



## **4-DoF SCARA Style 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***

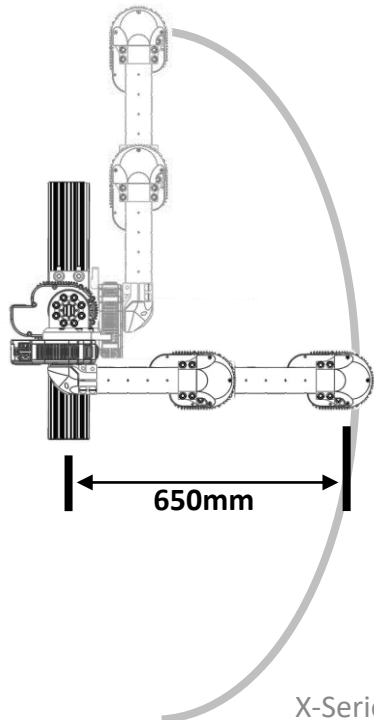
## Technical Specifications

<u>Specifications</u>	<u>Value</u>
<b>Weight</b> (Excludes T-Slot Frame)	2.5 kg
<b>Reach</b>	650 mm
<b>Max Continuous Payload*</b>	1.00 kg
<b>Max Peak Payload*</b>	1.50 kg

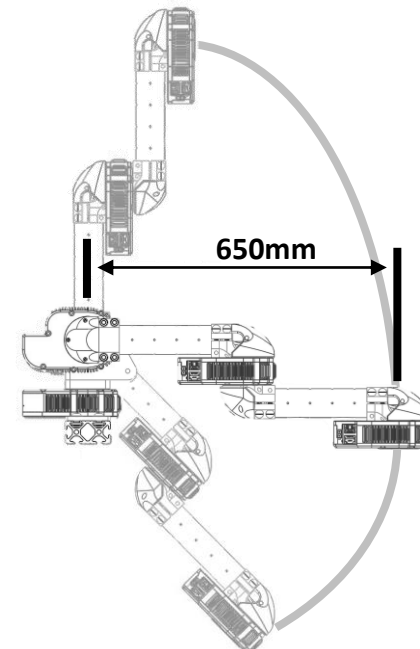
\*Calculated using Default Configuration.\*  
Using a different configuration of X-Series Actuators will provide different payload capacities.

<u>Movement</u>	<u>Working Range</u>	<u>Max Speed</u>
<b>Axis 1 – Base</b> [Default: X5-4]	-50° to +80° (limited by wiring)	192°/s
<b>Axis 2 – Shoulder</b> [Default: X5-9]	-30° to +90°	84°/s
<b>Axis 3 – Elbow</b> [Default: X5-4]	-155° to +155° (avoid end effector collisions)	192°/s
<b>Axis 4 – Wrist 1</b> [Default: X5-1]	Continuous (avoid end effector collisions)	540°/s

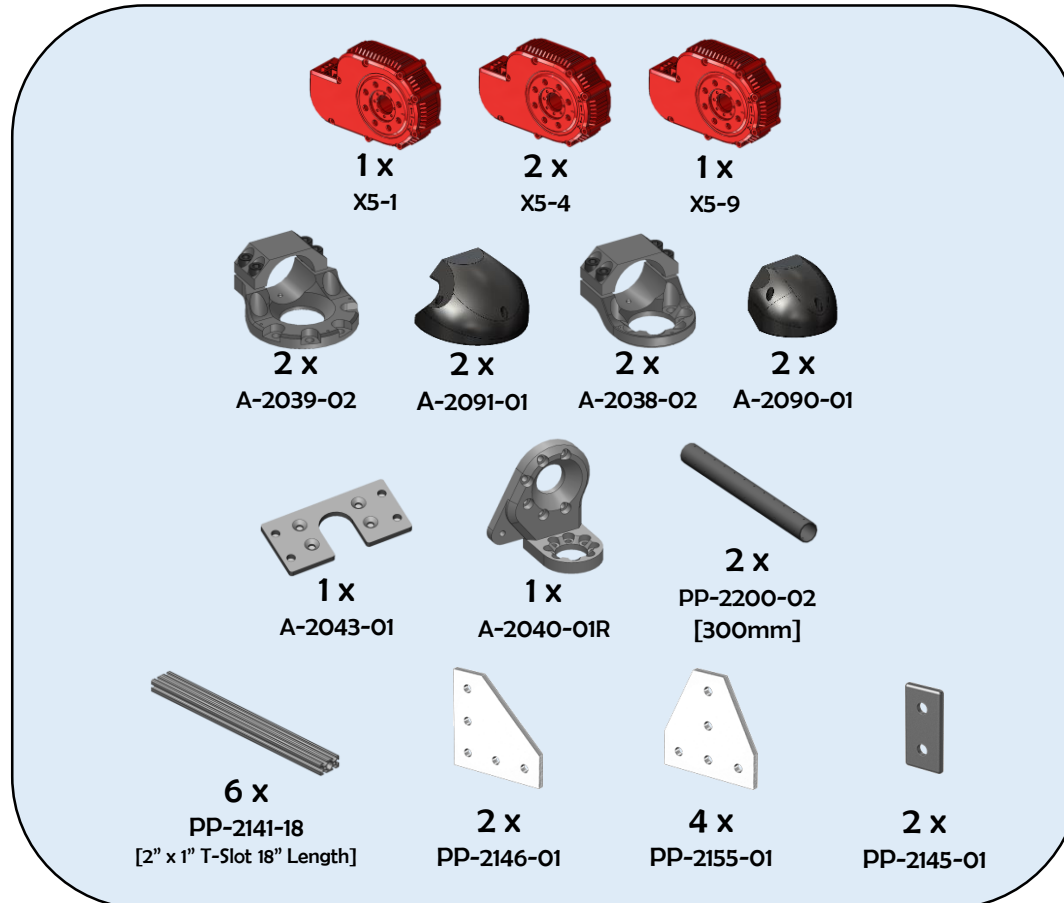
**Top View**



**Side View**



## Bill of Materials - Mechanical\*



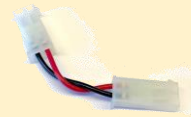
**\*fasteners included, not shown\***

Additional T-Slot components available from McMaster-Carr or 80/20 Inc.

# Bill of Materials - Electrical



2 x  
A-2128-01  
Power Distribution Board



1 x  
A-2048-02  
Power Jumper



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



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



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

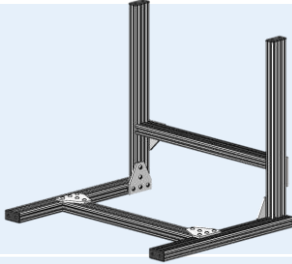
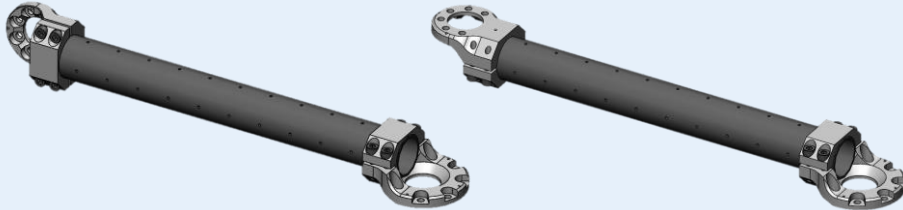
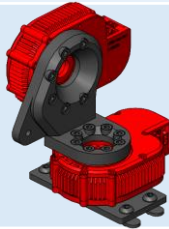
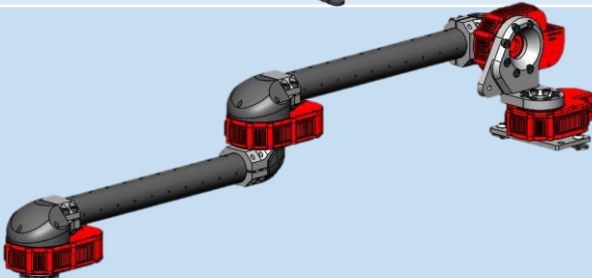


