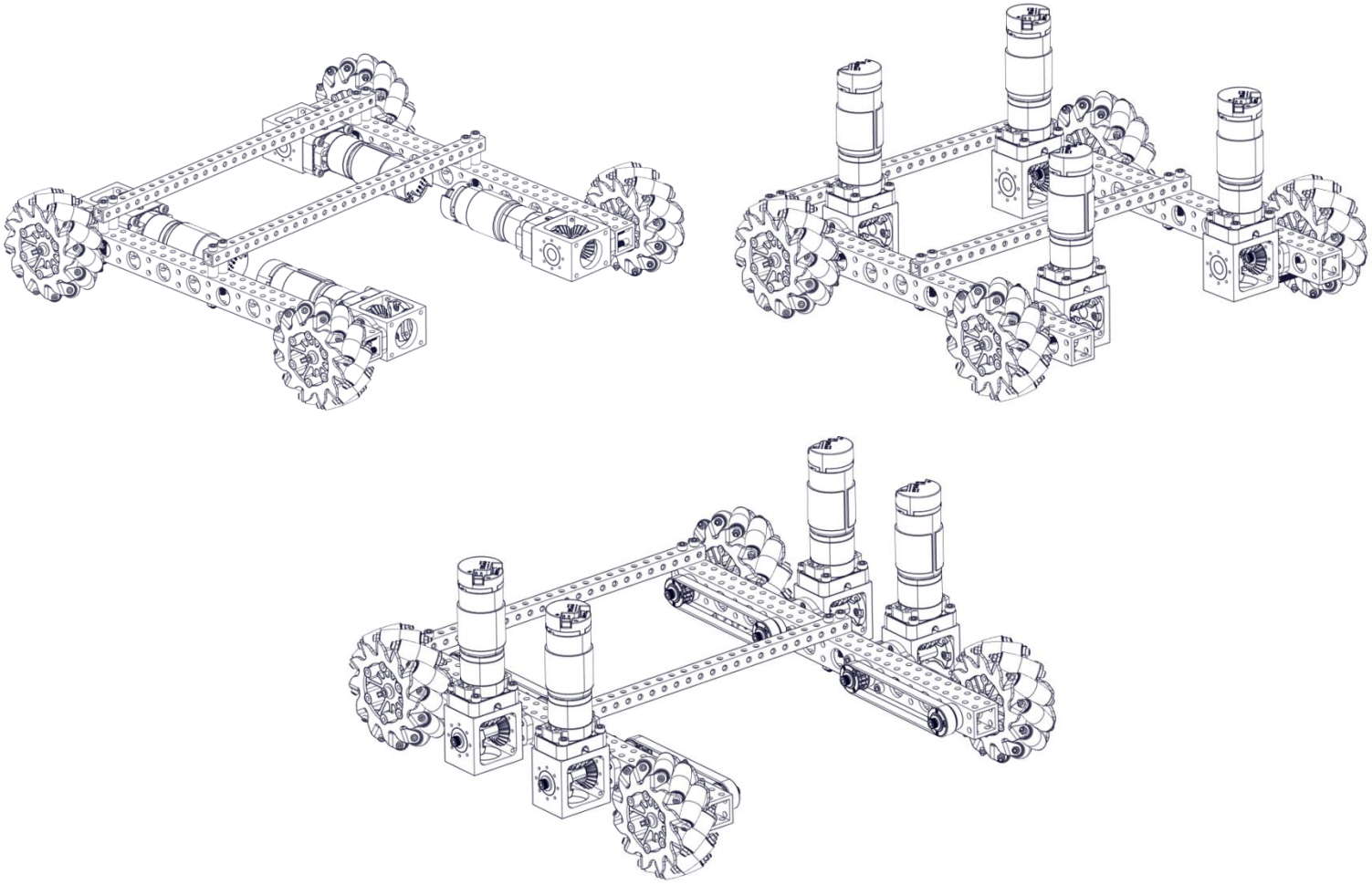
ROBITS Intermediate Mobility Kit

(am-5159a)

Assembly Guide



Revision #	Date	Author	Purpose
0	9/19/2025	E. Scime	Original Document

P. Yeung	10/7/2025
Reviewer Name	Date Reviewed

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Parts & Tools

Recommended Tools List

Component	Part #	QTY	Photo
5/32″ Ball End Hex Driver	am-2751	1	
2.5mm Ball End Hex Driver	am-3724	1	
3/8 Combination Wrench	am-4961	1	

Parts List

Component	Part #	QTY	Photo
1″ x 1″ x 15.5″ ROBITS Tube	am-5002-1550	2	
1/2" x 1/2" x 12″ ROBITS Tube	am-5001-1200	2	
1/2" x 1/2" x 14″ ROBITS Tube	am-5001-1400	2	
ROBITS Bushing	am-5021	12	
14T Pulley, 3/8″ Hex, Half	am-4960_half	16	
NeveRest Orbital Adapter Mount	am-5462	4	

Component	Part #	QTY	Photo
ROBITS Hex Shaft, 4″	am-5003-0400	4	
ROBITS Hex Shaft, 3″	am-5003-0300	4	
8mm M3 Socket Head Cap Screw	am-1500	16	
0.75″ 10-32 Socket Head Cap Screw	am-1047	20	
1.25″ 10-32 Socket Head Cap Screw	am-1041	16	
1.75″ 10-32 Socket Head Cap Screw	am-1048	8	
0.25″ Nylon Screw Spacer	am-1700	4	
0.5″ Nylon Screw Spacer	am-1697	8	
#10 Washer	am-1026	16	
10-32 Nylock Jam Nut	am-1063	8	
45T 5mm HTD Belt	am-5209_45T	4	

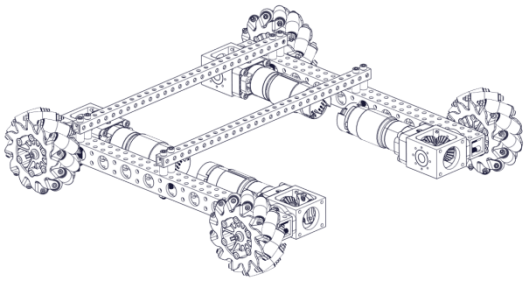
Component	Part #	QTY	Photo
60T 5mm HTD Belt	am-5209_60T	4	
19.1:1 NeveRest Hex Gearmotor	am-5550_0100_019	4	
2.25″ 10-32 Socket Head Cap Screw	am-1156	8	
4″ BB Mecanum Plate, Left	am-4734L_plate	4	
4″ BB Mecanum Plate, Right	am-4734R_plate	4	
4″ BB Mecanum Hub	am-4735_hub	4	
4″ BB Mecanum Roller	am-3680	48	
3/16″ Bore 3/8″ OD Bearing	am-3681	96	
BB Wheel Inner Axle	am-4764	48	
45mm M3 Socket Head Cap Screw	am-1659	48	

Component	Part #	QTY	Photo
M3 Nylock Nut	am-1023	48	
0.430″ ID 21mm OD NeveRest Bushing	am-5534	4	
Pass Through Bevel Housing	am-5535	4	
15mm ID 21mm OD Flanged Bearing	am-5536	4	
20T Bevel Gear	am-4869	8	
NeveRest Spacer Mount	am-5537	4	
12mm M3 Socket Head Cap Screw	am-1706	16	
0.25″ Shaft Spacer	am-1698	4	

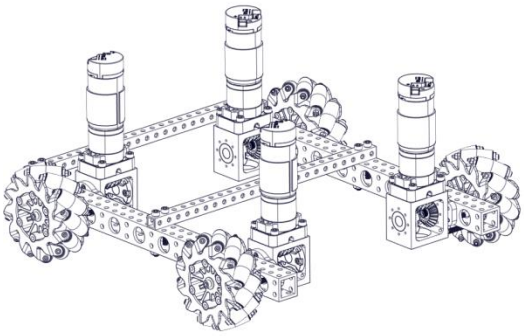
Assembly

The intermediate mobility kit can be assembled in a variety of different ways, though there are 3 primary configurations this kit is built to support:

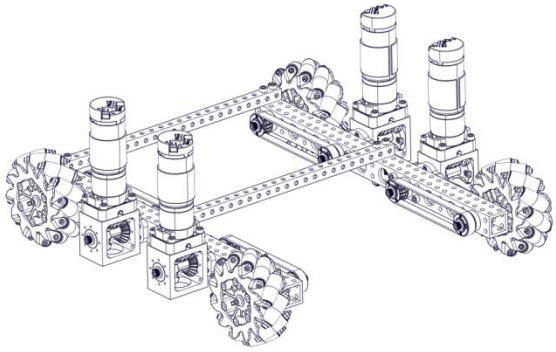
- **Horizontal motors** - This configuration mounts the motors horizontally on the inside of the chassis. This can be useful to conserve space above your drivetrain for various components and mechanisms. This configuration can limit the placement of your motors and wheels from front to back due to their length in that direction.



- **Vertical Motors** - This configuration mounts the motors vertically on the inside of the chassis. This can be useful to allow greater flexibility in the placement of your motors and wheels from front to back and opens up space in the middle of your robot.



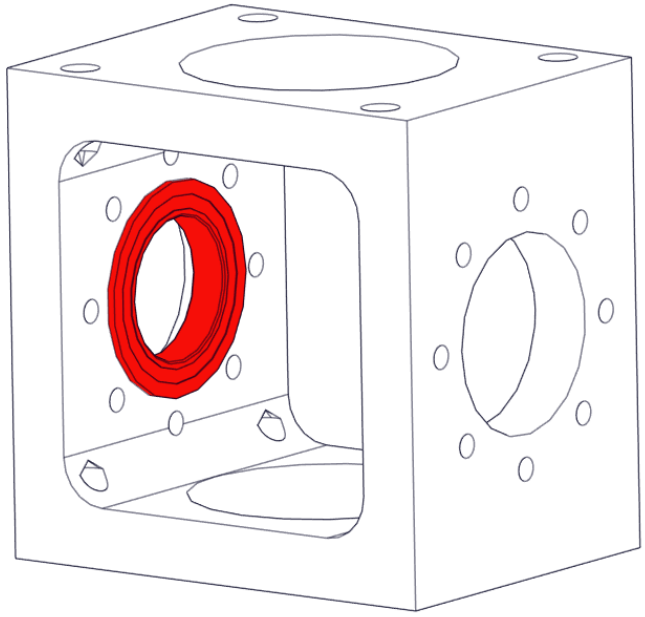
- **Motors Between Wheels** - This configuration mounts the motors between the wheels and utilizes belts to provide power between them. This option can provide a large opening in the chassis for mechanisms and components



All configurations begin with the assembly of [4] 4" BB Mecanum wheels. Follow this guide to assemble your wheels!

