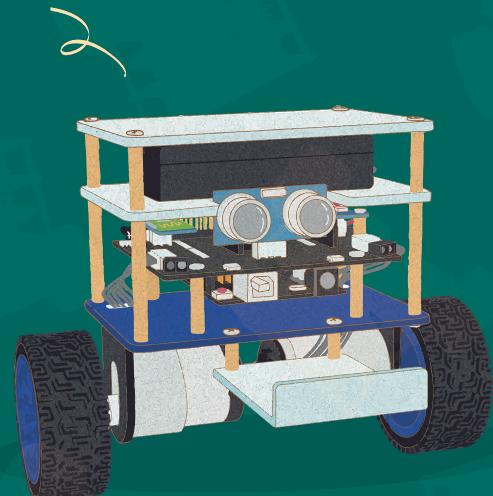


# Assembly Tutorial

TUMBLER

V1.1



Thank you

Thank you for your support and  
purchasing ELEGOO products.



If you have any questions regarding our products  
please feel free to contact us at  
[service@elegoo.com](mailto:service@elegoo.com) (North America area) or  
[euservice@elegoo.com](mailto:euservice@elegoo.com) (Europe and Asia area)

Register membership on [ELEGOO.com](http://ELEGOO.com) and follow  
us on social media to subscribe to  
our latest news and win exclusive promotions.



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## Material List



USB Cable \* 1PCS



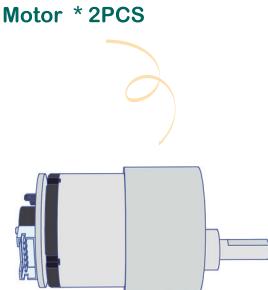
Battery box (Lithium Battery inside)\* 1PCS



Phillips Screwdriver \* 1PCS



6P Cables \* 2PCS

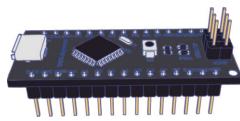


Motor \* 2PCS

Some material images shown in the instruction manual are illustration purposes only. Actual product may vary.

## Material List

NANO \* 1PCS



TB6612FNG Module \* 1PCS



GY-521 Module  
(Using MPU6050 chip) \* 1PCS



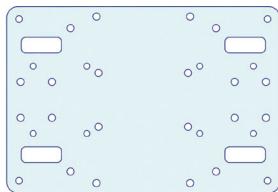
Expansion board \* 1PCS



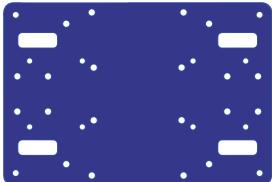
Ultrasonic sensor \* 1PCS



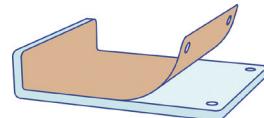
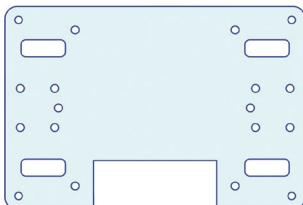
Top plate \* 1PCS



Aluminum Alloy Board \* 1PCS



Fastener for battery box \* 1PCS



Foothold \* 1PCS

## Material List



M3\*12 Pan head machine screws \* 2PCS



M3\*6 Pan head machine screws \* 29PCS

Actually only need 28 pieces for assembly, 1 more additional as spare.