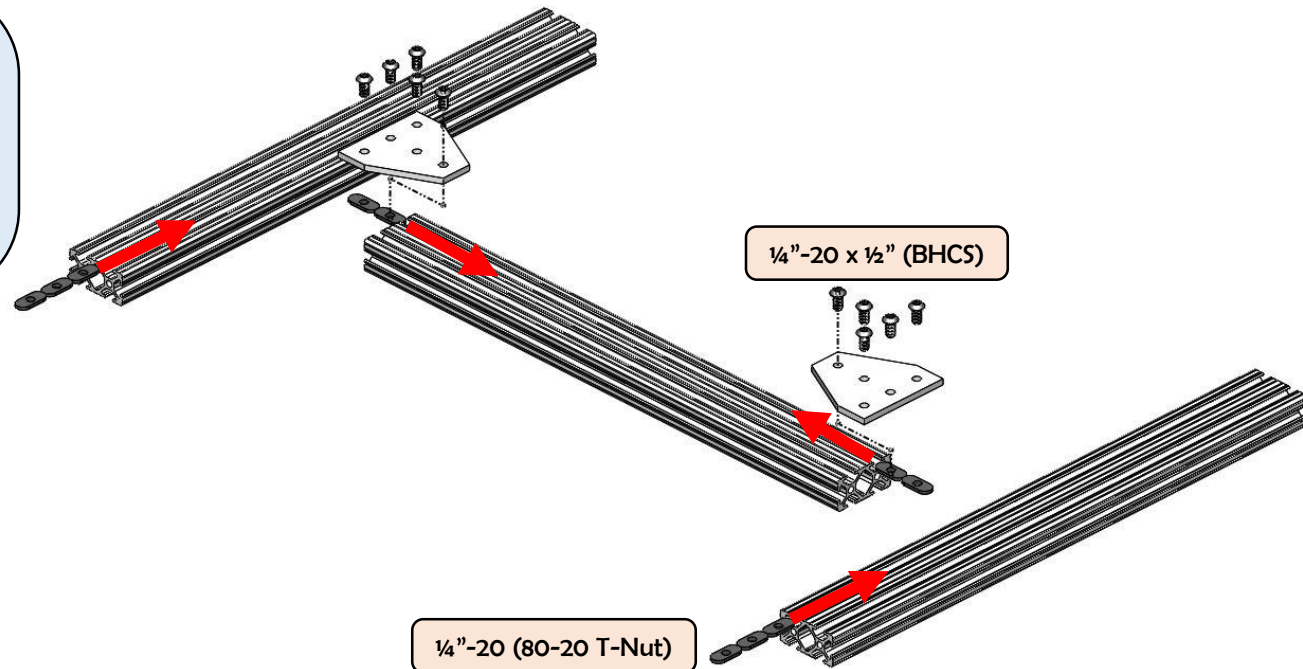
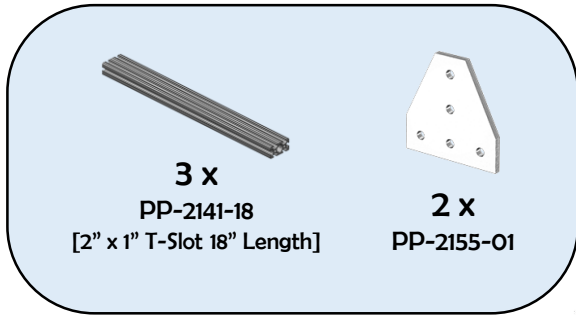
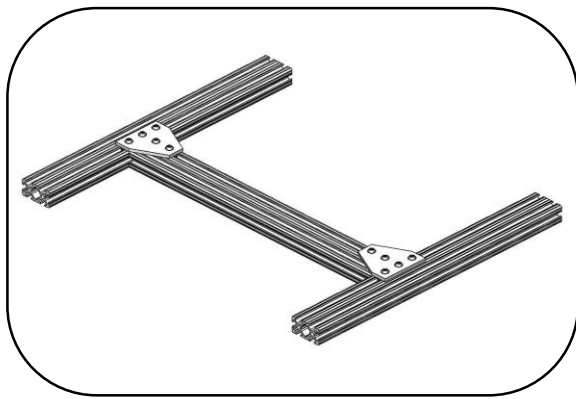
1 x  
PP-2059-01  
Ethernet Cable, 12" Length

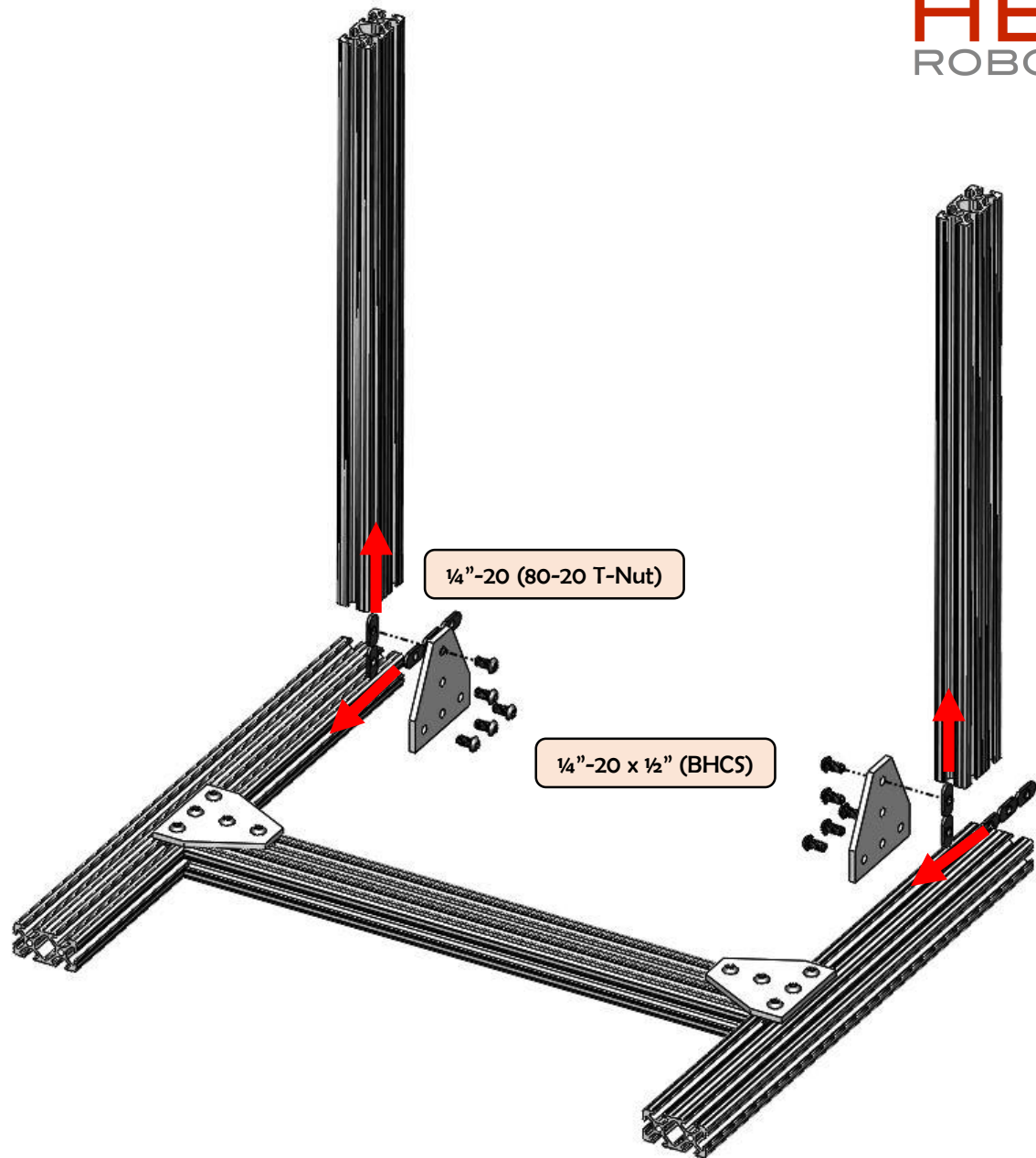
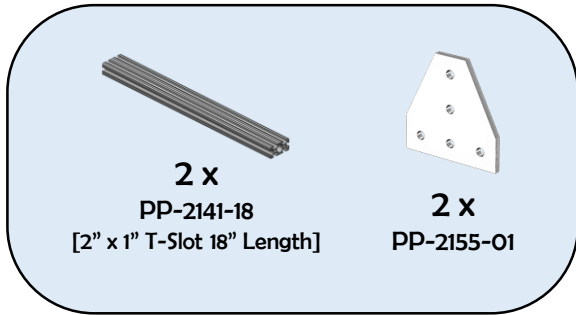
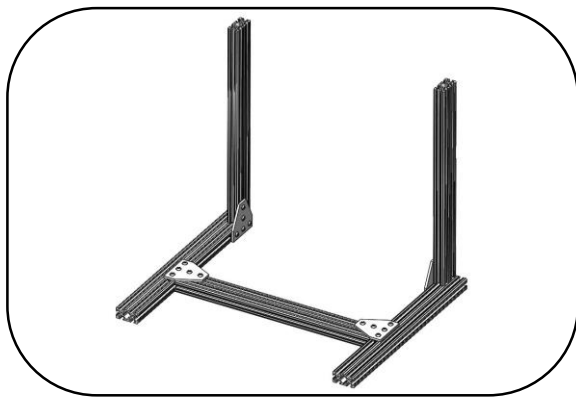


