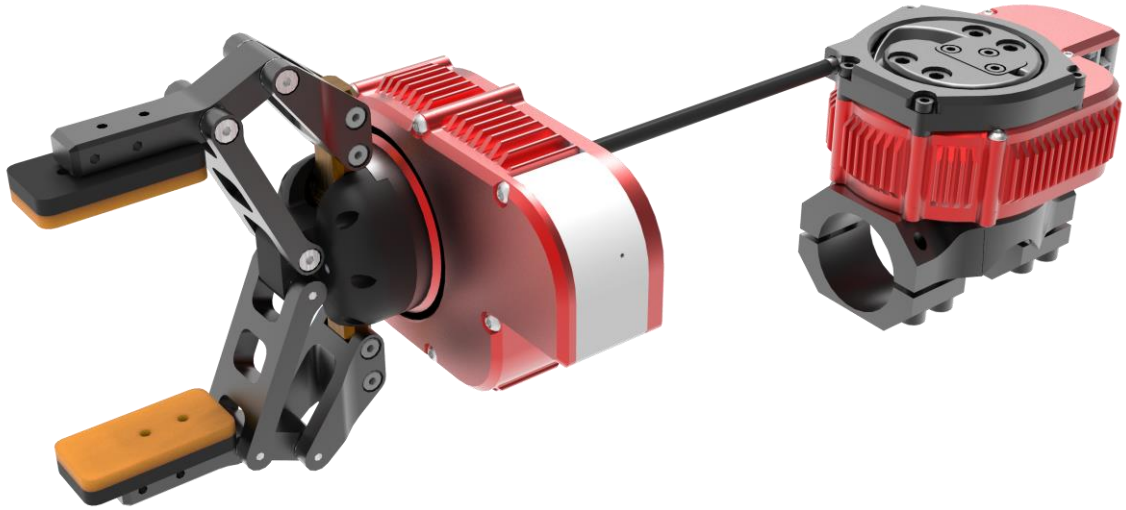
HEBI ROBOTICS



X-Series Gripper

Wire Actuated 2-Finger Gripper

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)

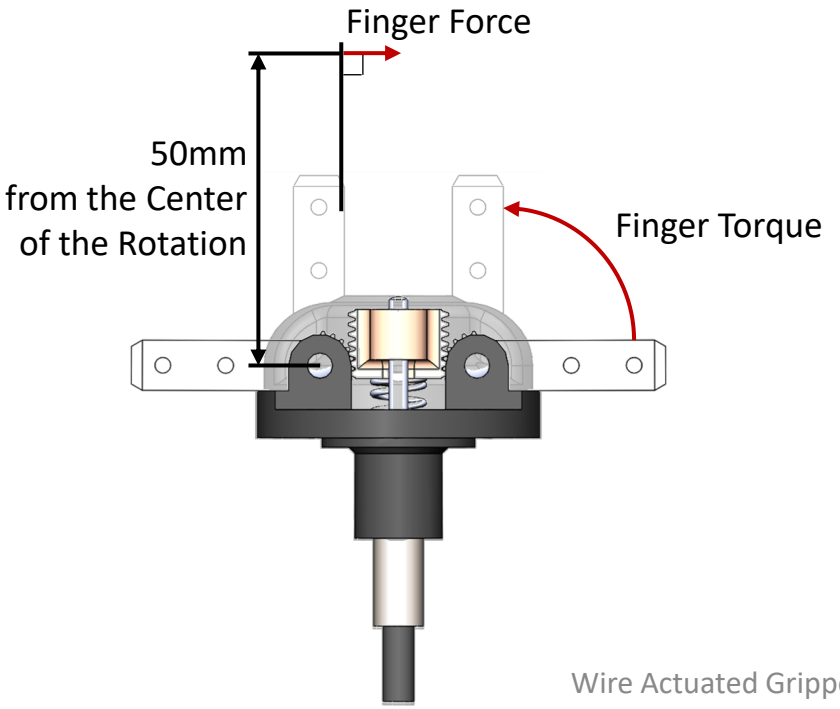
- Before operating, read all applicable instructions and notices found here:
  http://docs.hebi.us/#quickstart-guide-x-series-actuator
- Comply with the operating temperature (-10℃ to 50℃)
- Turn off power source before connecting or disconnecting actuator power.
- Do not expose the actuator to permanent 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.

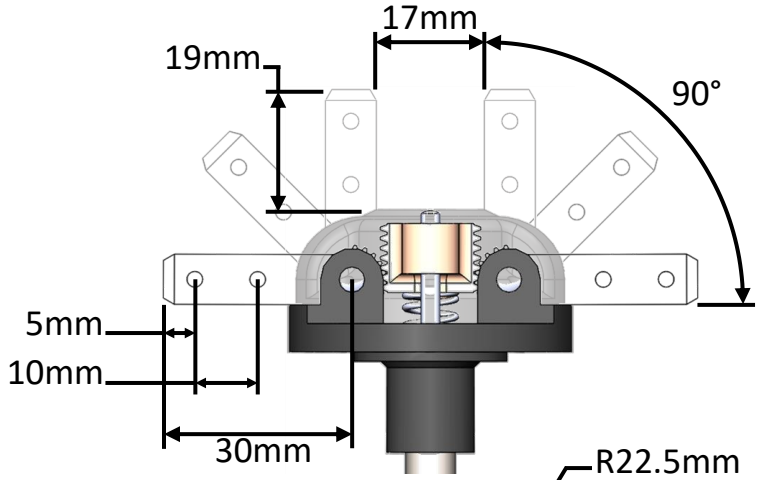
For more information please visit: ***docs.hebi.us***

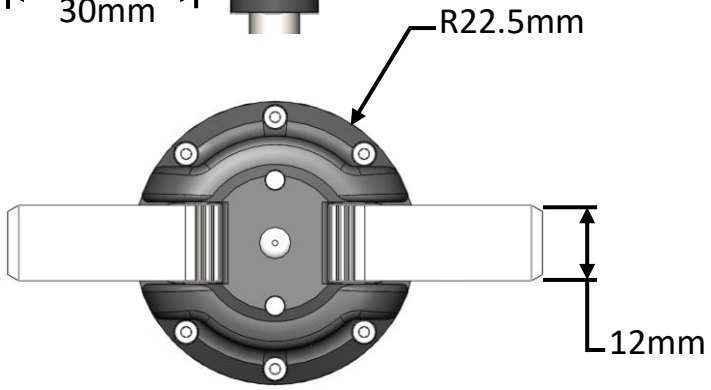
Technical Specifications

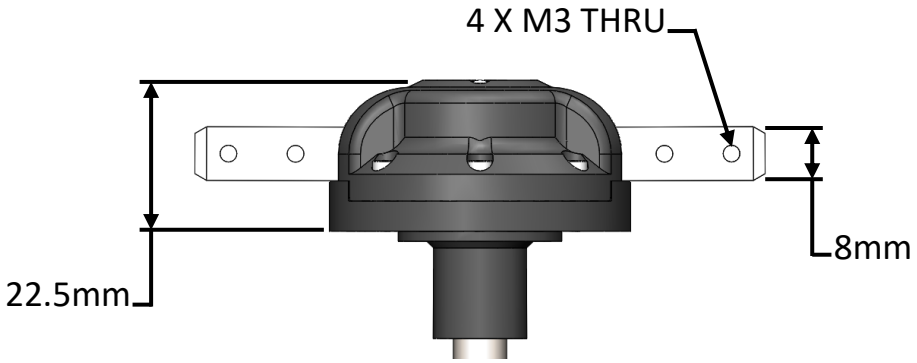
Spool Module	Max Finger Torque	Max Finger Force at 50mm
X5-1	0.1 Nm	2 N
X5-4	0.5 Nm	10 N
X5-9	1.1 Nm	23 N
X8-3	0.4 Nm	8 N
X8-9	1.1 Nm	23 N
X8-16	2.0 Nm	40 N

