

TOOLBOX ROBOTICS

Collaborative Robotic Arm EB300

Assembly document with instructions

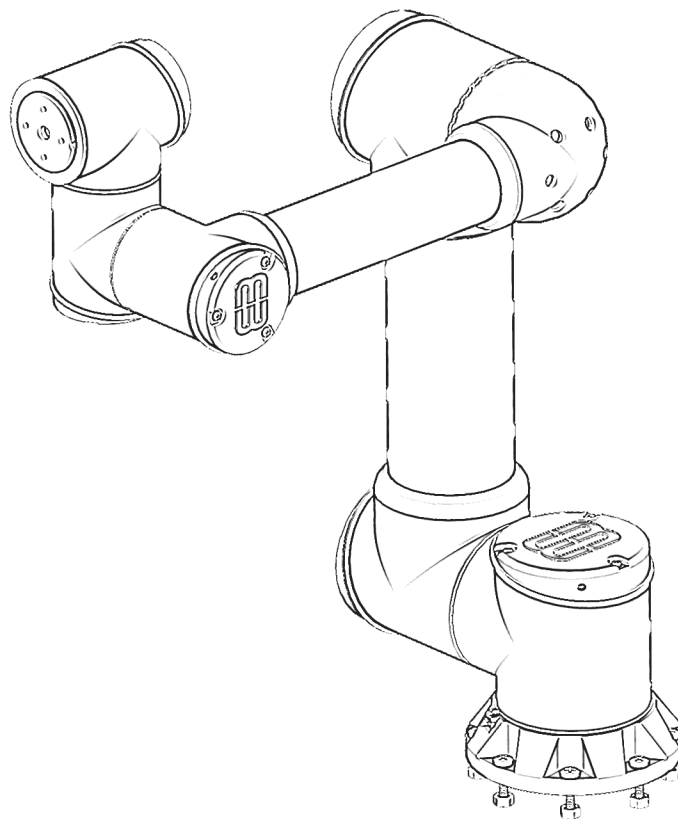


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Web:

<https://toolboxrobotics.com>

Youtube:

<https://www.youtube.com/@ToolBoxRobotics>

Tools

Necessary tools

Screw cross head screwdriver



Metal saw



Spanner 5/16



Drill bit 9/64



Drill



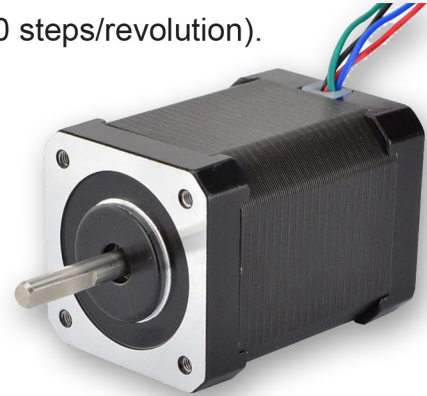
Electromechanical

NEMA 17 stepper motor 60mm (x3)

NEMA 17 is a hybrid stepping motor with a 1.8° step angle (200 steps/revolution).

Specification:

- 4 wires or 6 wires
- 1.8 deg. Step angle (200 steps/rev)
- Holding torque of 0.65 Nm
- Rated current 2.1 A
- Dimensions: 42 x 42 x **60mm**
- Rod diameter: $\Phi 5$ mm

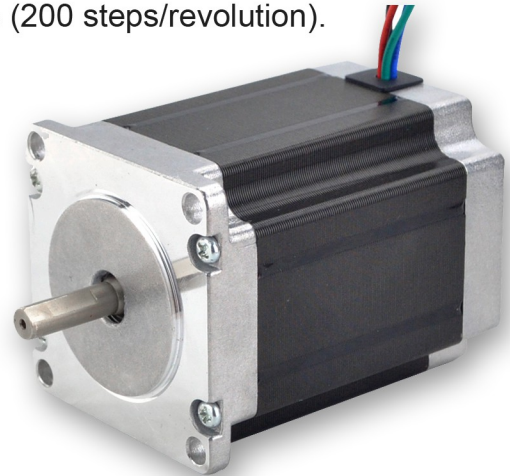


NEMA 23 stepper motor 76mm (x1)

NEMA 23 is a hybrid stepping motor with a 1.8° step angle (200 steps/revolution).

Specification:

- 4 wires or 6 wires
- 1.8 deg. Step angle (200 steps/rev)
- Holding torque of 1.85 Nm
- Rated current: 2.8 A
- Dimensions: 57 x 57 x **76mm**
- Rod diameter: $\Phi 8$ mm or $\Phi 6.35$ mm

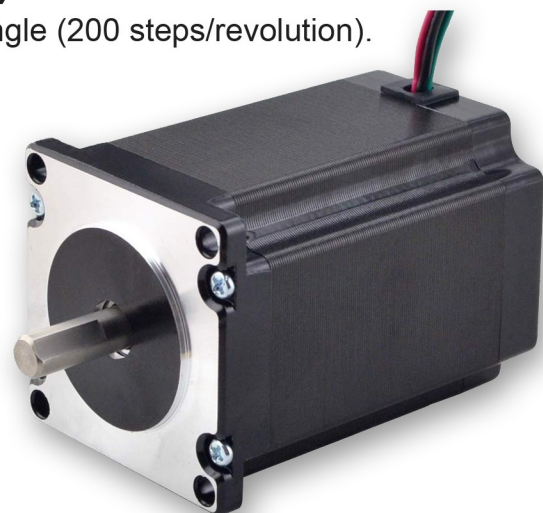


NEMA 23 stepper motor 82mm (x2)

NEMA 23 is a hybrid stepping motor with a 1.8° step angle (200 steps/revolution).

Specification:

- 4 wires or 6 wires
- 1.8 deg. Step angle (200 steps/rev)
- Holding torque of 2.4 Nm
- Rated current: 4.0 A
- Dimensions: 57 x 57 x **82mm**
- Rod diameter: $\Phi 8$ mm or $\Phi 6.35$ mm

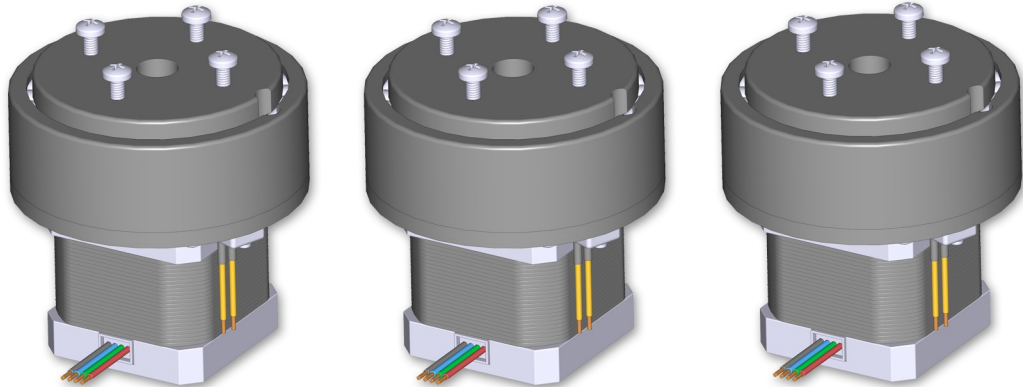


Planetary Gears Actuators

You will need

Planetary Gears Actuator **EBA17**

(x3)

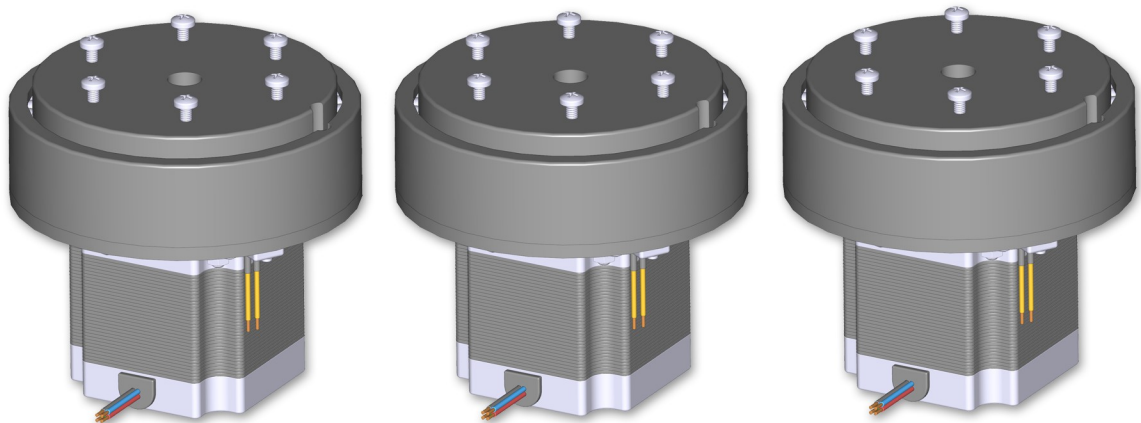


Planetary Gears Actuator EBA17 Nema 17

<https://toolboxrobotics.com/robotic-actuator-eba17>

Planetary Gears Actuator **EBA23**

(x3)



Planetary Gears Actuator EBA23 Nema 23

<https://toolboxrobotics.com/robotic-actuator-eba23>

Materials

You will need

3D filament 1.75 Black

- 1KG PLA+ or ABS (x2)
- ± 0.02 MM



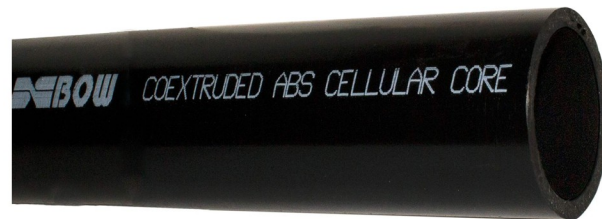
3D filament 1.75 Grey

- 1KG PLA+ or ABS (x1)
- ± 0.02 MM



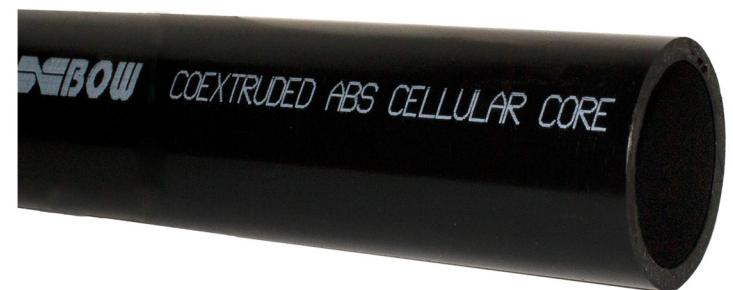
2" black ABS pipe

Cut a length of 220mm



3" black ABS pipe

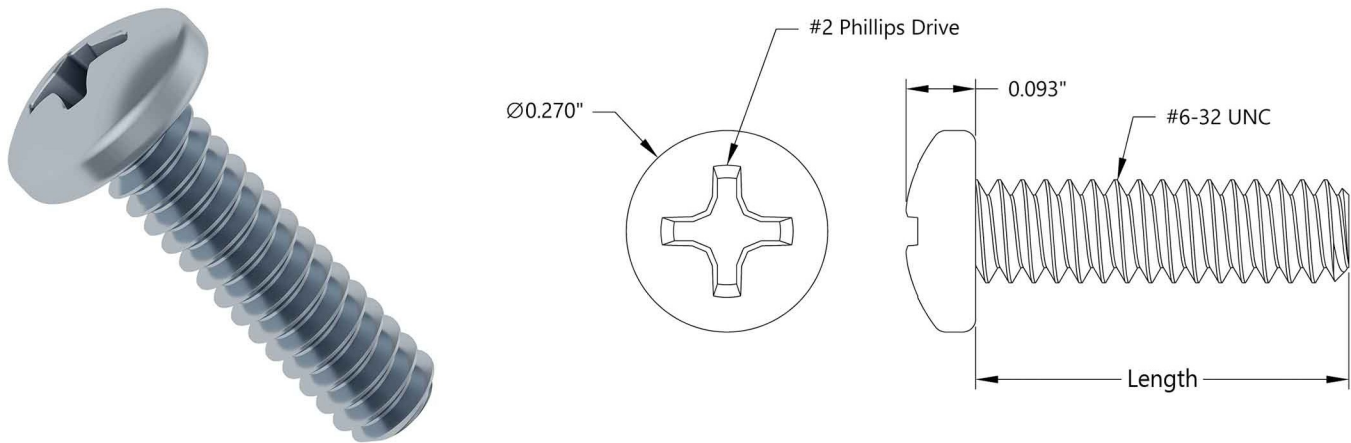
Cut a length of 220mm



Hardware

Screws and bolts

6-32 Pan Head Screws are a great alternative. Pan heads provide more surface area under the head which is preferred when working with plastic and soft materials that are prone to distorting from the pressure of tightening a screw. The head height is less than a socket head screw so if you're limited on clearance in that orientation, these may provide that bit of extra space to make your project come together.



Hardware

Screws, nuts and washers

#6-32 x 1/2in



#6-32 x 3/4in



#6-32 x 1-1/2in



#6-32



#6-32



Use a metal saw to cut these screws

#6-32 x 11mm

#6-32 x 16mm



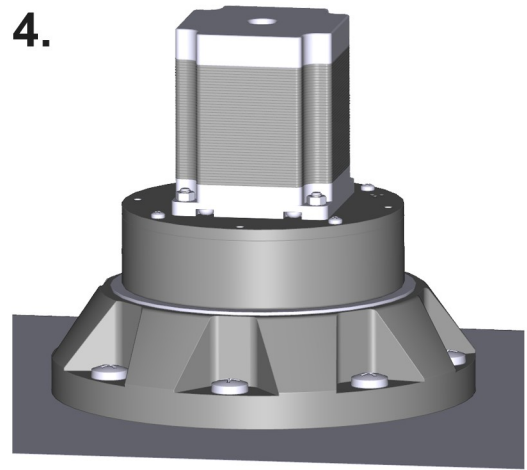
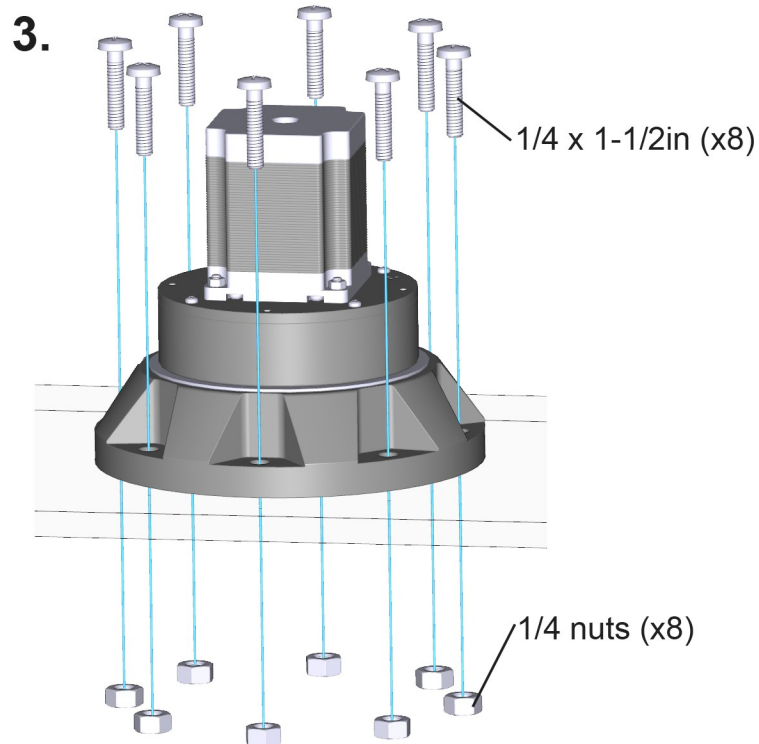
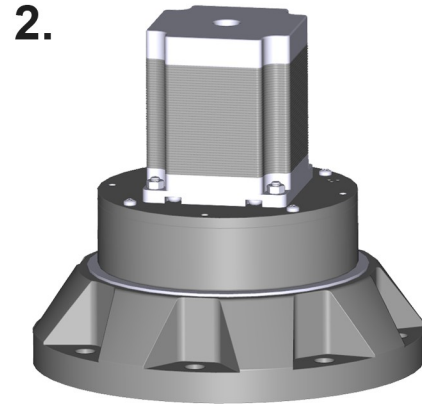
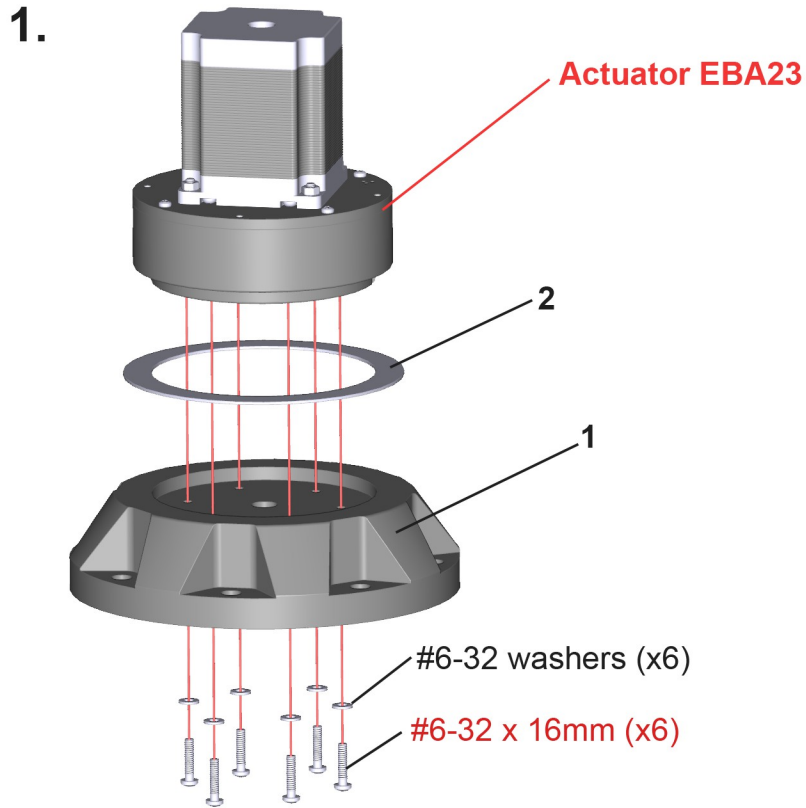
1/4 x 1-1/2in



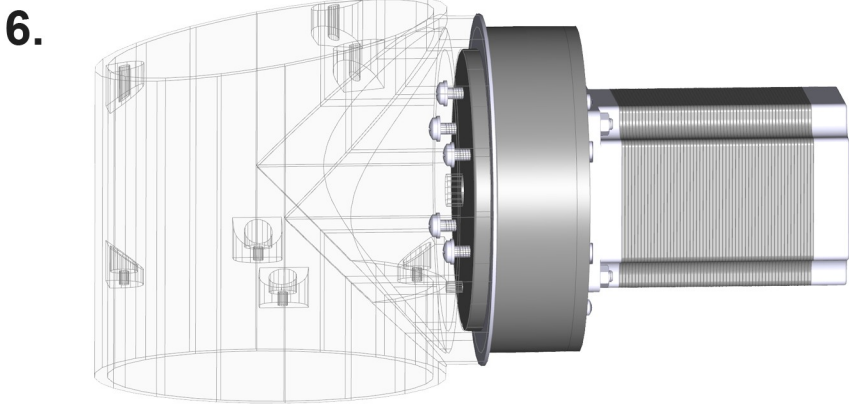
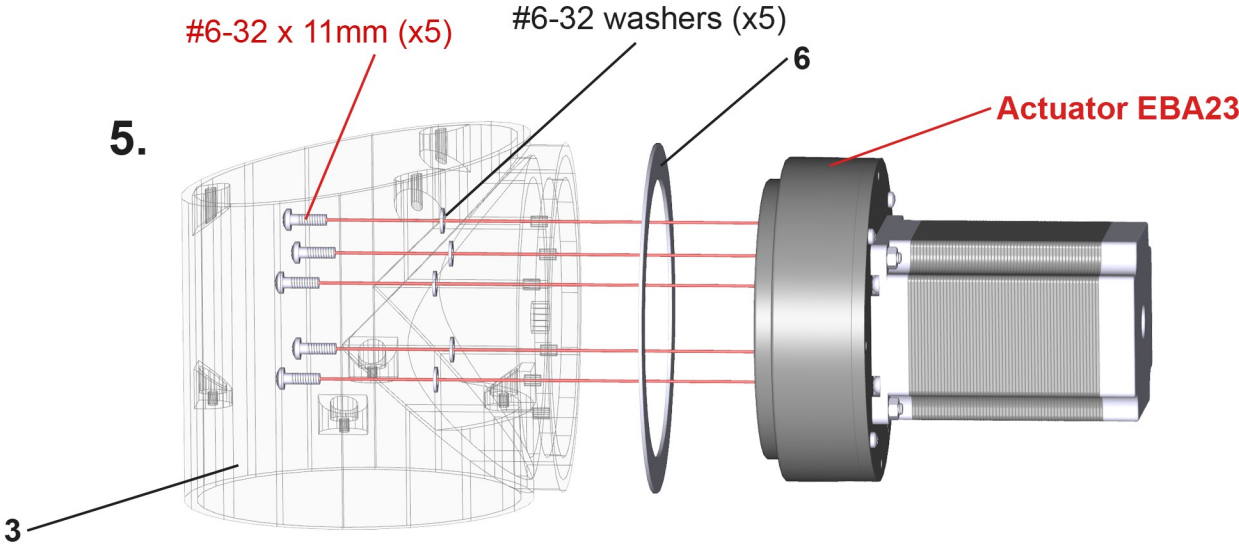
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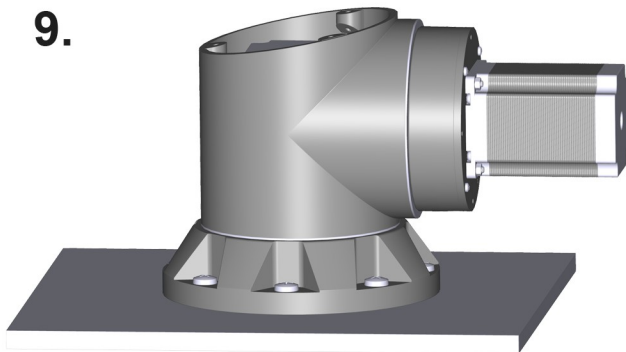
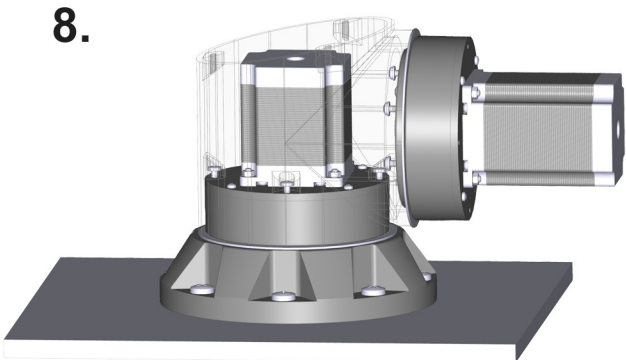
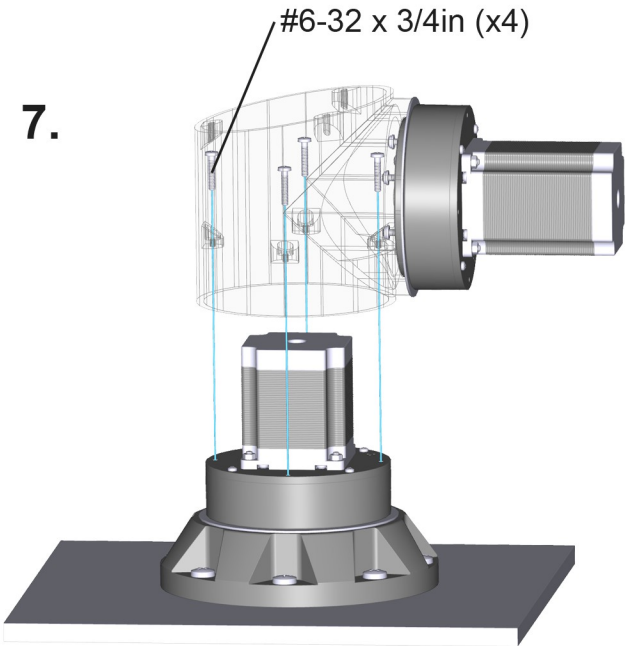
Step 1



