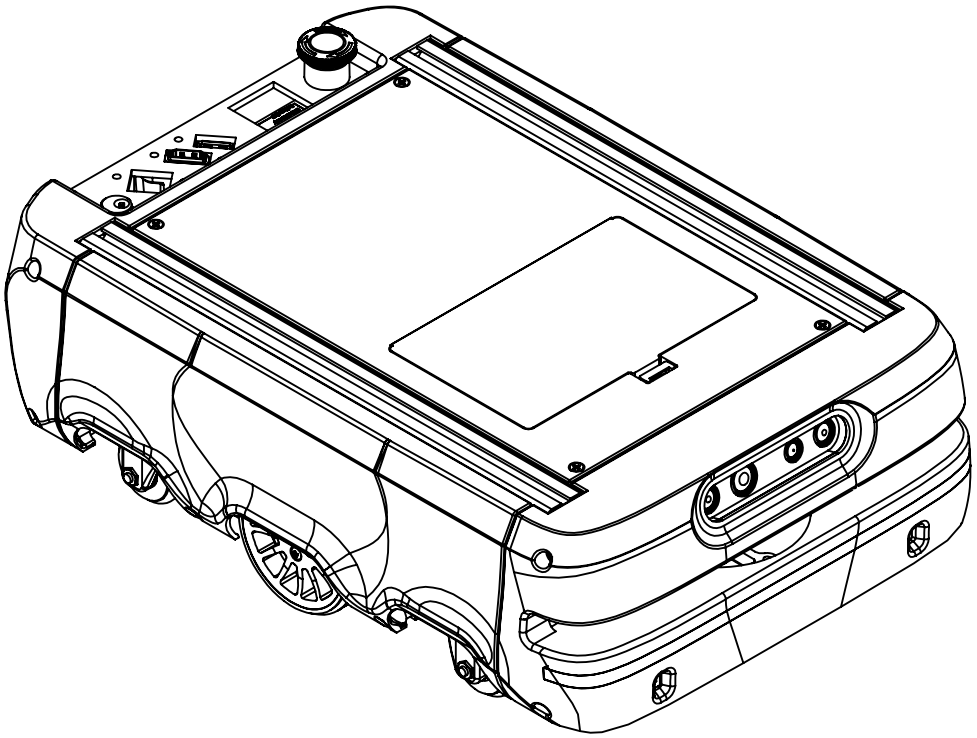
ROBOLAUNCH CLOUDY MK2 MANUFACTURING GUIDE



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1. OVERVIEW

1.1 Dimensions

Dimensions of the robot shown below fig1

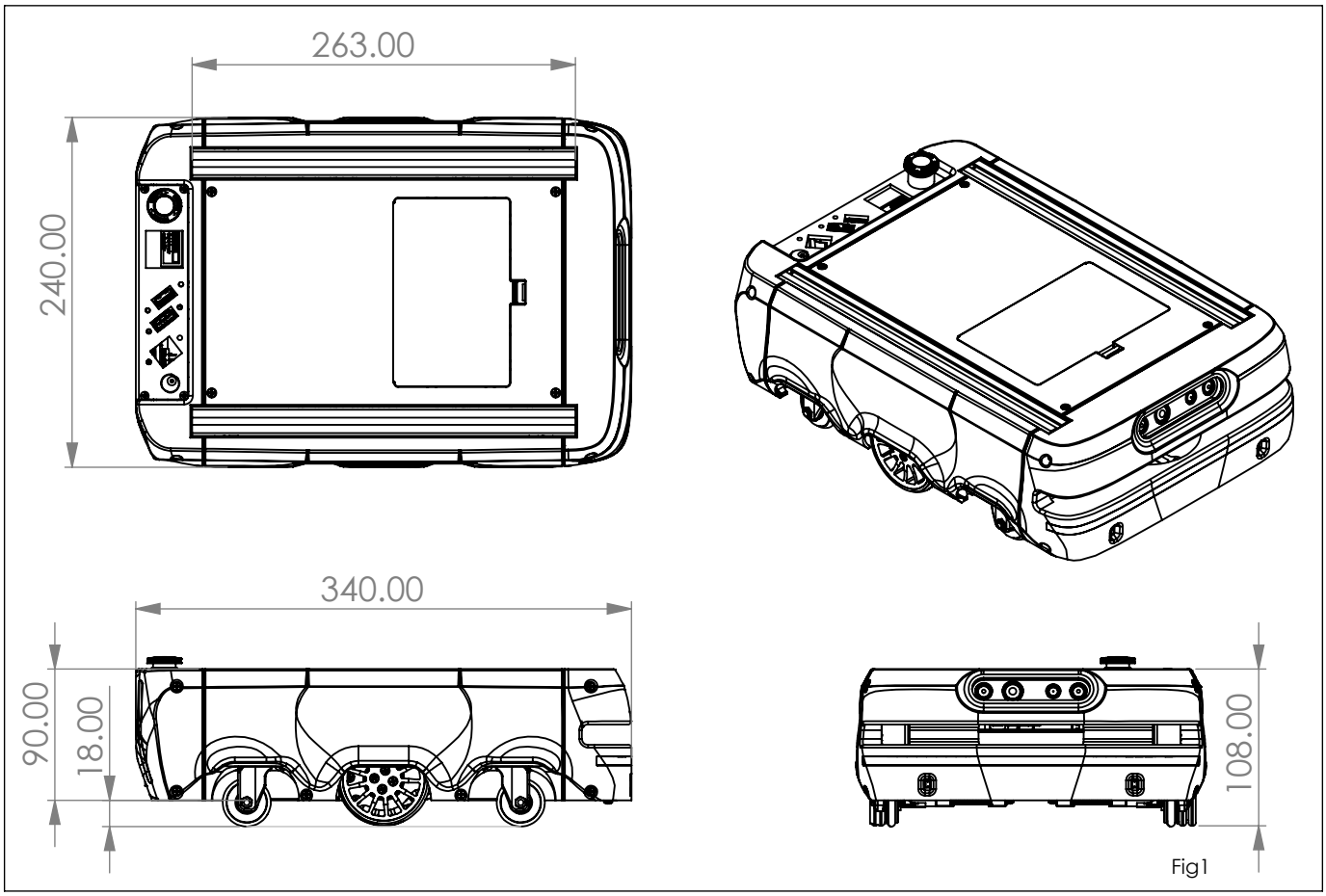


Fig1

1.2 Mechanical layout

FRAME

Cloud2 frame has 3 piece chassis reinforced with aluminum sigma profiles. Able to handle 20kgs of payload
Drive train consist of a drive wheel between two caster wheels making a total of 4 caster wheels and 2 drive wheels.(fig2)

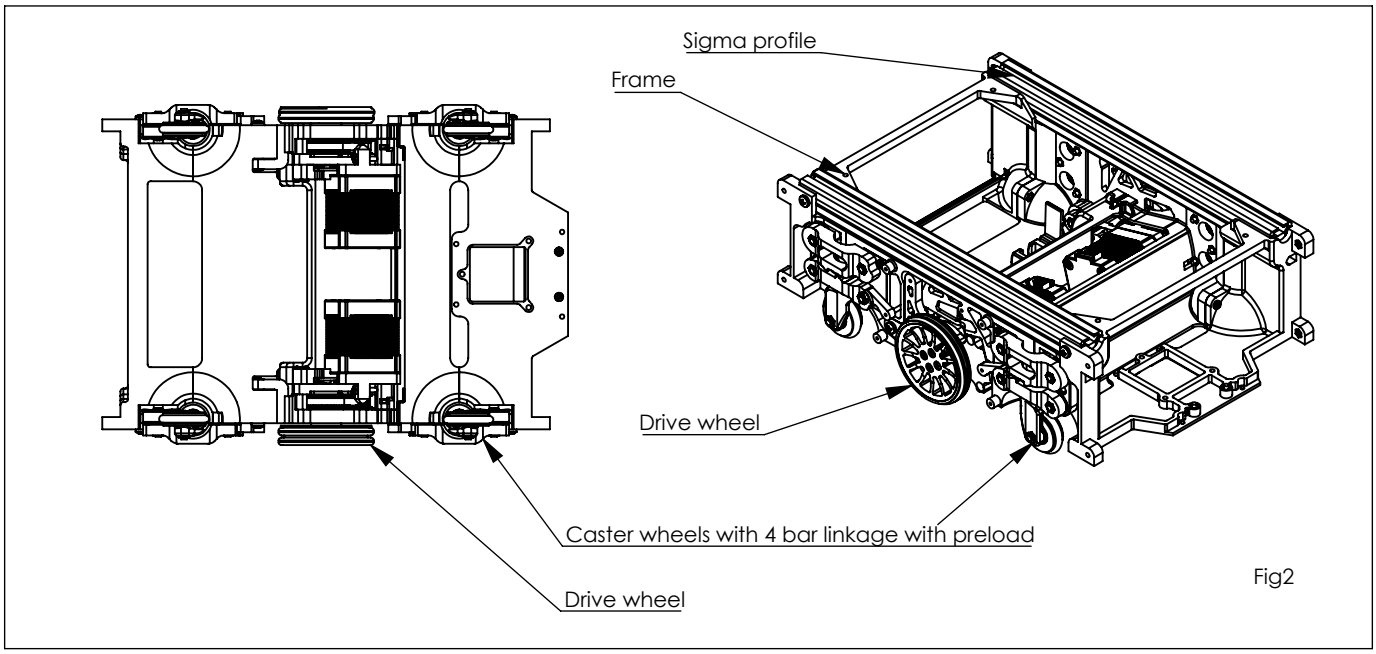


Fig2

CASTER WHEELS

Caster wheels are spring preloaded 4 bar linkage to ensure constant contact with ground.
Ball bearings are used for all hinges and rotating components.
Orings are used as tires on wheels for smooth operation (fig3)

