



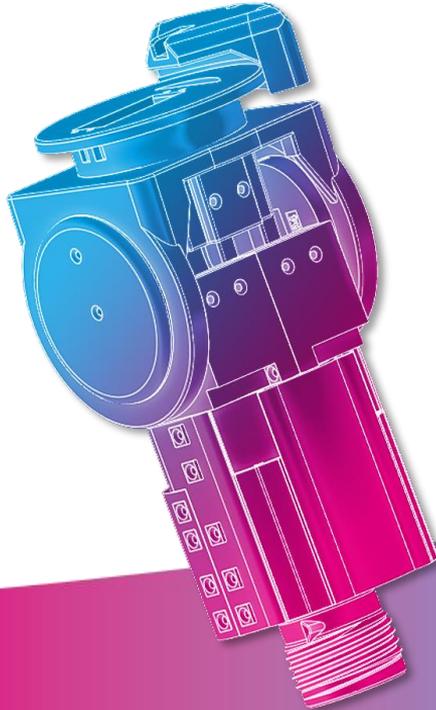
How to build your robot

[www.pib.rocks/build](http://www.pib.rocks/build)



assembly instructions for:

*SHOULDER JOINT*



You  
Print  
Build  
Develop

*your own robot!*

## Printable parts



Pib's shoulder joint consists of **16 printable parts** and is assembled in **20 steps**.

In order to construct the shoulder joint, you will need to print the parts as seen in the table.

Please note: For better readability we use the abbreviations in the tutorial: C01 instead of **C01-Shoulder\_head**.

### Printable parts

**C01**-Shoulder\_head

**C02**-Shoulder\_base

**C03**-Shoulder\_rotator

**C04**-Shoulder\_rotator\_2

**C05**-Shoulder\_arm\_inner\_connector

2 x **C08**-Central\_rotator\_bracket

**C09**-Central\_rotator\_connector

**C15**-Central\_rotator\_motor\_connector

**C26**-Central\_rotator\_motor\_scaffold\_short

**C27**-Arm\_shell\_lateral\_major

**C28**-Arm\_shell\_lateral\_minor

**C29**-Shoulder\_horizontal\_mount

**C30**-Shoulder\_arm\_inner\_connector2

**B01**-Clavicle\_left

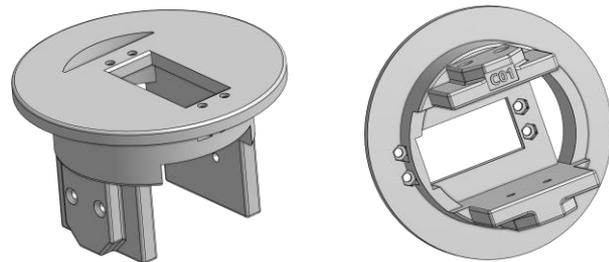
**B02**-Clavicle\_right

## Printable parts - Overview

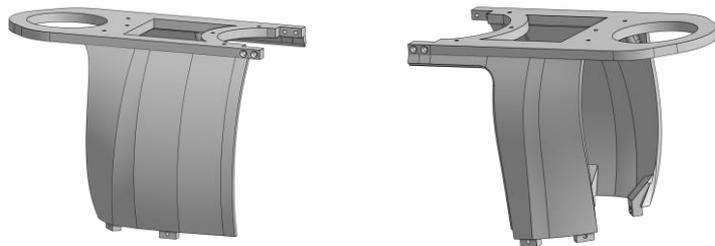
**B01-Clavicle\_left**



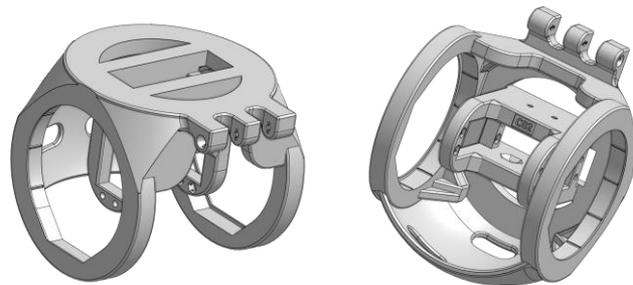
**C01-Shoulder\_head**



**B02-Clavicle\_right**

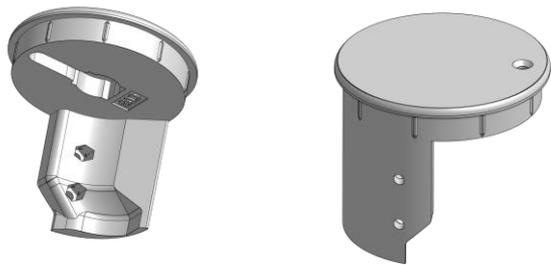


**C02-Shoulder\_base**

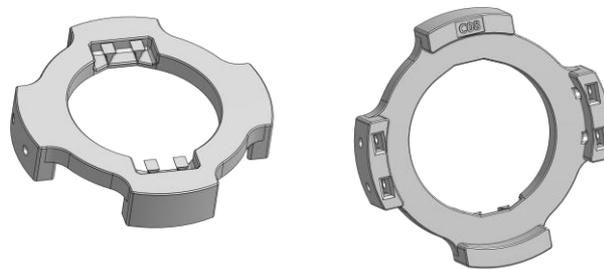


## Printable parts - Overview

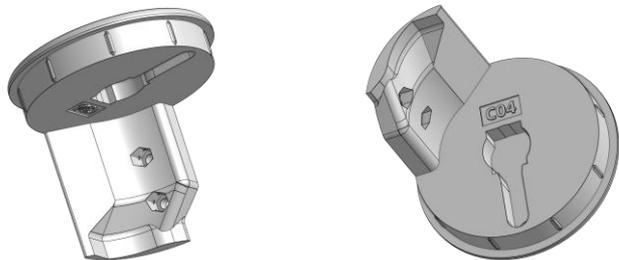
C03-Shoulder\_rotator



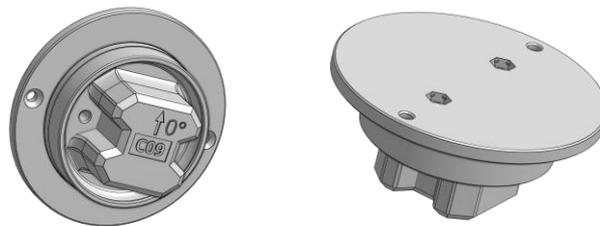
C08-Central\_rotator\_bracket



C04-Shoulder\_rotator\_2

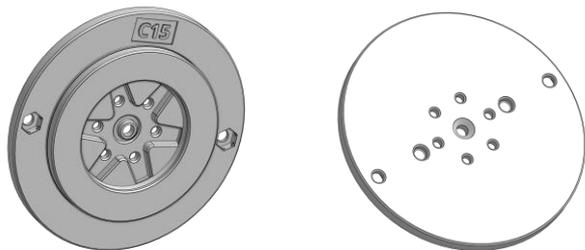


C09-Central\_rotator\_connector

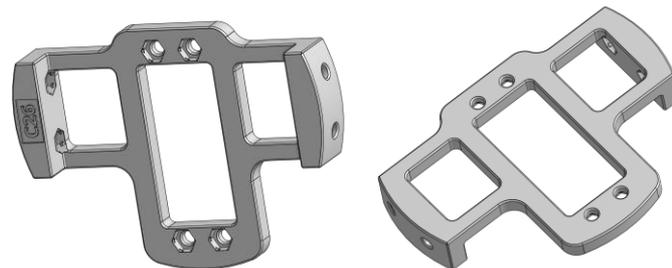


## Printable parts - Overview

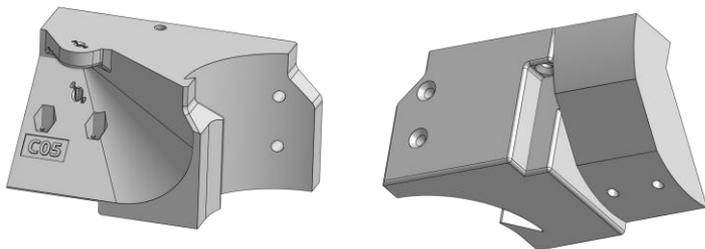
**C15**-Central\_rotator\_motor\_connector



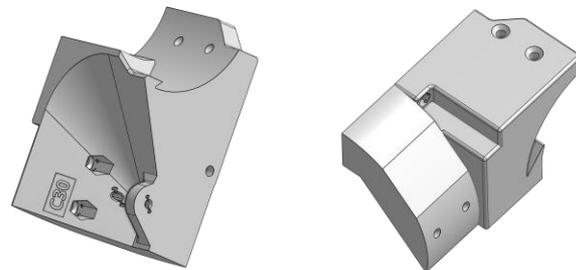
**C26**-Central\_rotator\_motor\_scaffold\_short