*Values assume a symmetric two-finger grasp

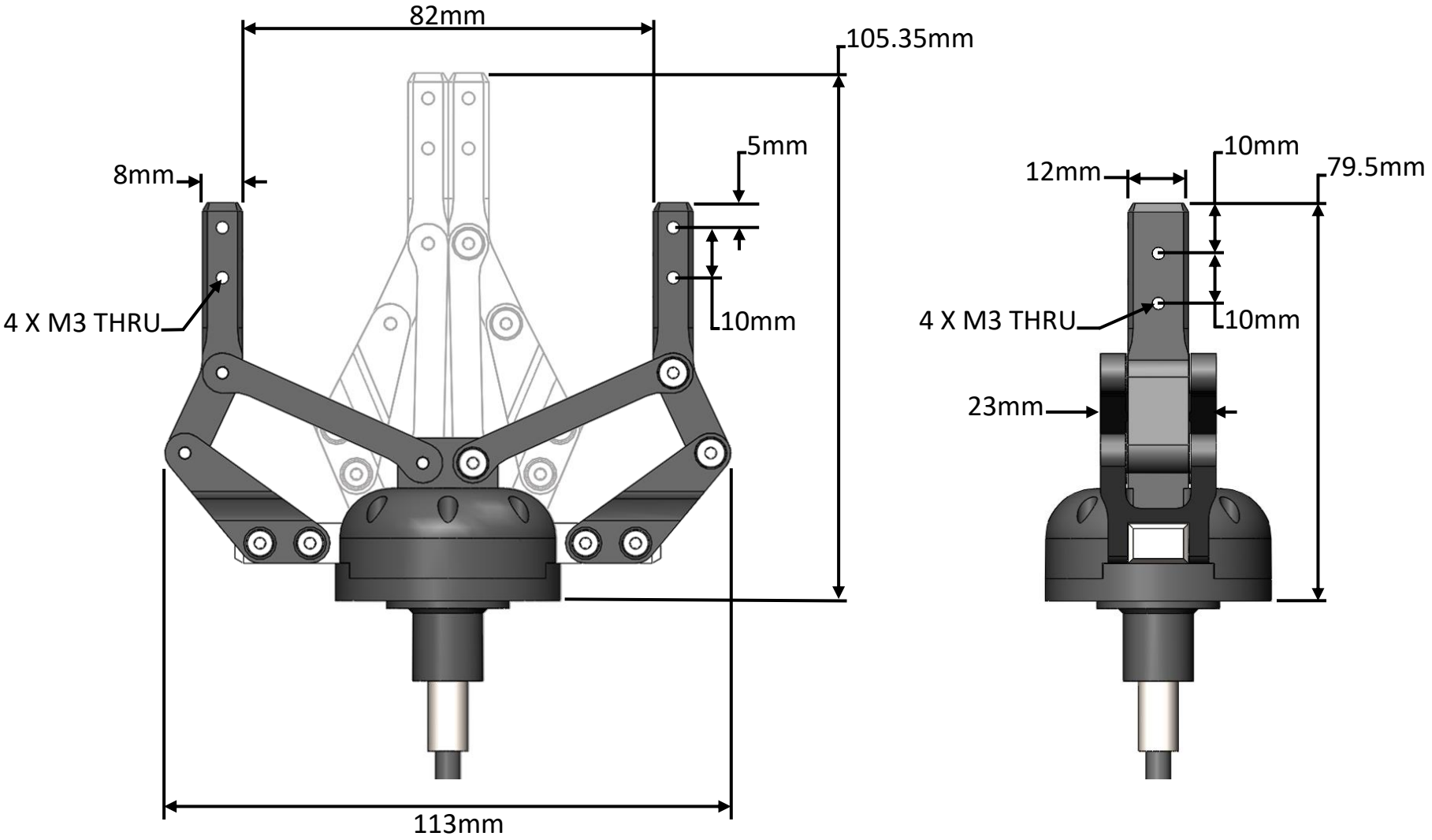




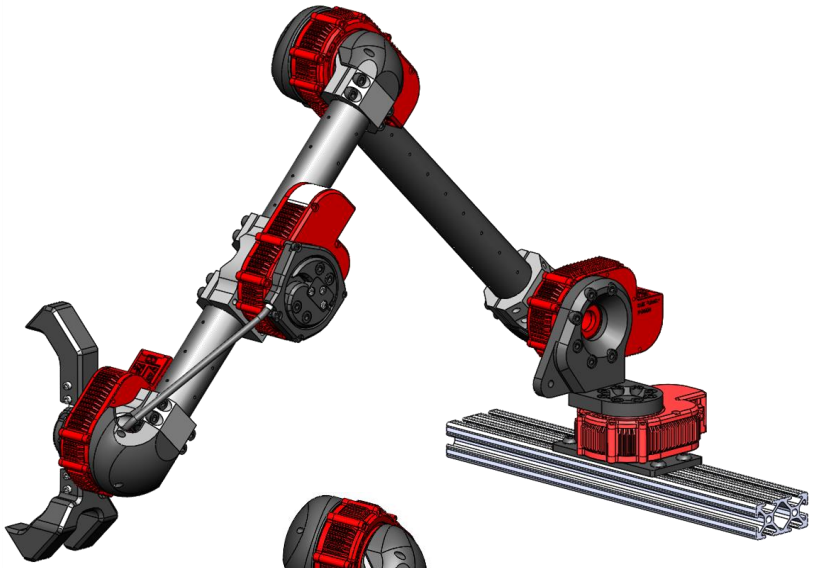


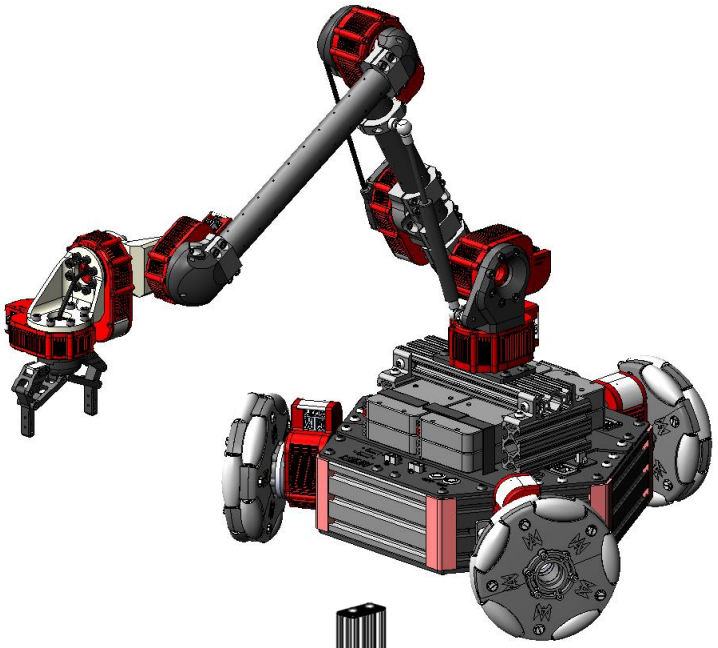


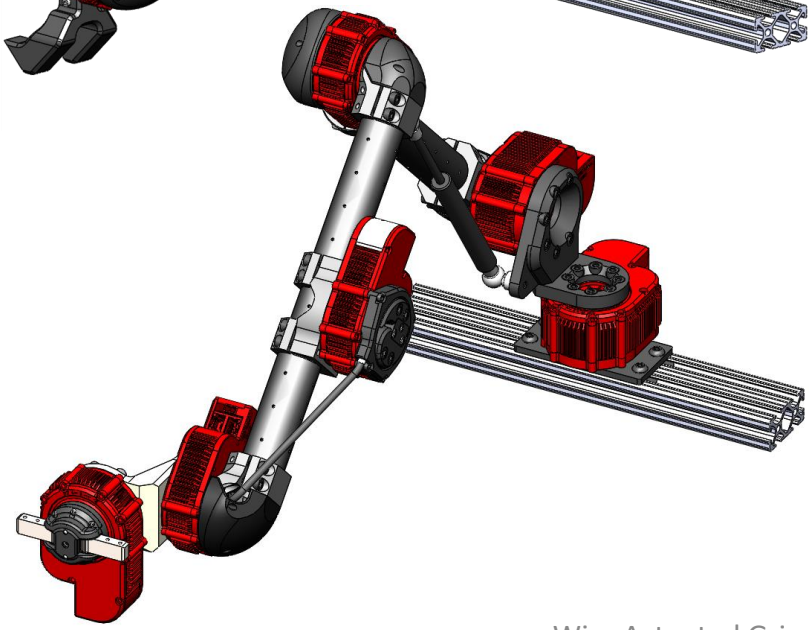
Technical Specifications

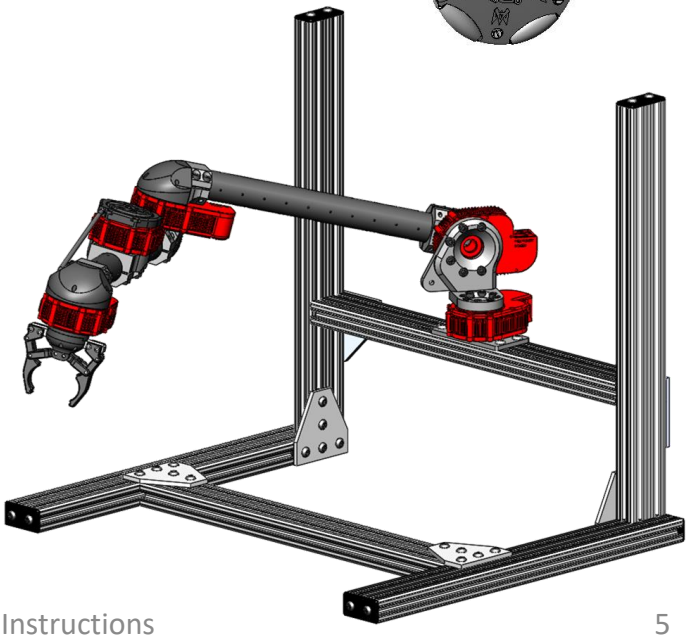


Examples of Uses



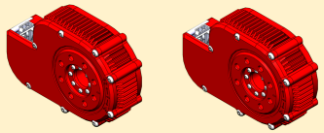






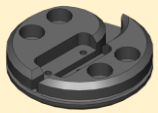
Bill of Materials

Default Configuration



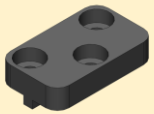
1 x
X5-9

1 x
X5-1

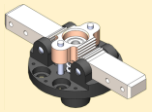


1 x
PM-2292-01
Spool

1 x
PM-2293-01
Spool Housing

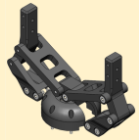


1 x
PM-2290-01
Cable Clamp



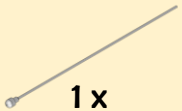
1 x
A-2055-01
Gripper Assembly

1 x
PM-2343-01
Gripper Cover
(part of A-2055-01)