M4\*6 Round head Phillips screws \* 6PCS

Coupling \* 2PCS



M3\*5 Countersunk Screws \* 11PCS

Actually only need 10 pieces for assembly, 1 more additional as spare



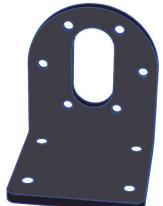
M3 K-type gear nut \* 2PCS



M3\*11 Double-pass copper column \* 7 PCS



M3\*45 Single-pass copper pillar \* 4PCS



Motor Bracket \* 2PCS

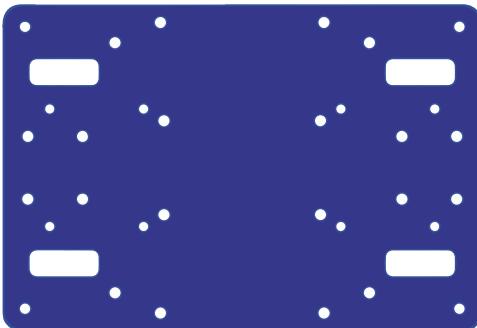


M3\*23 Double-pass copper column \* 4PCS

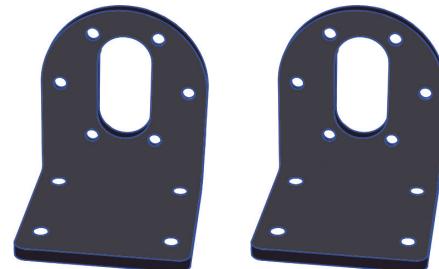


Tires \* 2PCS

## Assembly the motor bracket



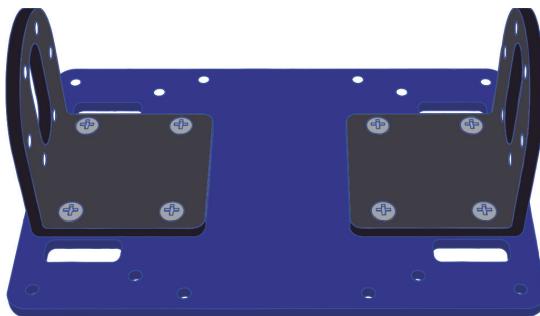
① 1x Aluminum alloy board



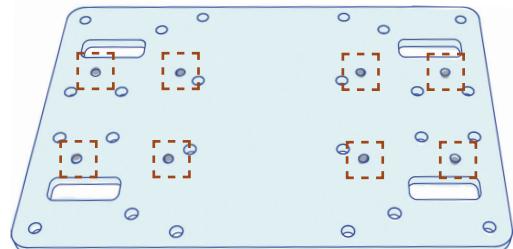
② 2x Motor Bracket



③ 8x M3\*6 Pan head machine screws

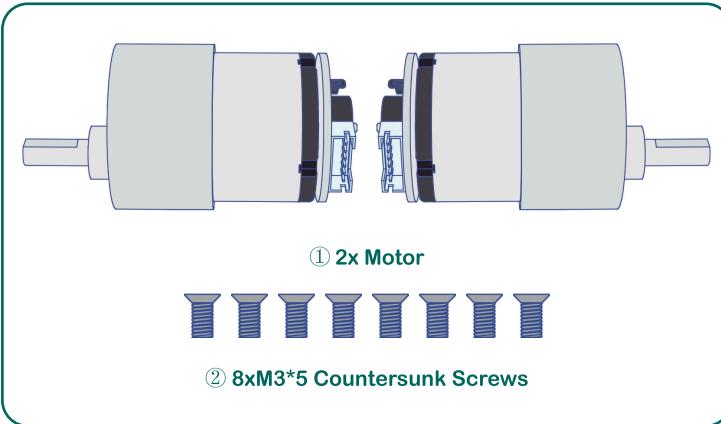


Take out ③ from No.1 label bag

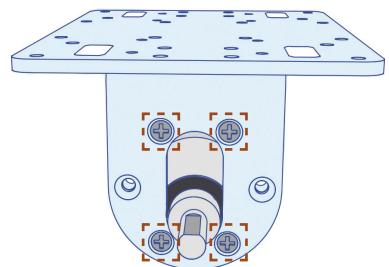


Back side

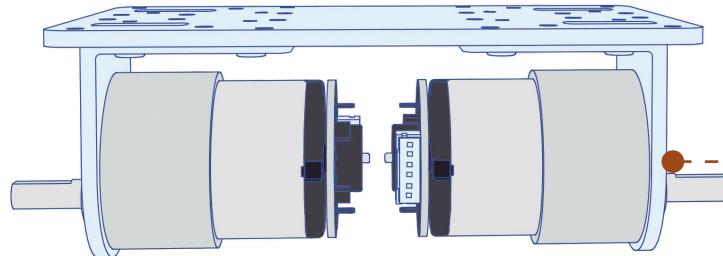
## Assembly the motor



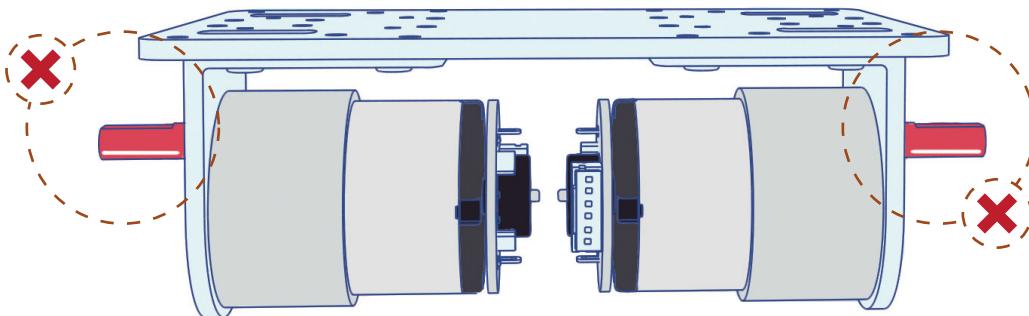
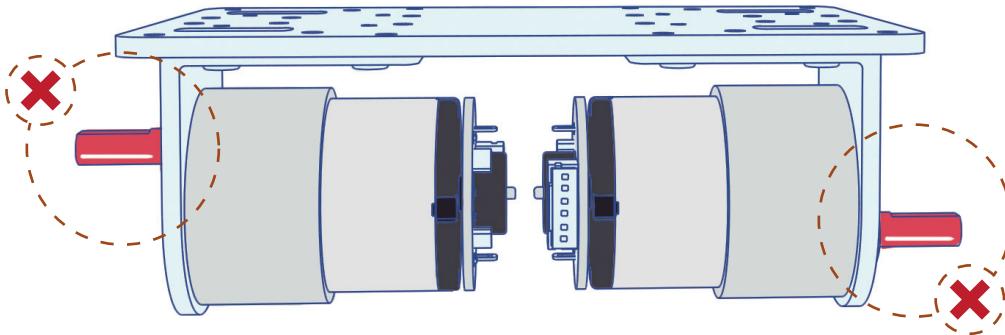
Take out ② from No.2 label bag  
(Pay attention to the installation location of the motor axle)



Pay attention that only lock 4 screws  
on Motor Bracket, as the picture shows.

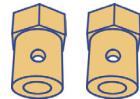


## Wrong Installation



Wrong Installation

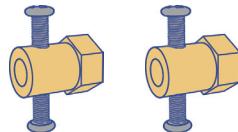
## Assembly the tires



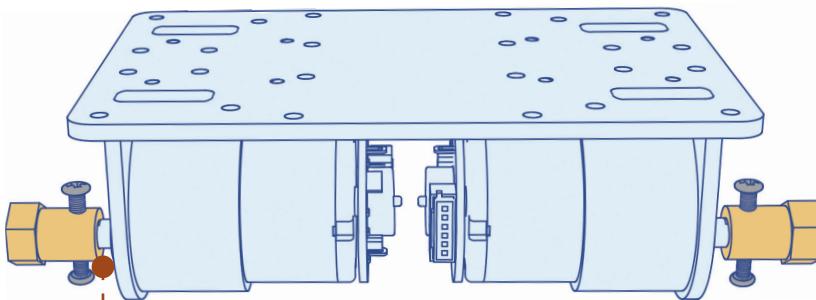
① 2x Coupling



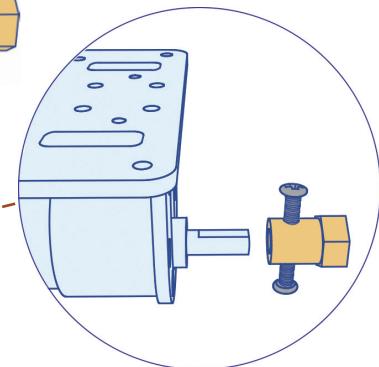
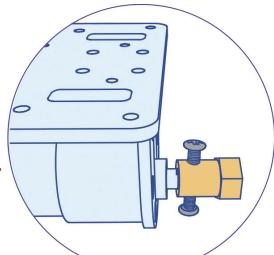
② 6 X M4\*6 Round head Phillips screws



