



MAKERGEAR

V4 and Rev F/G Cooling Upgrade

Tools Needed

- M3 Driver (2.5 mm Allen wrench)
- 1.5 mm Allen wrench
- 2 mm Allen wrench
- 3 mm Allen wrench
- Snips

Make sure machine is OFF before disassembling

Removal of V3B Extruder Assembly

Remove Fan Assembly

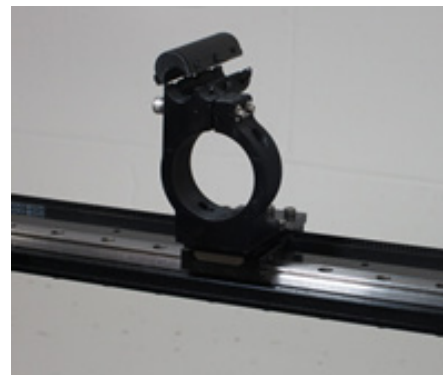
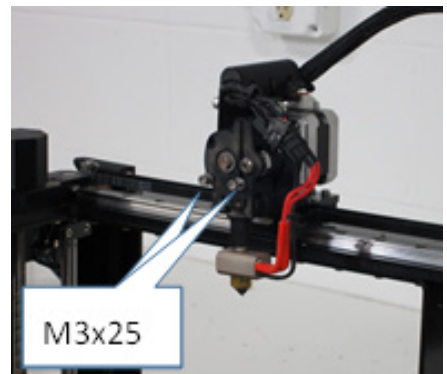
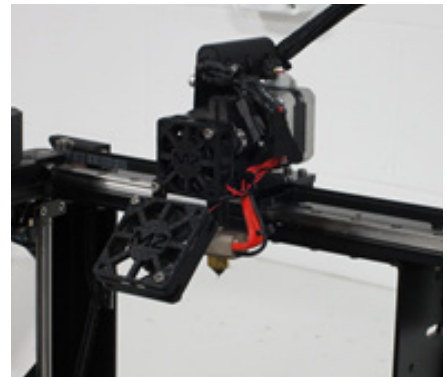
- Cut the zip tie on the right side of the Filament Drive to free the fan wires. Disconnect the fan connectors.
- Remove the M3x40 screw from the top left hole of the smaller Extruder fan to remove the fan assembly.
- You will not use the fan assembly as you rebuild.

Remove the Filament Drive

- Disconnect the Thermistor and Heater connectors.
- Remove the (2) M3x25 screws holding the Filament Drive in place and set aside Filament Drive. You will reuse these screws for the V4 upgrade.

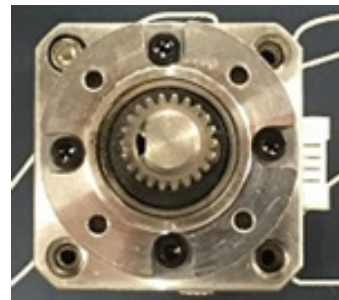
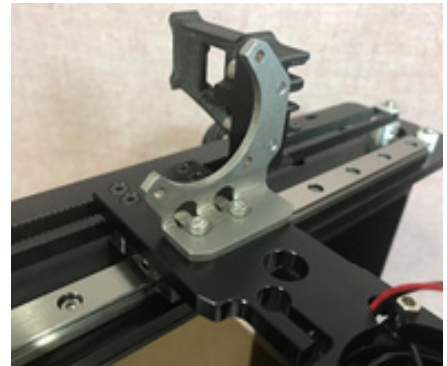
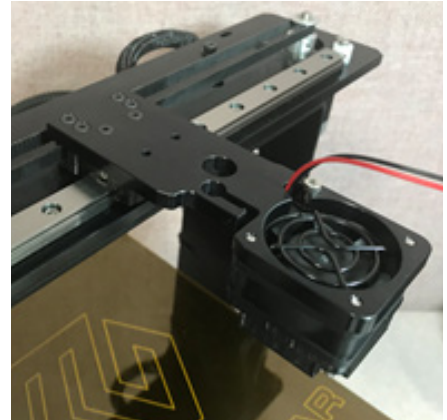
Remove Motor, Motor mount and Wiring harness

- Cut the (3) zip ties on the top of the Extruder Motor Mount and remove that piece. You will not use it in the upgrade.
- Loosen the (2) M4x35 screws so that the motor can be slid out from the back.
- Remove the motor along with the Extruder harness and put them aside to reuse later.
- Remove the (4) M3x12 screws holding the Extruder Motor Mount to the plate on the carriage.
- Remove Extruder Motor Mount. You will not use it in the upgrade.
- Remove (4) M2x16's from mounting plate as well as the motor mount plate and belt clamp and all attached hardware. You will not need these for the V4 upgrade.



