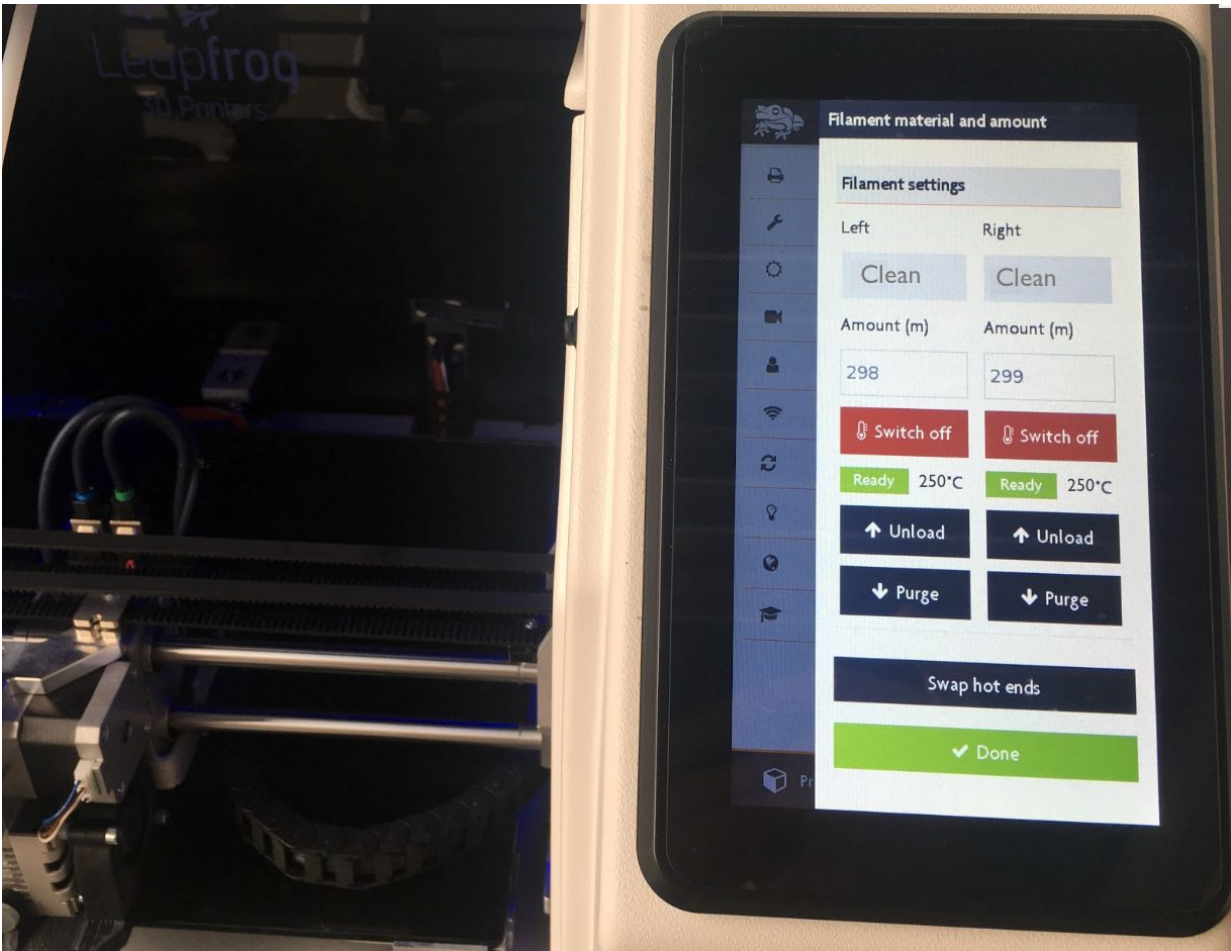
Materials

Material	Extruder	Bed	(°C)
PLA	200	40	Delete
ABS	230	70	Delete
Flex	220	45	Delete
Hybrid	240	70	Loaded
HIPS	240	70	Delete
Wood	210	45	Delete
Carbon	210	70	Delete
PVA	200	45	Delete
Nylon	230	70	Delete
PET-G	220	60	Delete
Clean	250	0	Delete

