

Beverage Robot

Robotic Arm Tank

Camera Dolly



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Technical Support: tec-support@makeblock.com
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: @Makeblock : @Makeblock : +Makeblock

Infinite Extensibility

10-in-1

Arduino & Raspberry Pi Compatible

Heavy-duty Aluminum Alloy

Encoder Motors

App-Enabled

Support Various Programming Languages



Make & Control Your Own Robot



Ultimate 2.0 is a flagship robot kit of Makeblock platform. It contains various mechanical parts and electronic modules, allowing you to build more complicated robots and develop your creativity. Get started and build your own Ultimate 2.0 for exploring more interesting cases!

Note: This user manual includes building instruction for the three main building forms.

For other building instructions, please refer to learn.makeblock.com/ultimate2/



Robotic Arm Tank

This Robot Arm Tank consists of a highly-adaptable track chassis and a flexible robotic arm. This robot is designed to help you grip, lift, and deliver objects in various terrains.



Beverage Robot

Beverage Robot is made up of a mobile chassis, a variable angle support structure and a self-adaptive bracket. It can independently pour beverage into a glass (or do other similar action) and deliver the glass to you.



Camera Dolly

Camera Dolly consists of a mobile chassis and a 360-degree swivel base. Add a smart phone or a camera onto this robot and start filming from a low angle. You can also preset a path for the robot to follow in order to capture the moments of your life. (Motion noise may affect the sound recording.)

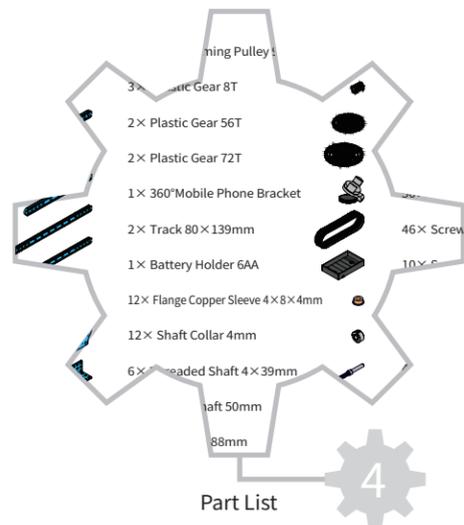


Quick Guide

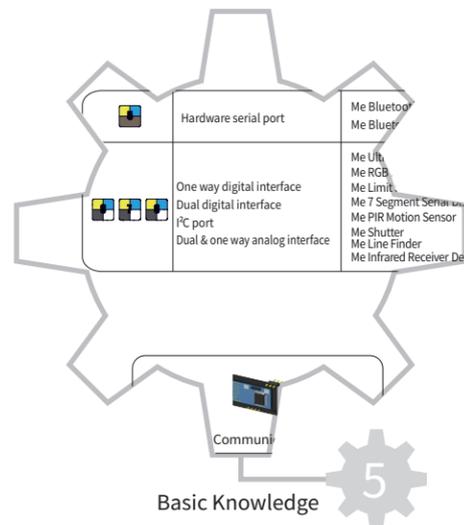
※ Here is a quick guide for you to get started easily.

※ WARNING

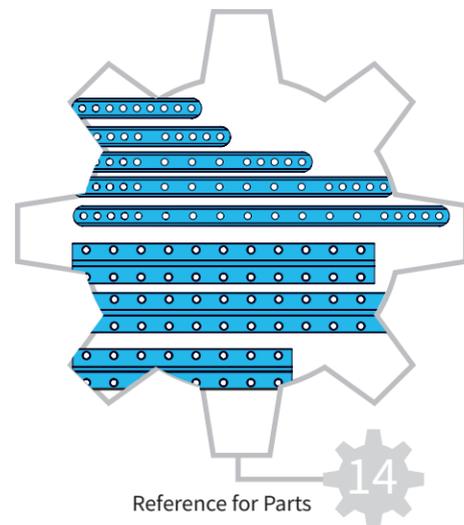
- Keep this kit out of the reach of children or animals.
- Small parts may cause choking or serious injury if swallowed.



Check the parts of Ultimate 2.0 according to the Part List.



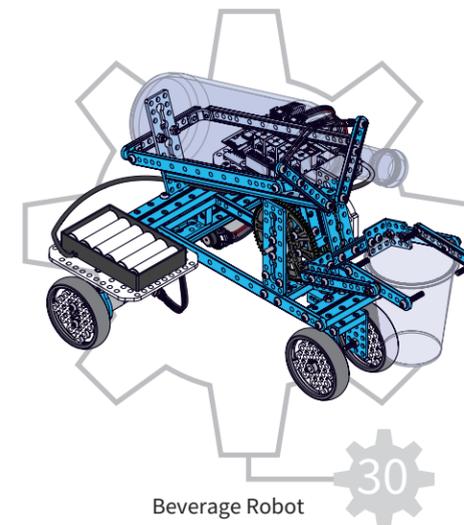
Explain in detail how to use the instructions for you.



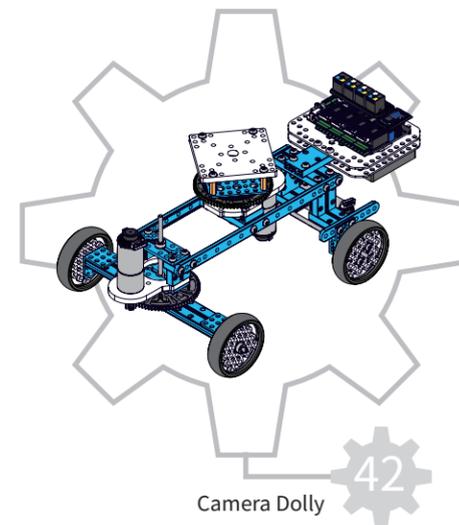
A reference with a ratio of 1:1 provides an easier way for you to distinguish parts of Ultimate 2.0.



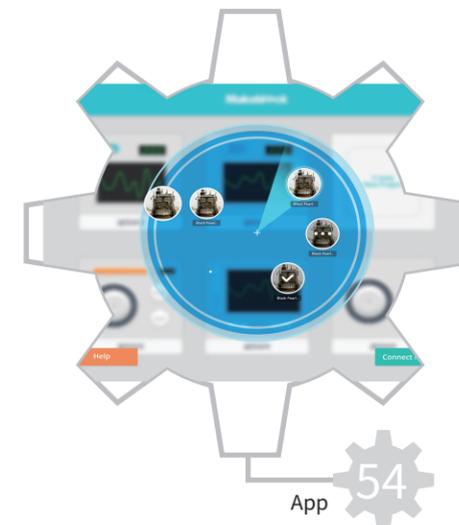
Robotic Arm Tank uses its gripper to grip and deliver objects.



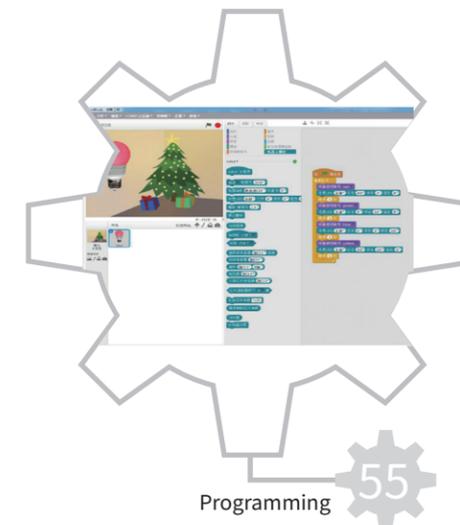
Control Beverage Robot to pour water via the companion app.



By adding a smartphone or a digital camera, Camera Dolly can film your life from a low angle.



Control your robot with smartphone, tablet, and computer.

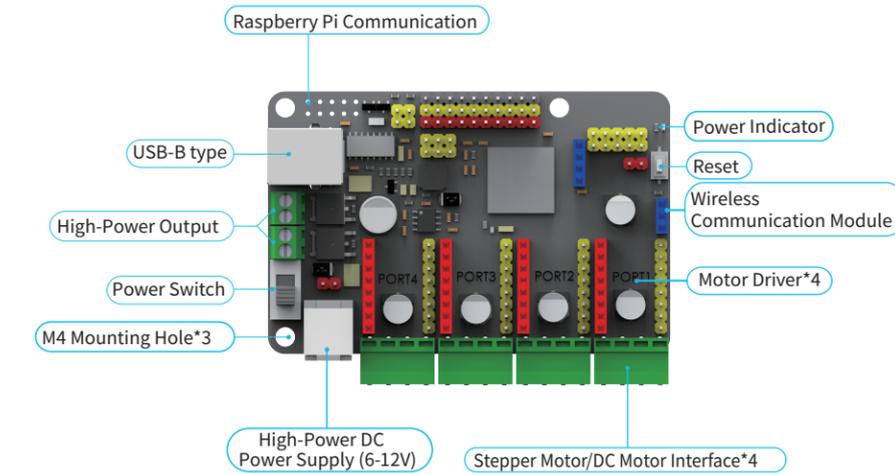


Ultimate 2.0 supports graphical programming to realize more interesting interactions. Or combine Ultimate2.0 with Raspberry Pi to realize Python programming.

Part List

| | | | |
|--------------------------|------------------------------------|------------------------------------|--|
| 4× Beam0824-016 | 4× Stiffener1616-08-M4 | 4× Brass Stud M4×16 | 1× Makeblock Robot Gripper |
| 5× Beam0824-032 | 1× Plane Bearing TurntableD34x24mm | 4× Plastic Ring 4×7×2 | 3× 25mm DC Encoder Motor Cable |
| 3× Beam0824-064 | 1× Quick Release Plate | 8× Plastic Ring 4×7×3 | 1× MegaPi |
| 2× Beam0824-128 | 2× 25mm Motor Bracket-72T | 2× Plastic Ring 4×7×10 | 4× Megapi Encoder/DC Motor Driver |
| 1× Slide Beam0824-176 | 2× MegaPi Acrylic Bracket | 20× Plastic Rivet 4060 | 1× Megapi Shield for RJ25 |
| 2× Slide Beam0824-192 | 4× Rubber Blanket | 20× Plastic Rivet 4100 | 1× Bluetooth Module |
| 2× Beam0808-024 | 4× Tire 90T B | 20× Plastic Rivet 4120 | 1× Me Ultrasonic Sensor |
| 2× Plate0324-056 | 6× Plastic Timing Pulley 90T | 12× Headless Set Screw M3×5 | 1× Me Line Follower |
| 3× Plate0324-088 | 3× Plastic Gear 8T | 8× Headless Set Screw M3×8 | 1× Me Shutter |
| 4× Beam0412-076 | 2× Plastic Gear 56T | 6× Countersunk Screw M3×8 | 1× Me 3-Axis Accelerometer and Gyro Sensor |
| 4× Beam0412-092 | 2× Plastic Gear 72T | 4× Countersunk Screw M3×10 | 1× Me Adapter |
| 4× Beam0412-140 | 1× 360° Mobile Phone Bracket | 50× Screw M4×8 | 1× USB Cable B-1.3m |
| 6× Beam0412-188 | 2× Track 80×139mm | 46× Screw M4×14 | 2× 6P6C RJ25 Cable-20cm |
| 2× Beam0412-220 | 1× Battery Holder 6AA | 10× Screw M4×16 | 1× 6P6C RJ25 Cable-35cm |
| 2× Bracket P3 | 12× Flange Copper Sleeve 4×8×4mm | 4× Screw M4×22 | 10× Rubber Band |
| 3× 25mm DC Motor Bracket | 12× Shaft Collar 4mm | 4× Screw M4×30 | 10× Nylon Cable Tie 1.9×100 |
| 4× Bracket 3×3 | 6× Threaded Shaft 4×39mm | 47× Nut M4 | 1× Cross&2.5mm HEX Screwdriver |
| 2× Plate 3×6 | 2× D shaft D4×50mm | 10× Nylon Lock Nut M4 | 1× Small Fourway Socket Wrench |
| 1× Plate 7×9-B | 2× Shaft D4×88mm | 1× 25mm DC Encoder Motor 9V/86RPM | 1× Wrench 5mm&7mm |
| 6× Shaft Connector 4mm | 1× D shaft D4×160mm | 2× 25mm DC Encoder Motor 9V/185RPM | 1× HEX Key 1.5mm |

