



7-DoF Double Shoulder Arm Kit

Assembly Instructions

General Warnings and Cautions

Danger (May cause serious injury or death)

- Keep water, flammables, solvents and other liquids clear from actuator.
- Never place fingers, arms, toes and other body parts near actuator during operation.
- Cut power if actuator emits strange odors or smoke.
- Keep actuator out of reach of children.

Warning (May cause injury or damage to actuator)

- Before operating, read all applicable instructions and notices found here:
<http://docs.hebi.us/#quickstart-guide-x-series-actuator>
- Comply with the operating temperature (-10°C to 50°C)
- Turn off power source before connecting or disconnecting actuator power.
- Do not expose the actuator to permanent and strong magnetic fields.
- The actuator must not be exposed to dusty or wet environments.
- If actuator is under load, abruptly removing the power connection can cause permanent damage.
- Do not force screws into the bottom of the actuator.
 - **X5**: 5mm tap depth
 - **X8**: 7mm tap depth
- Use provided hardware with accessories and hand tighten as needed.
- Do not attempt to disassemble actuator, this will void the warranty and can cause permanent damage.

For more information please visit: ***docs.hebi.us***

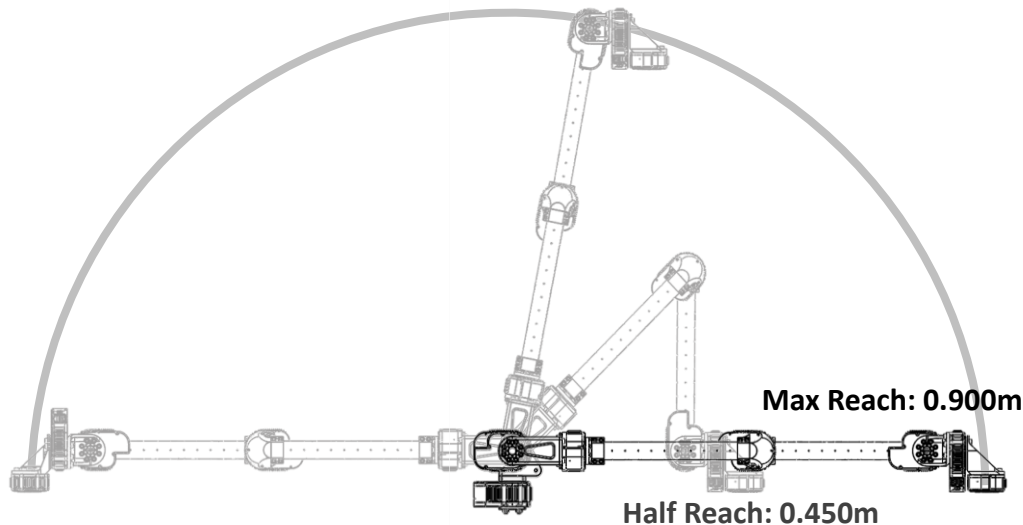
Technical Specifications

<u>Movement</u>	<u>Working Range</u>	<u>Speed</u>
Axis 1 – Base [Default: X8-16]	Continuous (limited by wiring)	15 RPM
Axis 2 – Shoulder Pitch [Default: 2 x X8-16]	-90° to +90° (avoid end effector collisions)	15 RPM
Axis 3 – Shoulder Twist [Default: X8-16]	Continuous (limited by wiring)	15 RPM
Axis 4 – Elbow [Default: X8-16]	-155° to +155° (avoid end effector collisions)	15 RPM
Axis 5 – Wrist 1 [Default: X5-4]	Continuous (limited by wiring)	32 RPM
Axis 6 – Wrist 2 [Default: X5-4]	Continuous (limited by wiring)	32 RPM
Axis 7 – Wrist 3 [Default: X5-4]	Continuous (limited by wiring)	32 RPM

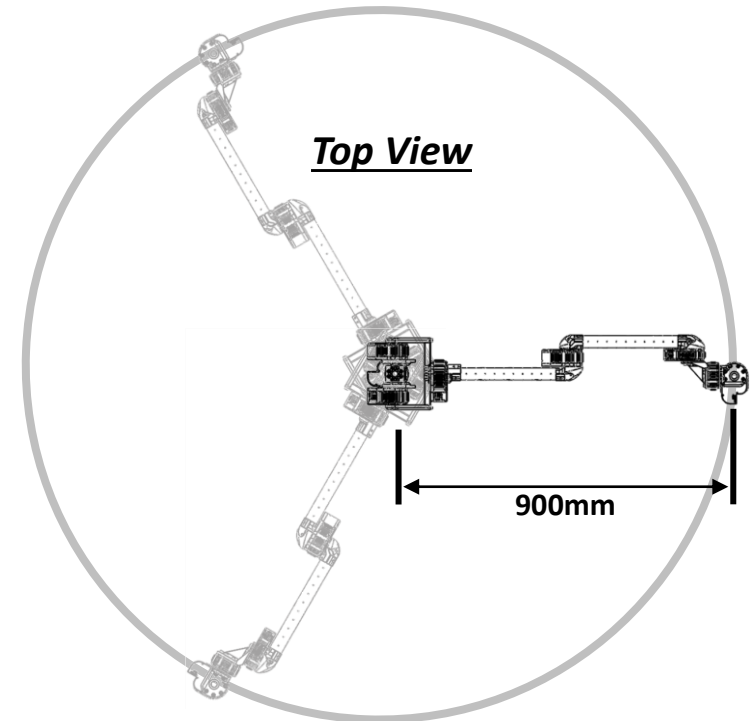
<u>Specifications</u>	<u>Value</u>
Weight	9 kg
Max Reach	900 mm
Payload @ Max Reach	1.5 kg
Half Reach	450 mm
Payload @ Half Reach	3 kg

Using a different configuration of X-Series Actuators will provide different payload capacities.

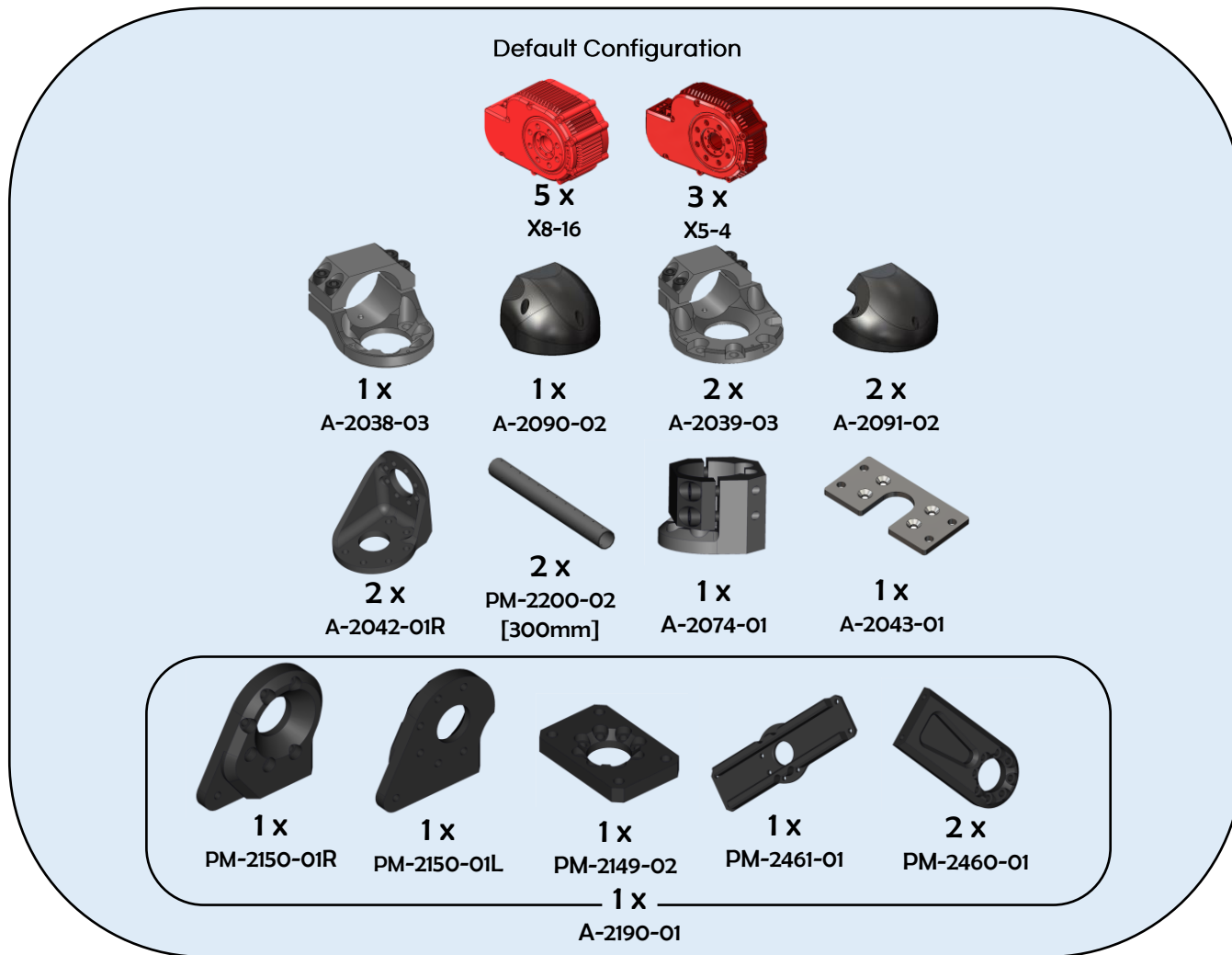
Side View



Top View



Bill of Materials - Mechanical*



fasteners included, not shown

Bill of Materials - Electrical



4 x
A-2128-01
Power Distribution Board



1 x
A-2048-02
Power Jumper



4 x
A-2046-12
Power Cable, 12" Length



4 x
A-2046-18
Power Cable, 18" Length



4 x
A-2046-24
Power Cable, 24" Length


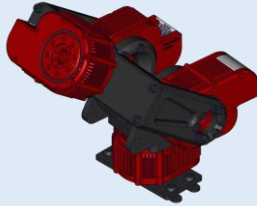
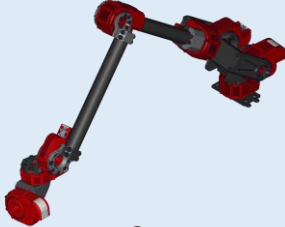
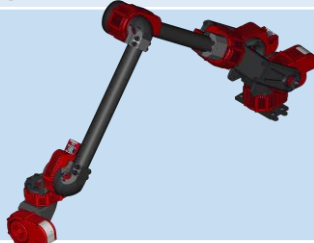


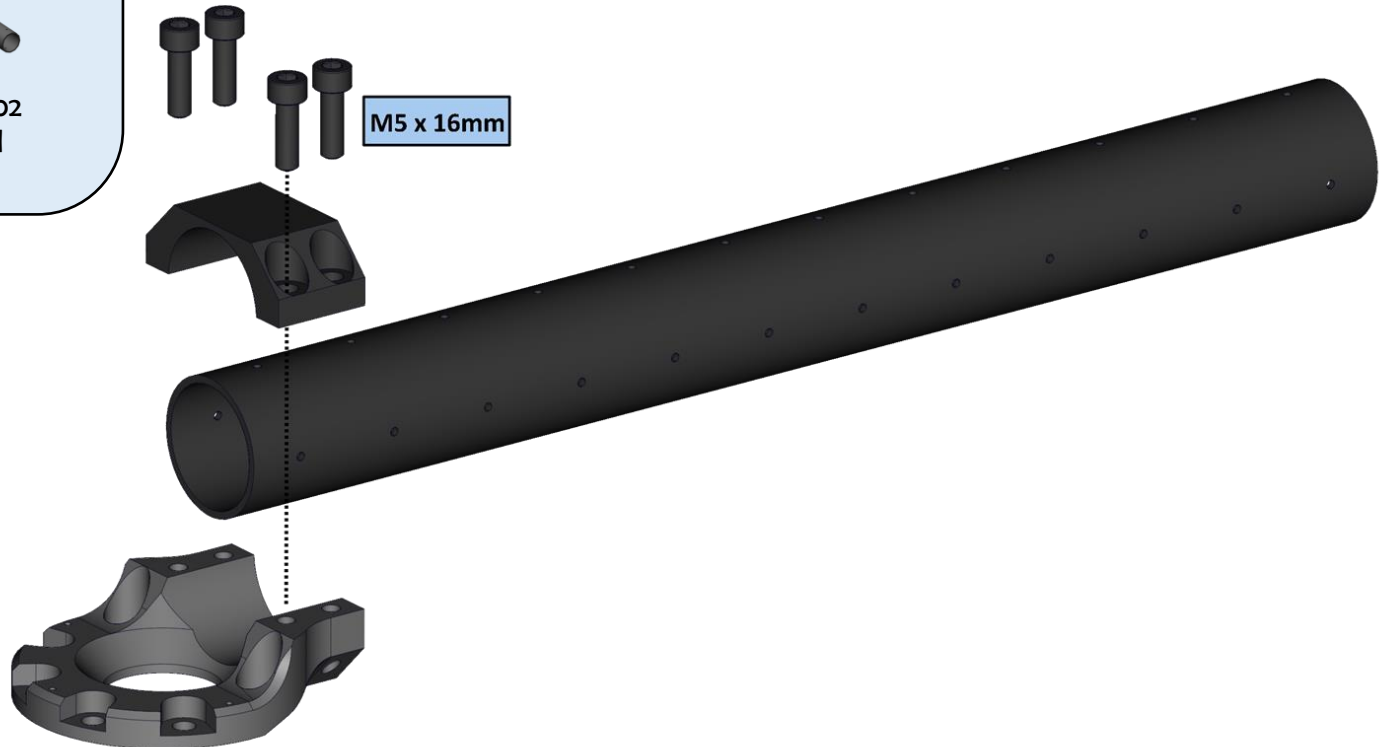
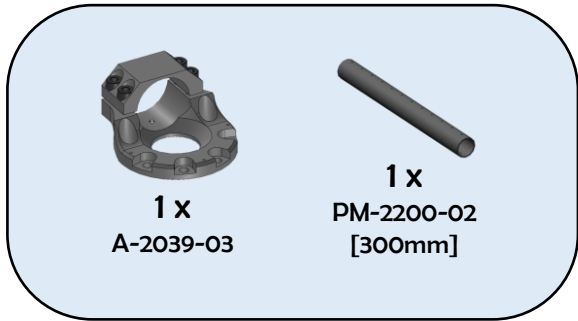
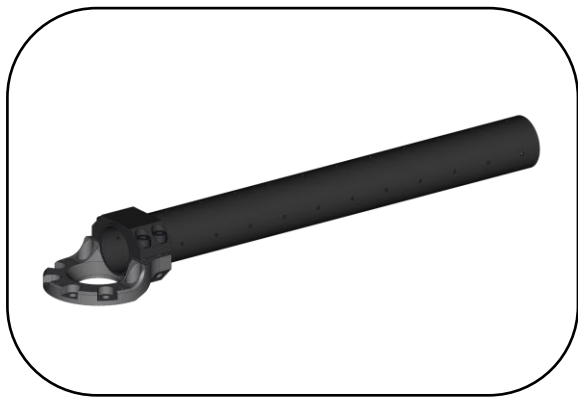
5 x
PP-2059-01
Ethernet Cable, 12" Length

