

Fusion3

EDGE 3D Printer

REPAIR:

EXTRUDER SERVICE & REBUILD

Revision 02/08/2023

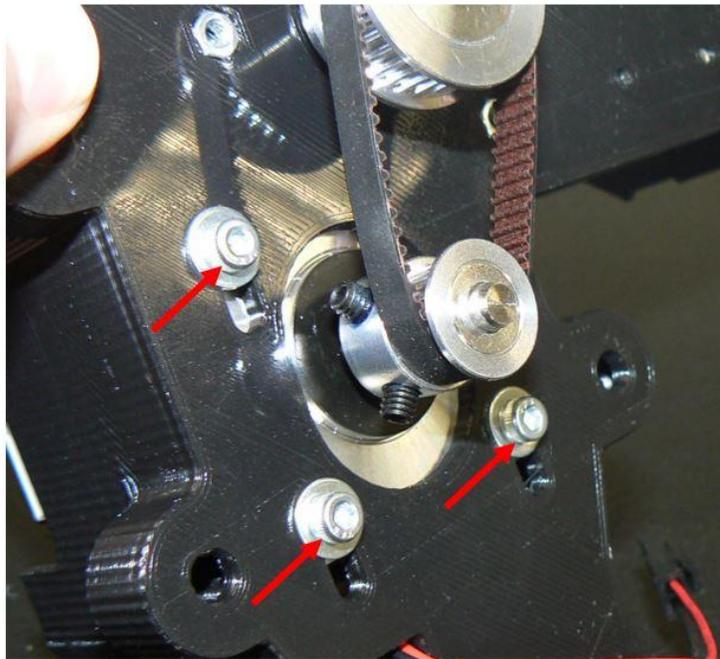
HOW TO DISASSEMBLE & REASSEMBLE EDGE'S EXTRUDER

Instructions for how to disassemble and reassemble EDGE's original (v3) extruder. Depending on what component you need to service or replace you may not need to follow every step below.

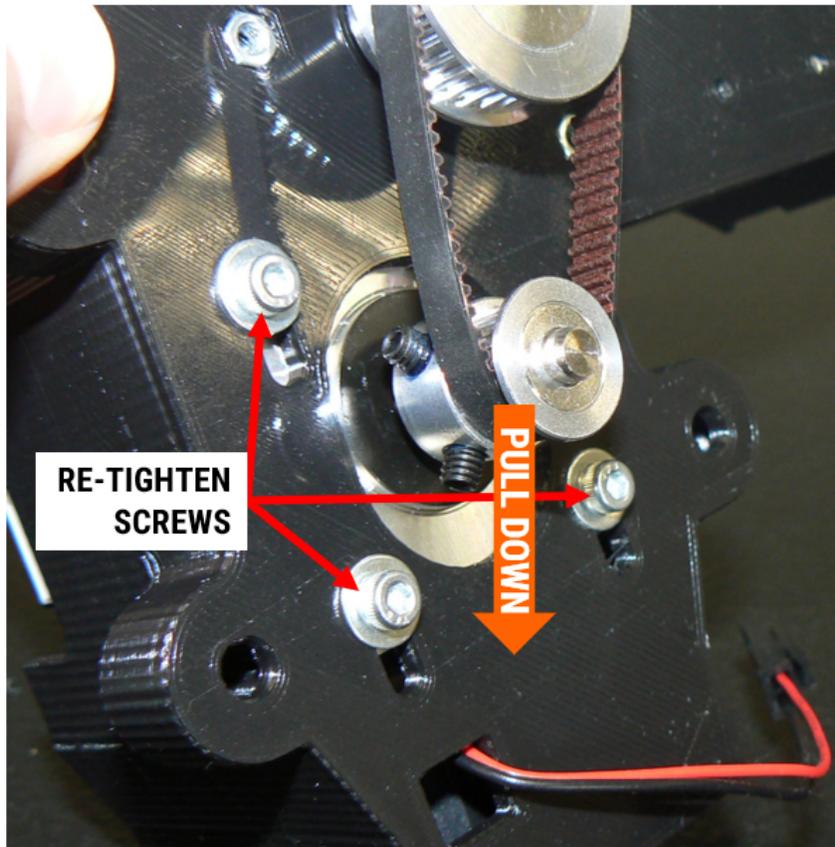
NON-DISASSEMBLY MAINTENANCE ITEMS

1) Adjust Extruder Belt Tension

1. Remove the extruder from the printer, following the steps in "*Maintenance - Removing & Installing Extruder*".
2. Loosen the 3 motor screws.



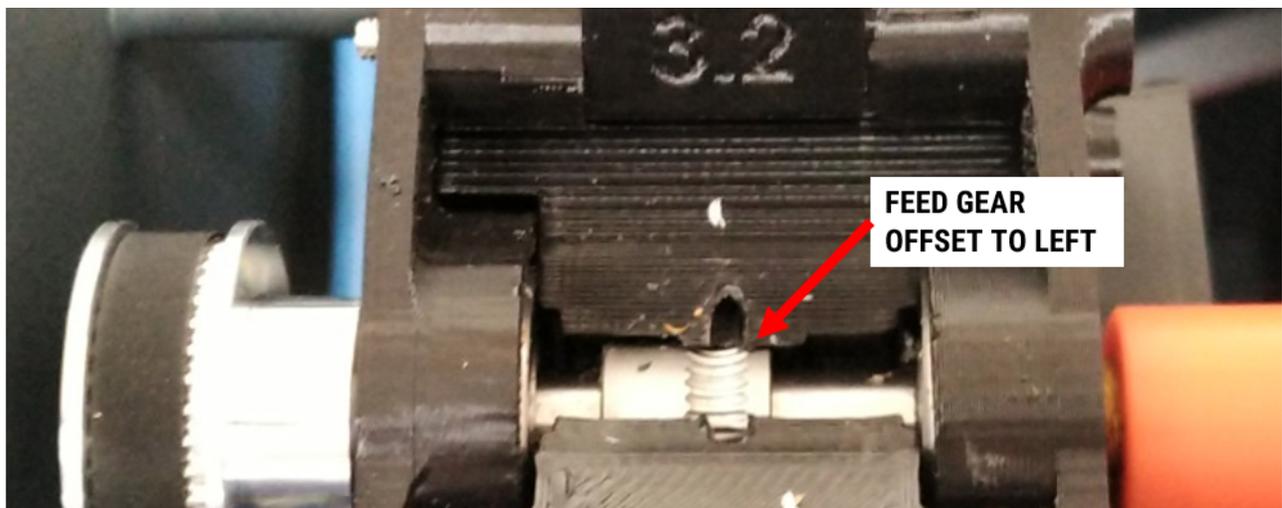
3. Pull down firmly on the small pulley to slide the motor away from the large pulley.
4. While holding the motor in place, re-tighten the 3 screws firmly.



5. Rotate the extruder by hand and make sure it spins freely and the belt does not try to walk off the pulleys.
6. Reinstall the extruder onto the printer, following the steps in "*Maintenance - Removing & Installing Extruder*".

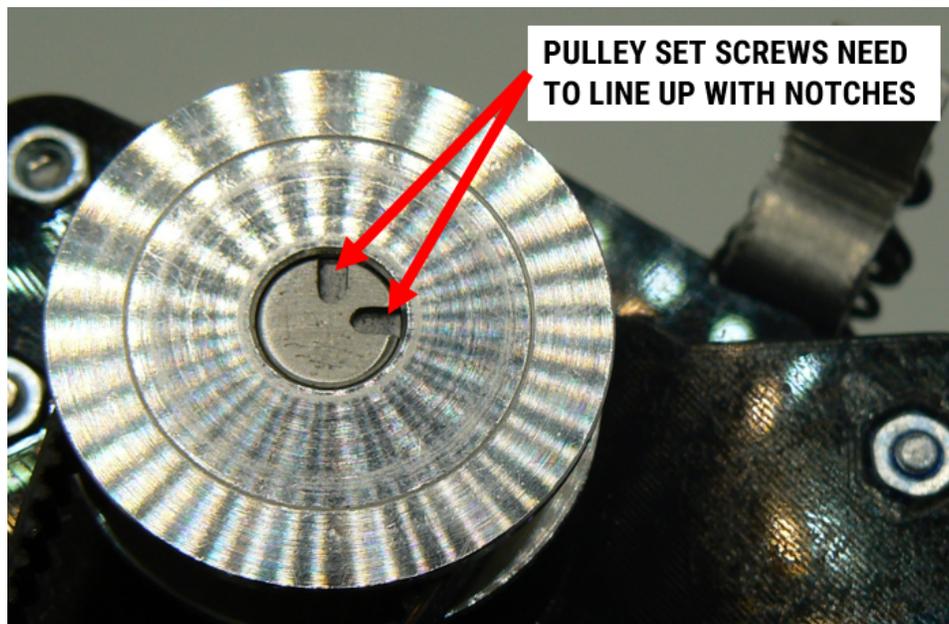
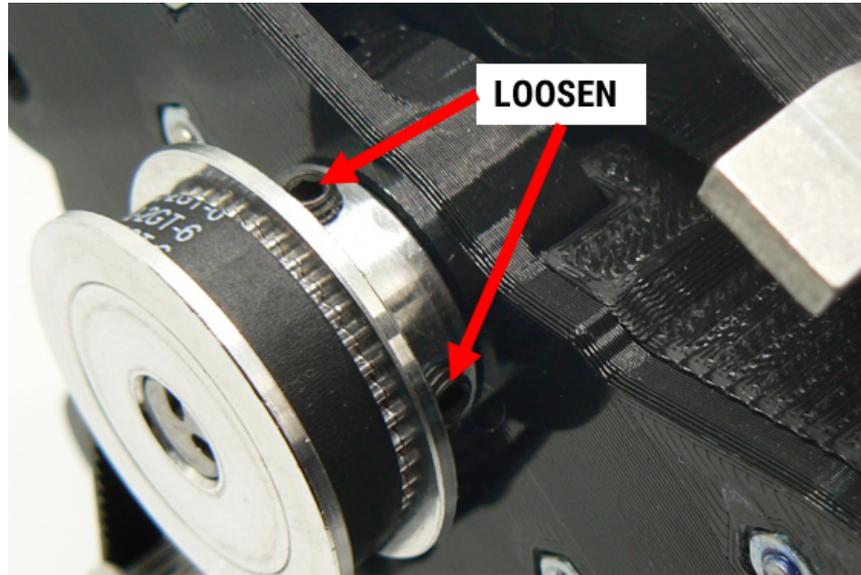
2) Adjusting the Main Shaft Position

If the feed gear is persistently not lined up with the filament feed path, this can cause feed issues and needs to be corrected.

