



PP Extruder Pro

This tutorial documents the build process for the Precious Plastic Extruder Pro as supplied by Citizen Scientific Workshop out of Idaho, United States.

 Difficulté **Moyen**

 Durée **2 jour(s)**

 Catégories **Machines & Outils, Recyclage & Upcycling**

 Coût **3000 USD (\$)**

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Outils

Étape 1 - Table Build-Top deck 1

Tools

1/2" Socket

Parts

2x 1000mm 4080 extrusion

4x 300mm 4040 extrusion

40x t-nuts

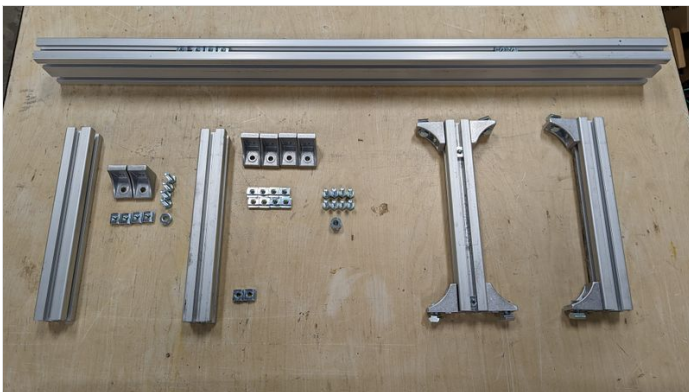
22x M8x20 bolts

22x M8 Washers

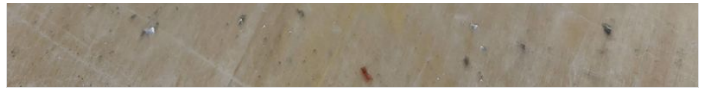
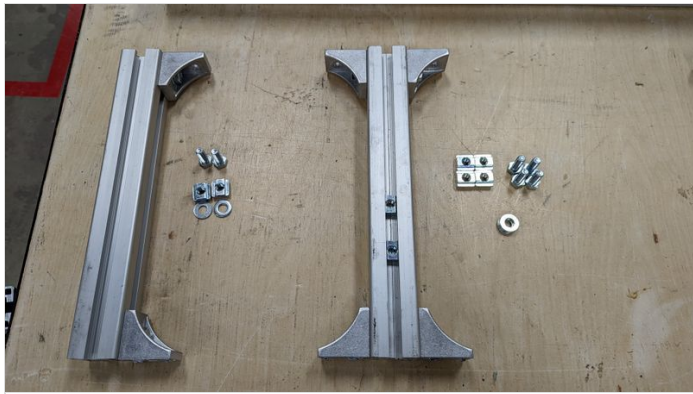
12x Corner Brackets

Steps

1. Slide 6 t nuts into the top side of the 1000mm extrusion. (repeat for other beam)
2. For the 300mm beams, 2 pairs of 2 will be identical, one "I" shaped, and one "C" shaped.
3. For the C-shaped beam, Slide two t-nuts into one rail. Attach the corner brackets at the ends, ensuring the bracket is flush with the beams end. *Always use the side of the bracket with a flat face (non-lipped) first. This ensures you can get a tool onto the 2nd bolt without being blocked.
4. For the I-Beams, repeat the same steps for the C-beam, but on both sides.
5. Repeat so you have 2 I-beams and 2-C beams.
6. *Optional* Add bolts to all remaining bracket holes and loosely attach t-nuts. (as seen in the right two beams in image 3)







