

zortrax



# Robotic Arm Assembly Manual

# 1. List of materials

## 3D printed Parts:

Part	Quantity
Arm 1 gear.STL	1
Arm 1 lower.STL	1
Arm 1 upper.STL	1
Arm 2.STL	1
Arm 3.STL	1
Base gear.STL	1
Base.STL	1
Grasper 1.STL	1
Grasper 2.STL	1
Grasper Body.STL	1
Grasper holder.STL	1
Ring.STL	1
Side cover arm L.STL	1
Side cover arm R.STL	1
Side cover base L.STL	1
Side cover base R.STL	1
Side lid arm L.STL	1
Side lid arm R.STL	1
Small gear.stl	1
Support.STL	1
Toothed ring.STL	1
Vertical axis gear.STL	1

## Hardware:

Part	Quantity
Steel rod $\varnothing 8 \times 80$	2
M3 x 12 SHCS screw	14
M3 x 20 SHCS screw	10
M3 nut	8
Steel balls	36
Spring 6x20	2

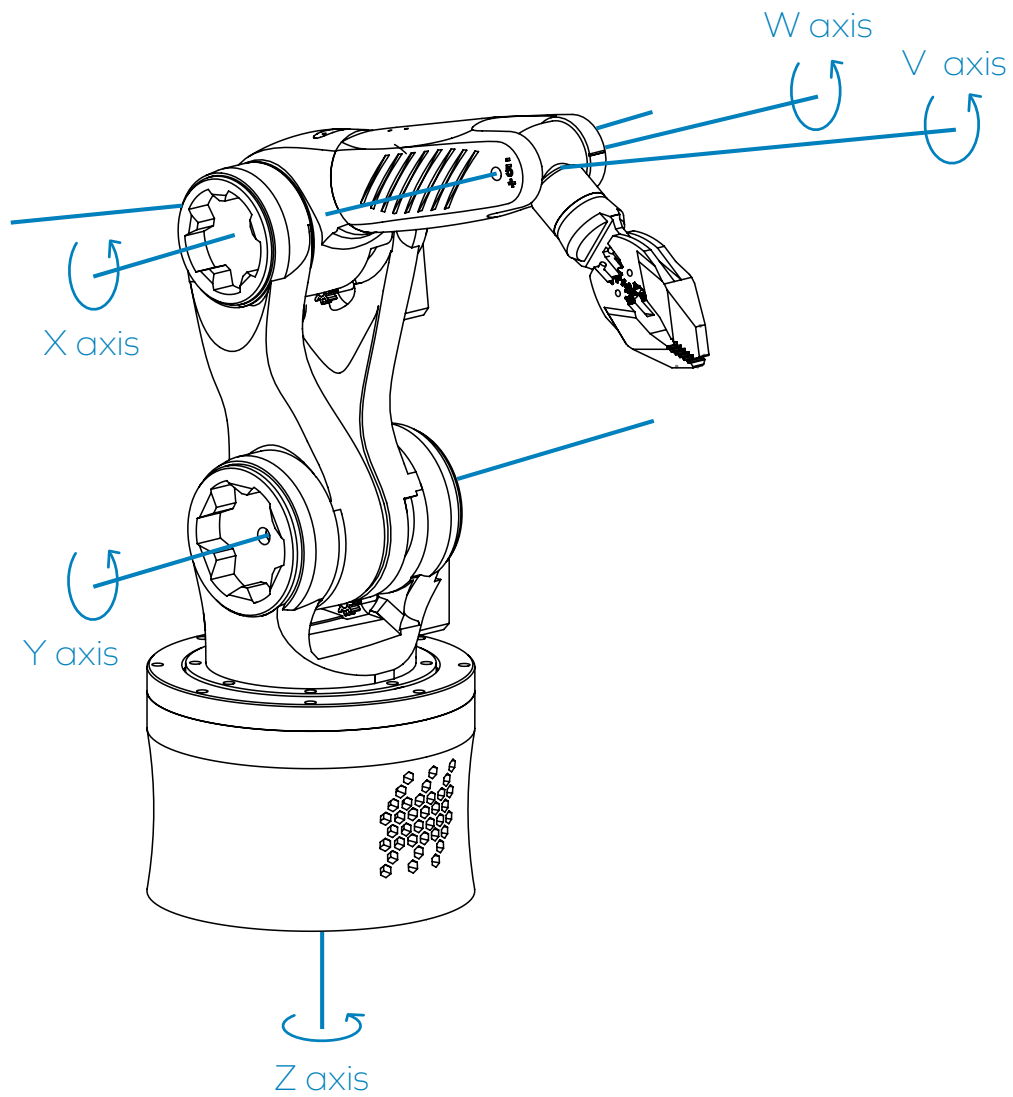
## Electronics:

Part	Quantity
Power supply	1
RAMPS 1.4 board	1
Nema 17 Stepper Motors	3
40x40 Fan	2
Wires	-