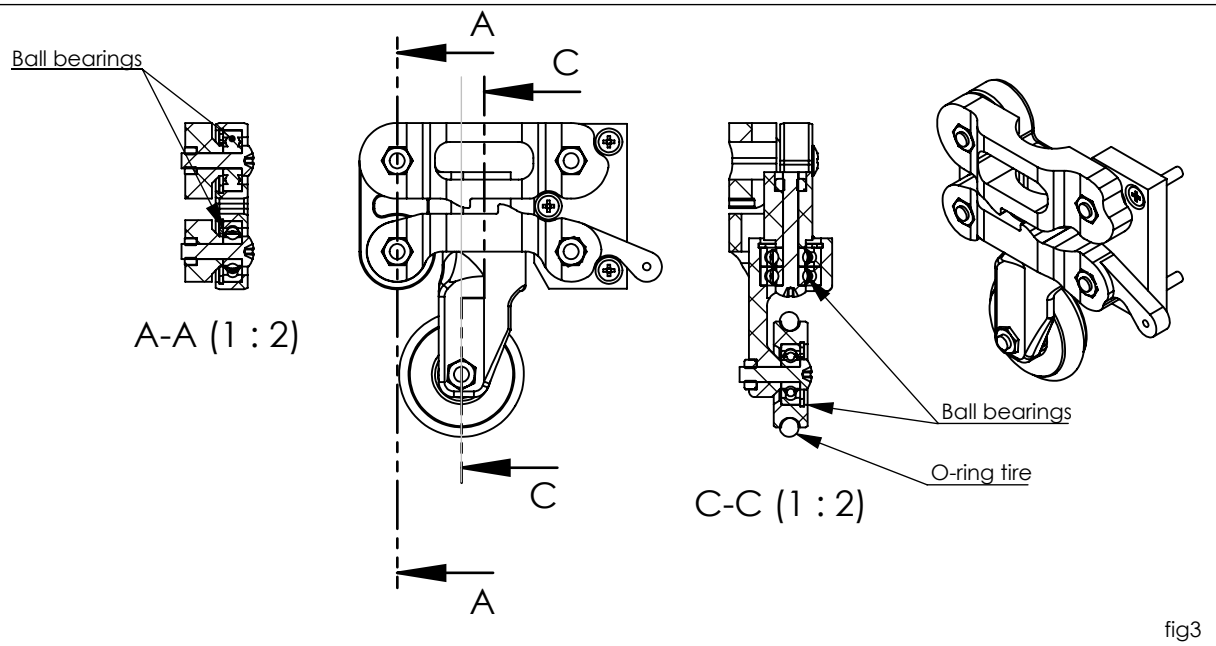


fig3

DRIVE WHEELS

Drive wheels are belt driven, reduction ratio is i:3.15. Ratio can be customised by advanced users by custom sized pulleys. Belt tension can be adjusted via screws shown below.(fig4)

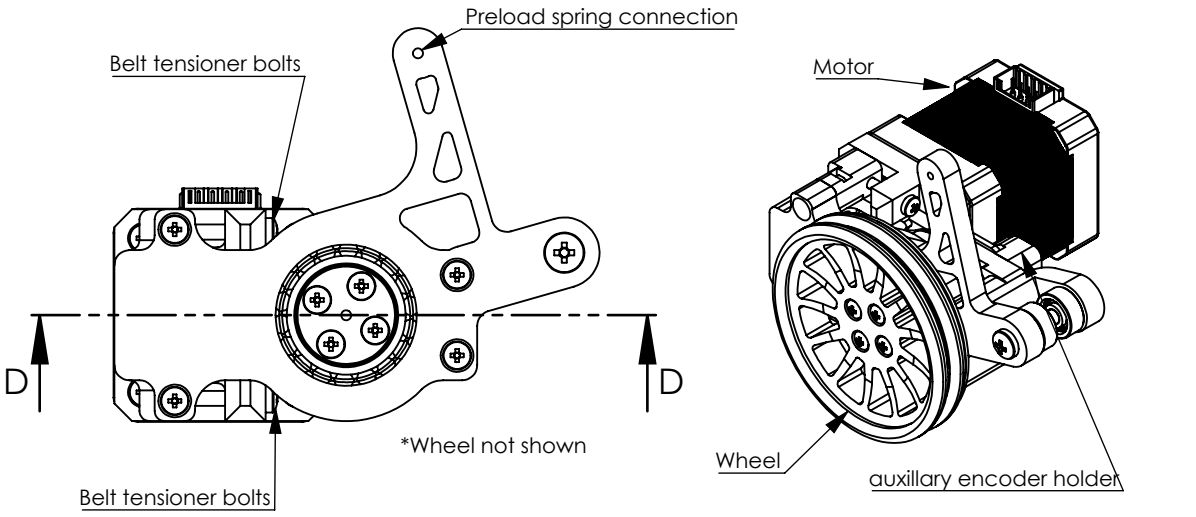
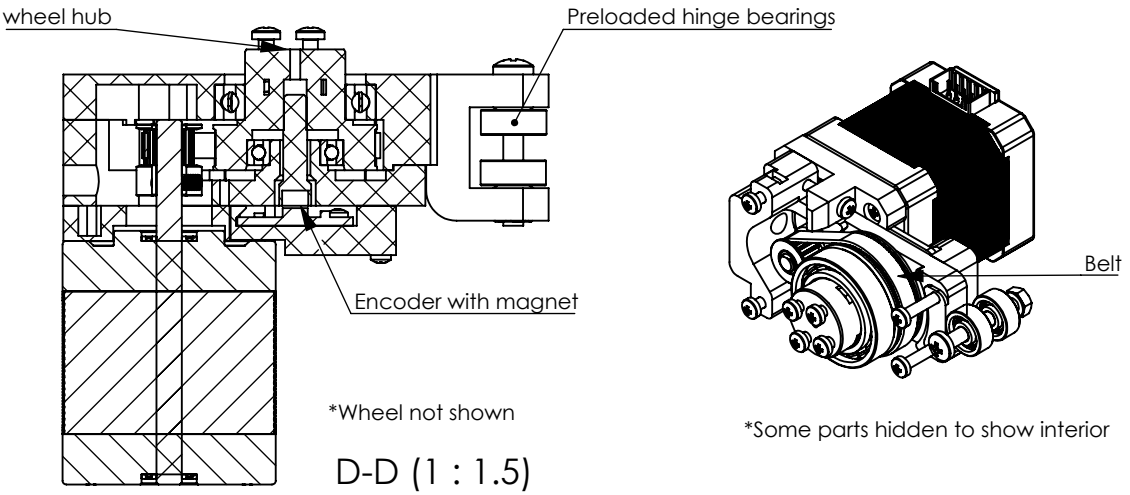


fig4



2 - BILL OF MATERIALS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	0404_011		1
1.1	0404_033	Middle frame	1
1.2	0401_002		2
1.2.1	0401_001	Caster wheel	1
1.2.2	0401_003	Caster wheel	1
1.2.3	0401_004	Caster wheel	1
1.2.4	O-ring D25_30 d5		1
1.2.5	0401_005	Caster wheel	1
1.2.6	0401_006	Caster wheel	1
1.2.7	0404_012	Caster fixture	1
1.2.8	Bearing SKF - 634 - 4 x 16 x 5		7
1.2.9	Circlip DIN 472 - 16 x 1		4
1.2.10	Hexagon Nut ISO 4032 - M4 - W - N		6
1.2.11	ISO 7045 - M4 x 16 - Z - 16N		6
1.2.12	ISO 7046-1 - M3 x 16 - Z - 16N		3
1.3	0404_014	Rear frame	1
1.4	0404_024	Front frame	1
1.5	sigma20x20		2
1.6	0404_016		2
1.6.1	0401_004	Caster wheel	1
1.6.2	O-ring D25_30 d5		1
1.6.3	0404_012	Caster fixture	1
1.6.4	0404_017	Caster wheel	1
1.6.5	0404_018	Caster wheel	1
1.6.6	0404_070	Caster wheel	1
1.6.7	0404_020	Caster wheel	1
1.6.8	Bearing SKF - 634 - 4 x 16 x 5		7
1.6.9	Circlip DIN 472 - 16 x 1		4
1.6.10	Hexagon Nut ISO 4032 - M4 - W - N		6
1.6.11	ISO 7045 - M4 x 30 - Z - 30N		6
1.6.12	ISO 7046-1 - M3 x 16 - Z - 16N		3
1.7	0404_059		1
1.7.1	0404_028_50T	Drive wheel pulley	1
1.7.2	0404_029	Motor Flange	1
1.7.3	0404_030	Drive train	1
1.7.4	0404_031	Drive train	1
1.7.5	O-ring D45_50 d5		2
1.7.6	AS5600 v1.step		1
1.7.7	0404_034	Sensor magnet holder	1
1.7.8	0404_035	Wheel sensor holder	1
1.7.9	17HS8401		1
1.7.10	16 teeth pulley GT2 6mm		1
1.7.11	GT2 122T BELT 6mm		1
1.7.12	0404_032	Wheel	1
1.7.13	Bearing SKF - 624 - 4 x 13 x 5		4

