000 - TOOLS REQUIRED FOR BUILDING THE K8200

- COMBINATION SNAP RING PLIERS **(VTSRP)**

or

- CLASSIC CIRCLIP PLIERS FOR OUTER RINGS (SHAFTS) **(WH26790)**

- ALLEN KEYS 1.5-6 mm - RING WITH 8 PCS **(1620-8)**

- WRENCH SET - OPEN END - 6 – 22 mm - 8PCS **(1420-R8)**

- CERAMIC SOLDERING IRON 30W / 230V **(STC30N)**

- SOLDER 60/40 1 mm 100g **(SOLD100G)**

- WIHA - SOFTFINISH CABINET SCREWDRIVER - SLOTTED 3 x 100 mm **(WH00687)**

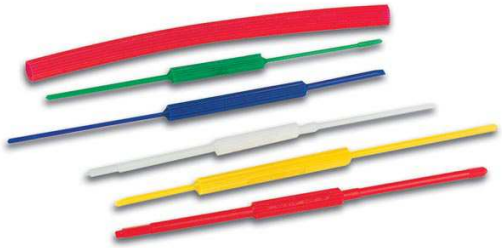
- 5" ELECTRICAL CUTTER & STRIPPER **(VT109 or VT109N)**

- 3 ½-DIGIT DIGITAL MULTIMETER **(DVM840)**

- DIGITAL CALLIPER – 150 mm / 6" - 0.01 mm **(DCA150)**

- TAPE RULE 3 m **(HRUT3PRO)**

- 6-PC PLASTIC TUNING NEEDLE SET **(VTPT)**



- 5-PC DIAMOND FILE SET **(VTDF2)**

001 – ASSEMBLING THE COIL SUPPORT

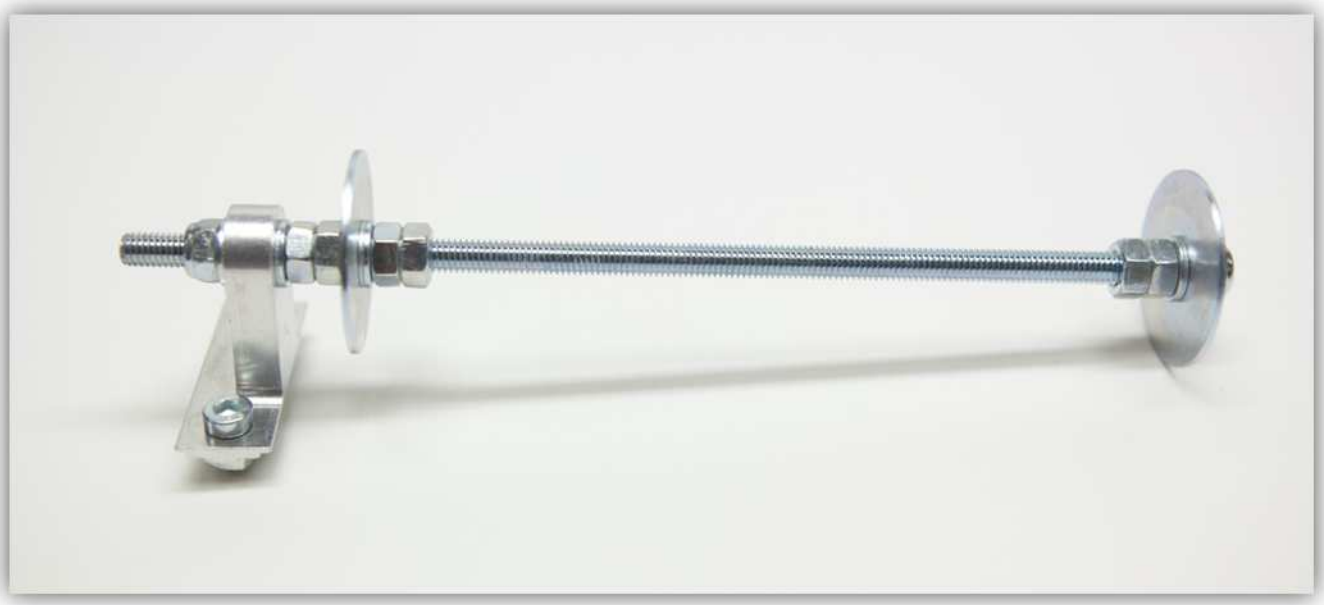
Take the bag labelled with a 1 out of the box, you should have these parts:

Starting from the left of the threaded rod, put the parts together in this order:

- 1 x M6 locking nut
- 1 x M6 small washer
- The mounting bracket oriented as in the picture below
- 1 x M6 small washer
- 2 x M6 nut
- 1 x M6 small washer
- 1 x M6 large washer
- 1 x M6 small washer
- 2 x M6 nut
- 2 x M6 nut
- 1 x M6 small washer
- 1 x M6 large washer
- 1 x M6 small washer
- 1 x M6 locking nut

Leave some extra thread on the left (around 10 mm or 0.39"):

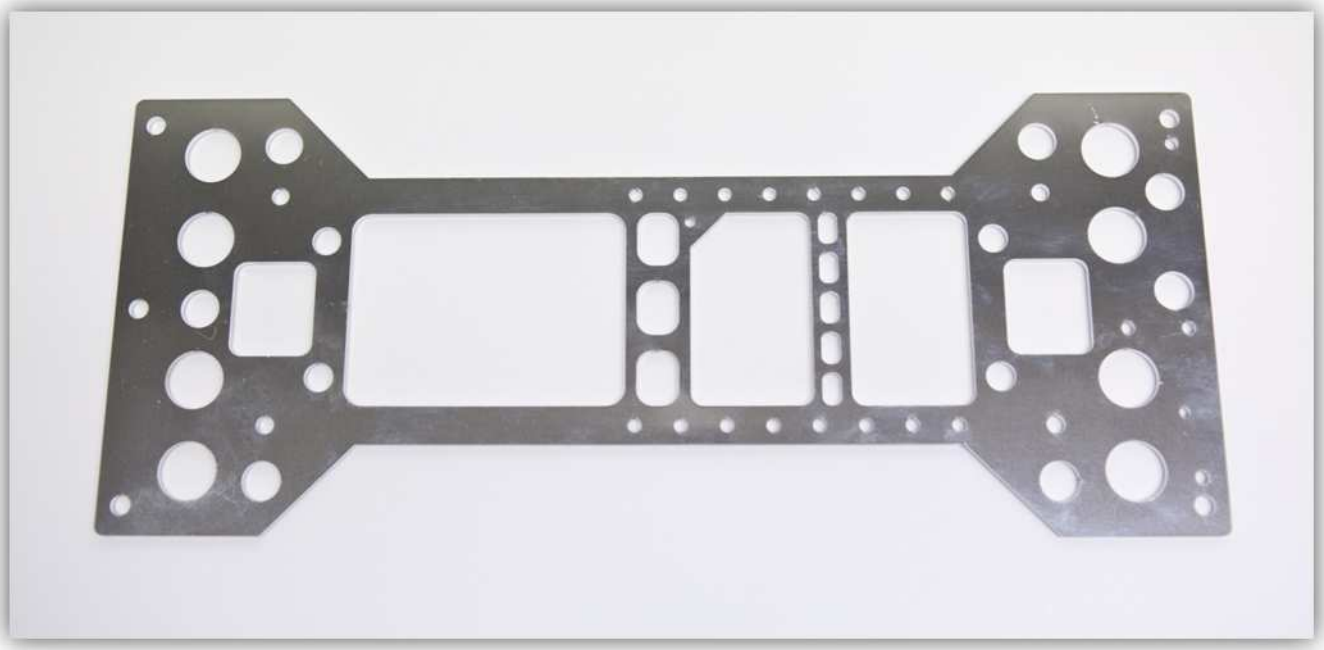
Then tighten all the nuts, the result should look like this:



Put this part aside, you will need it later in the build.

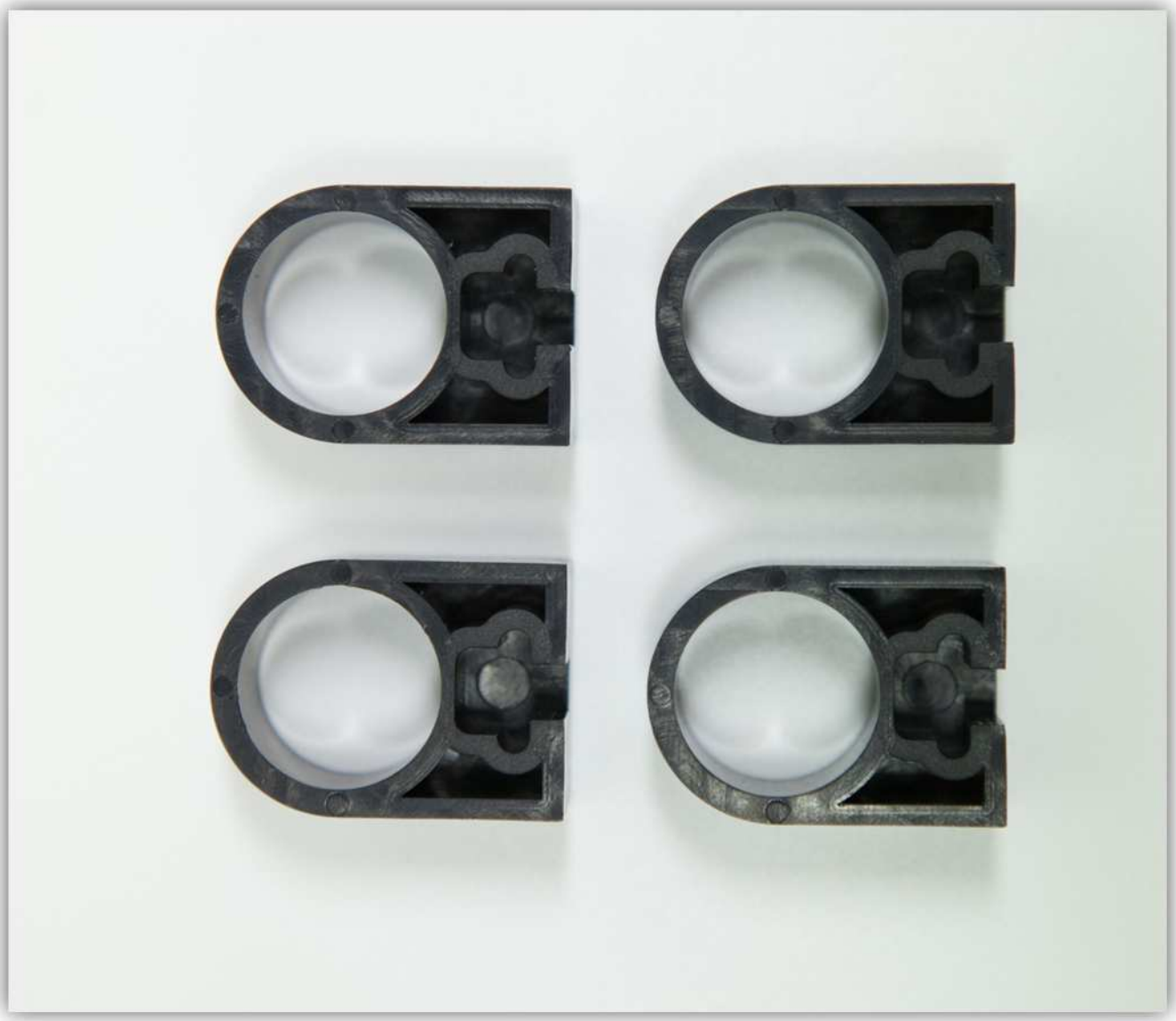
002 – ASSEMBLING THE X CARRIAGE

Take the X CARRIAGE out of the box.



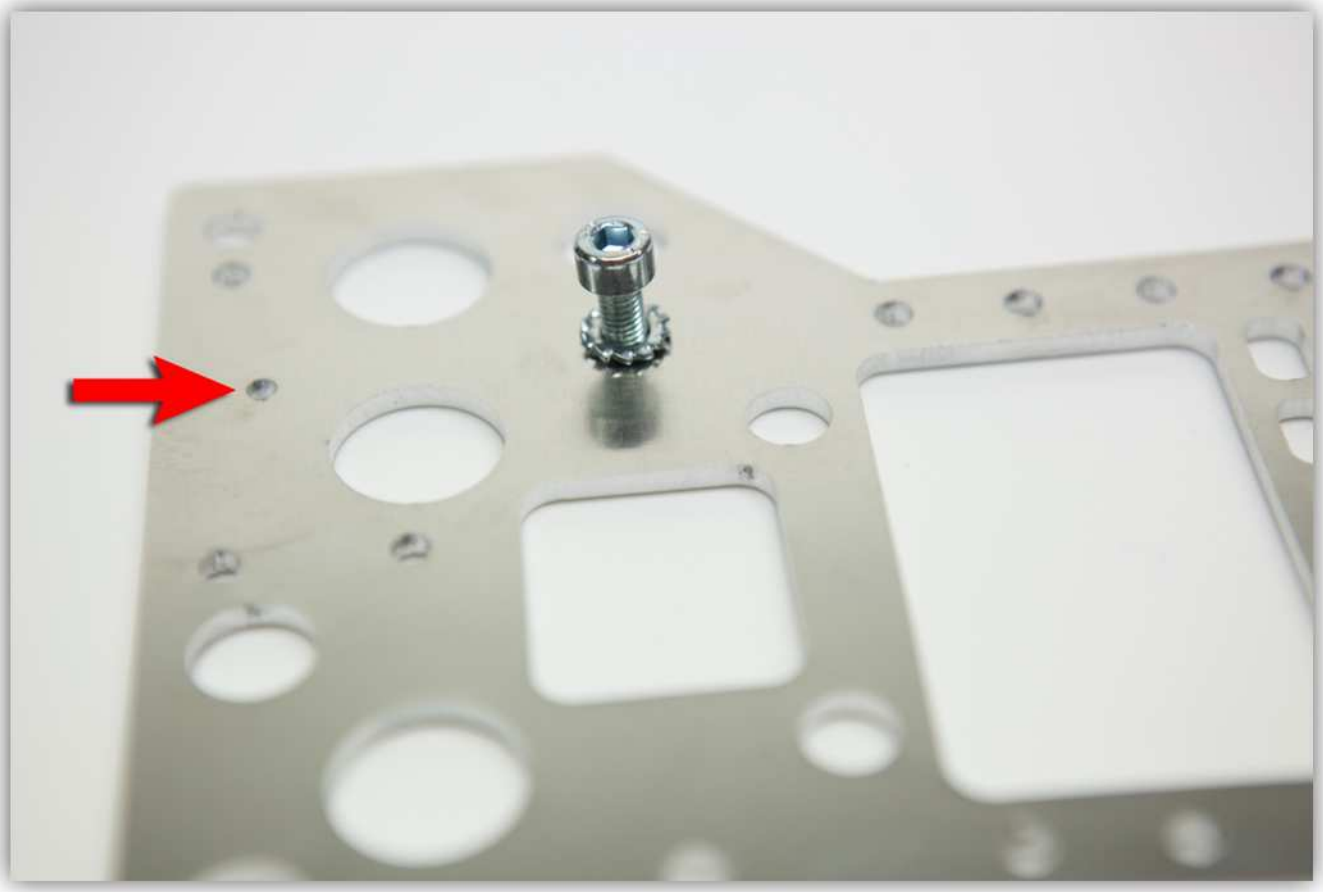
Take the bag labelled with 3 out of the box, you should have these parts:

Now take 4 pieces as shown in the picture below out of the bag containing the plastic parts (BEARING CLAMP X):

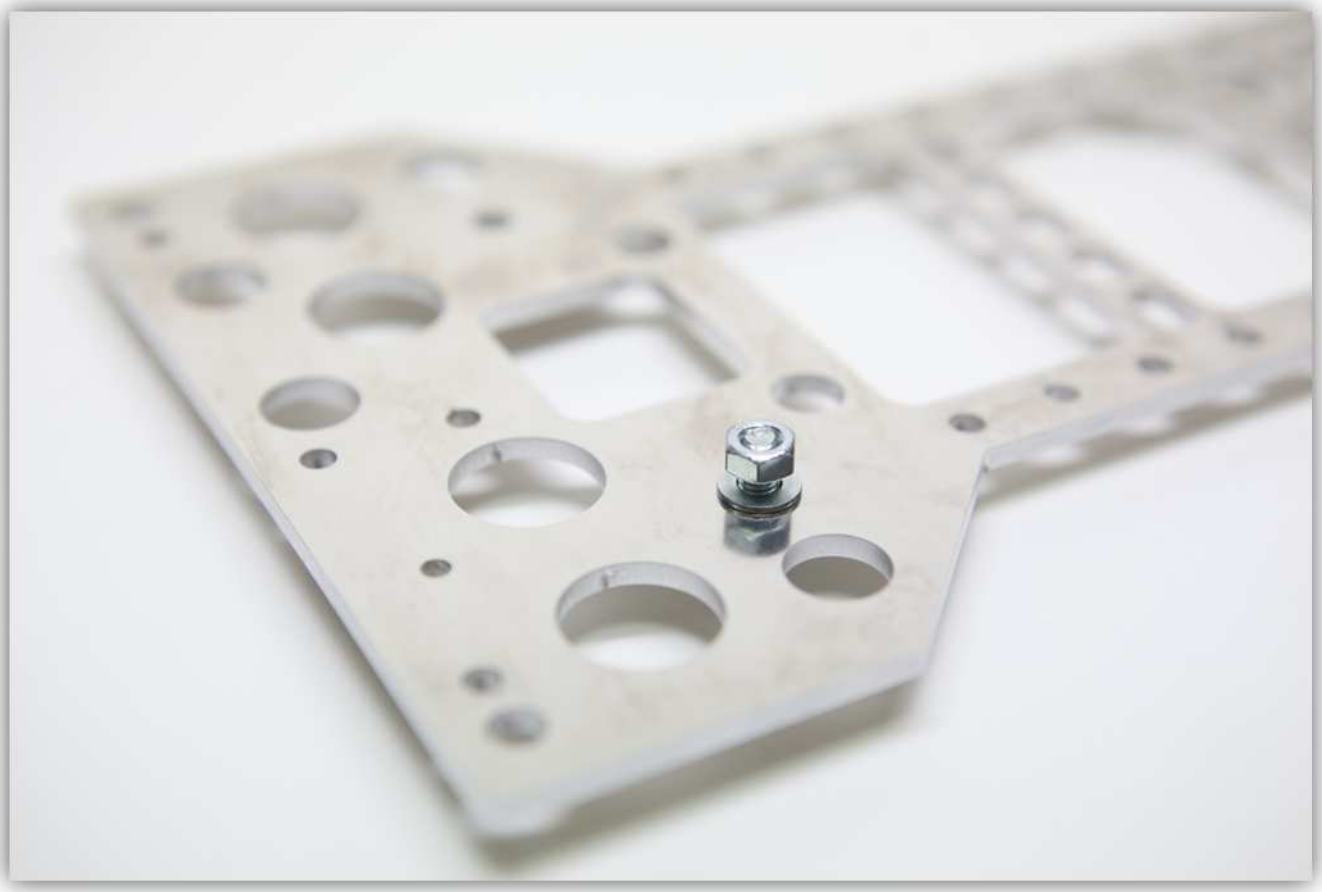


Put an M5 bolt and an M5 toothed washer through the X CARRIAGE as shown in the picture. **Take notice of the orientation of the aluminium plate. The red arrow shows a little hole, make sure this hole lines up as in the picture**

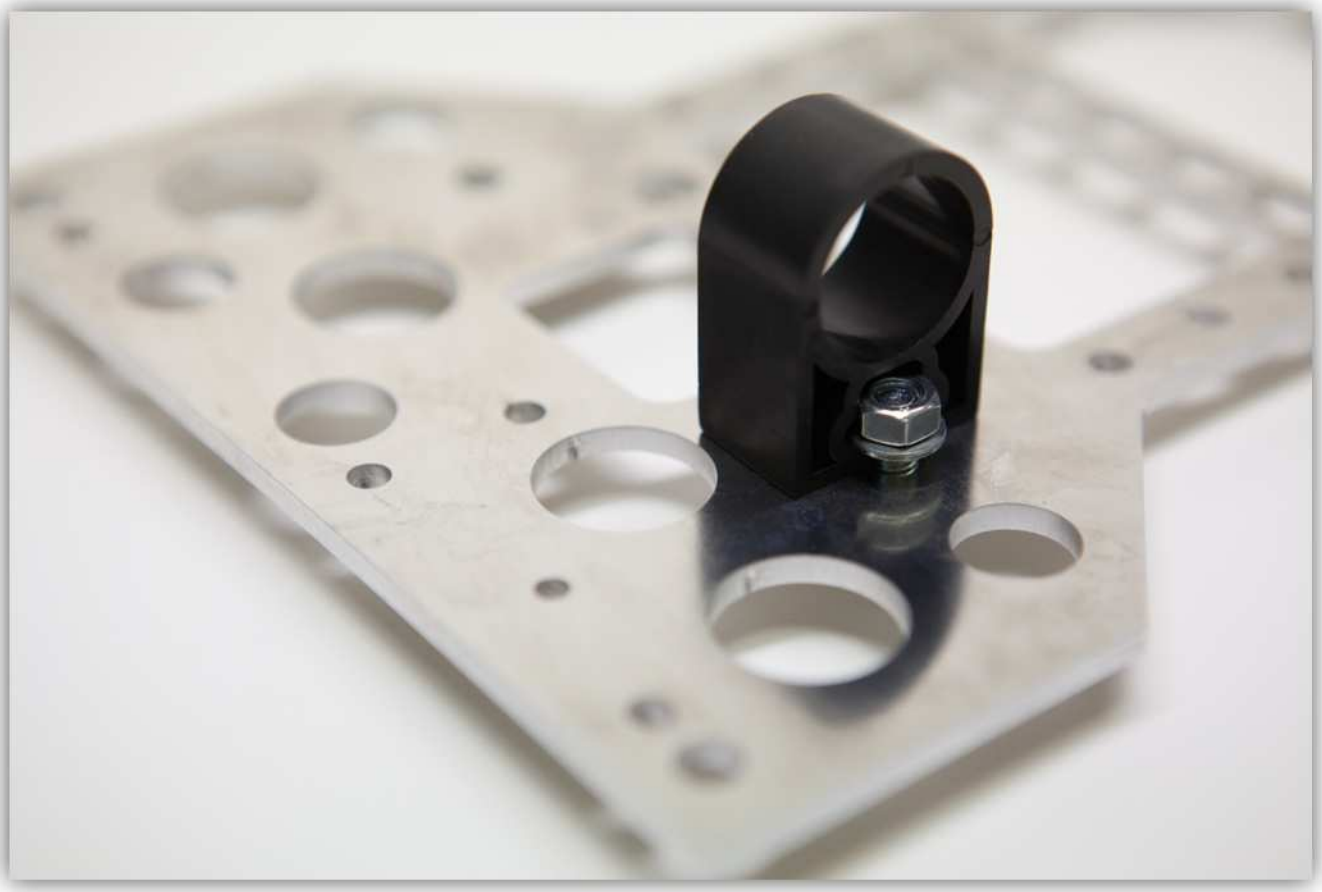
below:

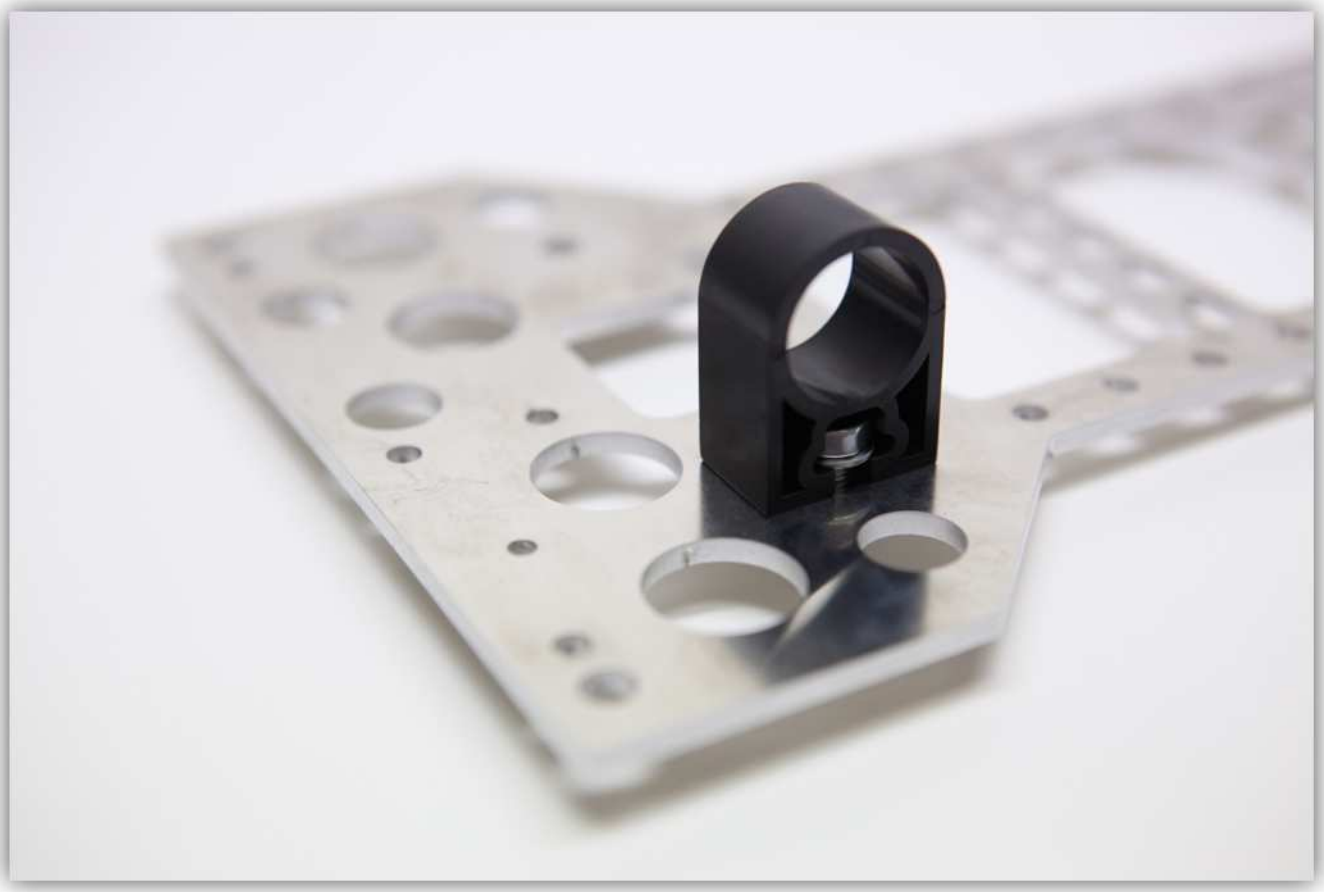


Flip the X CARRIAGE and put a M5 flat washer and an M5 nut on the M5 bolt as in the picture. **Do not tighten this nut.**



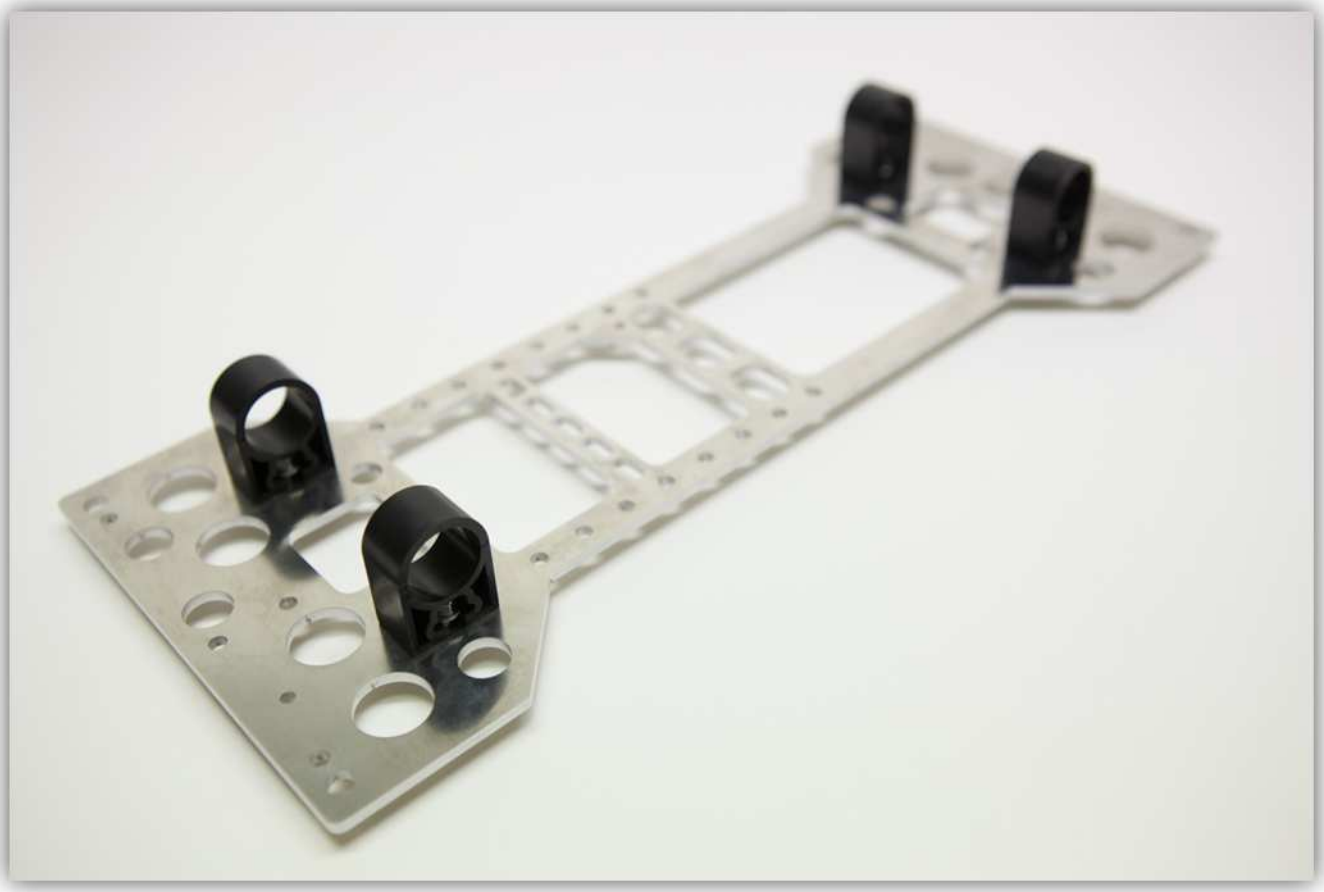
Slide 1 of the BEARING CLAMP X pieces over the washer and nut as shown in the pictures below. **Hand tighten this assembly. This part should be able to move freely but not fall off, later in the build we will tighten this piece.**

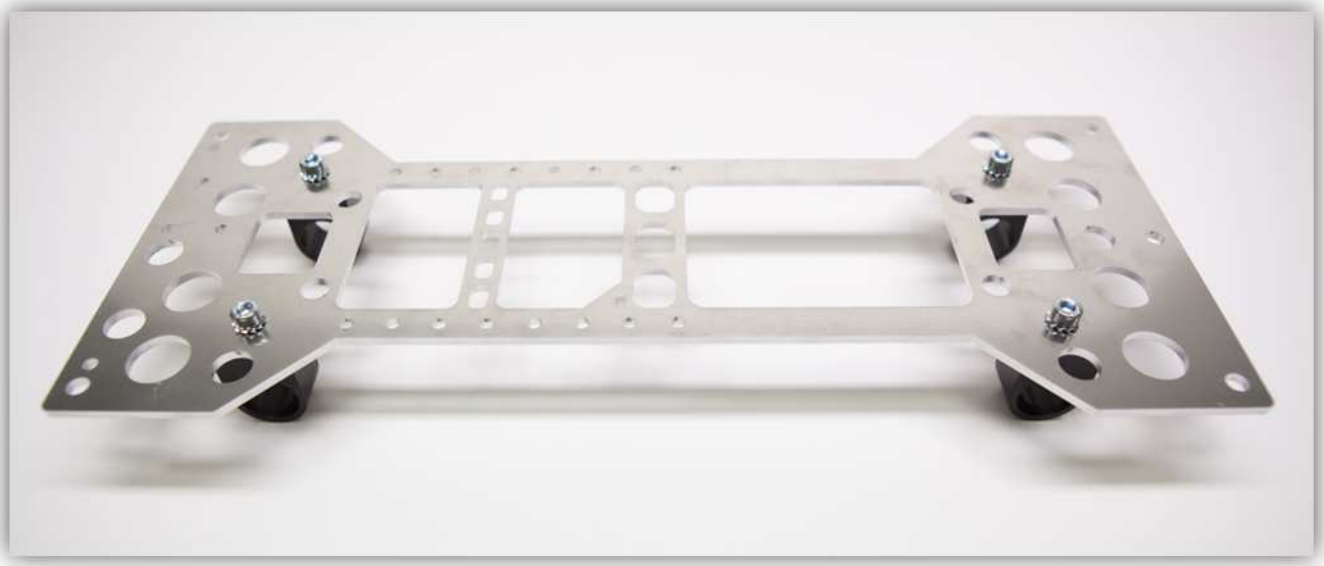




The assembly should look like this:

Repeat this 3 times in the positions shown on the pictures. **Remember, do not fully tighten these bolts. Just hand tighten them.**

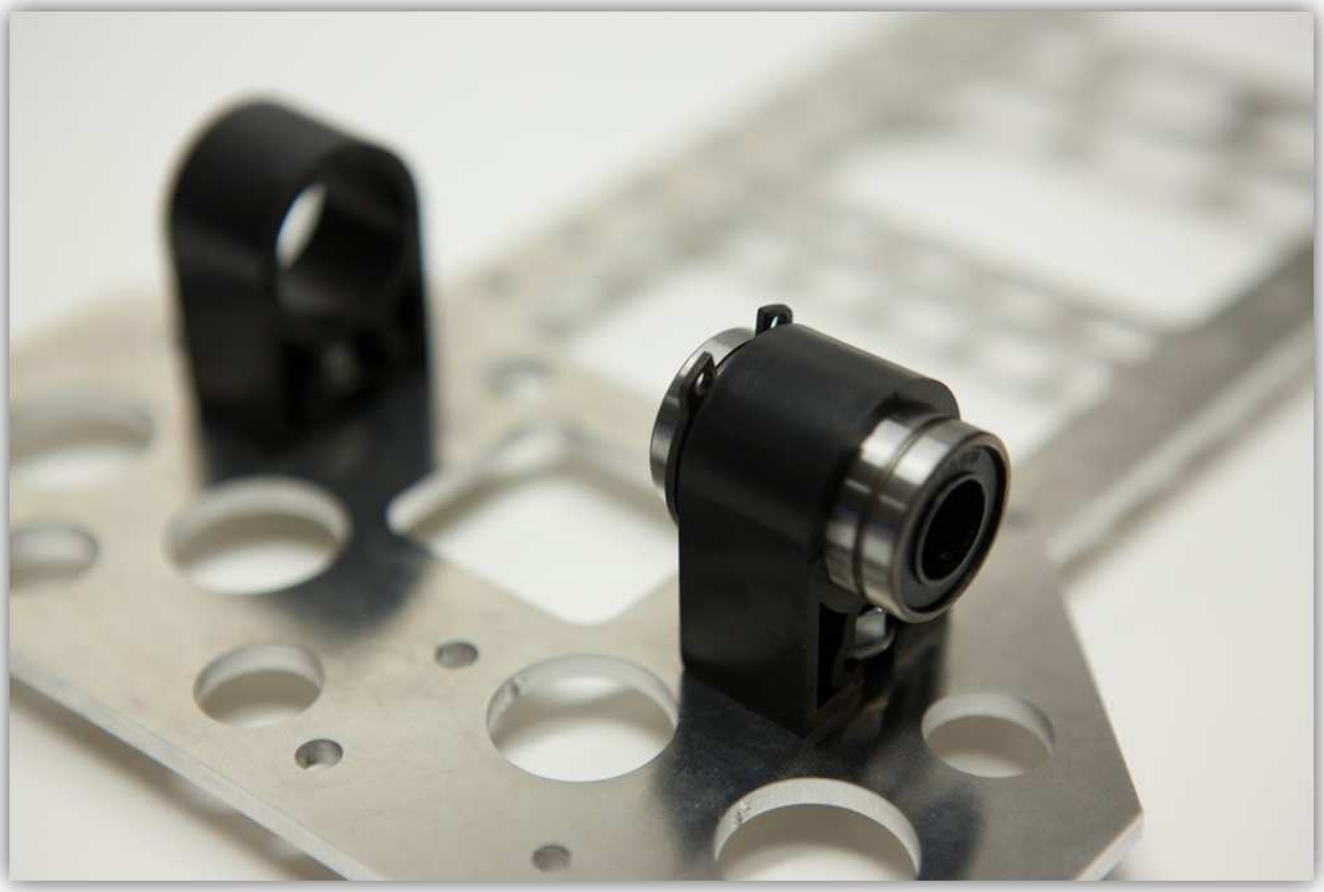




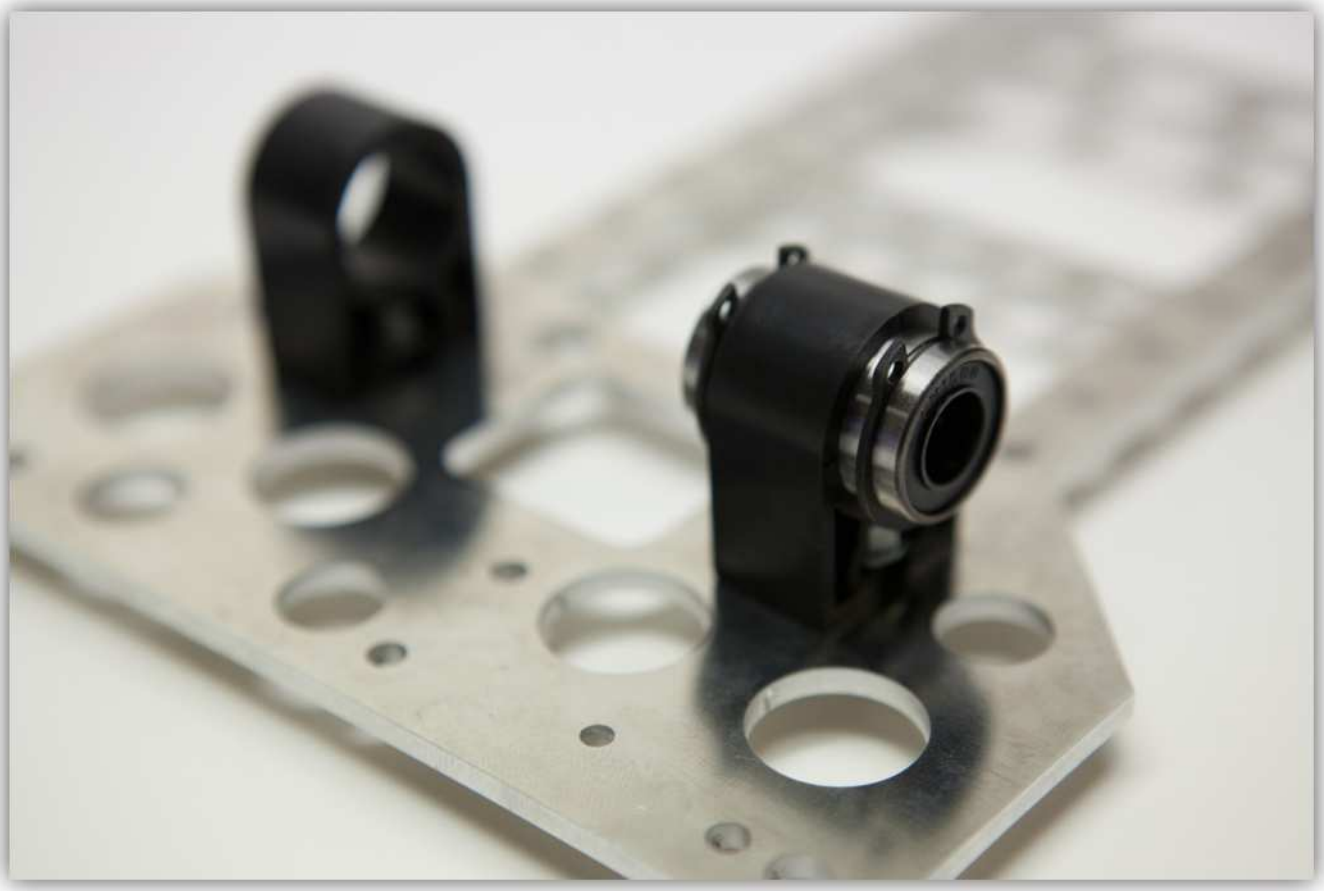
Now take the circlip pliers, a circlip and an LM10UU linear bearing:

Use the circlip pliers to carefully fit the circlip around the LM10UU linear bearing.

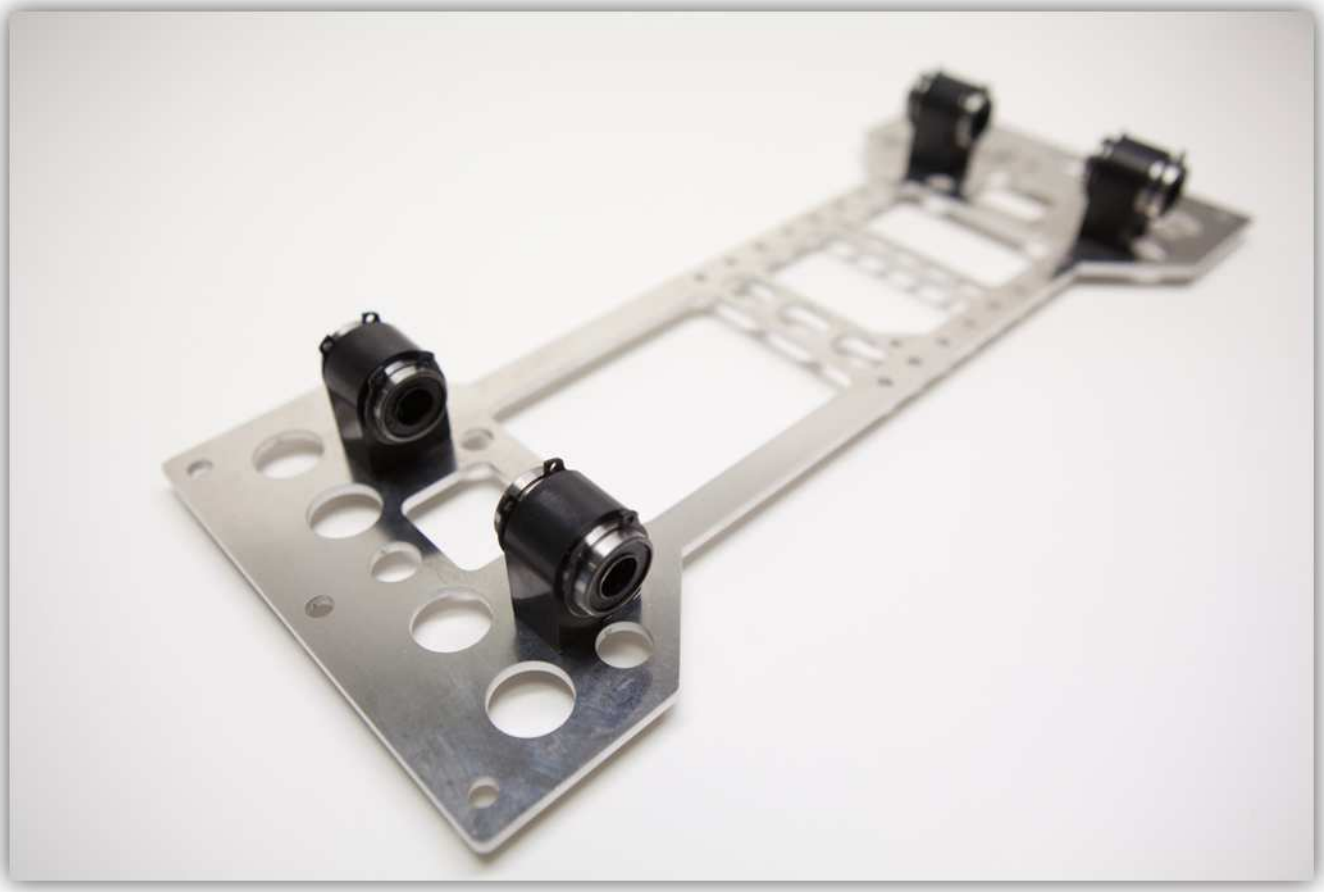
Slide the bearing with one circlip inside one of the BEARING CLAMP X pieces:



Use the circlip pliers to carefully fit the circlip around the LM10UU linear bearing and lock it in the BEARING CLAMP X piece:



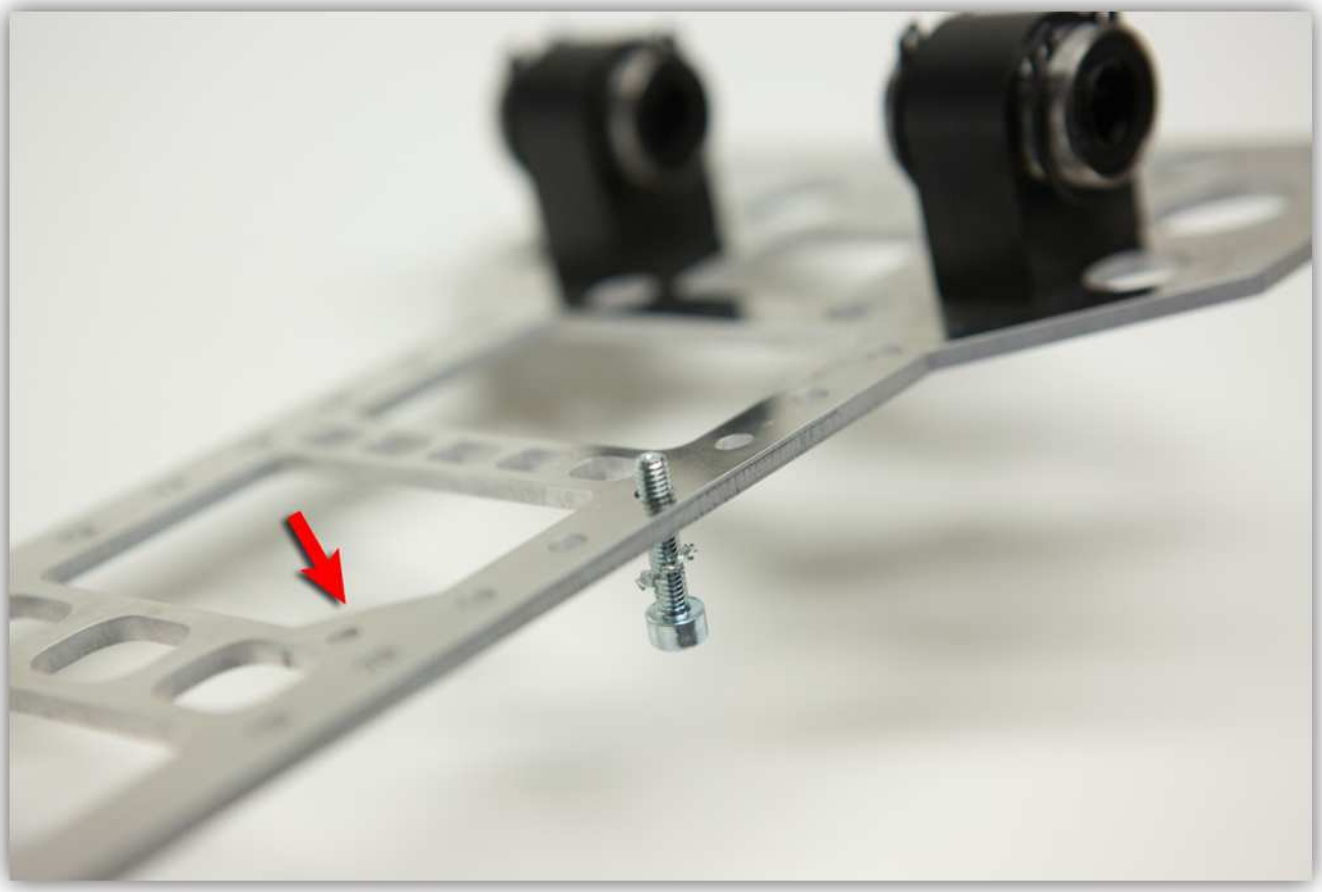
Repeat this process 3 more times so all the BEARING CLAMP X pieces have a bearing with circlips:



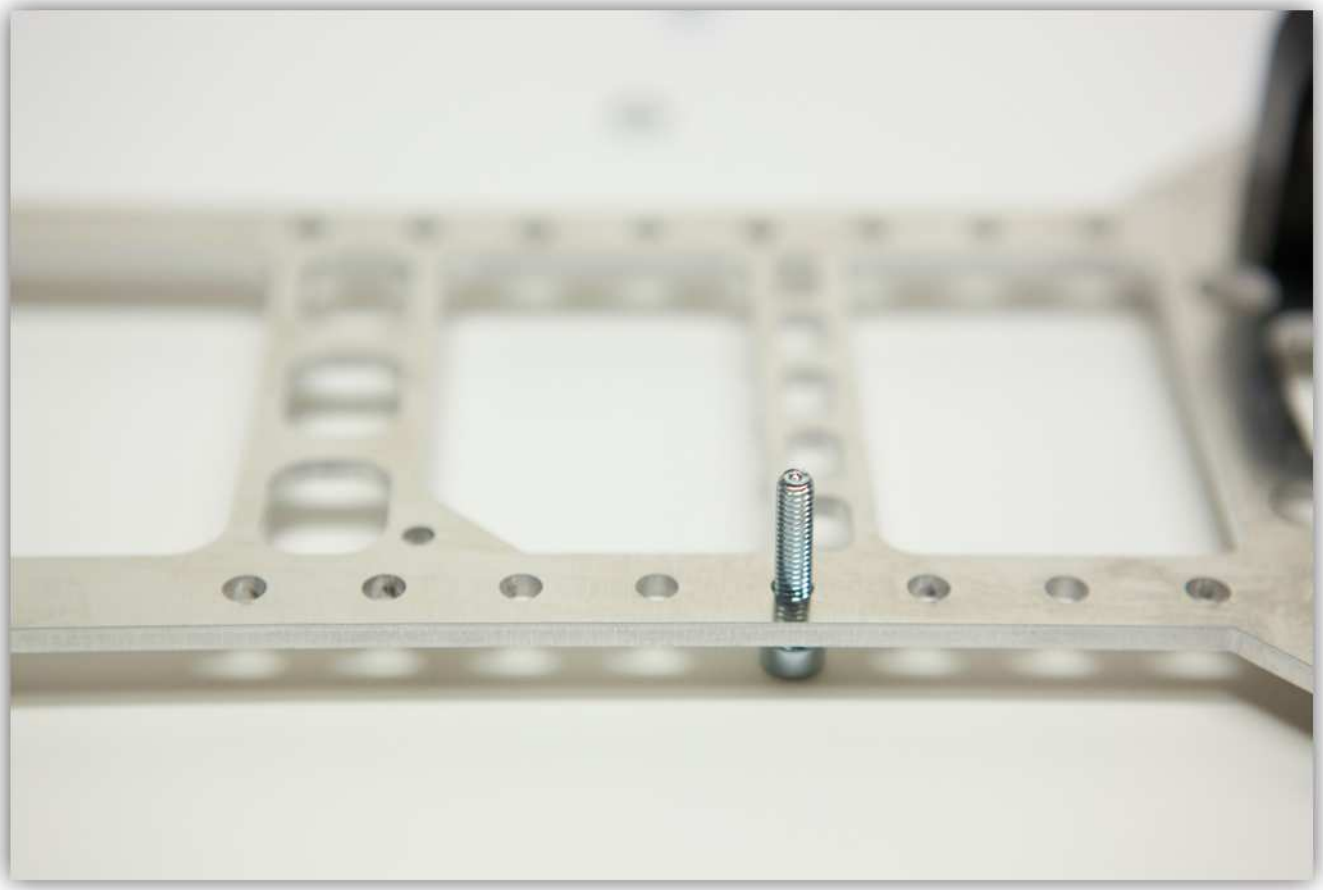
Take the bag labelled with 4 out of the box, you should have these parts. Notice the plastic piece (ADJUST SCREW BRACKET), you can find this in the bag containing the plastic parts.

Insert a small M3 nut in the ADJUST SCREW BRACKET as shown in the picture:

Insert the M4 bolt with a toothed washer as in the picture. **Notice the red arrow, it shows a detail that is only on one side of the X CARRIAGE. You need to insert the bolt on this side.**

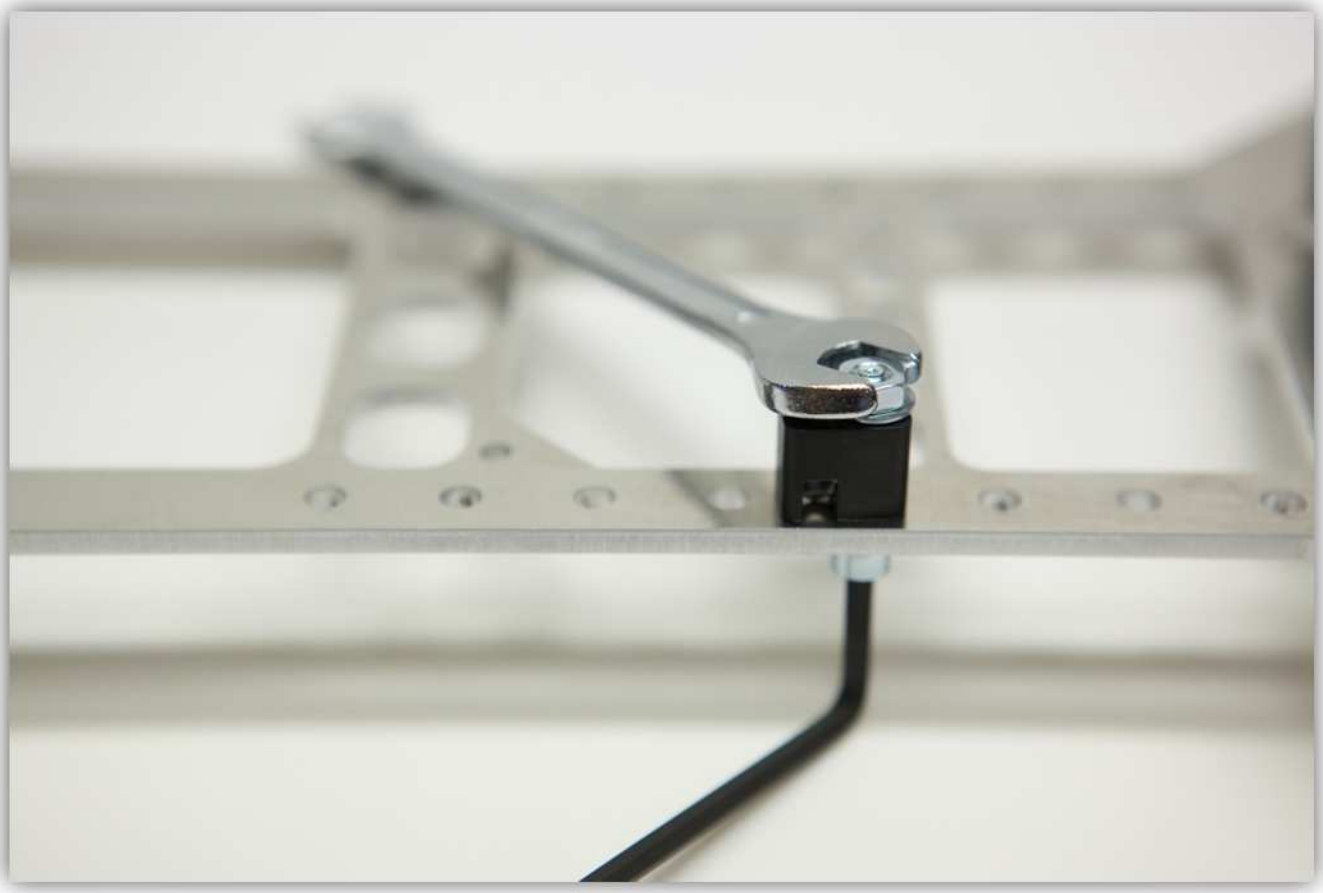


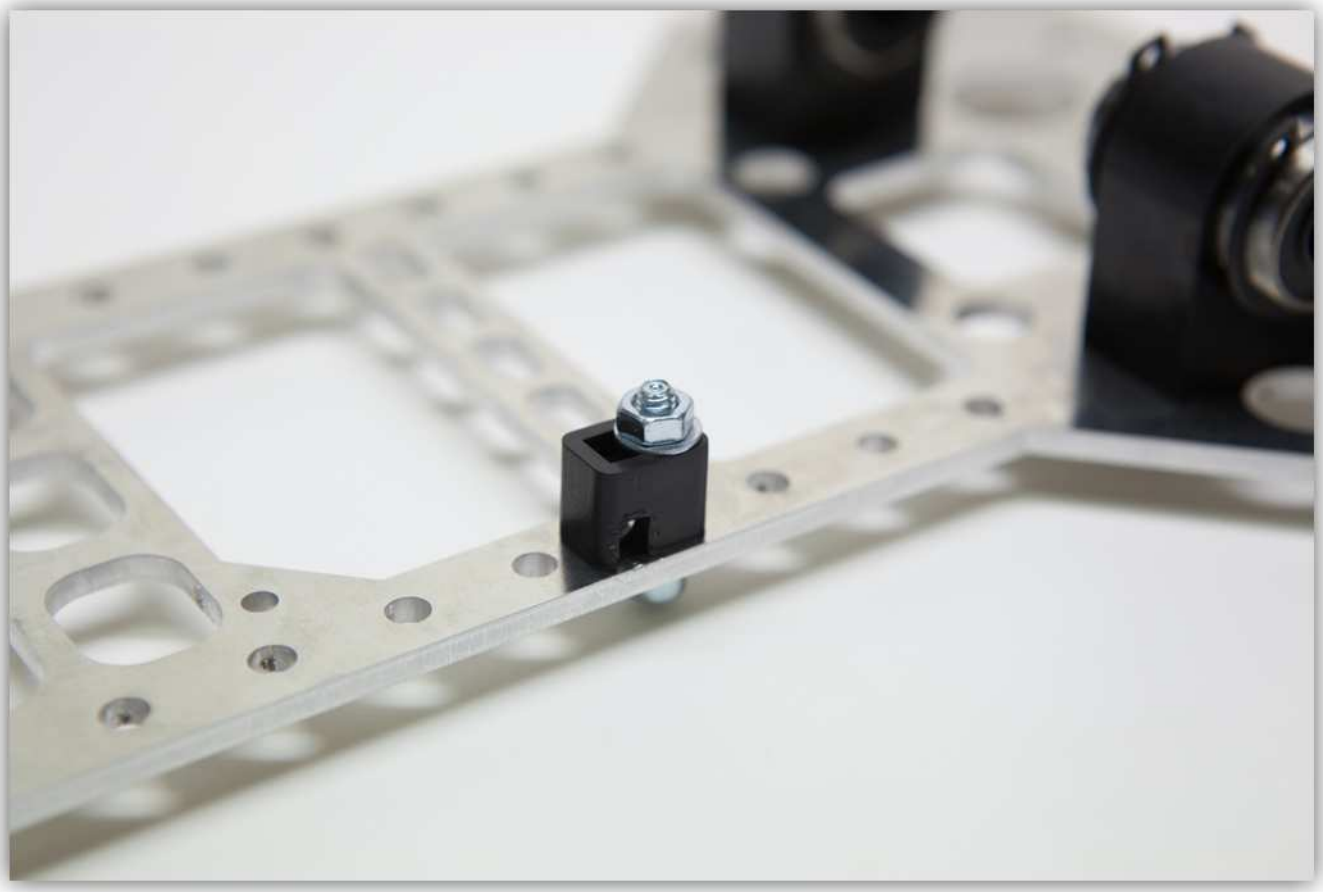
It should look like this:



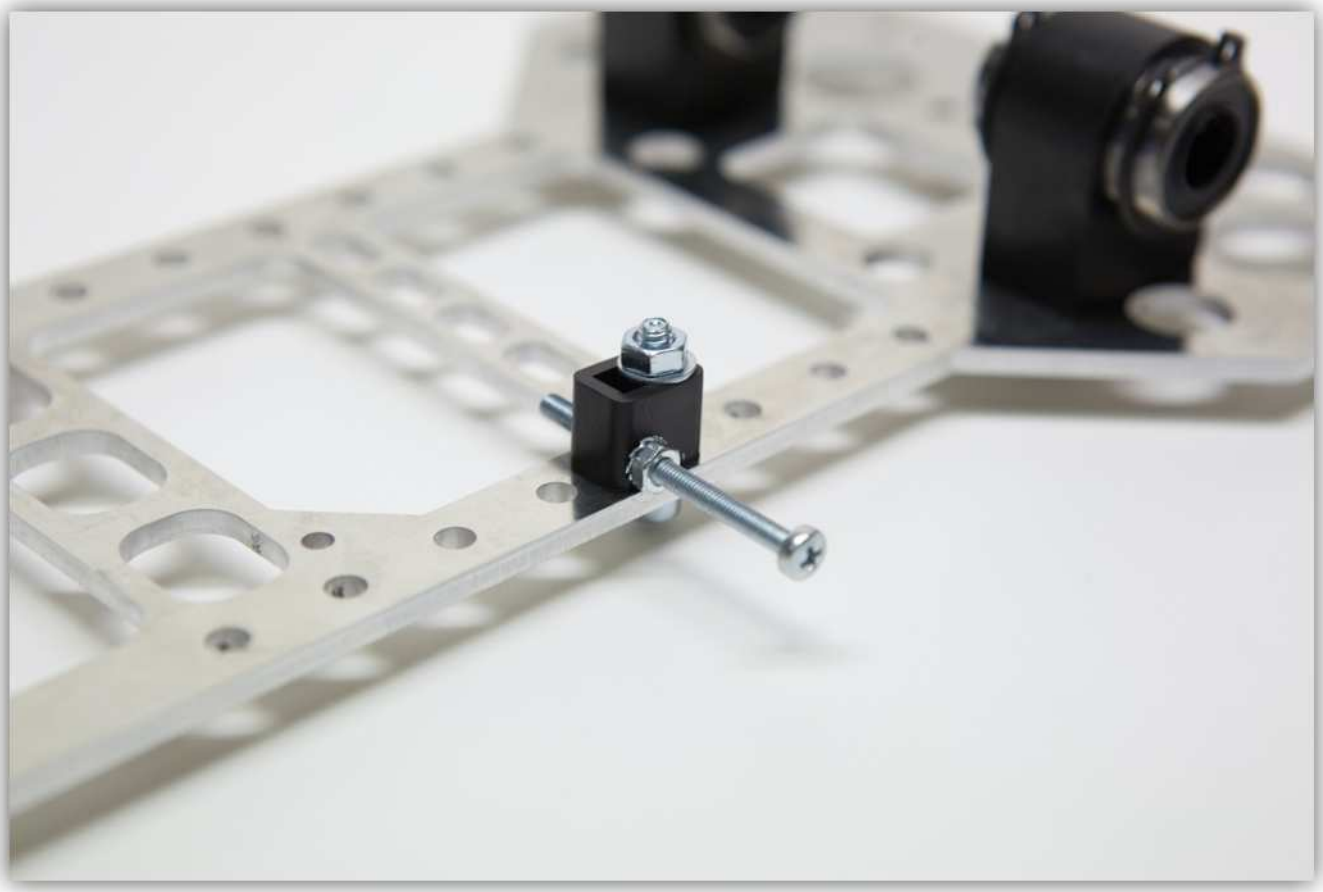
Place the ADJUST SCREW BRACKET with the small M3 nut inside over this bolt as in the picture:

Put an M4 washer and M4 nut on this bolt and tighten everything:

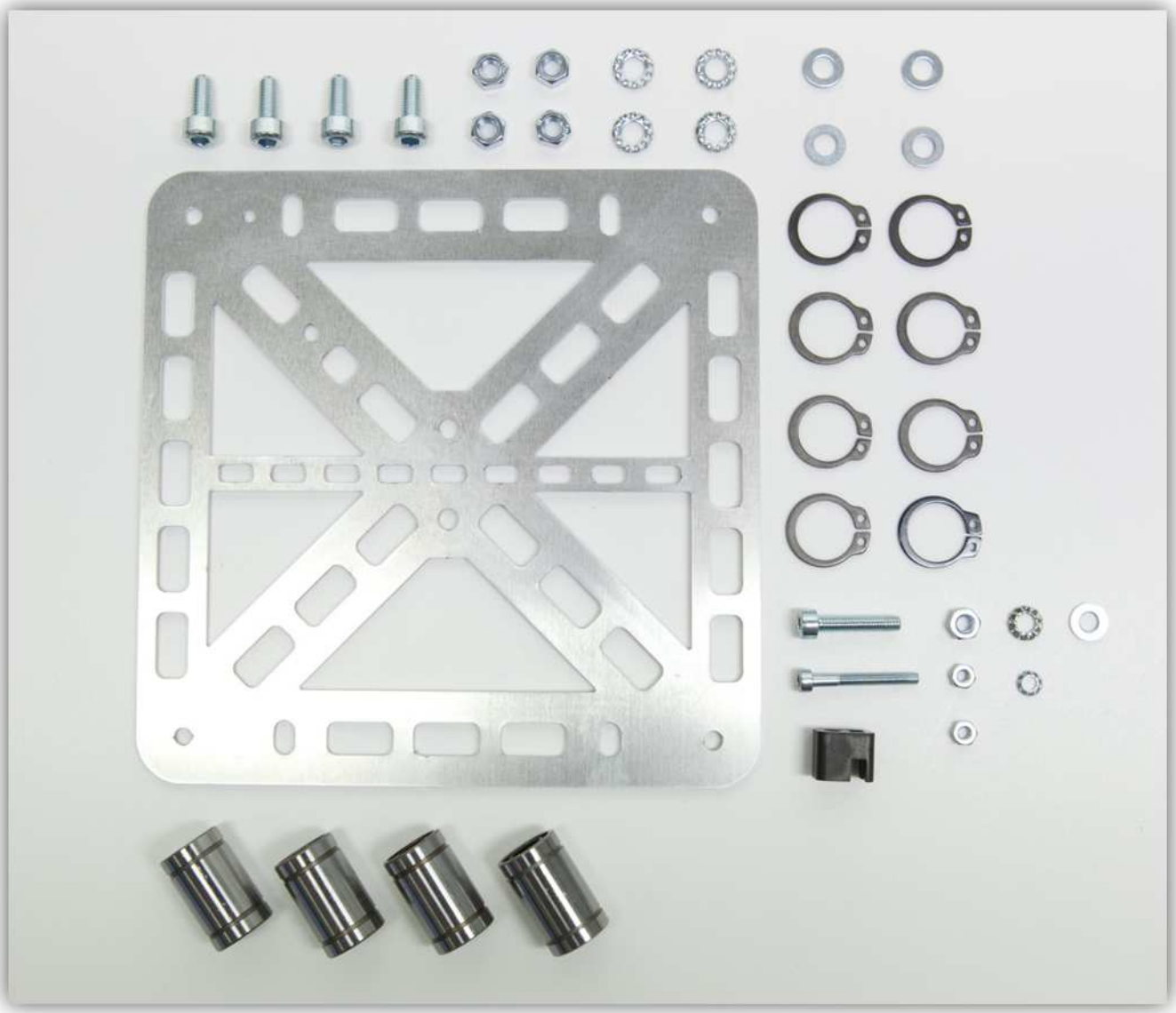




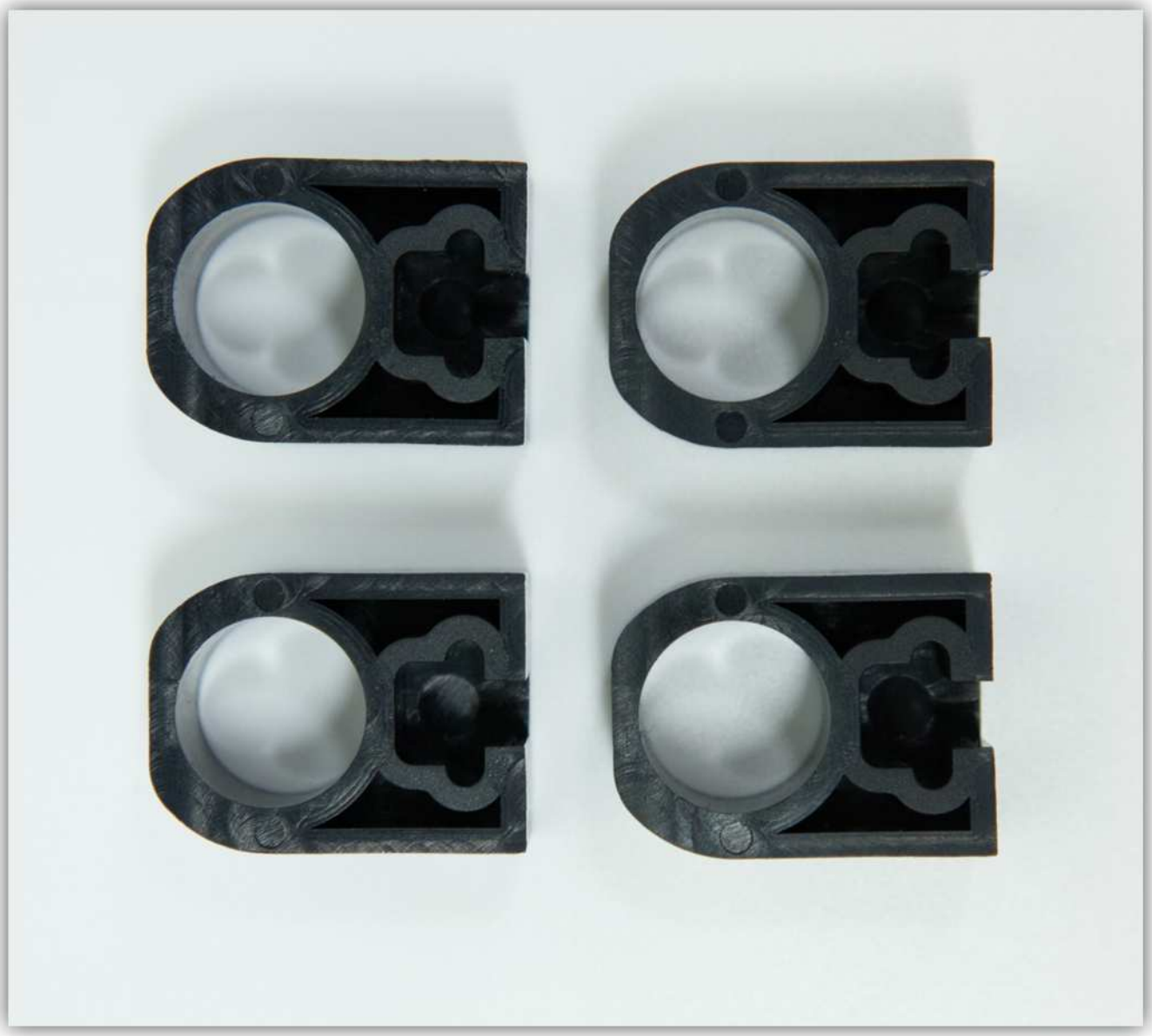
Put an M3 nut and M3 toothed washer over the long bolt and screw it in the M3 nut that is inside the plastic piece:



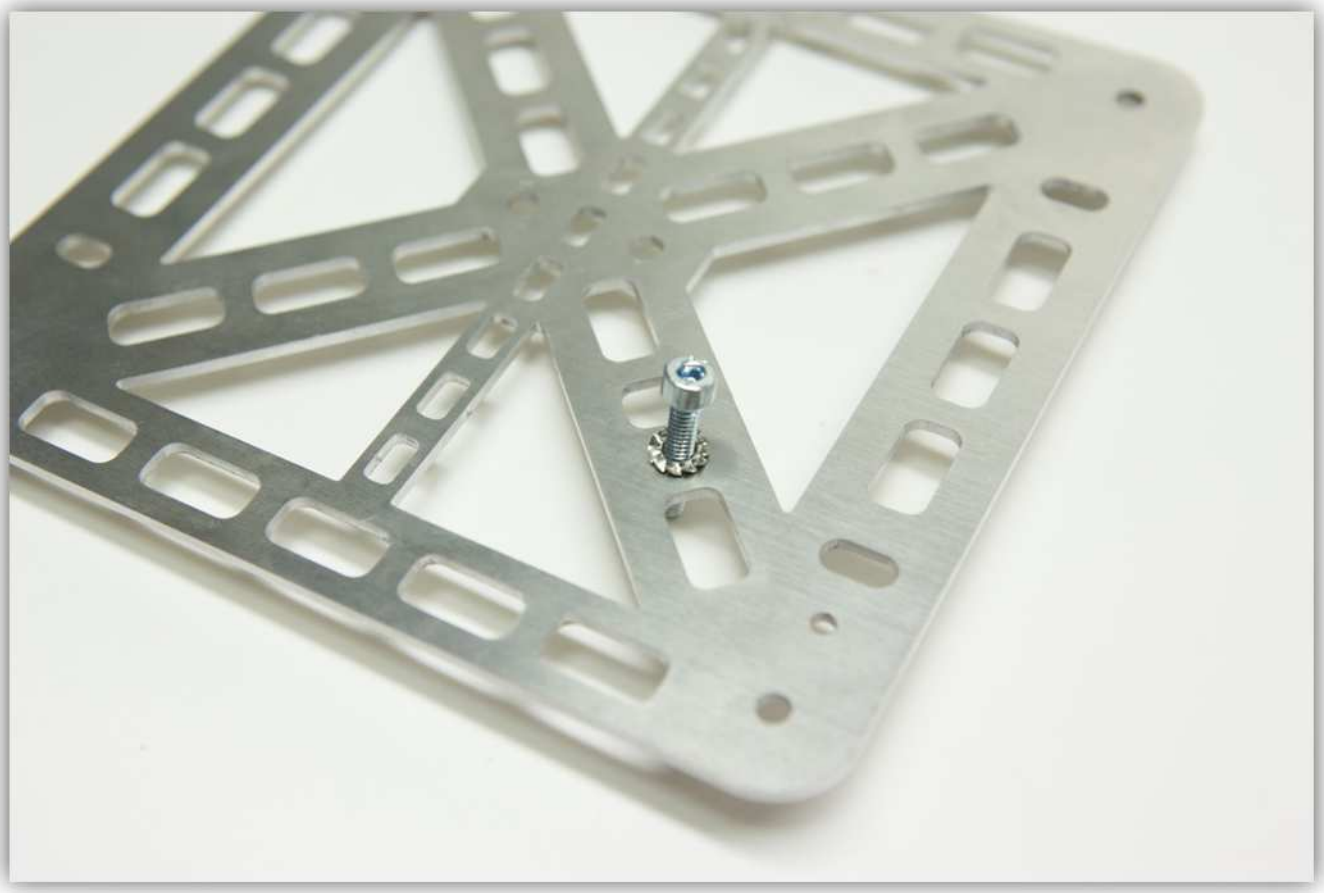
Take the bag labelled with 5 out of the box, you should have these parts. Notice the plastic piece (ADJUST SCREW BRACKET), you can find this in the bag containing the plastic parts.



Also take 4 pieces (BEARING CLAMP Y) as shown in the picture below out of the bag containing the plastic parts:

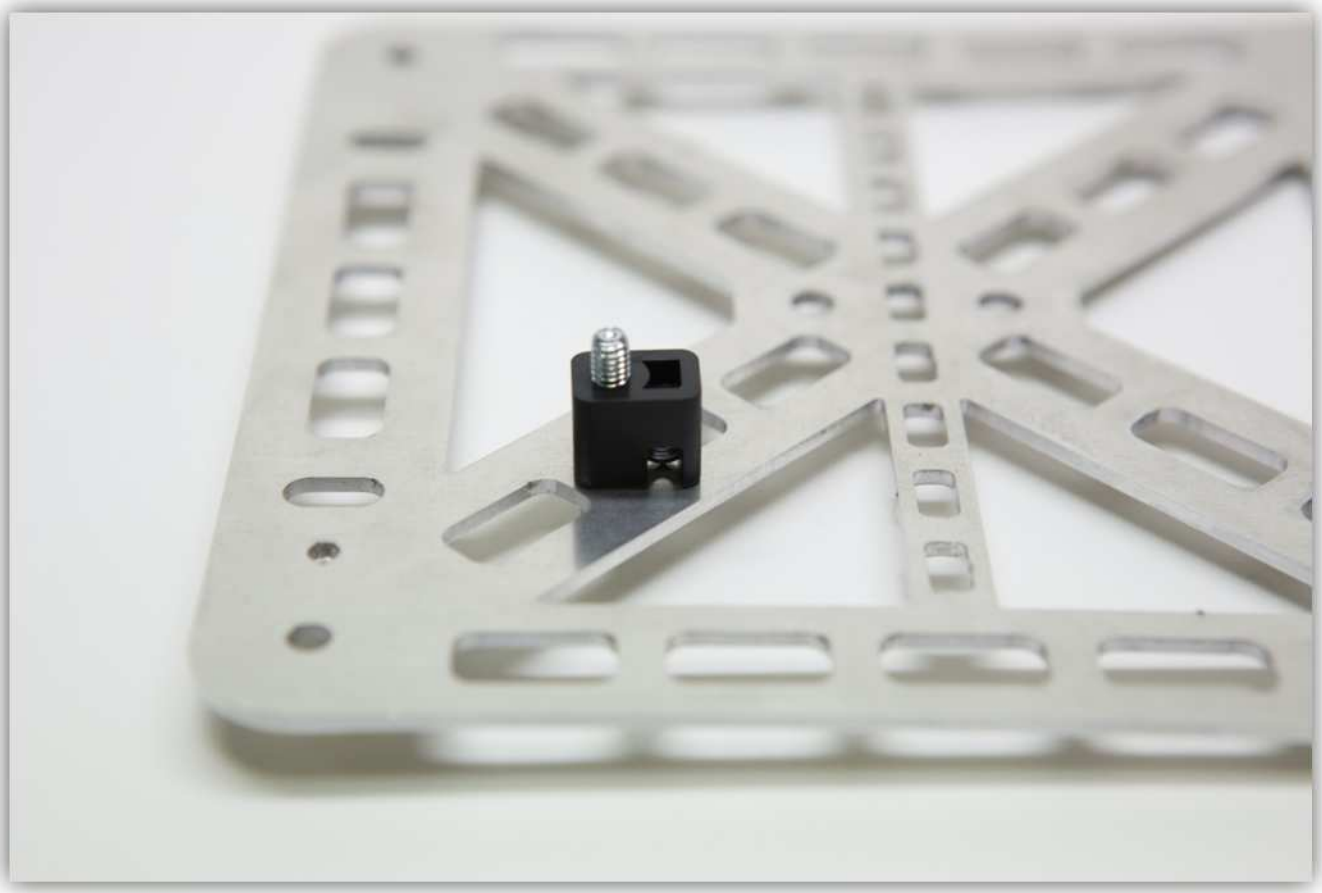


Insert the M4 bolt with an M4 toothed washer as shown in the BED SUPPORT plate (smaller aluminium plate). **Notice the orientation of the aluminium plate. Make sure it is exactly as in the picture.**

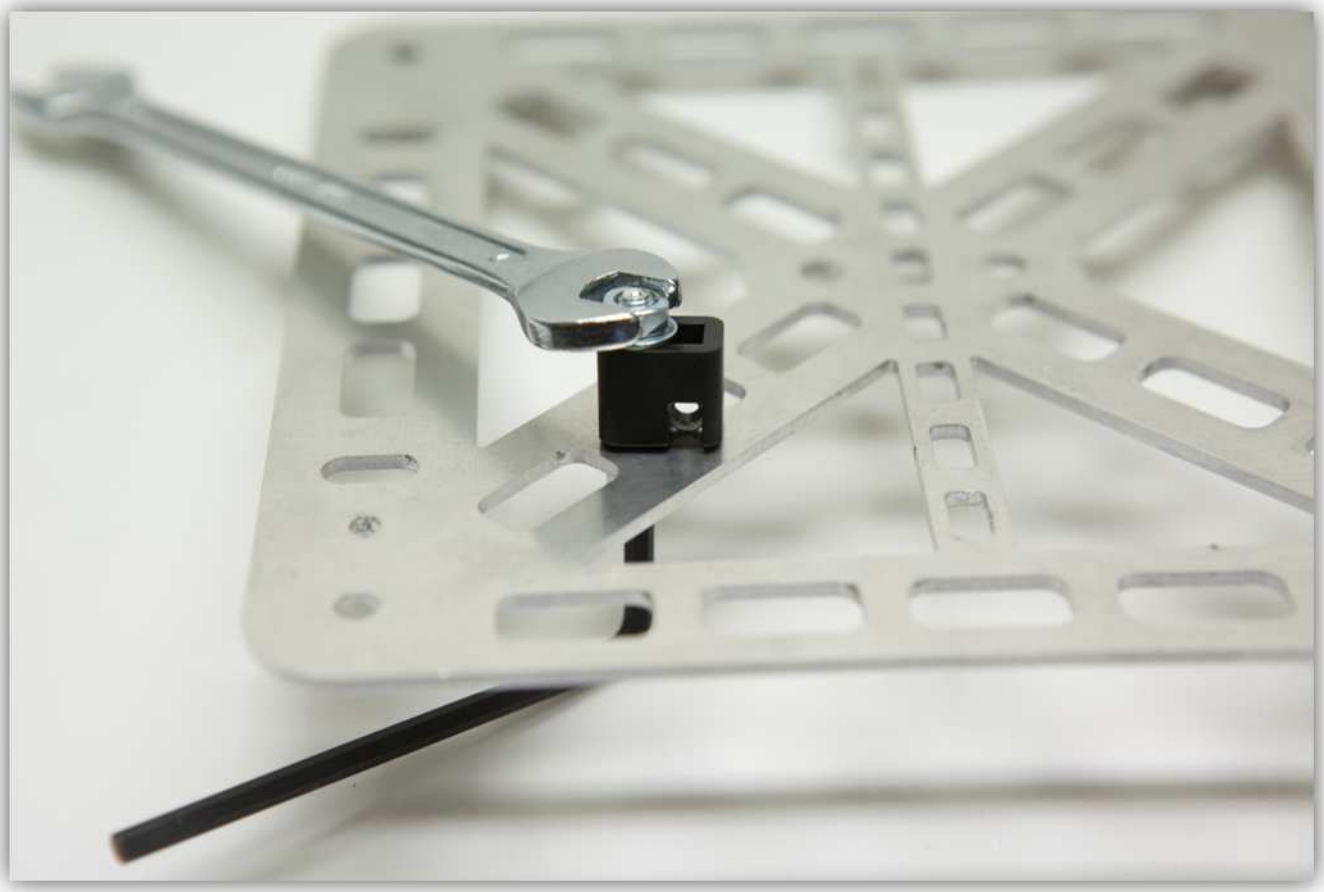


Insert a small M3 nut inside the ADJUST SCREW BRACKET:

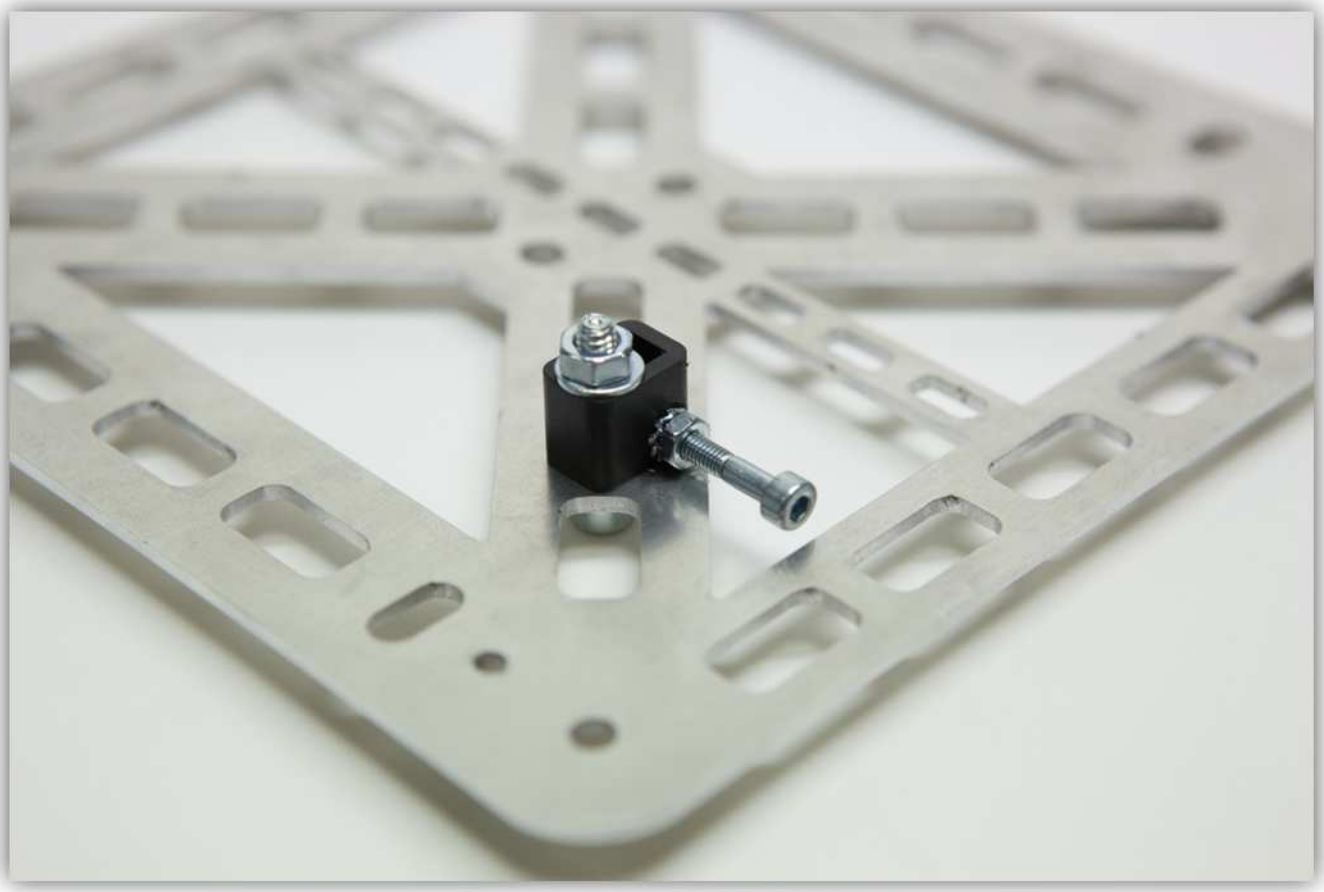
Place this over the M4 bolt. **Notice the orientation of the BED SUPPORT plate. Make sure it is exactly as in the picture.**



Place a M4 washer and an M4 nut on the bolt and tighten everything.



Screw the long M3 bolt with an M3 toothed washer and an M3 nut in the ADJUST SCREW BRACKET as shown in the picture:

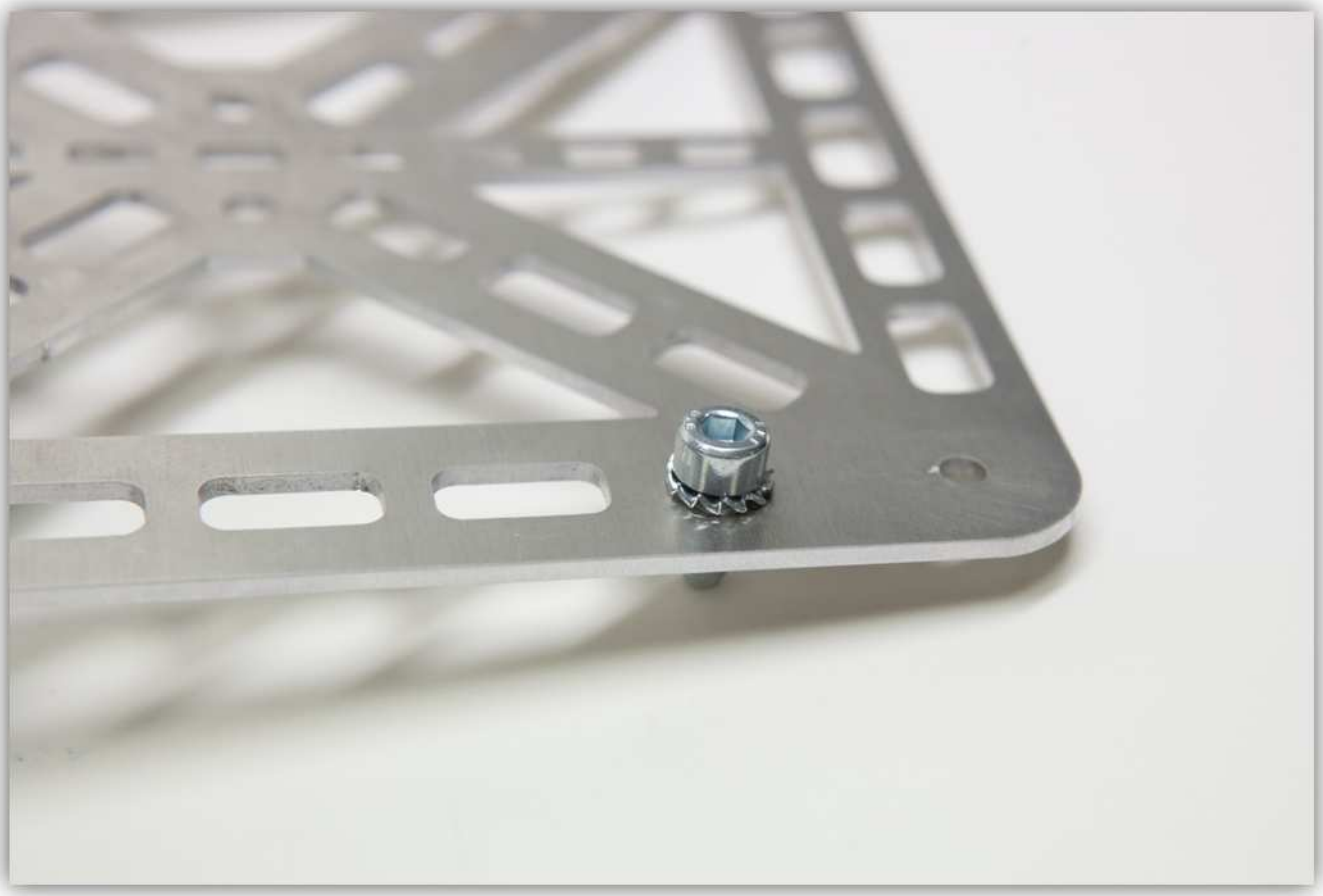


Slide an LM8UU linear bearing in the BEARING CLAMP Y piece as shown in the picture

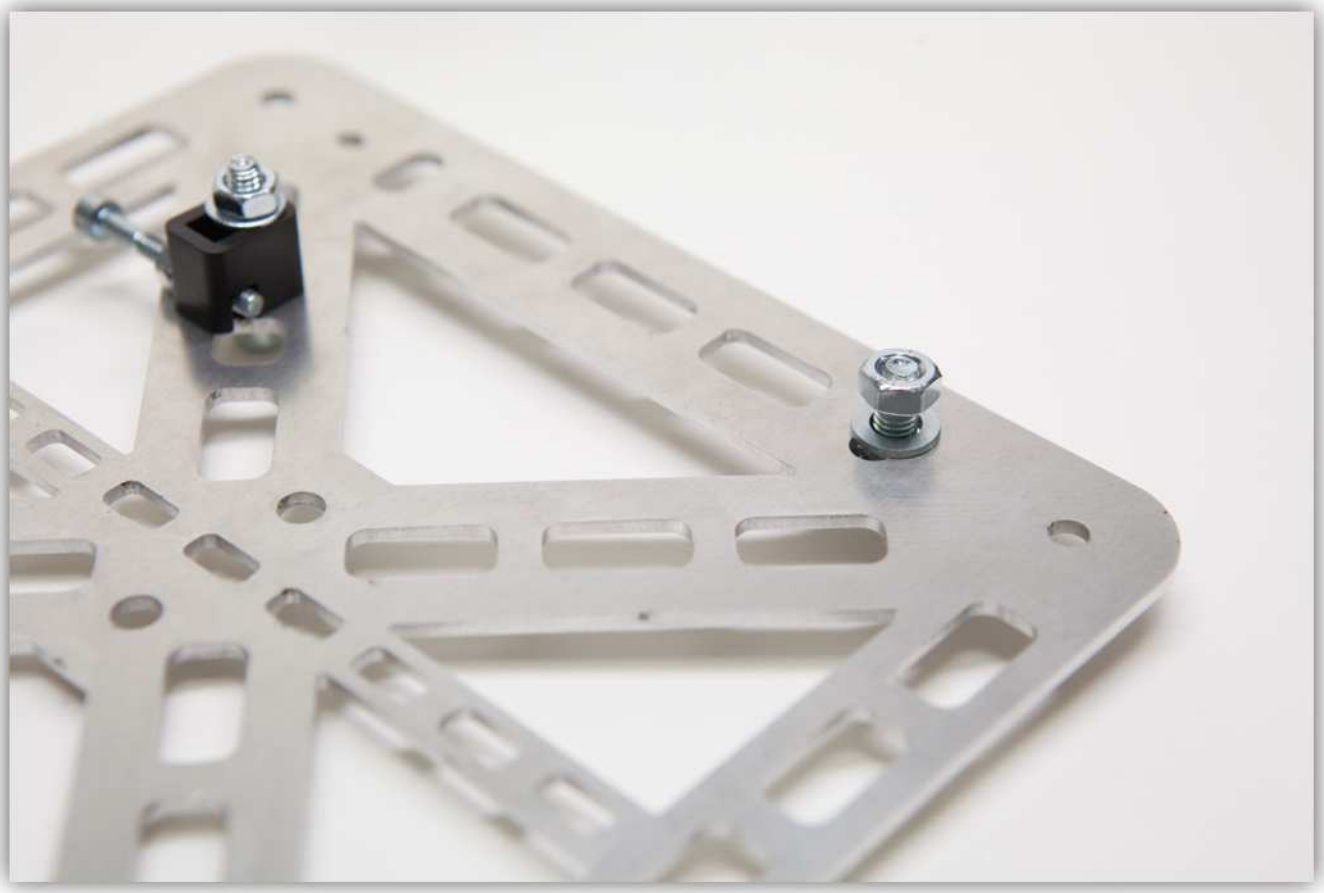
Repeat this 3 more times:

Use the circlip pliers to carefully fit the circlip around the LM8UU linear bearing.

Take an M5 bolt and an M5 toothed washer and insert them in the BED SUPPORT plate as follows:

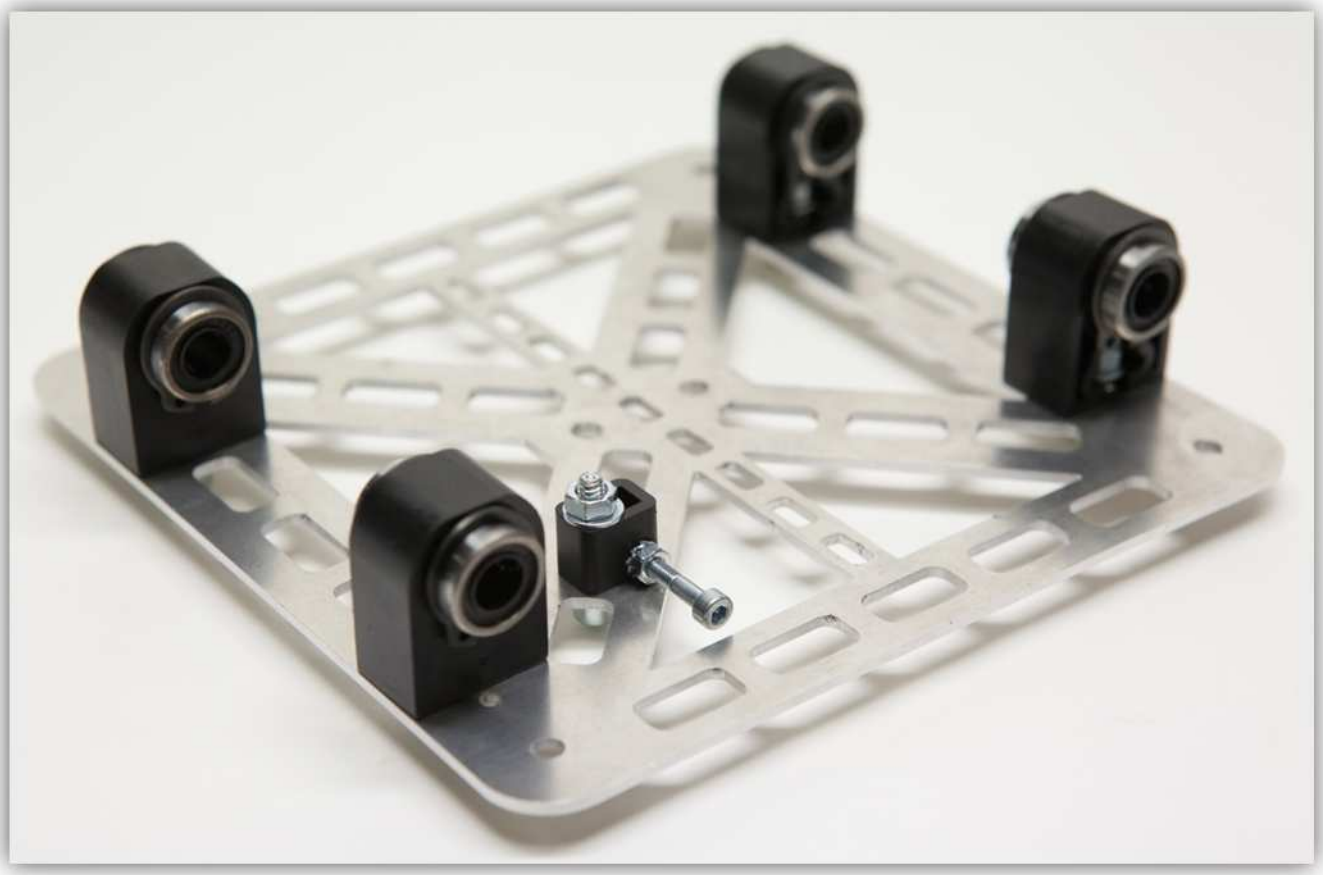


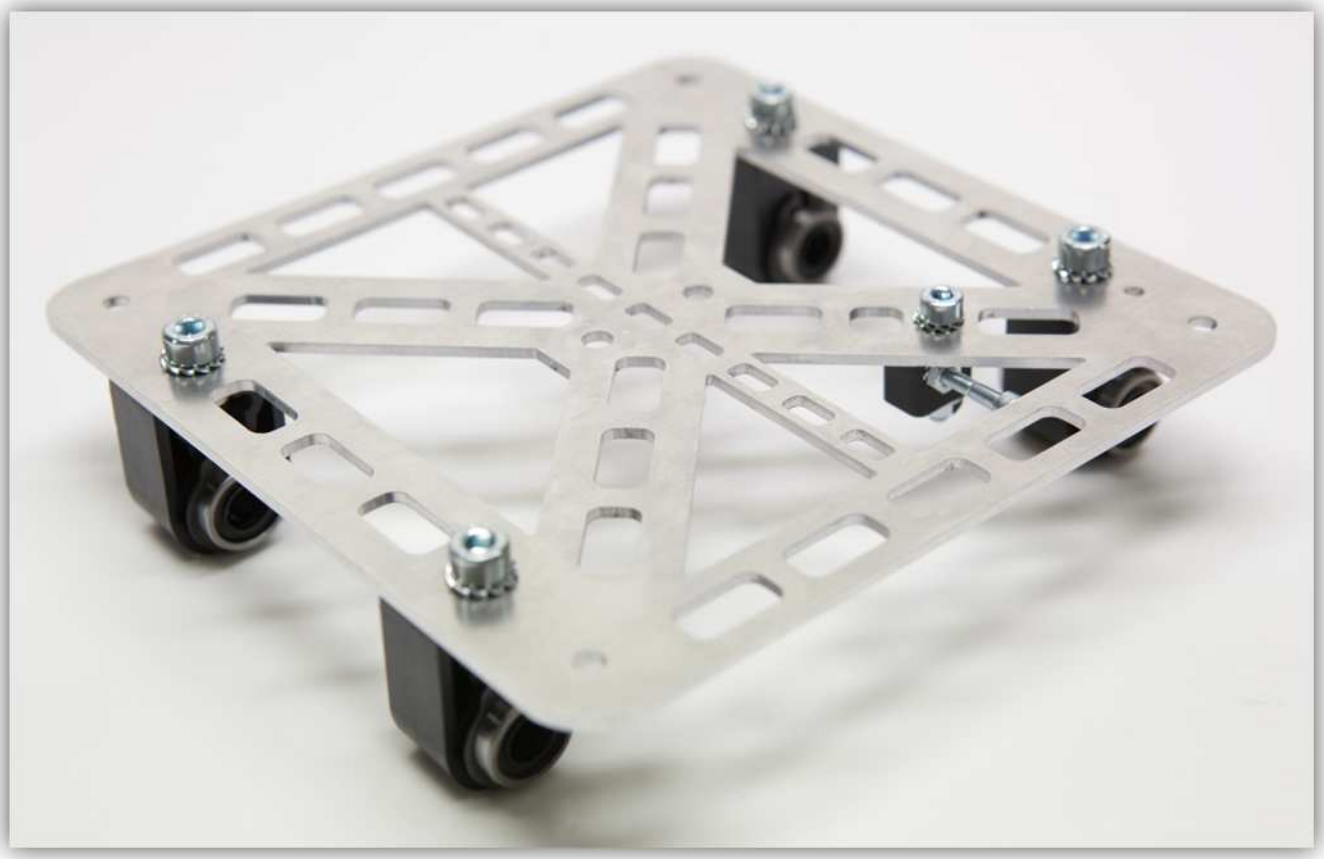
Flip the plate and use an M5 washer and an M5 bolt. **Do not tighten this nut.**



Slide a BEARING CLAMP Y piece over the washer and bolt as follows.

Repeat this process 3 more times, the assembly should look like this:



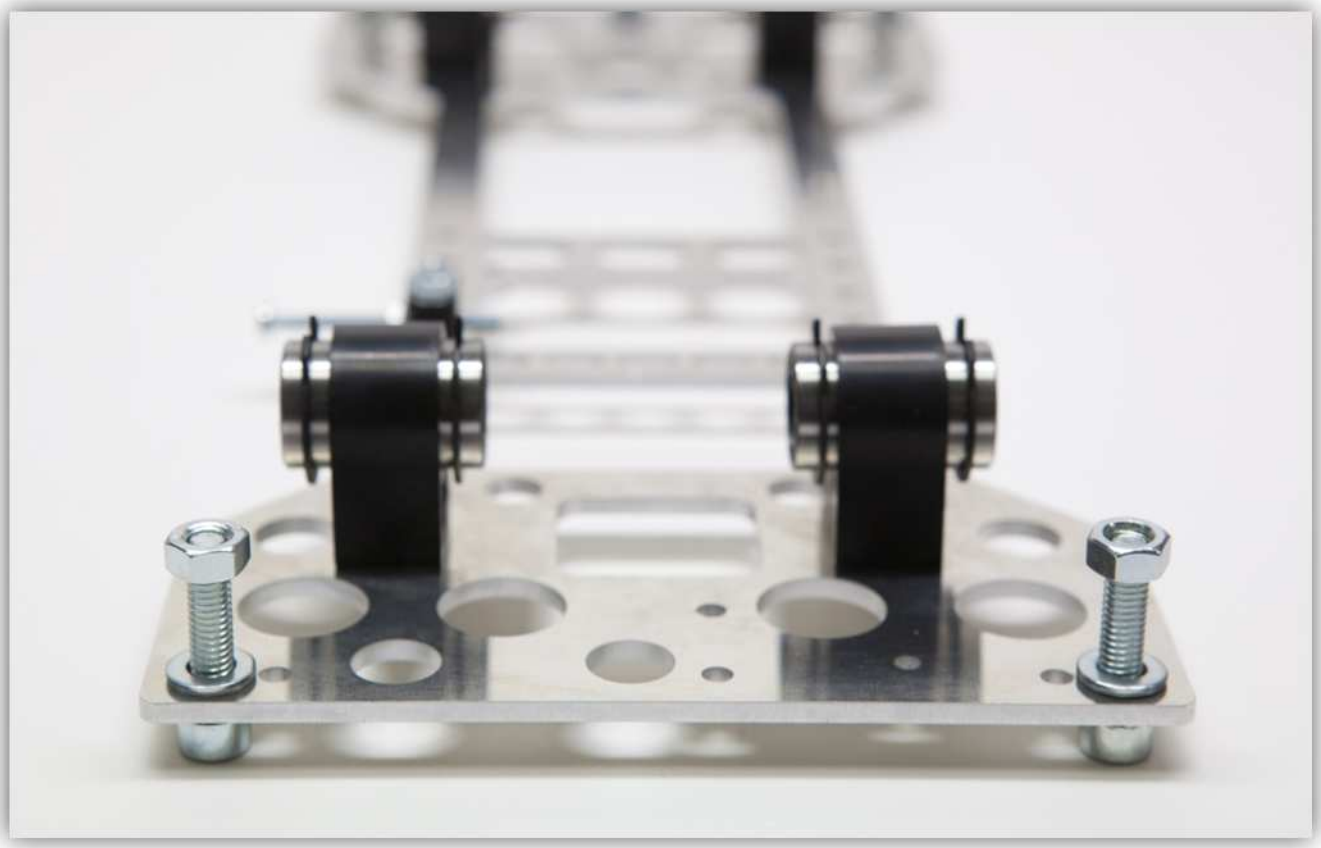


This piece will be referred as the BED SUPPORT CARRIAGE later in the manual.

Take these pieces (BIG Y ROD CLAMP, Y ROD CLAMP RIGHT and Y ROD CLAMP LEFT) as shown in the picture below out of the bag containing the plastic parts:

Take the bag labelled with 6 out of the box, you should have these parts:

Use the long M6 bolts with M6 toothed washers as follows:

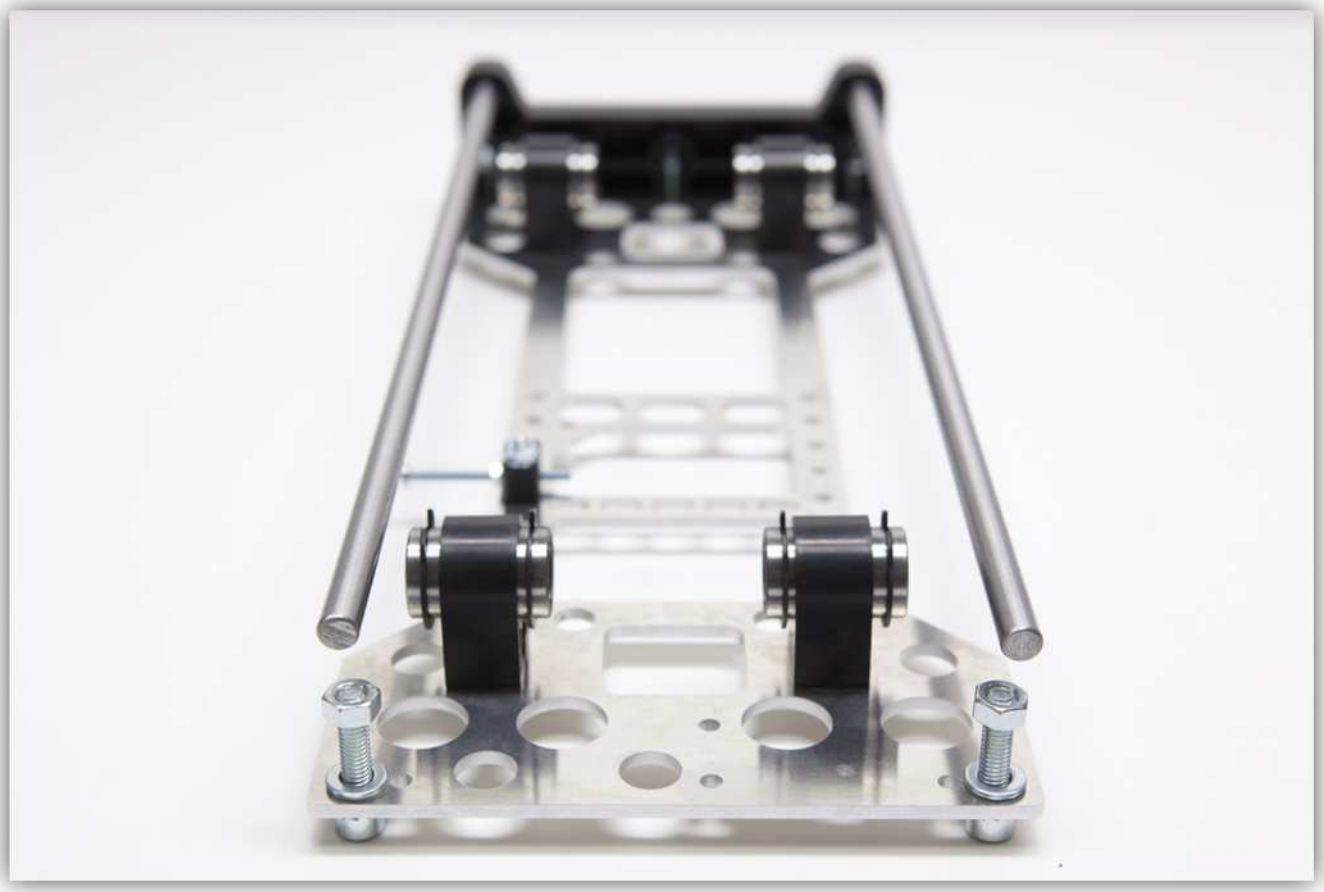


Slide the BIG Y ROD CLAMP part over the bolts and washer on the side with the 3 M6 bolts:

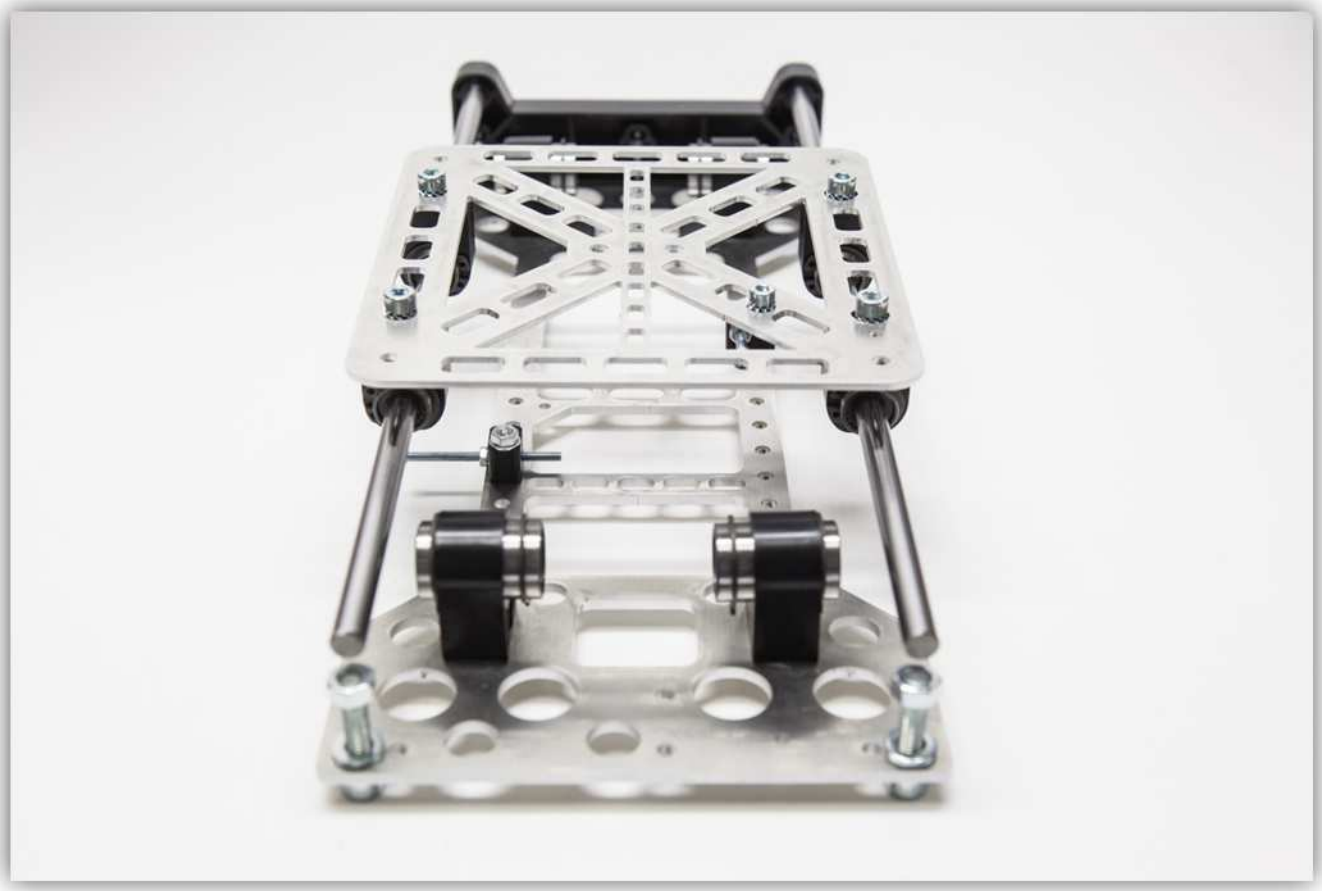
Tighten the 3 M6 bolts.

Out of the bag labelled with 7 get two smooth rods with a diameter of 8 mm (0.31") and a length of 32.5 cm (12.8").

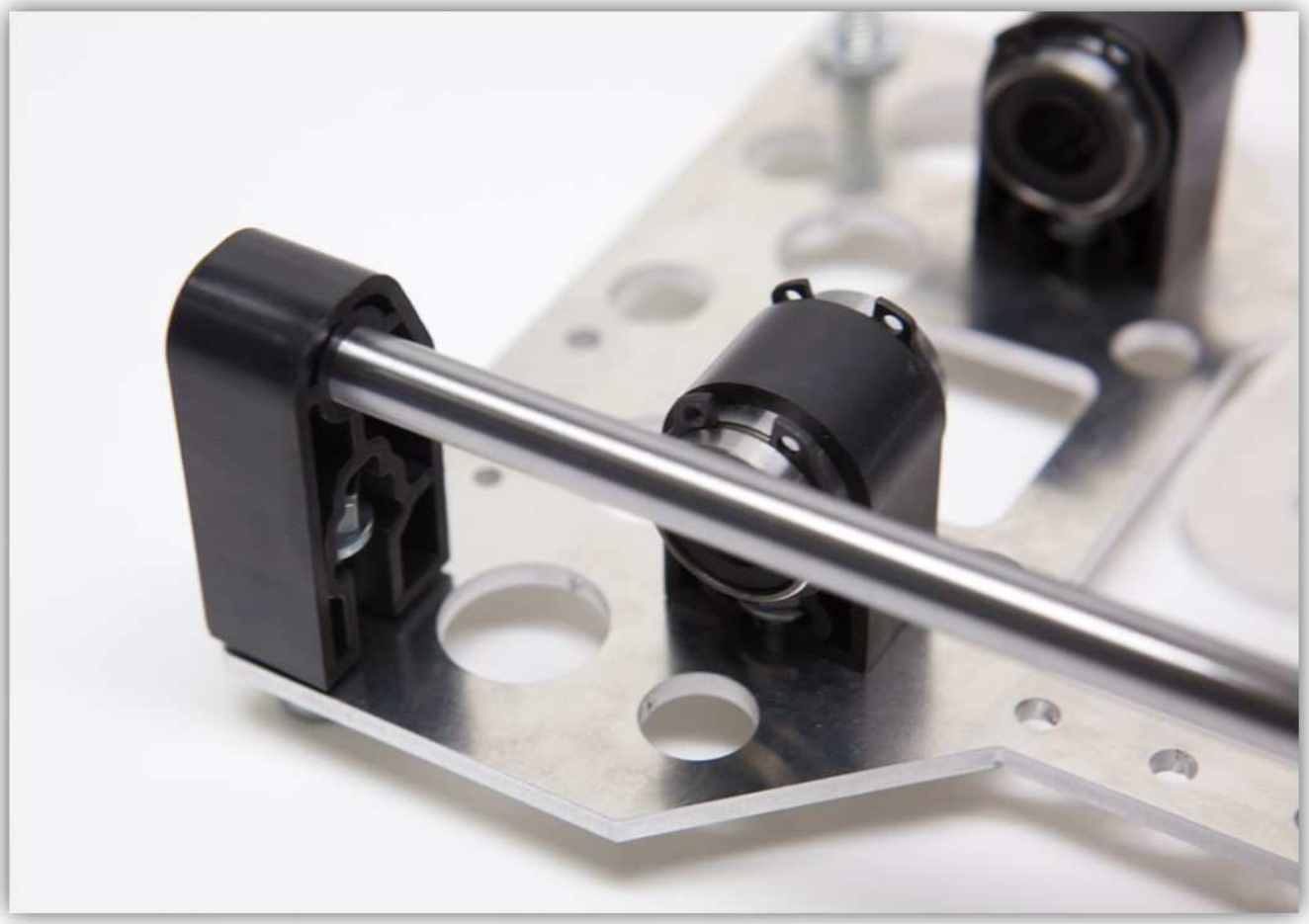
Slot the two rods in the BIG Y ROD CLAMP part.

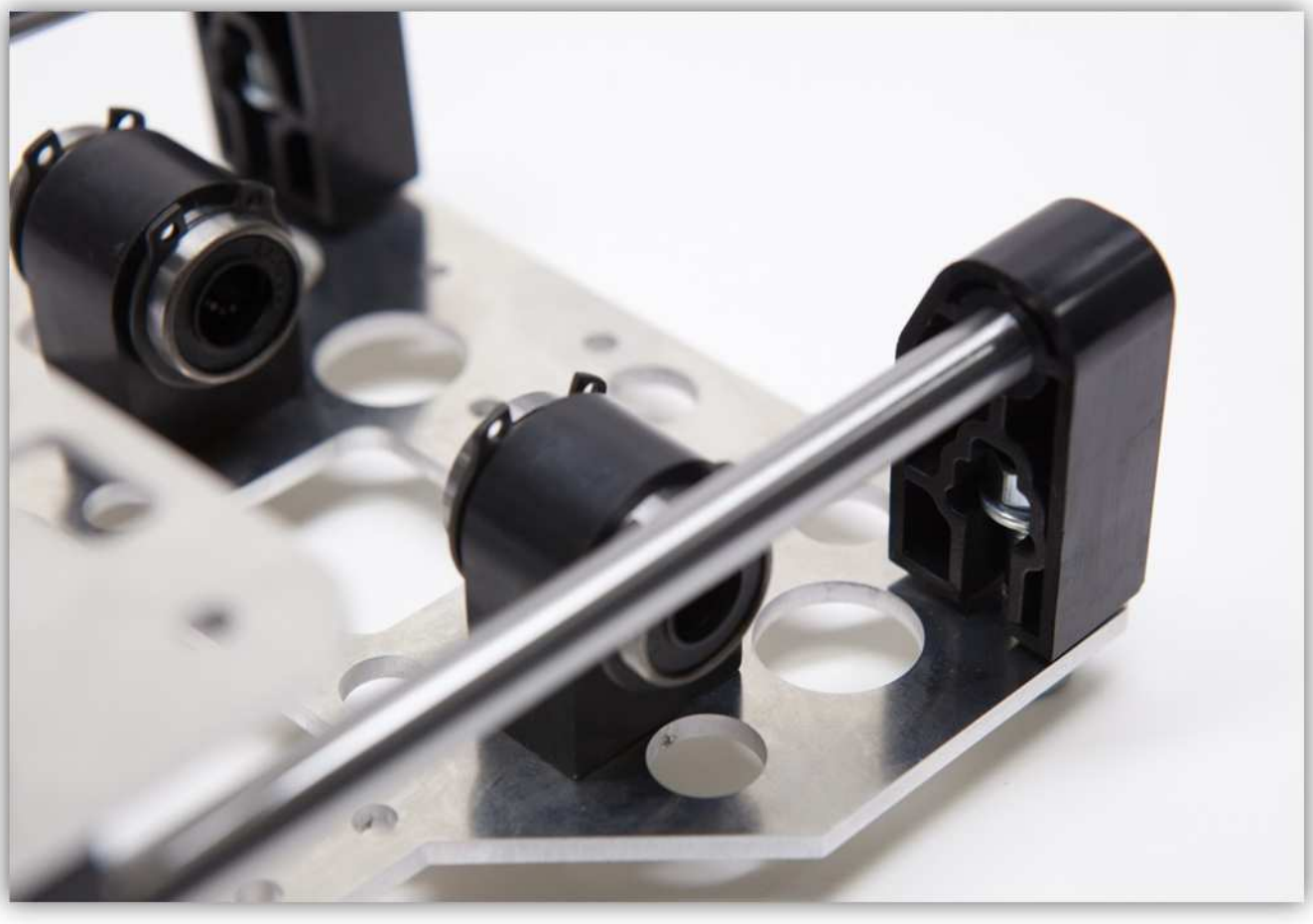


Slide the BED SUPPORT CARRIAGE over these two rods. **Notice the orientation.**

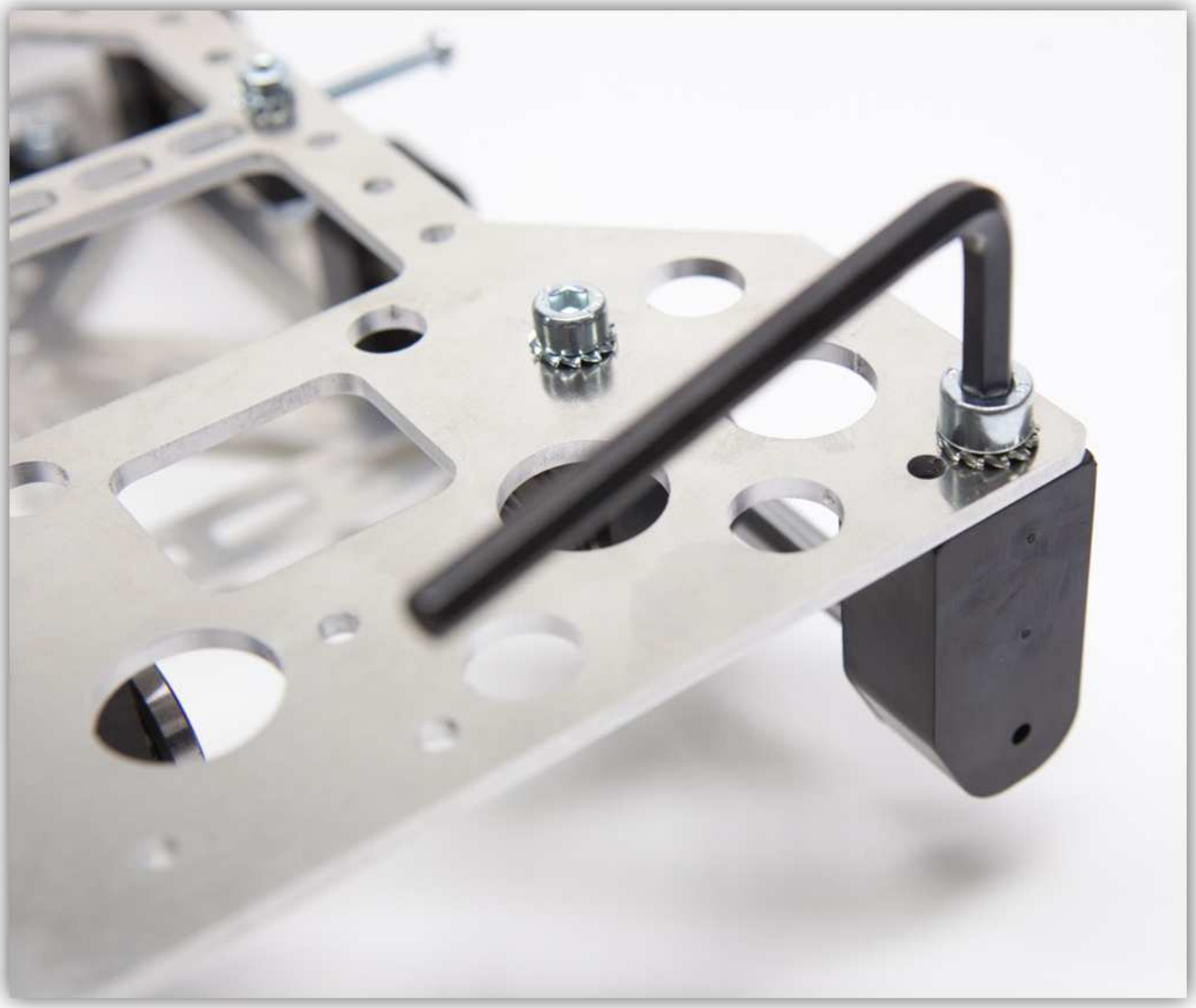


Slide the two smaller plastic pieces (Y ROD CLAMP LEFT and Y ROD CLAMP RIGHT) over the bolt and washer and make sure that the rods slot nicely in these parts.

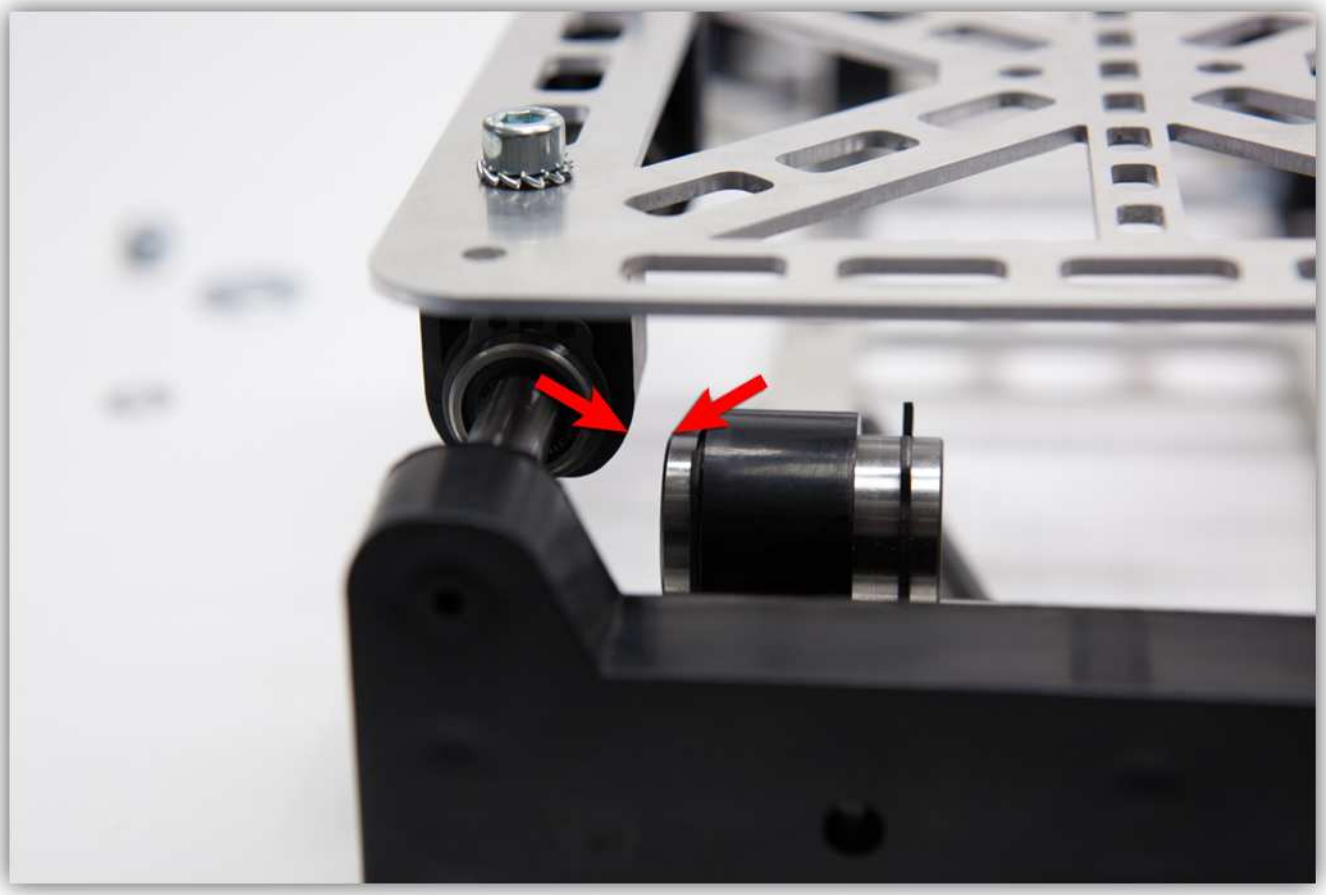


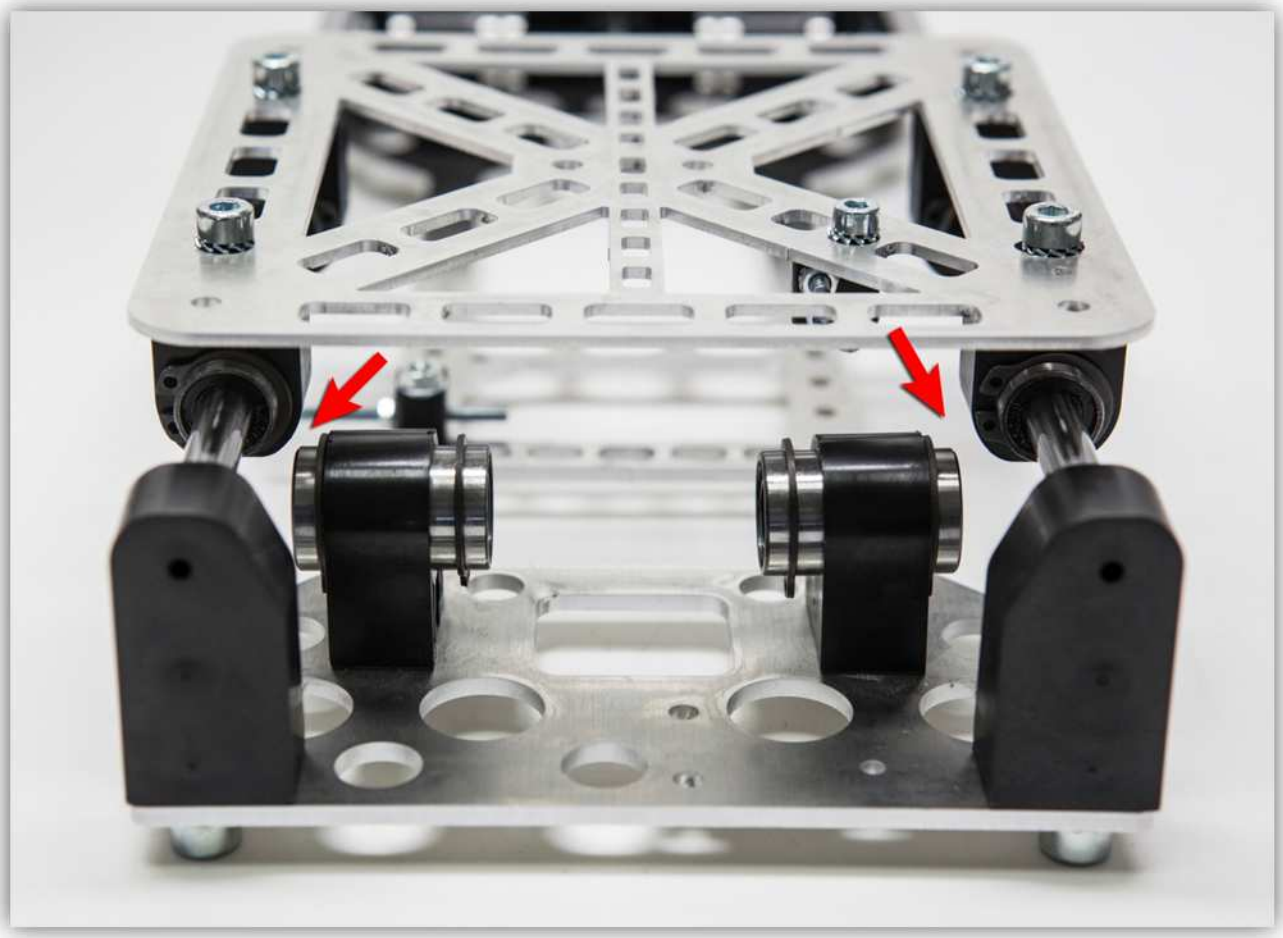


Tighten these bolts firmly.

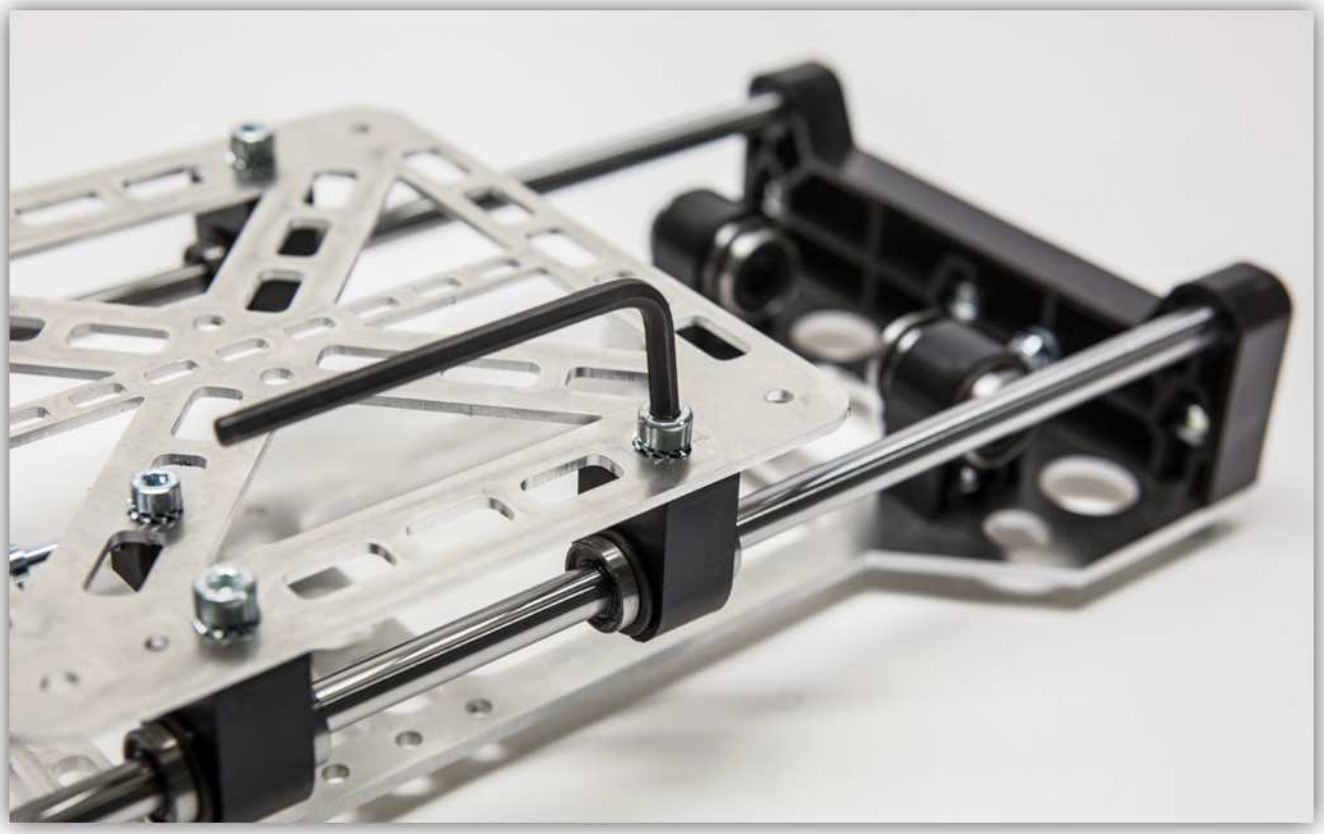


Make sure there is enough clearance between the points marked with a red arrow.



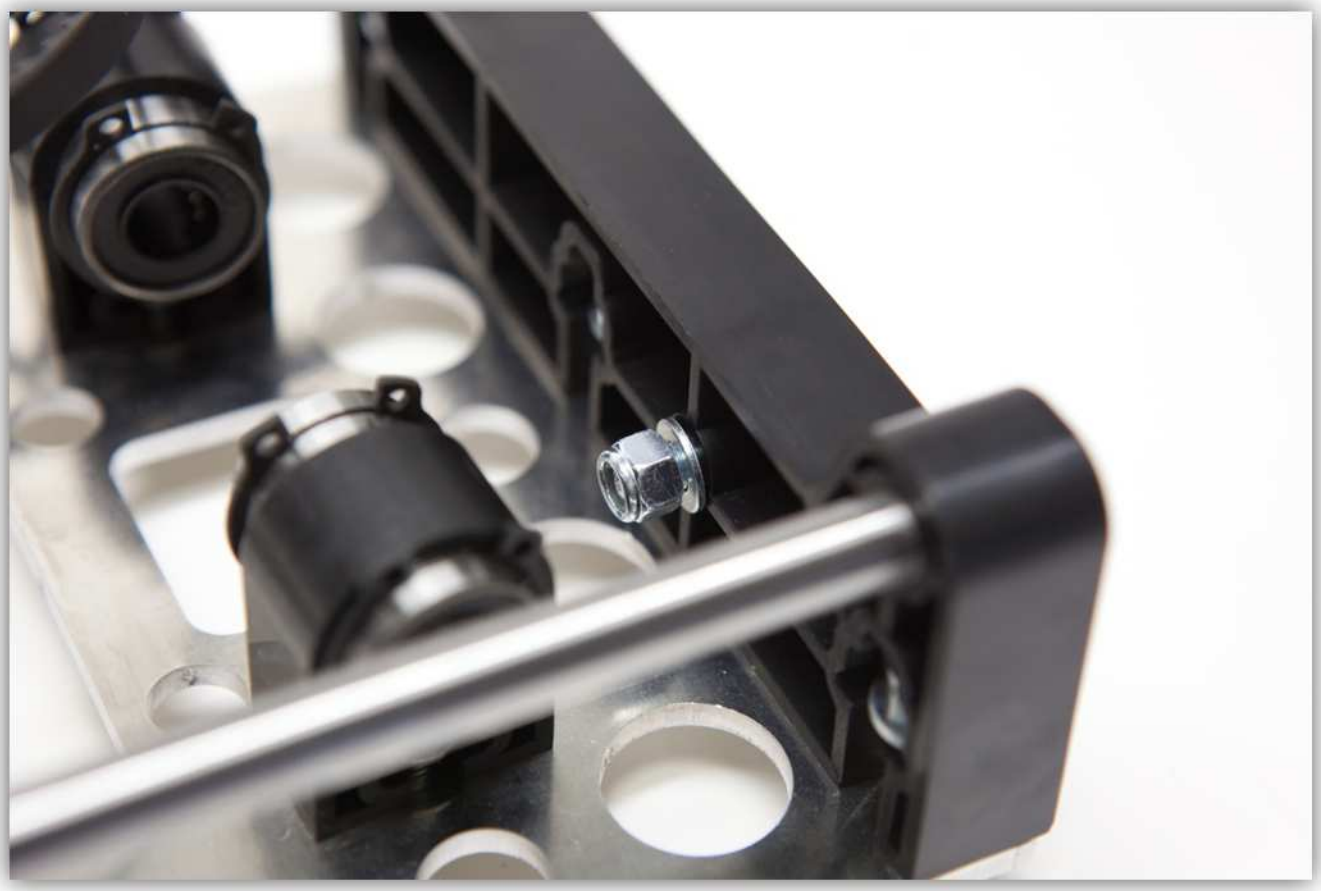


Now while moving the BED PLATE SUPPORT CARRIAGE left and right you can tighten the bolts that keep the LM8UU linear bearings in place. Ensure a smooth motion while tensioning these bolts. When the motion is not fluid, loosen the bolts and start over tensioning them.



Use the M5 bolt and the large M5 washer as follows:

And the small M5 washer and an M5 locking nut on the other end. **Do not tighten the locking nut. Just put it on so it won't fall off. We will come back to this part in a few steps.**



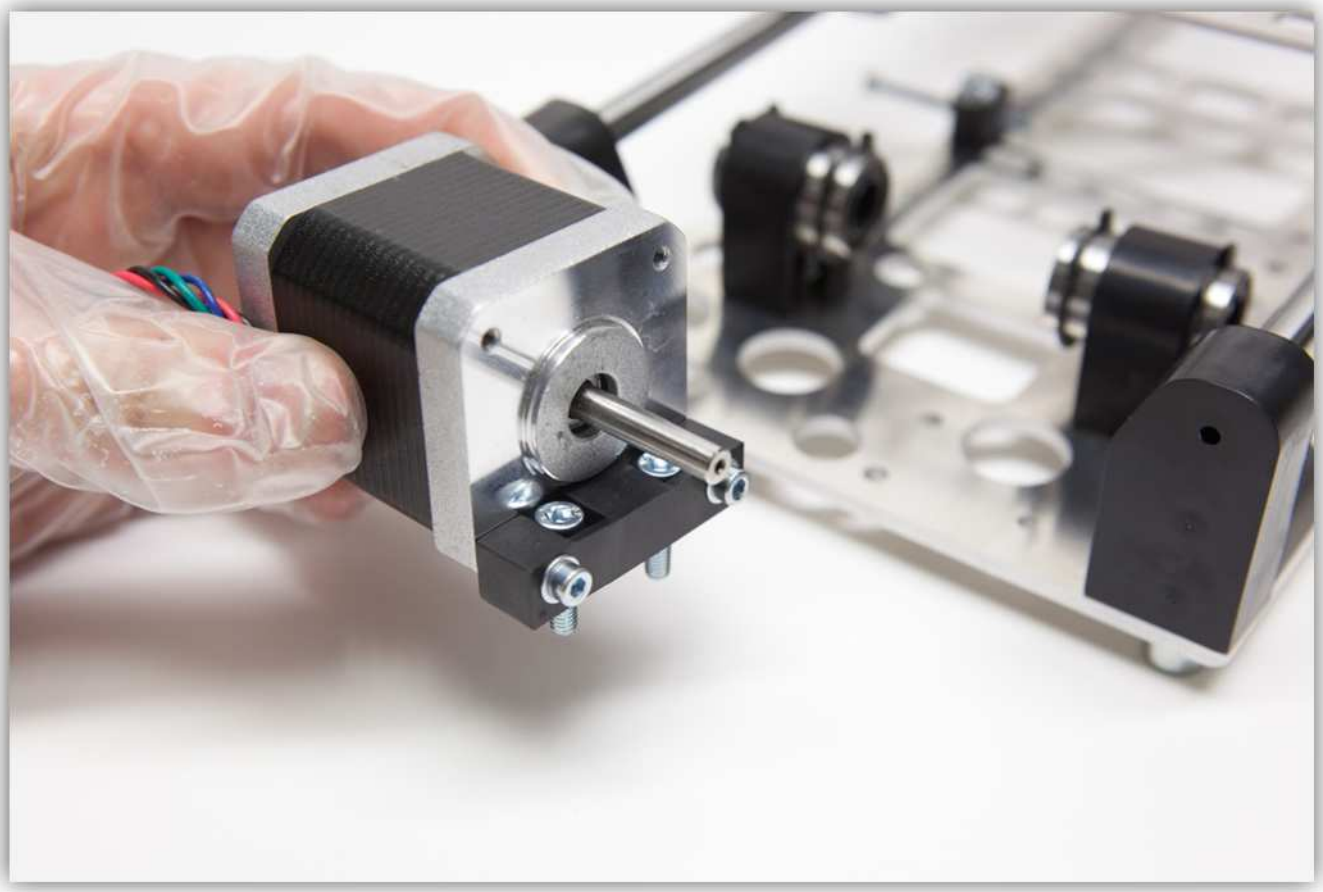
Take the bag labelled with 8 out of the box, you should have these parts:

Search the piece (MOTOR MOUNT) as shown in the picture below out of the bag containing the plastic parts:

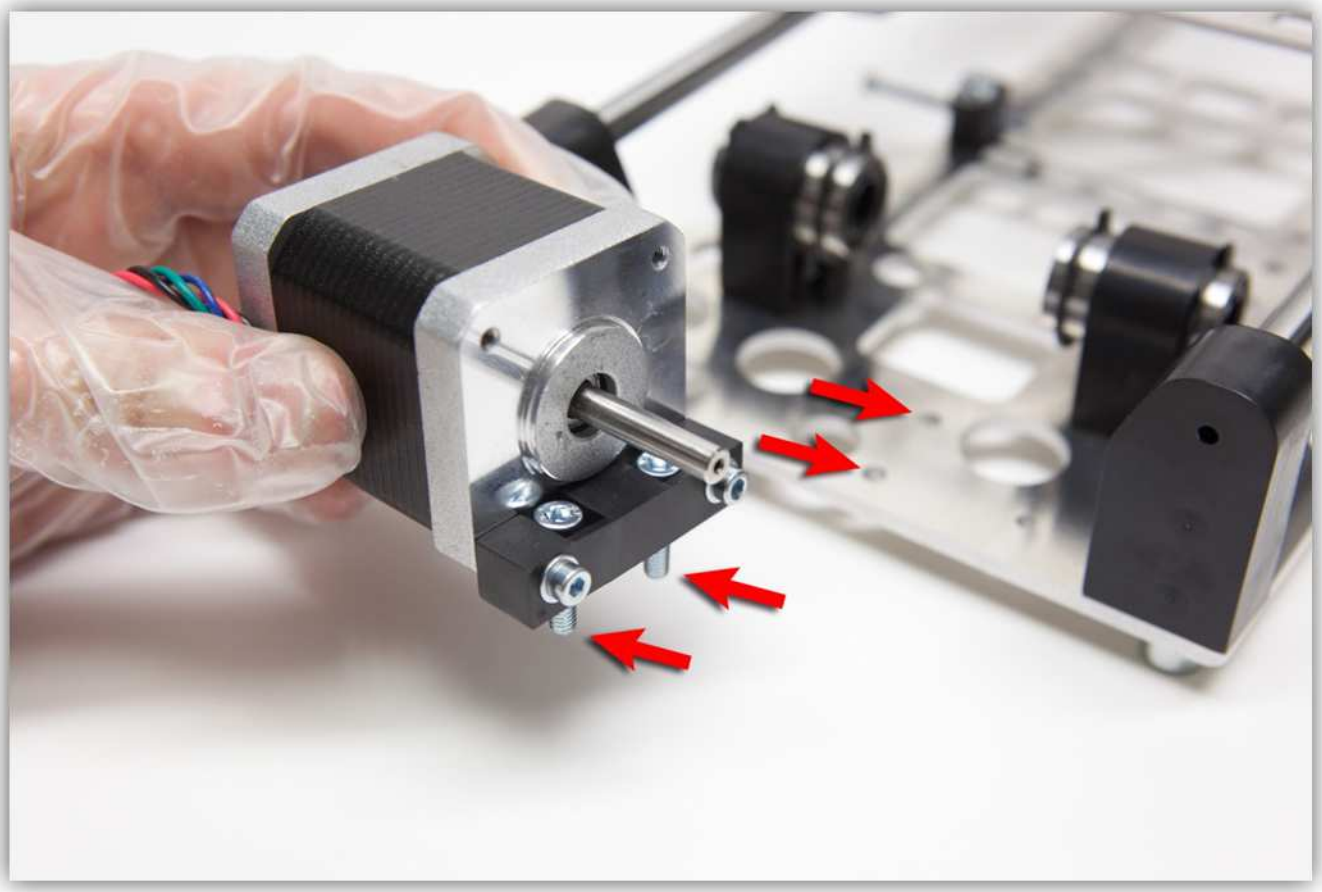
Take 1 motor out of the package labelled 9.

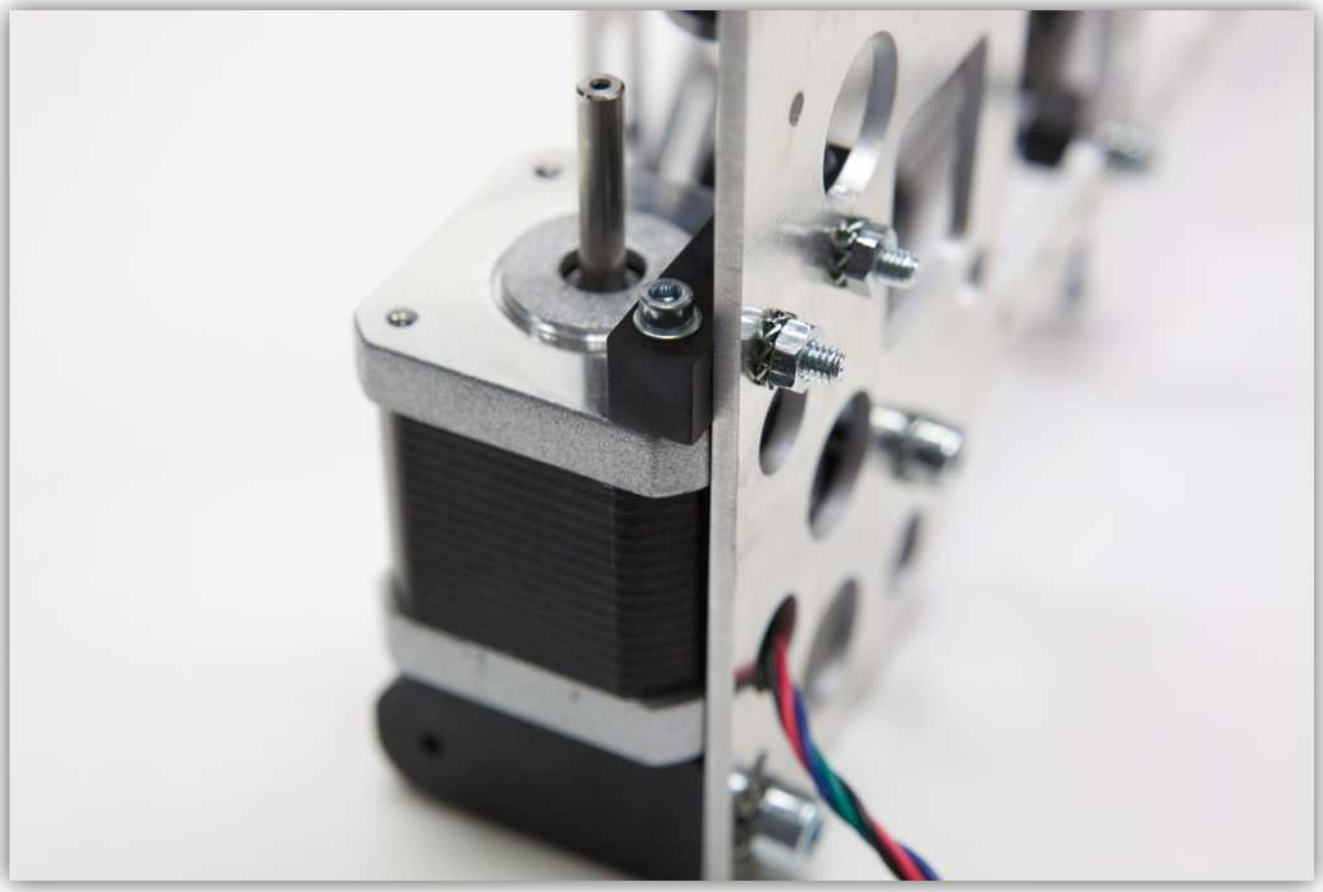
Use the 2 M3 bolts with an M3 washer to bolt the MOTOR MOUNT to the motor. **Notice the orientation of the wires.**

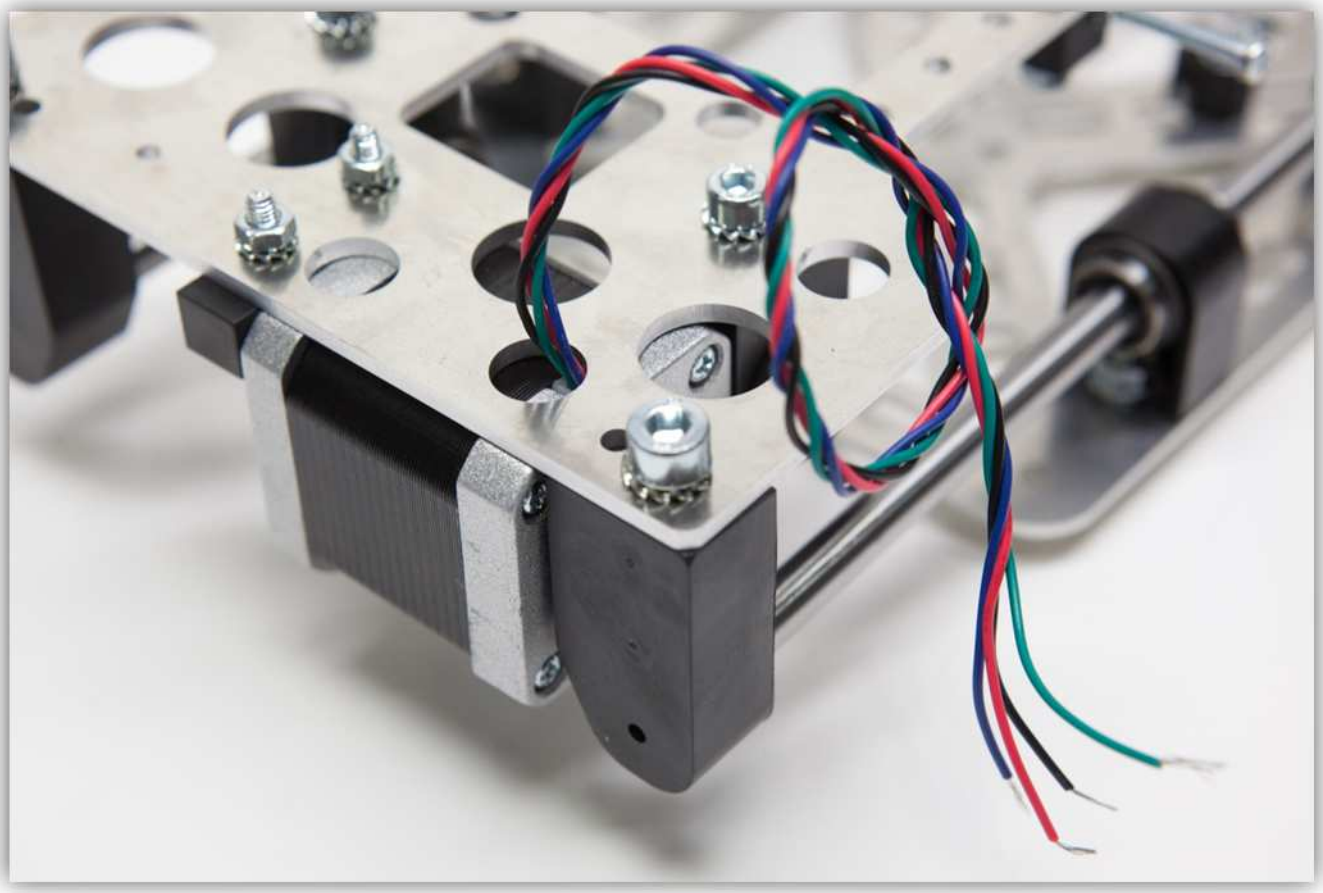
Insert the 2 M4 bolts as follows:



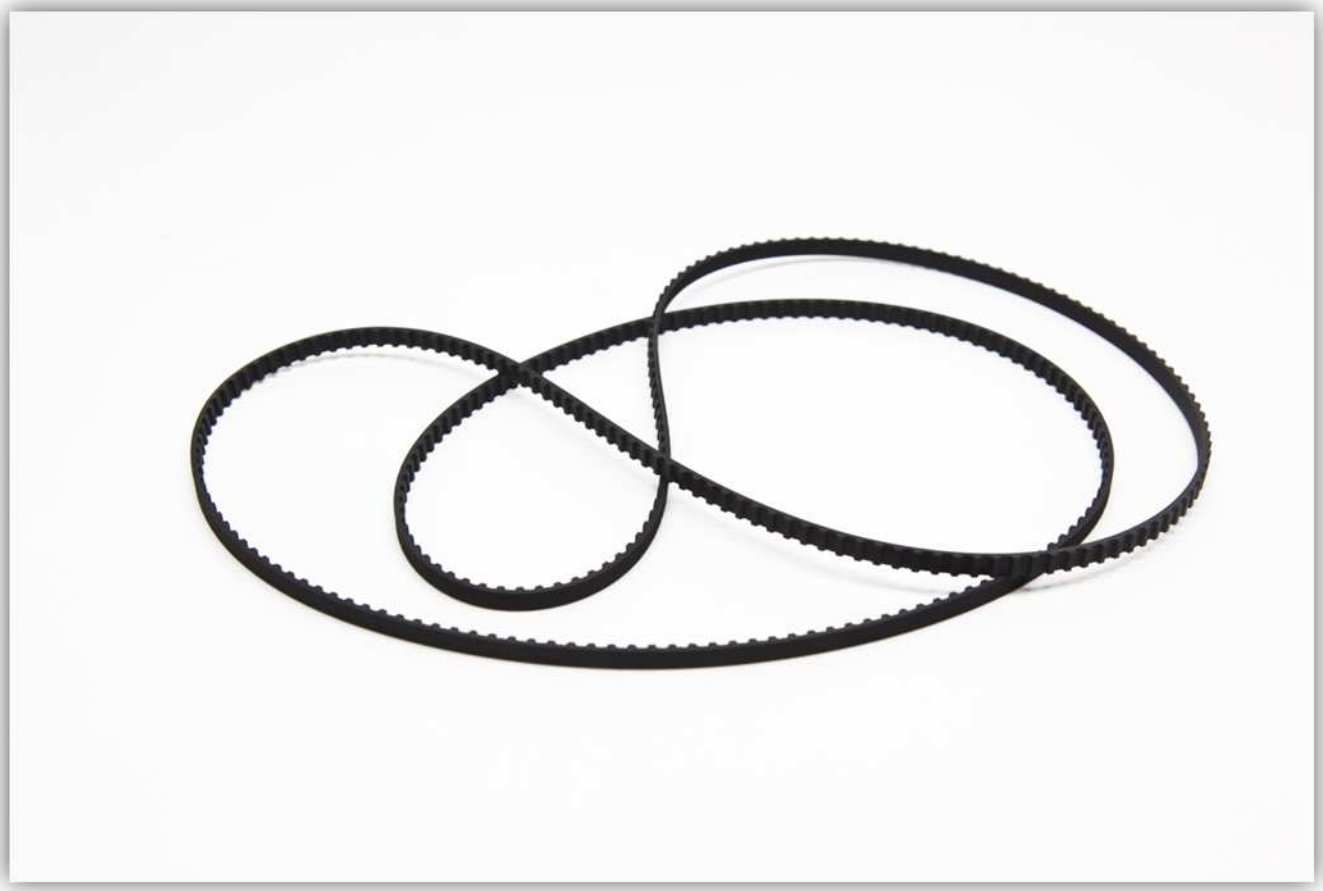
Place the assembly as follows on the X CARRIAGE and use 2 M4 toothed washers and M4 bolts to secure the motor. Make sure that the motor is mounted level and on a 90° angle with the rods and that the wires are through the large hole of the X CARRIAGE.



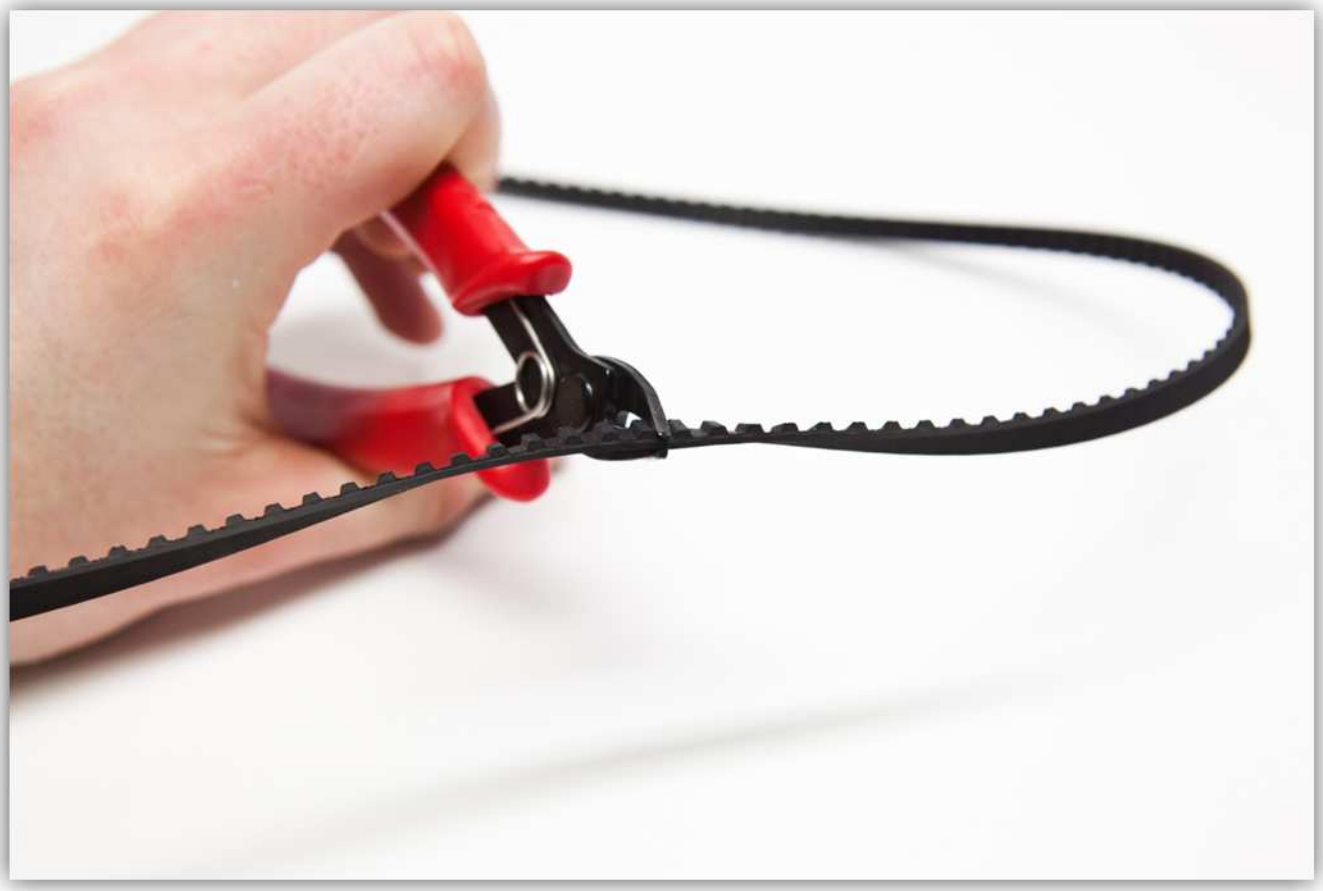


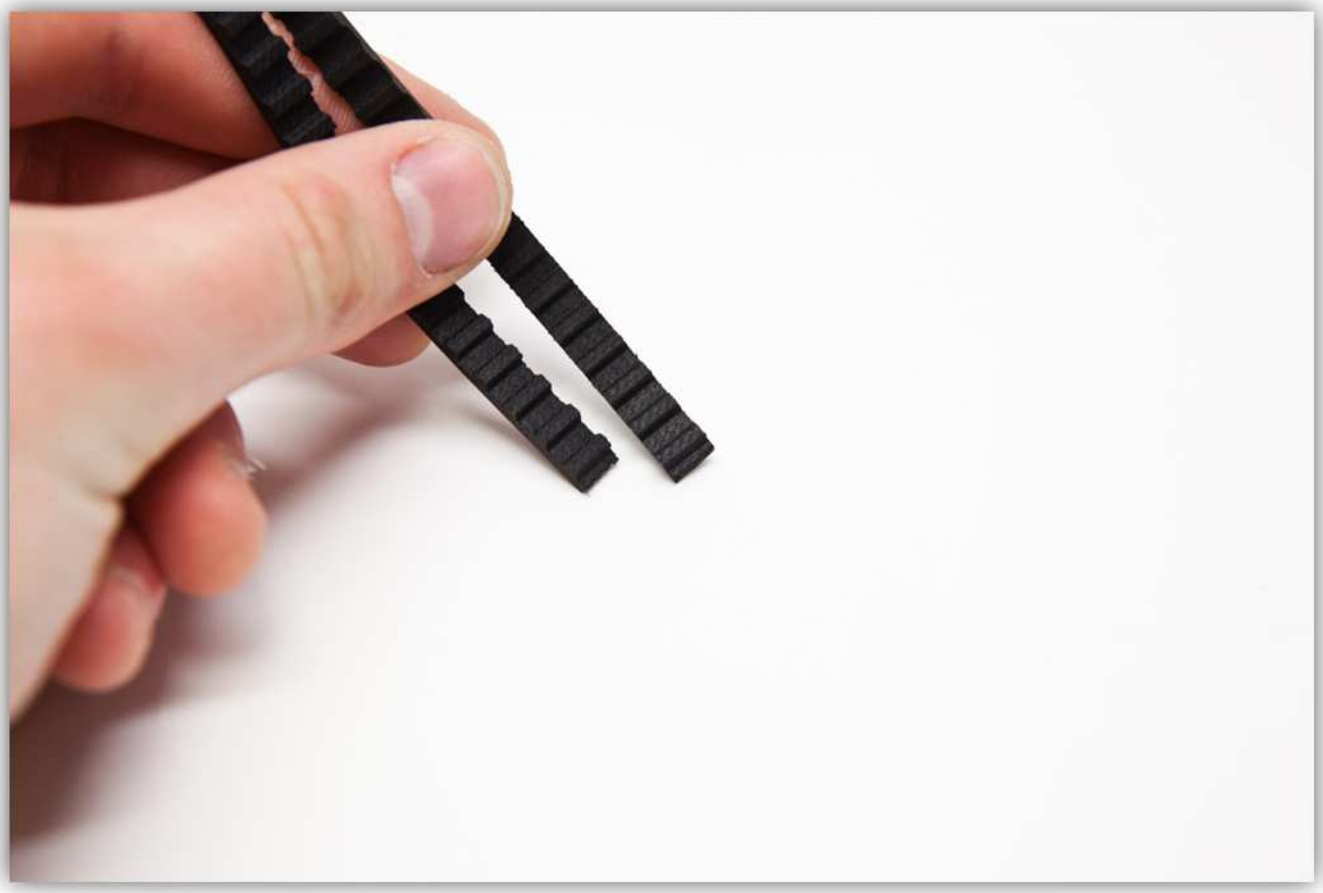


Take the bag labelled with 10 out of the box, you should have these parts:



Cut the belt once.



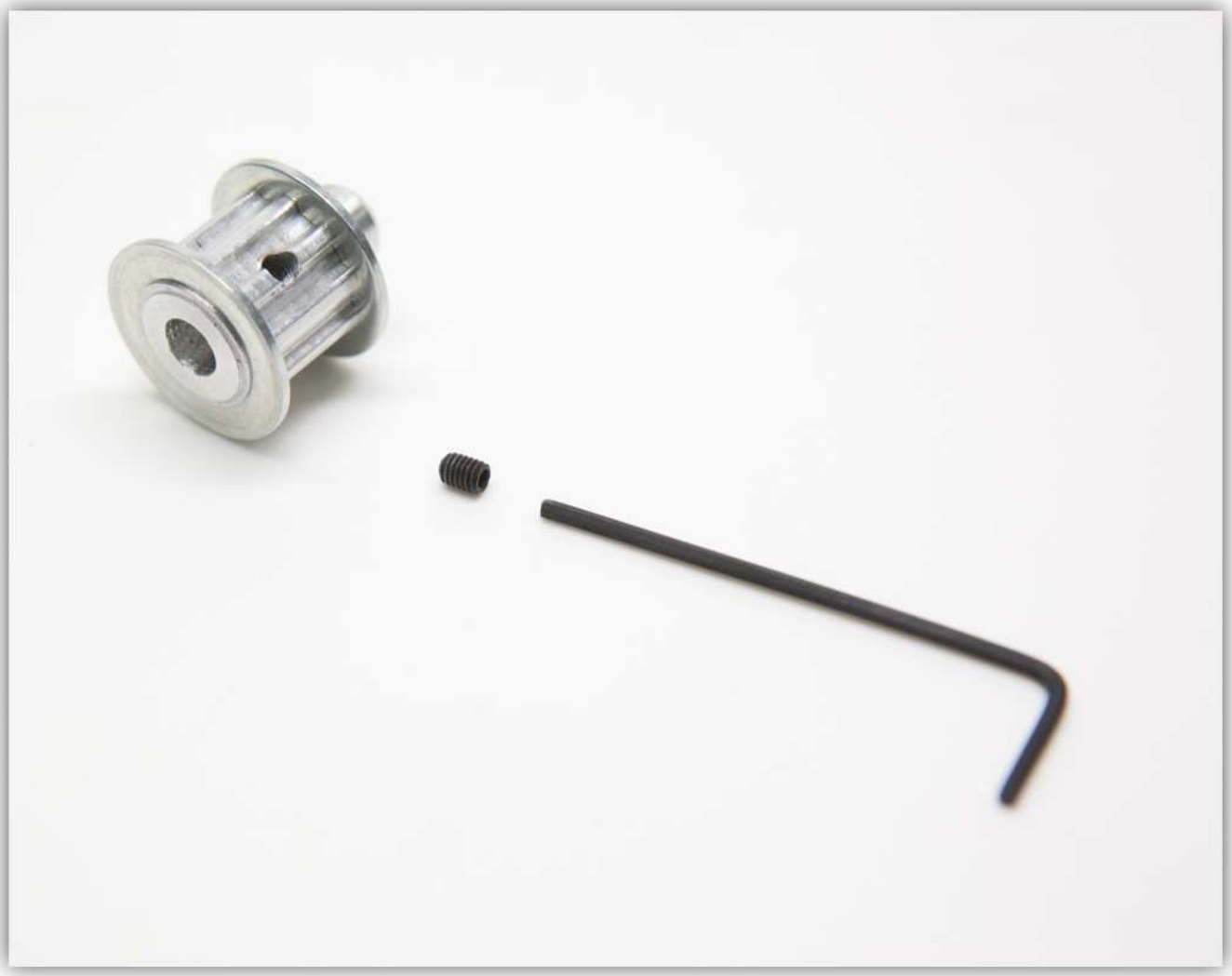


Now from the end you just cut, measure the belt for **63.5 cm (25") or 127 teeth. This measurement is critical. We advise to count the teeth and also measure the distance before cutting.**

The other half should be approx. 86 cm (33.9"). For this stage in the build we shall need the piece of 63.5 cm (25"). Store the piece of 86 cm (33.9") for later use**.**

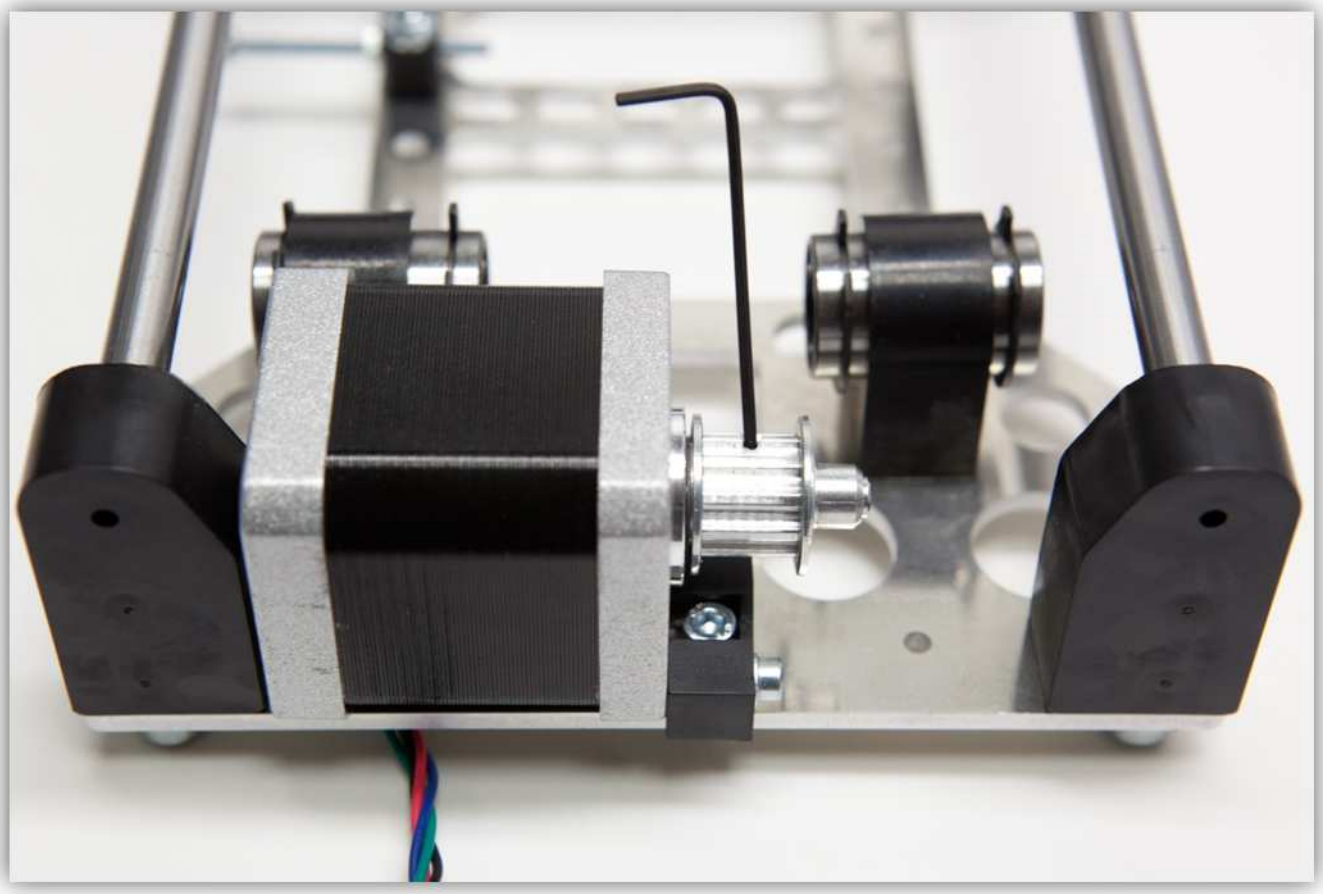
Take these pieces (BELT CLAMP A and BELT CLAMP B) as shown in the picture below out of the bag containing the plastic parts:

Take the pulley and the small M3 locking bolt.



Screw the bolt into the pulley.

Slide the pulley over the motor shaft as shown and tighten the small locking bolt.

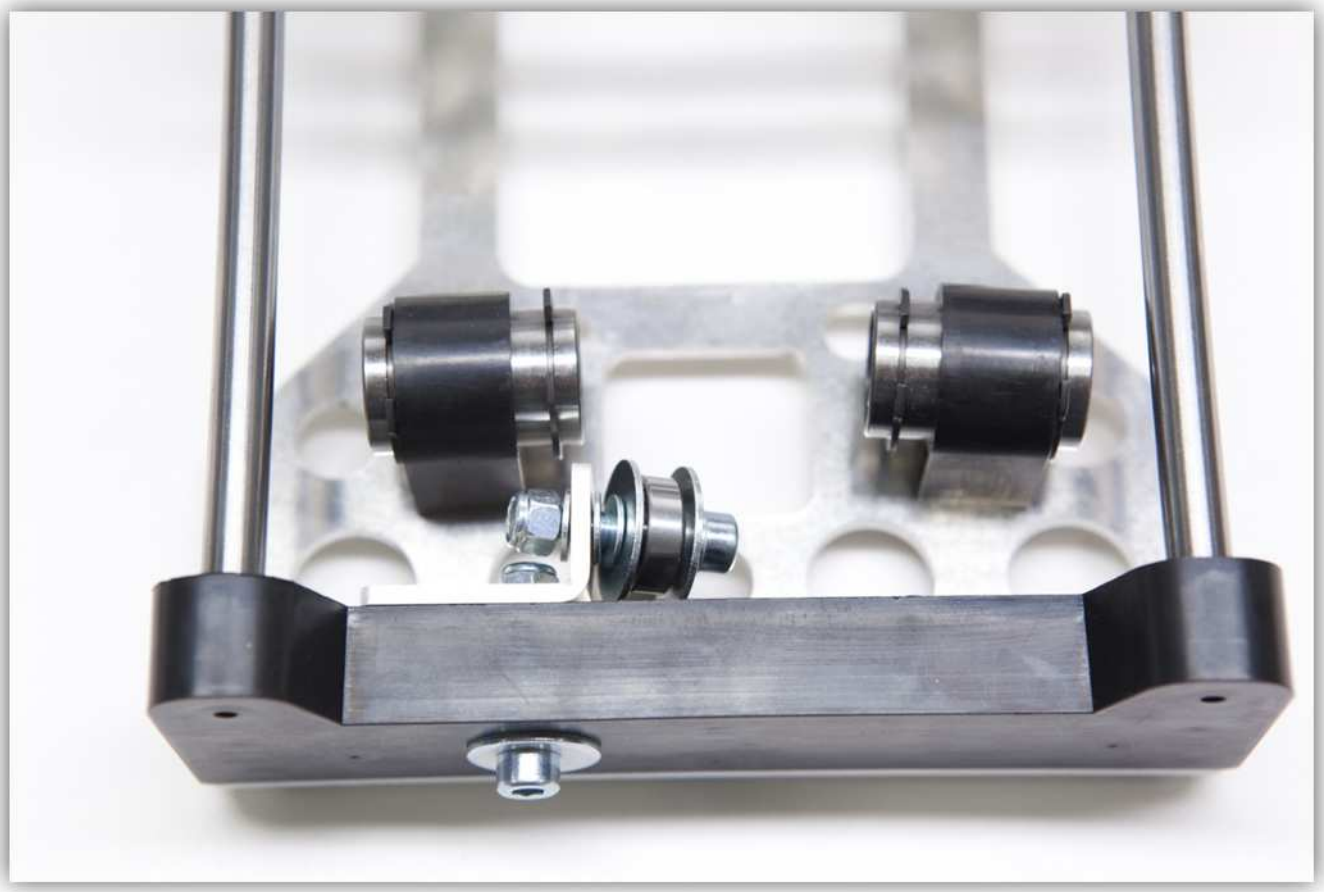


Loosen the bolt and washer on the BIG Y ROD CLAMP you mounted earlier.

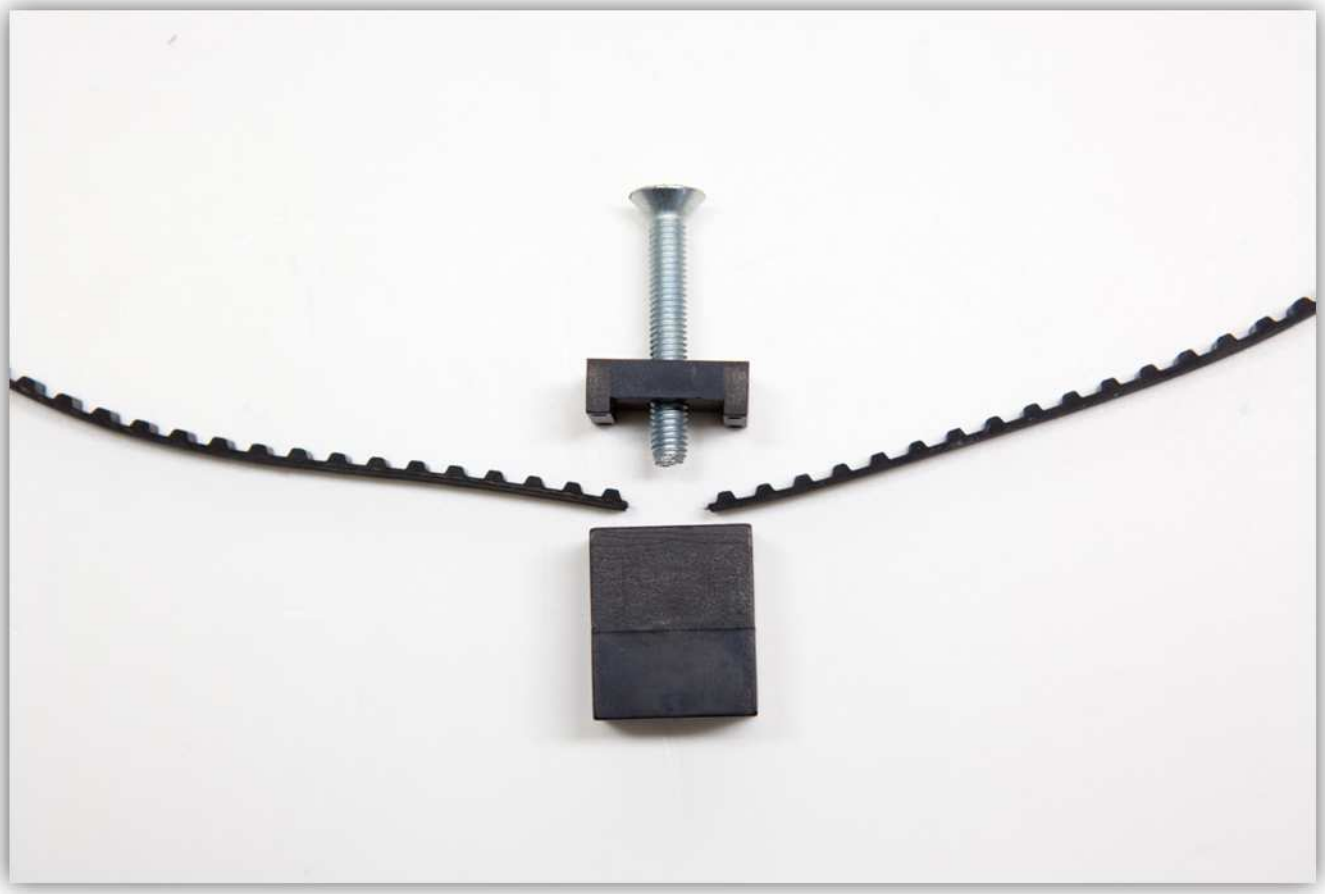
Place the small aluminium bracket as shown in the picture and tighten the assembly.

Use the M5 bolt, the 625 bearing, 6 M5 washers and 2 large M5 washers to assemble the following:

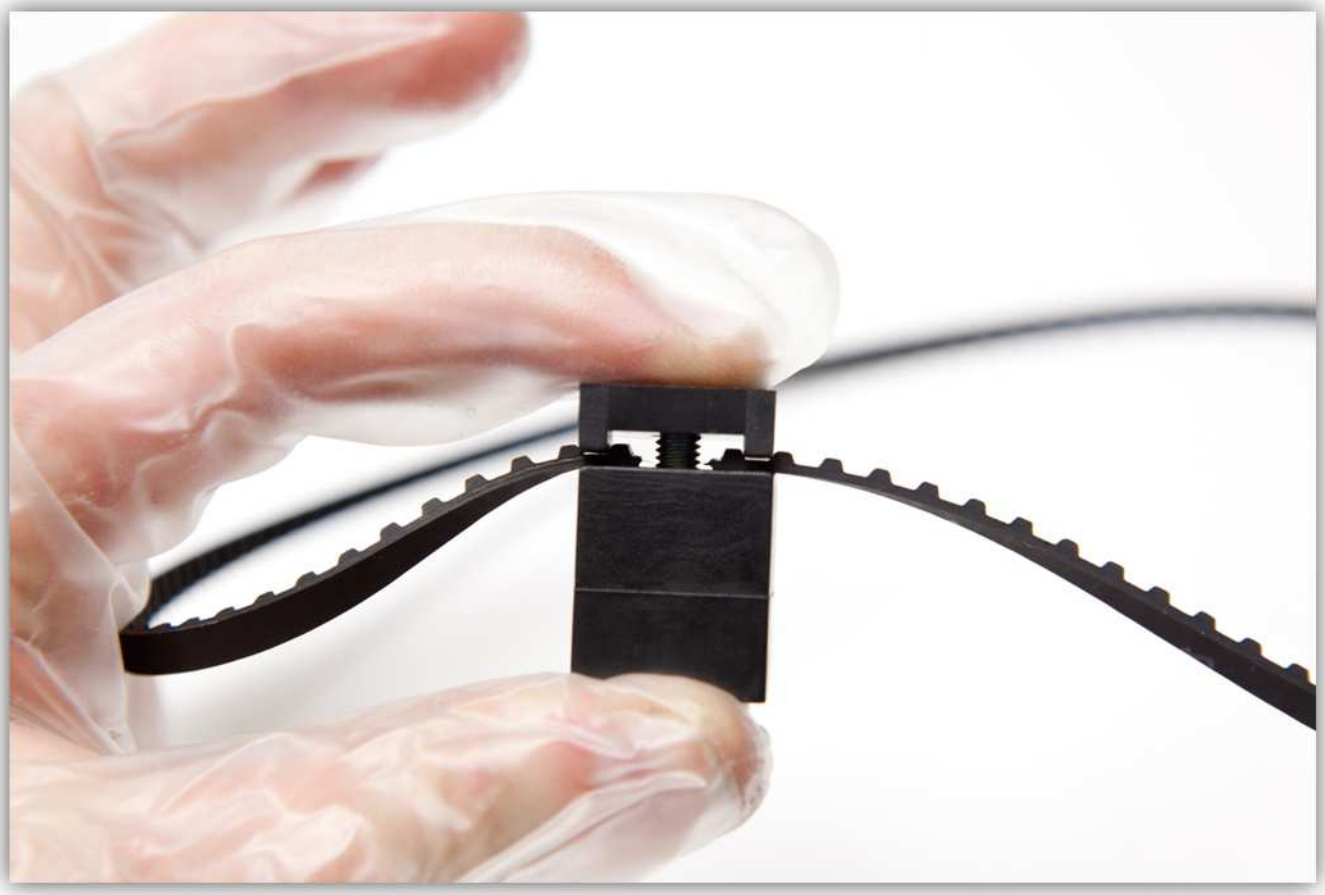
Use an M5 locking nut and an M5 washer and mount the assembly as shown in the picture. **Do not tighten this assembly.**



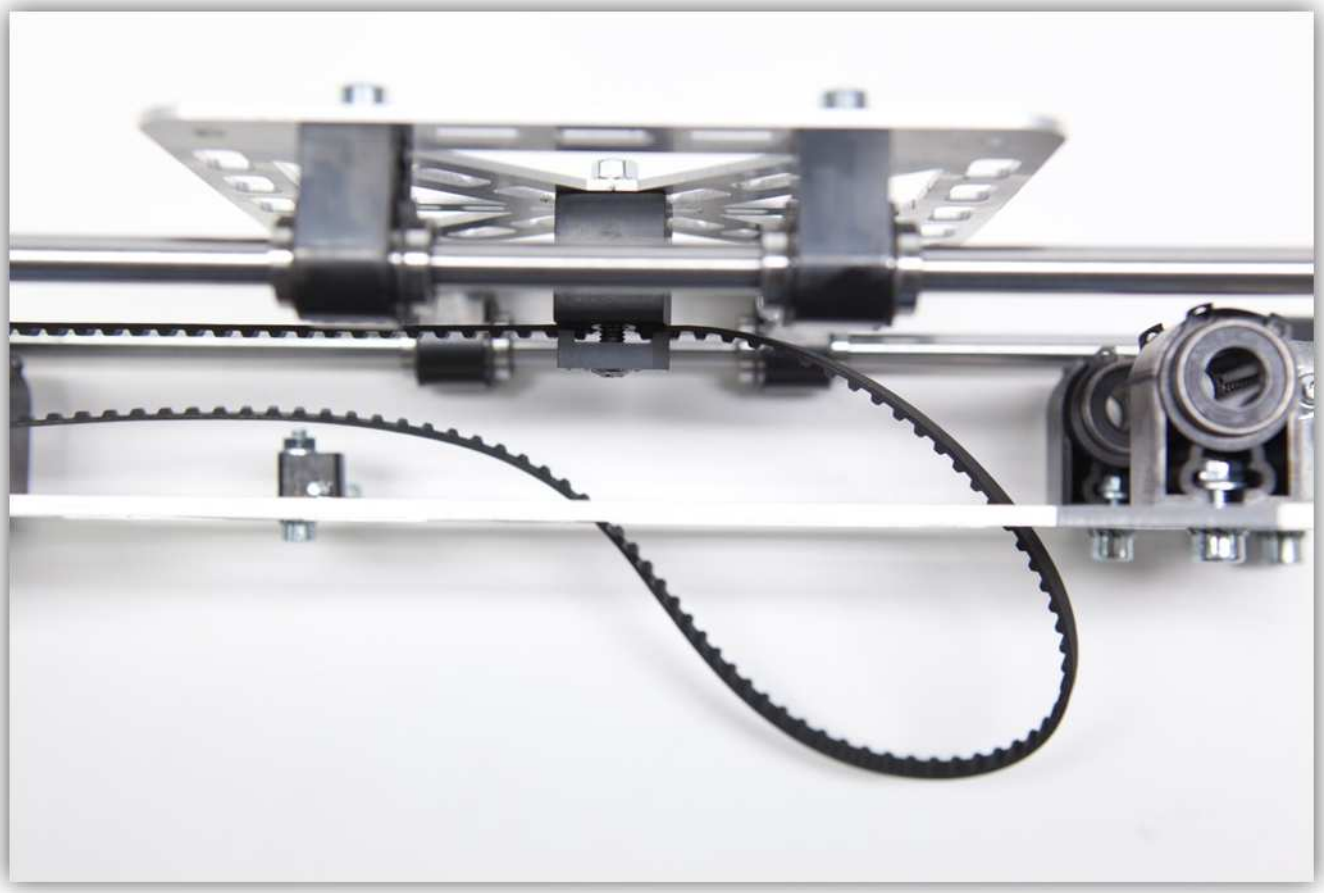
Take the long M5 bolt, the belt and the 2 plastic pieces (BELT CLAMP A and BELT CLAMP B).



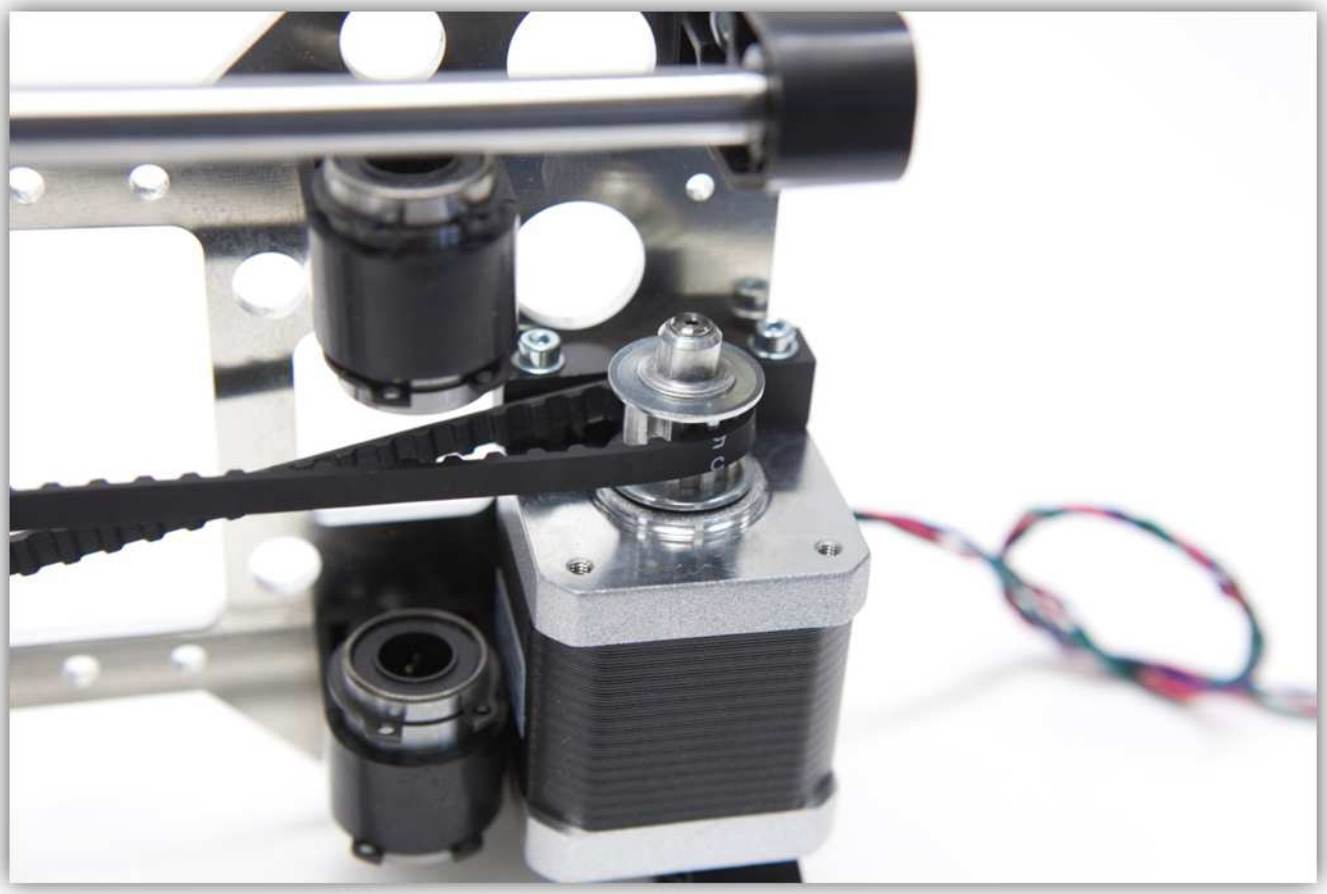
Assemble them as shown in the picture. **Take notice that the belt sits between the clamps exactly as in the picture.**

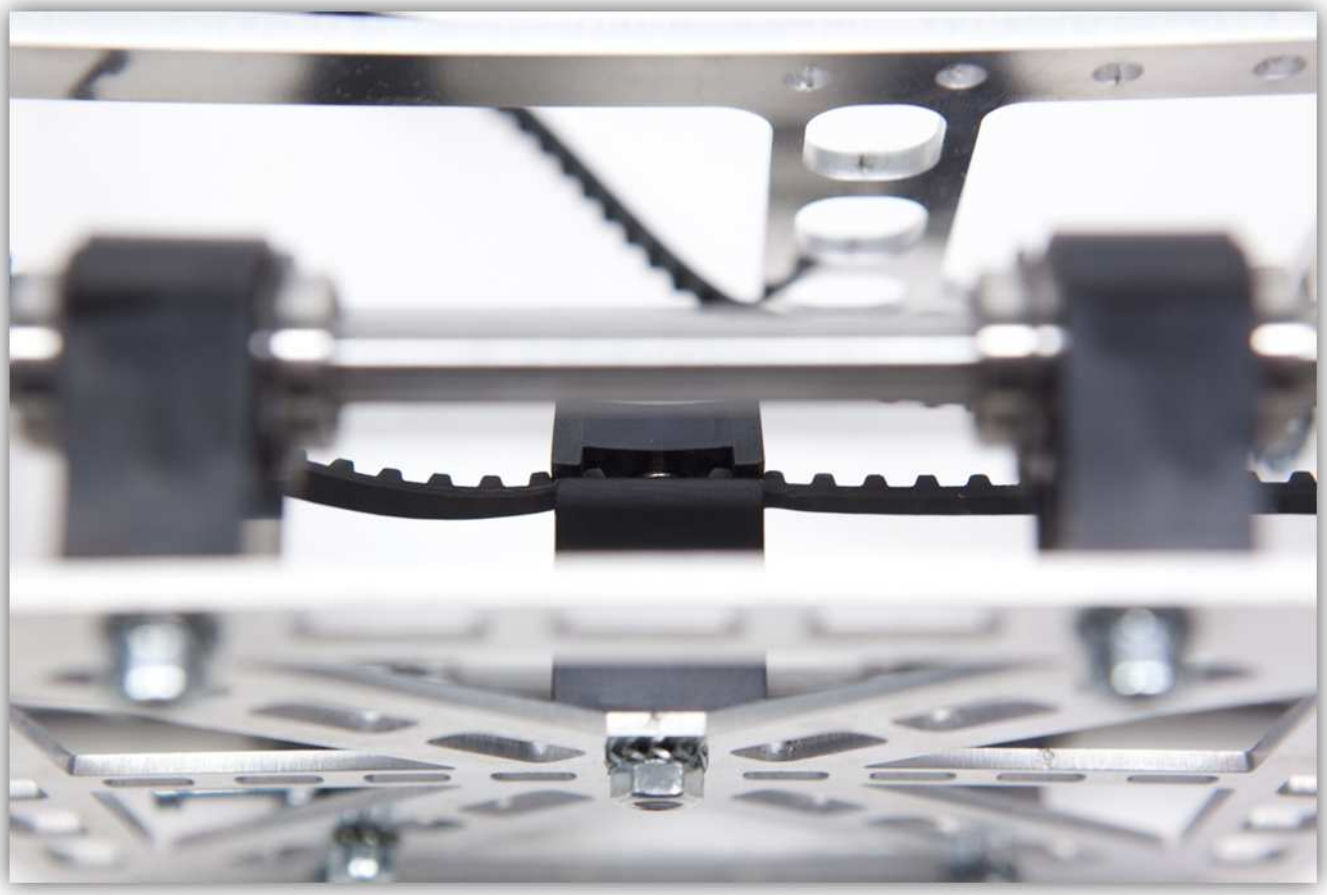


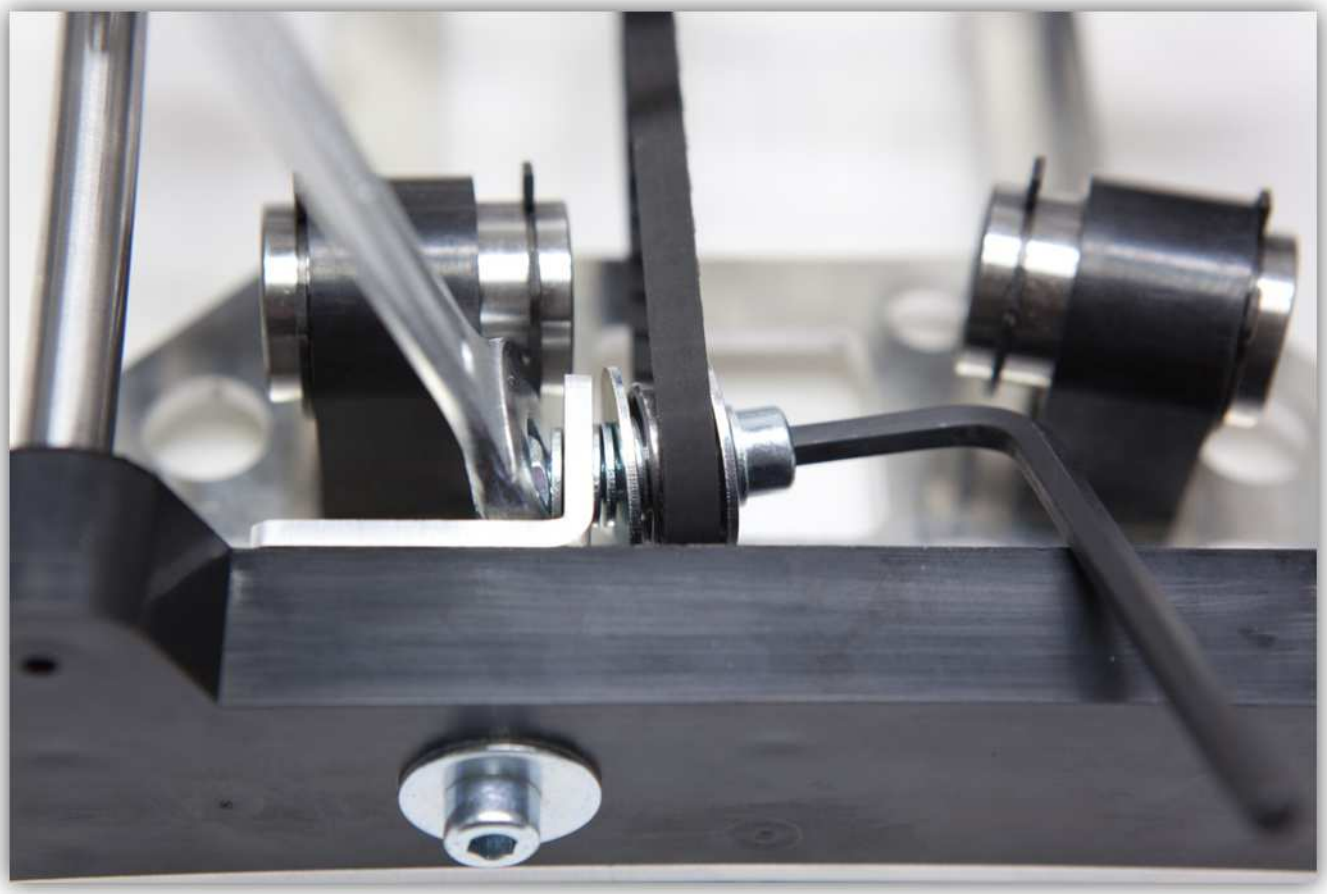
Use an M5 washer and bolt to secure this assembly to the BED SUPPORT CARRIAGE as shown in the pictures:

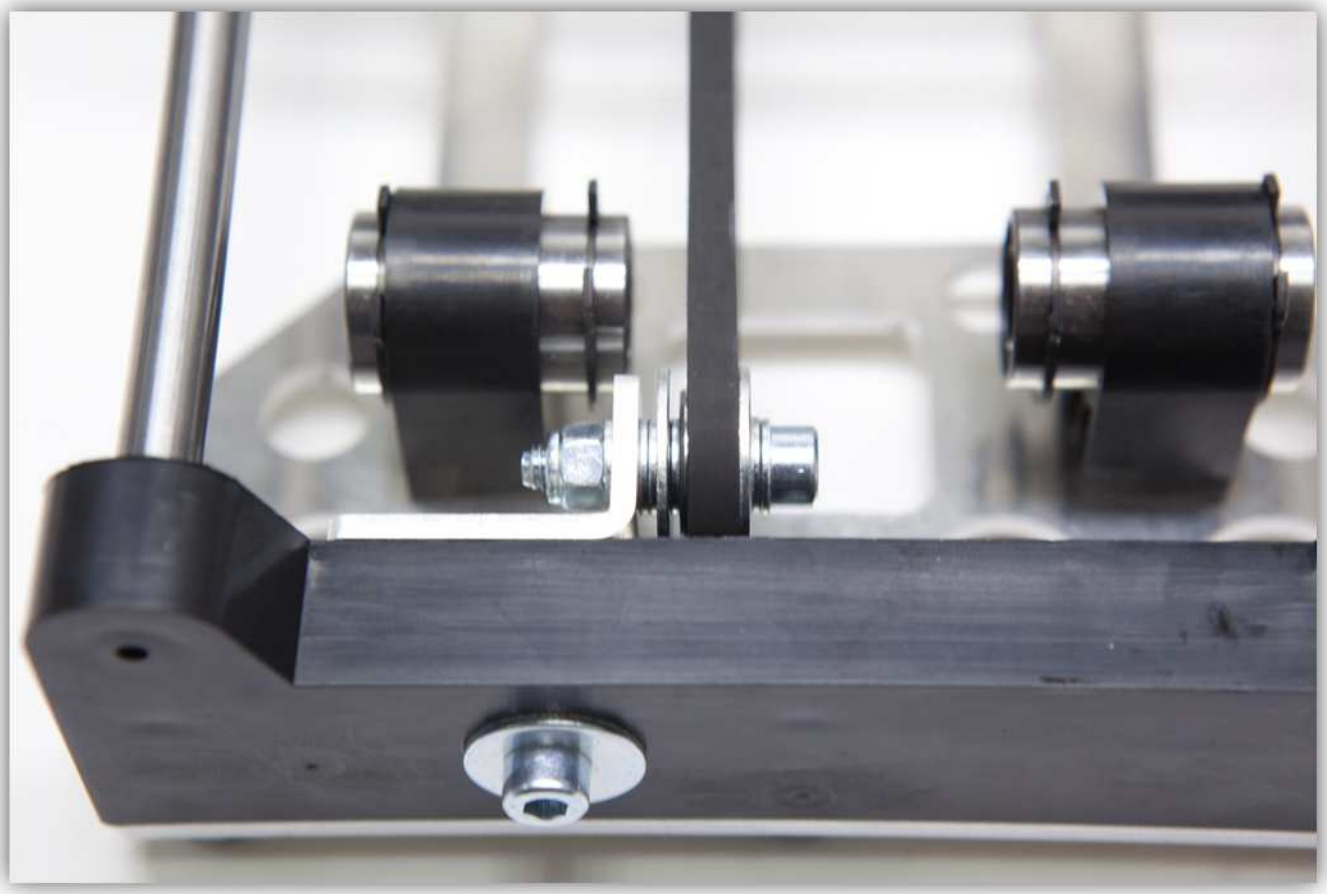


Loop the belt around the pulley and around the 625 BEARING. Now tighten the bolt with the 625 BEARING as shown in the pictures to put tension on the belt.









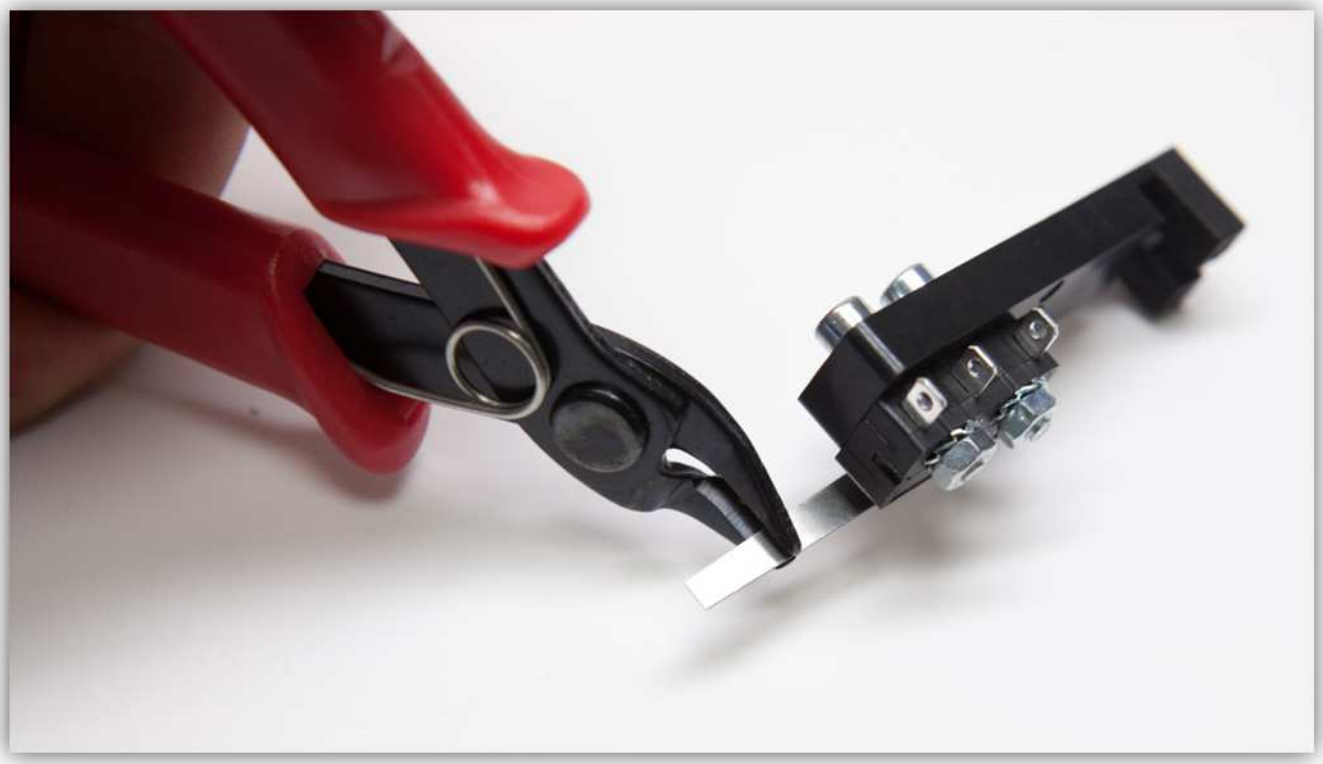
Take the bag labelled with 11 out of the box, you should have these parts:

Search the piece (MICROSWITCH MOUNT) as shown in the picture below out of the bag containing the plastic parts:

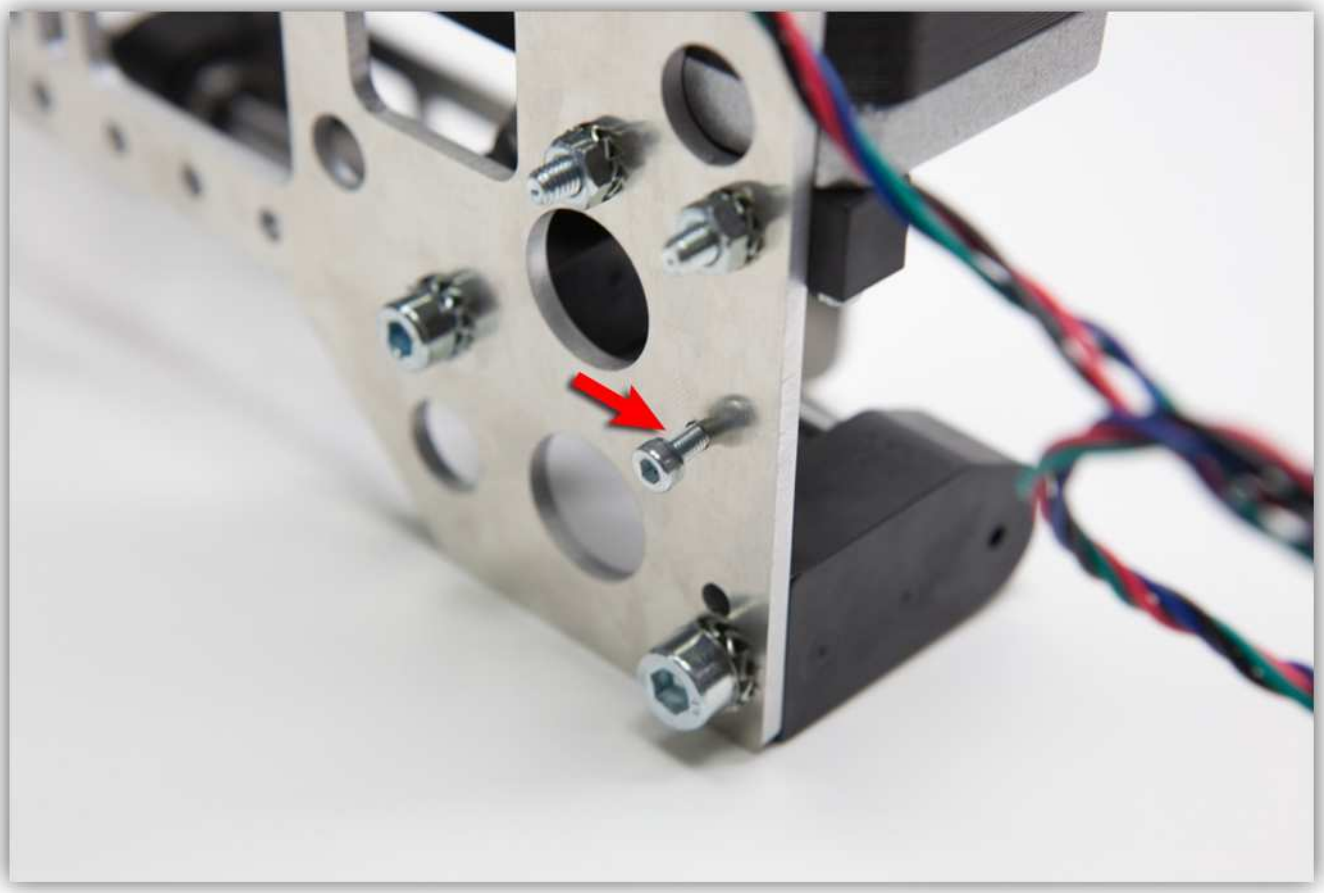
Insert 2 M3 bolts with M3 washers as shown:

Add a micro switch and 2 M3 toothed washer and 2 M3 bolts. Tighten these bolts.

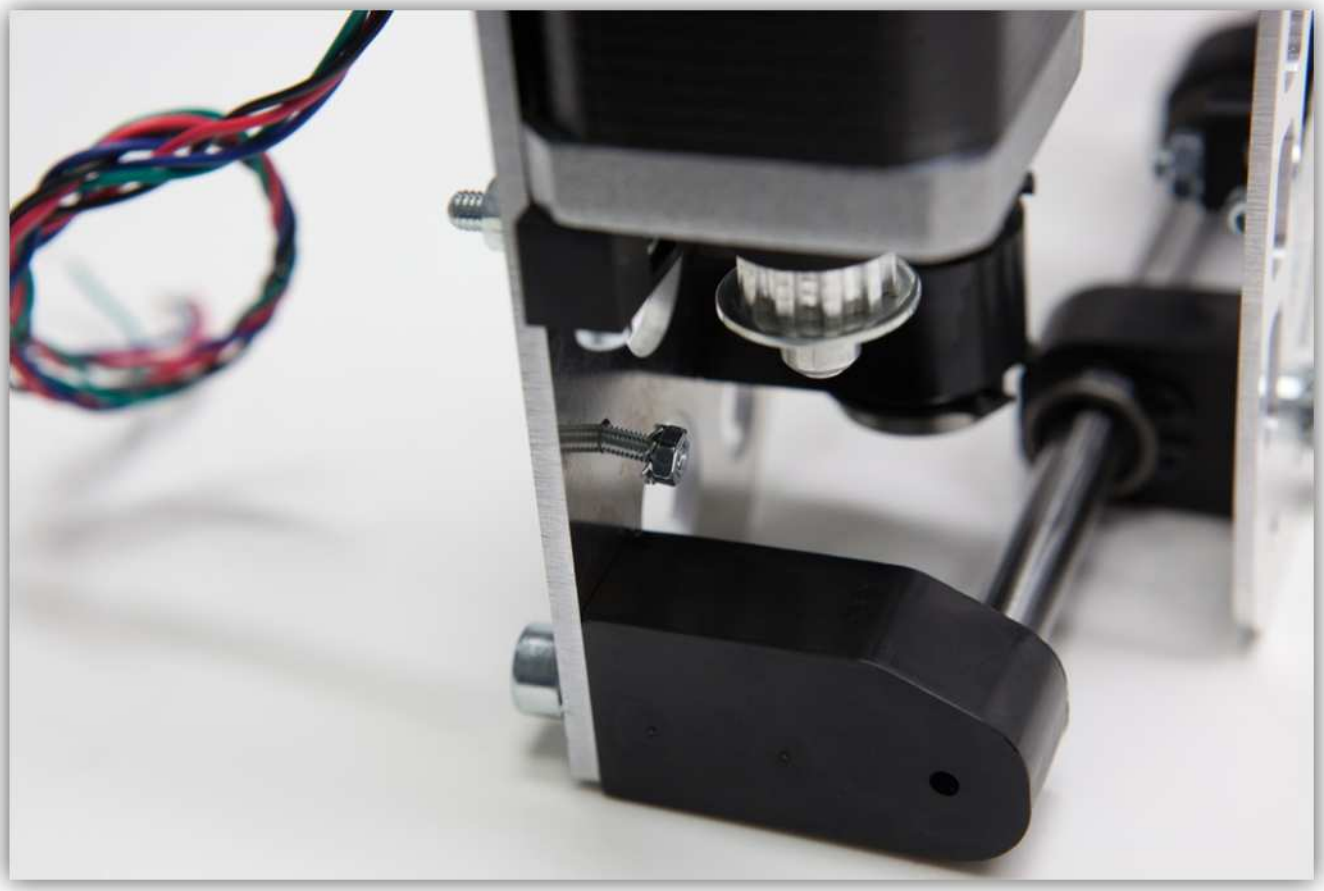
Cut 10 mm (0.39") of the lever of the micro switch, be careful not to cut too much.



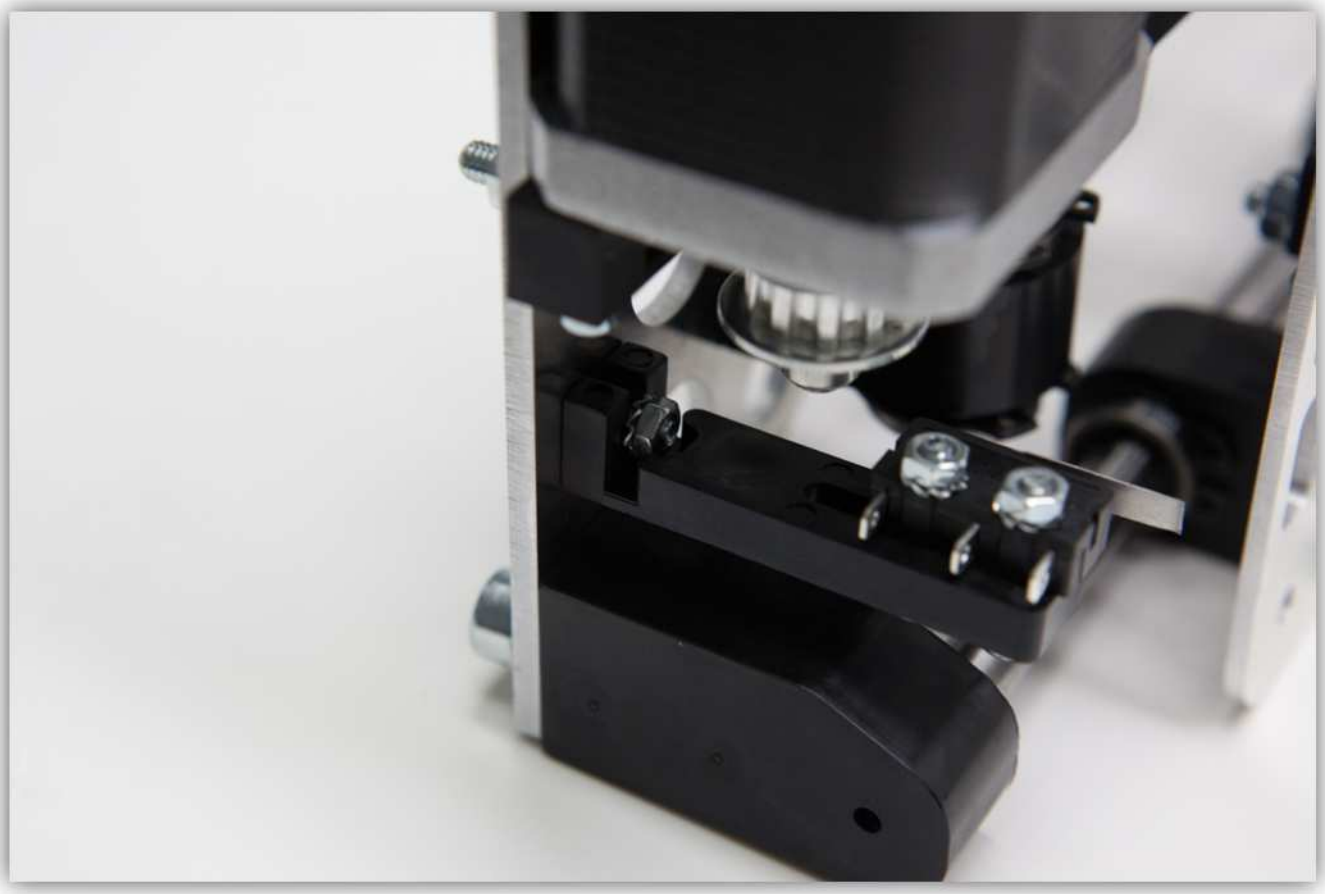
Slot the remaining M3 bolt in the X CARRIAGE as in the picture:



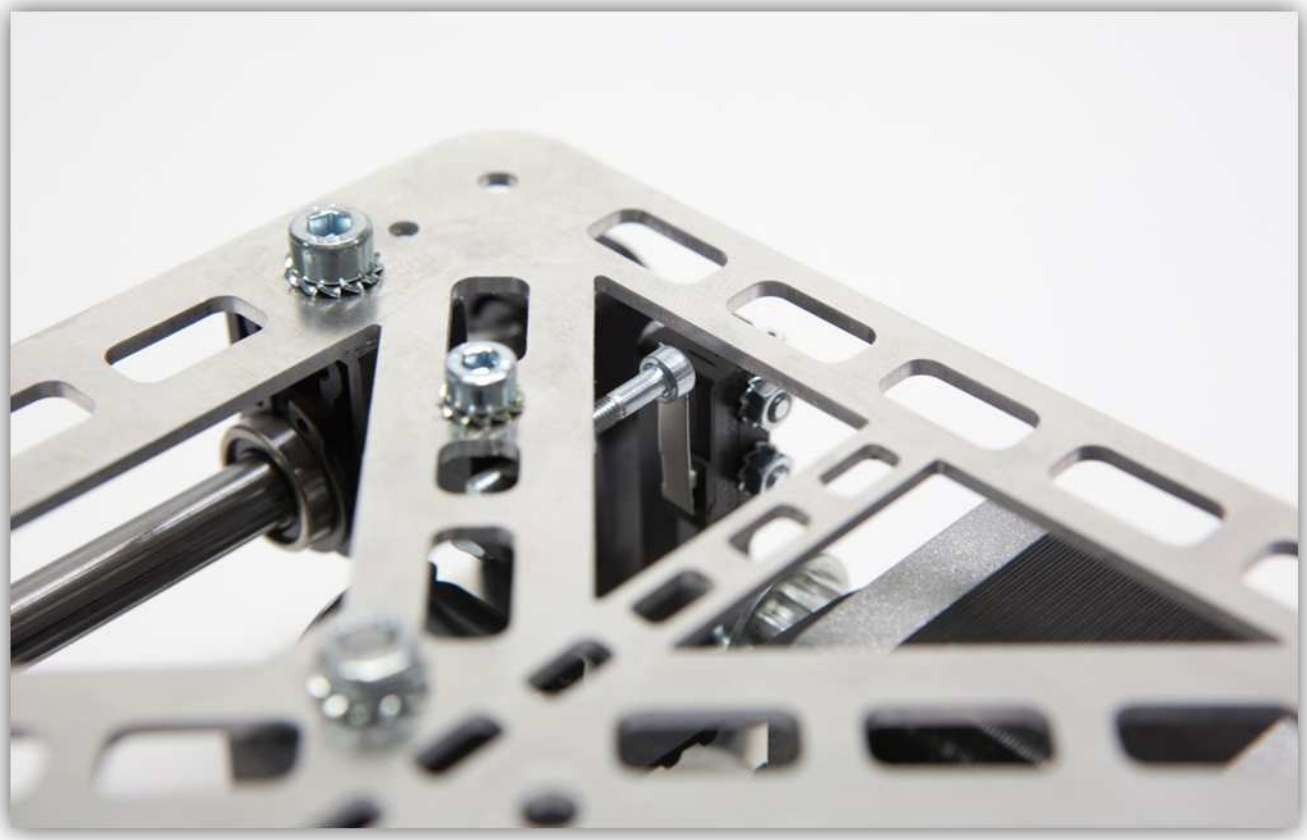
Use an M3 toothed washer and an M3 bolt to hold it in place. **Do not tighten this bolt.**

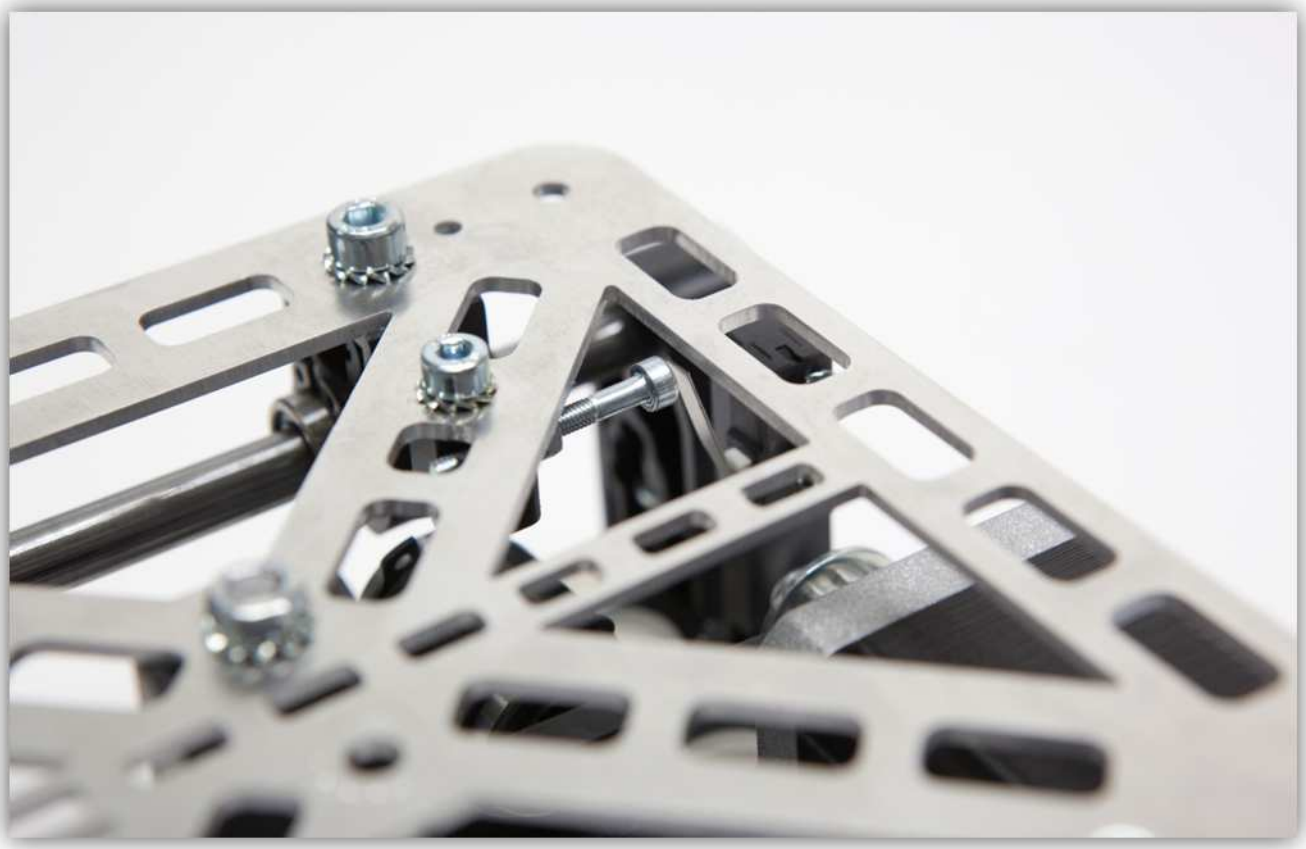


Slide the MICROSWITCH MOUNT under the washer and nut as shown. Hand tighten this nut.