## 2. Robot axes

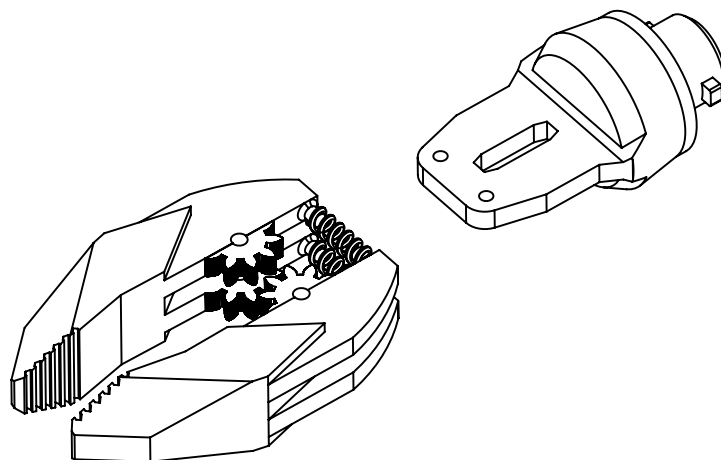
Movable axes: V, W, X, Y, Z

Electrically driven axes: X, Y, Z

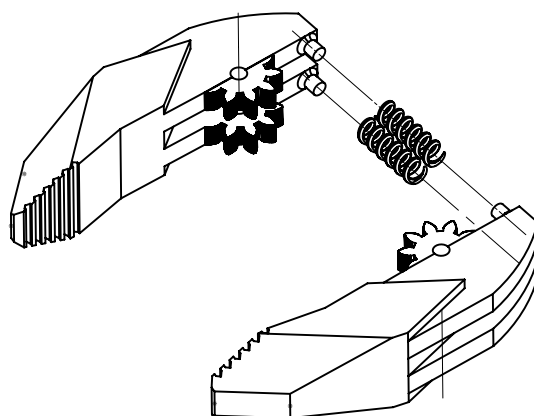


### 3. Gripper assembly

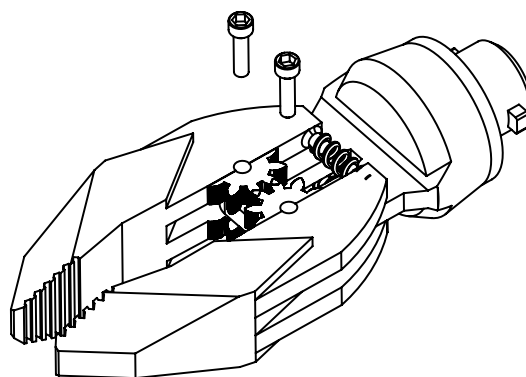
1. Take two springs 6x20 and connect them to grasper 1 and grasper



