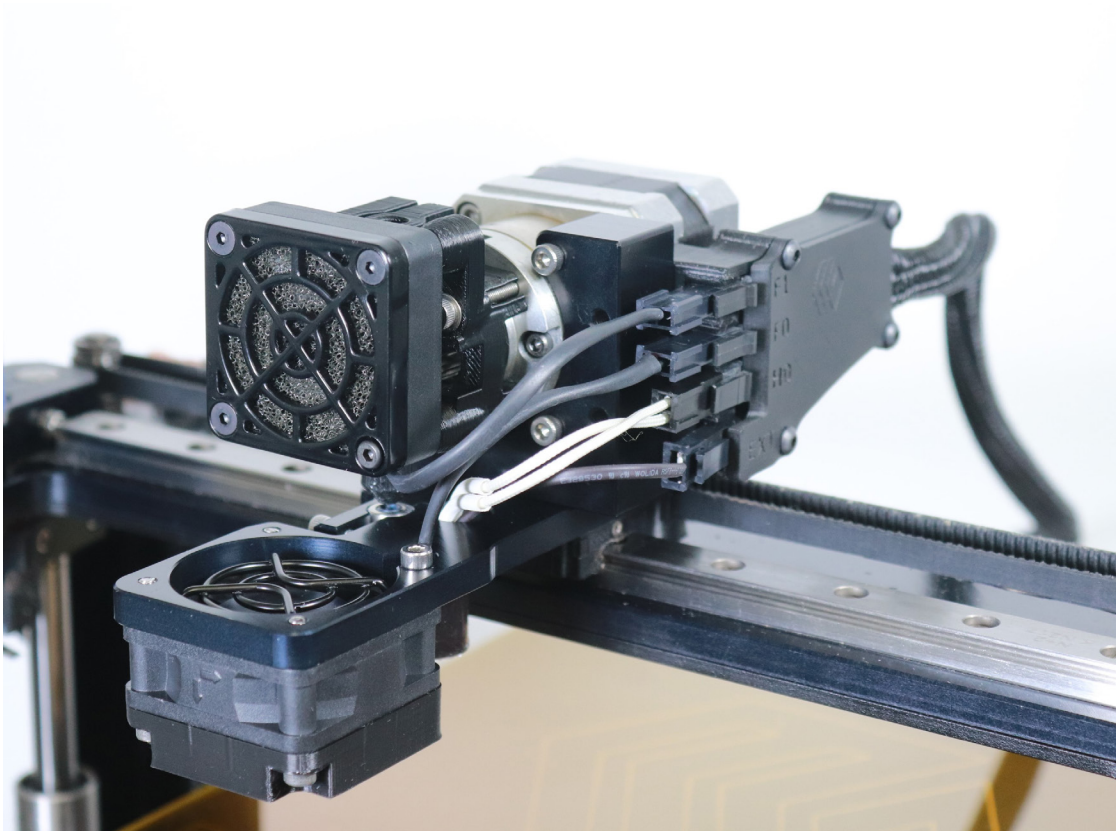
MAKERGEAR

V4 Hotend and Rev.F/G Cooling Upgrade Installation Guide



Last edited on 10/04/2022

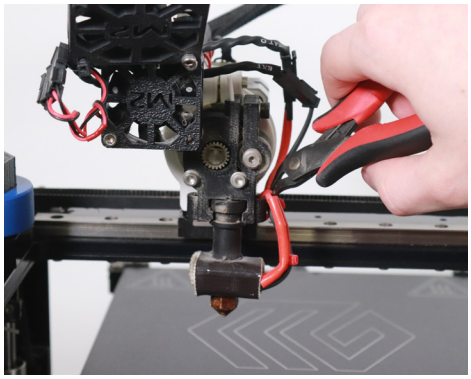
List of components:

- x1- Filament drive / Fan assembly
- x1 - V4 Hotend
- x1 - Z-Endstop (Max)
- x1 - Extruder mounting plate
- x1 - Belt clamp
- x1 - Metal motor mount
- x1 - Printed wiring box and lid
- x1 - M3x12 socket head screw
- x2 - M3x14 socket head screws
- x4 - M3x18 flathead screws
- x1 - M3x20 socket head screw
- x3 - M3x28 socket head screws
- x1 - M3x45 flathead screw
- x8 - Zip ties (4in)

Please verify the printer is OFF and the power is disconnected before disassembling

Step 1: Disassembling the original v3b extruder assembly

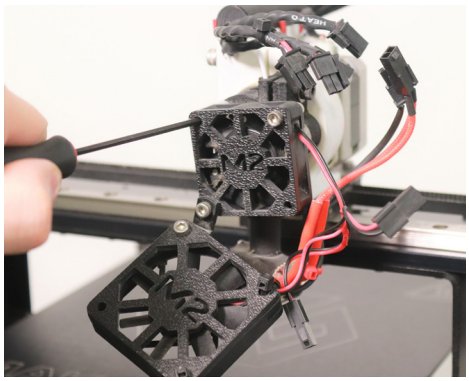
Removing the filament drive and fans assembly



- Cut and remove the zip tie on the right side of the filament drive to free the fan wires
- Disconnect the hotend and fan cables
- Loosen and remove the (x1) **M3x40** screw from the top-left hole on the extruder motor fan and then remove the fans
- Remove both of the **M3x25** screws that are holding the filament drive in place

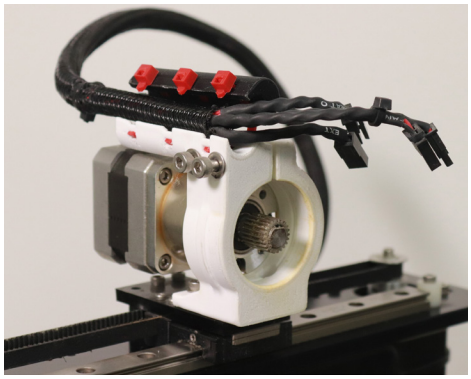
(You will reuse both **M3x25** screws later in this upgrade)

- Remove the filament drive



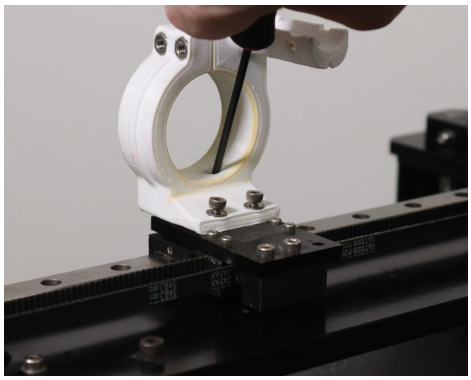
Removing the motor and mounting plate

- Cut the (x3) zip ties on top of the extruder wiring harness
- Loosen the (x2) **M4x35** screws so that the motor can be slid out from the back
- Remove the motor along with the extruder wiring harness and then set them aside to reuse later
- Remove the (x4) **M3x12** screws that attach the printed extuder motor mount to the X-axis carriage
- Remove the printed extruder motor mount
- Remove the (x4) **M2x16** screws from the extruder mounting plate and then remove the mounting plate
- Remove the printed belt clamp from the X-axis belt



M2 - Revision E Users:

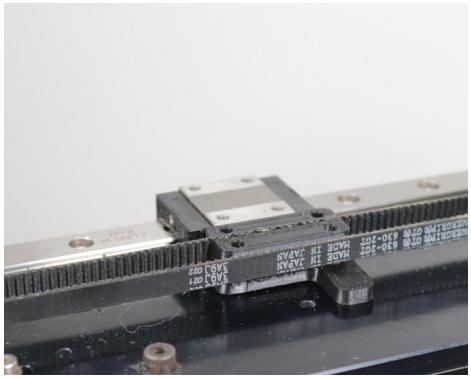
Please note, the extruder and motor mounts look slightly different, but the basic concept remains the same. Remove all of the extruder components until only the carriage is left