Étape 2 - Table Build- Top deck 2

Tools

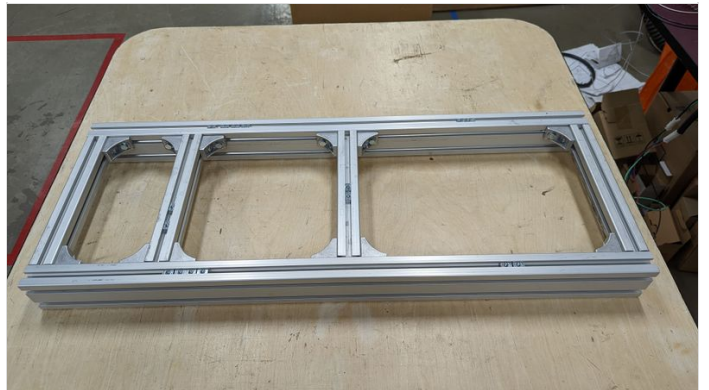
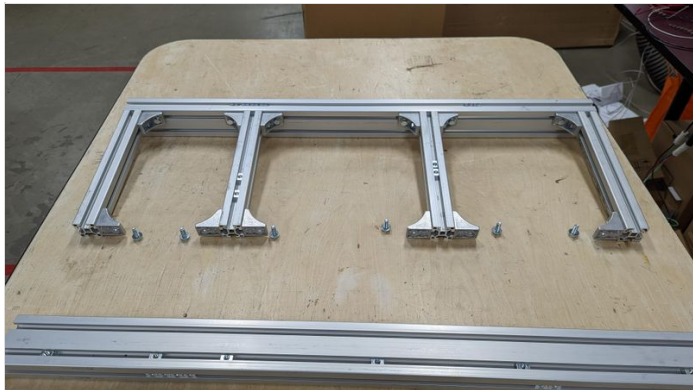
1/2" Socket Wrench

Parts

Assemblies from previous step

Steps

1. If you have already attached the bolts/and t-nuts from the optional step - Slide beams into the upper channel (as seen in image 1)
Otherwise, thread the nuts into the channel and attach LOOSELY with bolts.
2. Repeat for the bottom rail.
3. Secure the C beams in place with the socket wrench, but leave the I-beams LOOSE as they will need to be shifted later.



Étape 3 - Table Build- Top deck 3

Tools

1/2" Socket Wrench

Parts

Assembly from previous step

4x Steel Corner Brackets

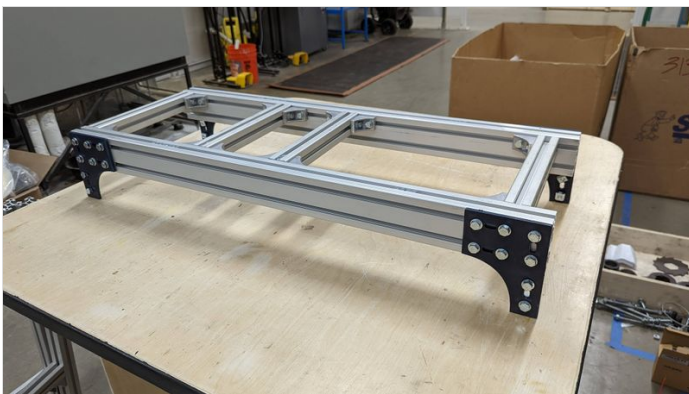
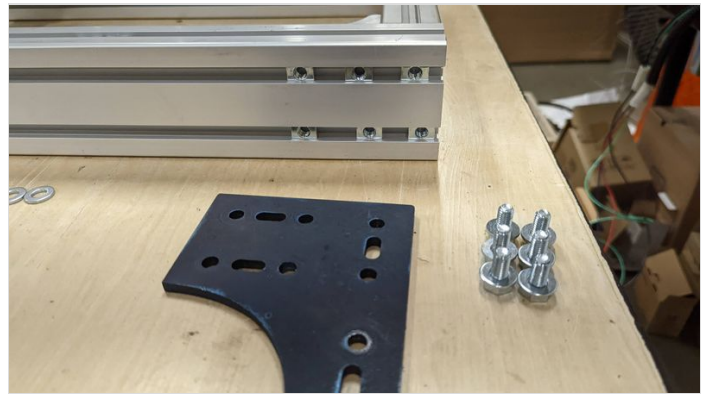
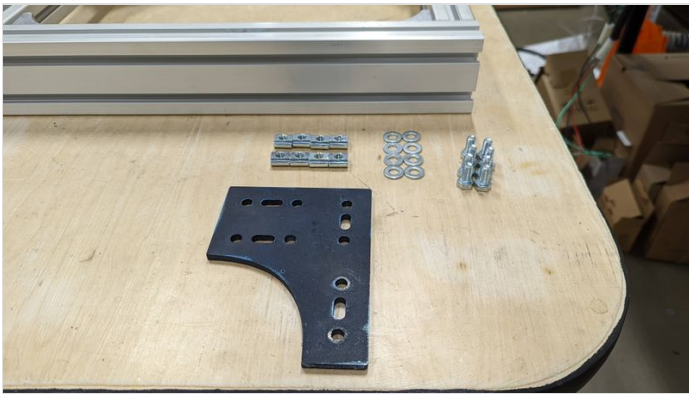
32x M8x20 Bolts

32x M8 washers

32x t-nuts

Steps

1. On the exterior corner of the 4080 extrusion, slide 3 t-nuts into each top/bottom rail.
2. Secure corner plate to rail with accompanying 6 bolt/washer combos.
3. Add 2 additional bolt/washer/t-nut combos to the 2 remaining vertical holes. Keep these very loose as we'll slide them into another assembly later.
4. Repeat on all corners.



