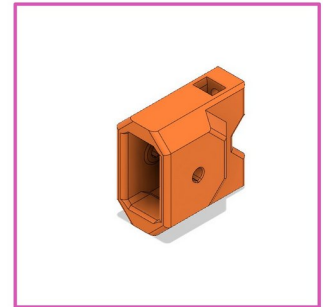
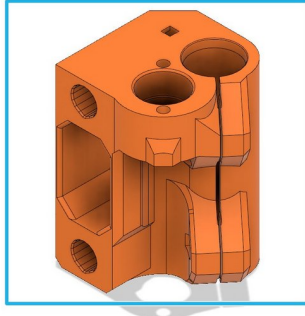
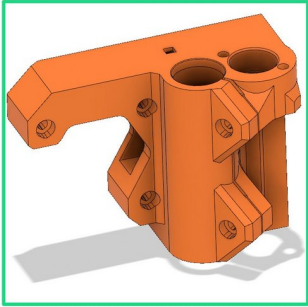


# Bear Lab

## 2. X axis

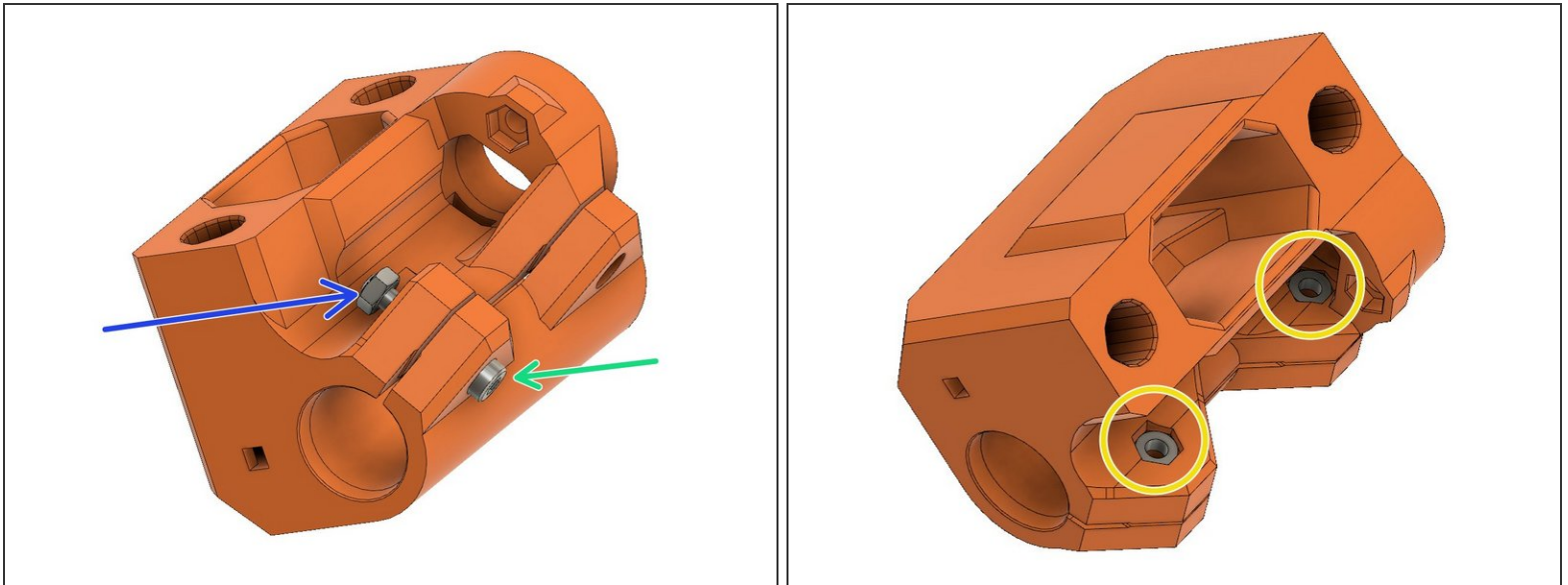
Written By: Grégoire Saunier

## Step 1 — X Ends Parts



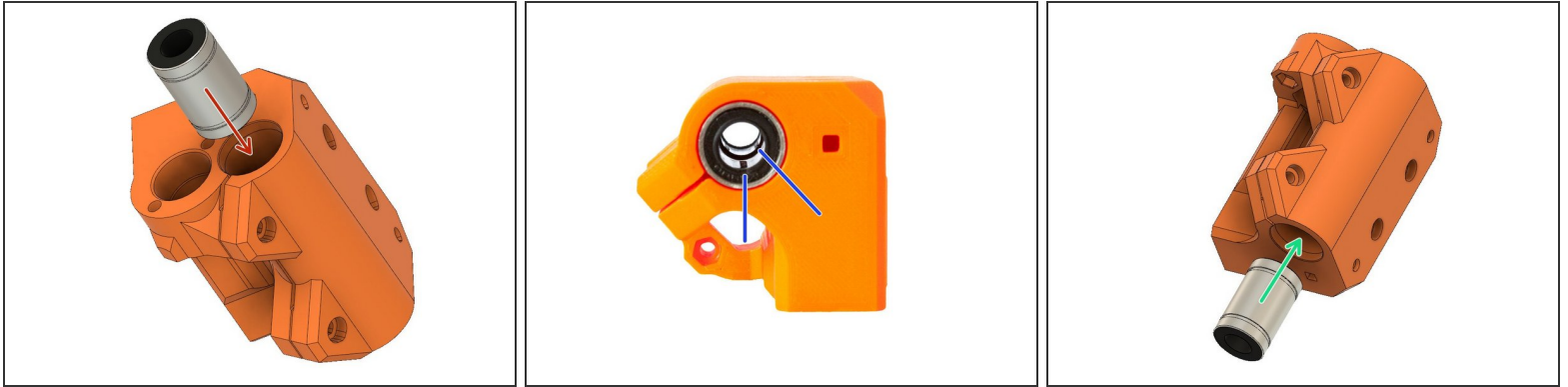
- *x\_end\_motor*
- *x\_end\_idler*
- *x\_end\_idler\_tensioner*