Basic Knowledge -- MegaPi



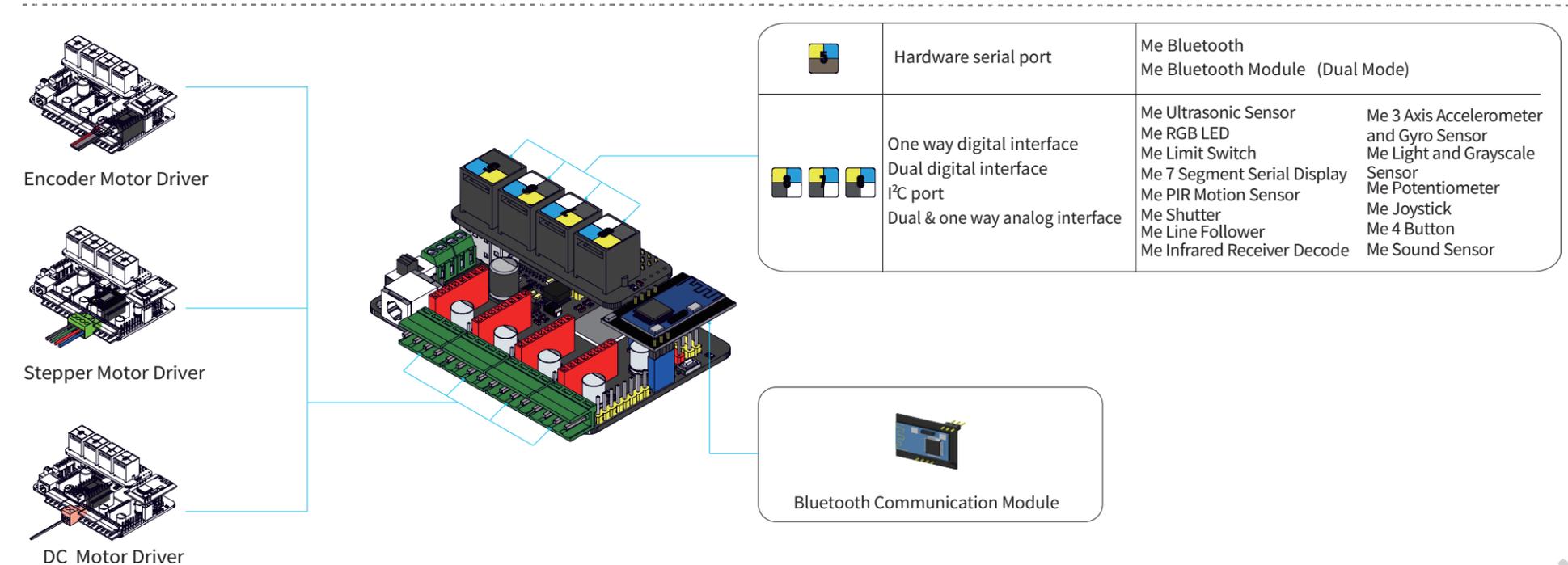
MegaPi is a main control board specially designed for makers and also an ideal option for being applied to education field and all kinds of matches. It is based on Arduino MEGA 2560 and supports programming with Arduino IDE perfectly. MegaPi can be divided into 6 function area, allowing you to connect with various plug-in modules to drive motors and sensor and to realize wireless communication. MegaPi has strong motor-driving ability which is capable of driving 10 servos or 8 DC motors simultaneously. It is the ideal option for various robotic projects, such as smart robot car and 3D printer.

Technical Specifications

- Microcontroller: ATMEGA2560-16AU
- Input Voltage: DC 6V-12V
- Operating Voltage: DC 5V
- I/O Pins: 43
- Serial Ports: 3
- I²C Interface: 1
- SPI Interface: 1
- Analog Input Pins: 15

The various colors on MegaPi represents specialized functions:

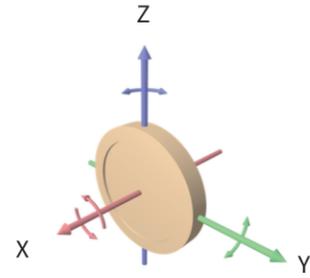
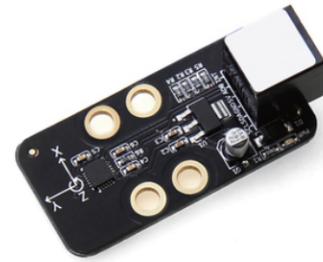
1. Red Pin--power output/motor output
2. Yellow Pin--I/O pin
3. Blue Pin--wireless communication interface
4. Black Pin--power GND
5. Green Interface--power output/motor output



Basic Knowledge -- Electronic Modules

Gyroscope Sensor

Gyro Sensor is a motion-processing module. It can be used to measure the angular rate and the acceleration information of your robot or other devices. This gyro sensor is developed based on MPU-6050, which is capable of processing complex 9-axis Motion Fusion algorithms by combining a 3-axis gyroscope, 3-axis accelerometer, and a Digital Motion Processor™(DMP). You can build a self-balance robot using the Gyro Sensor with encoder motor.

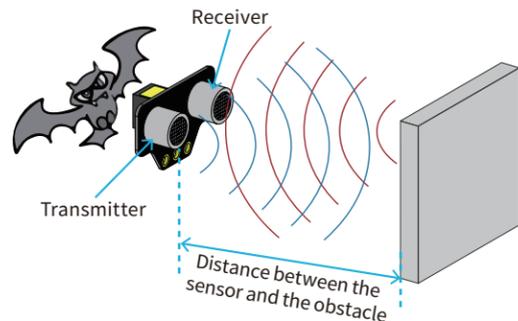


Specifications:

- Operating Voltage: 5V DC
- Angular rate sensor (gyro) sensitivity: 131 LSBs/dps

Me Ultrasonic Sensor

Ultrasonic module is a kind of electronic module to measure distance, and the measurement range is 3 cm to 400 cm. It is used for obstacle avoidance car as well as other projects. This module can be connected to the port with yellow tag on mainboard.



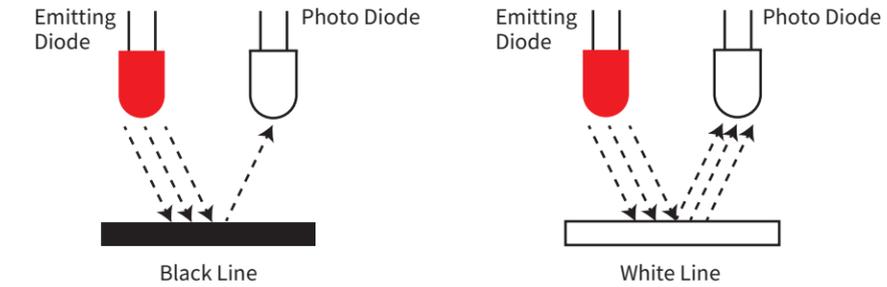
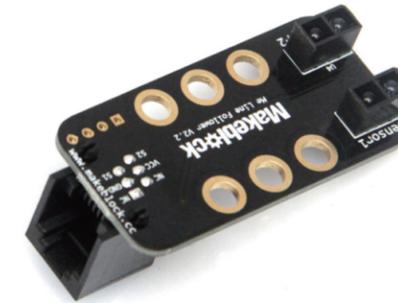
Specifications:

- Operating Voltage: 5V DC
- Detecting Range: 3cm-400cm
- Detecting Angle: Prefer at 30 degree angle

Basic Knowledge -- Electronic Modules

Me Line Follower Sensor

Me Line Follower is designed for the line-following robots. It has two sensors on the module and each sensor contains two parts - an IR emitting diode and an IR sensitive phototransistor. You can program the robot to reliably follow a black line on a white background, or vice versa.

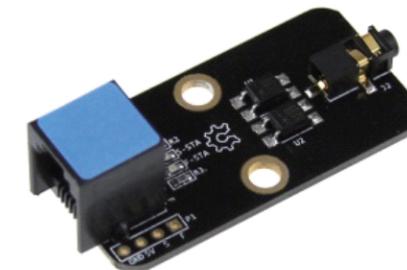


Specifications:

- Operating Voltage: 5V DC
- Detecting Range: 1~2cm

Me Shutter

Me Shutter is a special module designed to implement auto-photographing for digital SLR camera. Users can use it to take high-speed photos, or take time-lapse video and photo through controlling time exposure. This module can be connected to the port with blue tag on the mainboard. Specific cable is required when connecting camera with this module.



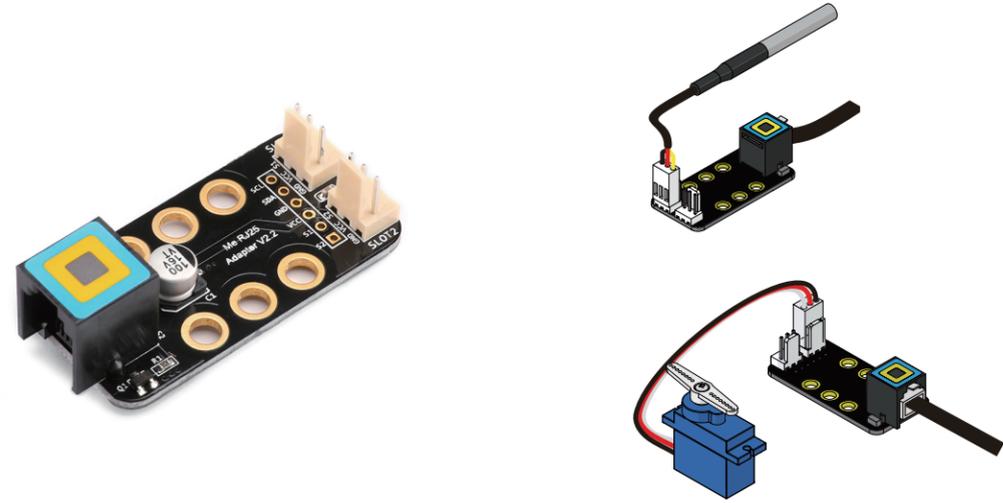
Specifications:

- Rated Voltage: 5V DC

Basic Knowledge -- Electronic Modules

Me RJ25 Adapter

The Me RJ25 Adapter module converts the standard RJ25 port into six pins (VCC, GND, S1, S2, SDA, and SCL) so that they can be easily drawn out from Makeblock port in compatible with electronic modules from other manufacturers, such as temperature sensor and servo module.



Features:

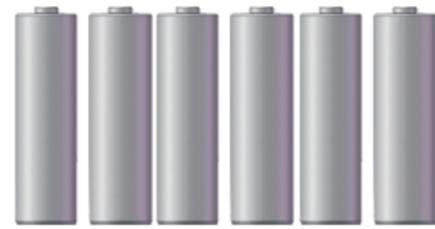
- Enable connections with electronic modules from other manufacturer

Battery Information

Ultimate 2.0 requires six 1.5V AA alkaline batteries (Not included).

IMPORTANT BATTERY INFORMATION:

- Use only fresh batteries of the required size and recommended type.
- Do not mix old and new batteries, or use different types of batteries.
- Please respect the correct polarity, (+) and (-).
- Do not try to recharge non-rechargeable batteries.
- Do not throw batteries into fire.
- Replace all batteries of the same type/brand at the same time.
- The supply terminals are not to be short-circuited.
- Batteries should be replaced by adults.
- Remove batteries if the robot is not going to be played with for some time.