Mounting Plate and Motor Attachment

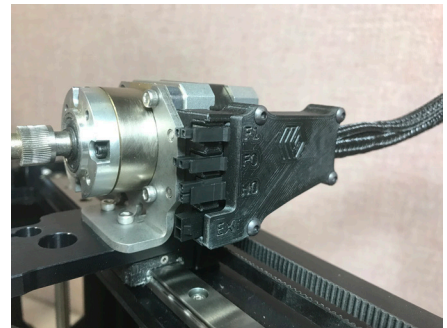
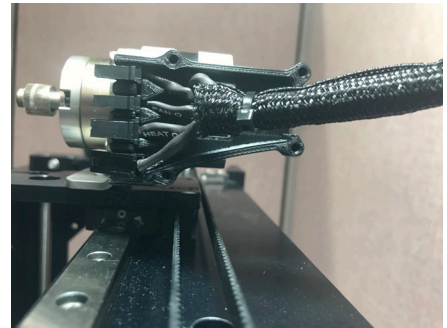
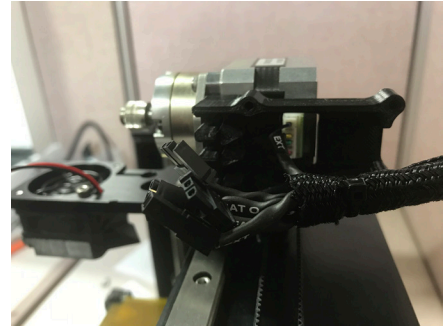
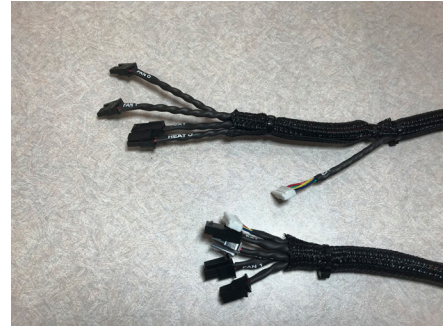
- (1) Mounting Plate
 - (1) Belt Clamp (nuts pressed in)
 - (1) Metal Motor Mount with ECB
 - (2) M3x10 flathead screws
 - (4) M3x18 flathead screws
 - (5) M3x12 socket head screws
- Place belt clamp on front belt span with fin toward the rear.
 - Place the extruder mounting plate on top of the belt clamp and X rail carriage with the slot of the clamp facing towards the Z-knob on the top left of the machine. Insert (4) M3x18 screws through the back four holes of the mounting plate to secure the belt clamp. Tighten.
 - Insert (2) M3x10 screws through the two rearmost remaining holes to tighten the mounting plate to the X rail carriage.
 - Place the Motor Mount on top of the mounting plate with the printed ECB facing the rear. Insert (2) M3x12 screws and tighten while pulling the Motor Mount to the front.
 - Noting the location of the connector, remove the three m3 bolts that have been removed from the corners in the picture to the right using a 2.5 mm wrench.
 - Place the motor through in the Motor Mount with the wire connector facing right. After making sure the motor is slid all the way into the motor mount, tighten the (3) M3x12 screws to secure the motor.



Wiring Harness Adjustment and Installation

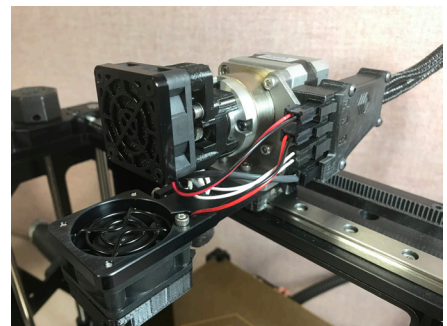
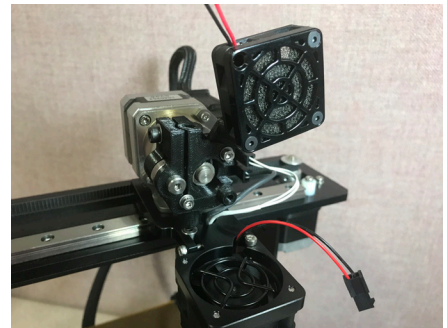
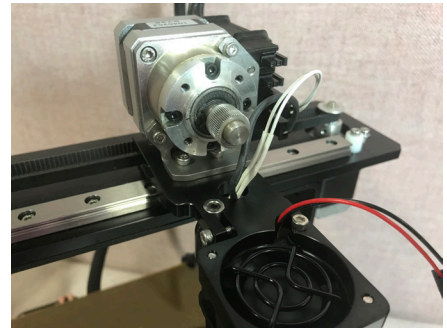
- (1) ECB Lid
- (8) Cable ties

- Snip the cable ties that secure the extruder harness to the frame. Your harness should look like the top harness and you will need to adjust it to look like the bottom harness. Snip the cable ties that hold the cables inside of the black braided wire loom. Now pull the wires through the harness so that there is about 1" of each of the wires with the black connectors coming out of the loom. Put the wire with the white connector in the loom all the way to the end. You will leave a little less than 1" coming out of the loom. Reapply cable ties to the harness.
- Plug the white connector into the extruder motor.
- Install each of the four black connectors into the printed ECB. Fan 1 is the top wire and you will fit this into the slot designed specifically for this connector. Make sure the release lever is facing the right when installed. Next install the Fan 0 wire in the same way as the Fan 1 wire. Third, install the Heat 0 wire with the release lever facing the right. Last install the Ext 0 wire with the release lever catch facing the right.
- Now using a 2 mm allen wrench, install the ECB lid. This takes a little torque as the screws are tapping themselves into the printed plastic piece.



