

Open Manipulator Link Assembly

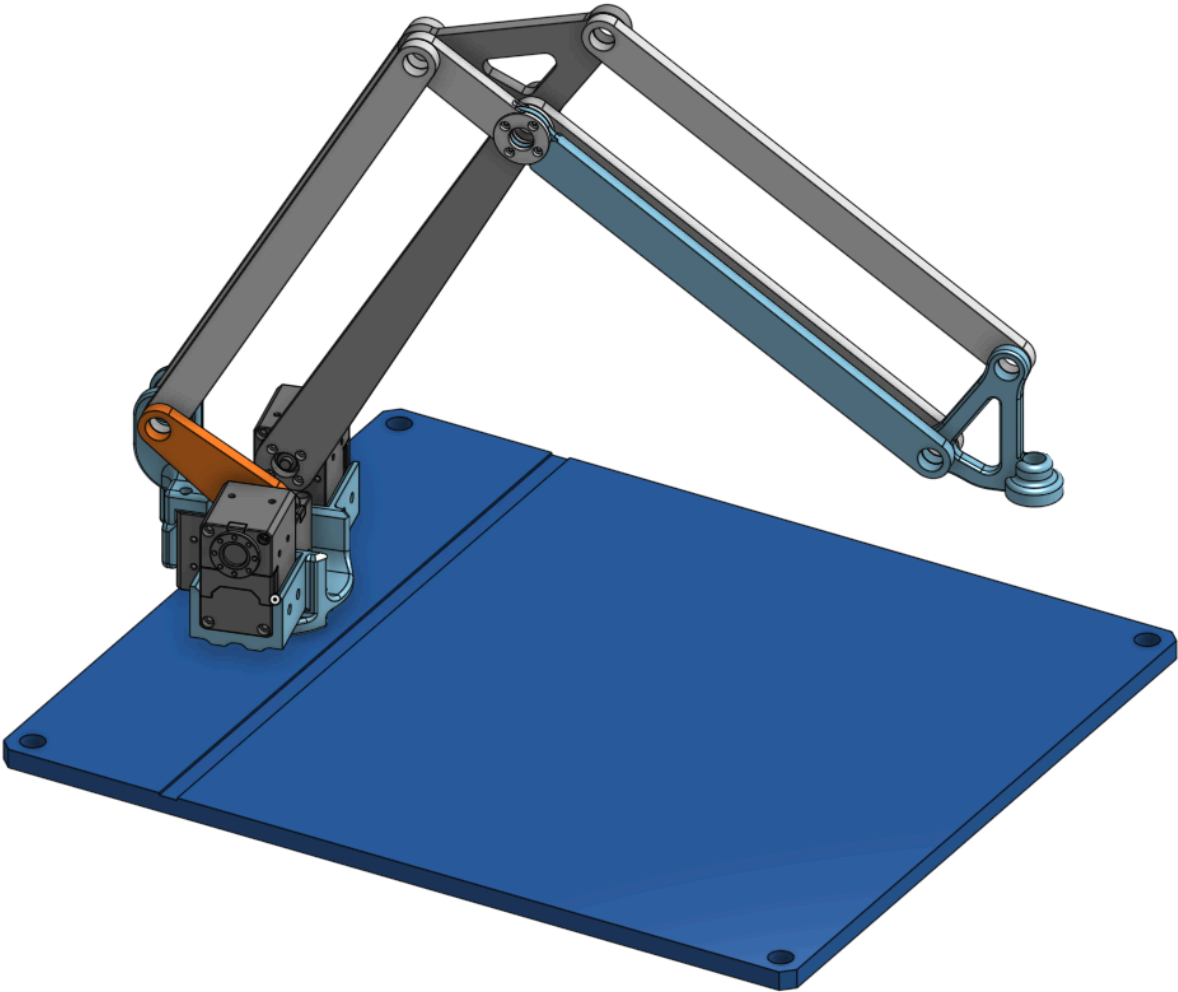


Table of Contents

| | |
|--------------------------------|----|
| Open Manipulator Link Assembly | 0 |
| Useful Links and Tips | 2 |
| Parts List | 3 |
| Suggested Additional Materials | 9 |
| Assembly Instructions | 10 |

Useful Links and Tips

Before assembling the arm there are a couple of useful hints and materials needed in order to make assembly as simple as possible.

Open Manipulator Link Manual:

<http://emanual.robotis.com/docs/en/platform/openmanipulator/>

In the table of contents simply click on Friends-> OpenManipulator Link.

Link to 3D model:

<https://cad.onshape.com/documents/d8f9aaf0f4d96484292b2012/w/9958ec1ee2bfa99d3baf1f82/e/96adb859da7674cb264ba0f4>

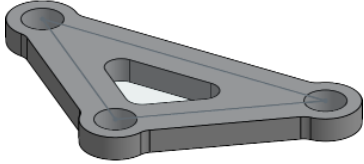
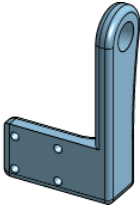
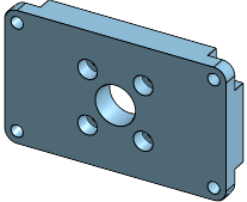
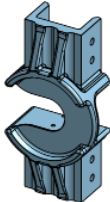
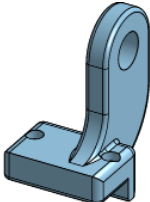
This will allow you to view all parts assembled as well as hide or show certain parts for a more thorough view than what is provided below. With this program you can also take measurements as well as providing the name for each individual part. Note: the program does not show what screws or nuts to use, we have provided a guide for which to use below.

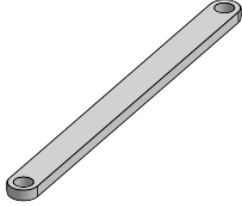
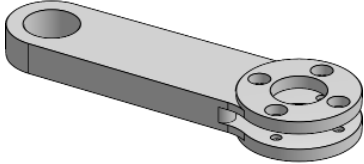
Check the quality of 3D printed parts before assembling. Test all screw holes and holes in general and use a Dremel in order to fix any imperfections that may happen from 3D printing.

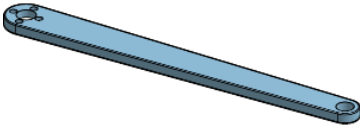




Make sure to test each Dynamixel using RoboPlus 2.0 and set them to 0 before assembly to avoid any possible issues with torque overflow.

Warning: When purchasing screws from Misumi the actual length is roughly 2 mm off. We have adjusted for this in this guide, providing the actual screw sizes needed but keep this in mind if taking measurements based on the 3D model measurements.