1 x
A-2143-02
Parallel Linkage Add-on

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



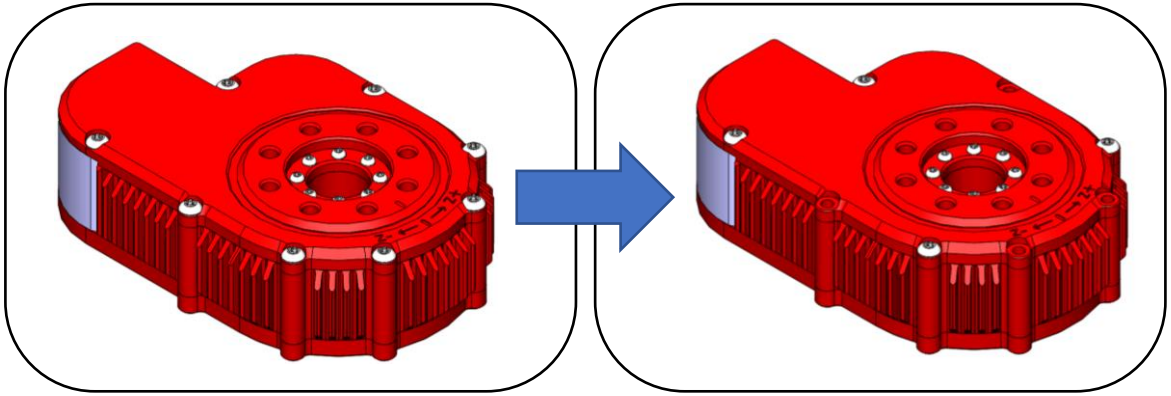
1 x
PP-2239-01
Cable

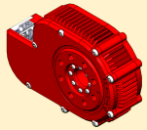
1 x
PP-2240-01
Cable Housing
(Standard Road Bike Brake Cable Set)

1 x
PP-2241-01
Cable Housing End Cap

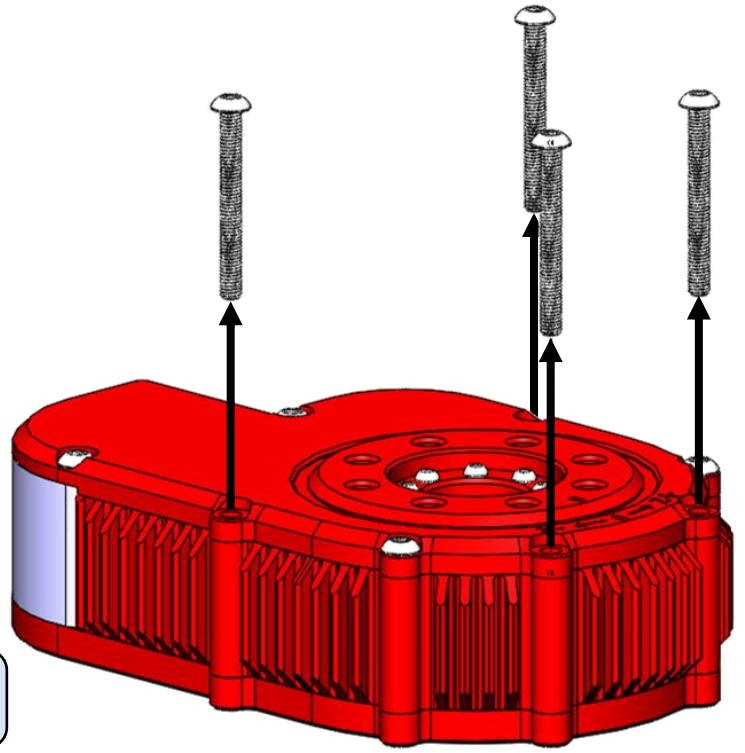
12 x
PM-2467-01
M3 5.9mm OD Flat Washer
(Use for X8 Spool ONLY)