MECHANICAL HARDWARE LIST

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
44	ISO 7045 - M3 x 8 - Z - 8N		8
45	ISO 7045 - M3 x 10 - Z - 10N		6
46	ISO 7045 - M3 x 12 - Z - 12N		16
47	ISO 7045 - M3 x 16 - Z - 16N		8
48	ISO 7046-1 - M3 x 16 - Z - 16N		16
49	ISO 7045 - M3 x 20 - Z - 20N		4
50	ISO 7045 - M3 x 25 - Z - 25N		4
51	ISO 7045 - M4 x 12 - Z - 12N		4
52	ISO 7045 - M4 x 16 - Z - 16N		20
53	ISO 7045 - M4 x 30 - Z - 30N		6
54	Hexagon Nut ISO 4032 - M3 - W - N		54
55	Hexagon Nut ISO 4032 - M4 - W - N		26
56	Tapping screw DIN 7049-ST2.2x6.5-C-H-N		12
57	Tapping screw DIN 7049-ST2.2x13-C-H-N		4
58	Tapping screw DIN 7049-ST2.9x9.5-C-H-N		9
59	Tapping screw DIN 7049-ST2.9x6.5-C-H-N		4
60	Tapping screw DIN 7049-ST2.9x16-C-H-N		4
61	Bearing SKF - 61800 - 10 x 19 x 5		2
62	Bearing SKF - 61804 - 20 x 32 x 7		2
63	Bearing SKF - 634 - 4 x 16 x 5		28
64	Bearing SKF - 624 - 4 x 13 x 5		4
65	Circlip DIN 472 - 16 x 1		16
68	O-ring D25_30 d5		4
74	O-ring D45_50 d5		4
75	sigma20x20		2
89	17HS8401		2
90	16 teeth pulley GT2 6mm		2
91	GT2 122T BELT 6mm		2
92	Ext. Spring 1/4" x 7/8"		4
93	Ext. Spring 11/32" x 1-27/32"		2

MANUFACTURING PART LIST

All of the robot parts are completely 3d printable. We recommend using maximum 0.6mm nozzle and setting maximum 0.32mm layer thickness for printing non cosmetic parts for faster printing while maintaining minimum required dimensional tolerances. We recommend using PLA for all parts. For custom applications requiring more durable materials ABS, PETG or other high strength material can be used. Cosmetic parts are bodywork parts, thinner layer thickness and slower printing speed may be preferred for better surface finish.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	0404_033	Middle frame	1
2	0401_001	Caster wheel	2
5	0401_003	Caster wheel	2
7	0401_004	Caster wheel	4
9	0401_005	Caster wheel	2
10	0401_006	Caster wheel	2
11	0404_012	Caster fixture	4
16	0404_014	Rear frame	1
17	0404_024	Front frame	1
19	0404_017	Caster wheel	2
20	0404_018	Caster wheel	2
21	0404_070	Caster wheel	2
22	0404_020	Caster wheel	2
23	0404_028_50T	Drive wheel pulley	2
24	0404_029	Motor Flange	2
25	0404_030	Drive train	2
27	0404_031	Drive train	1
34	0404_034	Sensor magnet holder	2
35	0404_035	Wheel sensor holder	2
41	0404_032	Wheel	2
47	0404_039	Rc module holder	1
48	0404_060	Drive train	1
61	0404_044	Front panel (COSMETIC)	1
65	0404_046	Front lighting (COSMETIC)	1
66	0404_047	Rear panel (COSMETIC)	1
73	0404_054	Rear lighting (COSMETIC)	2
74	0404_053	Rear Lighting (COSMETIC)	1
82	0404_051	Power box	1
83	0404_052	Battery cap (COSMETIC)	1
84	0404_064	Side panel (COSMETIC)	1
87	0404_055	Side Panel (COSMETIC)	1
89	0404_067	Battery bottom (COSMETIC)	1
90	0404_049	Top panel (COSMETIC)	1

ELECTRONIC HARDWARE LIST

PART NUMBER	DESCRIPTION	QTY.
AS5600 v1.step		2
17HS8401		2
Intel D435i		1
led sticker 8led		4
VL6180X-Time_of_Flight_Sensor.stp	PART-VL6180X-Time_of_Flight_Sensor-DESC	2
GX12-2P v2		1
hdmi_f_chassis		1
USB Type A - panel mount		1
OLED Display 128x64		1
Button_ 12_Switch		1
Push Switch Button (12mm) R		1
PJ-011A	CONN PWR JCK 2.1 X 6.0MM PNL MNT	1

Battery size should not exceed 25x70x123(HxWxL) if using standard part model.

3 - ASSEMBLY GUIDE

PREPARING PARTS

Before assembling, all the parts must be cleaned of support structures. Mounting surfaces and holes must be levelled of imperfections.

Tools required for part preparations;

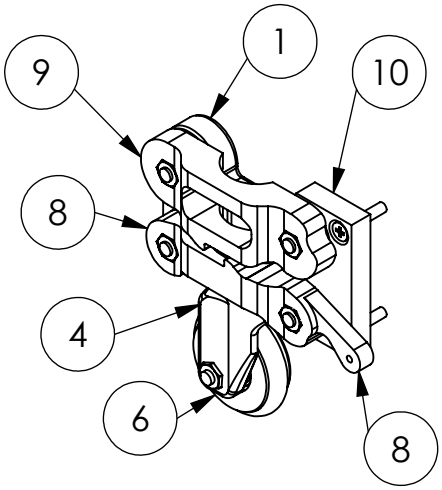
- Pliers
- Utility knife
- flat head screwdriver

Follow step by step guide for complete mechanical systems assembly.

Tools required for assembly:

- Philips screwdriver
- Small assembly hammer
- Pliers

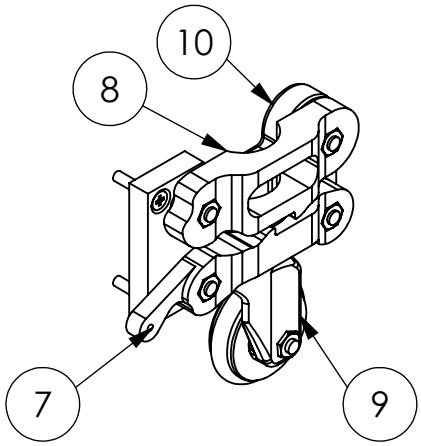
STEP 1: Gather parts; Caster wheels left



* Hardware not shown
* 2 left caster wheel assemblies per robot is required, list on the right is BOM per assembly

ITEM NO.	PART NUMBER	QTY.
1	0401_001	1
2	Bearing SKF - 634 - 4 x 16 x 5	7
3	Circlip DIN 472 - 16 x 1	4
4	0401_003	1
5	Hexagon Nut ISO 4032 - M4 - W - N	6
6	0401_004	1
7	O-ring D25_30 d5	1
8	0401_005	1
9	0401_006	1
10	0404_012	1
11	ISO 7045 - M4 x 30 - Z - 30N	1
12	ISO 7045 - M4 x 16 - Z - 16N	5
13	ISO 7046-1 - M3 x 16 - Z - 16N	3

Caster wheels right

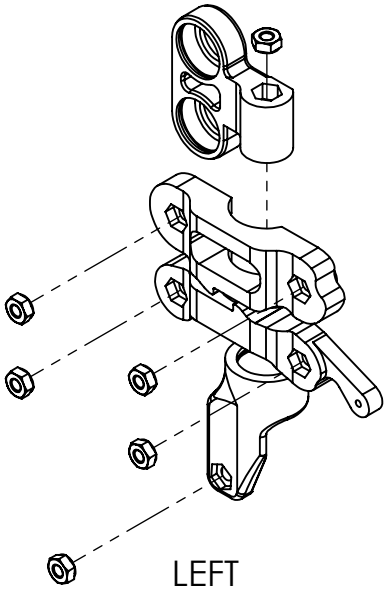


* Hardware not shown
* Only different parts are marked
* 2 right caster wheel assemblies per robot is required, list on the right is BOM per assembly

ITEM NO.	PART NUMBER	QTY.
1	Bearing SKF - 634 - 4 x 16 x 5	7
2	Circlip DIN 472 - 16 x 1	4
3	Hexagon Nut ISO 4032 - M4 - W - N	6
4	0401_004	1
5	O-ring D25_30 d5	1
6	0404_012	1
7	0404_017	1
8	0404_018	1
9	0404_070	1
10	0404_020	1
11	ISO 7045 - M4 x 16 - Z - 16N	5
12	ISO 7046-1 - M3 x 16 - Z - 16N	3
13	ISO 7045 - M4 x 30 - Z - 30N	1

STEP 2: Assemble nuts

Assemble ISO 4032 M3 nuts in their hexagonal pockets shown below, tap lightly with assembly hammer if recessary. Nuts should fit tightly.



