



How to build your robot

www.pib.rocks/build

assembly instructions for:

UPPER BODY

v2024



PRINT

BUILD

DEVELOP

YOUR OWN ROBOT

Printable parts

Printable parts

4 x **B48**-Hinge

2 x **B49**-Hinge_Plate

B51-Servo_Array_Scaffold

2 x **B52**-Tube_Holder_Side

B53-Tube_Holder_Top

2 x **B60p**-M3-M4.5_Adapter

C60-Flange_Inner_Shoulder

C61-Motor_Bracket_Inner_Shoulder

C62-Ringflange_Inner_Shoulder

C63-Motor_Axis_Inner_Shoulder

C64-Motor_Axis_Cap_Inner_Shoulder

Printable parts

B19-Flat_stand_right

B20-Flat_stand_left

7 x **B25**-Wire_connector

6 x **B26**-Wire_connector_pawl

7 x **B27**-Wire_connector_mount

1 x **B31**-Wire_connector_pawl_forearm

B41-L-Clavicle_left

B41-R-Clavicle_right

B42-L-Ribcage_Left

B42-R-Ribcage_Right

B43-L-Ribcage_Lower_Left

B43-R-Ribcage_Lower_Right

B44-Electronics_back

B45-Electronics_base

B46-Power_back

B47-Power_holder

Non-printable parts

You will also need the following non-printable parts from our pib.Box Master.

If you do not have it yet, you can buy in our shop
<https://shop.pib.rocks>.

Non-printable parts - Electronics

2 x **E03**-TinkerForge ServoBricklet

6 x **E07**-MG996R

1 x **E09**-DS3225

1 x **E15**-DS5180SSG

1 x **E16**-RPi Power Supply

1 x **E17**-GPIO_Header

1 x **E24**-Relay

Non-printable parts

116 x **S01** M3 nuts

8 x **S02** M3 6 mm screws

52 x **S04** M3 10 mm screws

23 x **S05** M3 12 mm screws

11 x **S06** M3 16 mm screws

8 x **S08** M3 20 mm screws

2 x **S09** M3 22 mm screws

7 x **S11** M3 30 mm screw

7 x **S13** M3 40 mm screws

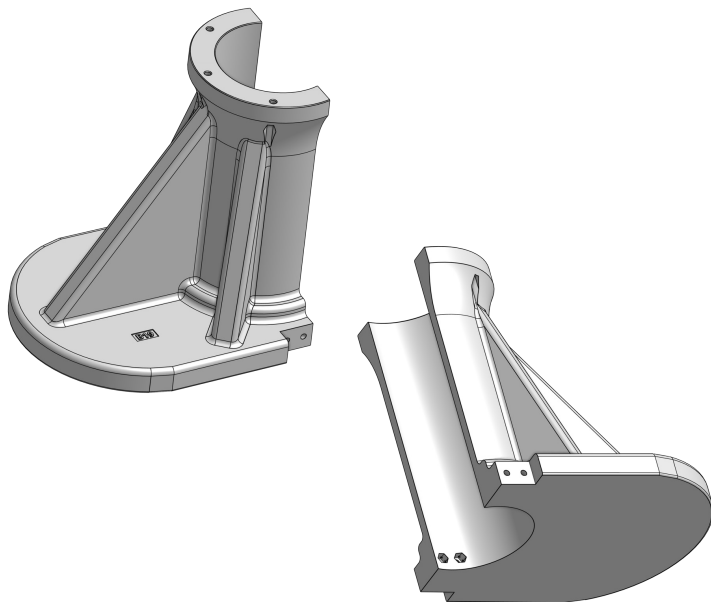
4 x **M08** 20 mm metal rods

1 x **M04** Ballbearing

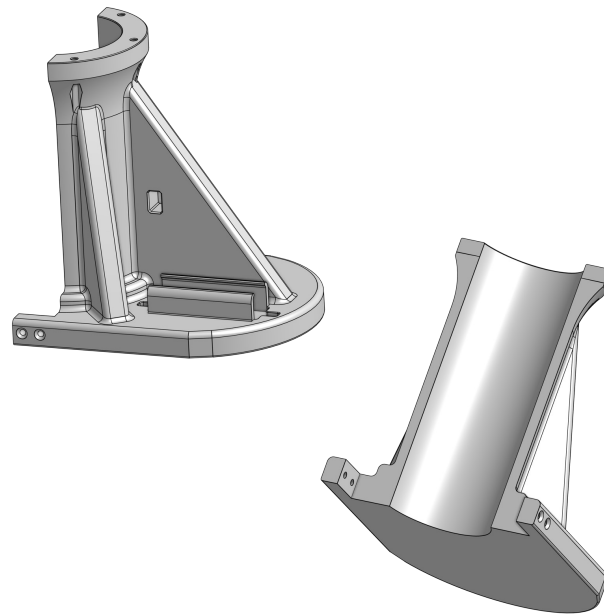
8 x **M13** Distancer

Printable parts - Overview

B19-Flat_stand_right

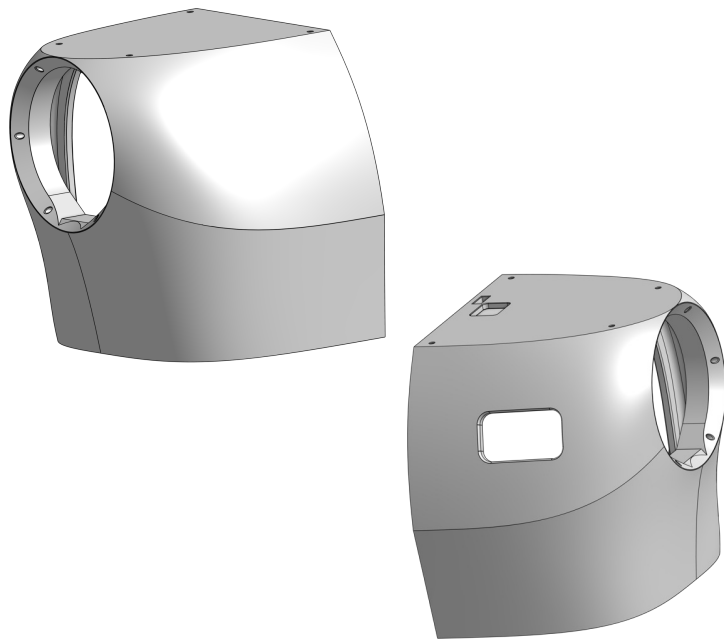


B20-Flat_stand_left



Printable parts - Overview

B41-L/-R-Clavicle_Left/Right

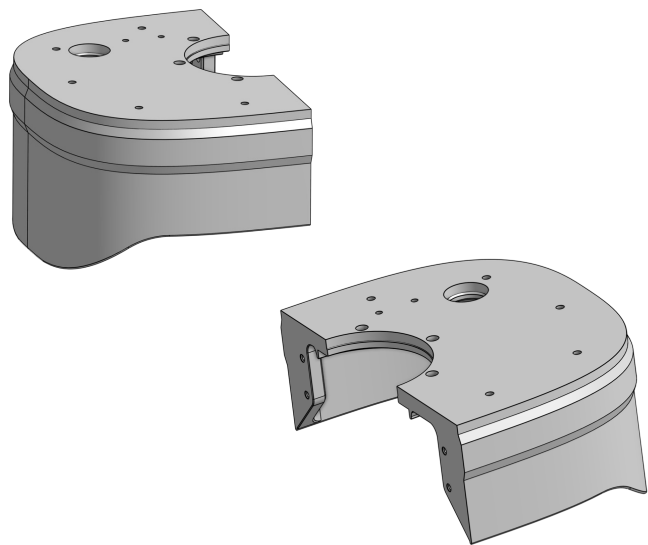


B42-L/-R-Rip cage_Left/Right

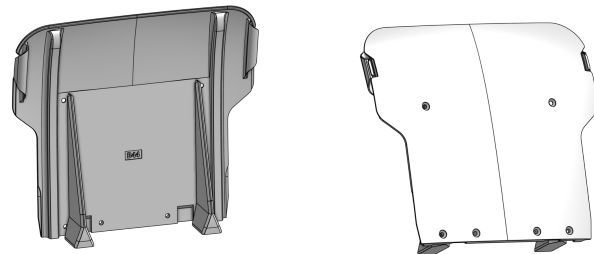


Printable parts - Overview

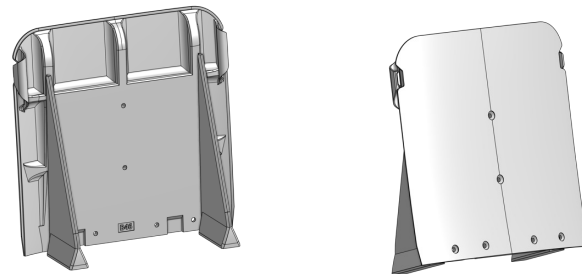
B43-L/-R-Ripcase_Lower_Left/Right



B44-Electronics_back

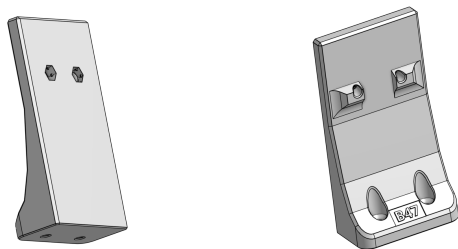


B46-Power_back

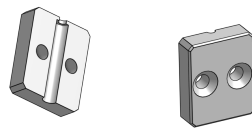


Printable parts - Overview

B47-Power_Holder



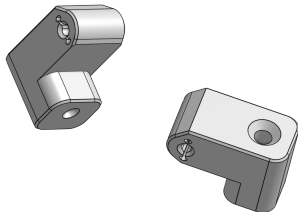
B53-Tube_Holder_Top



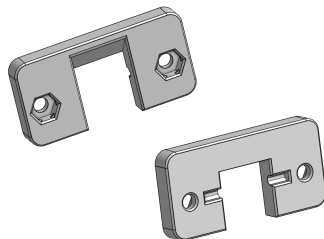
B60p-M3-M4.5_Adapter



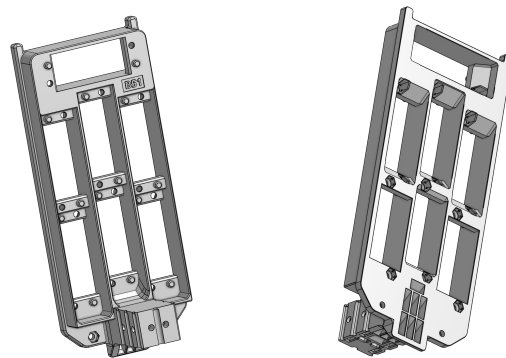
B48-Hinge



B49-Hinge_Plate

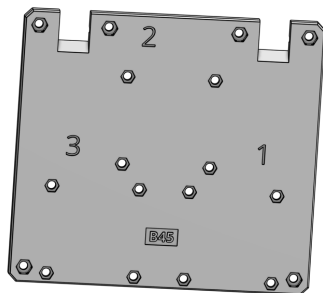


B51-Servo_Array_Scaffold

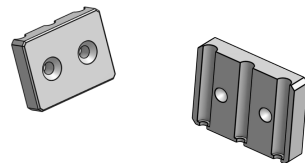


Printable parts - Overview

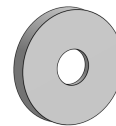
B45-Electronics_base



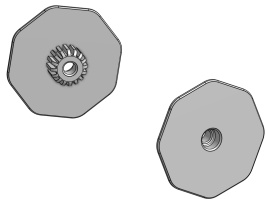
B52-Tube_Holder_Slide



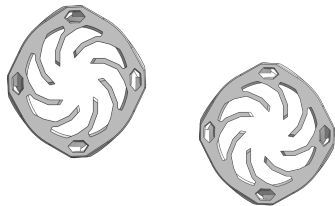
B27-Wire_connector_mount



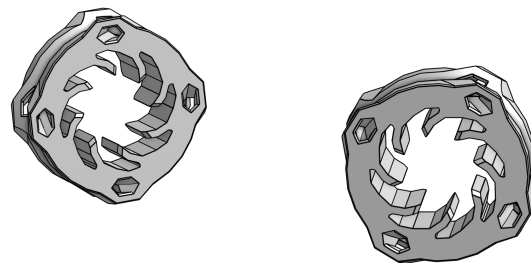
B25-Wire_connector



B26-Wire_connector_pawl

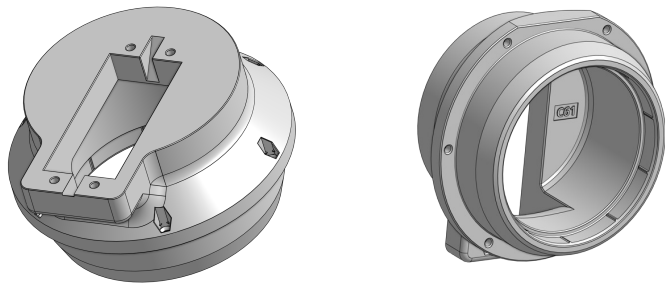


B31-Wire_connector_pawl_forearm



Printable parts - Overview

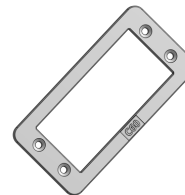
C61-Motor_Bracket_Inner_Shoulder



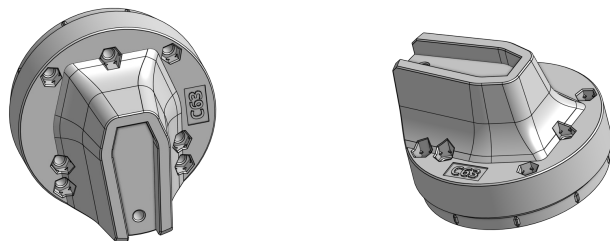
C62-Ringflange_Inner_Shoulder



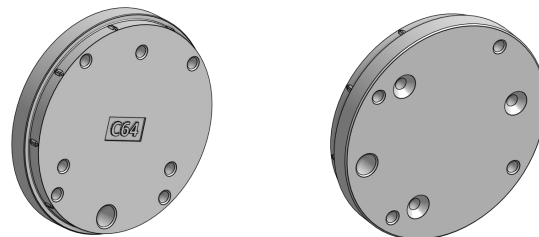
C60-Flange_Inner_Shoulder



C63-Motor_Axis_Inner_Shoulder



C64-Motor_Axis_Cap_Inner_Shoulder



Build it better: our suggestion for assembling pib



We recommend **tools** for each step. These are a suggestion, you can of course also use other tools.



1-5

We have categorized each step according to its **difficulty** - from **1-5** (1 being the easiest, 5 the hardest)



We also show you which **non-printable parts** you need for each step

Step 1

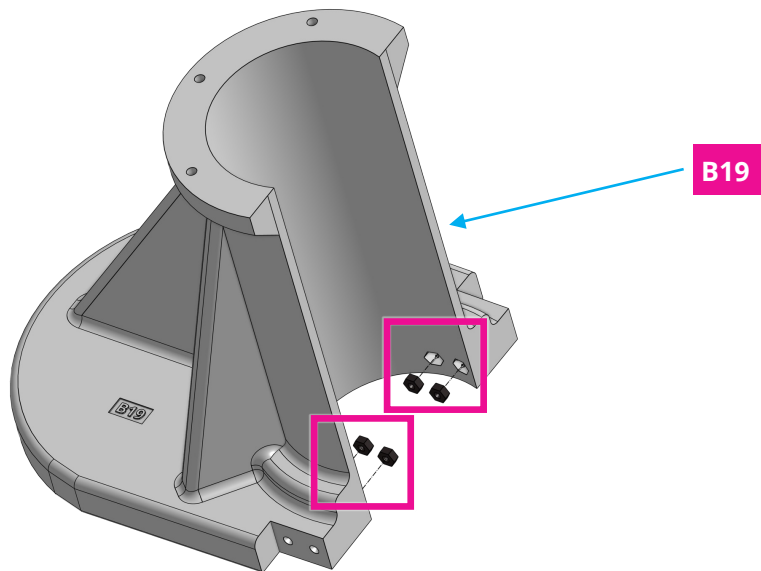
Place **4 x nuts** in the shown spots in **B19**, then use **4 x 30 mm screws** to fix **B20** to **B19**.