**C05**-Shoulder\_arm\_inner\_connector

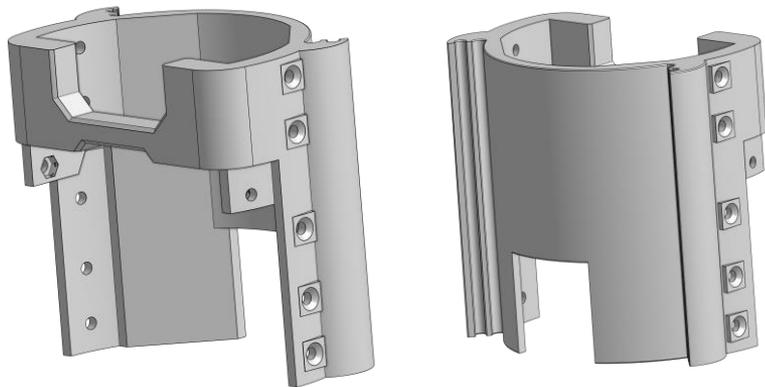


**C30**-Shoulder\_arm\_inner\_connector2

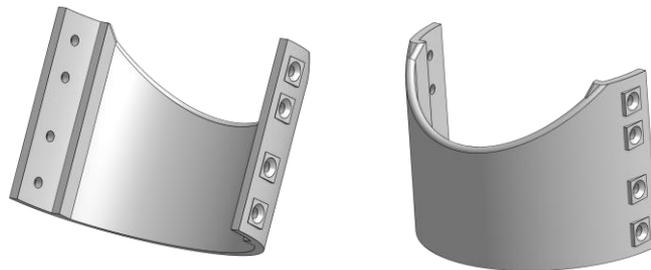


## Printable parts - Overview

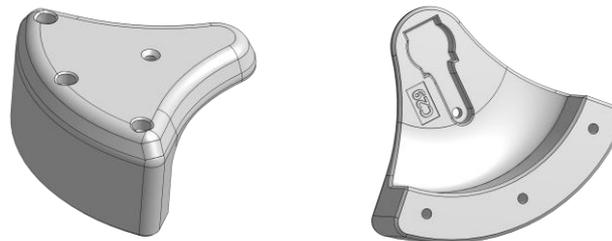
C27-Arm\_shell\_lateral\_major



C28-Arm\_shell\_lateral\_minor



C29-Shoulder\_horizontal\_mount



## 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

3 x **E09** DS3225 Servo

1 x **E07** MG996R Servo

3 x **M09** Motor-clamp

4 x **M08** Rod 2x20mm

2 x **M12** Tension Spring T700

1 x **M15** nylon connector

### Non-printable parts

50 x **S01** M3 nuts

6 x **S03** M3 8 mm screws

13 x **S04** M3 10 mm screws

17 x **S05** M3 12 mm screws

13 x **S08** M3 20 mm screws

4 x **S10** M3 25 mm screws

3 x **S13** M3 40 mm screws

2 x **M04** Ballbearing 60x78x10

1 x **M05** Thrust\_bearing 95x70x6

2 x **M06** Ballbearing Axial 70x50x3

2 x **M07** Thrust\_bearing 70x50x1

## 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

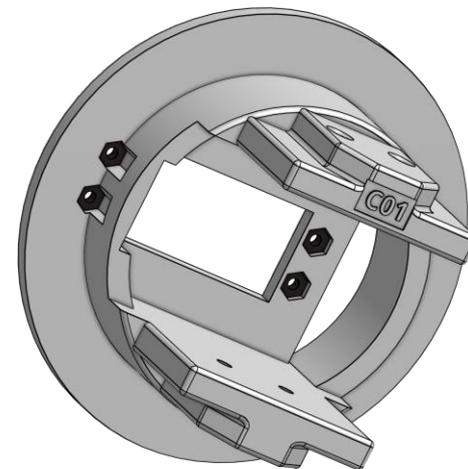
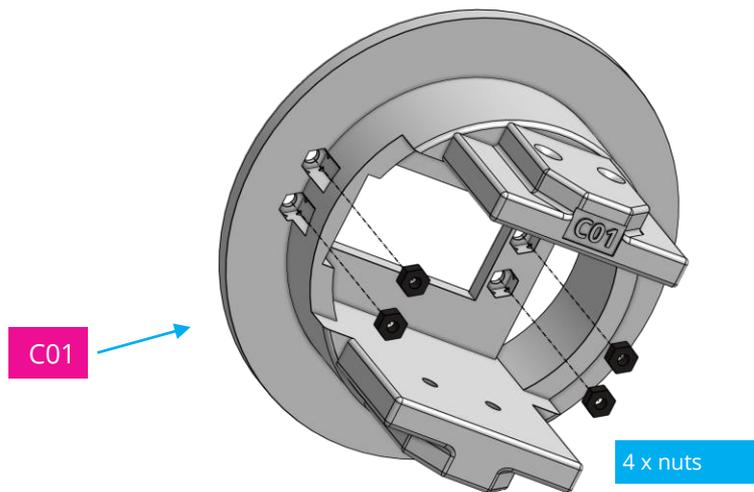
We have categorized each step according to its **difficulty** - from **1-5** (1 being the easiest, 5 the hardest)



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

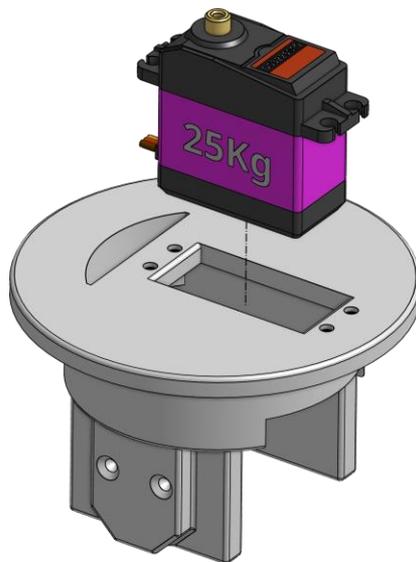
Step 1a

Insert **4 x nuts** in the shown spots in **C01**.

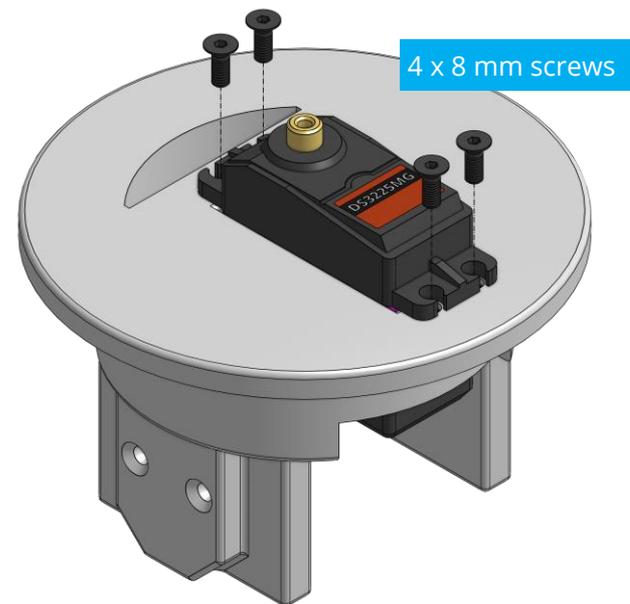


## Step 1b

Insert **1 x E09 servo** into shown place of C01 and attach it using **4 x 8 mm screws**.



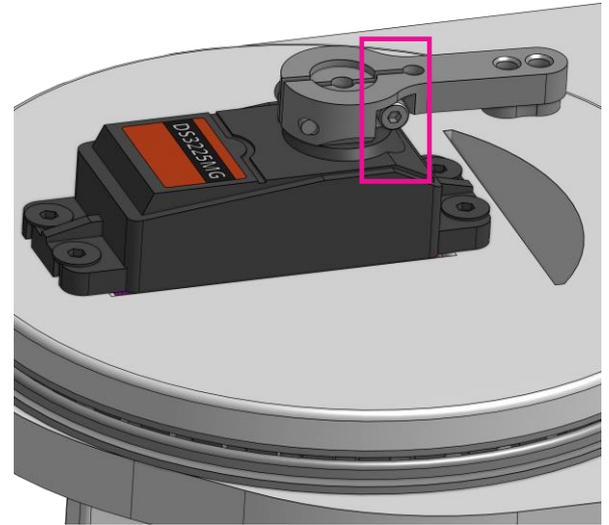
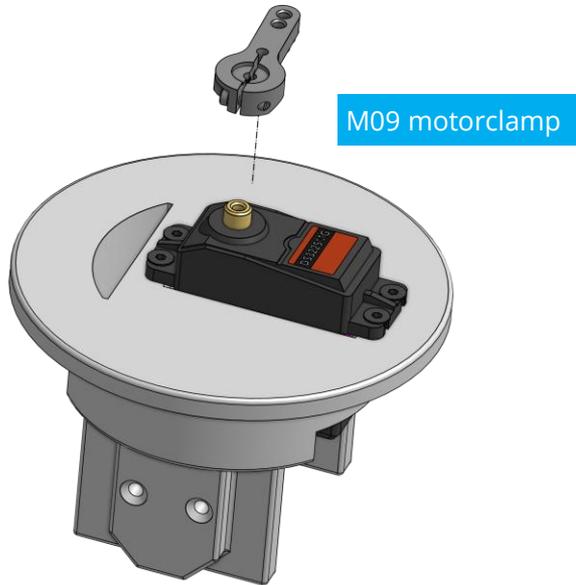
Pull the cable first, then tilt the motor a little bit to put in into the shown spot.  
You may apply some gently force.



Step 2



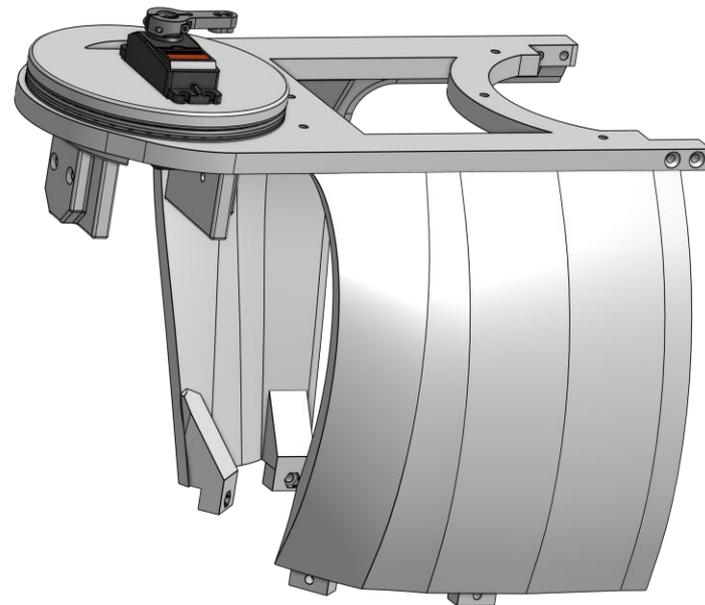
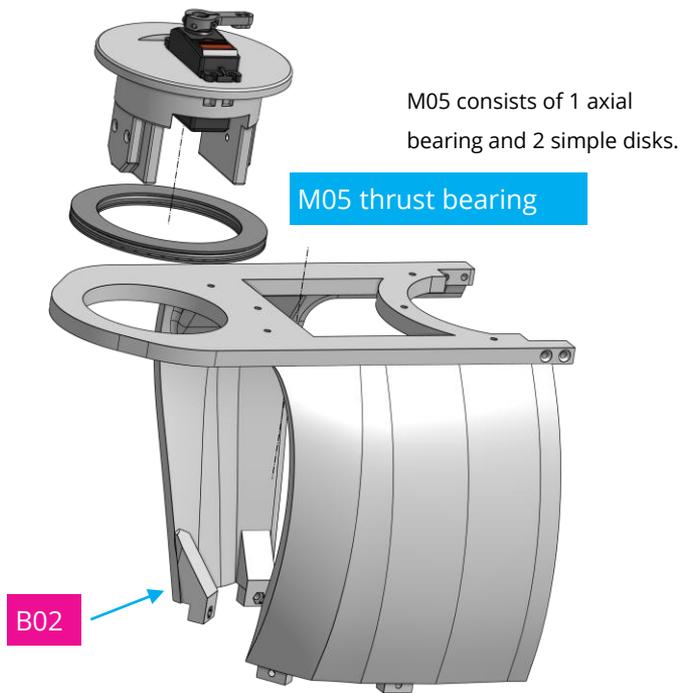
Attach **1 x M09 motorclamp** to the servo and fix it by tightening the 2 small screws in the clamp.



Step 3

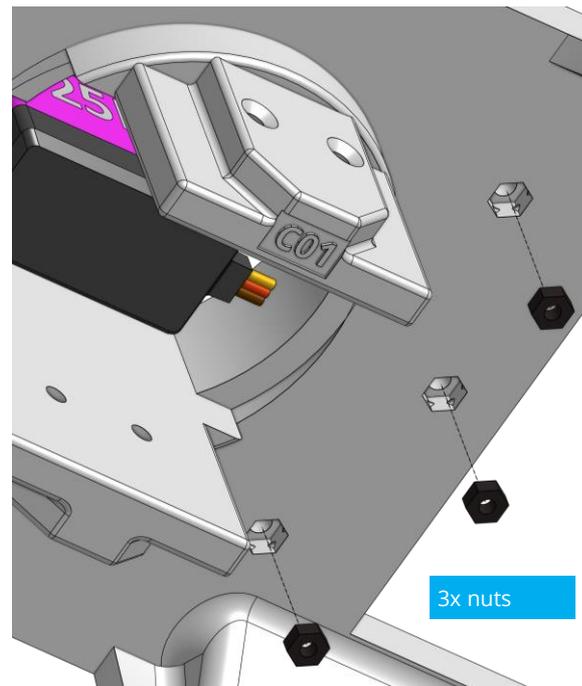


Insert the assembly of **C01** into the hole of **B02** by putting **1 x M05 thrust bearing** in between.



Step 4a

Insert **3 x nuts** into the shown spots in **B02**.