2. Put the assembly on the grasper body.

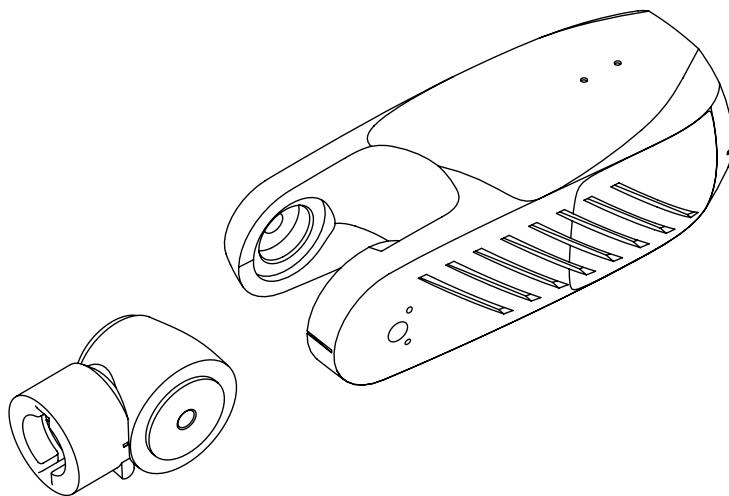


3. Insert two screws M3 x 20 SHCS into the grasper 1 and grasper 2.



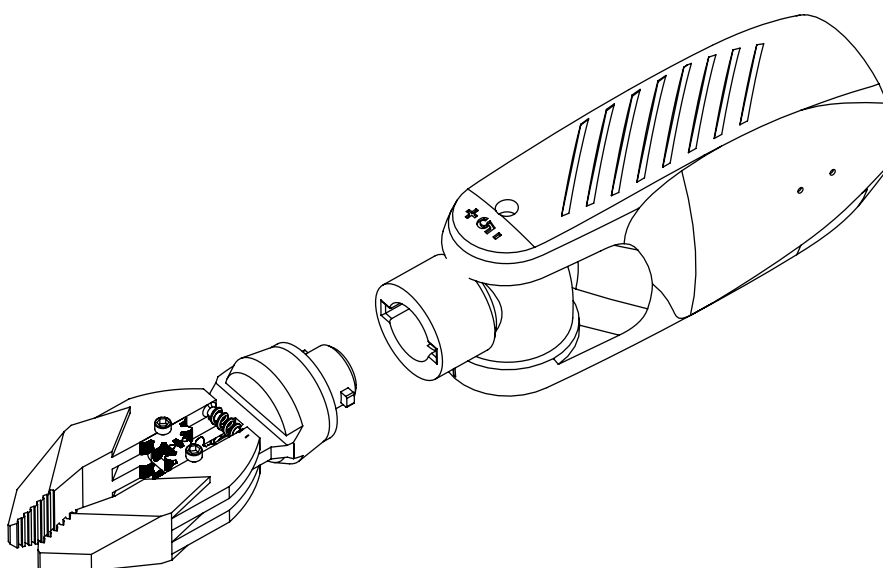
## 4. W axis assembly

1. Connect the grasper holder to arm 3.



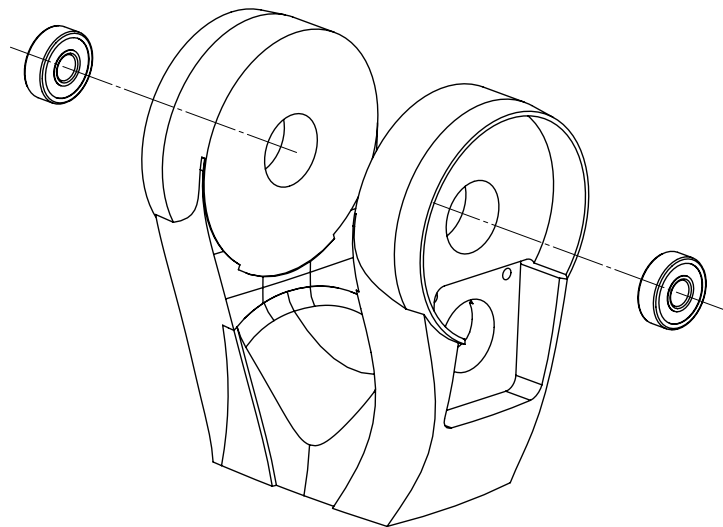
## 5. V axis assembly

1. Insert the grasper assembly into the grasper holder.

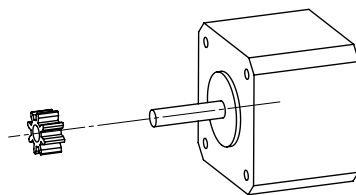


## 6. X axis assembly

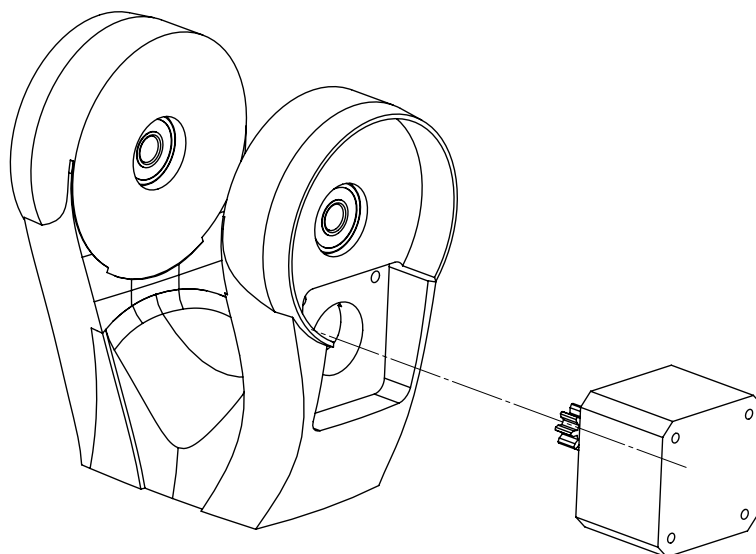
1. Insert two bearings 608 into the arm 1 upper.



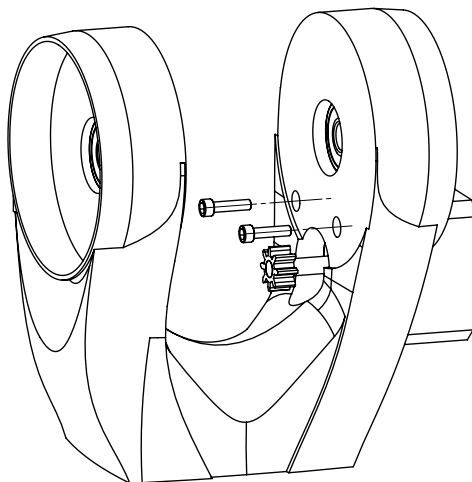
2. Put the small gear on the motor.



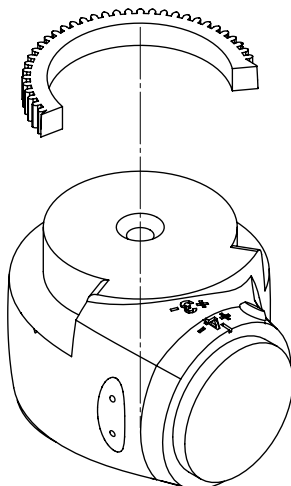
3. Put motor into the slot.



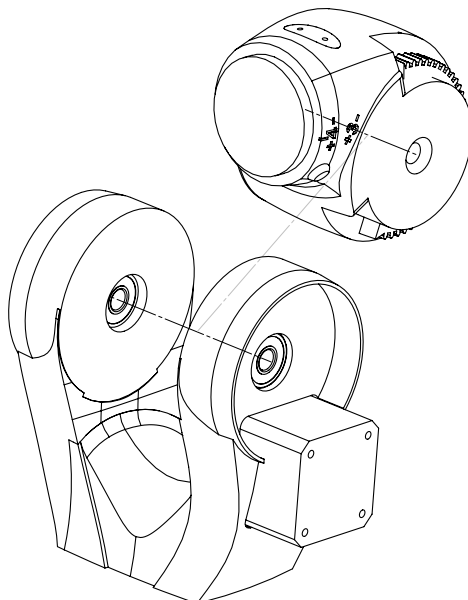
4. Take two screws M3 x 12 SHCS and insert them into the holes in the arm 1 upper.



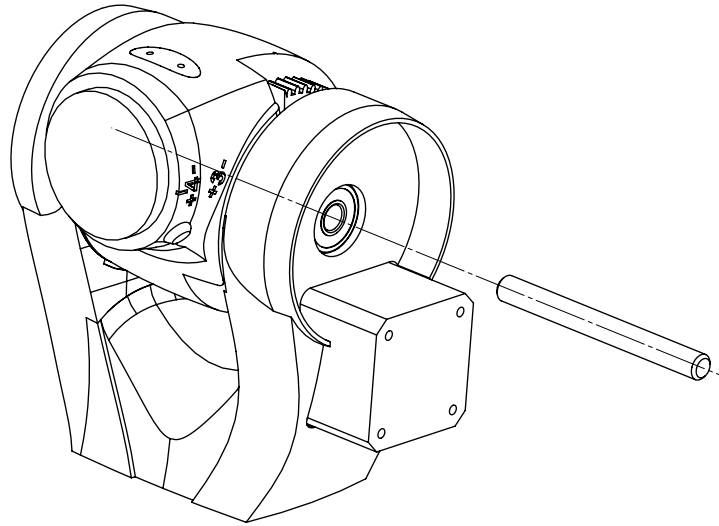
5. Put the arm 1 gear on the arm 2 and connect them with glue.



