

**Fusion3**

# **EDGE 3D Printer**

## **REPAIR: INSTALL PRINT HEAD HARNESS STRAIN RELIEF**

Revision 12/13/2022

# INSTALLING PRINT HEAD HARNESS STRAIN RELIEF

How to install the strain relief bracket on the print head cable harness.

## WHAT AND WHY

Some users have experienced intermittent failures related to the 8 pin print head cable harness and the breakout PCB on the rear of the print head assembly. These failures manifest as intermittent heater faults or intermittent loss of fan/blower power.

We believe the cause of these failures is inadequate strain relief on the cable as it mates to the PCB. Over time, the flexing of the cable breaks the conductors in the cable and can cause the solder joints on the PCB to crack.

The following instructions and WRD bracket will correctly strain relieve the cable to prevent issues in the future. Please install this part at your earliest convenience.

If you are currently experiencing the problems above, please reach out to Fusion3 Customer Support so we can assist you in resolving your issues; you will likely need additional replacement parts which we'll provide under your warranty.

## ACQUIRE KIT

There are two ways to acquire the strain relief bracket:

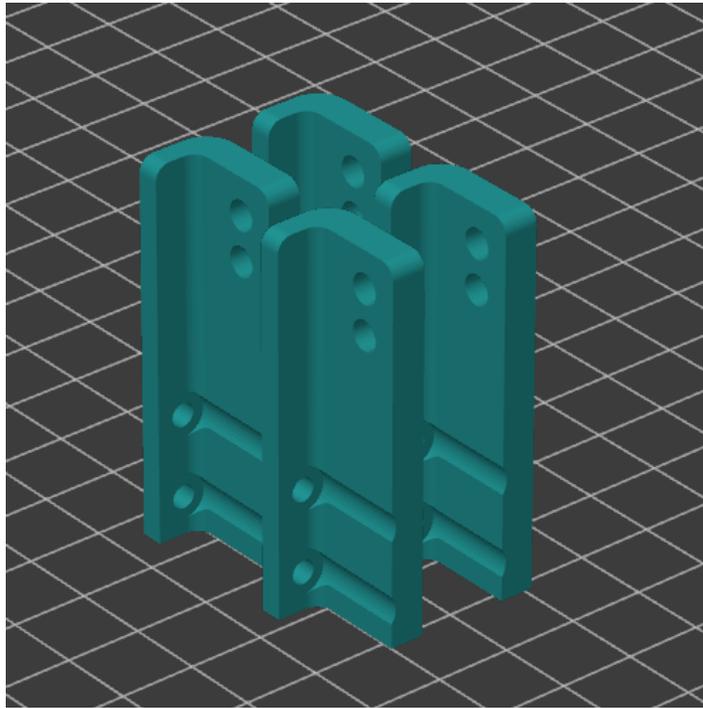
- Download the STL and print it yourself
- Purchase it through our online store

## Download and Print

[Download the STL here.](#)

In order to make sure the strain relief bracket can perform its function, please set it up and print it with the following parameters:

- Material: polycarbonate (PC), CF-PC, or PC-PBT
- # perimeters: 4
- %infill: 50
- # copies: 2-4, to allow adequate cooling
- Orient the part as shown in the picture



**If you do not have the above listed materials, please purchase the part through our online store instead of printing it yourself. The material is critical to the performance of the part.**

You will need to acquire the appropriate screws on your own as well:

- M3x8 SHCS: <https://www.mcmaster.com/91502A103/>
- M3x6 SHCS: <https://www.mcmaster.com/91502A102/>

You will also need 4-8 small (3-4" long) zip ties.

## **Purchase Through Store**

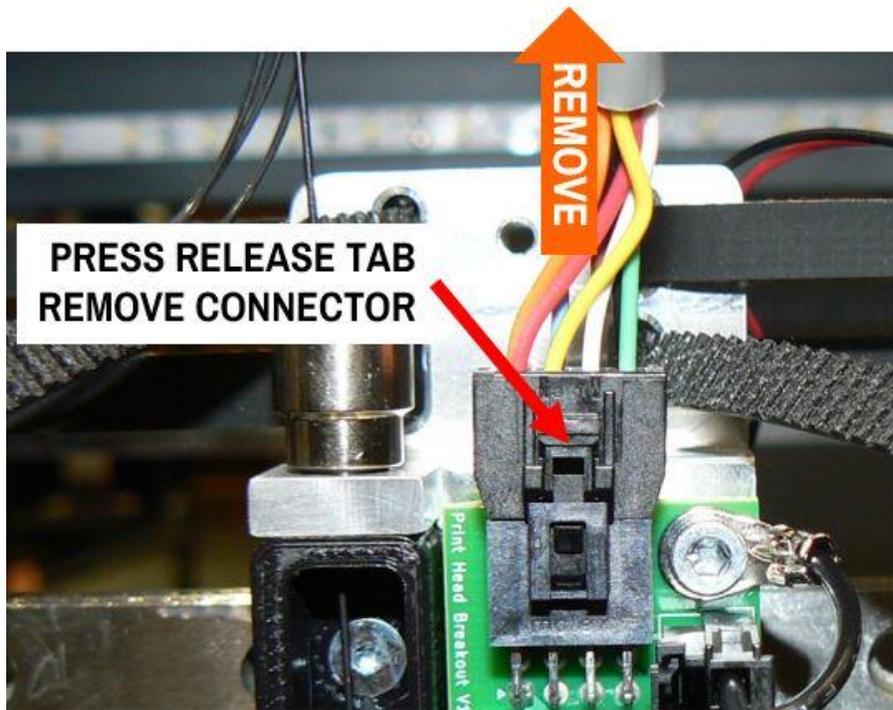
[The strain relief bracket kit is in our store here.](#)

This kit will come with all the screws and zip ties you need to complete the installation.

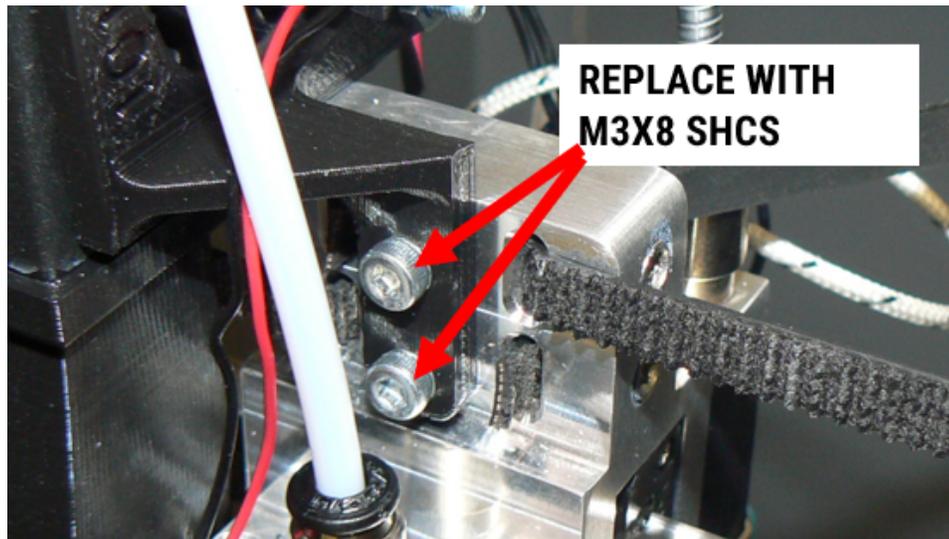
## **INSTALL PARTS - BRACKET ONLY**

If you are **only** installing the strain relief bracket, follow these steps.