LOW BATTERY INDICATORS:

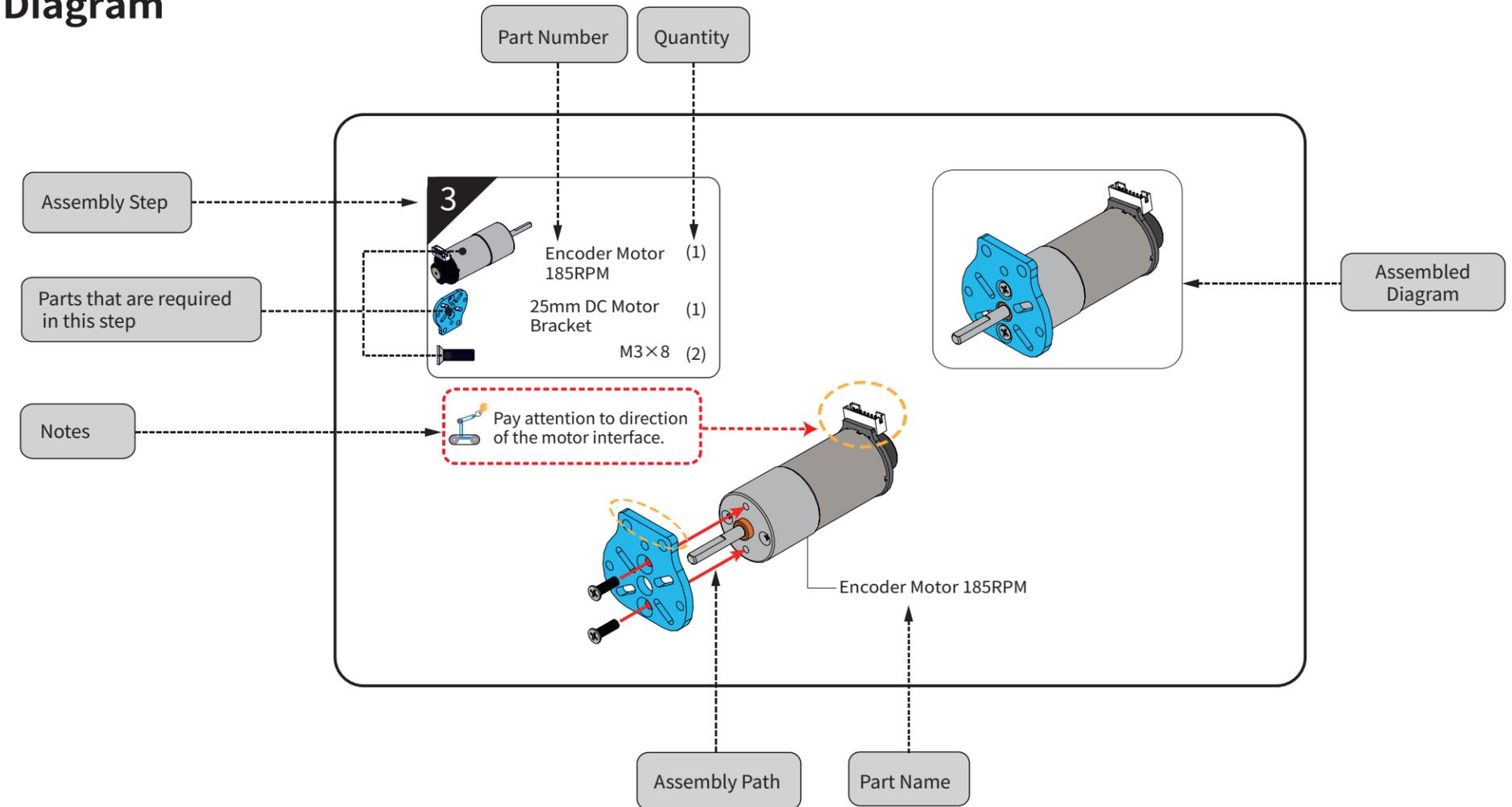
When the batteries grow weak, Ultimate 2.0 robot kit will move much slower than usual, or even restart its mainboard. At this time, power off the robot and replace all batteries.

Basic Knowledge -- Assembly Tip



※ With many parts contained in this product, please assemble the Ultimate2.0 exactly as the steps in this instruction to avoid confusion. Pay especially attention to the mark of "O" and "X". Make sure you are doing exactly as required by the diagram marked with "O", otherwise the parts may be broken and the robot may fail to work normally.

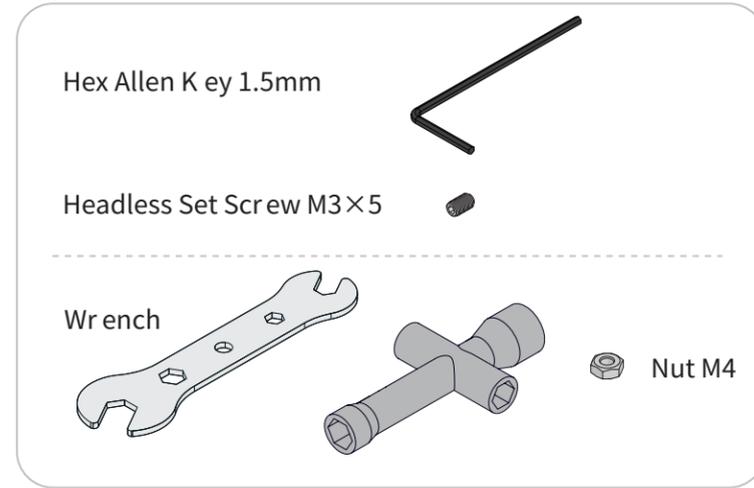
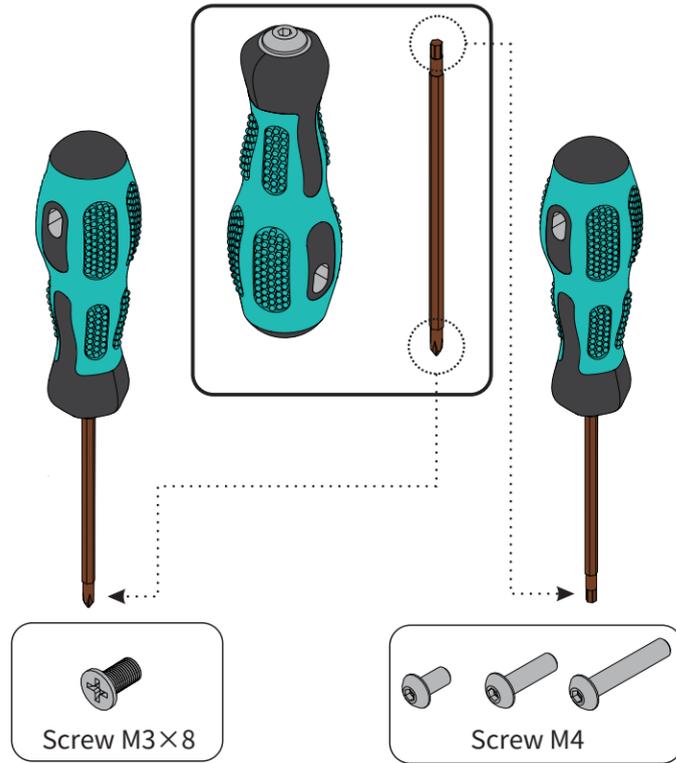
Diagram