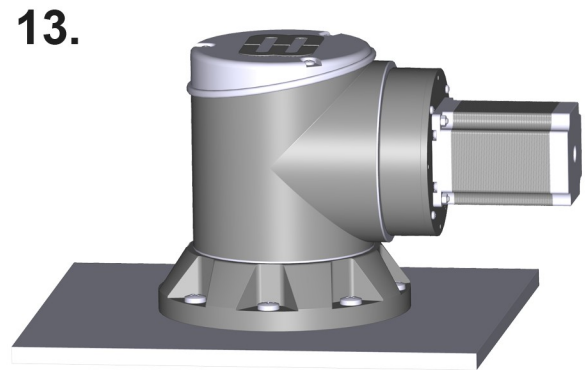
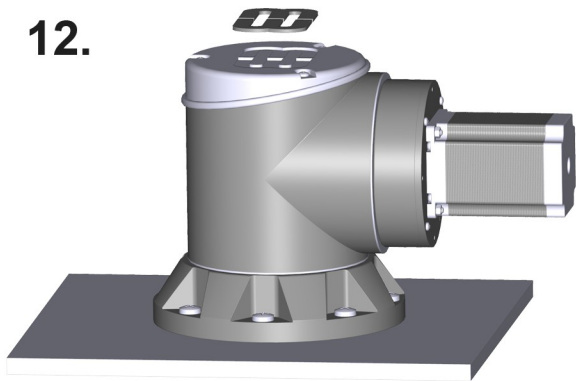
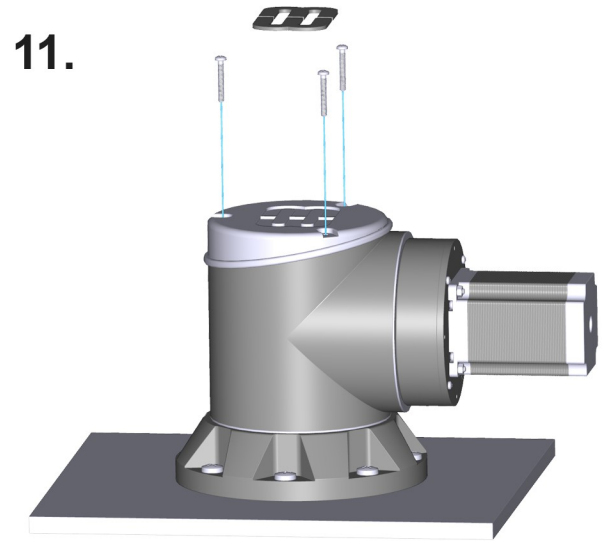
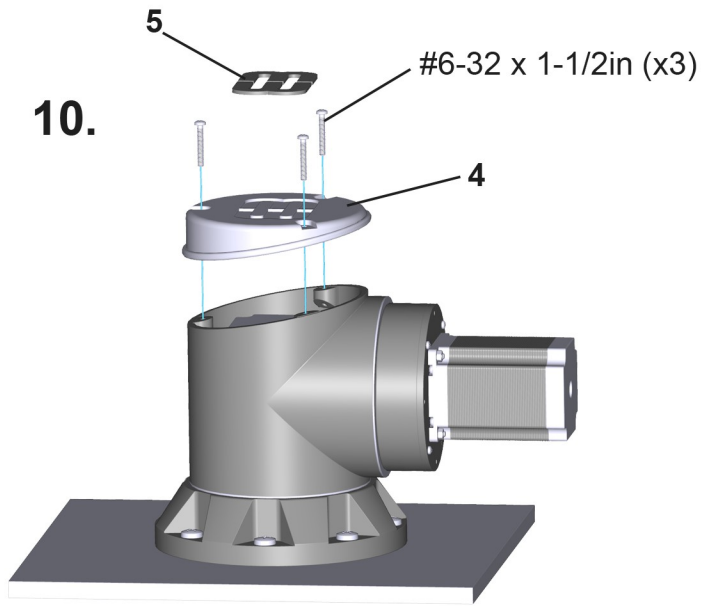
Step 1



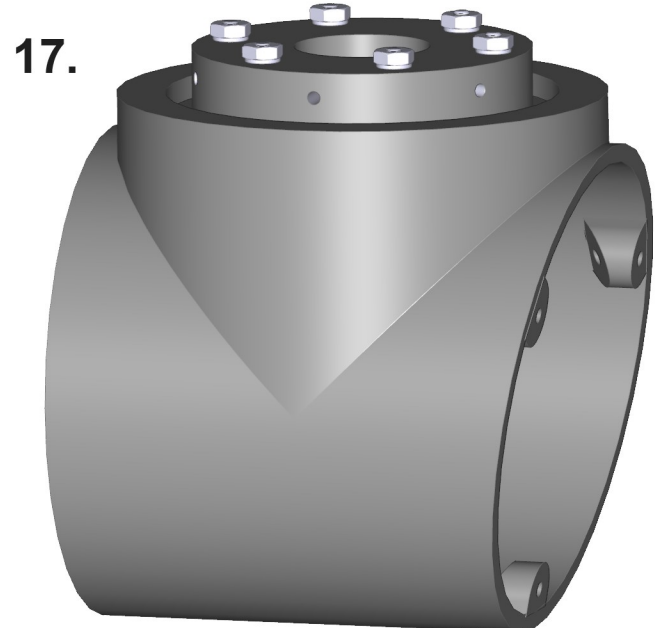
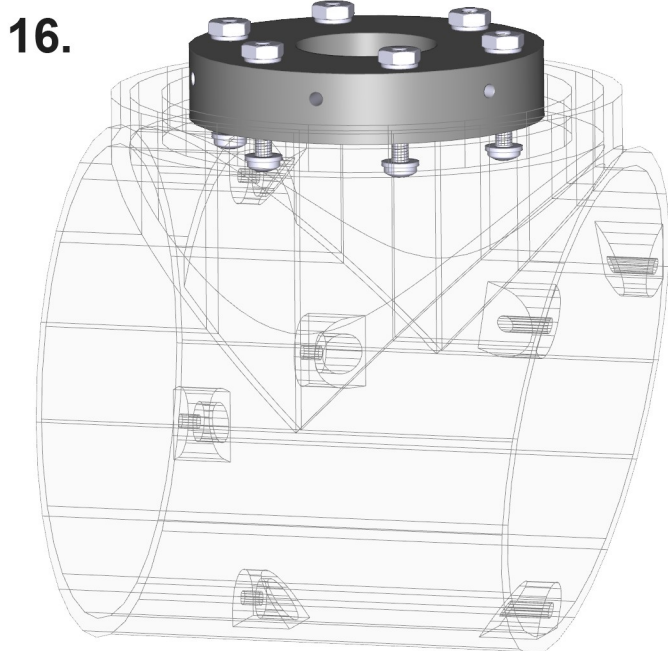
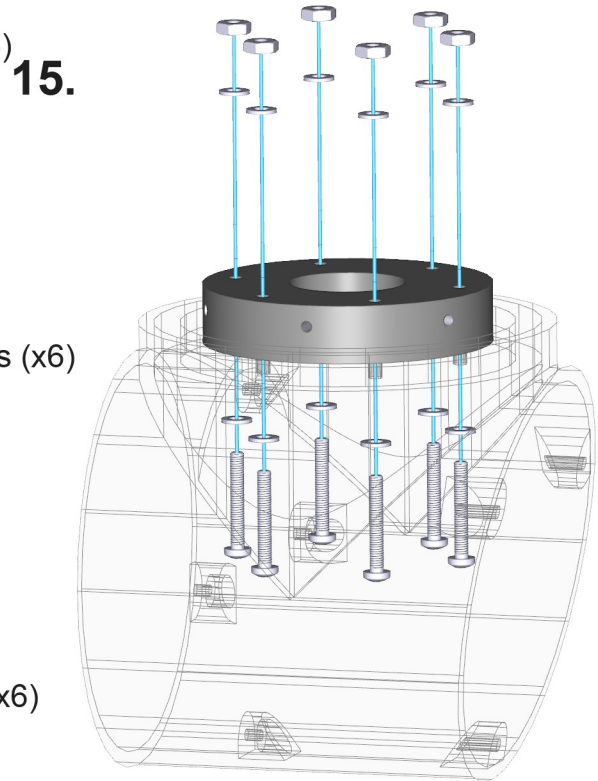
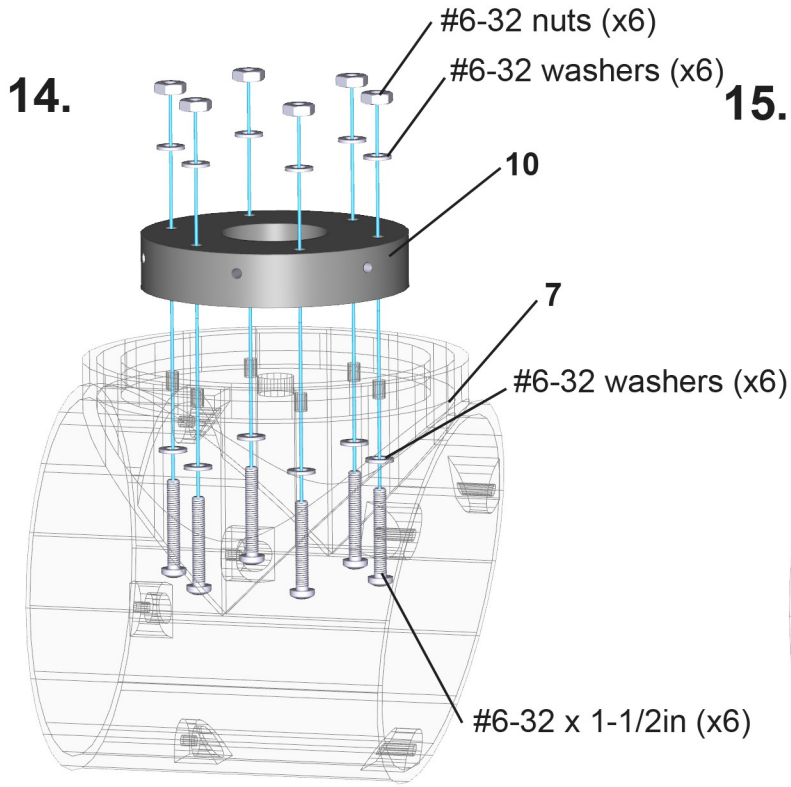
Step 1



Step 1

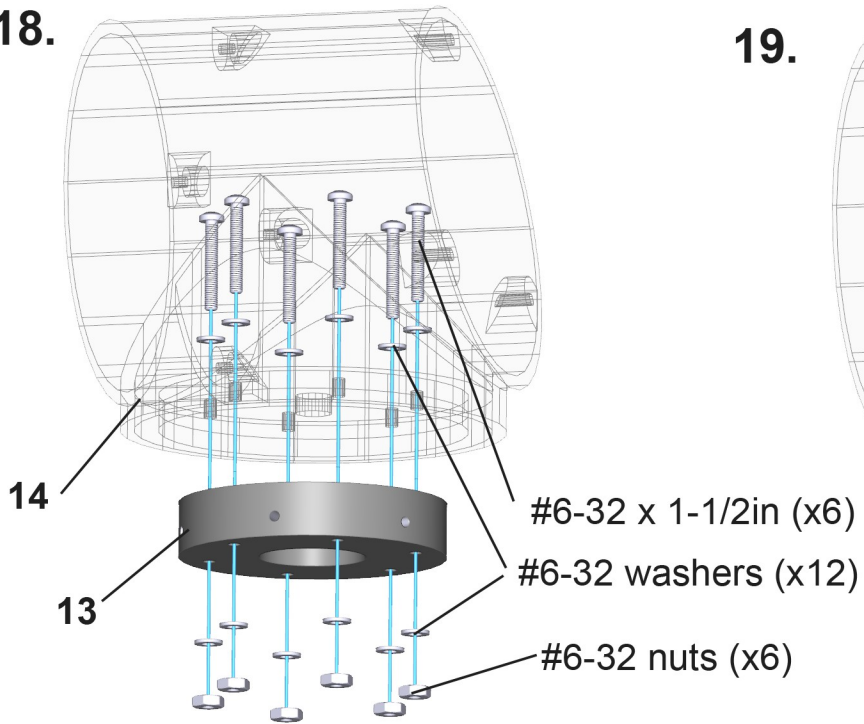


Step 2

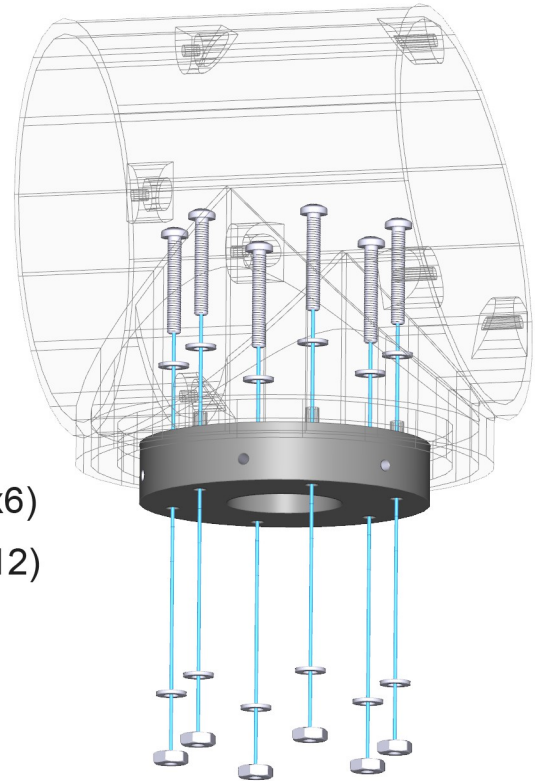


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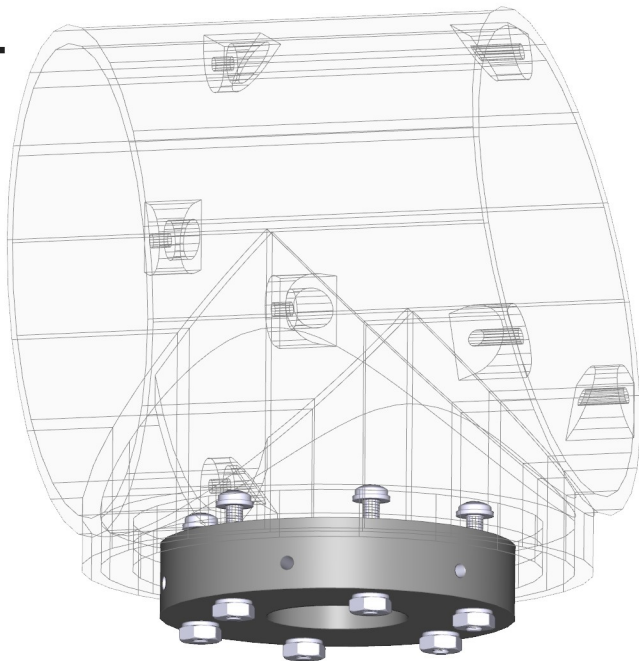
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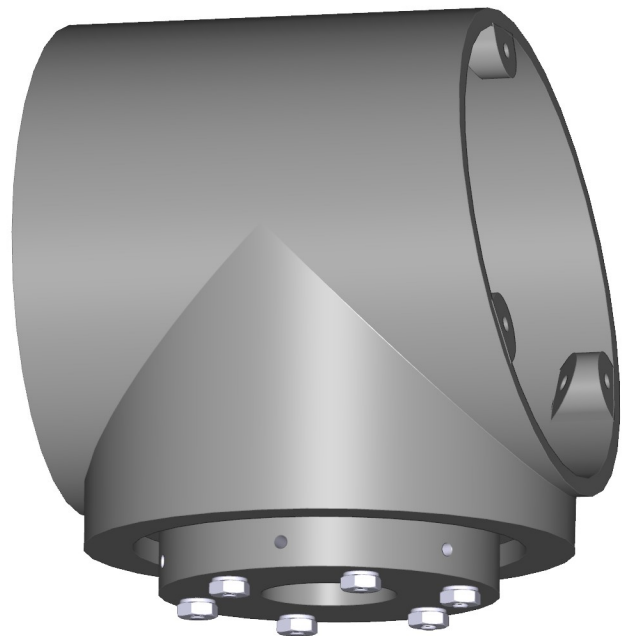
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20.

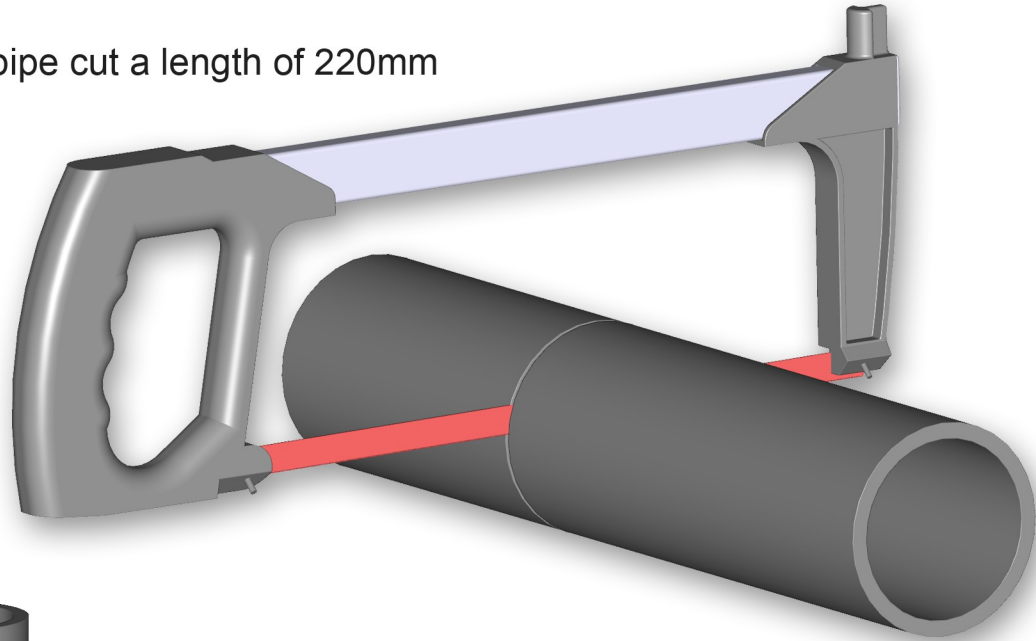


21.



Step 2

3" black ABS pipe cut a length of 220mm

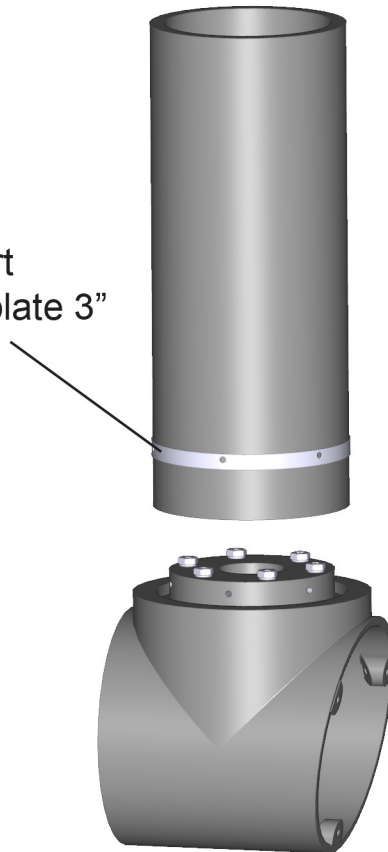


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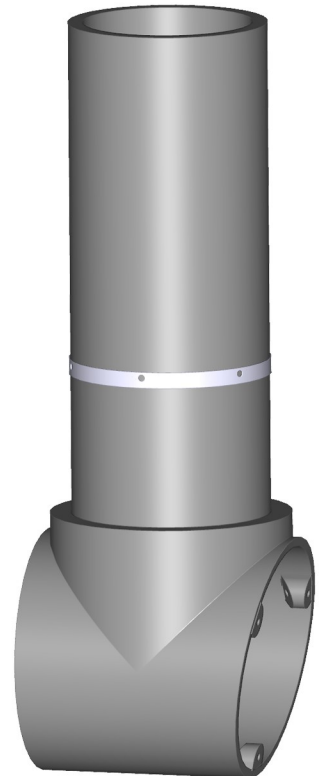


23.

Insert
template 3"



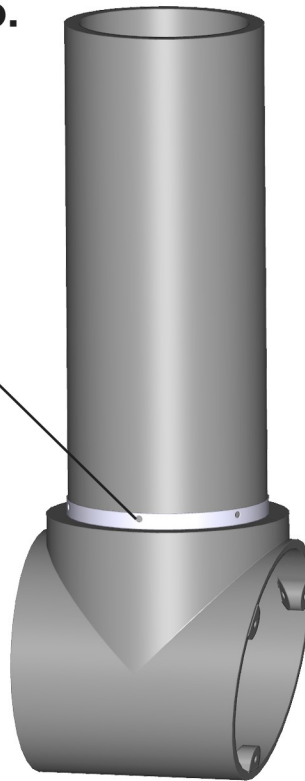
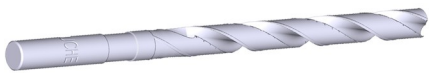
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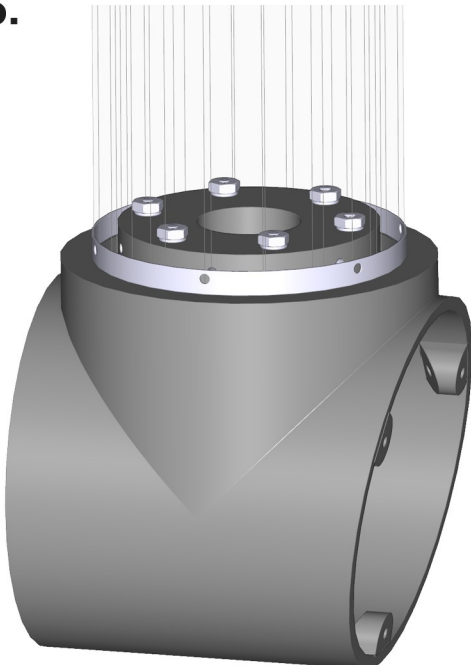
Step 2

25.

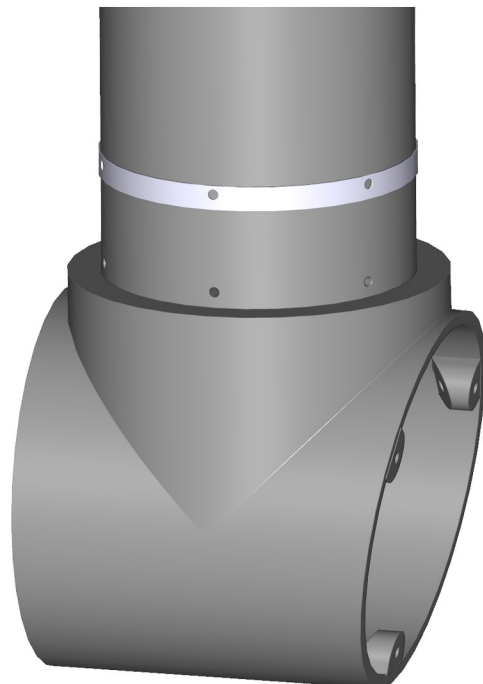
Drill the holes with the 9/64 drill bit



26.

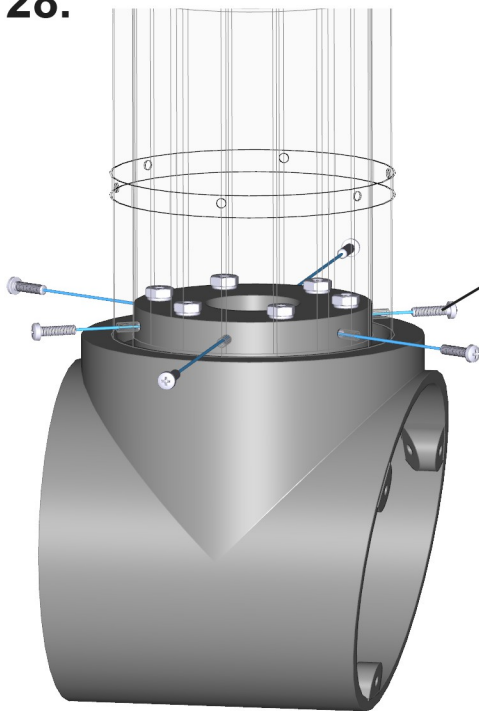


27.



Step 2

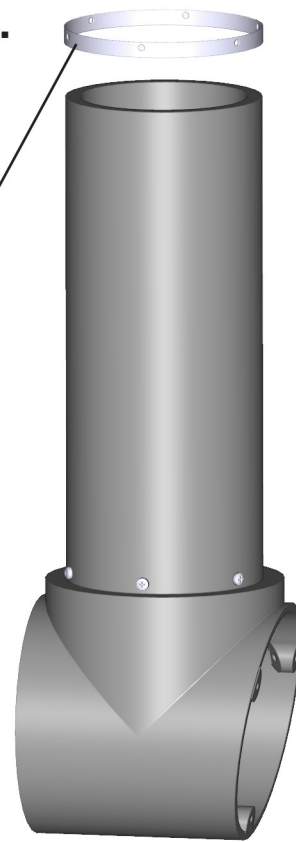
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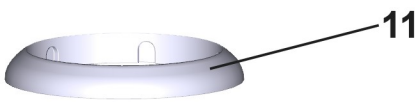
#6-32 x 3/4 (x6)

Remove the template

29.



30.

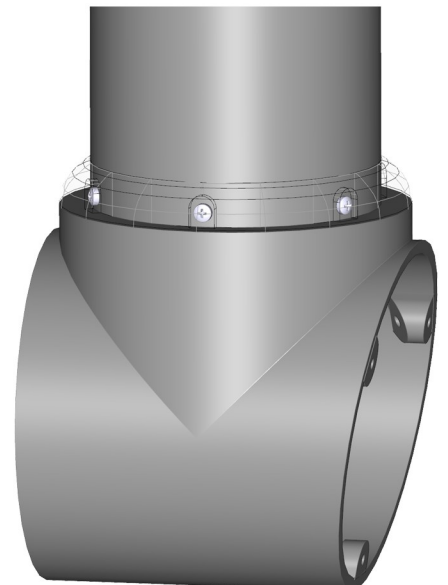


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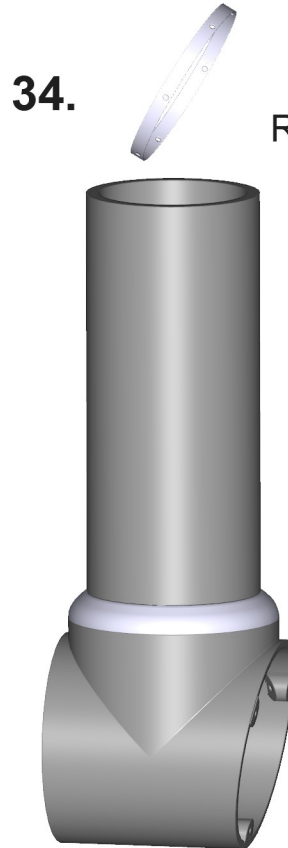
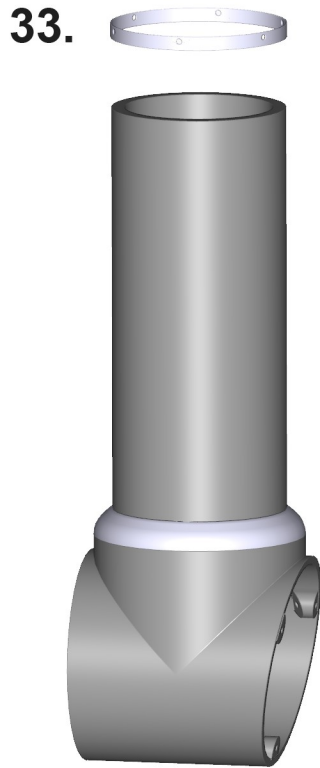
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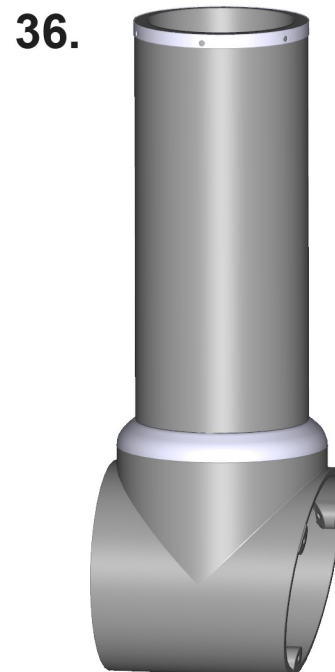
32.