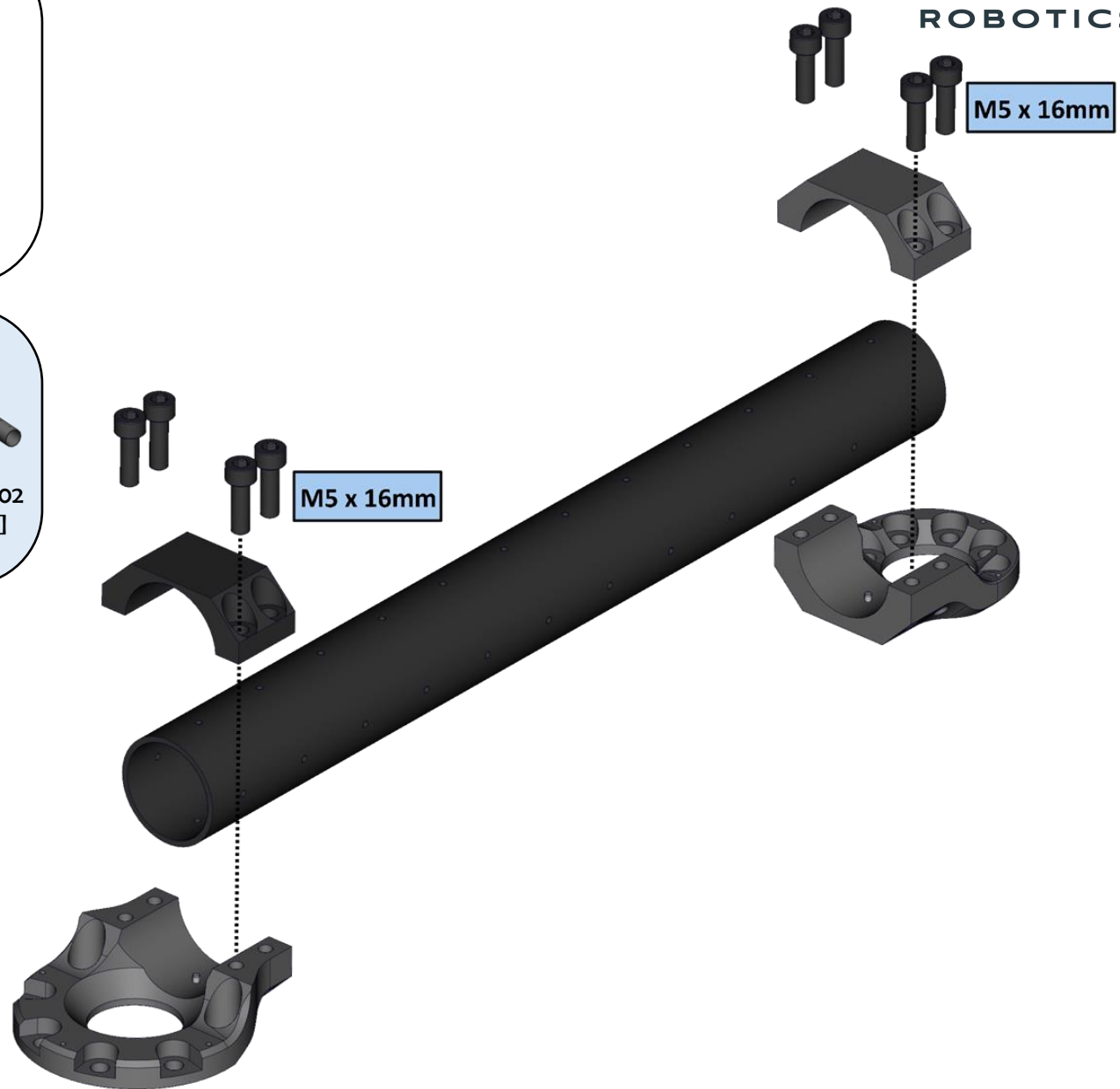
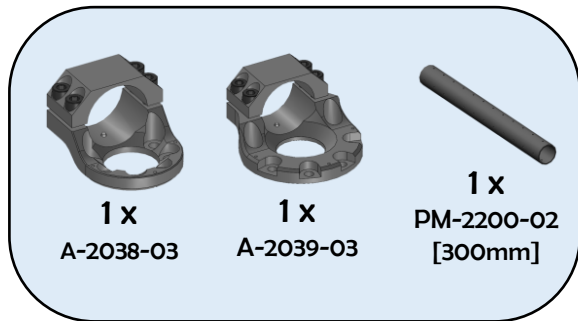


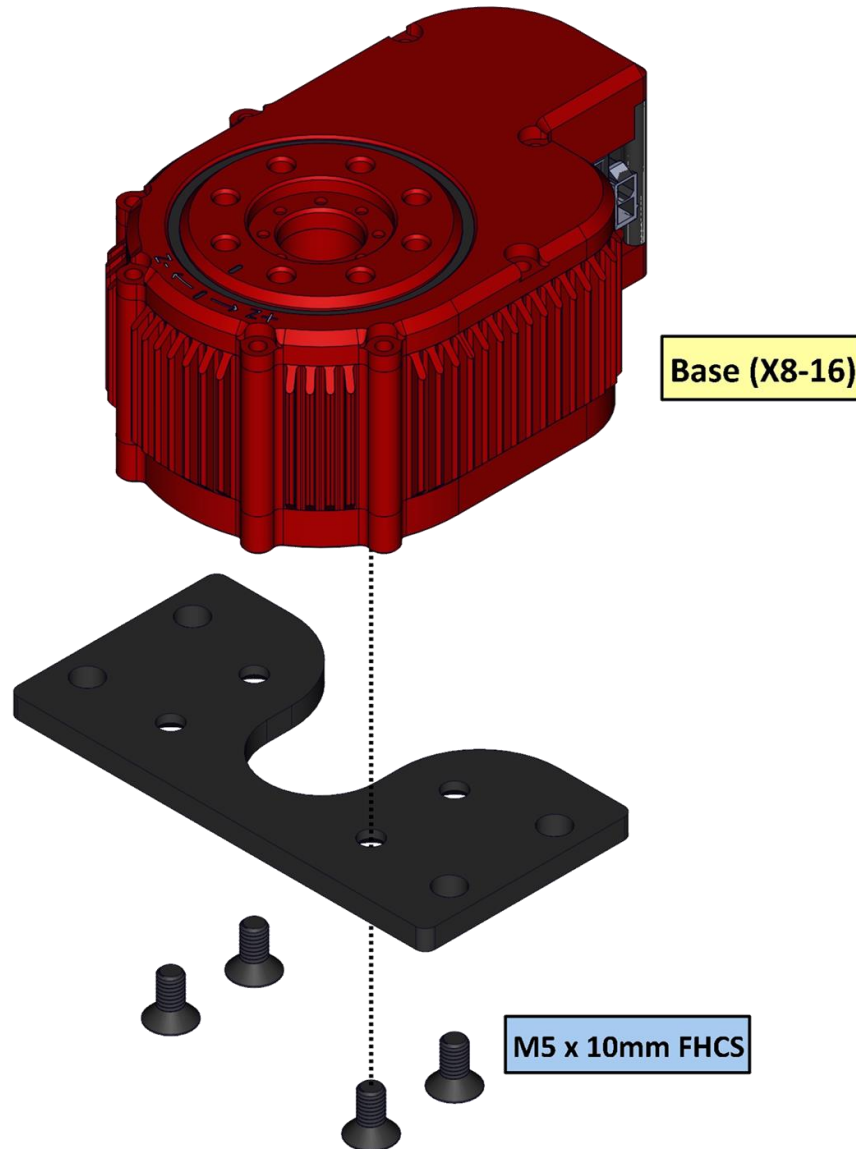
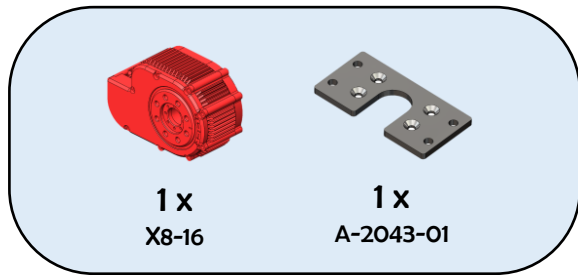
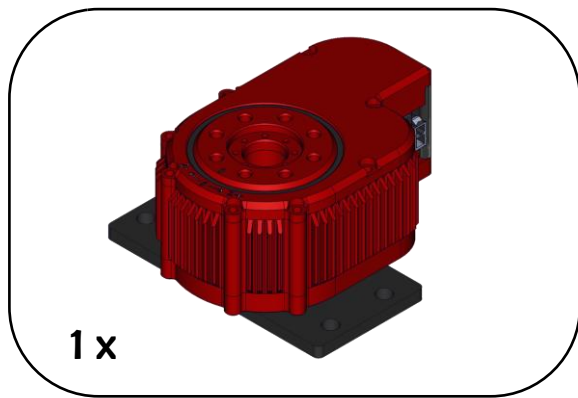
3 x
PP-2061-01
Ethernet Cable, 36" Length

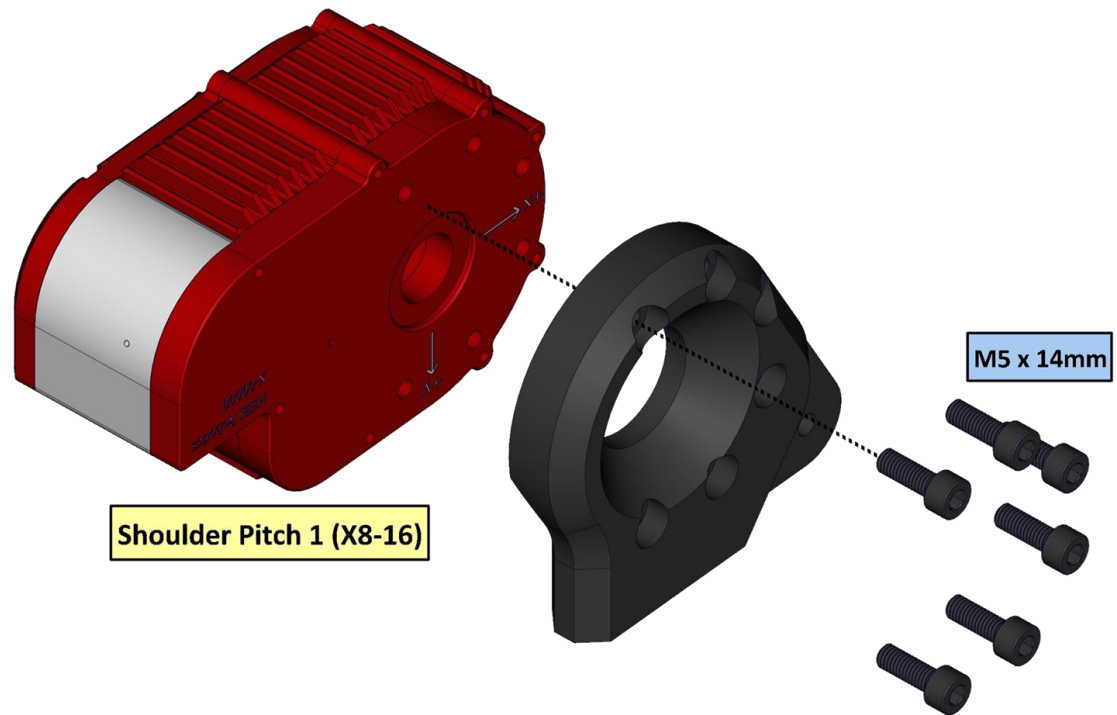
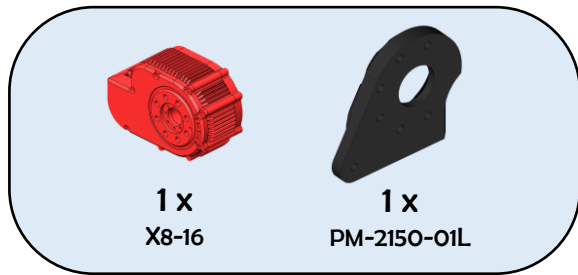
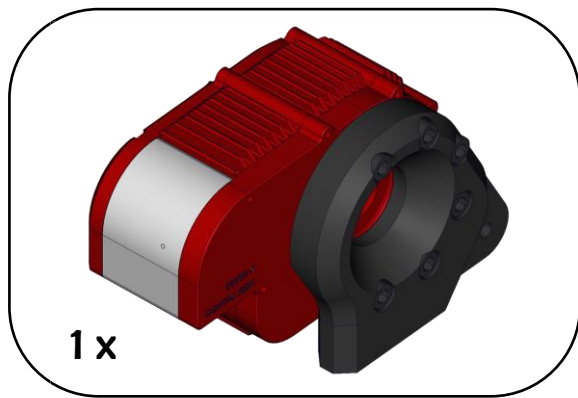
Table of Contents