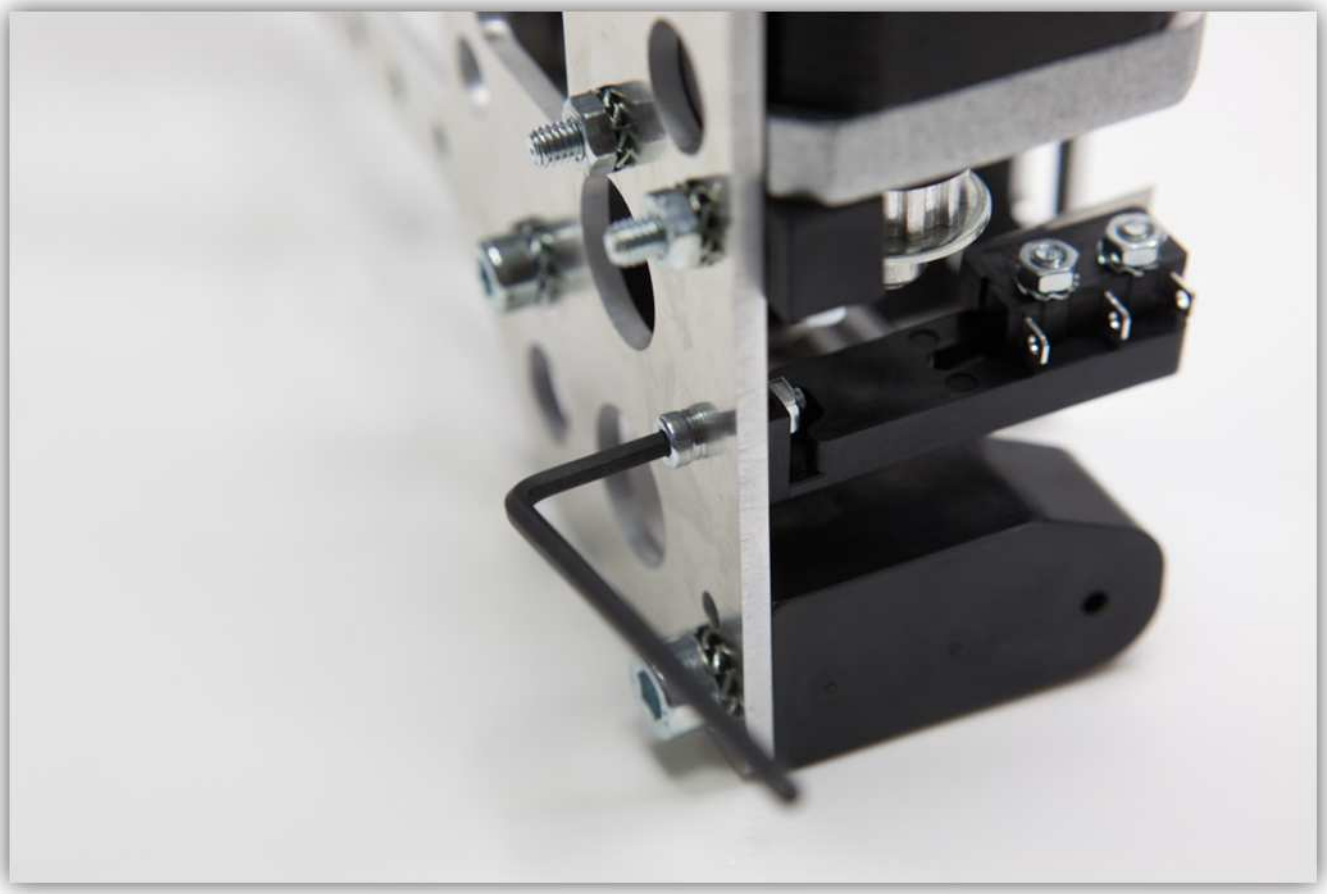


Make sure that the screw on the BED support carriage actuates the micro switch as shown in the pictures below. If this is not the case you can loosen the 4 bolts that hold the BEARING CLAMP Y pieces in place, move the BED SUPPORT PLATE left or right and tighten the bolts again, ensuring a fluid motion.

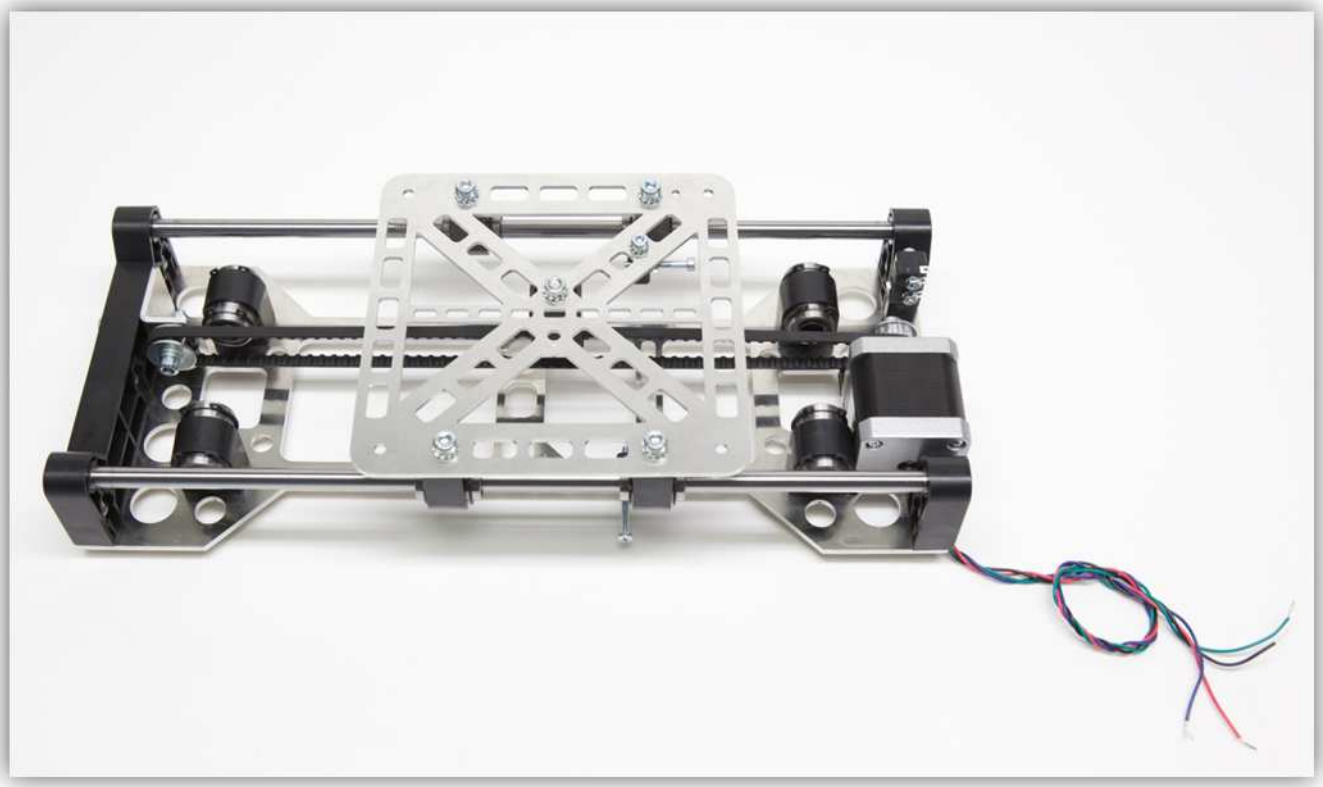




Tighten the bolt that holds the MICROSWITCH MOUNT in place.



You have now finished the second chapter of your build. You should have a completed X CARRIAGE as shown in the picture below:



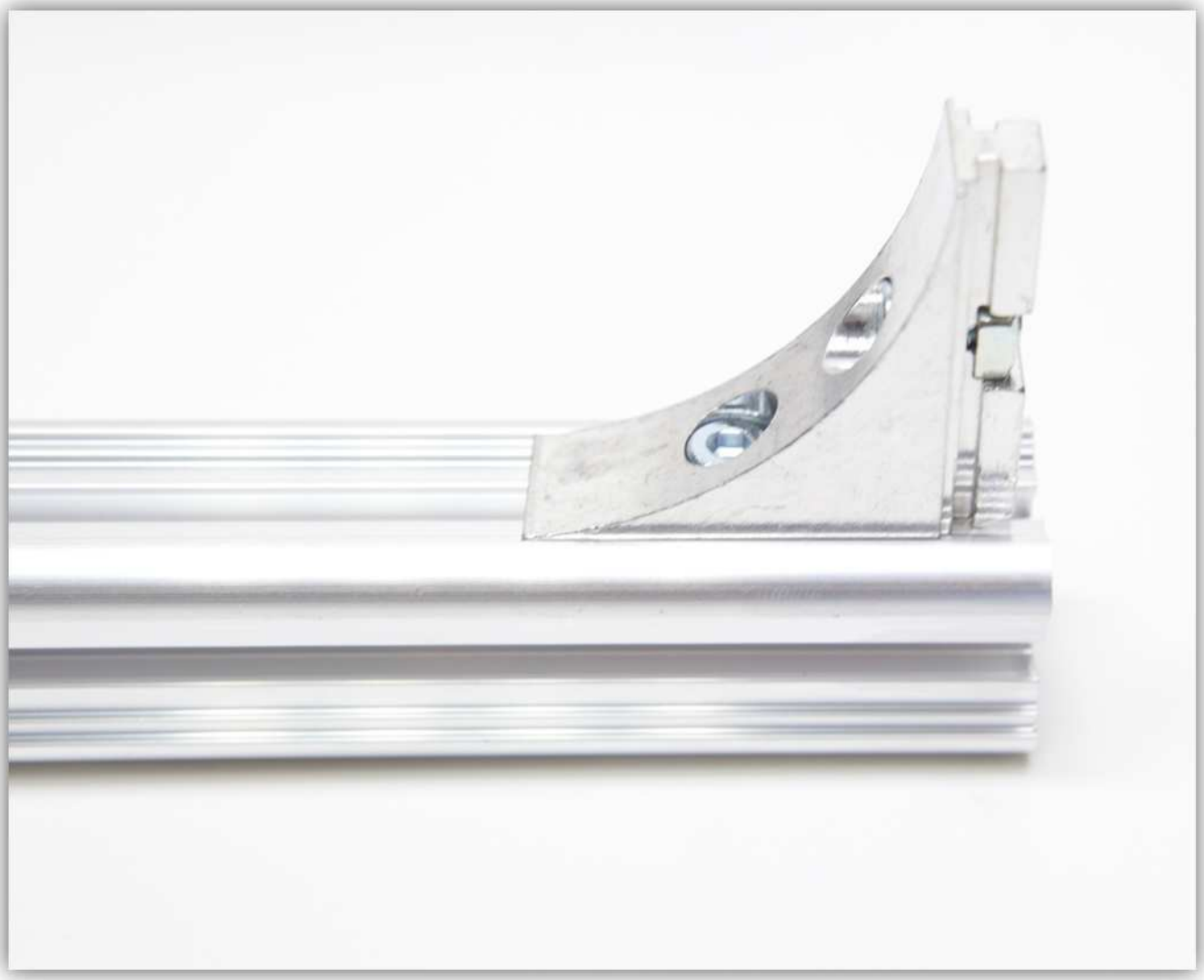
003 – ASSEMBLING BASE FRAME

Take one ALUMINIUM PROFILE of 450 mm (17.7") out of the box.

Take two ALUMINIUM PROFILES of 416 mm (16.4") out of the box.

Take the bag labelled with 14 out of the box. You should have 14 ANGULAR MOUNTS:

Slide 2 of these ANGULAR MOUNTS in each side of the ALUMINIUM PROFILE of 450 mm (17.7").



Slide an ALUMINIUM PROFILE of 416 mm (16.4") on each side of the ALUMINIUM PROFILE of 450 mm (17.7").

Tighten all the bolts firmly and make sure all angles are 90° and all ALUMINIUM PROFILES are flush.

You should have this:

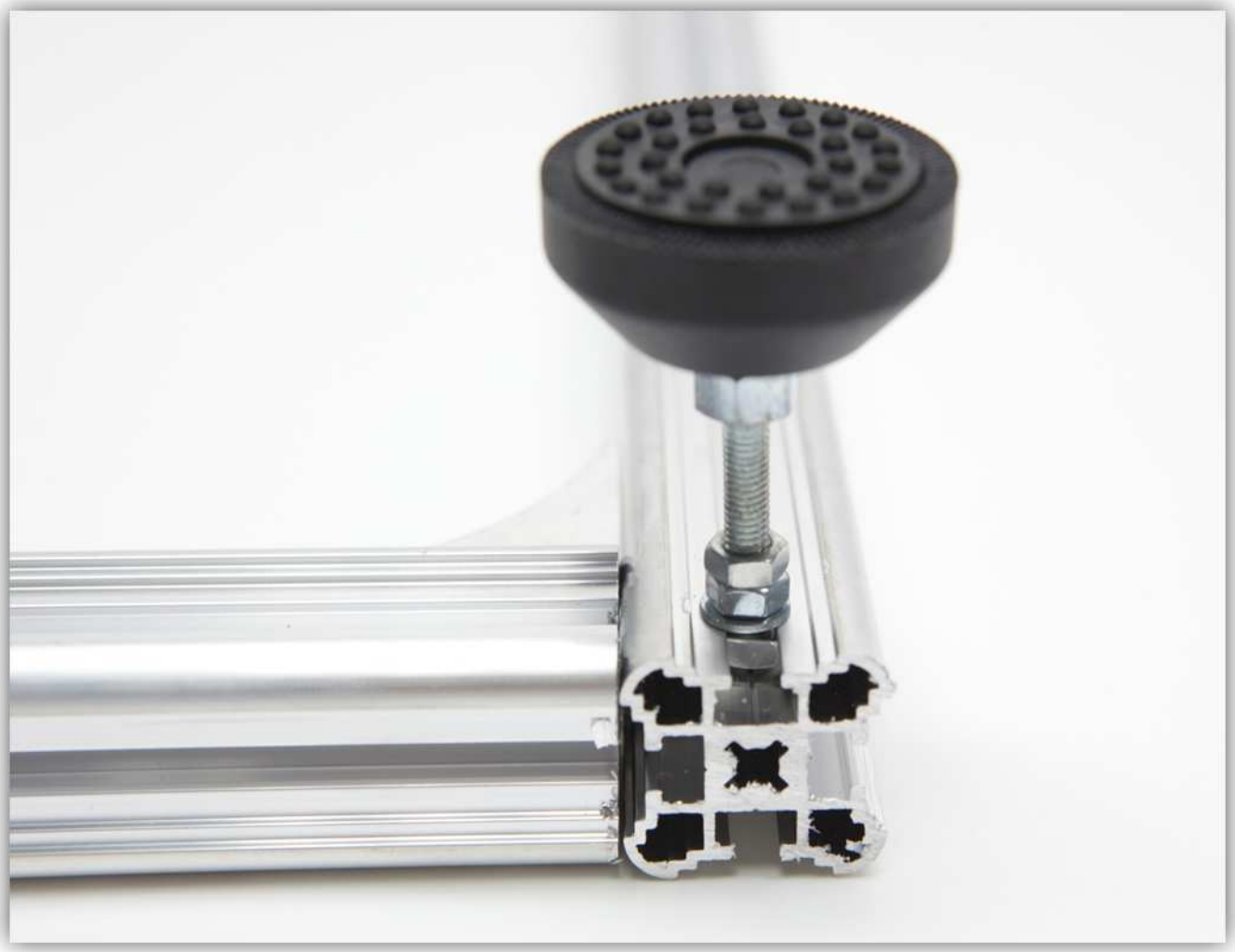
Take the bag labelled with 15 out of the box. You should have these parts:

Take the bag labelled with 16 out of the box. You should have a bag with 34 square nuts:

There should already be an M5 nut on the bolt. Screw a regular M5 nut, an M5 flat washer and a square M5 nut on the foot. Repeat this 4 times. **Do not tighten these nuts.**

Slide these assemblies into the ends of each 416 mm (16.4") ALUMINIUM PROFILE.

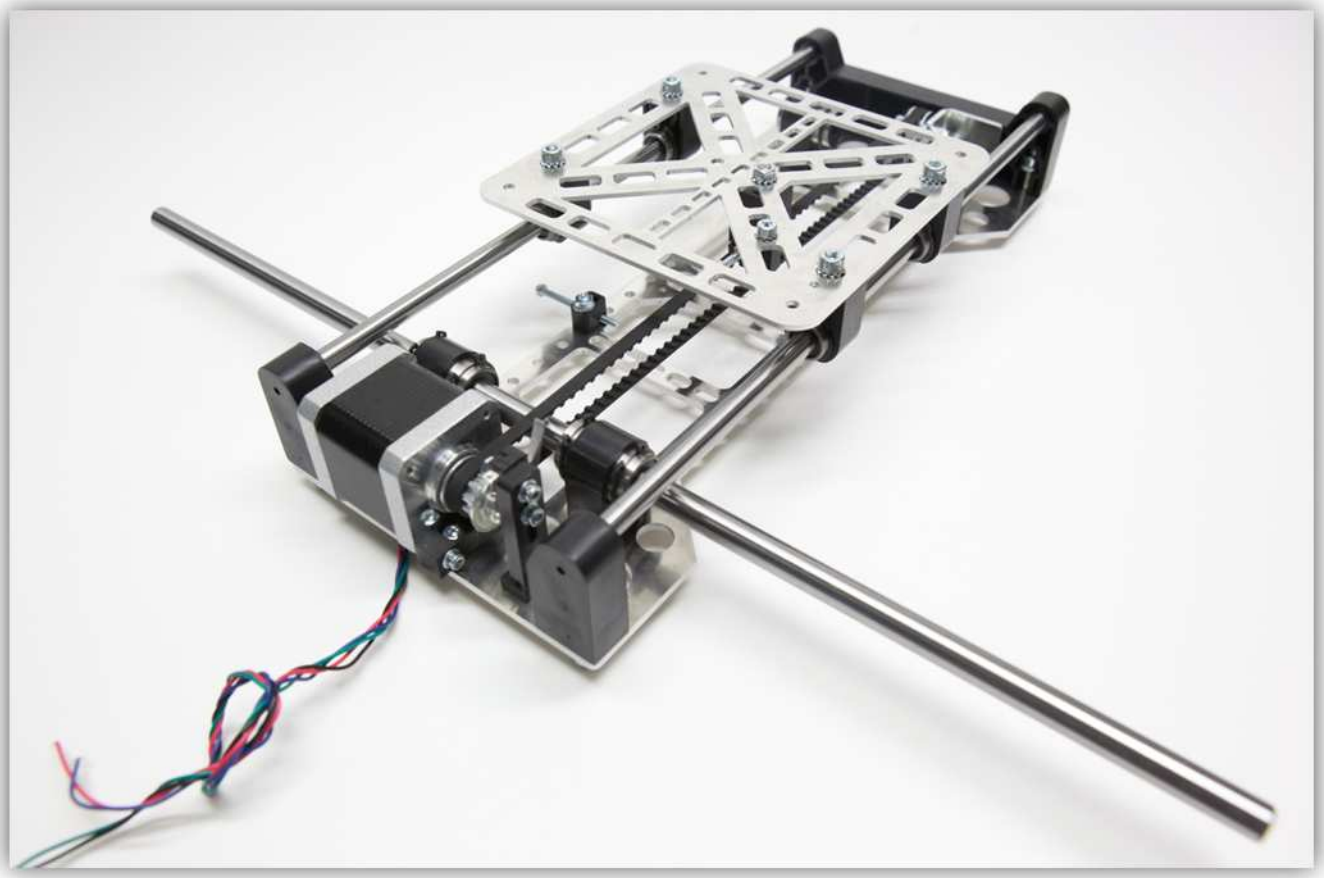
Tighten the nuts firmly as in the picture below:

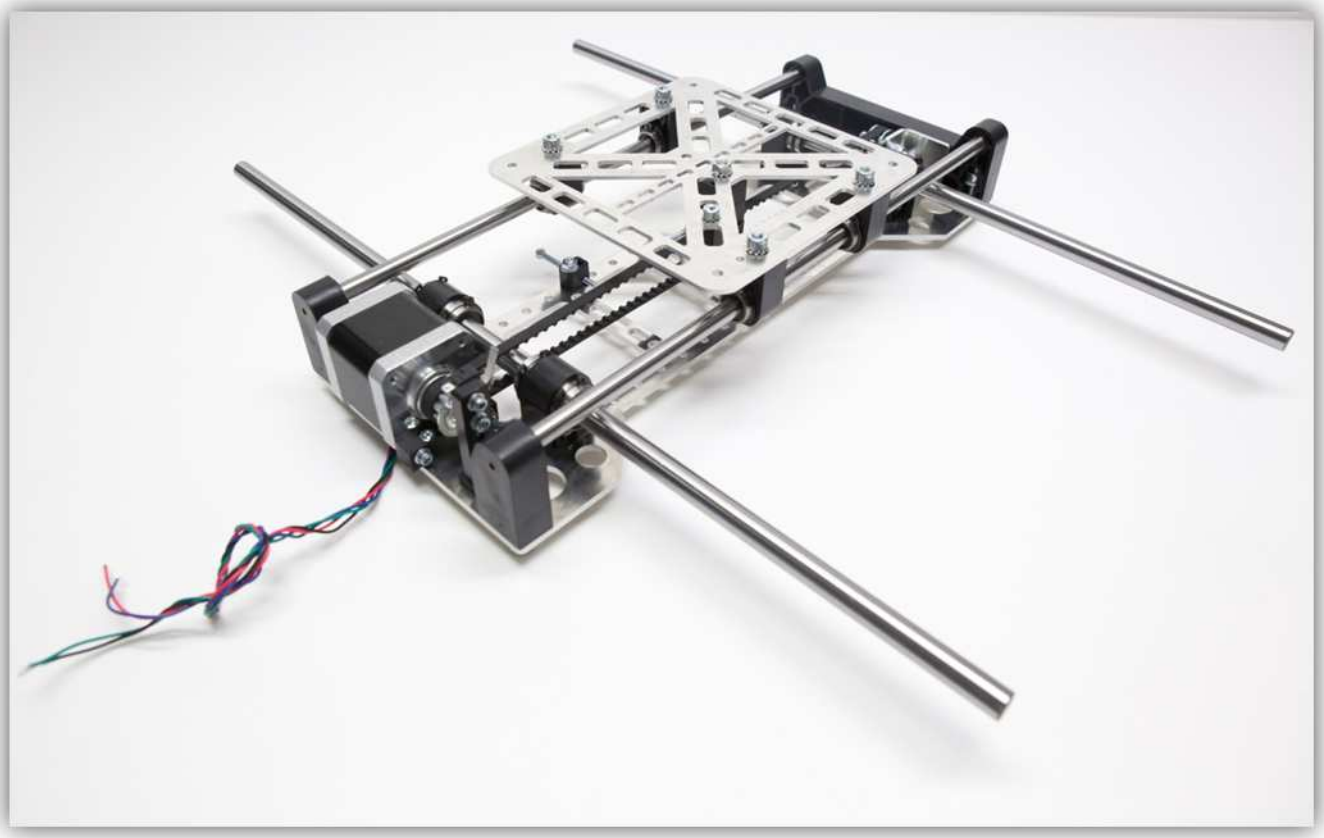


The frame should look like this:

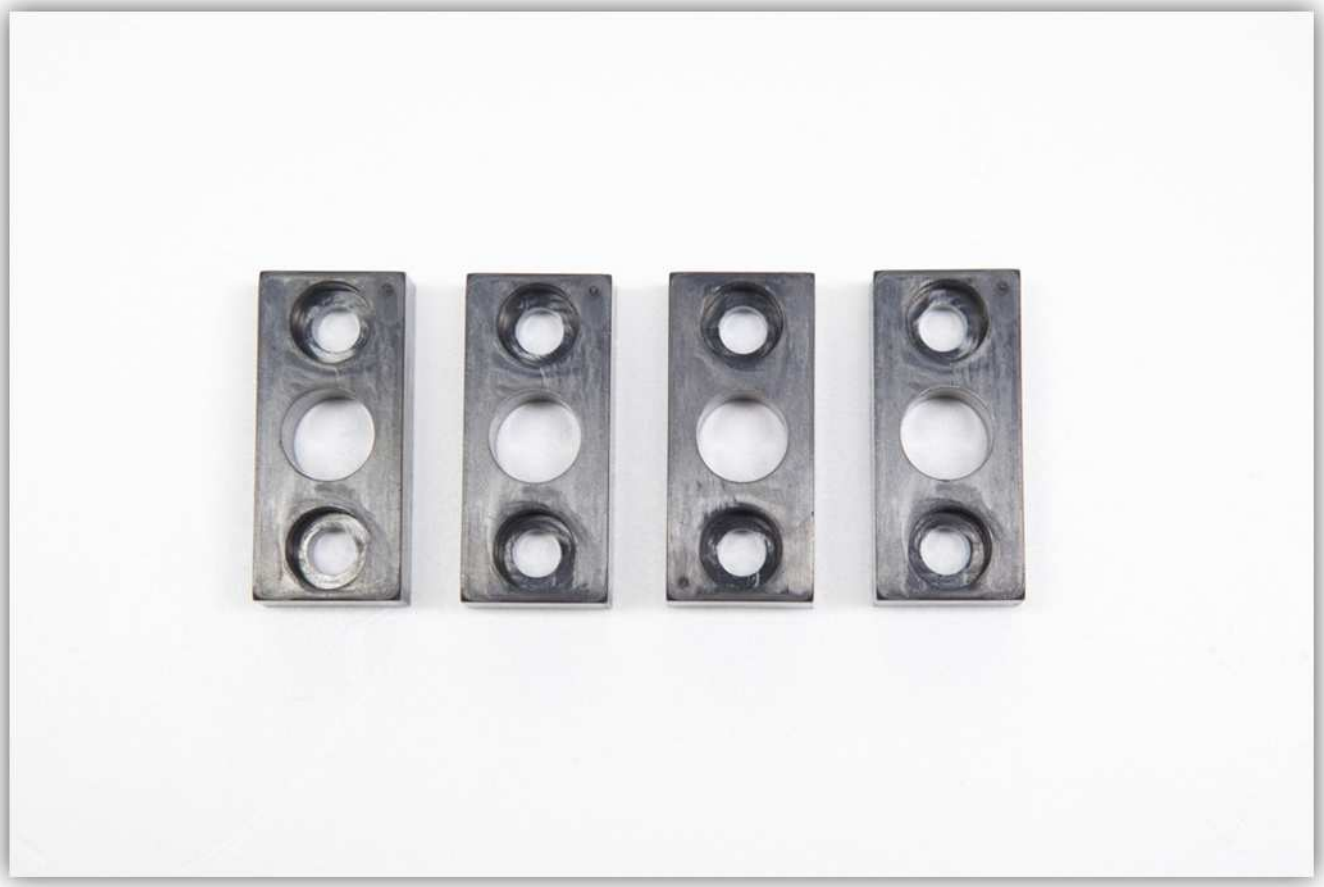
Take two rods out of the bag labelled with 7. These rods should have a diameter of 10 mm (0.39") and a length of 450 mm (17.7").

Slide the two rods into the linear bearings as shown in the pictures below:

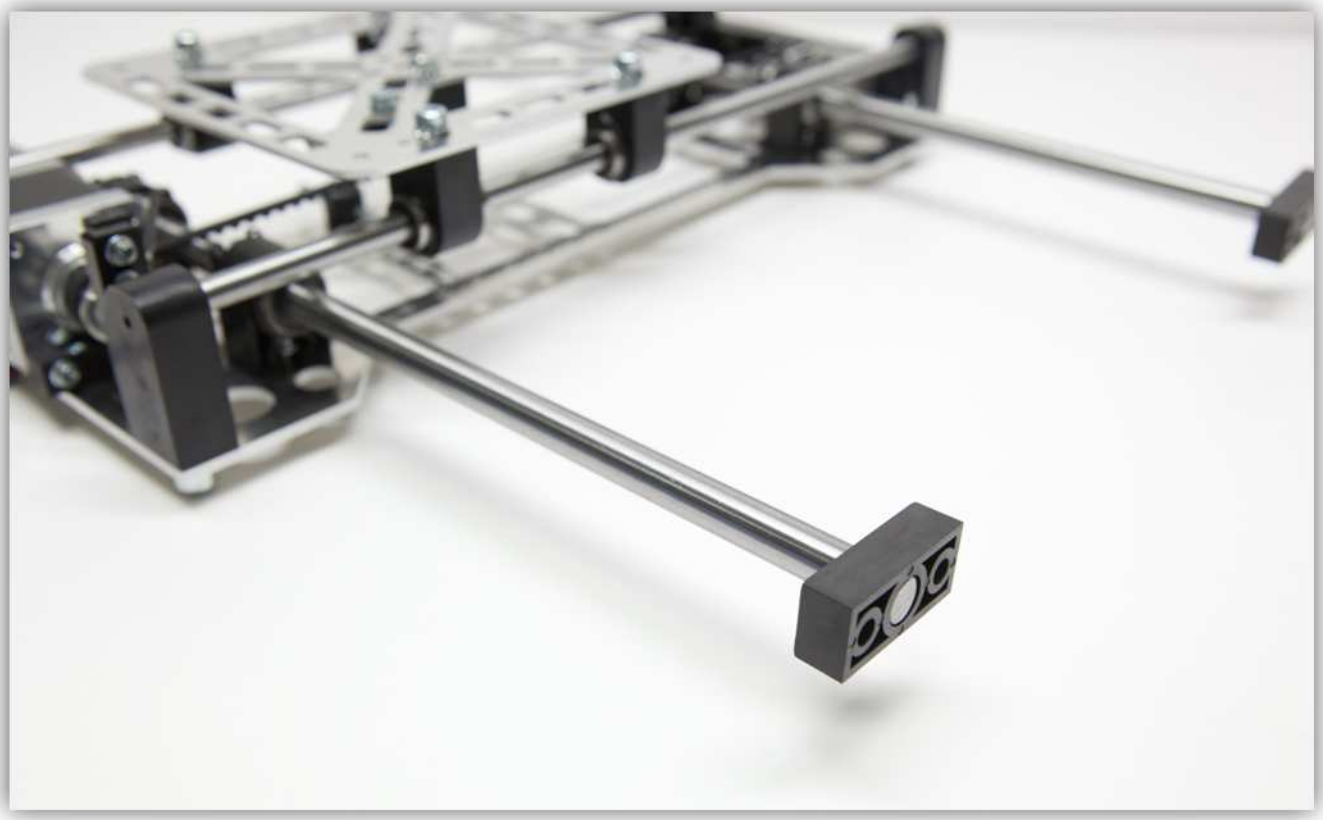


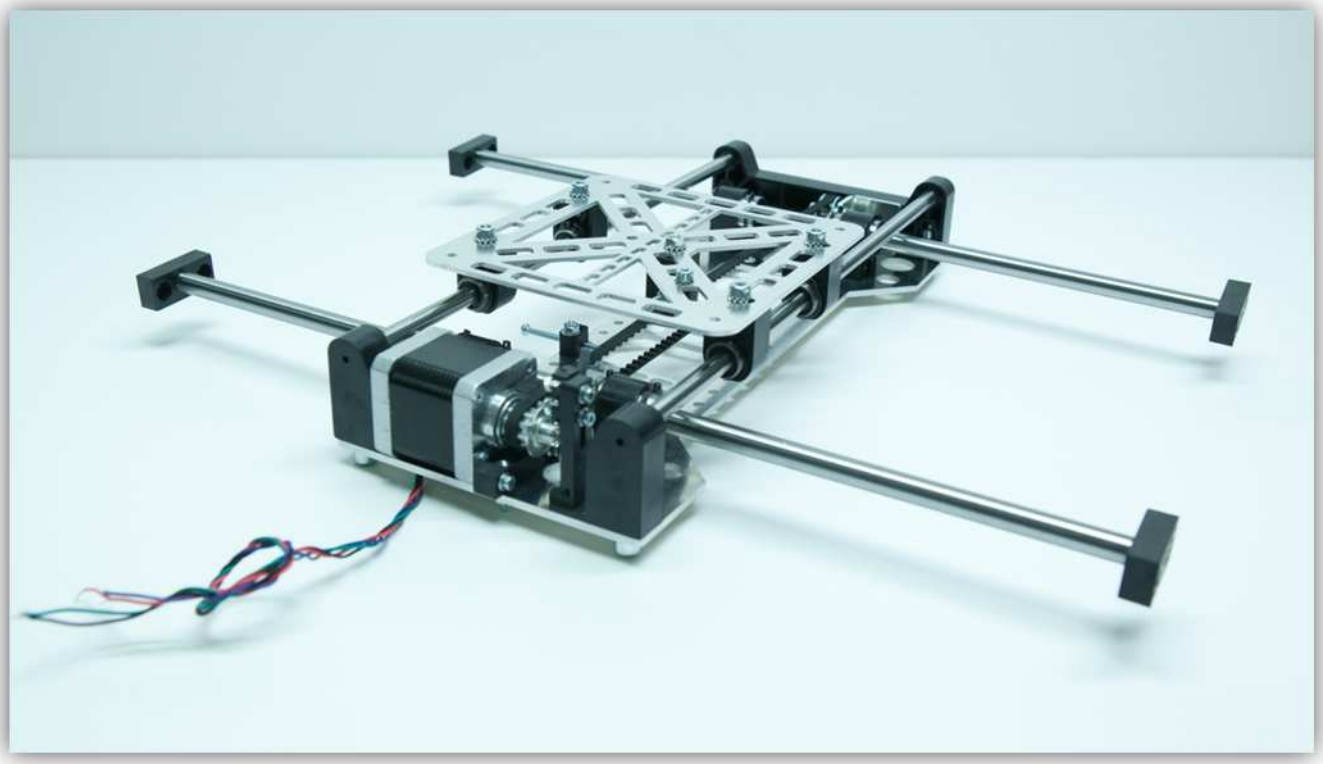


Now take 4 pieces as shown in the picture below out of the bag containing the plastic parts (ROD CLAMP X):



Slide the 4 ROD CLAMP X pieces over the ends of each rod.



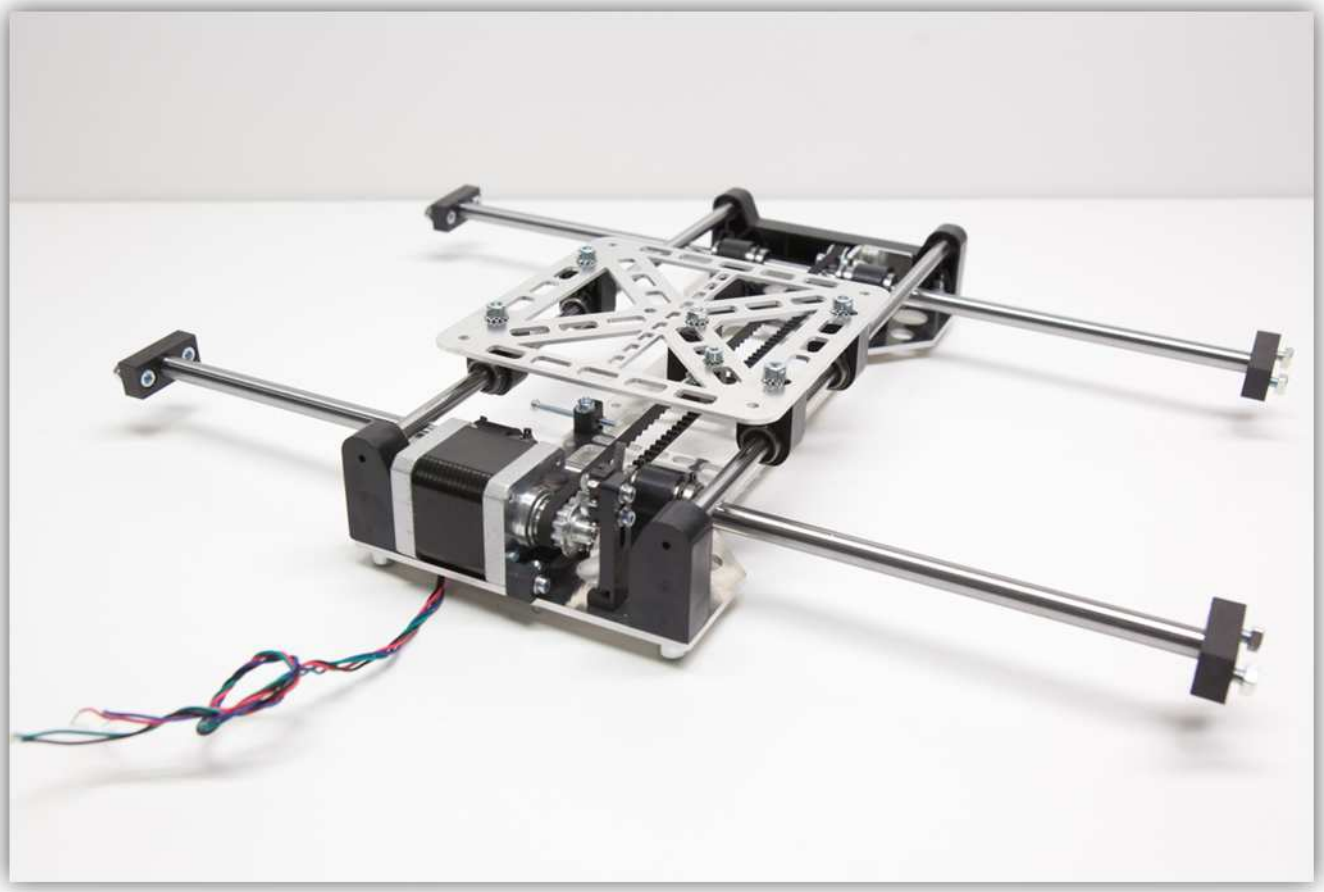


Take all the M5 bolts out of the bag labelled with 17.

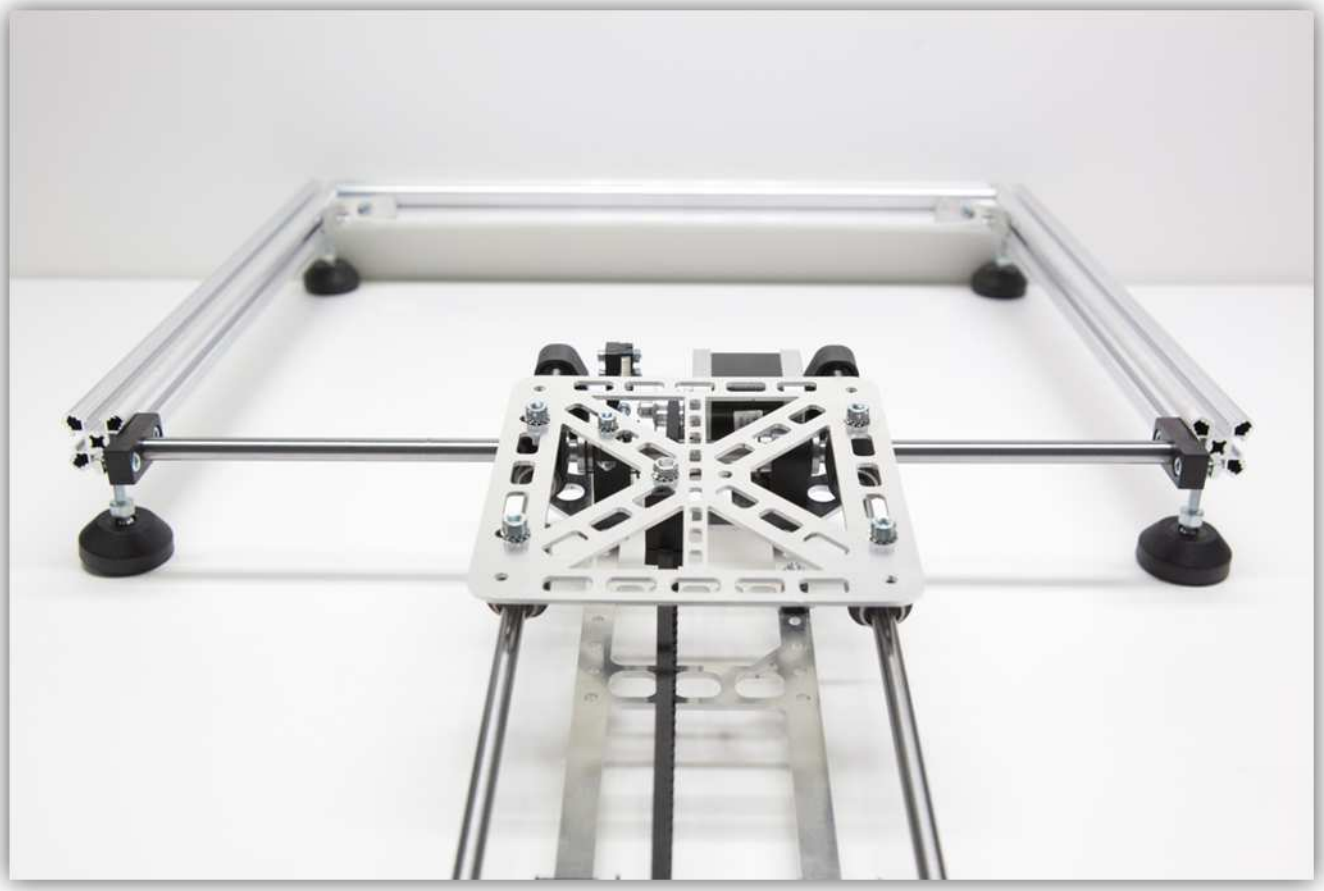
Insert these bolts in each of the ROD CLAMP X pieces as follows:

Screw an M5 square nut on each of the bolts. **Do not tighten these nuts.**

The X CARRIAGE should look like this:



Now slide the X CARRIAGE into the frame as shown in the pictures below. Do this with the side of the motor first.

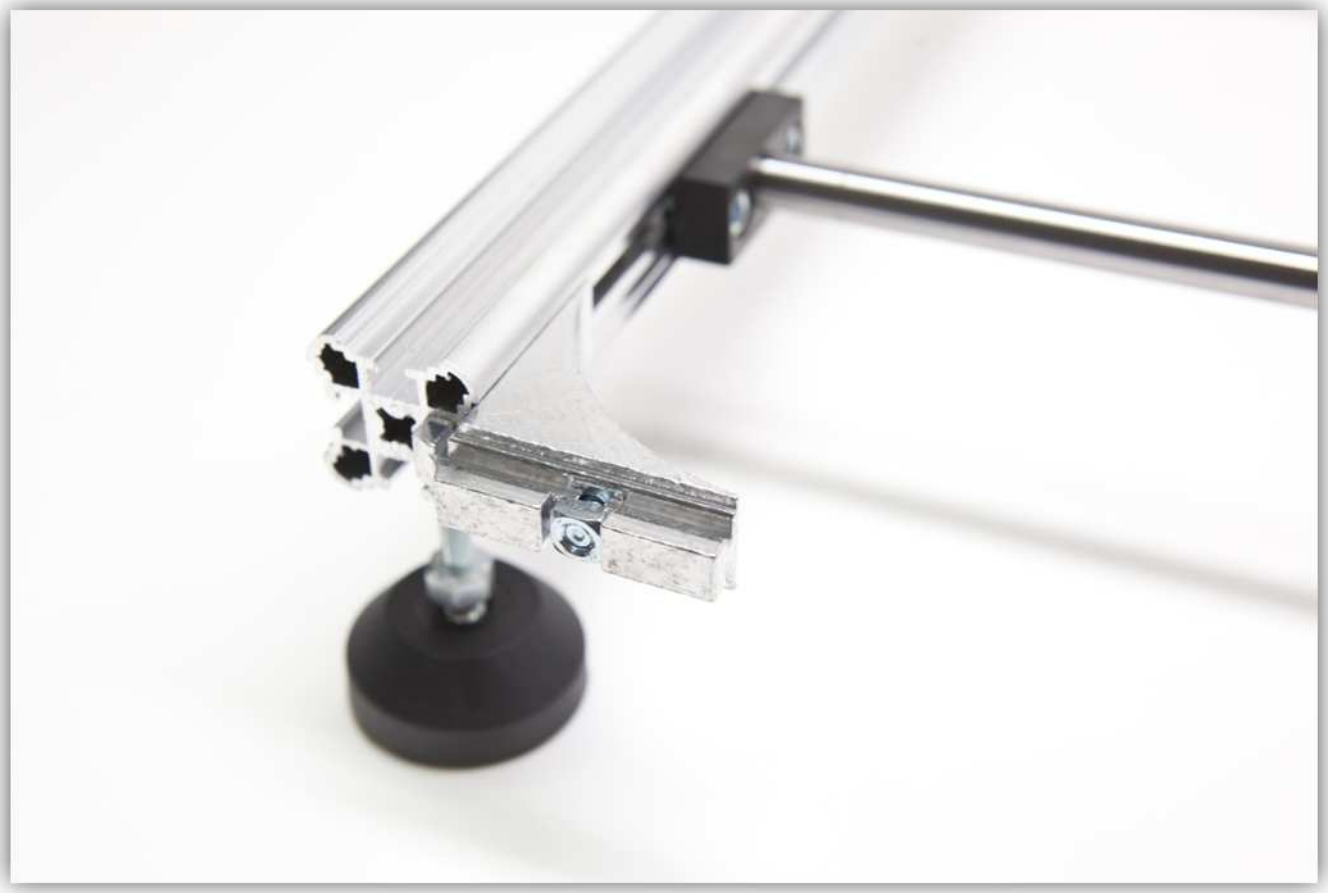


Now slide 2 square M5 nuts into the right ALUMINIUM PROFILE as shown:

Slide one square M5 nut into the left ALUMINIUM PROFILE as shown:

Slide the X carriage further until there is approx. 4 mm (0.16") between the first ROD CLAMP X piece and the ANGULAR MOUNT on the end of the frame. Make sure the X CARRIAGE is level and parallel inside the frame. Also check if the BEARING CLAMP X pieces are still in the right place. The bolts holding these pieces in place should still be just hand tightened.

Now slide an ANGULAR MOUNT on each ALUMINIUM bar on the open side of the frame.

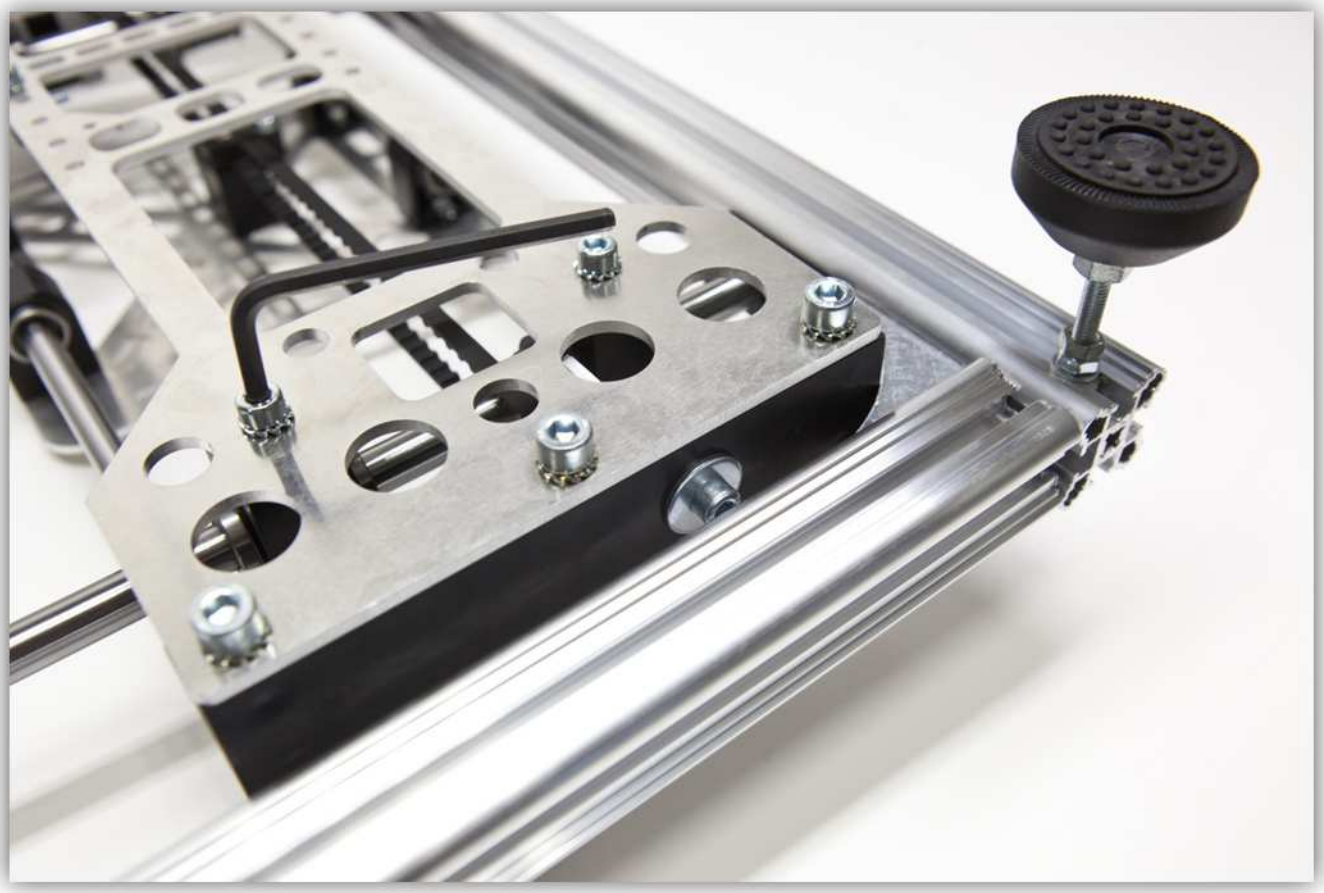


Take one ALUMINIUM PROFILE of 450 mm (17.7") out of the box and slide it down the two ANGULAR MOUNTS.

Now slide the ALUMINIUM PROFILE and the 2 ANGULAR MOUNTS inside the frame.

If the ALUMINIUM PROFILE is flush with the rest of the frame you can tighten all the bolts of the ANGULAR MOUNTS.

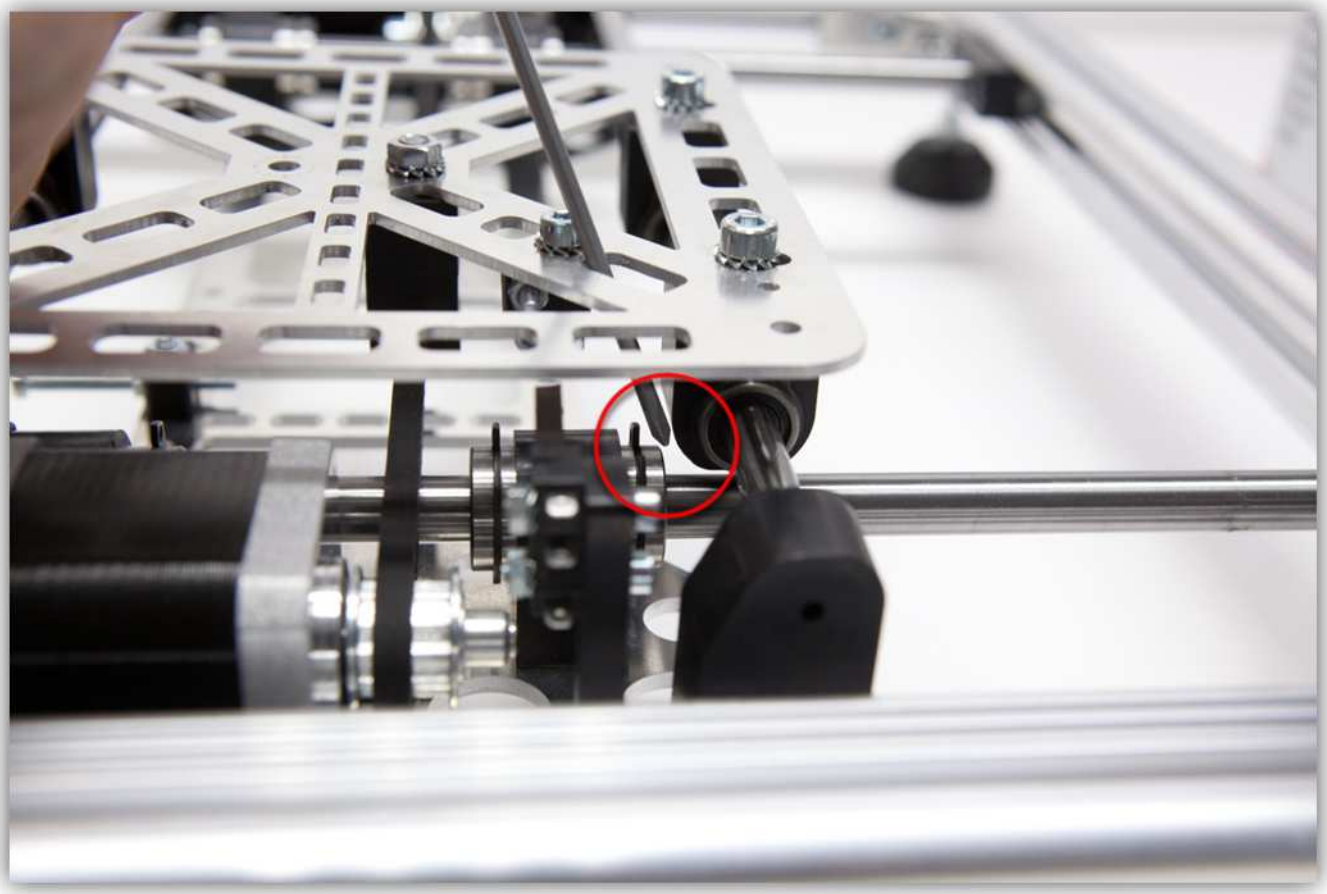
Now after making sure that the BEARING CLAMP X pieces are still in the right place, you can tighten these bolts holding them in place. Make sure the X CARRIAGE can move freely.

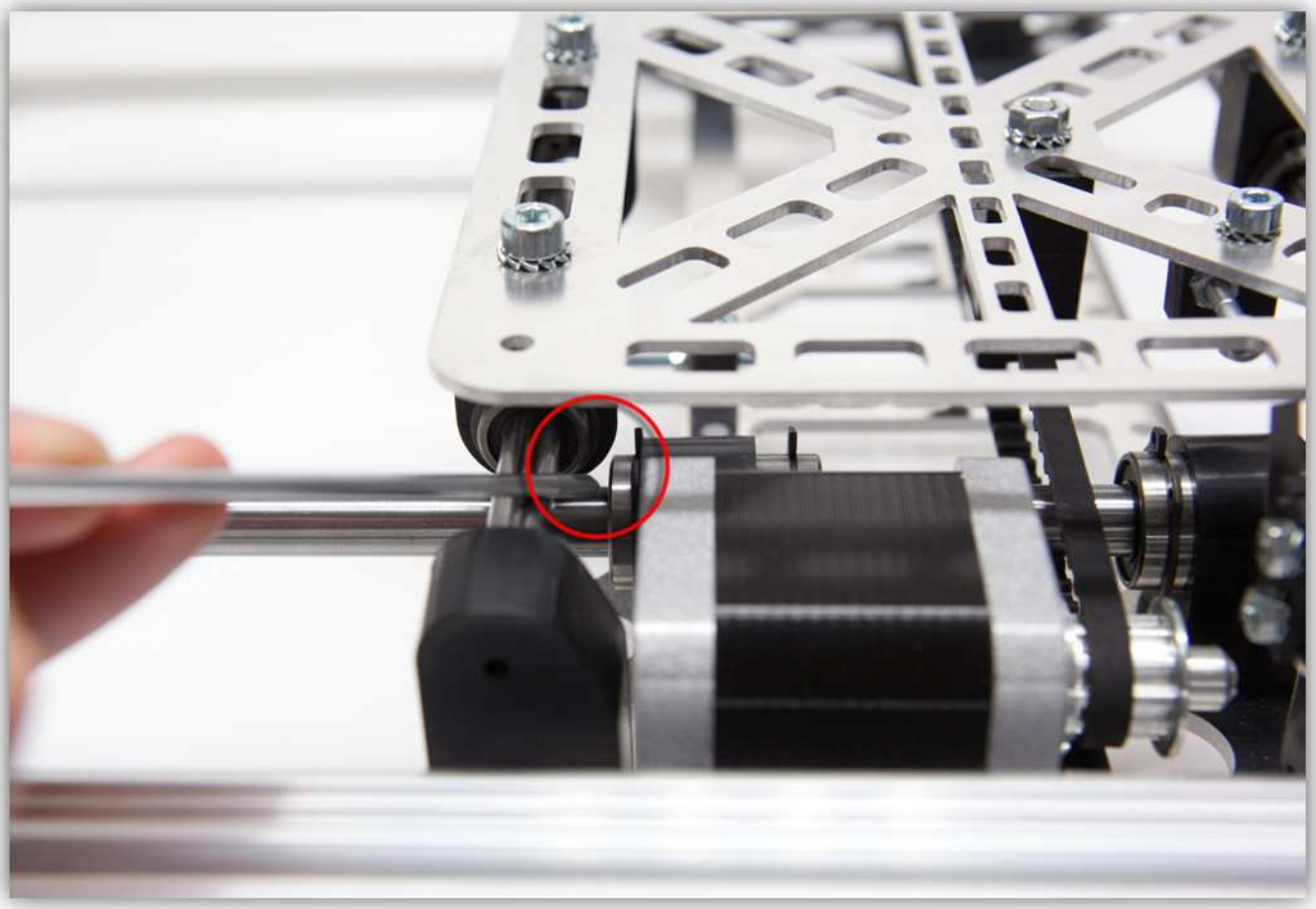


Check if the X CARRIAGE is centred, you should measure approx. 93.50 mm (3.68") on each side.

Now tighten the bolts on de ROD CLAMP X pieces securing the X carriage in place.

Make sure you have enough clearance between the BEARING CLAMP Y pieces and the LINEAR BEARINGS in the BEARING CLAMP X pieces. You can slide these bearings a few millimetres out of the way when there is not enough clearance. The 2 carriages should now move freely along the full length of all the rods.





004 – ASSEMBLING THE LEFT UPRIGHT OF THE FRAME

Take one ALUMINIUM PROFILE of 500 mm (19.7") out of the box.

Slide two ANGULAR MOUNTS (from the box) in the end of the ALUMINIUM PROFILE of 500 mm (19.7").

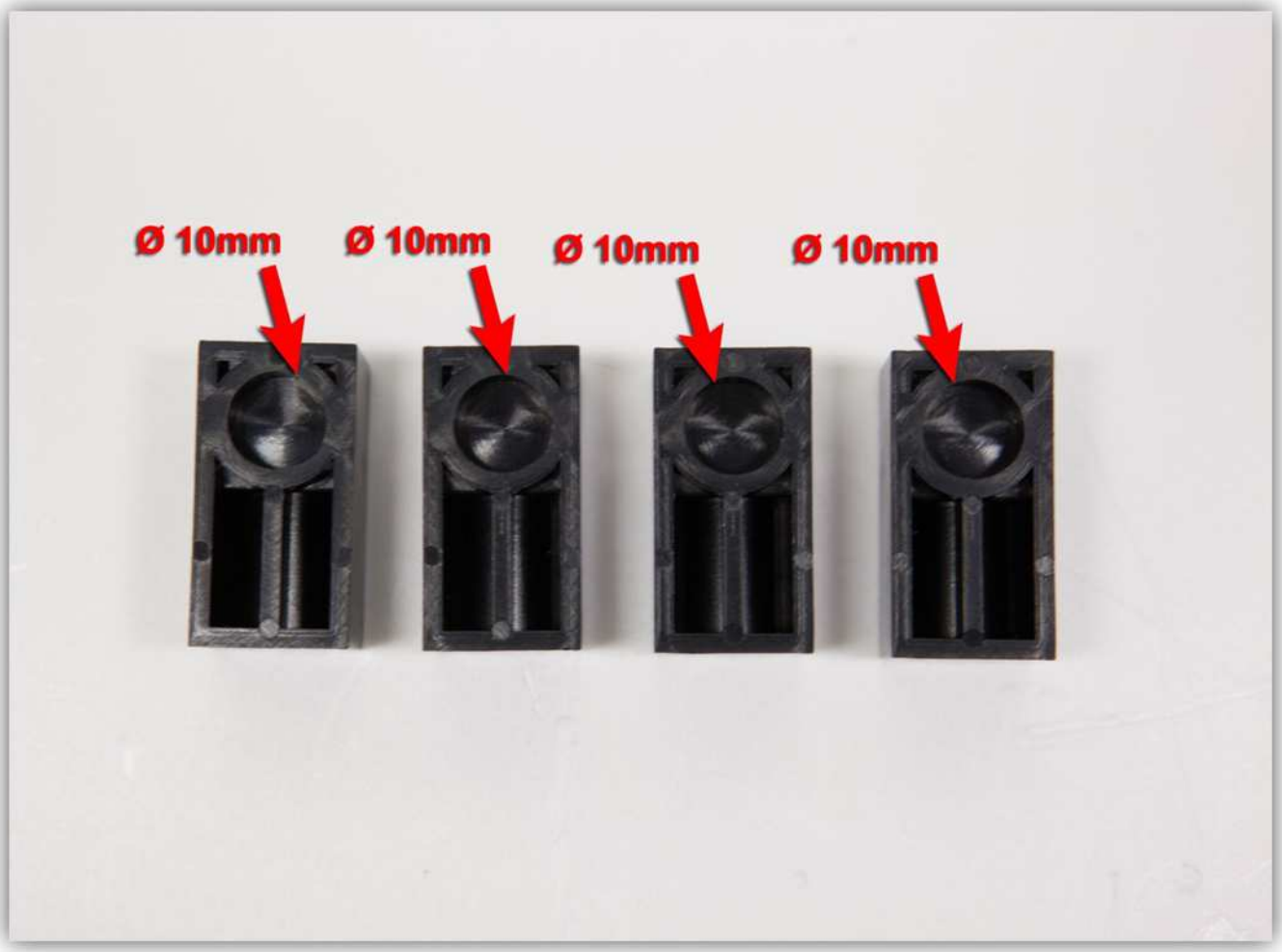
Slide this assembly in the left profile of the BASE FRAME.

Slide it further down the profile until its centre is at 16 cm (6.3") from the edge of the base frame.

Tighten the bolts on the ANGULAR MOUNTS.

Take all the parts out of the bag labelled with 21.

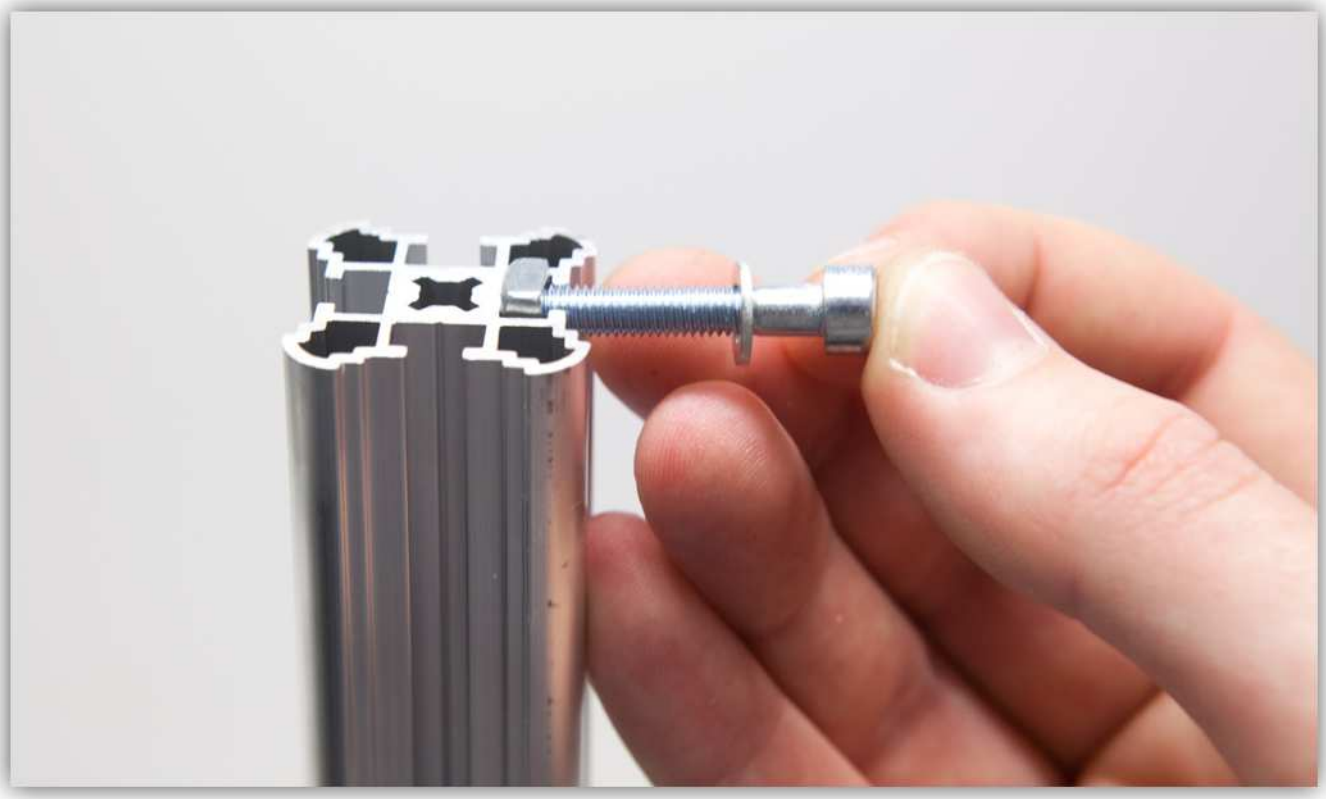
Now take 4 pieces as shown in the picture below out of the bag containing the plastic parts (ROD CLAMP Z BIG). Notice how the round hole must be 10 mm (0.39") in diameter.

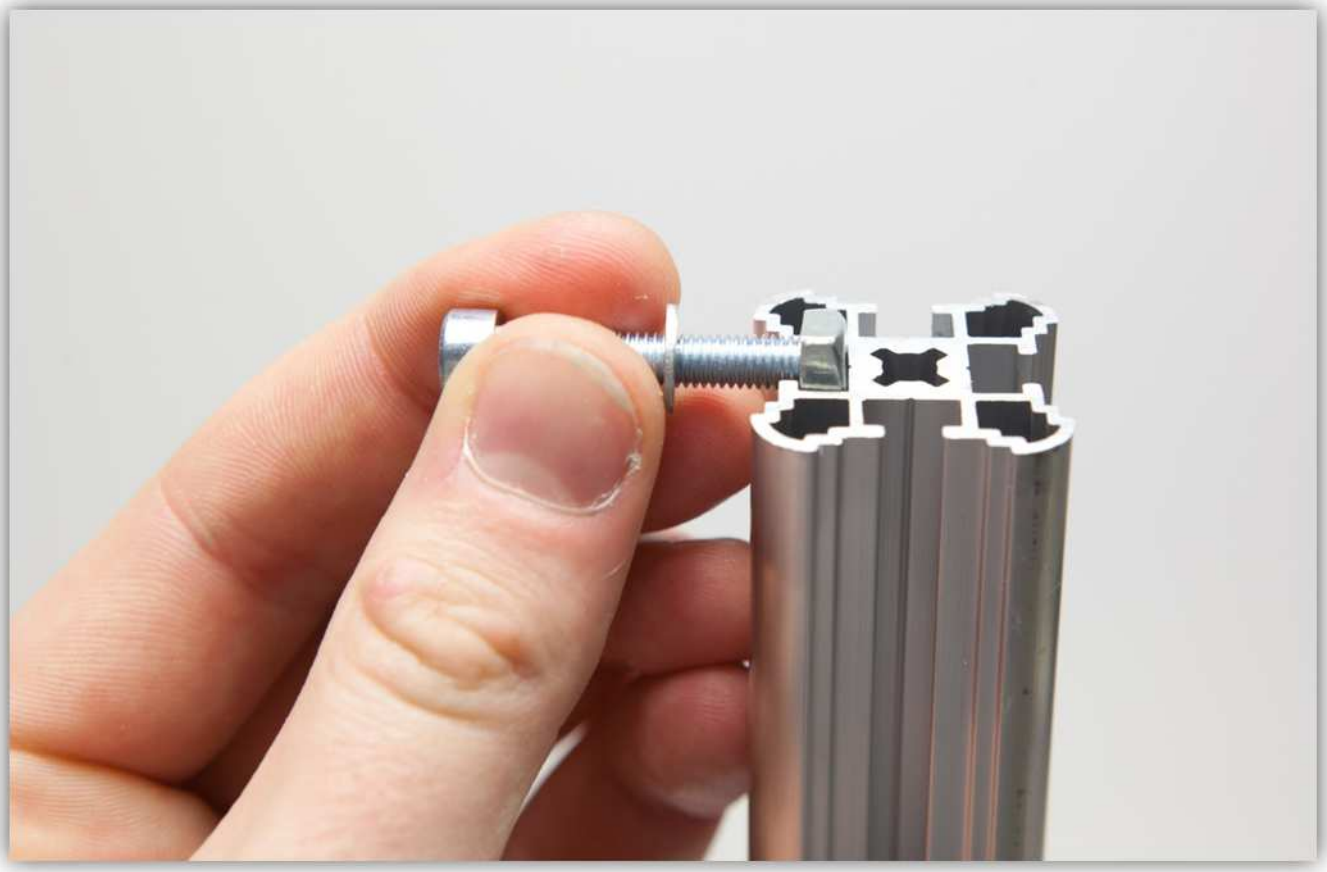


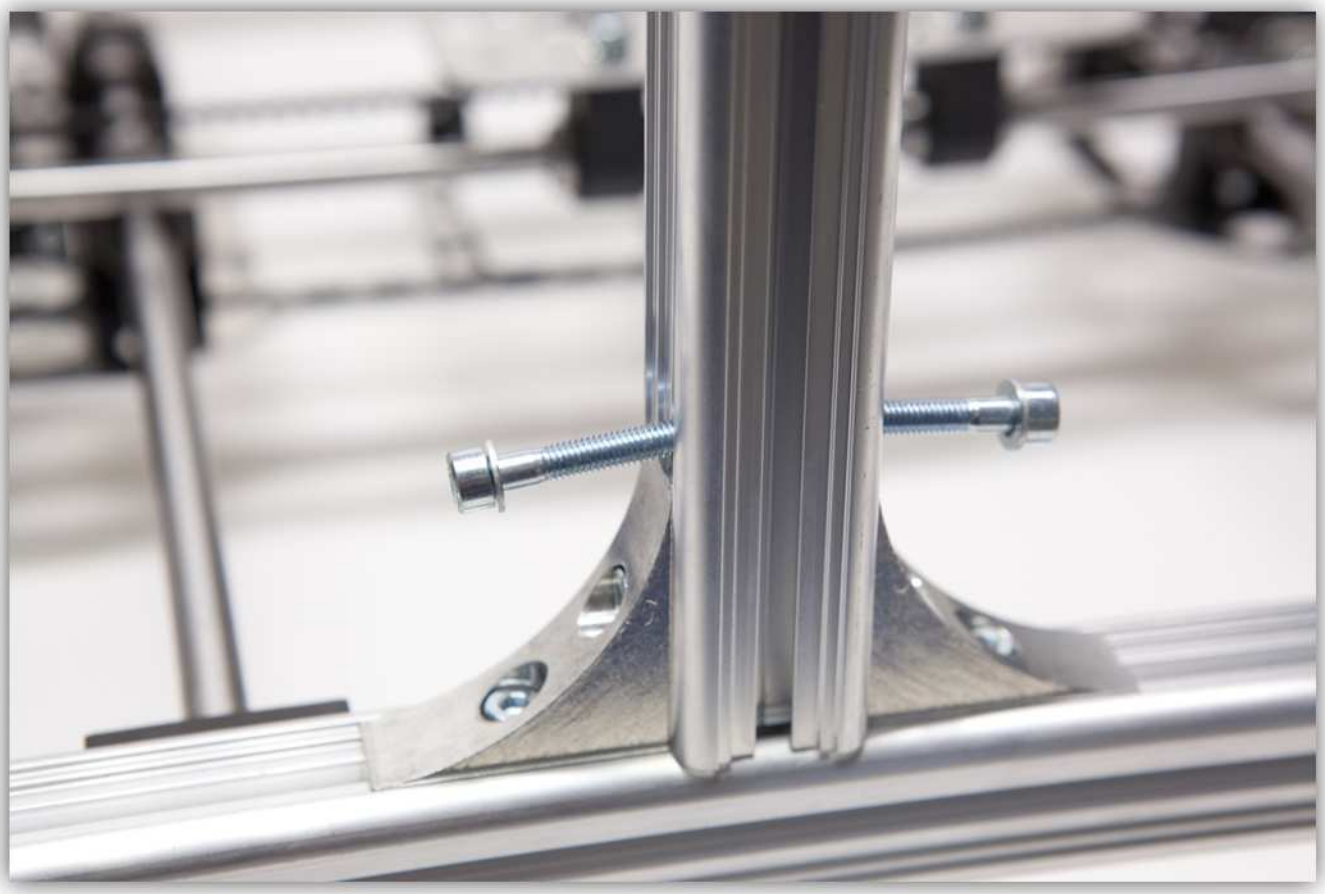
Take two rods out of the bag labelled with 7. These rods should have a diameter of 10 mm (0.39") and a length of 345 mm (13.6").

Use 4 square M5 nuts to assemble the following:

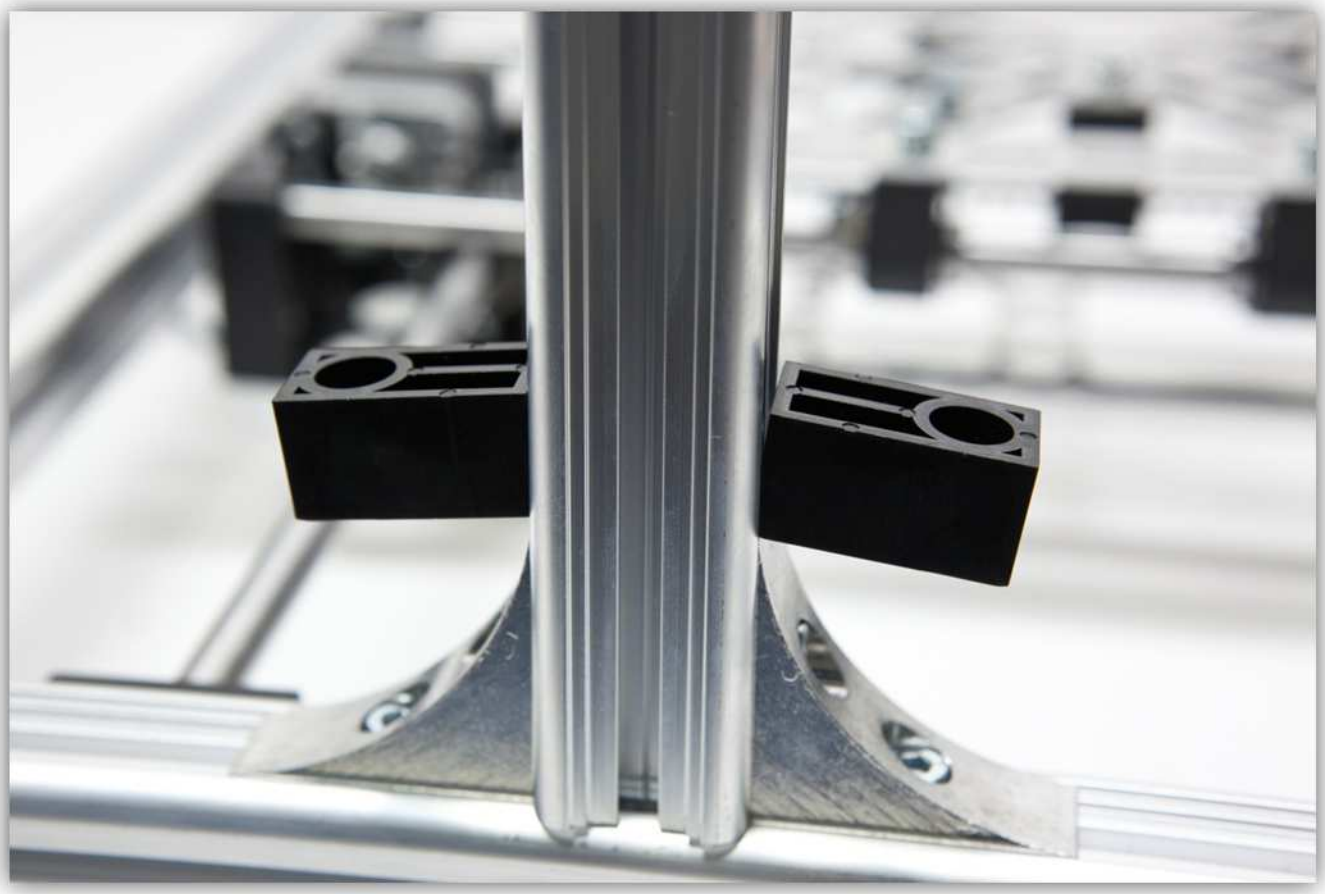
Slide 2 of these down the left upright ALUMINIUM PROFILE as shown in the pictures below:





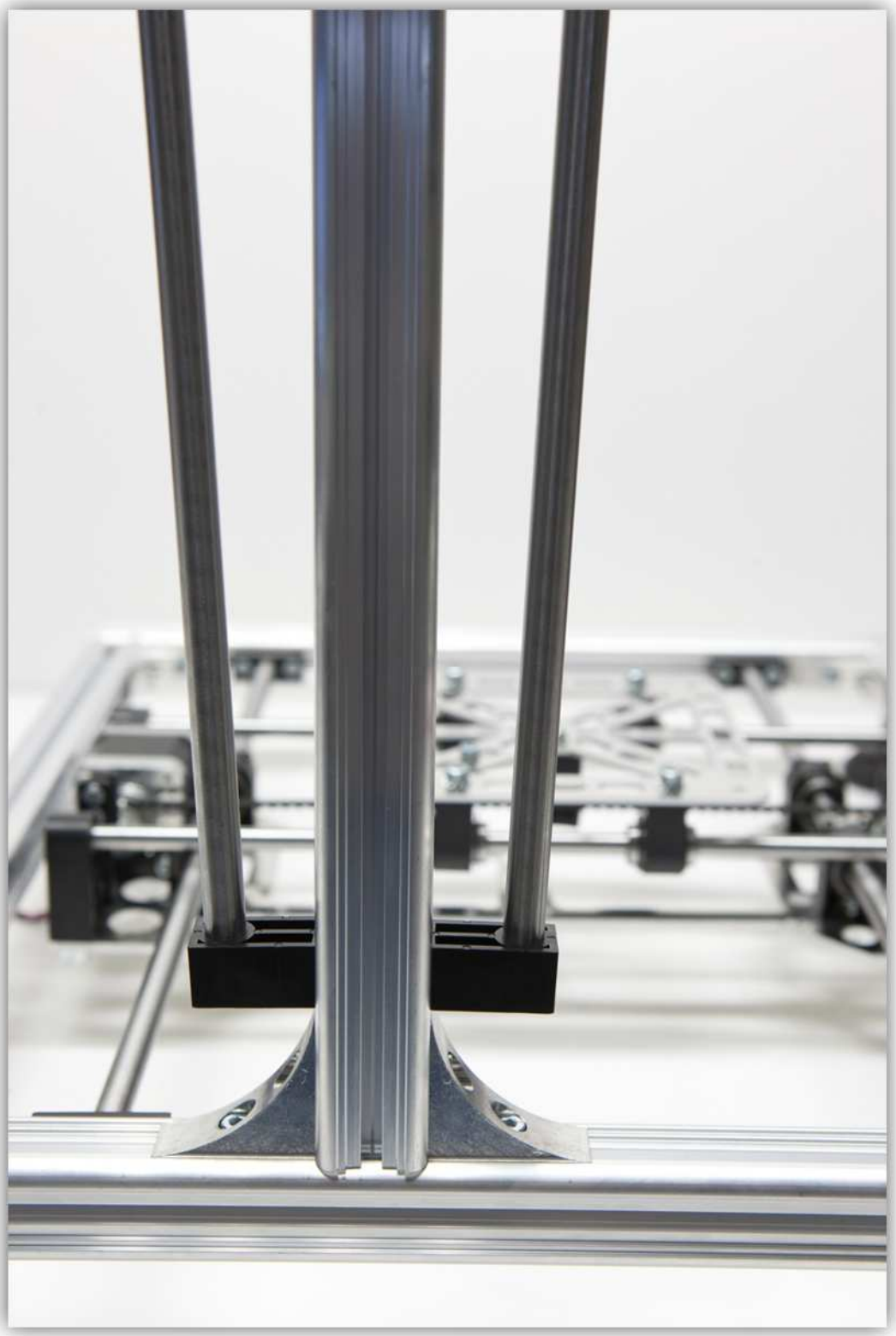


Now slide two ROD CLAMP Z BIG pieces over the bolts as shown in the pictures below.

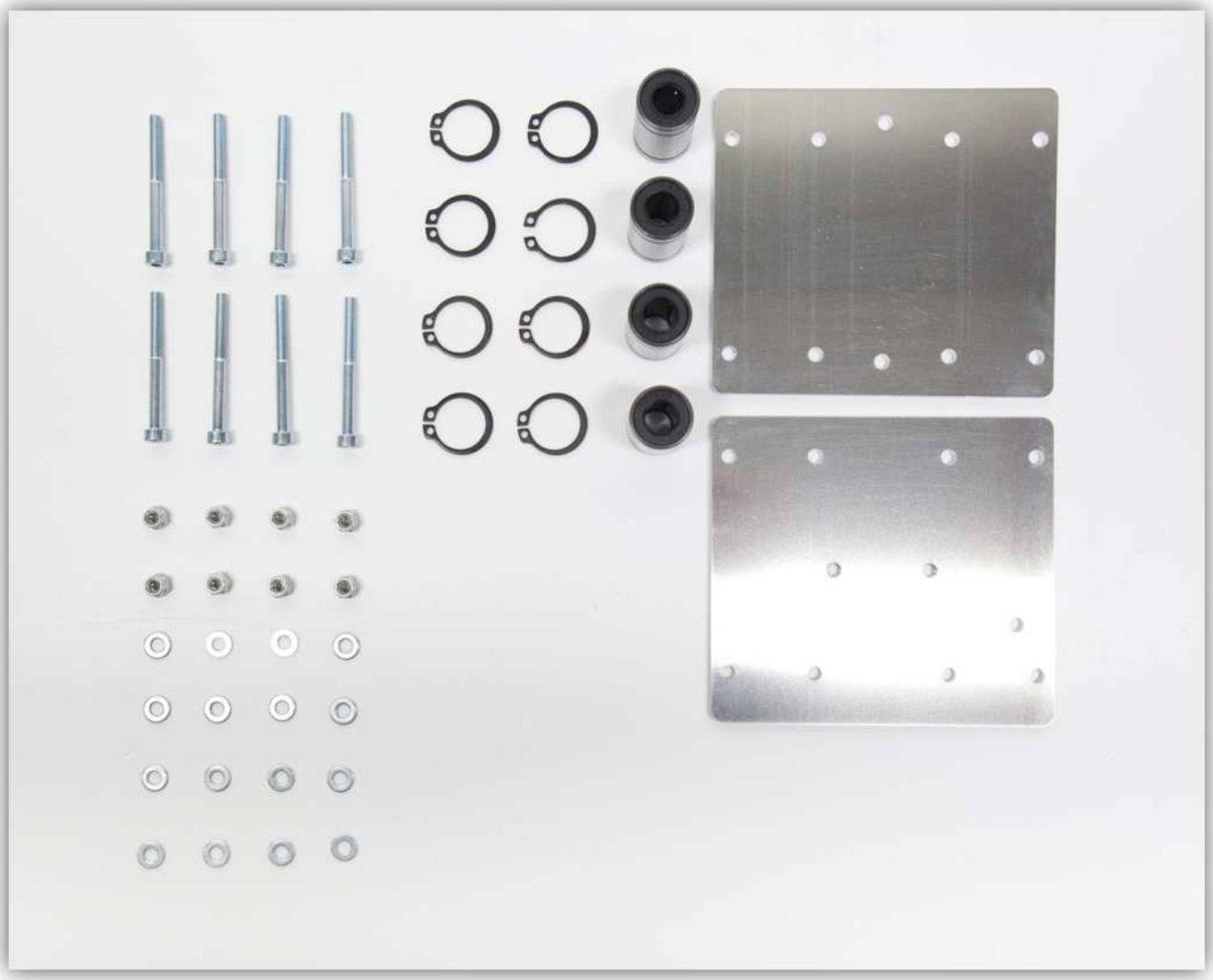


Make sure that the ROD CLAMP Z BIG pieces are as far down as possible and then tighten the bolt. **Do not over tighten this bolt.**

Put the two rods in the ROD CLAMP Z BIG pieces.



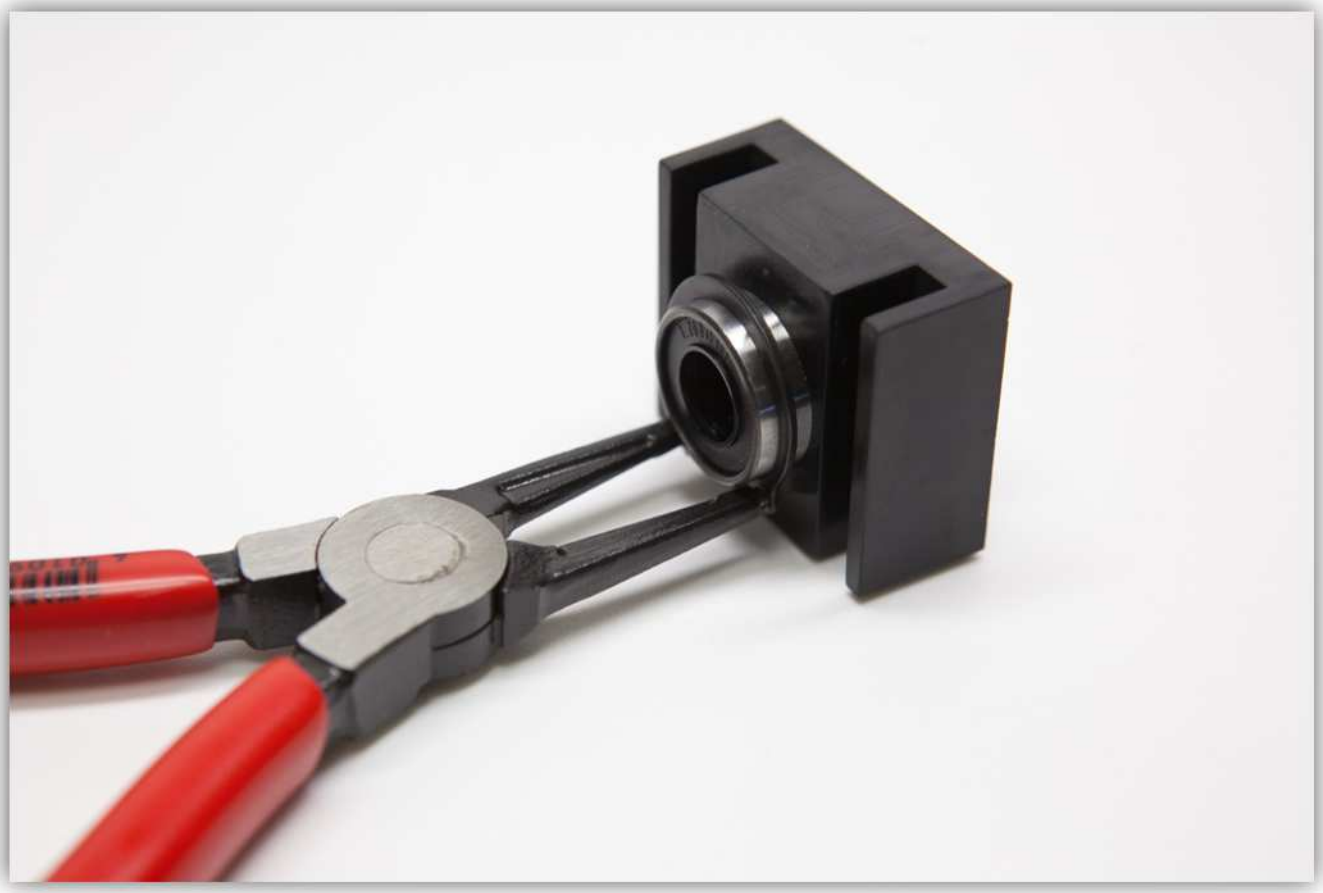
Take all the parts out of the bag labelled with 19.



Now take 4 pieces as shown in the picture below out of the bag containing the plastic parts (BEARING CLAMP Z BIG).

Slide 4 linear bearings into the 4 BEARING CLAMP Z BIG pieces.

Use the circlip pliers to carefully fit the circlips around the both sides of the 4 LM10UU LINEAR BEARINGS.



Take all the parts out of the bag labelled with 20.

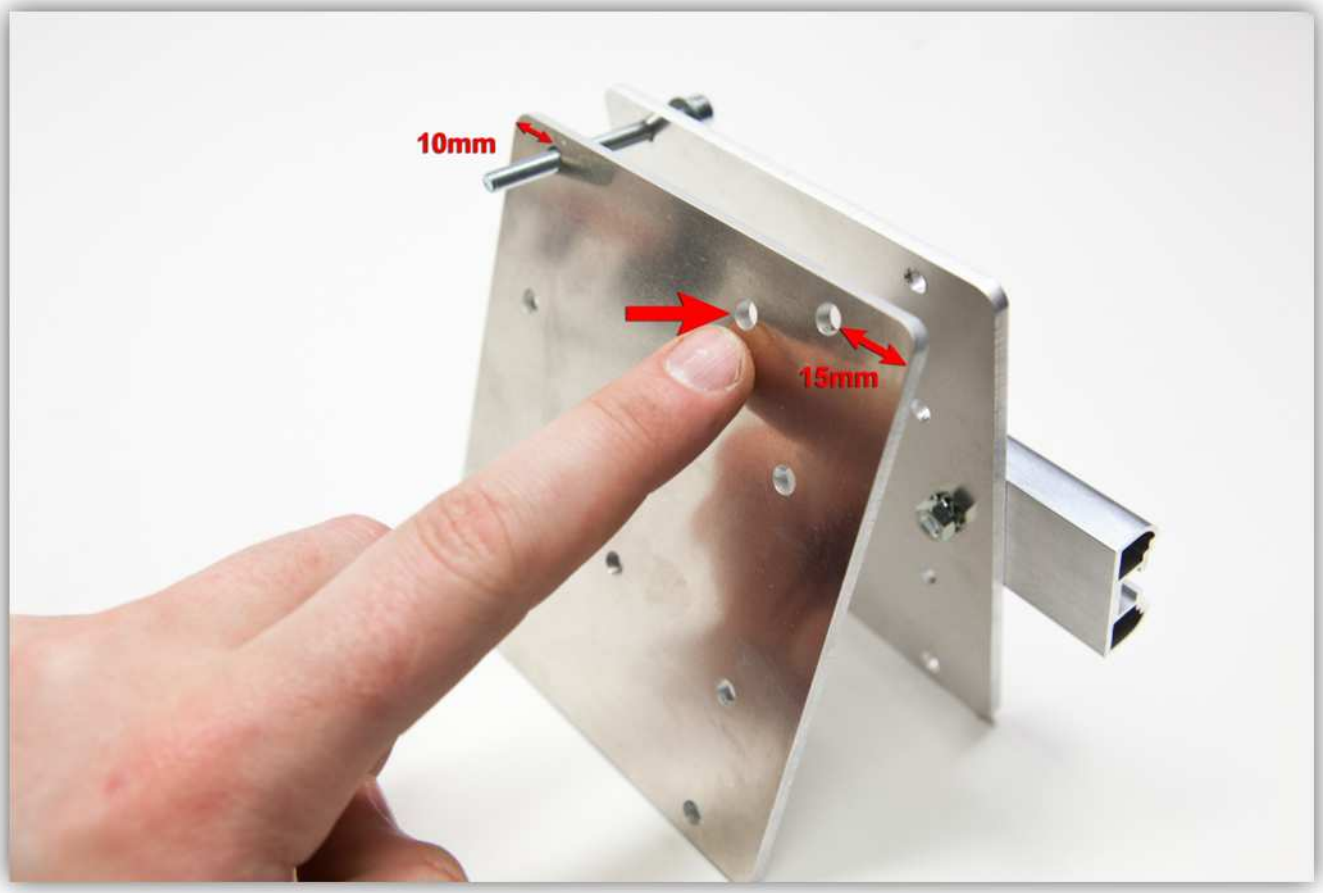
Use the 2 M4 countersunk screws to attach the small ALUMINIUM PROFILE to the Z CARRIAGE FRONT piece.

Note the red markings. Make sure the orientation is correct.

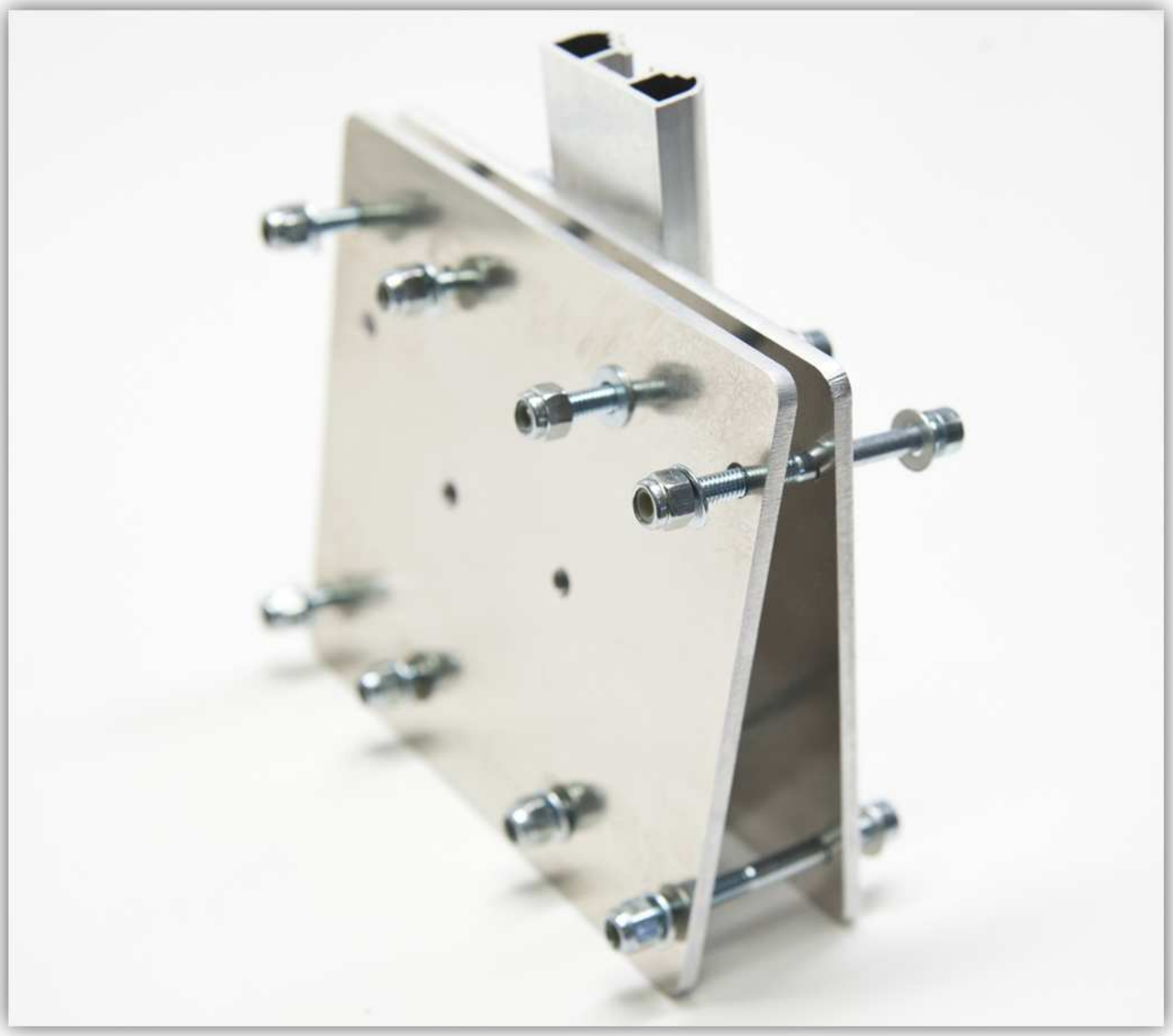
Use the M4 nuts and M4 toothed washers as shown in the picture below:

Slide an M4 washer over the long M4 bolt. Repeat this 8 times.

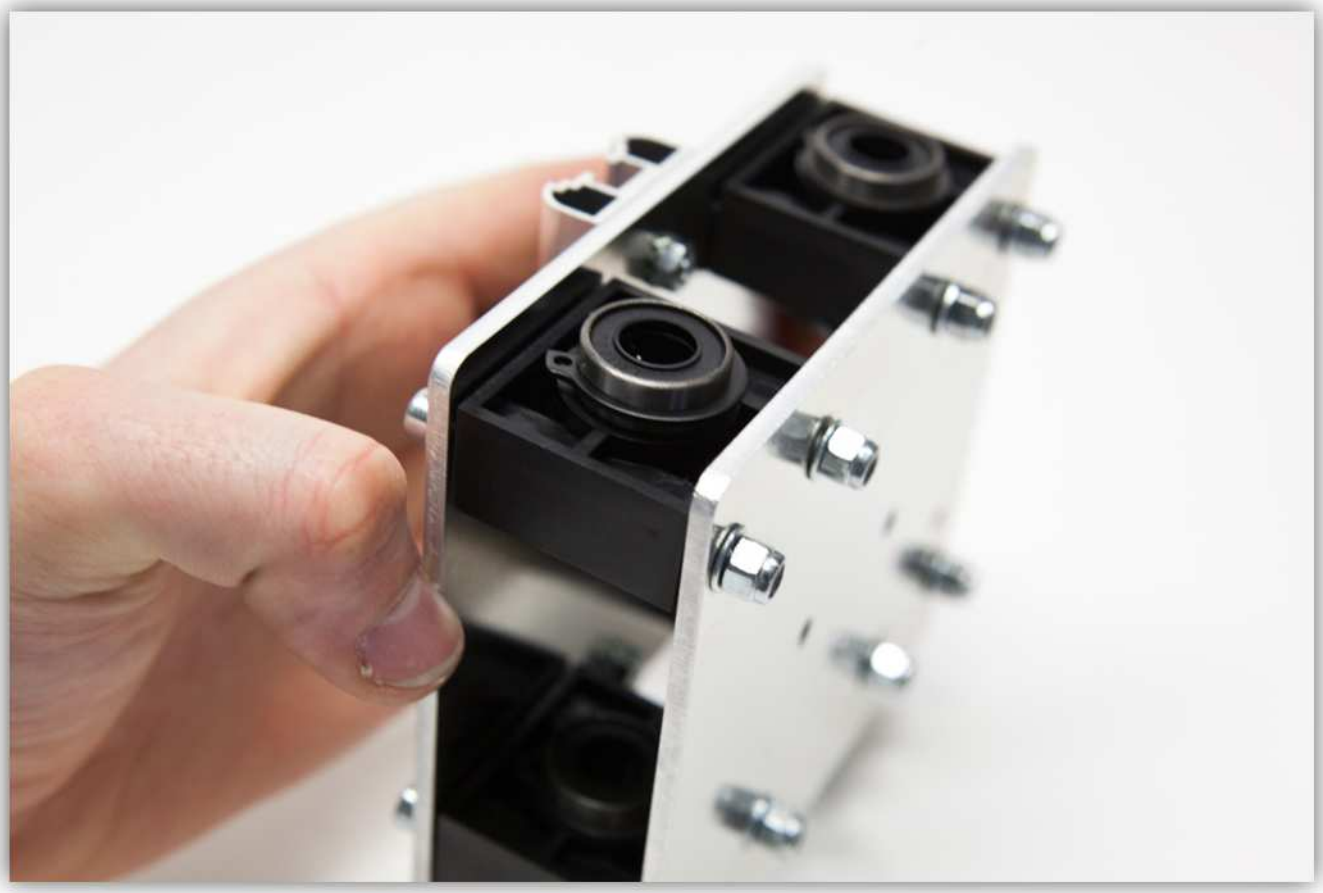
Slide the bolt with washer through then Z CARRIAGE FRONT piece and the Z CARRIAGE back piece. **Make sure that the orientation of the pieces is exactly as in the picture (watch the red arrows carefully).**



Put the remaining bolts in place and use an M4 washer and an M4 locking nut on each bolt. **Do not tighten the bolts.**

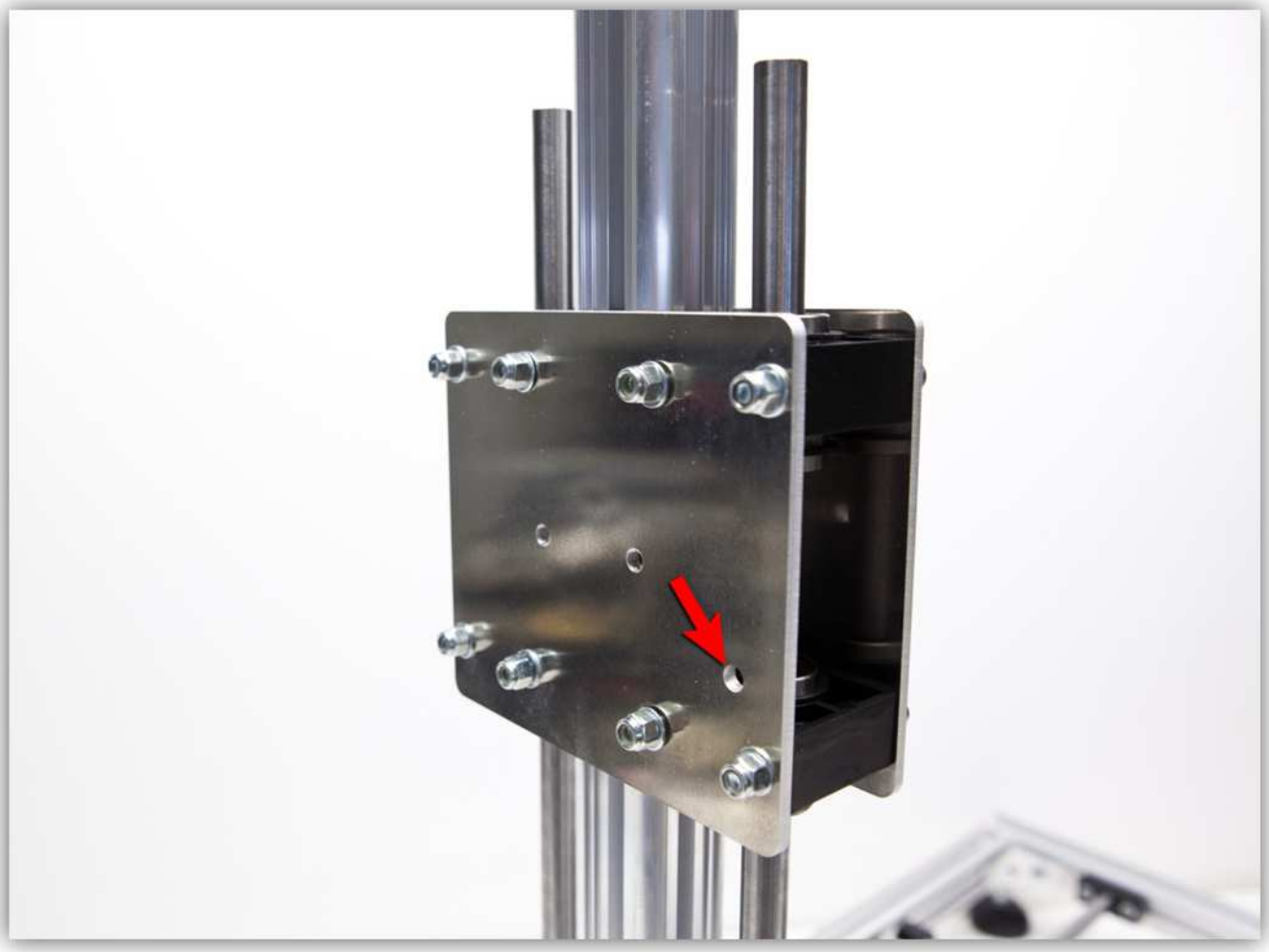


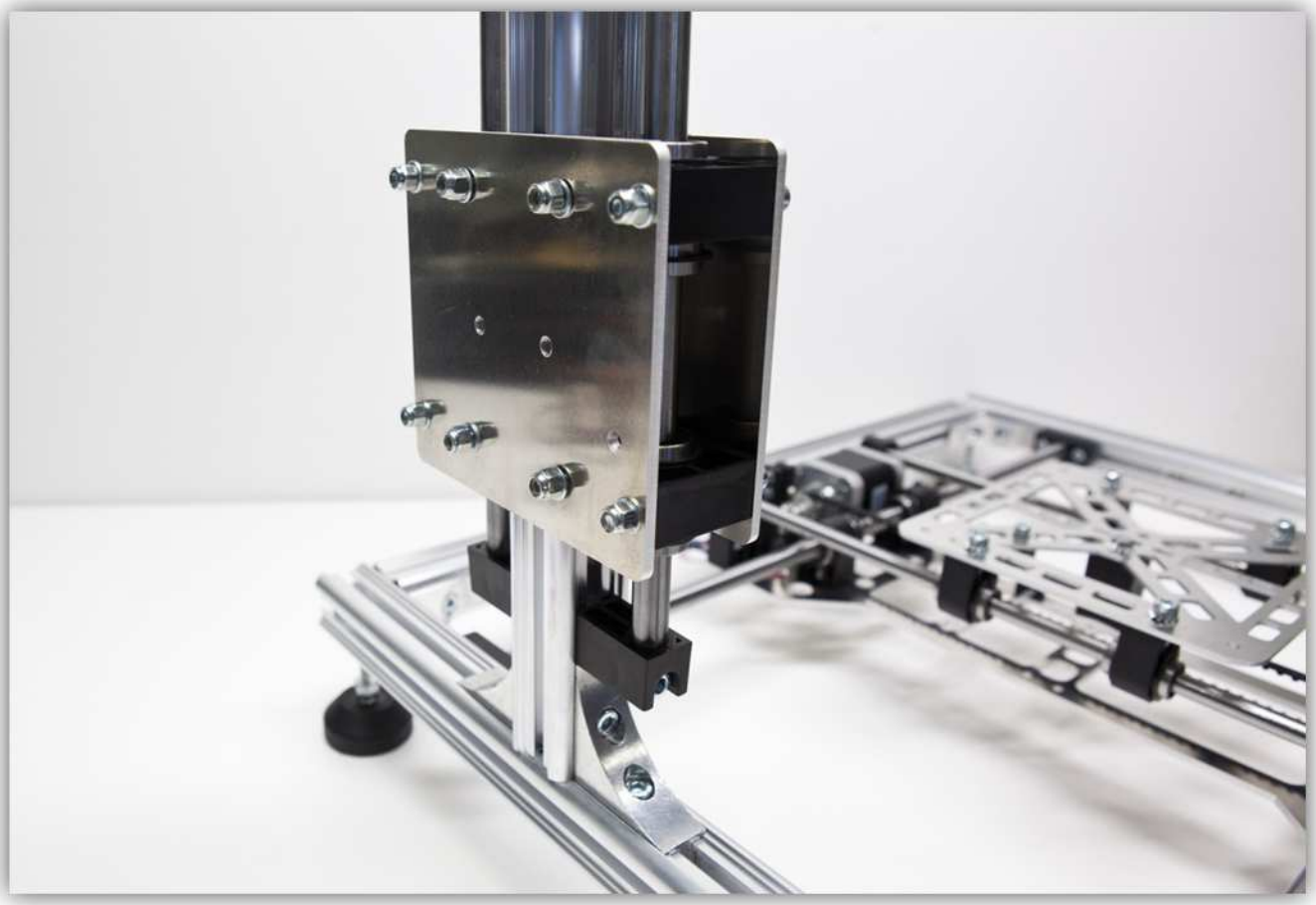
Slide the 4 BEARING CLAMP Z BIG pieces between the 2 aluminium plates and over the bolts.



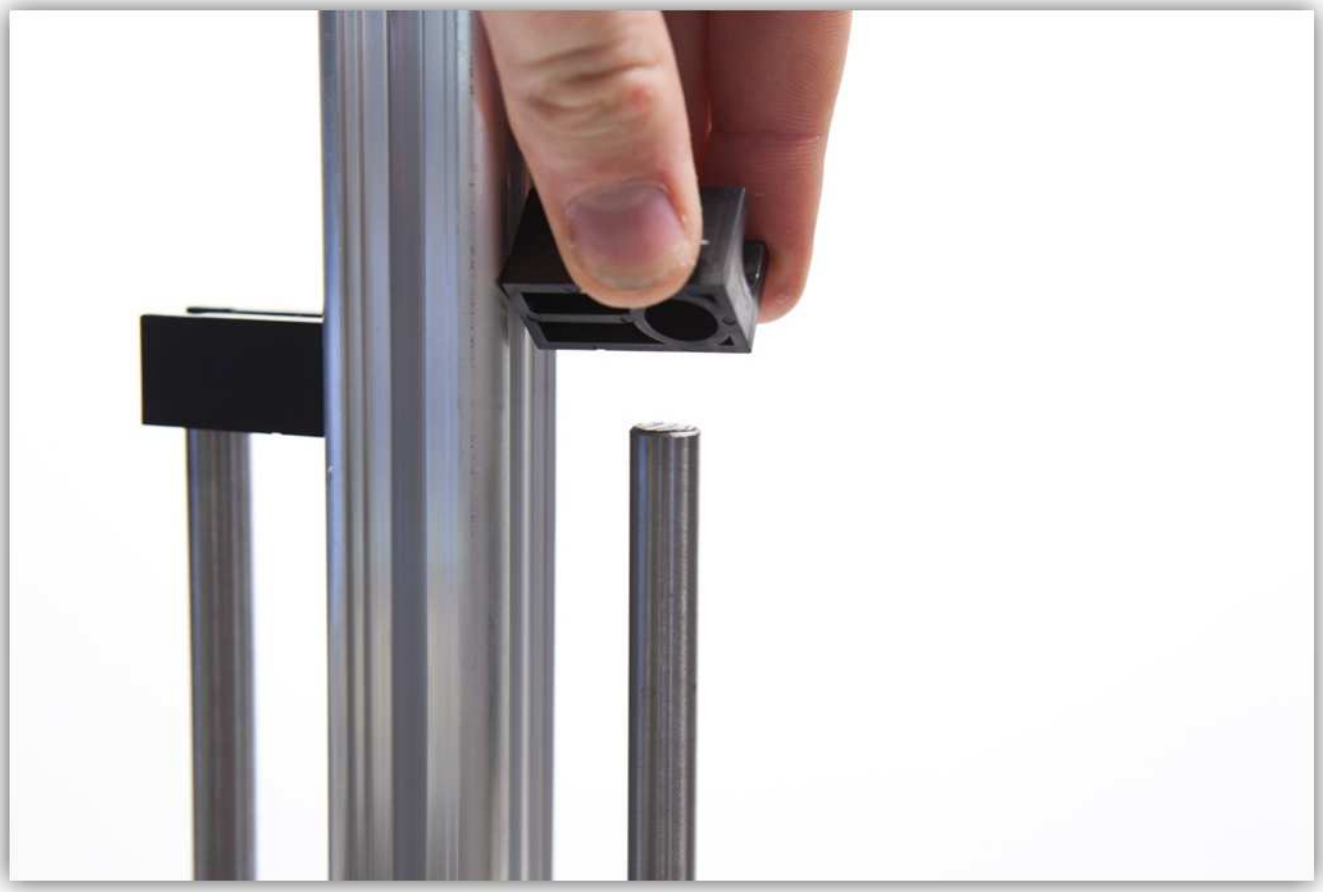
Slightly tighten the bolts. We will fully tighten these bolts at a later step in the building process.

Slide this assembly over the upright 2 rods. **Pay attention to the orientation.**



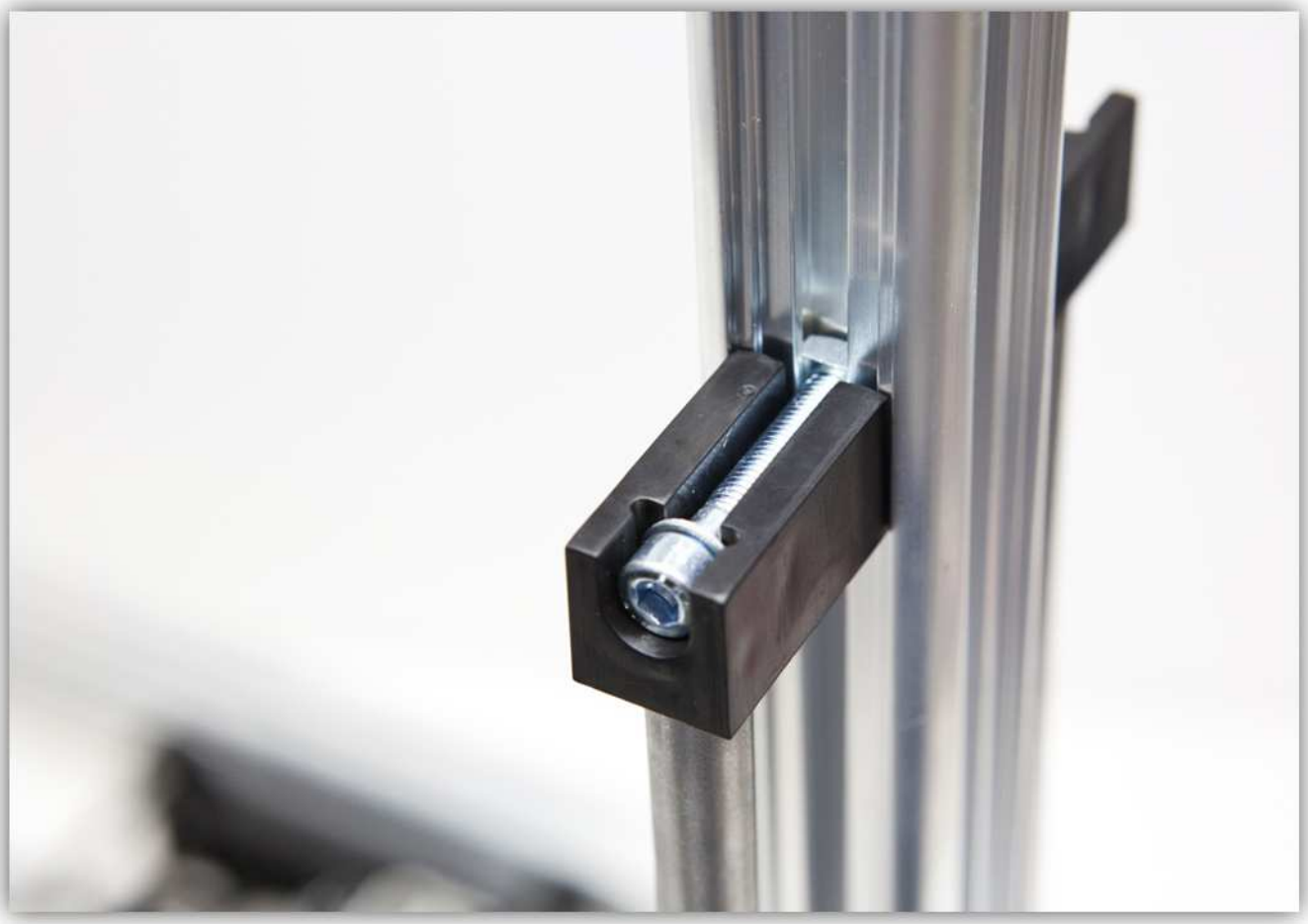


Now slide the two remaining ROD CLAMP Z BIG pieces over the rods.



Take two of these bolts you assembled earlier:

Slide these bolts in the upright profile so they fit in the ROD CLAMP Z BIG pieces.



Tighten these bolts. **Do not over tighten.**

Making sure that this Z CARRIAGE can move freely up and down, you can firmly tighten all the bolts that were previously only slightly tightened.

005 - ASSEMBLING THE RIGHT UPRIGHT OF THE FRAME

Take one ALUMINIUM PROFILE of 500 mm (19.7") out of the box.

Slide two ANGULAR MOUNTS (from the box) in the end of the ALUMINIUM PROFILE of 500 mm (19.7").

Slide this assembly in the right profile of the BASE FRAME. Slide it down the profile until its centre is at 16 cm (6.3") from the edge of the base frame.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NYLON COAT


UK/0126/00019
NYLON COAT

Tighten the bolts on the ANGULAR MOUNTS.

Take all the parts out of the bag labelled with 22.

Now take the piece as shown in the picture below out of the bag containing the plastic parts (BEARING CLAMP Z SMALL).

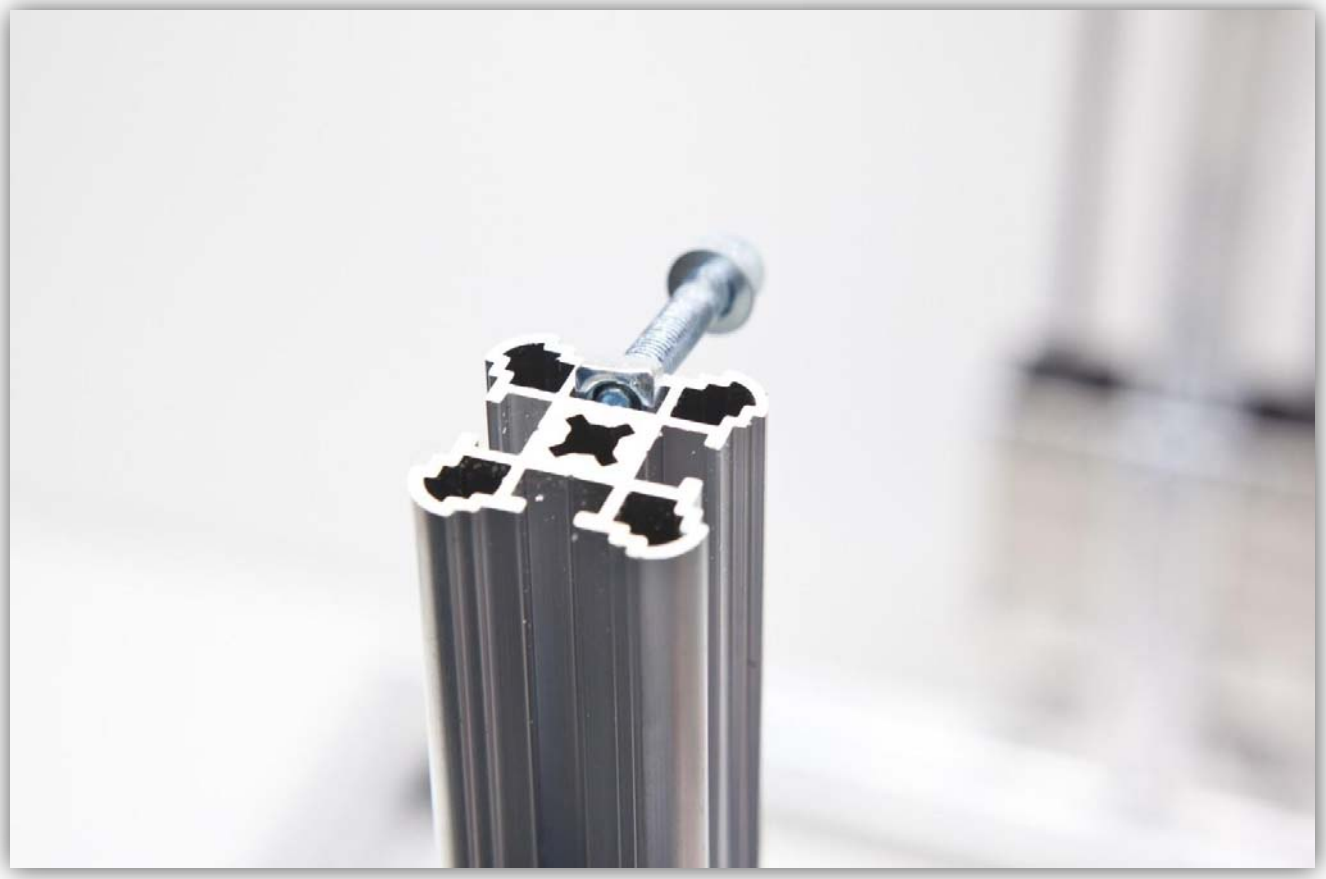
Take all the parts out of the bag labelled with 23.

Take a rod out of the bag labelled with 7. This rod should have a diameter of 8 mm (0.39") and a length of 300 mm (11.8").

Now take the 2 pieces as shown in the picture below out of the bag containing the plastic parts (ROD CLAMP Z SMALL).

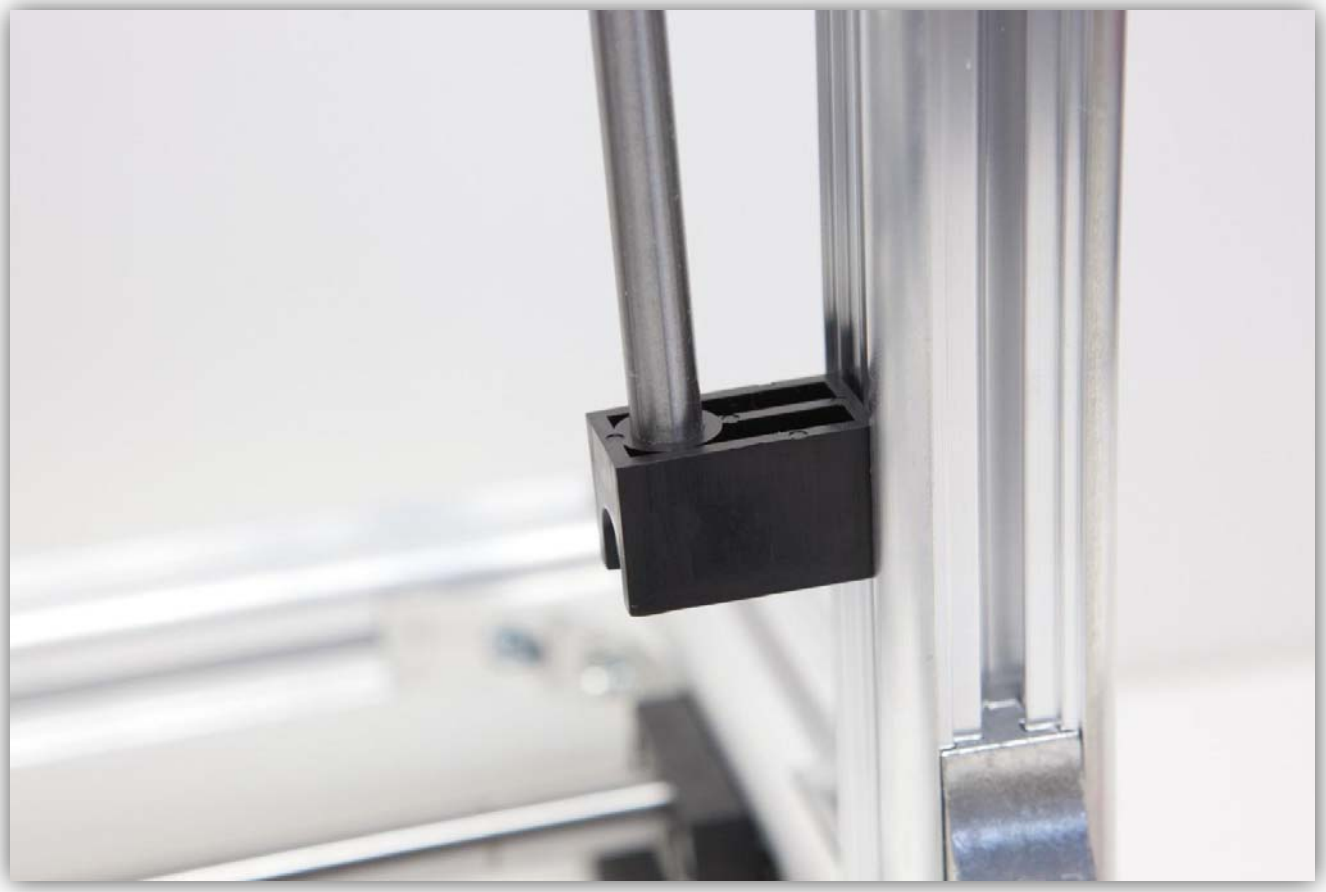
Slide an M5 washer over the M5 bolt and screw a square M5 nut on. Repeat this 2 times.

Slide one of these bolts in the right upright ALUMINIUM PROFILE.



Slide one of the ROD CLAMP Z SMALL pieces over this bolt and make sure you tighten this bolt so that this piece sits at about 6 cm (2.36") of the base frame.

Insert the rod into the ROD CLAMP Z SMALL piece.



Slide an LM8UU LINEAR BEARING into the BEARING CLAMP Z SMALL piece.

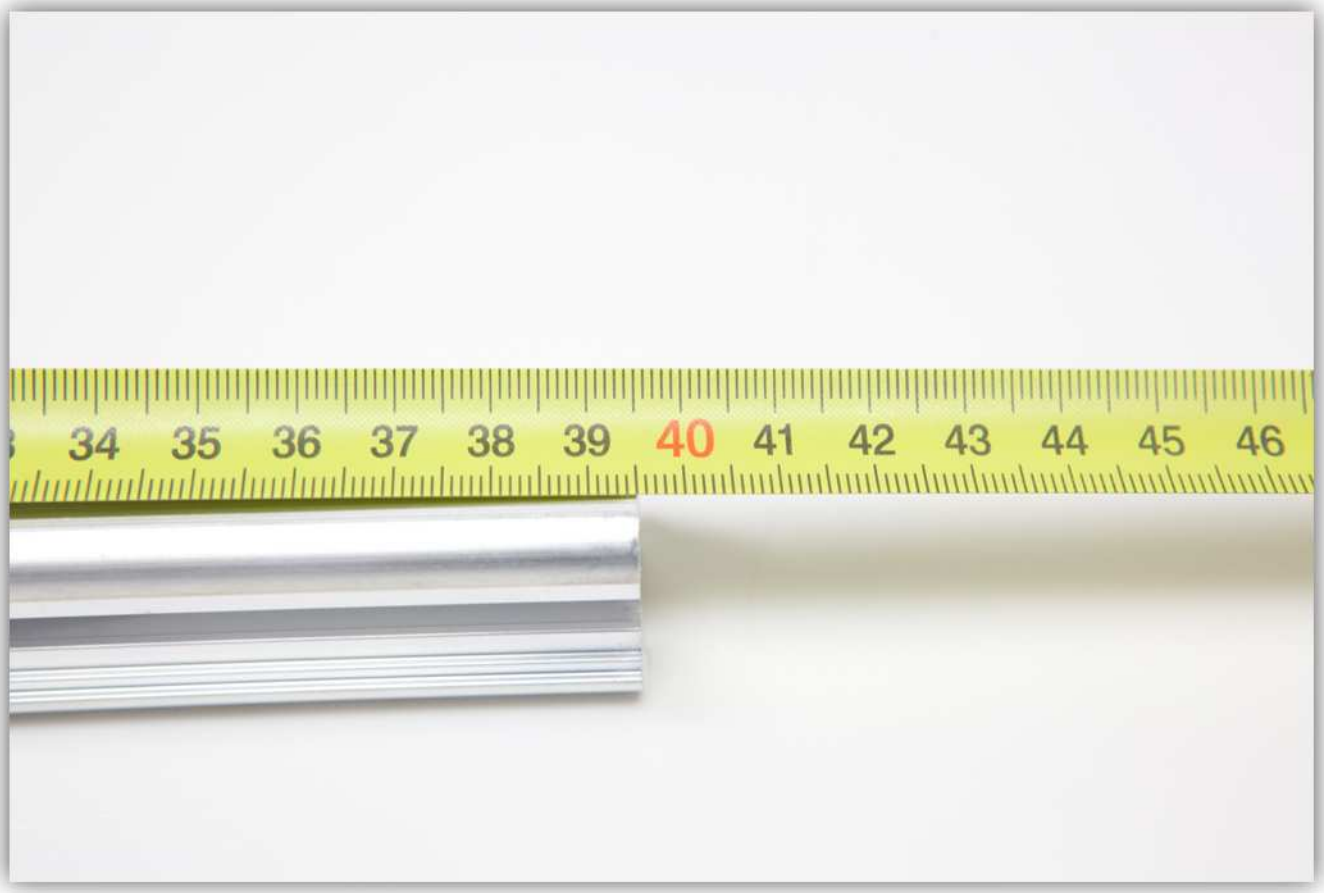
Use the circlip pliers to carefully fit the circlips around the both sides of the LM8UU LINEAR BEARING.

Slide this piece over the rod as shown in the picture below.

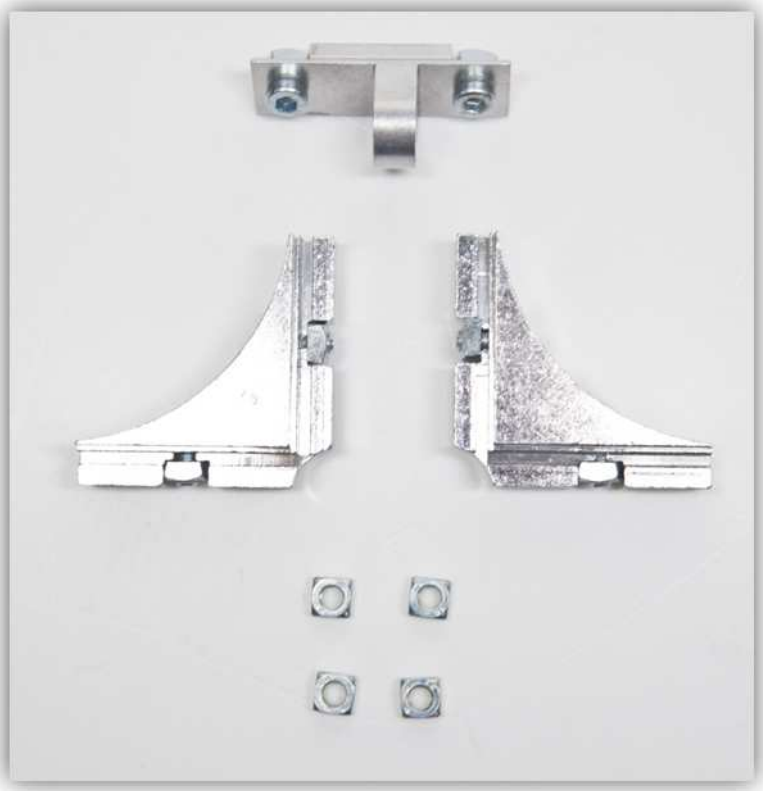
Slide one of the M5 bolts (with washer and square nut) and slide it down the ALUMINIUM PROFILE and slide a ROD CLAMP Z SMALL over this bolt. It should fit over the rod.

006 – ASSEMBLING THE EXTRUDER ARM

Take one ALUMINIUM PROFILE of 395 mm (15.6") out of the box.



Take the FAN HOLDER BRACKET out of the bag labelled with 25, also take 4 square M5 nuts (bag 16) and 2 ANGULAR MOUNTS (bag 14).



Slide the 2 ANGULAR MOUNTS into one end of the ALUMINIUM PROFILE of 395 mm (15.6").

Slide 2 square M5 nuts into the ALUMINIUM PROFILE as shown in the picture below.

Slide the FAN HOLDER BRACKET and 1 square M5 nut into the ALUMINIUM PROFILE. **Notice the orientation of each part.**

Now insert another square M5 nut on the opposite side of the fan holder bracket. **Notice the orientation.**

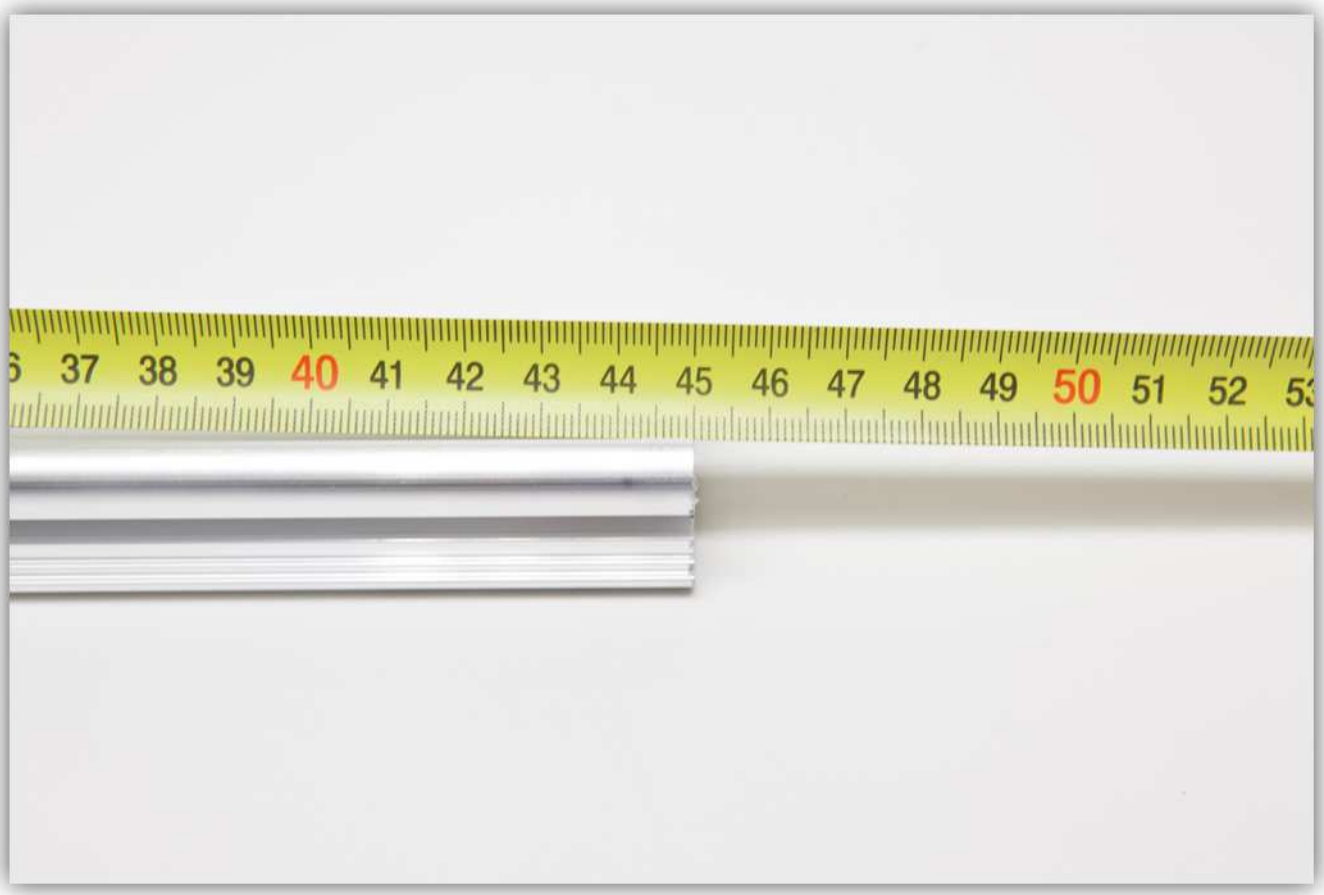
Now slide the ALUMINIUM PROFILE into the BEARING CLAMP Z SMALL piece.

Now slide the two ANGULAR MOUNTS into the Z CARRIAGE. Be careful that while doing this, none of the square M5 nuts slide out of the angular profile.

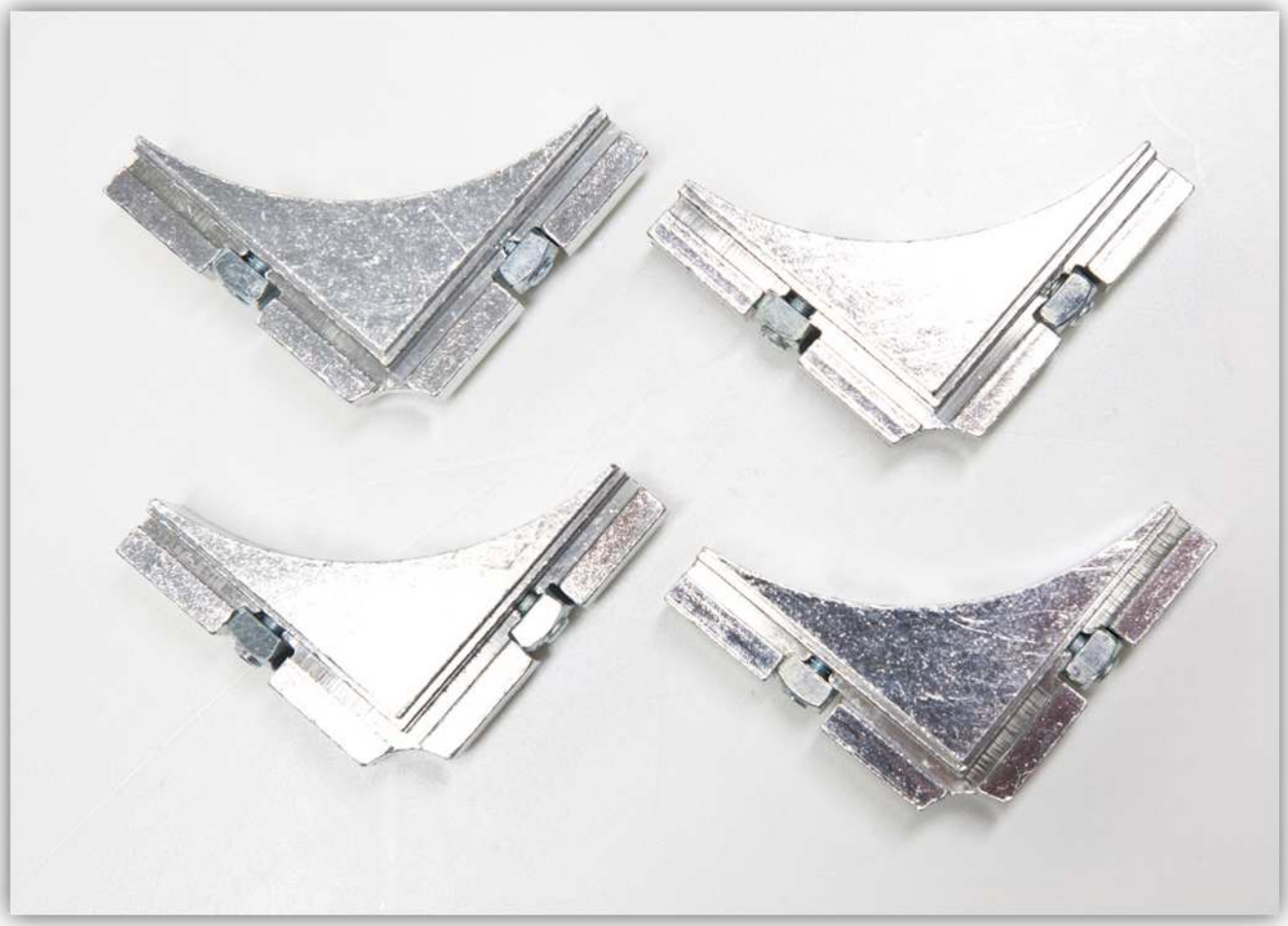
Make sure there is about 5 mm of a gap from the top of the Z CARRIAGE and the top of the ANGULAR MOUNT.

Tighten all the bolts on the ANGULAR MOUNTS.

Now take the last ALUMINIUM PROFILE it should be one of 450 mm (17.7").



Take 4 ANGULAR MOUNTS out of bag 14.



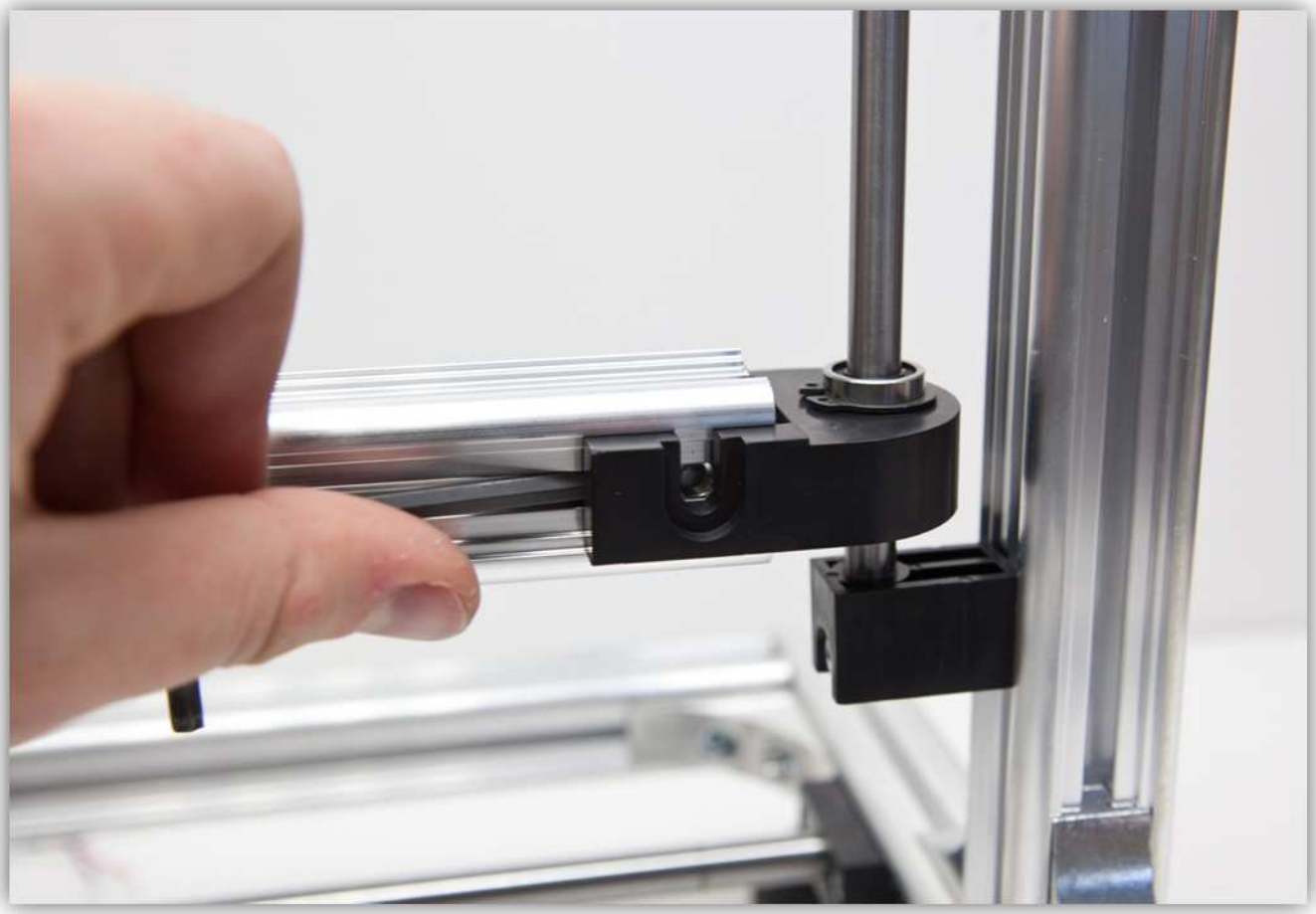
Slide 2 ANGULAR MOUNTS on each end of the ALUMINIUM PROFILE.

Slide this assembly in the top of the frame.

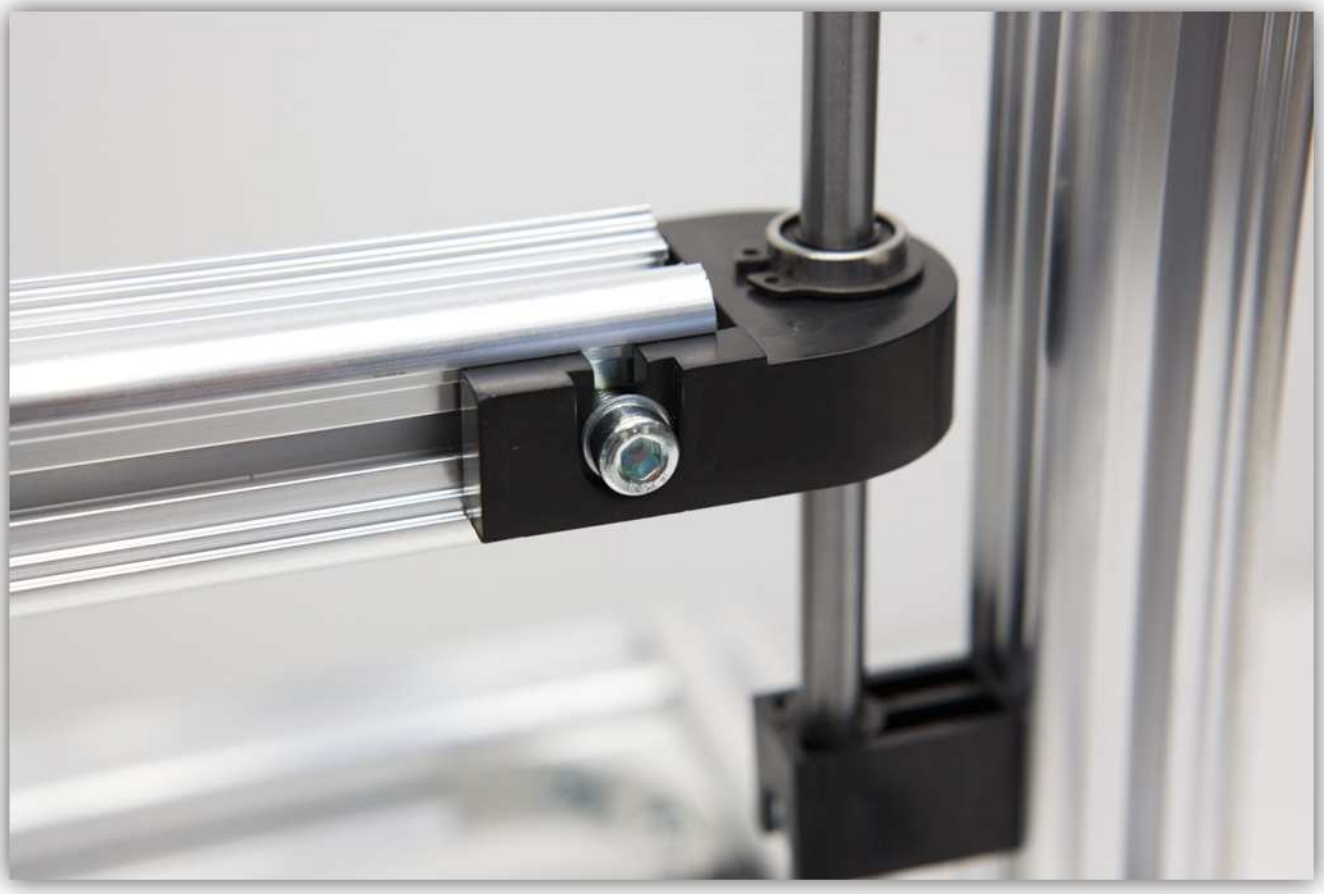
Slide the ALUMINIUM PROFILE down until the tops of the ANGULAR MOUNTS are flush with the tops of the frame.

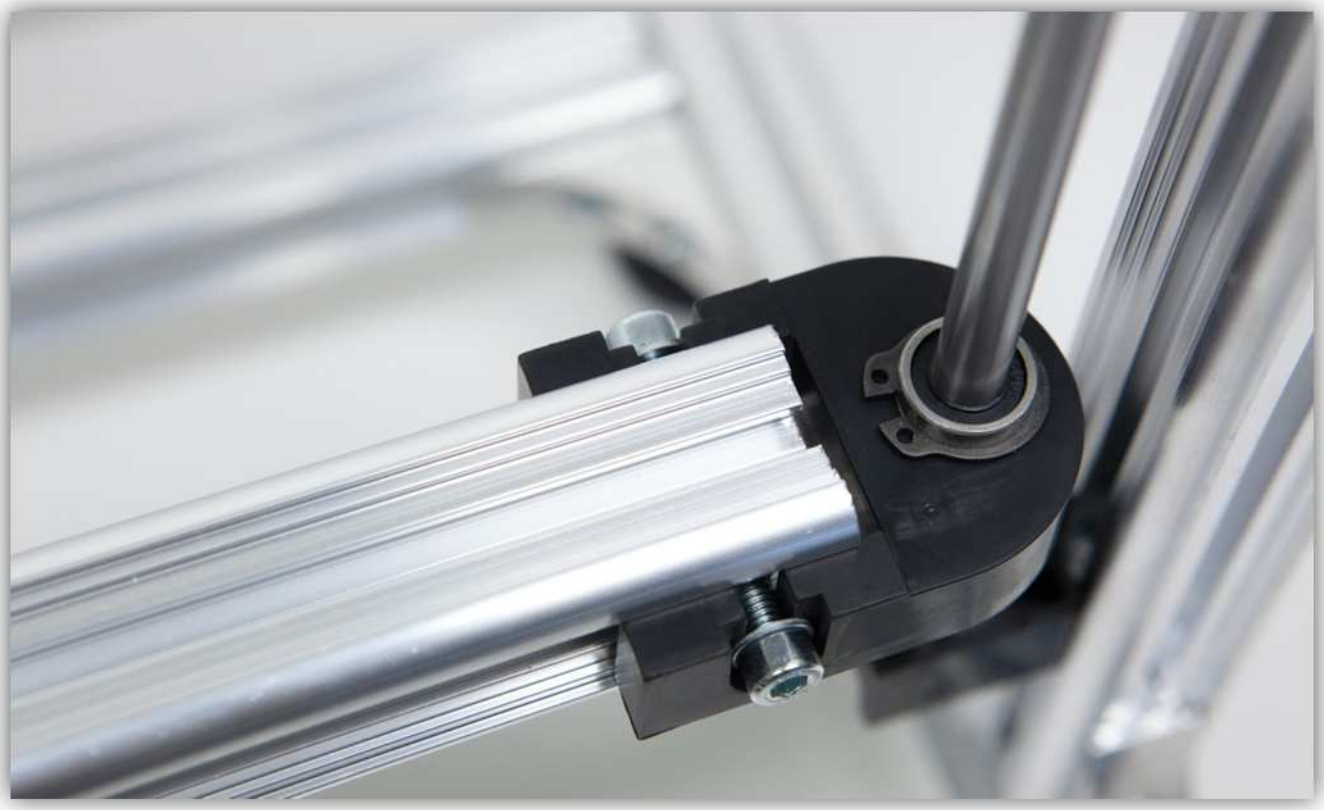
Tighten all the bolts on the angular mounts.

Slide the two square nuts on the opposite of each other in the extruder arm towards the BEARING CLAMP Z SMALL piece.



Use the 2 M5 bolts and 2 M5 washers to screw the BEARING CLAMP Z SMALL piece to the EXTRUDER ARM.

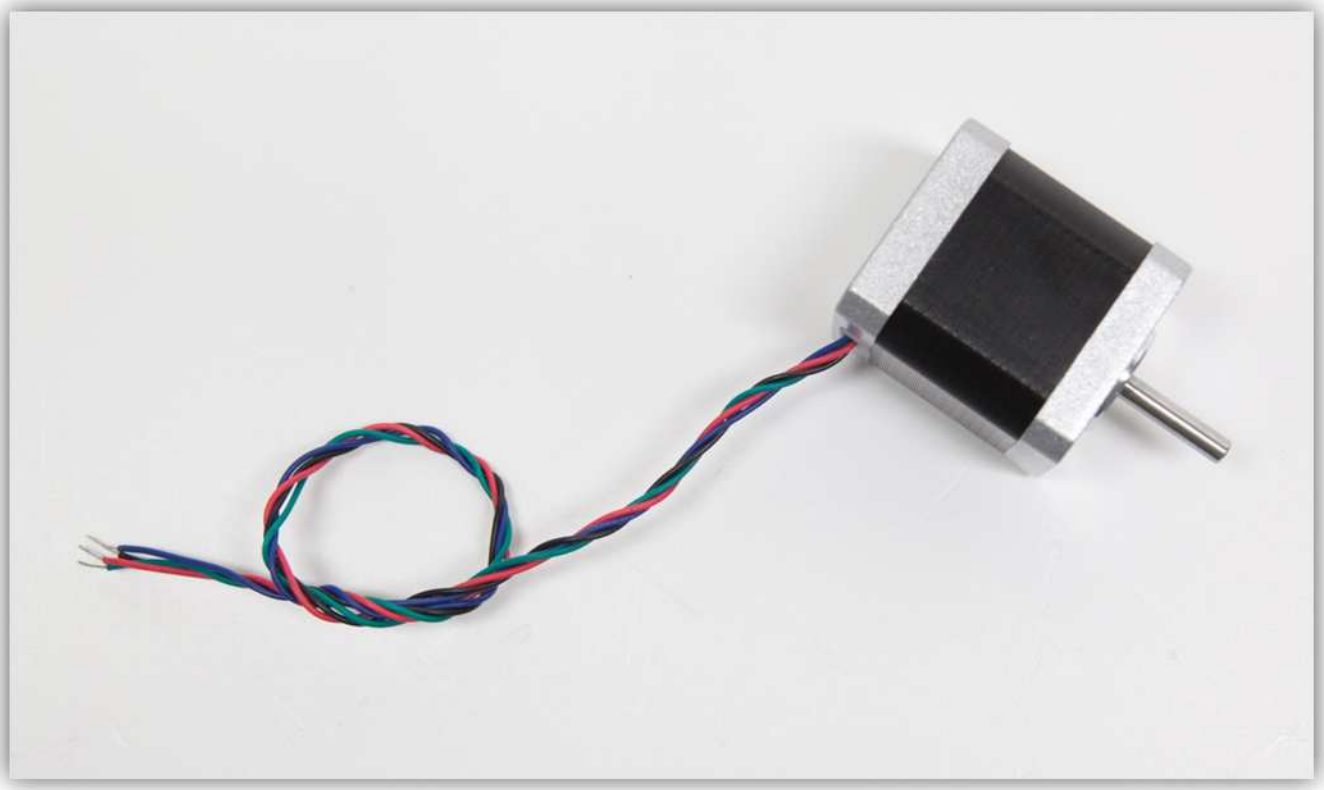




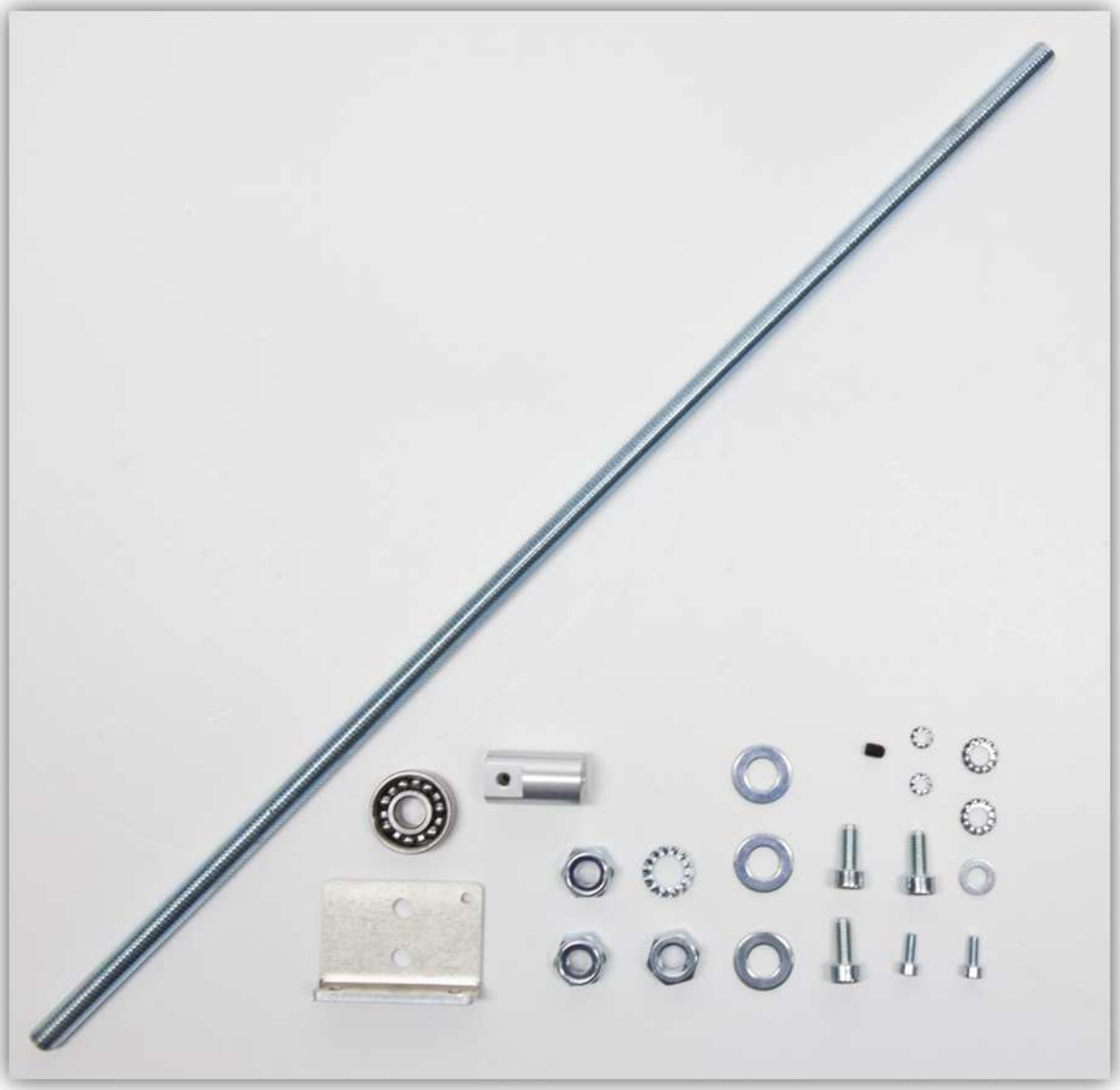
Tighten these bolts while making sure the Z CARRIAGE and the EXTRUDER ARM move freely.

007 – ASSEMBLING THE Z MOTOR AND THREADED ROD

Take a motor out of the package labelled with 9.

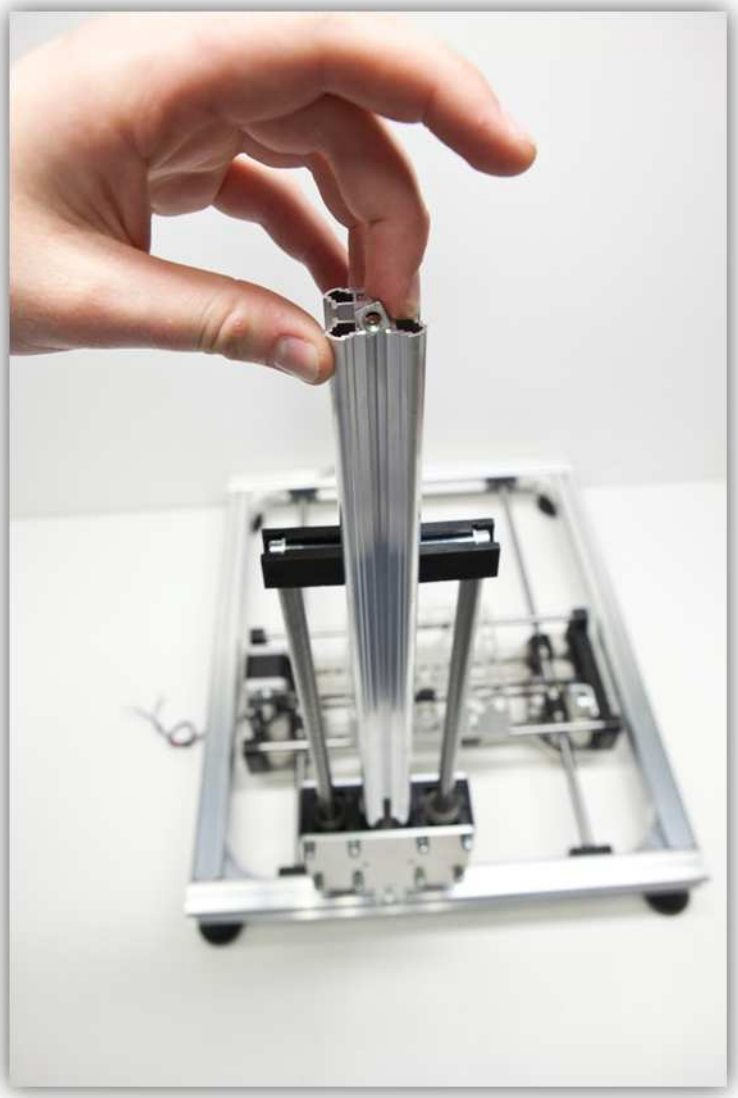


Take the parts out of the bag labelled with 26.

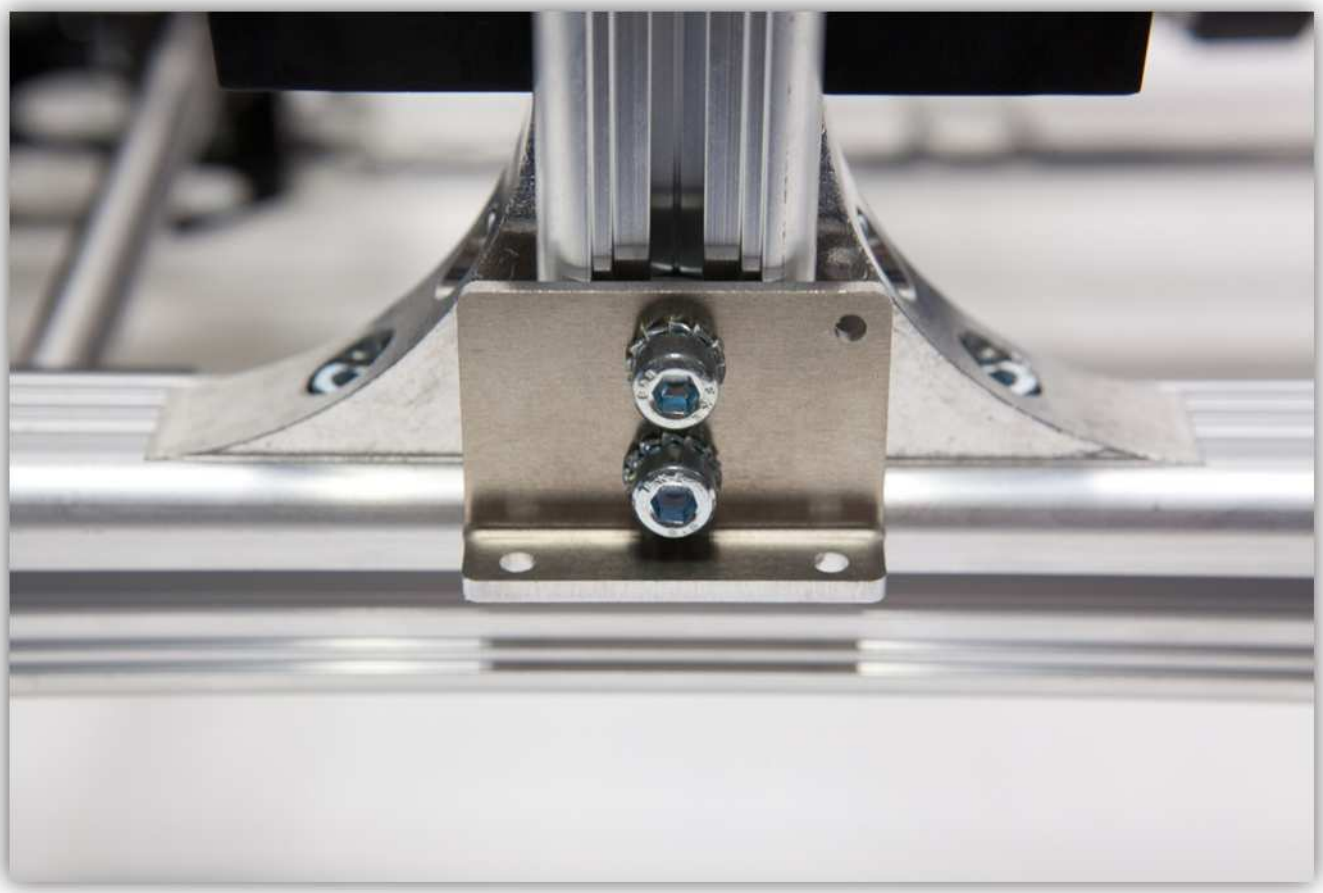


Now take the piece as shown in the picture below out of the bag containing the plastic parts (Z ROD GUIDE).

Slide **2** square M5 nut into the left upright ALUMINIUM PROFILE as shown in the pictures below.

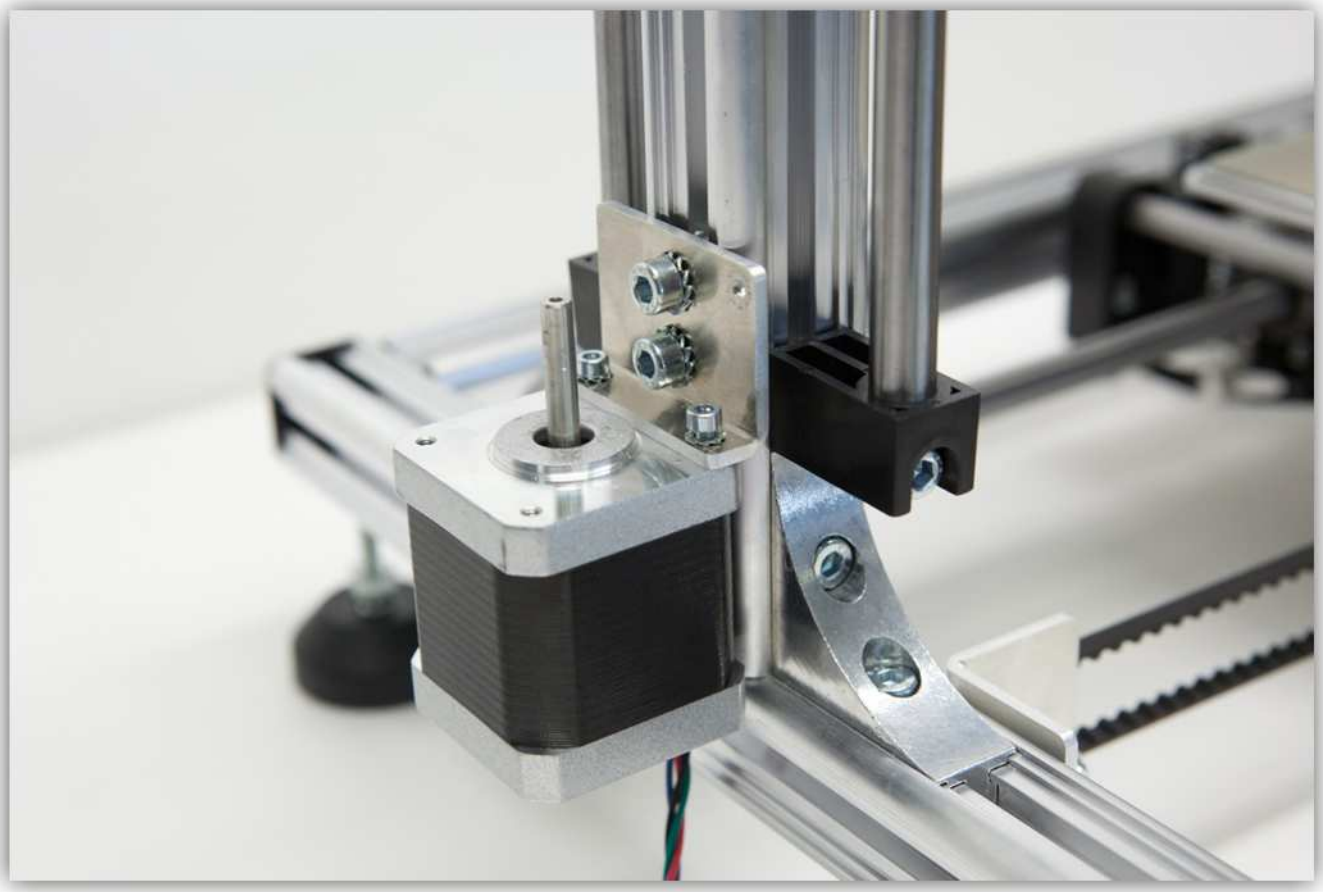


Use 2 M5 bolts and 2 M5 toothed washers to bolt the Z MOTOR BRACKET to the frame.

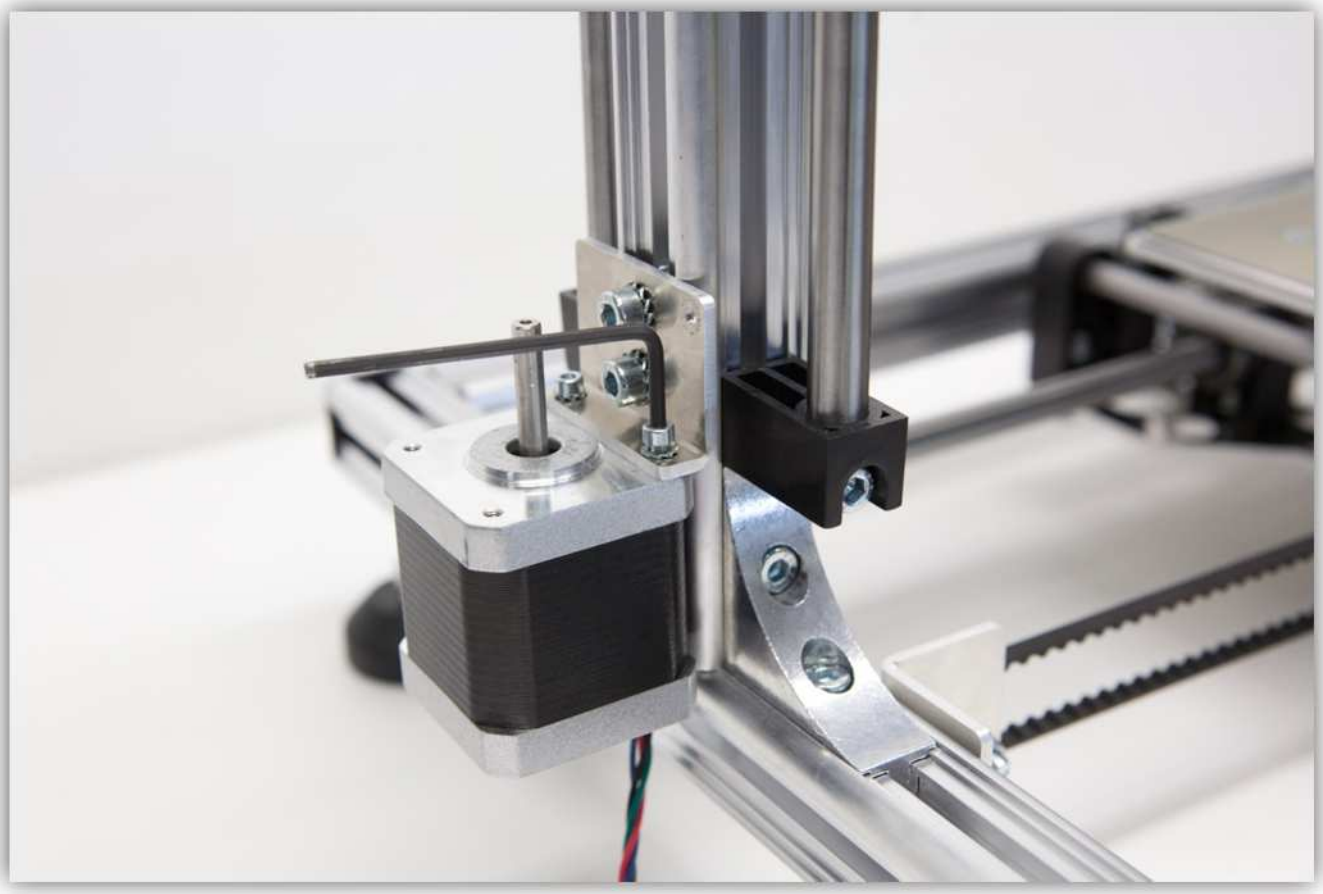


Make sure the bracket bottom is at **MAXIMUM** 4.5 cm (1.77") from the bottom frame. It should be between 4 cm (1.57") and 4.5 cm (1.77"). Tighten the 2 bolts and **make sure that the bracket is perfectly horizontal.**

Take the 2 M3 bolts and 2 M3 toothed washers and bolt the motor to the bracket.



Tighten these bolts firmly.



Screw an M8 bolt followed by an M8 washer, an M8 toothed washer, an M8 washer and the MOTOR CONNECTOR as shown in the picture below.

Tighten everything firmly.

Take the small locking bolt.

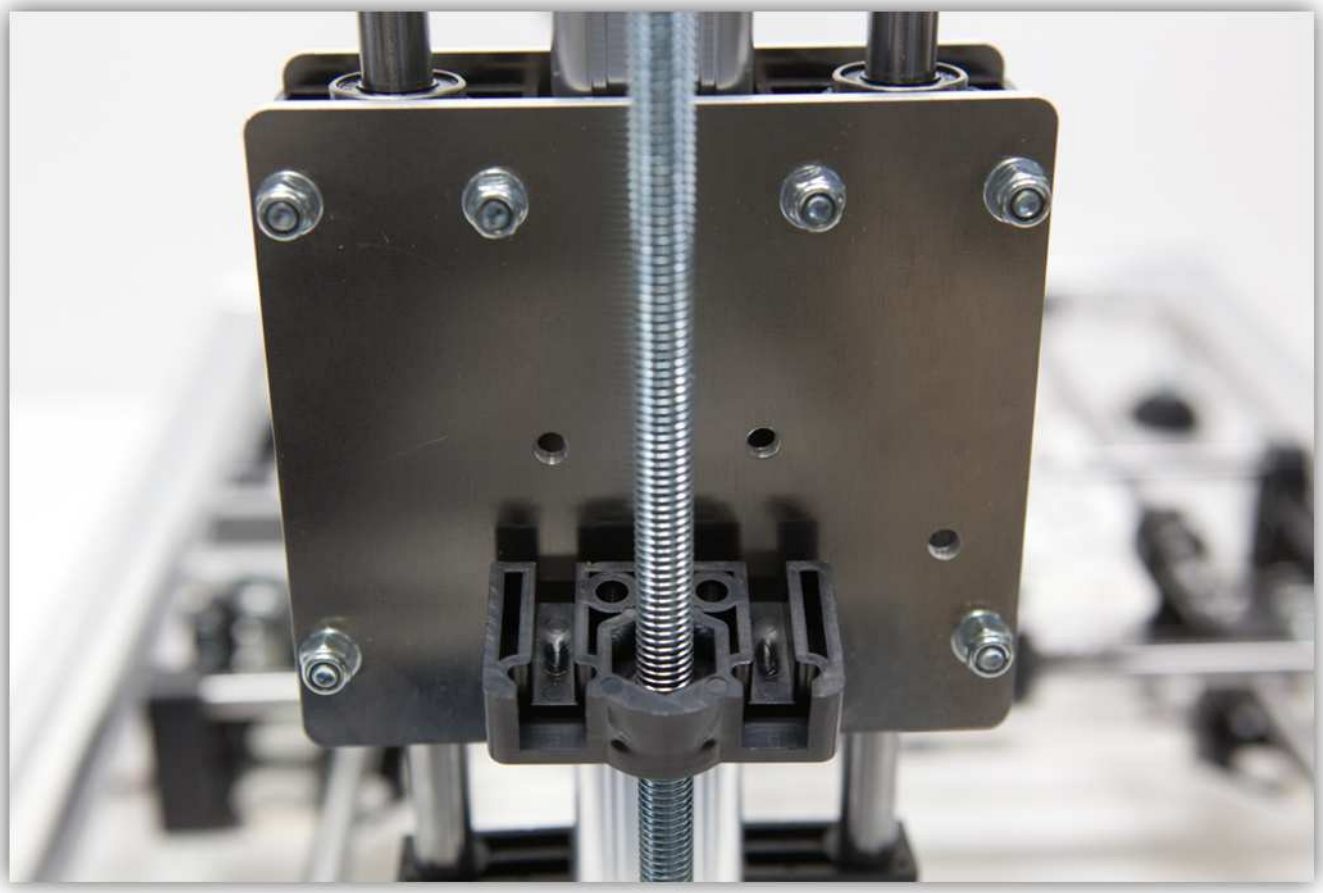
Screw it in the MOTOR CONNECTOR. **Do not screw this bolt in completely.**

Place the MOTOR CONNECTOR over the motor shaft. Make sure that the shaft goes as far as it can. Now tighten the small locking bolt.

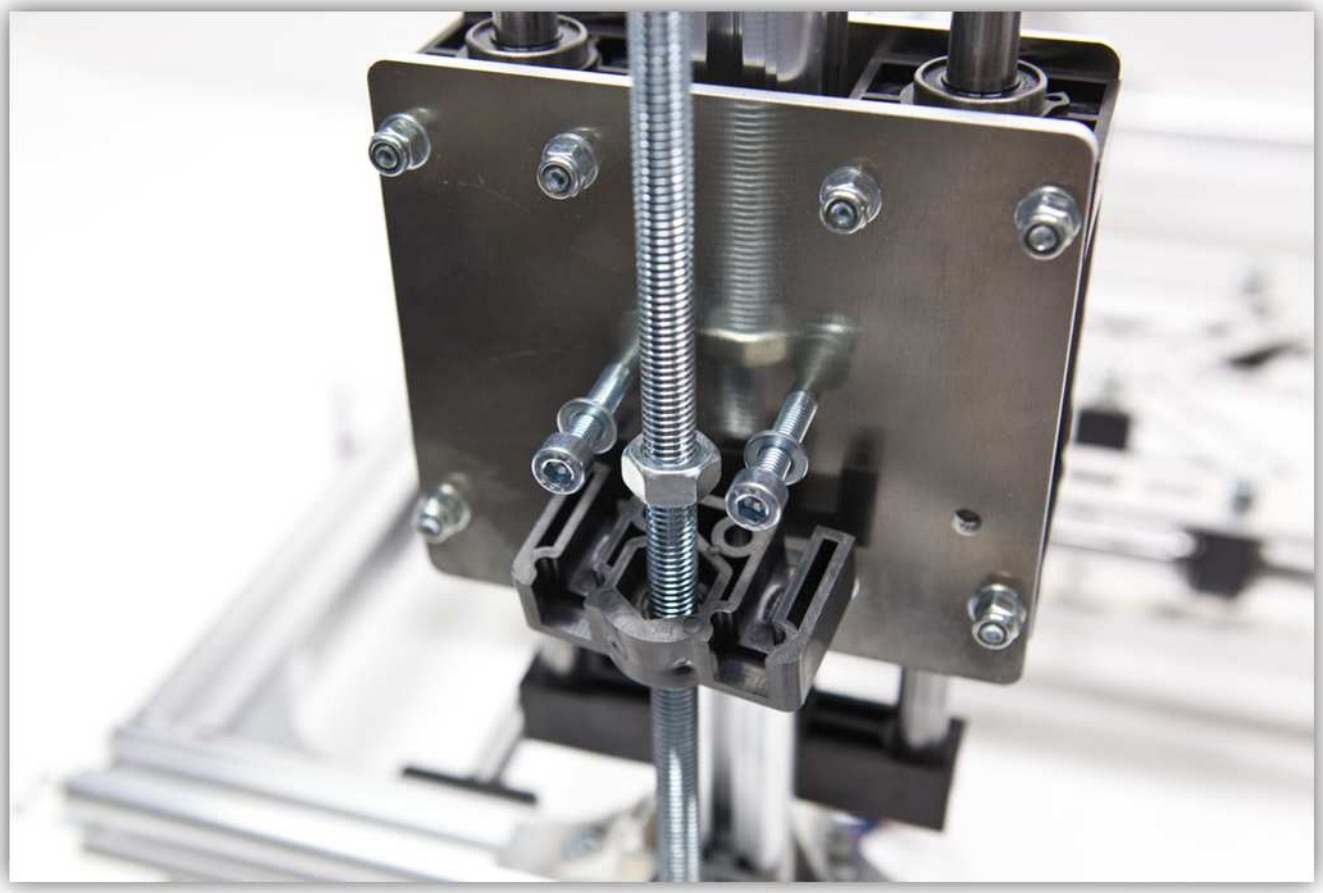
Now take these pieces as shown in the picture below out of the bag containing the plastic parts (Z FOLLOWER A and Z FOLLOWER B).

Take the parts out of the bag labelled with 27.

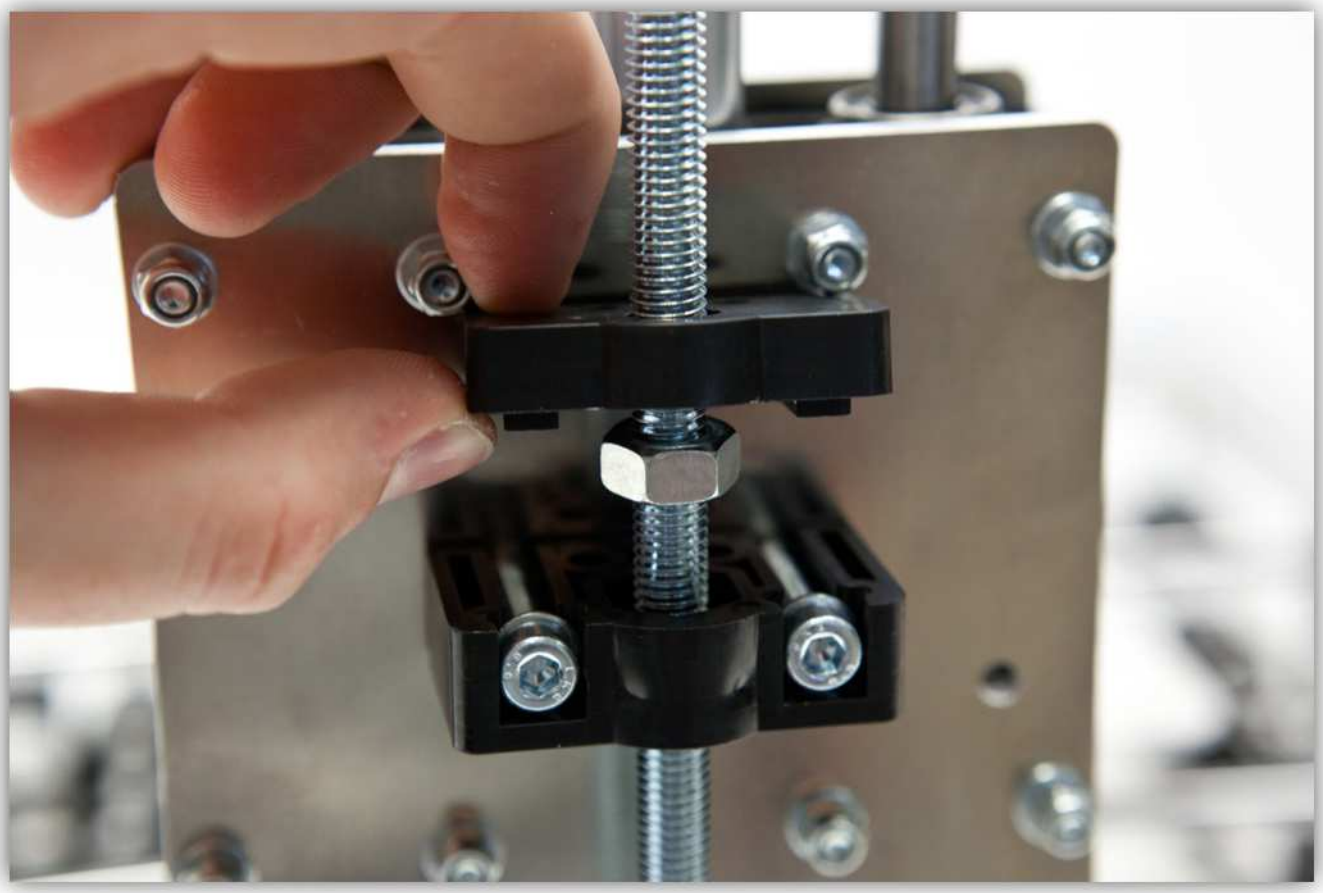
Slide the Z FOLLOWER A piece over the rod as shown in the picture. **Watch the orientation.**



Screw the M8 nut over the rod and take the 2 M5 bolts and 2 M5 washers and screw them into the Z CARRIAGE.

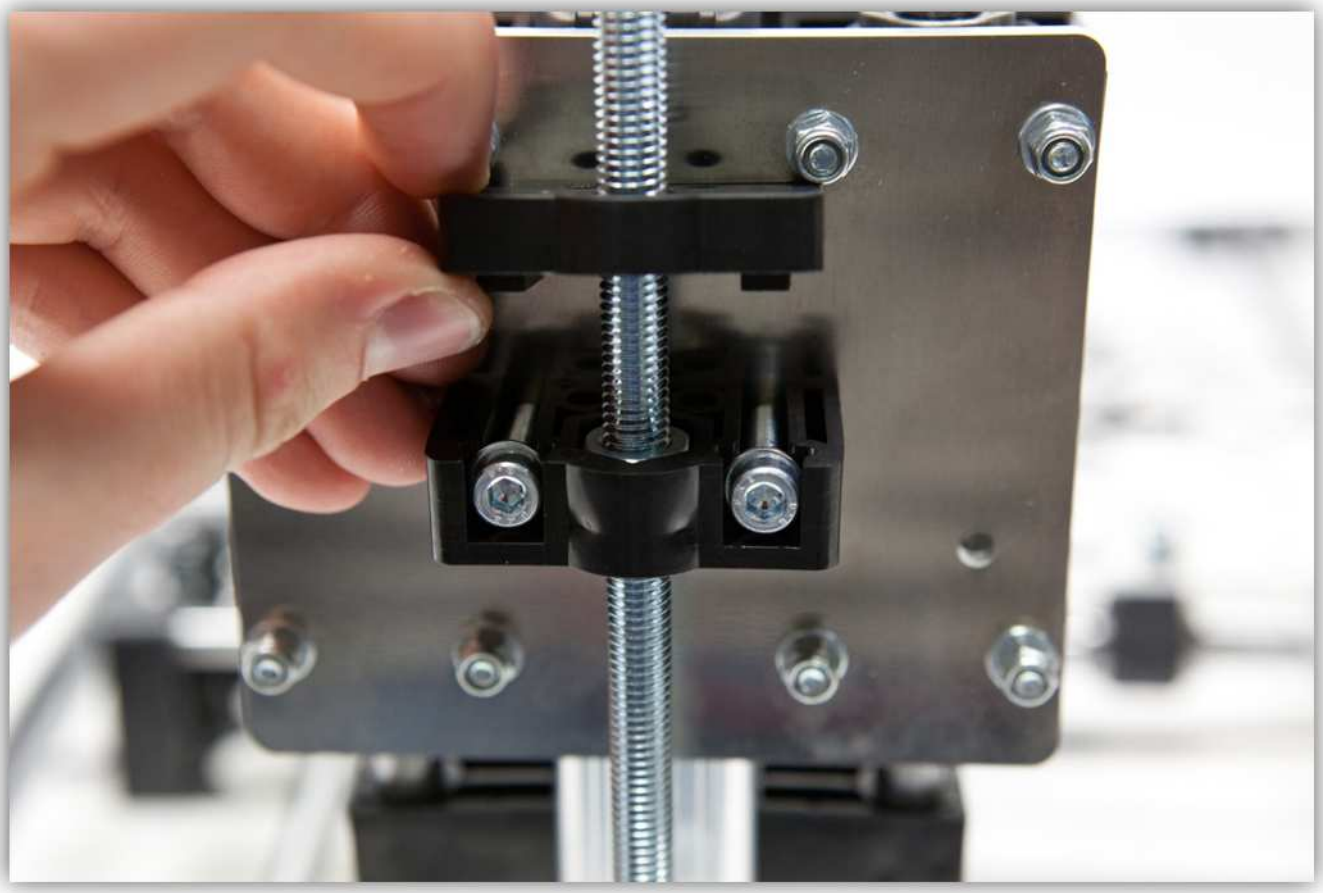


Slide the Z FOLLOWER B piece over the rod as shown in the picture. **Watch the orientation.**

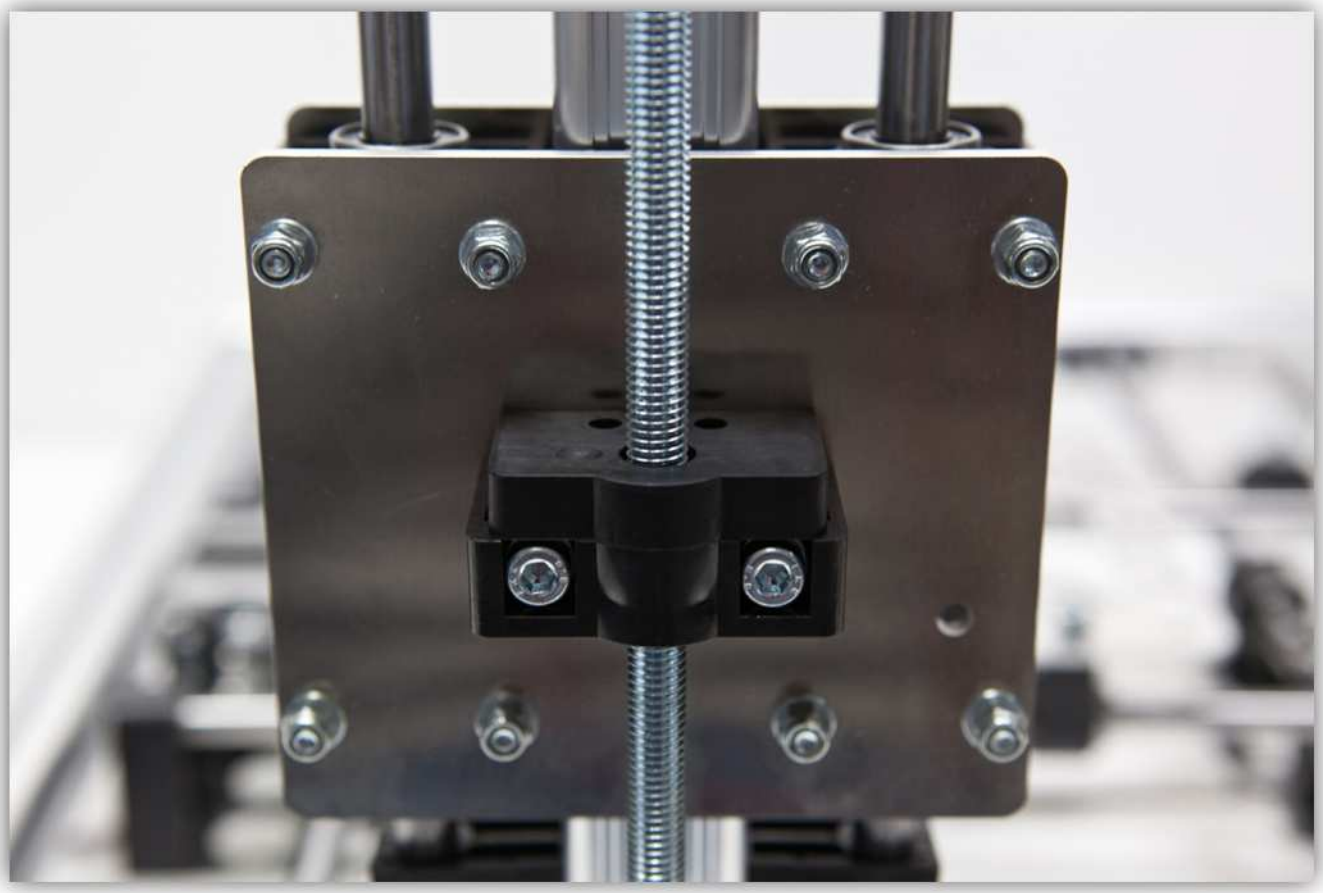


Tighten the MOTOR CONNECTOR to make sure there is no play.

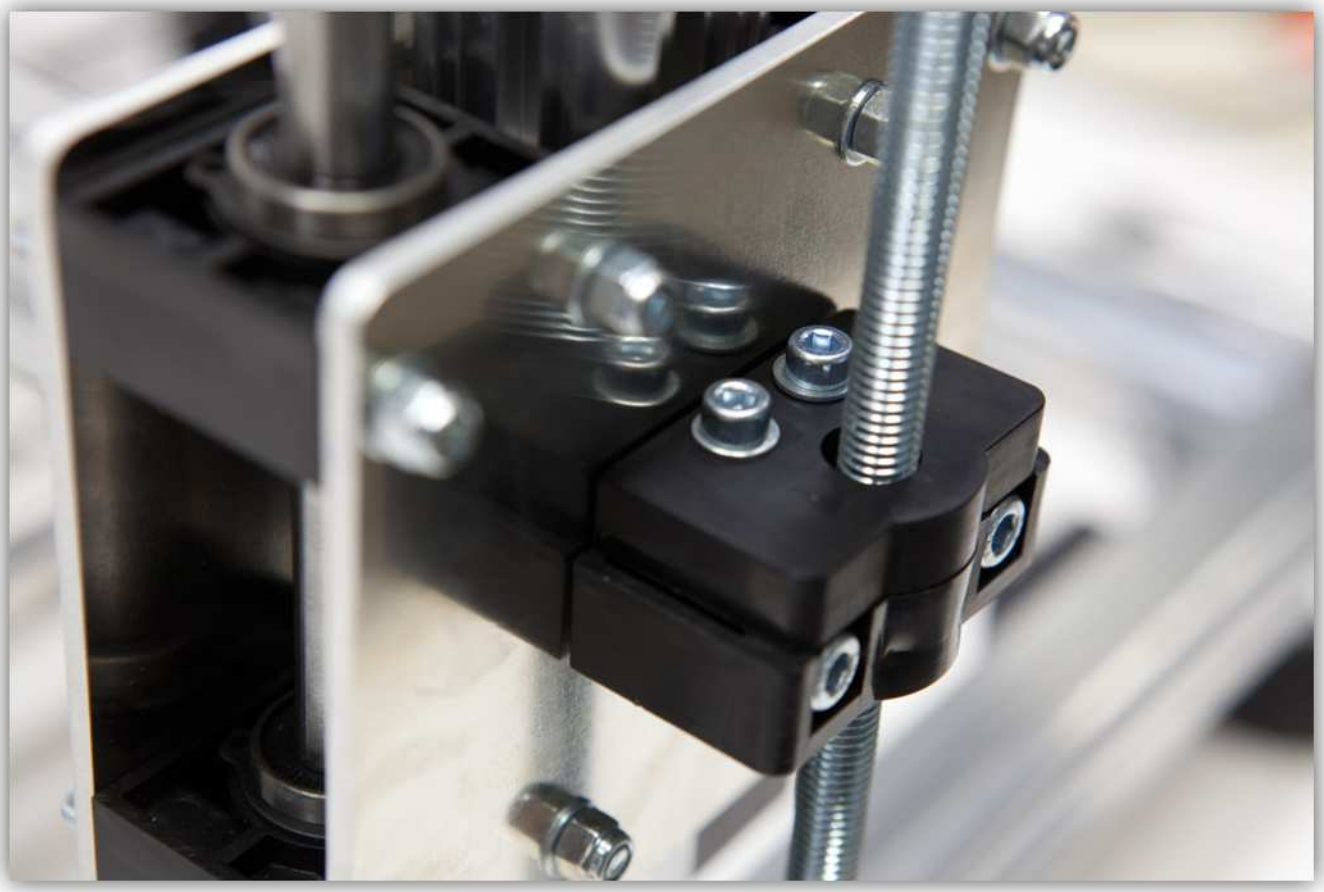
Attach the Z FOLLOWER A piece to the CARRIAGE. **Do not fully tighten these bolts.** Turn the rod until the M8 bolt sits snugly into the Z FOLLOWER A piece.



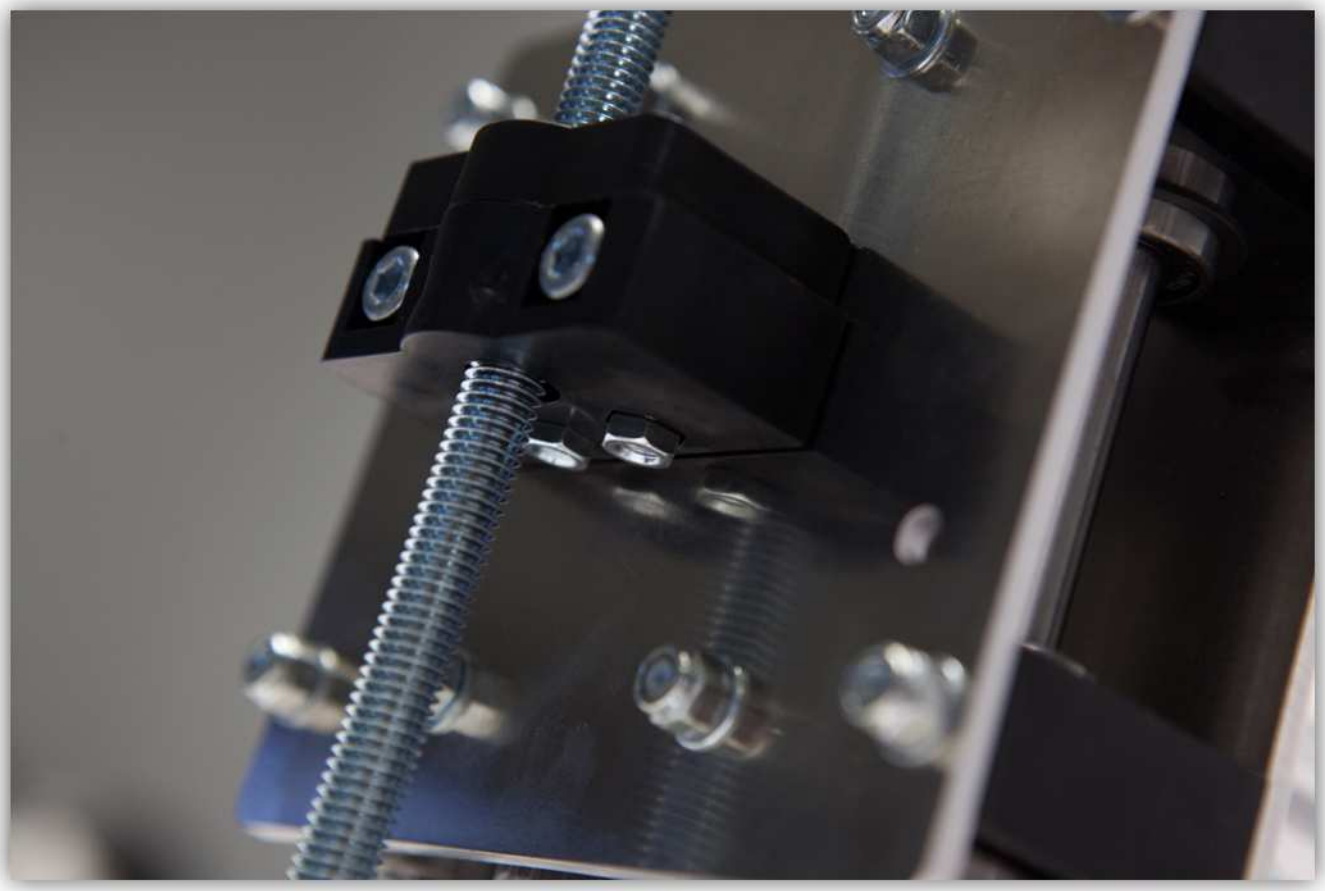
Snap the Z FOLLOWER B piece into the Z FOLLOWER A piece.



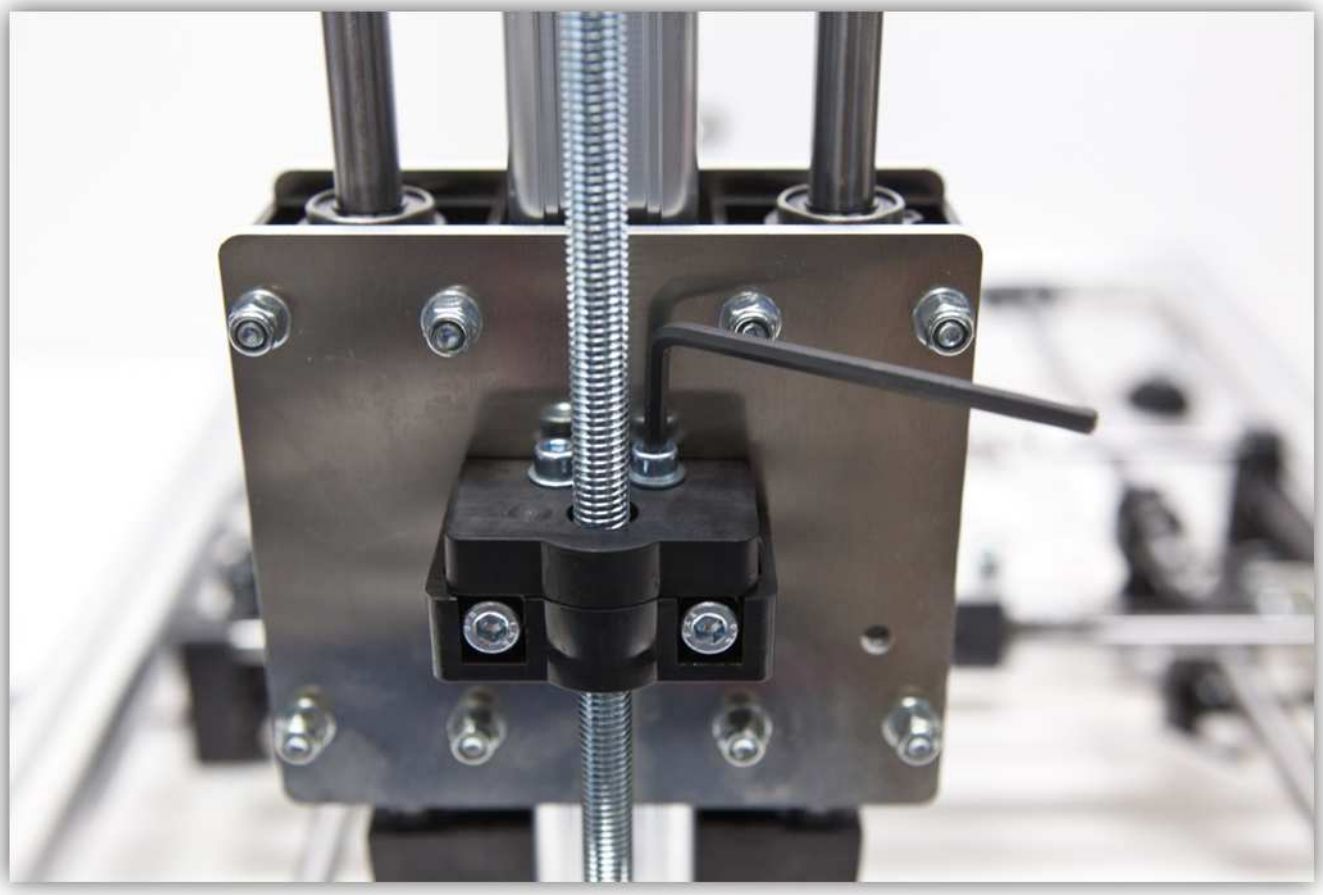
Take the 2 M4 bolts and 2 M4 washers and screw them into the top of the Z FOLLOWER assembly as shown in the picture below.



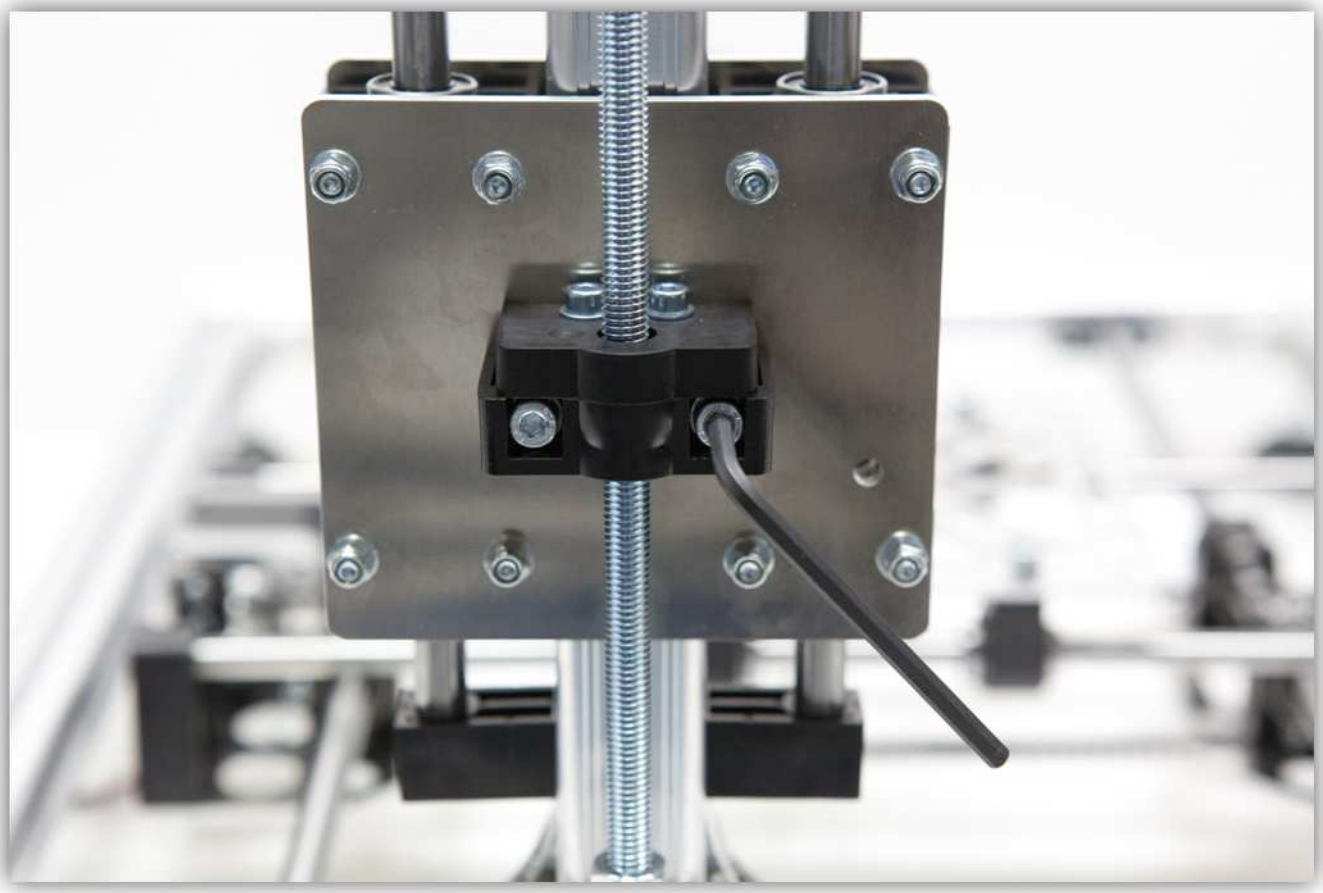
Use 2 M4 nuts to keep the two Z FOLLOWER pieces together.



Tighten these bolts.



Now fully tighten the bolts that attach the Z FOLLOWER assembly to Z CARRIAGE assembly.



Screw an M8 locking bolt on the rod followed by an M8 washer.

Slide a 608 bearing into the Z ROD GUIDE piece.

Slide this assembly over the rod.

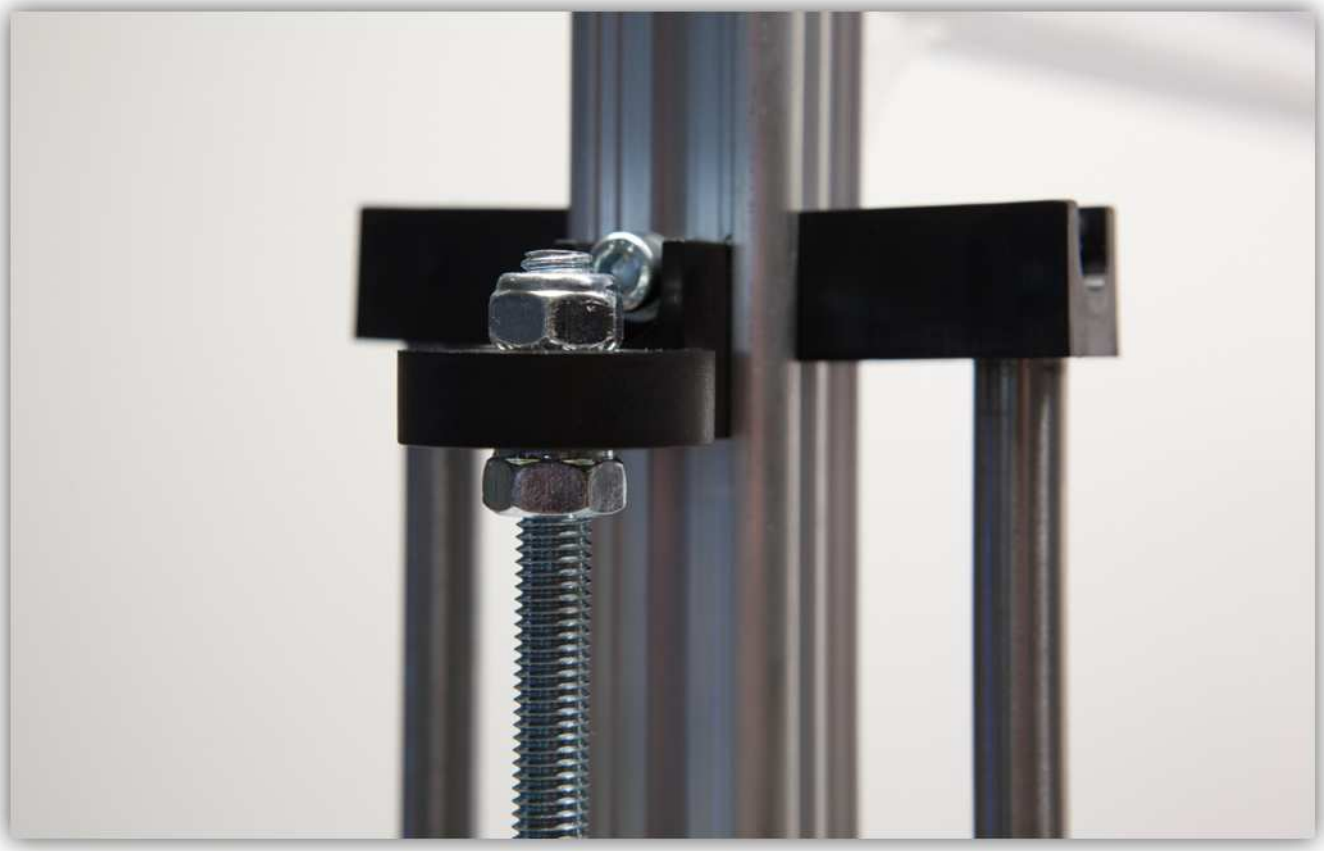
Take an M5 bolt, an M5 washer and a square M5 nut.

Slide this assembly into the left upright ALUMINIUM PROFILE as shown in the picture below.

Slide the assembly over the Z ROD GUIDE and tighten the bolt so that it is fixed but still possible to slide up and down.

Slide this bolt and Z ROD GUIDE down until the 608 bearing meets the M8 washer.

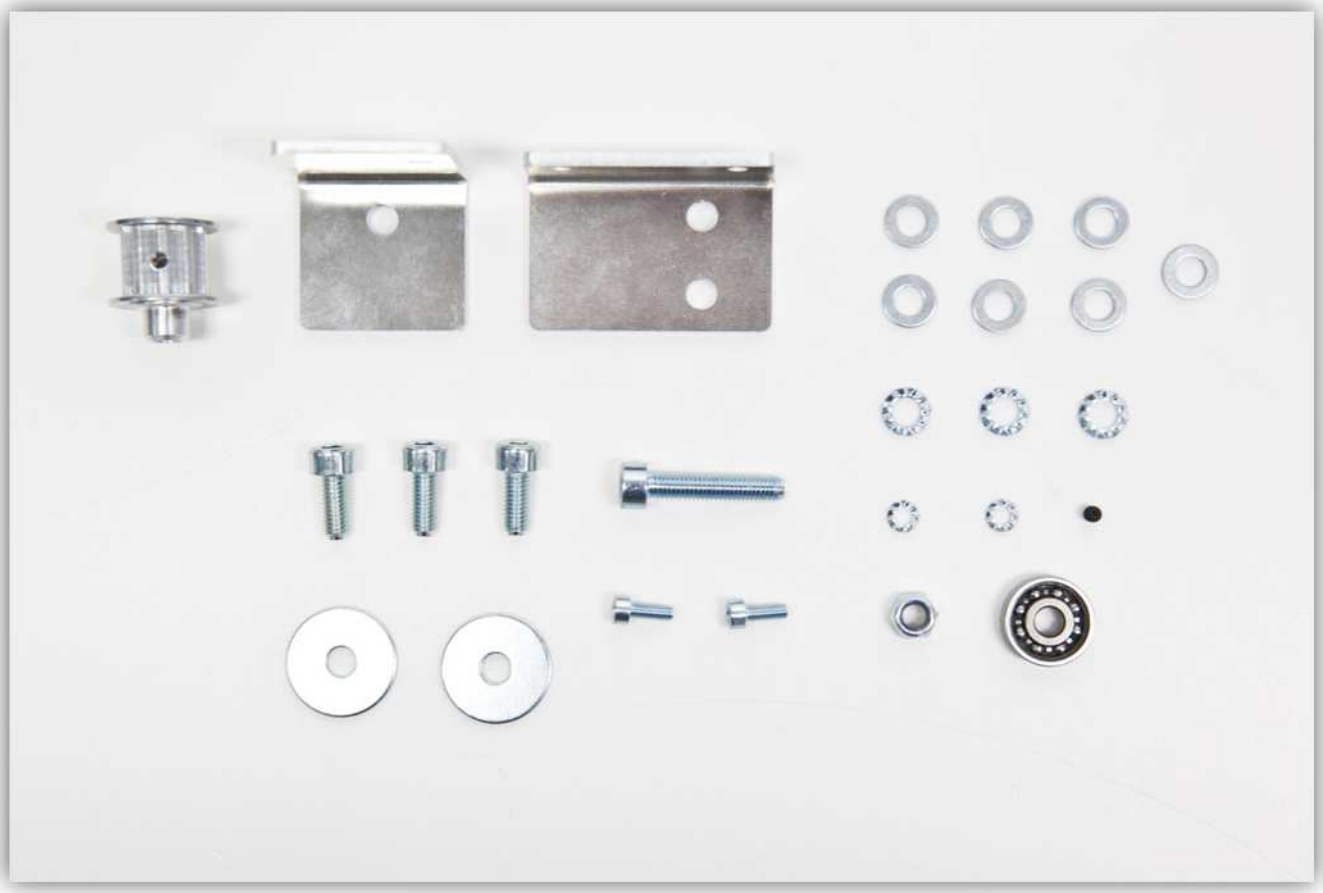
Screw an M8 locking nut over the rod as shown in the picture.



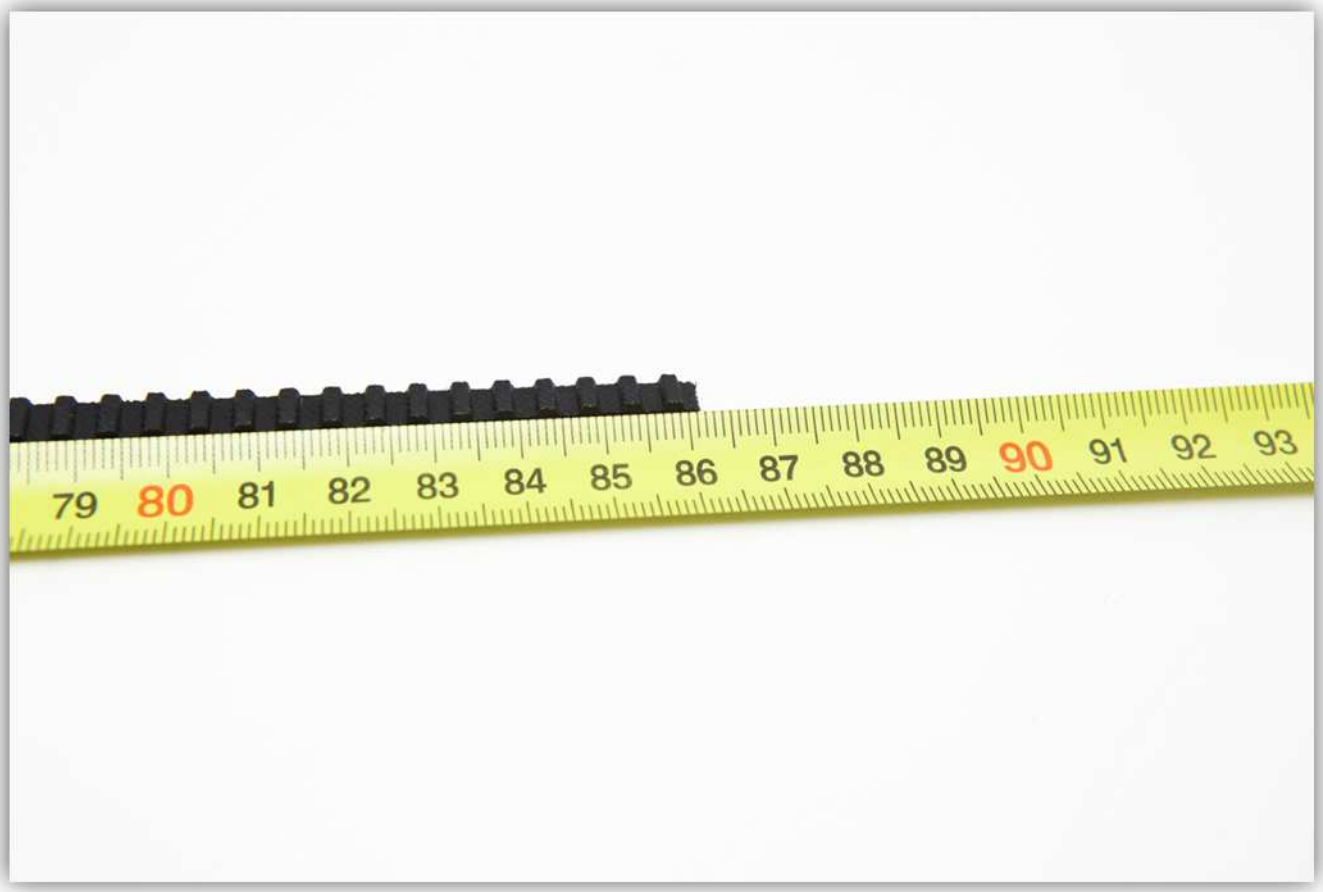
The build should now look like this:

008 – ASSEMBLING THE X DRIVETRAIN

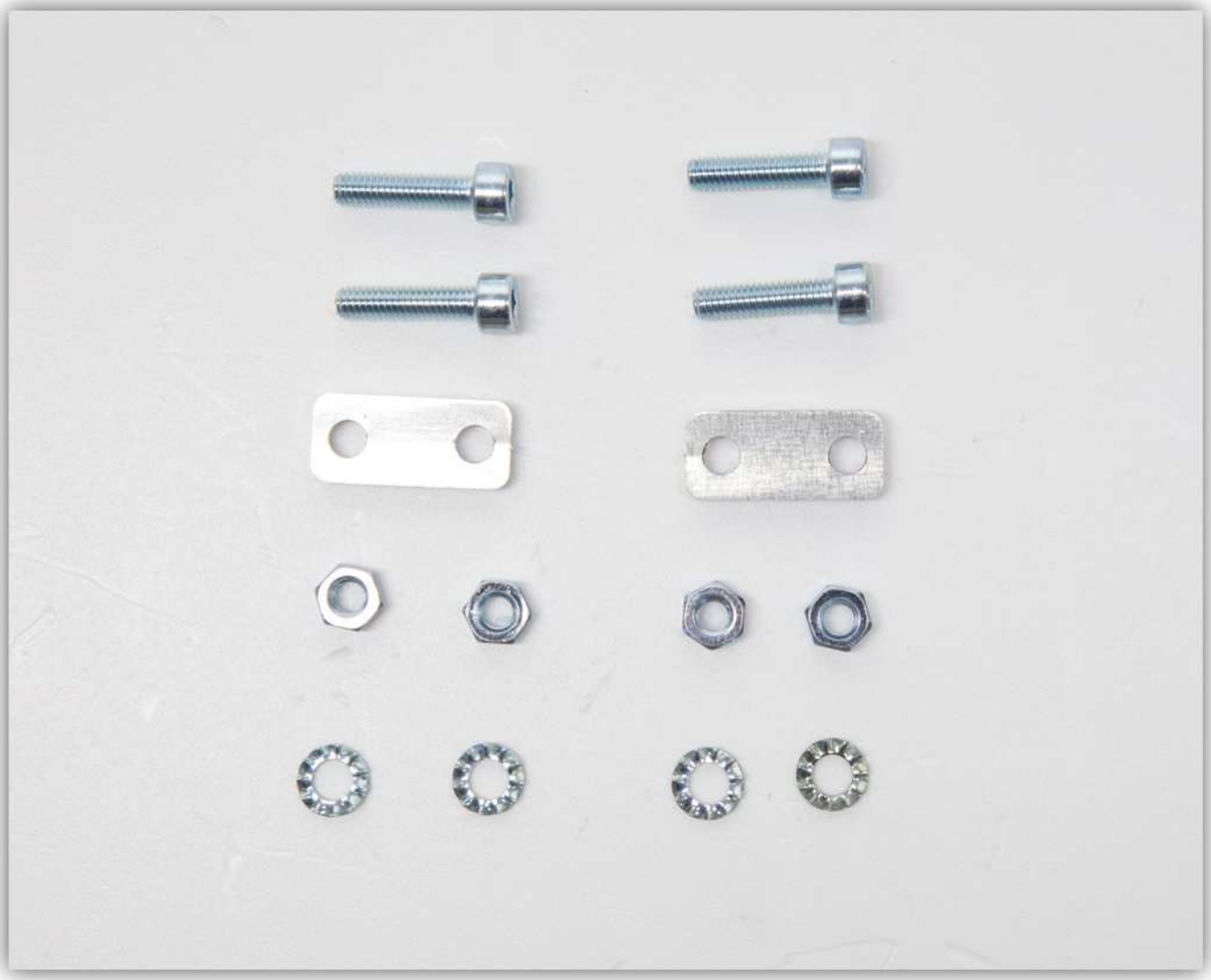
Take the parts out of the bag labelled with 28.