Step 2

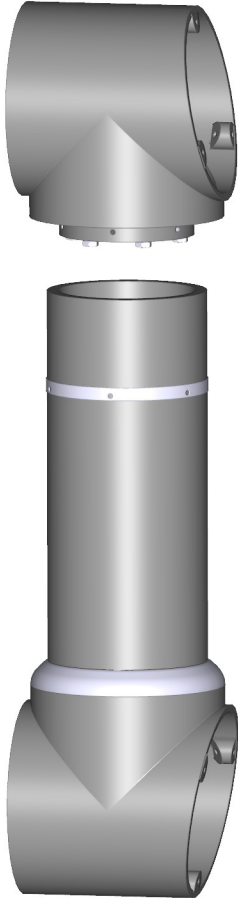


Reverse the template and reinsert it



Step 2

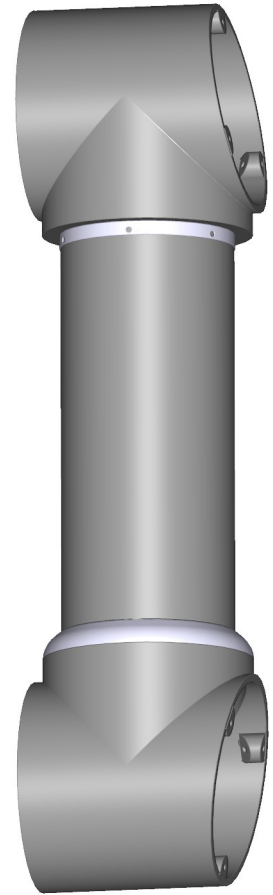
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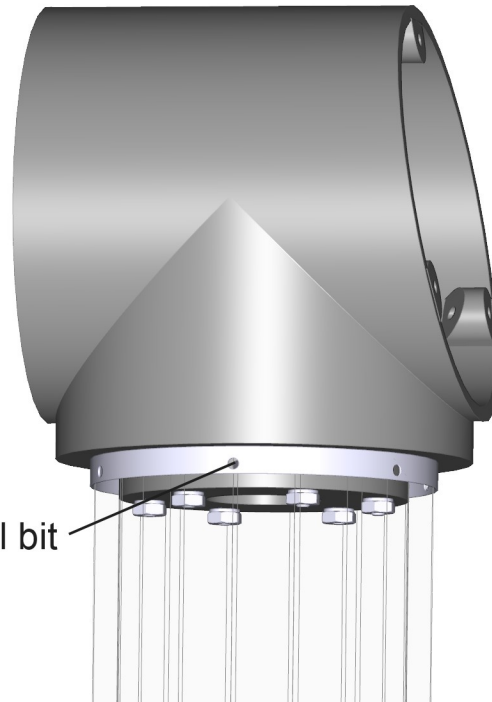
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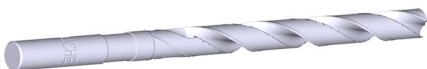
39.



40.



Drill the holes with the 9/64 drill bit



**Flatten both elbows
before drilling so that
the arm is straight**

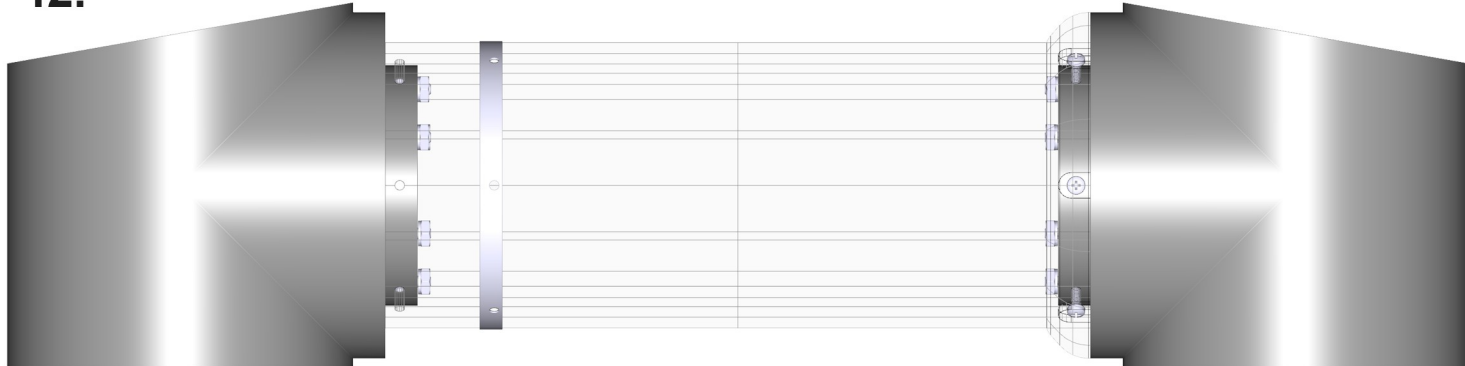


Step 2

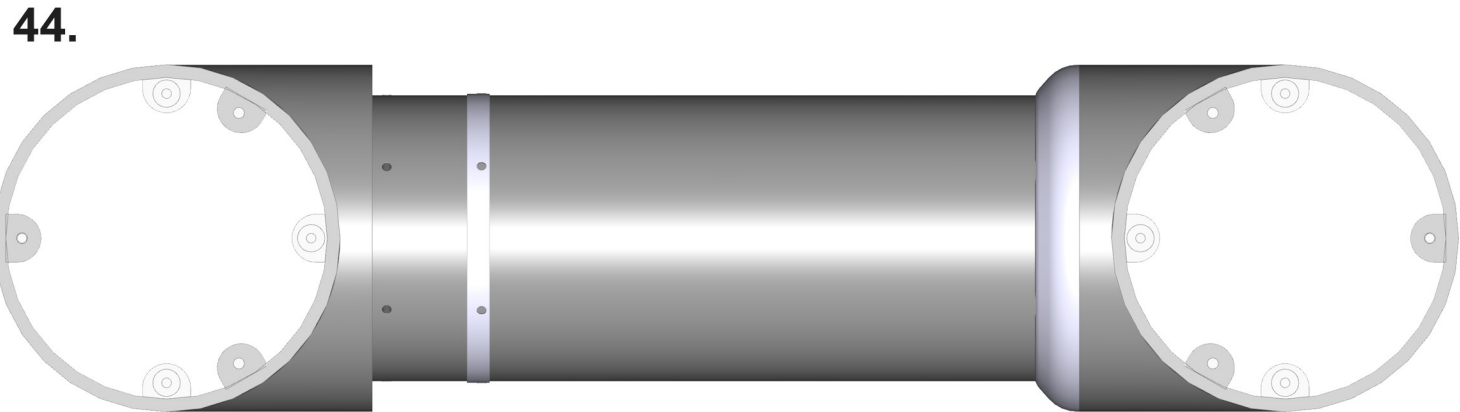
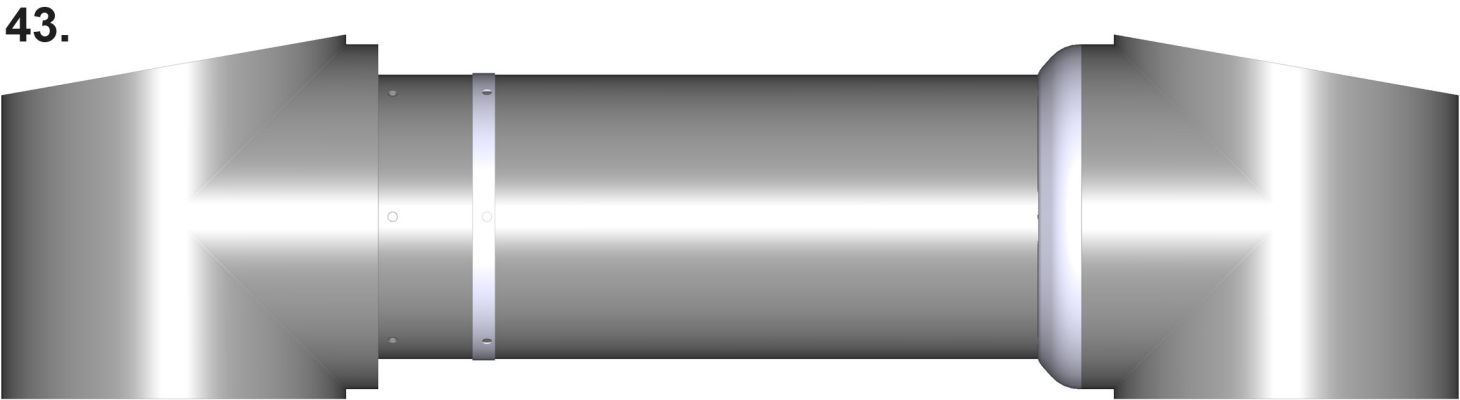
41.



42.



Step 2



Step 2

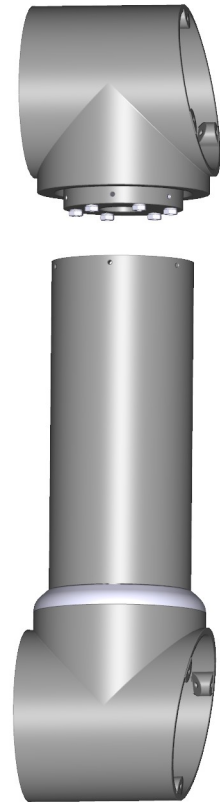
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46.



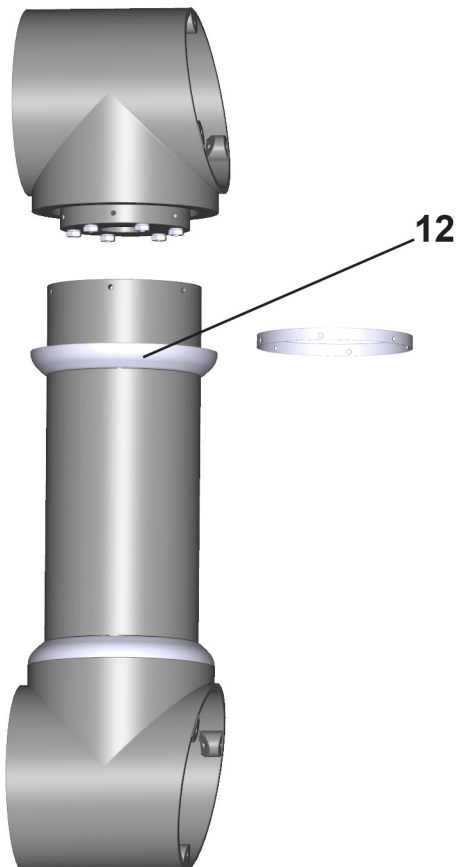
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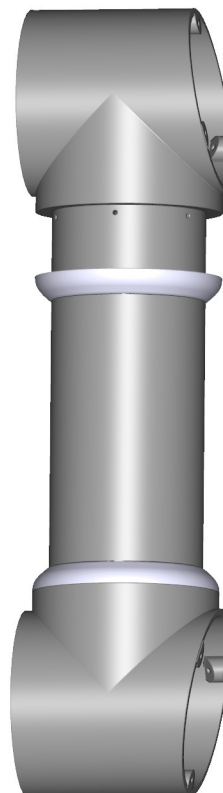
Remove the template



48.

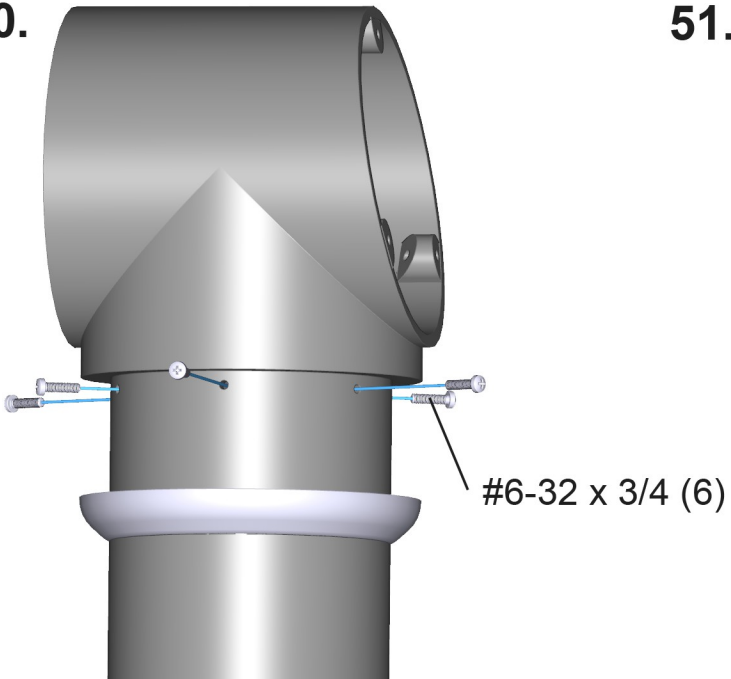


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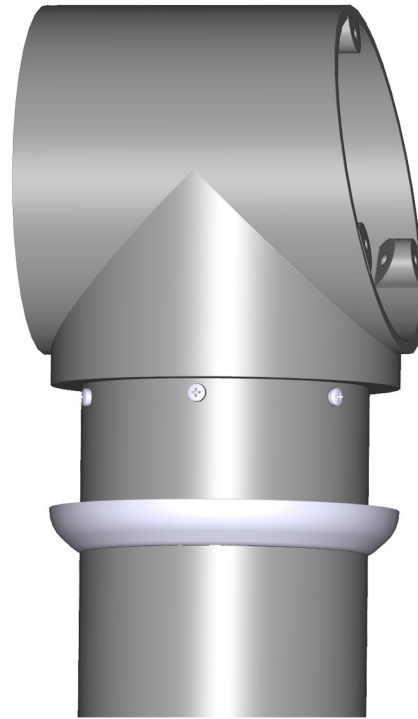


Step 2

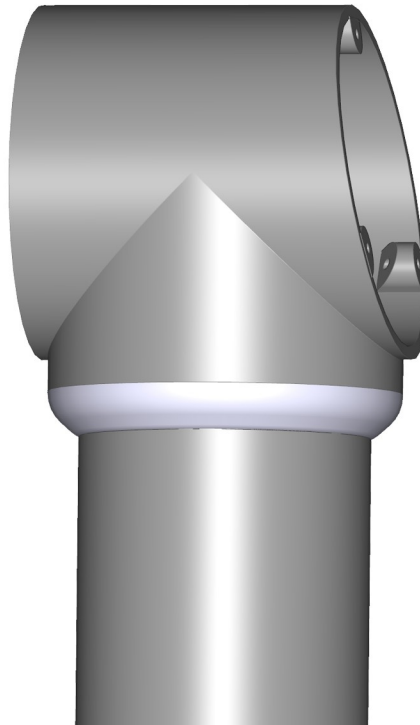
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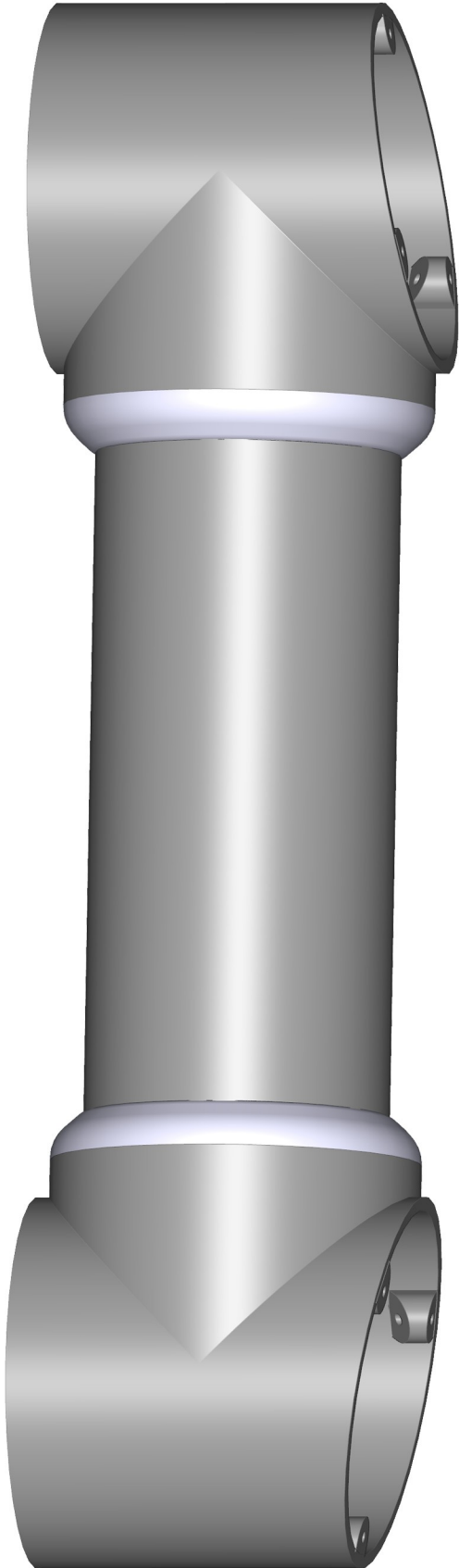


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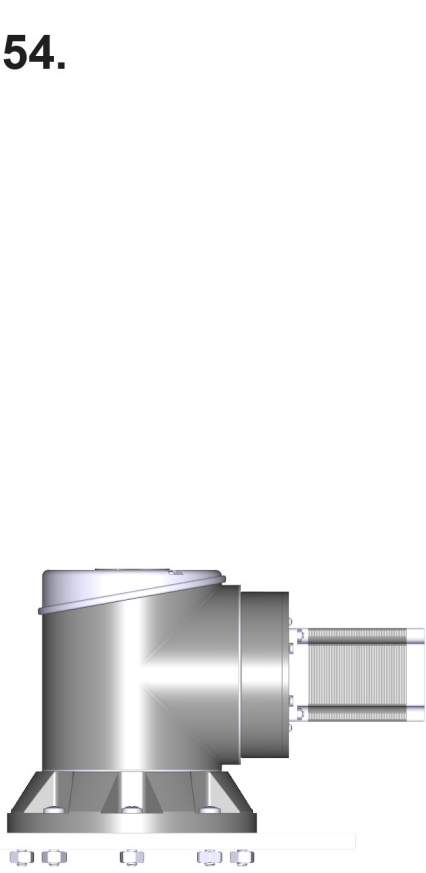
Step 2

53.

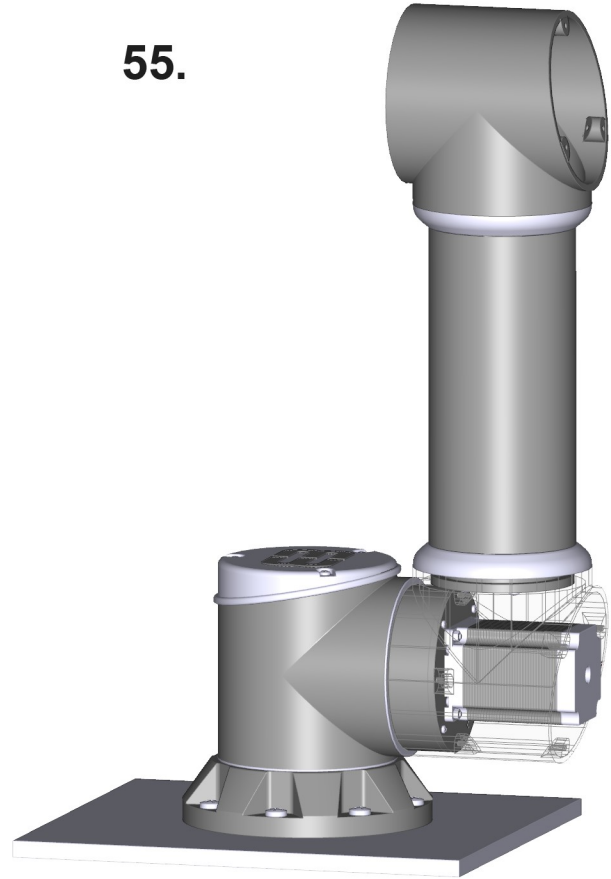


Step 3

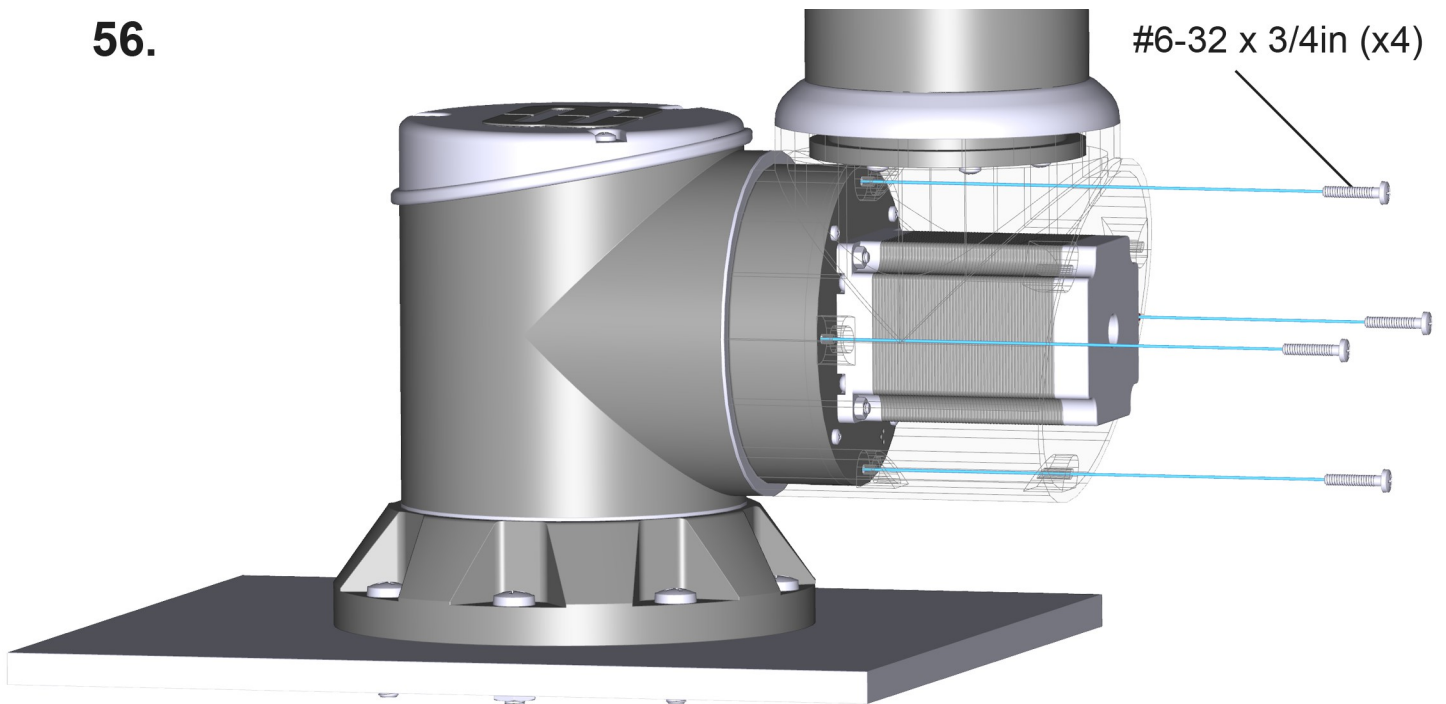
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55.