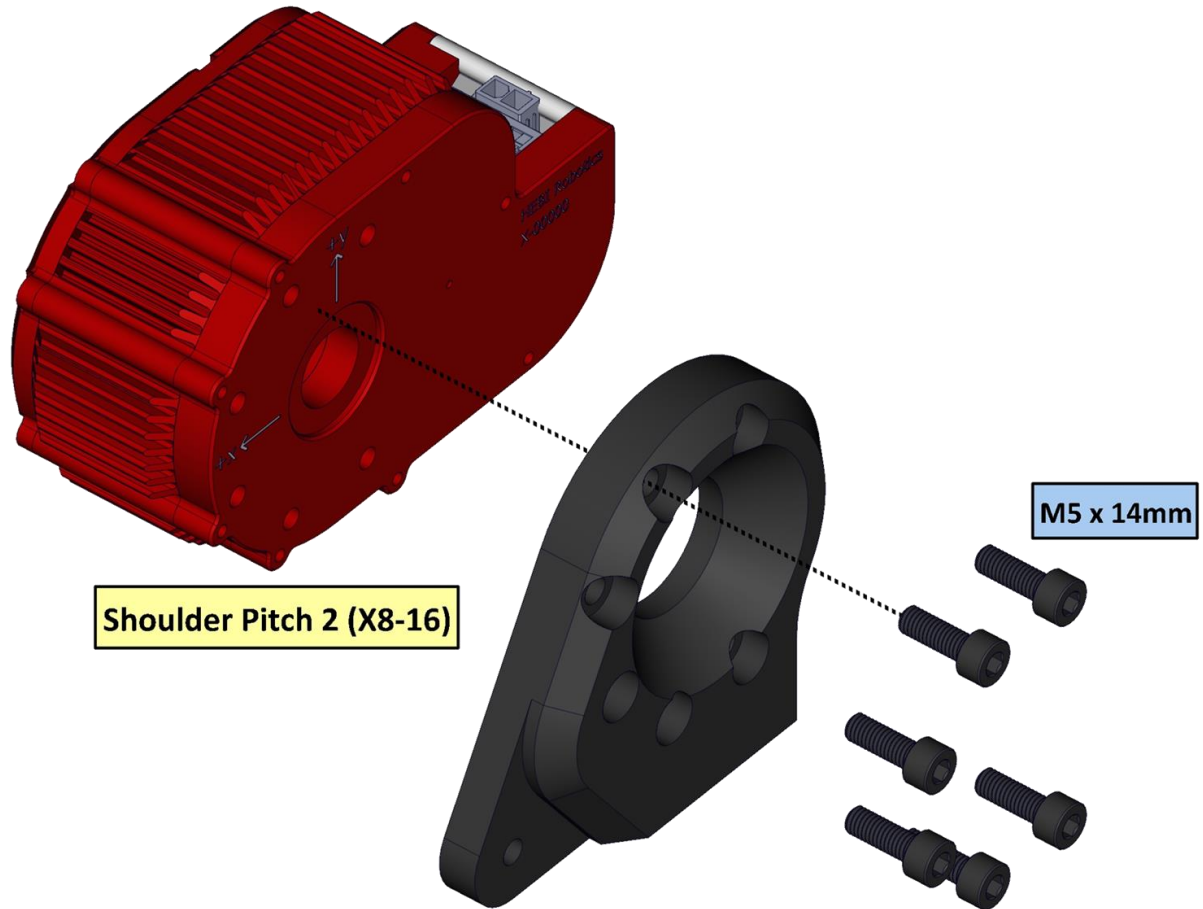
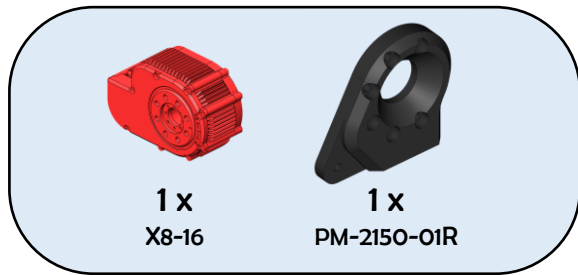
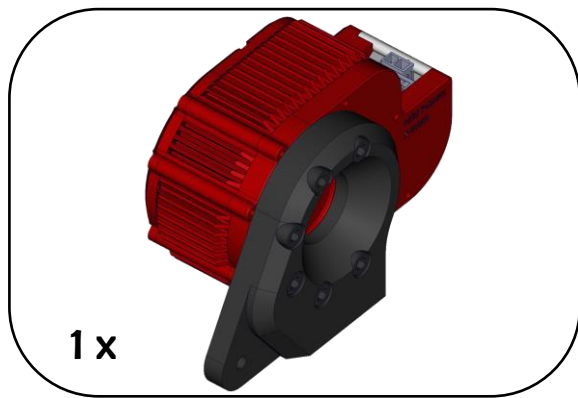
<u>Assembly</u>	<u>Image</u>	<u>Pages</u>
Tubes		[7-8]
Base		[9-16]
Arm		[17-26]
Final		[27-29]

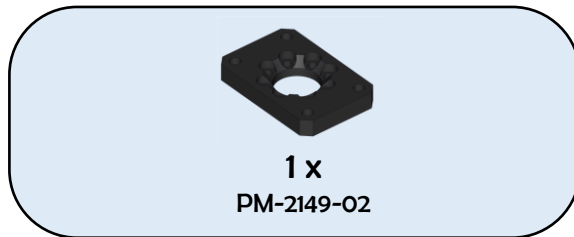
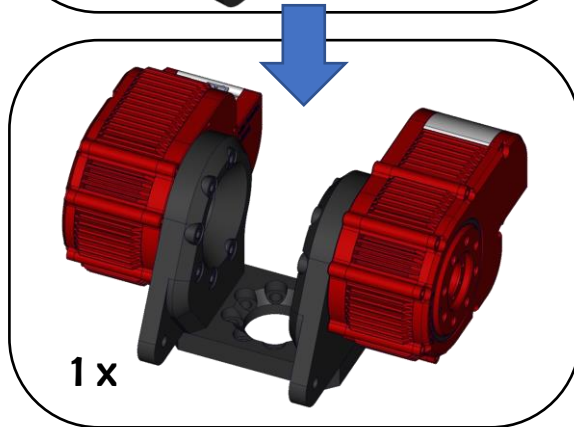
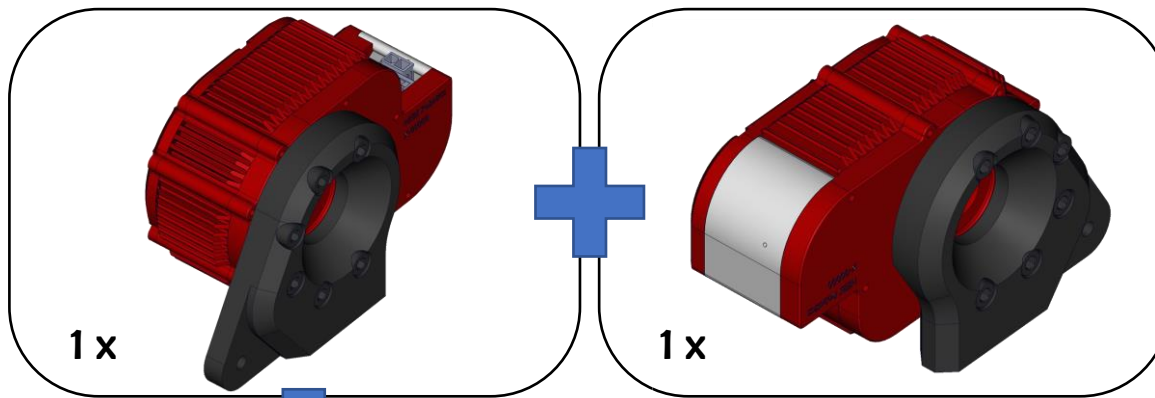




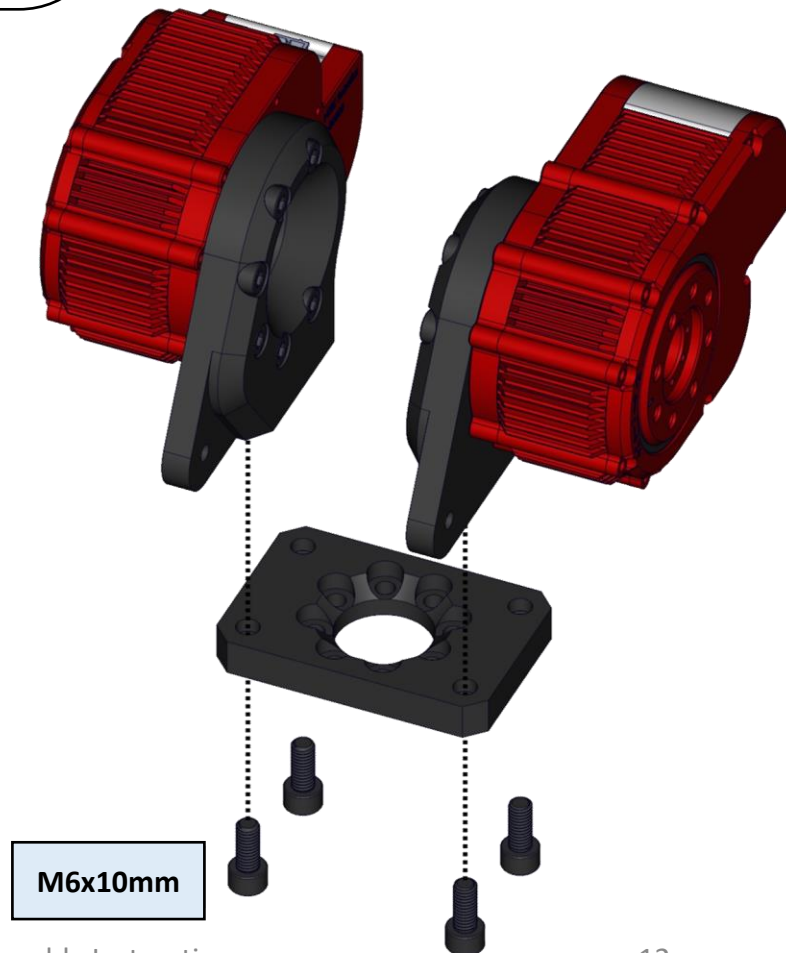


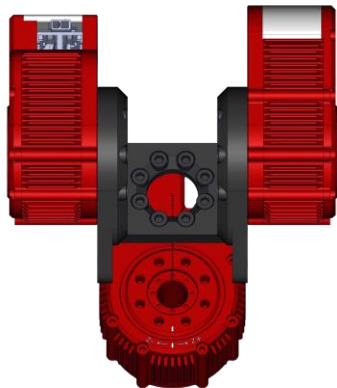
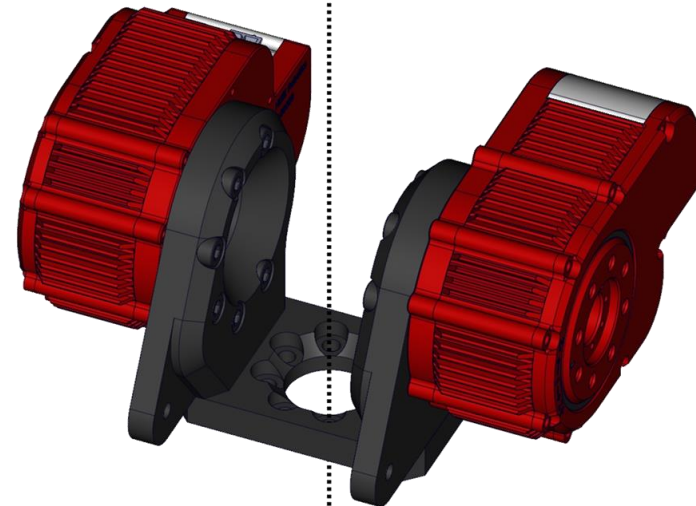
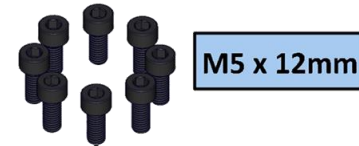
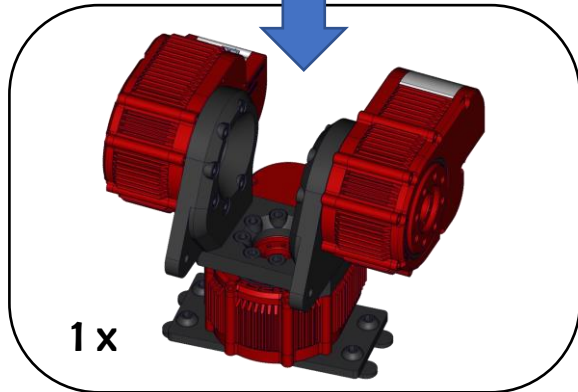
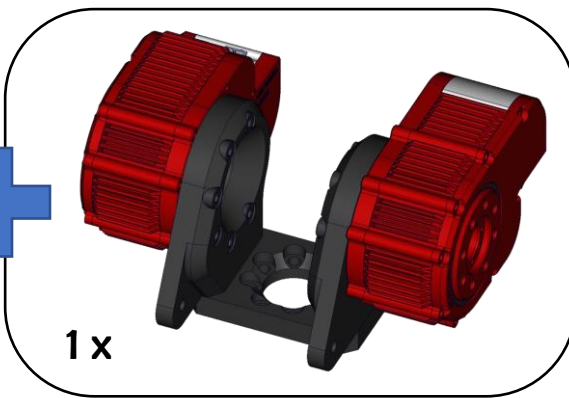
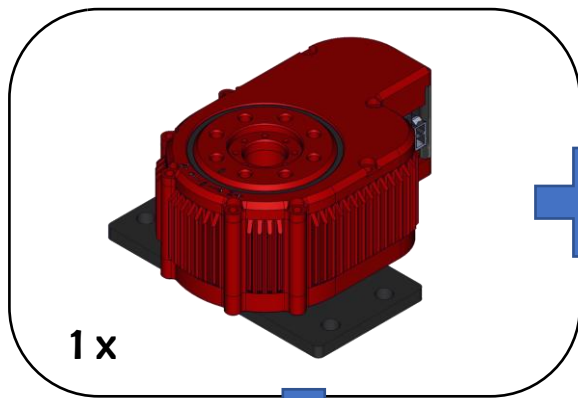