3 x  
PP-2061-01  
Ethernet Cable, 36" Length

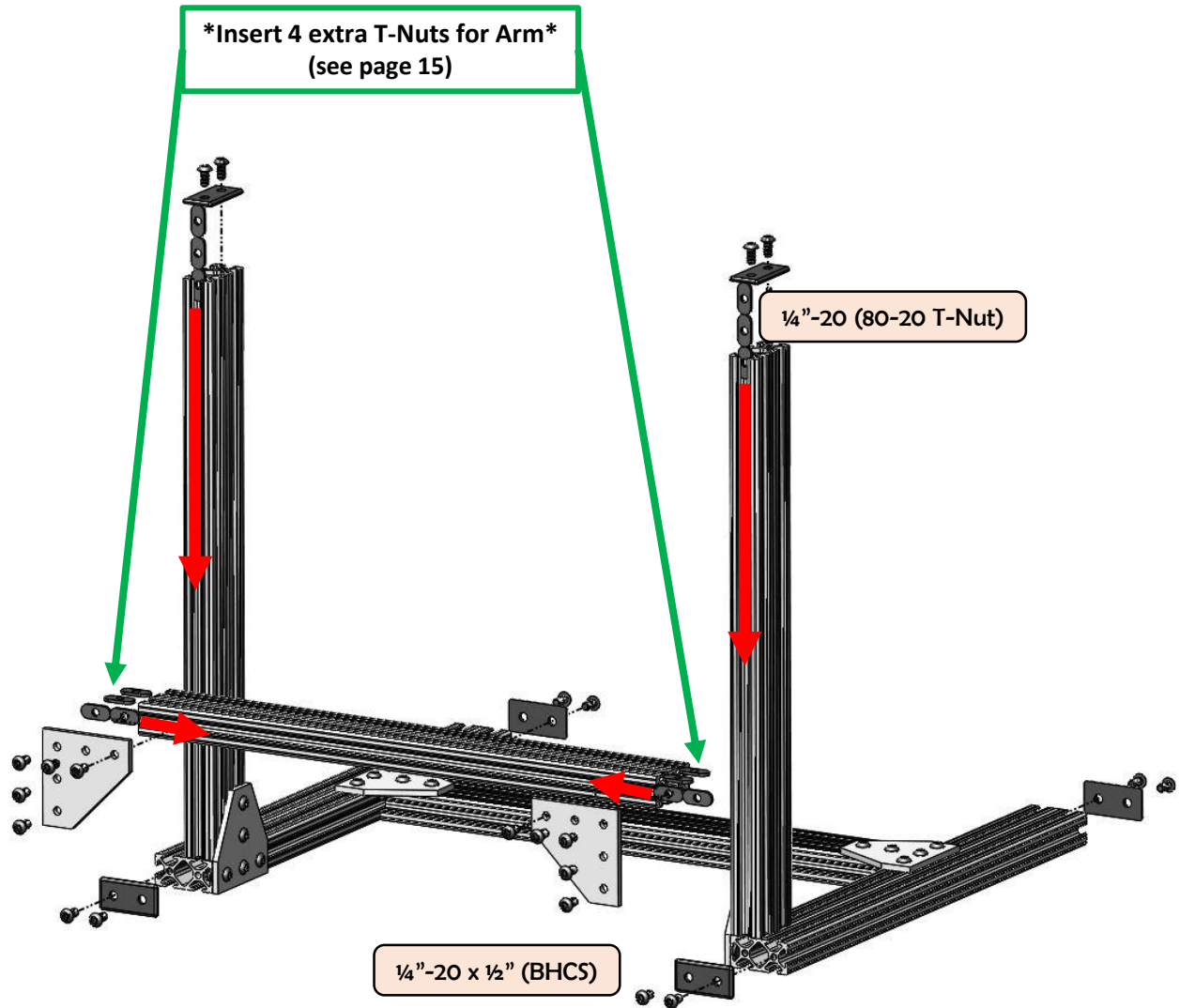
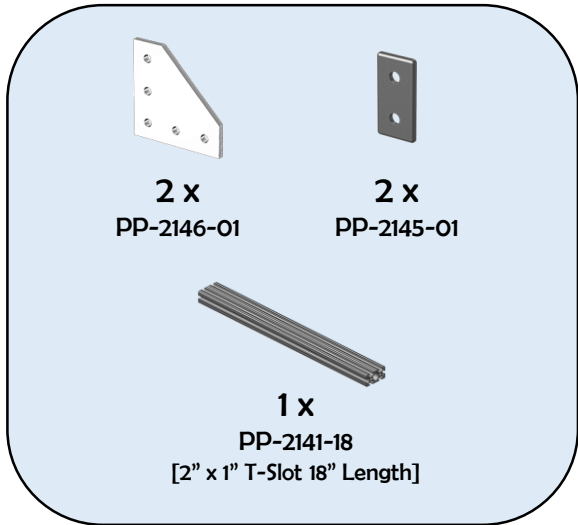
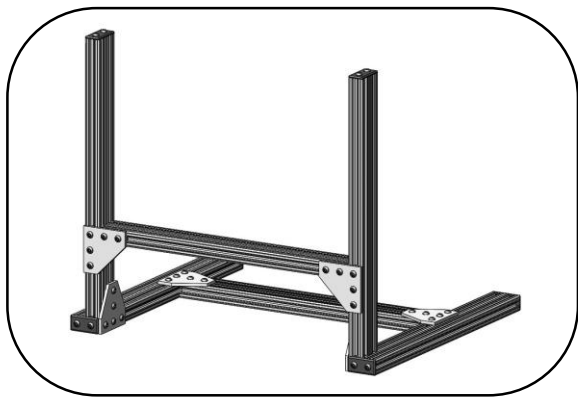
## Table of Contents