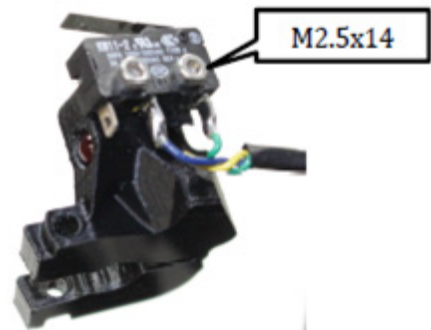
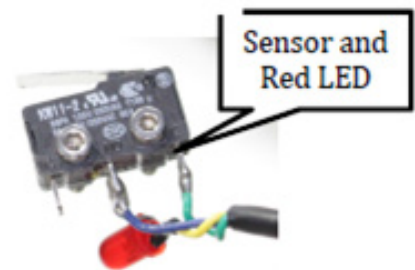
Filament Drive, Fan and Hotend Assembly

- (1) Filament Drive/Fan assembly
 - (1) Hot End assembly
 - (1) M3x12 socket head screw
 - (2) M3x25 socket head screws, washers, reused from disassembly process
 - (1) M3x45 flathead screw
- Thread the (1) M3x12 screw into the side hole of the extruder plate, but do not tighten.
 - From under the mounting plate, individually feed the white and black wires through the hole just in front of the motor mount.
 - Insert the hotend into the slotted hole, with the top surface protruding slightly above or flush with the top surface of the mounting plate. Rotate so that the black and white wires flow freely through their hole.
 - Tighten the (1) M3x12 screw securing the hotend into place.
 - Connect the white wire to the H0 connector in the ECB and the black wire to the EXT connector.
 - Rotate the fan on the filament drive so that you can clearly see all parts of the filament drive.
 - Place the Filament Drive onto the motor with the flat surface touching the motor face. The conical protrusion from the filament drive should face downwards.
 - Slide (2) M3x25 screws with washers into the top right and bottom left holes on the front of the Filament Drive. Rotate the Filament Drive to align the hole at the base of the protrusion with the hole on top of the hotend. Tighten.
 - Rotate the fan on the filament drive so that empty hole is in the lower right. Insert the M3x45 screw and tighten.
 - Connect the upper fan to the F1 connector and the lower fan to the F0 connector.



Replace Z Endstop

- (1) Z Endstop Clamp
 - (1) M3x25 socket head screw
 - (2) M2.5x14 socket head screws, reused from disassembly process
- Loosen the (2) M3x12 screws to remove the Z-endstop clamp from the 10 mm shaft. The endstop can be found inside of the build area of the machine, near the top of the rear 10 mm shaft.
 - Remove the (2) M2.5x14 screws and printed piece from the wired assembly. Being careful to not damage the connectors, remove the printed piece from the switch and LED.
 - Insert the LED into the Z Endstop Clamp. To do this, the LED must pass through the hole in the Clamp from the side having a large notch, and the wires must be oriented to seat into the notch.
 - Carefully bend the soldered wire connecting to the end stop switch so that once the LED is in place the switch can be moved into the position shown in the picture on the bottom right. The two holes on the switch body will line up with the two on the Clamp, and the metal lever should be on the opposite of the flat side of the Clamp.
 - Secure the switch to the Clamp using (2) M2.5x14 screws.
 - Using a narrow tool like a hex wrench, push against the LED next to its wires until its round surface reaches the other end of the hole and comes to a stop.
 - Slide the assembly onto the 10 mm shaft near the back of the printer with switch lever facing down. Feed the (1) M3x25 screw, but do not tighten.
 - Slide the clamp to the top of the shaft until the flat surface is against the frame of the printer. Make sure wires do not get pinched between the components. The clamp must be rotated so that the LED is facing directly into the print area parallel to the X-rail on top of the printer, and the switch body is square with the rest of the machine.
 - Tighten the clamp into position with the (1) M3x25 screw taking caution not to over-tighten. The clamp is fine if it is snugly in place but can still be turned on the shaft with a little pressure by hand.
 - Adjust bed height screw according to new z stop. Please reference: <https://www.youtube.com/channel/UCBtJ0C9I7LjT04rBJPYOIfQ> and <http://makergear.wikidot.com/m2-getting-started#toc12>



Congratulations! You have finished the V4 hardware set up.

To get your firmware modified for your new hardware:

- Visit firmware.makergear.com
- Watch the video <5 minutes
- Select your proper configuration (make sure to select Rev F for hot end).
- Download and install firmware

If you have any issues please be sure to contact us at support@makergear.com