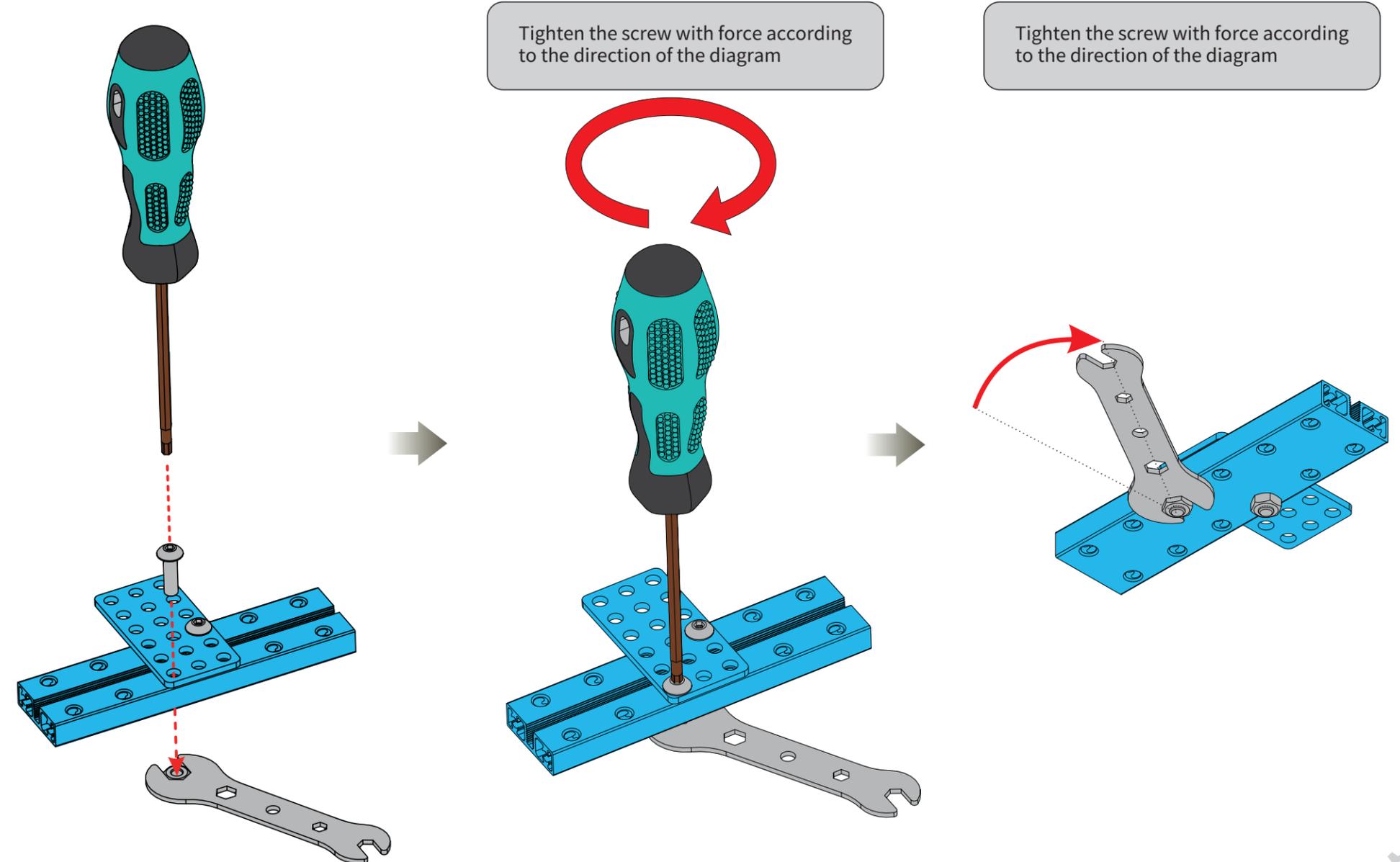
Basic Knowledge -- Assembly Requirement

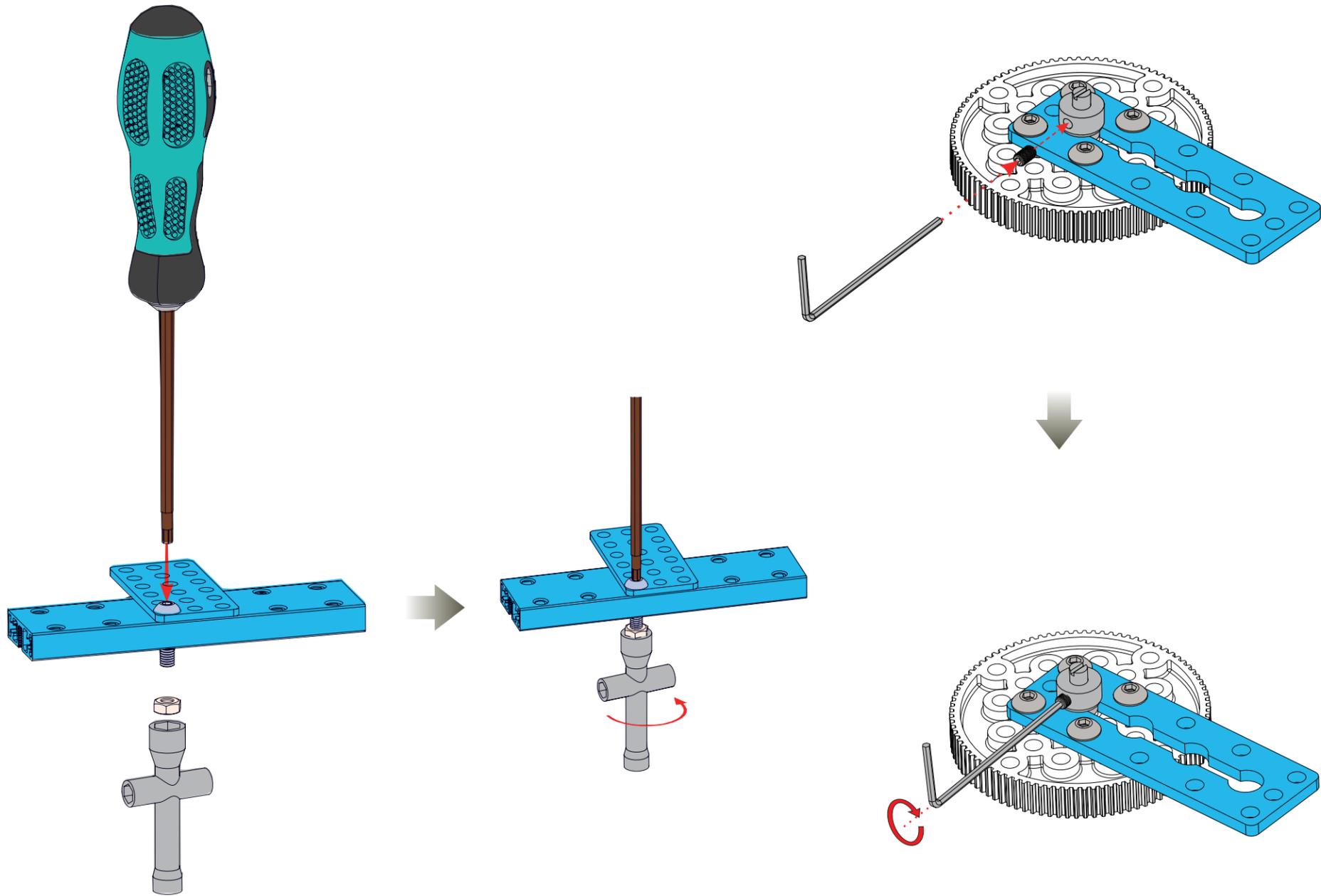
Please assemble the robot in strict accordance with the following three requirements, otherwise it will result in inaccuracy or unsatisfying performance.

1. Tools



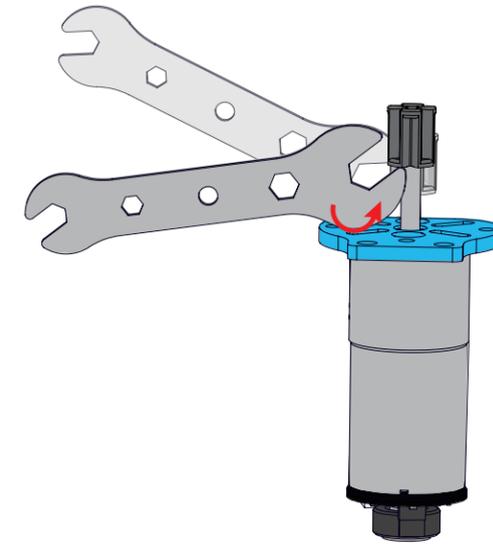
2. Make sure to tighten the screw and the nut.



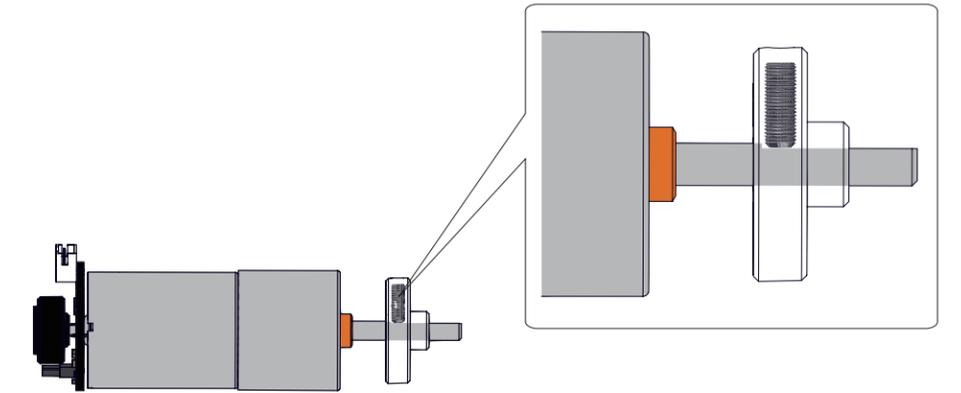


3. Assembly Requirements

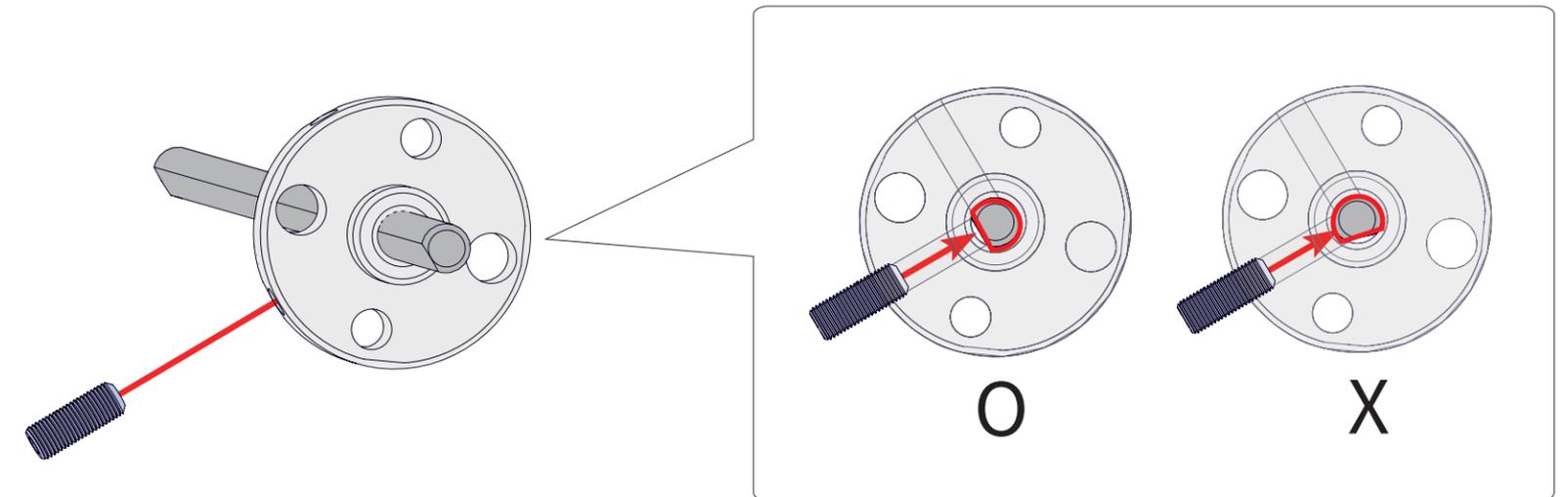
① Disassemble Gear 8T



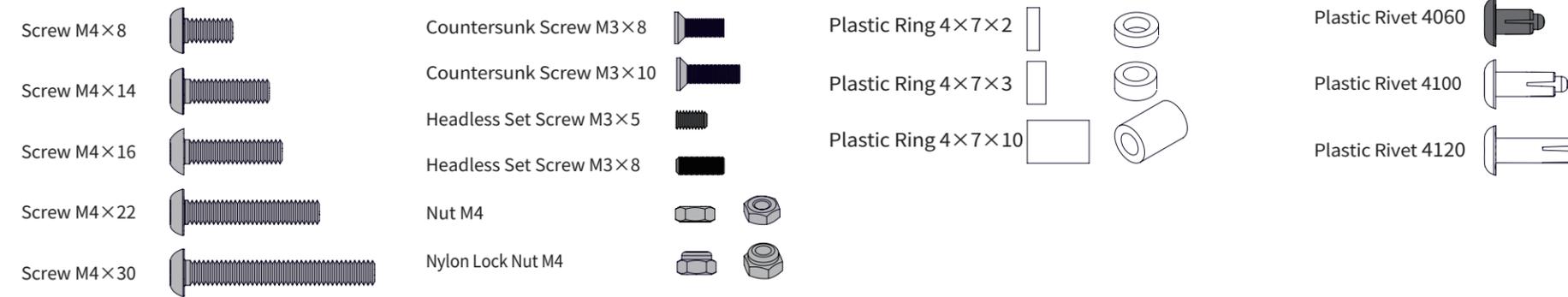
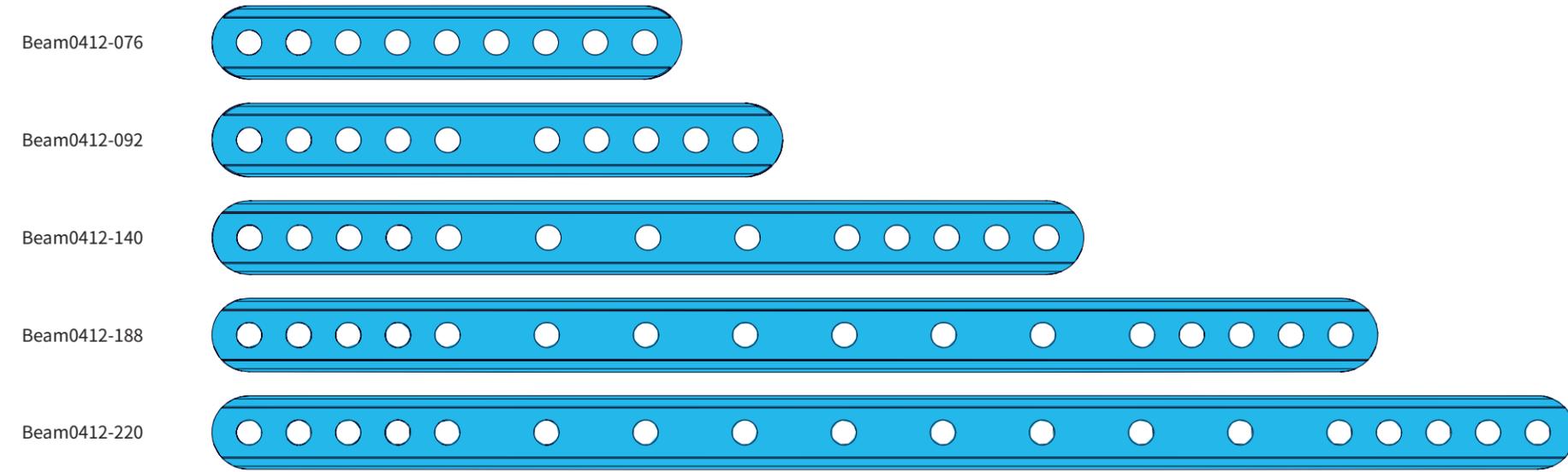
② Tighten the Headless Set Screw and make sure the screw is pushing against the D-shape plane



