HEBI ROBOTICS

Rosie

6-DoF Arm w/ Gripper on Omni-Directional Base

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.

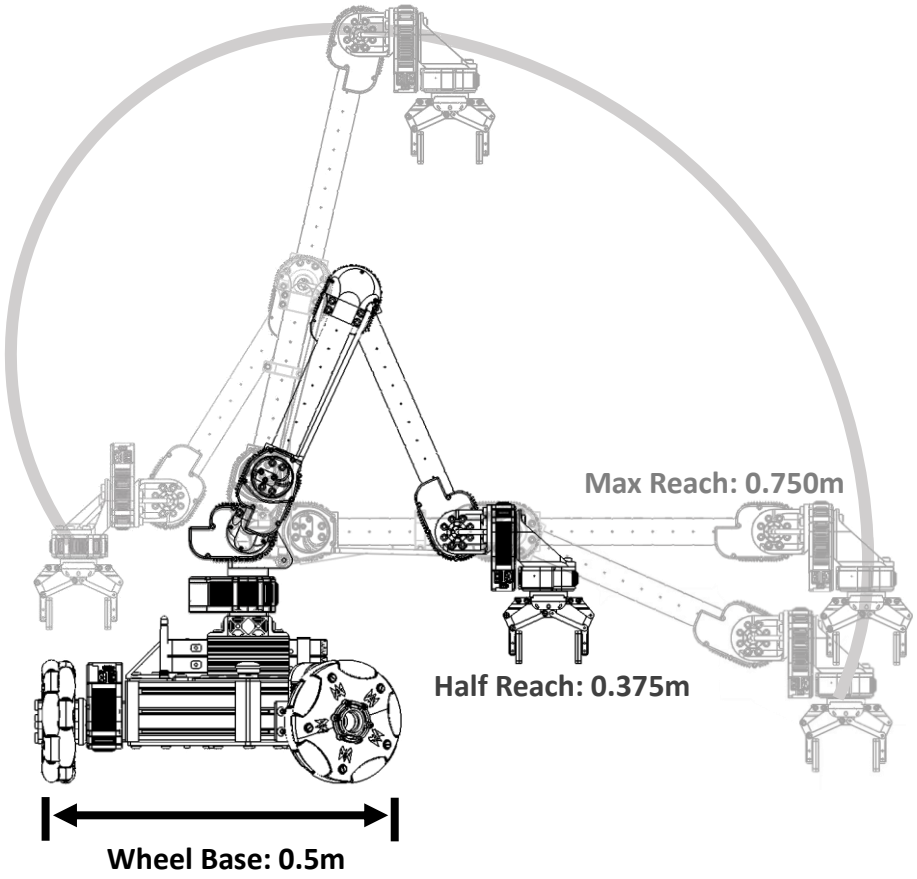
Warning (May cause injury or damage to actuator)

- 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.

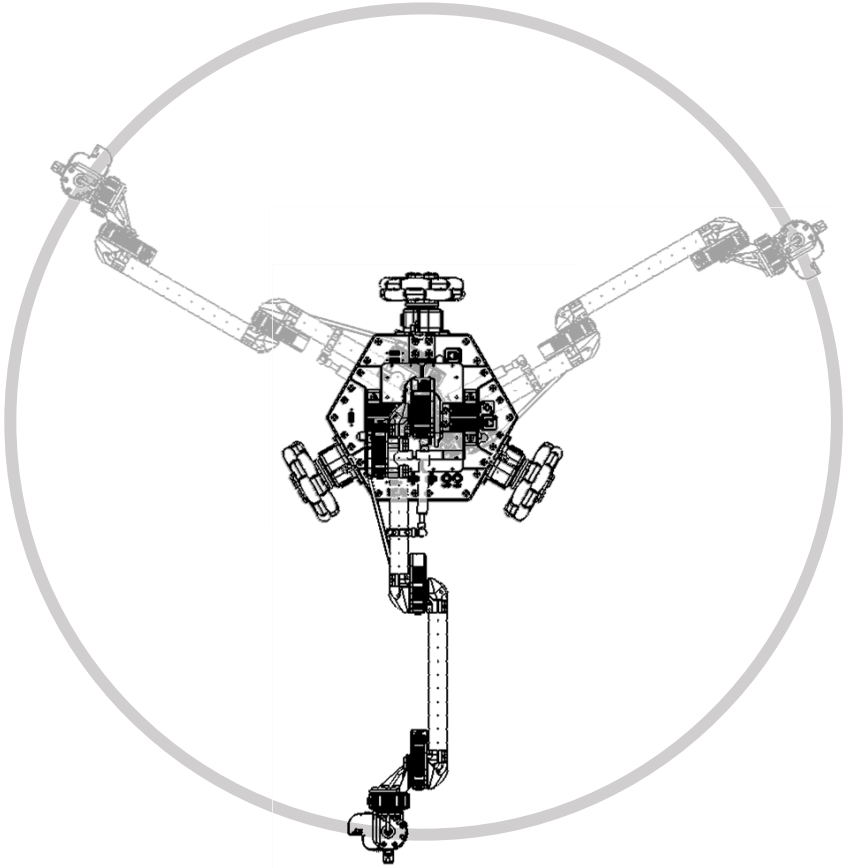
For more information please visit: ***docs.hebi.us***

Robot Workspace

Side View



Top View



Technical Specifications

Specifications	Value
Weight	16.5 kg
Max Continuous Payload	1.00 kg
Max Peak Payload	3.75 kg
Max Speed (with X8-3s)	1.0 m/s

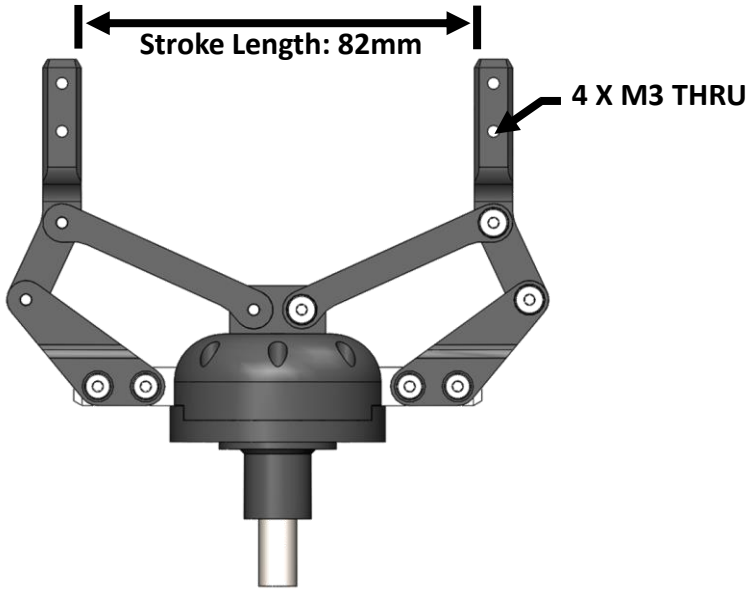
6-DoF Arm Specifications

Movement	Working Range	Speed
Axis 1 – Base [Default: X8-9]	Continuous (limited by wiring)	180°/s
Axis 2 – Shoulder [Default: X8-9]	0° to +70° (limited by gas spring)	180°/s
Axis 3 – Elbow [Default: X5-9]	-155° to +155° (avoid end effector collisions)	84°/s
Axis 4 – Wrist 1 [Default: X5-1]	Continuous (avoid end effector collisions)	540°/s
Axis 5 – Wrist 2 [Default: X5-1]	Continuous (limited by wiring)	540°/s
Axis 6 – Wrist 3 [Default: X5-1]	Continuous (limited by wiring)	540°/s

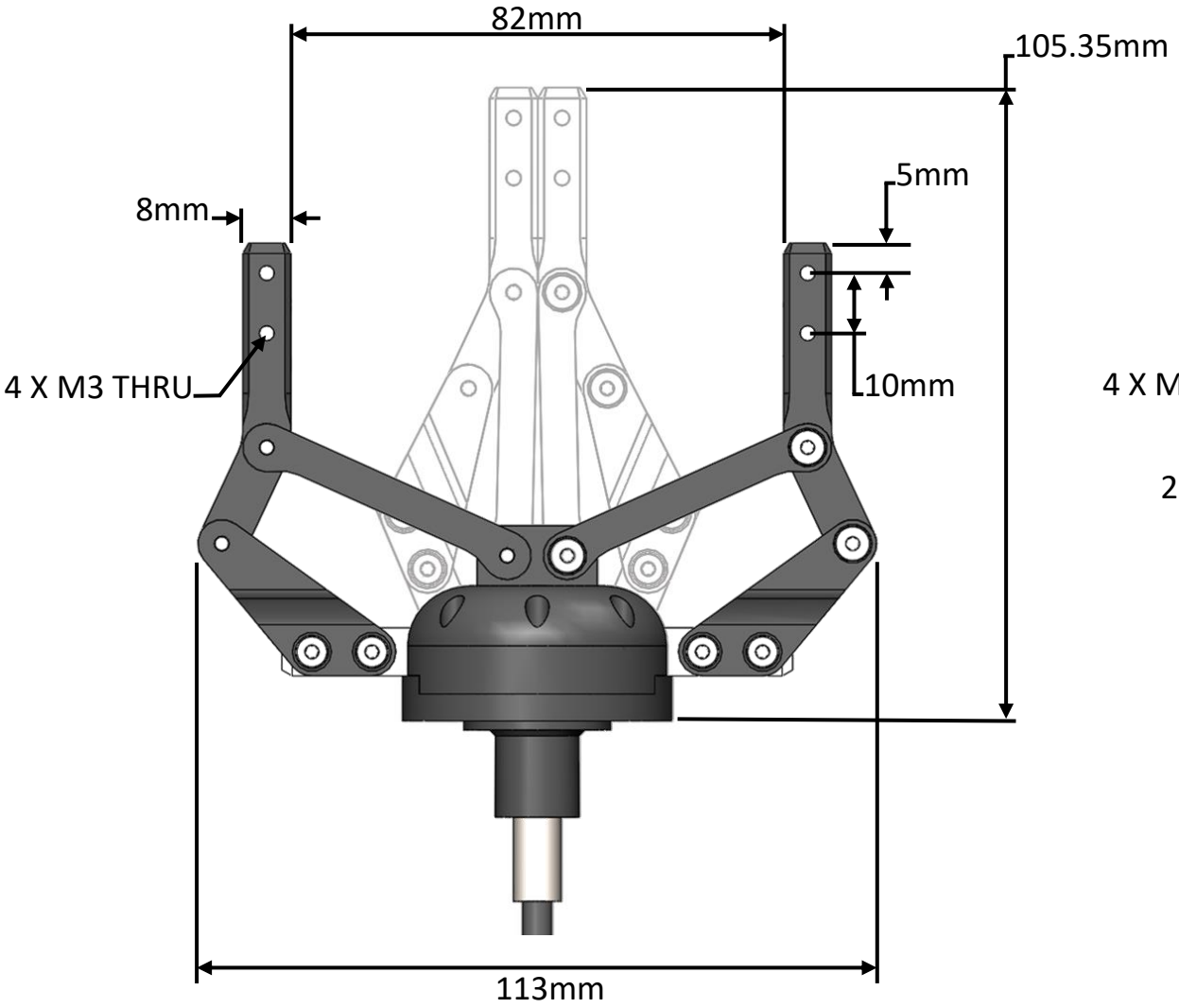
Gripper Specifications*

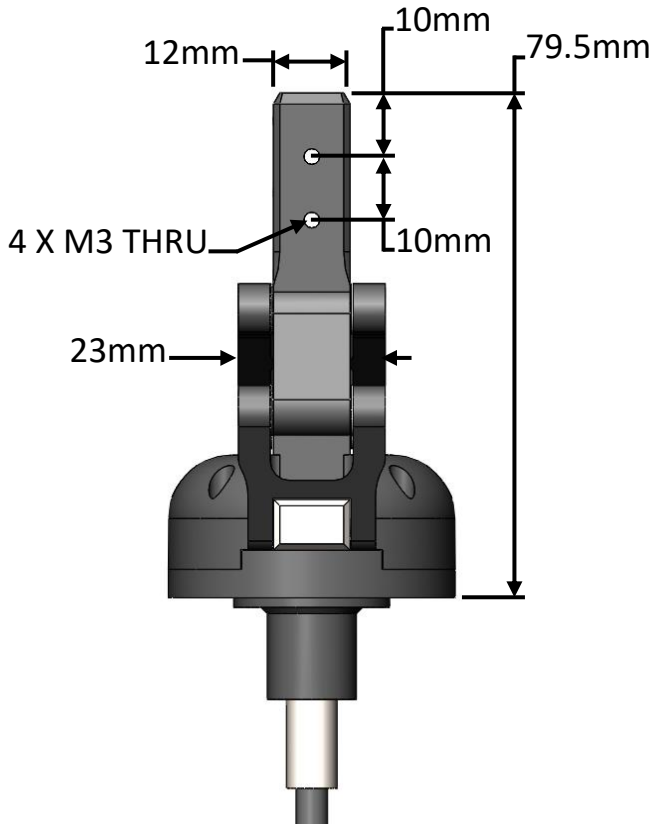
Spool Module	Max Finger Torque	Max Finger Force at 50mm
X5-1	0.1 Nm	2 N
X5-4	0.5 Nm	10 N
X5-9**	1.1 Nm	23 N
X8-3	0.4 Nm	8 N
X8-9	1.1 Nm	23 N
X8-16	2.0 Nm	40 N

*Values assume a symmetric two-finger grasp
** Default Module



Technical Specifications





Bill of Materials - Mechanical*

Default Configuration

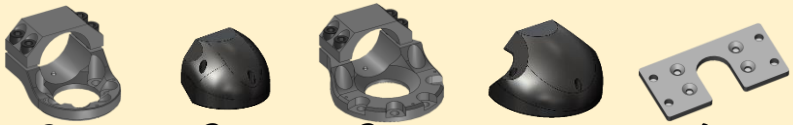
3 x
X5-1

1 x
X5-9

3 x
X8-3

2 x
X8-9

1 x
X8-16



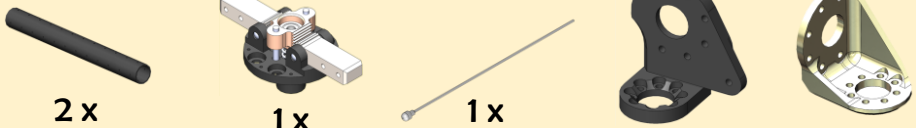
2 x
A-2038-02

2 x
A-2090-01

2 x
A-2039-02

2 x
A-2091-01

4 x
A-2043-01



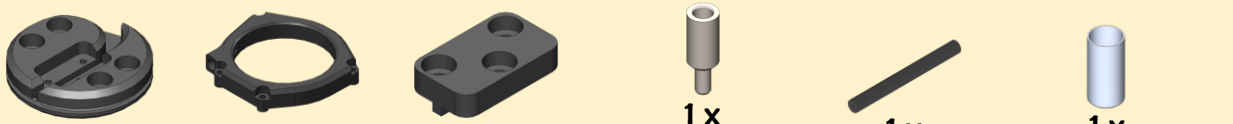
2 x
PM-2200-02
[300mm]

1 x
A-2055-01
Gripper Assembly

1 x
PP-2239-01
Cable

1 x
A-2040-01R

2 x
A-2042-01R



1 x
PM-2292-01
Spool

1 x
PM-2293-01
Spool Housing

1 x
PM-2290-01
Cable Clamp

1 x
PM-2222-01
Cable Housing Adapter
(part of A-2055-01)

1 x
PP-2240-01
Cable Housing

1 x
PP-2241-01
Cable Housing End Cap

3 x
PP-2185-01
6" Omni Wheel

3 x
A-2076-01
Wheel Adapter

1 x
A-2127-01
Hexagonal Wireless Chassis

fasteners included, not shown

Bill of Materials - Electrical

3 x
A-2128-01
Power Distribution Board

up to 4 x
PP-2084-01
LiGo Battery

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

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

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

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

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

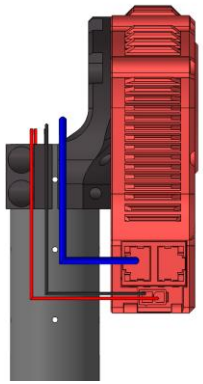
Wiring Notes

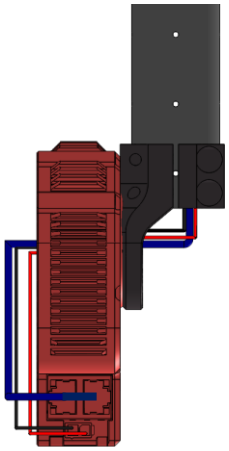
[Spiral sleeving]

- It is best to wire each limb before moving onto the Final Assembly.
- 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 one at a time.

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

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.

