HEBI ROBOTICS

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***

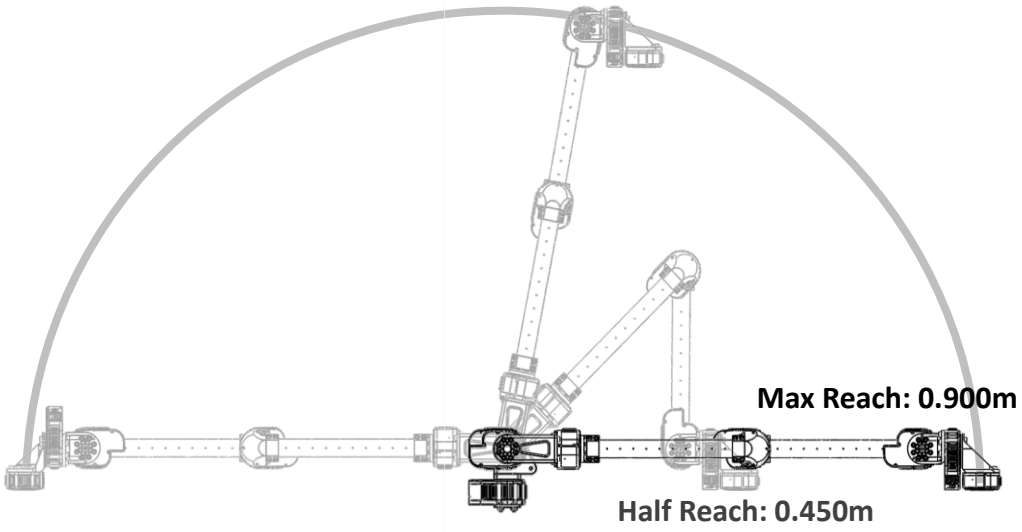
Technical Specifications

Movement	Working Range	Speed
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

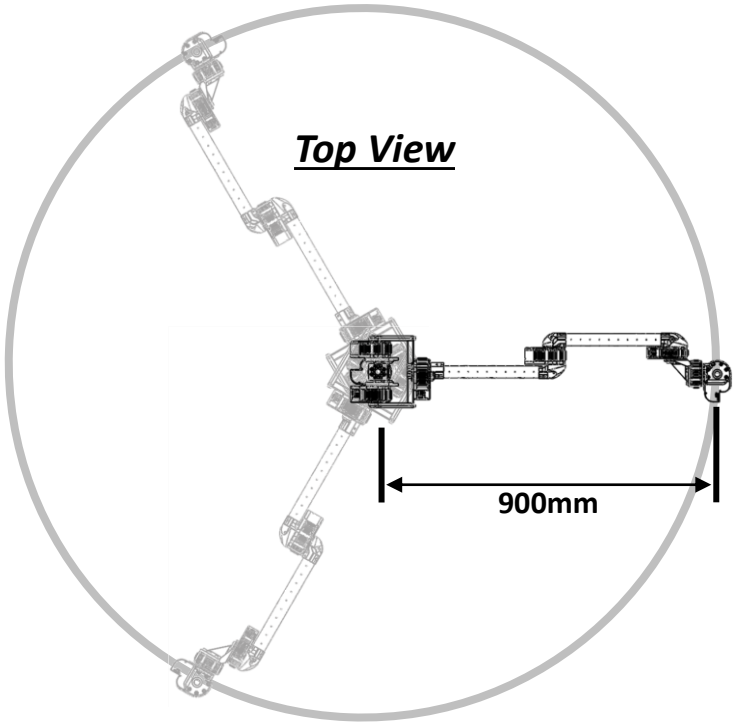
Specifications	Value
Weight	9 kg
Max Reach	900 mm
Payload @ Max Reach	1.5 kg
Half Reach	450 m
Payload @ Half Reach	3 kg

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

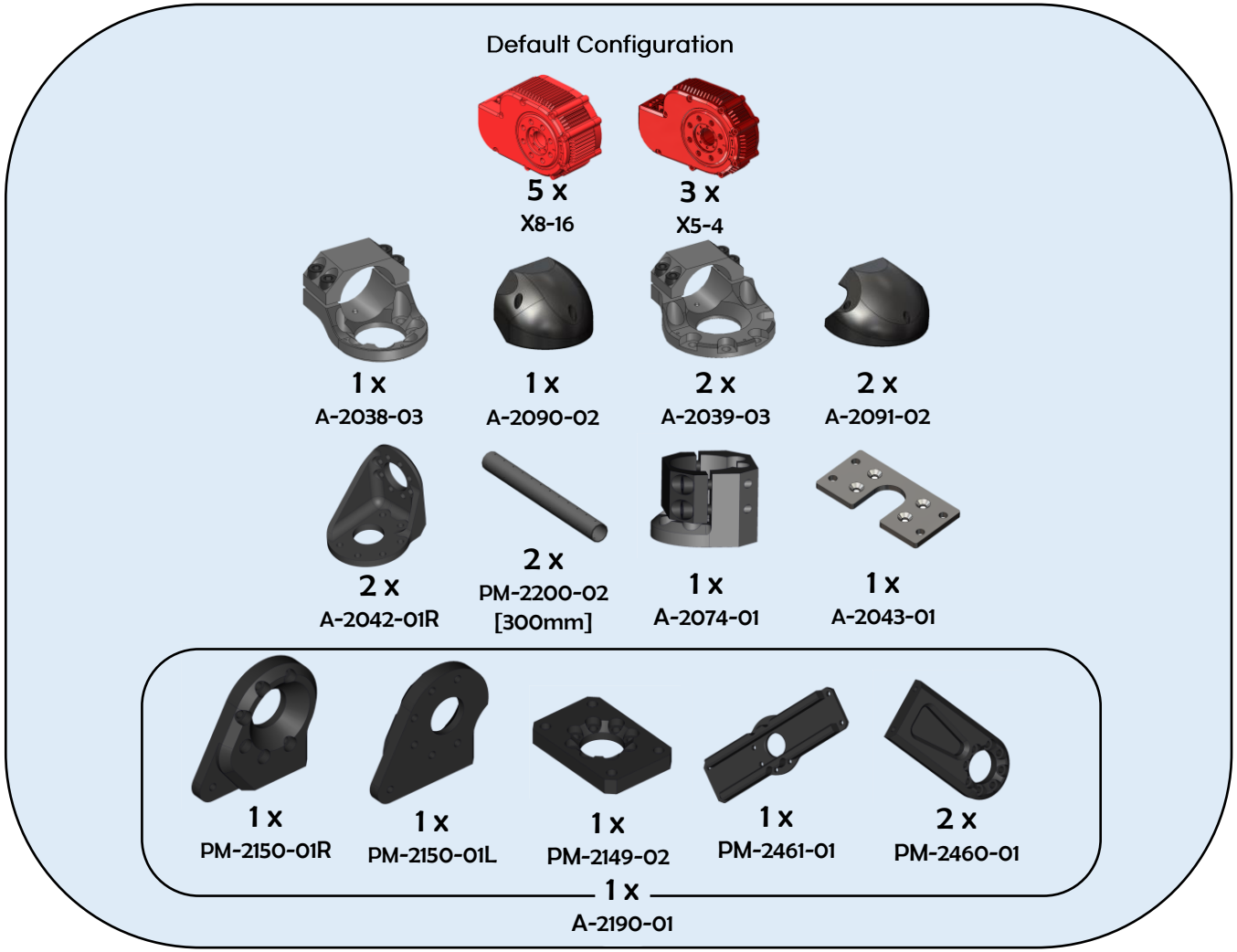
Side View



Top View



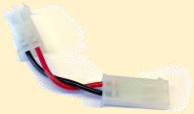
Bill of Materials - Mechanical*



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

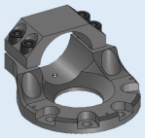
4 x
A-2046-18
Power Cable, 18" Length

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



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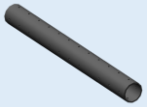

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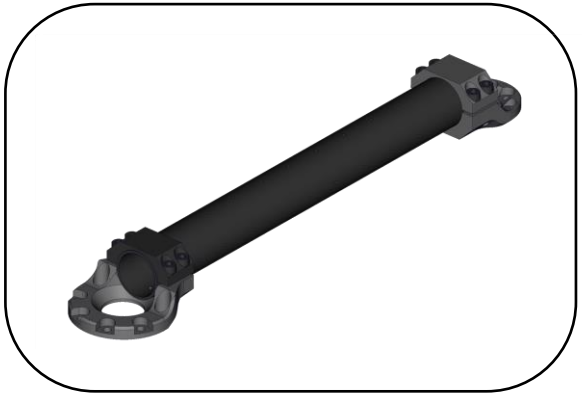
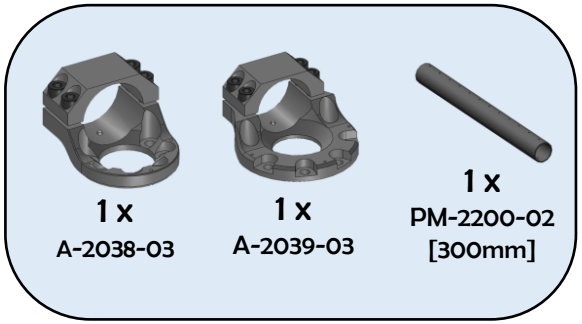
[300mm]

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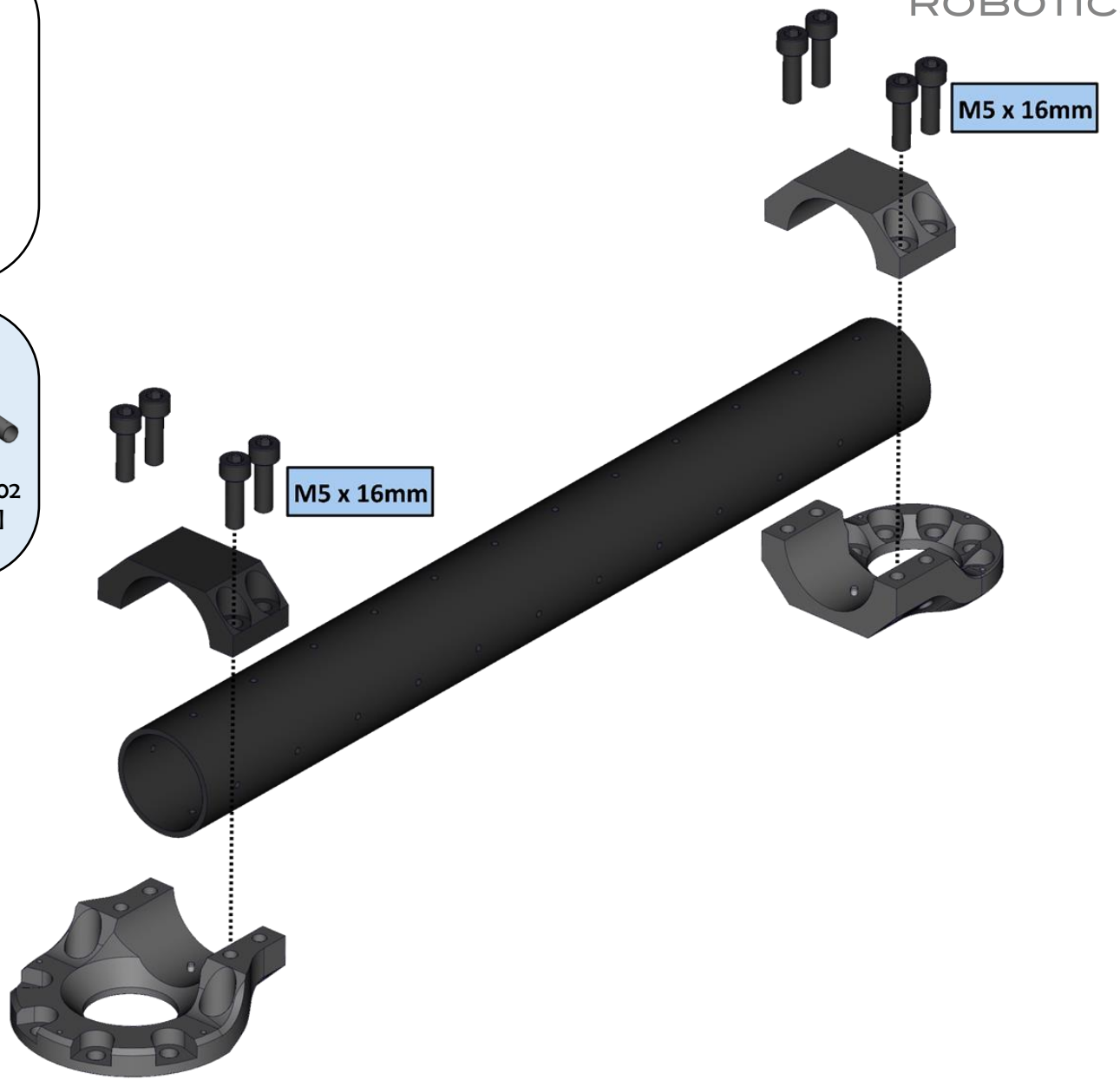
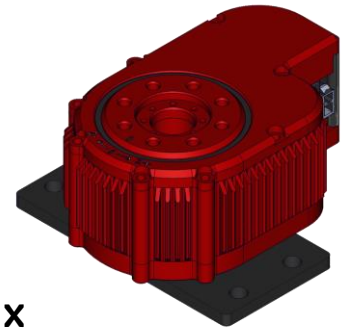
1 x
A-2039-03
1 x
PM-2200-02
[300mm]