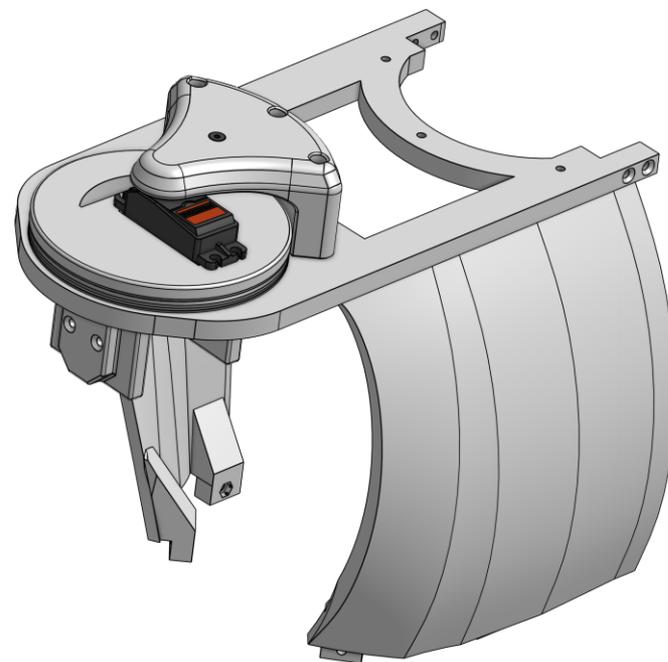
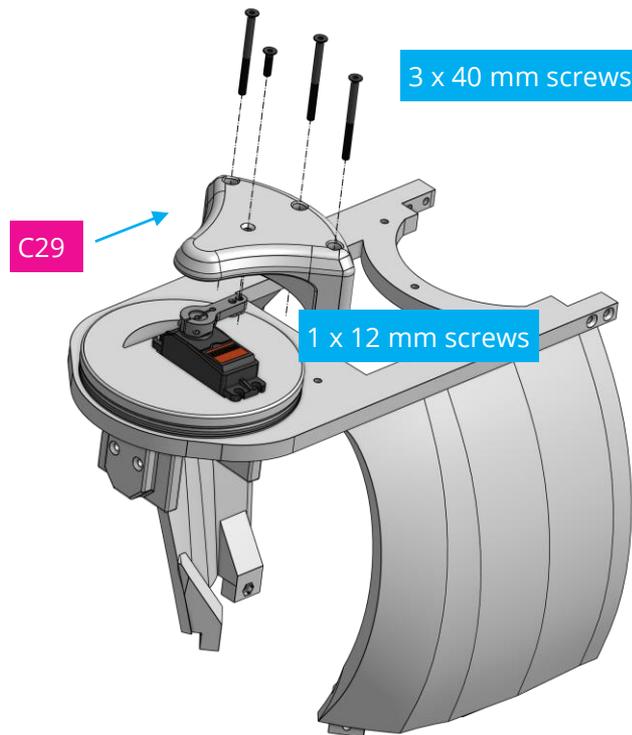


B02 - View from below

3x nuts

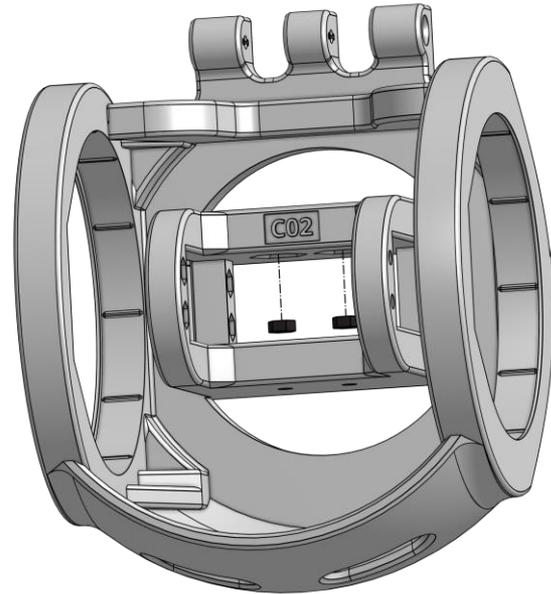
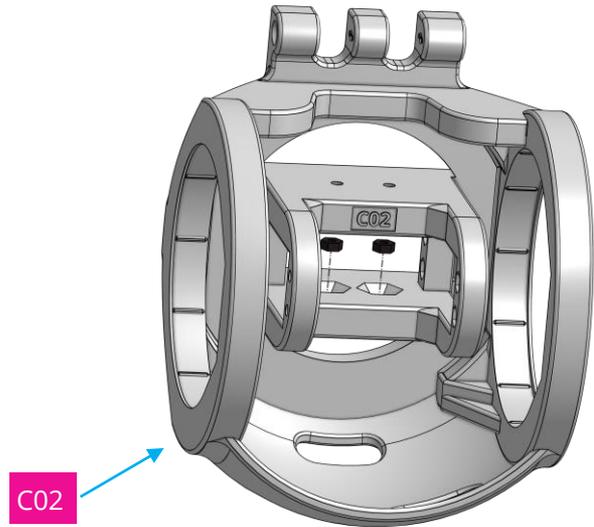
Step 4b

Attach **C29** with **3 x 40 mm screw** to B01 and **1 x 12 mm screw** to the motor clamp.



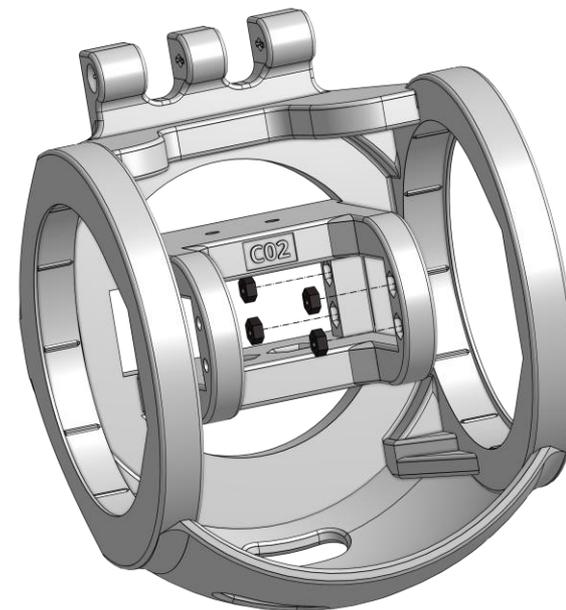
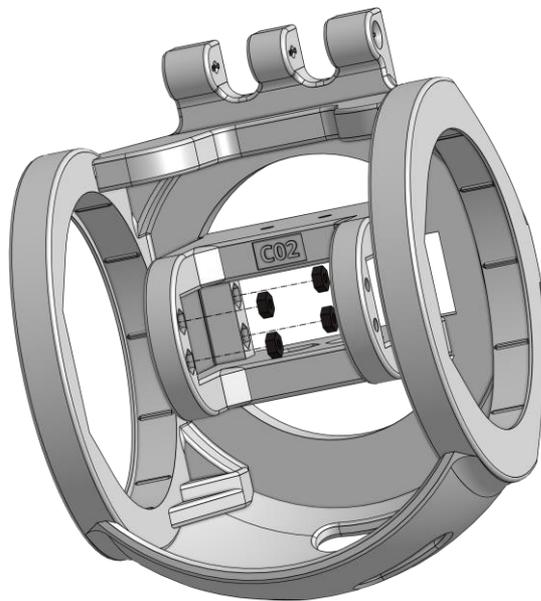
Step 5a

Insert **4 x nuts** in the shown spots in **C02**.



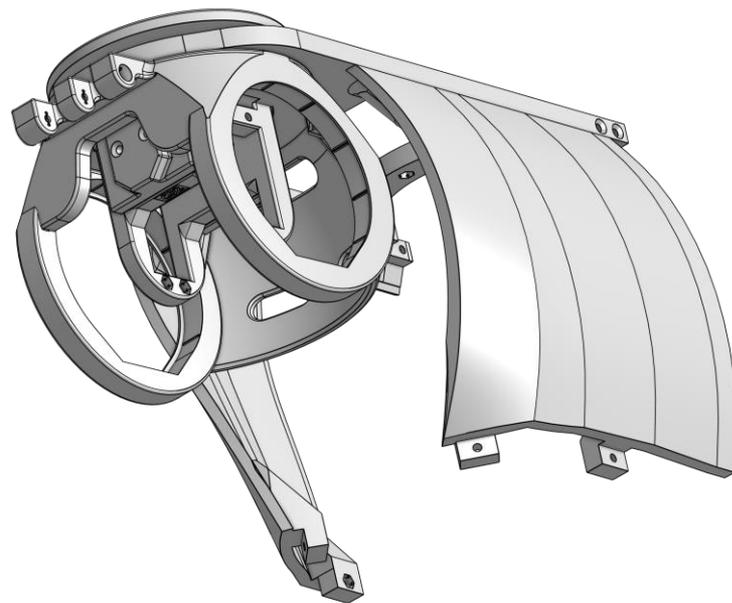
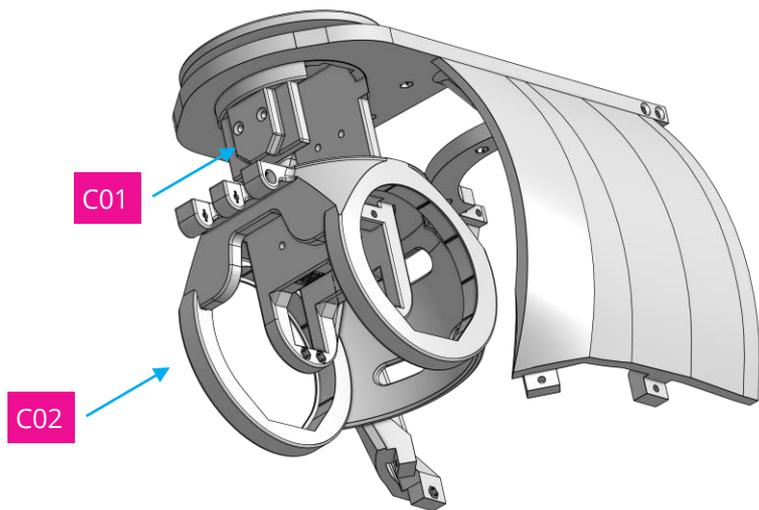
Step 5b

Insert **8 x nuts** in the shown spots in **C02**.



Step 6

Attach **C02** to **C01** using **4 x 20mm screws**.

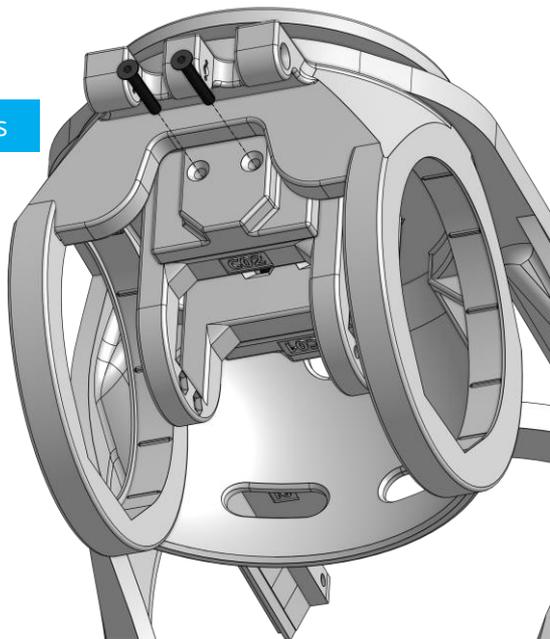


## Step 6 – addition

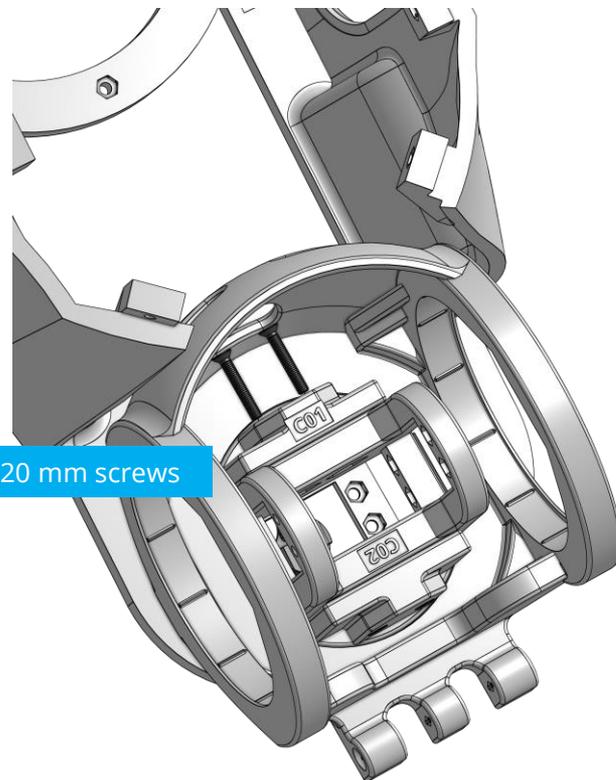
Attach **C02** to **C01** using **4 x 20mm screws**.