X-Series Actuators sold separately
Fasteners included, not shown

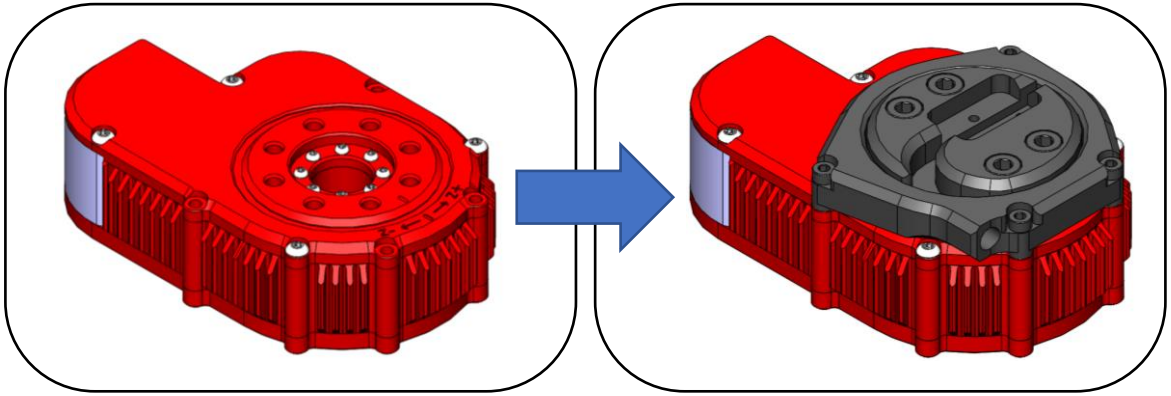




1 x
X5-9



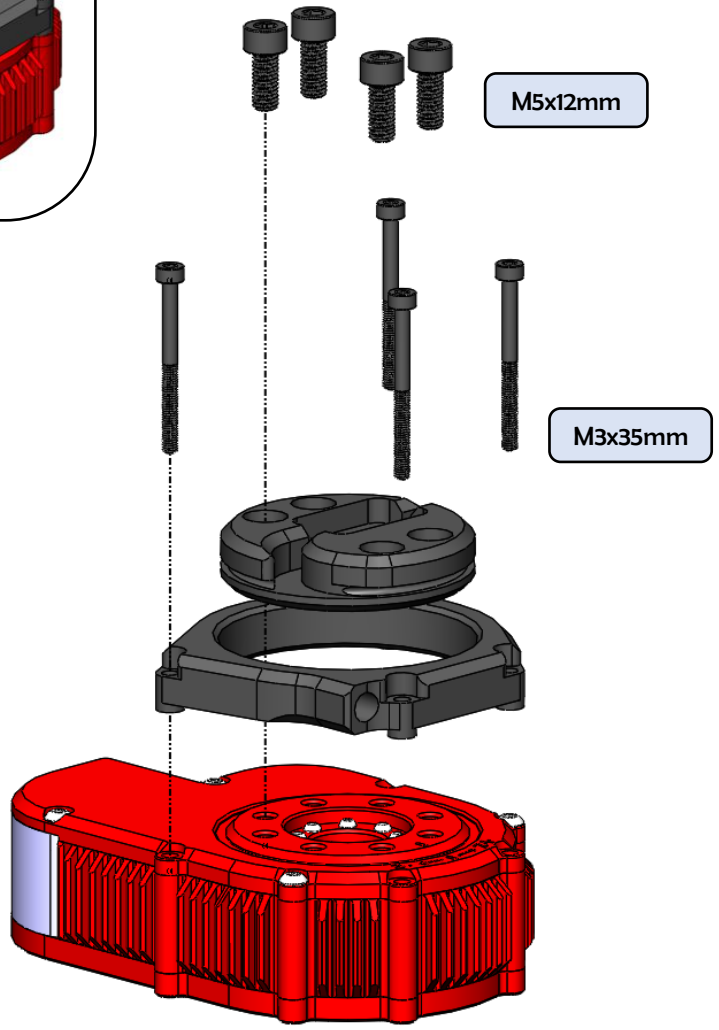
Spool
Default X5-9



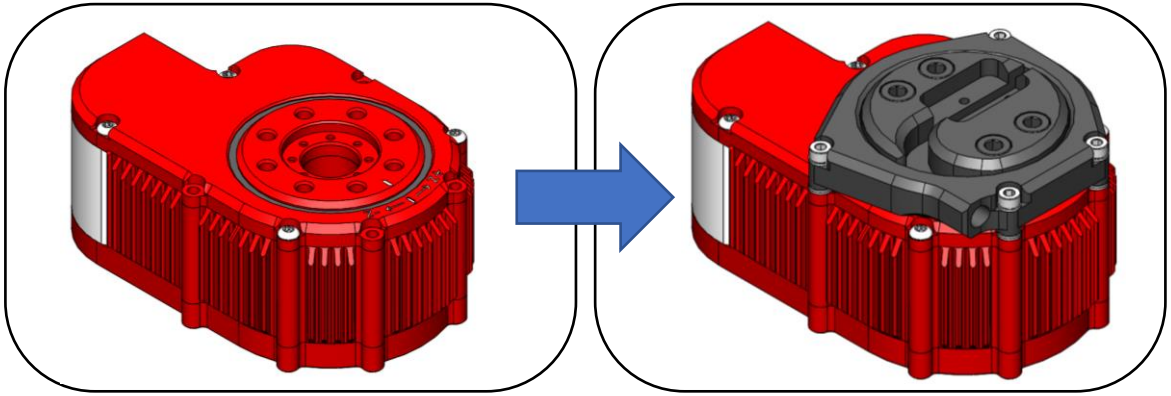
1 x
PM-2292-01
Spool

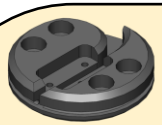
1 x
PM-2293-01
Spool Housing

***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**



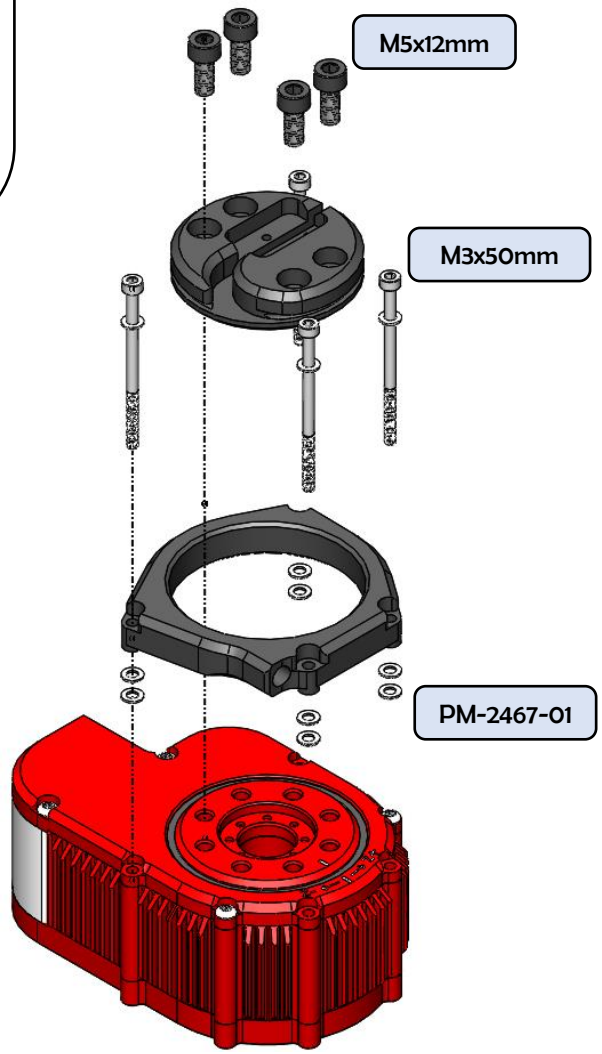


1 x
PM-2292-01
Spool

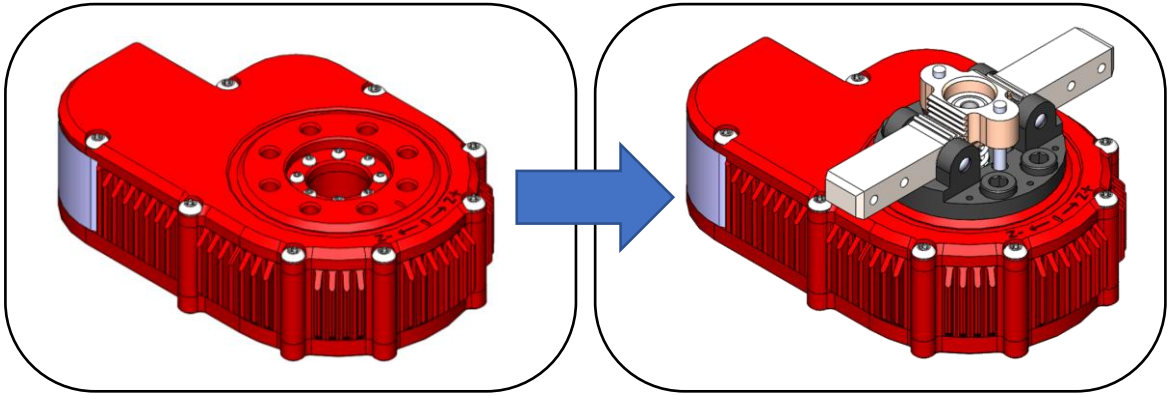
1 x
PM-2293-01
Spool Housing

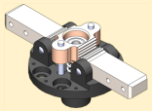
12 x
PM-2467-01
M3 5.9mm OD Flat Washer
(Use for X8 Spool ONLY)

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

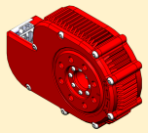


***Clocking for the Spool does not matter**

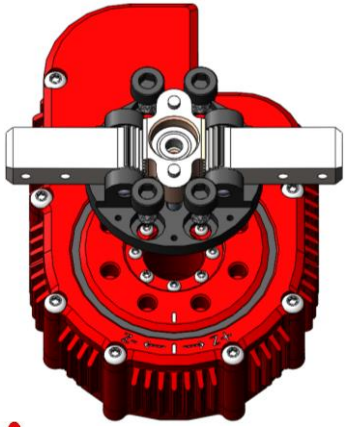




1 x
A-2055-01
Gripper Assembly

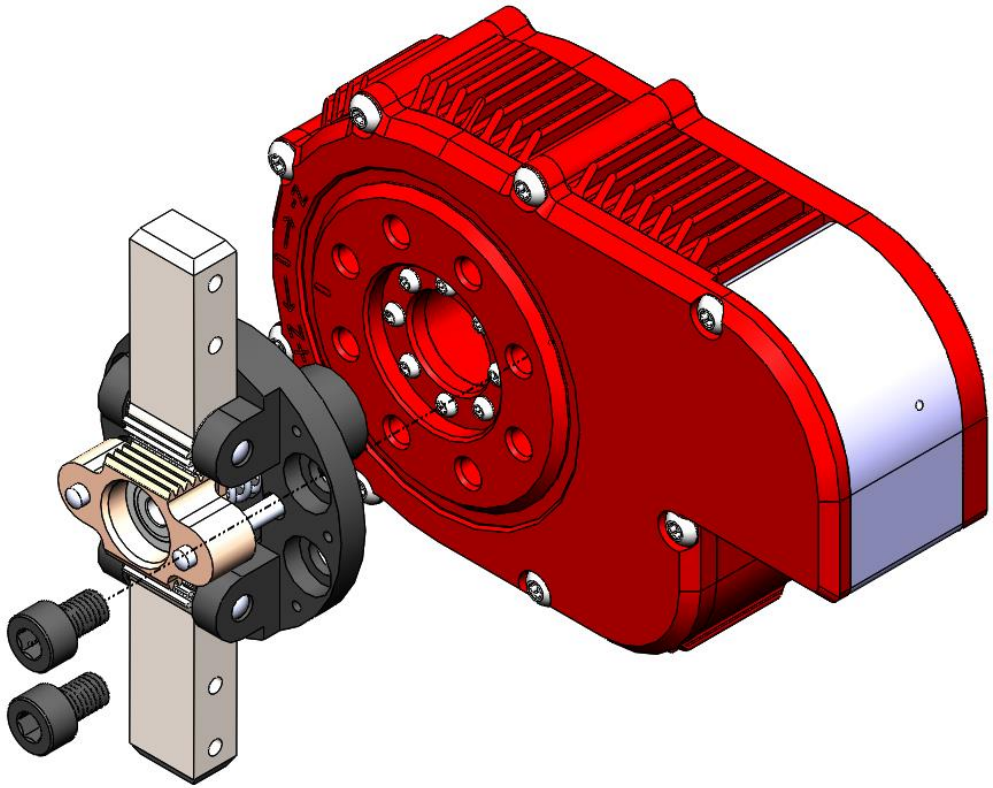


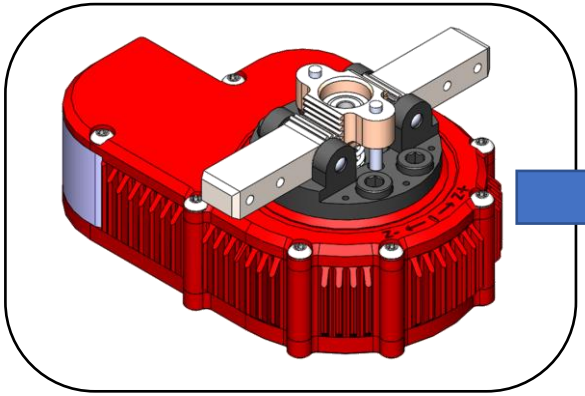
1 x
X5-9

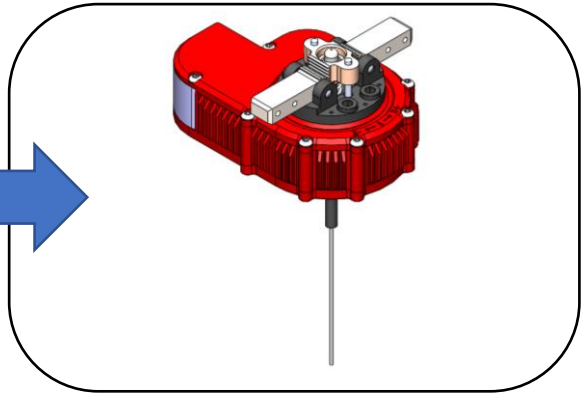


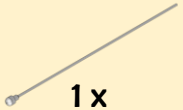
Align with actuator output hub tick mark
(Fingers perpendicular to the tick mark)