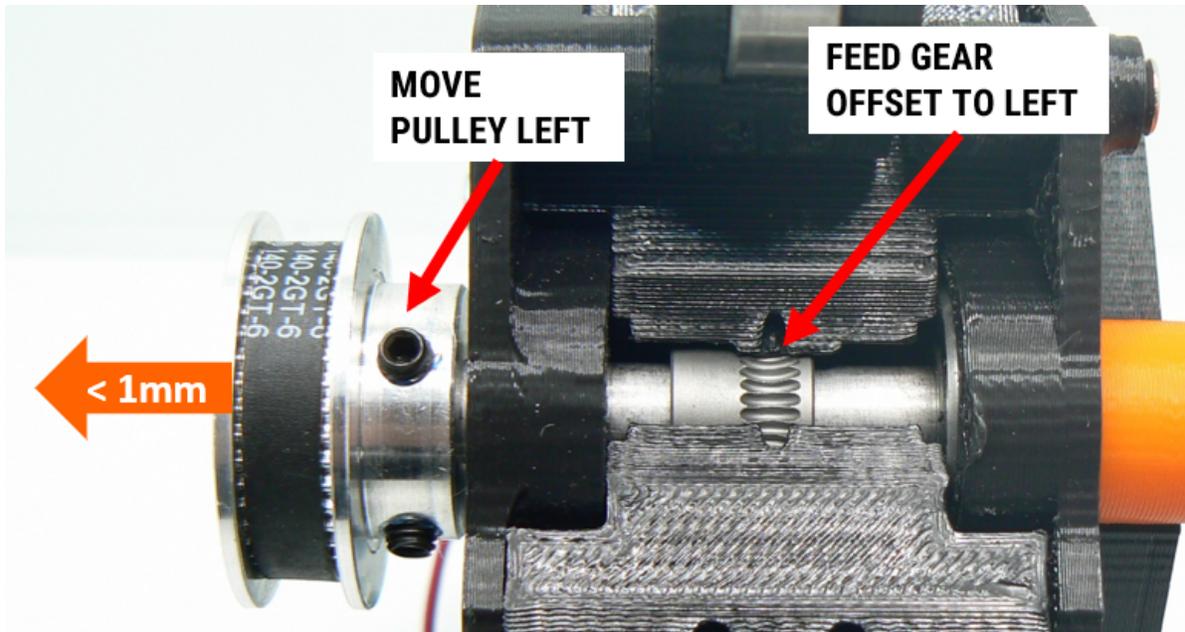


Due to how tight the feed gear set screw must be, and how small and easy to round out the set screw is, **DO NOT ADJUST** the feed gear itself, but follow this procedure.

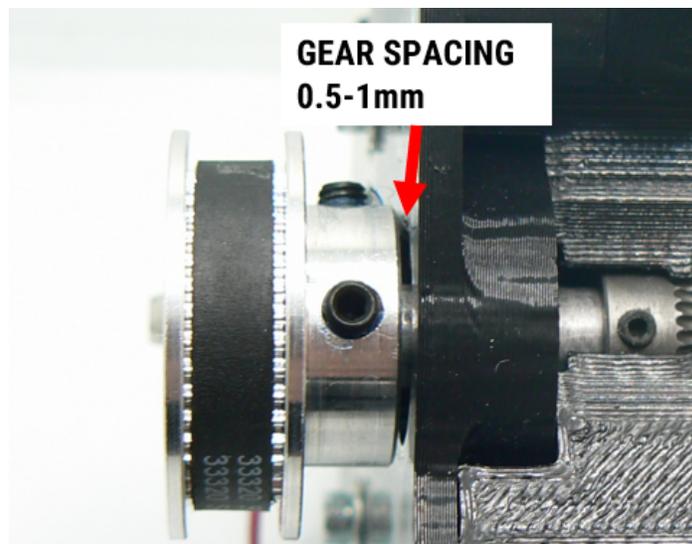
1. Loosen the belt tension so the pulley can be easily adjusted (see section above).
2. Loosen the large pulley set screws (2) enough that you can slide the pulley along the shaft, but not so much that the pulley can rotate freely. You want the set screws to stay on the flats machined into the shaft.



3. If the feed gear is to the LEFT of the filament path, move the large pulley to the LEFT.



4. If the gear is to the RIGHT of the filament path, move the large pulley to the RIGHT. (this is rare)
5. Move the pulley less than 1mm at a time.
 - a. After you make the adjustment, tighten the set screws, add belt tension, and load filament through the extruder by hand on the bench (not on the printer).
 - b. Feeding filament through the extruder shows you how everything is going to behave under actual operation.
 - c. It's normal for the shaft to have some float and we want to see where things naturally settle before making further adjustments.
6. Make sure the large pulley is spaced away from the extruder body by 0.5-1mm.



7. Repeat these steps as needed to get the feed gear lined up with the filament path. You want the filament tracking in the middle of the toothed groove, +/- 0.25mm.
8. Check your idler bar spring spacing. The gear has moved so the filament will sit lower.
9. Once you're happy with the position of the feed gear, firmly tighten the large pulley set screws and the motor screws.
10. Re-install the extruder back on the printer.
11. After a few hours of run-time, check the feed gear position to make sure it hasn't drifted again. Make further adjustments as needed.

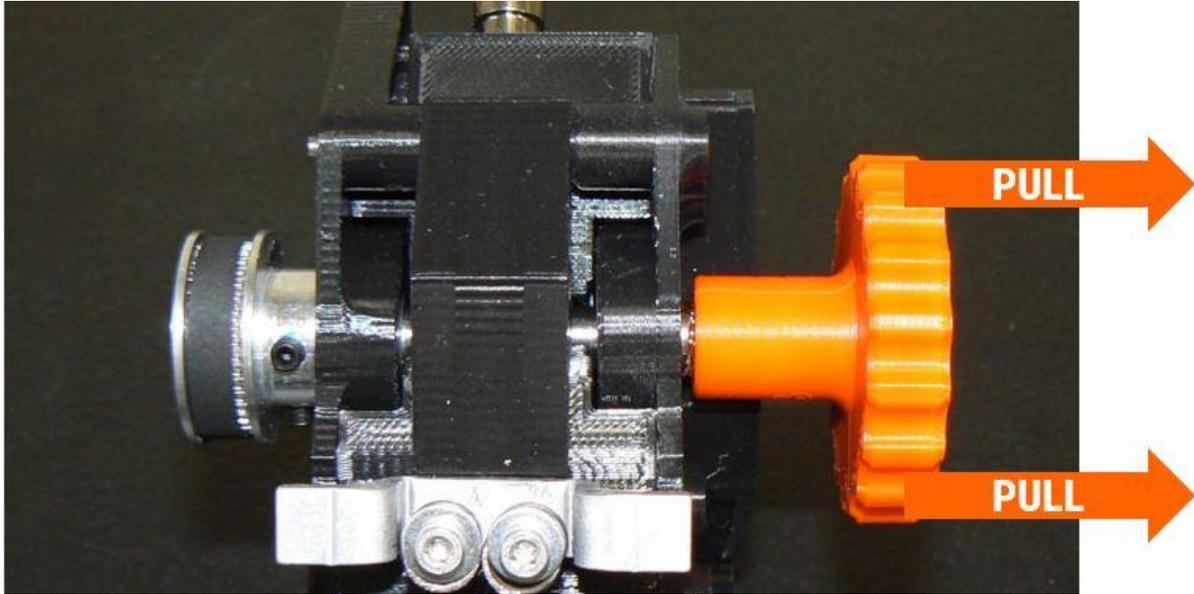
DISASSEMBLY

1) Remove Extruder From Printer

Follow the instructions in our separate document "*Maintenance - Removing & Installing Extruder*".

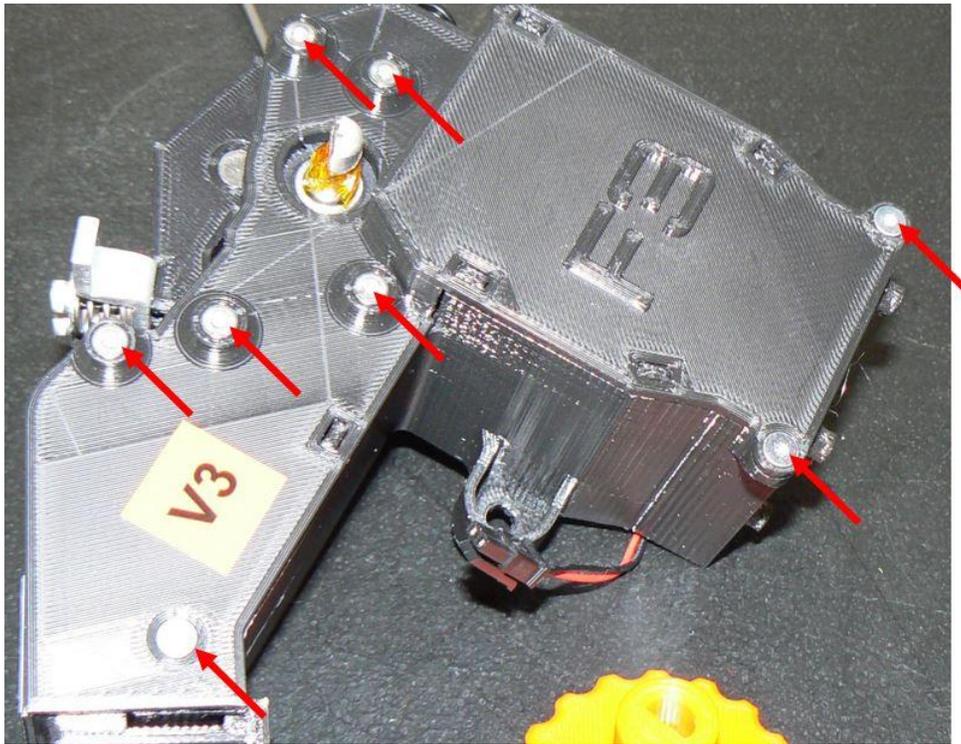
2) Remove Manual Advance Knob

The orange manual advance knob is a press fit on the end of the shaft. Pull it away from the extruder body slowly but firmly until it pops off the shaft.