2 x 20 mm screws

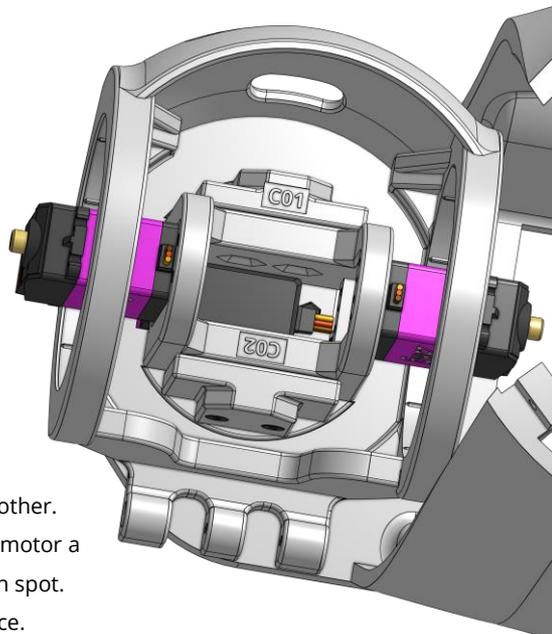


2 x 20 mm screws

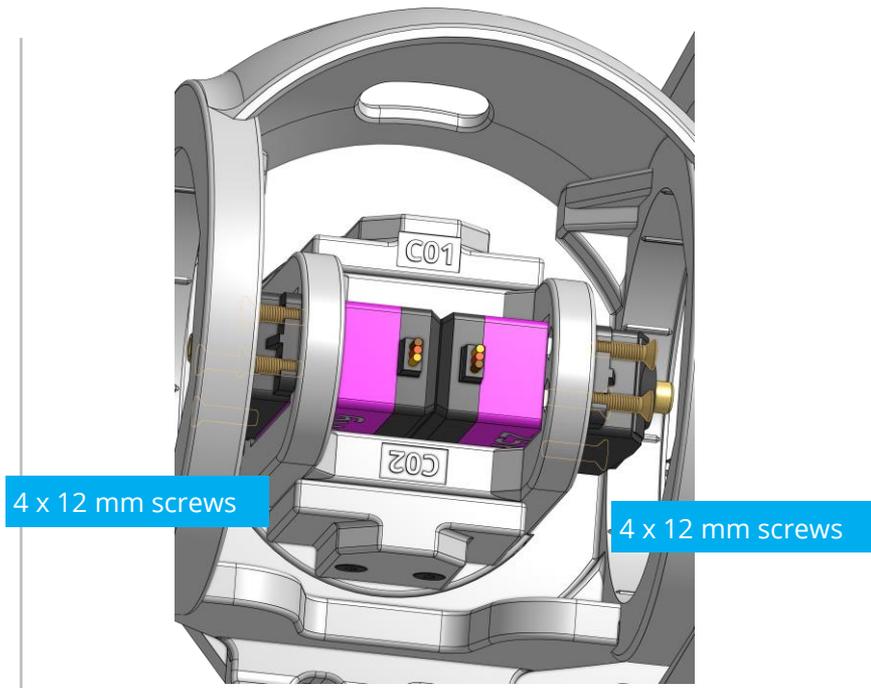


## Step 7

Insert **2 x E09 servo motors** and attach them with **8 x 12 mm screws**.



Insert the servos one after the other.  
Pull the cable first, then tilt the motor a little bit to put in into the shown spot.  
You may apply some gently force.



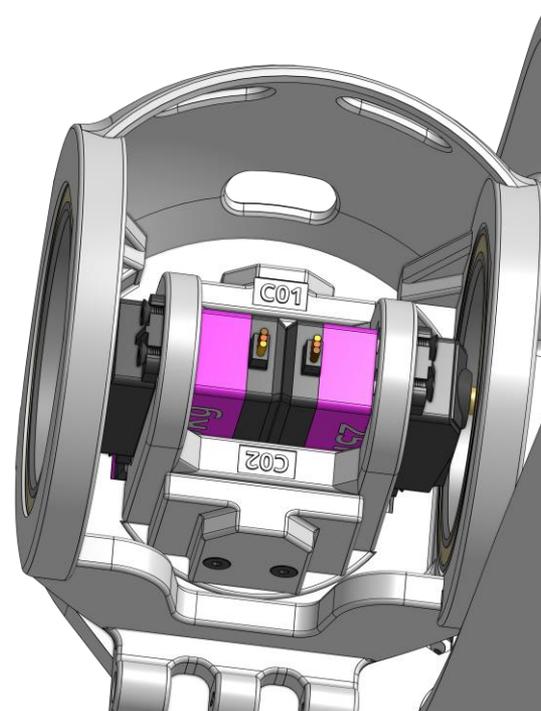
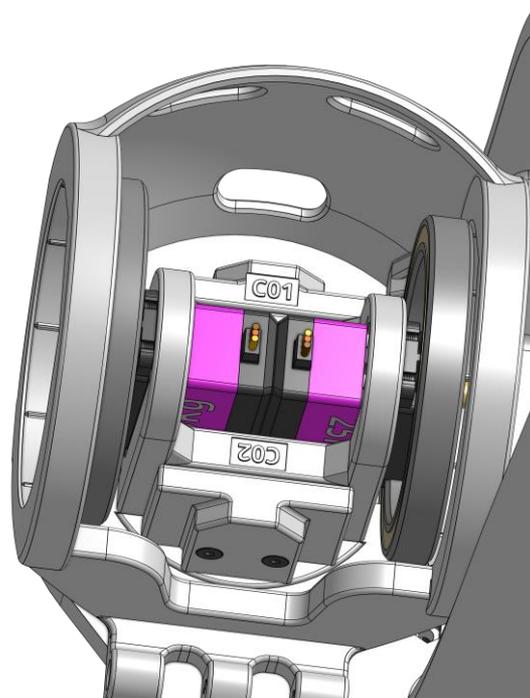
## Step 8

Insert **2 x M04 ballbearings** in the shown spots in **C02**.



2 x M04 ballbearings

Insert the ballbearings from the inside and apply some gently force. Pliers can be very helpful here.

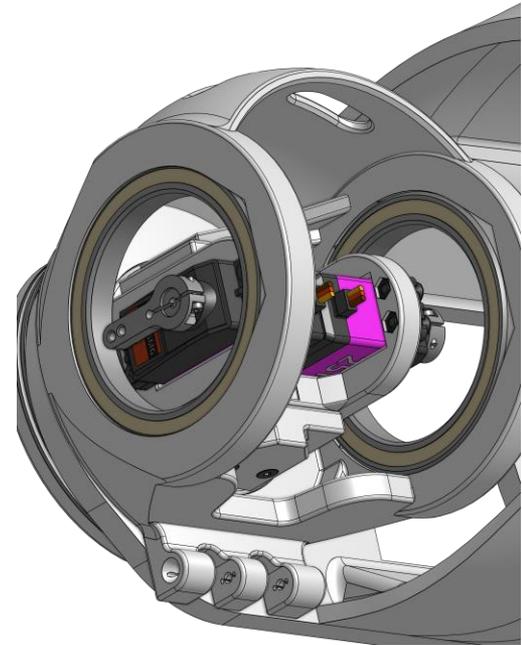
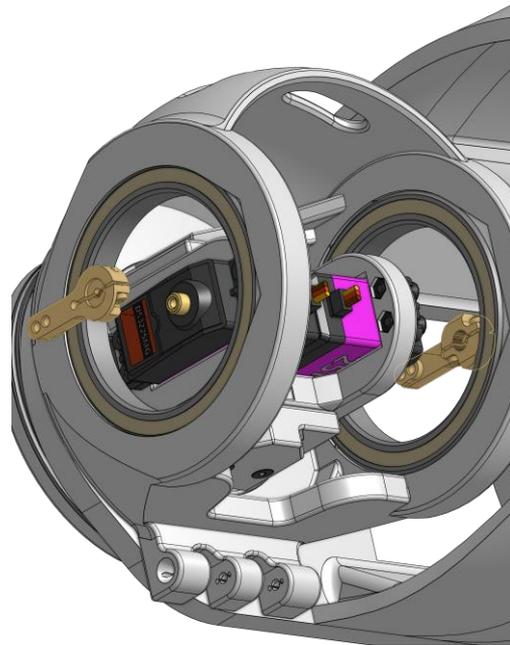


Step 9



Insert **2 x M09 motor clamps** on both E07 servos and fix them using the 2 small screws in clamps.

2 x M09 motor clamps

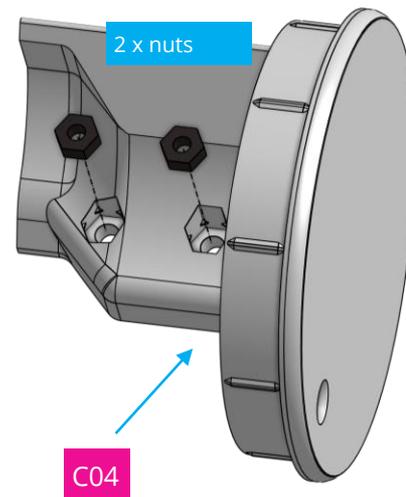
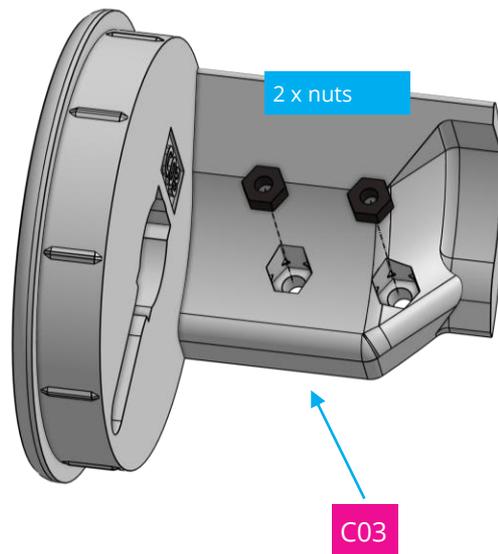


Step 10

Insert **2 x nuts** in both **C03** and **C04**.