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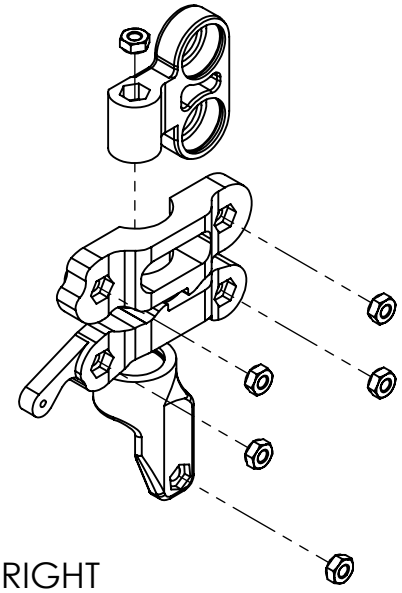
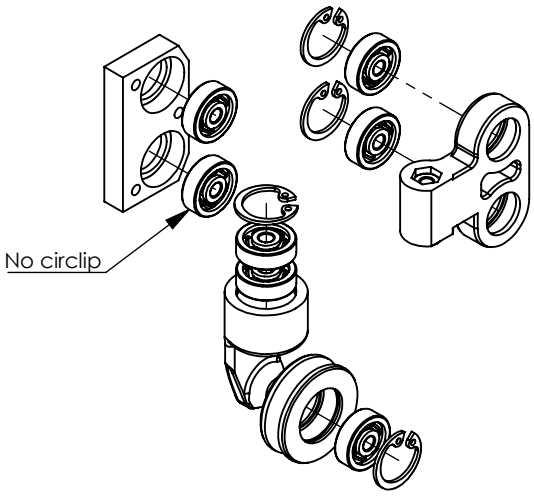


RIGHT

STEP 3: Assemble Bearings

Mount bearings in the pockets, tap lightly with assembly hammer if required. when tapping make sure using force on correct ring on the bearing so that forces are not transmitted through rolling elements. these forces will cause dents in the raceway paths, known as true brinelling.

Lock bearings with circlips using circlip pliers for bores. Note that some bearings dont have circlip grooves



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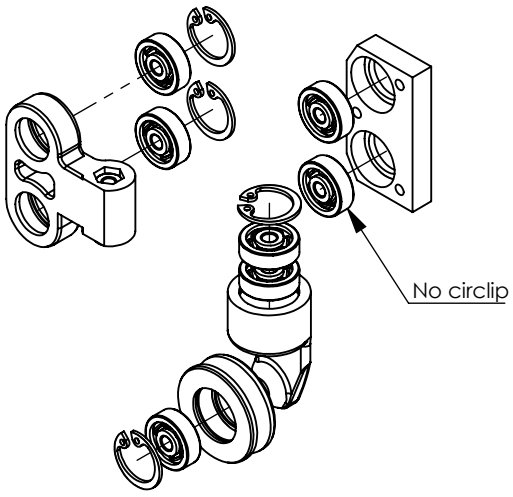
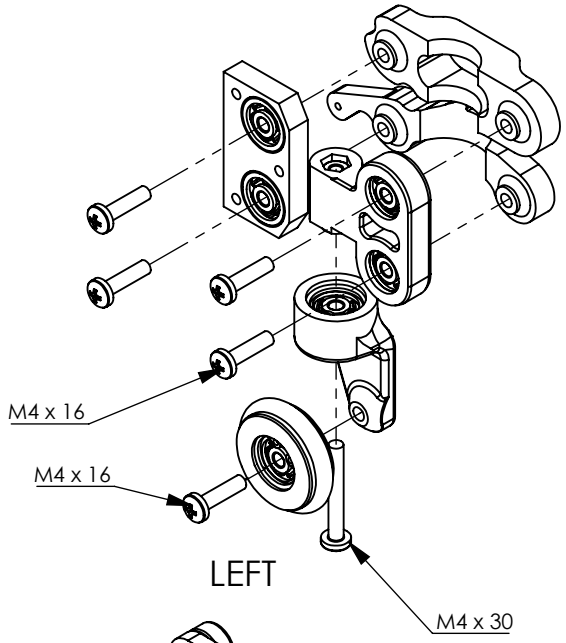


RIGHT

STEP 4: Caster Assembly

Assemble components together using ISO 7045 M4x16 and ISO 7045 M4 x 30 bolts using philips screwdriver.



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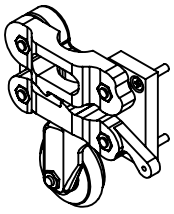
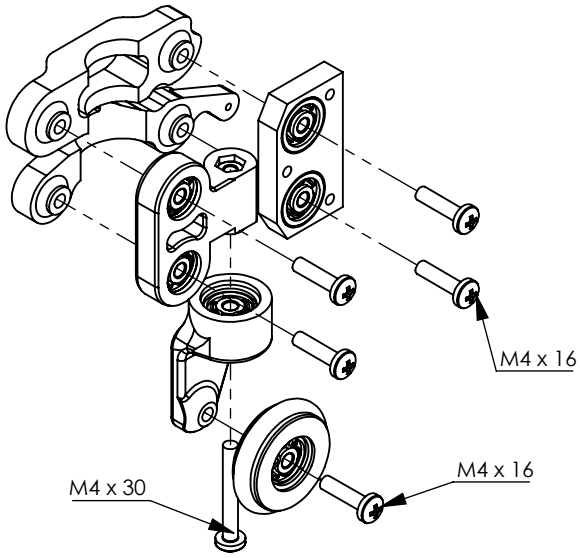
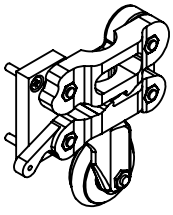


X 2

0401_004 Finished subassembly



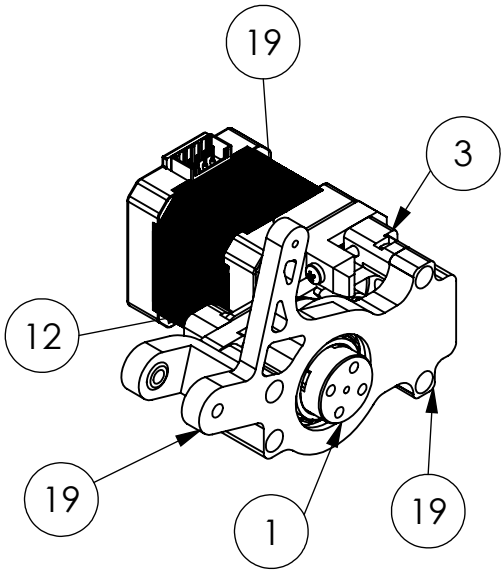
RIGHT



X 2

0404_016 Finished subassembly

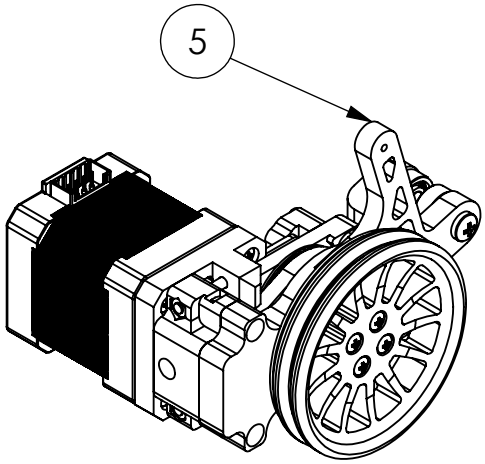
STEP 5: Gather parts; Drive wheel left



ITEM NO.	PART NUMBER	QTY.
1	0404_028_50T	1
2	0404_029	1
3	0404_030	1
4	Bearing SKF - 61804 - 20 x 32 x 7	1
6	Bearing SKF - 61800 - 10 x 19 x 5	1
8	ISO - 4032 - M3 - W - N	10
9	ISO - 4032 - M4 - W - N	1
10	AS5600 v1.step	1
11	0404_034	1
12	0404_035	1
13	Tapping screw DIN 7049-ST2.2x6.5-C-H-N	2
14	Tapping screw DIN 7049-ST2.2x13-C-H-N	2
15	17HS8401	1
16	16 teeth pulley GT2 6mm	1
17	GT2 122T BELT 6mm	1
19	0404_060	1
20	ISO 7045 - M3 x 8 - Z - 8N	4
21	ISO 7045 - M3 x 25 - Z - 25N	2
22	ISO 7045 - M3 x 10 - Z - 10N	2
25	ISO 7045 - M3 x 20 - Z - 20N	2