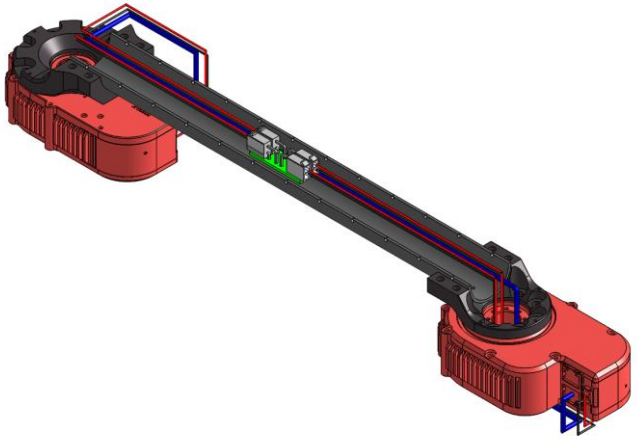
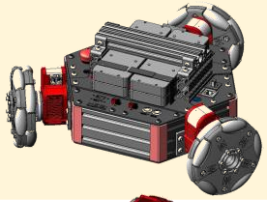
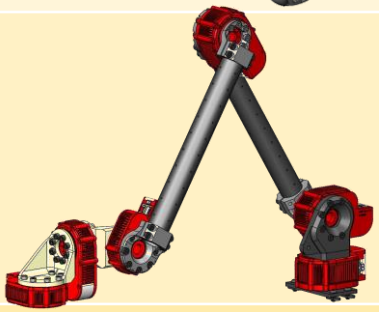
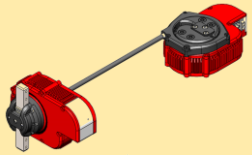
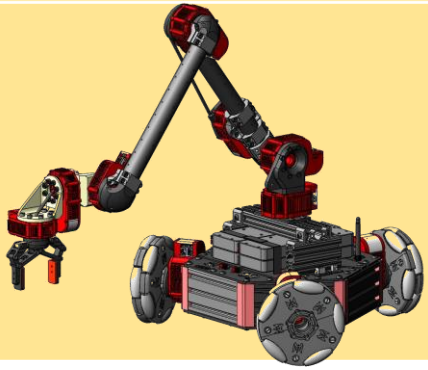
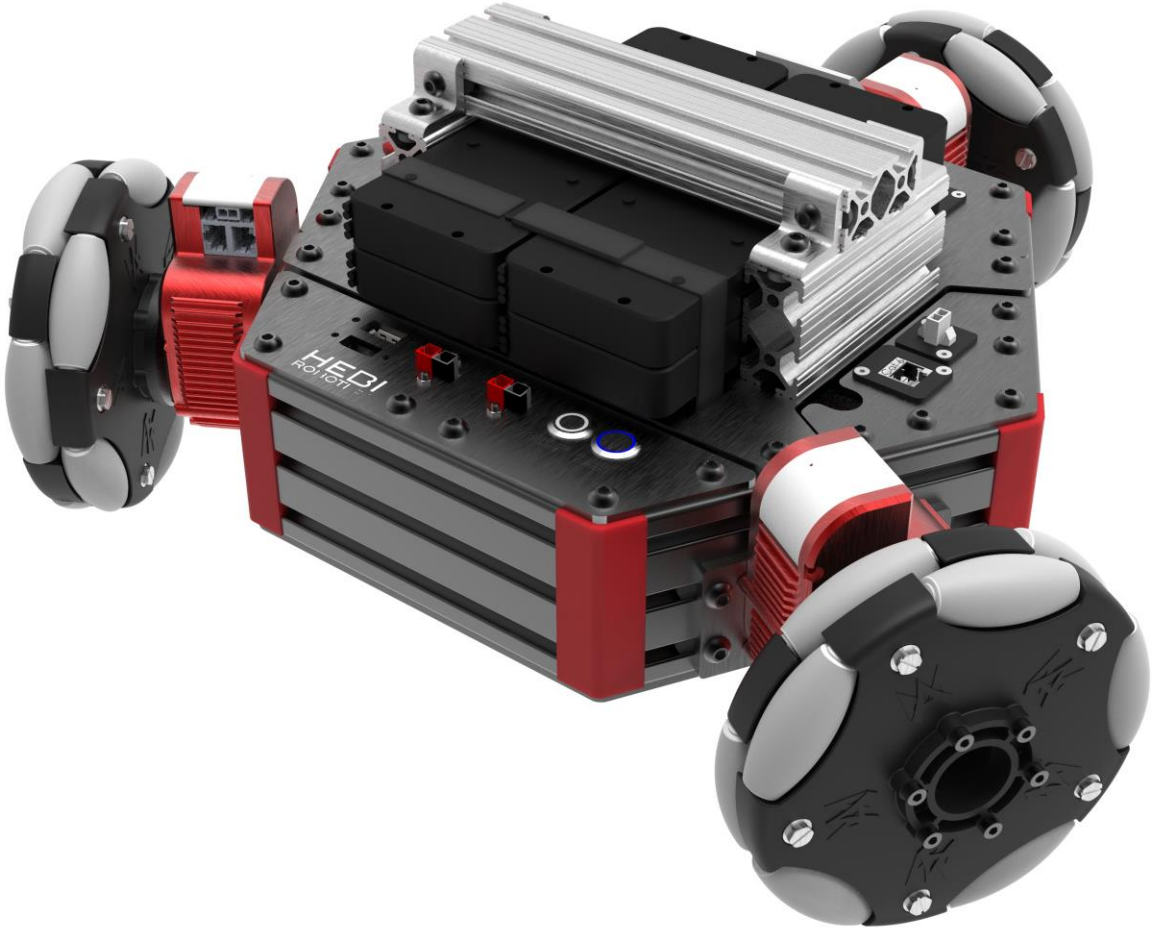
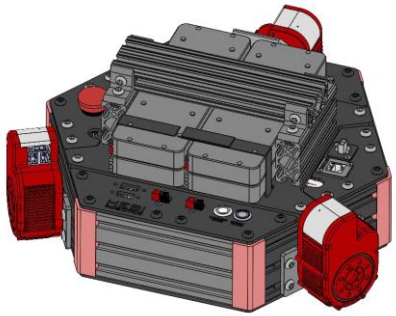


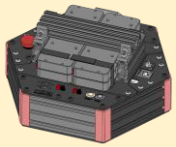
Table of Contents

Assembly	Quantity	Image	Pages
Chassis	1x		[10-14]
6-DoF Arm Kit	1x		[15-23]
Gripper	1x		[24-27]
Final	1x		[28-39]



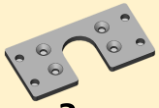
Chassis



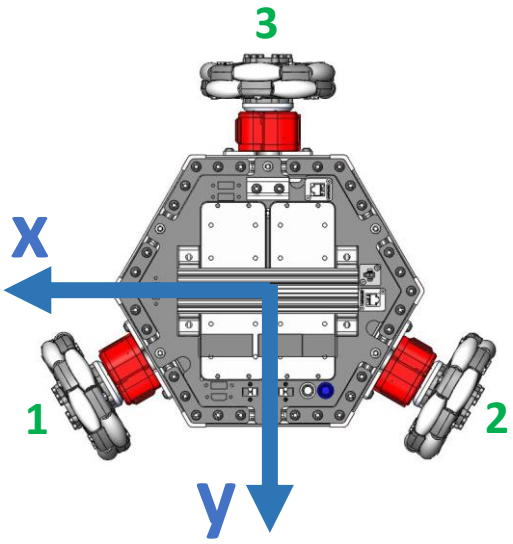


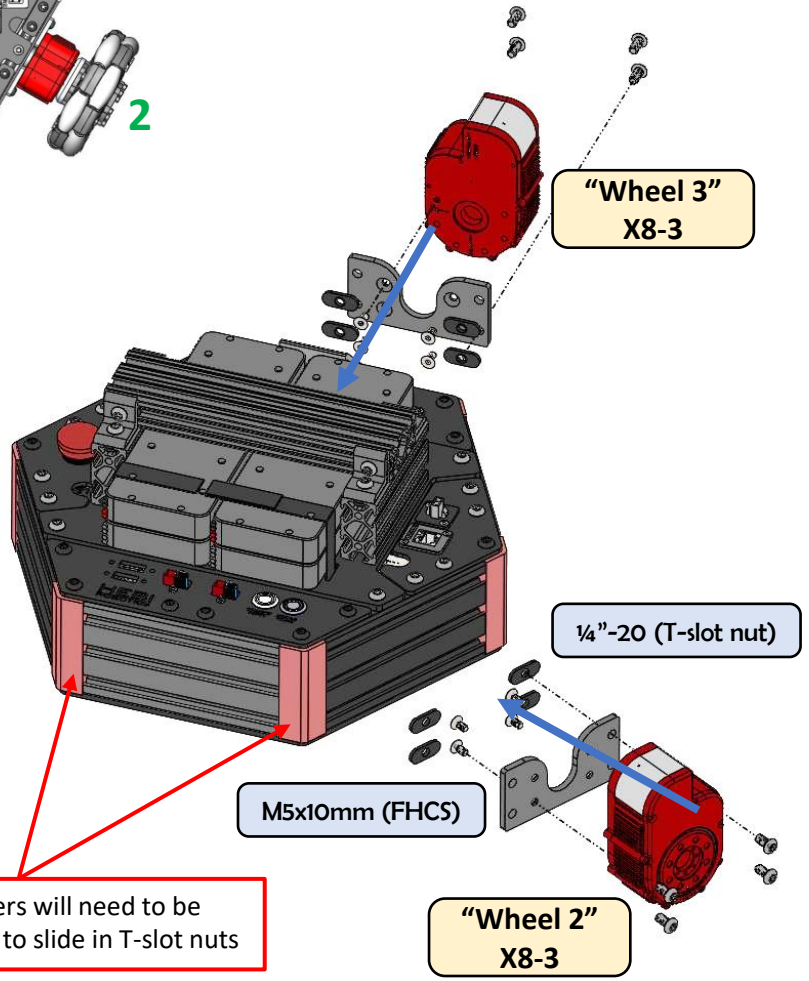
1 x
A-2127-01
Hexagonal Wireless Chassis