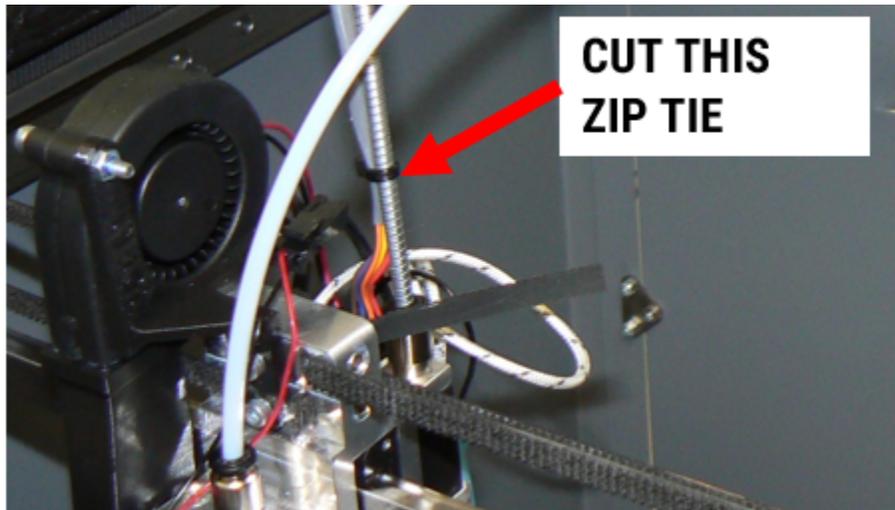
1. Unplug the harness from the breakout PCB. This connector has a latch you need to depress in order to remove the connector.



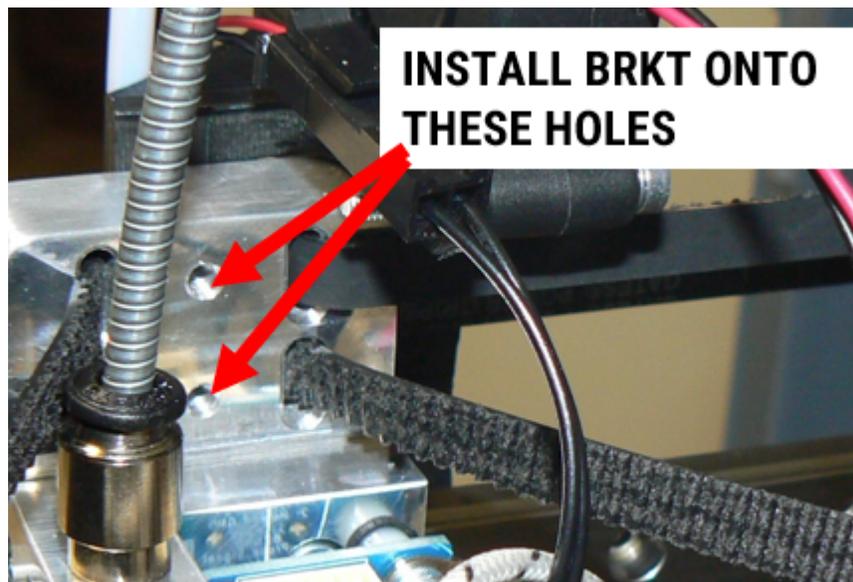
2. Replace the blower mounting screws with the included M3x8 SHCS. (Some printers may have this component installed with M3x10 and those will be too long to share the same hole with an additional screw)

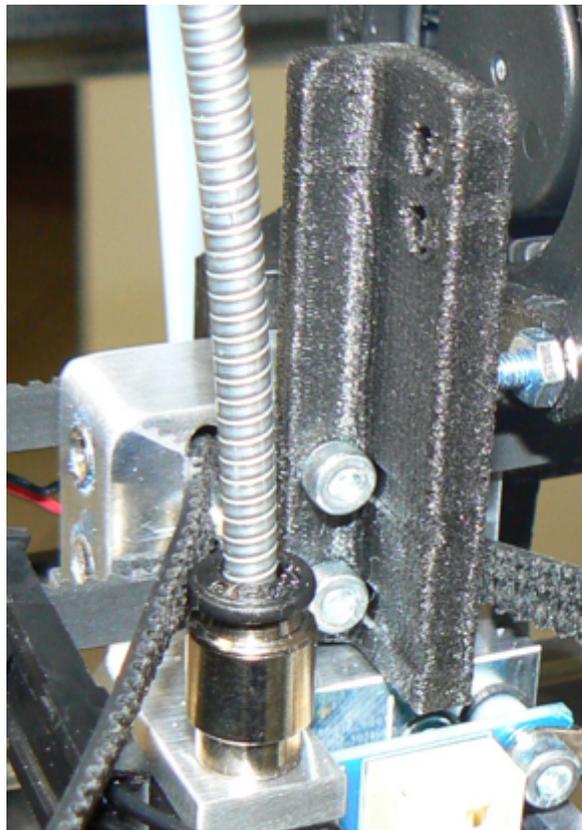


- Clip the zip tie nearest the breakout PCB that holds the wire to the spiral metal tube. **Be careful not to cut the wire itself.**