+ Add profile

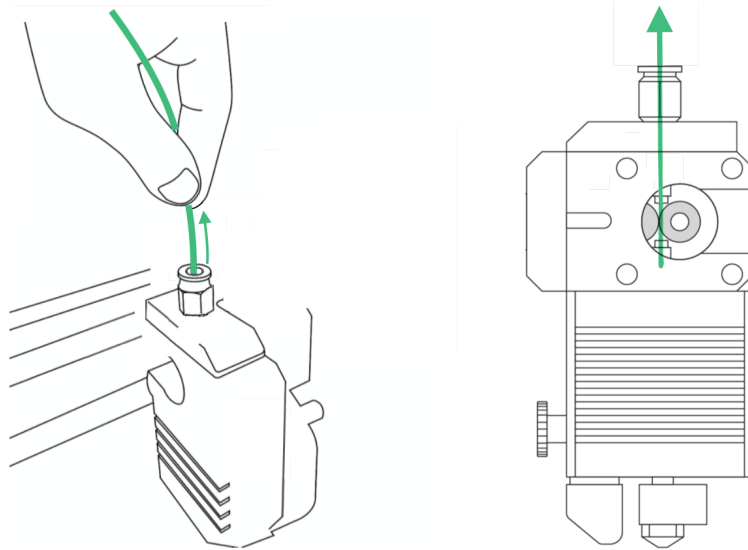
- Switch on the machine and navigate to Materials in the settings tab.
- Create a new profile by pressing “Add profile”, choose the name “Clean”.
- Determine which filament was last used and add +10 °C to the extruder temperature (e.g. last used hybrid 240°C + 10°C = 250°C).
- Enter the Extruder temperature value determined at previous step into the “Clean” profile.

Step 4 Pre-Heat the clogged Nozzle



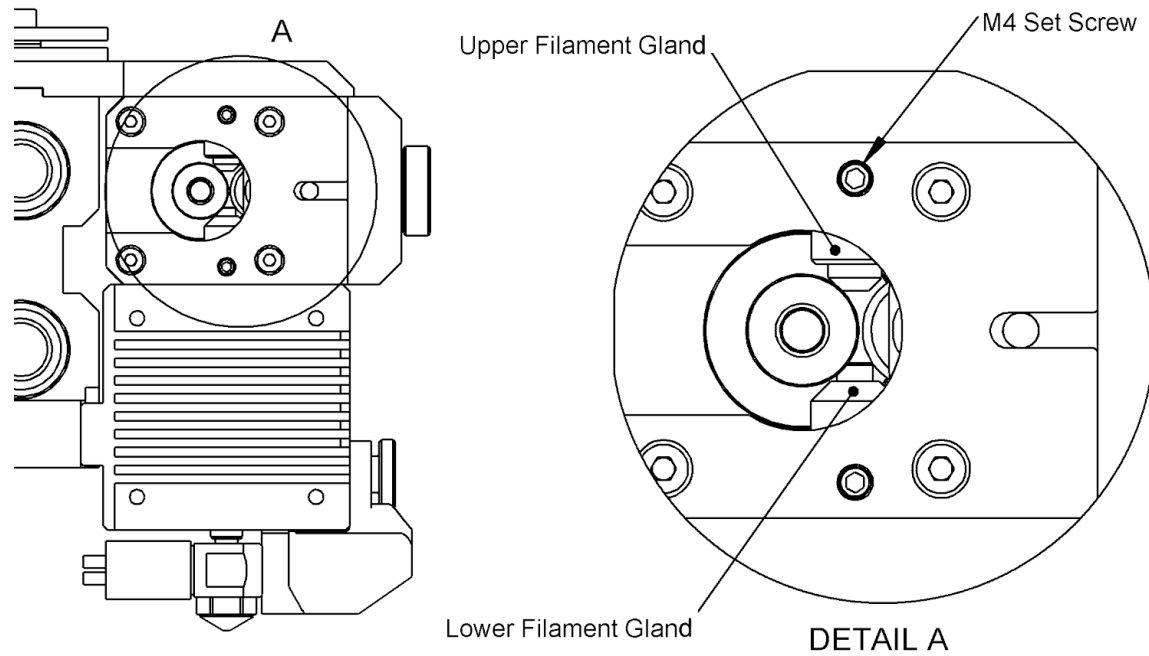
a.	In the settings tab navigate to Head Maintenance.
b.	Select the material "Clean".
c.	Press the Pre-Heat button and wait for the temperature to be "Ready".
d.	Cleaning the Nozzle exterior. Gently scrub any filament remainings from the Nozzle using a spatula.
e.	Clean any filament debris from the extruder drive gear with a brass wire brush. The extruder drive gear may be automatically rotated by pressing the Unload button.