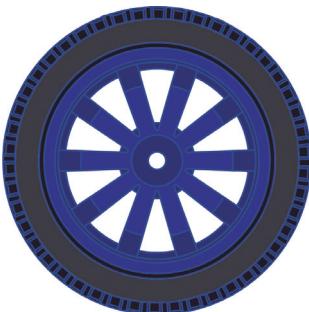
Take out ① ② from No.3 label bag



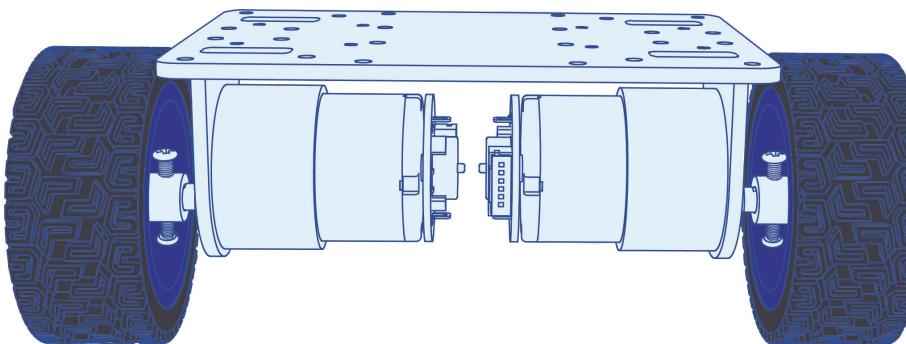
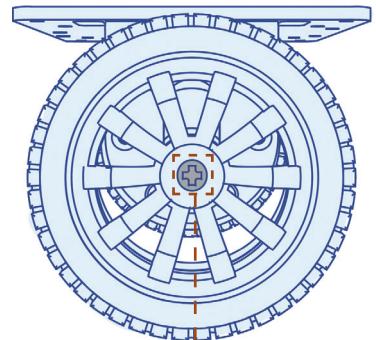
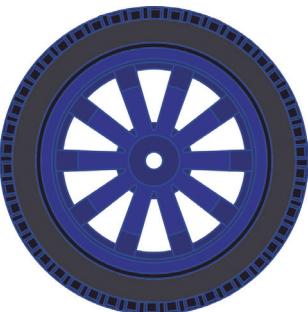
Attention:  
Make sure that the screw  
on coupling should align with the  
cross-section of motor shaft.



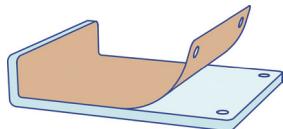
## Assembly the tires



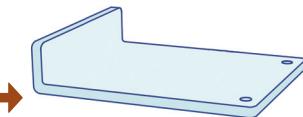
③ 2xTires



## Assembly the foothold



① 1x Foothold



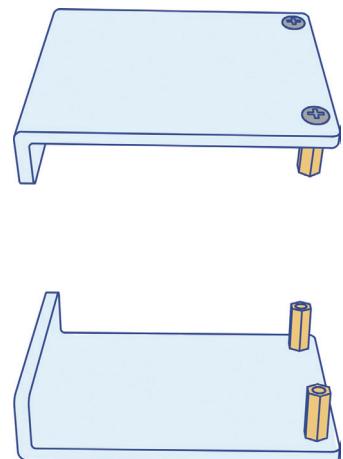
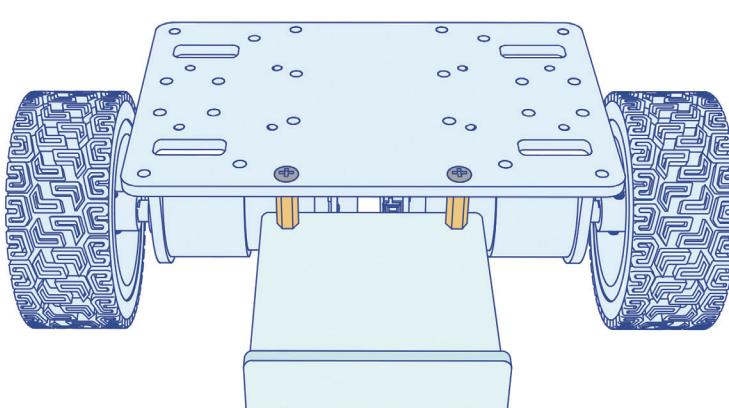
② 4x M3\*6 Pan head  
machine screws



③ 2XM3\*18 Double-pass  
copper column  
The second shortest copper  
column in NO.4 label bag.

Tips: Please make sure you remove the protective film on the Acrylic plate.