## Step 2 — X End Idler



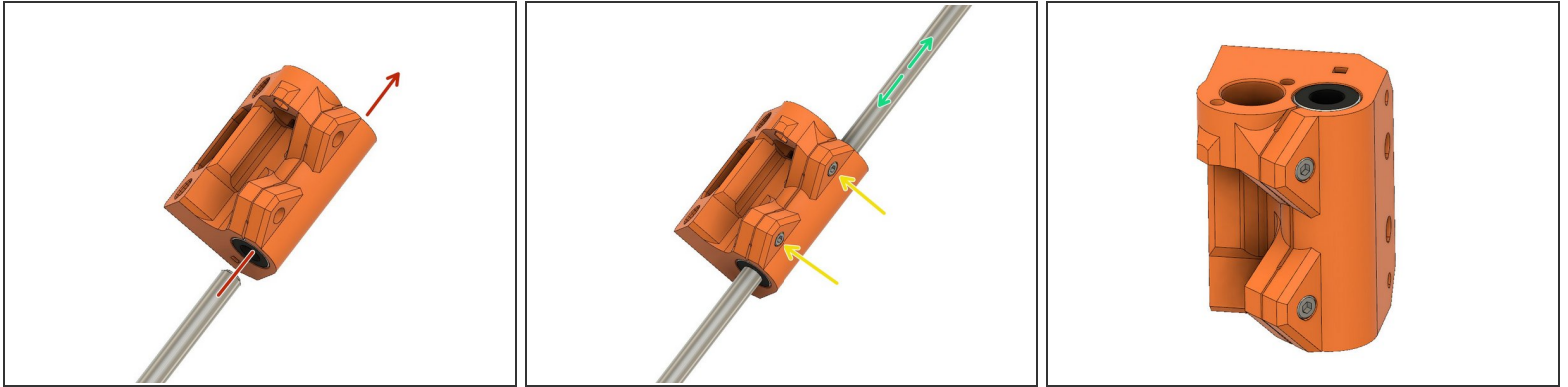
- Insert an M3x18mm socket head screw in one of the *x\_end\_idler* clamp holes. This screw helps insert the hex nut.
- Using tweezers, hold an M3 hex nut so that it can be threaded onto the M3x18mm socket head screw. Tighten that screw until the M3 hex nut is firmly seated.
- Remove the M3x18 socket head screw and repeat on the other clamp hole.