Parts List

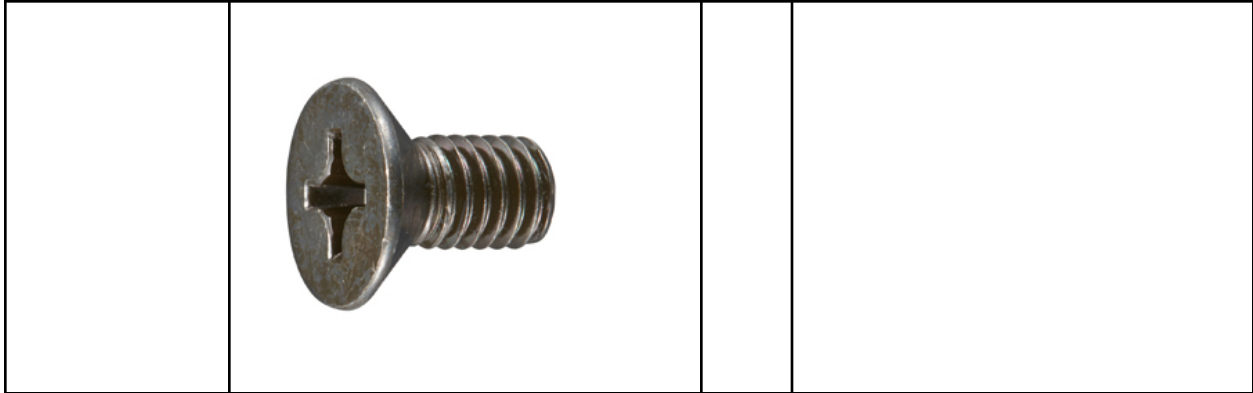
| | Part Name/Image | Qty | Link |
|-------------------------|--|-----|---|
| 3D Printed Parts | Triangle_link  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Holder_b  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Base_link  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Rotational_base  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Holder_a  | 1 | https://www.thingiverse.com/thing:3069557 |

| | | | |
|--|---|---|---|
| | Link_50  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Link_200_b  | 4 | https://www.thingiverse.com/thing:3069557 |
| | Link_50_for_250  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Link_200_for_250  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Tool_link  | 1 | https://www.thingiverse.com/thing:3069557 |
| | Link_200_a  | 1 | https://www.thingiverse.com/thing:3069557 |

| | | | |
|-------------------|---|---|---|
| |  | | |
| Actuators | Dynamixel XM430-W350-3  | 3 | http://www.robotis-shop-en.com/?act=shop_en_goods_view&GS=2923&GC=GD080101 |
| Misc Parts | 24mm Metal Shaft  | 5 | |
| | 28mm Metal Shaft  | 1 | |
| | 38mm Metal Shaft  | 1 | |
| | 42mm Metal Shaft | 1 | |




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| |  | %3A2.5 |
|--|---|------------------------|

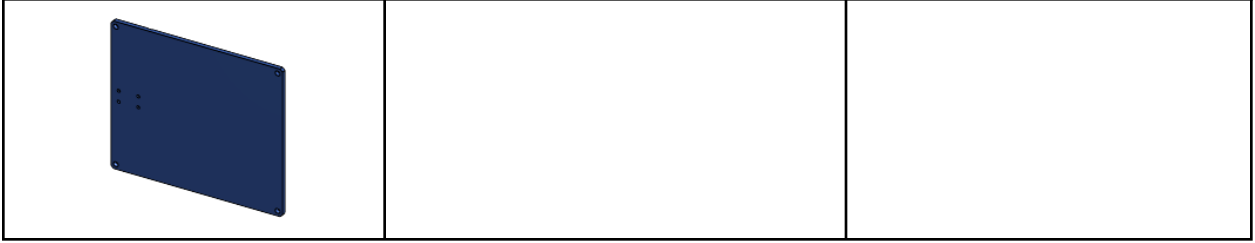
| | | | |
|--|--|----|---|
| | <p>CSPCSZ-SUSTBS-M2.5-10 Screws</p>  | 4 | https://us.misumi-ec.com/vona2/detail/221000547315/?PNSearch=CSPCSZ-SUSTBS-M2.5-10&HissuCode=CSPCSZ-SUSTBS-M2.5-10&searchFlow=suggest2products&Keyword=CSPCSZ-SUSTBS-M2.5-10 |
| | <p>M2.5 screws (come with dynamixel)</p>  | 16 | Alt screw |
| | <p>M2-6mm screws CSPCSZ-SUSTBS-M2-6</p> | 16 | https://us.misumi-ec.com/vona2/detail/221000547315/?HissuCode=CSPCSZ-SUSTBS-M2-6&PNSearch=CSPCSZ-SUSTBS-M2-6&KWSearch=CSPCSZ-SUSTBS-M2-6&searchFlow=results2type |



| | | | |
|--|--|----|---|
| | <p>MC-04 Metric shaft collars 4mm ID</p>  | 18 | https://us.misumi-ec.com/vona2/detail/110302637270/?HissuCode=PSCBRJ6-9&PNSearch=PSCBRJ6-9&KWSearch=PSCBRJ6-9&searchFlow=results2type |
| | <p>MSRB6-1.0 Washers</p>  | 40 | https://us.misumi-ec.com/vona2/detail/110100142970/?HissuCode=MSRB6-1.0&PNSearch=MSRB6-1.0&KWSearch=MSRB6-1.0&searchFlow=results2type |

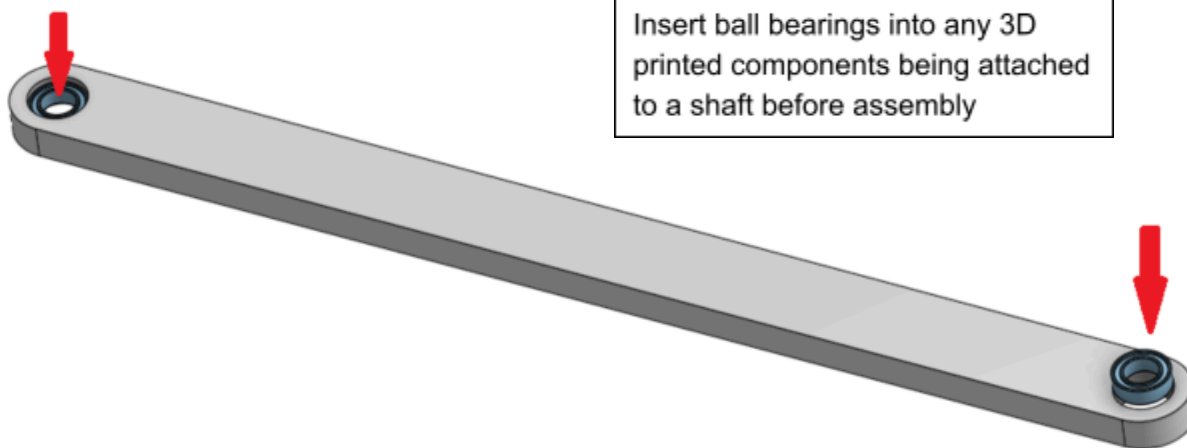
Suggested Additional Materials

| Part Name/Image | Use | Link |
|--|--|--|
| <p data-bbox="203 386 300 415">Dremel</p>  | <p data-bbox="581 386 992 485">Used for widening and cleaning 3D printed components and holes</p> | <p data-bbox="1040 386 1414 520">https://www.lowes.com/pd/Dremel-4000-39-Piece-Variabe-Speed-Corded-Multipurpose-Rotary-Tool-Kit/3824381</p> |
| <p data-bbox="203 810 391 840">Nylon Washer</p>  | <p data-bbox="581 810 1013 974">3D printed component perfect for pressing and taking out components into the shaft with ease. Use with a mallet or arbor press</p> | <p data-bbox="1040 810 1414 945">https://www.lowes.com/pd/Hillman-2-Count-0-500-in-x-3-8-in-Nylon-Standard-SAE-Flat-Washer/3012448</p> |
| <p data-bbox="203 1234 537 1264">Precision Screwdriver set</p>  | <p data-bbox="581 1234 964 1297">Allows for ease with screwing hex screws as well as phillips</p> | <p data-bbox="1040 1234 1414 1333">https://www.harborfreight.com/33-piece-precision-screwdriver-set-93916.html</p> |
| <p data-bbox="203 1654 342 1684">Base plate</p> | <p data-bbox="581 1654 992 1717">Can use a metal, wooden or 3D printed plate as a base.</p> | <p data-bbox="1040 1654 1235 1717">Dimensions 30 x .8 x 35cm</p> |