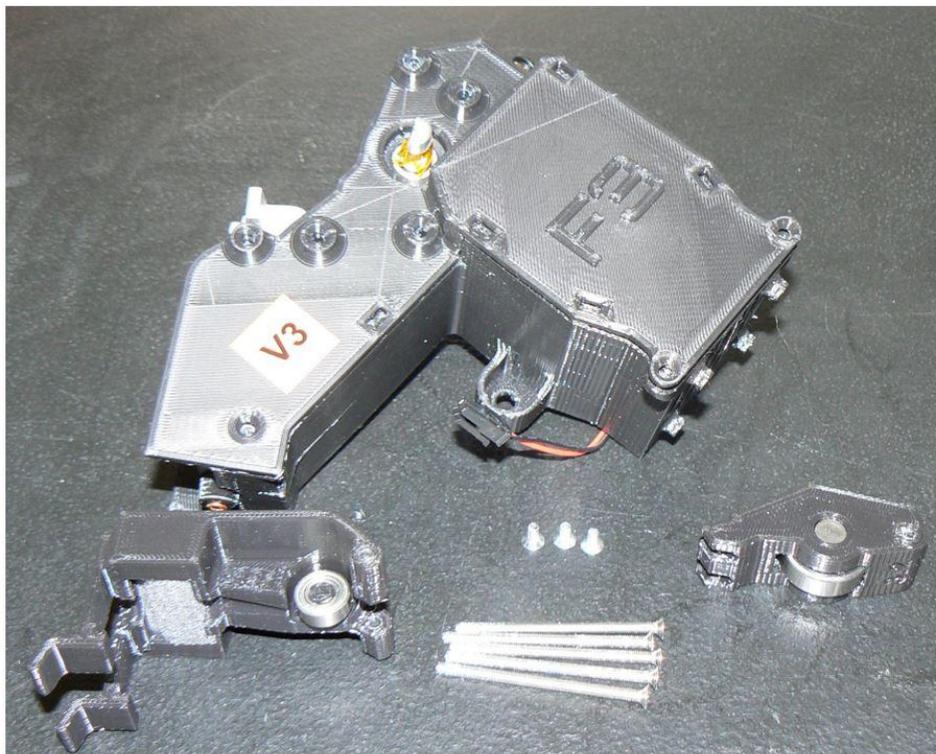
3) Remove Main Screws

Use the 2mm hex drive from your toolkit to remove the 3 short M3 FHCS and the 5 long M3 FHCS.



4) Remove Filament Monitor Door & Idler Bar

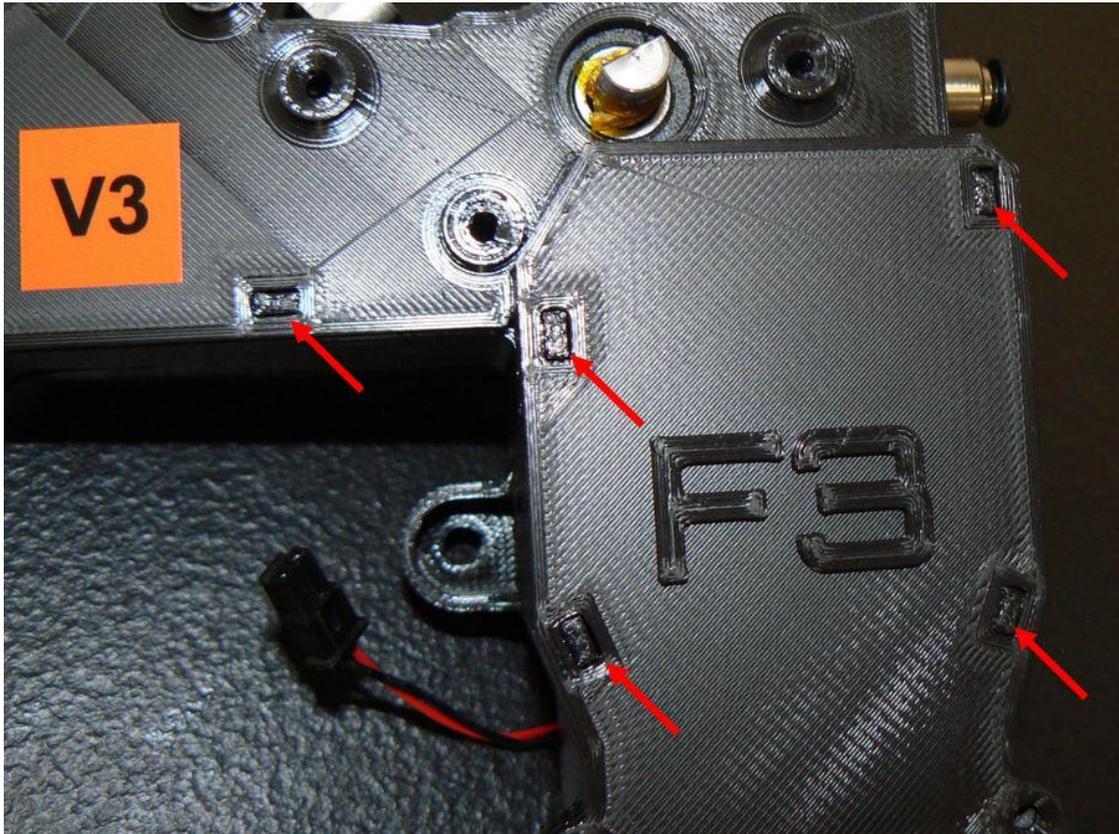
Remove the filament monitor door and idler bar from the assembly.



5) Separate Frontplane

Using a black stick or small flat blade screwdriver, gently pry the front of the extruder (frontplane) loose from the assembly.

There are 5 tabs that align the Frontplane than you need to make sure separate without damaging the Frontplane or the tabs.

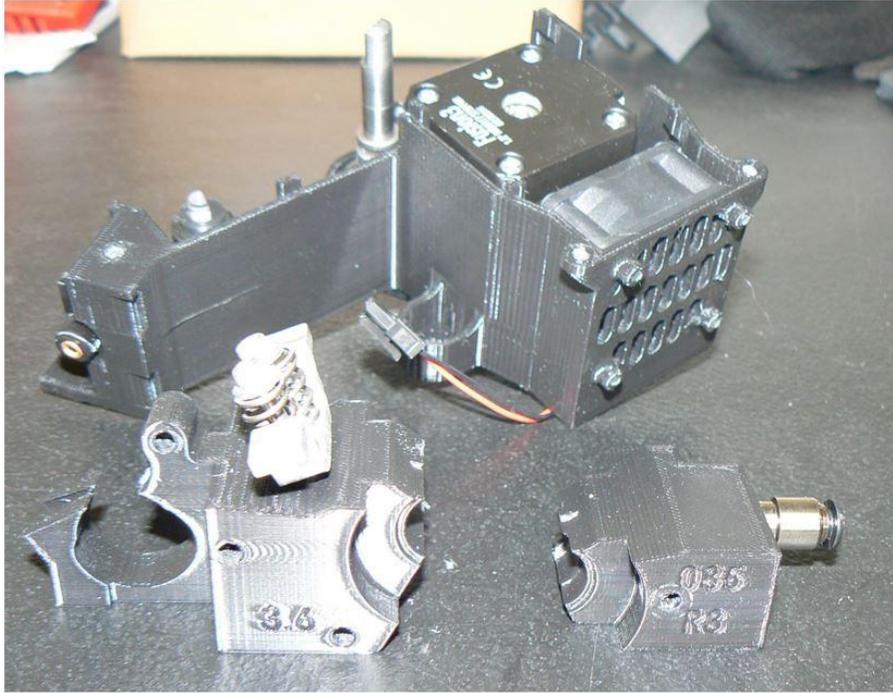


Once the Frontplane is loose, slide it off of the main shaft.