M5 x 16mm
M5 x 16mm



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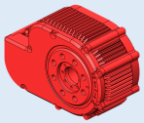
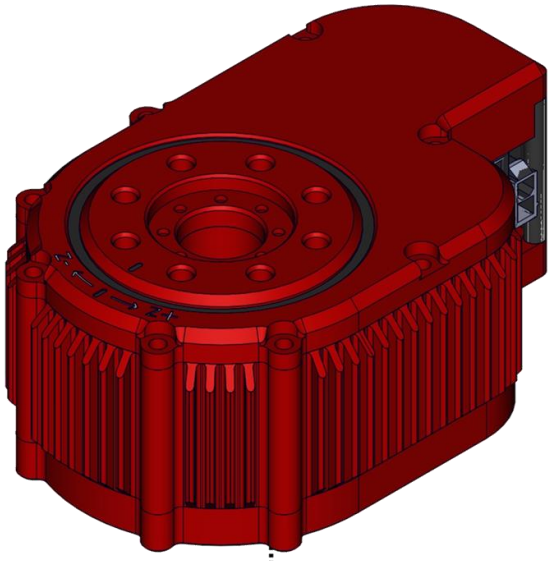
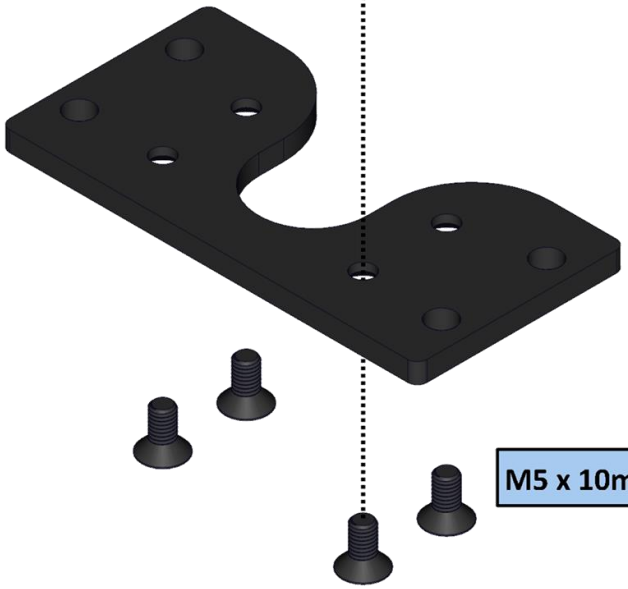


1 x
X8-16

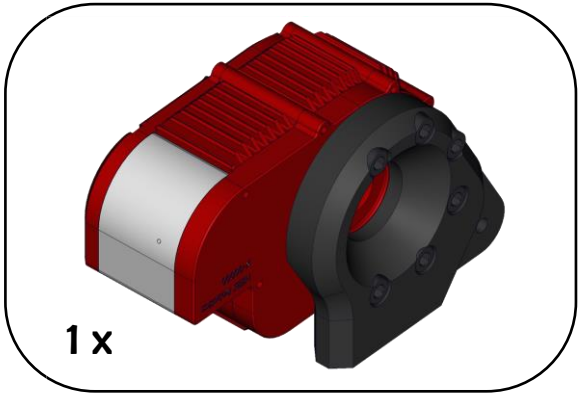
1 x
A-2043-01



Base (X8-16)



M5 x 10mm FHCS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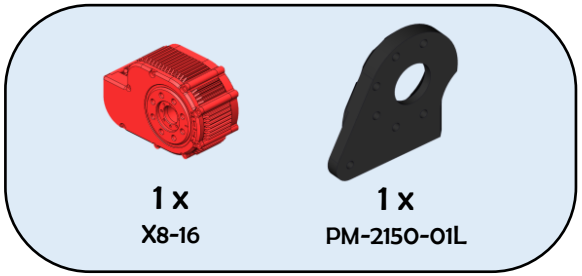
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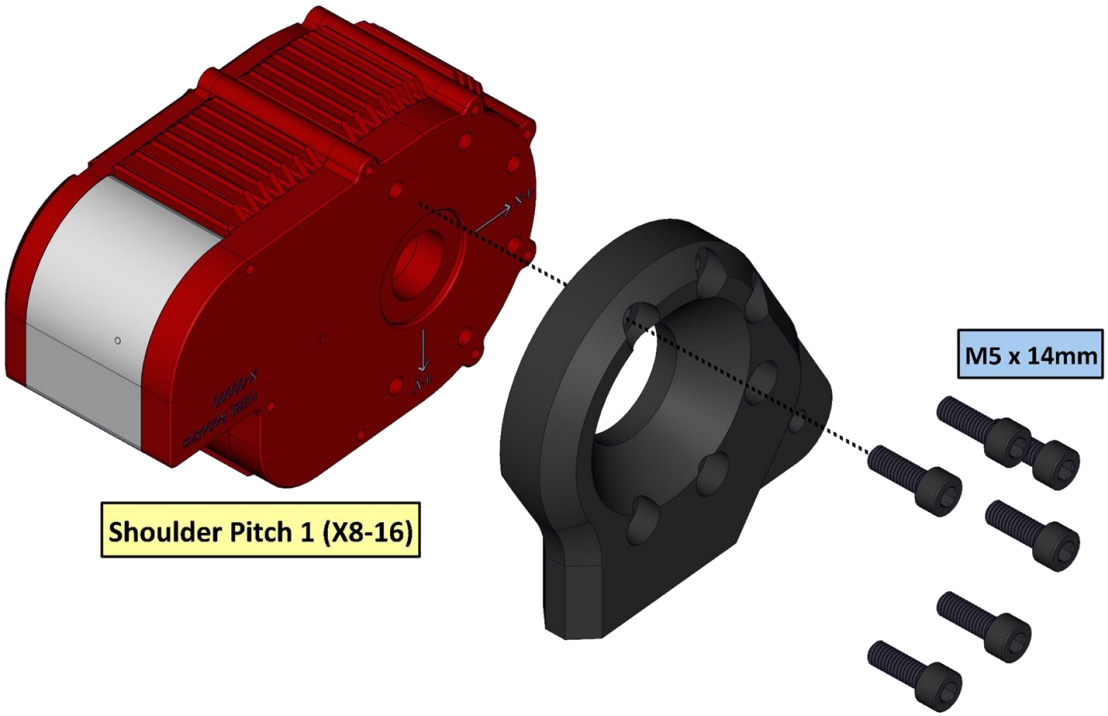
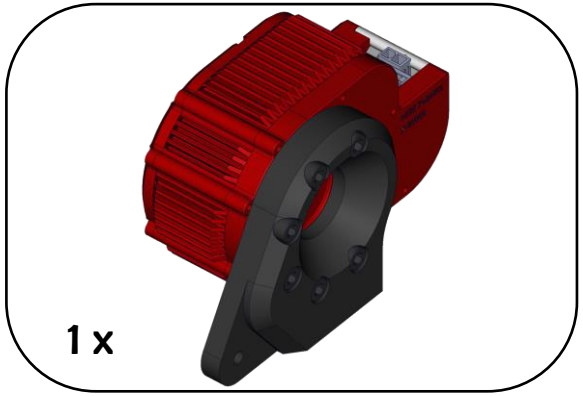
X8-16
1 x
PM-2150-01L


M5 x 14mm
Shoulder Pitch 1 (X8-16)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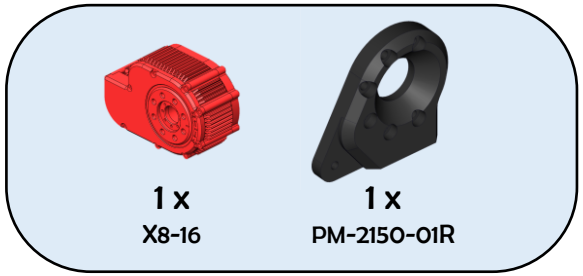
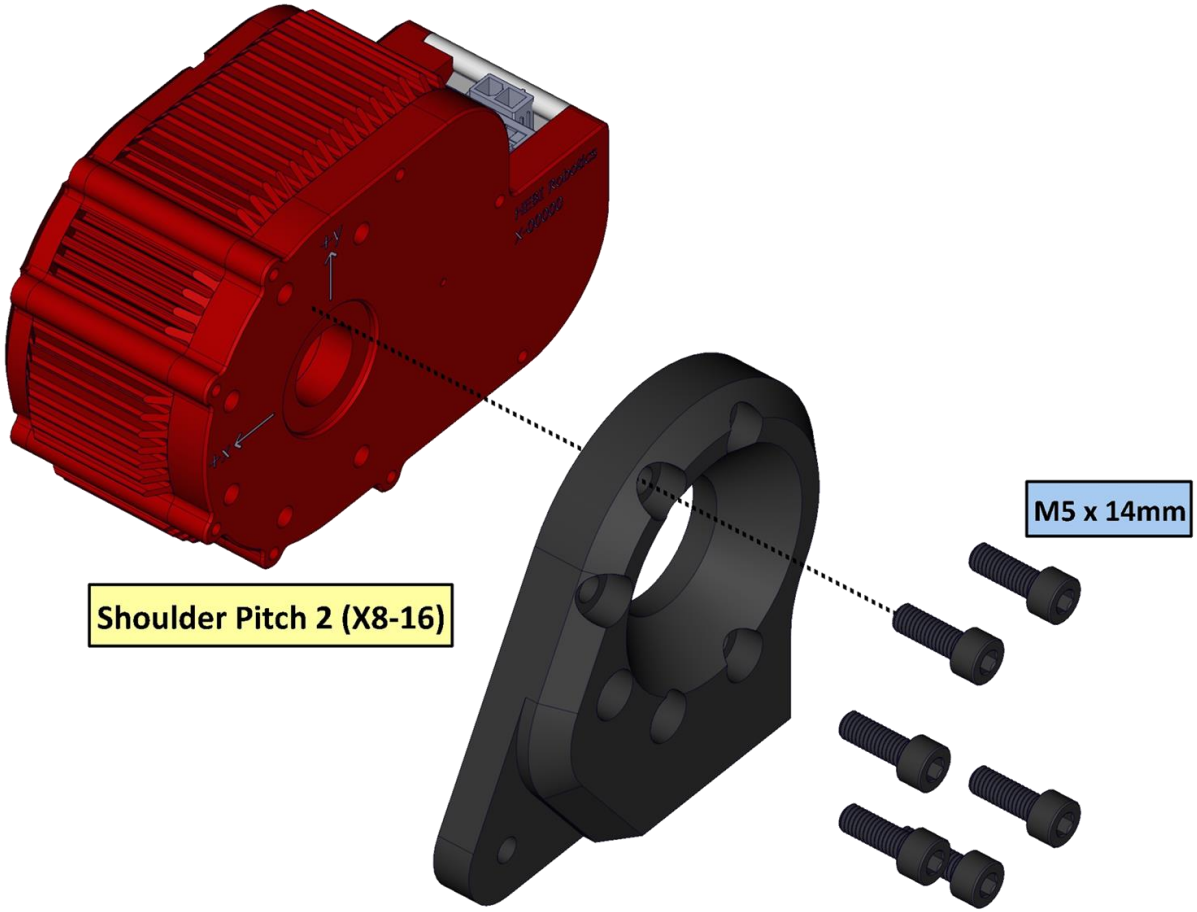
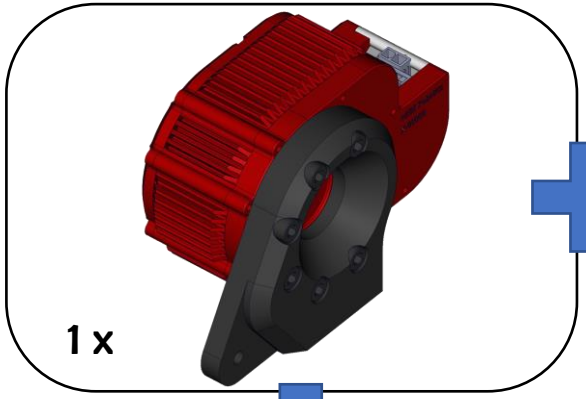
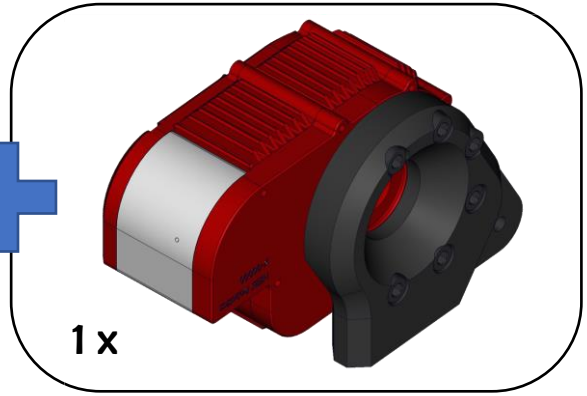
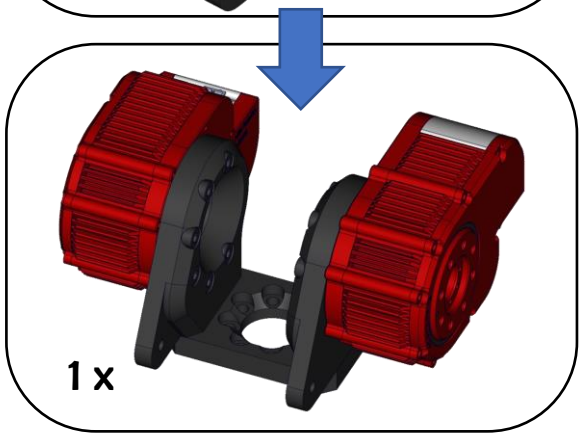
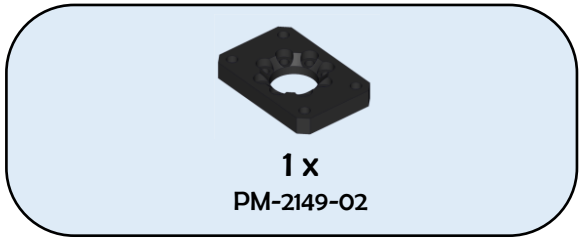