Étape 4 - Table Build - Side Legs 1

Tools

1/2" Socket Wrench

Parts

4x 800mm 4040 Aluminum extrusion

2x 300mm 4040 Aluminum extrusion

4x corner Brackets

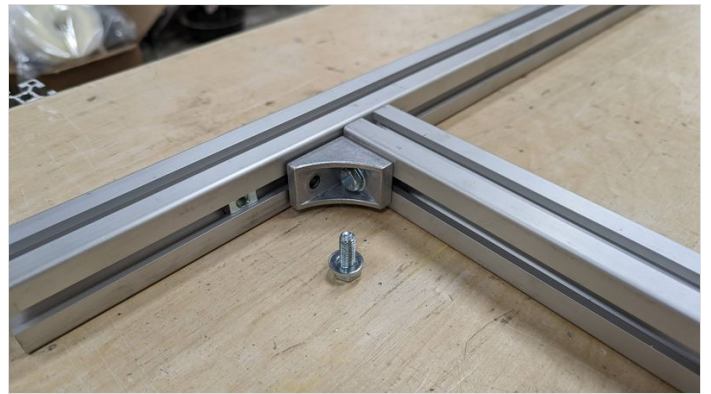
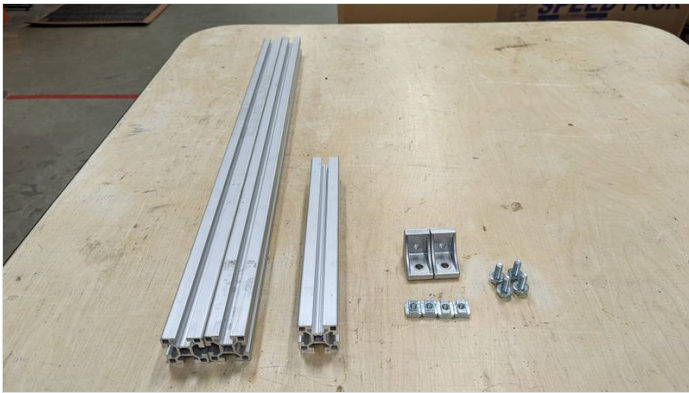
8x M8x20 Bolts

8x M8 washers

8x t-nuts

Steps

1. Slot 2 t-nuts into one rail of the 300mm extrusion
2. Secure corner brackets on the rail, ensuring that the ends are flush with the beam.
3. Slide a t-nut into a rail on the 800mm extrusion about 12in from the end.
4. Secure one side of the short beam to the long beam.
5. Repeat on the other side.
6. Repeat steps 1-5 so you have 2 "H" assemblies.



Étape 5 - Table Build - Side Legs 2

Tools

1/2" Socket Wrench

Parts

2 "H" Assemblies from previous step

Top deck Assembly

Steps

1. Shift the top deck assembly off your worksurface so that 2 corners are free hanging in space.
2. Position an H assembly underneath the corners, aligning the pre-attached t-nuts to the external rail slots. This requires you to adjust the t-nuts so they are perfectly vertical.
3. Slide the H assembly up until it is flush with the top deck and holding its weight.
4. Once in place, tighten down the bolts
5. Repeat on the other side.