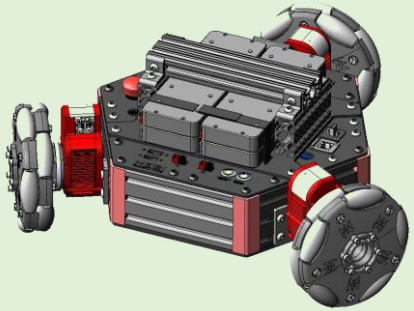
3 x
X8-3

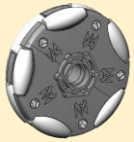


3 x
A-2043-01

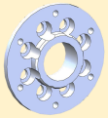




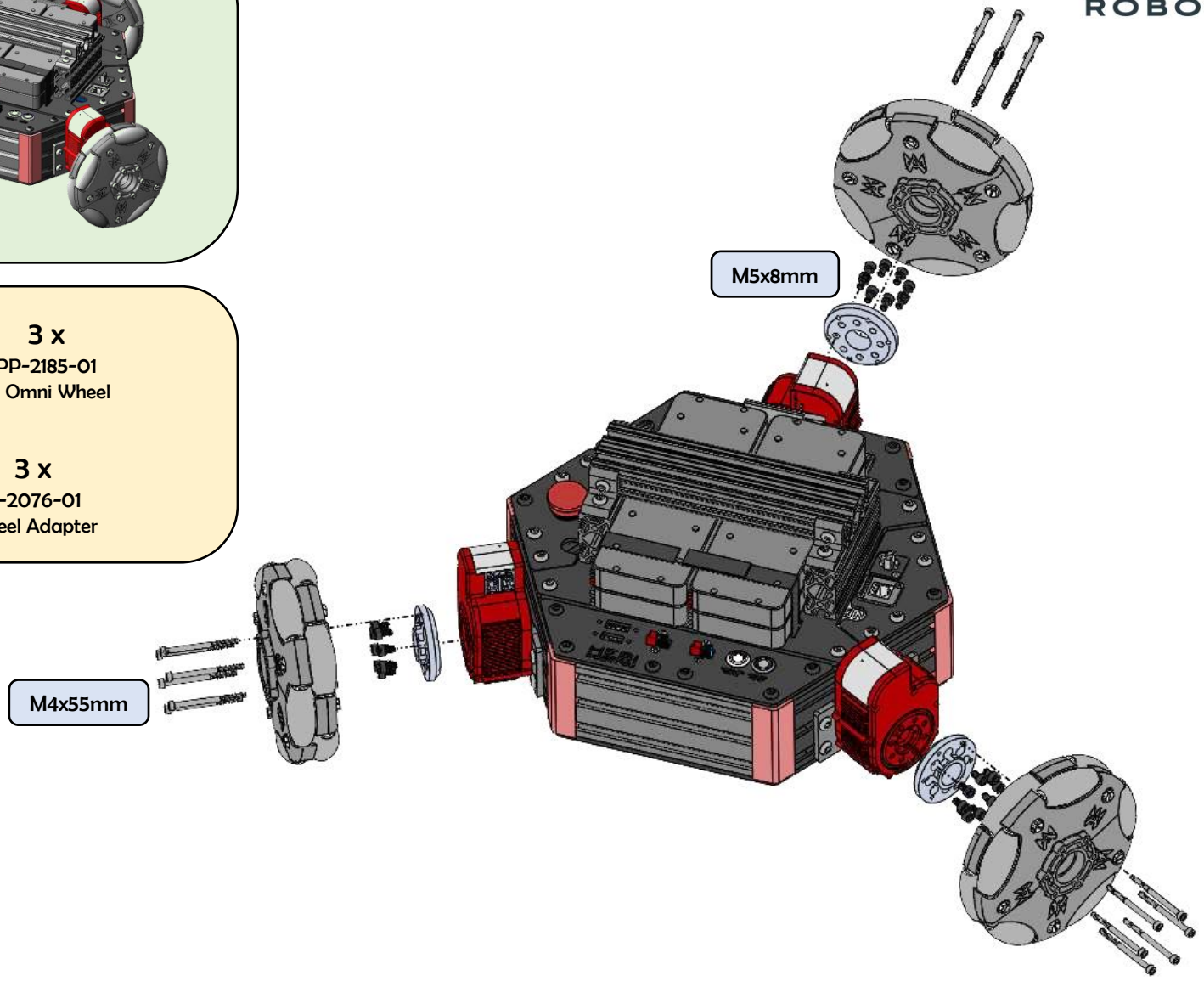




3 x
PP-2185-01
6” Omni Wheel

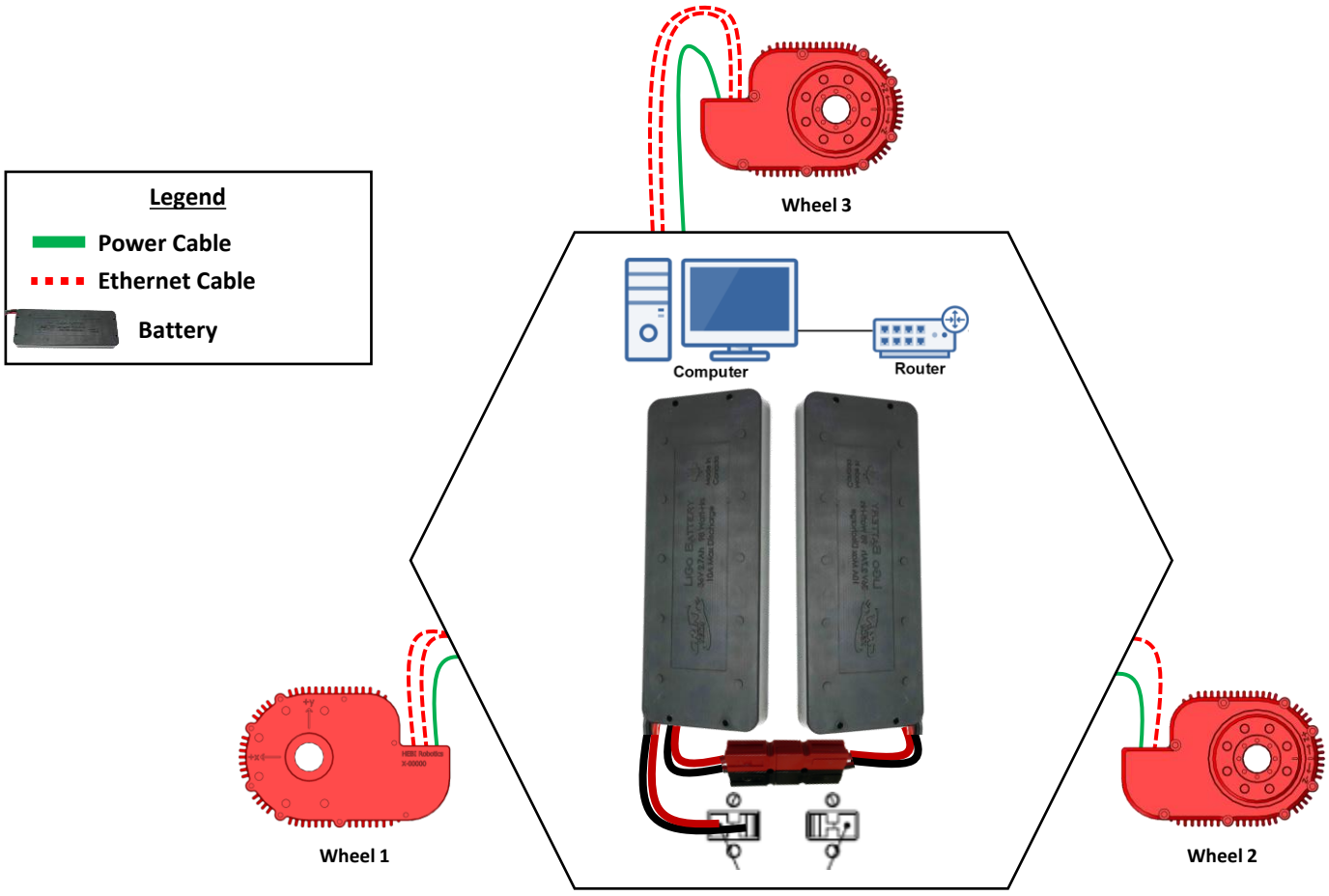


3 x
A-2076-01
Wheel Adapter

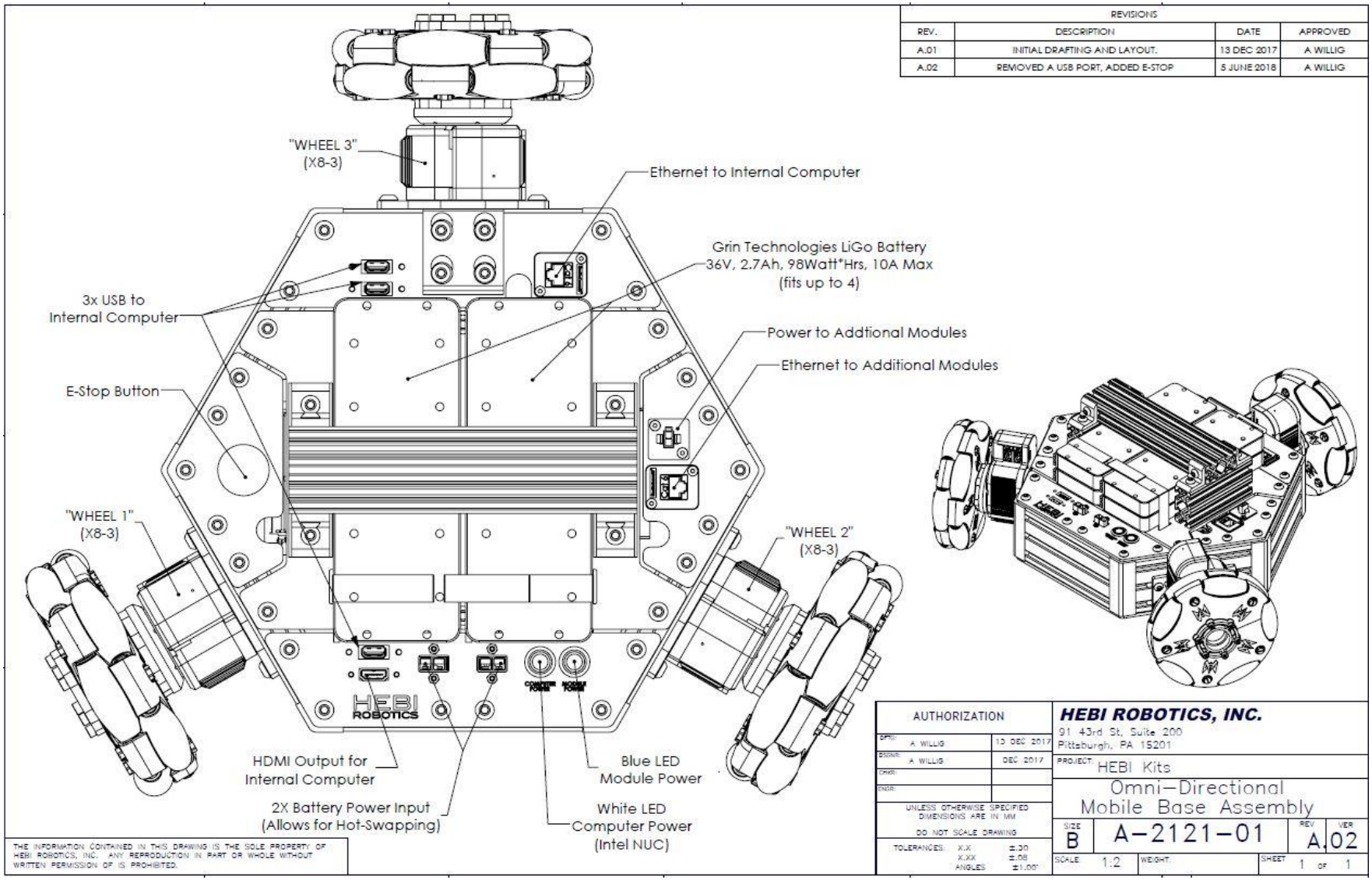


Chassis Wiring

*Cabling will be provided with assembled chassis

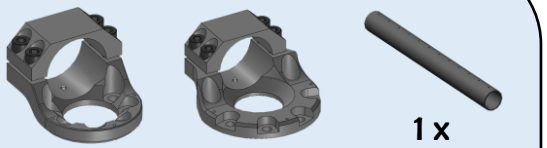


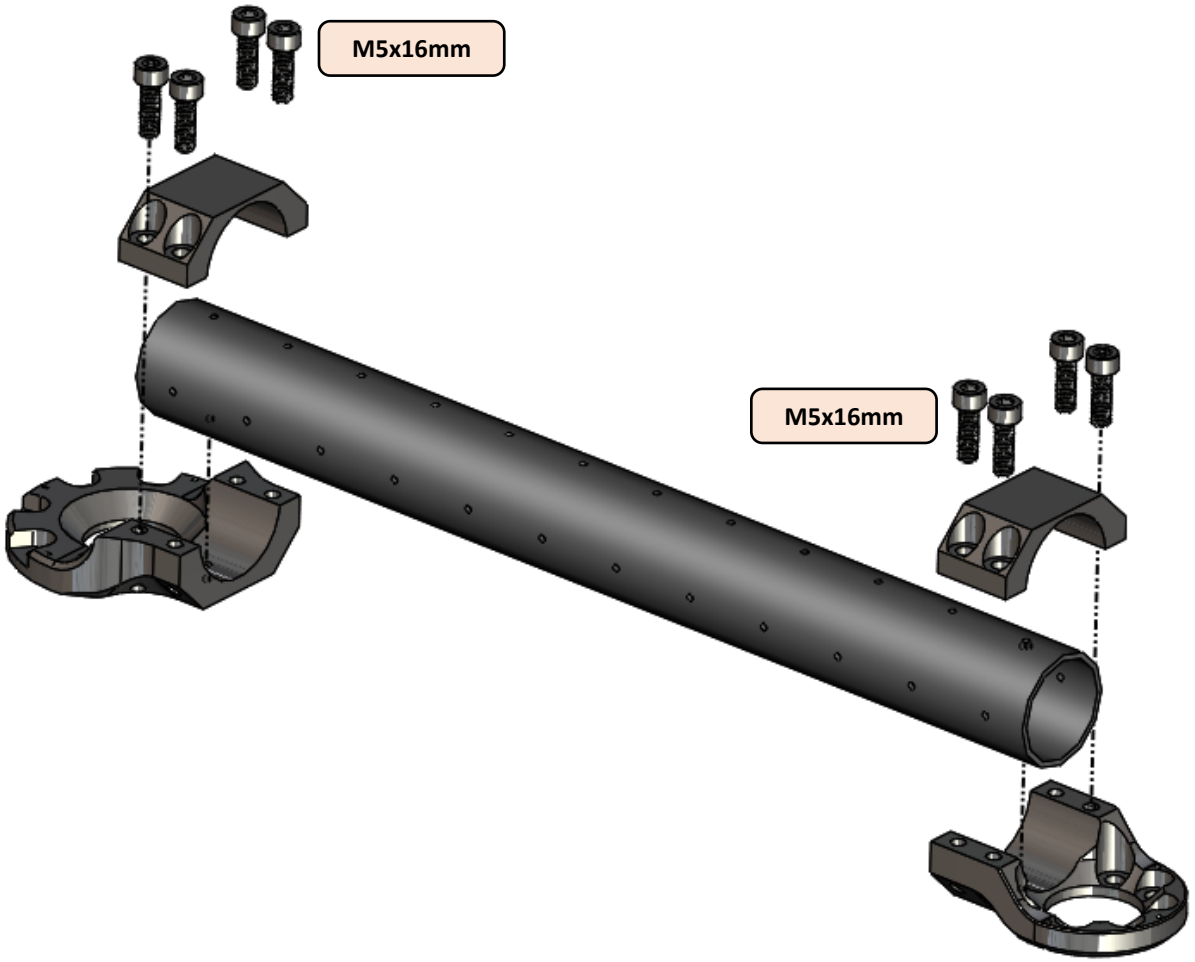
Chassis Bulkhead Layout

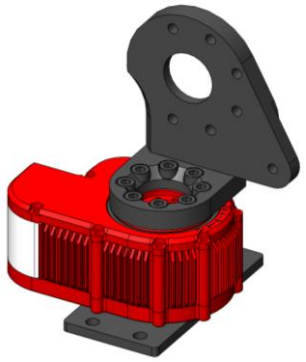


6-DoF Arm Kit (right-inside)

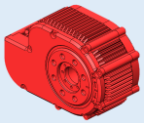
2 x


1 x
A-2038-02
1 x
A-2039-02
1 x
PP-2200-02
[300mm]