Take out ② from No.1 label bag  
Take out ③ from No.4 label bag



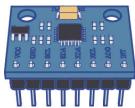
## Assembly the circuit board



① 1x M3\*11 Double-pass  
copper cylinder



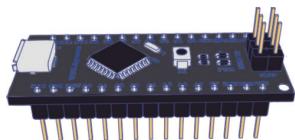
② 2xM3\*5  
Countersunk Screws



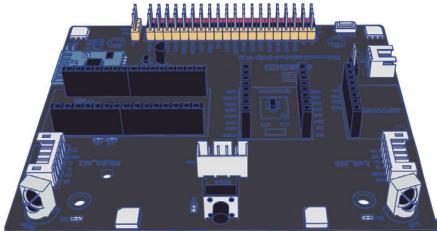
③ 1XGY-521 Module



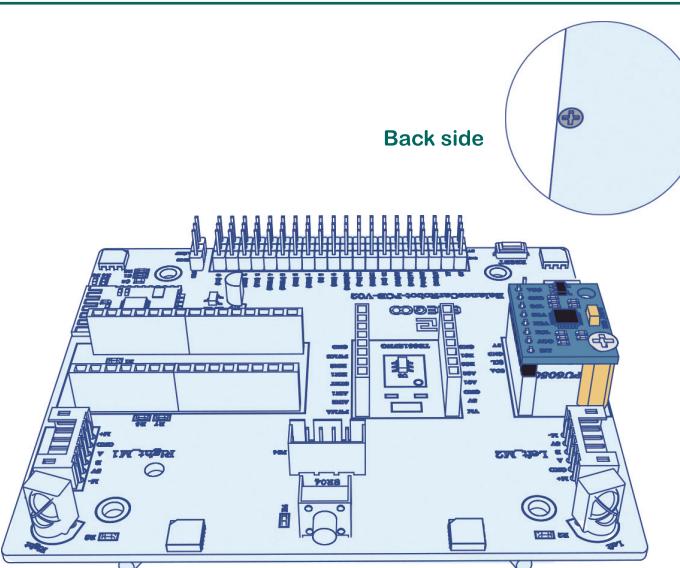
④ 1XTB6612FNG Module



⑤ 1 x NANO



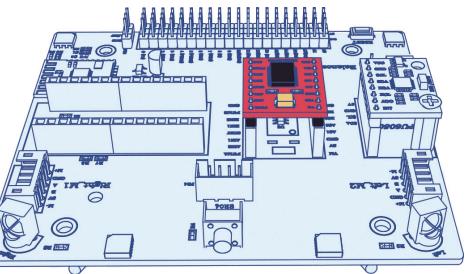
⑥ 1X Expansion Board



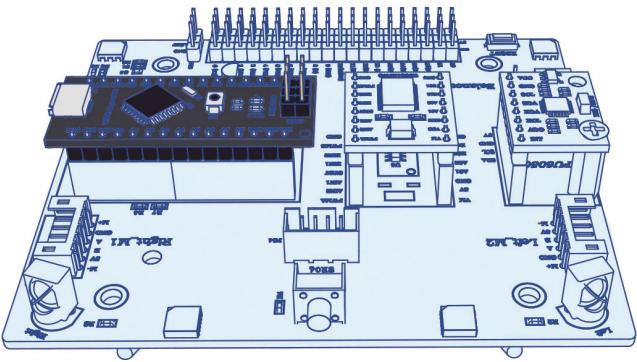
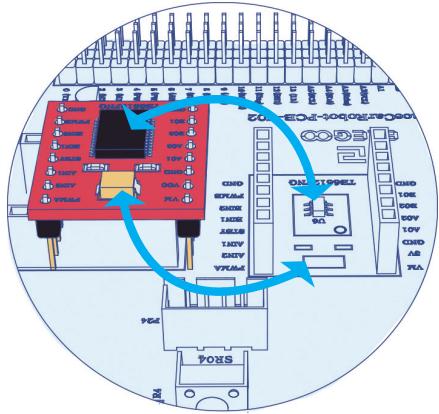
Take out ① from No.4 label bag

Take out ② from No.2 label bag

## Assembly the circuit board



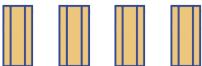
To make sure the TB6612FNG Module align with the expansion board according to the correspond sign, as the picture shows.



## Assembly the ultrasonic sensor



① 1 x Ultrasonic Sensor



② 4X M3\*11 Double-pass copper column

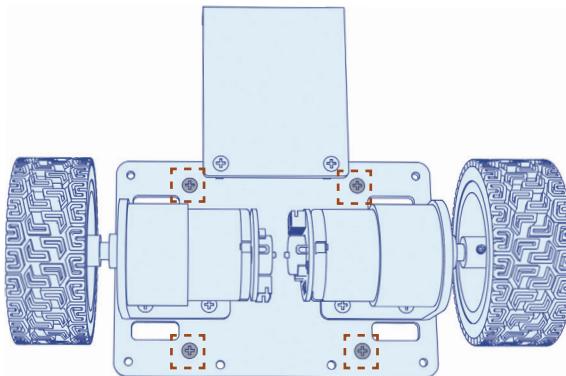
The shortest copper column in NO.4 label bag.



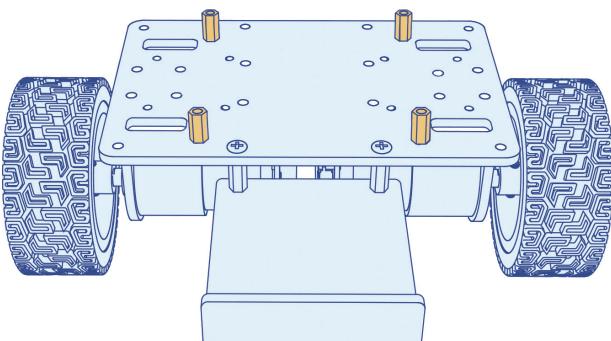
③ 8X M3\*6 Pan head machine screws

Take out ② from No.4 label bag

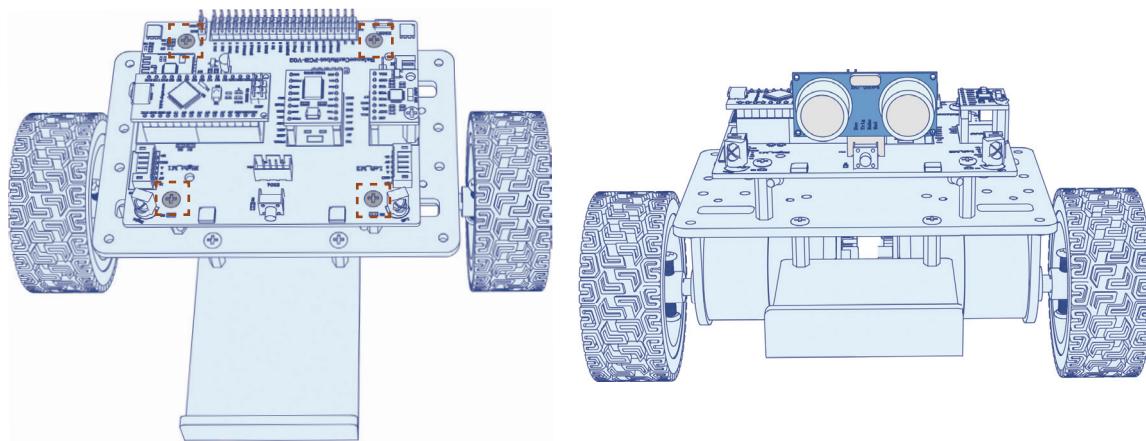
Take out ③ from No.1 label bag



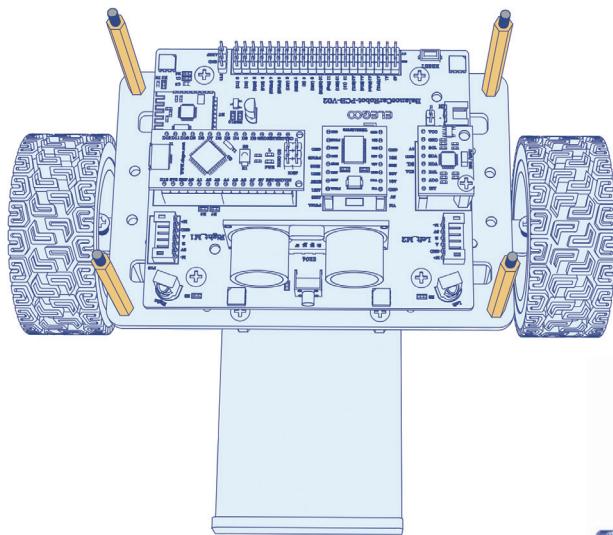
Back side



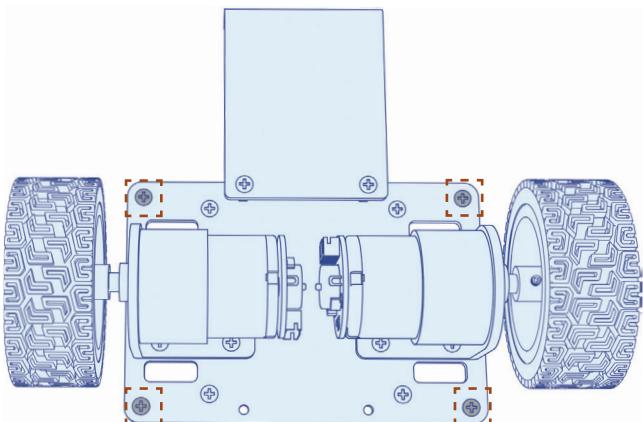
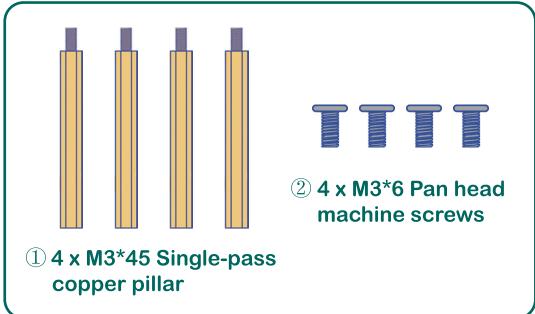
## Assembly the ultrasonic sensor