* Hardware not shown
* 1 drive wheel left assembly per robot is required, list on the right is BOM per assembly

Drive wheel right

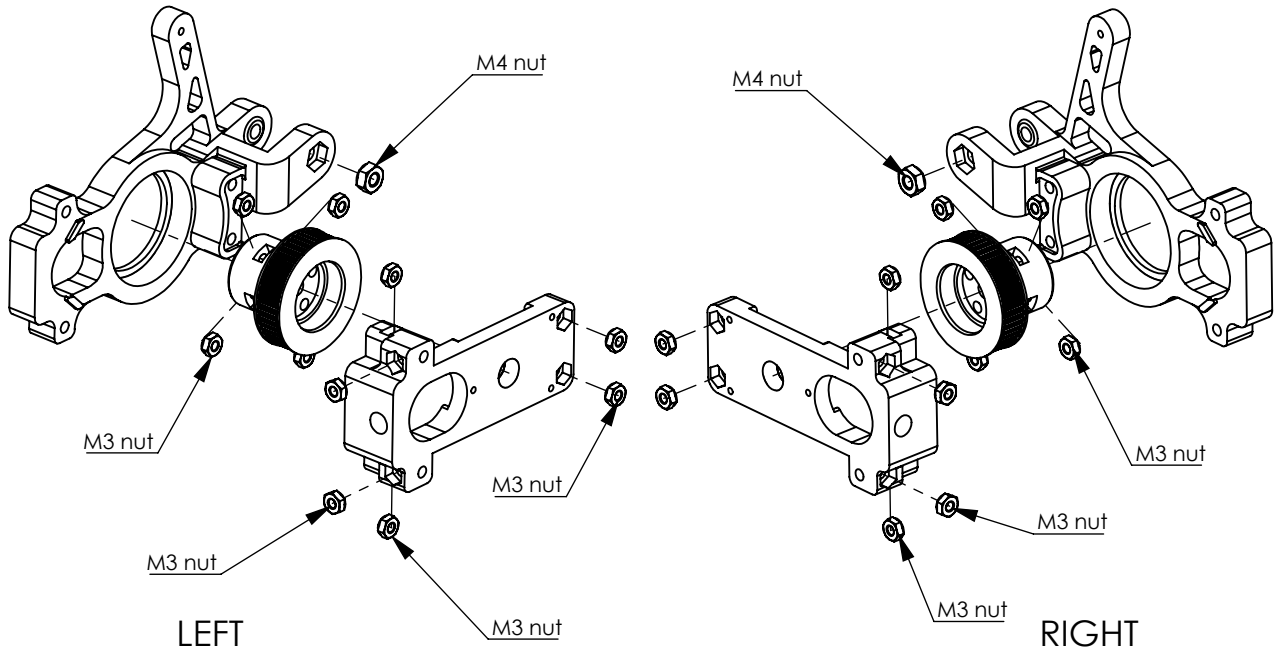


* Hardware not shown
* Only different part is marked
* 1 drive wheel left assembly per robot is required, list on the right is BOM per assembly

ITEM NO.	PART NUMBER	QTY.
1	0404_028_50T	1
2	0404_029	1
3	0404_030	1
4	Bearing SKF - 61804 - 20 x 32 x 7	1
5	0404_031	1
6	O-ring D45_50 d5	2
7	Bearing SKF - 61800 - 10 x 19 x 5	1
8	Bearing SKF - 624 - 4 x 13 x 5	2
9	ISO - 4032 - M3 - W - N	10
10	ISO - 4032 - M4 - W - N	1
11	AS5600 v1.step	1
12	0404_034	1
13	0404_035	1
14	Tapping screw DIN 7049-ST2.2x6.5-C-H-N	2
15	Tapping screw DIN 7049-ST2.2x13-C-H-N	2
16	17HS8401	1
17	16 teeth pulley GT2 6mm	1
18	GT2 122T BELT 6mm	1
19	0404_032	1
20	ISO 7045 - M3 x 8 - Z - 8N	4
21	ISO 7045 - M3 x 25 - Z - 25N	2
22	ISO 7045 - M3 x 10 - Z - 10N	2
23	ISO 7045 - M3 x 12 - Z - 12N	4
24	ISO 7045 - M3 x 20 - Z - 20N	2
25	ISO 7045 - M4 x 30 - Z - 30N	1

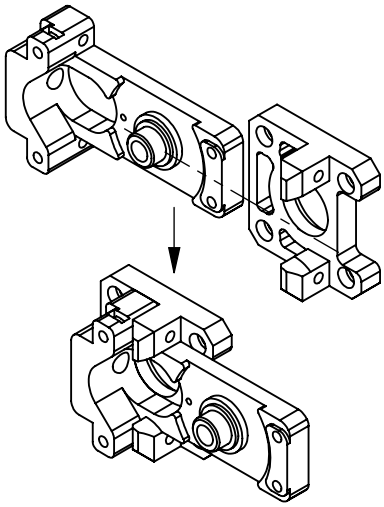
STEP 6: Assemble nuts

Assemble ISO 4032 M3 and ISO 4032 M4 nuts in their hexagonal pockets shown below, tap lightly with assembly hammer if recessary. Take caution not damaging parts. Nuts should fit tightly.

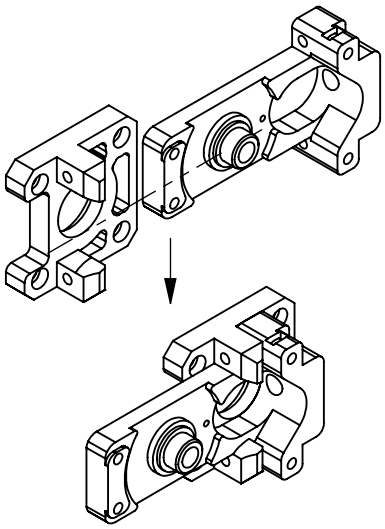


STEP 7: Tensioner motor mount assembly

Slide motor mount into drive gearbox frame slot as shown in the picture, There should be no backlash and parts should fit tightly. Use assembly hammer if required, take caution not to damage the parts.



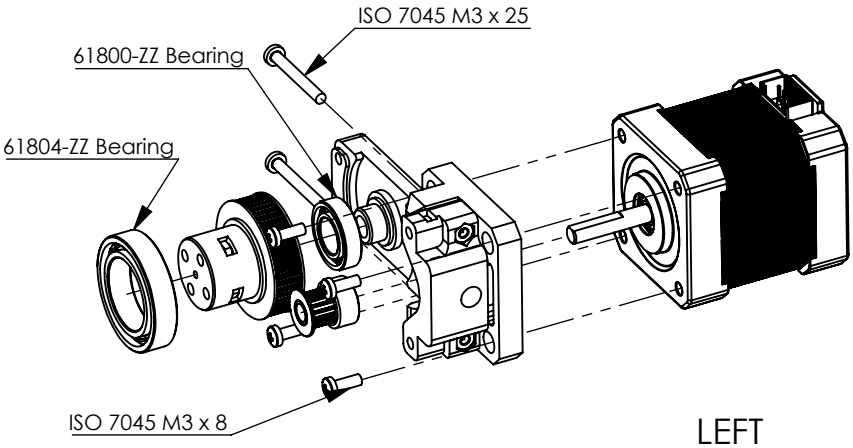
LEFT



RIGHT

STEP 8: Motor and pulley assembly

Assemble motor, motor pulley and 50T pulley with bearings. Assemble belt tensioning screws loose as possible for belt adjustment, do not tighten at this stage. Motor connector pins must be towards up



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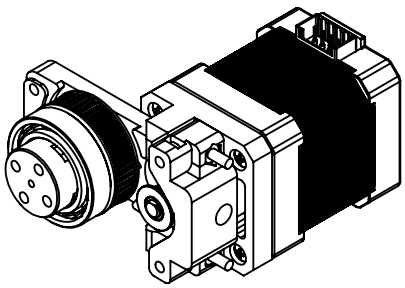
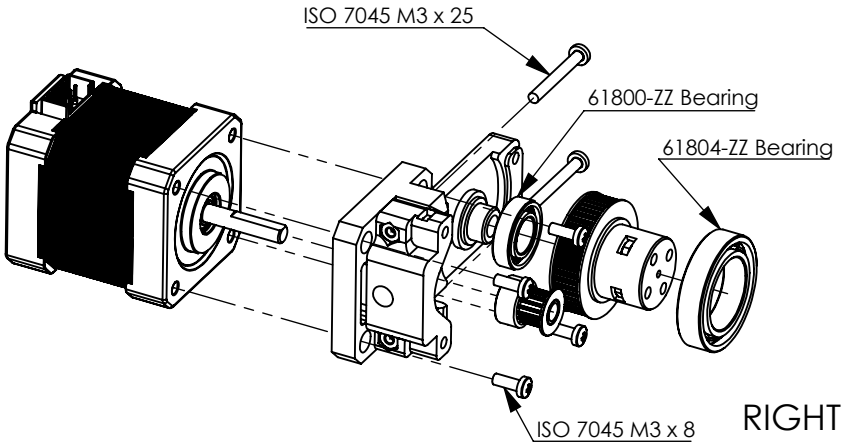