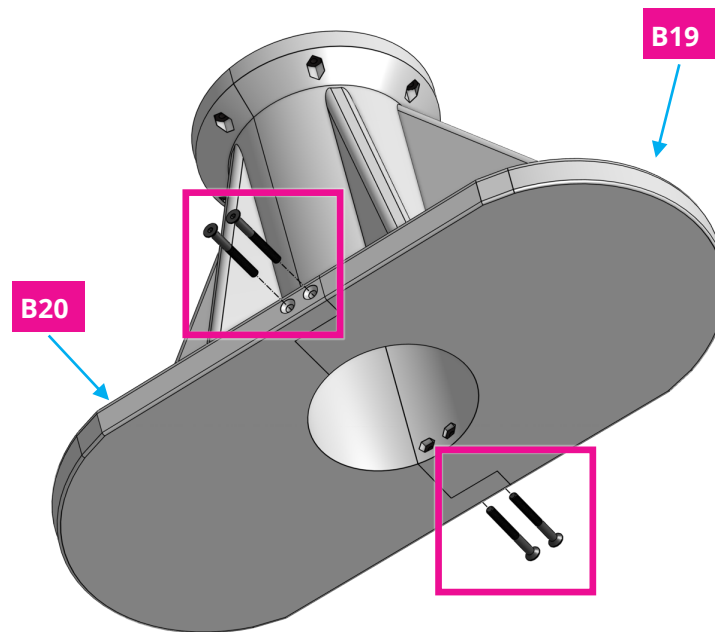
4x



4x



Our tip: use a hammer and gently push the nuts into the holes.

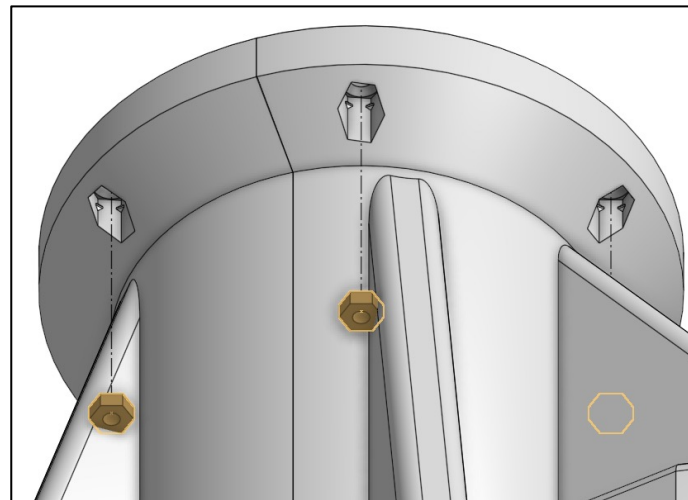
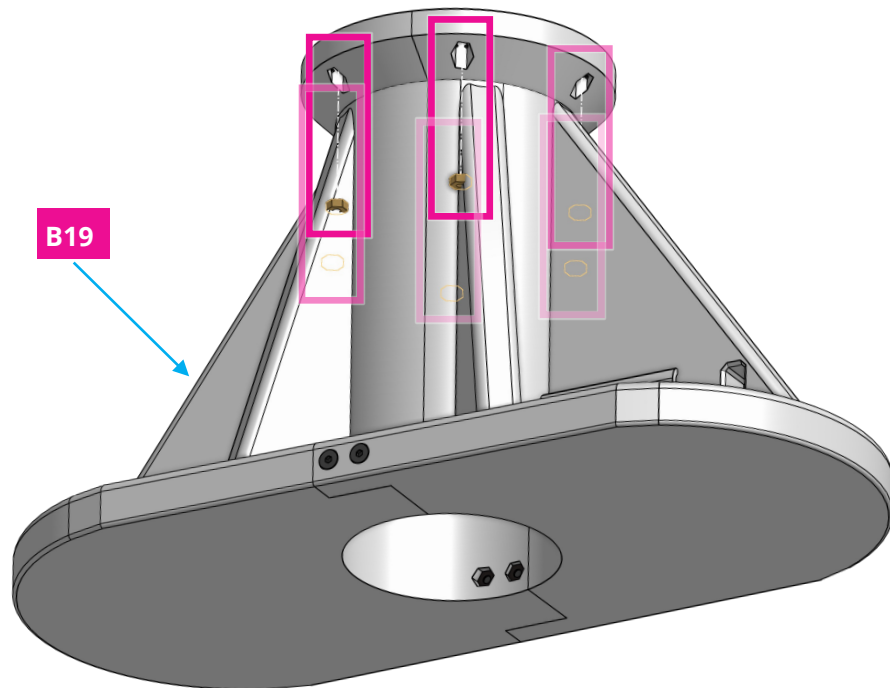


Step 2a

Place **6 x nuts** in shown spots in **B19** and **B20**.



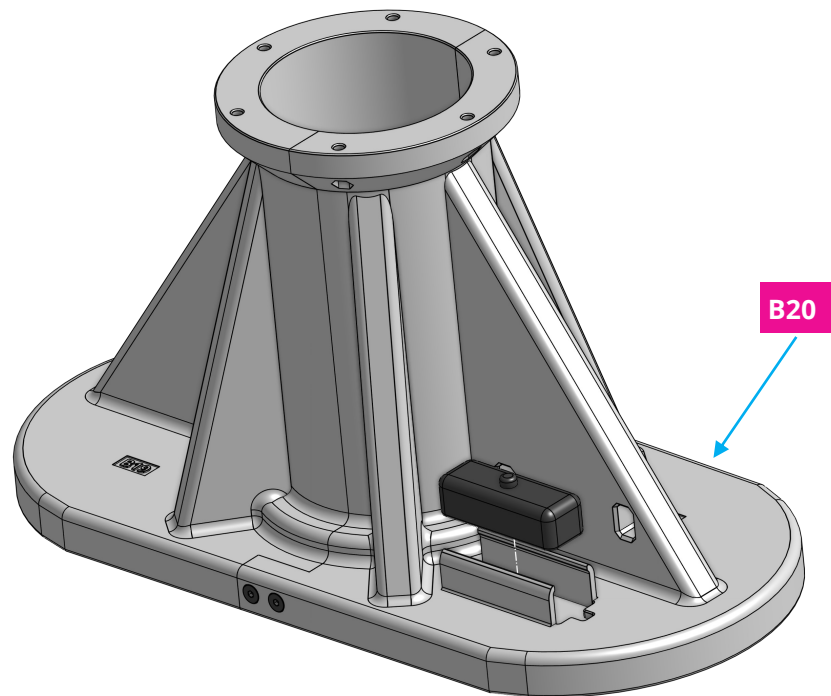
6x



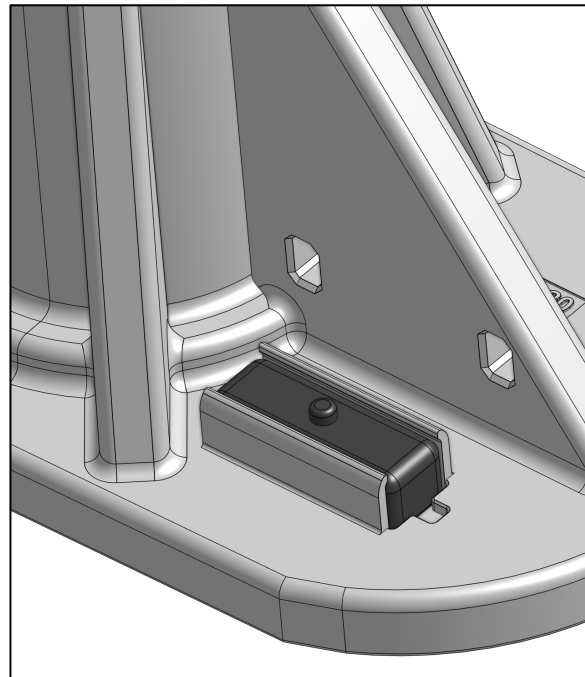
*It is easier to put the nuts into place,
when you flip the assembly.*

Step 2b

Place **E16** in **B20**.

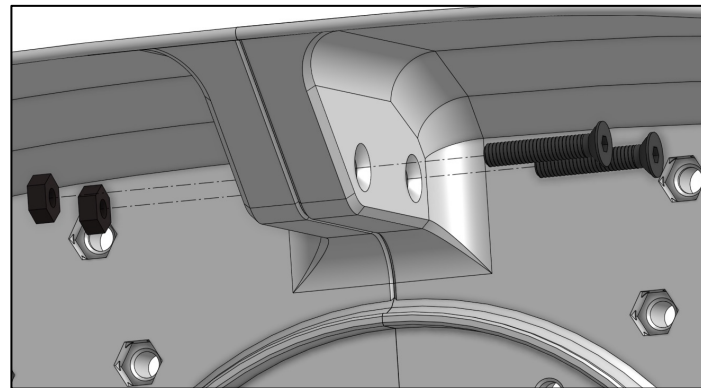
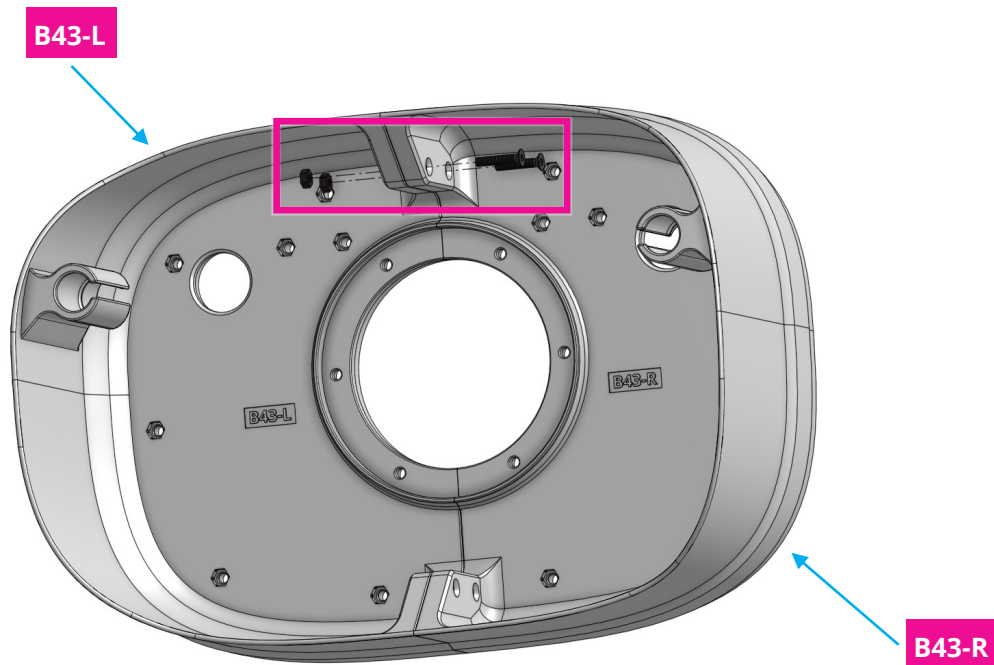


1



Step 3a

Connect **B43-L** and **B43-R** using **4 x M3 nuts** and **4 x M3 mm screws**.



Step 3b

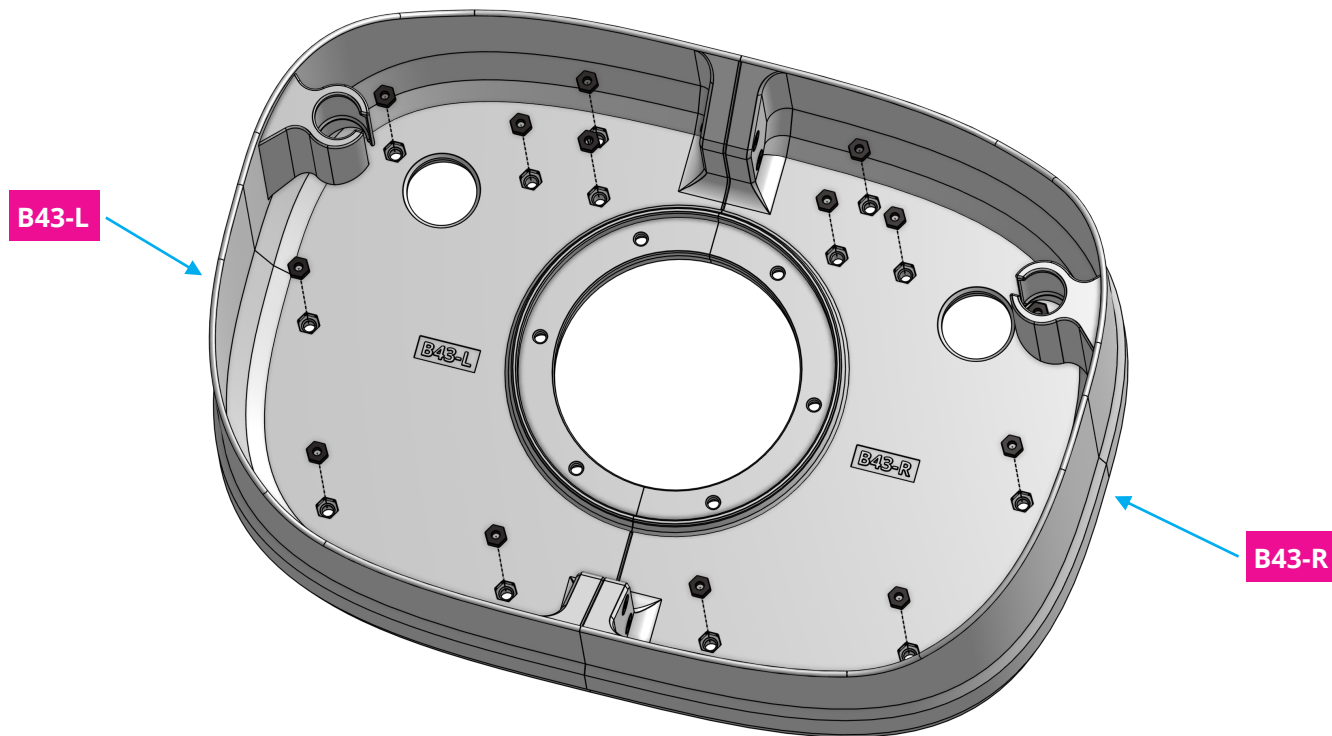
Place **14 x M3** nuts in the assembly.



2



14x



Step 4

Connect both assemblies using **6 x 16 mm screws**.