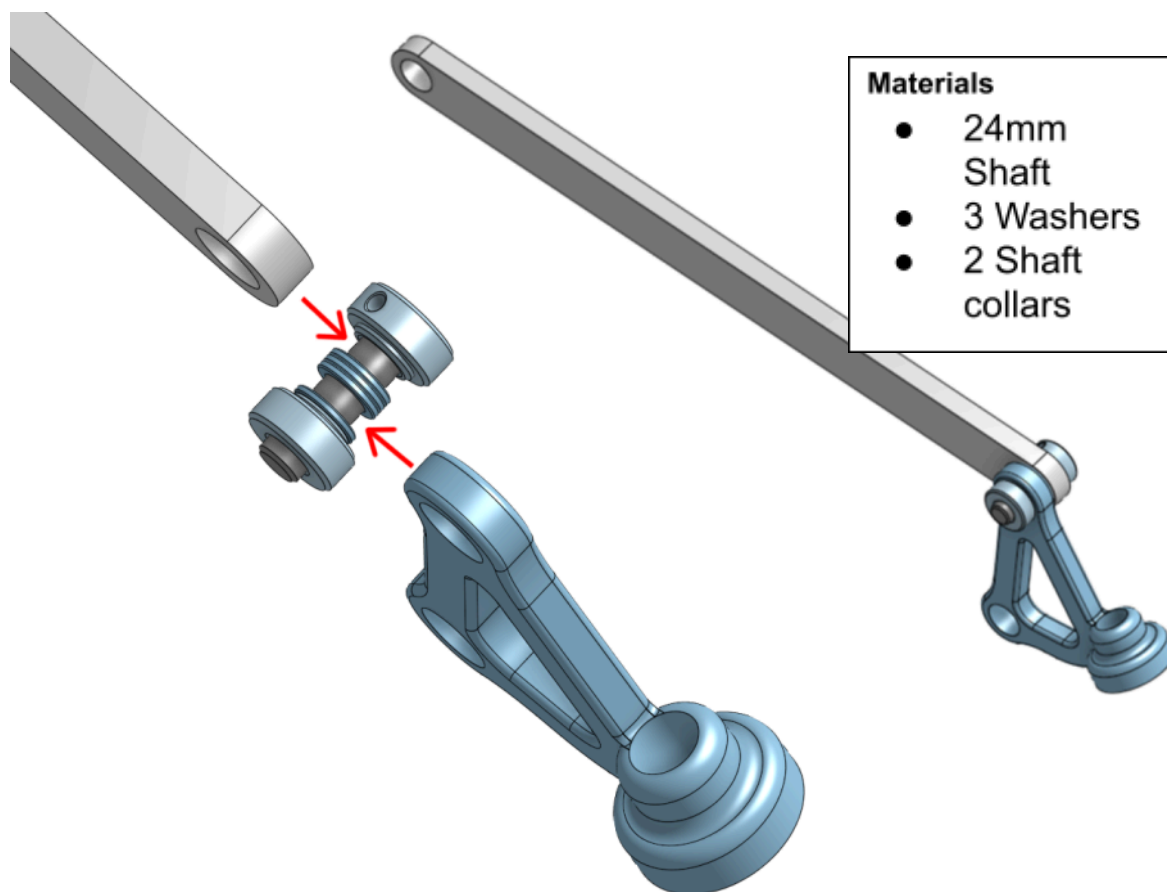


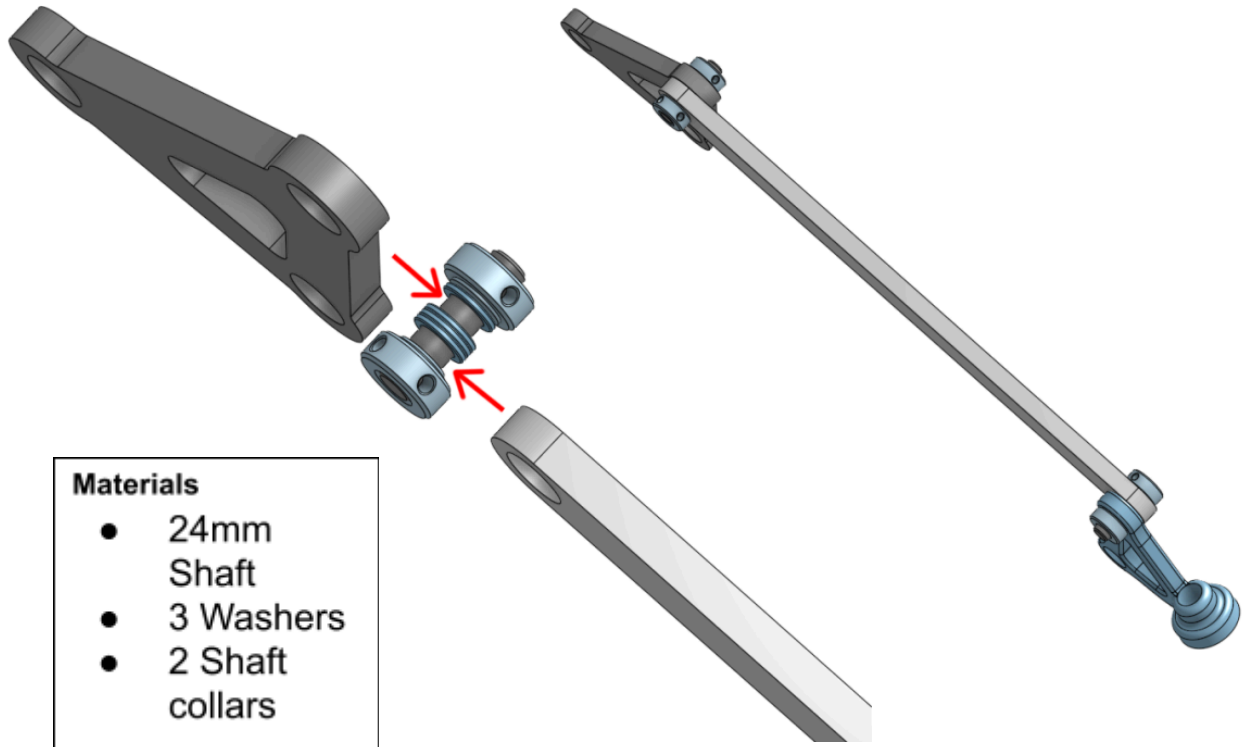
Assembly Instructions

Step 1



Step 2

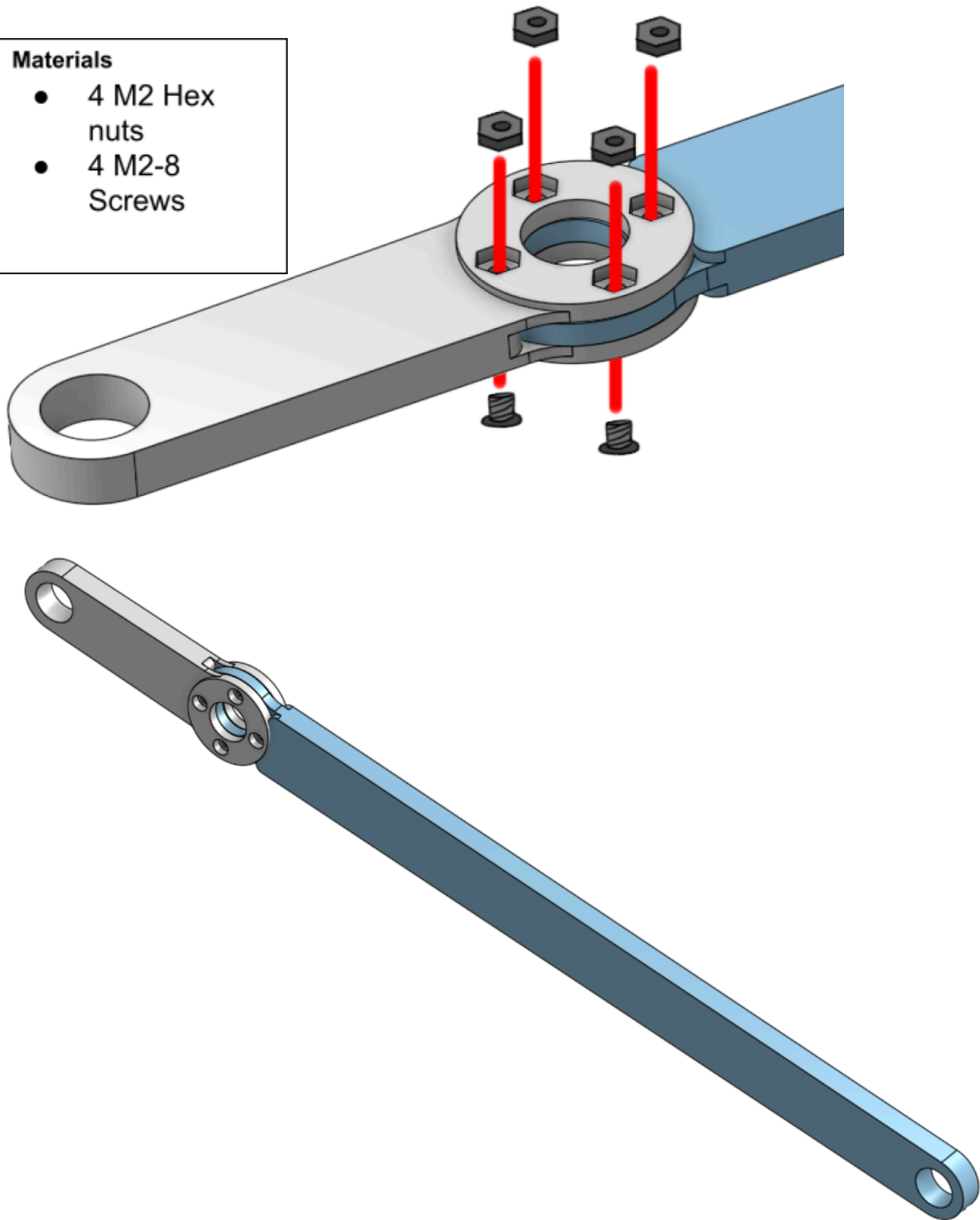


