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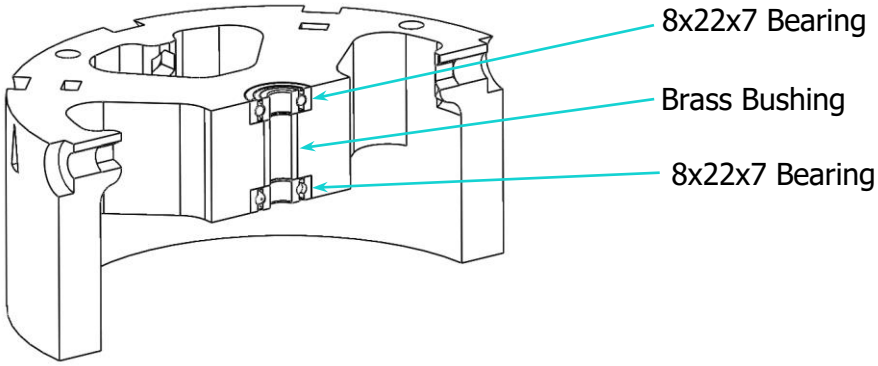
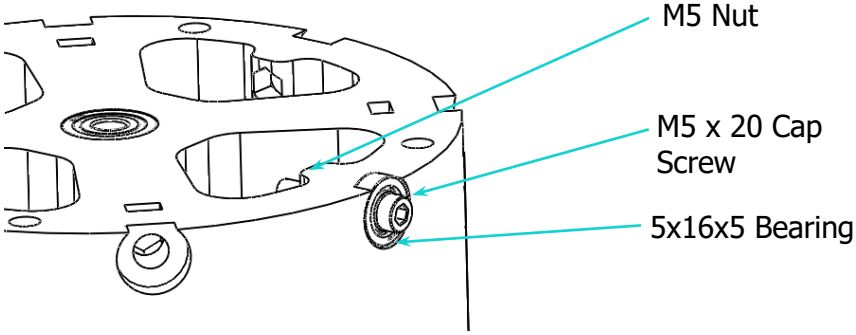
Part #1: Base Assembly



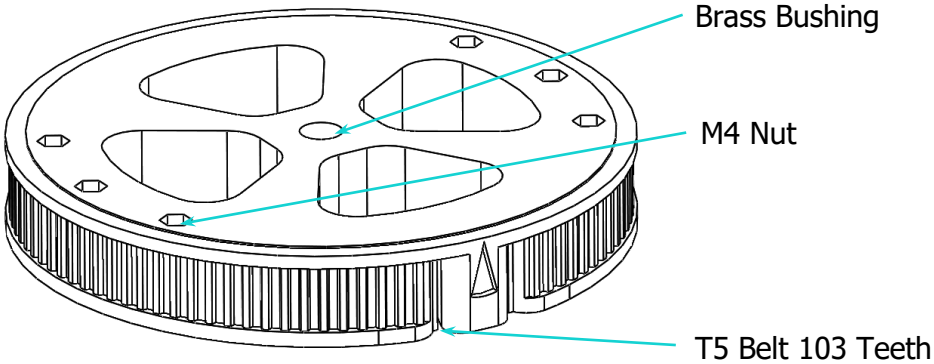
1. Insert the large brash bushing into the base
2. Insert both large bearings into the base assembly

Tip: If pressing in the bearings is very difficult the large M8 Bolt can be used to tap in the bushing



1. Insert M5 nuts into all nut traps on the inside of the base
2. Sit all bearings into the circular recess
3. Tighten the socket head cap screw through the bearing and into the nut

Tip: Do not overtighten this bolt. Check that the bearing spins freely.



1. Press in the second brass bushing into the base gear
2. Place an M4 nut into each nut trap. Make sure the nuts are lying flat on the printed surface
3. Slide in the T5 belt into the tooth catch feature on the base gear

Tip: Inserting the belt can take a lot of wiggling the belt back and forth.

