

MakerGear

V4 Extruder Assembly Kit

Step 1:

Tools Needed

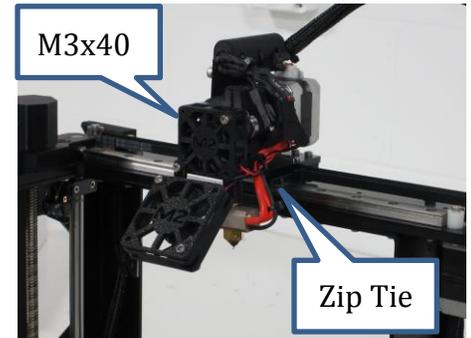
- M3 Driver (2.5mm Allen wrench)
- 1.5mm Allen wrench
- 3mm Allen wrench
- Snips

Make sure machine is OFF before disassembling

Removal of V3B Extruder Assembly

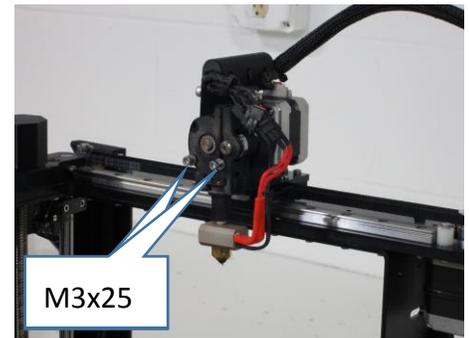
Remove Fan

- 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.
- Set aside fan assembly for later use.



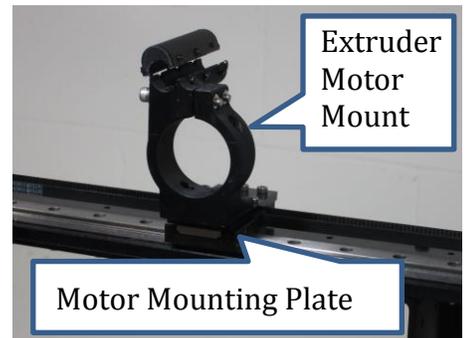
Remove the Filament Drive

- 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 and set aside for later use.
- 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 and set aside for later use.
- 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.



Step 2:

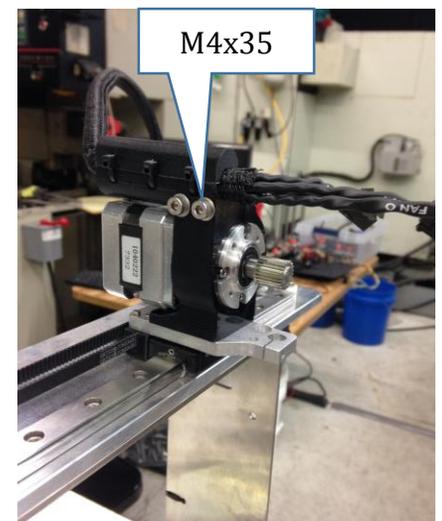
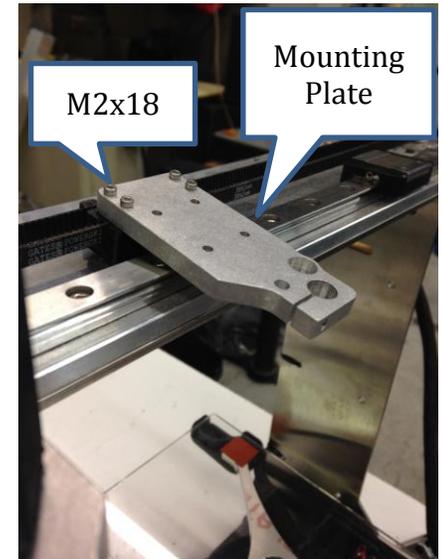
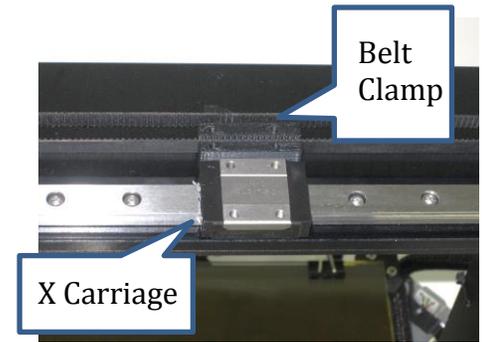
Tools Needed