4x

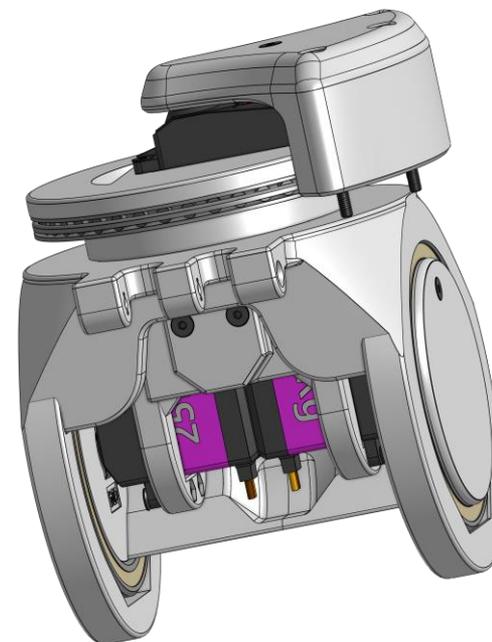
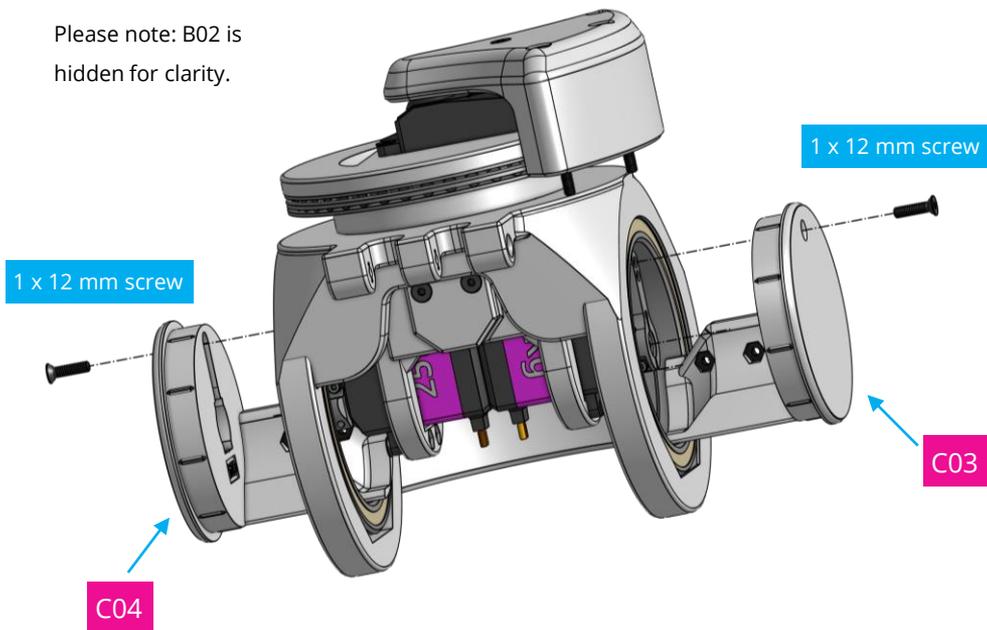


## Step 11



Connect **C03** and **C04** to the former assembly and tighten them to clamps using **2 x 12 mm screws**.

Please note: B02 is hidden for clarity.

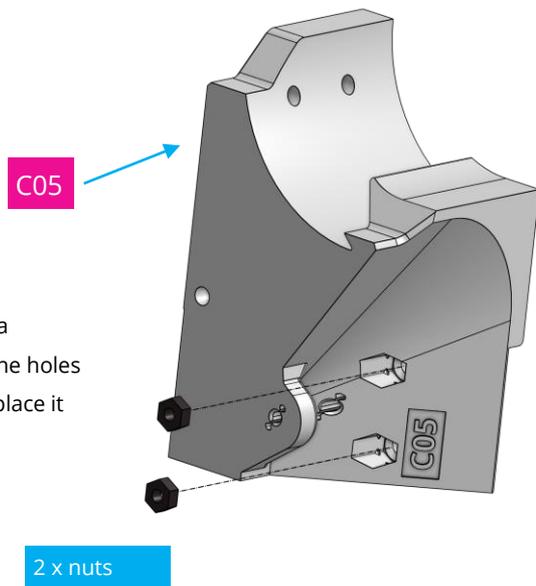


## Step 12a

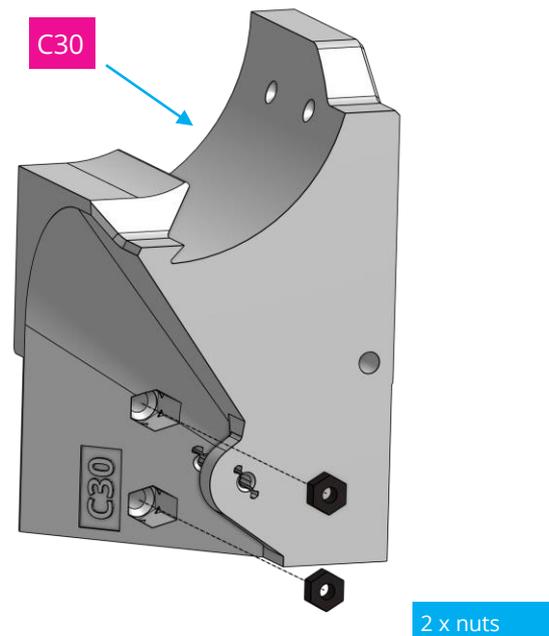
Place **2 x nuts** in both **C05** and **C30**.



4x

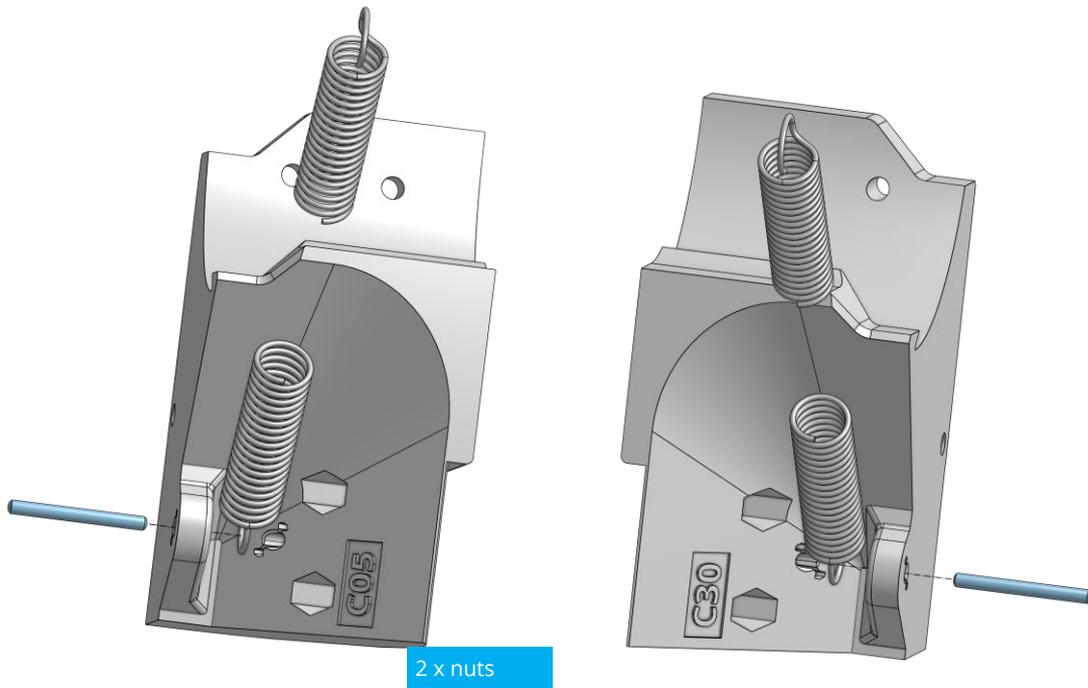


Our tip: use a small screwdriver or a precision tool to put the nuts into the holes and hit it gently with a hammer to place it correctly.

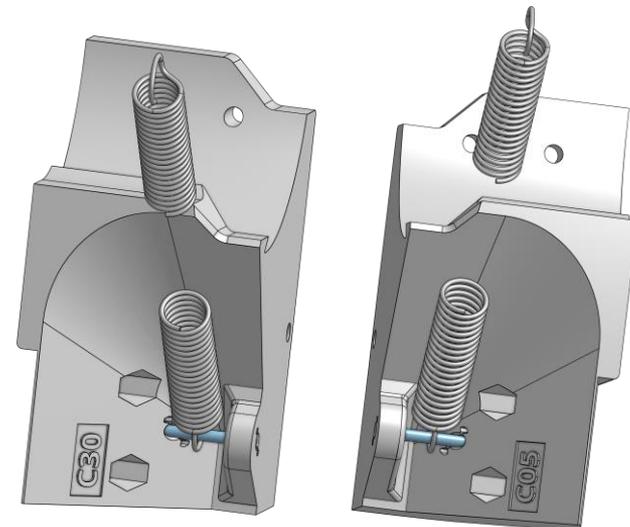


## Step 12b

Push **2 x M08 rods** in shown places and place **2 x M12 springs** onto the rods.

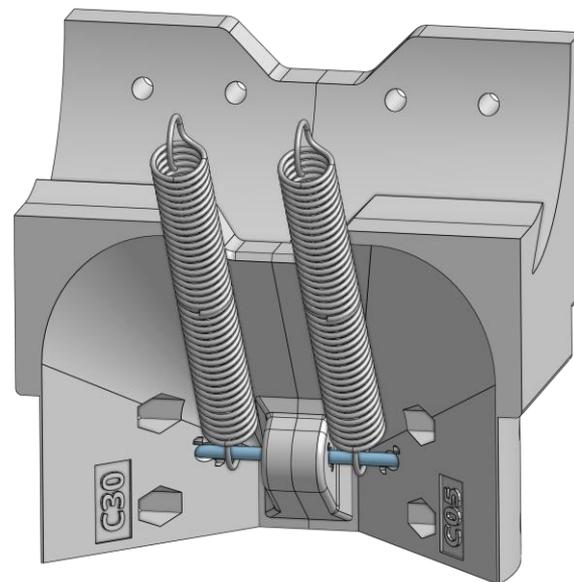
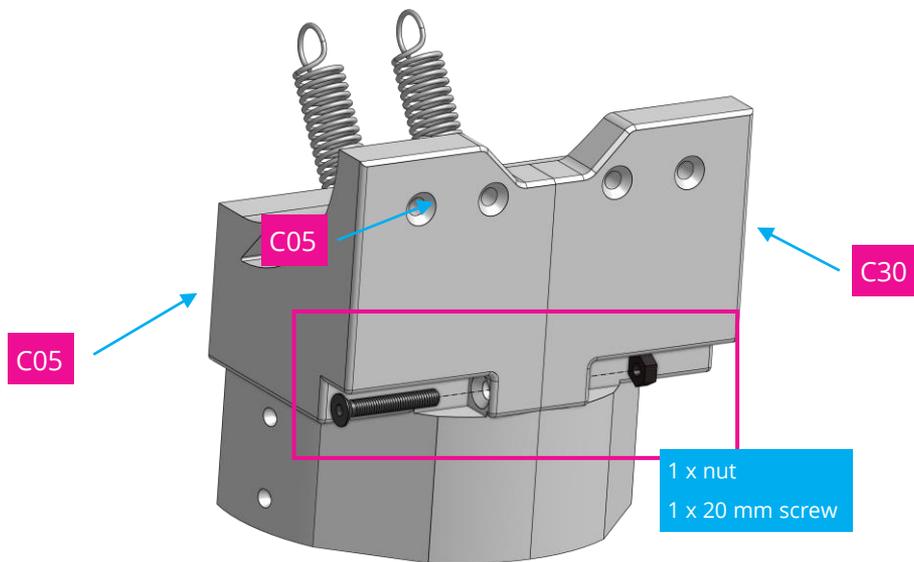


Please note: Due to a display effect, the spring is displayed in two parts, but it is just one spring each.