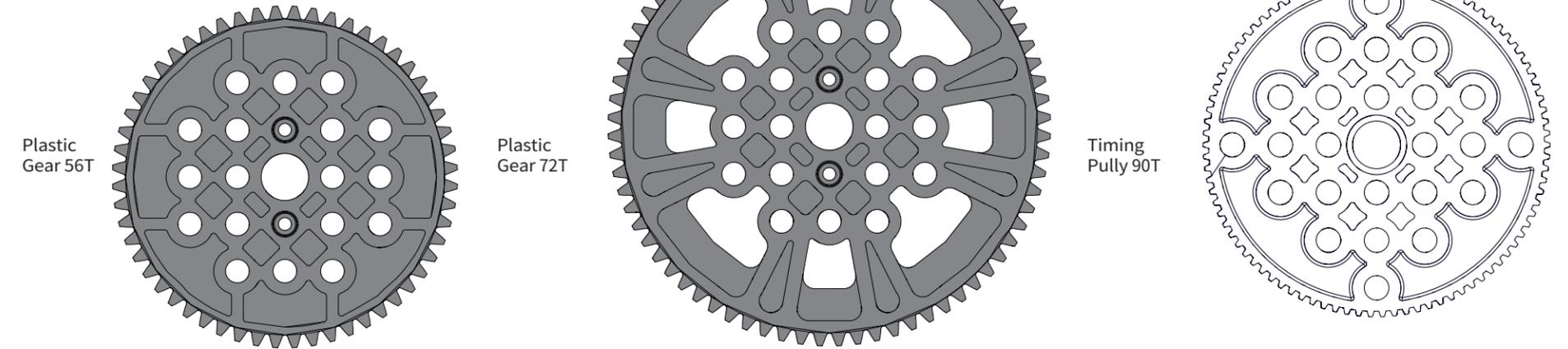
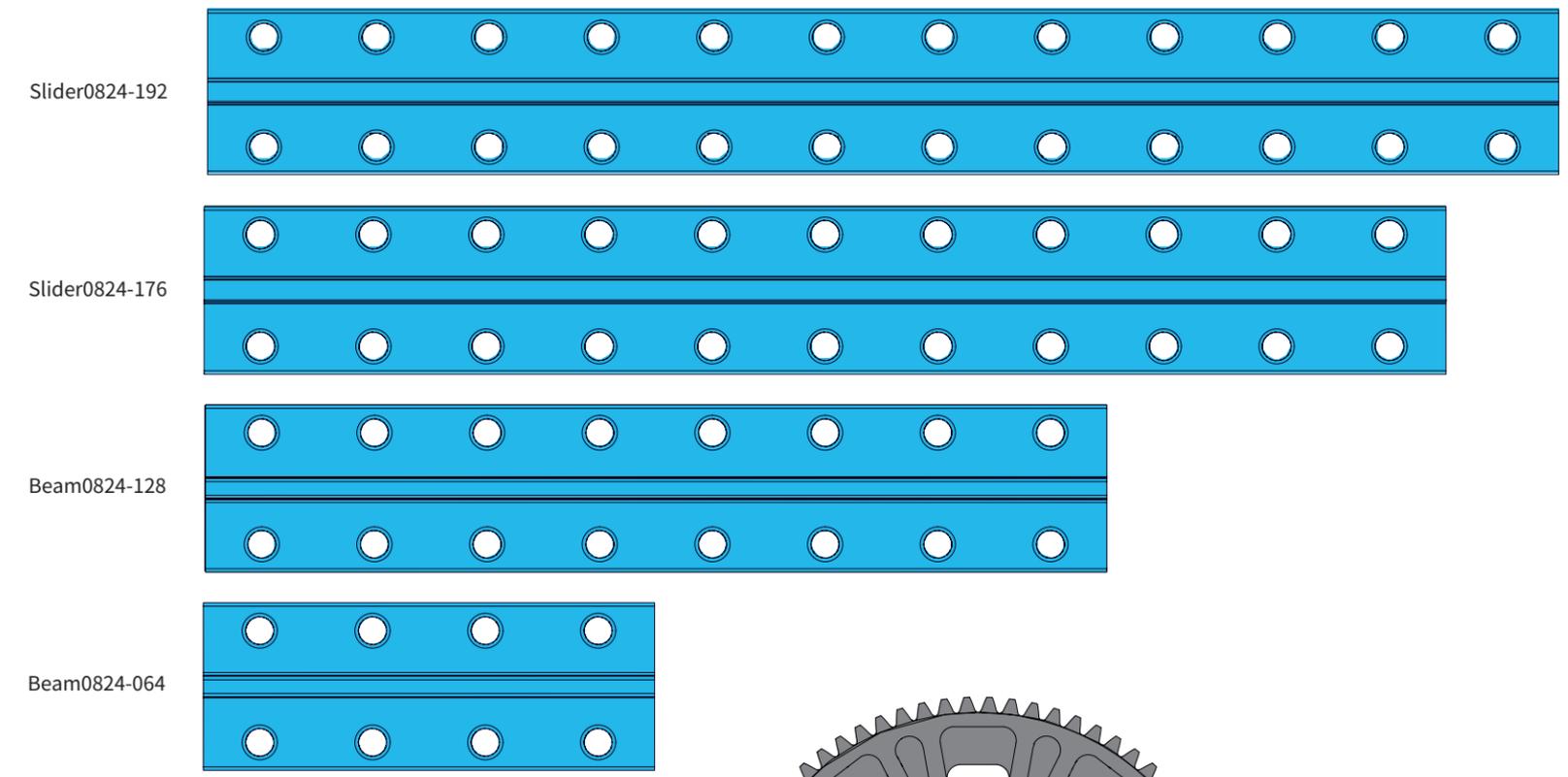
③ Headless Set Screw require alignment with the D-shaped plane



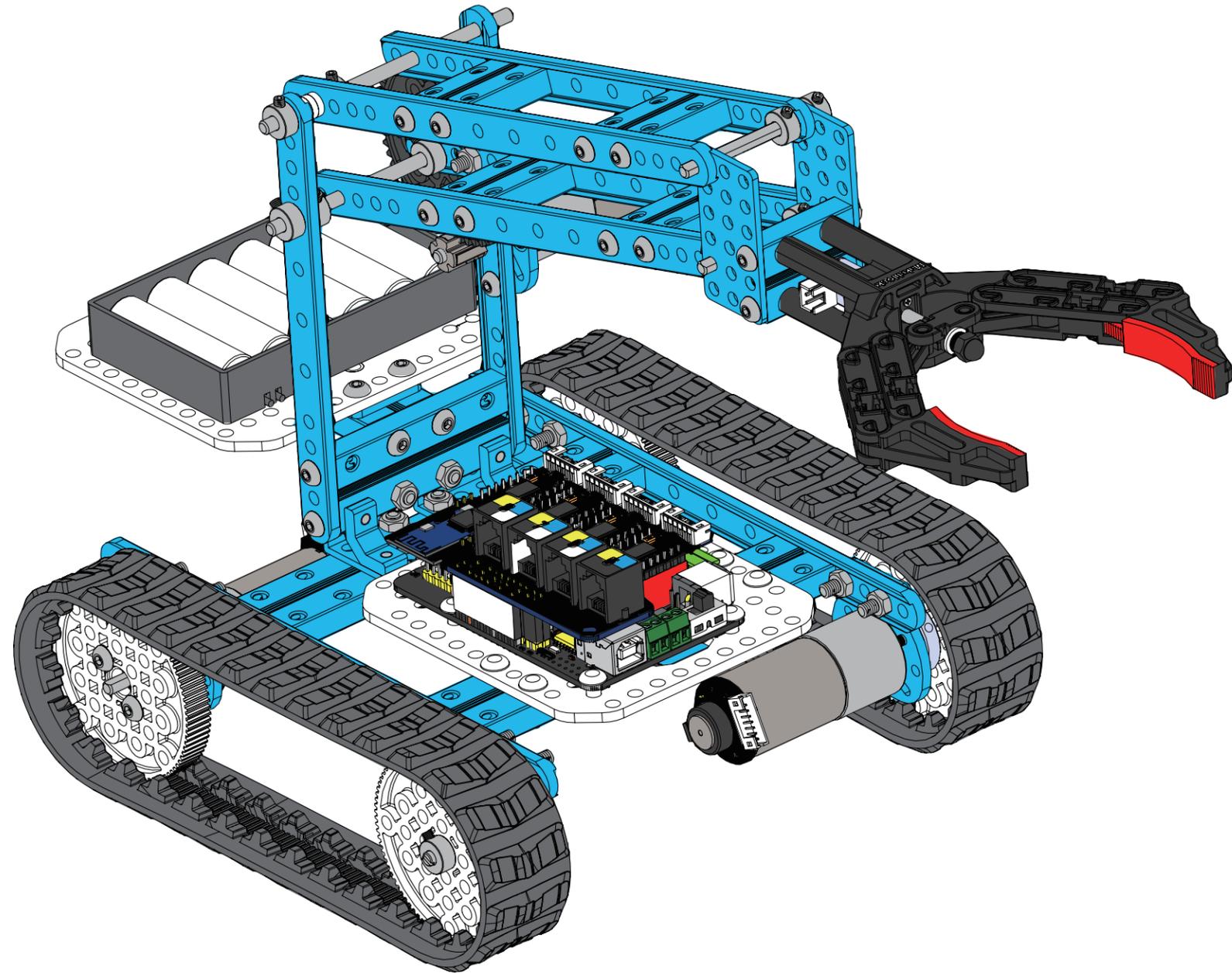
Reference I for Parts (Ratio 1:1)



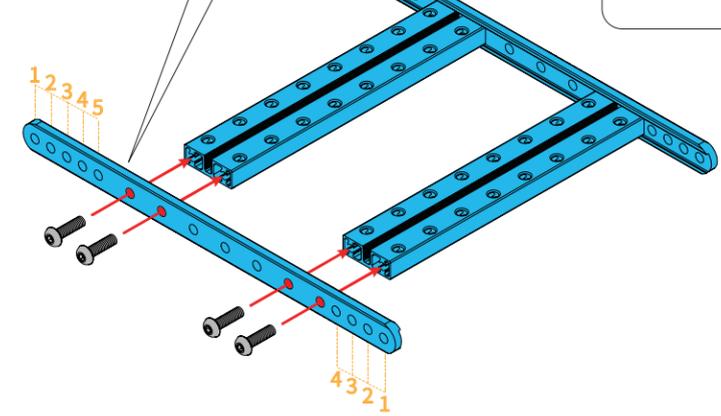
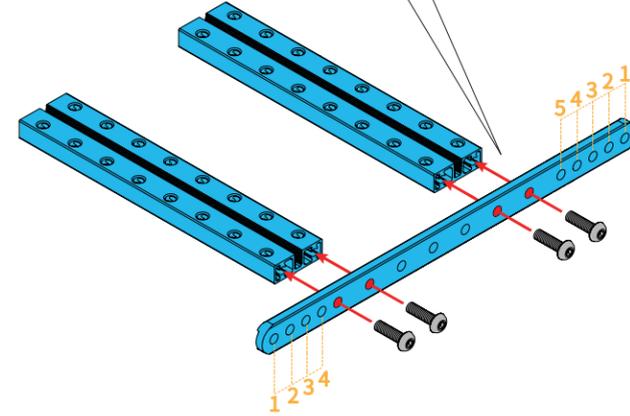
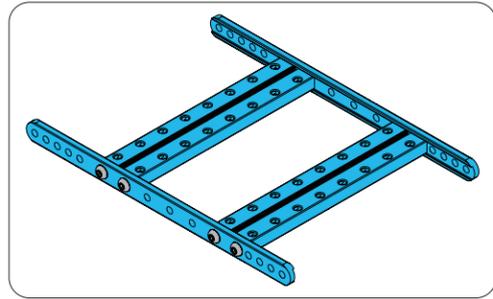
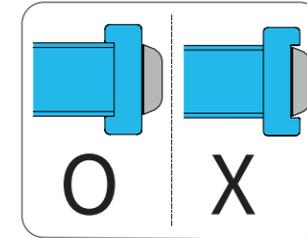
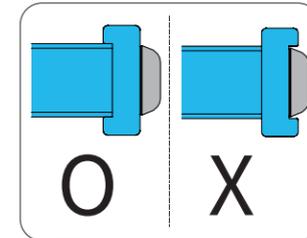
Reference II for Parts (Ratio 1:1)



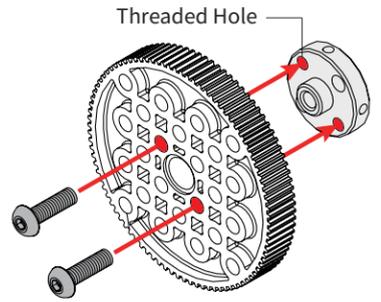
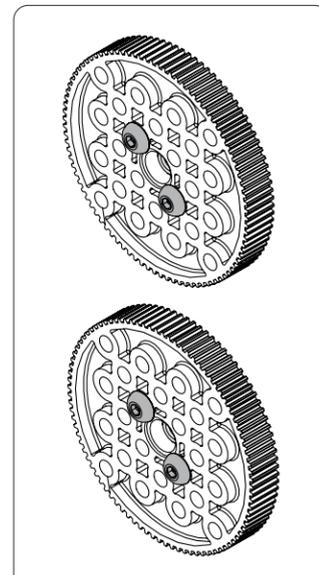
Robotic Arm Tank



- 1**
- 0412-188 (2)
 - 0824-128 (2)
 - M4×8 (8)

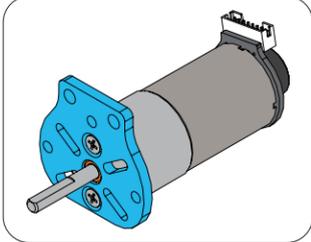


- 2**
- 90T (2)
 - Shaft Connector 4mm (2)
 - M4×14 (4)

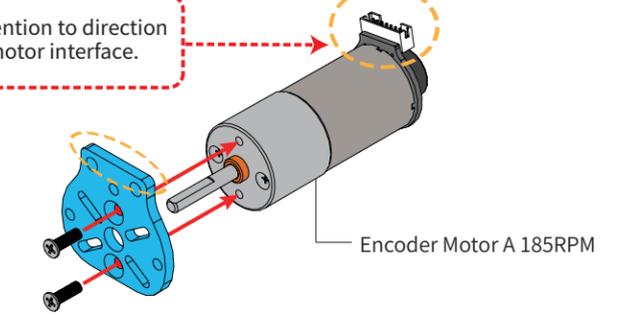


Note: Assemble two as shown.