M5x8mm





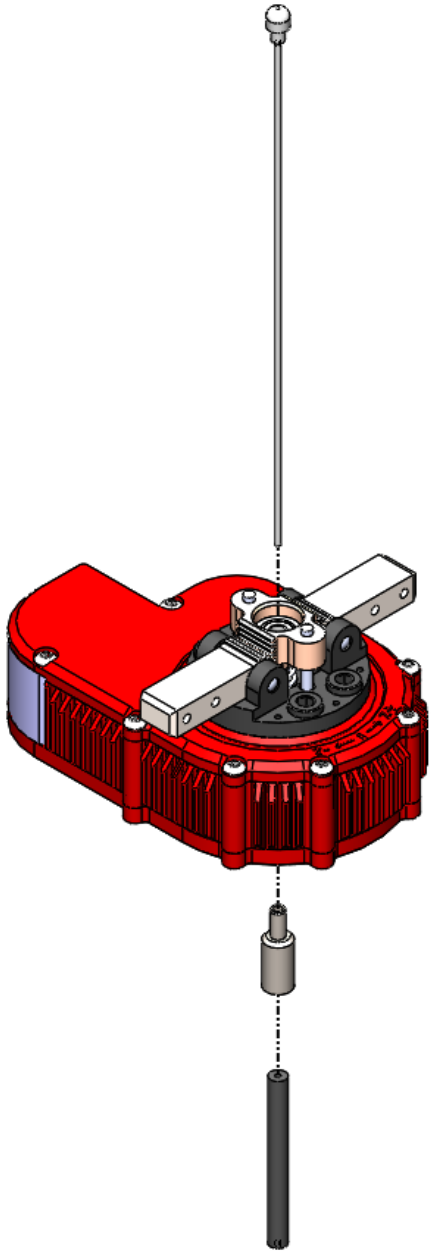




1 x
PP-2239-01
Cable

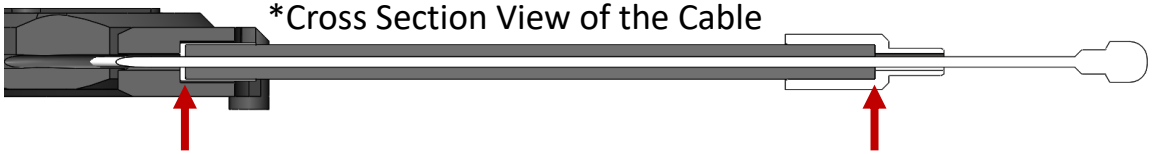
1 x
PP-2240-01
Cable Housing

1 x
PM-2222-01
Cable Housing Adapter

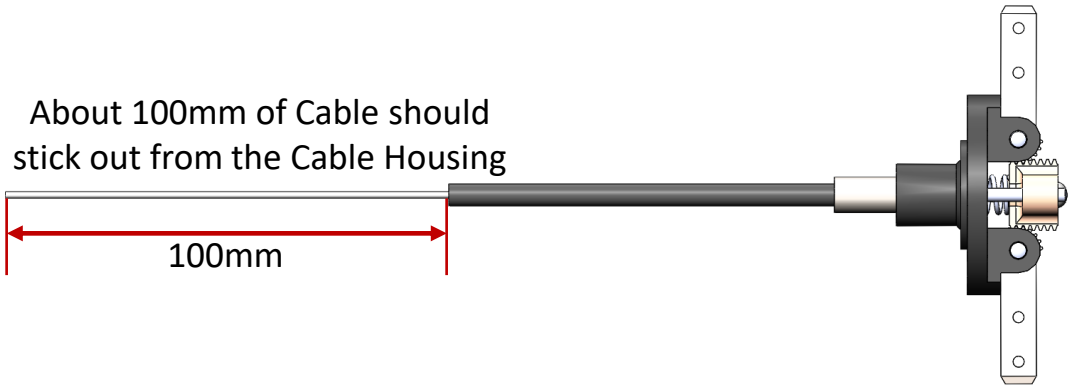


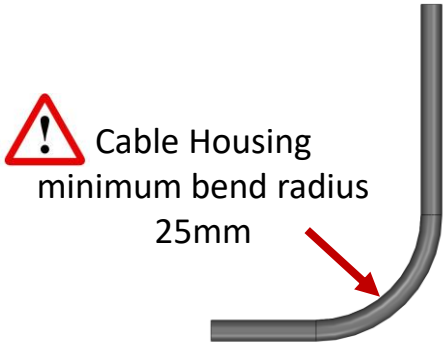
Running the Cable Through

- 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.

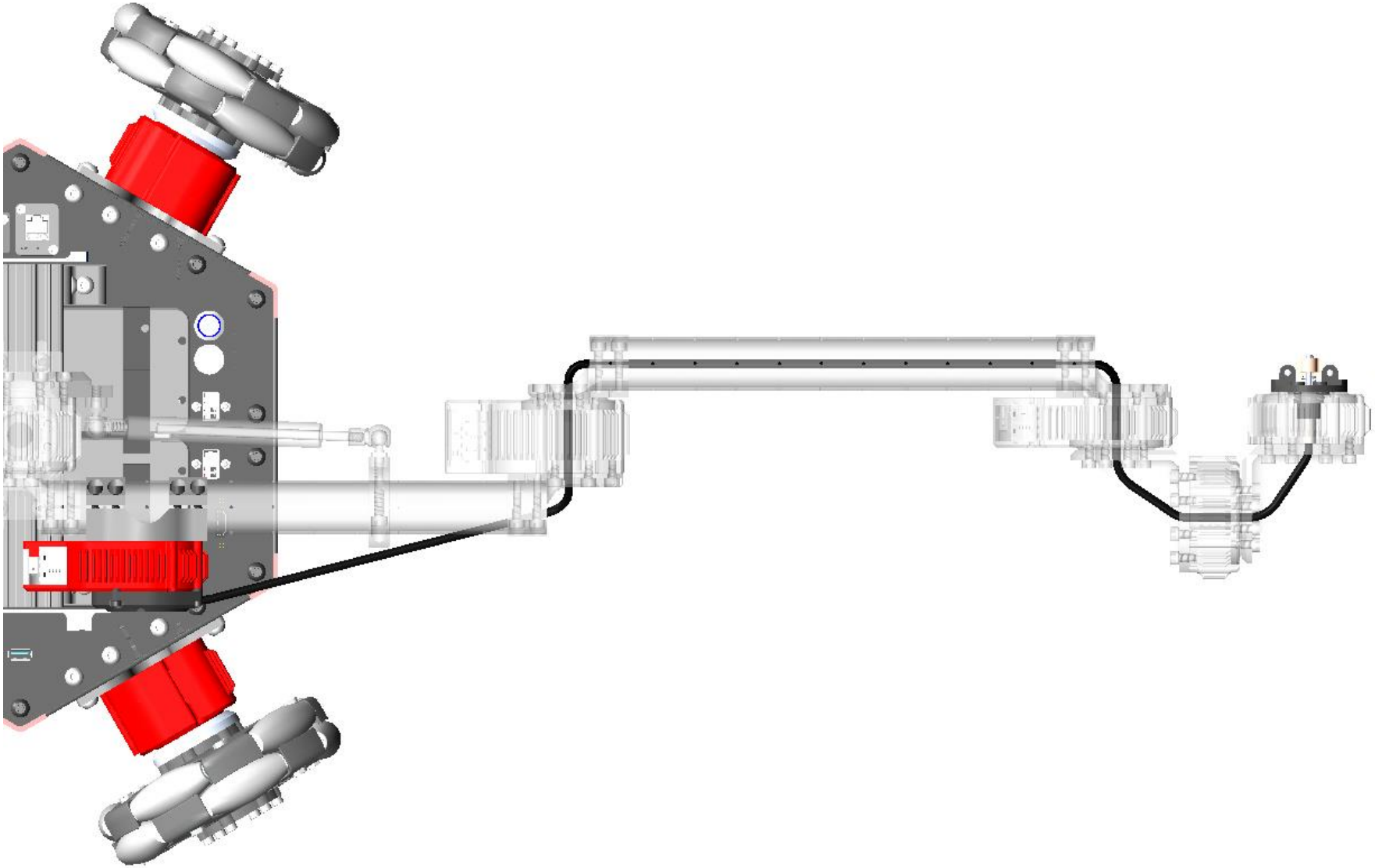


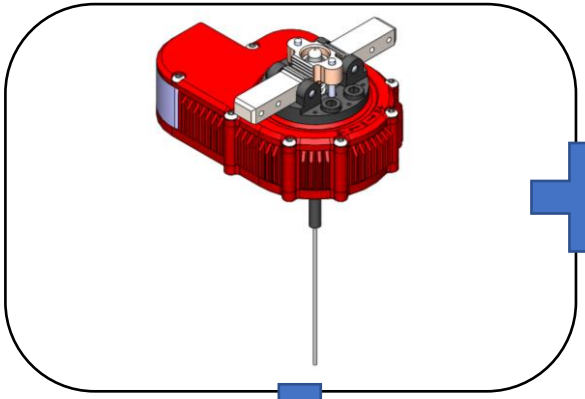
Make sure that the Cable Housing is long enough to be fully inserted into the Housing End Cap and the Housing Adapter