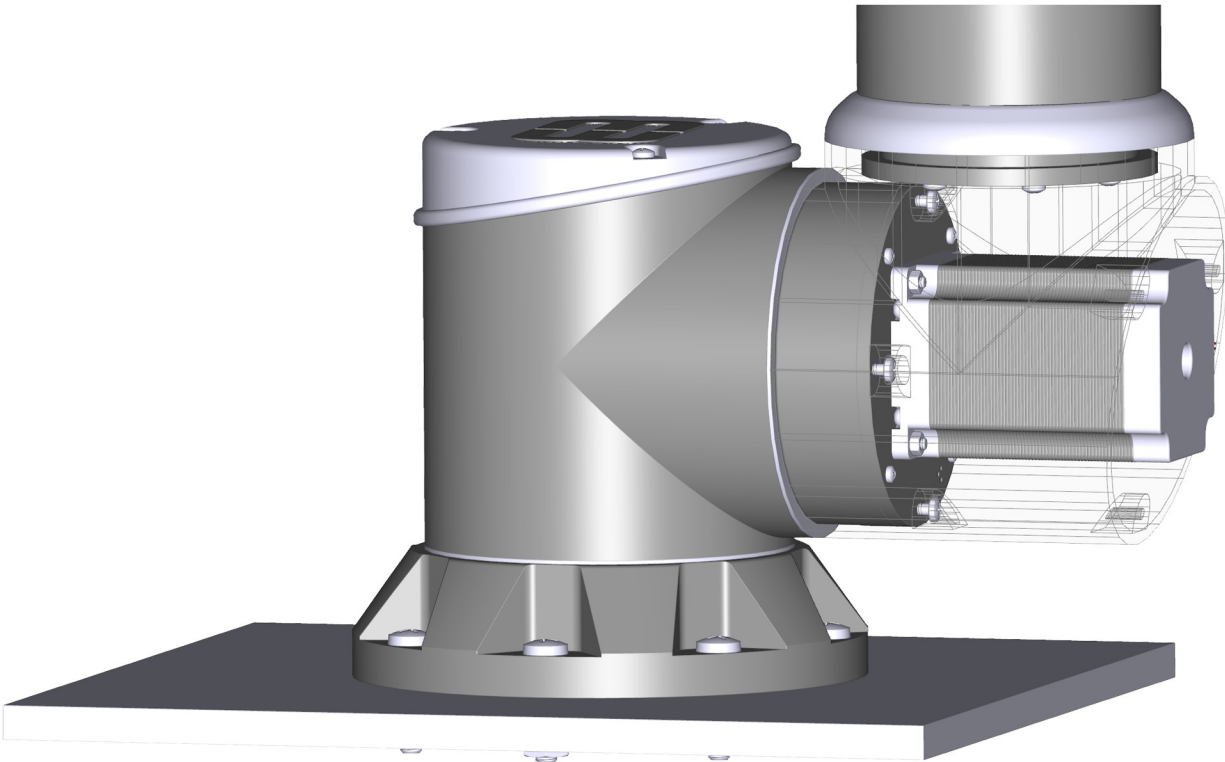


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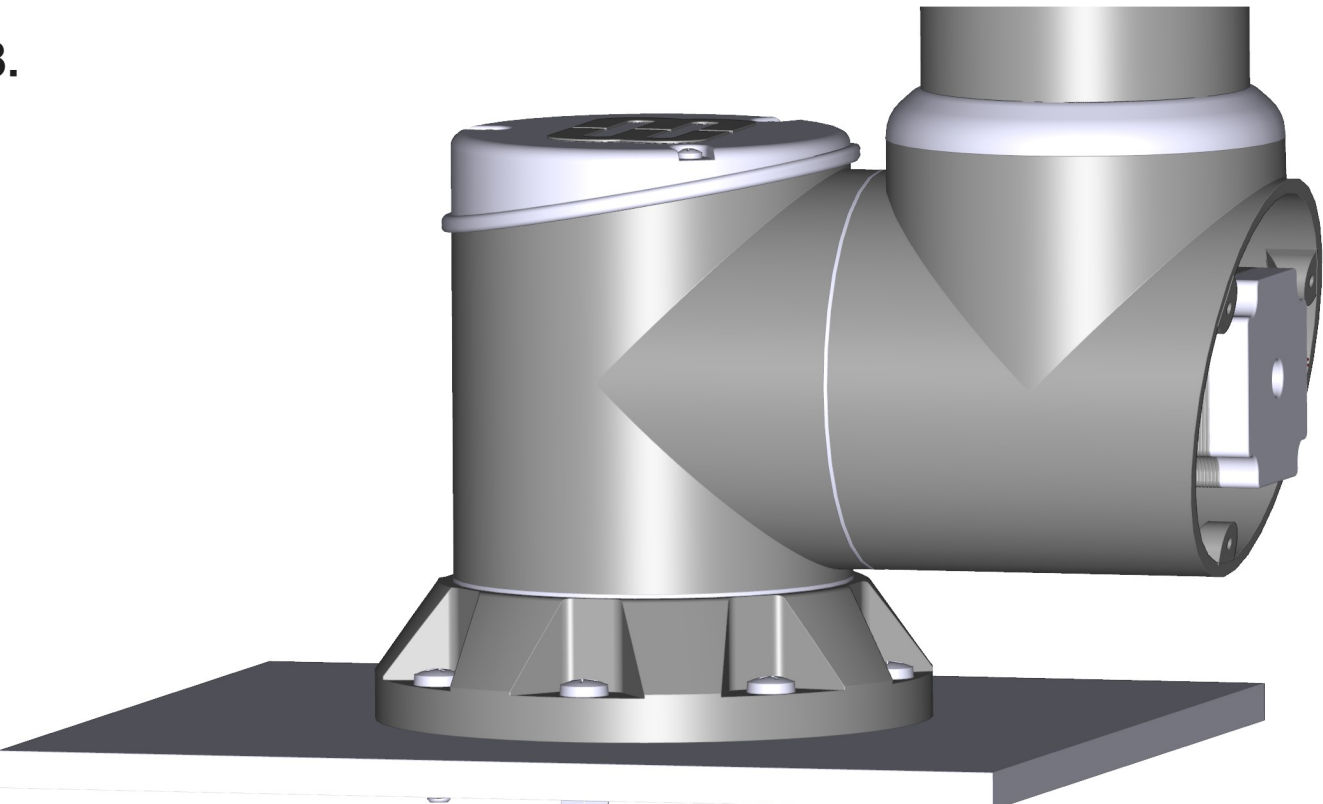


Step 3

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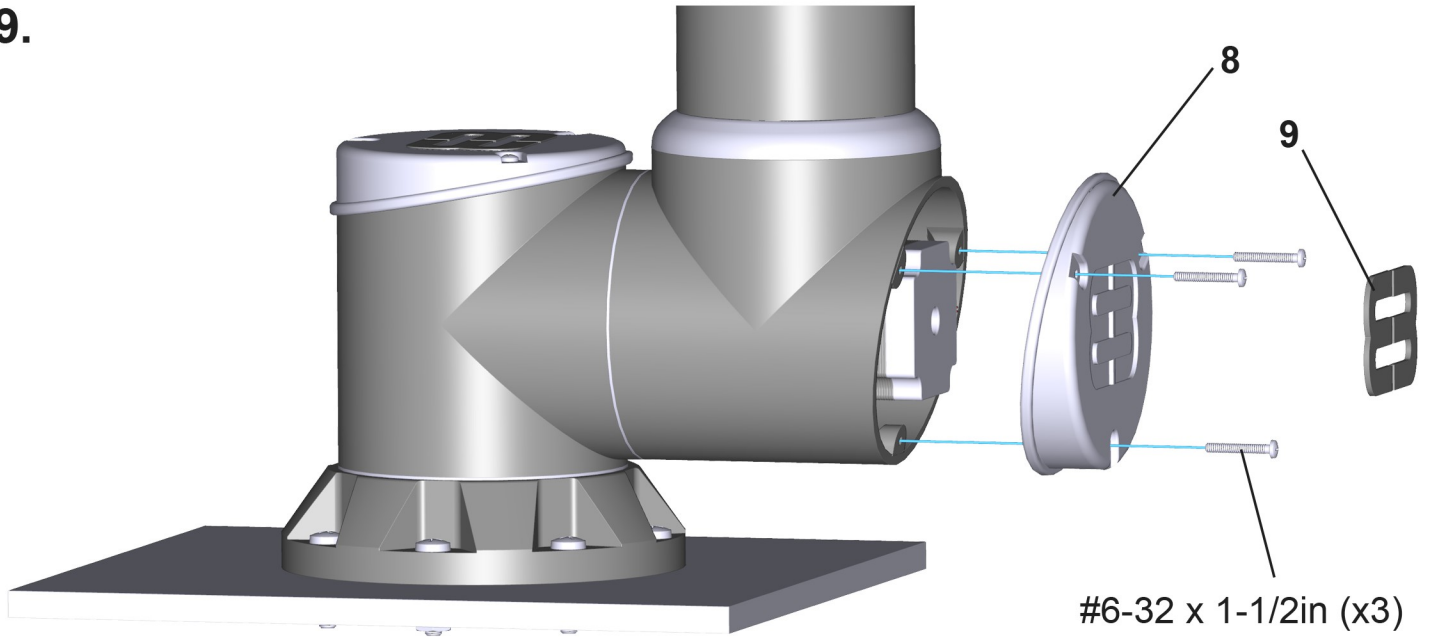


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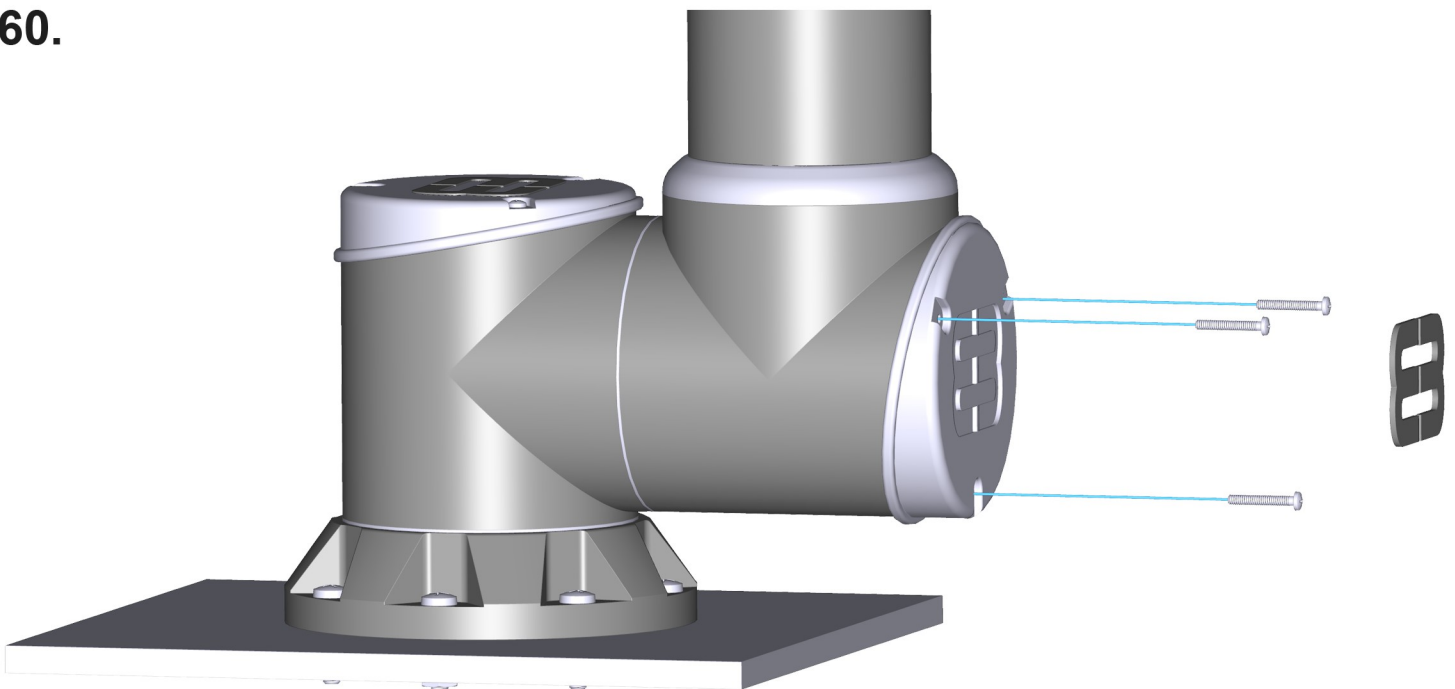


Step 3

59.

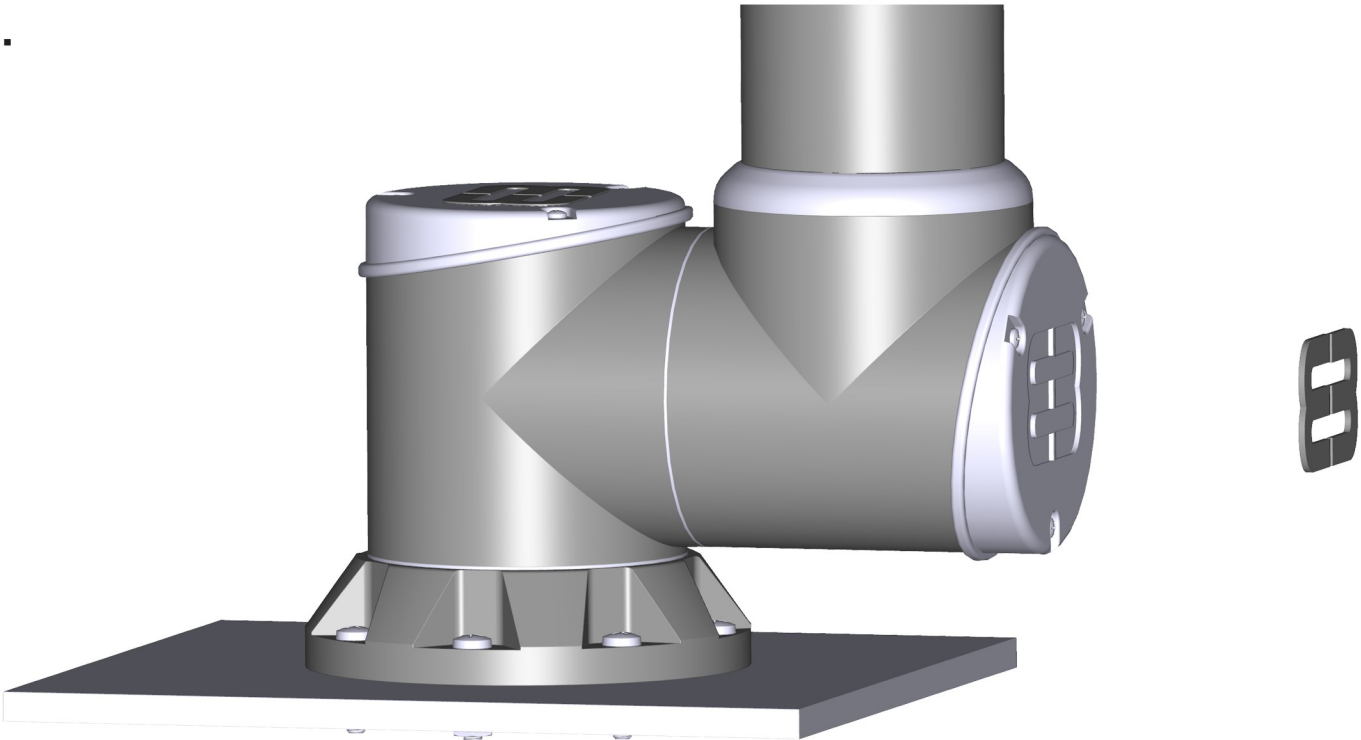


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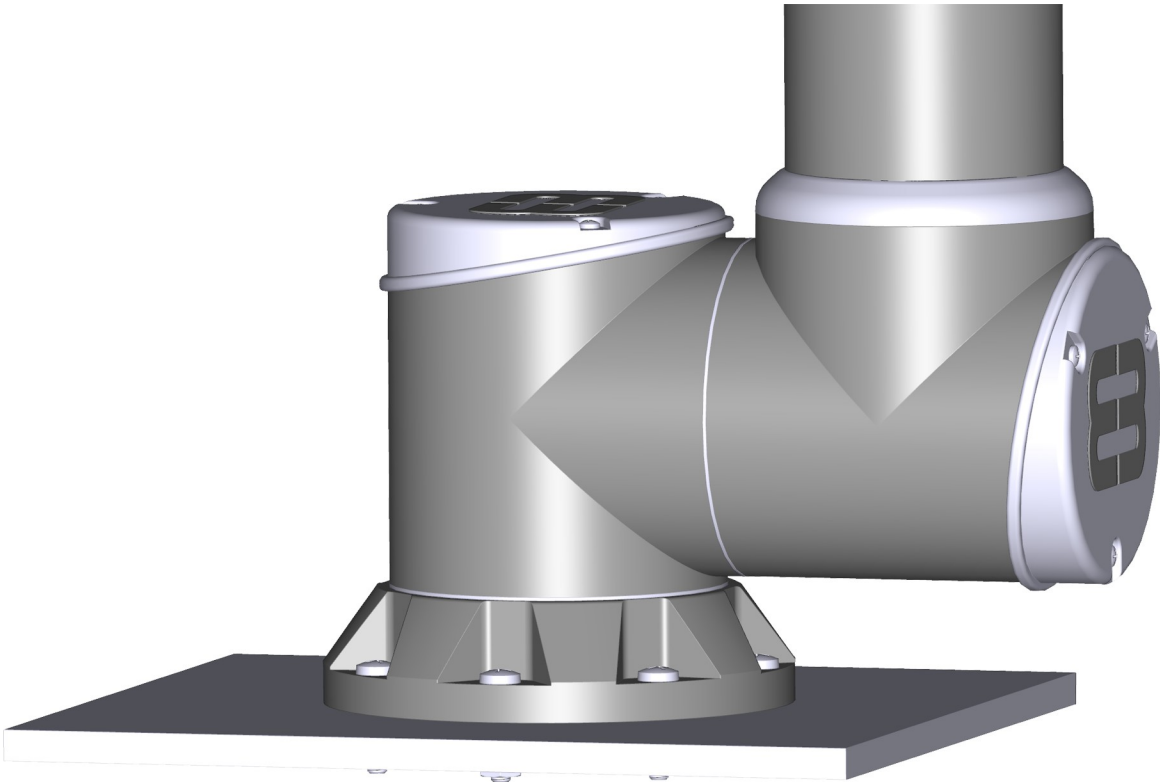


Step 3

61.

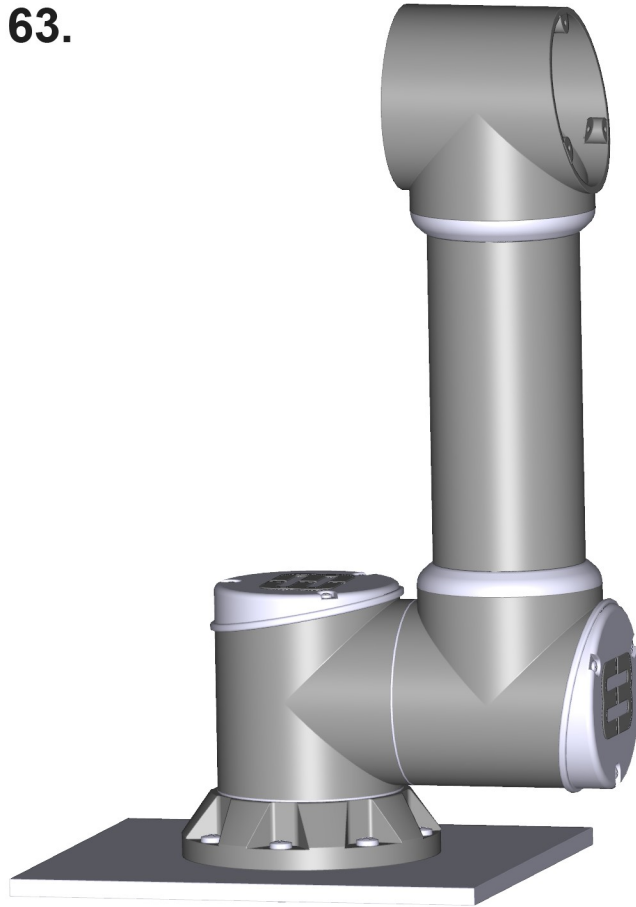


62.

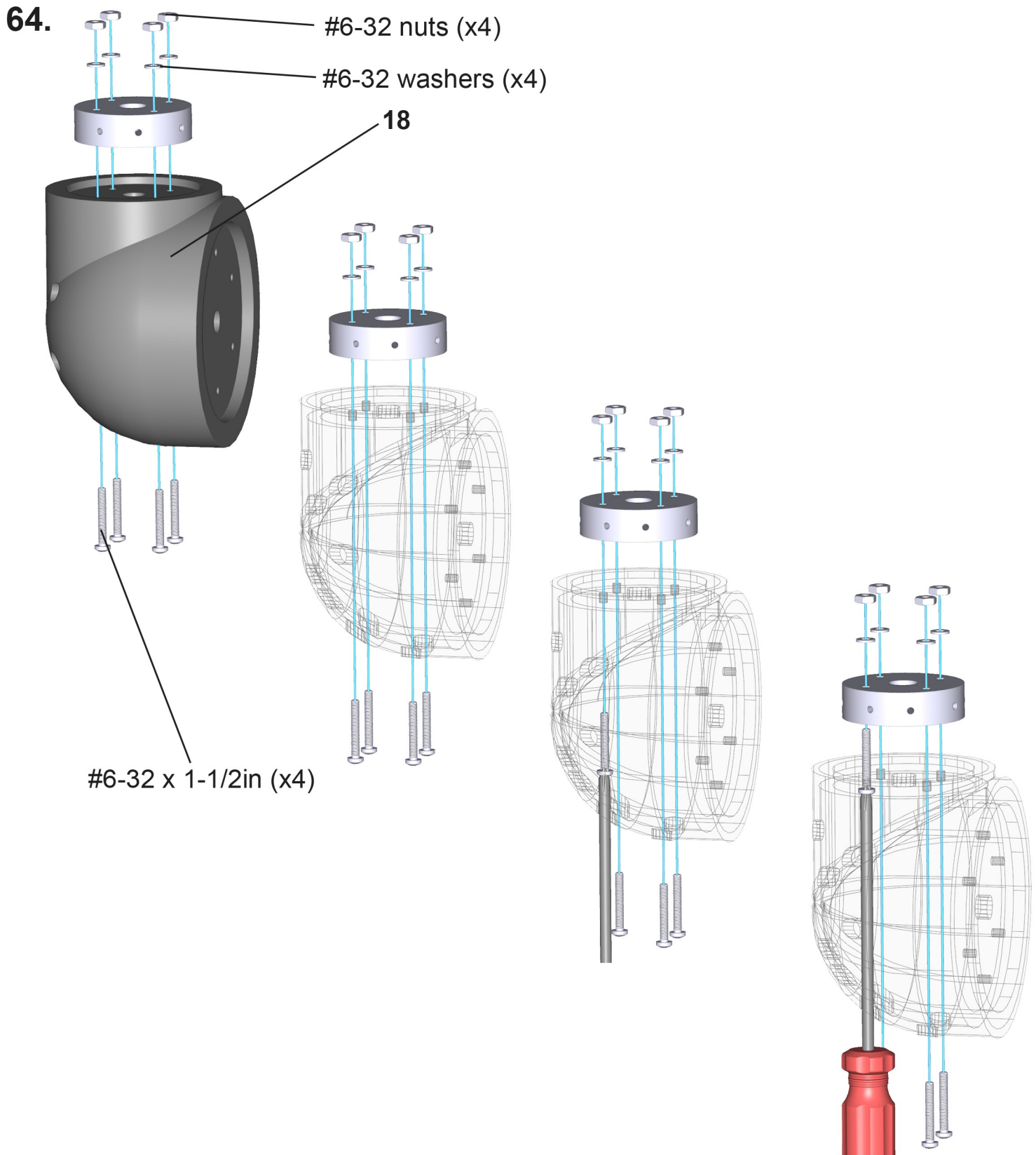


Step 3

63.