M5x16mm
M5x16mm

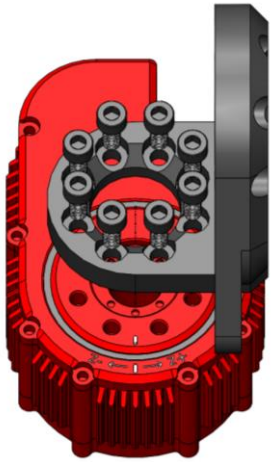


1 x



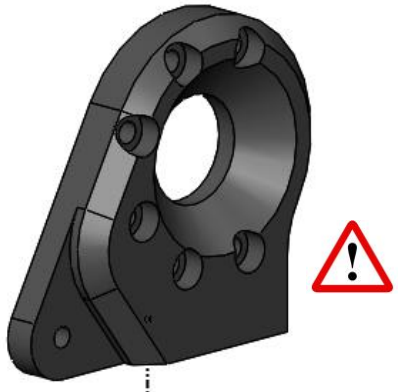
1 x
X8-9

1 x
A-2040-01R



Align with actuator output hub tick mark

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



Flat face towards inside

M5x12mm

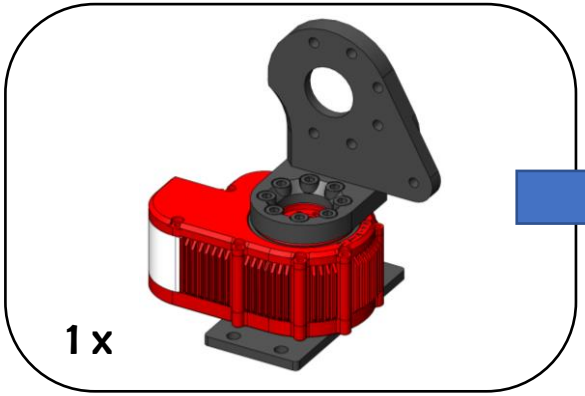
Step 2 of 2

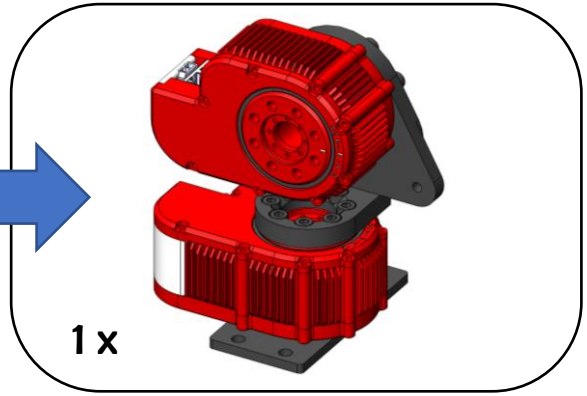
M6x10mm

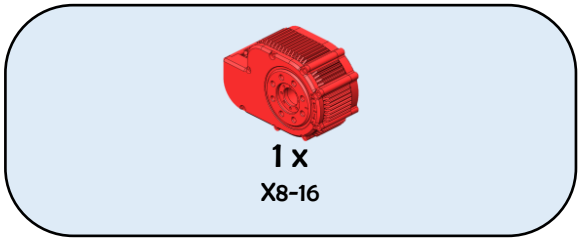
Step 1 of 2

Axis 1: Base
Default X8-9

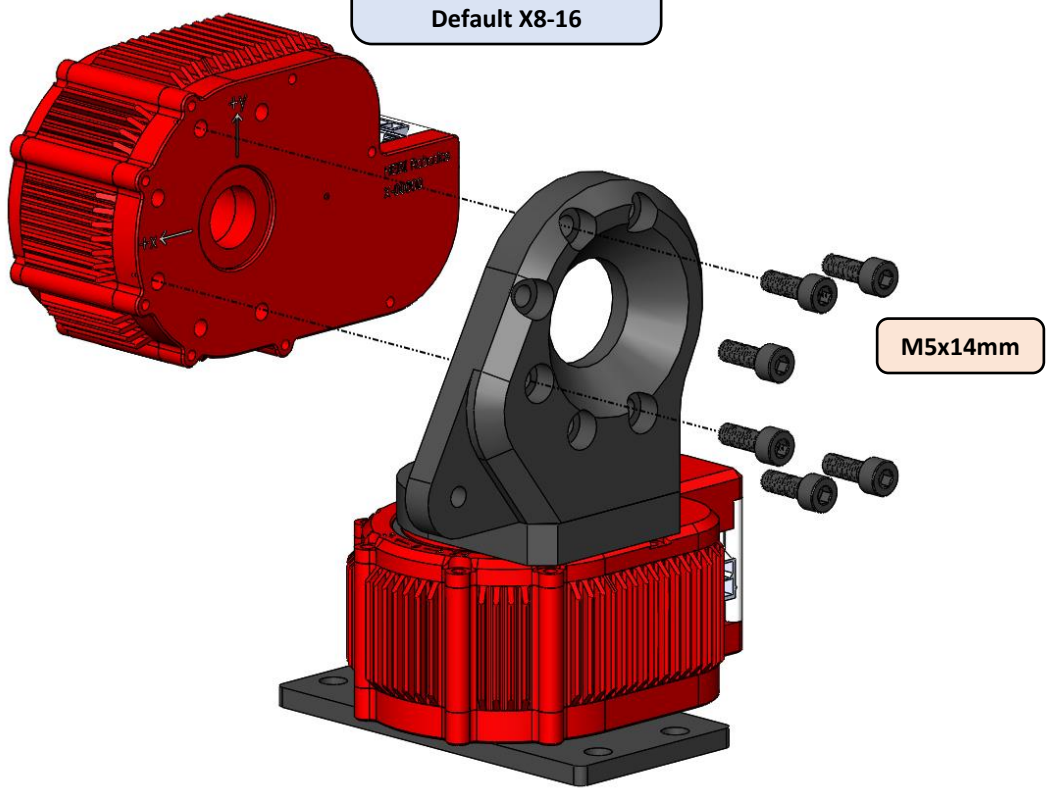
M5x10mm FHCS

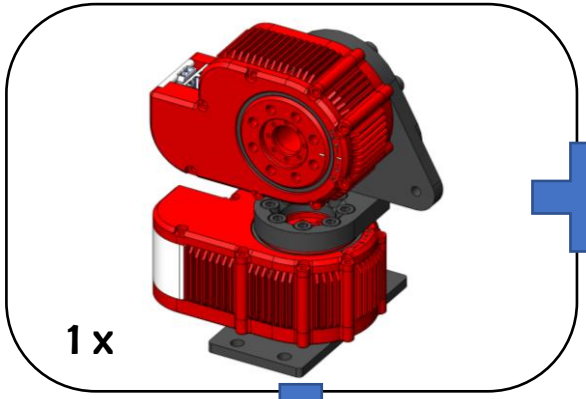


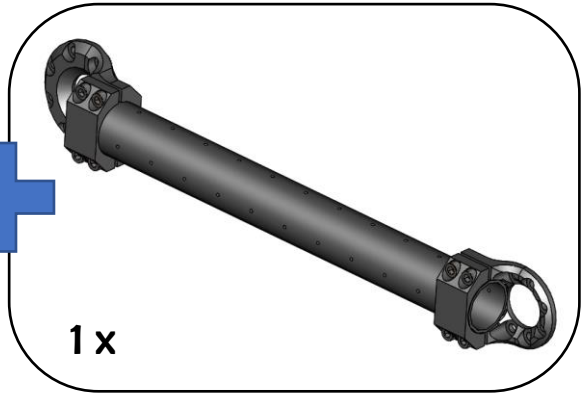


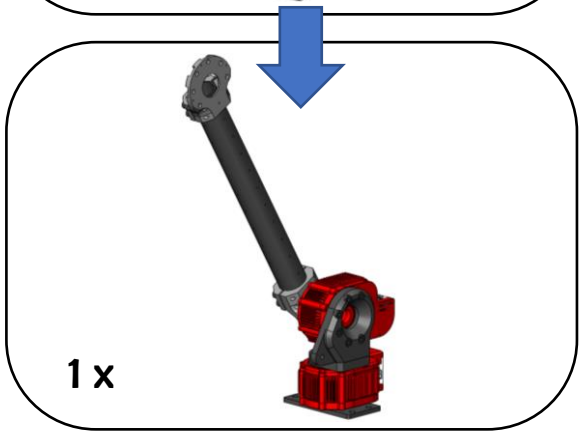


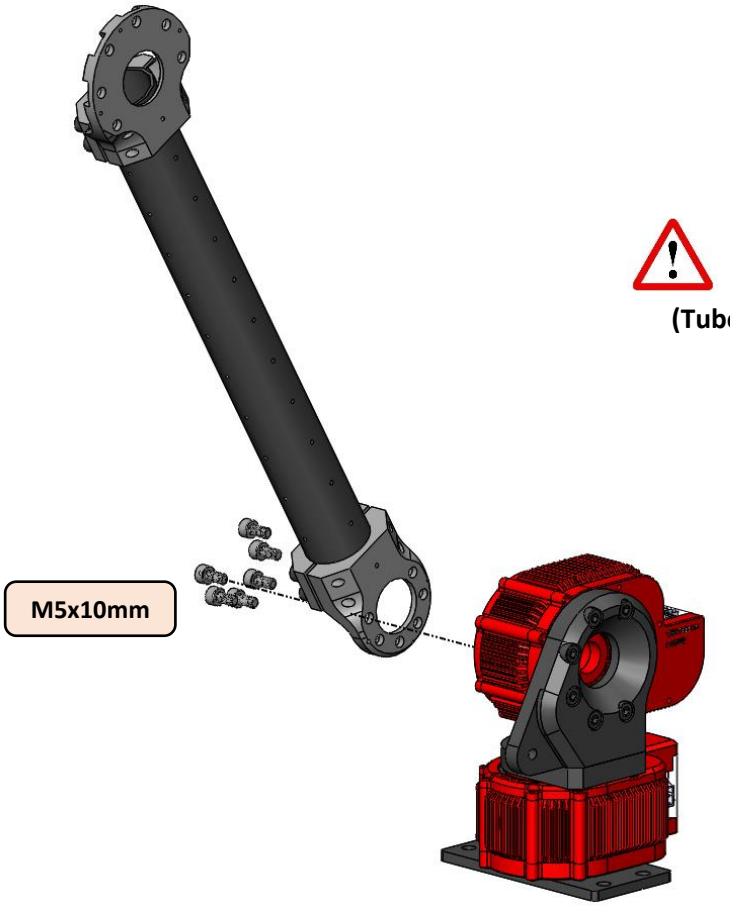
Axis 2: Shoulder
Default X8-16

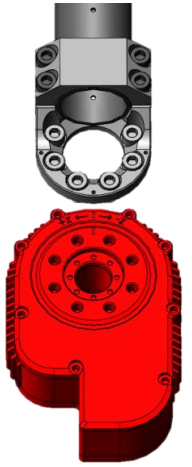






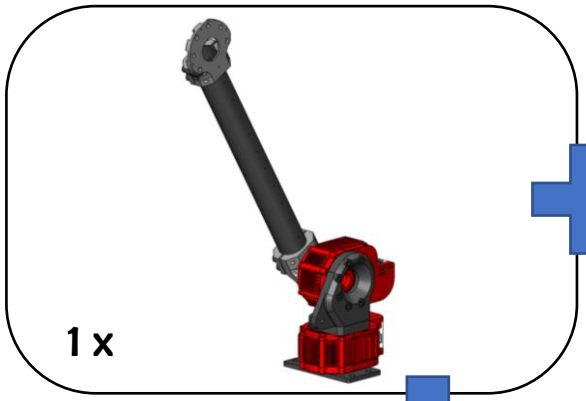


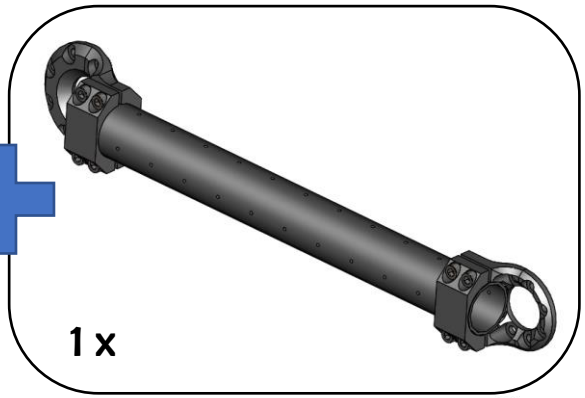


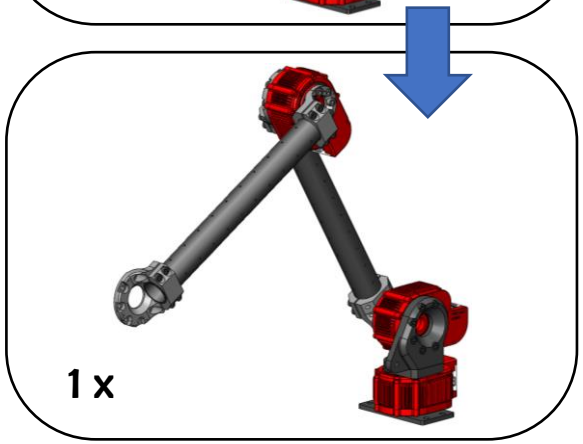


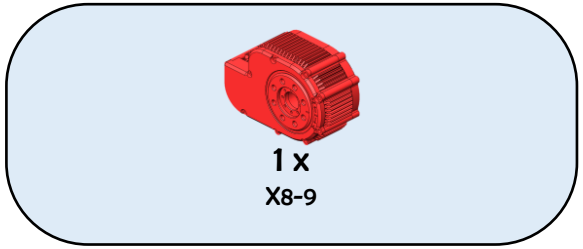
Align with actuator output hub tick mark

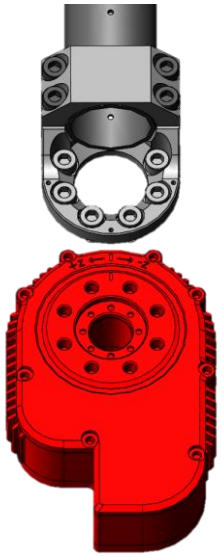
(Tube aligns with tick mark)





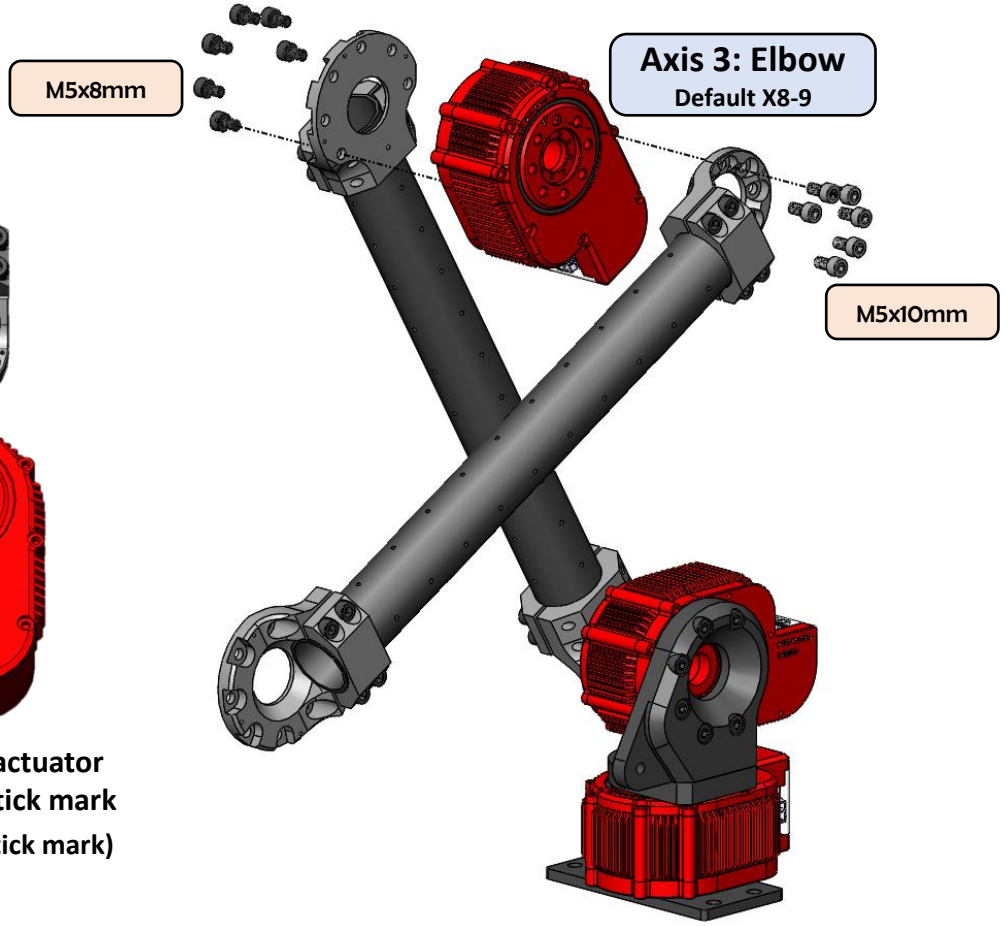


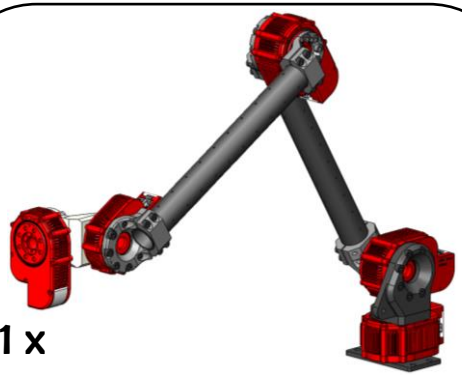


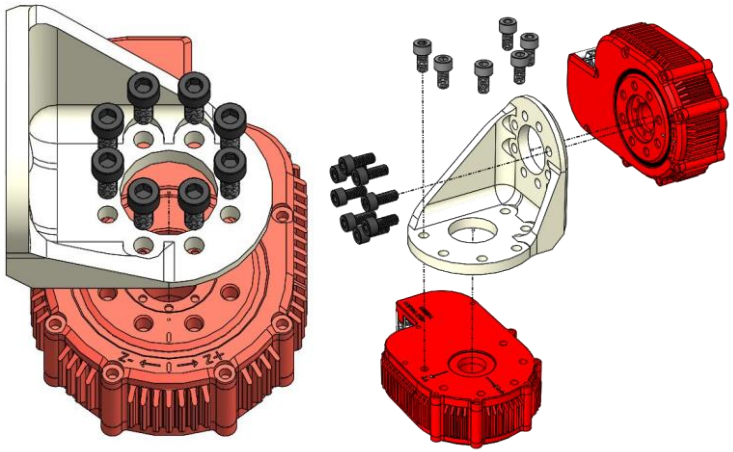


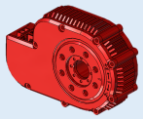
Align with actuator output hub tick mark

(Tube aligns with tick mark)





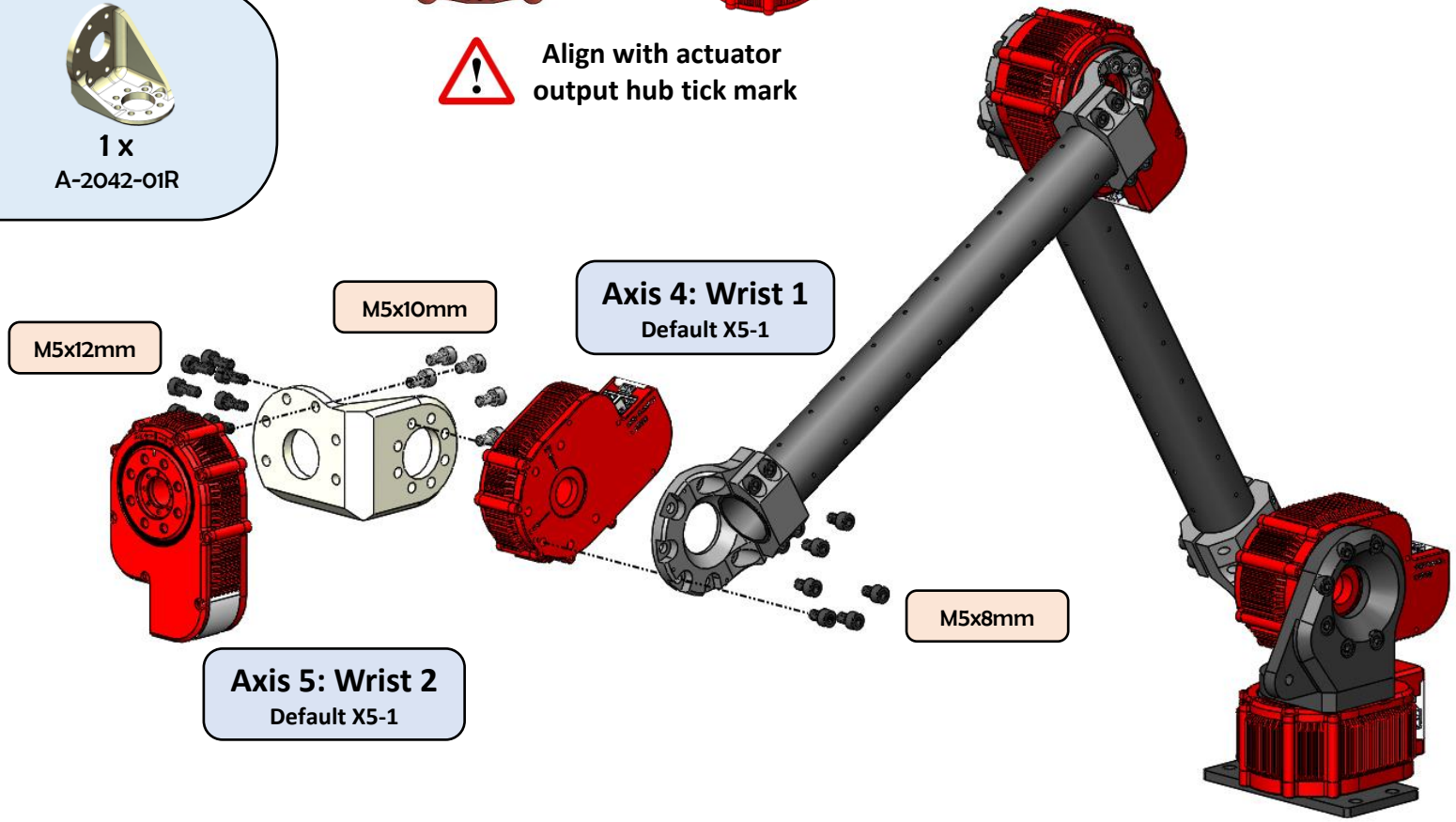


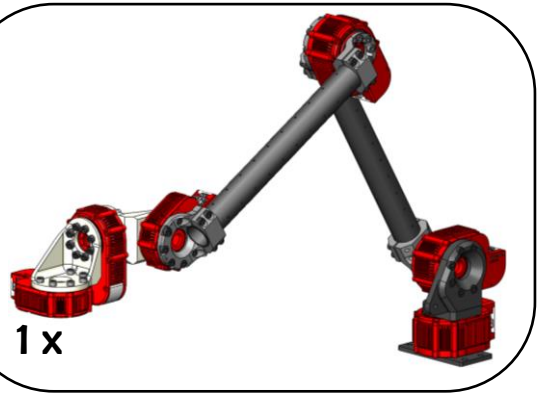


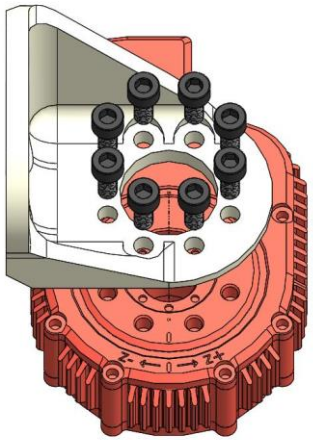
2 x
X5-1

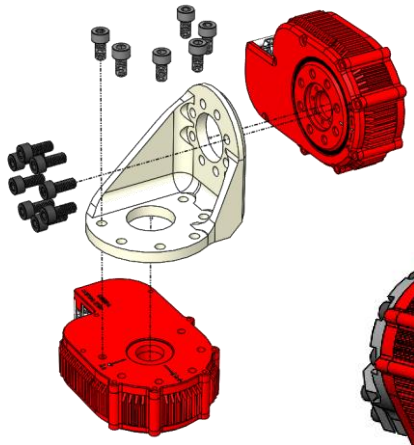
1 x
A-2042-01R

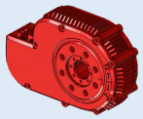
Align with actuator output hub tick mark