Step 2: Install the extruder mounting plate

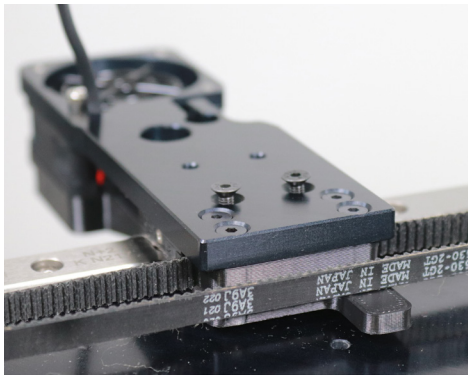
Parts needed for this step:

- x1 - Extruder mounting plate
- x1 - Belt clamp
- x1 - Metal motor mount with printed wiring box
- x2 - M3x14 socket head screws
- x3 - M3x28 socket head screws
- x2 - M3x10 flathead screws
- x4 - M3x18 flathead screws

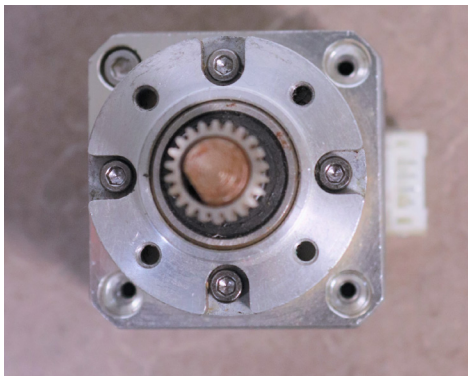


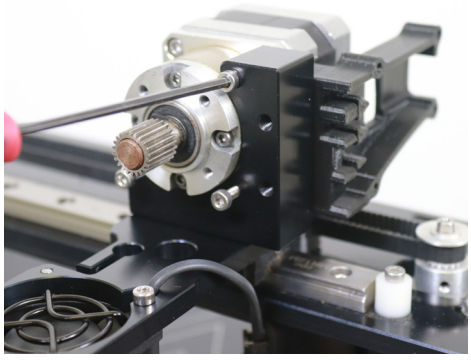
Installing the new belt clamp and mounting plate

- Install the new belt clamp on the front belt span with the fins facing the back of the printer
- Place the new extruder mounting plate on top of the belt clamp and the X-axis carriage
- Insert and tighten the (x4) **M3x18** screws through the back four mounting plate screw holes to secure the belt clamp
- Insert the (x2) **M3x10** screws through the two rearmost holes to tighten the mounting plate to the X rail carriage



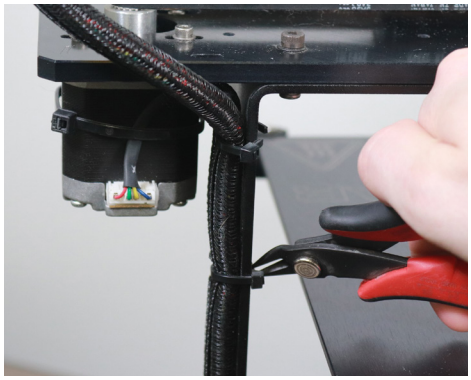
- Place the new motor mount on top of the mounting plate with the printed wiring box facing the rear
- Insert (x2) **M3x14** screws and tighten while pulling the motor mount towards the front
- Noting the location of the connector, remove the three M3 bolts from the extruder motor using a 2.5mm wrench
- Place the motor through the motor mount with the connector facing right
- Insert and tighten the (x3) **M3x28** screws to secure the motor