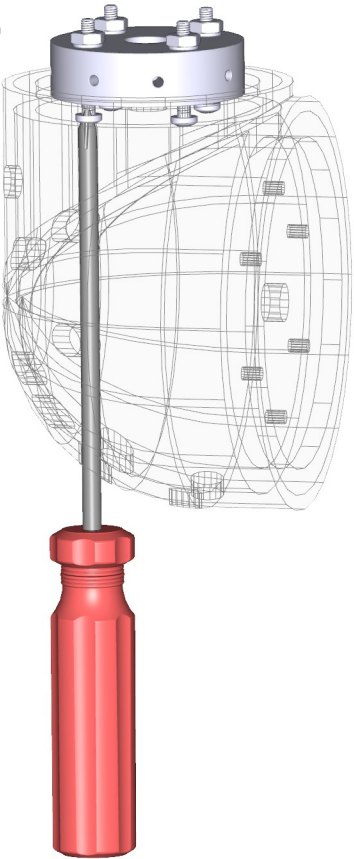


Step 4

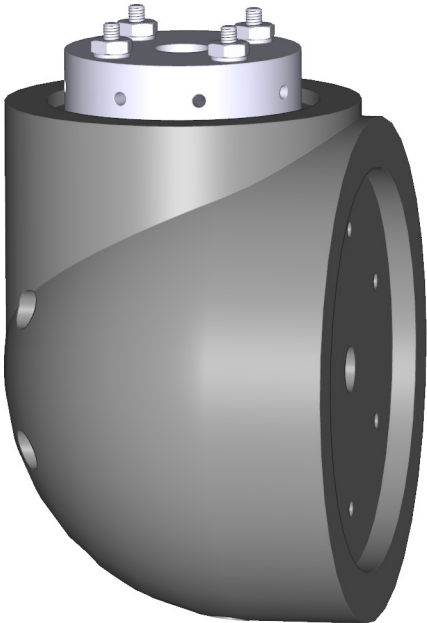


Step 4

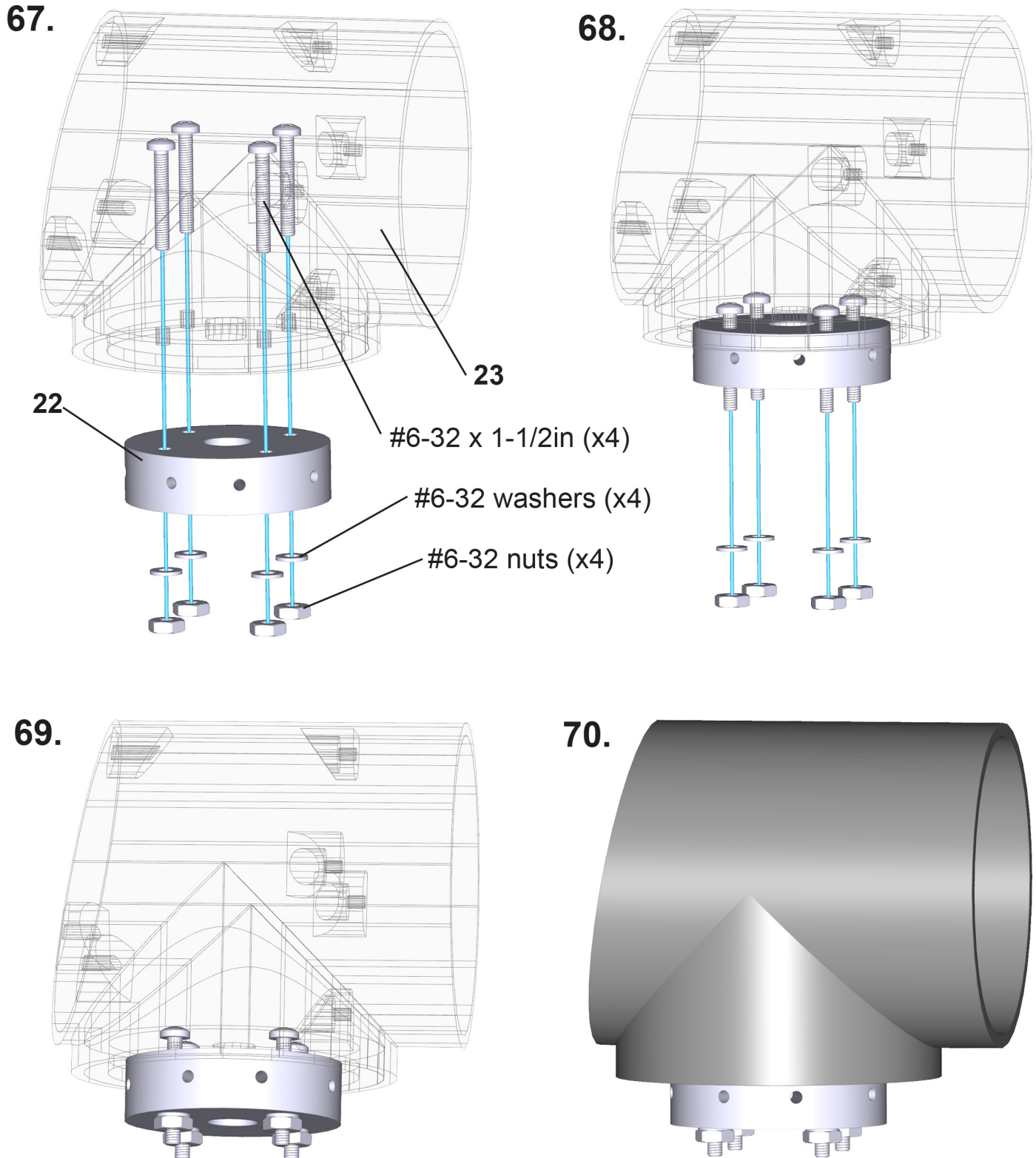
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66.

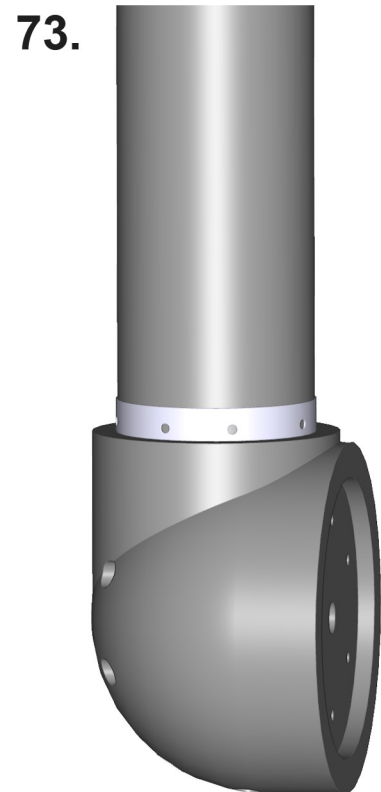
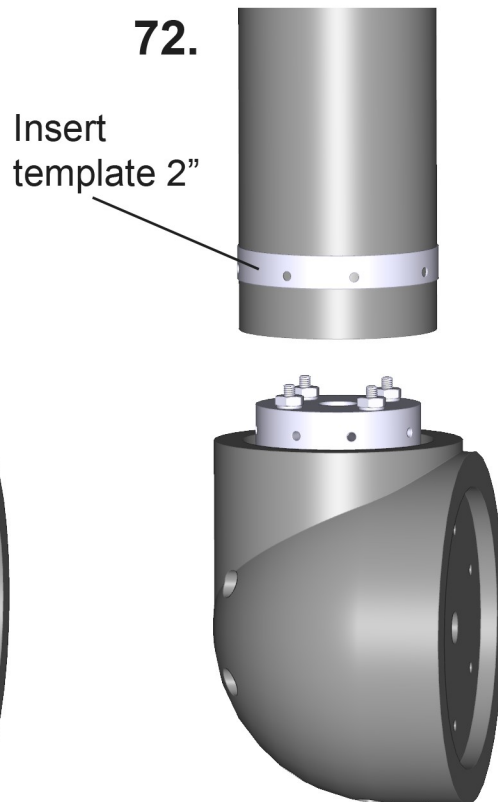
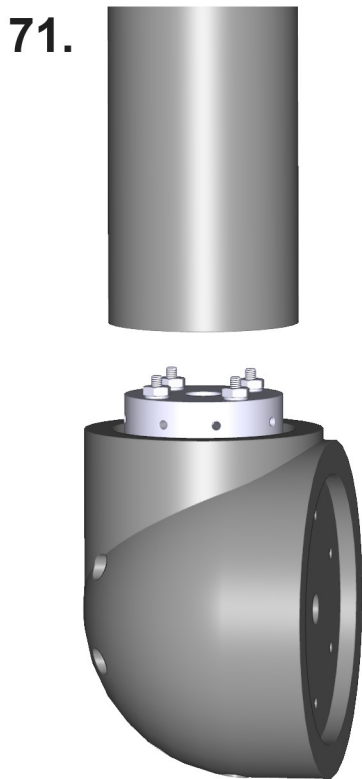
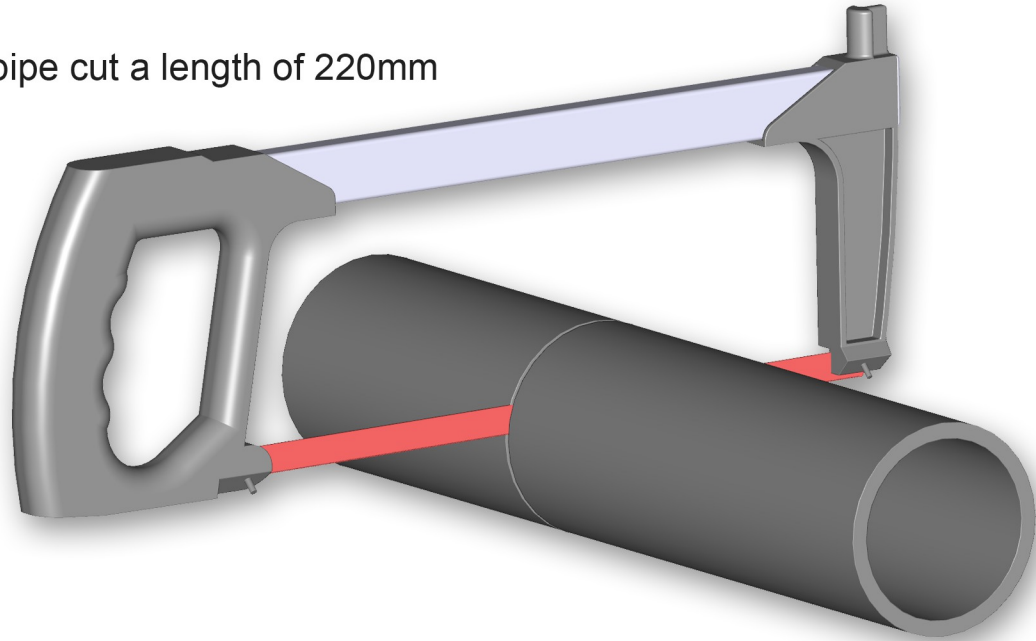


Step 4



Step 4

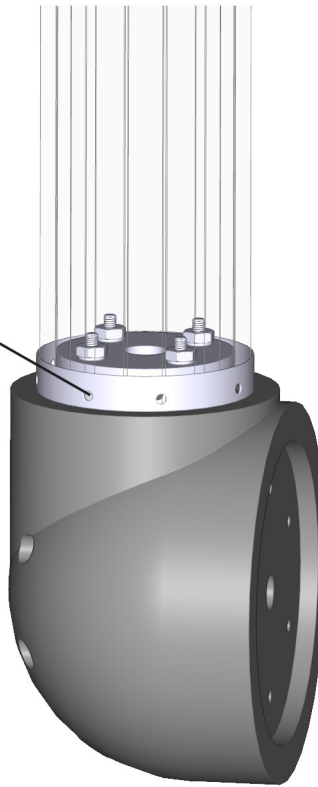
2" black ABS pipe cut a length of 220mm



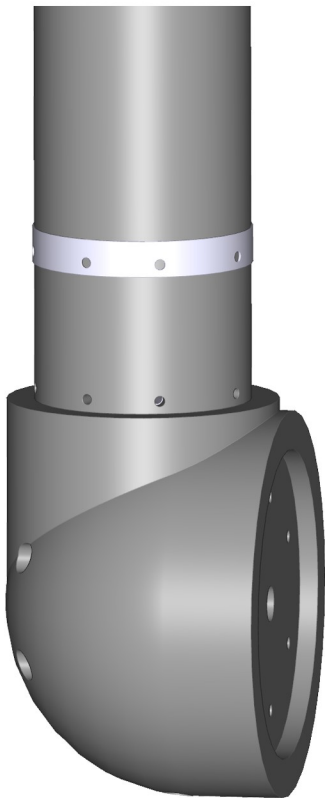
Step 4

74.

Drill the holes with the 9/64 drill bit

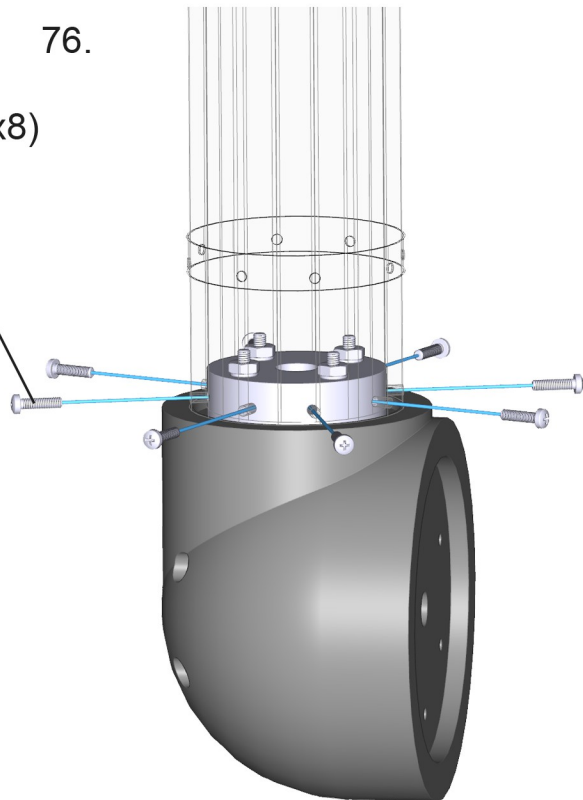


75.



76.

#6-32 x 3/4 (x8)



Step 4

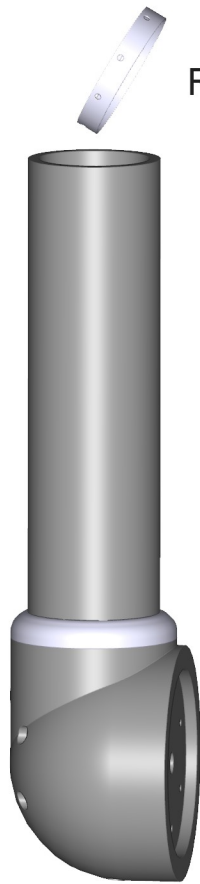
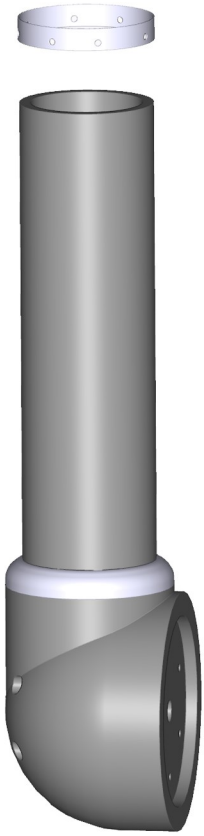
77.  Remove the template

78.  20

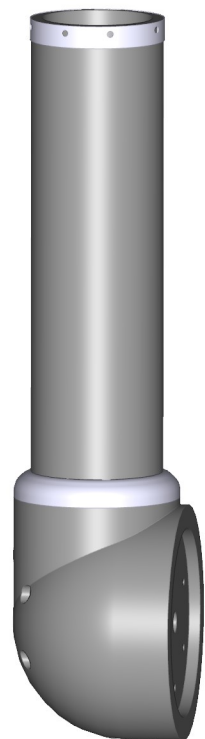
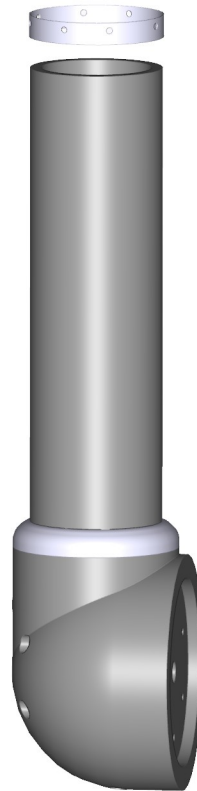
79. 

Step 4

80.

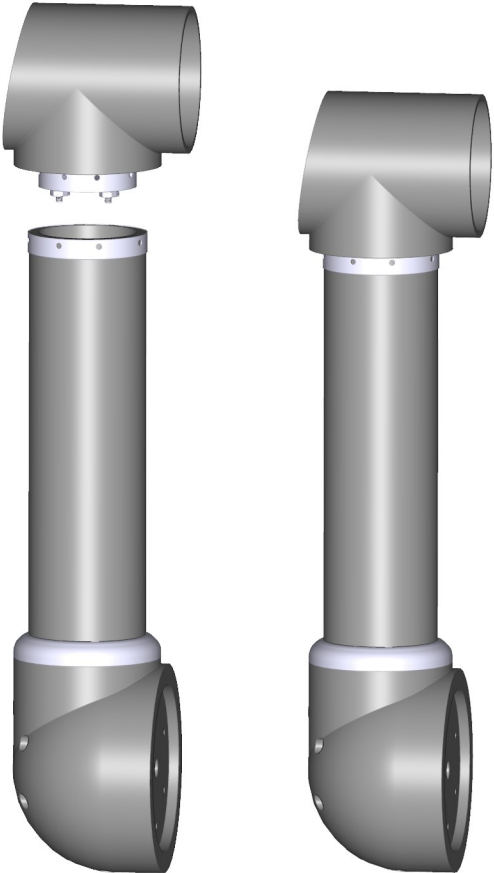


Reverse the template and reinsert it

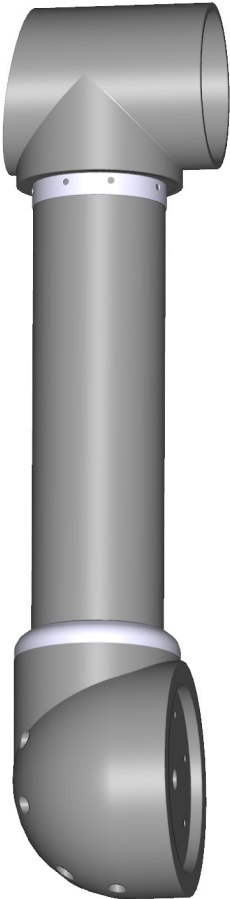


Step 4

81.

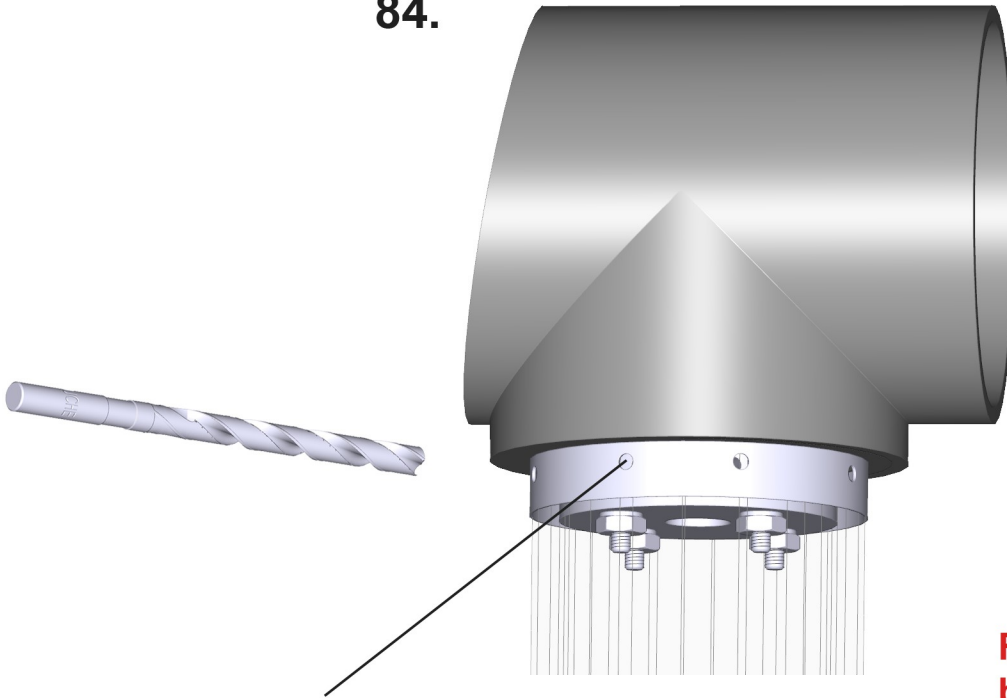


82.



Step 4

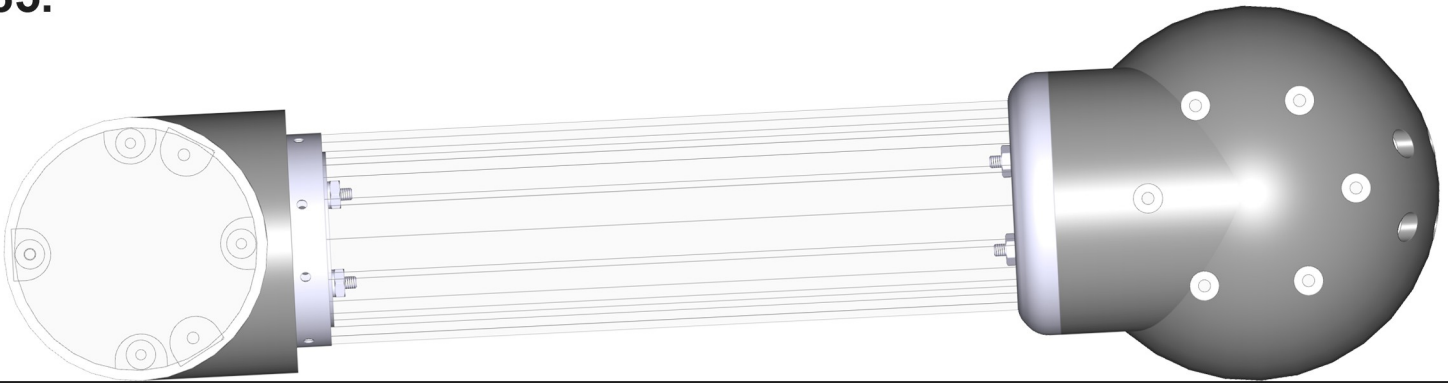
84.



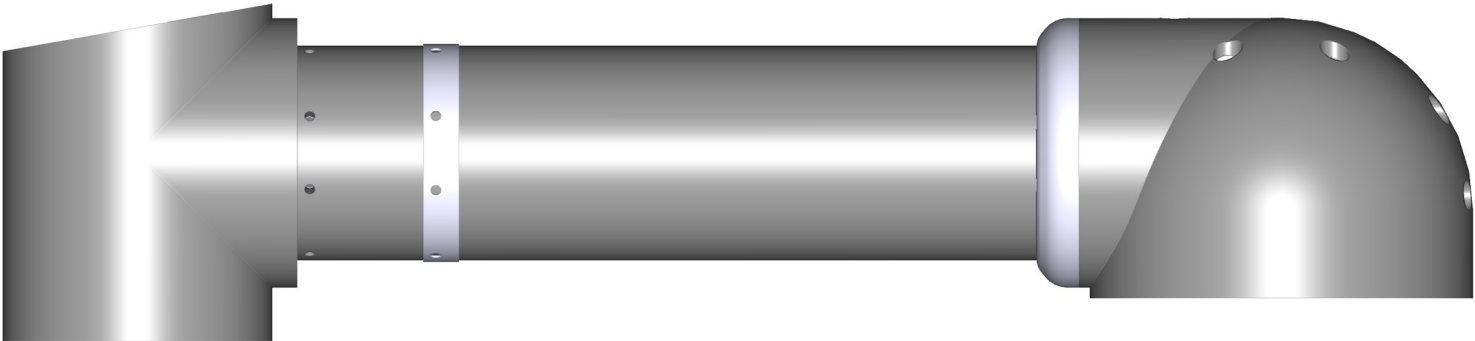
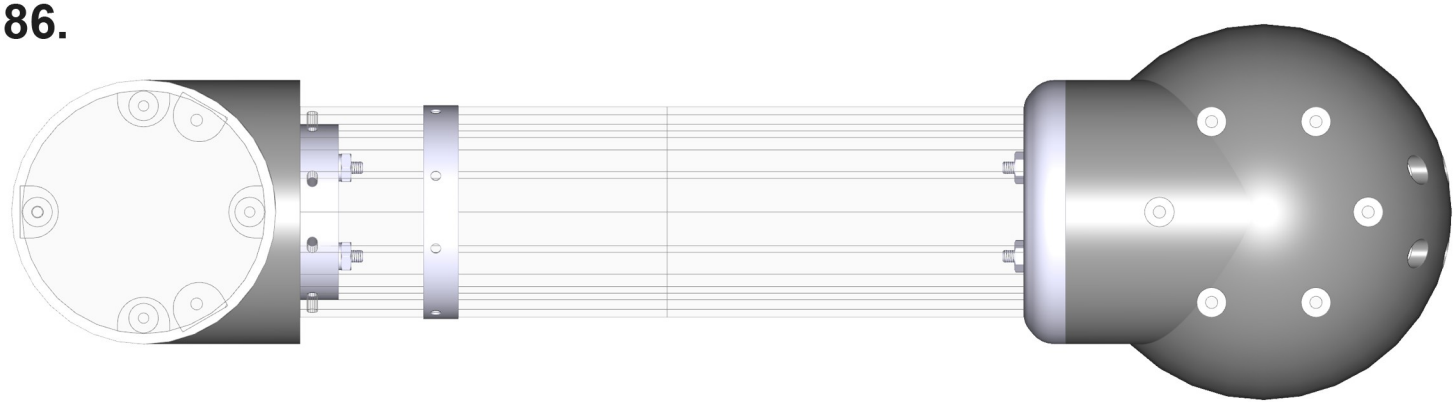
Drill the holes with the 9/64 drill bit

**Flatten both elbows
before drilling so that
the arm is straight**

85.