*Semi assembled component



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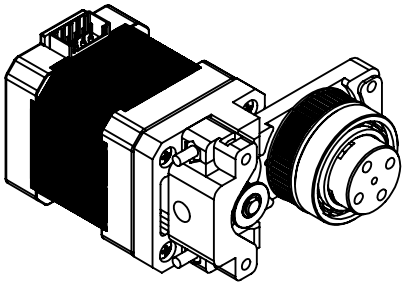
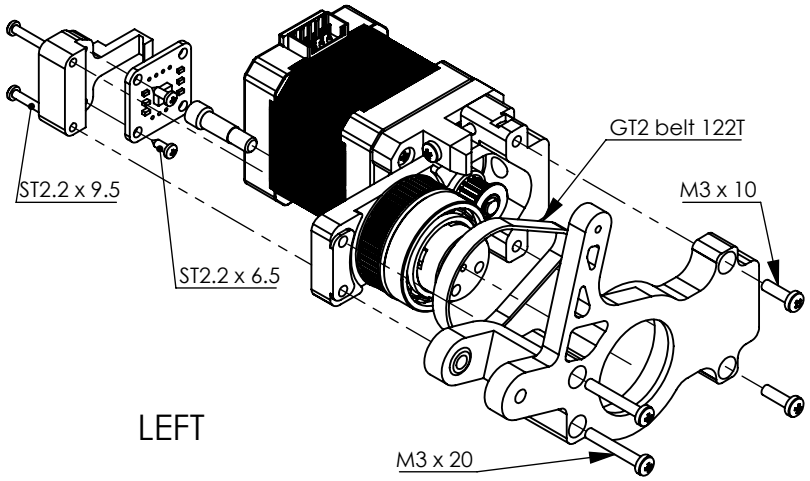


*Semi assembled component

STEP 9: Belt and gearbox case assembly

Assemble belt, gearbox cap, and encoder holder using philips screwdriver. Bolts are ISO 7045 M3 x 10, ISO 7045 M3 x 20, DIN 7049 ST2.2x6.5 and DIN7049 ST2.9x13.

Tighten belt using tightening screws equally **after** assembling gearbox cap. Do not overtighten belts, belts should have a play of approximately 2mms.



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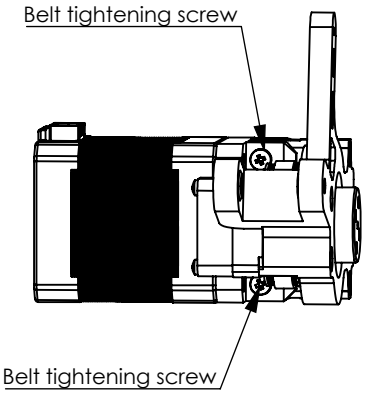
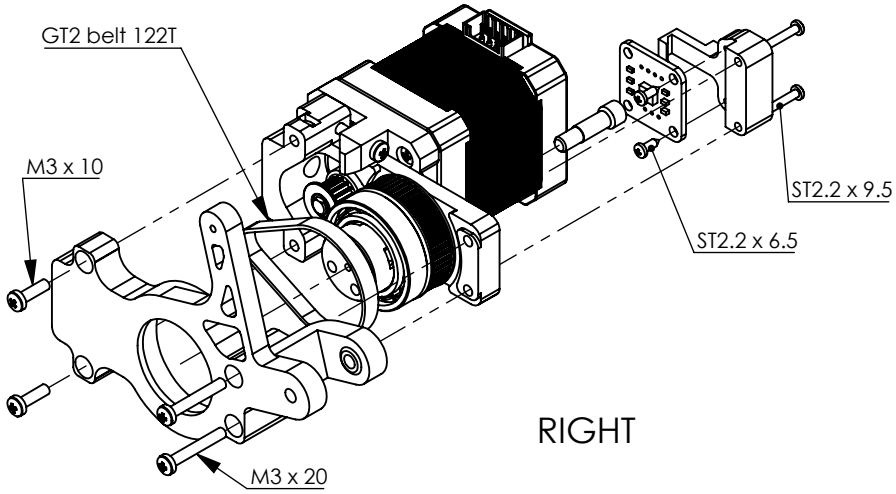
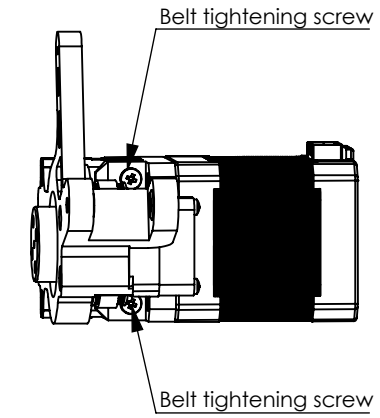
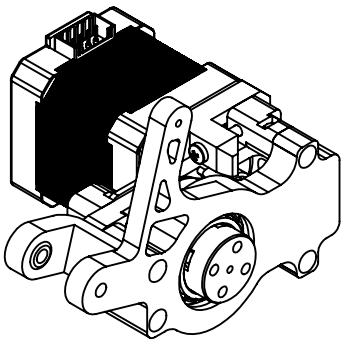




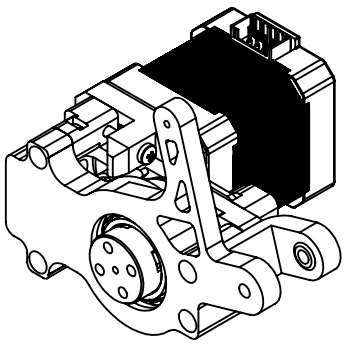
RIGHT





*Semi assembled component

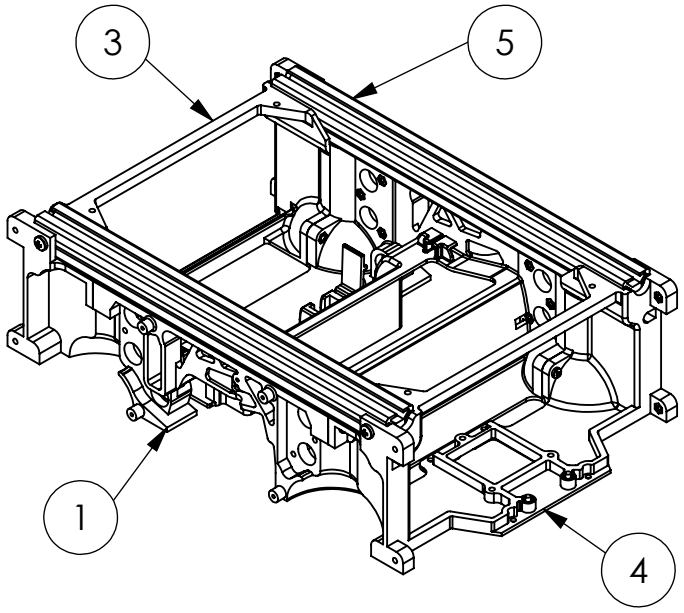
LEFT



*Semi assembled component

RIGHT

STEP 10: Gather parts; Frame

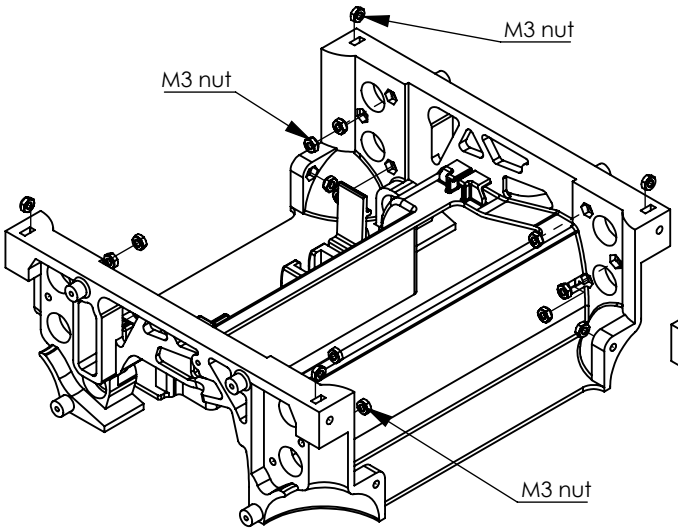


* Hardware not shown
* 1 frame assembly is required per robot.
list on the right is BOM per assembly

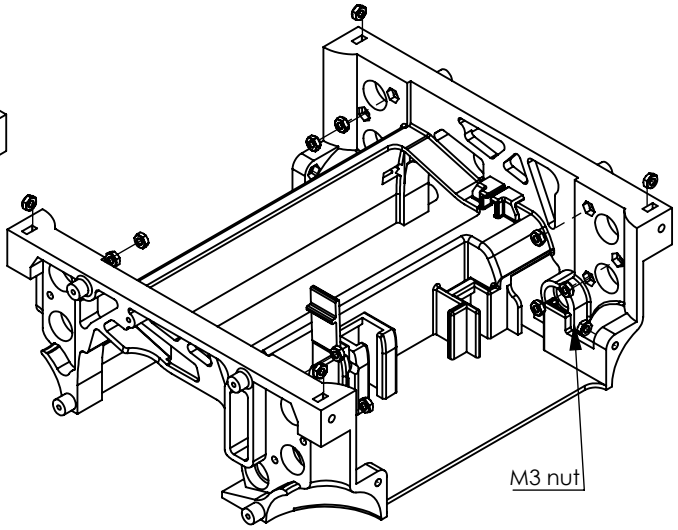
ITEM NO.	PART NUMBER	QTY.
1	0404_033	1
2	Hexagon Nut ISO 4032 - M3 - W - N	21
3	0404_014	1
4	0404_024	1
5	sigma20x20	2
6	0404_039	1
7	ISO - 4032 - M3 - W - N	13
8	ISO 7045 - M3 x 16 - Z - 16N	4
9	ISO 7045 - M4 x 12 - Z - 12N	4
10	ISO 7045 - M3 x 12 - Z - 12N	4
11	ISO 7045 - M3 x 10 - Z - 10N	2

STEP 11: Assemble Nuts; Middle frame

Assemble ISO 4032 M3 nuts in their hexagonal pockets shown below, tapgently with assembly hammer if recessary. Using pliers may help getting around tight spaces. Nuts should fit tightly.