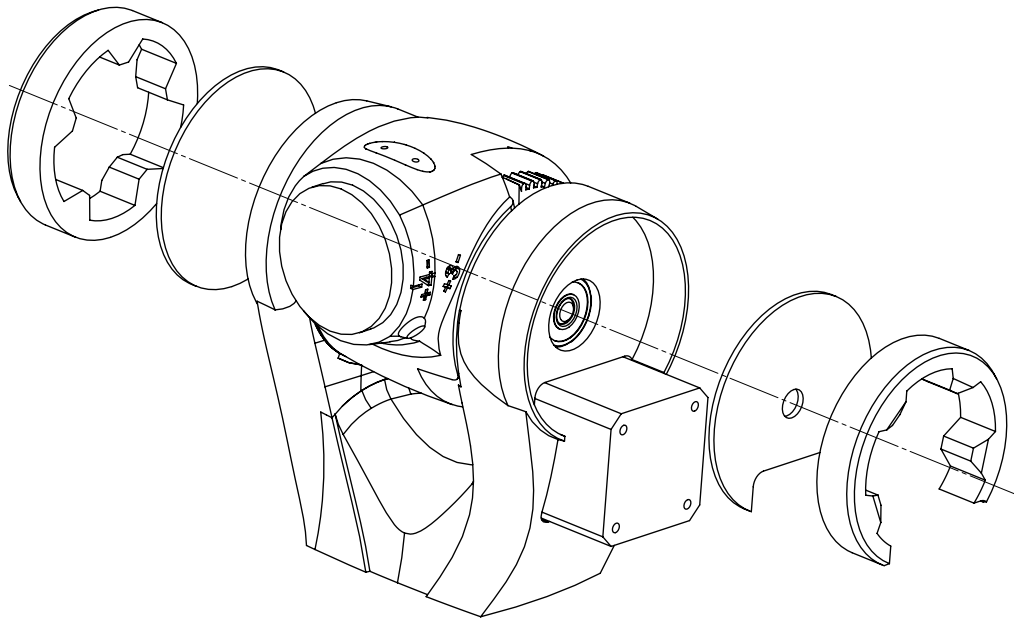
6. Put together arm 2 and arm 1 upper.



7. Insert the steel rod  $\varnothing 8 \times 80$  into the bearings in arm 1 upper.



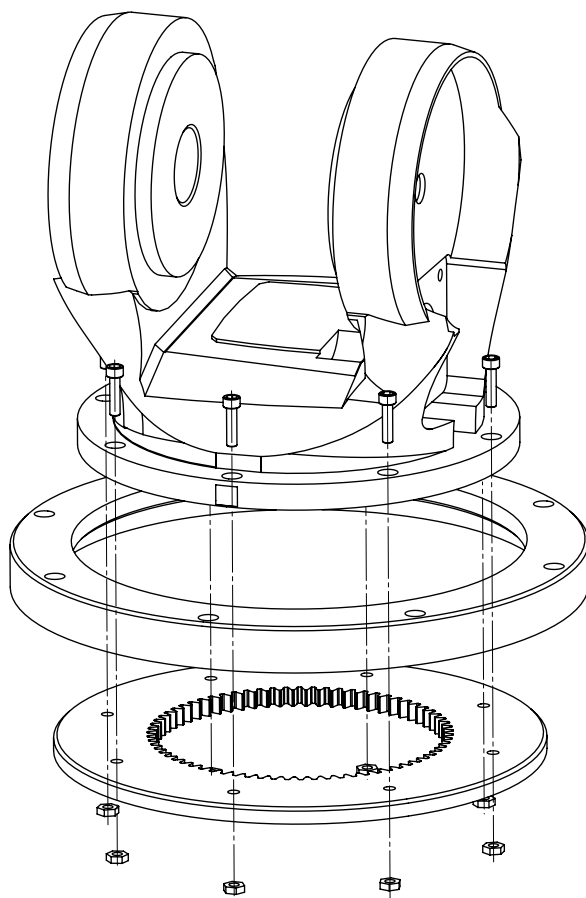
8. Take side lid arm L and side lid arm R and put it into the holes in arm1 upper. Put arm cover L and arm cover into the holes in arm1 upper.



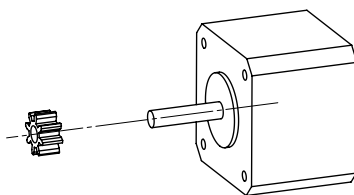


## 7. Y axis assembly

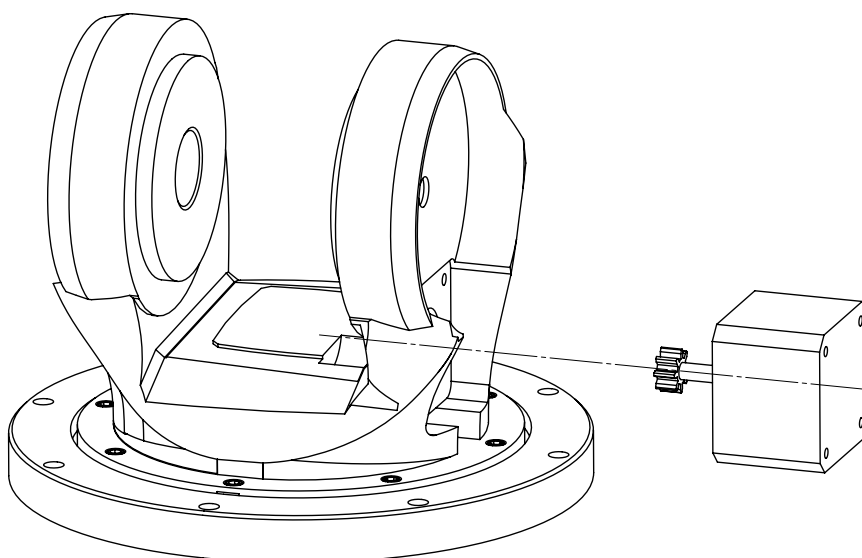
1. Connect base with toothed ring, then connect it with eight SHCS screws and eight M3 nuts. The ring should be placed between the base and the toothed ring.