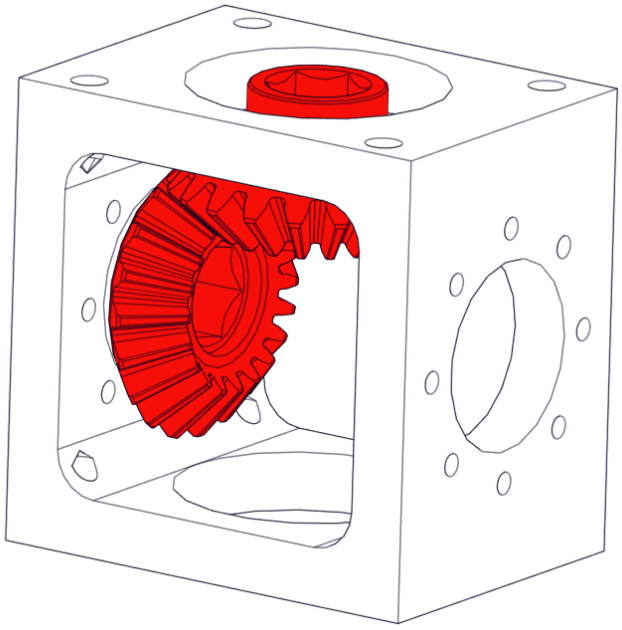
Gearbox Assembly – Step 1

Each configuration will use [4] Pass Through Bevel Boxes. Begin assembling [1] by inserting [1] 15mm x 21mm bearing (am-5536) into the inside of [1] bevel gearbox housing (am-5535) such that the flange of the bearing is inside the housing.



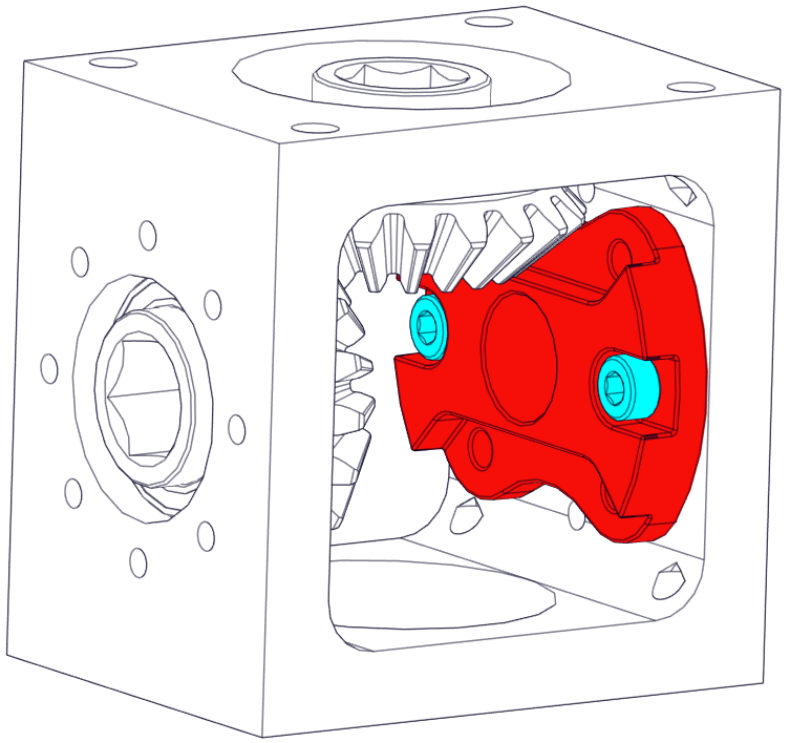
Gearbox Assembly – Step 2

Insert [2] bevel gears (am-4869) into the housing. One should be placed in the previously installed bearing and the other will very loosely fit into the large hole.



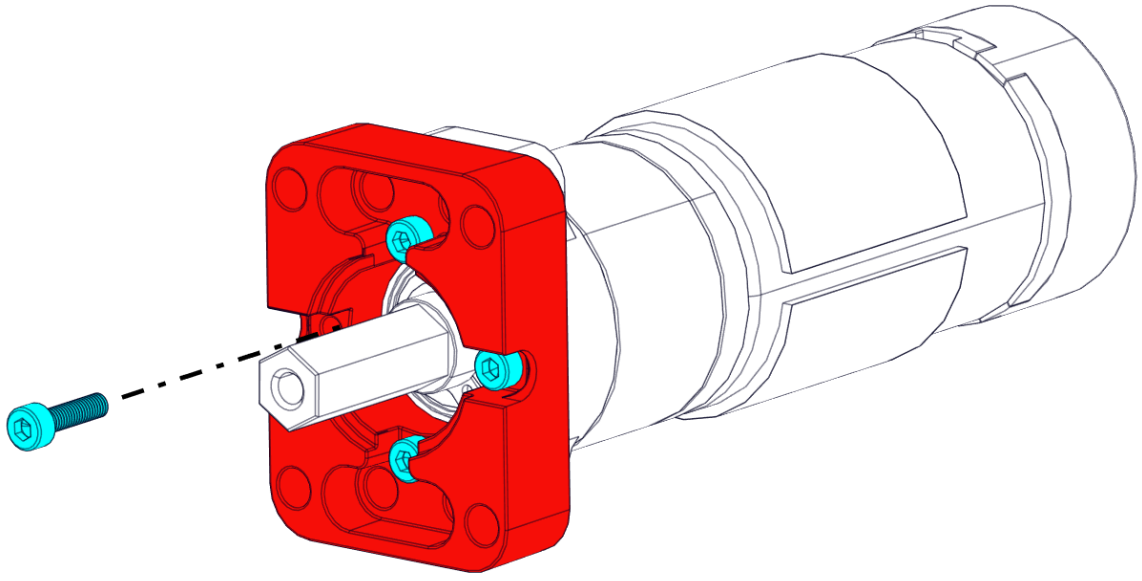
Gearbox Assembly – Step 3

Insert [1] flanged bushing (am-5534) into the inside of the housing assembly and affix it to the housing using [2] 8mm M3 screws (am-1500).



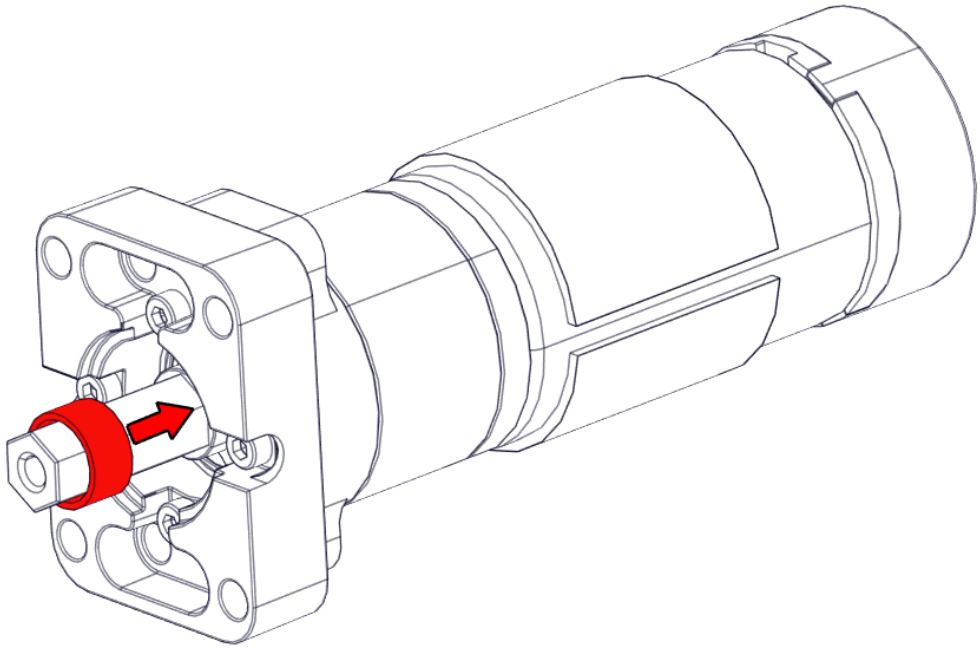
Gearbox Assembly – Step 4

Install [1] NeveRest Hex gearmotor on [1] NeveRest Spacer Mount (am-5537) using [4] 12mm M3 screws (am-1706). Be sure that the motor does not stick out over the sides of the spacer mount.



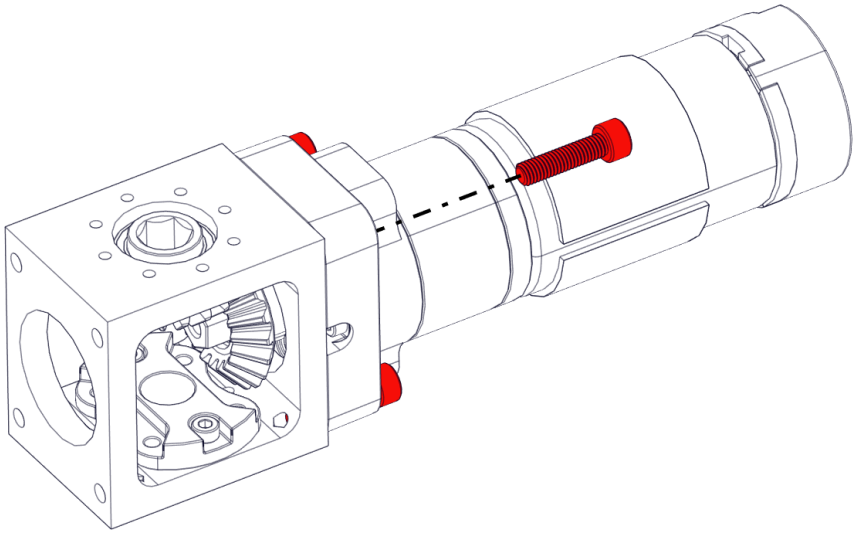
Gearbox Assembly – Step 5

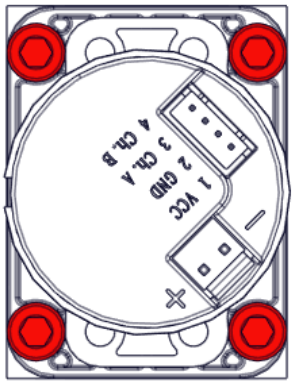
Slide [1] 0.25" shaft spacer (am-1698) onto the motor shaft.