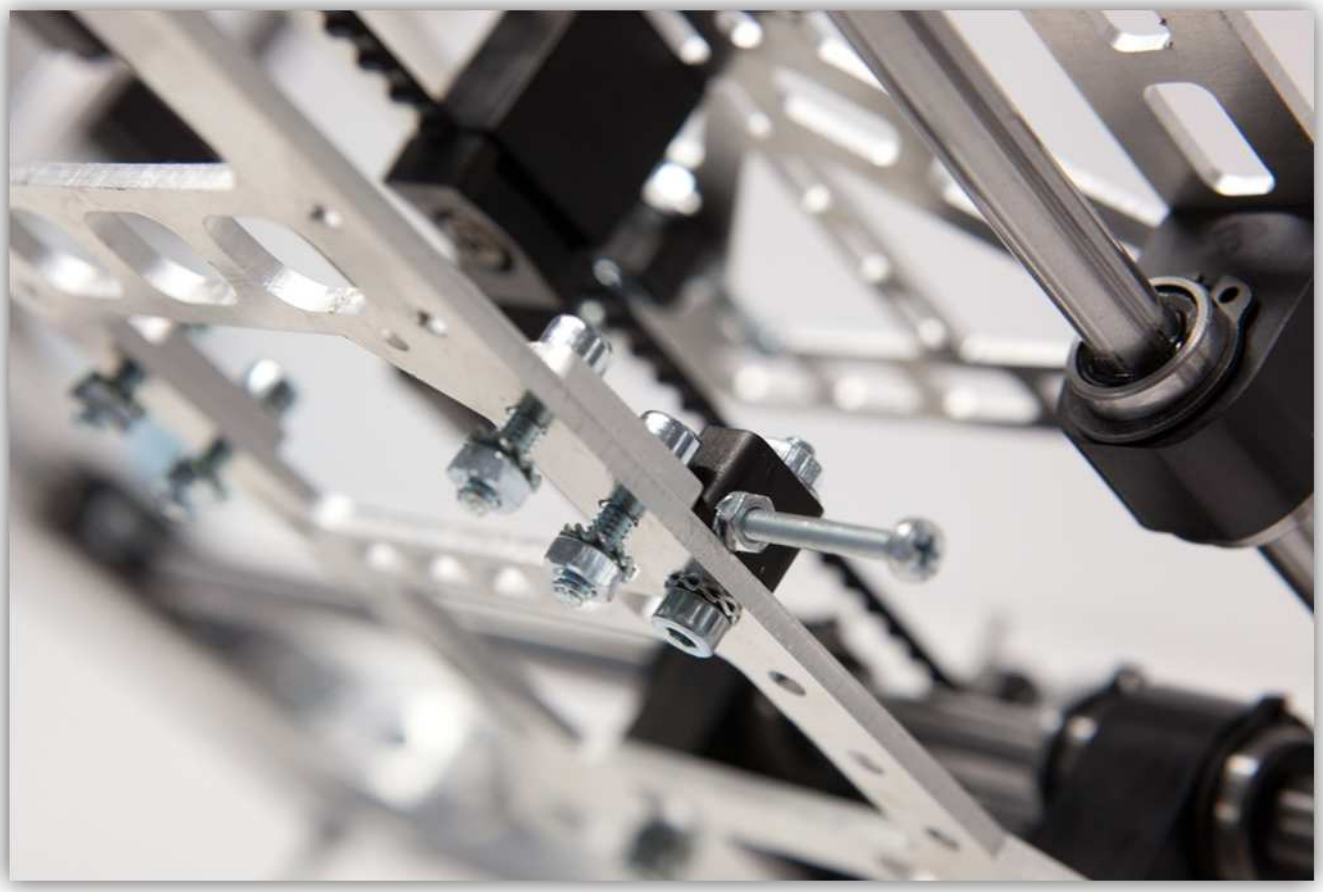
Take the piece of 86 cm (3.39") belt you cut earlier.

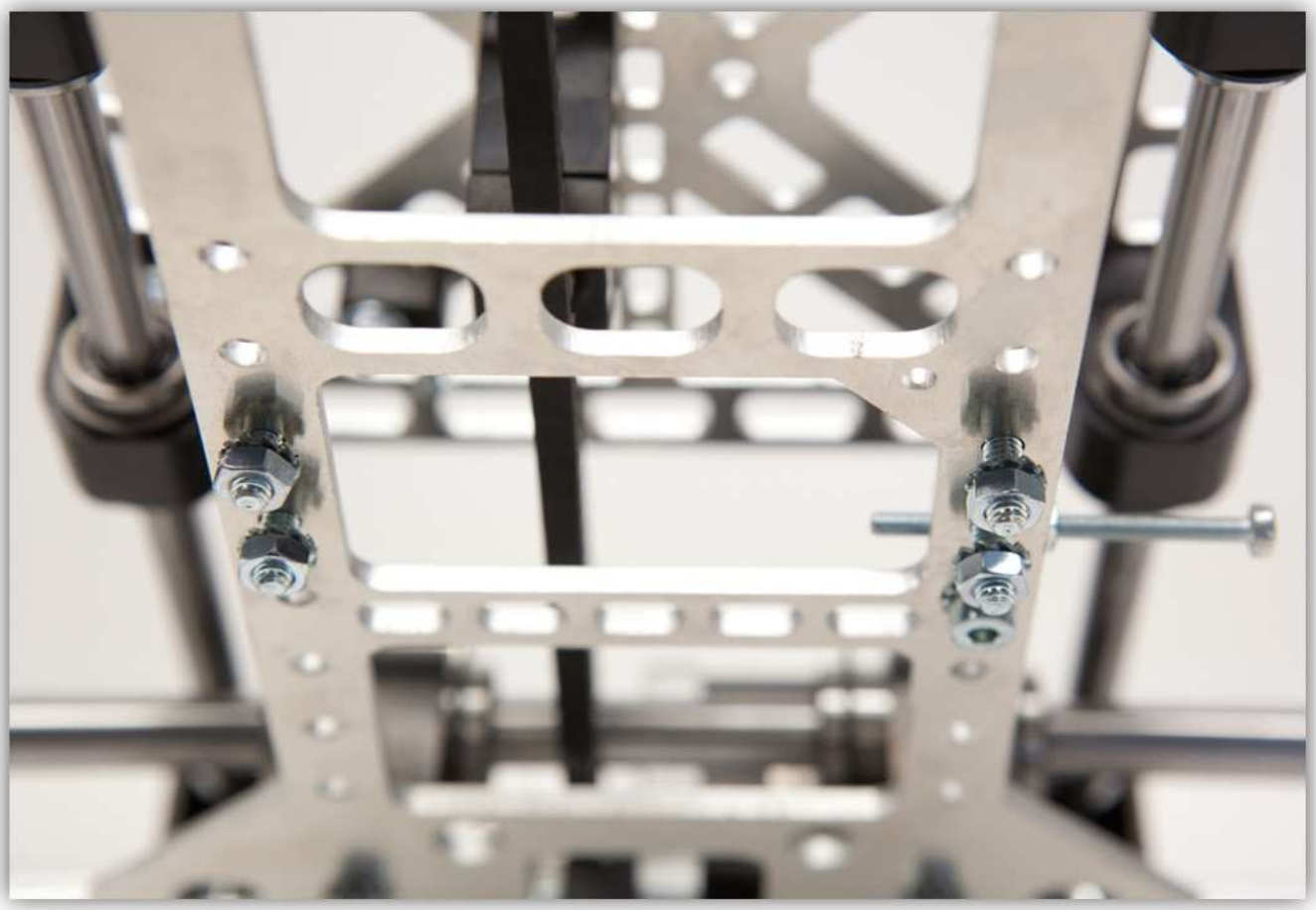


Take the parts out of the bag labelled with 29.

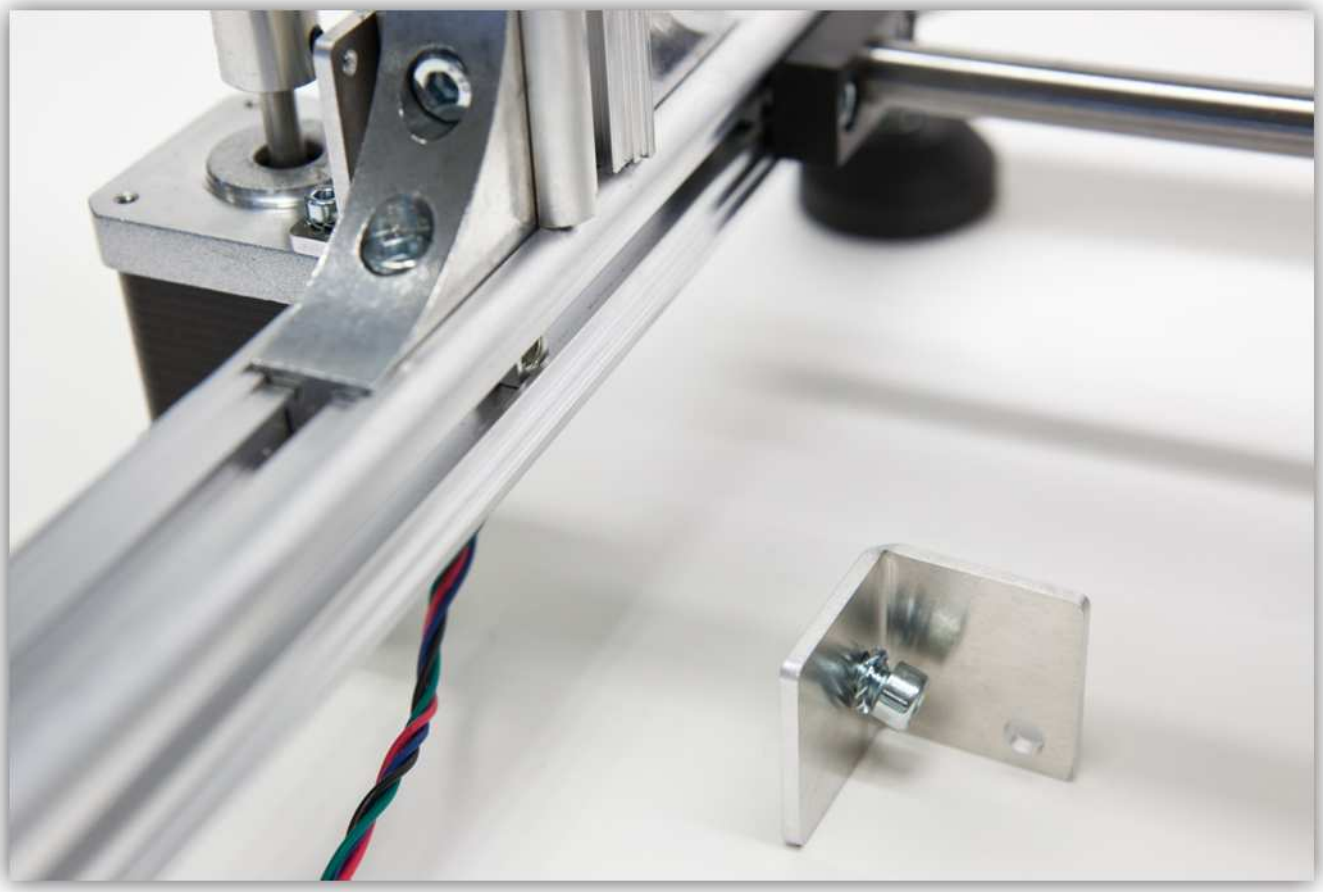


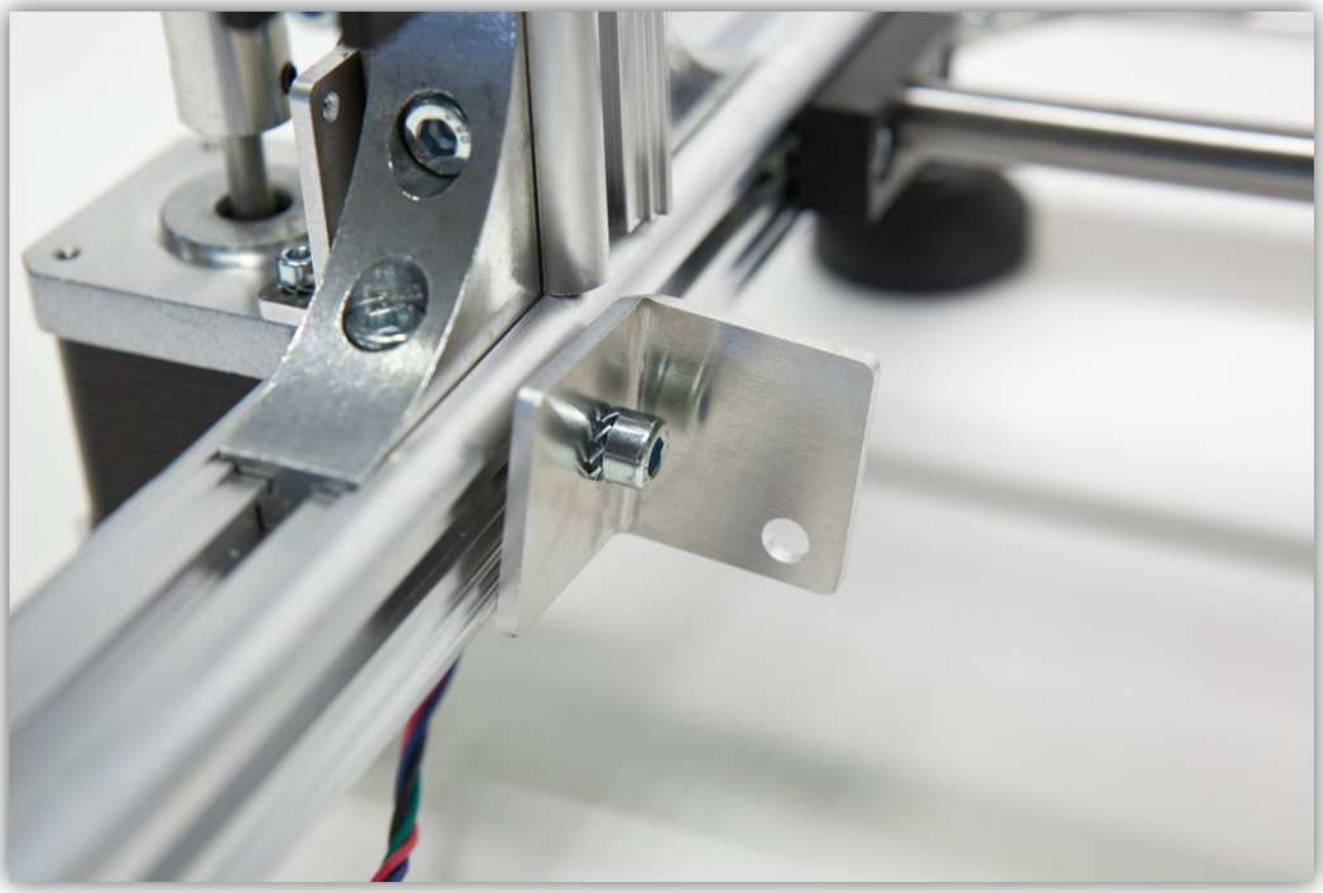
Take the two X BELT CLAMPS, 4 M4 bolts, 4 M4 toothed washers and 4 M4 nuts. Bolt the X BELT CLAMPS as shown to the X CARRIAGE. **Notice the orientation of all the components.**





Take the short M5 bolt and an M5 toothed washer and screw the X PULLEY BRACKET to the square nut on the left side of the base frame you put there earlier. **Do not fully tighten the bolt.**

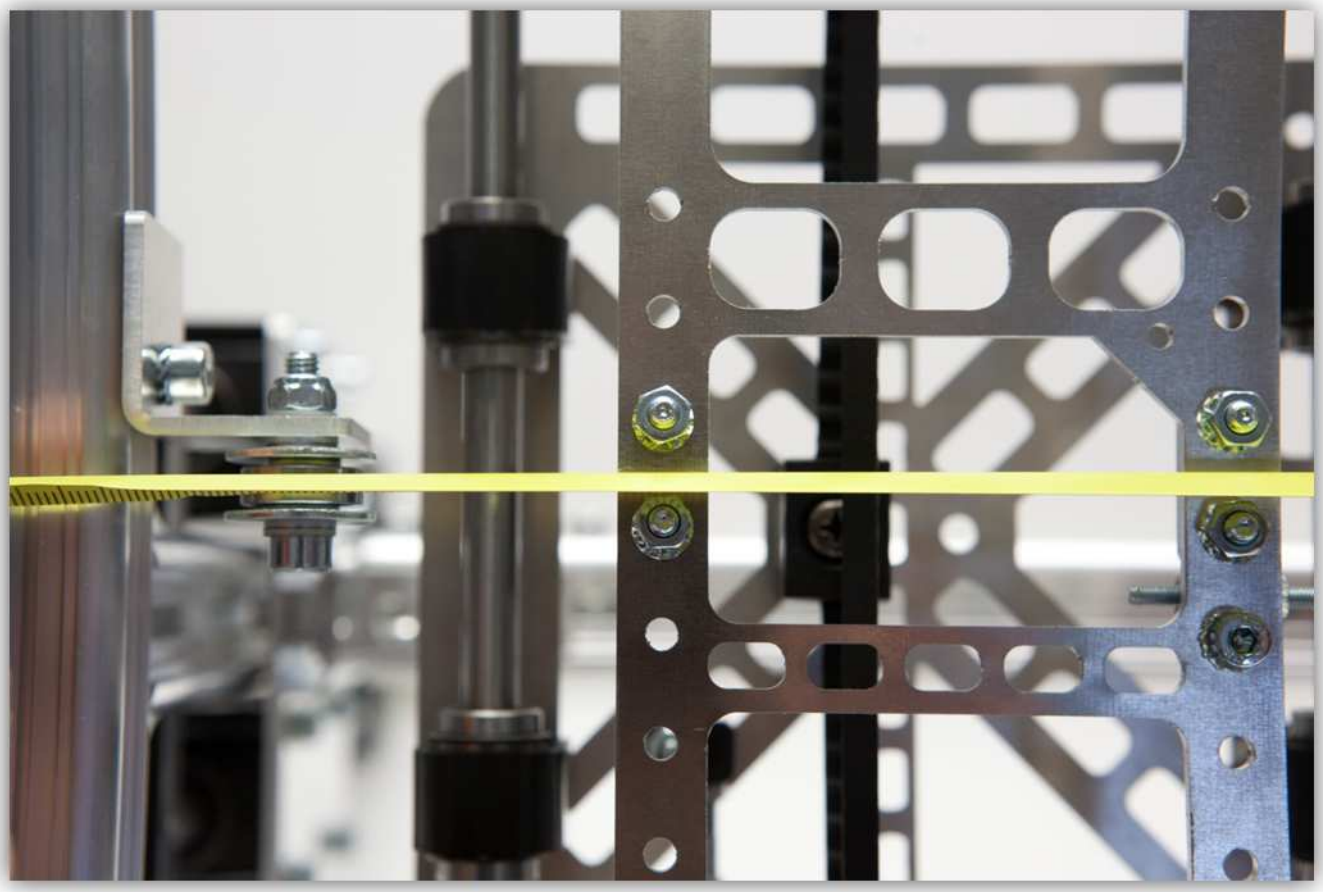




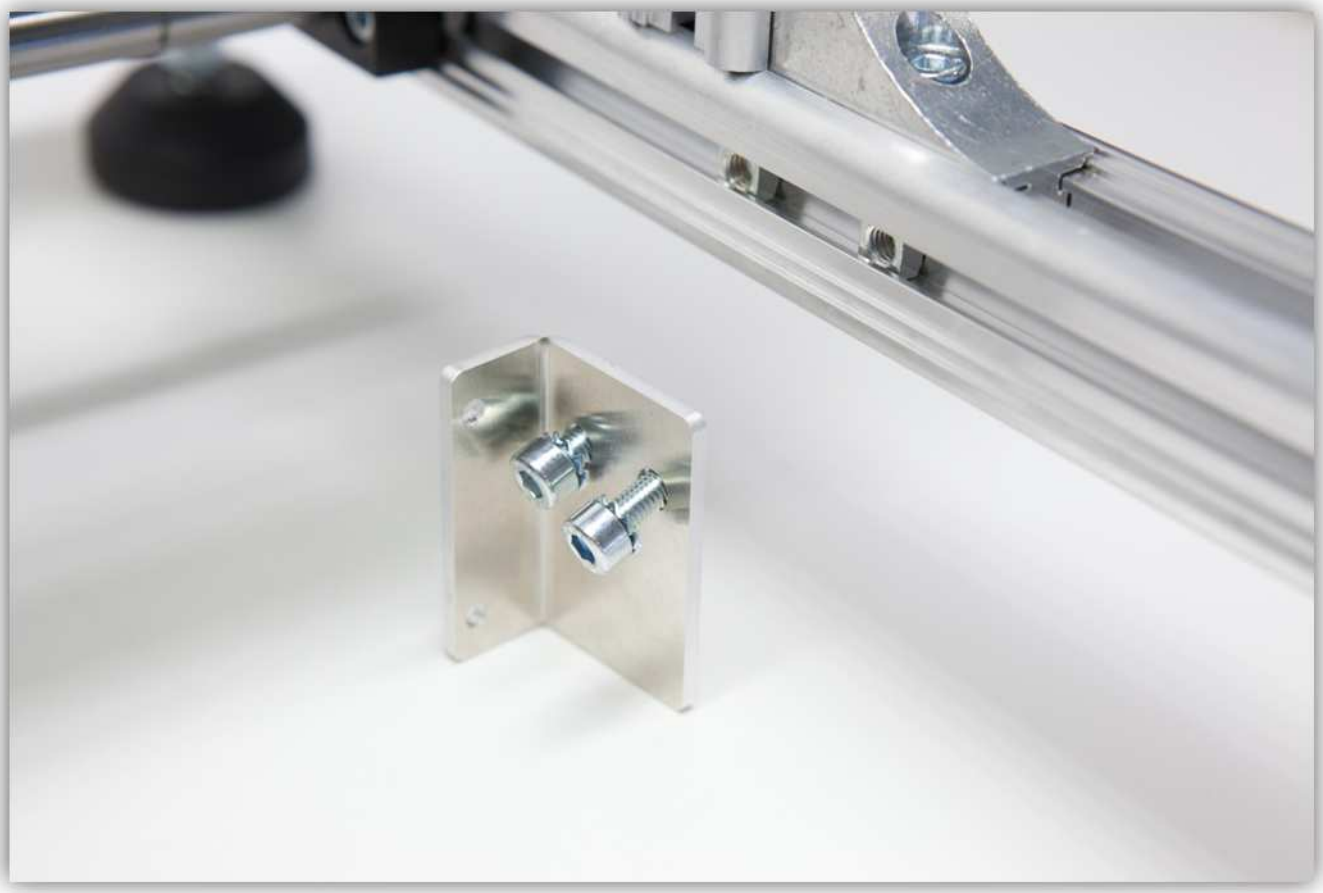
Take the large M5 bolt, 6 small M5 washers, 2 large M5 washers and 1 625 bearing. And assemble the following:

Use an M5 locking nut and an M5 washer to bolt this assembly to the X PULLEY BRACKET as shown in the picture below.

As you look from the bottom, the X BELT CLAMPS and the X pulley should be in one line. Slide the X PULLEY BRACKET until it is in one line with the two X BELT CLAMPS and then tighten the bolt holding it to the base frame. **Make sure it is perfectly horizontal.**



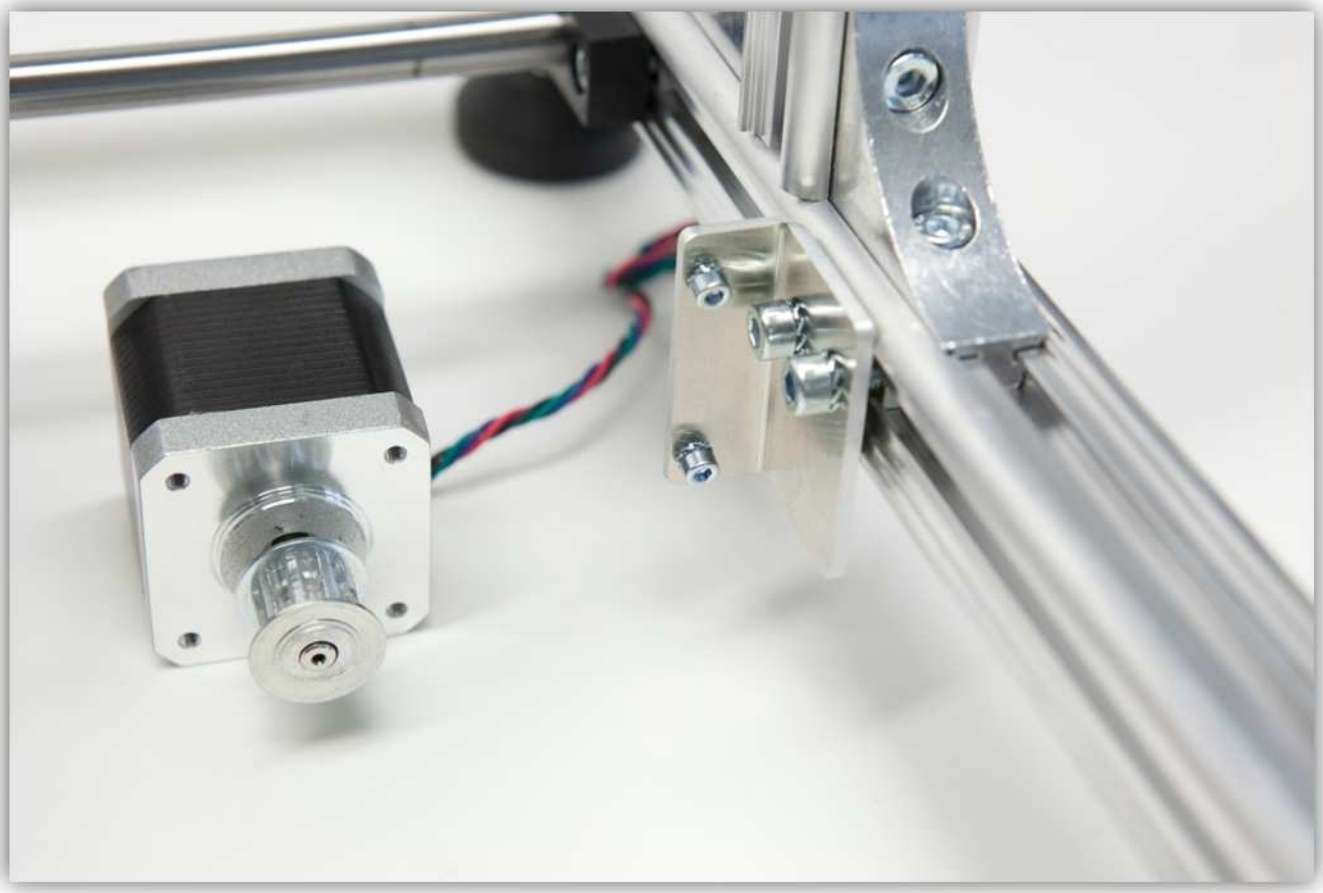
Take two short M5 bolts and two M5 toothed washers and screw the X MOTOR BRACKET to the 2 square nuts on the right side of the base frame you put there earlier. **Do not fully tighten the bolts.**



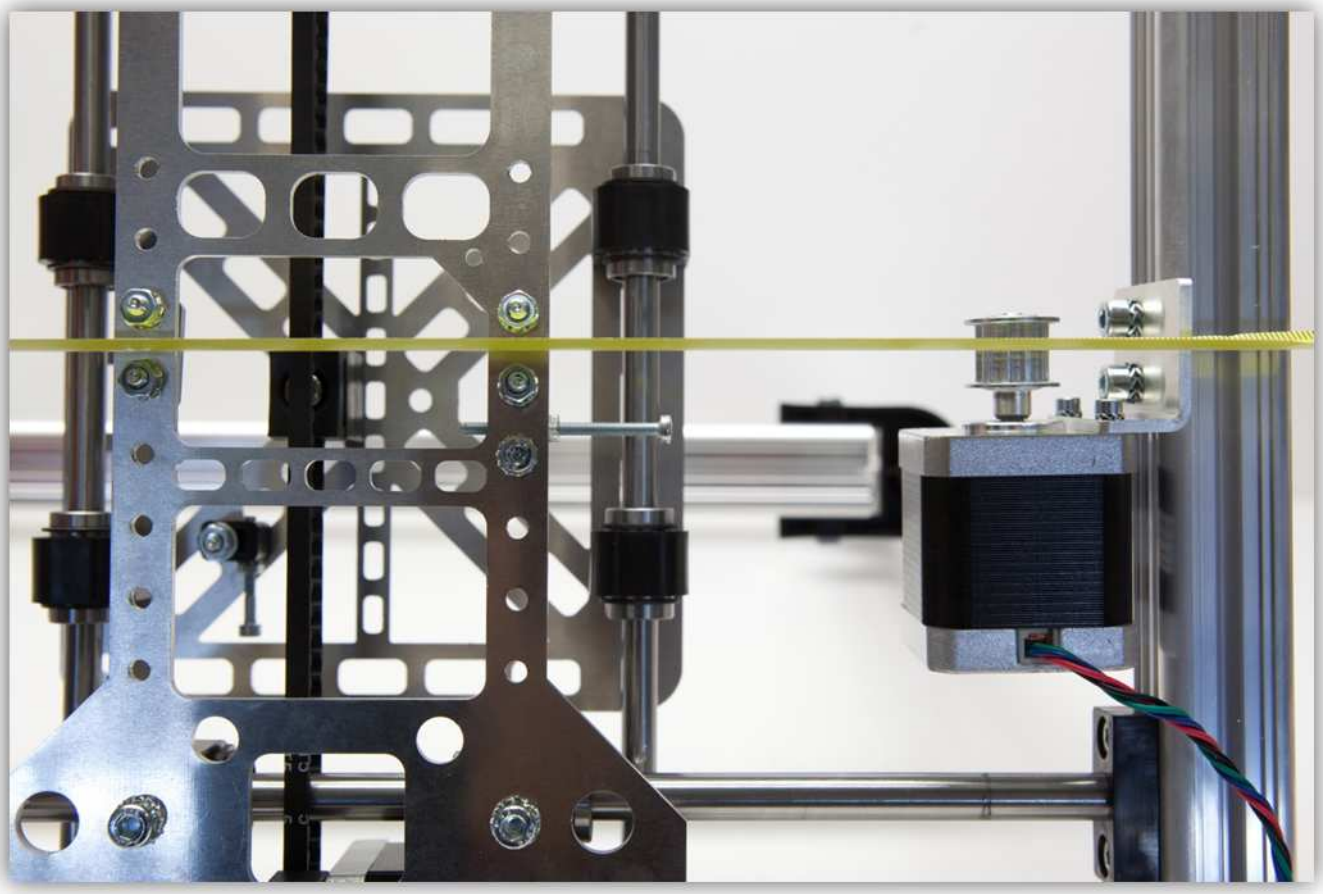
Take the small M3 locking bolt and screw it into the X TOOTHED PULLEY. Do not screw it in completely.

Slide the toothed pulley over the shaft of the motor and tighten the small M3 bolt. **Watch the orientation of the pulley closely and make sure it is flush at the top.**

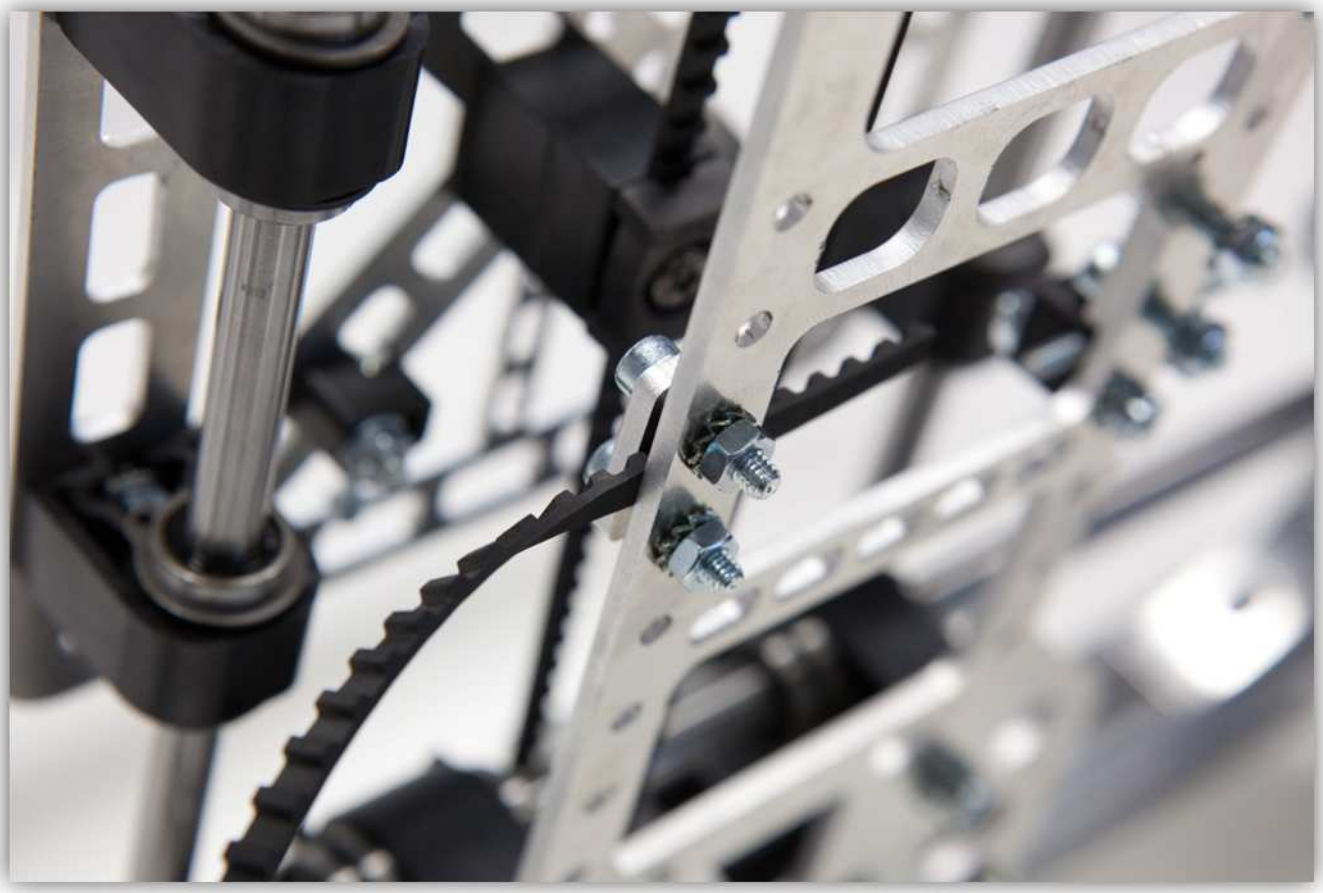
Take the 2 M3 bolts and the M3 toothed washers and use them to bolt the motor in place.



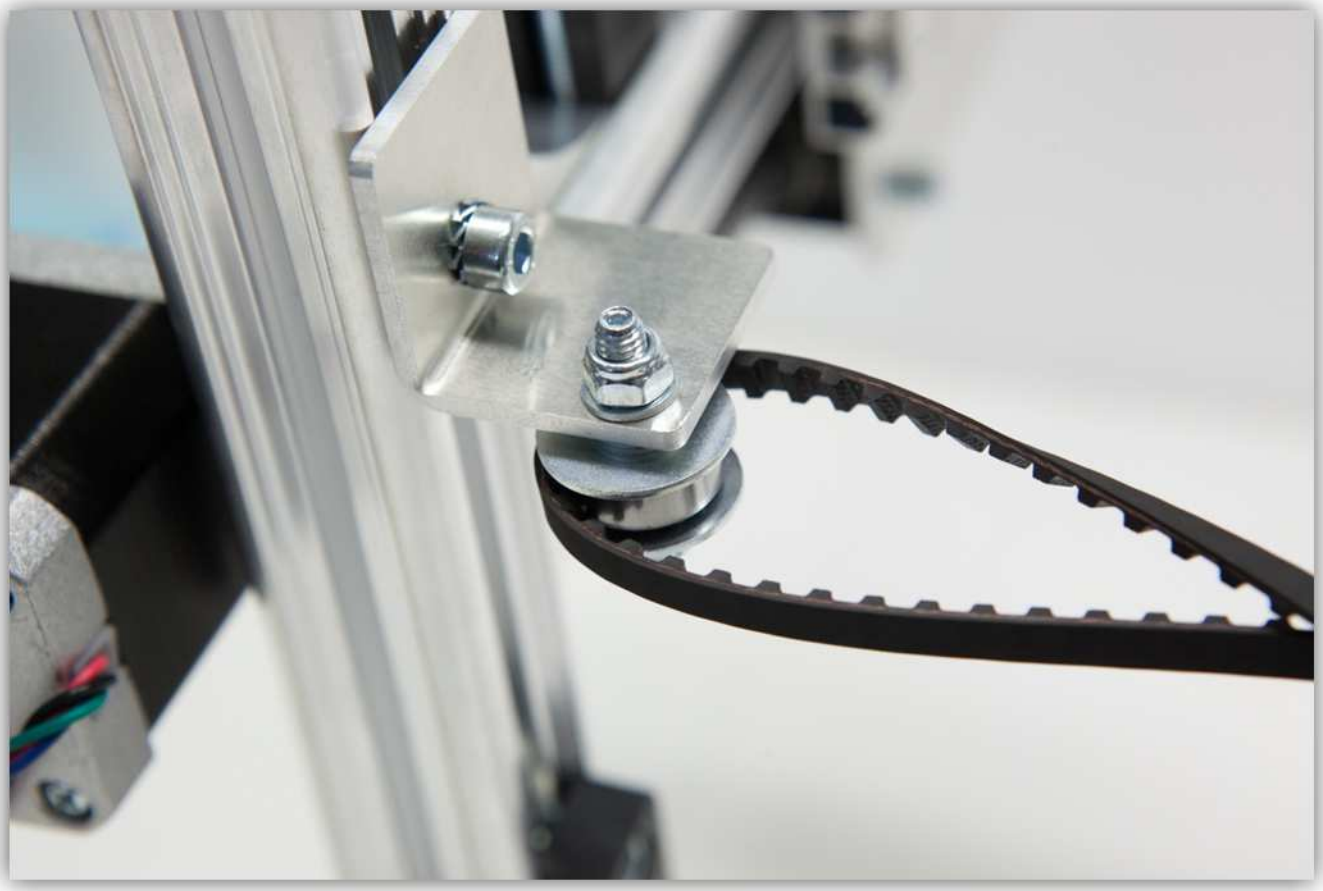
The pulley of the motor should be in line with the 2 X BELT CLAMP pieces. Slide it in place and tighten the bolts. **Make sure it is completely level.**



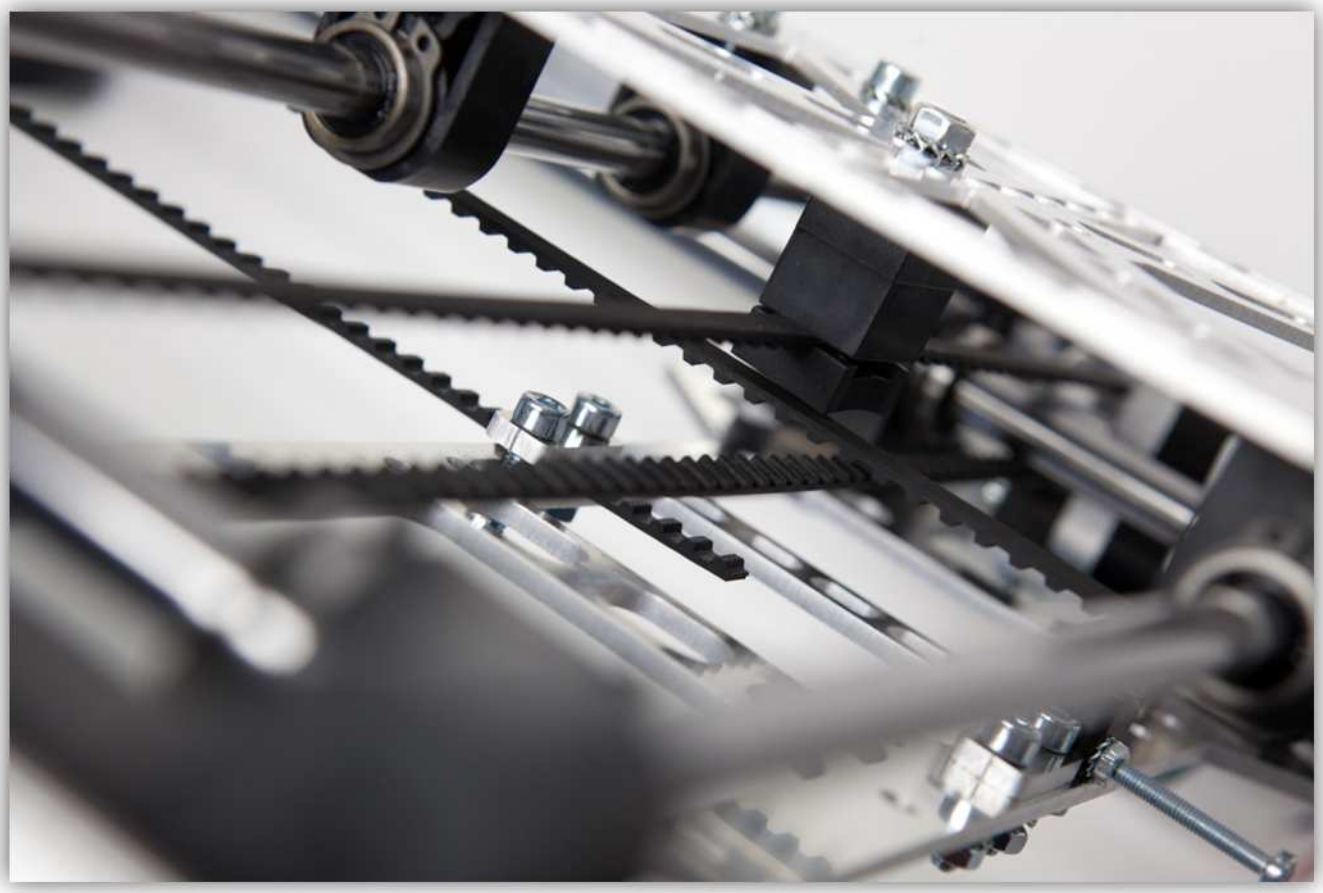
Now clamp the end of the belt into the leftmost X BELT CLAMP. Tighten the nuts.



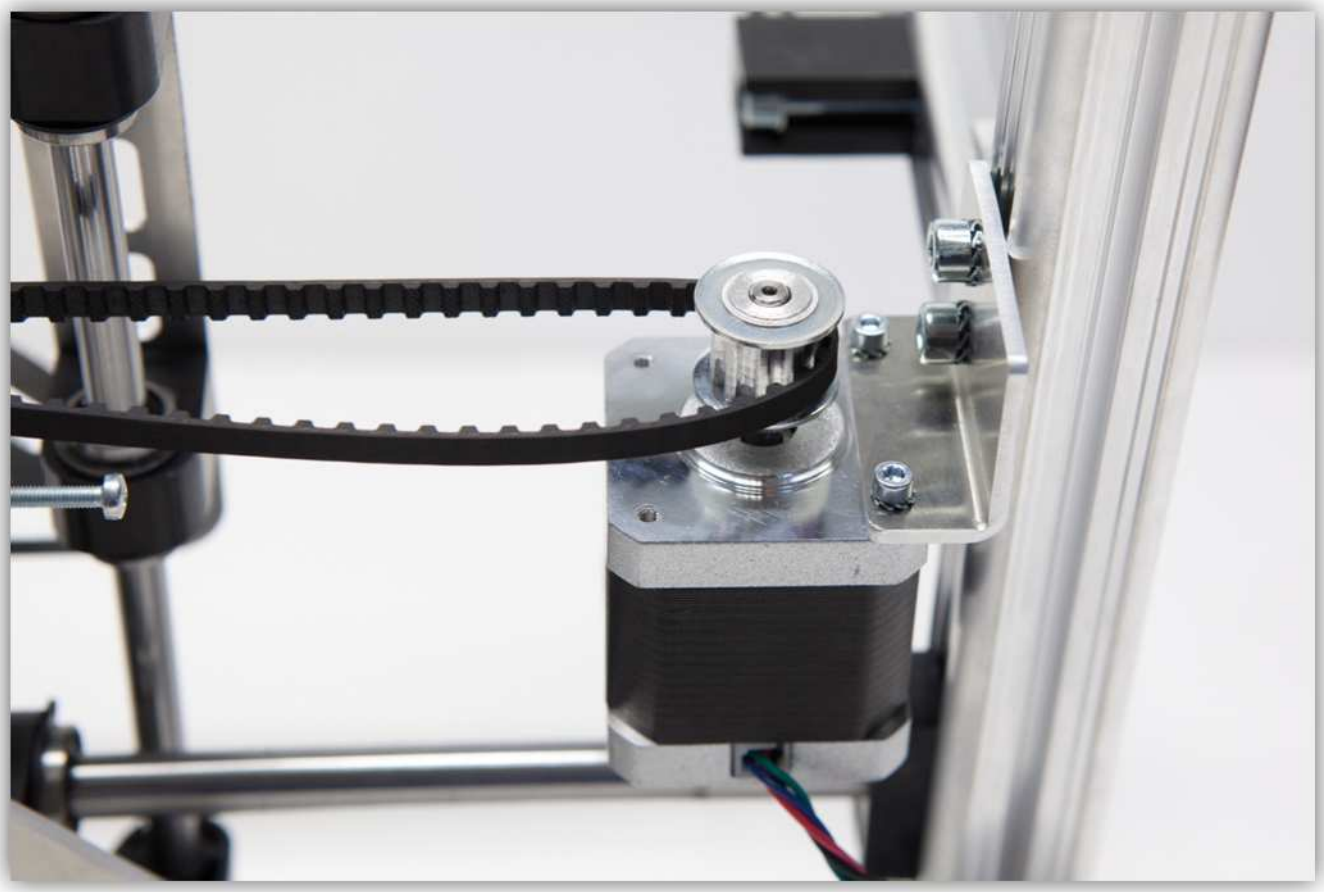
Thread the belt around the pulley.



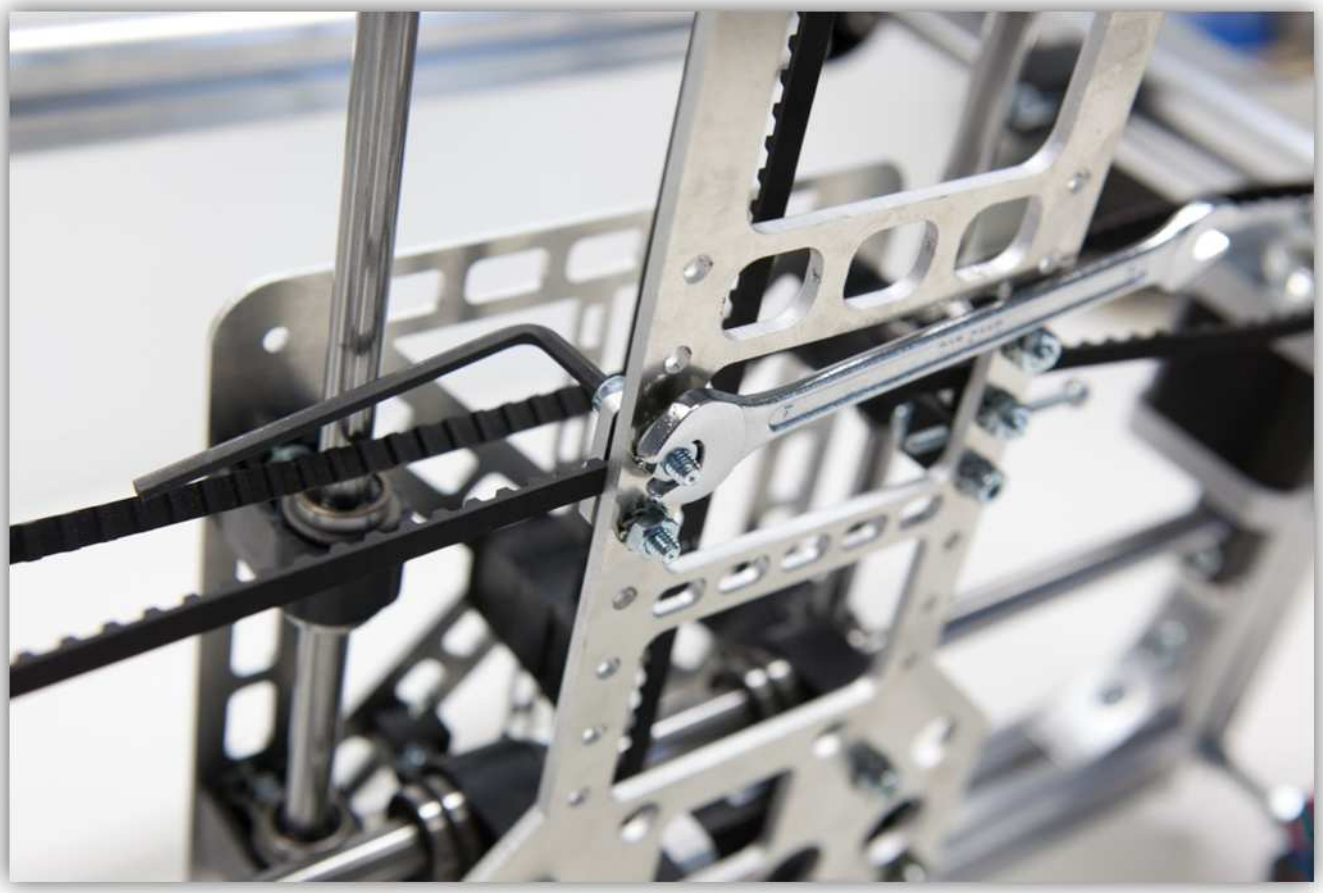
Loop the belt through the Y belt,

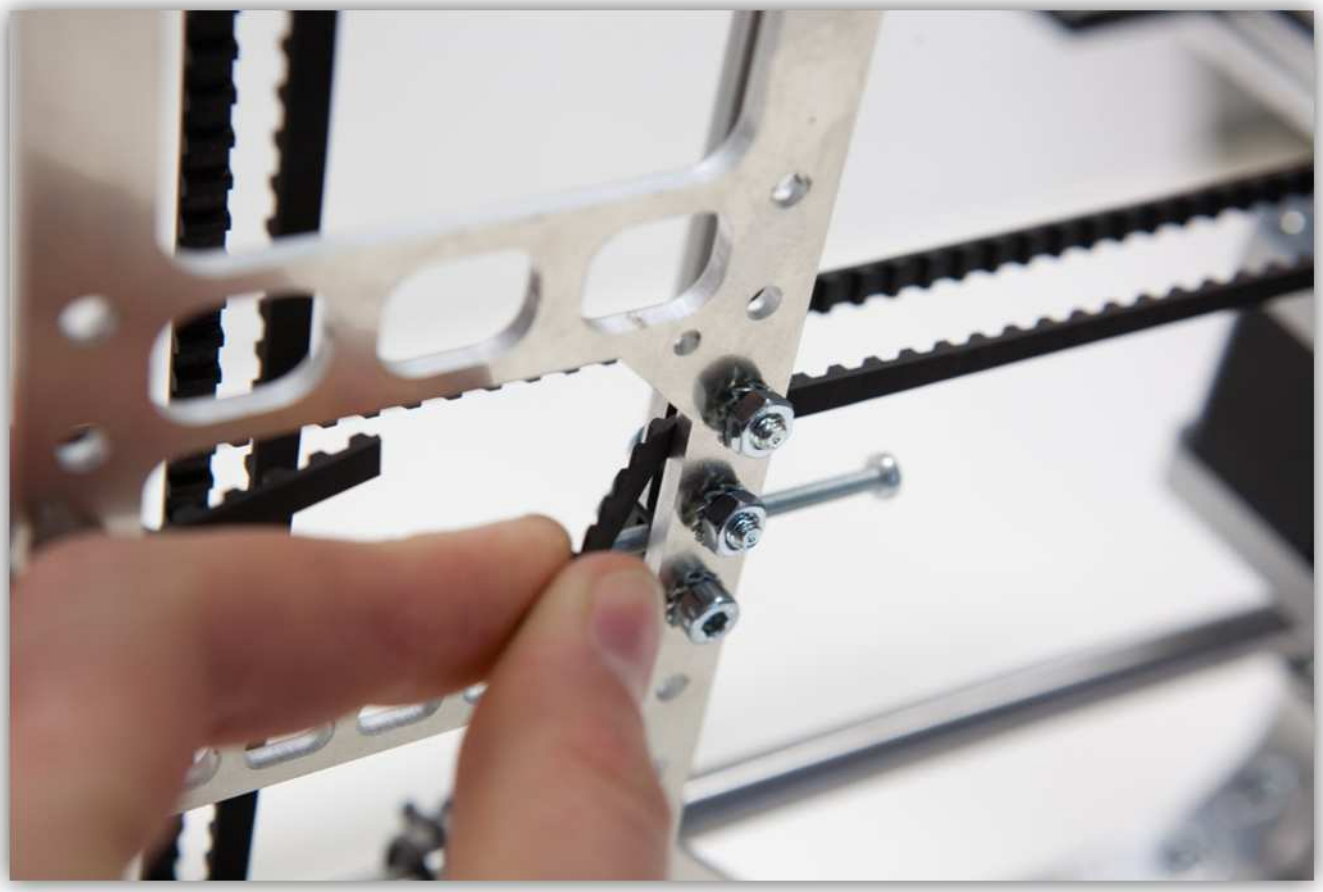


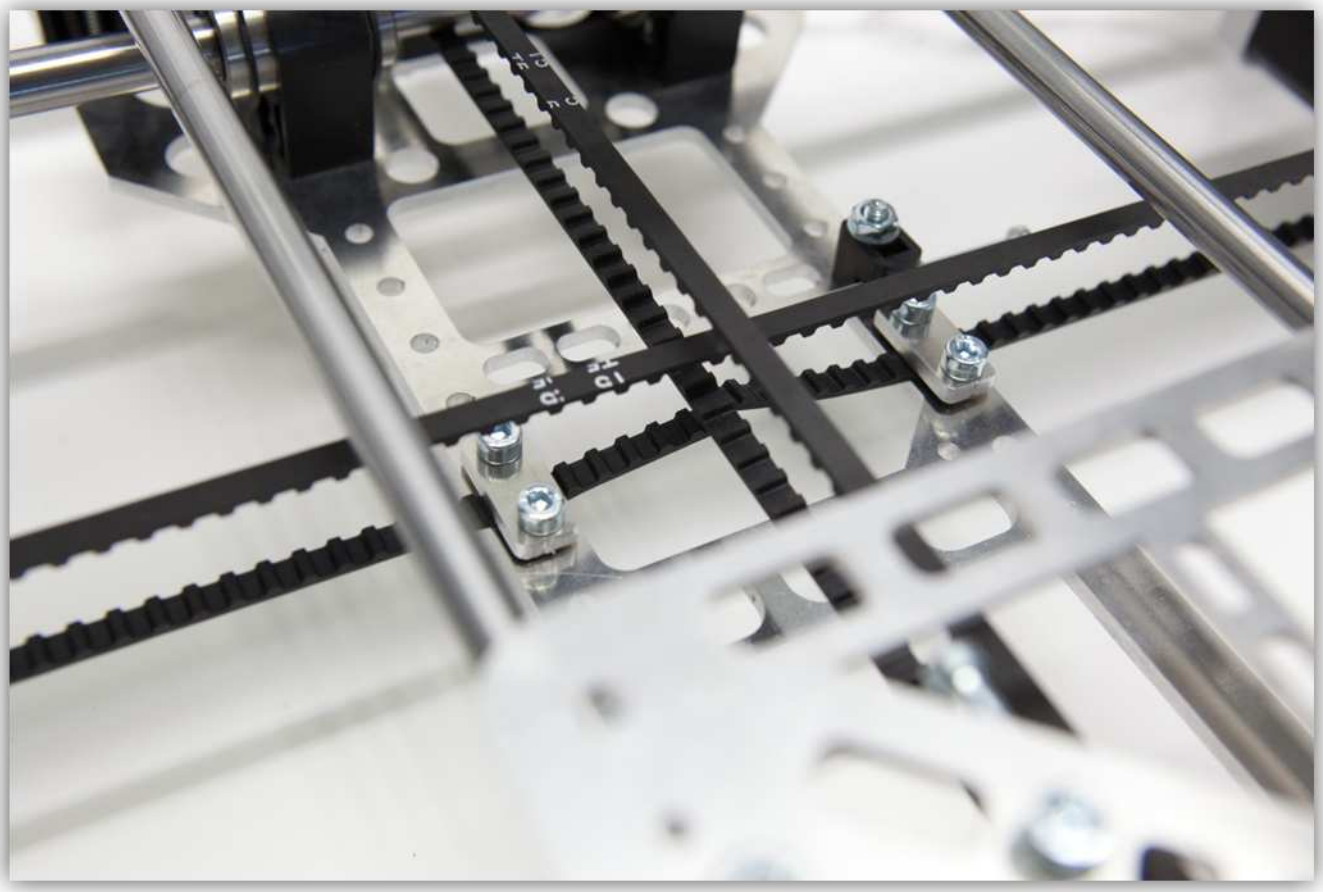
and around the motor pulley.



Clamp the end of the belt between the X BELT CLAMP on the right. Pull tension on the belt before tightening the nuts on the X BELT CLAMP.

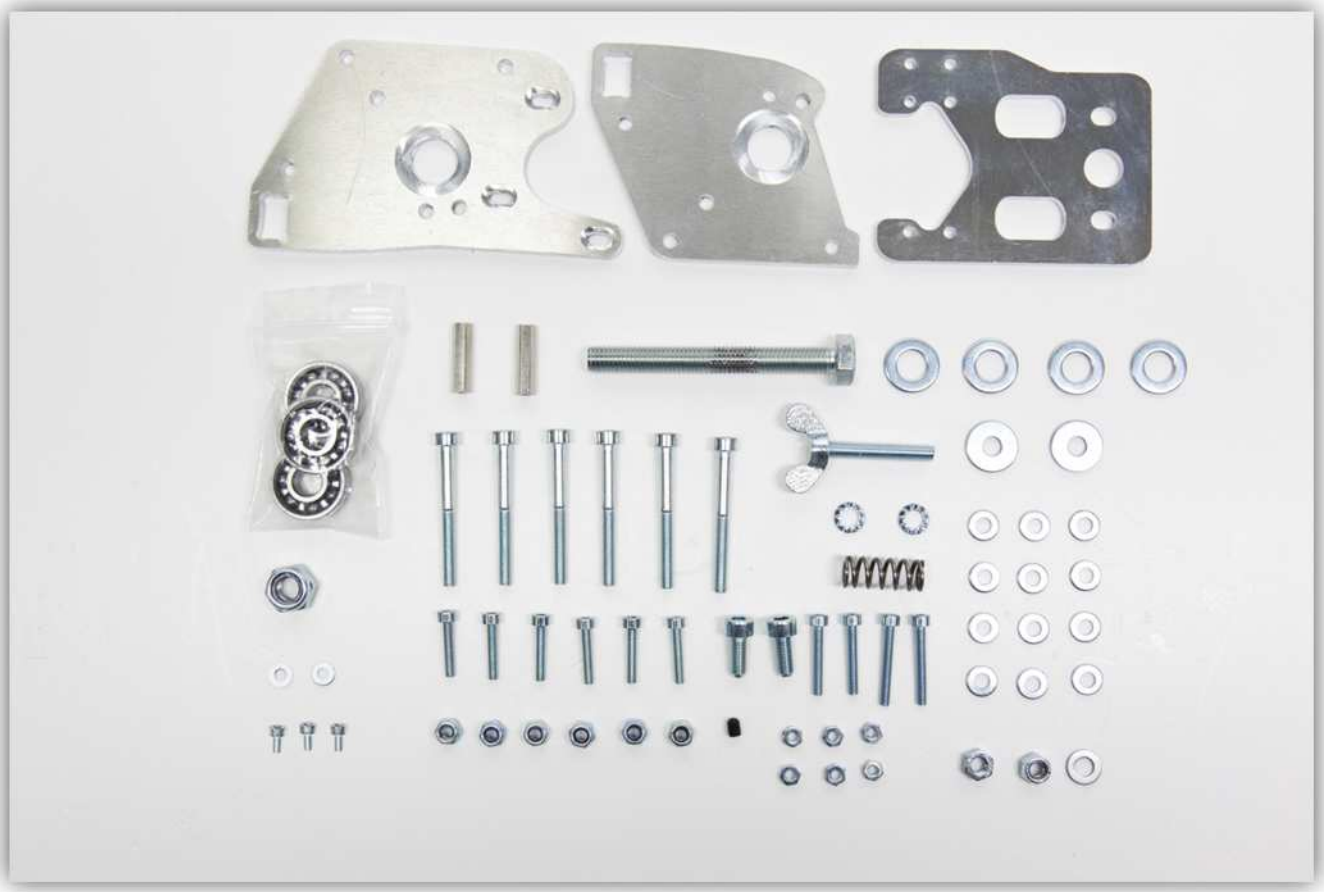






009 – ASSEMBLING THE EXTRUDER

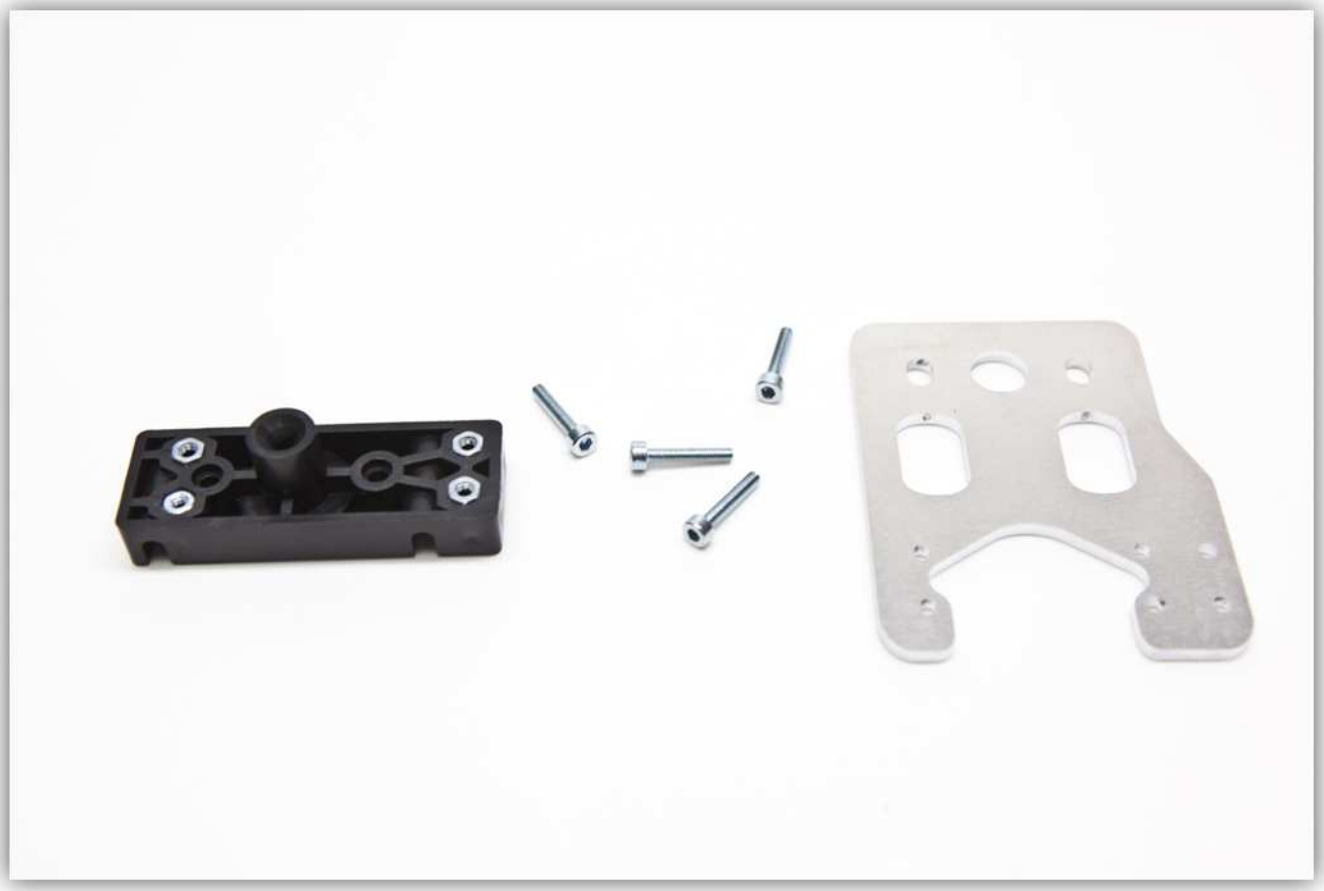
Take the parts out of the bag labelled with 30.



Now take the pieces as shown in the picture below out of the bag containing the plastic parts (LARGE GEAR, SMALL GEAR, EXTRUDER BASE, EXTRUDER SPRING MOUNT, FILAMENT GUIDER, EXTRUDER BEARING CLAMP A, EXTRUDER BEARING CLAMP B). **Attention: there is one SMALL GEAR with a small threaded hole on the side this is the one you need, there are also 3 SMALL GEARS in a separate bag without the small threaded hole on the side, these are spare parts. Do not use one of these 3).**

Take 4 M3 nuts and push them into the EXTRUDER BASE as shown below.

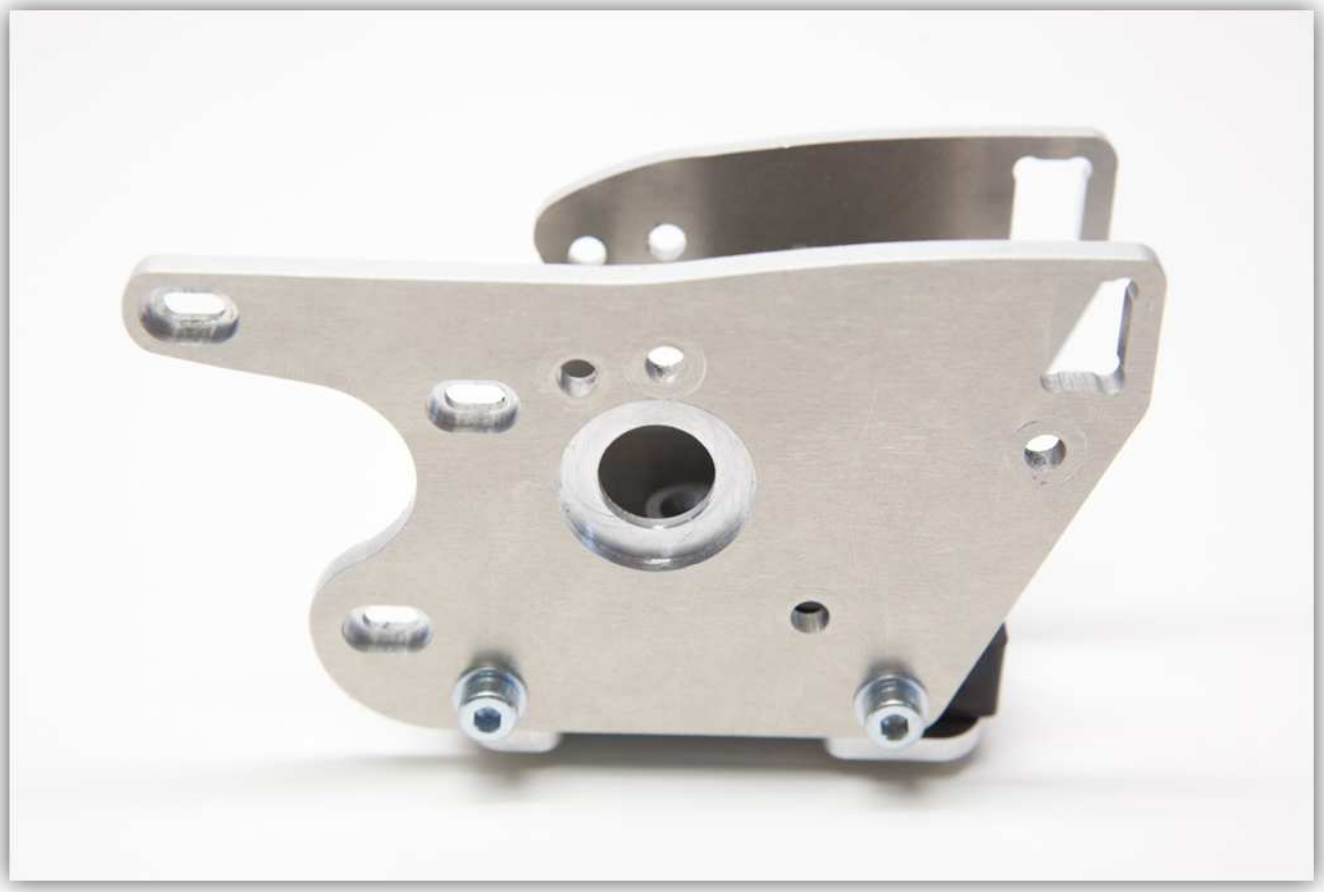
Take the EXTRUDER MOUNT PLATE and 4 M3x16 bolts.



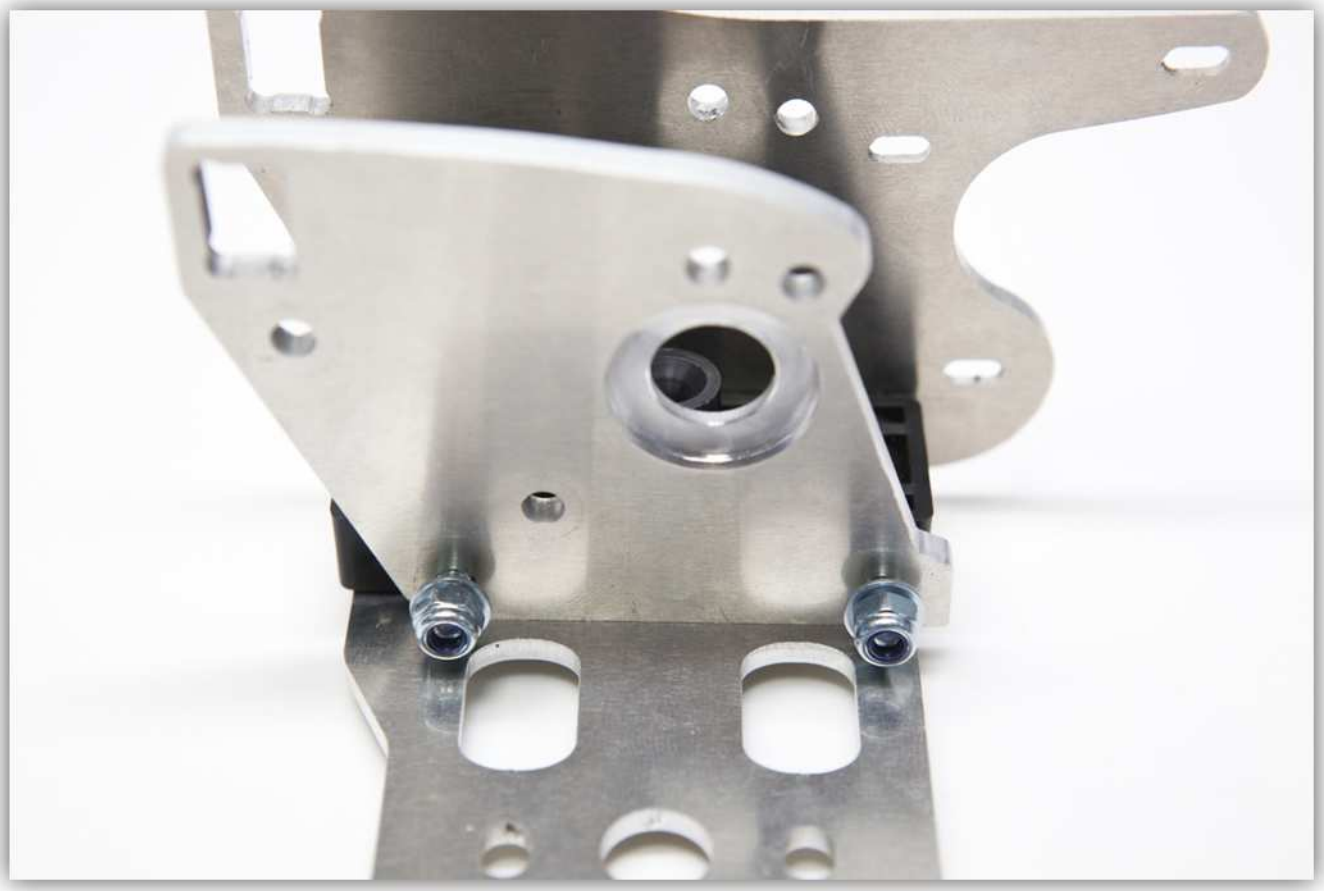
Bolt the EXTRUDER MOUNT PLATE to the EXTRUDER BASE. **Watch the orientation of the pieces closely. Do not fully tighten these bolts.**

Take 2 M4 bolts and 2 M4 washers.

Bolt the FRONT AND BACK EXTRUDER PLATE to the EXTRUDER BASE. **Watch the orientation of the parts closely.**

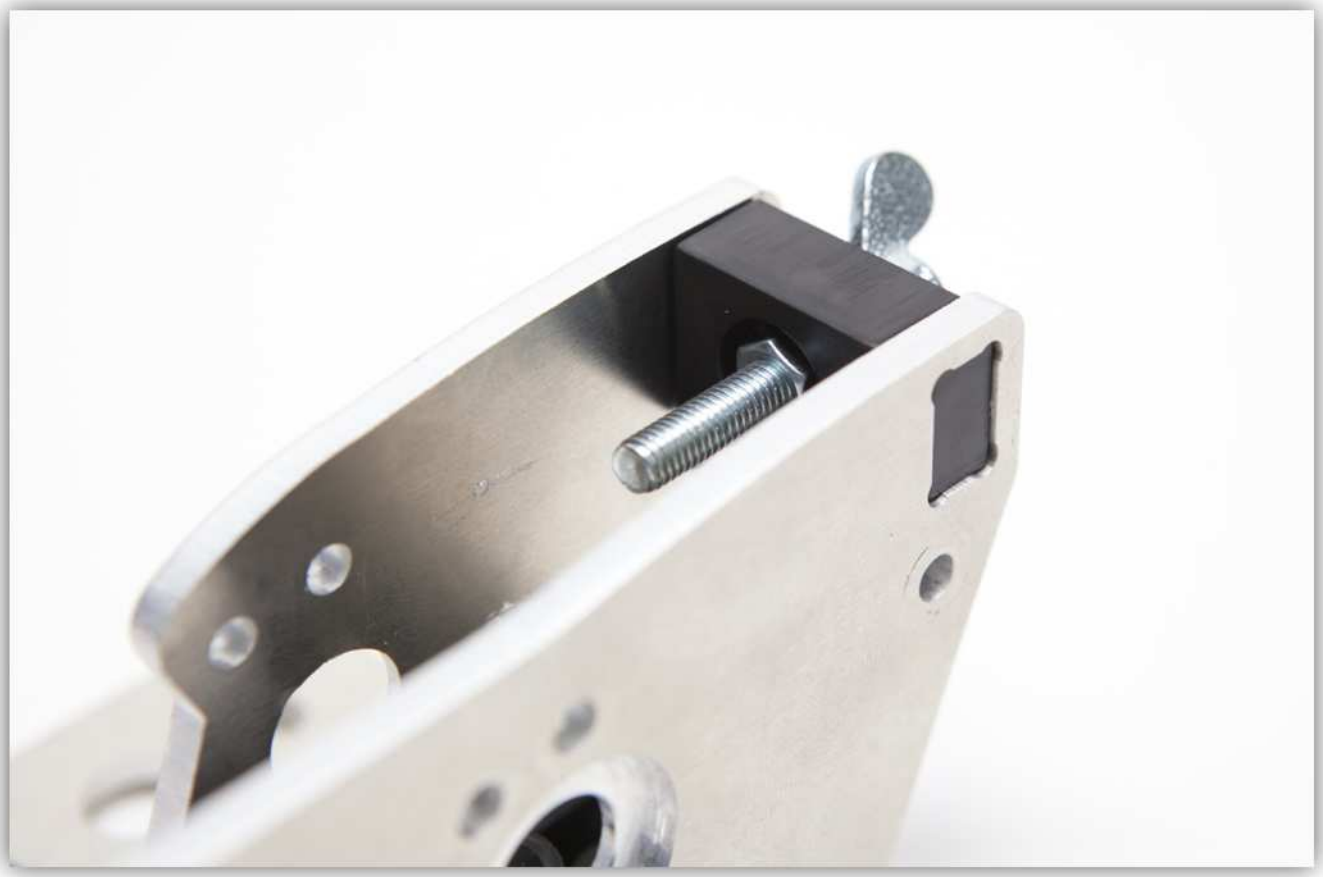


Use 2 M4 locking nuts and 2 M4 washers. **Do not tighten the nuts.**



Use the M5 butterfly bolt and an M5 nut as shown in the picture below together with the EXTRUDER SPRING MOUNT.

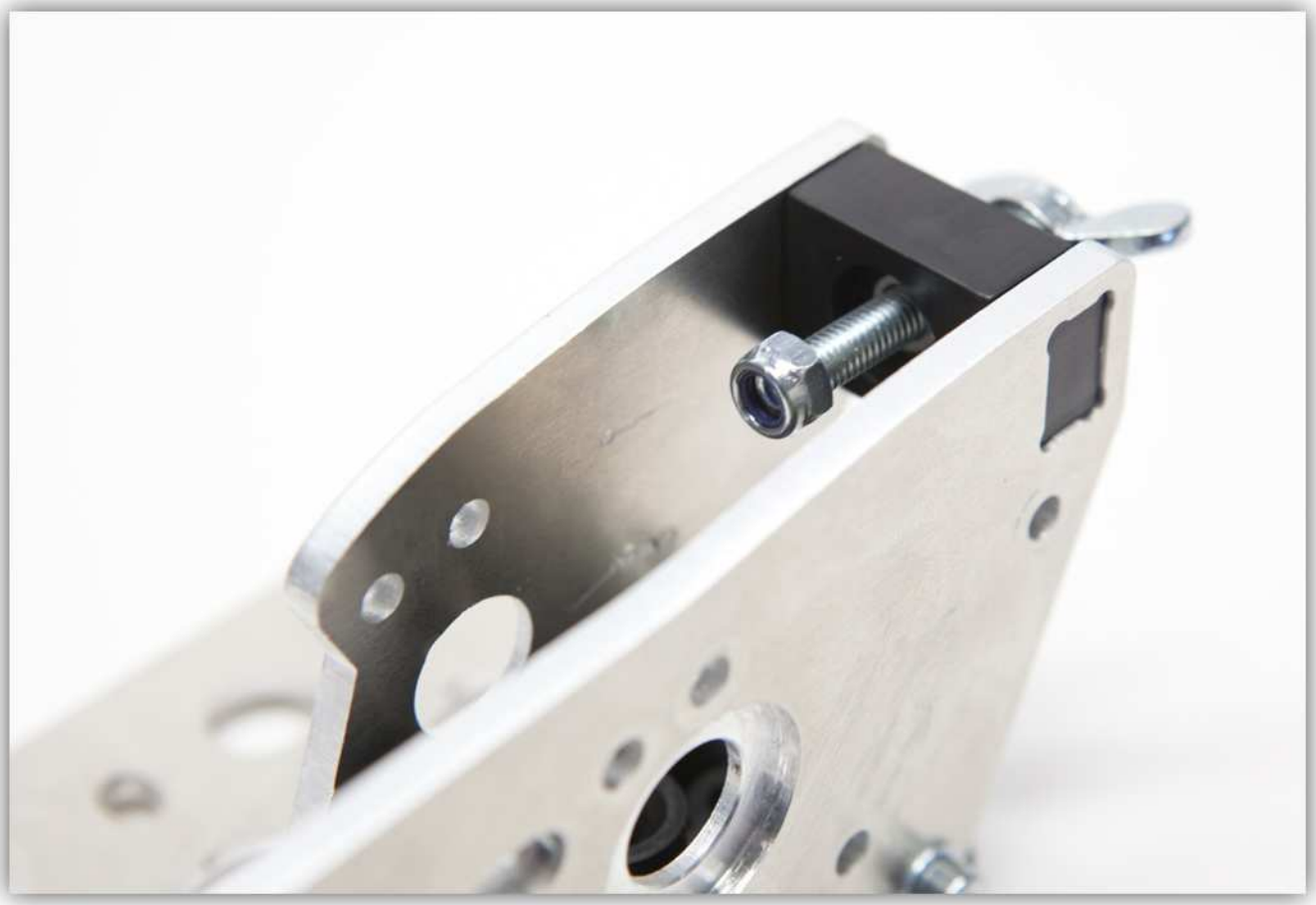
Slide this assembly into the FRONT AND BACK EXTRUDER PLATE.



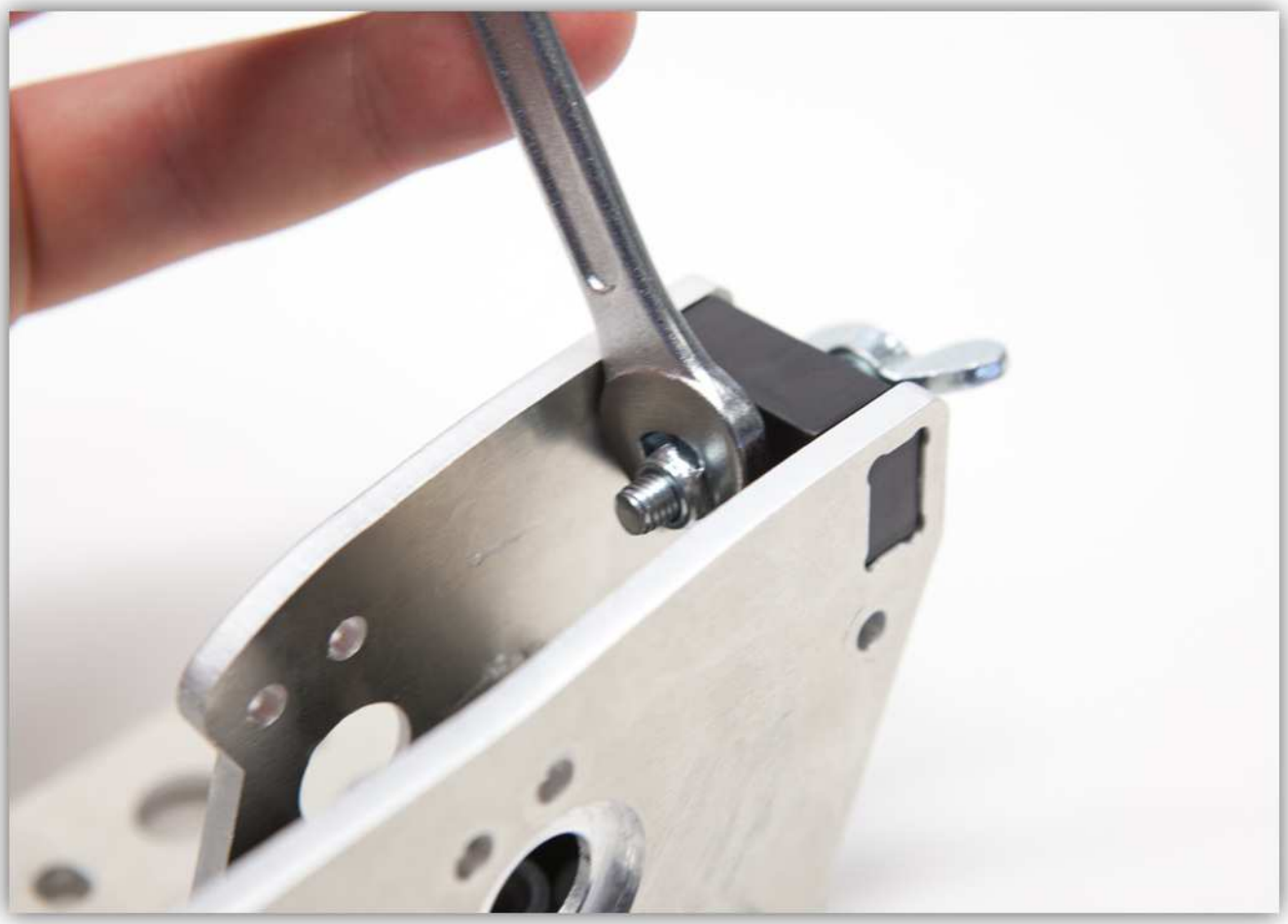
Tighten the bolts that hold the FRONT AND BACK EXTRUDER PLATE together.

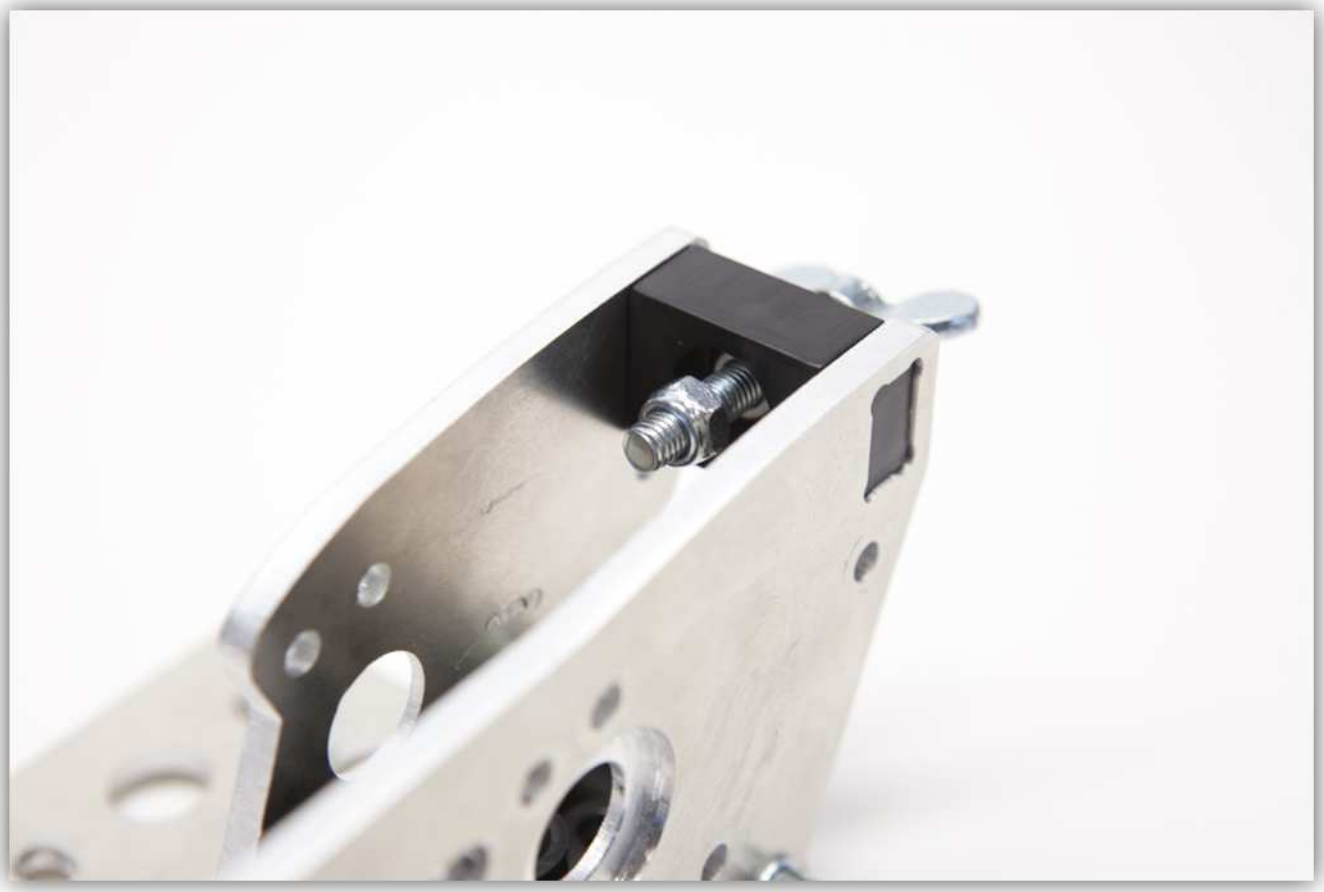
Tighten the bolts that hold the EXTRUDER MOUNT PLATE to THE EXTRUDER BASE.

Use an M5 locking nut and screw it on the end of the butterfly bolt.



Screw this bolt further down so there is about 3 to 5 mm (0.12" to 0.2") of thread from the butterfly bolt visible.



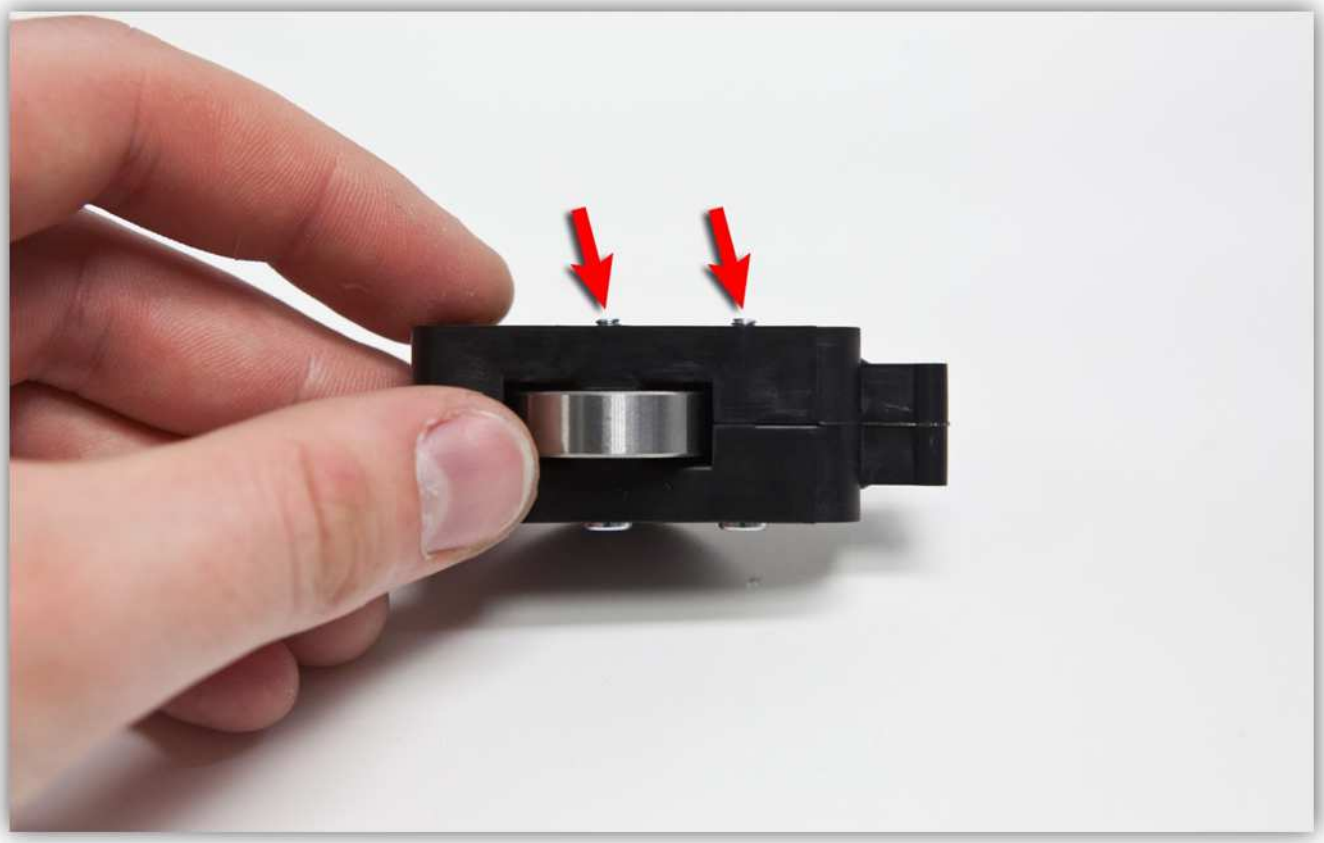


Push 2 M3 nuts into the EXTRUDER BEARING CLAMP A piece.

Take a 608 bearing out of the bag with 3 bearings and put it between the EXTRUDER BEARING CLAMP A and the EXTRUDER BEARING CLAMP B.

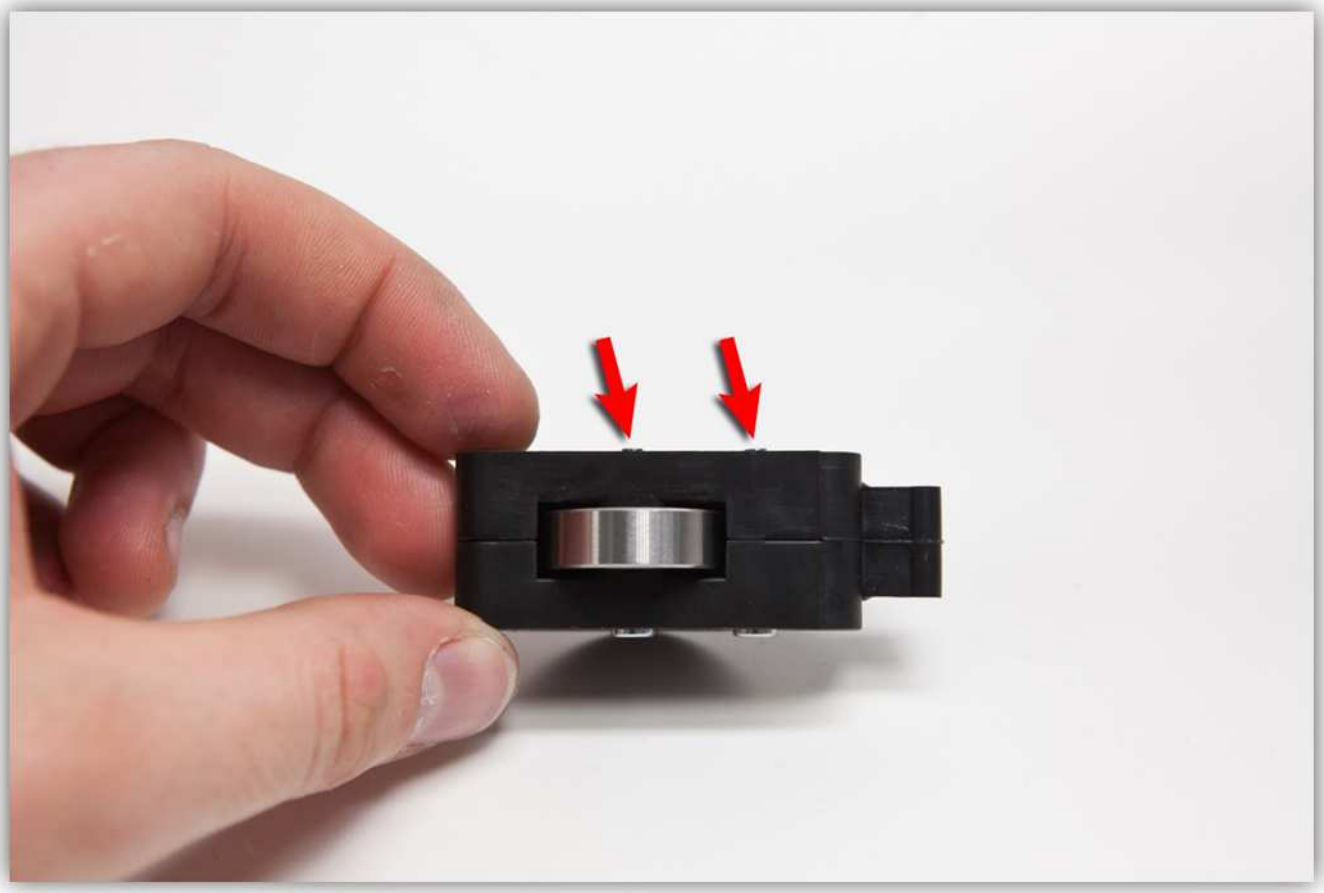
Take the 2 M3x20 bolts and bolt the two halves together.

If the bolts stick out a bit you should grind them down.

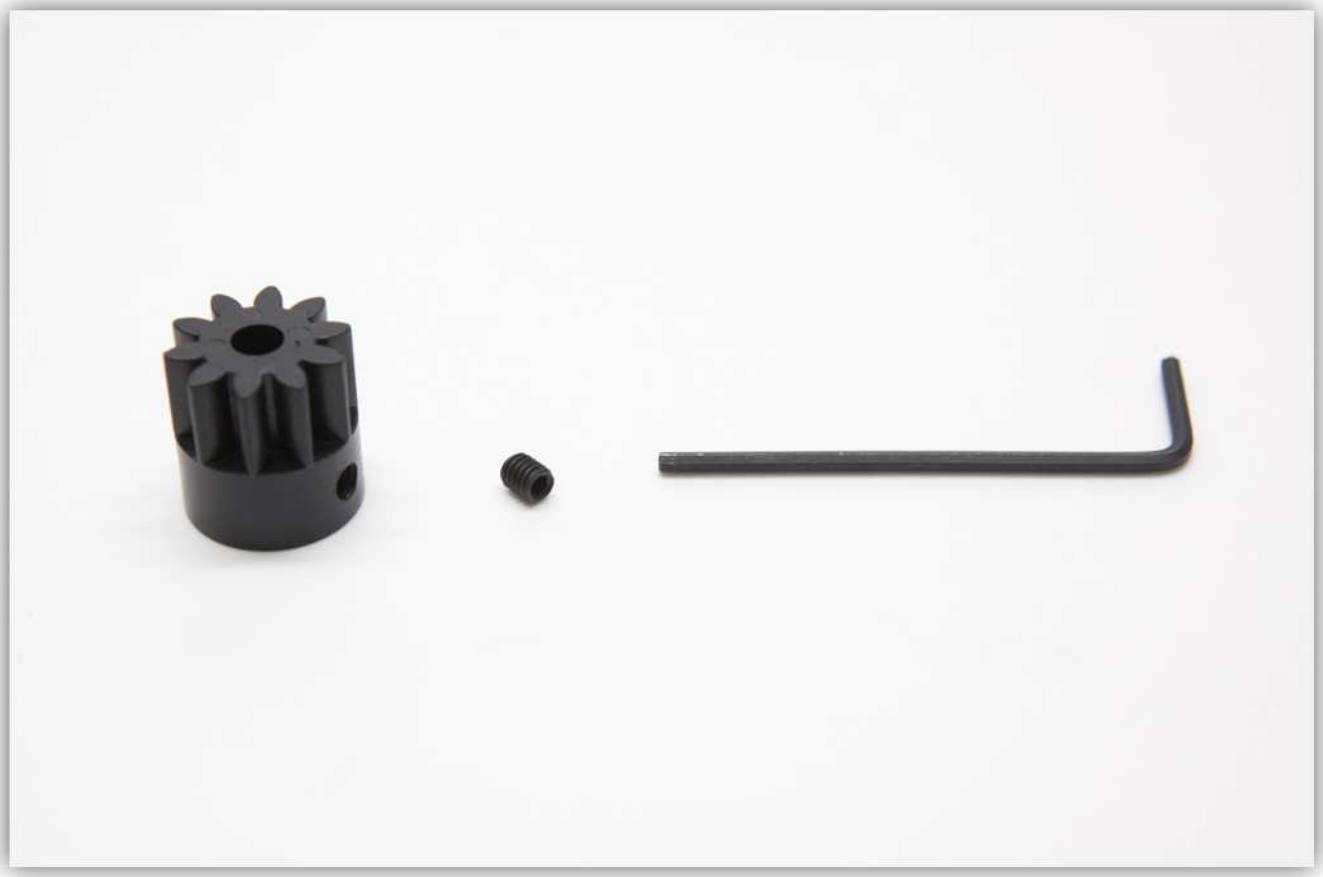


Use a small file and grind the bolts down. Make sure that none of the grindings end up in the 608 BEARING.

If the bolts are almost flush with the plastic they will be ok.



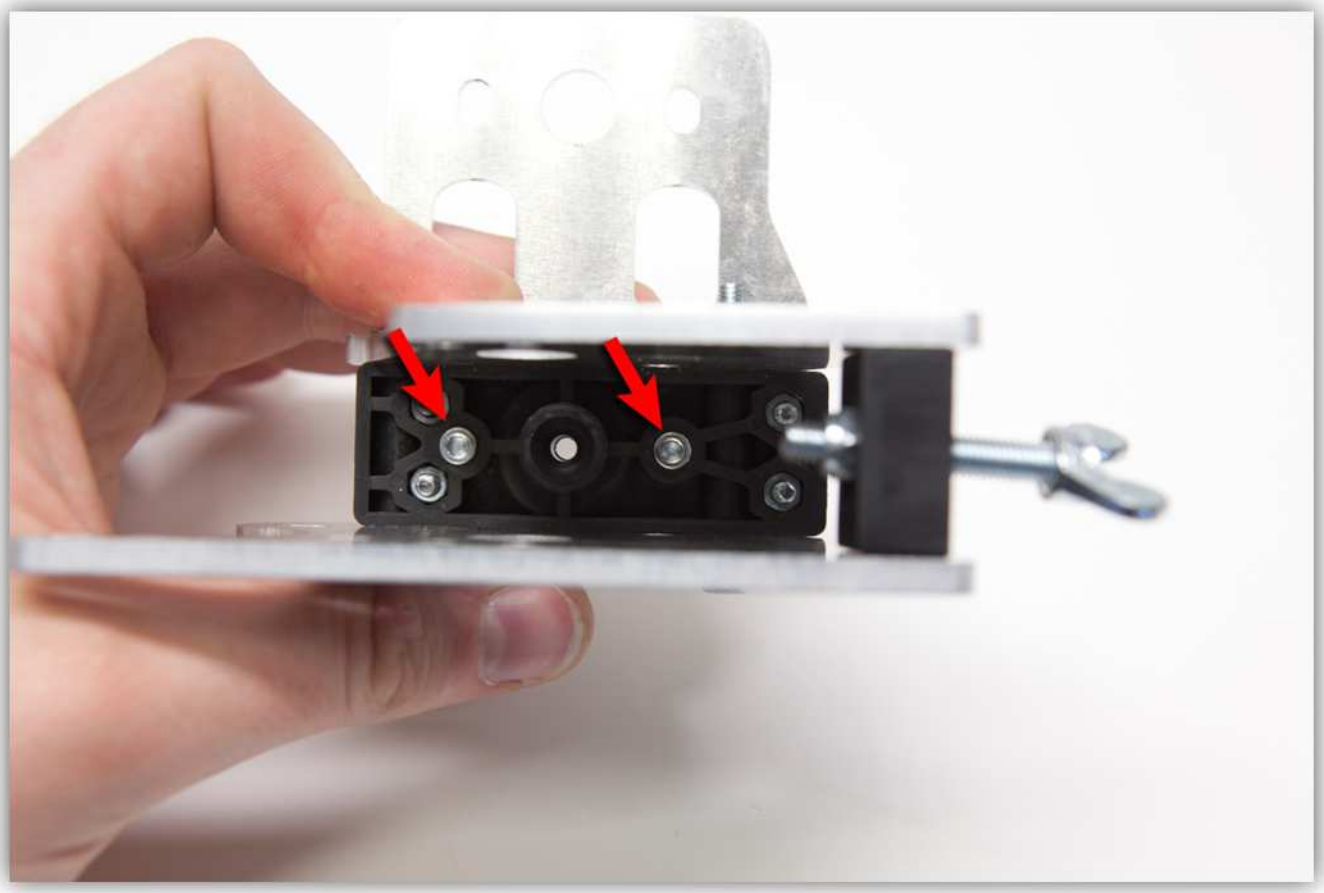
Now screw the small locking bolt (M4 x 5) in the small gear. **Do not screw it in completely.**

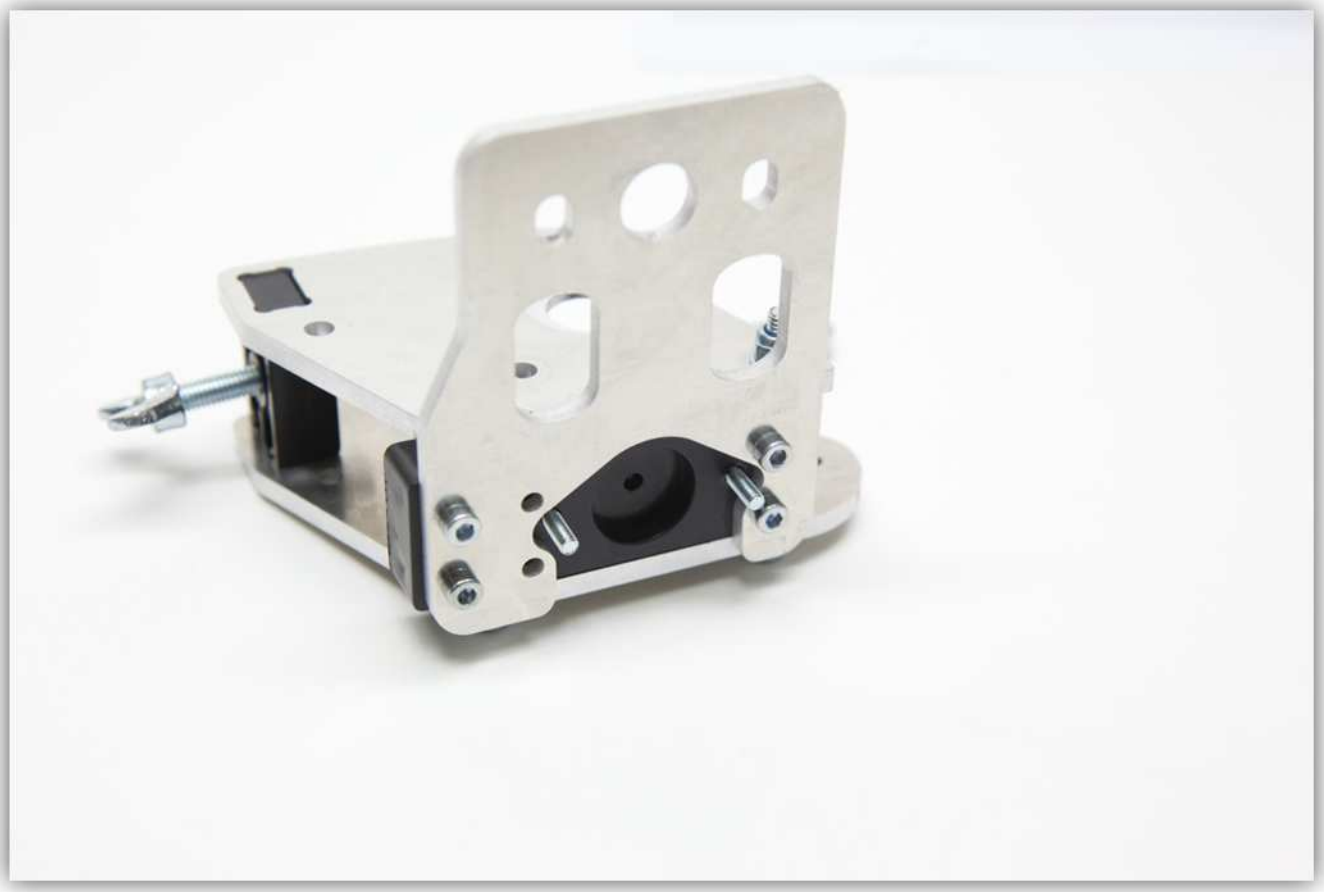


Now take a motor out of the package labelled with 9 and slide the small gear over the shaft. **Slide it down until there is just place for a piece of paper between the motor and the small gear.** Then tighten the small locking bolt.

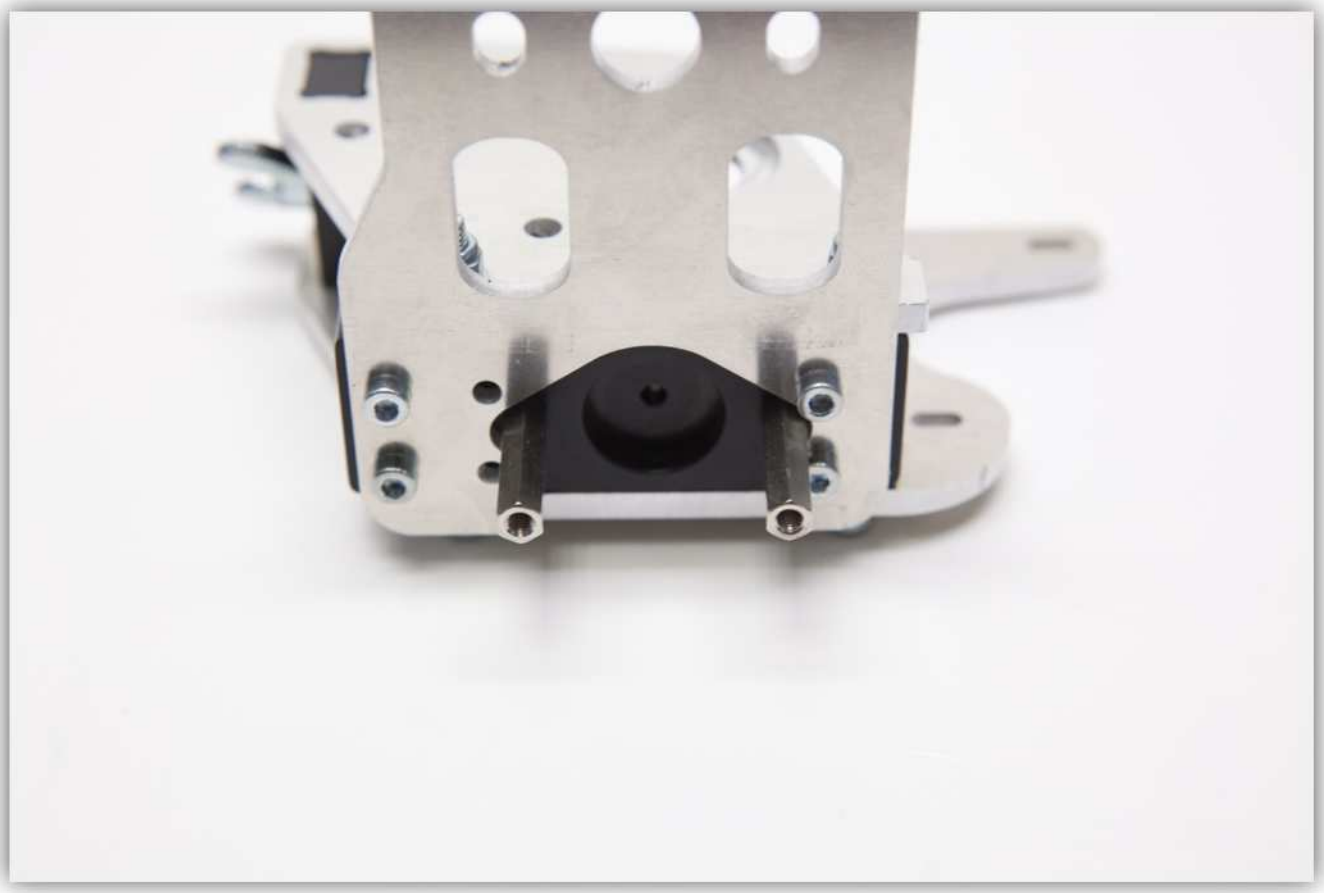
Now take the 2 metal spacers and two M3 x 16 bolts.

Slide the two bolts into the EXTRUDER BASE piece as shown in the picture below.

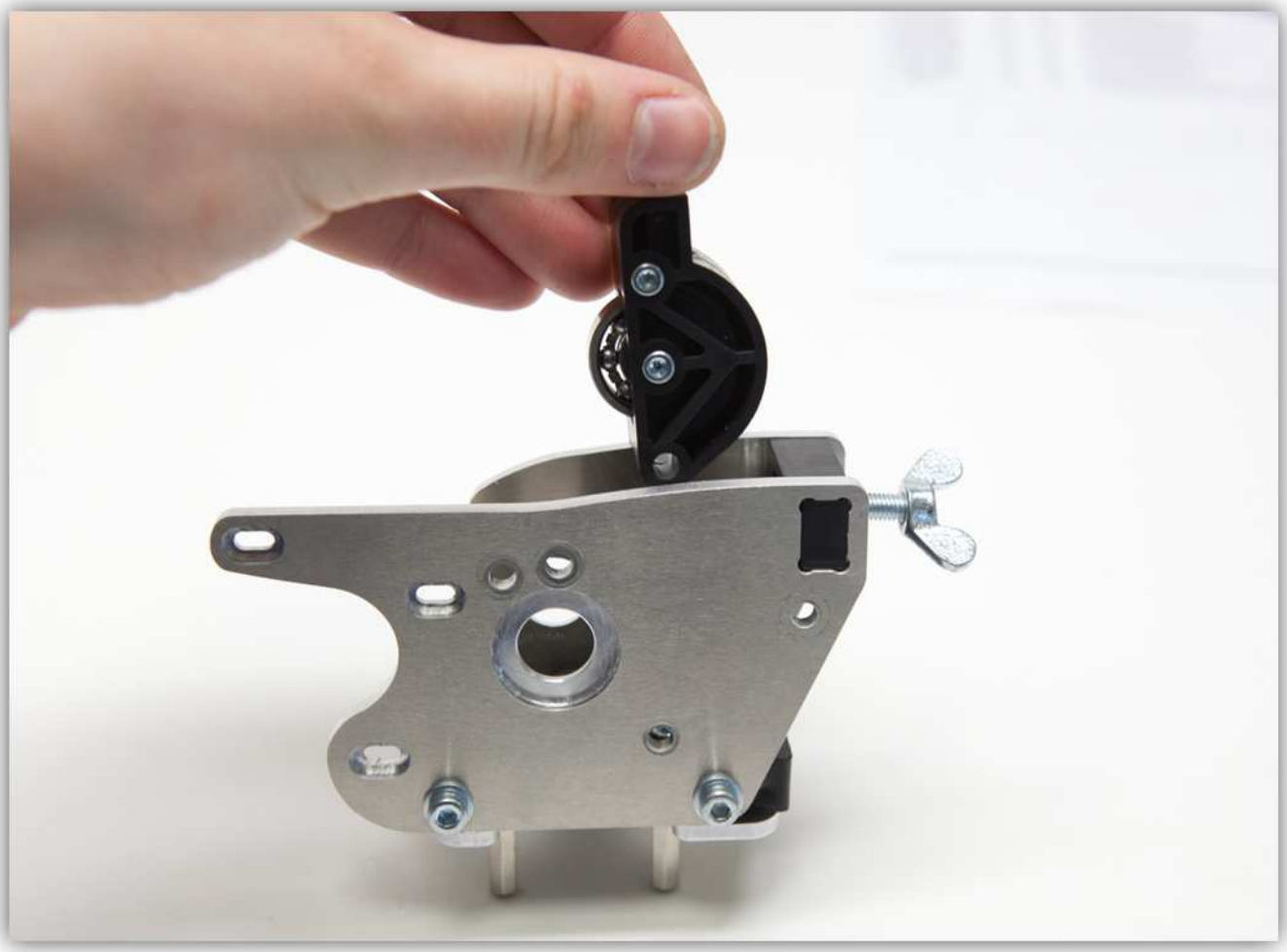




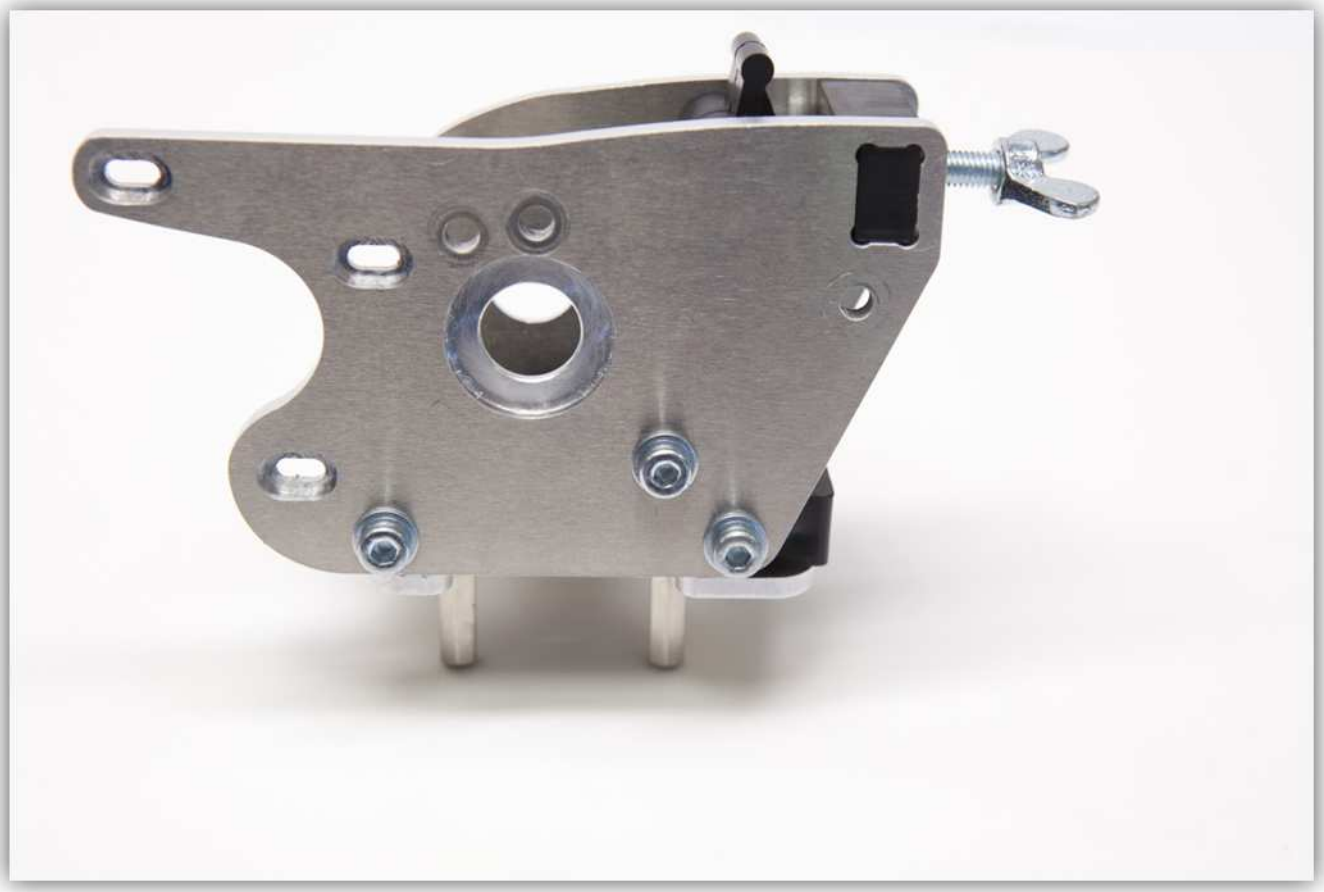
Tightly screw the metal spacers on these bolts.



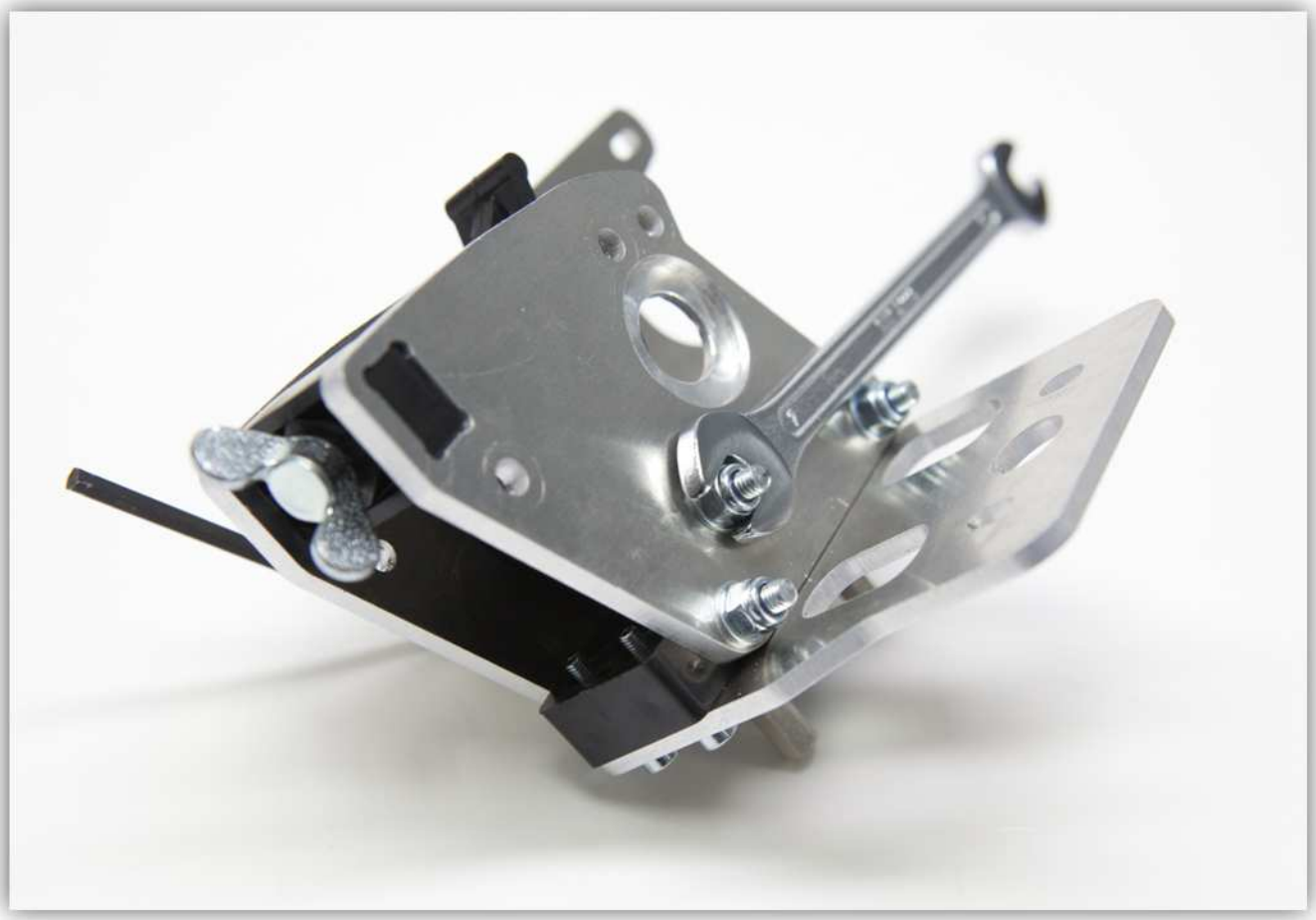
Slide the BEARING CLAMP assembly into the extruder assembly.



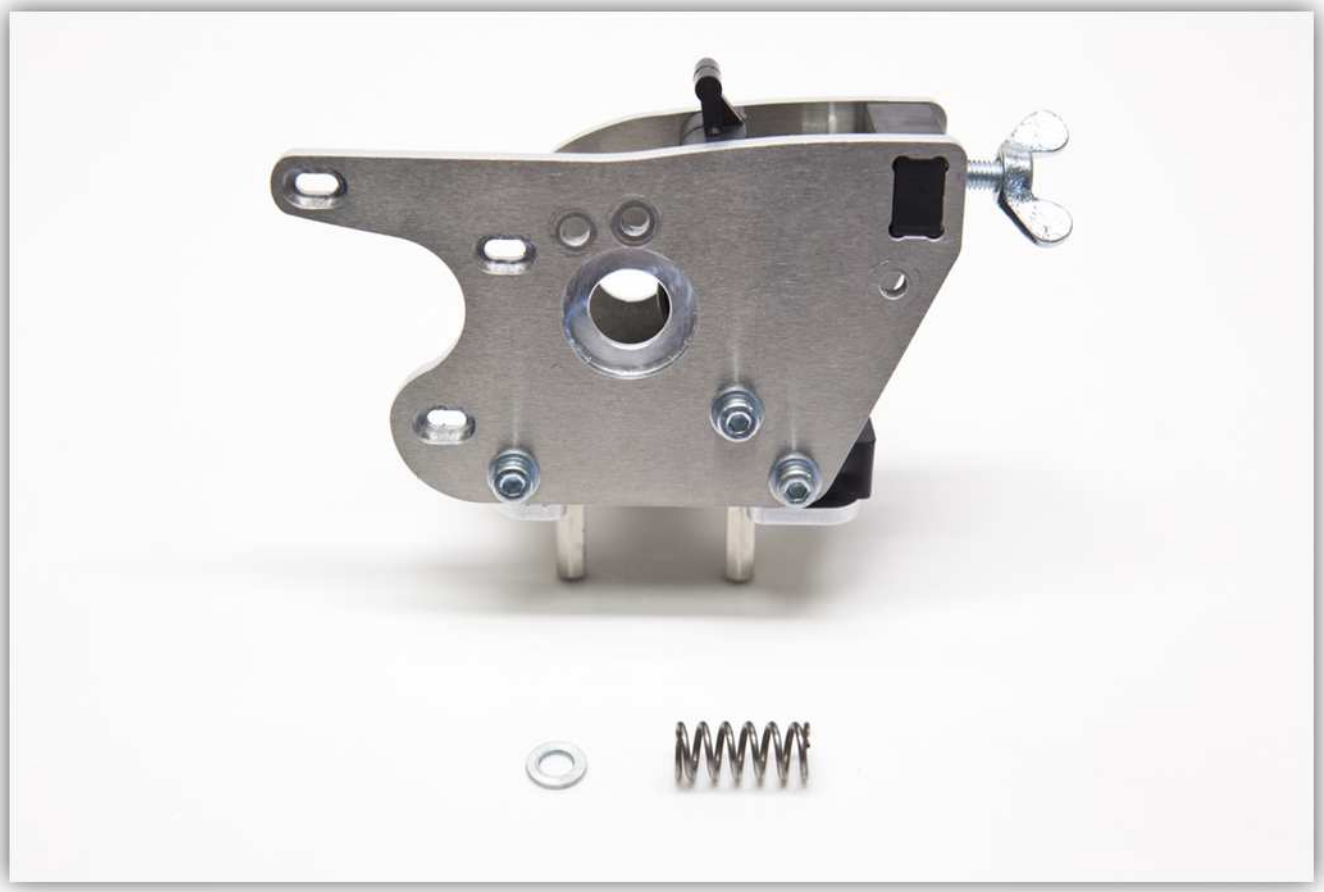
Use a long M4 bolt and an M4 washer to lock the BEARING CLAMP assembly in place.



Use an M4 washer and an M4 bolt to **slightly (!)** tighten this bolt.



Take the **small** M5 washer and the spring.



Place the spring into the cavity of the BEARING CLAMP assembly.

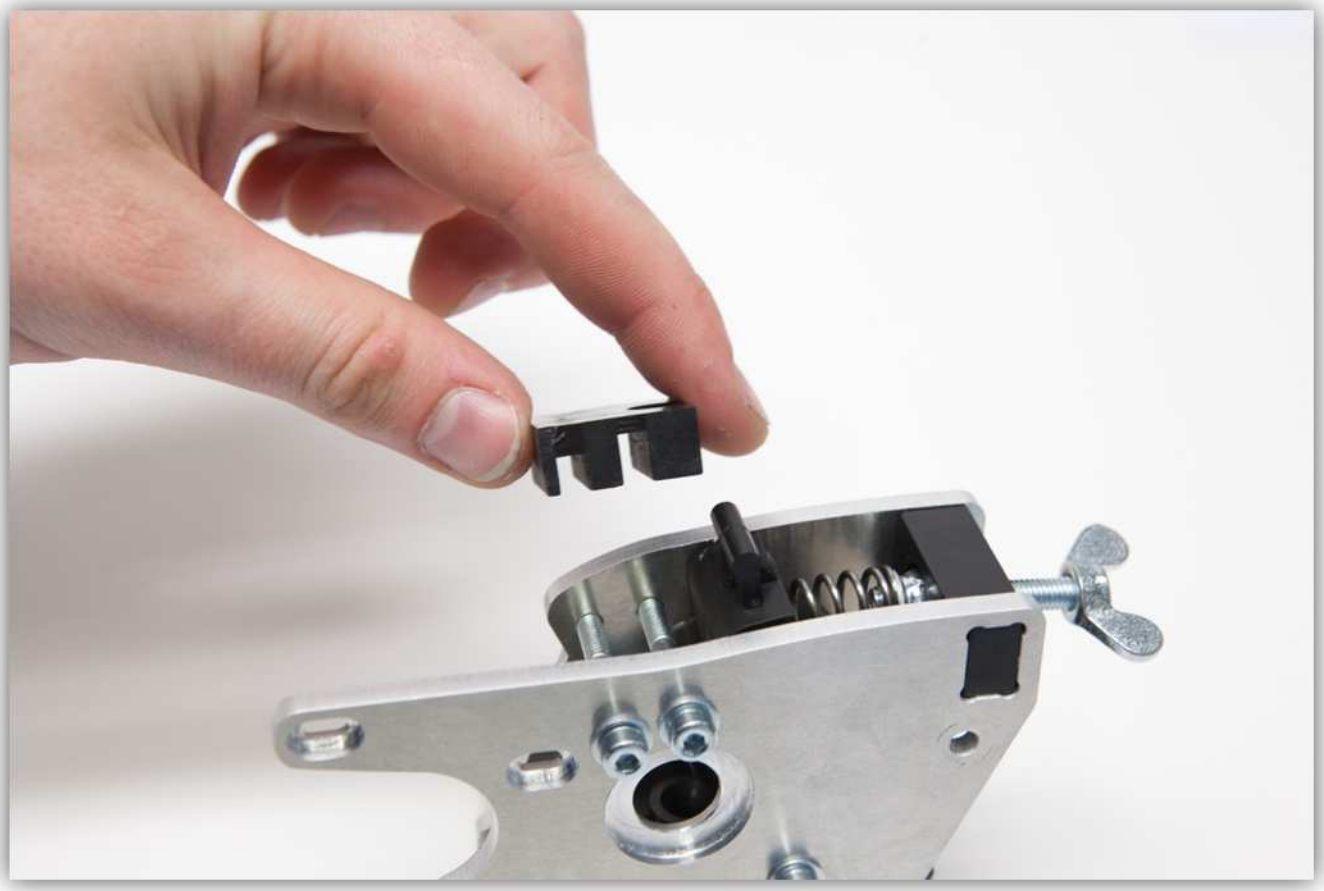
Slide the washer over the butterfly bolt.

Carefully force the spring over the butterfly bolt.

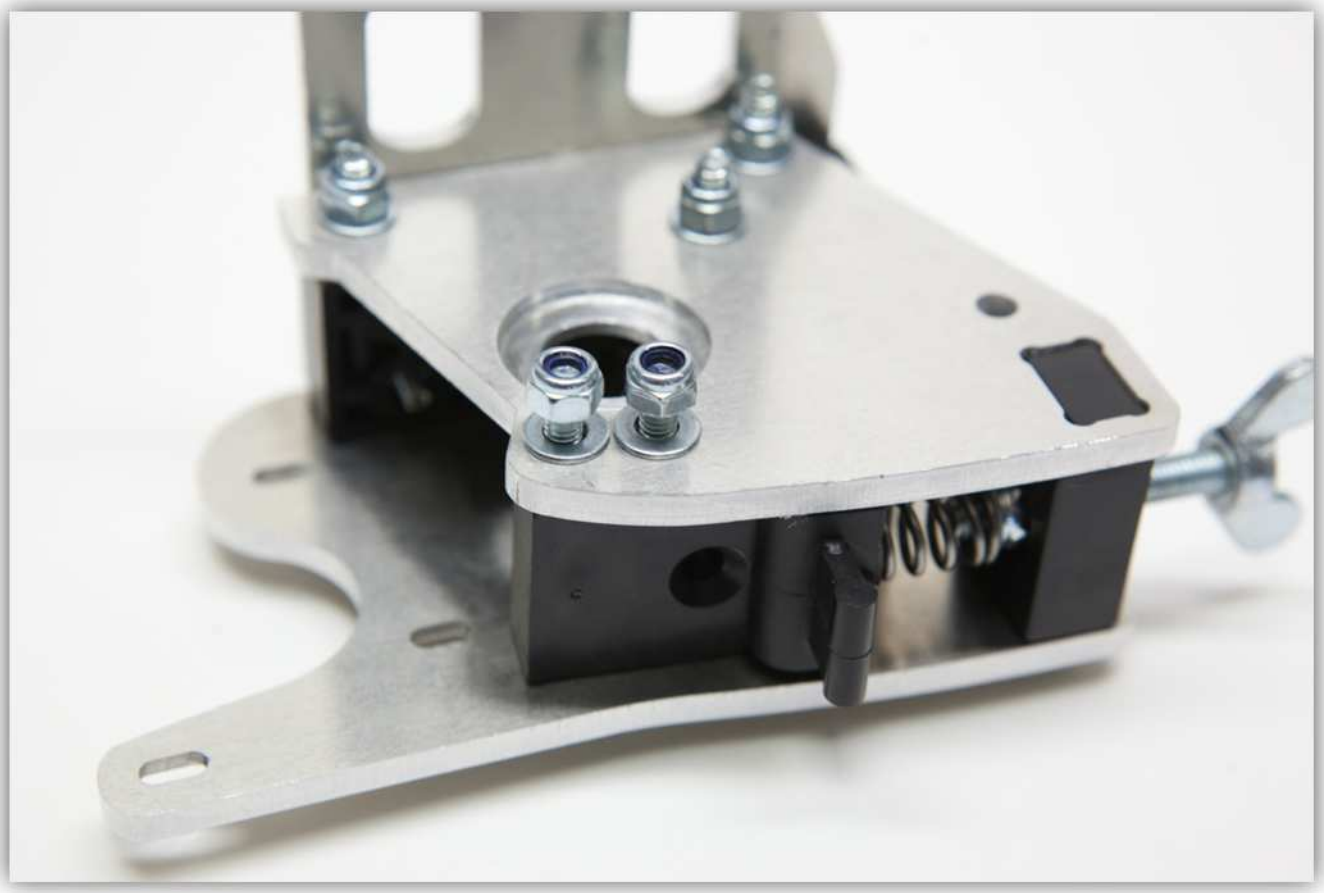
Take 2 long M4 bolts and 2 M4 washers.

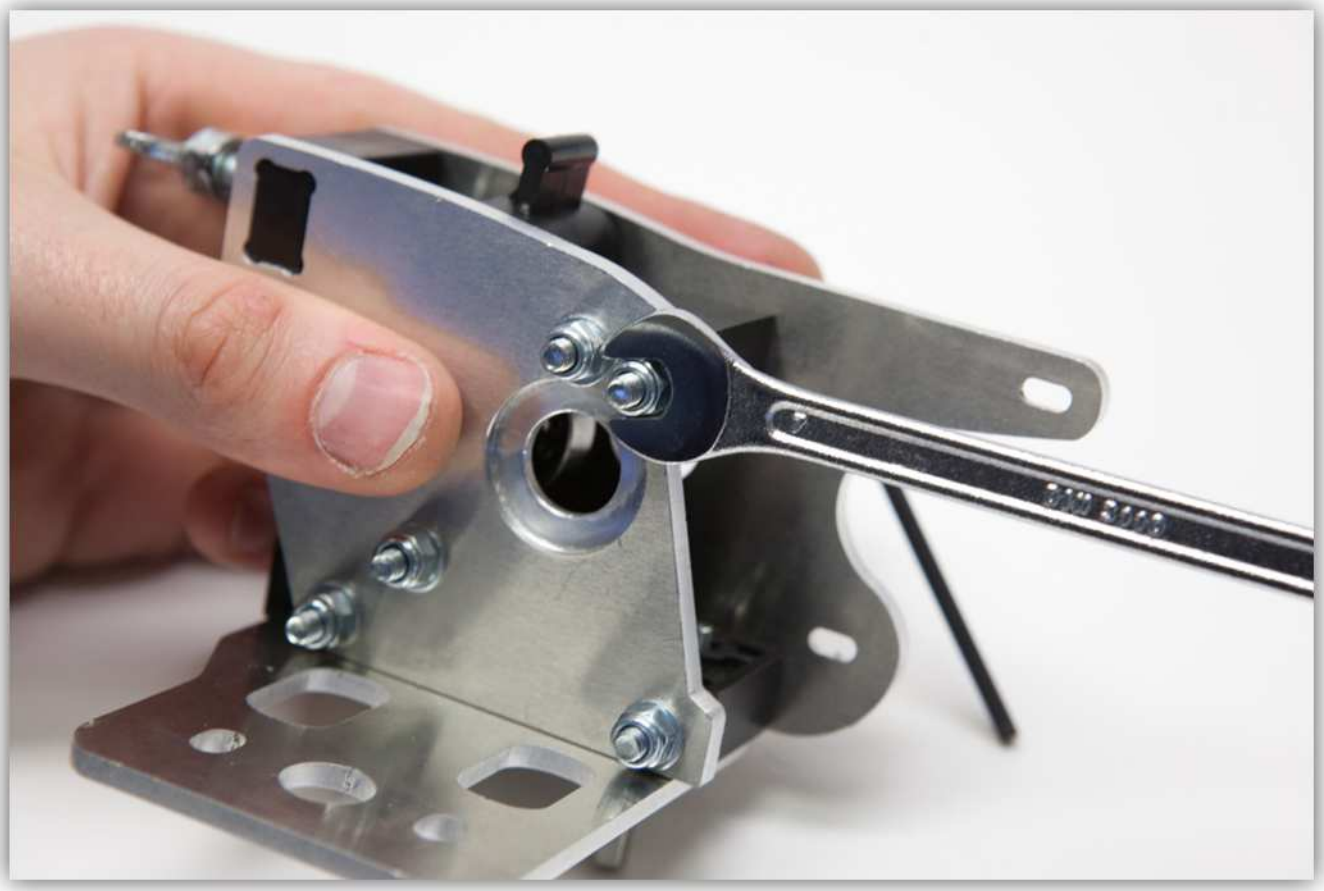
Slide these two bolts in the two holes at the top of the extruder housing.

Take the filament guide piece and slide it over these bolts. **Watch the orientation of this piece.**



Take 2 M4 washers and 2 M4 locking bolts to **slightly (!)** tighten these bolts.



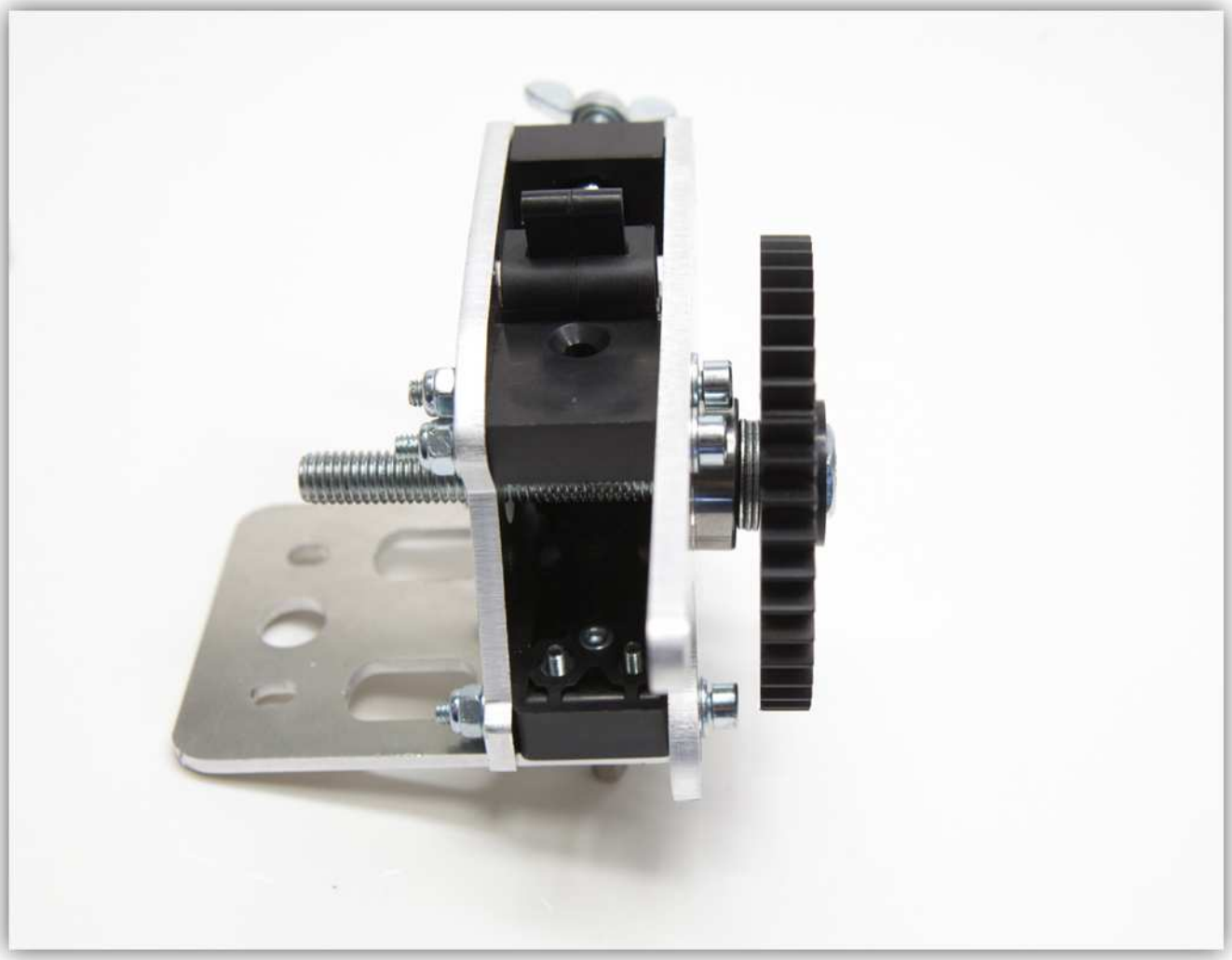


Next you will need the LARGE GEAR, 2 608 BEARINGS, 2 M8 washers and the HOBBED BOLT.

Slide the HOBBED BOLT into the LARGE GEAR so that the head of the HOBBED BOLT fits snugly in the cavity of the LARGE GEAR.

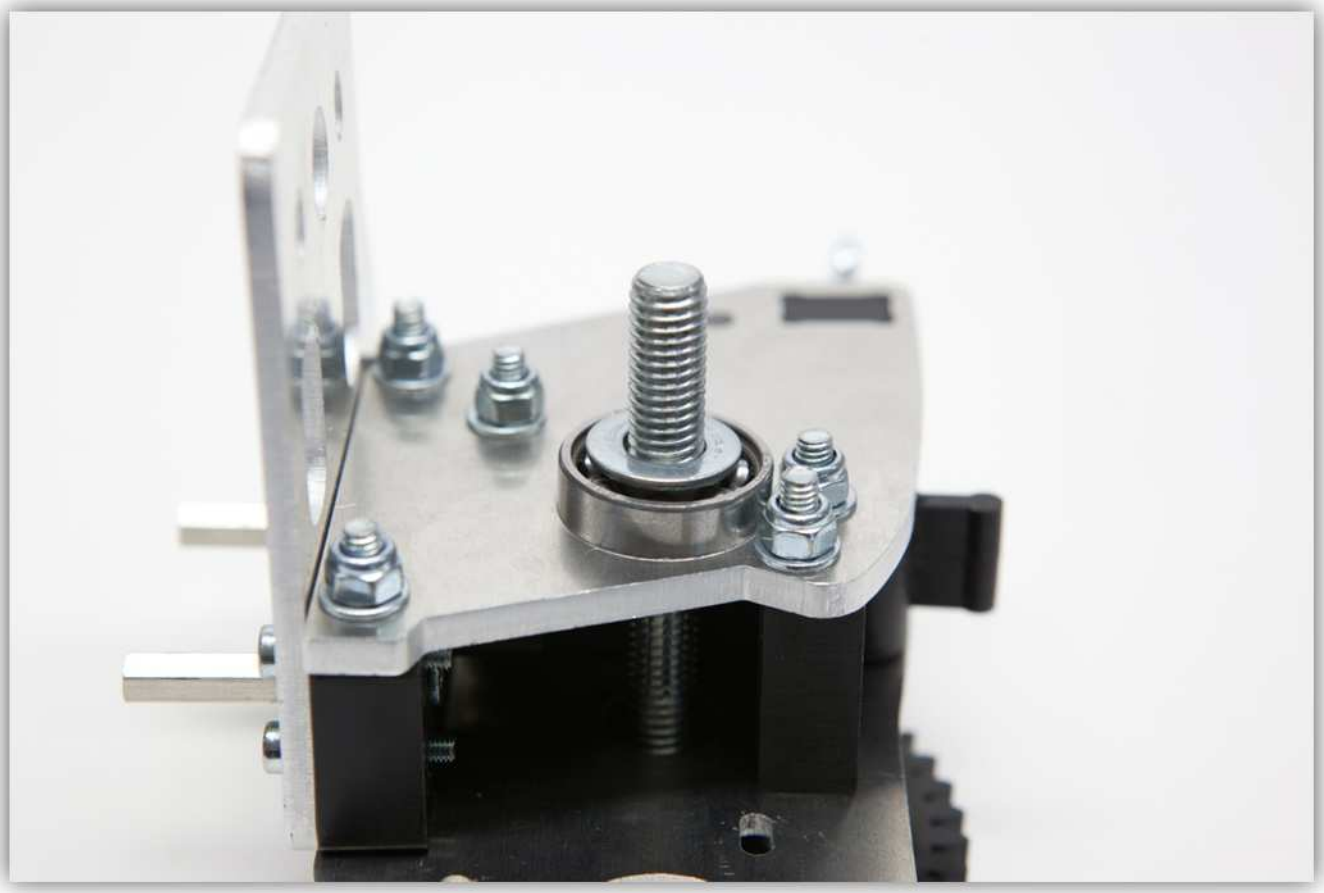
Slide the 3 M8 washers over the bolt followed by a 608 BEARING.

Slide this assembly into the extruder housing. **Watch the orientation carefully.**

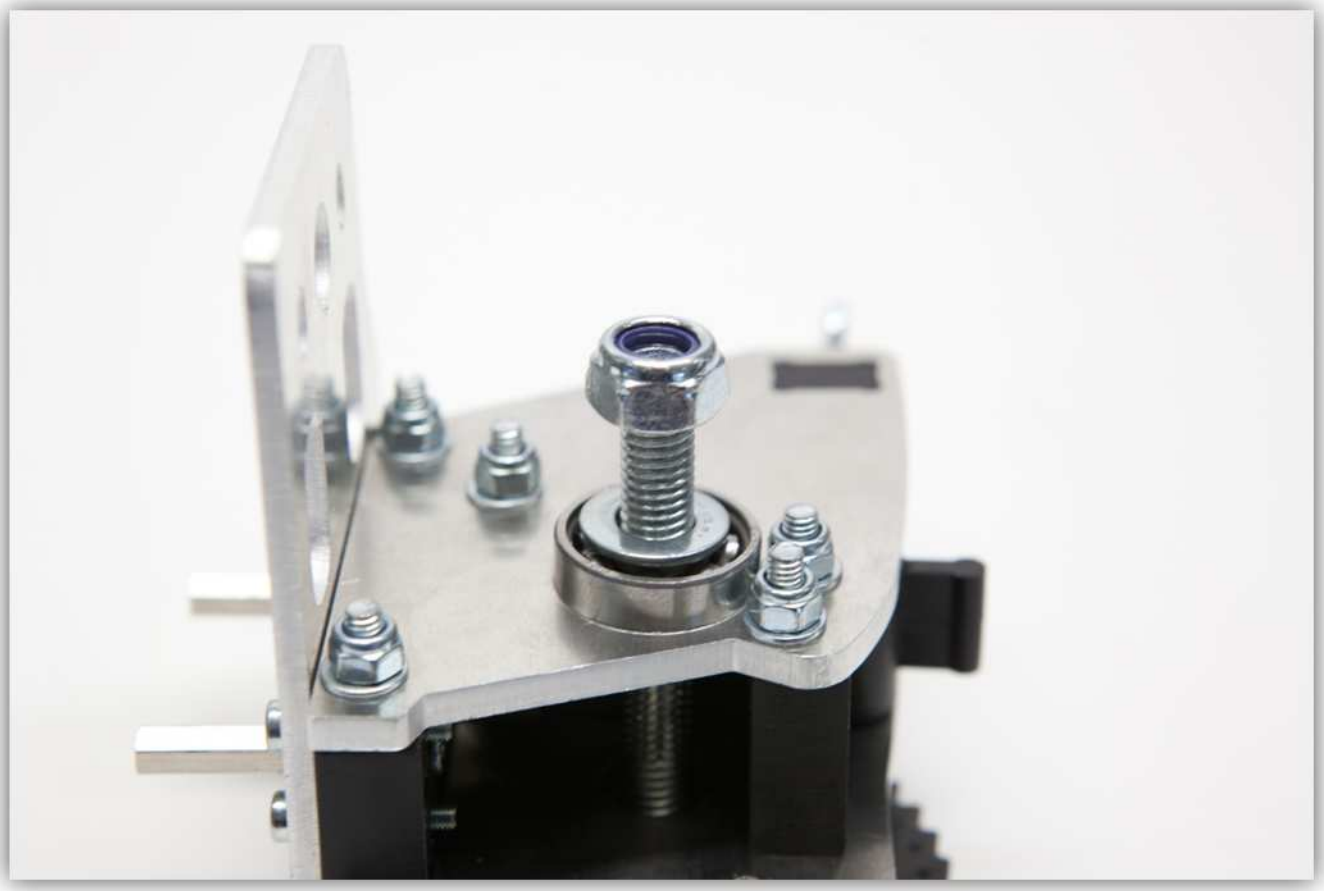


Slide a 608 BEARING over the other end of the HOBBED BOLT.

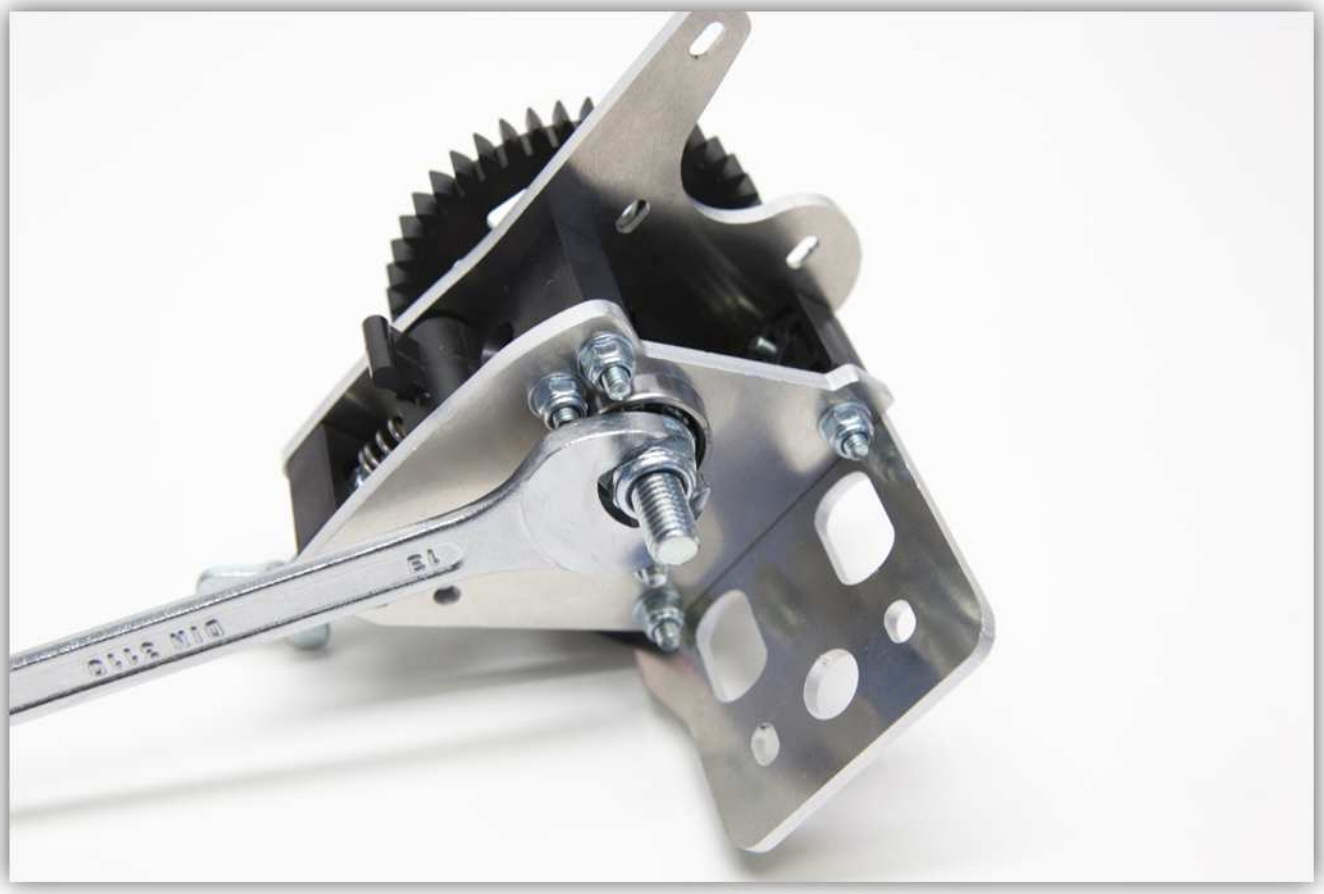
Slide an M8 washer to cover the 608 BEARING.



Screw an M8 locking nut on the HOBBED BOLT.



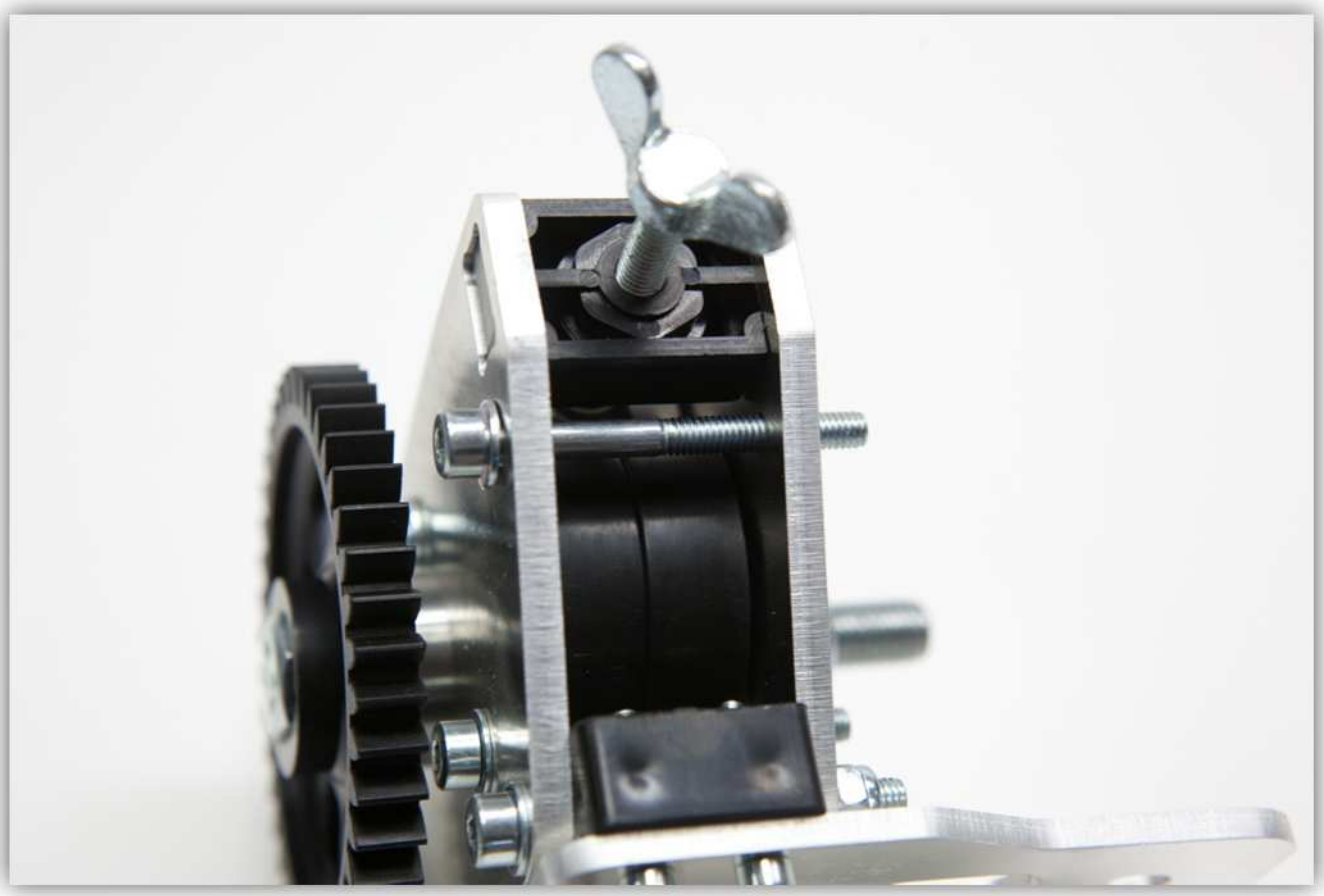
Tighten this bolt but make sure that the large gear turns smoothly.



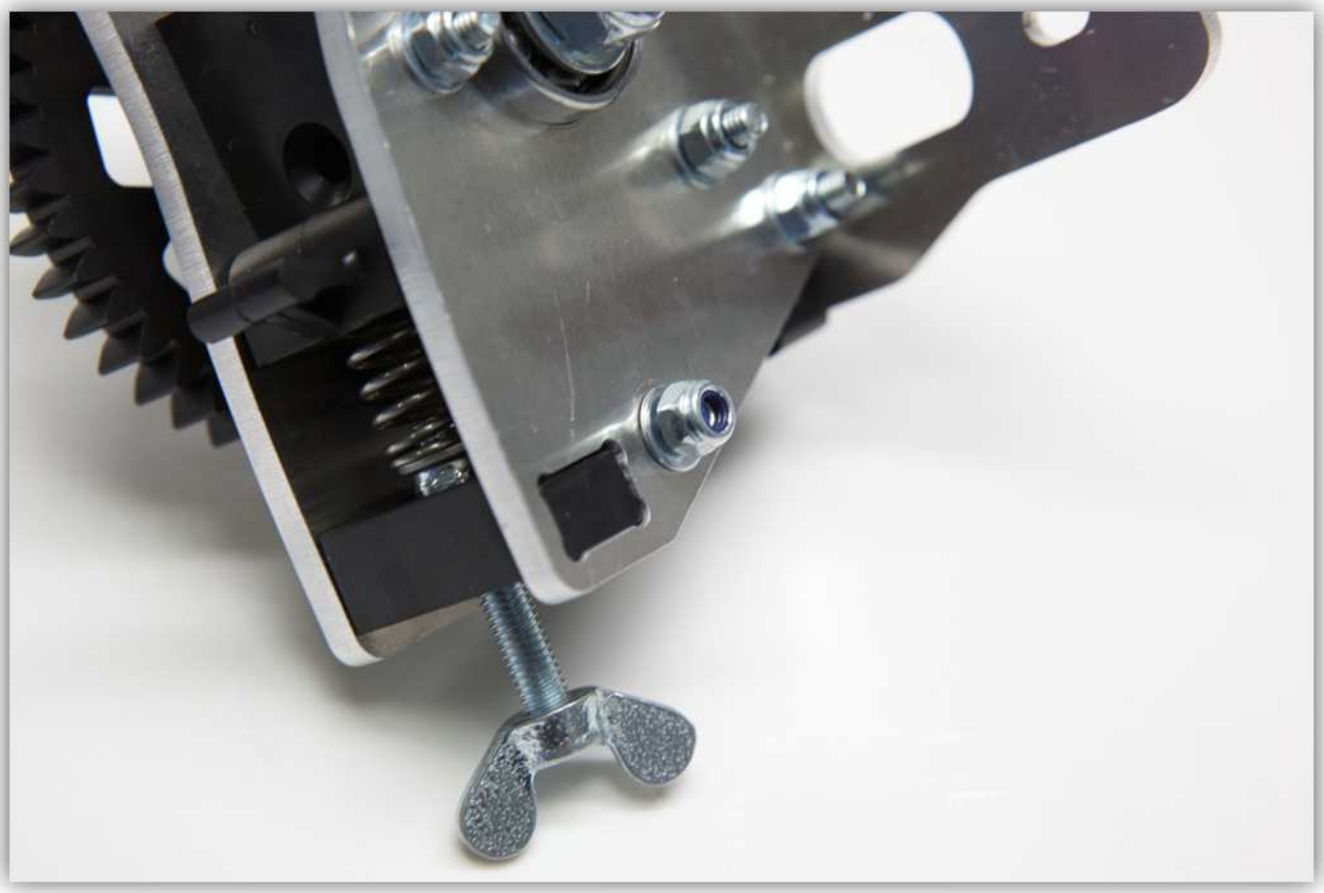
The extruder housing should look like this.

Take a long M4 bolt and an M4 washer.

Place it as shown in the picture below.

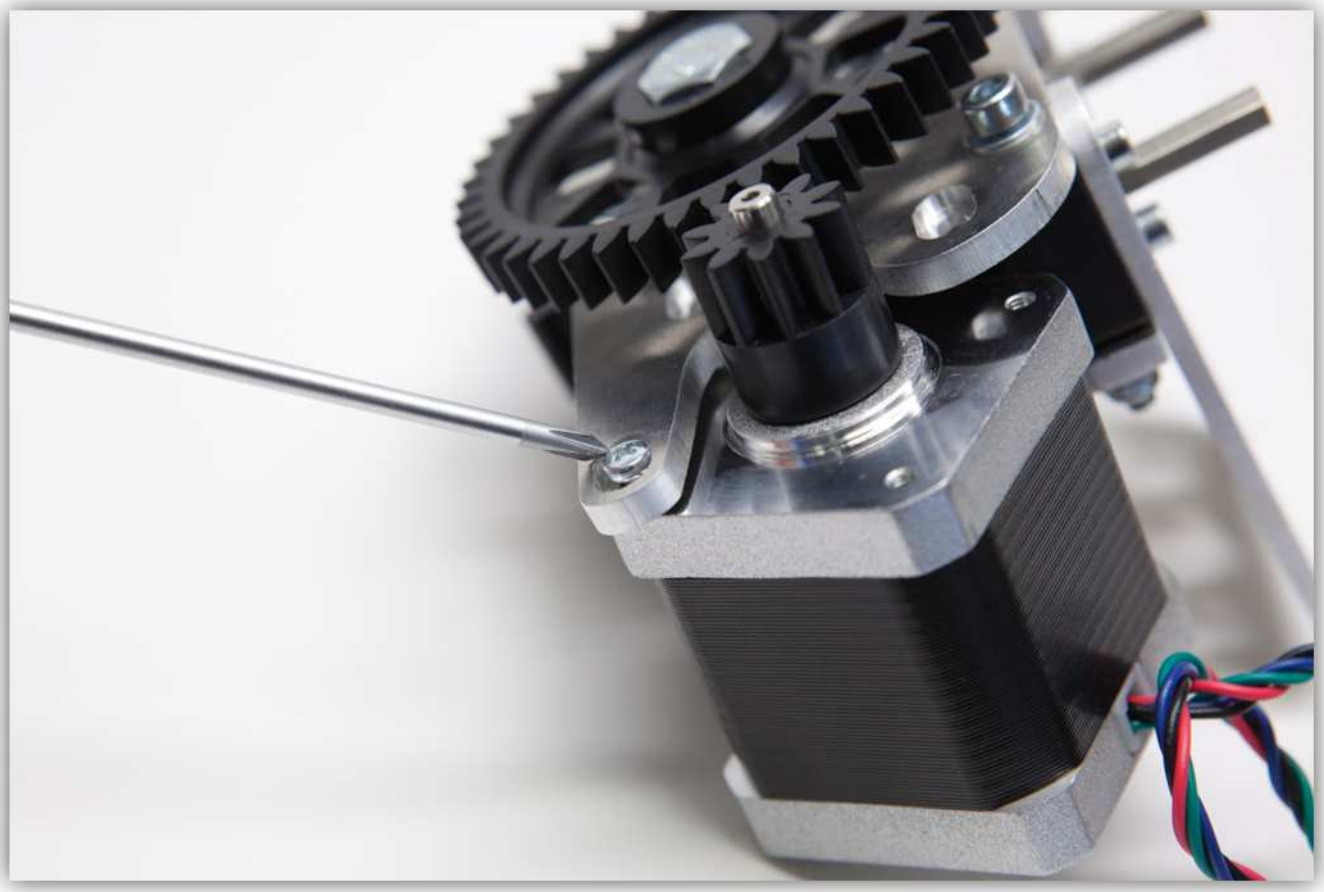


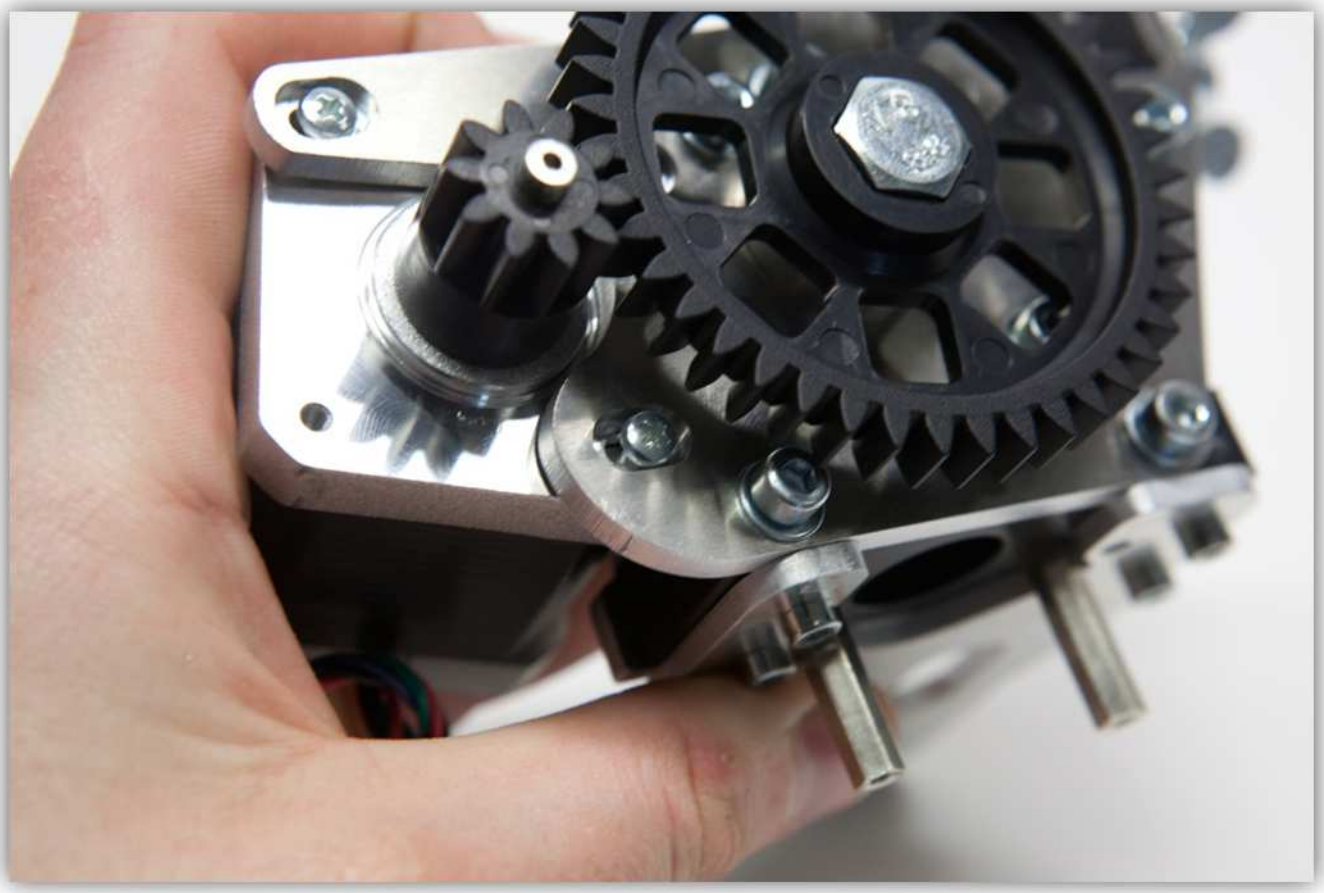
Tighten this bolt **slightly (!)**



Take the 3 M3 x 6 bolts.

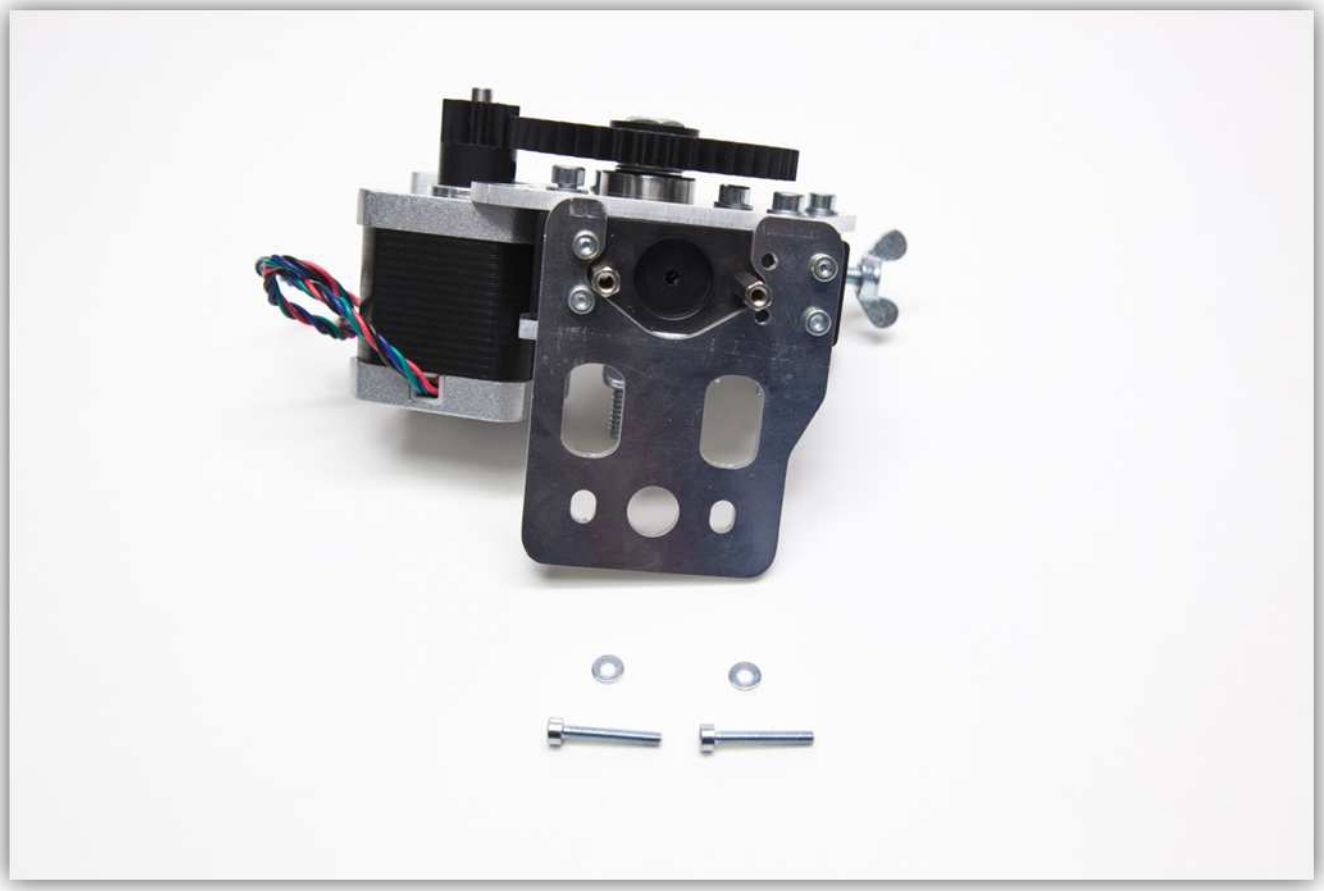
Bolt the motor to the extruder housing. **Do not fully tighten these bolts.**



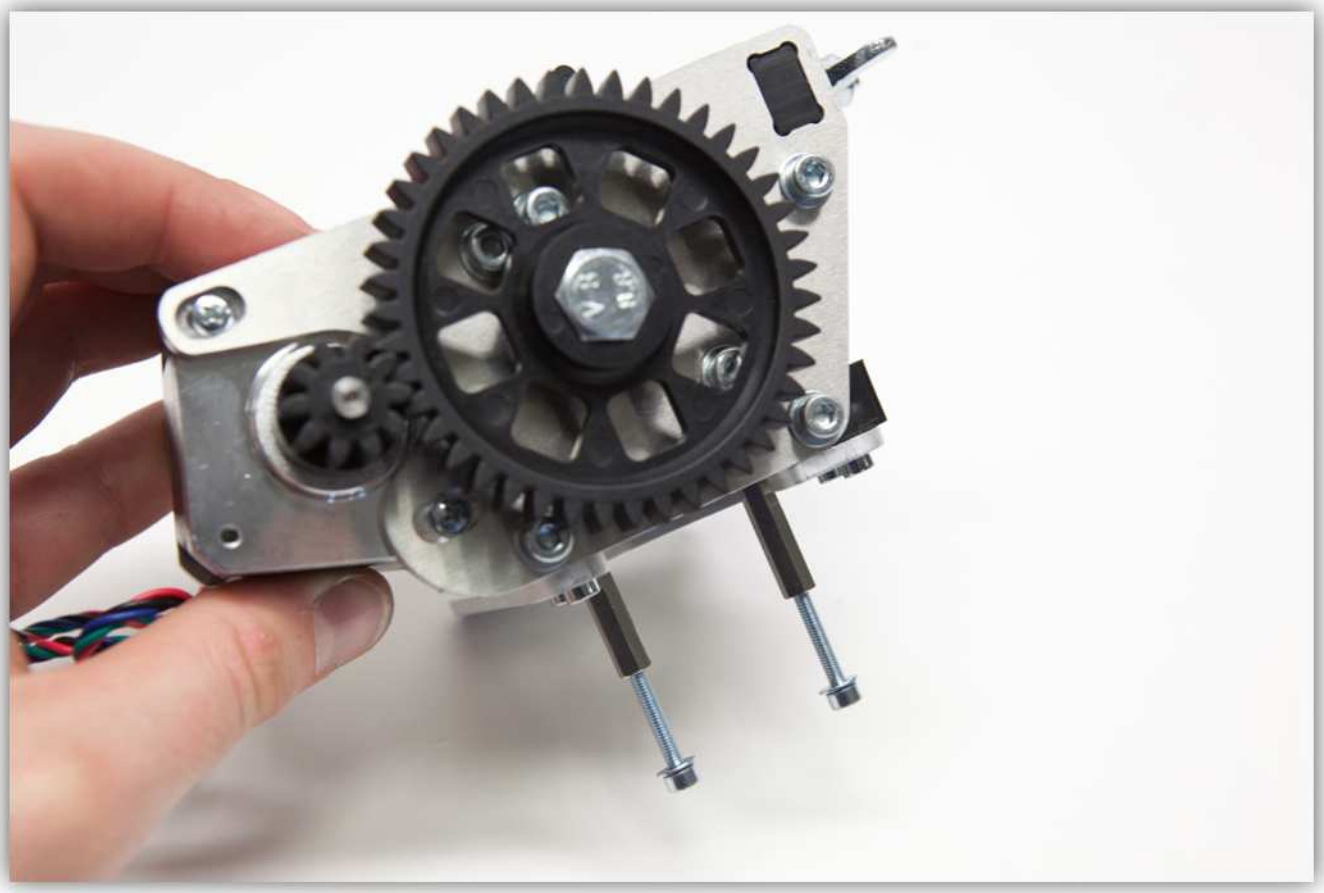


Position the motor so the teeth of the gears interlock as shown in the picture below. **Then you can fully tighten the bolts.**

Take 2 M3 x 25 bolts and 2 M3 washers.

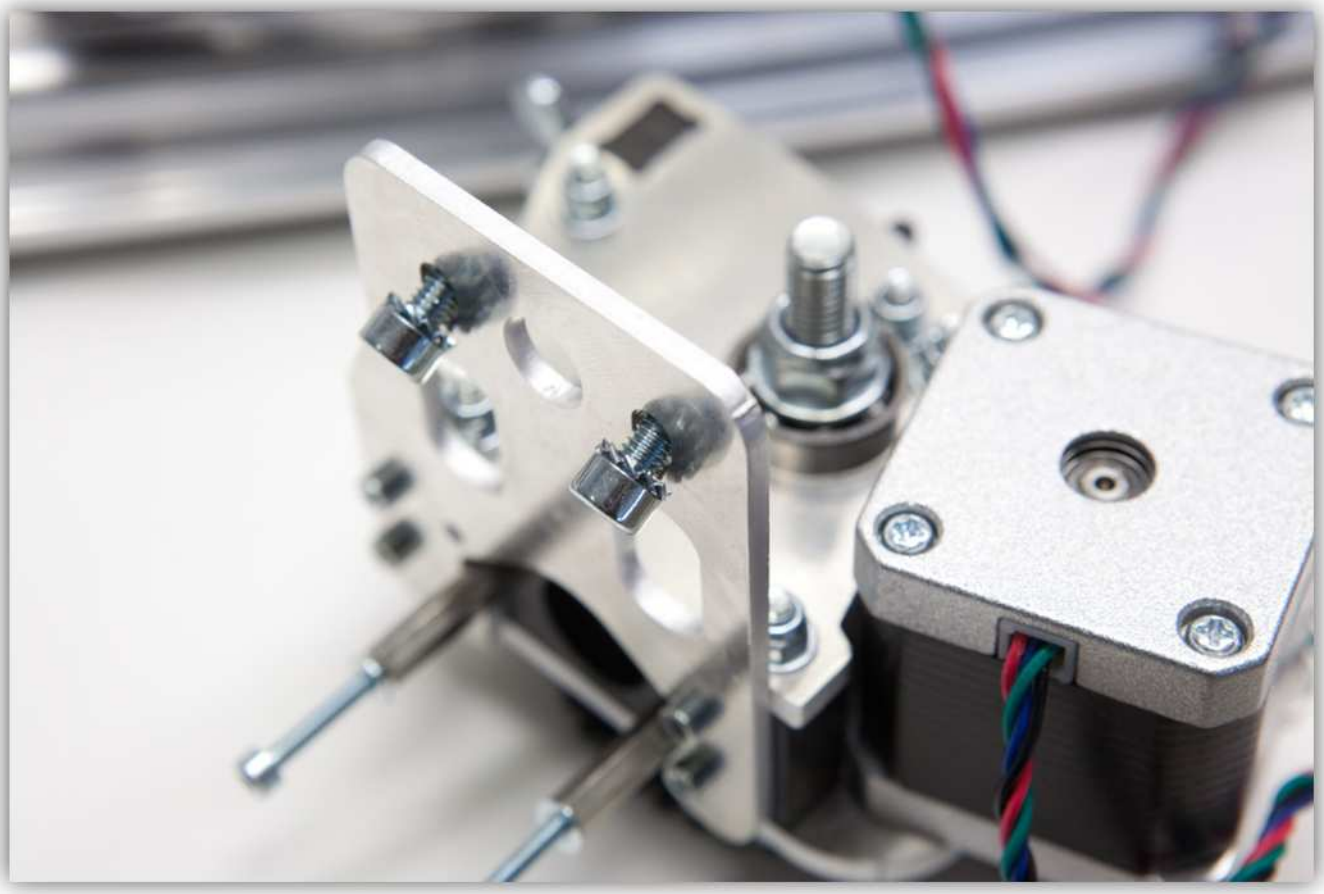


Screw these into the spacers for later use (the extruder itself will be mounted with these bolts.)

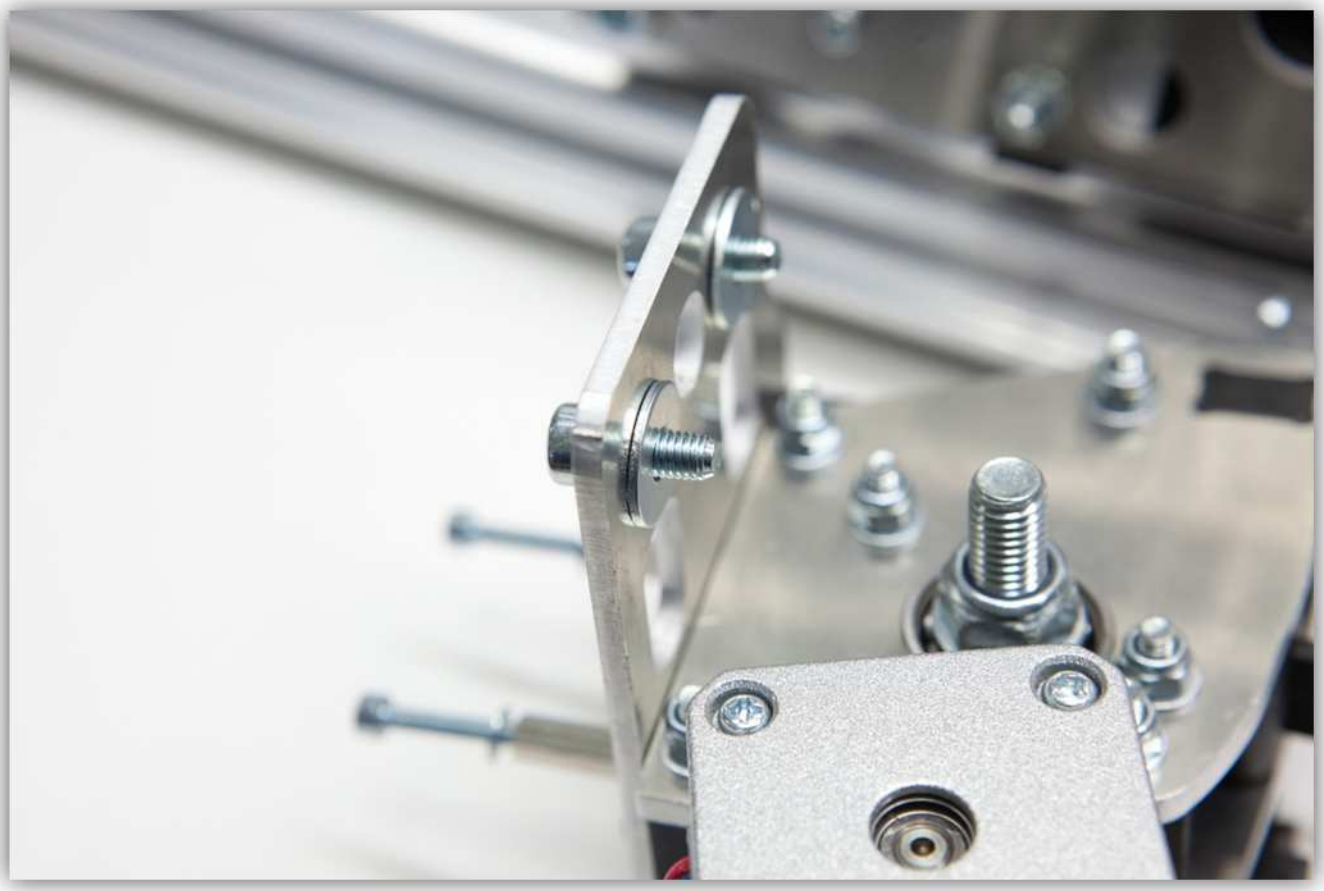


Take the 2 M5 bolts, the two large M5 washers and 2 M5 toothed washers

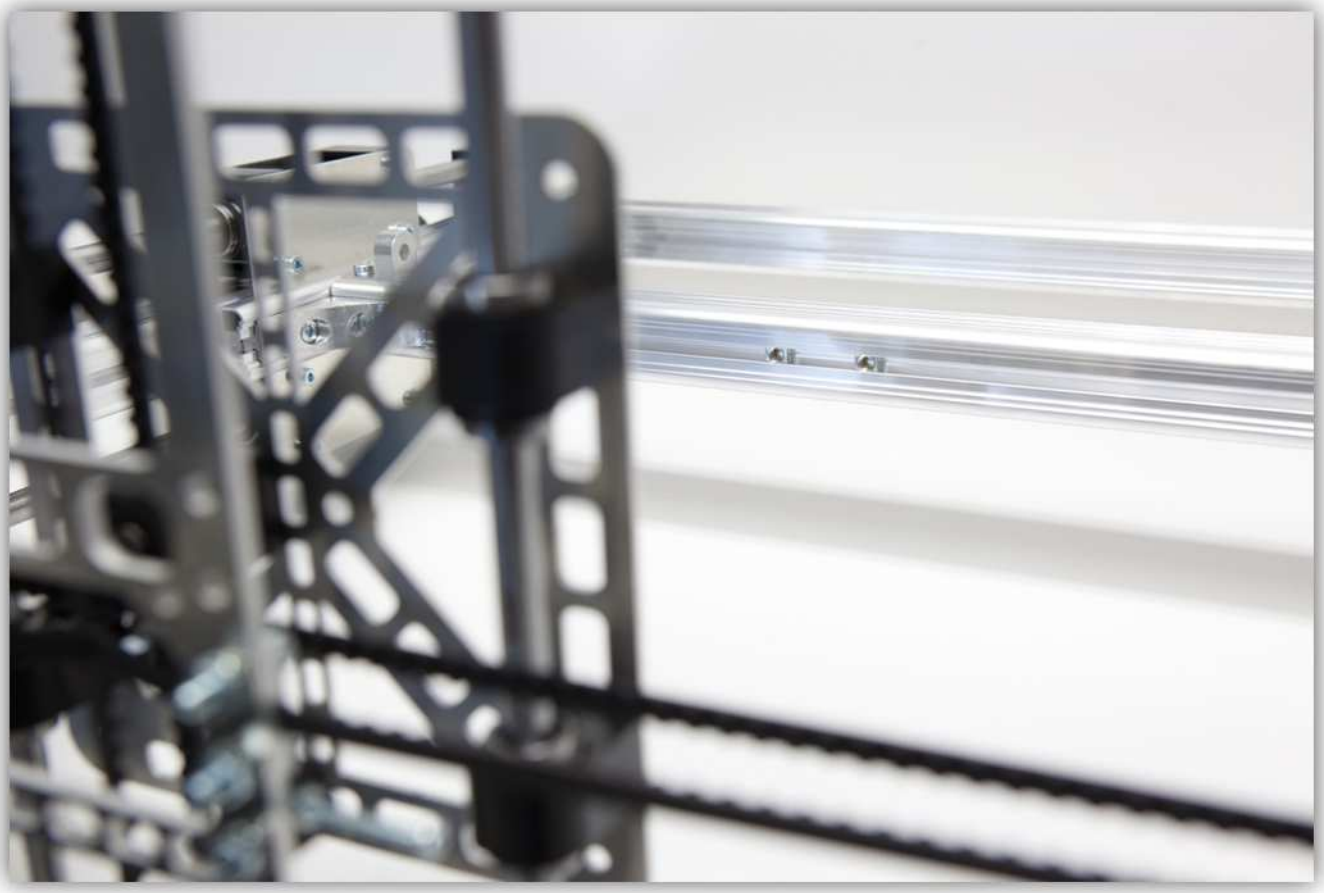
Place these bolts and washers as shown in the pictures below.



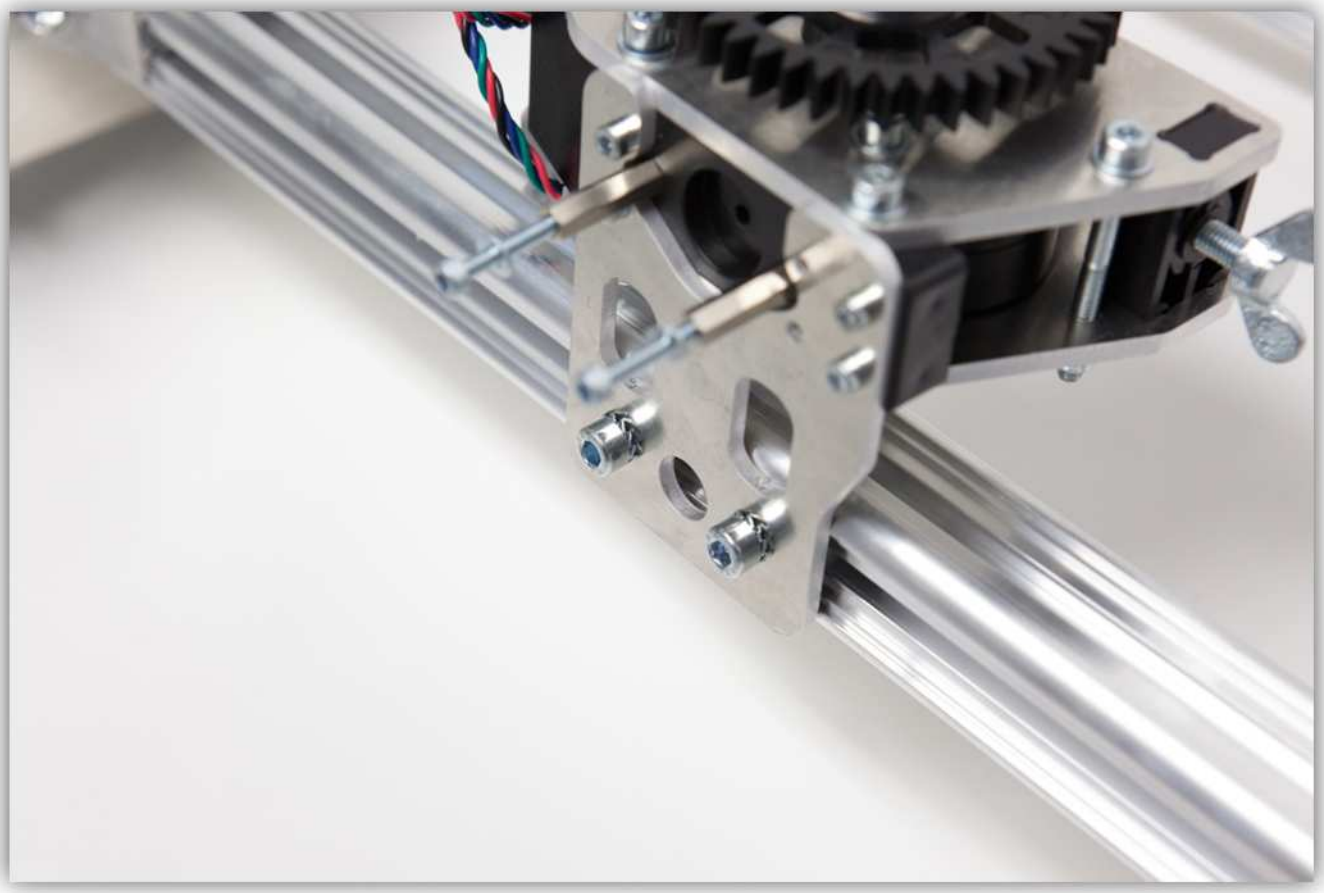
Notice the 2 large M5 washers.

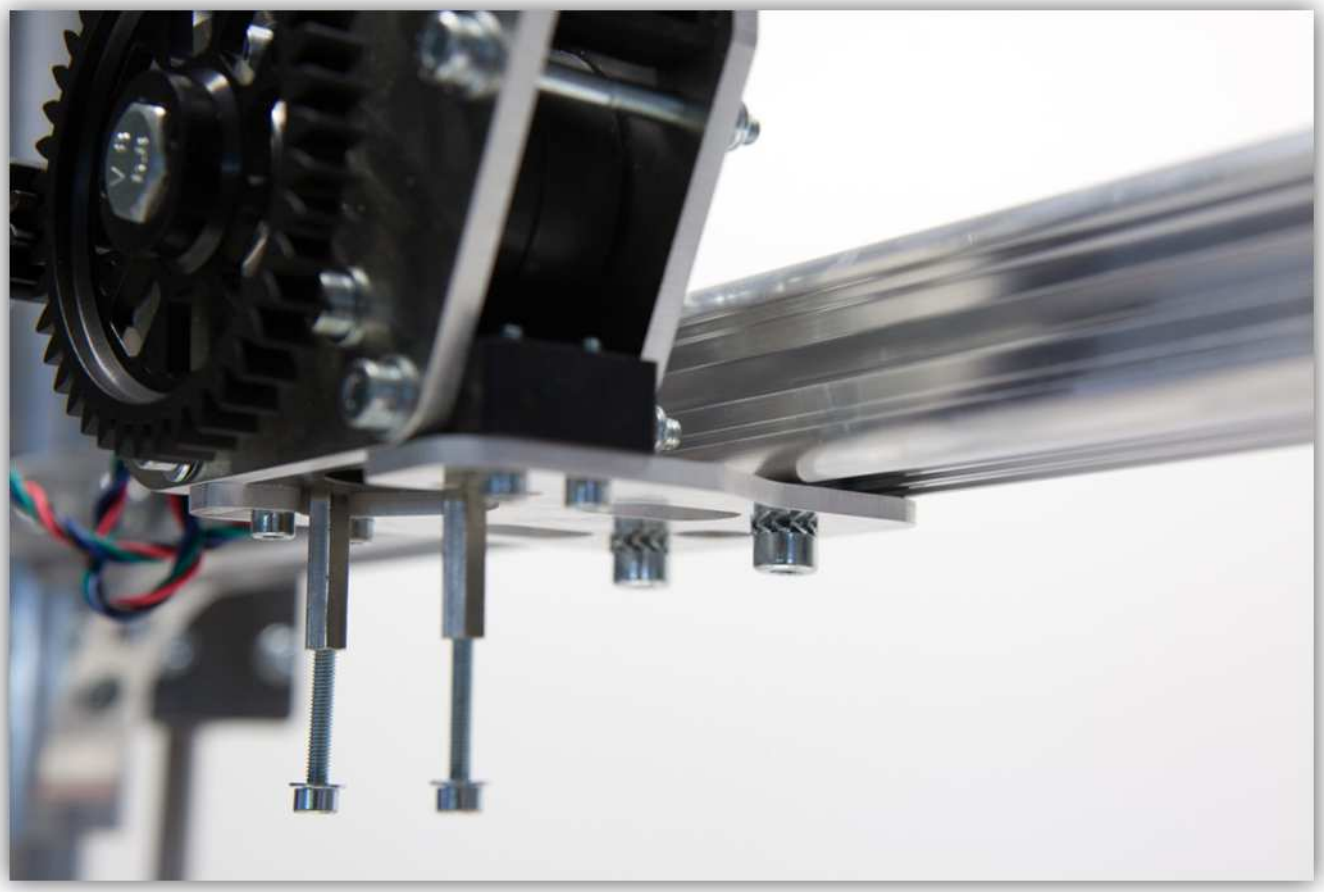


Locate the 2 square M5 nuts in the bottom of the extruder arm profile you put there before.

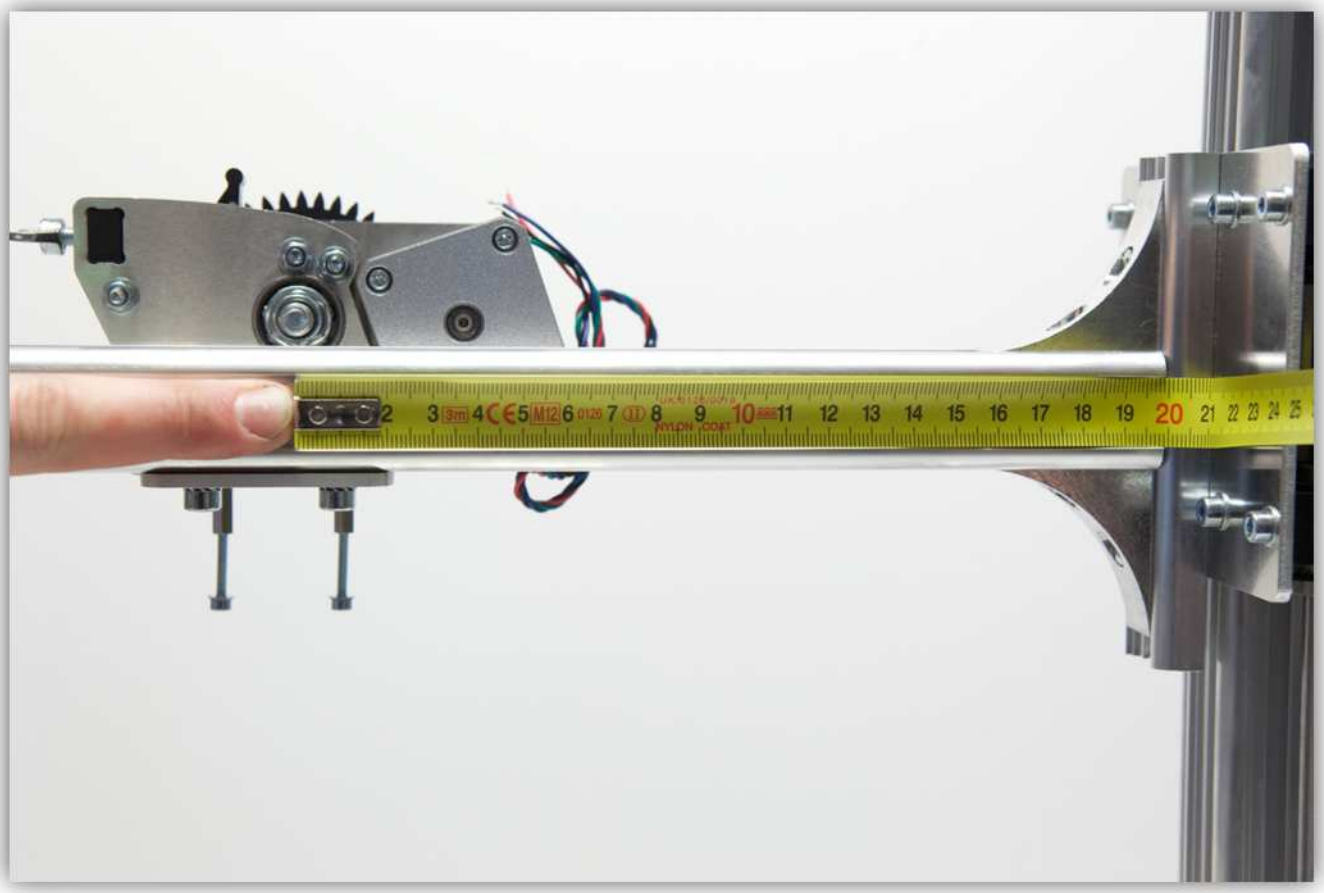


Bolt the extruder to these two nuts. **Do not tighten these bolts fully. Notice the orientation, the extruder housing should be facing forward.**

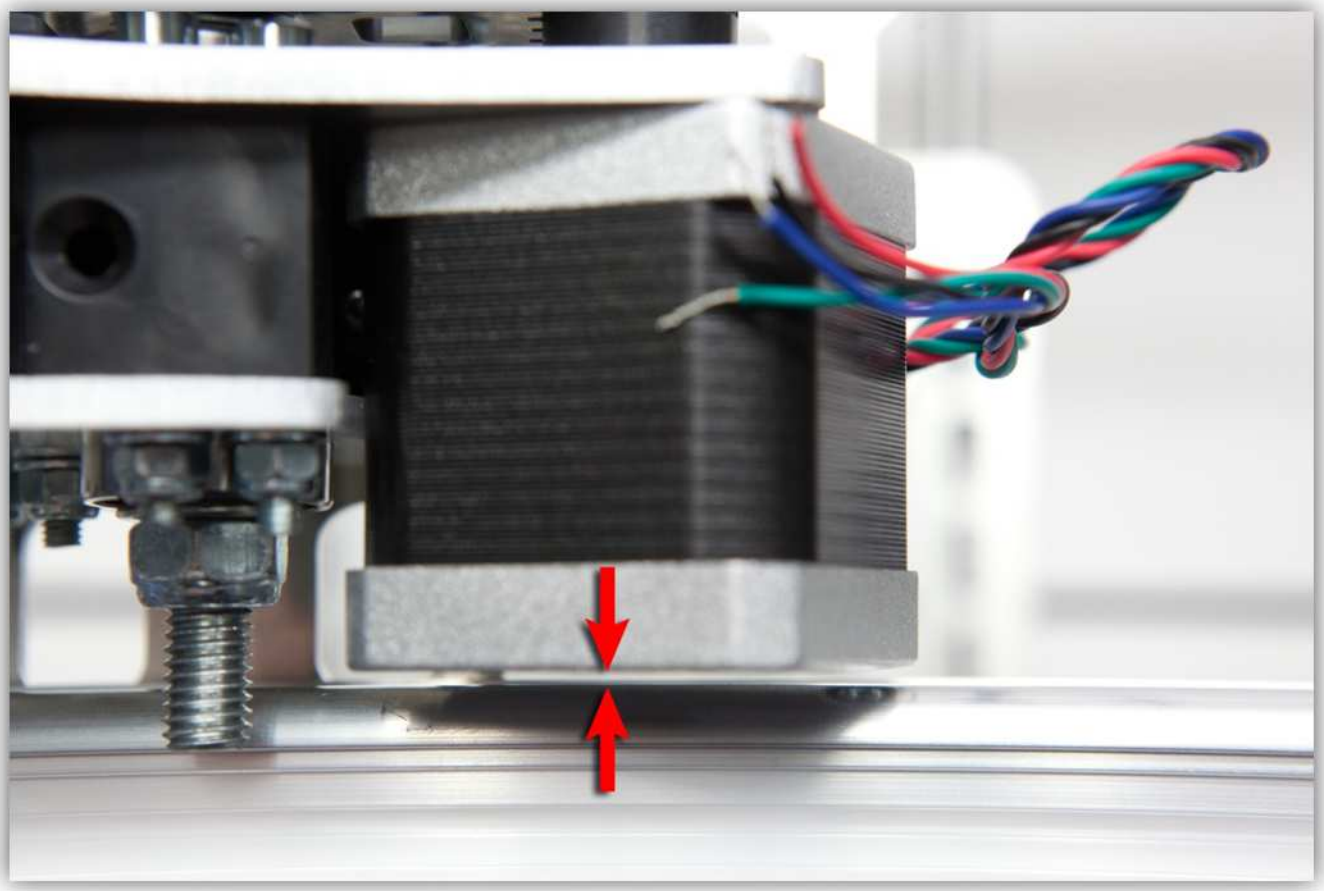




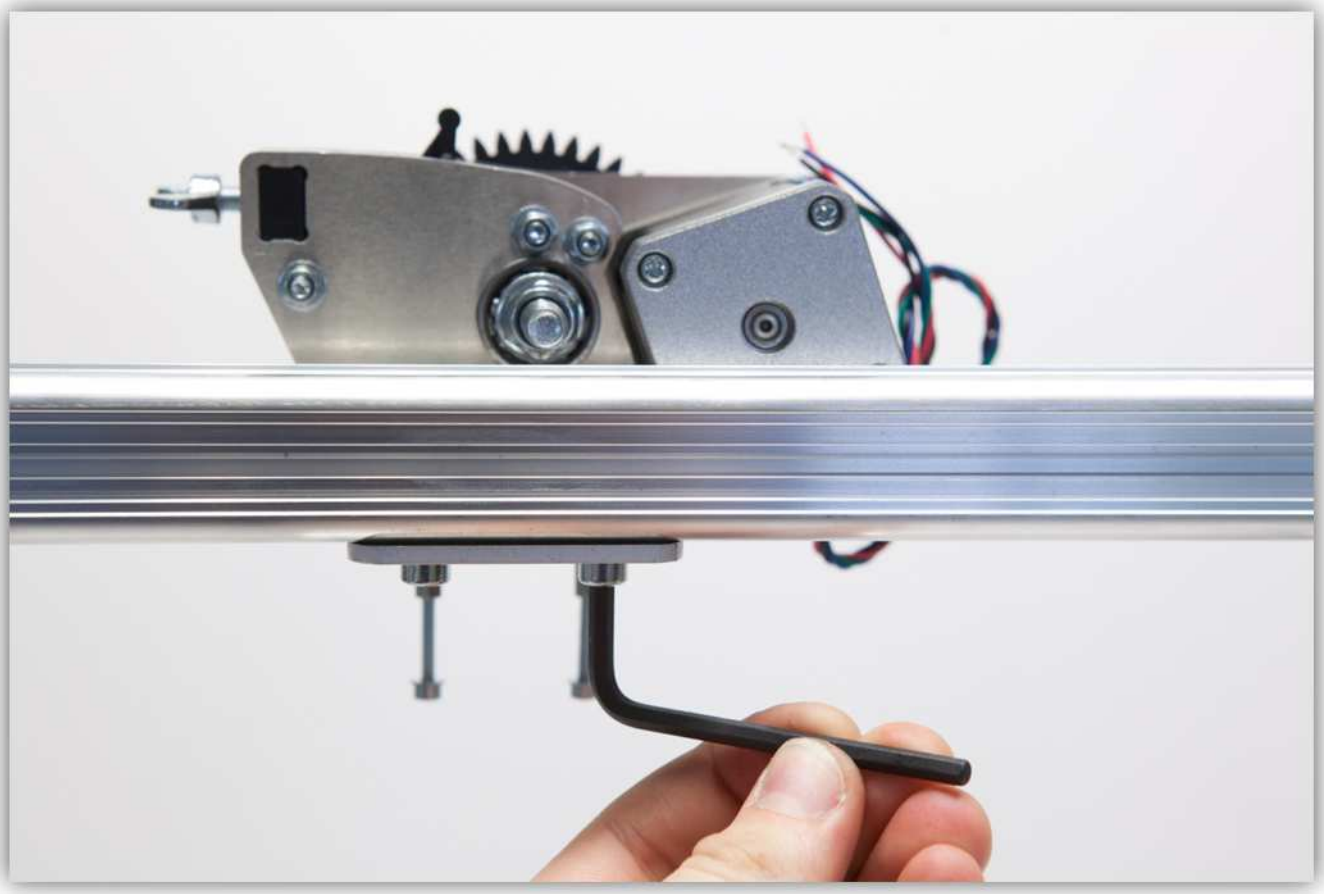
Slide the housing so the centre of the HOBBED BOLT sits at 20 cm (0.79") of the Z CARRIAGE.



Now make sure the extruder housing sits level and there is about a 1 mm (0.04") gap between the extruder arm profile and the back of the motor.

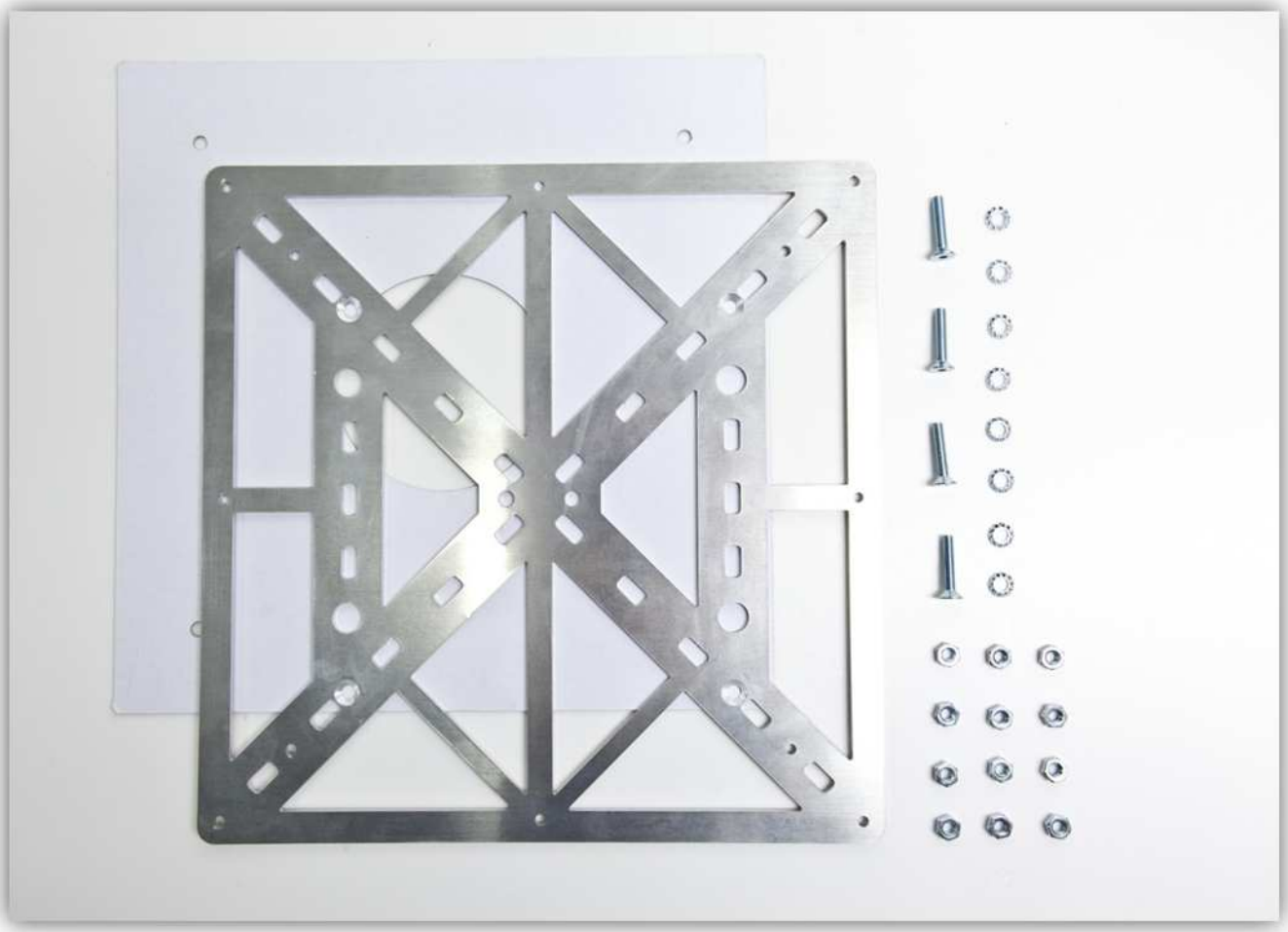


Now you can tighten the bolts that hold the extruder in place.

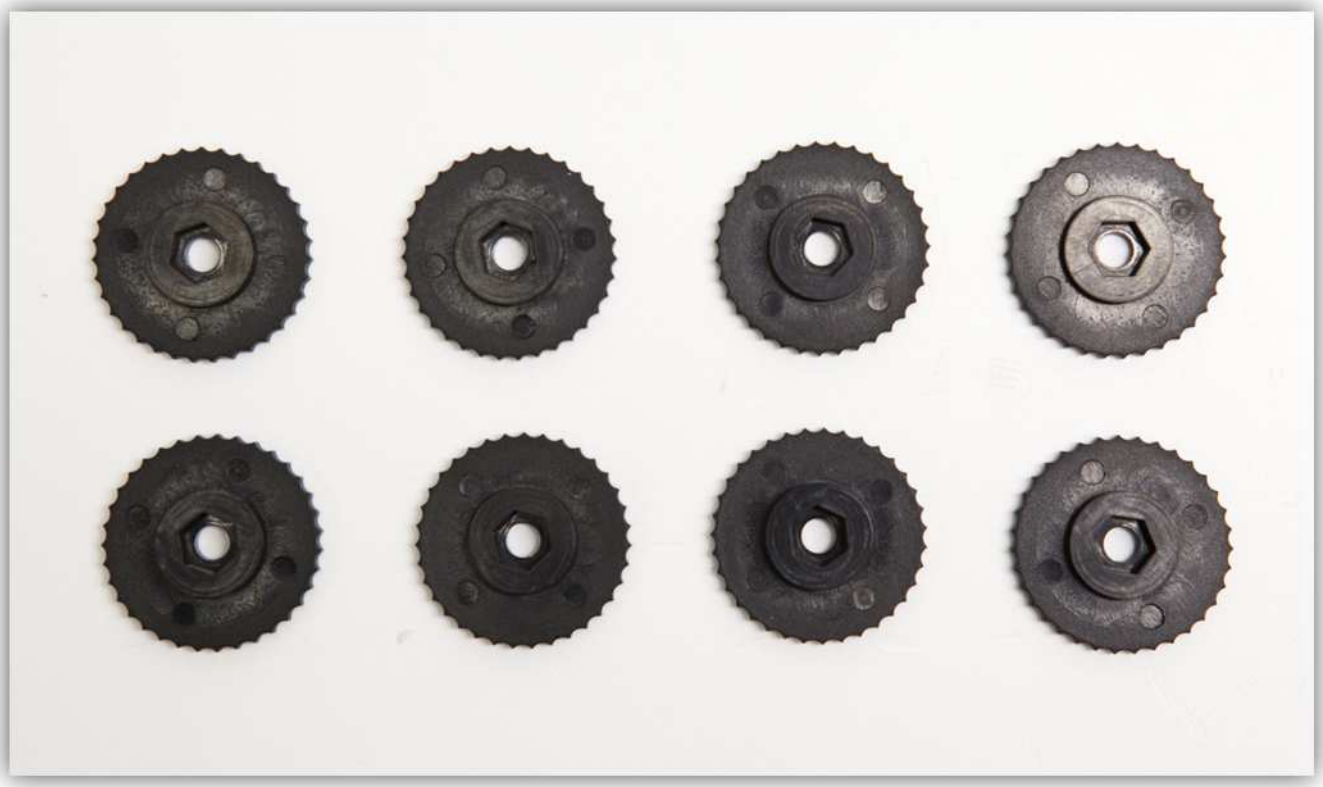


010 – ASSEMBLING THE HEATED BED

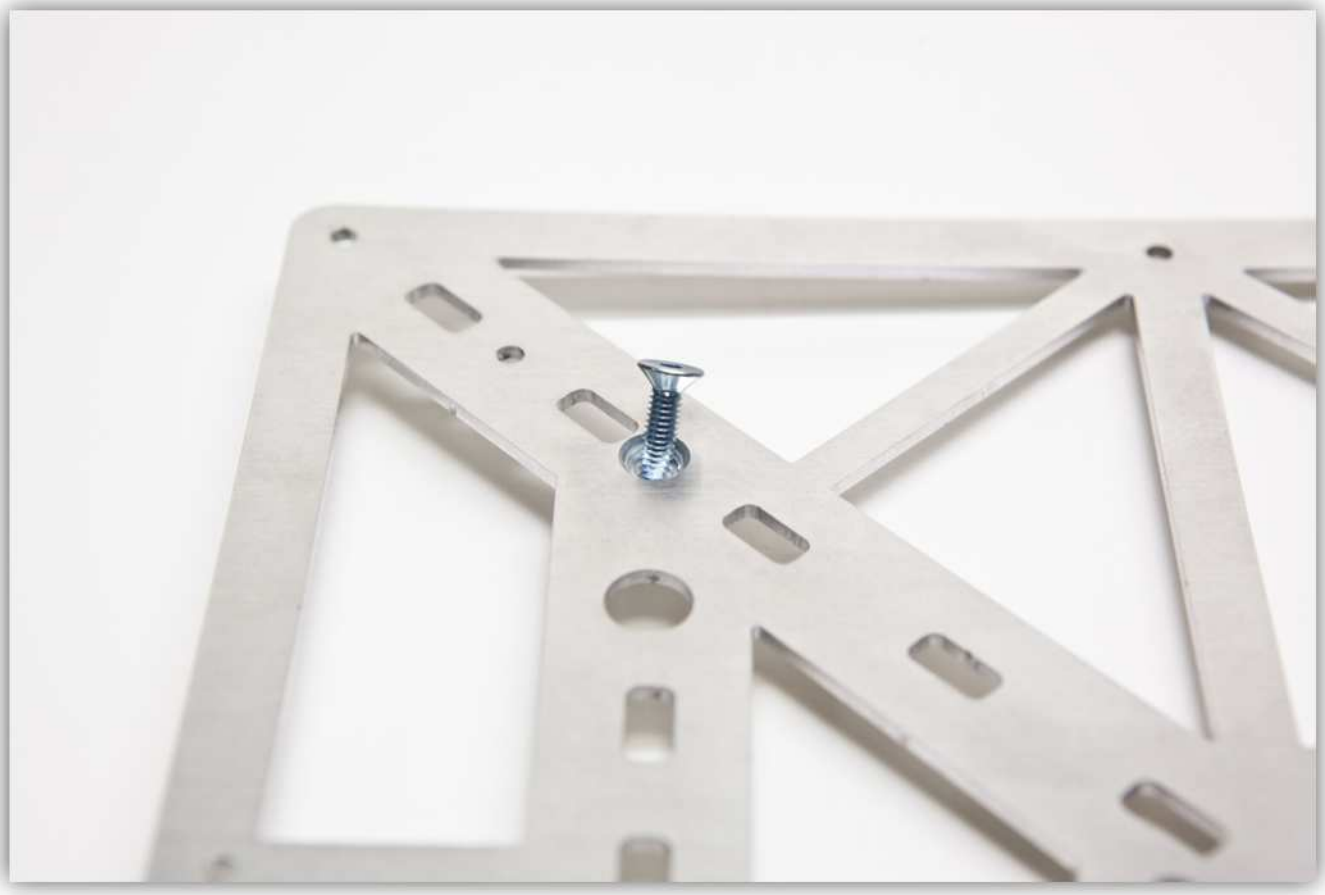
Take all the parts out of the bag labelled with 32.

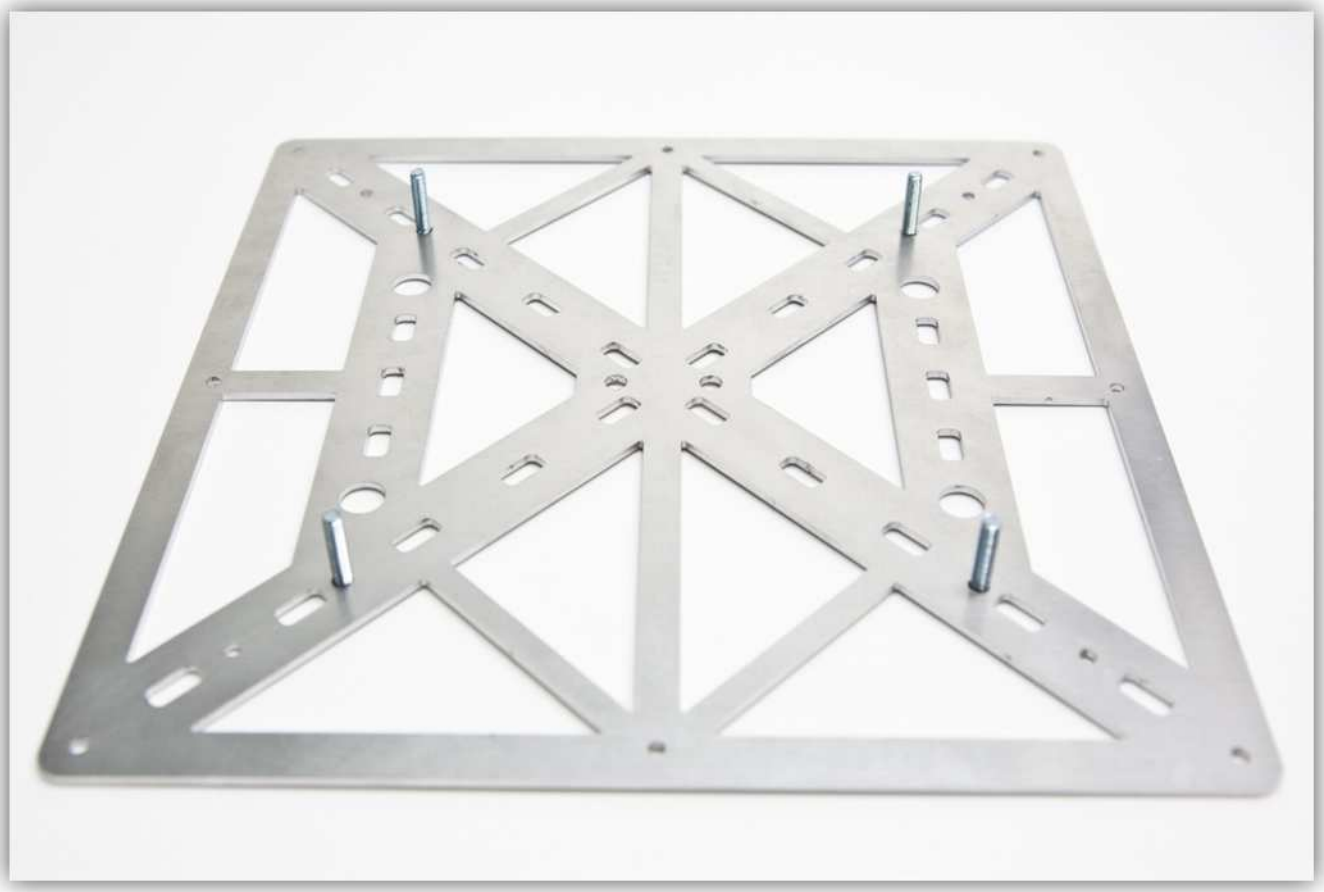


Now take the pieces as shown in the picture below out of the bag with all the plastic parts (THUMB SCREWS)

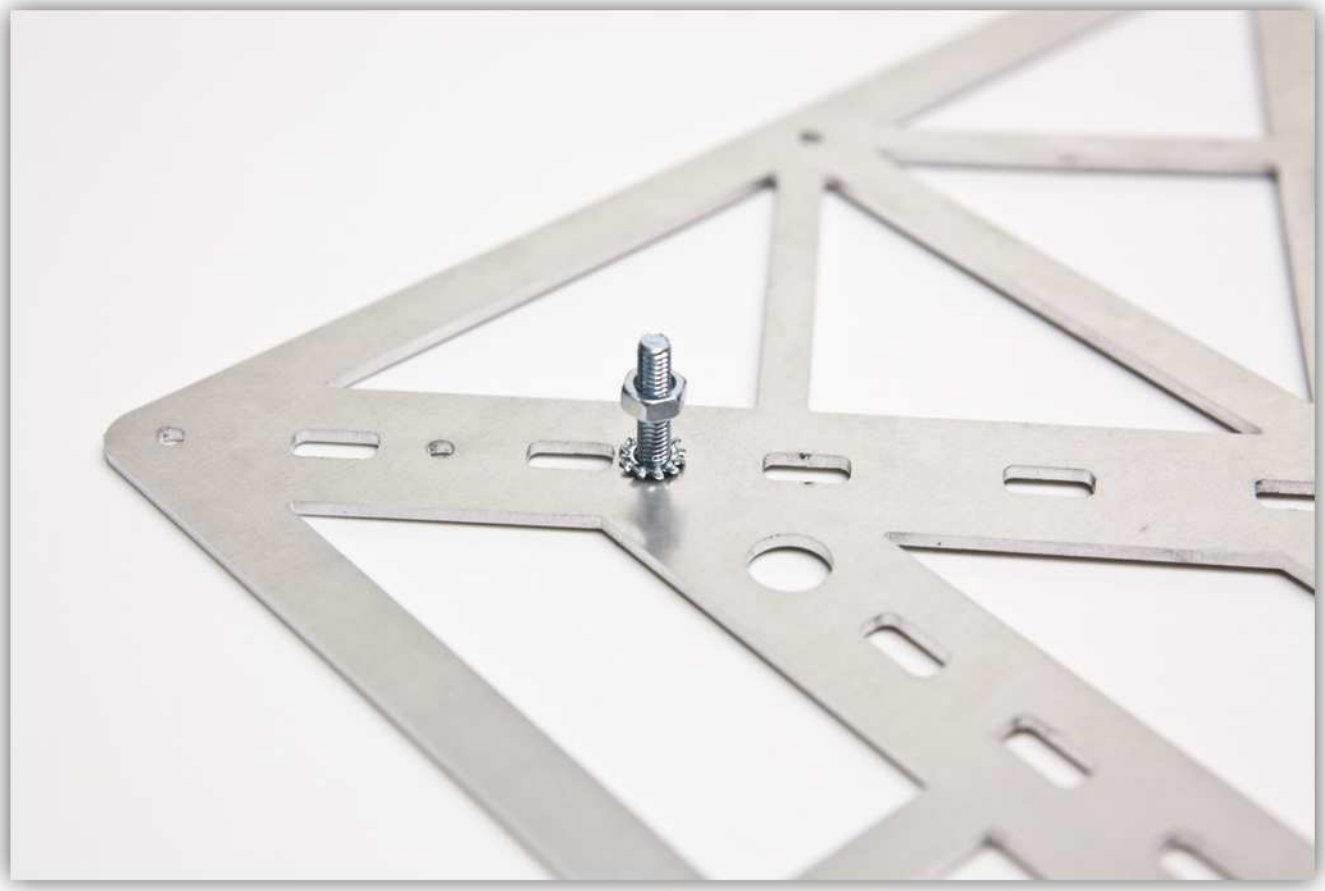


Take the 4 countersunk M4 bolts and put them through the BED PLATE.