Étape 6 - Table Build - Tapping beams

Tools

1/2" tap

Parts

Table assembly

Steps

1. Tap the two central holes on the exterior of the 1000mm 4080 extrusion.
2. Repeat on all 4 corners.



Étape 7 - Barrel Support 1

Tools

13mm tap (or 1/2")

1/2" socket wrench

3/4" socket wrench

Parts

2x 300mm Extrusion

2x Steel barrel brackets

4x corner brackets

4x 13mm hex bolts (or 1/2")

4x 13mm washers

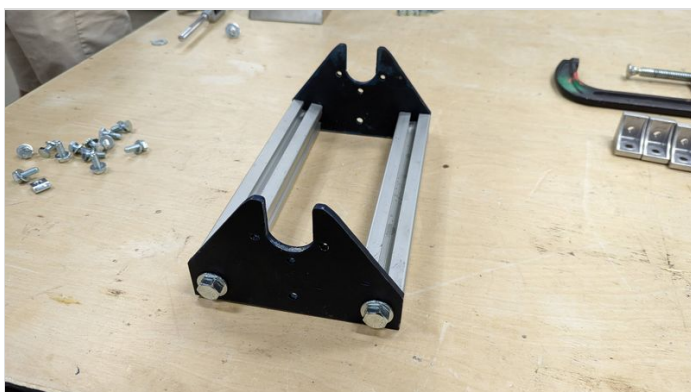
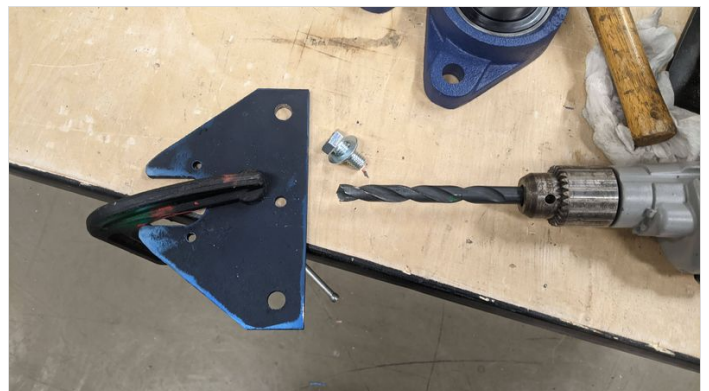
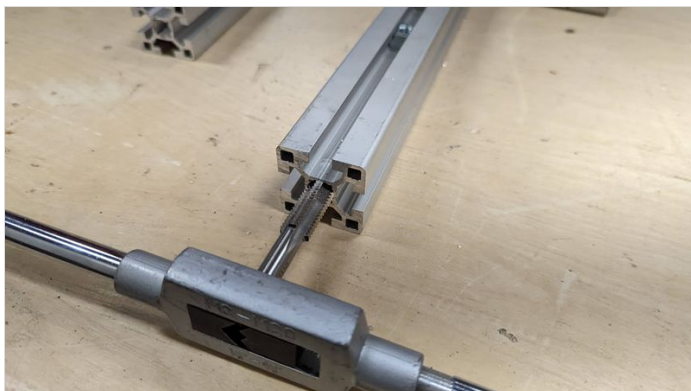
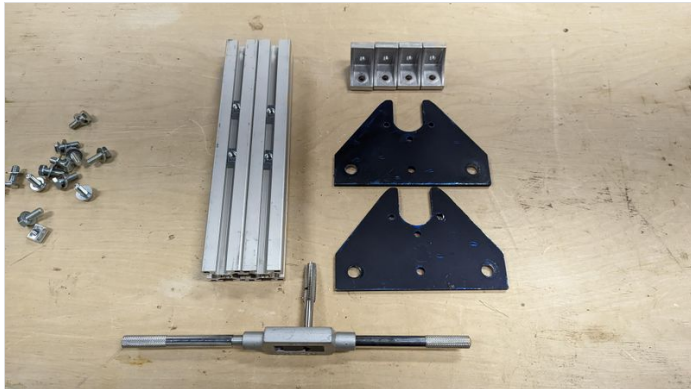
4x M8x20 Bolts

4x M8 washers

4x t-nuts

Steps

1. Tap both end holes in each 300mm beam.
2. (check to make sure the 1/2 bolts fit through the large holes on the barrel brackets. If not, use a 1/2" drill bit to open the holes up)
3. Slide 2 nuts into each beam. position these rails on the outside/facing away from each other (see image 6 for orientation)
4. Secure the barrel brackets to the beams as seen in image 5.
5. Secure corner brackets to slotted t-nuts so the open hole is facing down. Keep these loose as there final position will be determined later.