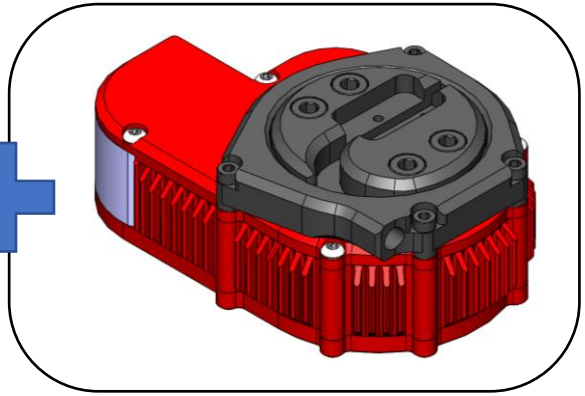


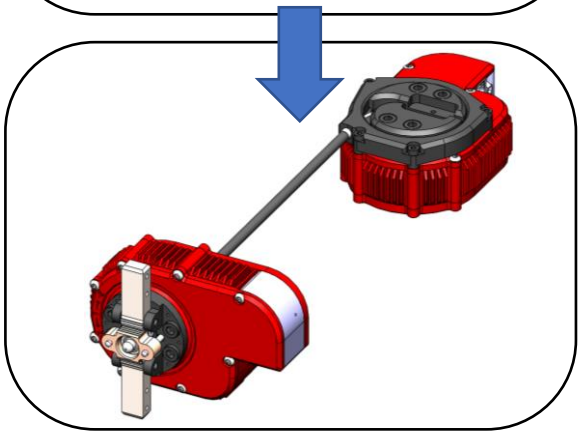


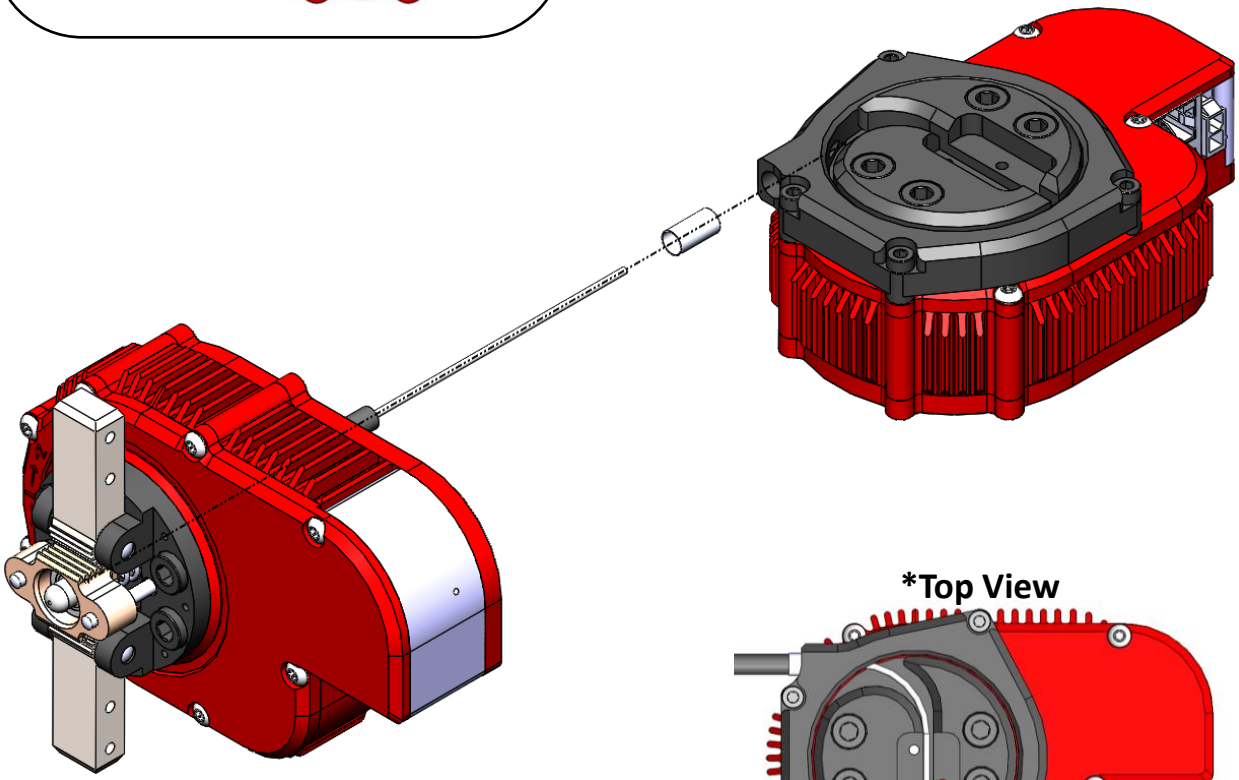
Cable Routing Example (6-Dof Arm)

