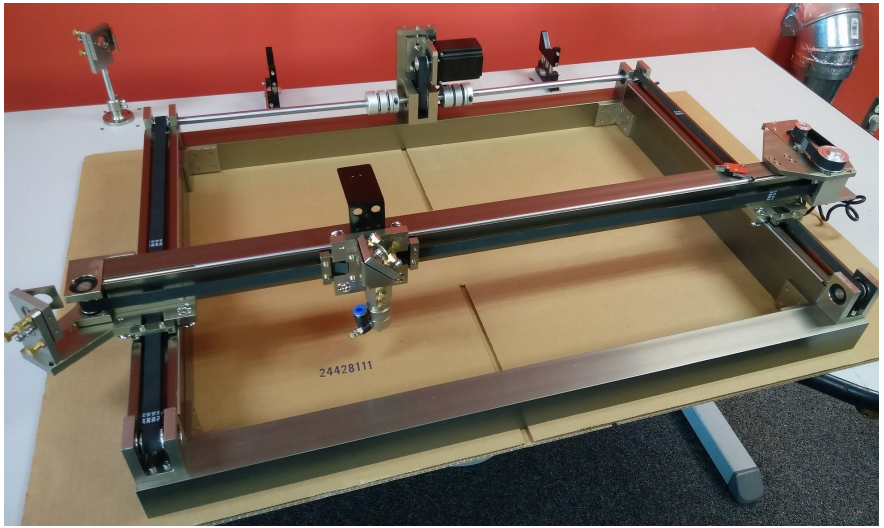
X-Y Stage Assembly Manual
400x600 series

Before you begin...

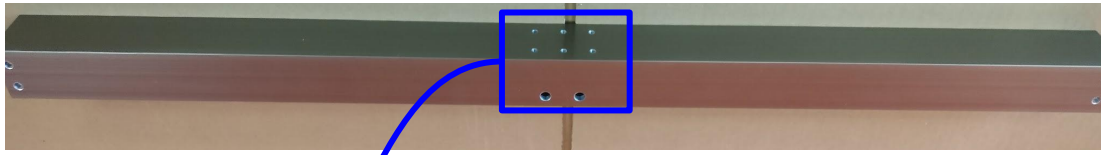
- Ensure that all parts are included and intact
- Assemble parts on top of a protective surface such as cardboard or a towel in order to prevent damaging the parts or work surface.
- Have an empty box or tray to keep the screws and smaller components in so that no parts will be lost.
- Some parts may look identical, but will have slight differences in the placement and amount of tapped holes. Ensure that the correct parts are put in the appropriate places and at the right orientation to prevent a longer assembly time.
- Do not completely tighten all screws on the frame as the assembly will need to be properly aligned later on.
- Loosen all adjustment screws before attaching belts to make adjusting tension easier.



X-Y Stage Final Assembly

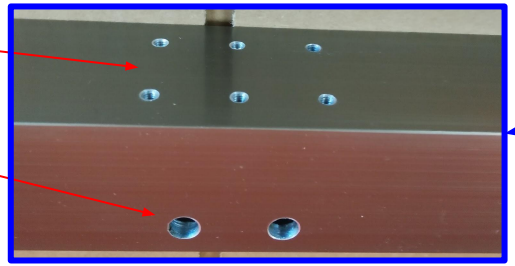
Step 1: Attach Y-axis gear reduction box to rear frame bar

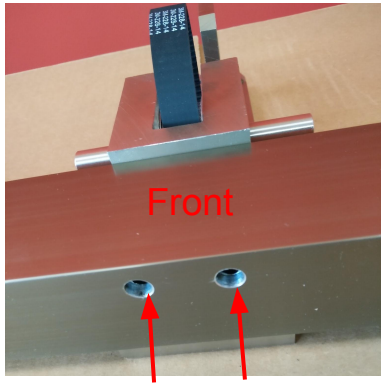
Note: rear frame bar is one of the longer bars with six holes in the middle of one side (rear) and two larger holes in the middle of and adjacent side(bottom).