## Step 12c

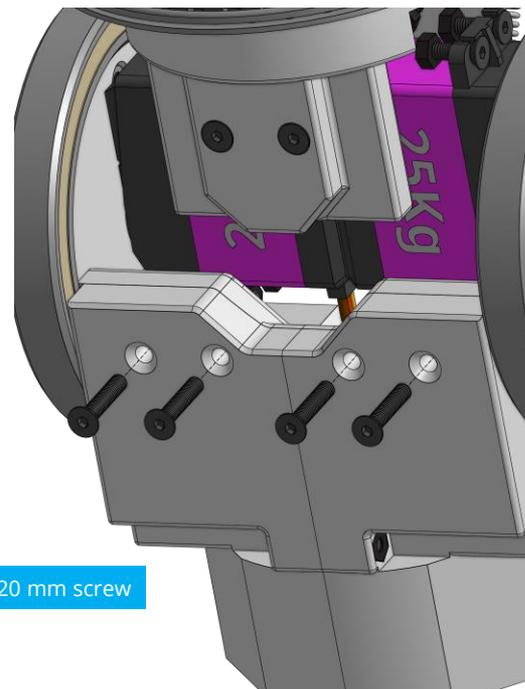
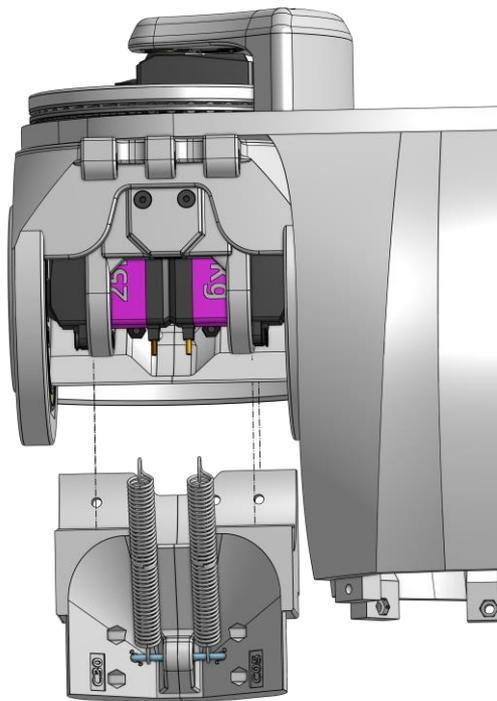
Assemble **C05** and **C30** using **1 x nut** and **1 x 20 mm screw**.



### Step 13a

Connect both assemblies together using **4 x 20 mm screws**.

Please note: You'll need some dexterity for this, as it's not easy to insert it here.



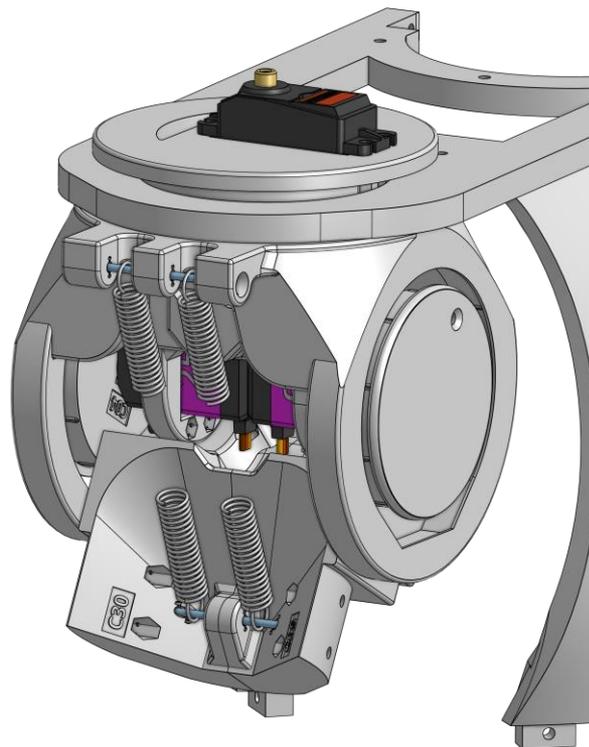
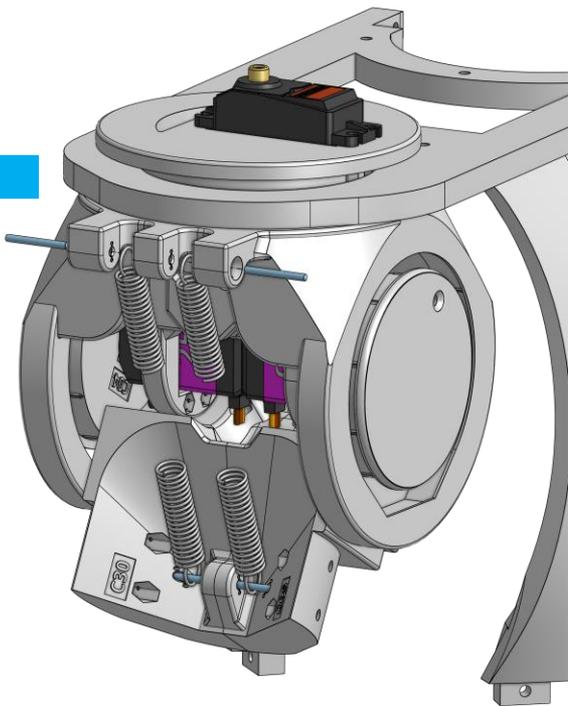
4 x 20 mm screw

## Step 13b



Attach the loose ends of both springs to the shown spot using **2 x M08 rods**.

2 x M08 rod

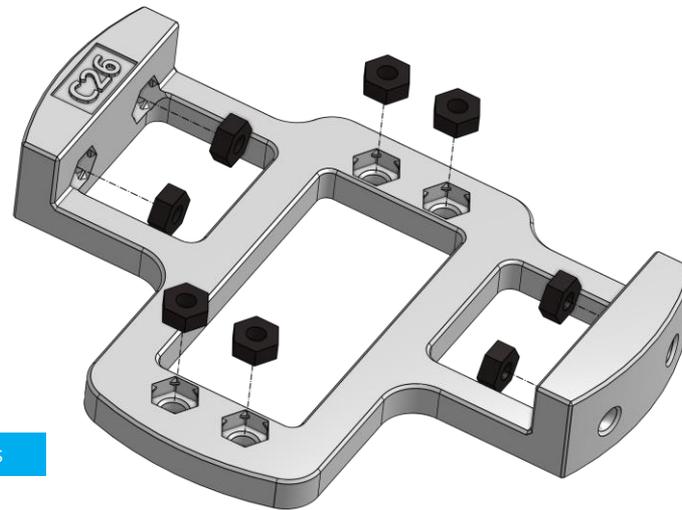


Step 14a

Insert **8 x nuts** into the shown spots of **C26**.



8 x nuts

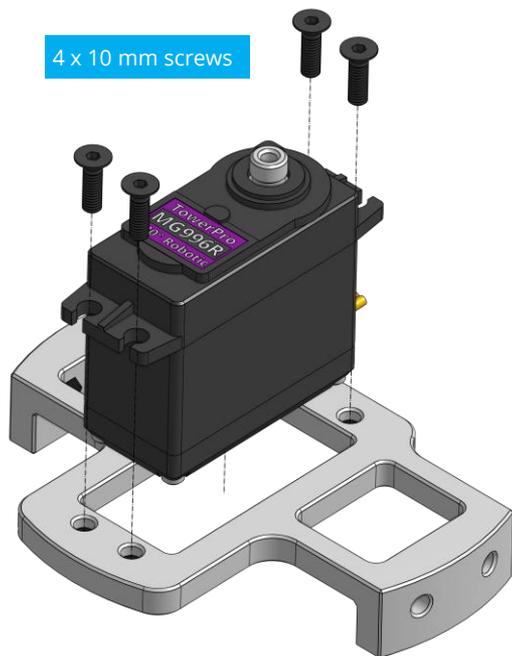




## Step 14b

Flip C26, then put **1 x E07 servo motor** in the shown spot and assemble it to C26 using **4 x 10 mm screws**.

Put **1 x M15** on top of E07.



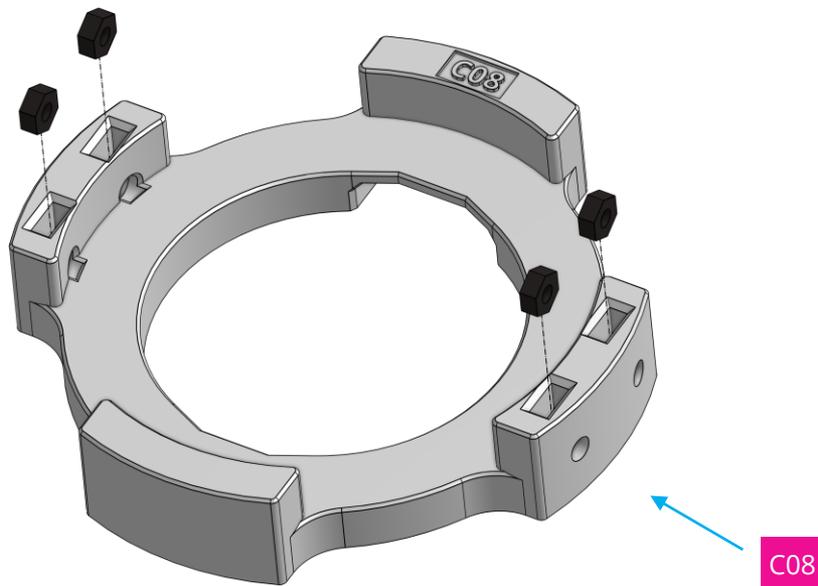
Pull the cable first, then tilt the motor a little bit to put in into the shown spot. You may apply some gently force.



## Step 15a

Insert **4 x nuts** in the shown spot of **C08**.

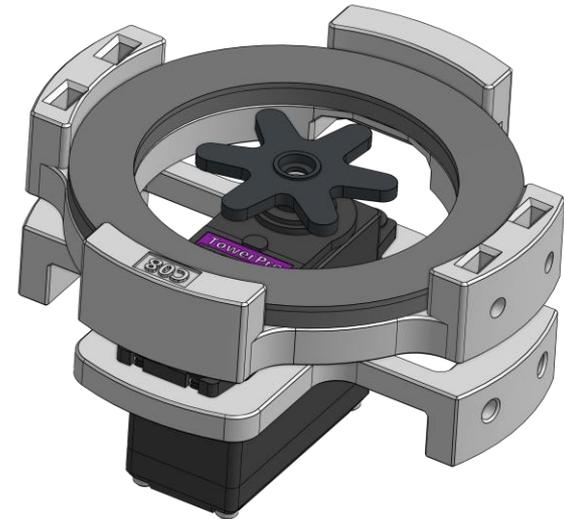
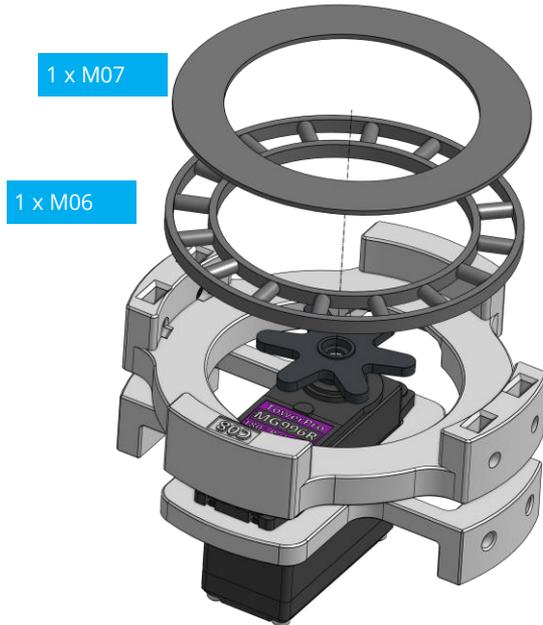
Repeat this step, as you will need a second C08 later.