Étape 8 - Barrel Support 2

Tools

1/2" socket wrench

Parts

Barrel Support Assembly

Table

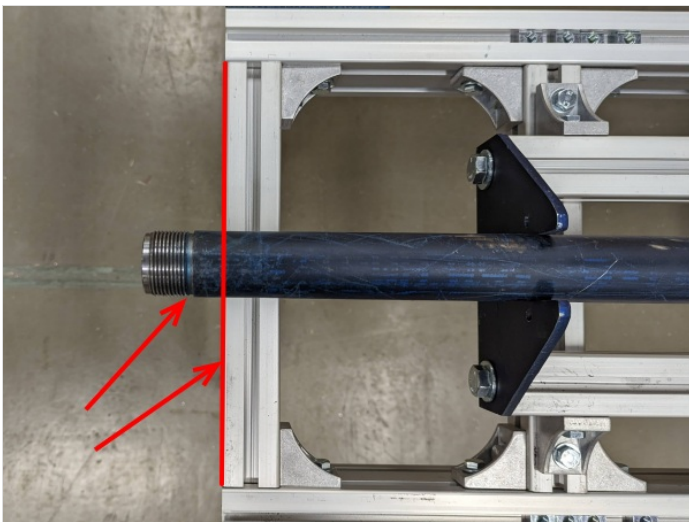
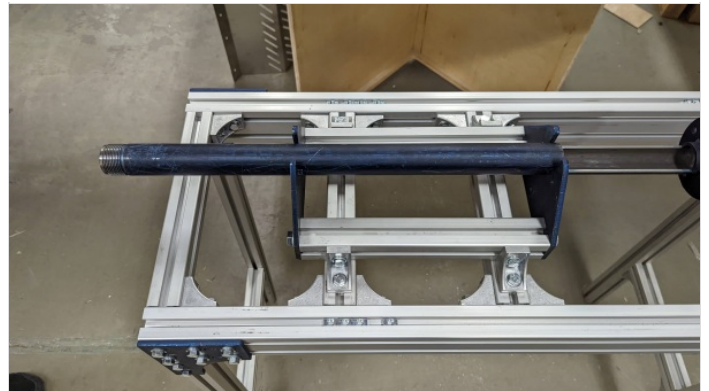
Barrel

4x M8x20 Bolts

4x M8 washers

Steps

1. Place the Barrel support assembly on the table so it that it crosses the two "I" assemblies.
2. Loosely attach the assembly to the table with bolts/washers.
3. Place the barrel into the support structure, aligning the flat notches on the barrel to the bracket.
4. Slide the barrel towards the end of the table until the threads CLEAR the table face.
5. Leave these connections loose as it will be moved into its final position later.
6. Temporarily remove the barrel.



Étape 9 - Barrel/Shaft/Bearings

Tools

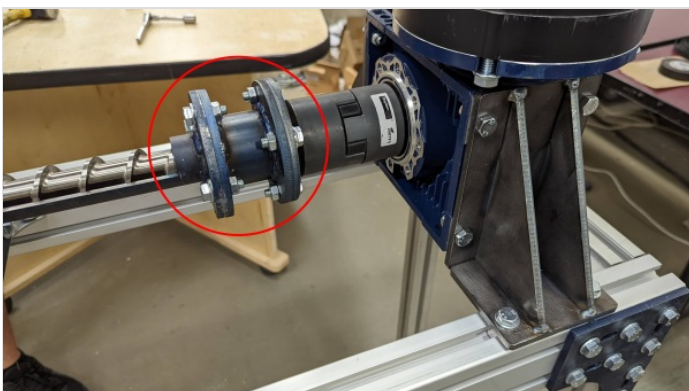
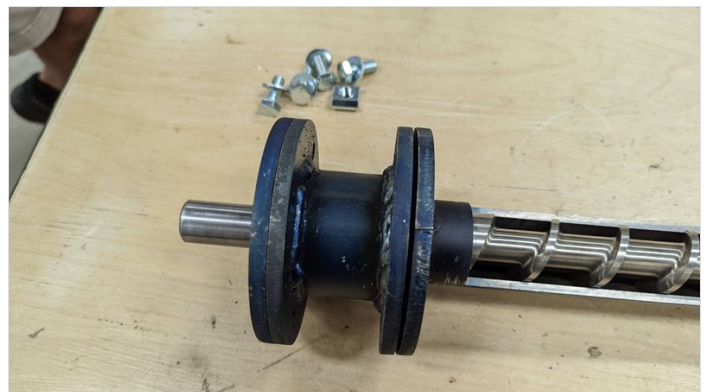
1/2" Socket Wrench
adjustable wrench