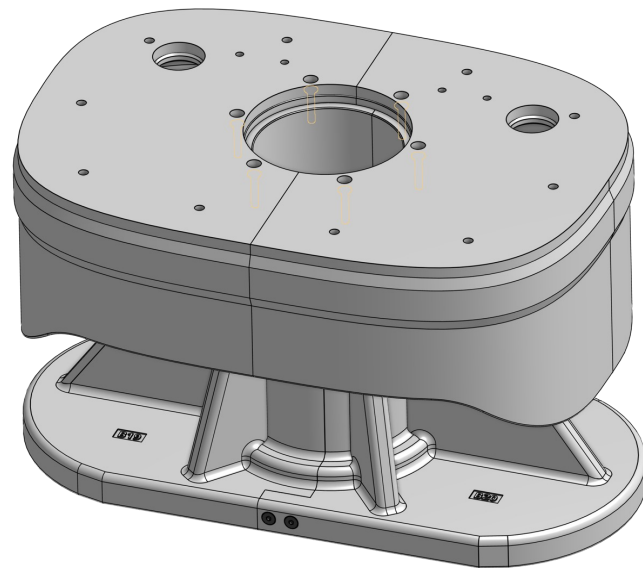
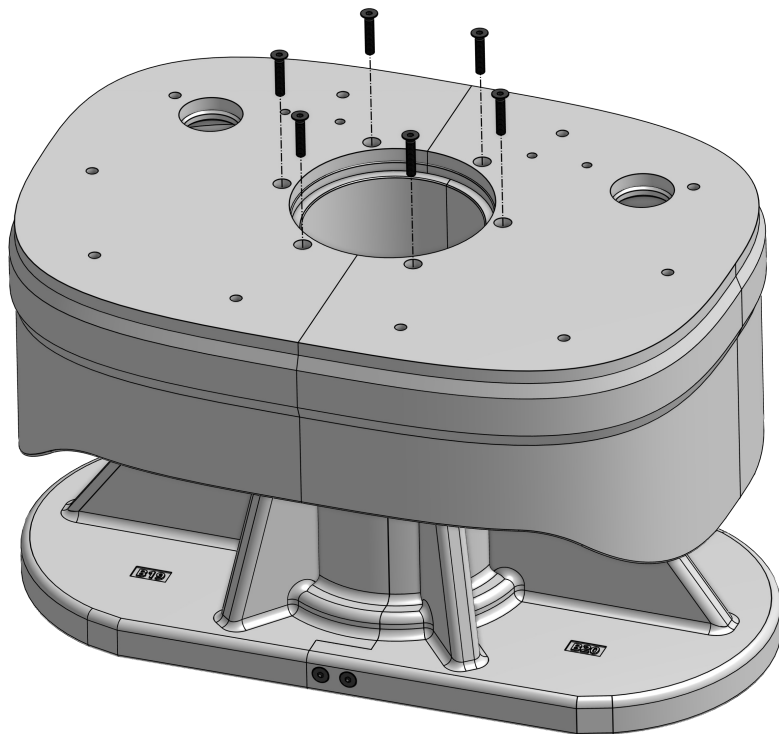
You may apply some gentle force to connect the assemblies.



2

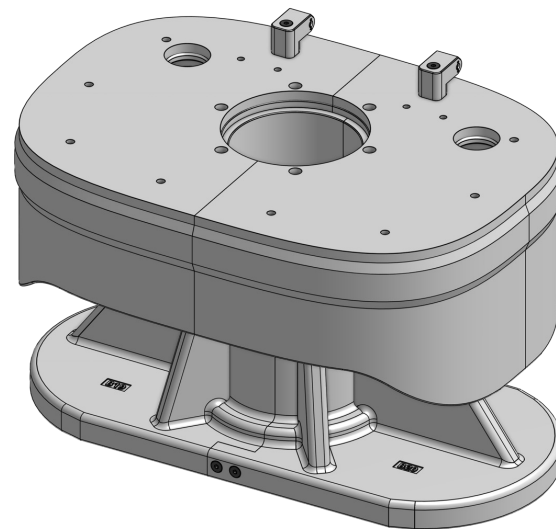
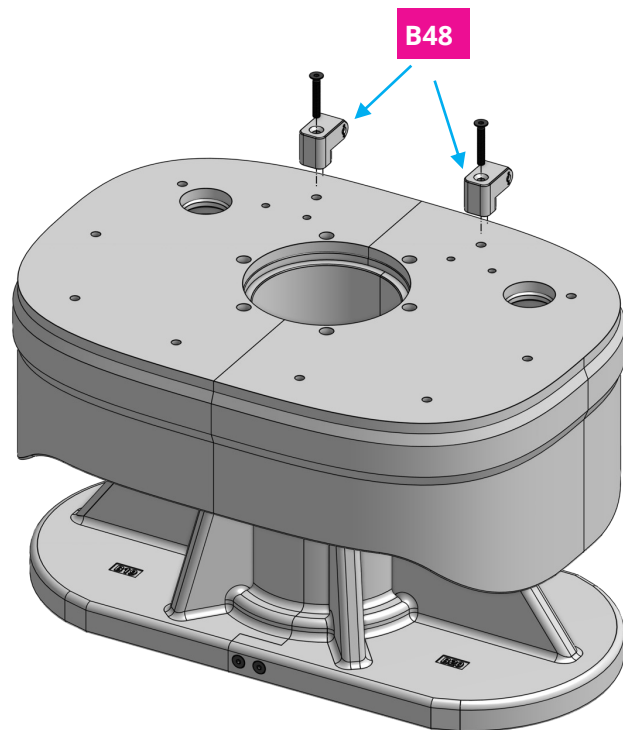


6x



Step 5

Connect 2 x **B48** to **assembly** using 2 x 20 mm screws.



Step 6a

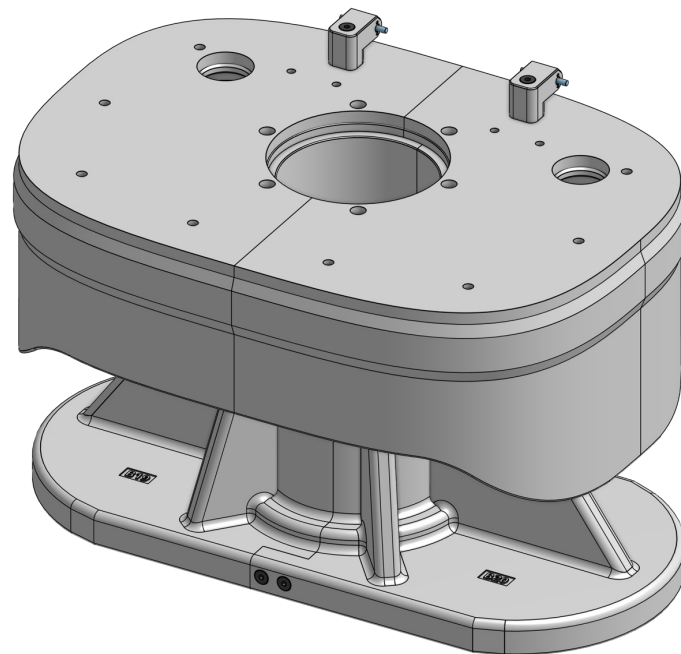
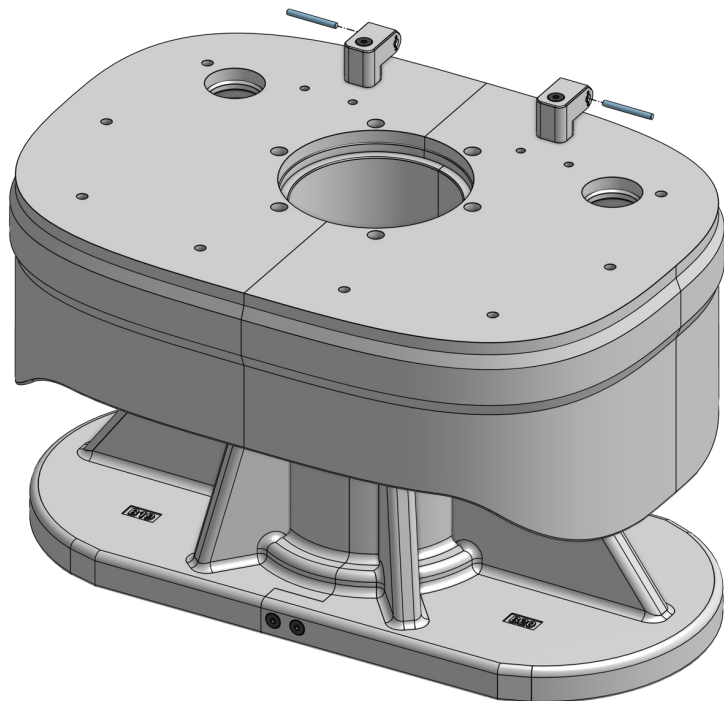
Insert 2 x **M08** to both **B48**.



2



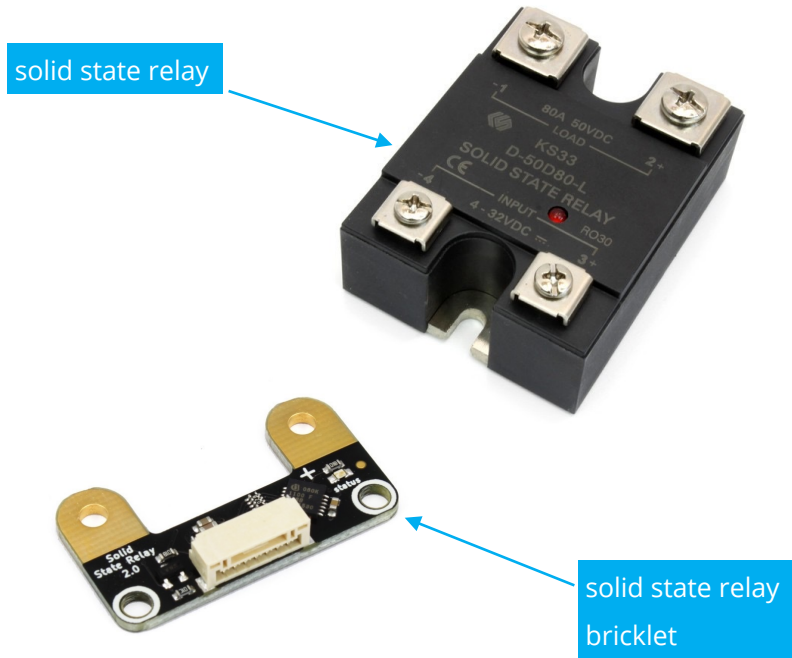
2x



Step 6b

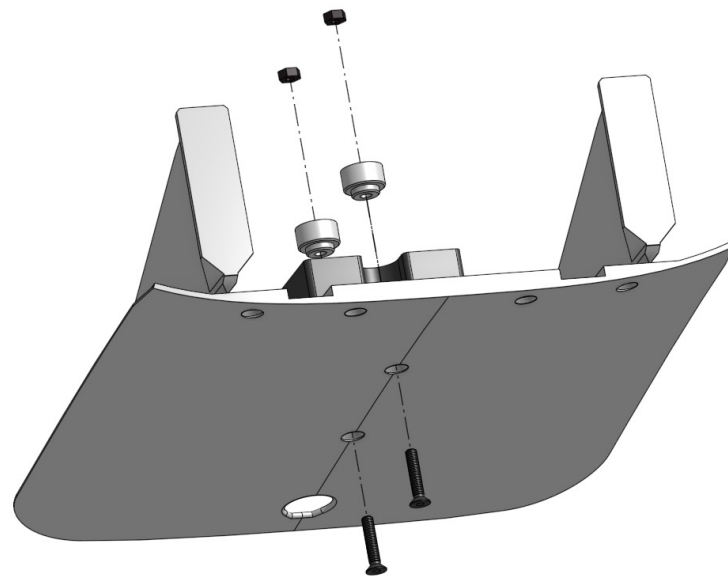
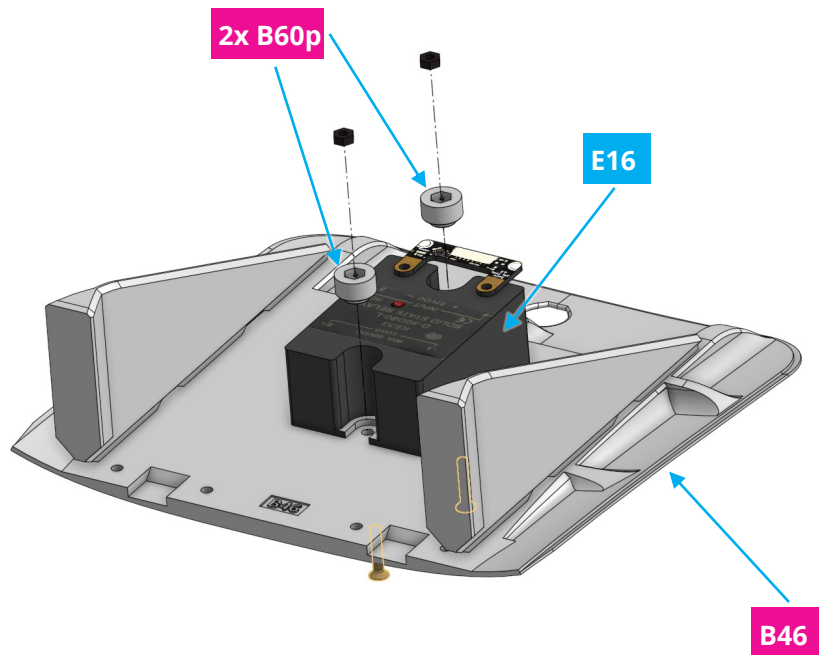


Connect **solid state relay bricklet** and **solid state relay** using 2 screws from the relay. This assembly will be called **E16** from now on.



Step 6c

Connect **E16** to **B46** using **2 x B60p**, **2 x M3 nuts** and **2 x M3 16mm screws**.



Step 7

Connect **B46** to the previous assembly using **2 x B49**, **4 x M3 nuts** and **4 x M3 10mm screws**.



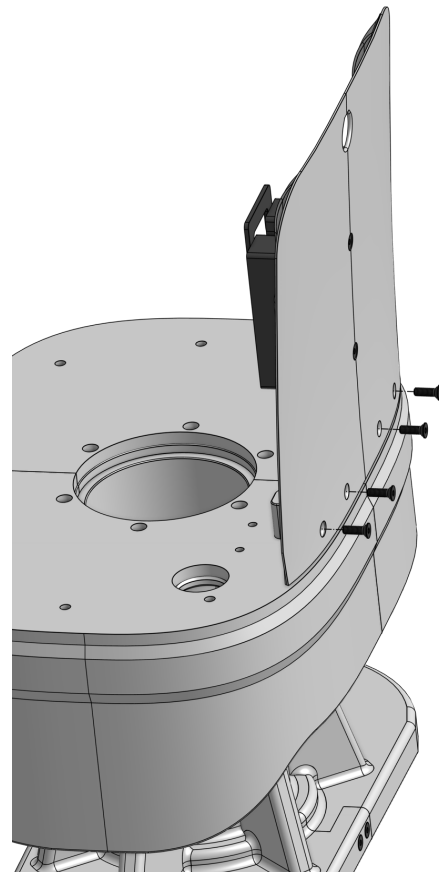
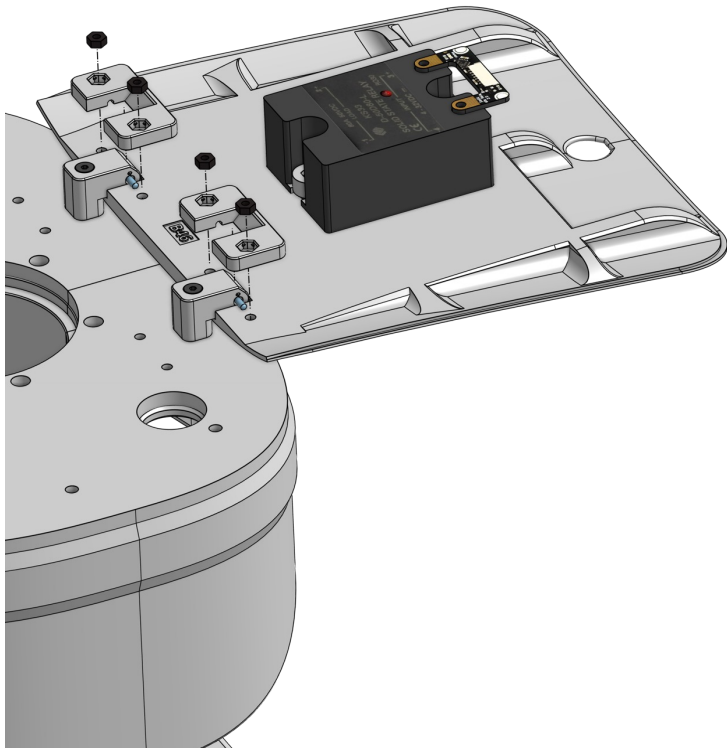
2