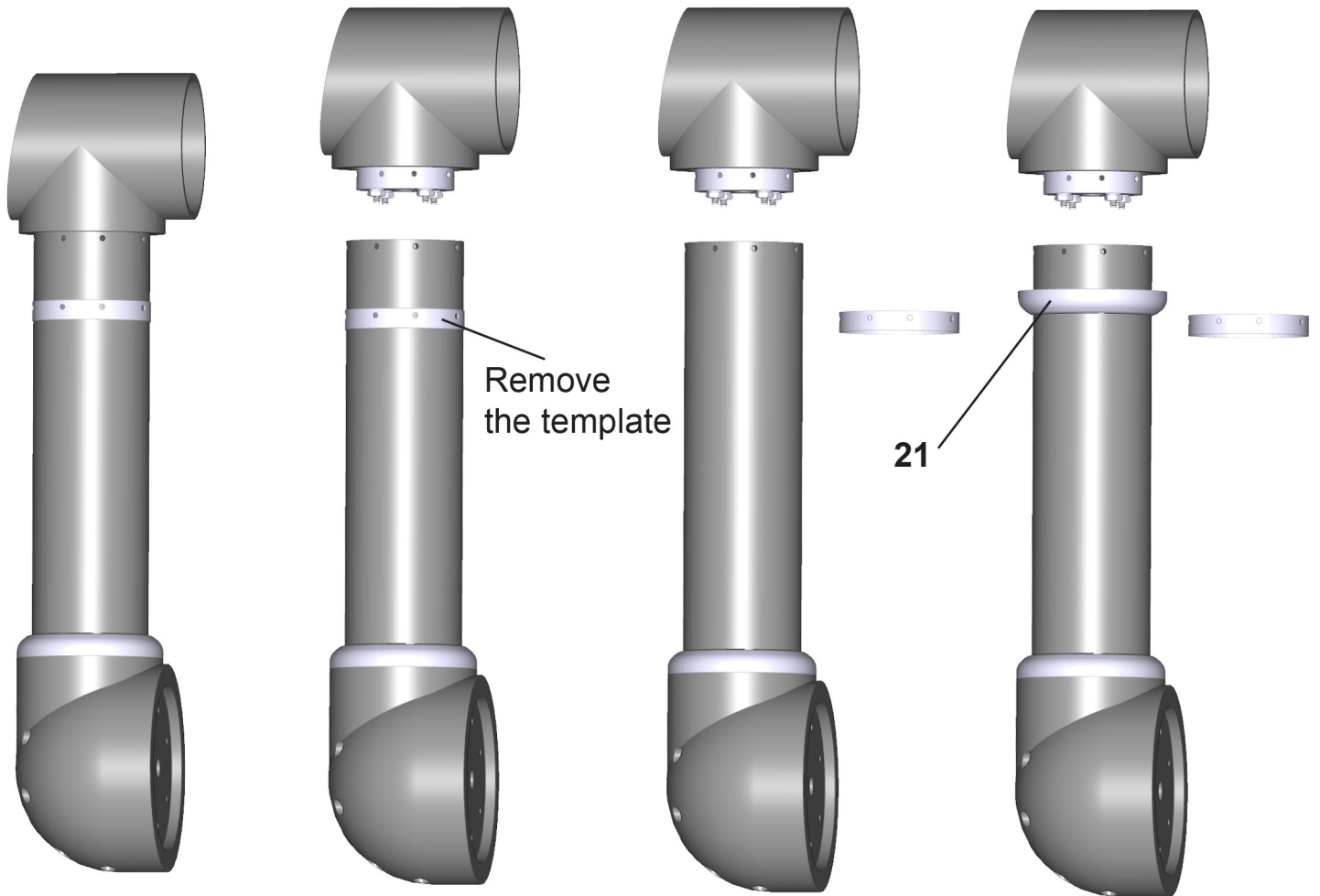


Step 4



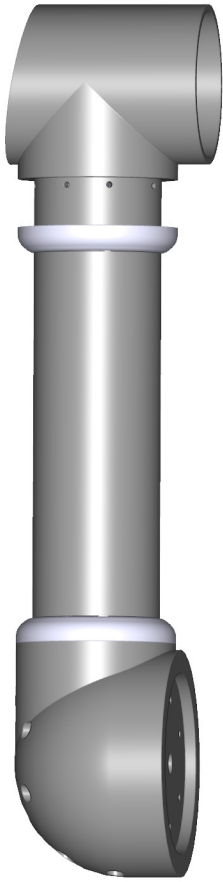
Step 4

88.



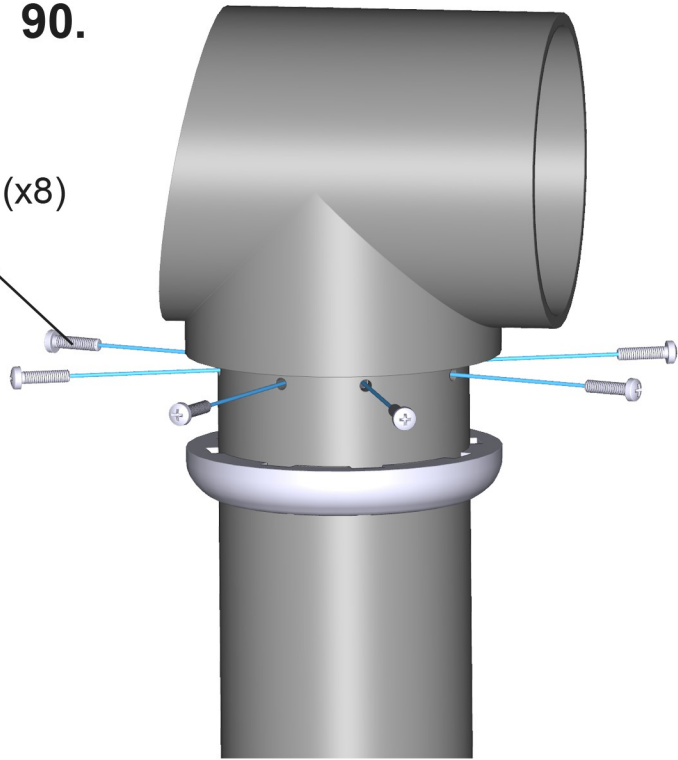
Step 4

89.

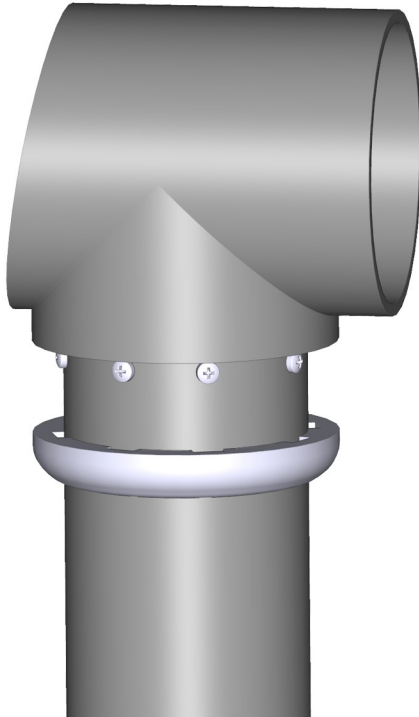


90.

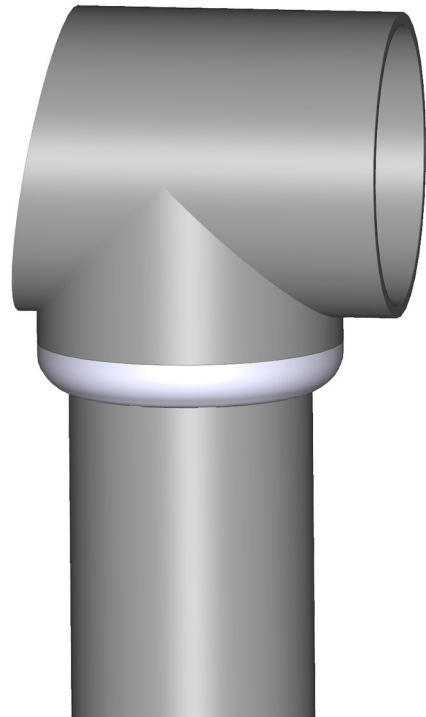
#6-32 x 3/4in (x8)



91.

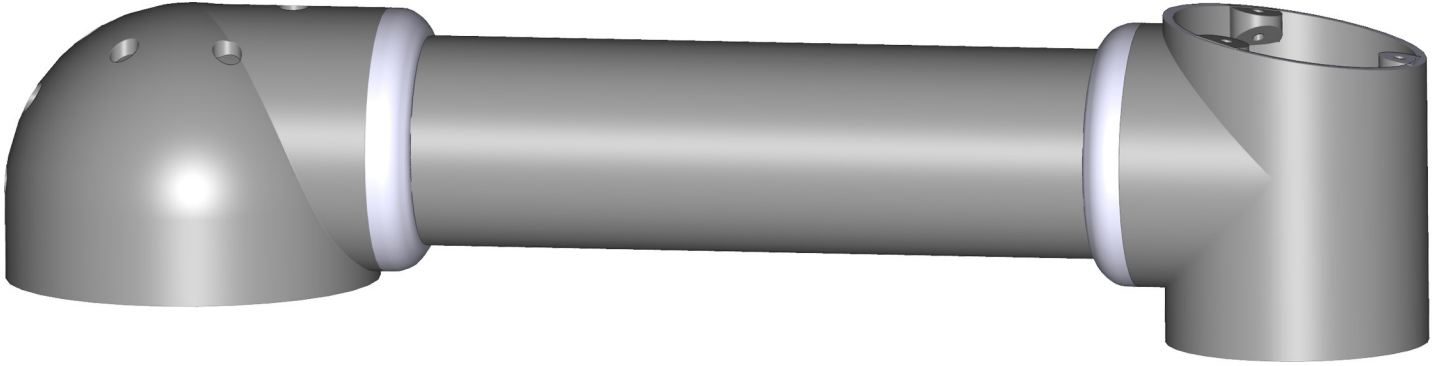


92.

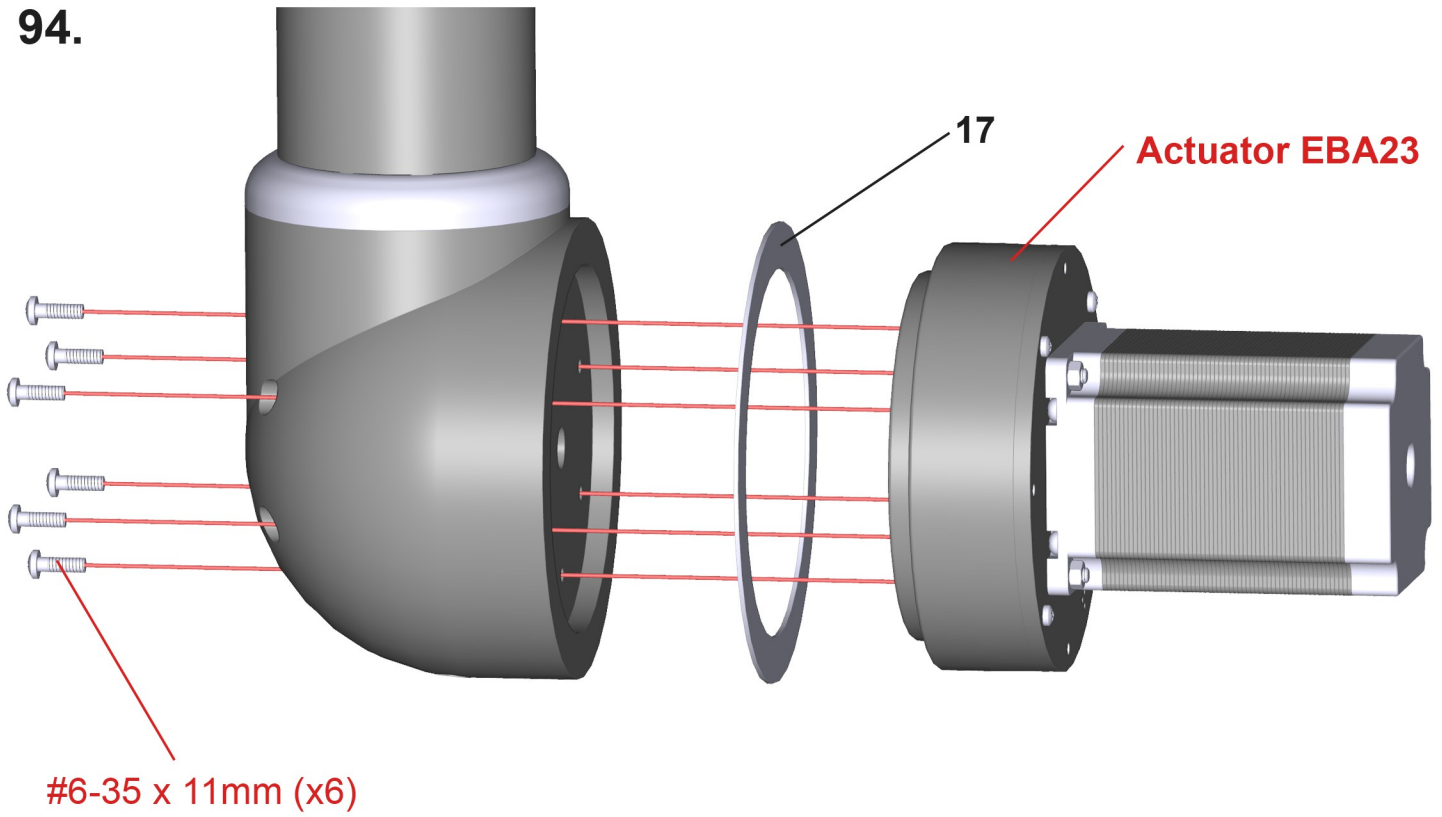


Step 5

93.

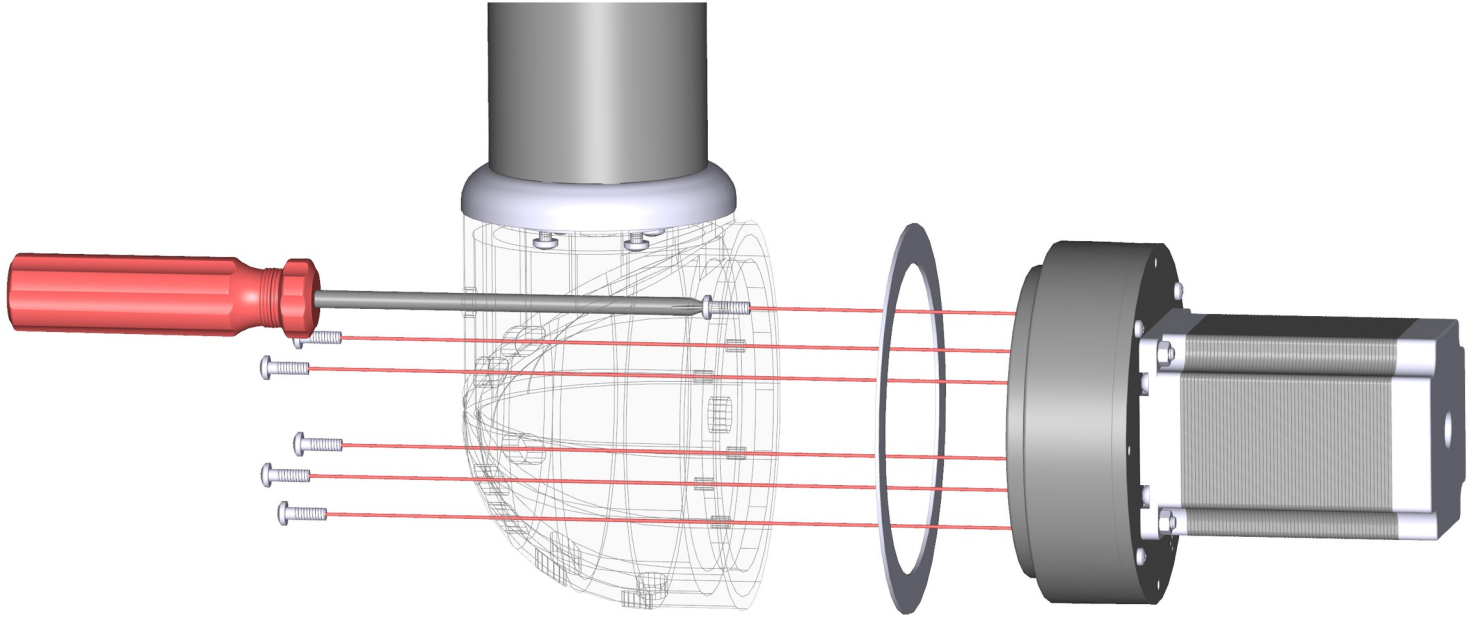


94.

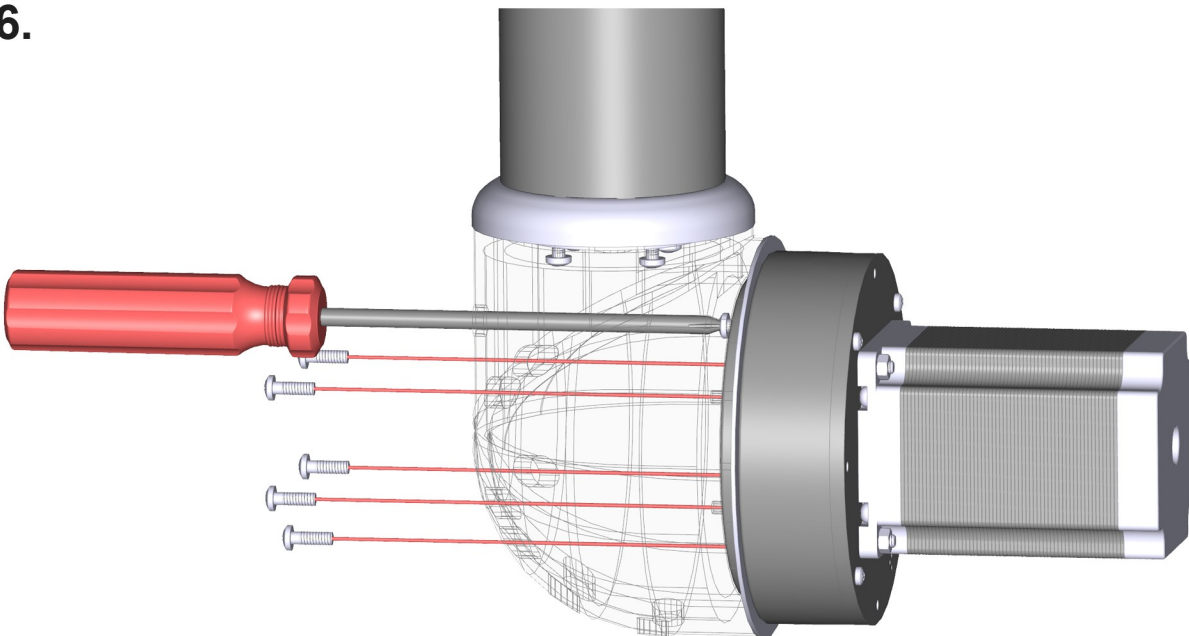


Step 5

95.

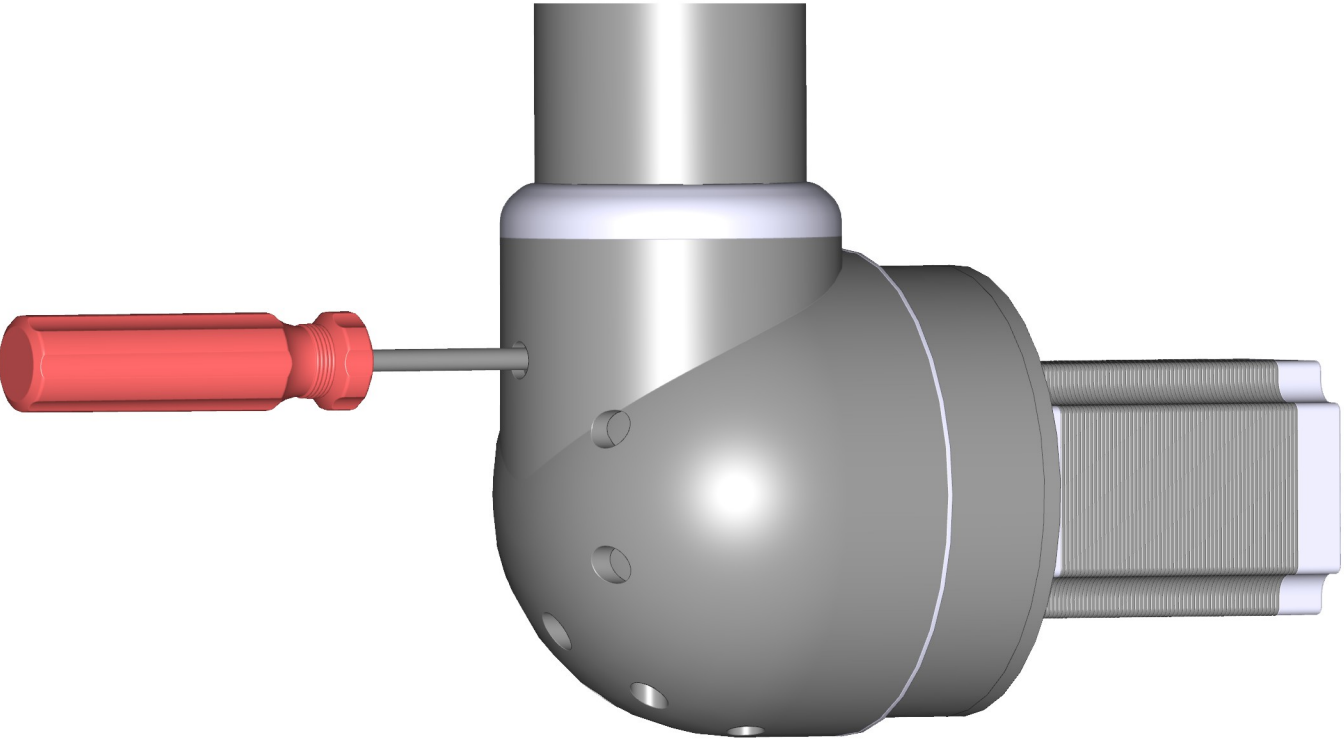
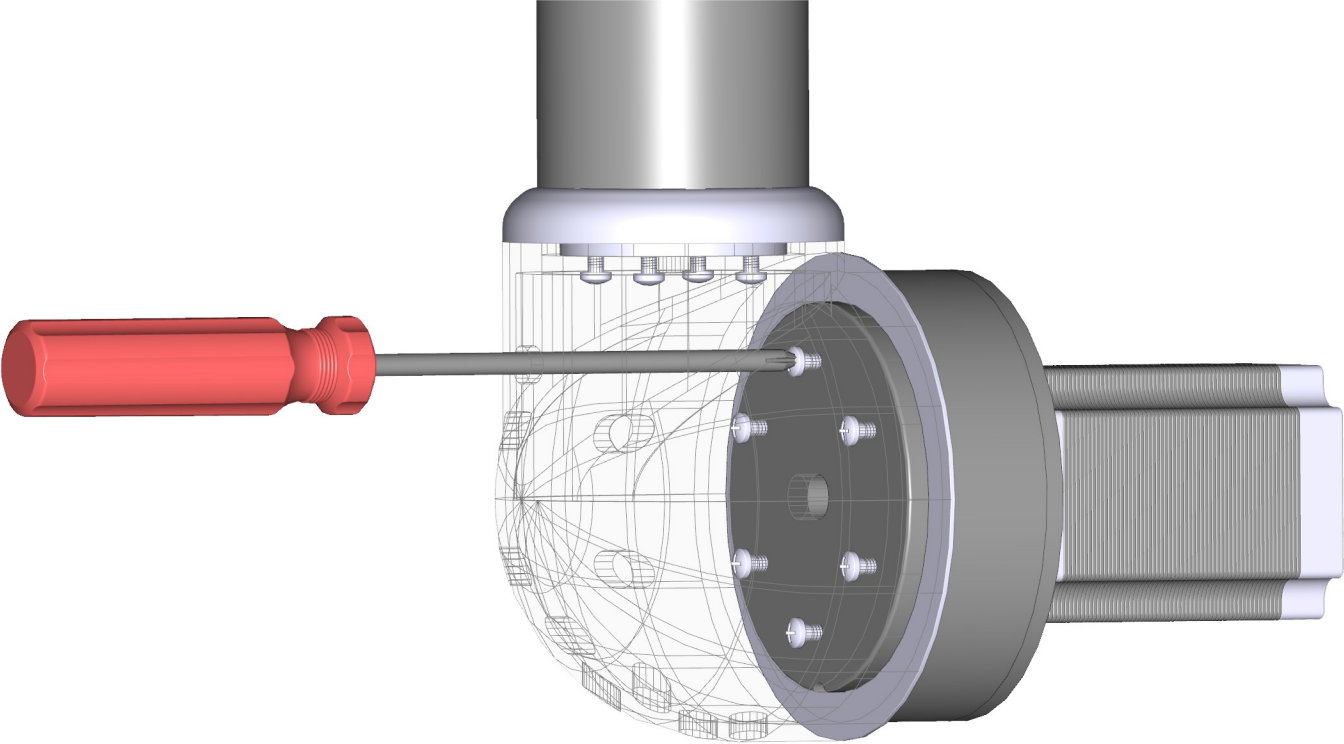


96.



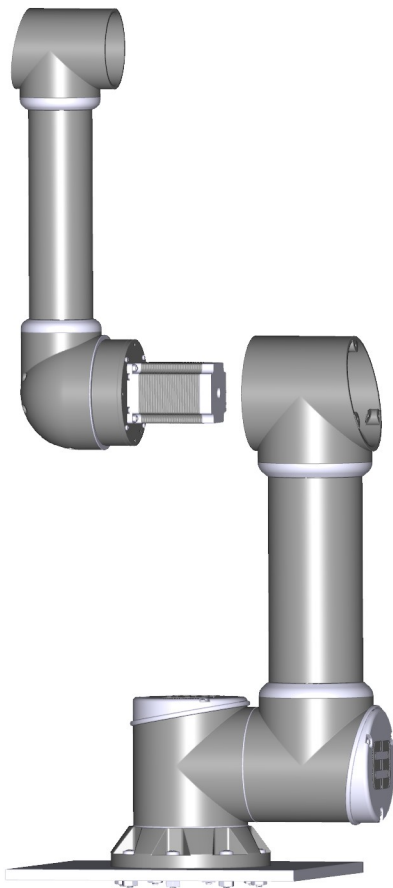
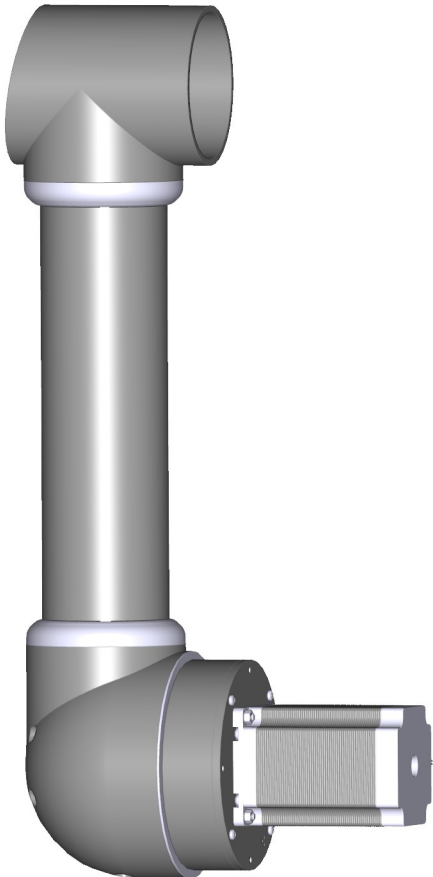
Step 5

97.