- 3**
- Encoder Motor 185RPM (1)
 - 25mm DC Motor Bracket (1)
 - Countersunk Screw M3×8 (2)



Pay attention to direction of the motor interface.



4

- M4×14 (2)
- Nut M4 (2)
- Headless Set Screw M3×8 (1)

1.5mm tool

O X

6

- M4×14 (2)
- Nut M4 (2)
- Headless Set Screw M3×8 (1)

Encoder Motor A 185RPM

Encoder Motor B 185RPM

O X

5

- Encoder Motor 185RPM (1)
- 25mm DC Motor Bracket (1)
- Countersunk Screw M3×8 (2)

Pay attention to direction of the motor interface.

Encoder Motor B 185RPM

7

- P3 (2)
- 4×39mm (2)
- Flange Copper Sleeve (4)
- Nut M4 (2)

Note: Assemble two as shown.

8

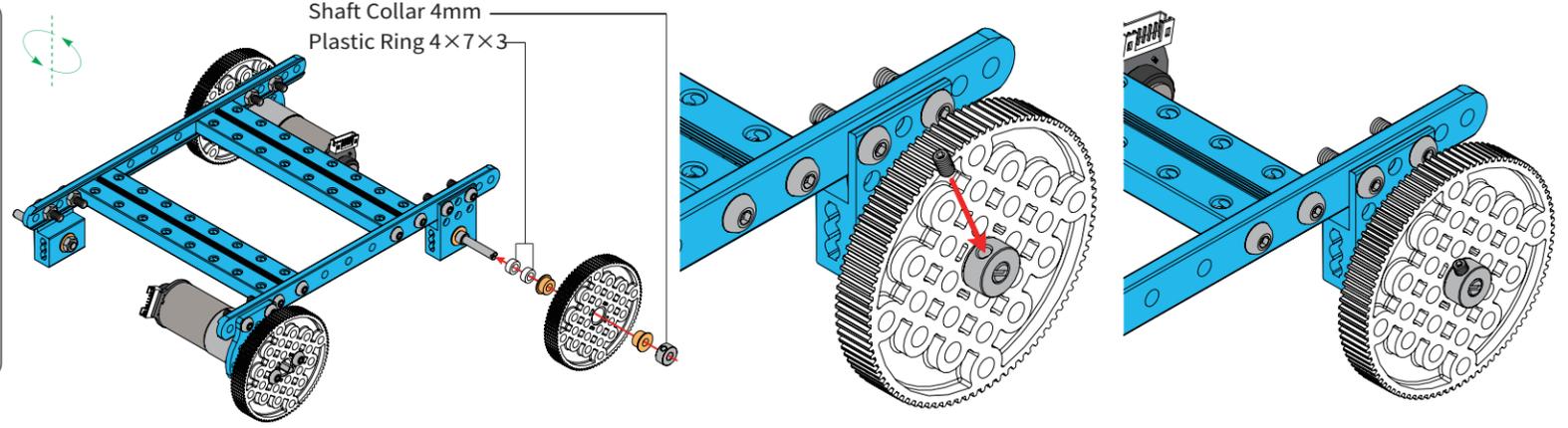
- M4×14 (4)
- Nut M4 (4)

Encoder Motor A 185RPM

Encoder Motor B 185RPM

Back Front

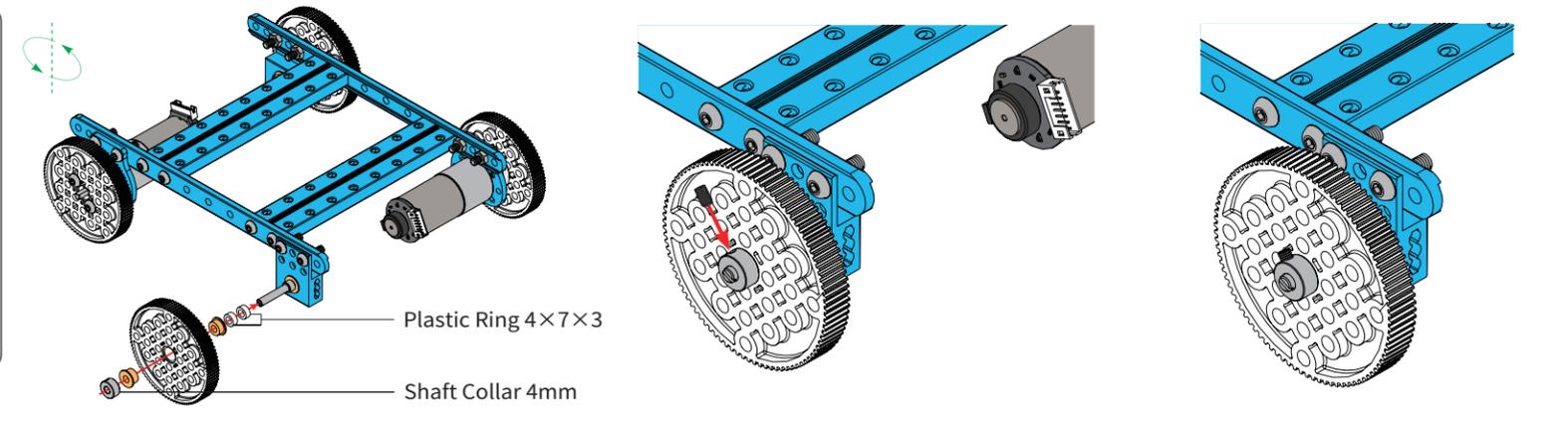
- 9**
- 90T (1)
 - Shaft Collar (1)
 - Flange Copper Sleeve (2)
 - Plastic Ring 4×7×3 (2)
 - Headless Set Screw M3×5 (1)



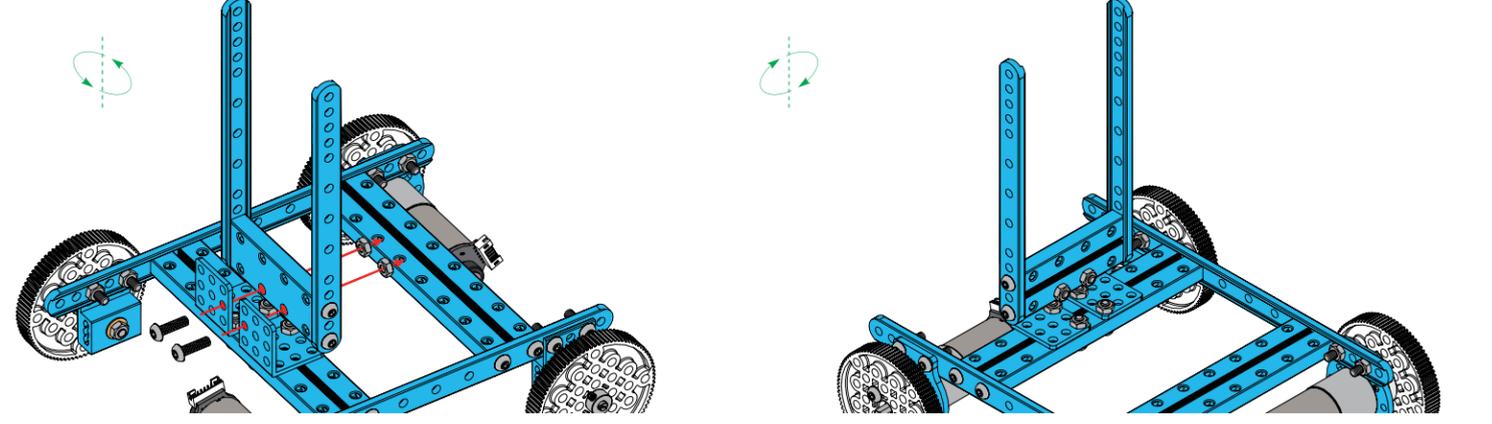
- 12**
- 0412-140 (2)
 - 0824-064 (1)
 - M4×8 (4)



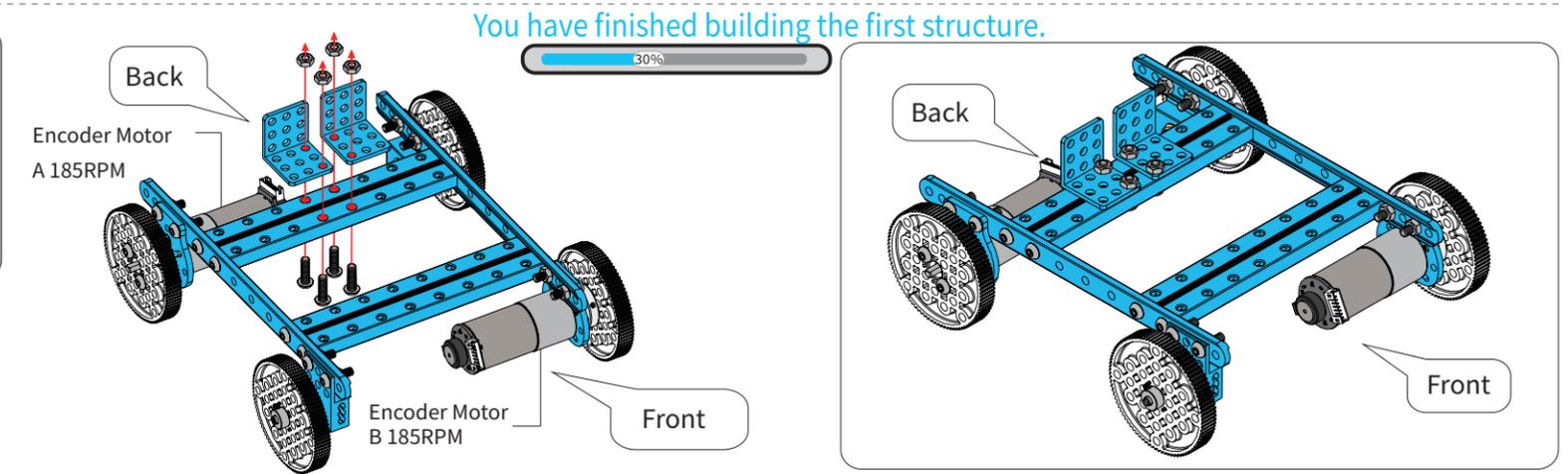
- 10**
- 90T (1)
 - Shaft Collar (1)
 - Flange Copper Sleeve (2)
 - Plastic Ring 4×7×3 (2)
 - Headless Set Screw M3×5 (1)