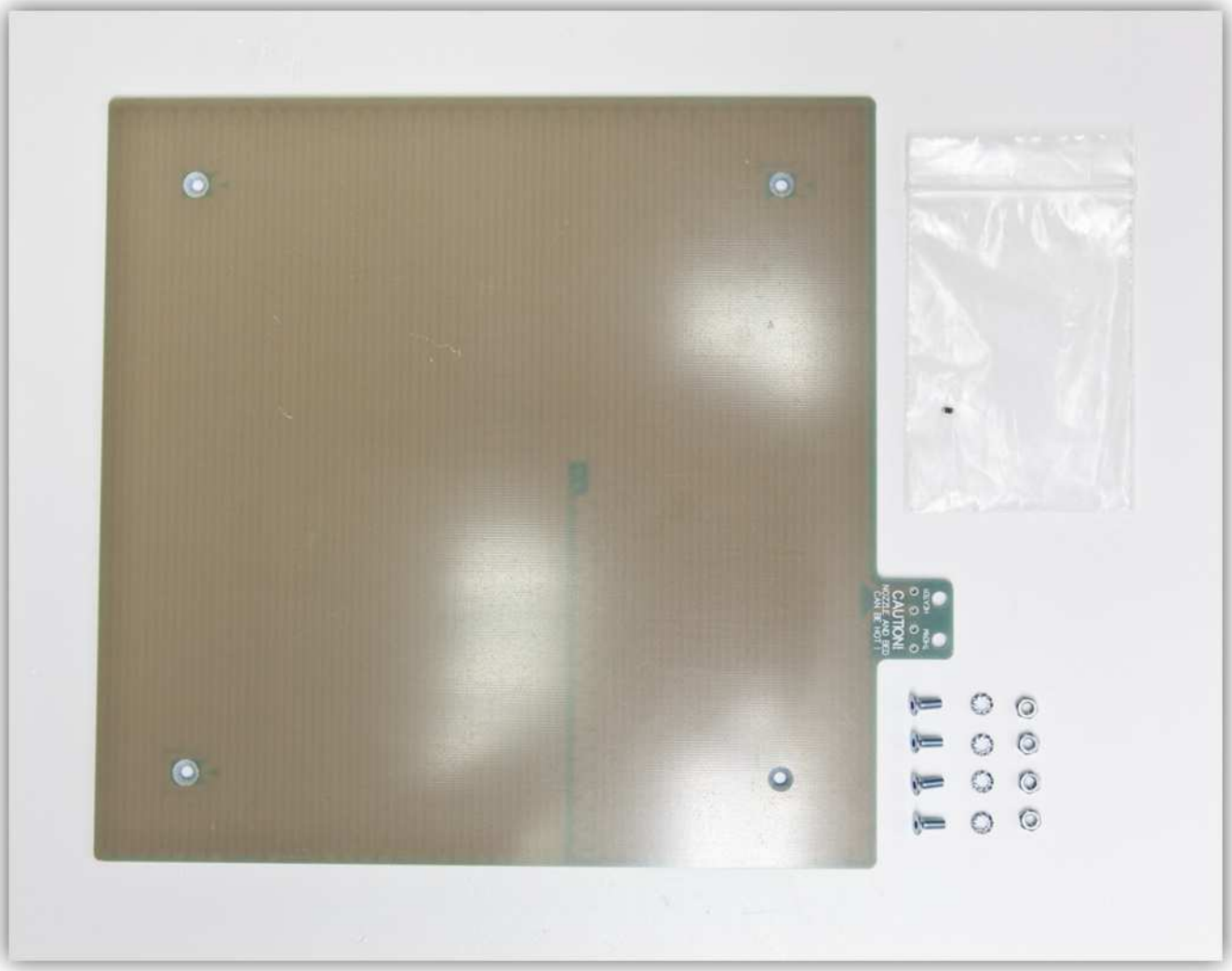


Use 4 M4 toothed washers and 4 M4 nuts.

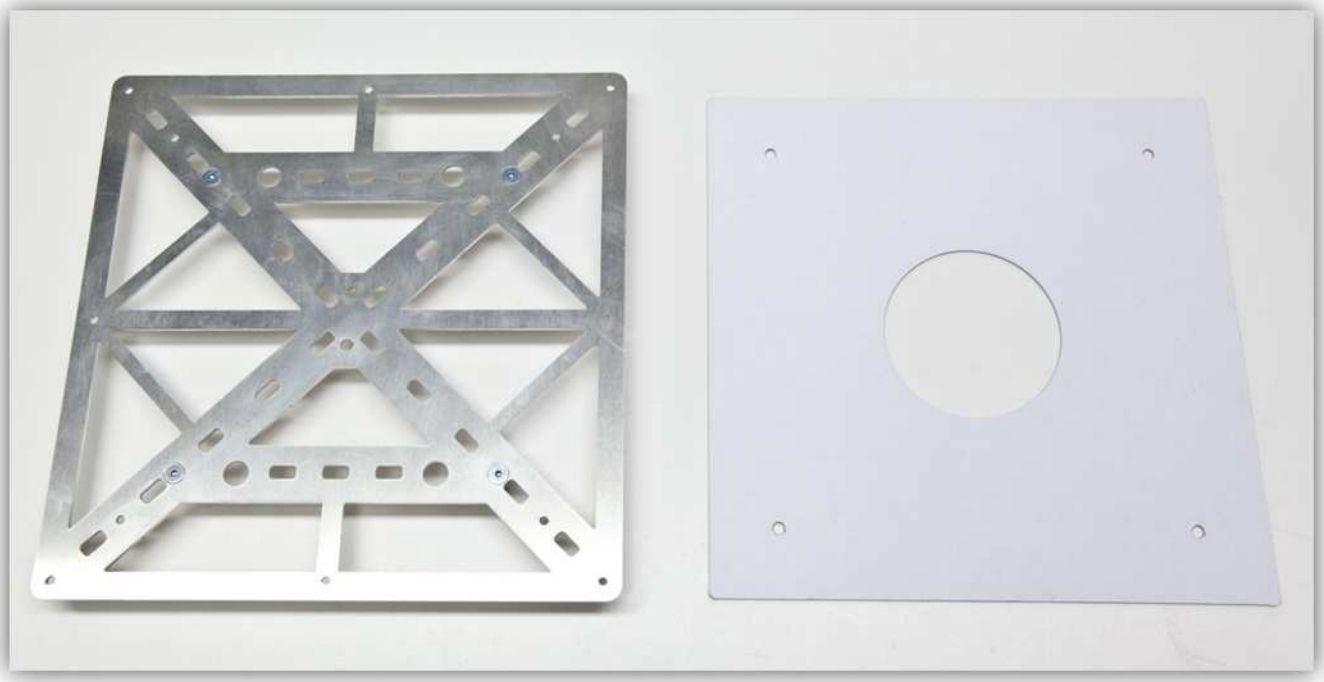


Tighten all these bolts firmly.

Take all the parts out of the bag labelled with 33. **Take extra care with the bag with the small NTC thermistor.**

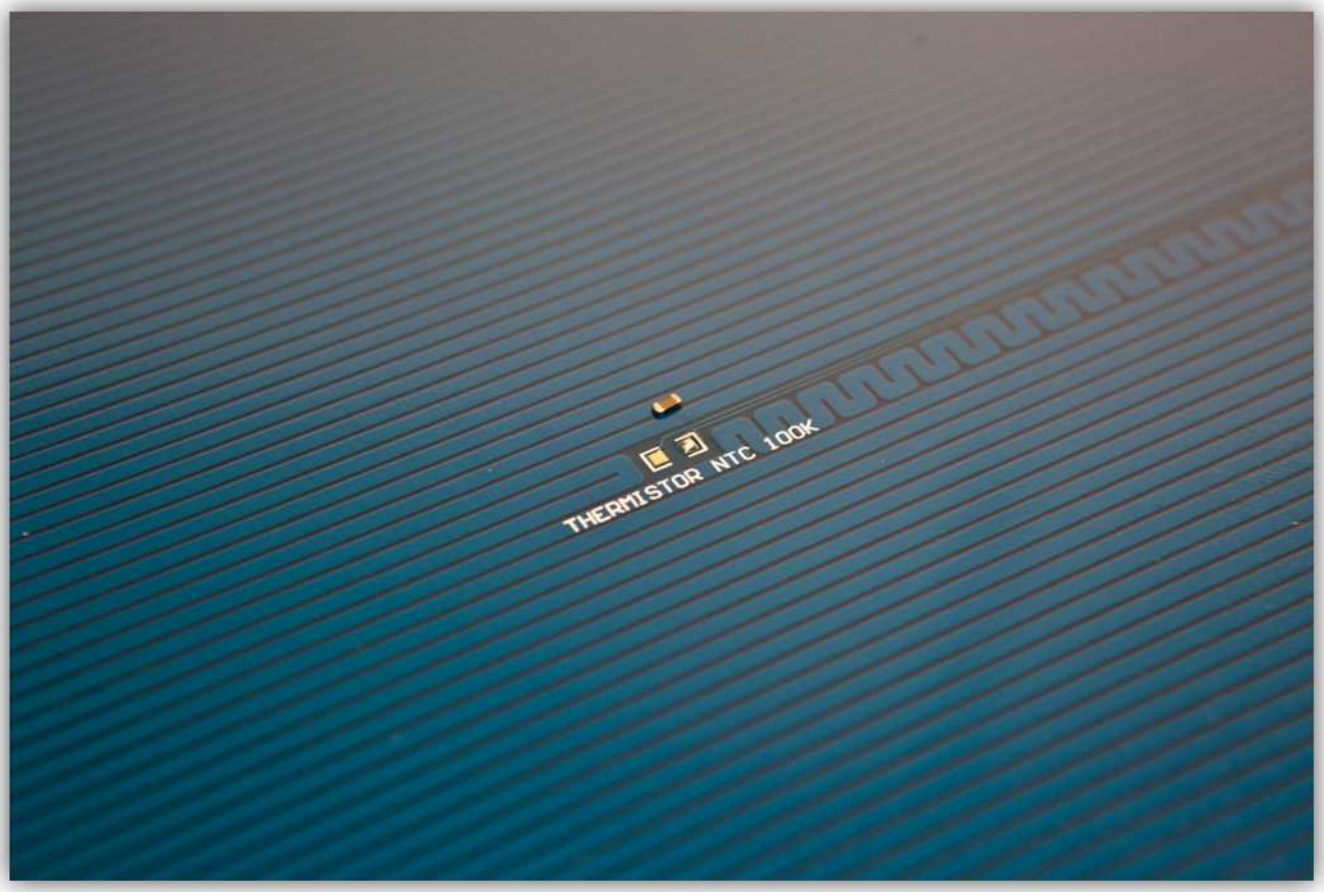


Lay the CARDBOARD ISOLATOR on top of the BED PLATE and align the holes. **Watch the orientation of the bedplate carefully.**

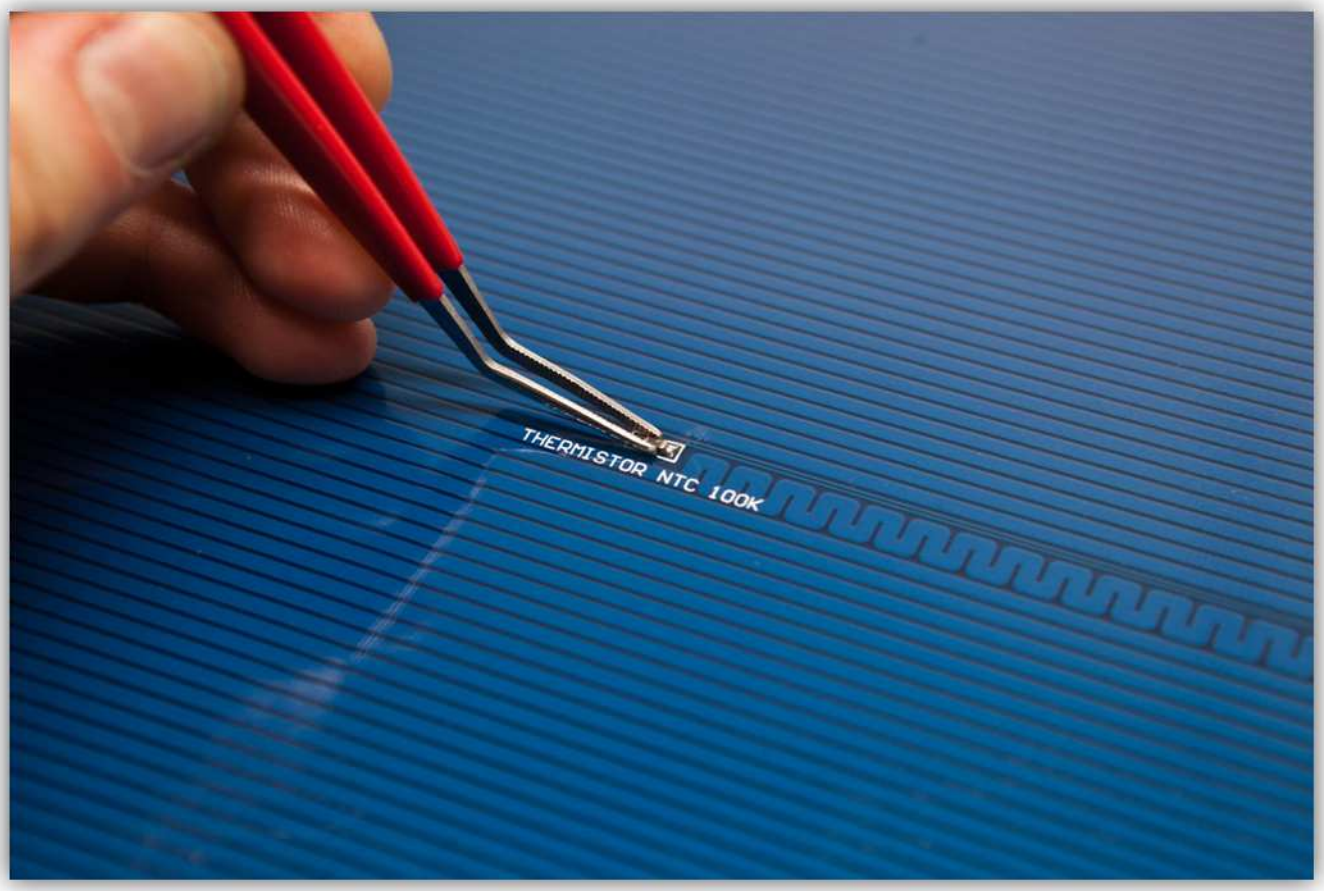


Now take the HEATED BED PCB and the NTC THERMISTOR.

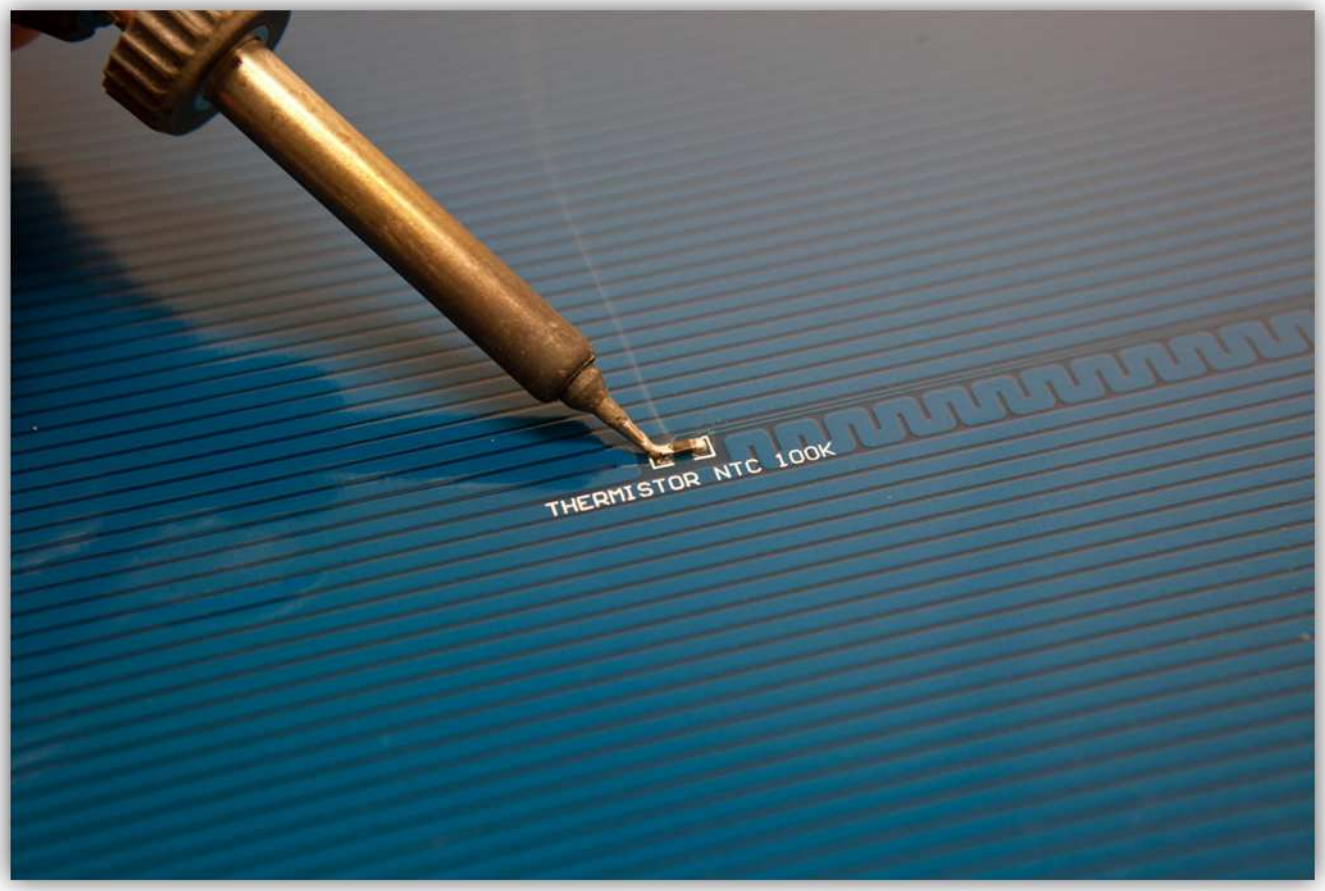
Tin one pad.



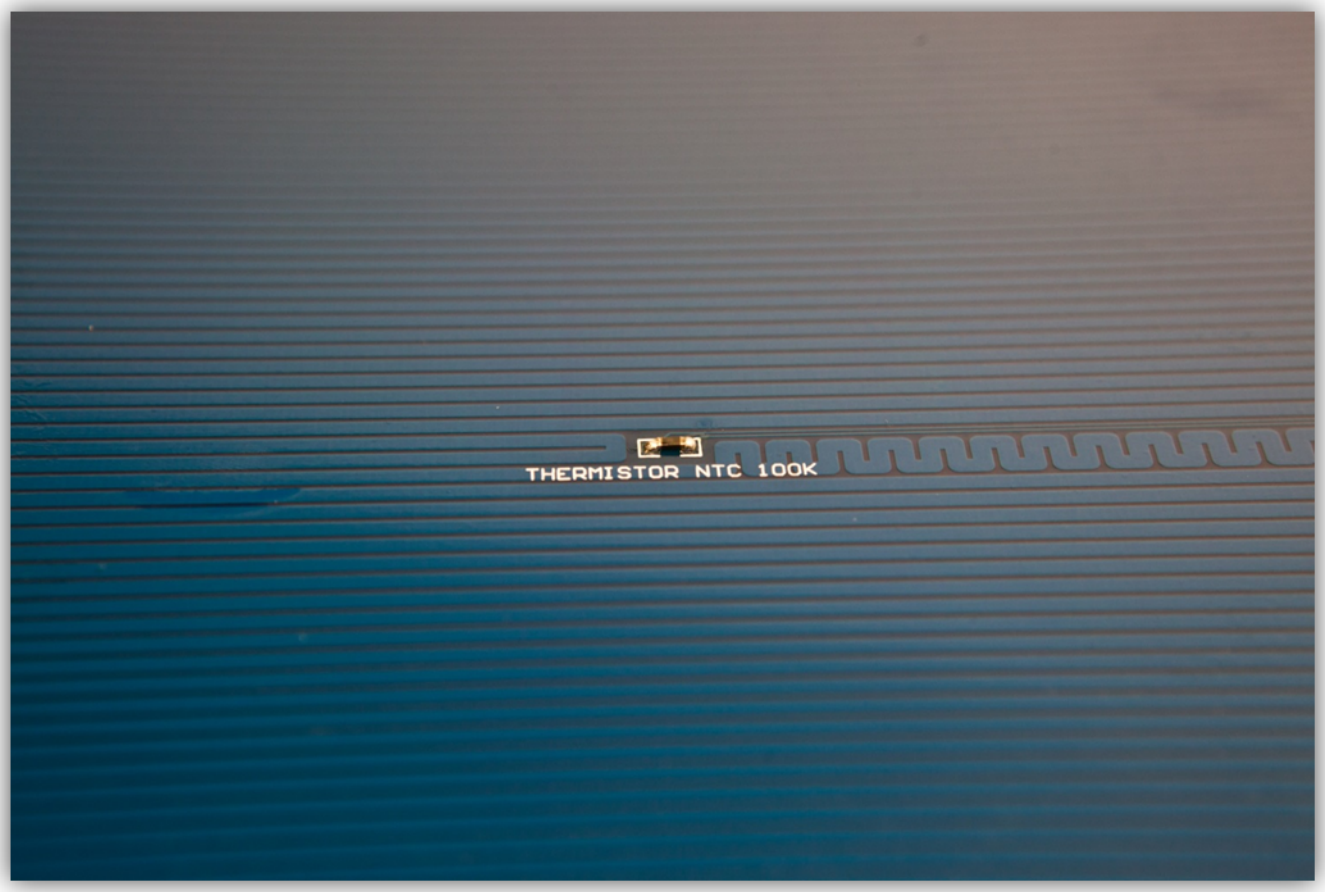
Place the NTC THERMISTOR with one side on the pad while you apply heat, it does not matter which side, a thermistor is not polarized. **Make sure you do not heat the thermistor for too long.**



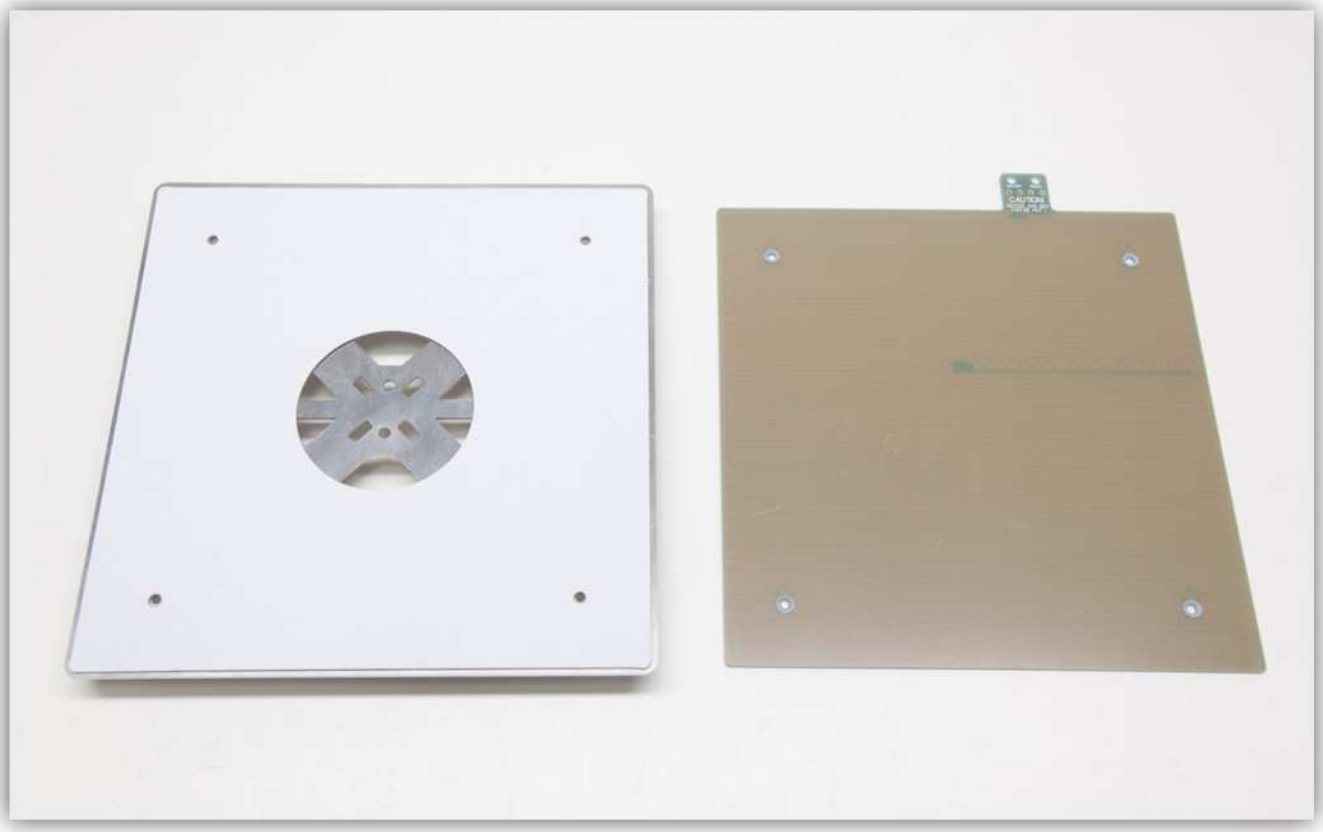
Now tin the other pad and other side of the NTC THERMISTOR.

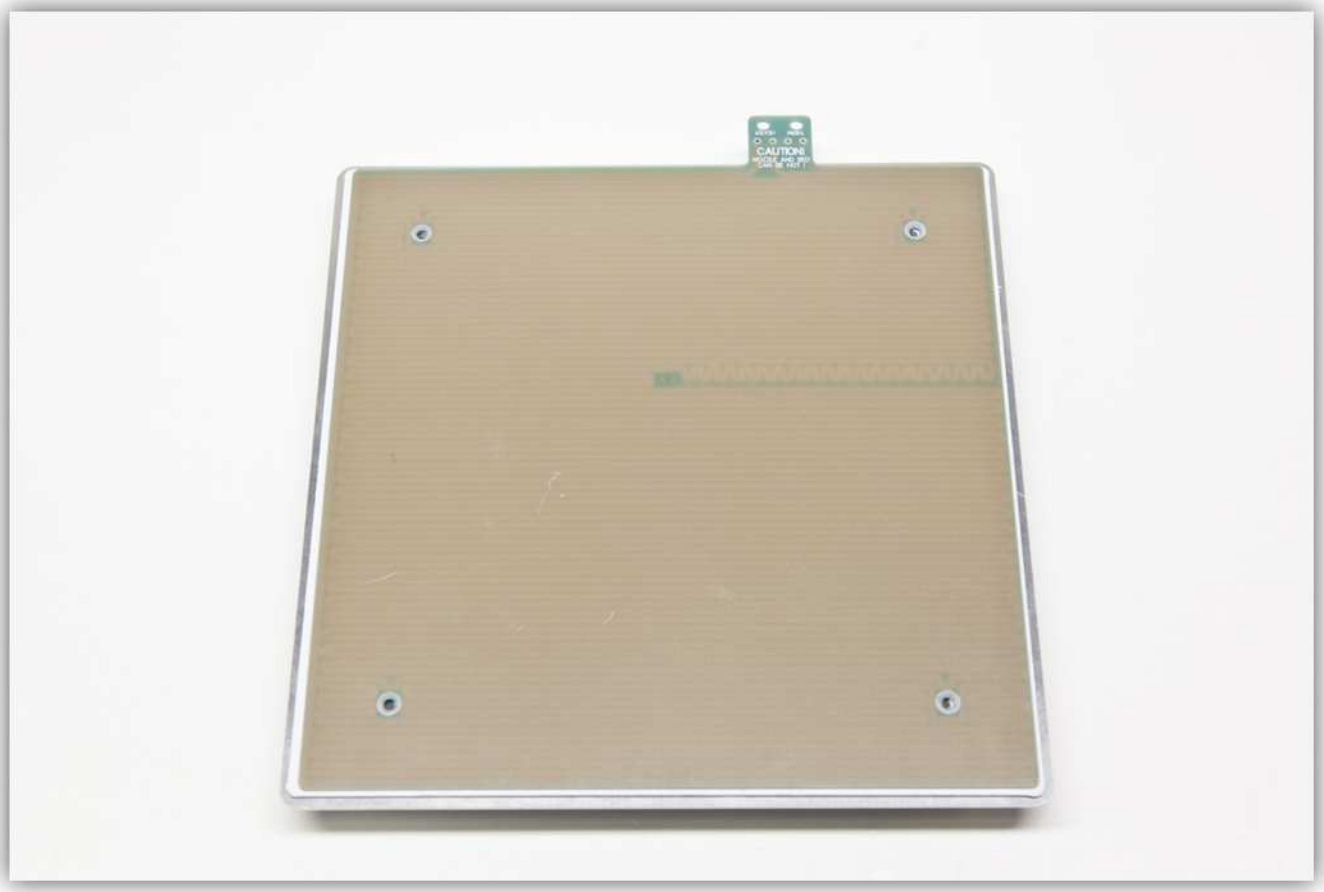


A soldered NTC THERMISTOR should look like this.



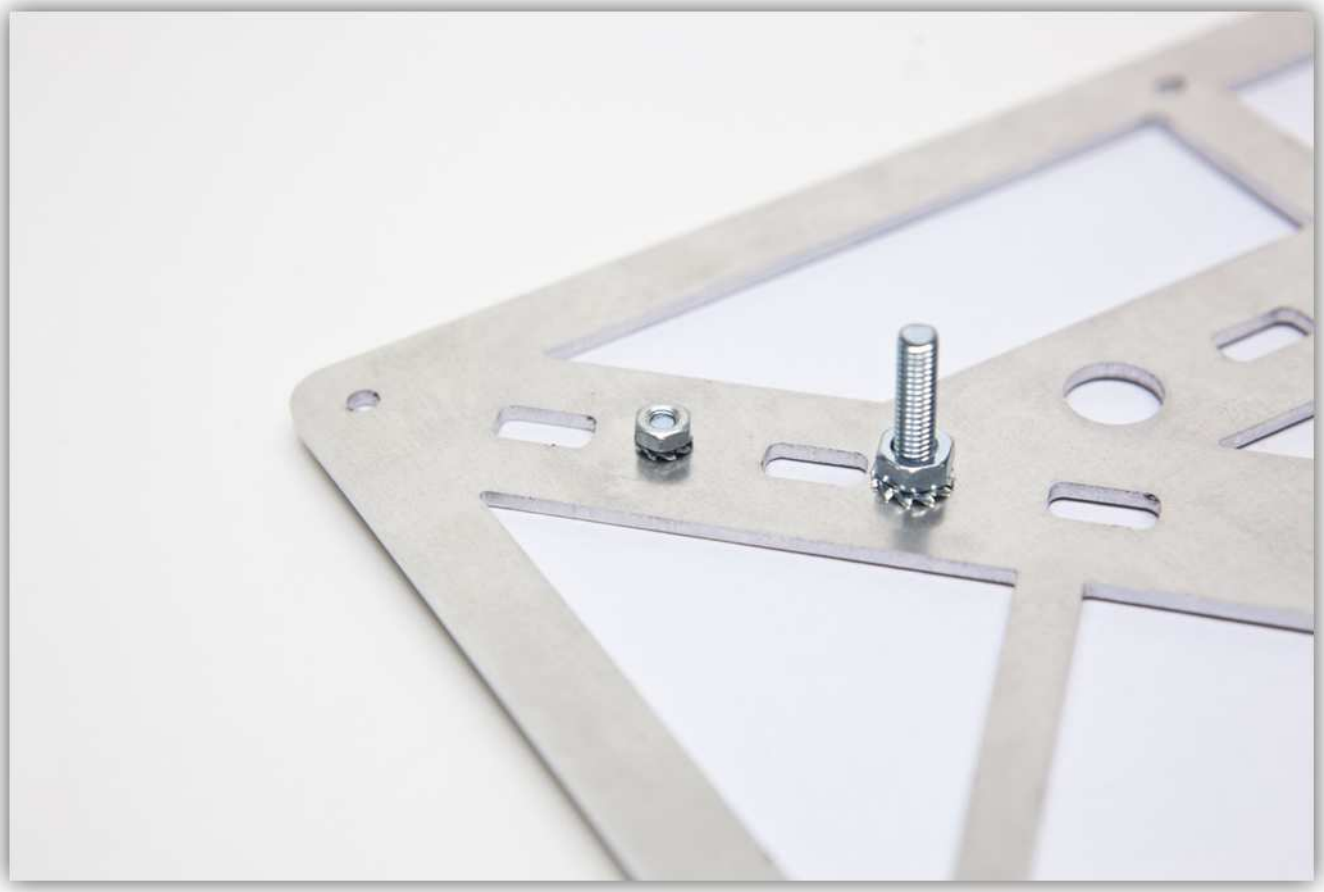
Place the HEATED BED PCB on the BED PLATE. **Watch the orientation carefully.**



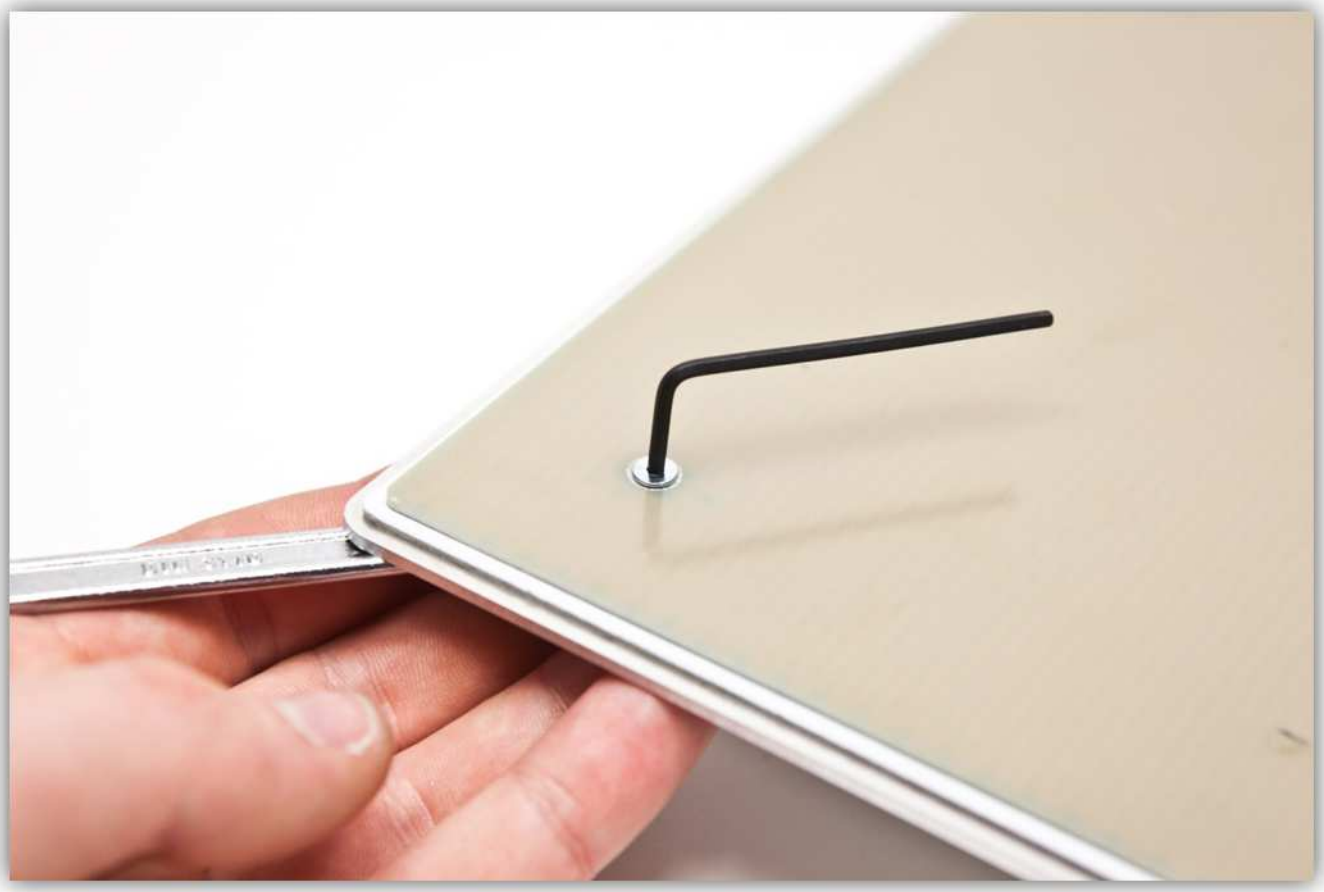


Insert the 4 countersunk M3 bolts in the 4 holes.

Use 4 M3 washers and 4 M3 nuts to secure the HEATED BED PCB to the BED PLATE.

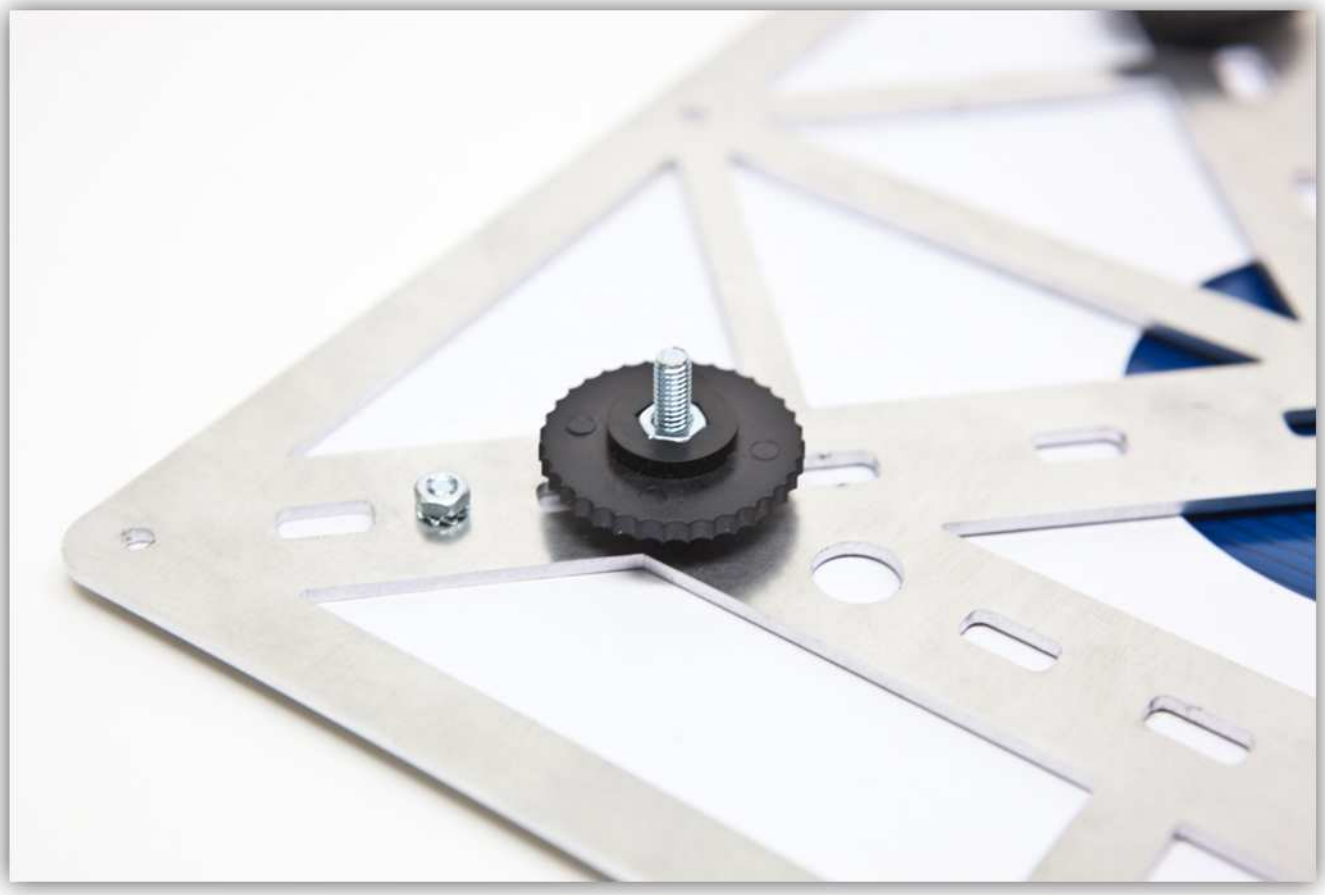


Tighten these 4 bolts firmly.

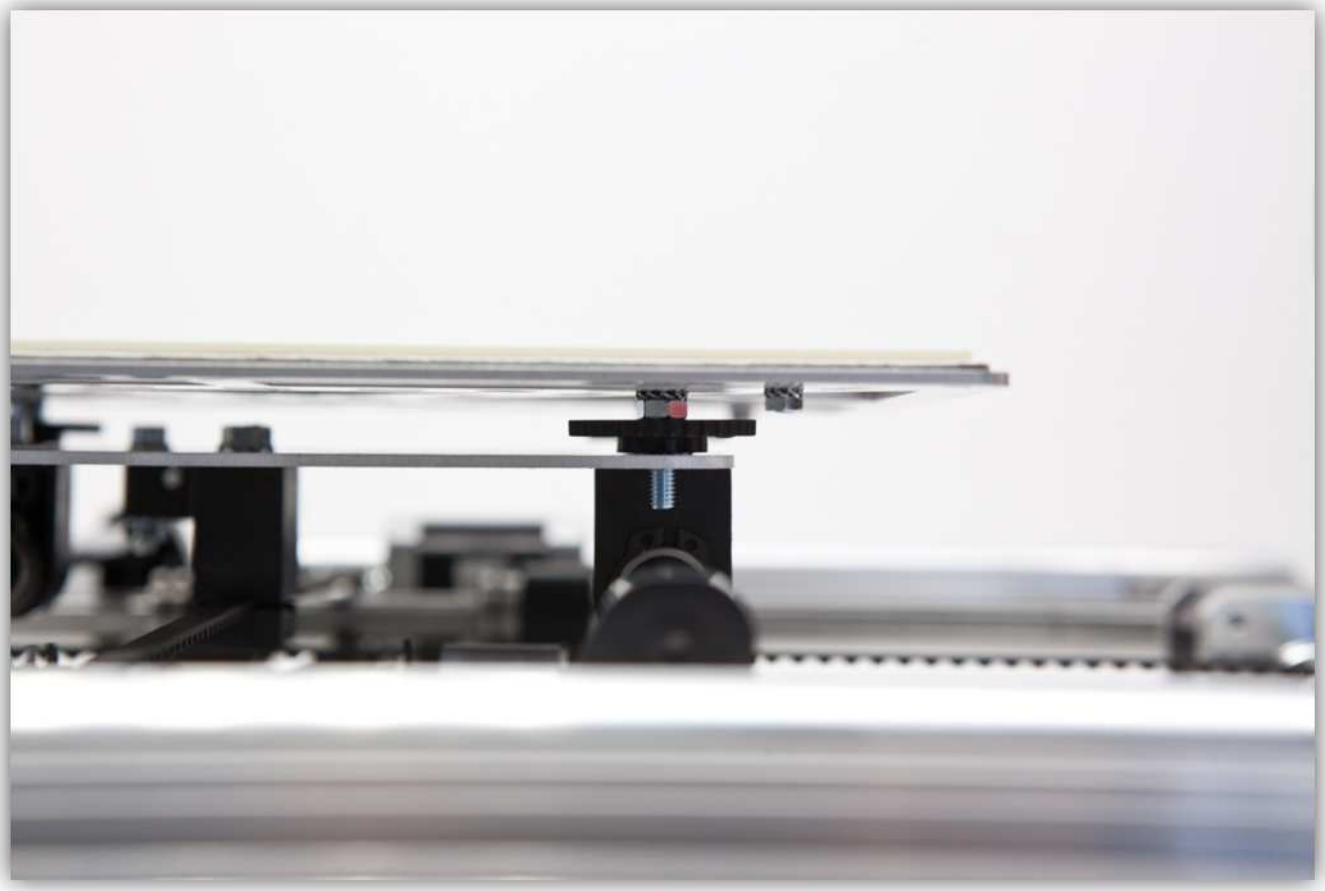


Insert an M4 nut into 4 THUMB SCREWS.

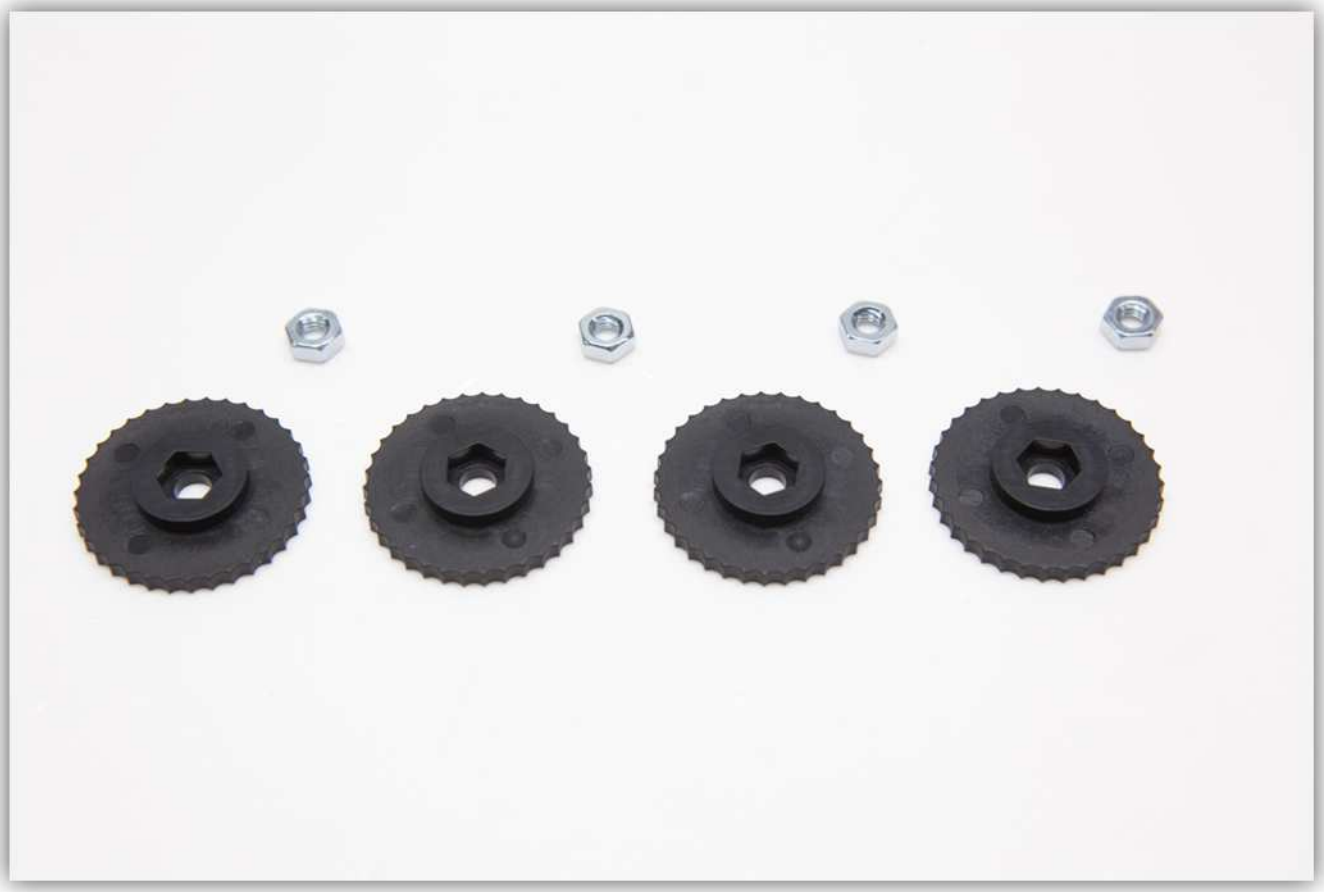
Screw these THUMB SCREWS onto the 4 BED PLATE bolts (all the way down).

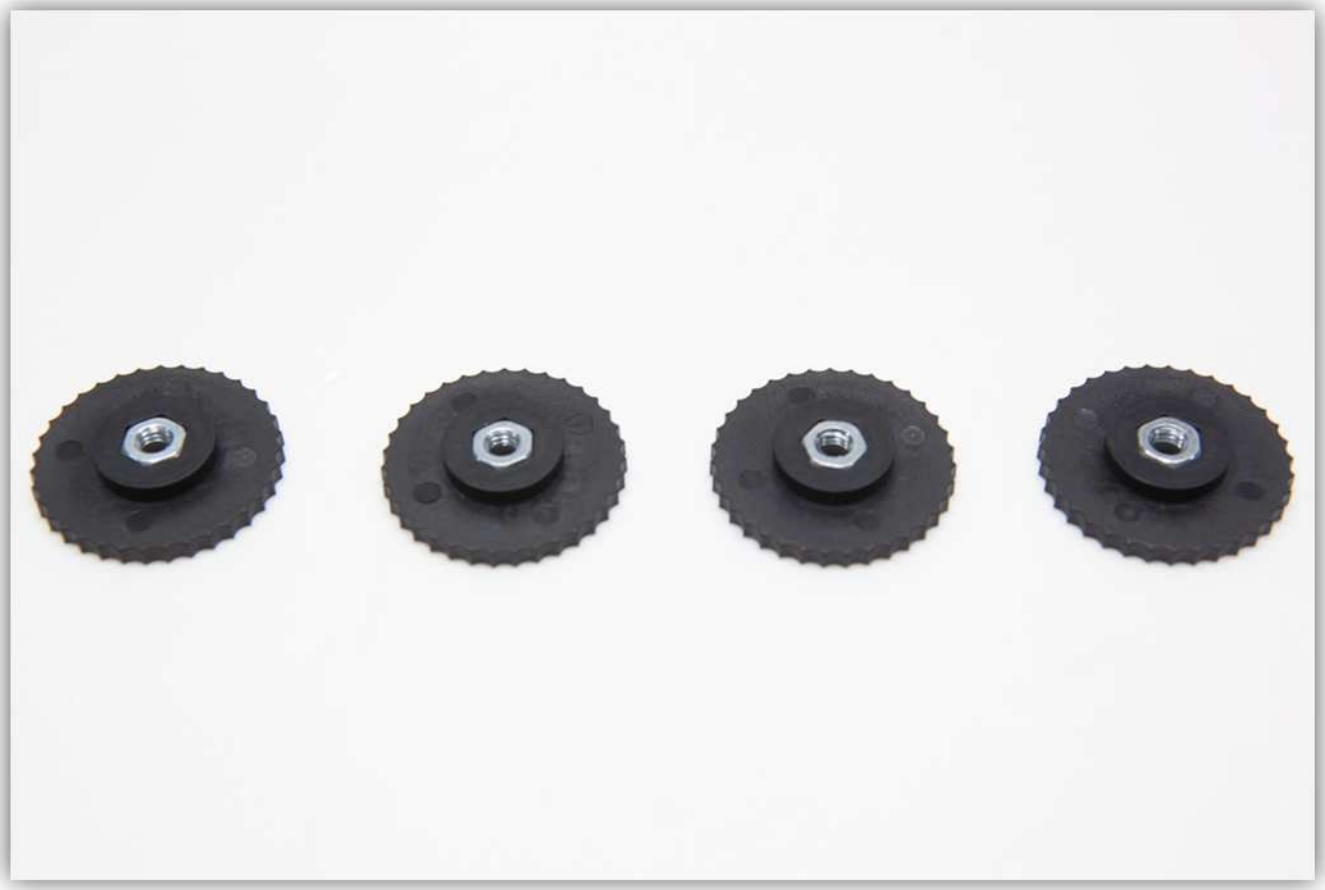


Now place the bed onto the X CARRIAGE. Make sure all the 4 bolts slide through the BED SUPPORT PLATE. **Notice the orientation.**

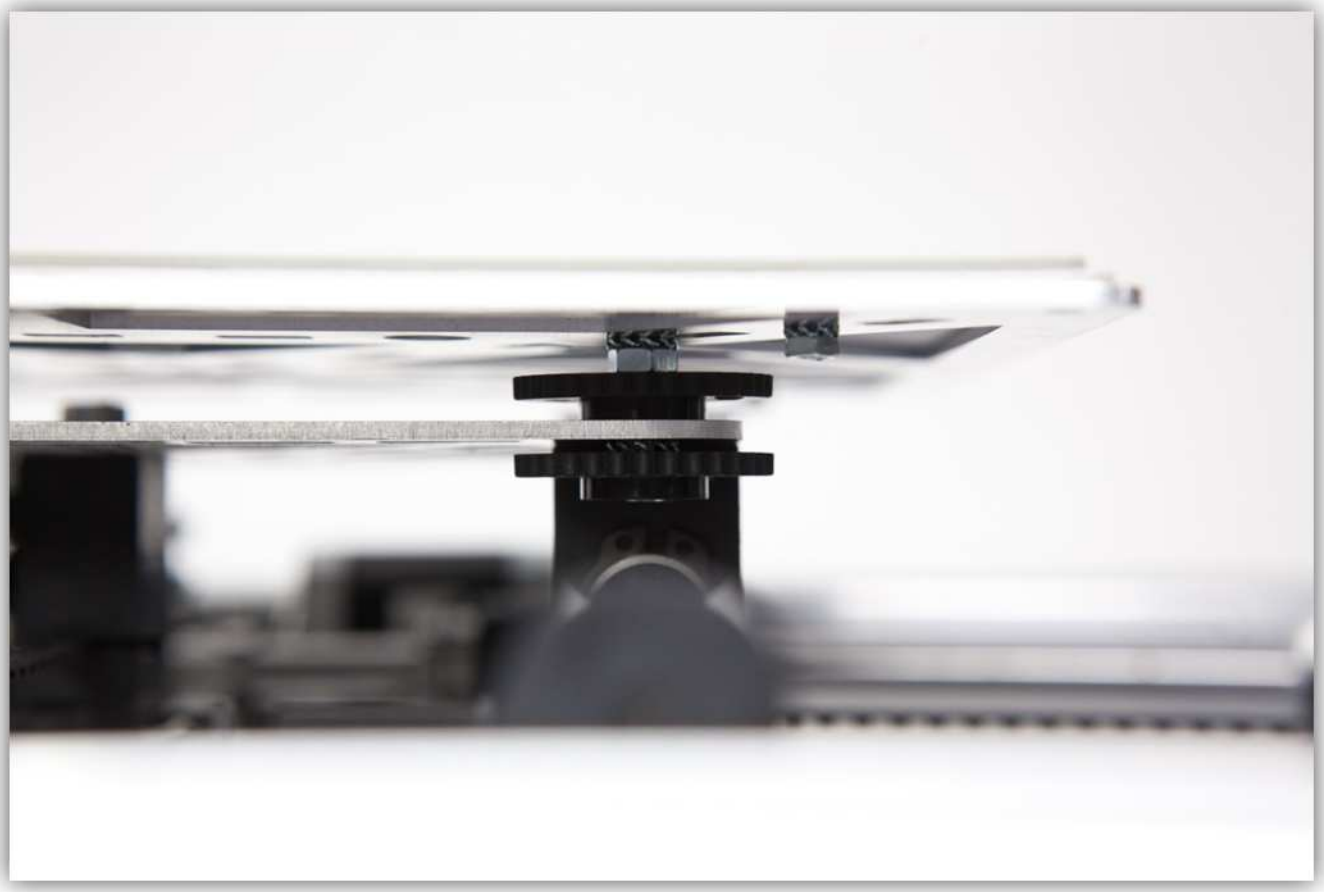


Insert an M4 nut into 4 THUMB SCREWS.





Put an M3 toothed washer on each of the THUMB SCREWS and screw these on each of the BED PLATE bolts as shown in the pictures below.



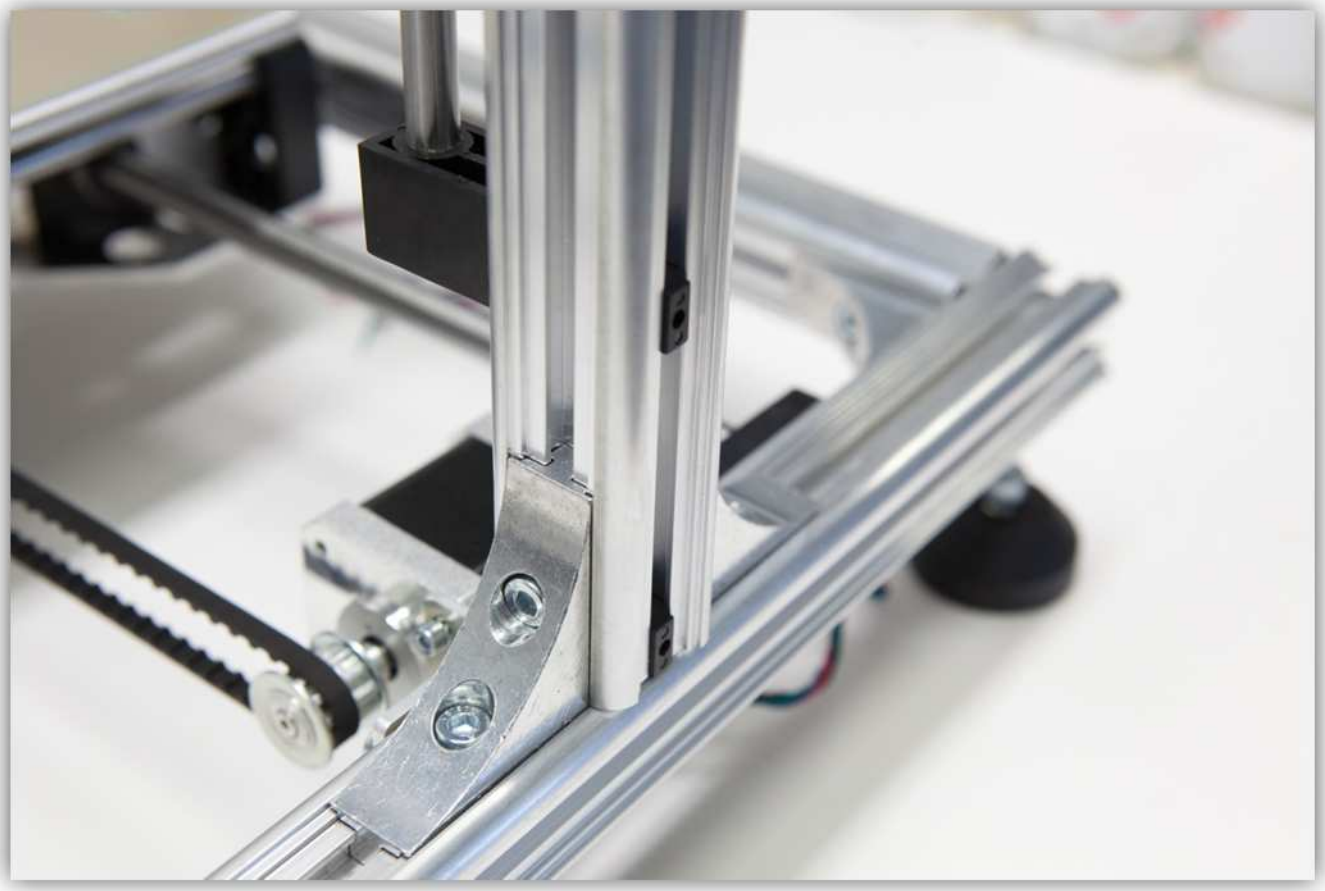
011 – FINISHING THE FRAME

Take all the parts out of the bag labelled with 35.

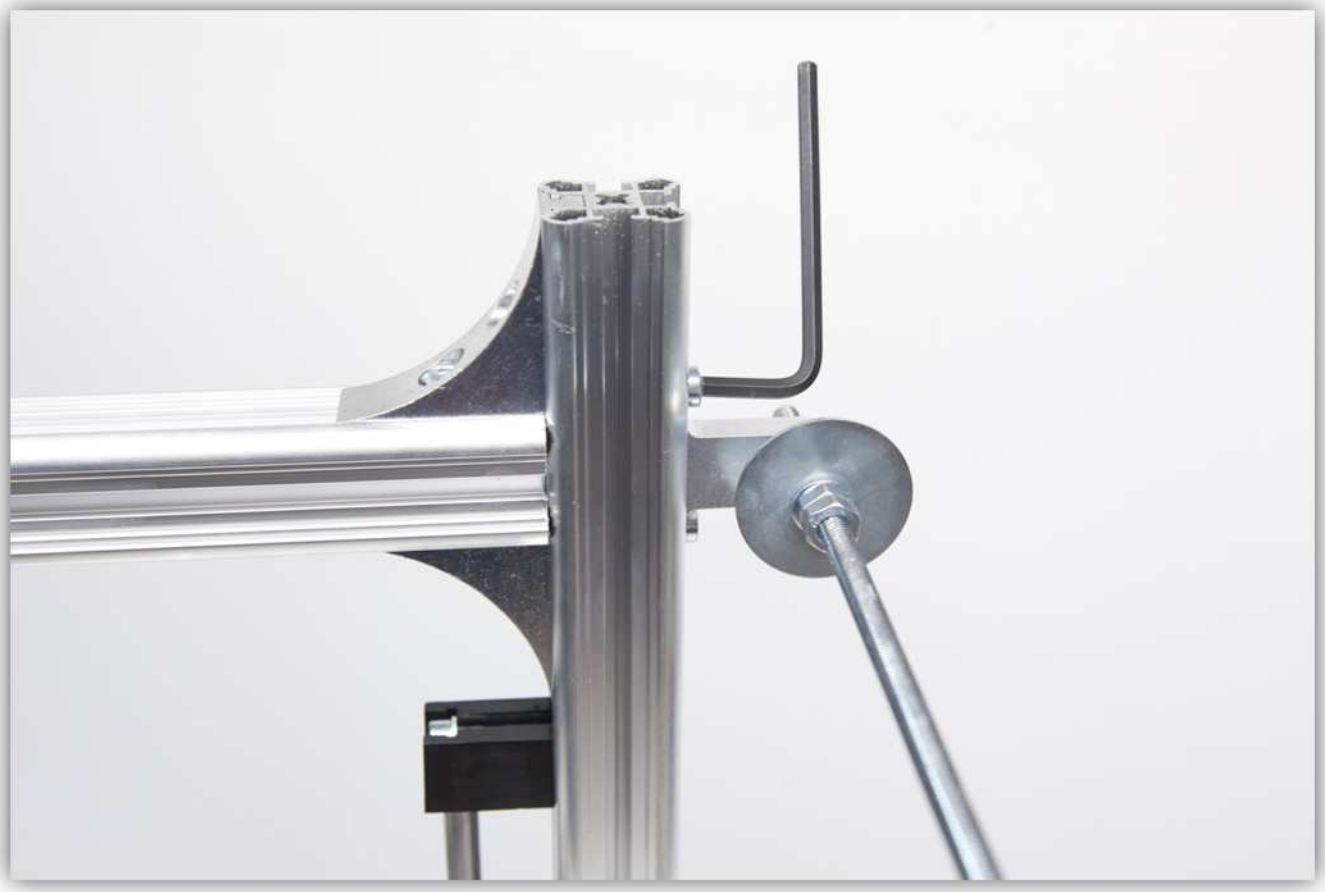
You will also need the COIL SUPPORT you assembled earlier.

Now take 2 pieces as shown in the picture below out of the bag containing the plastic parts (PROFILE MOUNTS)

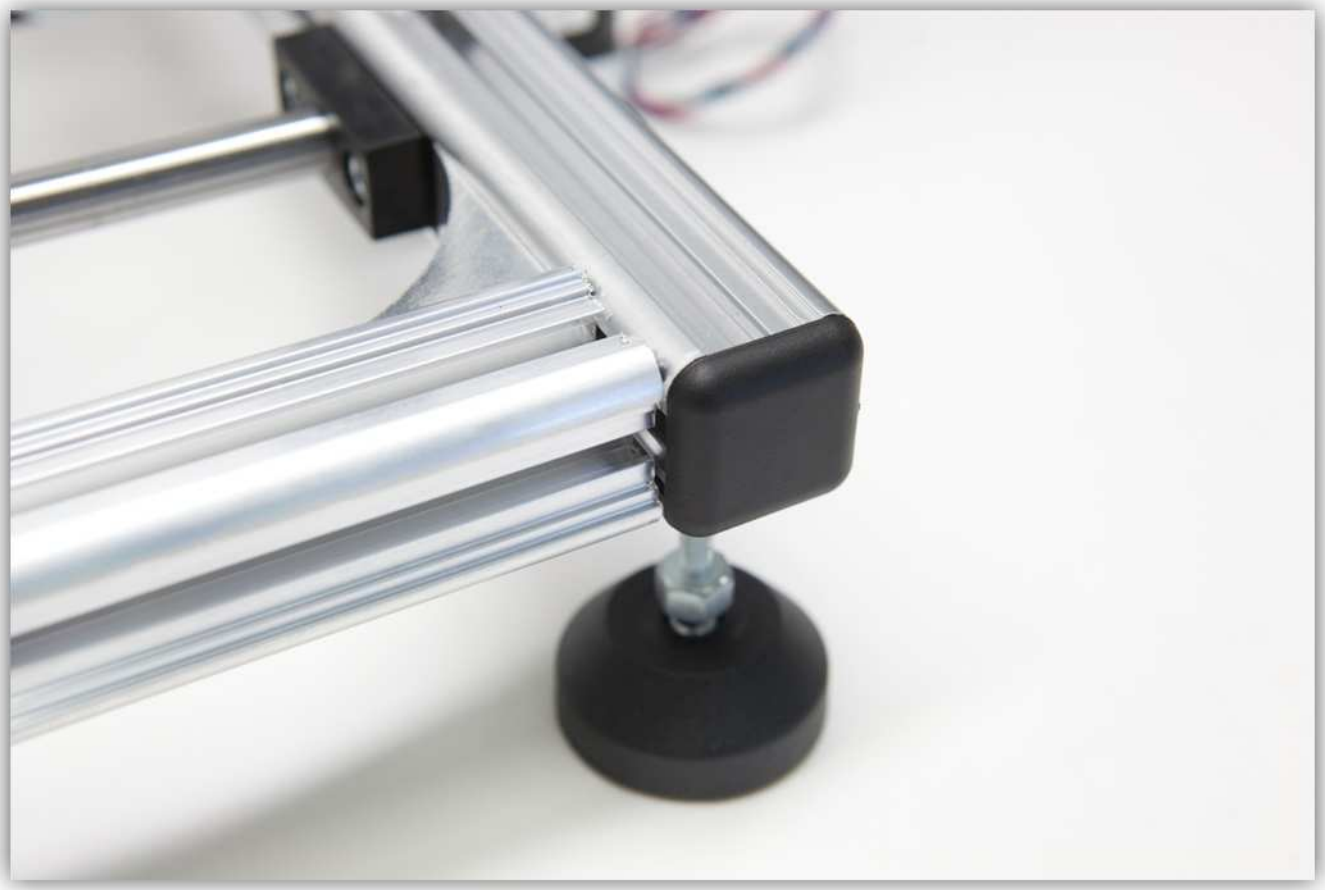
Slide these PROFILE MOUNTS in the right upright ALUMINIUM PROFILE as shown in the pictures below.

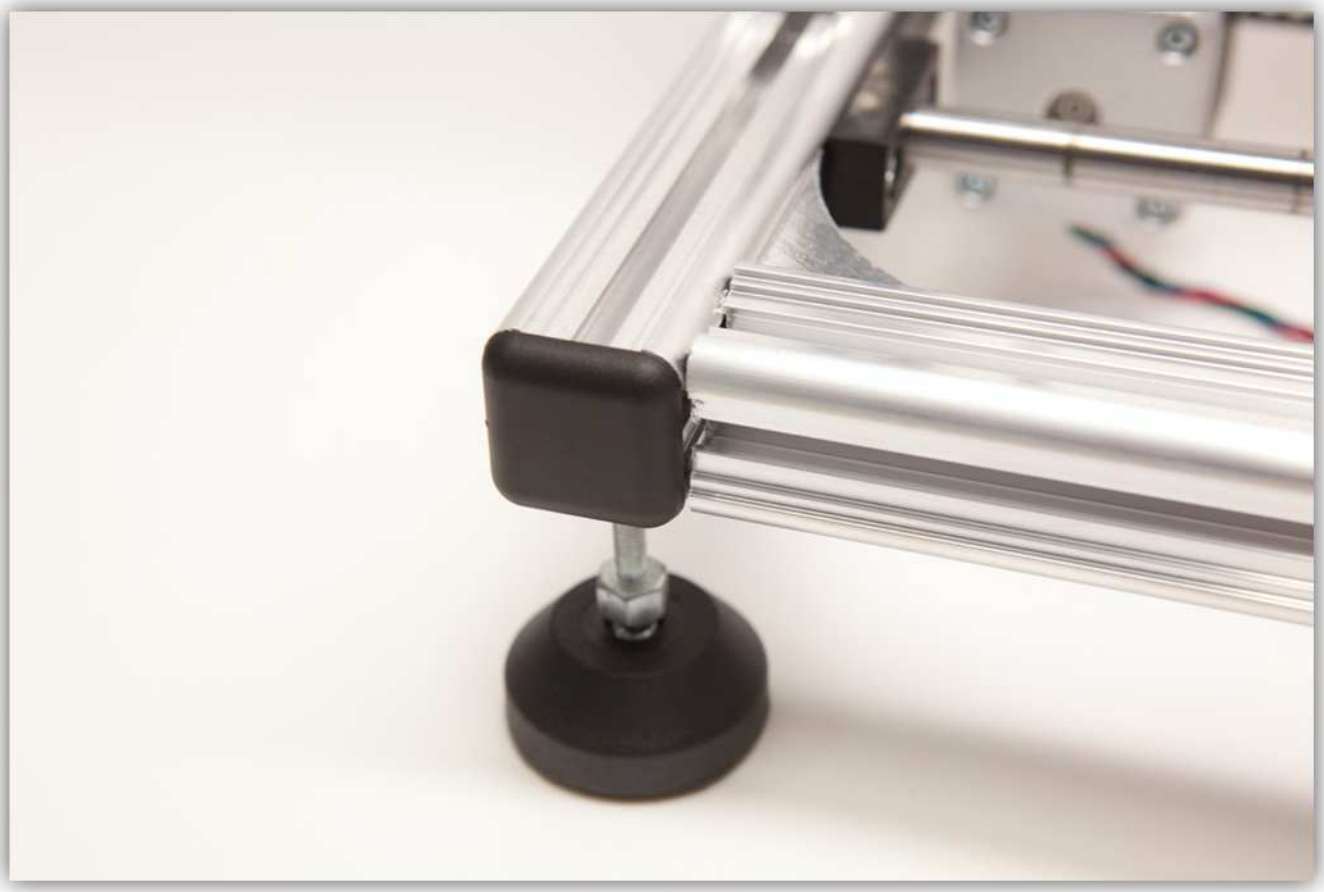


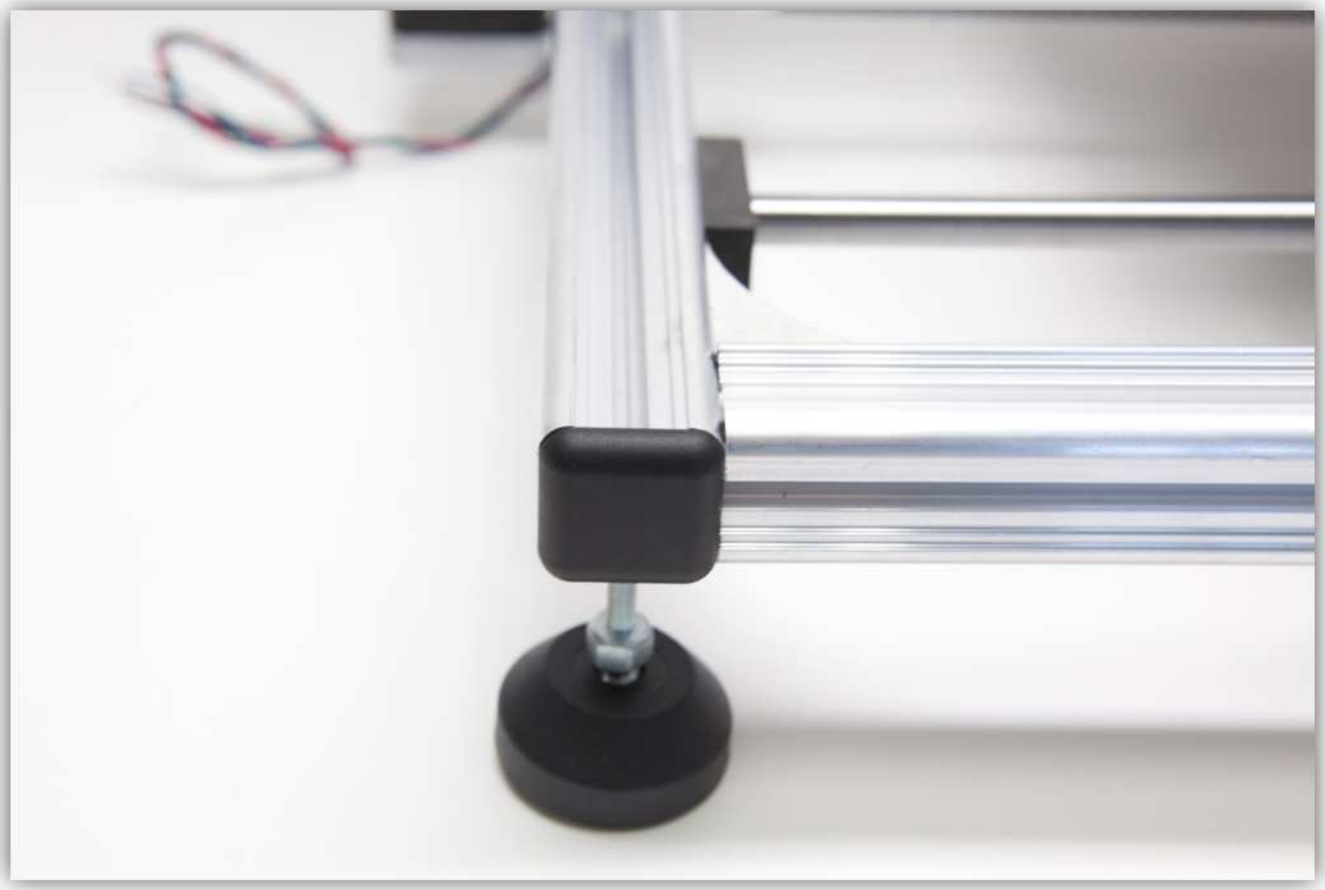
Next slide the COIL SUPPORT in the same profile and align it with the horizontal ALUMINIUM PROFILE. Tighten it firmly.

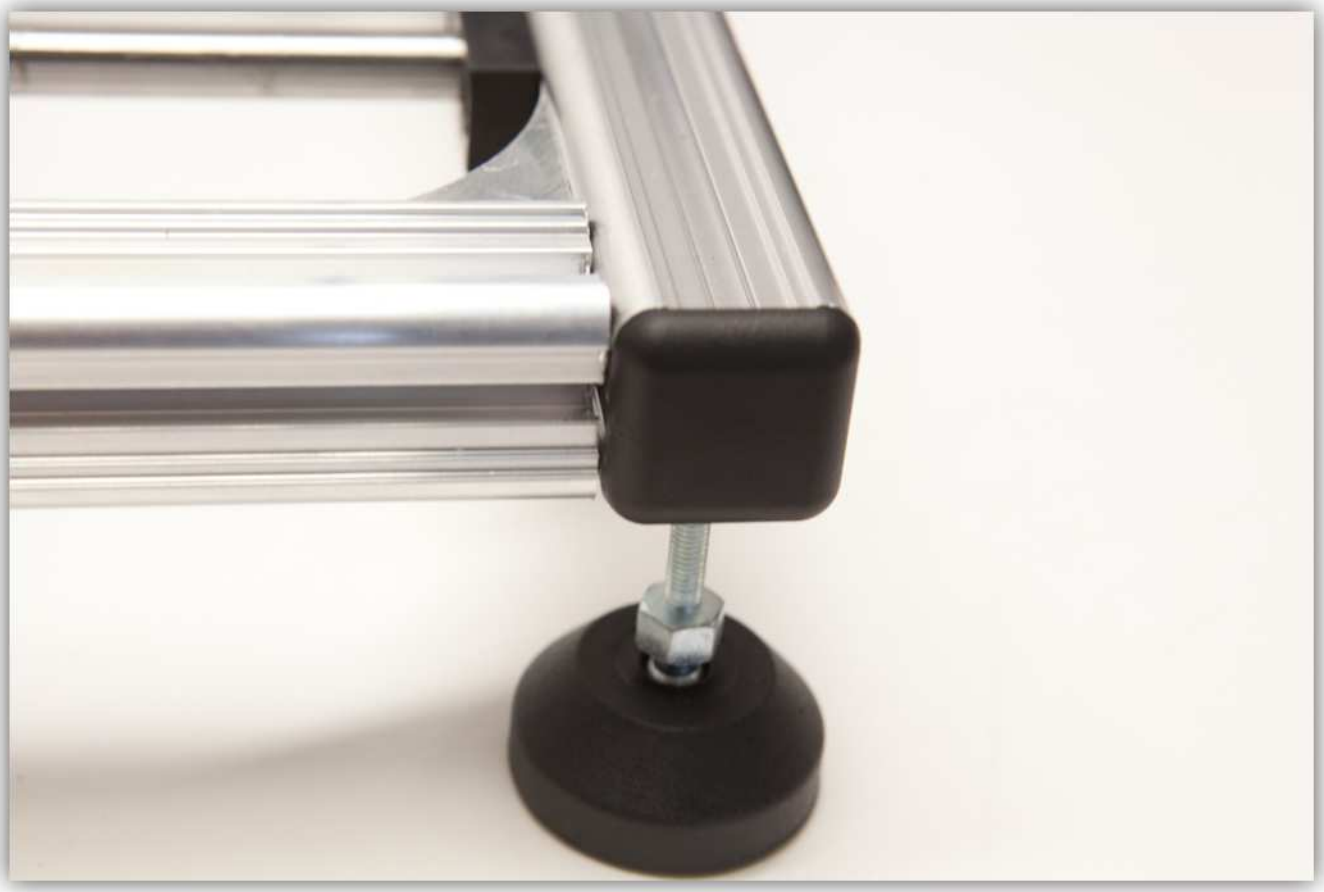


Place an END CAP on every open ALUMINIUM PROFILE end.





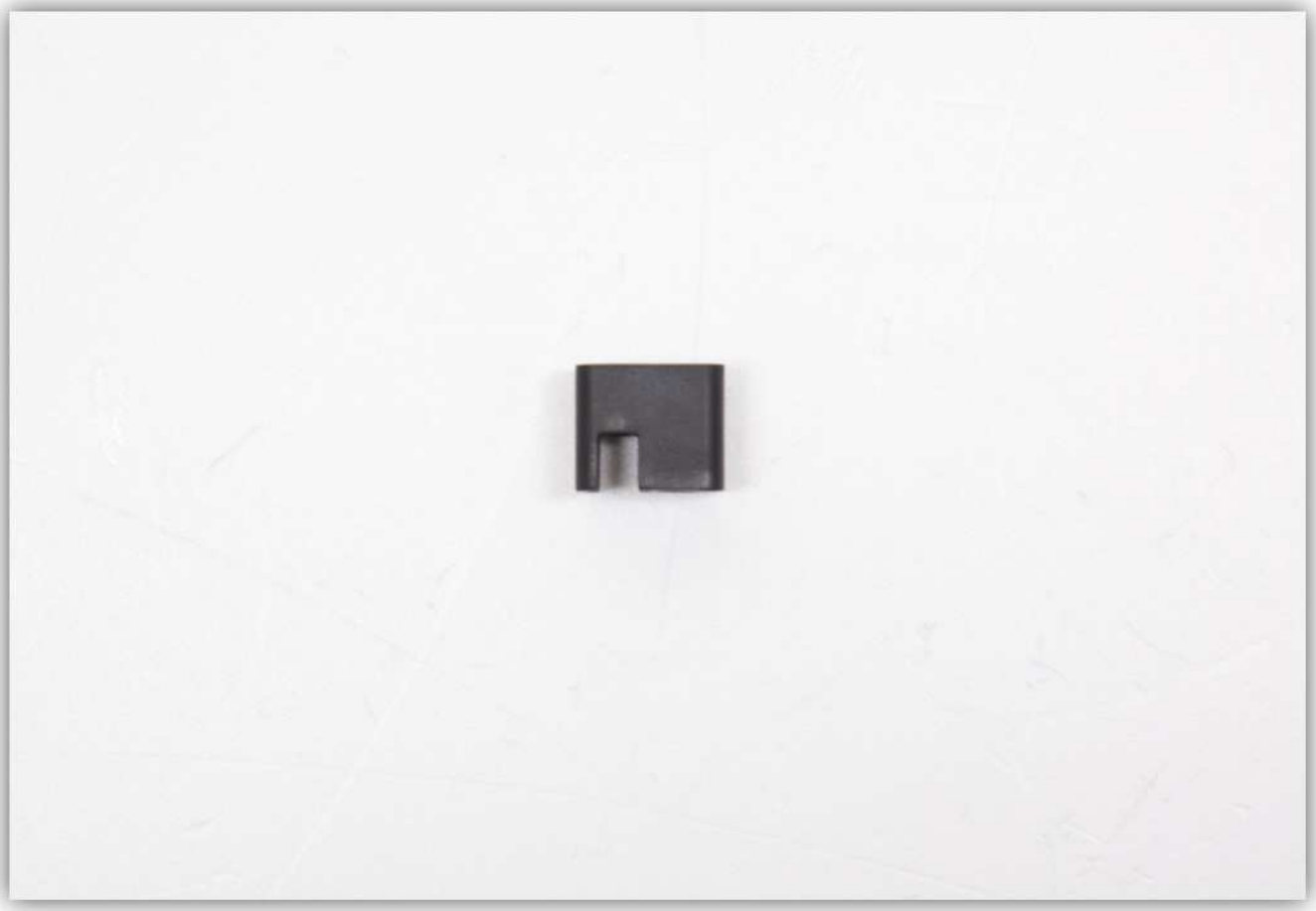




012 – MOUNTING THE Z & X END STOPS

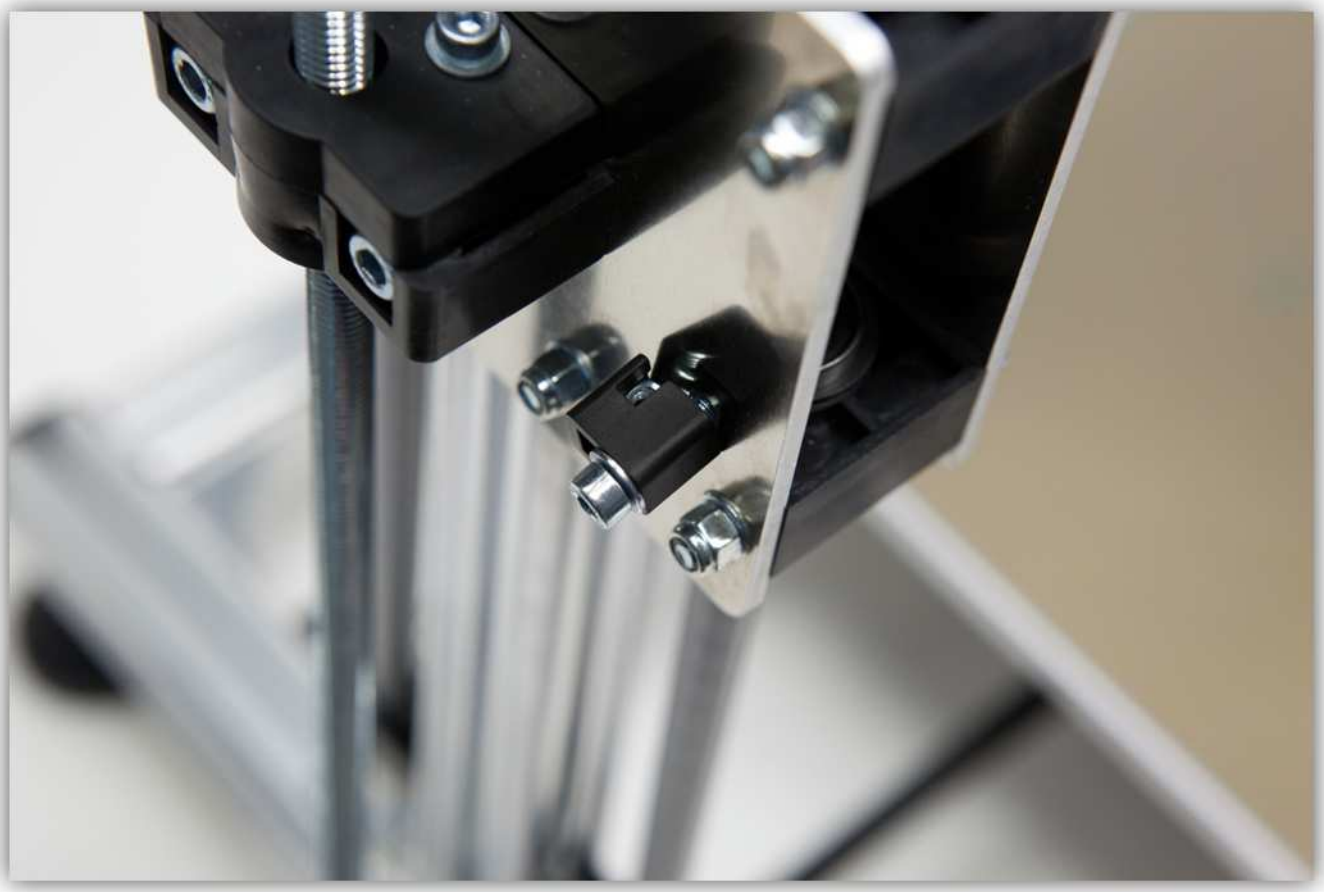
Take all the parts out of the bag labelled with 39.

Now take the piece as shown in the picture below out of the bag containing the plastic parts (ADJUST SCREW BRACKET).

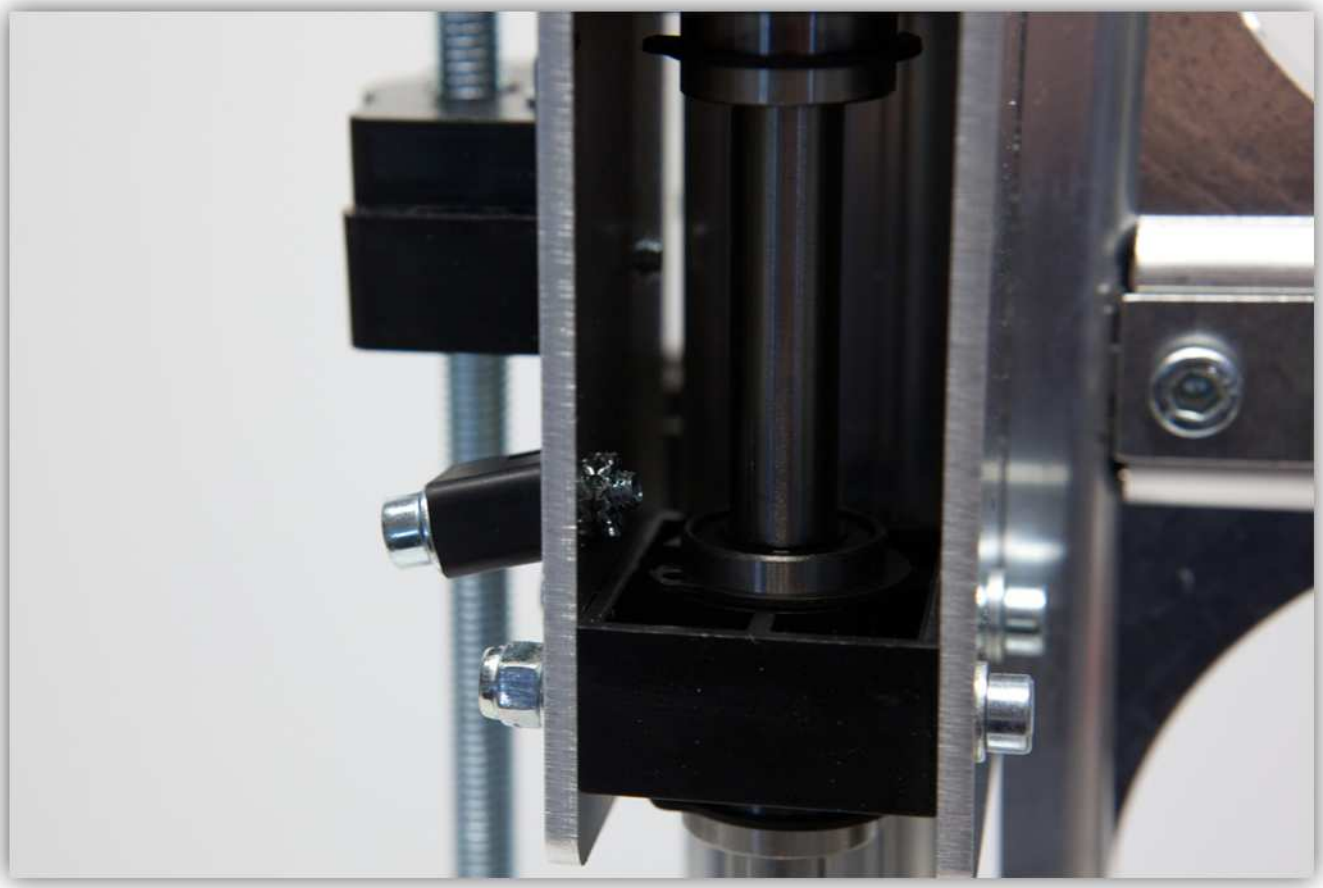


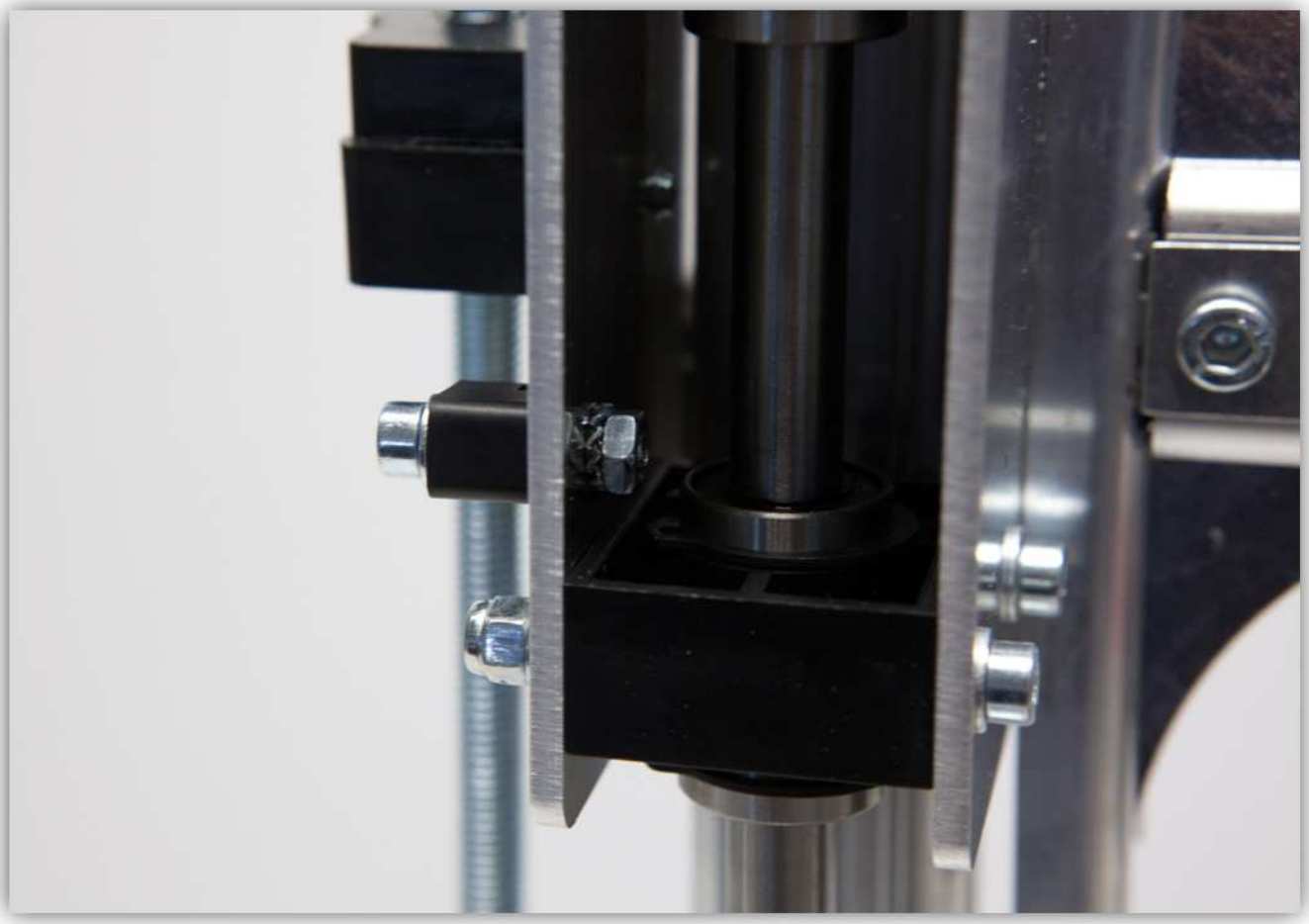
Slide an M3 nut into the ADJUST SCREW BRACKET piece as shown below.

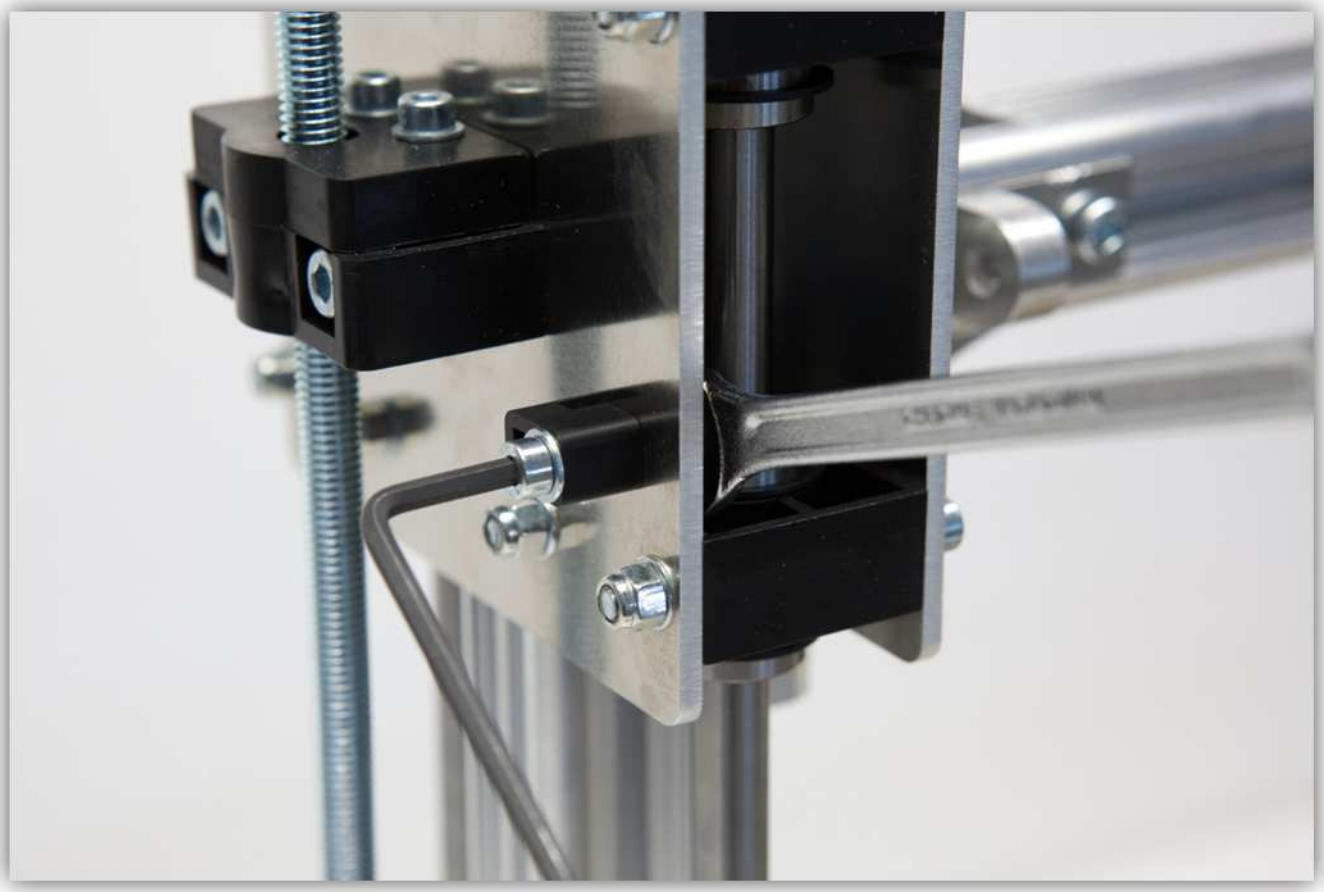
Take the M4 bolt and an M4 washer and bolt the ADJUST SCREW BRACKET piece to the Z CARRIAGE as shown in the pictures.



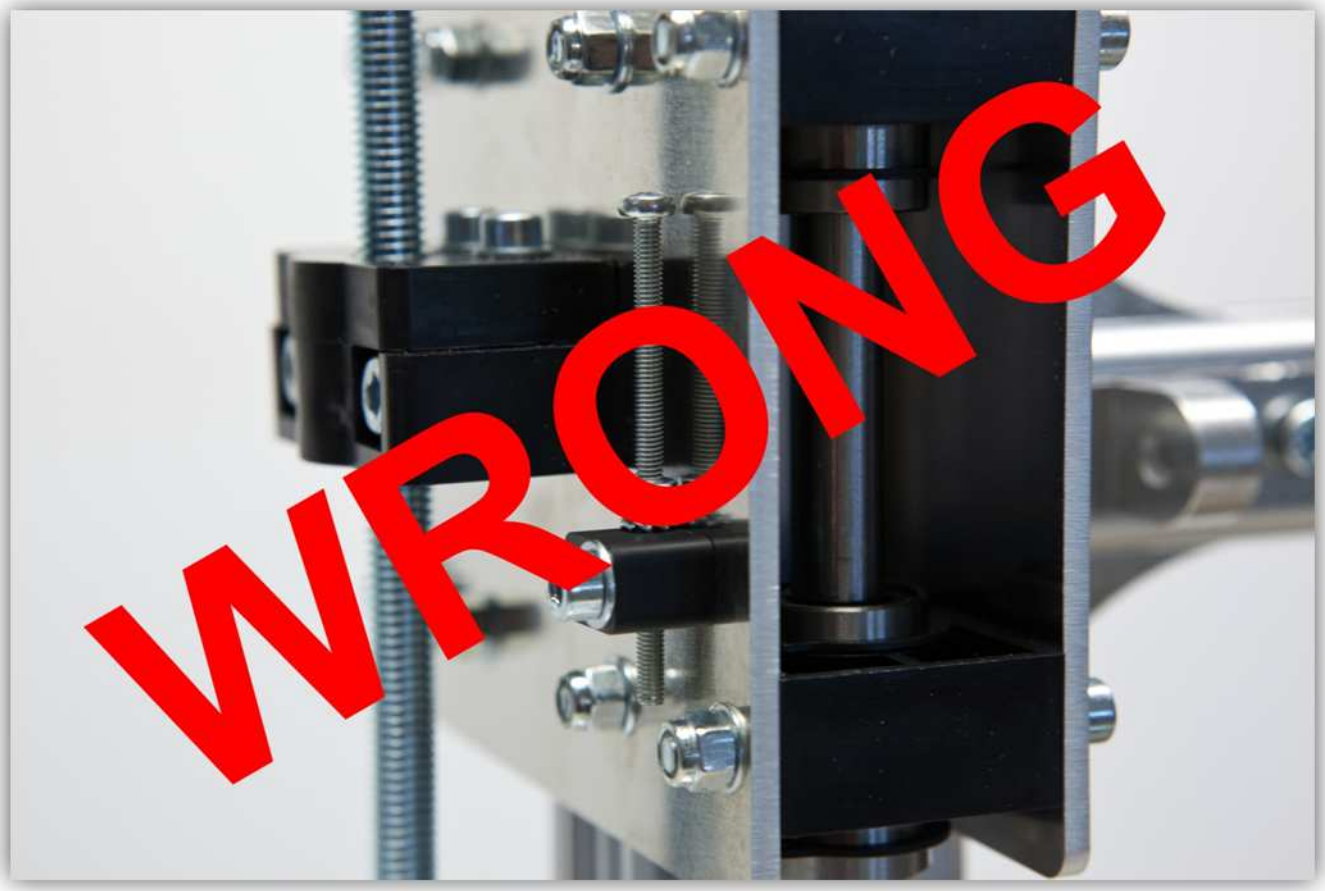
Use an M4 toothed washer and an M4 nut to bolt everything together firmly.



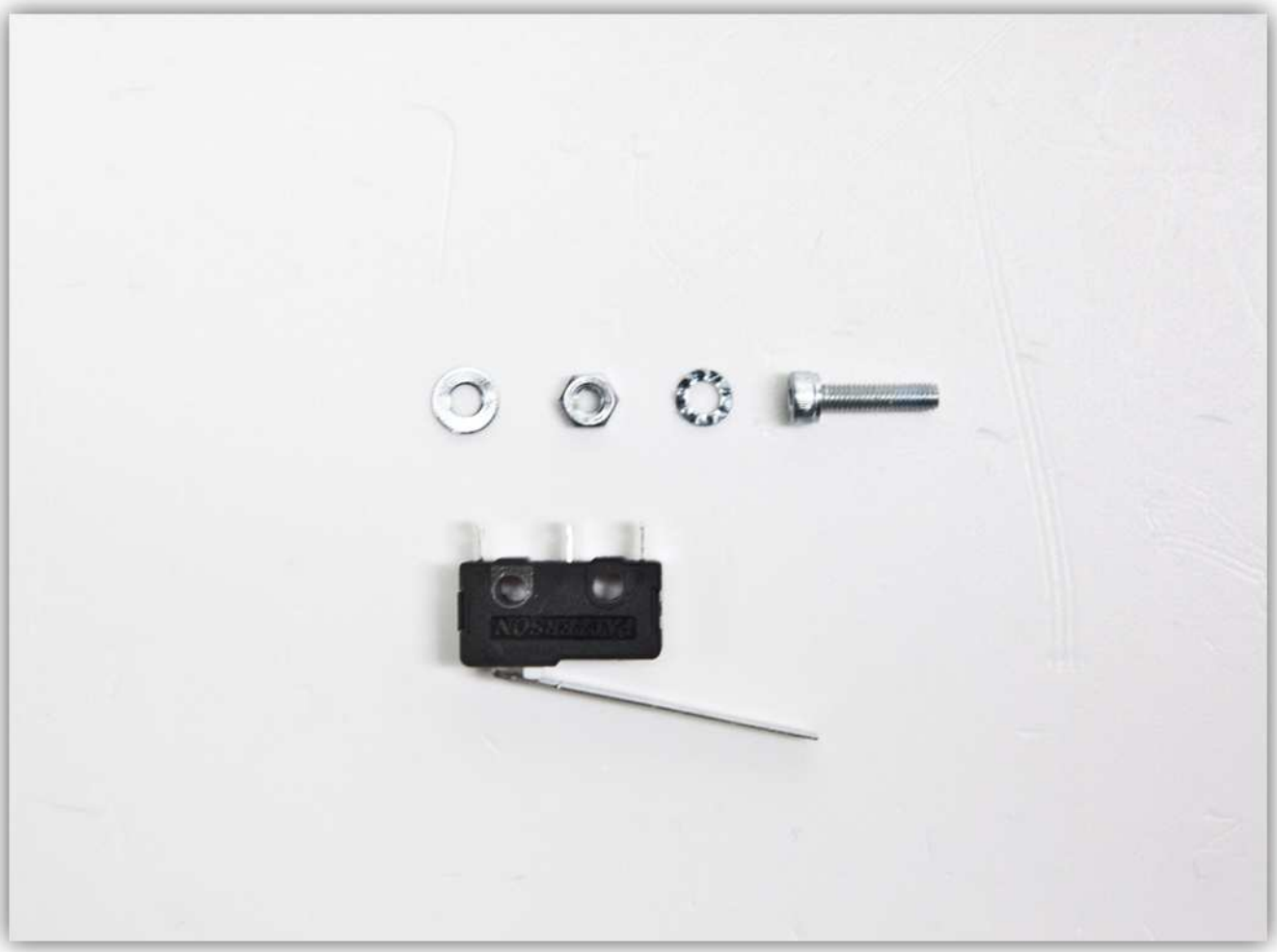




Use the long M3 screw with an M3 nut and an M3 toothed washer as shown in the picture.

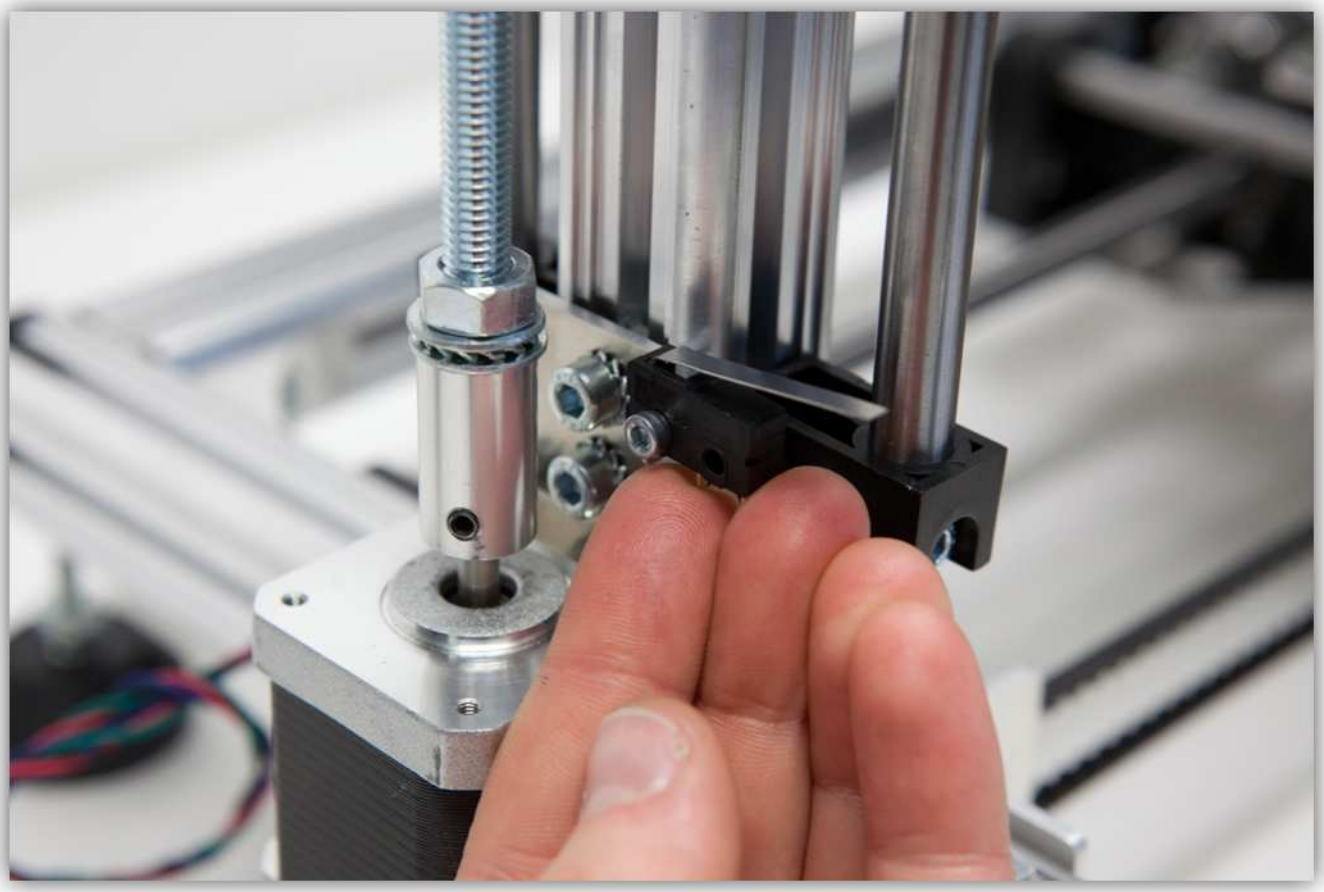


Take all the parts out of the bag labelled with 38.

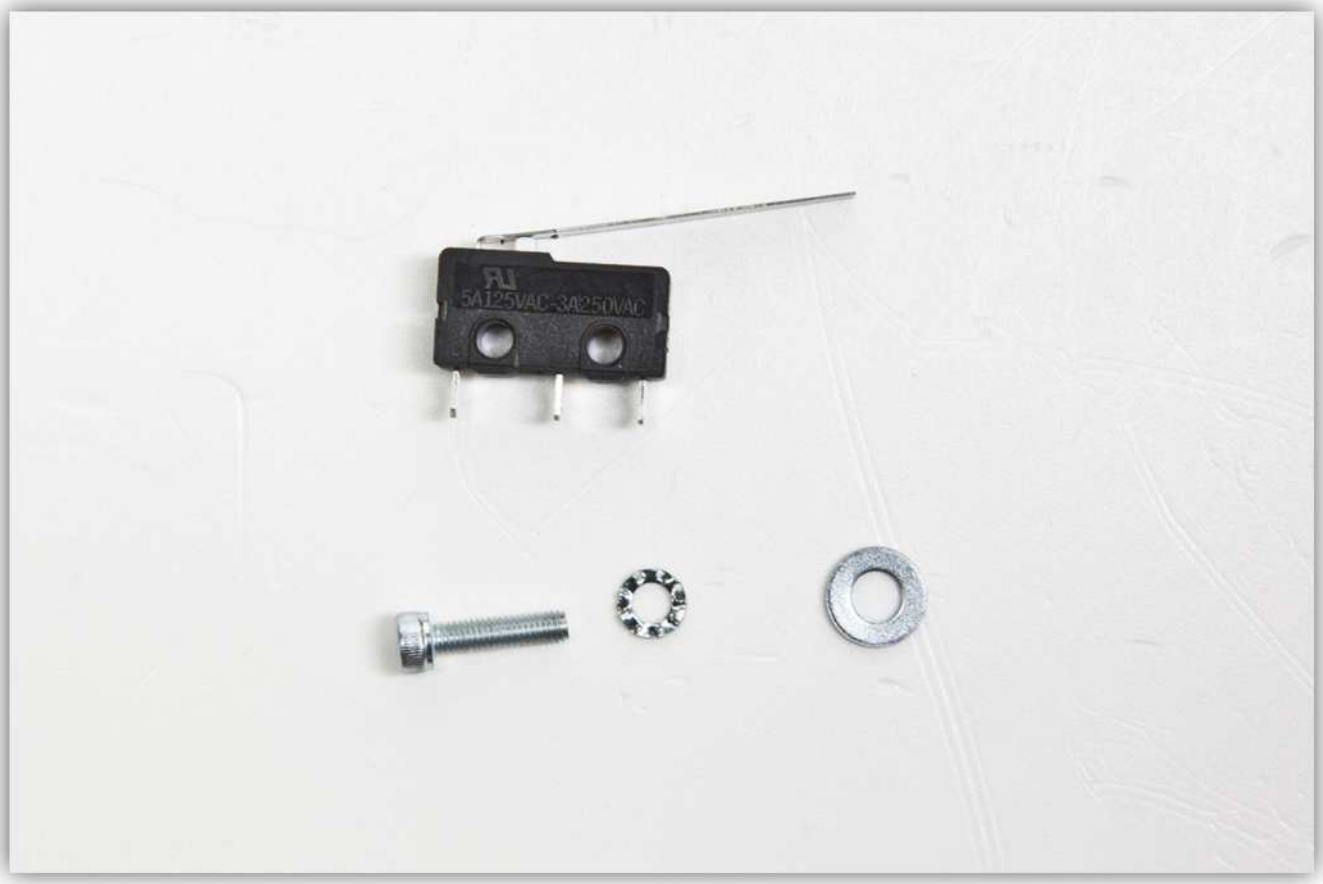


Slide the M3 bolt with an M3 washer and an M3 toothed washer through the micro switch as shown in the pictures.

Bolt the micro switch to the Z MOTOR BRACKET, use an M3 bolt. **Make sure it is level.**



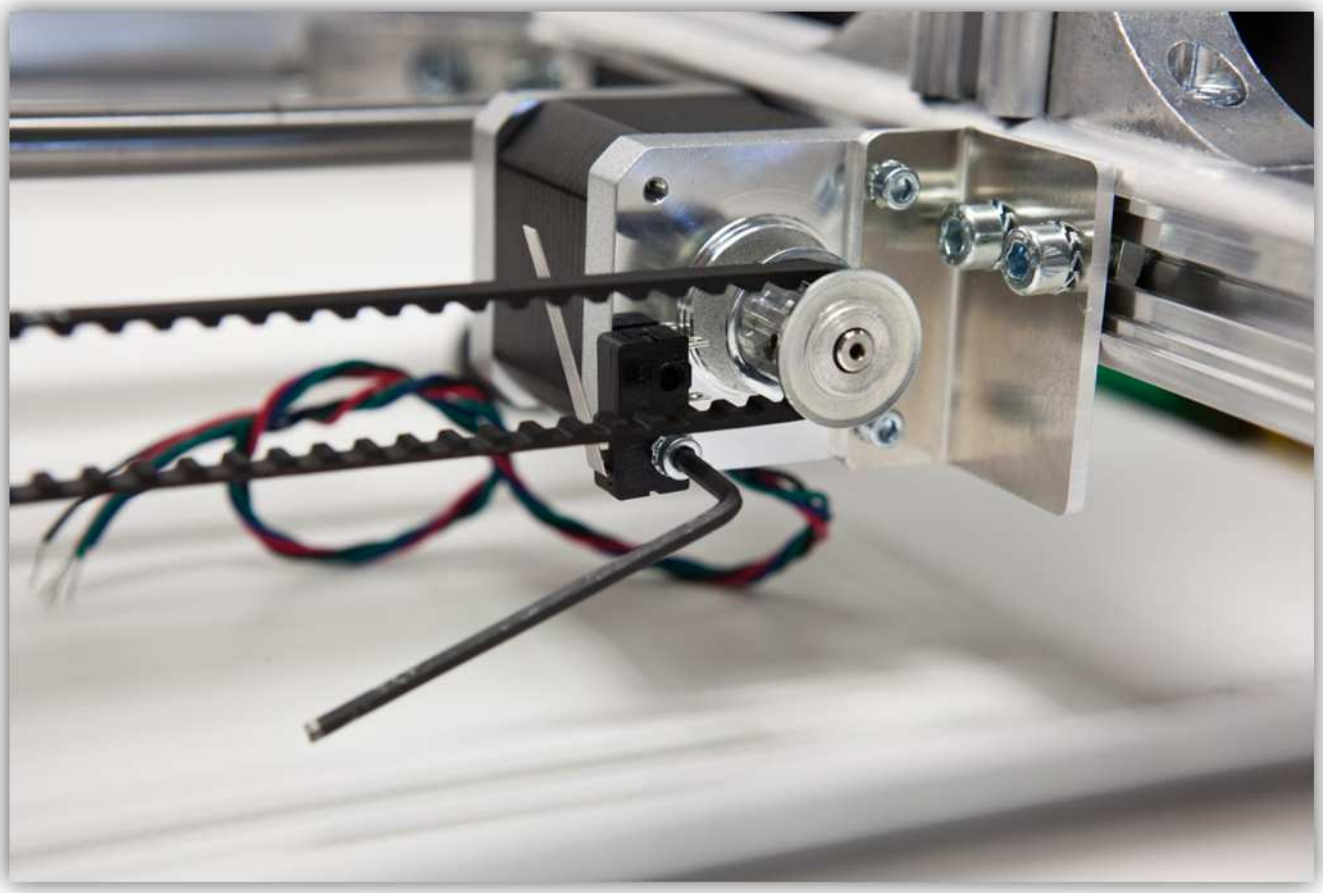
Take all the parts out of the bag labelled with 41.

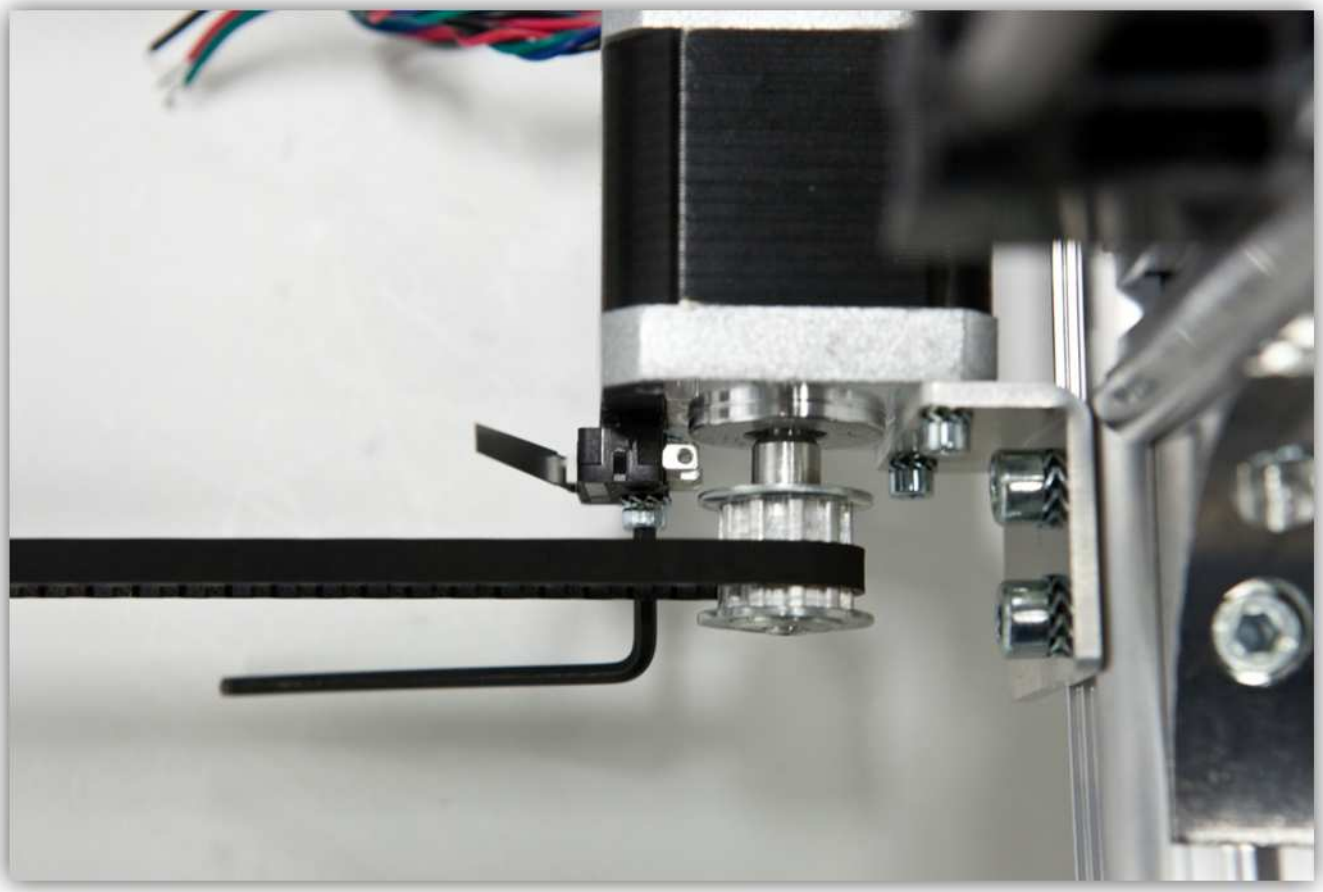


Slide the M3 bolt with an M3 toothed washer through the micro switch.

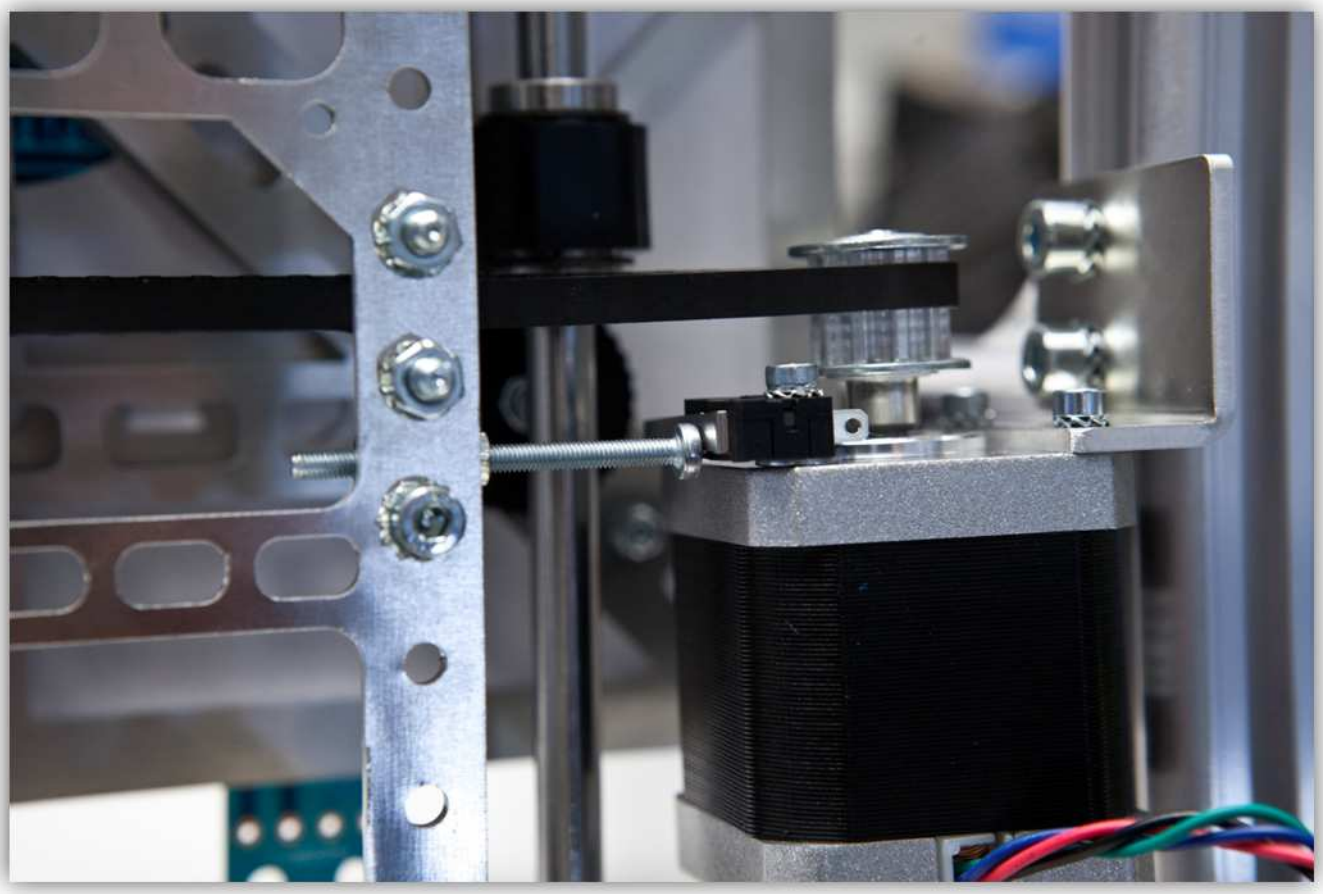
Put the M4 washer on the other end.

Bolt the micro switch to the X motor as shown in the pictures below.





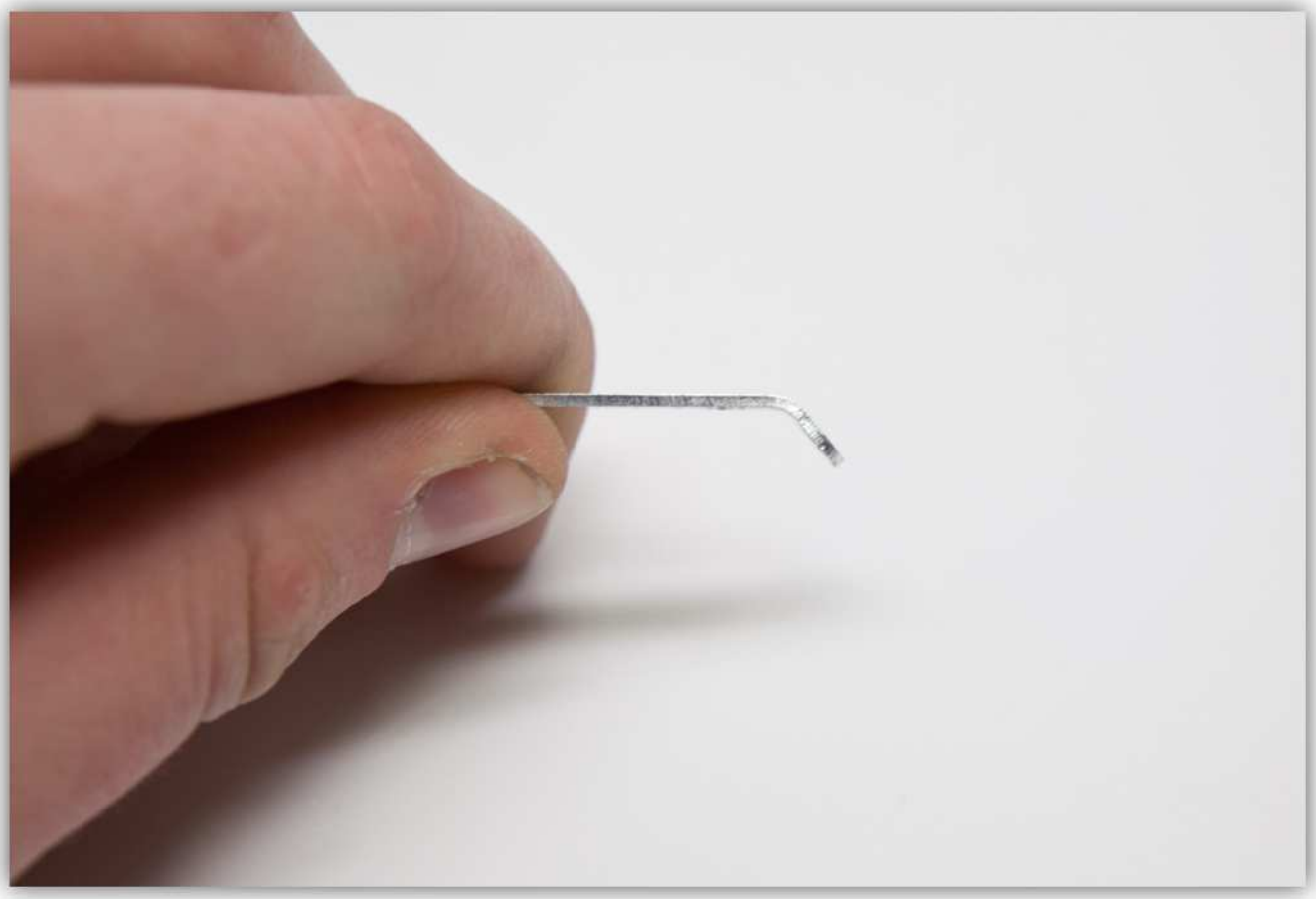
Make sure that the micro switch is in line with the screw on the X CARRIAGE. If not you will have to reposition both X PULLEY BRACKET and X MOTOR BRACKET.

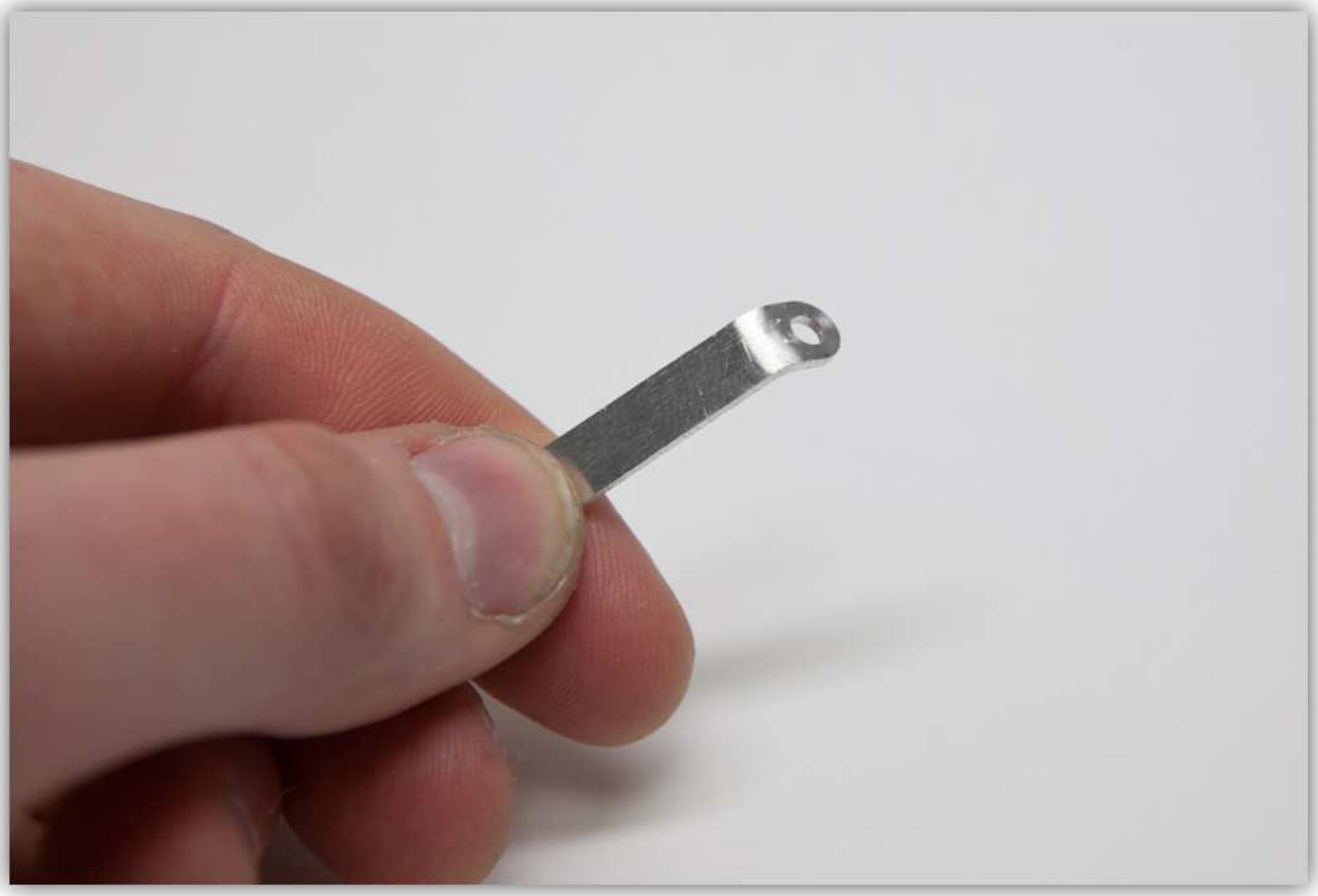


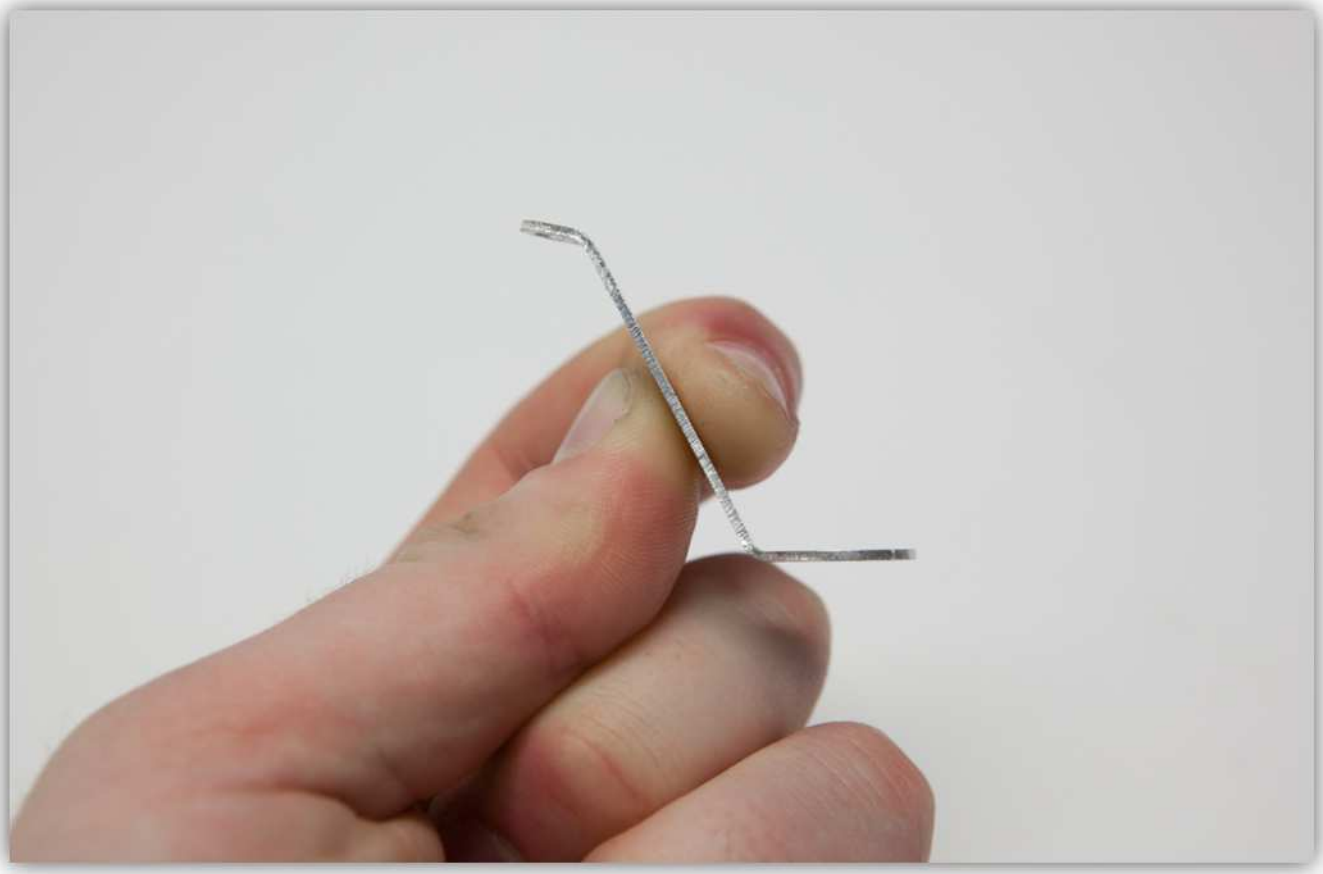
013 – MOUNTING THE FAN

Take all the parts out of the bag labelled with 36.

Bend the FAN HOLDER as in the pictures below. The angles should be roughly the same.

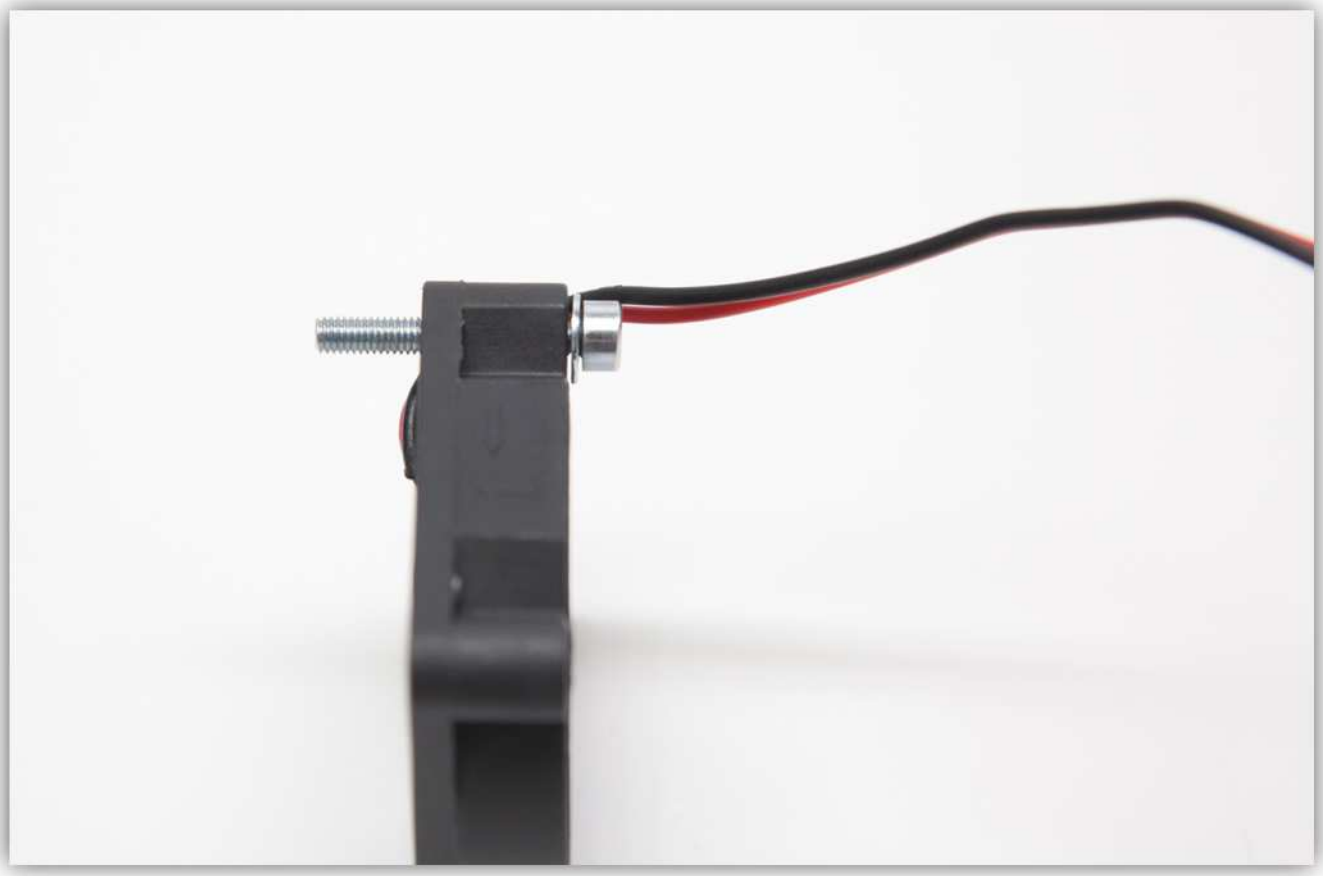


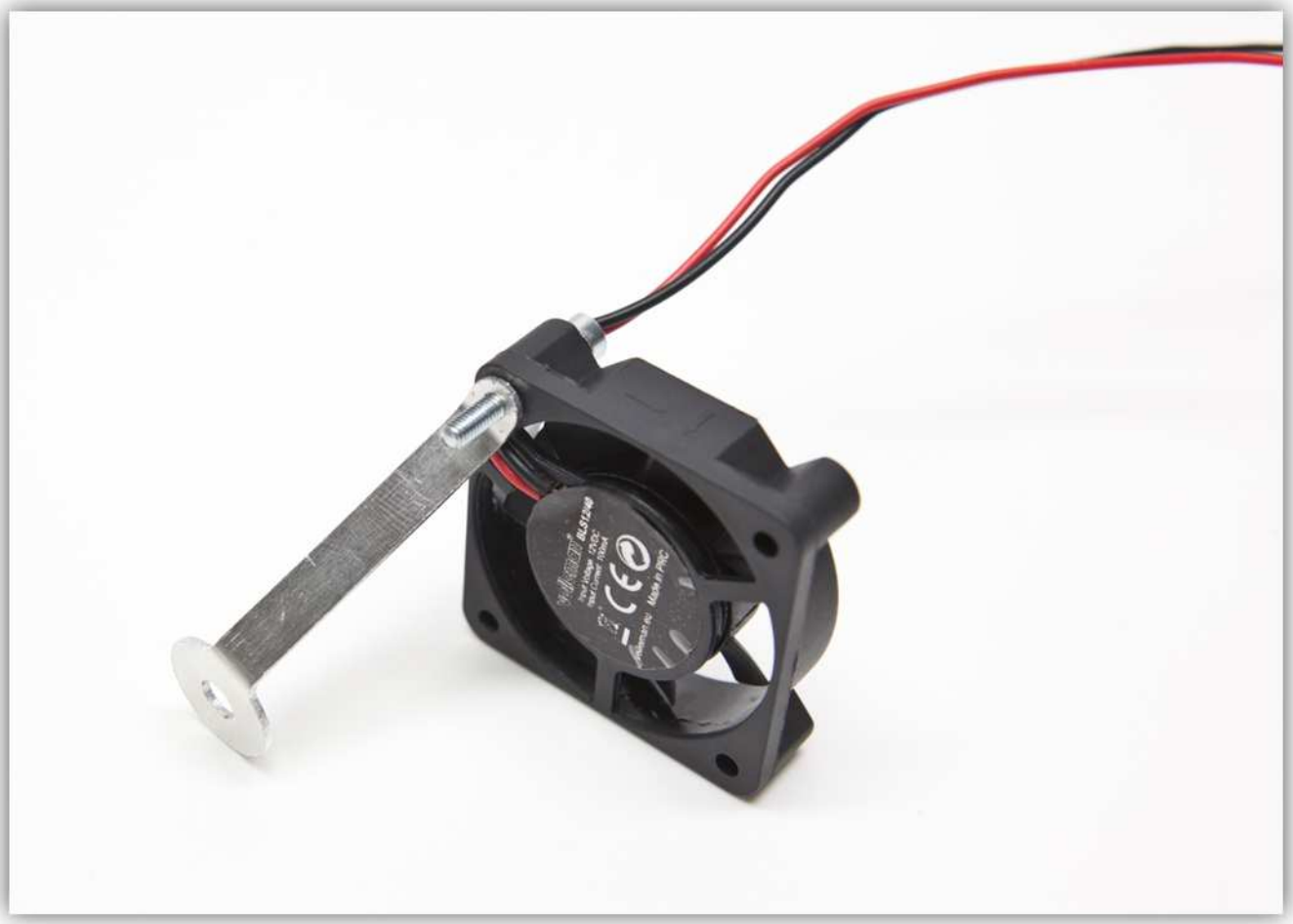




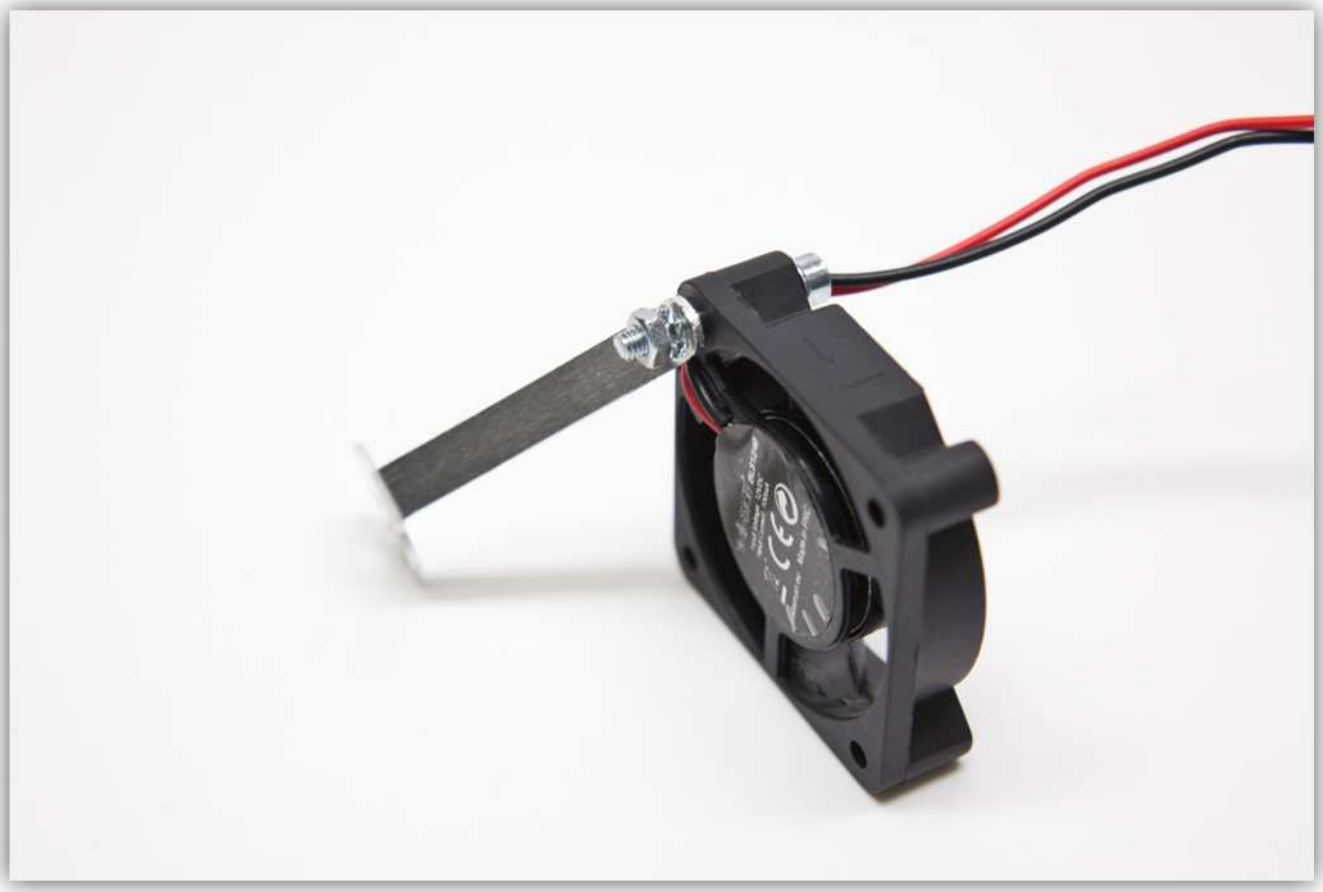
Take the M3 bolt with an M3 washer.

Slide it through the fan and add the FAN HOLDER.



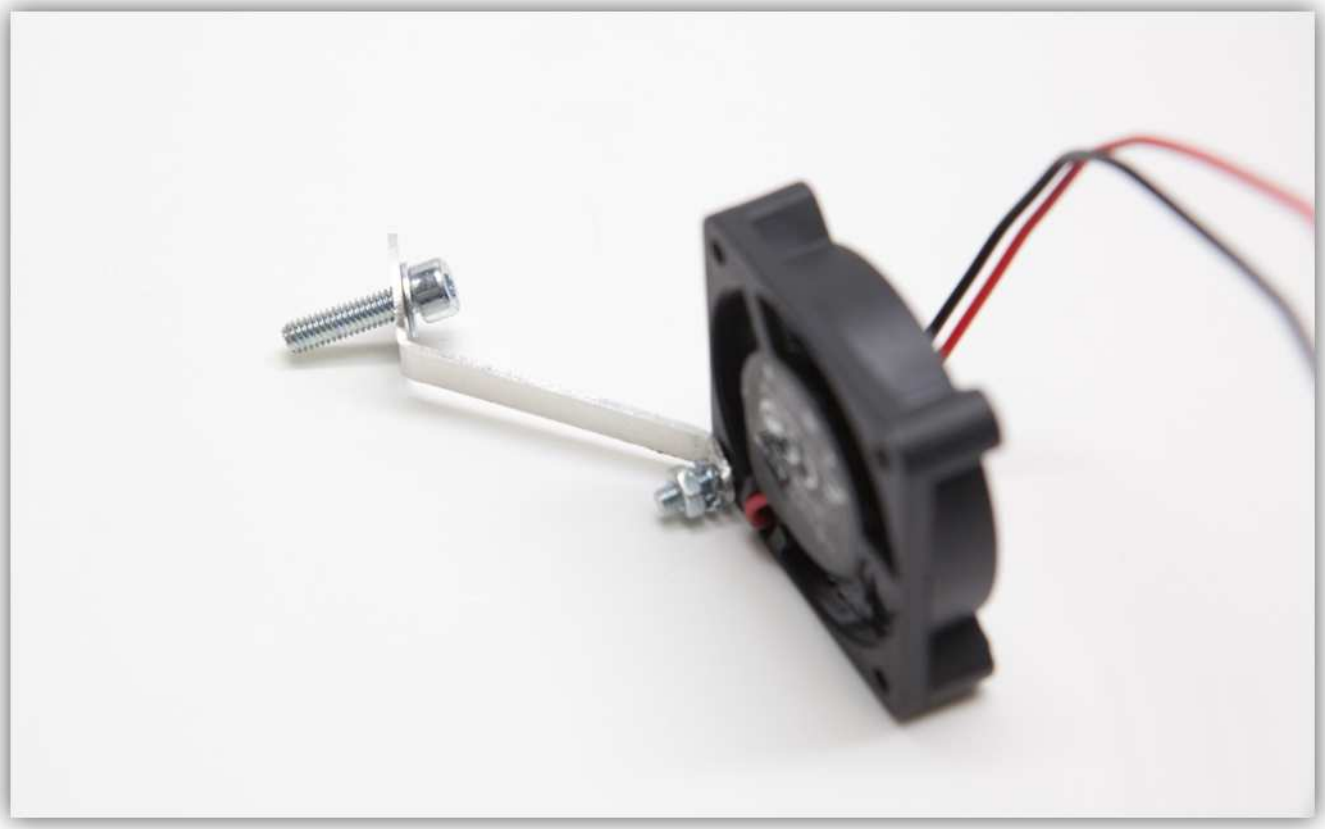


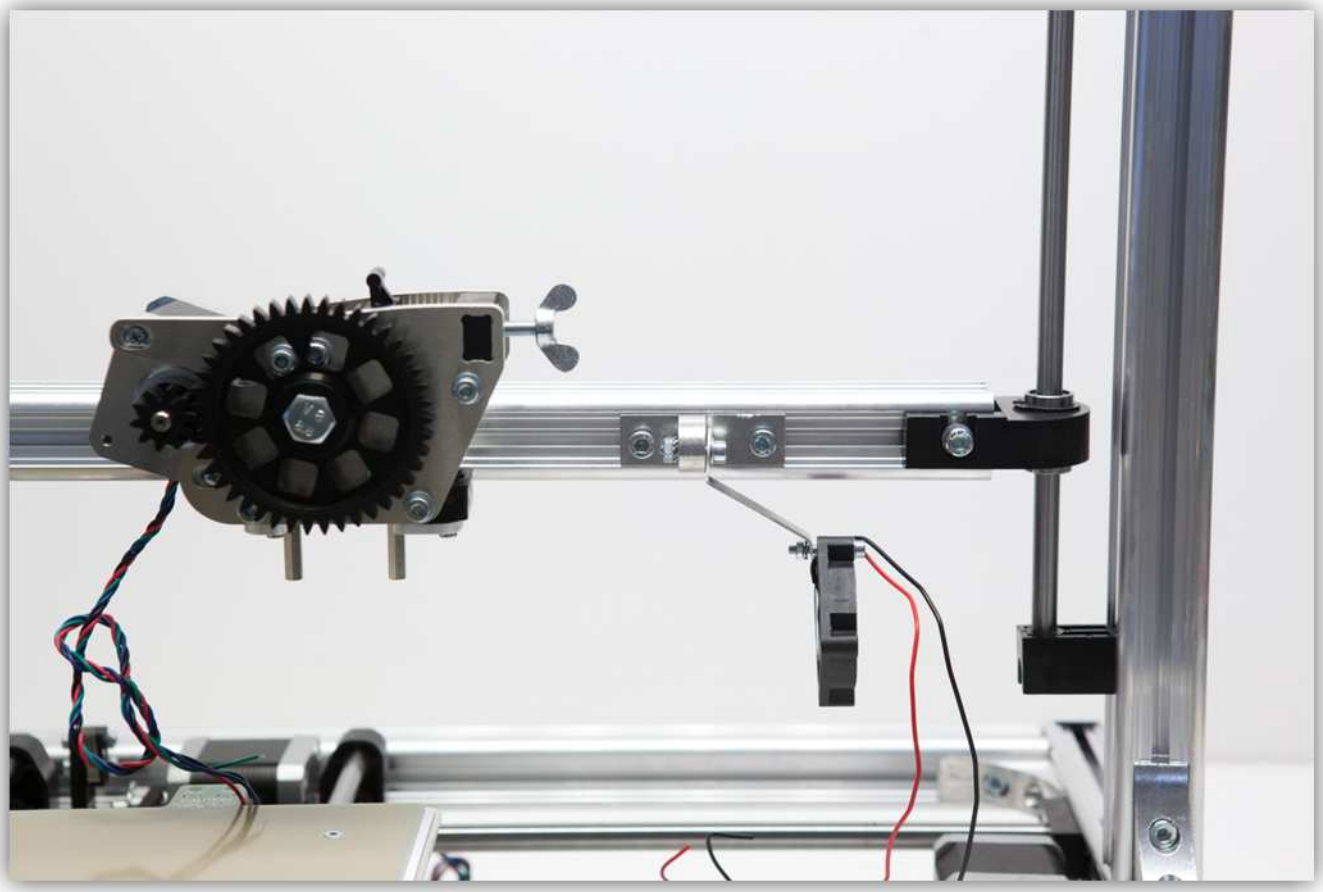
Add an M3 toothed washer and an M3 nut.



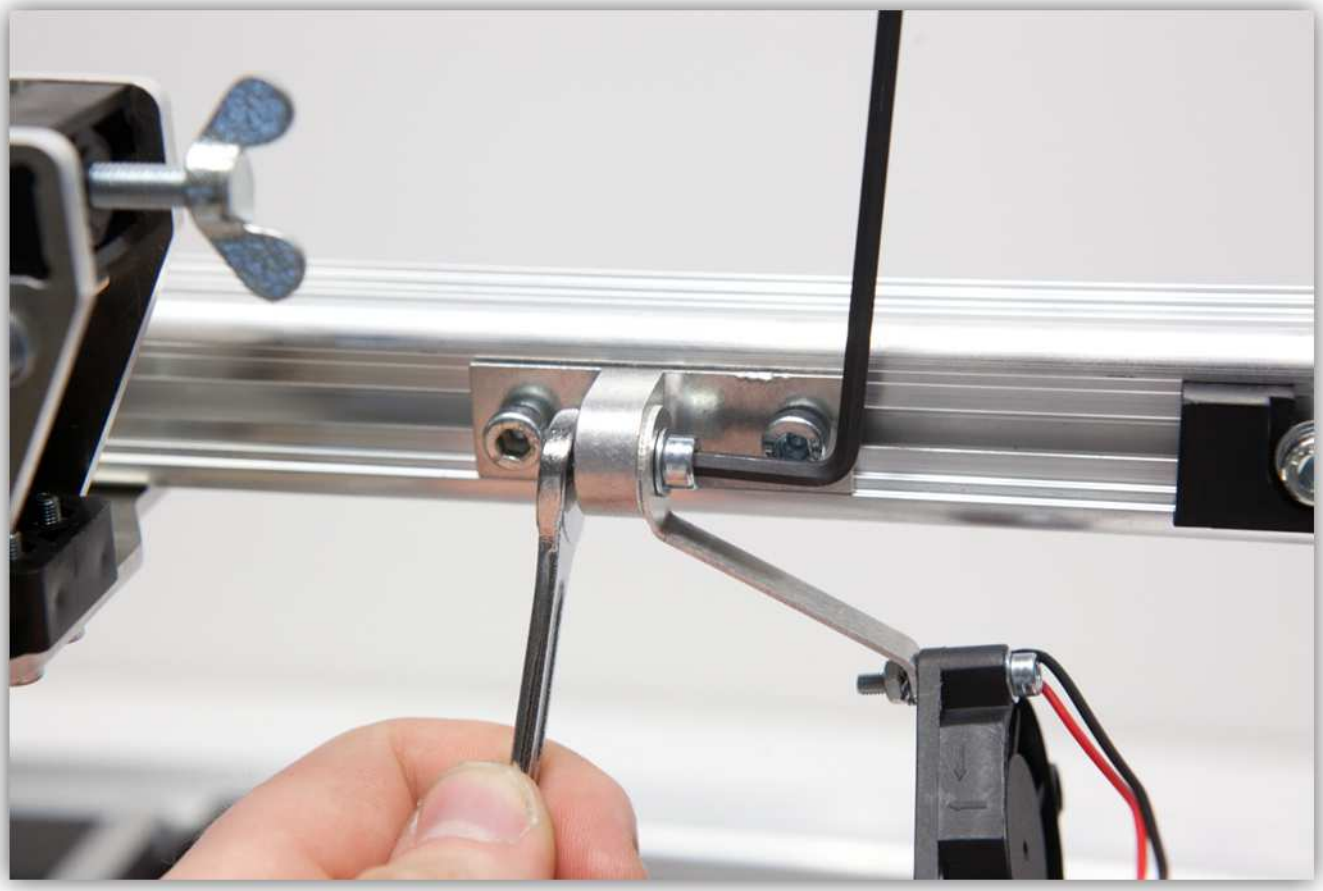
Take the M4 bolt and an M4 washer.

Slide it through the FAN HOLDER and mount it to the FAN HOLDER BRACKET you put earlier on the extruder arm with an M4 nut and an M4 toothed washer.



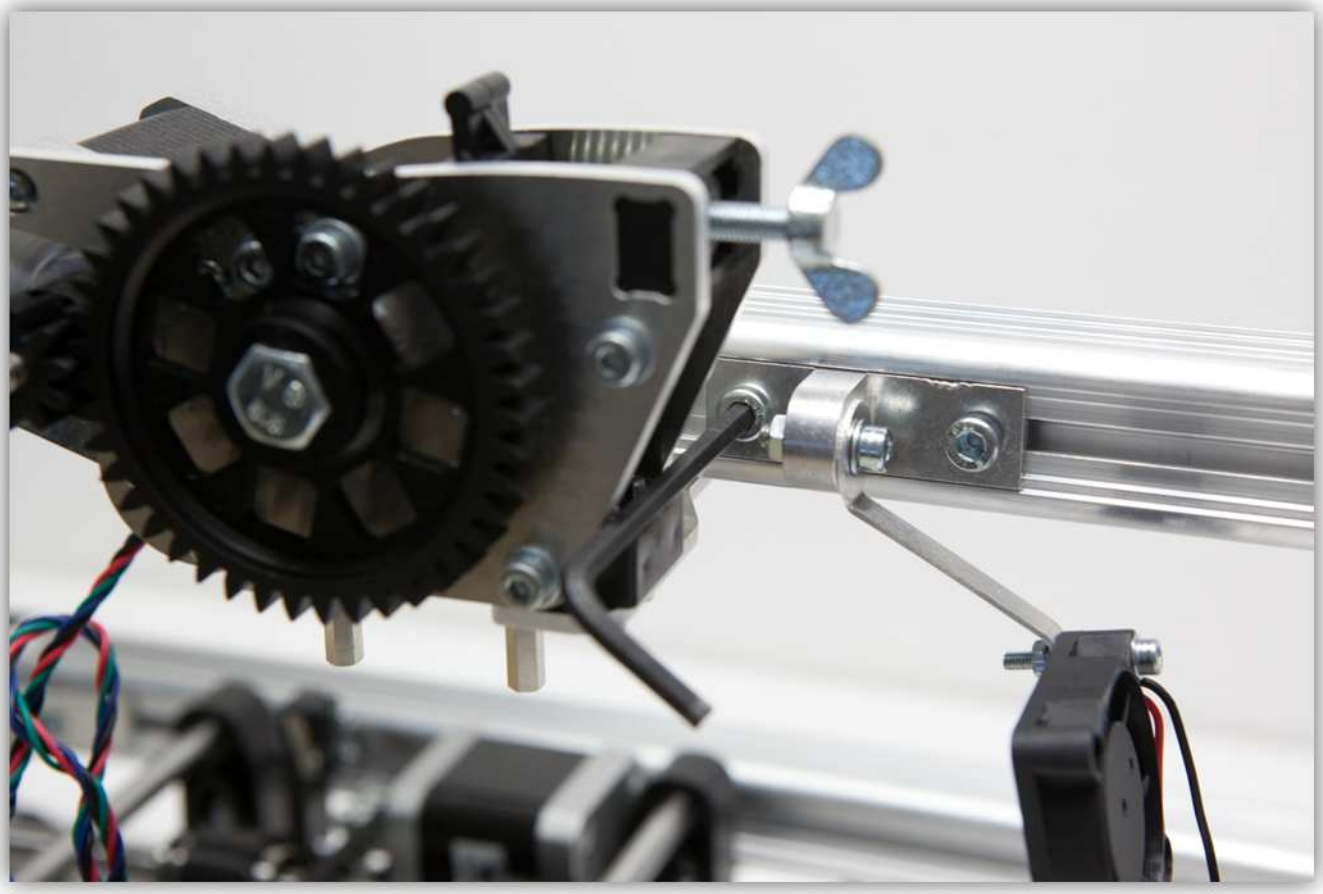


Tighten this bolt, make sure that the FAN HOLDER is vertical.

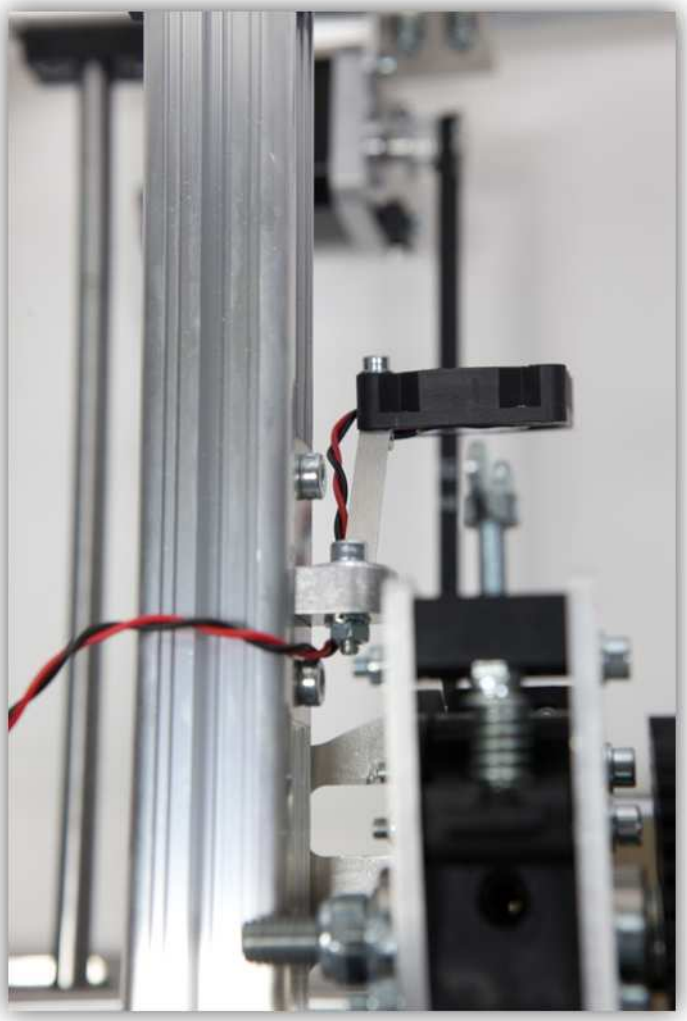


Tighten the bolt on the fan, make sure that the fan is level.

Slide the FAN HOLDER BRACKET closer to the extruder and tighten it firmly.



Place the wire as follows.

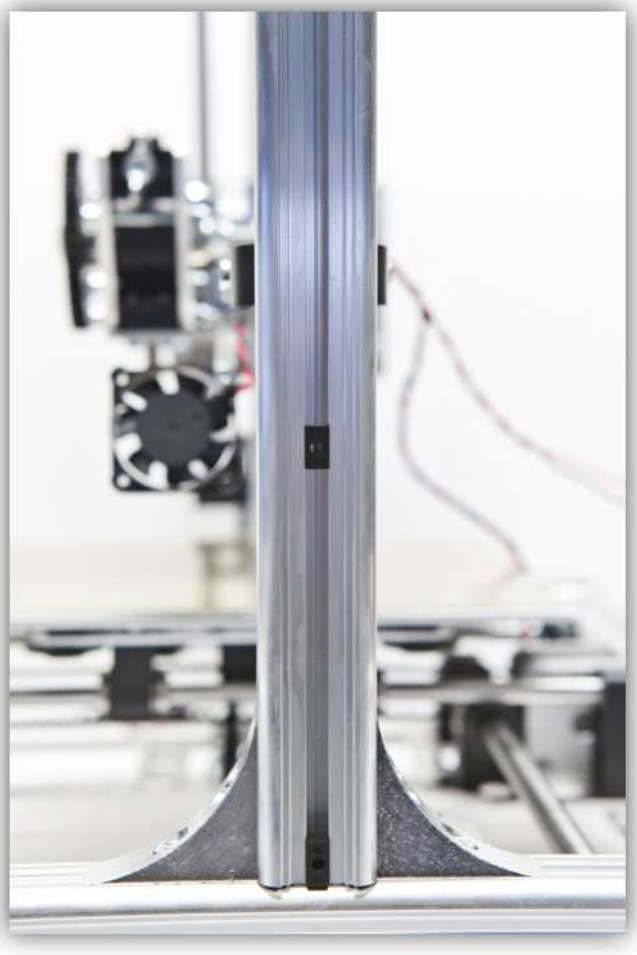


014 – MOUNTING THE CONTROLLER BOARD

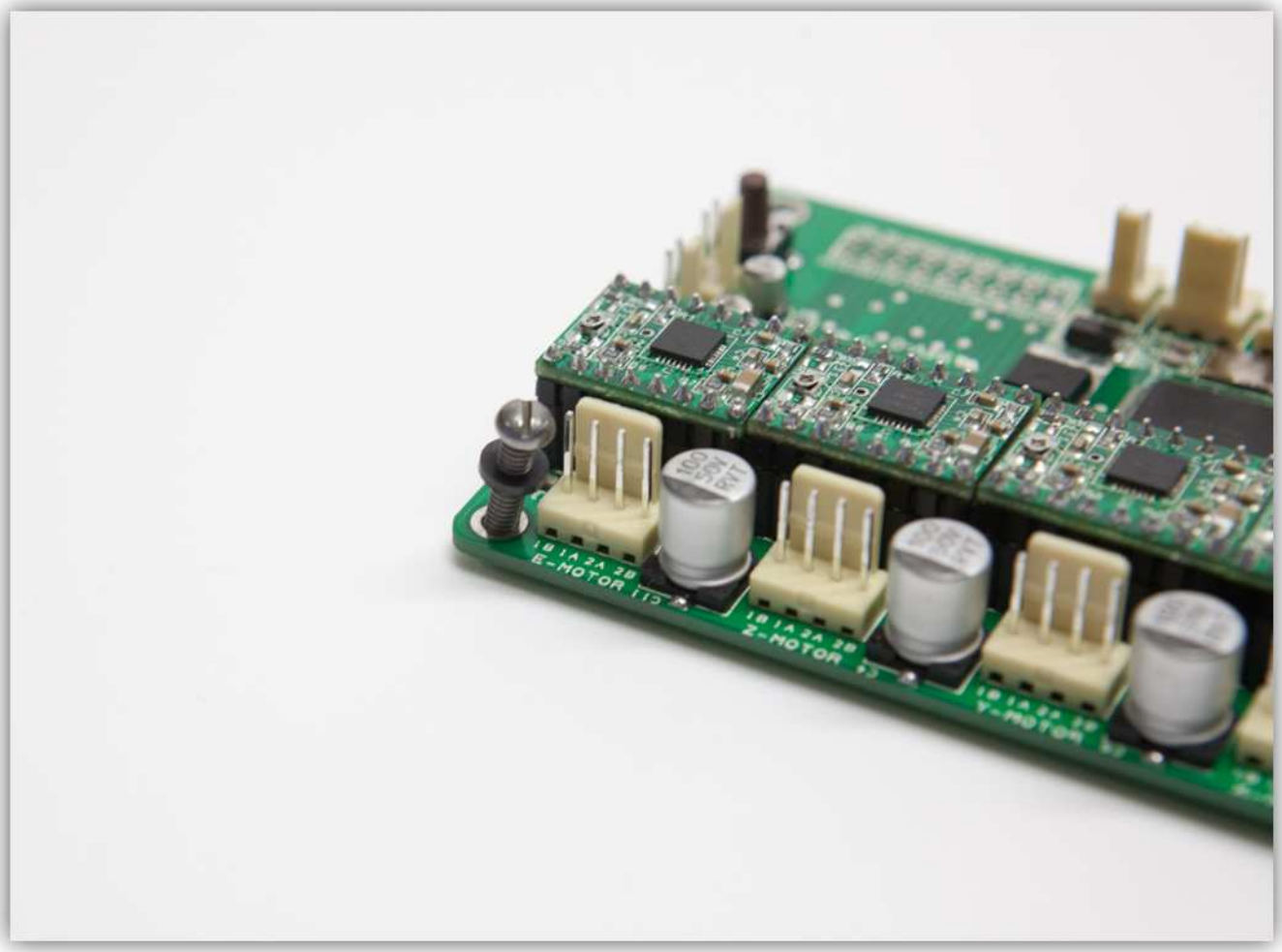
Take all the parts out of the bag labelled with 34 and 37.

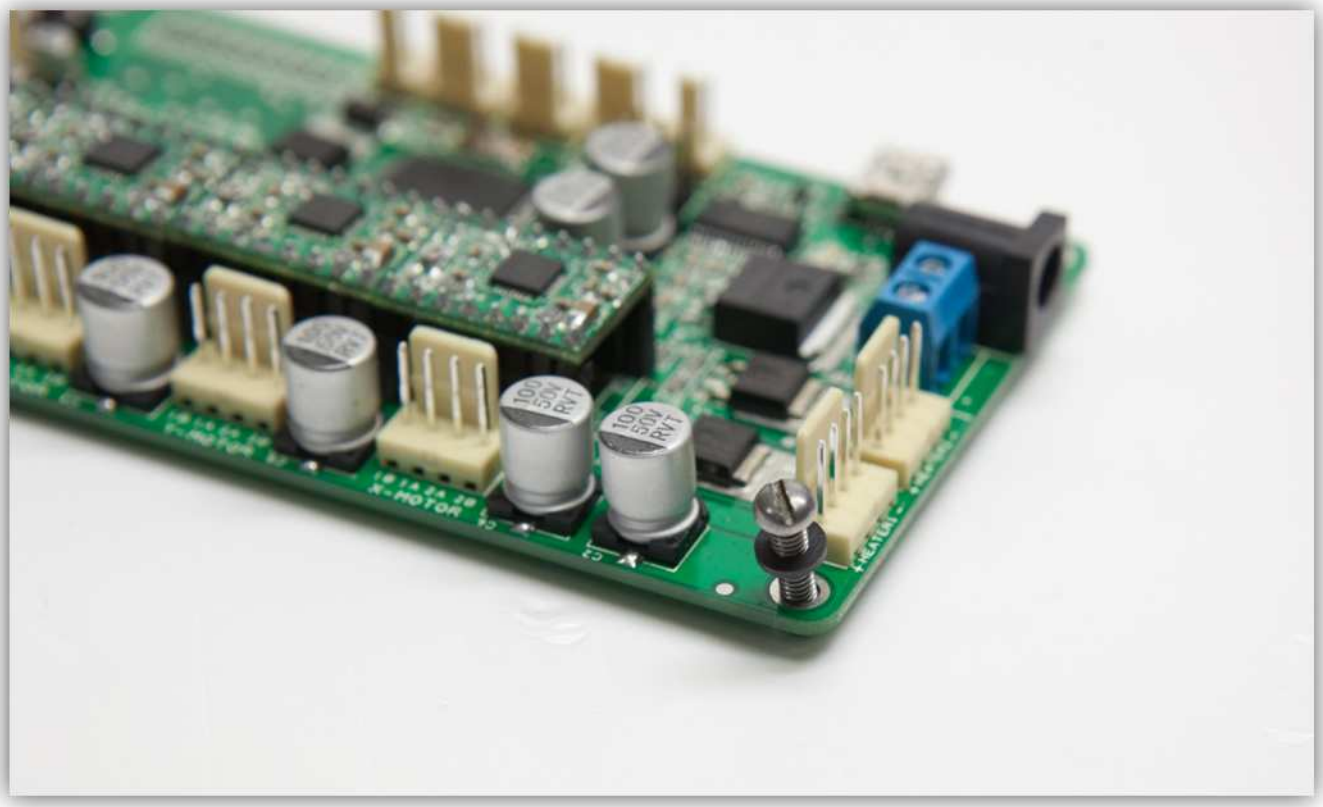
Slide 2 of the small plastic rings over the bolts. **Watch the orientation of the plastic rings.**

Make sure that the plastic PROFILE MOUNTS are approx. 105 mm (4.13") apart.

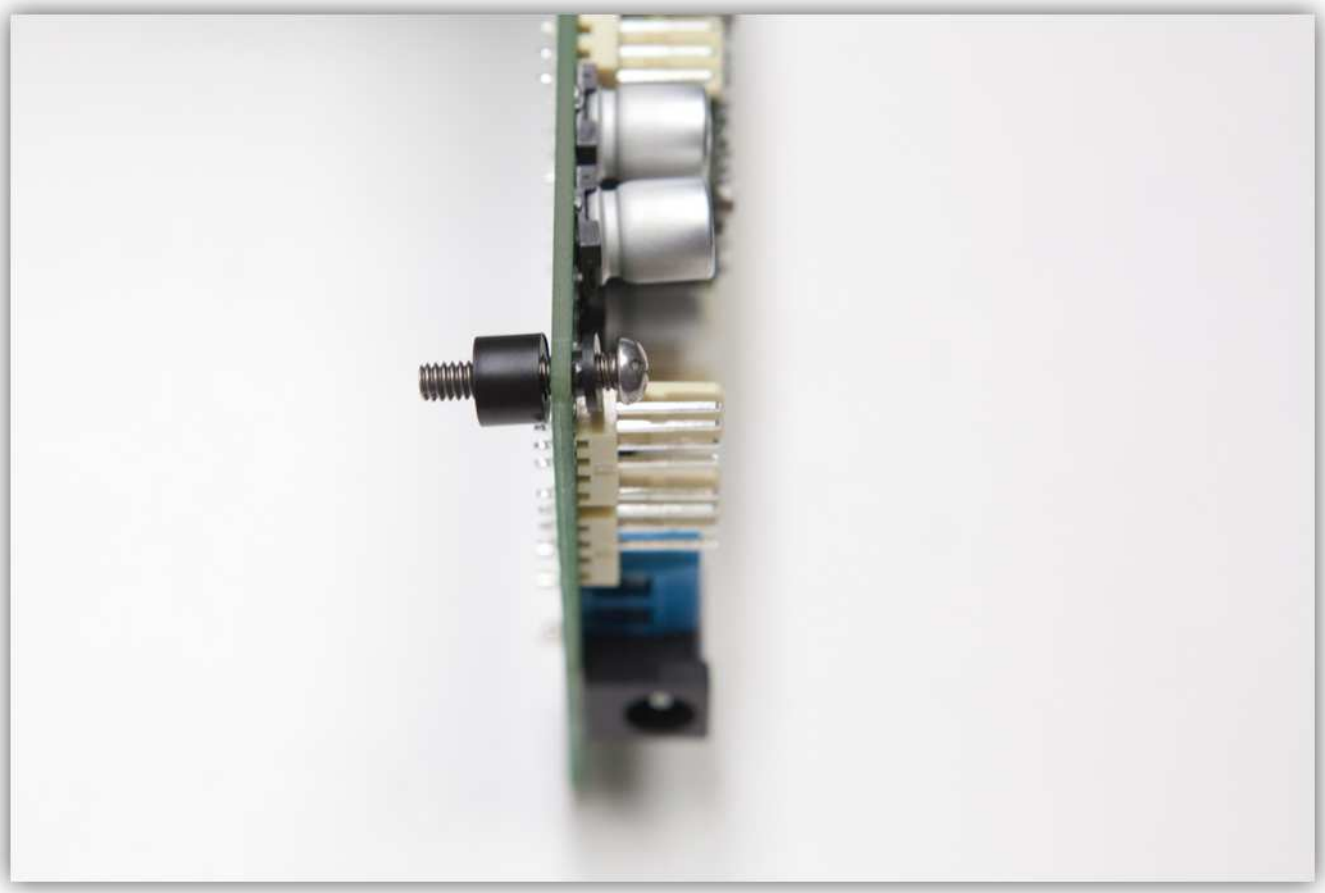


Slide the bolts through the controller board as shown in the pictures below. **Watch the orientation of the controller board closely.**

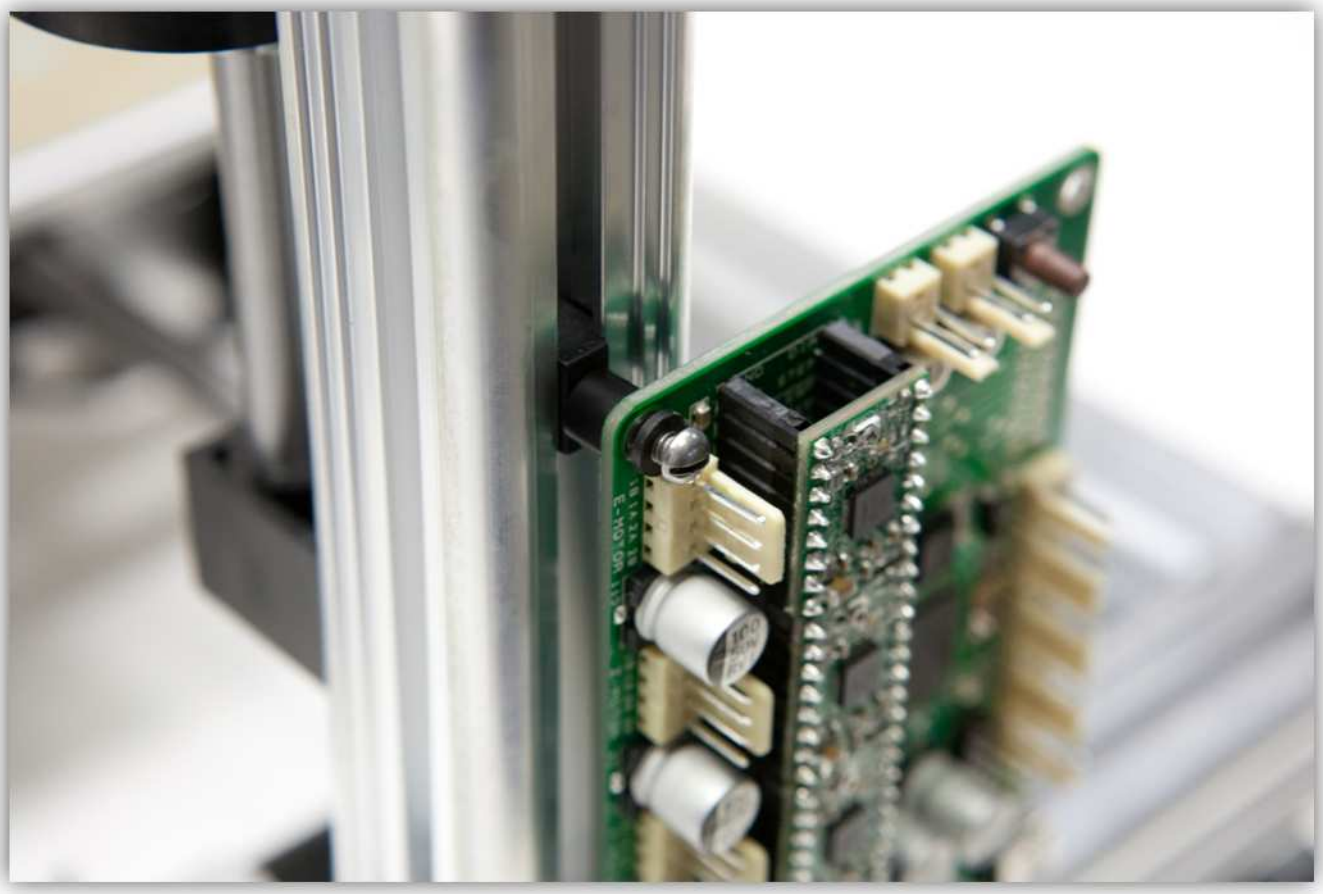


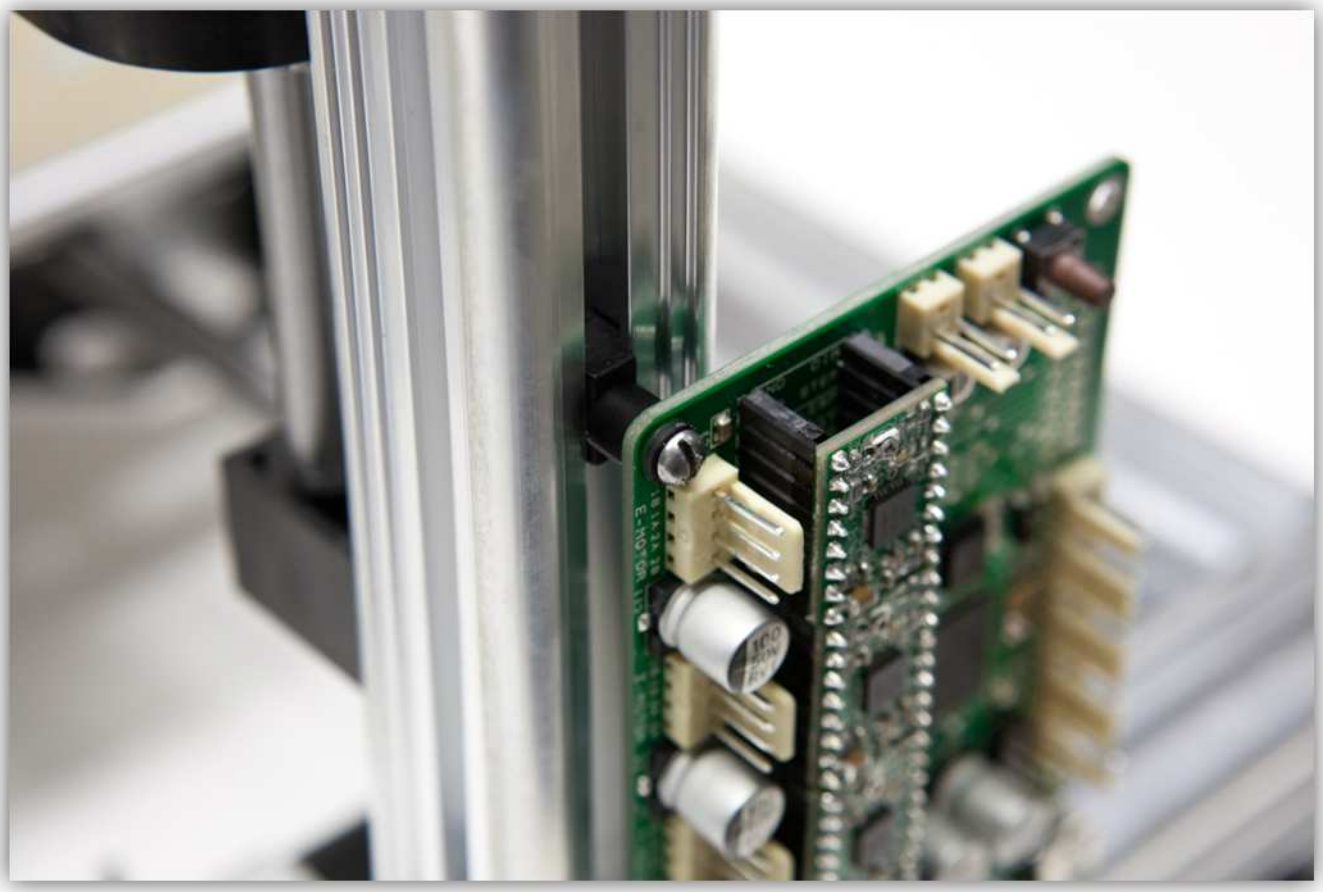


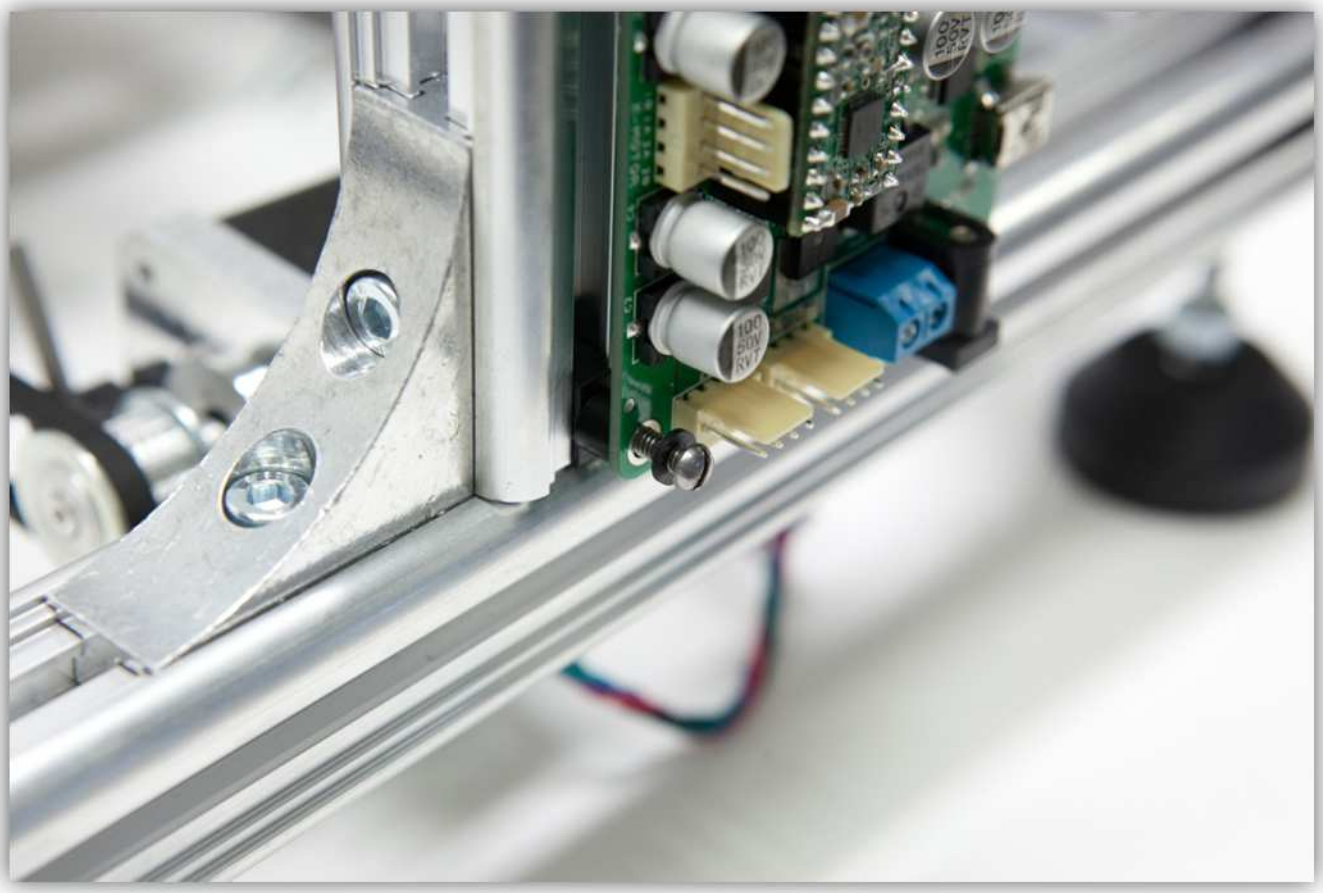
Slide a spacer over each bolt.

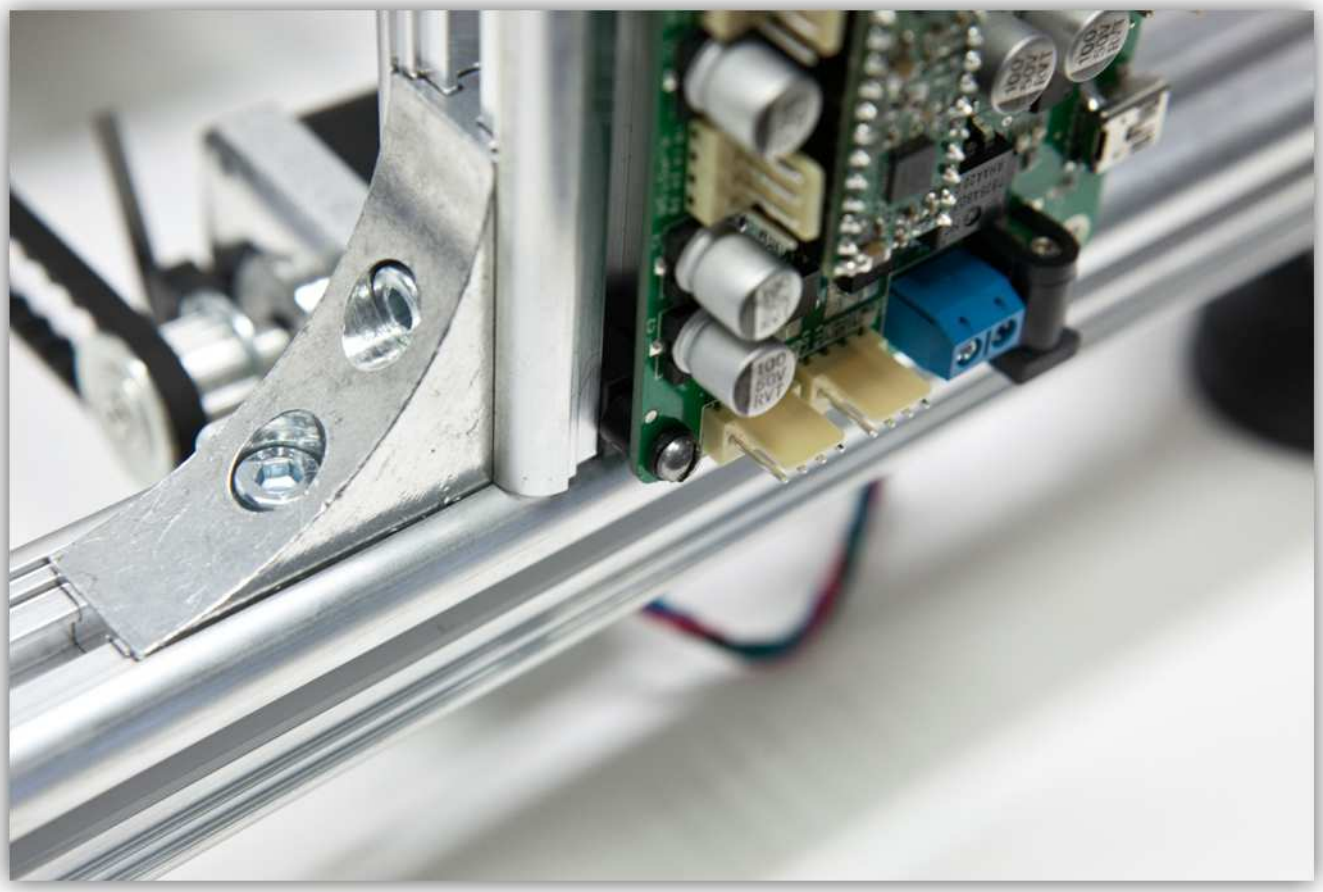


Screw the bolts into the PROFILE MOUNTS.

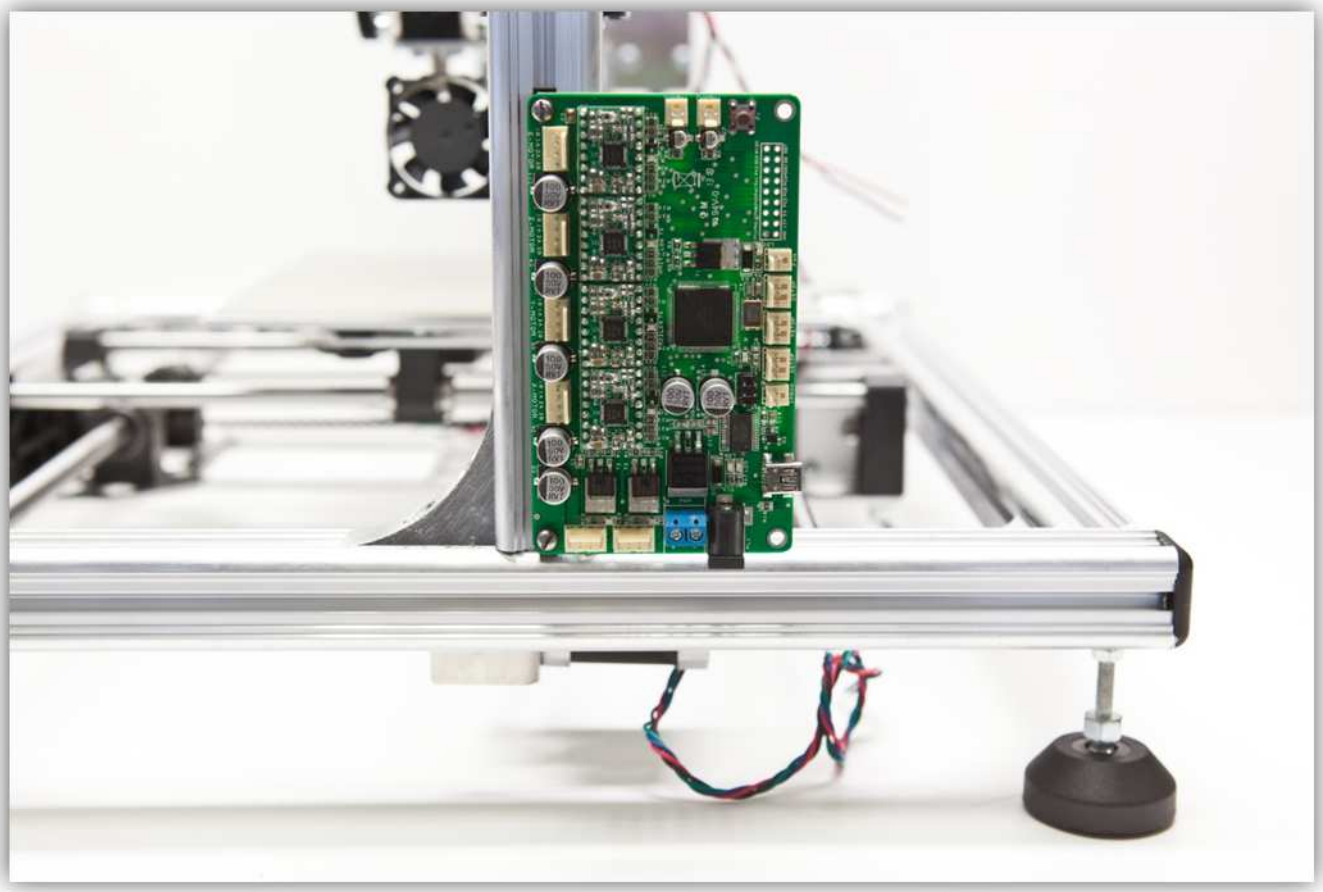






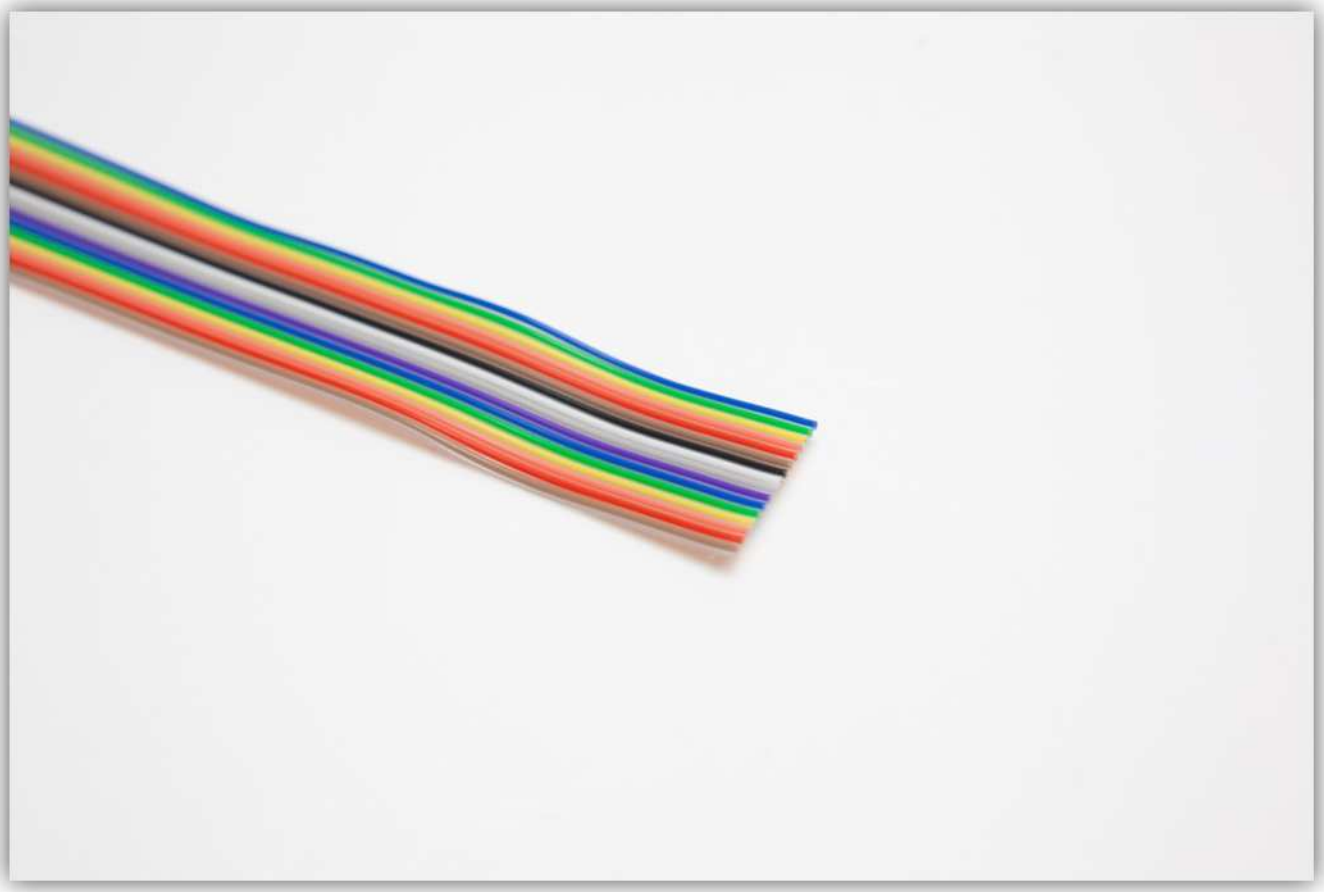


The board should be oriented as follows.

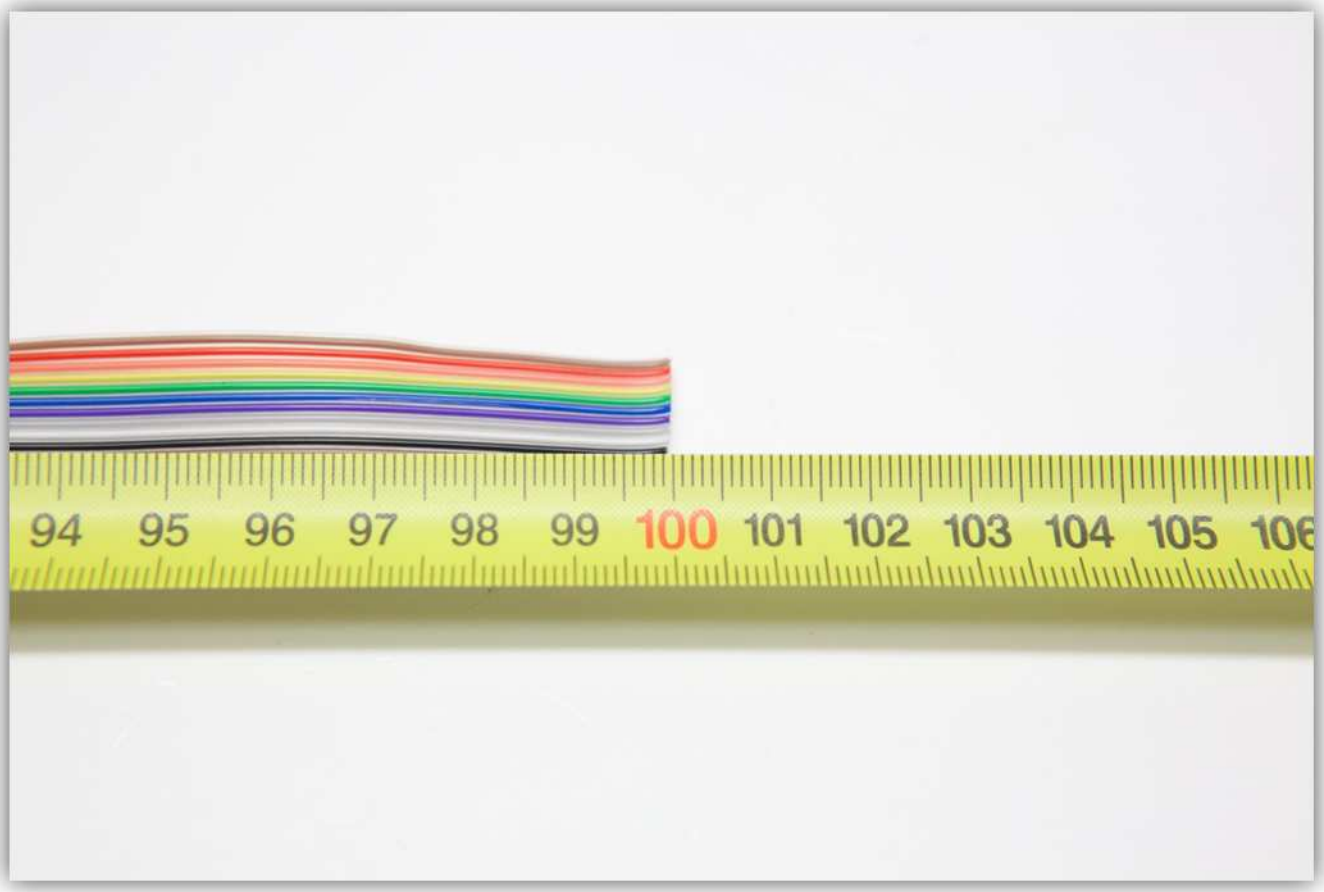


015 – WIRING THE EXTRUDER MOTOR AND FAN

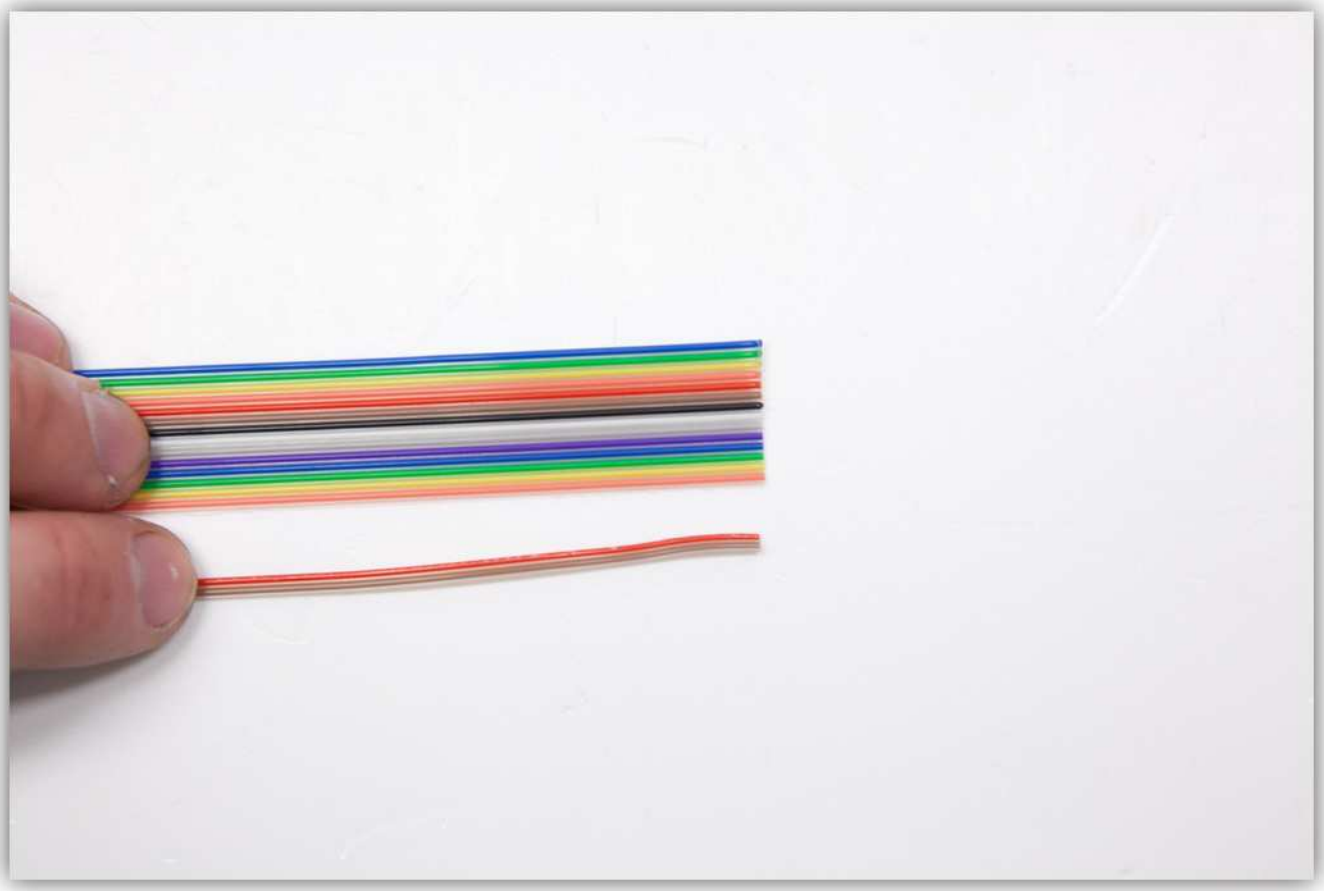
Take the MULTI-COLOURED FLATCABLE out of the bag labelled with 40.



Cut a piece of 100 cm (39.4"). **This length is critical, measure twice before cutting.**

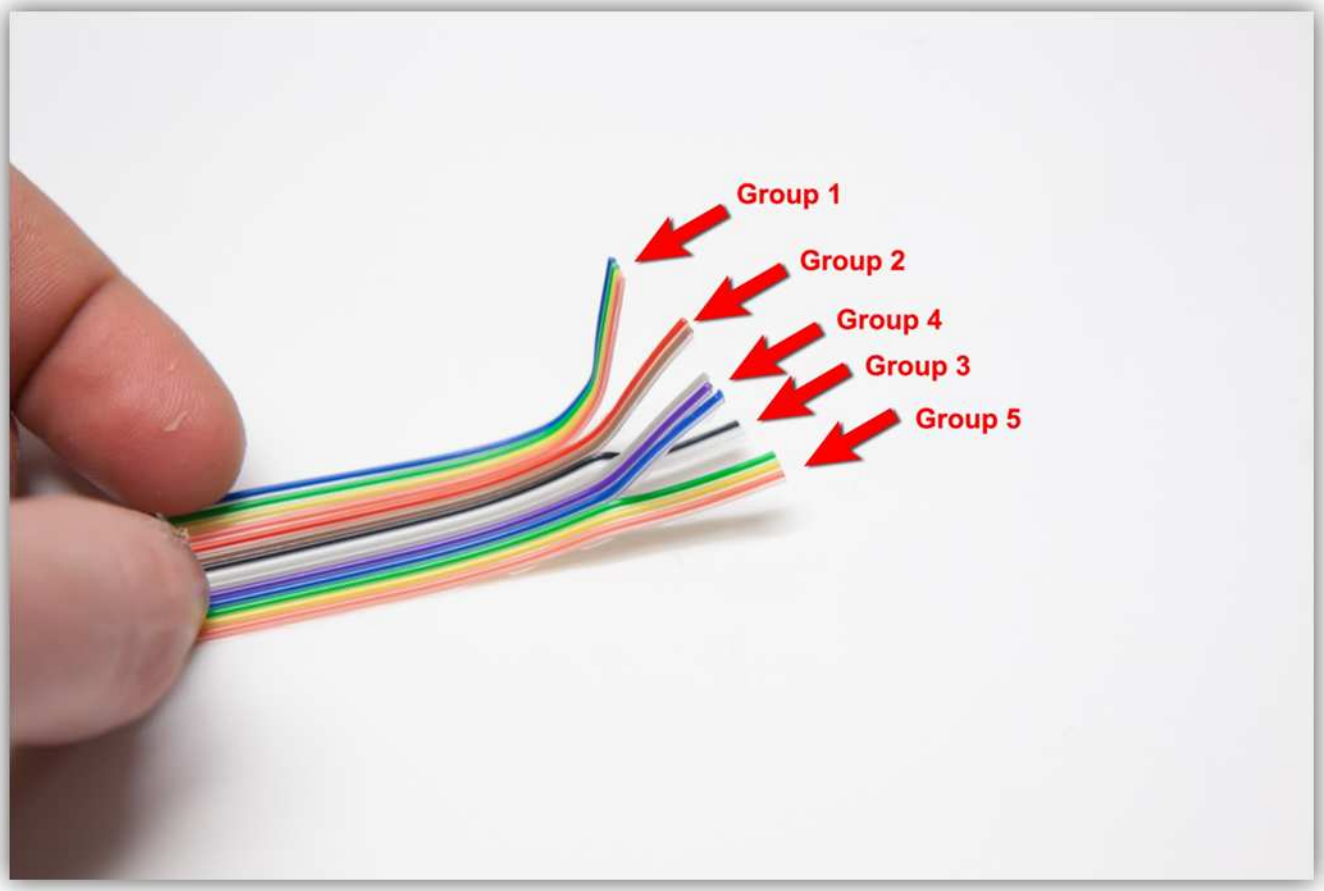


Detach (rip them of) the outer **Brown** and **Red** coloured wires from the pack over the whole length. Keep these apart, you will need these later.



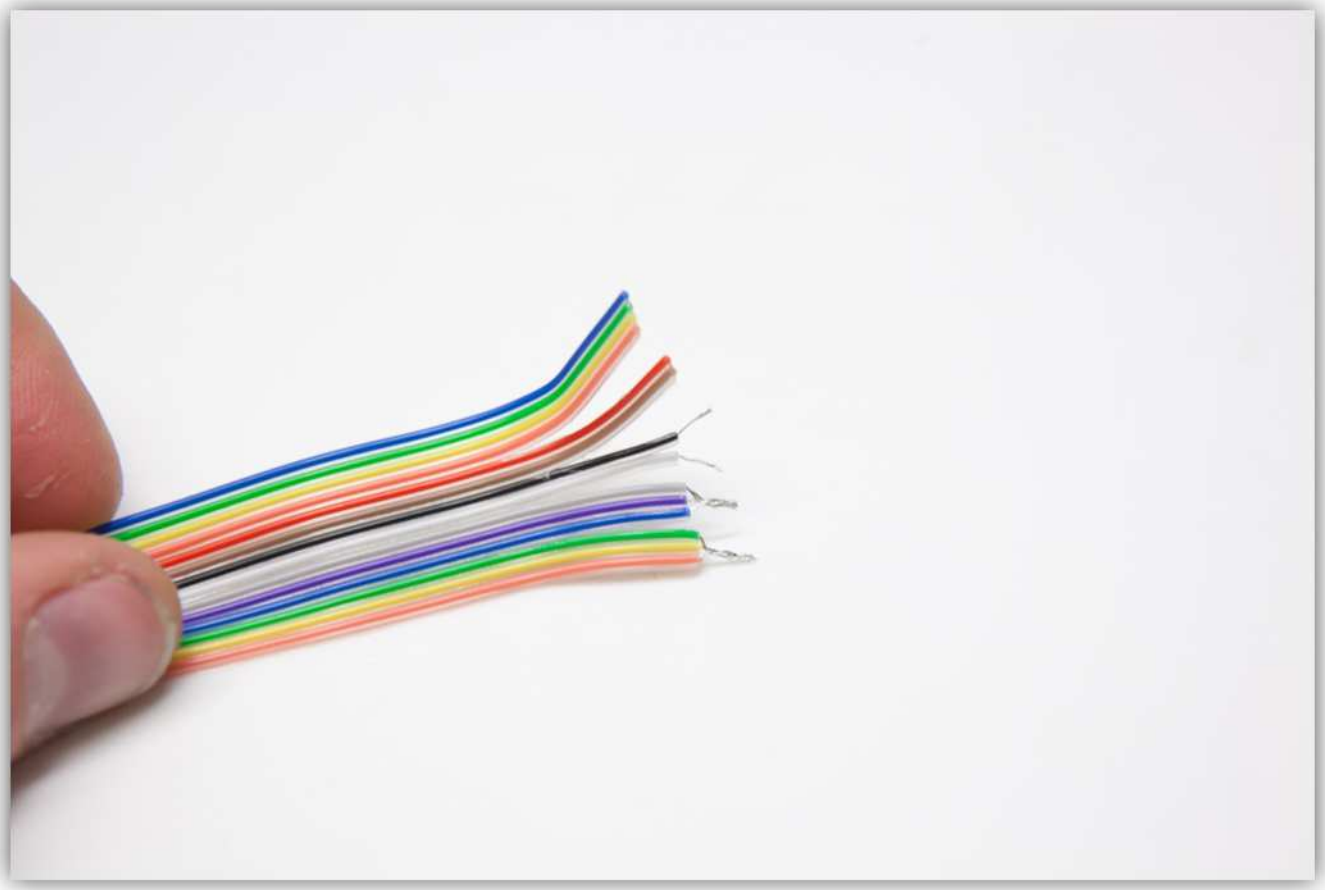
Detach the following groups for about 2 cm (0.79"):

- Group 1 : **Blue, Green, Yellow, Orange**
- Group 2: **Red, Brown**
- Group 3: **Black, White**
- Group 4: **Grey, Violet, Blue**
- Group 5: **Green, Yellow, Orange**

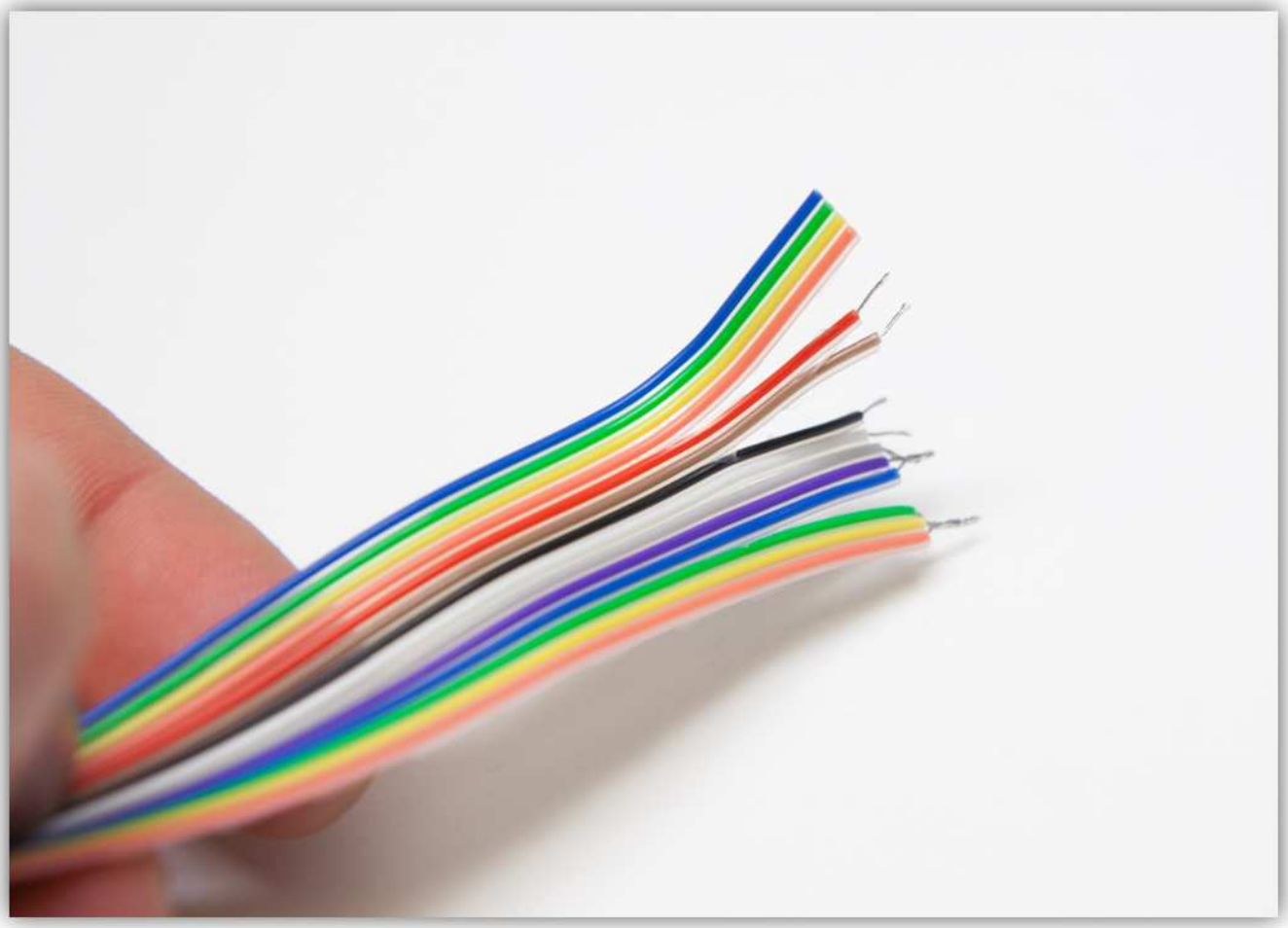


Strip the wires from group 4 and group 5 (5 mm) and twist the wires in a group together as shown in the picture.

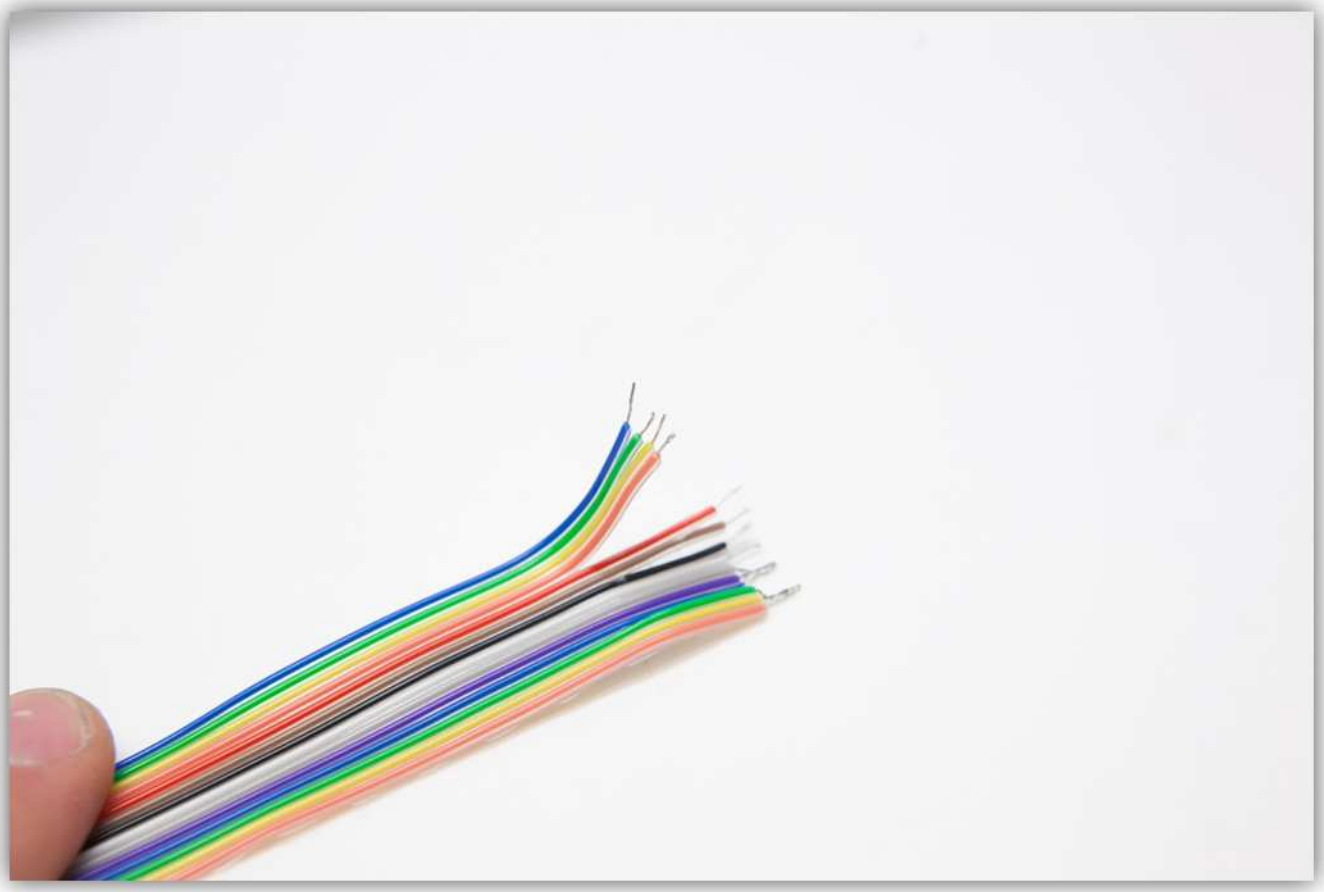
Strip the wires from group 3 (5 mm) (0.2"). **Do not twist these together.**



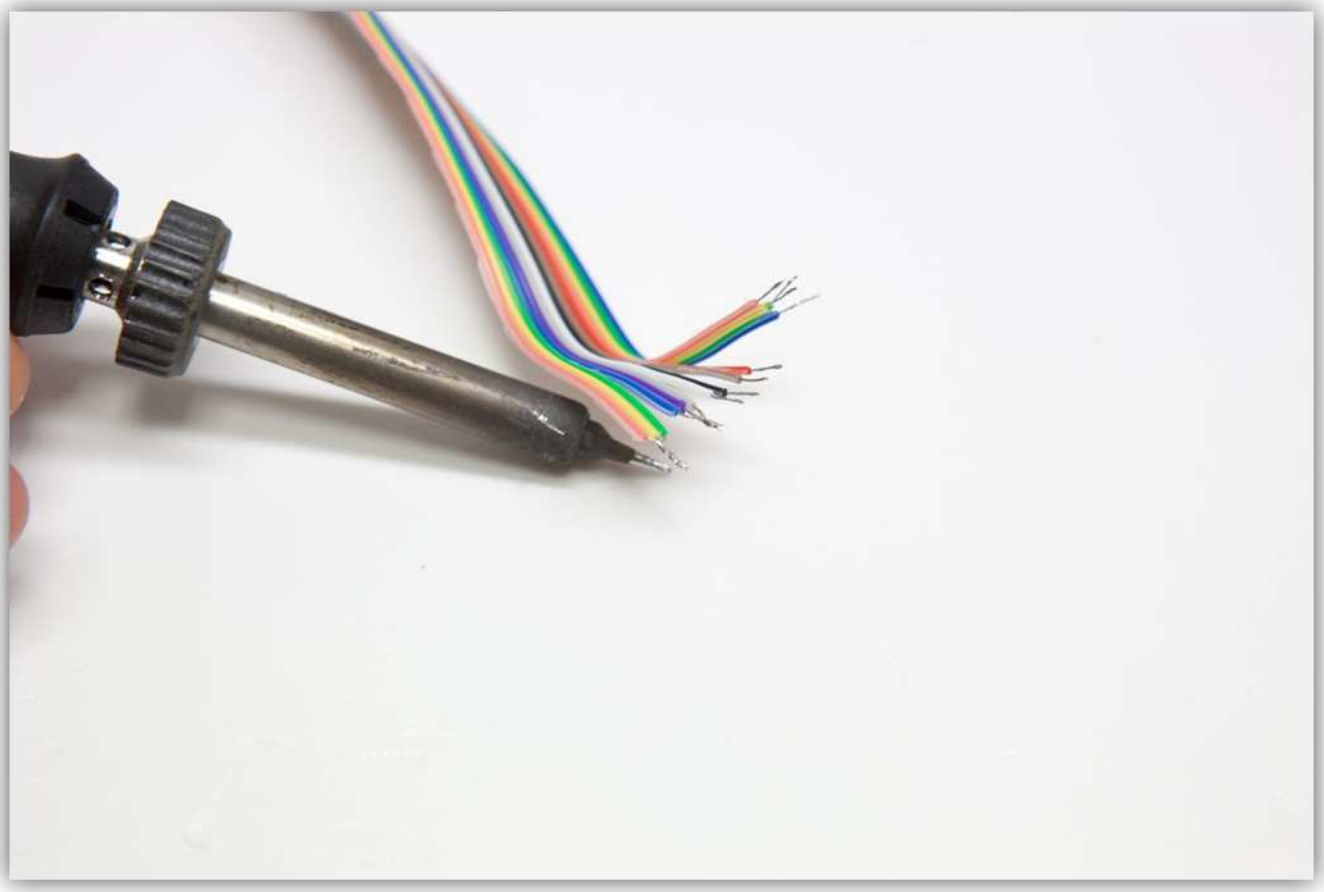
Strip the wires from group 2 (5 mm) (0.2"). **Do not twist these together.**



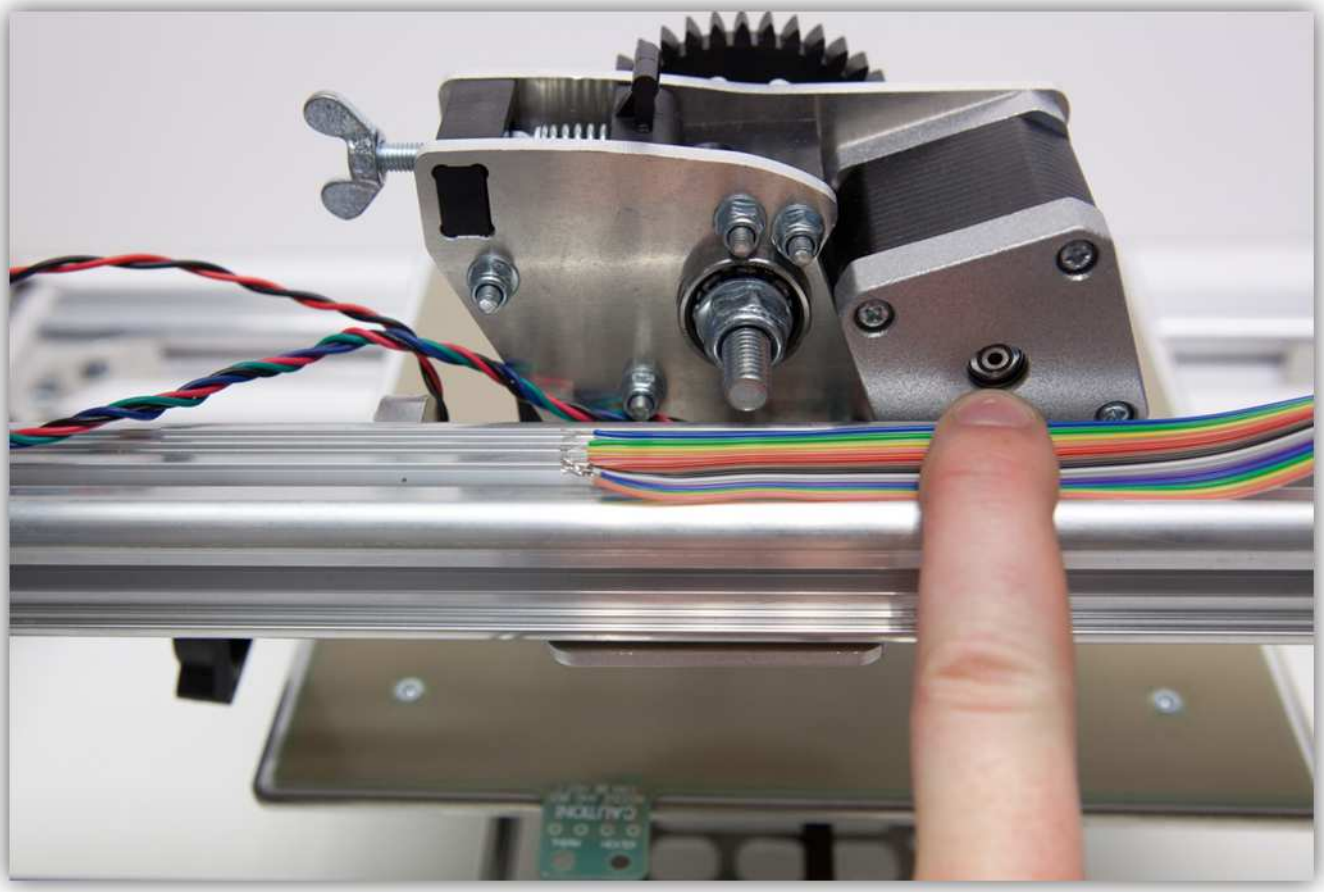
Strip the wires from group 1 (5 mm) (0.2"). **Do not twist these together.**



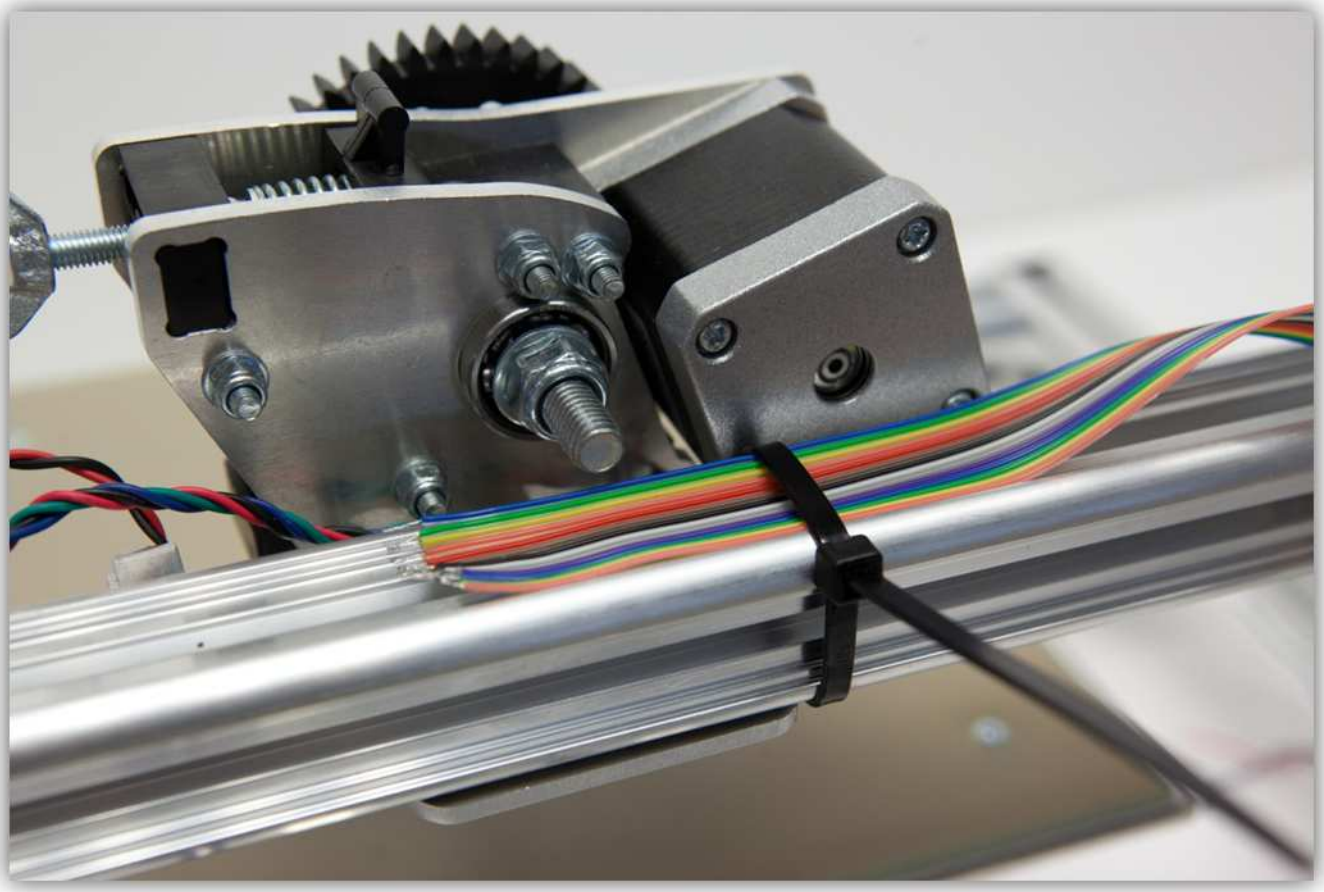
Tin all the wires. Take extra care when tinning the wires from group 4 and 5 since these are twisted together they need a bit more tin to make sure they all stay together.