Gearbox Assembly – Step 6

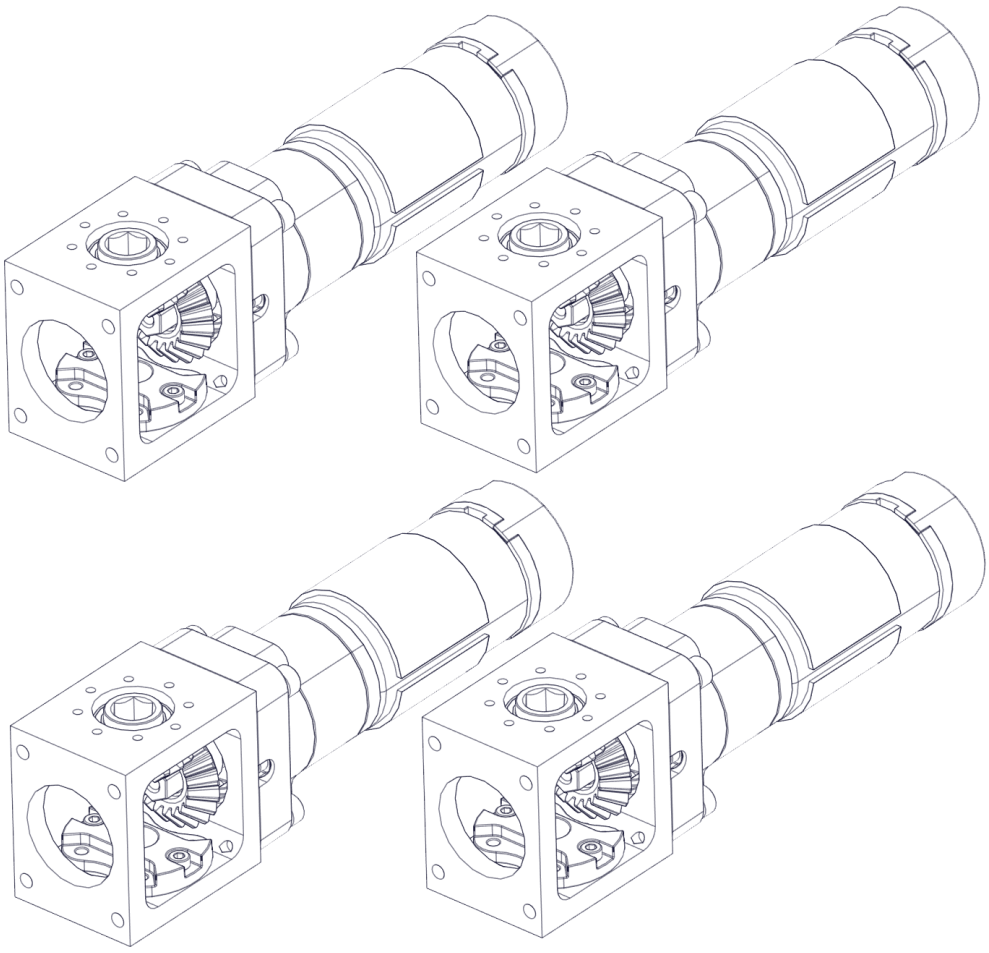
Install the motor assembly in the housing assembly using [4] 0.75" 10-32 screws (am-1047).





Gearbox Assembly – Step 7

Repeat Steps 1 through 6 to assemble [4] total gearboxes.



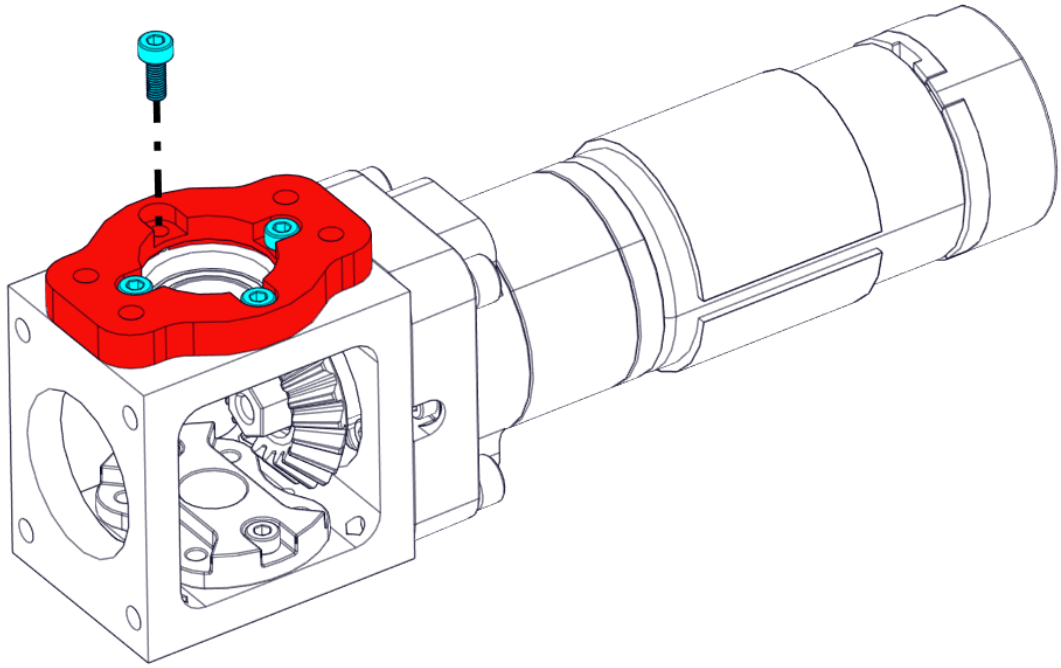
Tap to continue to Horizontal Motors Configuration Assembly.

Tap to continue to Vertical Motors Configuration Assembly.

Tap to continue to Motors Between Wheels Configuration Assembly.

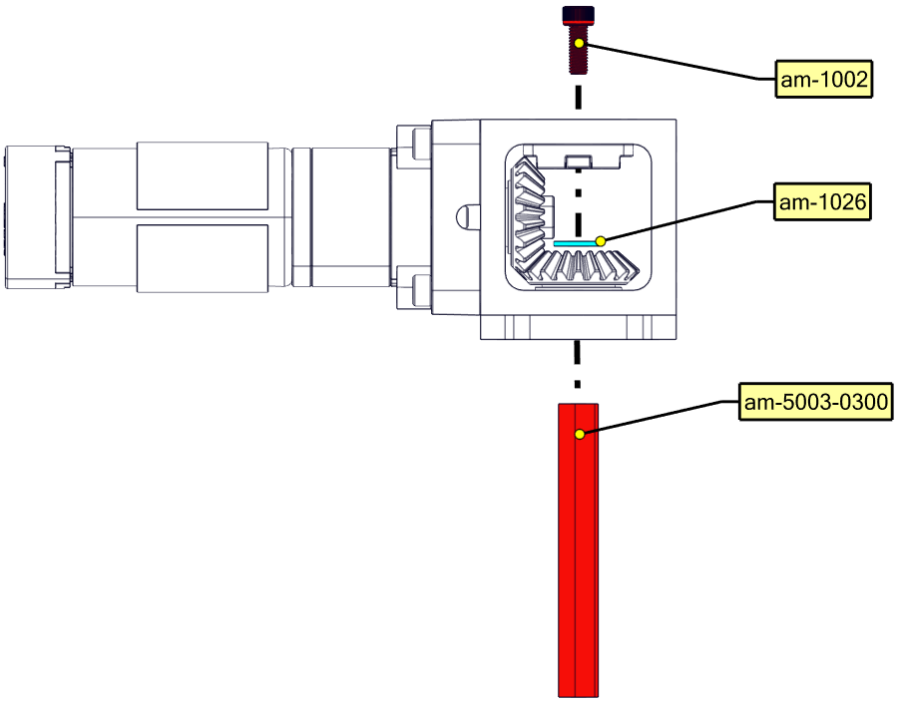
Horizontal Motors Configuration – Step 1

Install [1] NeveRest Orbital Adapter Mount (am-5462) to the bevel gearbox using [4] 8mm M3 screws (am-1500).



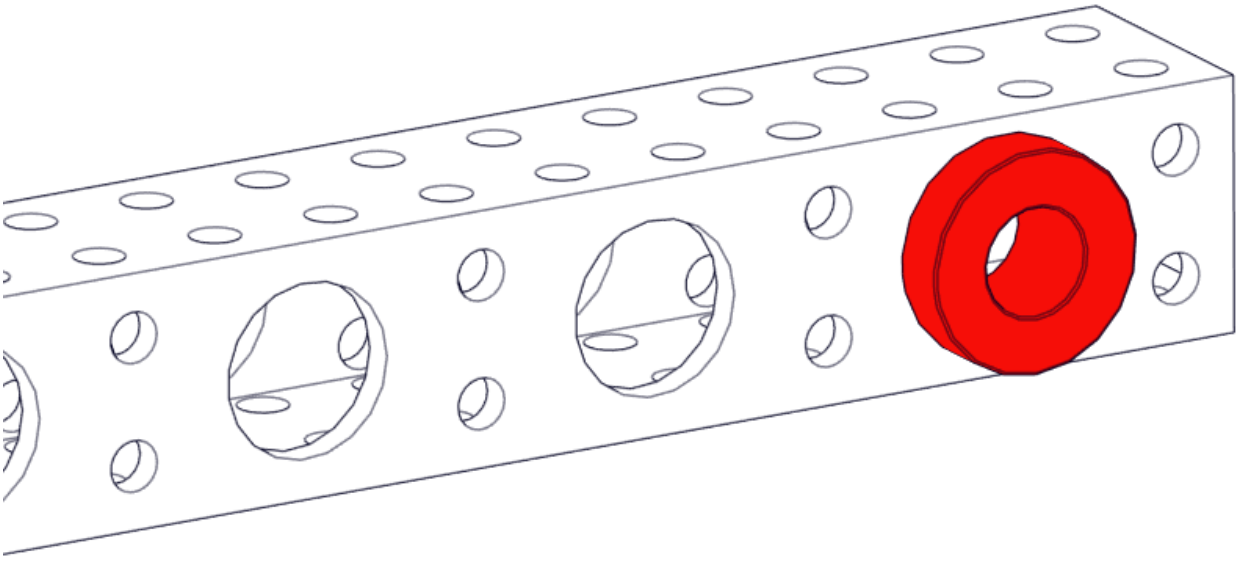
Horizontal Motors Configuration – Step 2

Insert [1] 3" ROBITS Shaft (am-5003-0300) into the gearbox assembly and insert [1] 0.5" 10-32 Screw (am-1002) with [1] #10 Washer (am-1026) into the bevel gear side.