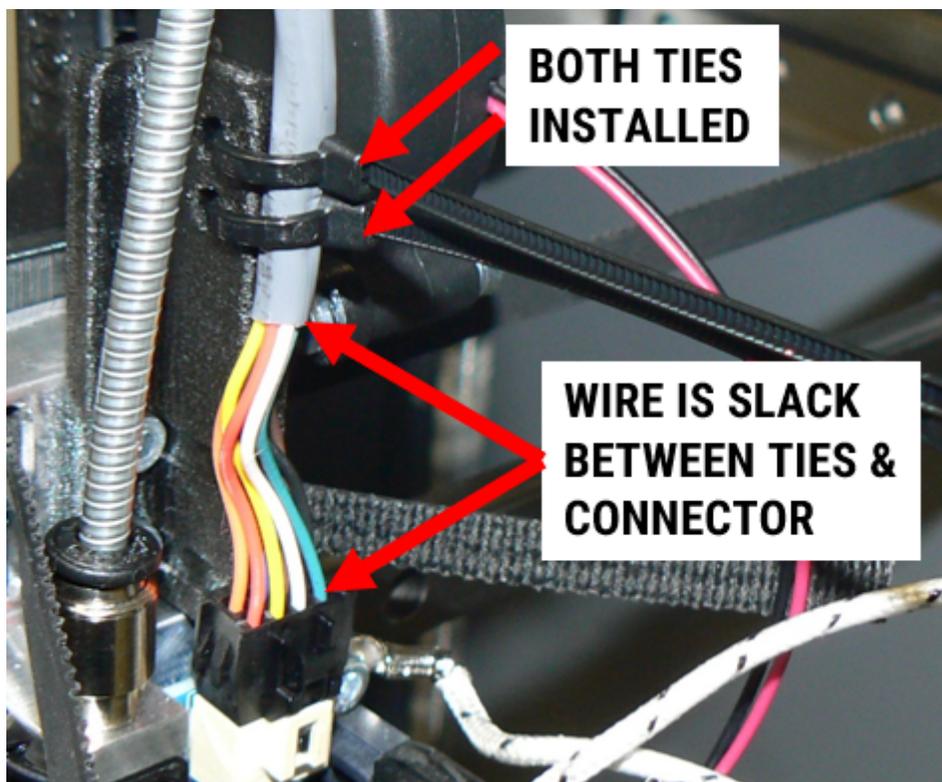


- Install the bracket into the two threaded holes in the center of the print head body. Use M3x6 SHCS. Position the bracket as shown. If you have **blue plastic-safe** thread locker, it's a good idea to put a small dab on each screw. **DO NOT USE RED OR NON-PLASTIC-SAFE THREADLOCKER**

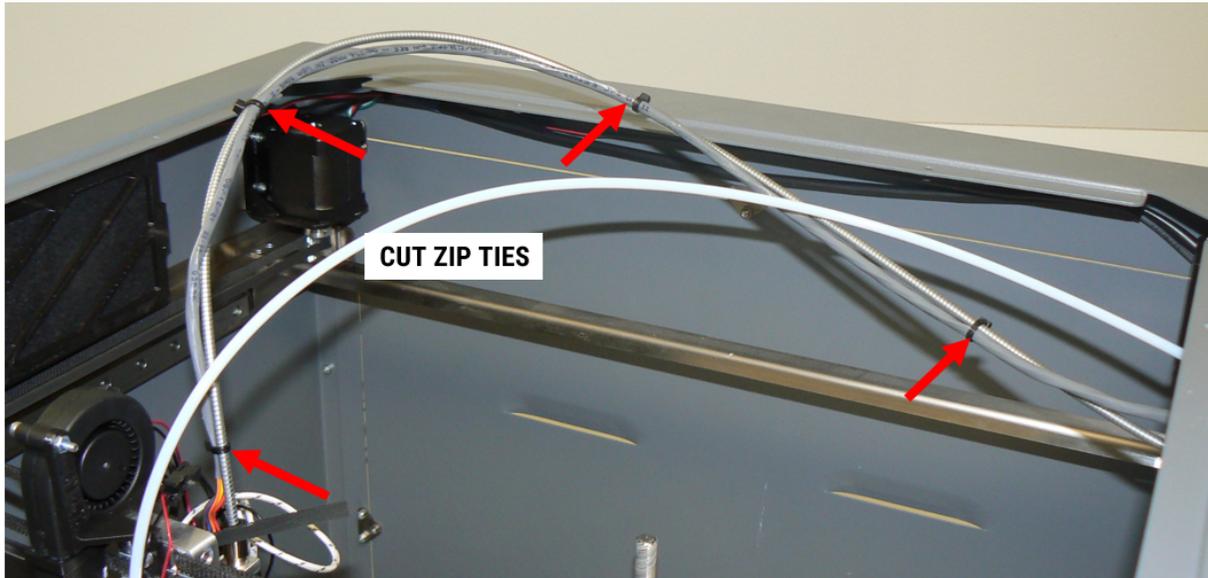




5. Thread 2 zip ties through the upper holes in the bracket. Position the wire so it lies along the edge of the part as shown. Wrap the zip ties around the wire and tighten them so they're snug, but you can still slide the wire underneath them.
6. Adjust the slack in the wire between the zip ties and the PCB. You want enough slack that none of the conductors are under tension or force, and the wires smoothly lead away from the connector.



7. Install a zip tie around the spiral tube and the wire about 3-4" above the bracket.
8. **If you need to adjust slack or the position of the cable,** cut all the zip ties holding the wire to the spiral tube, and adjust the slack at the print head. Install fresh zip ties when everything is adjusted correctly.



9. Firmly tighten the zip ties and trim them flush.
10. Proceed to the function checks section.

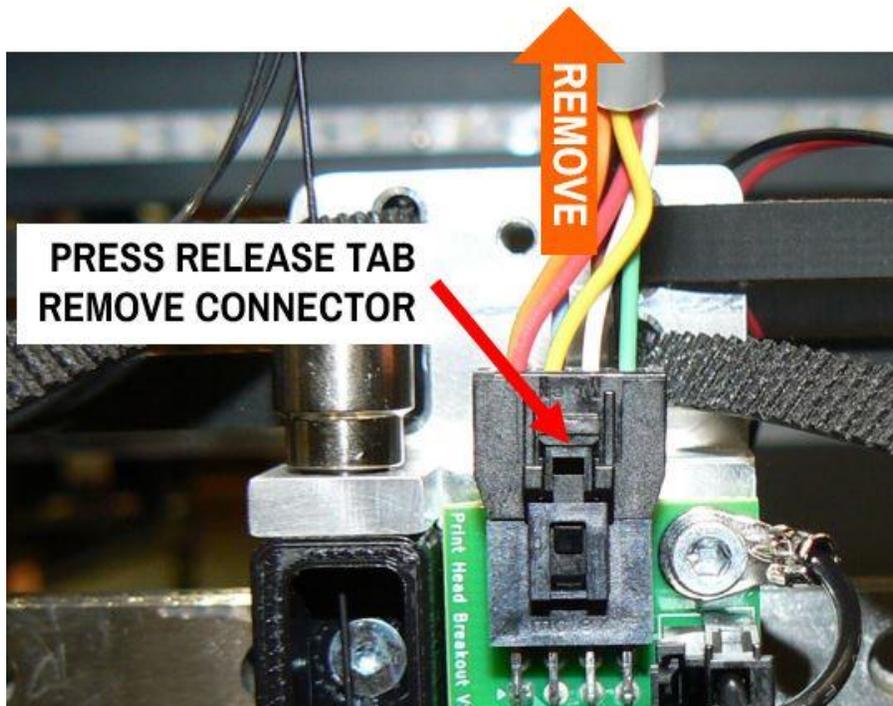
## REPLACE / INSTALL PARTS

Follow these instructions if you are **REPLACING** the print head harness and the breakout PCB, and **INSTALLING** the strain relief bracket. For printers that are currently experiencing a problem related to the print head wiring.