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

Mounting Plate and Motor Attachment

- (1) Mounting Plate
- (1) Belt Clamp (nuts pressed in)
- (4) M3x16 screws
- (4) M3x18 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.
- Place the Motor Mount on top of the mounting plate with the flat side facing the front of the machine, as before. Attach using (4) M3x16 screws (not M3x12's previously used). Reuse the washers through the back two holes near the belt clamp screws as before, going first through the extruder plate, and tightening into the carriage. The front two screws passing through connect the same way except they do not use washers. Note: Aluminum plate is tight, you may need to apply extra force to get screws through.
- Slide the motor through the opening of the Motor Mount through the back, with the wire connector facing upwards. After making sure the motor is slid all the way into the motor mount, tighten the (2) M4x35 screws to secure the motor.



Step 3:

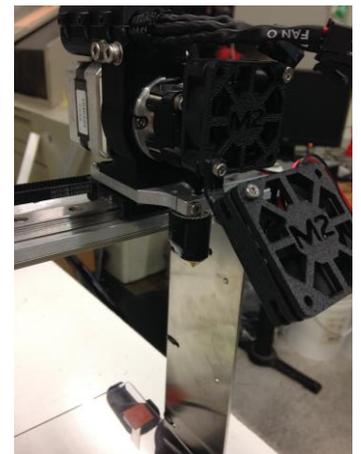
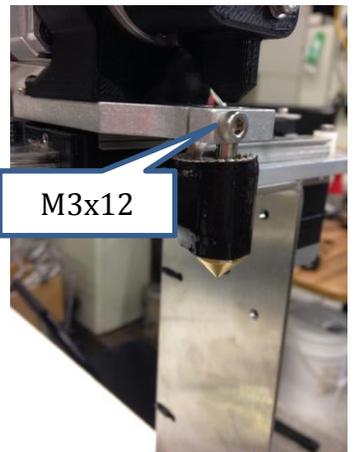
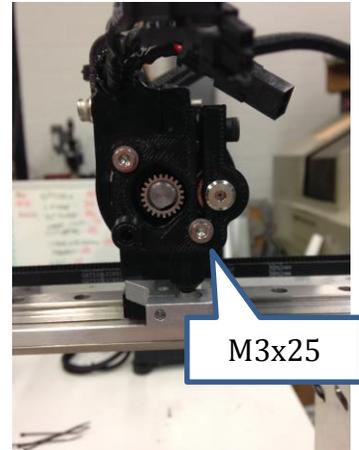
Tools Needed

- M3 Driver (2.5mm Allen wrench)
- 3mm Allen wrench
- Needlenose pliers

Filament Drive, Fan and Hotend Assembly

- (1) Filament Drive assembly
- (1) Hot End assembly
- (1) M3x12 screw
- (2) M3x25 screws, washers
- (1) M3x45 screw

- Thread the (1) M3x12 screw into the front hole of the extruder plate, but do not tighten.
- Ensuring that the thermistor and cartridge heater are fully seated, insert the hotend assembly into the slotted hole, with the top surface protruding slightly above or flush with the top surface of the extruder plate. Rotate so that the bulk of the hotend faces back towards the carriage. The wires should bend underneath the extruder plate.
- Tighten the (1) M3x12 screw securing the hotend into place.
- Place the Filament Drive onto the motor with the flat surface touching the motor face. The conical protrusion should face downwards.
- Slide (2) M3x25 screws with washers into the top left and bottom right 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. Note: If the holes won't align loosen 2 M4 bolts securing motor and rotate the motor until aligned, retighten screws.
- Retrieve the fan assembly, being careful to save the black washer that spaces the fan guard from the fan, remove the M3x22 screw and M3 nut connecting the printed bracket from the small fan (40 mm fan).
- Rotate the small fan guard slightly to expose the head of the (1) M3x40 screw, then remove the screw along with the white spacer.
- If the remaining screw in the small fan is in lower right corner move to upper right ensuring washer is placed between guard and fan.
- Rotate the small fan guard back into position, and place the black washer between the fan and the guard in lower left hole.
- Slide the (1) M3x45 screw through bracket (with large fan attached), the small fan guard, washer, and small fan.
- Attach the fan assembly by pushing the (1) M3x45 screw through the protruding hole on the front of the filament drive. Adjust the fans so that they align vertically, with the small fan on top pointing at the filament drive, and the large fan pointing towards the print bed at an angle. Tighten the screw. being careful not to overtighten.