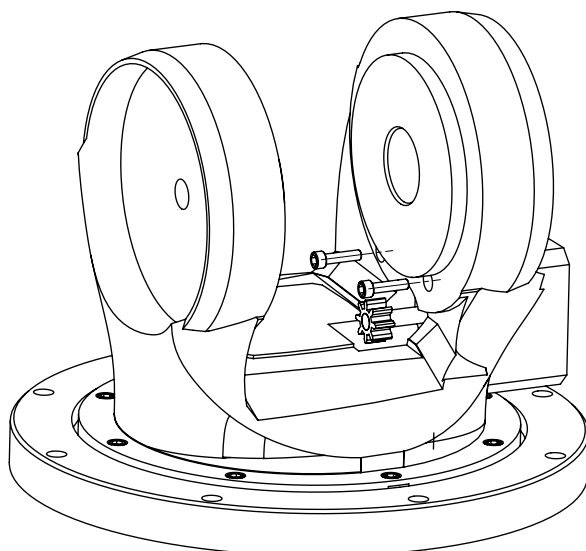
2. Put the small gear on the motor shaft.



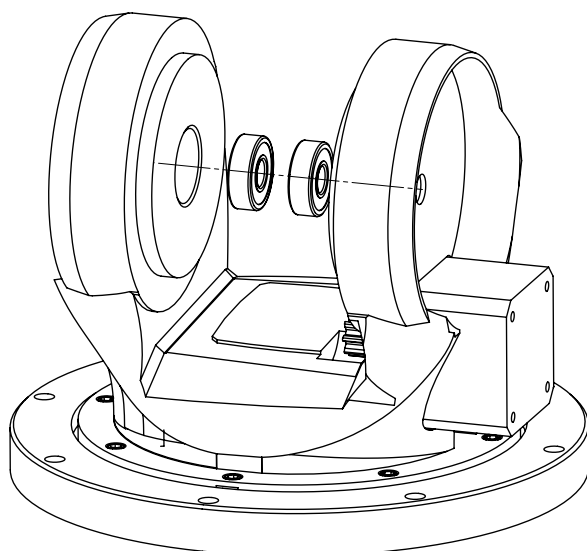
3. Insert the motor into the slot in base.



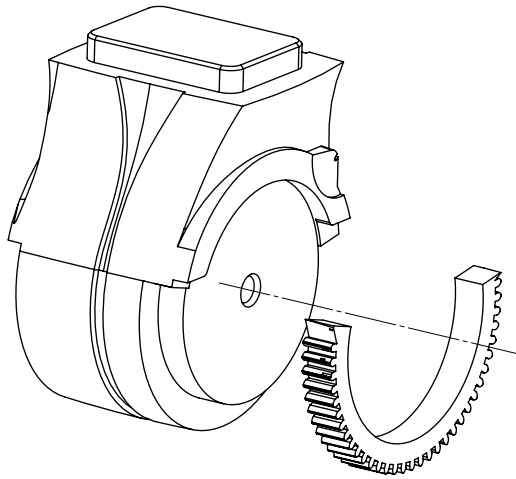
4. Insert two screws M3 x 12 SHCS into the holes in the base.



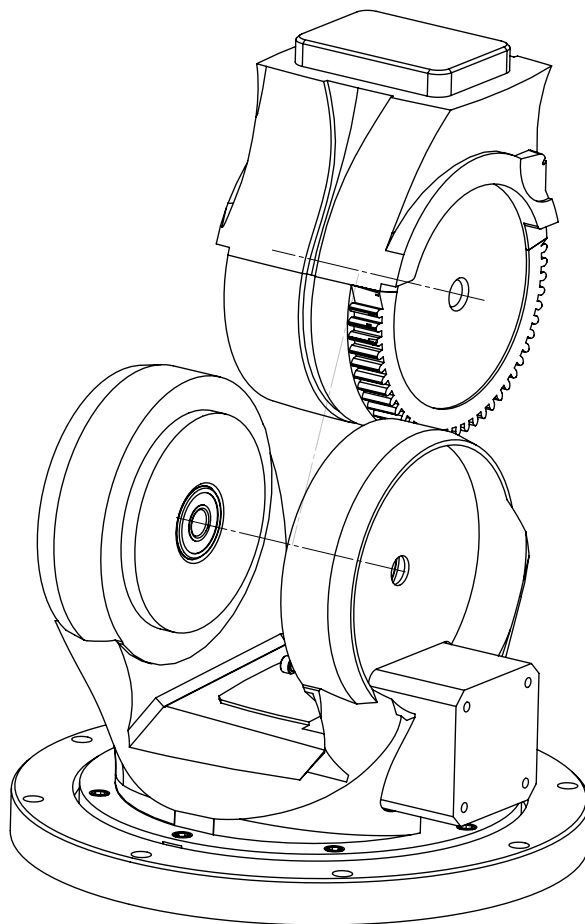
5. Insert two 608 bearings into the holes in the base.