## Assembly the ultrasonic sensor



Take out ① from No.4 label bag  
Take out ② from No.1 label bag



Back side

## Assembly the battery box



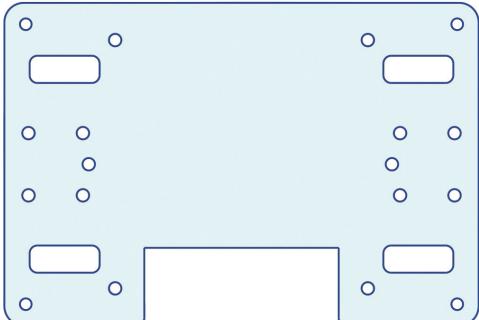
① 2 x M3 K-type gear nut



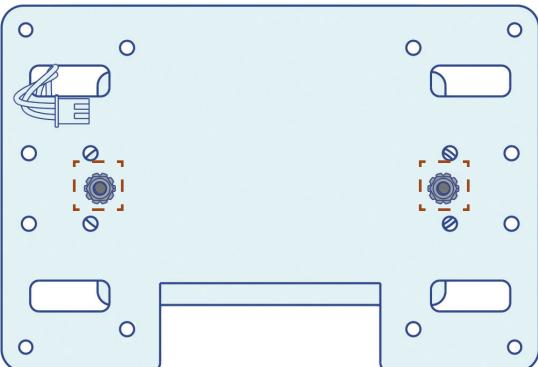
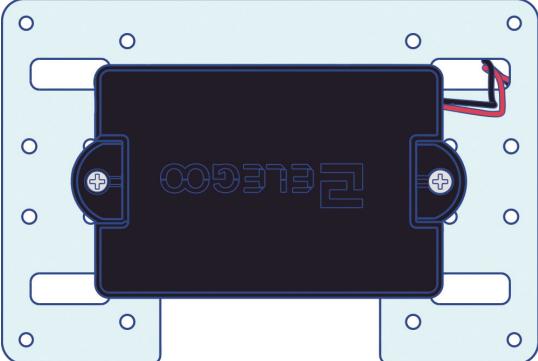
② 2 x M3\*12 Pan head machine screws



③ 1 x Battery box (Lithium Battery inside)

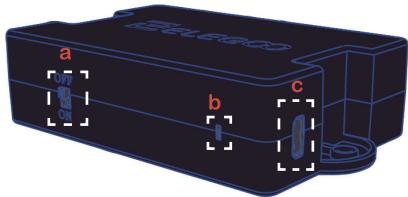


④ 1 x Fastener for battery box  
Take out ①② from No.5 label bag



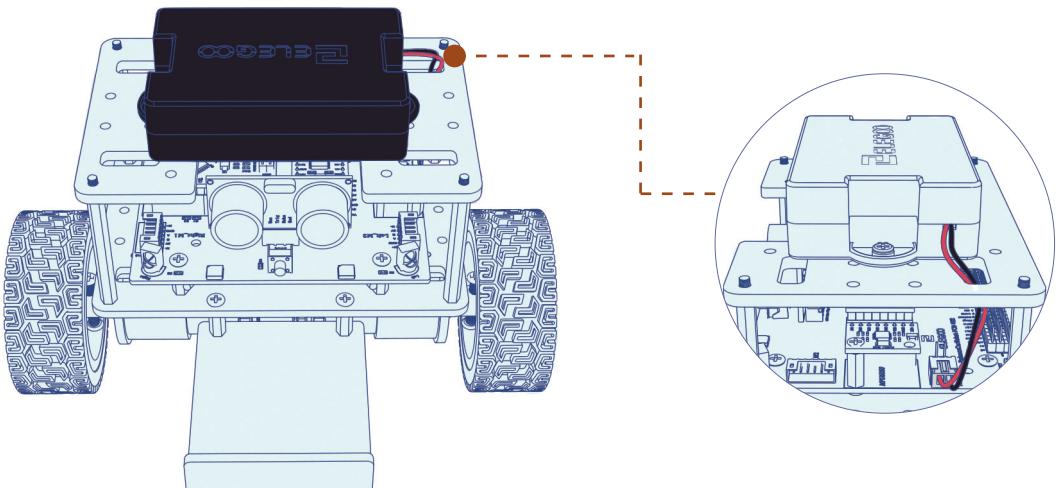
Back side

## Assembly the battery box

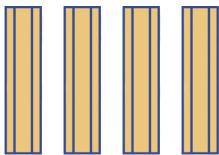


- a Power switch
- b Status indicator(lights in green when charging and it will be turned off once fully charged.)
- c USB charging interface

Attention: Please fully charge batteries before using.



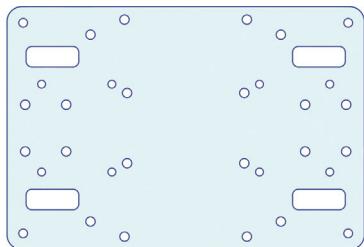
## Assembly the top board



① 4 x M3\*23 Double-pass copper cylinder

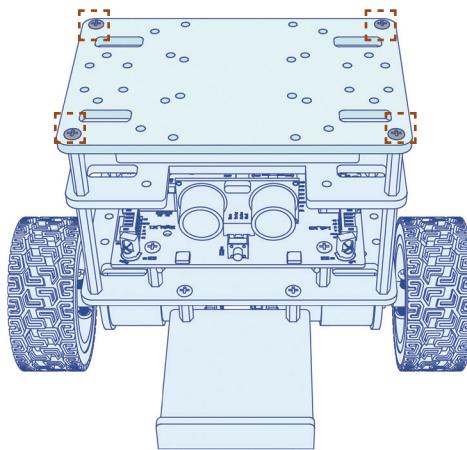
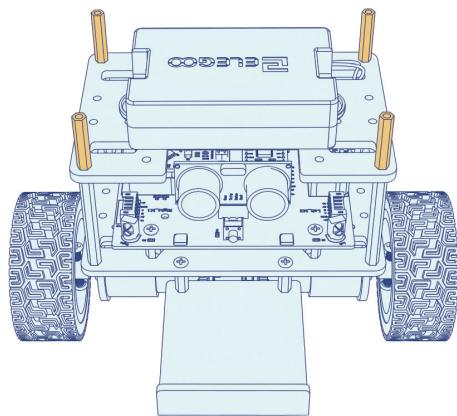