4x



4x

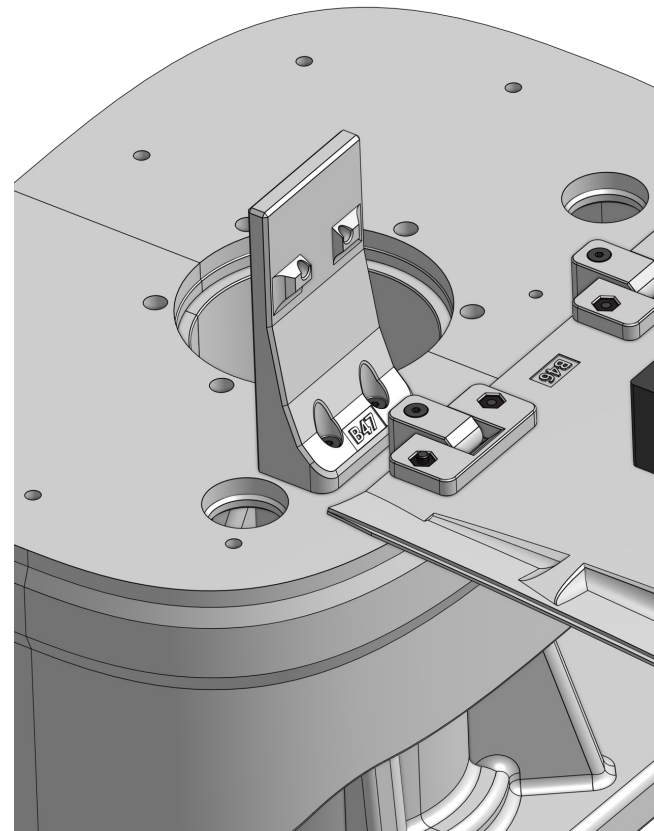
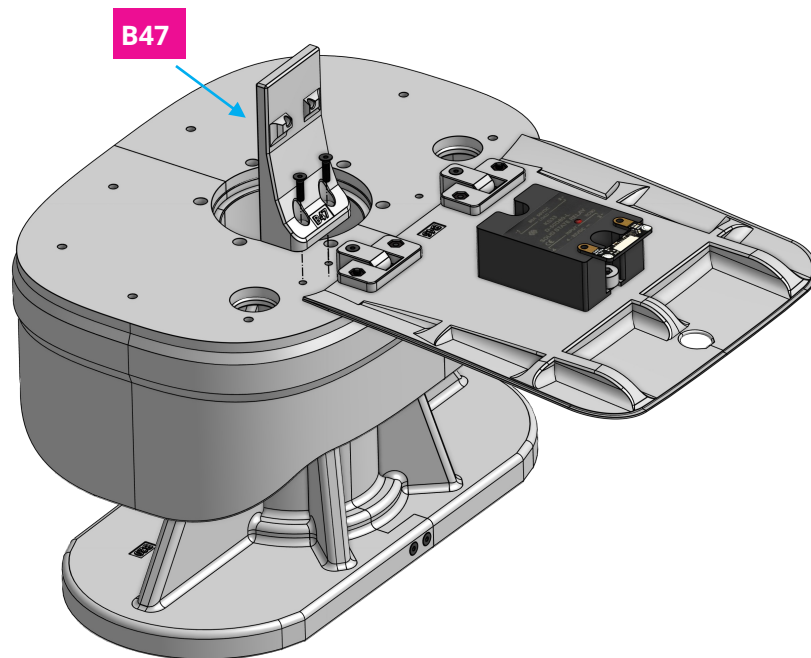


Step 8a

Connect **B47** to assembly using 2 x **M3 16mm** screws.

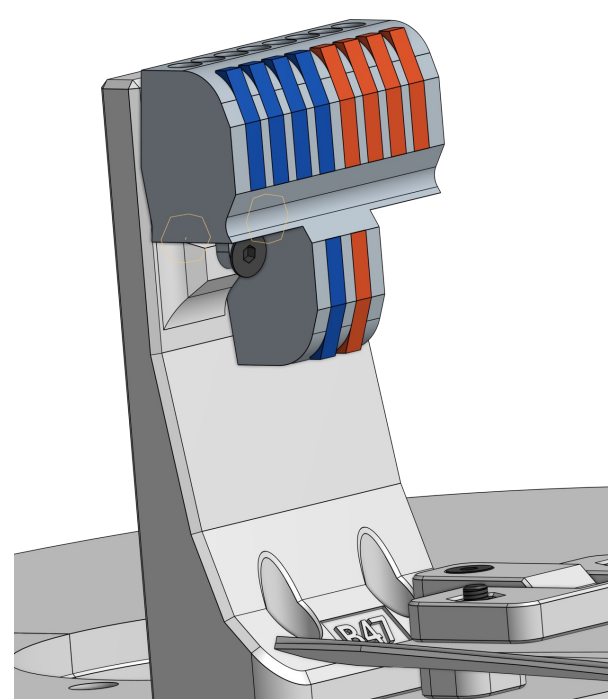
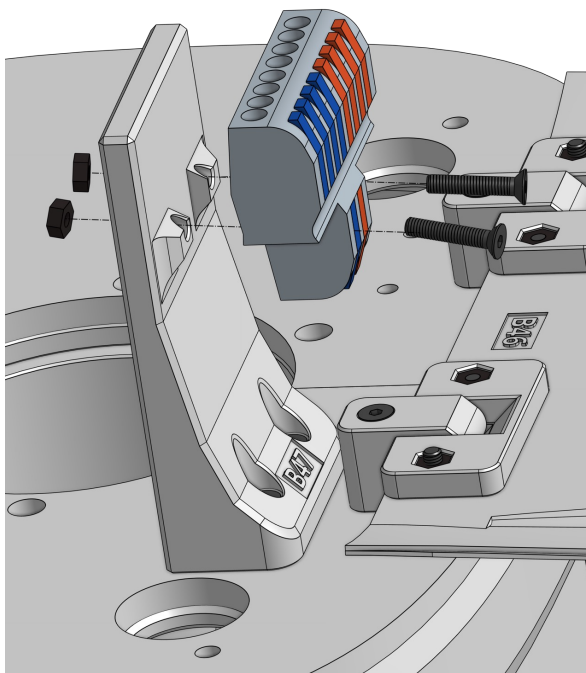


2x



Step 8b

Connect **E13** to **B47** using **2 x M3 nuts** and **2 x M3 12mm screws**.



Step 9a

Connect **B42-L** and **B42-R** using **3 x M3 nuts** and **3 x M3 10mm screws**.



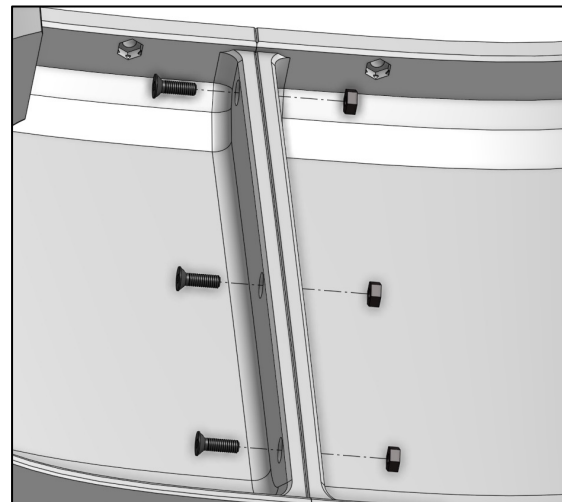
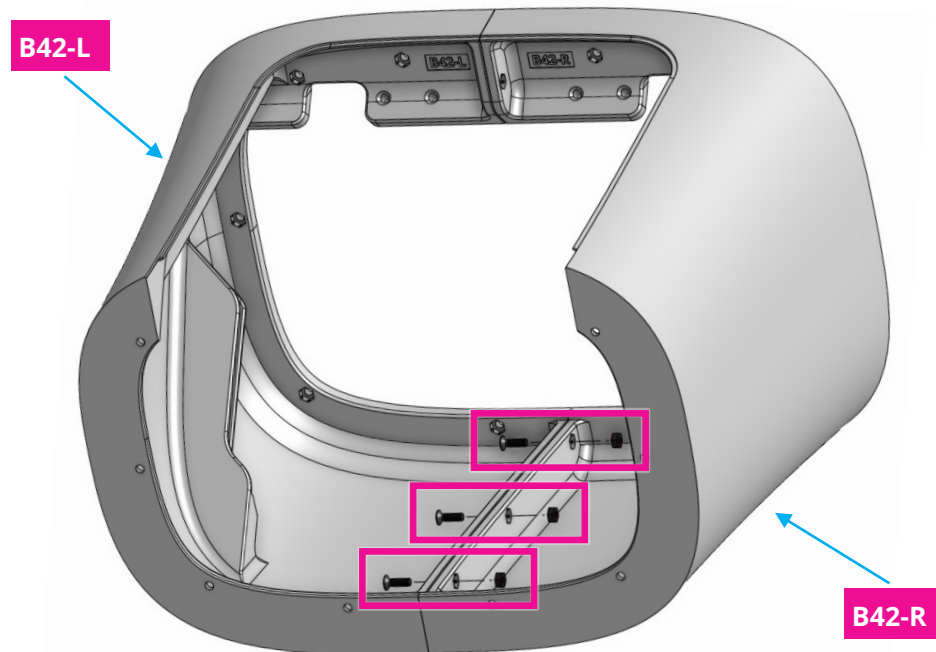
2



3x



3x



Step 9b

Place **10 x M3 nuts** in **B42** and improve connection between **L** and **R** using **1 x M3 nut** and **1 x M3 10mm screw**.



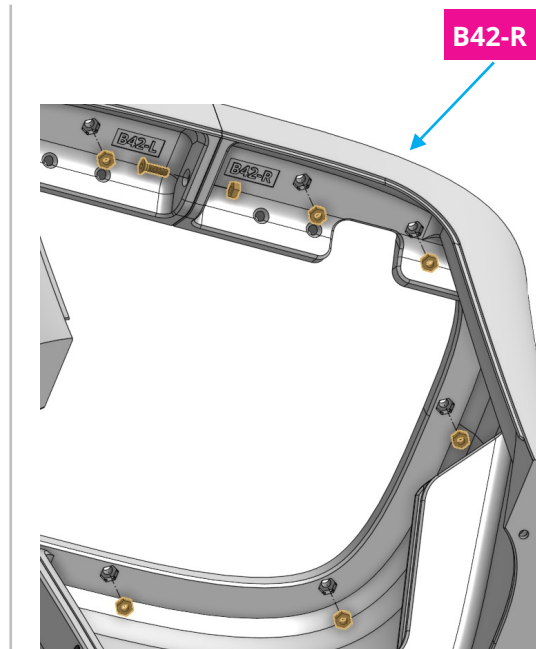
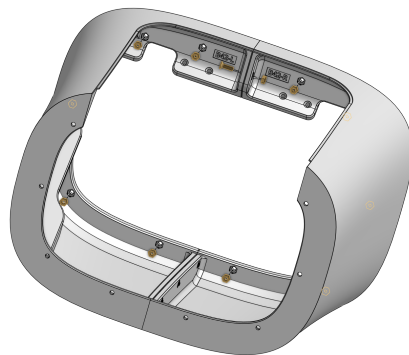
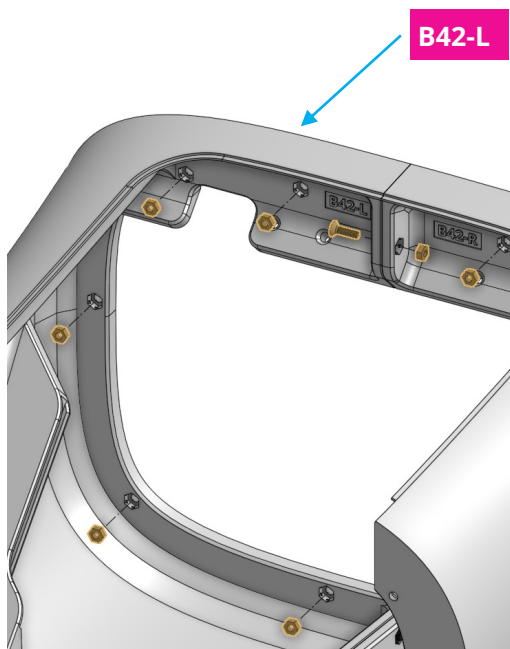
2



11x



1x

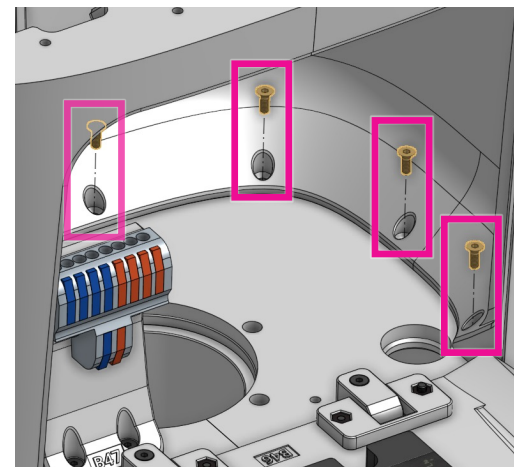
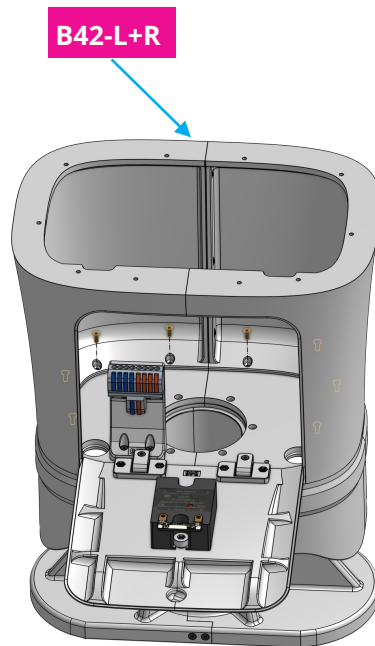
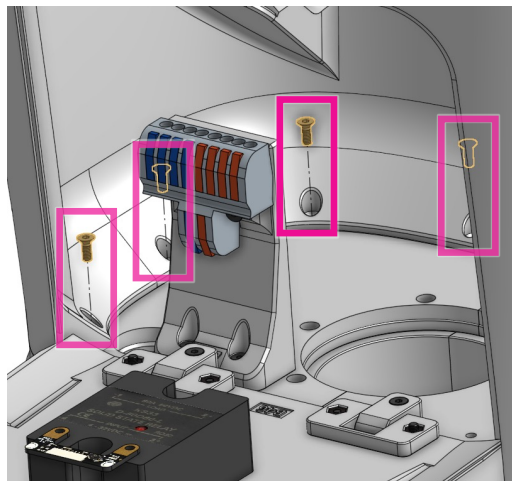


Step 9c

Connect ribcage (previous assembly) to assembly from step 7 with **8 x M3 12mm screws**.



8x



Step 10a

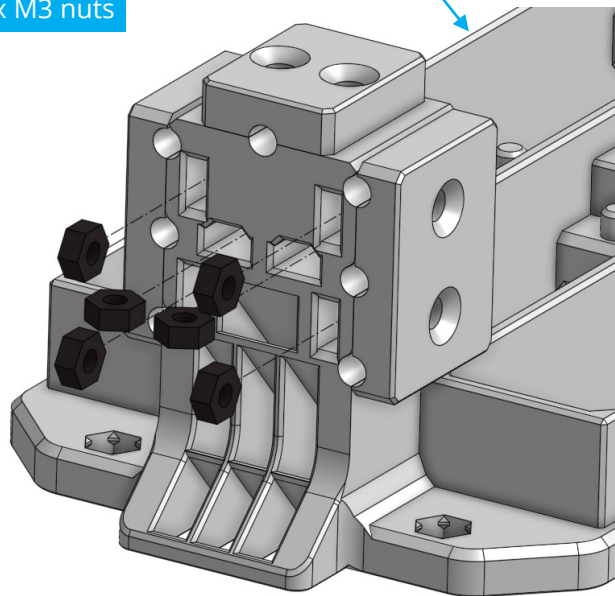
Place **20 x M3 nuts** in **B51**.