### Step 3 — X End Idler



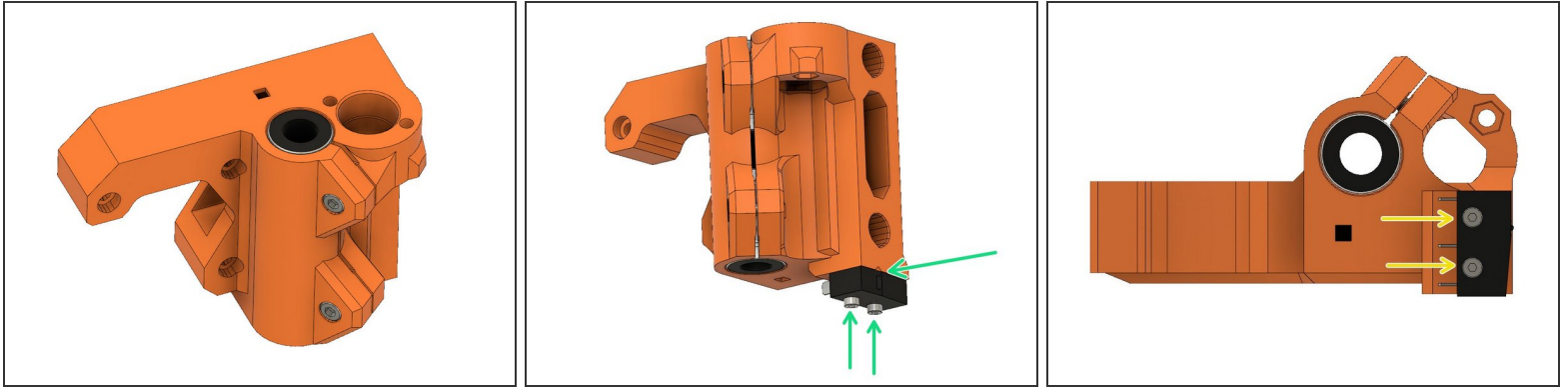
- Insert an LM8UU linear bearing into the *x\_end\_idler* until it hits the internal stop.
- The next LM8UU linear bearing will have to be inserted so that the rows of ball bearings are at  $45^\circ$  to the rows in the other bearing.
- Insert that LM8UU linear bearing into the *x\_end\_idler* until it hits the internal stop.
- ⚠ Verify that the rows of balls are rotated at an angle of  $45^\circ$  from each other (as shown in the photograph).

## Step 4 — X End Idler



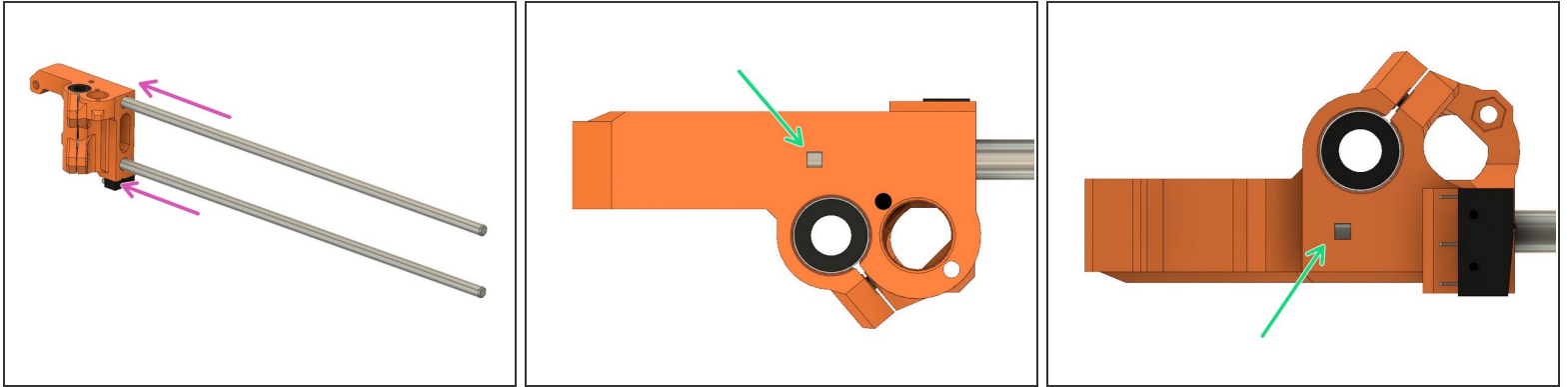
- Temporarily insert a 8mm smooth rod through both LM8UU linear bearings.
- Engage two M3x10 socket head screws in the hex nuts, but do not tighten them at this time.
- Alternatively tighten the two M3x10 clamp screws to secure the linear bearings. Slide the smooth rods back and forth while tightening.
- ⚠ Don't over-tighten the clamp screws; they need to be just tight enough to keep the bearings from moving.
- Remove the 8mm smooth rod.