Step 4:

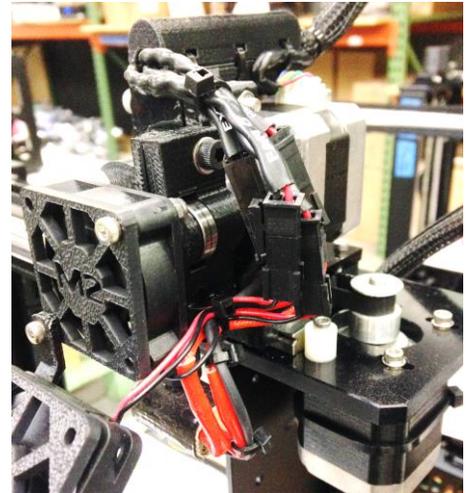
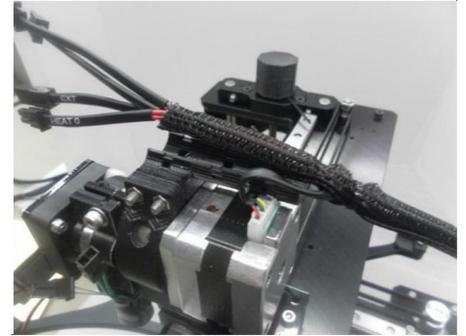
Tools Needed

- Snips

Wiring

- (4) Cable ties
- (1) Motor Mount Wire Cover

- Connect the Fan 0 plug to the 50mm fan, Fan 1 Plug to the 40mm fan, Heat 0 Plug and Extruder Plug to the hotend plugs with the corresponding male and female plugs.
- Secure all the wires to the Filament Drive using a cable tie as shown on the right (Do not attach the cable tie directly to the hotend).
- Plug the white connector into the top of the motor if this was unplugged.
- Lay the wiring into the top of the Motor Mount, place the wire cover on top, and use a cable tie to secure into place through the front two openings in the motor mount and cover.
- With another cable tie, secure the extruder motor cable to the motor mount while also securing the cover.
- After tightening all cable ties, snip off the excess.



Step 5:

Tools Needed

- M3 Driver (2.5mm Allen wrench)
- 2mm Allen wrench

Replace Z Endstop

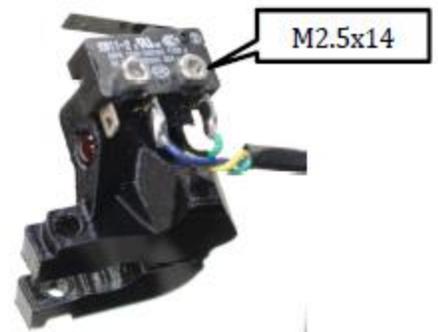
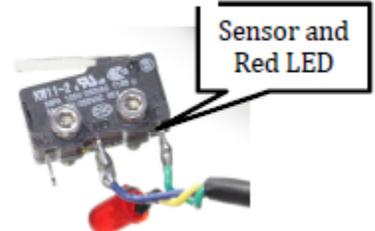
(1) Z Endstop Clamp (Assembled)

(1) Red LED and sensor

(1) M3x25 screw

(2) M2.5x14 screws

- Loosen the (2) M3x12 screws to remove the Z-endstop clamp from the 10mm shaft. The endstop can be found inside of the build area of the machine, near the top of the back 10mm shaft. Hang the wired half with the endstop out of the back or the side of the machine in order to work on it.
- Remove the (2) M2.5x14 screws and printed piece from the wired assembly. Set these screws aside for reuse. 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 10mm 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. This screw must not be very tight: using just the thumb and forefinger, medium pressure to turn the wrench is sufficient (using a hex wrench that is screwdriver style, or L-style being turned by the narrow side for low torque) and 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/UCBtj0C9l7LjT04rBJPYOIfQ> and <http://makergear.wikidot.com/m2-getting-started#toc12>



Congratulations! Your V4 is now set up.

If you didn't lose any hardware or pieces in the process you should have the following left over.

Extra Hardware (included with V4 upgrade kit):

- 2 M3 washer
- 2 M3x25
- 2 M3 washer
- 2 M2.5x14

Left over V3b materials:

- 1 Filament Drive/Hot End
- 1 Belt clamp with nuts pressed in
- 1 Acrylic Motor Mount Plate with printed piece attached and 4 loose M2x16.
- 4 M3x12 that previously held the Motor Mount in place.
- 1 M3x40 and white spacer previously used to secure the fan assembly.
- 2 printed pieces (with attached hardware) that held the Z Endstop previously.