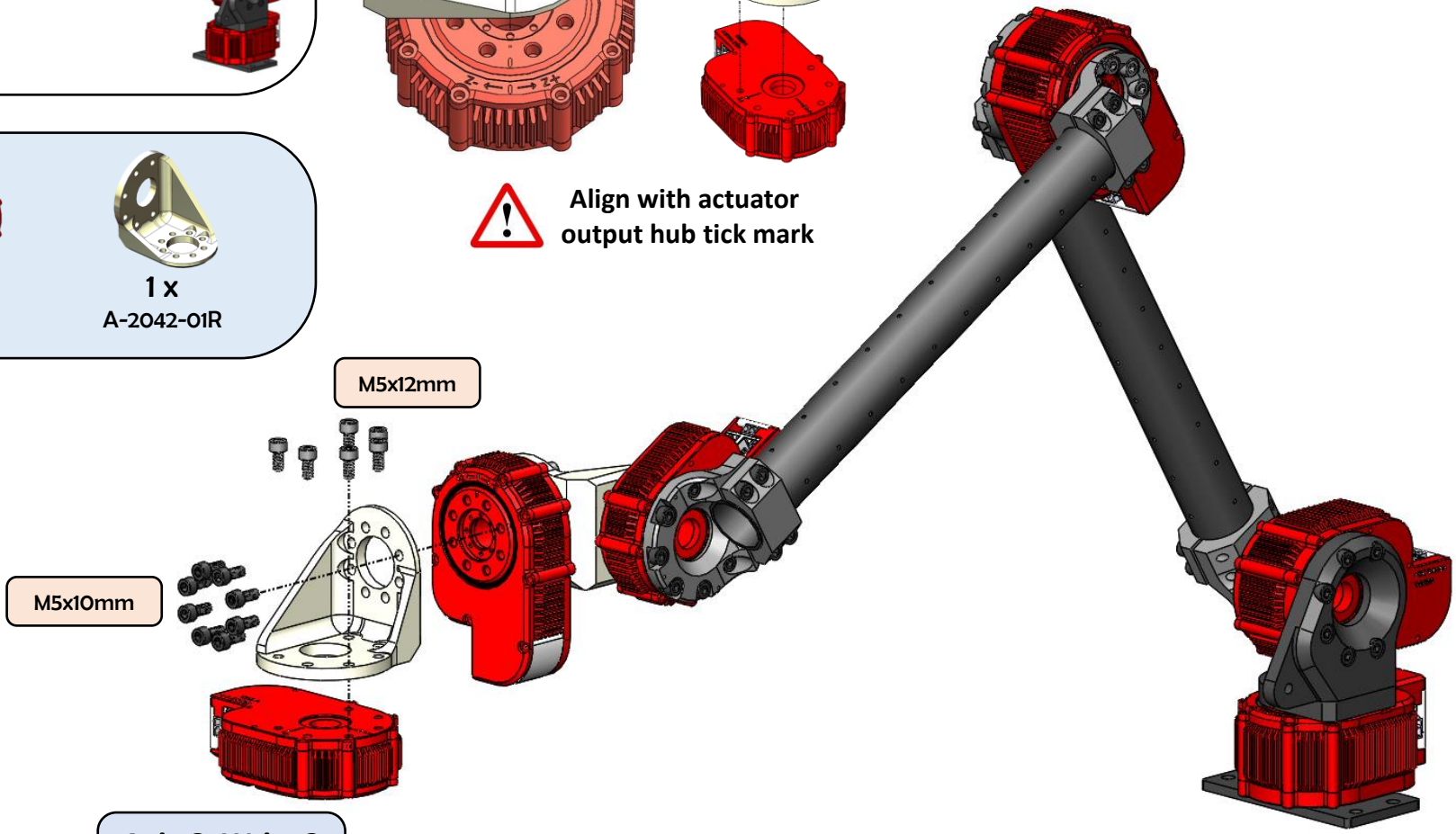
1 x
X5-1

1 x
A-2042-01R

Align with actuator output hub tick mark

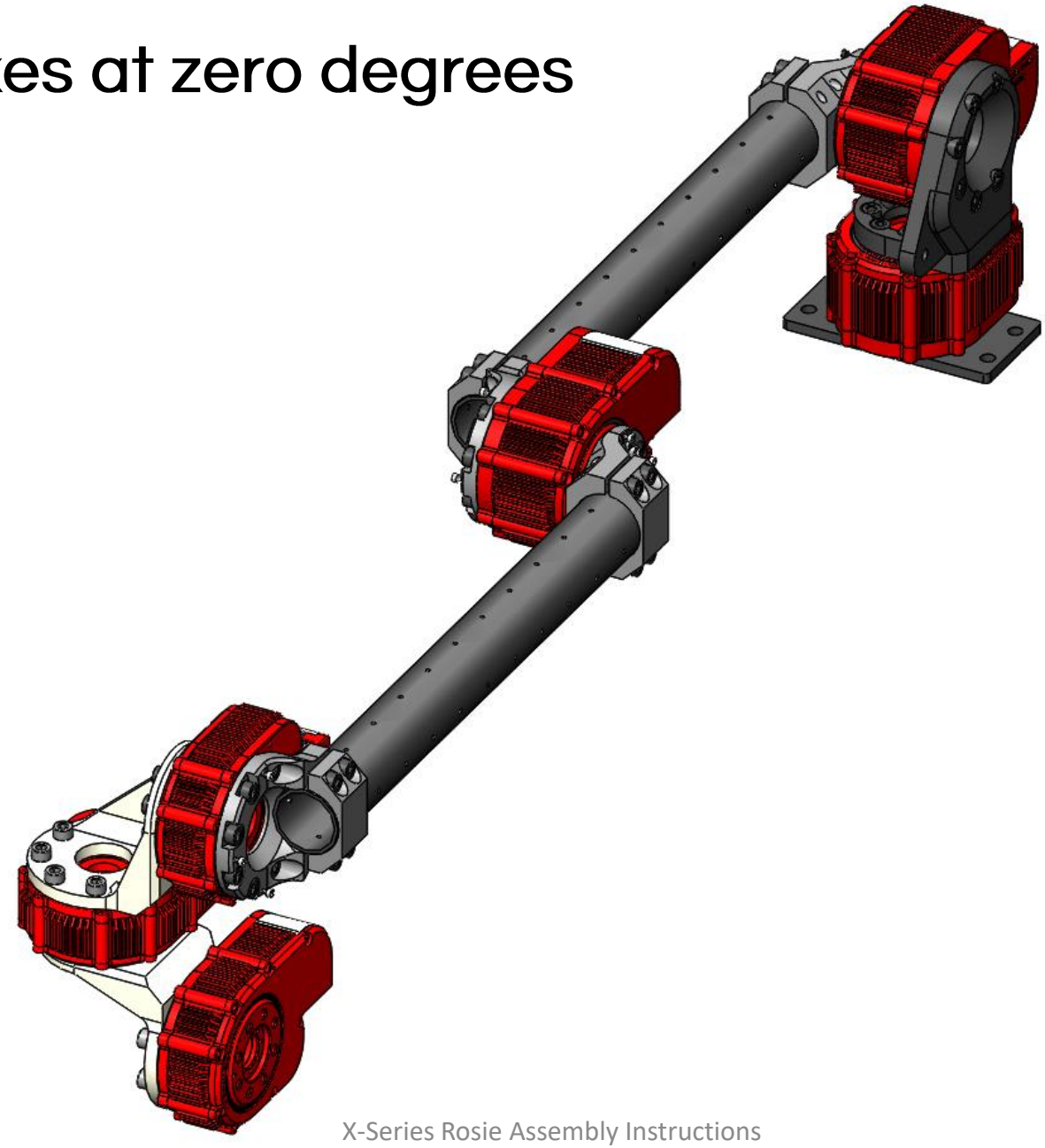
M5x12mm

M5x10mm

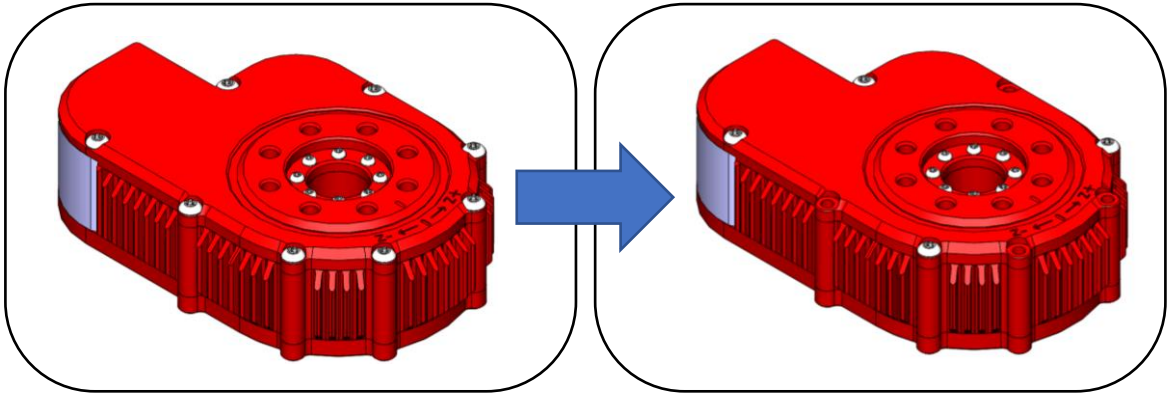


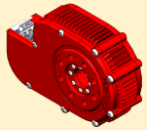
Axis 6: Wrist 3
Default X5-1

All axes at zero degrees

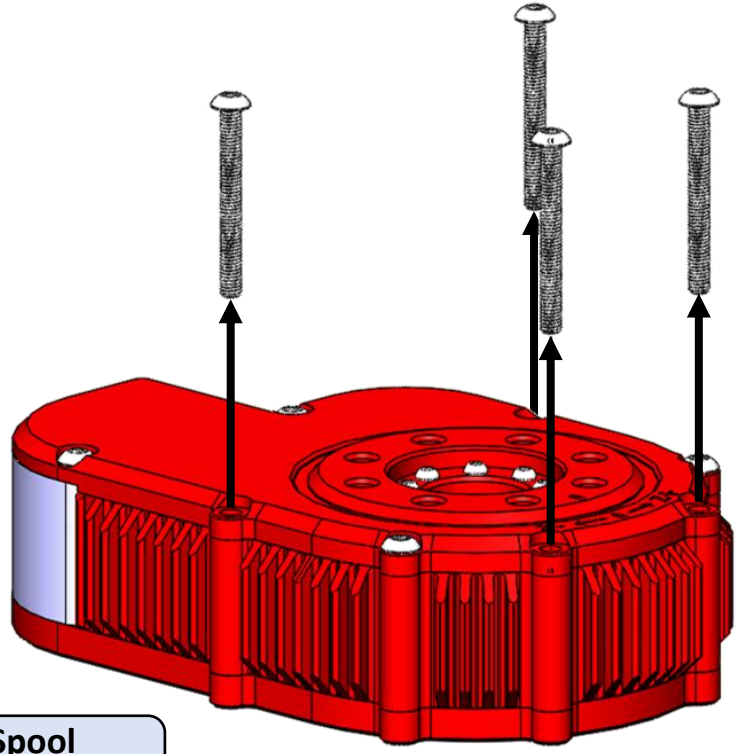


Gripper

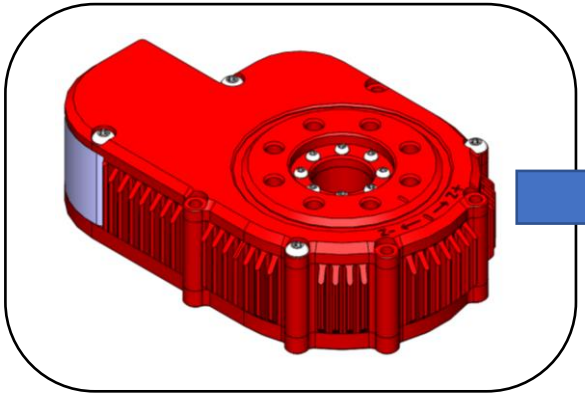


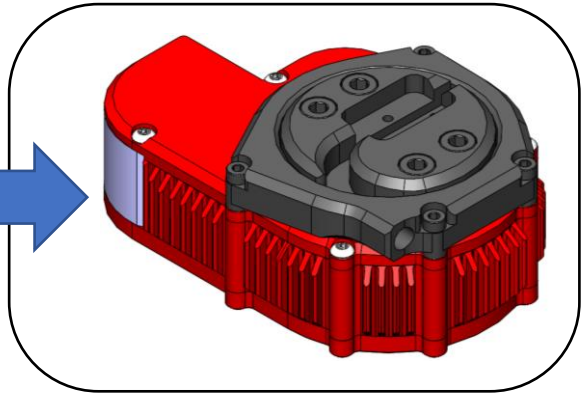


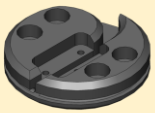
1 x
X5-9



Spool
Default X5-9



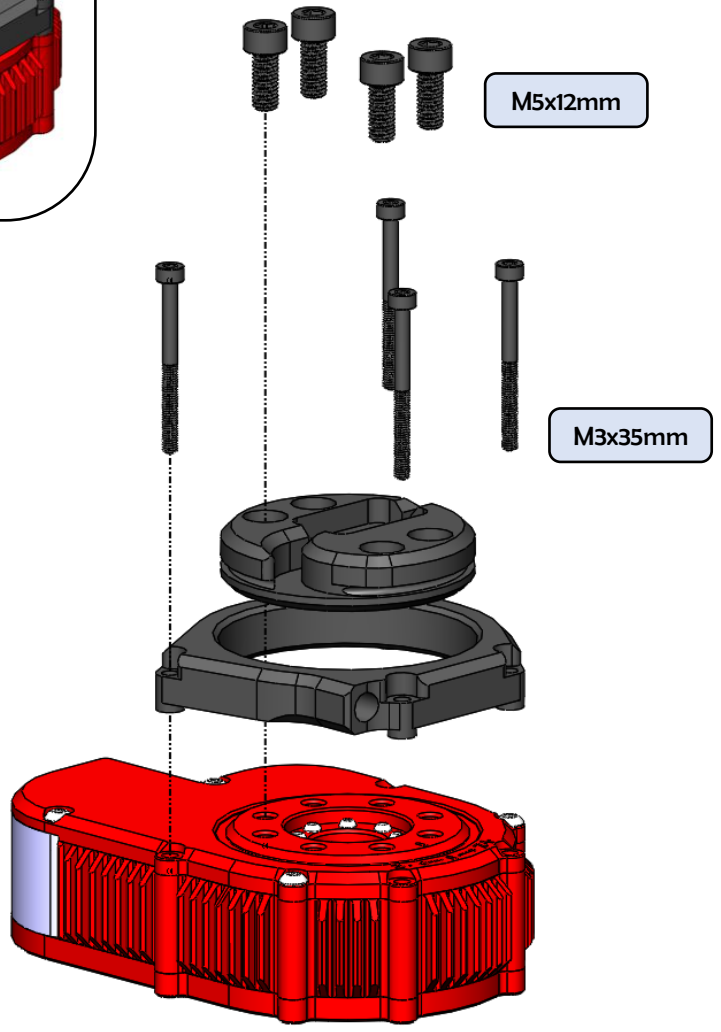




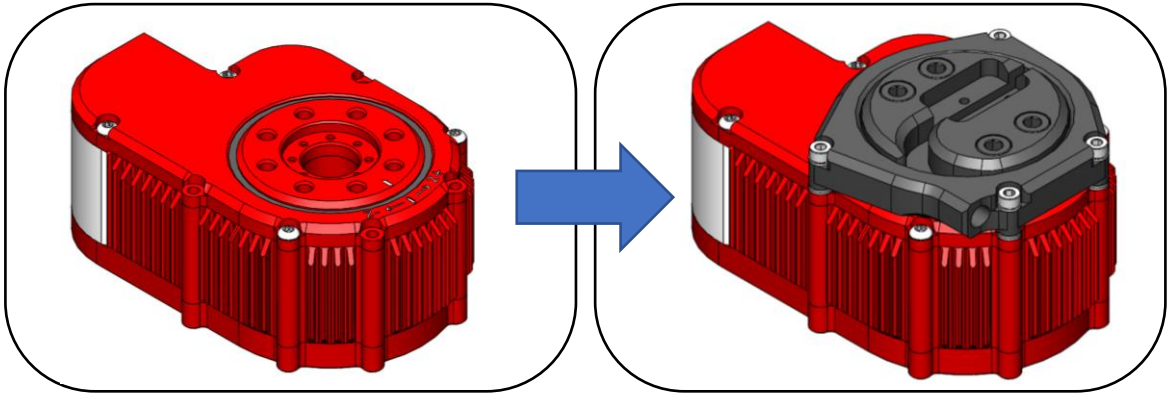
1 x
PM-2292-01
Spool

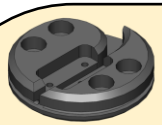
1 x
PM-2293-01
Spool Housing

***If the spool module is an X8 MODULE, SKIP this page and go to the NEXT Page. Rest of the steps are the same for both.**