Rear: 12mm M4 screws
(6 total)

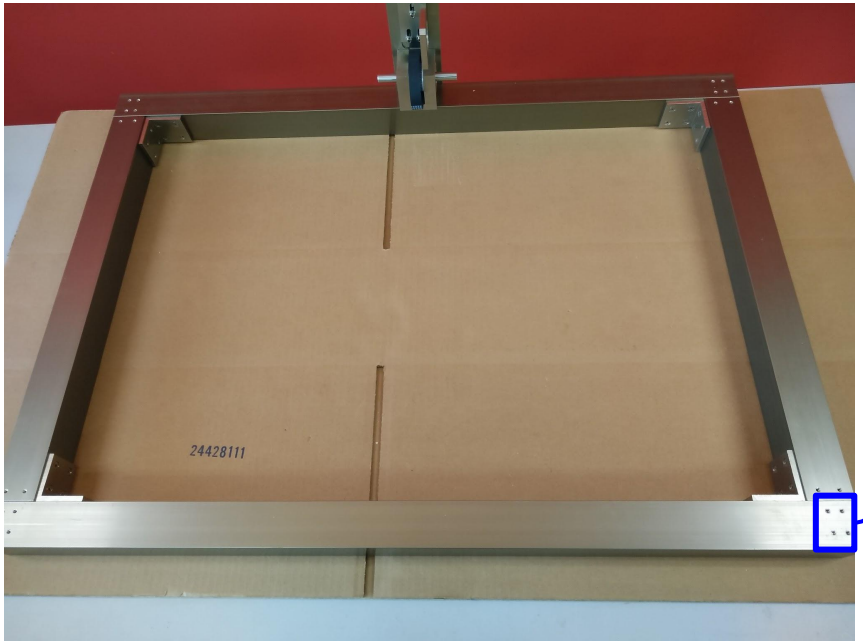
Bottom: 16mm M4 screws
(2 total)





The bottom screws can be difficult put on and may fall into the frame. Doing this step first ensures that the screws can be retrieved from the inside of the frame if they were to fall in.

Step 2: Assemble the rest of the frame



Ensure that the sides with the sets of four holes arranged in a square pattern are facing inward. Use the connector plates to attach the four bars together.

For the front bar, make sure that the side with the sets of four holes in a rectangular pattern are facing upward.

Flat 16mm M4 screws
8 per plate (32 tota)l

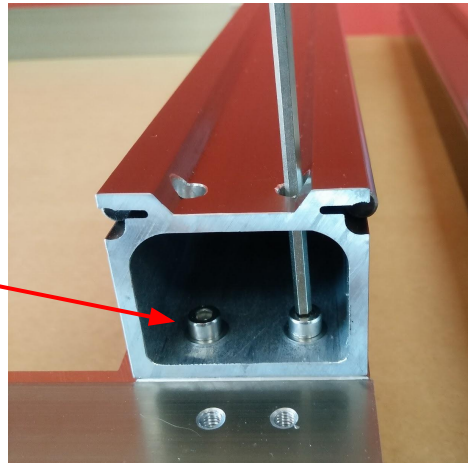
Step 3: Attach Y-axis rails onto frame

Make sure grooved side is facing upward. One of the rails will have two holes in a diagonal line meant for attaching a limit switch. Put this rail on the right side with those holes facing outward.

Rear left (outer side)

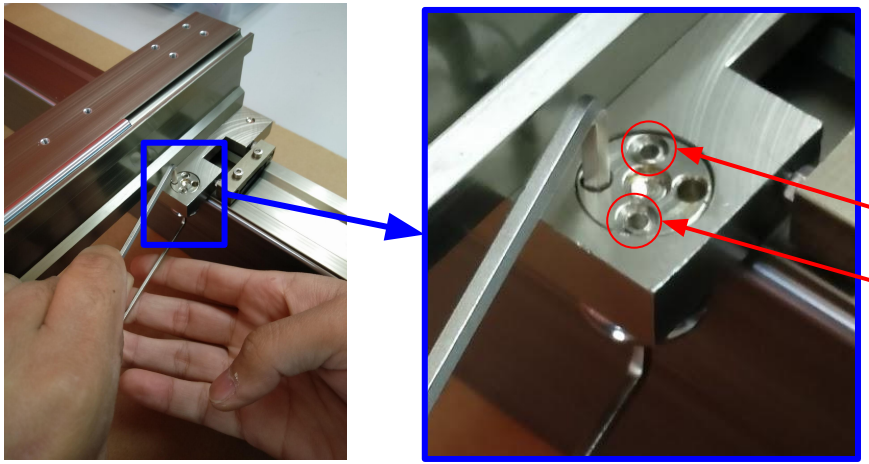
Rear right (outer side) Note: holes for limit switch