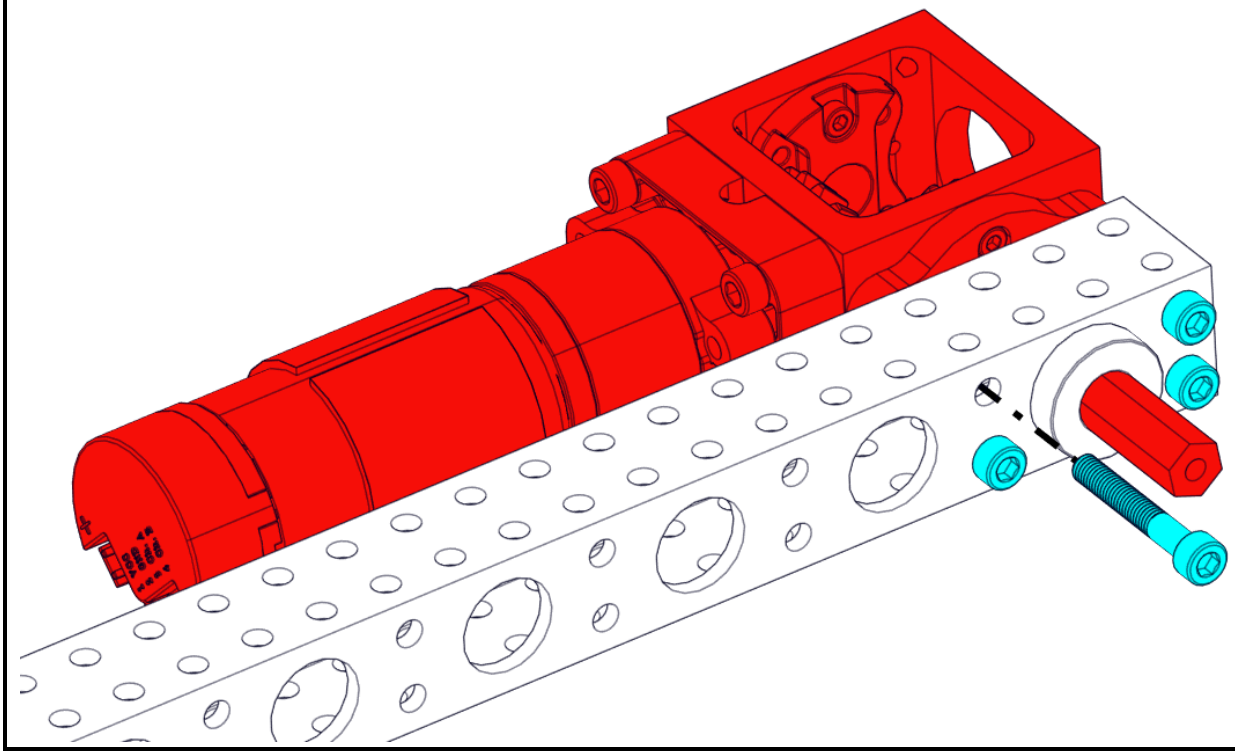
Horizontal Motors Configuration – Step 3

Install [1] ROBITS Bushing (am-5021) on [1] 1″x1″x15.5″ ROBITS Tube (am-5002-1550).



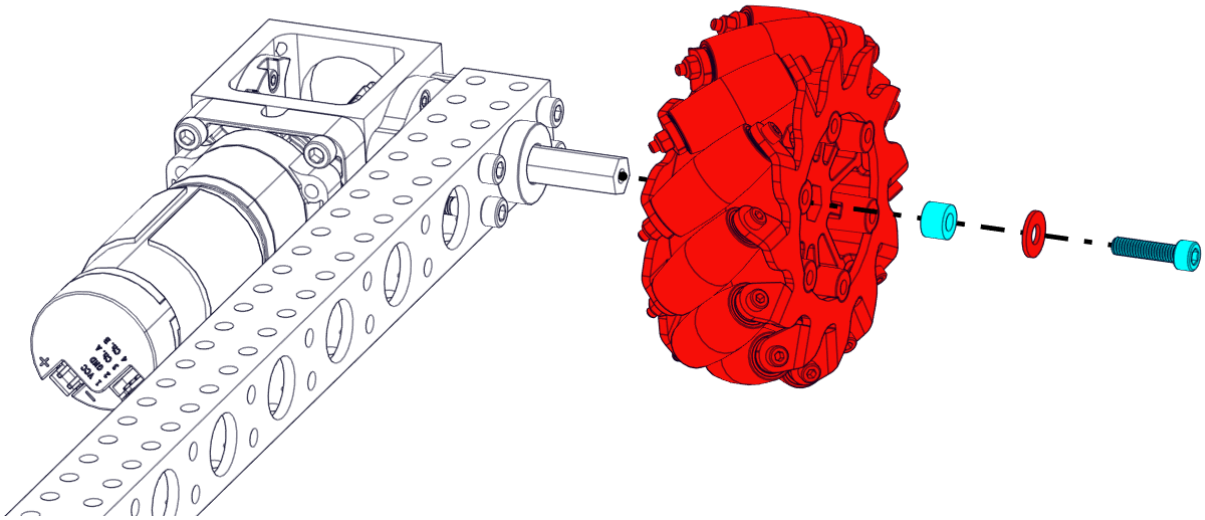
Horizontal Motors Configuration – Step 4

Install a bevel gearbox assembly on the ROBITS Tube using [4] 1.25″ 10-32 screws (am-1041).



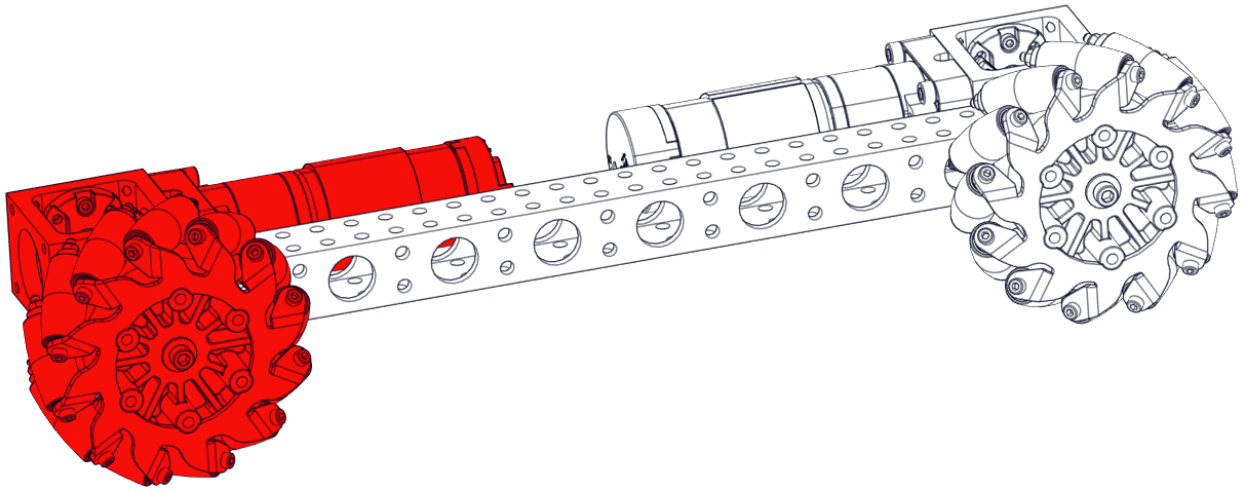
Horizontal Motors Configuration – Step 5

Install [1] 4" BB mecanum wheel on the ROBITS Shaft and secure it with [1] 0.25" screw spacer (am-1700), [1] #10 washer (am-1026), and [1] 0.75" 10-32 screw (am-1047).



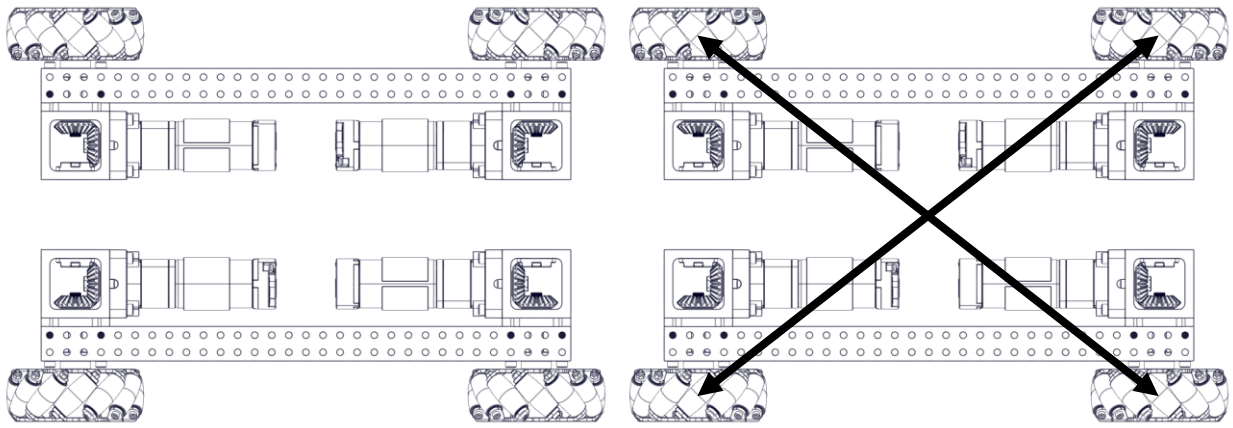
Horizontal Motors Configuration – Step 6

Repeat steps 1-5 on the opposite end of the tube to create one drive module. Be sure to use the opposite type of wheel than what was used first (i.e. if the first wheel was left, use a right).



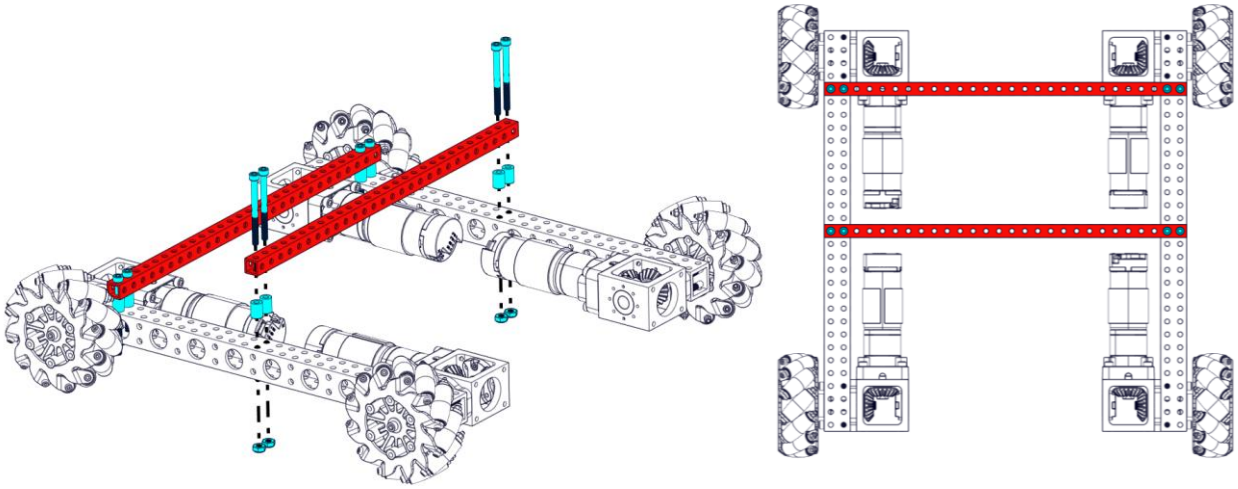
Horizontal Motors Configuration – Step 7

Repeat steps 1-6 to create a second drive module. Be sure that, when next to each other, the wheels form an "X" shape when viewed from the top.