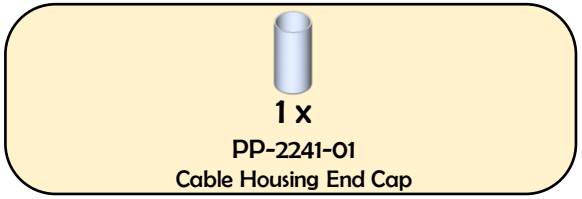










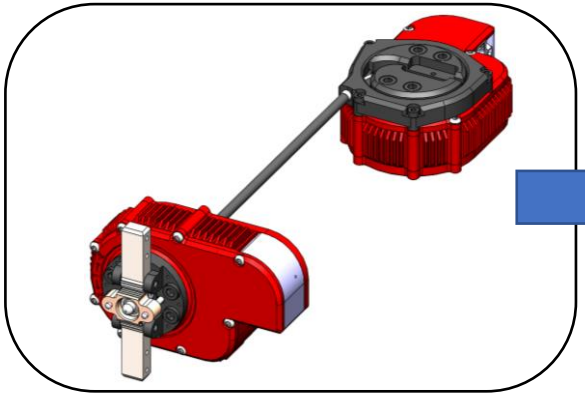


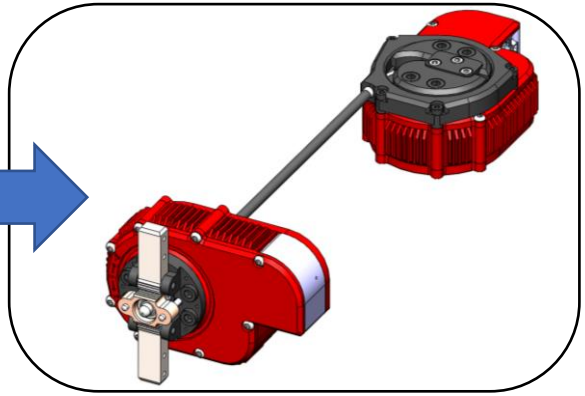
1 x

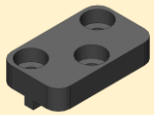
PP-2241-01

Cable Housing End Cap

*Top View

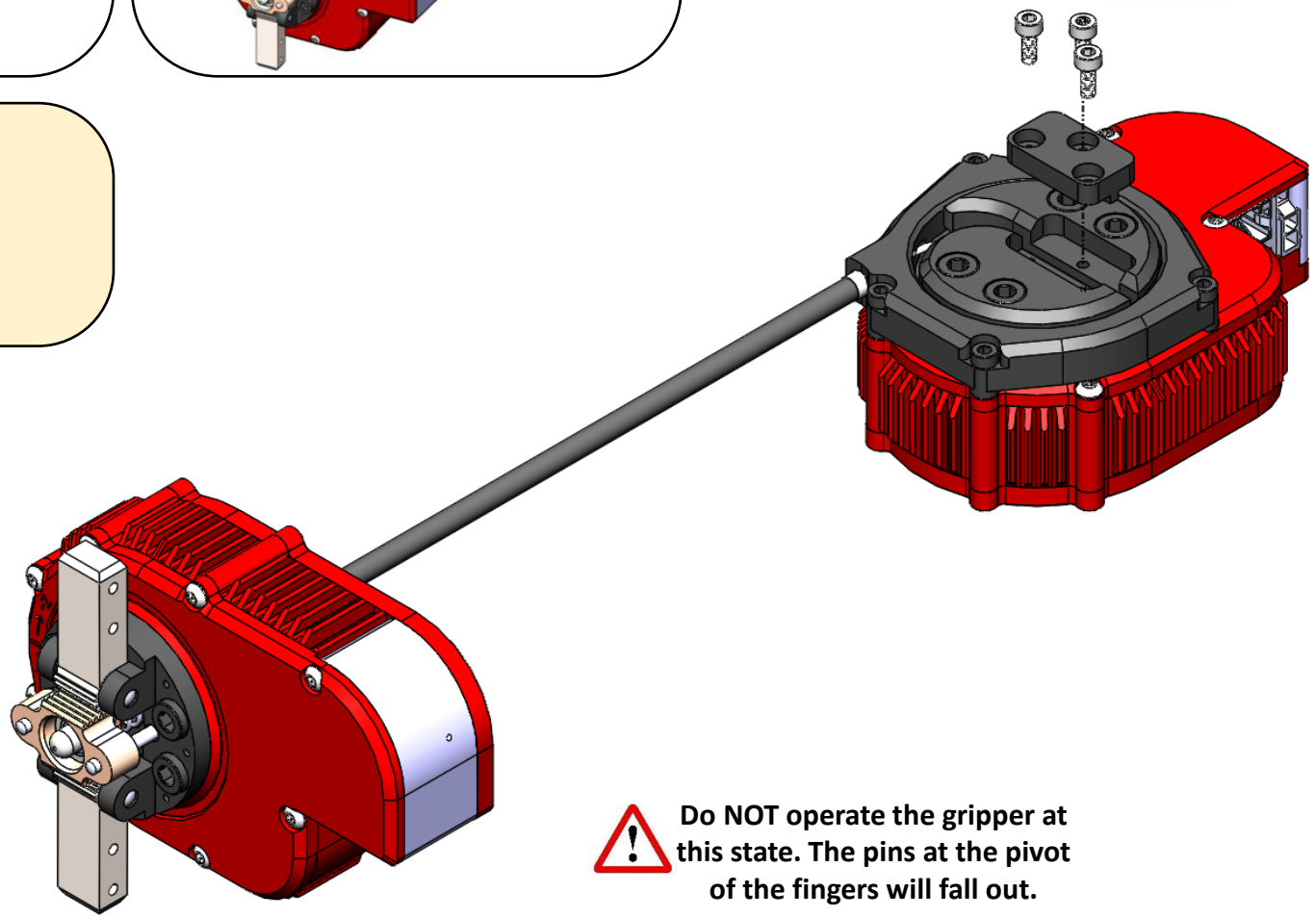




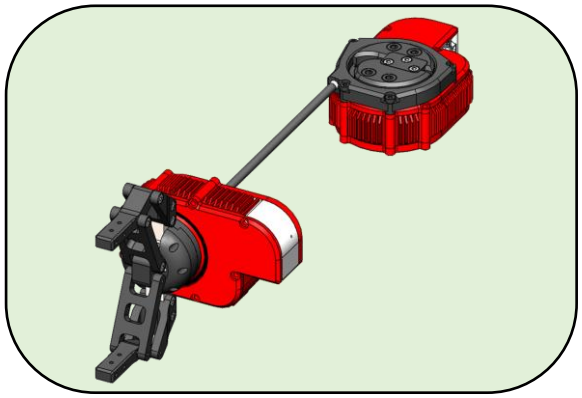


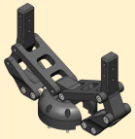
1 x
PM-2290-01
Cable Clamp

M3x8mm



Do NOT operate the gripper at this state. The pins at the pivot of the fingers will fall out.

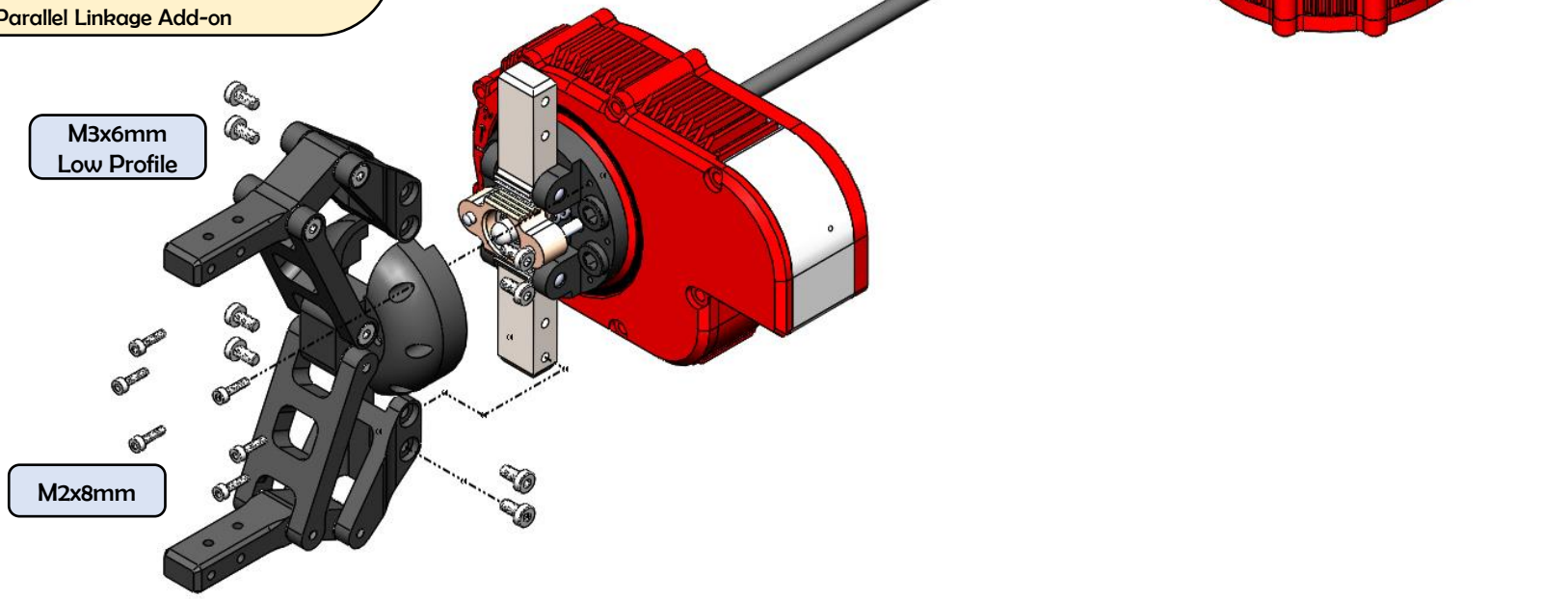


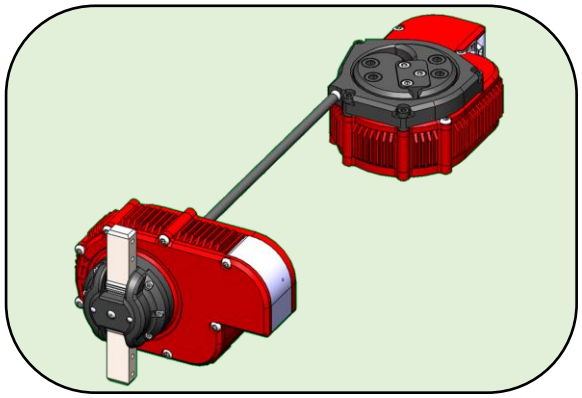


1 x

A-2143-02

Parallel Linkage Add-on





1 x
PM-2343-01
Gripper Cover

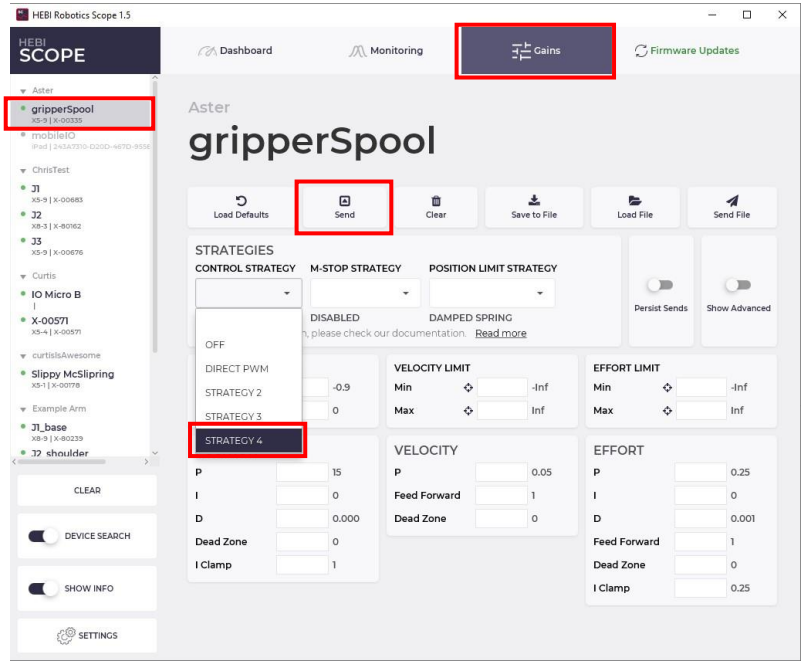
Use PM-2343-01 when the parallel linkage is not needed.