Step 3: Wiring harness adjustment and installation

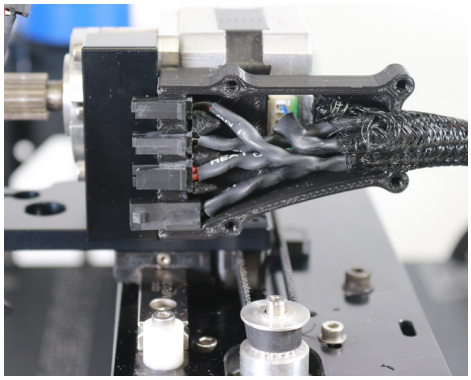
Removing the extruder harness

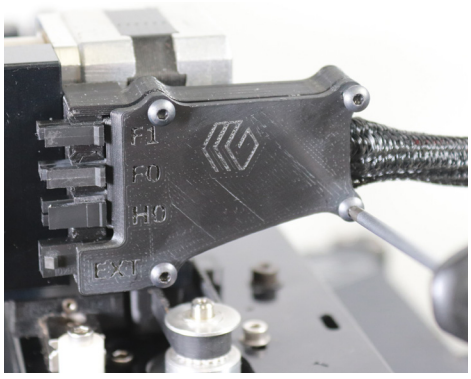


- Cut and remove the zip ties that secure the extruder harness to the printer
- Please review the comparison photo. Your harness should look like the top harness and you'll need to adjust it to look like the bottom harness
- Snip the cable ties that hold the cables inside of the braided wiring loom

Adjusting the extruder harness

- Pull the wires through the harness so there is only **1**" of each wire sticking out of the loom
- Pull the wire with the white connector in the loom all the way to the end
- Reapply cable ties to the harness
- Plug the white connector into the extruder motor through the wiring box
- Install the wiring box lid with a 2mm allen wrench. This takes a little torque as the screws are tapping themseleves into the printed part

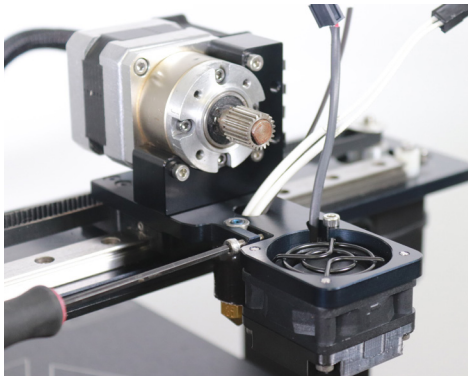




Step 4: Filament Drive, fan, and hotend assembly

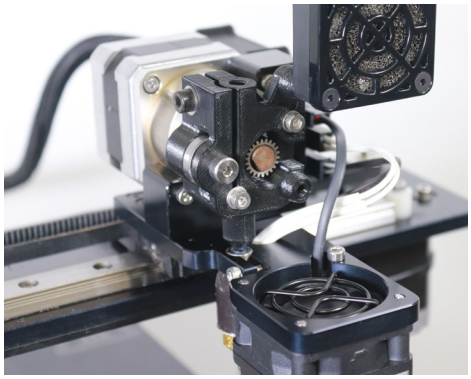
Parts needed for this step:

- x1- Filament drive / Fan assembly
- x1 - v4 Hotend
- x1 - M3x45 flathead screw
- x1 - M3x12 socket head screw
- x2 - M3x25 socket head screws and washers (reused from the original filament drive)