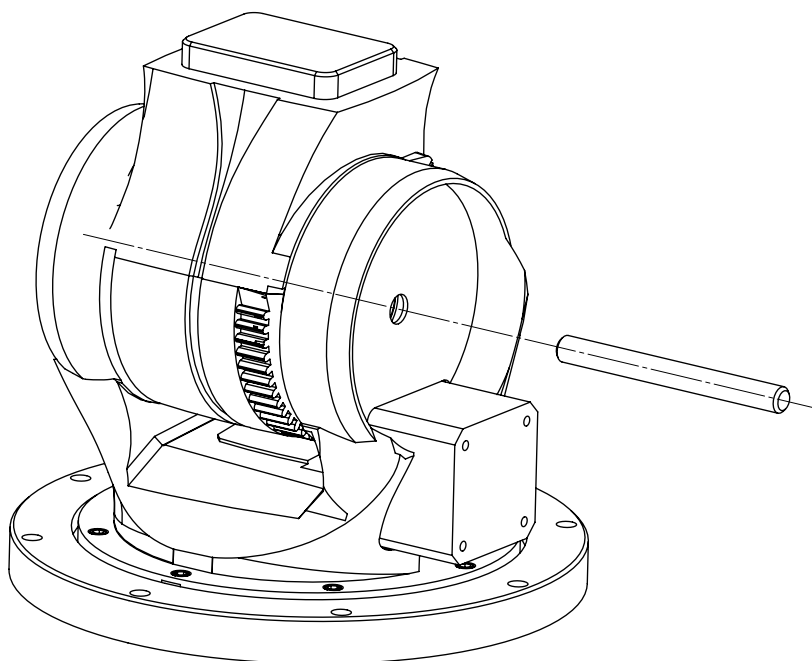
6. Use glue to connect the base gear and the arm 1 lower.



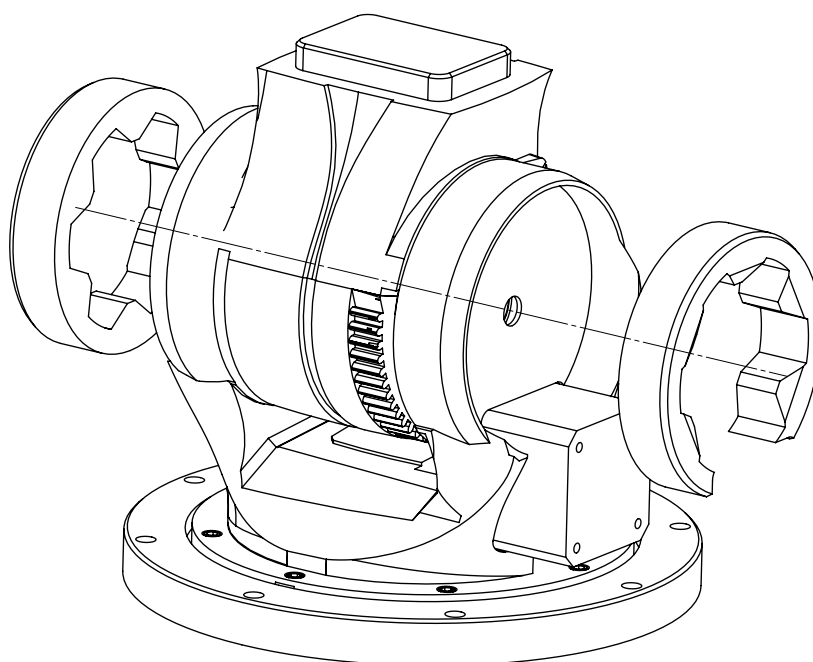
7. Put the arm1 lower on the base.



8. Insert the steel rod  $\varnothing 8 \times 80$  into the bearings in the base.

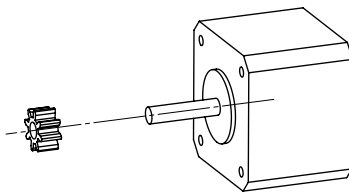


9. Connect side cover base L and R.

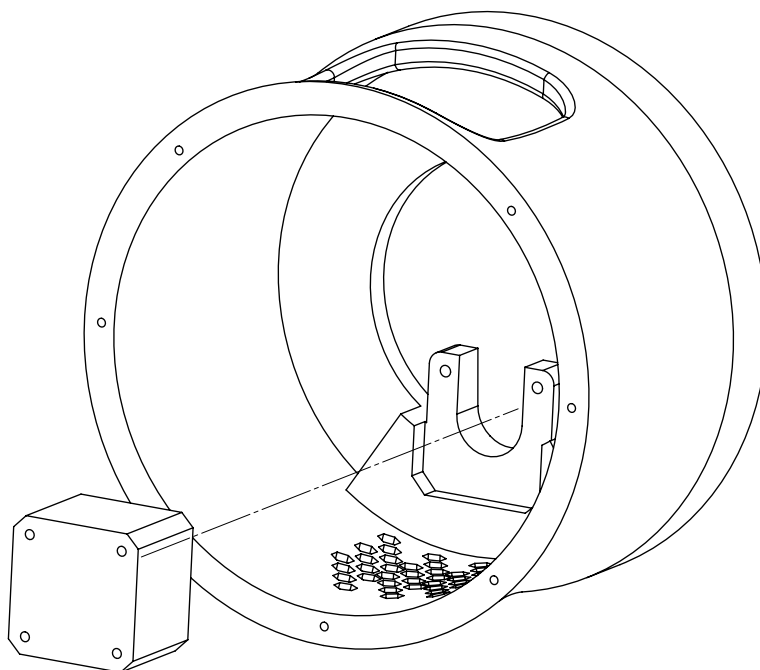


## 8. Z axis assembly

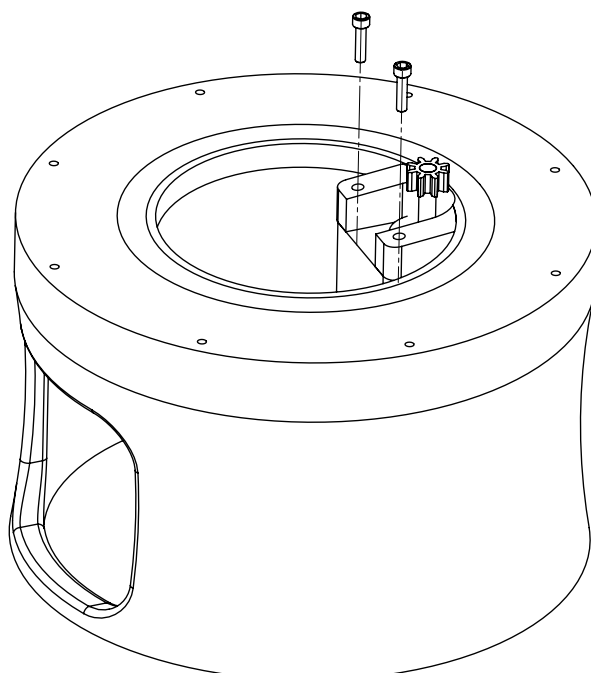
1. Put the vertical axis gear on the motor.