Parts

Barrel
Extrusion Screw
3x Bearings
1x Bearing spacer
Flange
Bearing Housing
8x M8x25 Bolts
8x M8 washers
8x M8 nuts

Steps

1. Slide the bearings onto the screw shaft, followed by the bearing spacer.
2. Slide the barrel over the screw.
3. Slide the bearing housing over the bearings and flush with the barrel.
4. Slide the flange over the shaft and flush with the bearing housing.
5. Secure the bearing and flange in place with m8 bolts/washers/nuts.
6. (see image 5 for a finished state, but ignore the other parts)



Étape 10 - Coupling 1 and Heating elements

Tools

Mallet

Hex wrench (for heating element bolts, depends on manufacturer)

Parts

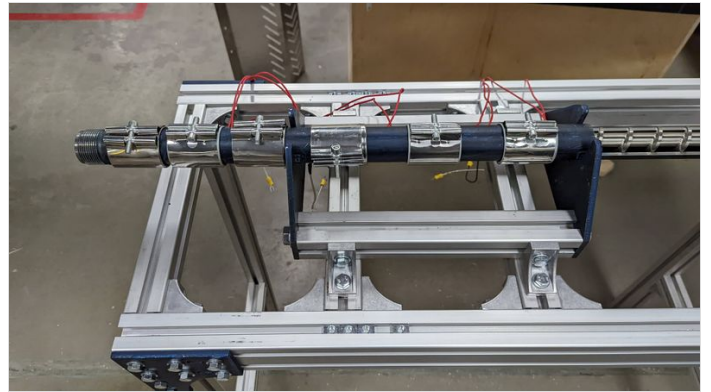
20mm coupling

1/4" Key(filed down)

6x heating band elements

Steps

1. Place the key into the keyway on the extruder shaft.
2. Slide the coupling over the shaft/key until it is flush with the extruder shaft. It should **not** come into contact with the m8 Bolts on the flange.
3. On the other end of the barrel, slide the heating elements into position.
 1. Three should be within the barrel supports, and three should be past the support towards the extrusion end.



Étape 11 - Gearbox support

Tools

1/2" Socket Wrench
Adjustable wrench

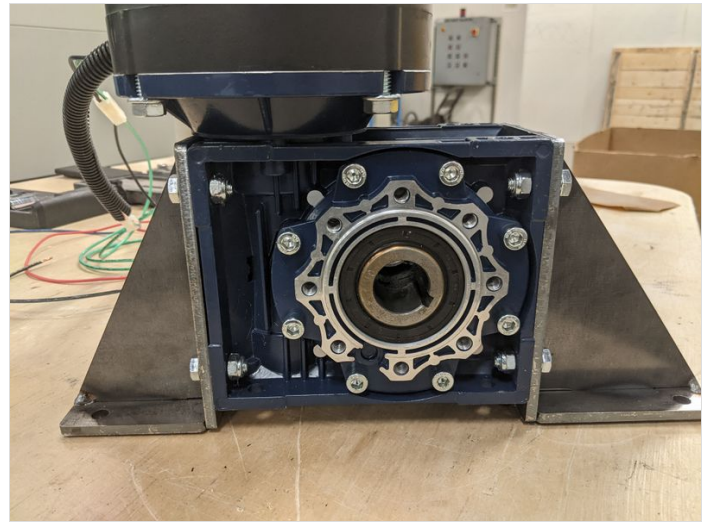
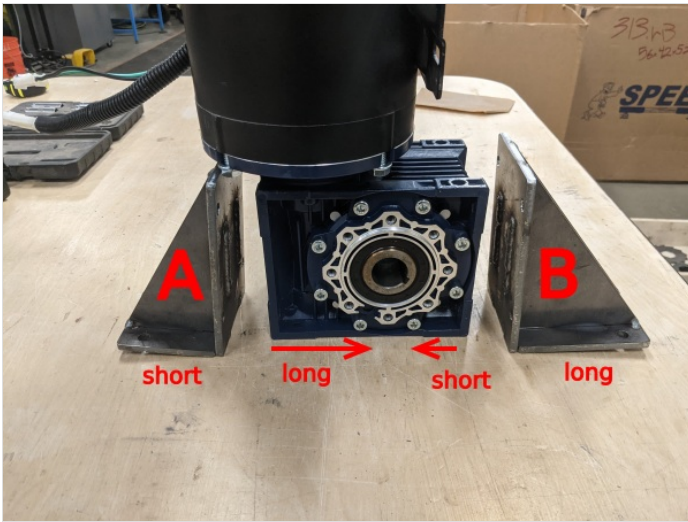
Parts

Gearbox support A
Gearbox support B
Gearbox/motor assembly
8x m8x25 bolts
8x m8 washers
8x m8 nylon lock nuts

Steps

It is important to note that the two supports are not identical. Support A has a narrower base than B.