12mm M4 screws
4 per rail (8 total)



Step 4: Insert slide blocks onto y-axis rails

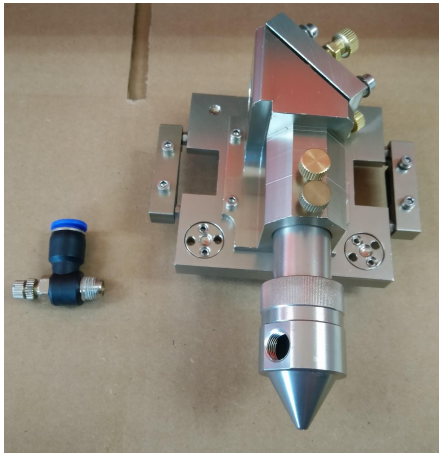
To tighten guide wheels, use the 2.5mm allen key to tighten the screw on the underside of the wheel while using one of the other two allen keys to pull on the wheel from the top so that the offset center hole moves closer to the rail. This moves the guide wheel towards the rail and ensures a tight fit.

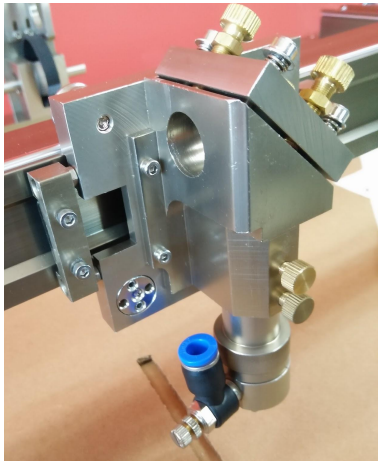


Make sure that slide blocks are secured tightly enough so that there is no play, but not so tight that they cannot slide down rails on their own when the frame is tilted.

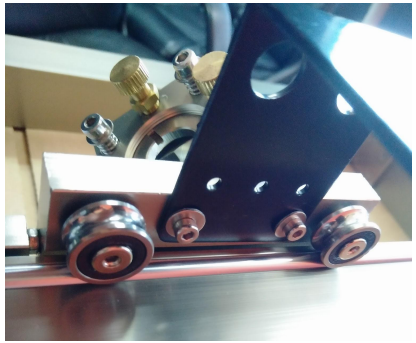
Tightening only the screw on the underside of the wheel prevents it from rolling. The two setscrews on top must be used to tighten the wheel while still allowing them to spin freely.

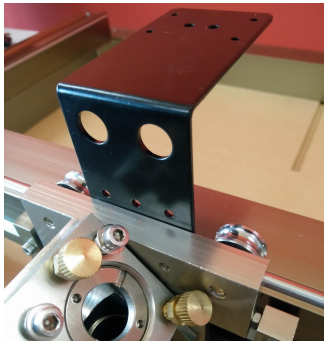
Step 5: Slide Laser head mount onto X-axis rail and attach air tube bracket as well as air connector to laser head mount





Use pre-attached screws and washers on laser head mount to attach bracket

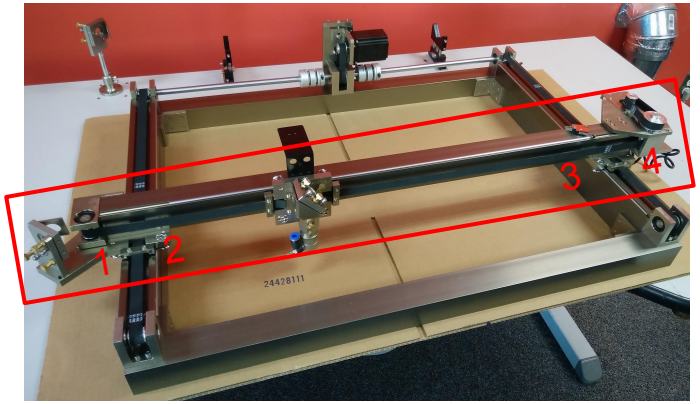




Ensure that the x-axis bar is facing the facing the correct way (asymmetric hole pattern facing up) and that the laser head is pointing downward

Use the same method in Step 4 to set laser head mount.