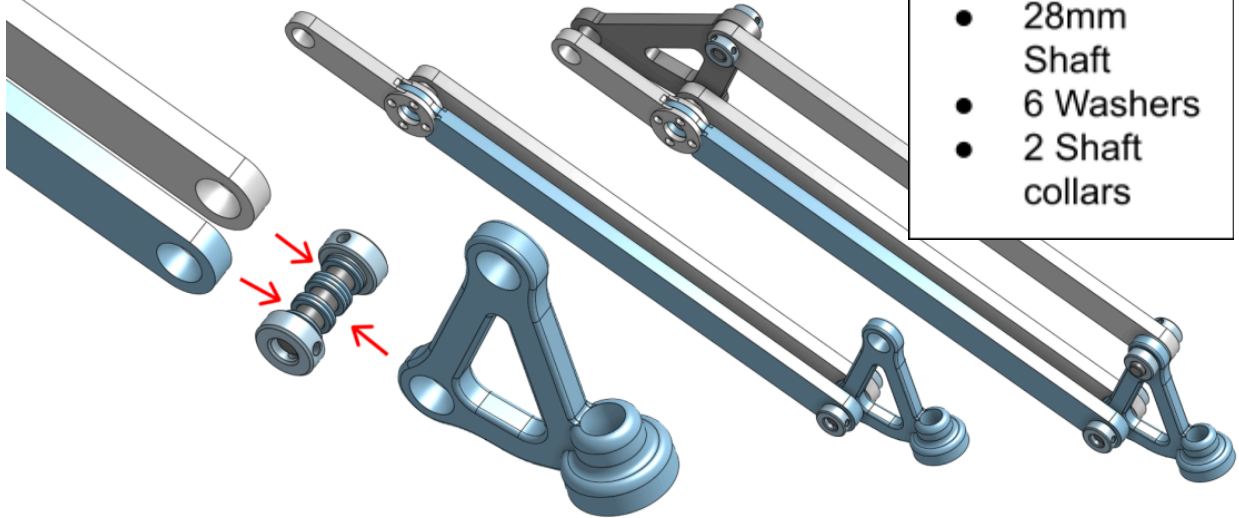
Step 3**Materials**

- 24mm Shaft
- 3 Washers
- 2 Shaft collars

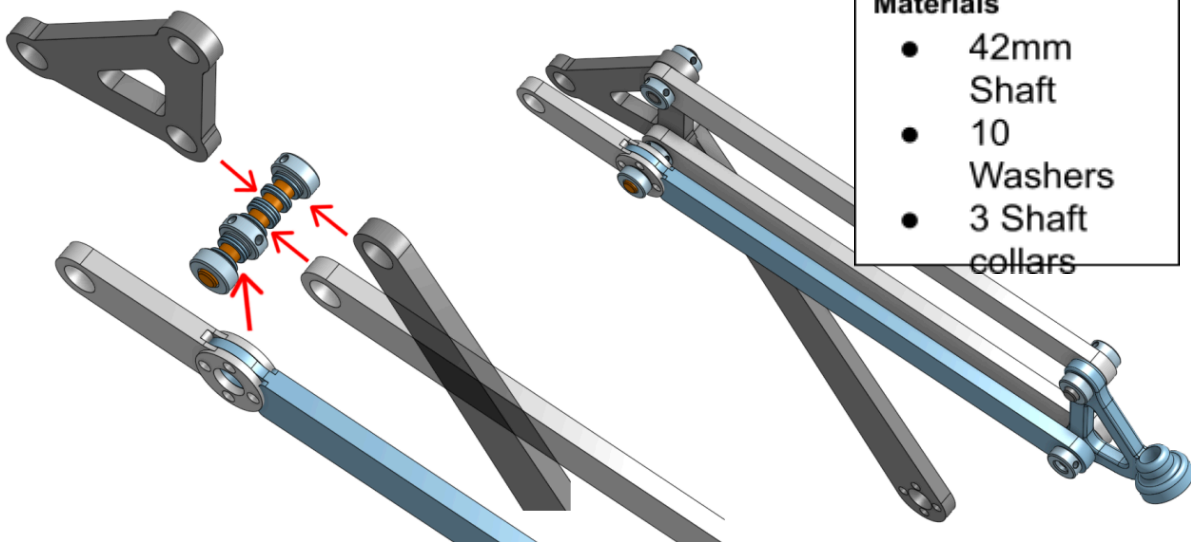
Step 4**Materials**

- 4 M2 Hex nuts
- 4 M2-8 Screws