② 4 x M3\*6 Pan head machine screws

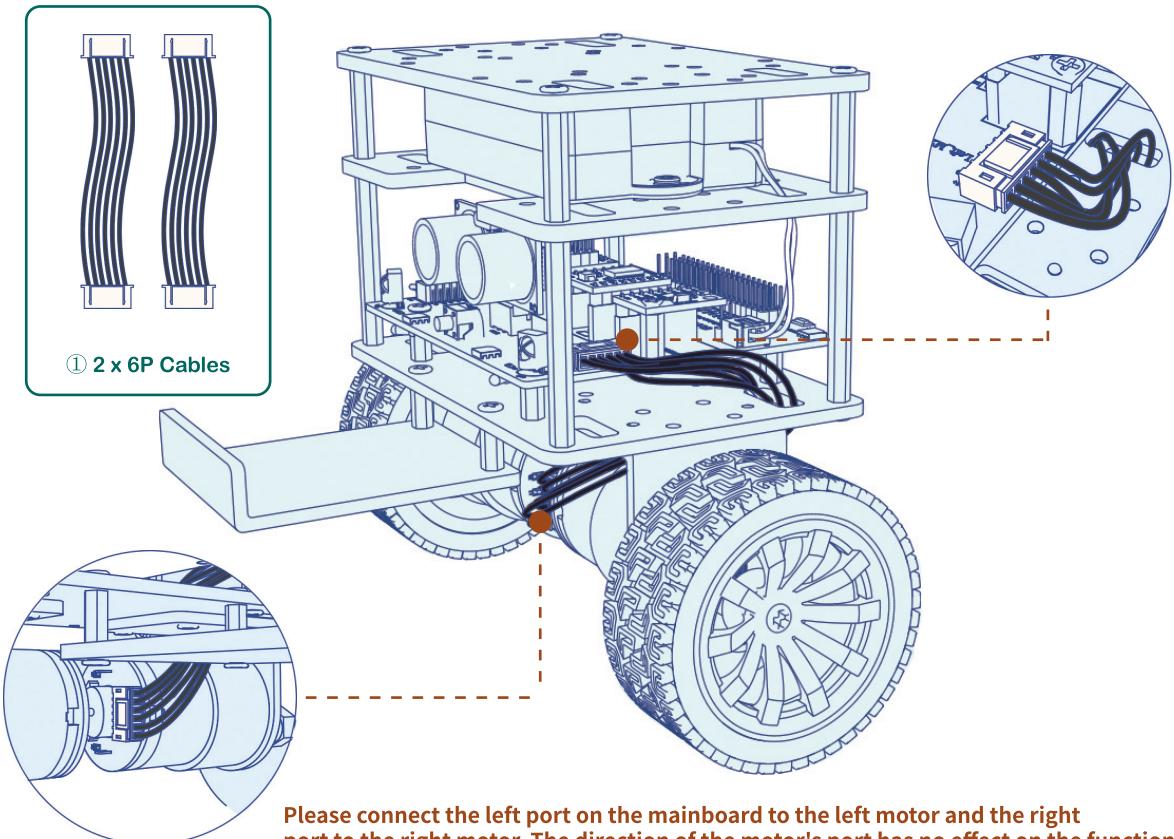


③ 1 x Top plate

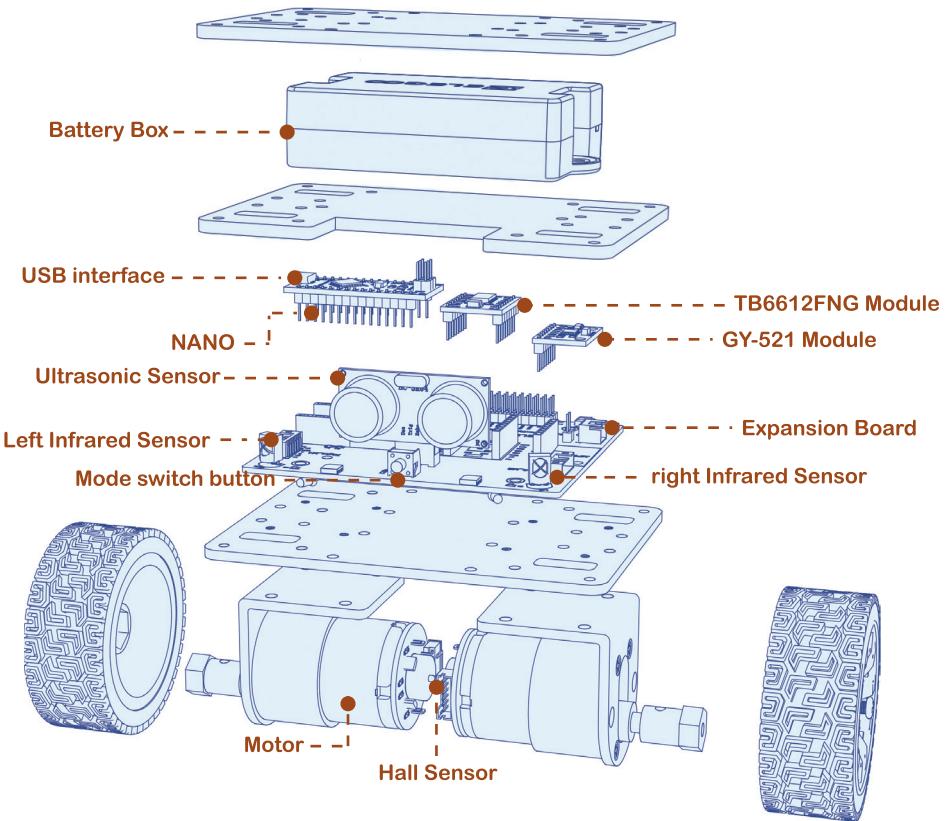
Take out ① from No.4 label bag  
Take out ② from No.1 label bag



## Wire the motor



# Tumbller user tutorial



Tumbller component parts

## Function of each component parts

Battery Box	Power Supply
TB6612FNG Module	Motor Drive
GY-521 Module	Motion Detection
Ultrasonic Sensor	Detect the distance from the obstacle ahead
Expansion Board	Provide Module Interface
Mode switch button	Switch each function mode
Left Infrared Sensor	Detect the distance from the obstacle on the left side
right Infrared Sensor	Detect the distance from the obstacle on the right side
NANO	Main Controller
USB interface	Upload program
Motor	Move Mechanism
Hall Sensor	Measure Speed

## Upload the Tumbller program

### Notice:

We have uploaded some necessary programs in advance, thus you can skip uploading the programs. However, if you change the codes, you will need to reupload them.