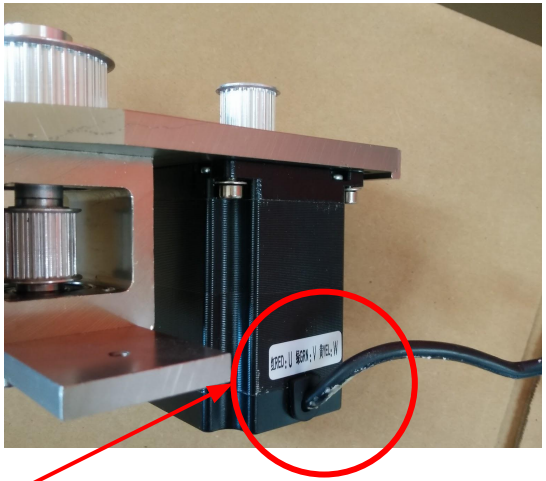
Step 6:Attach X-axis bar onto slide blocks



Screws fastened from the underside of the rail. Ensure that the grooved side is facing towards the front

Use 16mm M4 screws. Add washers to screws for left slide block (oval holes) (8 screws, 4 washers total)

Step 7: Attach Stepper Motor to X-axis gear reduction box as well as the belt for the X-motor



Ensure that side with cord is facing to the right.

Do not tighten screws until tension on belt has been adjusted.

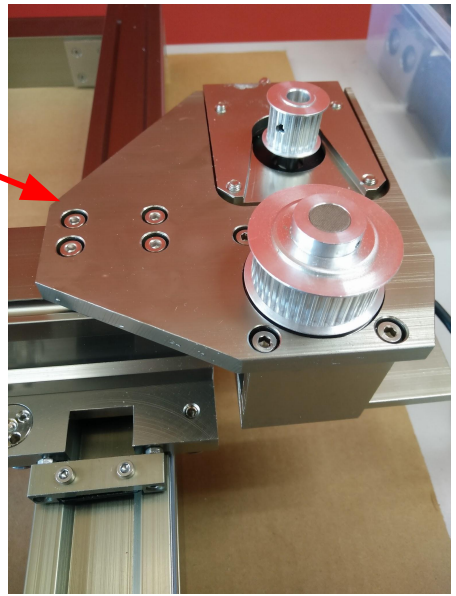
16mm M4 screws + washers (4 screws , 4 washers total)

Use adjustment screw to increase tension in belt. Tighten nut to set adjustment.

Step 8: Attach X-axis gear reduction box and X-axis pulley to X-axis rail

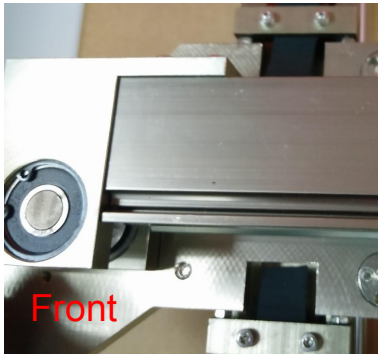
Attach to right end of rail.

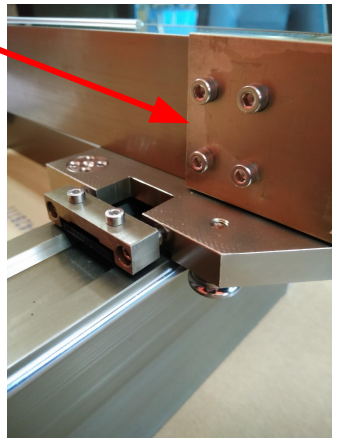
12mm M4 screws
(4 total)



Attach to left end of rail. Make sure that gear is facing towards the front

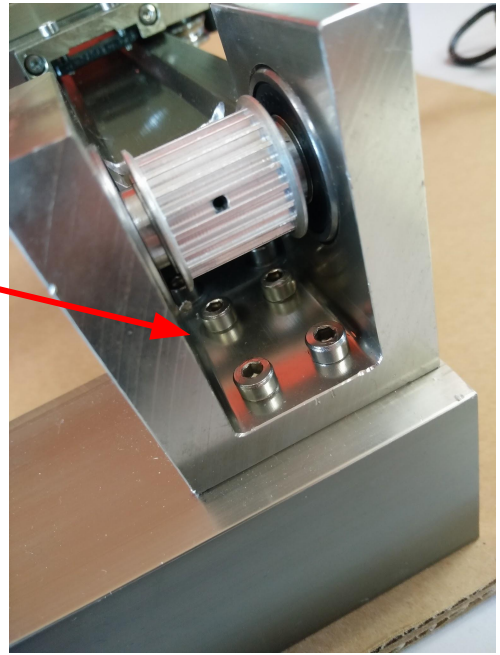
12mm M4 screws
(4 total)