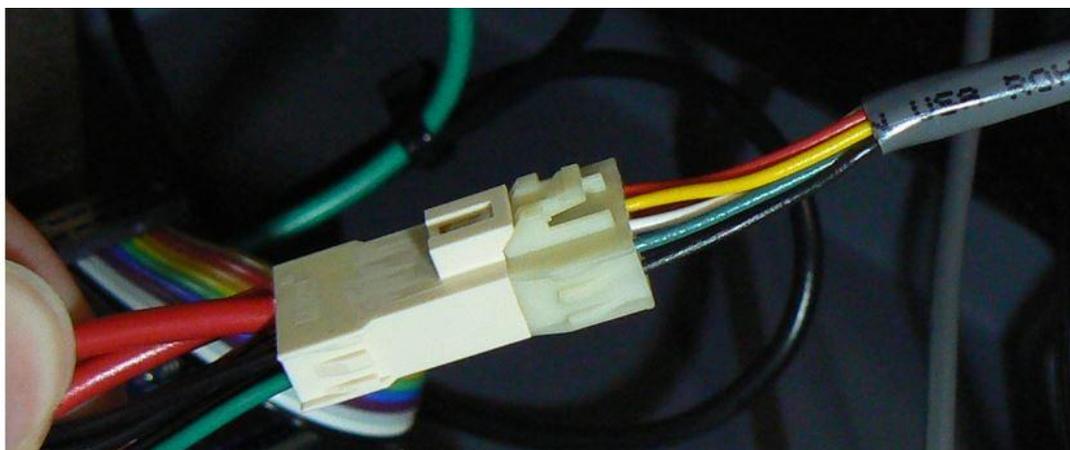
**INSTALL ALL 3 NEW COMPONENTS AT THE SAME TIME.**

### Replace Wire Harness

11. Unplug the harness from the breakout PCB. This connector has a latch you need to depress in order to remove the connector.

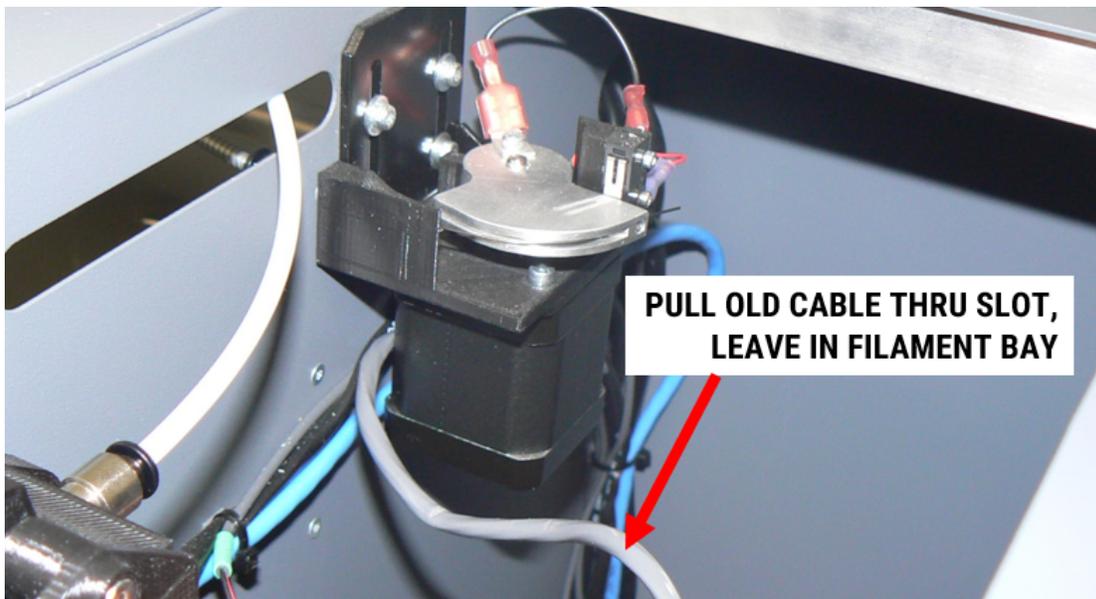
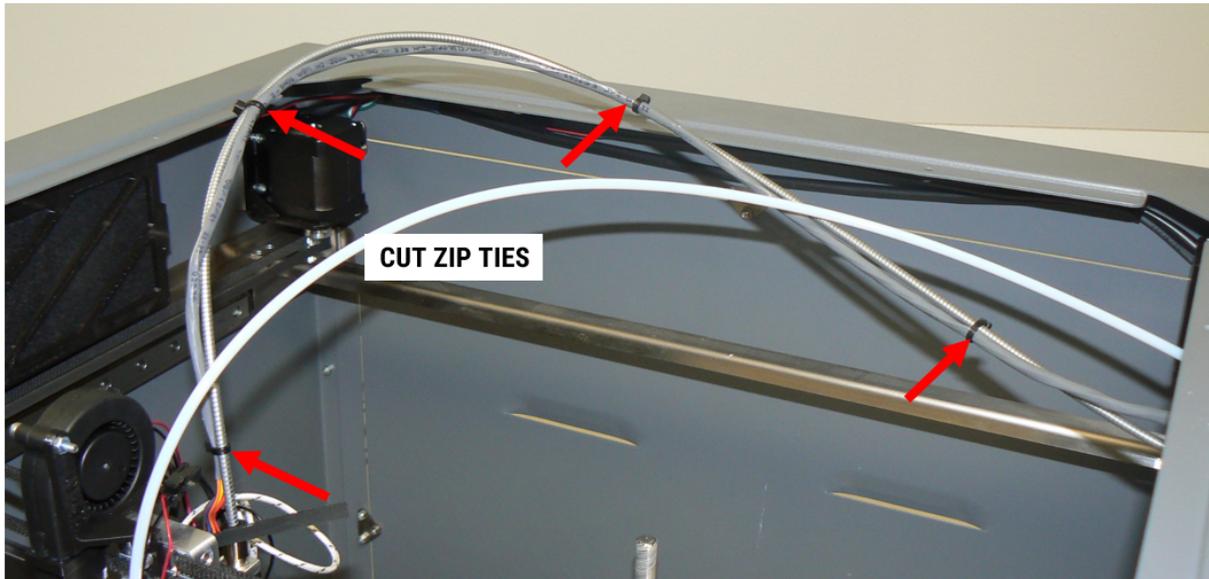


12. Open the electronics bay. Locate the tan in-line 8 pin connector. This is the other end of the print head harness. Unplug the tan connector. This connector also has a latch you must depress.