1 x
X8-16
1 x
PM-2150-01R


Shoulder Pitch 2 (X8-16)
M5 x 14mm

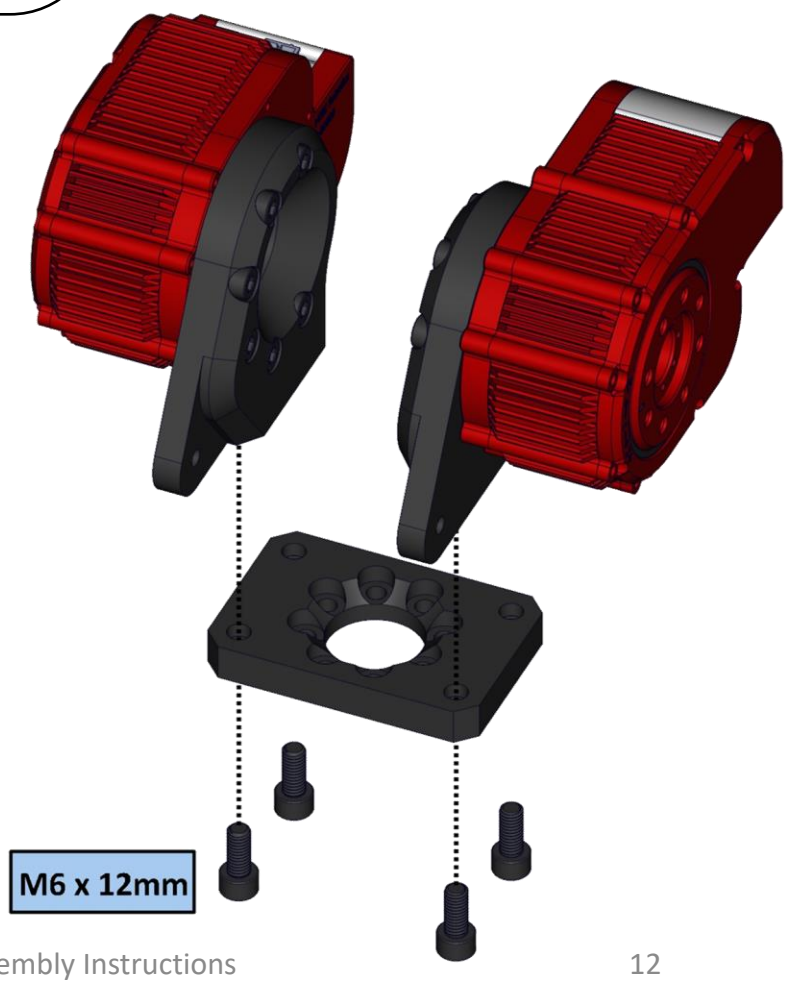


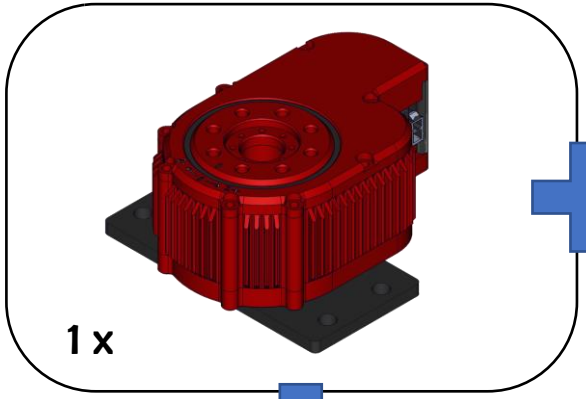


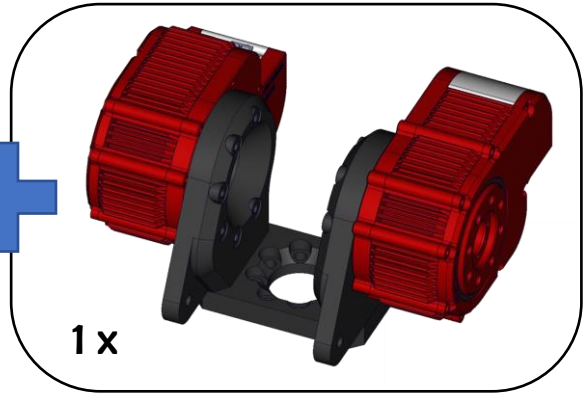


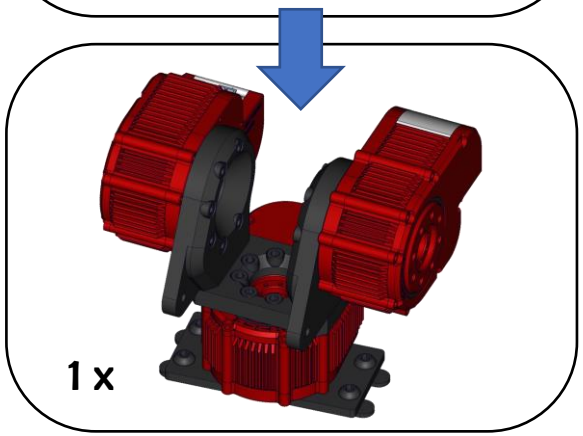


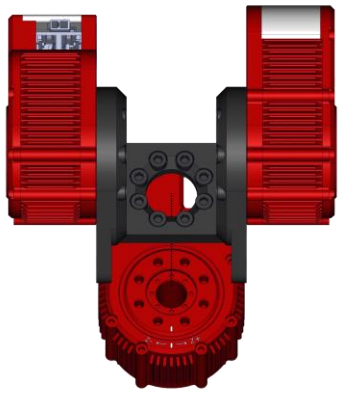
Module output faces towards outside





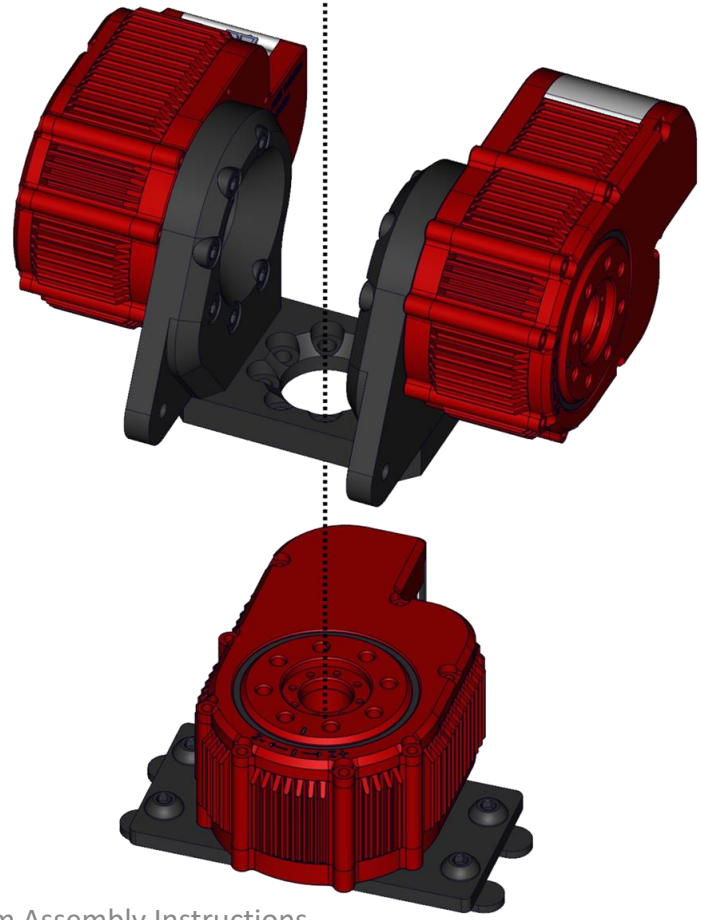


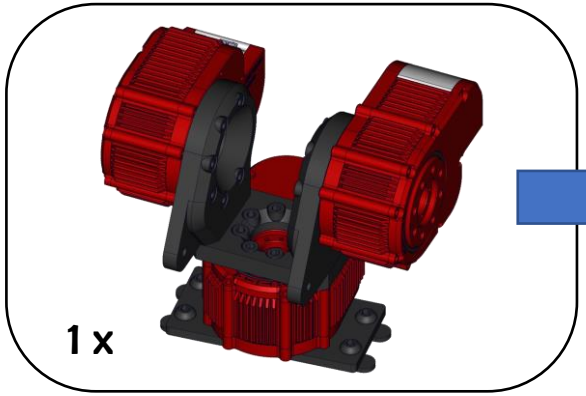


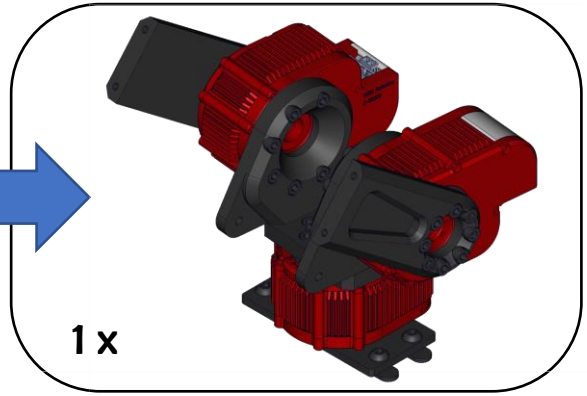


Align with actuator output hub tick mark

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



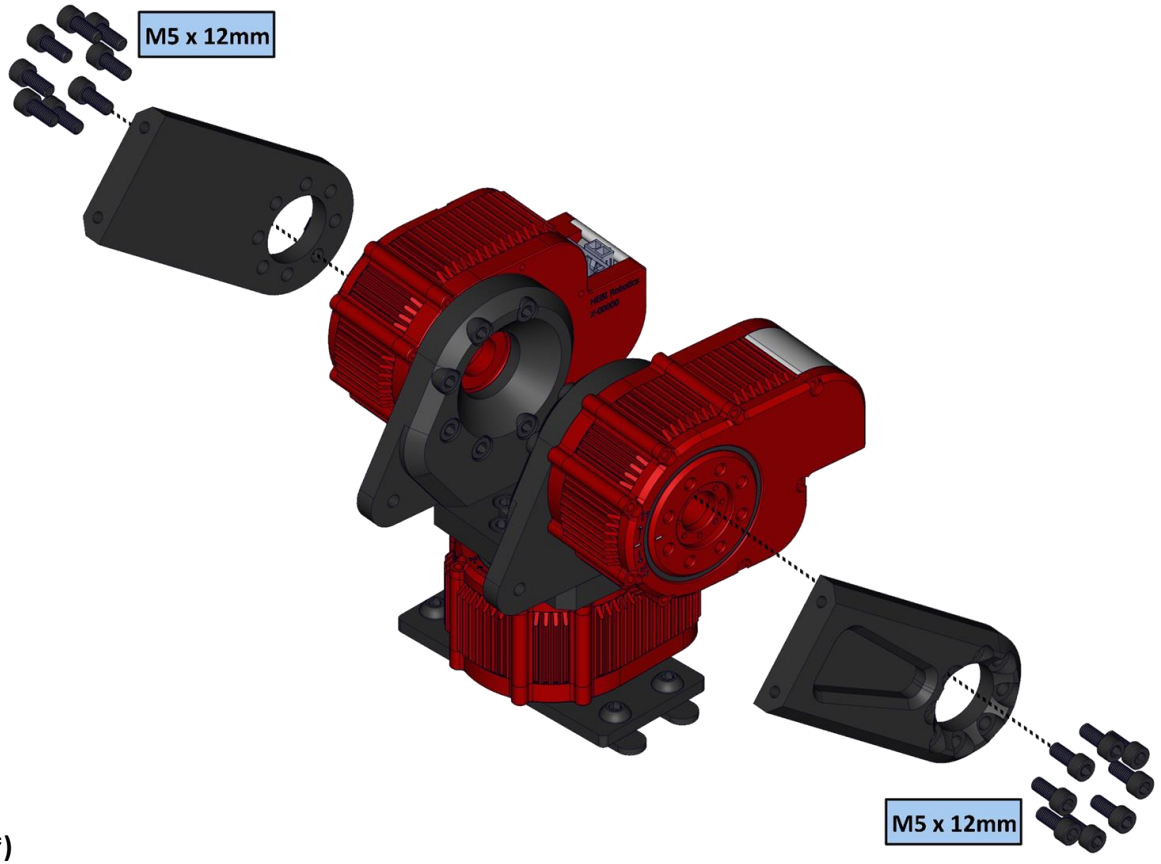


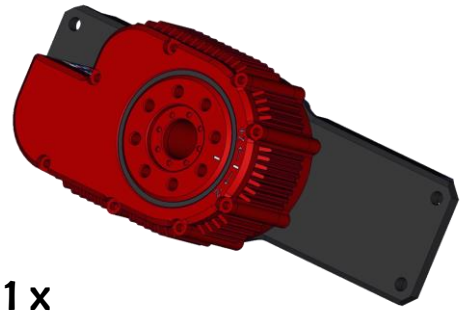


2 x
PM-2460-01

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**





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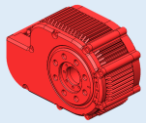
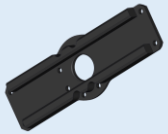