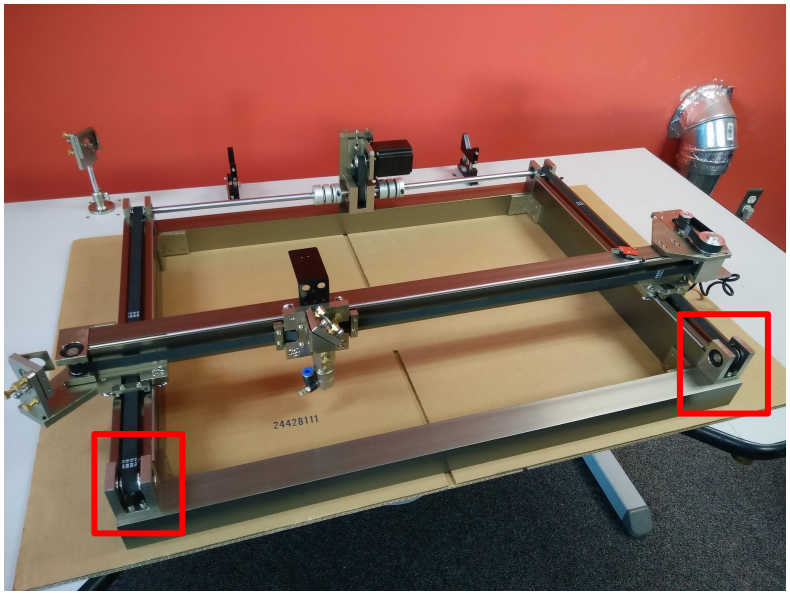




Step 9: Attach front Y-axis pulleys to frame

16mm M4 screws
4 per pulley, (8 total)