***Clocking for the Spool does not matter**



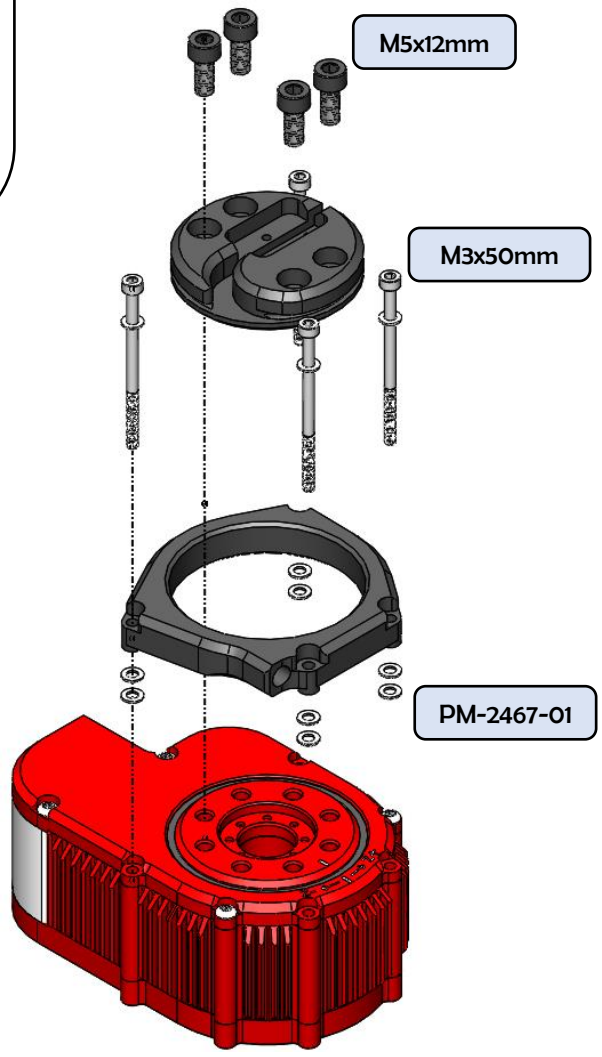


1 x
PM-2292-01
Spool

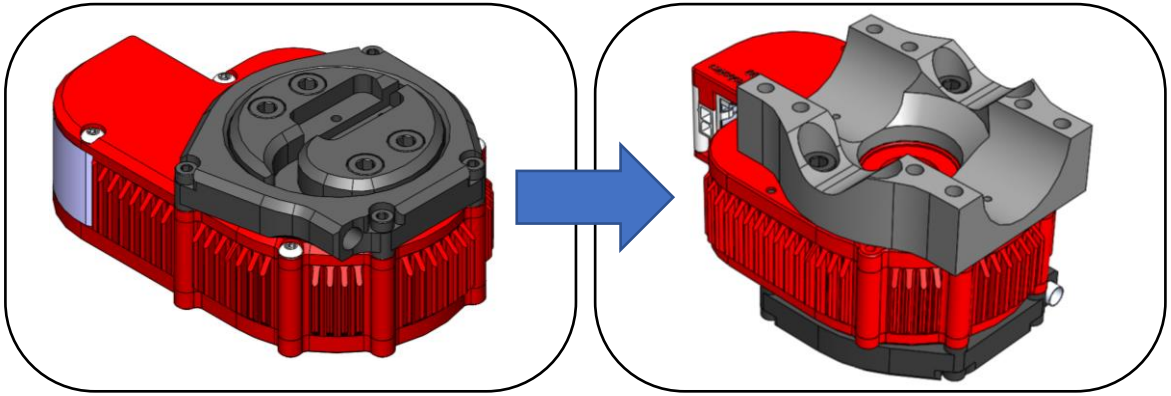
1 x
PM-2293-01
Spool Housing

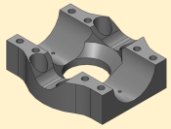
12 x
PM-2467-01
M3 5.9mm OD Flat Washer
(Use for X8 Spool ONLY)

***For using an X8 MODULE ONLY.**
If the spool module is an X5, SKIP this page.



***Clocking for the Spool does not matter**

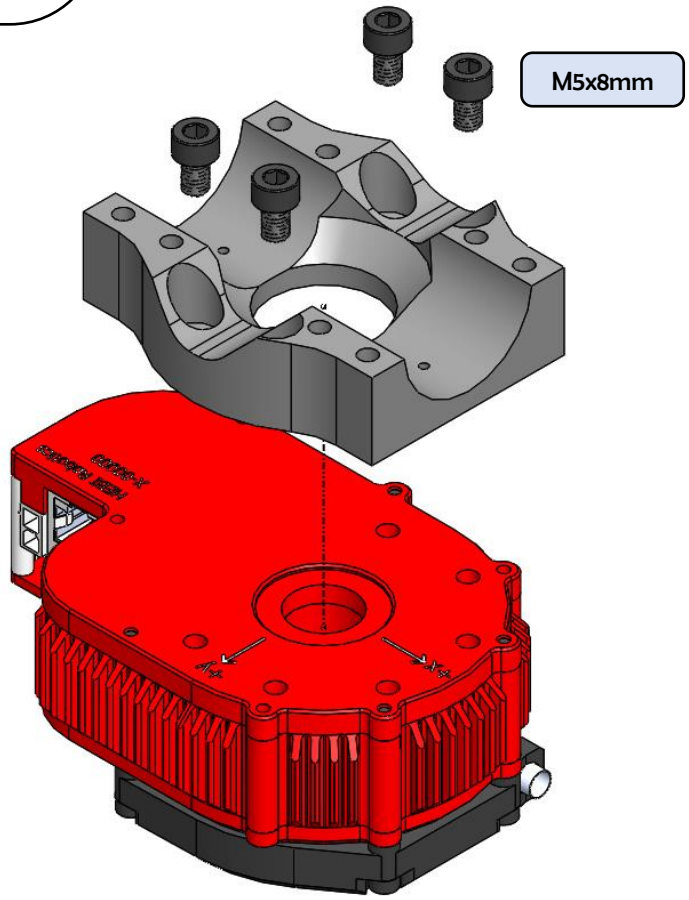




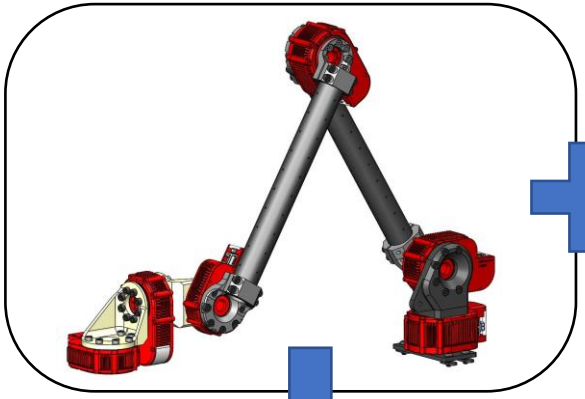
1 x

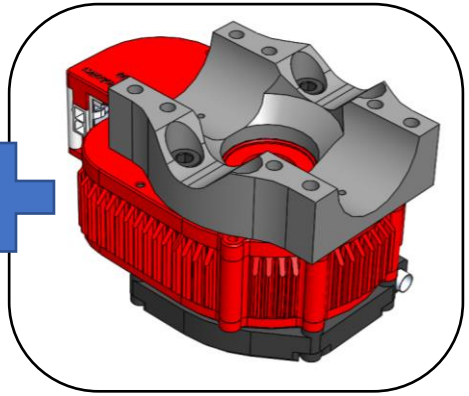
PM-2290-02

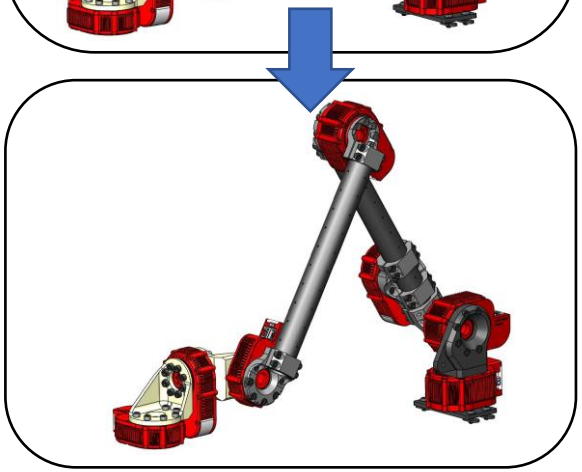
Housing Horizontal Tube Adapter

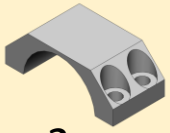


Final Assembly

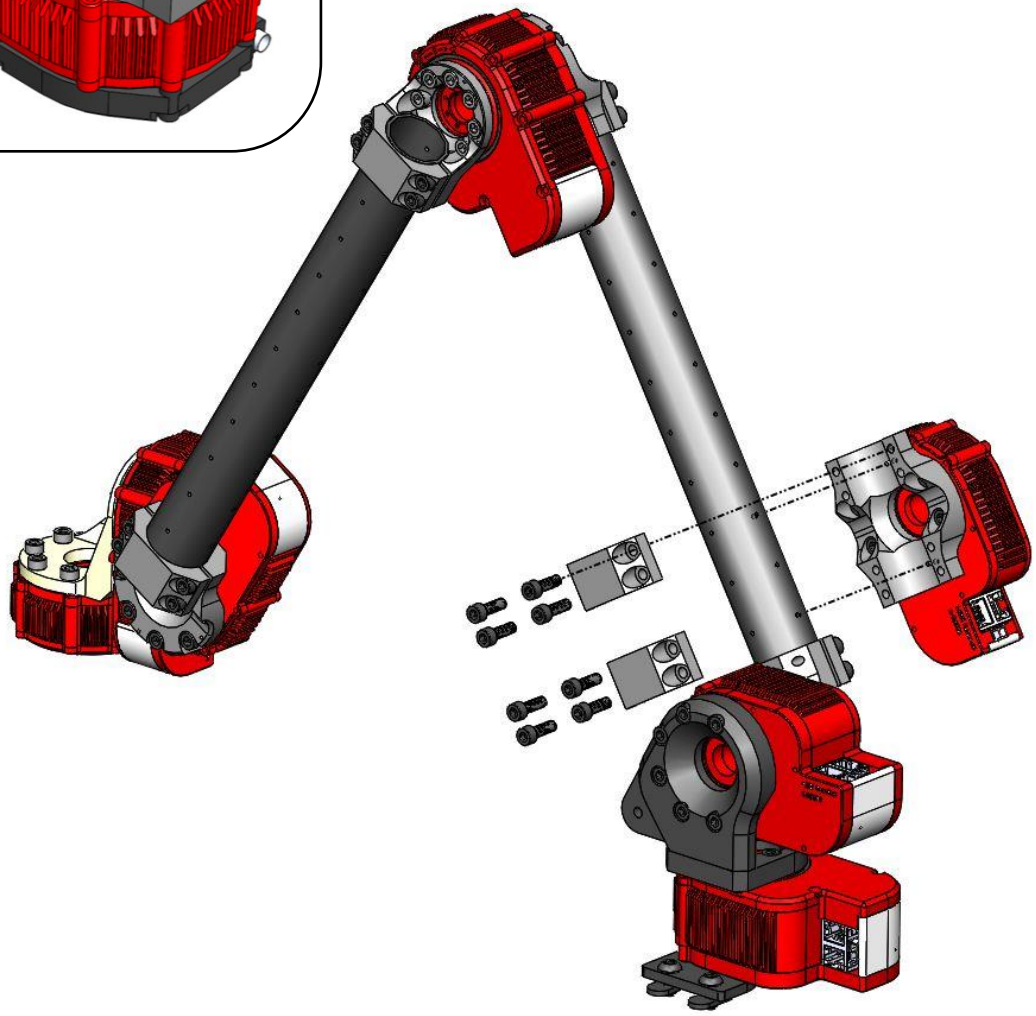


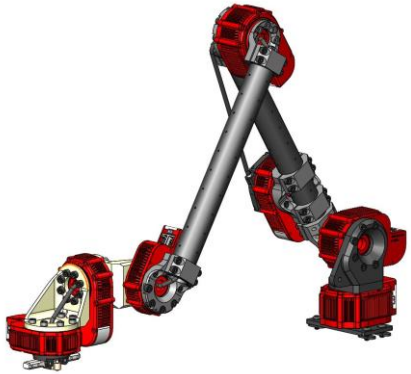


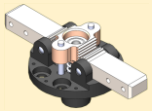




2 x
PM-2148-01
Tube Clamp



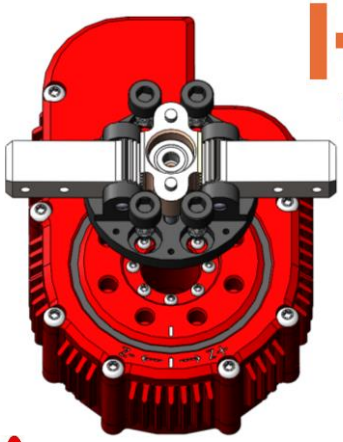




1 x

A-2055-01

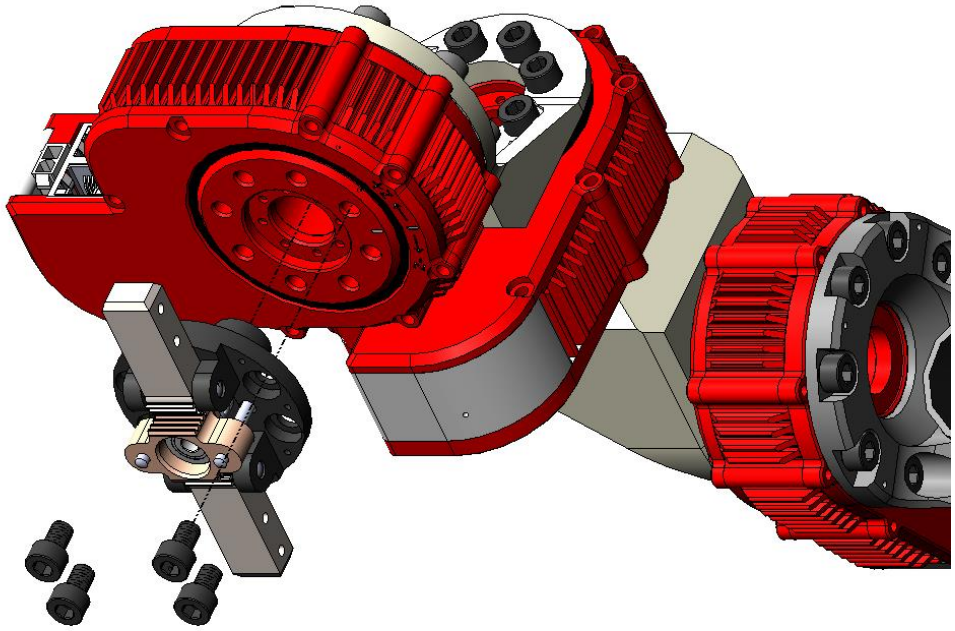
Gripper Assembly



Align with actuator output hub tick mark

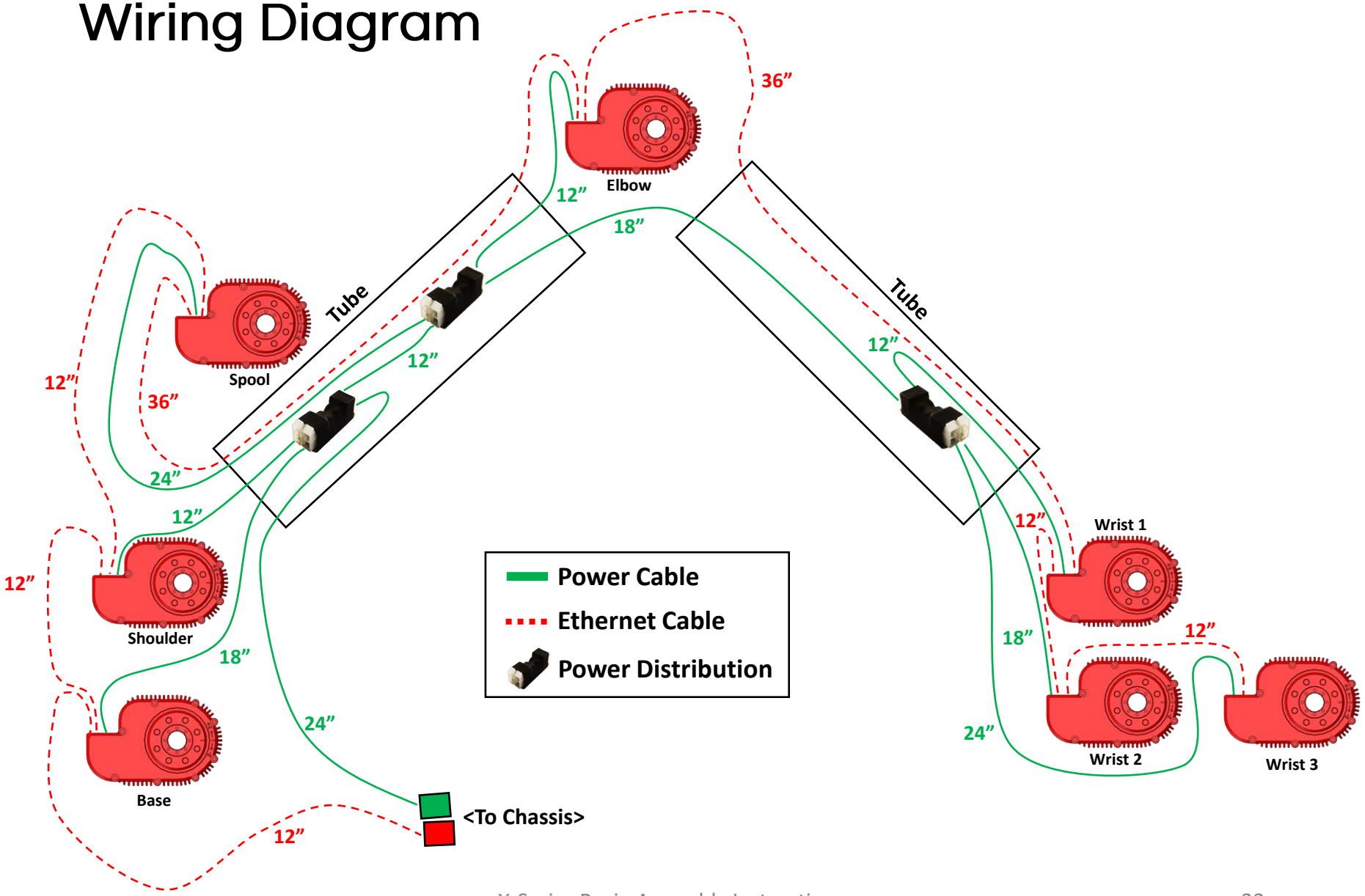
(Fingers perpendicular to the tick mark)