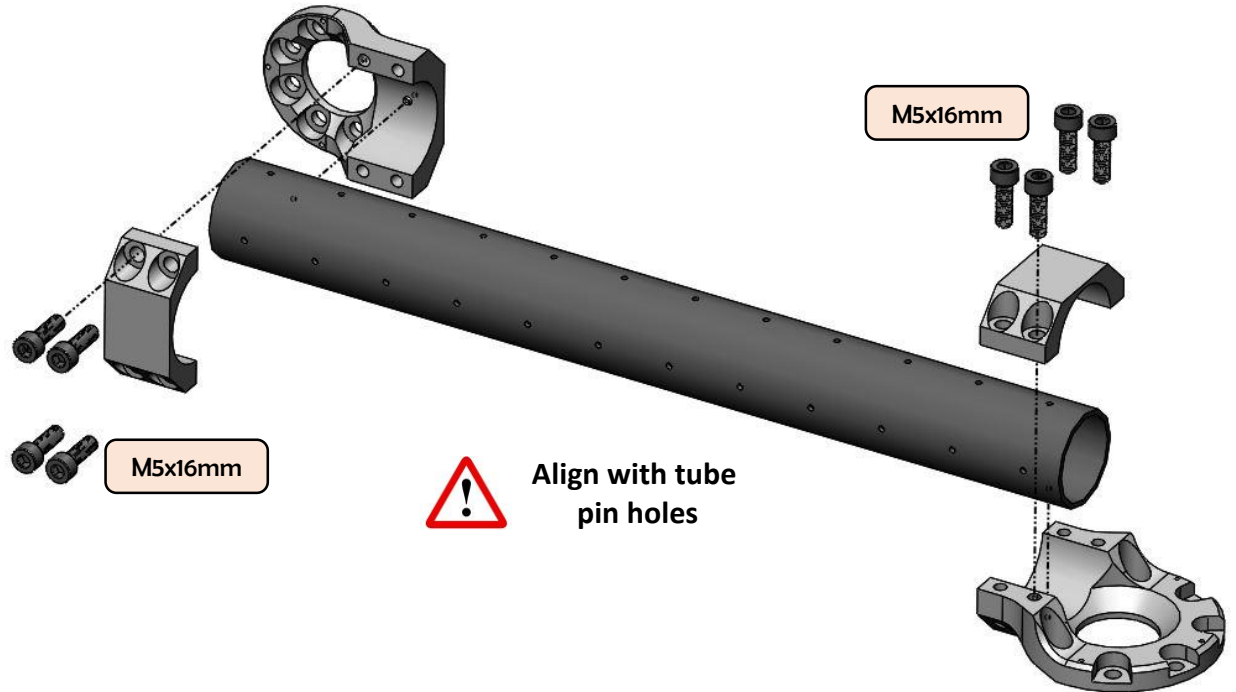
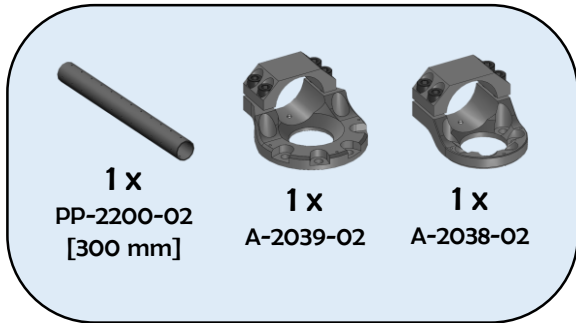
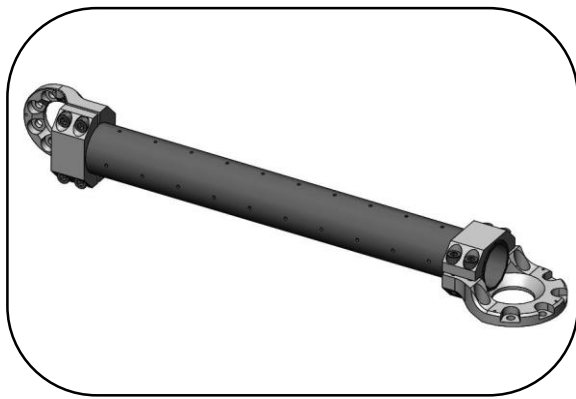
<b><u>Assembly</u></b>	<b><u>Image</u></b>	<b><u>Pages</u></b>
Frame		[6-8]
Tubes		[9-10]
Base		[11-12]
Final		[13-17]

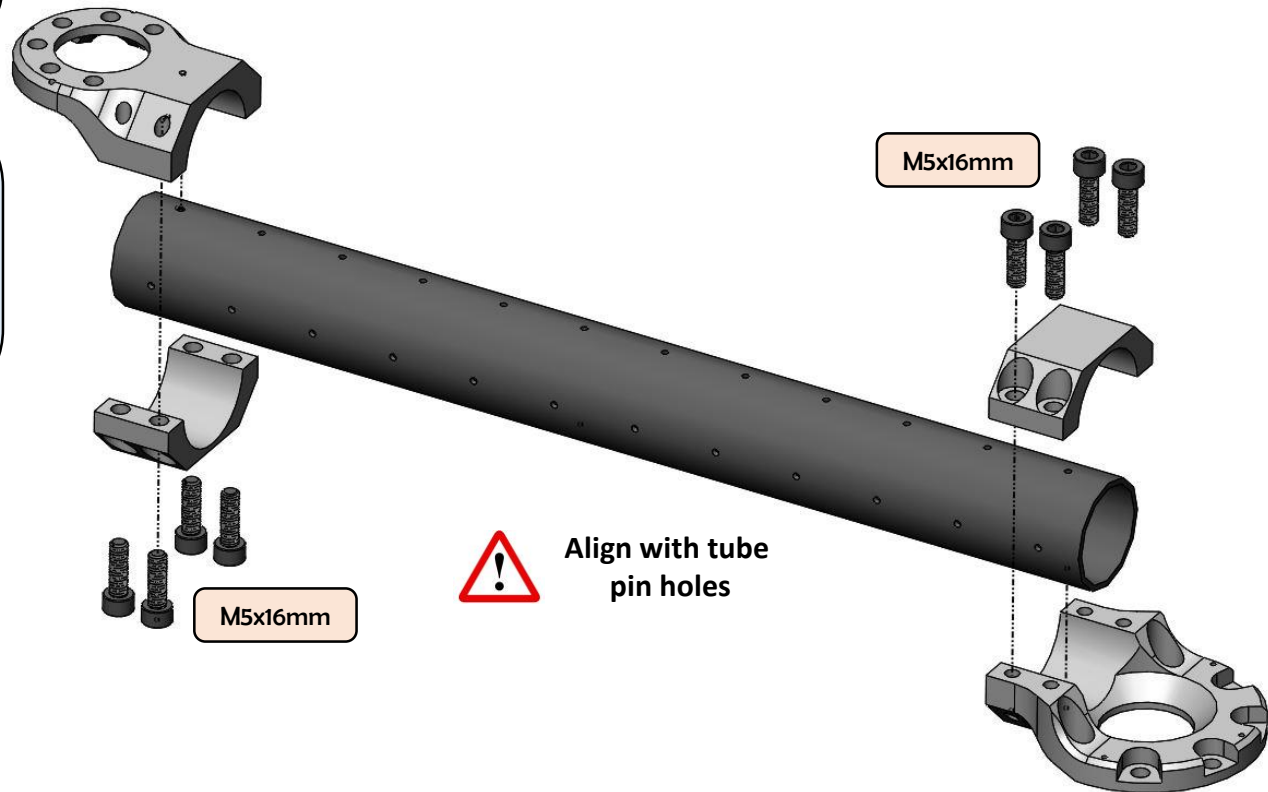
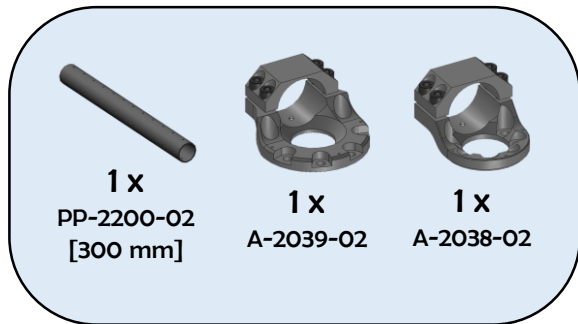
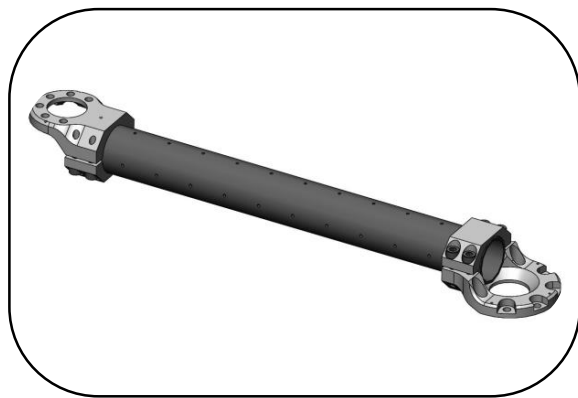


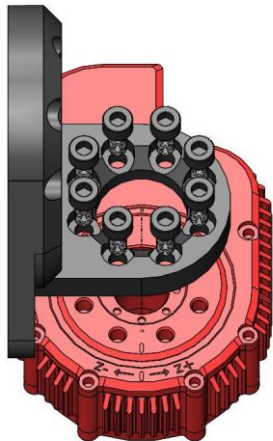
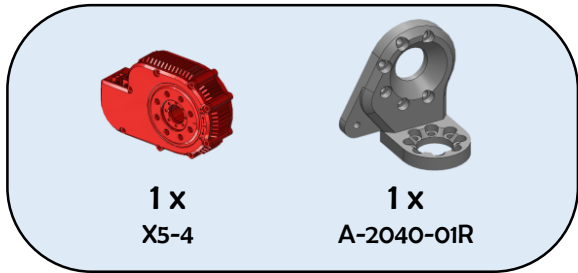
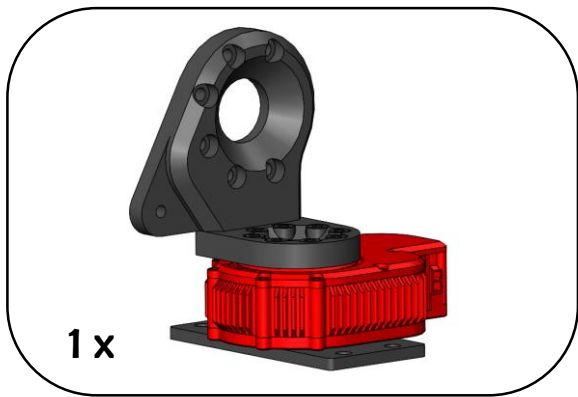