13. Cut the zip ties that hold the wire onto the spiral metal tube. Slide the wire back into the filament bay, and fold it back and down out of the way.

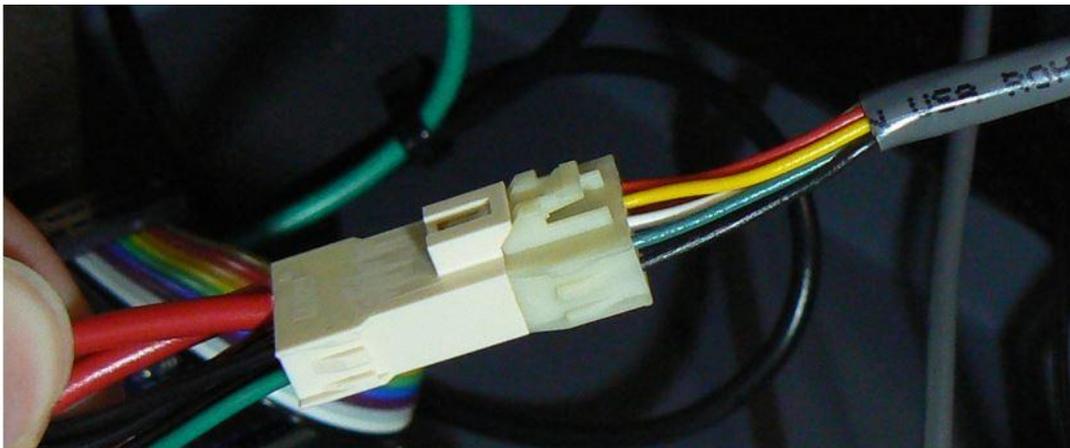
NOTE: It's not necessary to completely remove the wire from the printer. We recommend leaving it in place.



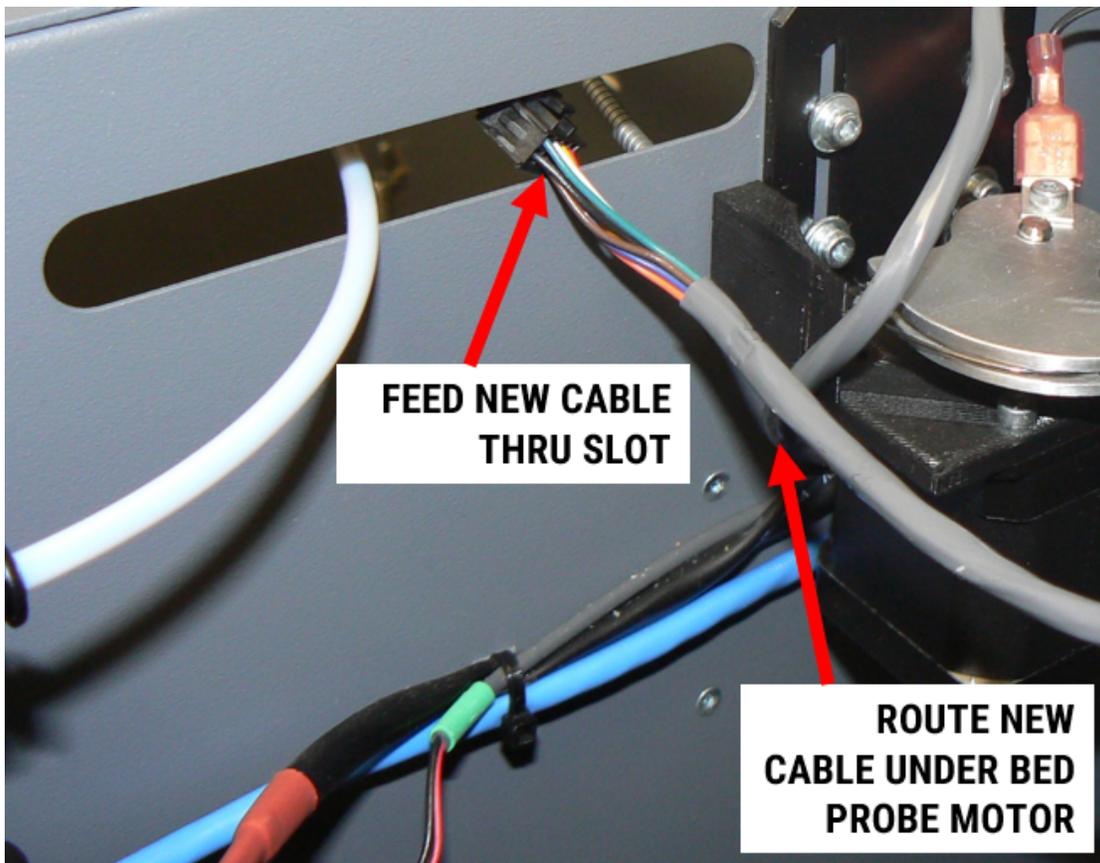
14. Feed the tan connector end into the electronics bay from the filament bay. The wire goes through the hole in the floor in the back. This can be a tight fit, but be patient and gently work the other wires out of the way.