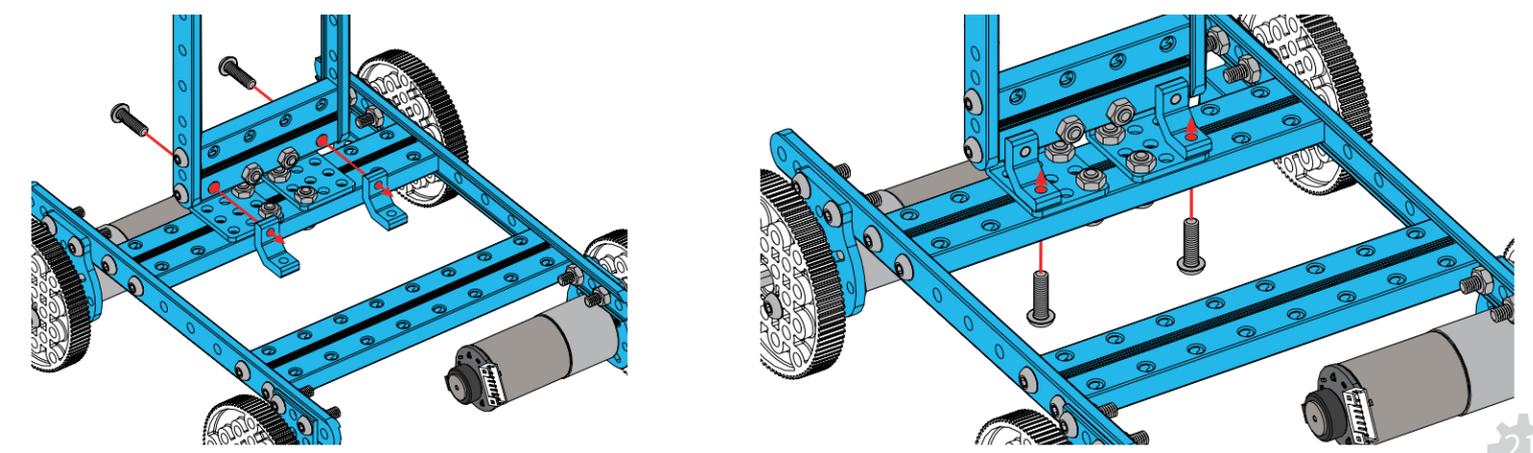
- 13**
- M4×14 (2)
 - Nut M4 (2)



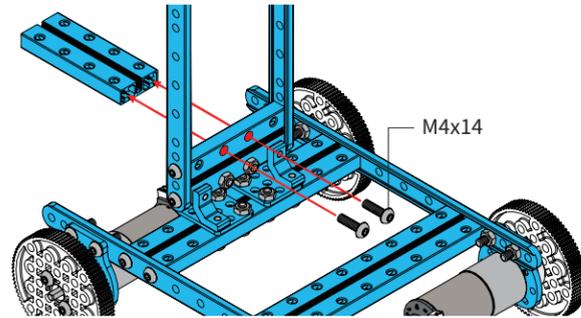
- 11**
- Bracket 3×3 (2)
 - M4×14 (4)
 - Nut M4 (4)



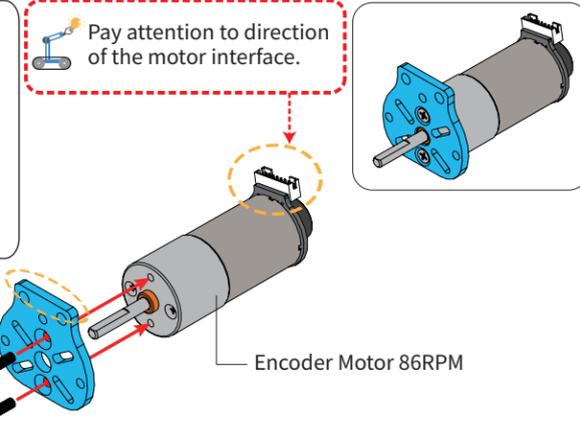
- 14**
- 1616-08-M4 (2)
 - M4×14 (4)



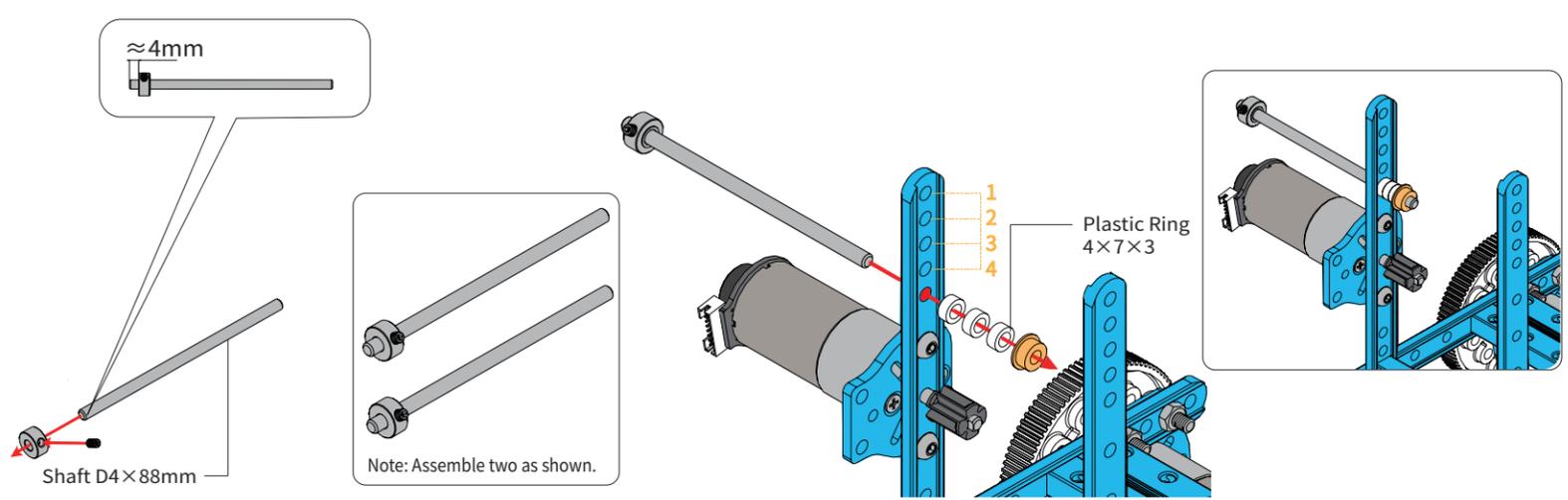
- 15**
- 0824-064 (1)
 - M4×14 (2)



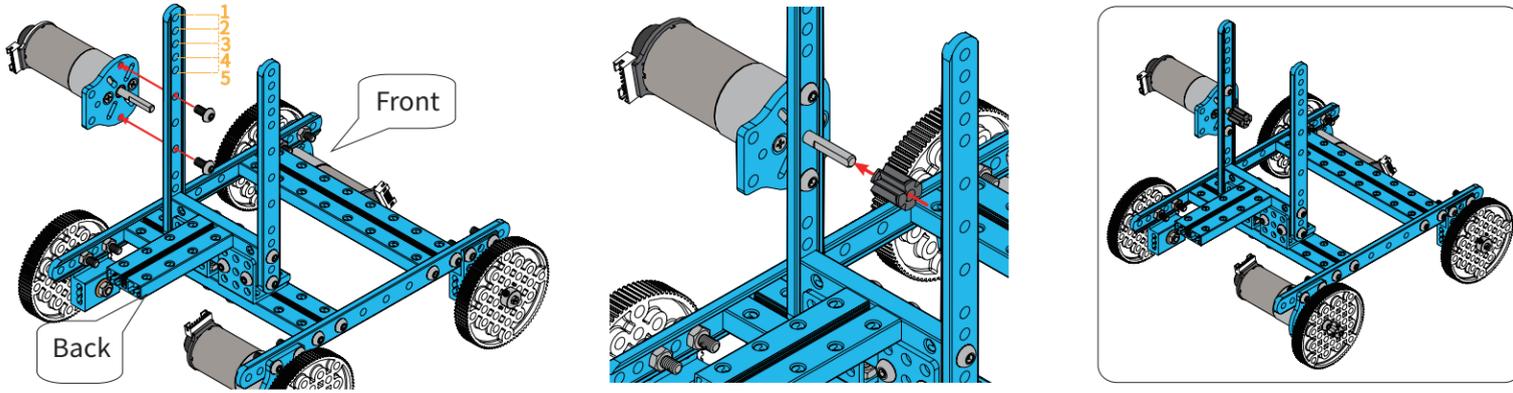
- 16**
- Encoder Motor 86RPM (1)
 - 25mm DC Motor Bracket (1)
 - Countersunk Screw M3×8 (2)



- 19**
- D4×88 (2)
 - Shaft Collar (2)
 - Flange Copper Sleeve (1)
 - Plastic Ring 4×7×3 (3)
 - Headless Set Screw M3×5 (2)

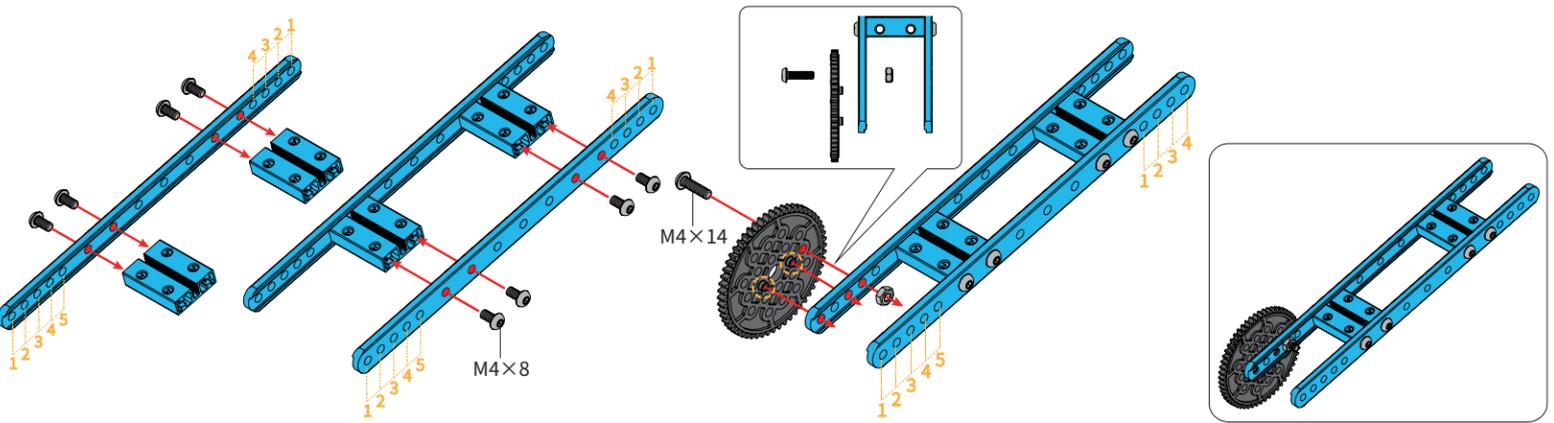


- 17**
- M4×8 (2)
 - 8T (1)