Step 5 Unloading filament



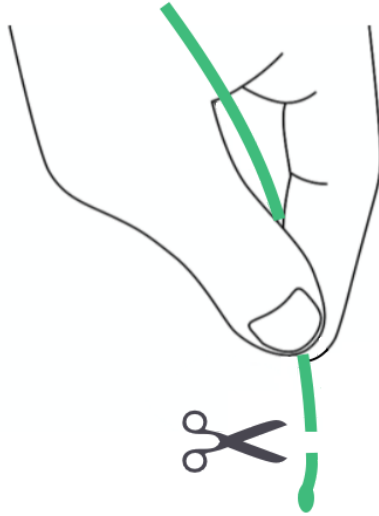
<b>Note</b>	If no filament is loaded in the printhead, proceed to step 6.
a.	Gently pull the filament upwards out of the printhead. If the filament cannot be fully removed proceed to the next step.
b.	Push the filament downwards until it either comes out of the Nozzle or cannot be pushed any further. Then repeat step a.

Step 6 Inspecting the printhead for filament debris



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| a. | <p>Make sure all visible filament debris between the Upper and Lower Filament Gland is removed.</p> <p><b>Tips &amp; Tricks</b><br/>The upper M4 Set Screw may be temporarily loosened using an 2mm size allen key allowing removal of the upper filament gland. Replace after cleaning.</p> |
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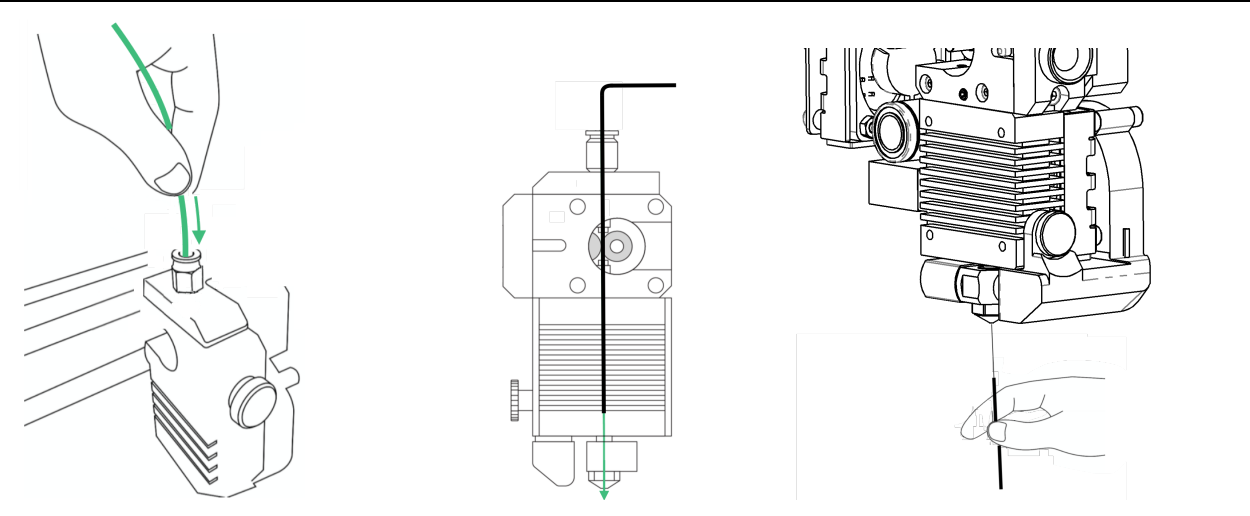
Step 7 Preparing a new piece of filament