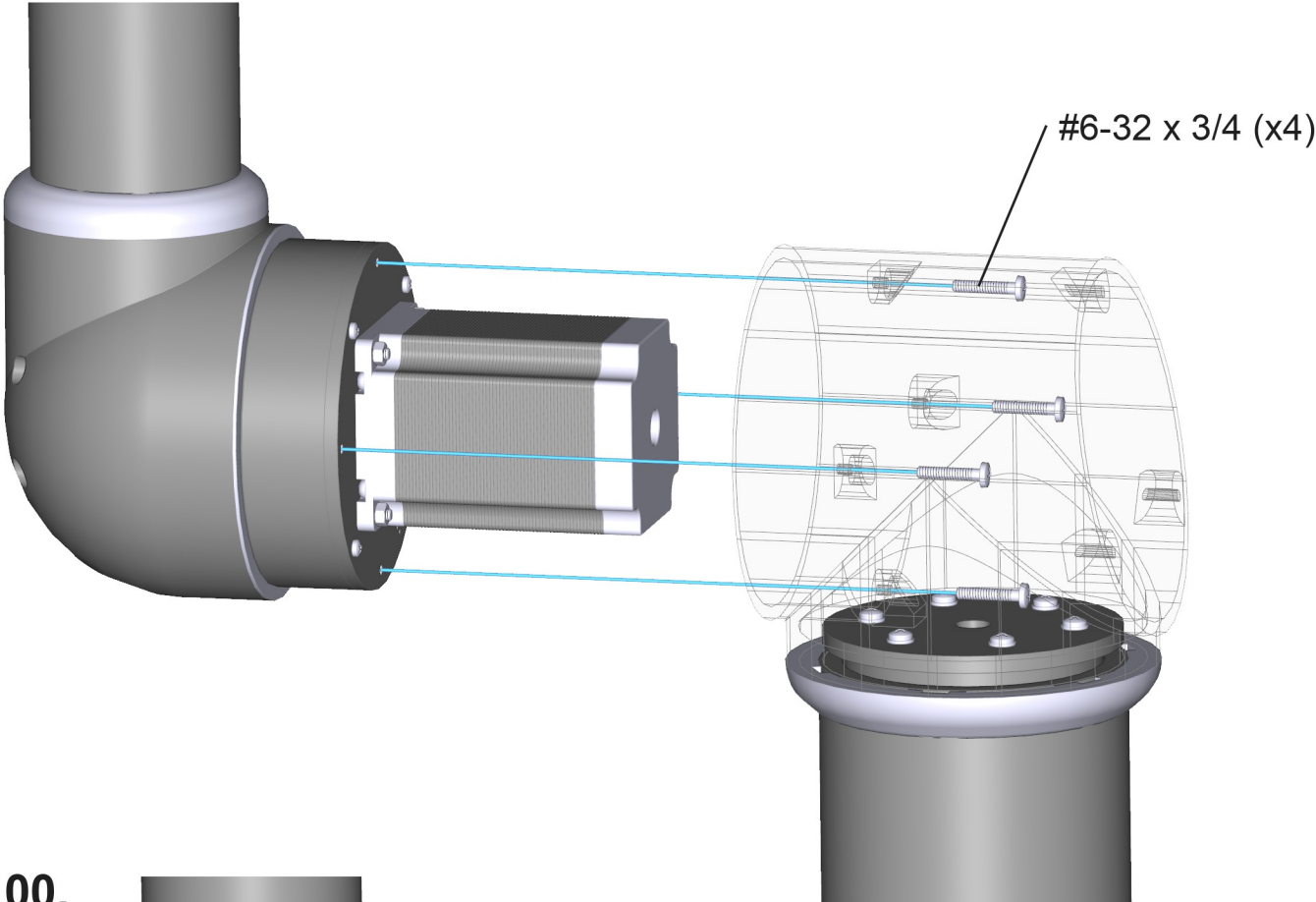
Step 5

98.

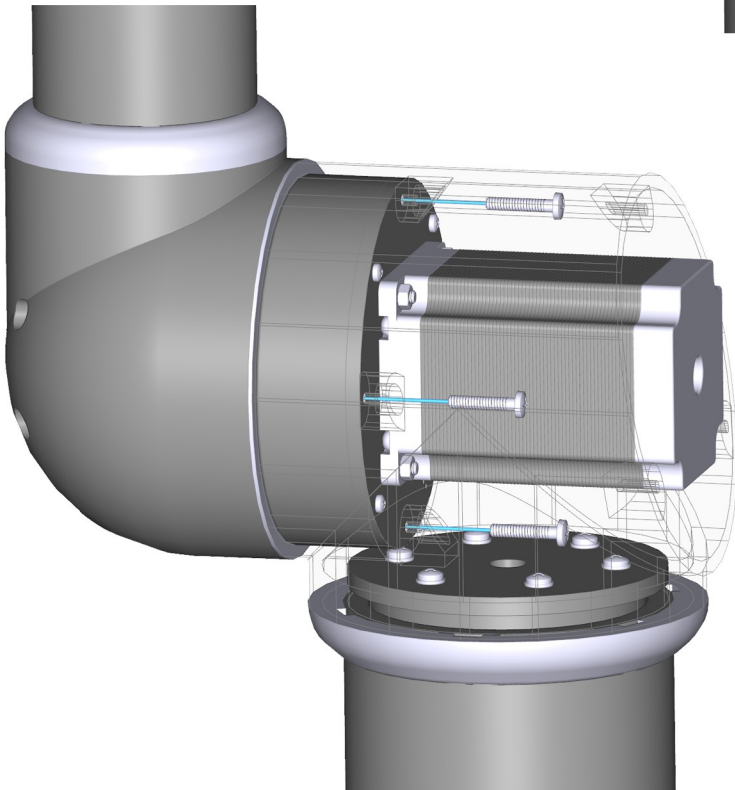


Step 5

99.

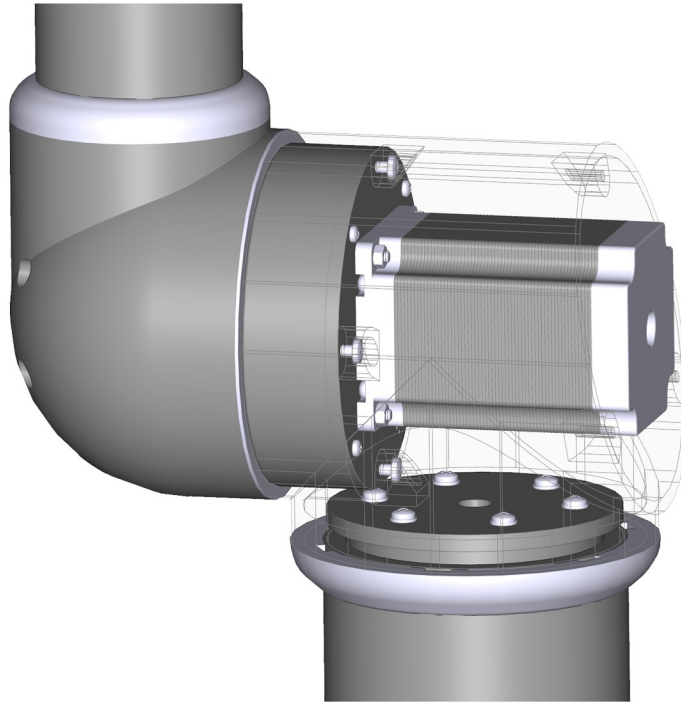


100.

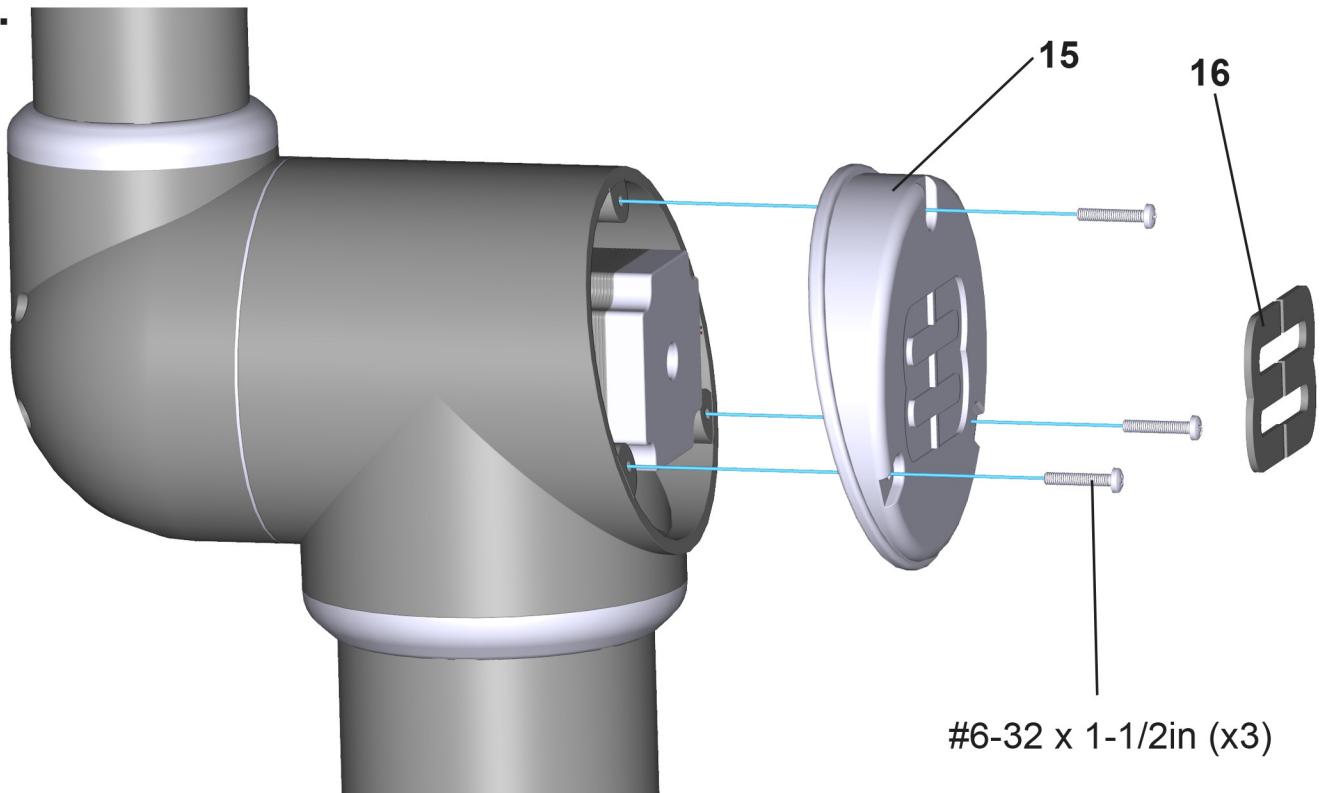


Step 5

101.

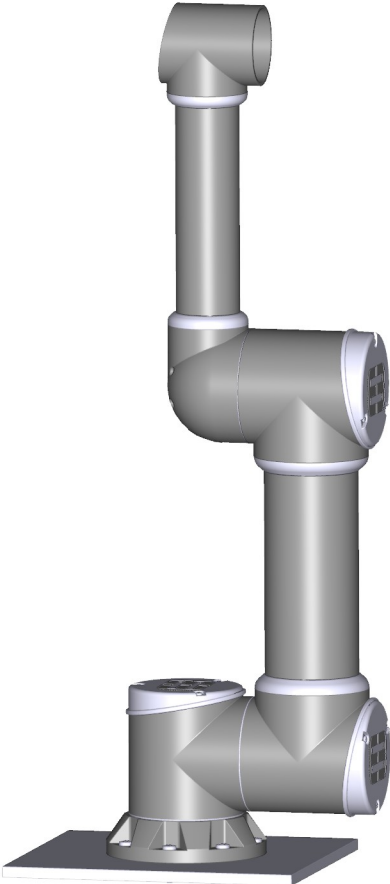
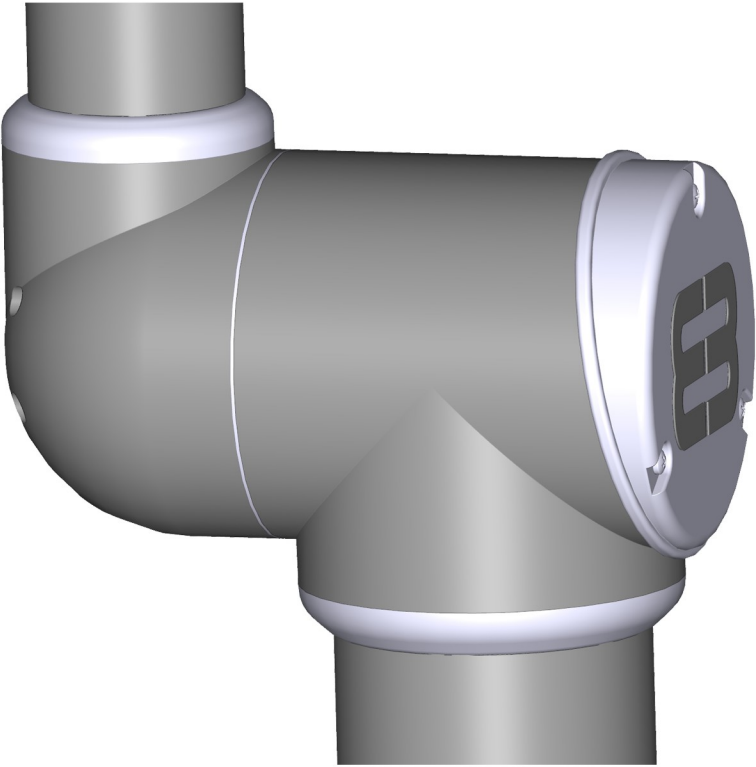


102.

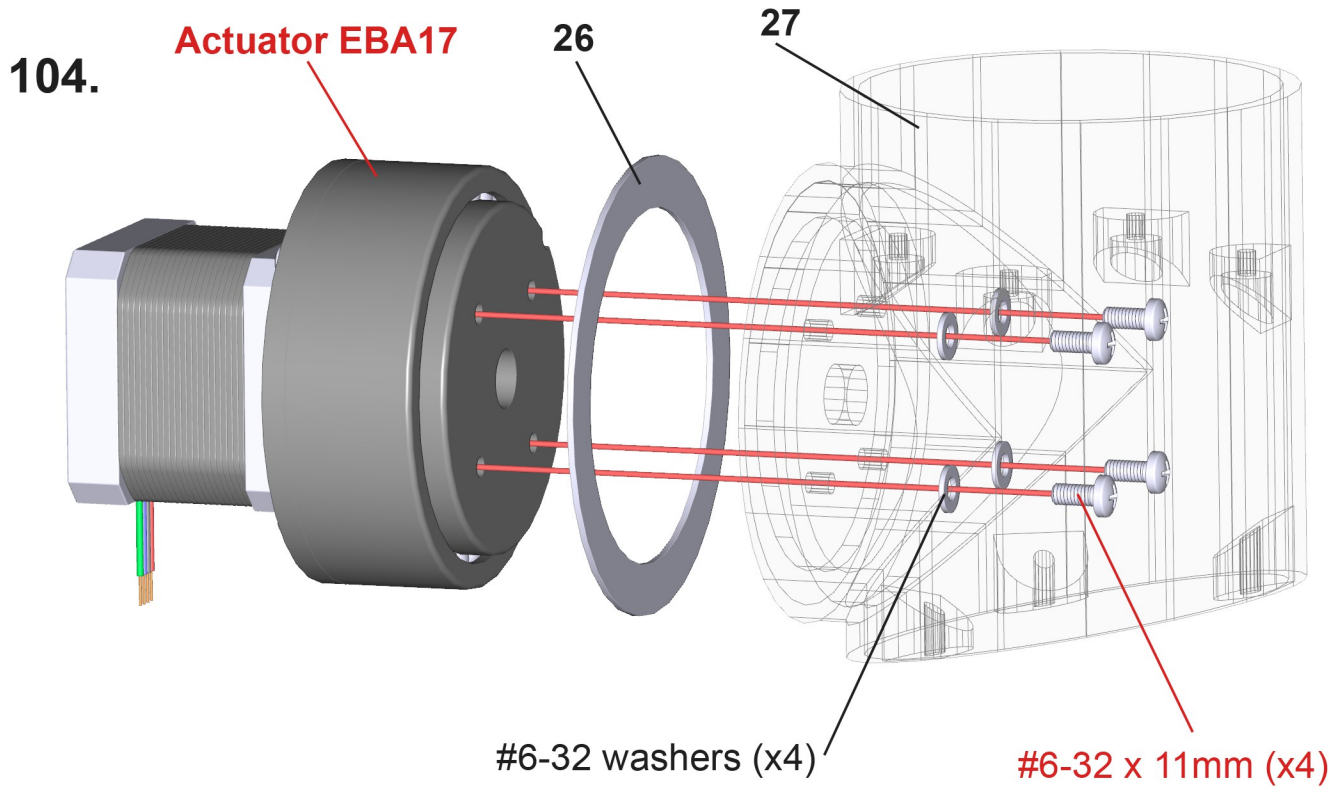


Step 5

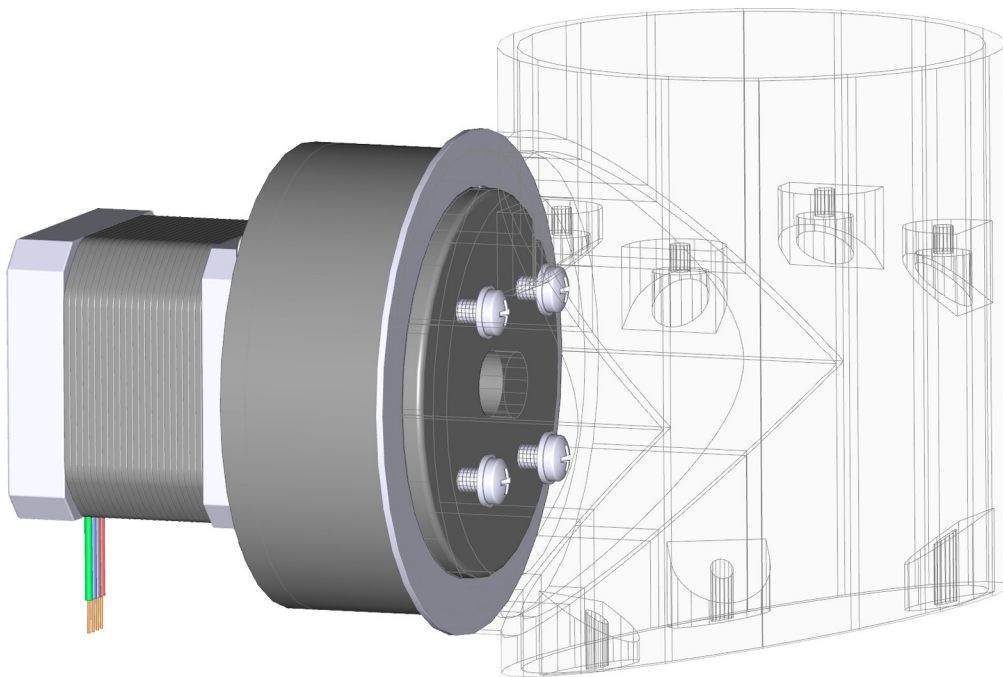
103.



Step 6



105.

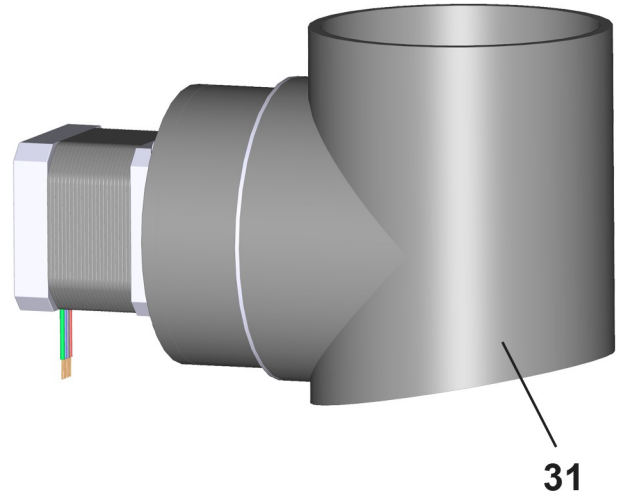
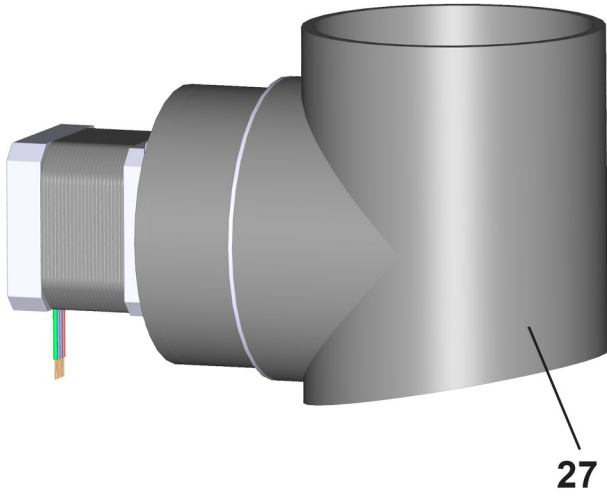


Step 6

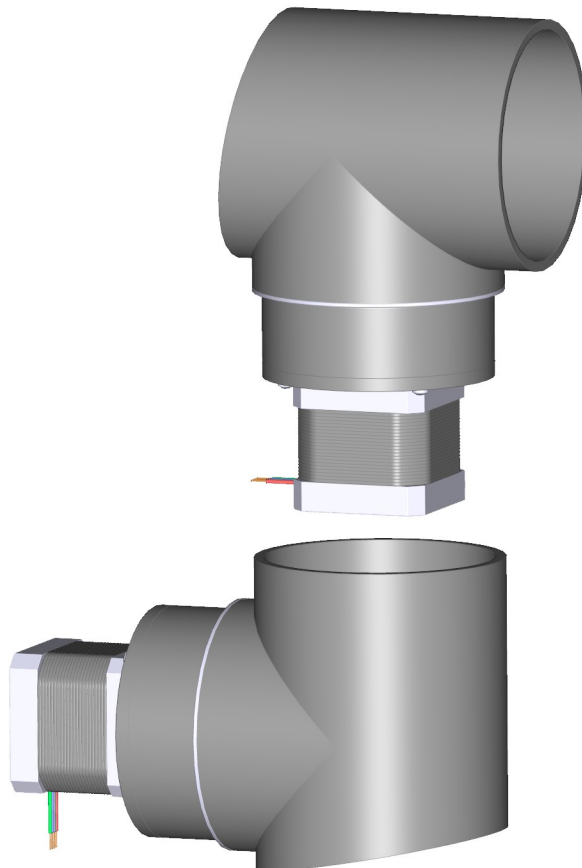
106.

Wrist 1

Wrist 2

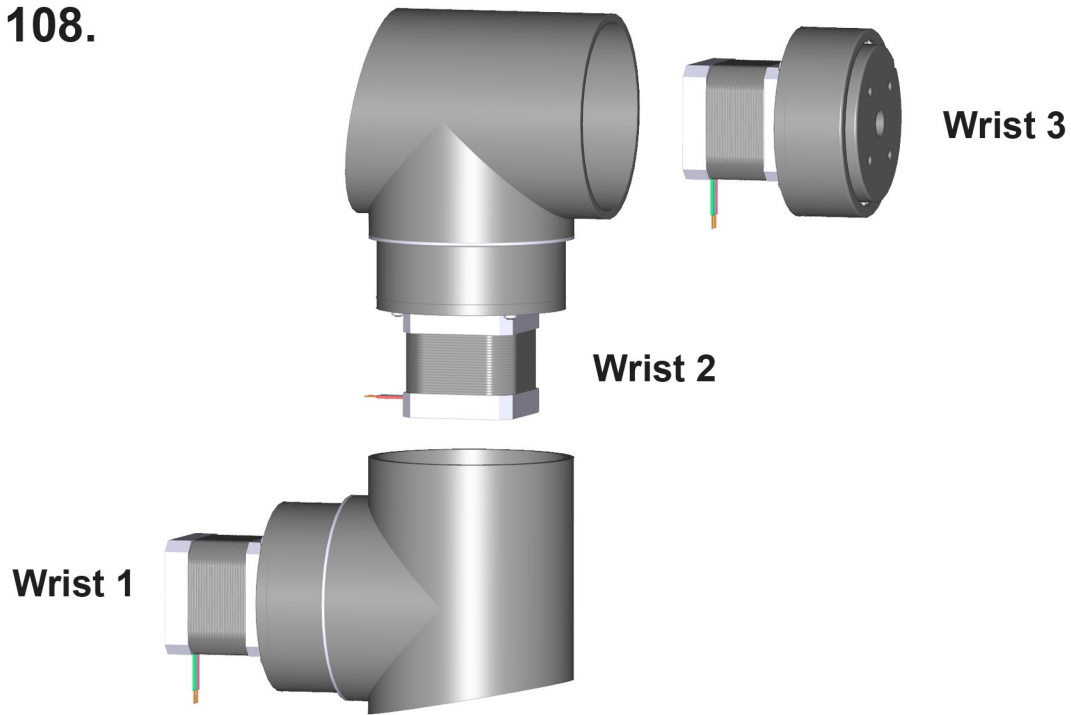


107.