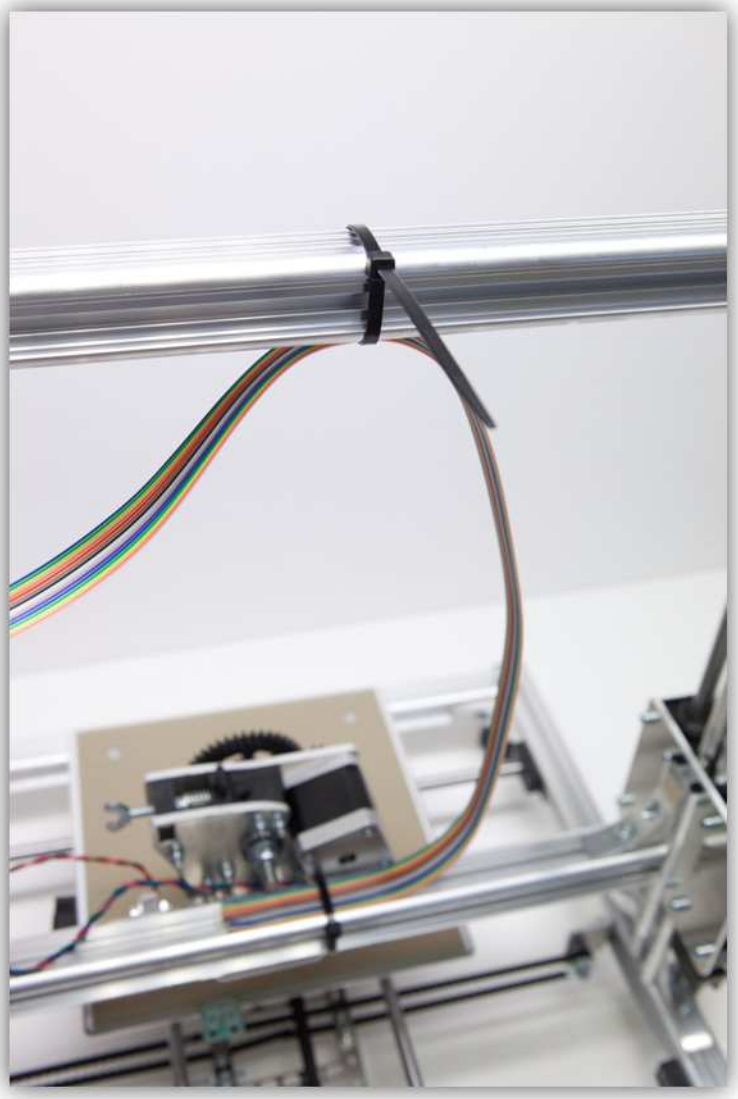
Place this end of the cable next to the extruder with group 1 closest to the extruder housing.



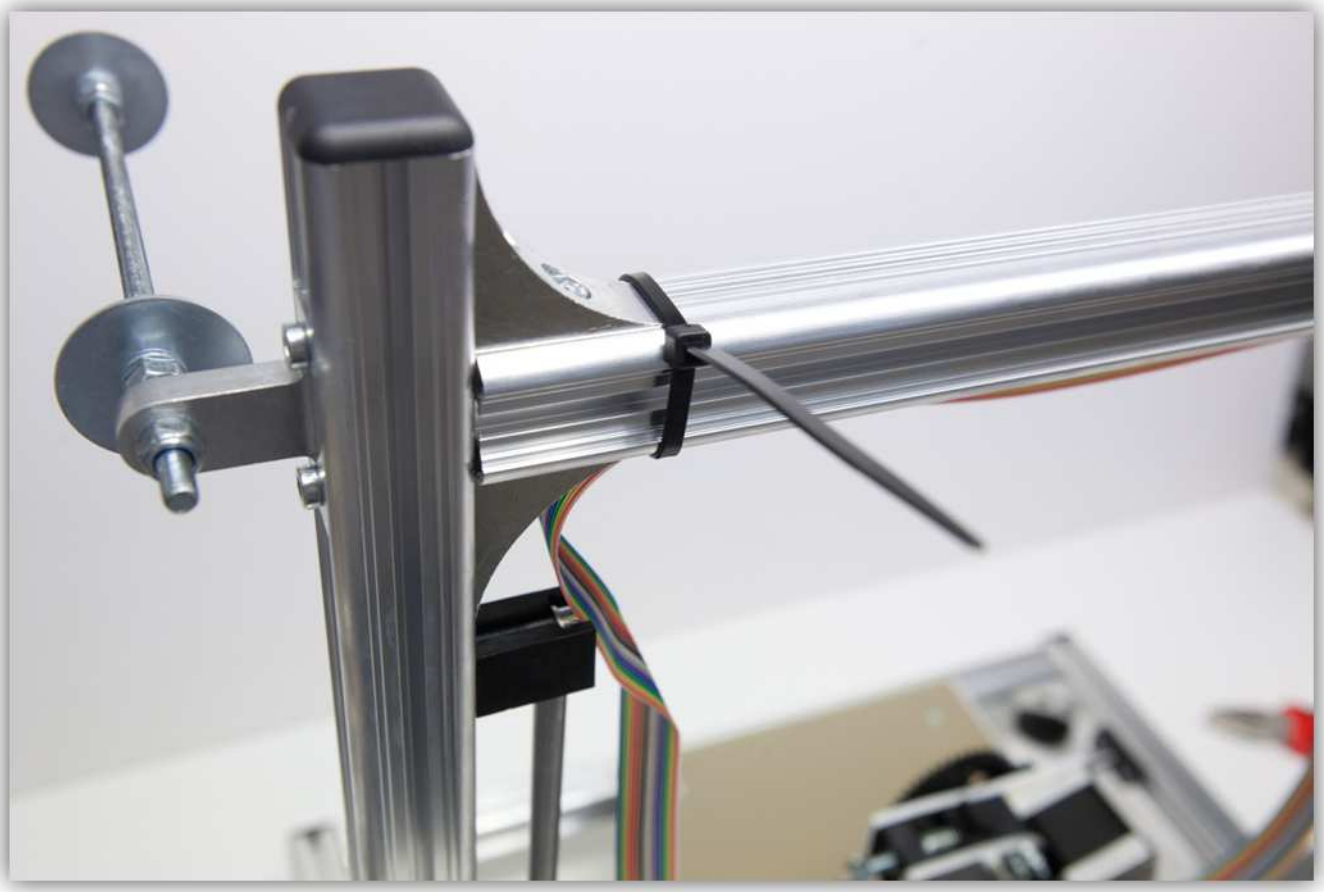
Secure the cable with a large tie strip (from the bag labelled with 40).



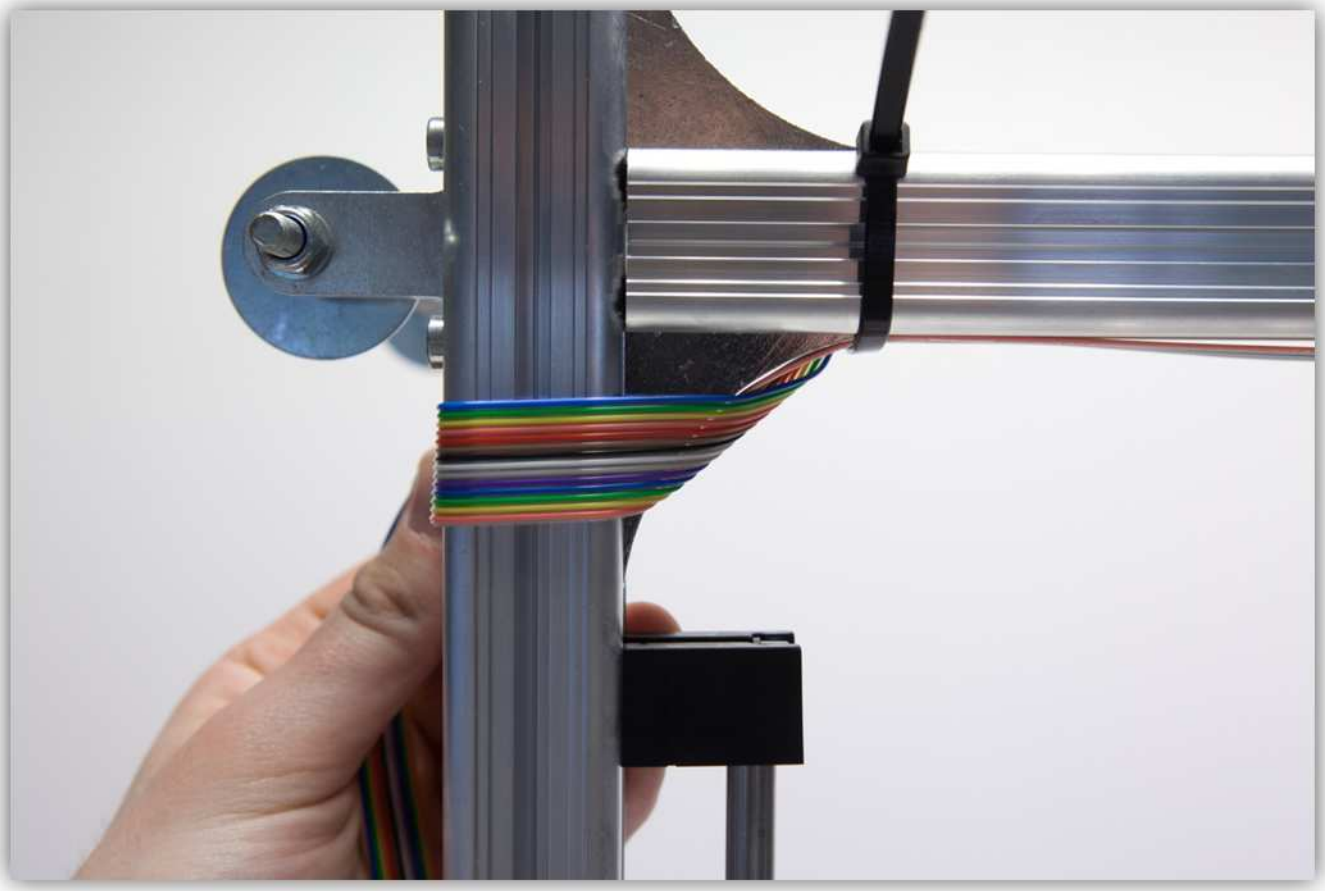
Make sure that the extruder arm is at its lowest point an then secure the cable to the horizontal profile at the top with a large tie-strip as shown in the picture. **Use only the length of cable needed, not more.**



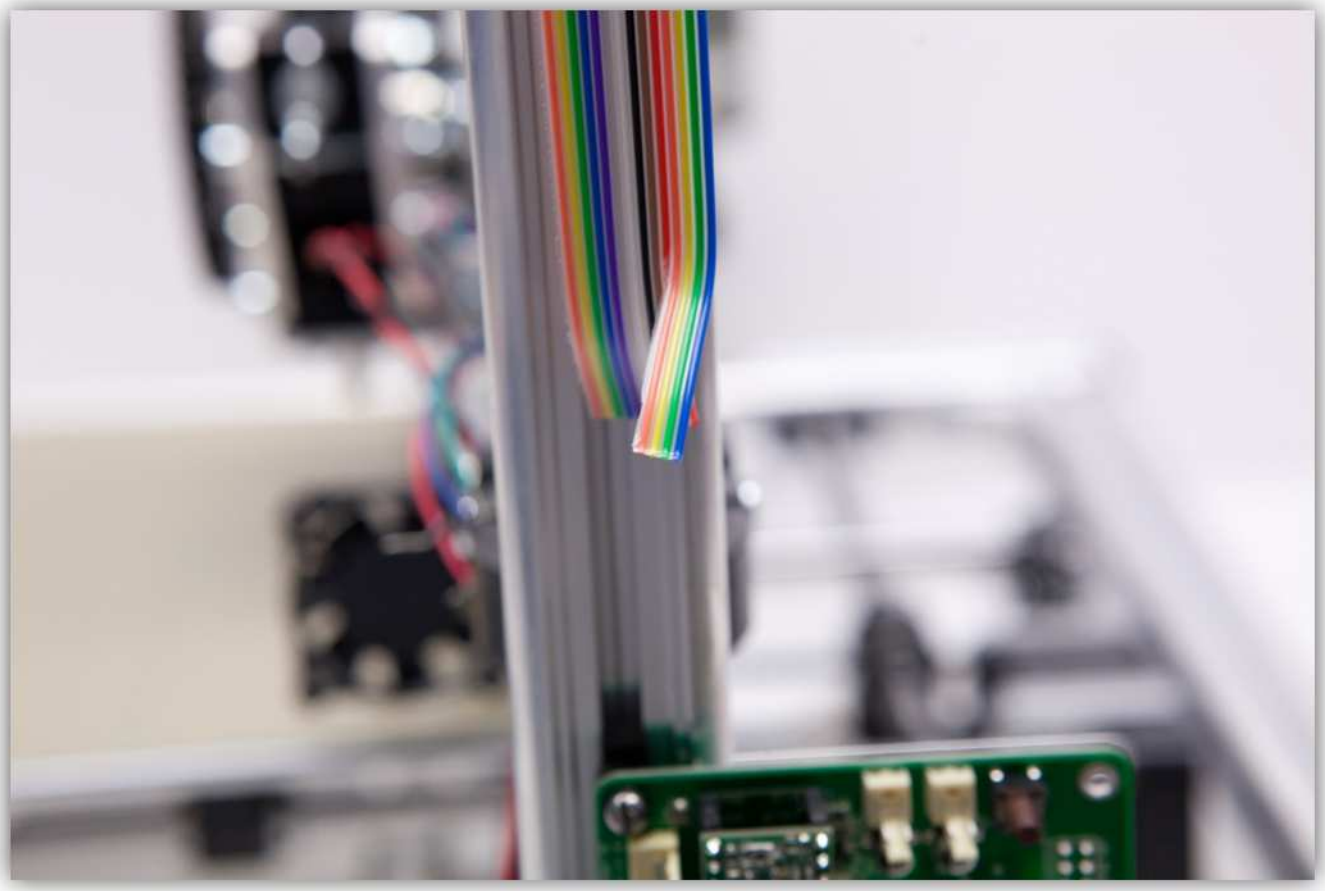
Next secure the cable with a large tie-strip next to the right upright profile.



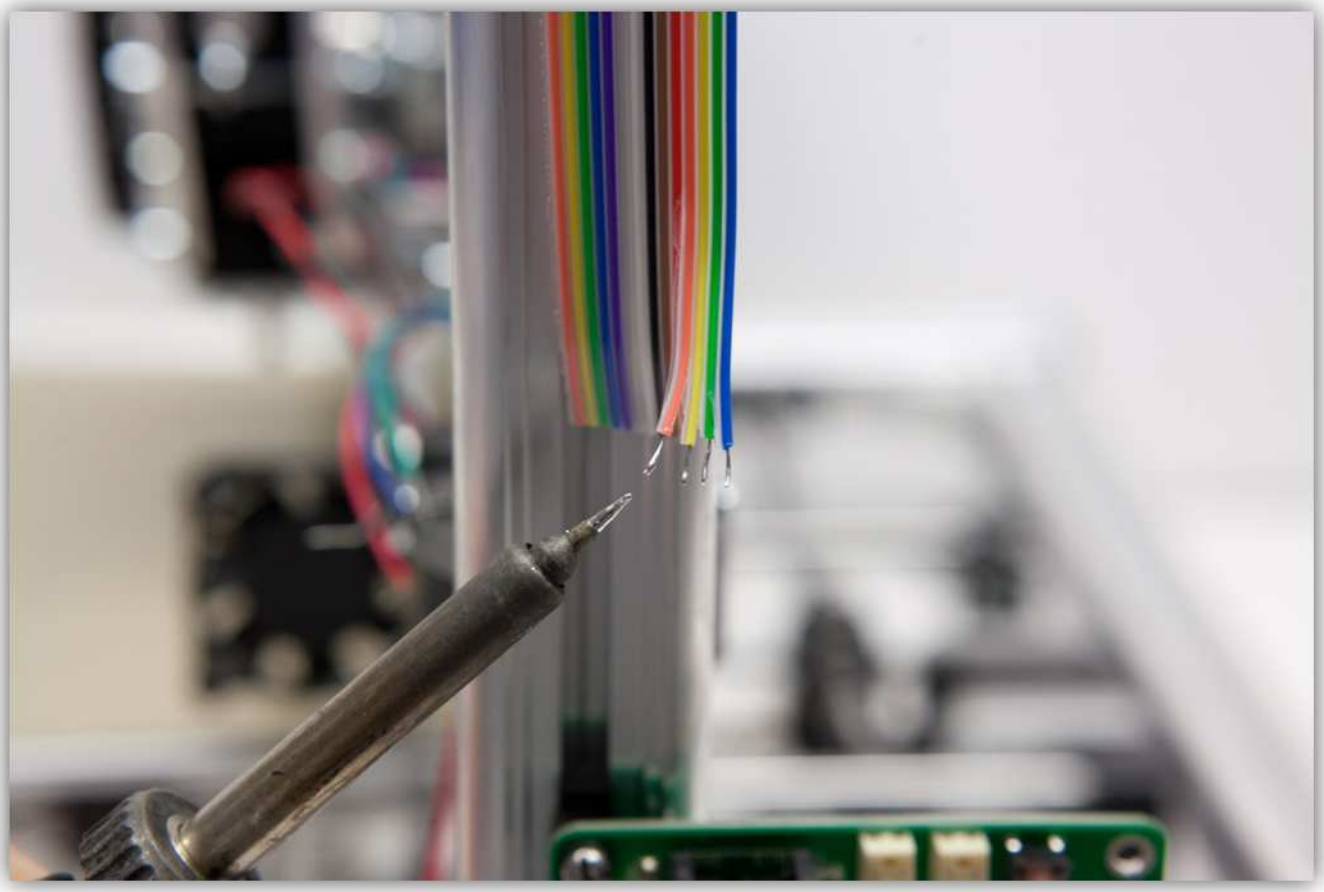
Fold the cable as shown in the pictures below and secure the cable with a large tie strip.



On this end of the cable detach (2 cm) (0.79") the **Blue, Green, Yellow, Orange** wires as a group.

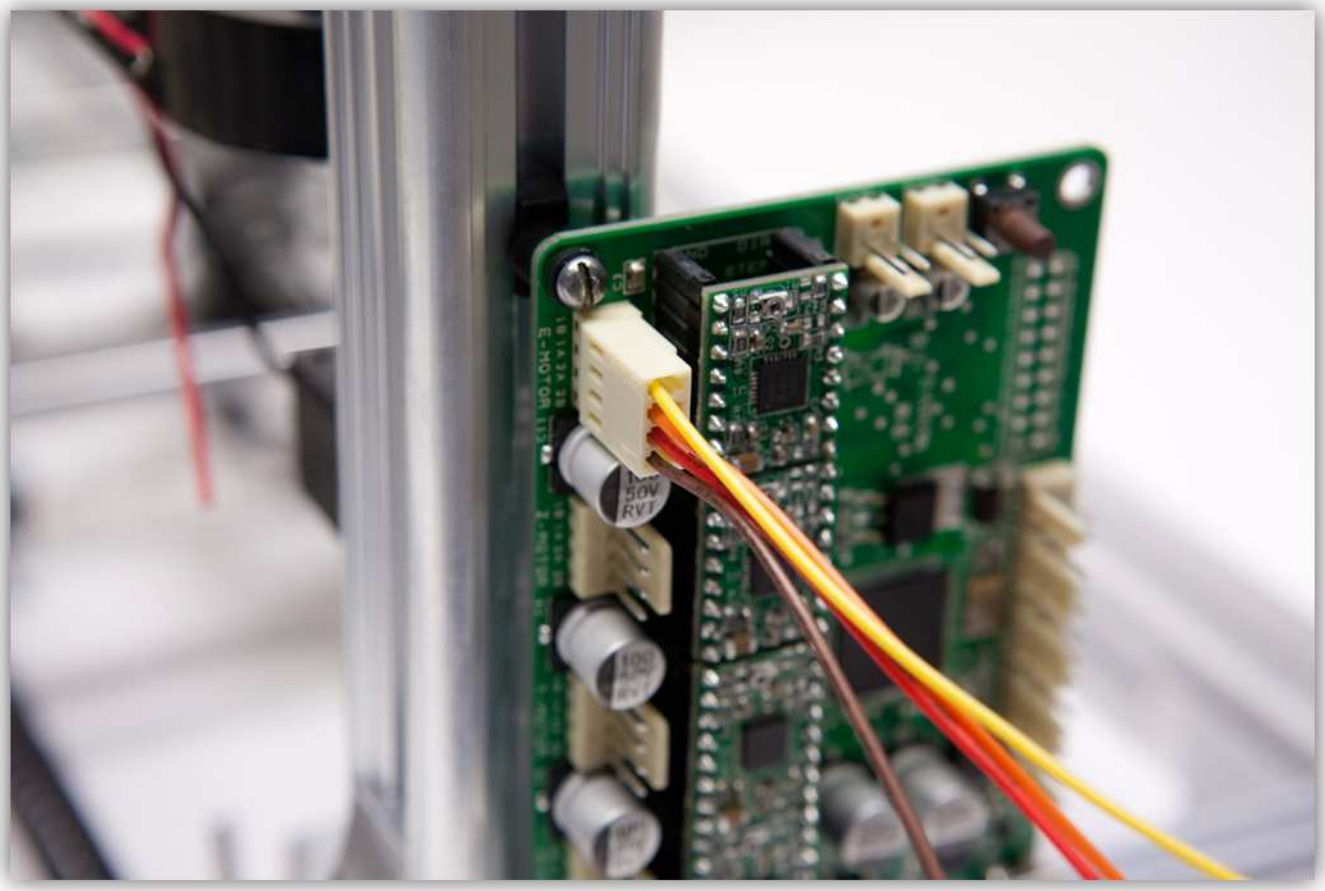


Strip the 4 wires (5 mm) (0.2") and tin them.



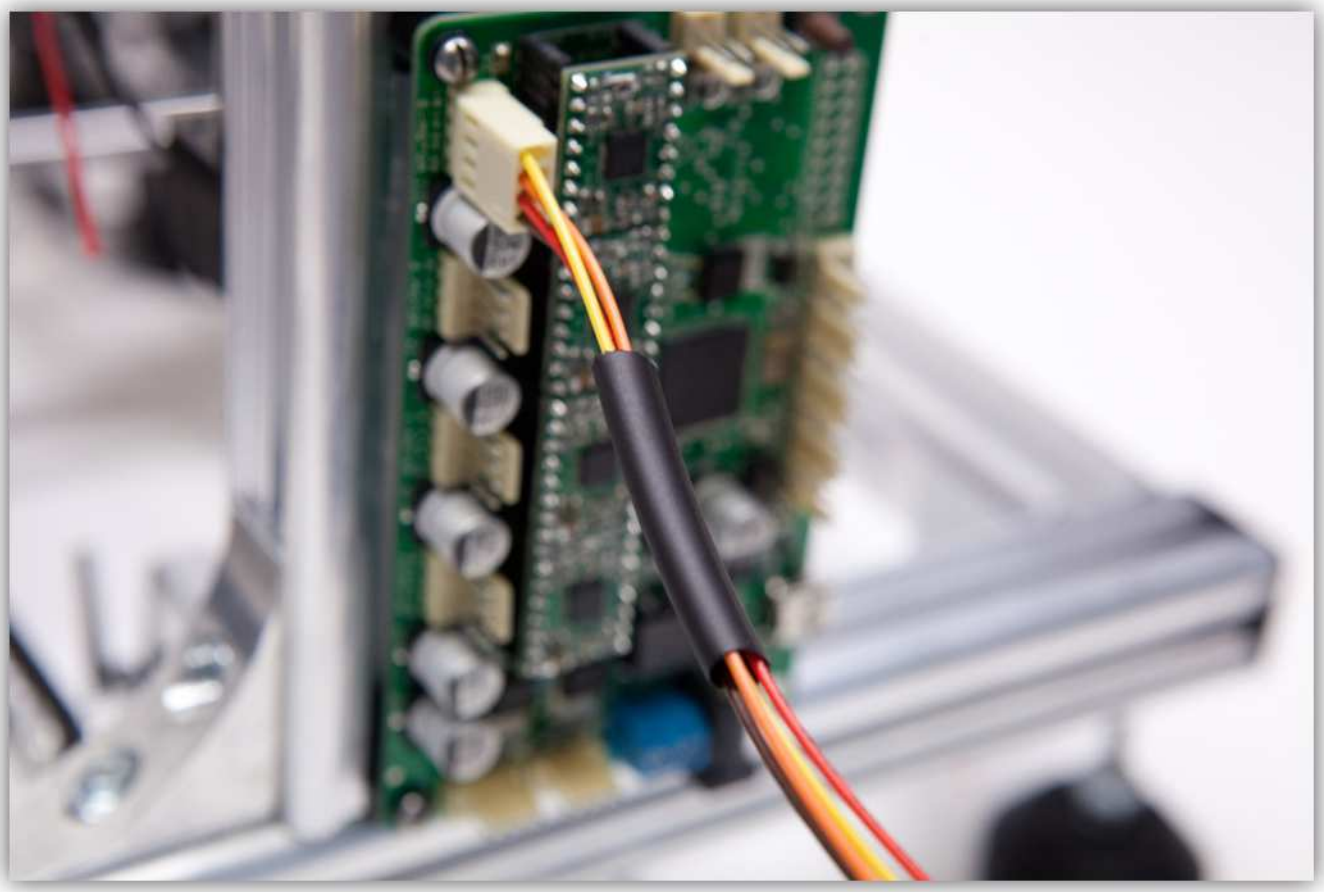
Take a board to wire connector with 4 wires out of the bag labelled with 40.

Plug the female connector in the male connector labelled with E-MOTOR on the controller board.

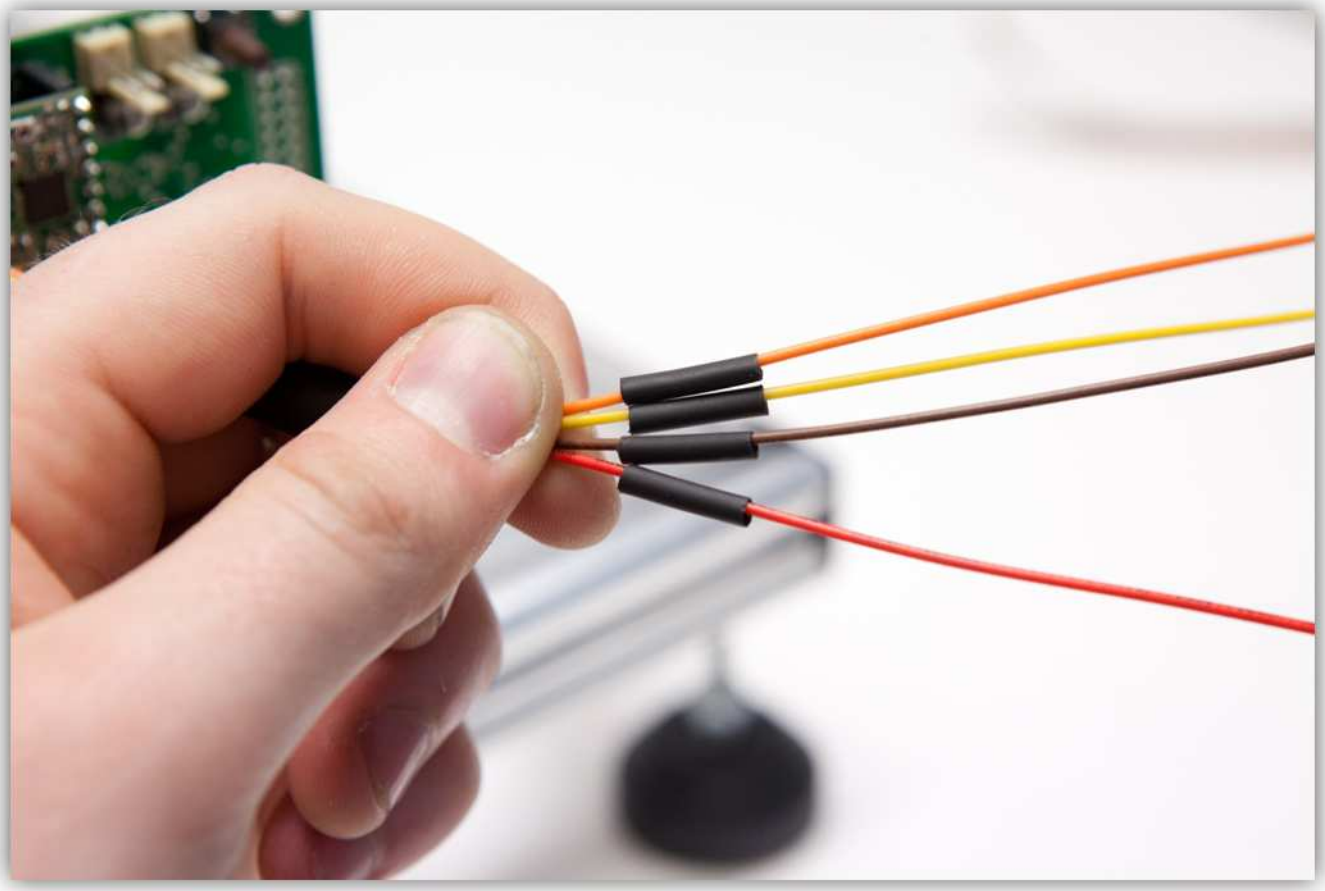


Cut 4 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the biggest piece of heat shrink tubing over the 4 wires from the connector.

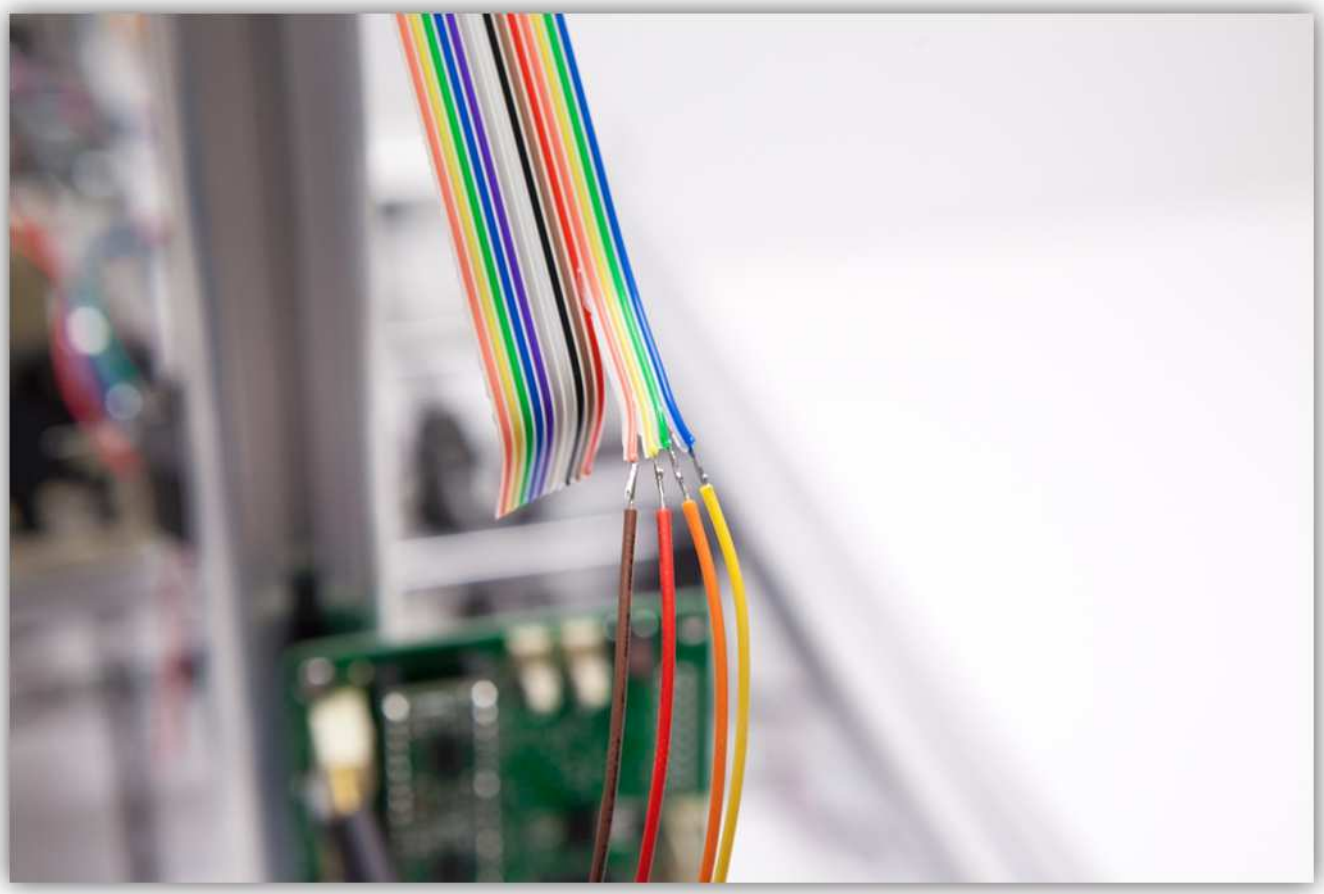


Slide the 4 small pieces of heat shrink tubing over the 4 wires of the connector.

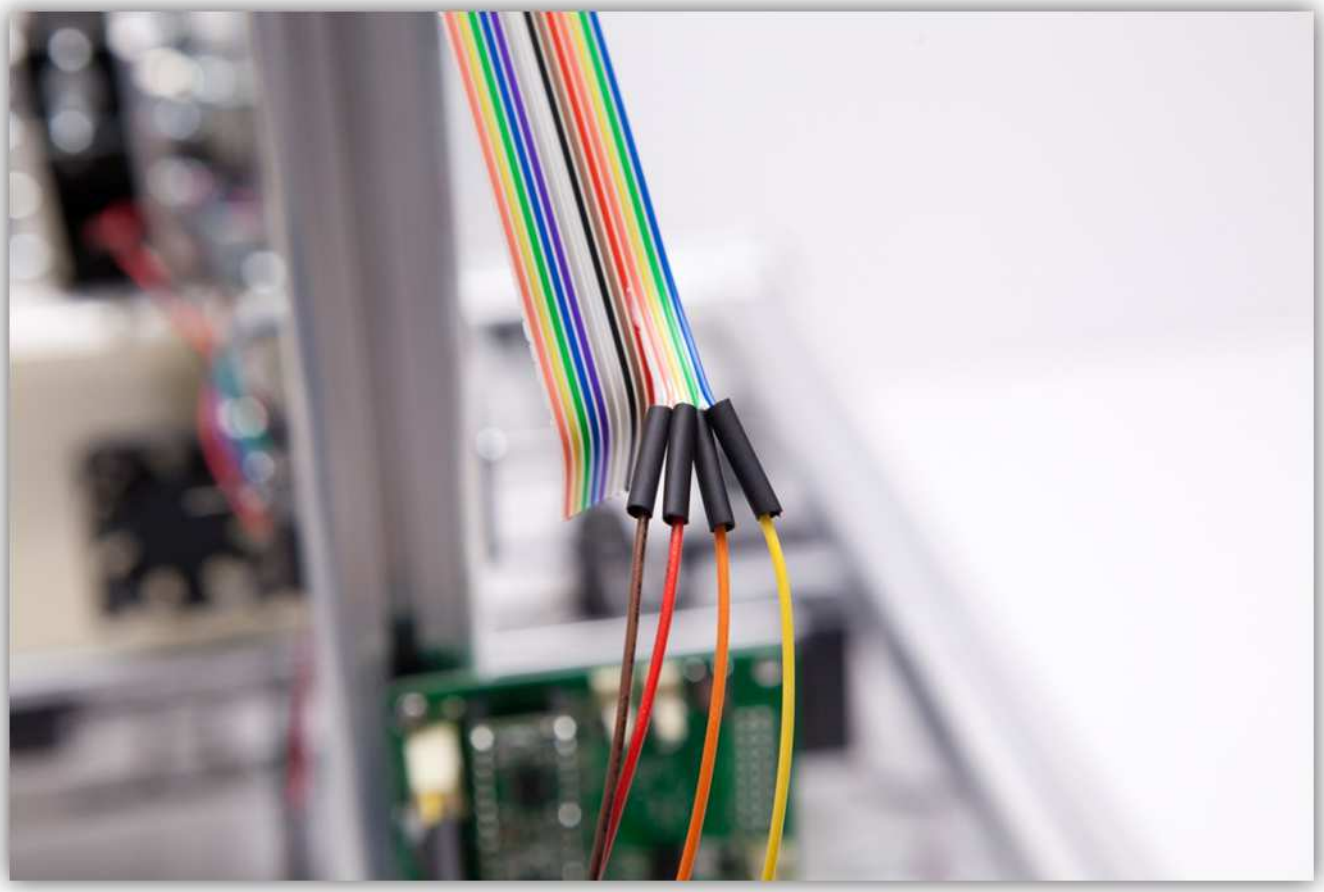


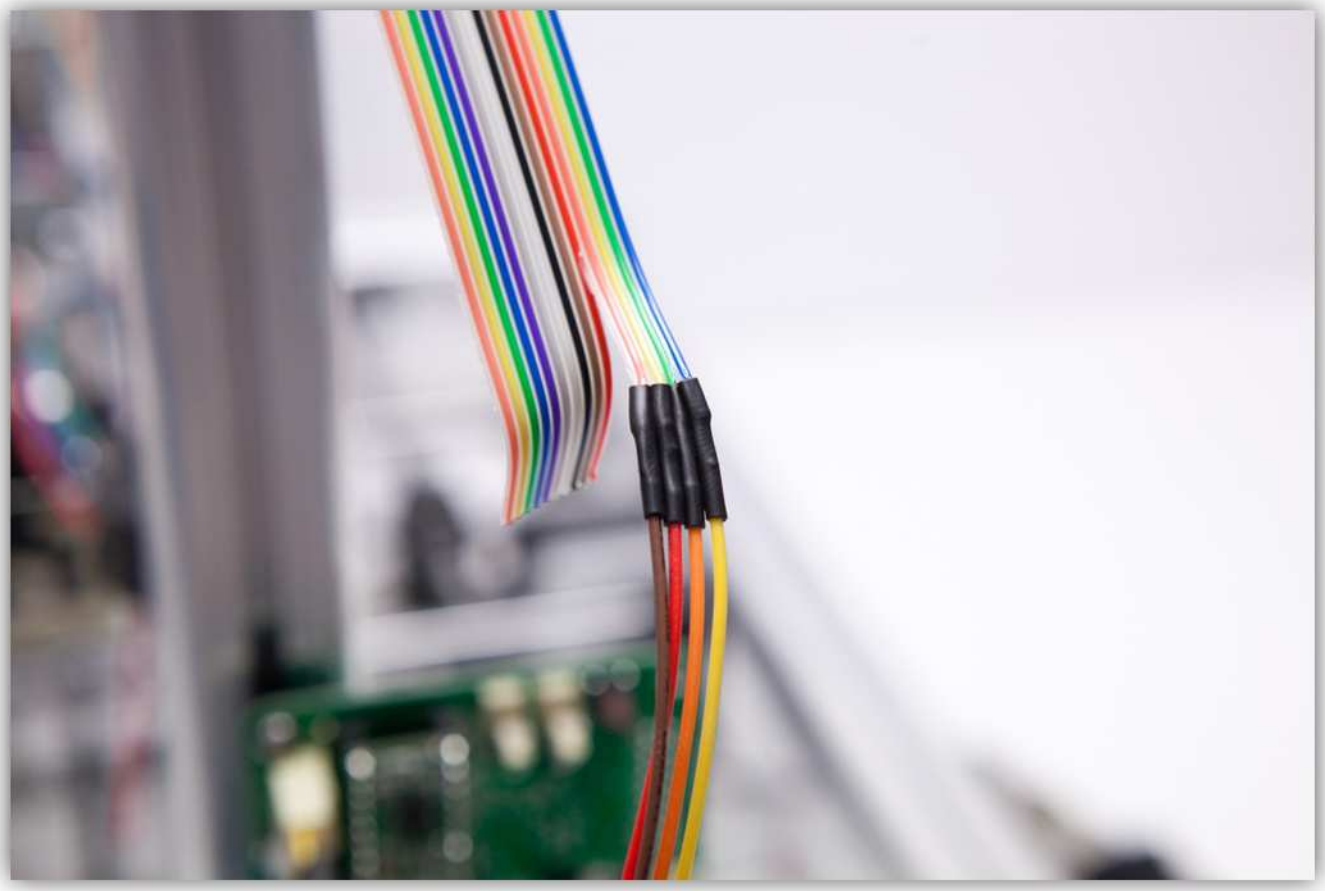
Solder the 4 wires from the connector to the 4 wires of the flat cable you tinned earlier. **Watch the colours closely.**

Flat cable	**->**	**Connector wires**
Blue	**->**	**Yellow**
Green	**->**	**Orange**
Yellow	**->**	**Red**
Orange	**->**	**Brown**

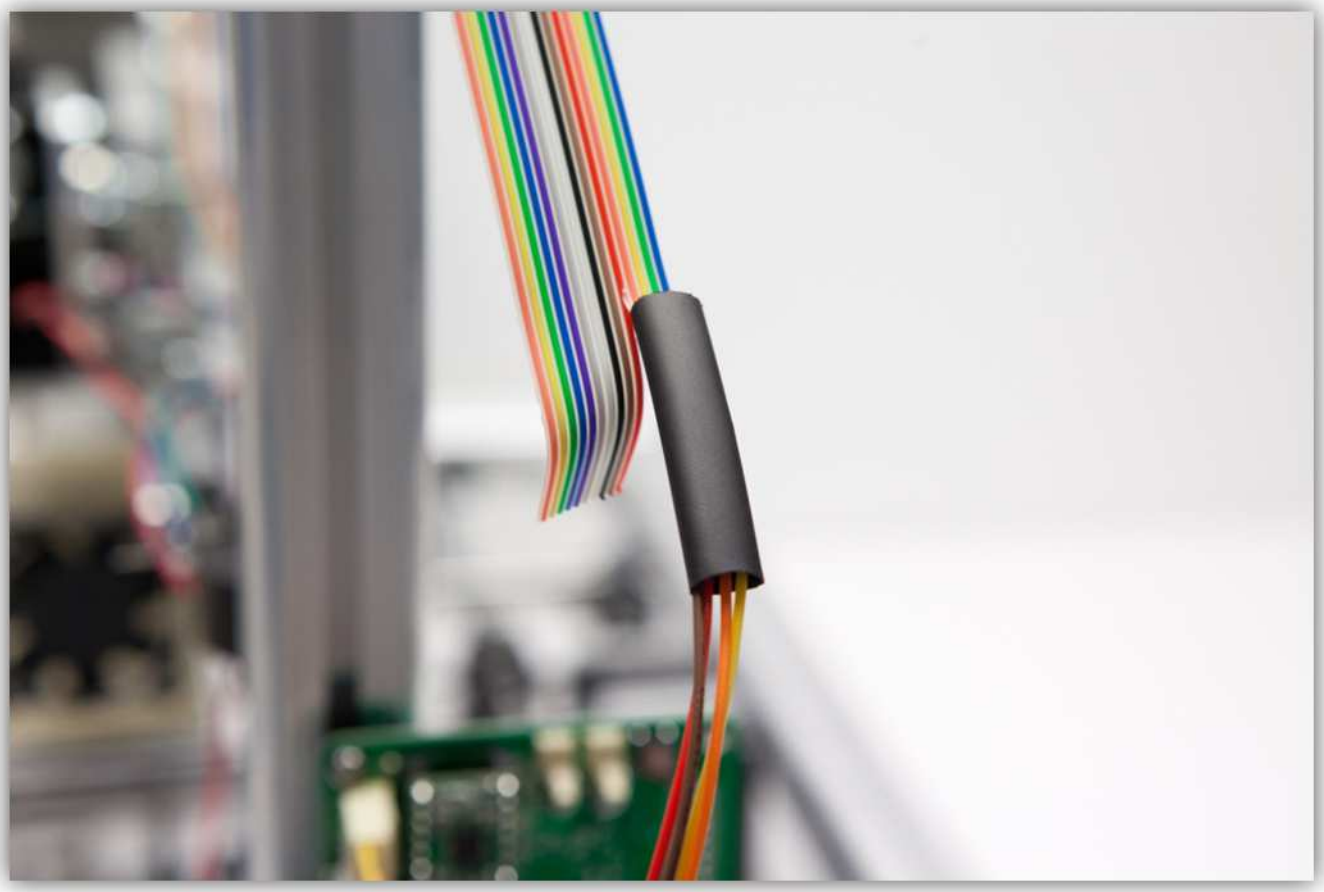


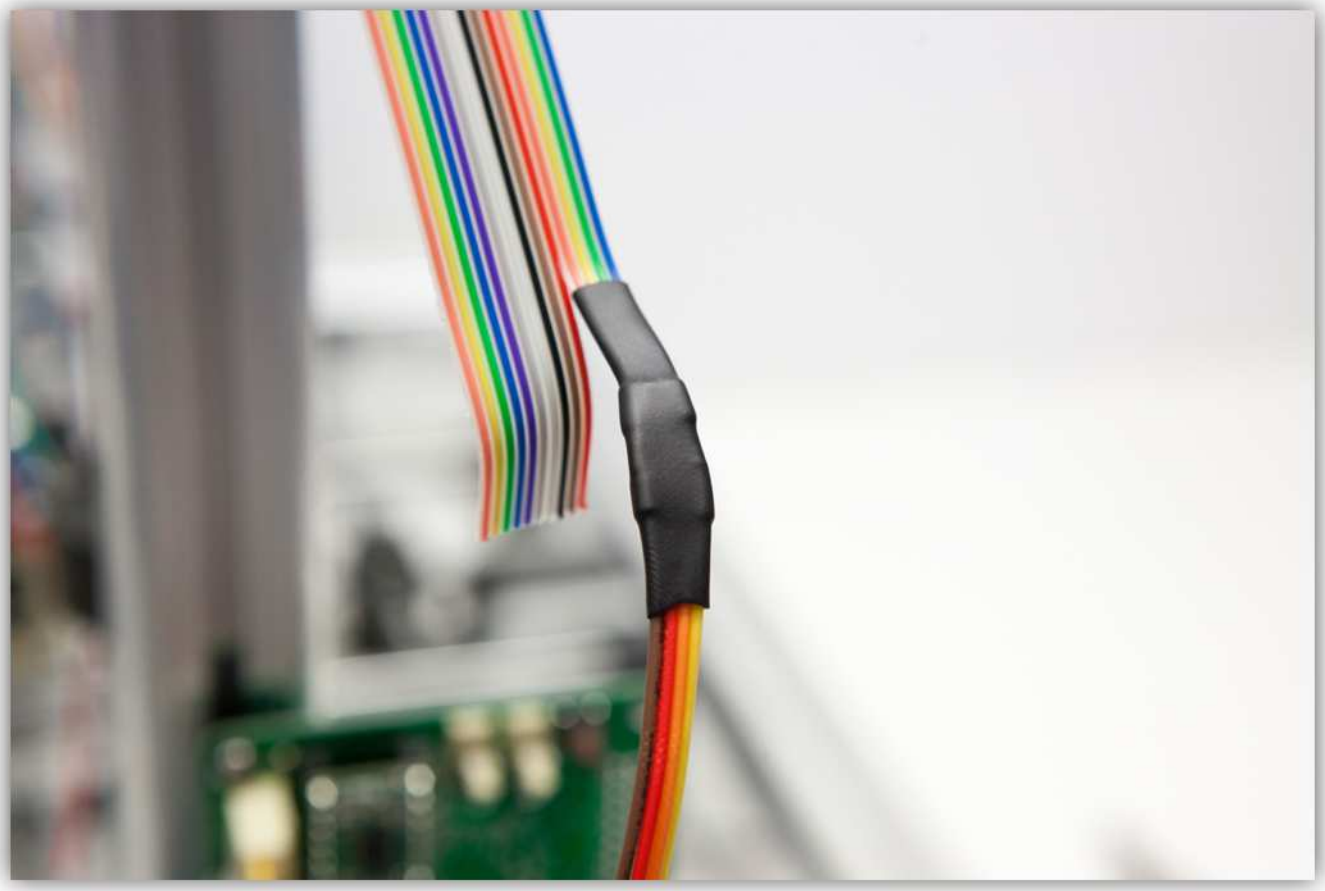
Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.





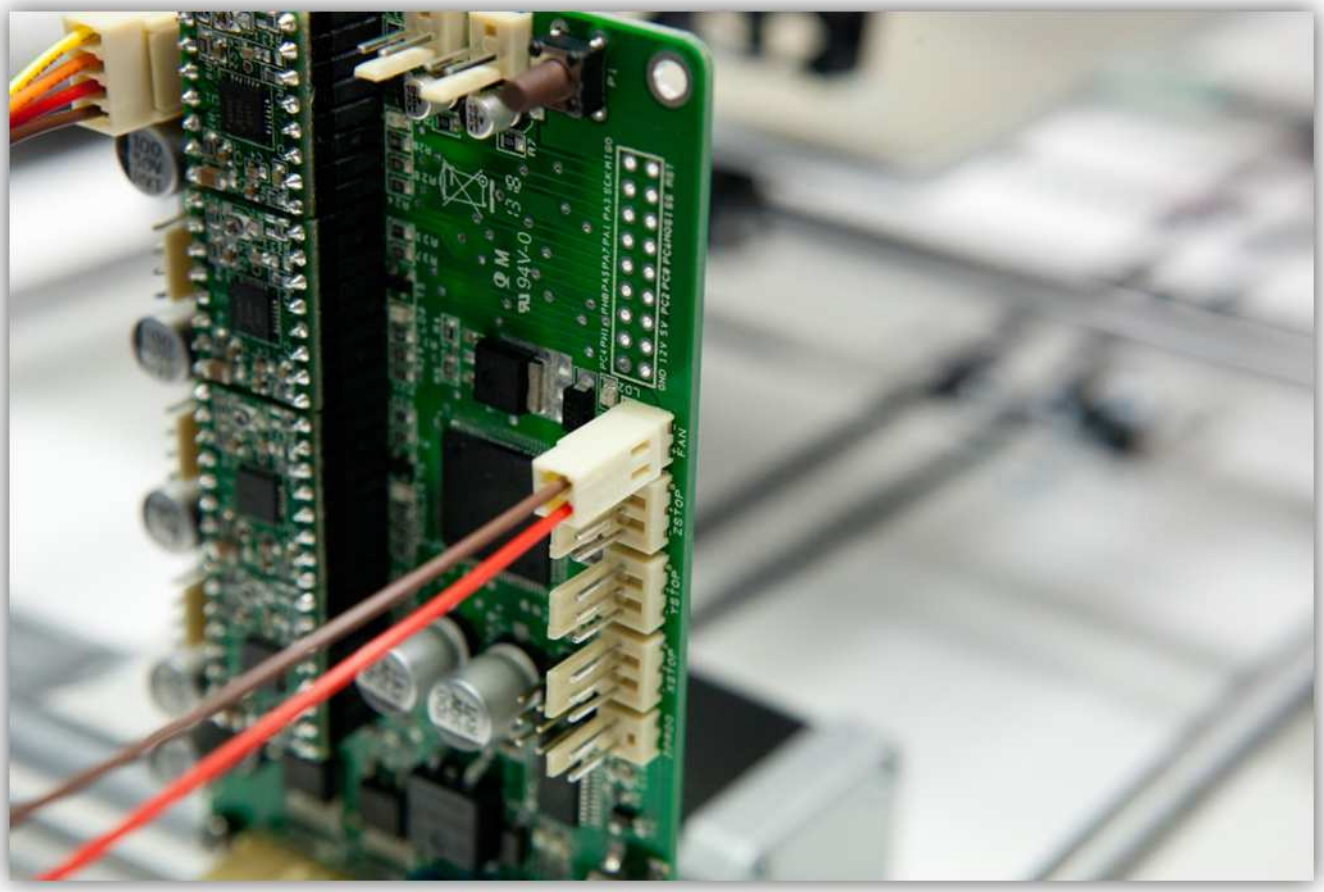
Now slide the big piece of heat shrink tubing over the 4 small pieces, heat the big piece so it covers and protects the 4 heat shrunk joints.





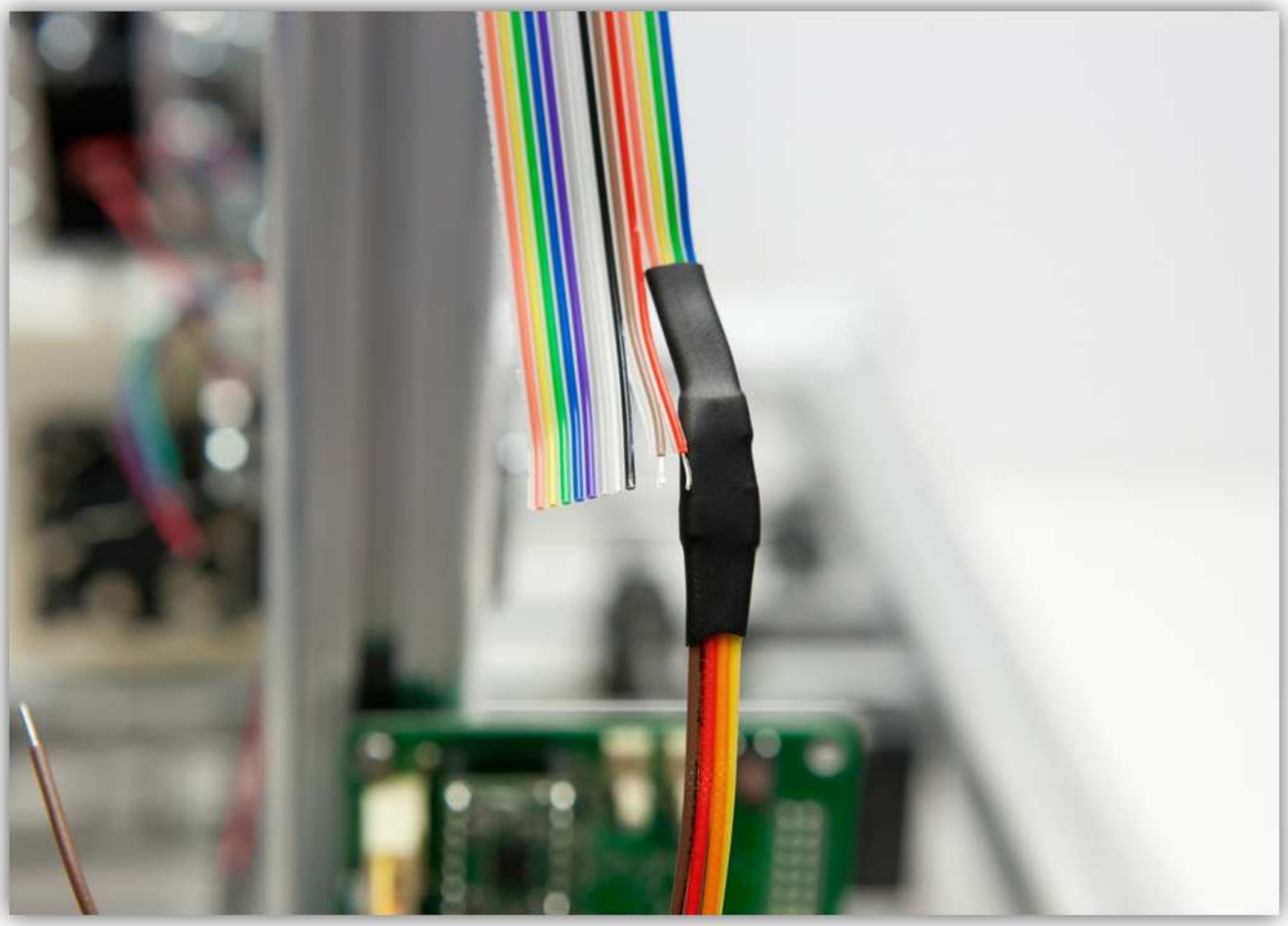
Take a board to wire connector with 2 wires out of the bag labelled with 40.

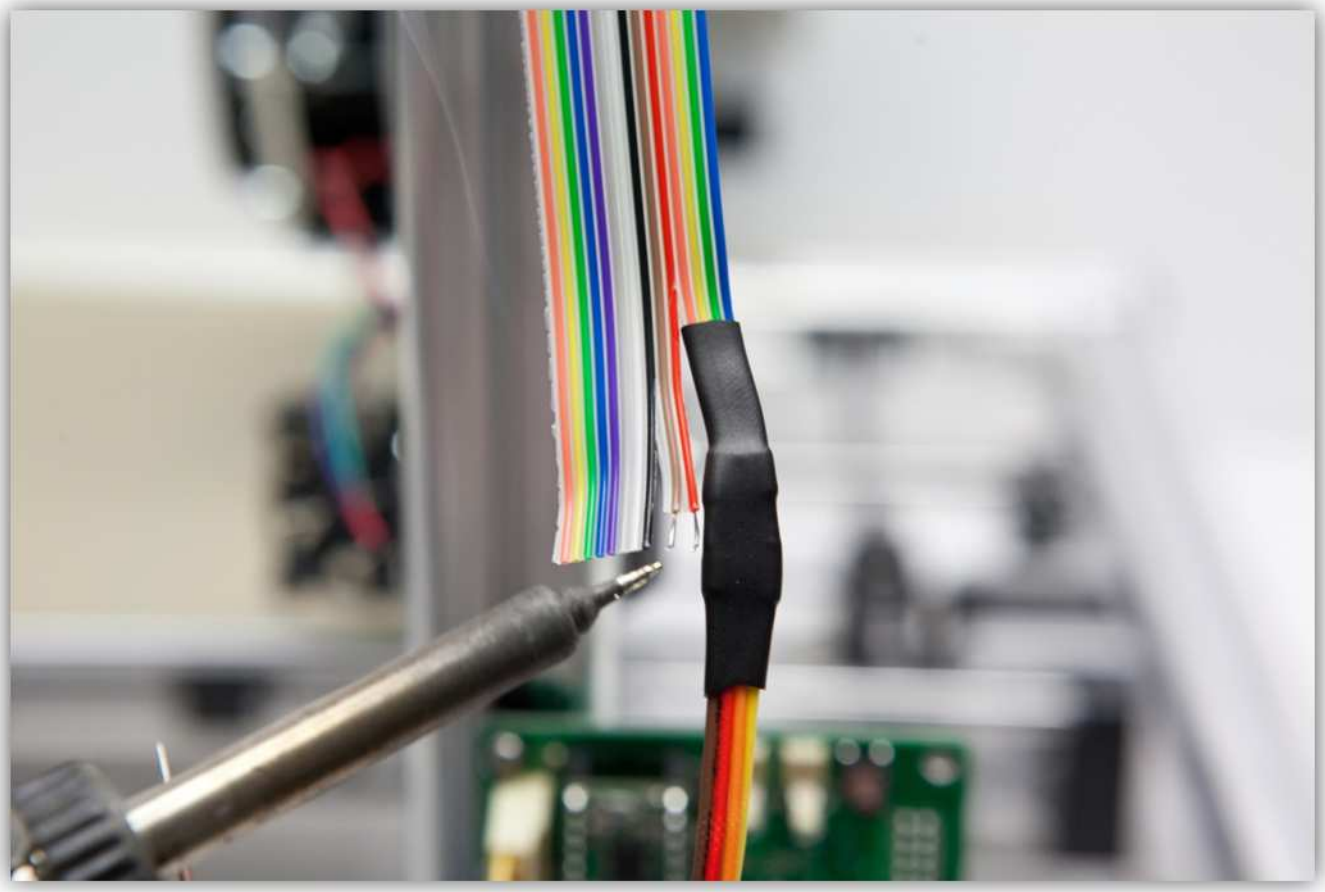
Plug the female connector in the male connector labelled with FAN on the controller board.



Detach (2 cm) the **Red** and **Brown** wires from the flat cable as a group.

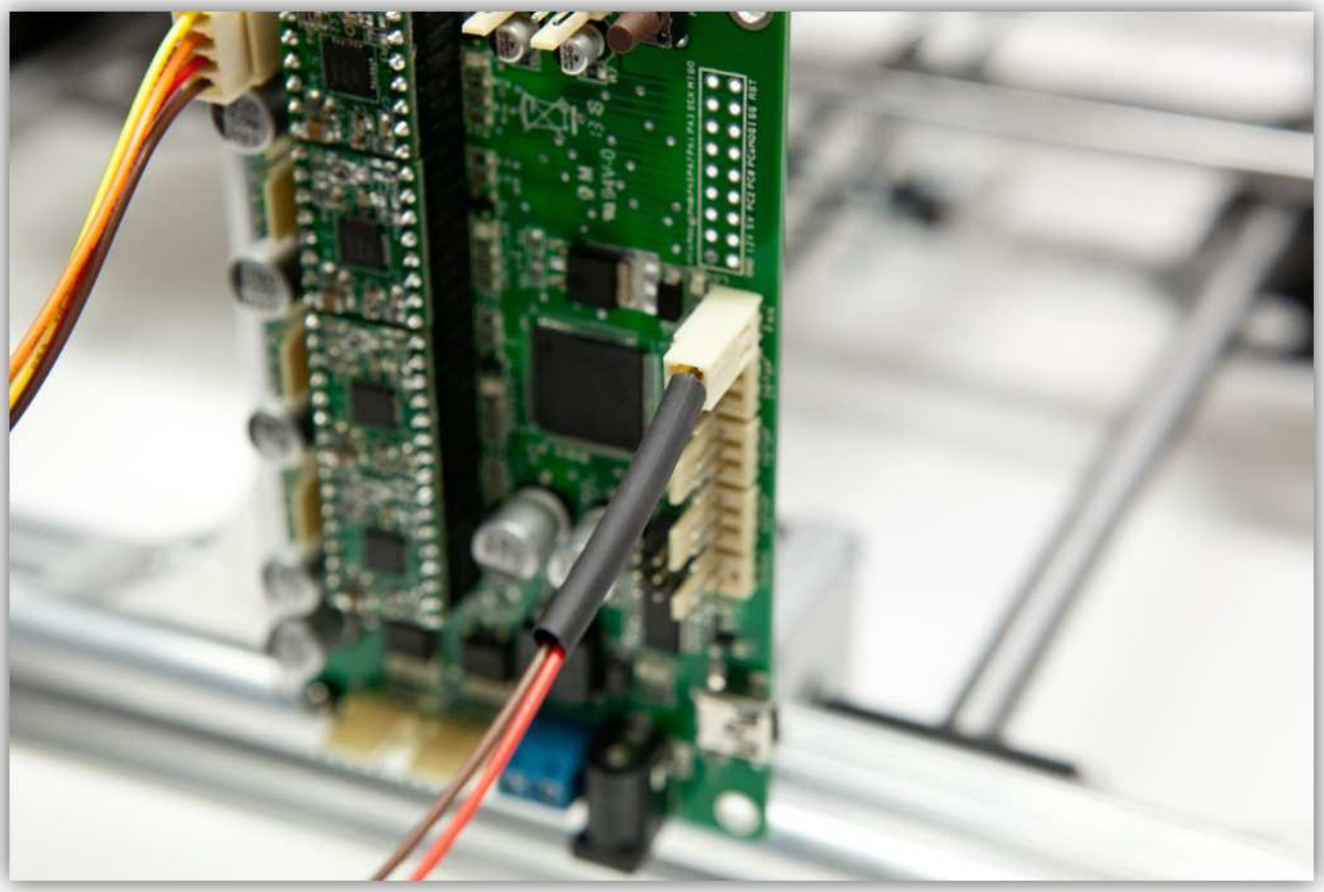
Strip and tin these two wires.



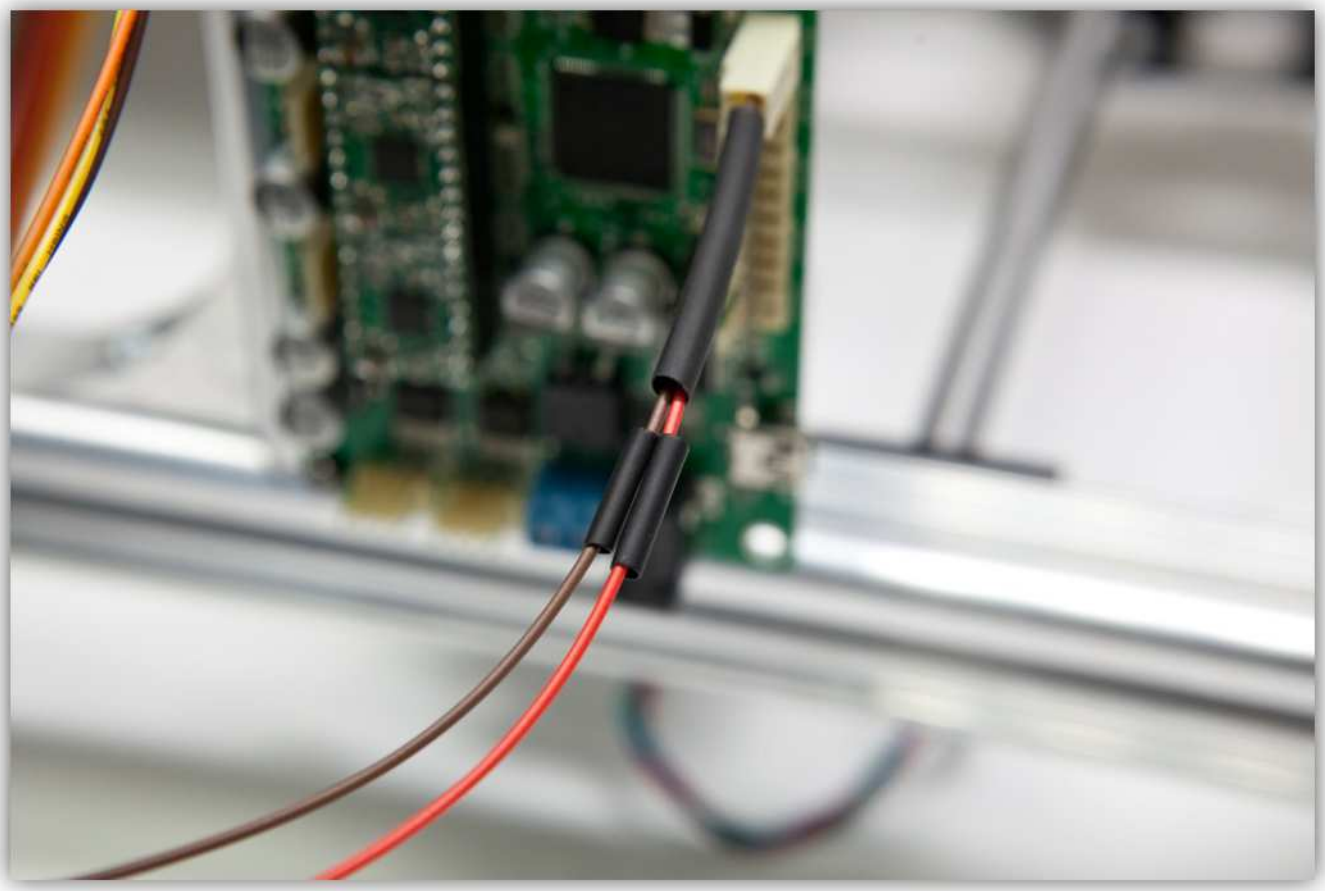


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the medium size heat shrink tubes over the 2 wires of the connector.



Slide the 2 small heat shrink tubes over the 2 wires of the connector.

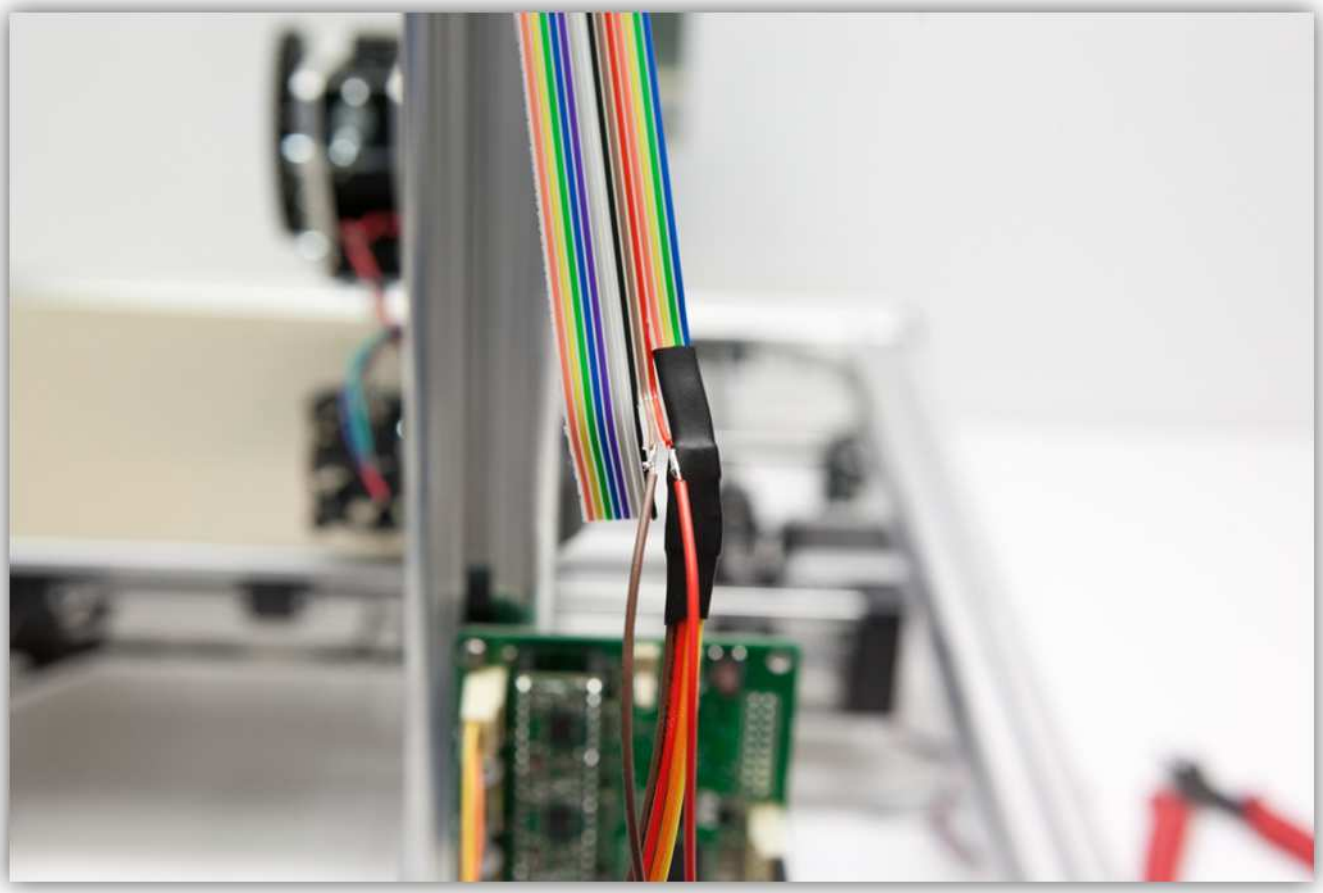


Solder the 2 wires from the connector to the 2 wires of the flat cable you tinned earlier. **Watch the colours closely.**

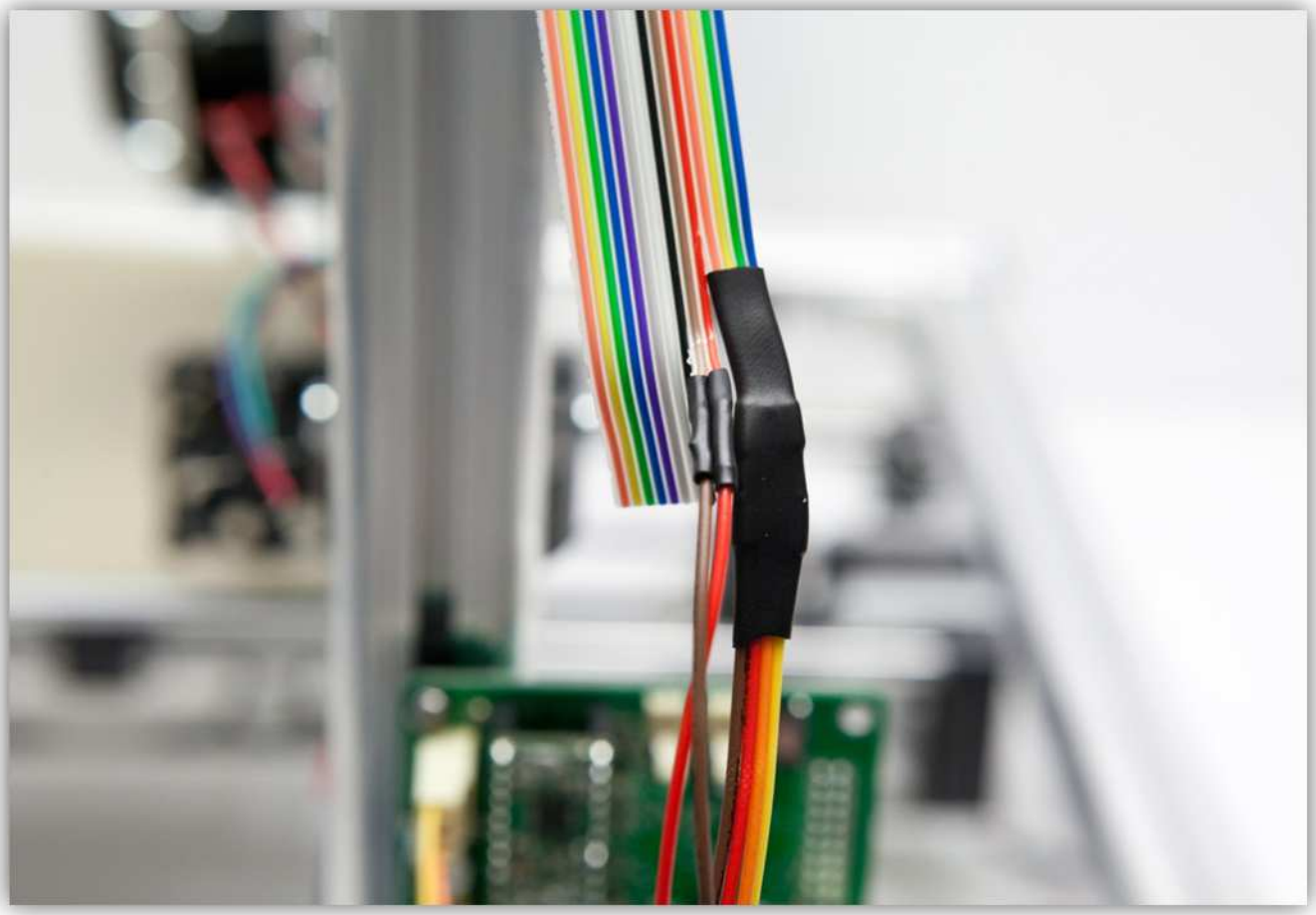
Flat cable -> Connector wires

Red -> Red

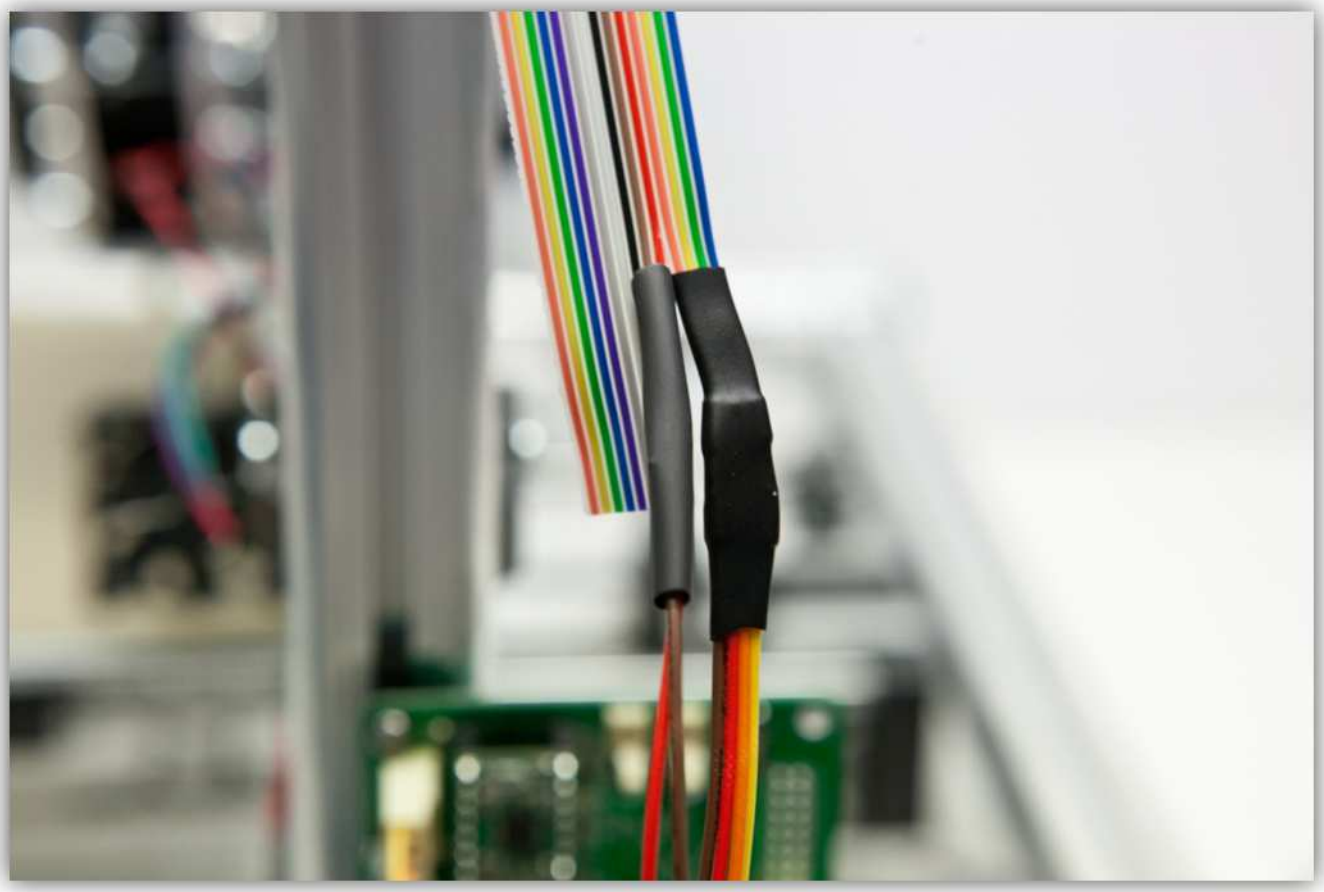
Brown -> Brown

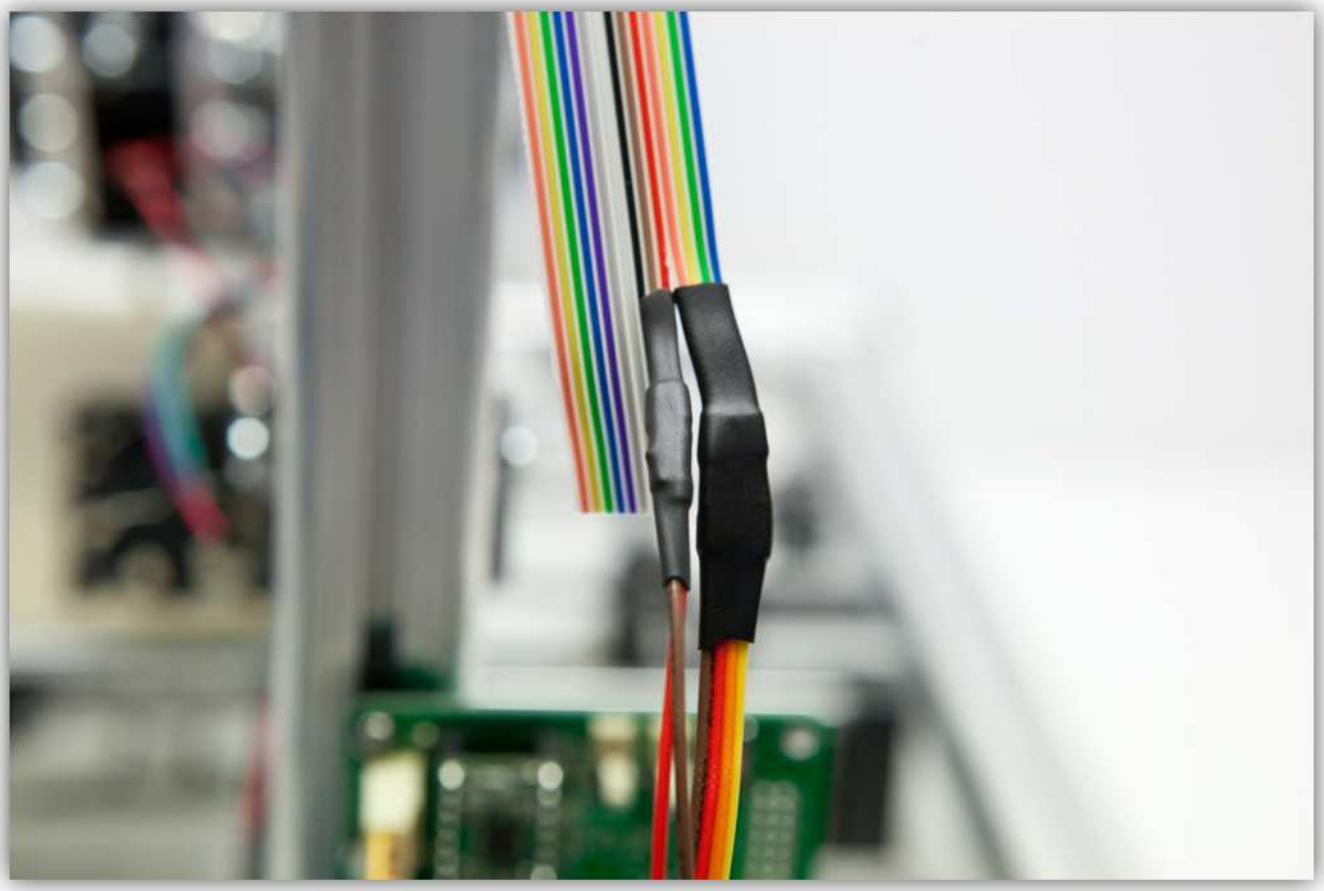


Slide the 2 small heat shrink tubes over the solder joints and heat them up.

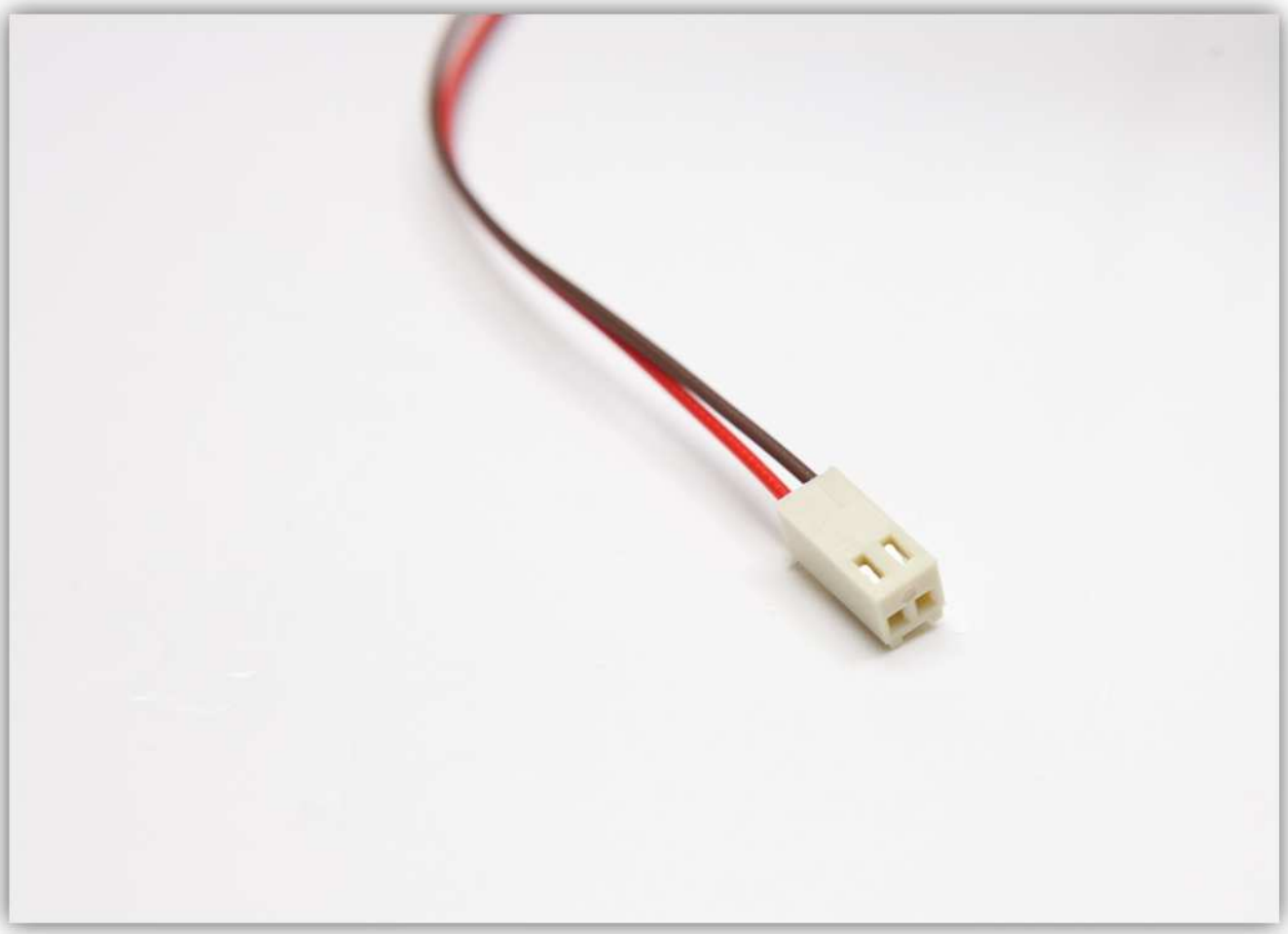


Now slide the medium size piece of heat shrink tubing over the 2 small pieces, heat the medium size piece so it covers and protects the 2 heat shrunk joints.

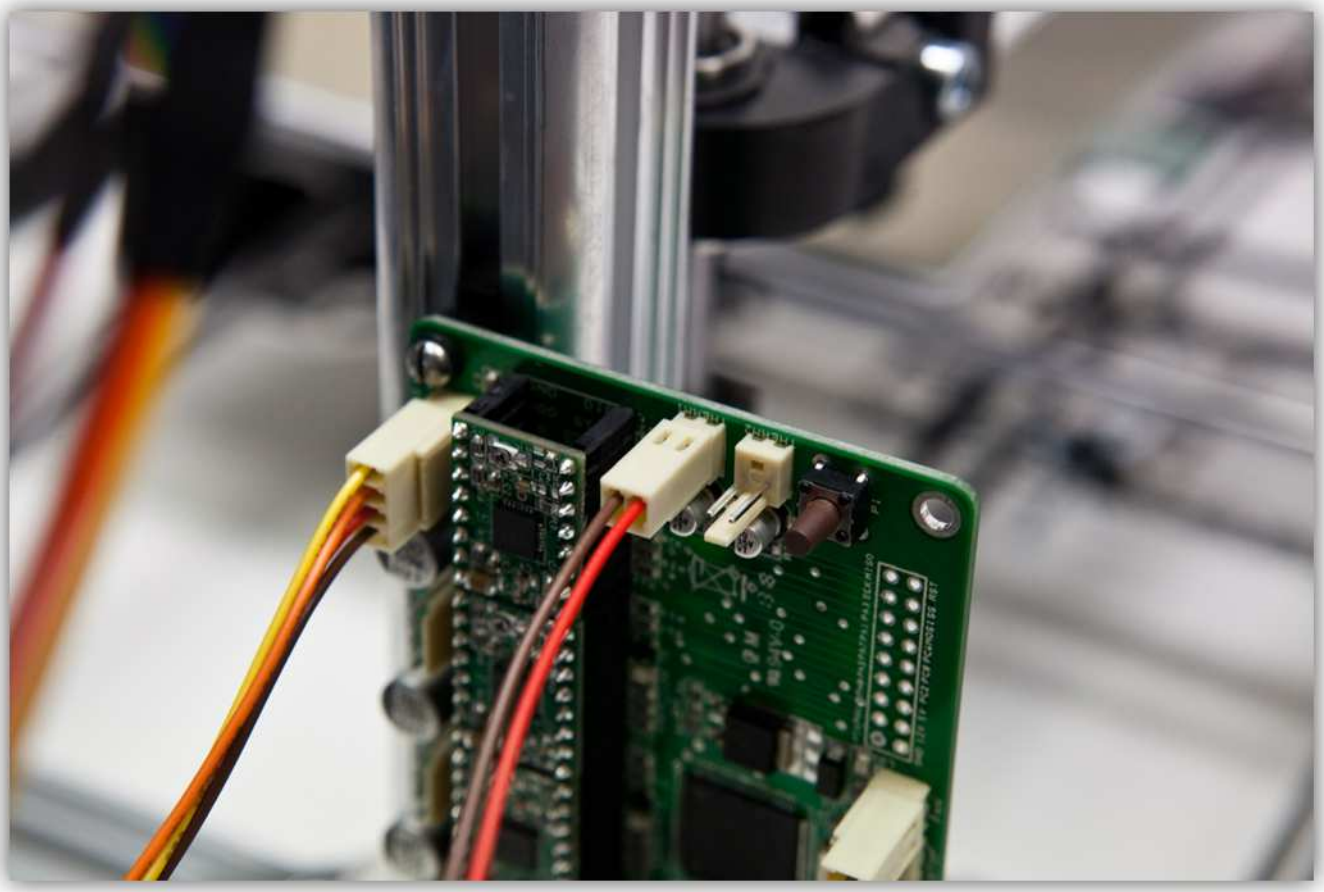




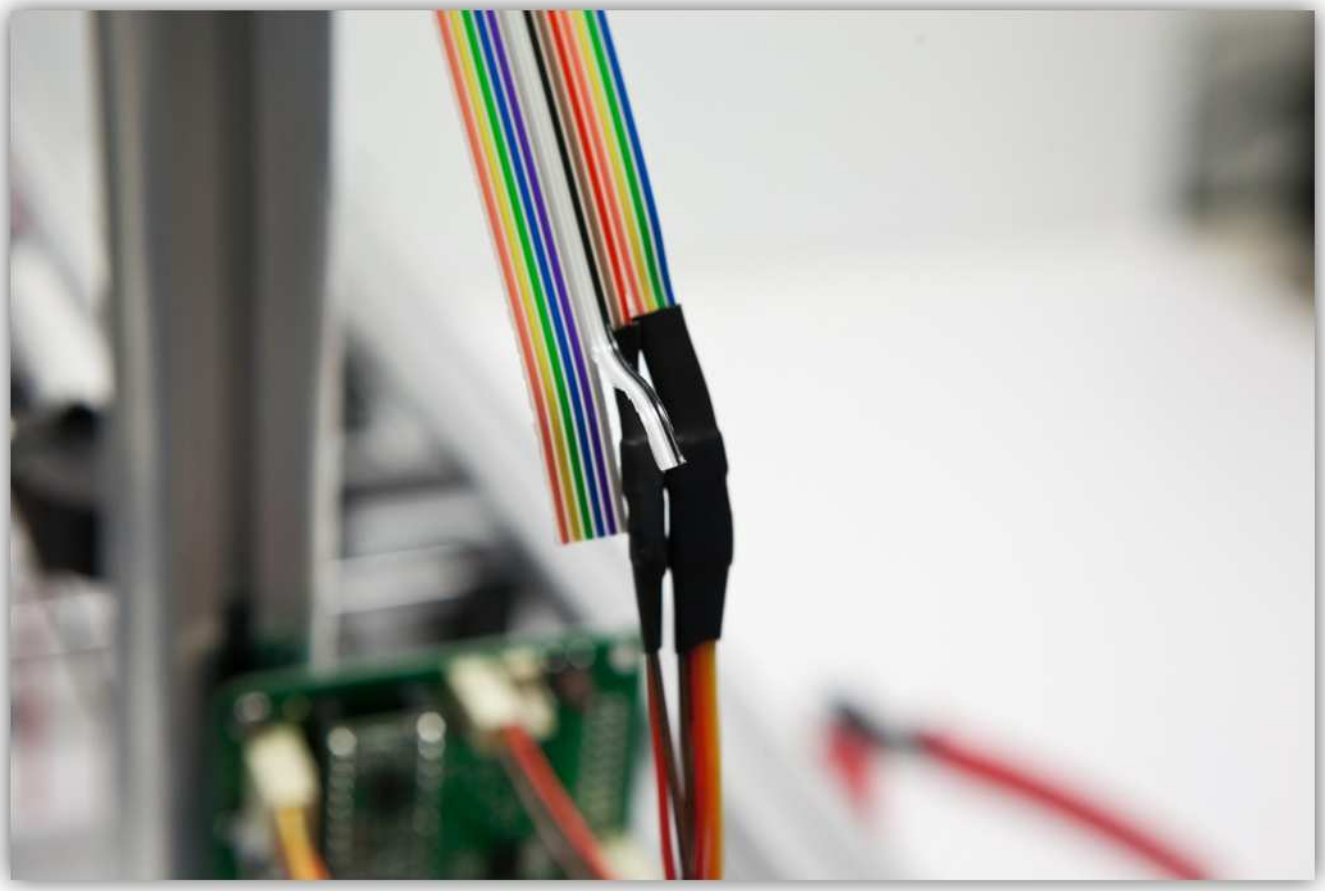
Take a board to wire connector with 2 wires out of the bag labelled with 40.



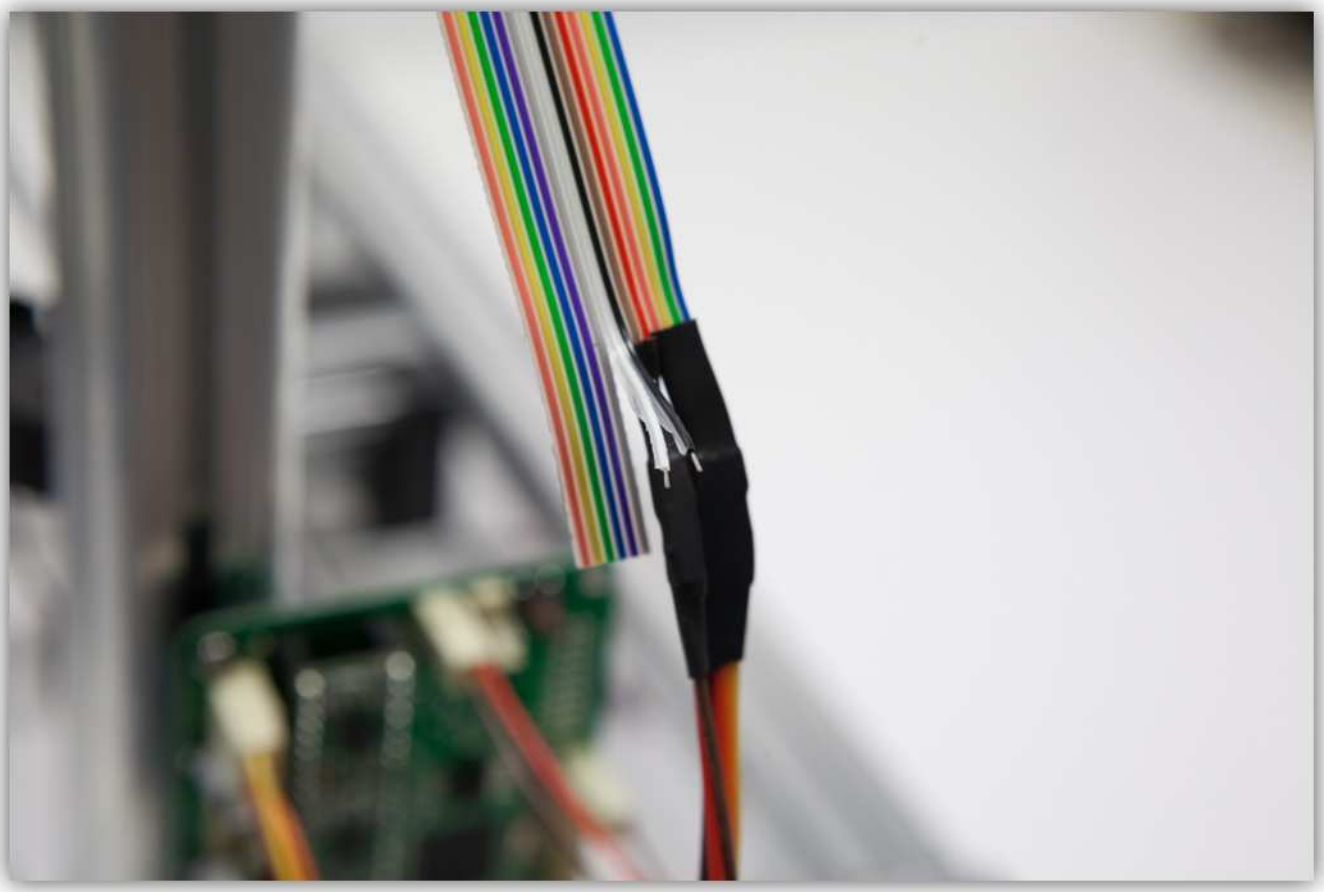
Plug the female connector in the male connector labelled with THERM1 on the controller board.

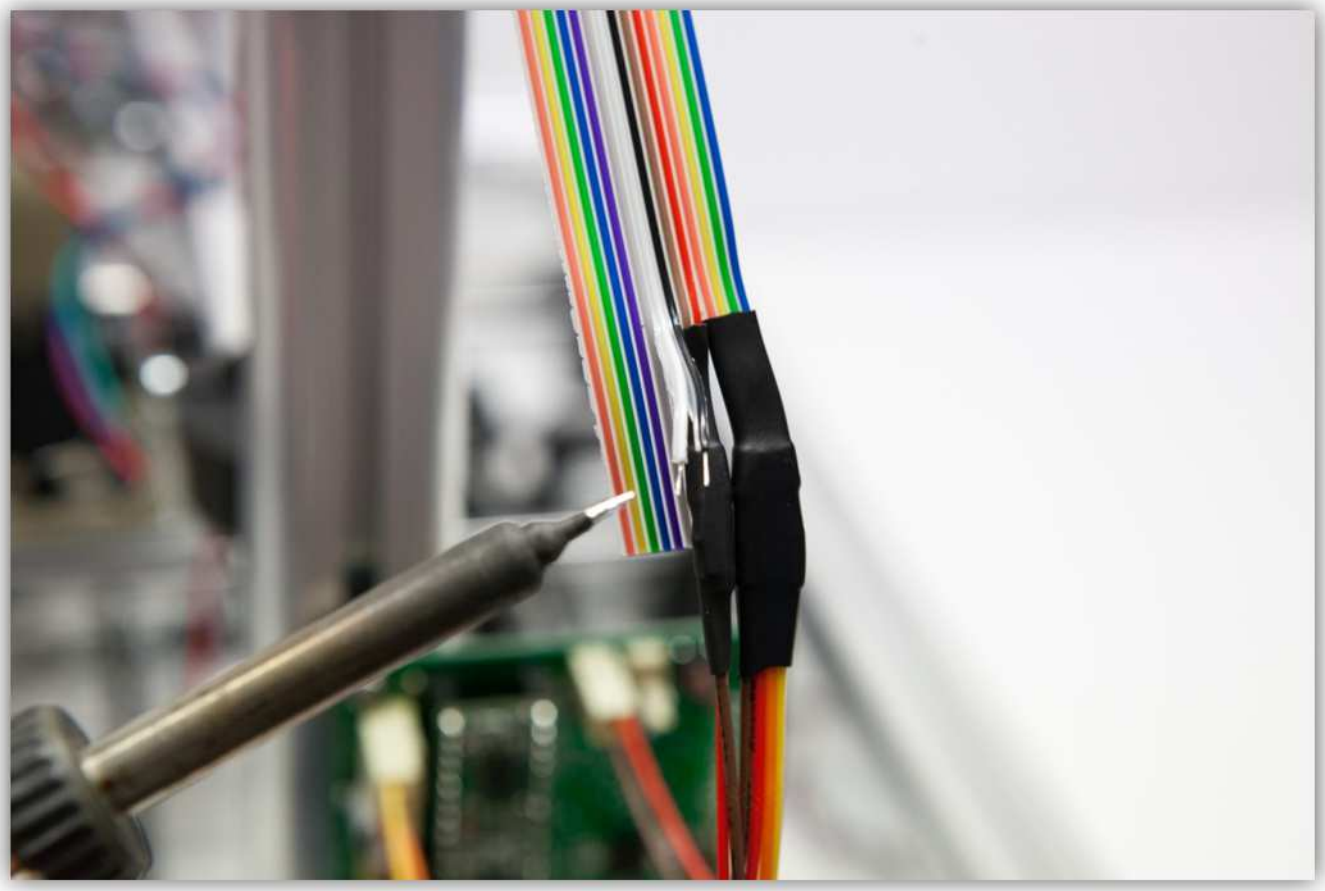


Detach (2 cm) (0.79") the **Black** and **White** wires from the flat cable as a group.



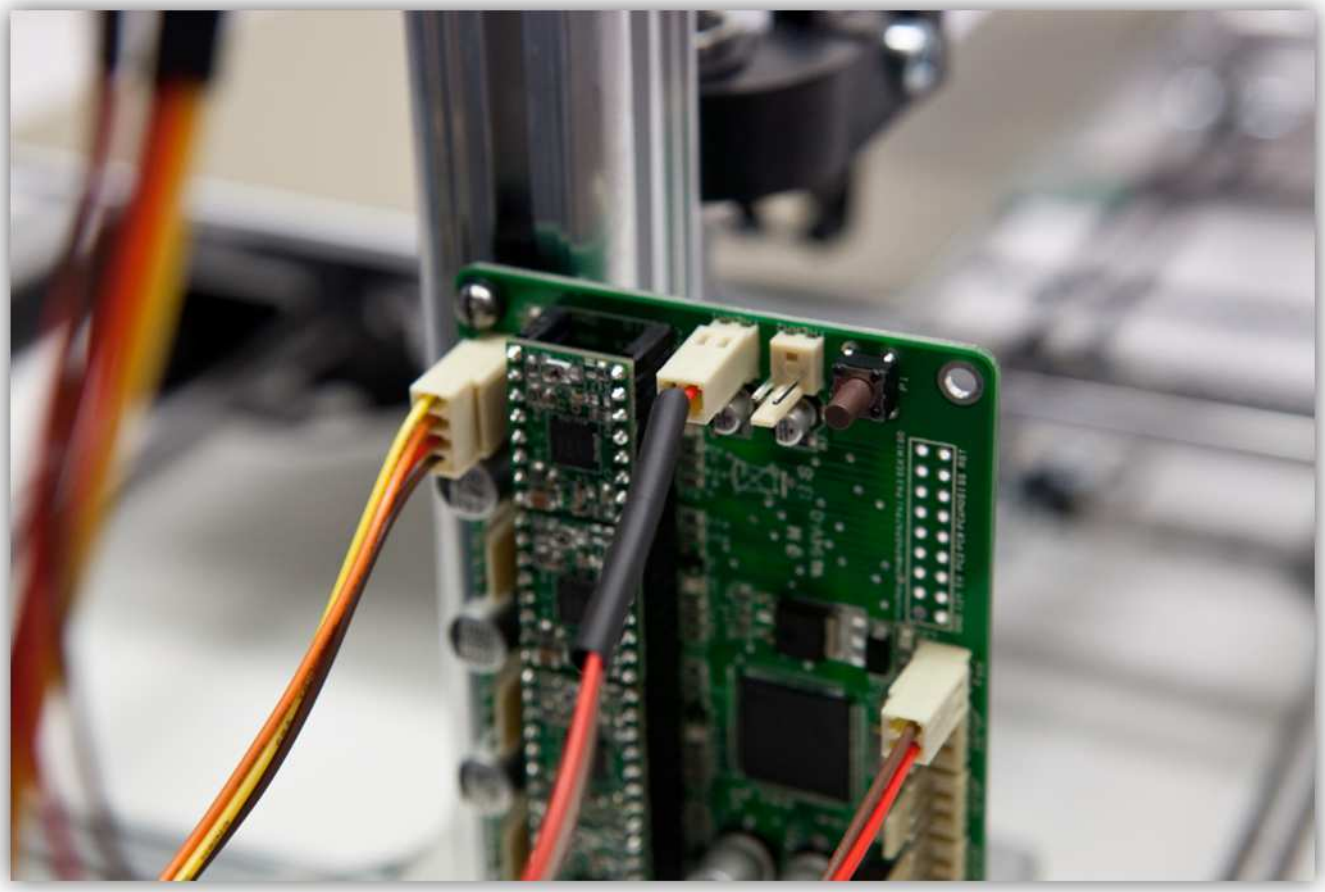
Strip the two wires (5 mm) (0.2") and tin them.



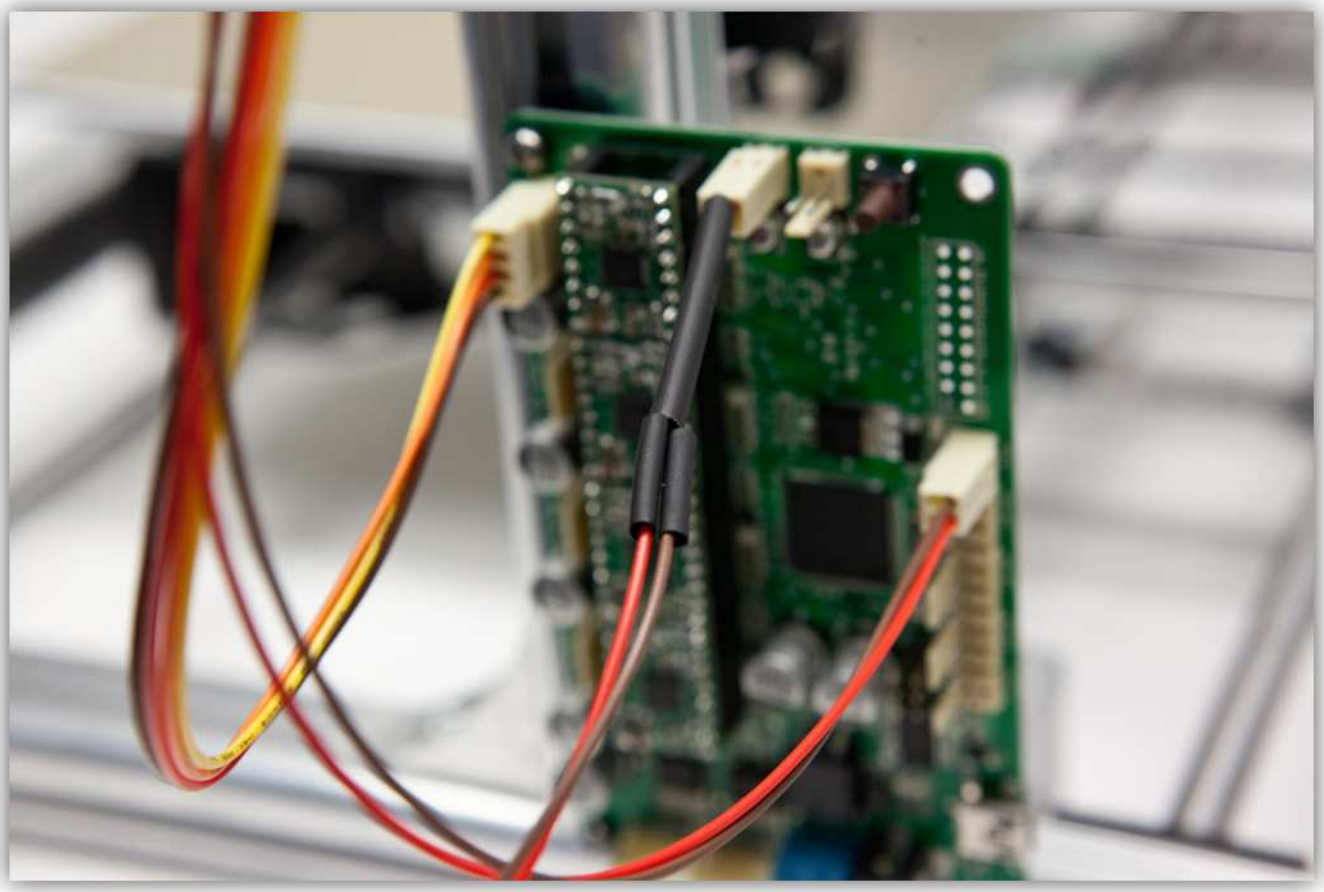


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the medium size heat shrink tubes over the 2 wires of the connector.



Slide the 2 small heat shrink tubes over the 2 wires of the connector.

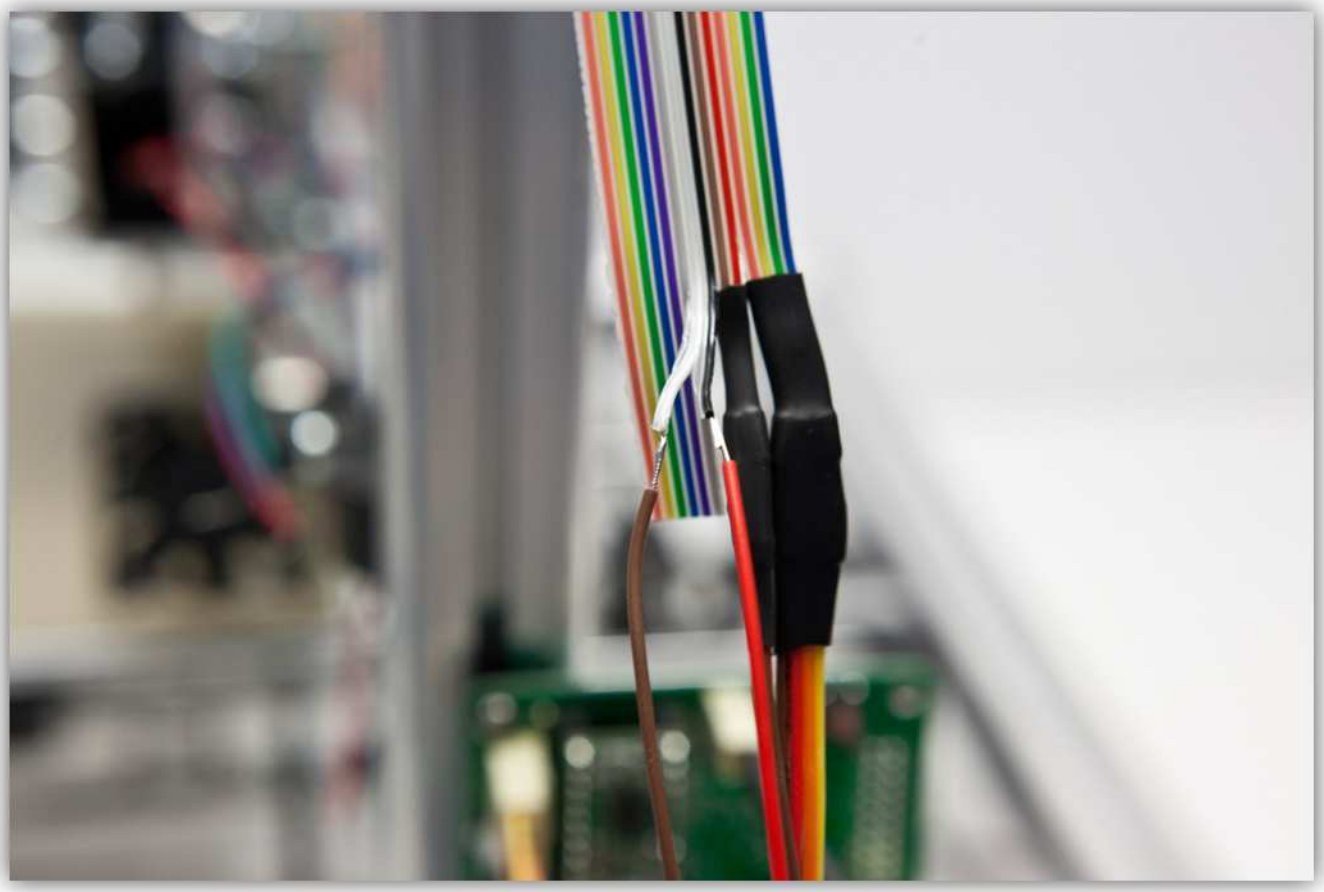


Solder the 2 wires from the connector to the 2 wires of the flat cable you tinned earlier. **Watch the colours closely.**

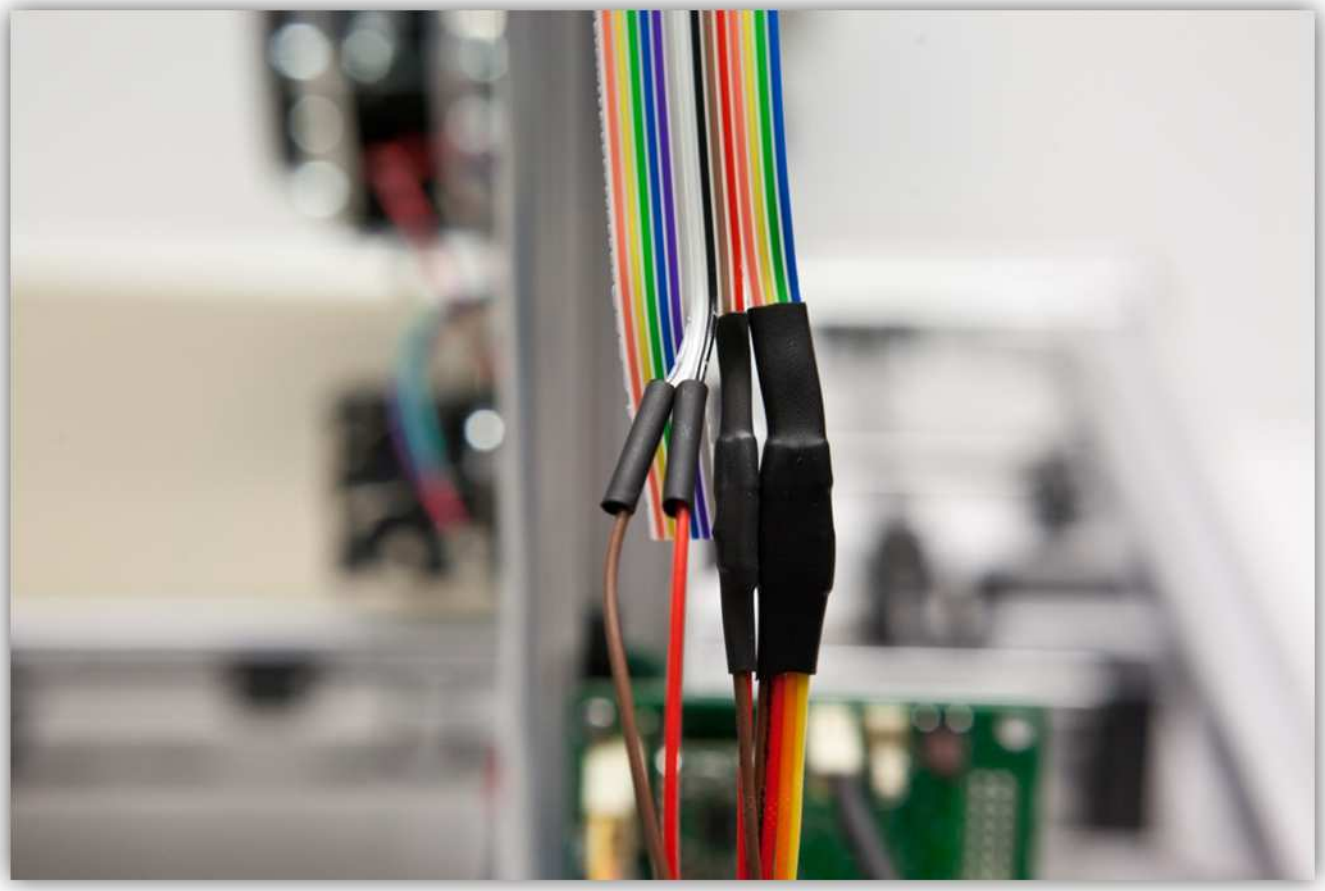
Flat cable -> Connector wires

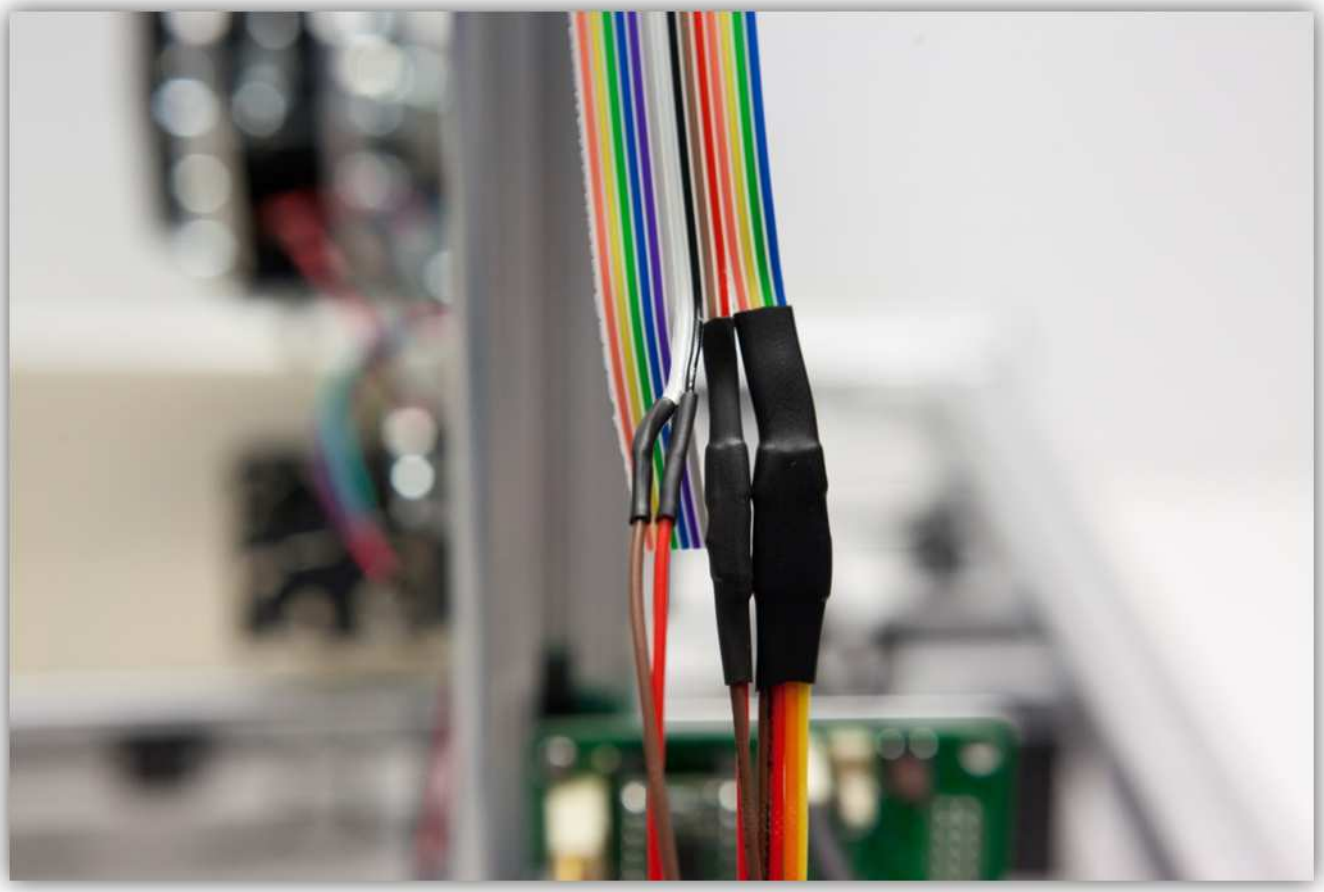
Black -> Red

White -> Brown

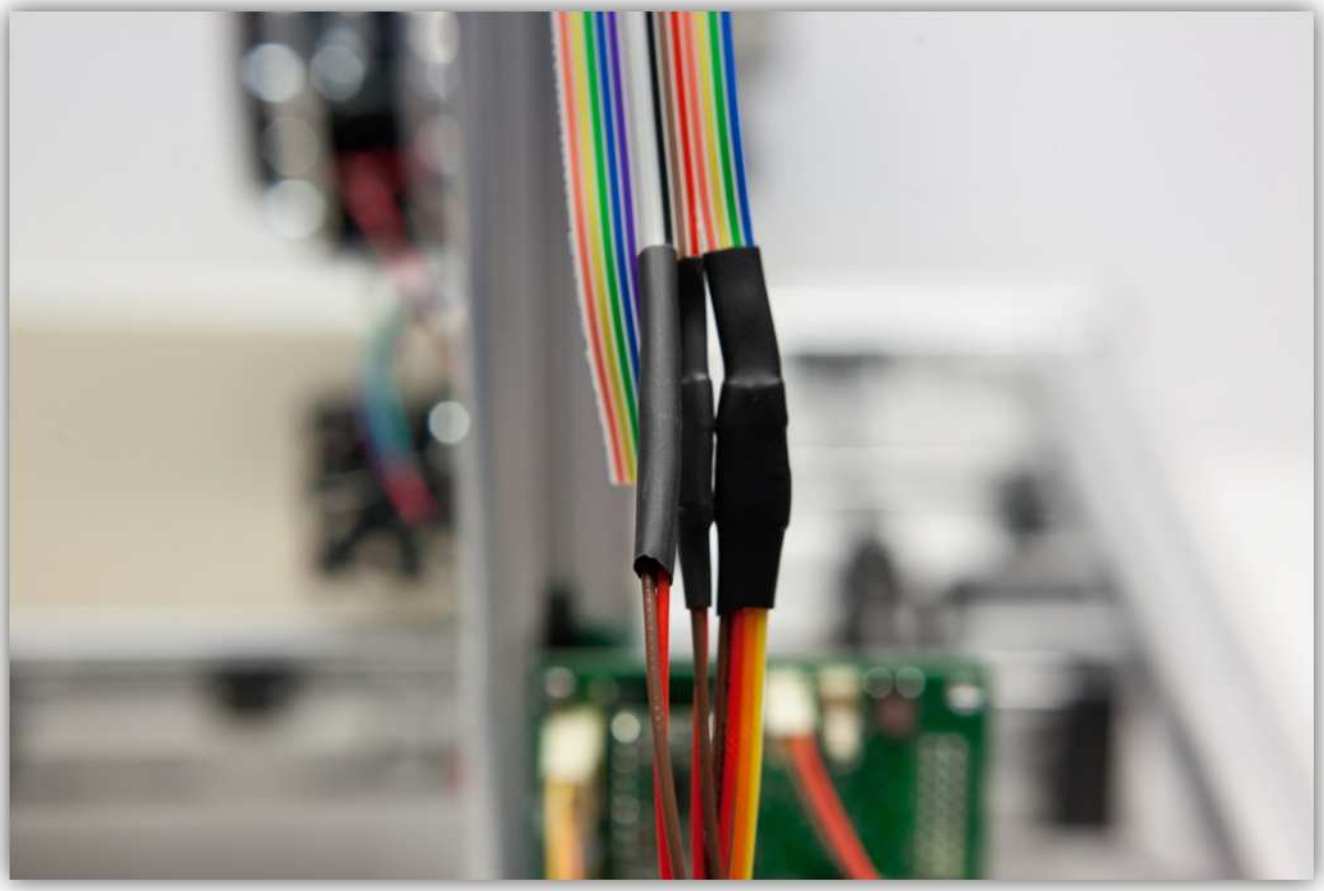


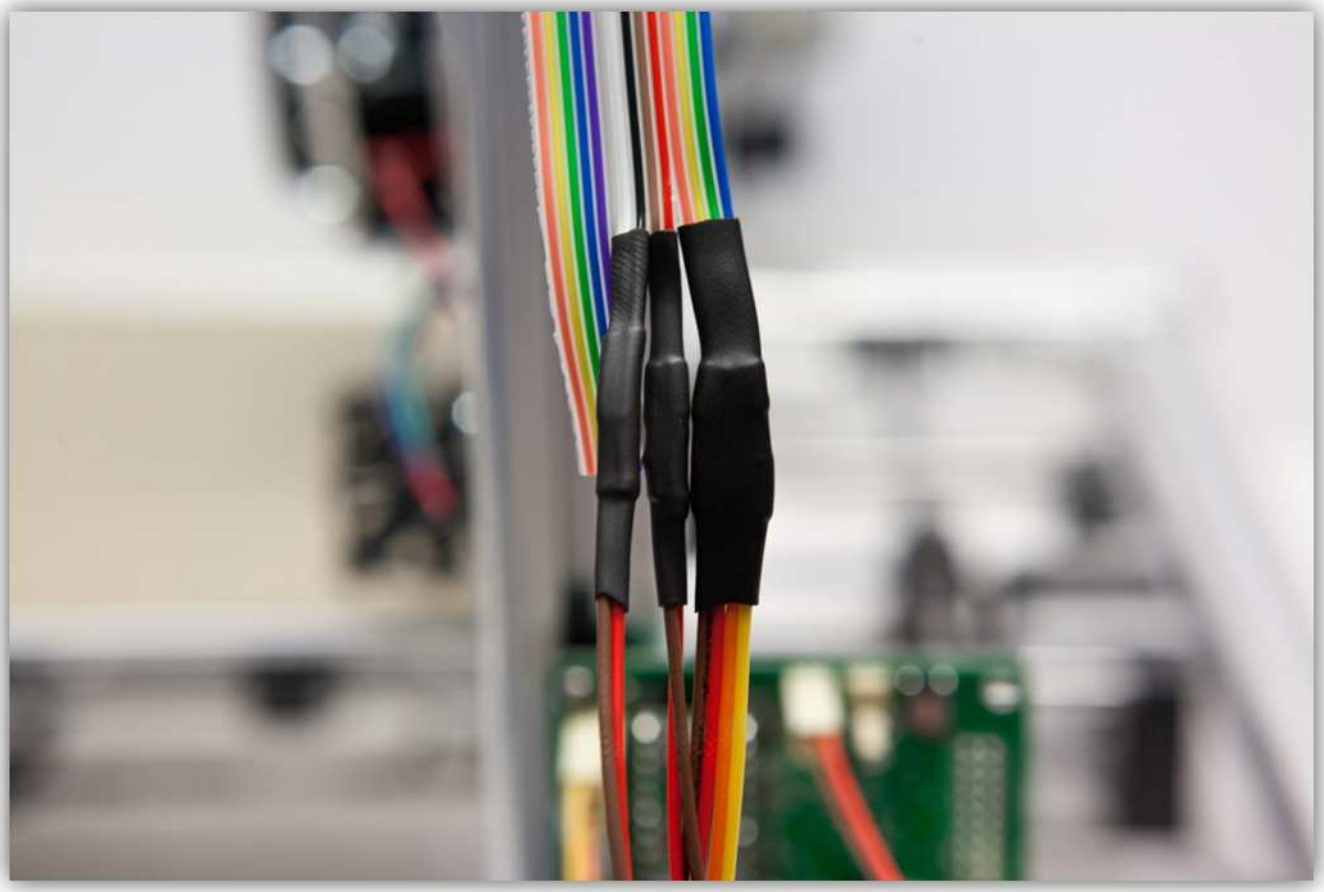
Slide the 2 small heat shrink tubes over the solder joints and heat them up.



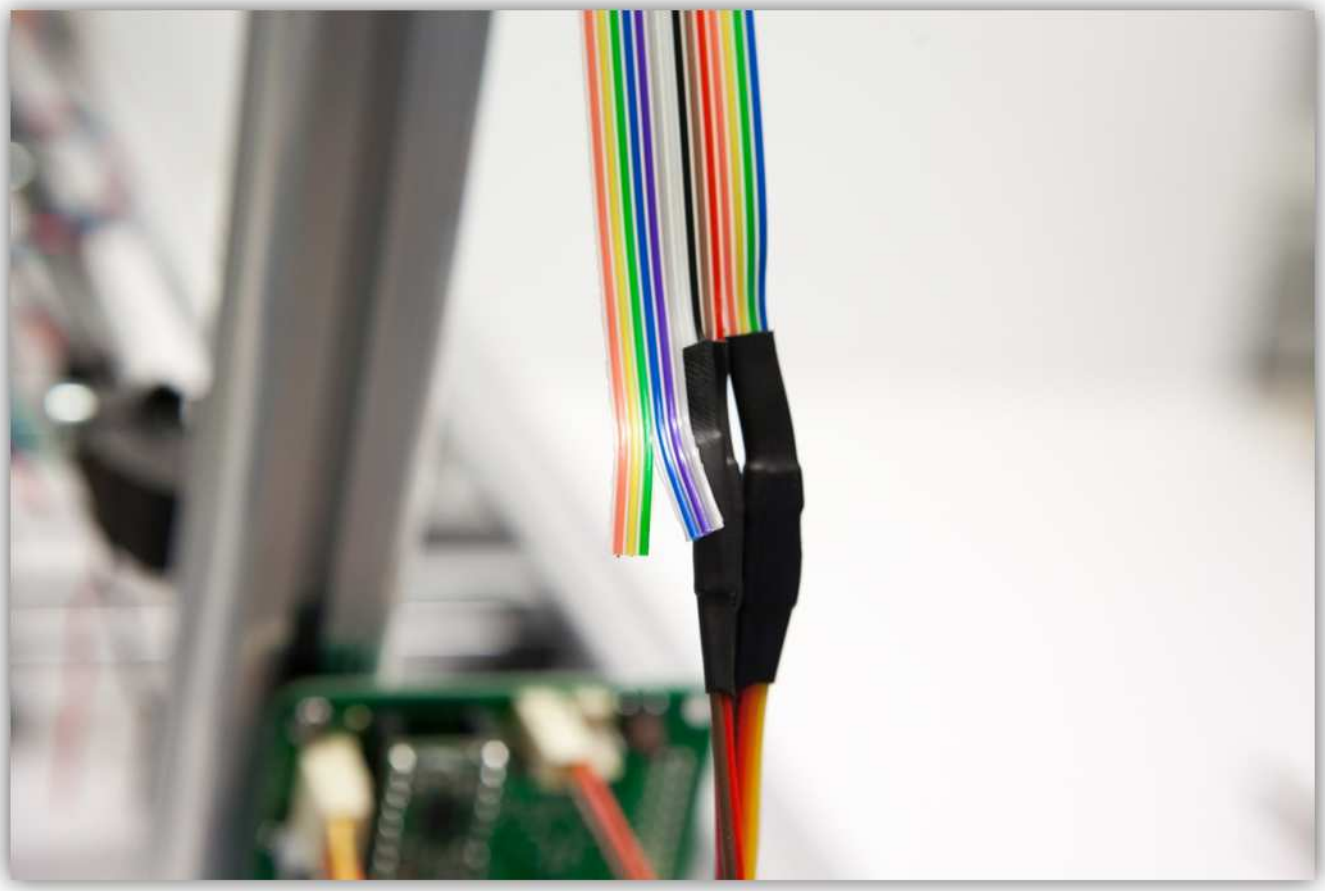


Now slide the medium size piece of heat shrink tubing over the 2 small pieces, heat the medium size piece so it covers and protects the 2 heat shrunk joints.

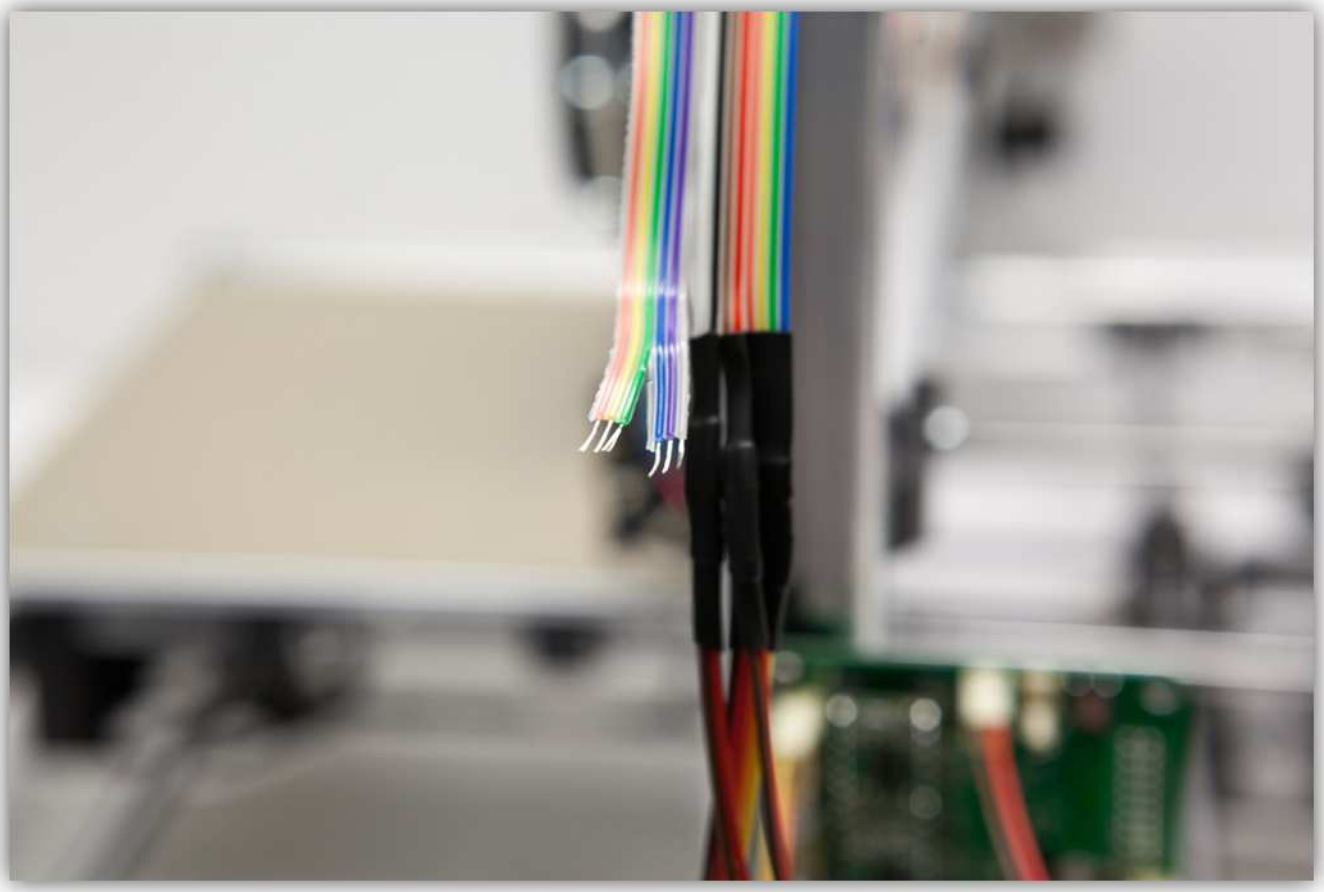


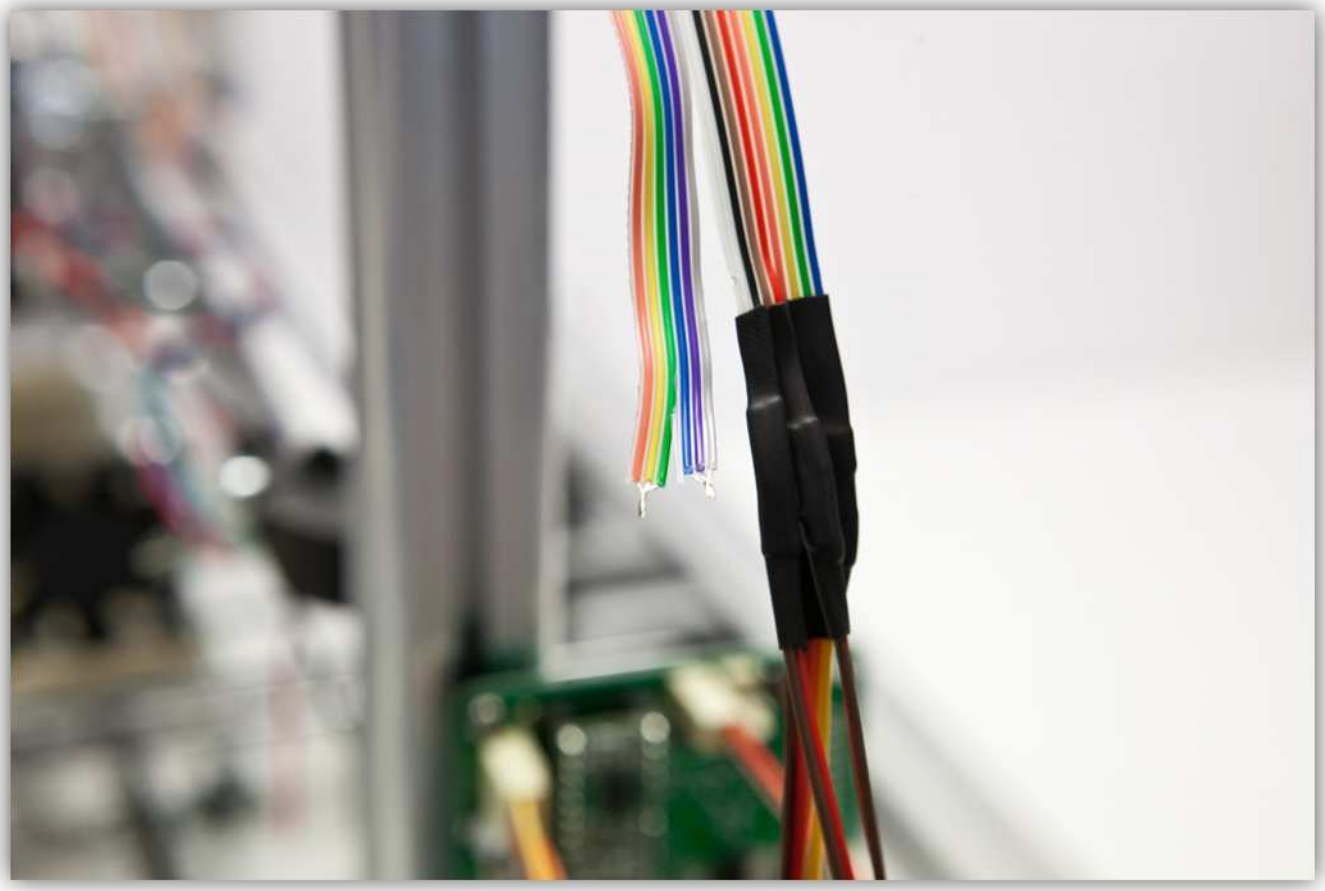


Next detach 2 cm (0.79") the **Orange, Yellow, Green,** and **Blue, Violet, Grey** as groups.

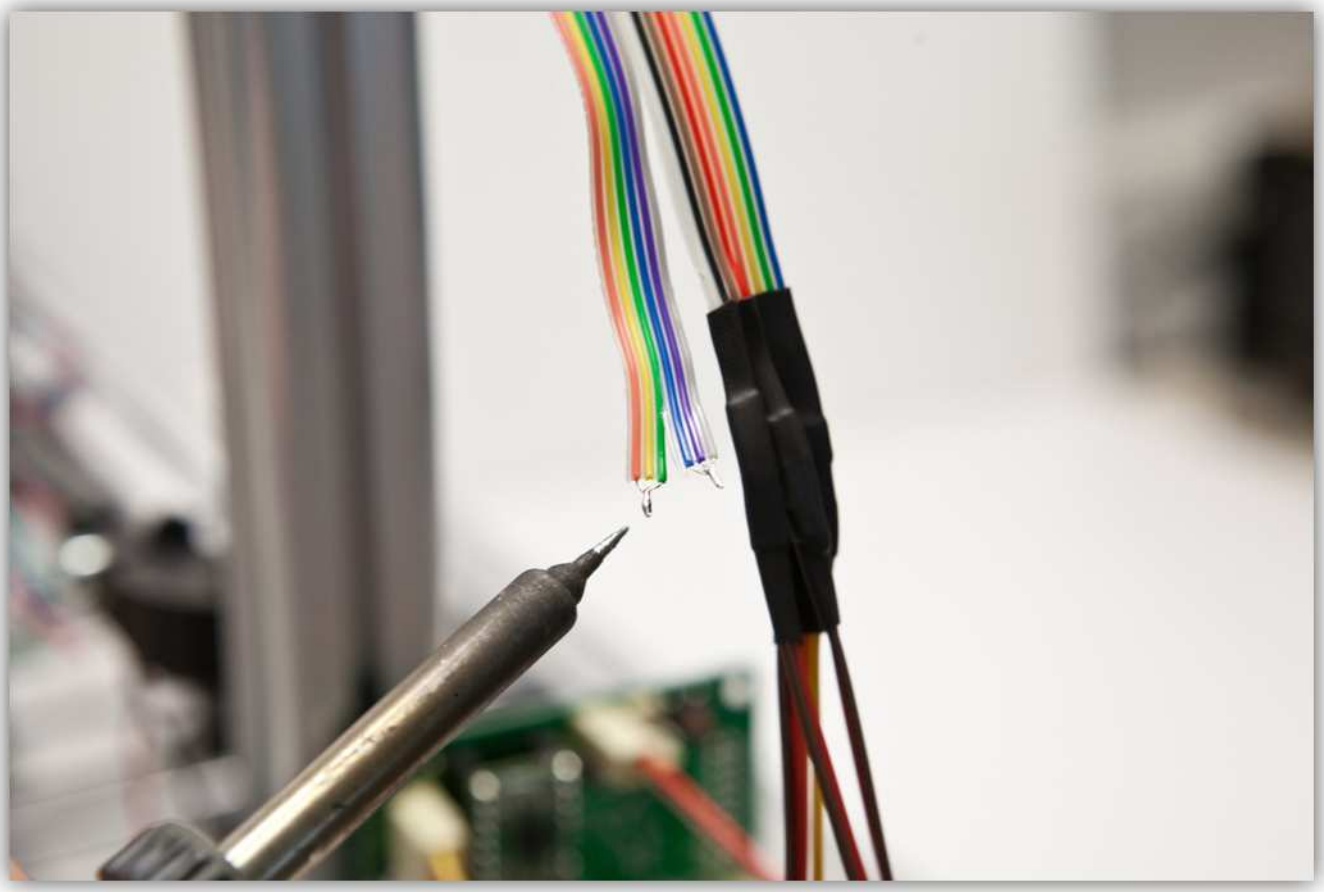


Strip the wires (5 mm) (0.2") and twist them together per group.



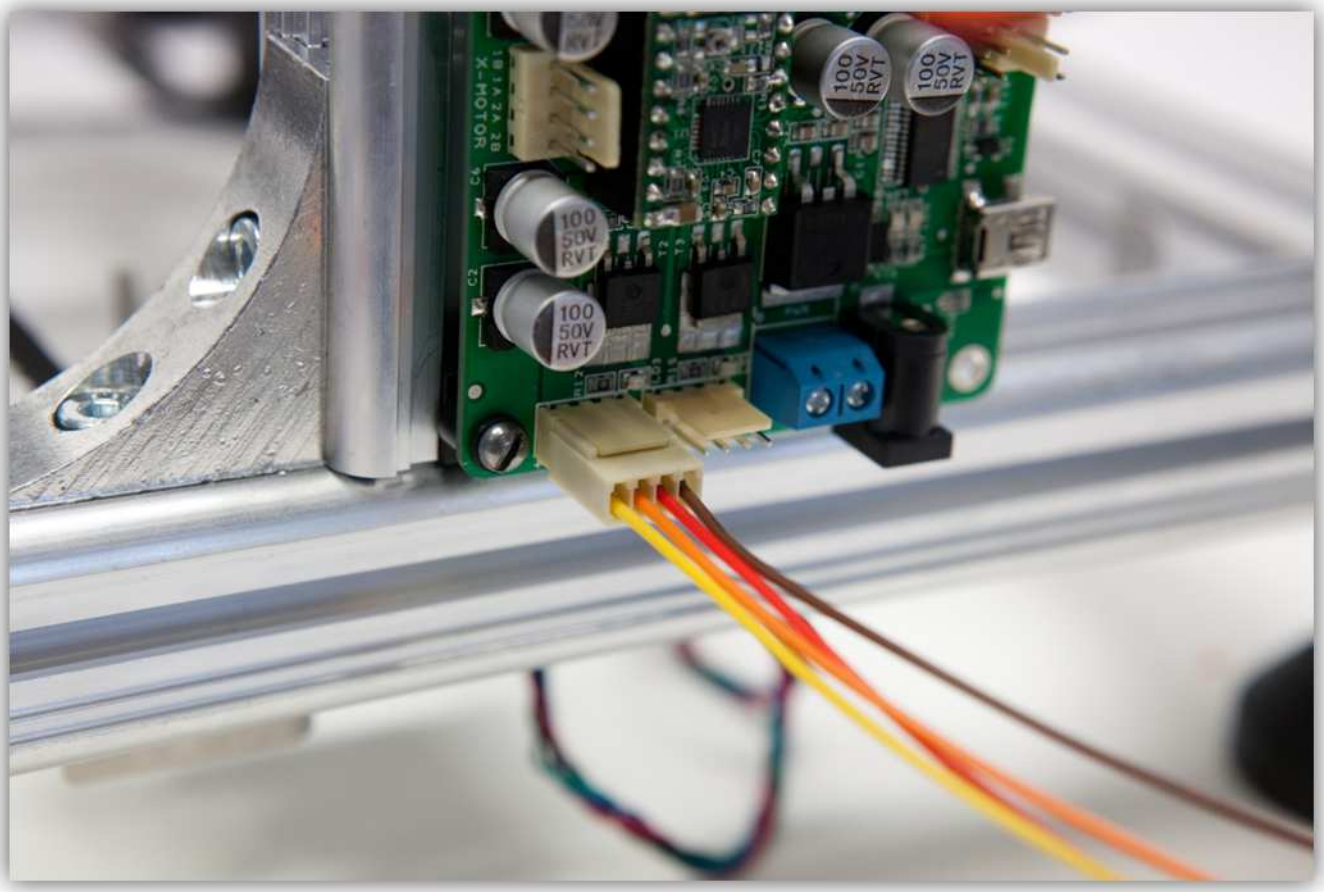


Tin the wires together per group.



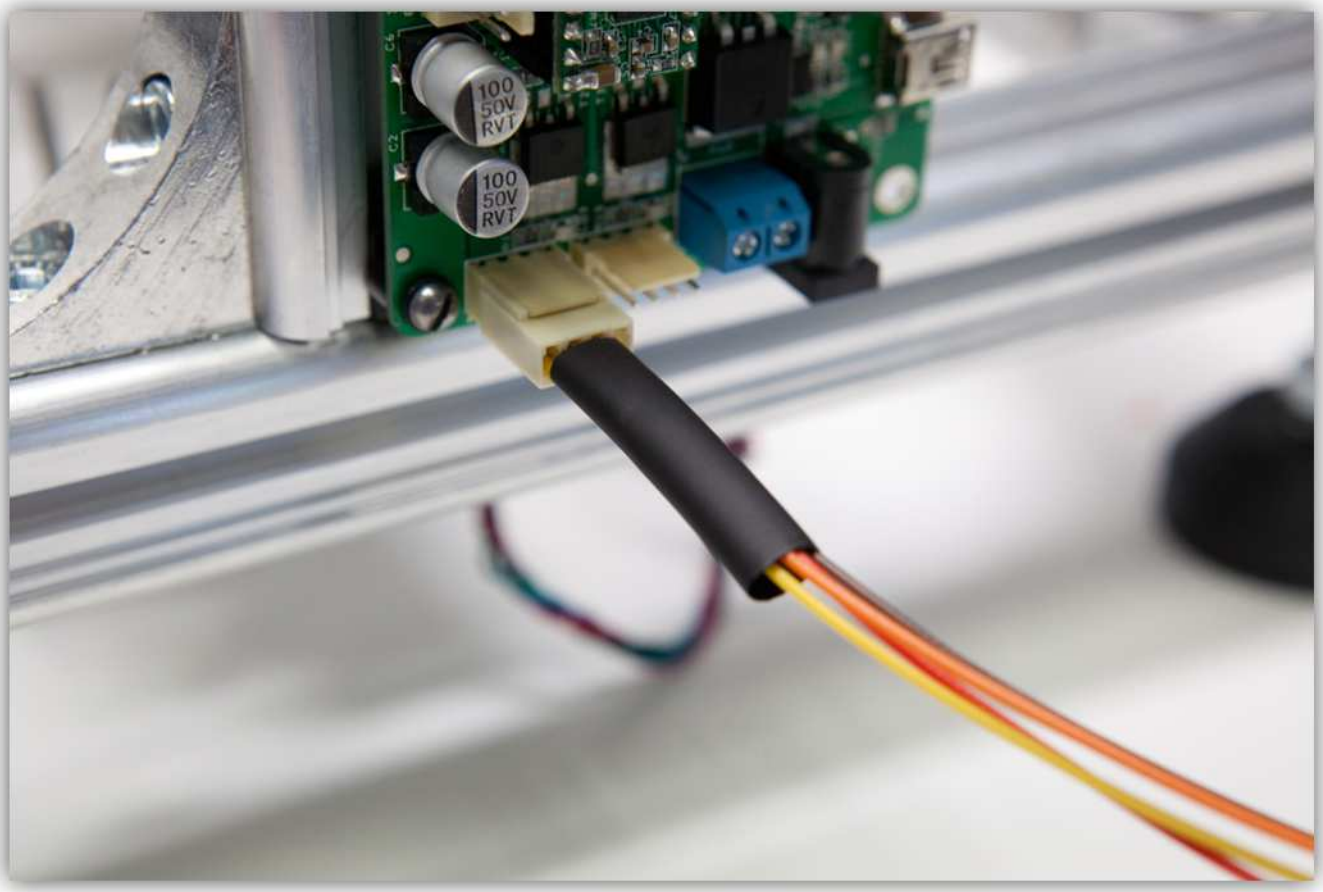
Take a board to wire connector with 4 wires out of the bag labelled with 40.

Plug the female connector in the male connector labelled with HEATER1 on the controller board.

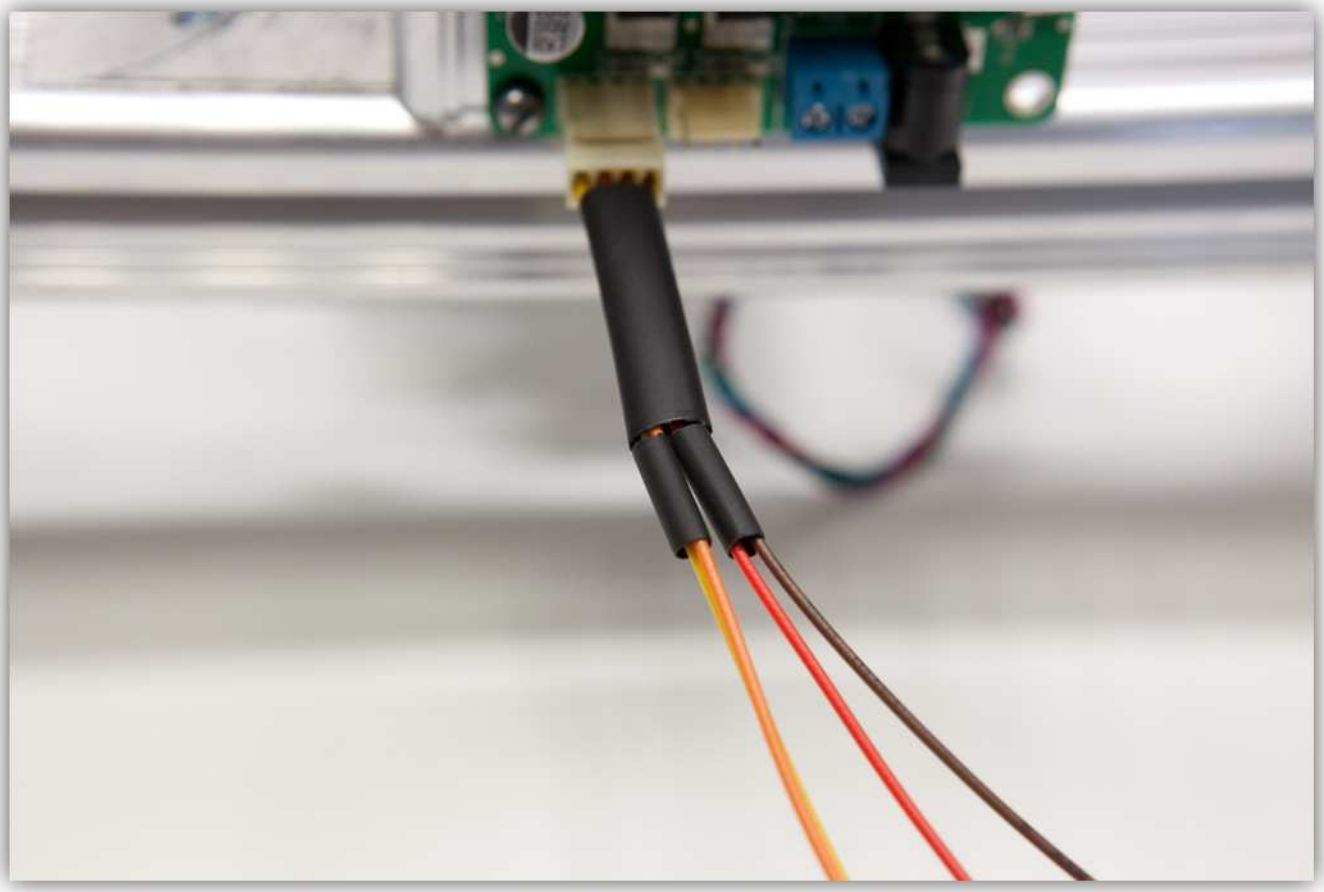


Cut 2 small pieces of the medium size heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

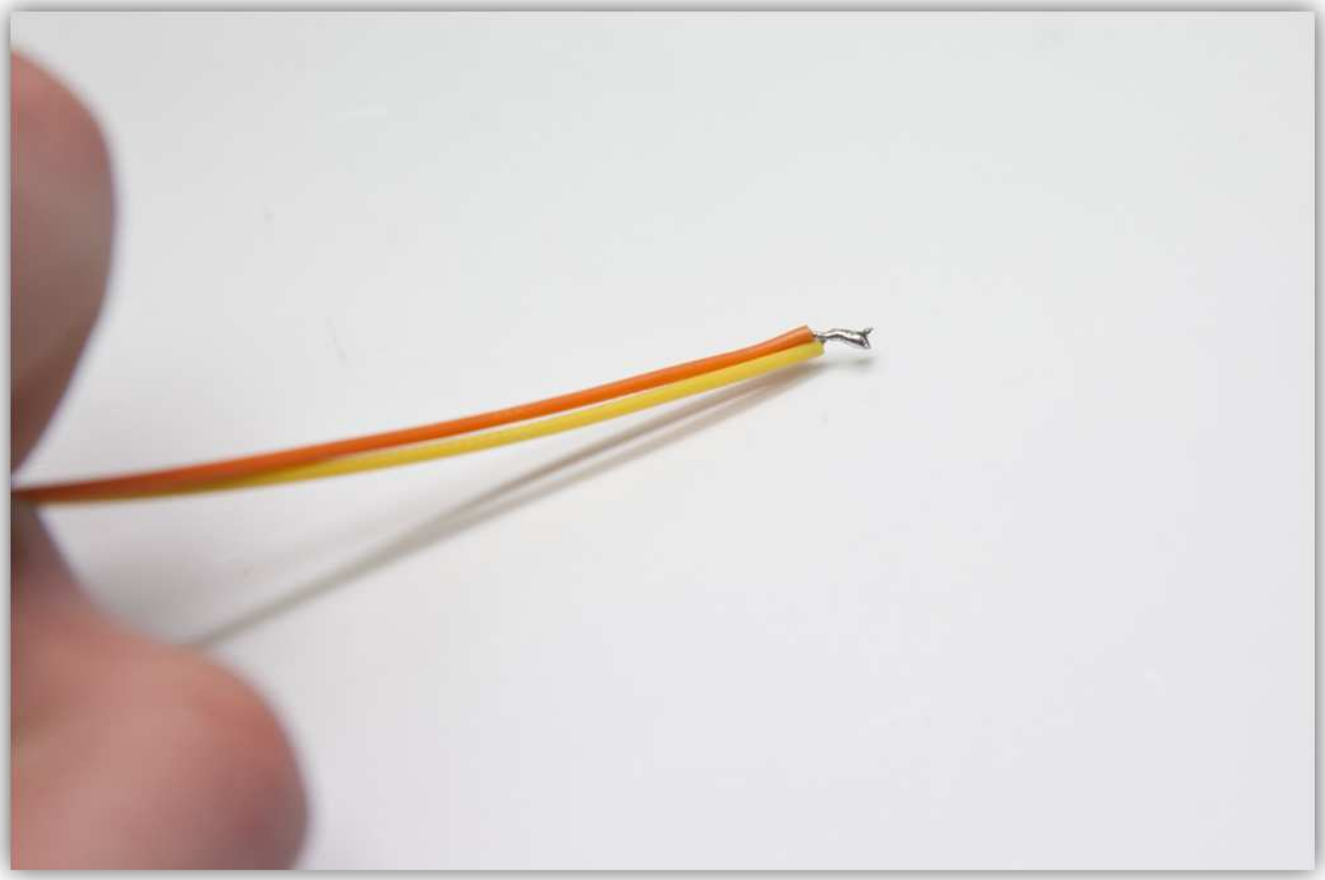
Slide the big heat shrink tubes over the 4 wires of the connector.



Slide 1 medium size heat shrink tubes over the **Yellow** and **Orange** wire and 1 medium size heat shrink tube over the **Red** and **Brown** wire.



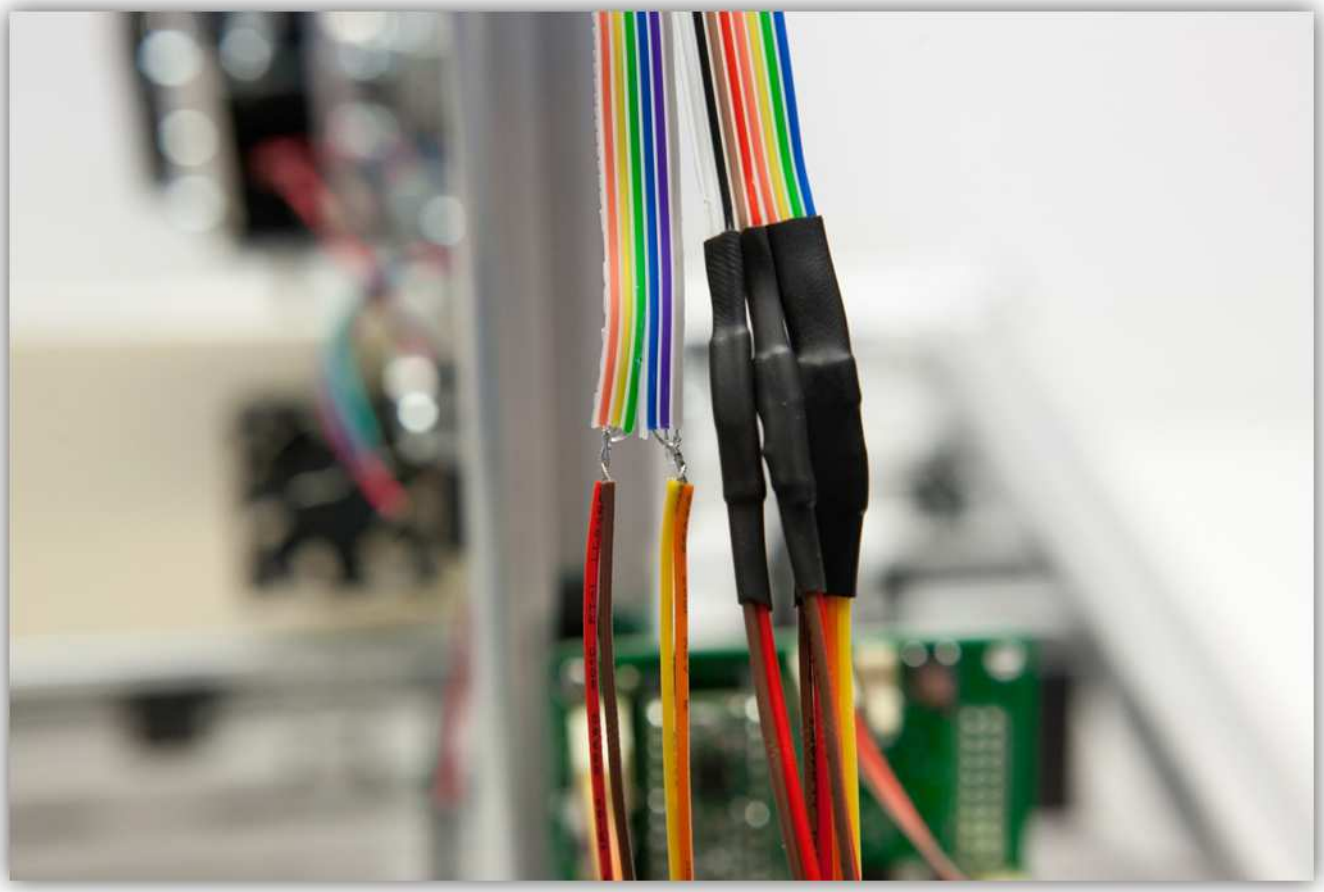
Next twist and tin the ends of the **Yellow** and **Orange** wires together.



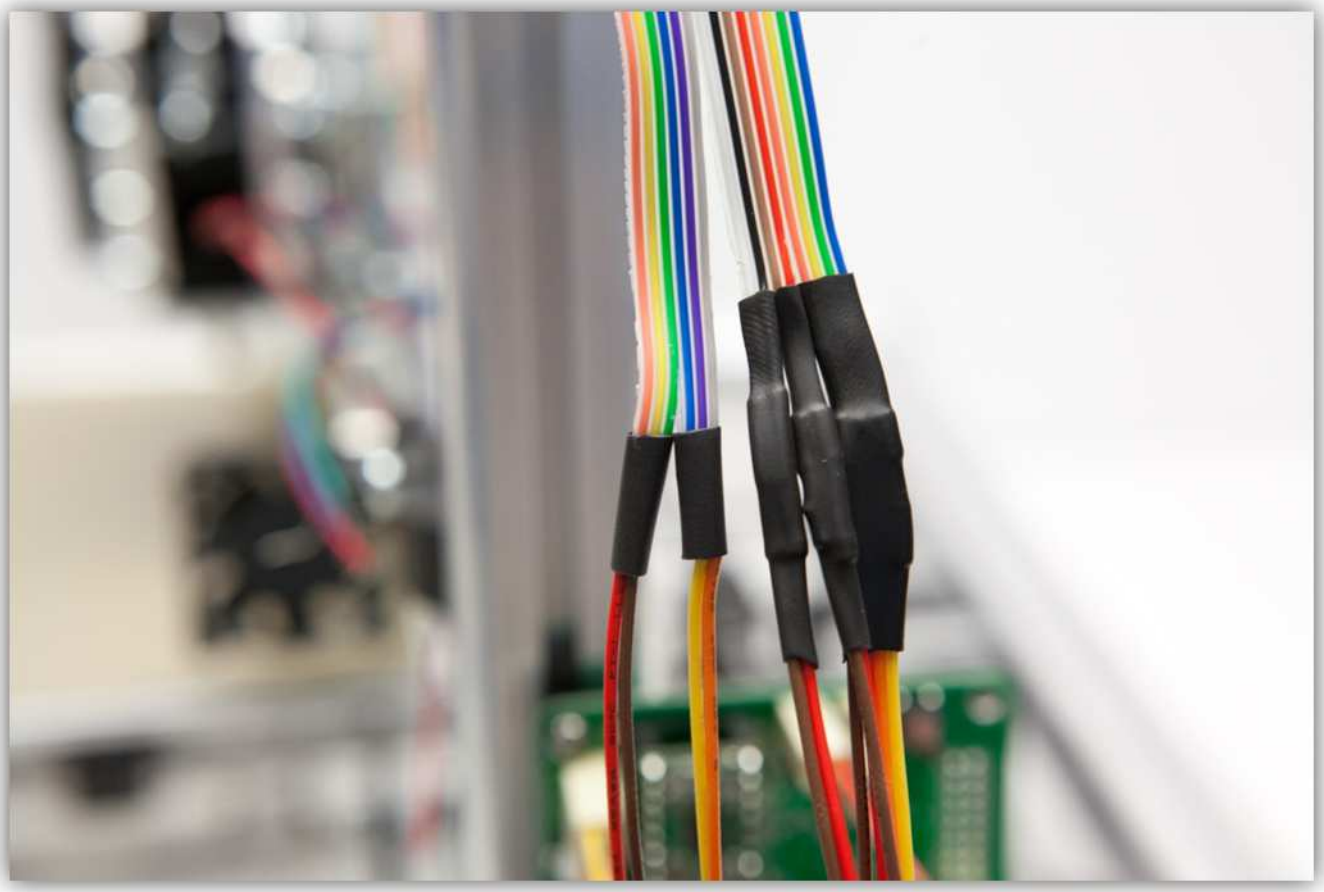
Also twist and tin the ends of the **Red** and **Brown** wires together.

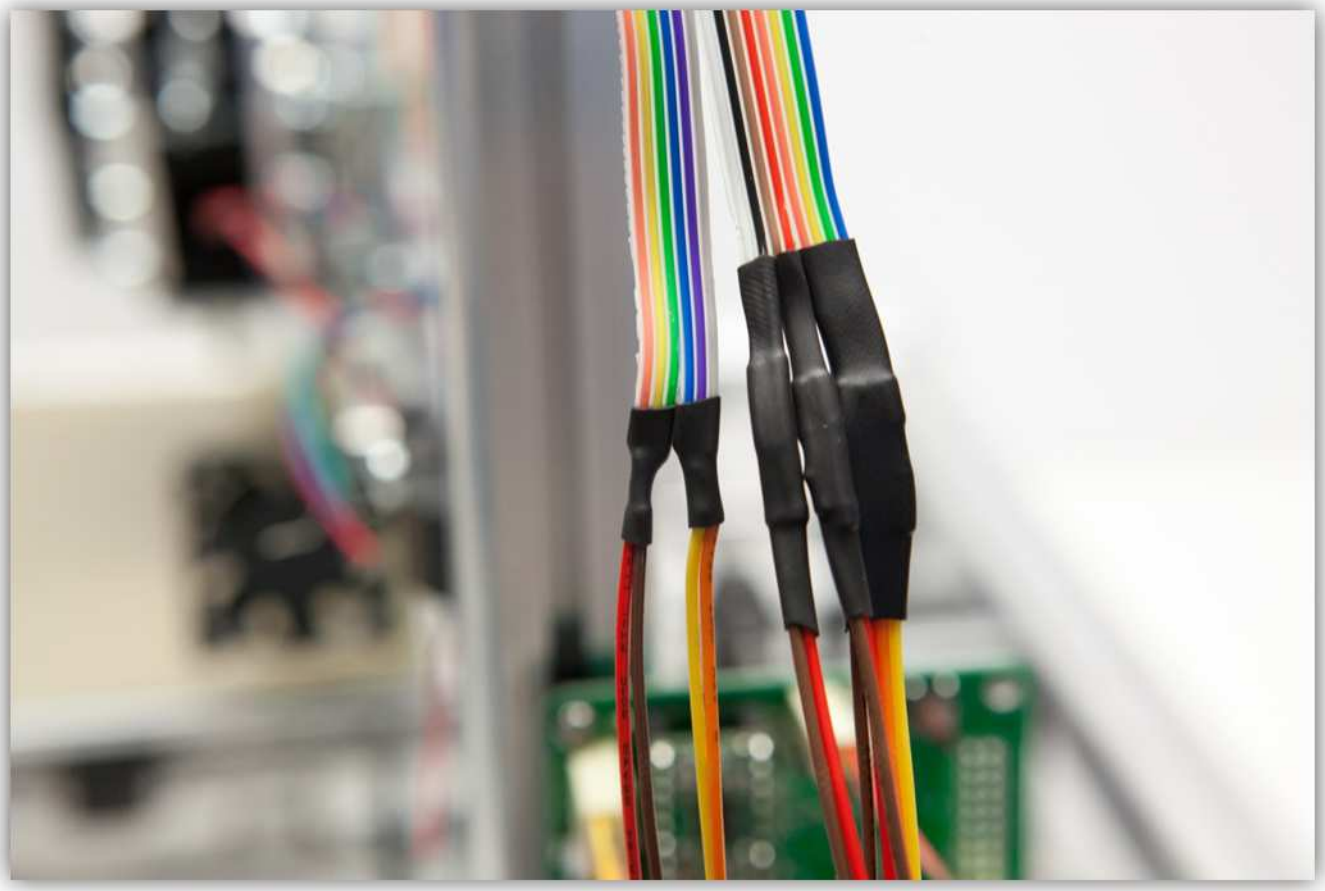
Solder the 6 wires from the connector to the 4 wires of the flat cable you tinned earlier. **Watch the colours closely and respect the groups.**

Flat cable	**->**	**Connector wires**
Orange, Yellow, Green	**->**	**Red** and **Brown**
Blue, Violet, Grey	**->**	**Yellow** and **Orange**

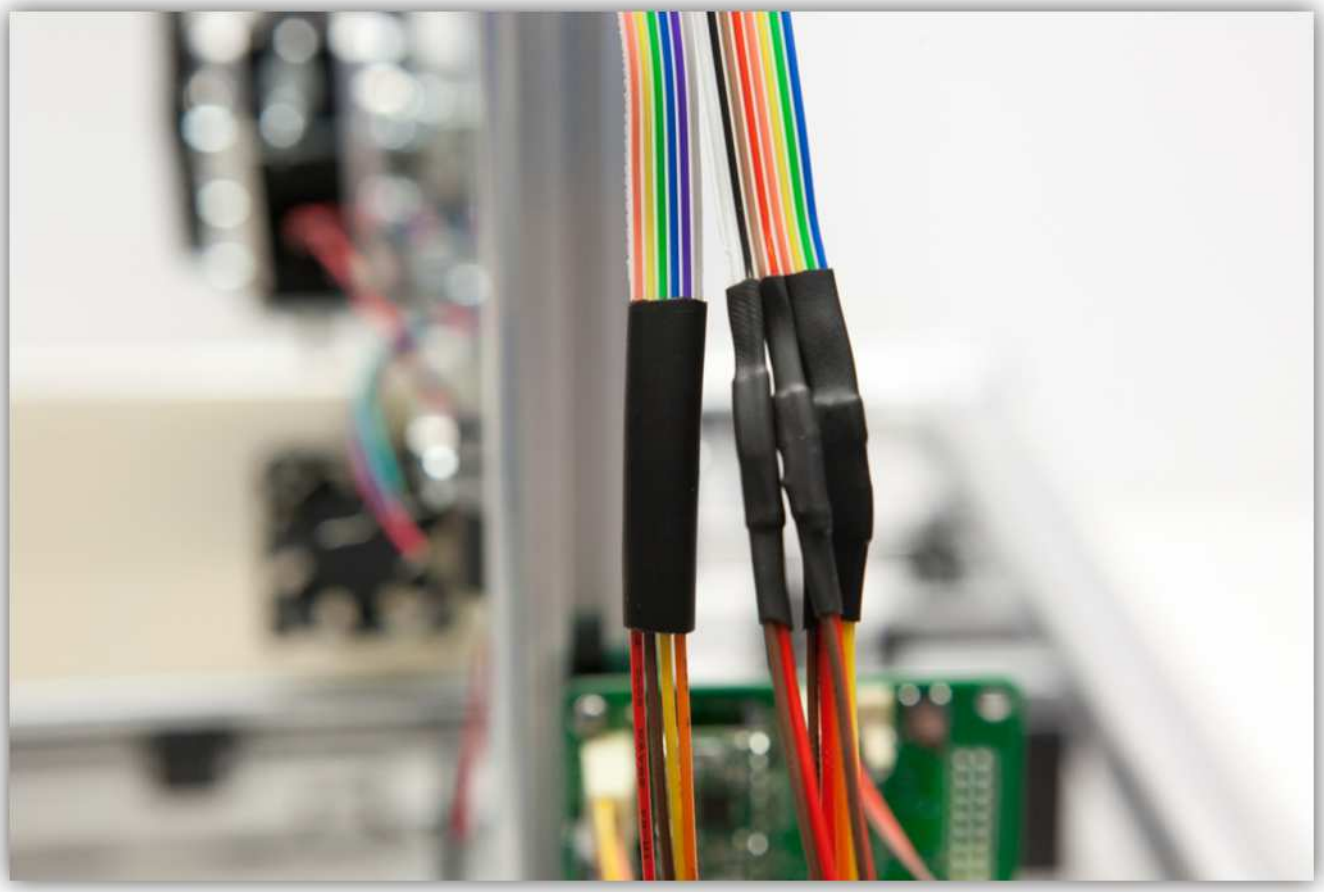


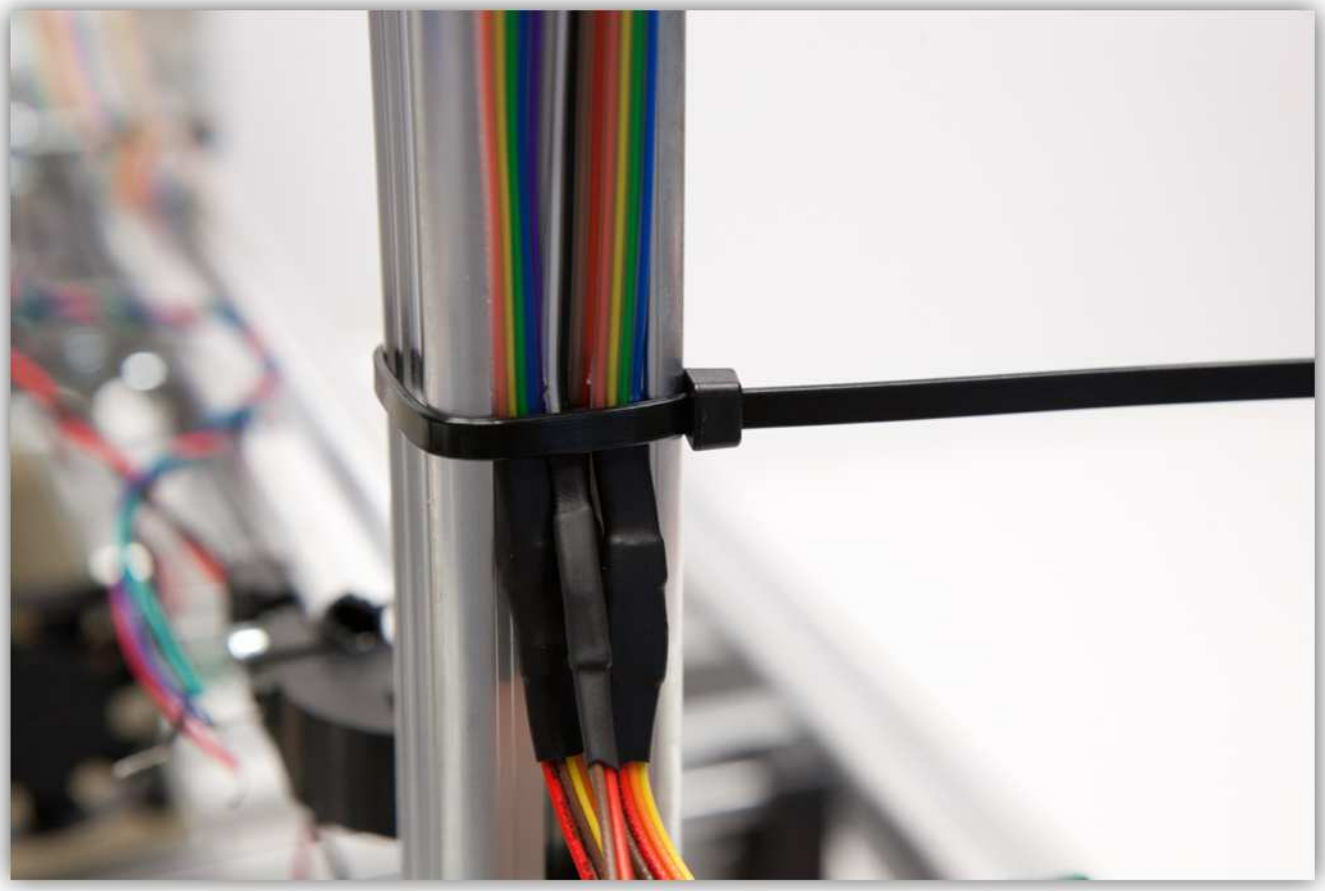
Slide the medium size heat shrink tubes over the solder joints and heat them up so they shrink.

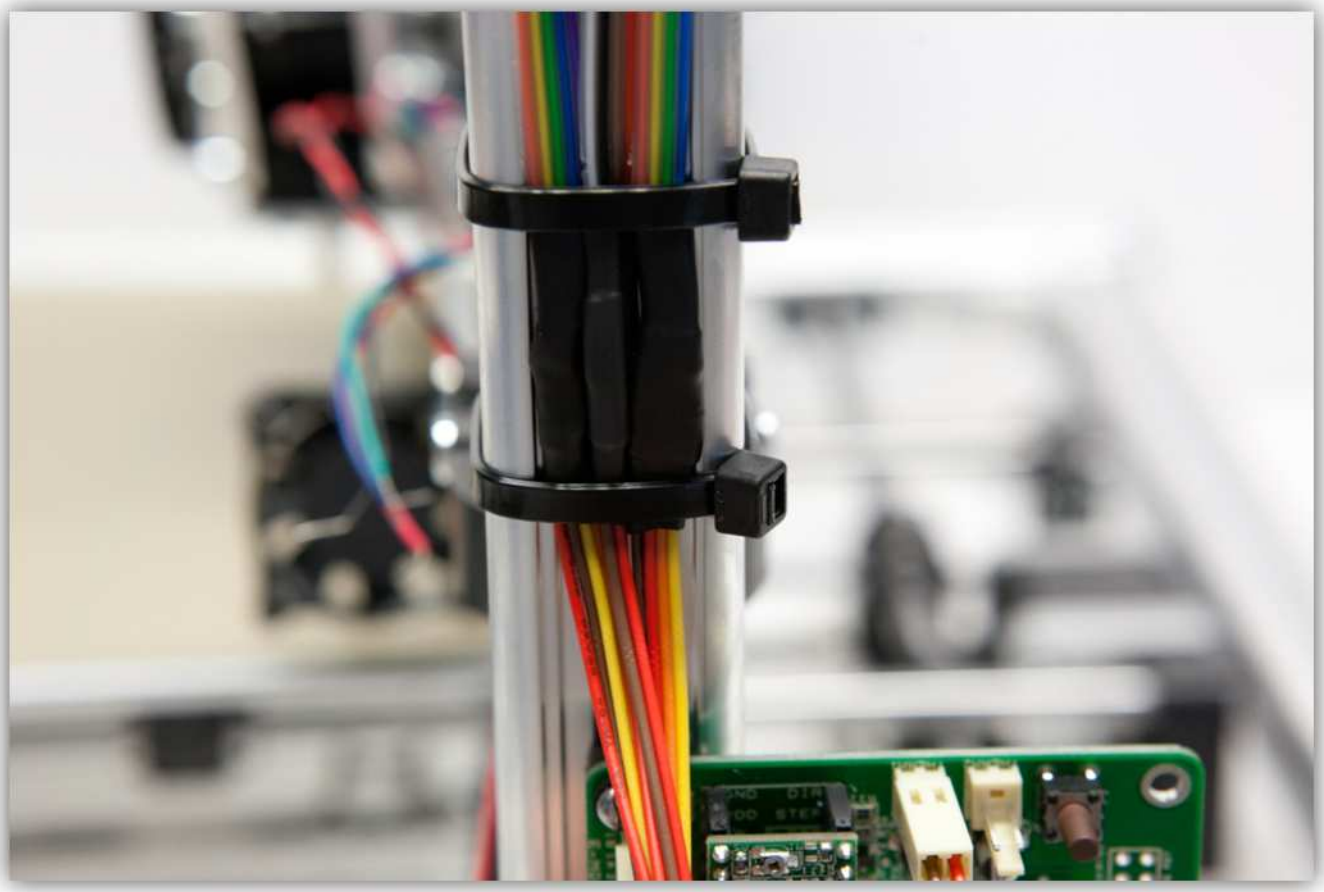




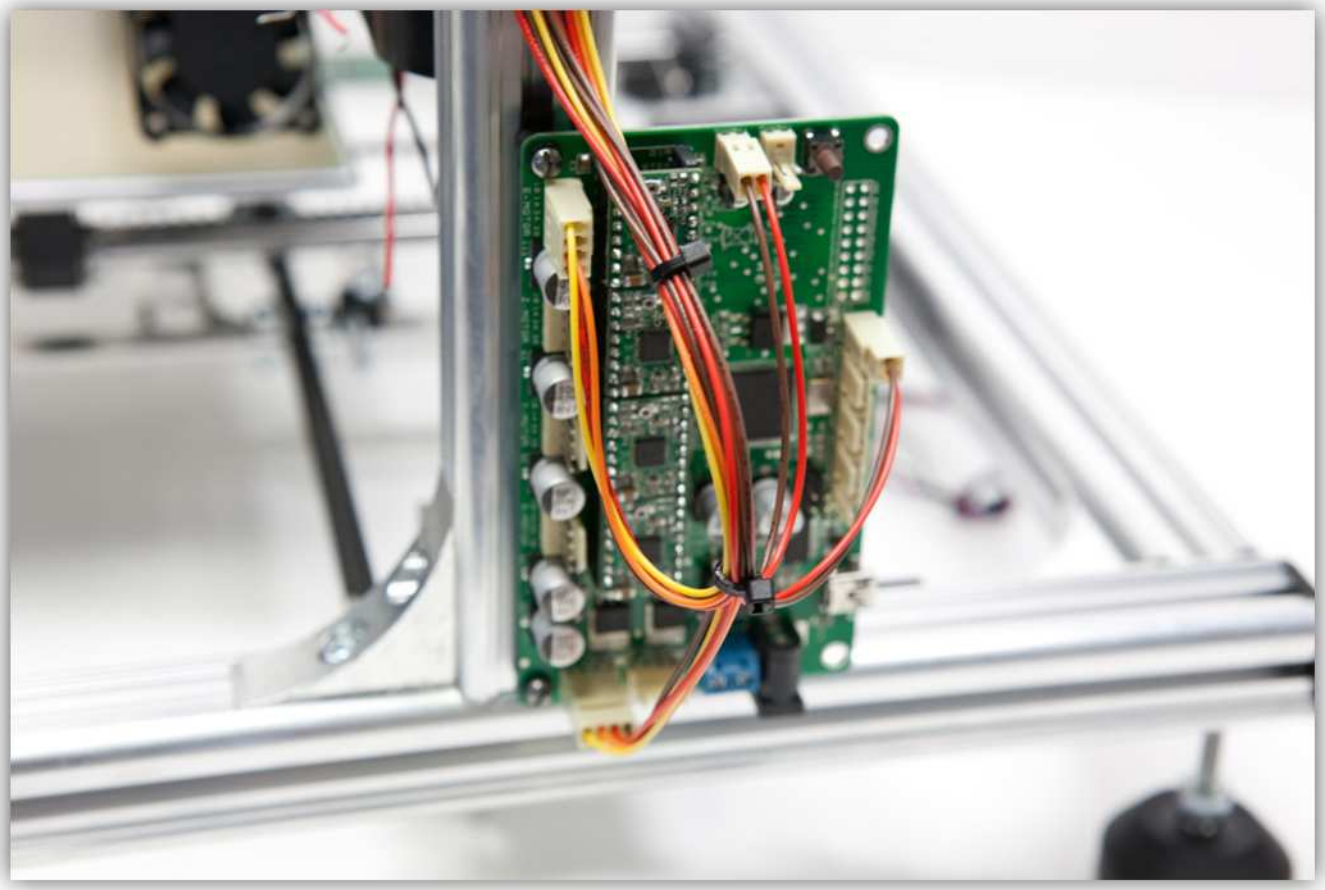
Now slide the big piece of heat shrink tubing over the 2 medium size pieces, heat the big piece so it covers and protects the 2 heat shrunk joints. Secure all the joints with 2 large tie-strips to the profile.



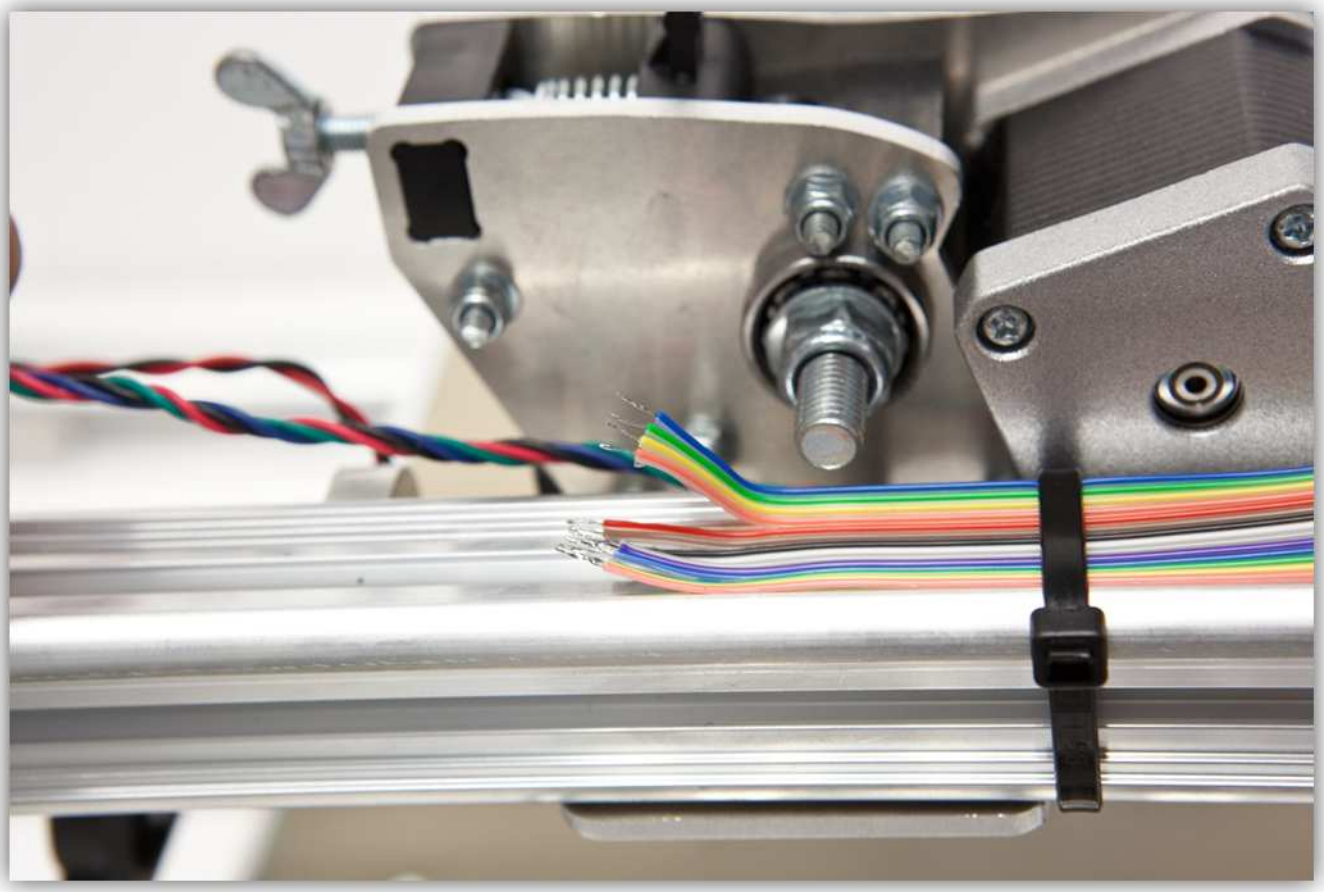




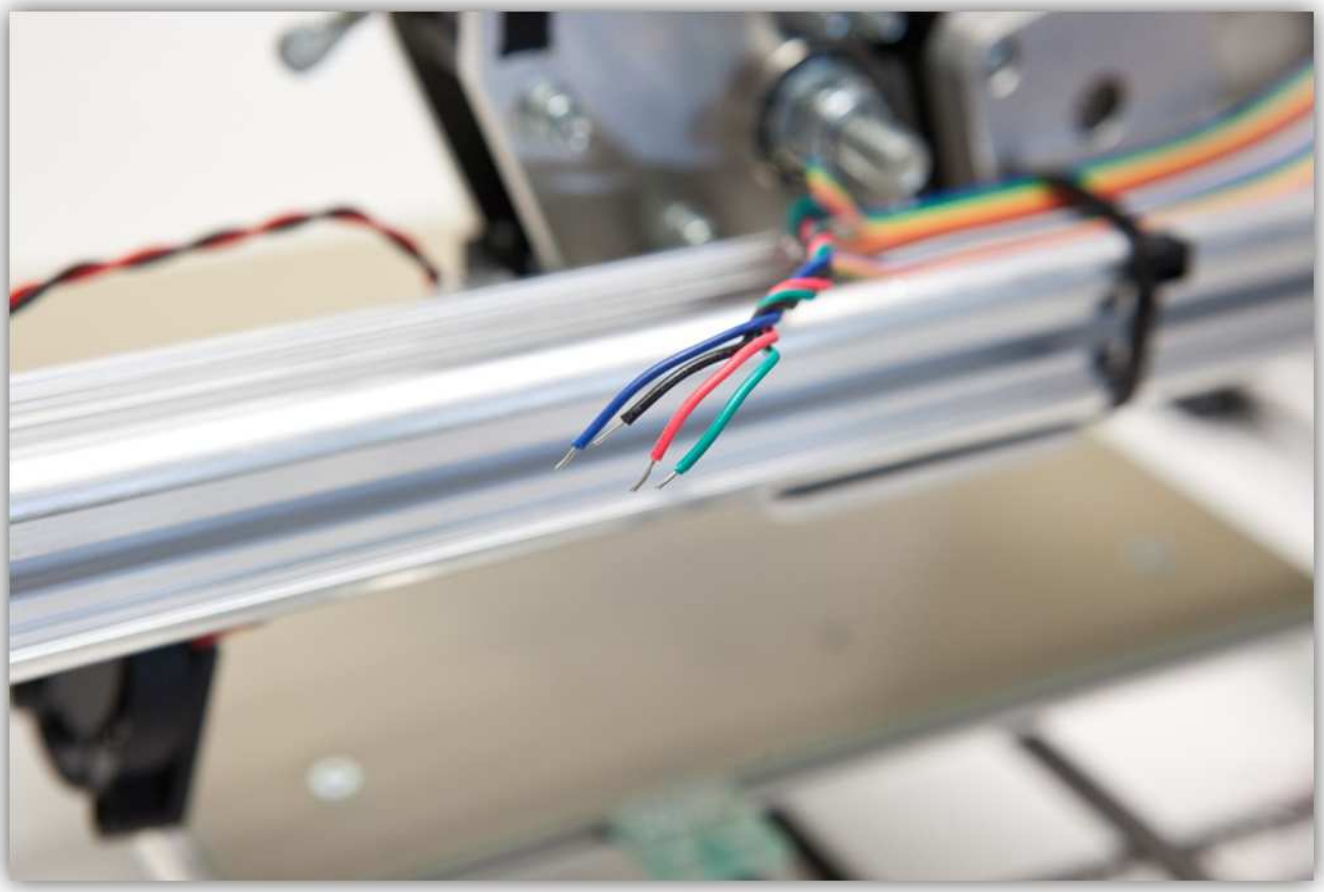
Use some small tie-strips (bag 40) to group the wires together.



Turn you attention to the other end of the flat cable again.

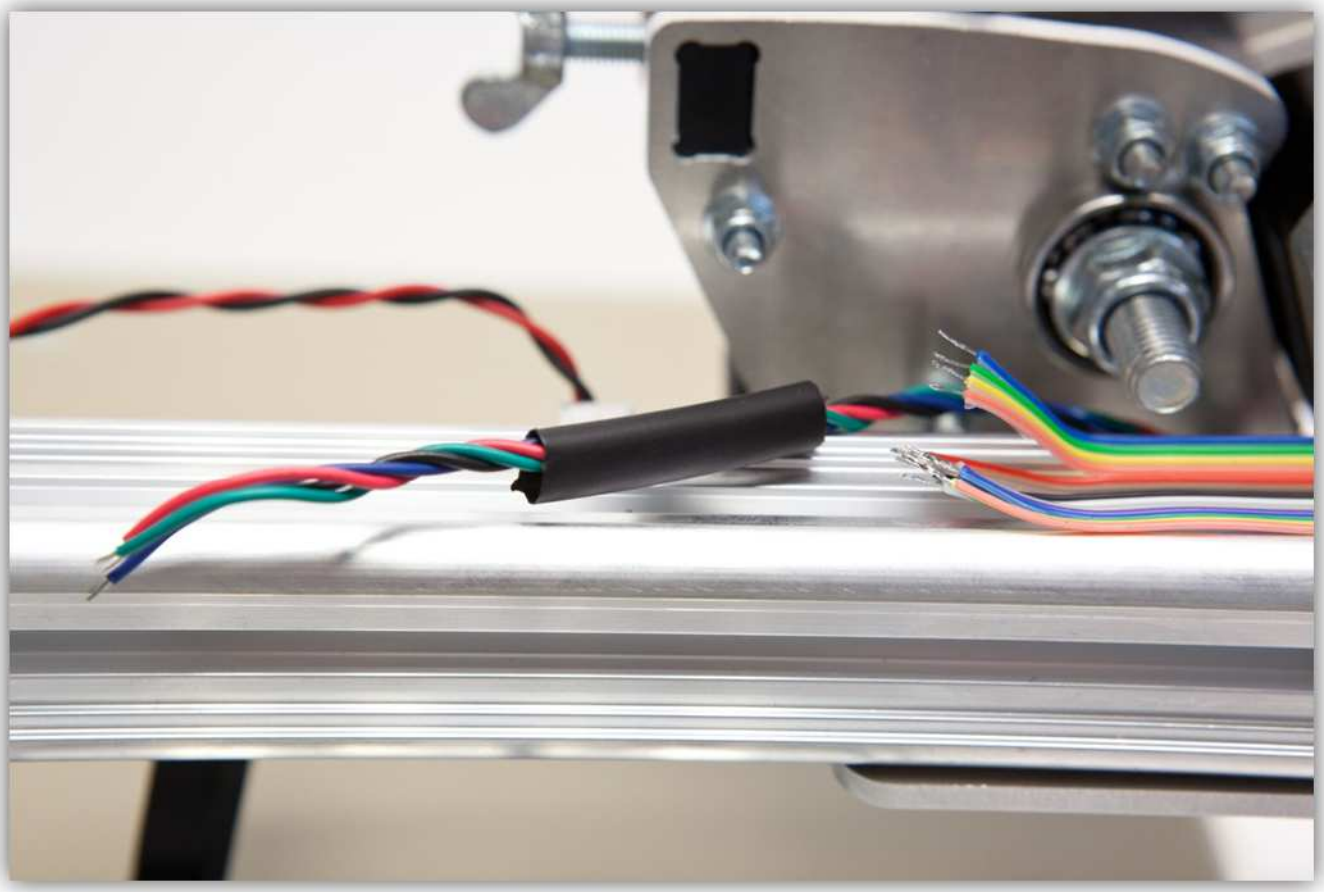


Take the wires of the extruder motor and tin them.

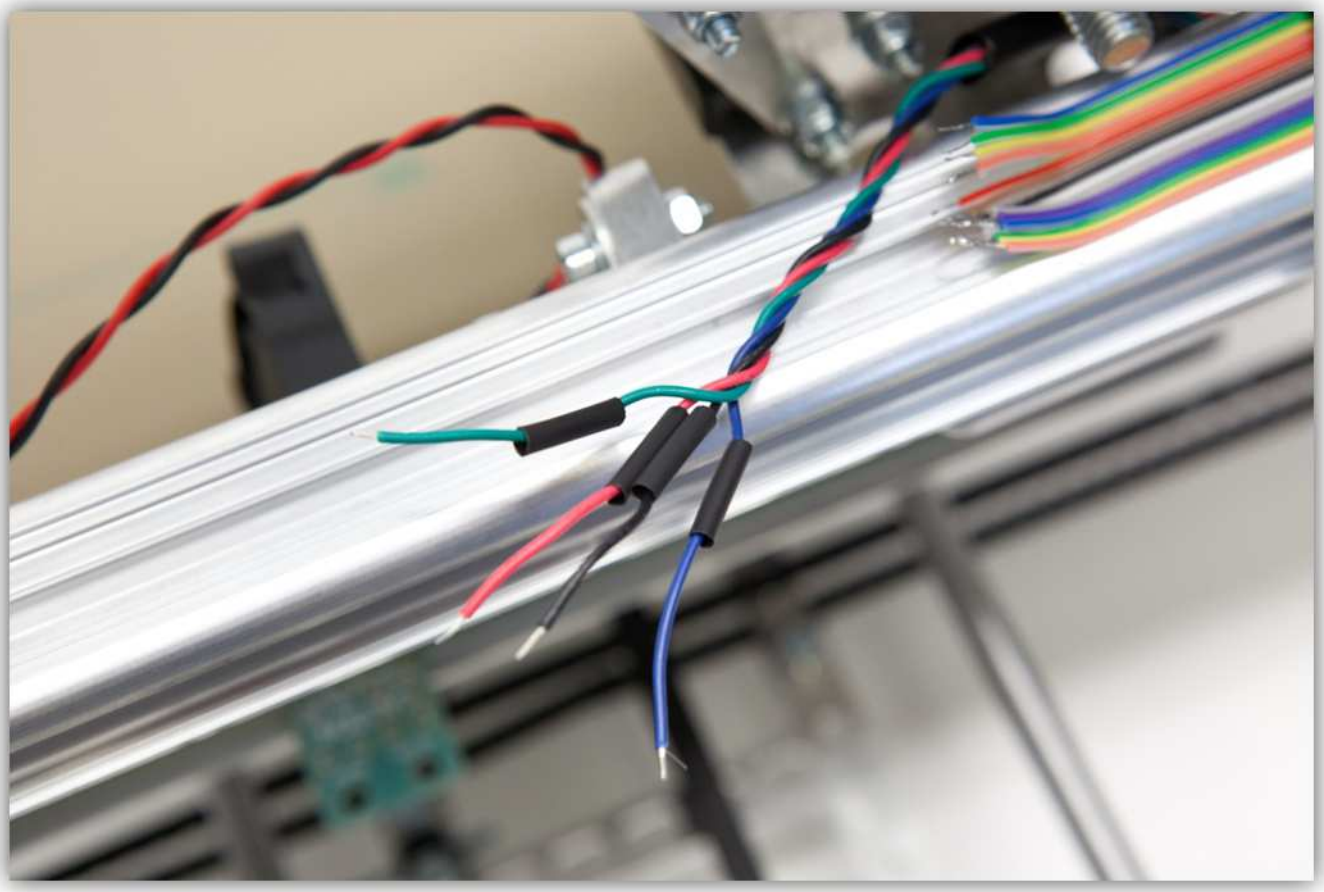


Cut 4 small pieces of the small heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

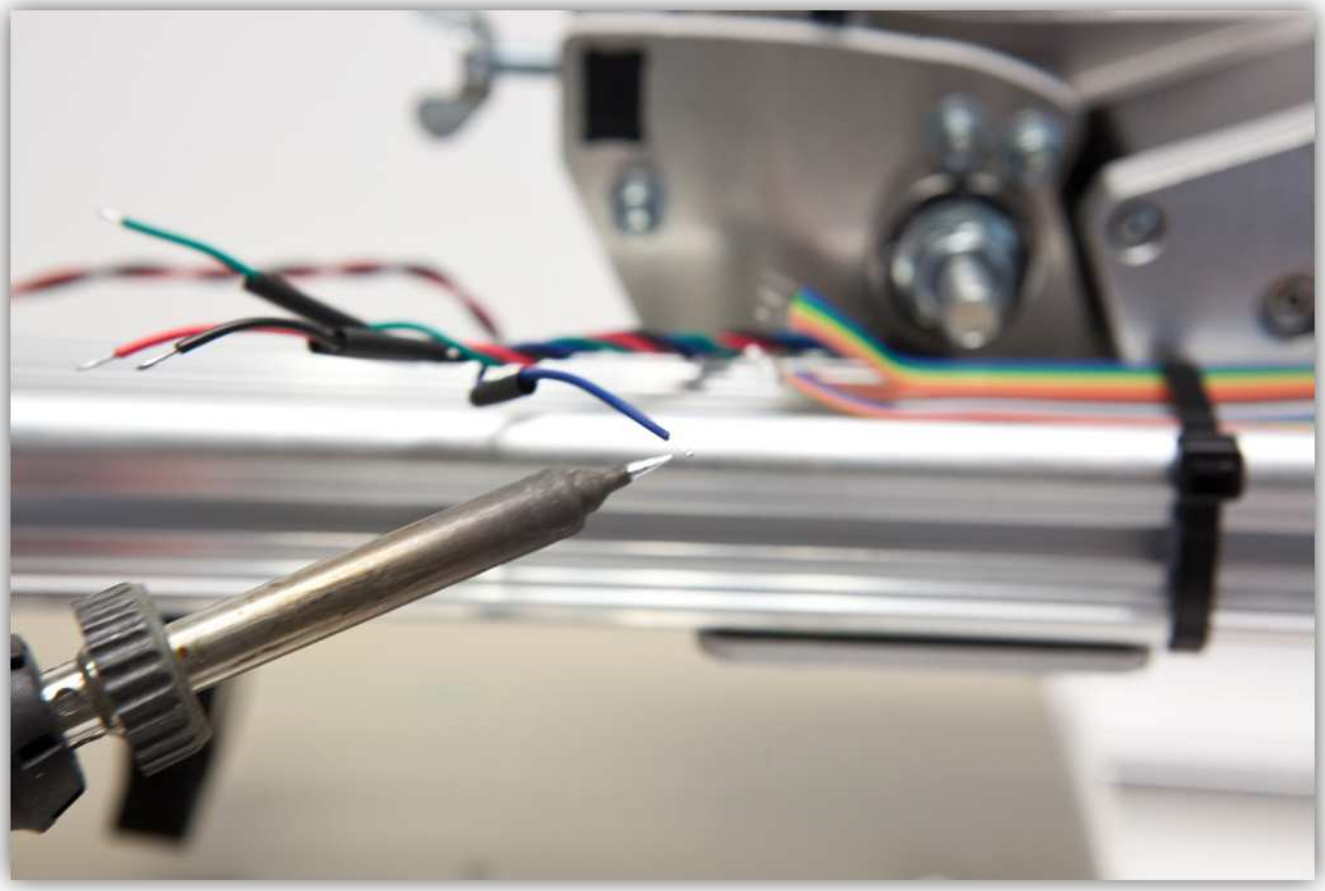
Slide the big heat shrink tube over the 4 wires of the motor.



Slide the 4 small heat shrink tubes over the 4 wires of the motor.

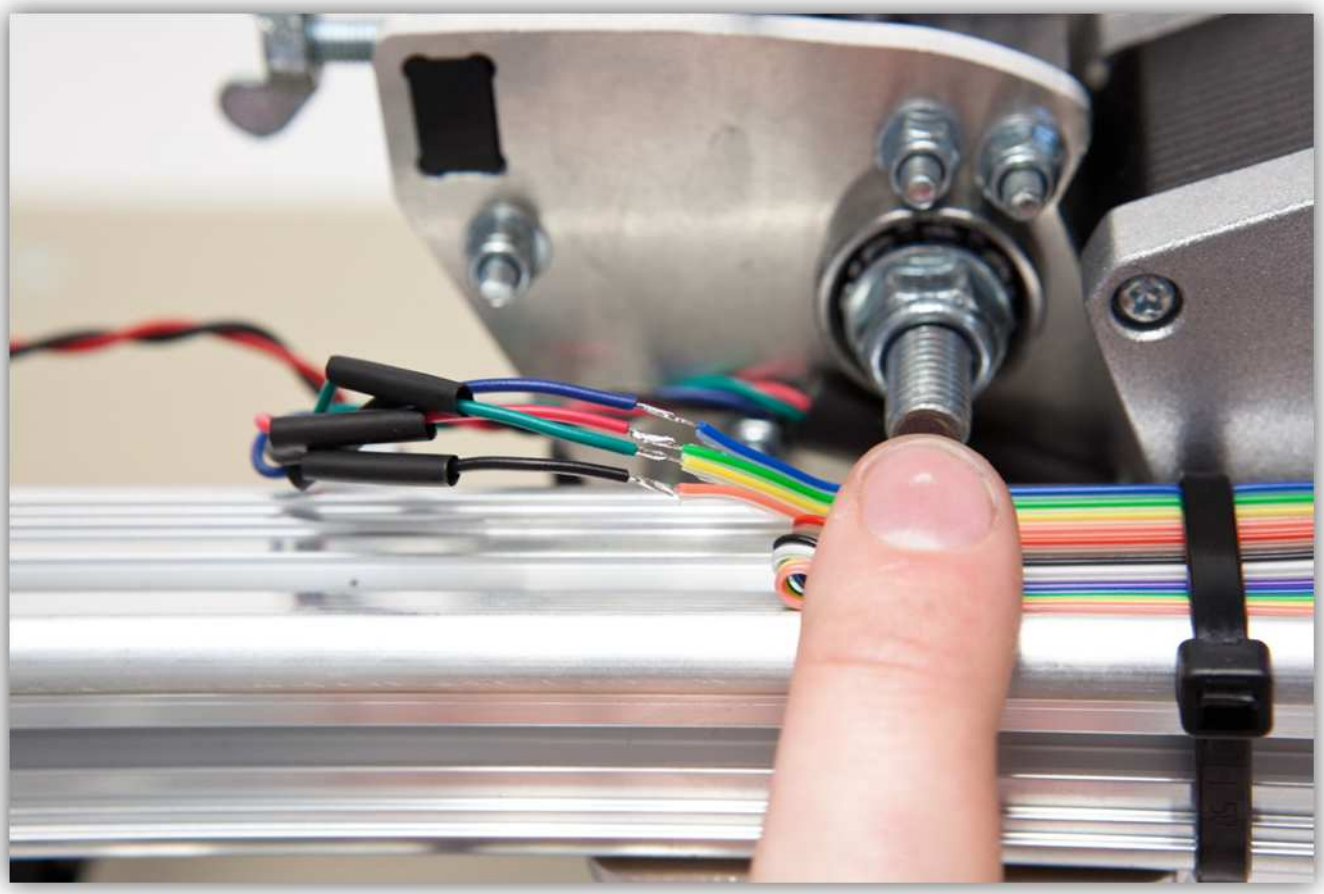


Tin all the wires.

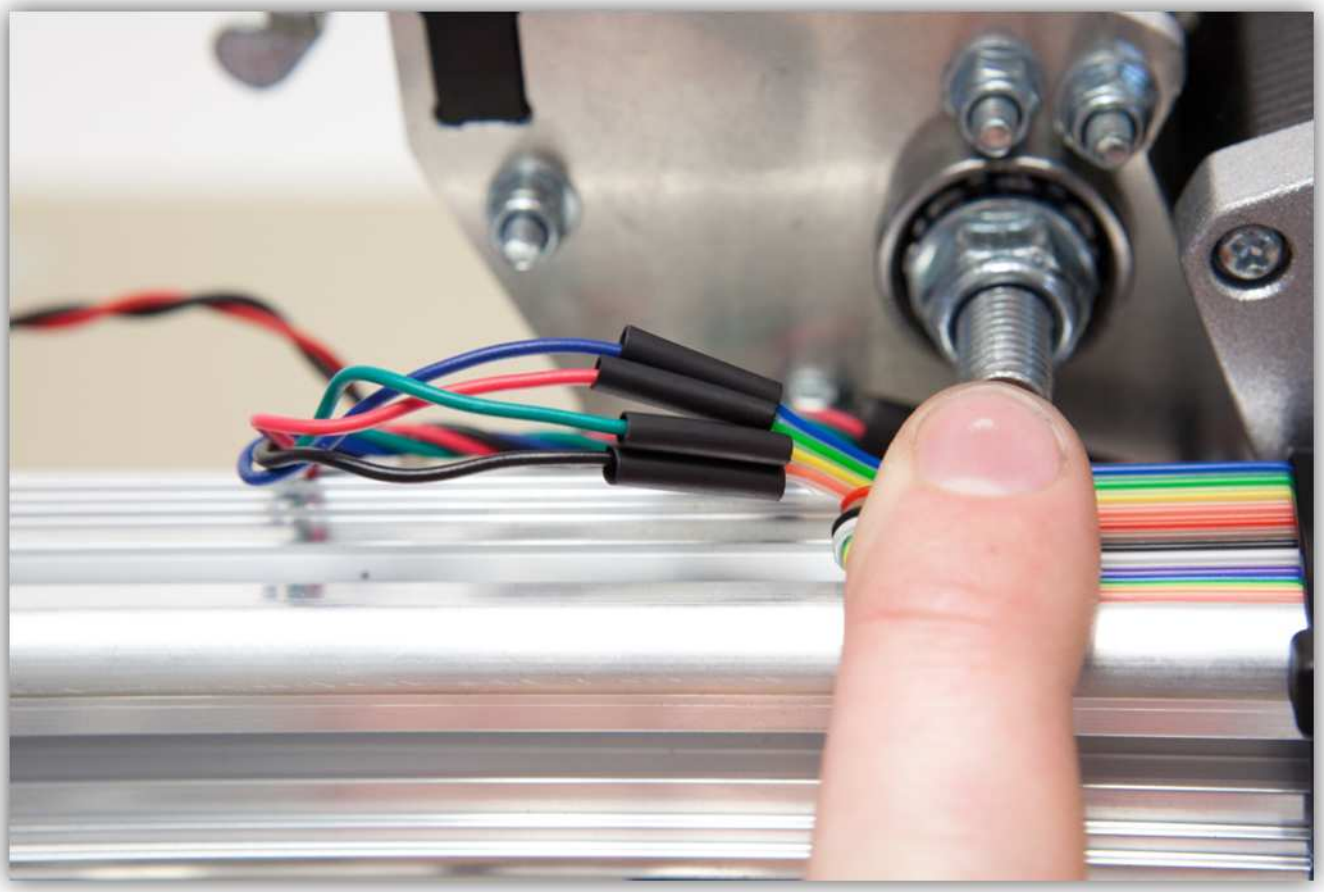


Solder the 4 wires from the motor to the 4 wires of the flat cable you tinned earlier. **Watch the colours closely.**

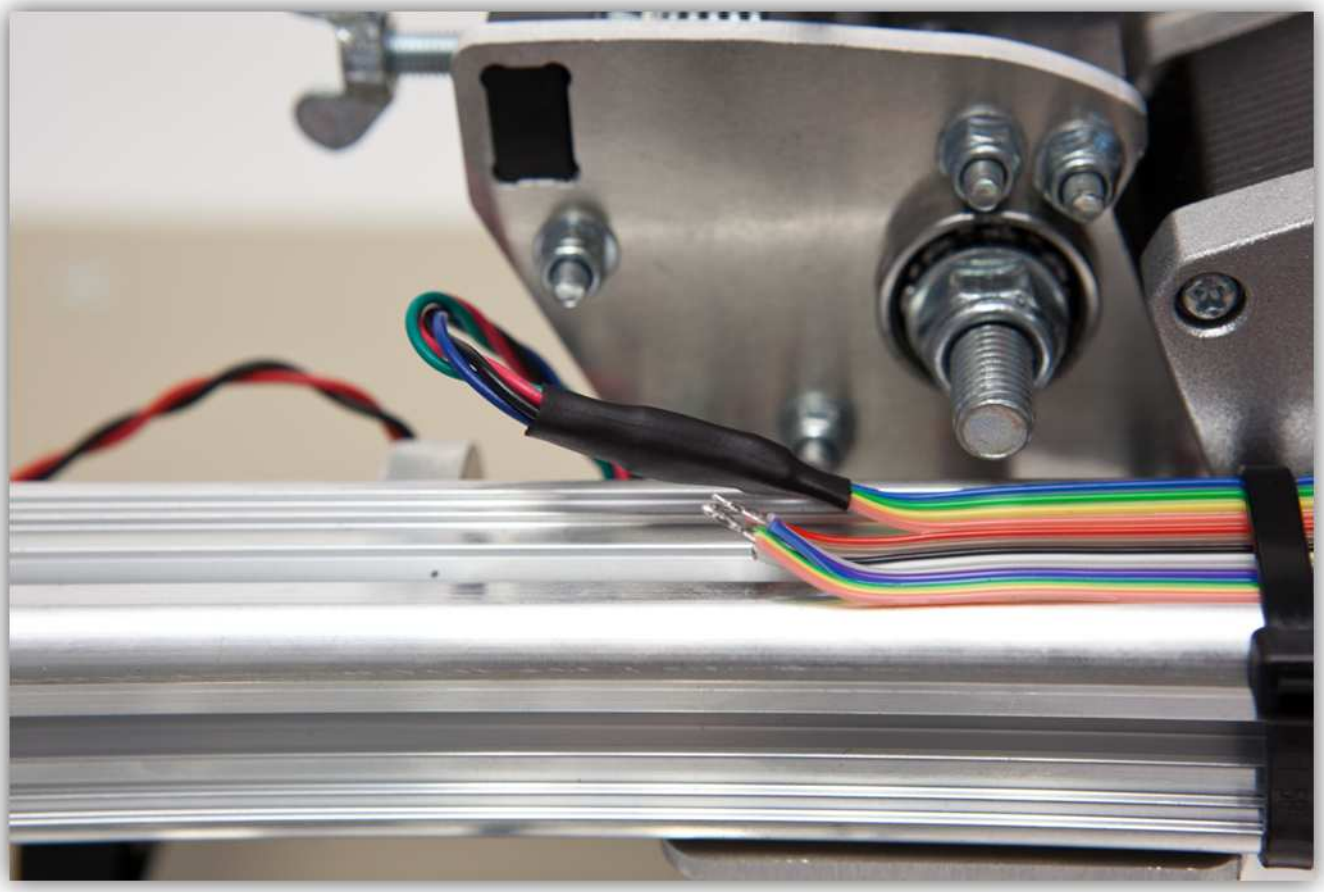
Flat cable	**->**	**Motor wires**
Blue	**->**	**Blue**
Green	**->**	**Red**
Yellow	**->**	**Green**
Orange	**->**	**Black**



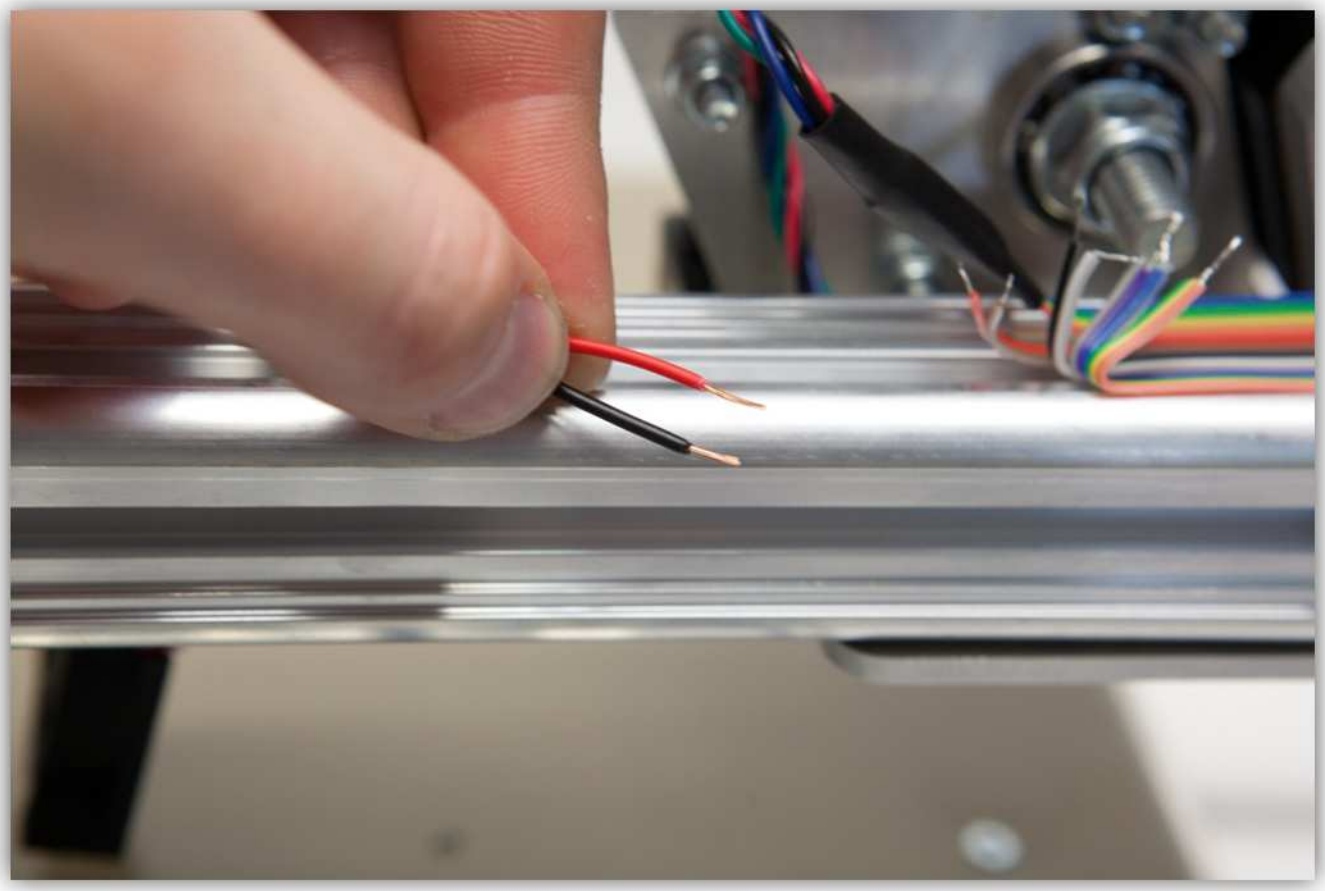
Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.