First of all, please go to our website below to download the Tumbller tutorial: <http://www.elegoo.com/download/>

And then select the tutorial files based on your computers' running systems.

For Windows system, please refer to “Upload Tumbller program for Windows.pdf”

For MacOS system, please refer to “Upload Tumbller program for MacOS.pdf”

The Tumbller has 6 modes which are

Standby Mode

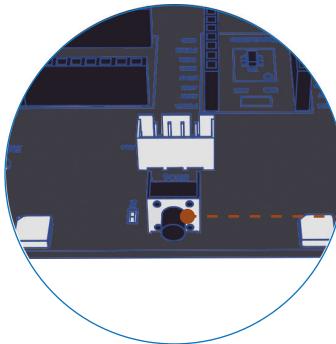
Obstacle-avoidance Mode

Glowing Mode

Auto-follow Mode

Bounce Mode

Mobile Control



Put the Tumbller on the ground and tilt it forward, then open the switch on the battery case, the Tumbller will automatically stand up and maintain balance. Then you can operate the Tumbller through APP or the mode switch button.

# The Tumbller has 6 modes which are

## Auto-follow Mode (Forward)

- Press the mode switch button once, Tumbller will be in the follow mode “forward”, then Tumbller will lights up in green.
- If there is an obstacle within 10-35cm in front, the 2 LEDs in front flash in green, and Tumbller will move forward with the obstacle.
- If there is an obstacle within 0-20cm on the left or right side, Tumbller will turn left or right with obstacle.
- If there are obstacles on both right and left side within 0-20cm, Tumbller will move forward with the obstacles.

## Obstacle-Avoidance Mode

Then press the mode switch button twice, Tumbller will be in the obstacle-avoidance mode and light up in yellow. In this mode, Tumbller will avoid obstacles automatically if there is an obstacle within 0-50cm in front.

# The Tumbller has 6 modes which are

## Auto-follow Mode (Backward)

- Press the mode switch button for 3 times, Tumbller will be in the follow mode “backward”, then Tumbller will lights up in green.
- If there is an obstacle within 10-35cm in front, the 2 LEDs in back flash in green, and Tumbller will move backward with the obstacle.
- If there is an obstacle within 0-20cm on the left or right side, Tumbller will turn left or right with obstacle.
- If there are obstacles on both right and left side within 0-20cm, Tumbller will move backward with the obstacles.

## Glowing Mode

Press the mode switch button for 4 times, Tumbller will be in the glowing mode and light up a random lighting effect

## Standby Mode

Press the mode switch button for 5 times, Tumbller will be in standby mode and stop all motions. Likewise to repeat.

## The Tumbler has 6 modes which are

### Mobile Control

-For Android system, copy the APK file to the Android products and install it.

-The APK file located in “ELEGOO Tumbler Self-Balancing Car Tutorial ELEGOO BLE Tool”, or go to google play and search for “ELEGOO BLE Tool” to download and install our app .

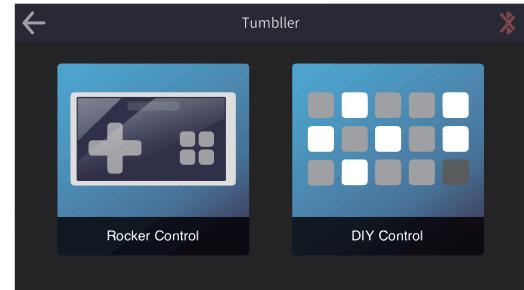
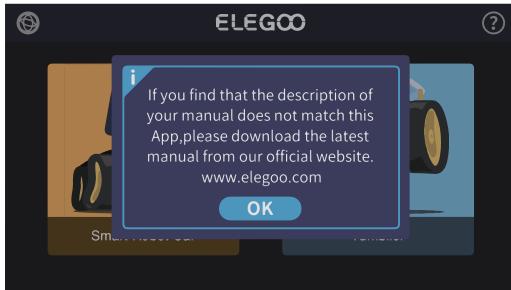
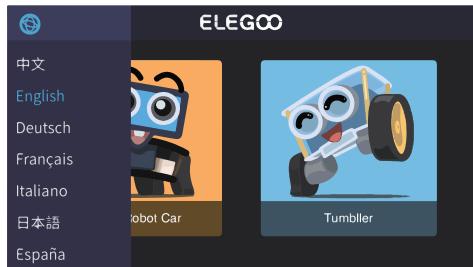
Below, take the Apple mobile phone or tablet for example:

-First of all , search “ELEGOO BLE Tool” in Apple APP Store. Install the APP and then run it on your phone.



ELEGOO BLE Tool

Click the icon in the top left corner, to enter the language list, then choose the language you prefer.



Click OK, then click Tumbler to enter the control page

# The Tumbler has 6 modes which are

-Click the Bluetooth icon in the right upper corner to enter the Bluetooth search page, then click the search list of Bluetooth name in the upper left corner, and select our Bluetooth name (ELEGOO BT16) to connect.

-If you can't find the Bluetooth name(ELEGOO BT16), please turn off Tumbler, then turn it back on and reconnect Bluetooth.

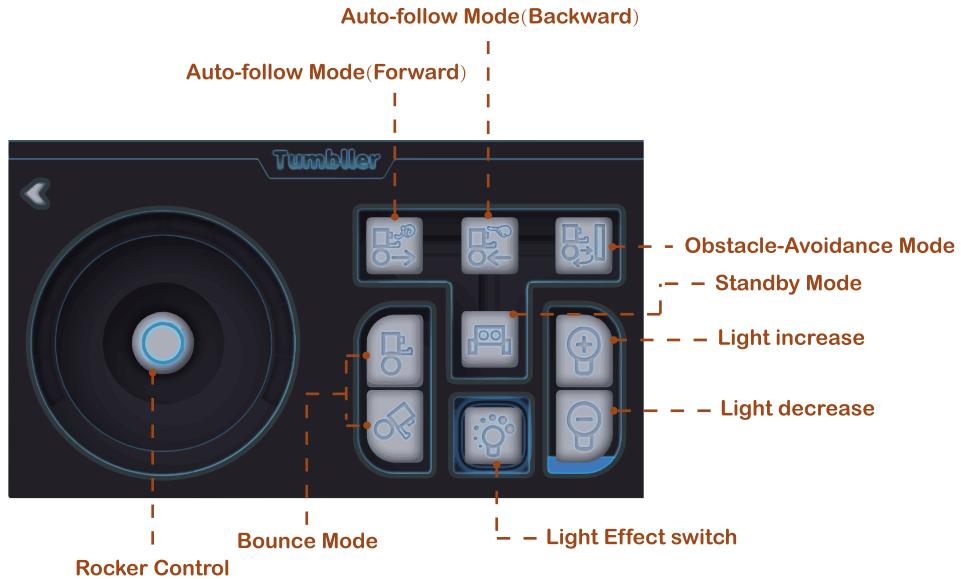


When the Bluetooth icon turns to blue in the upper right corner, that means Bluetooth is connected.