15. Connect the tan connector to its mate.

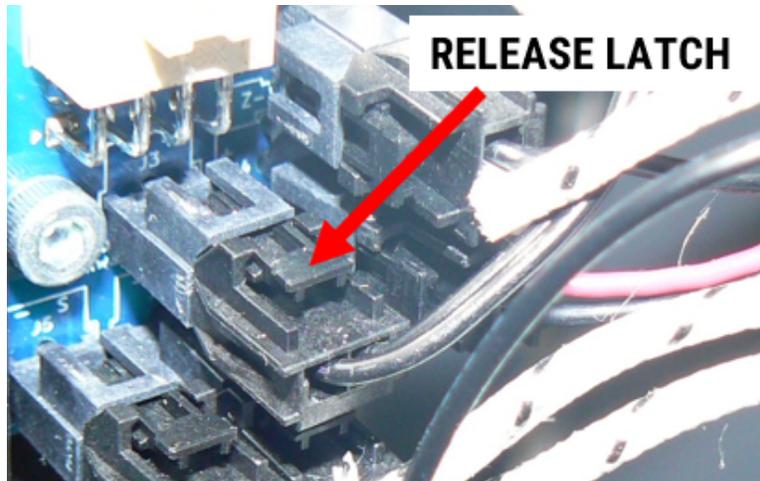


16. Route the black connector end of the cable out through the slot where the bowden tube goes.

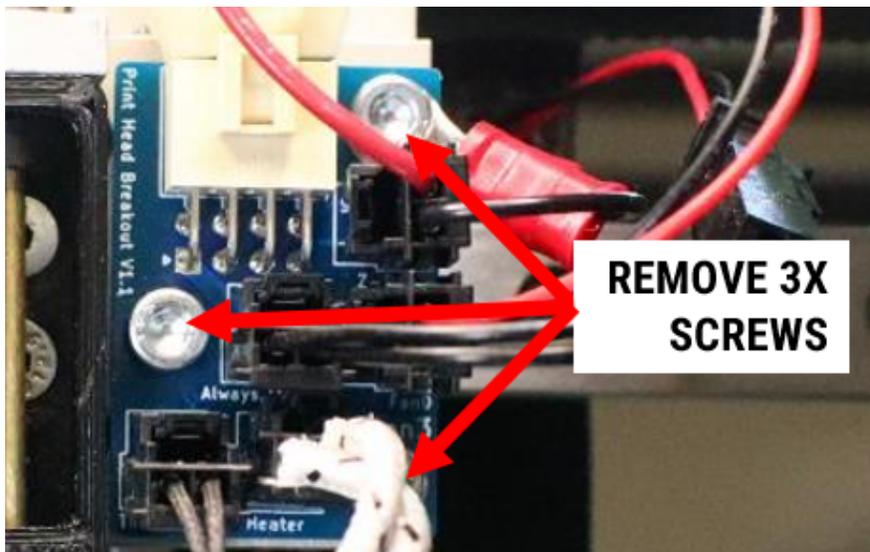


## Replace Breakout PCB

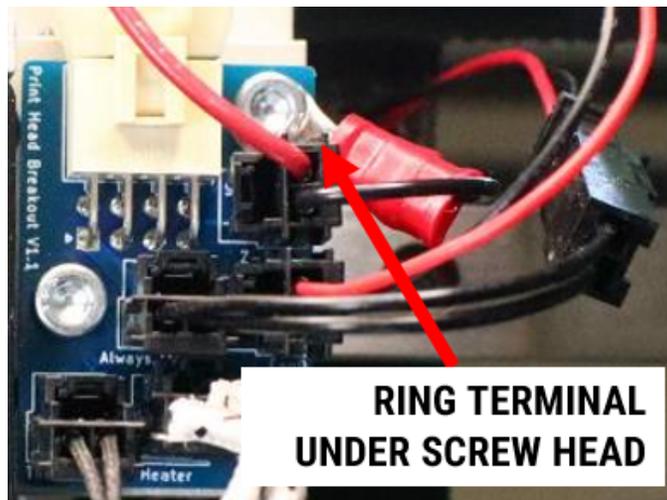
1. Disconnect all the remaining connectors from the PCB. All of these have a latch you need to depress to free the connector. Some are on top, and some are on the side.



2. Remove the 3 screws that hold the PCB onto the print head body. Try to keep the rubber washers and plastic spacers on the screws; if they fall off they have a tendency to disappear. The rubber washers are just to retain the spacers for ease of assembly.

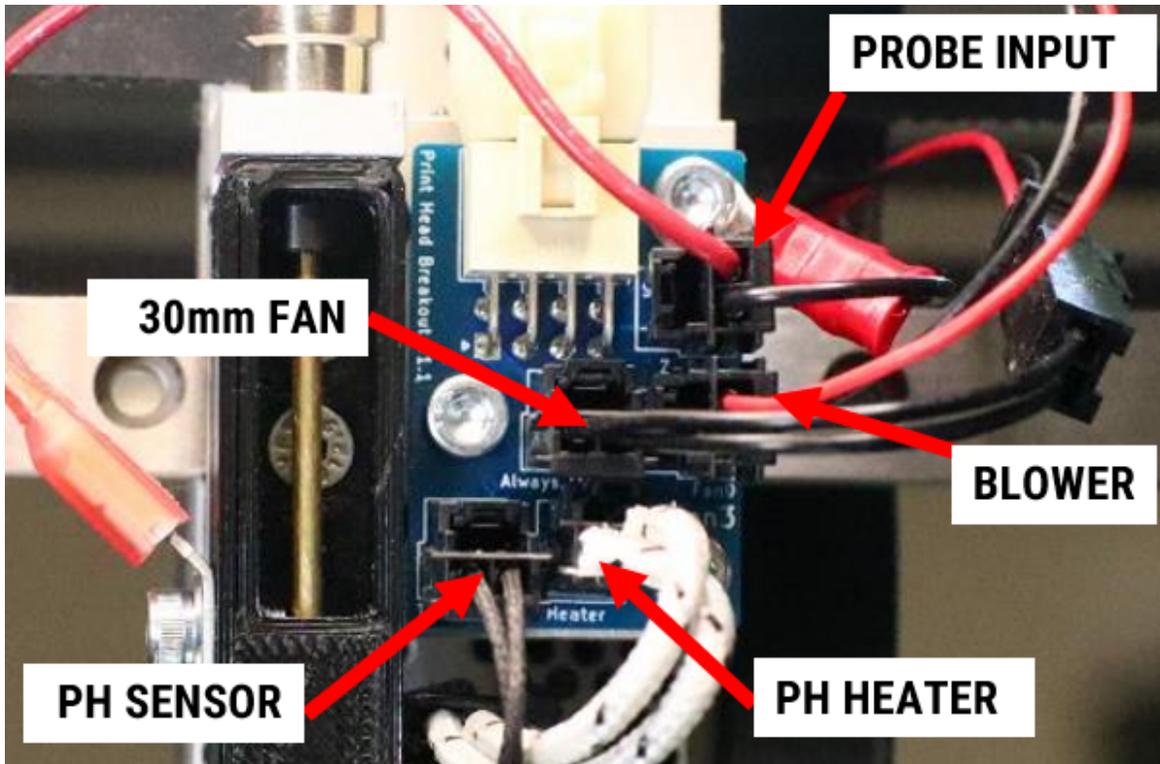


3. Transfer the screws, spacers, and rubber washers to the new PCB. Make sure the wire with the ring terminal goes under the top right screw as shown.