20x

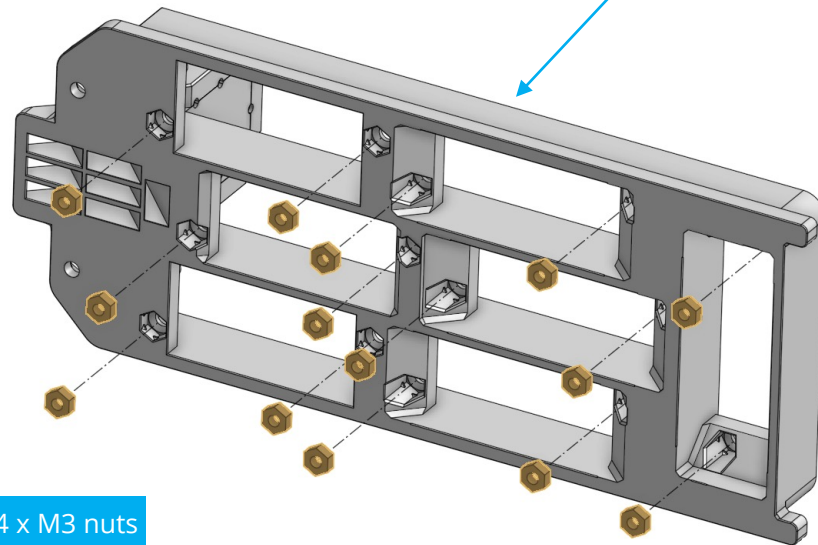
6 x M3 nuts

B51



B51

14 x M3 nuts

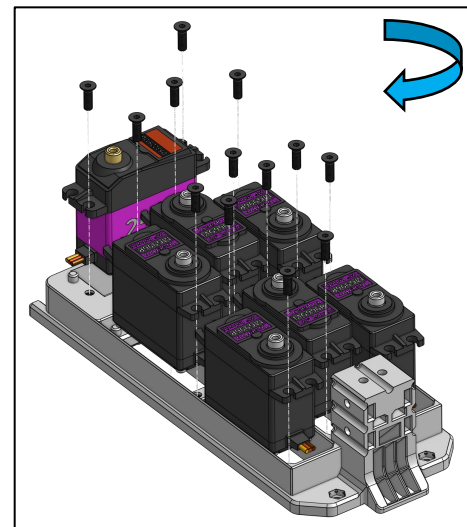
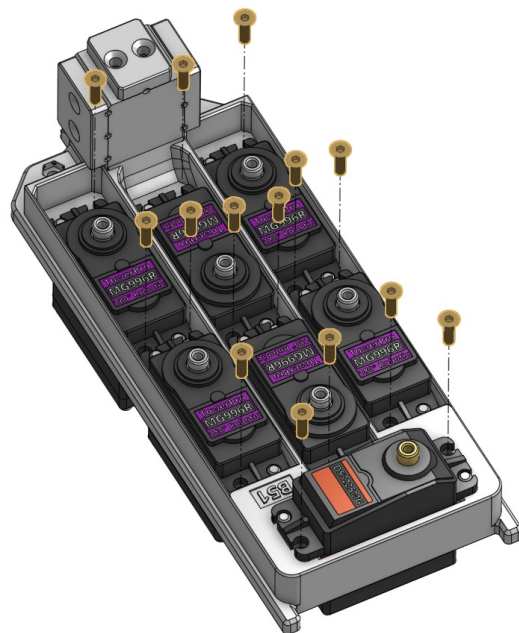
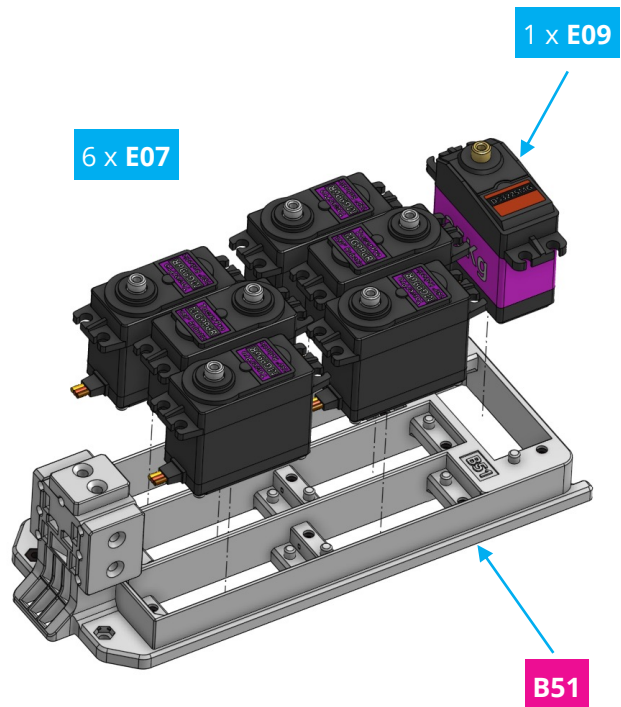


Step 10b

Assemble 6 x **E07** motors and 1 x **E09** in using 14 x **M3 10mm** screws.



14x



B51

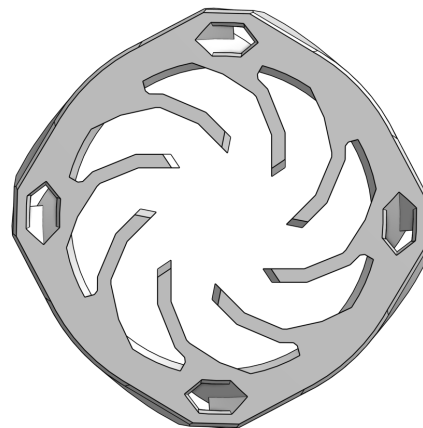
Note

Flip **B26** to switch orientation between clockwise (CW) and counterclockwise (CCW).

Clockwise (CW)

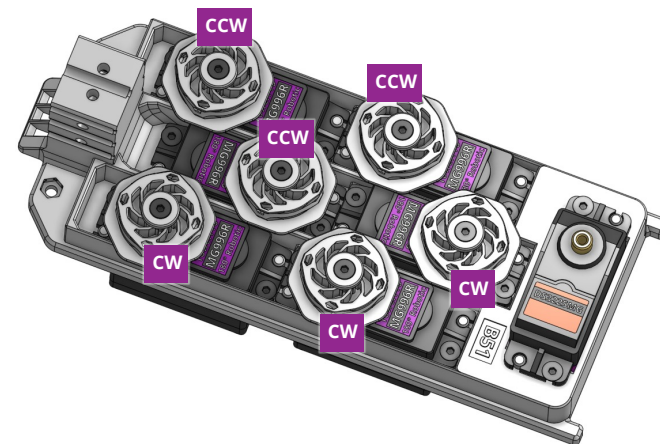
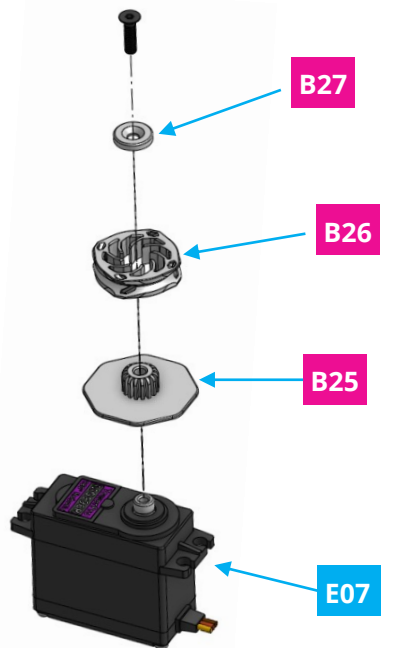
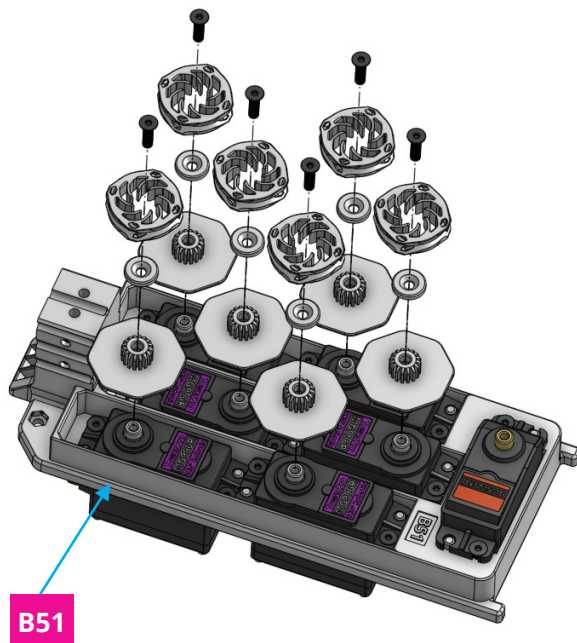


Counter clockwise (CCW)



Step 10c

Assemble wire connectors using the shown arrangement by using **6 x B25**, **B26**, **B27** and **6x M3 12mm screws**. Make sure **B26** orientation matches the shown one the right picture.



Step 10d

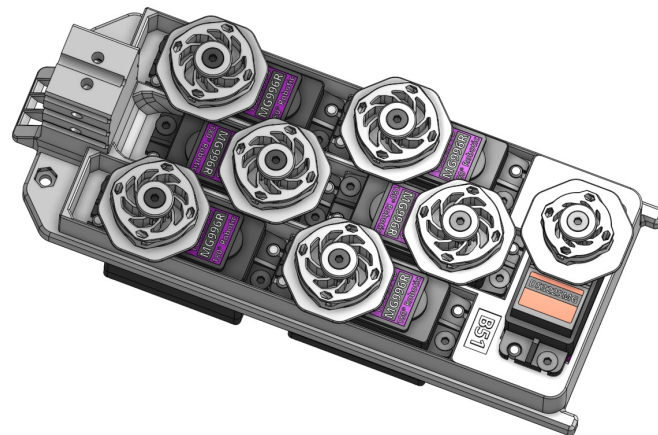
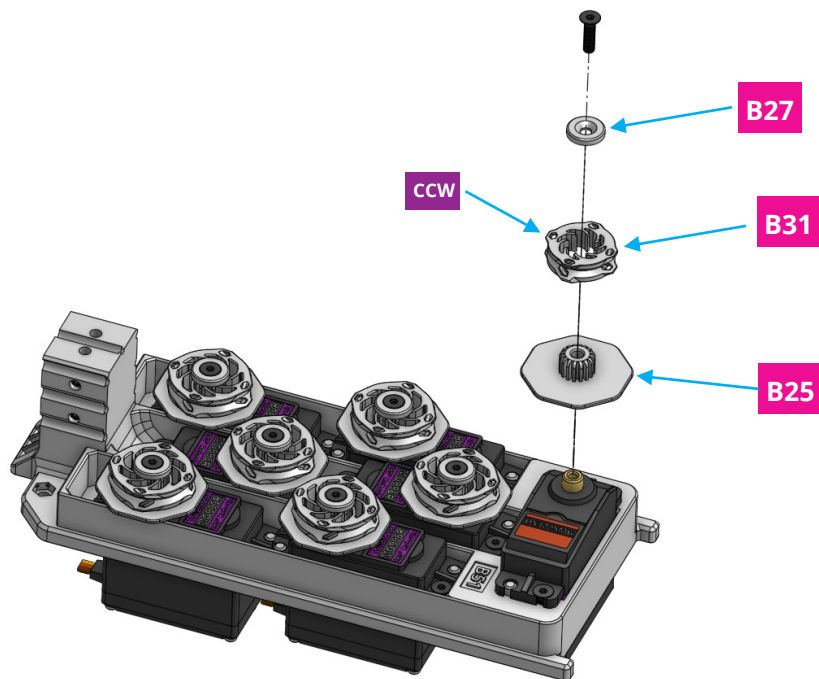
Assemble wire connectors using the shown arrangement by using **B25**, **B31**, **B27** and **1x M3 12mm screw**. Make sure **B31** is switched to counterclockwise orientation.



2



1x



Step 10e



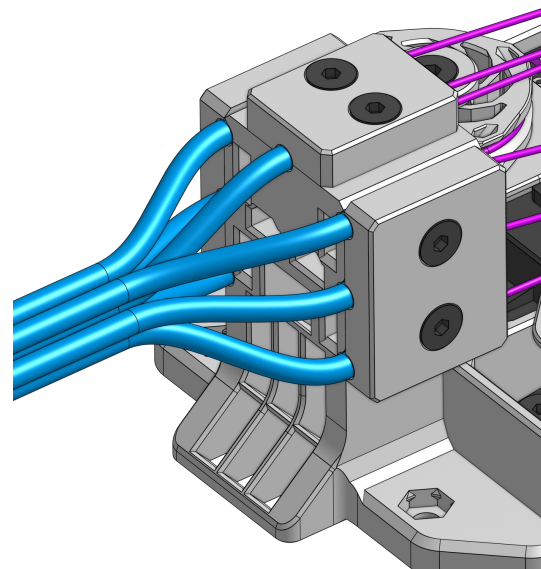
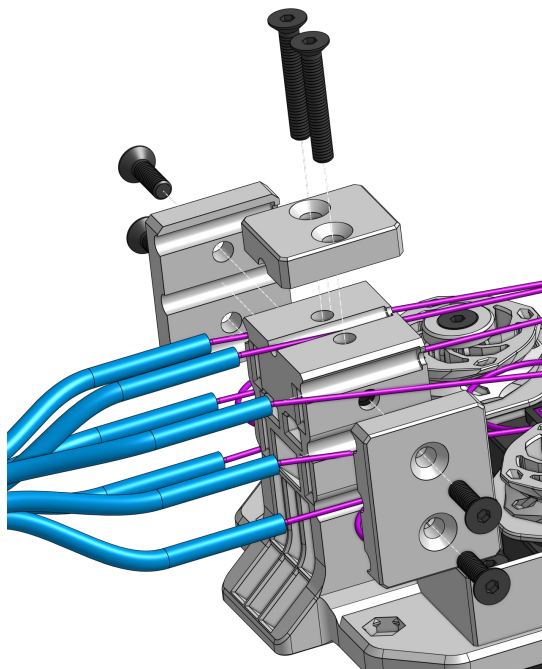
2



6x

Insert the **teflon tubes** from forearm through the shown spots and use **2 x B52, 1 x B53** and **2 x 20 mm** screws **and 4 x 10 mm** to fix them.

(Tipp: Wrap 2 x pieces of tape around each end of the tube before fixing them to have better grip.)

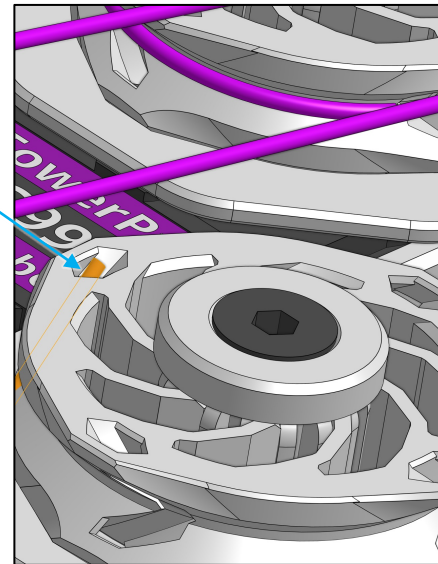


Step 10f

Insert **fluorocarbon wires** coming out of the **teflon tubes** in shown holes of the **B26** and **B31** connectors and tight a knot at the end to fix them. Wires and tubes will be hidden in following slides.



Tie a knot here



Step 11

Slide servo array into ribcage and fix it using **1 x M3 nut** and **1 x M3 16mm screw**.