1 x
X8-16



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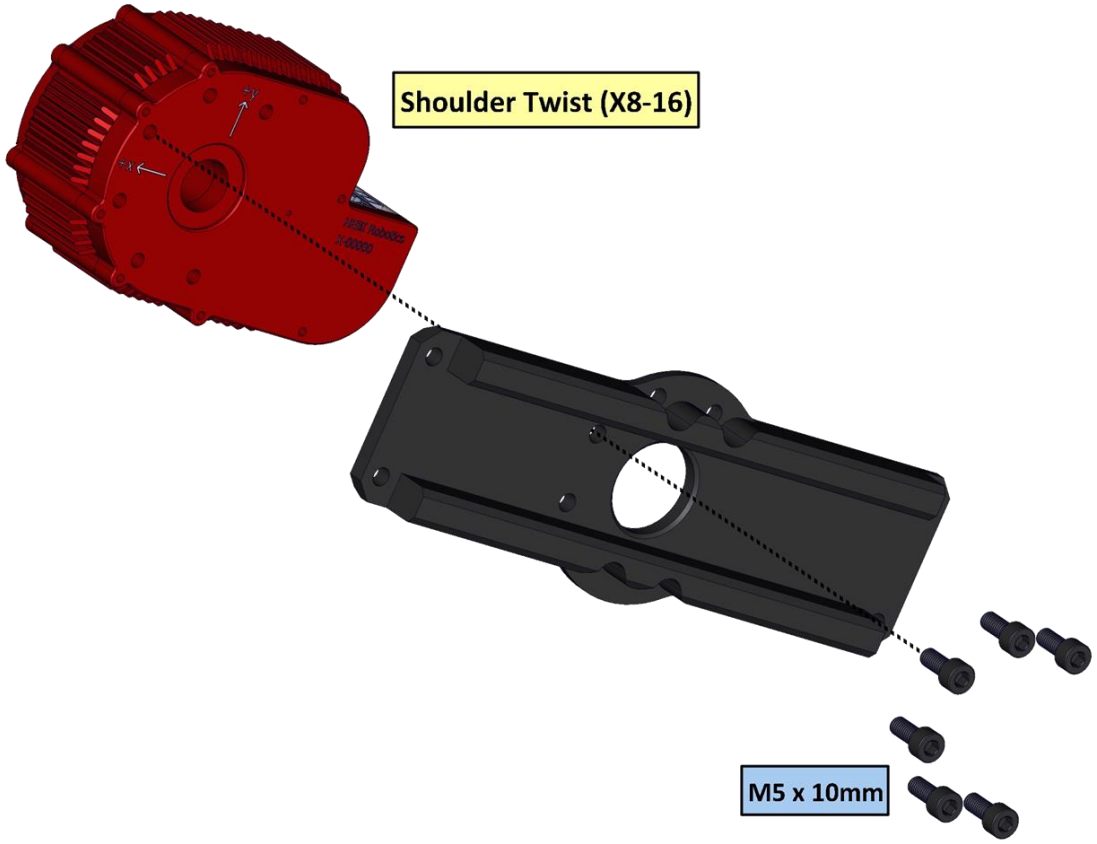
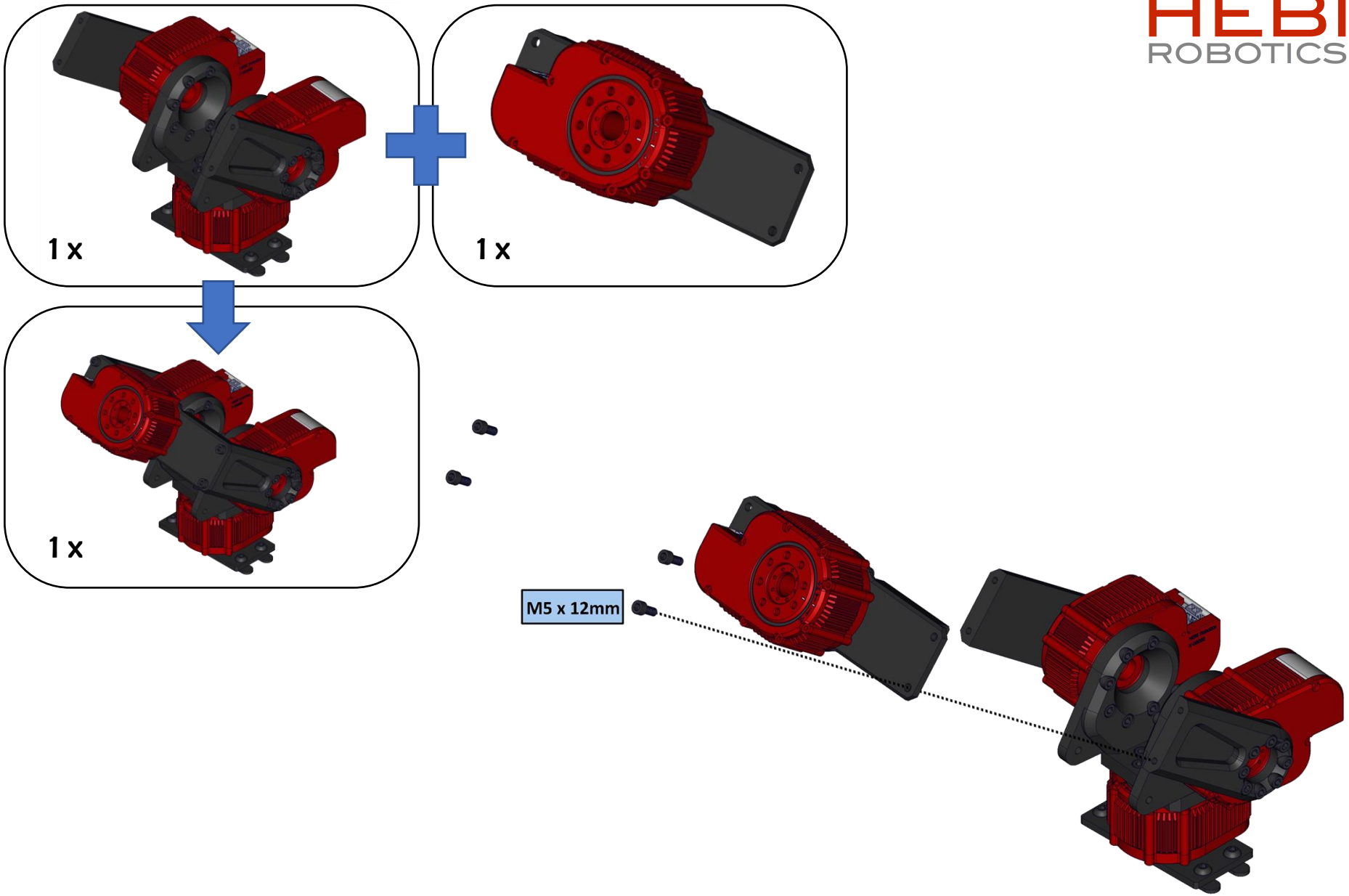
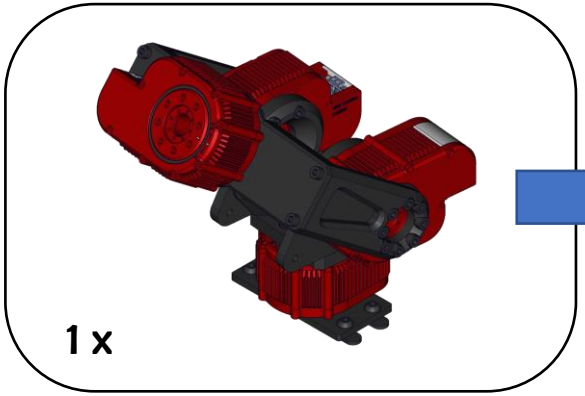
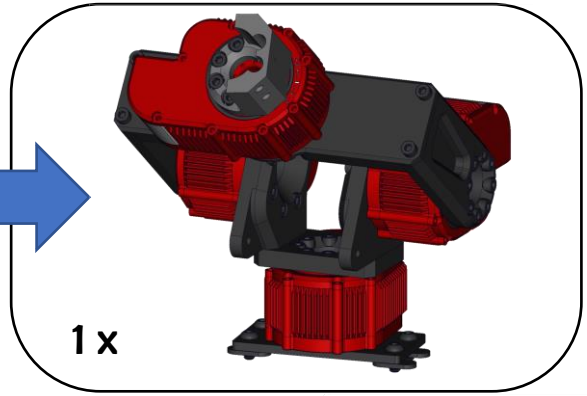
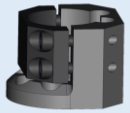



1 x
1 x
1 x
M5 x 12mm



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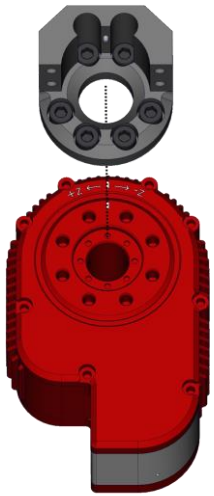
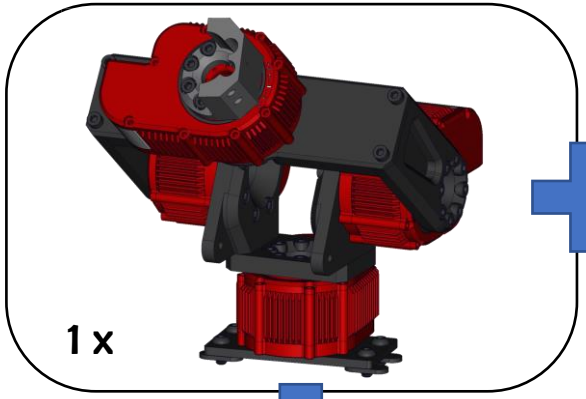