6) Remove Midplanes

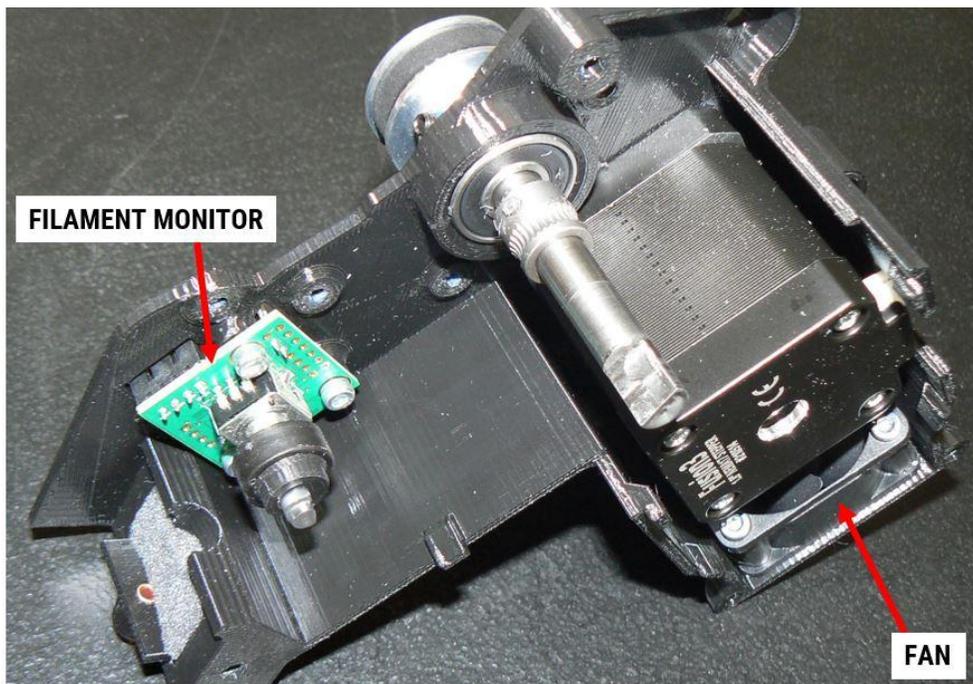
The fore and aft midplanes should now be loose and easily removed.



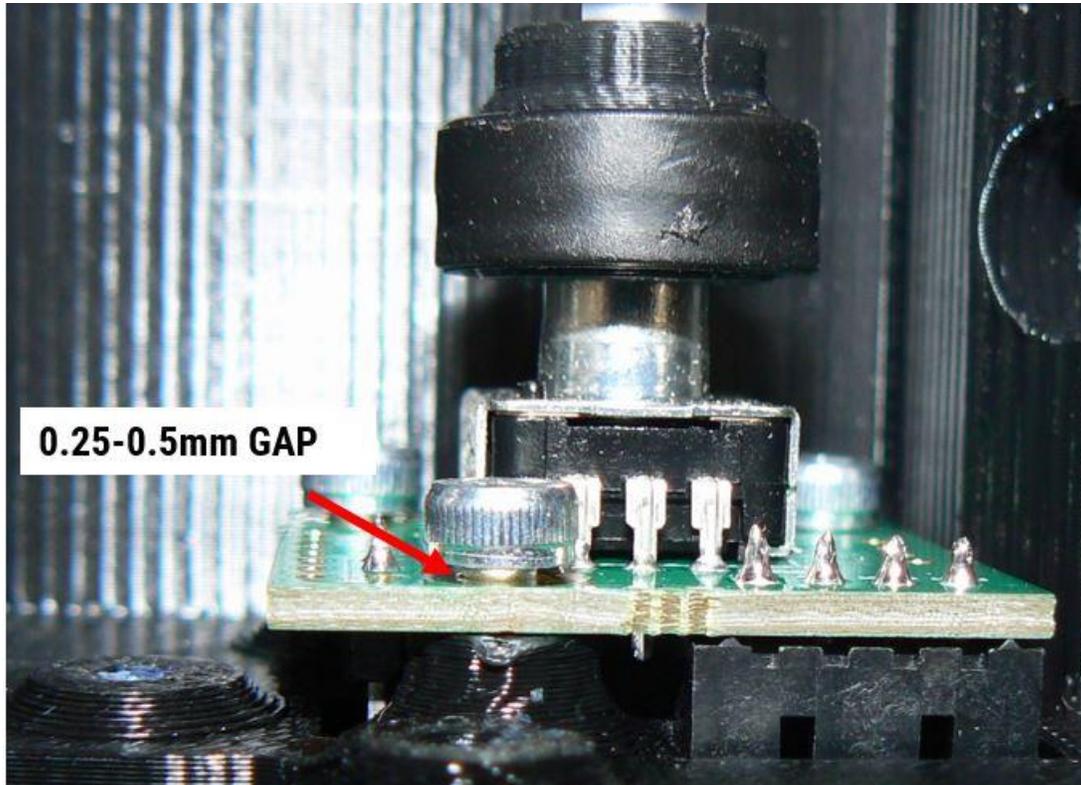
7) Misc Internal Parts

Filament Monitor:

You can now access and remove/replace the filament monitor encoder wheel, the filament monitor itself, etc.



If you remove/replace the filament monitor, leave the screws slightly loose so the PCB has some play in it. The screw heads should be 0.25-0.5mm from tightened down all the way.



Fan:

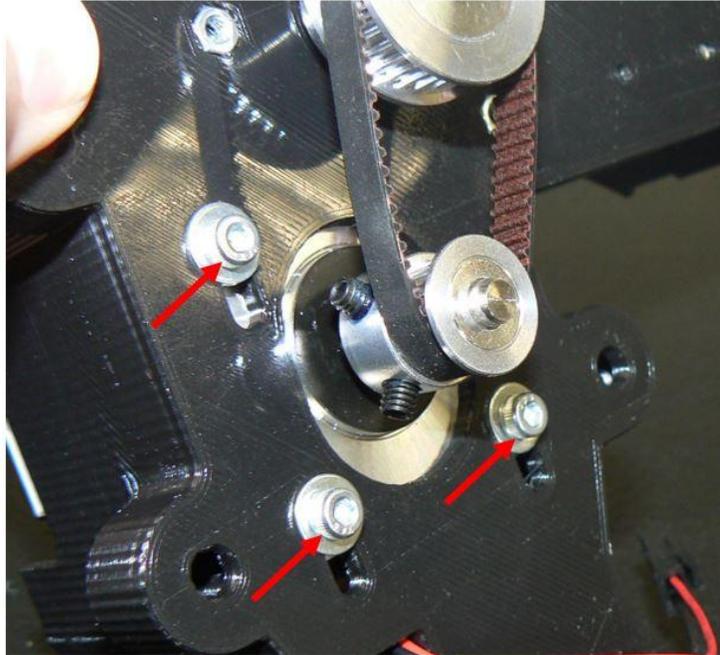
The fan is located below the motor. To access all 4 screws, you will need to remove the motor first. These screws thread into the plastic of the housing so don't get too aggressive with them.

If you replace the fan, make sure the airflow direction is pointing OUT through the bottom of the extruder.

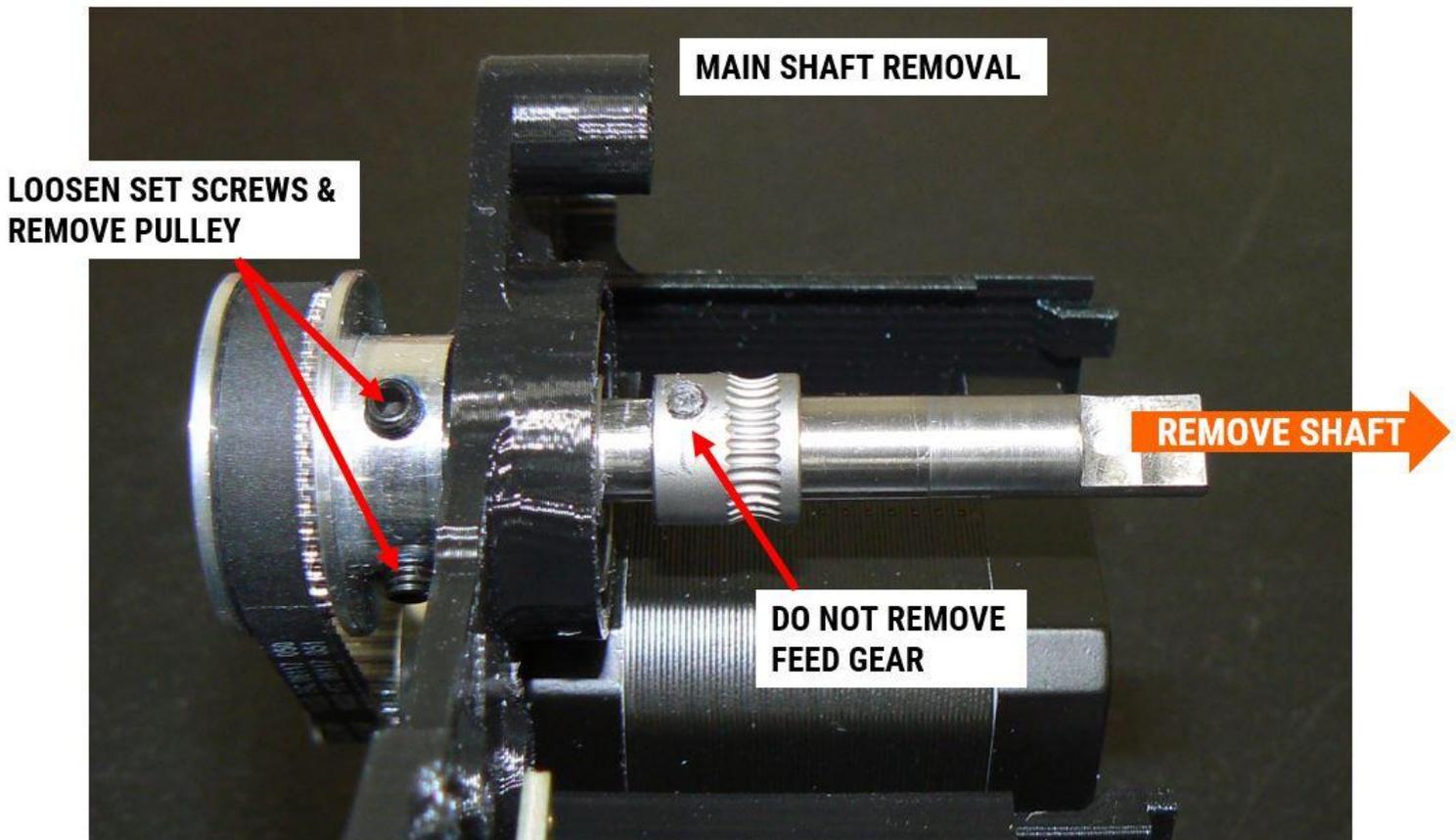
8) Removing the Main Shaft

If you need to remove the main shaft from the assembly:

1. Loosen the 3 motor screws and slide the motor up to reduce belt tension.



2. Loosen the 2 set screws in the large pulley on the main shaft



3. Slide the pulley off the shaft and remove the belt.

4. Slide the shaft out of the assembly towards the inside, so you don't have to remove the feed gear.

IMPORTANT: Don't remove the feed gear or try to loosen its set screw unless you are replacing the feed gear.