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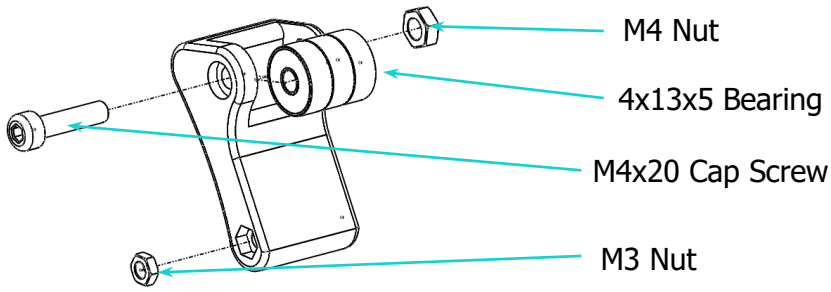
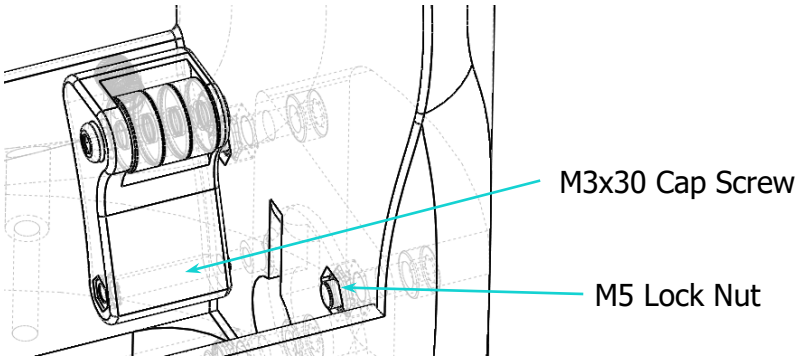
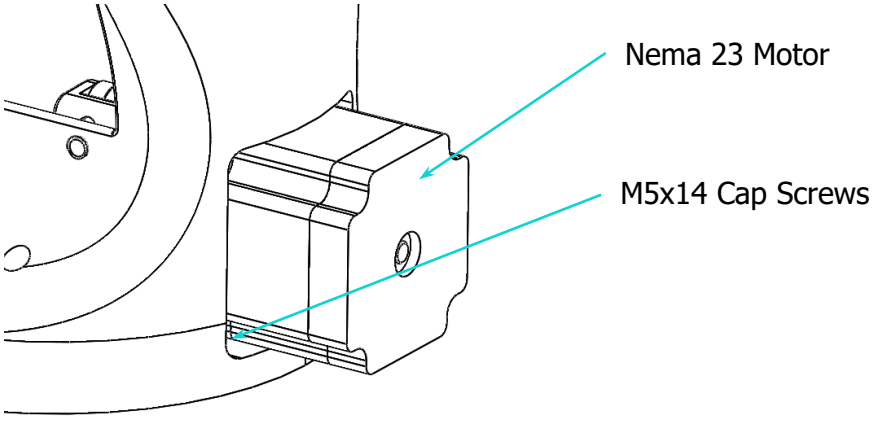
Part #2: Shoulder Assembly



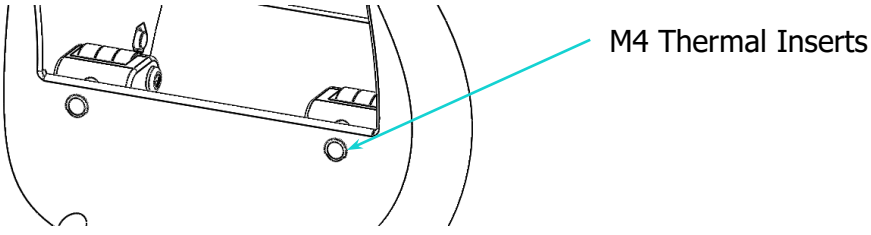
1. Place 3 bearings into the pocket on the tensioner print
2. Put the M4 cap screw through the bearings and tighten the M4 nut
3. Insert the M3 nut in the lower nut trap
4. Build two of these assemblies. The other with the mirrored version of this part



1. Place 4 M5 Lock nuts in the nut traps for the motor mounting. Do this on each side of the shoulder
2. Insert the tensioner sub assembly into the main shoulder body
3. Place an M3x30 cap screw through the body so that the head of the screw faces the outside of the body
4. Do this for both tensioners



1. Insert the motor into the side of the shoulder body
2. Screw 4 M5 Screws into the trapped nuts on the other side. This will hold the motor in place



1. Place the thermal insert on the end of a soldering iron
2. Wait about 20 seconds for the insert to heat up
3. Using the soldering iron press the insert into the plastic until its face is flush with the outside surface

Tip: This process can be delicate. Be careful not to get burnt!