## Step 5 — X End Motor



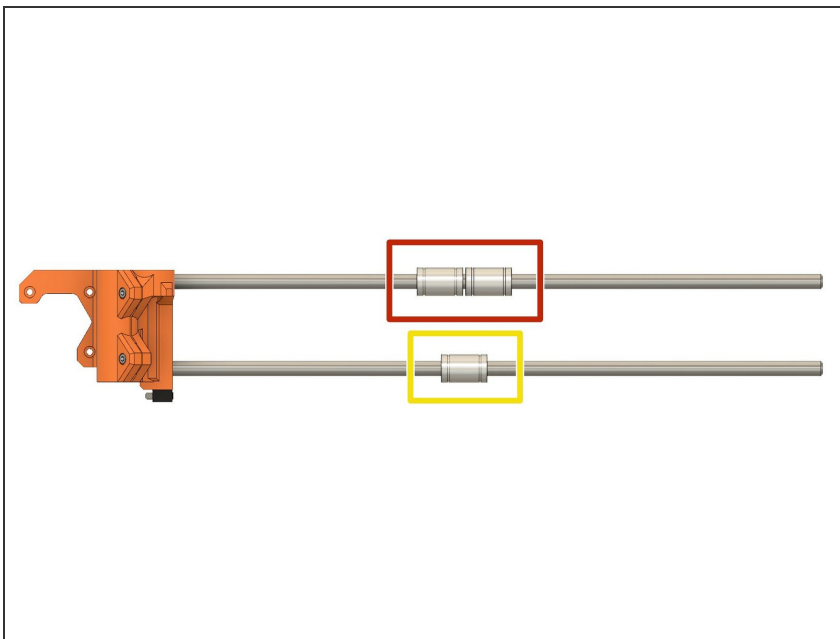
- Repeat the 3 previous steps on *x\_end\_motor*
- **MK2.5S only:** Use two M2x12 screws to attach the x-endstop switch. Ensure the correct orientation of the switch. The microswitch should be oriented so that it is closest to the v-notch in the printed part.
- **MK2.5S only:** While tightening the screws, apply gentle pressure in the direction shown.
- ⚠ **MK2.5S only:** Do not to over-tighten the M2x12 screws!
- ⚠ **MK2.5S only:** Double check the orientation of the endstop.

## Step 6 — X Smooth Rods



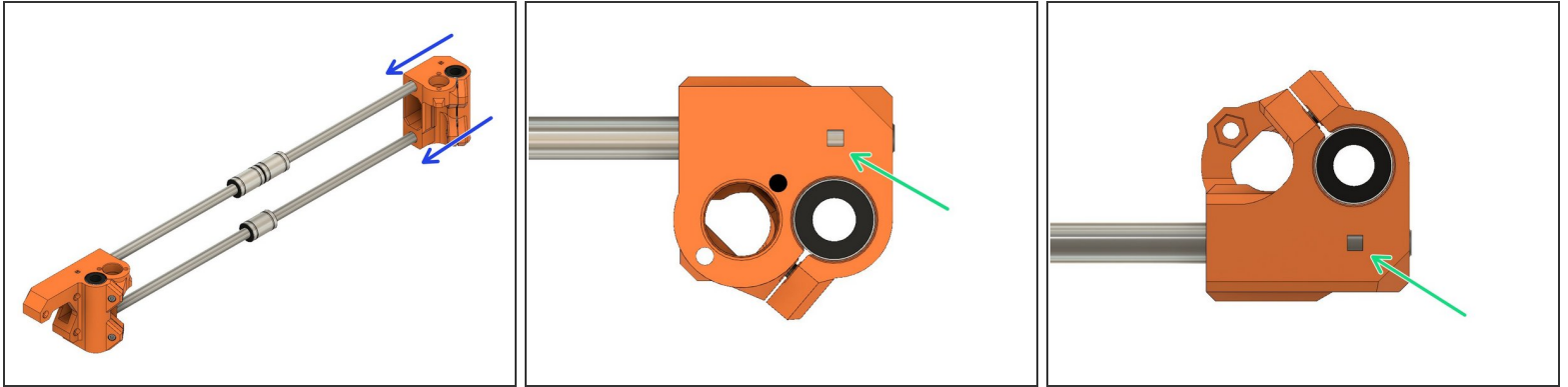
- Check the holes for the smooth rods in the `x_end_motor` part and ensure that they are clean and free from obstructions.
- Slide the two 370mm smooth rods in the `x_end_motor`.
- Ensure that the smooth rods are fully inserted. You can see them in the little windows on top and bottom.

## Step 7 — X Smooth Rods Assembly



- Insert two LM8UU linear bearings on the top smooth rod.
- Insert one LM8UU linear bearing on the bottom smooth rod.
- ⚠ Be very careful inserting the LM8UU linear bearings.