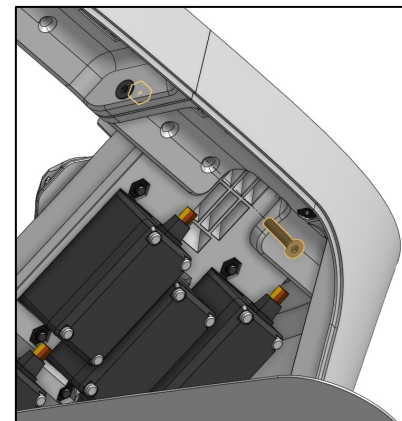
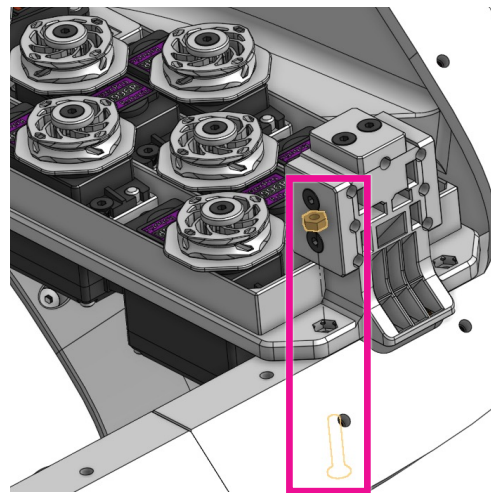
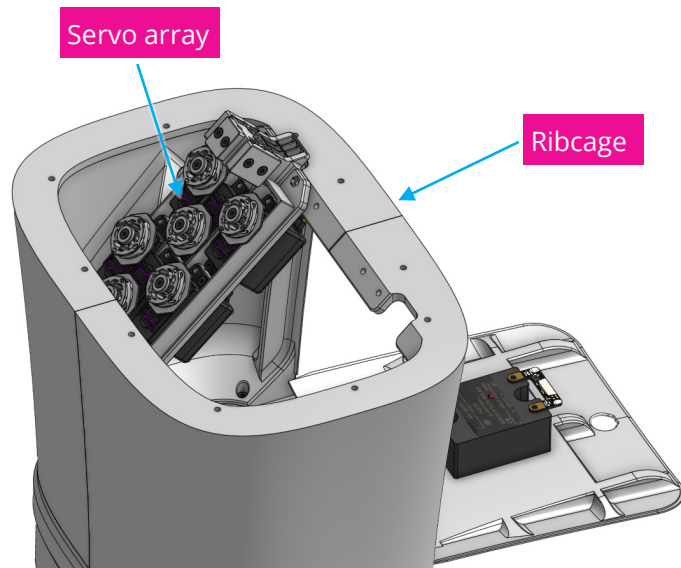
2



1x

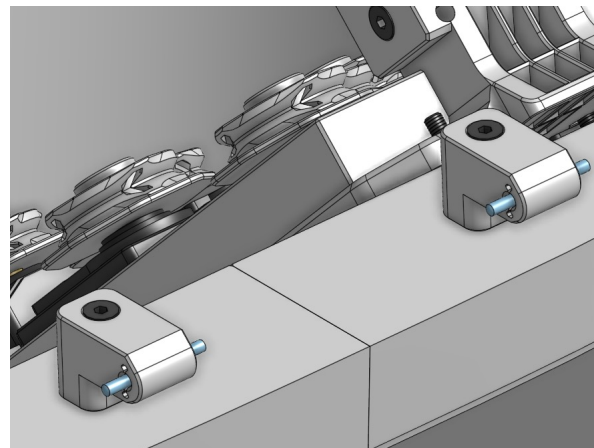
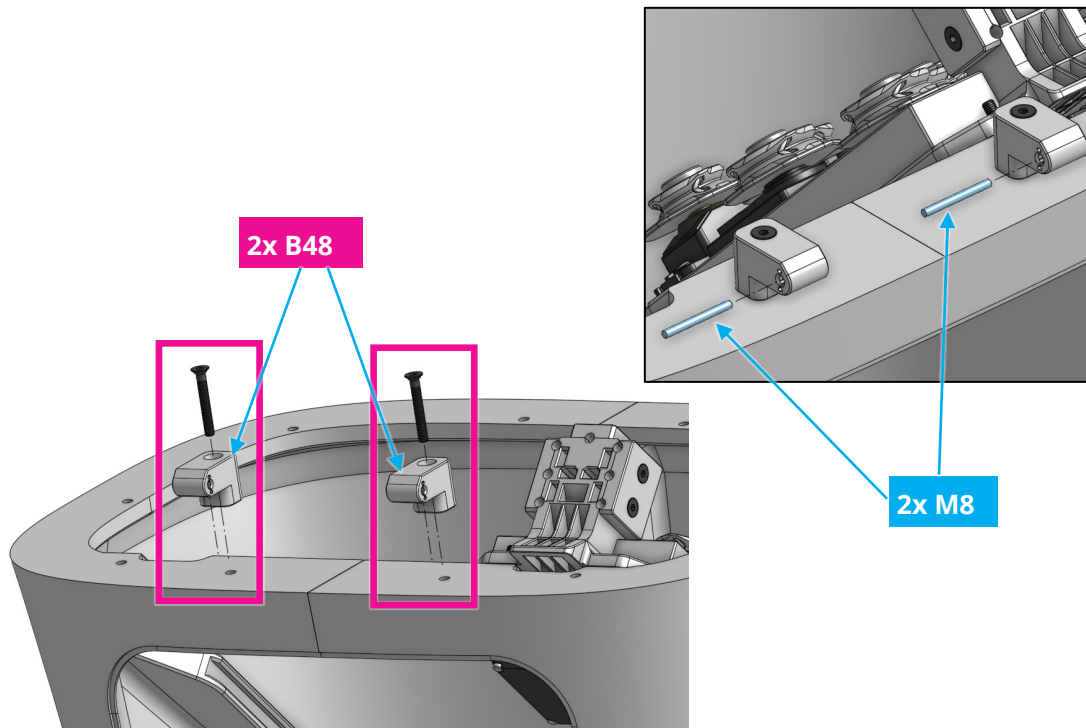


1x



Step 12a

Assemble **2 x B48** to assembly using **2 x M3 22mm screws** and insert **2 x M08**.



Step 12b

2



8x

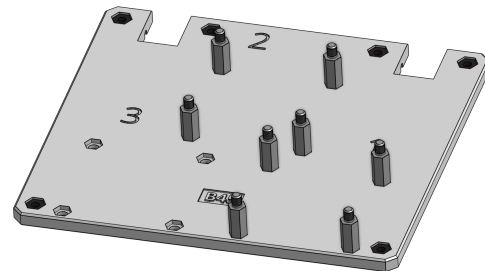
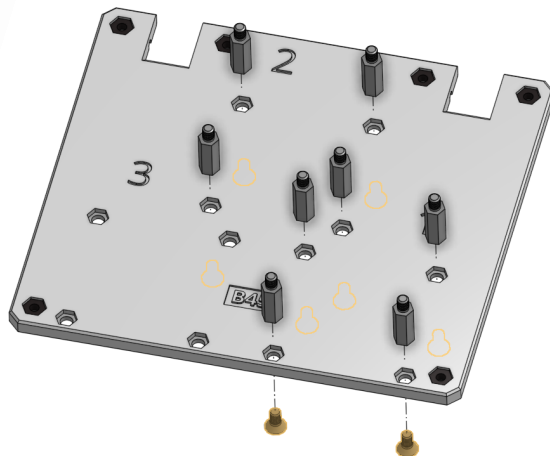
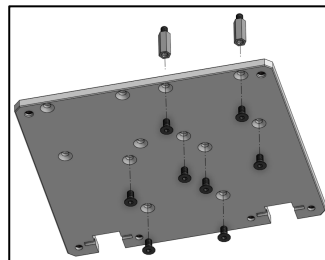
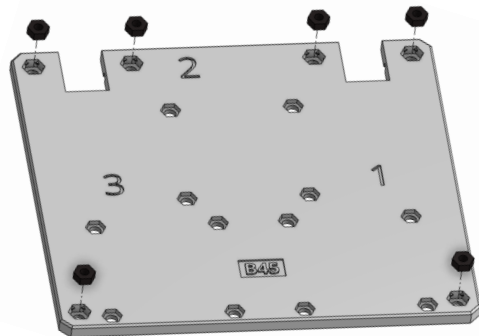


6x



8x

Insert **6 x M3 nuts** and **8 x M13 distancers** in **B45**. Fix the distancers using **8 x M3 6mm screws**.



Step 12c

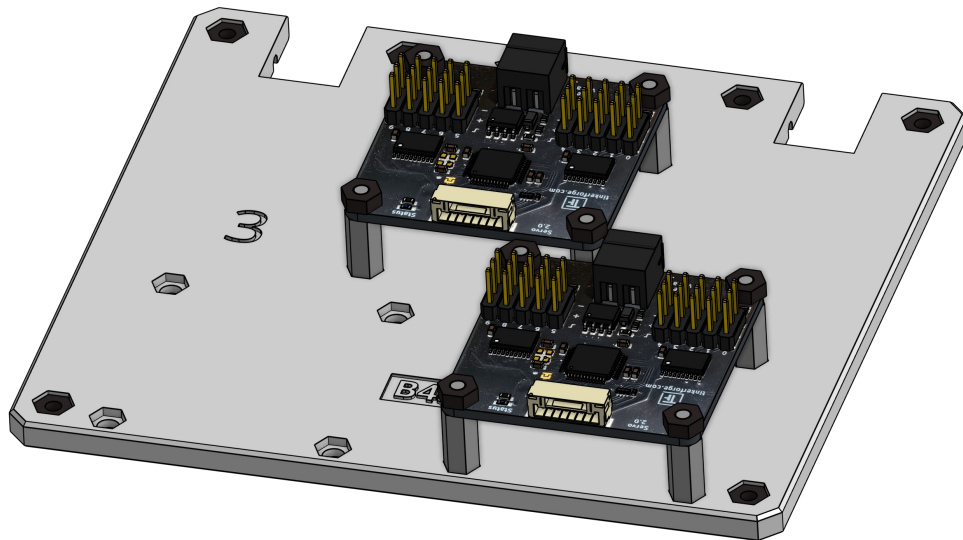
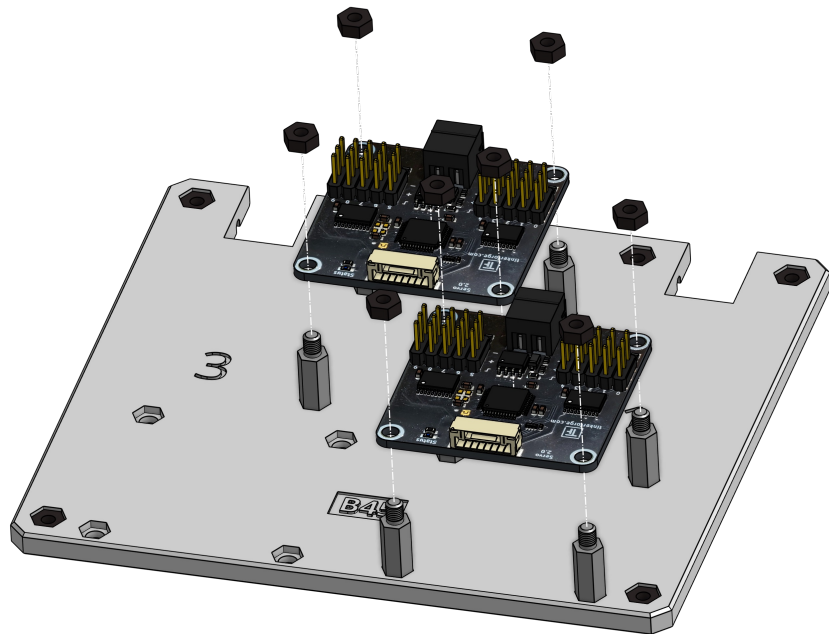
Connect **2 x E03** to the assembly and fix them using **8 x M3 nuts**.



2



8x

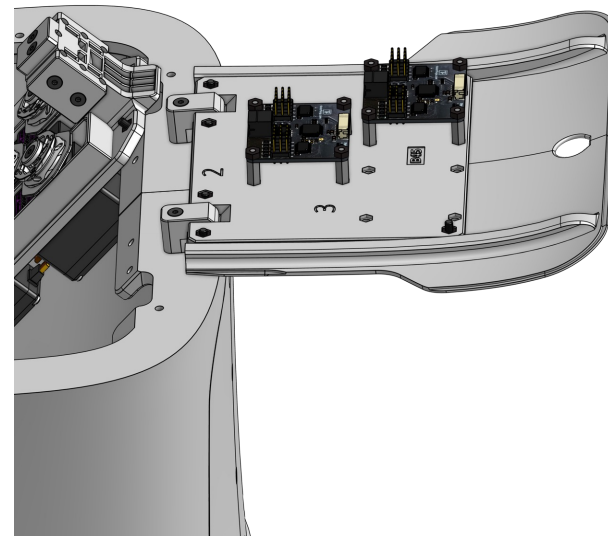
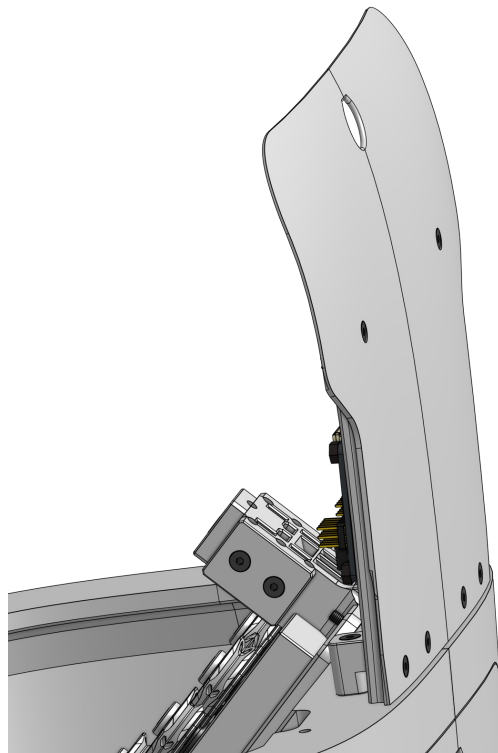
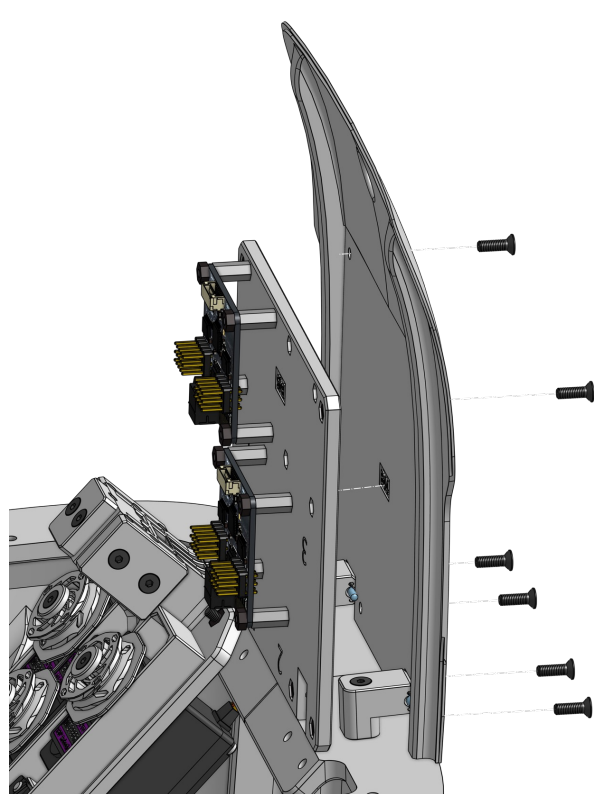


Step 12d

Connect **B44** to **B45** using 6 x M3 10mm screws.