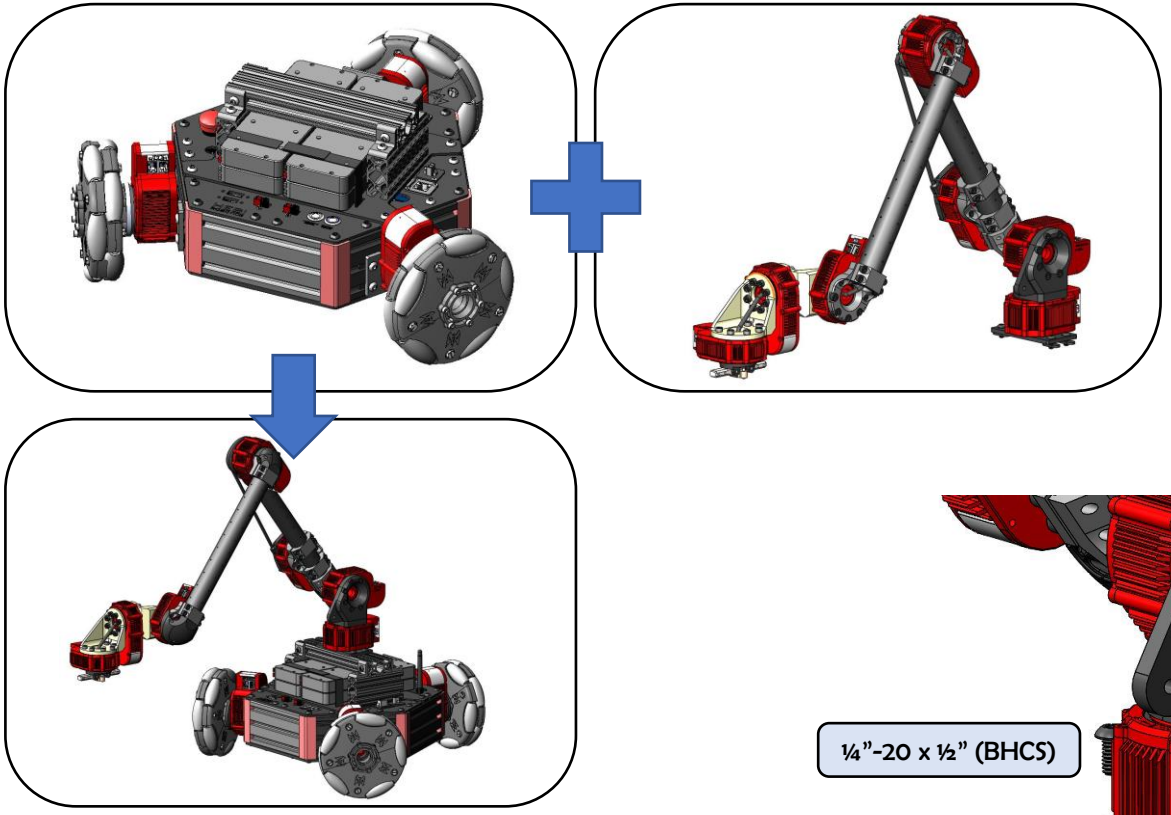
The Last Module on the Arm



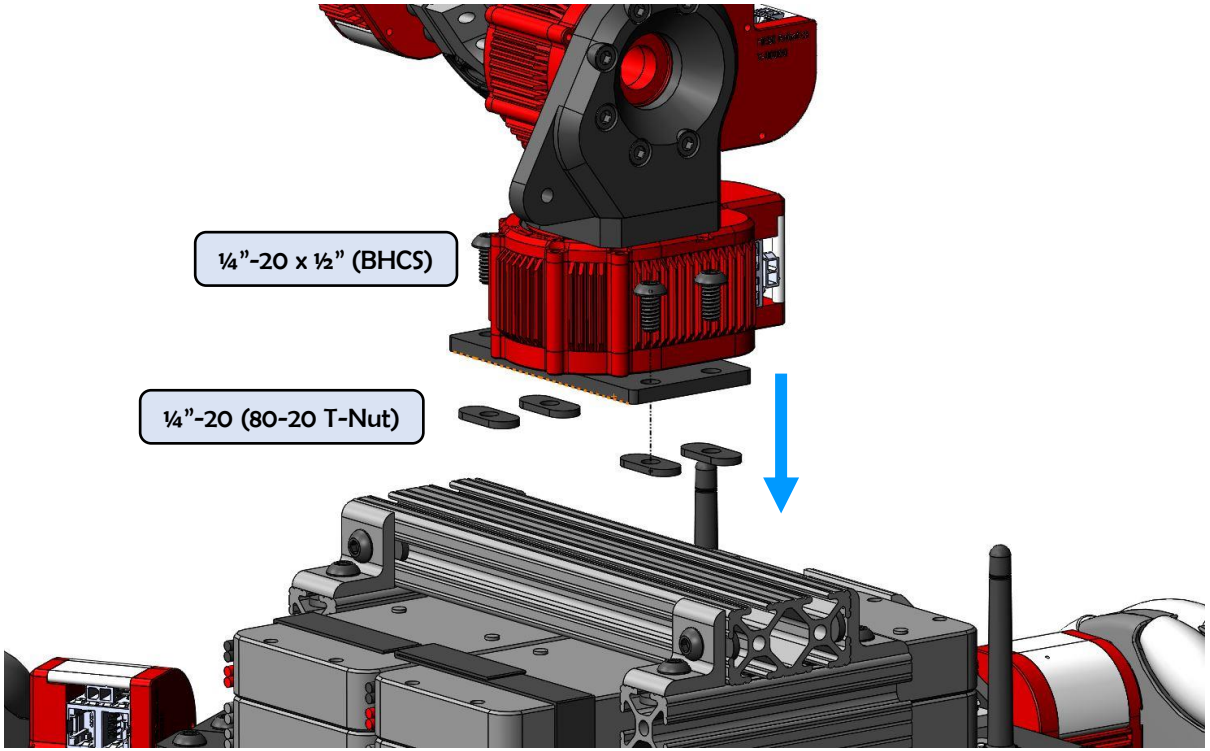
M5x8mm

Wiring Diagram



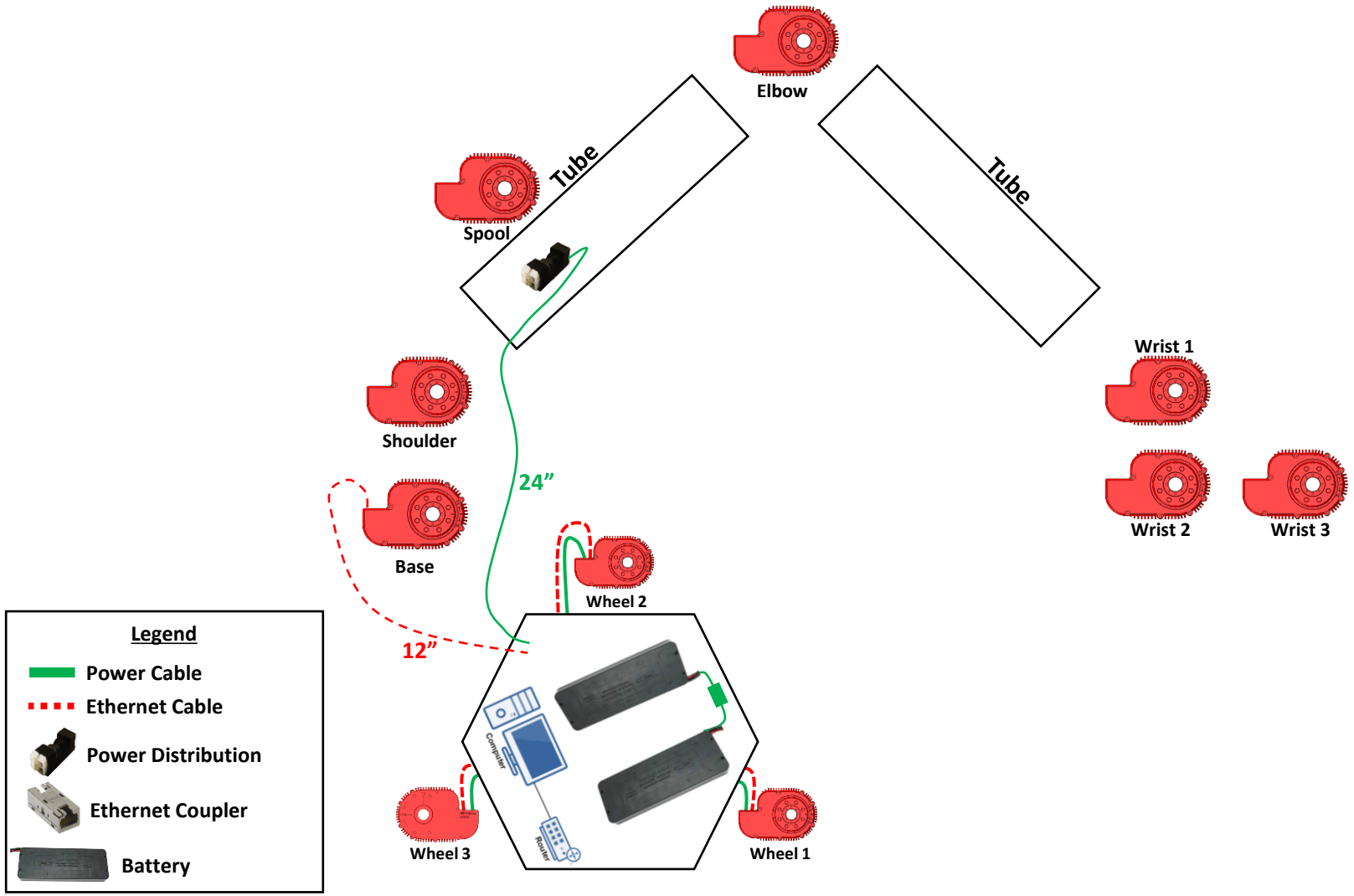


The arm must be wired before this step



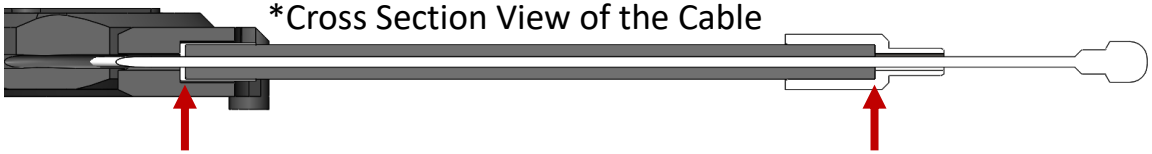
Wiring Diagram

(refer to subassembly wiring diagrams)

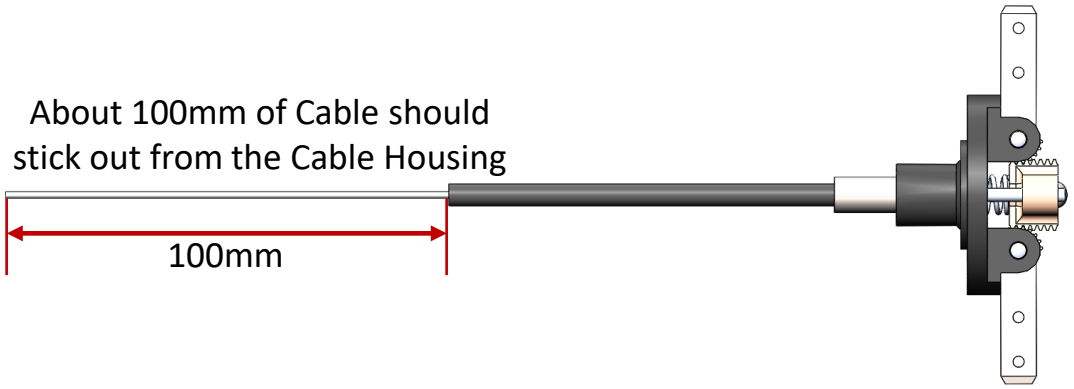


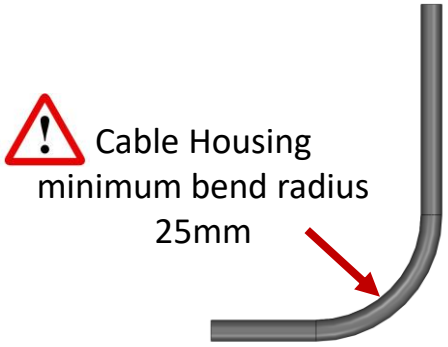
Running the Cable Through

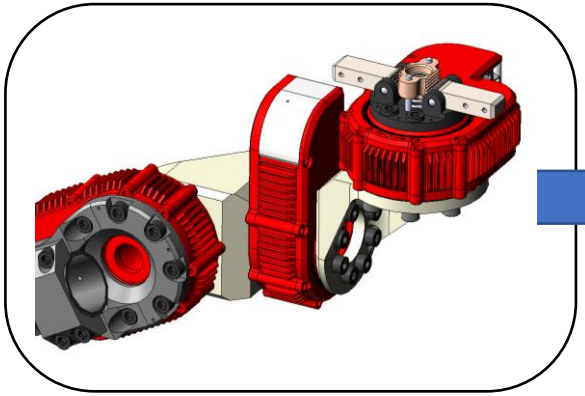
- Make sure to use a Standard Road Bike Brake Cable.
- Run the cable to fit your system.
- Run both the cable and the cable housing before cutting them to ensure that the cable is long enough.
- Cut the cable housing first, and then cut the cable.

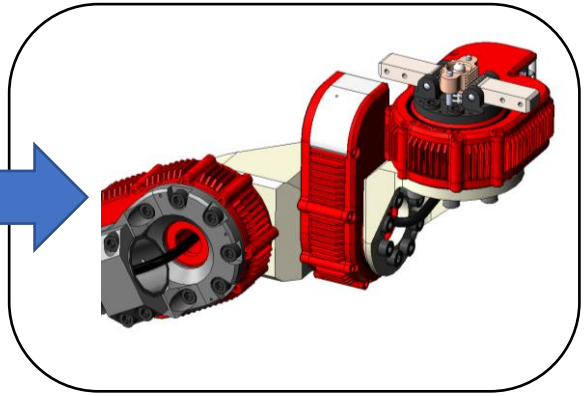


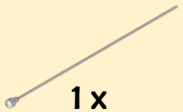
Make sure that the Cable Housing is long enough to be fully inserted into the Housing End Cap and the Housing Adapter