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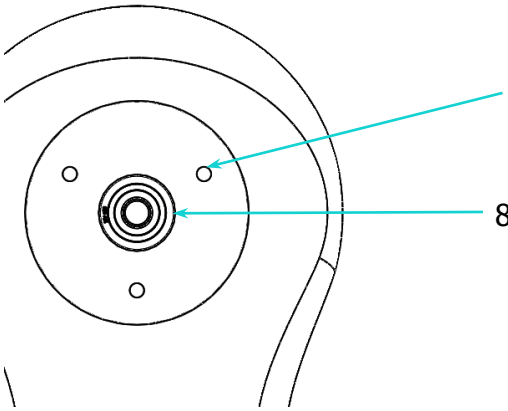
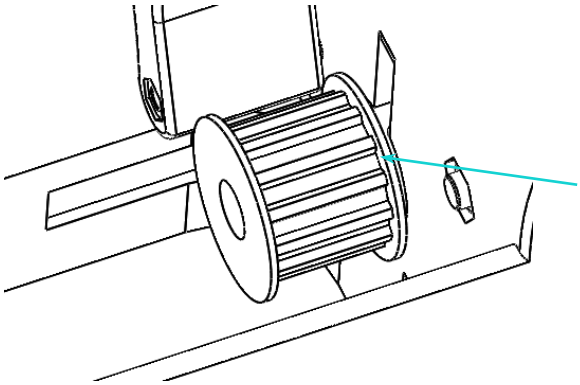
Part #2: Shoulder Assembly

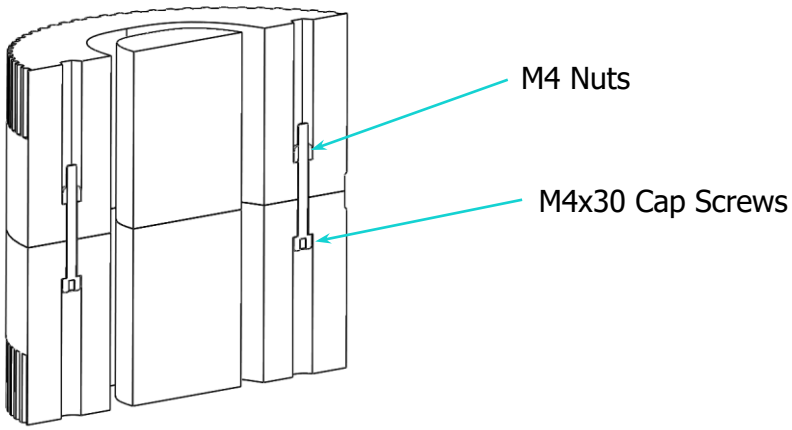


1. Insert the 6 thermal inserts
2. Insert the Bearing into the side of the assembly

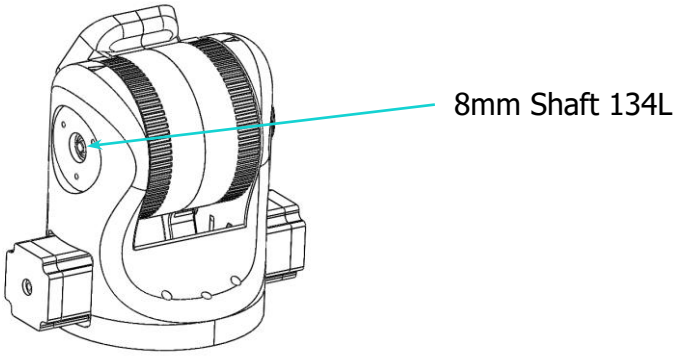
Tip: If you are having trouble getting the bearing in you can chamfer the edges of the hole with a file to ease it in.



1. Place the pulley onto the shaft of the motor
2. The flange of the pulley should be ~0.5mm from the surface of the plastic. If it is touching slightly that is fine
3. Use an Allen key to tighten the set screw. There is a slot to make this easier



1. Drop 4 M4 Nuts into the nut traps on the Shoulder gear
2. Use M4 Cap screws to fasten the two halves together
3. Place both T5 68 teeth belts into the belt traps. Loop the belts around so they are hanging down around the shoulder gear
4. Slide in the M4 nuts into the top slots of the Shoulder gear. Make sure they are aligned with the hole



1. Drop the belts into the Shoulder body and loop the belts around the timing pulleys
2. Place the 134mm Shaft through the bearings to complete the shoulder assembly