Our tip: use a small screwdriver or a precision tool to put the nuts into the holes and hit it gently with a hammer to place it correctly.

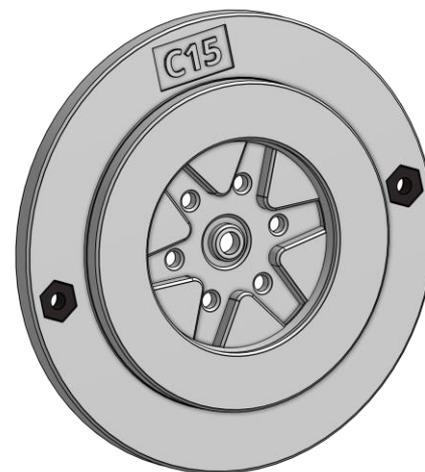
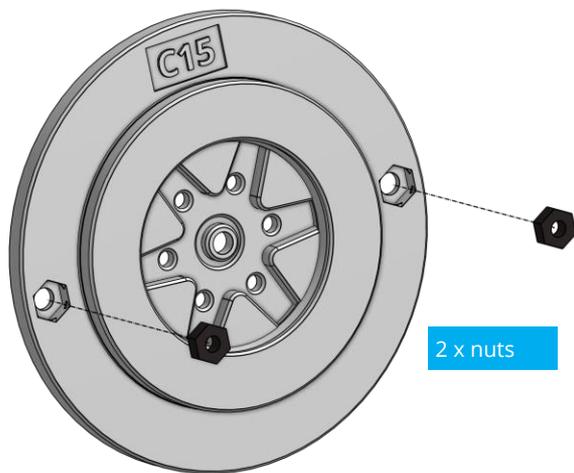
Step 15b

Place **C08**, **1 x M06** and **1 x M07 ballbearing** on top of C26 in the shown orientation.



Step 15c

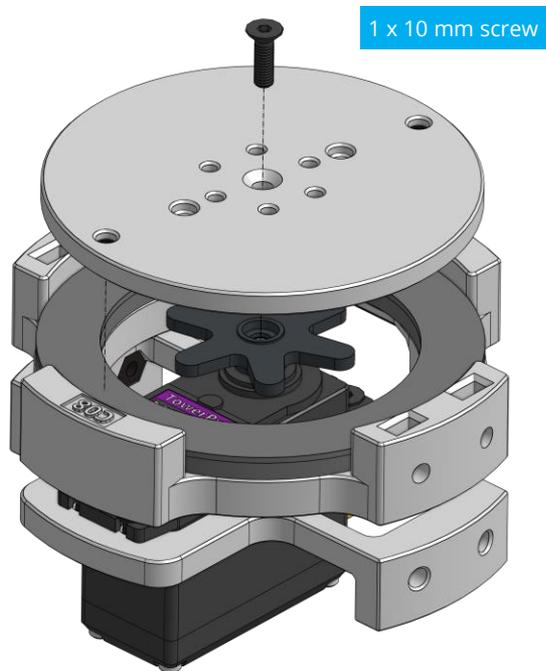
Insert **2 x nuts** in the shown spots of **C15**.



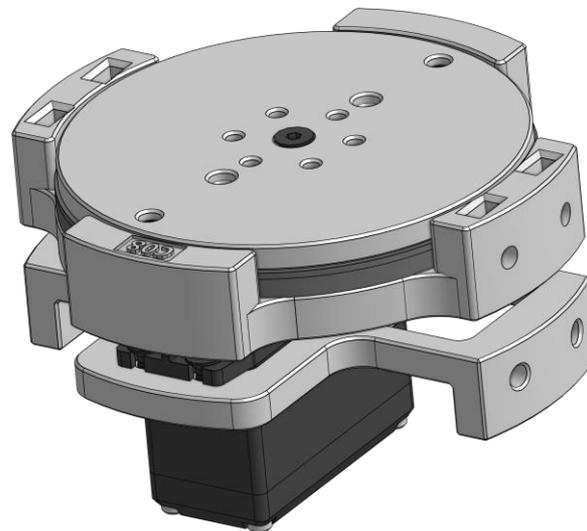
Step 15d



Flip **C15** and connect it to **M15** on the former assembly using **1 x 10mm screw** in the shown orientation.



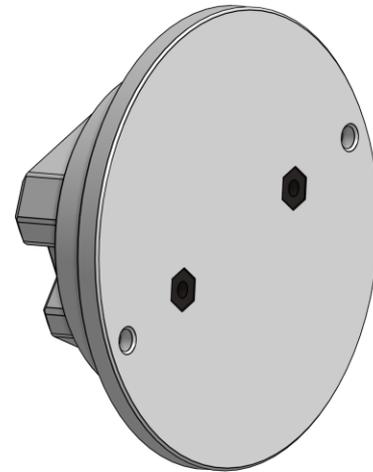
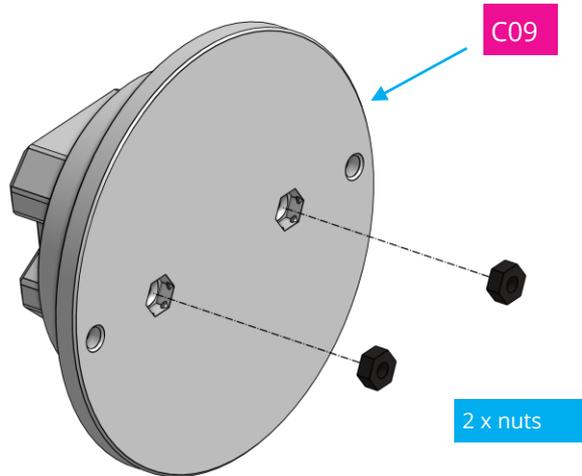
This step requires manual dexterity.



Step 16a



Insert **2 x nuts** in the shown spots of **C09**.



## Step 16b

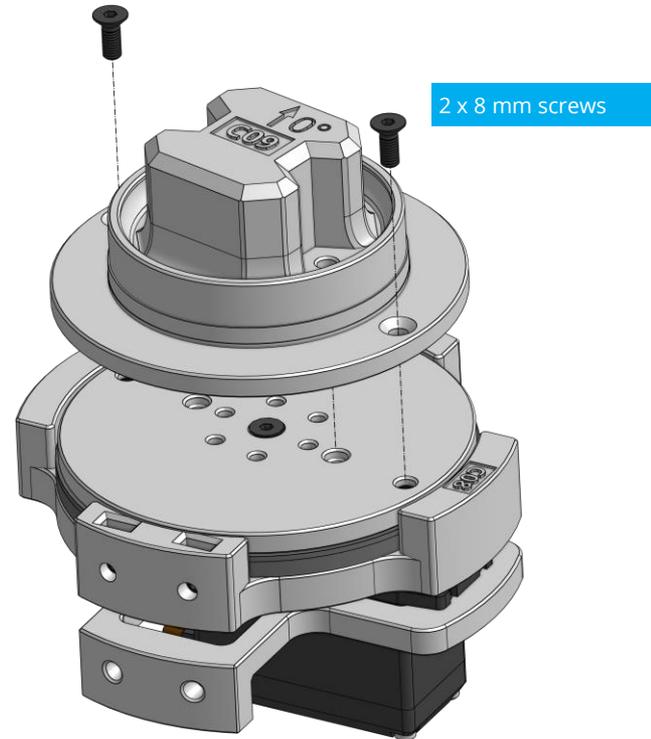
Connect **C09** to **C15** using **2 x 8 mm screws**.



1



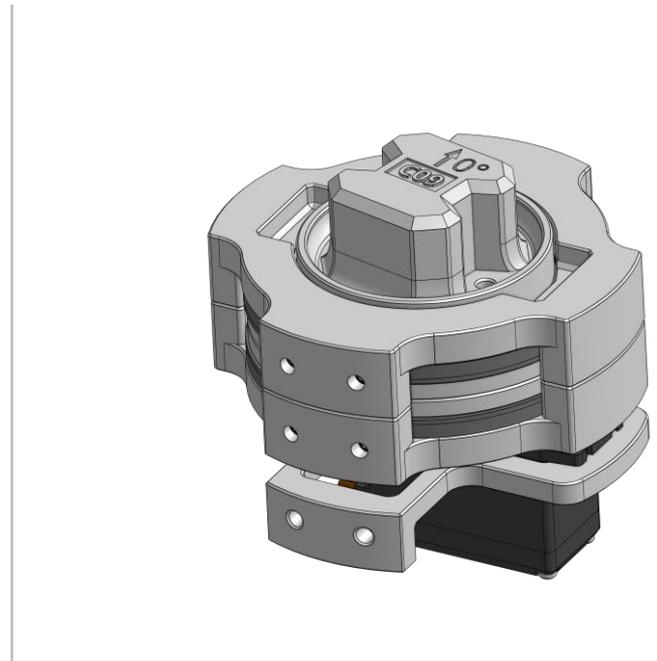
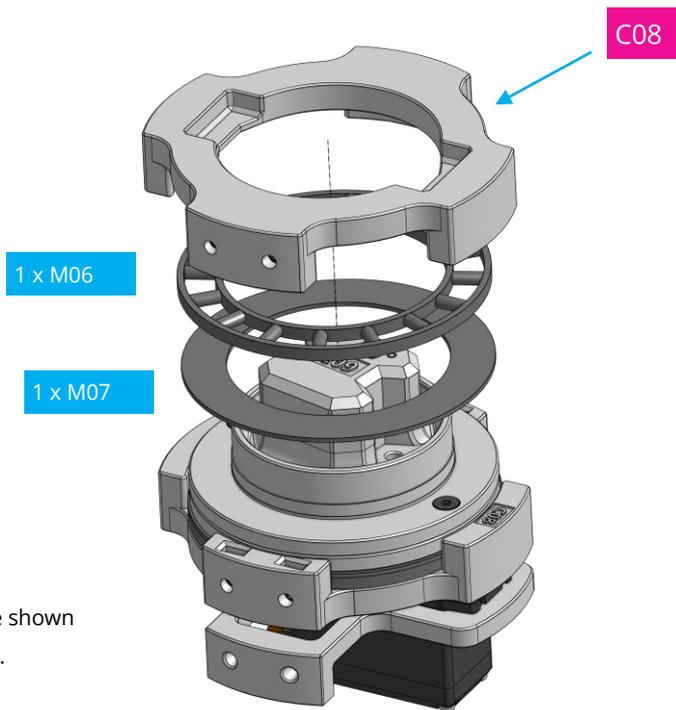
2x



Make sure to follow the shown orientation of the parts.

## Step 16c

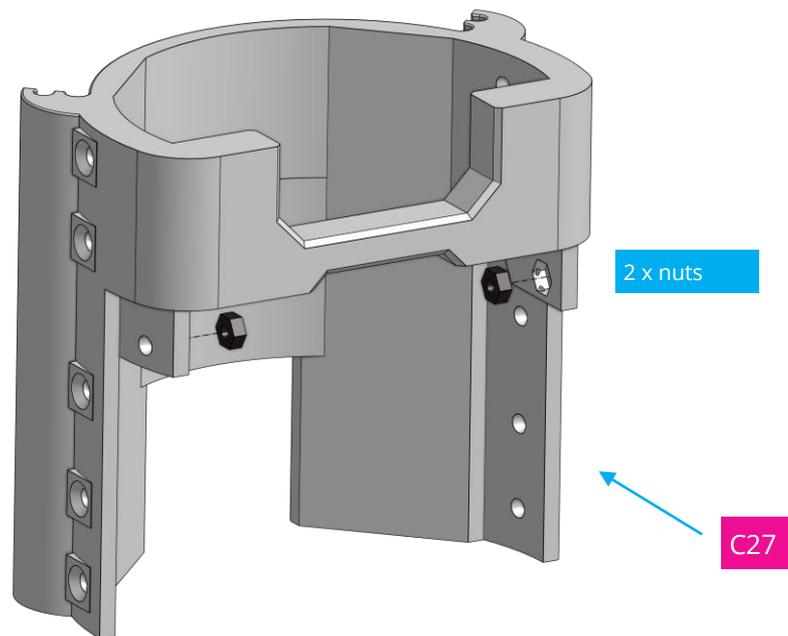
Then place **1 x M07**, **1 x M06** and the prepared **C08** from step 15 a on top of C09.