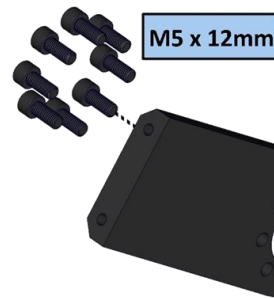
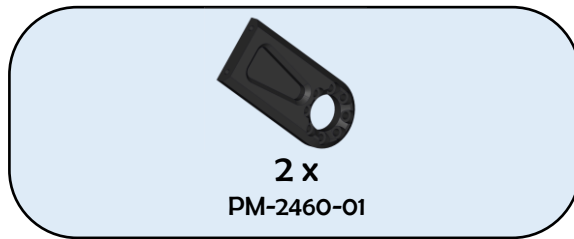
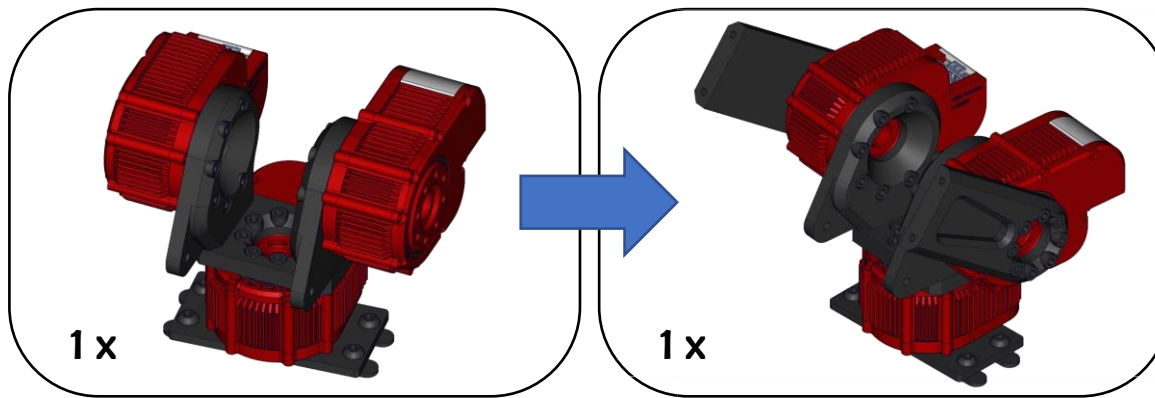
Module output faces towards outside





Align with actuator
output hub tick mark

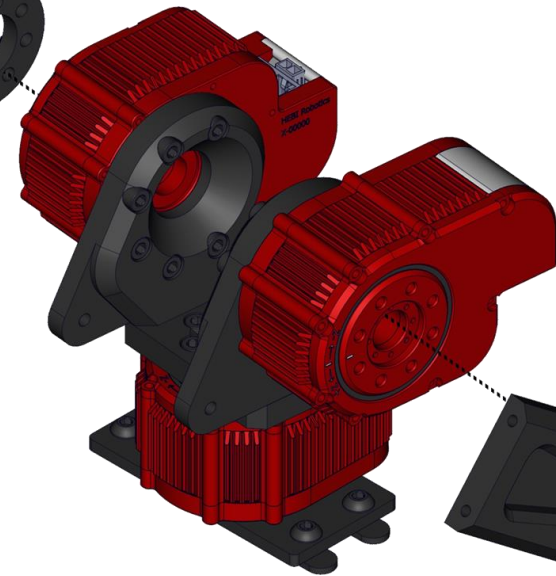
(face parallel with tick mark and spring
mounting hole pointed on same side)



Align with actuator
output hub tick mark

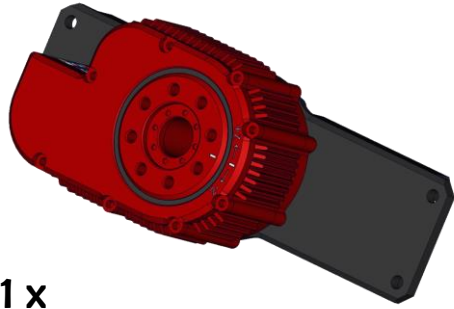
(flat surface with two tapped holes face towards +x*)

*Axis direction specified on the bottom of the module

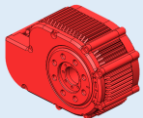


M5 x 12mm

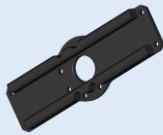




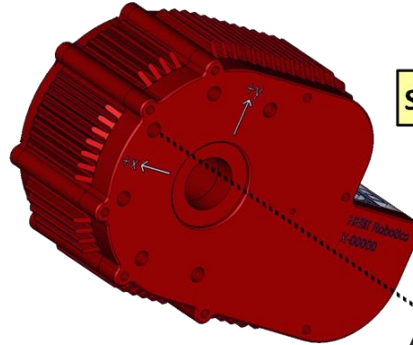
1 x



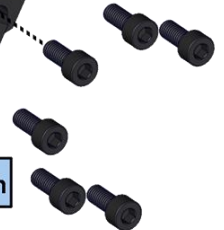
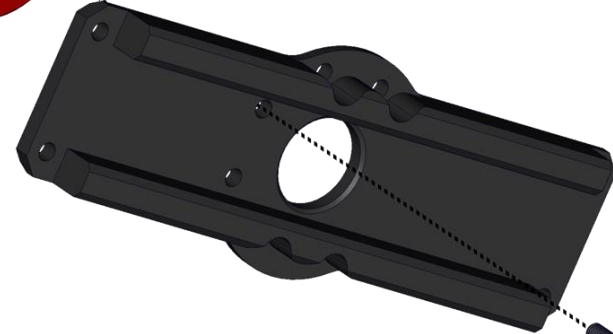
1 x
X8-16



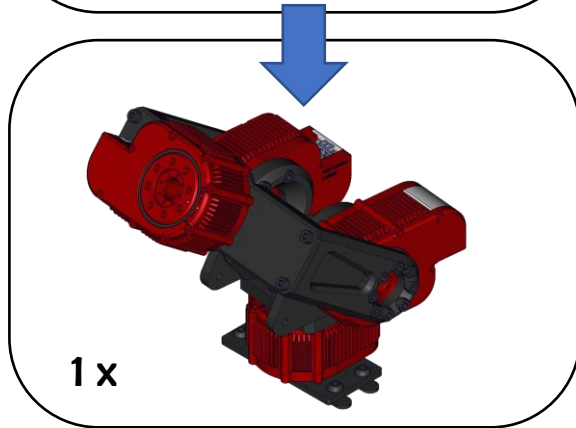
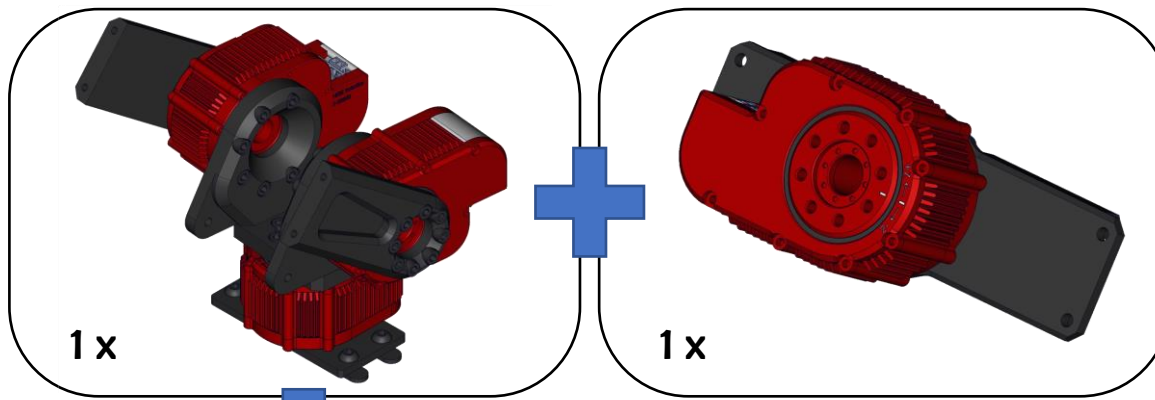
1 x
PM-2461-01



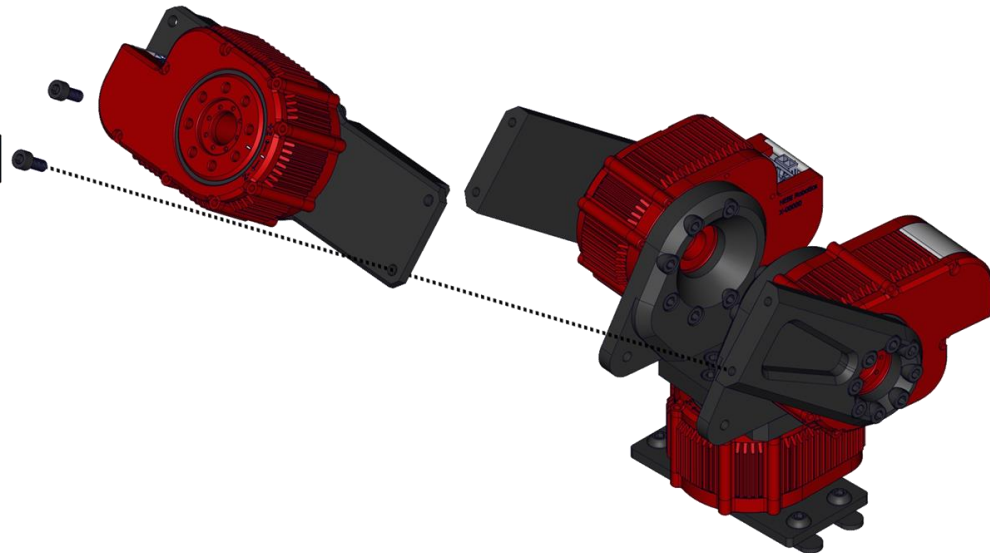
Shoulder Twist (X8-16)

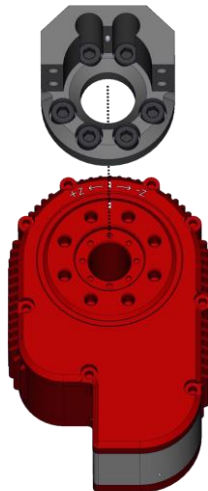
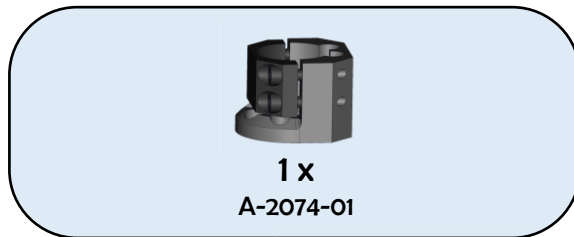
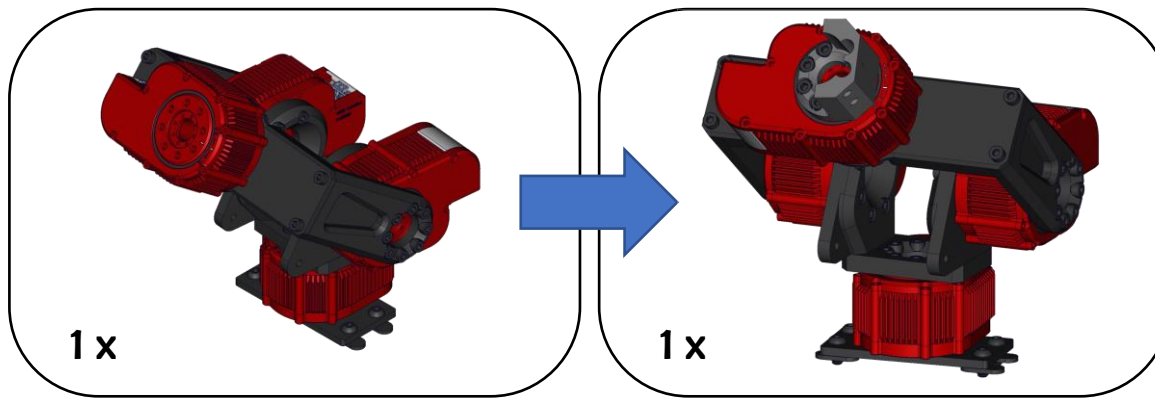