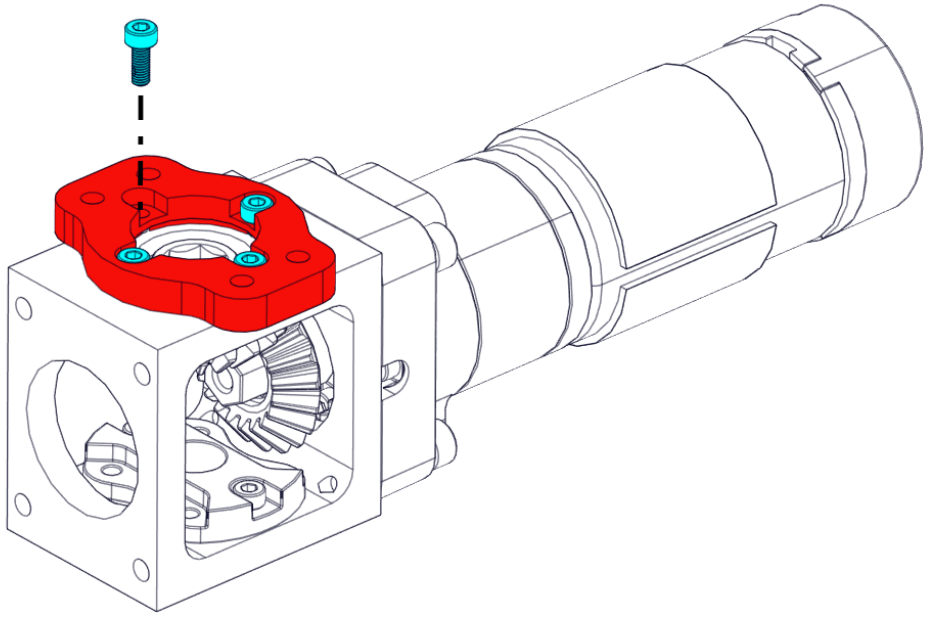
Horizontal Motors Configuration – Step 8

Attach [2] 0.5"x0.5"x14" ROBITS Tubes (am-5001-1400) to the drive module assemblies using [8] 2.25" 10-32 screws (am-1156), [8] 0.5" screw spacers (am-1697), and [8] 10-32 nylock jam nuts (am-1063).



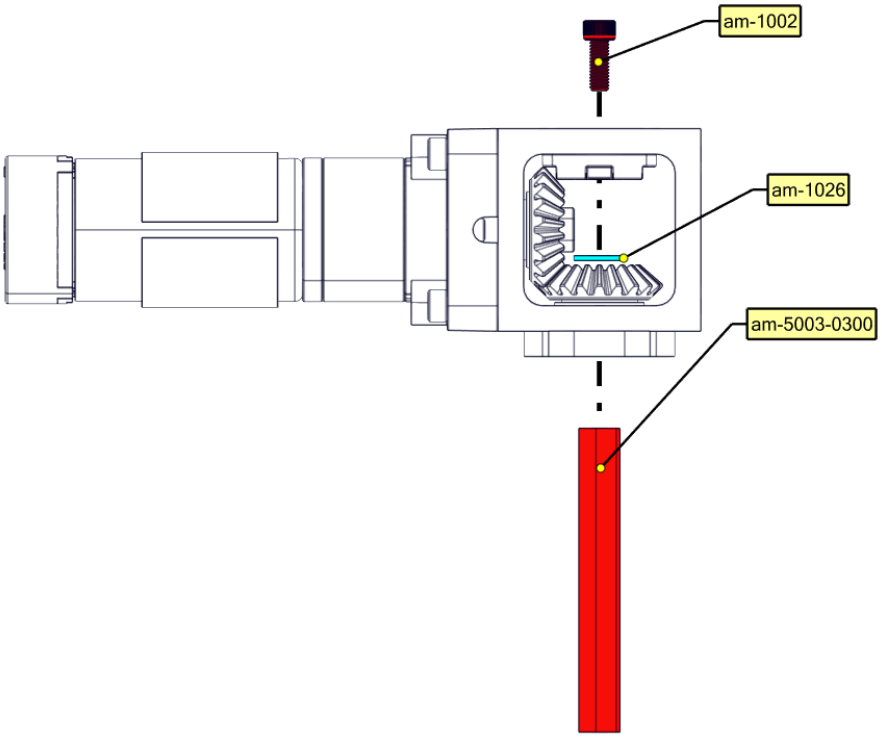
Vertical Motors Configuration – Step 1

Install [1] NeveRest Orbital Adapter Mount (am-5462) to the bevel gearbox using [4] 8mm M3 screws (am-1500).



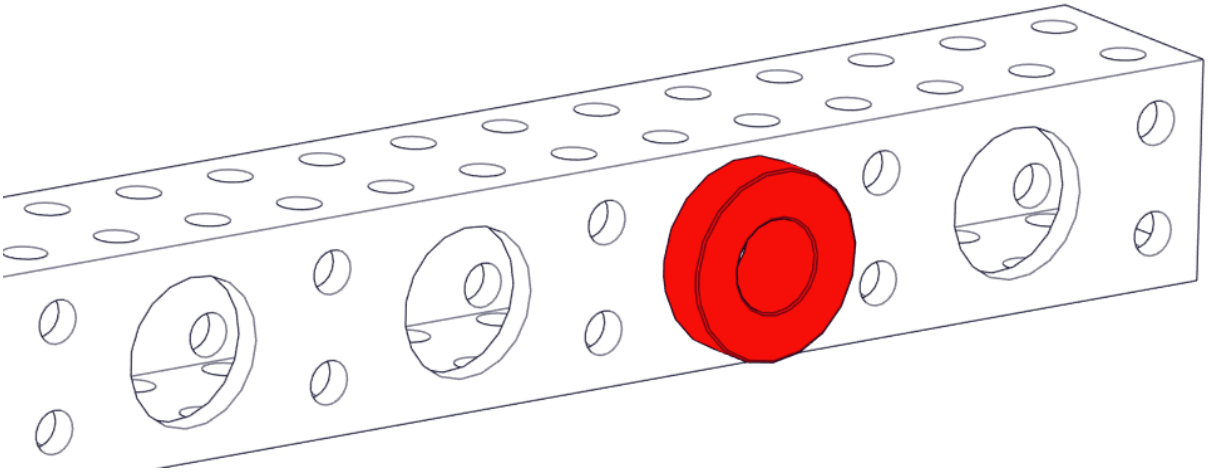
Vertical Motors Configuration – Step 2

Insert [1] 3" ROBITS Shaft (am-5003-0300) into the gearbox assembly and insert [1] 0.5" 10-32 Screw (am-1002) with [1] #10 Washer (am-1026) into the bevel gear side.



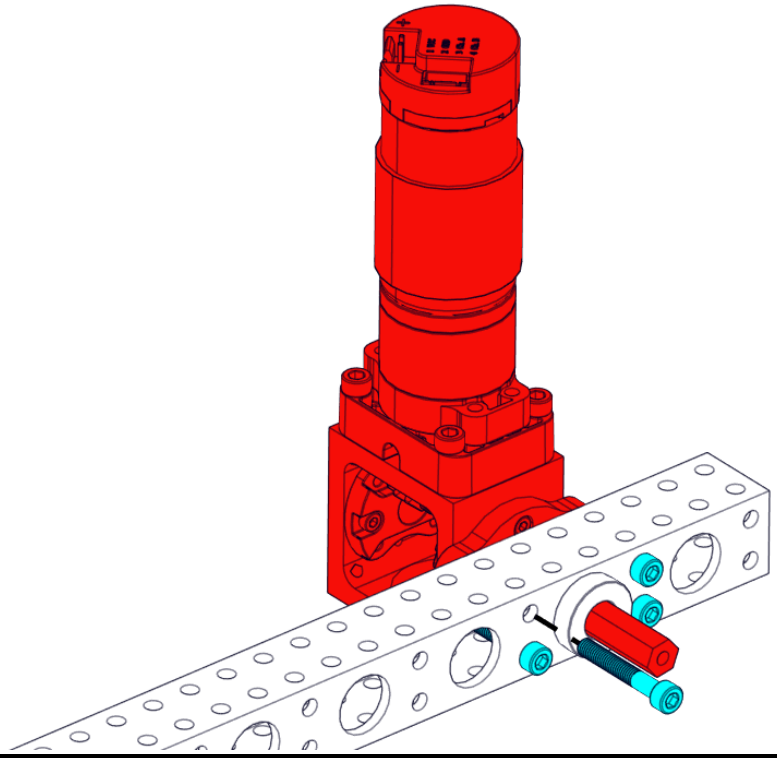
Vertical Motors Configuration – Step 3

Install [1] ROBITS Bushing (am-5021) on [1] 1″x1″x15.5″ ROBITS Tube (am-5002-1550).