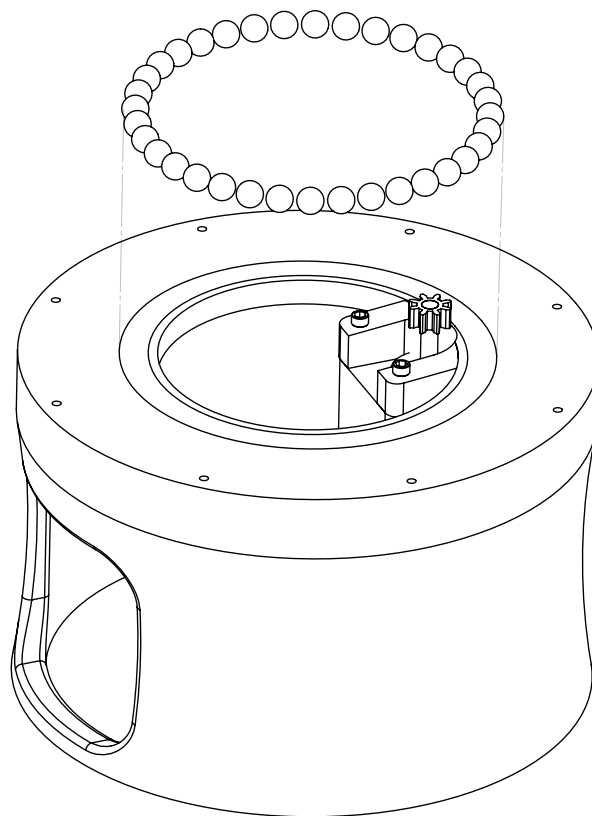
2. Put the motor on the slot in support.



3. Secure motor with screw M3 x 12 SHCS

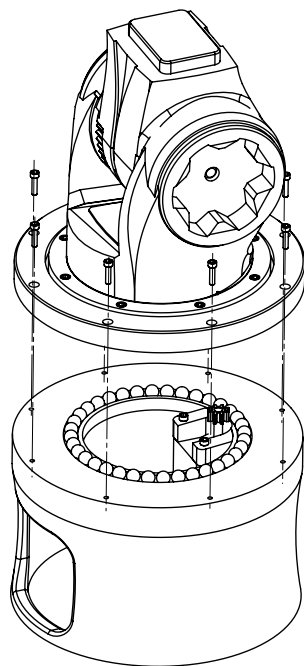


4. Put 36 steel balls on the support track.

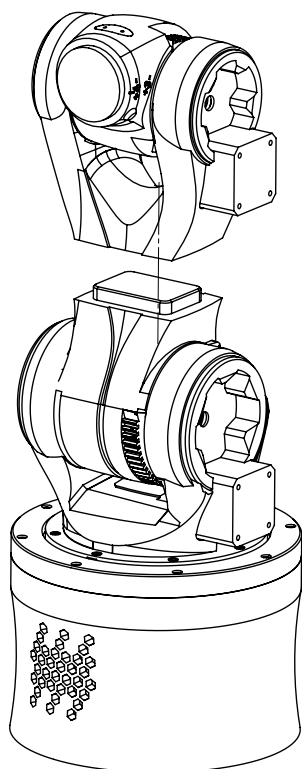


## 9. Z axis assembly

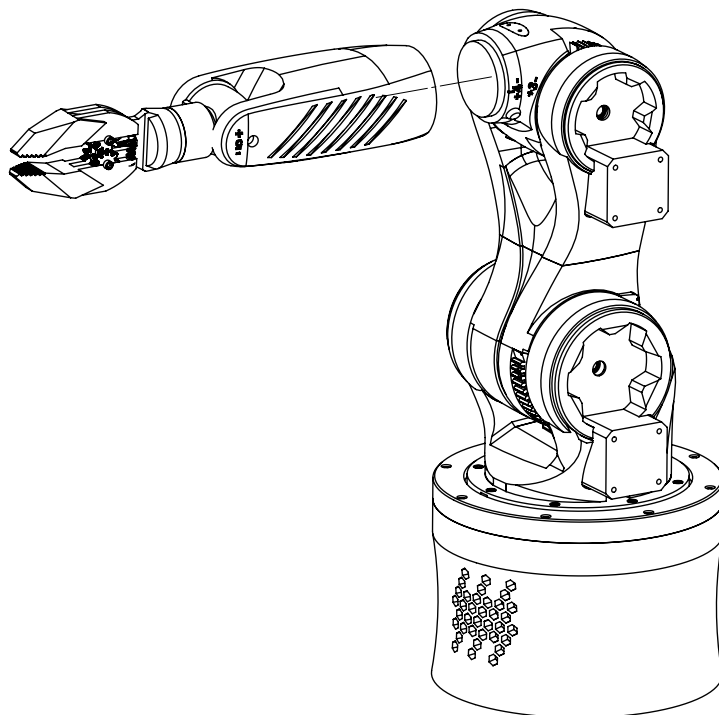
1. Connect the Y axis assembly with the support using 8 screws M3 x 20 SHCS.