1. Position the supports as seen in Image 1, ensuring that support A faces the gearbox side with longer distance between its wall and the shaft.
2. Secure the supports with bolts/washer/lock nuts.



Étape 12 - Motor shaft coupling

Tools

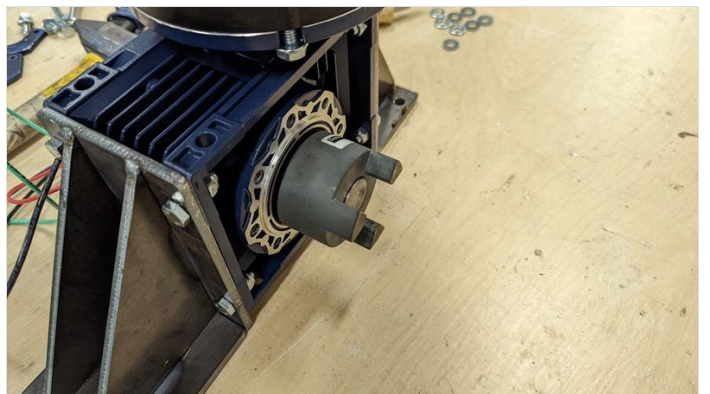
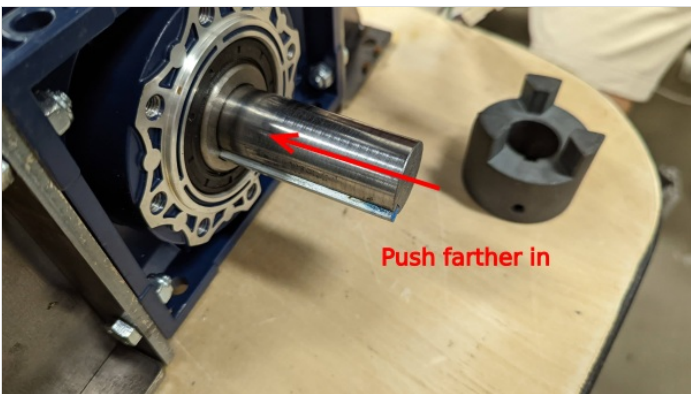
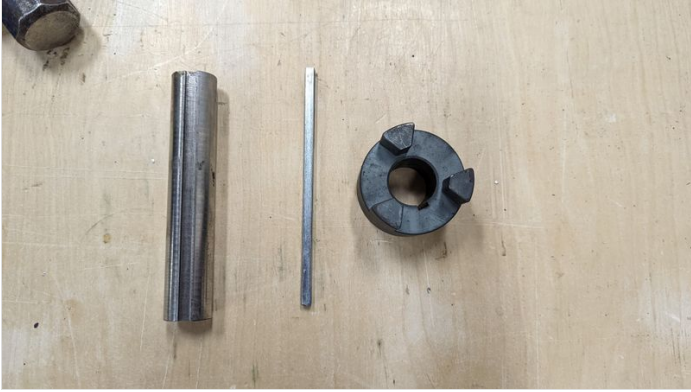
Mallet

Parts

1 1/8" Shaft
1/4" key
1 1/8" coupling
Gearbox

Steps

1. Place the key into the shaft
2. Slide these parts into the gearbox until flush with the back side of the gearbox.
3. Slide the coupling onto the shaft