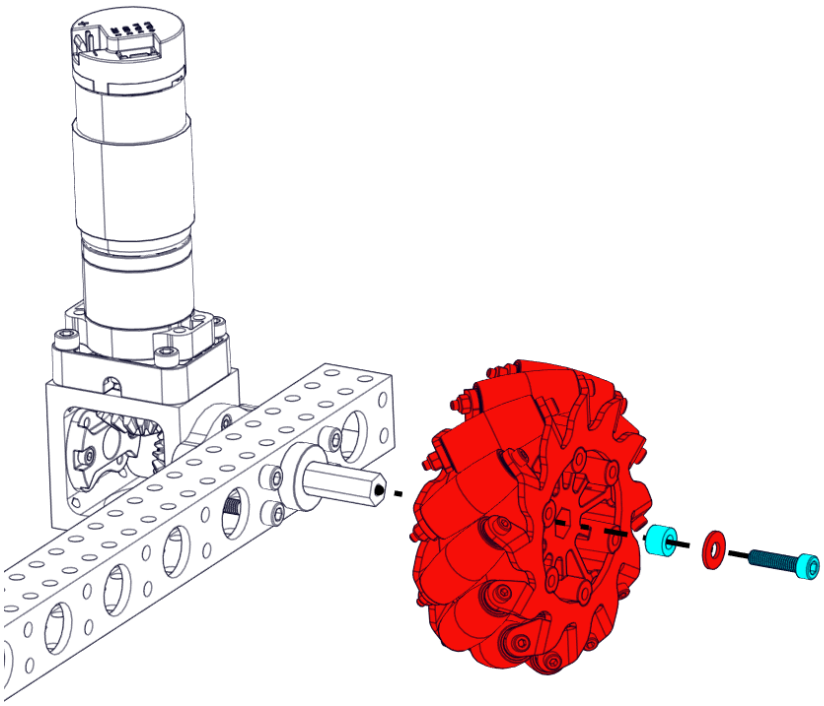
Vertical Motors Configuration – Step 4

Install a bevel gearbox assembly on the ROBITS Tube using [4] 1.25″ 10-32 screws (am-1041).



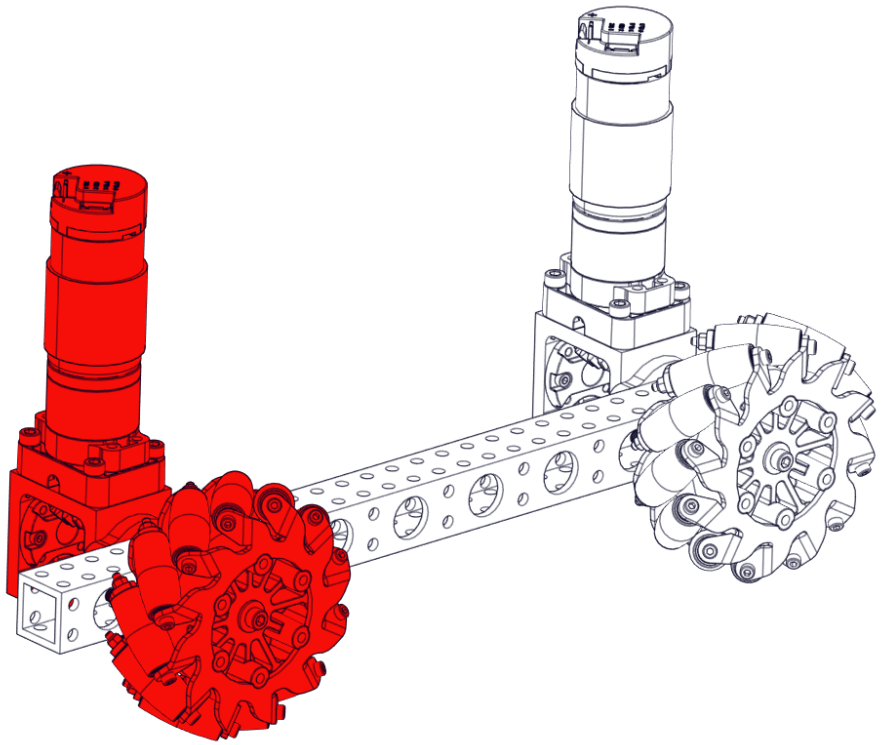
Vertical Motors Configuration – Step 5

Install [1] 4" BB mecanum wheel on the ROBITS Shaft and secure it with [1] 0.25" screw spacer (am-1700), [1] #10 washer (am-1026), and [1] 0.75" 10-32 screw (am-1047).



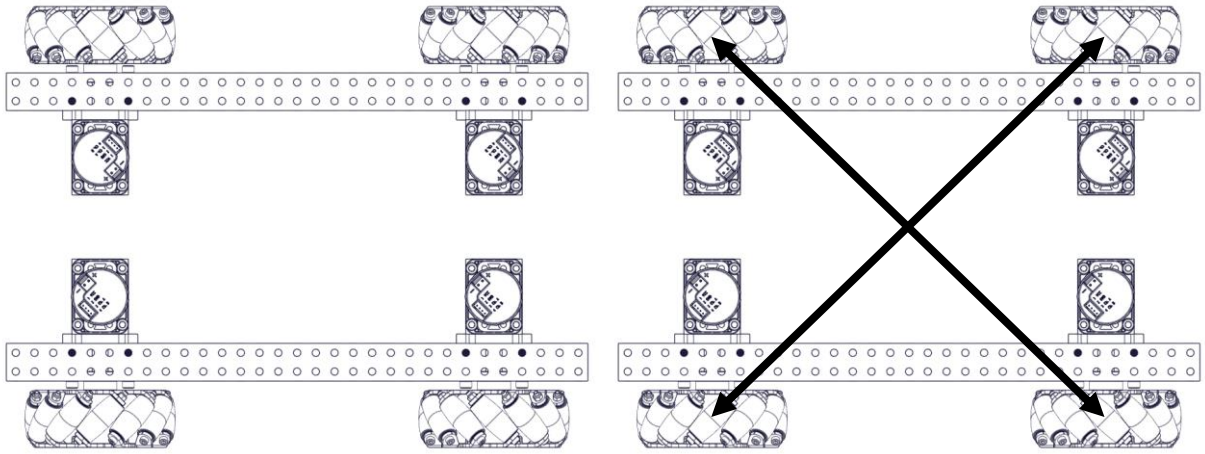
Vertical Motors Configuration – Step 6

Repeat steps 1-5 on the opposite end of the tube to create one drive module.



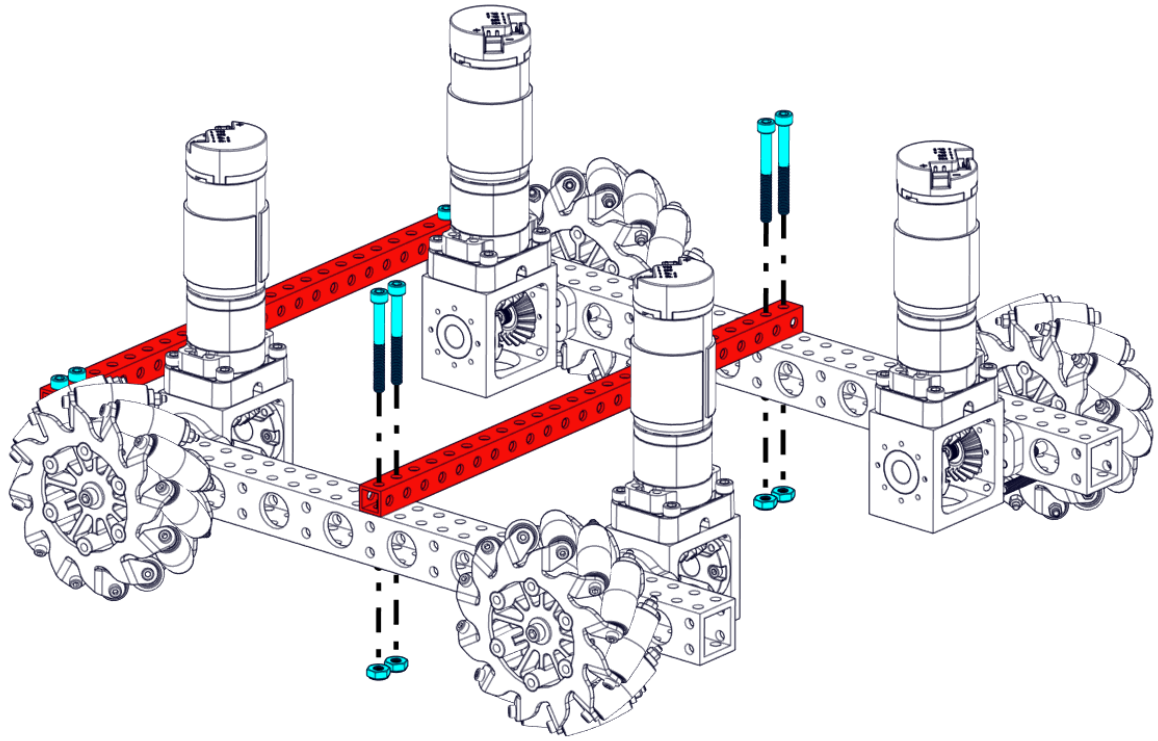
Vertical Motors Configuration – Step 7

Repeat steps 1-6 to create a second drive module. Be sure that, when next to each other as shown, the wheels form an "X" shape when viewed from the top.



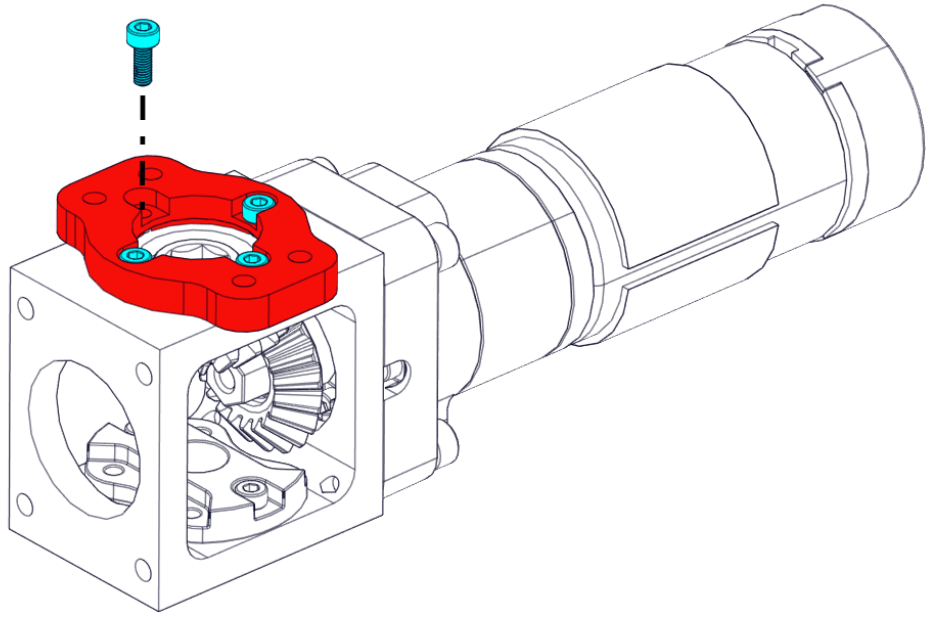
Vertical Motors Configuration – Step 8

Attach [2] 0.5"x0.5"x14" ROBITS Tubes (am-5001-1400) to the drive module assemblies using [8] 1.75" 10-32 screws (am-1048) and [8] 10-32 nylock jam nuts (am-1063).