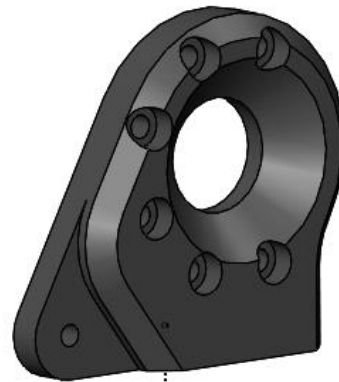








 **Align with actuator  
output hub tick mark**  
(face parallel with tick mark and  
mounting hole pointed on same side)



Flat face towards outside



M5x12mm

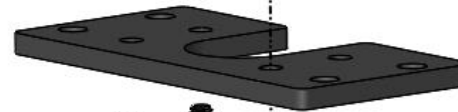
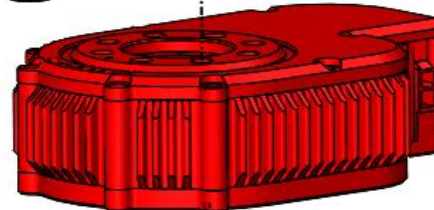
Step 2 of 2



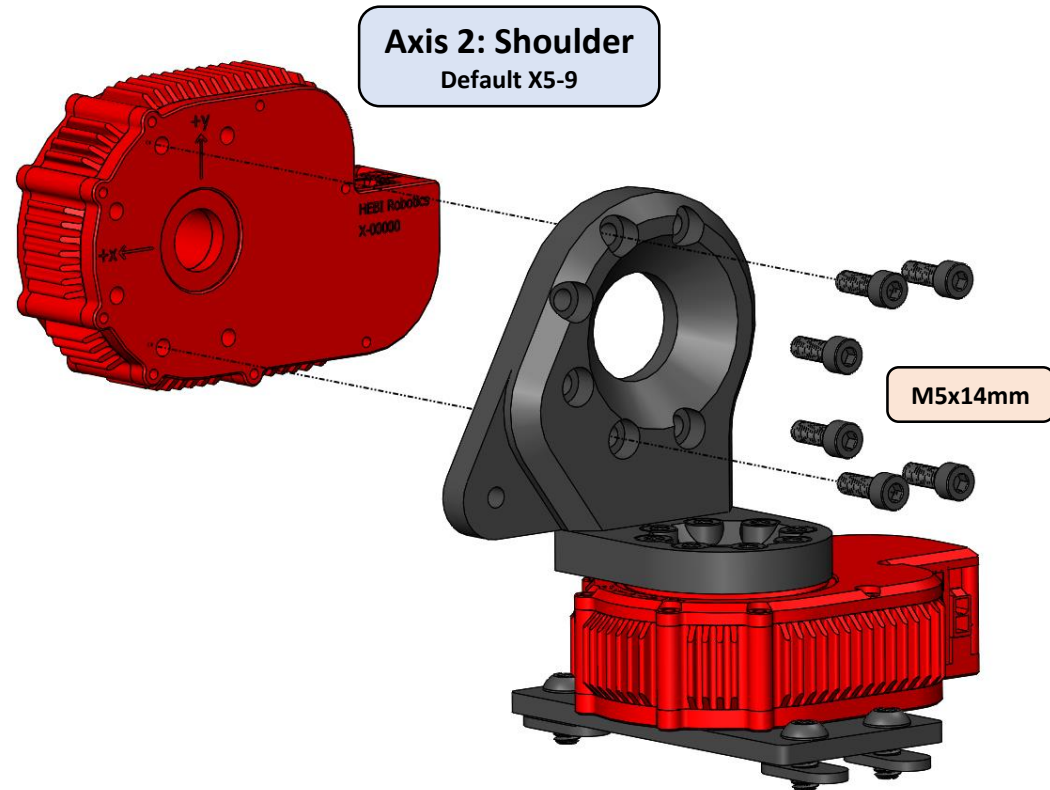
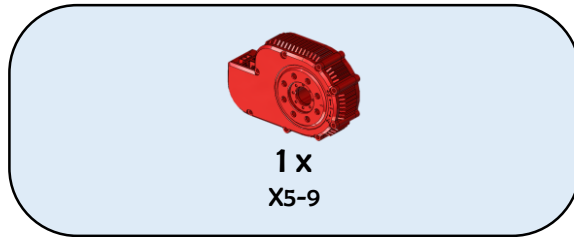
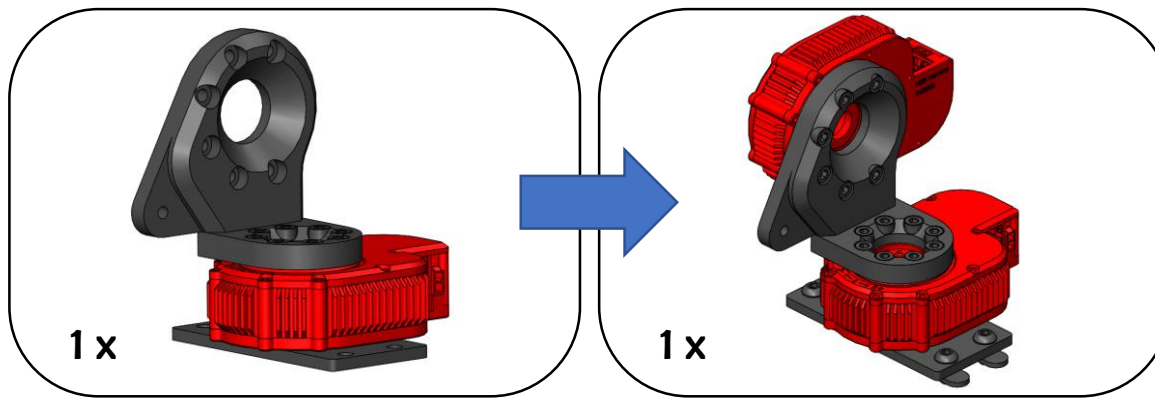
M6x12mm

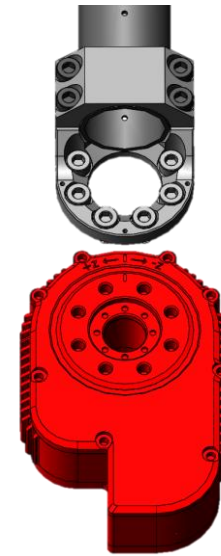
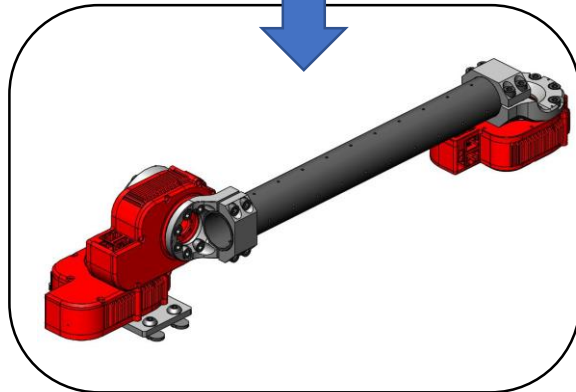
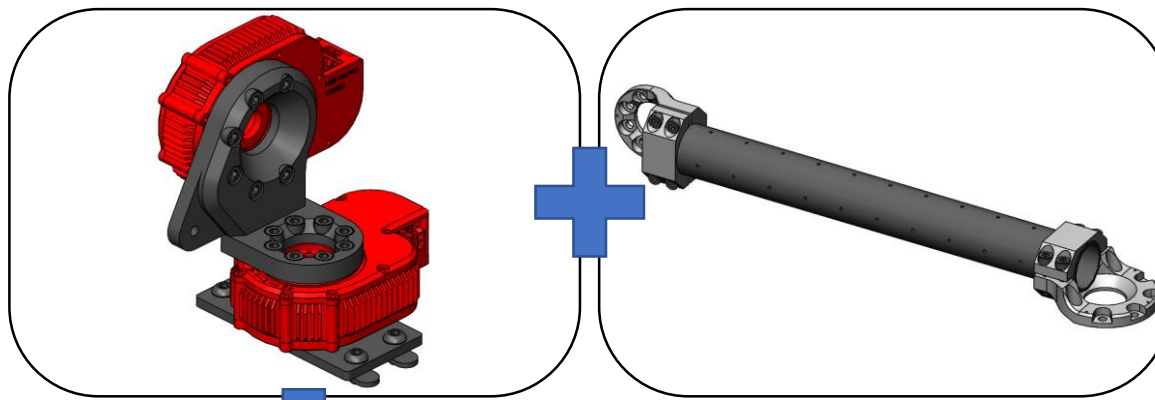
Step 1 of 2