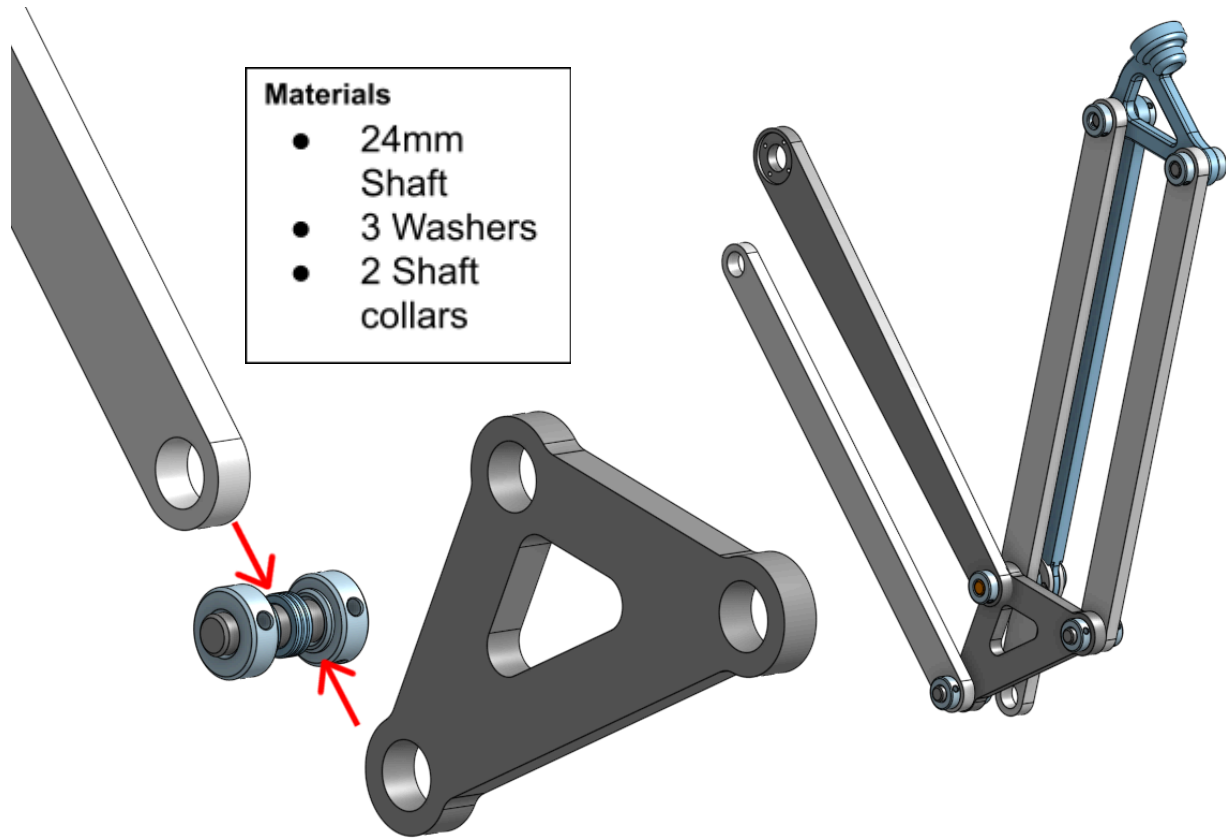


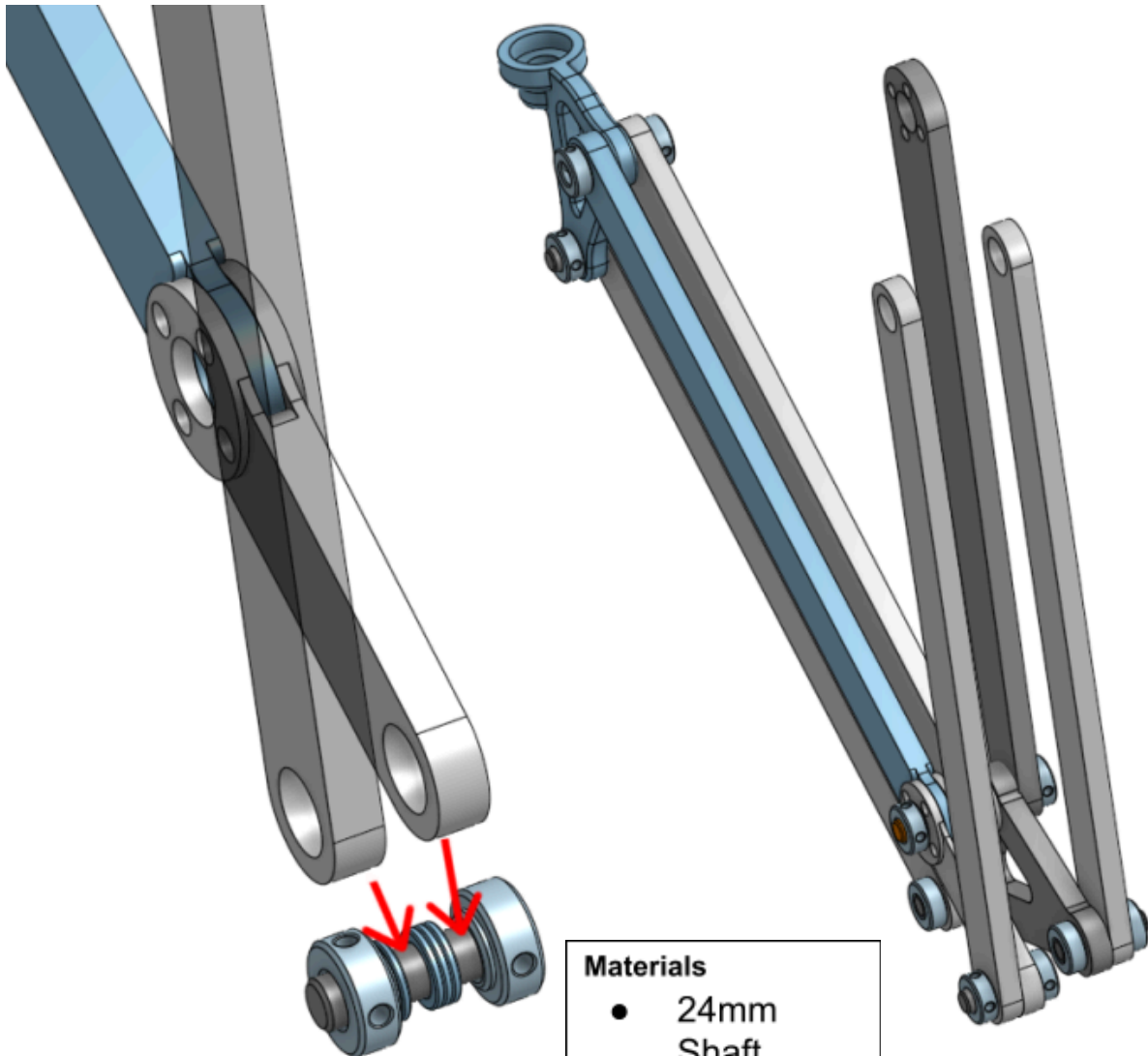
Step 5**Materials**

- 28mm Shaft
- 6 Washers
- 2 Shaft collars

Step 6**Materials**