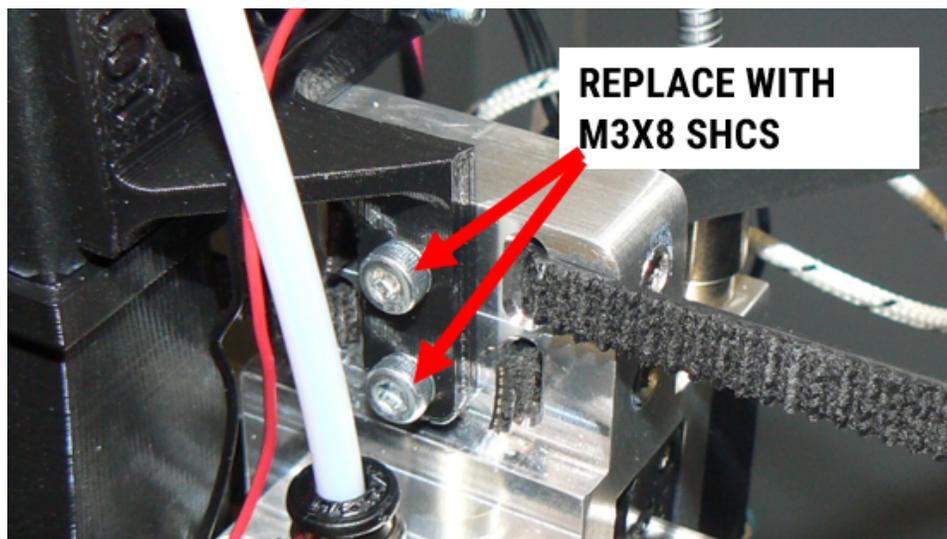
4. Install the new PCB onto the print head body. Tighten the screws firmly.

5. Re-install the connectors. Pay special attention to the location of each connector; if you get them wrong equipment damage and/or difficult to diagnose behavior may result. The board is labeled but it can be a little hard to read between the connector bodies.

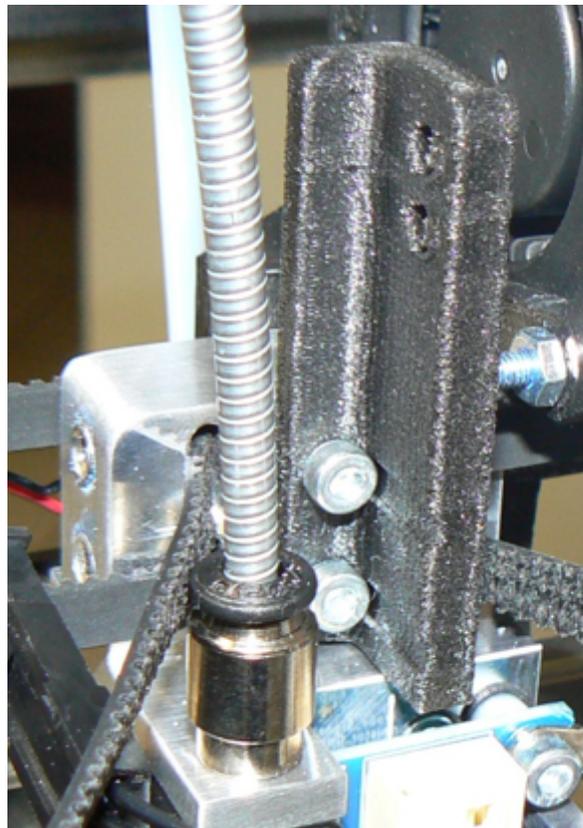
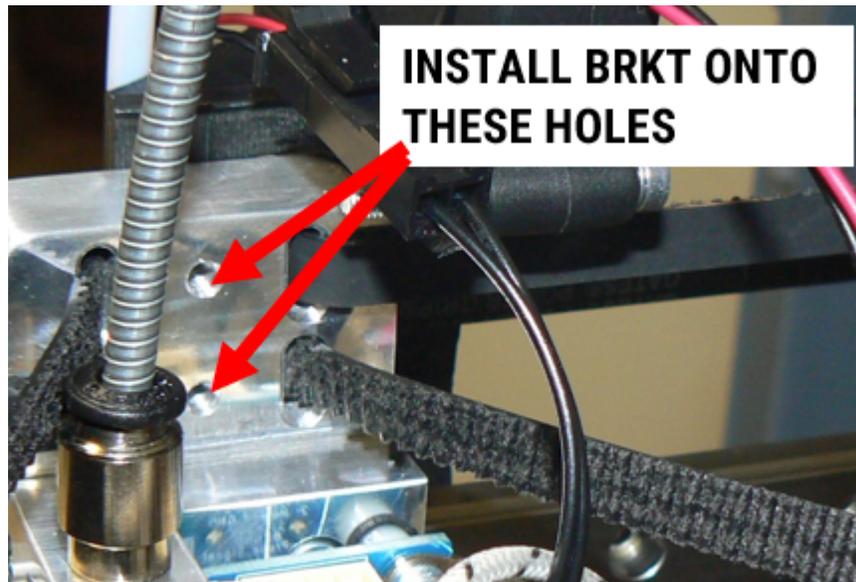


### Install Strain Relief Bracket

1. Replace the blower mounting screws with the included M3x8 SHCS. (Some printers may have this component installed with M3x10 and those will be too long to share the same hole with an additional screw)

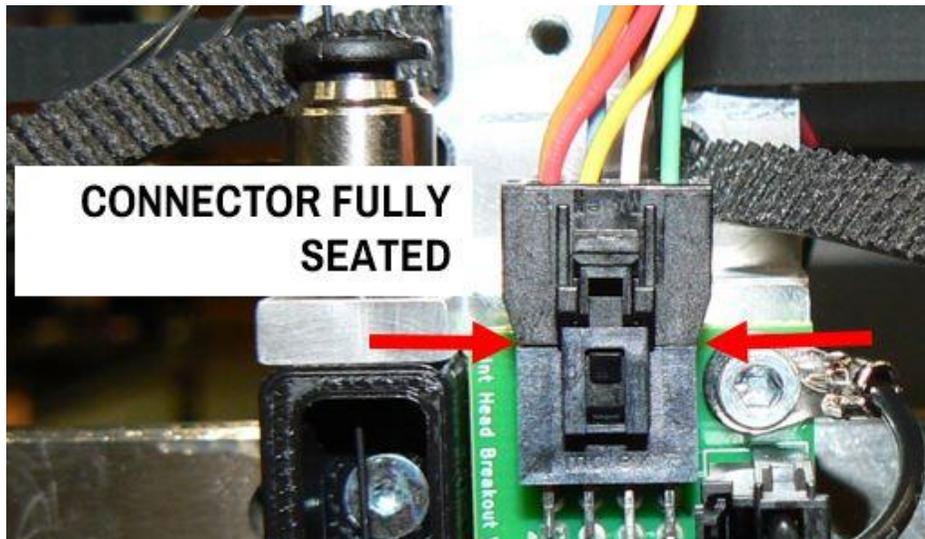


2. Install the bracket into the two threaded holes in the center of the print head body. Use M3x6 SHCS. Position the bracket as shown. If you have **blue plastic-safe** thread locker, it's a good idea to put a small dab on each screw. **DO NOT USE RED OR NON-PLASTIC-SAFE THREADLOCKER**