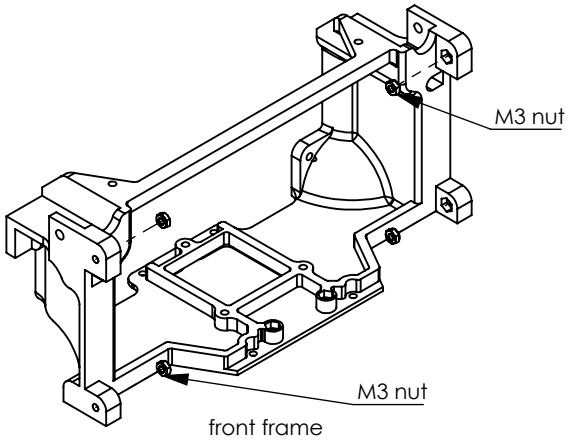
SOMETRIC VIEW



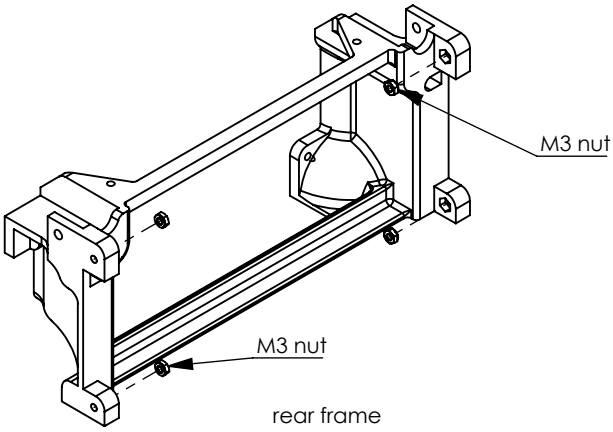
CROSS ISOMETRIC VIEW

STEP 12: Assemble nuts; Front and rear frame

Assemble ISO 4032 M3 nuts in their hexagonal pockets shown below, tap lightly with assembly hammer if recessary. Nuts should fit tightly.