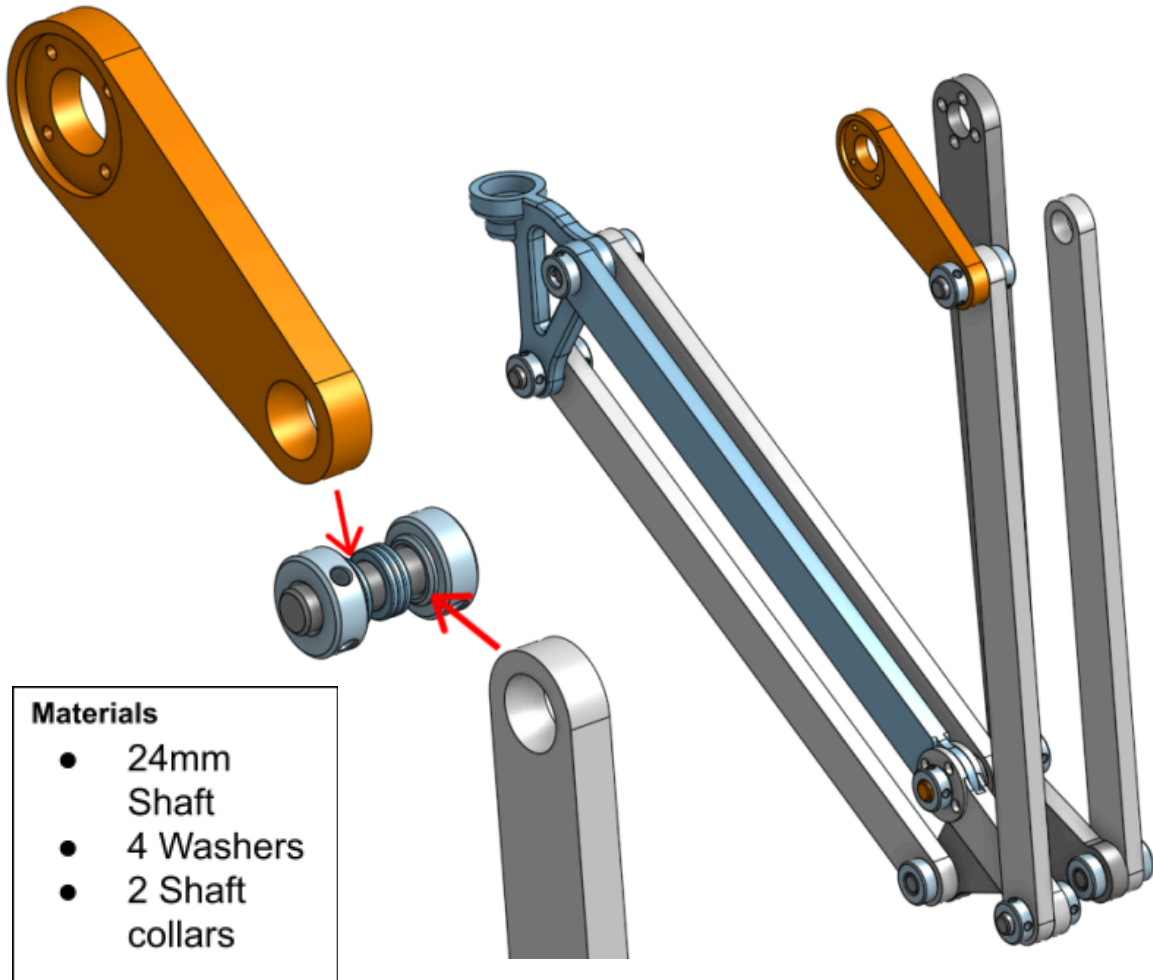
- 42mm Shaft
- 10 Washers
- 3 Shaft collars

Step 7

Step 8**Materials**

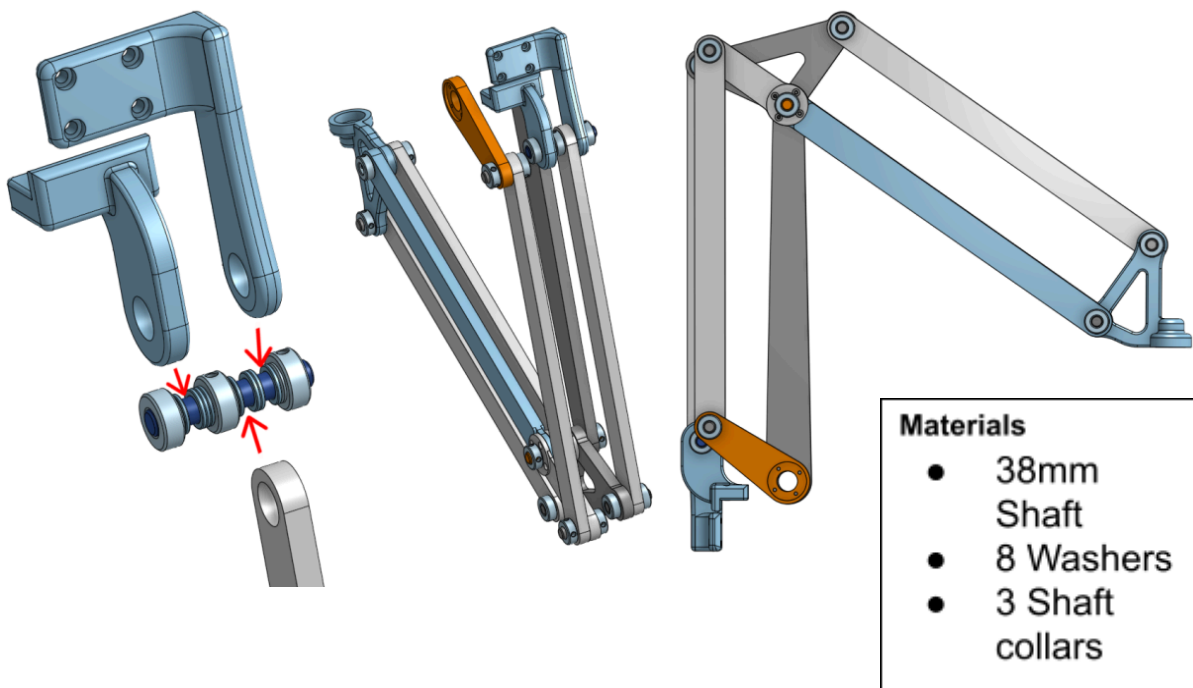
- 24mm Shaft
- 4 Washers
- 2 Shaft collars