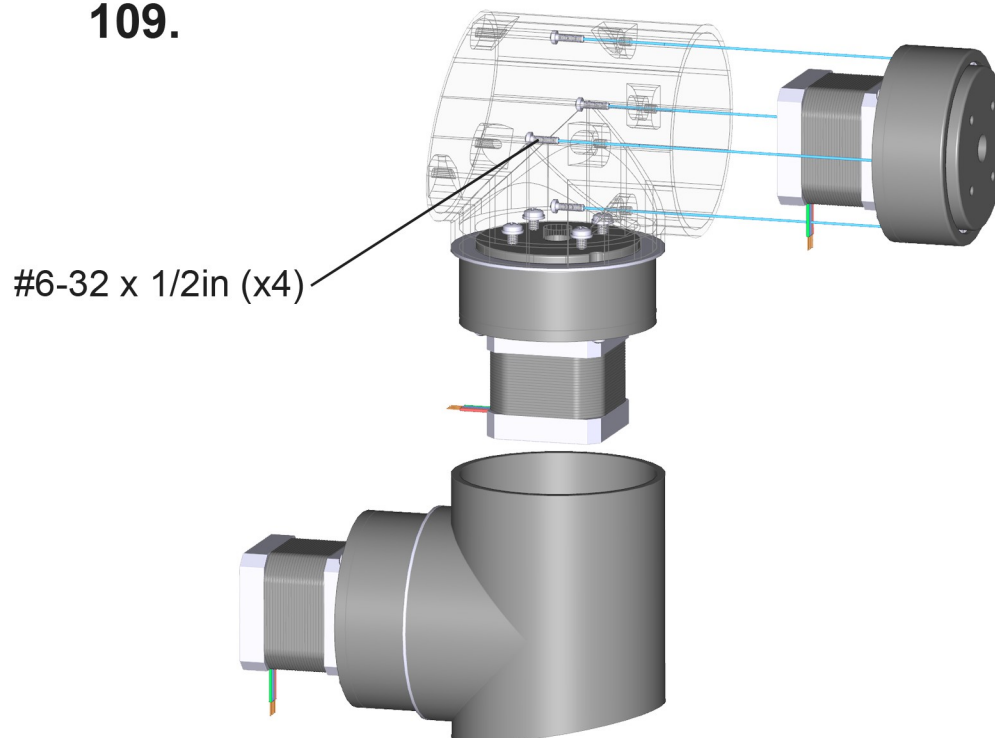


Step 6

108.

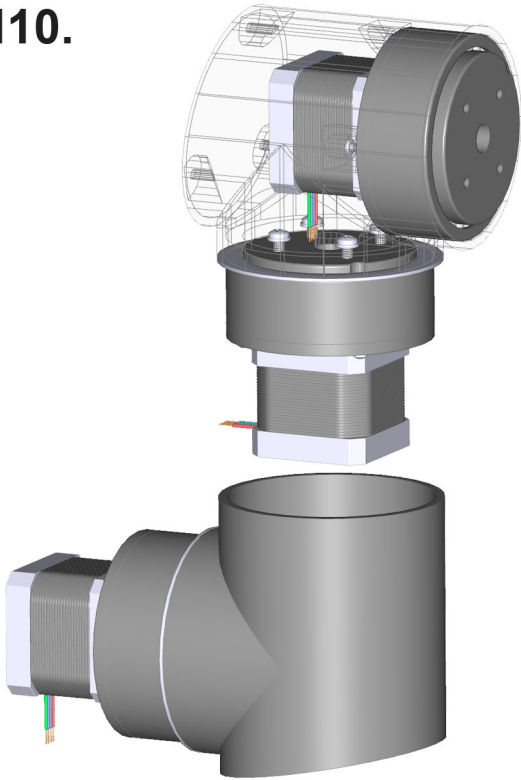


109.

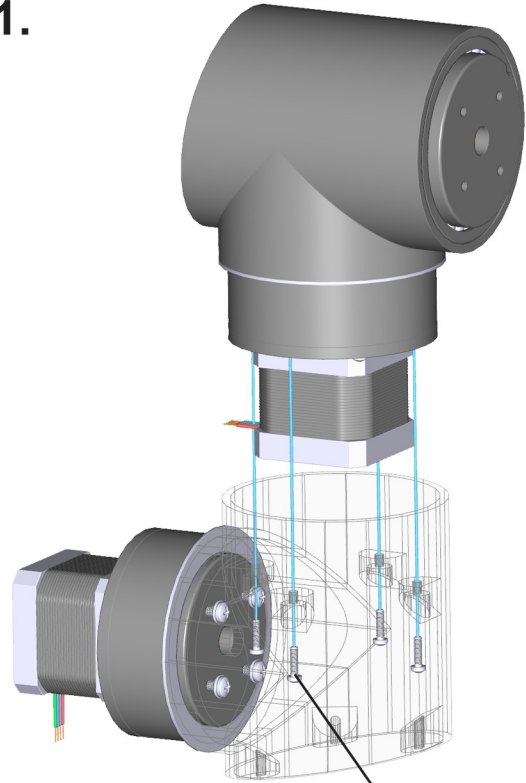


Step 6

110.

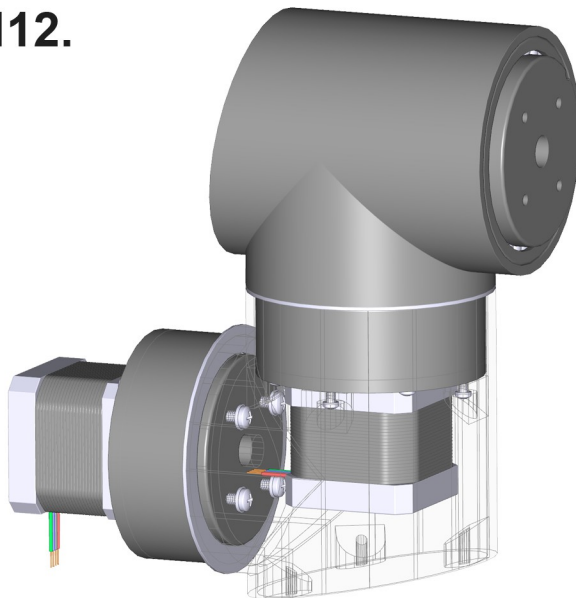


111.



#6-32 x 1/2in x (x4)

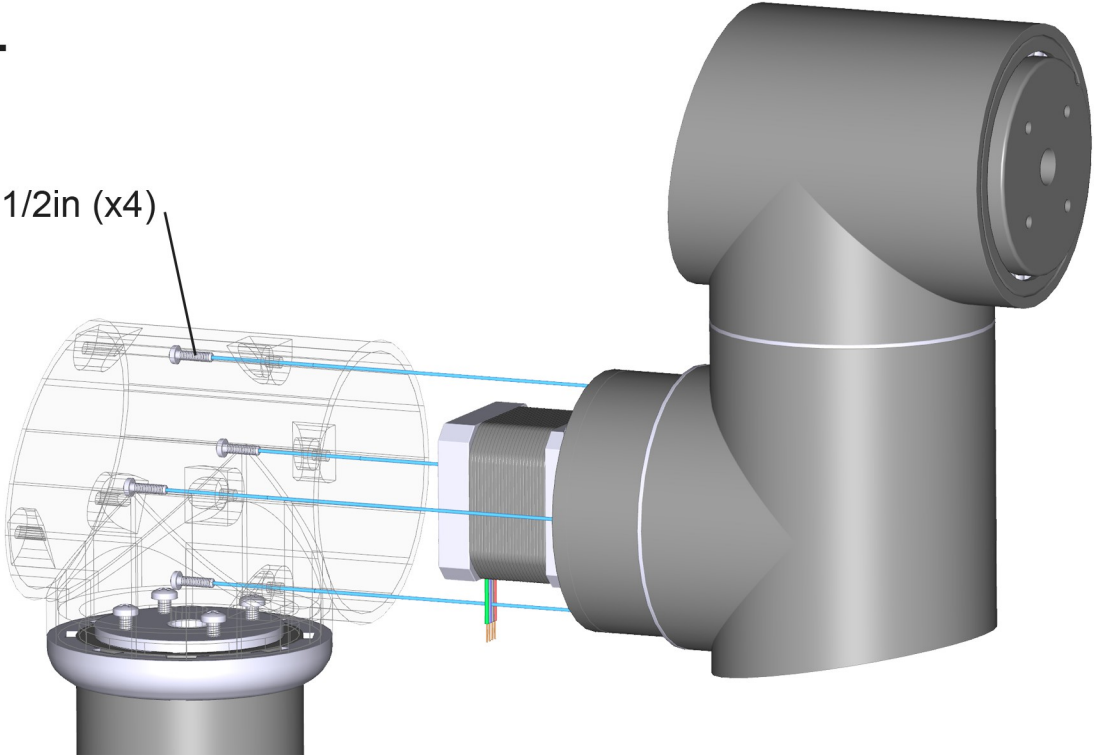
112.



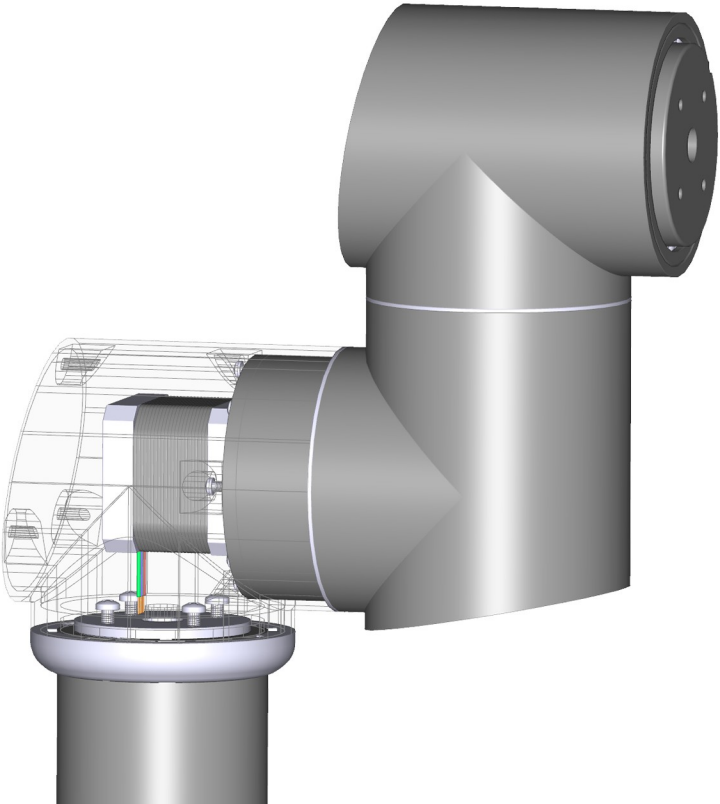
Step 6

113.

#6-32 x 1/2in (x4)

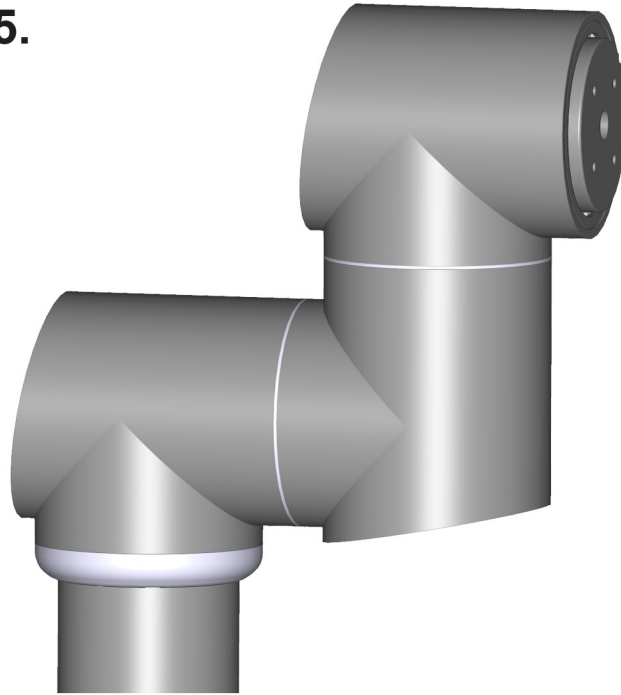


114.

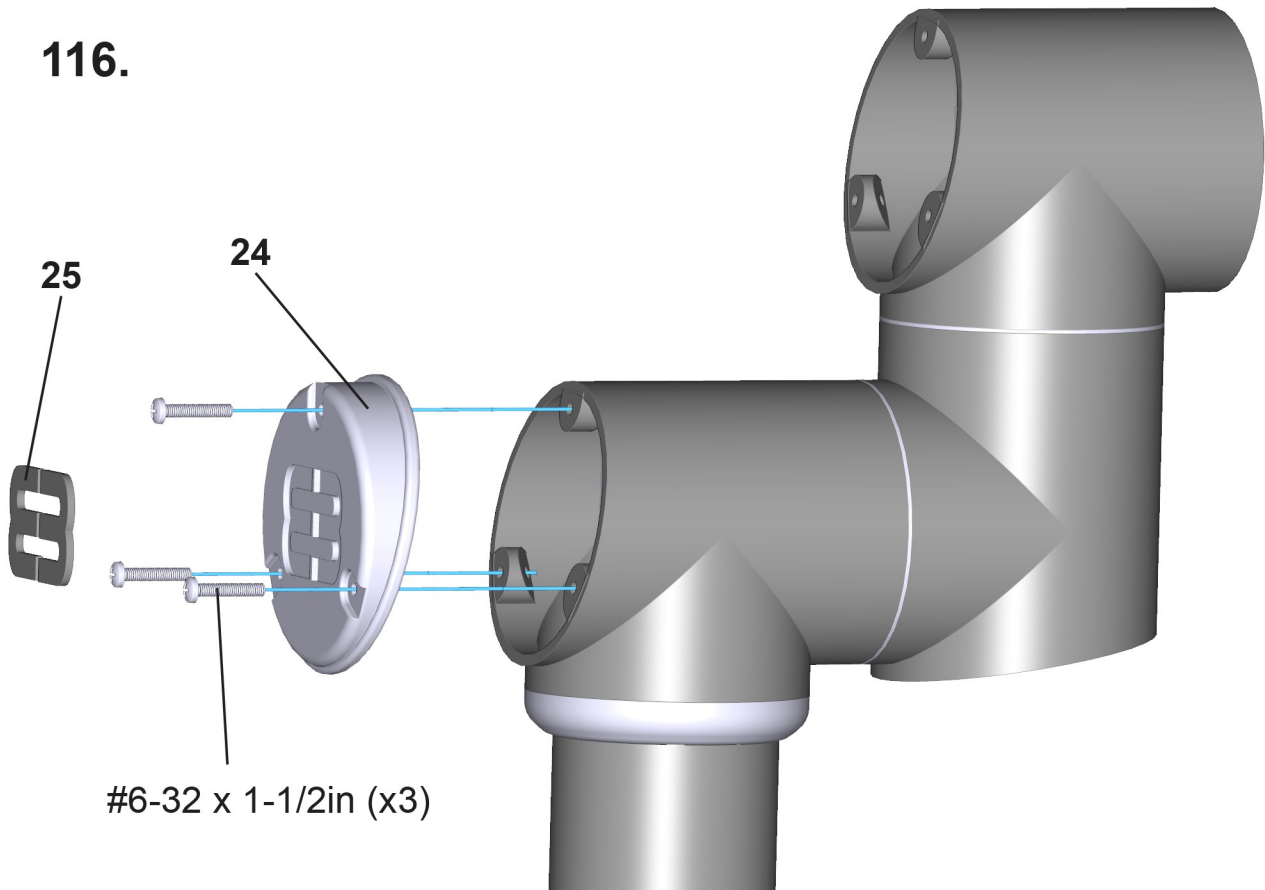


Step 6

115.

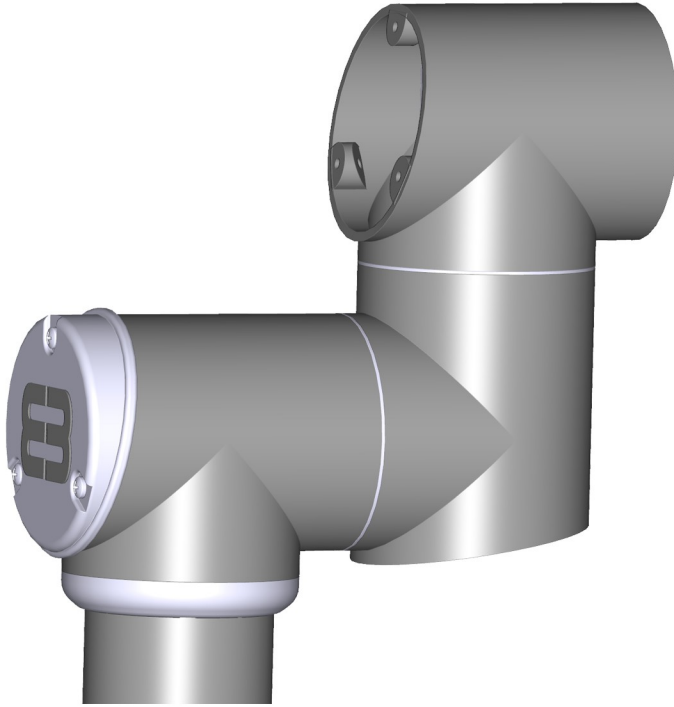


116.

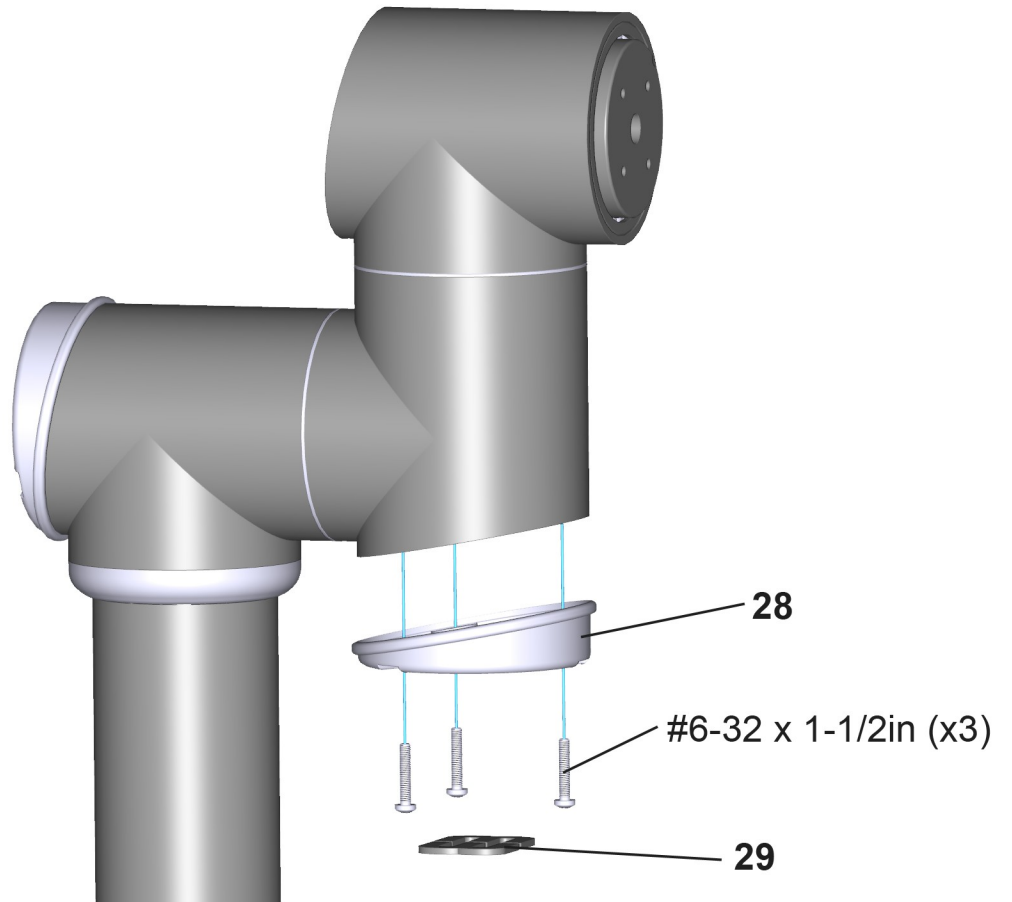


Step 6

117.

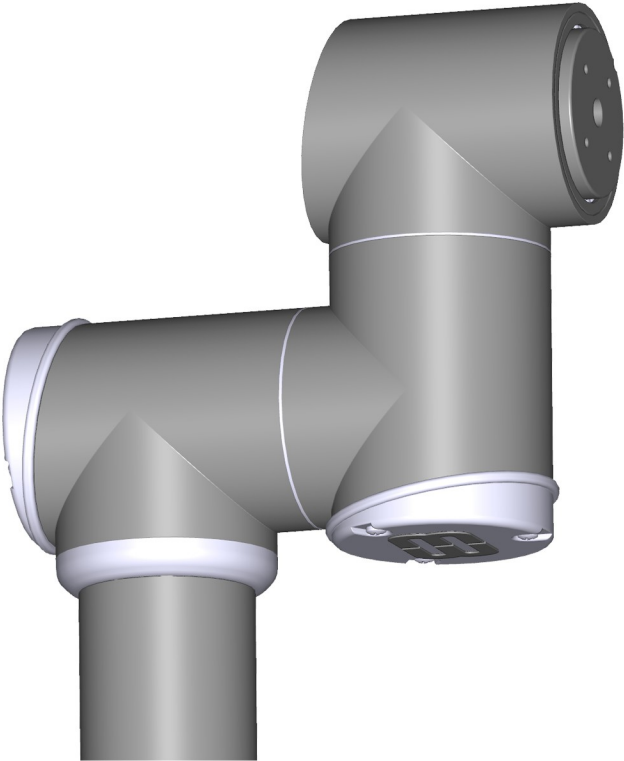


118.

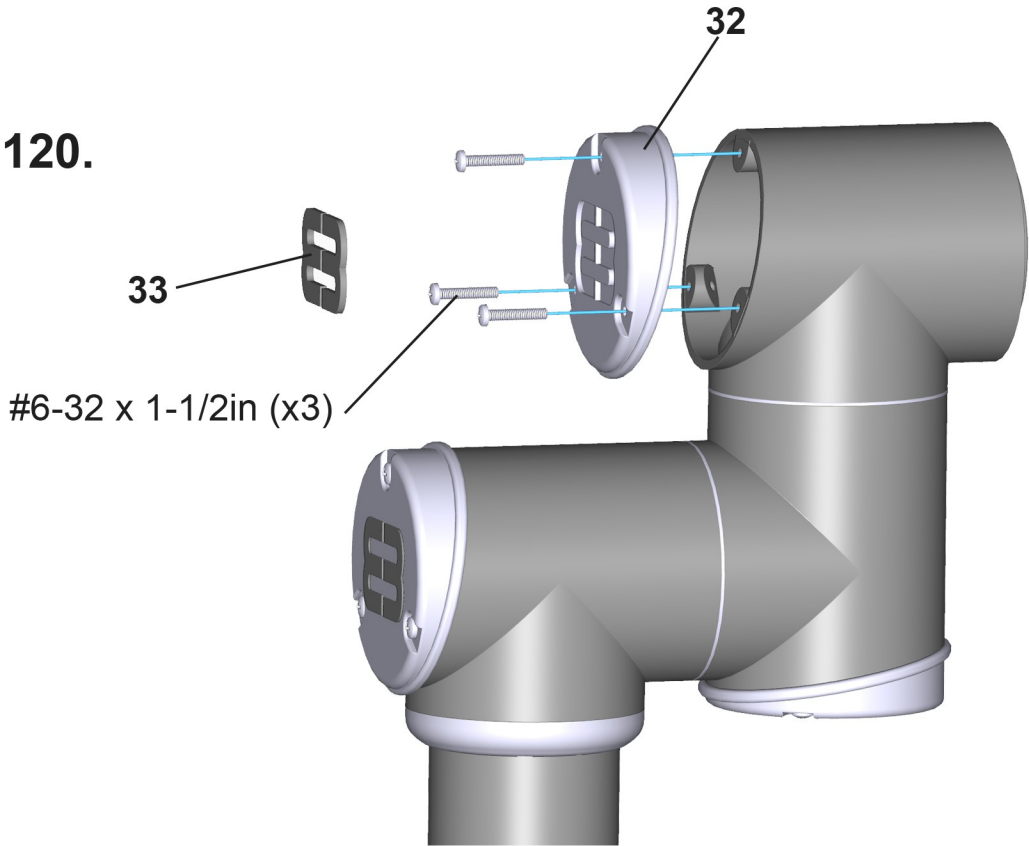


Step 6

119.

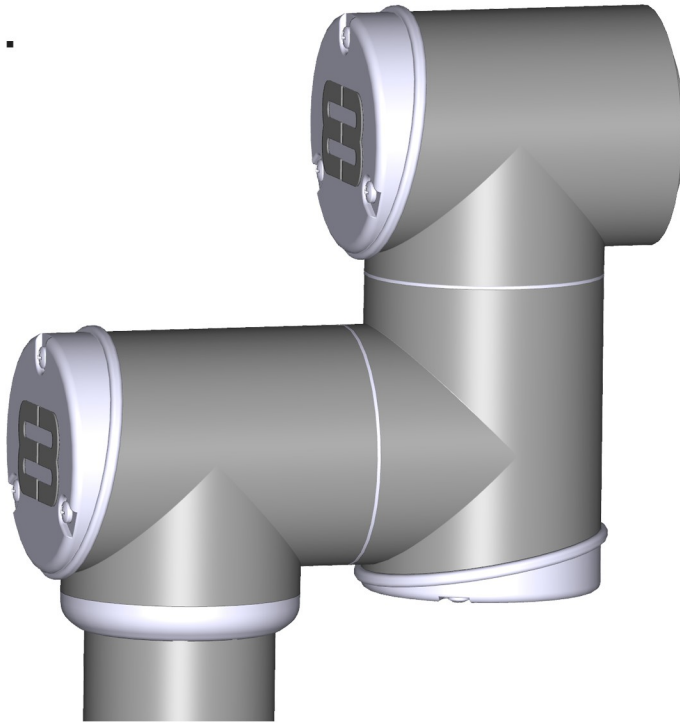


120.



Step 6

121.



Step 6

122.