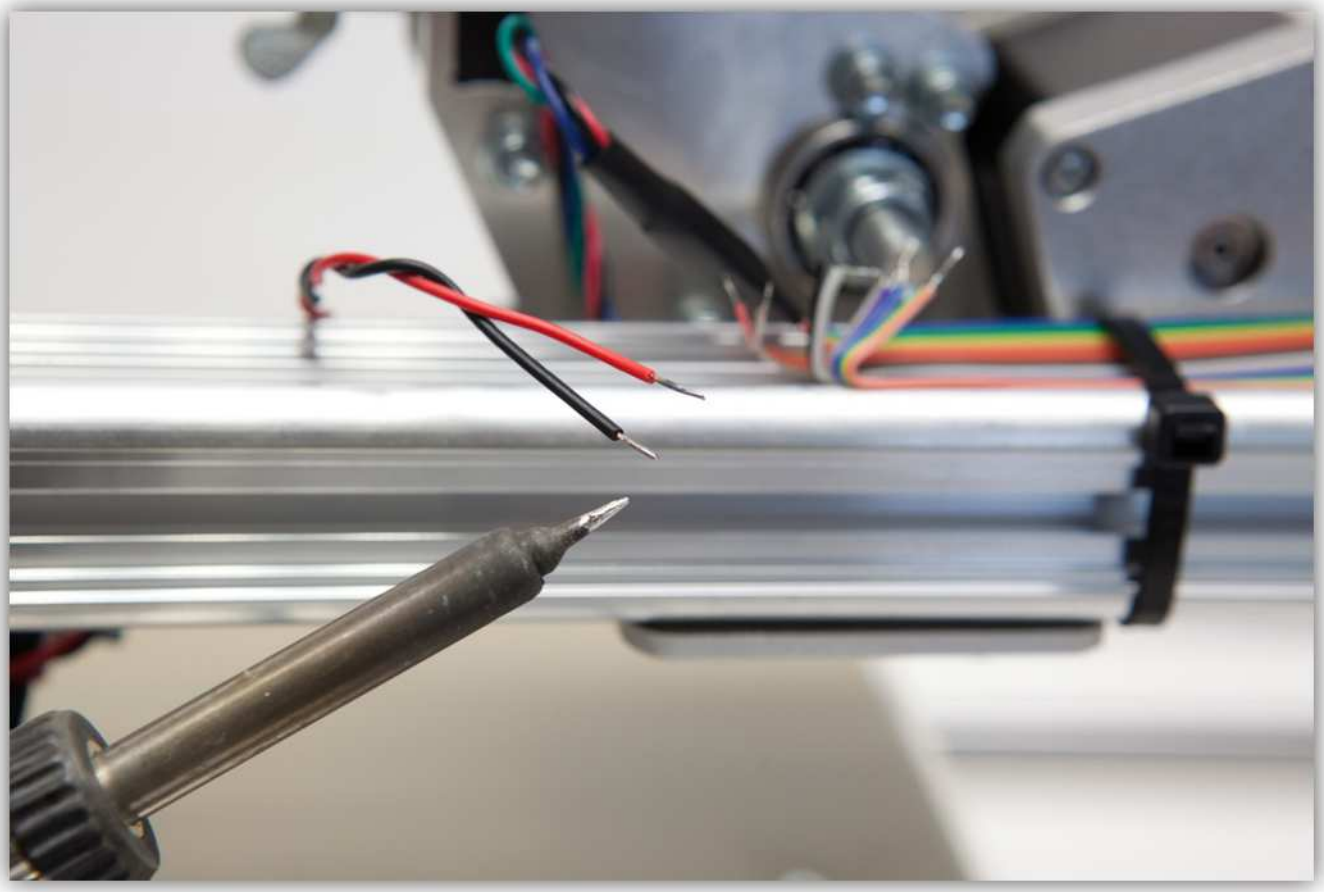


Now slide the big piece of heat shrink tubing over the 4 small pieces, heat the big piece so it covers and protects the 4 heat shrunk joints.



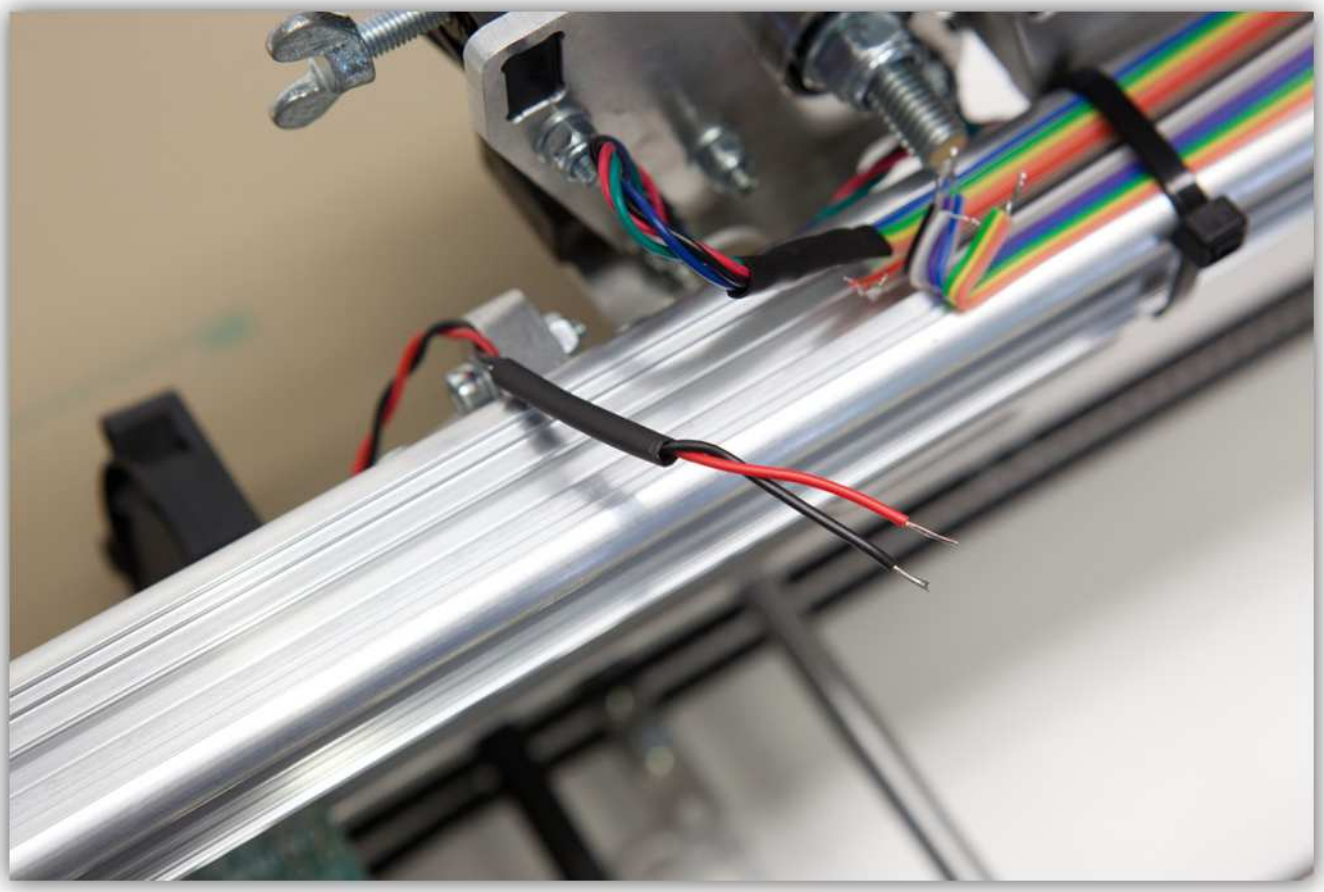
Now take the 2 wires of the fan and tin them.



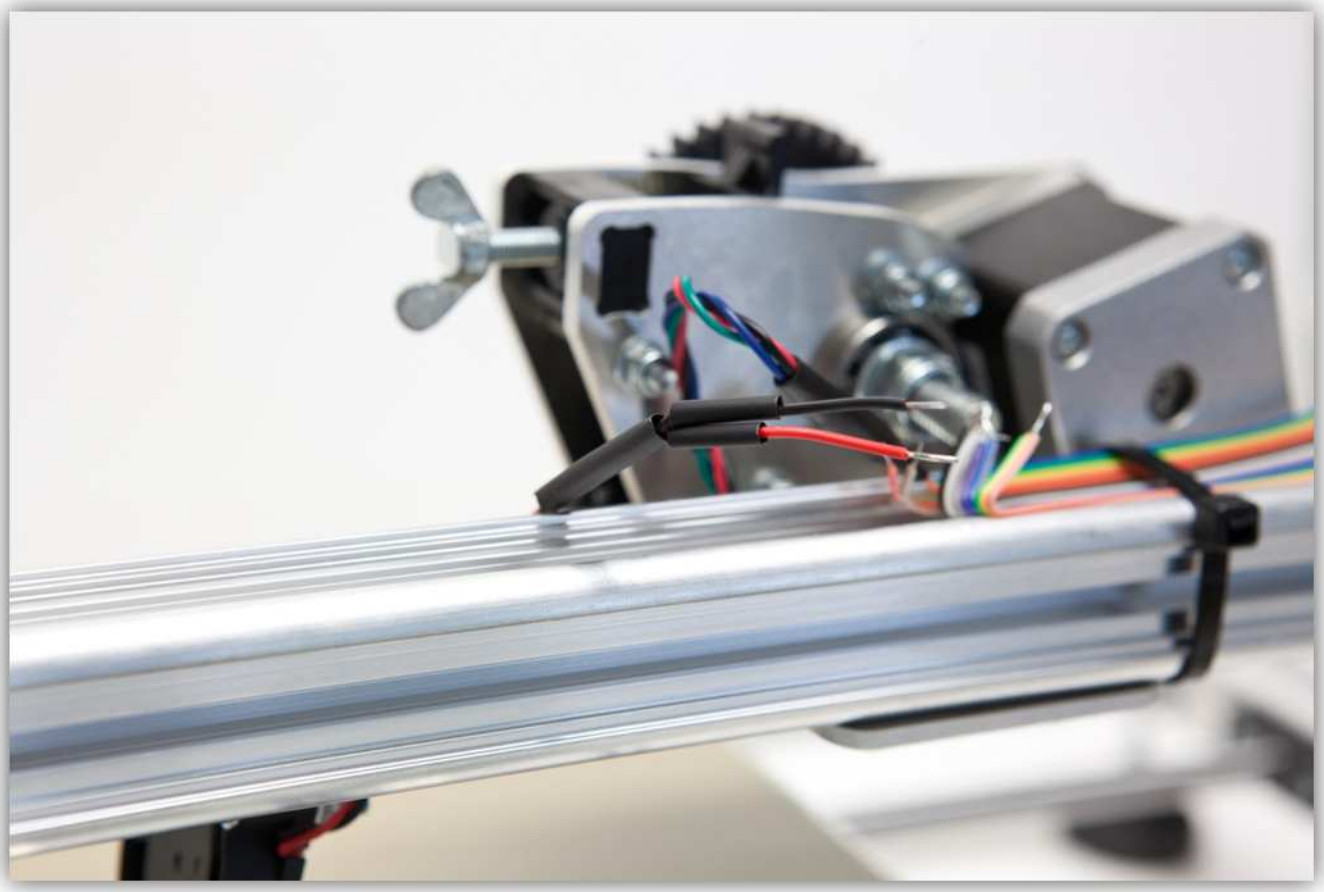


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the medium size heat shrink tube over the 2 wires of the fan.

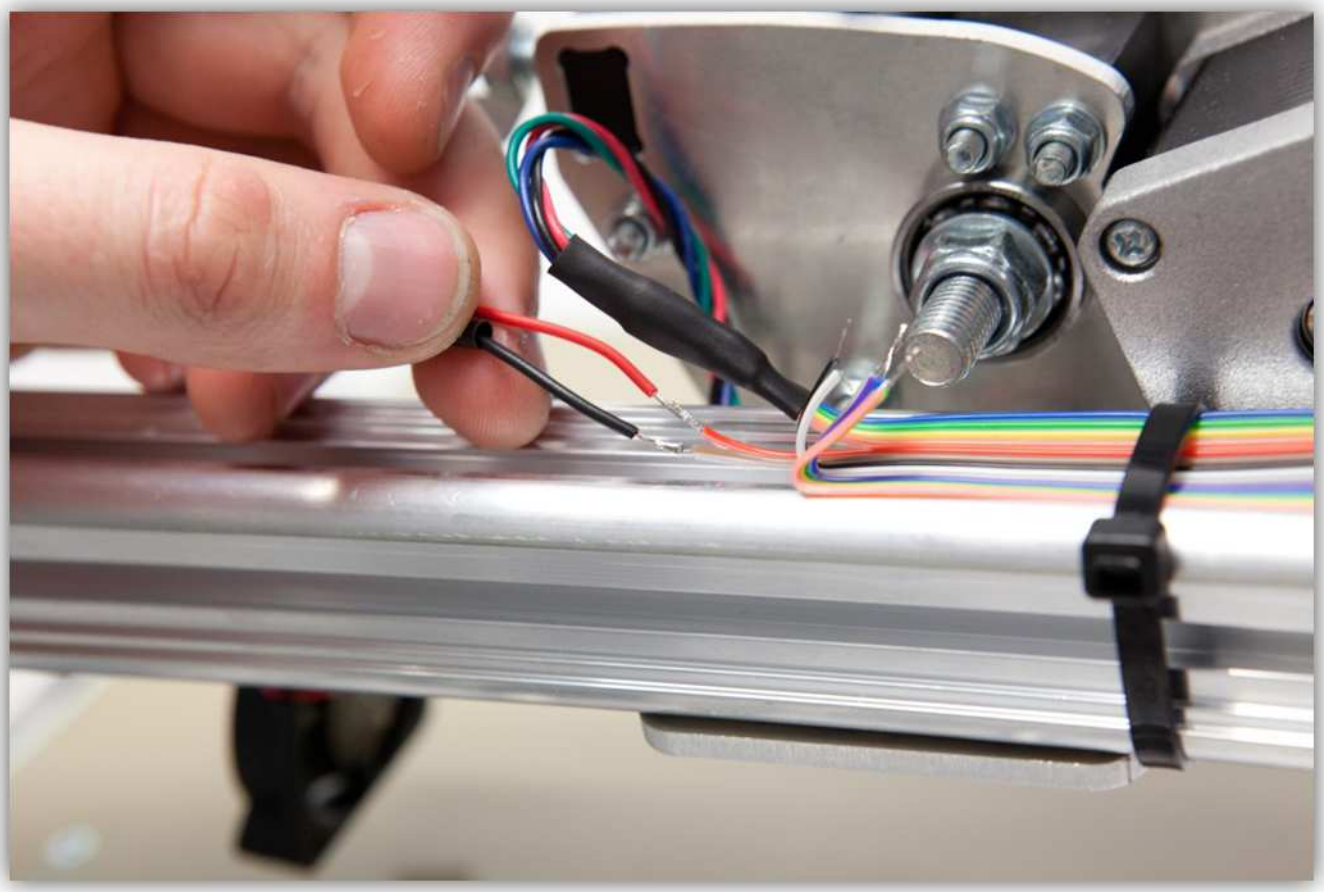


Slide the 2 small heat shrink tubes over the 2 wires of the connector.

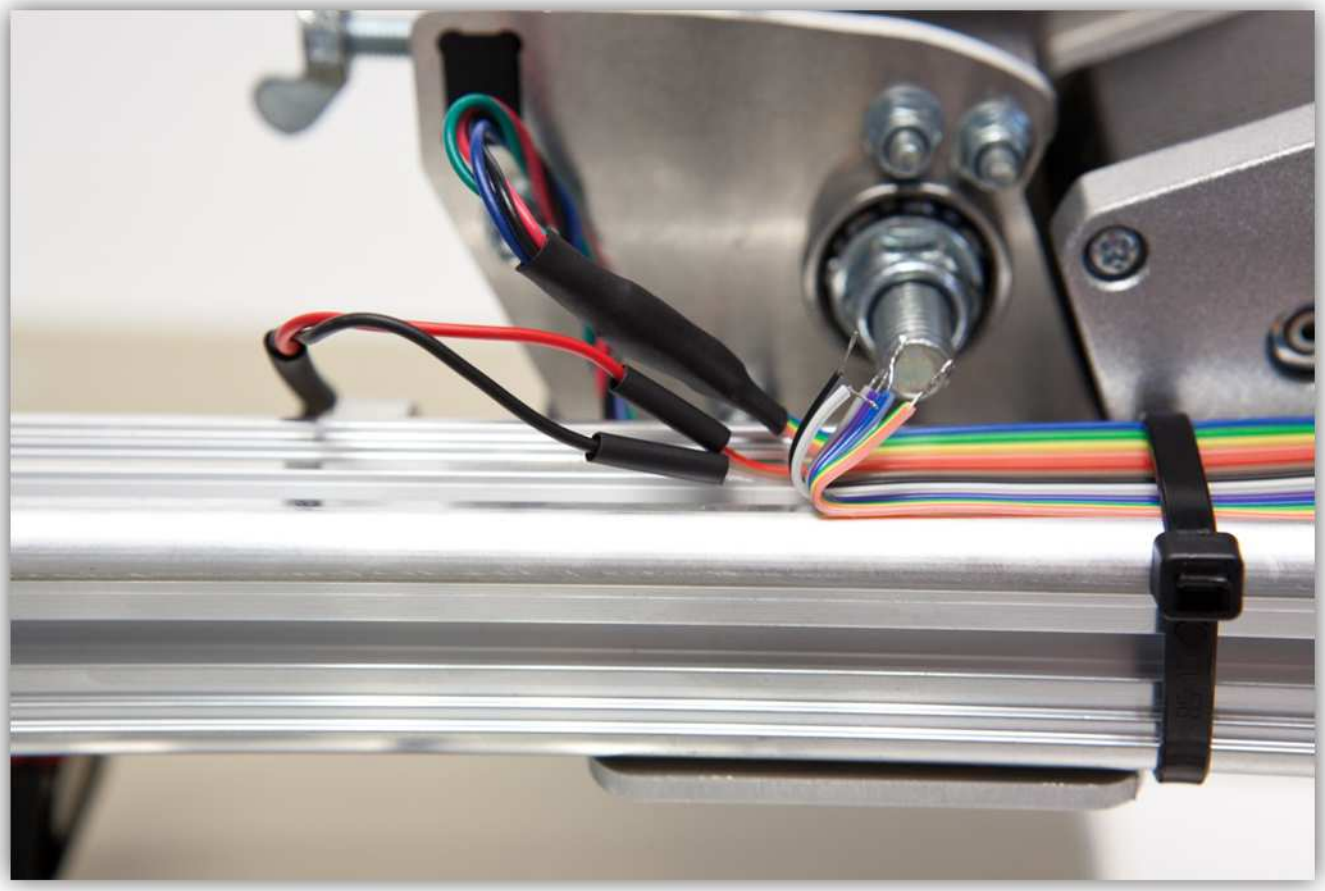


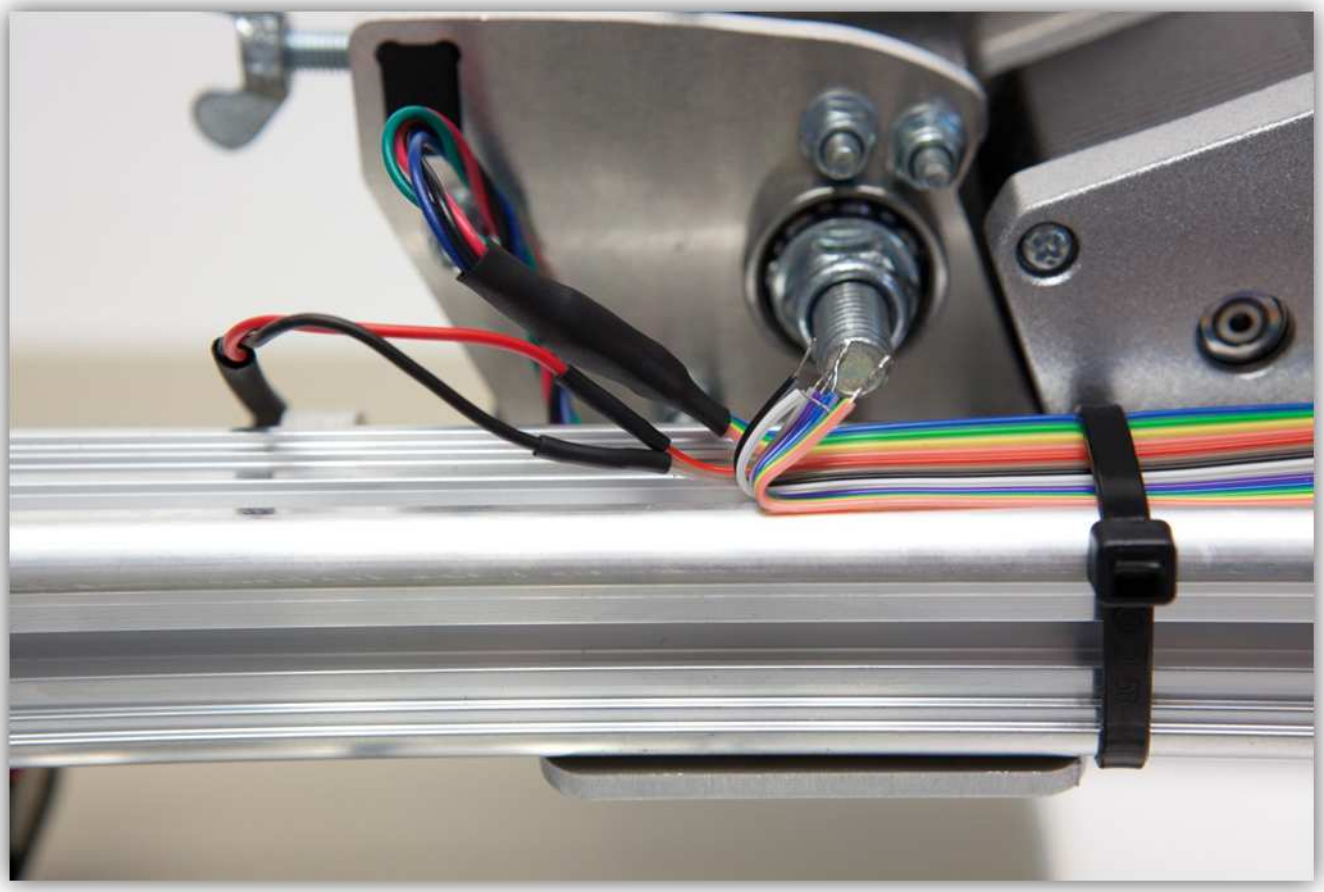
Solder the 2 wires from the fan to the 2 wires of the flat cable you tinned earlier. **Watch the colours closely.**

Flat cable	**->**	**Fan wires**
Red	**->**	**Red**
Brown	**->**	**Black**

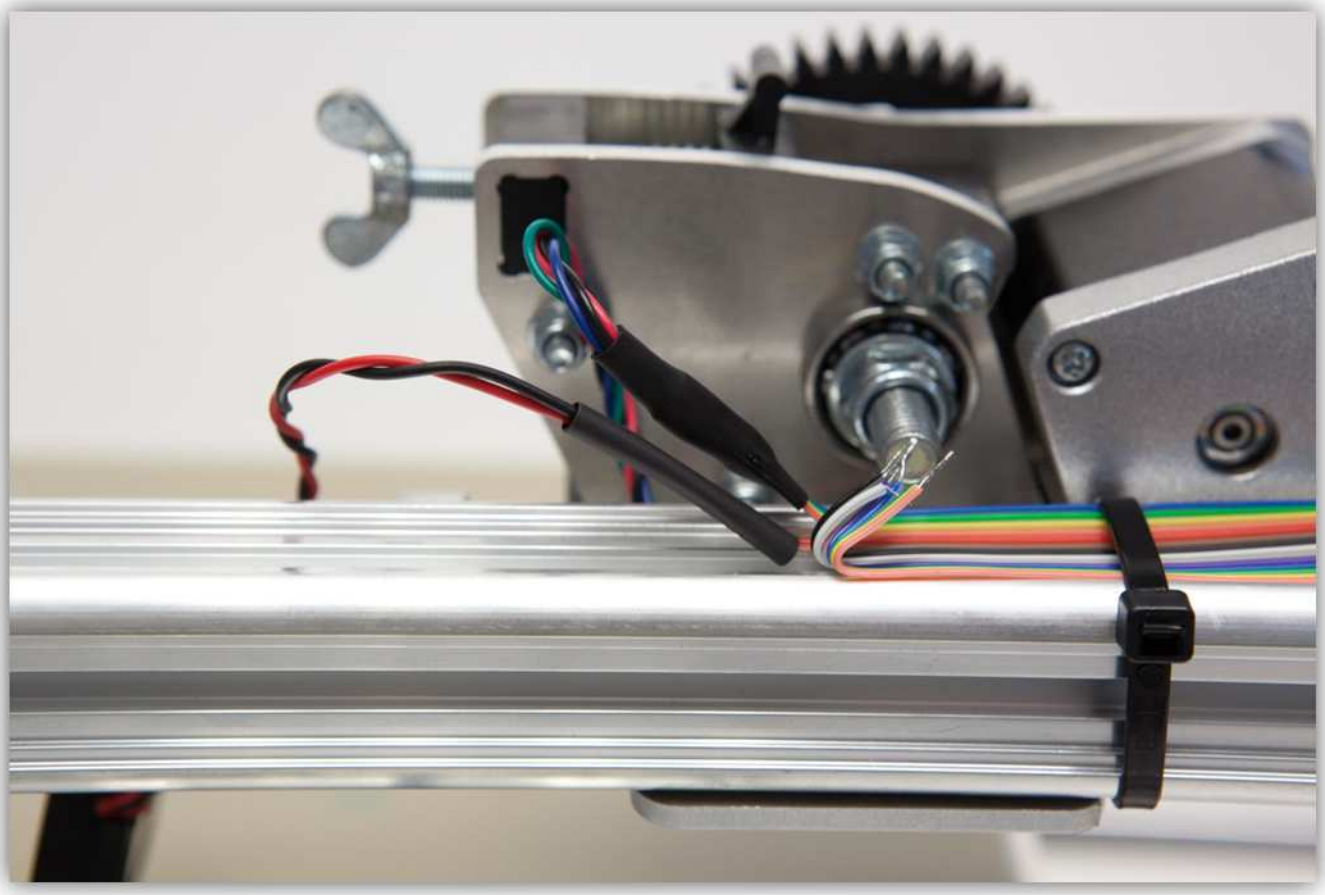


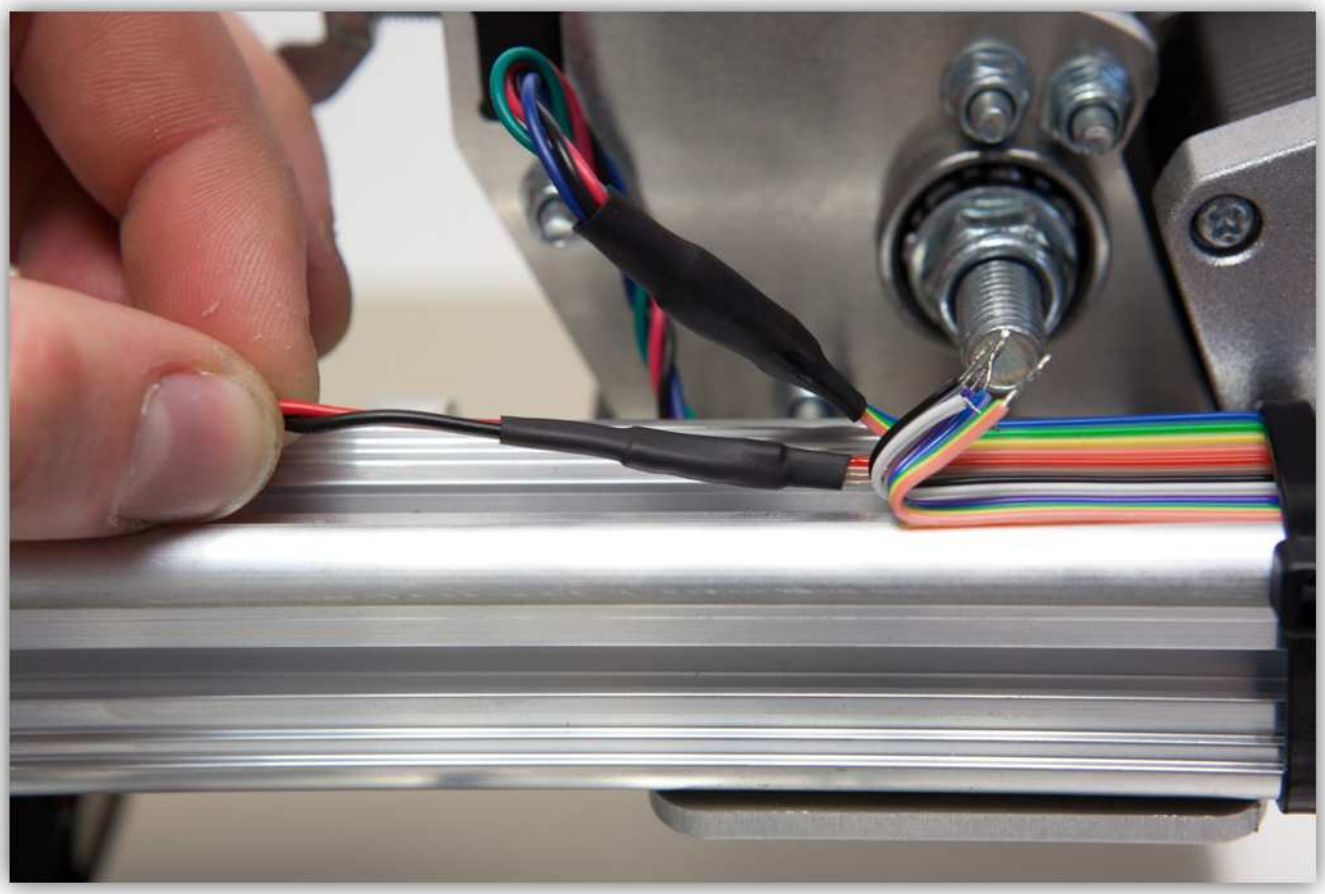
Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.



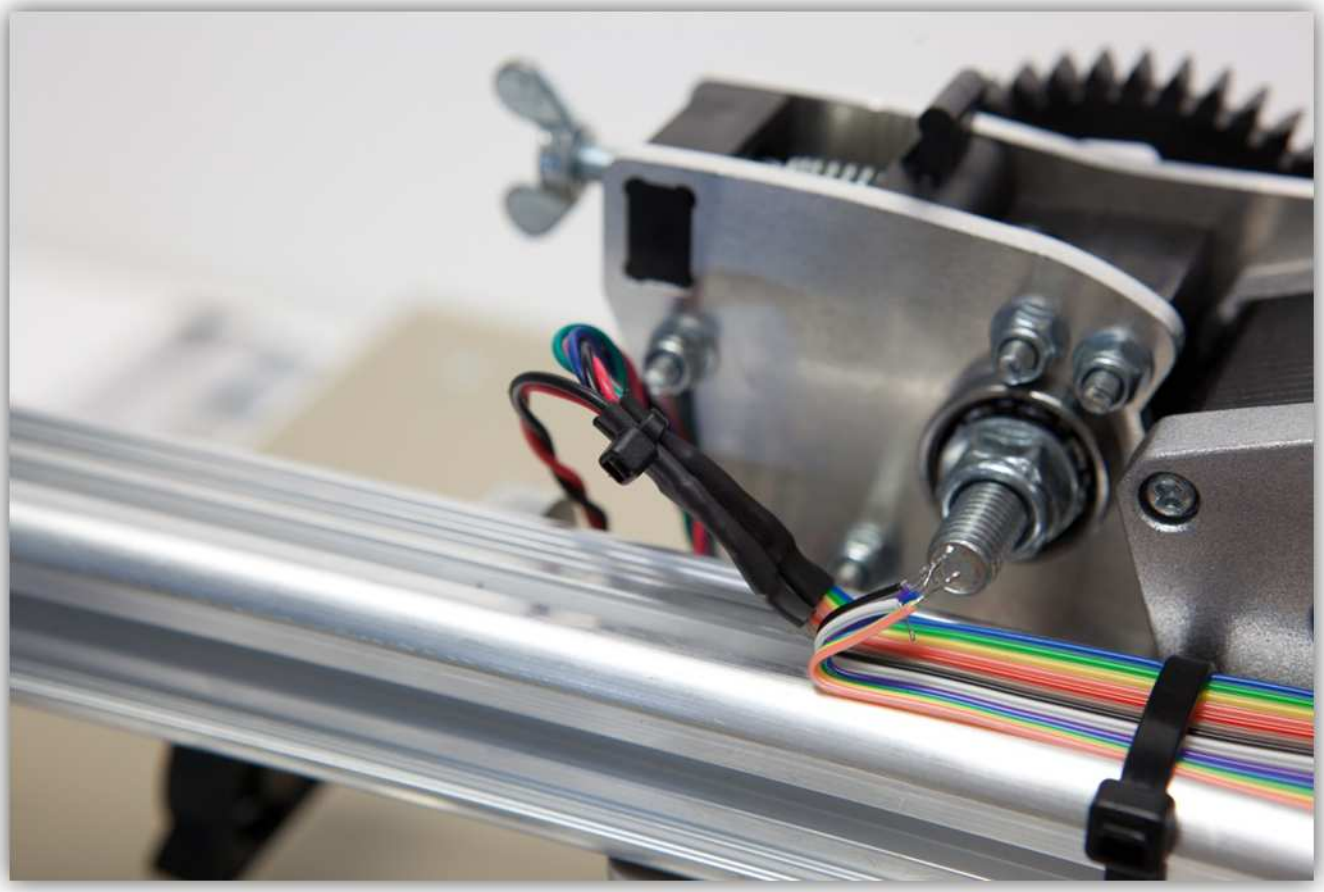


Now slide the big piece of heat shrink tubing over the 2 small pieces, heat the big piece so it covers and protects the 2 heat shrunk joints.





Use a small tie-strip to keep the cables together.

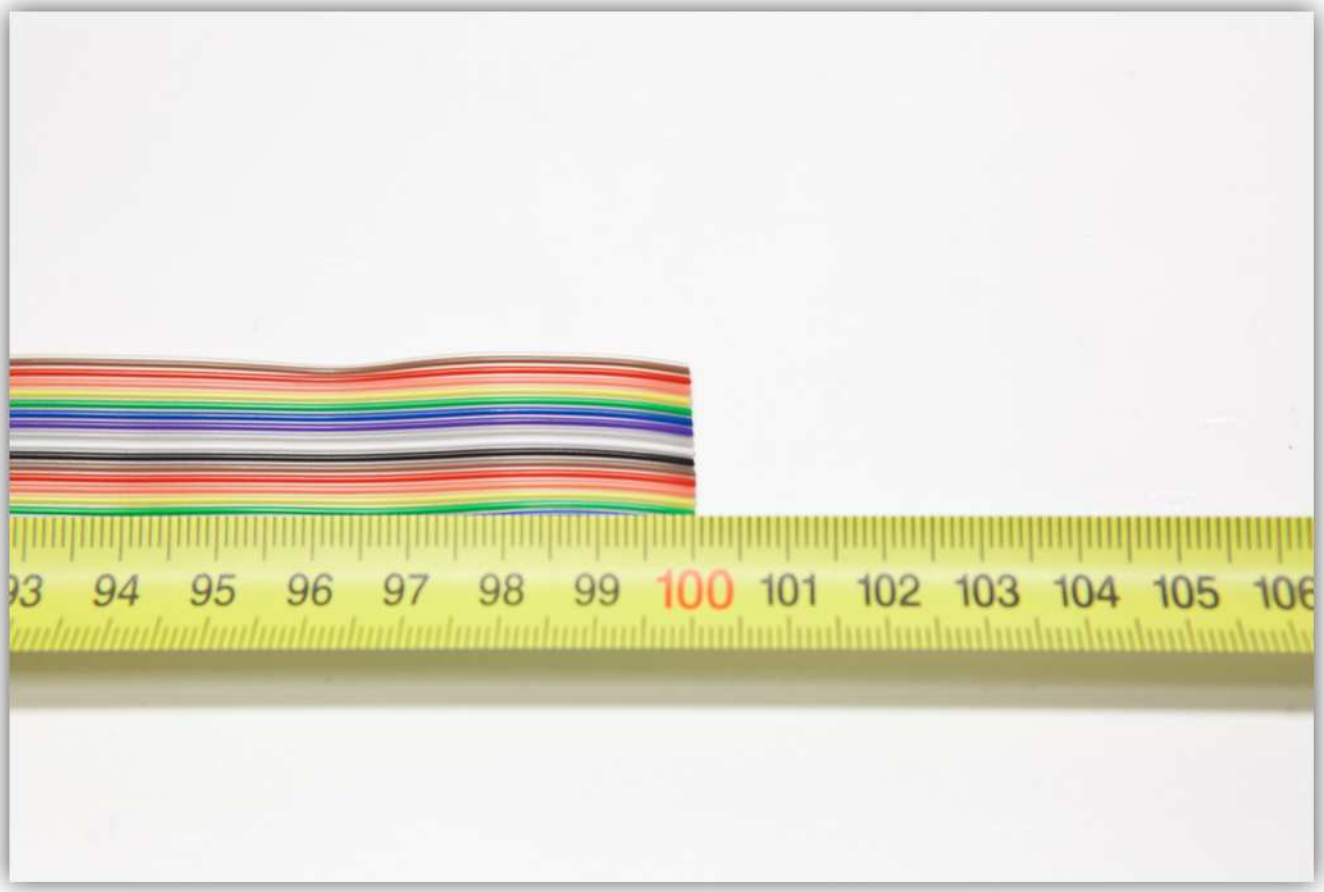


Use a small tie-strip to guide the cable of the fan.

We will return to this flat cable again in a later chapter to hook up the extruder itself.

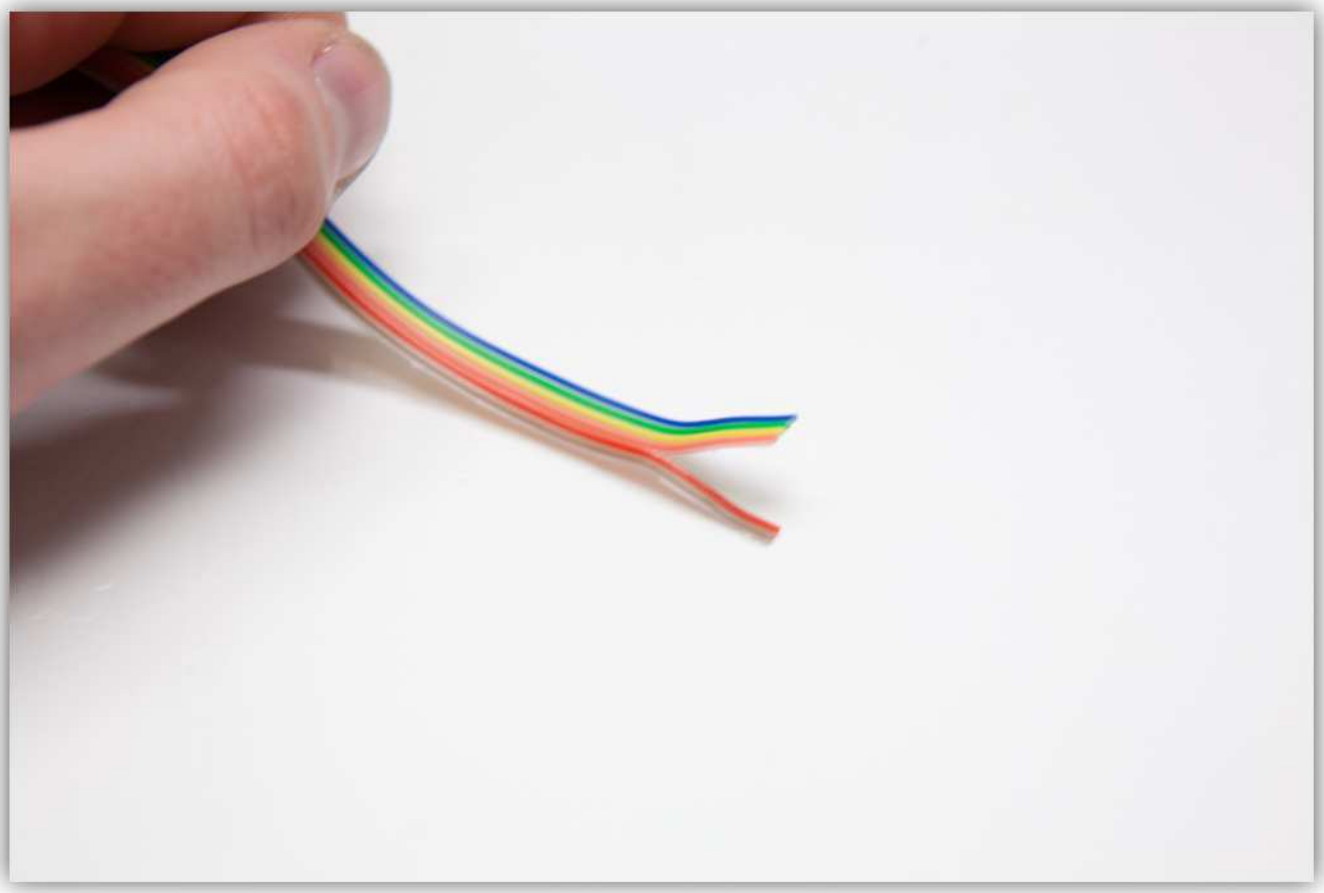
016 – WIRING THE Z AXIS MOTOR AND MICRO SWITCH

Take the MULTI-COLOURED FLATCABLE out of the bag labelled with 40. Cut a piece of 100 cm (3.94"). **This length is critical, measure twice before cutting.**

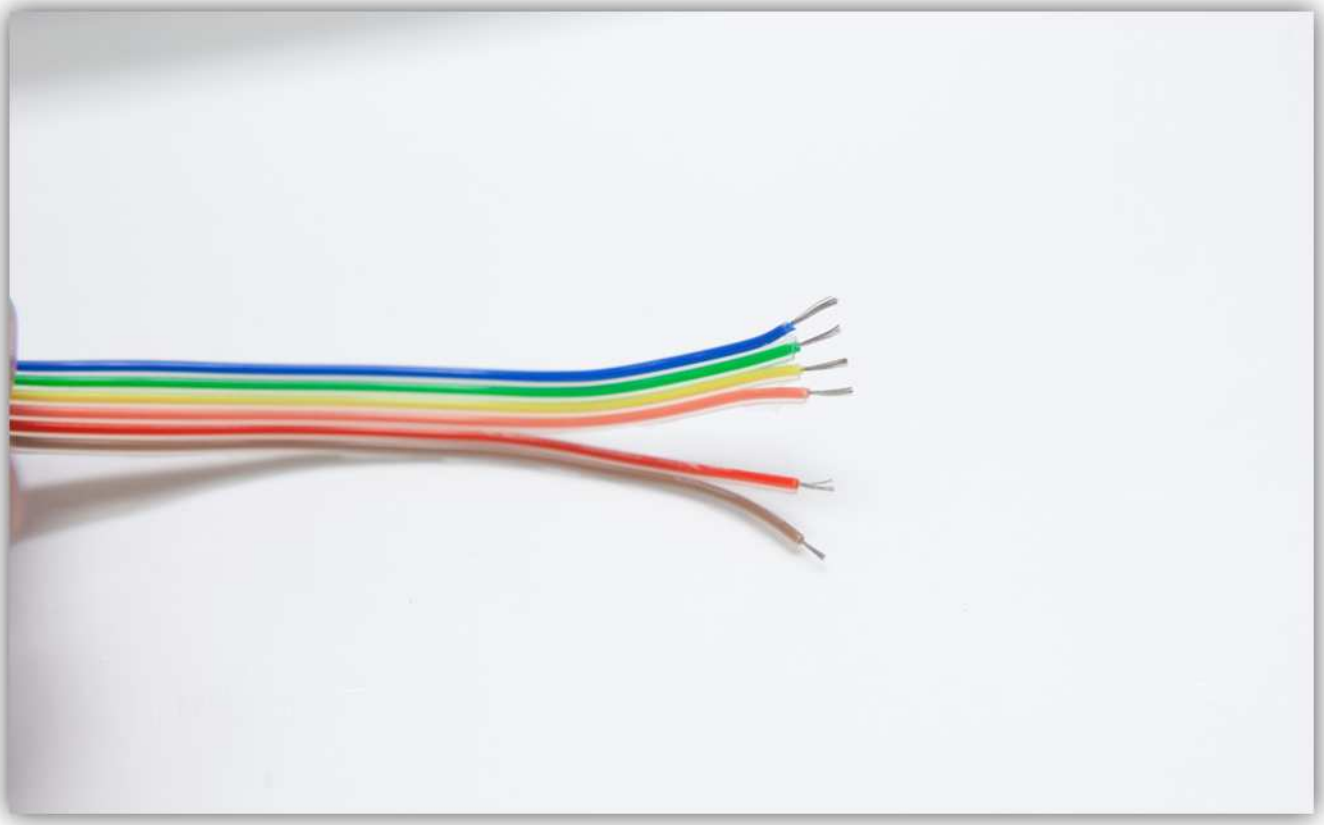


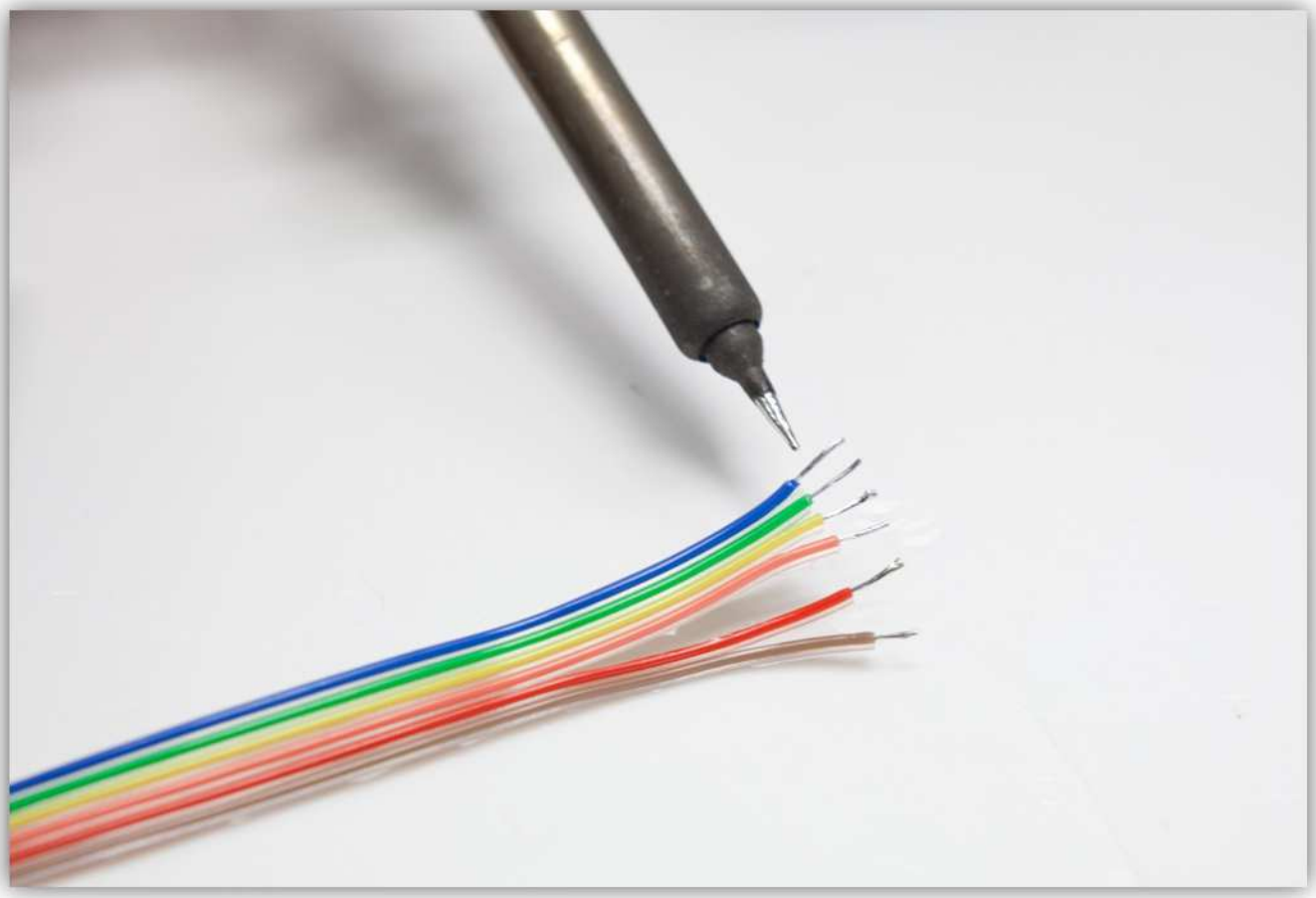
Detach (rip them of) the outer **Blue, Green, Yellow, Orange, Red** and **Brown** colour wires from the pack over the whole length. We will use these colours for this chapter.

Detach the **Brown** and **Red** wire for 2 cm (0.79").



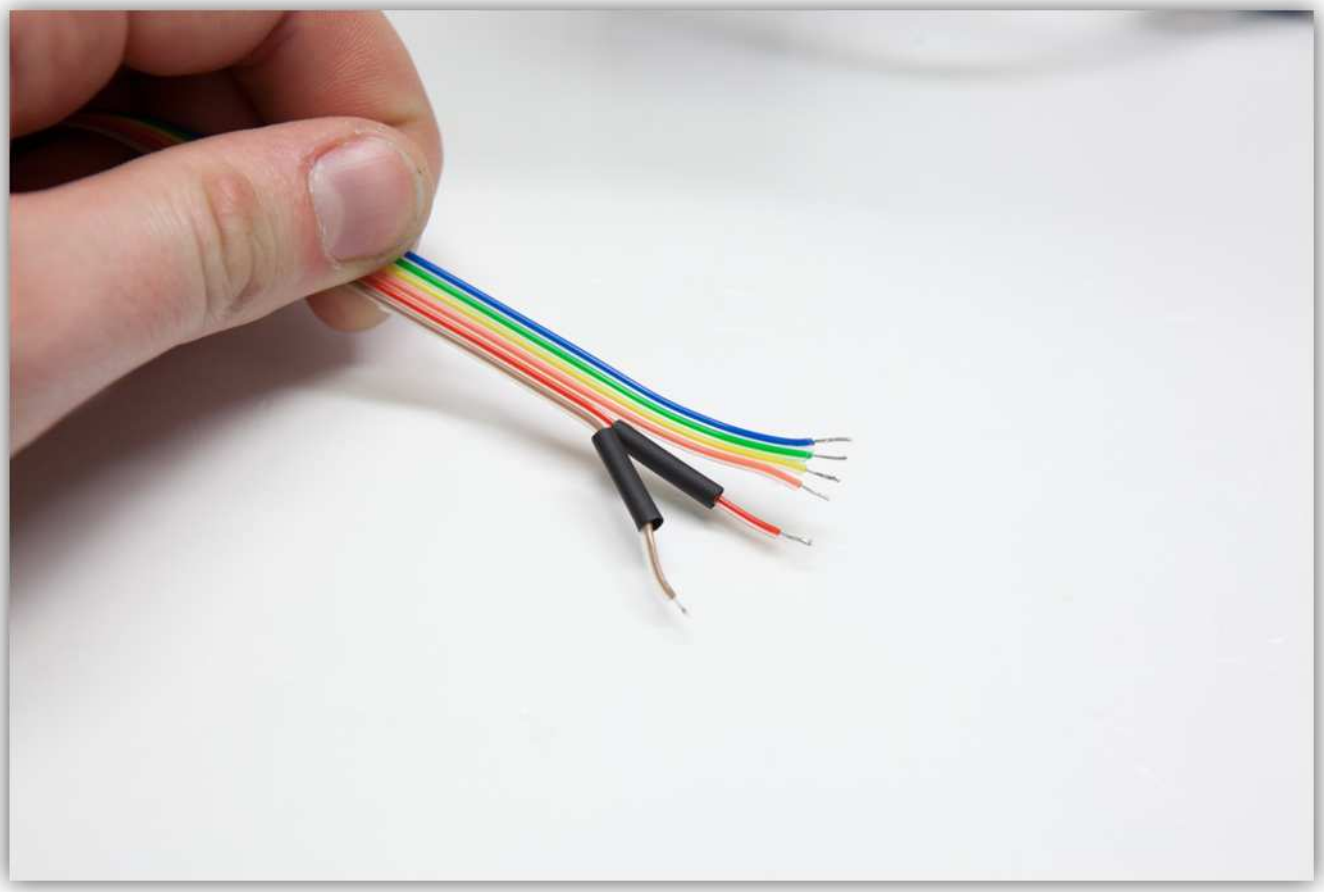
Strip and tin the wires.



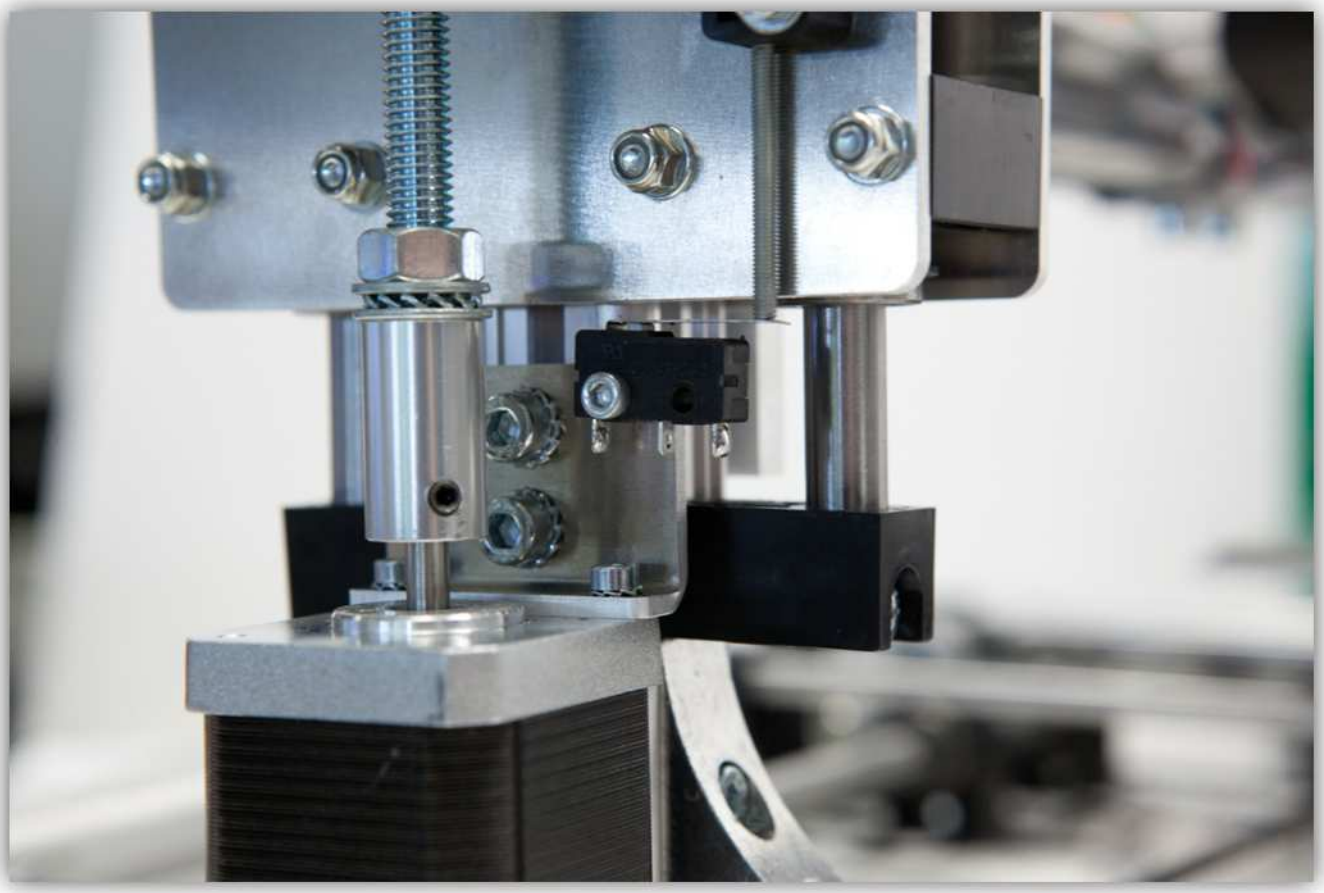


Cut 4 medium size pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long

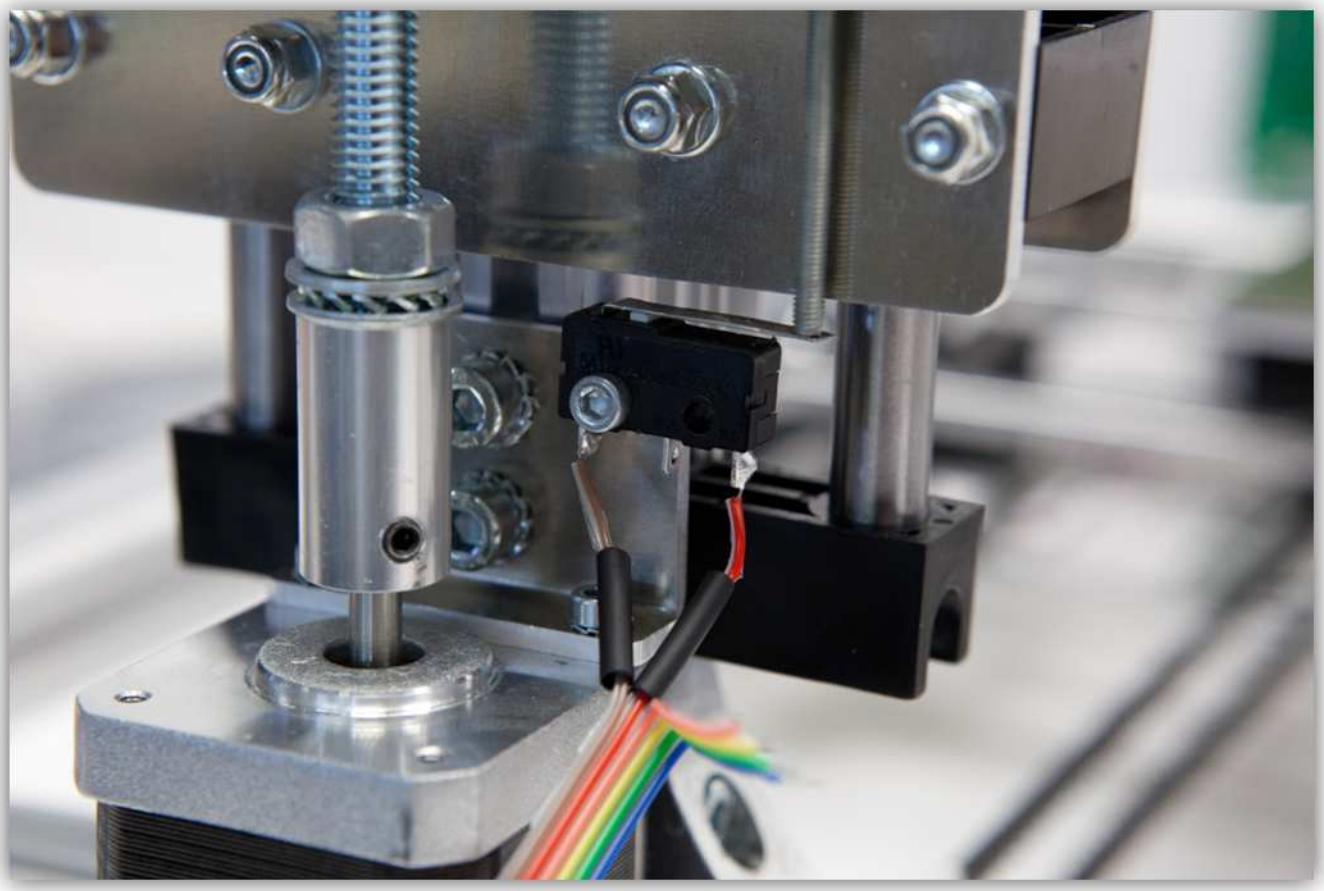
Slide the 2 medium size pieces of heat shrink tubing over the **Red** and **Brown** wires of the flat cable.



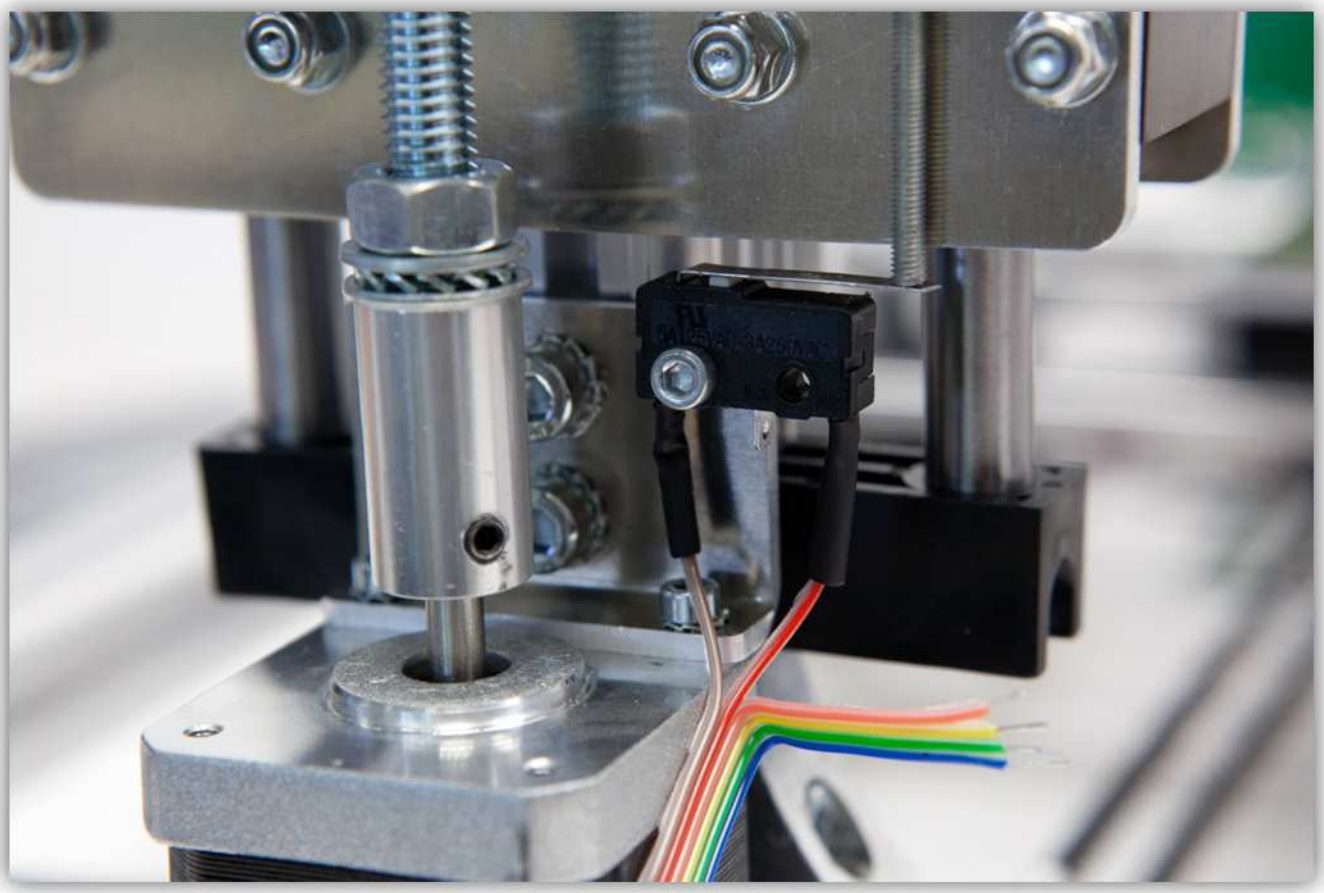
Tin the two outer contacts of the Z micro switch.

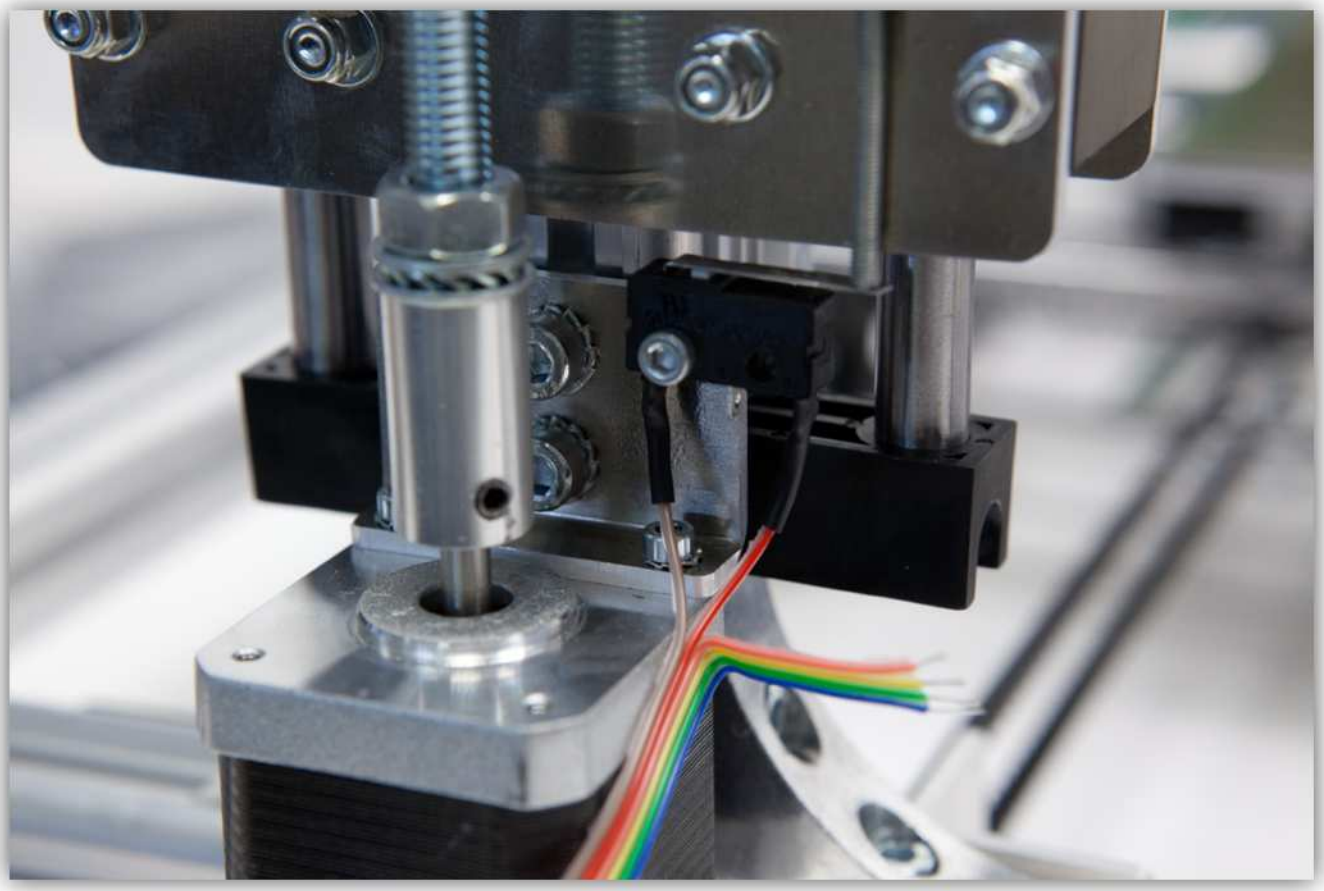


Solder the **Red** and **Brown** wires to the contacts.

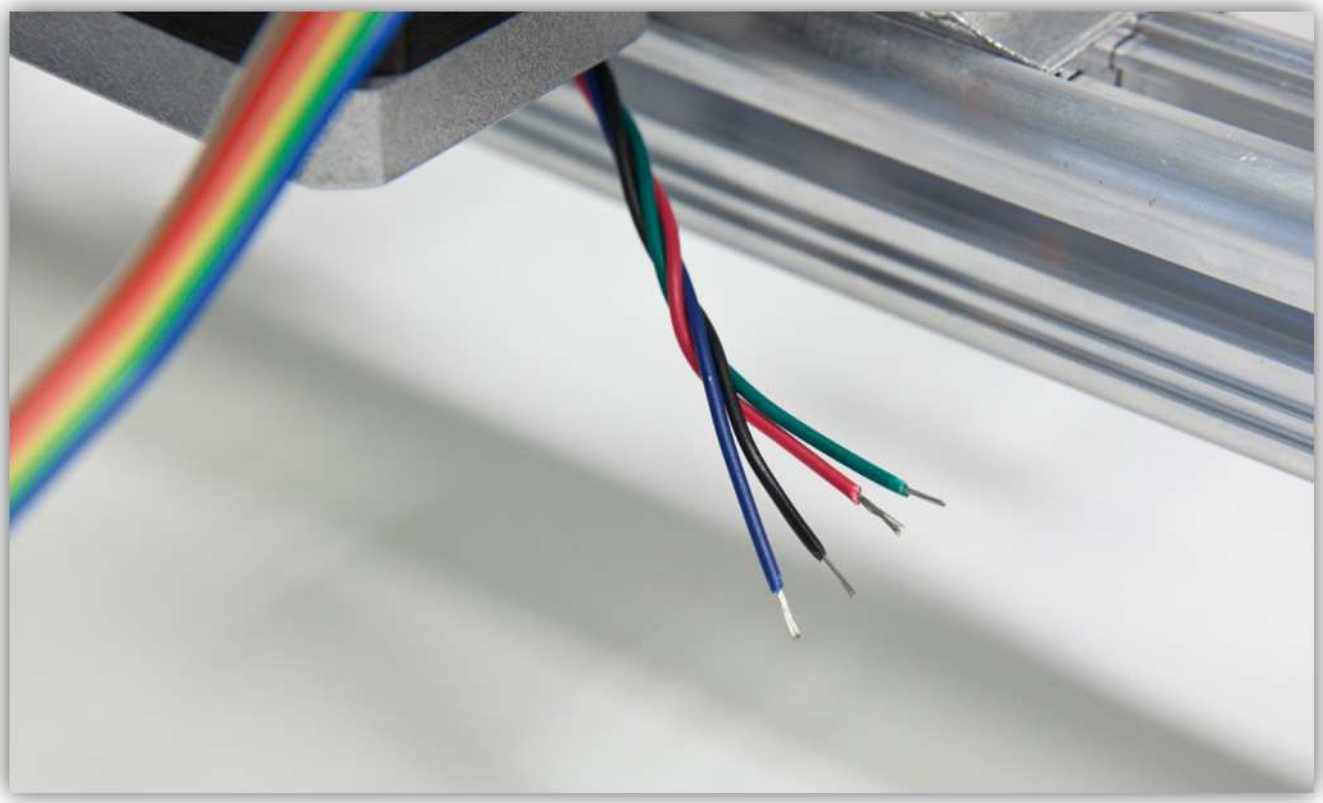


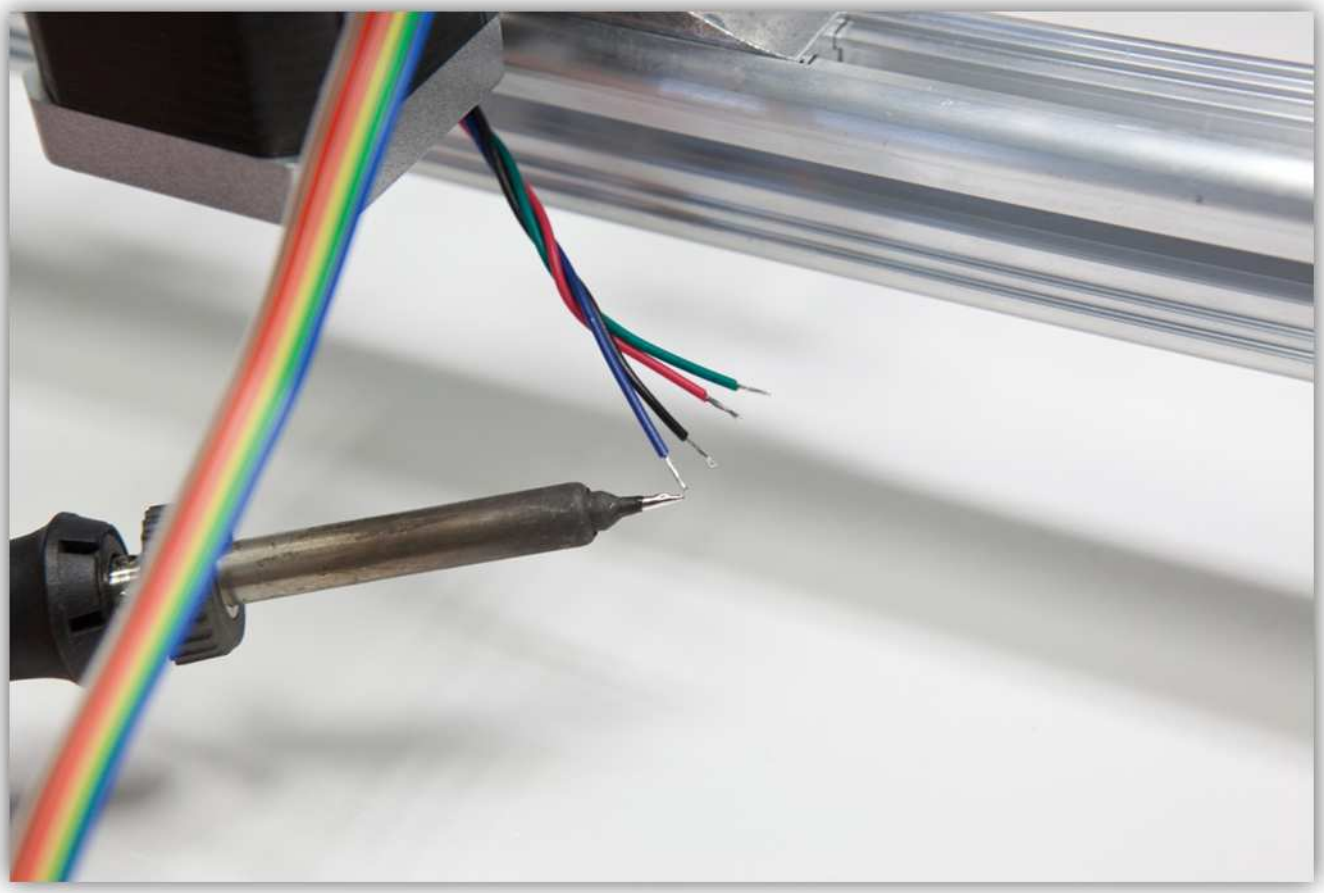
Slide the heat shrink tubes over the contacts and heat them up.





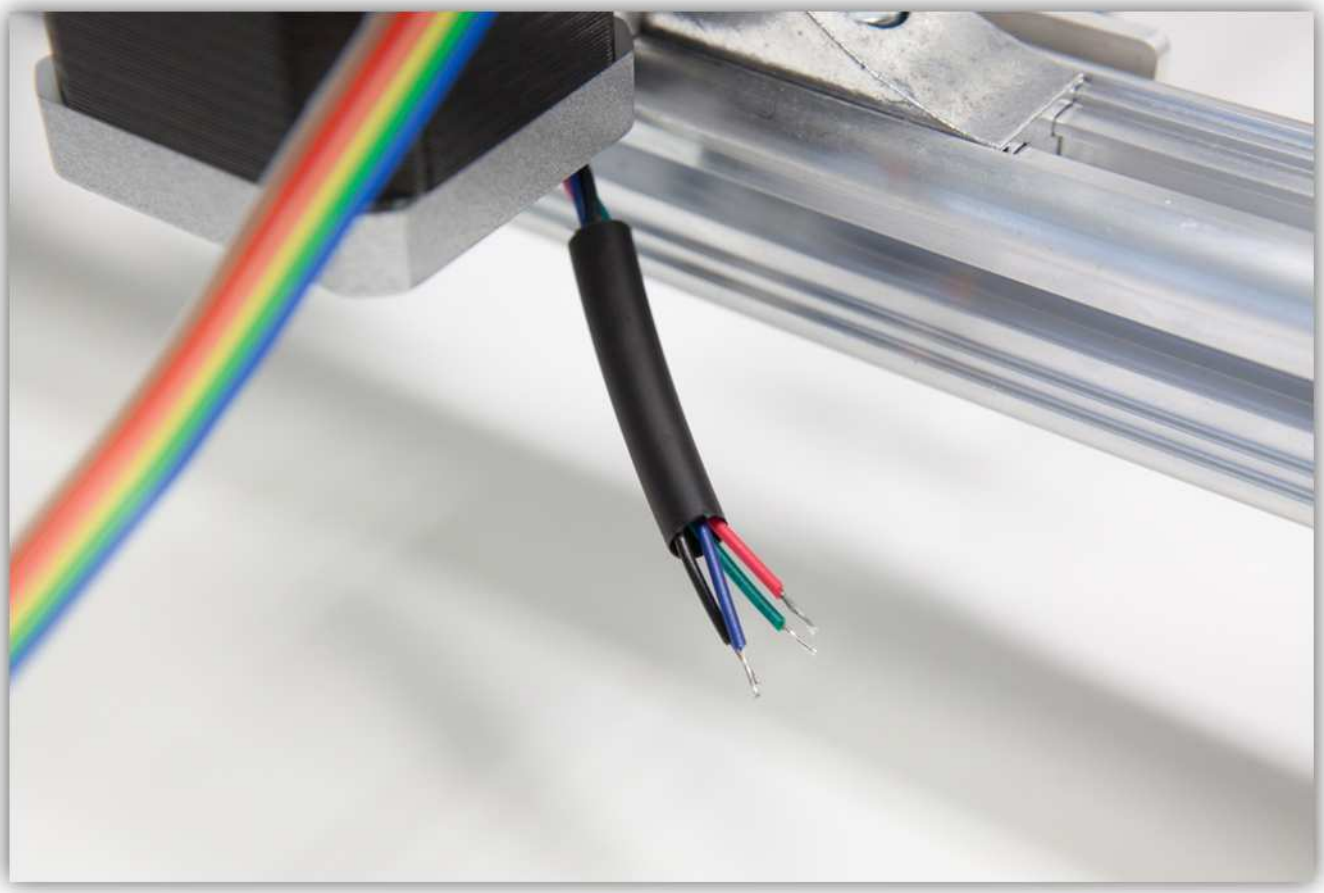
Shorten the wires of the Z motor a bit and thin them.



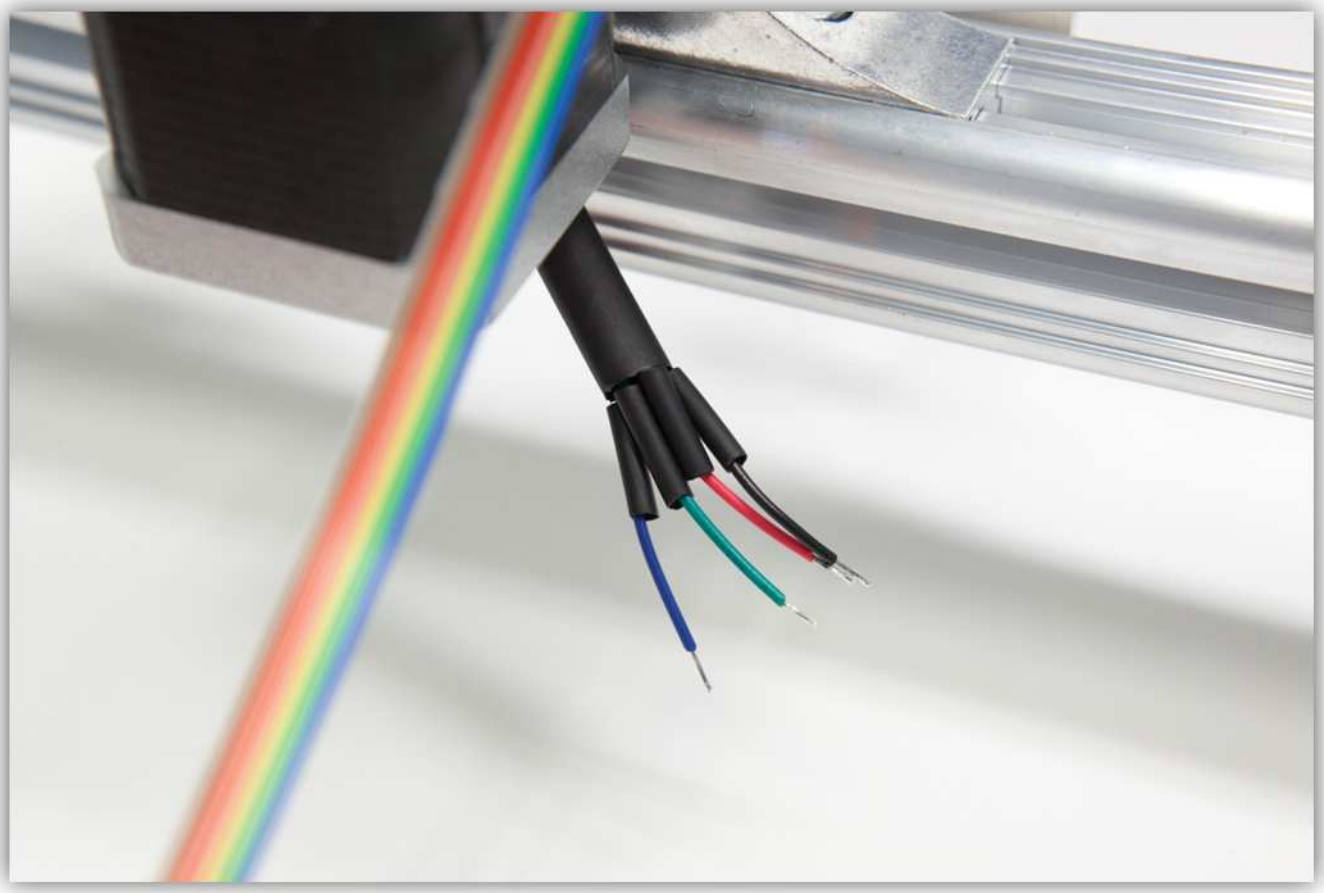


Cut 4 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the biggest piece of heat shrink tubing over the 4 wires from the motor.

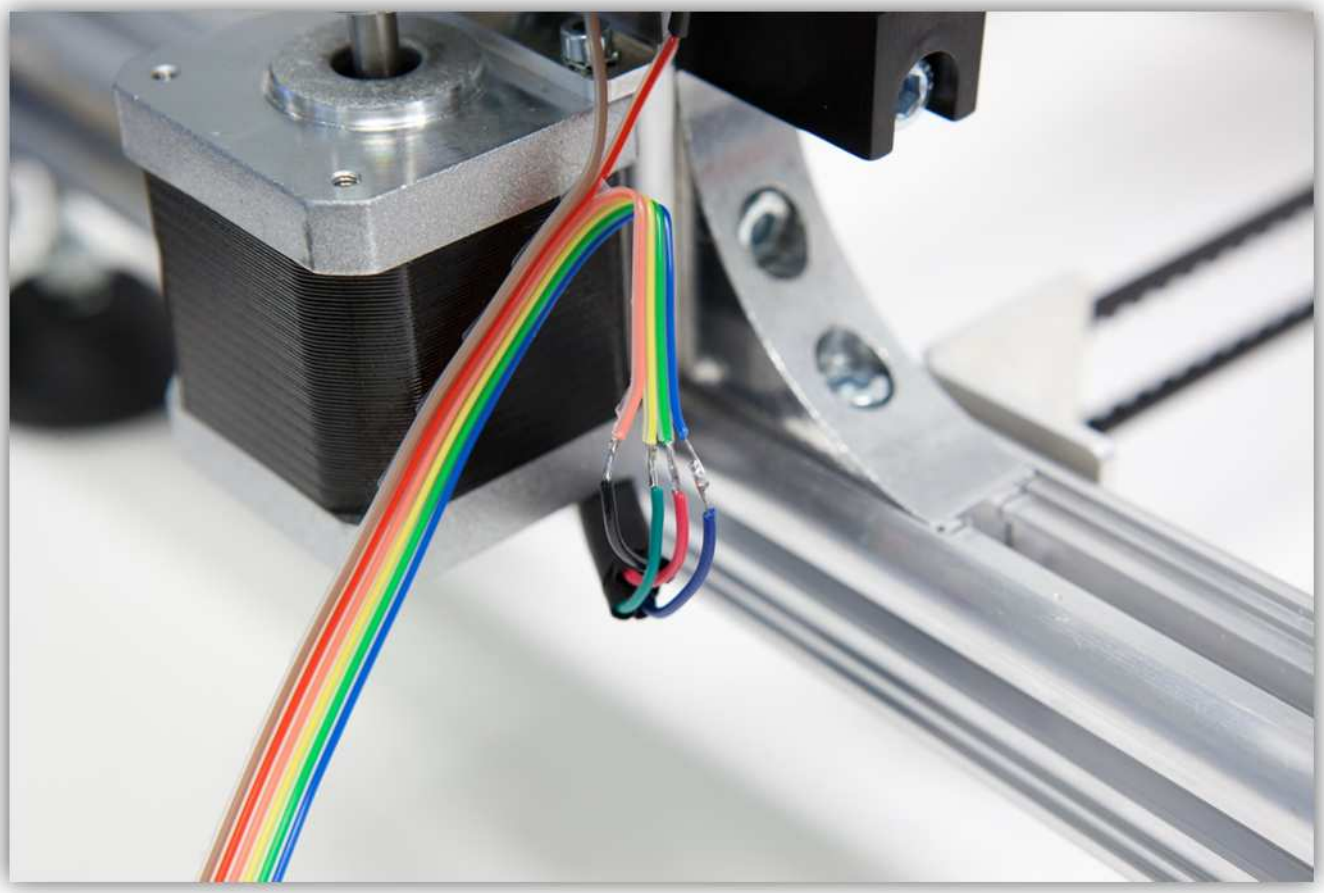


Slide the 4 small pieces of heat shrink tubing over the 4 wires of the motor.

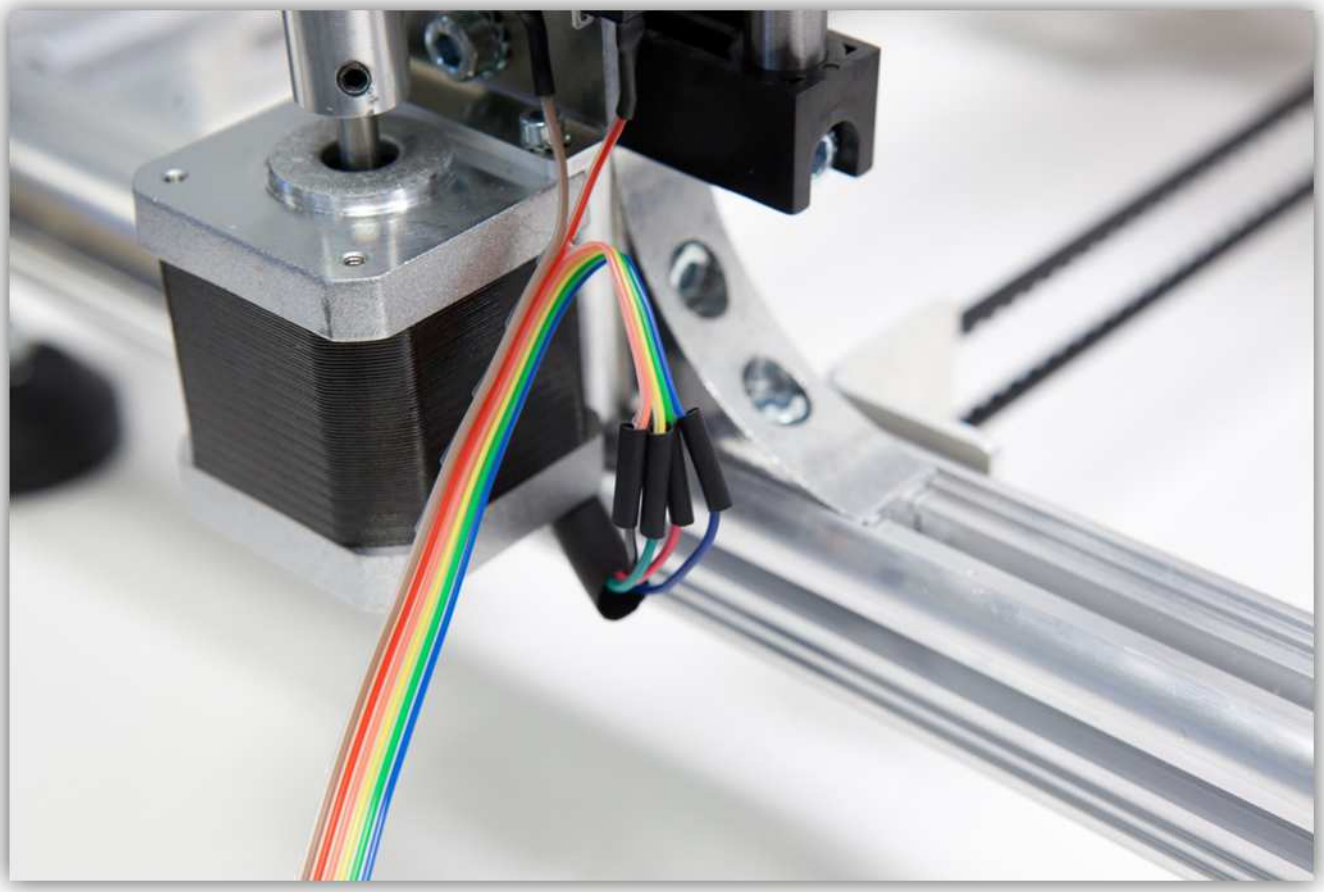


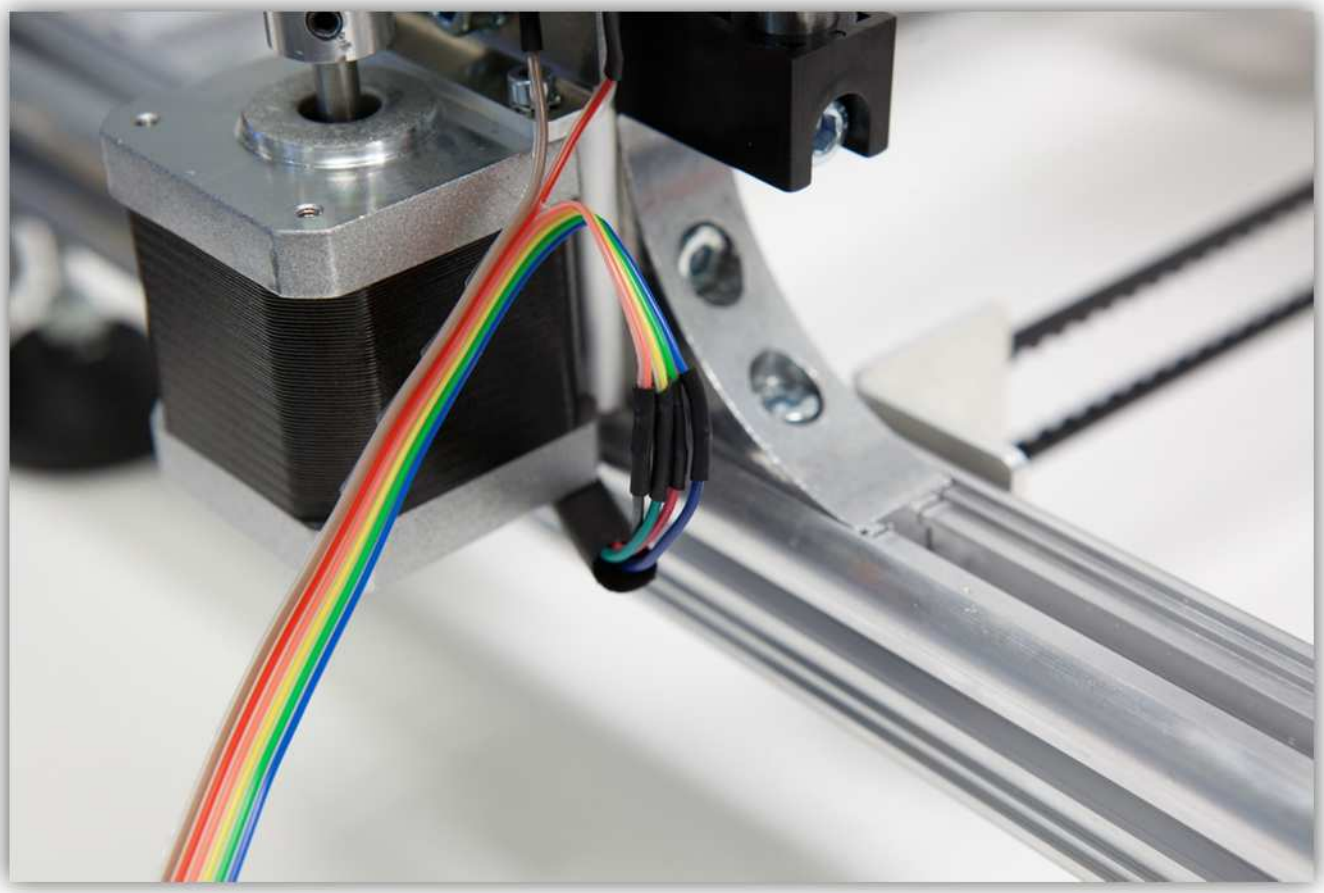
Solder the 4 wires from the motor to the 4 wires of the flat cable you tinned earlier. **Watch the colours closely.**

Flat cable	**->**	**Motor wires**
Blue	**->**	**Blue**
Green	**->**	**Red**
Yellow	**->**	**Green**
Orange	**->**	**Black**

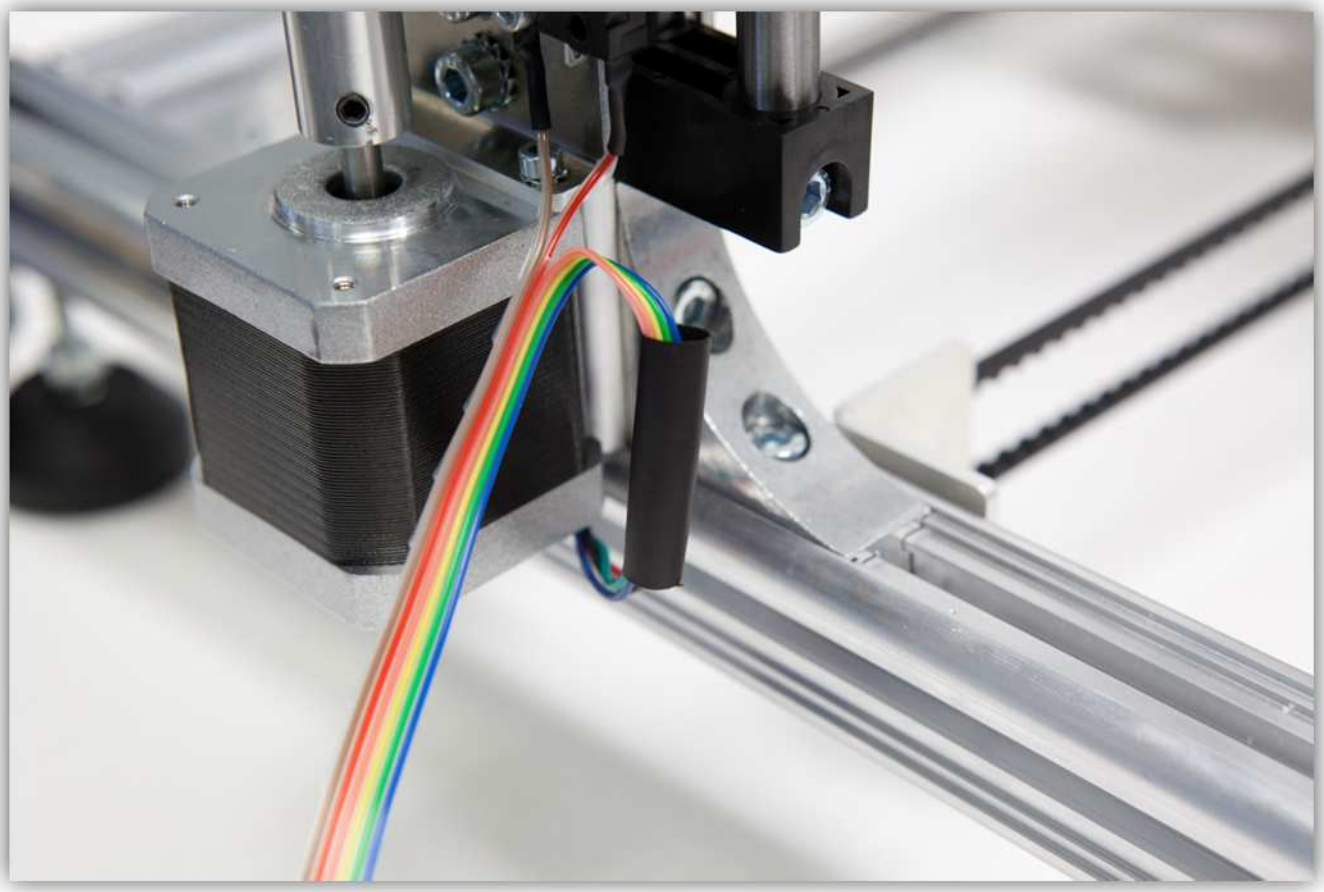


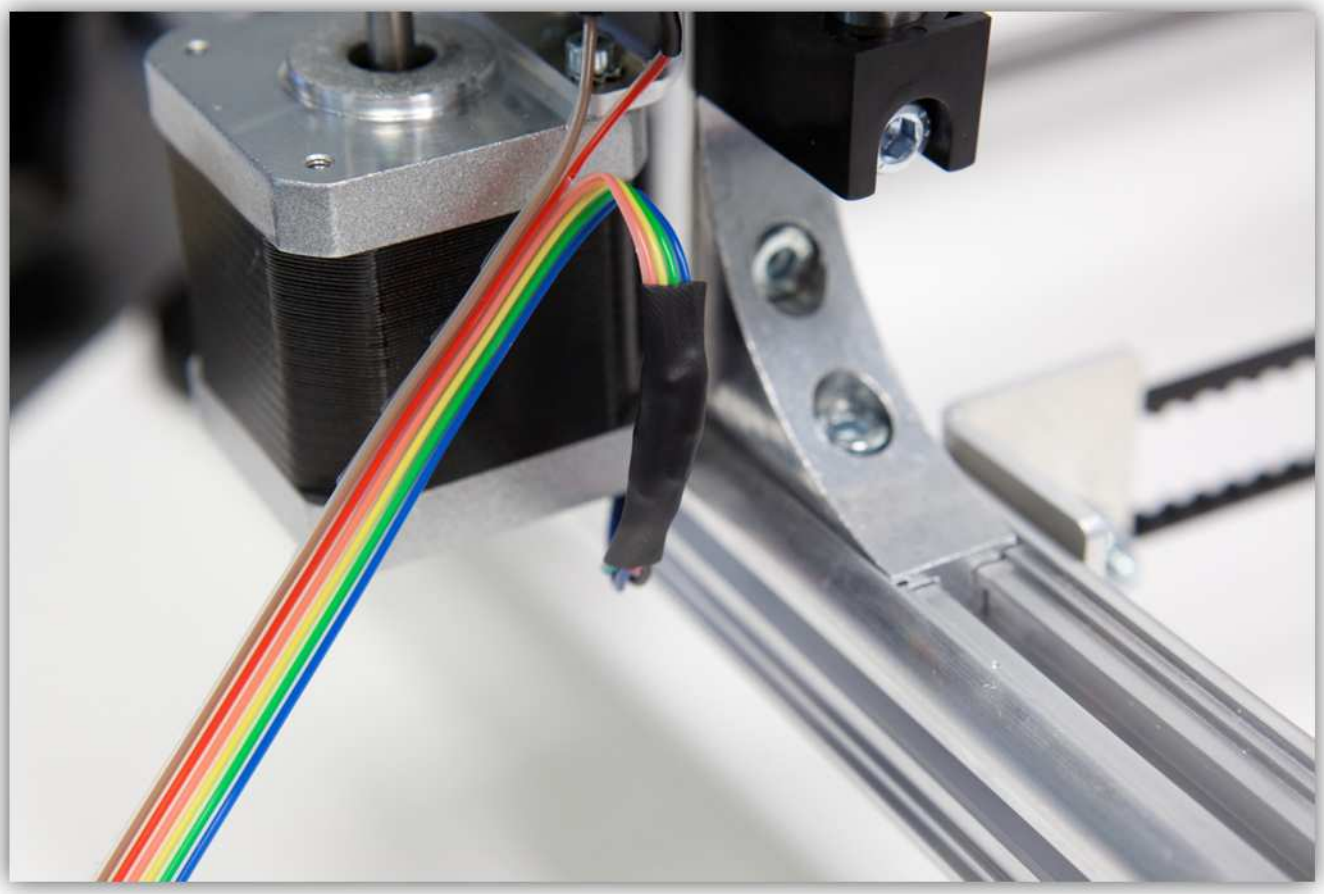
Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.



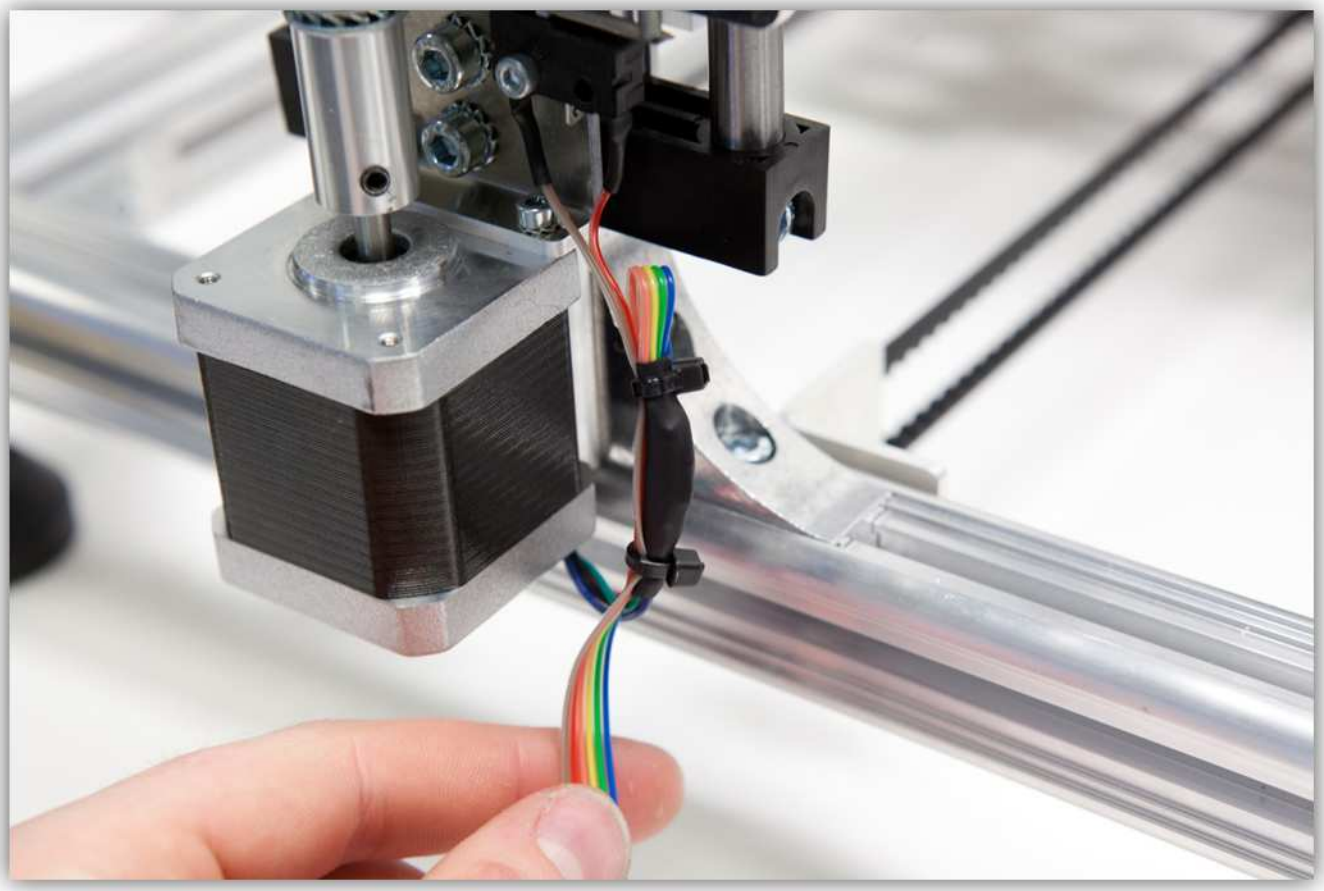


Now slide the big piece of heat shrink tubing over the 4 small pieces, heat the big piece so it covers and protects the 4 heat shrunk joints.

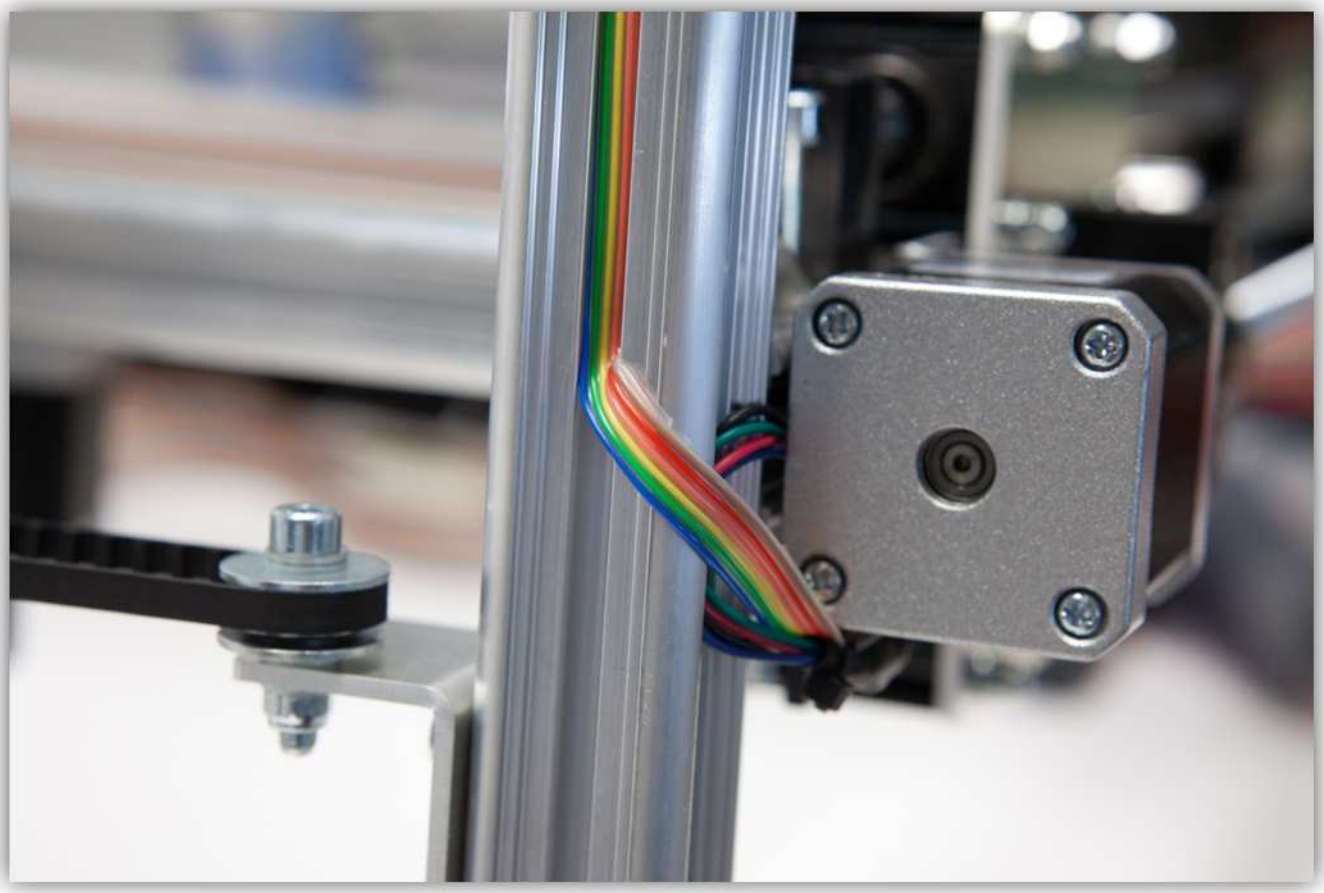


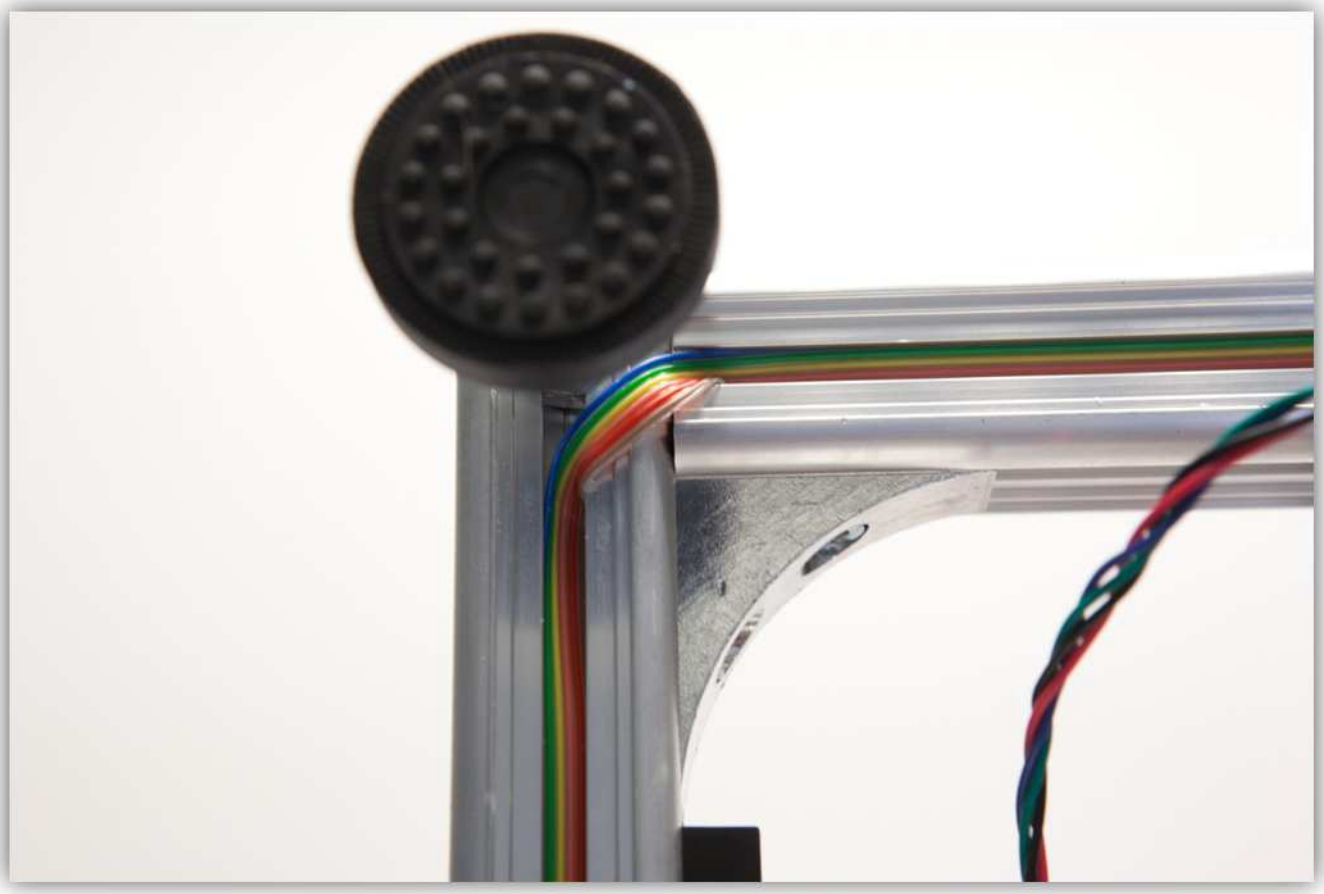


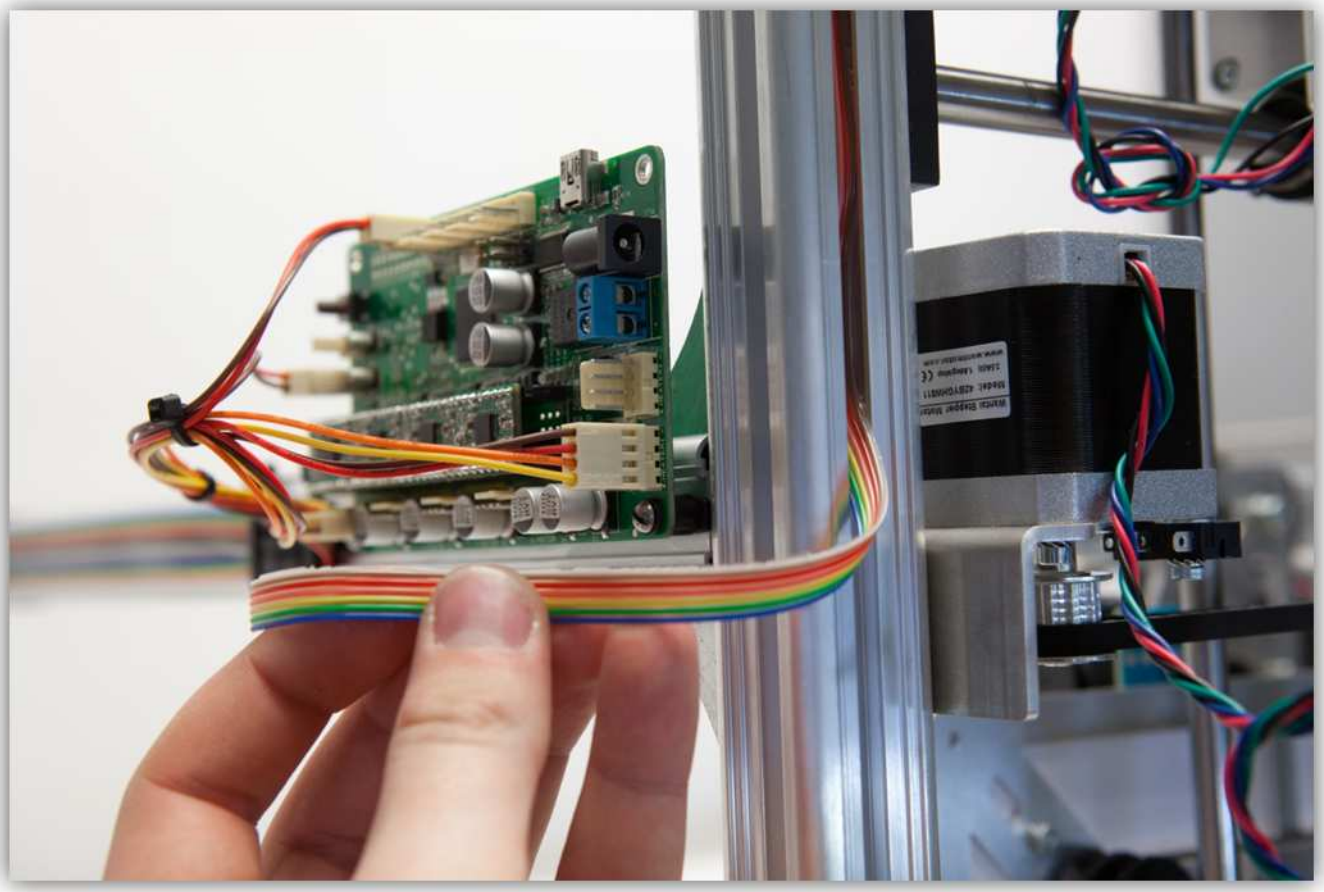
Use two small tie-strips to hold the wires in place as shown in the picture below.



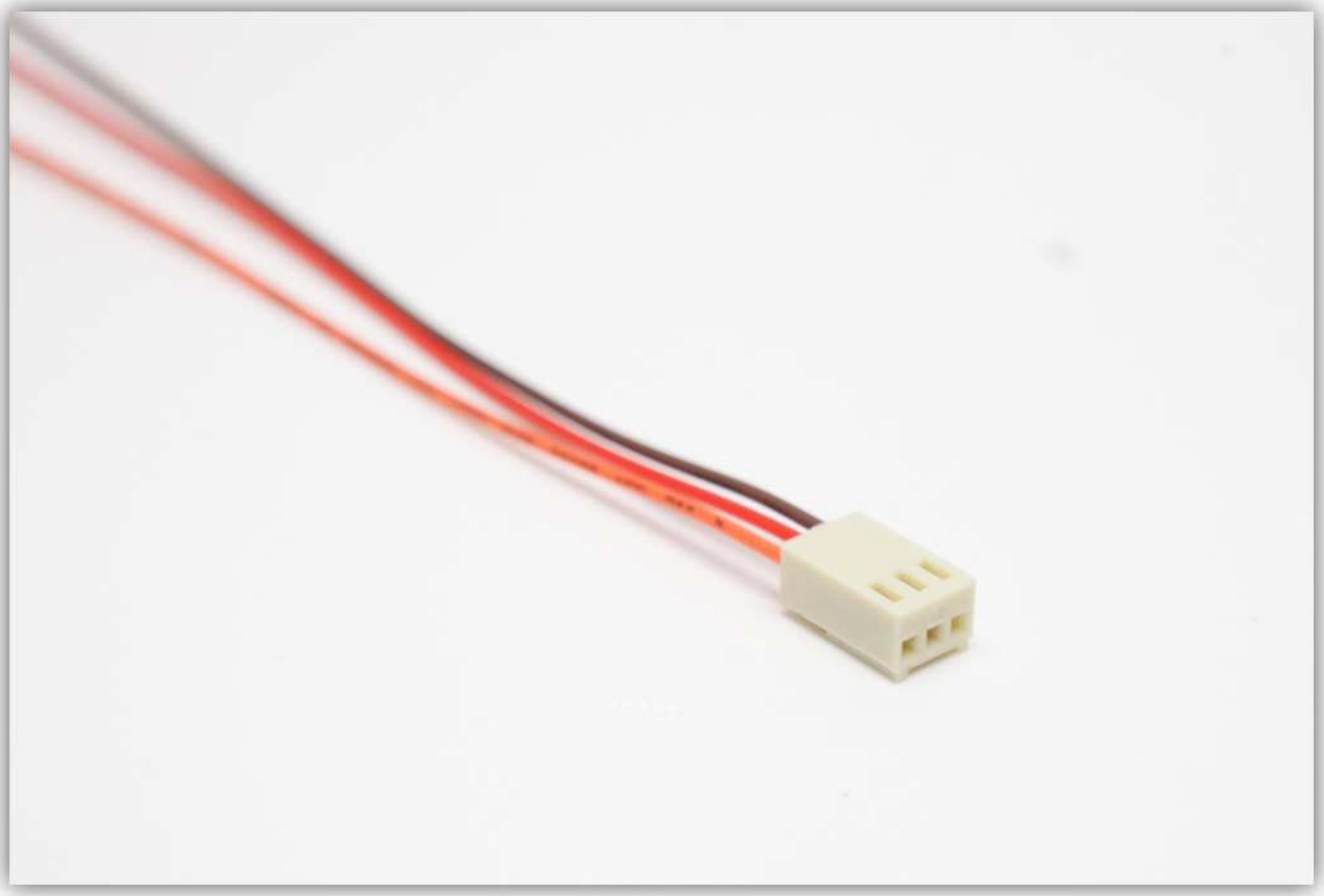
Slide the flat cable in the hollow space of the profile, run it through the back of the printer as shown in the picture below.



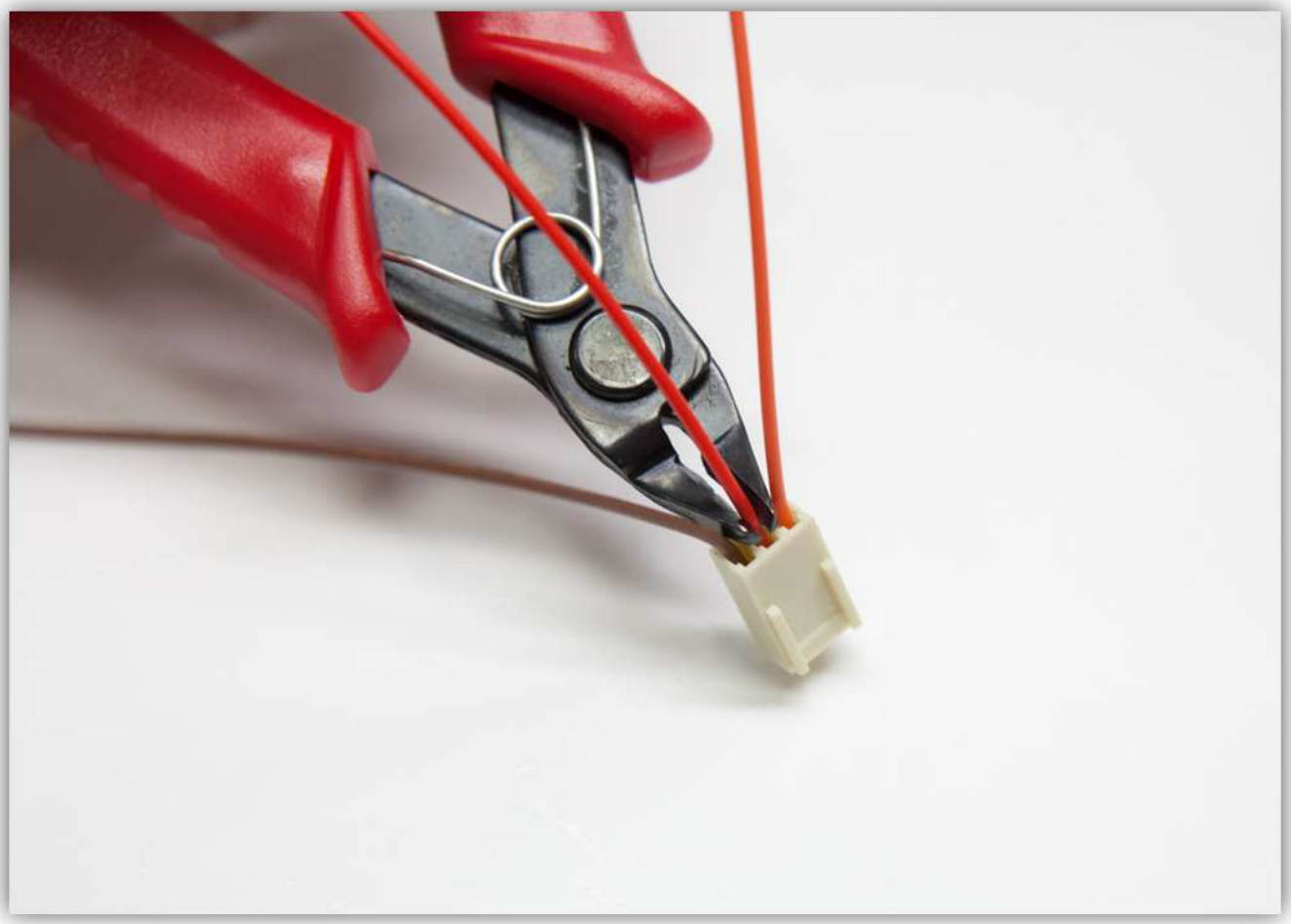


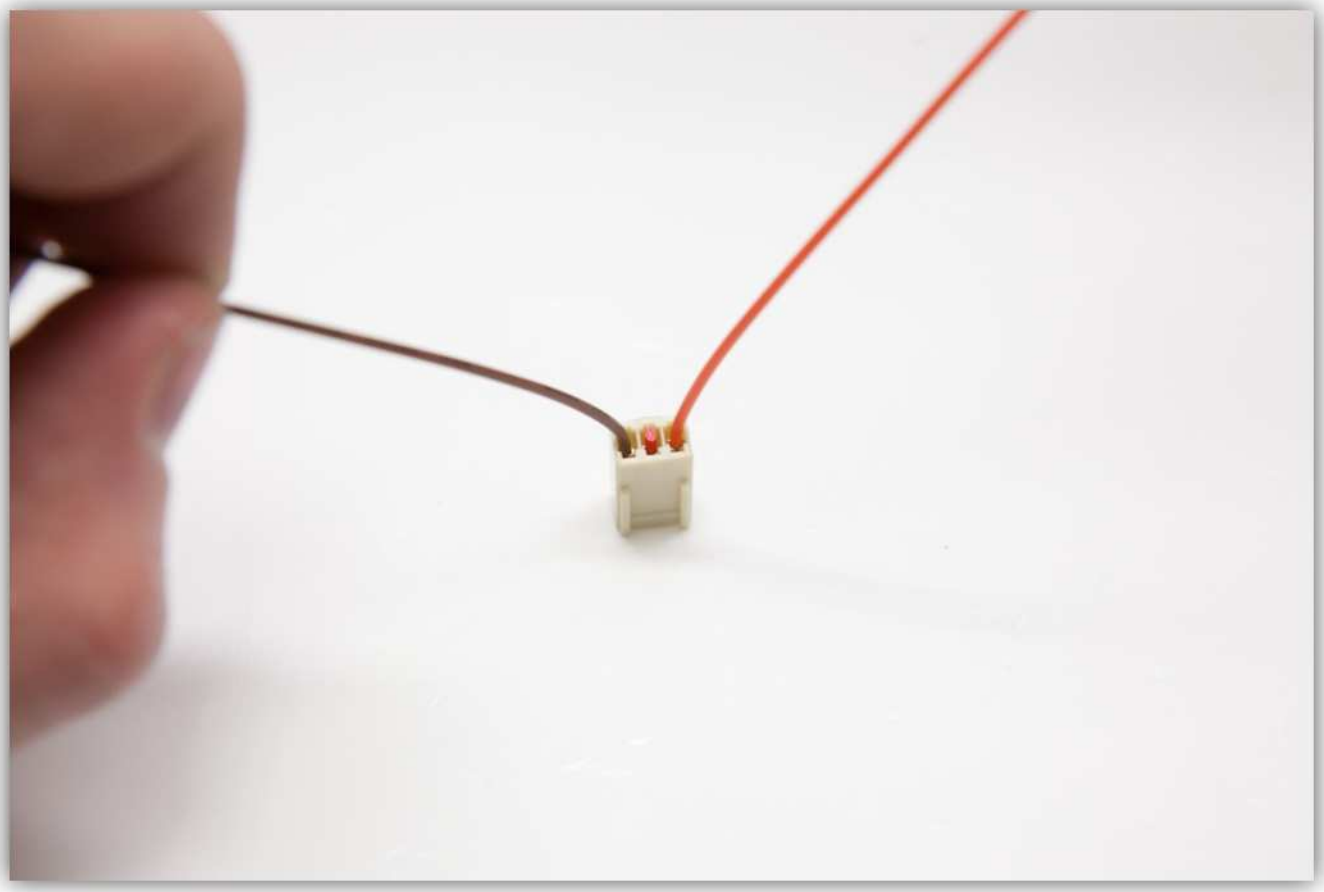


Take a board to wire connector with 3 wires out of the bag labelled with 40.

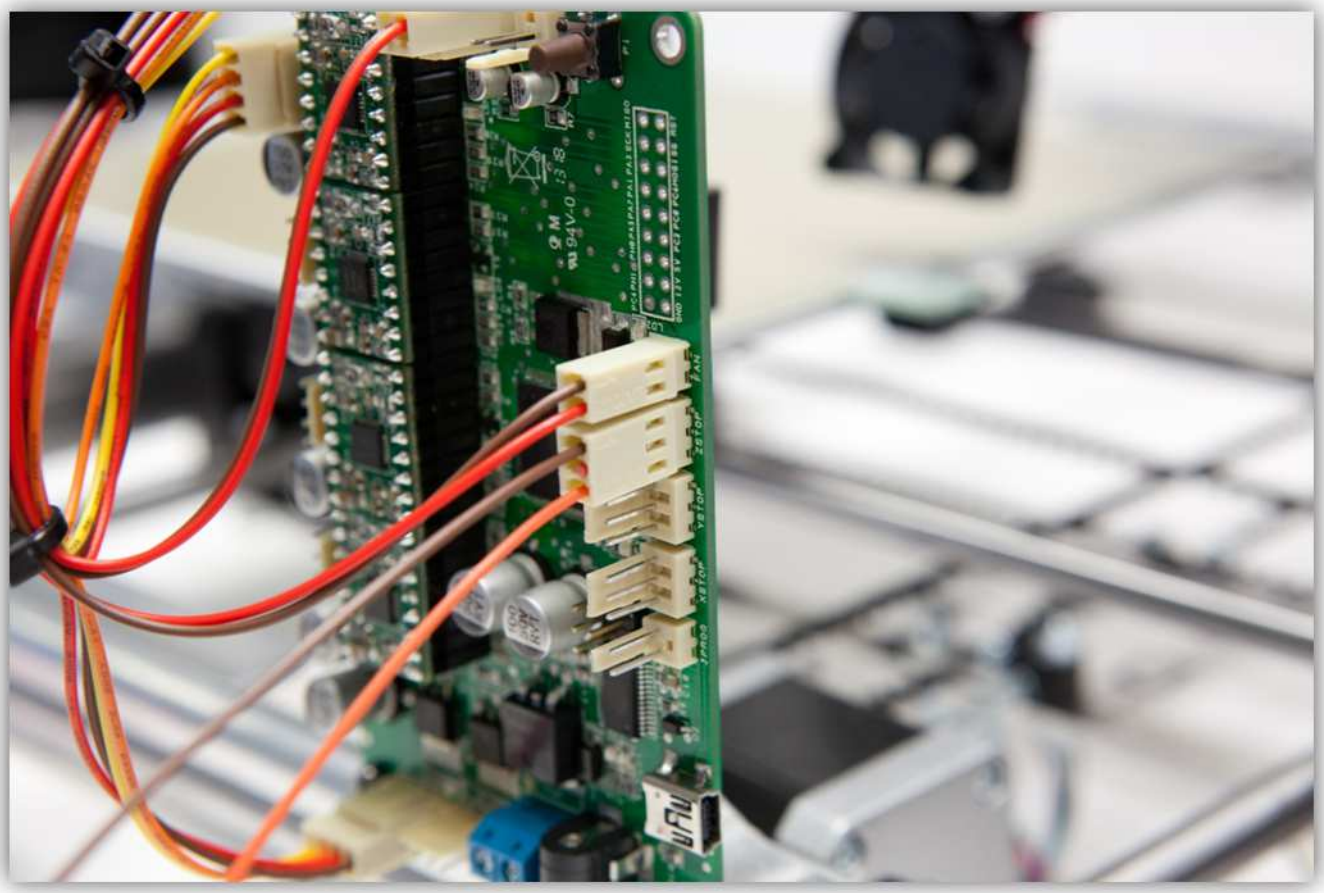


Cut the middle wire away at the connector.

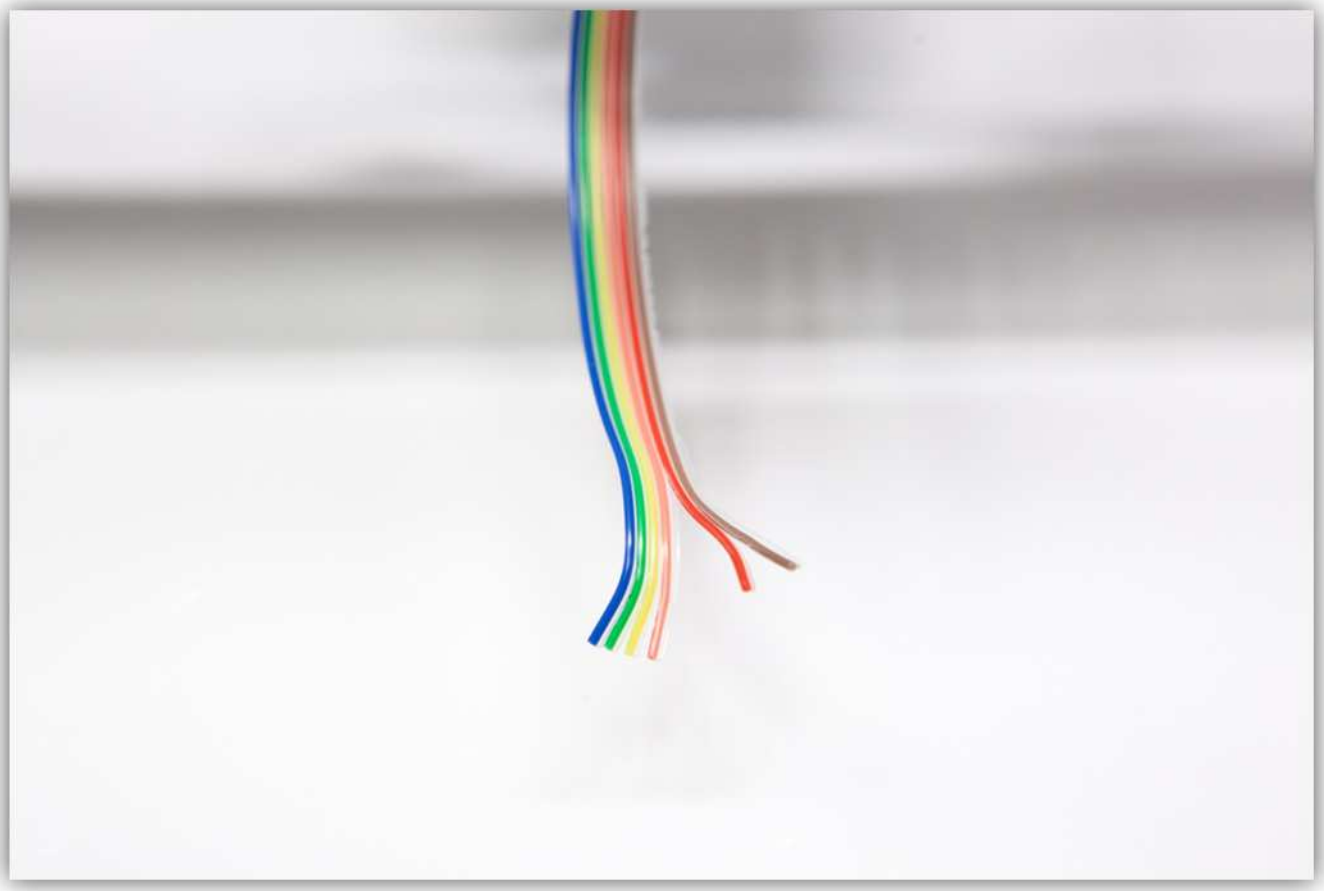


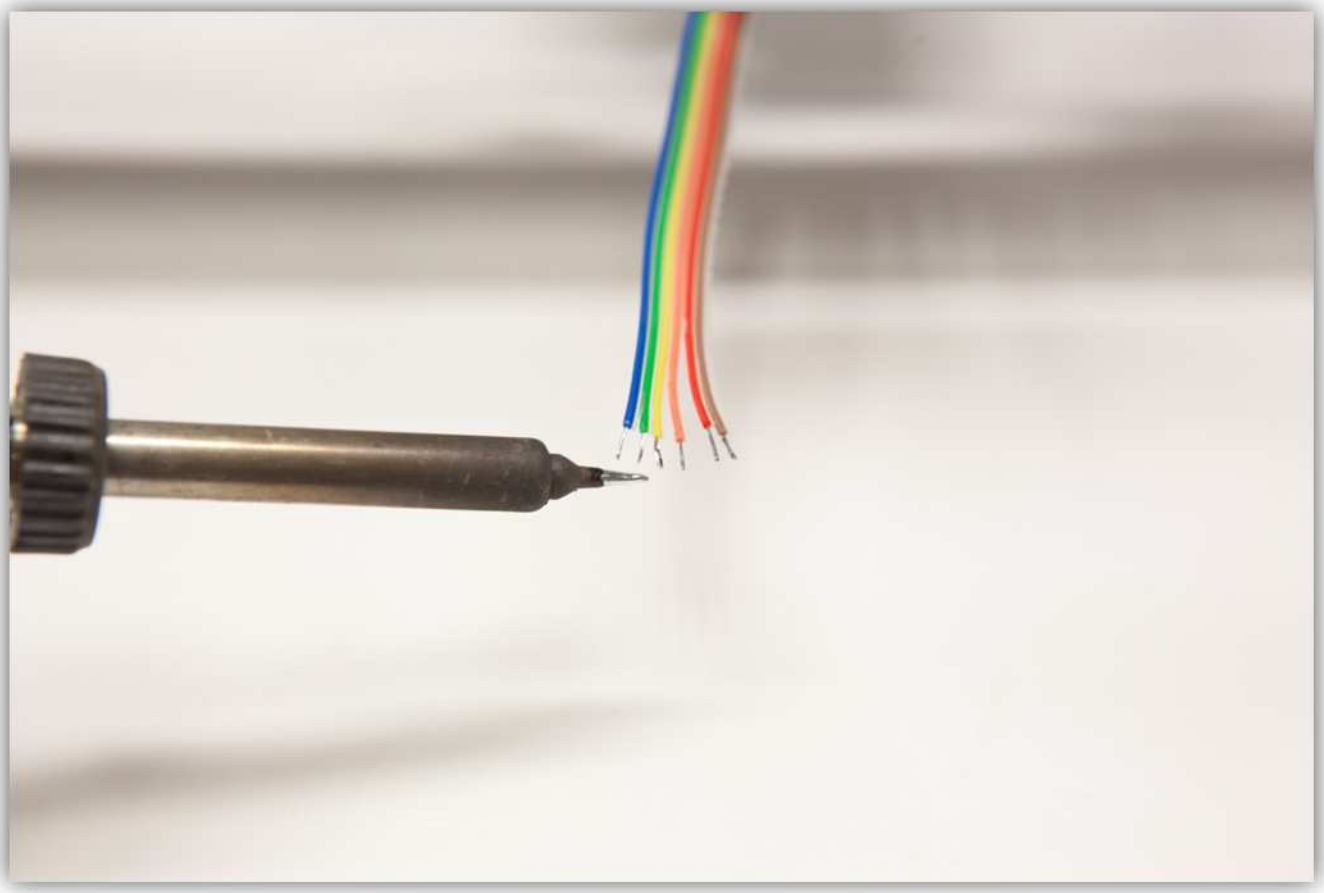


Plug the female connector in the male connector labelled with ZSTOP on the controller board.



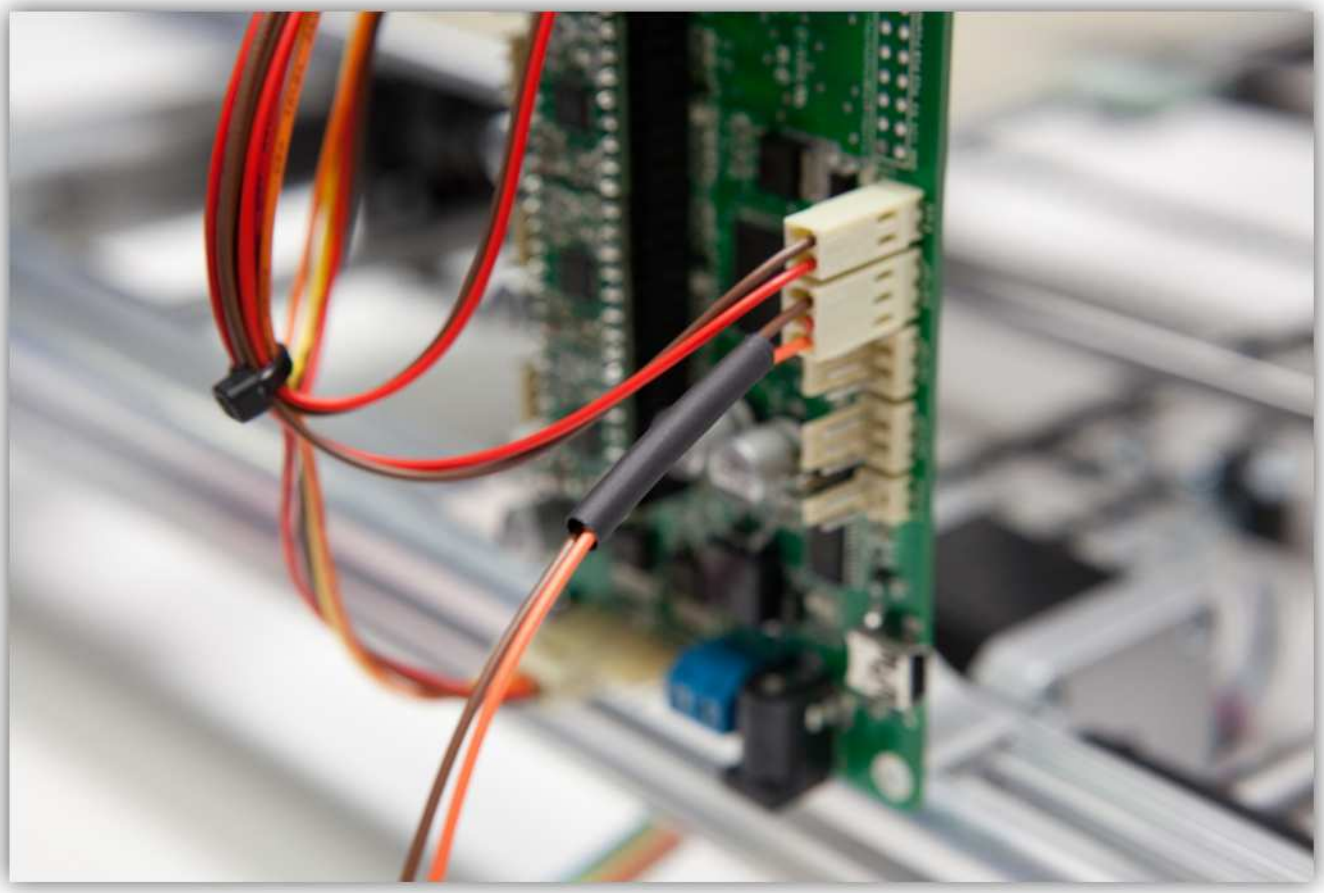
Strip all the wires from the flat cable that comes from the Z motor.



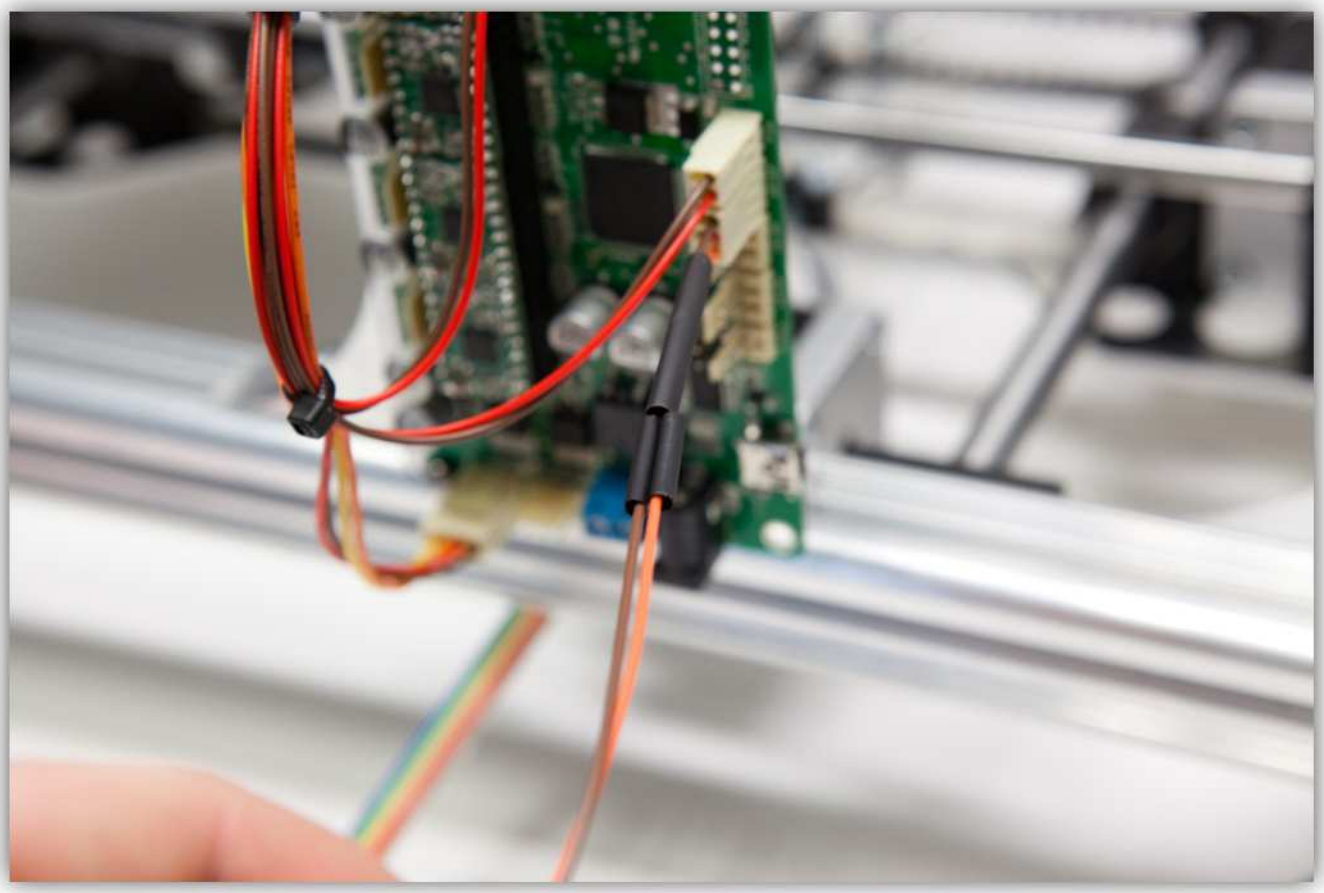


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the medium size heat shrink tubes over the 2 wires of the connector.

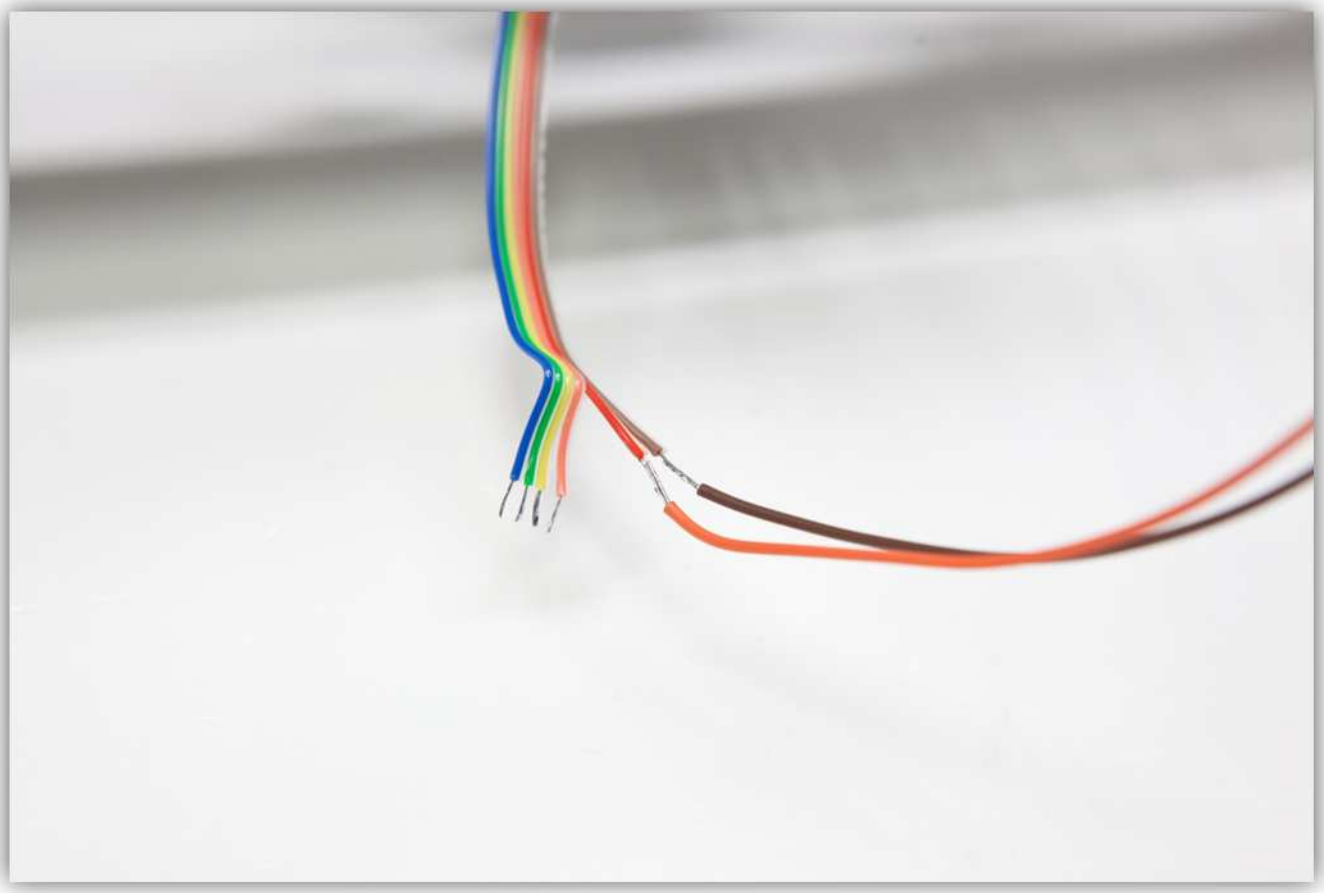


Slide the 2 small heat shrink tubes over the 2 wires of the connector.

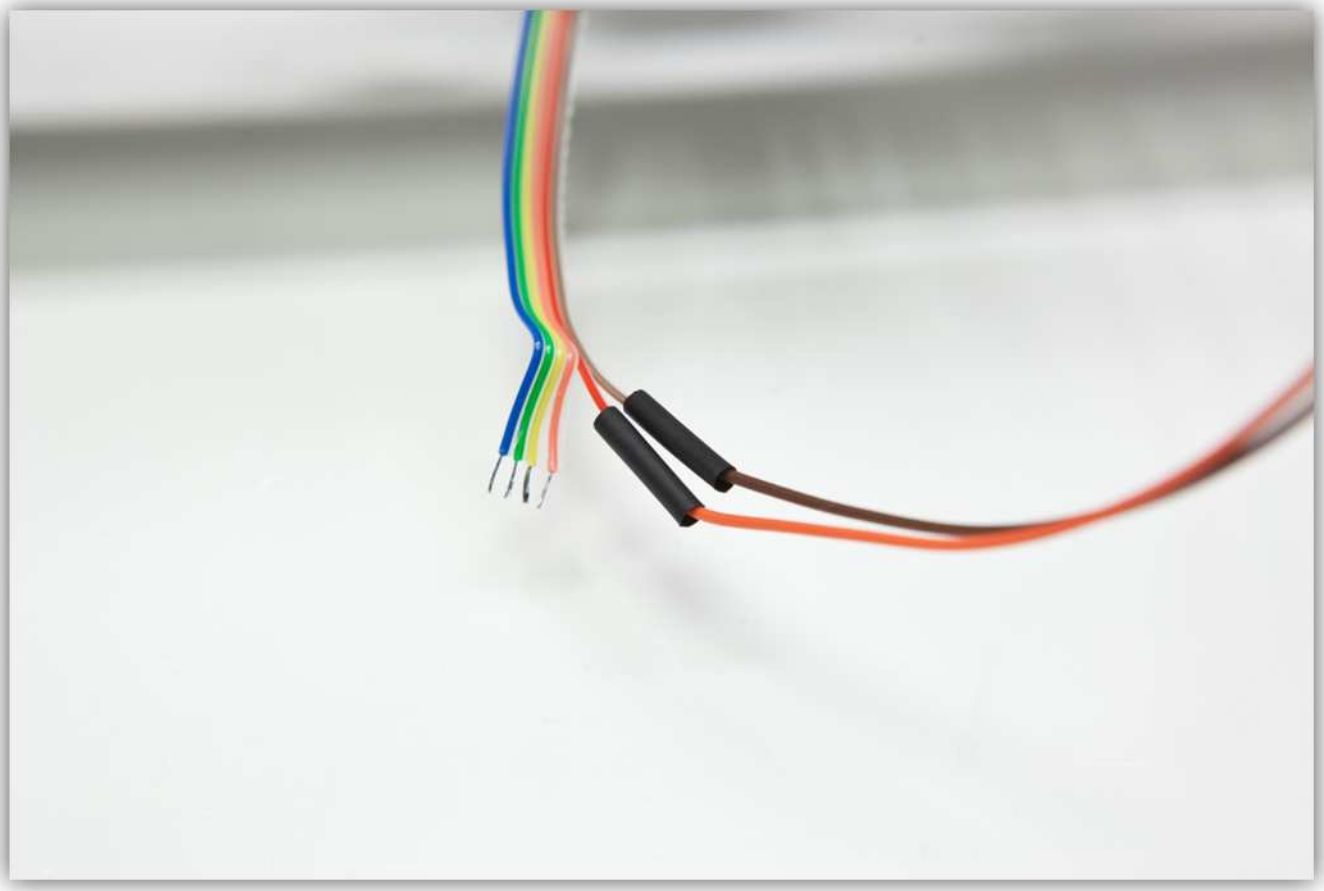


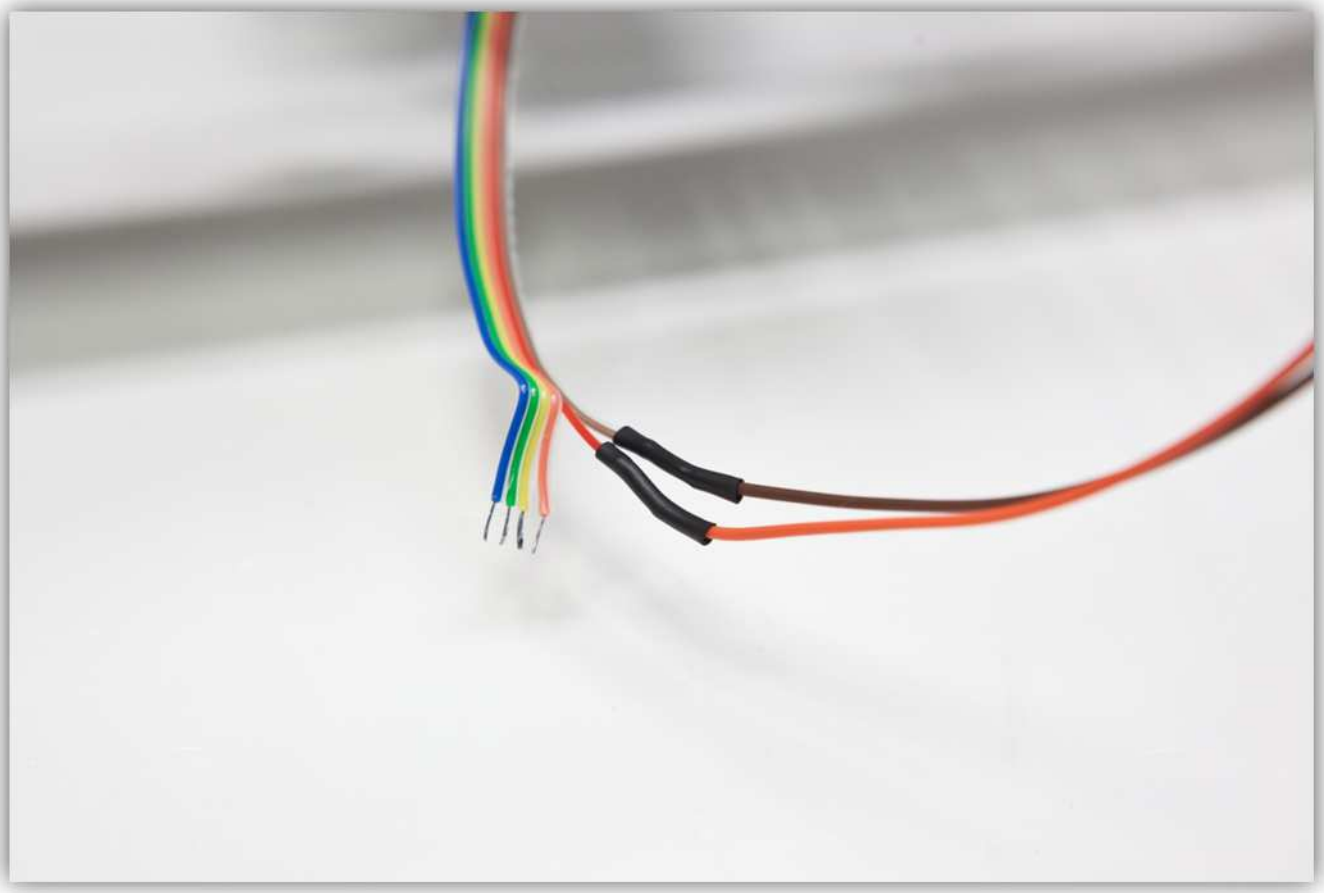
Solder the 2 wires from the connector to the 2 wires of the flat cable you tinned earlier. **Watch the colours closely.**

Flat cable	**->**	**Connector wires**
Red	**->**	**Red**
Brown	**->**	**Brown**

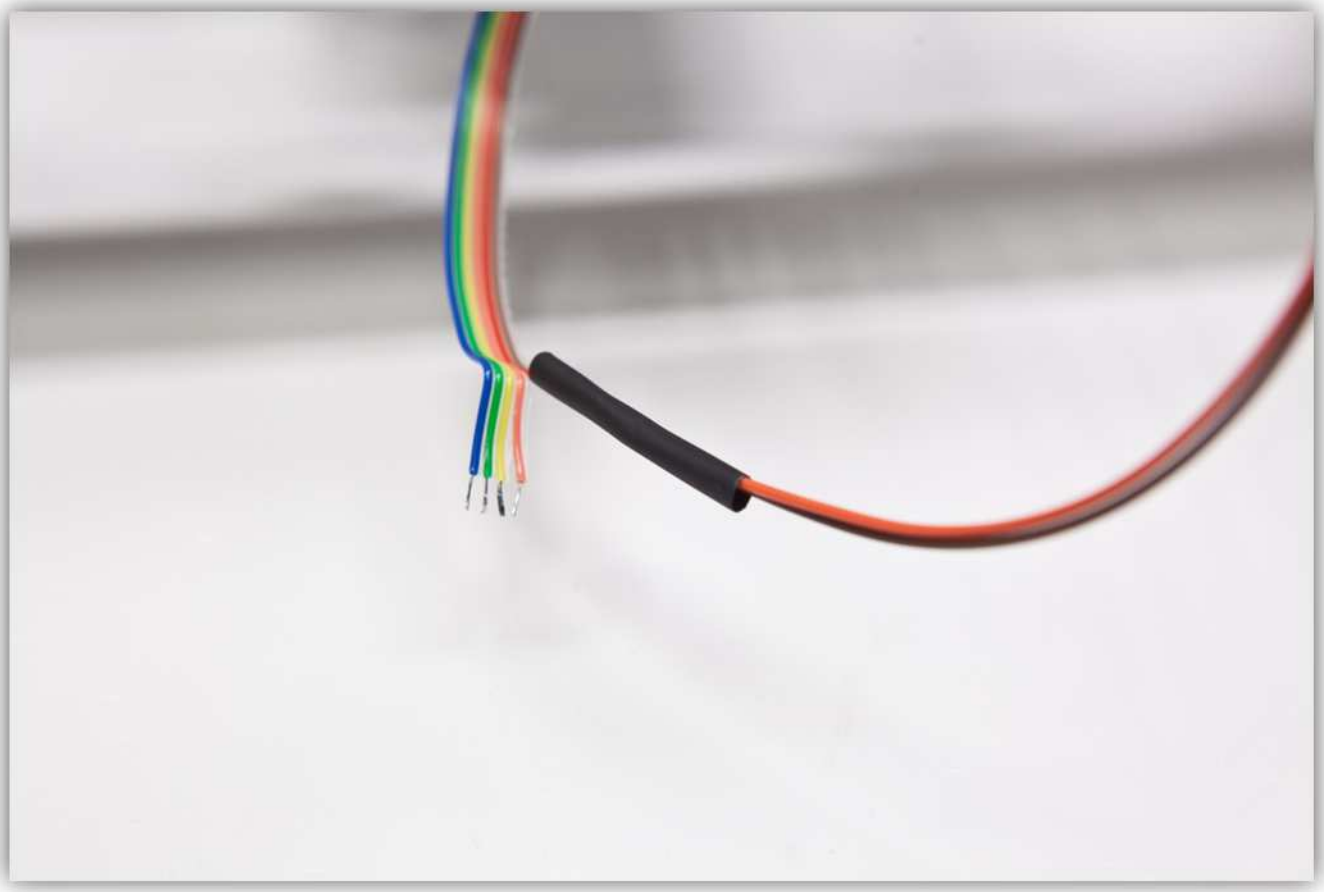


Slide the 2 small heat shrink tubes over the solder joints and heat them up.



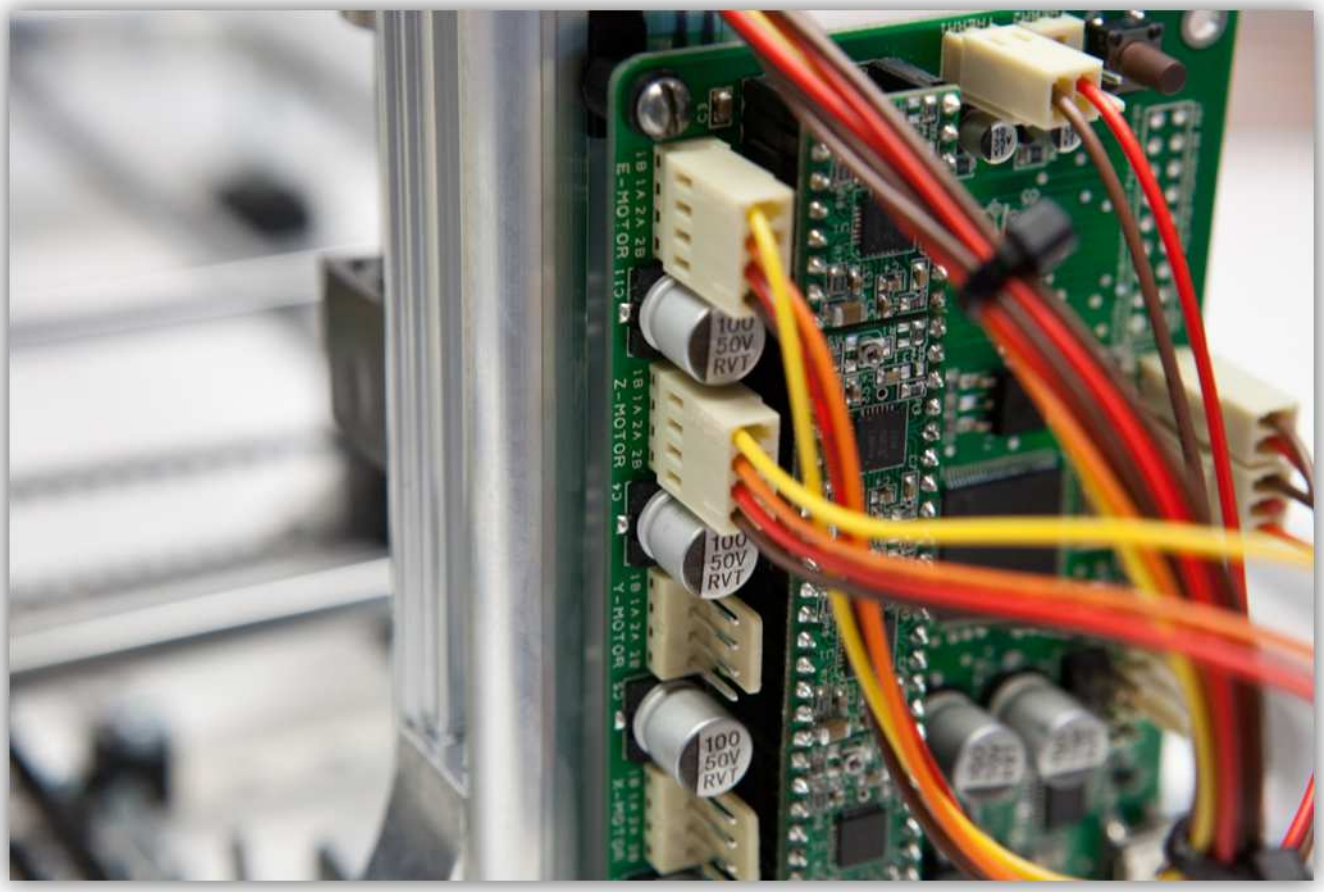


Now slide the medium size piece of heat shrink tubing over the 2 small pieces, heat the medium size piece so it covers and protects the 2 heat shrunk joints.



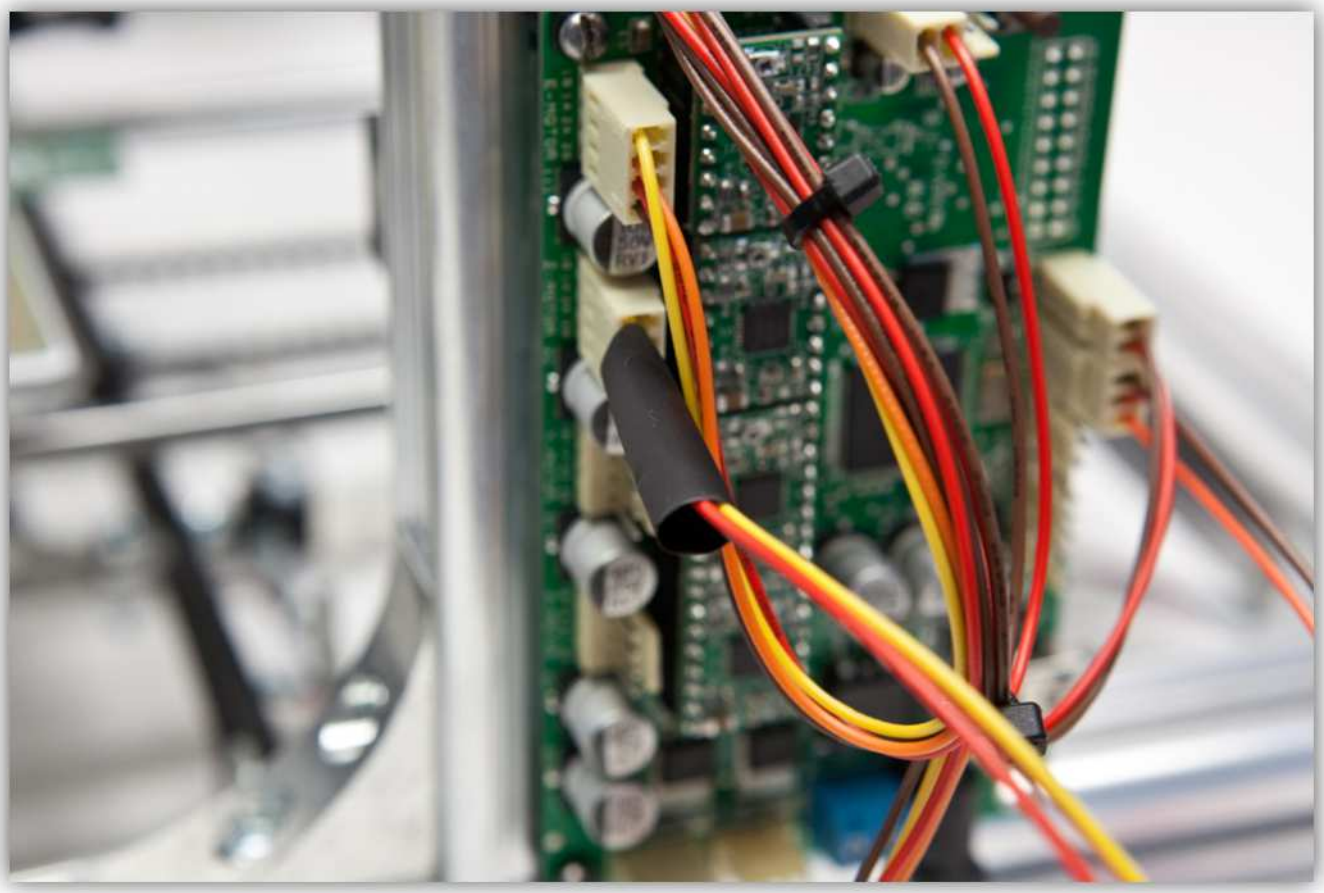
Take a board to wire connector with 4 wires out of the bag labelled with 40.

Plug the female connector in the male connector labelled with Z-MOTOR on the controller board.



Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the big heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

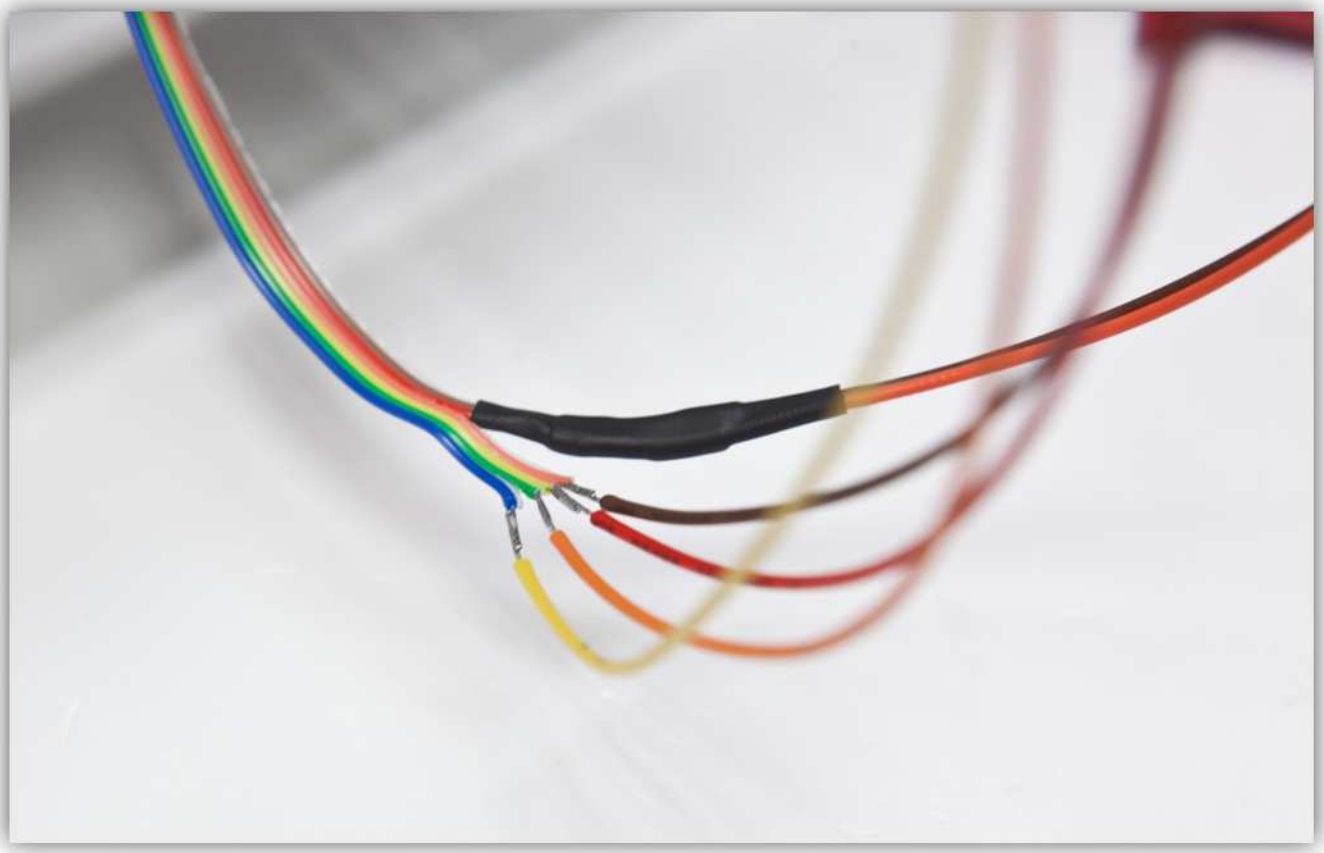
Slide the big heat shrink tubes over the 4 wires of the connector.



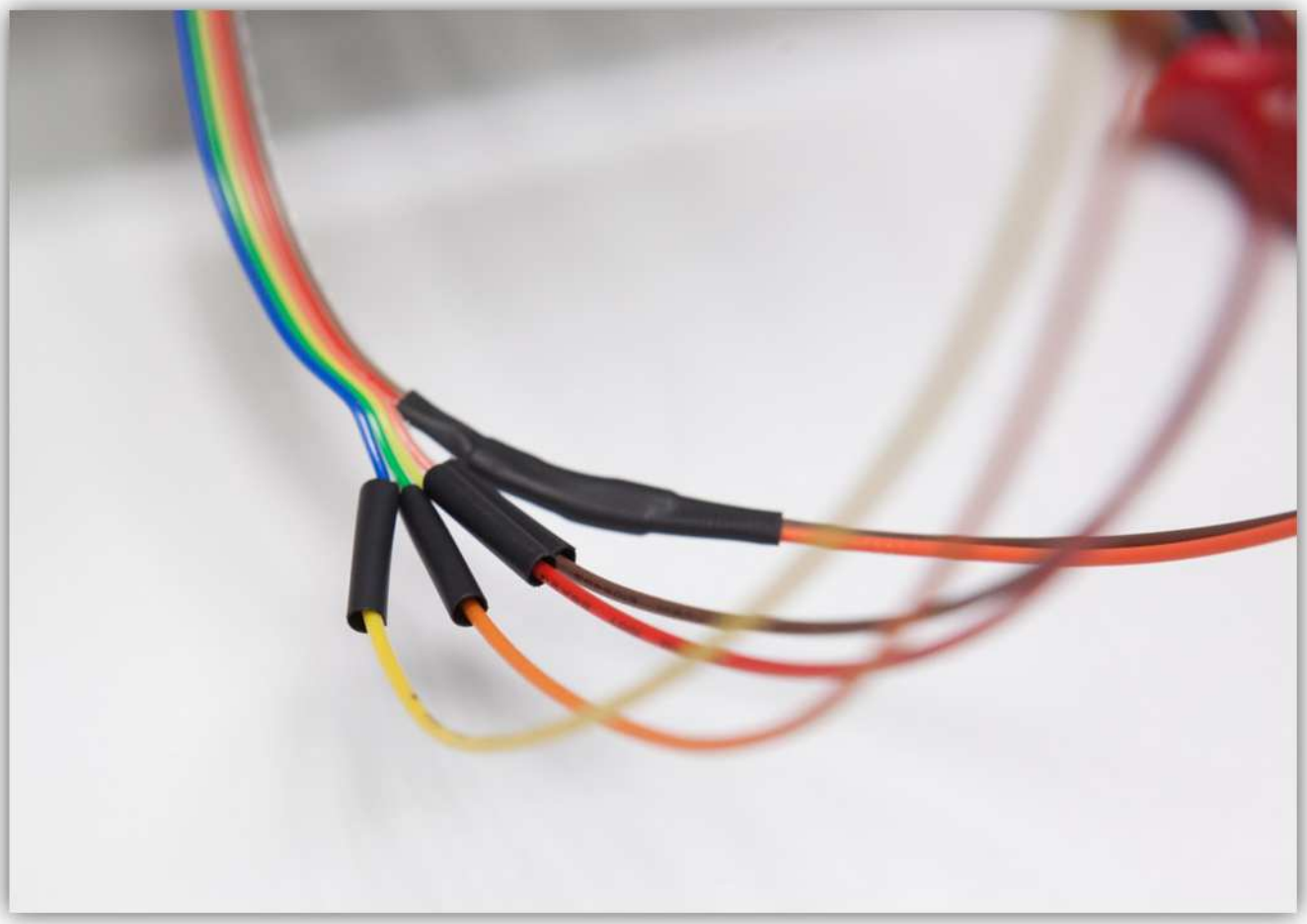
Slide the 4 small heat shrink tubes over the 4 wires of the connector.

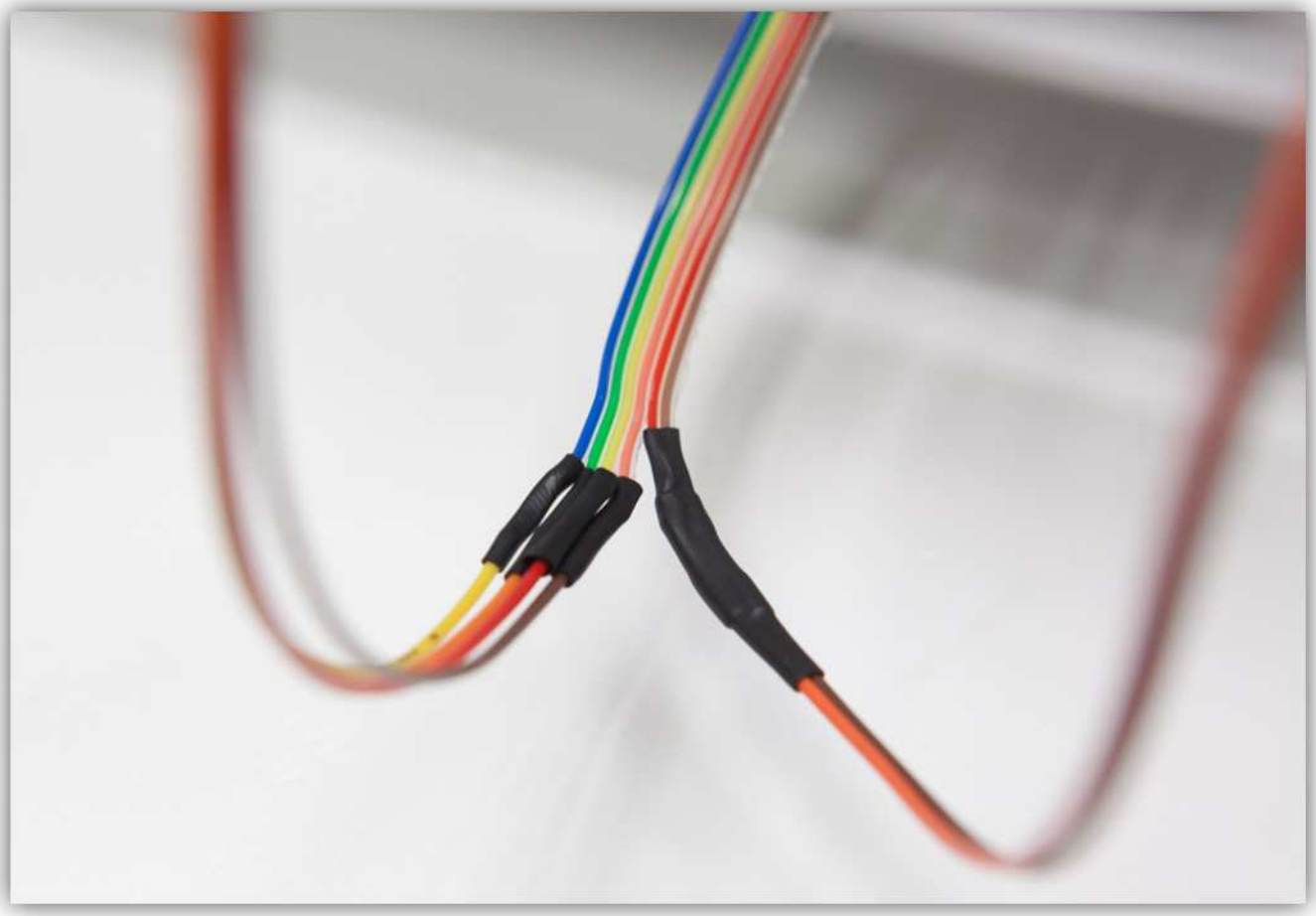
Solder the 4 wires from the connector to the 4 wires of the flat cable you tinned earlier. **Watch the colours closely.**

Flat cable	**->**	**Connector wires**
Blue	**->**	**Yellow**
Green	**->**	**Orange**
Yellow	**->**	**Red**
Orange	**->**	**Brown**

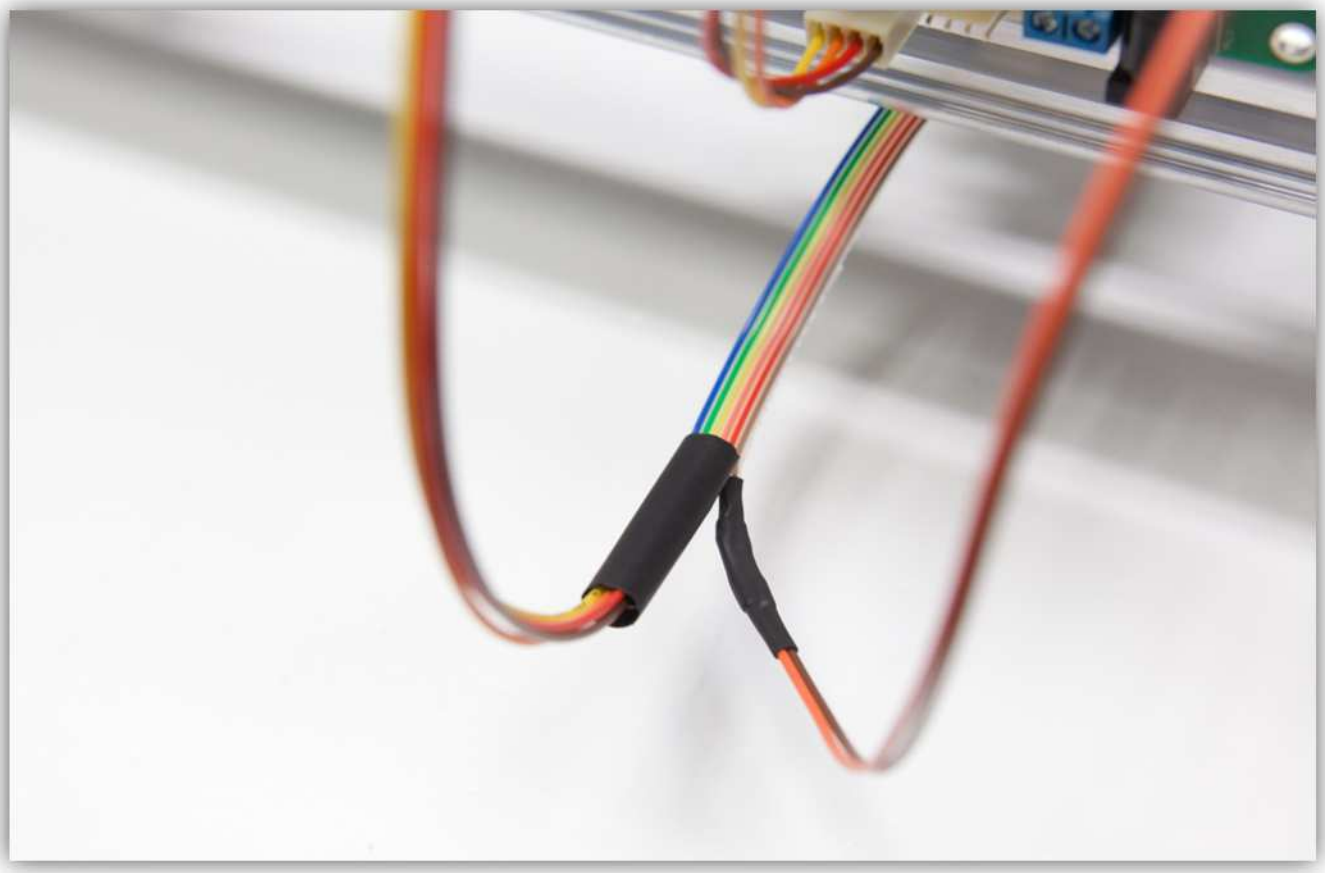


Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.

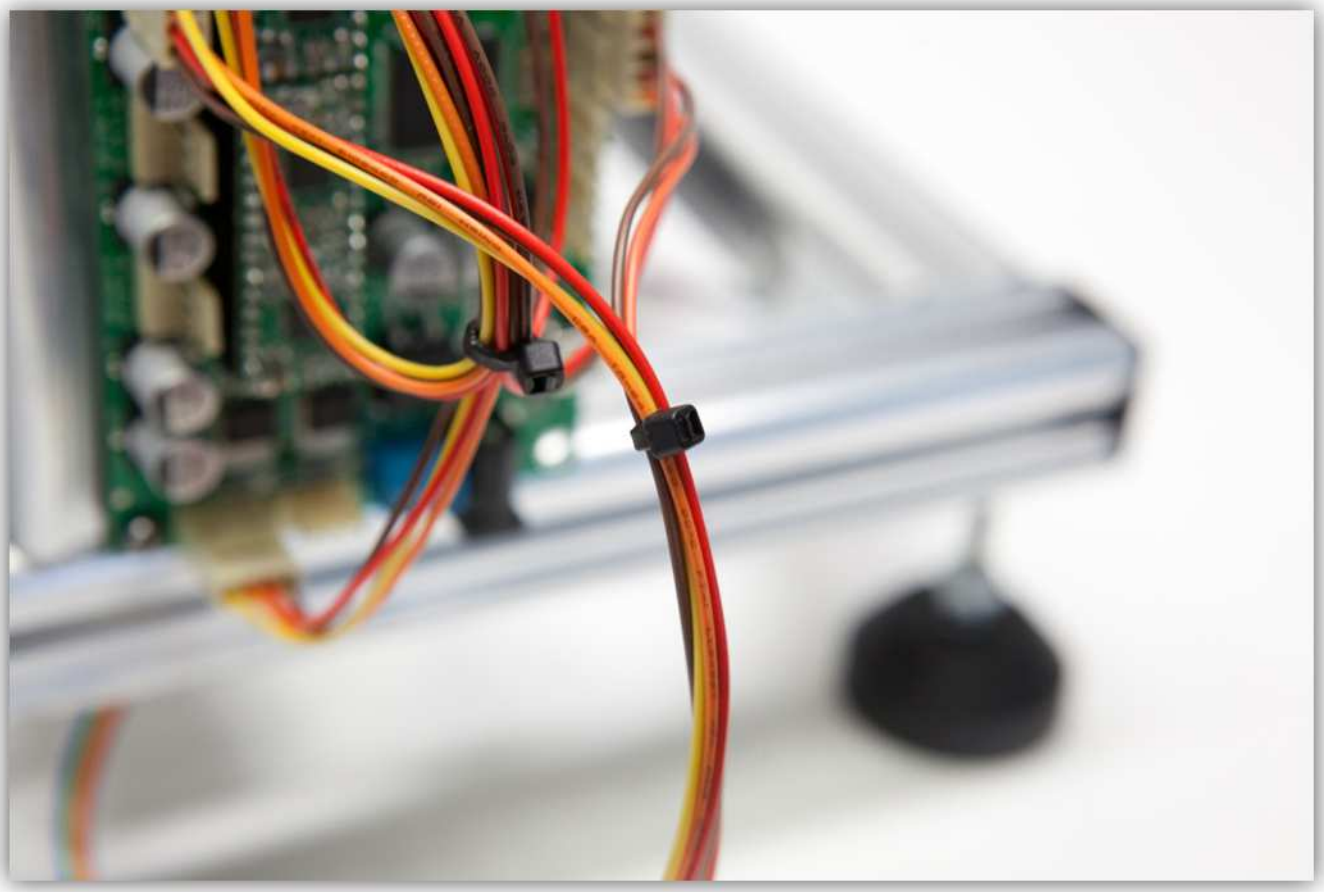




Now slide the big piece of heat shrink tubing over the 4 small pieces, heat the big piece so it covers and protects the 4 heat shrunk joints.

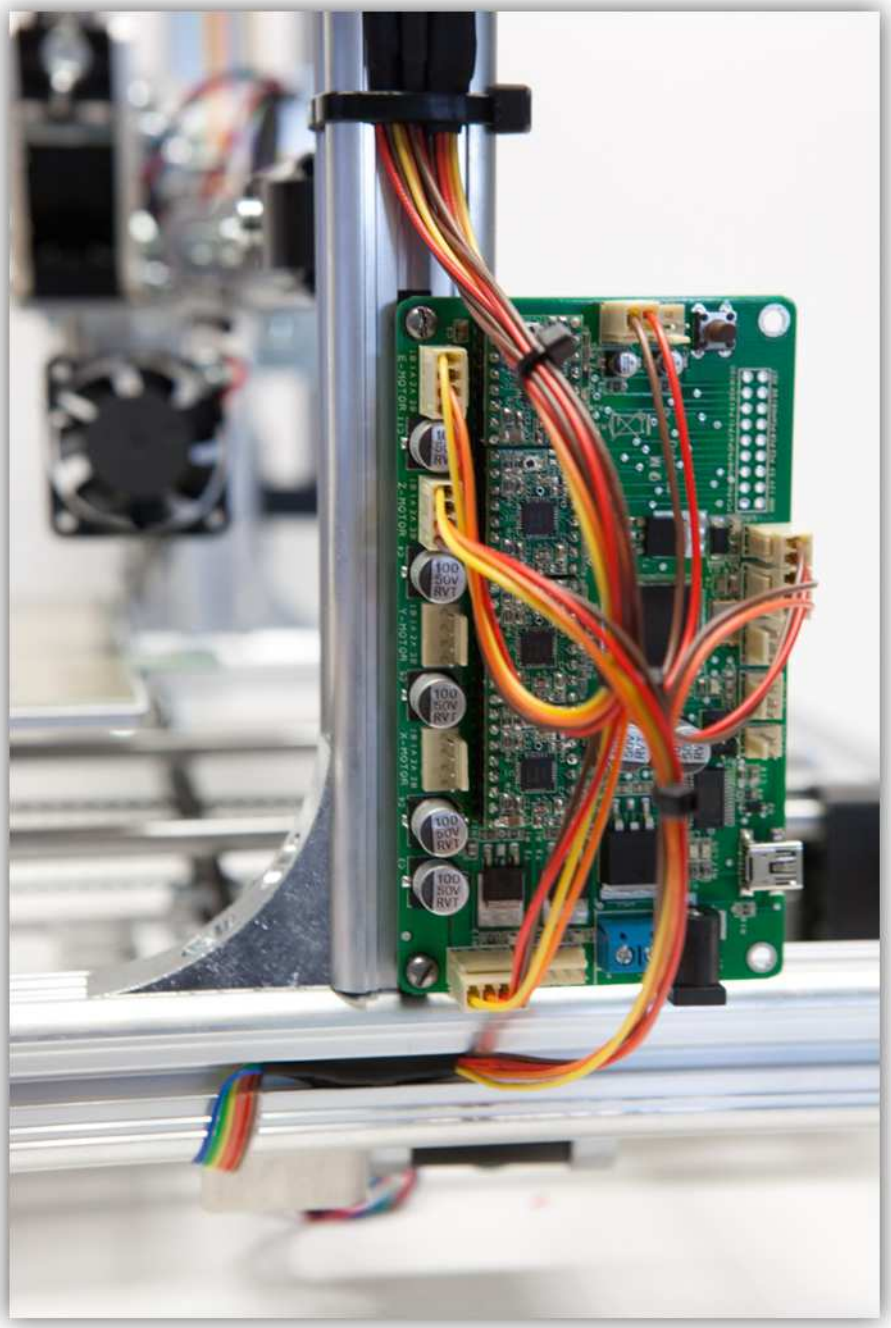


Use small tie-strips to group the cables together.



Tuck the excess cable into the void in the profiles.

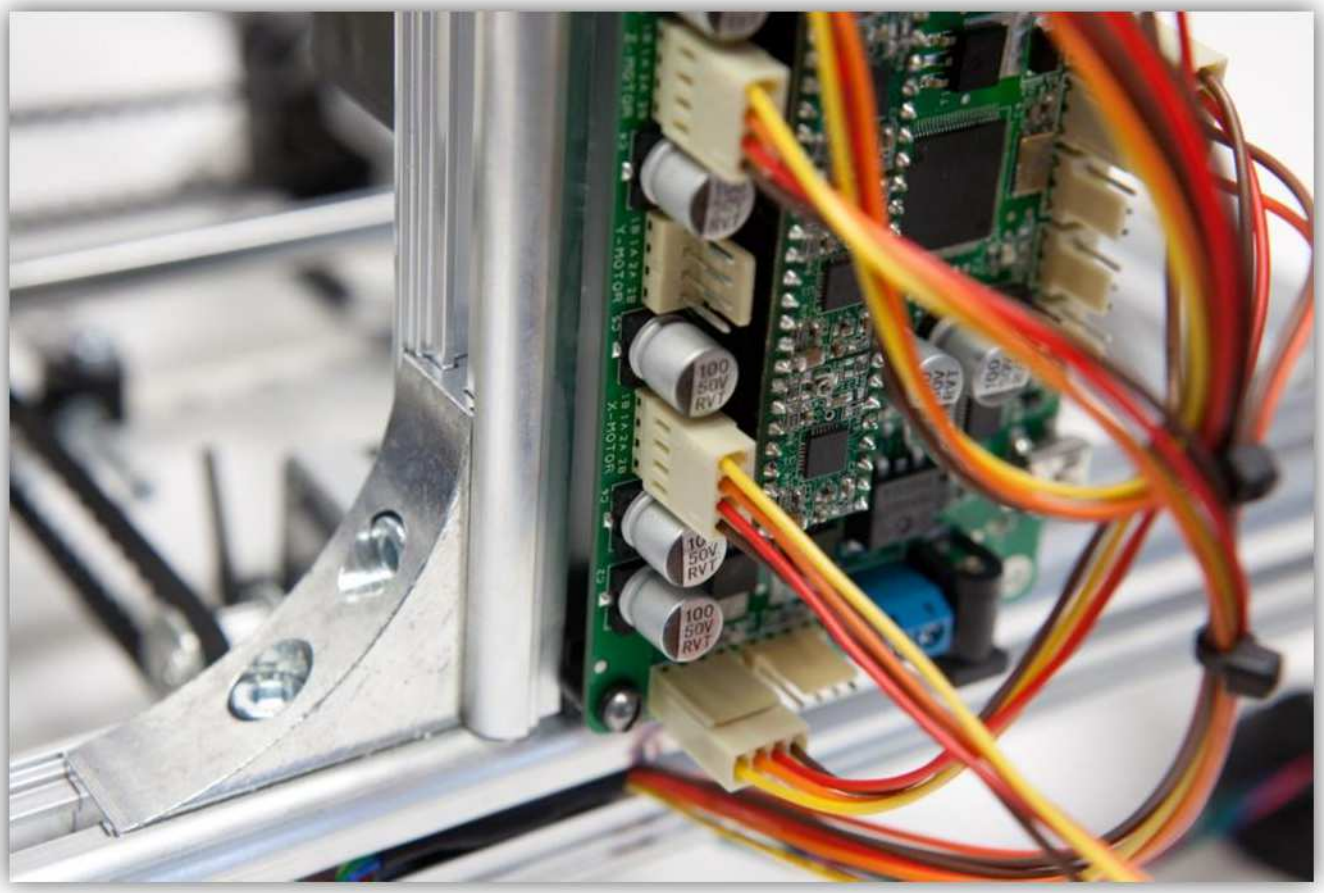
The controller board should now look like this.


E-MOTOR
Z-MOTOR
Y-MOTOR
X-MOTOR
100
50V
RVT

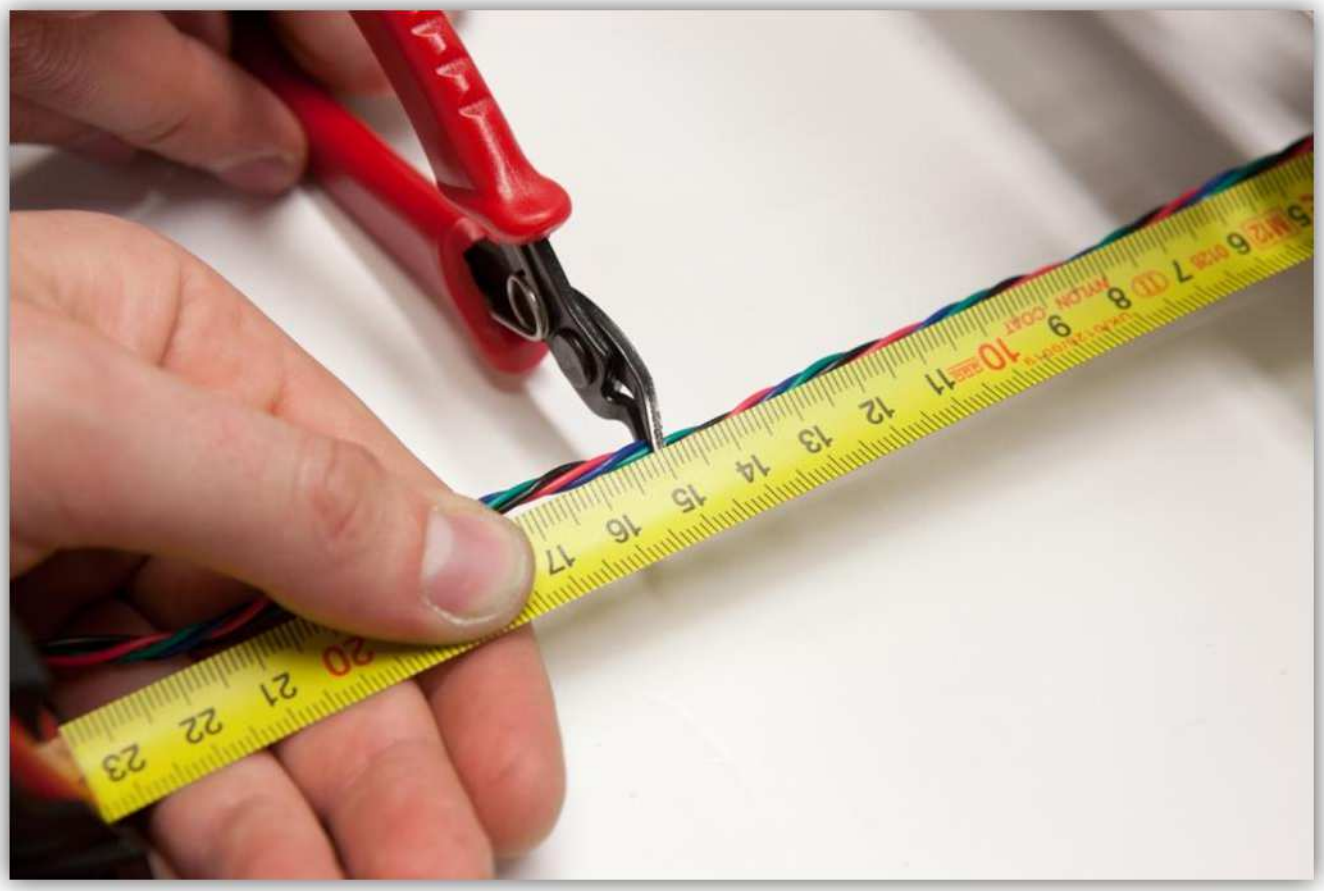
017 – WIRING THE X AXIS MOTOR AND MICRO SWITCH

Take a board to wire connector with 4 wires out of the bag labelled with 40.

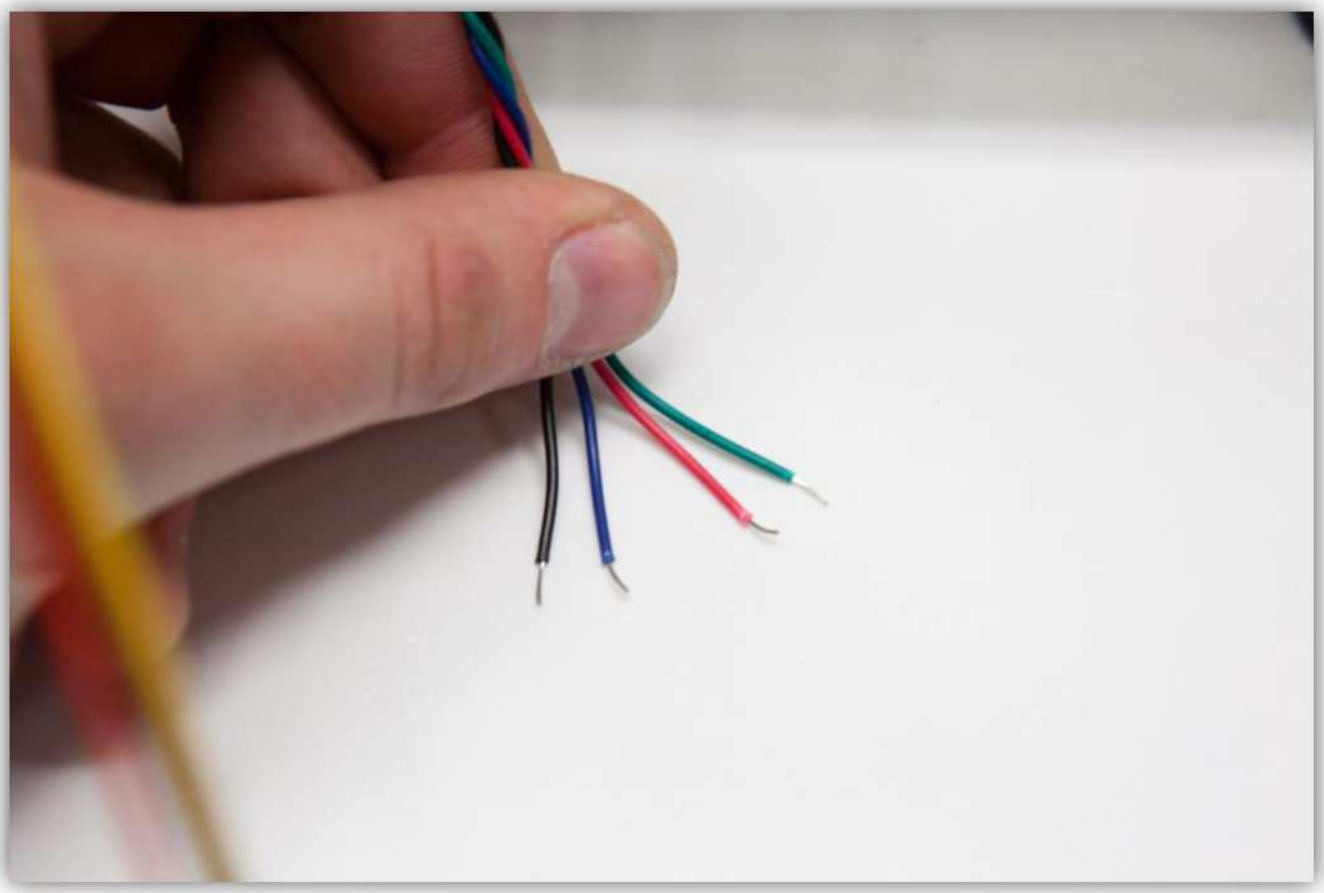
Plug the female connector in the male connector labelled with X-MOTOR on the controller board.



Cut the wires of the X axis motor down to about 15 cm (5,9").

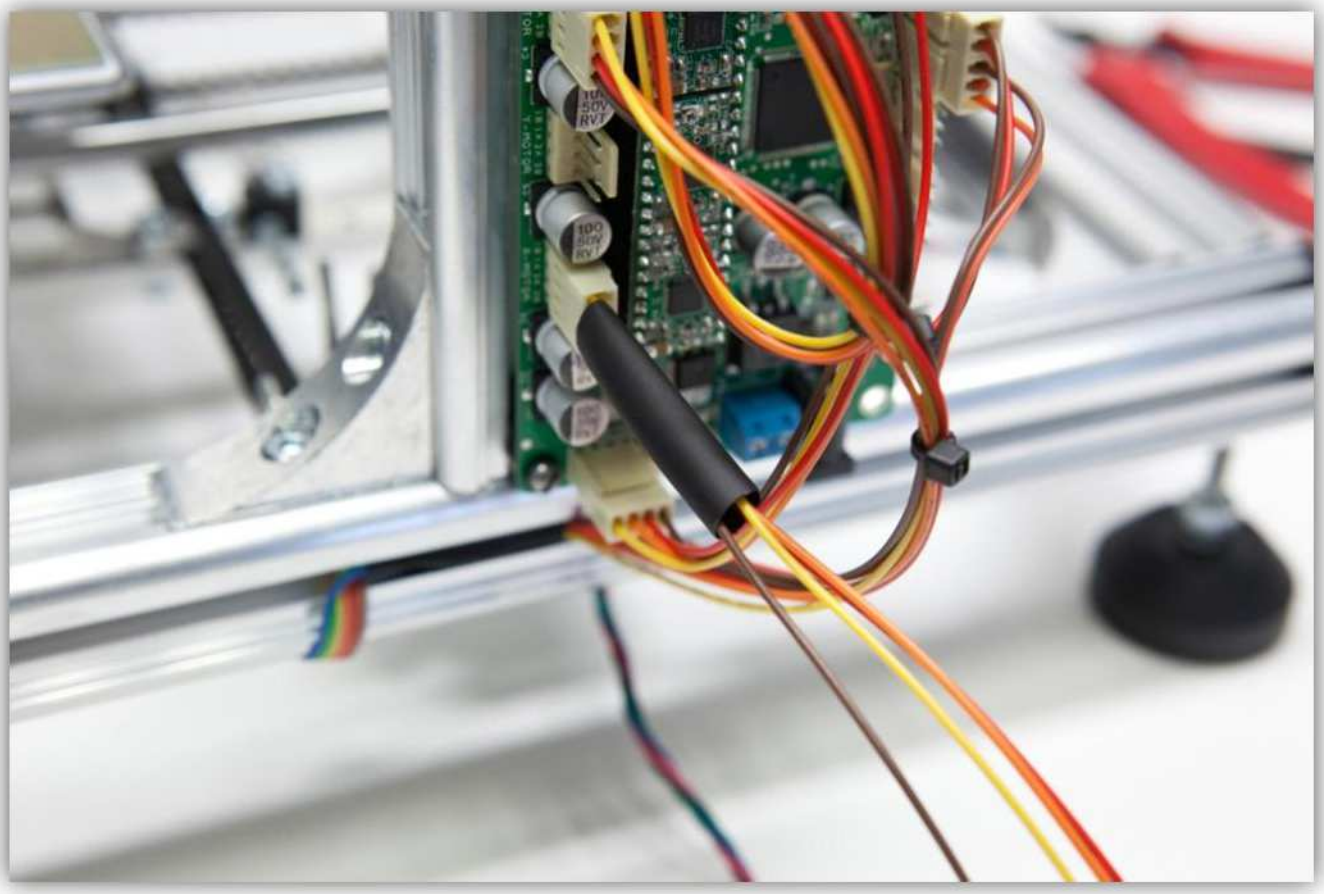


Strip the wires 5 mm (0.2") and tin them.

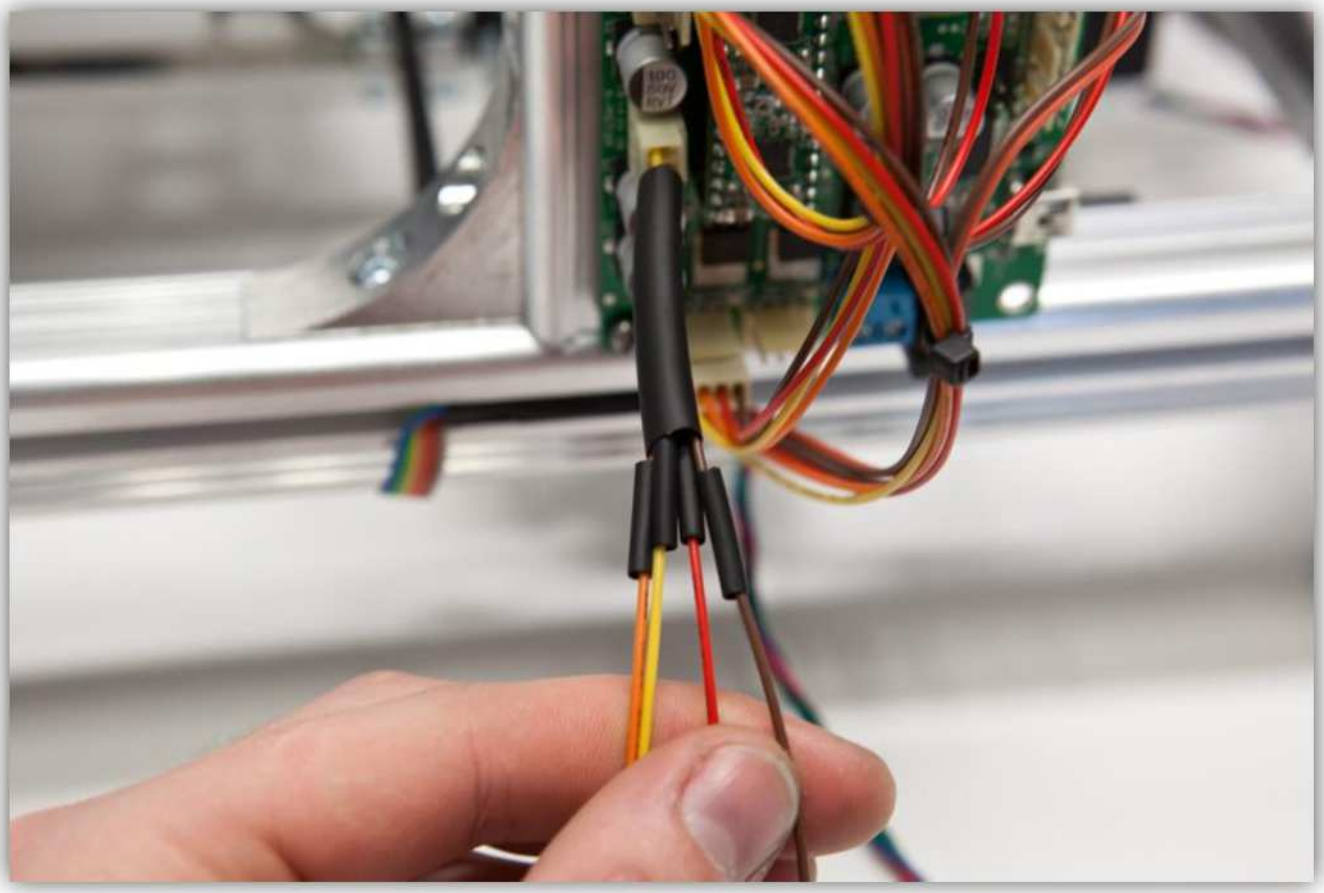


Cut 4 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the big heat shrink tube over the 4 wires of the connector.

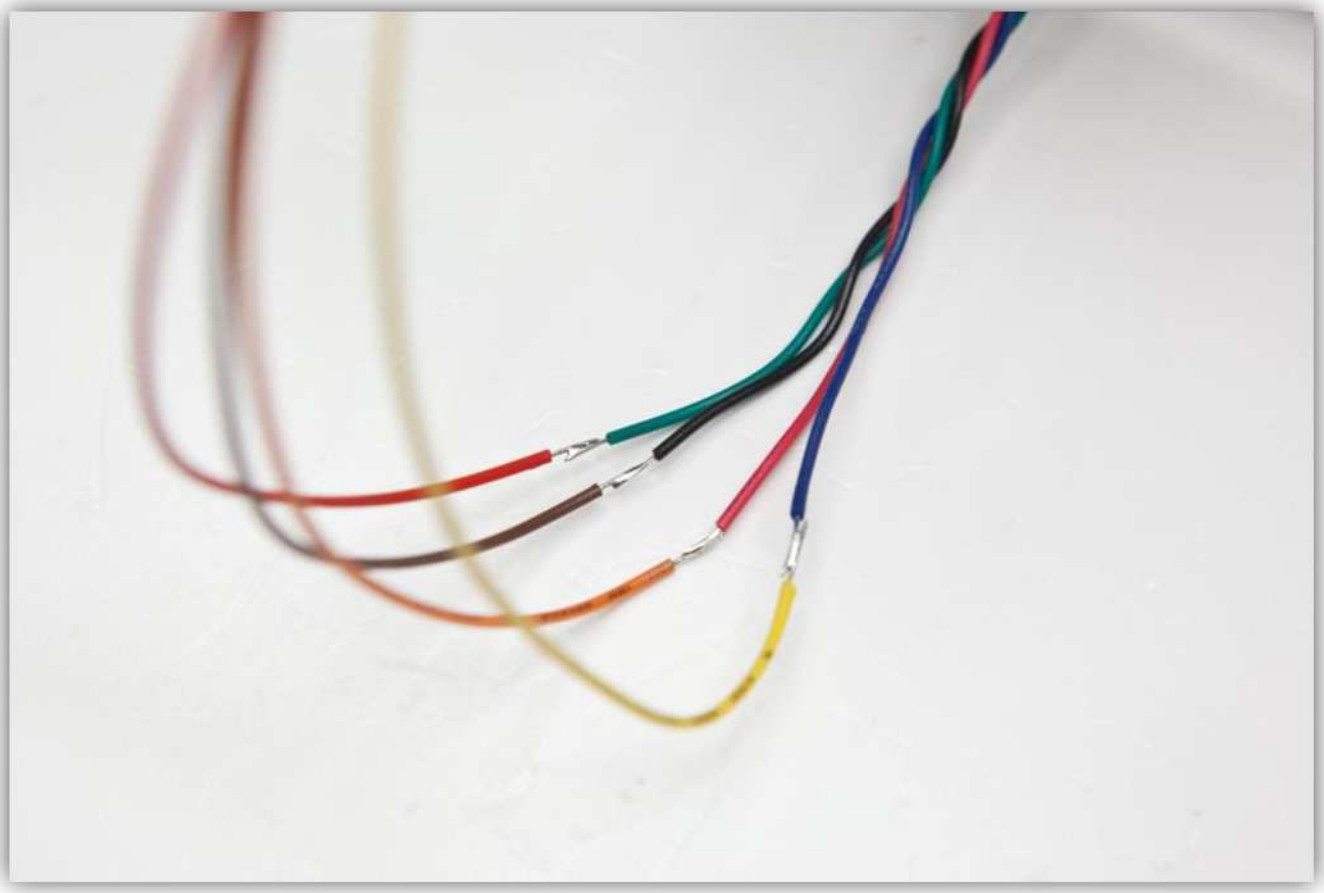


Slide the 4 small heat shrink tubes over the 4 wires of the connector.

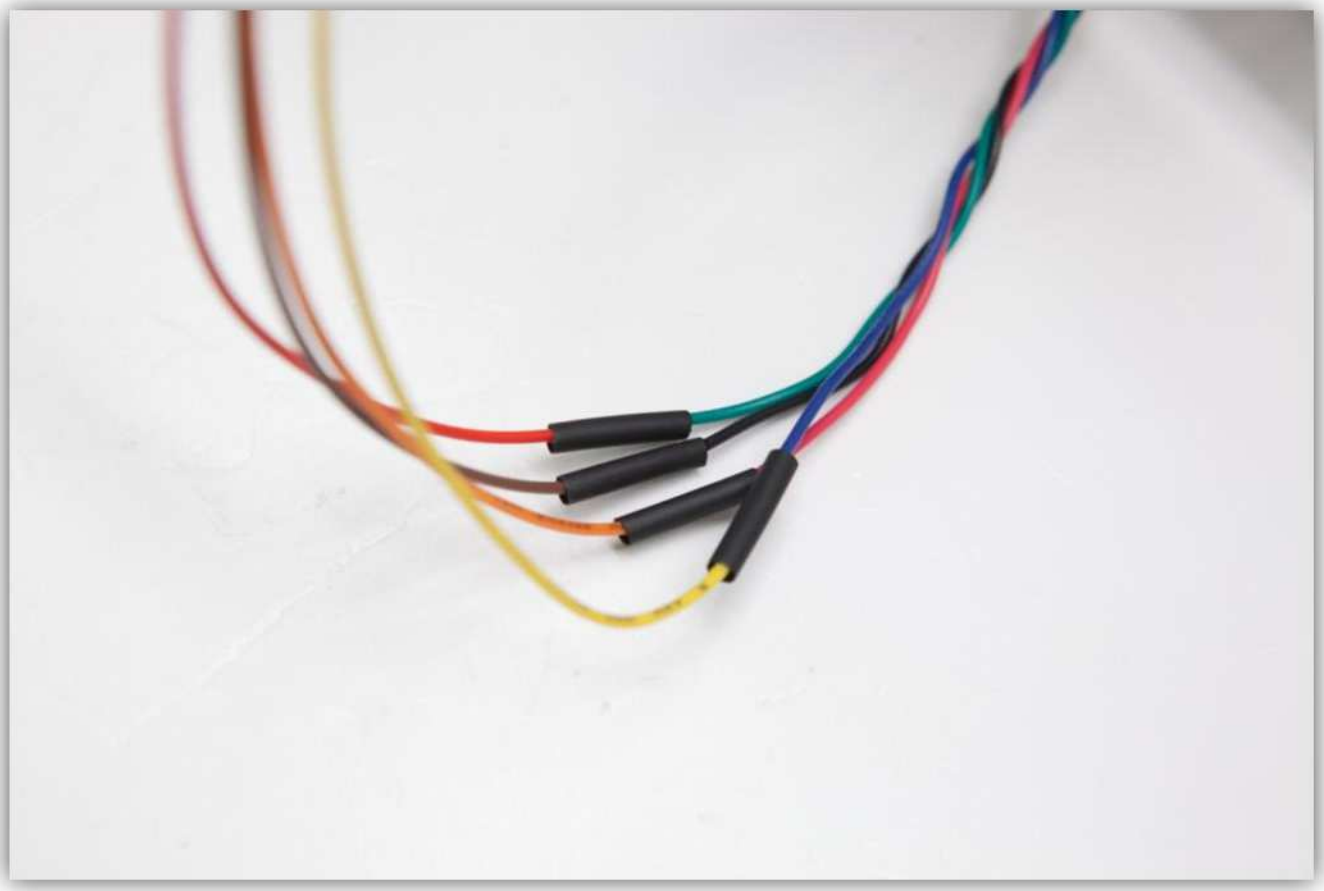


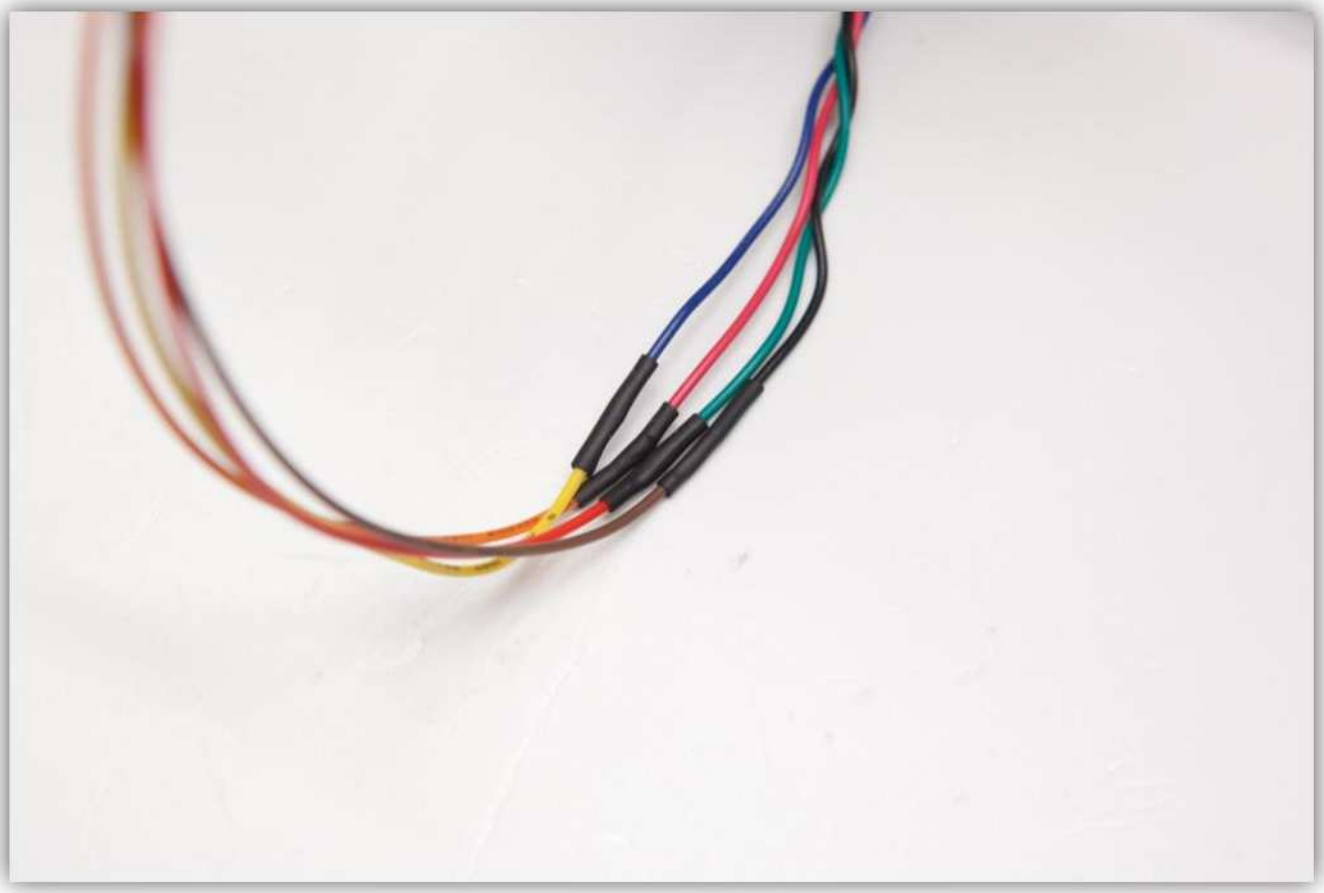
Solder the 4 wires from the motor to the 4 wires of the connector you tinned earlier. **Watch the colours closely.**

Connector cable	**->**	**Motor wires**
Yellow	**->**	**Blue**
Orange	**->**	**Red**
Red	**->**	**Green**
Brown	**->**	**Black**

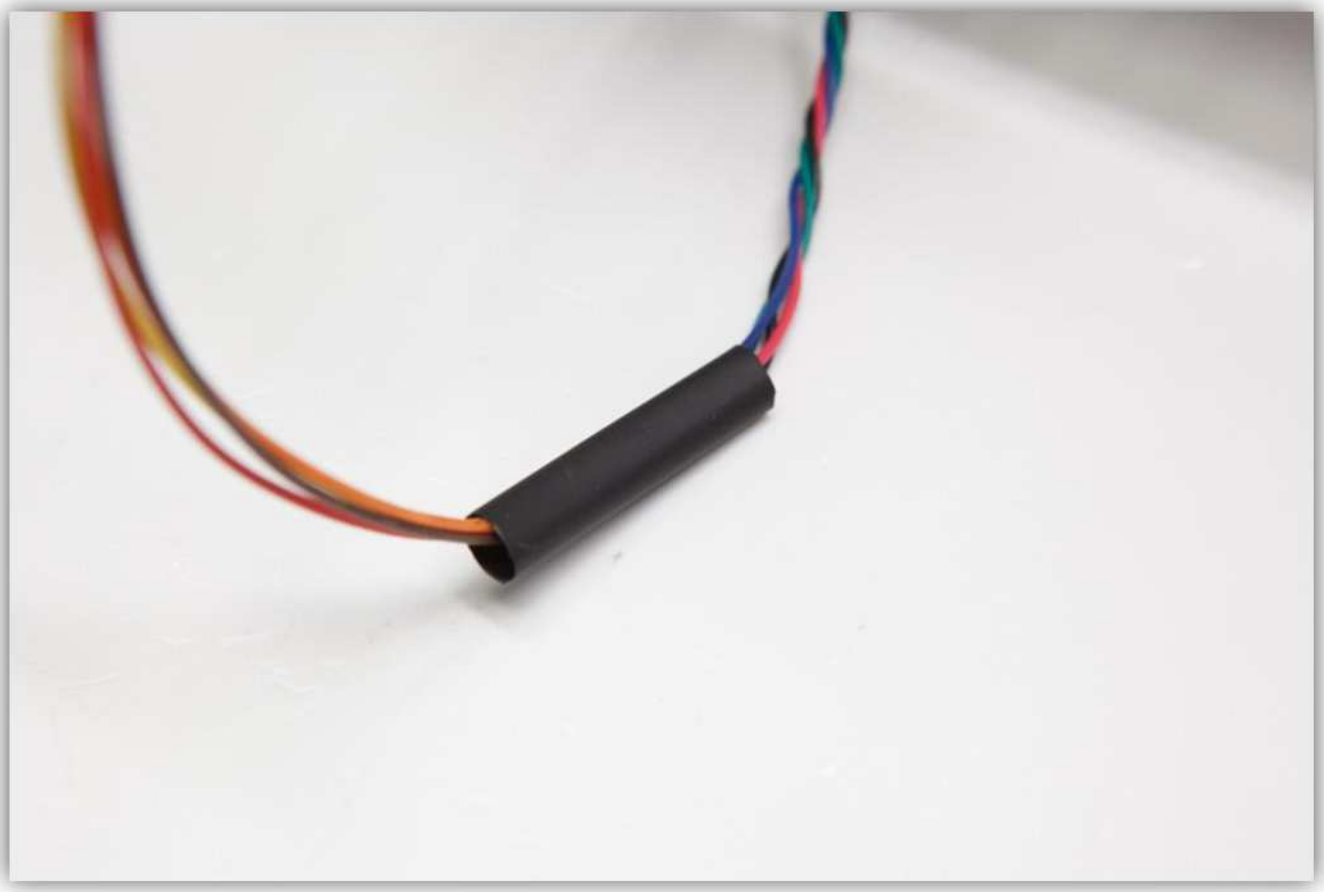


Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.