M5 x 10mm



M5 x 12mm

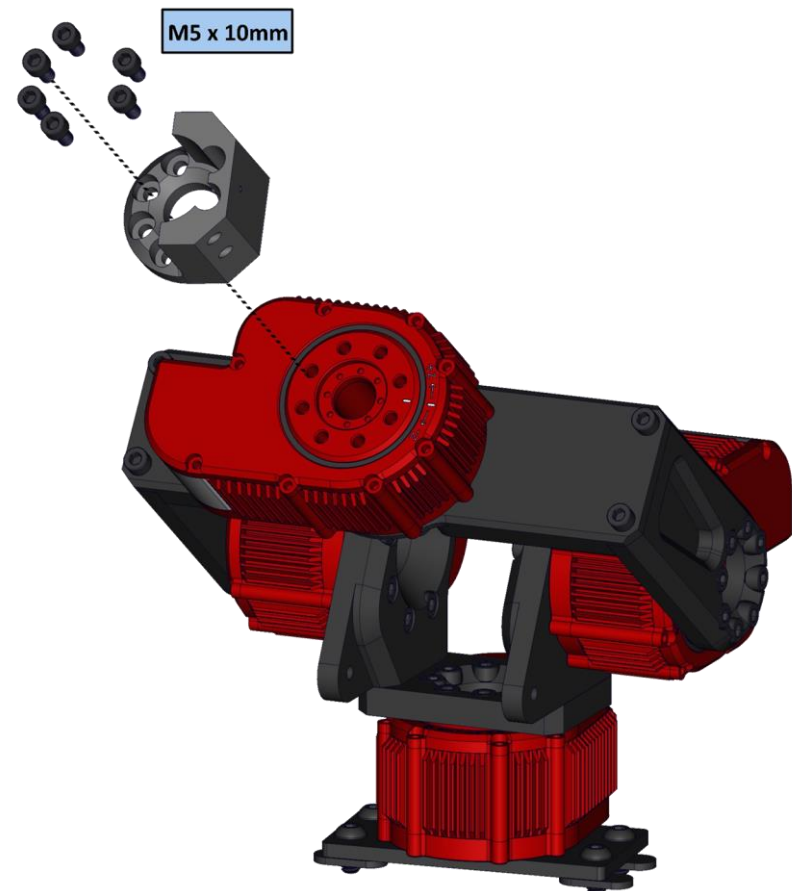


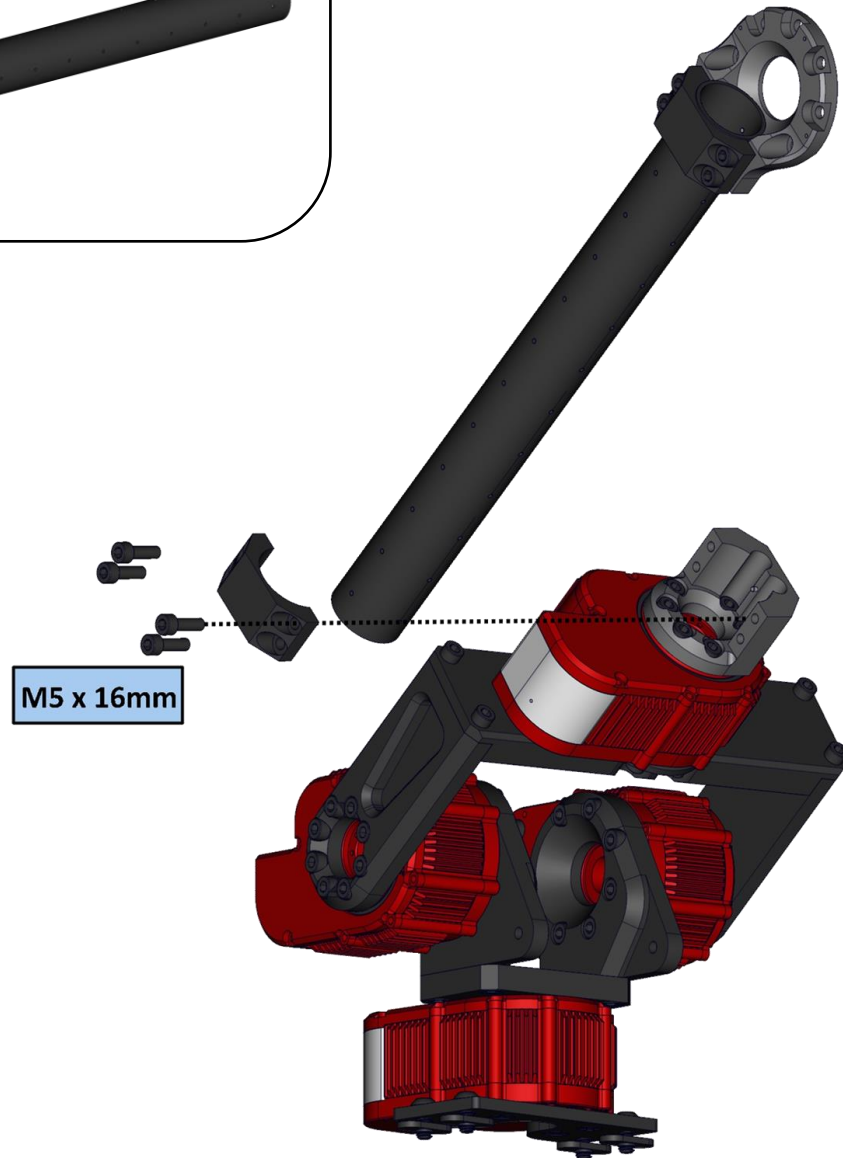
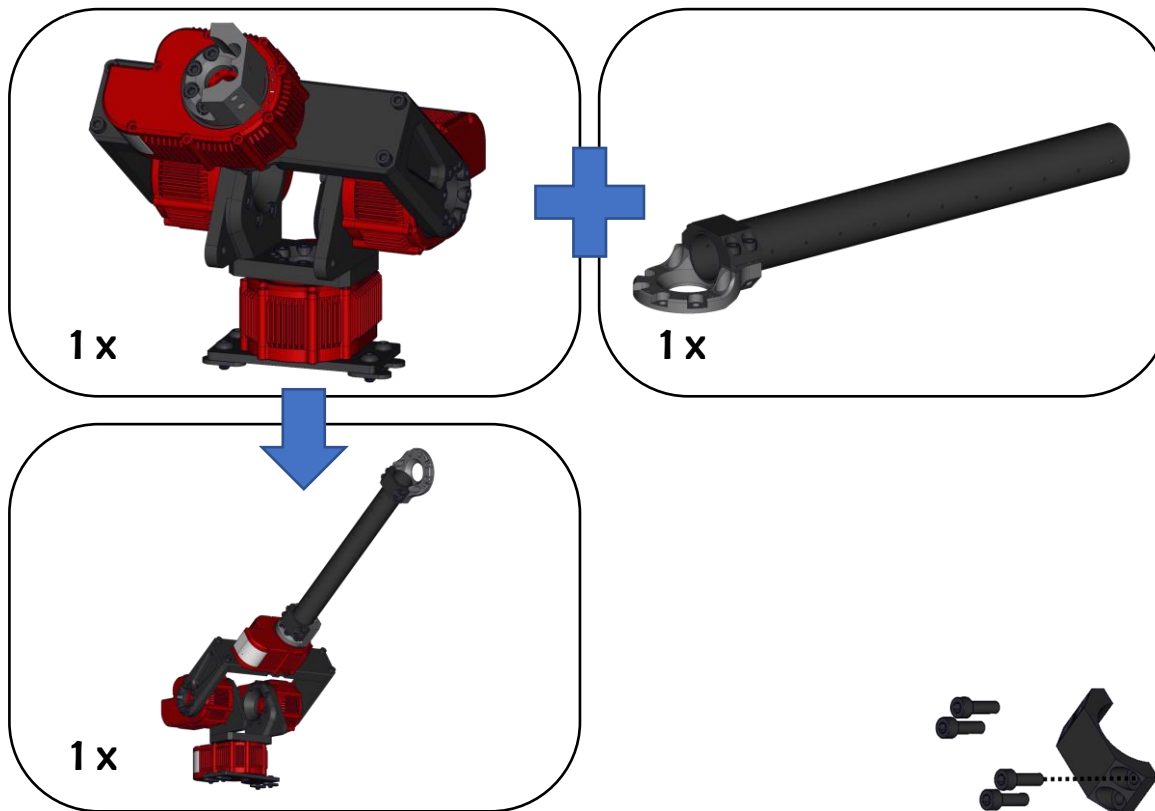


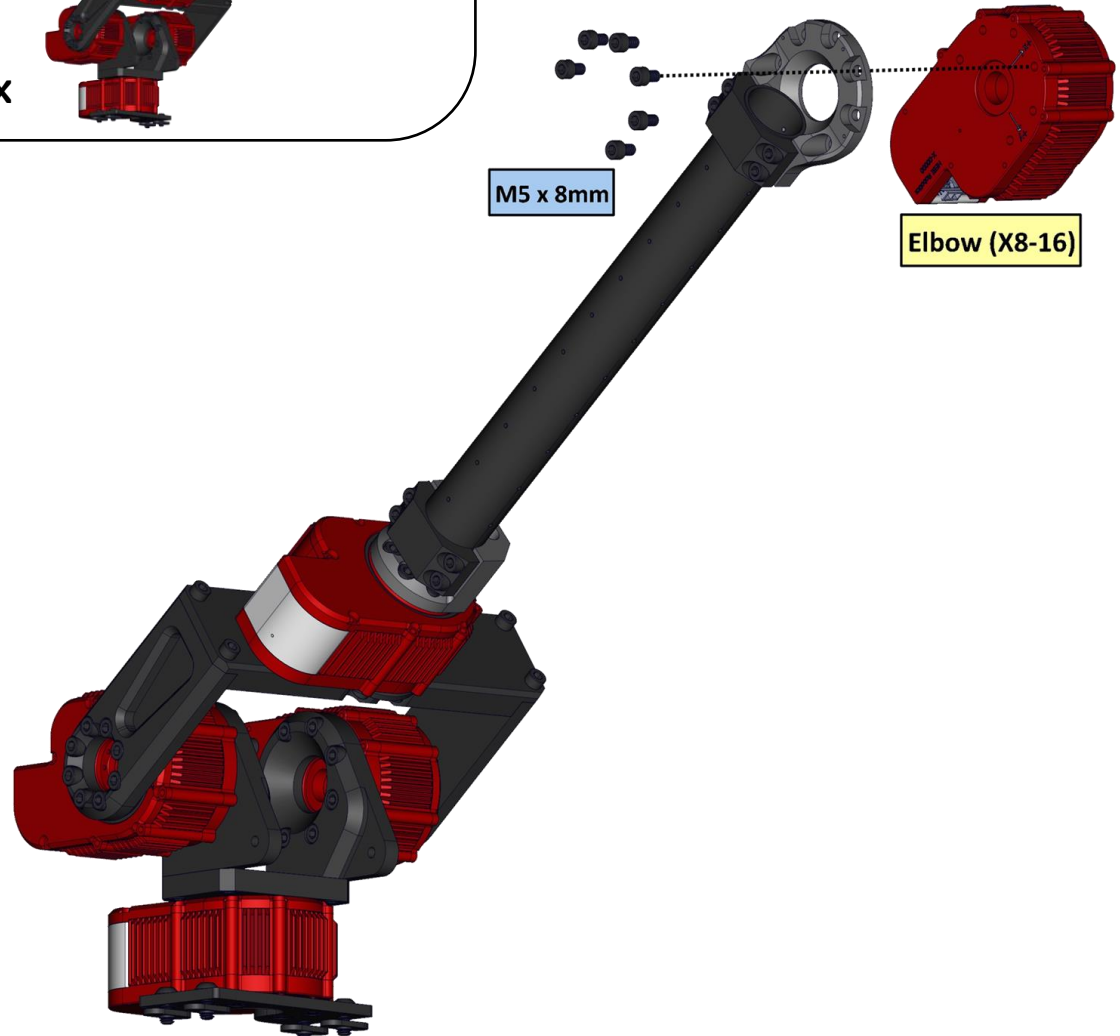
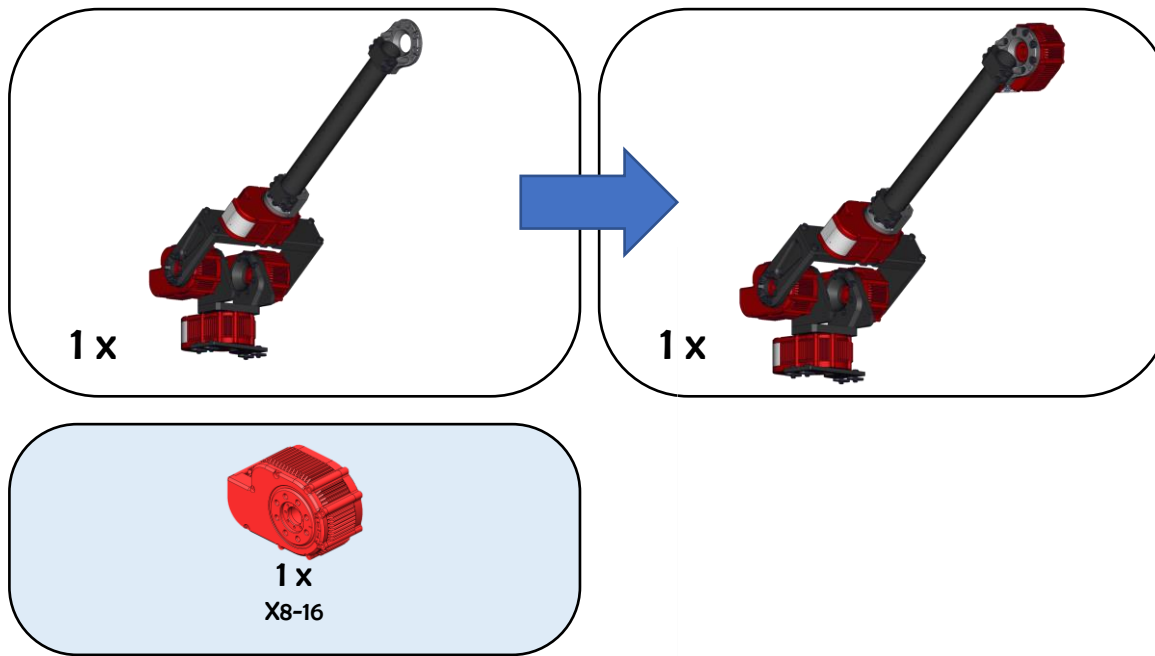
**Align with actuator
output hub tick mark**