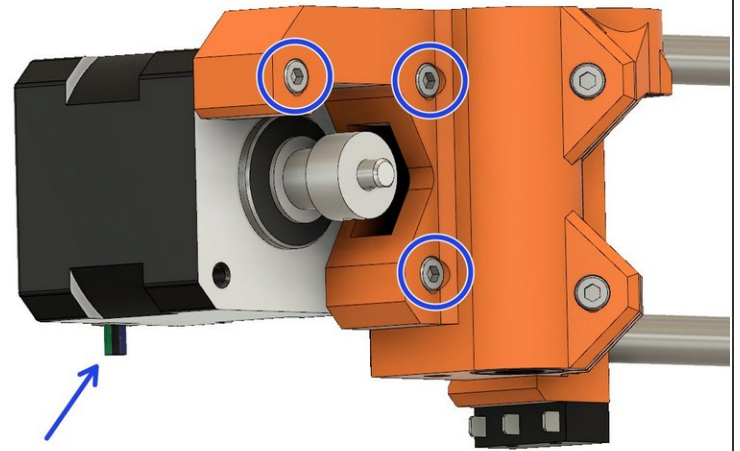
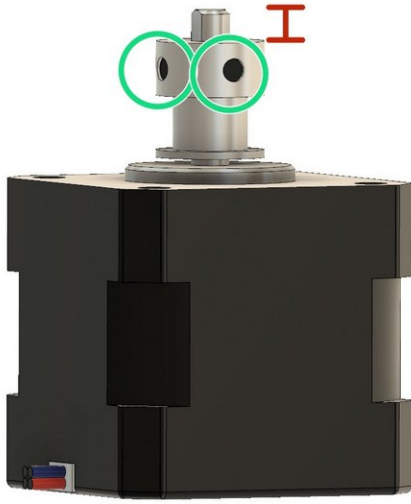
## Step 8 — X Smooth Rods Assembly



- Insert both rods simultaneously into the *x\_end\_idler* and provide even pressure to force the rods all the way in.
  - Using the observation windows, verify that each rod is fully seated.
- ⚠ Take the time to double check observation windows on both *x\_end\_idler* and *x\_end\_motor*.