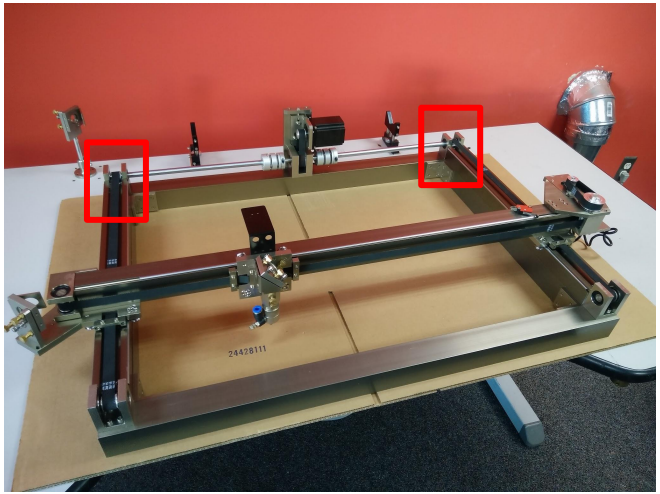


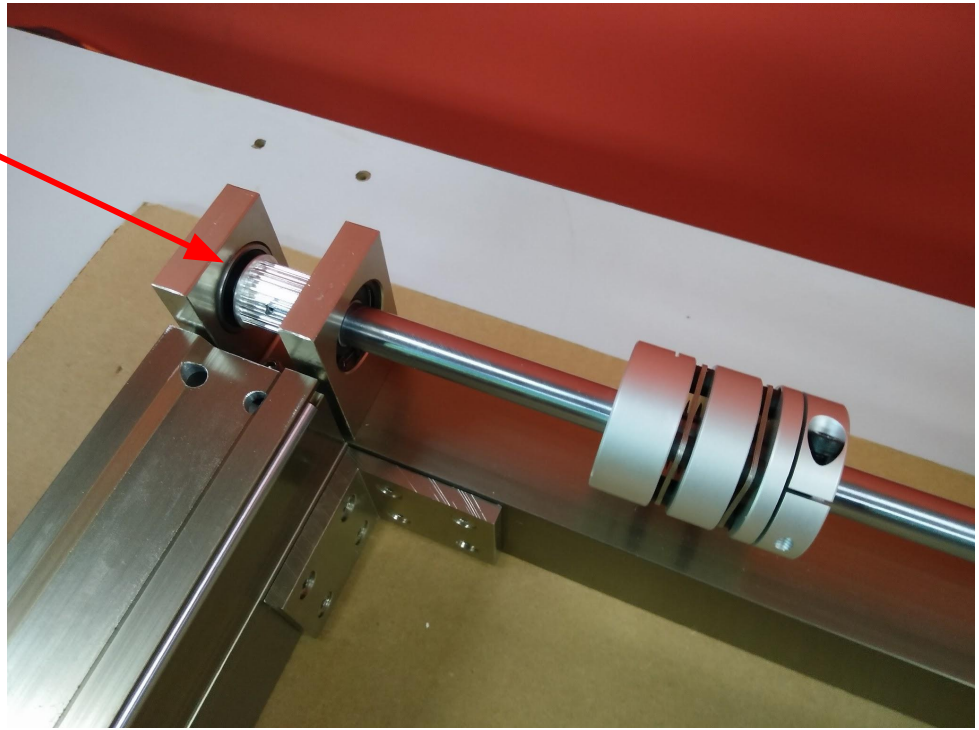


Step 10: Slip axial couplers onto rear y-axis pulley shafts and attach pulleys onto frame

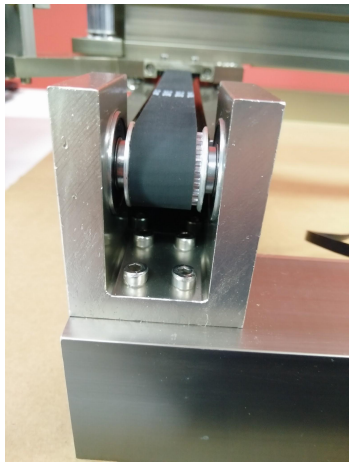
16mm M4 screws
4 per pulley, 8 total

Do not tighten couplers or connect shafts yet. This will be done after the belts are attached and tightened.