10x

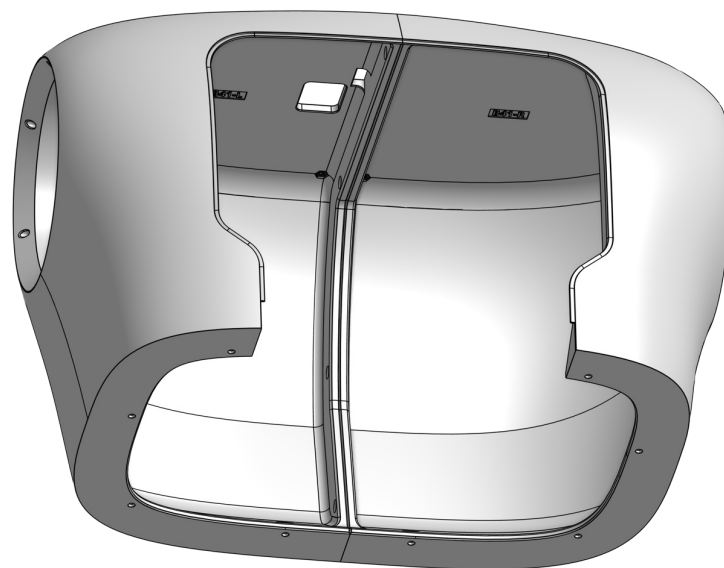
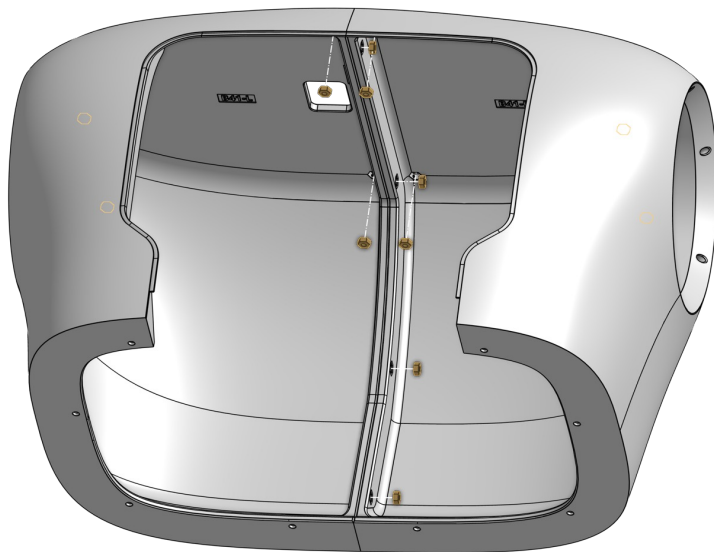


Step 13a

Insert **12 x M3 nuts** into **B41-L** and **B41-R**.

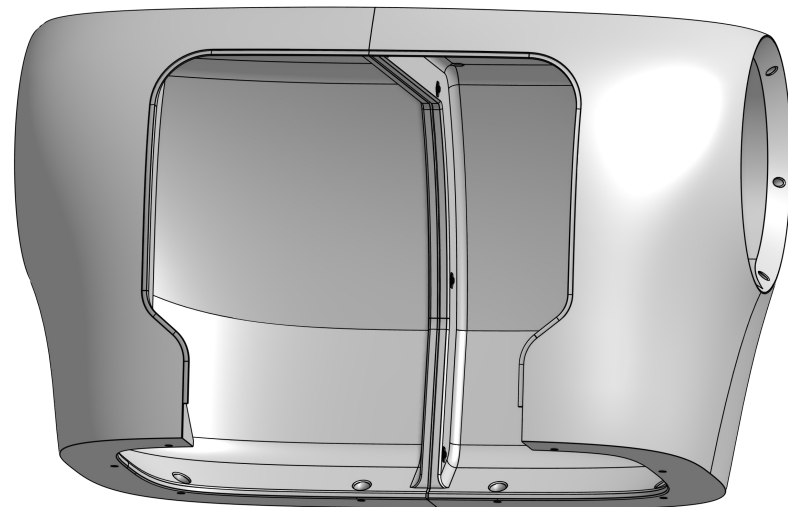
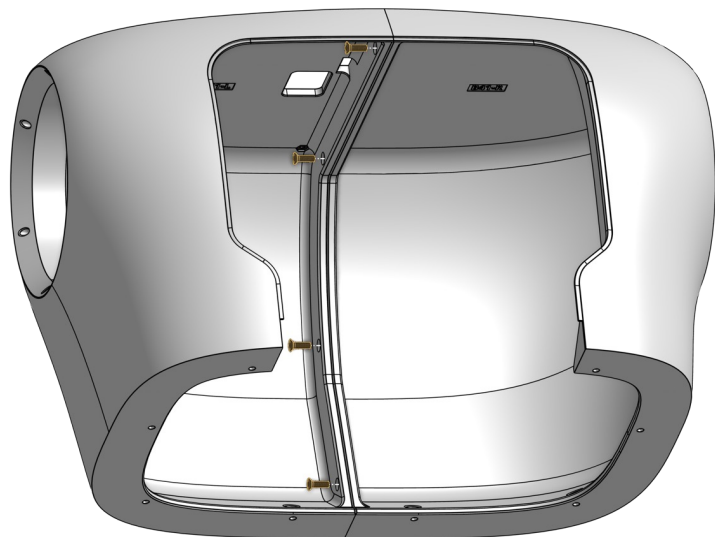


12x



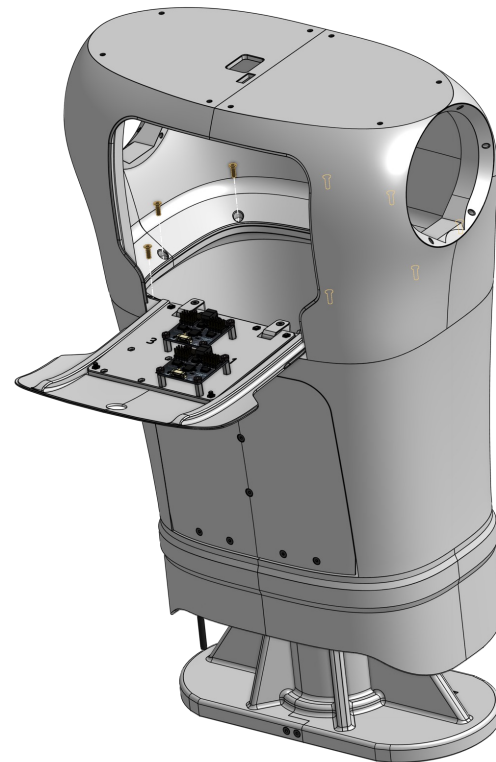
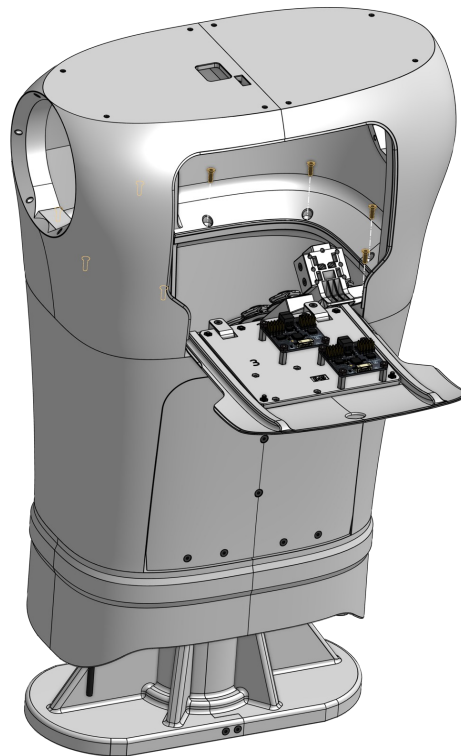
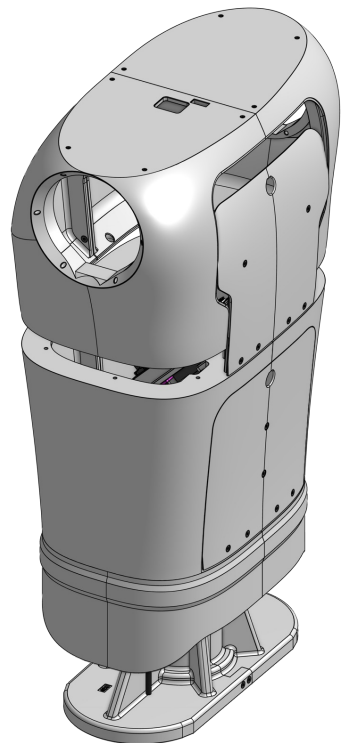
Step 13b

Connect **B41-L** to **B41-R** using 4 x **M3 10mm** screws.



Step 13c

Connect **Clavicles** to **assembly** using 8 x **M3 10mm** screws.



Step 14a

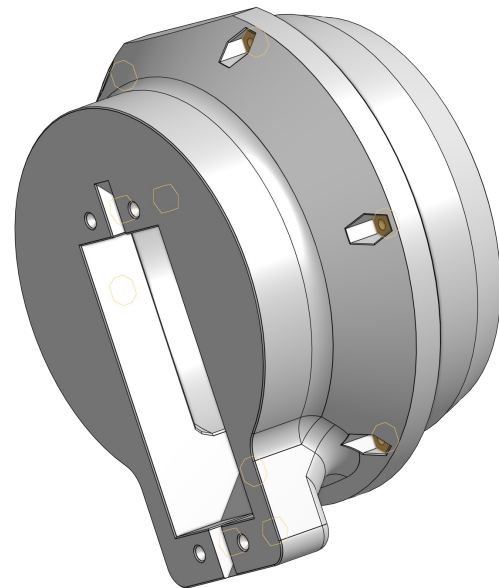
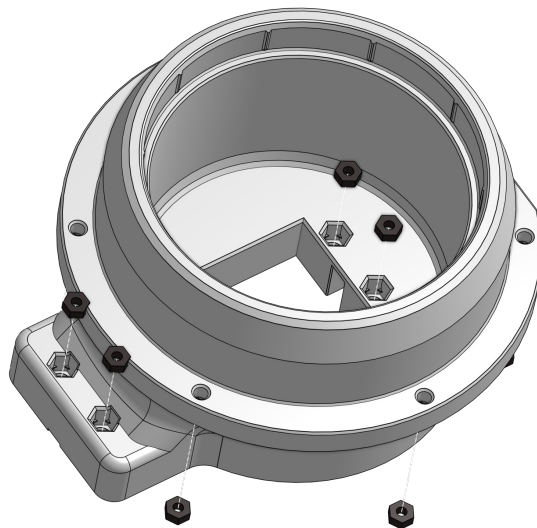
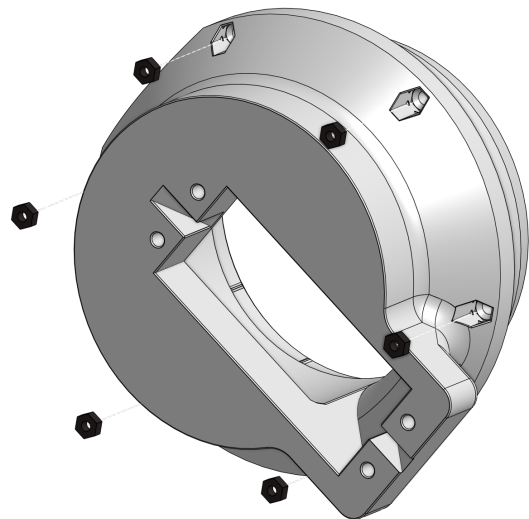
Insert 12 x **M3** nuts in **C61**.



2



10x



Step 14b

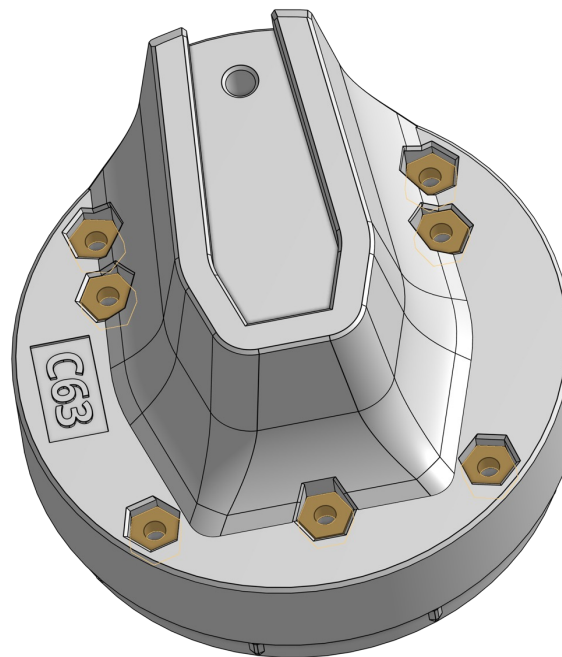
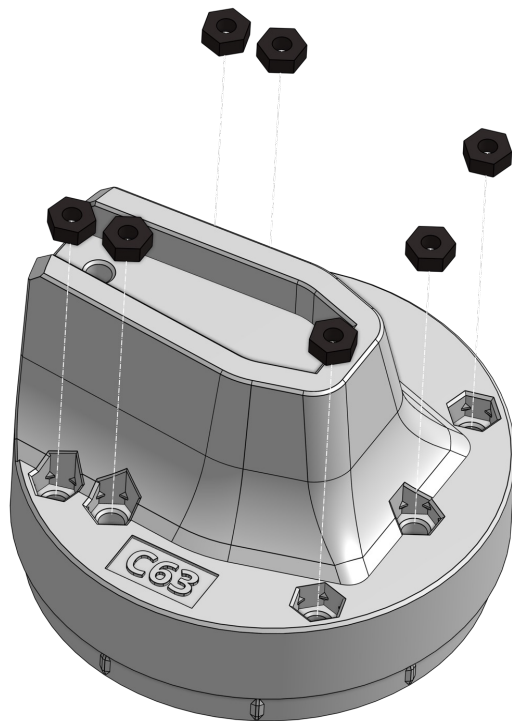
Insert **7 x M3 nuts** in **C63**.