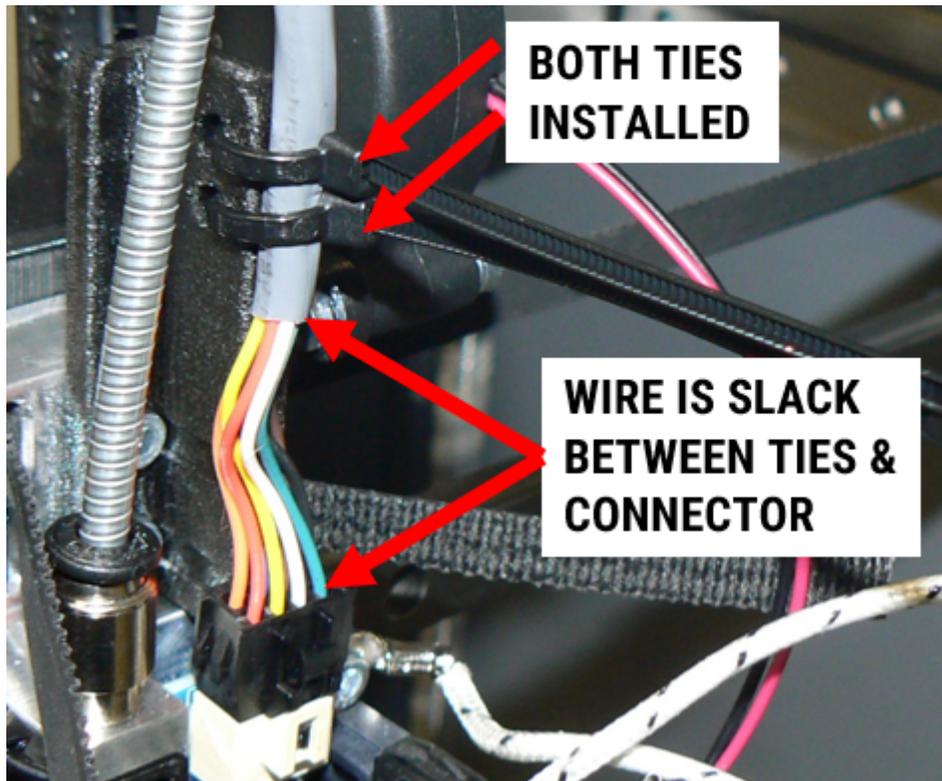


3. Thread 2 zip ties through the upper holes in the bracket. Position the wire so it lies along the edge of the part as shown. Wrap the zip ties around the wire and tighten them so they're snug, but you can still slide the wire underneath them.

4. Connect the black end of the cable to the breakout PCB.



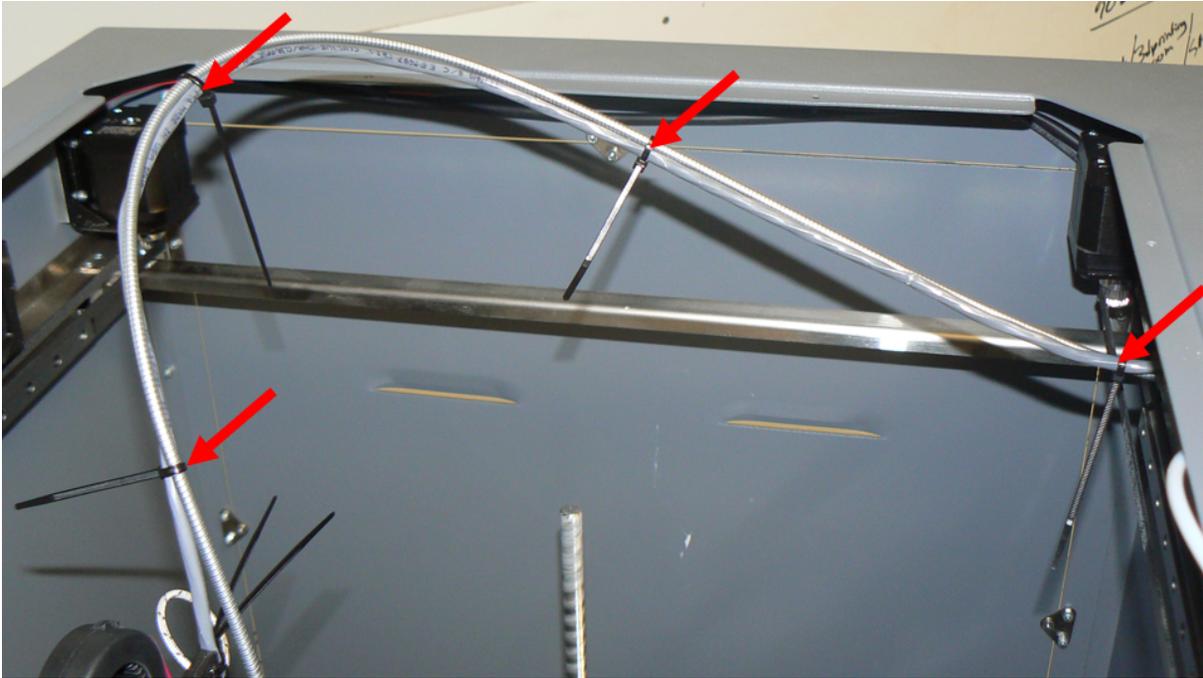
5. Adjust the slack in the wire between the zip ties and the PCB. You want enough slack that none of the conductors are under tension or force, and the wires smoothly lead away from the connector.



17. Route the wire along the spiral metal tube. You want to adjust the slack so that there is not excess wire hanging off. But you don't want it to be so taut that it pulls the spiral tube out of shape or out of position.

18. Install a zip tie around the spiral tube and the wire about 3-4" above the bracket.

19. Install 4 zip ties along the length of the spiral tube, spaced evenly apart. The one closest to the print head should be 1" - 1.5" above the top of the strain relief bracket.



20. Pull the zip ties tight, and trim them flush.

## POWER ON & FUNCTION CHECKS

### If you only installed the Strain Relief Bracket:

1. Move the print head to all 4 corners by hand, and make sure:
  - a. The wire, spiral tube, and bowden tube do not interfere with each other
  - b. There is enough slack in the wire, spiral tube, and bowden tube to reach the extreme of travel (front left corner)
2. Power on and make sure the print head temperature reads correctly.
3. Run a print and make sure everything works and no errors occur.

### If you replaced the PCB and wire as well:

1. Perform the above item 1.
2. Power the printer on.

3. Go to *Utilities > Maintenance >* and press the "*Self Diagnostic*" button. The first run wizard will start and run you through a full system check.
4. Run a print and make sure everything works and no errors occur.