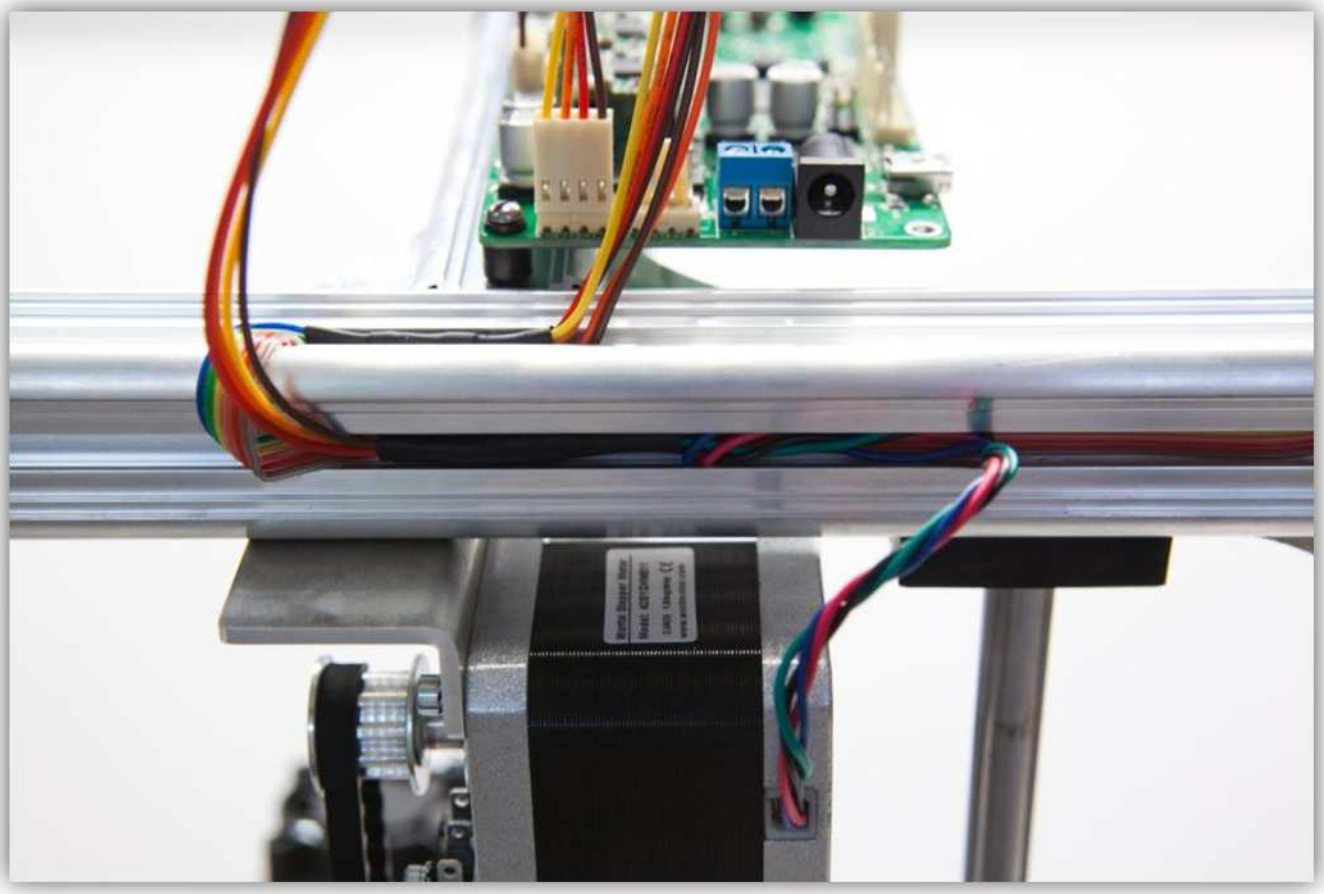




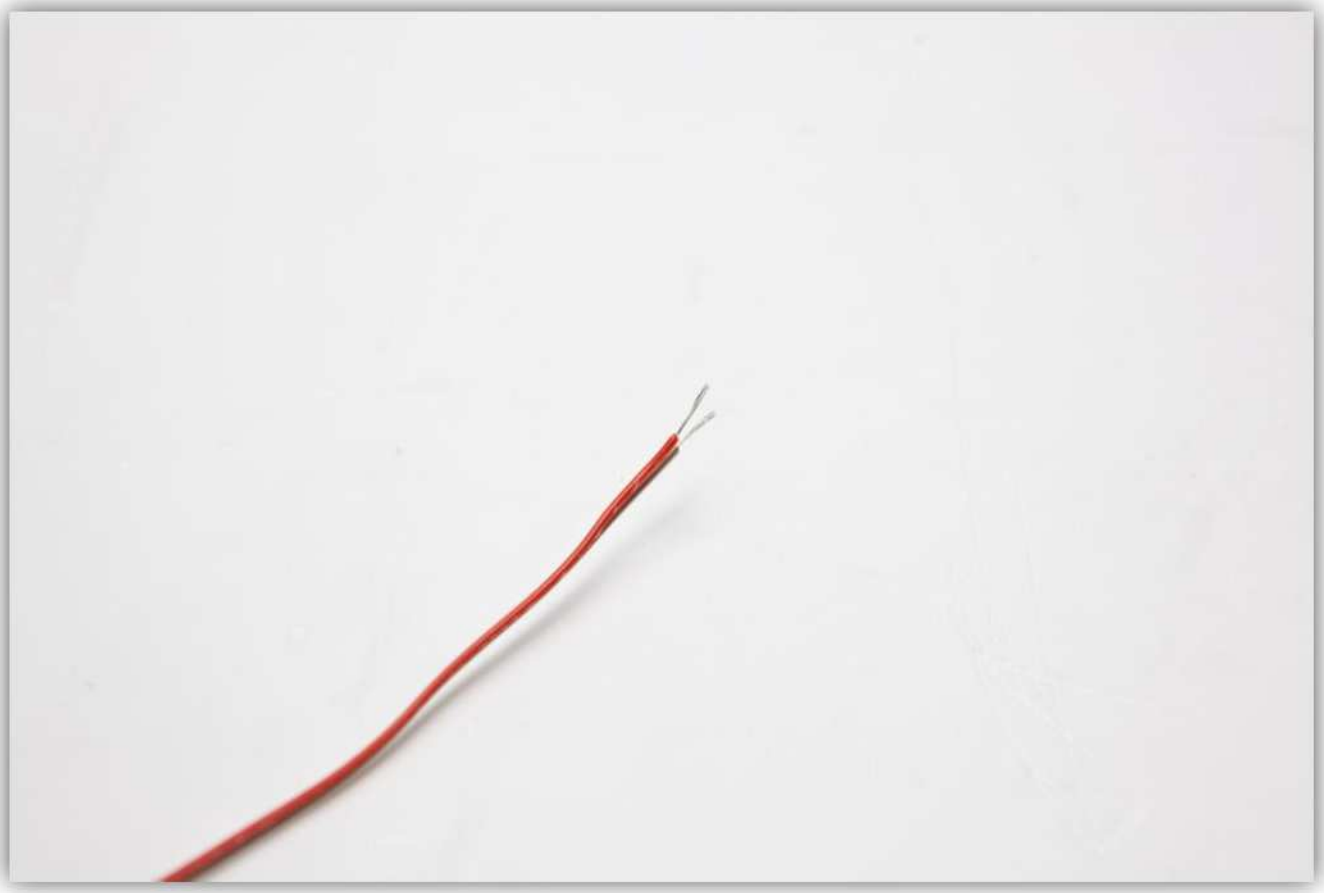
Now slide the big piece of heat shrink tubing over the 4 small pieces, heat the big piece so it covers and protects the 4 heat shrunk joints.



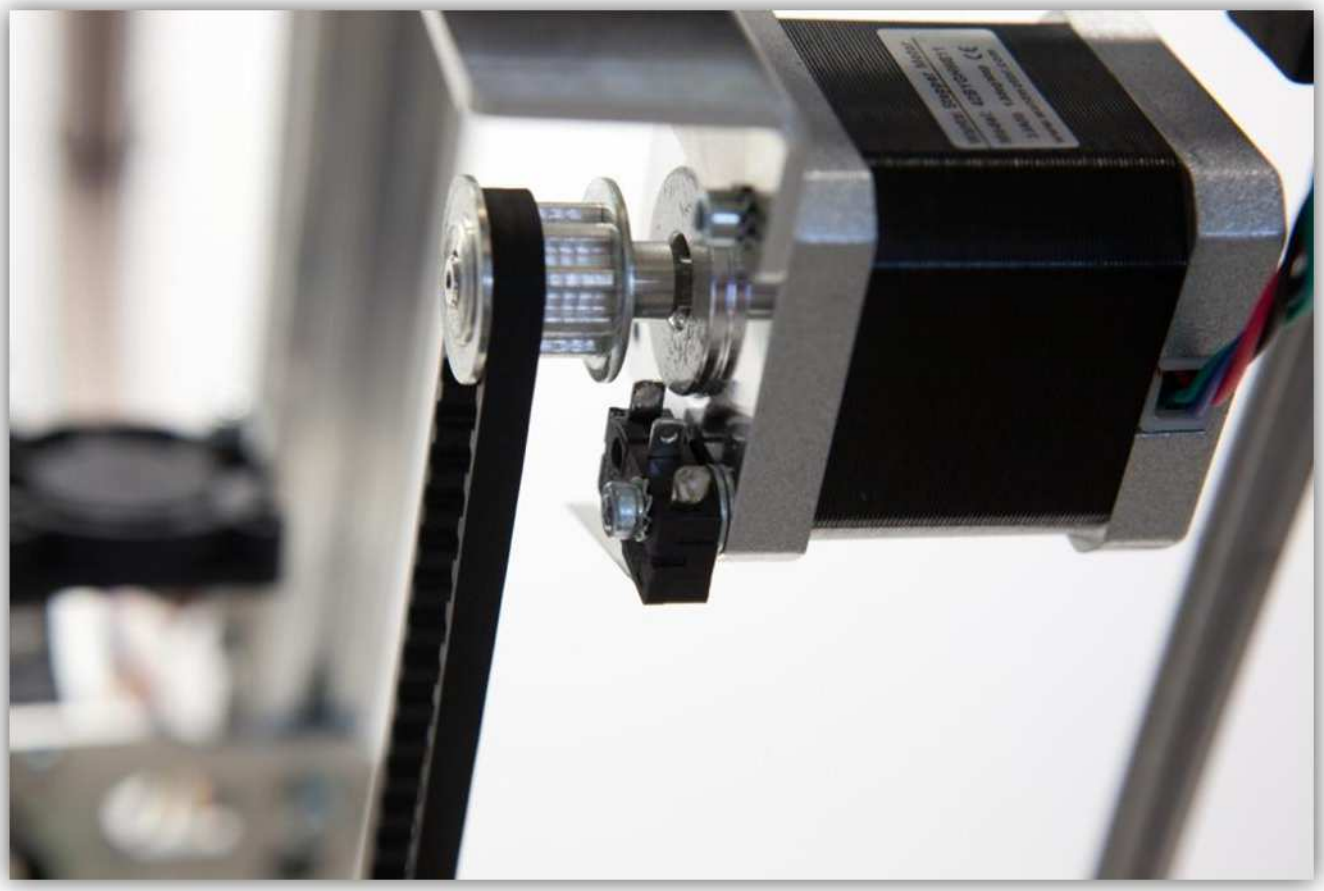
Tuck the excess cable into the void in the profiles.



Take a piece of **Red** and **Brown** wire that you detached from the flat cable earlier. Strip the ends 5 mm (0.2") and tin them.



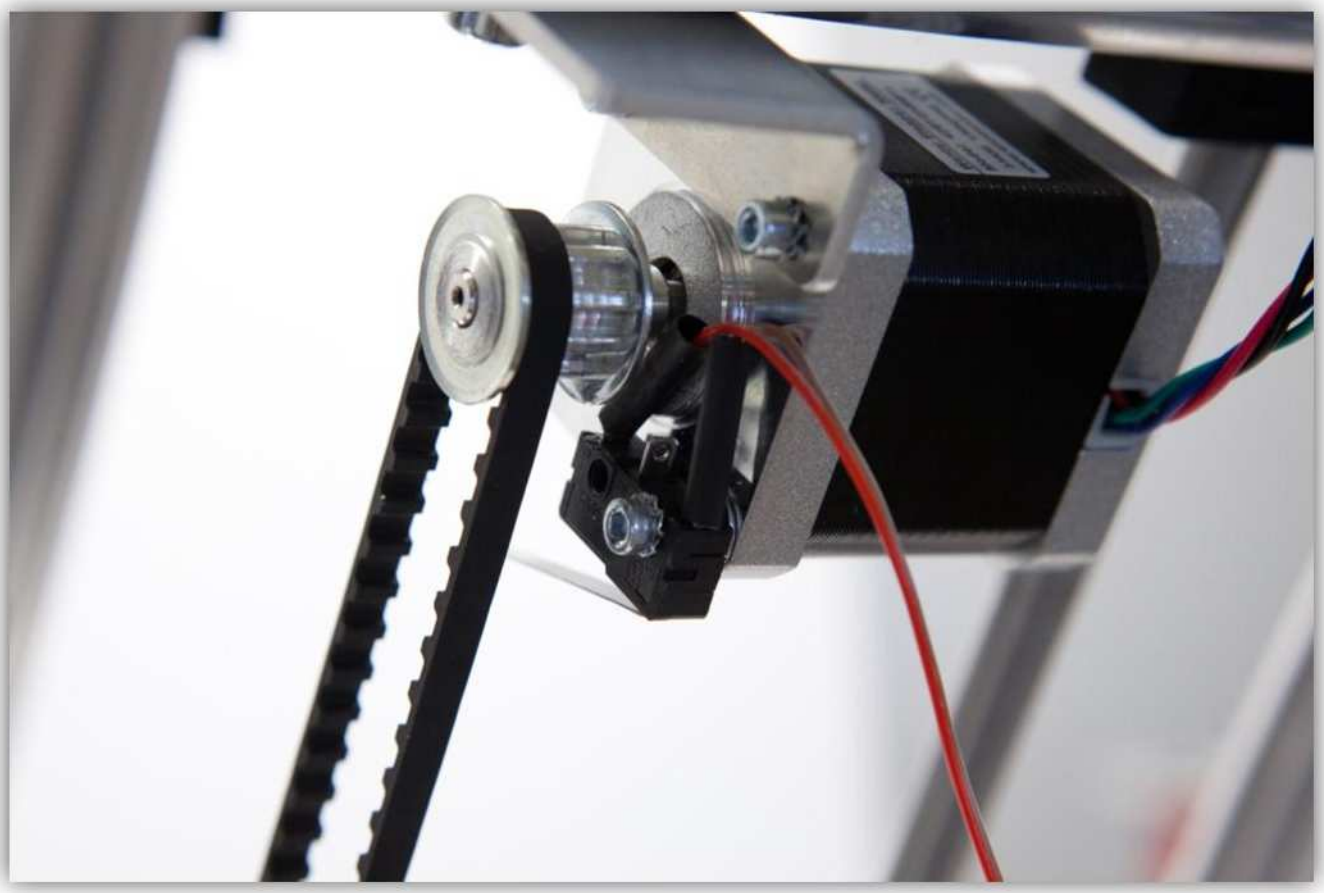
Tin the contact points of the X micro switch. **Be careful and don’t touch the belt with the hot soldering iron.**



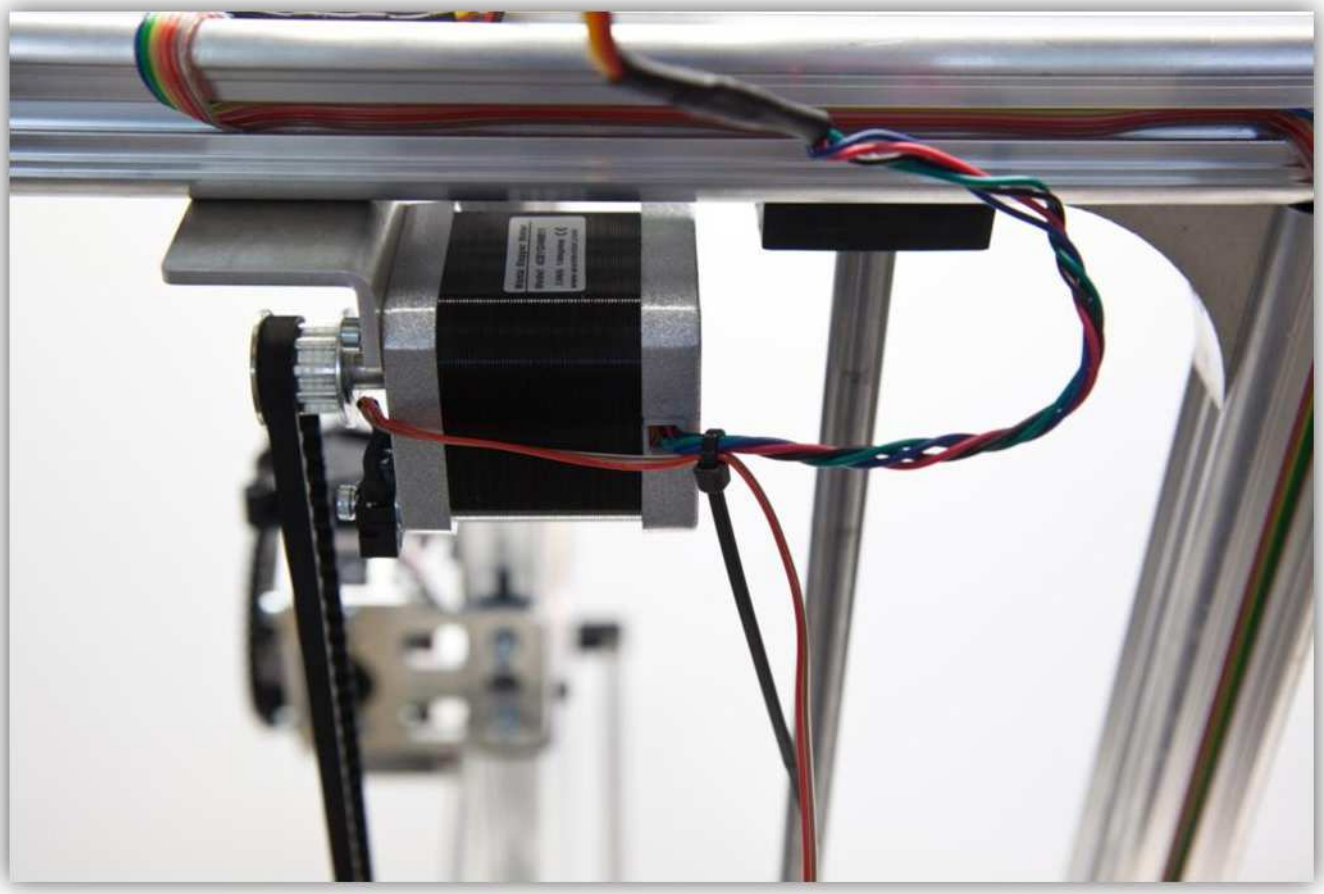
Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long.

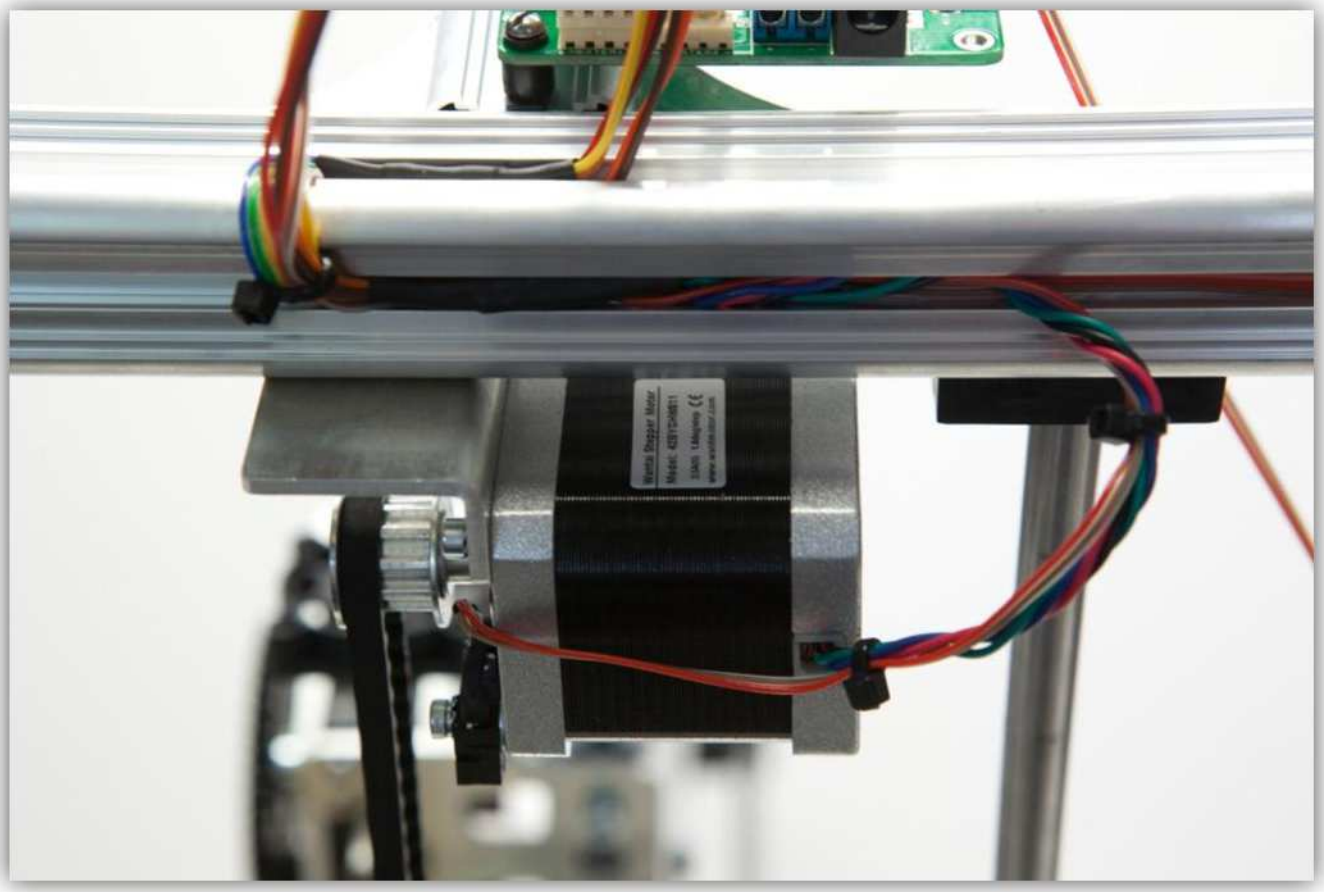
Slide them over the ends of the **Red** and **Brown** wire you tinned earlier.

Solder the wires to the contact points of the micro switch, slide the heat shrink tubes over the contacts and shrink them.

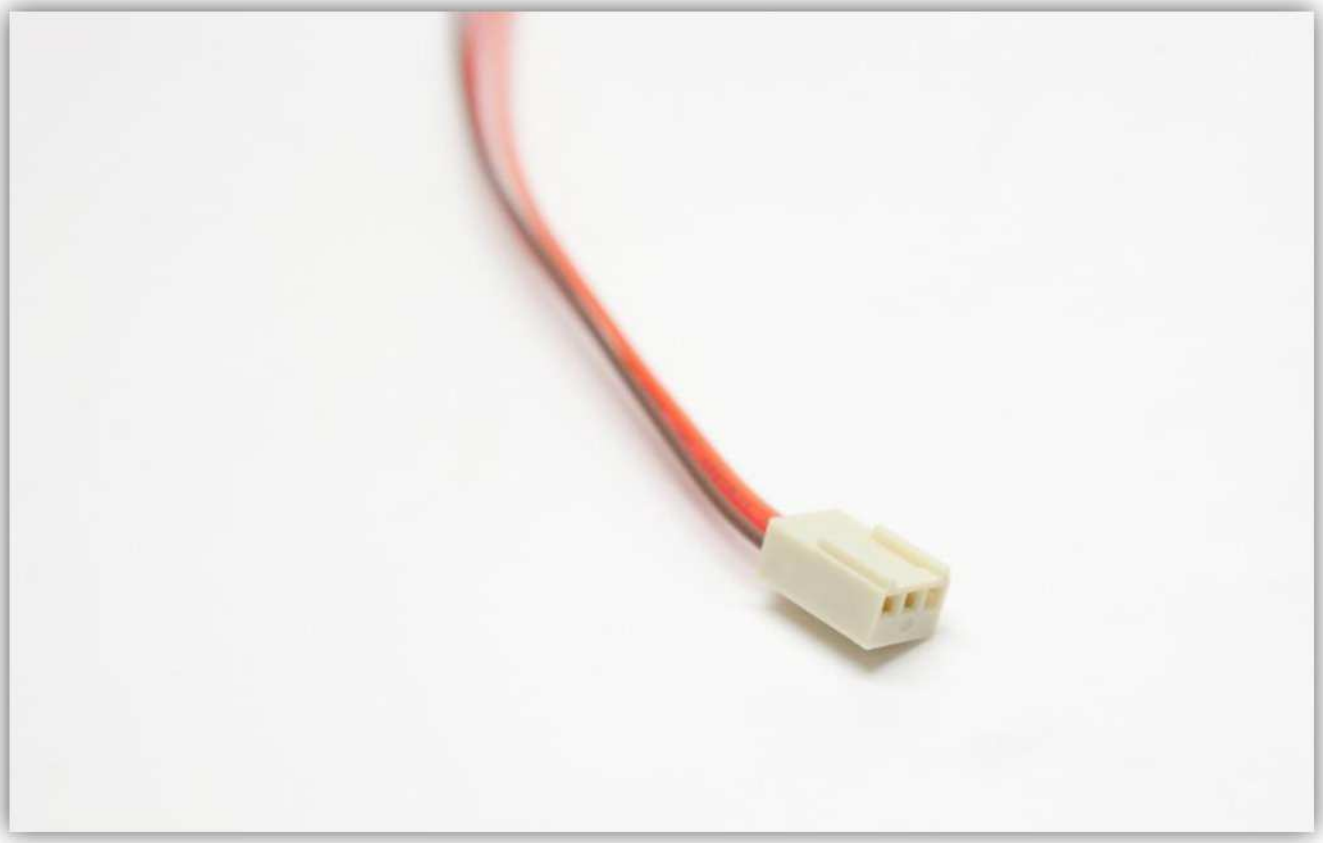


Use small tie-strips to hold the **Red** and **Brown** wire in place.

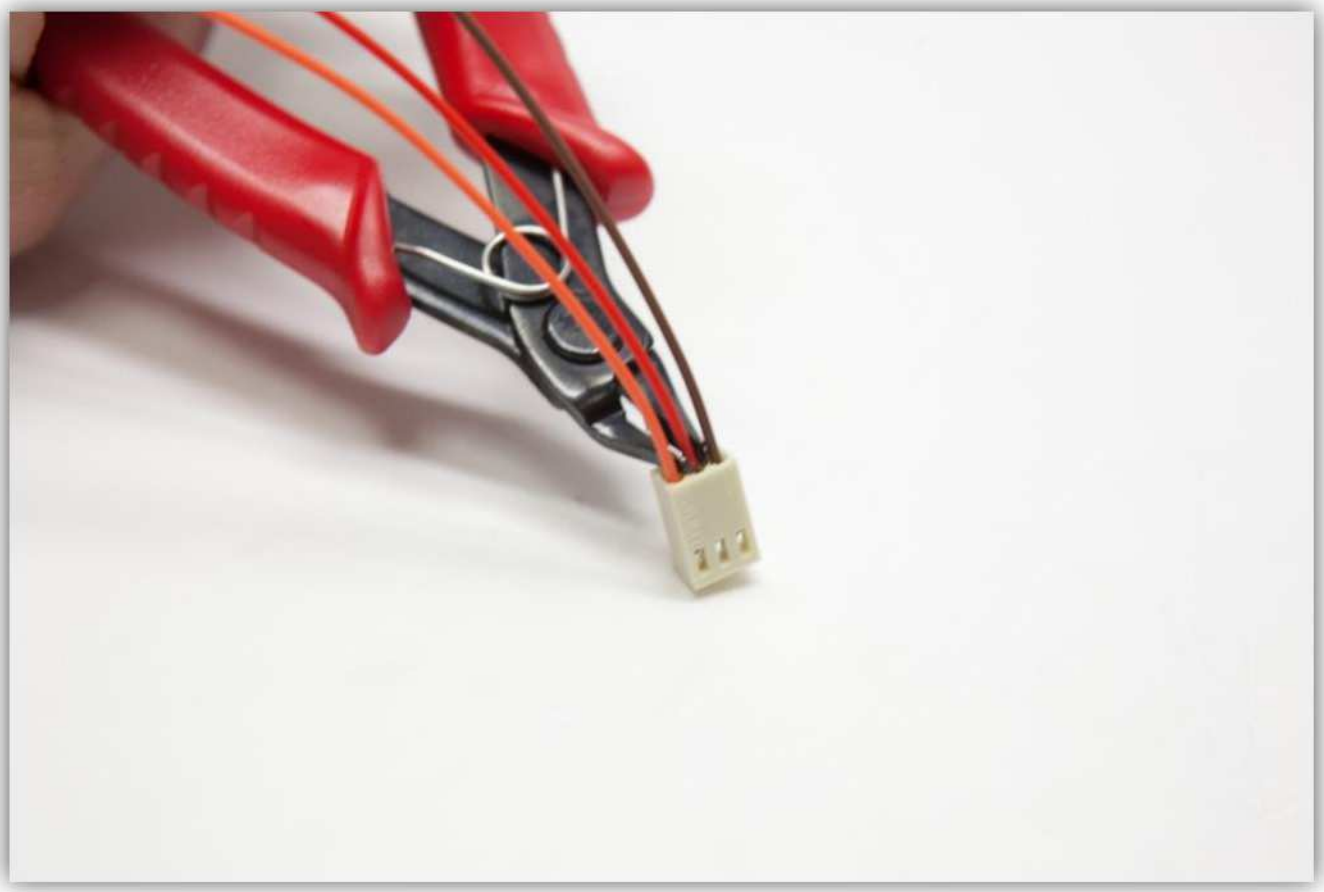


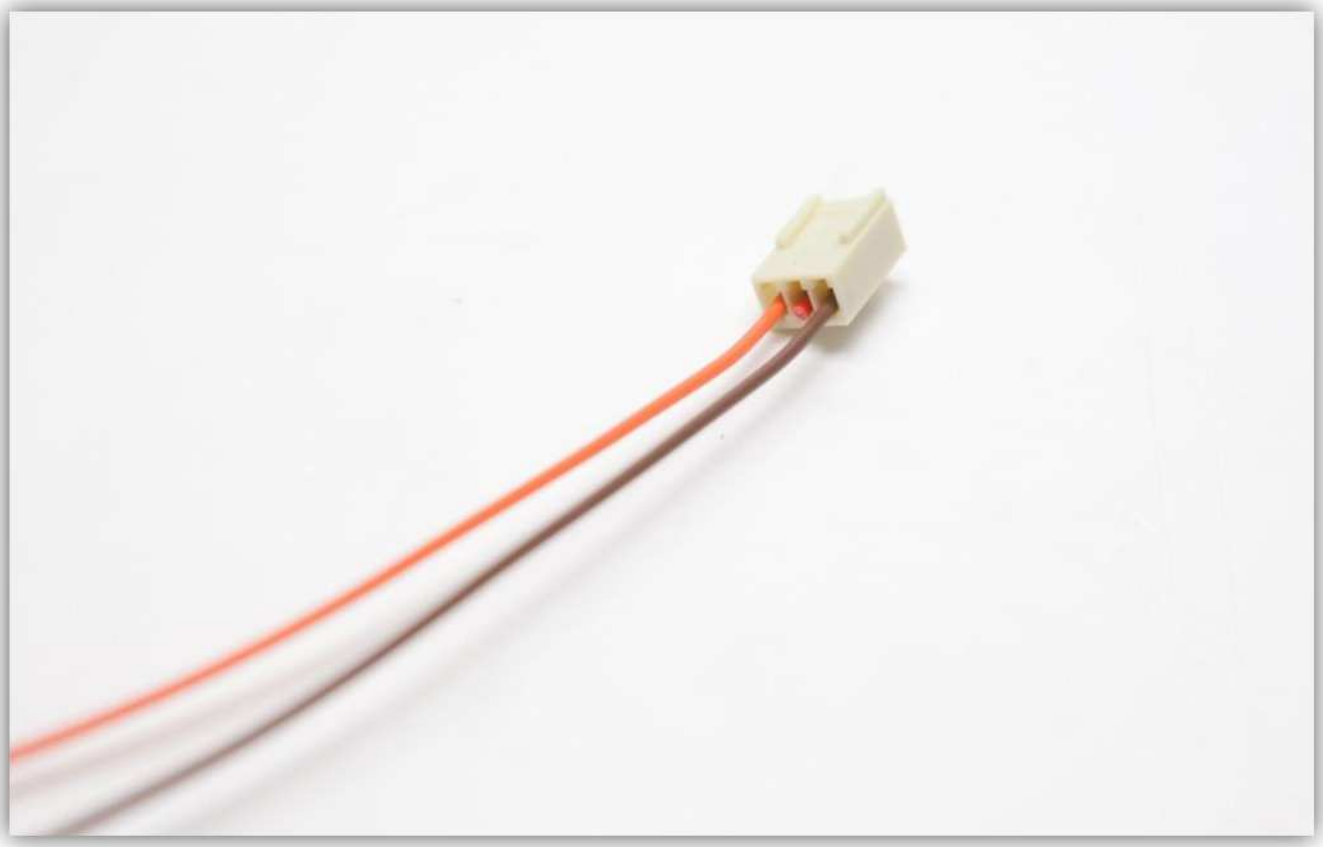


Take a board to wire connector with 3 wires out of the bag labelled with 40.

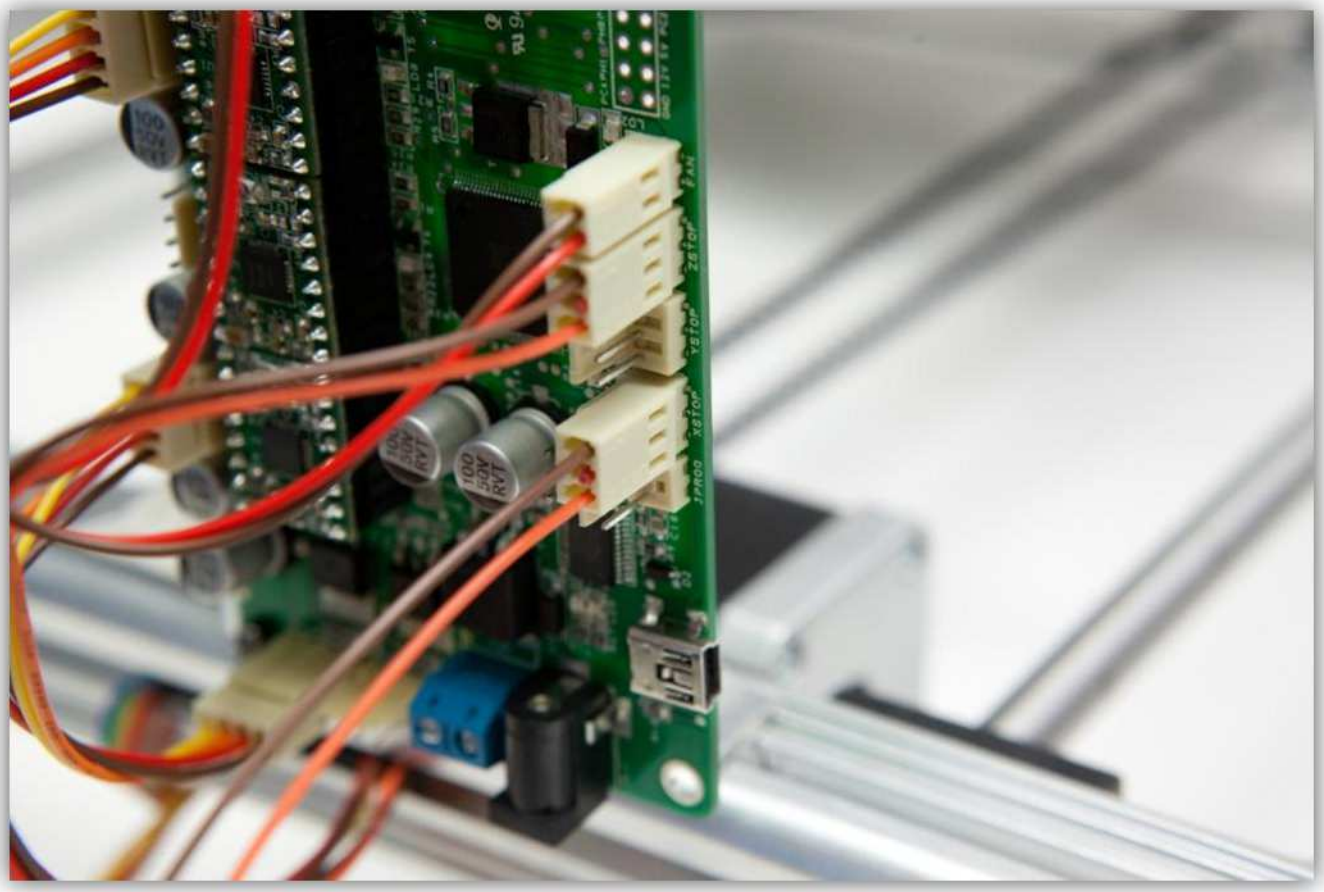


Cut the middle wire away at the connector.

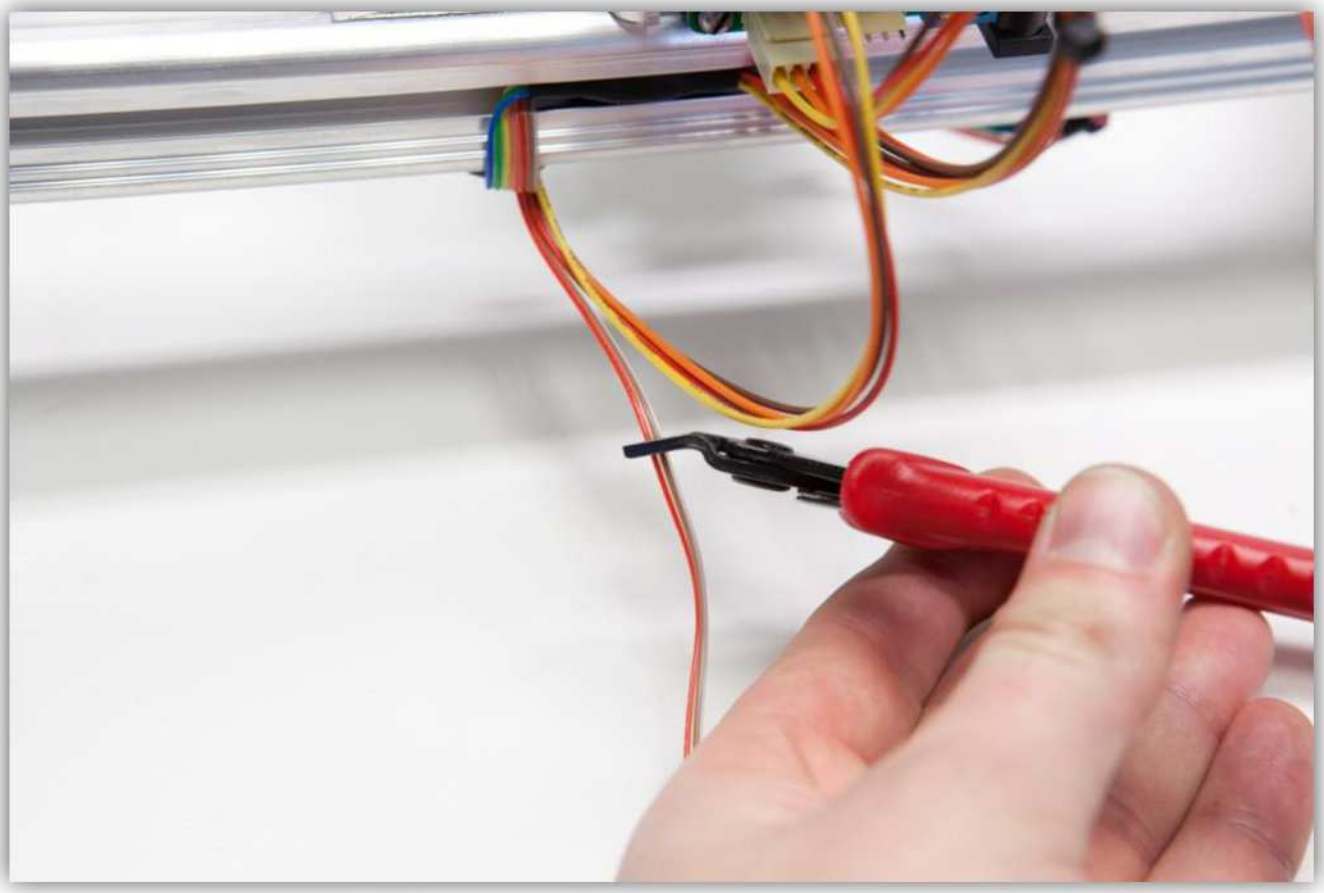




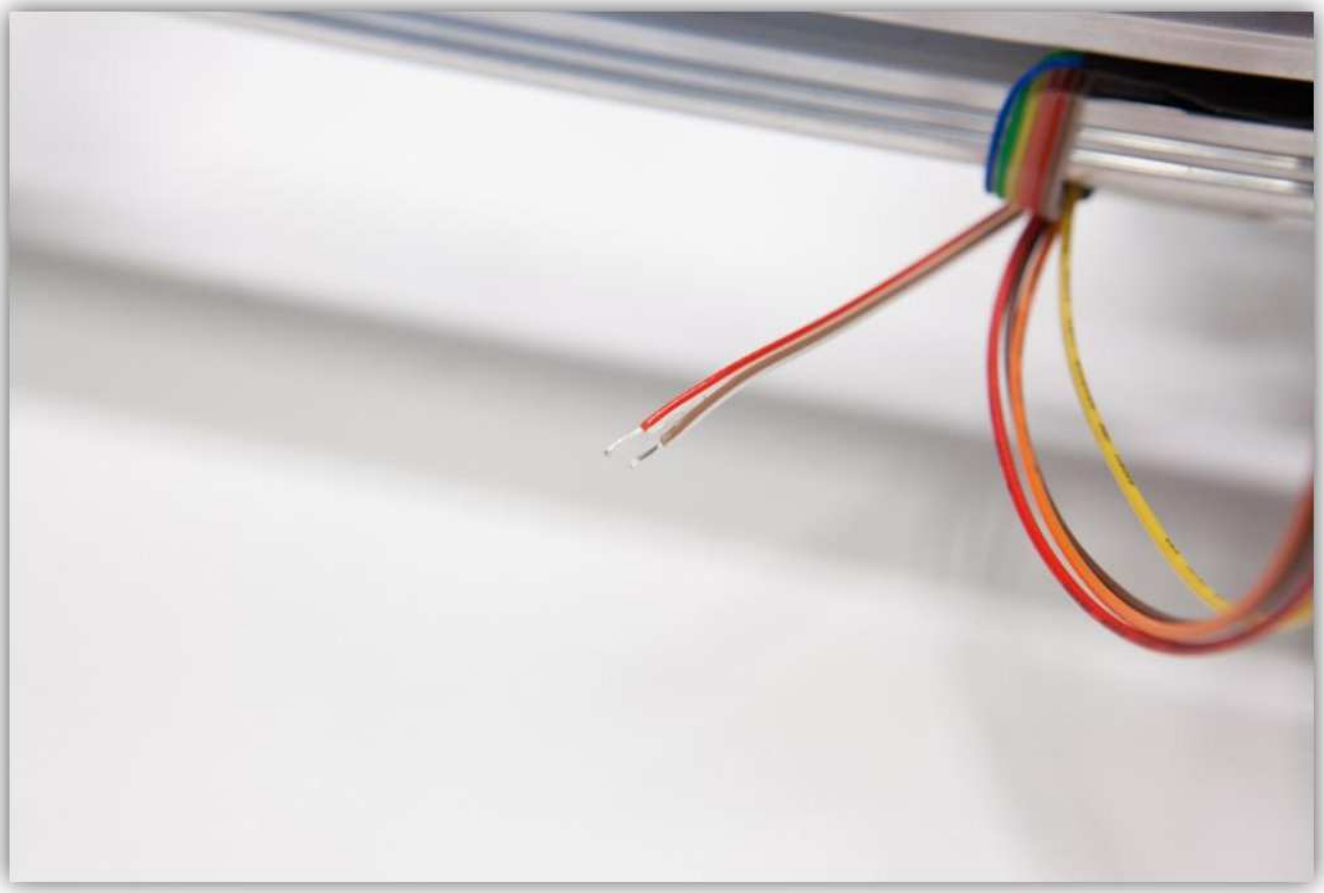
Plug the female connector in the male connector labelled with XSTOP on the controller board.

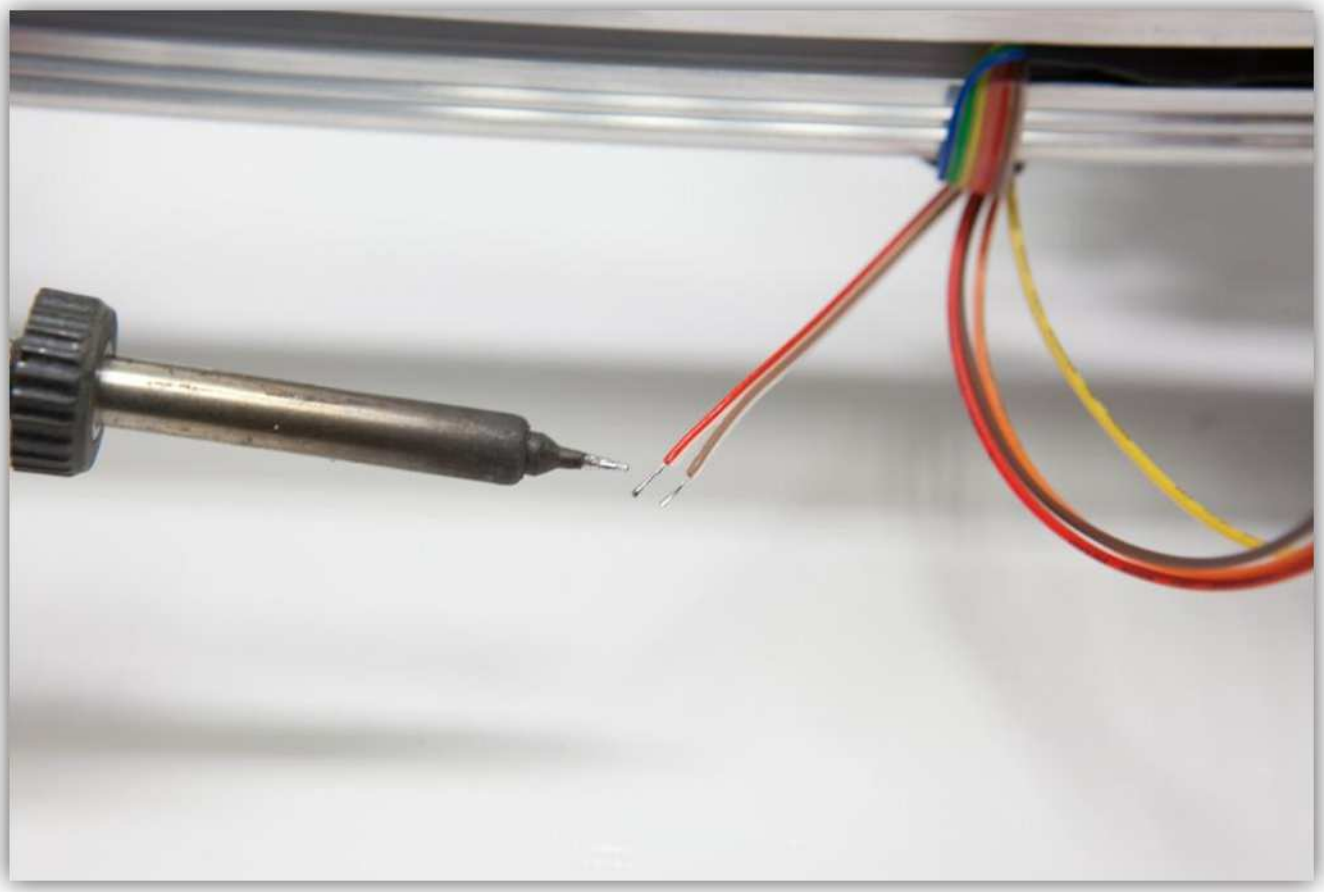


Cut the **Red** and **Brown** wire from the X micro switch so that it can connect to the wires of the connector you just plugged in.



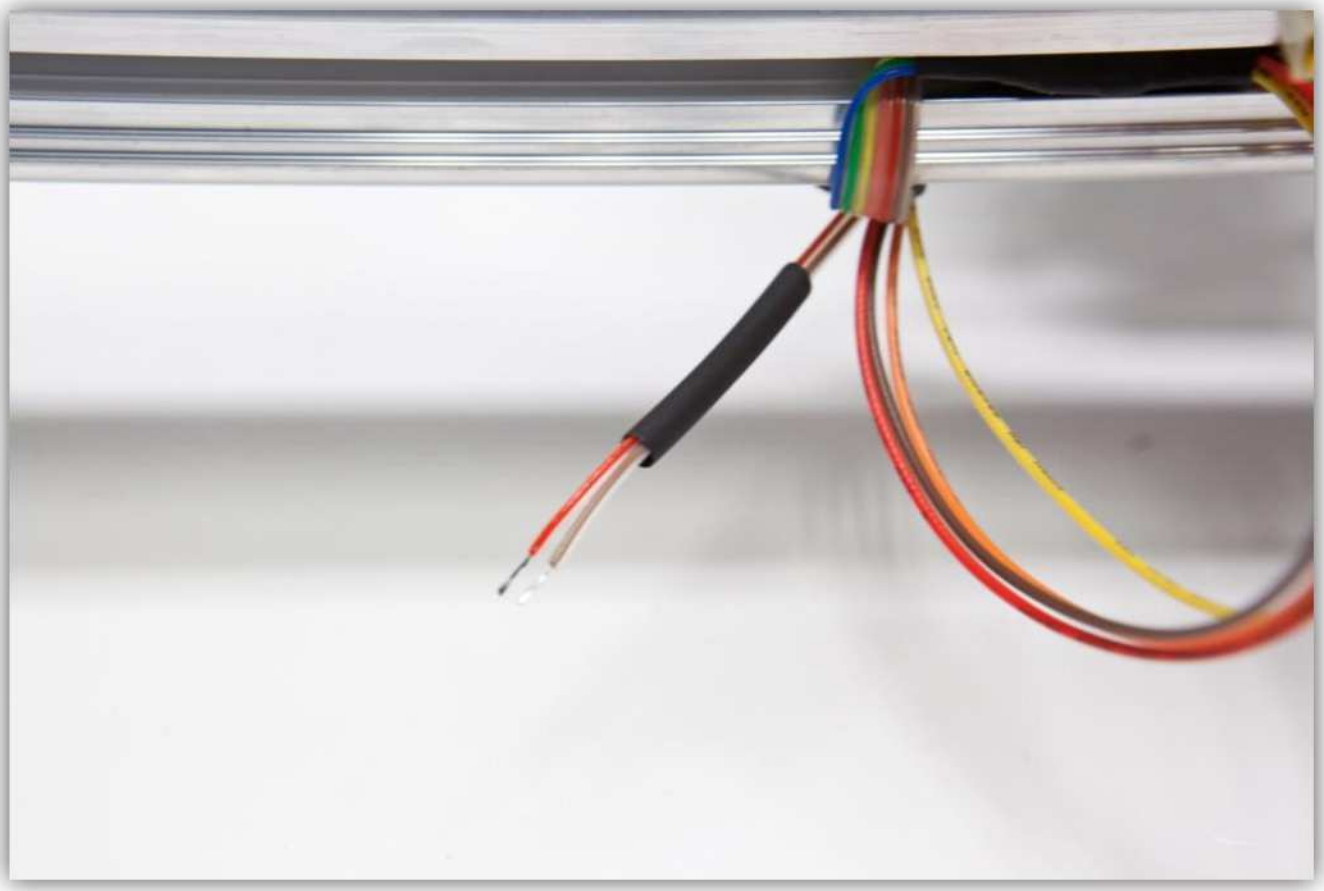
Strip 5 mm (0.2") and tin the ends of these wires.



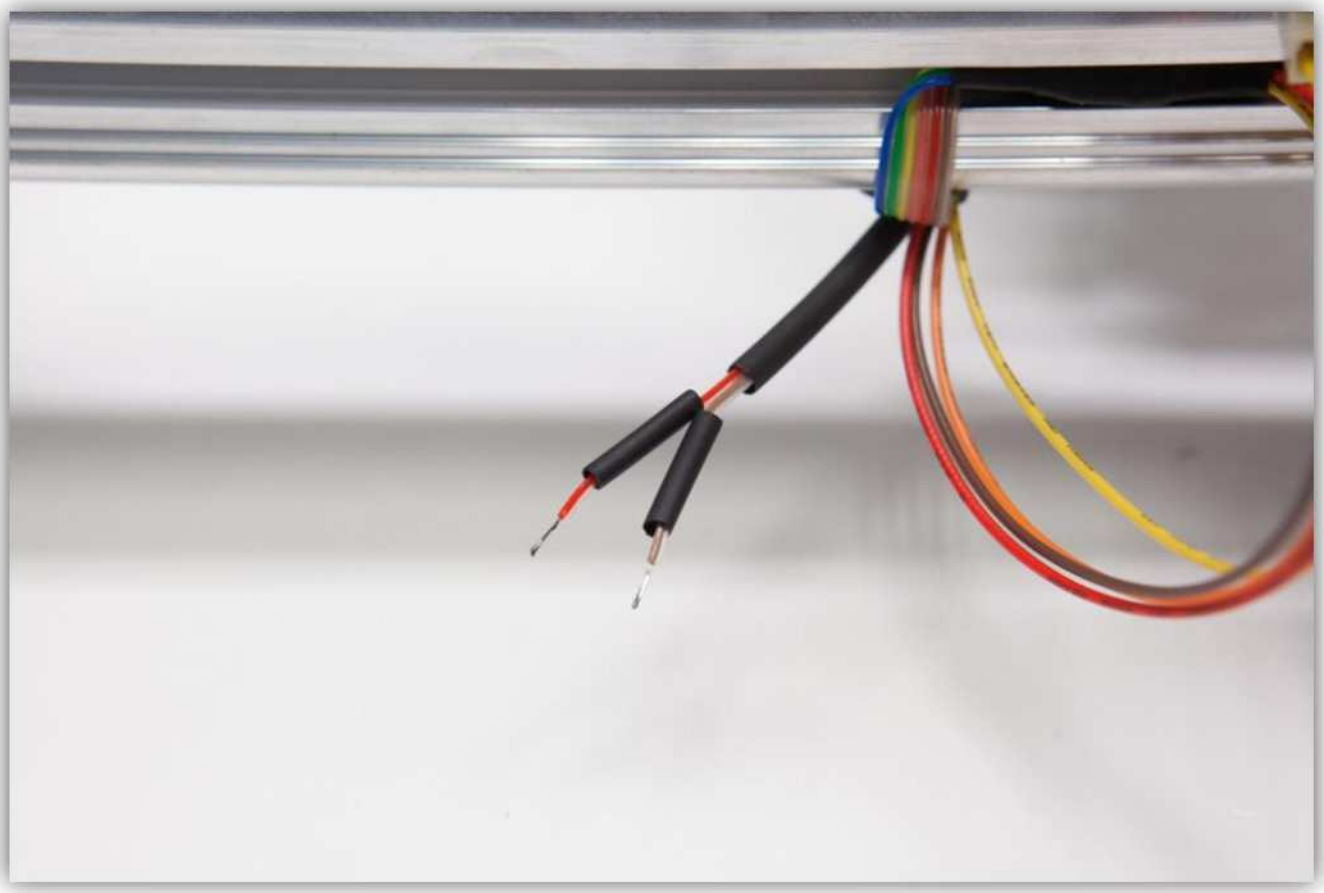


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the medium size heat shrink tubes over the 2 wires of the connector.

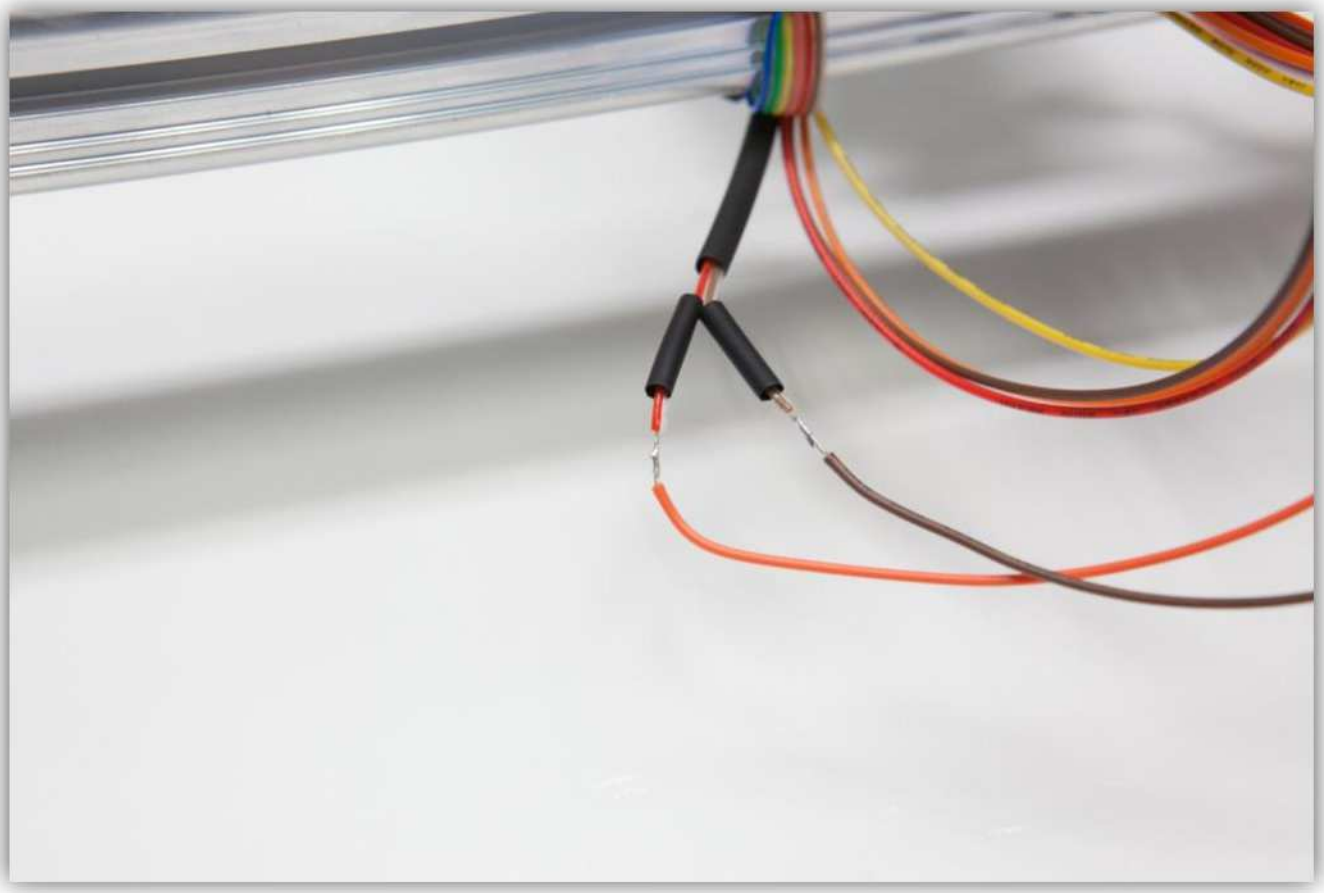


Slide the 2 small heat shrink tubes over the 2 wires of the connector.

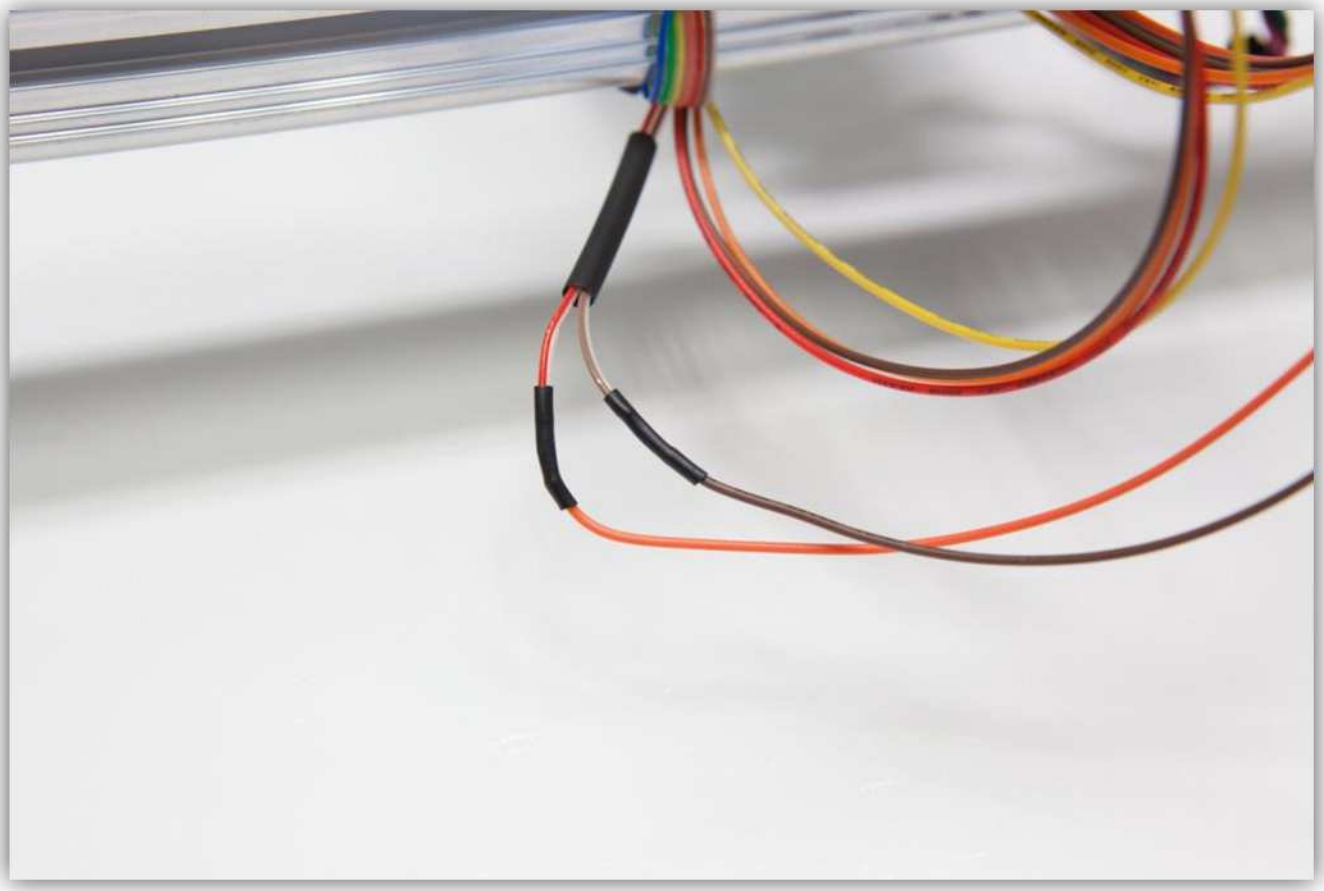


Solder the 2 wires from the **Red** and **Brown** wire to the 2 wires of the flat connector you tinned earlier. **Watch the colours closely.**

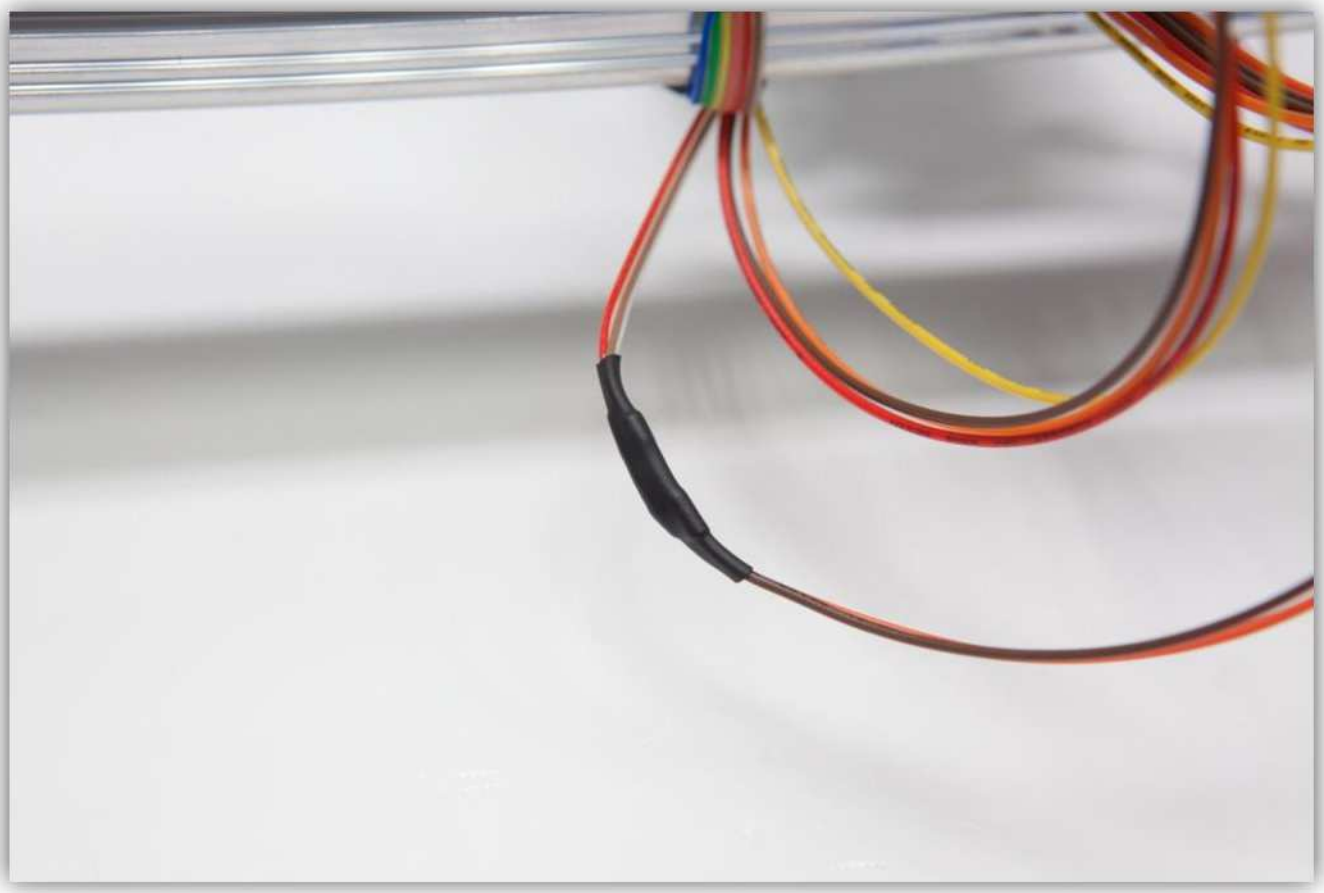
Flat cable	**->**	**Connector wires**
Red	**->**	**Red**
Brown	**->**	**Brown**



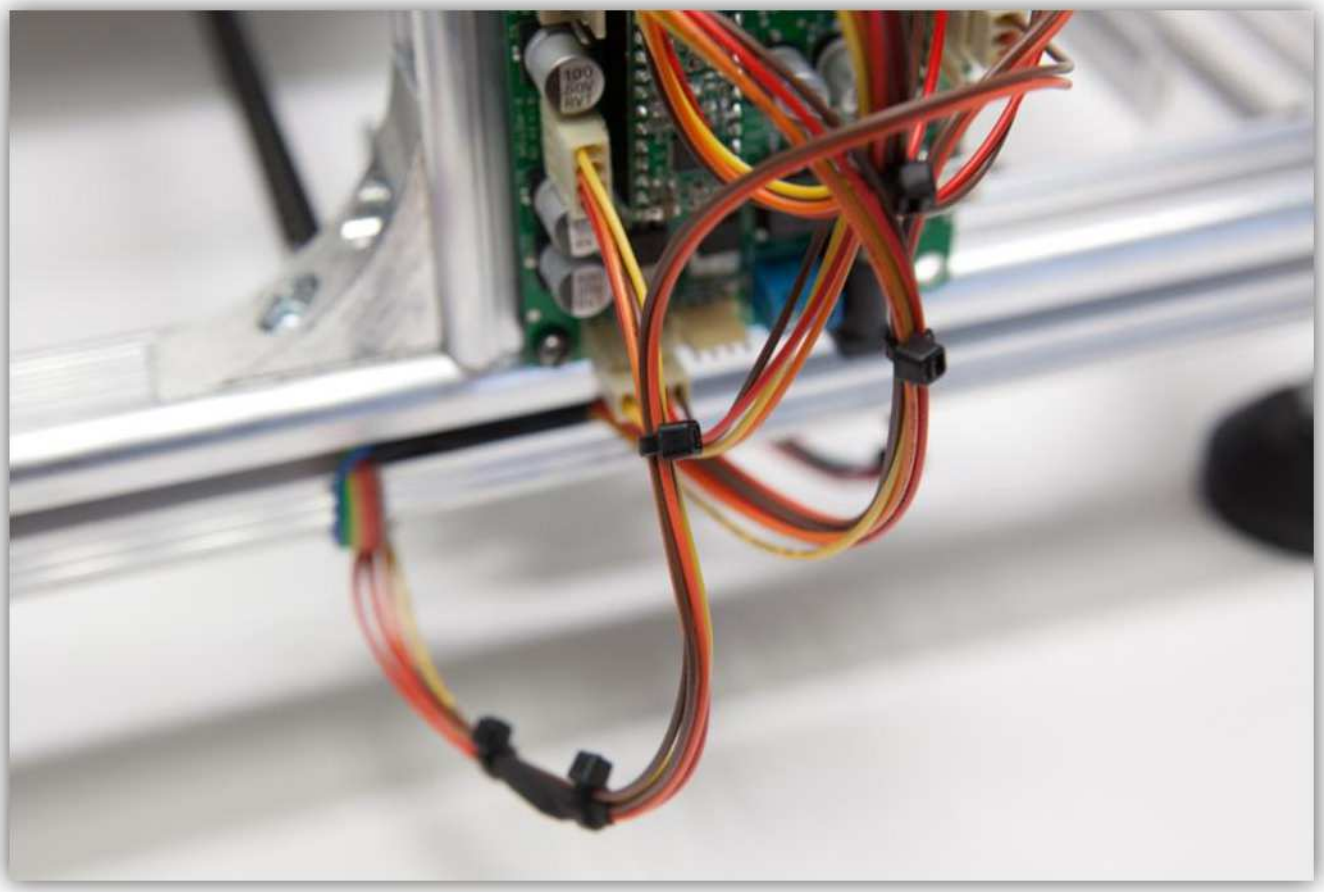
Slide the 2 small heat shrink tubes over the solder joints and heat them up.



Now slide the medium size piece of heat shrink tubing over the 2 small pieces, heat the medium size piece so it covers and protects the 2 heat shrunk joints.



Use a few small tie-strips to hold the wires together.

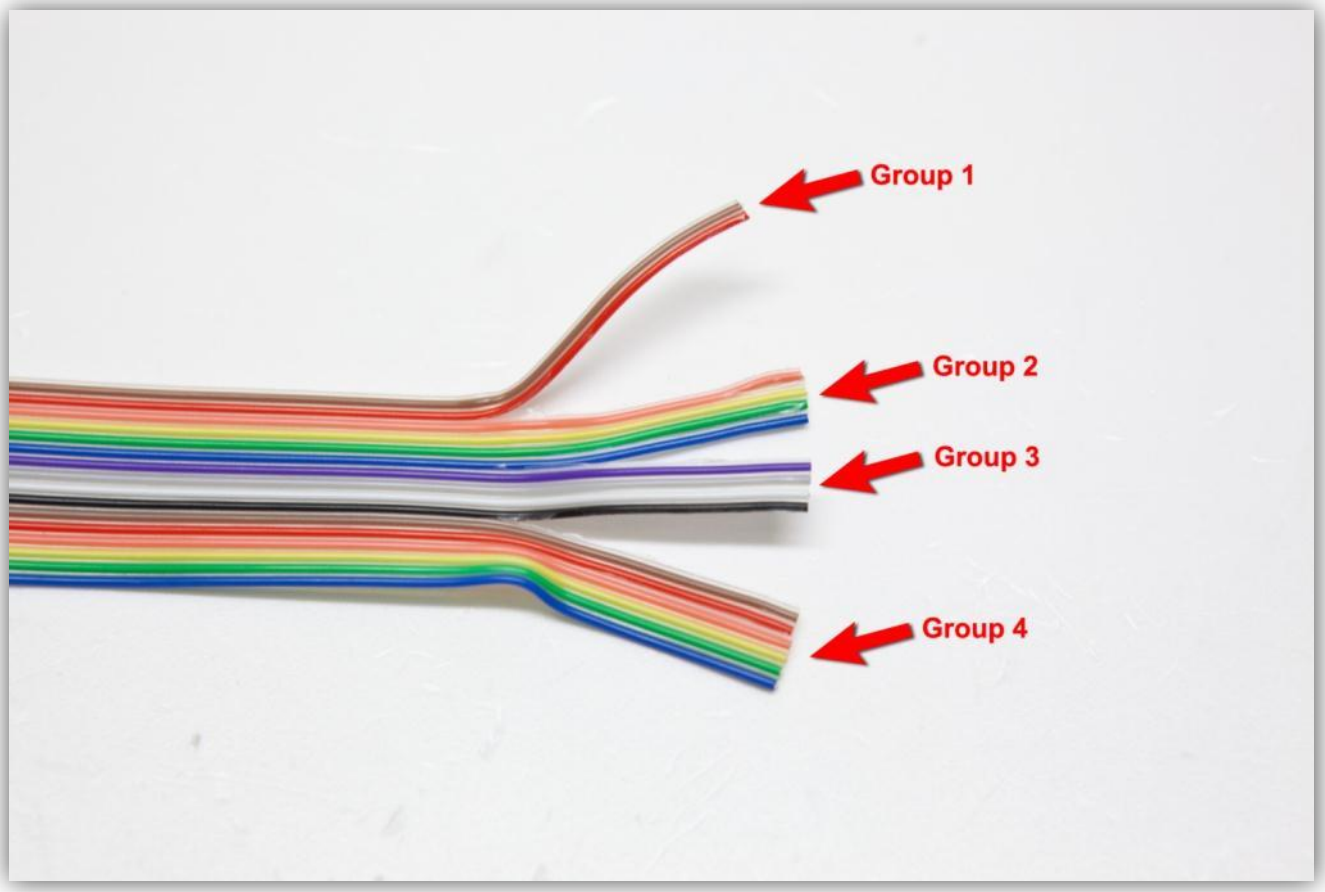


018 – WIRING THE Y AXIS MOTOR AND MICRO SWITCH

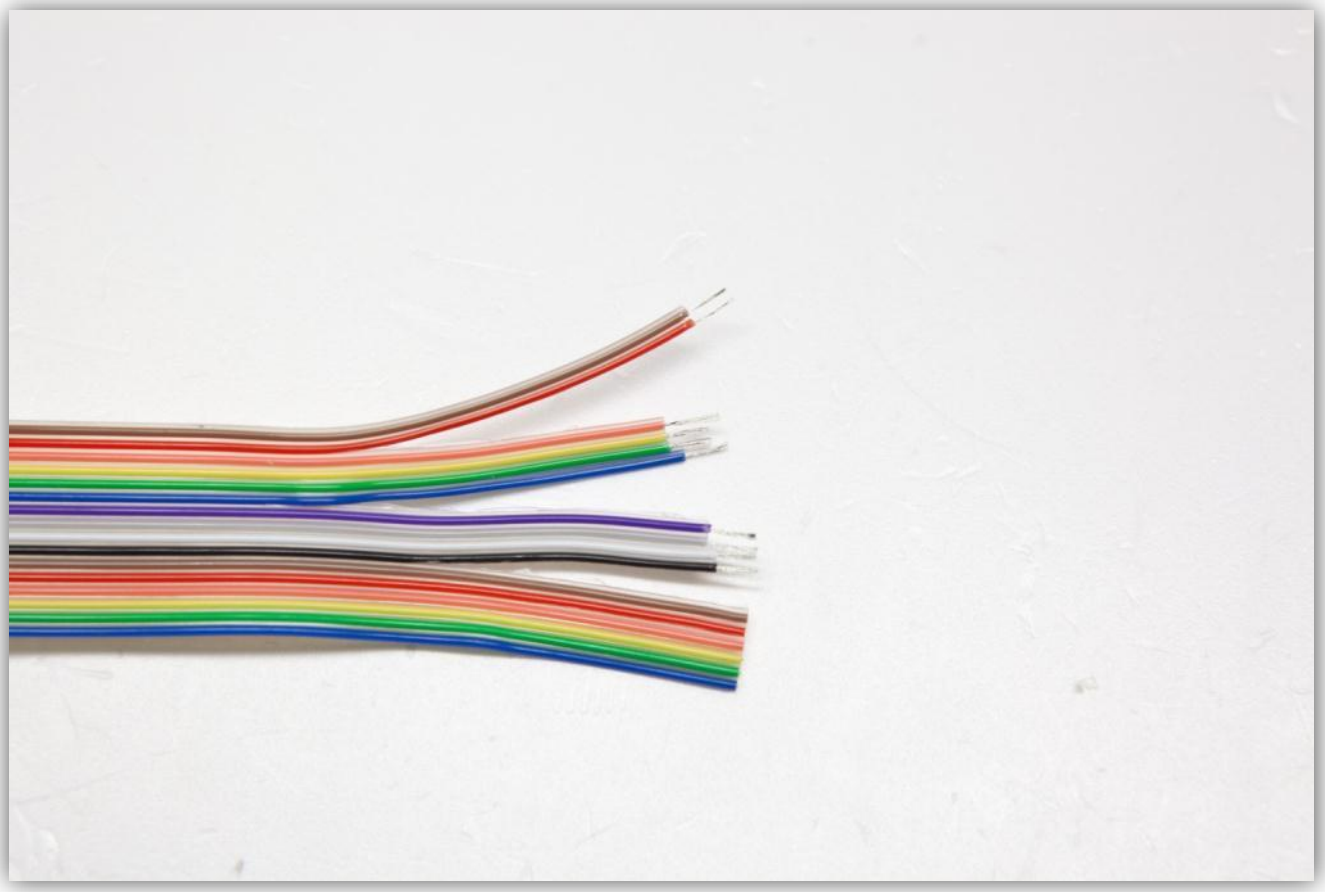
Take the rest of the flat cable, it should be 1 meter (39.4") long.

Detach the following groups for about 2 cm (0.79"):

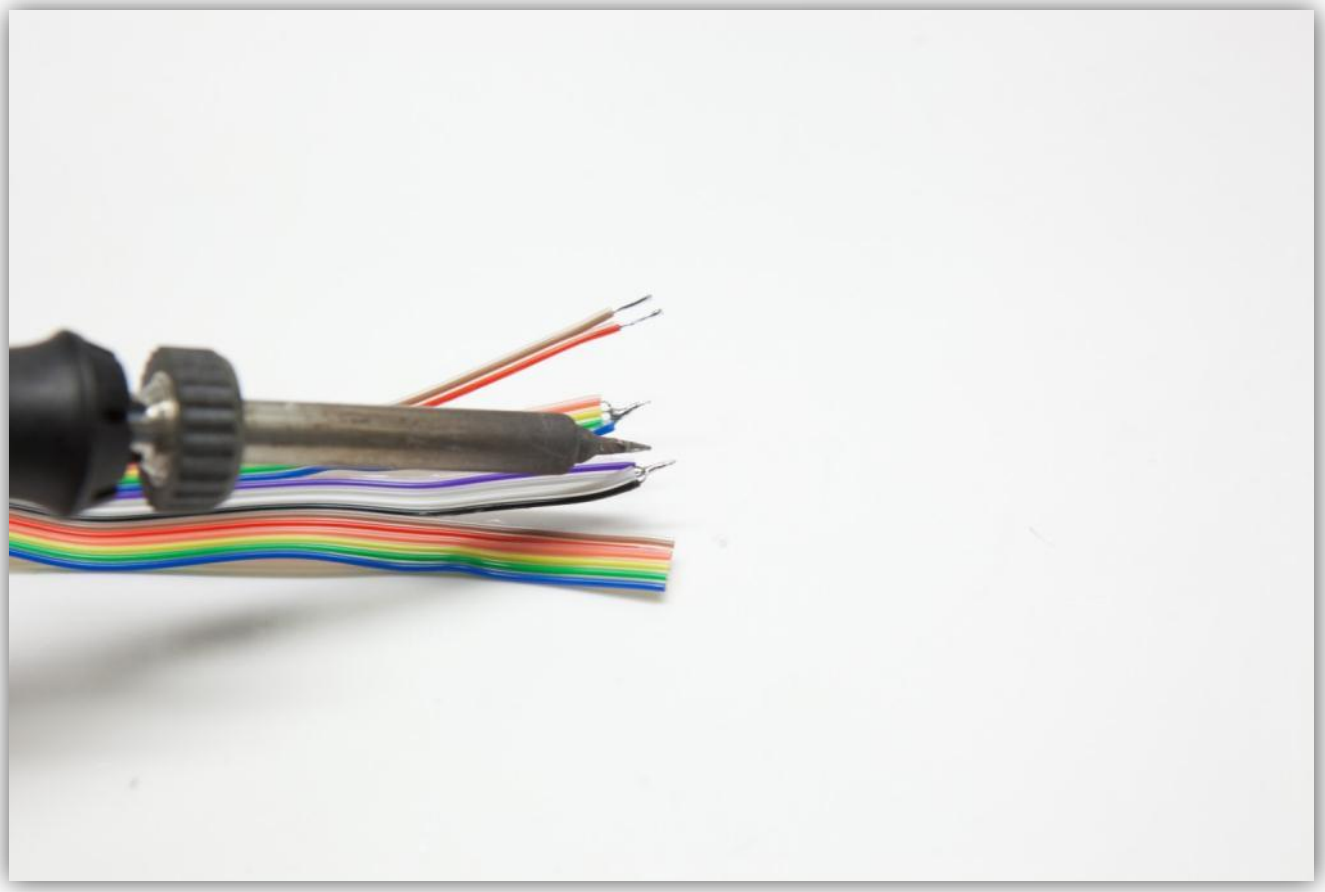
- Group 1: **Brown, Red**
- Group 2: **Orange, Yellow, Green, Blue**
- Group 3: **Violet, Grey, White, Black**
- Group 4: **Brown, Red, Orange, Yellow, Green, Blue**



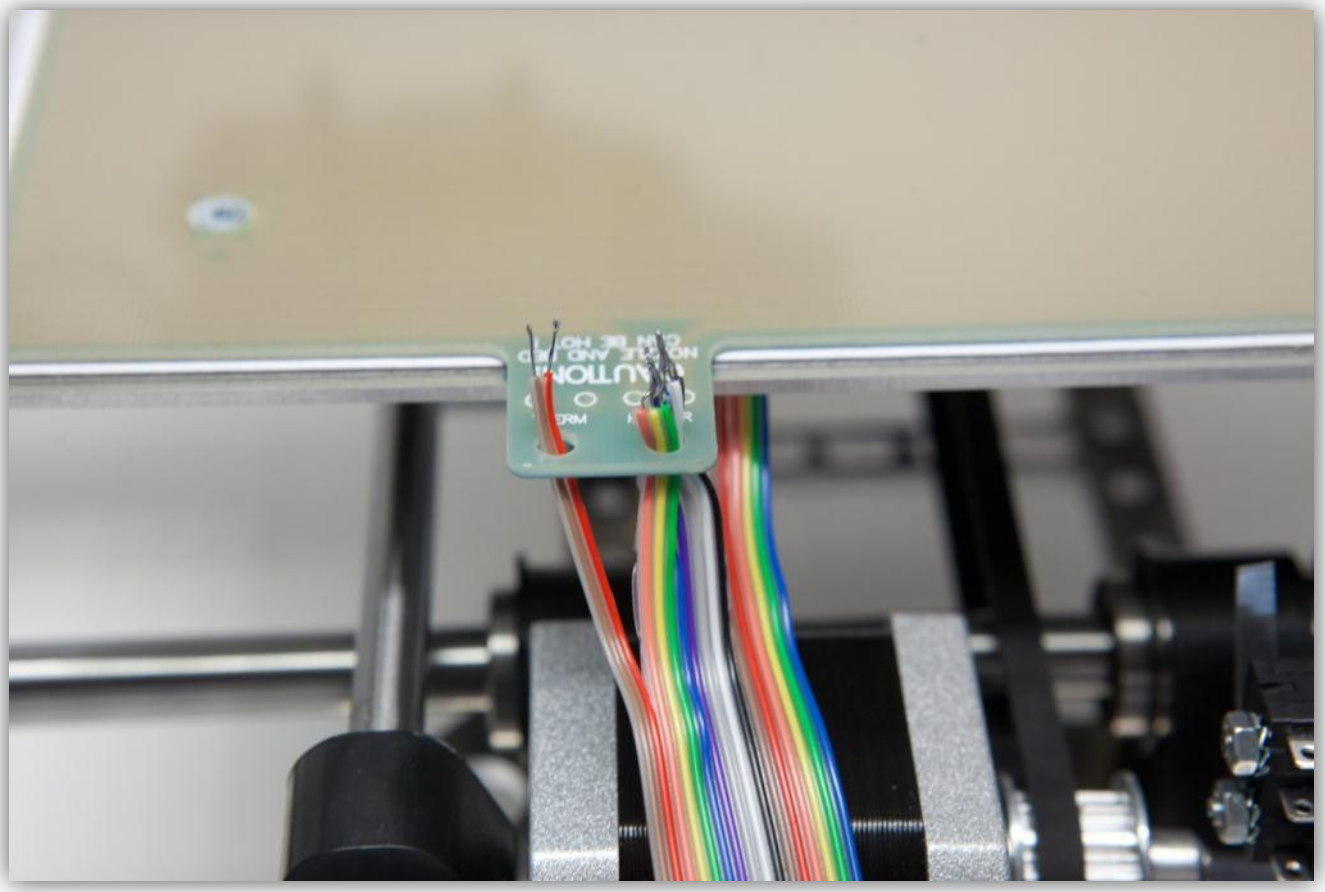
Strip and thin the first 3 groups. **Make sure you twist the wires from group 2 and 3 together.**



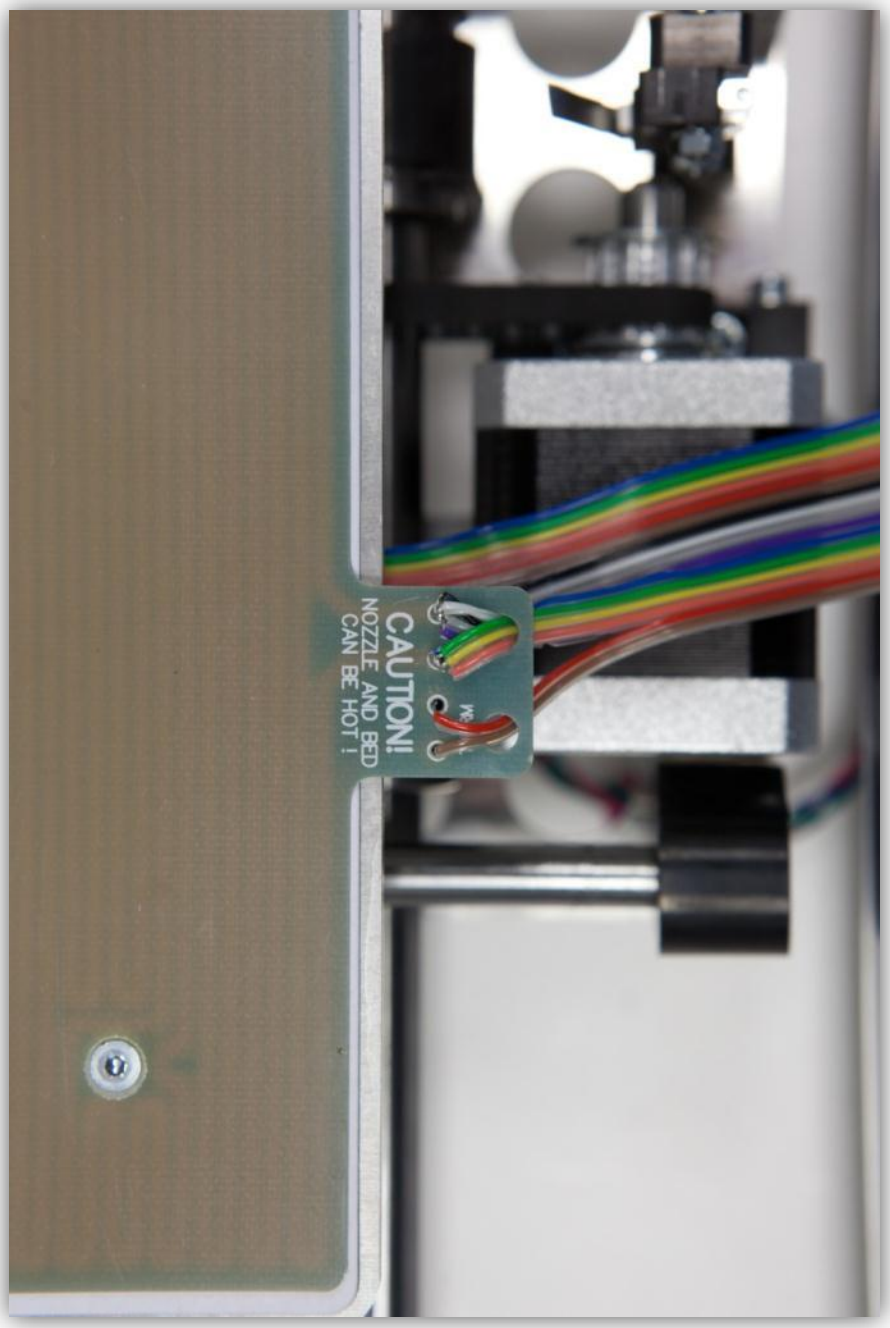
Twist the wires from group 2 and 3 together before soldering them together.



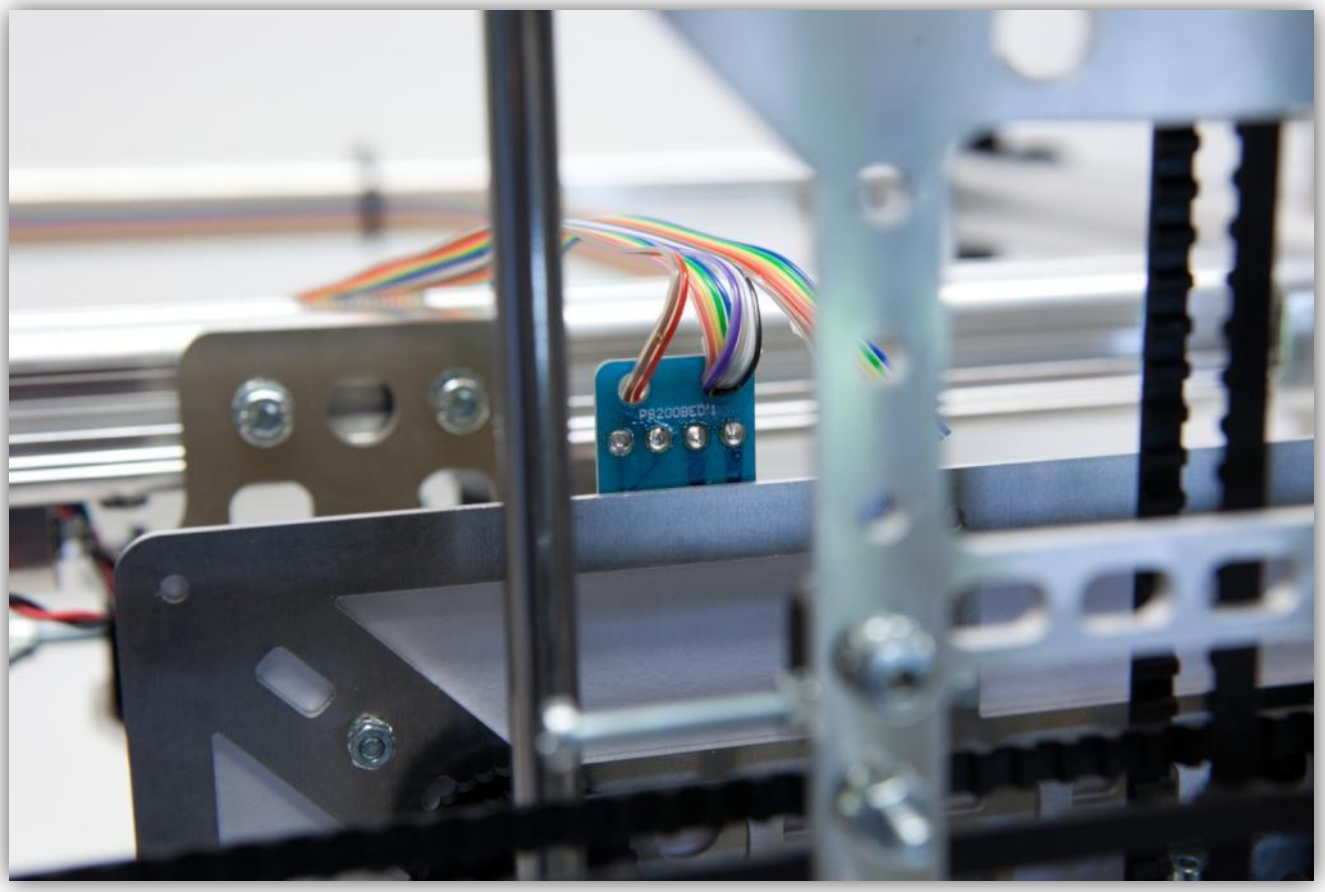
Guide the wires 1 cm through the holes of the heated bed. **Group 1** should go through the hole marked with THERM. **Group 2 and 3** should go through the hole marked with HEATER.



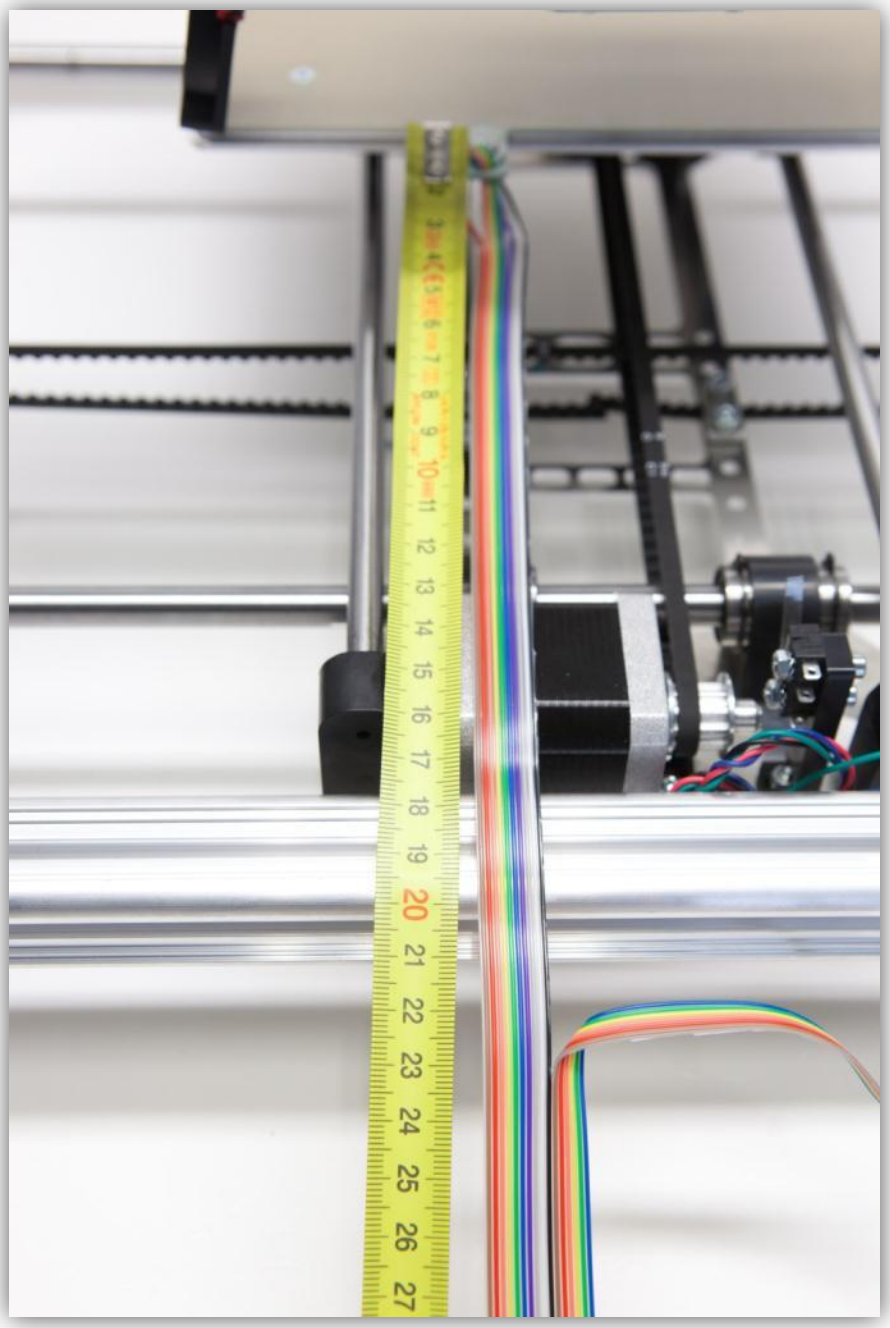
Now insert the tinned pieces of the wires into the small holes, the wires from **Group 1** go into the holes that correspond with THERM (not polarized) and the wires from **Group 2 and 3** go into the holes that correspond with HEATER (not polarized).



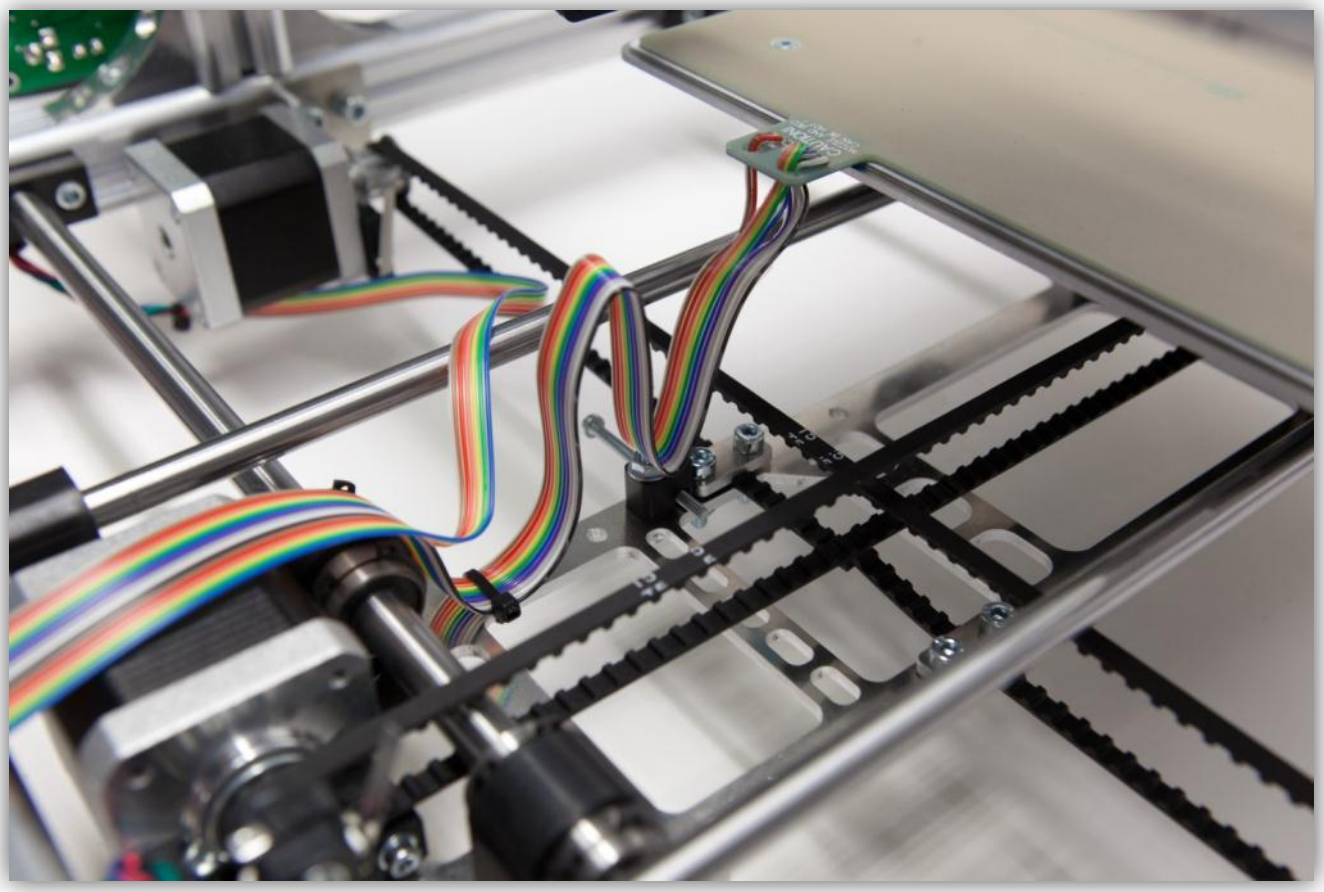
Solder the end of the wires to the bottom of the board. **Take extra care when soldering these points to not damage a part of the printer with the hot soldering iron.**



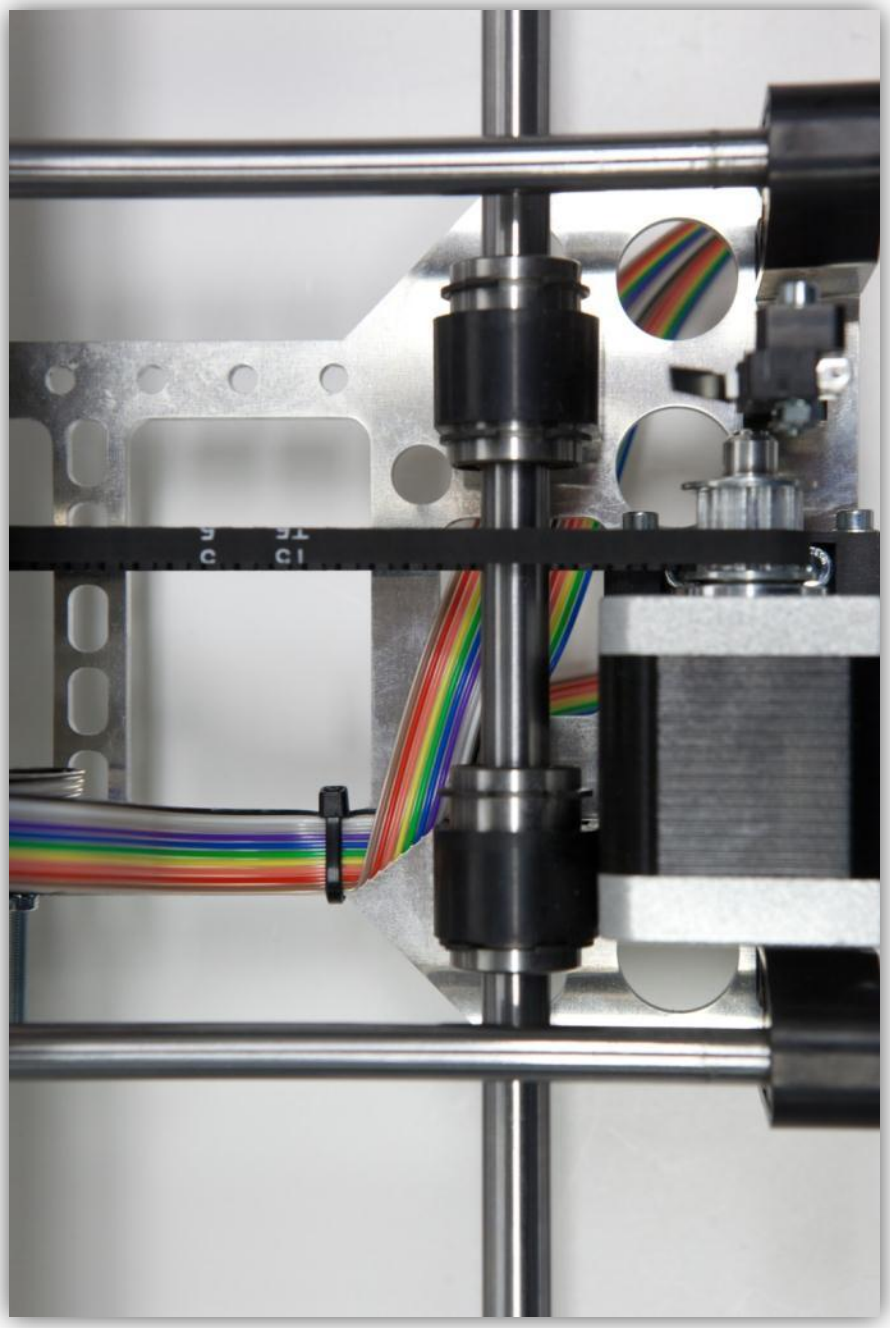
Detach **Group 4** 23 cm (9.06") from the wires that are now connected to the HEATED BED PCB.



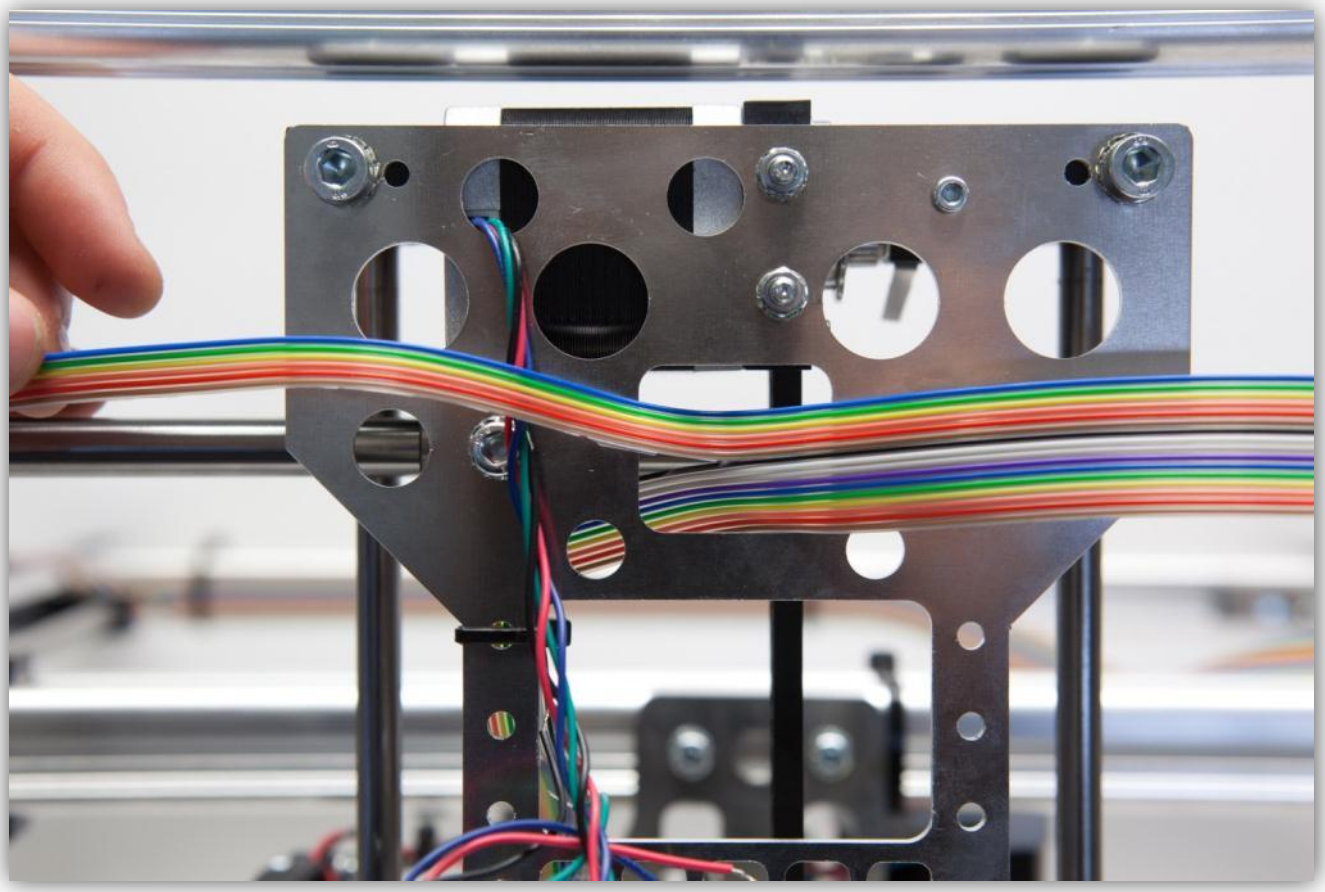
Use a small tie-strip to fasten the wires of **Group 1, 2** and **3.** Make sure the bed can move to its full extent without the wire catching or stretching. It’s good practice to give it some bends as shown in the picture so that it folds nicely when the bed is moving.



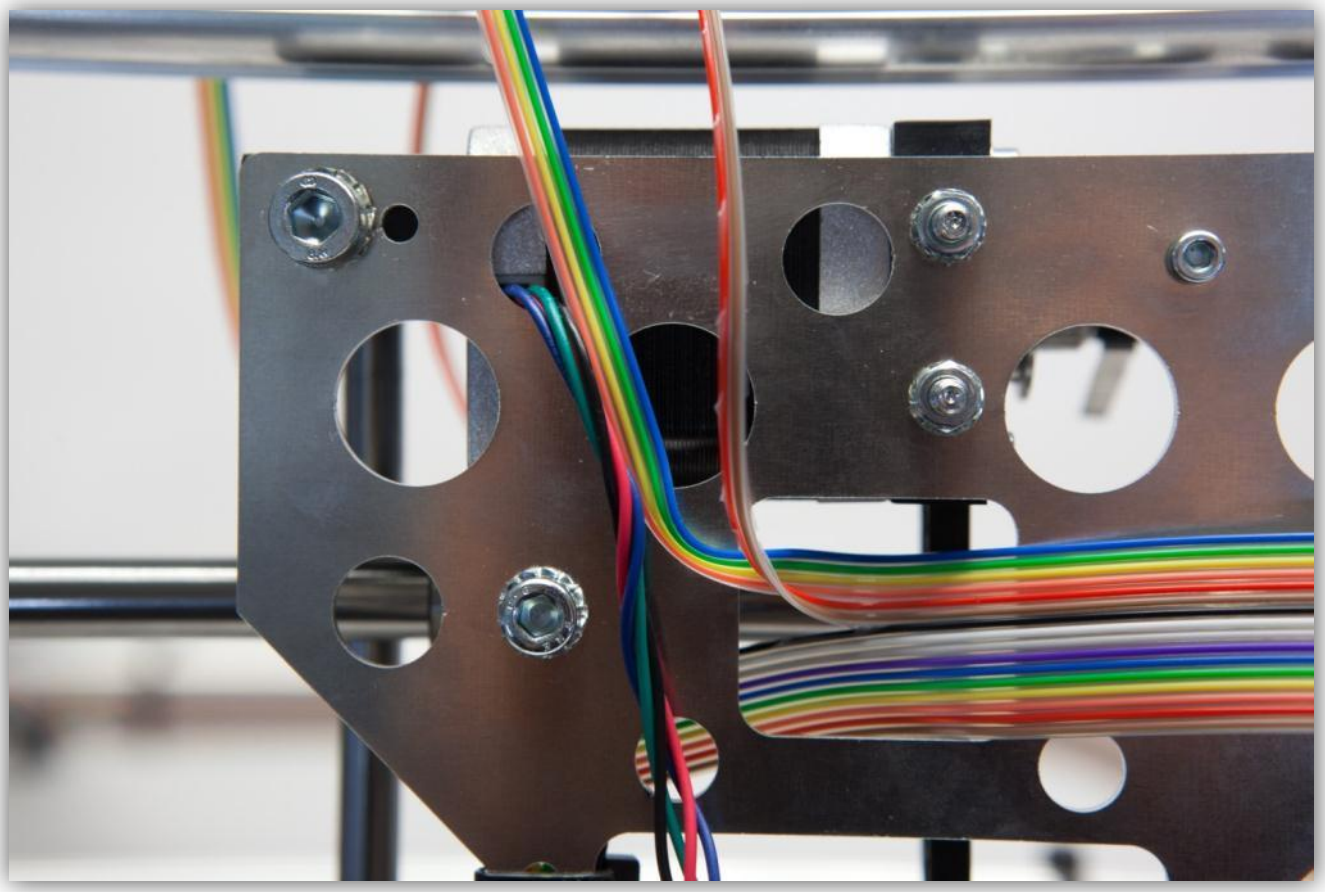
Fold the cable as shown in the picture below. Thread the cable through the hole.



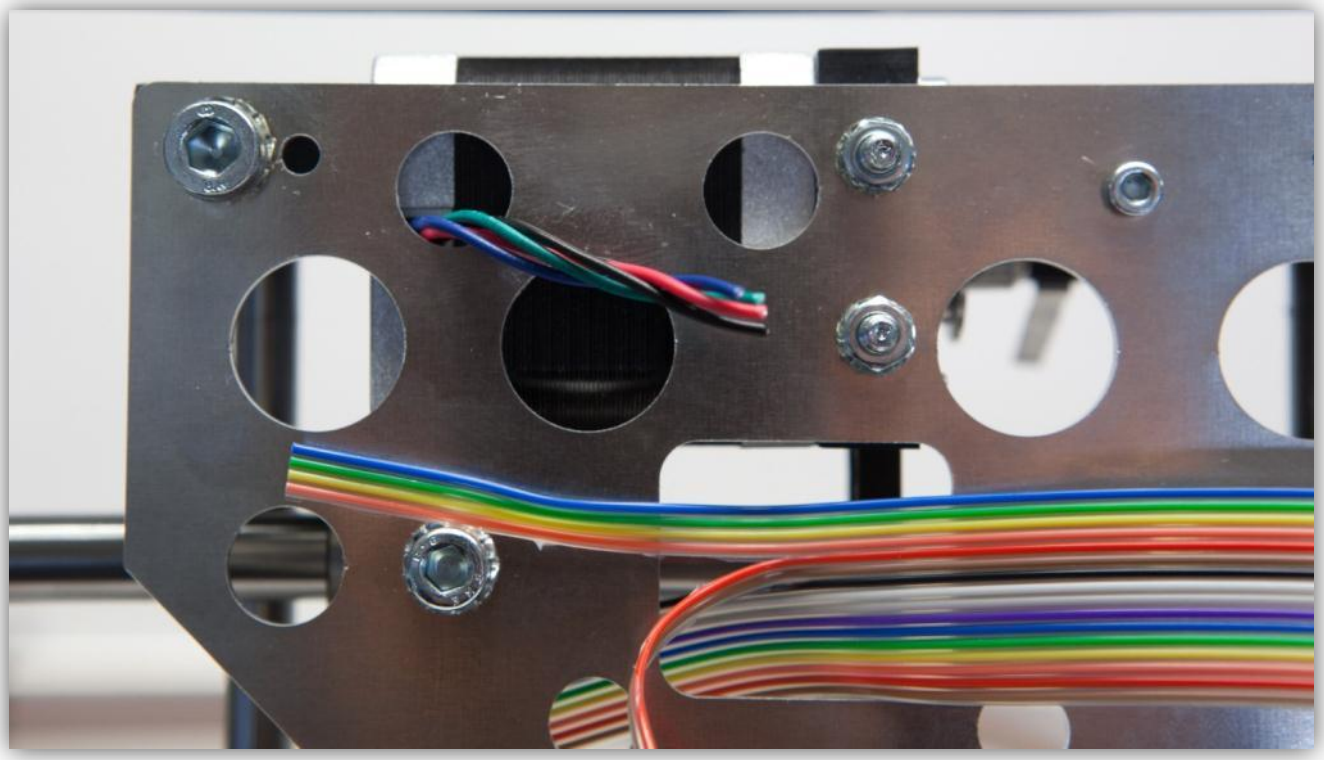
Notice where the cable splits.



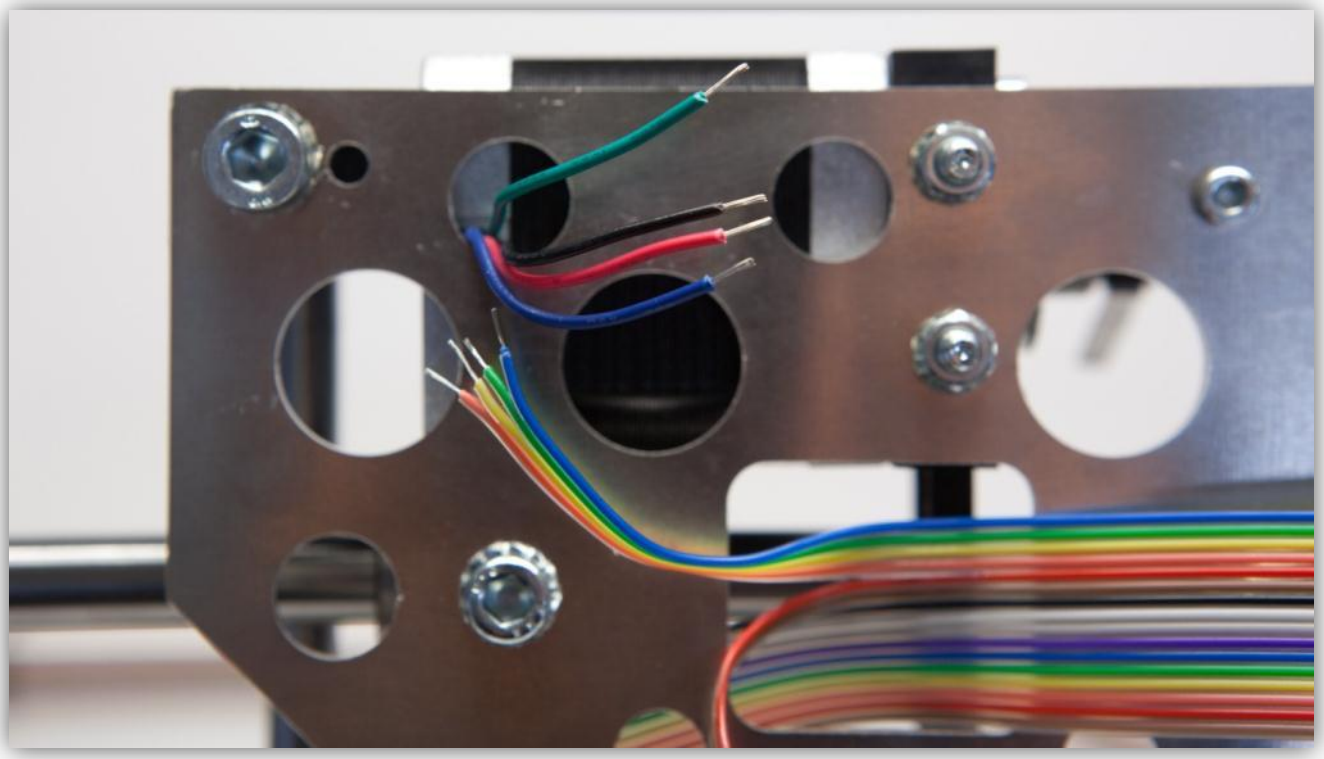
Split the wires as shown in the picture. You should have a group with the following wires: **Blue, Green, Yellow, Orange** and a group with the following: **Red, Brown.**

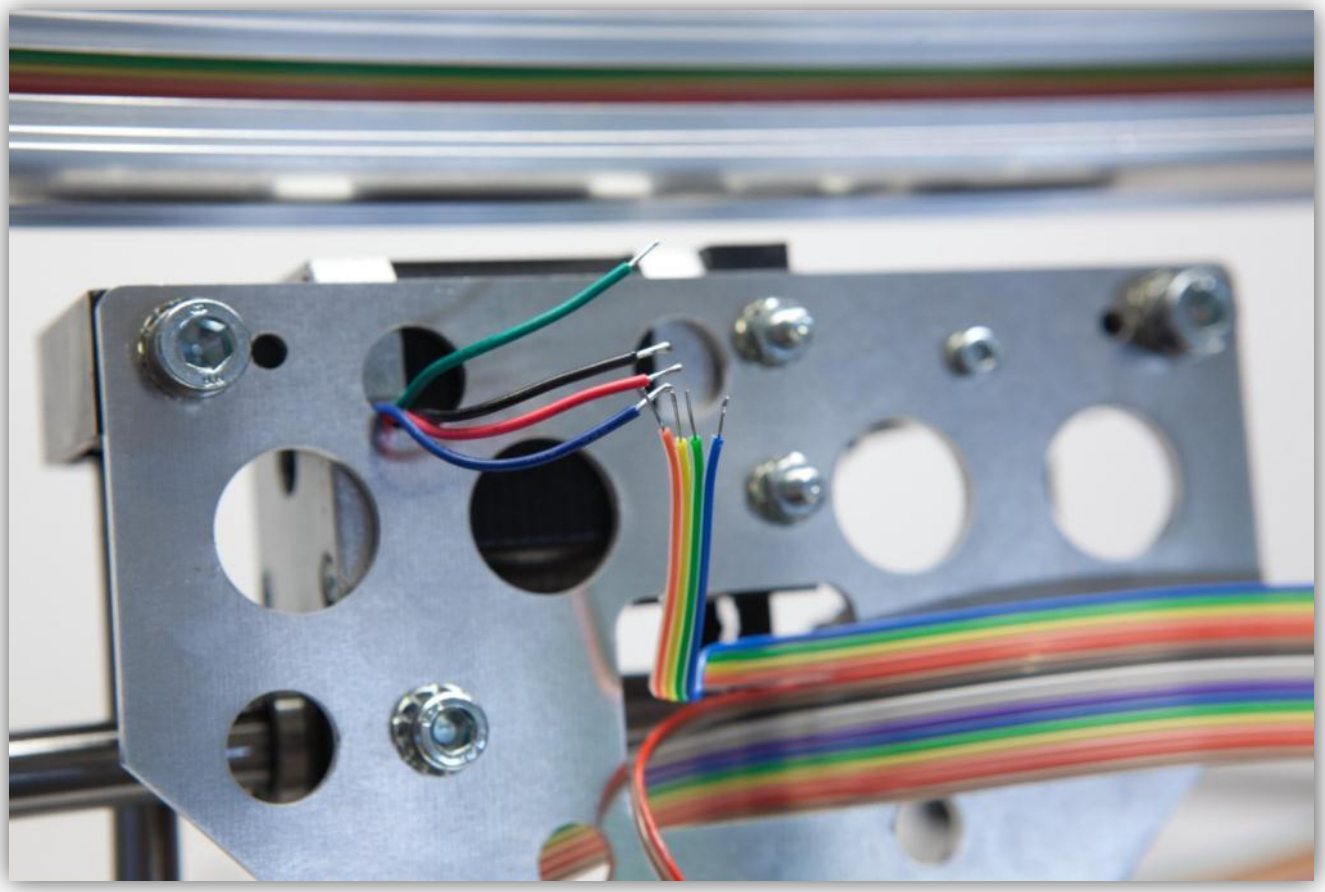


Cut the group with the following wires **Blue, Green, Yellow, Orange** and the wires of the motors so they can connect. Look at the picture below for guidance.

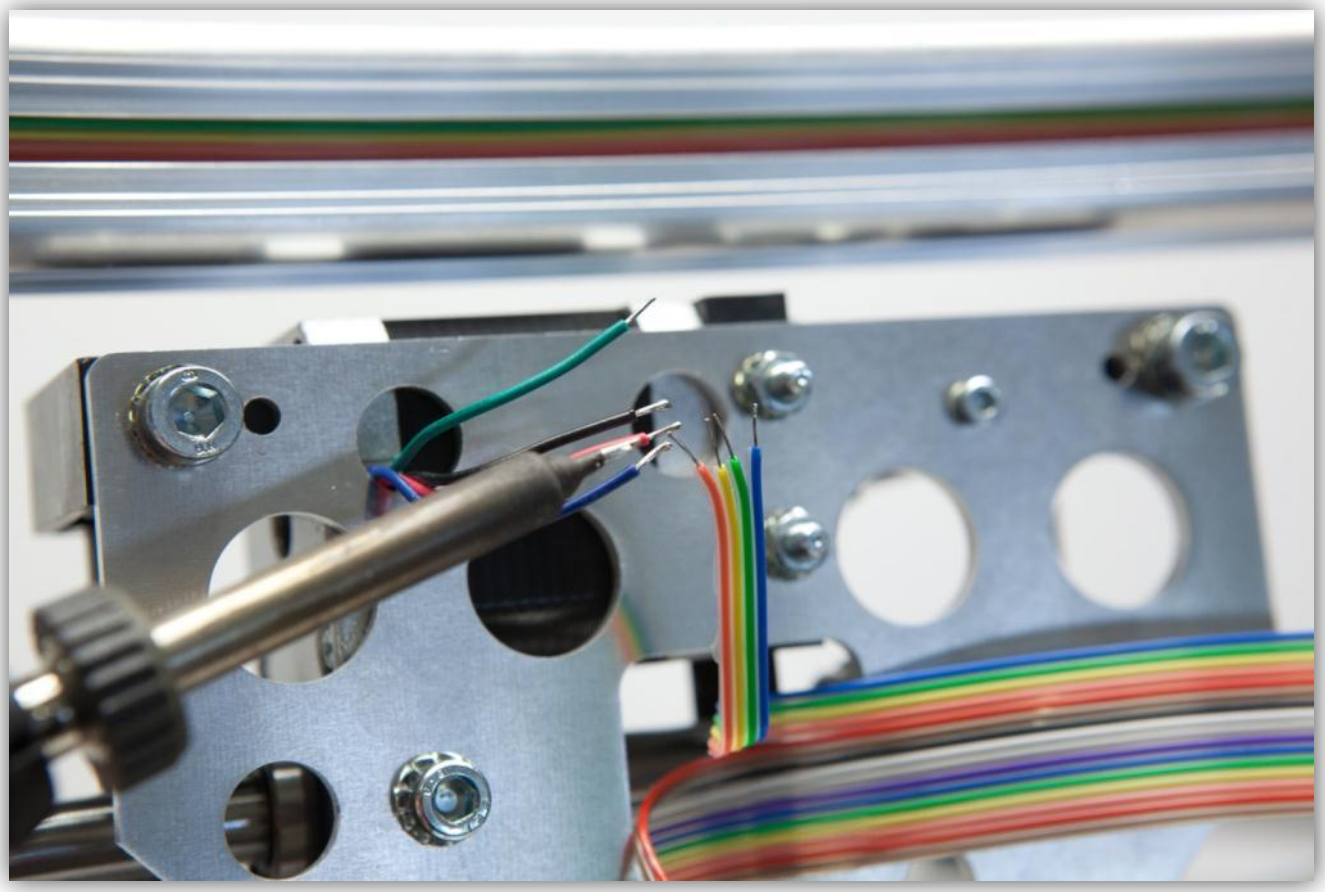


Strip 5 mm (0.2") the wires as shown in the pictures below.



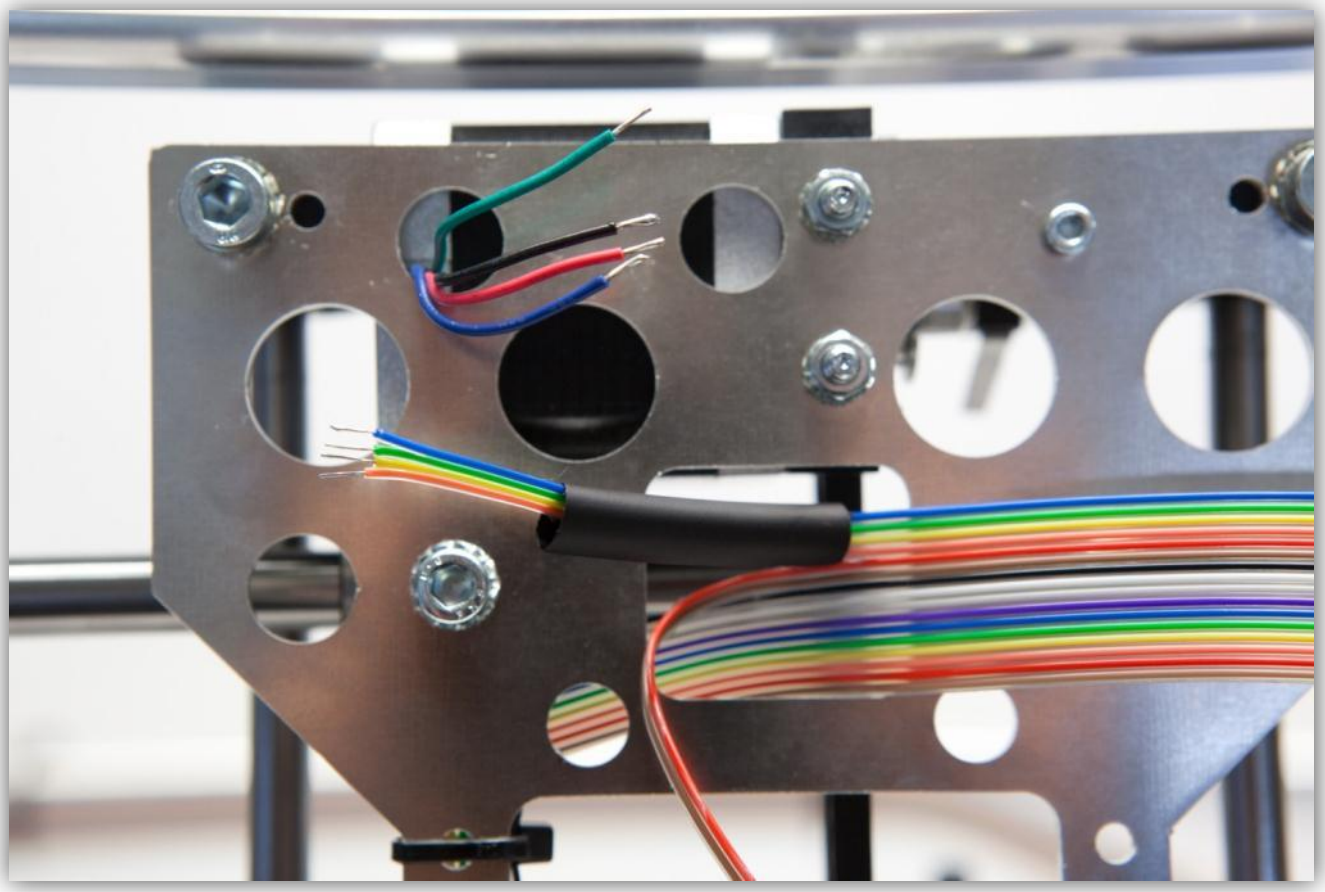


Tin the wires.

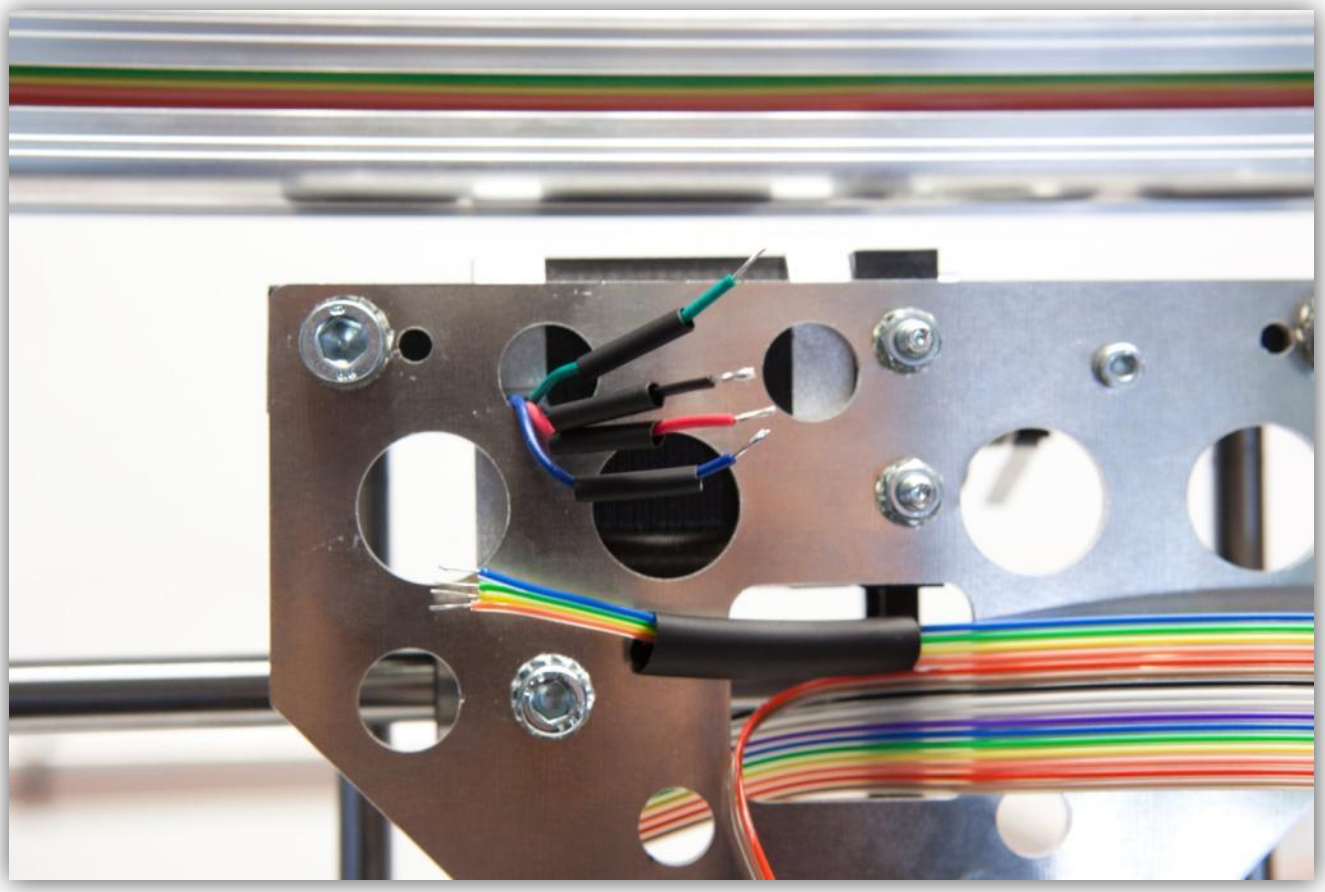


Cut 4 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the biggest piece of heat shrink tubing over the 4 wires from the flat cable.



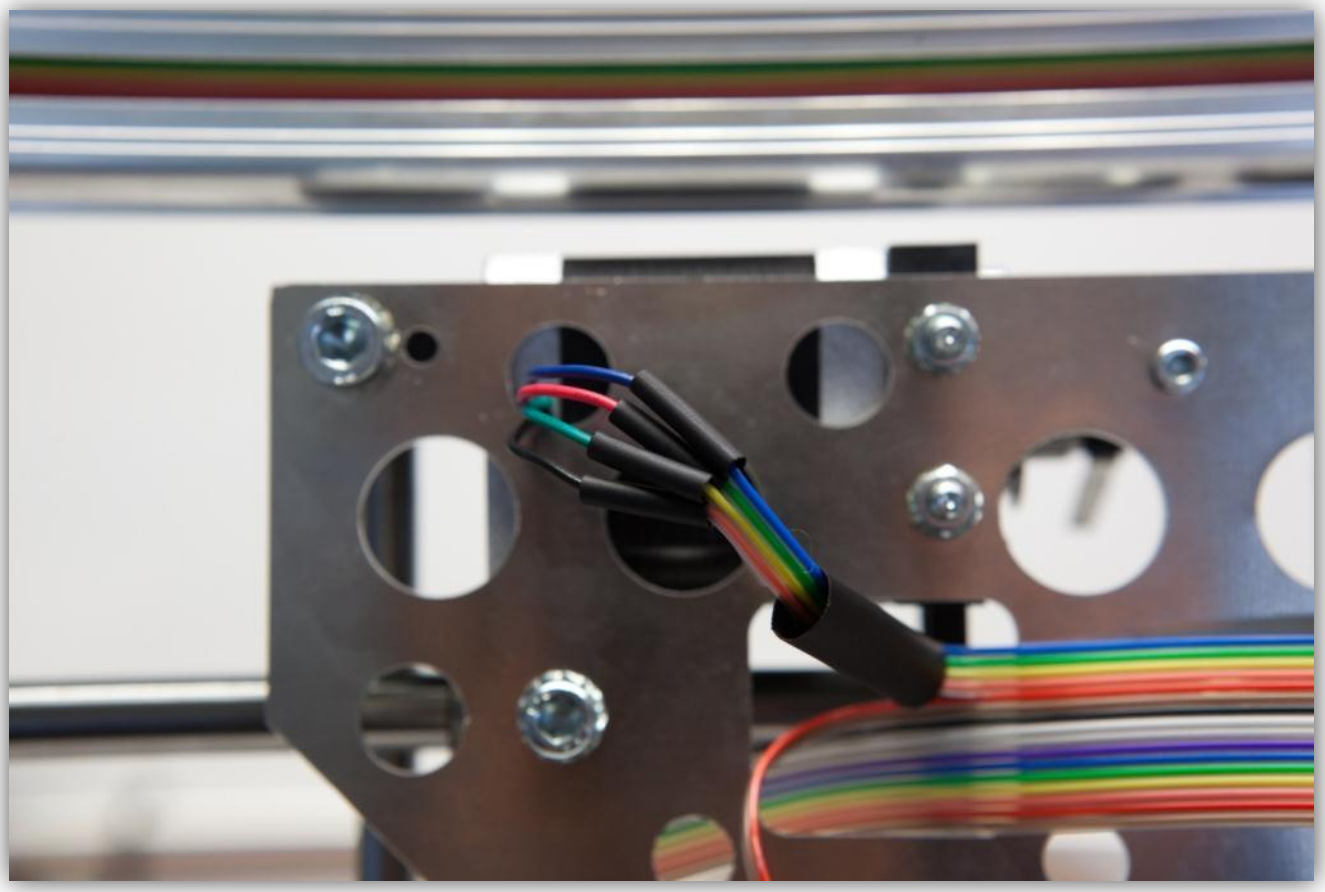
Slide the 4 small pieces of heat shrink tubing over the 4 wires of the motor.

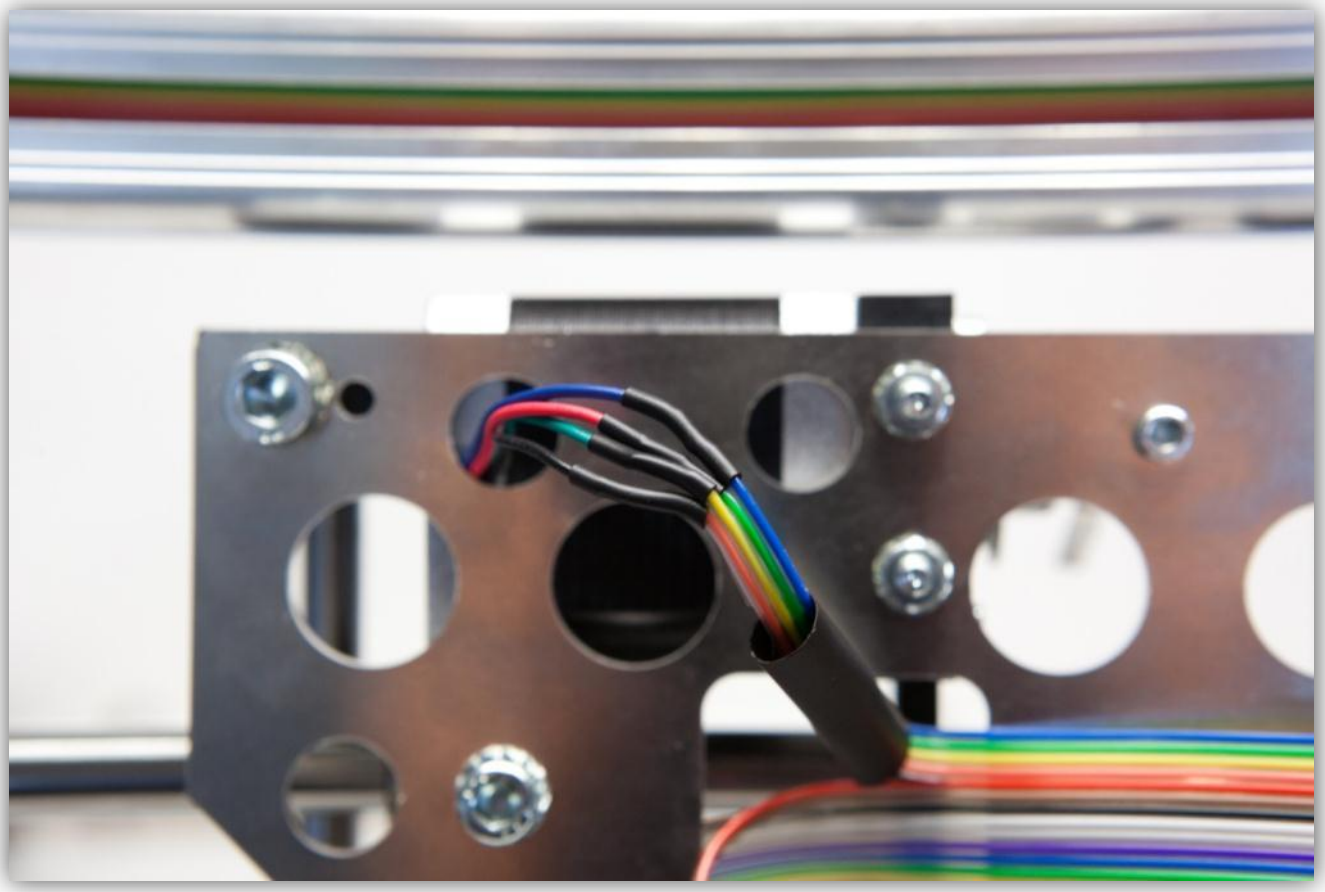


Solder the 4 wires from the motor to the 4 wires of the flat cable. **Watch the colours closely.**

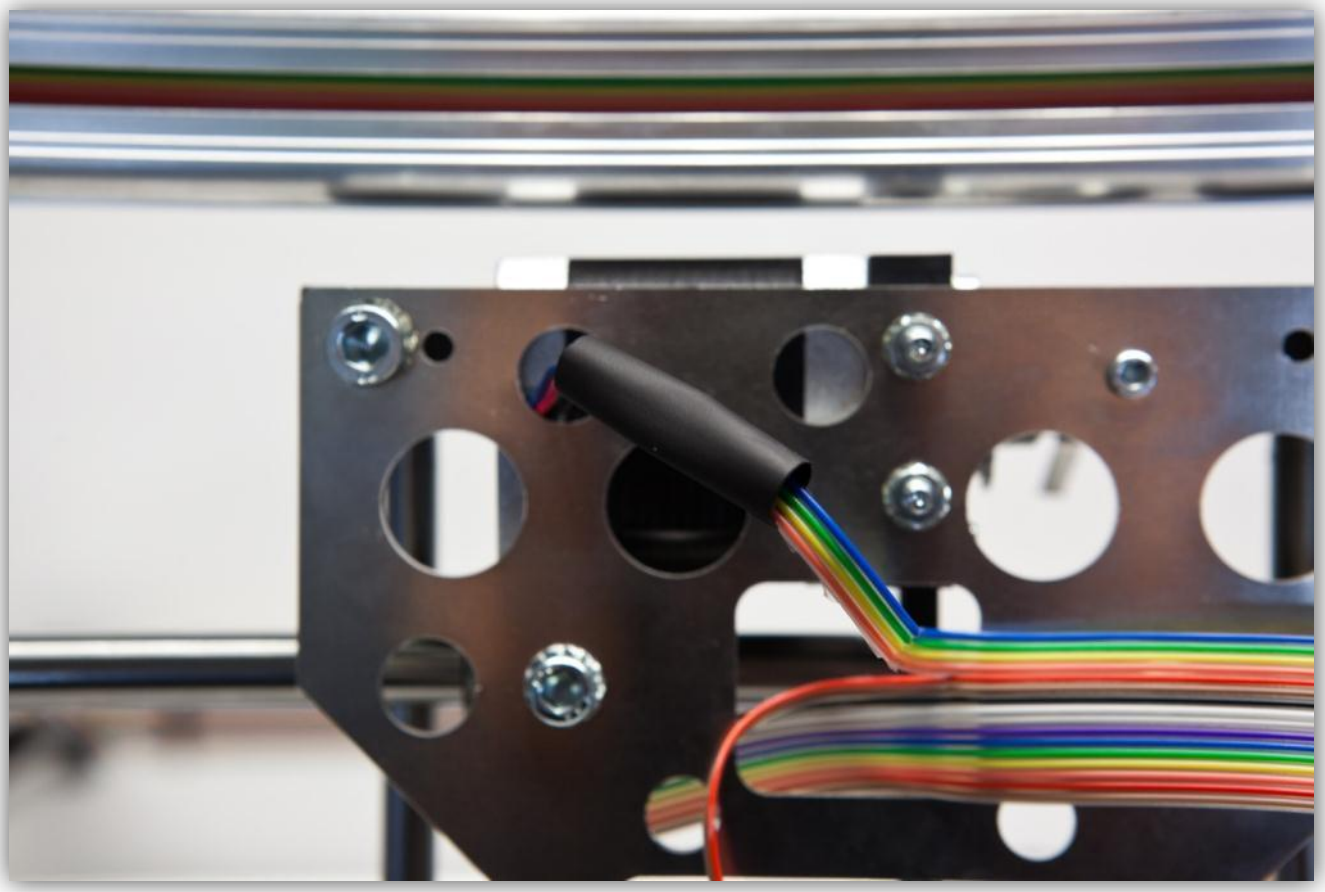
Flat cable	**->**	**Motor wires**
Blue	**->**	**Blue**
Green	**->**	**Red**
Yellow	**->**	**Green**
Orange	**->**	**Black**

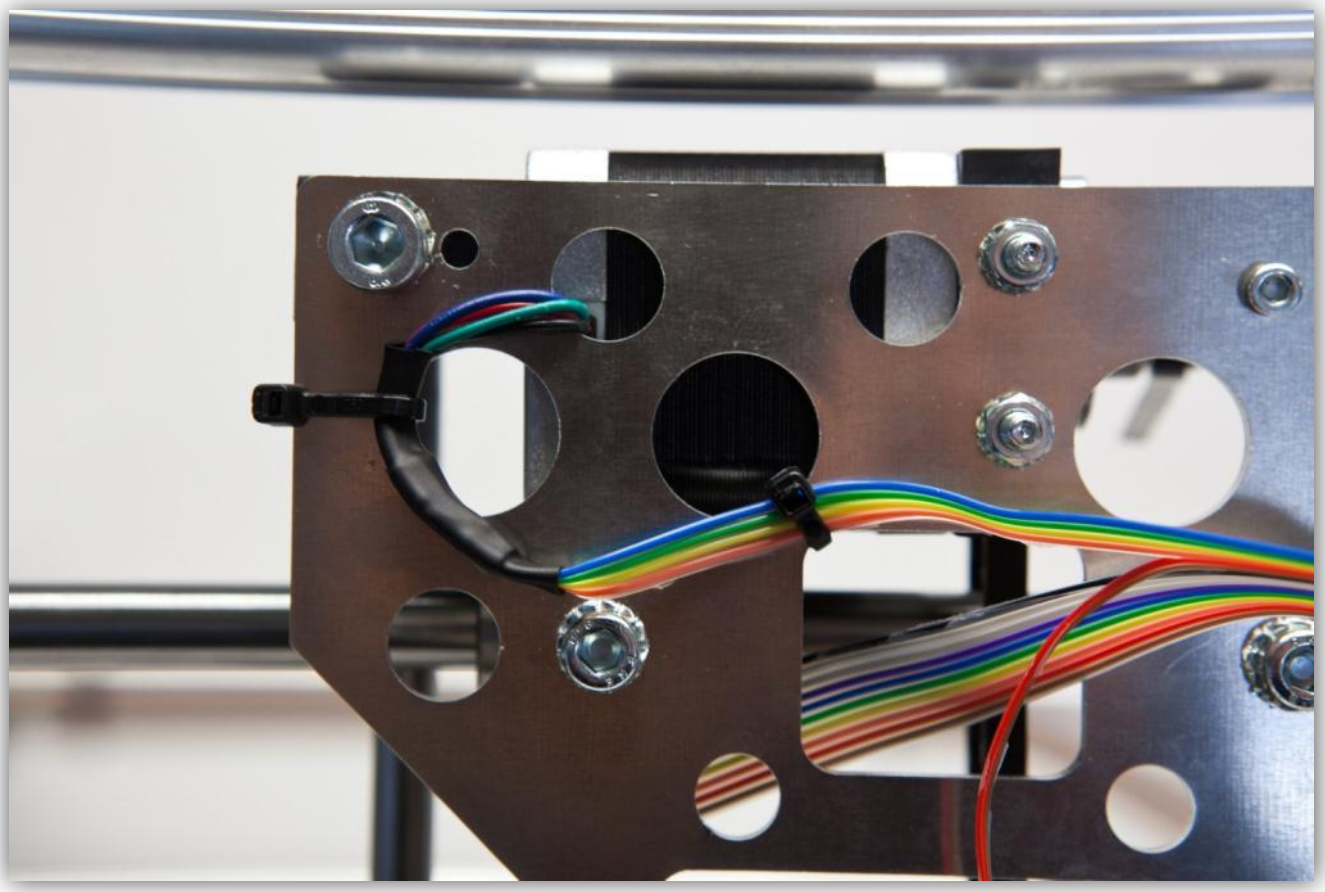
Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.



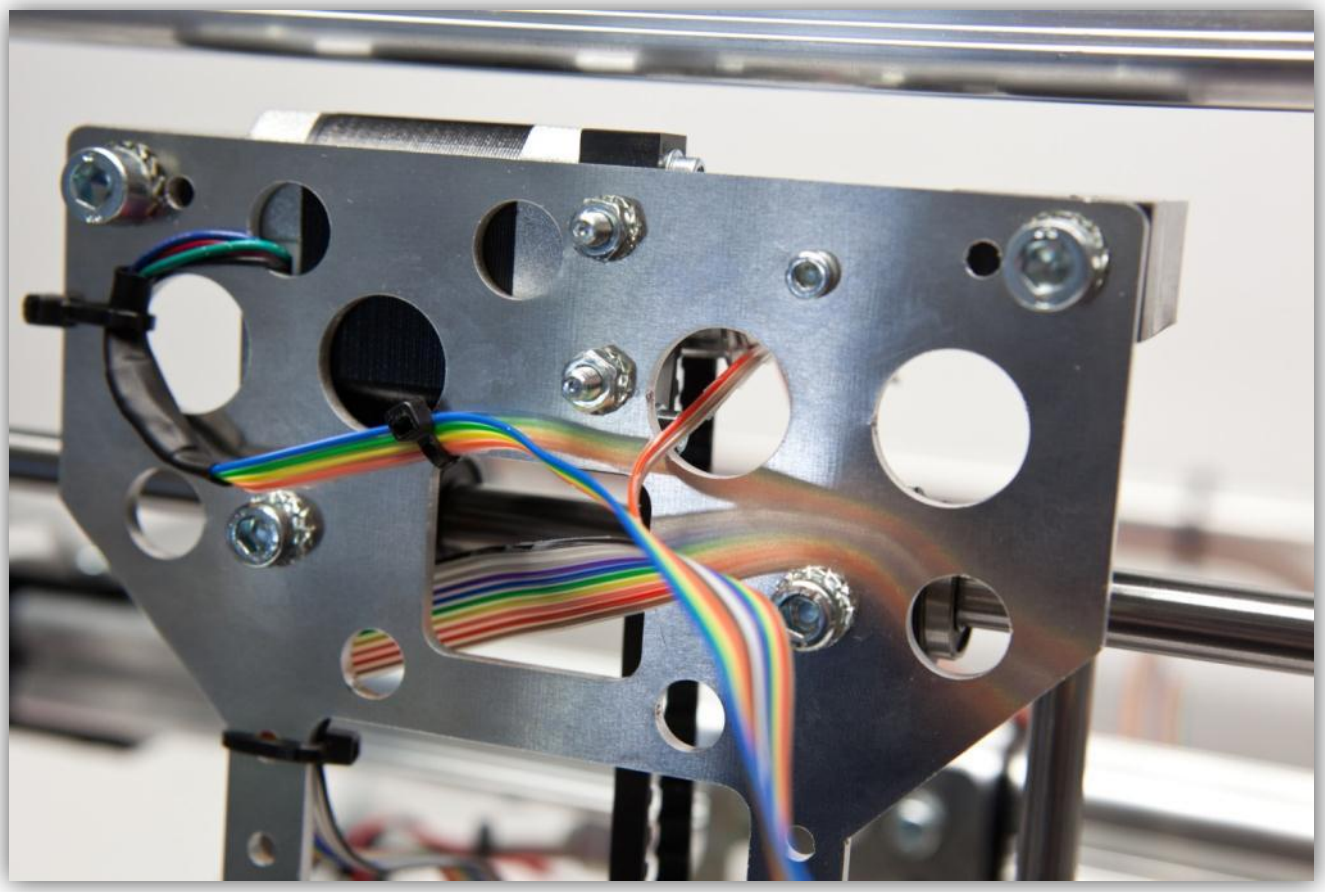


Now slide the big piece of heat shrink tubing over the 4 small pieces, heat the big piece so it covers and protects the 4 heat shrunk joints. Then use a small tie-strip to keep the wires in place as shown in the picture.

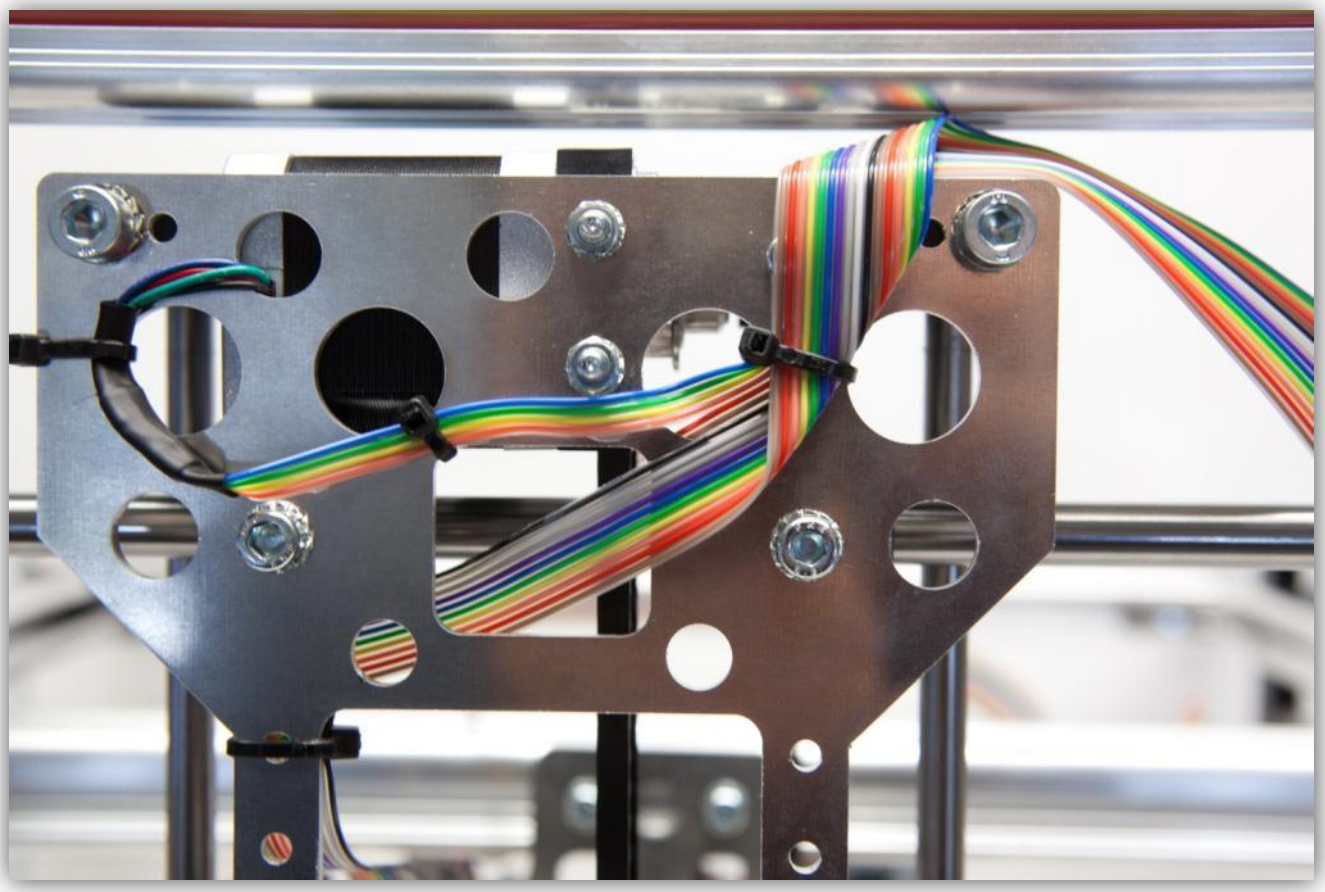




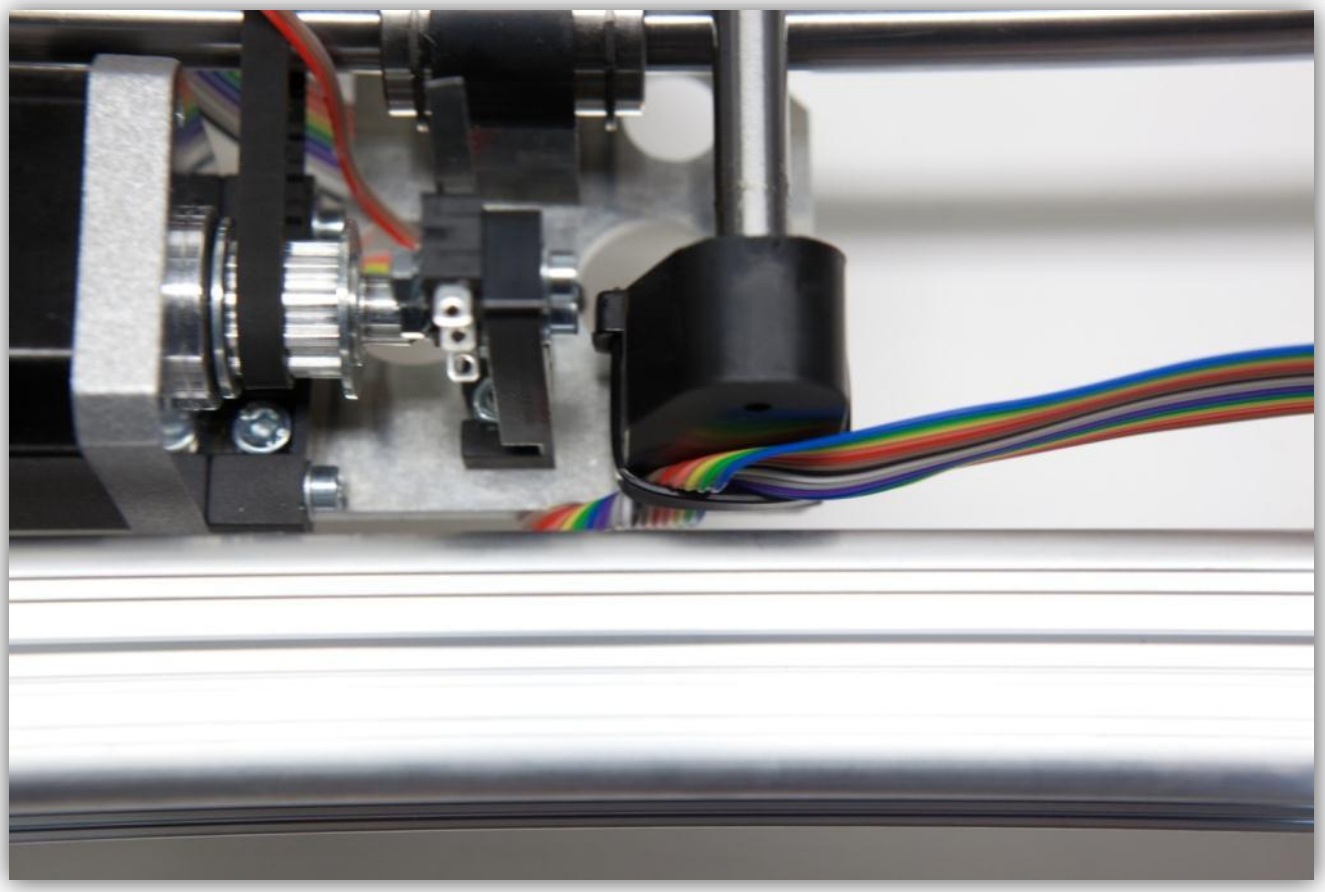
Slide the **Red** and **Brown** wire through the hole as shown in the picture below.

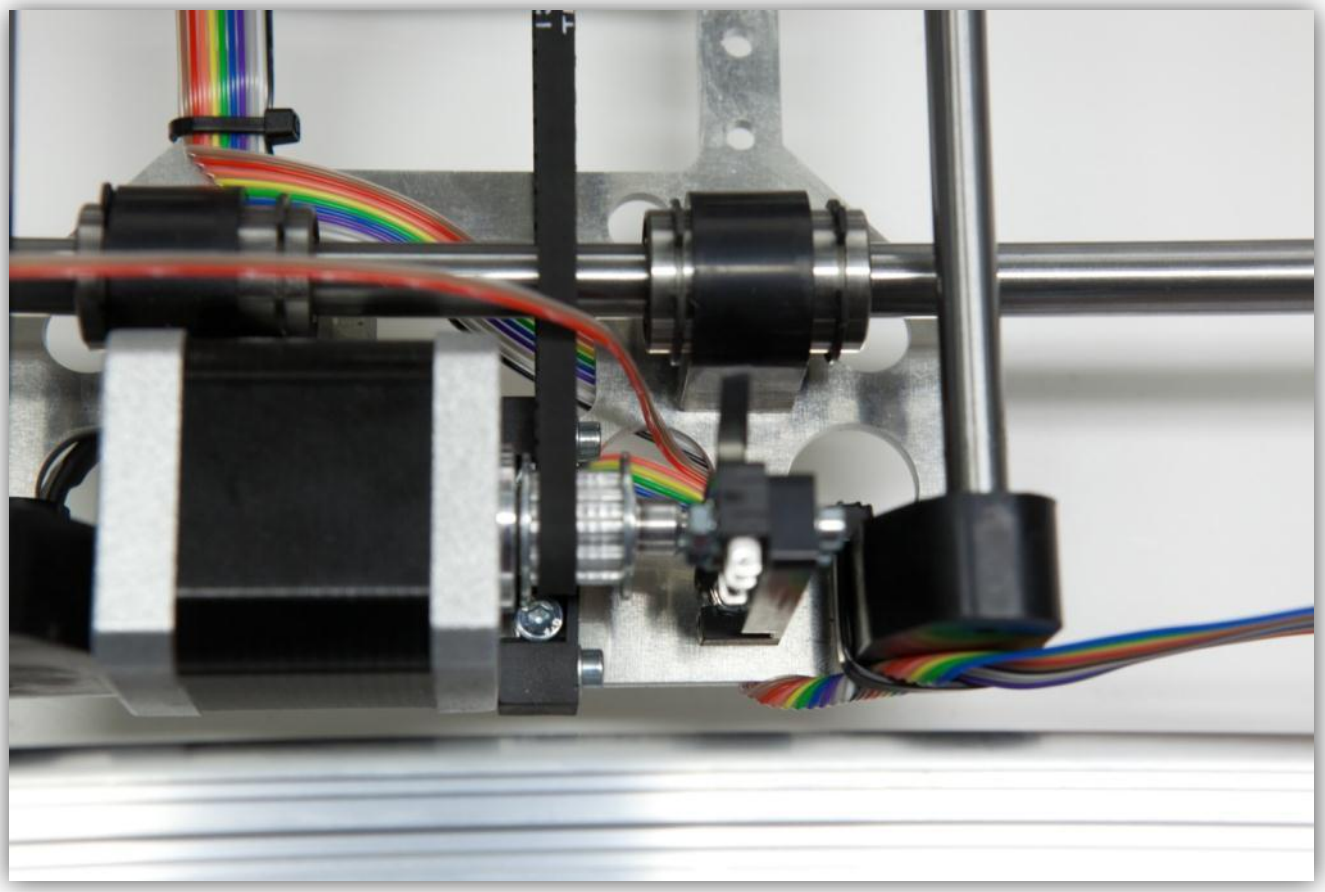


Fold the cable as shown in the pictures below and secure it with small tie-strips.

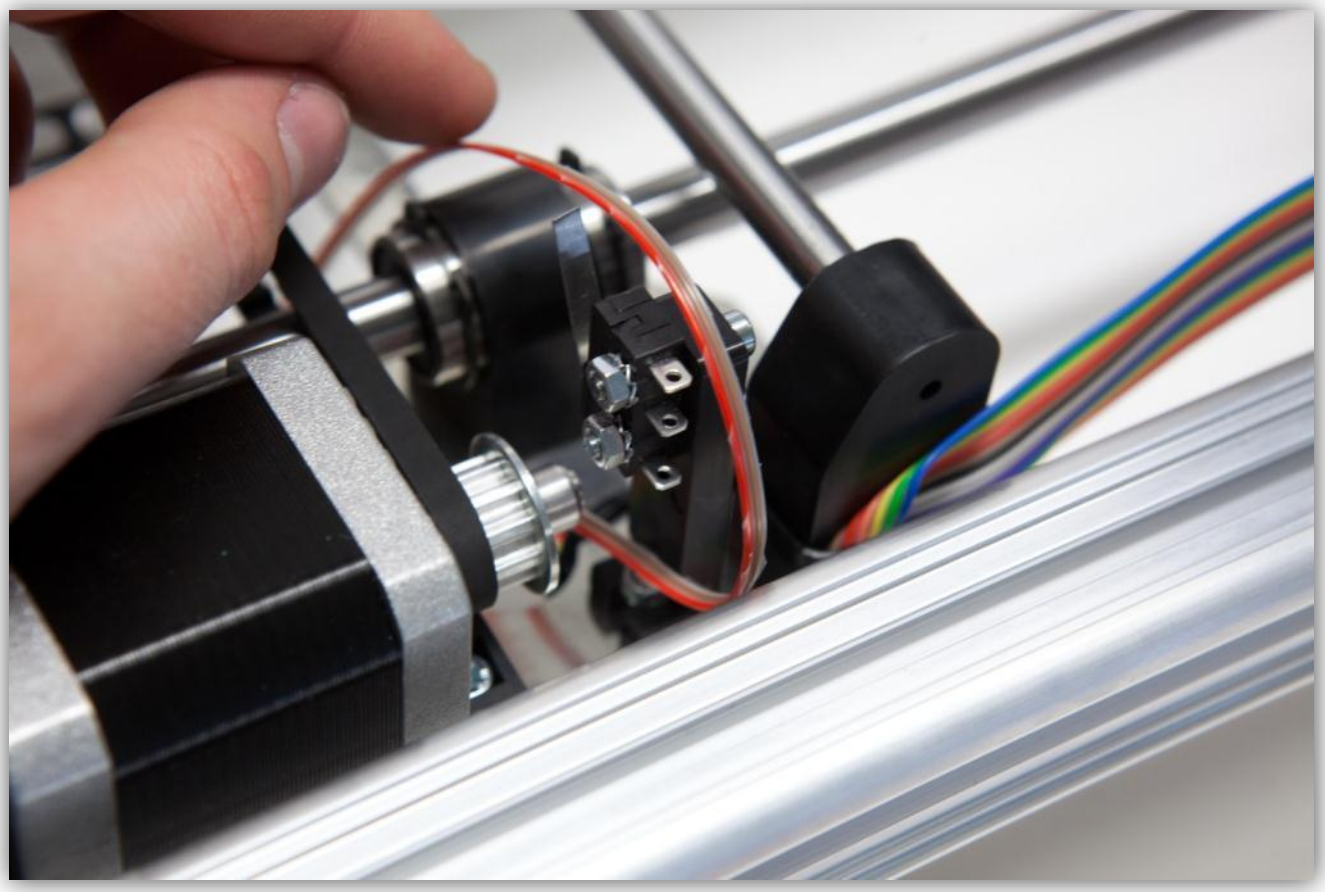


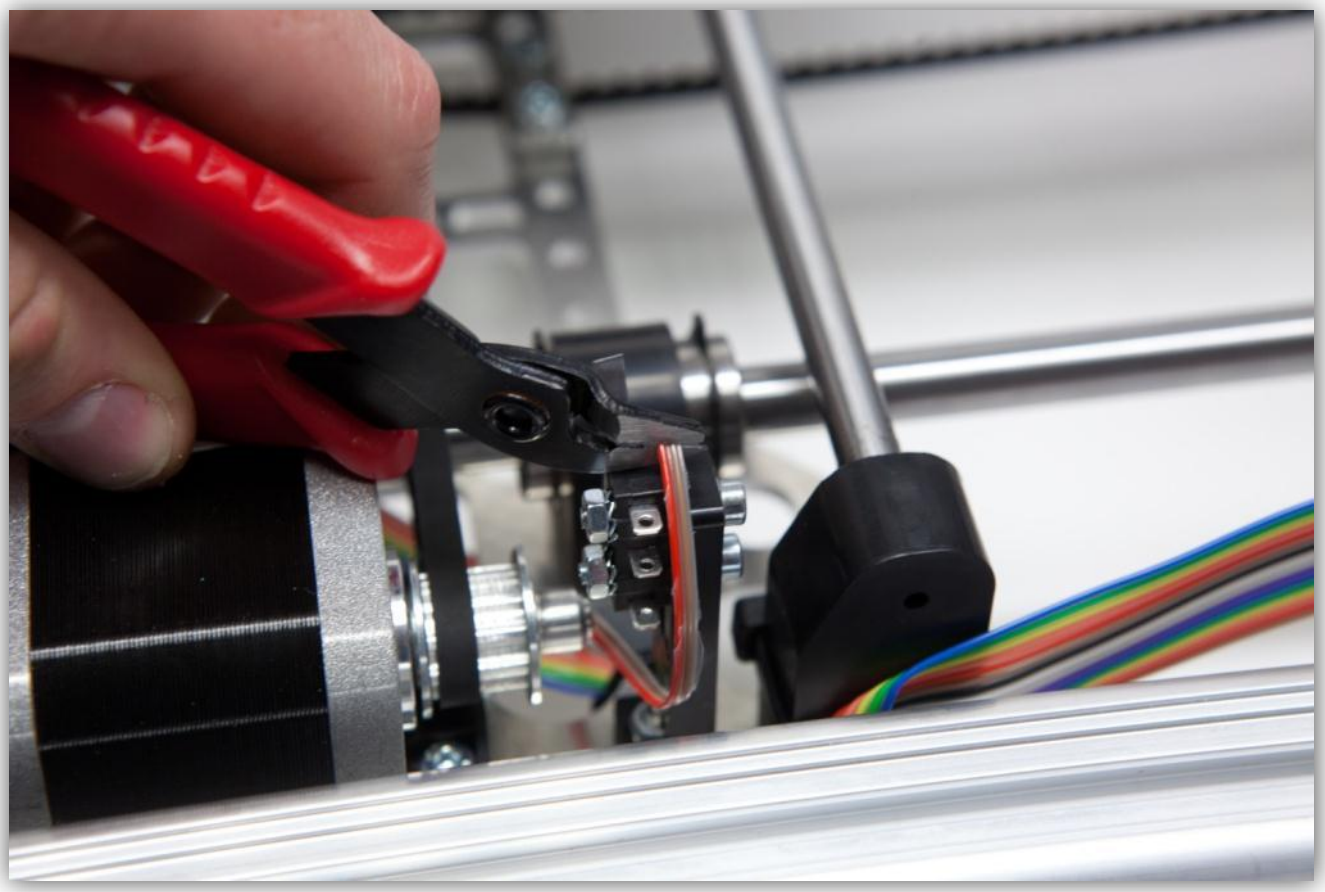
Secure the cable firmly so it is parallel to the frame.



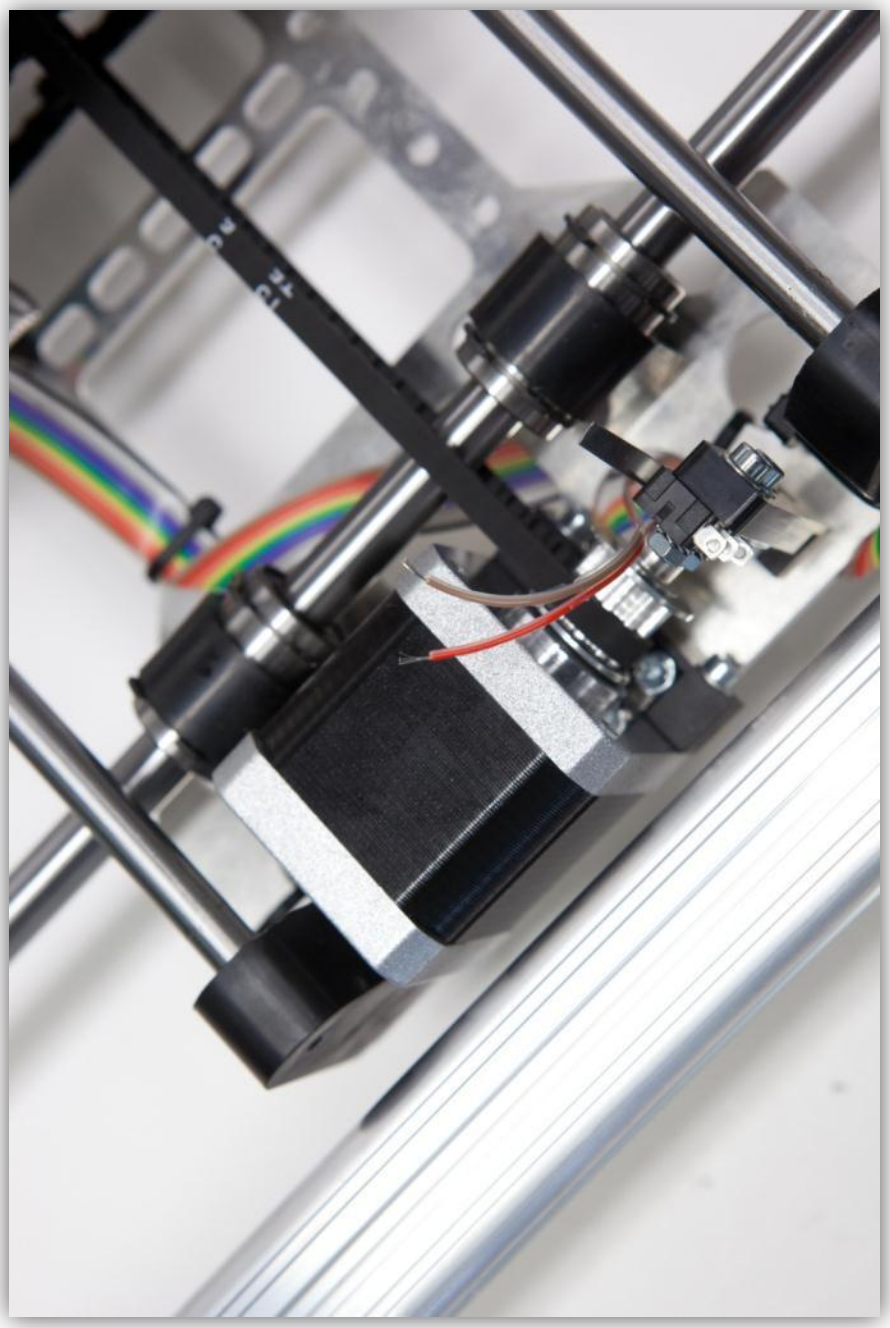


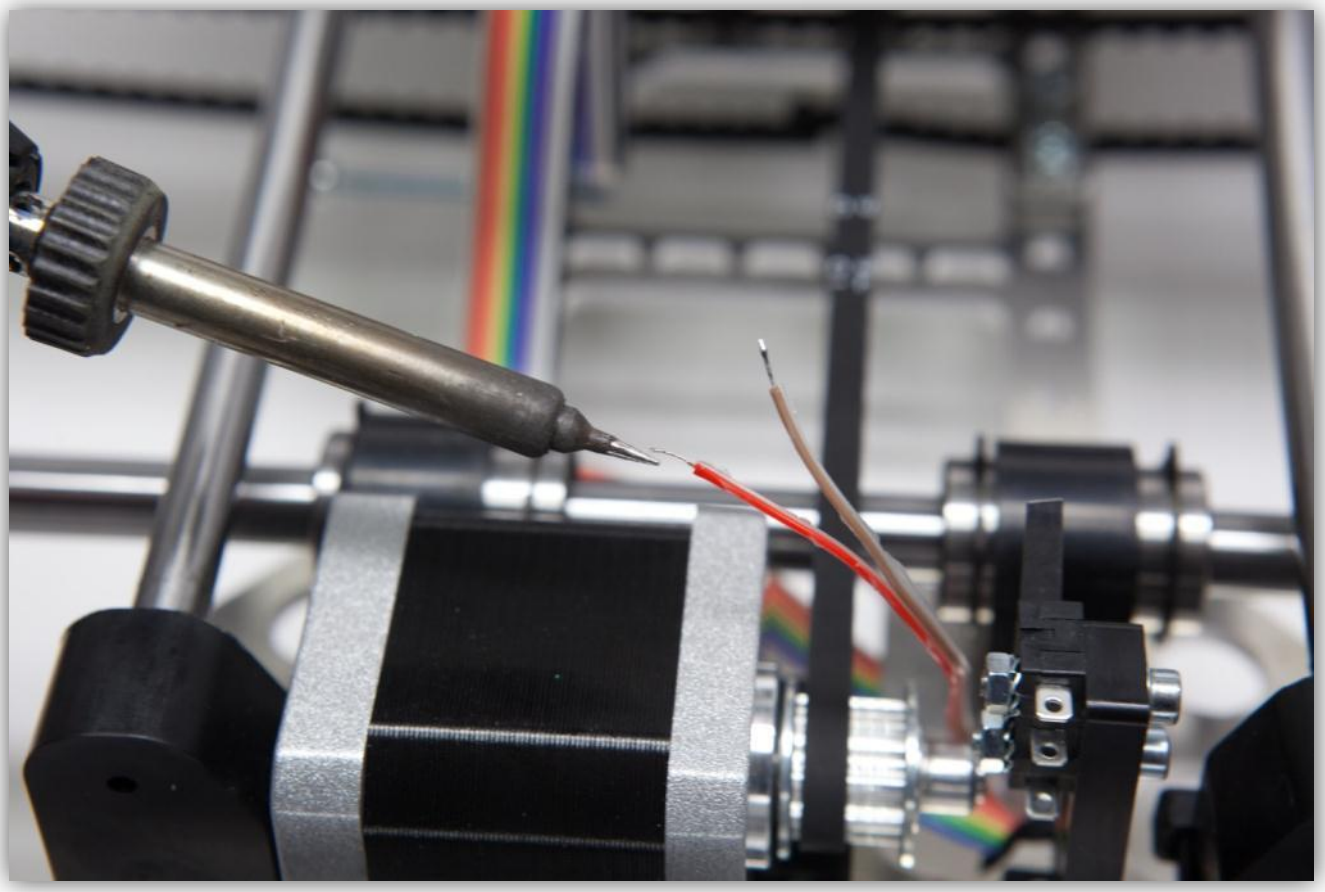
Cut the **Red** and **Brown** wire as shown in the pictures below.





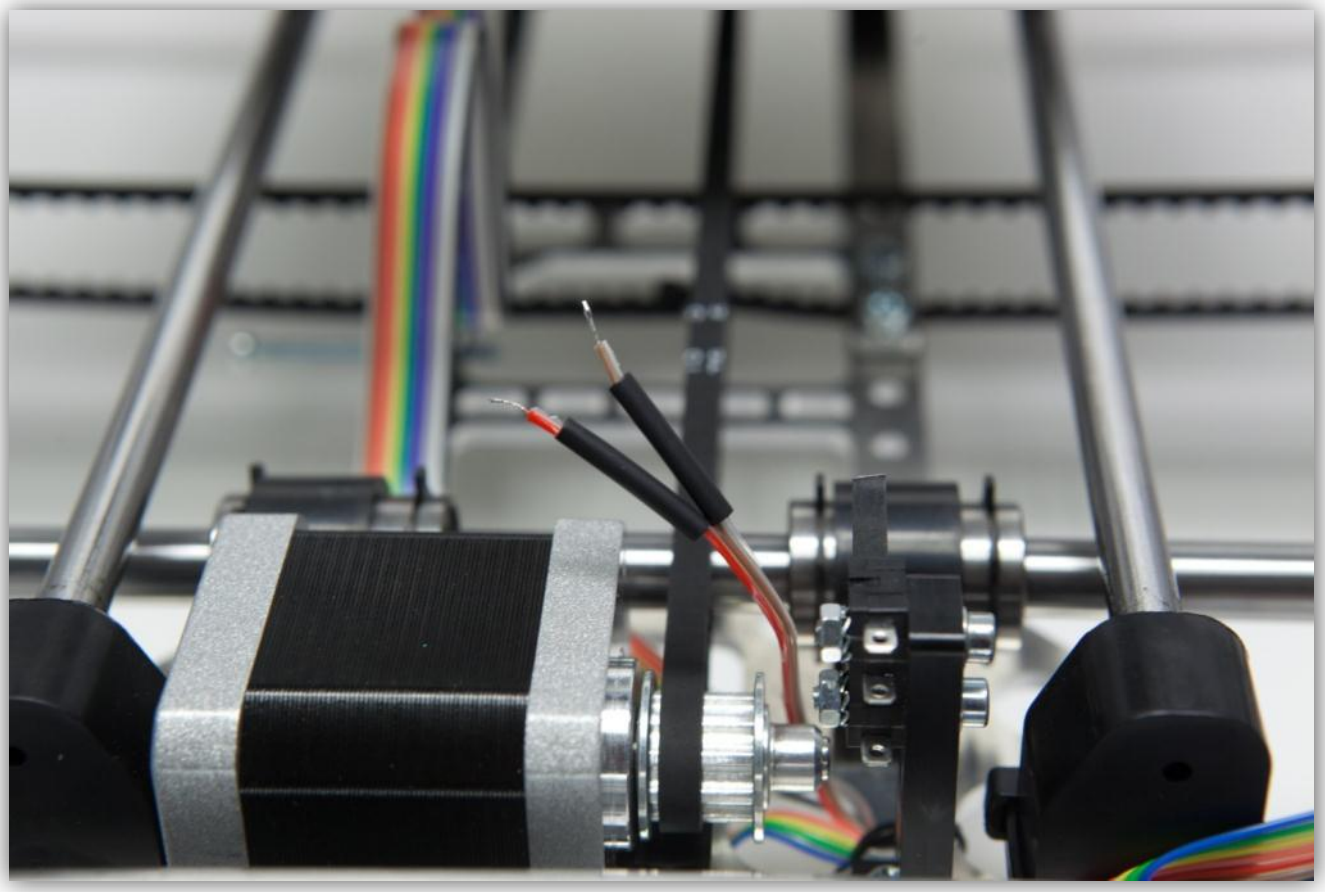
Strip 5 mm (0.2")) and tin the wires.



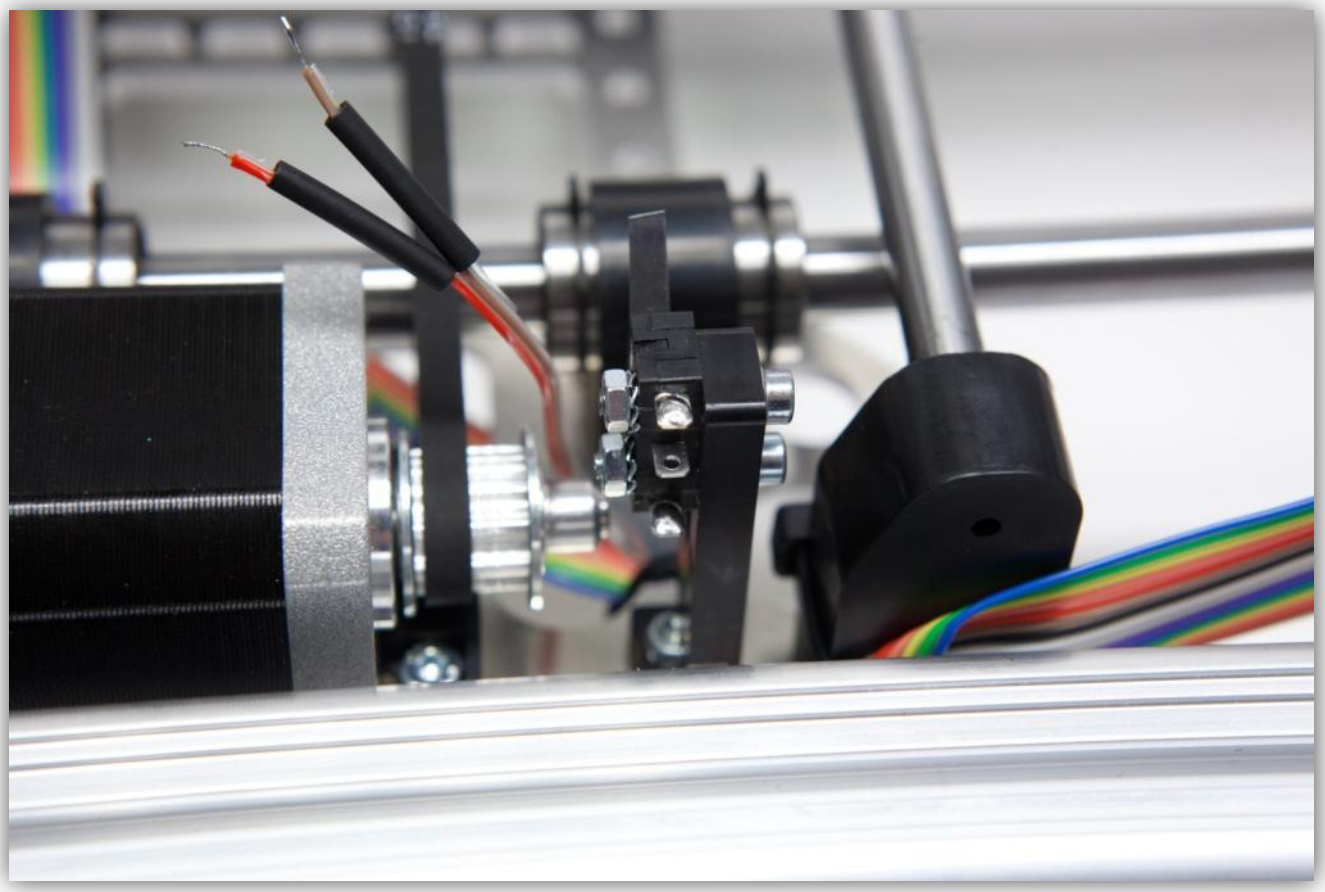


Cut 4 medium size pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long.

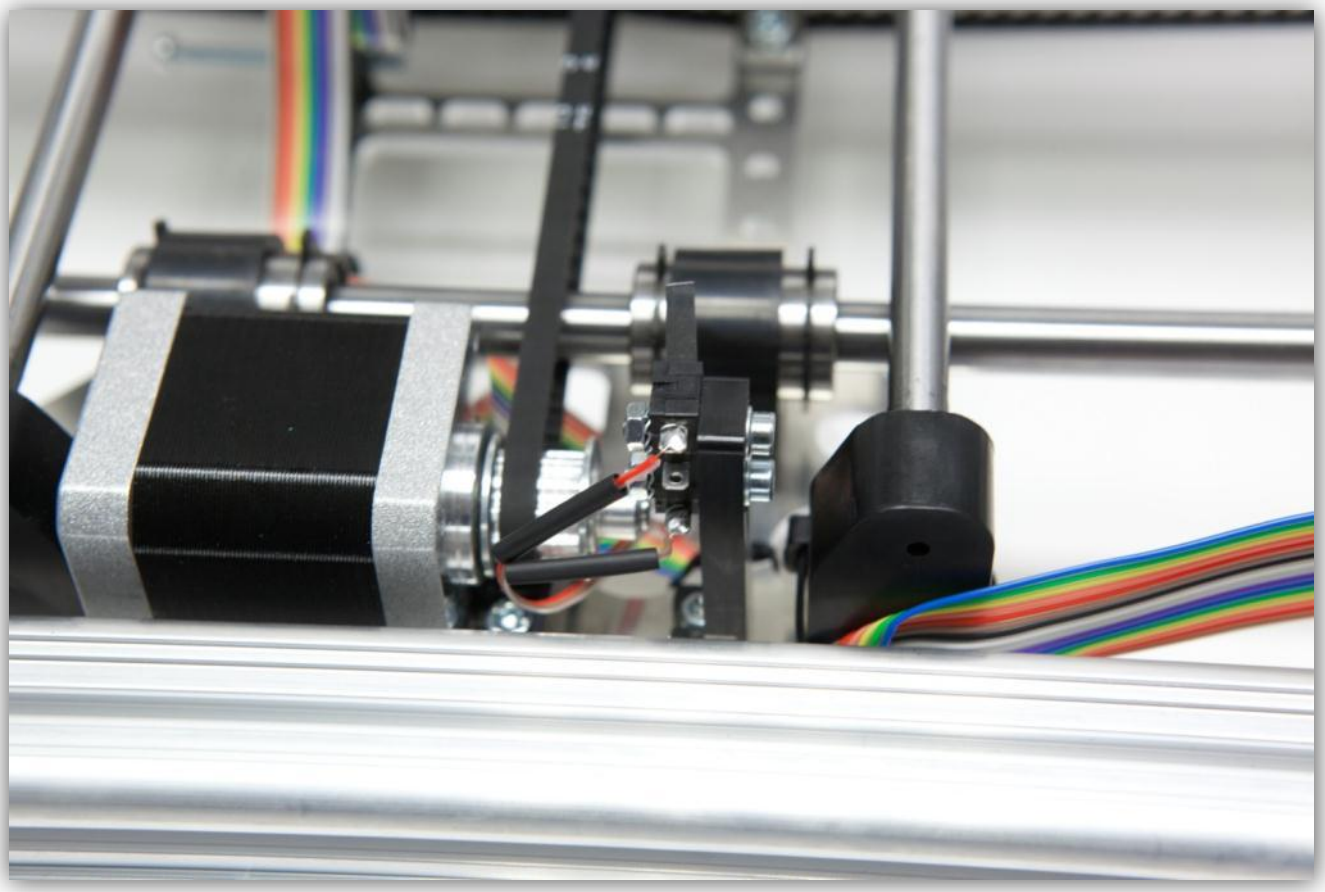
Slide the 2 medium size pieces of heat shrink tubing over the **Red** and **Brown** wires of the flat cable.



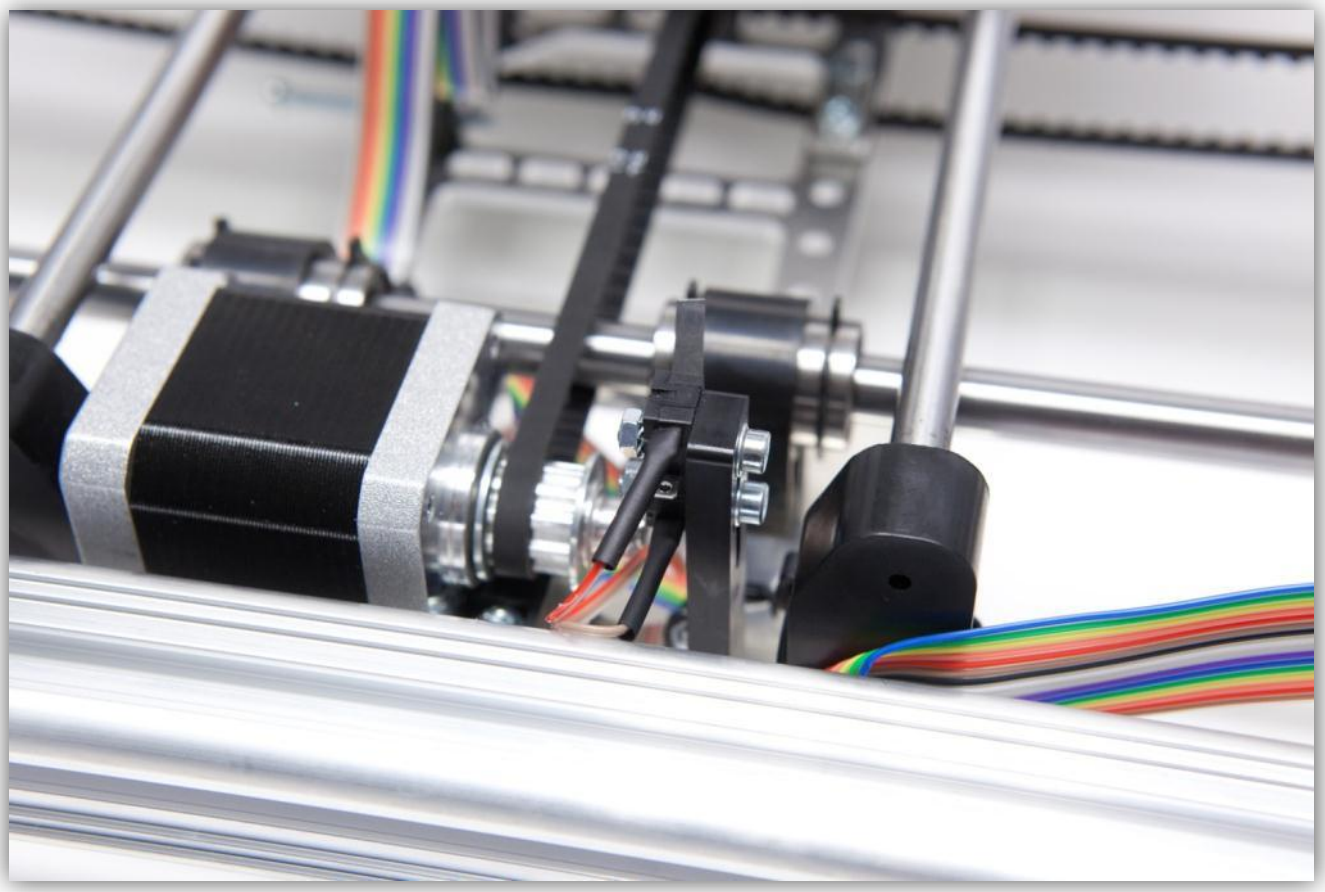
Tin the two outer contacts of the Y micro switch.

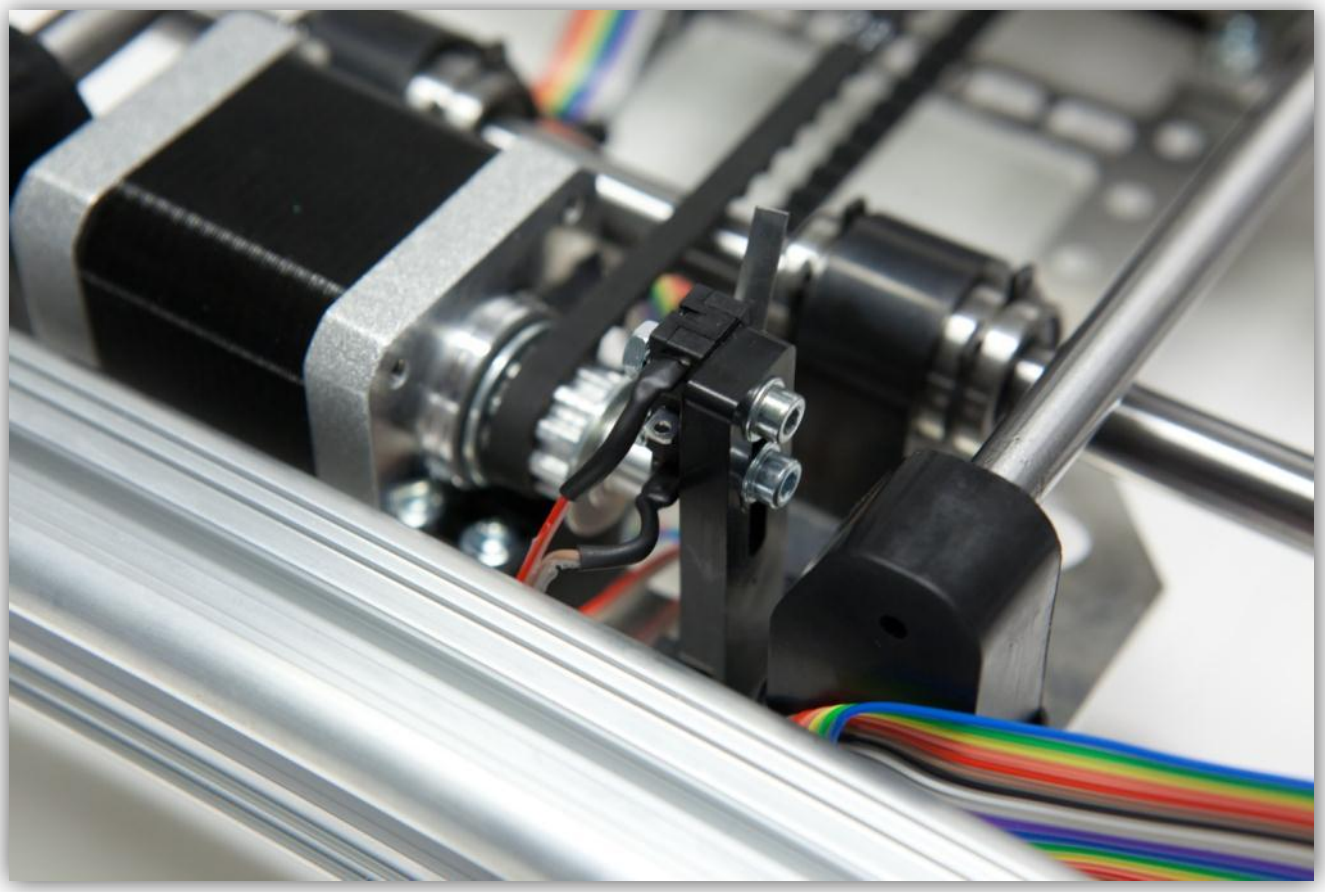


Solder the **Red** and **Brown** wires to the contacts.

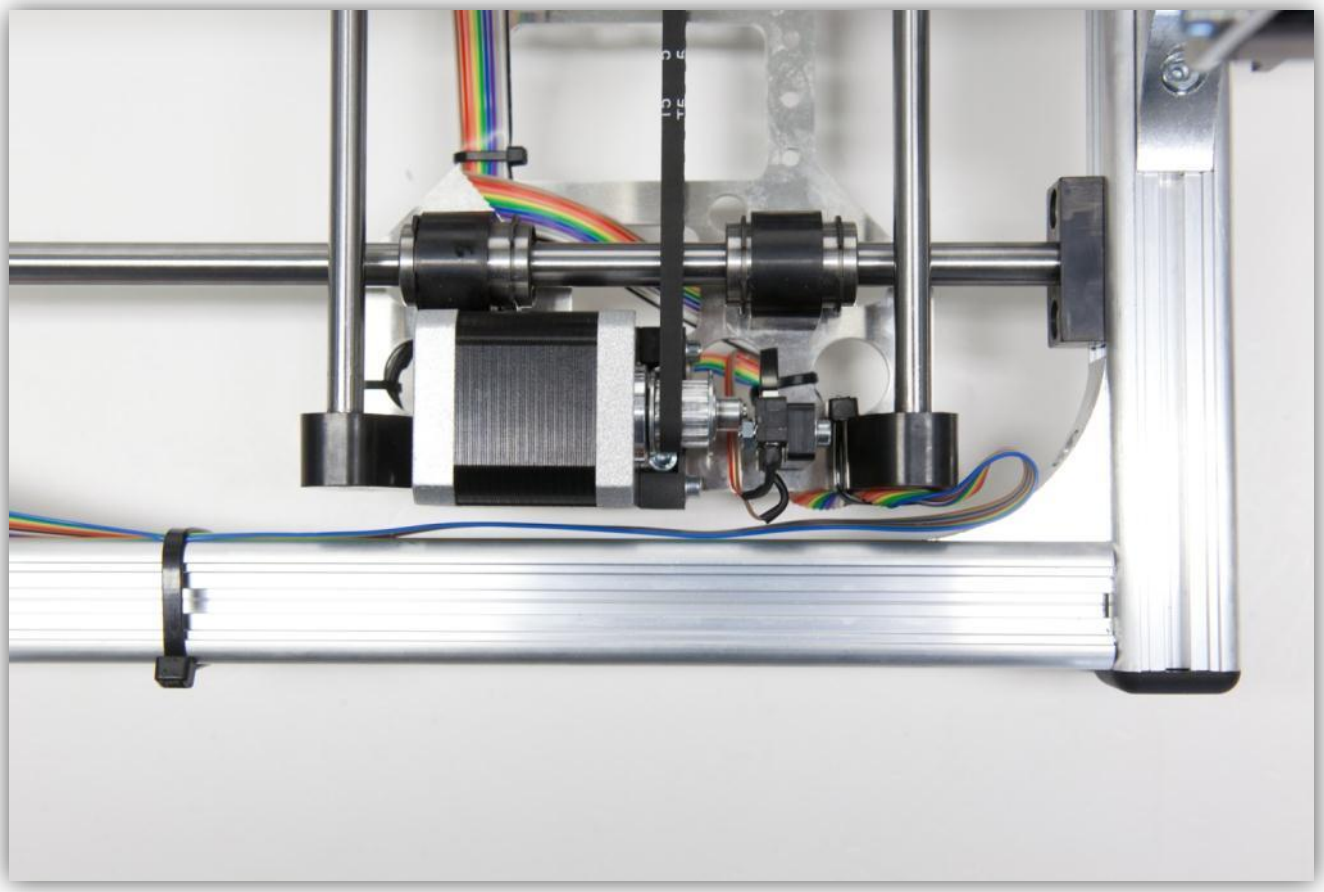


Slide the heat shrink tubes over the contacts and heat them up.

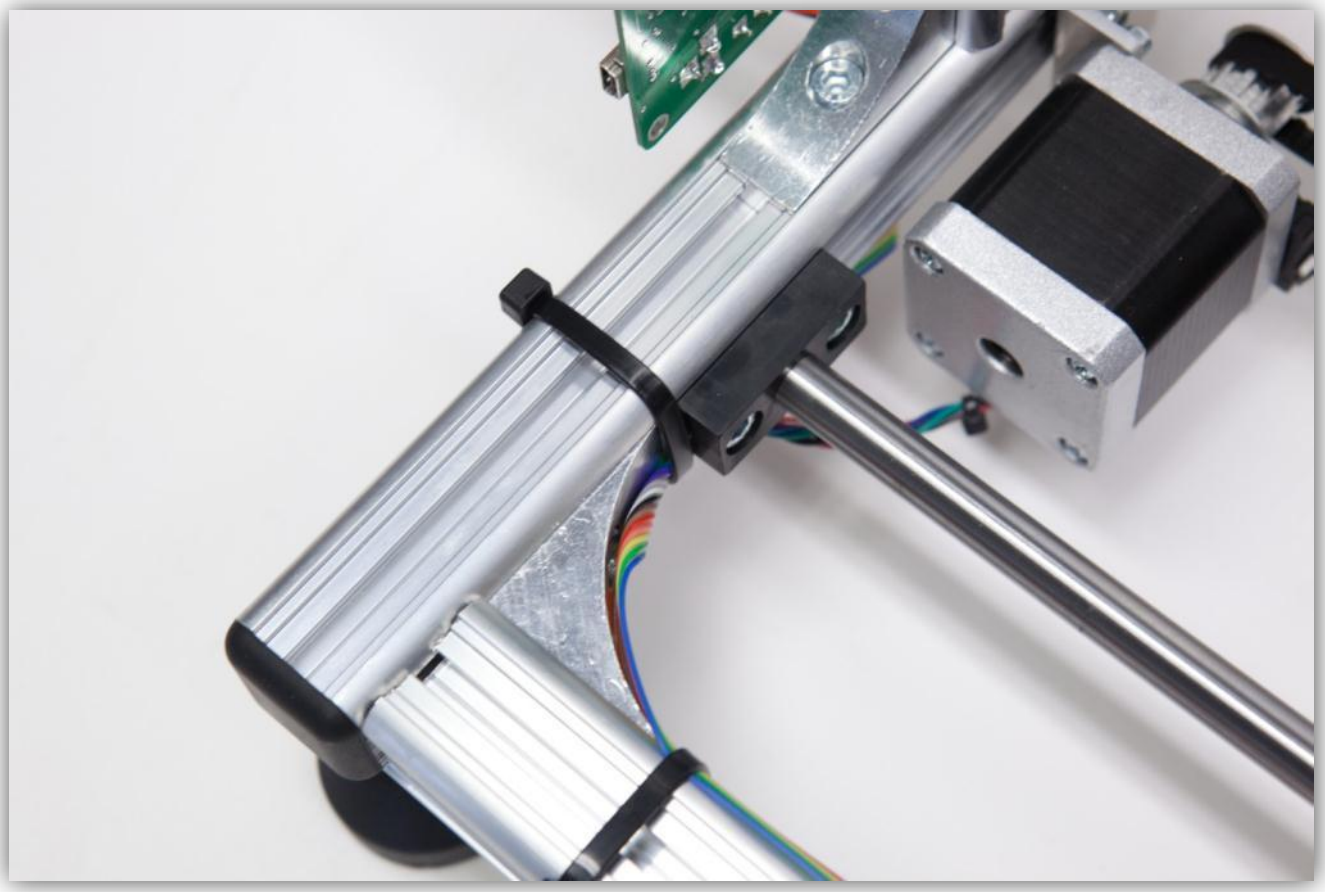




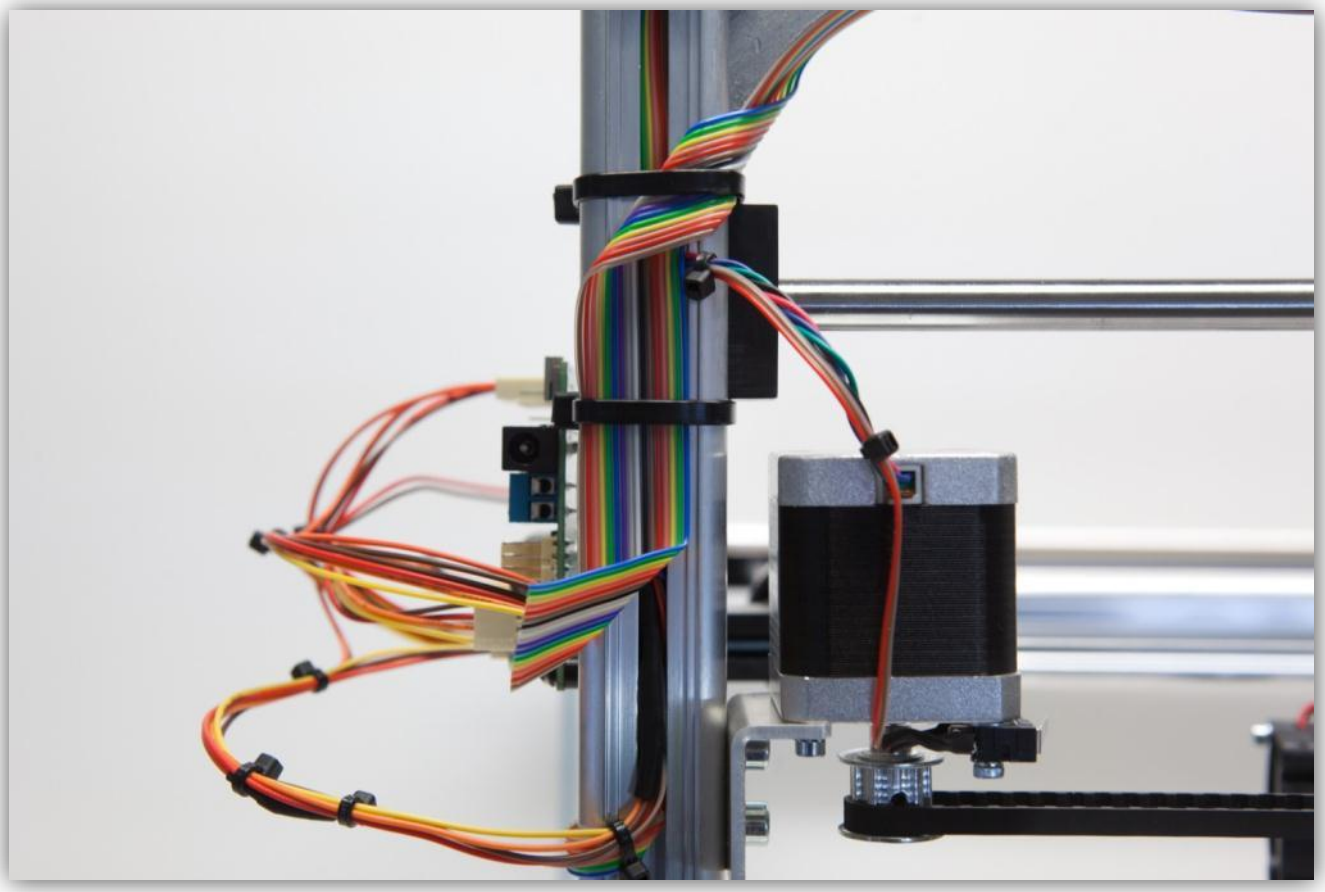
Now move the X CARRIAGE as far away as possible from the controller board. Lead the flat cable as shown in the picture and secure it with a large tie-strip.



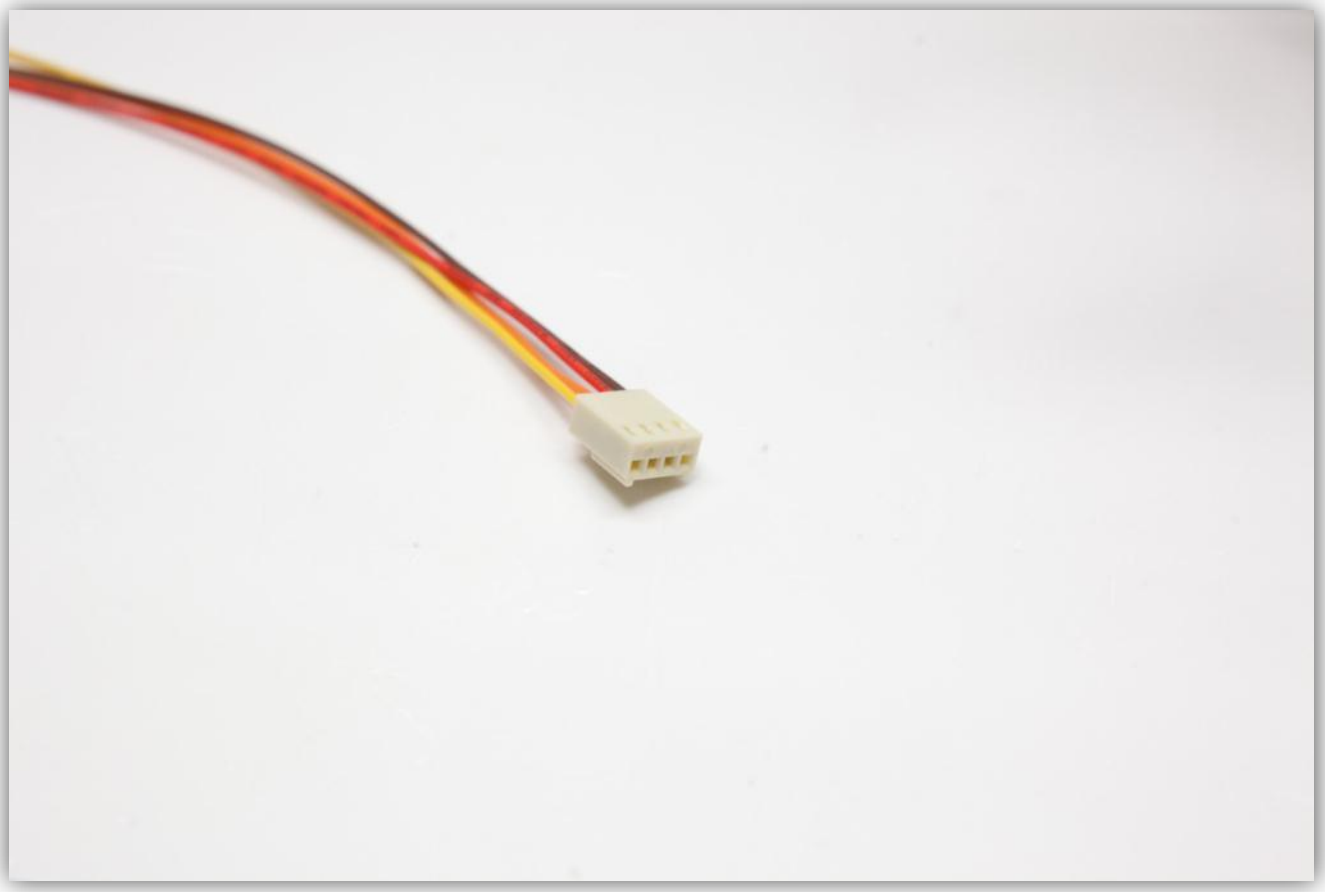
Lead the flat cable further along the ALUMINIUM PROFILES while securing it with large tie-strips. **Notice how the cable folds in the corner and disappears under the ALUMINIUM PROFILE.**



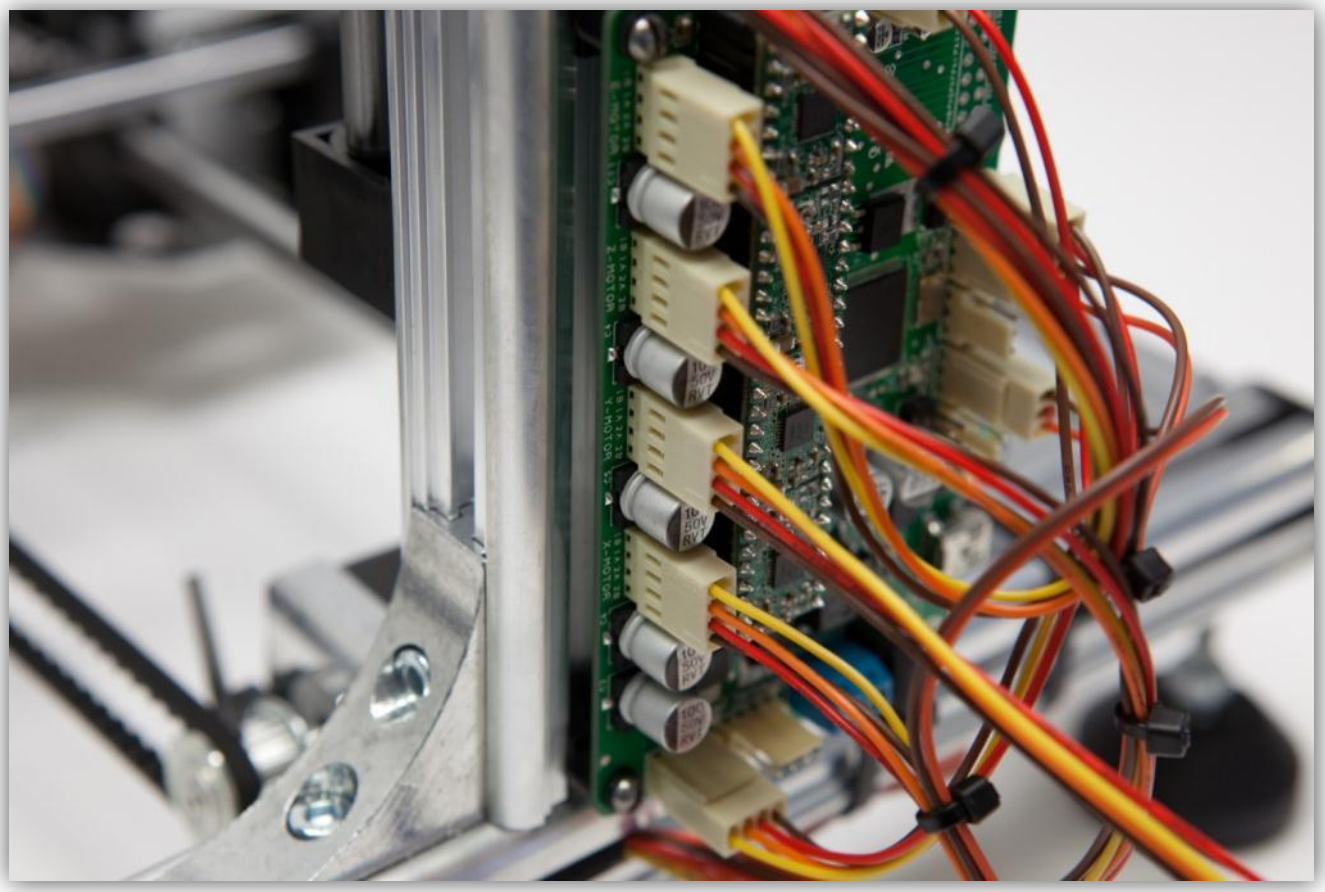
Fold and secure the cable as shown in the picture below.



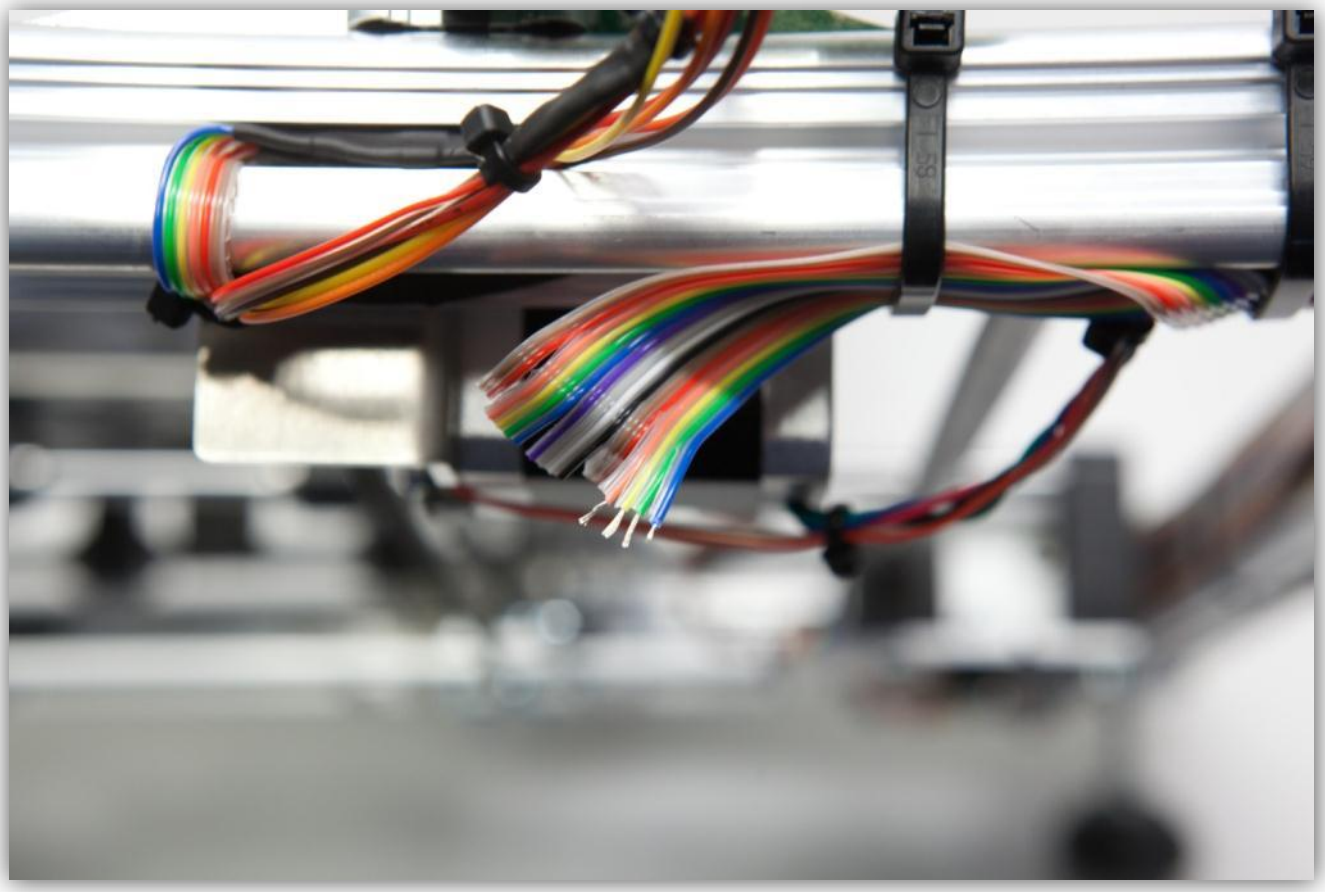
Take a board to wire connector with 4 wires out of the bag labelled with 40.



Plug the female connector in the male connector labelled with Y-MOTOR on the controller board.

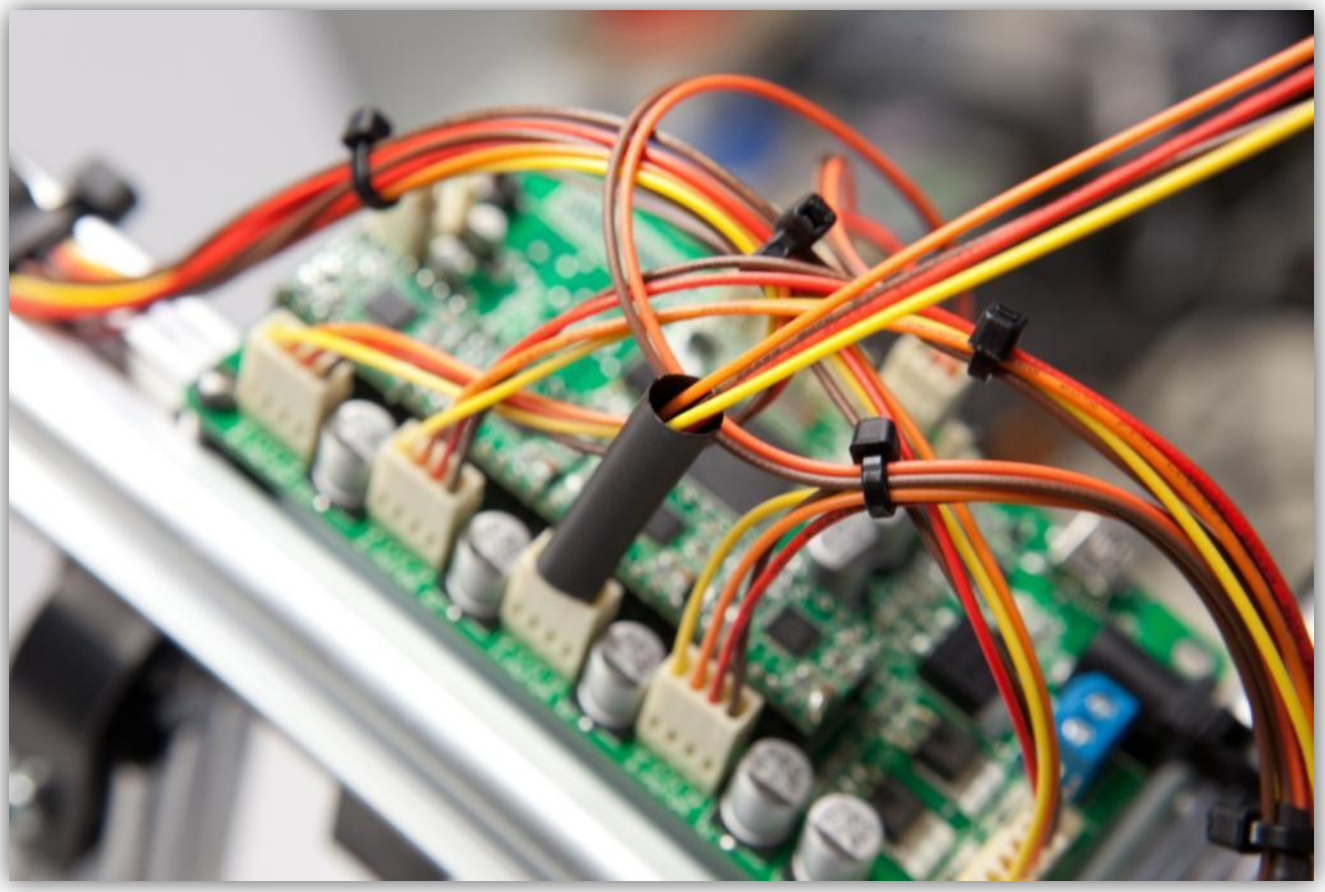


Strip 5 mm (0.2") the following wires: **Blue, Green, Yellow, Orange** and tin them.