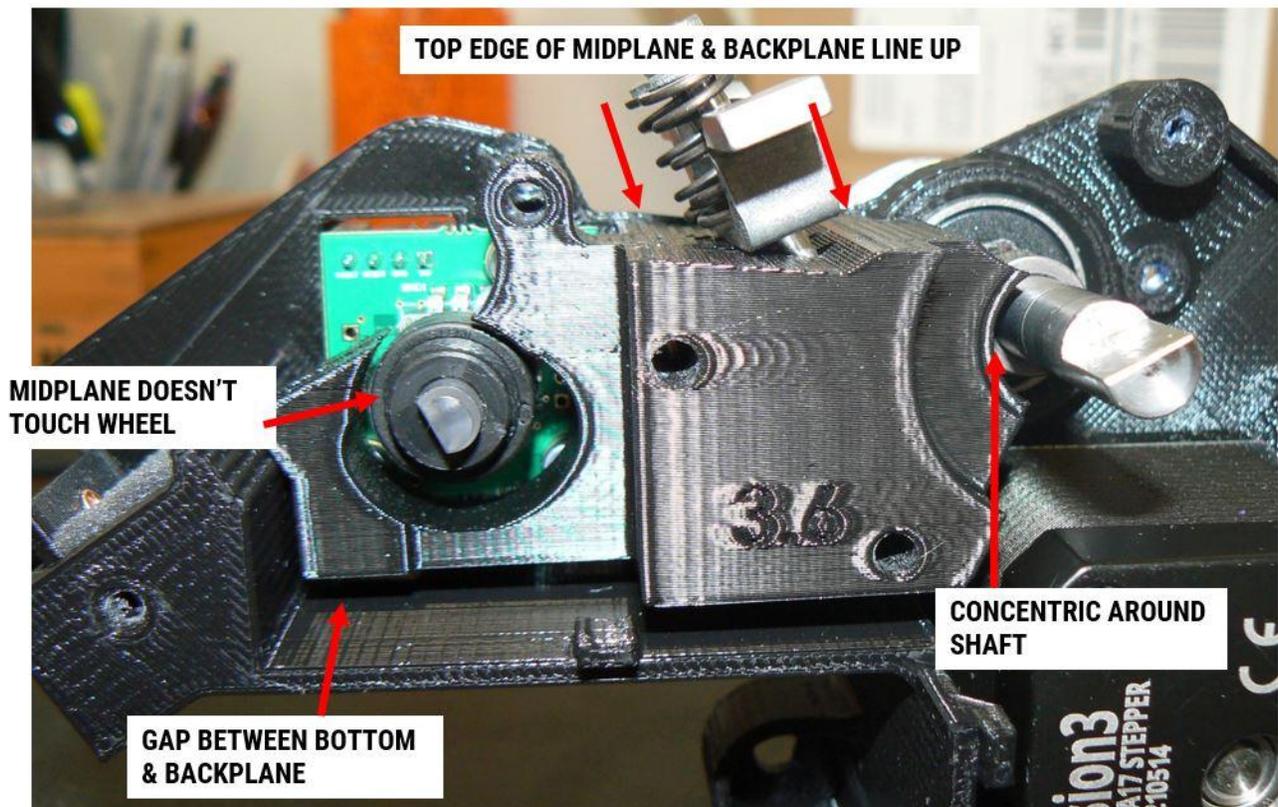
REASSEMBLY

1) Internal Parts

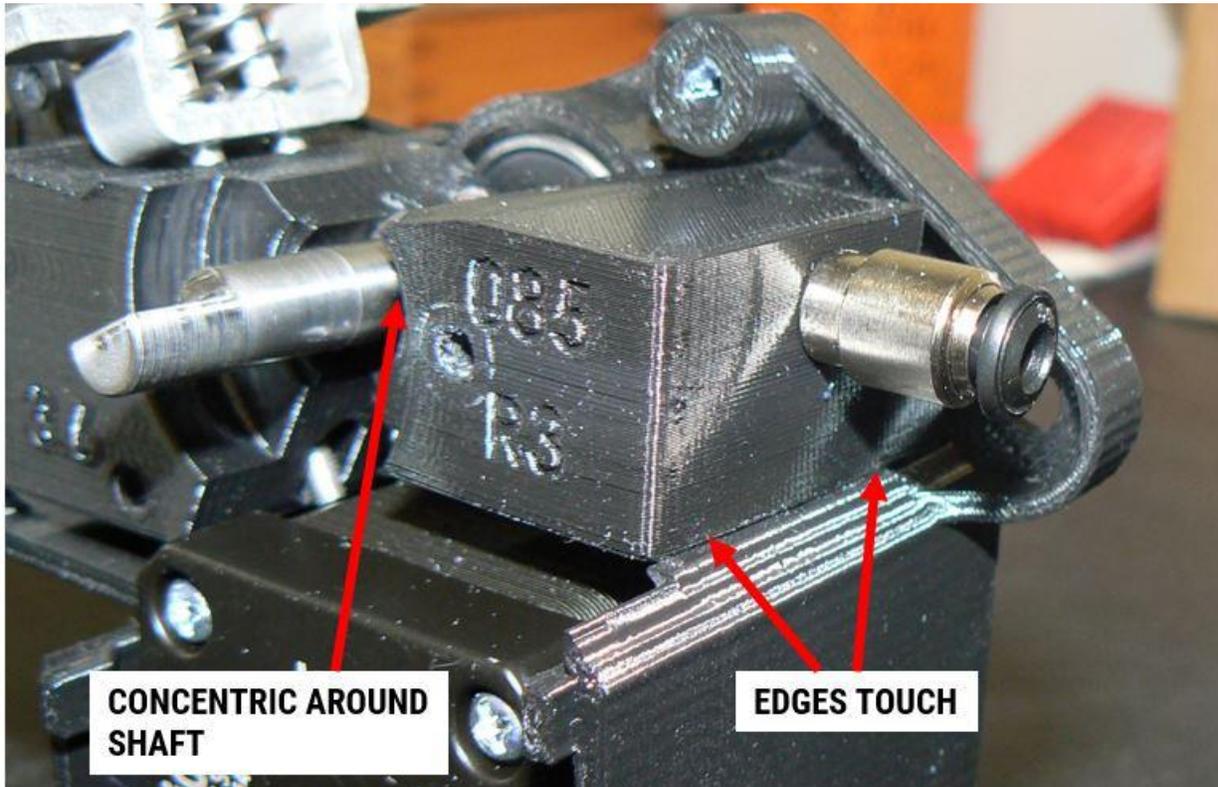
Make sure the following are installed:

1. Fan
2. Motor (screws left loose if you touched them)
3. Filament monitor PCB & encoder wheel
4. Main shaft
5. Both belt pulleys
6. Install belt now but leave slack, if you touched it.
7. 608 bearing on backplane
8. 608 and 686 bearing on frontplane

Install Aft Midplane in position shown.



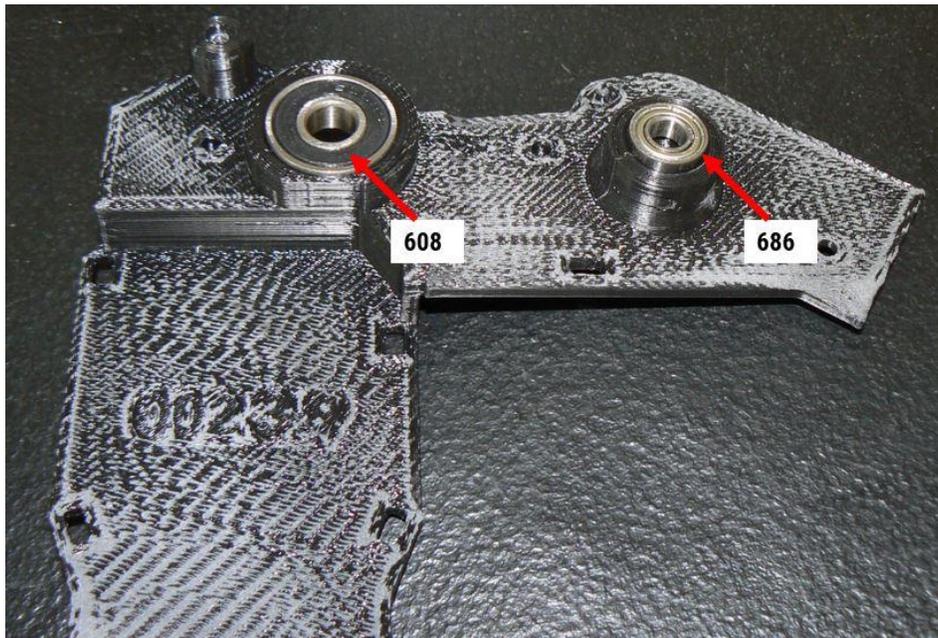
Install Fwd Midplane in position shown.