Axis 1: Base  
Default X5-4



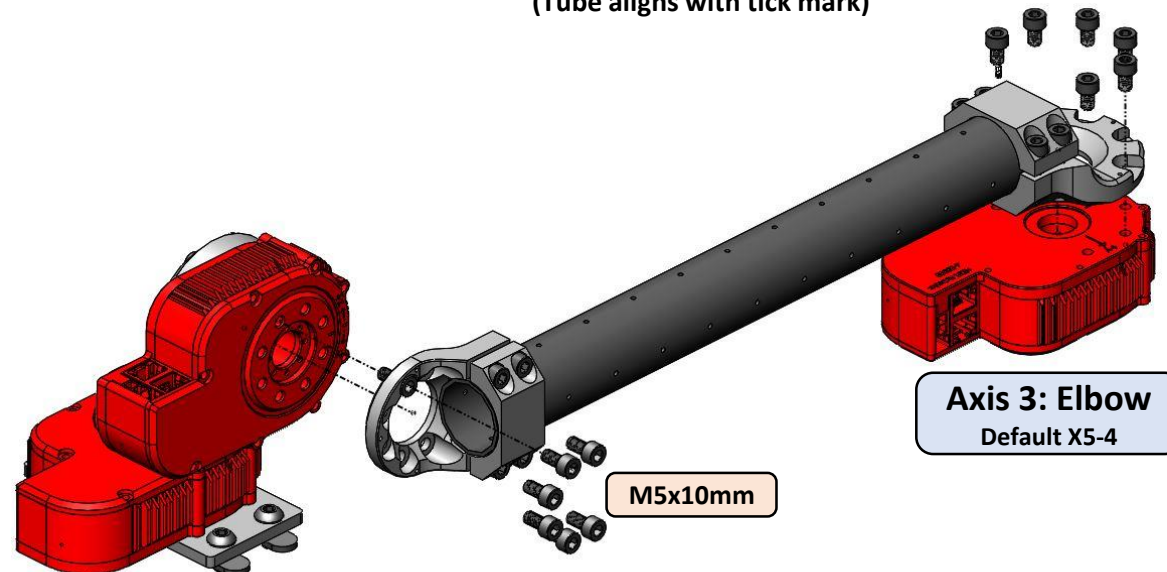
M5x10mm FHCS



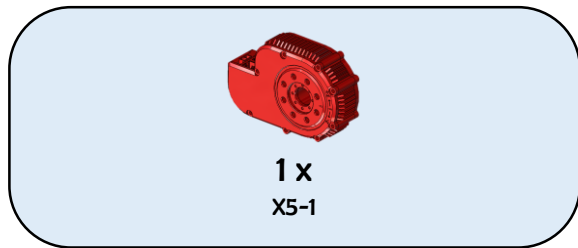
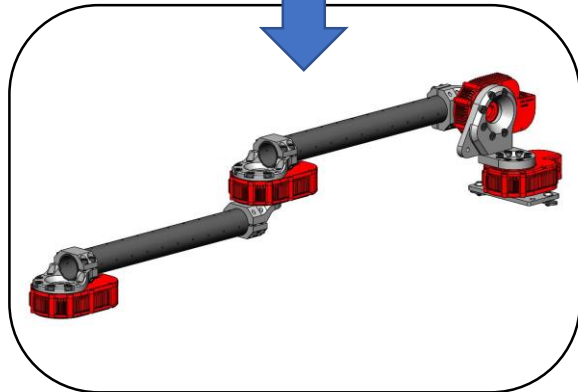
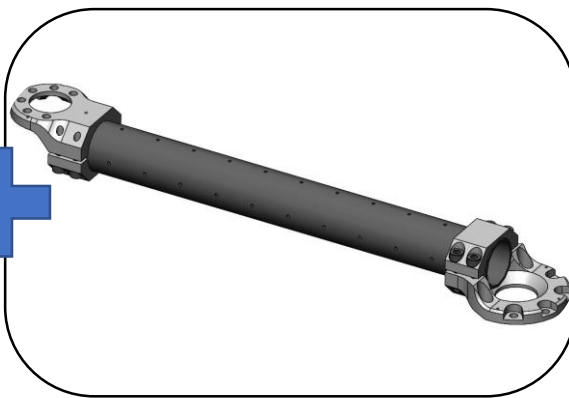
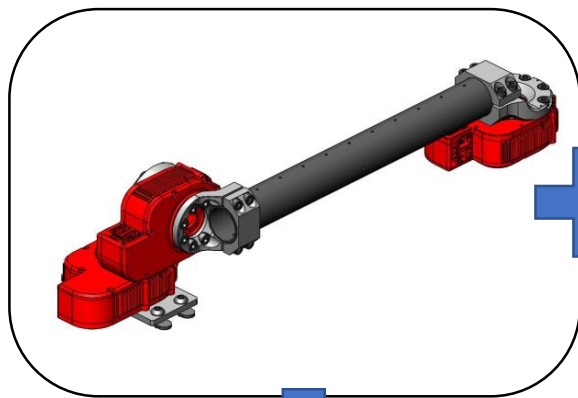



 **Align with actuator  
output hub tick mark**  
(Tube aligns with tick mark)

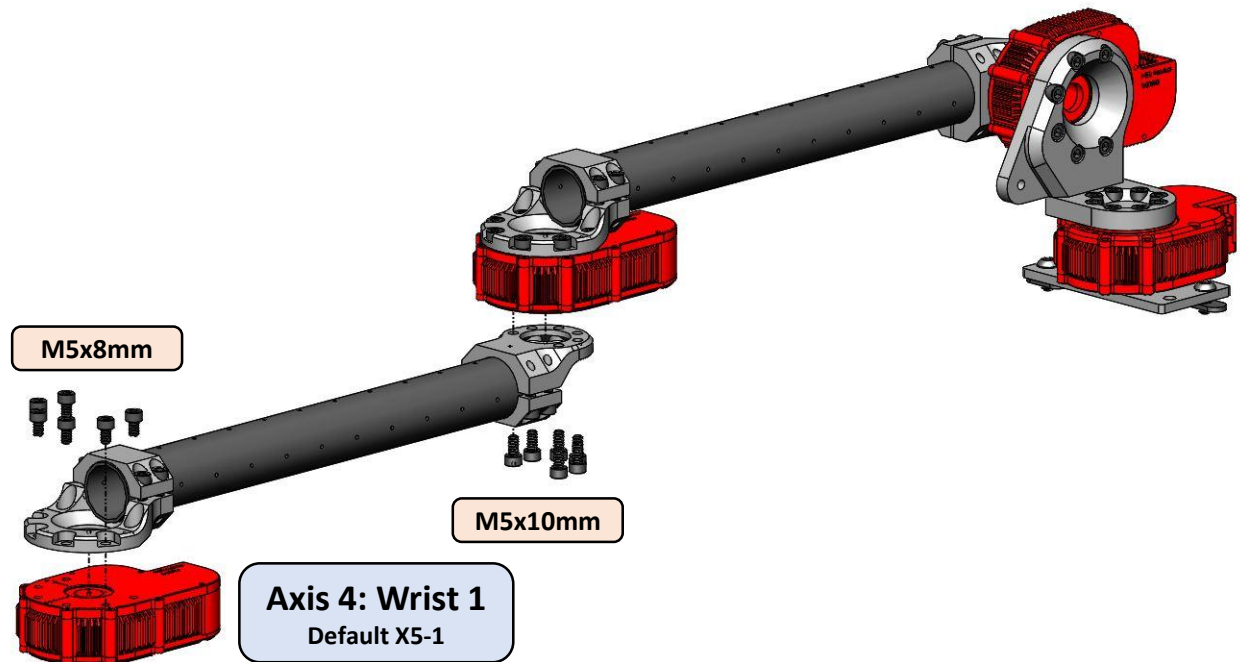
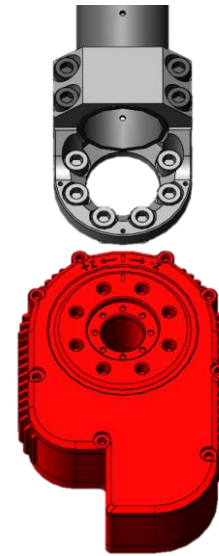
M5x8mm