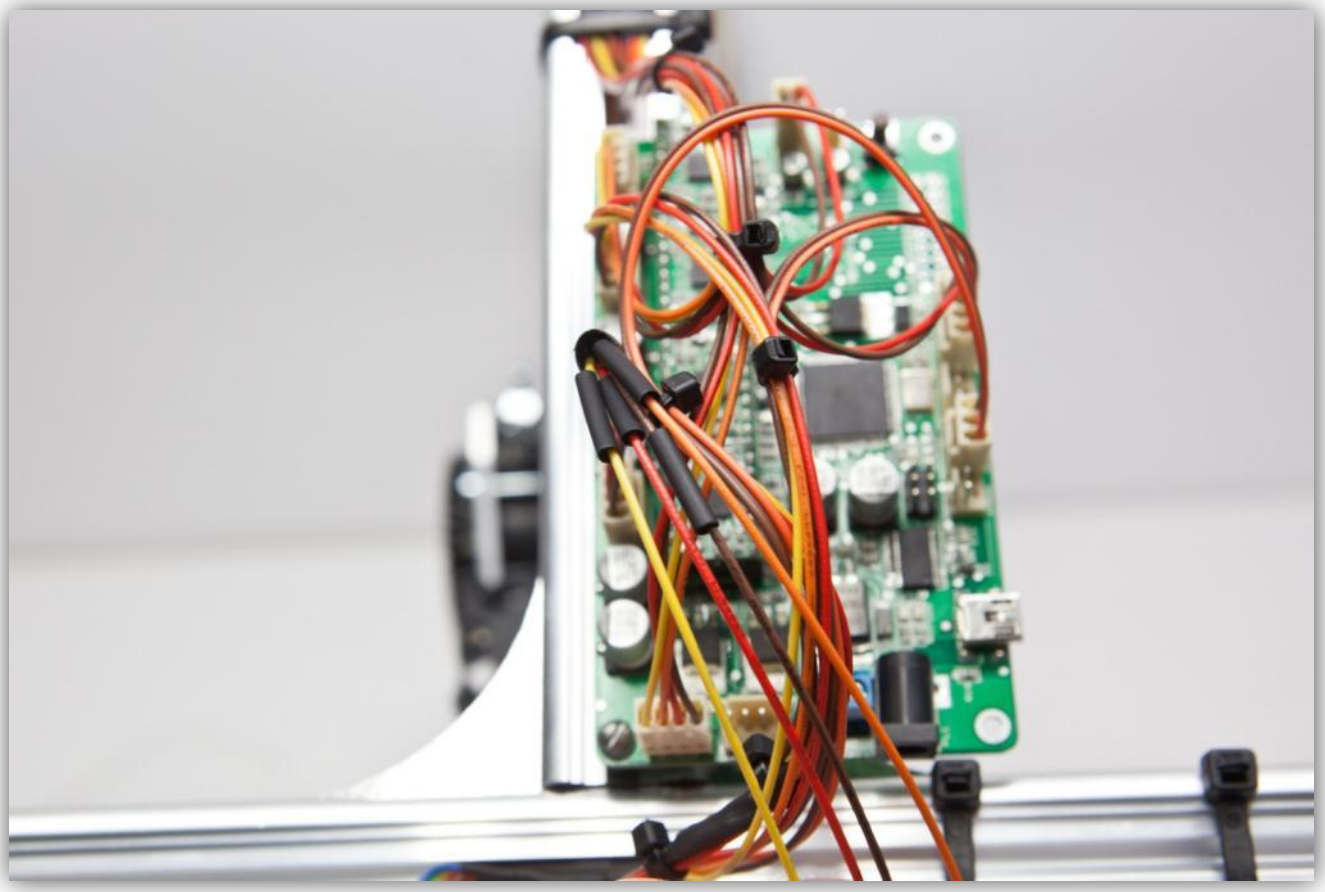


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the big heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the big heat shrink tubes over the 4 wires of the connector.

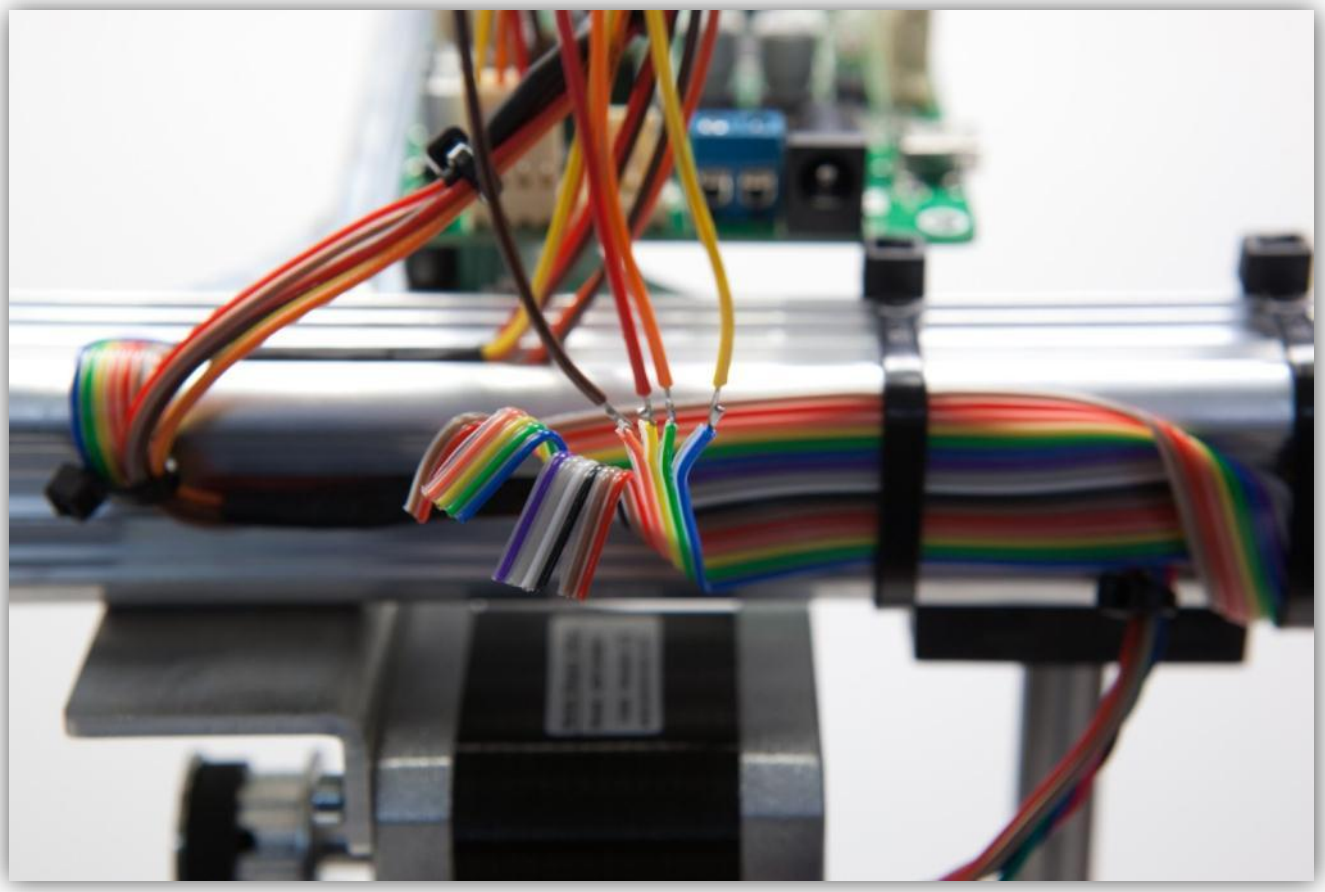


Slide the 4 small heat shrink tubes over the 4 wires of the connector.

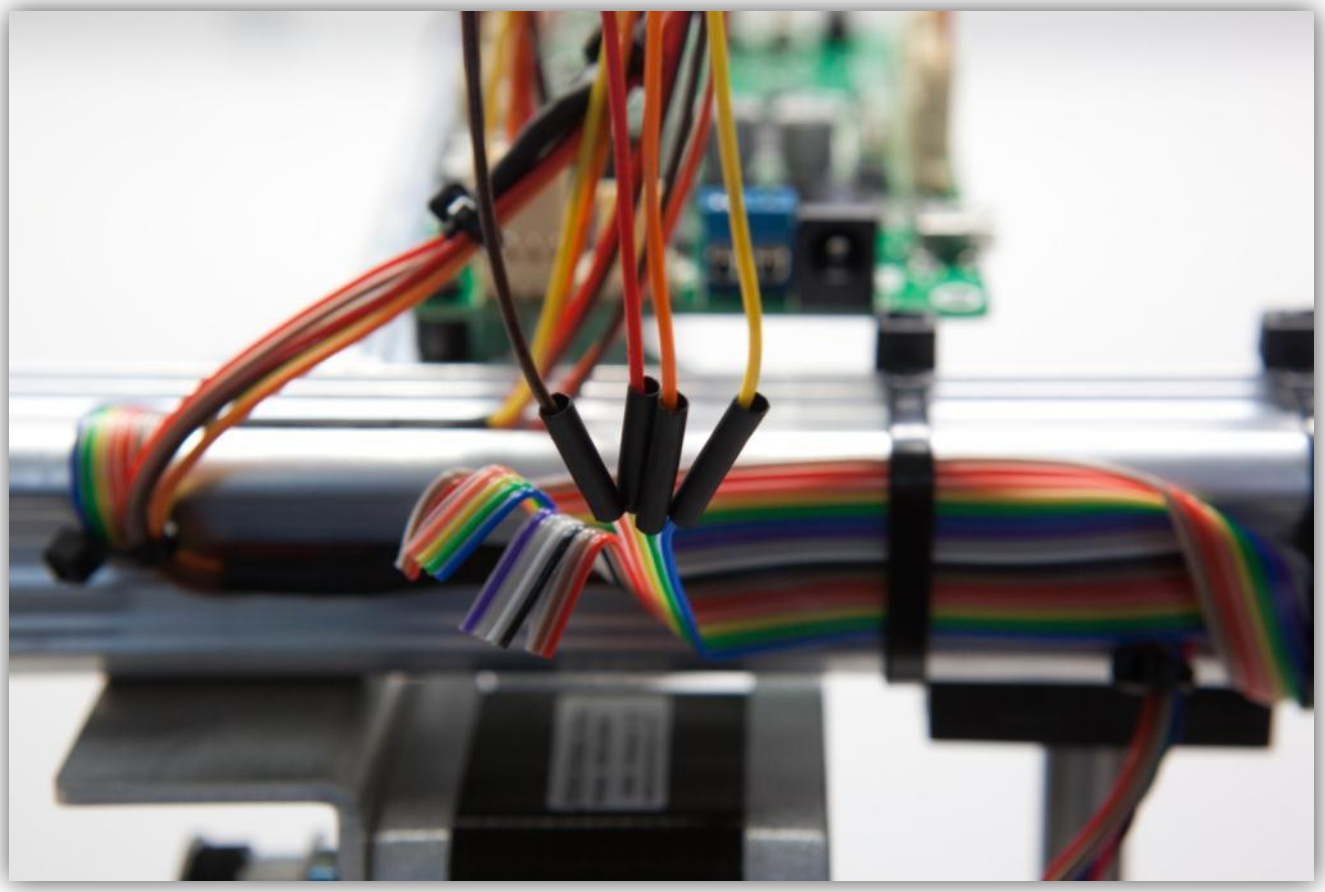


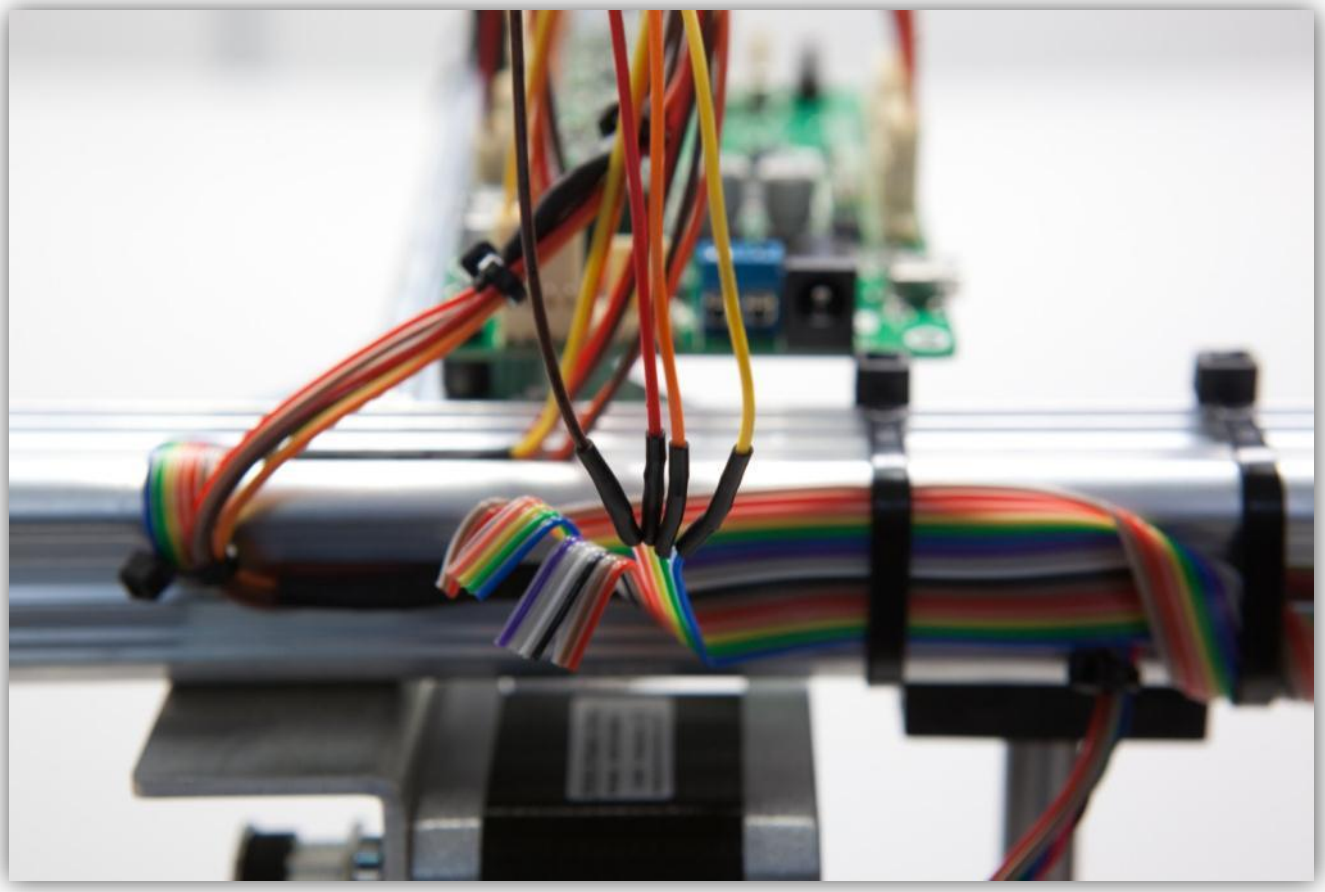
Solder the 4 wires from the connector to the 4 wires of the flat cable you tinned earlier. **Watch the colours closely.**

Flat cable	**->**	**Connector wires**
Blue	**->**	**Yellow**
Green	**->**	**Orange**
Yellow	**->**	**Red**
Orange	**->**	**Brown**

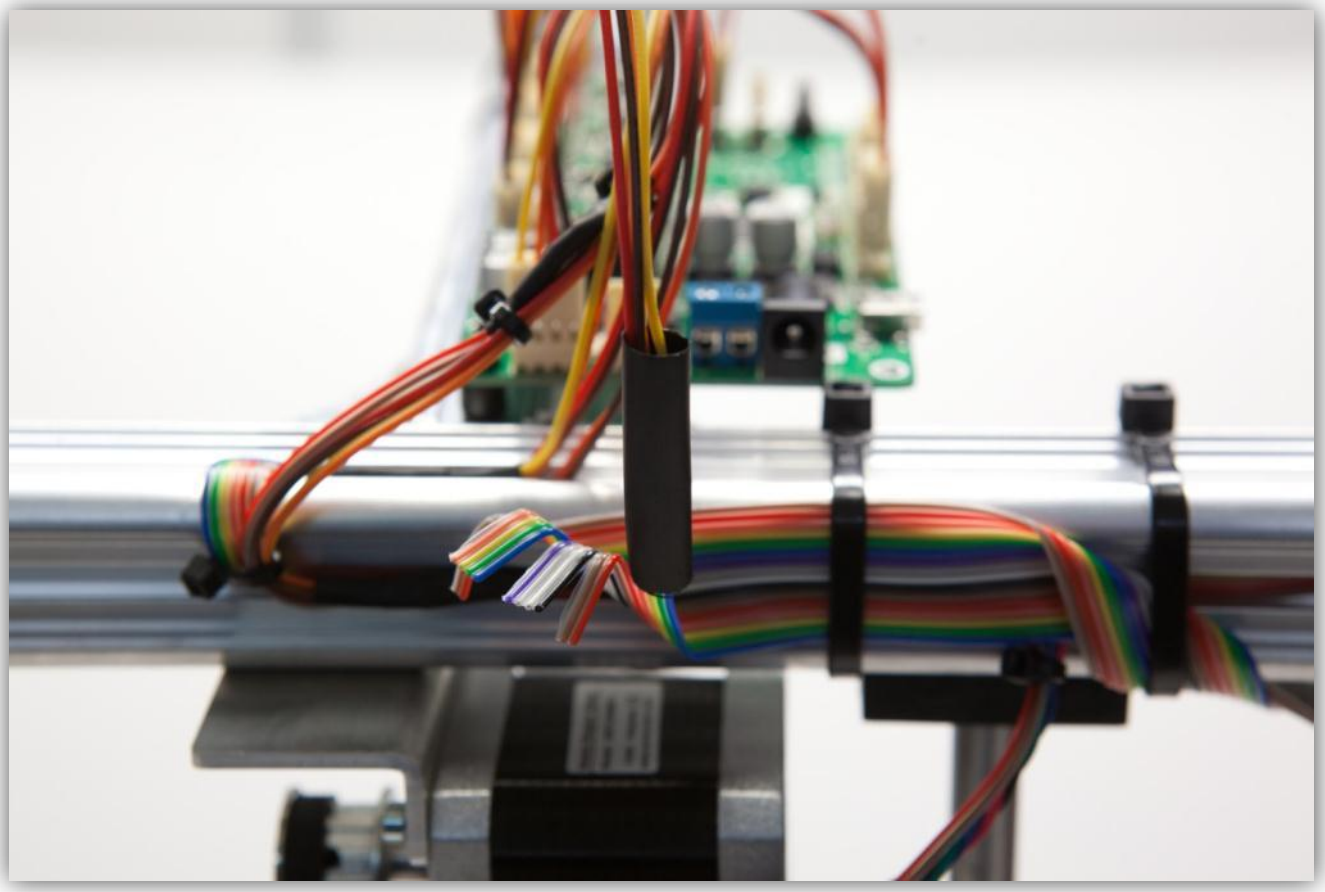


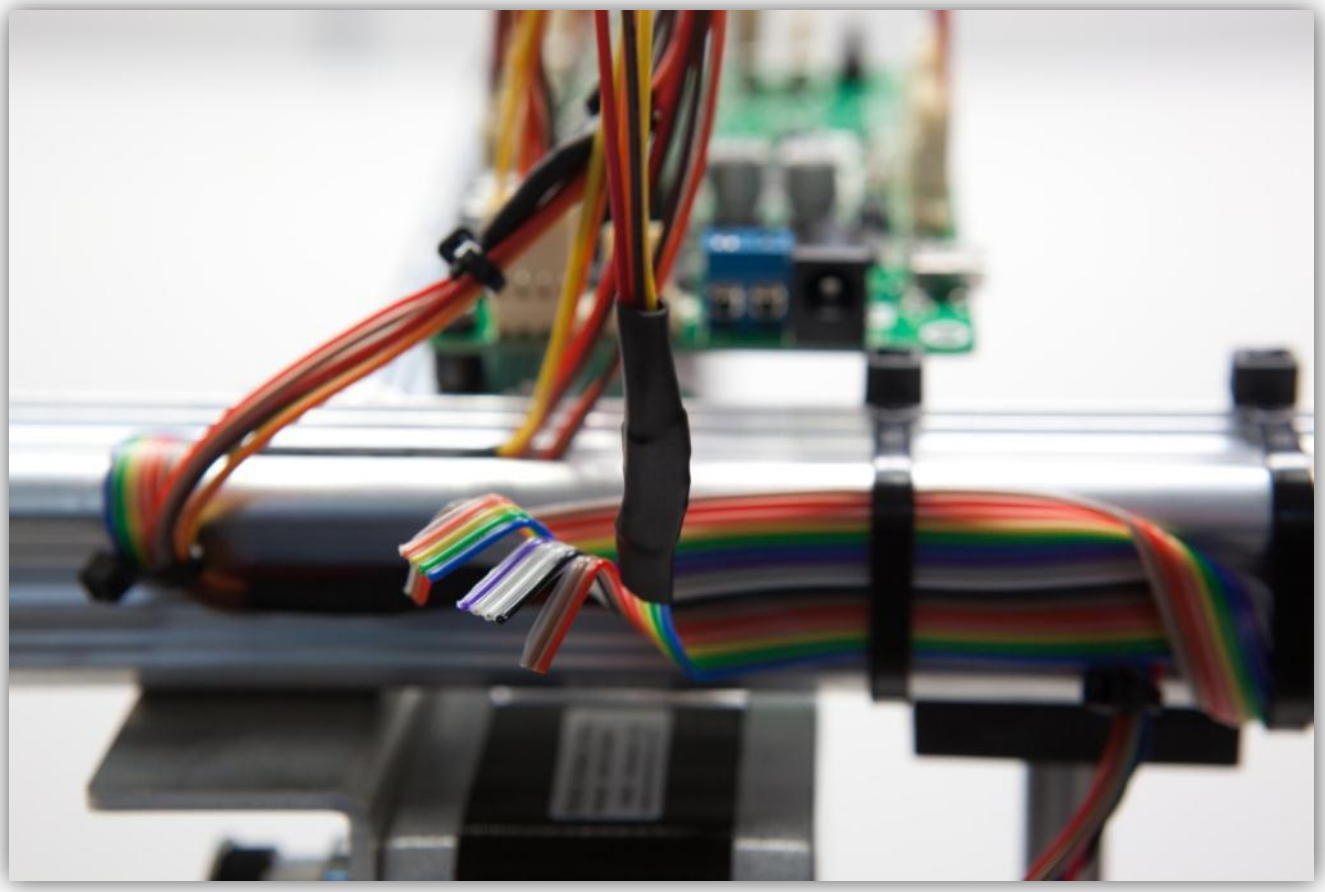
Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.



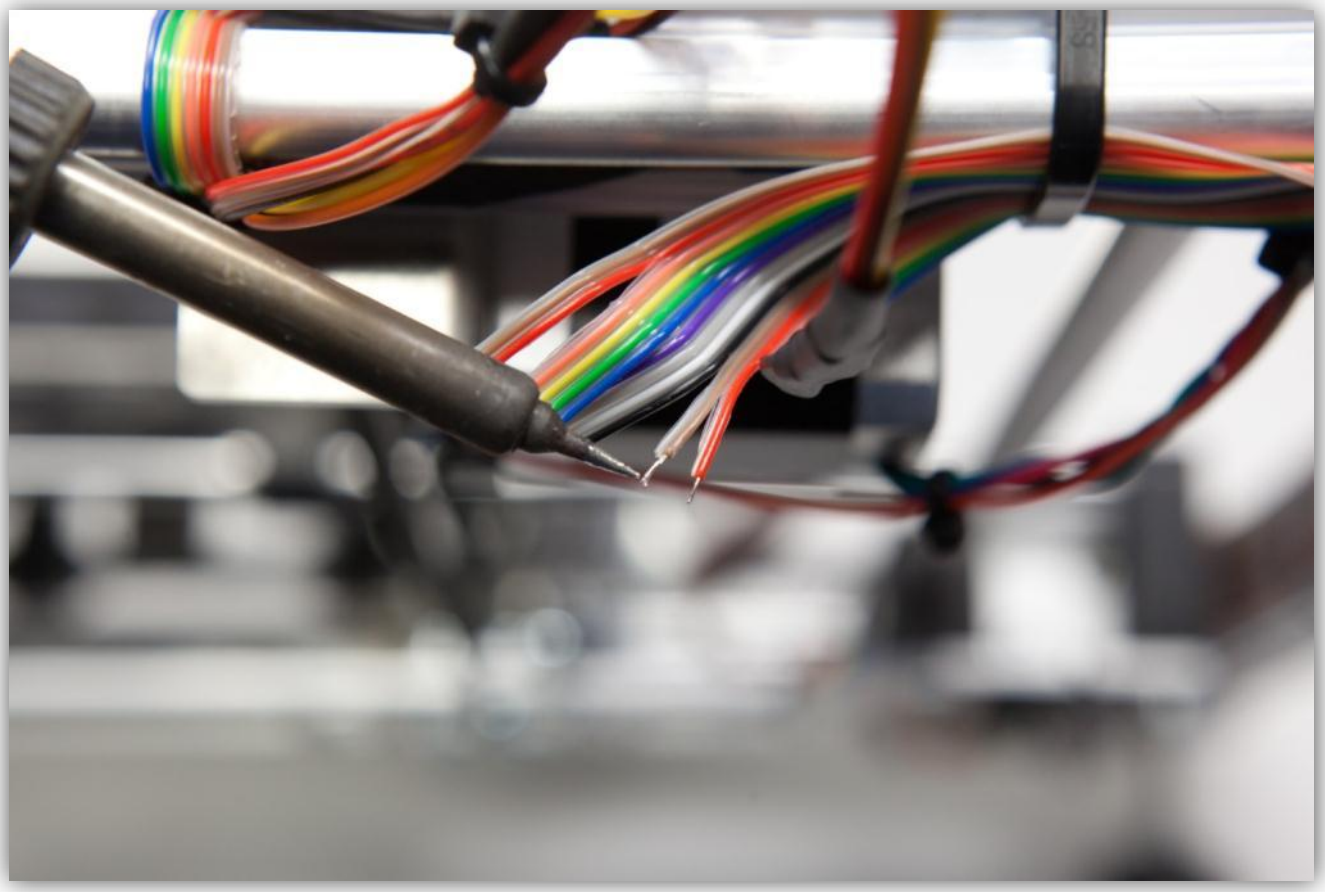


Now slide the big piece of heat shrink tubing over the 4 small pieces, heat the big piece so it covers and protects the 4 heat shrunk joints.

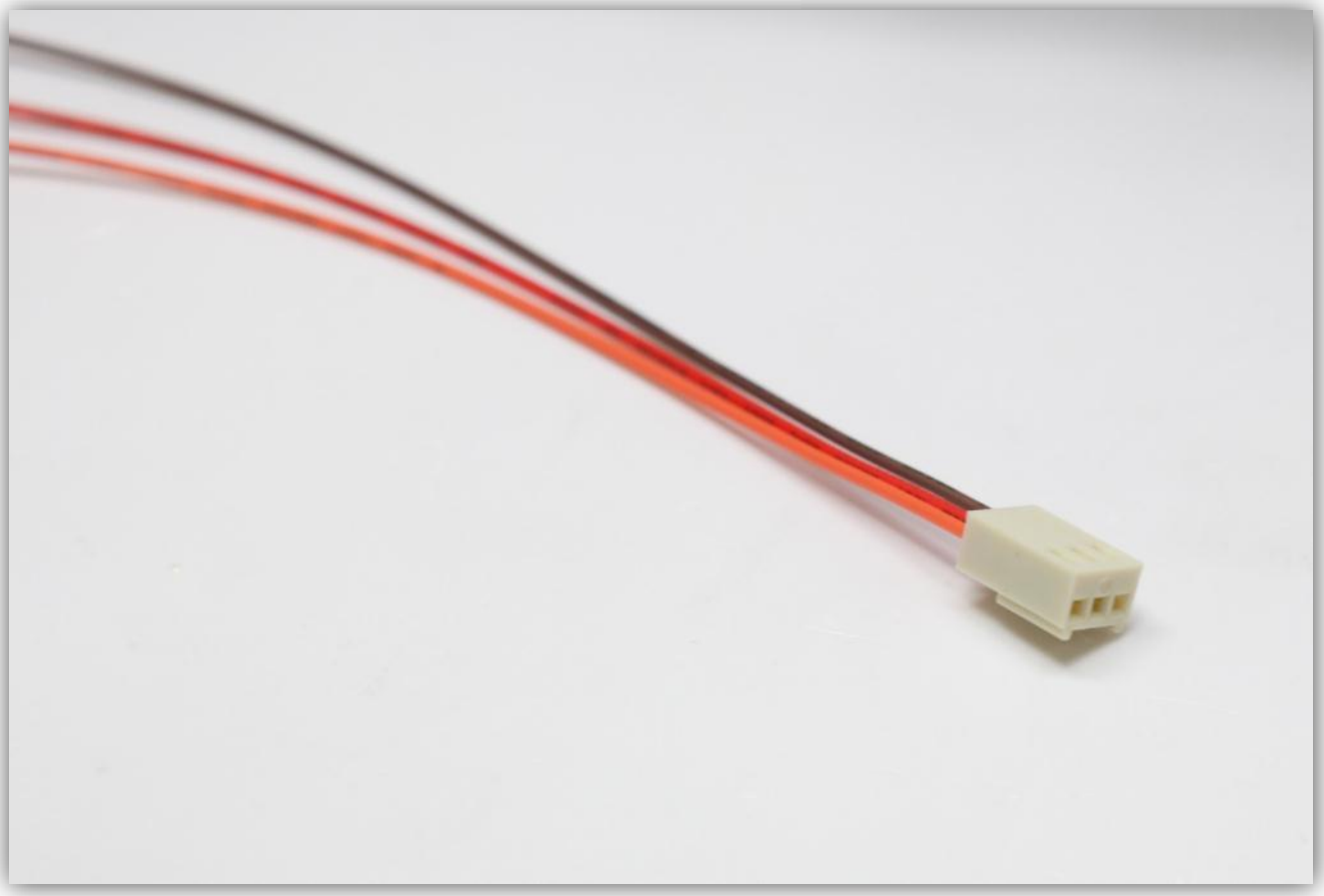




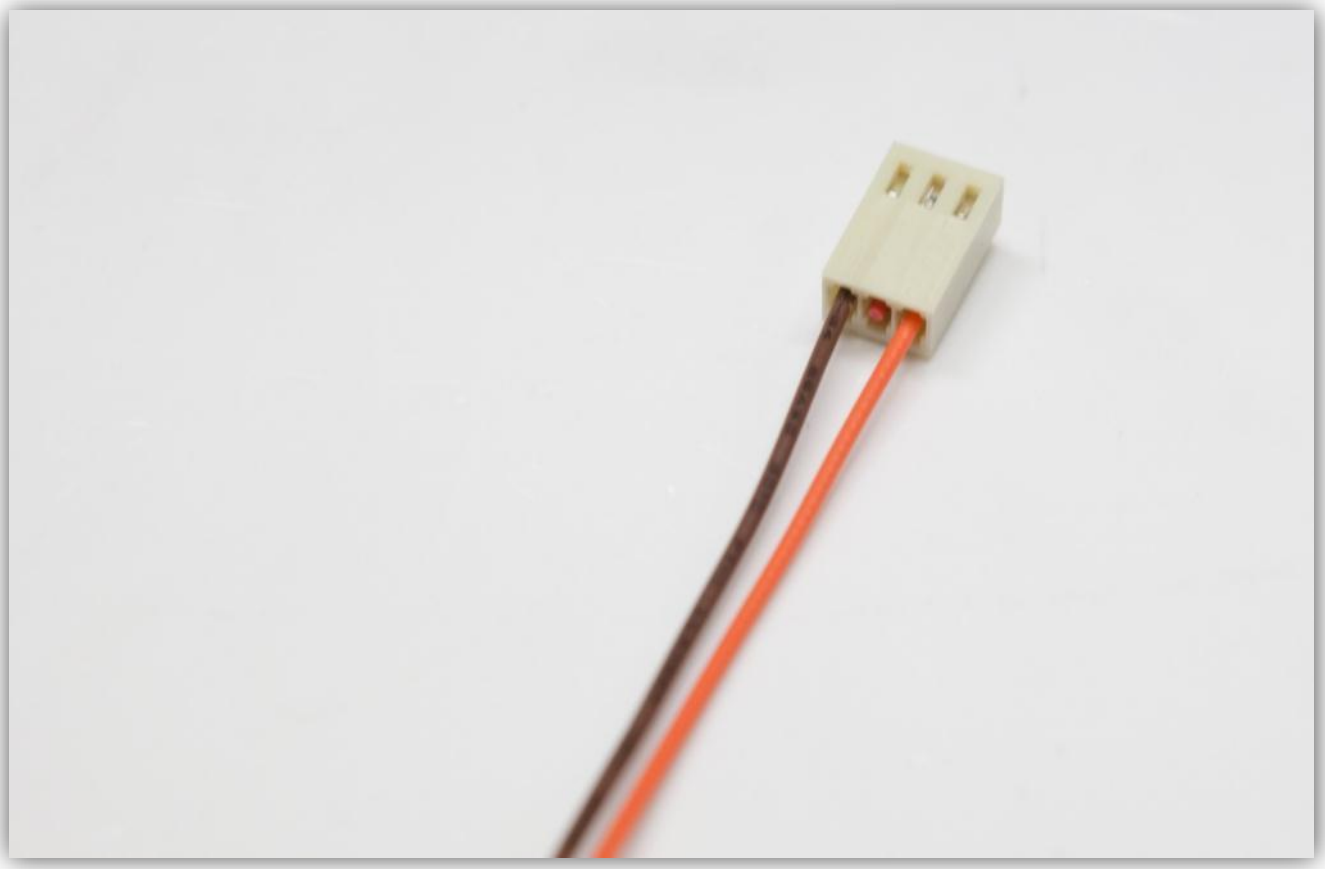
Strip 5 mm (0.2") the **Red** and **Brown** wire from the flat cable and tin the ends.



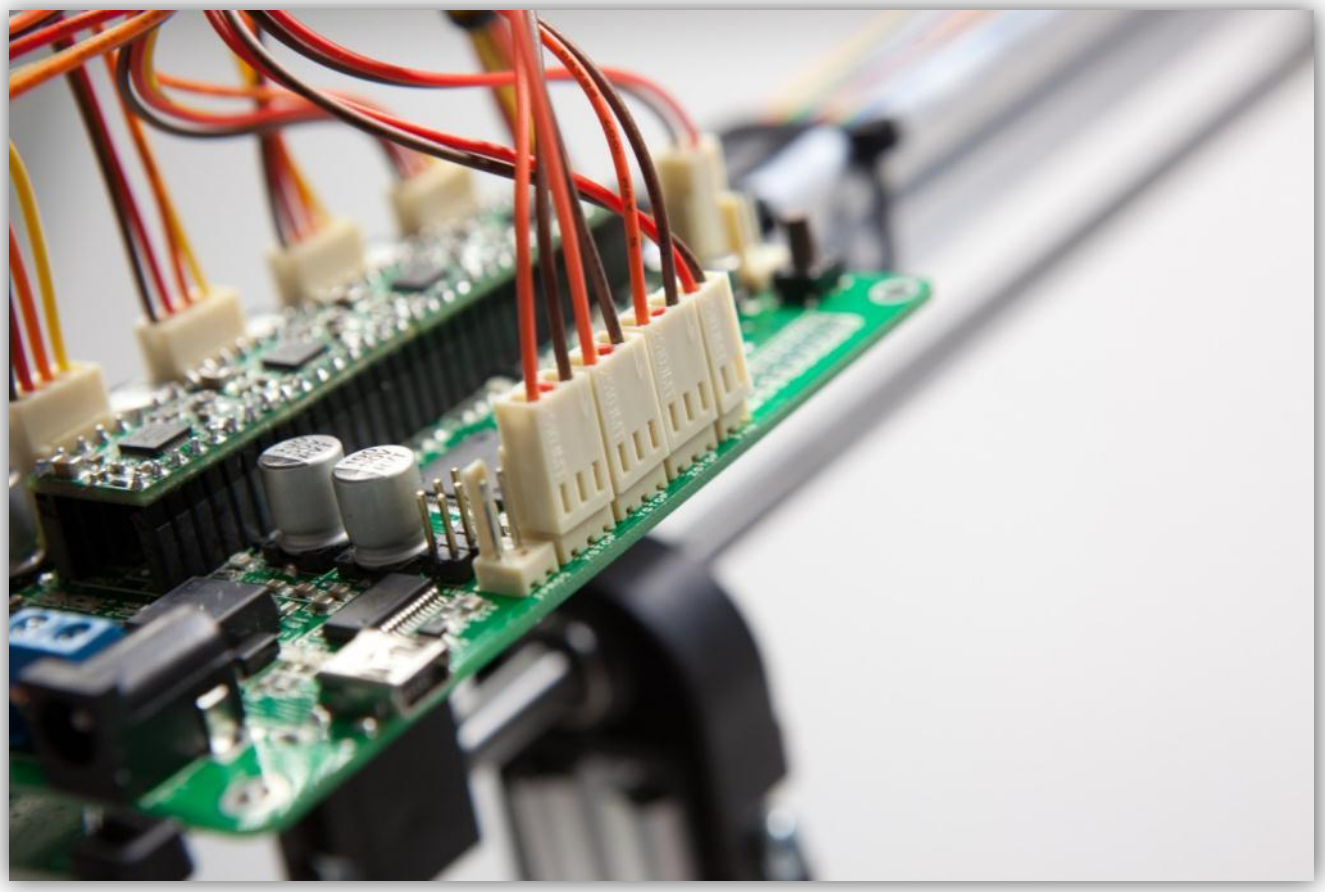
Take a board to wire connector with 3 wires out of the bag labelled with 40.



Cut the middle wire away at the connector.

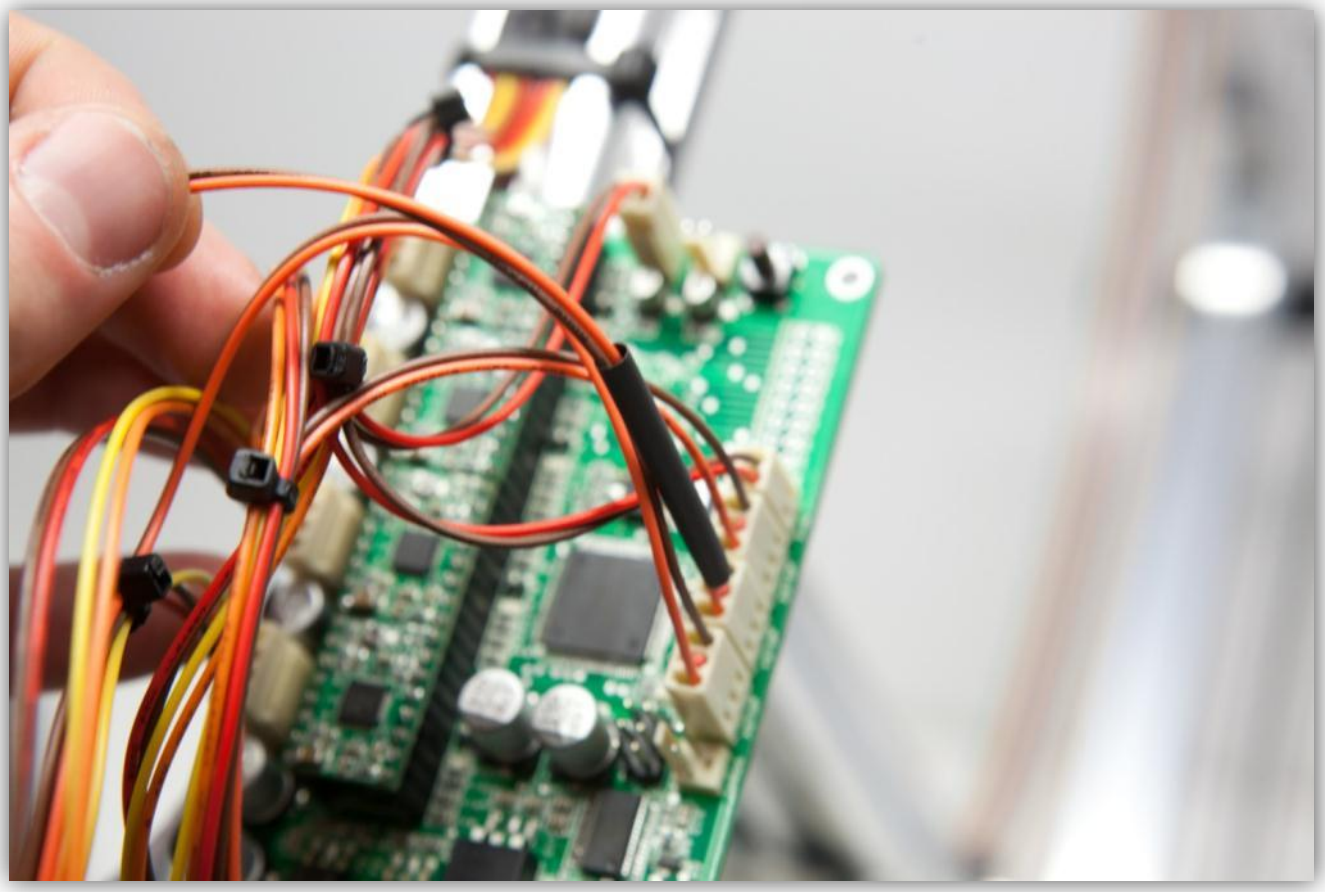


Plug the female connector in the male connector labelled with YSTOP on the controller board.

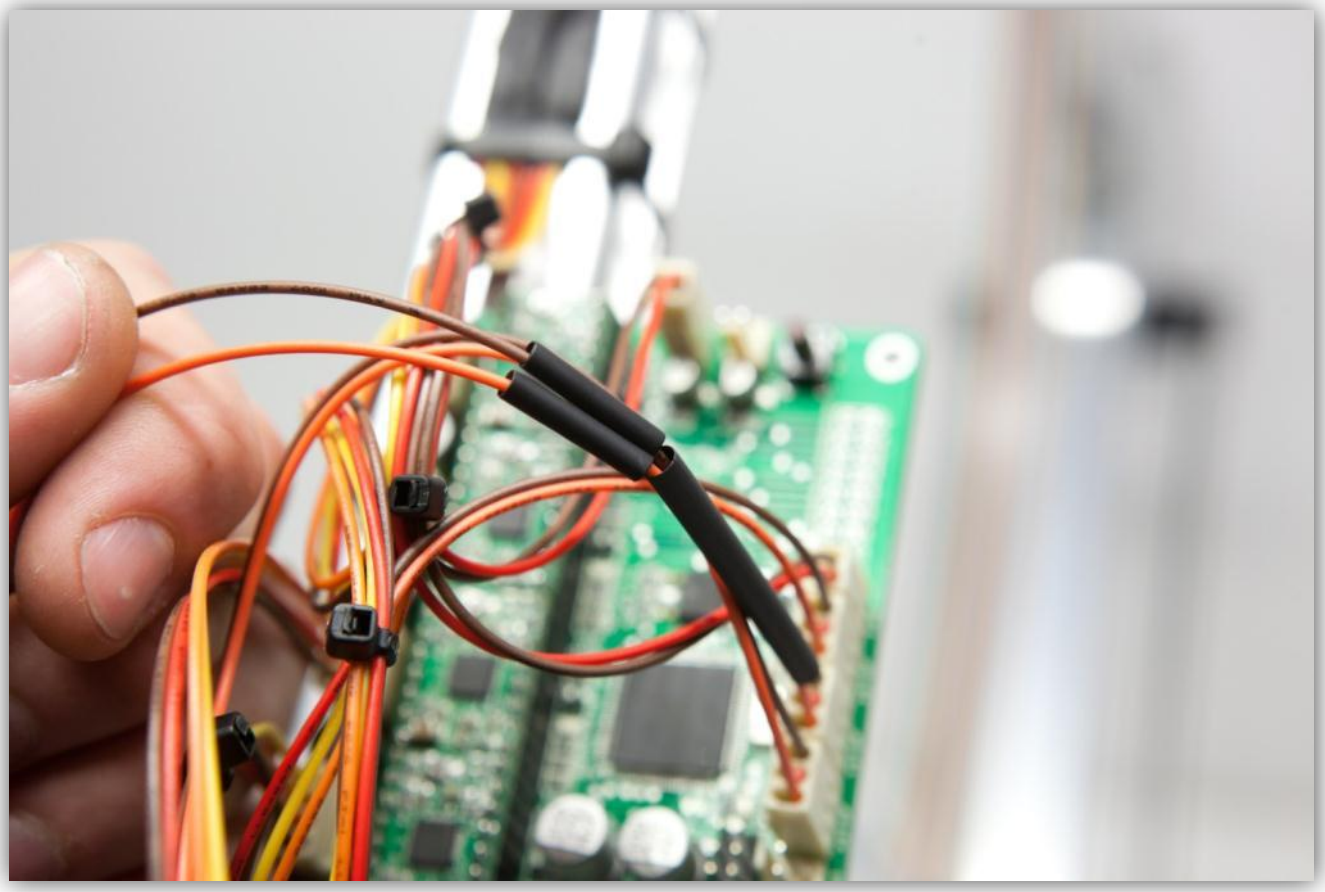


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the medium size heat shrink tubes over the 2 wires of the connector.



Slide the 2 small heat shrink tubes over the 2 wires of the connector.

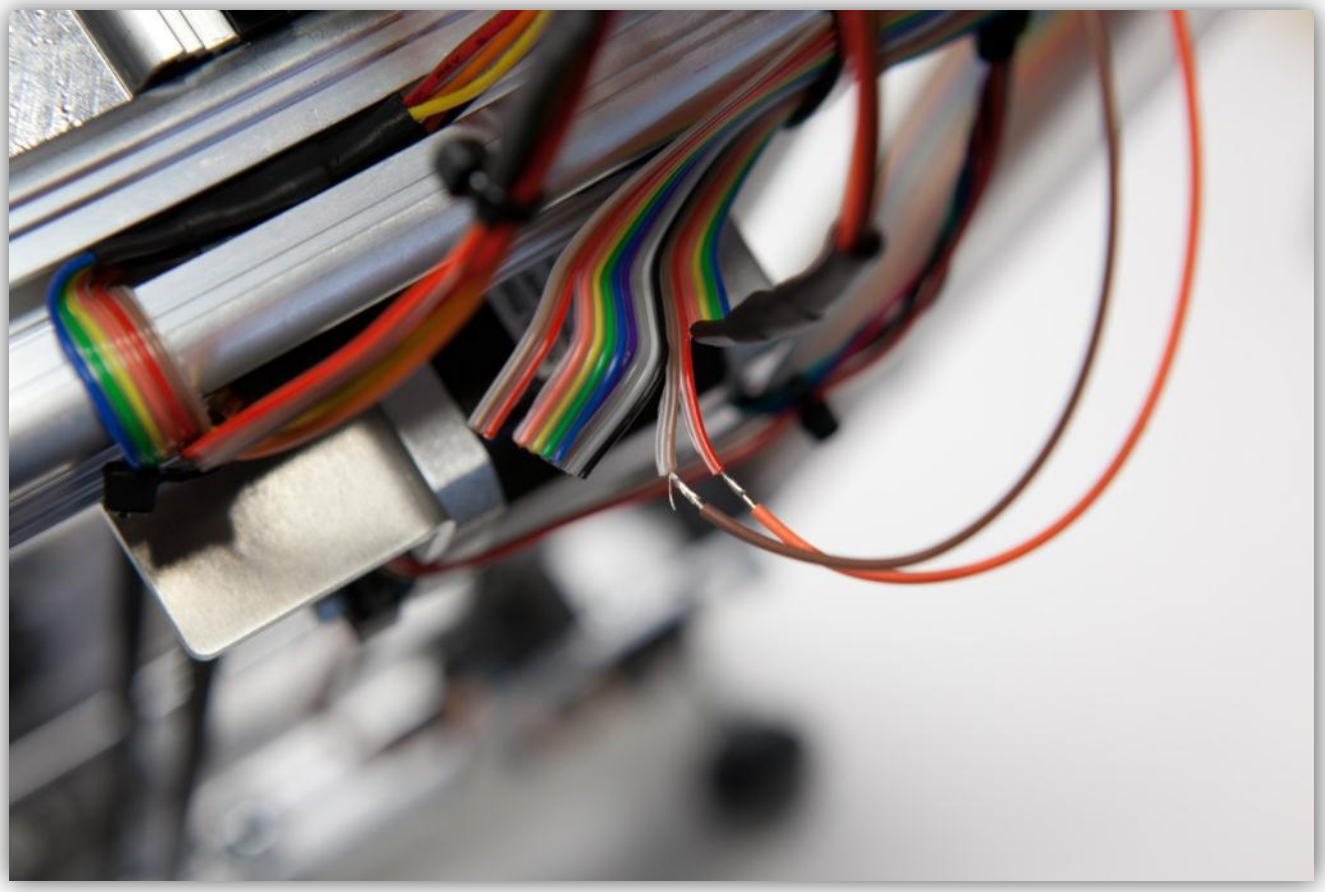


Solder the 2 wires from the connector to the 2 wires of the flat cable you tinned earlier. **Watch the colours closely.**

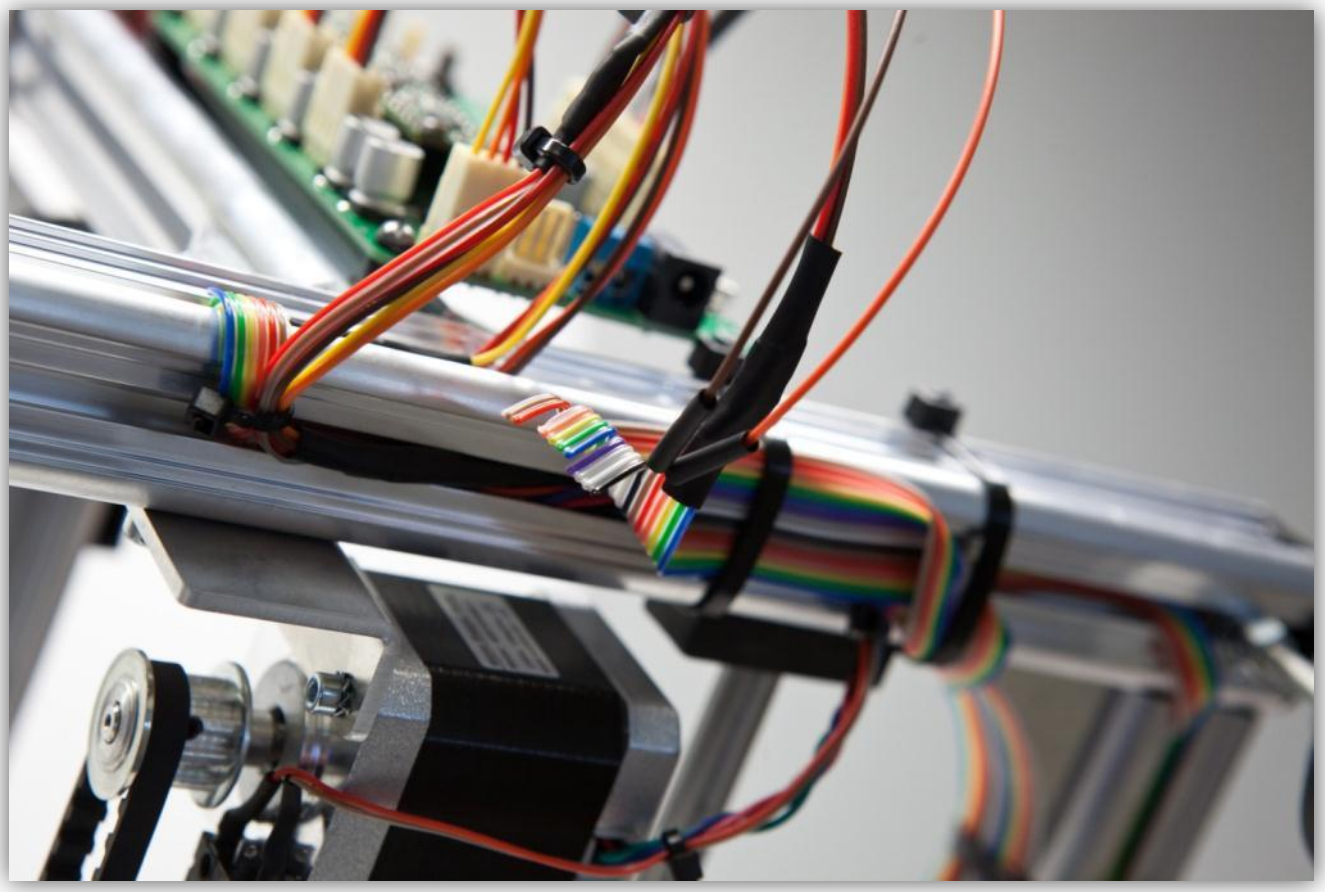
Flat cable -> Connector wires

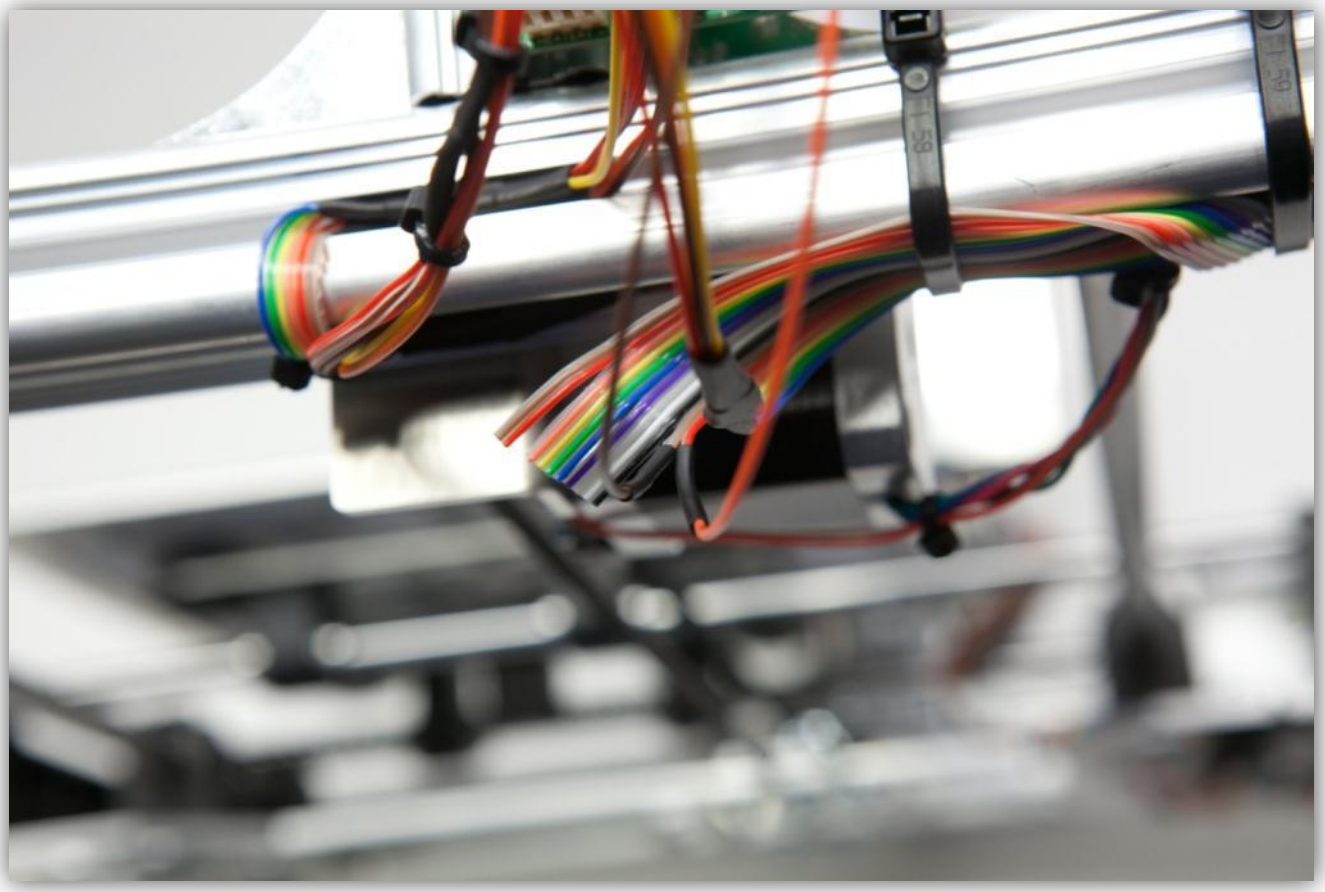
Red -> Red

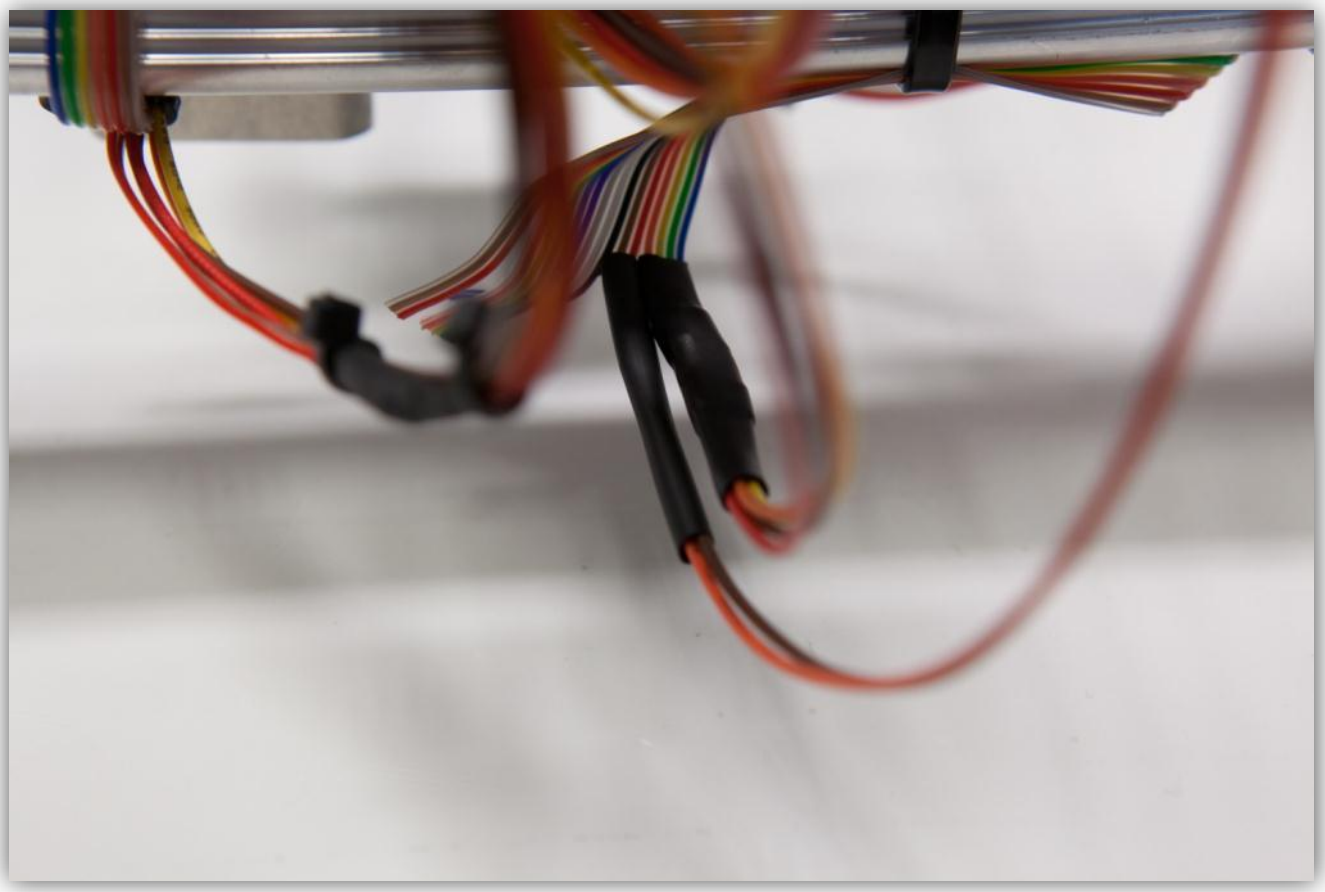
Brown -> Brown



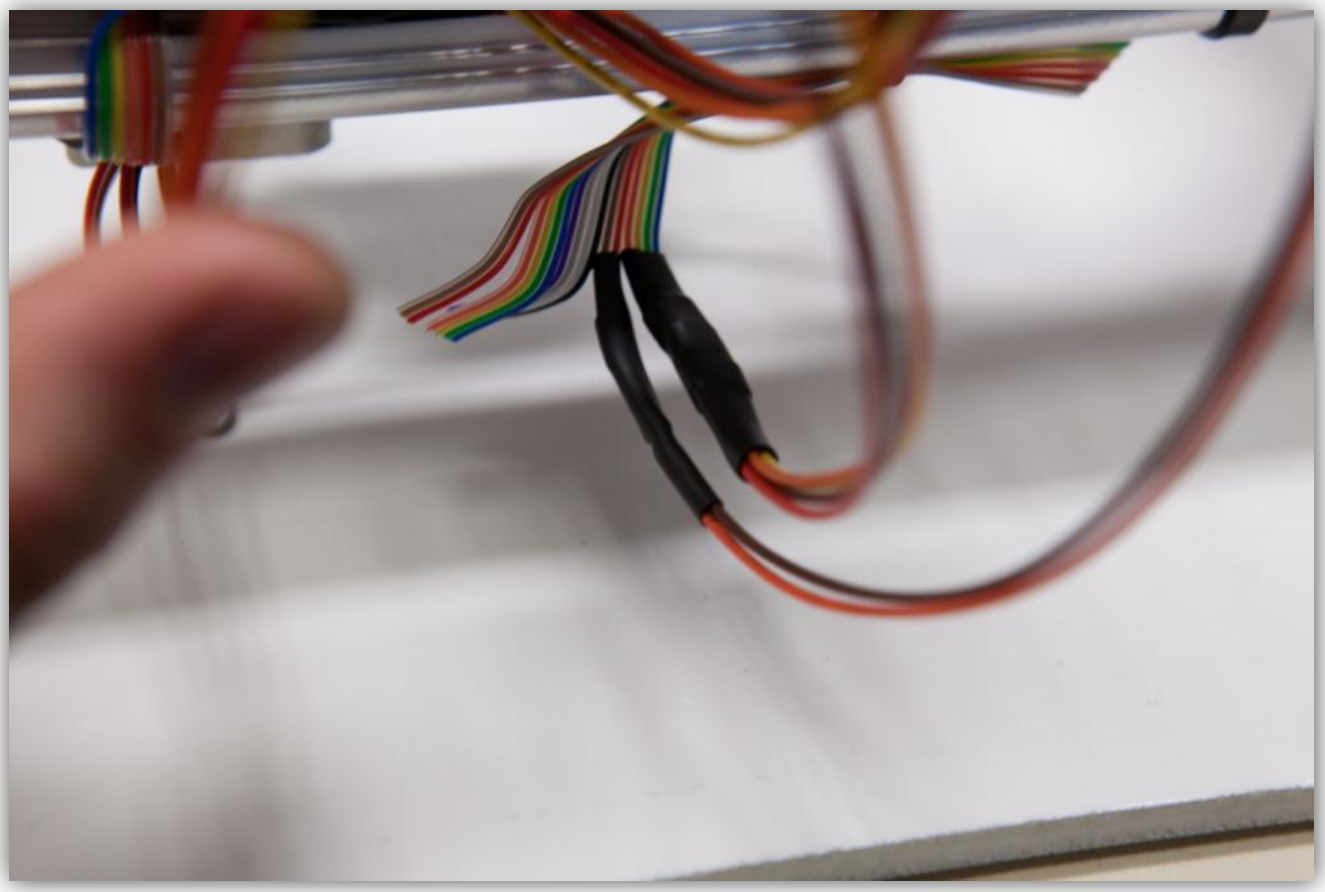
Slide the 2 small heat shrink tubes over the solder joints and heat them up.





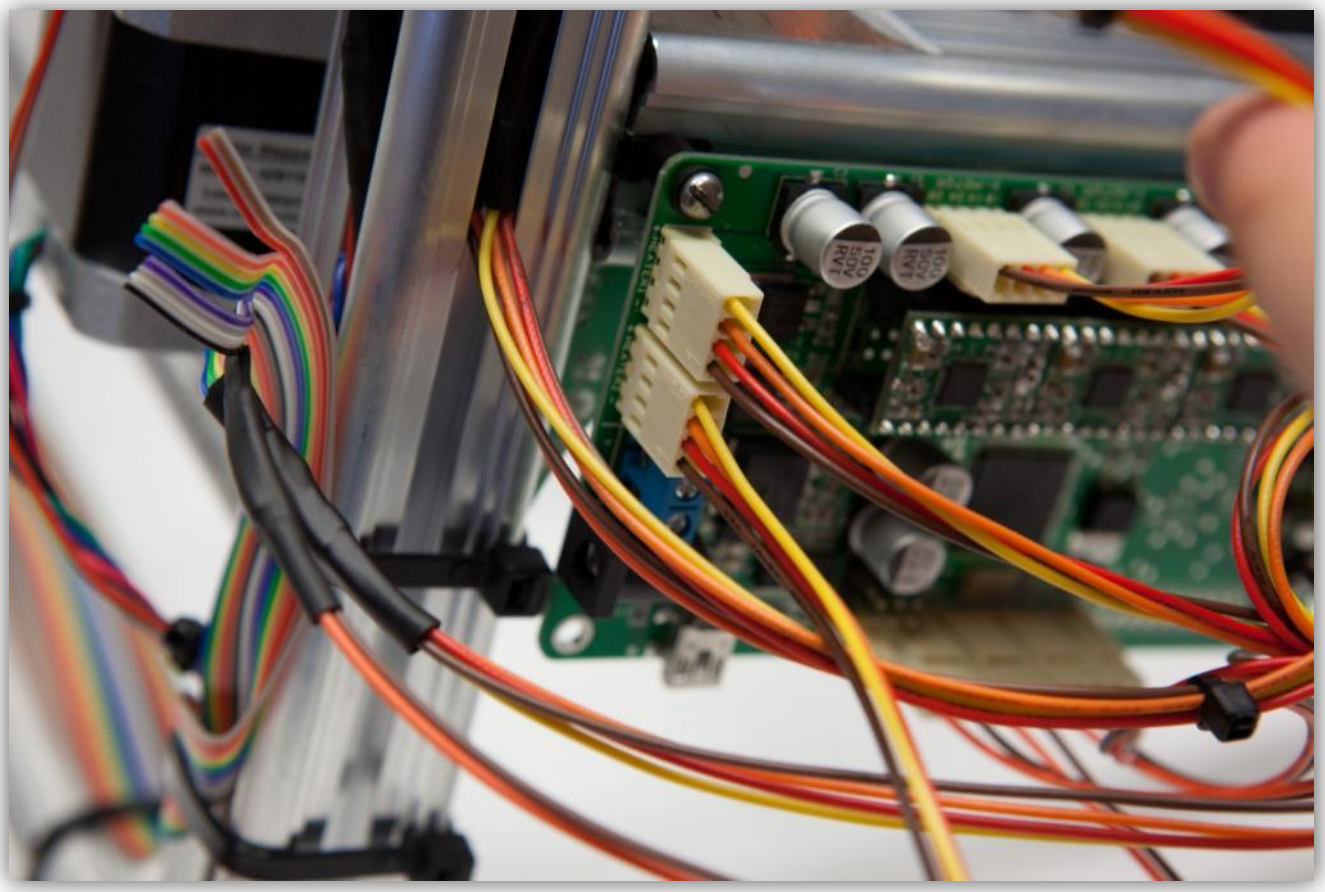


Now slide the medium size piece of heat shrink tubing over the 2 small pieces, heat the medium size piece so it covers and protects the 2 heat shrunk joints.

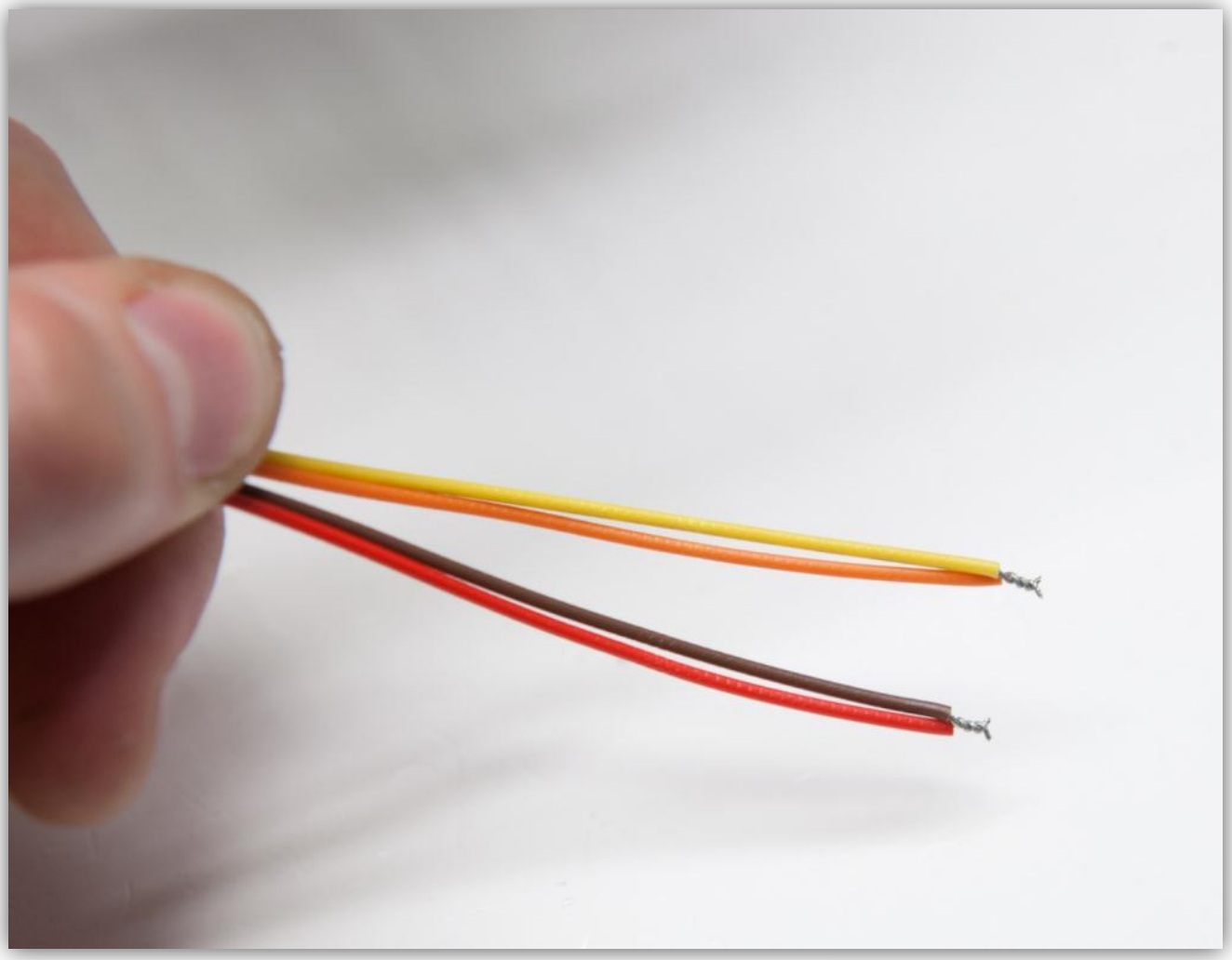


Take a board to wire connector with 4 wires out of the bag labelled with 40.

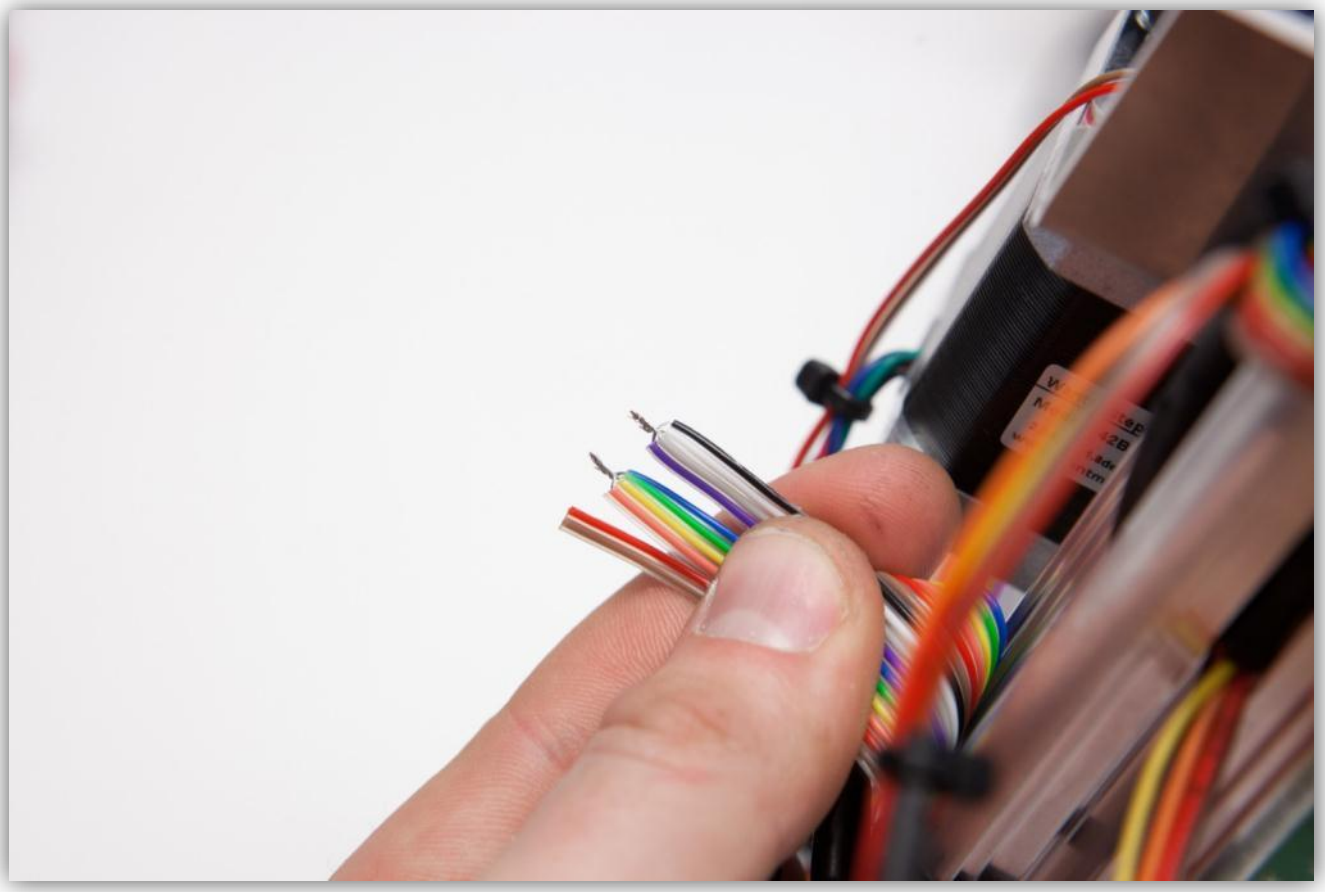
Plug the female connector in the male connector labelled with HEATER2 on the controller board.

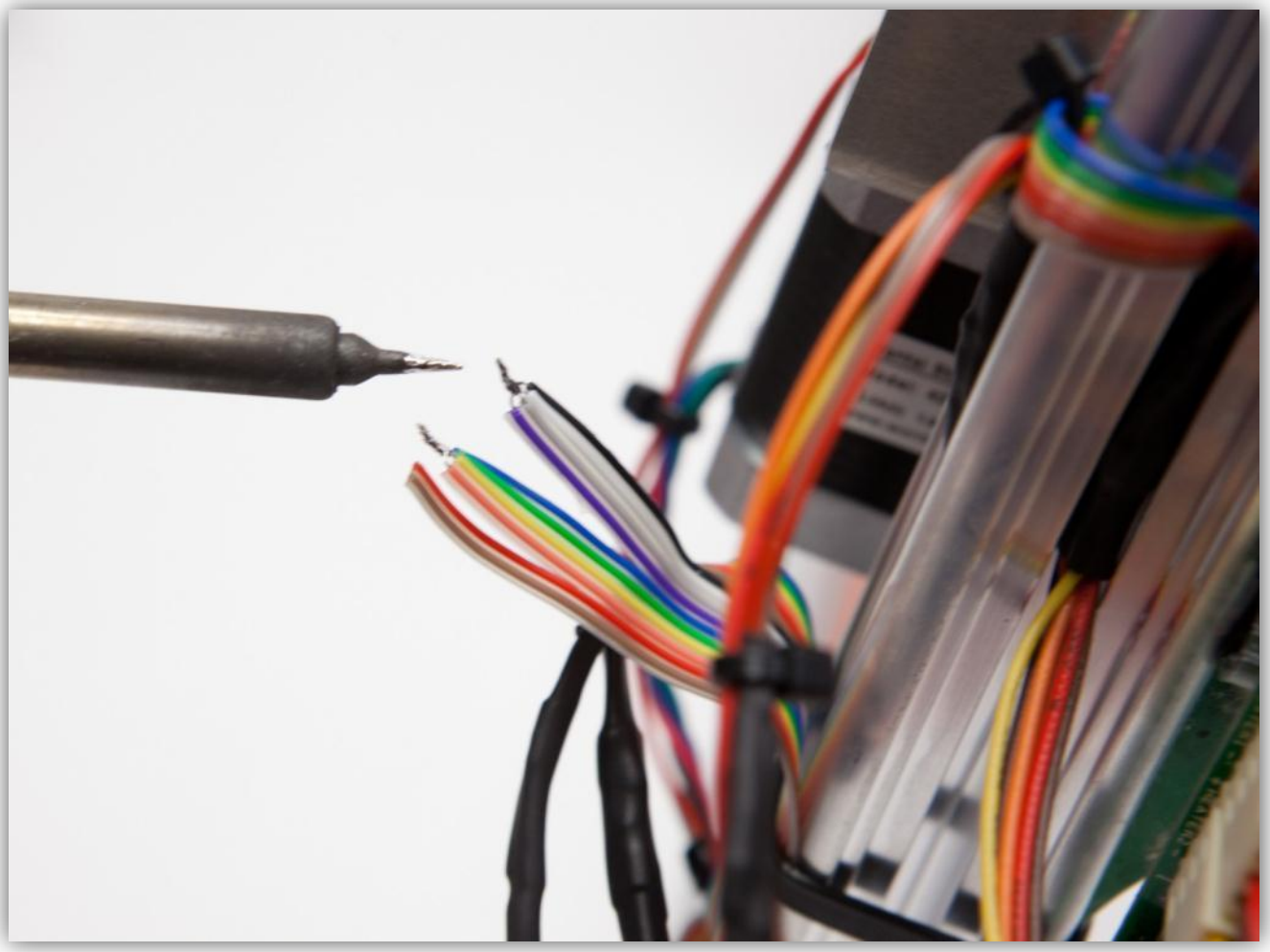


Twist and tin the ends of the **Yellow** and **Orange** wires together and twist and tin the ends of the **Red** and **Brown** wires together.



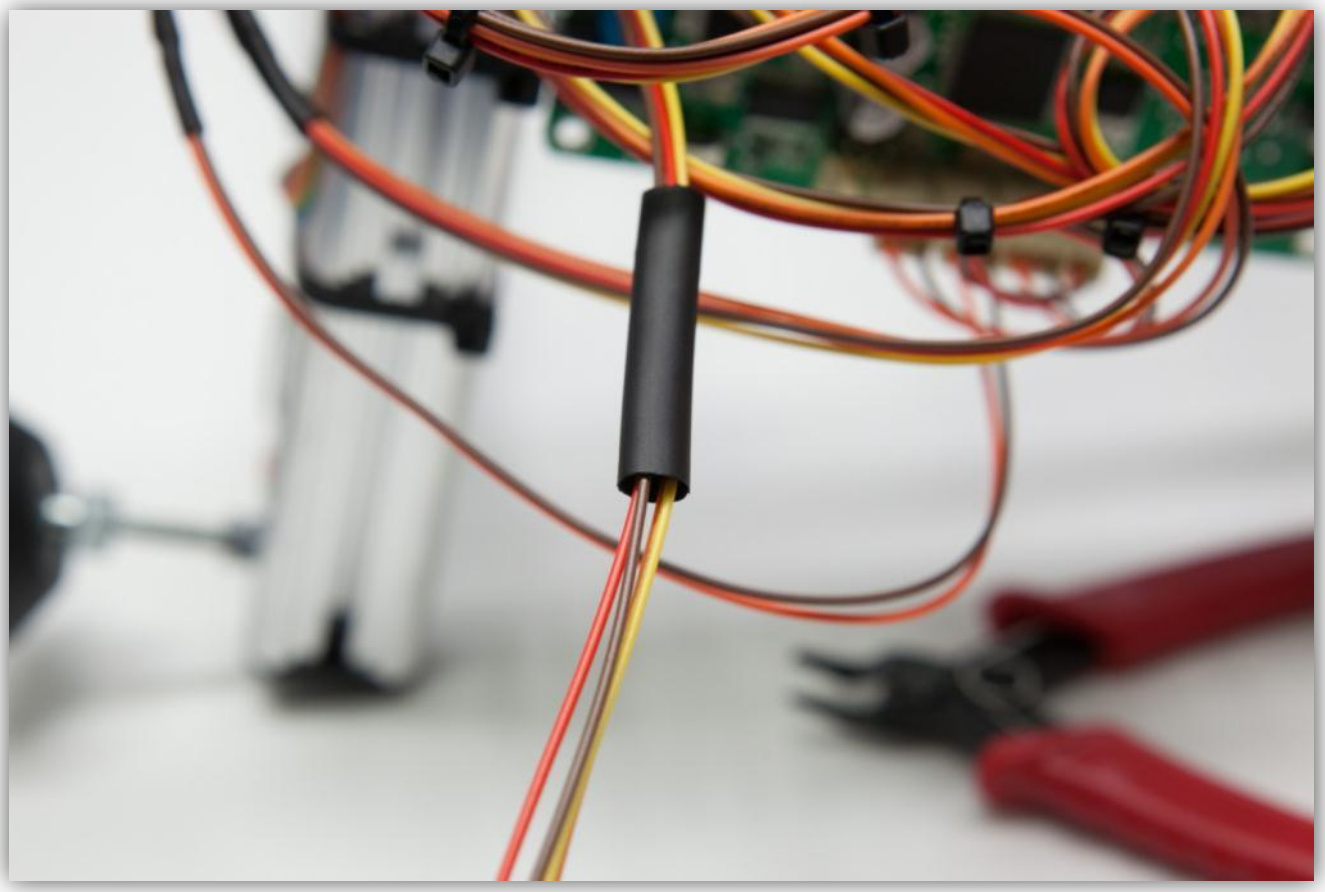
Next detach 2 cm (0.79") the **Orange, Yellow, Green, Blue** and **Violet, Grey, White, Black** as groups. Strip 5 mm (0.2") the ends, twist them together per group and tin the ends together per group.



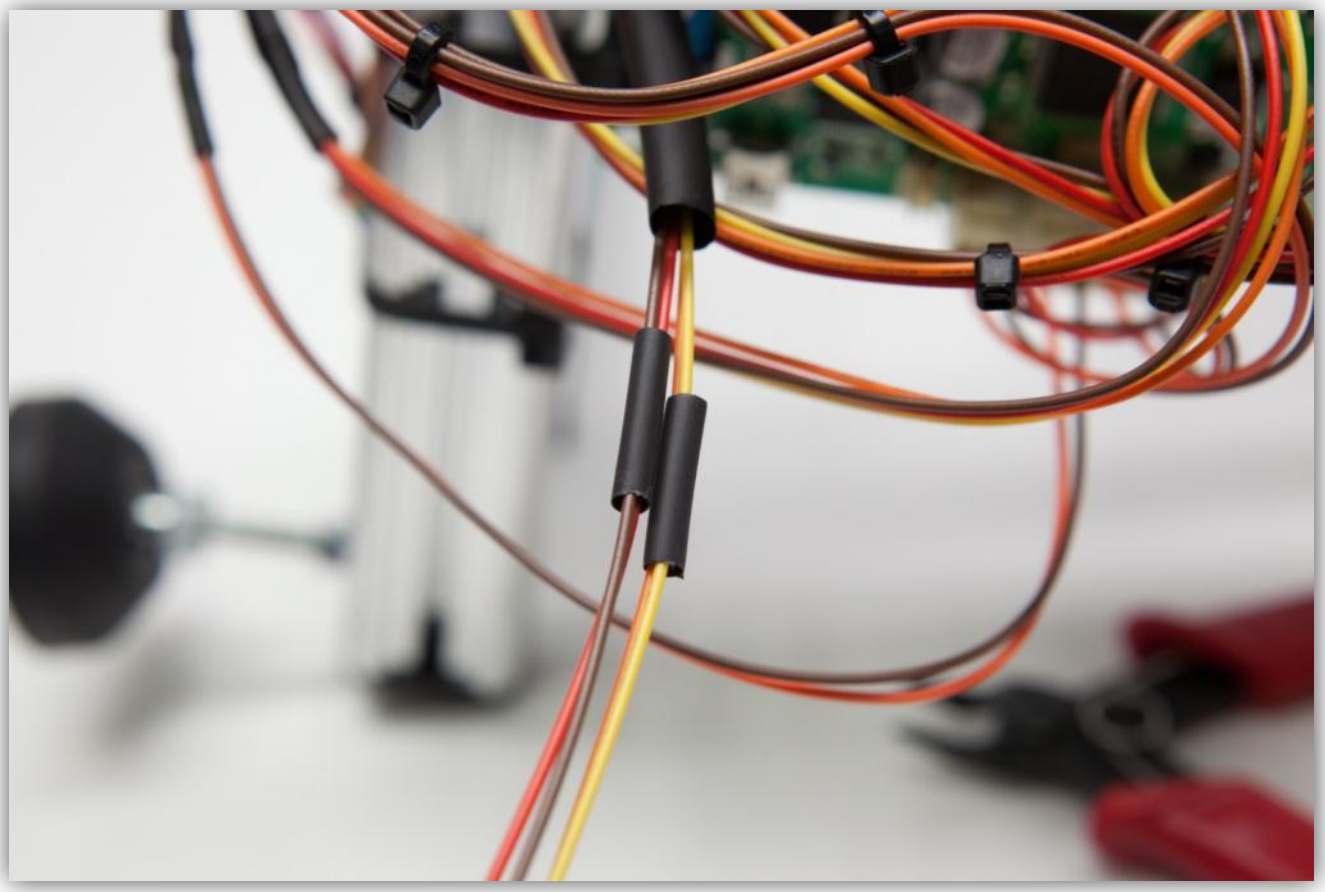


Cut 2 small pieces of the medium size heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

Slide the big heat shrink tubes over the 4 wires of the connector.

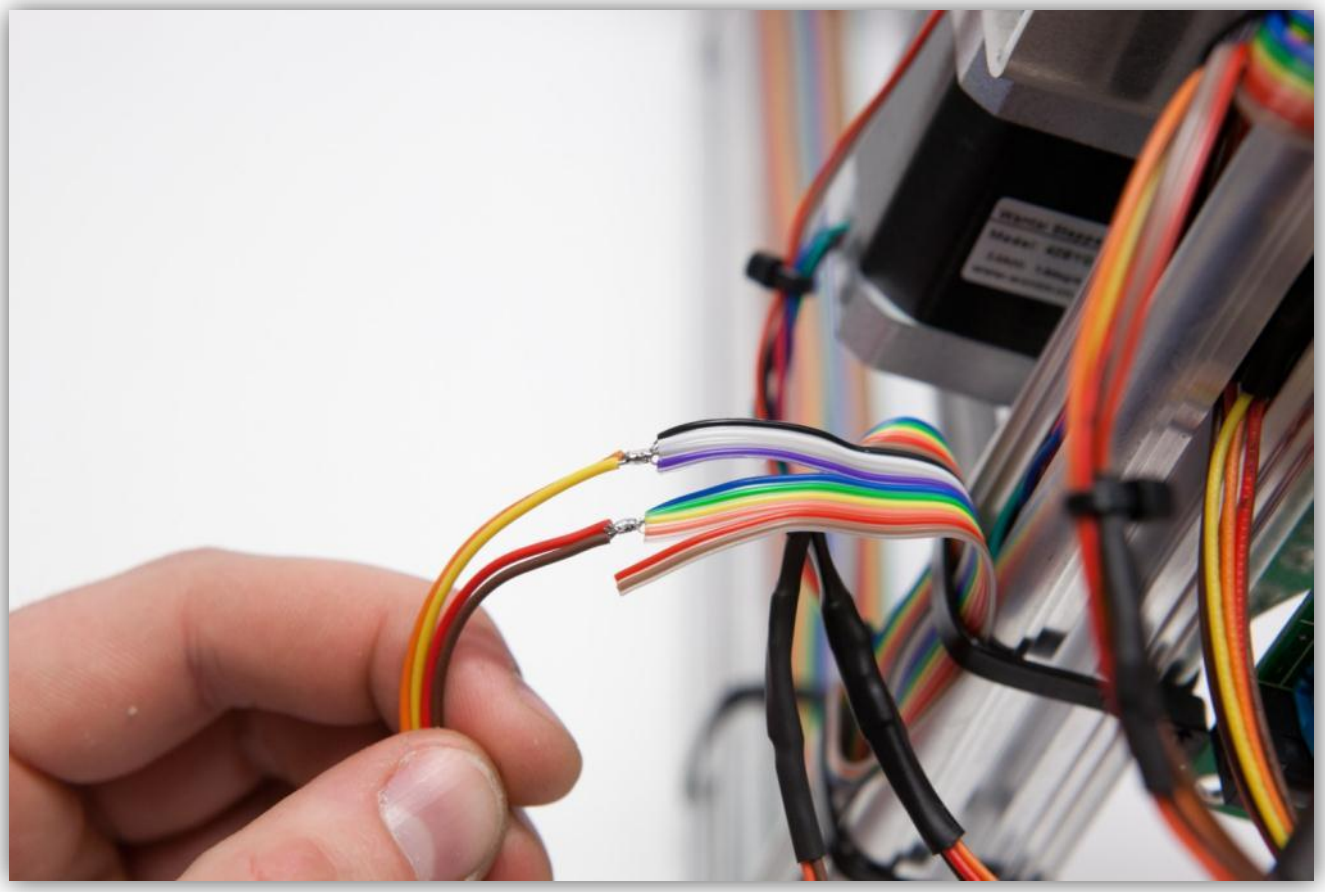


Slide 1 medium size heat shrink tubes over the **Yellow** and **Orange** wire and 1 medium size heat shrink tube over the **Red** and **Brown** wire.

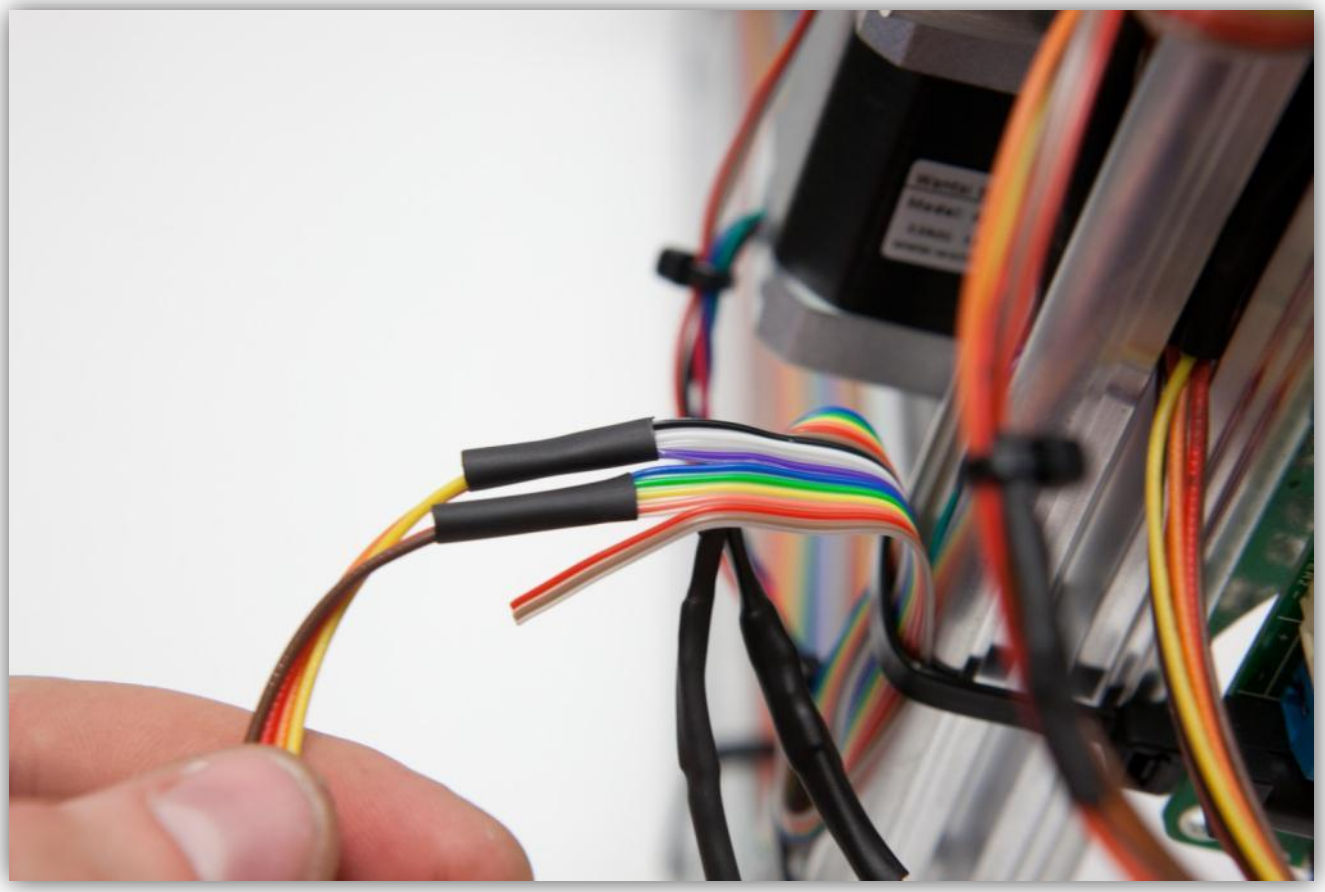


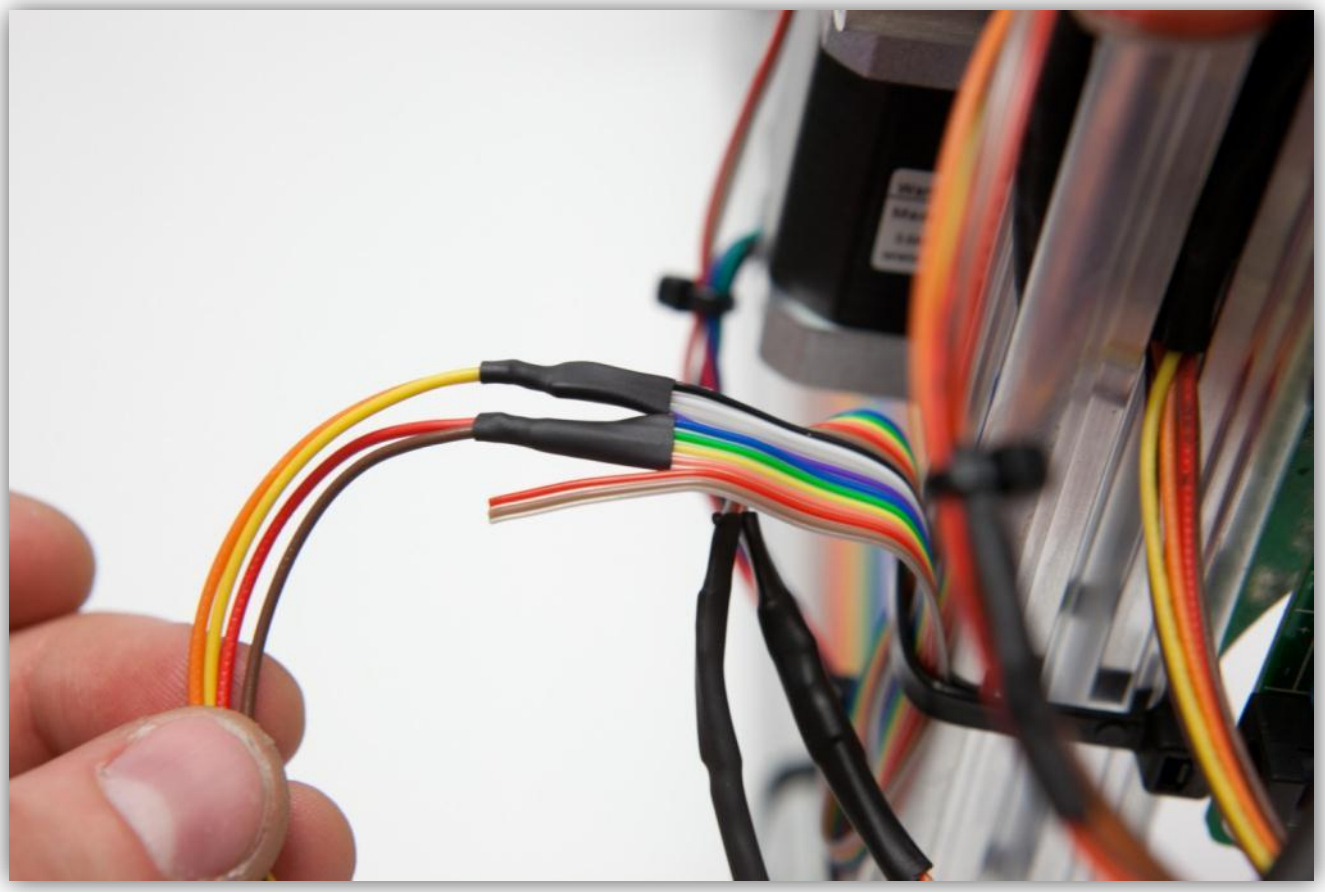
Solder the 6 wires from the connector to the 4 wires of the flat cable you tinned earlier. **Watch the colours closely and respect the groups.**

Flat cable	**->**	**Connector wires**
Orange, Yellow, Green, Blue	**->**	**Red** and **Brown**
Violet, Grey, White, Black	**->**	**Yellow** and **Orange**

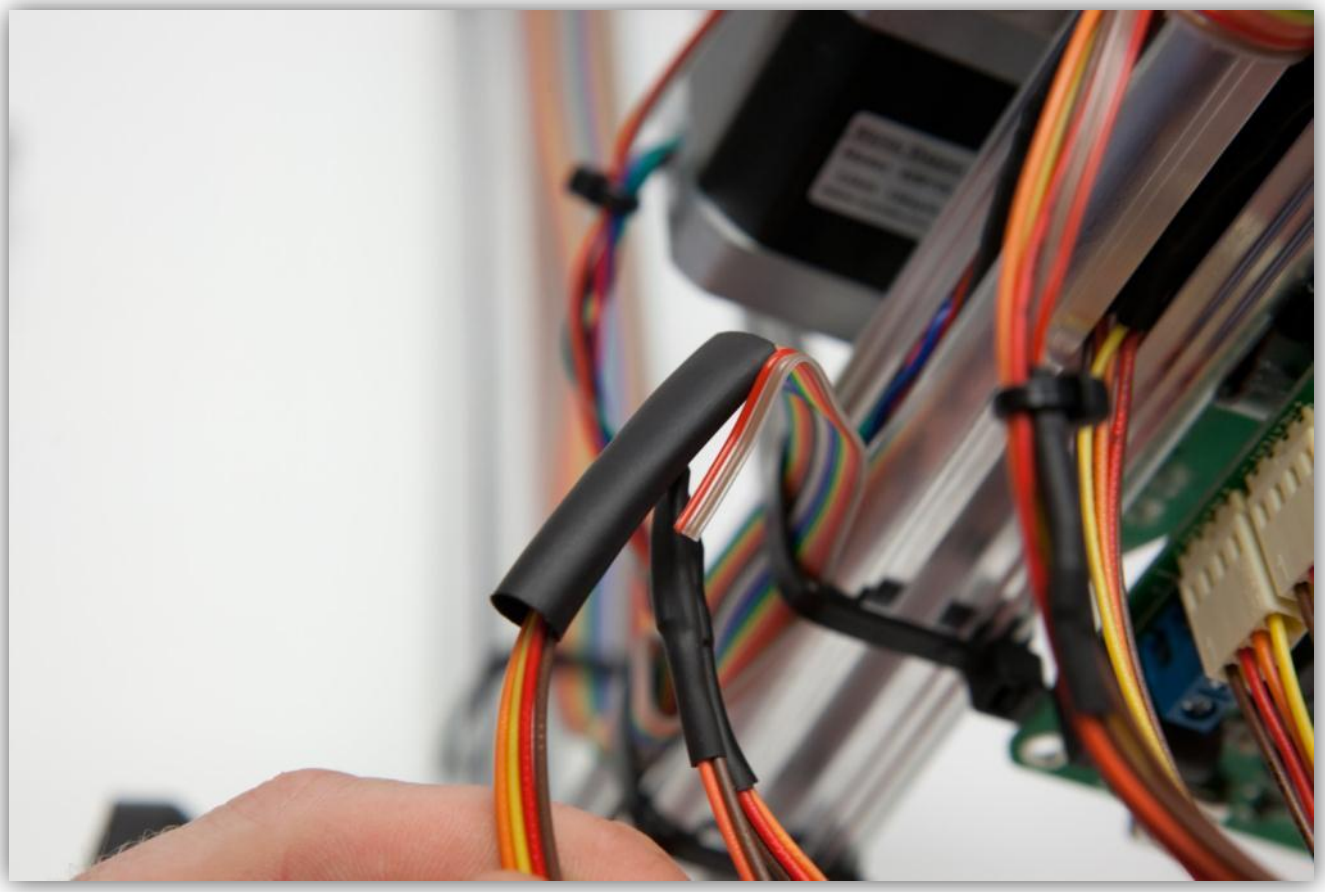


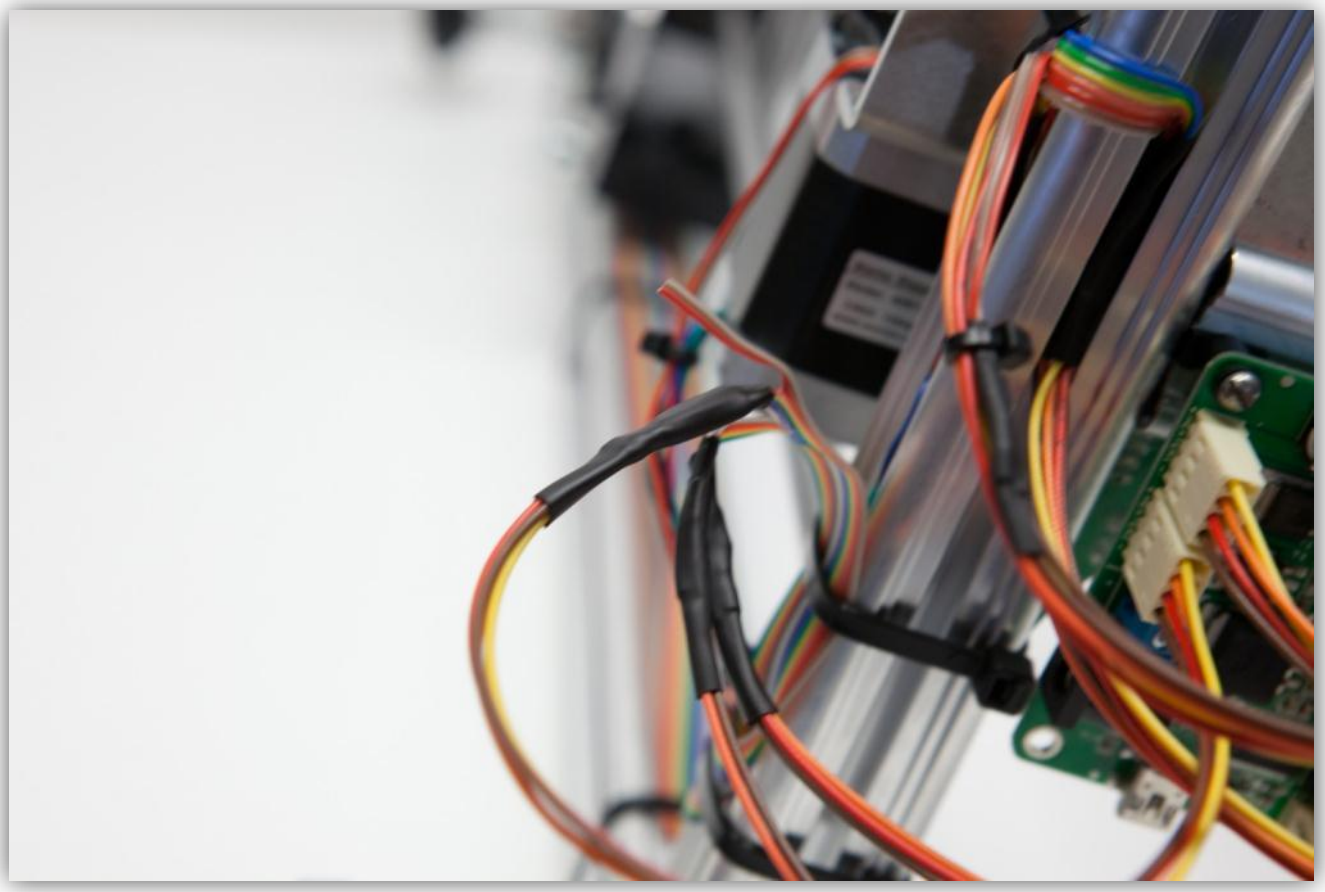
Slide the medium size heat shrink tubes over the solder joints and heat them up so they shrink.



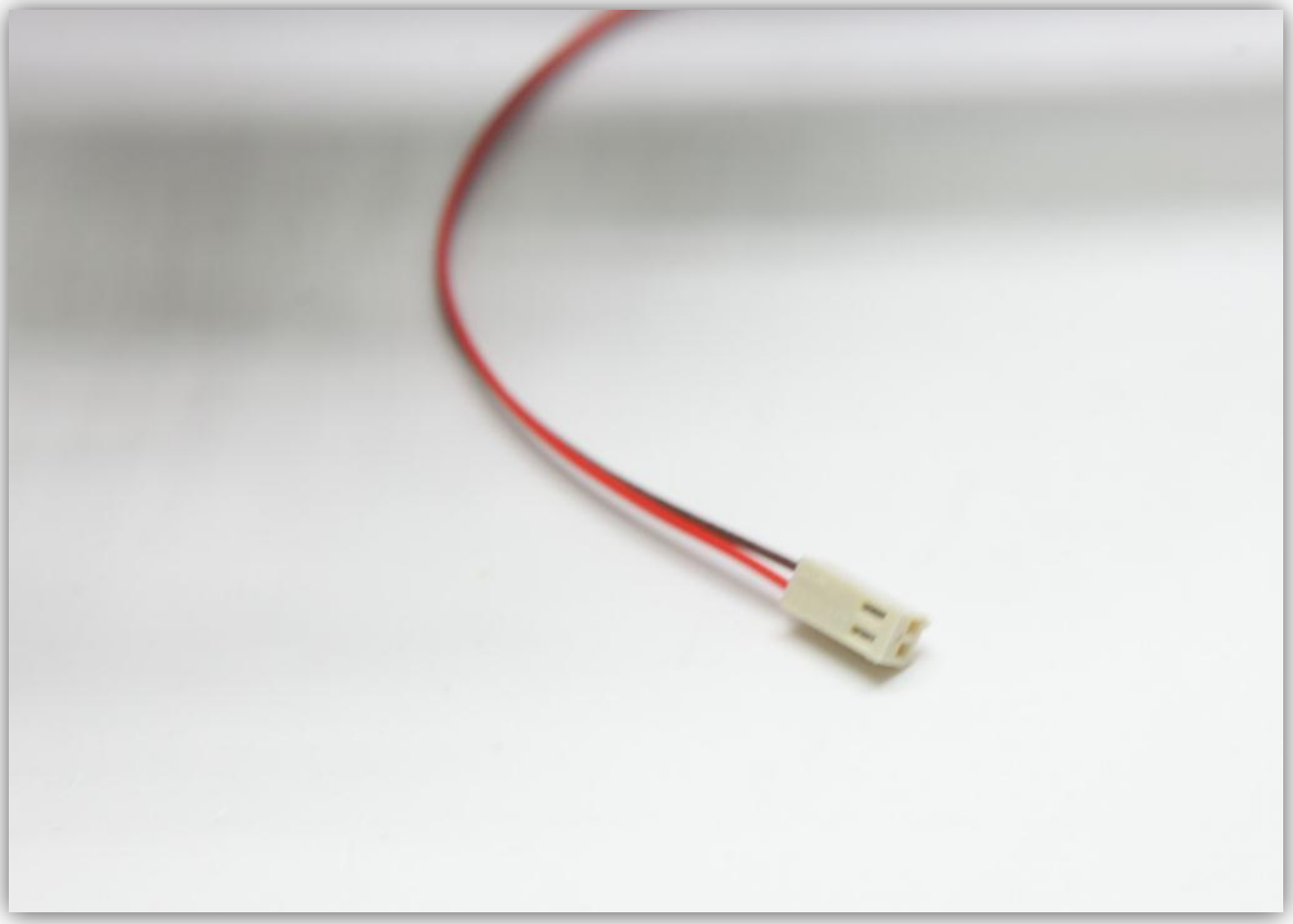


Now slide the big piece of heat shrink tubing over the 2 medium size pieces, heat the big piece so it covers and protects the 2 heat shrunk joints. Secure all the joints with 2 large tie-strips to the profile.

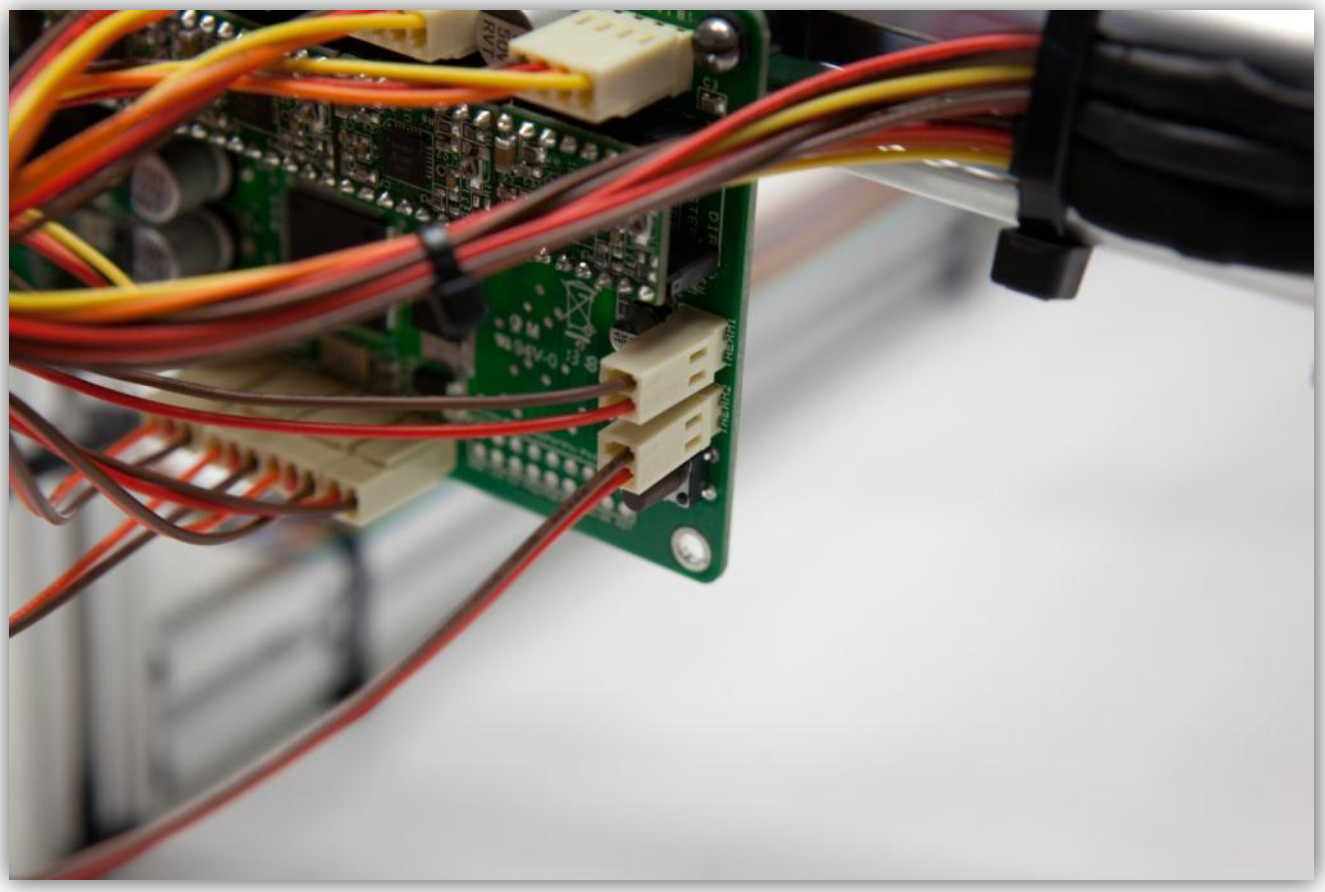




Take a board to wire connector with 2 wires out of the bag labelled with 40.

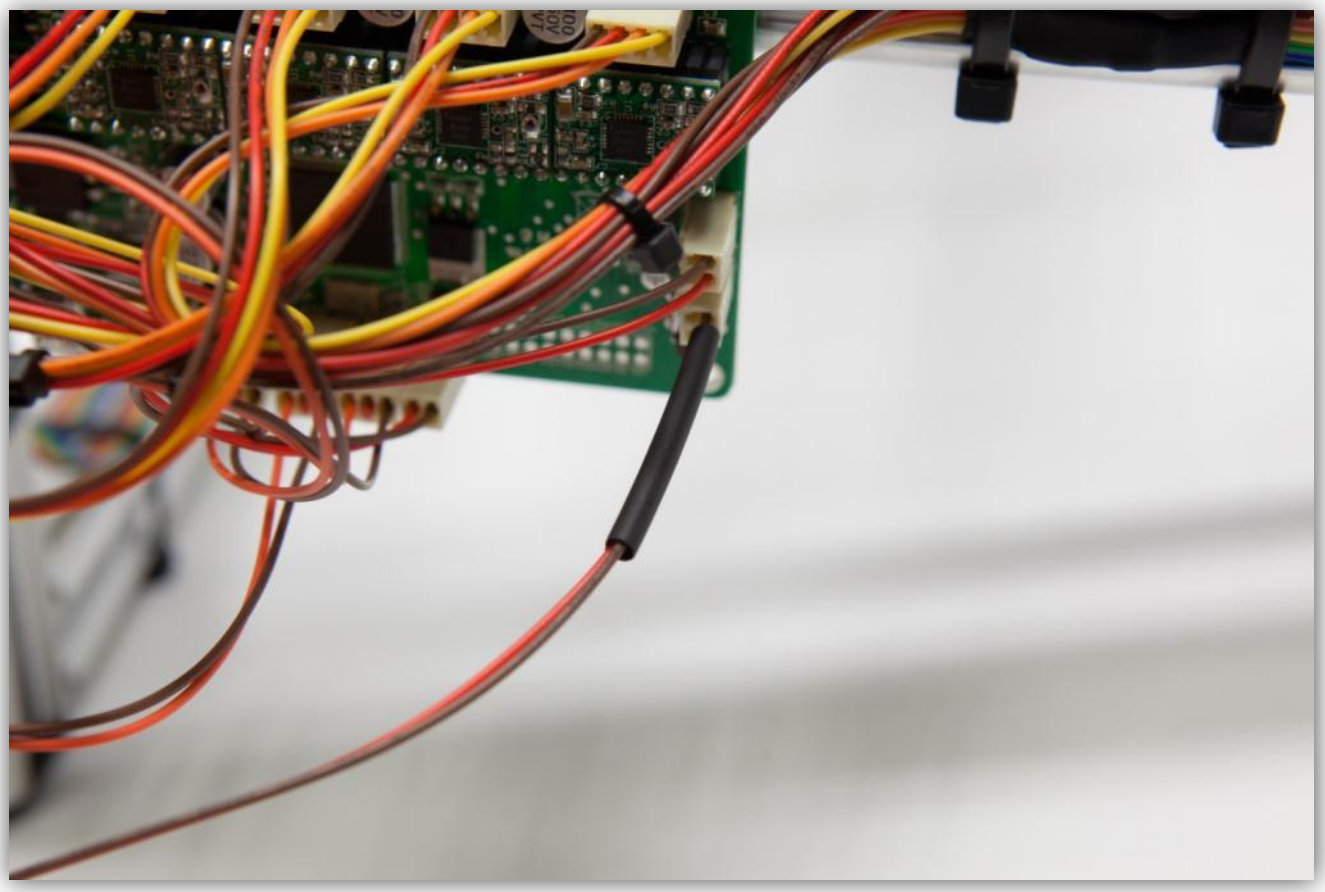


Plug the female connector in the male connector labelled with THERM2 on the controller board.

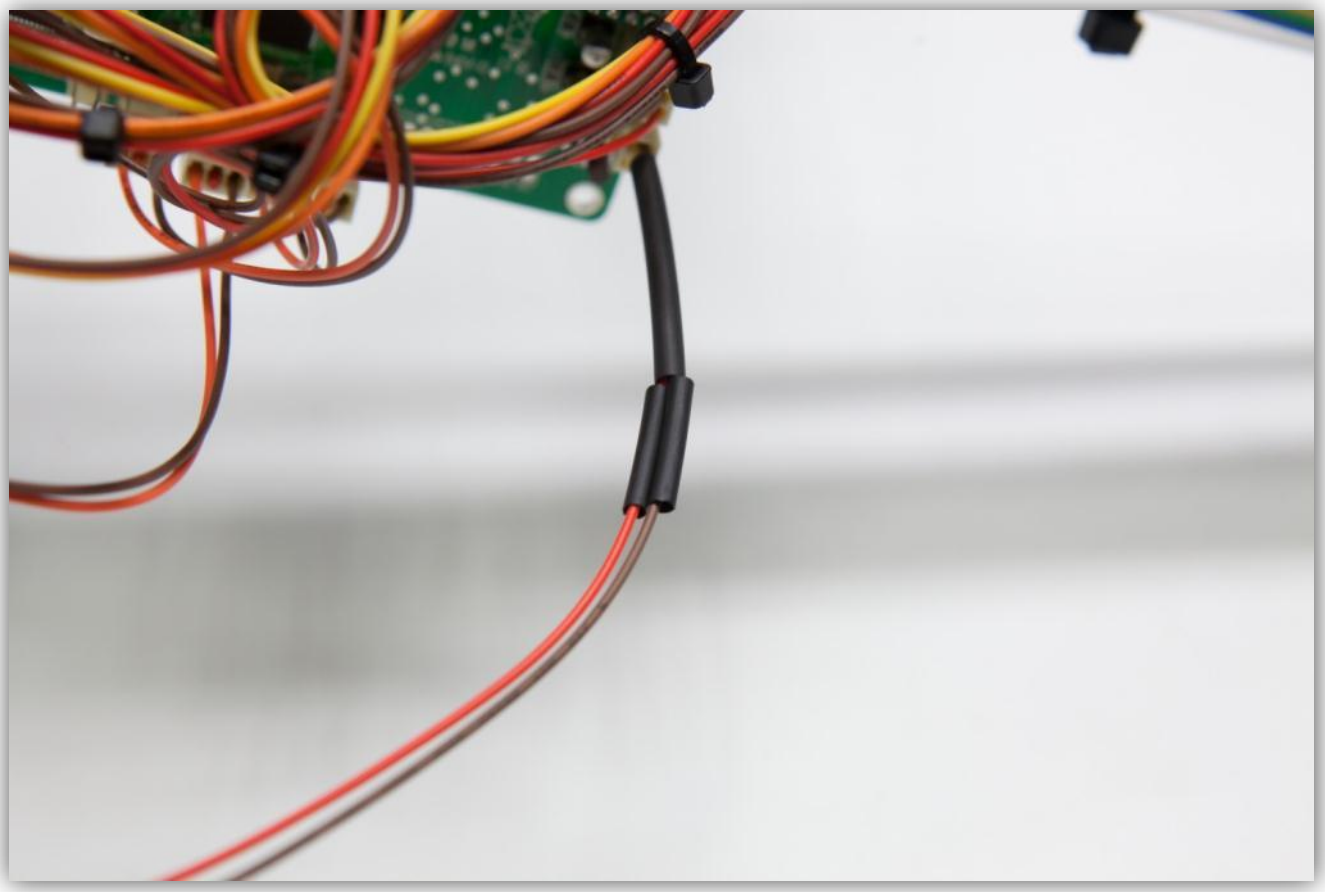


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

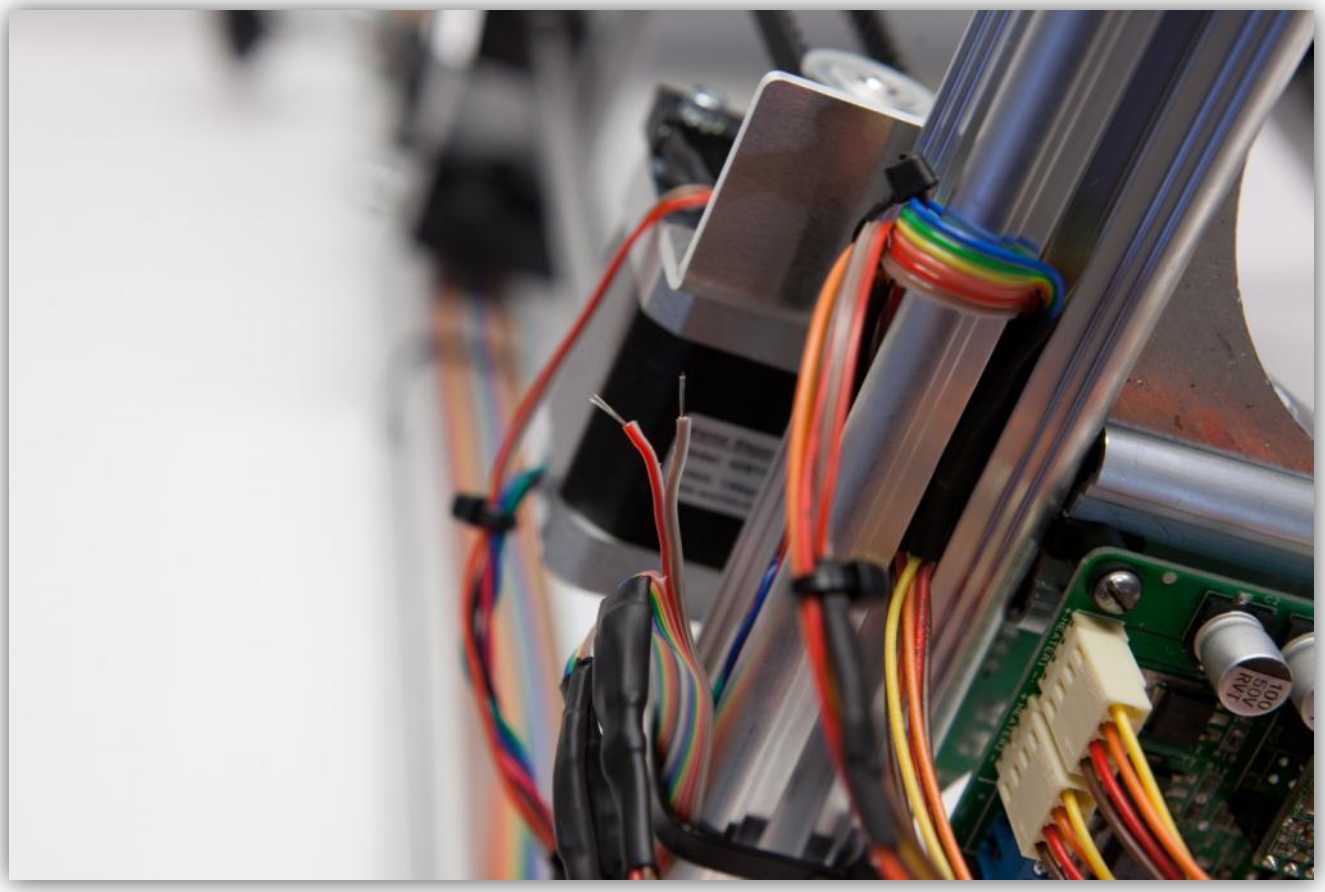
Slide the medium size heat shrink tubes over the 2 wires of the connector.

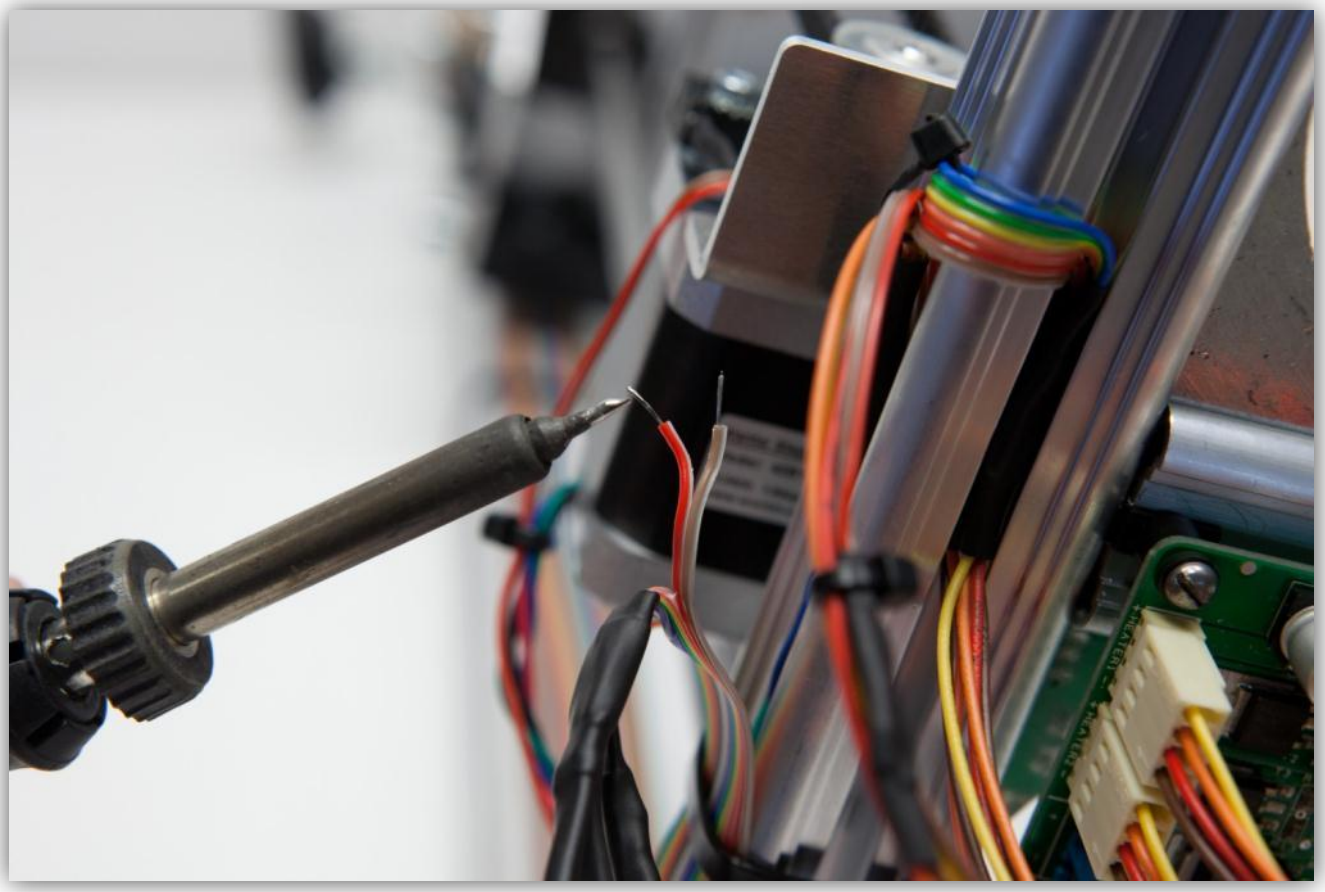


Slide the 2 small heat shrink tubes over the 2 wires of the connector.



Strip the two wires 5 mm (0.2") that are left over (**Red** and **Brown**) and tin them.



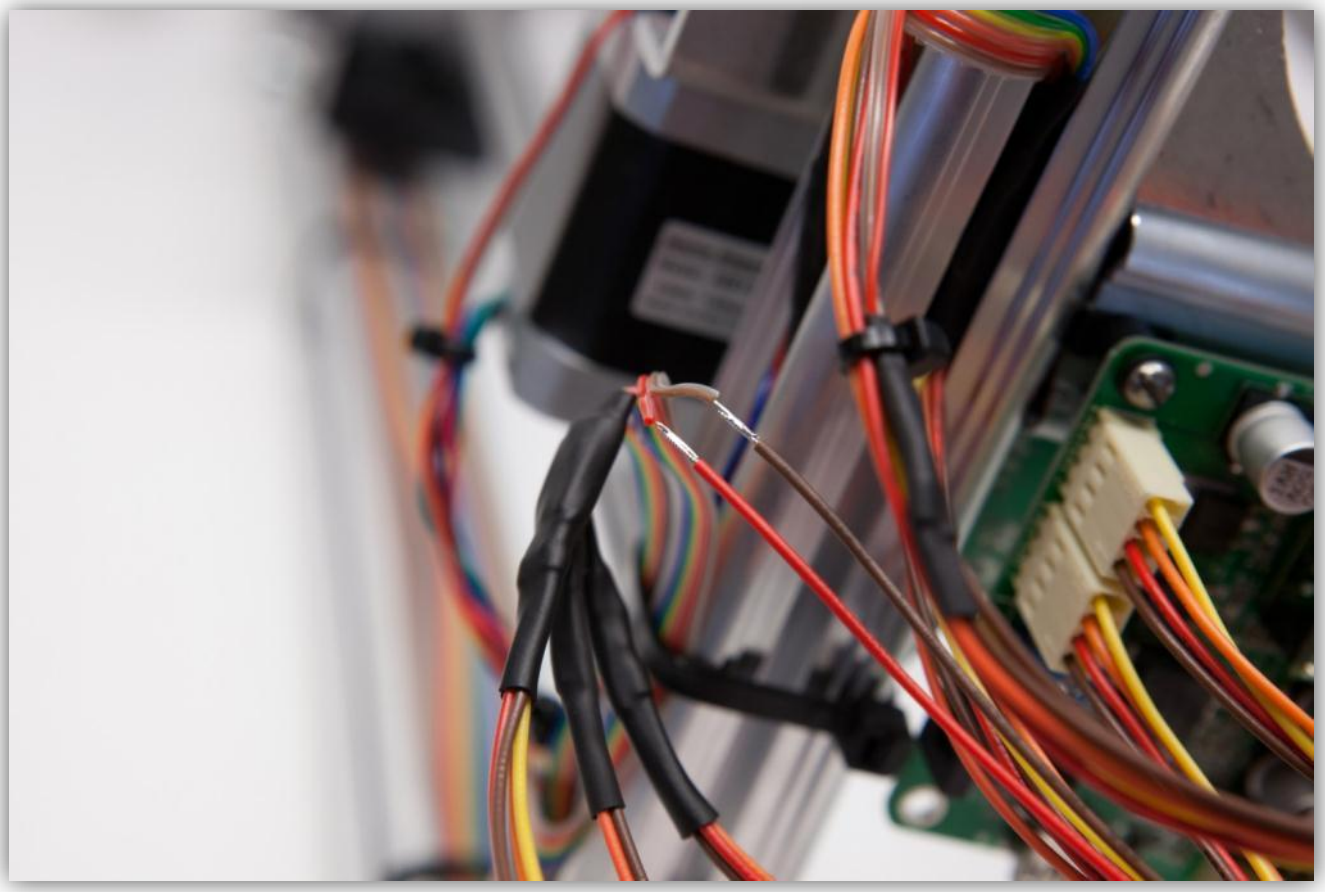


Solder the 2 wires from the connector to the 2 wires of the flat cable. **Watch the colours closely.**

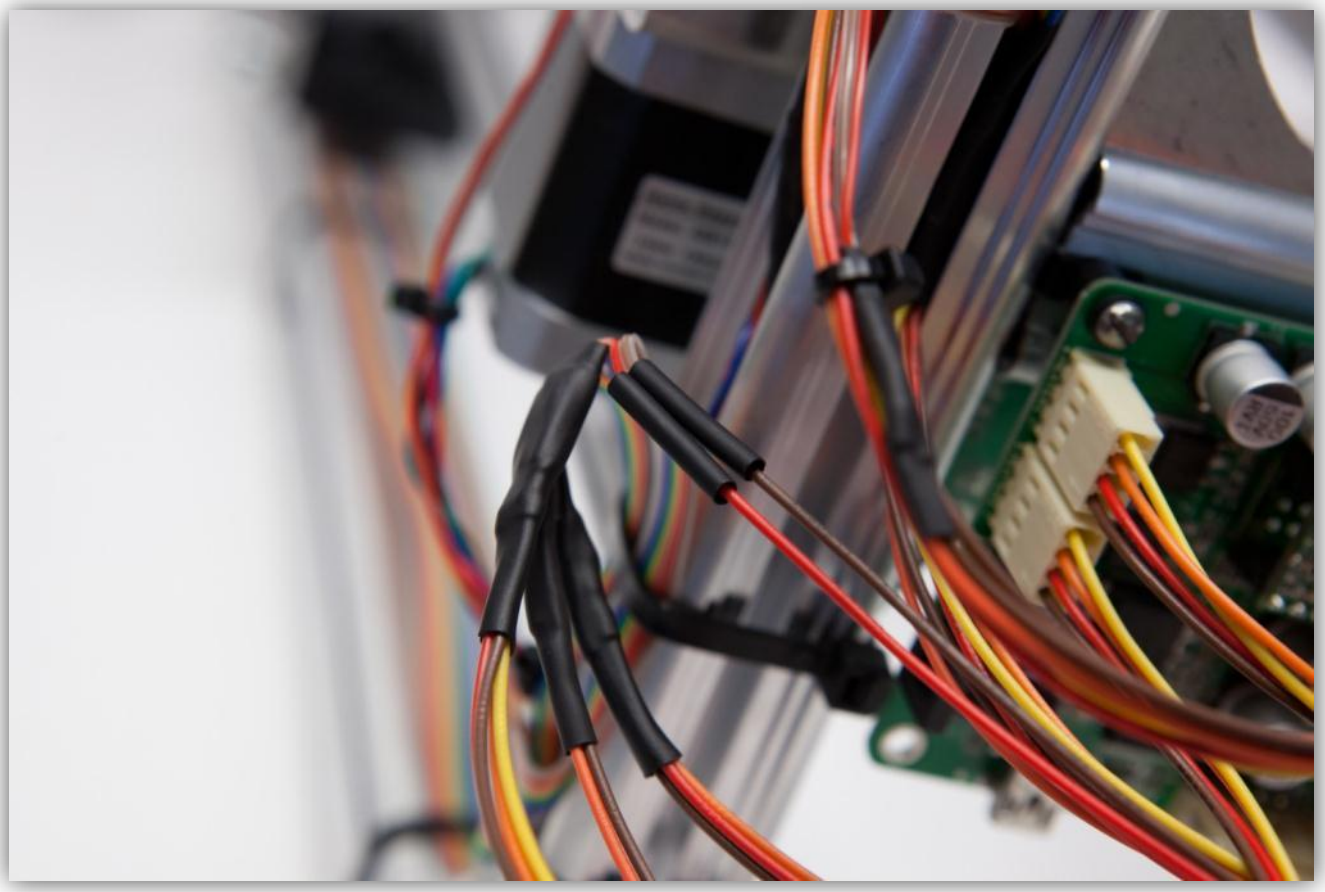
Flat cable -> Connector wires

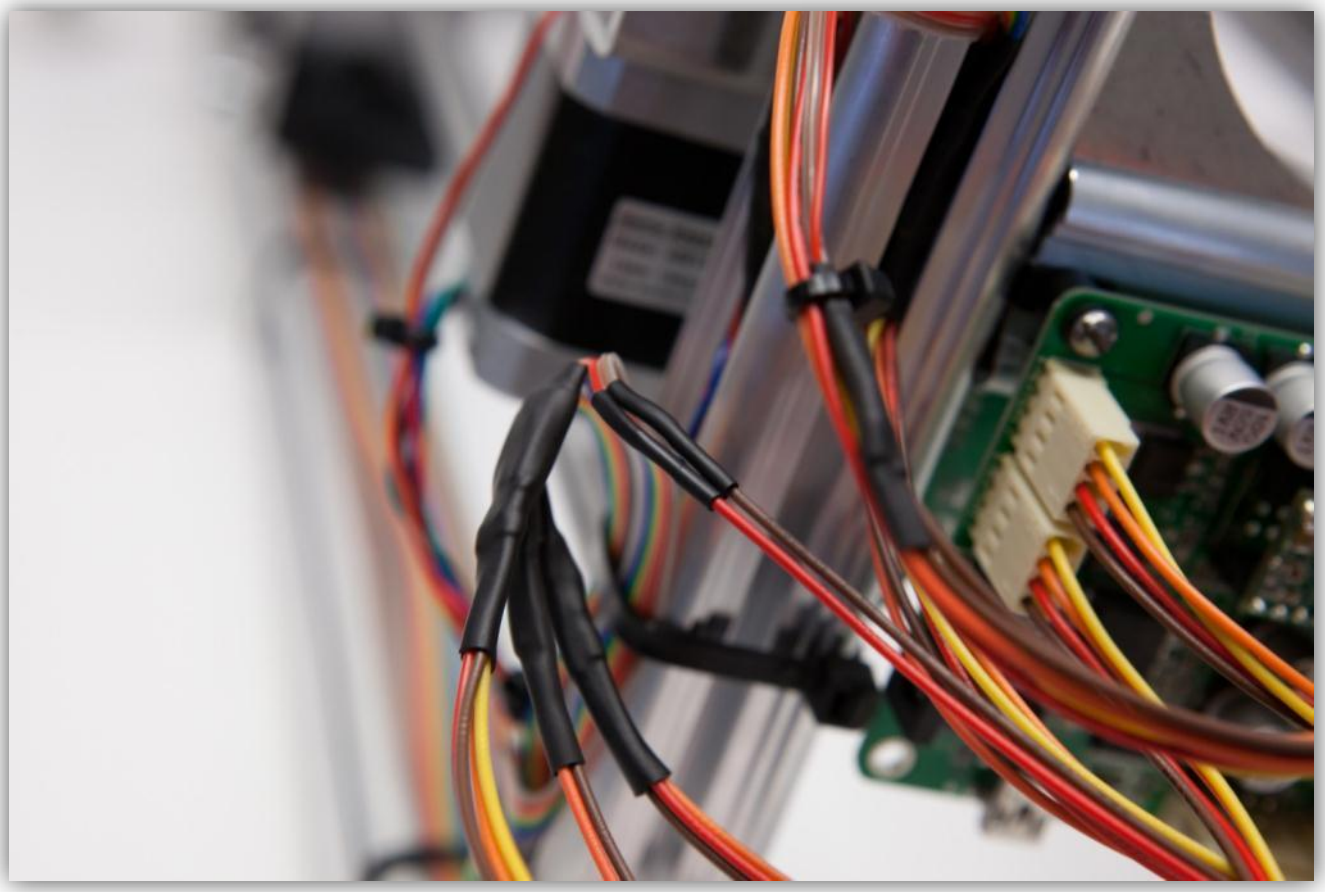
Black -> Red

White -> Brown

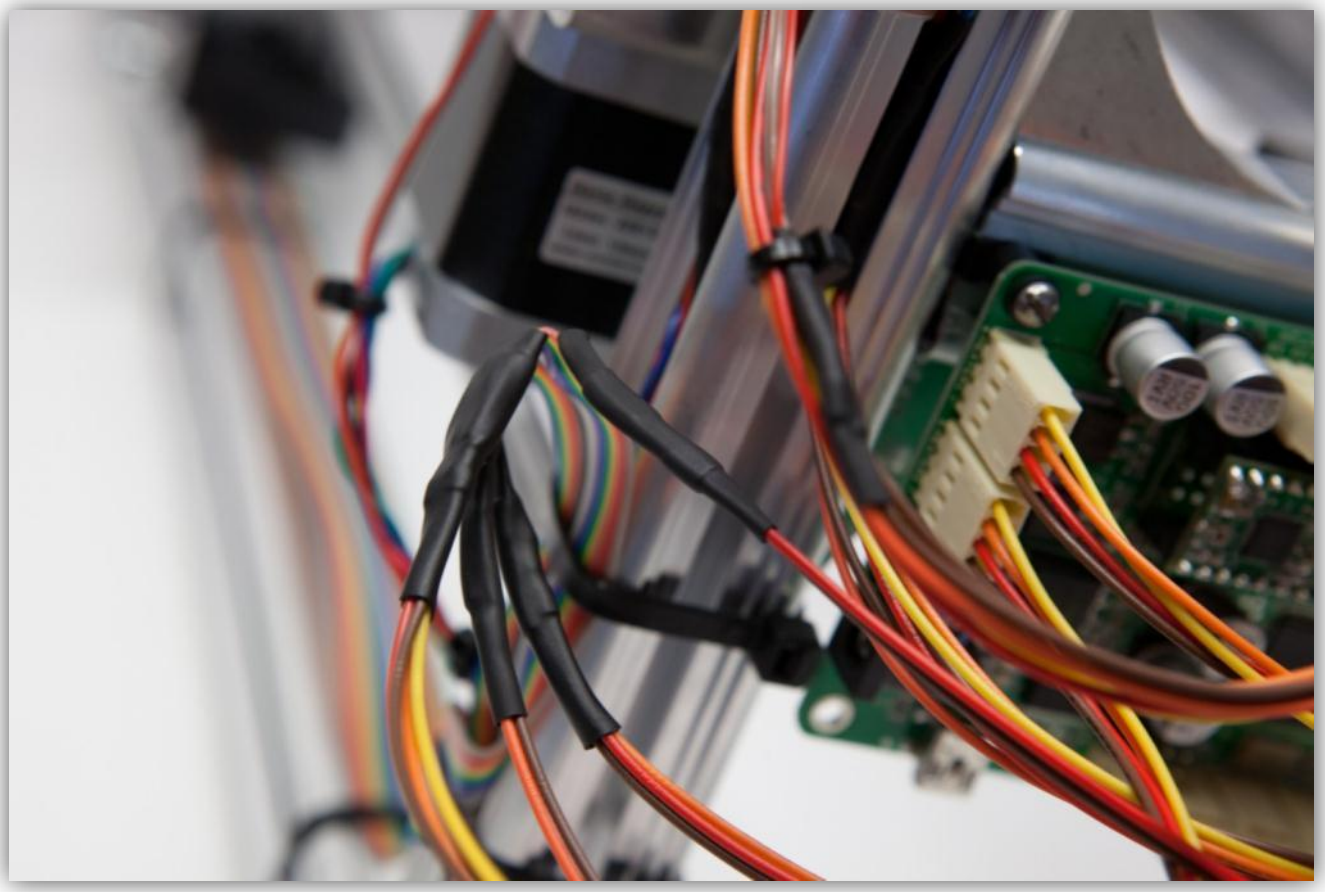


Slide the 2 small heat shrink tubes over the solder joints and heat them up.

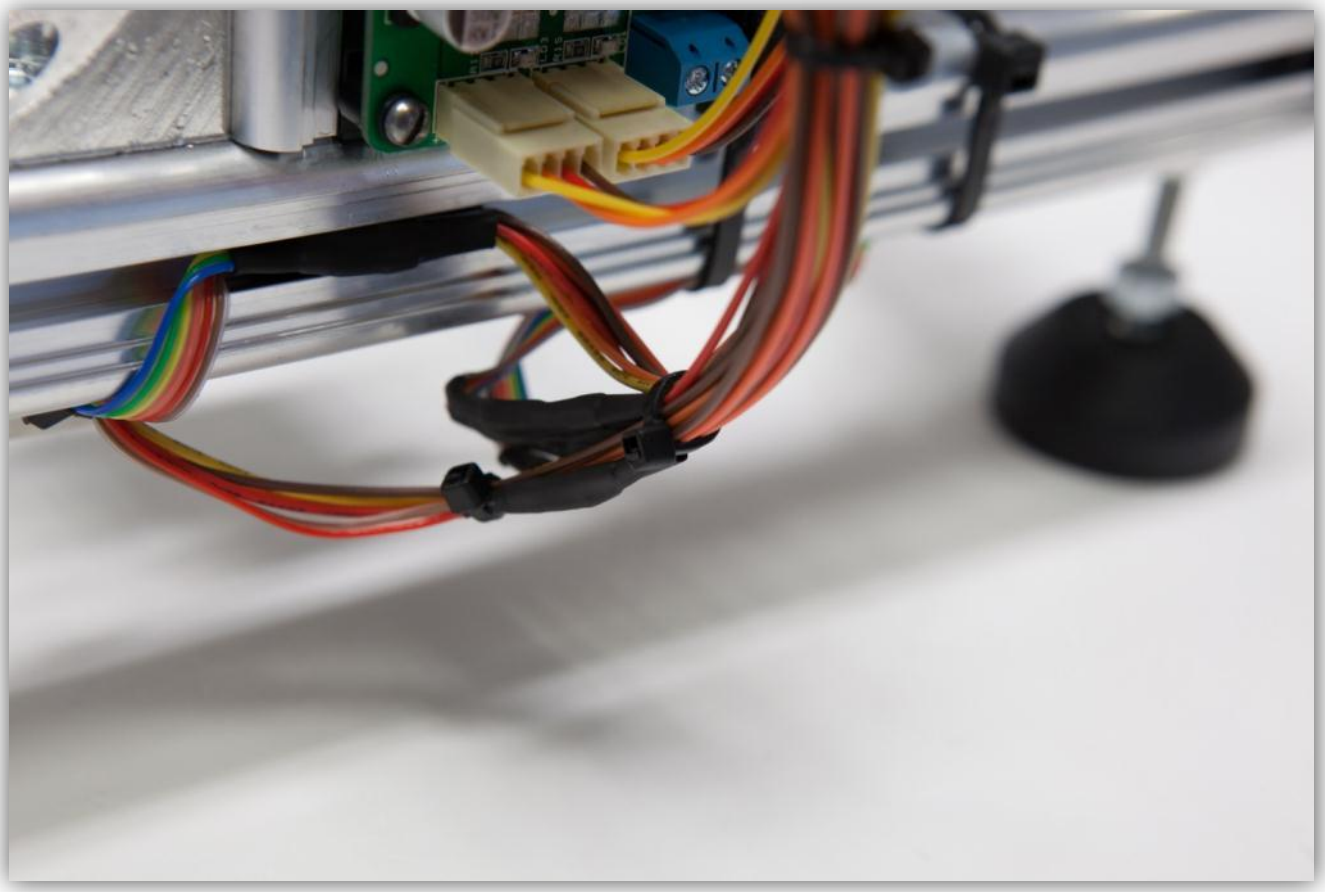


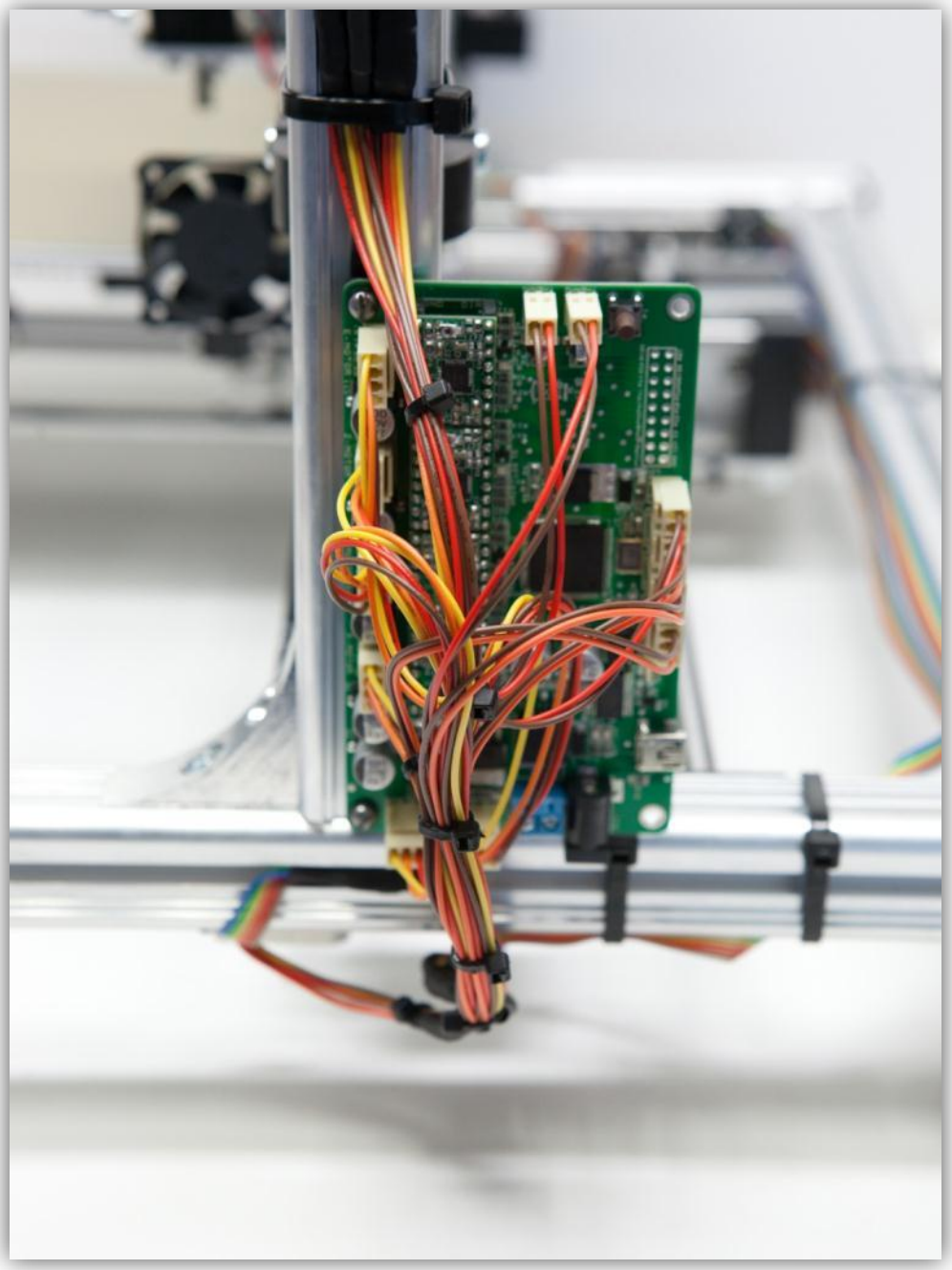


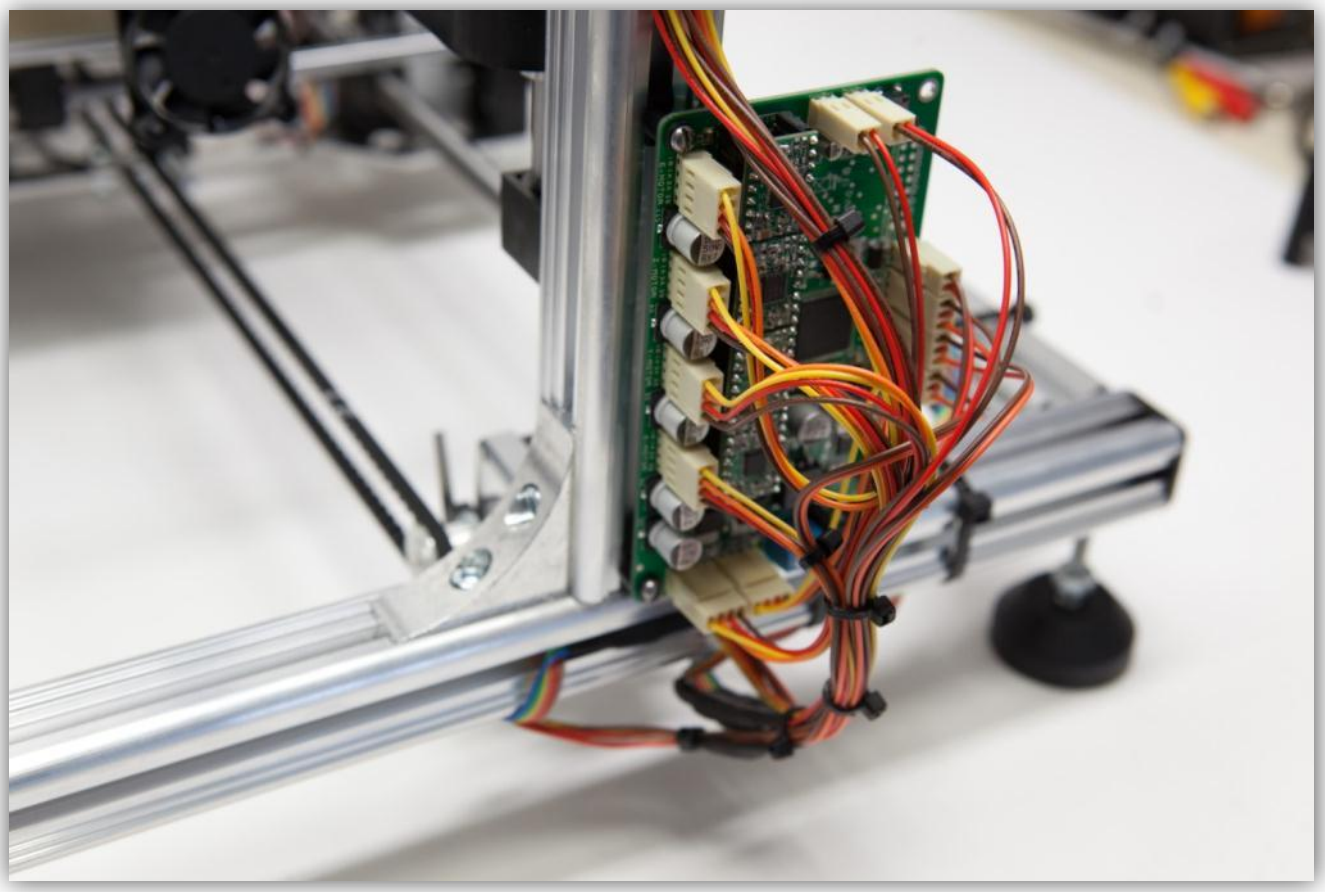
Now slide the medium size piece of heat shrink tubing over the 2 small pieces, heat the medium size piece so it covers and protects the 2 heat shrunk joints.



Use small tie-strips to keep the cables together.







019 – ASSEMBLING THE HOTEND

Take the bag labelled with 31 out of the box. You should have these parts. **Take EXTRA care with the small NTC THERMISTOR! It is very fragile.**

If on the other hand you have the parts shown in the picture below **(NTC Thermistor not shown in this picture)** you will have to assemble the heater block first. Note how the heater cartridge and the heater block are not assembled in the picture below.

Due to constant development it is also possible that you have a bag with an alternate LARGER version of the NTC and a heater block with an extra hole, as shown below. Do not panic, we will handle both versions in the manual below.

To assemble the heater block select these parts:

Insert the small grub screw into the heater block.

Insert the heater cartridge as shown in the picture below.

Make sure the orientation is correct; note the small holes on the side of the heater block. This is how it should look for the heater block without the extra hole:

This is how it should look for the heater block with the extra hole:

Tighten the grub screw (do not over tighten!). You have now finished the heater block assembly. From this point on the manual will use pictures of the heater block assembly with the heater cartridge sealed into the heater block. Both versions (with grub screw and the one with red sealant) have the same function.

Next slide the white plastic spacer into the aluminium bracket. You may need to use some force.

Slide the copper barrel into the white spacer. **Watch the orientation closely.**

Screw on the white plastic barrel.

Take the heater block (again it does not matter if you have the version with the small grub screw, they are the same).

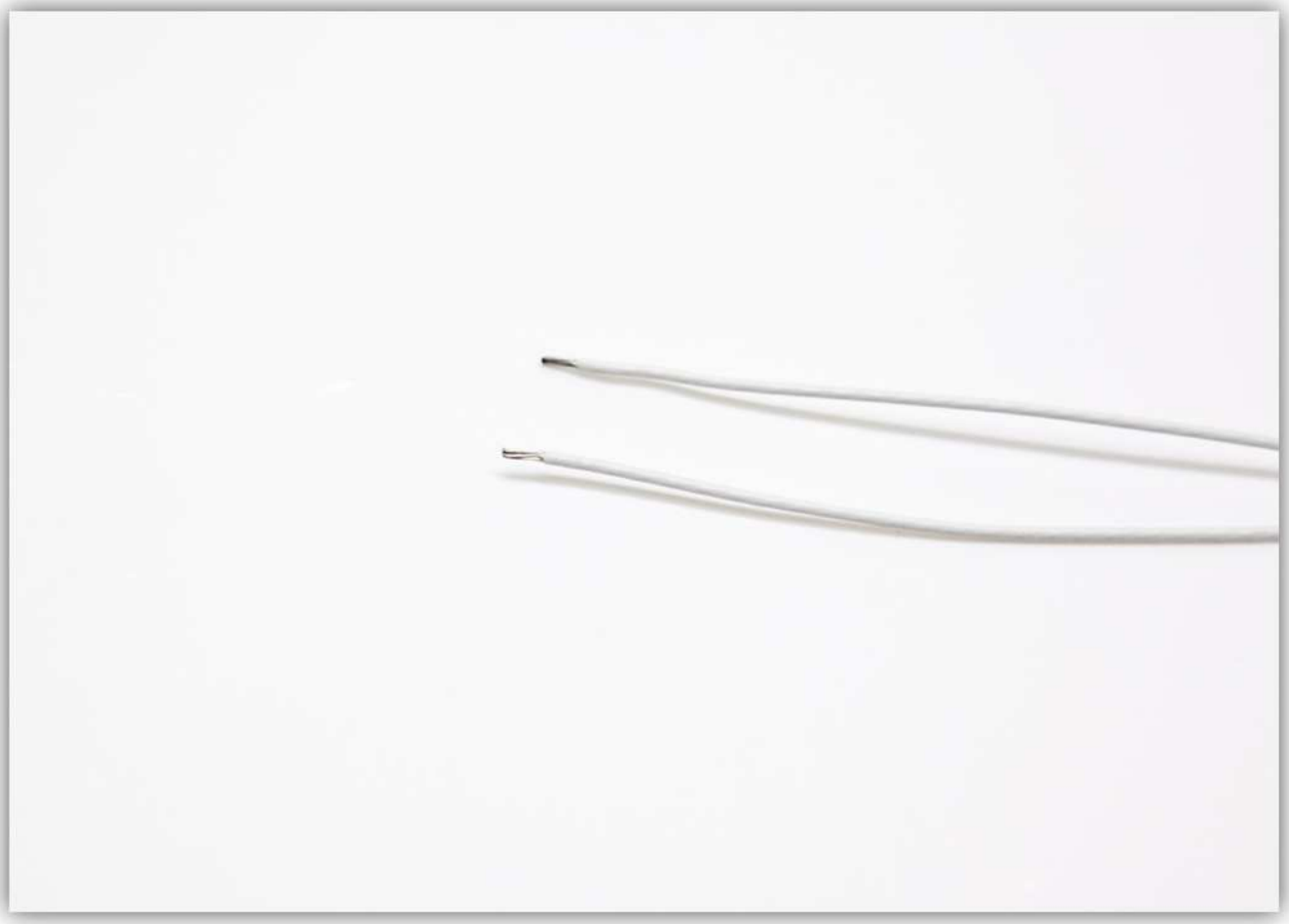
Slide the 2 sleeves of the cartridge.

FOR THE LARGE NTC: Cut ONE sleeve in halve, and slide the small pieces back over the heater cartridge:

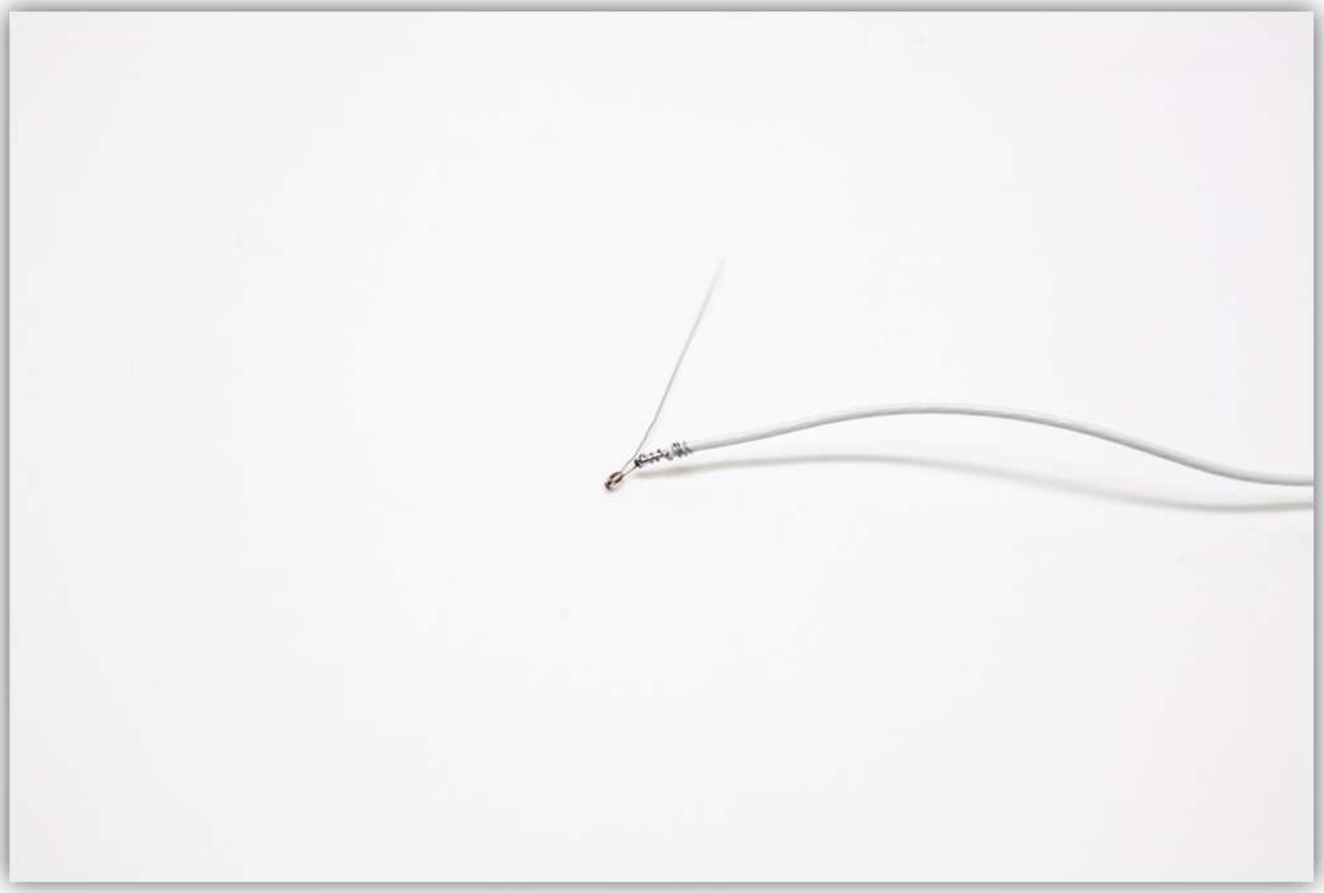
FOR THE SMALL NTC: Cut the TWO sleeves in halve, and slide two small pieces back over the heater cartridge:

Cut the wires of the heater cartridge in half.

Strip 5 mm (0.2") all the ends of the wires you have cut. Take the two loose wires.



FOR THE SMALL NTC (INSTRUCTIONS FOR THE LARGE NTC ARE BELOW, SKIP THESE INSTRUCTIONS IF YOU HAVE THE LARGE NTC): **Carefully (!)** wrap one leg of the NTC onto the bare wire. Solder it in place.



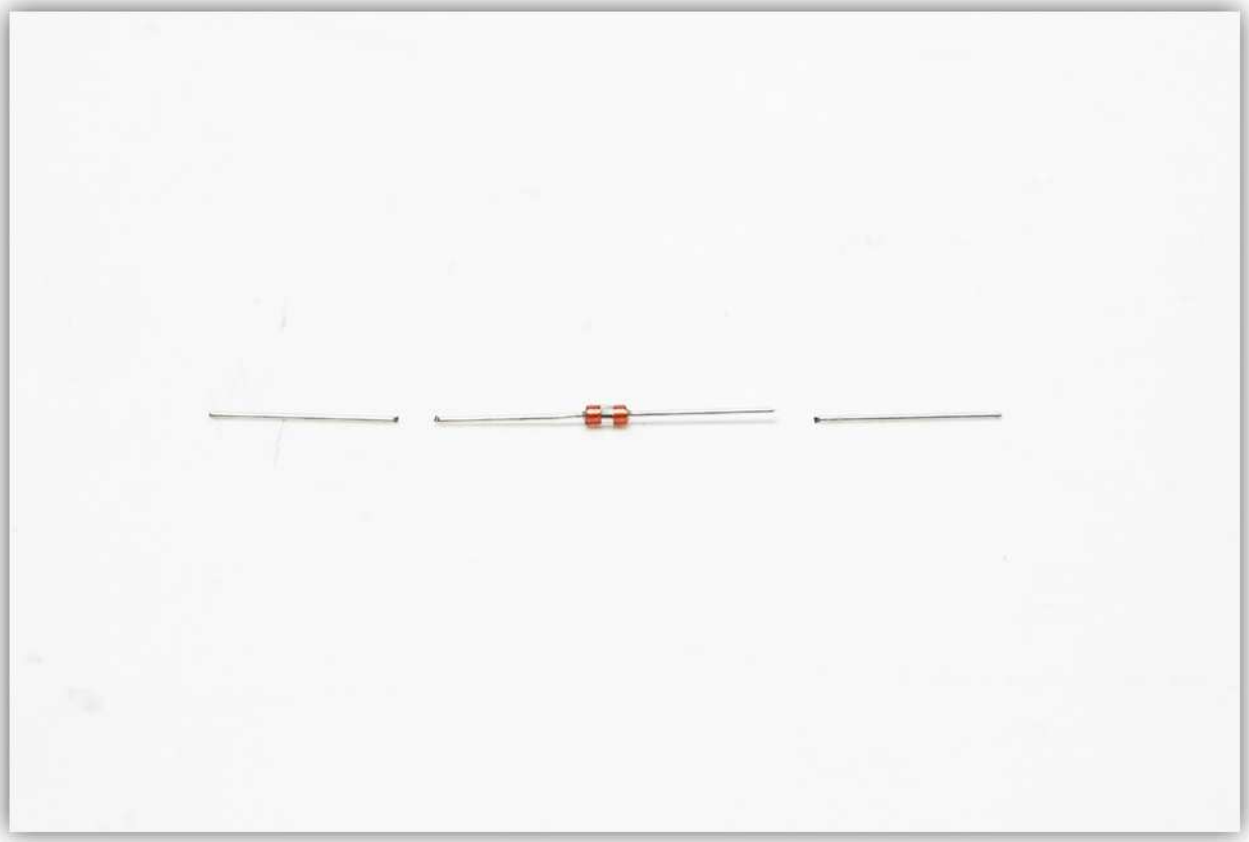
Carefully (!) wrap the other leg of the NTC onto the second bare wire. Solder it in place.

Slide the 2 remaining sleeves over the connections.

Use the small washer and the small copper screw to **lightly** fasten the wires to the heater block. **Make sure that the glass bead of the NTC fits snugly in the small hole and that you don't over tighten the small screw (this could cause a short circuit between the 2 wires!!**

Use a small tie-strip to hold the wires of the NTC and the heater block together.

FOR THE LARGE NTC: Cut 1.5cm of the legs of the NTC.



Solder the two loose wires to the legs of the NTC.

Slide the long sleeve over the NTC and the connections.

Slide the NTC through the hole in the heater block as shown.

Bend the leg of the NTC as shown in the picture.

Gently fix the wire to the heater block with the small washer and the small M2.5 screw.

Slide the big washer over the copper barrel.

Slide the heater block over the copper barrel. **Watch the orientation!**

Screw the nozzle on the copper barrel. **Tighten it firmly. You can unscrew the white plastic barrel and use another wrench on the copper barrel to tighten the nozzle firmly. Do not forget to screw the white plastic barrel back on firmly afterwards.**

Warning:

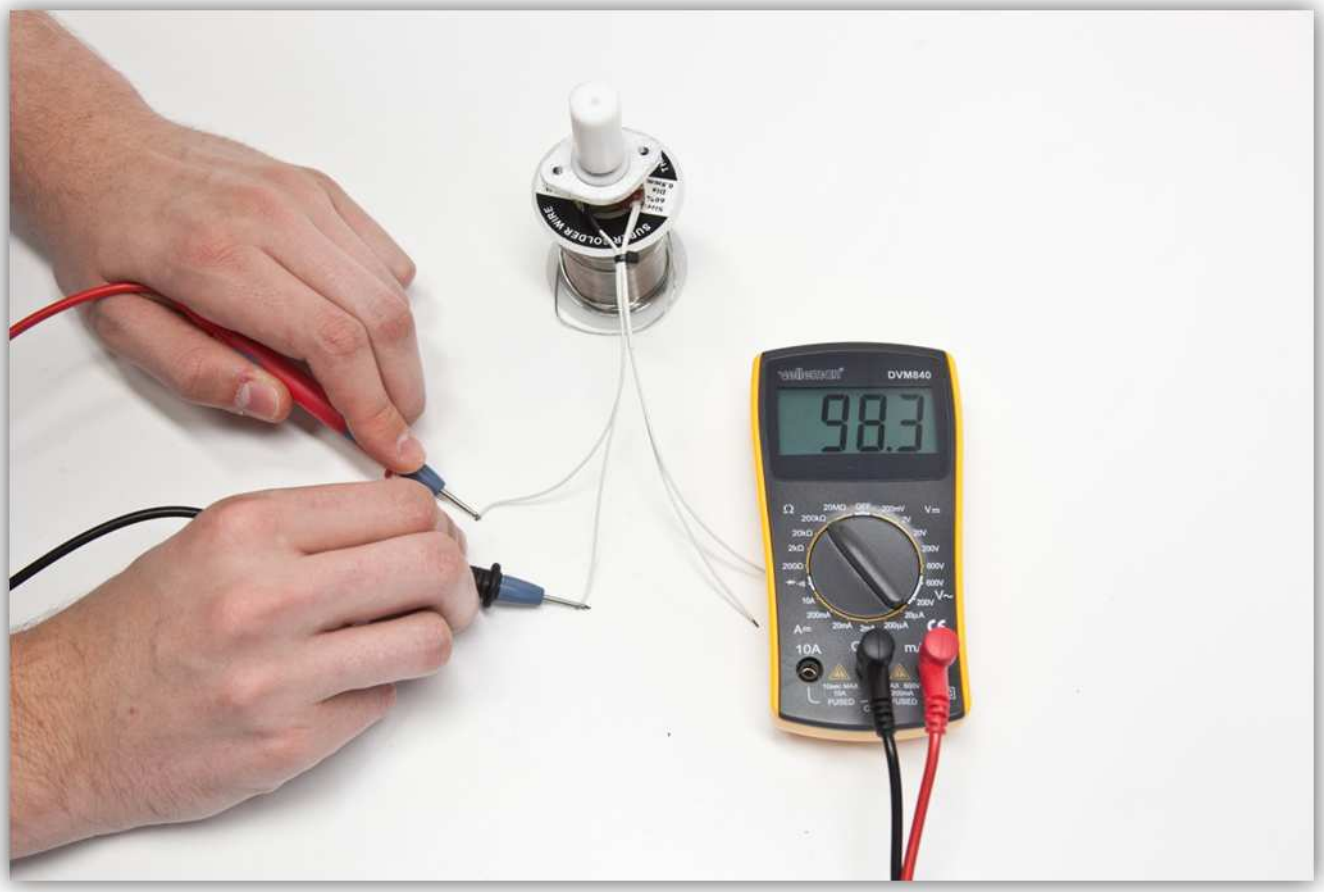
If you do not tighten these pieces firmly enough you risk having a leaking extruder. This is irreparable.

Then again, if you use too much force you can strip the threads of the barrel rendering the piece useless!

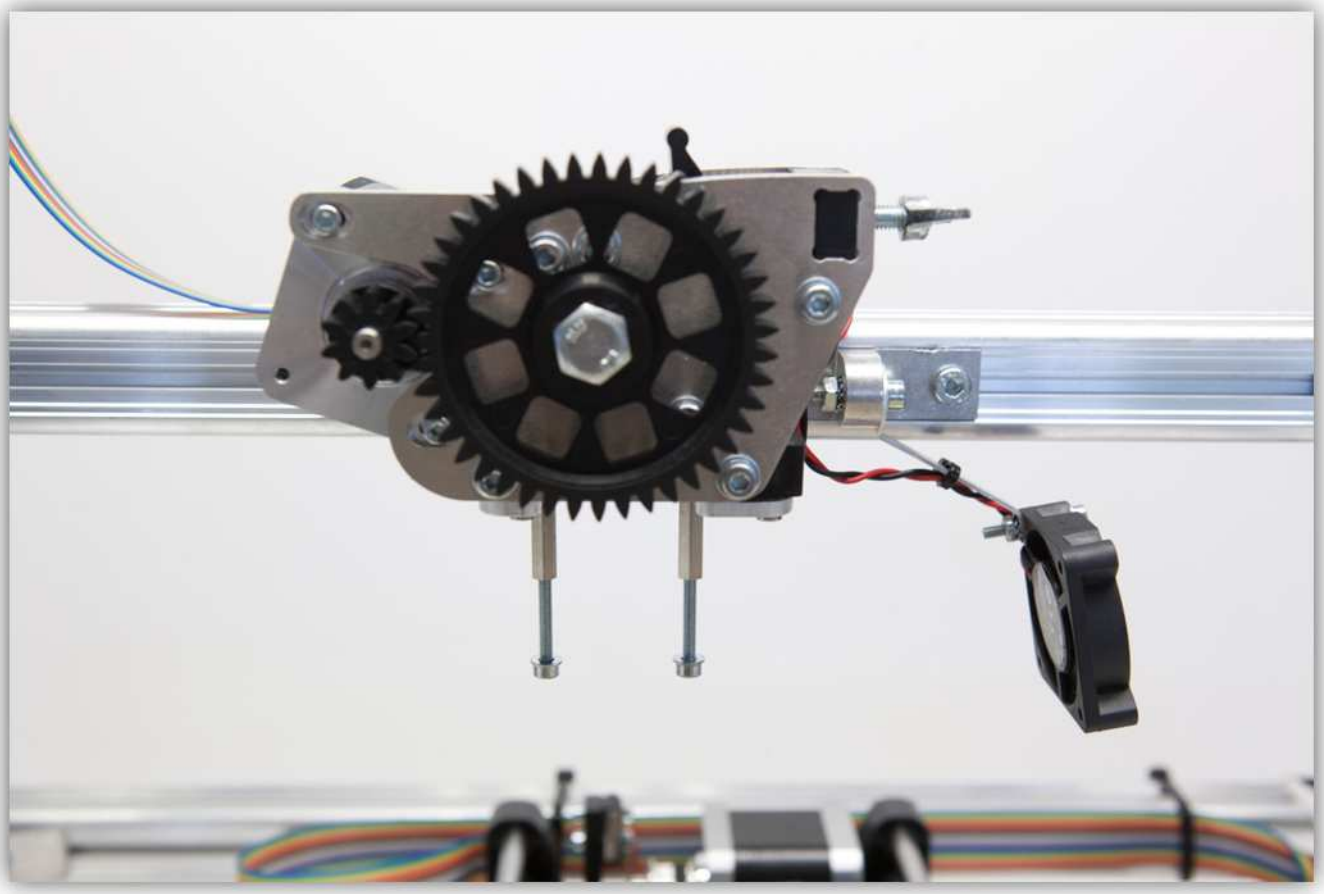
We recommend tightening the nozzle with a torque of 3.5 Nm.

FOR THE LARGE NTC:

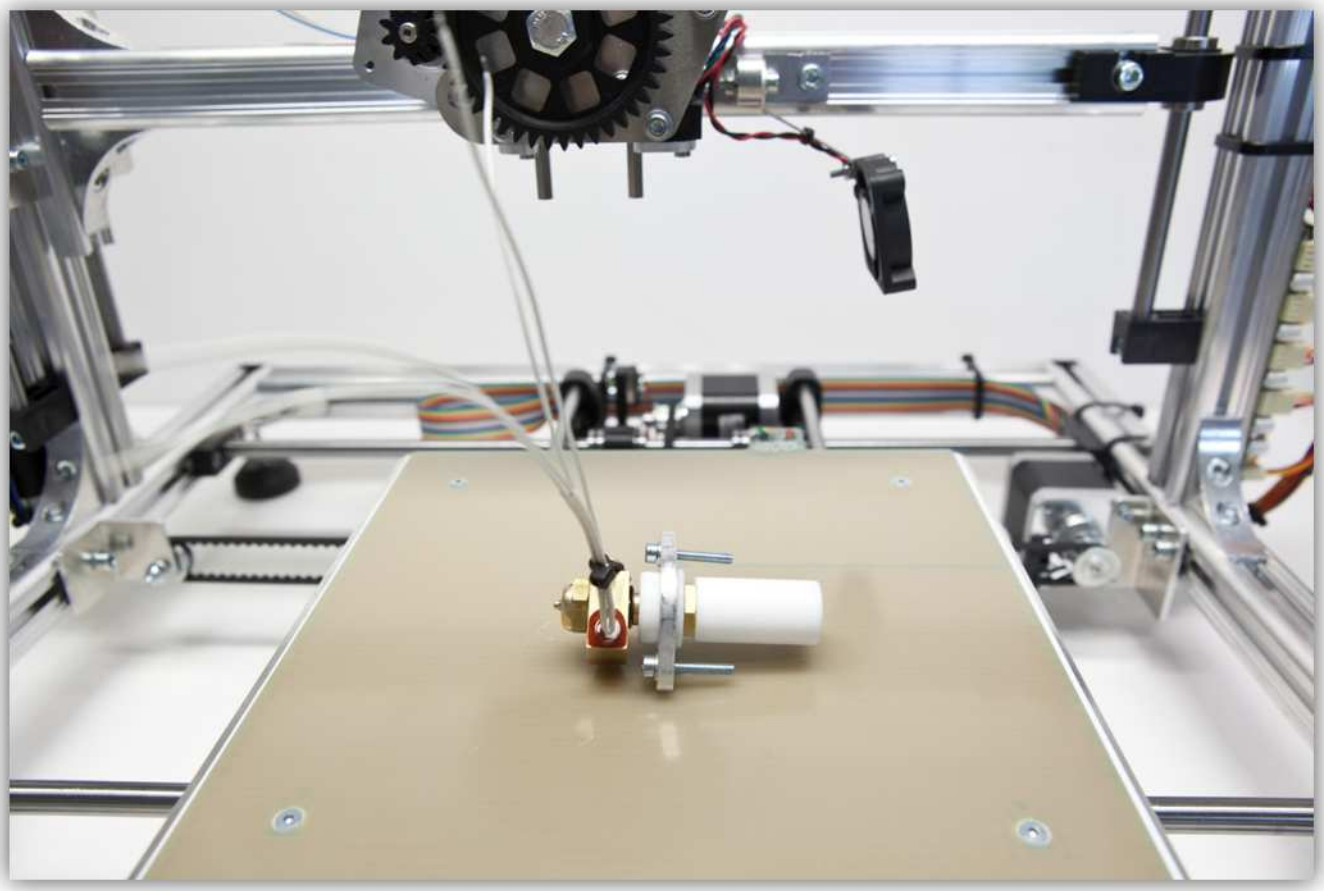
Put your multimeter on **200 kΩ** and measure the leads of the NTC. You should measure something between 70 to 100 KΩ depending how hot the NTC is. If your measurement is way lower than it is possible that the NTC is shorting out. Detach it, check it and attach it again.



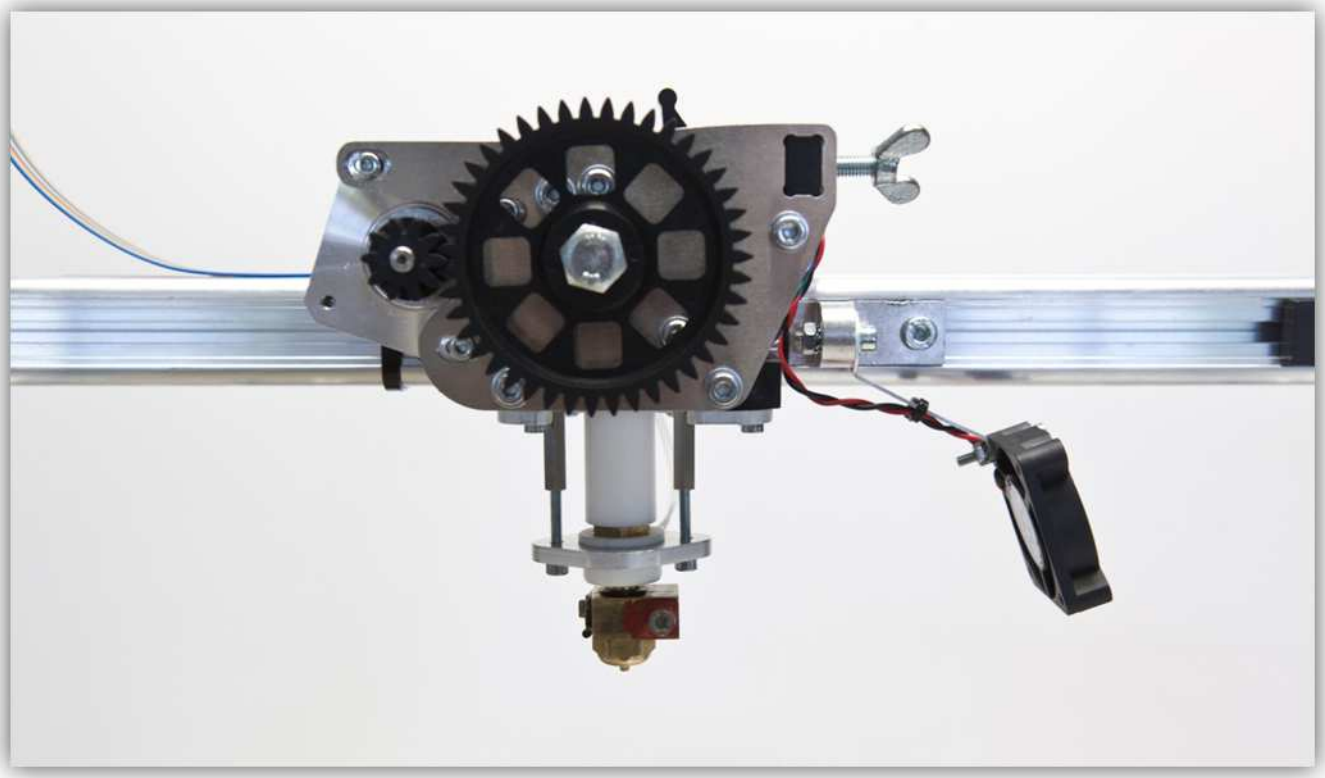
Unscrew the two bolts where the HOTEND needs to be mounted.



Slide these bolts and washer into the aluminium bracket.



Slide the white plastic barrel into the opening in the EXTRUDER BASE. Screw the bolts into the metal spacers. **Notice how the NTC side of the extruder faces away from the fan. Make sure this is correct!**



Cut 2 small pieces of the medium size heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the biggest heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

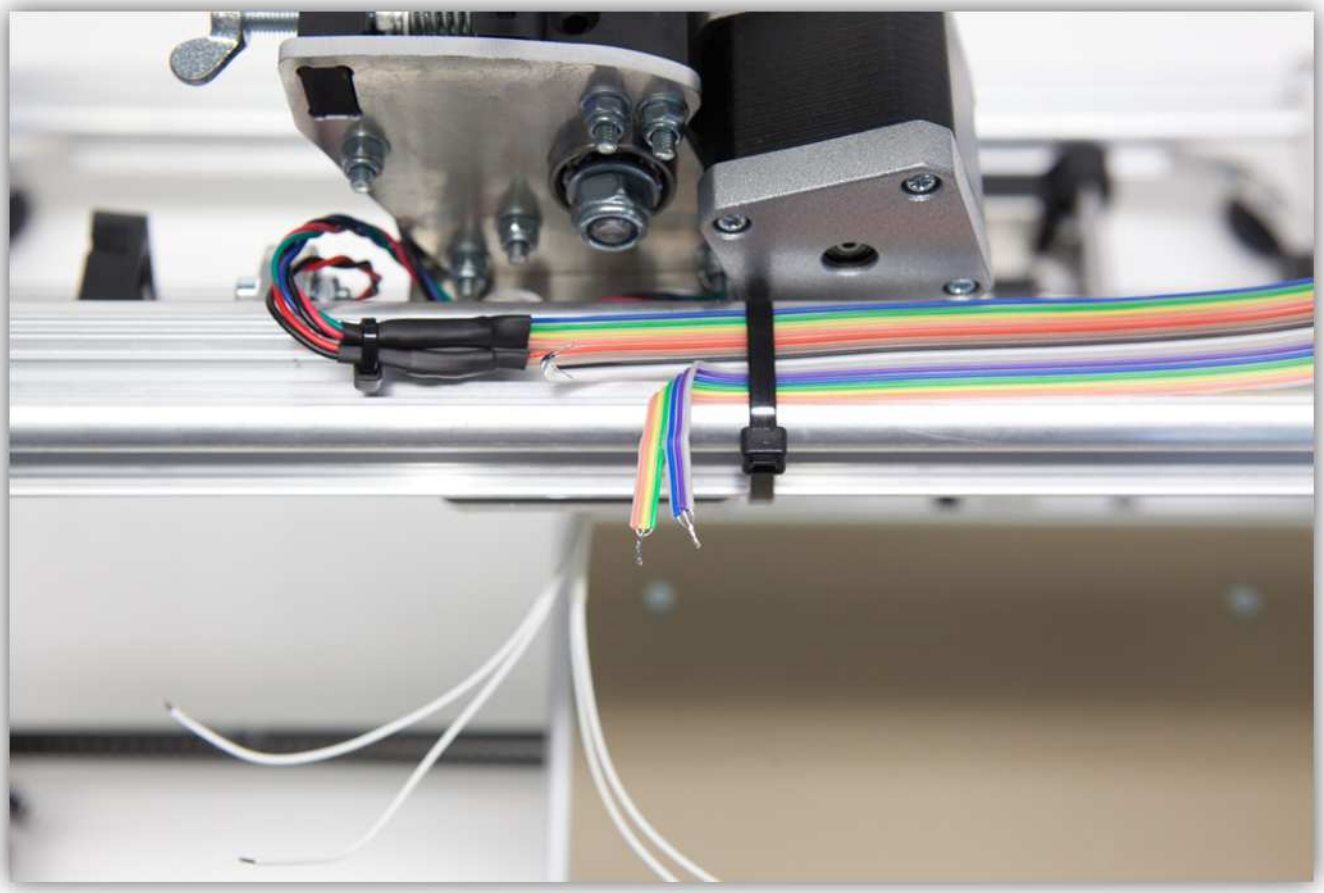
Slide the big heat shrink tubes over the 4 wires of the HOTEND.

Slide the 2 medium size heat shrink tubes over the 2 wires of the heater cartridge. **Make sure these are the wires of the heater cartridge and not the ones of the NTC!**

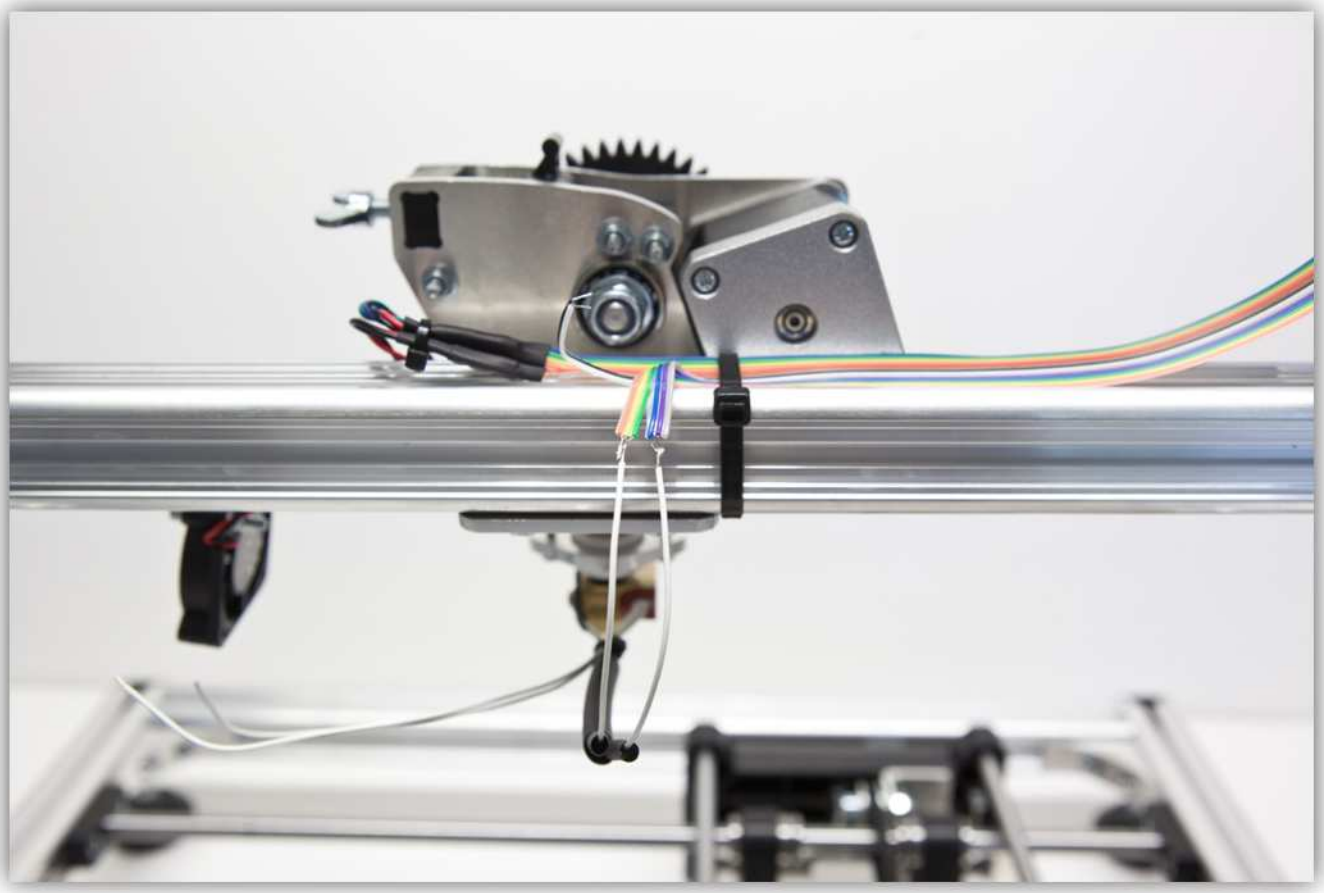
Tin the wires of the heater cartridge.

Take the 2 groups with the following wires:

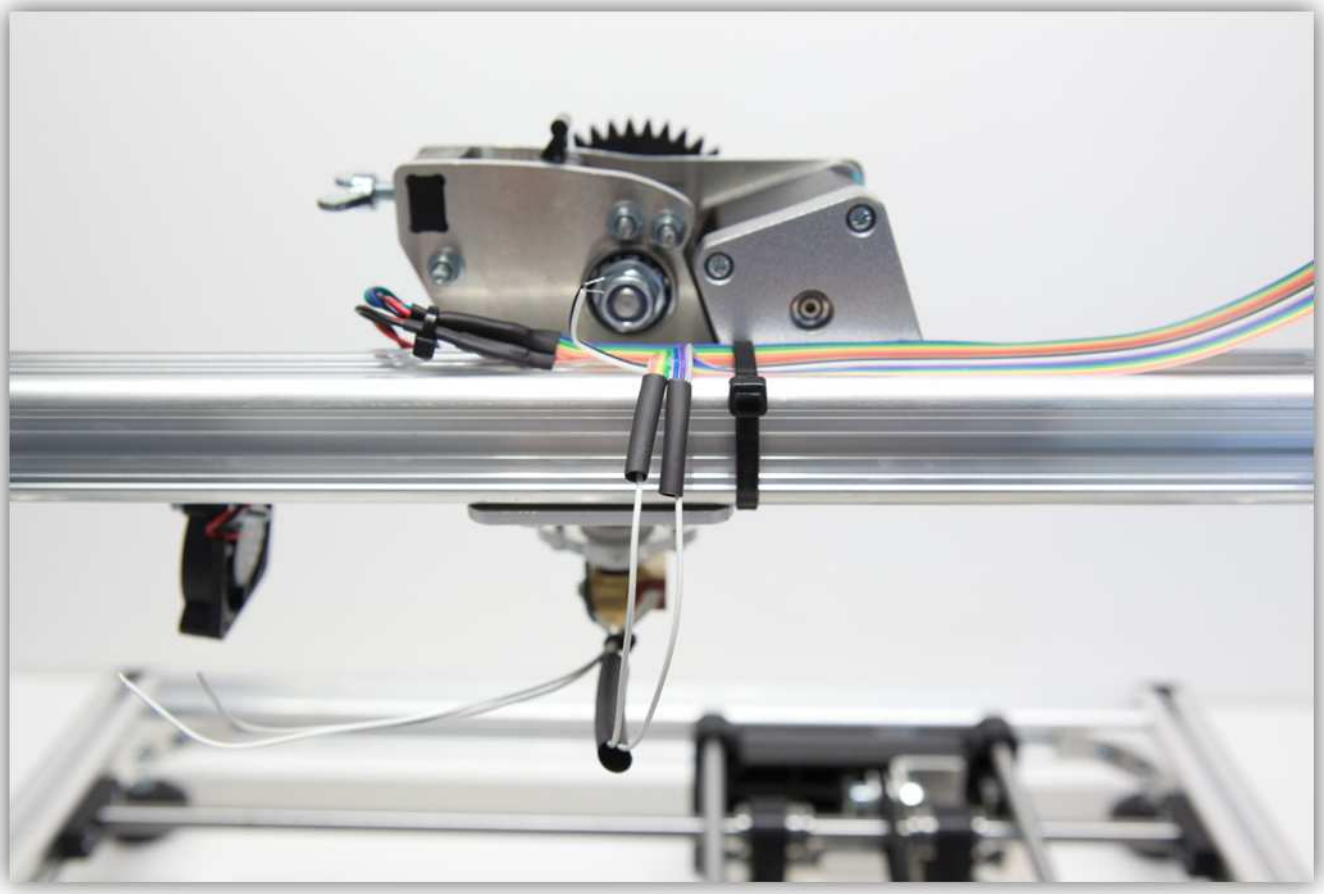
- Group 1: **Grey, Violet, Blue**
- Group 2: **Green, Yellow, Orange**

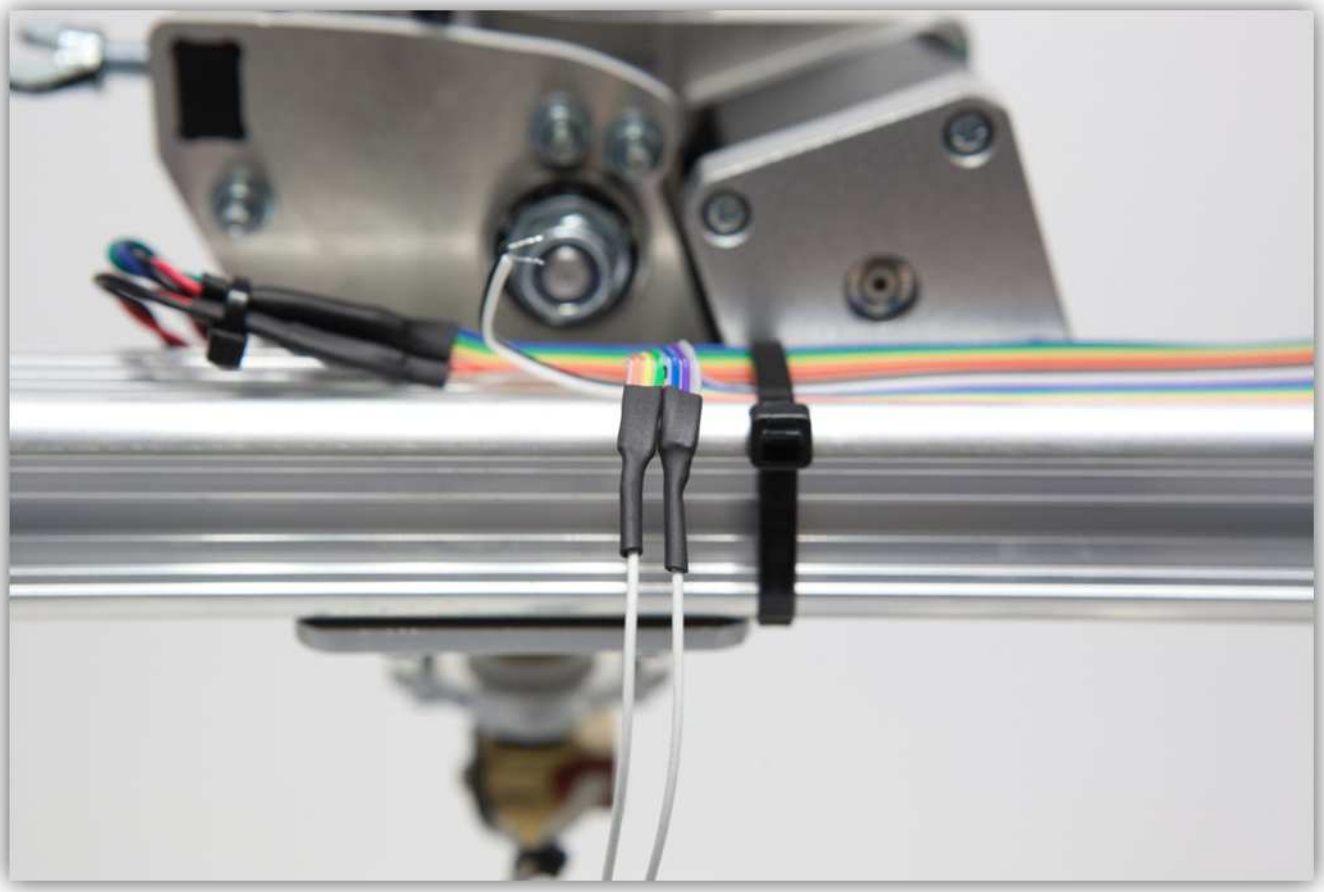


Solder the 2 wires of the heater cartridge to the 2 groups.

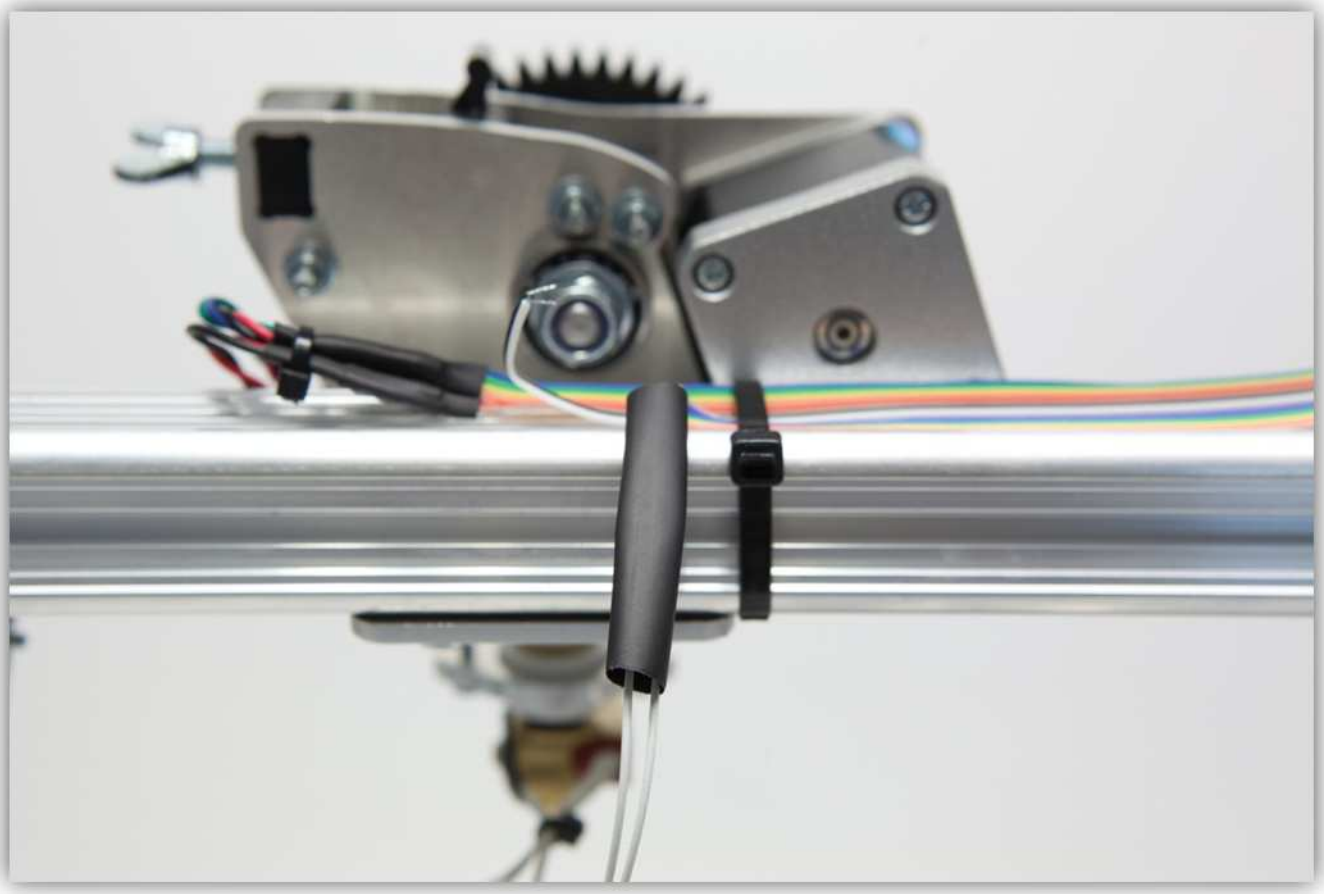


Slide the medium size heat shrink tubes over the solder joints and heat them up so they shrink.





Now slide the big piece of heat shrink tubing over the 2 medium size pieces, heat the big piece so it covers and protects the 2 heat shrinked joints.

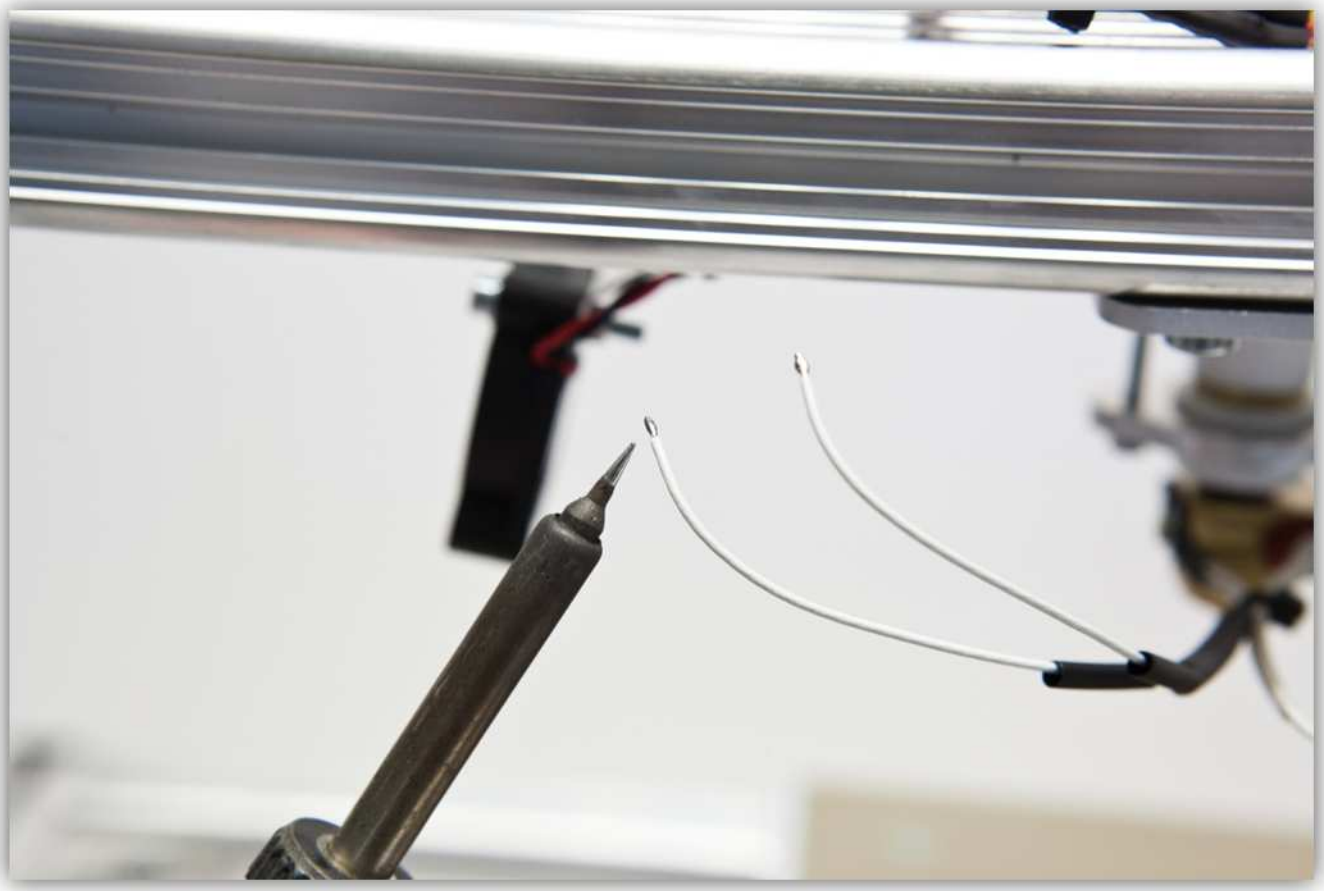


Cut 2 small pieces of the smallest heat shrink tubing of 1.5 cm (0.59") long and 1 large piece of the medium size heat shrink tubing of 4 cm (1.57"). You can find the heat shrink tubing in the bag labelled with 40.

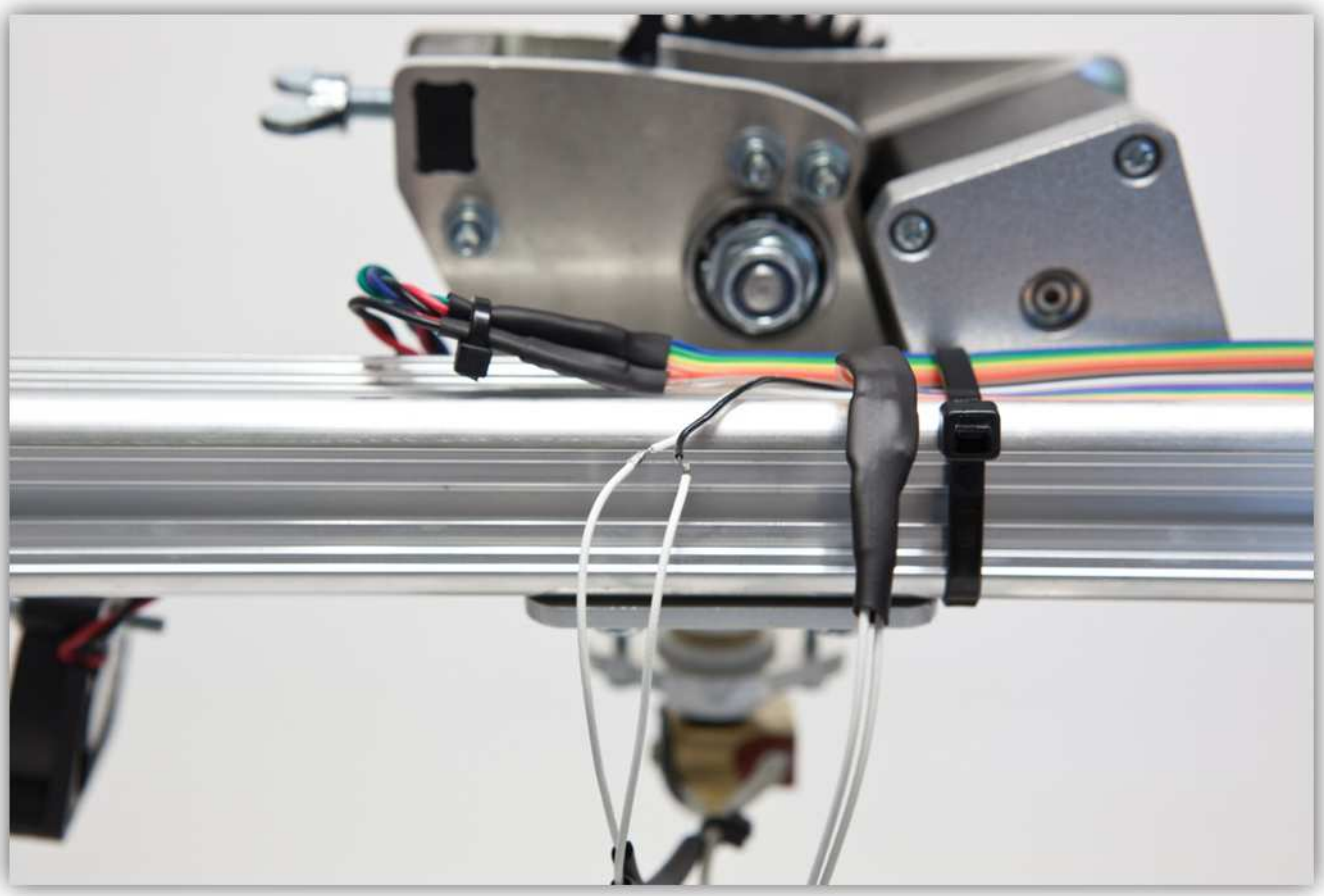
Slide the medium size heat shrink tubes over the 2 wires of the NTC. **Make sure these are the wires of the NTC.**

Slide the 2 medium size heat shrink tubes over the 2 wires of the NTC.

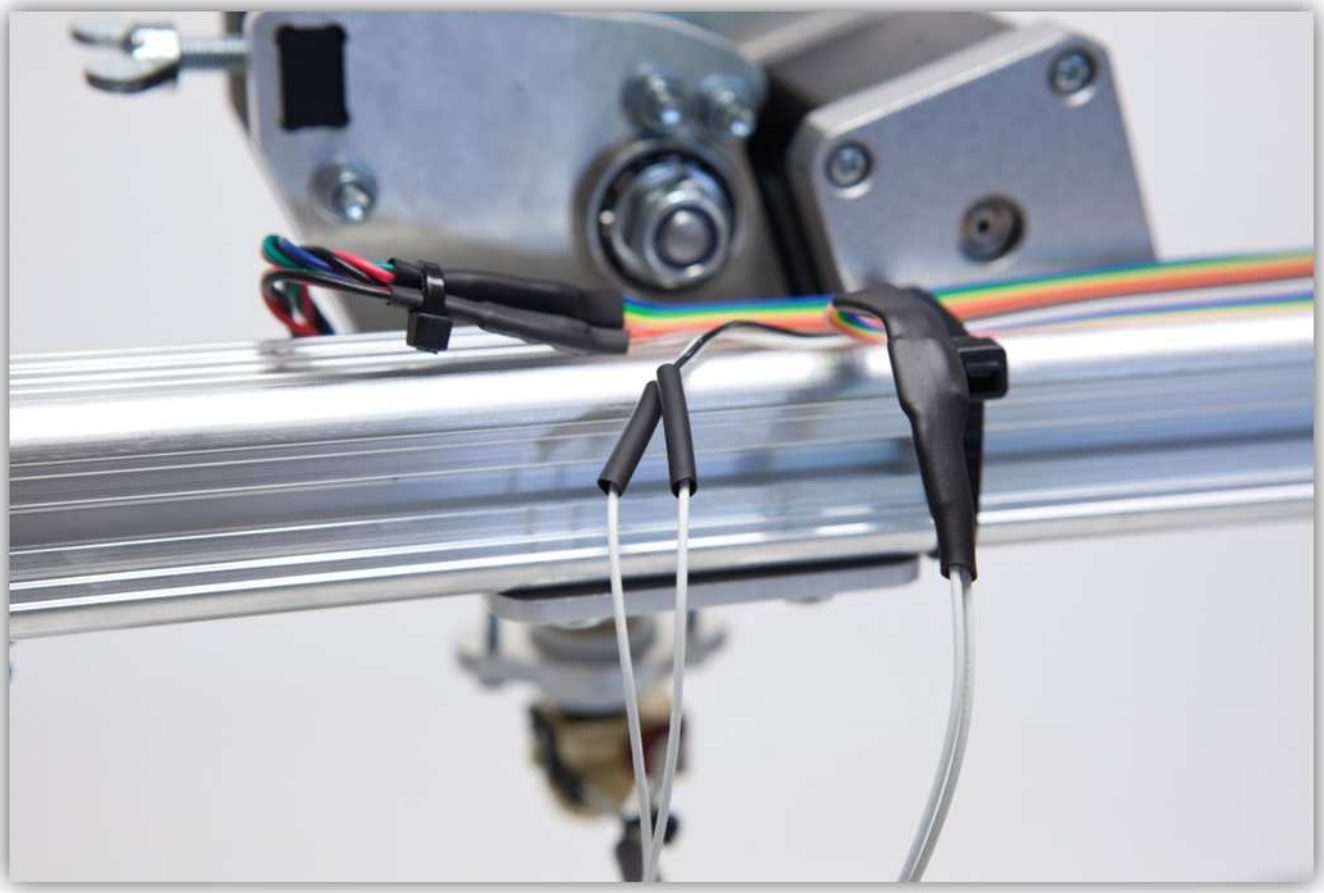
Tin the wires of the NTC.

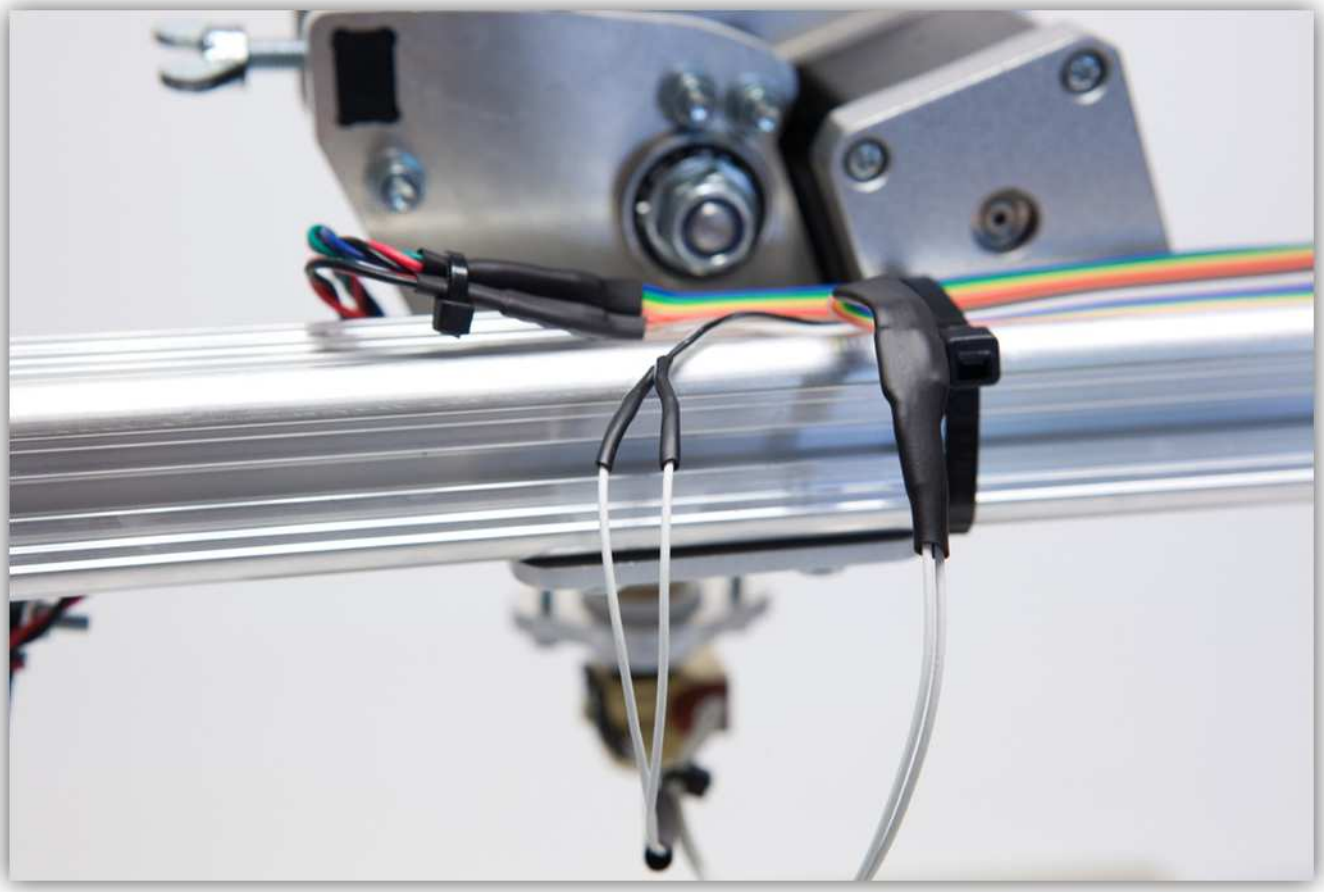


Solder the 2 wires of the NTC to the **Black** and **White** wires of the flat cable.

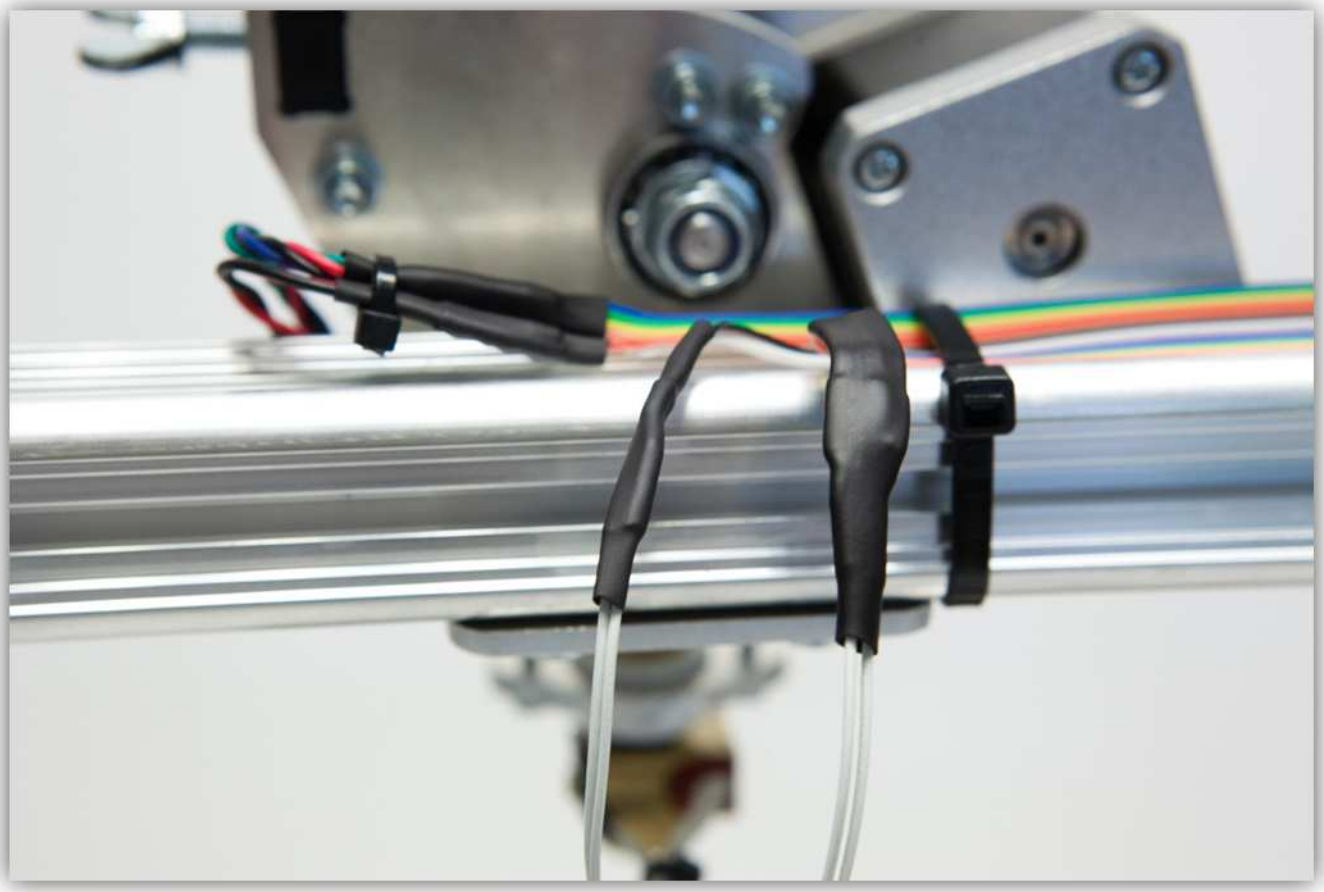


Slide the small heat shrink tubes over the solder joints and heat them up so they shrink.

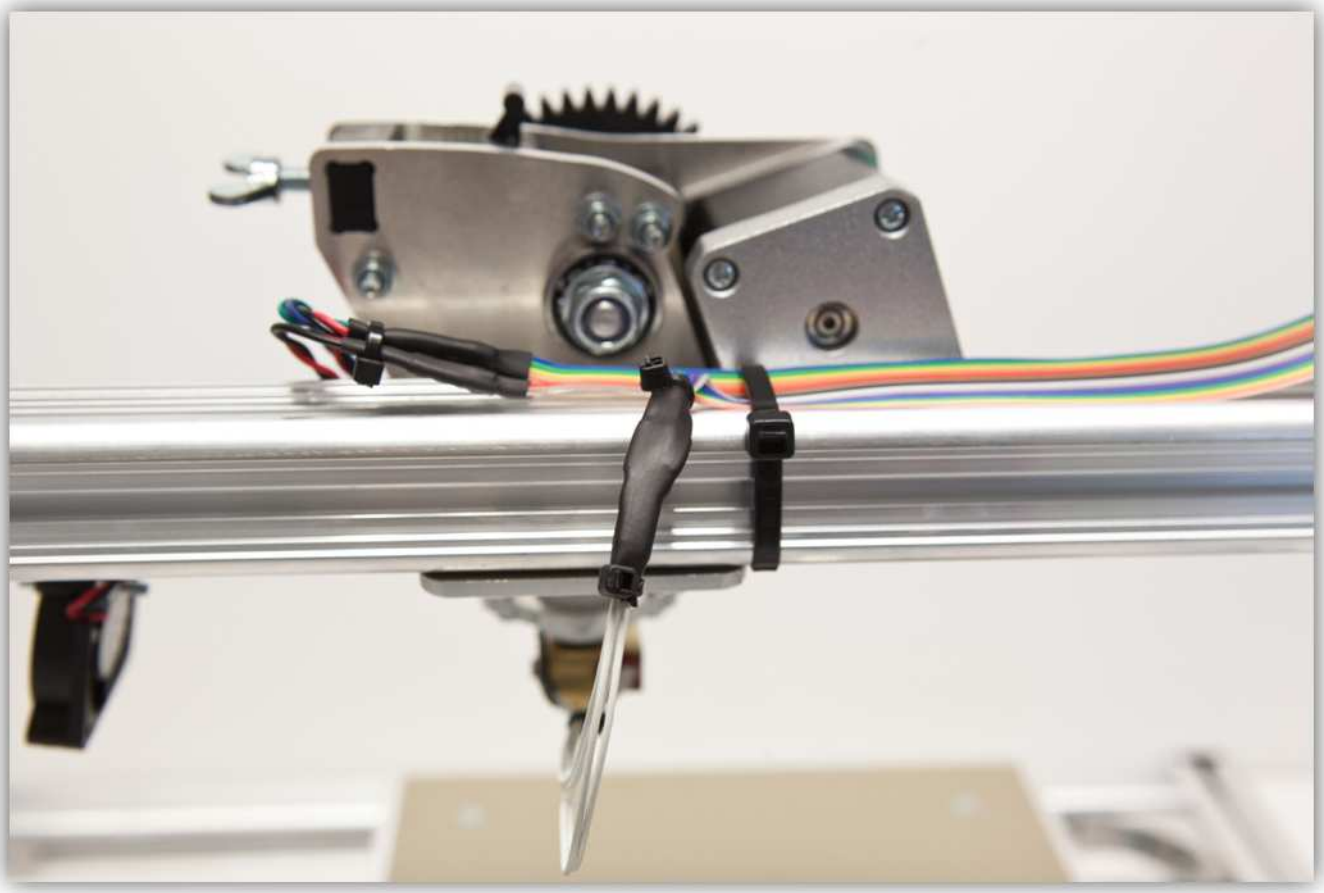




Now slide the medium size piece of heat shrink tubing over the 2 small size pieces, heat is piece so it covers and protects the 2 heat shrinked joints.



Use 2 small tie strips to keep all the wires together.



Congratulations! The K8200 3D PRINTER is now finished! In the next chapters we will speak about the basics of printing, calibrating your printer, more advanced settings and so on. Make sure to read and understand these next chapters, because they contribute a whole lot to the printing quality of the K8200.