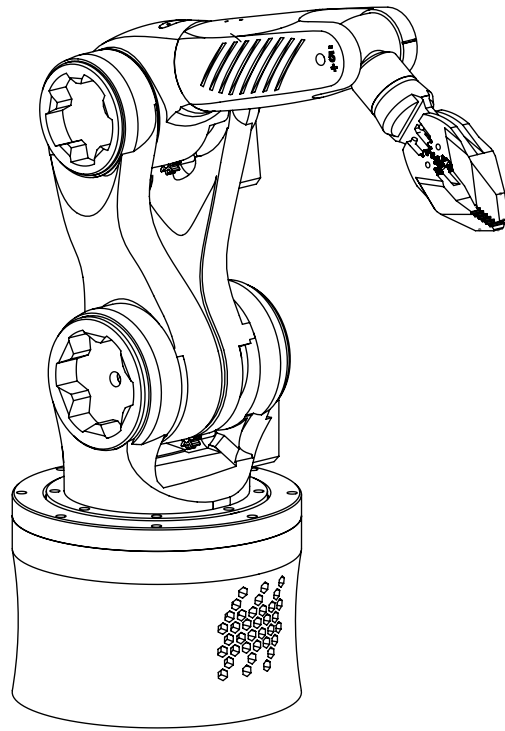
2. Connect X axis to Y axis assembly.



3. Connect V axis assembly to X axis assembly.



# Final look





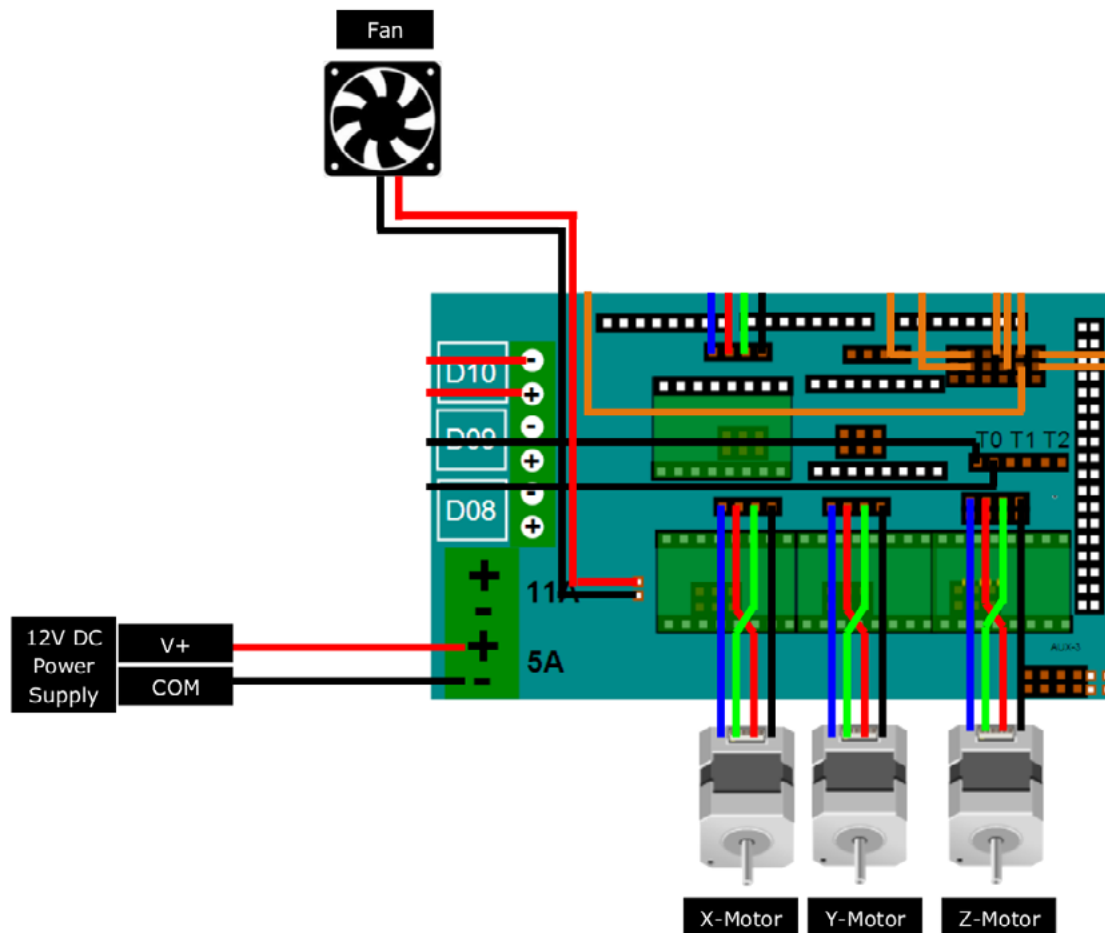
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Robotic Arm Electronics Manual

# 1. Electronics parts needed

- 12V Power supply (100W or more)
- 1x RAMPS 1.4 board with at least 3 Stepper motor controllers (stepsticks)
- 3x Nema 17 Stepper Motors
- 1 or 2 12V 40x40mm fans
- Wires and USB cable (used for 2D printers)



# 2. Installing electronics

1. Mount all motors on the robotic arm.
2. Connect all the motors to the motherboard. Colors of motor wires can vary depending on a motor model.
  - X motor means lower horizontal motor
  - Y motor means upper horizontal motor
  - Z motor means vertical motor
3. Place the motherboard in the compartment below the robotic arm.
4. Connect fan. You can connect 2 fans, just connect them in parallel. They need to fan on your electronics to prevent it from overheating.
5. Connect the power supply.

# 3. Programming the Electronics

1. Install Arduino Mega driver on your OS.
2. Upload firmware on RAMPS: Launch Arduino uploader and upload Marlin file from Marlin folder.
3. Download Pronterface – program for launching prints for 3D printers.
4. Launch Pronterface. Connect with your RAMPS.
5. Click Load File. Load Dancing robot.gcode file and click Print.