Click the Rocker Control on the left to enter the designed control page.



# Rocker Control control page introduction



### Rocker Control

- You can control the Tumbller to move in 8 directions by holding rocker. Tumbller will move towards the direction which the rocker points. Release the rocker then Tumbller will enter in standby status.



### Auto-follow Mode(Forward)

- Click the Auto-Follow Mode (forward) icon as picture,to make Tumbller enter in Auto-Follow mode and flashes in green light.
- If there is an obstacle within 10-35cm in front, the 2 LEDs in front flash in green, and Tumbller will move forward with the obstacle.
- If there is an obstacle within 0-20cm on the left or right side, Tumbller will turn left or right with obstacle.
- If there are obstacles on both right and left side within 0-20cm, Tumbller will move forward with the obstacles.



### Auto-follow Mode(Backward)

- Click the Auto-Follow Mode (Backward) icon as picture , to make Tumbller enter in Auto-Follow mode and flashes in green light.
- If there is an obstacle within 10-35cm in front, the 2 LEDs in back flash in green, and Tumbller will move backward with the obstacle.
- If there is an obstacle within 0-20cm on the left or right side, Tumbller will turn left or right with obstacle.
- If there are obstacles on both right and left side within 0-20cm, Tumbller will move backward with the obstacles.



# The Tumbller has 6 modes which are

## Obstacle-Avoidance Mode

- Click the Obstacle-Avoidance Mode icon as picture, to make Tumbller enter Obstacle-Avoidance Mode and flashes in yellow light.
- In this mode, Tumbller will avoid obstacles automatically if there is an obstacle within 0-50cm in front.



## Bounce Mode

- Click the stand icon as picture , Tumbller will stand up instantly and keep balance.
- Click the tilt forward icon as below, to make Tumbller enter Bounce Mode.



## Standby Mode

- Click the standby icon as picture , will enter in standby mode, Tumbller will stop all actions.



Light increase

## Light Effect switch

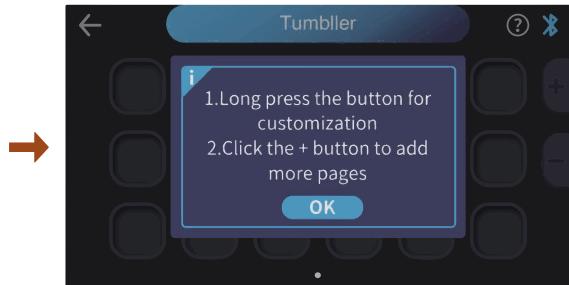
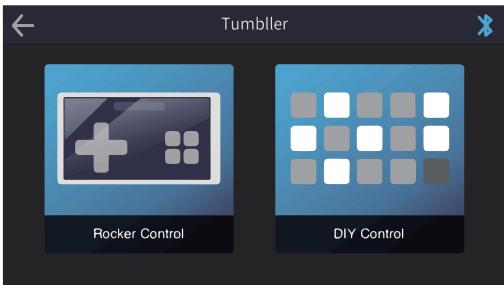
- Click the icon as picture, Tumbller will light up one light effect, then click it again, will switch to another one. There are total 6 light effects for switching.



Light decrease

# The Tumbller has 6 modes which are

If you want to customize the buttons, you can click “DIY control” to enter in the customization page, then click “ok”.



Press and hold any button to pop up the “Button editor”. Then you can choose color and edit name of the button as you like. But please notice that, the “message” is corresponding to below definition, (refer to next page) you can enter the “message” field according to your own needs.



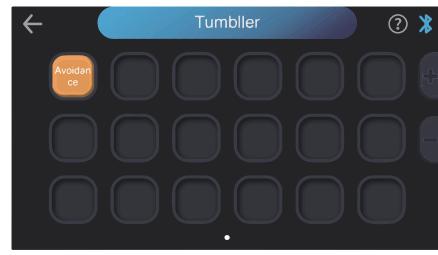
# The Tumbller has 6 modes which are

The following is the message sent for each function

- f → Forward
- b → Backward
- l → Turn Left
- i → Turn Right
- s → Standby Mode
- 0 → Auto-Follow Mode (Backward)
- 1 → Auto-Follow Mode (Forward)
- 2 → Obstacle Avoidance Mode
- 3 → Light Effect Switch
- 4 → Tilt Forward
- 5 → Stand up instantly
- 7 → Light Decrease
- 8 → Light Increase

For example, I want to customize the button of obstacle avoidance mode

First, click DIY control and enter in customization page. Then press and hold any button to pop up the “Button editor”. I like orange so I choose orange as the button color and name it as “avoidance”. And according to the information left side , the message for “Obstacle Avoidance Mode” is 2, so I enter “2” in message field and click “√”. Then it's done. Likewise, you can customize the buttons for any function of Tumbller.



The following are the issues to be aware of when using Tumbller

- 1- Make sure the battery is fully charged before using. The indicator LED of the battery box is green when charging and will turn off when fully charged .
- 2- The LED will flash red when the battery is running out of power.
- 3- When you pick up the Tumbller vertically, the wheel will still rotate. After tilting the Tumbler  $\pm 27^\circ$ , the rotation will stop.
- 4- In the use of all types of motion modes, Tumbller will automatically enter the standby mode or the motor stops moving if it hit something and makes the Tumbler tilt more than  $\pm 27^\circ$ .
- 5- Tumbller can't be used in places where the sunshine or light is very strong, because the strong brightness will affect the sensor.
- 6- Charge the battery via the USB port of the cell box .
- 7- The screw on the coupling is easy to get loose, please do lock tight.
- 8- The USB interface on NANO is only used for burning program. When burning program, please turn off the battery compartment switch to prevent interference.

If you feel it difficult to assemble the Tumbler, please check the assembling tutorial video from [www.elegoo.com](http://www.elegoo.com).

Please download the tutorial from our website [elegoo.com/download](http://elegoo.com/download).

If you have any questions during assembling or testing please feel free to contact us at [service@elegoo.com](mailto:service@elegoo.com).

Elegoo Team



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