Align with actuator output hub tick mark

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

***Axis direction specified on the bottom of the module**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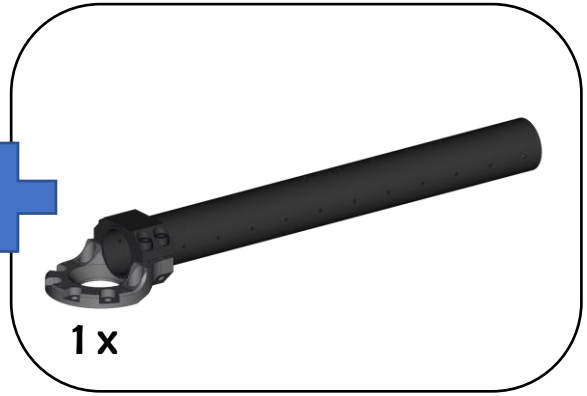
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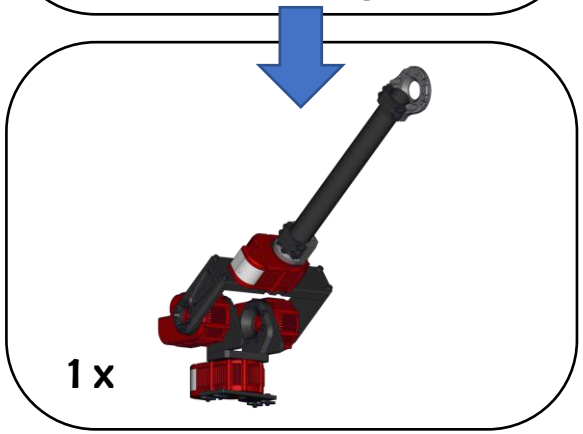
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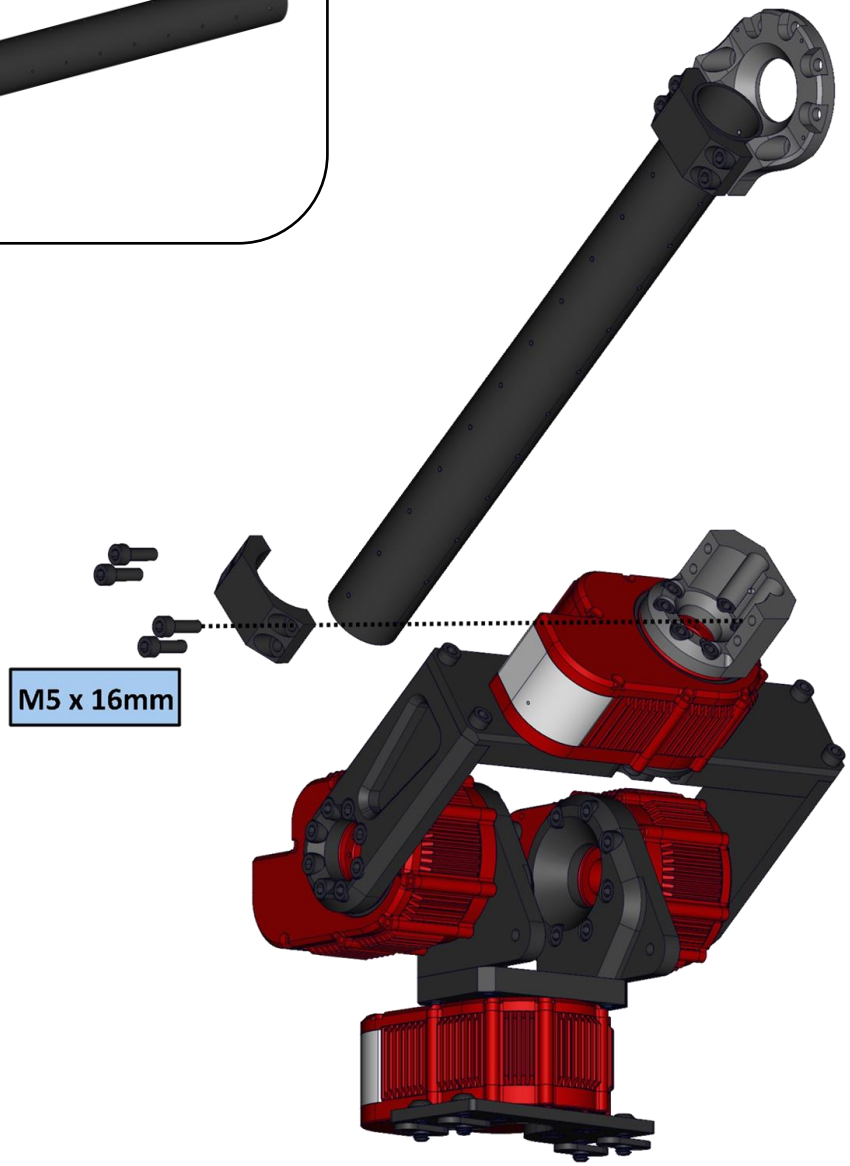
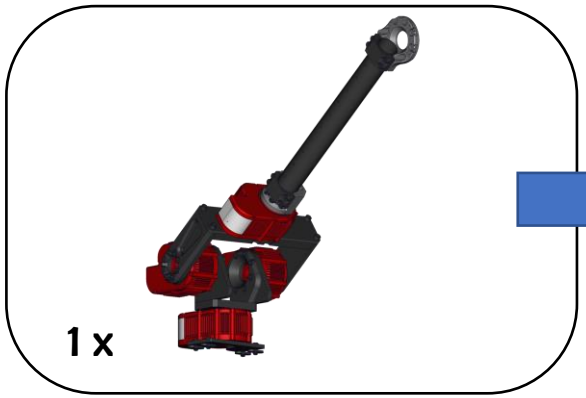

M5 x 16mm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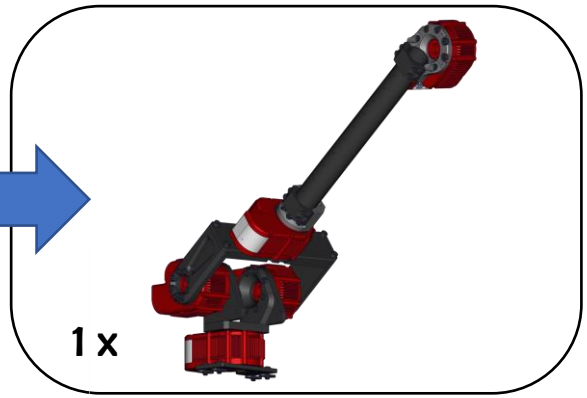
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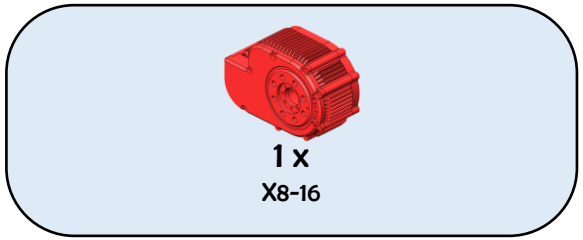
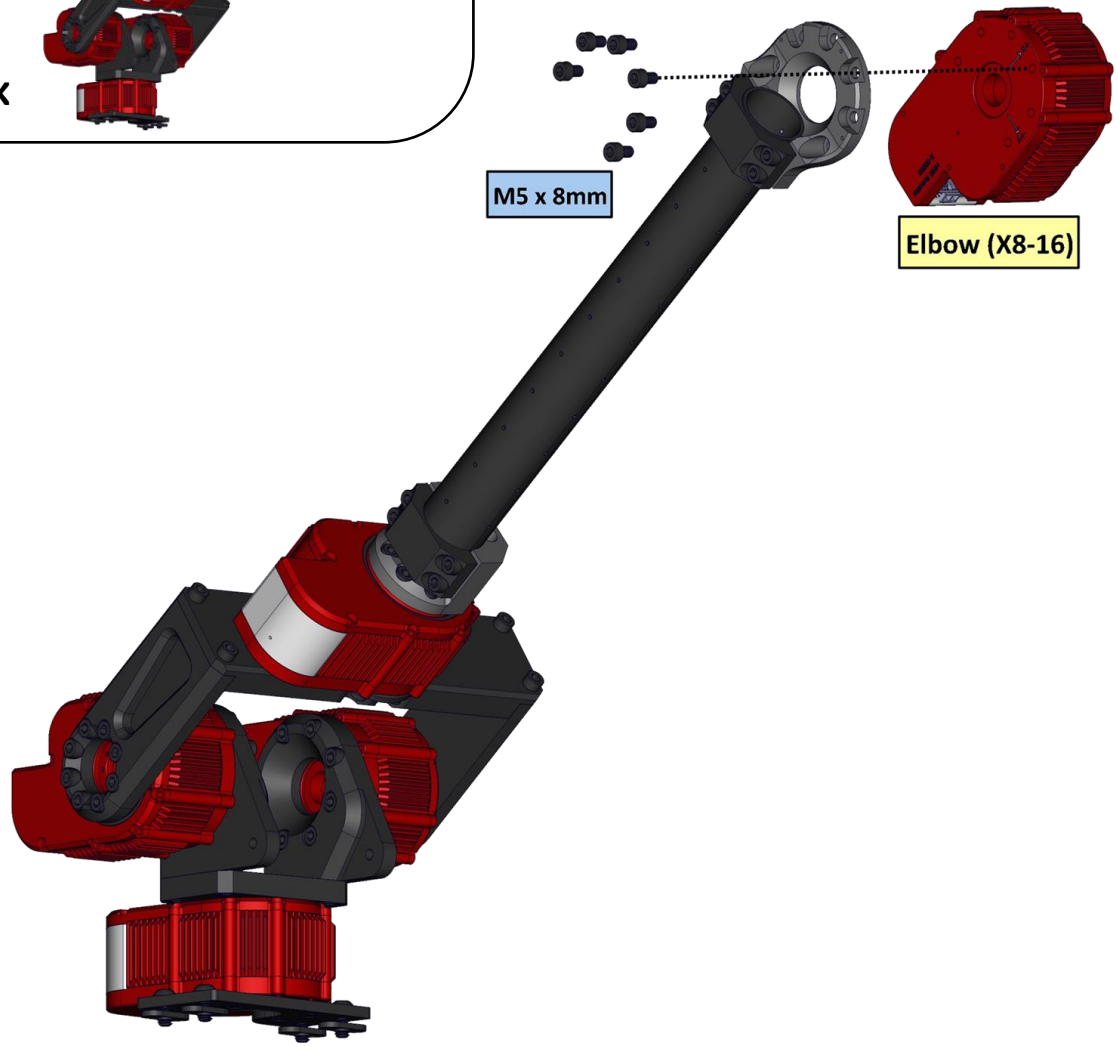
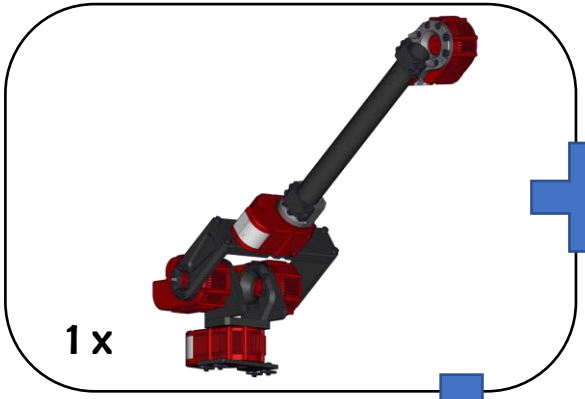
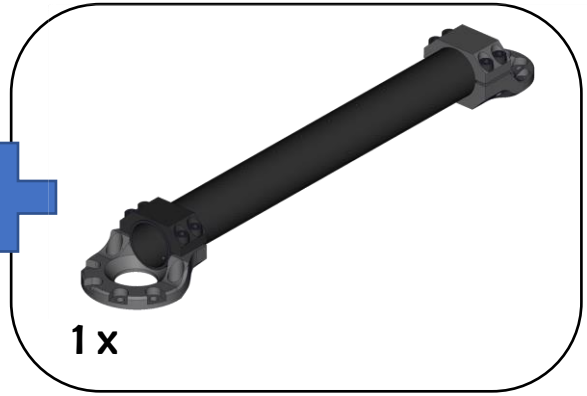
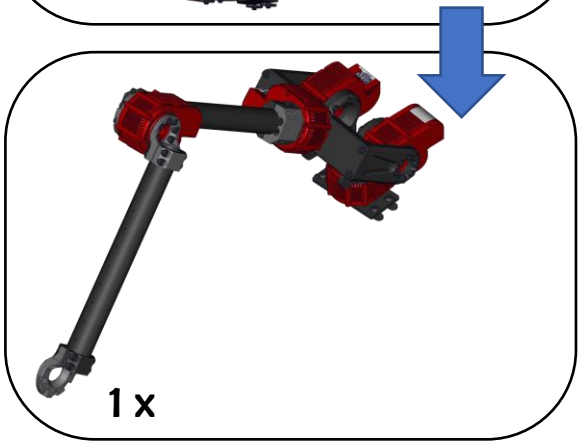
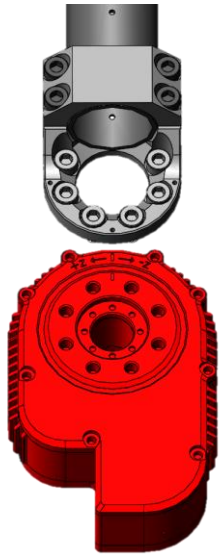

1 x
X8-16


M5 x 8mm
Elbow (X8-16)