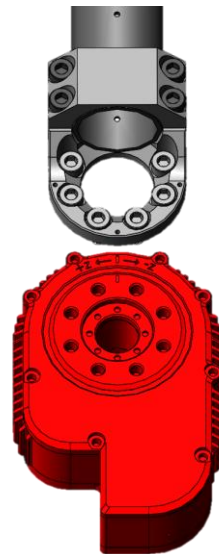
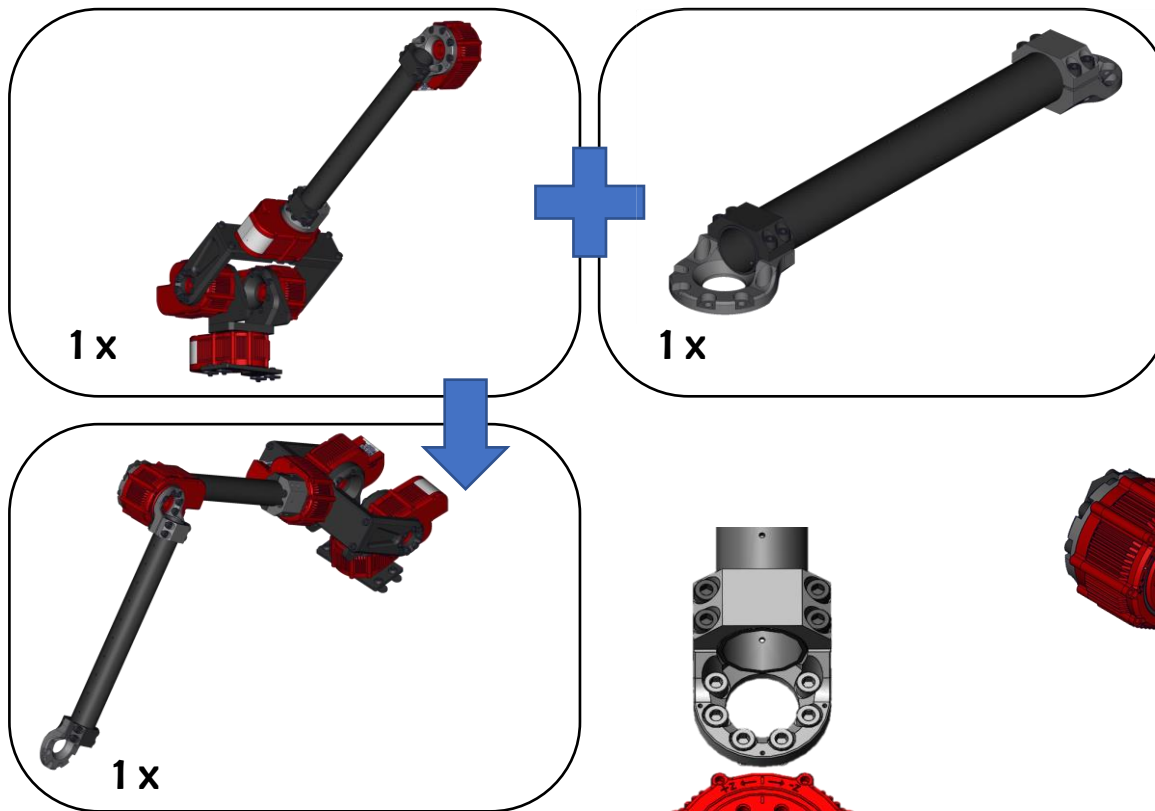
(symmetric about tick mark with flat surface facing towards +x*)

*Axis direction specified on the bottom of the module



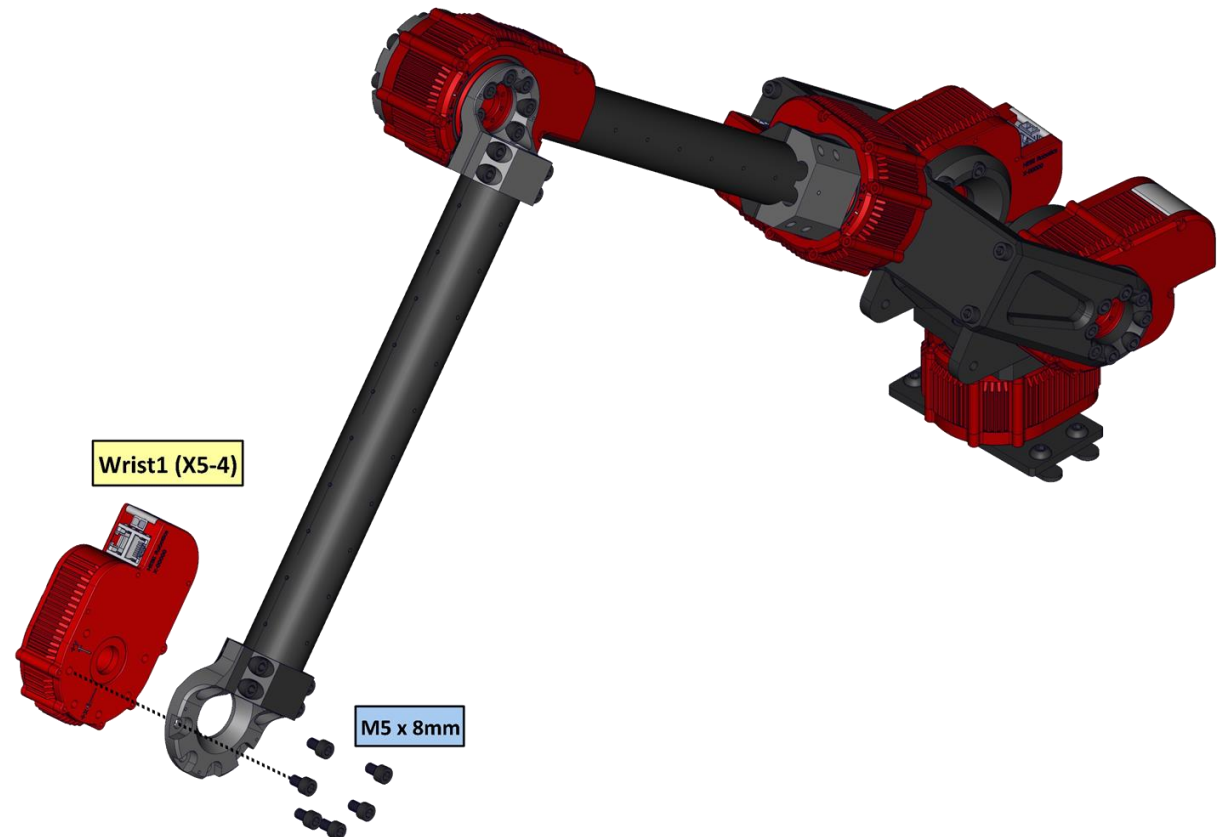
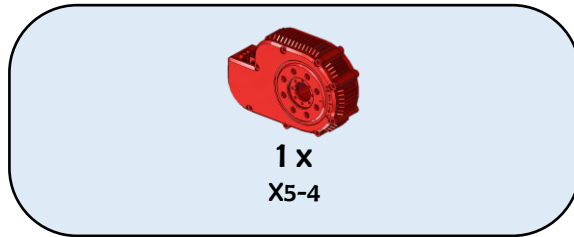
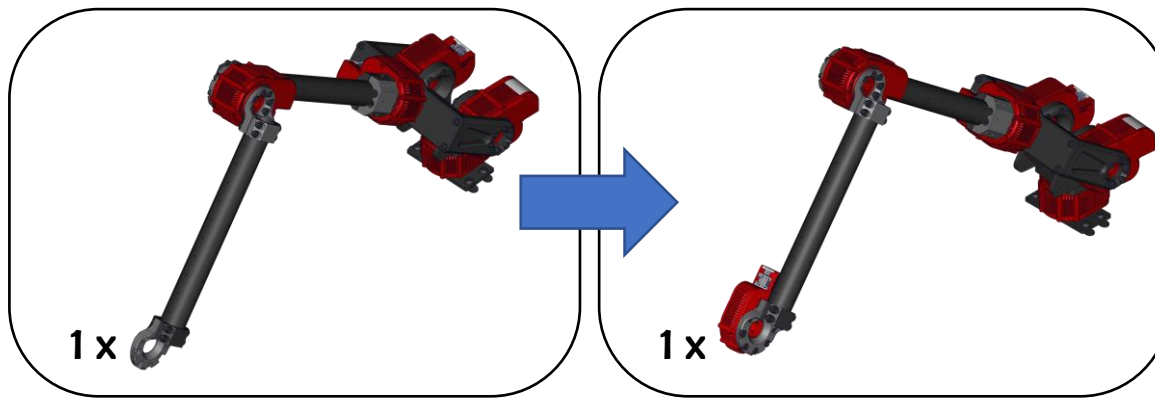


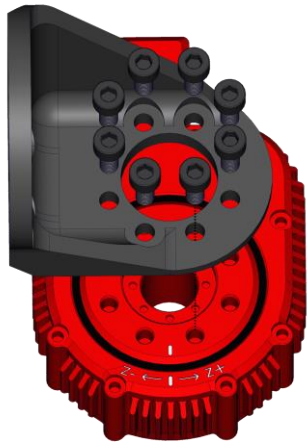
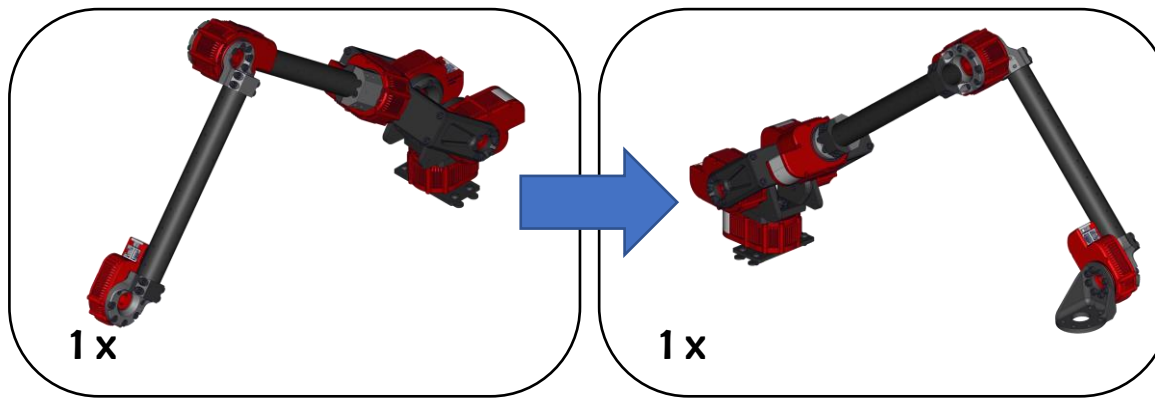




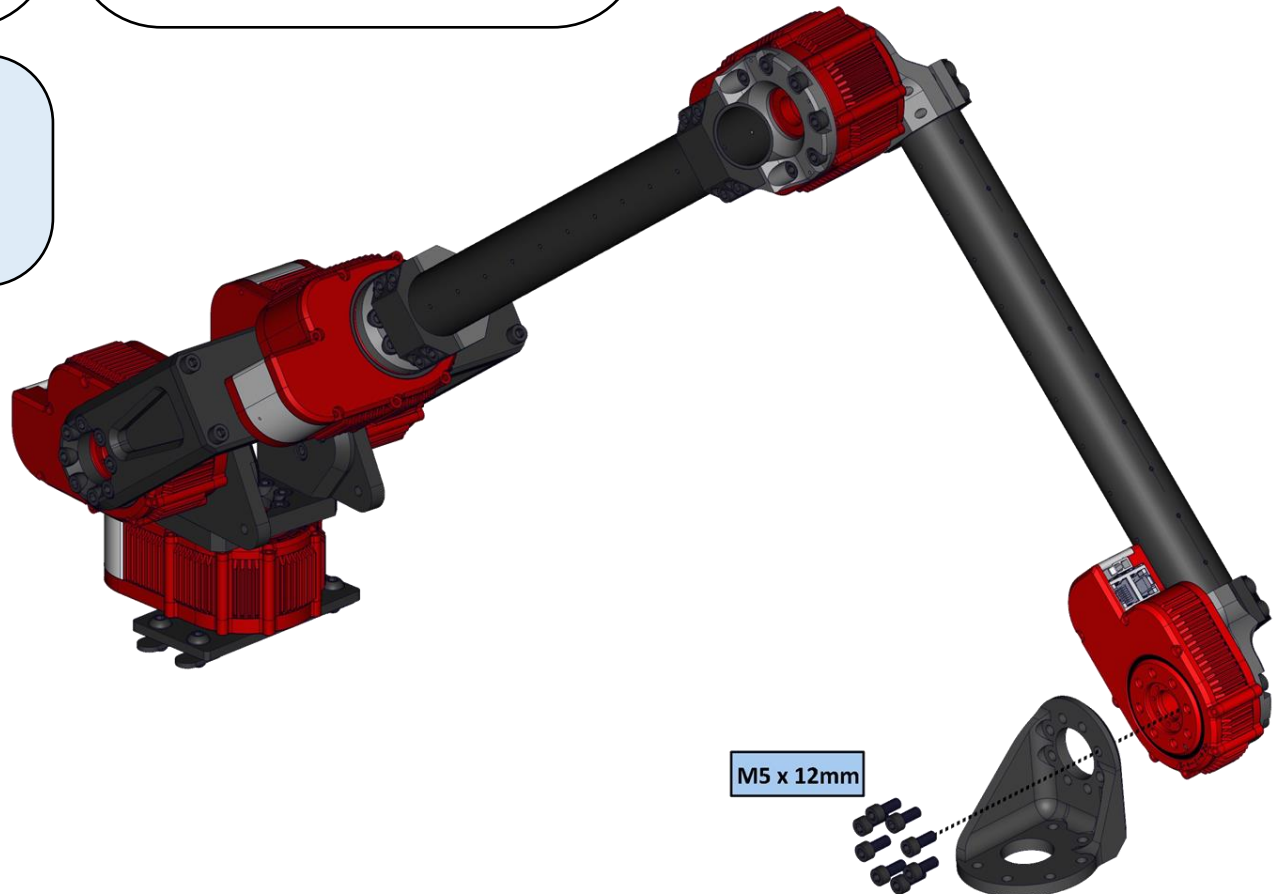
Align with actuator
output hub tick mark
(Tube aligns with tick mark)