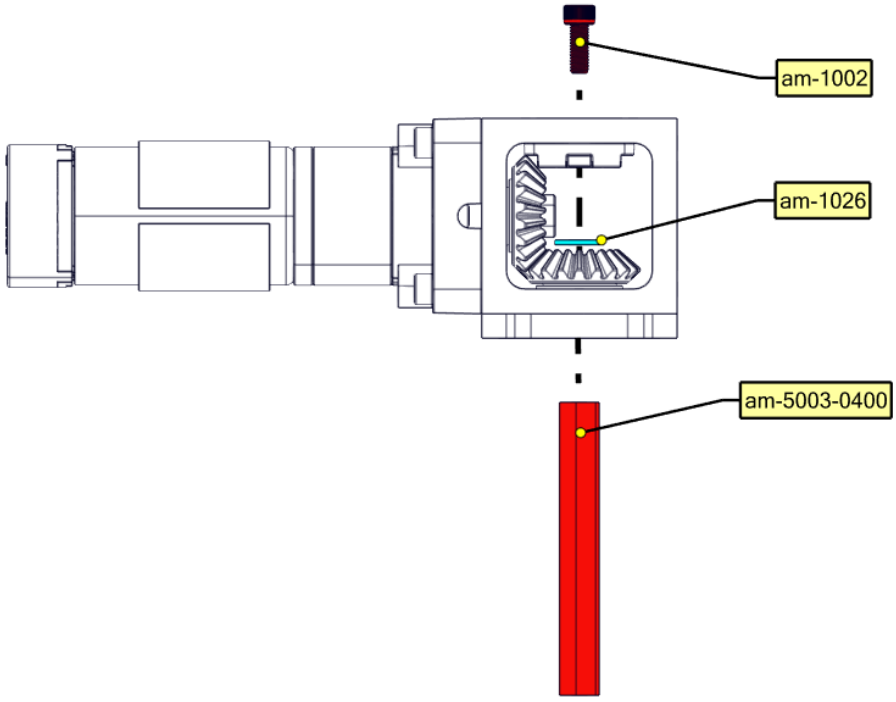
Motors Between Wheels Configuration – Step 1

Install [1] NeveRest Orbital Adapter Mount (am-5462) to the bevel gearbox using [4] 8mm M3 screws (am-1500).



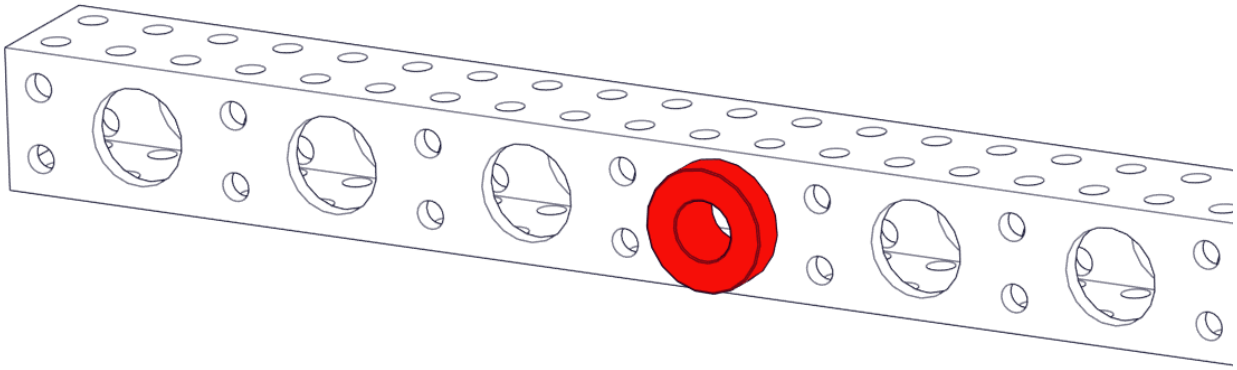
Motors Between Wheels Configuration – Step 2

Insert [1] 4" ROBITS Shaft (am-5003-0400) into the gearbox assembly and insert [1] 0.5" 10-32 Screw (am-1002) with [1] #10 Washer (am-1026) into the bevel gear side.



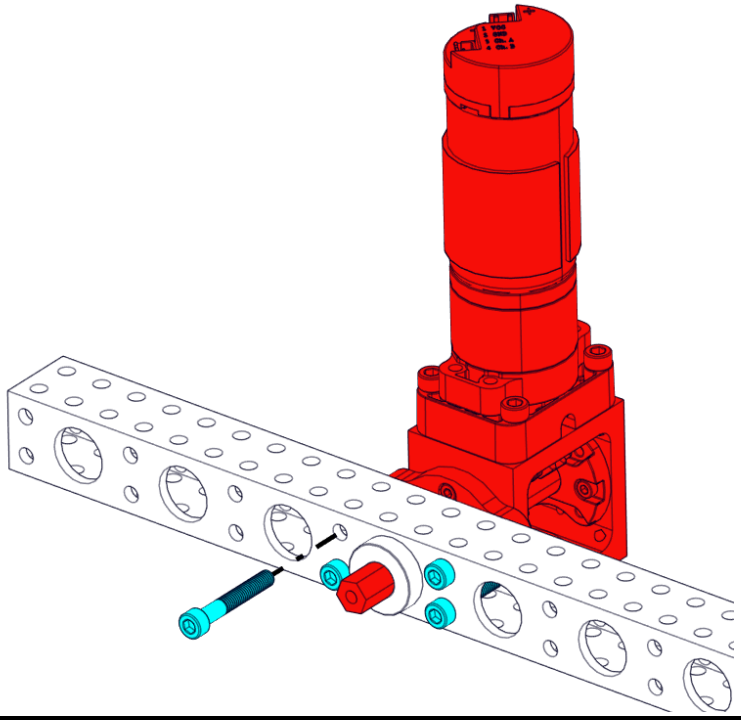
Motors Between Wheels Configuration – Step 3

Install [1] ROBITS Bushing (am-5021) on [1] 1″x1″x15.5″ ROBITS Tube (am-5002-1550).



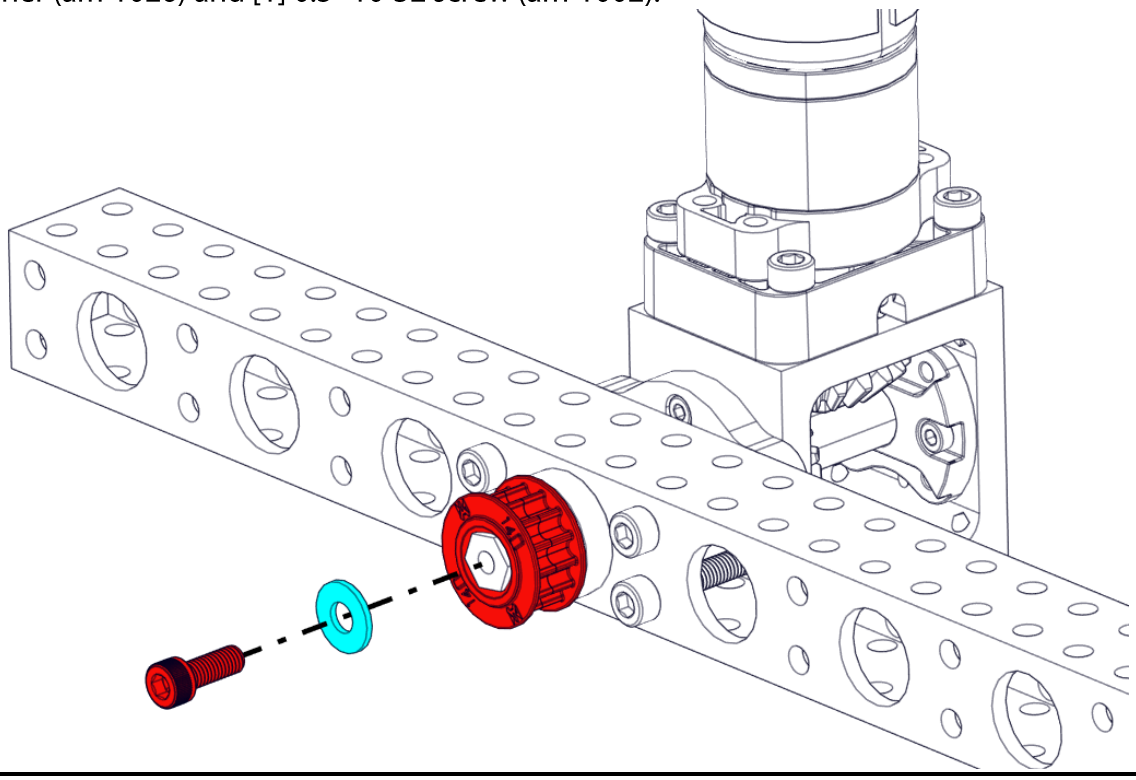
Motors Between Wheels Configuration – Step 4

Install a bevel gearbox assembly on the ROBITS Tube using [4] 1.25″ 10-32 screws (am-1041).



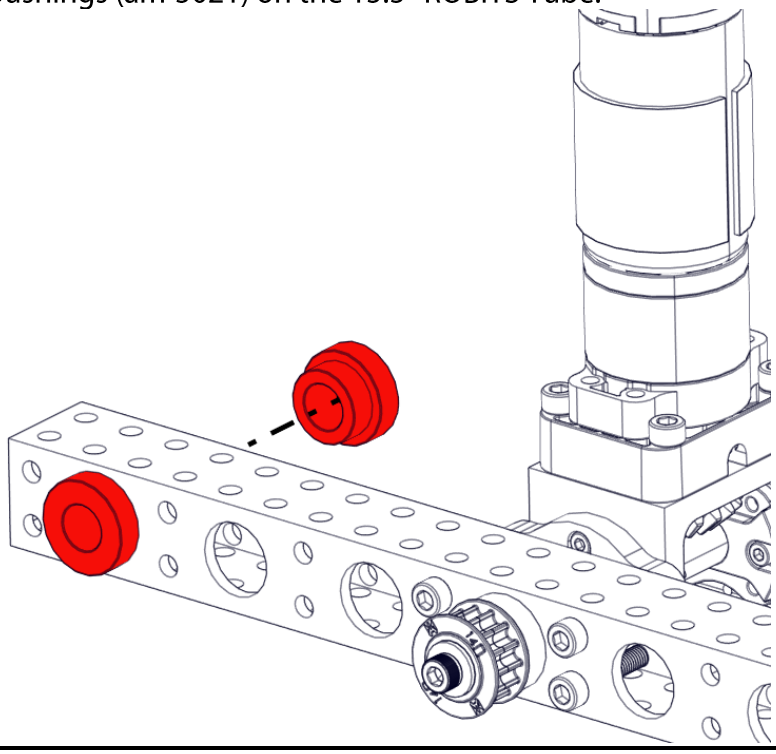
Motors Between Wheels Configuration – Step 5

Install [2] 14T pulley halves (am-4960_half) on the ROBITS Shaft. Retain the shaft using [1] #10 washer (am-1026) and [1] 0.5" 10-32 screw (am-1002).