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



## Wiring Notes

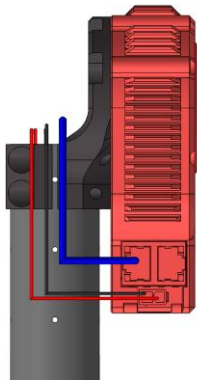
- Keeping wires organized will help prevent tangling and add a nice aesthetic.
  - Spiral sleeving is a good accessory for organizing loose wires
- HEBI X-Series actuators have a thru bore specifically designed to fit ethernet and power connectors.
  - Please pass connectors thru bore hole 1 at a time.

For more information visit: [docs.hebi.us](https://docs.hebi.us)

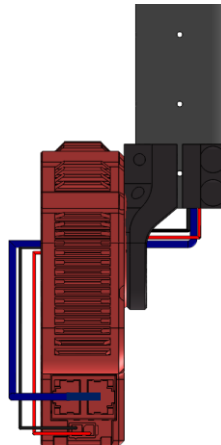


[Spiral sleeving]

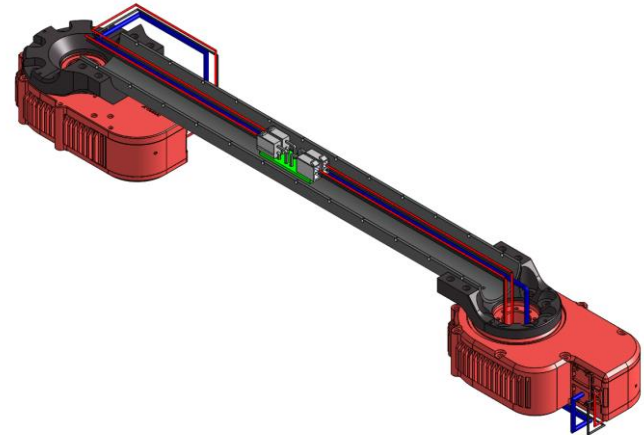
Wires that come from the previous joint should be inserted directly to actuator ports.



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

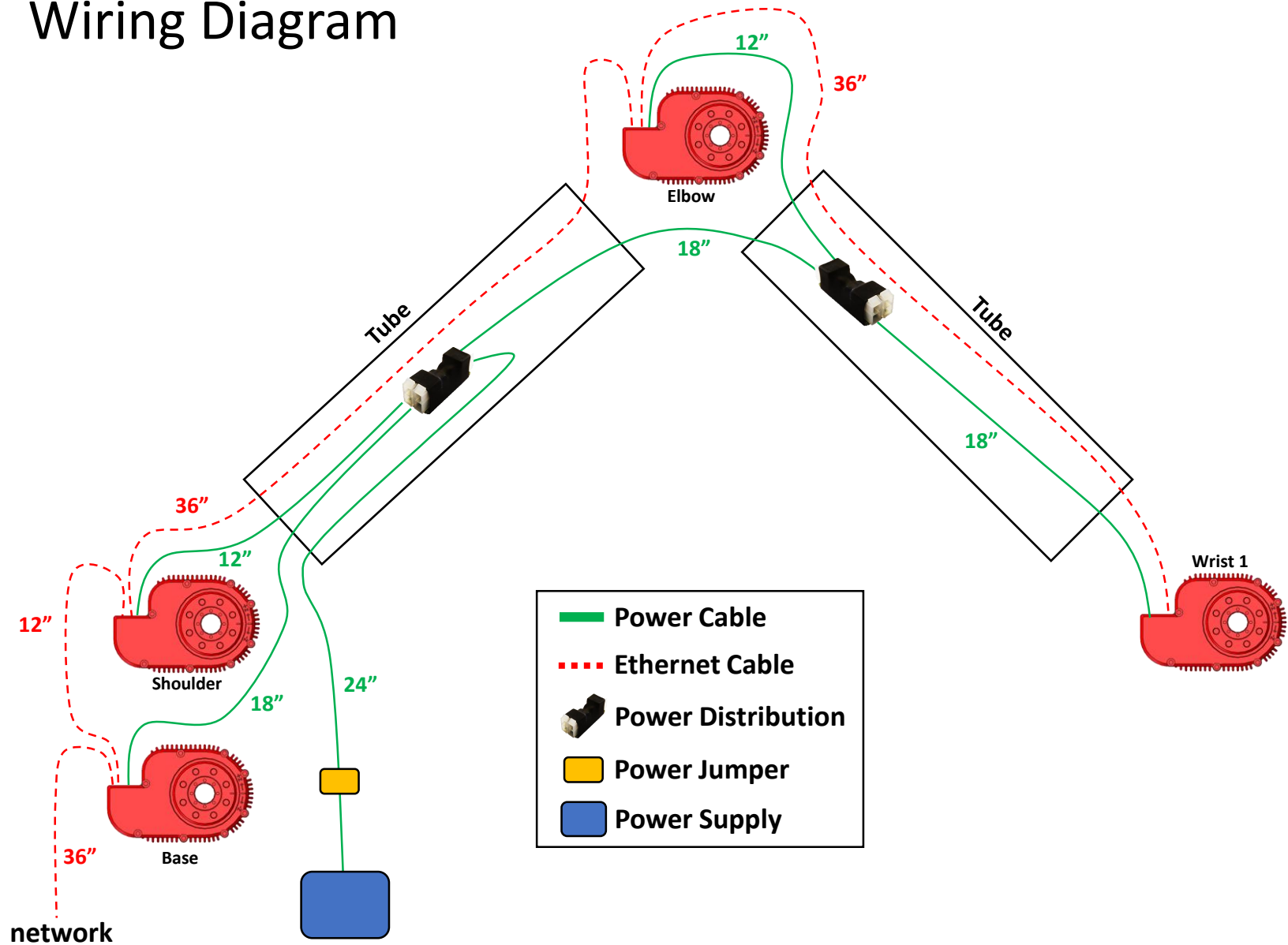


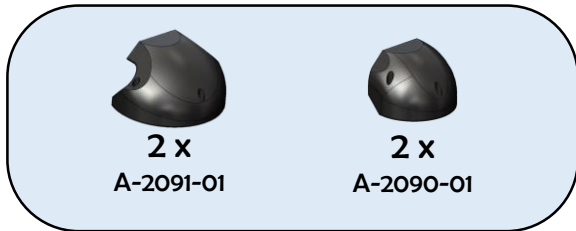
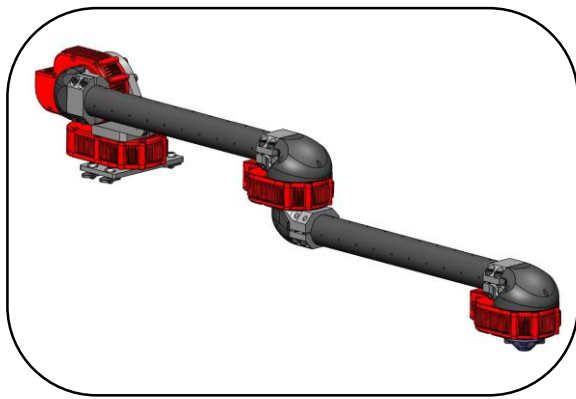
Power distribution boards are included to help daisy-chain power connections. These fit well within the tubes between actuators.