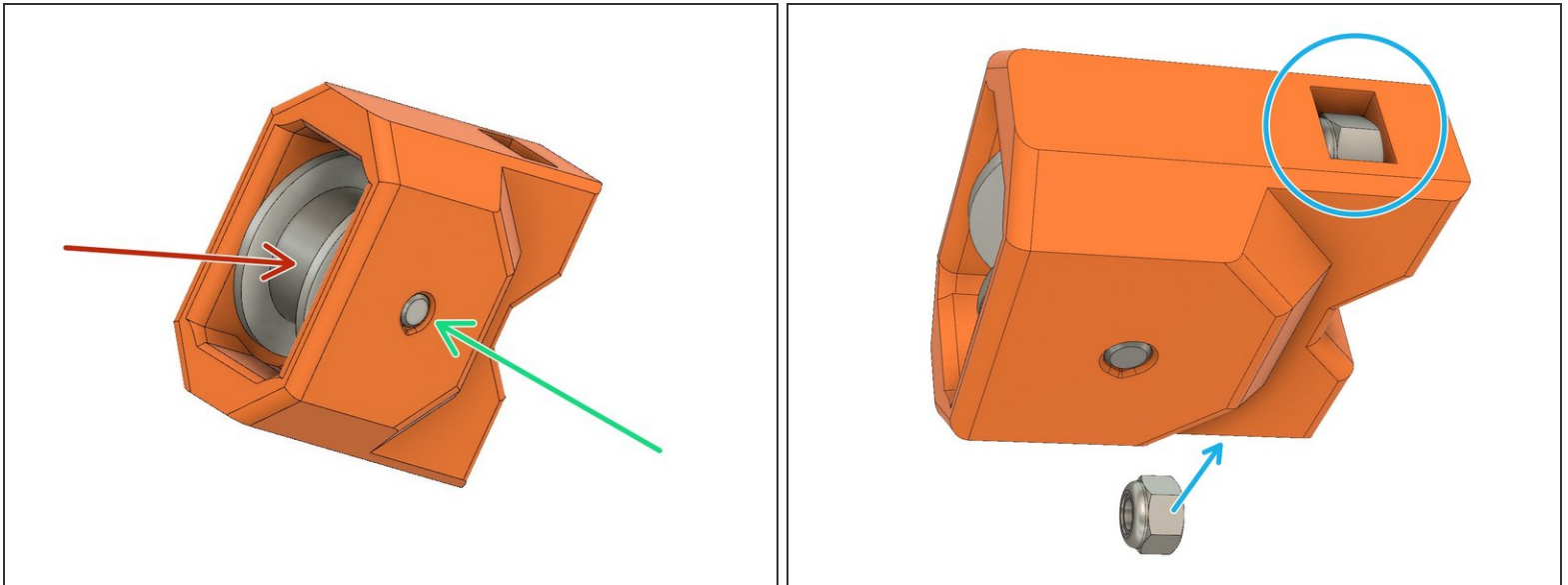


## Step 9 — X End Motor



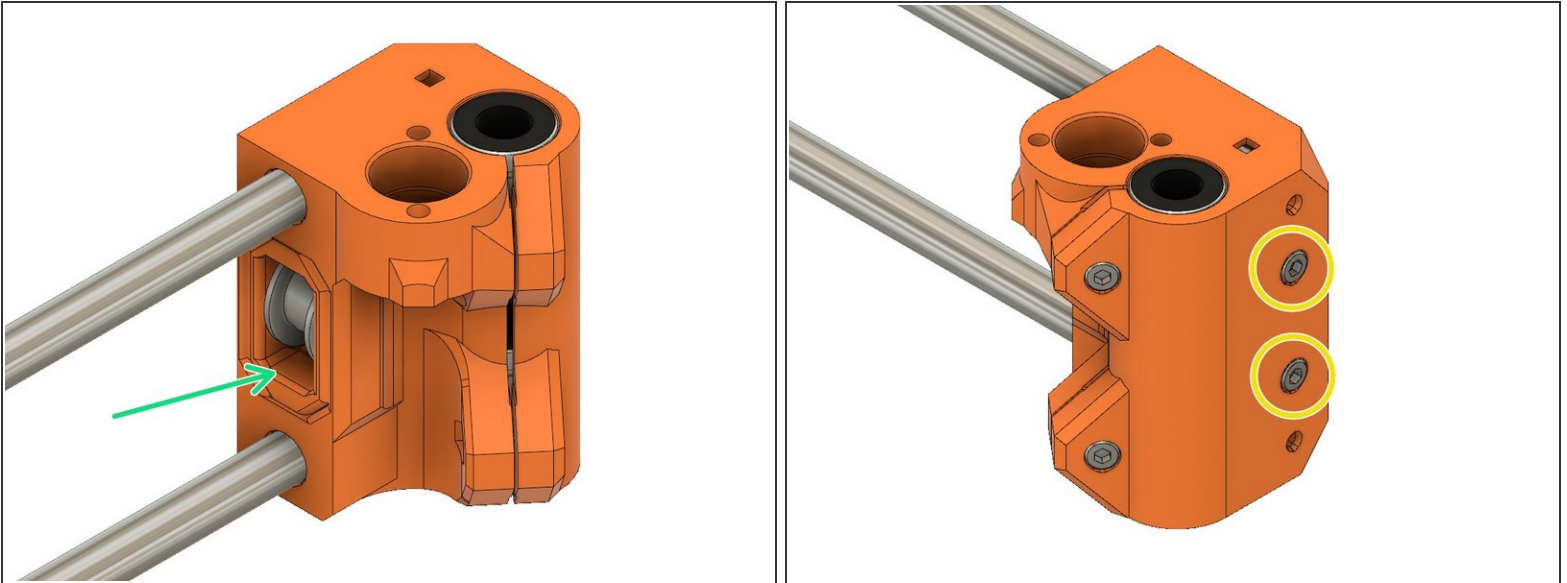
- ① The 2GT 16T pulley's gear teeth are not visible on the images.
- Position the 2GT 16T pulley so that approximately 3.5 to 4 mm of the shaft protrudes. Ensure the pulley is not touching the motor.
- Align one of the set screws on the flat on the motor shaft and then tighten, alternately, each set screw until they are both snug.
- Using three M3x18 screws, attach the x-axis motor. Note the orientation of the wires.
- ⚠ Double check the pulley position and ensure it does not touch the motor.