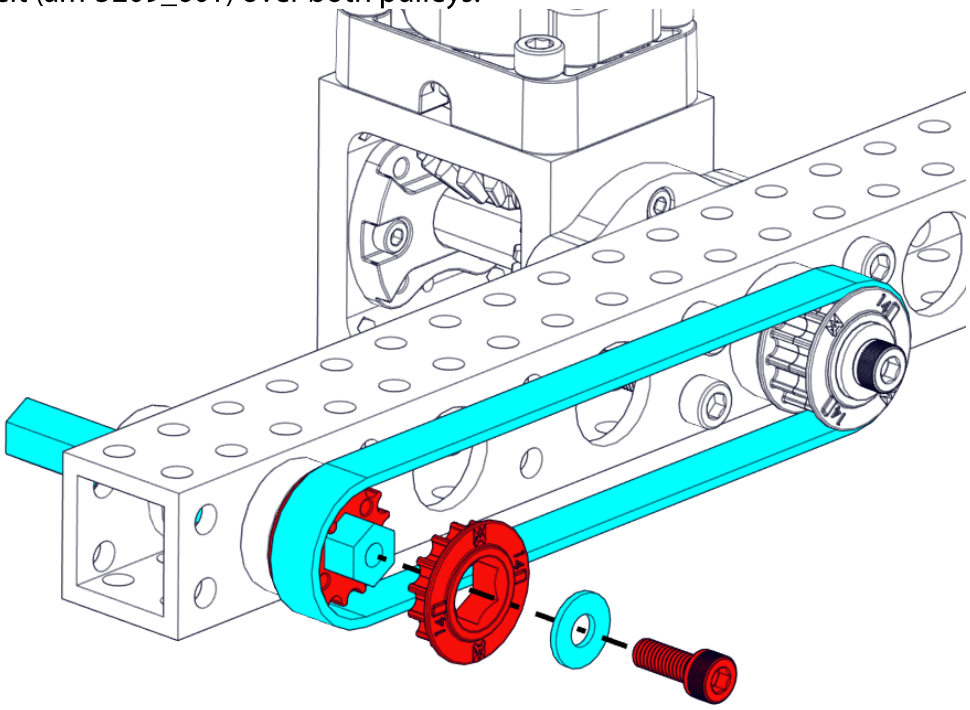
Motors Between Wheels Configuration – Step 6

Install [2] ROBITS Bushings (am-5021) on the 15.5" ROBITS Tube.



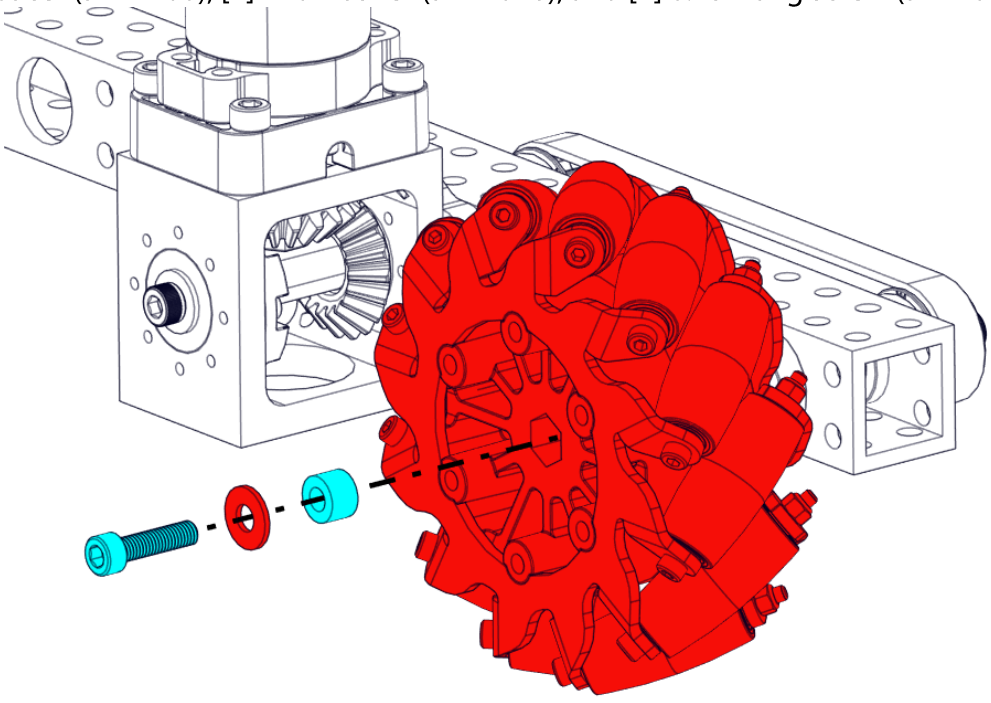
Motors Between Wheels Configuration – Step 7

Install [1] 3″ ROBITS Shaft (am-5003-0300) through [2] 14T pulley halves (am-4960_half). Retain the pulley with [1] #10 washer (am-1026) and [1] 0.5″ 10-32 screw (am-1002). Attach [1] 60T timing belt (am-5209_60T) over both pulleys.



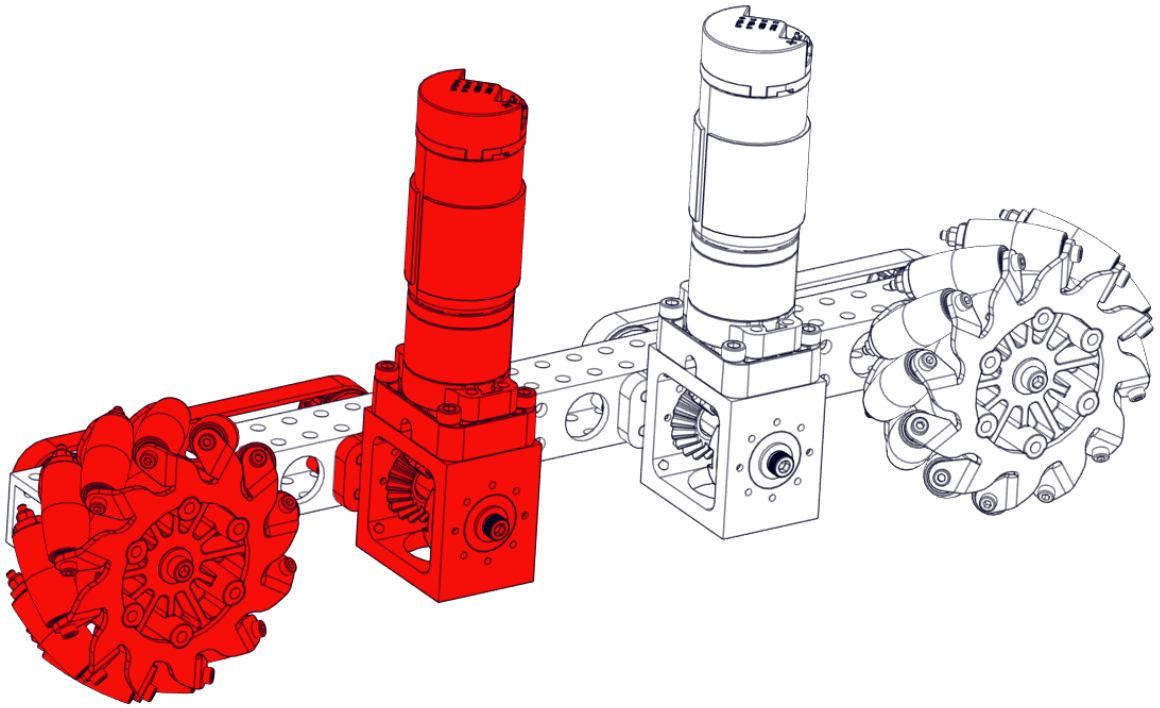
Motors Between Wheels Configuration – Step 8

Install [1] 4″ BB Mecanum wheel on the ROBITS Shaft and retain the assembly with [1] 0.25″ screw spacer (am-1700), [1] #10 washer (am-1026), and [1] 0.75″ long screw (am-1047).



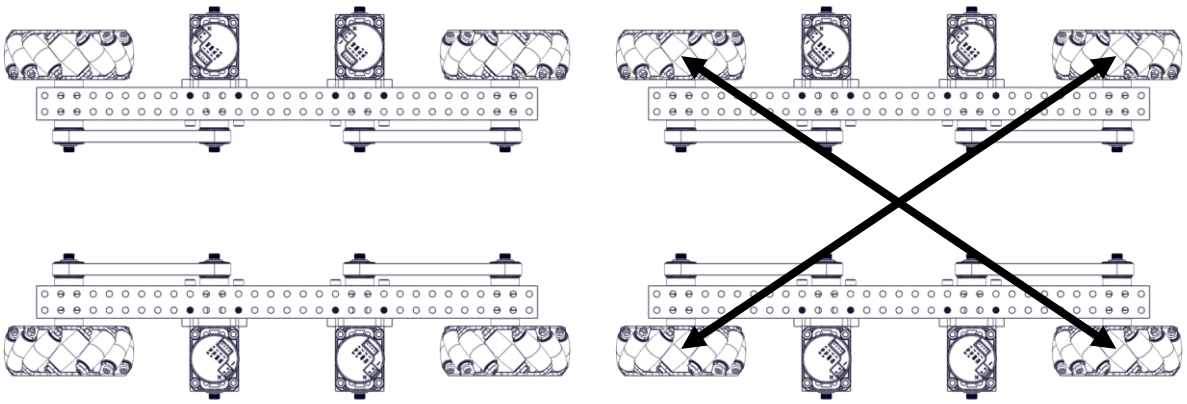
Motors Between Wheels Configuration – Step 9

Repeat steps 1-8 on the opposite end of the tube to create one complete drive module.



Motors Between Wheels Configuration – Step 10

Repeat steps 1-9 to create a second drive module. Be sure that, when next to each other as shown, the wheels form an "X" shape when viewed from the top.



Motors Between Wheels Configuration – Step 11

Attach [2] 0.5"x0.5"x12" ROBITS Tubes (am-5001-1200) to the drive module assemblies using [8] 1.75" 10-32 screws (am-1048) and [8] 10-32 nylock jam nuts (am-1063).