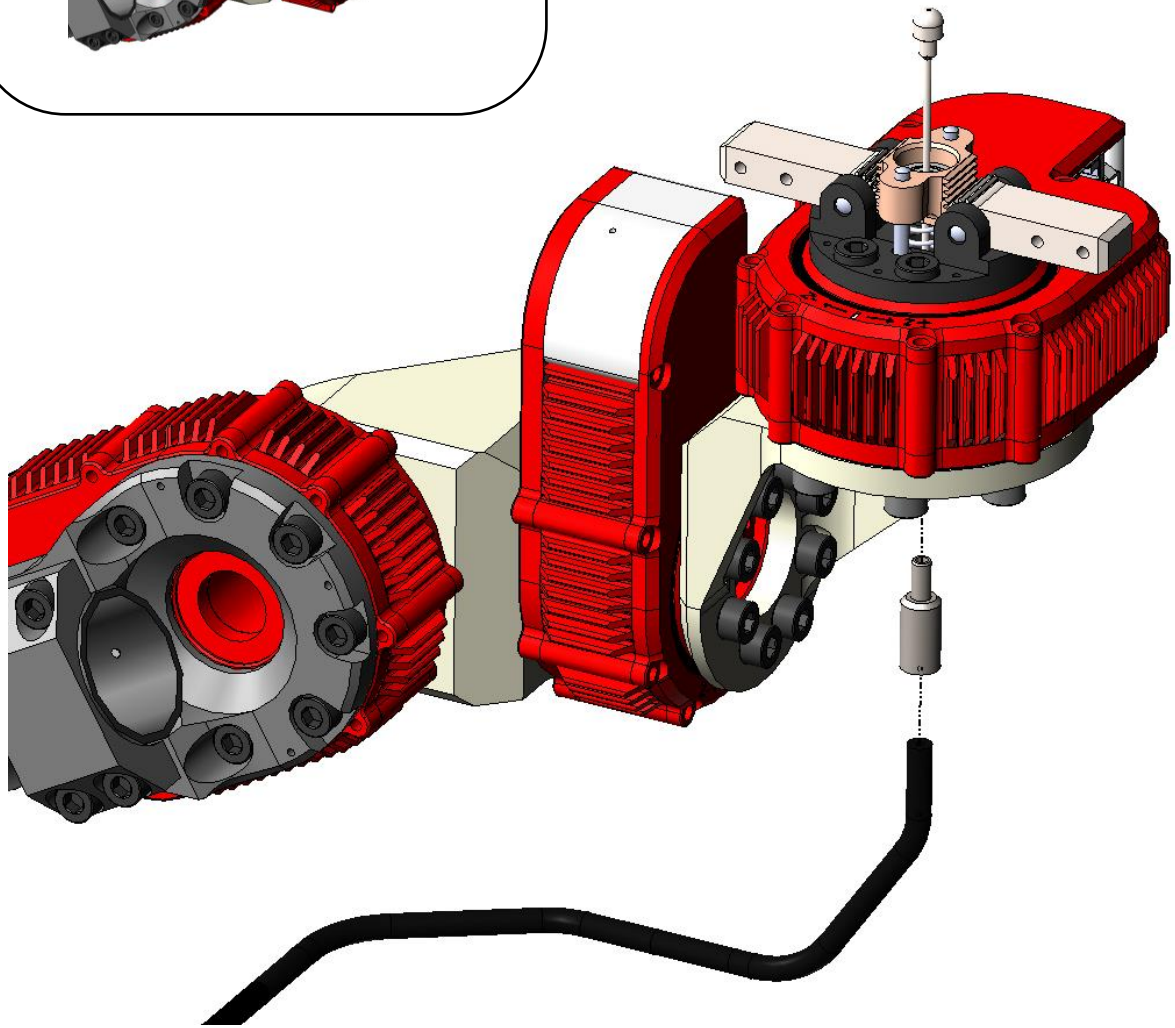




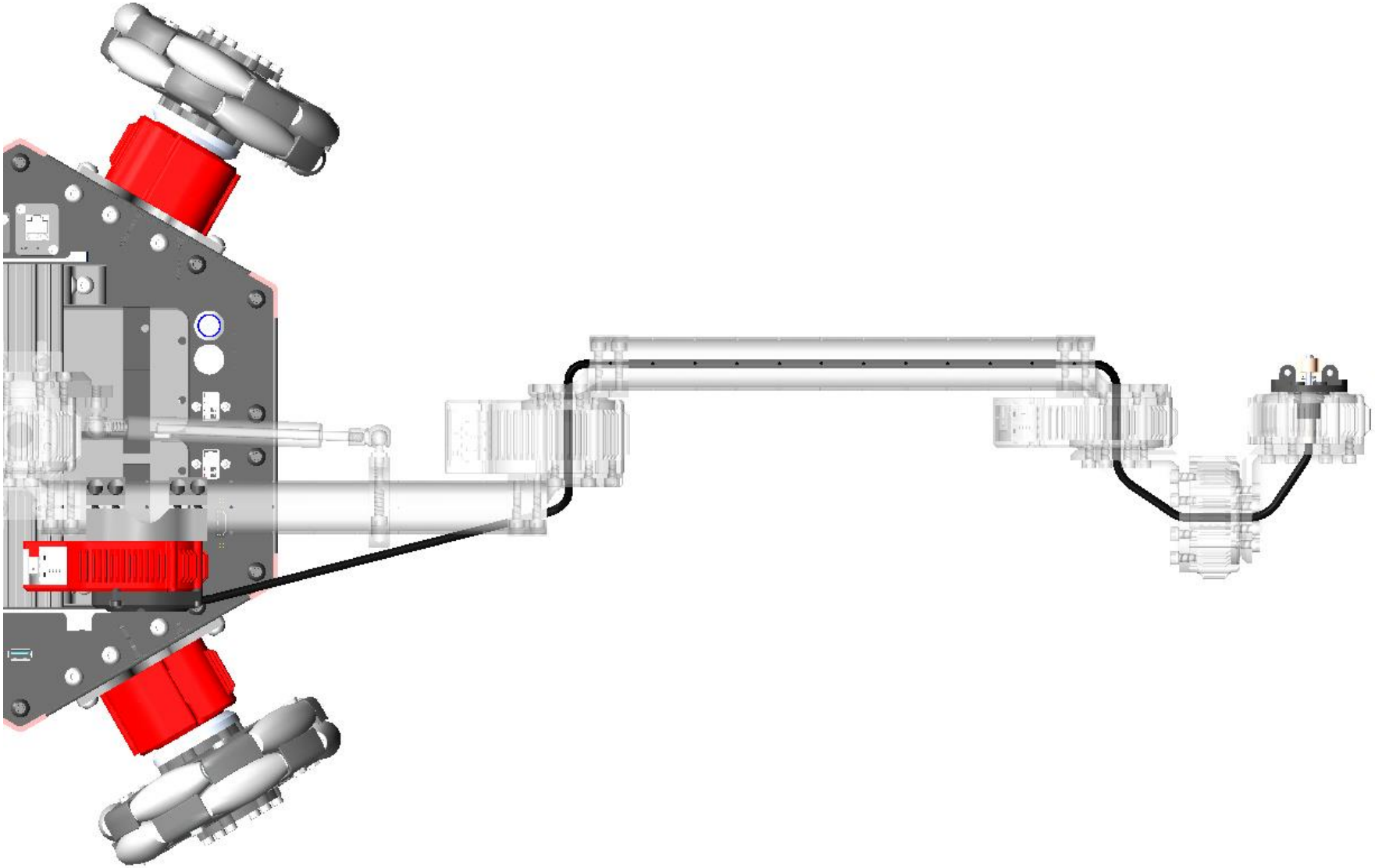
1 x
PP-2239-01
Cable

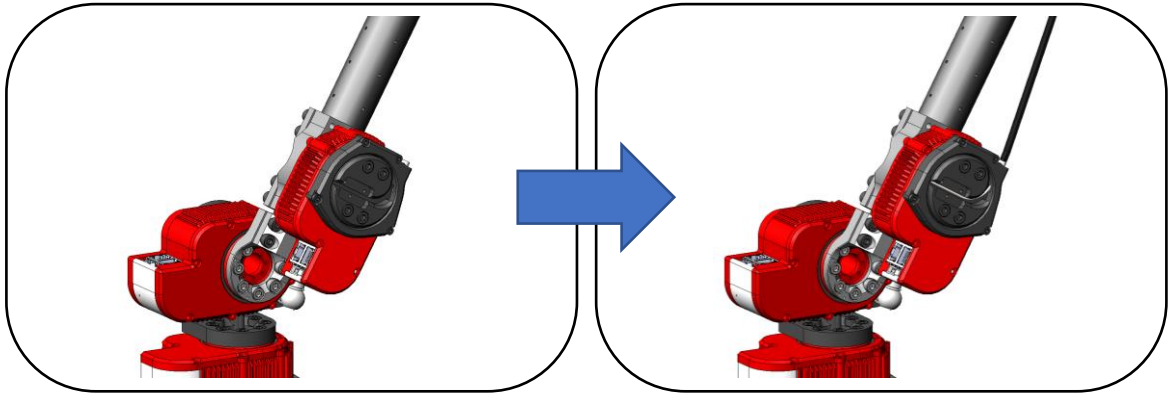
1 x
PP-2240-01
Cable Housing

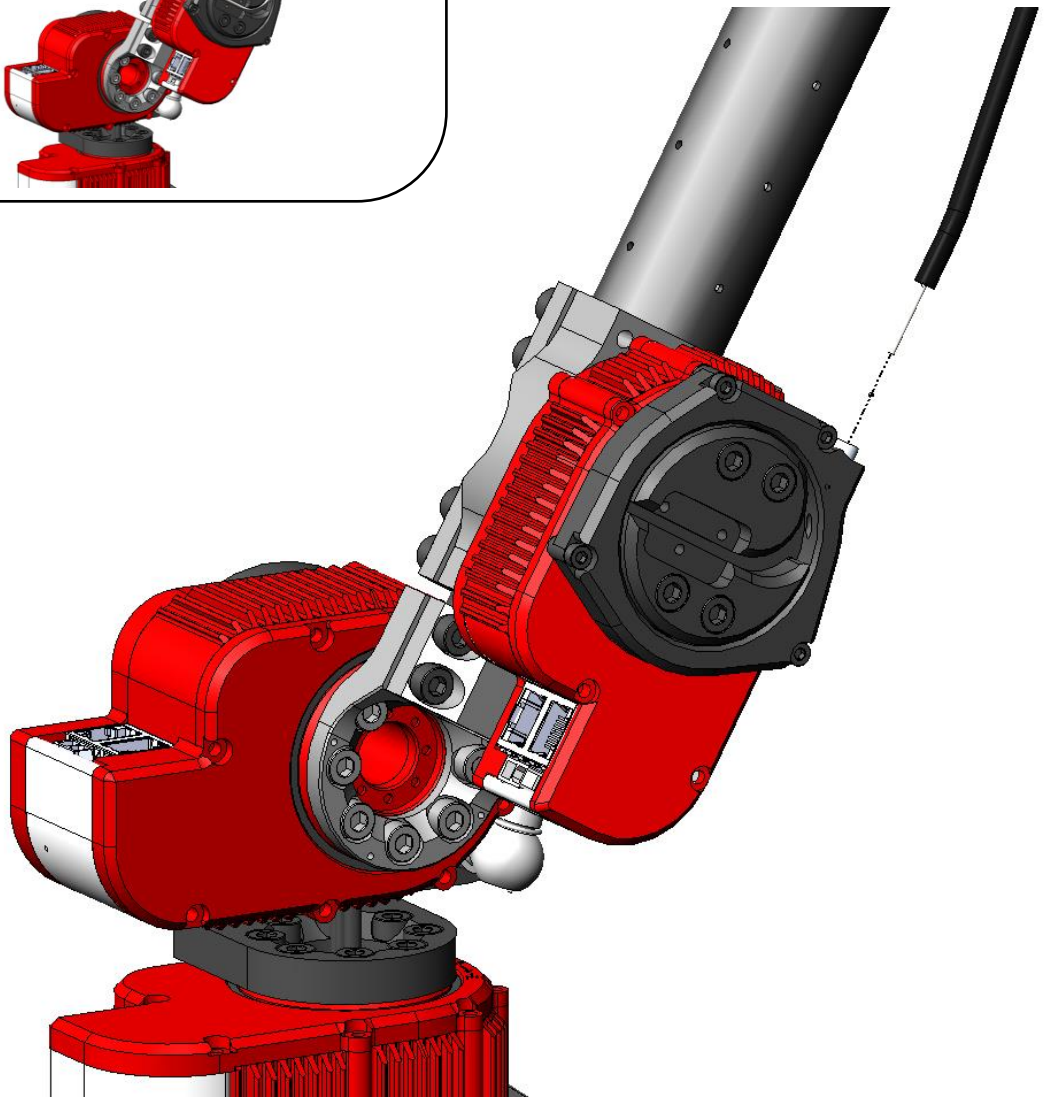
1 x
PM-2222-01
Cable Housing Adapter

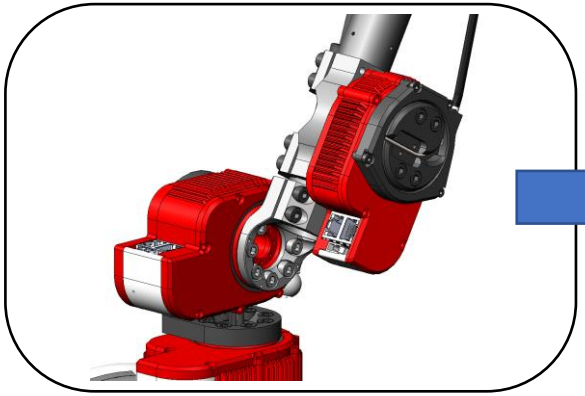


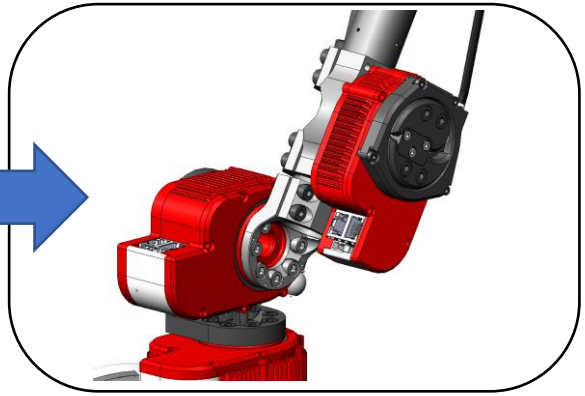
Gripper Cable Routing

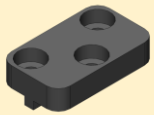




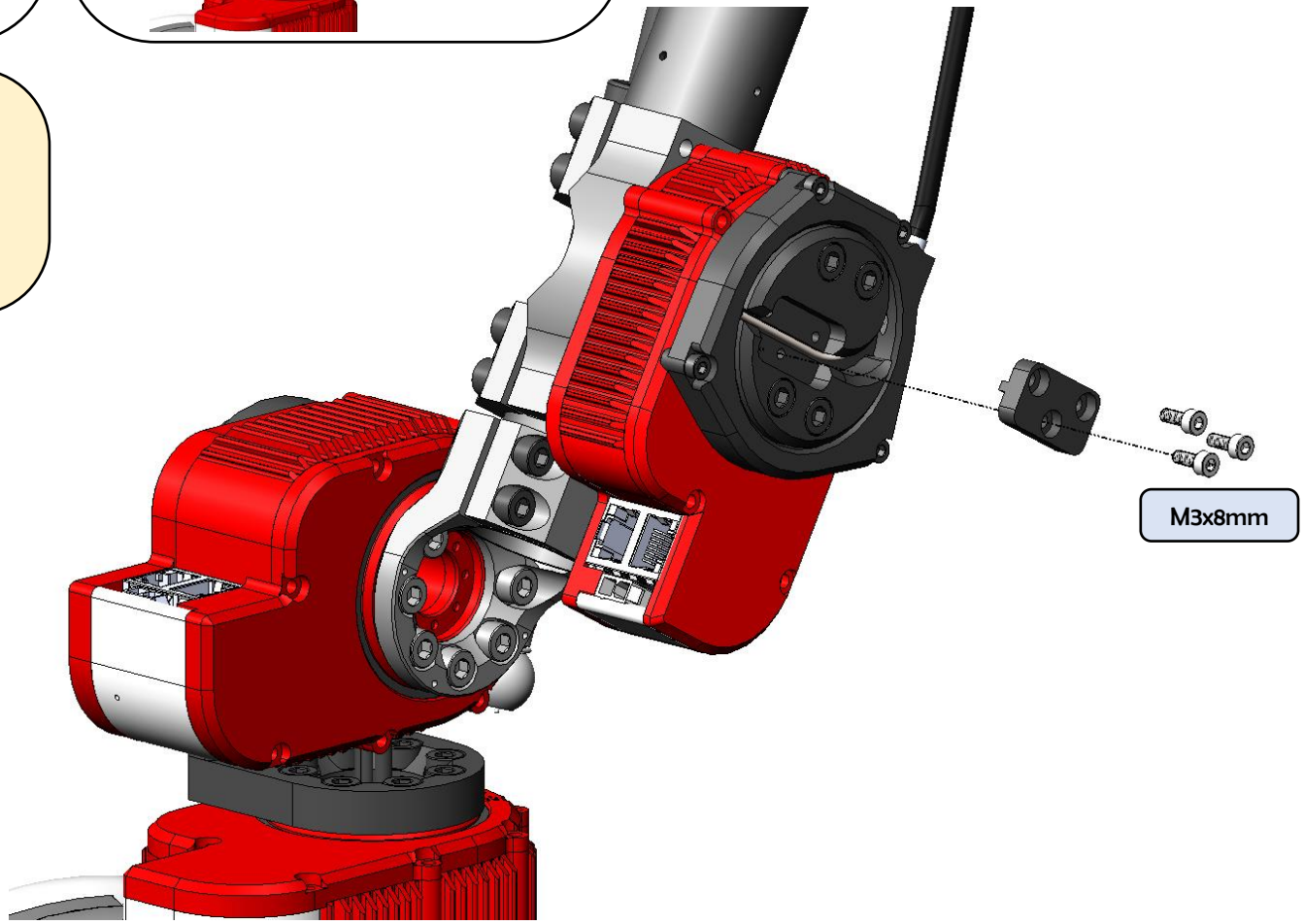


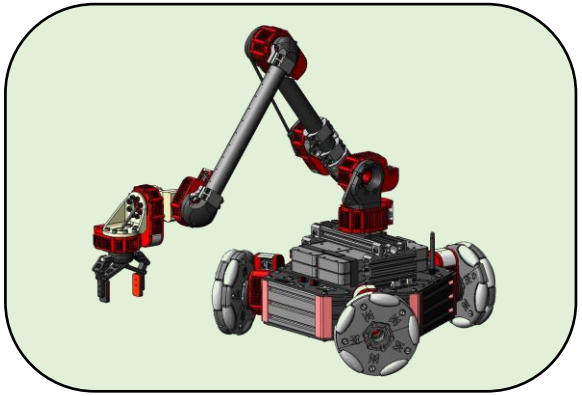






1 x
PM-2290-01
Cable Clamp





1 x
A-2090-01

2 x
A-2090-01

2 x
A-2091-01

Install all cables before attaching covers

M2x8mm

M2x8mm

M2x8mm

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