## Step 10 — X End Idler Idler Mount



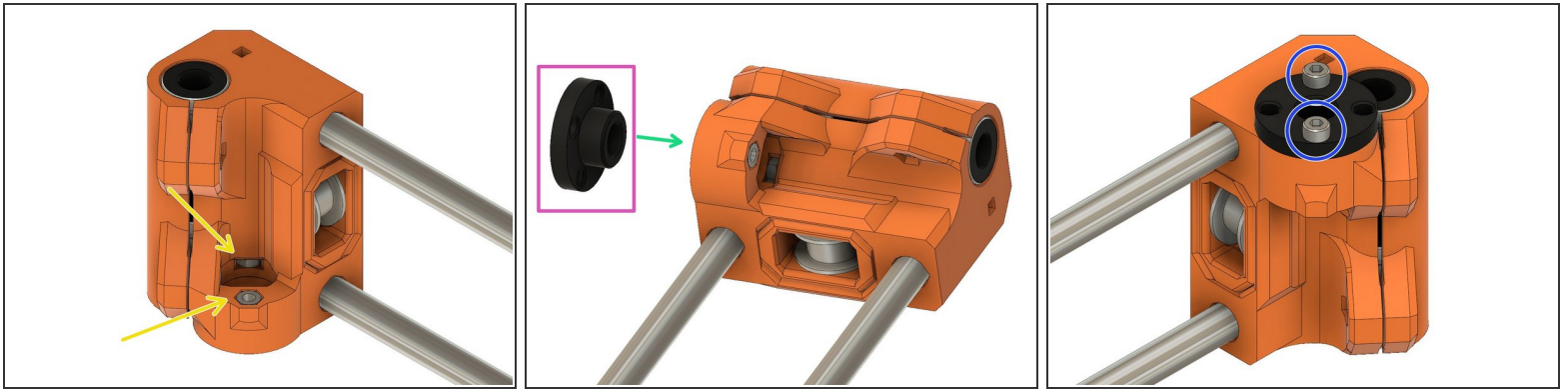
- Insert the idler in the *x\_end\_idler\_idler\_mount*.
- Press the dowel pin through the *x\_end\_idler\_tensioner* and idler bearings.
- ⚠ Verify that the dowel pin is not protruding from either side.
- ⚠ Verify that the idler spins freely.
- Insert two M3 nylock nuts in the top and bottom of *x\_end\_idler\_tensioner*. Note the orientation of the nylock nuts.

## Step 11 — X End Idler Idler Mount



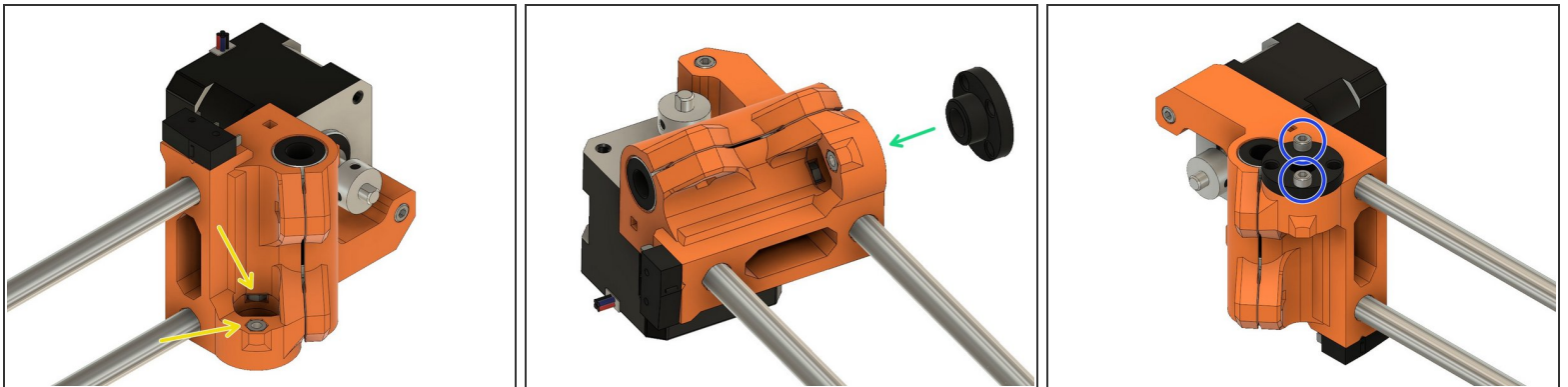
- Insert the *x\_end\_idler\_tensioner* in the *x\_end\_idler*.
- Secure it with two M3x18 screws. Don't need to tighten the screws, only engage them.