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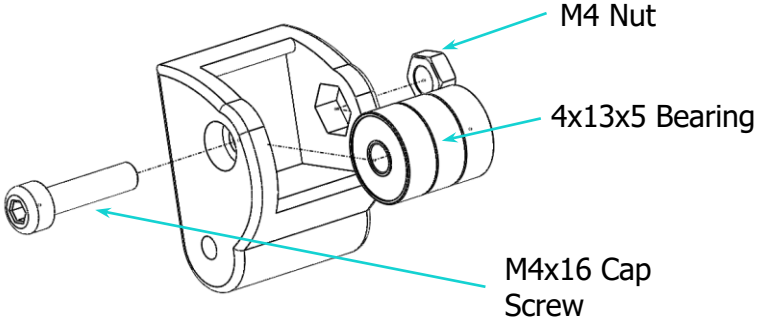
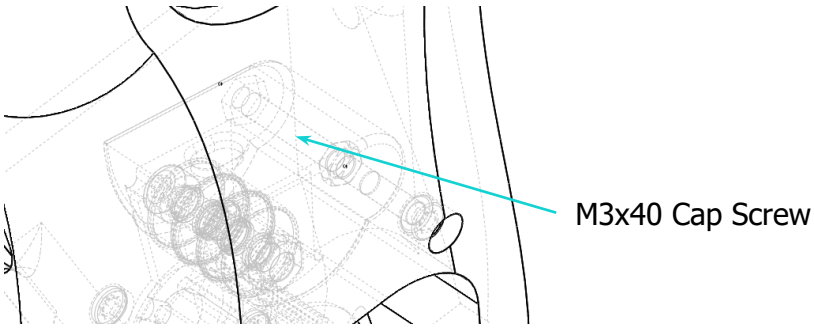
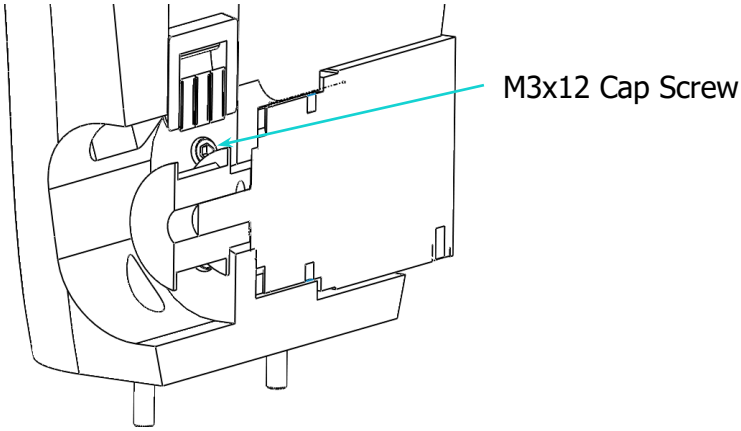
Part #3: Arm



1. Fasten the arm body onto the end of the Shoulder gears using M4x16 Cap screws
2. Sit all bearings in the recess of the tensioner
3. Put M4 set screw through and tighten with apposing nut

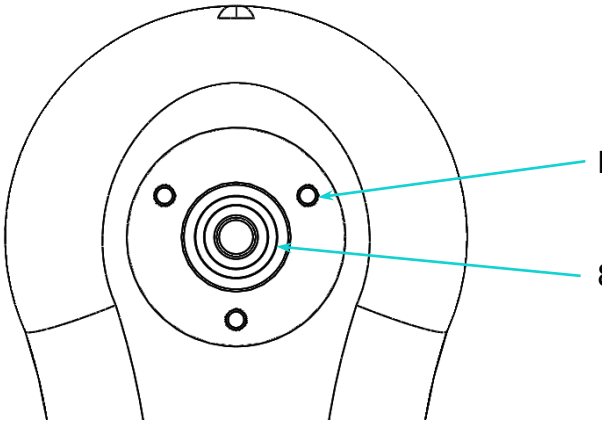


1. Place an M3 Nut in the Tensioner nut trap on the Arm body
2. Use an M3x40 cap screw to fasten on the body

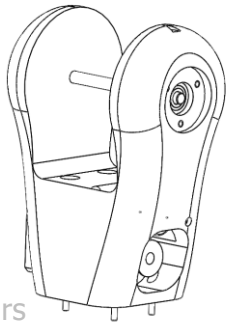


1. Install the geared motor using M3 cap screws
2. Install the timing pulley with the flange of the pulley ~0.5mm from the apposing face