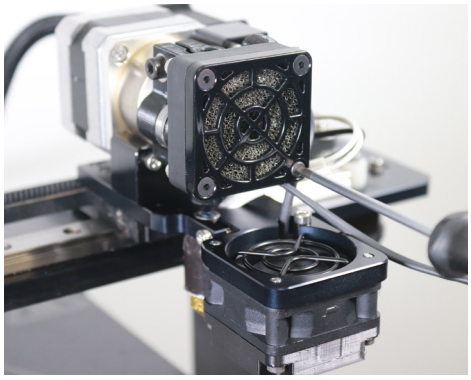
Hotend installation

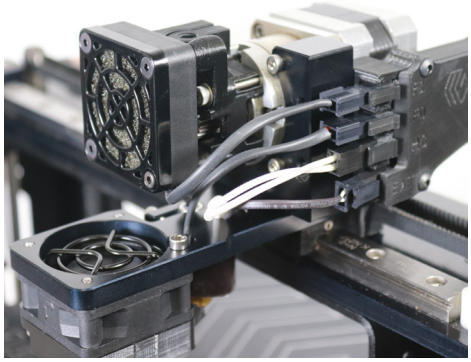
- Insert the (x1) **M3x12** screw into the hole on the side of the extruder mounting plate (Don't tighten yet)
- Insert the hotend into the slotted hole, with the top of the hotend flush with the mounting plate
- Individually feed both of the hotend cables through the hole just in front of the motor mount
- Rotate the hotend so the black and white wires flow freely through their hole
- Tighten the (x1) **M3x12** screw securing the hotend into place
- Connect the white hotend cable to the "**H0**" connector in the wiring box
- Connect the black hotend cable to the "**EXT**" connector in the wiring box



Filament drive installation

- Rotate the fan on the filament drive in order to clearly see all parts of the filament drive
- Place the filament drive around the extruder motor with the flat surface touching the motor face
- Insert the (x2) **M3x25** screws and washers into the top right and bottom left holes into the front of the filament drive
- Align the filament drive with the top of the hotend, then tighten the filament drive down
- Rotate the fan on the filament drive so the empty hole is in the lower right. Insert the (x1) **M3x45** screw and tighten
- Connect the extruder motor fan to the "**F1**" connector in the wiring box
- Connect the part cooling fan to the "**F0**" connector in the wiring box





Step 5: Replace the Z-endstop switch

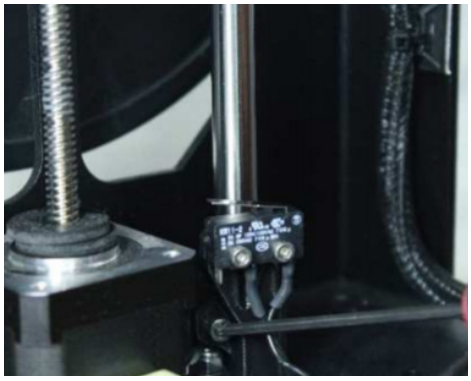
Parts needed for this step:

- x1 - M3x20mm socket head screw
- x1 - Z-Endstop (Max)

Z-Min (top) switch removal

- Use an 7mm (or adjustable) wrench to loosen the jam nut underneath the Z-stage
- Remove the old Z-adjustment screw by hand

Z-Max (bottom) switch installation



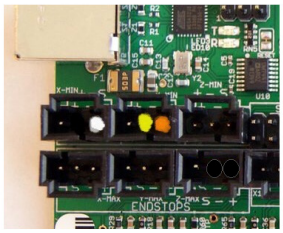
- Snap the new Z-endstop bracket onto the far smooth Z-rod
- Slide the Z-endstop bracket to the bottom of the printer
- Rotate it so the lever arm is pointed at the front smooth Z-rod
- Insert the (x1) **M3x20mm** into the Z-end endstop bracket
- Tighten the screw into the lock nut with a 2.5mm allen wrench

Plugging in the Z-max (bottom) switch cable

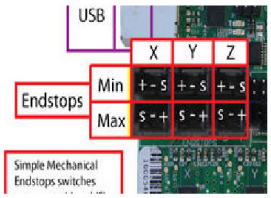
- Slightly open the enclosure and then unplug both the case fan and SD card reader cables
- Pivot the enclosure to rest it on its left side (The bed will need to be lifted to do this)
- Plug the new Z-endstop into the Z-max endstop port on the RAMBo board
- Plug the SD card reader cable back in
- Secure the electronics enclosure

RAMBo board wiring:

Z-Max



Rambo



Step 6: Upload the new firmware

- Visit firmware.makergear.com
- Watch the video for instructions on how to upload firmware
- Use the firmware selector
- Download and install the firmware

Please contact us at "support@makergear.com" if you encounter any issues installing the upgrade