Step 9

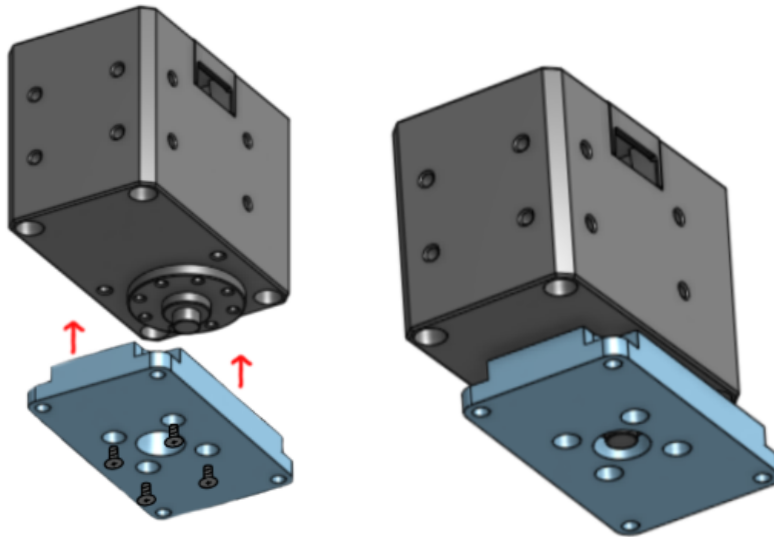
**Materials**

- 24mm Shaft
- 4 Washers
- 2 Shaft collars

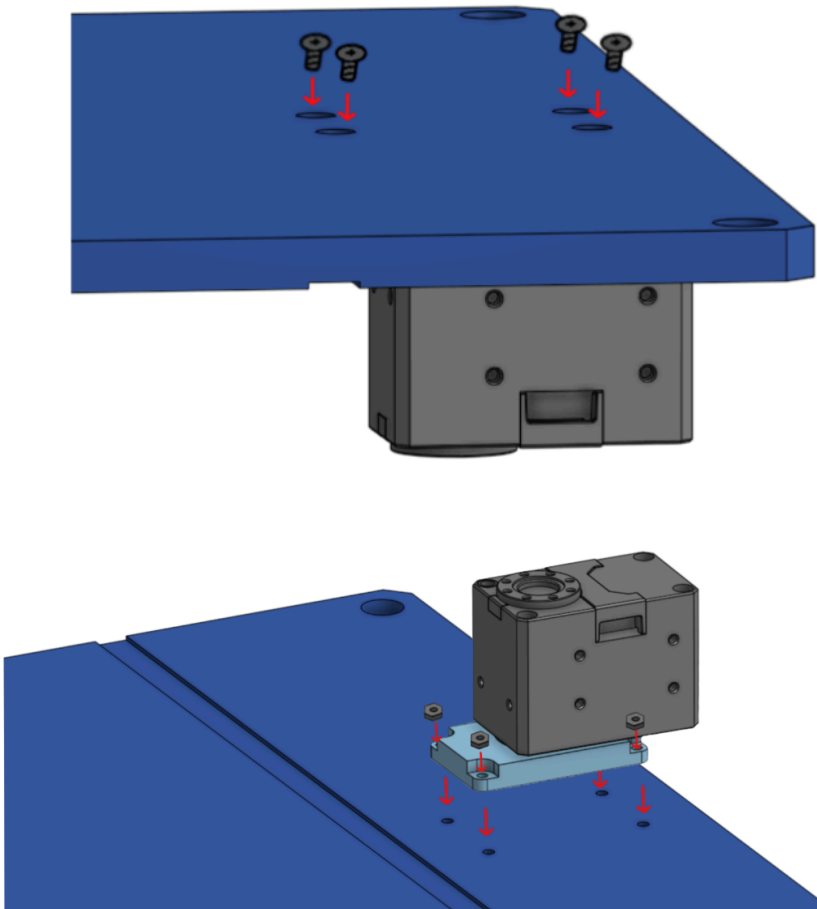
Step 10

**Materials**

- 38mm Shaft
- 8 Washers
- 3 Shaft collars

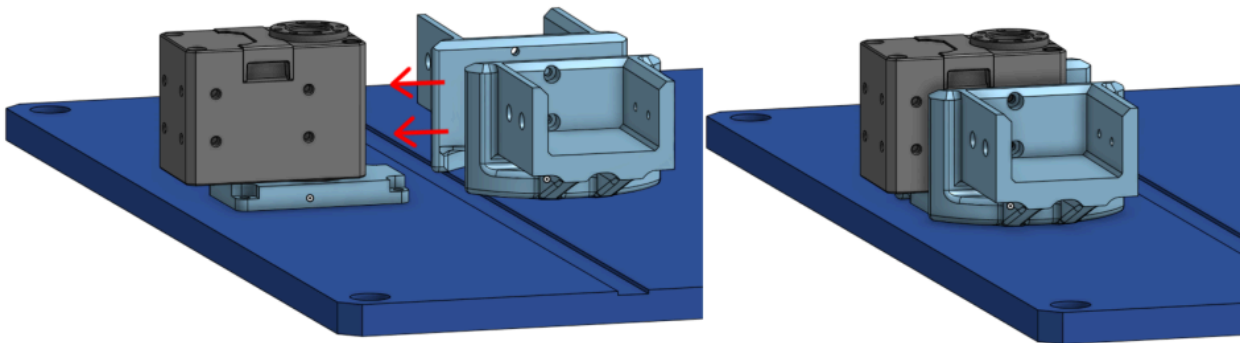
Step 11

Attach Dynamixel M
to base link using 4
M2-6 screws

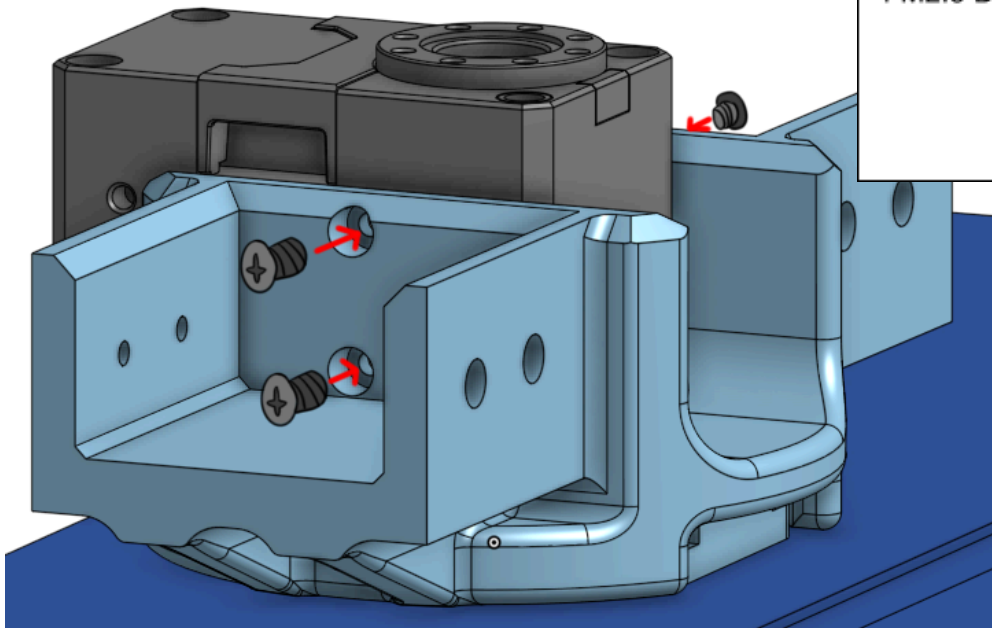
Step 12**Materials**

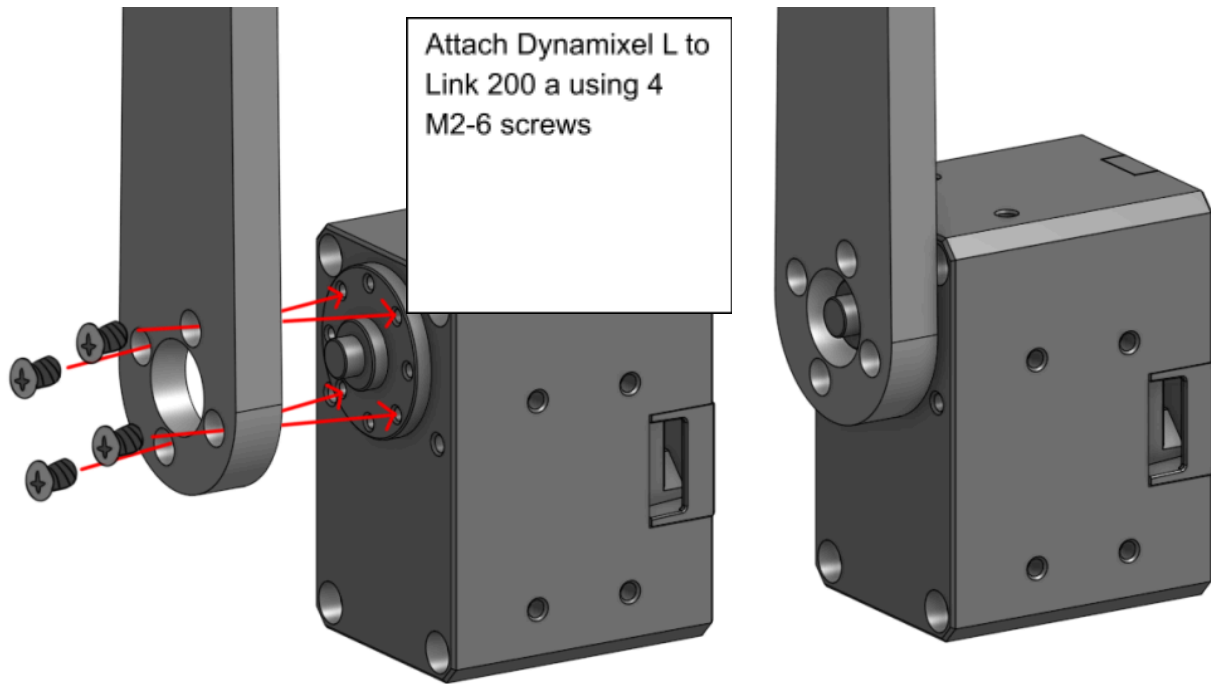
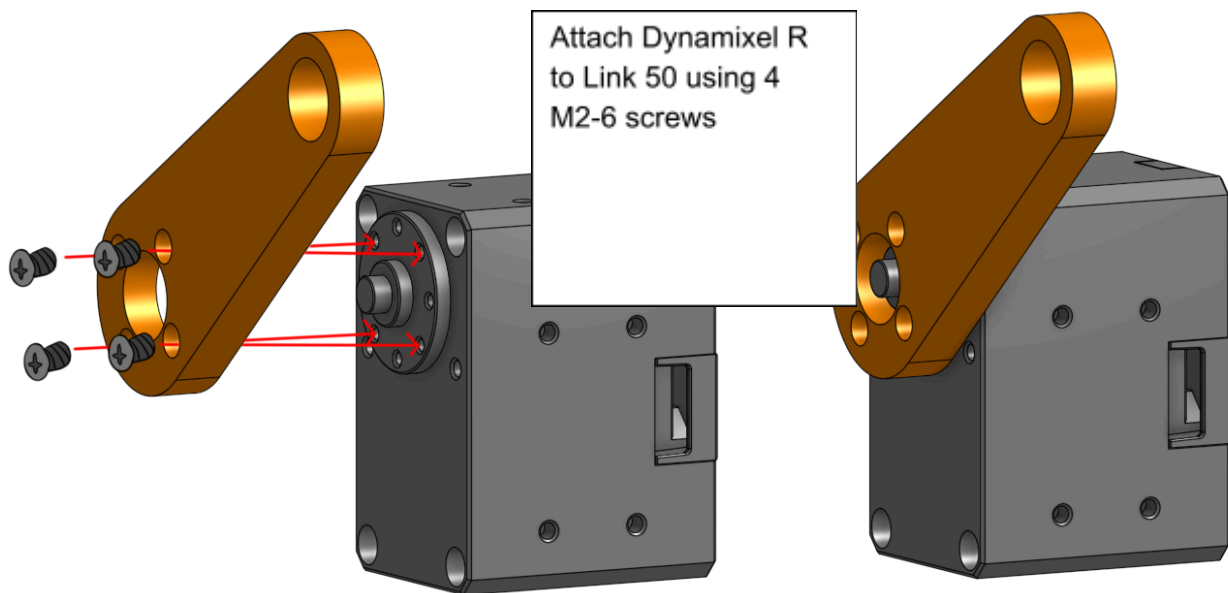
- 4 M2.5 hext nuts
- 4 M2.5-10mm screw

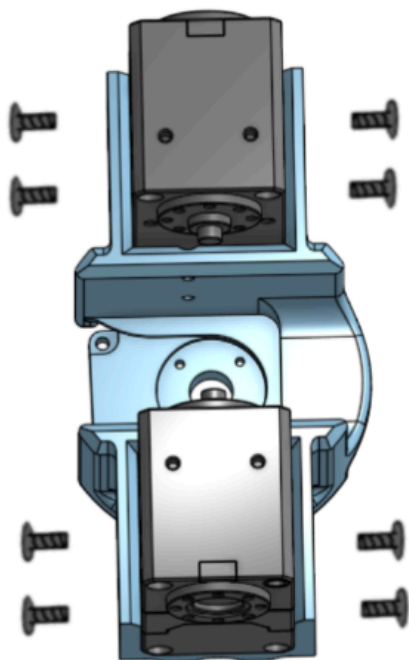
When assembling rotate Dynamixel
so it does not get in the way. While