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| a. | Cut a 20cm length of filament . PLA is preferred, flexible or brittle filaments should be avoided. |
| b. | Cut off any blobs or deformations on the tip of the filament.                                      |

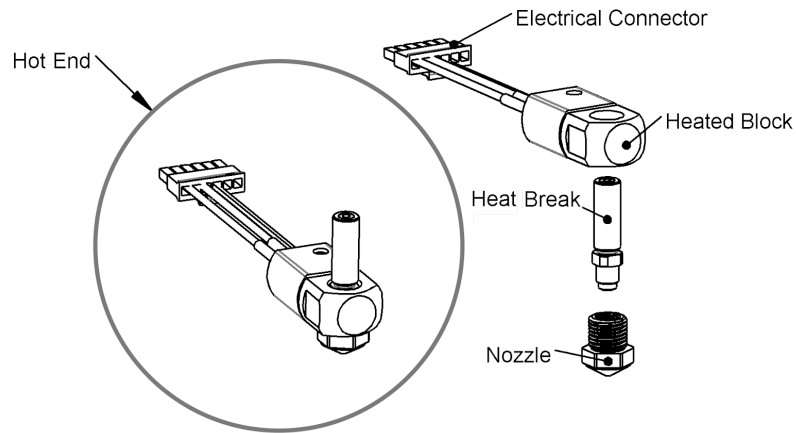


Step 8 Purging



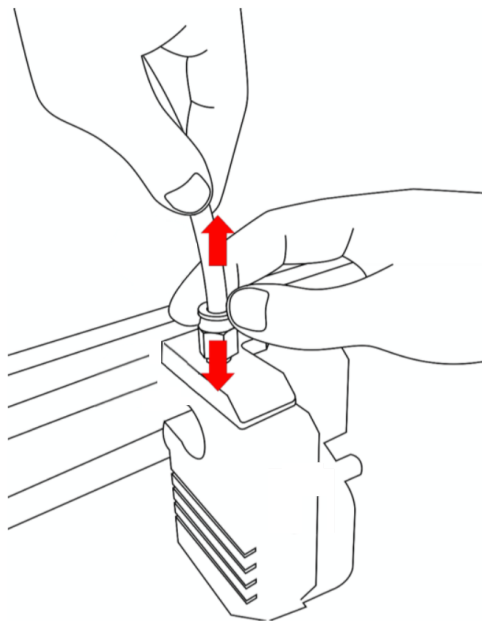
a.	<p>Insert the filament as far in as possible.</p> <p><b>Tips &amp; Tricks</b> To easily inspect if the inserted filament length reaches all the way to the Nozzle, pull the filament out and then hold it against the side of the printhead. In case the filament bumps against a ledge along the way the filament tip is not smooth enough, please cut it again.</p>
b.	<p>Push the filament downwards until it either comes out of the Nozzle or cannot be pushed any further. If the filament gets damaged / bent cut of a new 20 cm strand.</p> <p>If zero or hardly any filament comes out when trying to push it manually through the heated Hot End. Try pulling some particles out upwards, cut off a fresh filament string and re-insert it. In some cases, the Nozzle is clogged with just a tiny particle</p> <p>Tools (2mm size allen key) may also be used to push the filament in a downwards direction using no excessive force. When using tools be sure to remove all dirt and verify that there is no sharp edges on the tool that could scratch the inside of the print head.</p> <p><b>Tips &amp; Tricks</b> Sometimes it is possible to unclog the Nozzle using a needle. The needle must be thinner than the Nozzle diameter (standard .35mm). Acupuncture needles could be used. Simply insert the needle from the bottom side. Be careful not to damage the Nozzle when moving the needle. When removing the needle check if any particles are being pulled out of the Nozzle.</p> <p>Caution: Be careful not to burn fingers as the Nozzle and residue can be hot. Use protective gloves to get protection from the residue.</p>