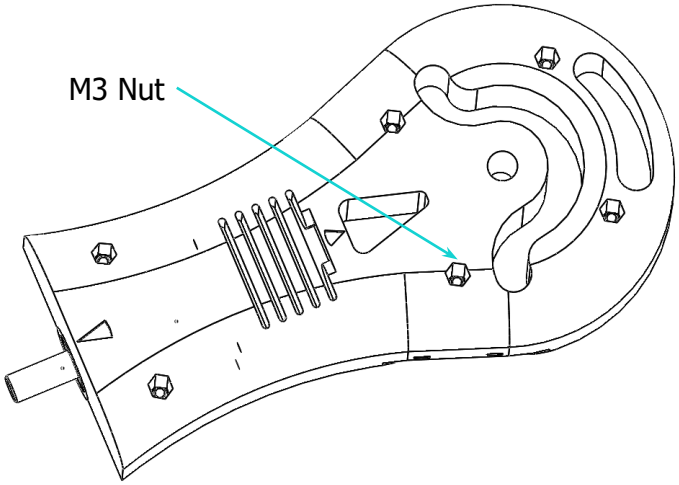
Tip: Don't forget the arm should already be installed on the shoulder gear at this point



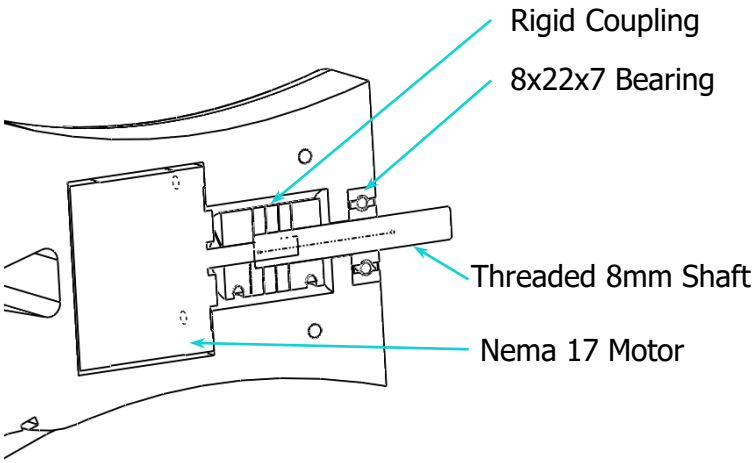
1. Install the M3 Thermal inserts on both sides. 6 should be installed in total
2. Press in 2 bearings for the joint rotation shaft.



Part #4: Forearm Assembly

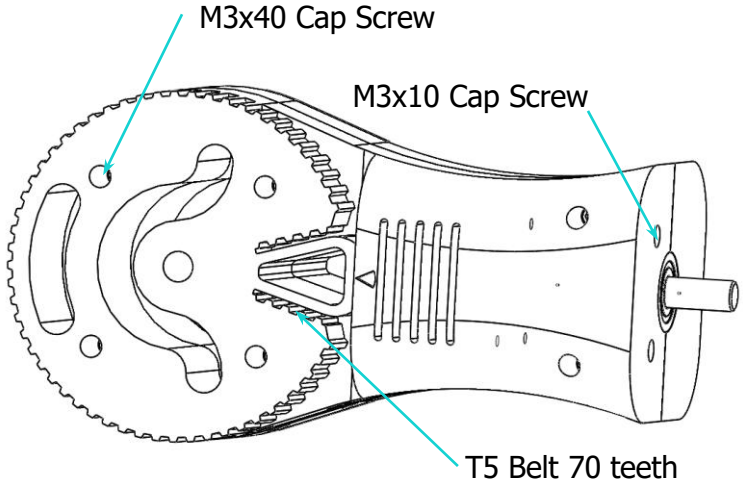


1. Insert 6 M3 nuts into the nut traps on the half of the Forearm body



1. Attach the stepper motor to the rigid coupling
2. Place the rigid coupling and stepper motor into the recessed area
3. Press the bearing into place
4. Insert the shaft into the bearing and through to the rigid coupler. Tighten the set screw on the coupler

Tip: Approximately 18mm of the shaft should be protruding past the bearing



1. Place the second half of the forearm body over the stepper motor and components installed in the previous half
2. Insert M3x10 cap screw in the end to fix the motor in place
3. Install 6 M3 cap screws to hold the body of the forearm together
4. Attach the Belt with 70 teeth to the belt tooth traps