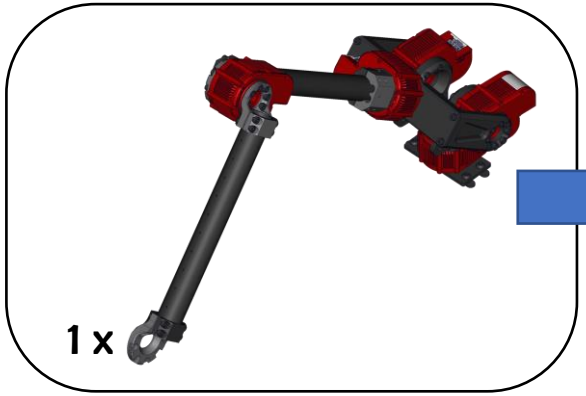






Align with actuator output hub tick mark

(Tube aligns with tick mark)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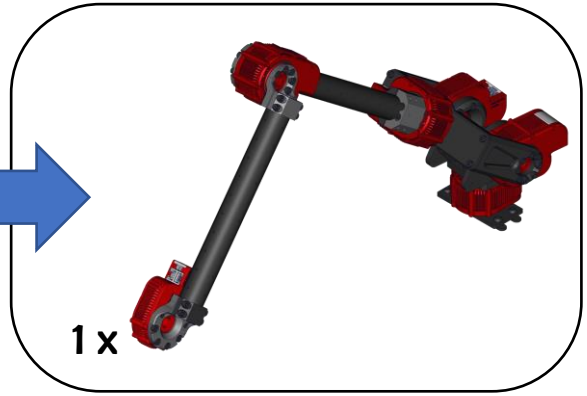
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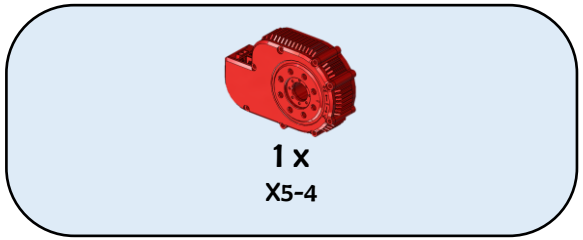
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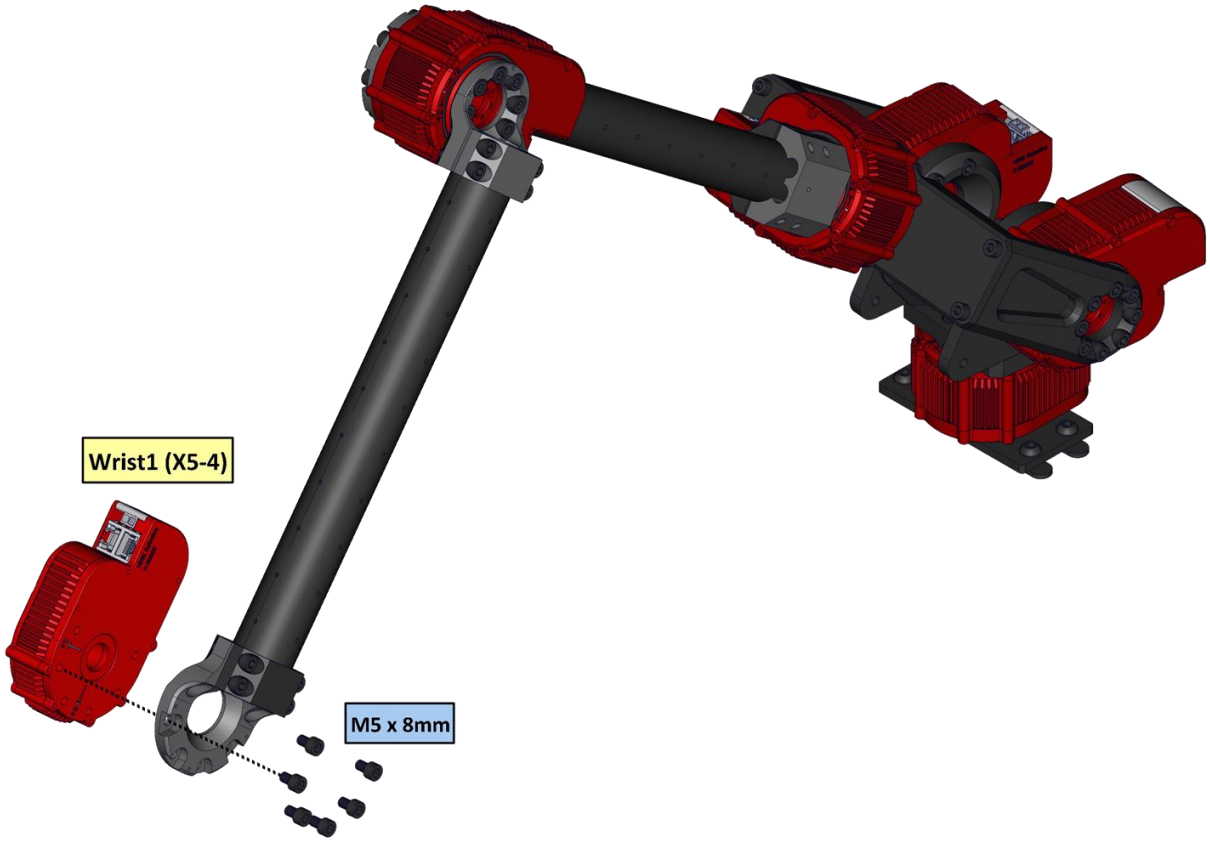
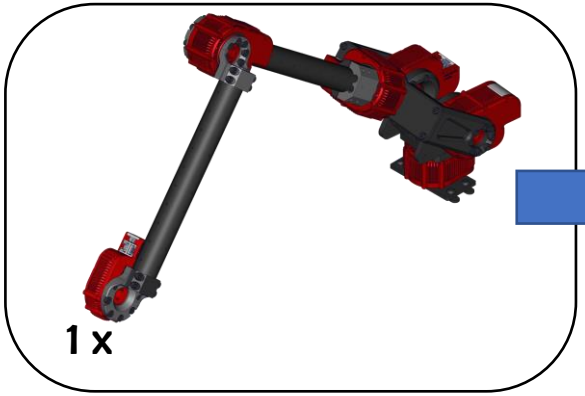
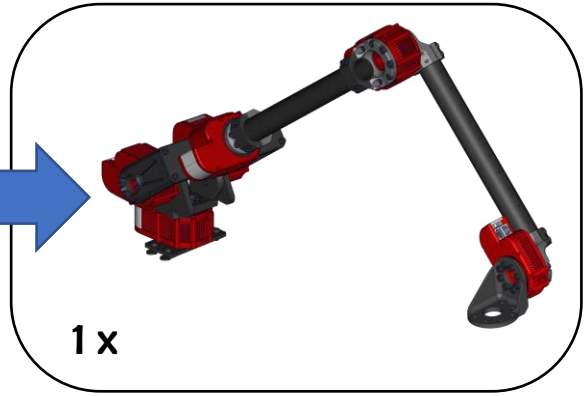
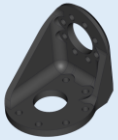
X5-4