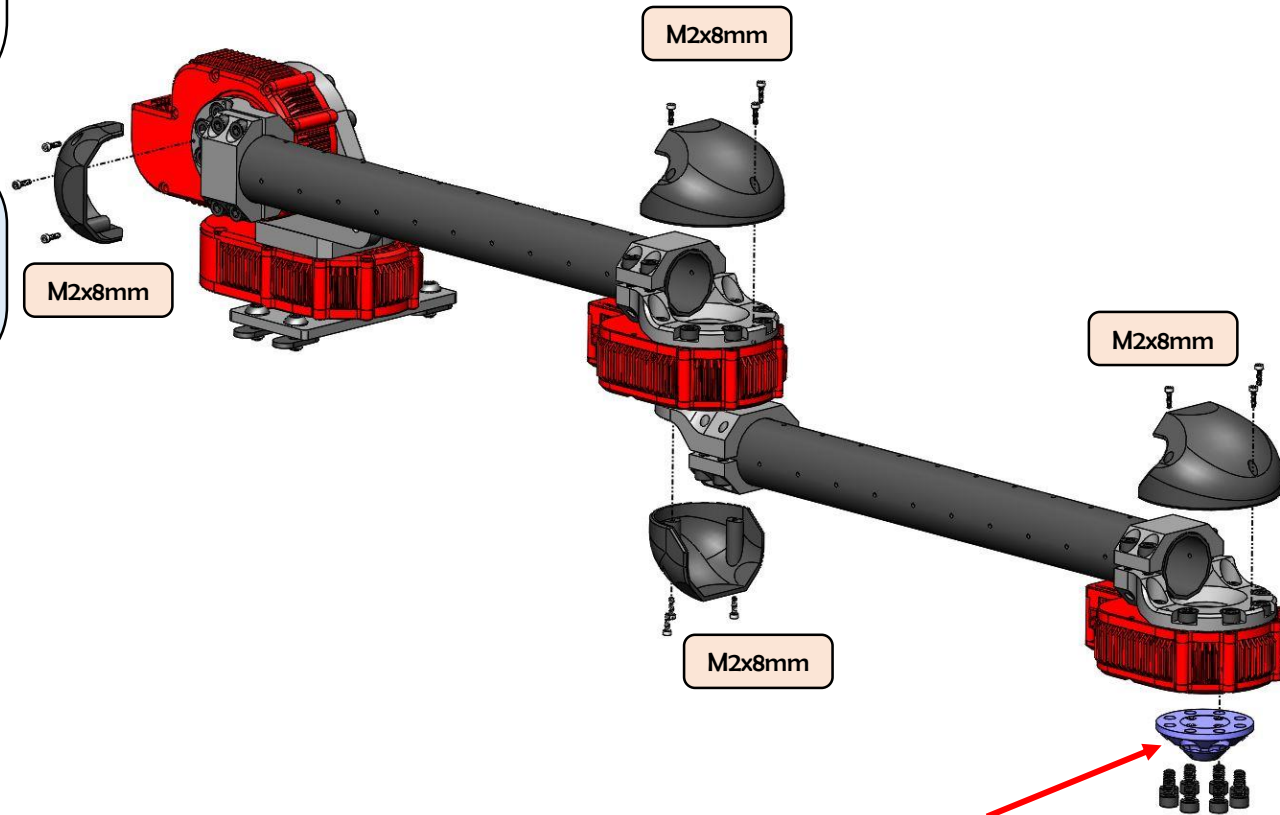


## Wiring Diagram

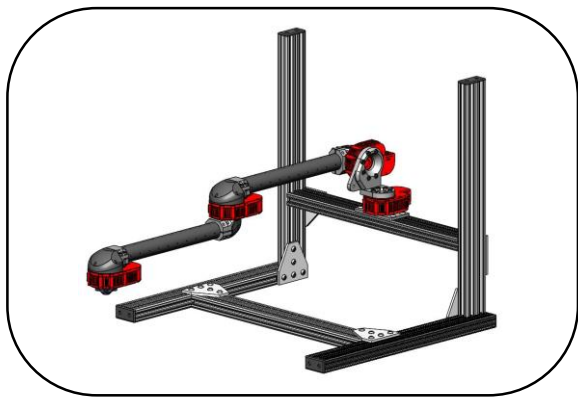




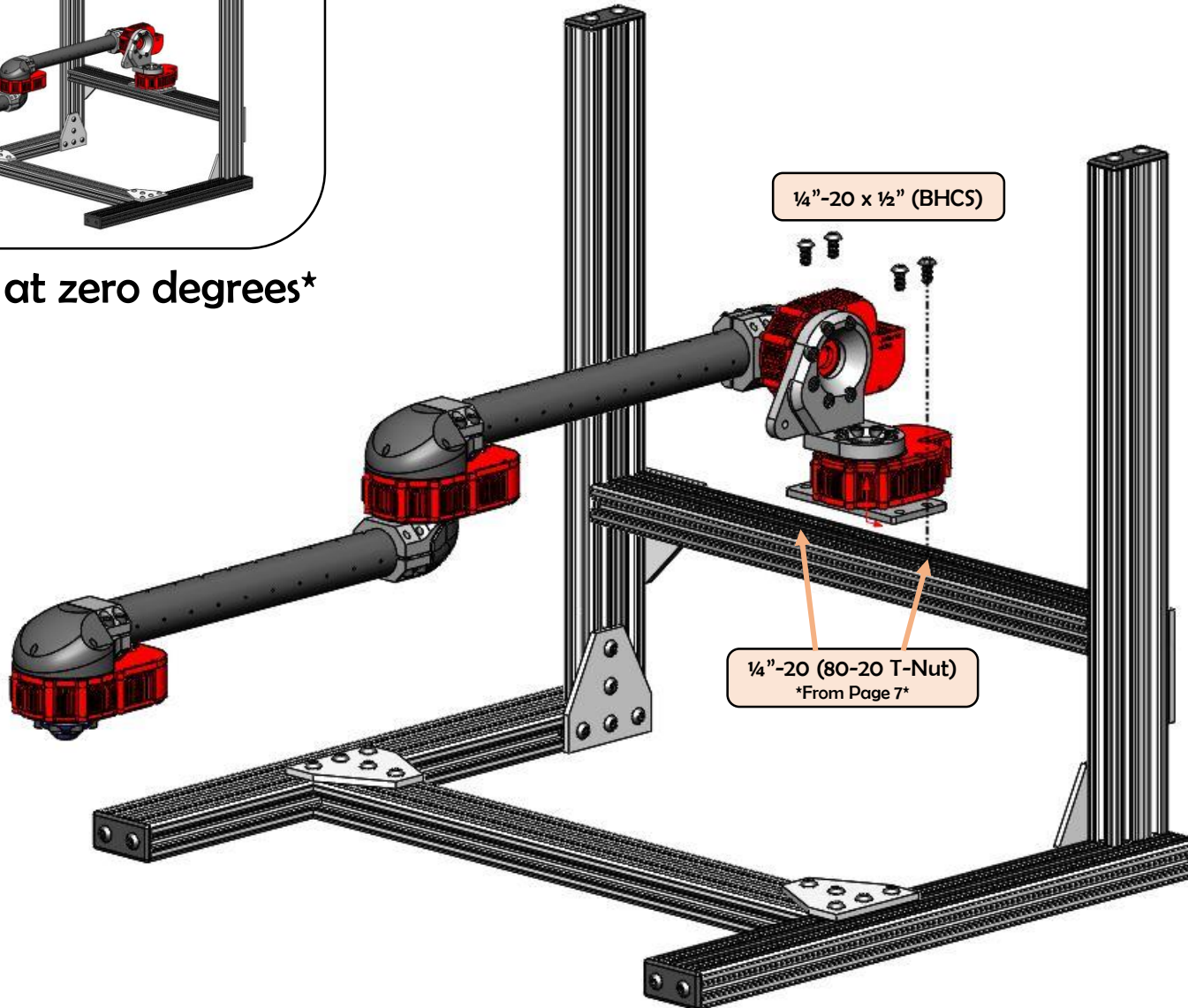
**Route wires before  
installing caps**



**\*End Effector Accessory Not Included\***



**\*All axes at zero degrees\***



# Additional Accessories

- Power Supply, 24V 220W (A-2098-24)
  - Comes with correct Molex Minifit Jr 2 connector
- Magnet embedded end effector (A-2081-01)
  - Interfaces with hex shaft driver bits for screwing/bolting tasks
  - Screwdriver bits not included
- HEBI I/O Board (A-2116-01)
  - Integrate with 3<sup>rd</sup> party end effectors or tools using HEBI APIs
- HEBI Gripper
  - Cable driven gripper keeps weight away from end of arm
  - \*Modules sold separately\*