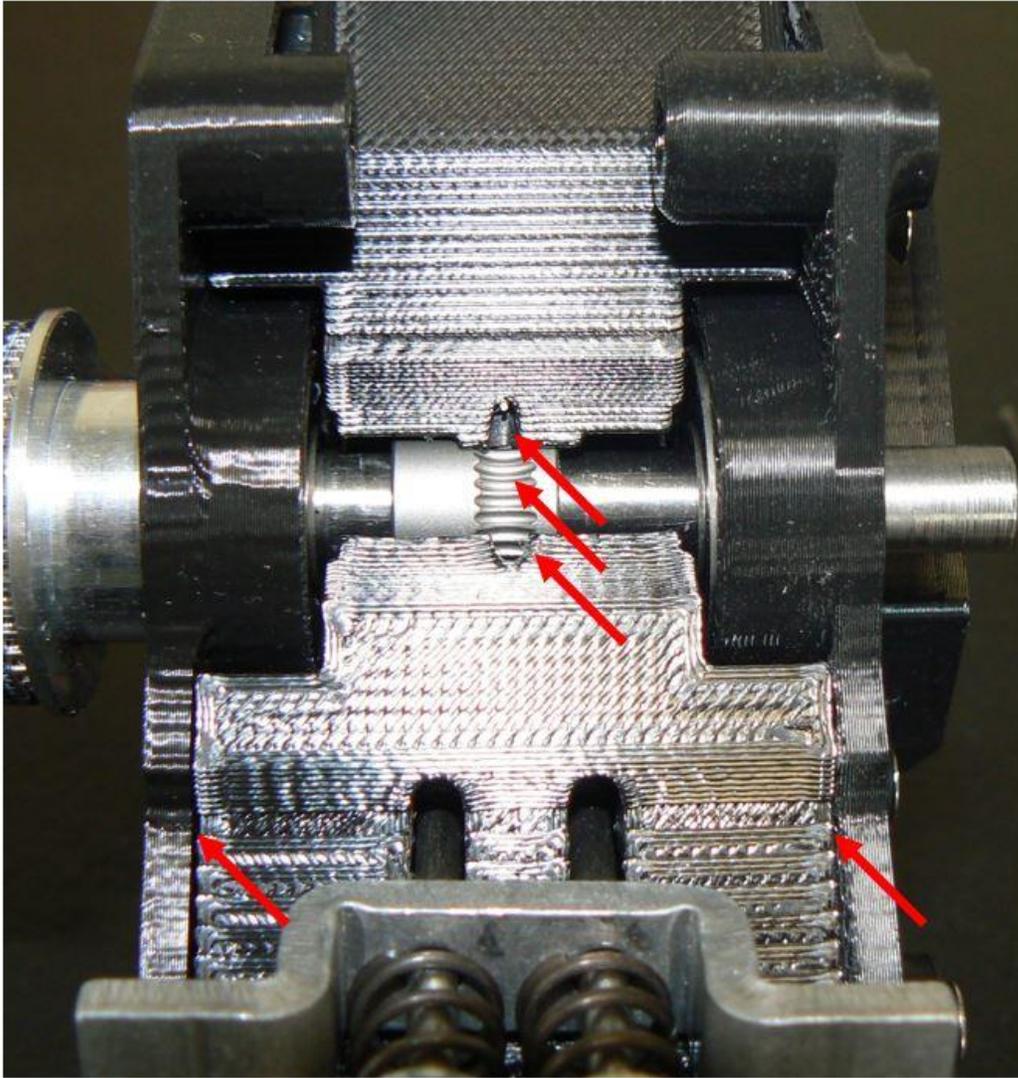
Both of these will "float" until the Frontplane is added and the screws tightened. But you should feel them register in the correct locations.

2) Frontplane

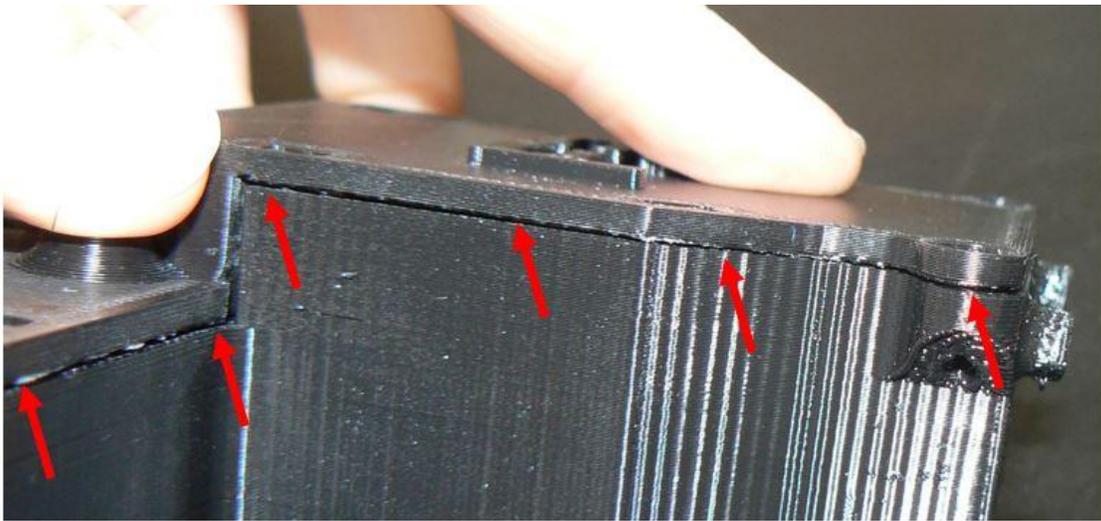
Slide the main shaft through the 608 bearing in the Frontplane. Align the holes in the Frontplane with the corresponding tabs on the Backplane.



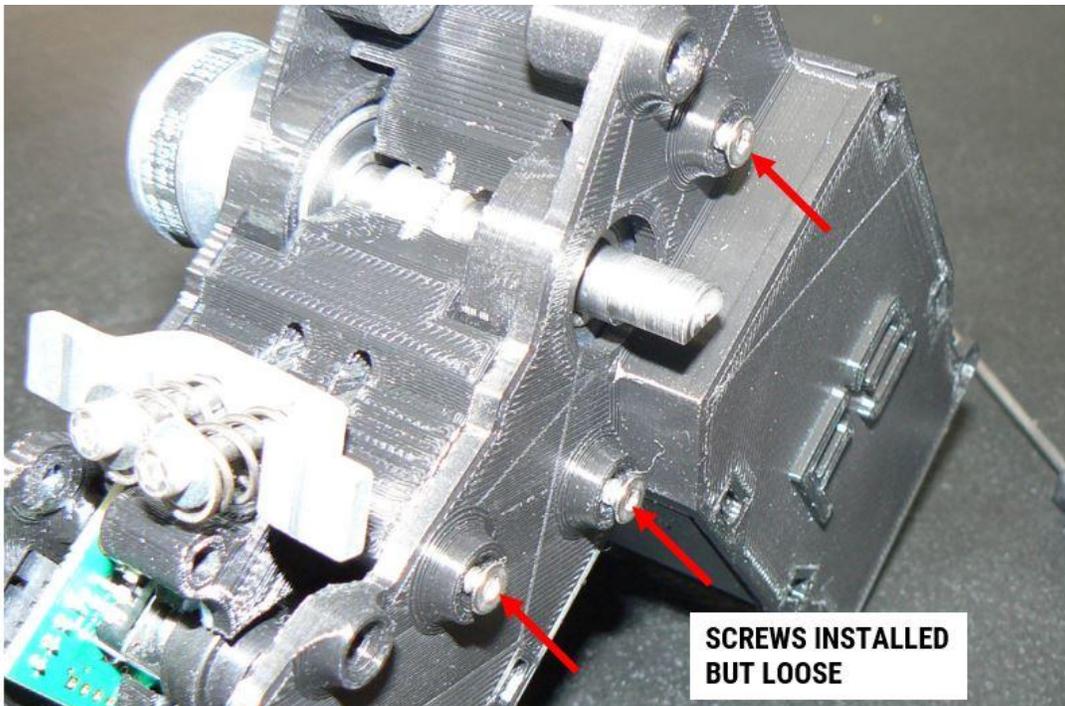
Press the assembly together. You should see the top faces of the Backplane, both Midplanes, and the Frontplane all line up as shown. The filament path should also line up. If the feed gear is out of alignment usually you can pull or push the shaft into place. If it won't line up see the section on adjusting the main shaft position.



Make sure the Frontplane is cleanly mated to the top of the Backplane and you don't have weird gaps anywhere. Gently press it together. If it won't go, stop, remove the Frontplane, and check for obstructions.

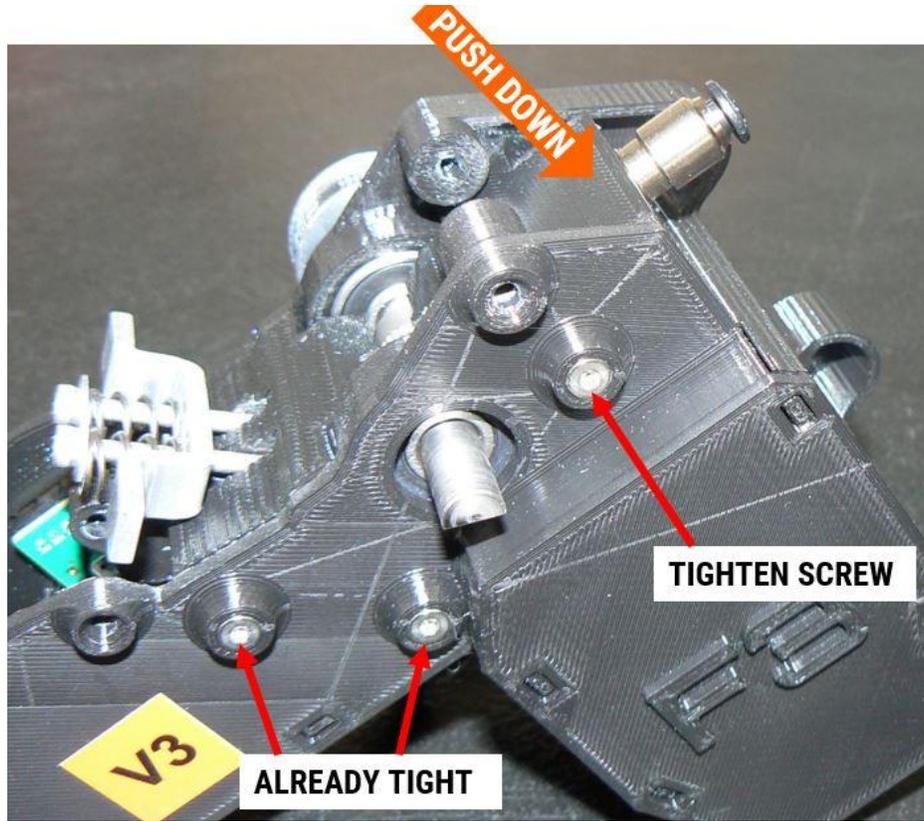


Install the 3 long M3 FHCS that go through the two Midplanes. Get them finger tight then back them off slightly so you can still adjust the fine position of the parts with light force.