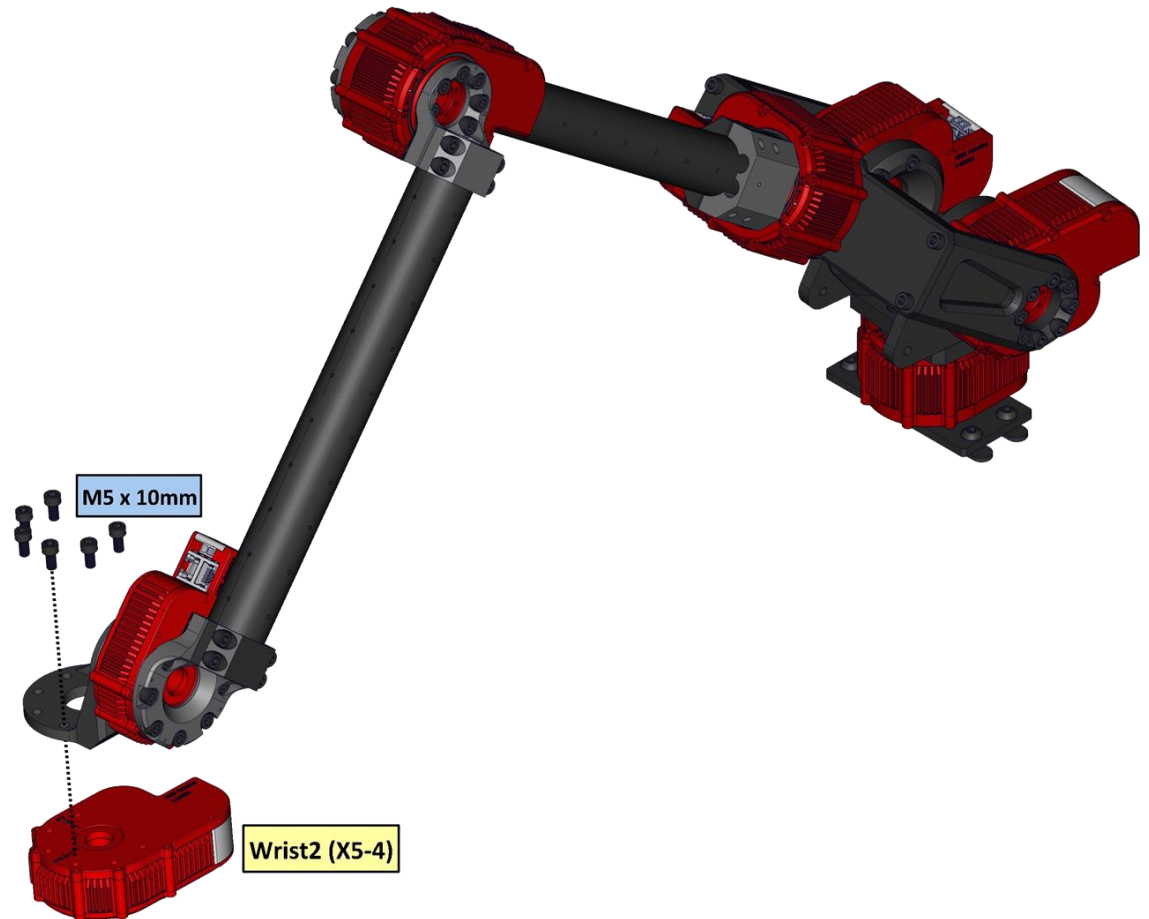
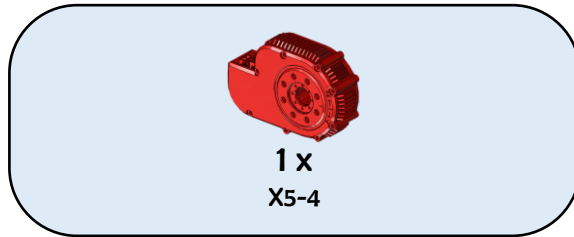
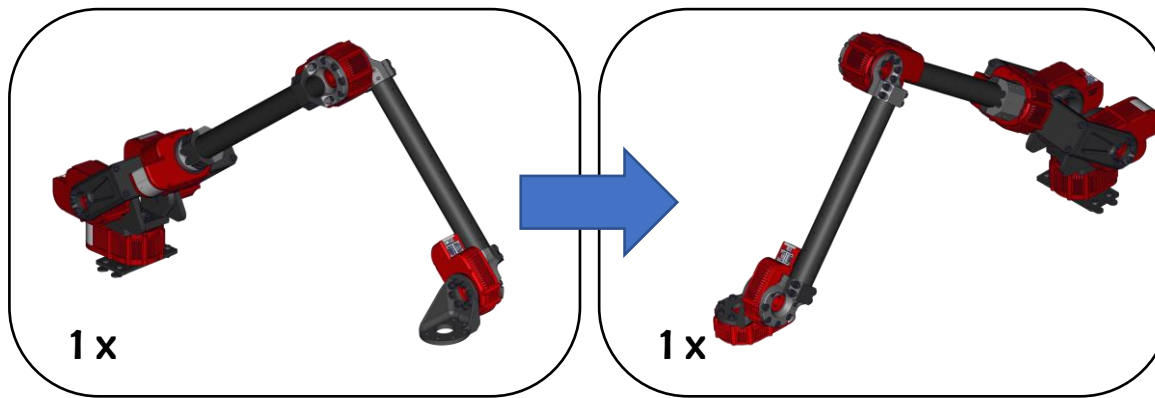


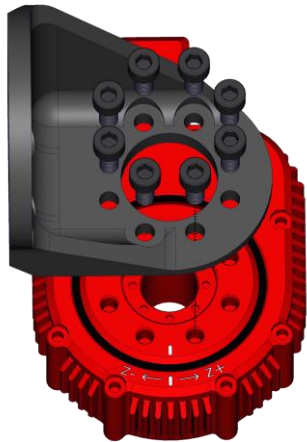
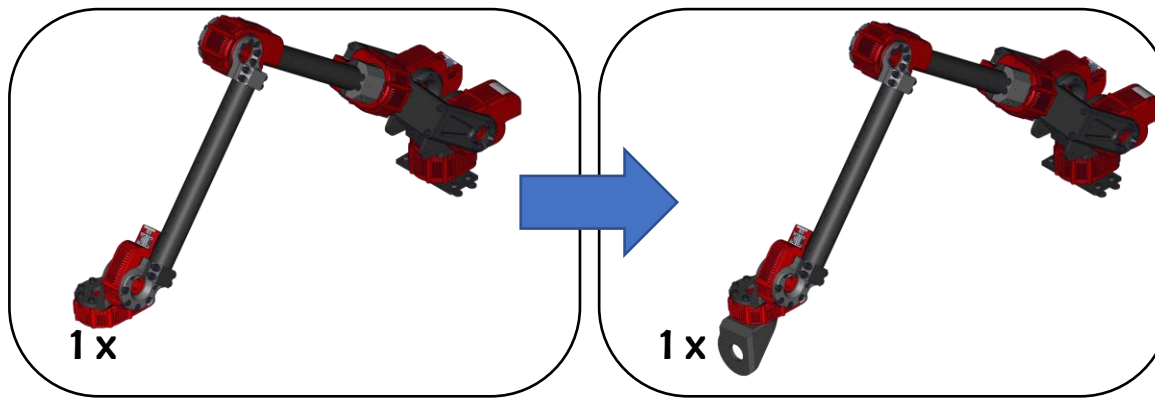




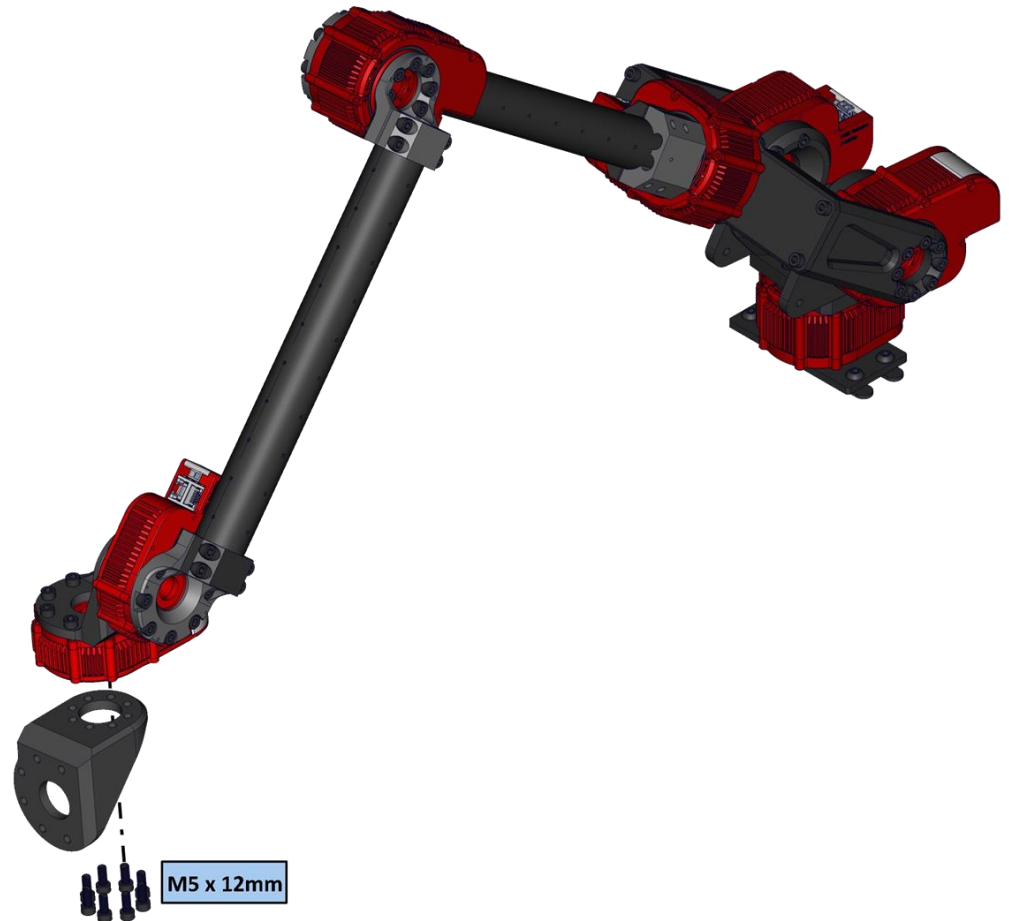
Align with actuator
output hub tick mark