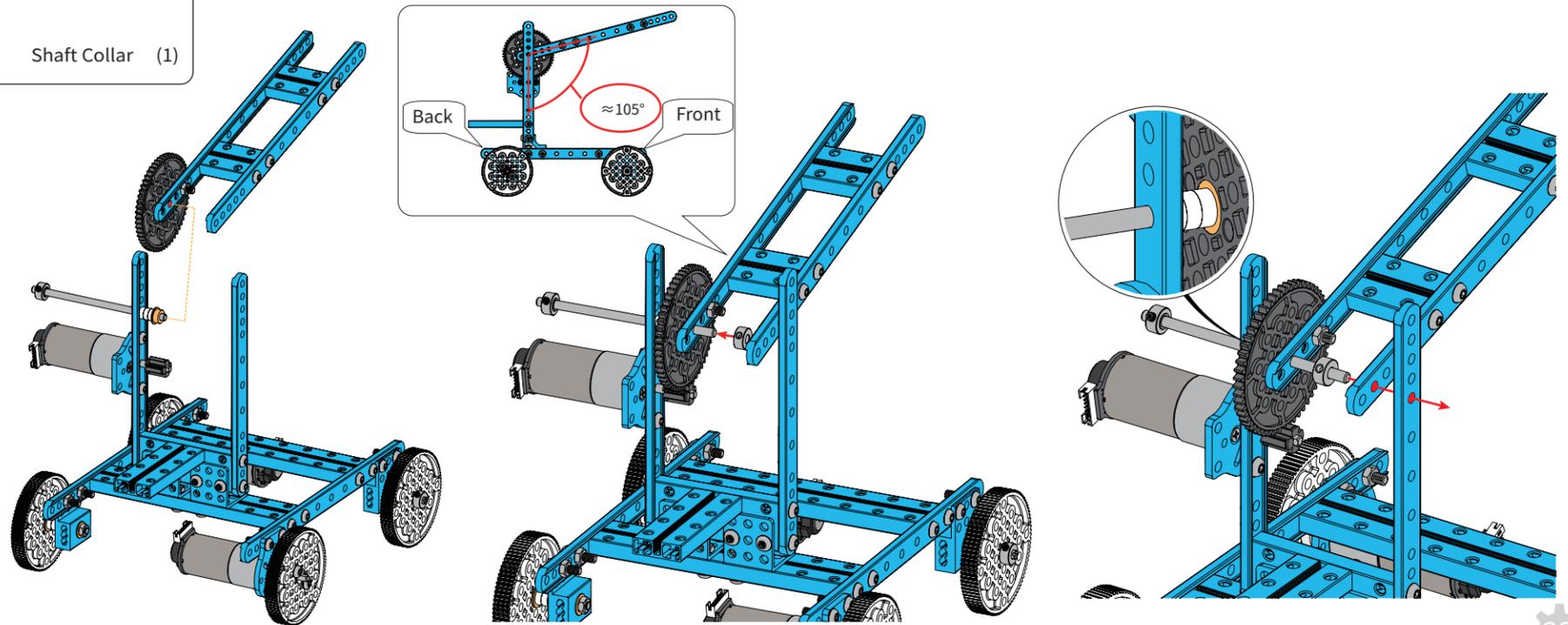


You have finished 50% of the assembling process.

- 18**
- 0412-188 (2)
 - 0824-032 (2)
 - 56T (1)
 - M4×14 (1)
 - M4×8 (8)
 - Nut M4 (1)

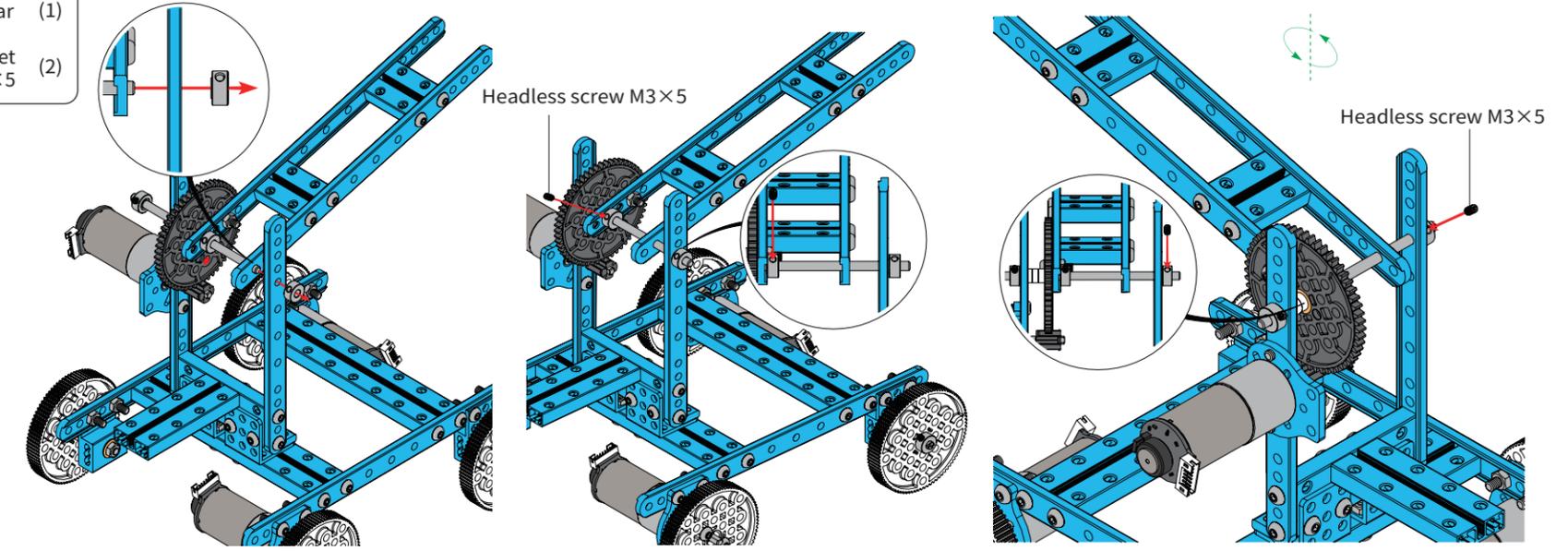


- 20**
- Shaft Collar (1)



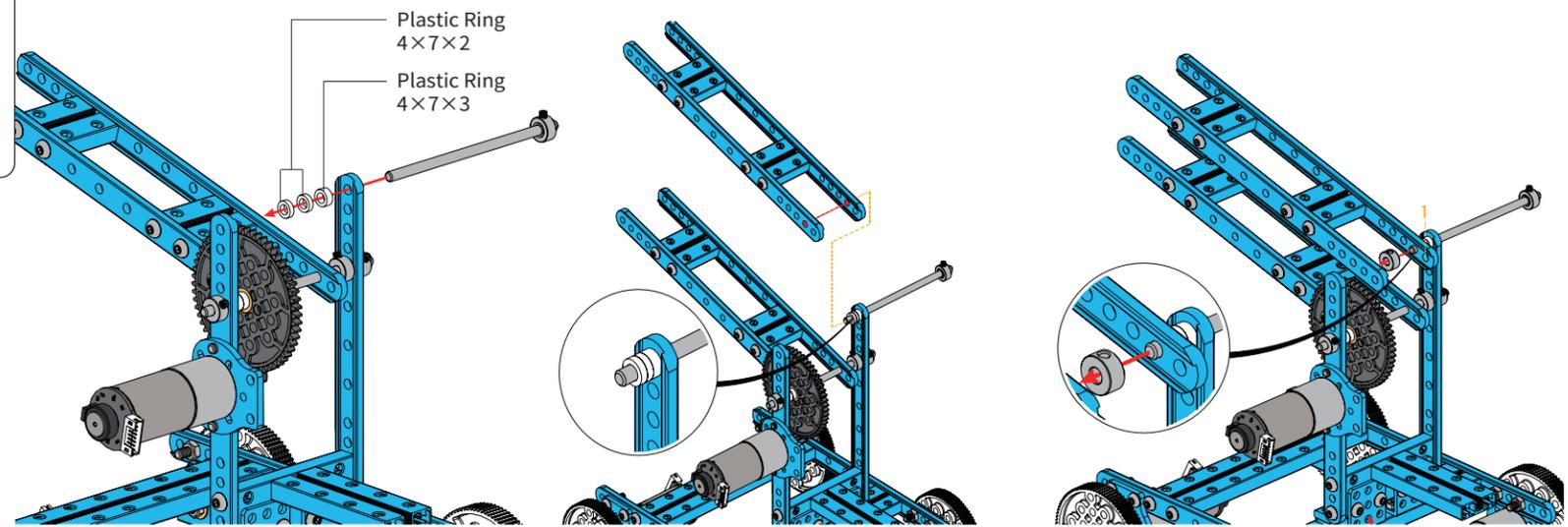
21

- Shaft Collar (1)
- Headless Set Screw M3×5 (2)



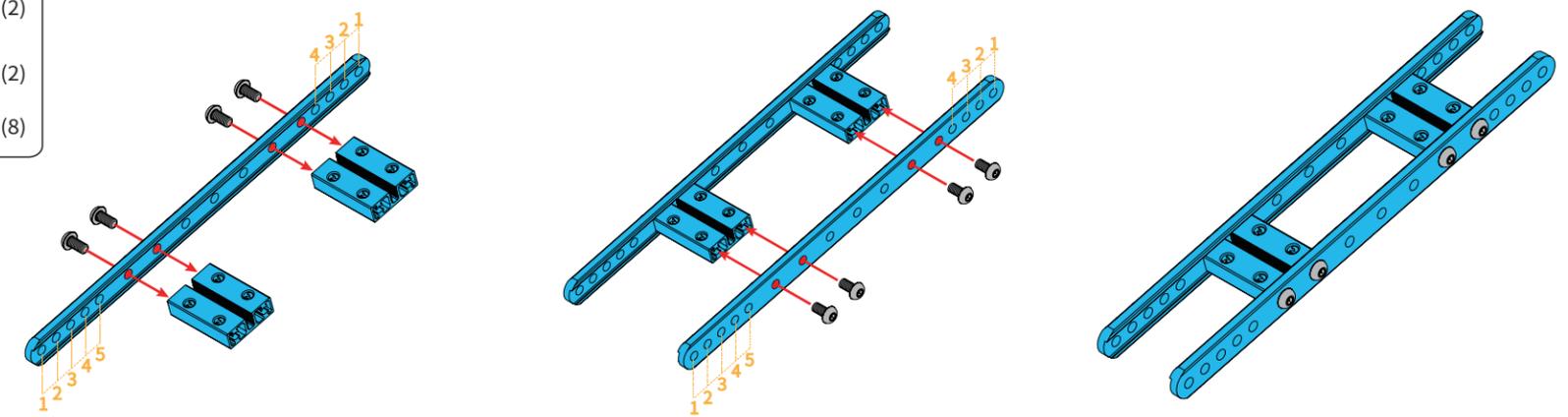
23

- Shaft Collar (2)
- Plastic Ring 4×7×3 (1)
- Plastic Ring 4×7×2 (2)



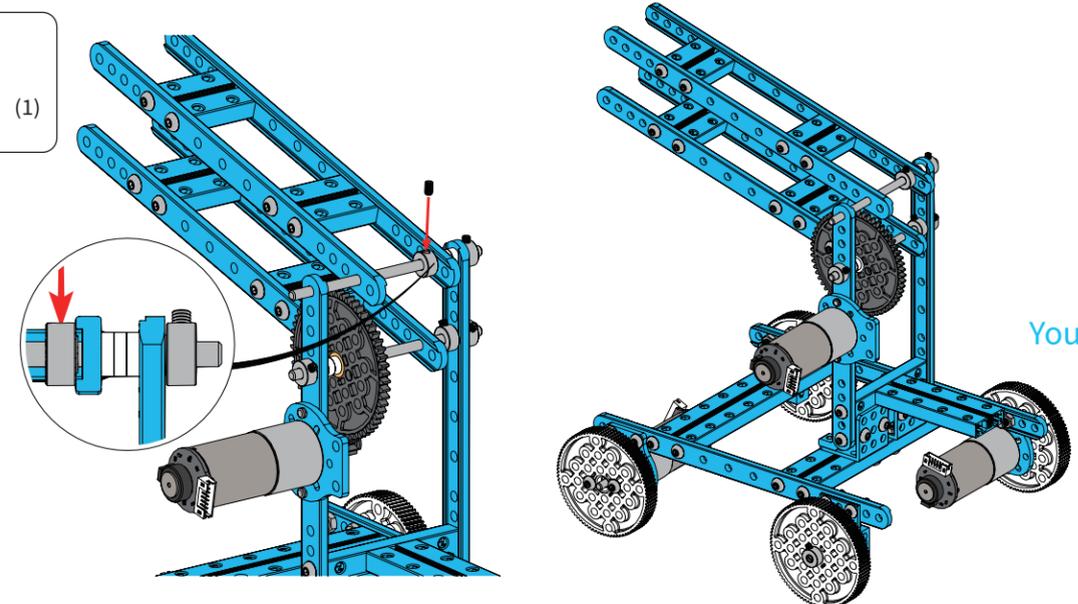
22

- 0412-188 (2)
- 0824-032 (2)
- M4×8 (8)



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- Headless Set Screw M3×5 (1)



You have finished 80% of the assembly.