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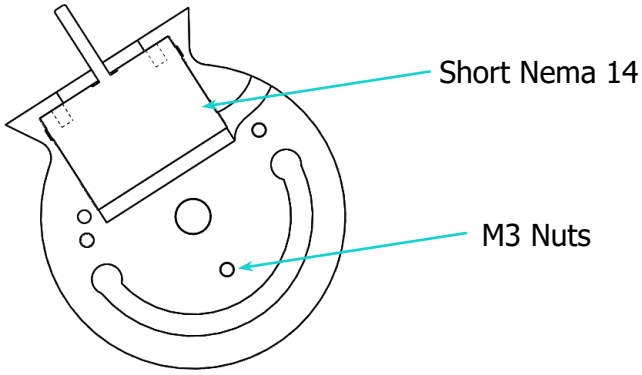
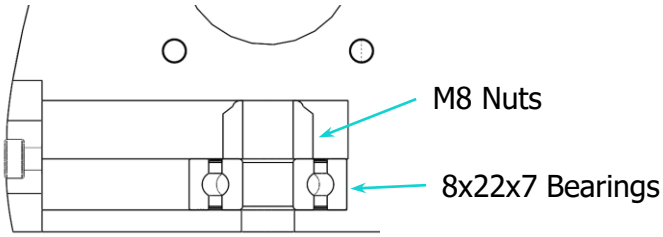
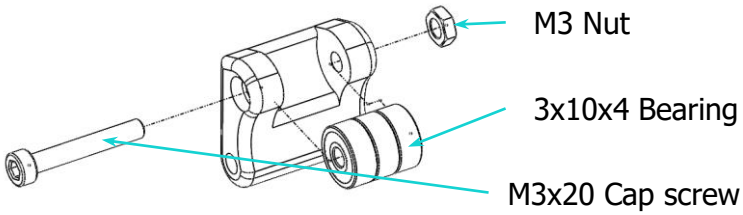
Part #5: Wrist Assembly



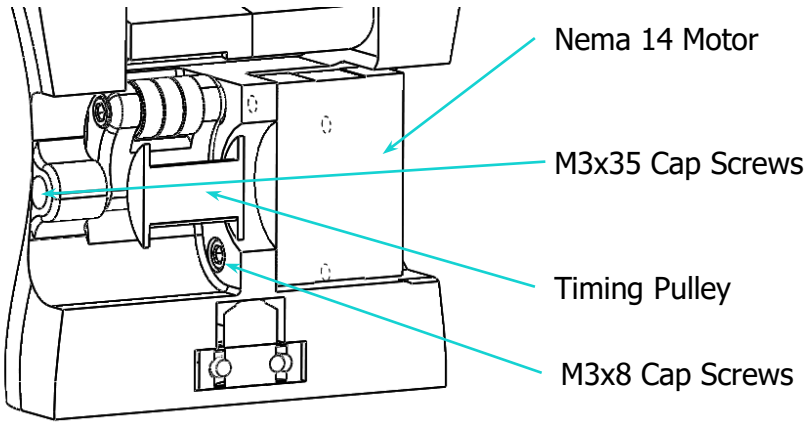
1. Insert 3 M3 Nuts into the nut traps on the other side of the wrist gear part
2. Insert the short Nema 14 motor into the wrist
3. Install the other side of the wrist gear using M3x25 cap screws
4. Install the short belt into the wrist gear traps



1. Slide the bearing into the trap hole. Look at the bottom of the wrist body to make sure the bearing hole is aligned correctly
2. Slide in the M8 nut. Make sure it is aligned with the bearing diameter.