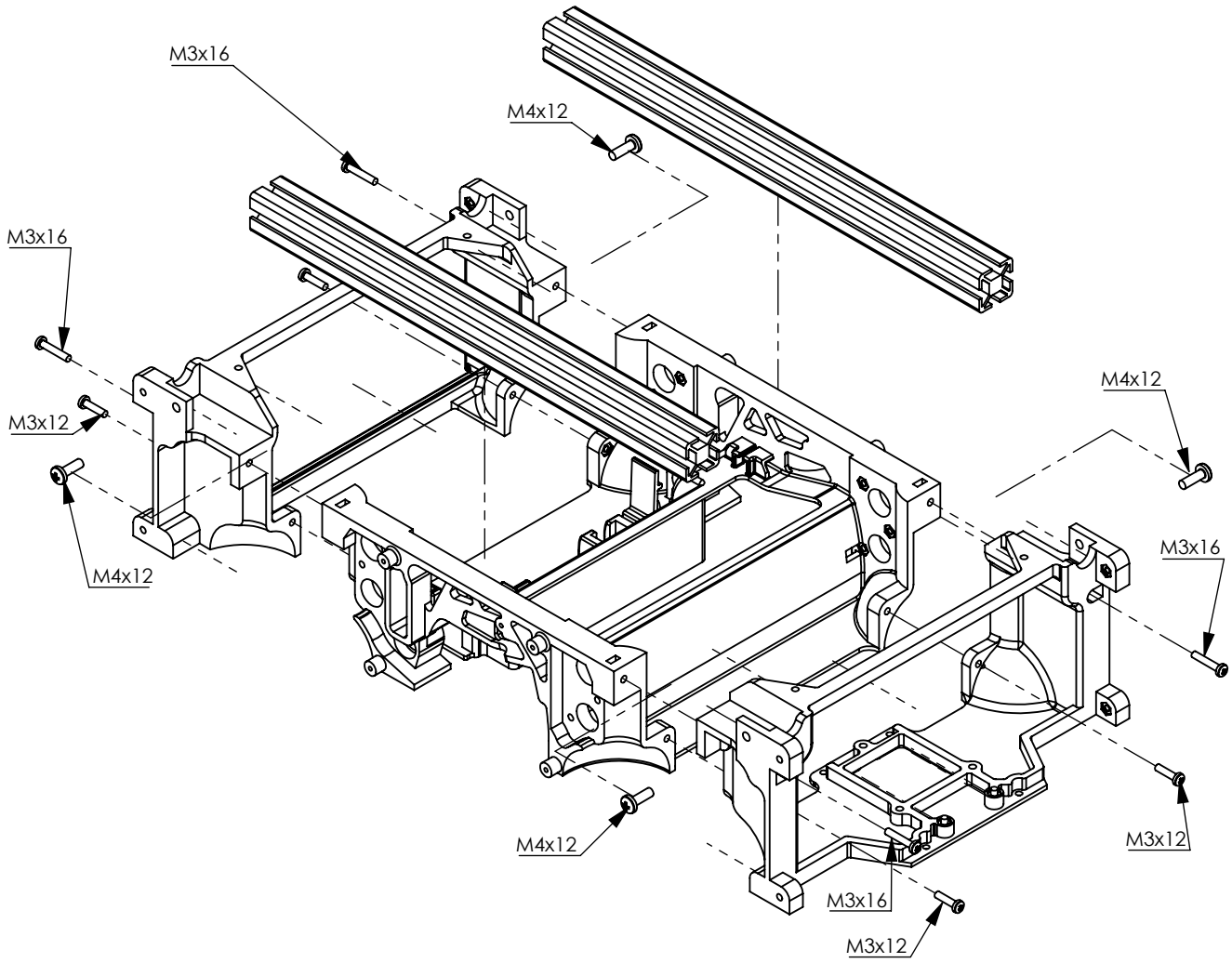
front frame



rear frame

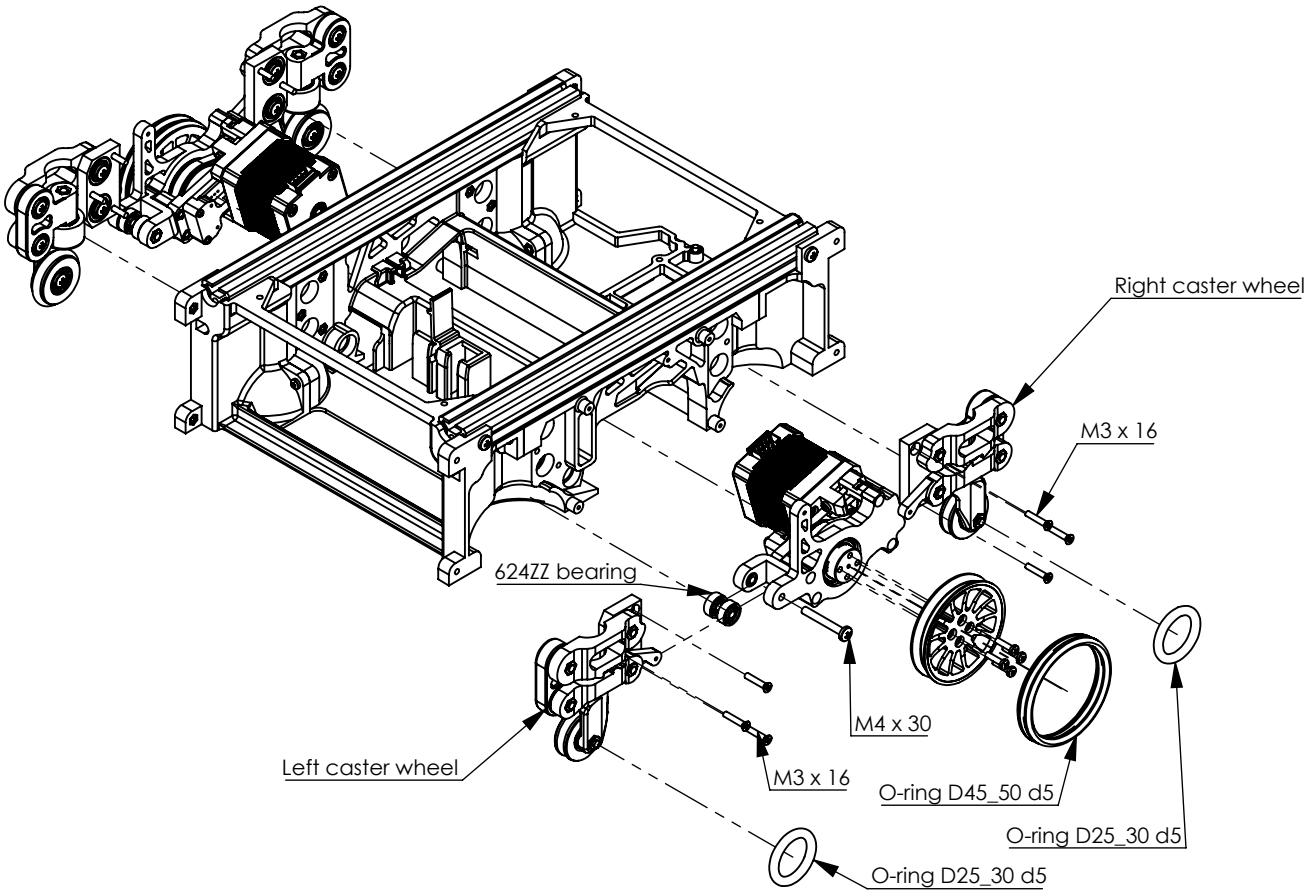
STEP 13: Assemble frame

Assemble frame components together using ISO 7045 M3x16, ISO 7045 M3x12, ISO 7045 M4x12 bolts using philips screwdriver.



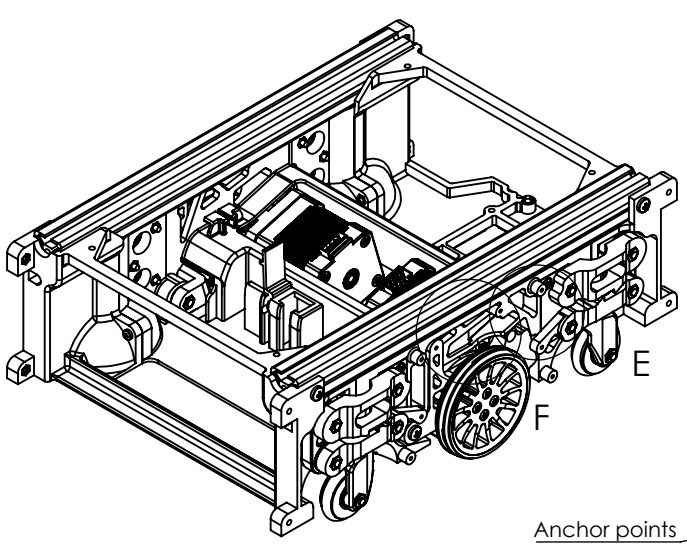
STEP 14: Assemble frame and drivetrain components

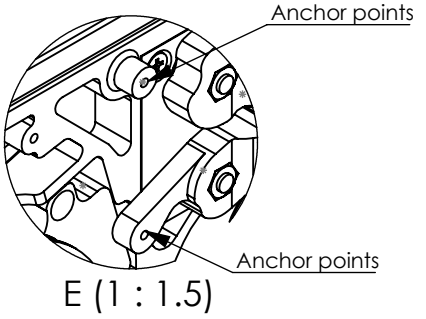
Assemble frame components together using ISO 7046 M3x16, ISO 7045 M4x30, bolts using philips screwdriver. Assemble drive motor bearings. put on oring tires.



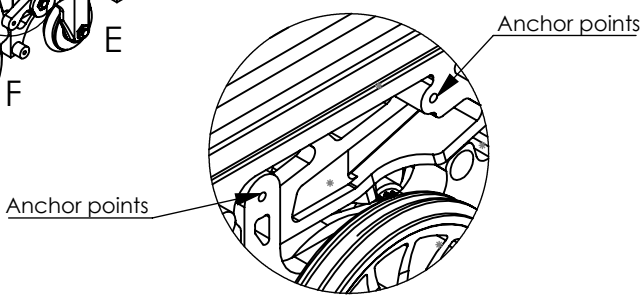
STEP 15: Assemble frame and drivetrain components

Assemble preload springs using ST2.2 x 6.5 screws anchor points shown below, total preload should be less than the weight of the robot. Purpose of these springs are ensuring all the wheels are constantly contacting ground instead of absorbing shocks





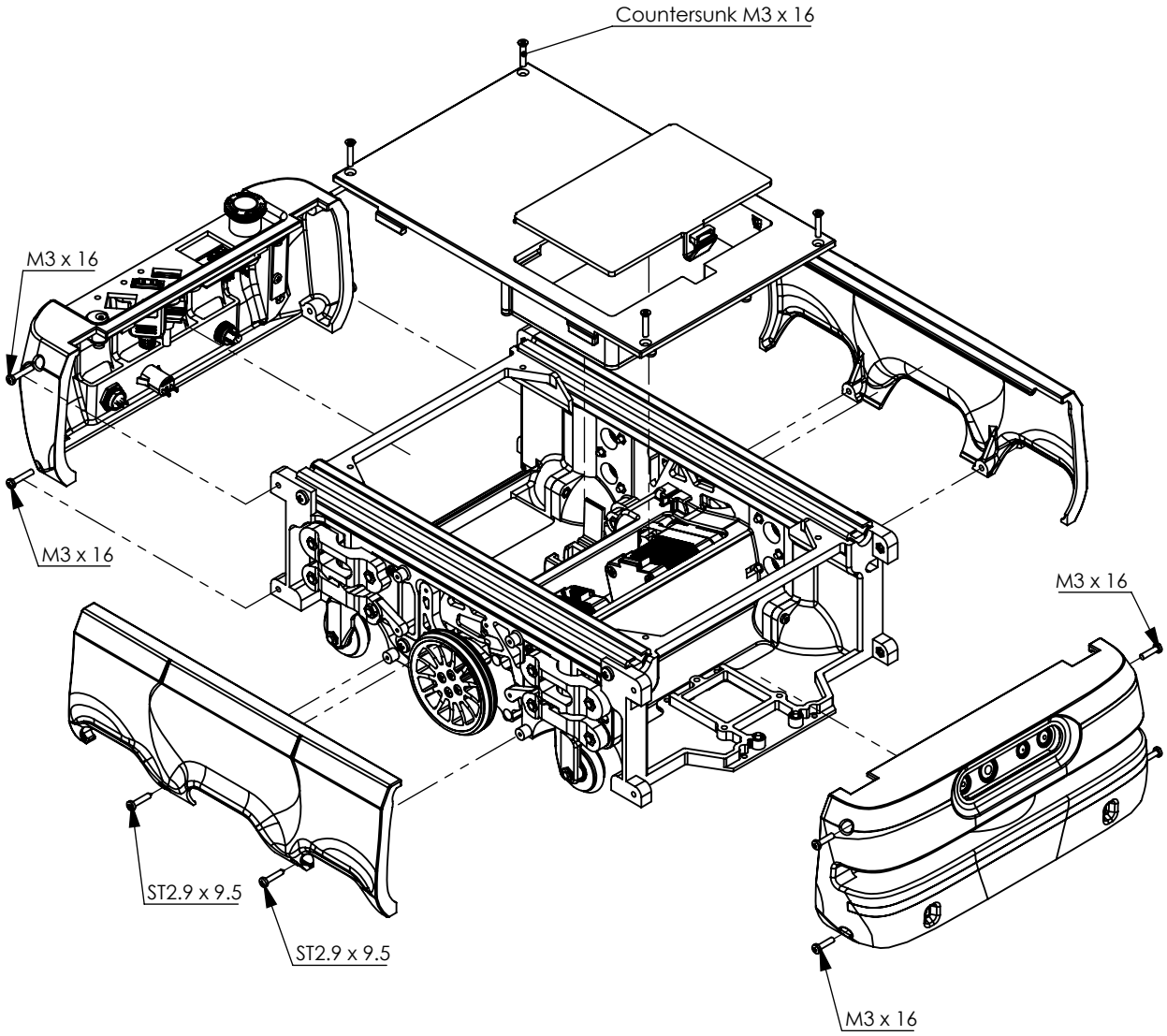
E (1 : 1.5)



F (1 : 1.5)

STEP16 : Assembling panels

Assemble front, rear, side and top panels using ISO 7045 M3 x 16, ISO 7046 M3 x 16 and ISO 7049 2.9 x 9.5 screws.



STEP17 : Admire

Conguratulations, you just finished assembling Robolaunch Cloudy MK2. Design additional modules for your use case, deliver payloads and customise as you wish.