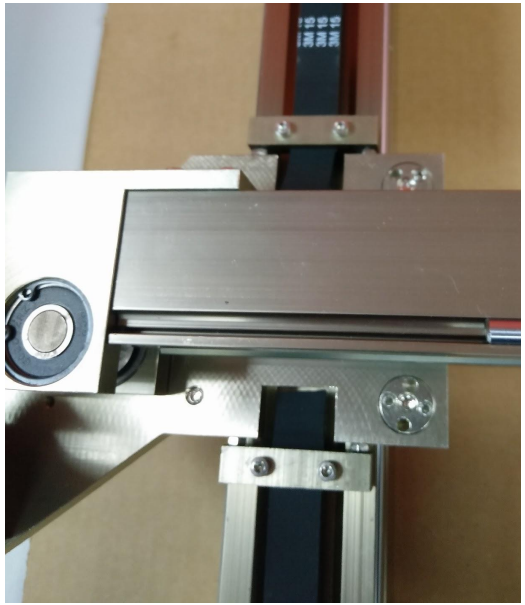




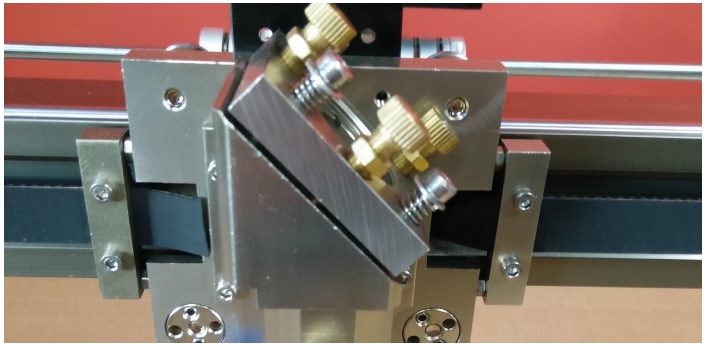
Step 11: Attach belts for each rail



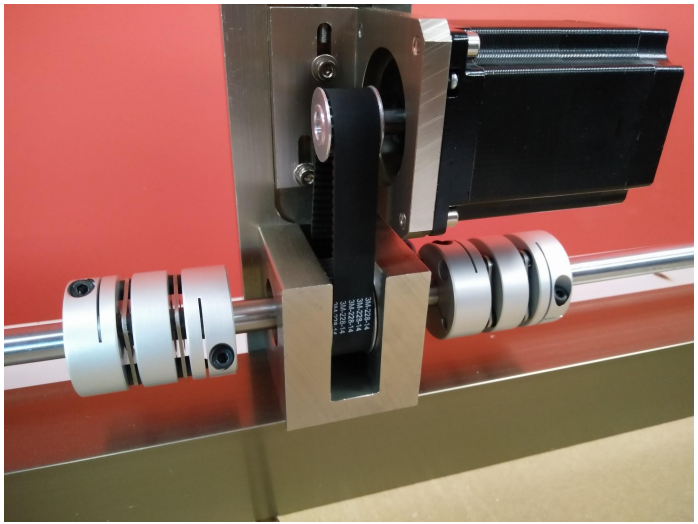
Belts must be looped THROUGH the rail bars.



Pull belts as tightly as possible when attaching to slide blocks to minimize slack as much as possible. Leave at least one inch extra length of belt in case of future adjustments.



Step 12: Adjust couplers to connect shafts, other stepper motor to Y-axis gear reduction box, and put belt on gear



16mm M4 screws + washers
(4 screws , 4 washers total)

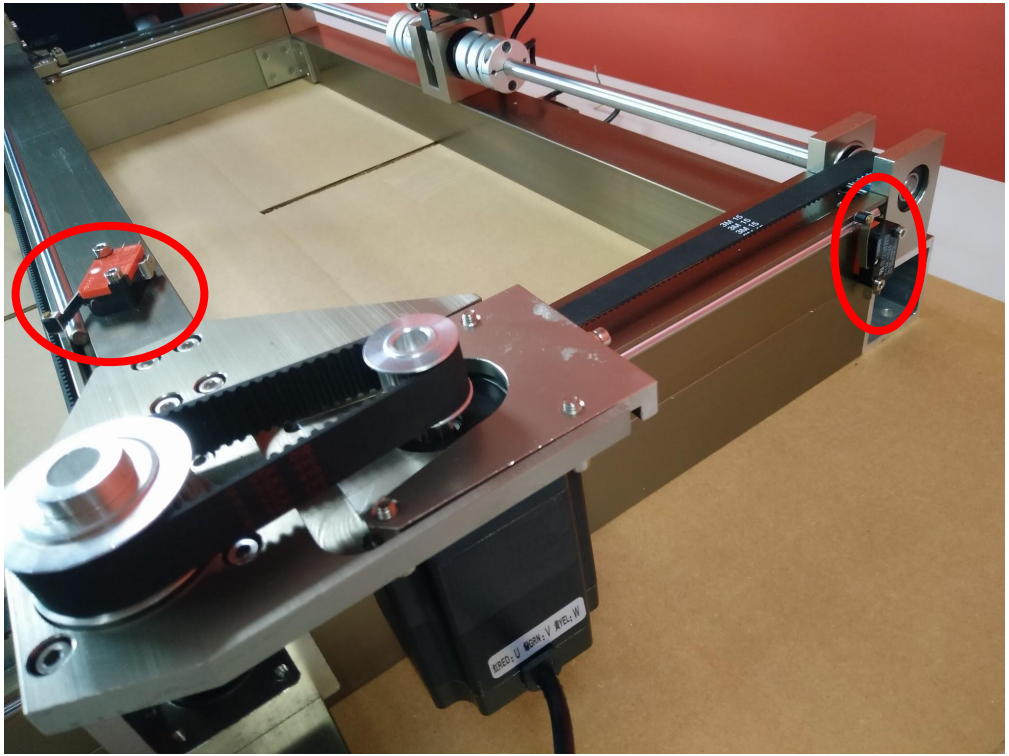
Use adjustment screw to increase tension in belt. Tighten nut to set adjustment.

Adjustment screw

Step 13: Attach limit switches

Attach limit switches to indicated areas using pre-existing holes. Ensure that the switches are facing the correct direction (lever side towards the further end of the rail)

Use 16mm M3 screws



Step 14: Aligning the Rails

Slide the X- axis bar up and down the rails and observe if both ends touch the pulleys at the same time. If they do, then the X-axis rails are aligned. If they do not, adjust the frame and slowly begin tightening all of the screws one at a time, while checking that the rails stay aligned. Also make sure that the Two Y-axis belts have the same tension