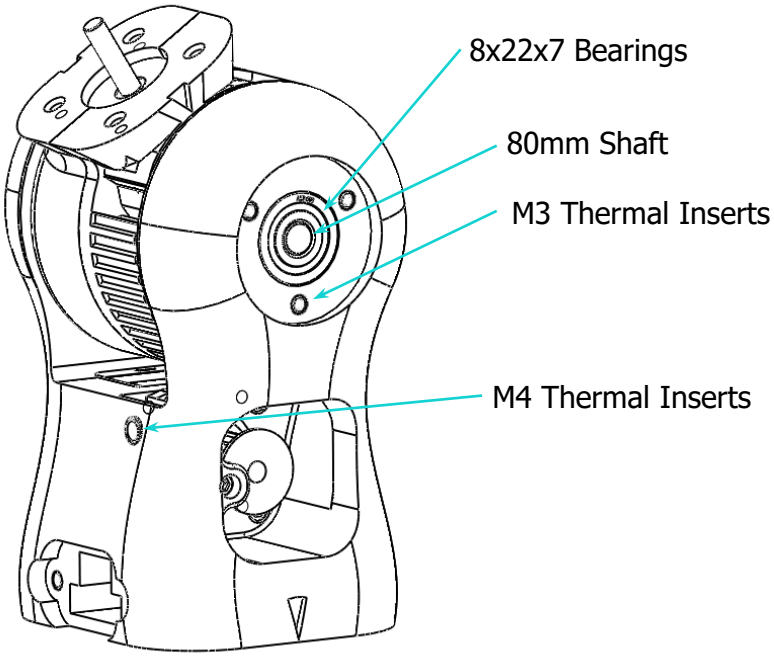


1. Assemble the tensioner in the same manner as the previous assemblies.



1. Place M3 Nut in nut trap in motor cavity
2. Install the Nema 14 motor with cap screws
3. Attach timing pulley to the motor shaft. Tighten set screw
4. Install tensioner with an M3x35 cap screw

Part #5: Wrist Assembly

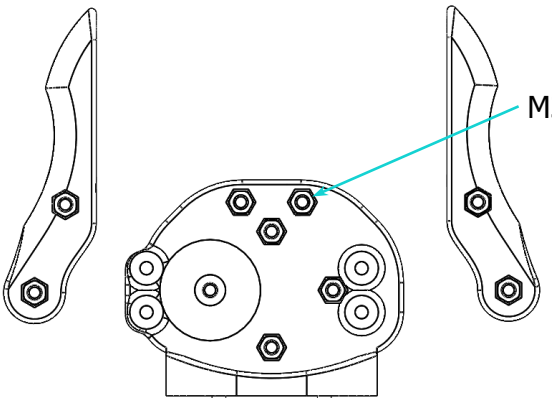


1. Drop the wrist gear into the assembly and loop the belt around the timing pulley
2. Lift the assembly up and insert the 8mm shaft to lock the gear unit in place
3. Insert 8 M3 thermal inserts and 1 M4 thermal inserts

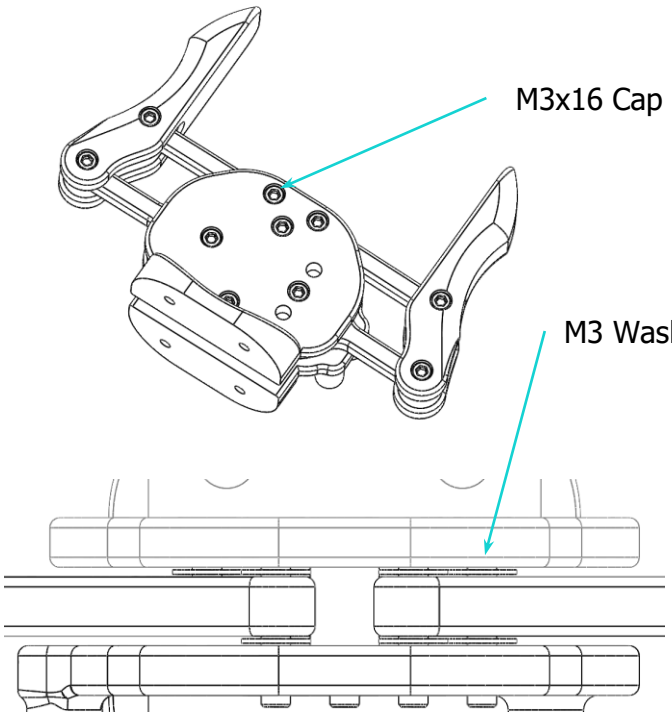
To attach the gripper to the wrist, slide mating feature onto the stepper shaft and tighten perpendicular bolts

To attach the gripper to the forearm place it on the threaded shaft of the forearm and then spin it until the shaft is threaded. You may have to lock the shaft using a screwdriver or flat piece.

Part #6: Gripper Assembly



1. Insert 11 M3 Nuts into their respective nut traps



1. Fasten all M3x16 cap screw into each of the available holes
2. The indicated screws should have a washer on both inside faces to prevent friction between parts.