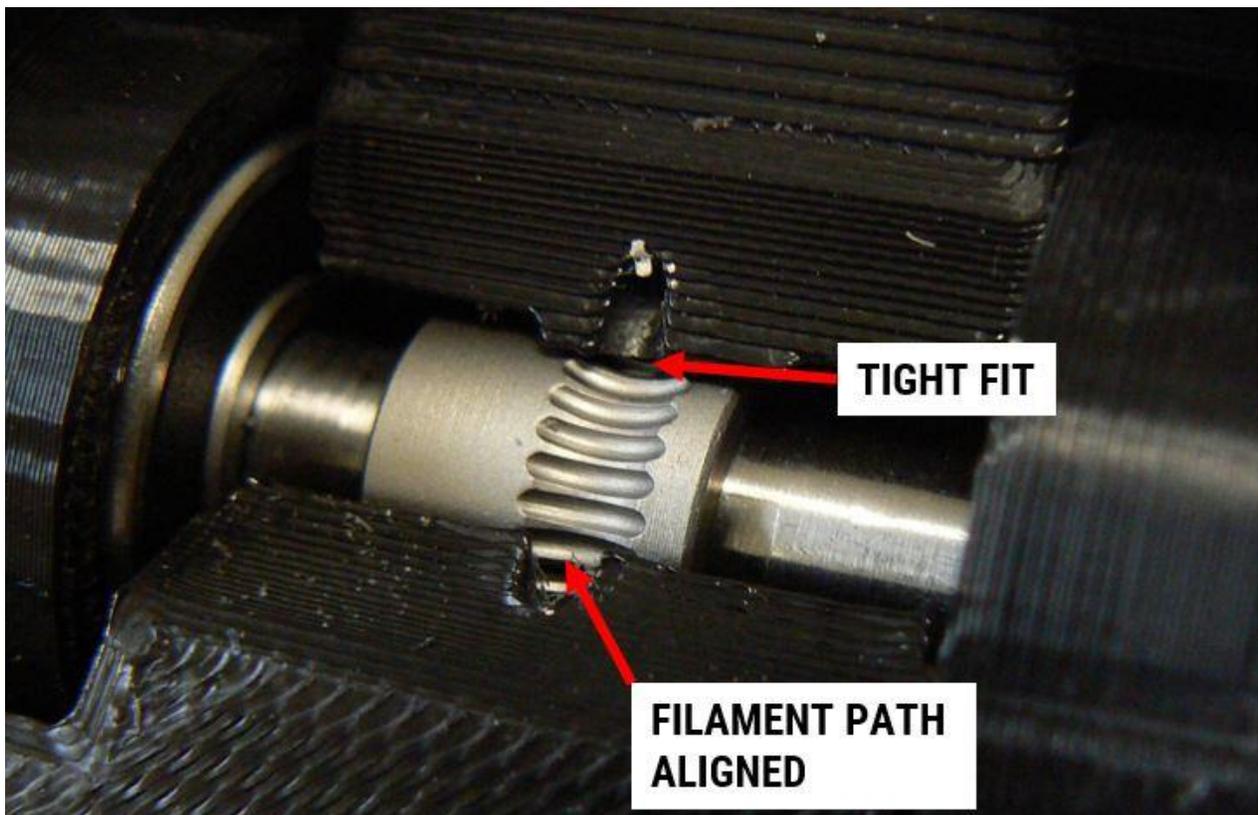


Make sure the Midplanes and Frontplanes seat correctly and everything lines up basically like it should. Tighten the 2 screws that go through the Aft Midplane (the one with the spring grabber).

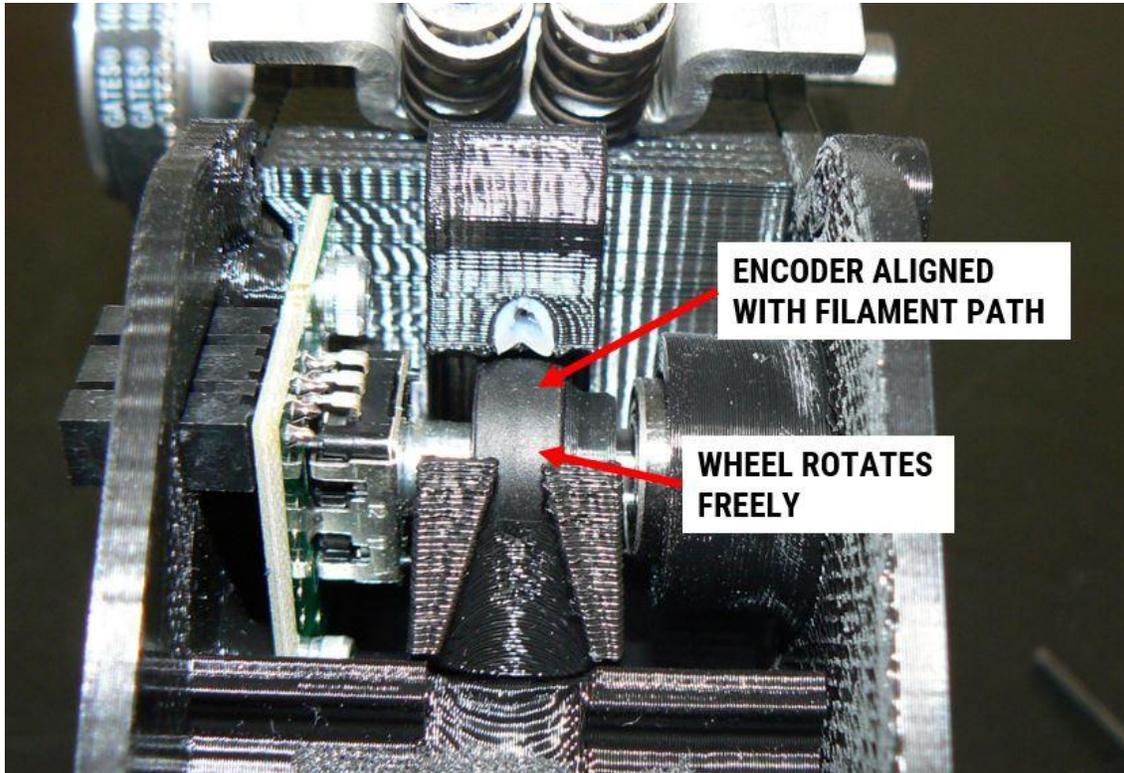
While you tighten the screw that holds the Fwd Midplane, push down on the end of it to keep it aligned as you tighten the screw.



Once all 3 Midplane screws are tight, double check your filament path alignment and how things fit around the feed gear. If it doesn't look like this, stop and take it back apart and fix it. This fit is CRITICAL to the performance of the extruder.