you do want the screw to stick out,
avoid it sticking out too much to the
point where it can touch and
scrape the Dynamixel.

Step 13

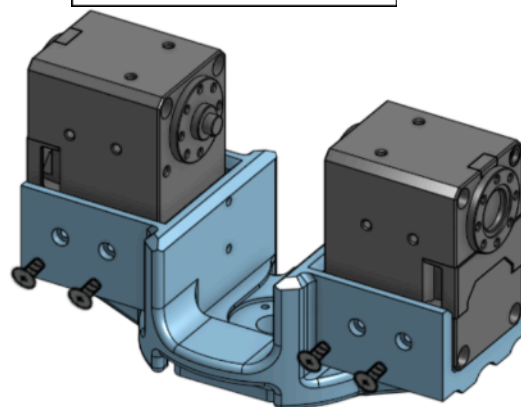
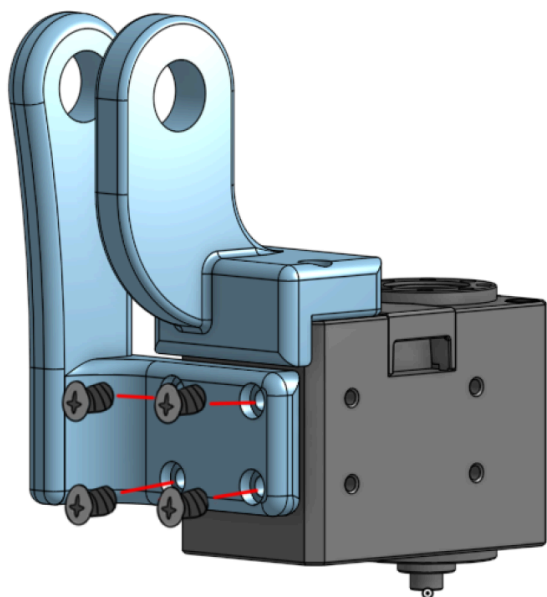
Slide in the rotational base into the Dynamixel. Secure it in place using 4 M2.5 Dynamixel screws.



Step 14**Step 15**

Step 16

Use 8 M2.5
Dynamixel screws to
attach Dynamixel L
and R to the
rotational base

**Step 17**

Use 4 M2.5 Dynamixel screws to
attach holder b to the middle
Dynamixel. Remove the 2 screws
from the top and reattach to lock
holder a in place.