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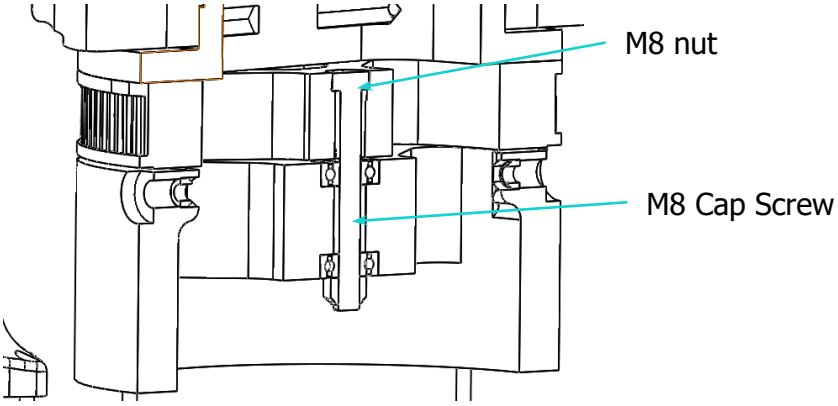
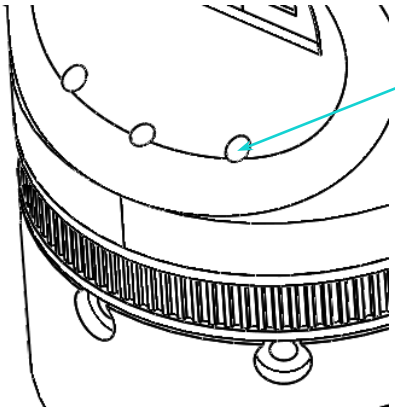
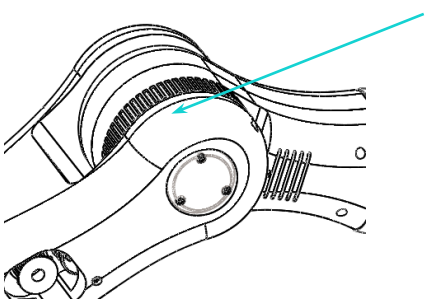
Part #7: Final Assembly



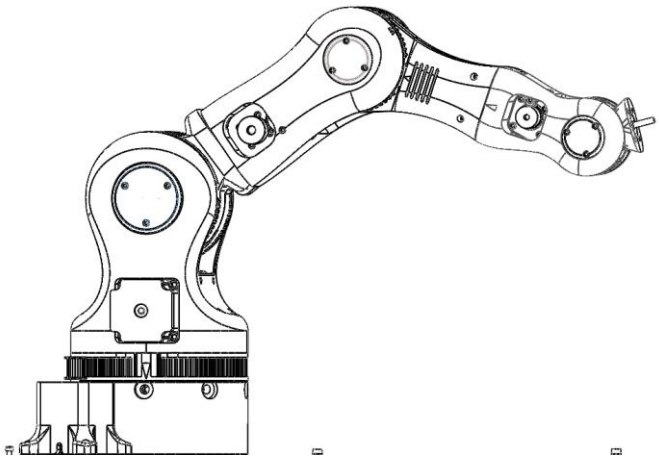
1. Assemble the shoulder gear to the base by running the M8 bolt through the brass bushing and tightening the lock nut.



1. Drop M4x45 cap screws down into the holes and then align with nuts on shoulder gear below. Tighten these to assemble the shoulder to the base



1. To assembled the forearm to the arm use the same technique that was used when assembling the shoulder gears
2. Drop the belt into place and get it around the timing pulley
3. Insert the shaft through the bearings and the body of the forearm



1. When all assembly is done, attach all bearing caps and mount the robot to the base.
2. Mount the base motor to the base

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6 Axis 3D Printed Robot Arm

Kit Contents

Servo Motor	Lower Timing Pullies	Upper Timing Pullies	Cable Wrap	Cable Wrap
Linear Bushings Axis Shafts Rigid Coupler	M3 Thermal Inserts M3	M4 X 12 M4 X 10 M4 X 15 M4 X 8	M3 X 10 M3 X 8	Tools Cable Ties T5 Timing Belts
	M4 Nuts	M4 X 20 M4 X 40 M4 X 45 M4 X 30	M3 X 12 M3 X 16	
	M5 Nuts	M4 X 60 M5 X 20 M4 X 25	M3 X 20 M3 X 25	
			M3 X 35 M3 X 30 M3 X 40	
Bearings (4 Types)		M5 X 14	M8 X 65 M8 Nuts	Bootable SD Card