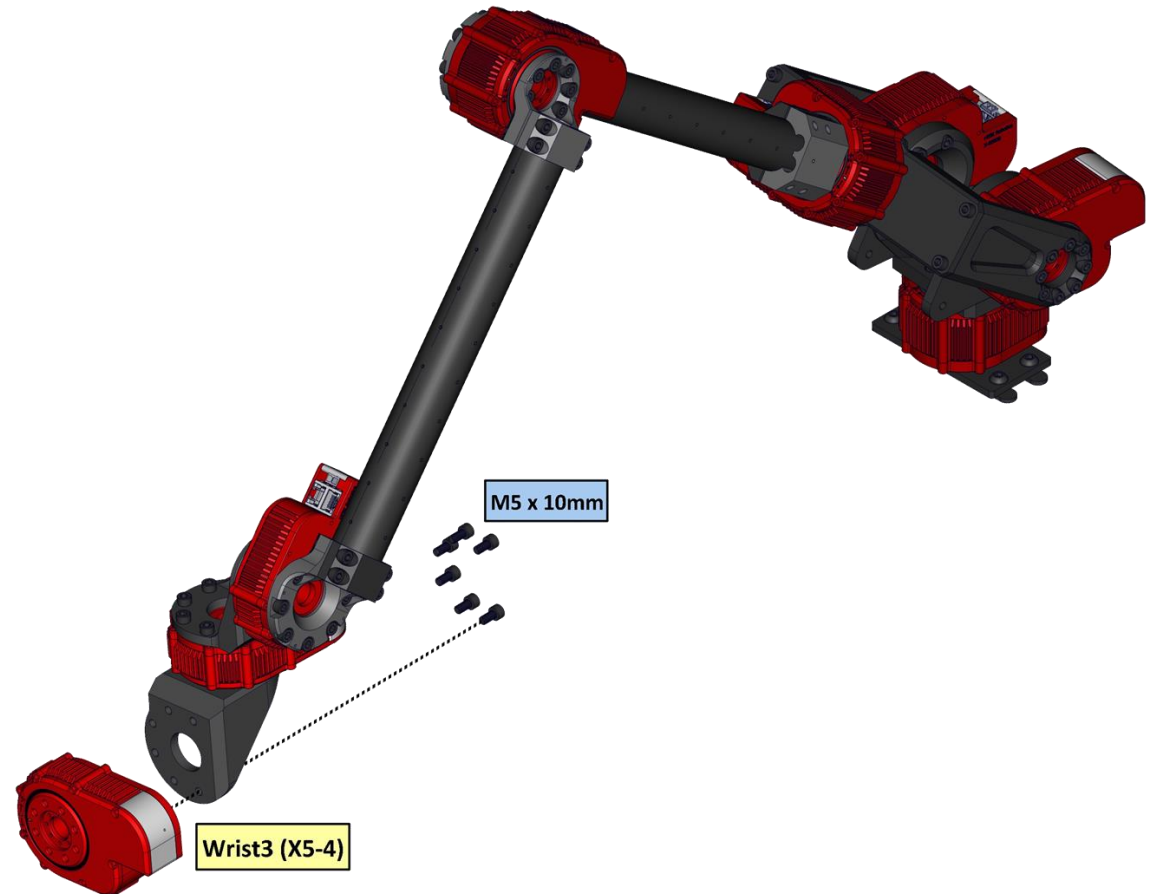
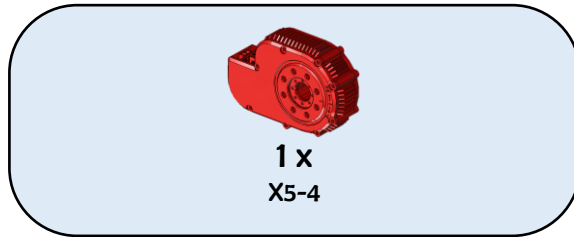
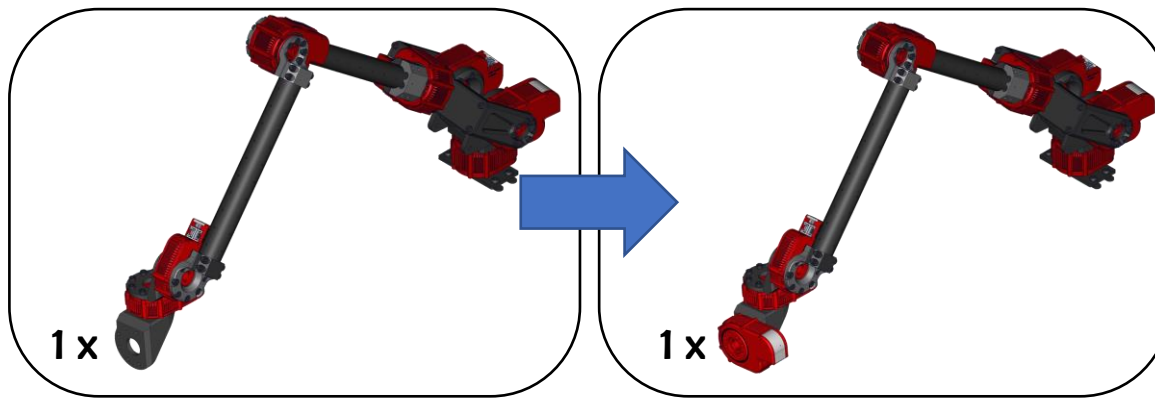




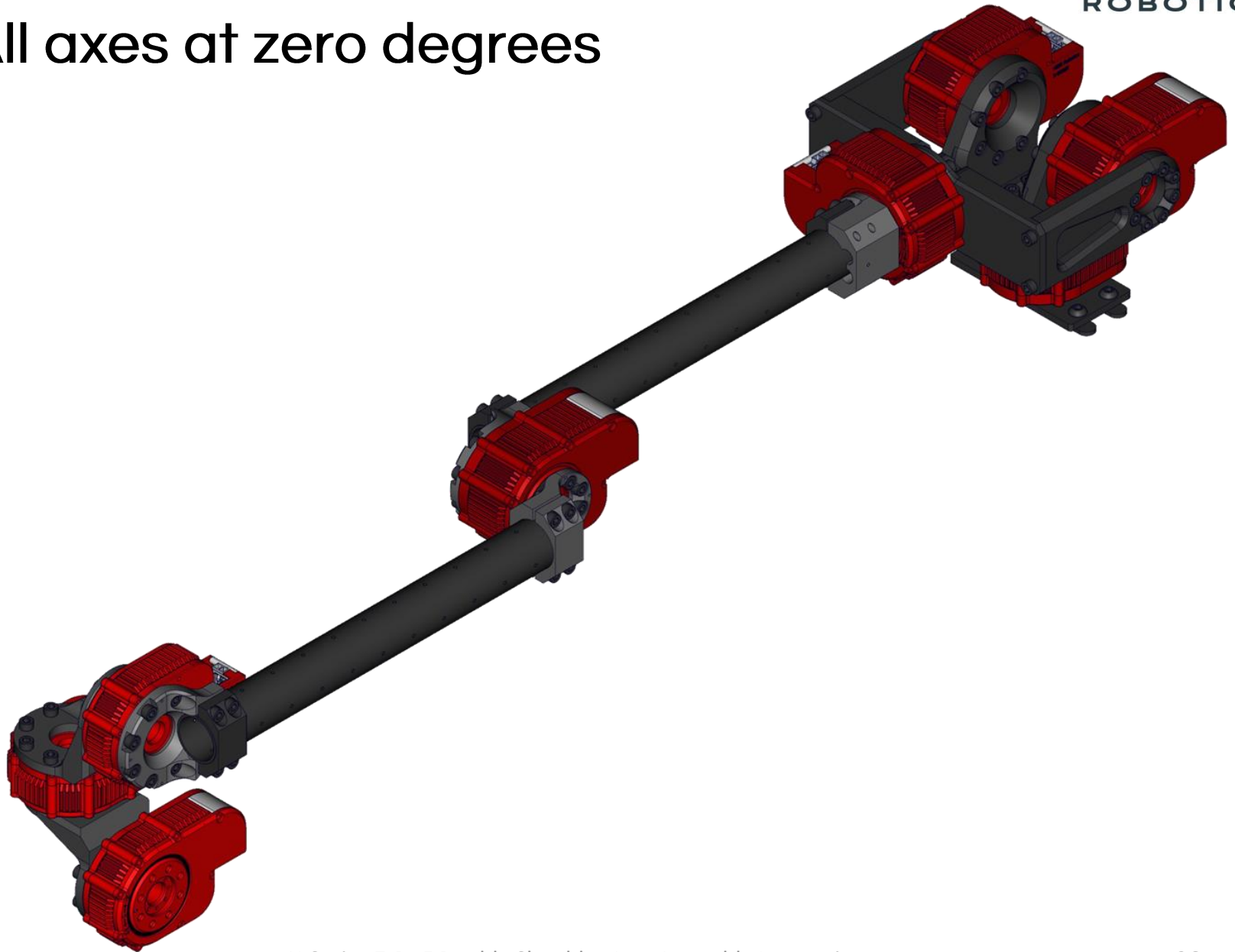


Align with actuator
output hub tick mark





All axes at zero degrees



Wiring Notes

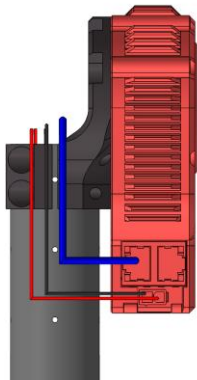
- Keeping wires organized will help prevent tangling and add a nice aesthetic.
 - Spiral sleeving is a good accessory for organizing loose wires
- HEBI X-Series actuators have a thru bore specifically designed to fit ethernet and power connectors.
 - Please pass connectors thru bore hole 1 at a time.

For more information visit: docs.hebi.us

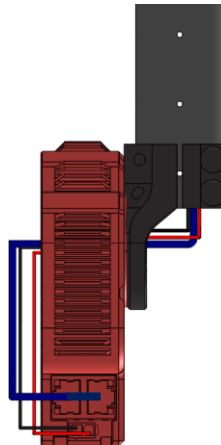


[Spiral sleeving]

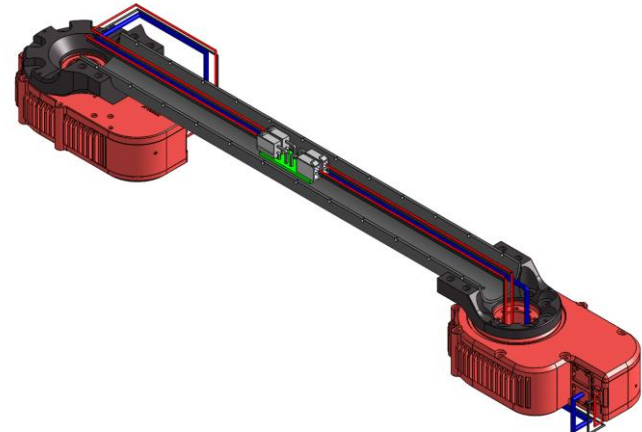
Wires that come from the previous joint should be inserted directly to actuator ports.



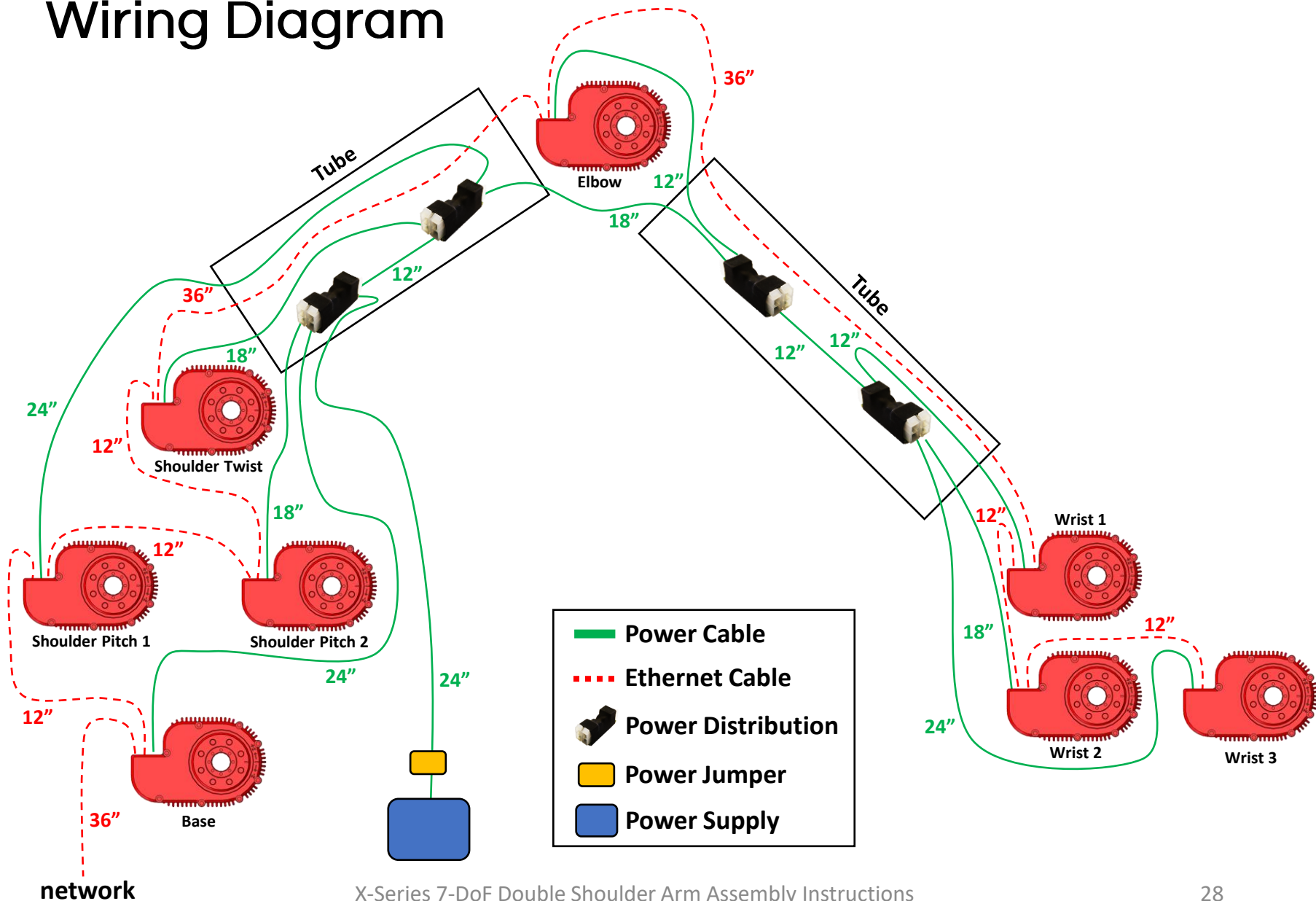
Wires that connect to the next joint should be threaded through the actuator's bore hole.

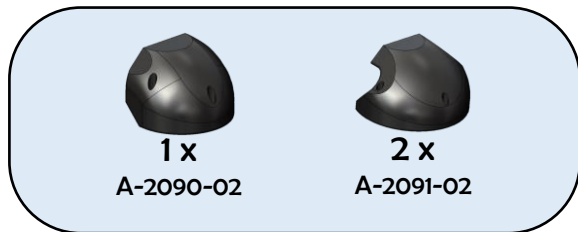
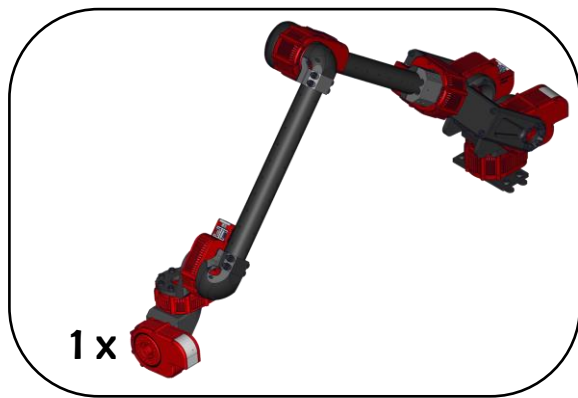


Power distribution boards are included to help daisy-chain power connections. These fit well within the tubes between actuators.



Wiring Diagram





Install cables before
adding caps