Step 9 Cleaning the Nozzle with Acetone



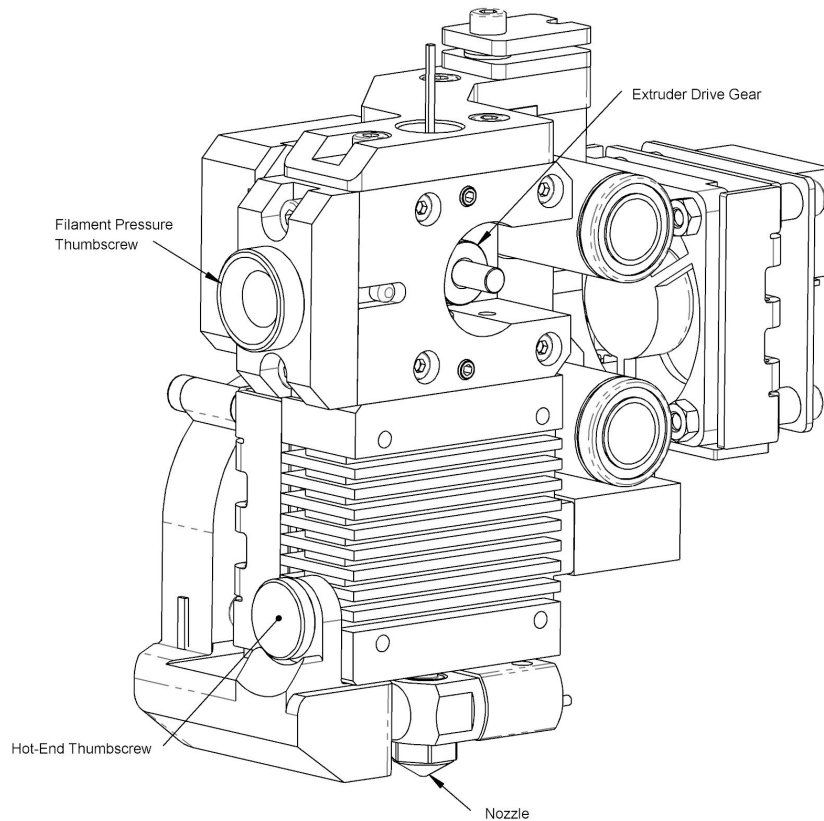
<b>Note</b>	Only follow this step if none of the above methods help to resolve the clogged Nozzle.
a.	Remove as much filament from the Nozzle as possible.
b.	Switch off the machine and let the Hot End cool down.
c.	Disconnect the Hot End electrical connector.
d.	Loosen the Hot End Thumbscrew and pull the Hot End out in a downwards vertical motion.
e.	Unscrew the Nozzle (wrench size 12) from the Heated block (wrench size 18).
f.	Disconnect the Heat Break (wrench size 8) from the Nozzle (wrench size 12).
g.	Place the Nozzle in a container filled with acetone for 8-10 hours.
h.	Take out the Nozzle with pliers and remove any excessive dirt using a spatula. A needle may be inserted from the bottom side of the Nozzle.
i.	Reassemble the Hot End and install in to the machine.

Step 10 Connect the Filament Tube



- a. Connect the filament tube from the printhead.

## Step 11 Final steps



a.	Install the Filament Pressure Thumbscrew and pressure spring in the printhead.
b.	Tension the Filament Pressure Thumbscrew in accordance to the used filament. Not enough pressure will cause slipping and results in under extrusion. To much pressure will cause the filament to get chewed away by the pinch wheels and will also result in under extrusion. A good starting point is to have 3 screw threads visible.
c.	Load new filament in to the machine. From the Head Maintenance screen purge the new filament.