Étape 13 - Motor mechanical install

Tools

1/2" socket wrench

Parts

Motor Assembly

Table

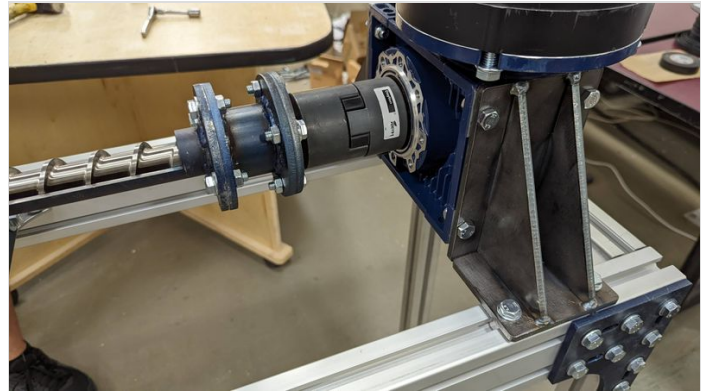
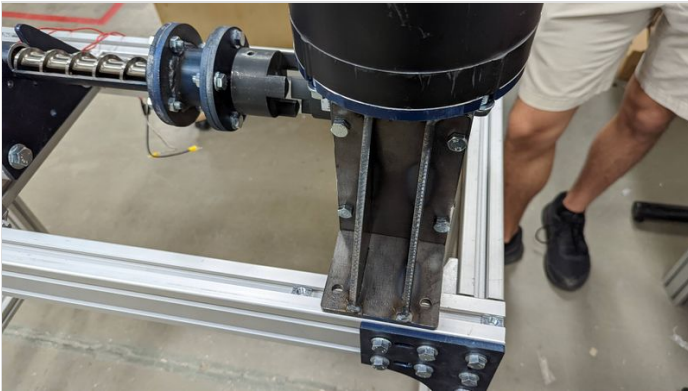
4x m8x20 Bolts

4x washers

Spider coupling

Steps

1. Position the motor on the table, sliding the t-nuts from the previous steps into position.
2. Loosely secure the motor to the table.
3. Insert the spider into one of the couplings.
4. Making use of the loose bolts, move the barrel and motor together until they are meshed at the couplings with the spider in between.



Étape 14 - Heat Shield bend and install

Tools

1/2" socket

Metal break

Digital angle gauge

Parts

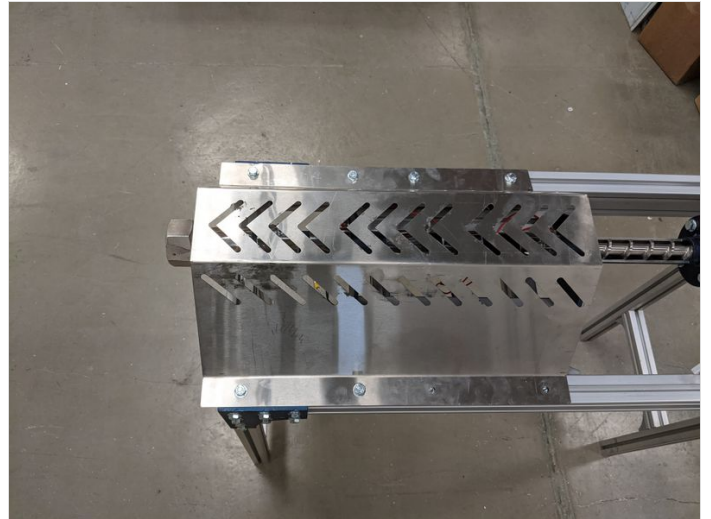
Perforated shield

6x M8x16 bolts/washers

Steps

1. Identify the small cut notches on the sheet metal that indicate where the bends should go.
2. Using the break, fix the sheet metal in position (figure 2) and bend the sheet at a 45 degree angle.
3. Flip and repeat for all 4 bends.
4. Position the shield in place and secure the back row with 4 bolts/washers and the pre-installed t-nuts.
5. attach the front of the shield with only the left two bolts. (the other two will be utilized for securing the electronic box later)





Étape 15 - Hopper Bend and install

Tools

Metal break
Digital angle gauge or square edge
vice
Rivet gun or hex wrench set

Parts

2x pre-cut hopper sheets
6x rivets or M4 nut/bolt combo

Steps

1. Using the break, fold the perforated sheet on the designated lines to 90 degrees. Both bends should be inward, so that the triangle flap and short flap face each other.
2. The bottom of the hopper sheets need to be flared out so it can fit around the barrel. *We found this easier to do in the vice because you can visually inspect the angle
3. Place the bent hopper half in a vice, and slowly press on the rectangular face until the top of sheet is parallel with the floor/table. (image 3)
4. Repeat for the other sheet.
5. Nest the two pieces so the triangular face is captured by the lip on the other sheet. Secure in place with either bolts/nuts or rivets
6. Place the hopper over the barrel.