M2x8mm

Initializing the Spool, pt. 1

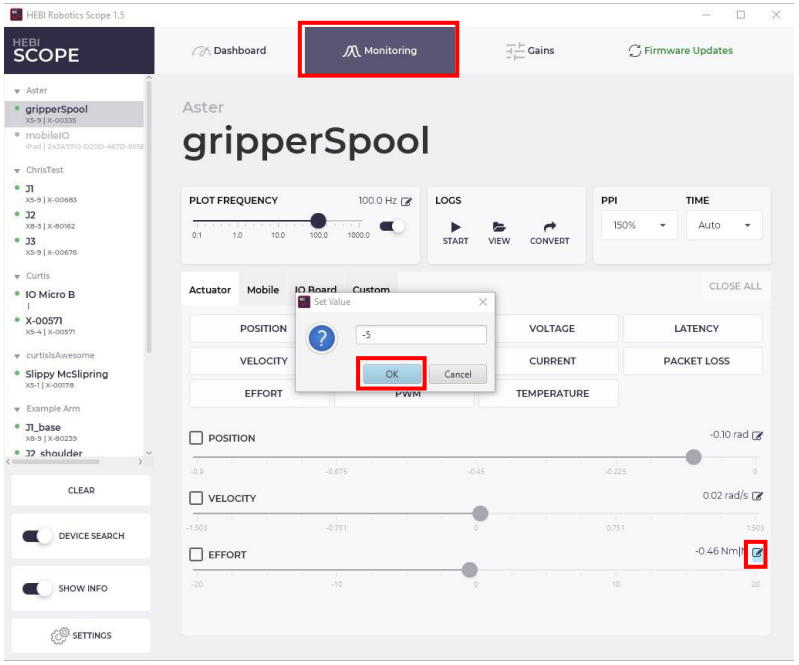
I. Connect the Spool Module into the network, and turn it on

II. Open HEBI Scope GUI



III. Set the Strategy of the Spool Module to "STRATEGY_4"

1. Click on your Spool Module
2. Go to "Gains" tab
3. Use the Control Strategy drop down menu to select a Suitable Strategy for your Application
4. Click "Send"

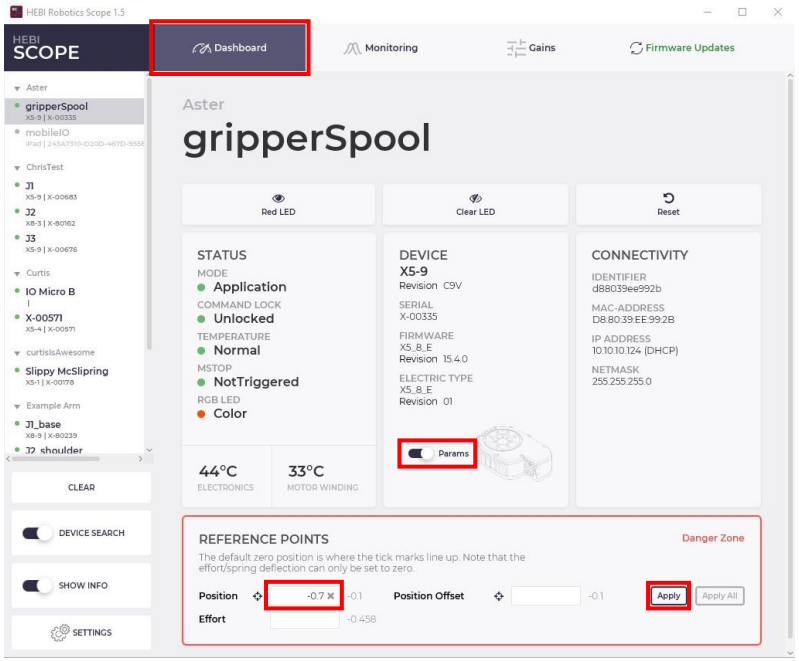


IV. Command the Effort to -5 Nm

1. Go to "Monitoring" tab
2. Click the "Target Button" for the Effort
3. Type "-5" and Click "OK"

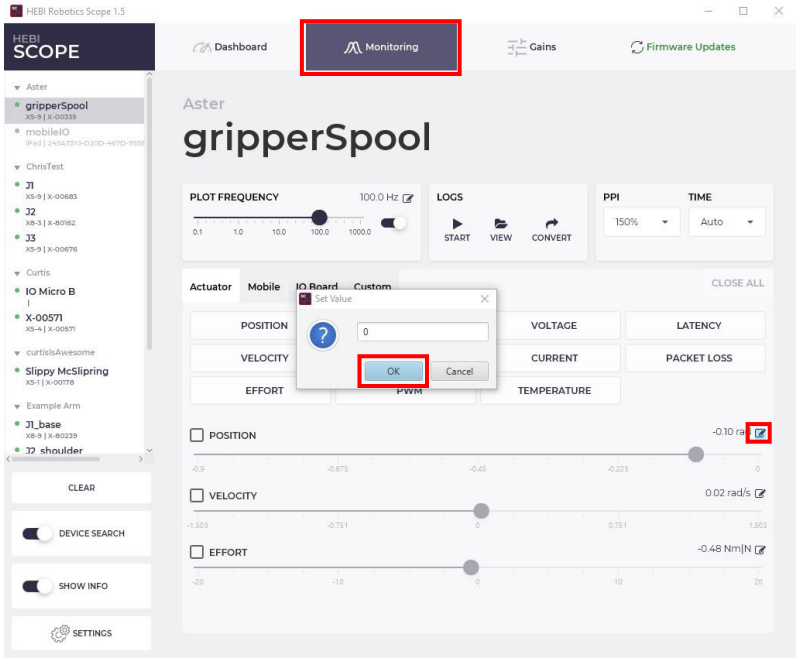
The Spool will wind the Cable and close the Fingers.

Initializing the Spool , pt. 2



V. While Commanding the Effort, set the current position to “-0.7”

1. Go to “Dashboard” tab
2. Toggle “Params” as shown
3. Type “-0.7” for Position
4. Click “Apply”



VI. Stop commanding the effort, and command the position to 0.

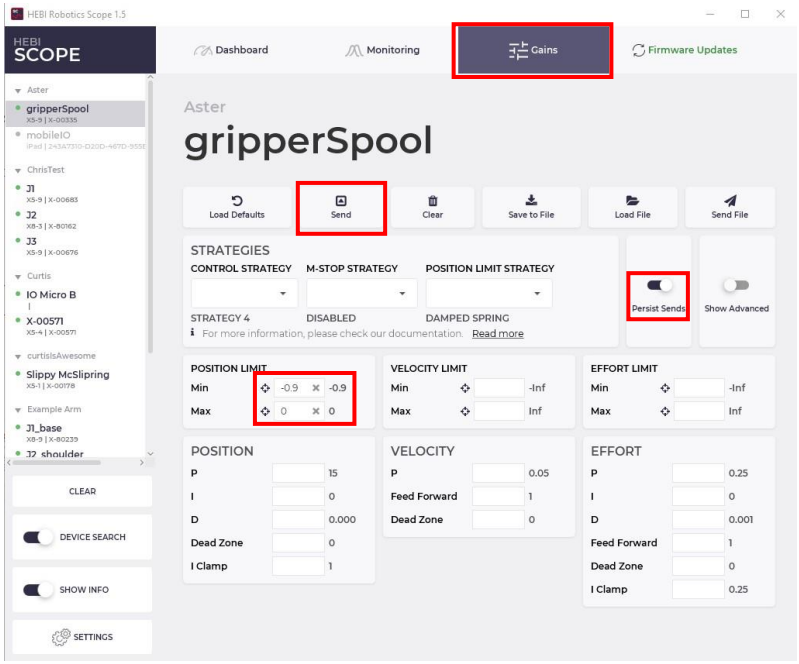
1. Go to “Monitoring” tab
2. Click the “Target Button” for Position
3. Type “0” and Click “OK”

The Spool will unwind the Cable and open the Fingers.

To close the gripper, turn the spool clockwise.

To open the gripper, command the spool to zero position.

Initializing the Spool, , pt. 3



VII. Set Safety Limits for the Spool

1. Go to “Gains” tab
2. Type “-0.9” for Min Position
3. Type “0” for Max Position
4. Toggle “Persist Sends” as shown
5. Click “Send”

If the Safety Limits are not set, the spool can turn to a position greater than zero, and break the cable.

To close the gripper, turn the spool clockwise (negative effort).

To open the gripper, turn the spool counter-clockwise (positive effort)

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