## Step 12 — Trapezoidal Nuts



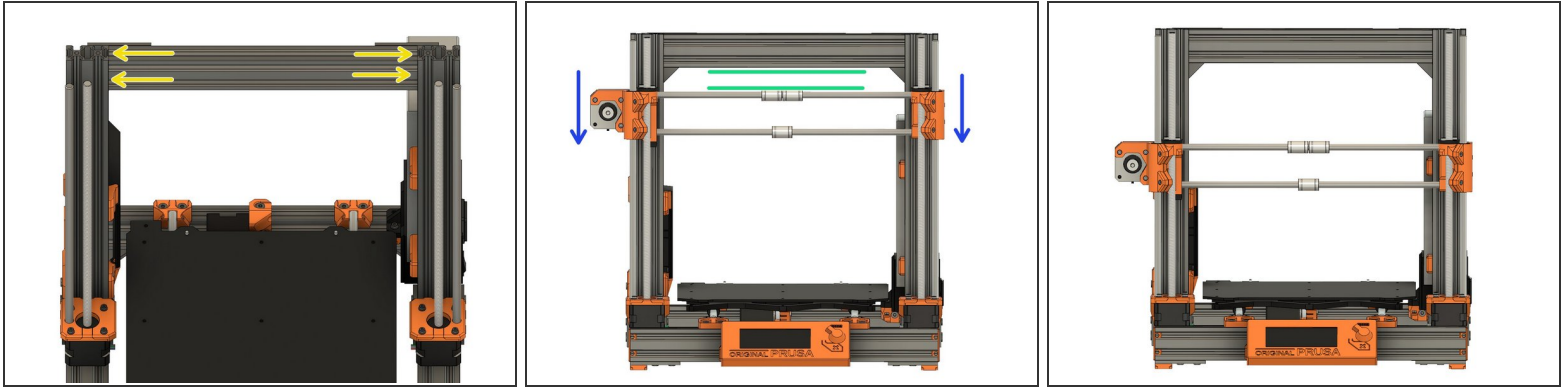
- Insert two M3 hex nuts in the dedicated pockets of *x\_end\_idler*.
  - Note the orientation of the trapezoidal nut.
  - Insert a trapezoidal nut on top of *x\_end\_idler*.
  - Using two M3x18 screws, tighten the trapezoidal nut in place. Do not over-tighten the screws.
- ⚠ Verify that the trapezoidal nut is in the correct orientation.

## Step 13 — Trapezoidal Nuts



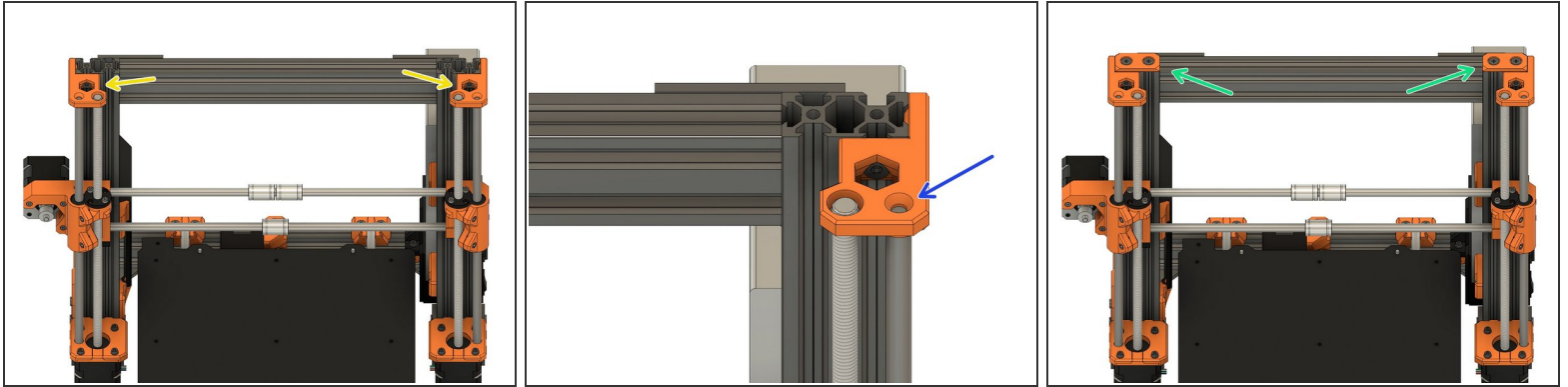
- Insert two M3 hex nuts into the dedicated pockets of *x\_end\_motor*.
  - Insert a trapezoidal nut on top of *x\_end\_motor*.
  - Using two M3x18 screws, tighten the trapezoidal nut in place. Do not over-tighten the screws.
- ⚠ Verify that the trapezoidal nut is in the correct orientation.

## Step 14 — Assembling X Axis On Z Axis



- Check that the *z\_tops* and *z\_end\_caps* have been removed.
- Carefully slide the X axis assembly onto the Z-axis. Rotate both lead screws to engage the X axis in the trapezoidal nuts.
- Continue to rotate both lead screws, by hand, to move the X axis assembly down by a few centimetres. If the X rods are not parallel with the top of the Z axis, rotate a lead screw on one side only, until the X axis assembly is parallel to the top of the Z axis.
- Continue to move the X axis assembly downwards until you reach the middle of the Z axis. Keep the X axis as level as possible.

## Step 15 — Assembling X Axis On Z Axis



- Install the Z axis tops and tighten them.
- **Bear Upgrade frame only:** Make sure the *z\_tops* are flush with the Z smooth rods on both sides
- **Bear Upgrade frame only:** Tighten the *z\_ends\_caps* on top of the Z axis with the M5 screws.

## Step 16 — Next chapter



- Congratulations you have finished this chapter :-)
- Go to the next chapter: [3. Extruder](#)