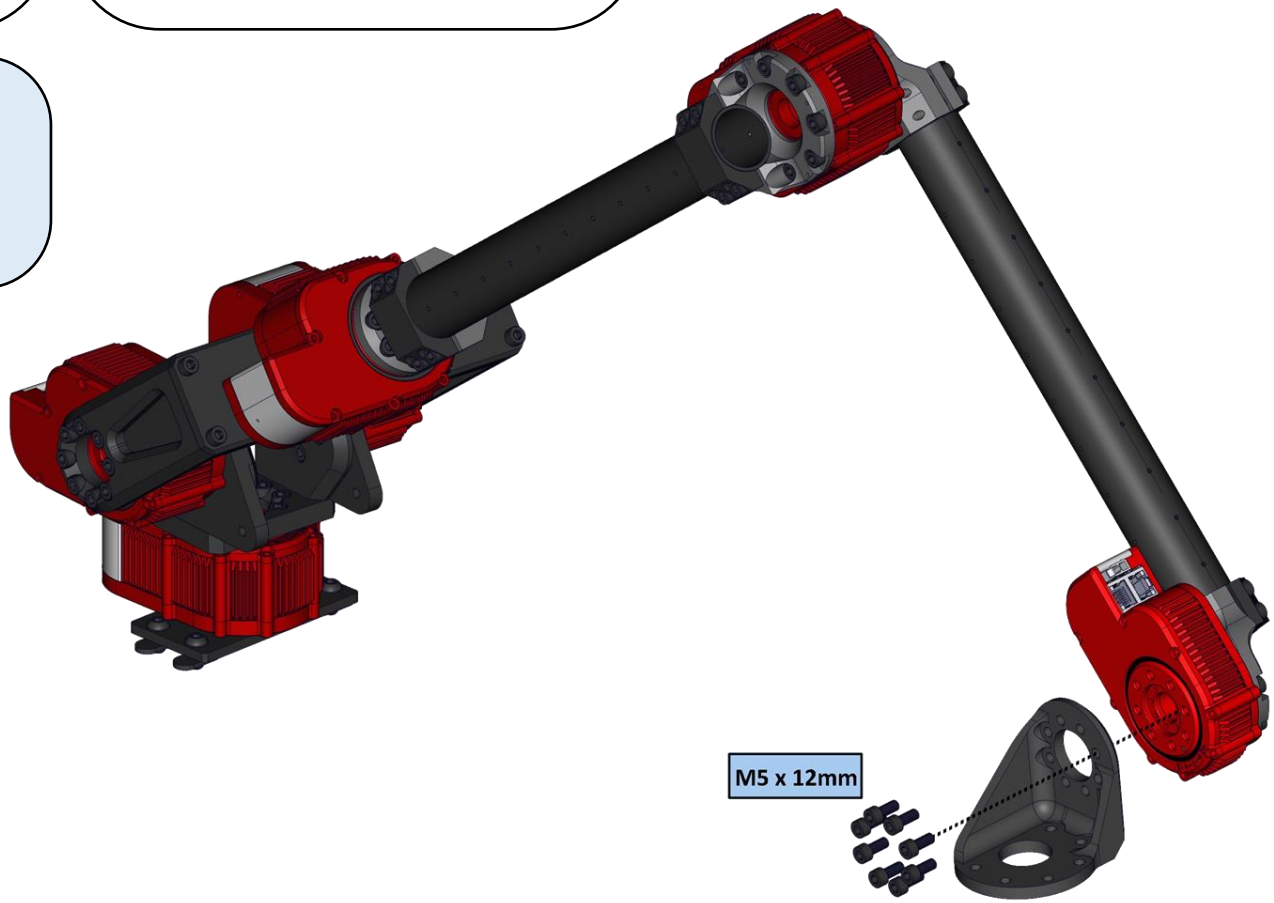

Wrist1 (X5-4)
M5 x 8mm

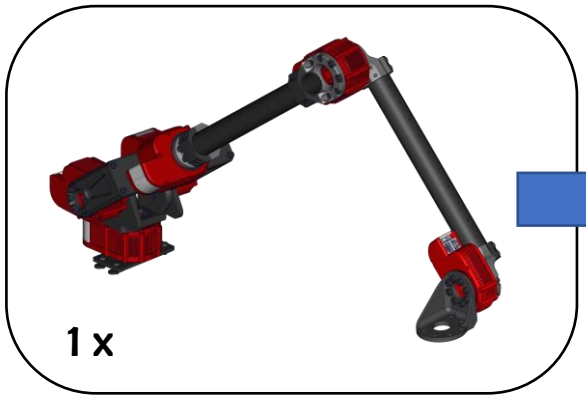






Align with actuator output hub tick mark

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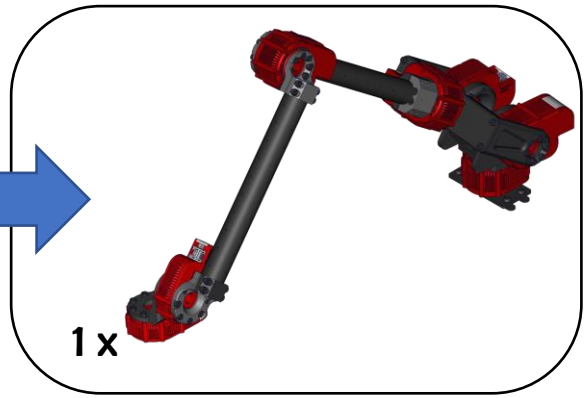
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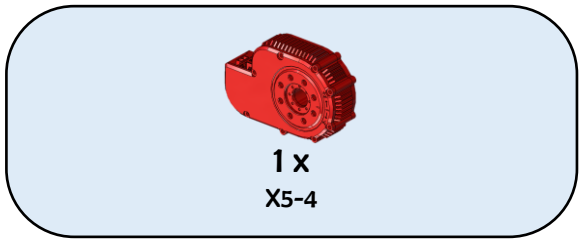
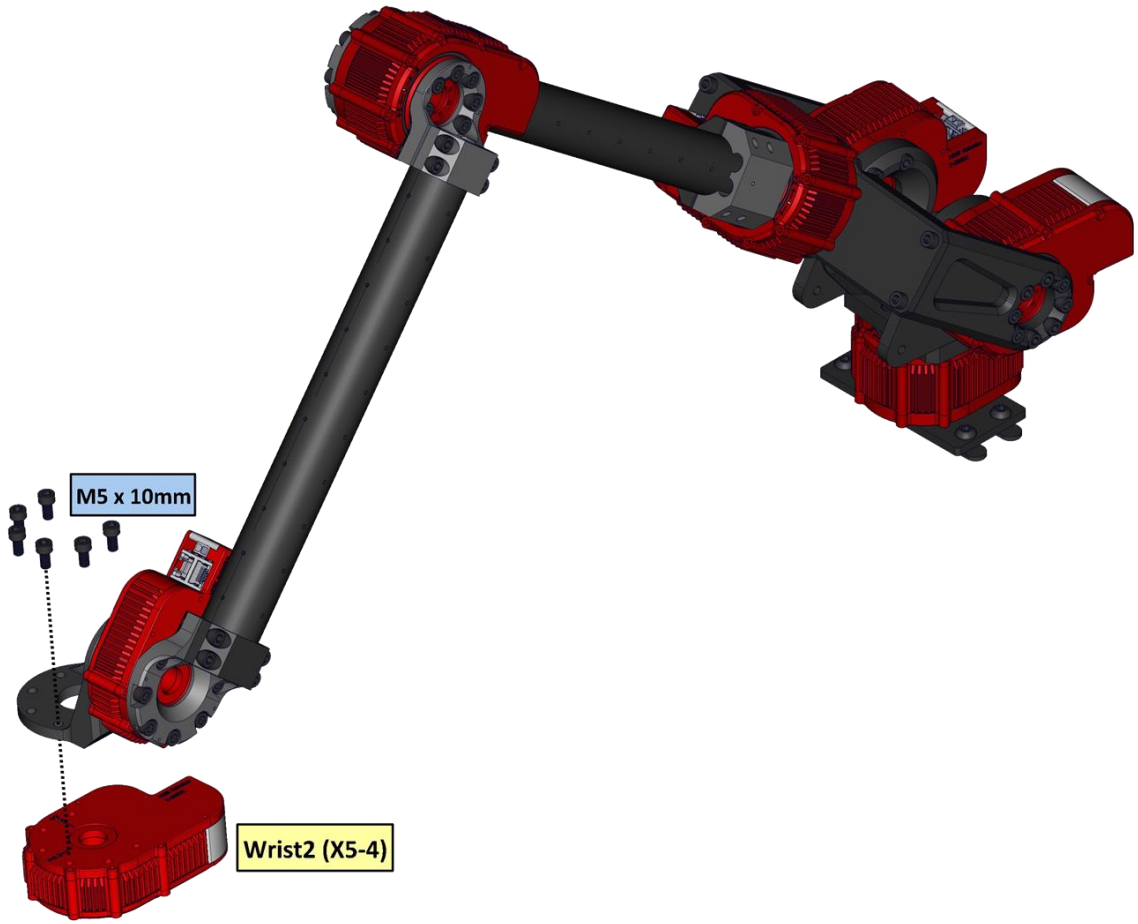
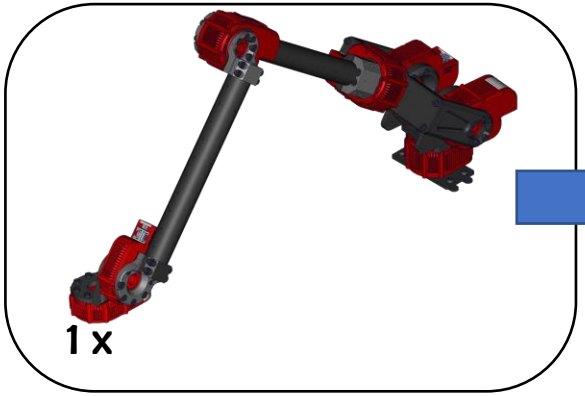
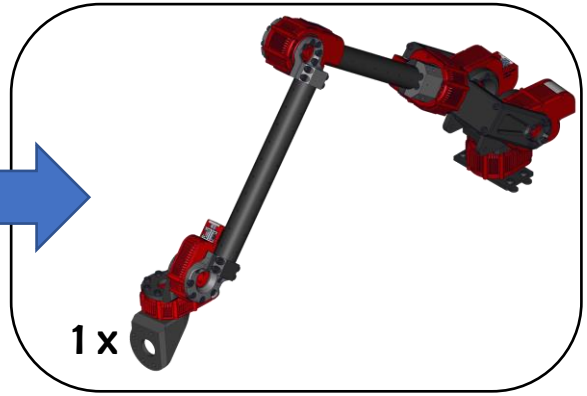
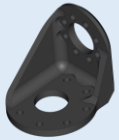

1 x
X5-4


M5 x 10mm
Wrist2 (X5-4)

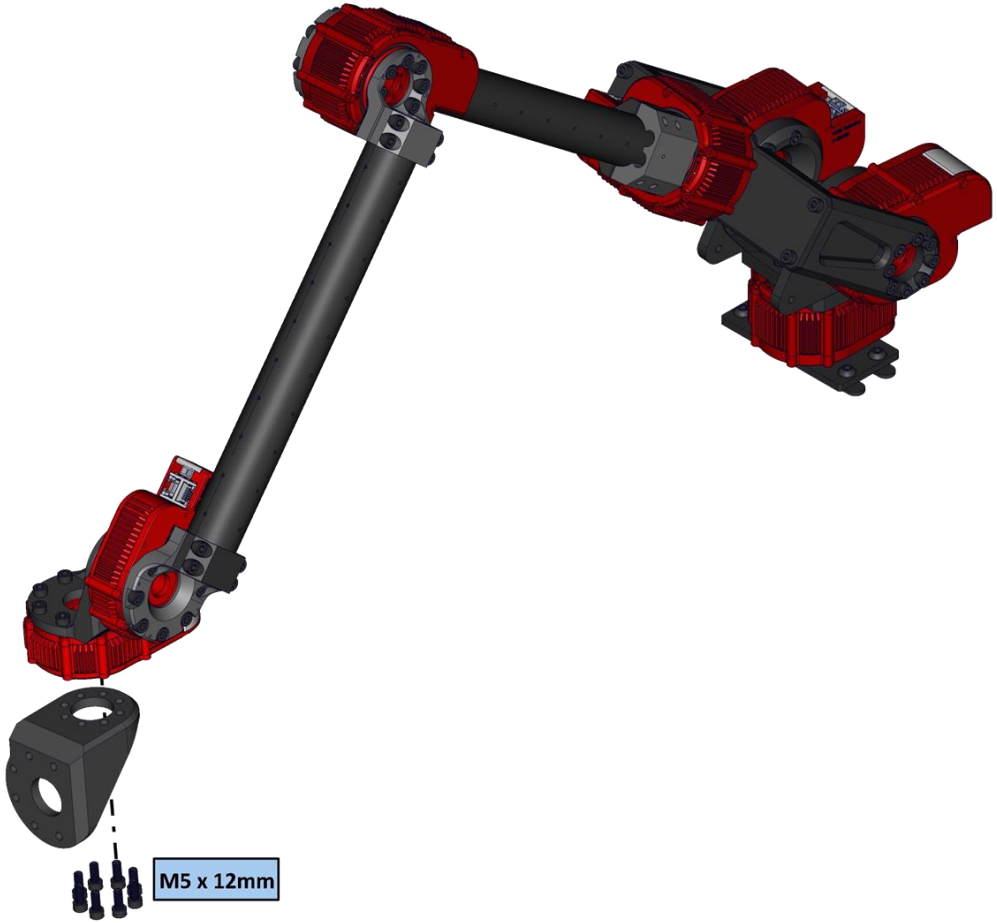


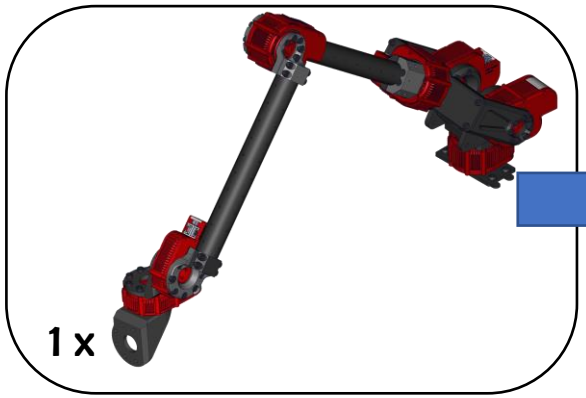




1 x
A-2042-01R

Align with actuator output hub tick mark

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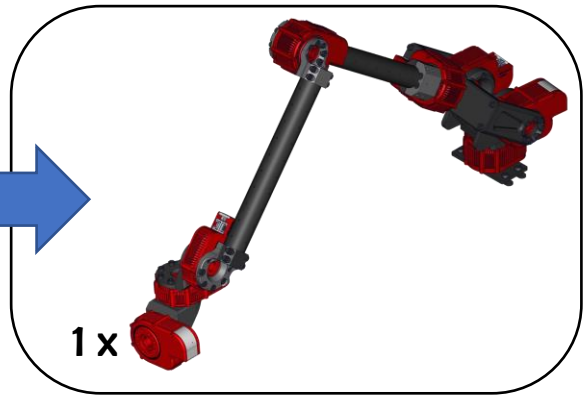
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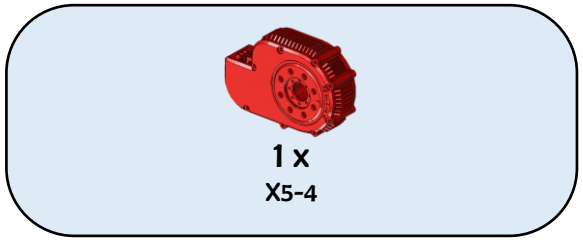
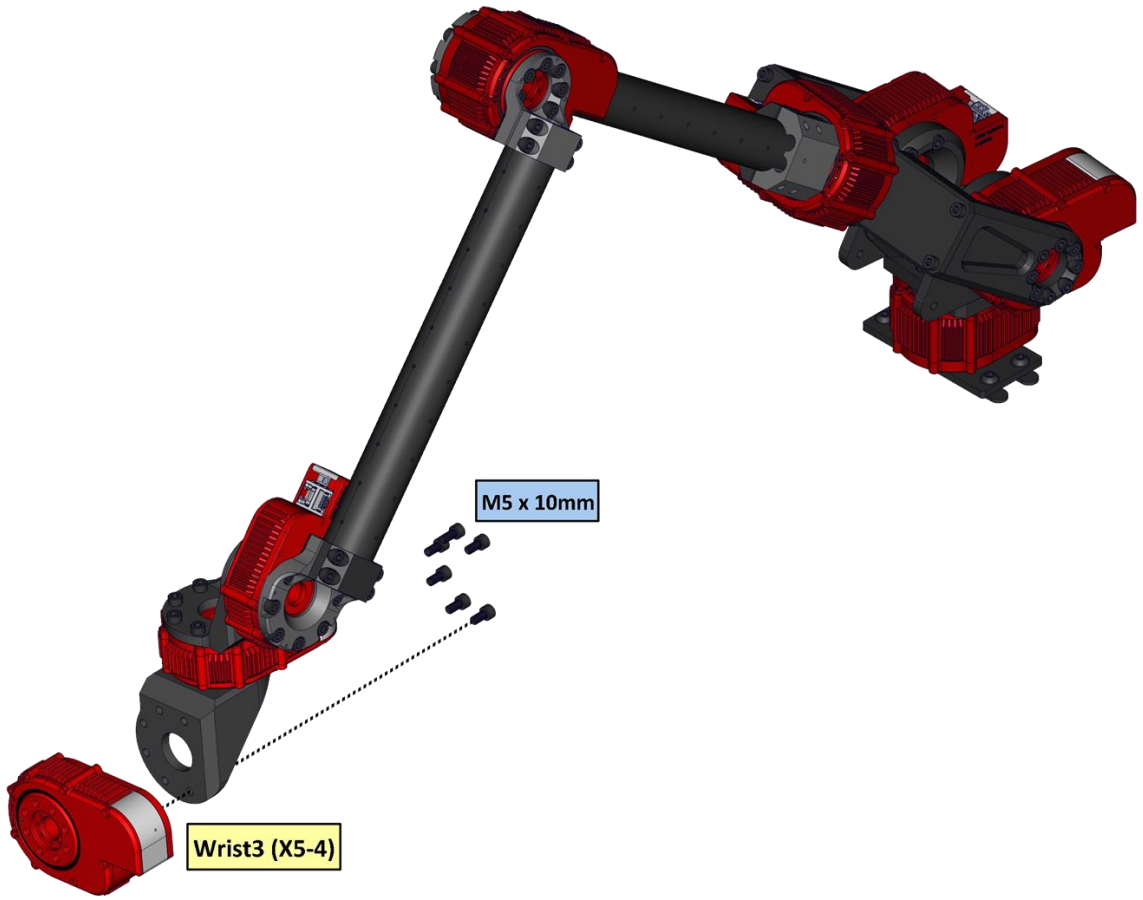
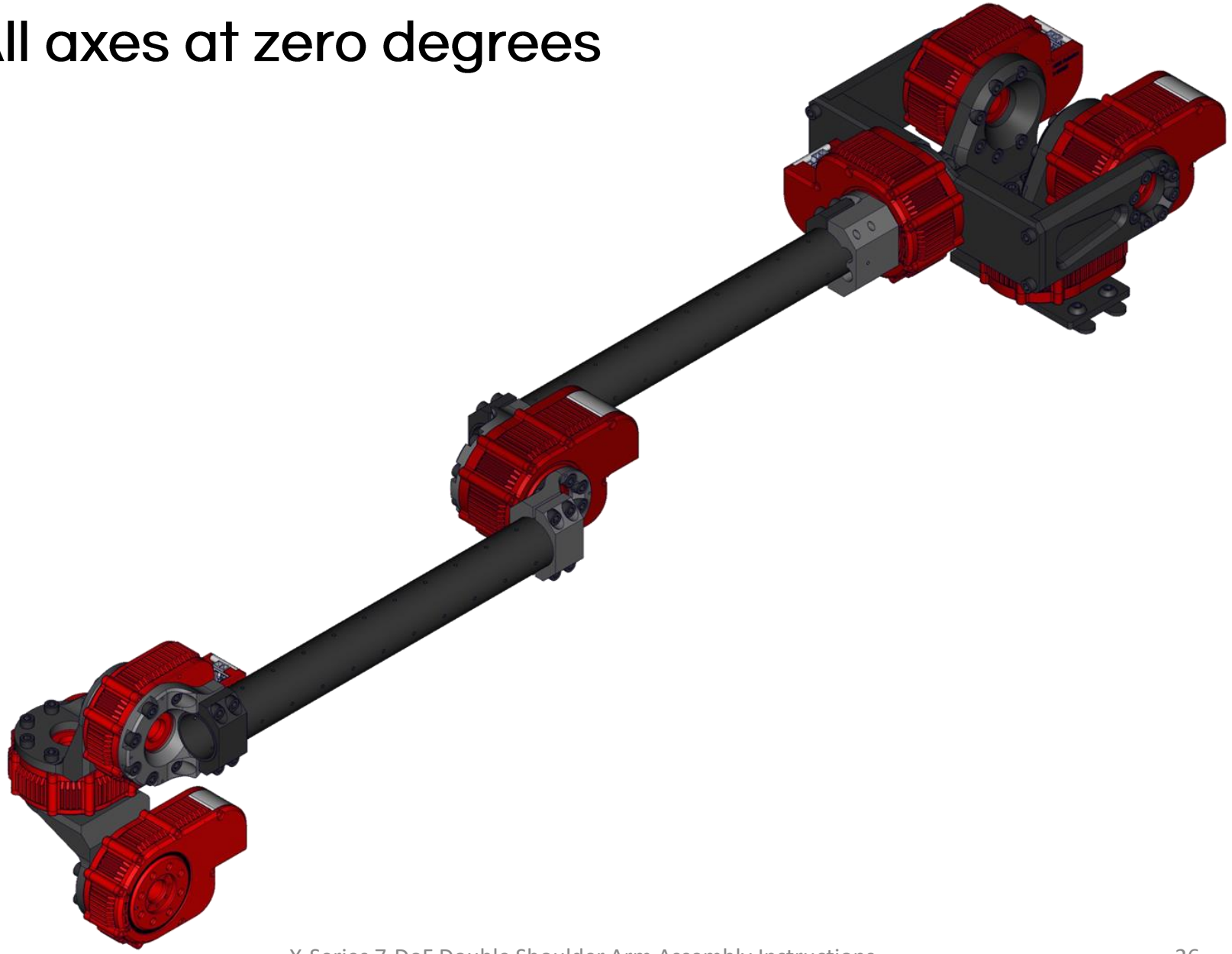