2

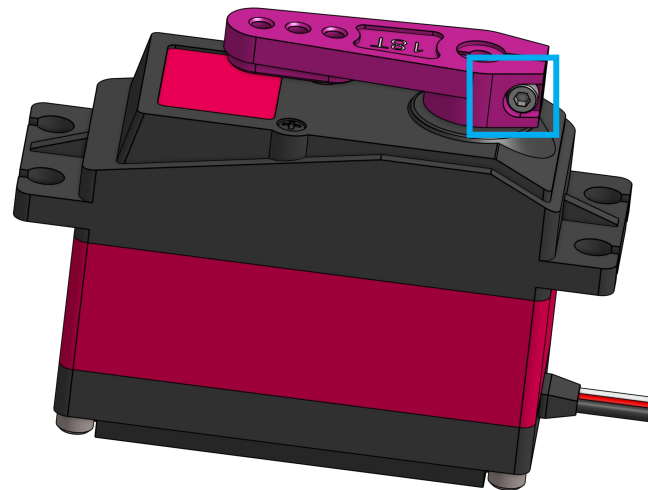
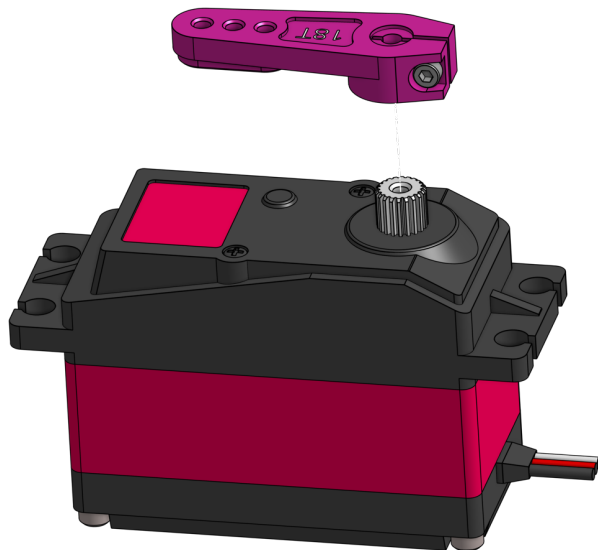


7x



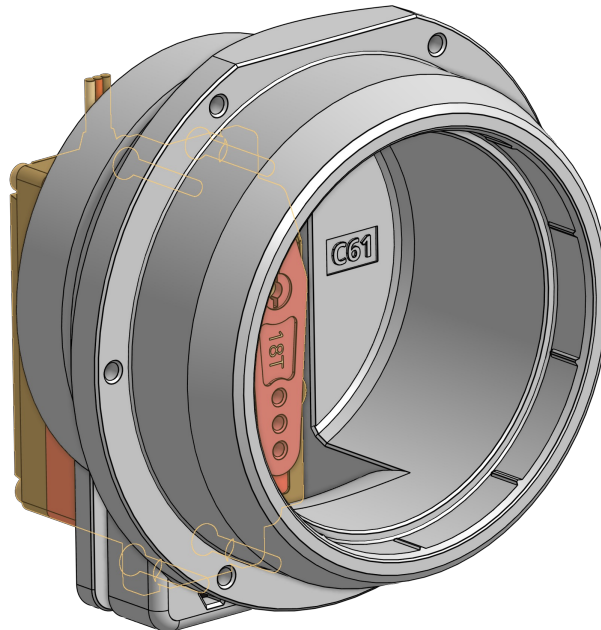
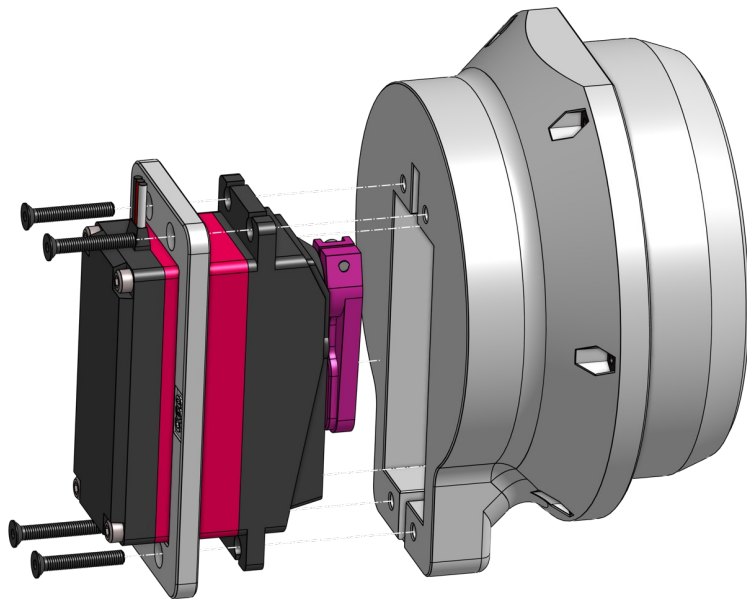
Step 15a

Attach **M17** to **E15** and tighten the connection using the shown screw.



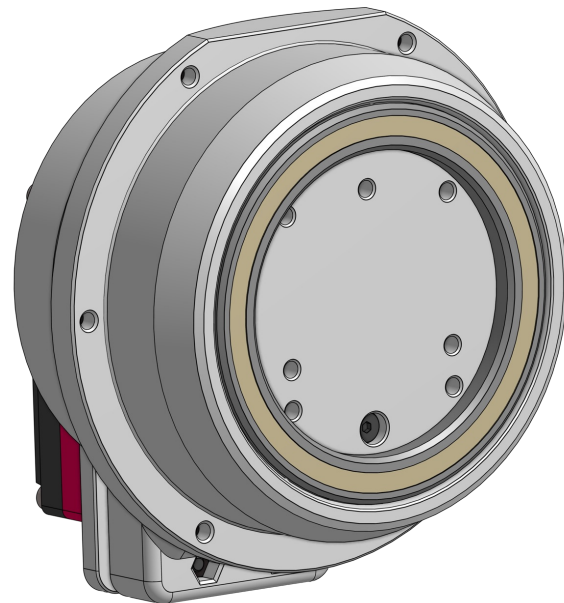
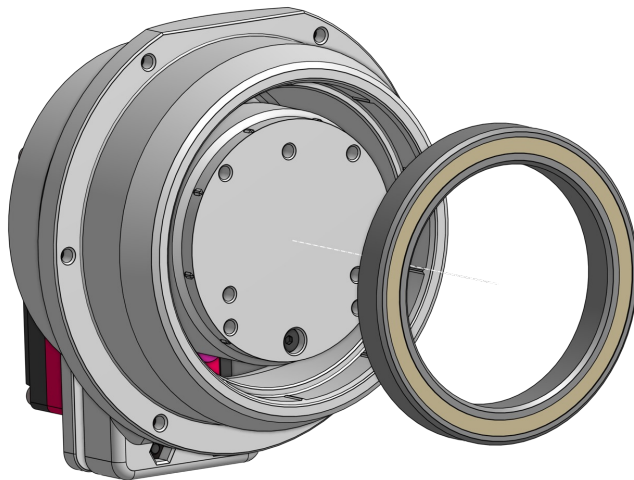
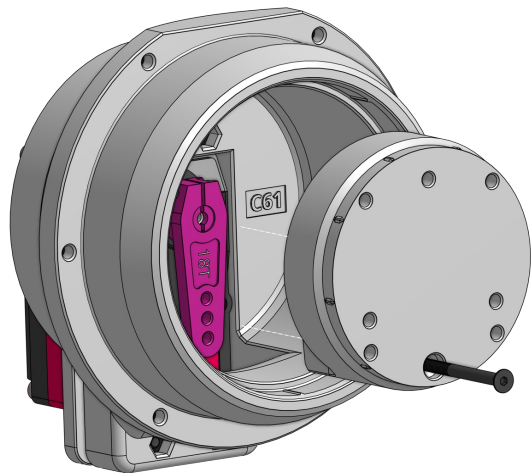
Step 15b

Attach **E15** to **C61** using **C60** and **4 x M3 20mm** screws.



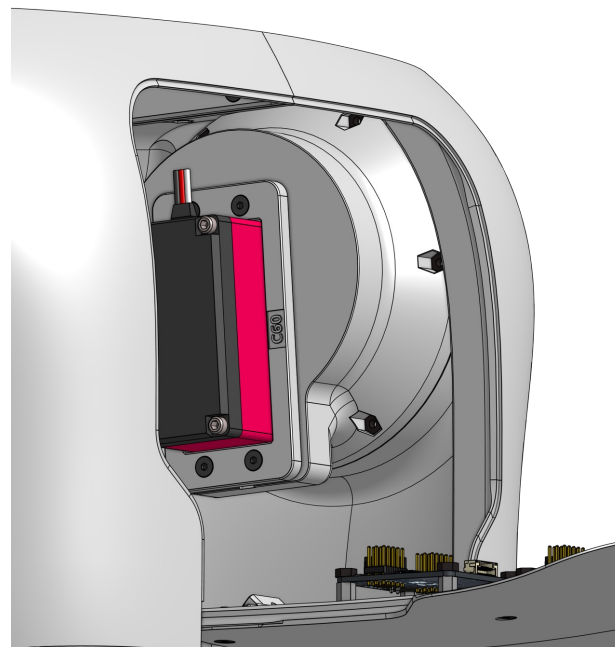
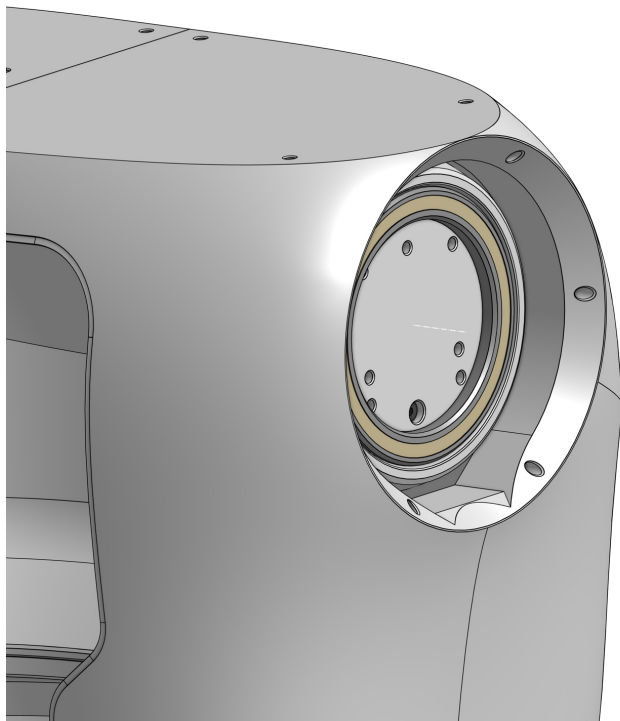
Step 15c

Attach **C63** to assembly using **1 x M3 40mm** screw and place **1 x M04** ballbearing on top.



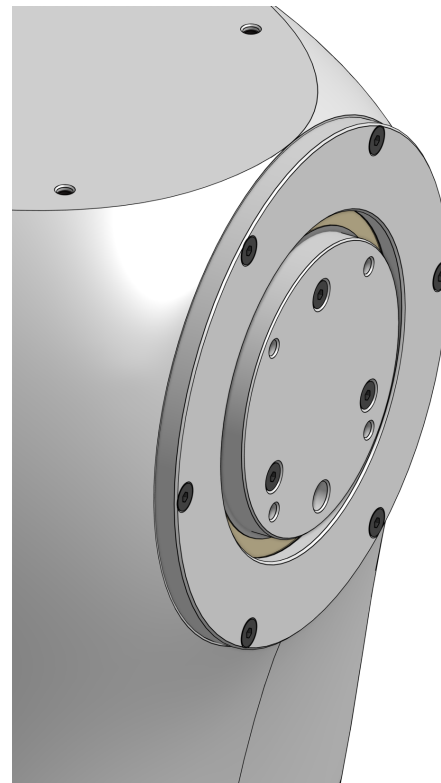
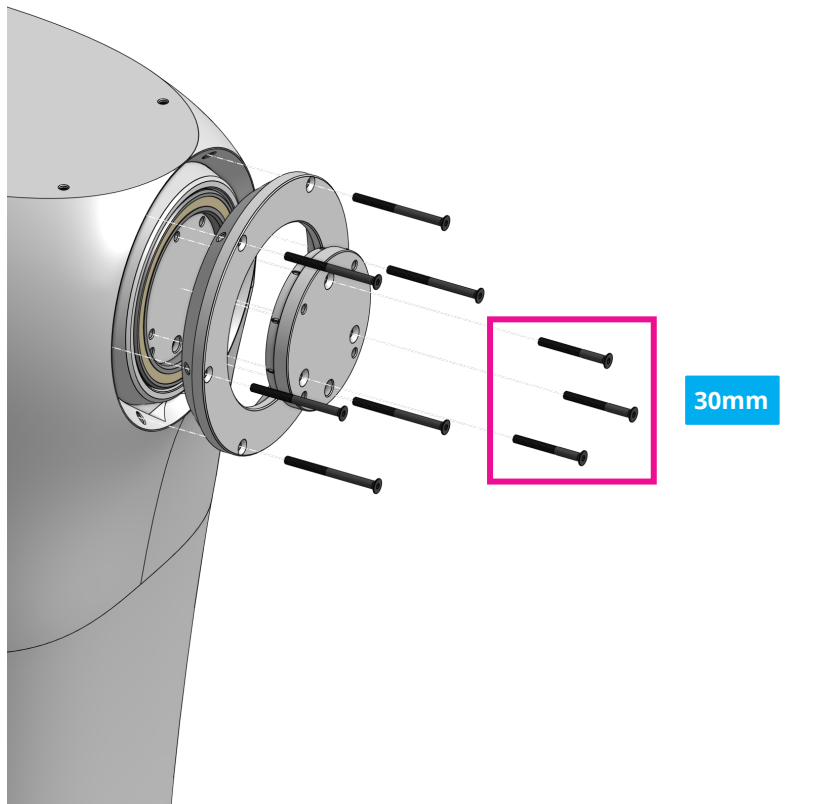
Step 16a

Place assembly into clavicles like shown in the pictures.



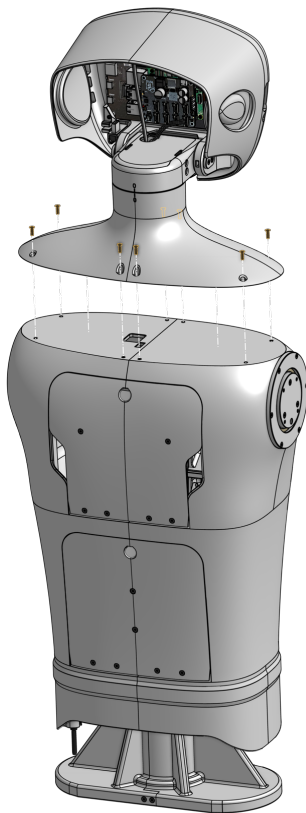
Step 16b

Fix the shoulder using **C62** and **C64** with **6 x M3 40mm** screws and **3 x M3 30mm** screws.

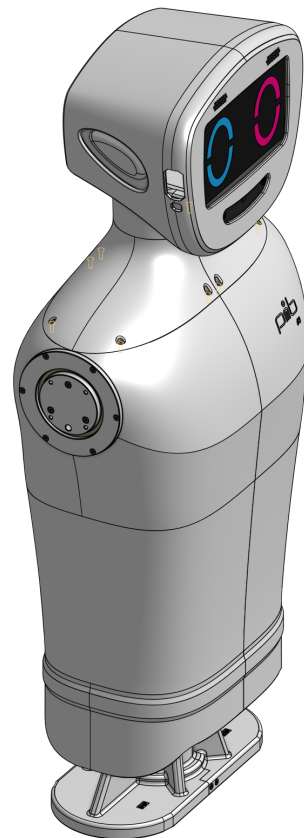


Step 17

Assemble neck and head to upperbody using **8 x M3 10mm screws**.



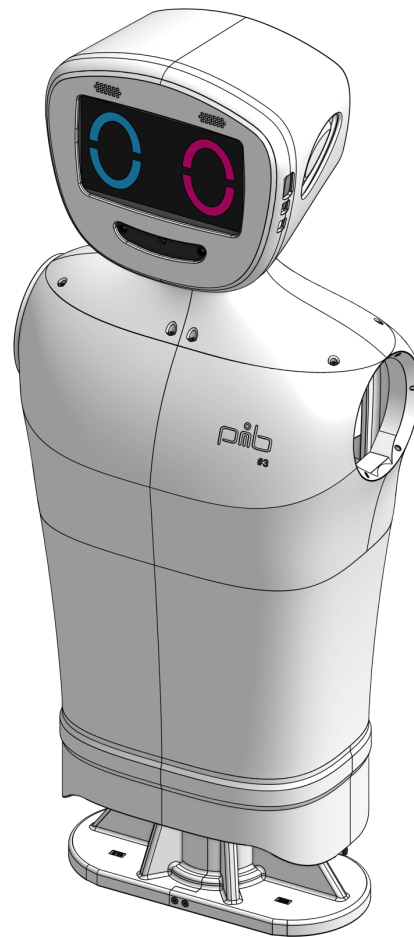
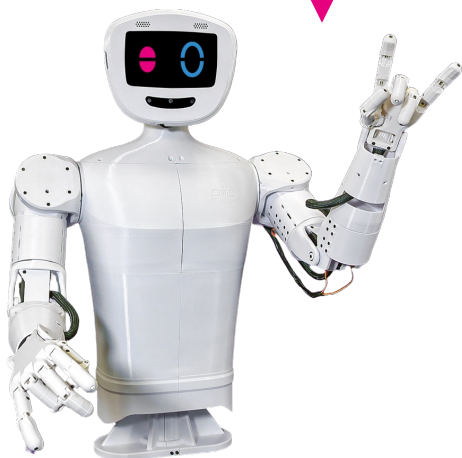
8x



Congratulations

You did a great job, pib's upper body is assembled!

Well done!



Do you need support?

Or do you need our pib.Box with all non-printable parts?

Or maybe you have some new ideas and improvements?

Please contact us.



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