Make sure to follow the shown orientation of the parts.

Step 17

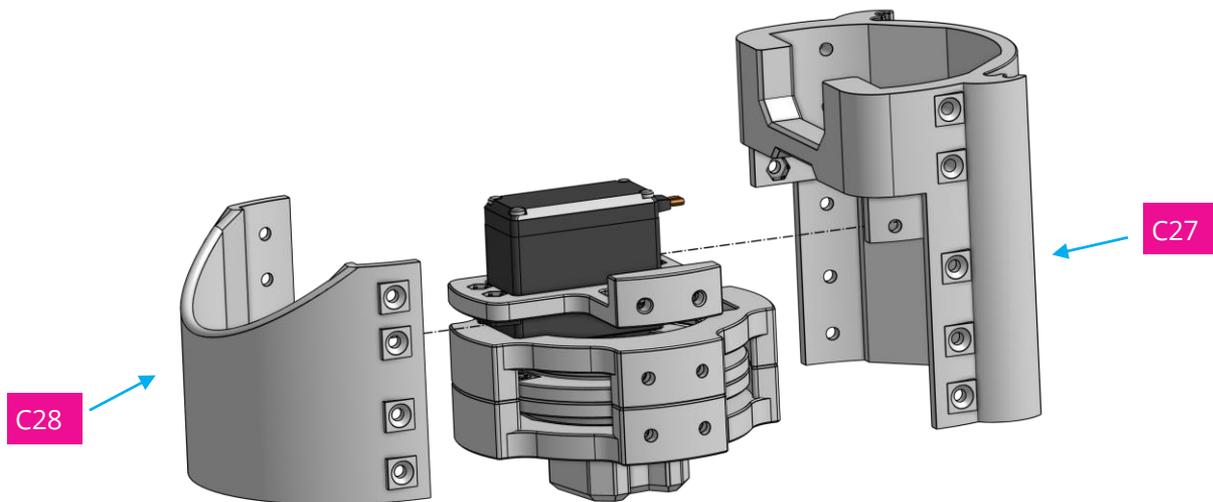
Insert **2 x nuts** in the shown spots of **C27**.



## Step 18 - note

Step 18 shows how to attach **C28** and **C27** to the former assembly.

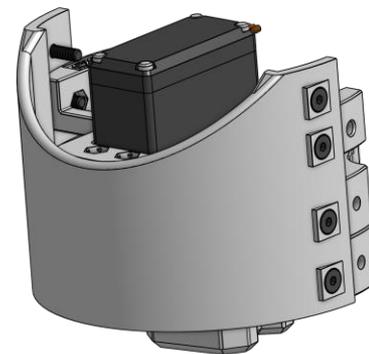
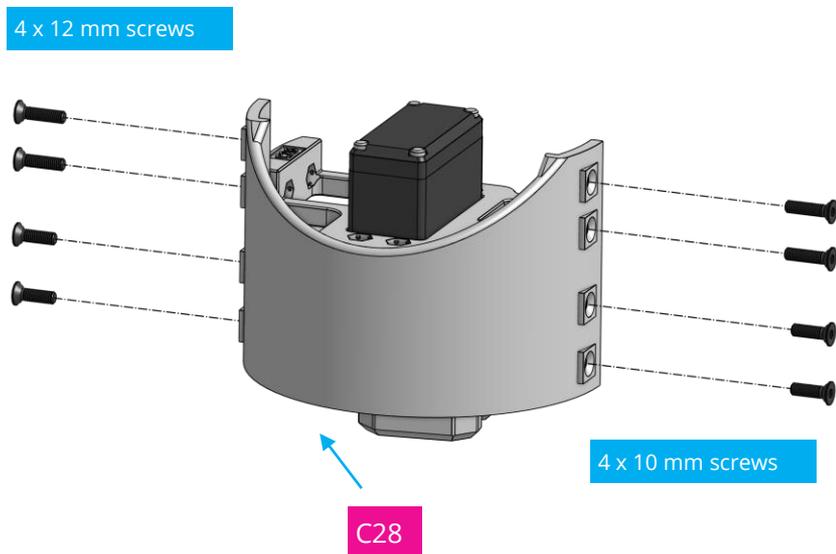
Please check carefully for the orientation of both the former assembly and the new parts.



## Step 18a

Attach **C28** to the former assembly in the shown orientation.

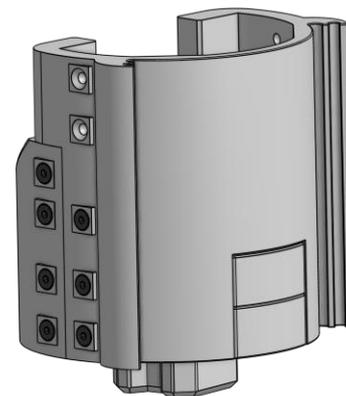
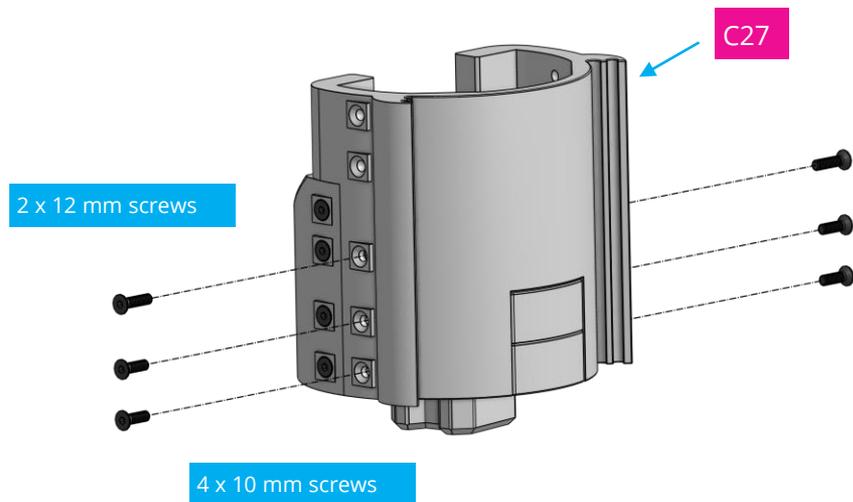
Use **4 x 10mm screws** in the lower 4 holes and **4 x 12mm screws** in the upper 4 holes.



## Step 18b

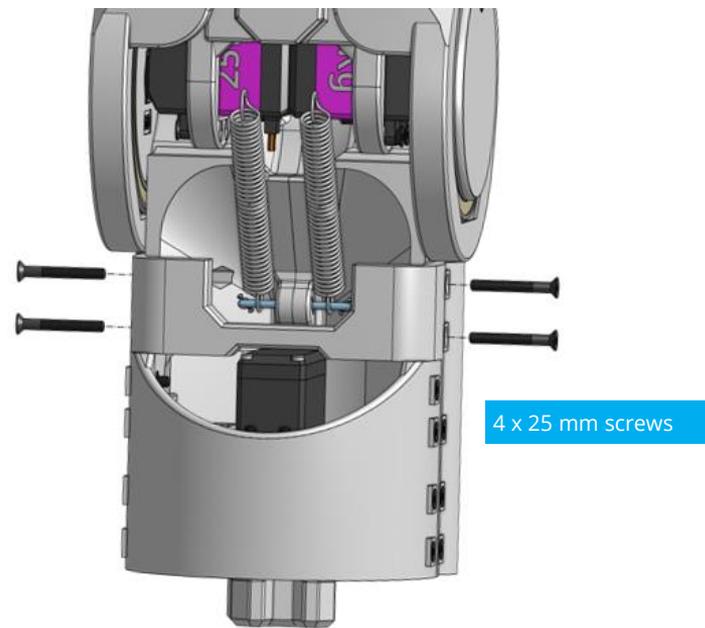
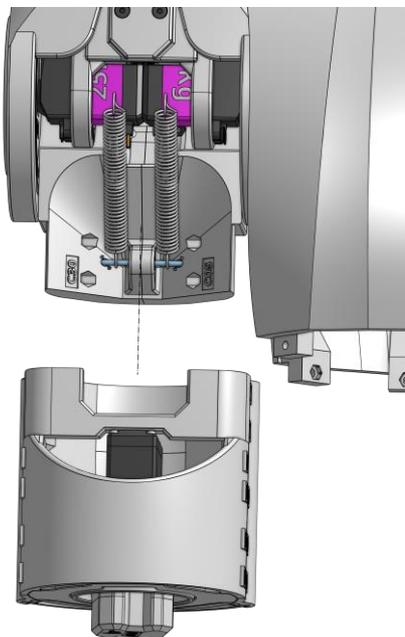
Then, attach **C27** to the assembly in the shown orientation.

Use **4 x 10mm screws** in the lower 4 holes and **2 x 12mm screws** in the upper 2 holes.



Step 19

Connect previous assembly to shoulder assembly using **4 x 25 mm screws**.



Step 20

Lastly, attach **B01** to **B02** using **4 x nuts** and **4 x 20 mm screws**.



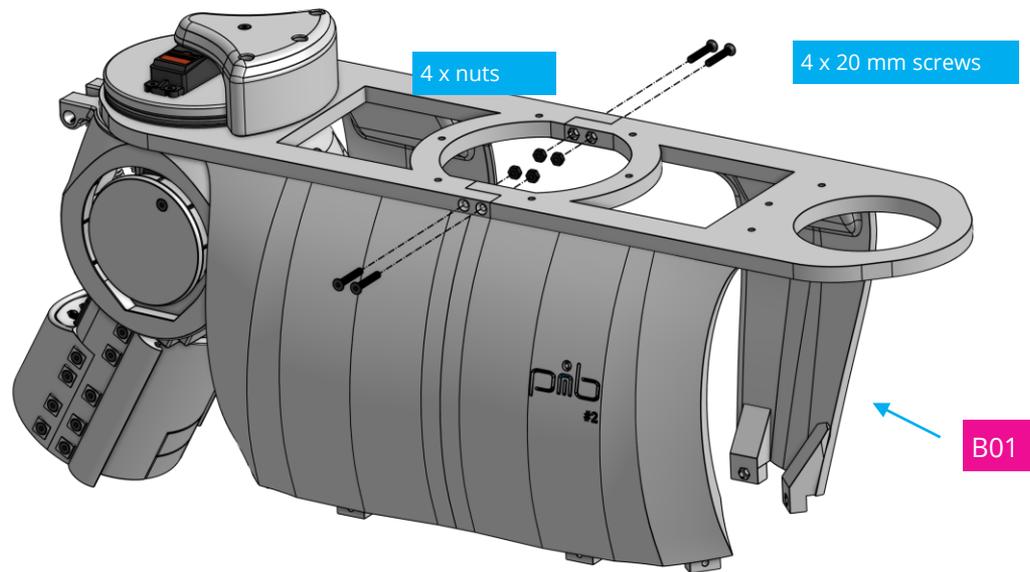
2



4x



4x



## Congratulations

You did a great job, pib's shoulder joint 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.



**team@pib.rocks**

Send us an email.



**discord.com/invite/GRdpyeDu7P**

Join us on Discord.



**shop.pib.rocks**

Order non-printable parts for pib.