1 x
X5-4


M5 x 10mm
Wrist3 (X5-4)

All axes at zero degrees



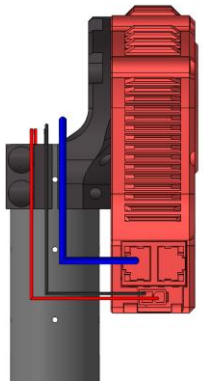
Wiring Notes

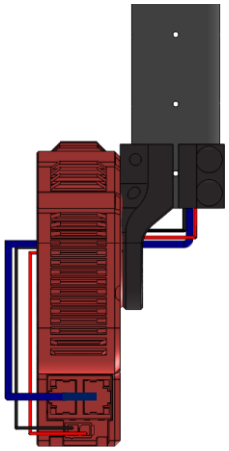
- Keeping wires organized will help prevent tangling and add a nice aesthetic.
  - Spiral sleeving is a good accessory for organizing loose wires
- HEBI X-Series actuators have a thru bore specifically designed to fit ethernet and power connectors.
  - Please pass connectors thru bore hole 1 at a time.

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

[Spiral sleeving]

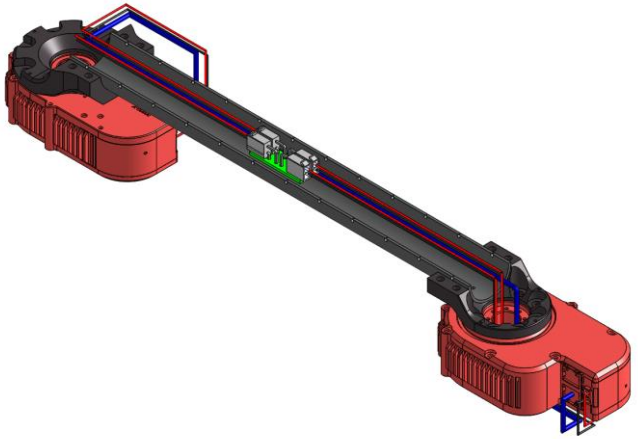
Wires that come from the previous joint should be inserted directly to actuator ports.



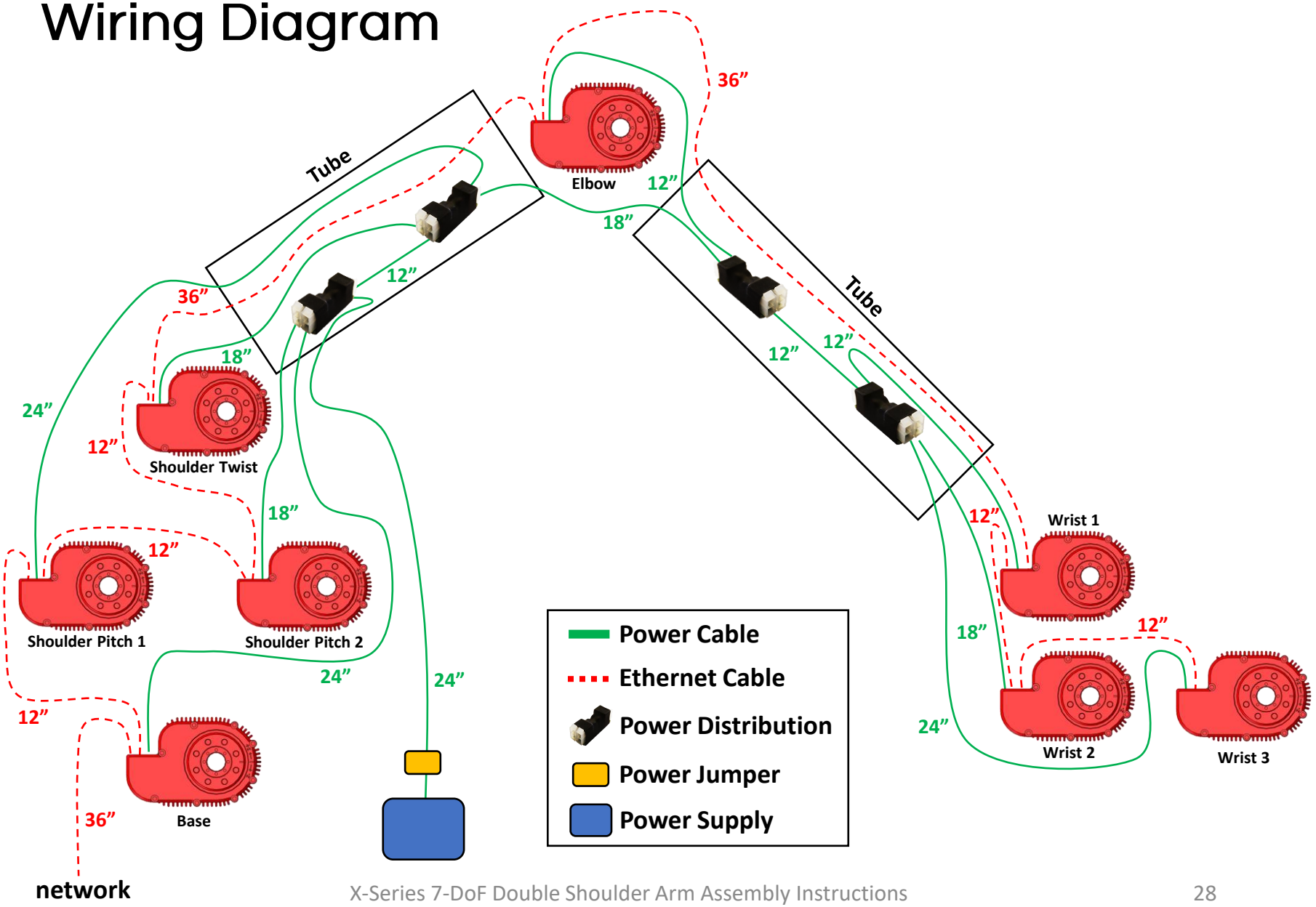


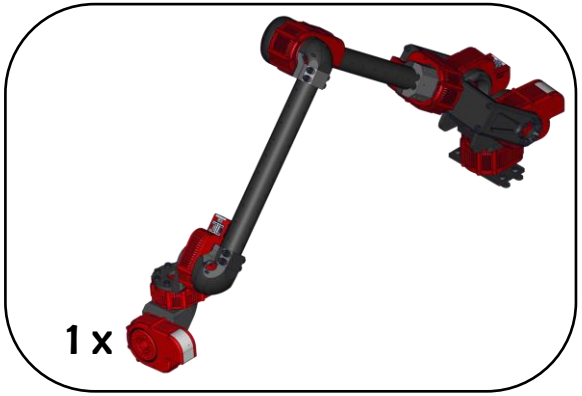
Wires that connect to the next joint should be threaded through the actuator's bore hole.

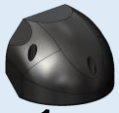
Power distribution boards are included to help daisy-chain power connections.
These fit well within the tubes between actuators.



Wiring Diagram



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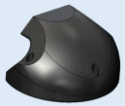
A-2090-02


2 x
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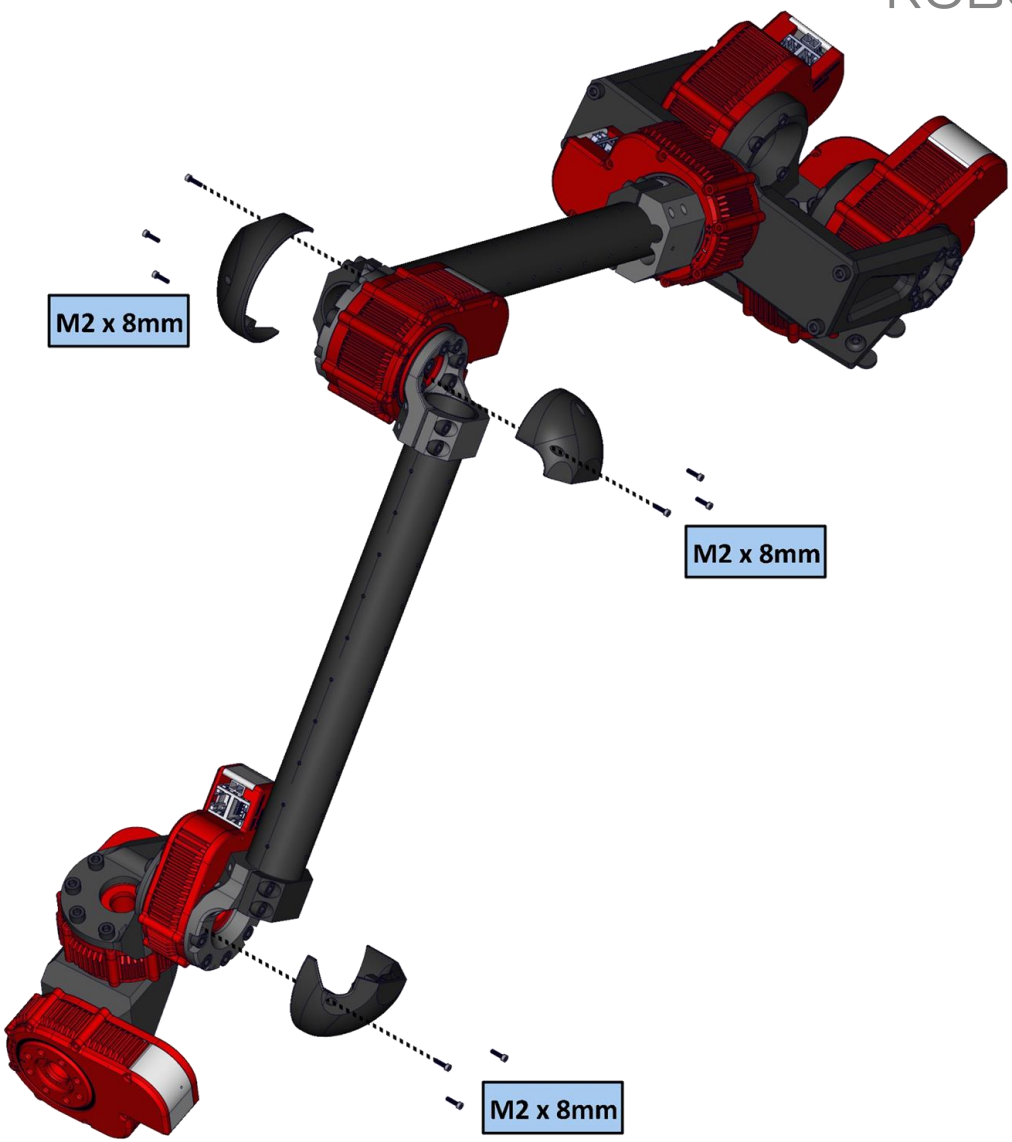
Install cables before adding caps



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