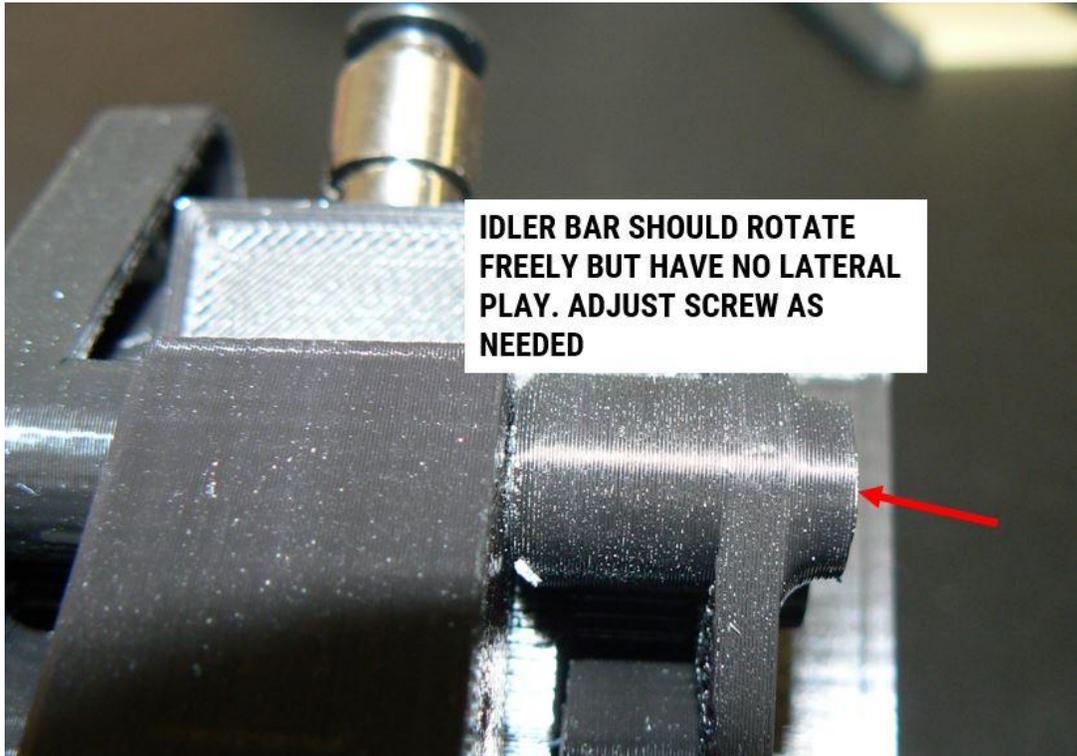
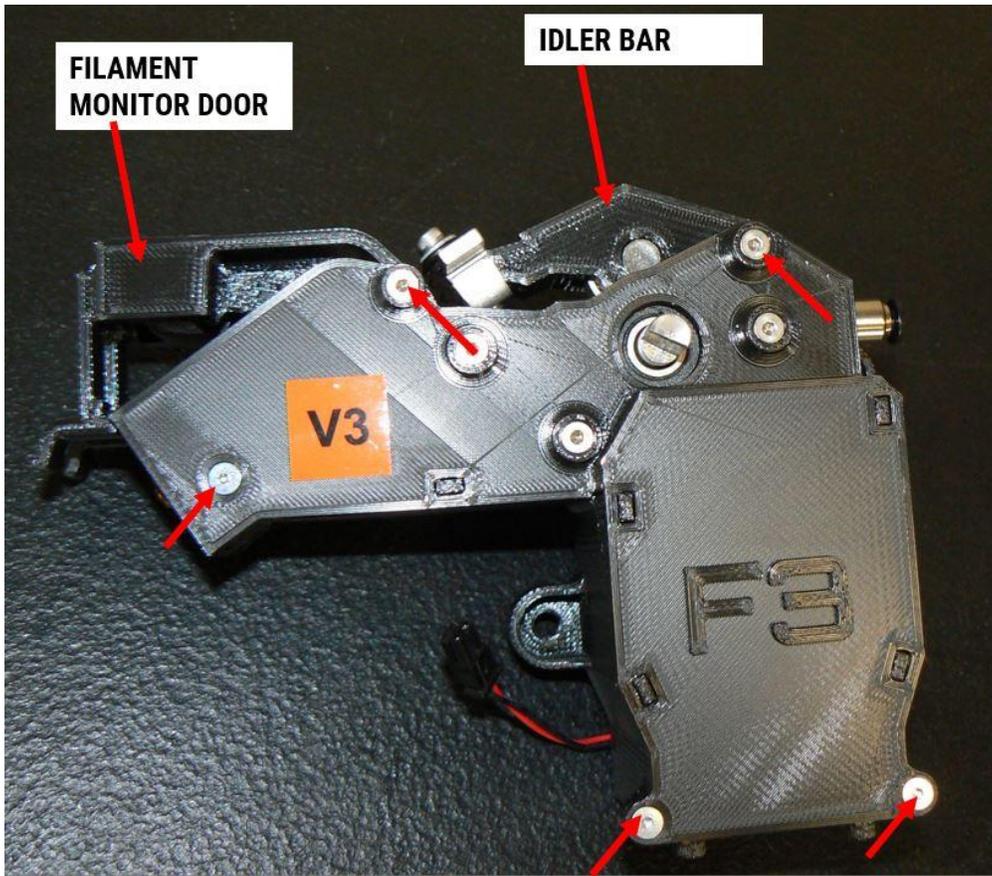
Check the alignment in the filament monitoring section:

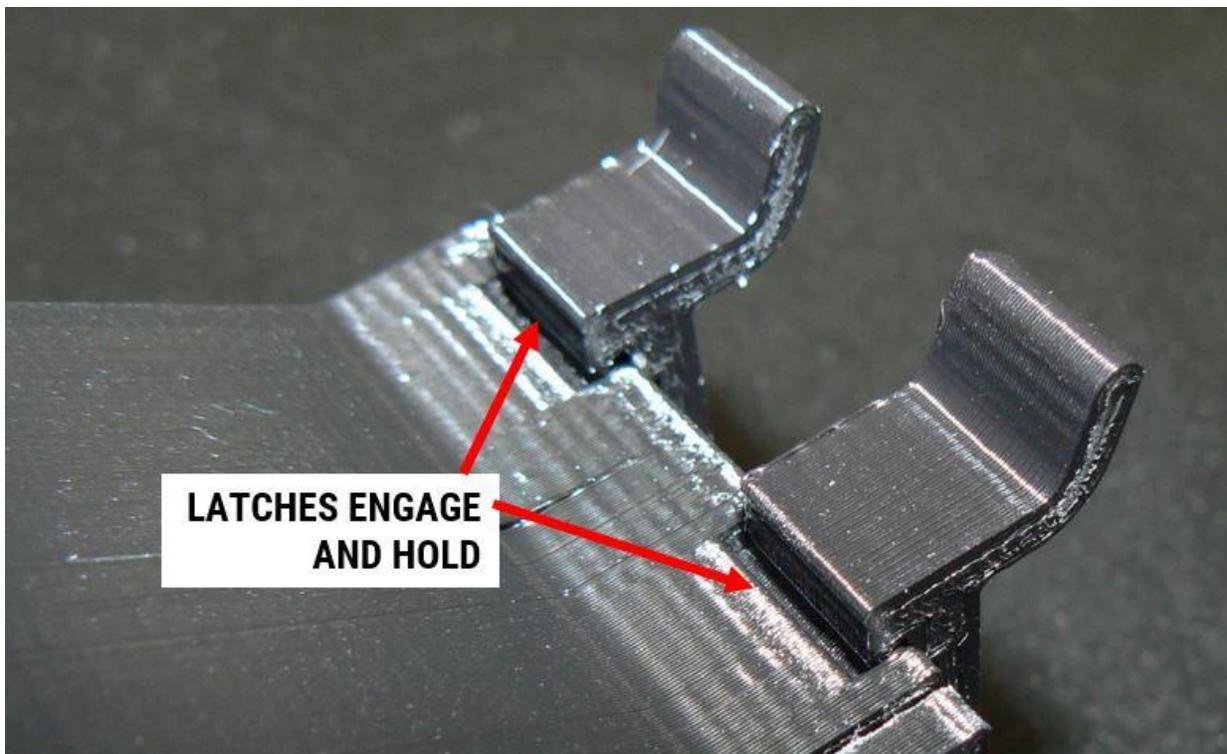
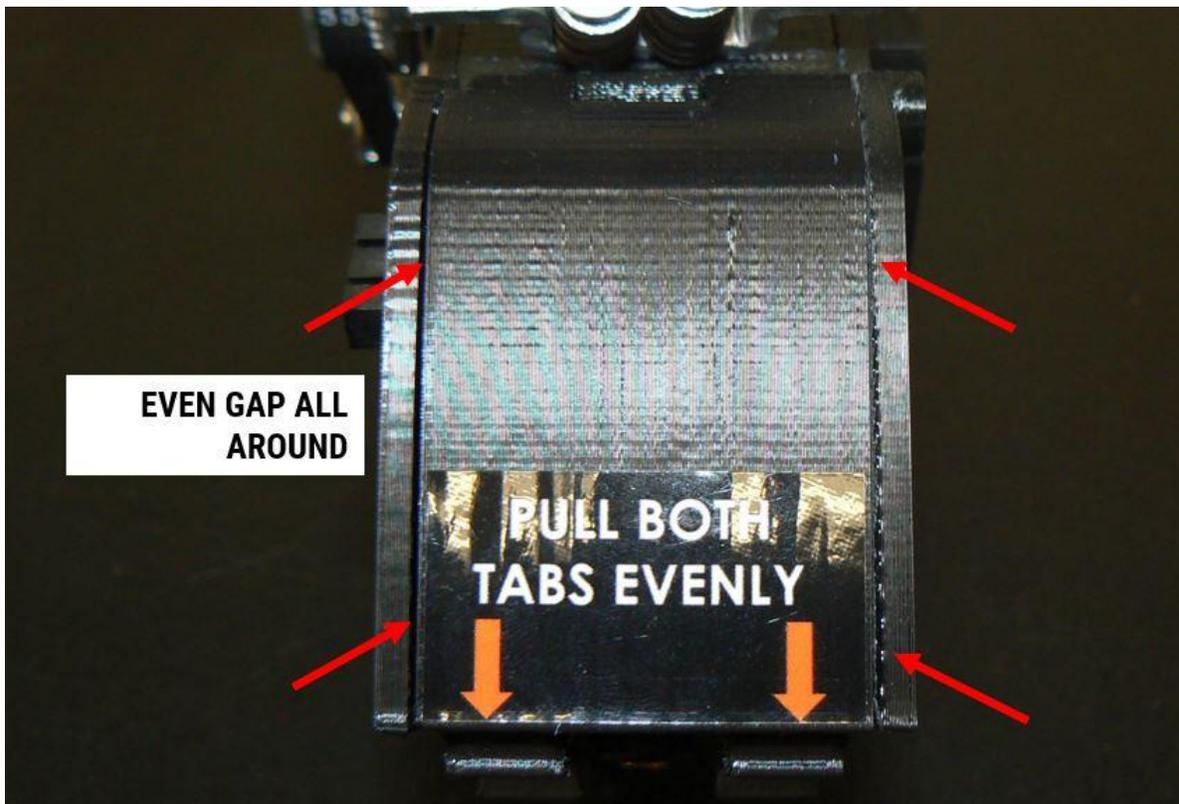


3) Idler Bar & Filament Monitor Door

Install the idler bar and the filament monitor door with the remaining 2 long M3 screws. These screws will fit tighter than the ones that go through the midplanes.

Also install the 3 short screws that hold the corners of the Frontplane in place.





4) Final Touches

Reinstall the orange manual advance knob. If the fit is loose, put a small piece of tape on the flat of the shaft.

Function check the extruder by loading a piece of filament through it and make sure it feeds through the whole extruder correctly.

While you have the piece of filament loaded, check your idler bar spring preload.

Install the extruder back on the printer.