How to make for Easy Pico

Contents

1.Tools

1-1. Basic Tools

1	#1 Phillips screwdriver	Convenient with magnet
2	Art Knife (or Cutter)	To clean up poor prints (Not required for good 3D printing)
3	About 1.5mm Pin Vise Drill	For pilot hole of servo horn. See [4-4 Around the Body Assemble 2]
4	Precision flathead screwdriver	For servos board battery connector. See [4-5 Temporary Assemble]

1

2

3

4

1-2. Option Tools

1	Soldering iron set	For LED (if you make LED) and Pin header of Raspberry Pi Pico W (Not necessary for WH)
2	Flux	Easier to solder. (Not required)
3	Solder absorption line	For just in case. (Not required)
4	2.0 mm Pin Vise Drill	For [5. Arm Assemble 2] (or you can use Art Knife)
5	3.0 mm Pin Vise Drill	For LED hole (or you can use Basic Art Knife)
6	Nipper	For cutting servo horn [4-4 Around the Body Assemble] (or you can use Art Knife)

1

2

3

4

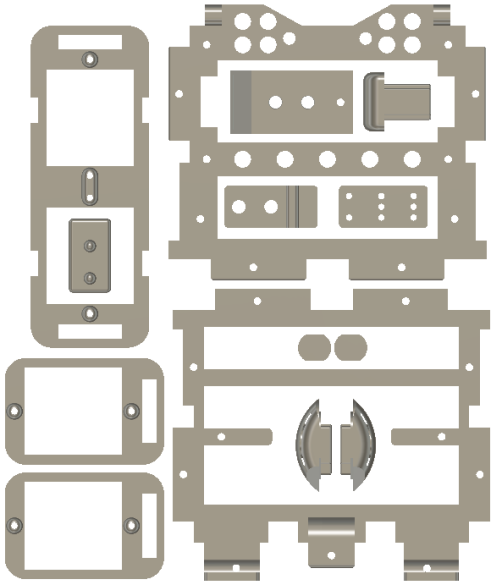
5

6

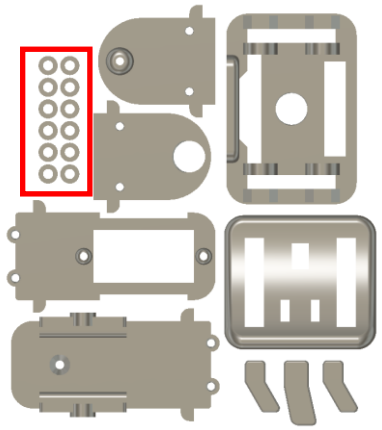
2.Print

2. Print

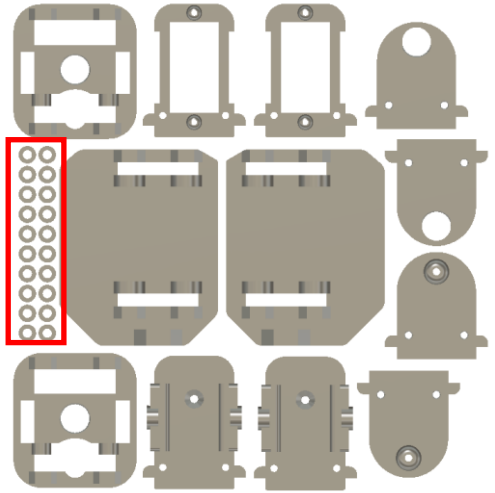
①	x1	Head & Body.stl	
②	x2	Arm.stl	Left and Right are the same
③	x1	Legs.stl	
④	x1	Covers.stl	



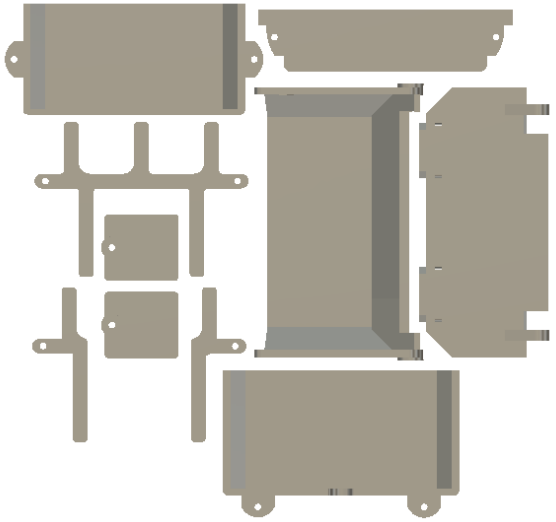
①



② x2



③



④

There are lots washers than needed. Don't worry poor printing or lost.

You'll only need 4 STL files.

- Head & Body
- Arm x2 (left and right are the same)
- Legs
- Covers

Individual Parts

If you have a small 3D printer or prefer to print each part separately,
I also offer separate STL files available.

- Individual_Parts.zip (28 files)

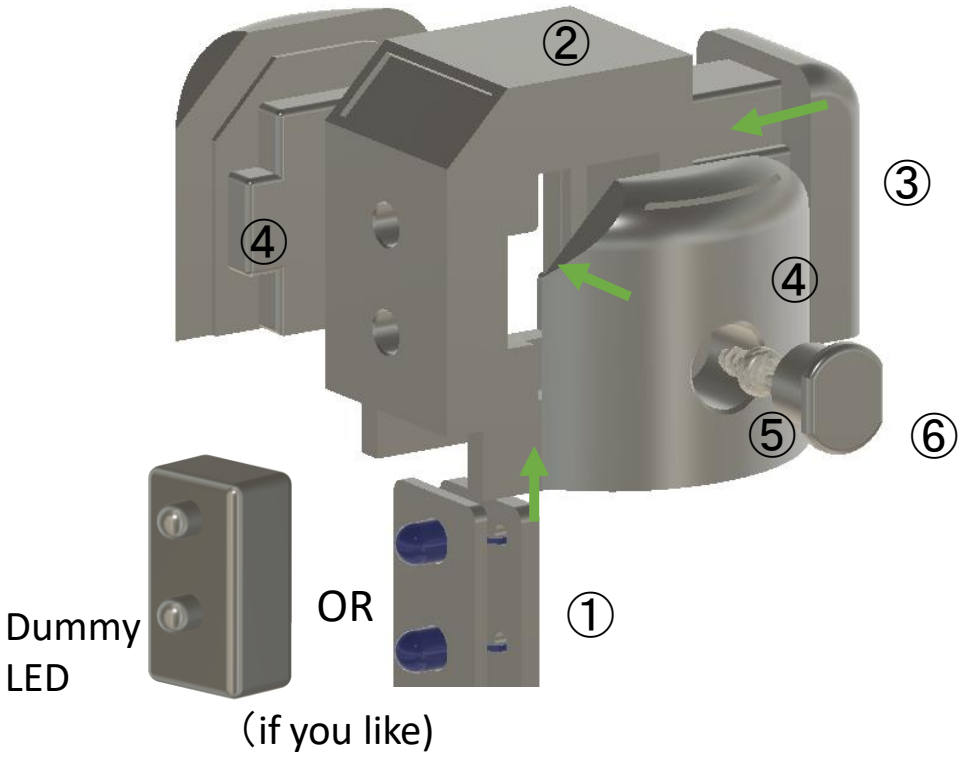
Example PLA Setting

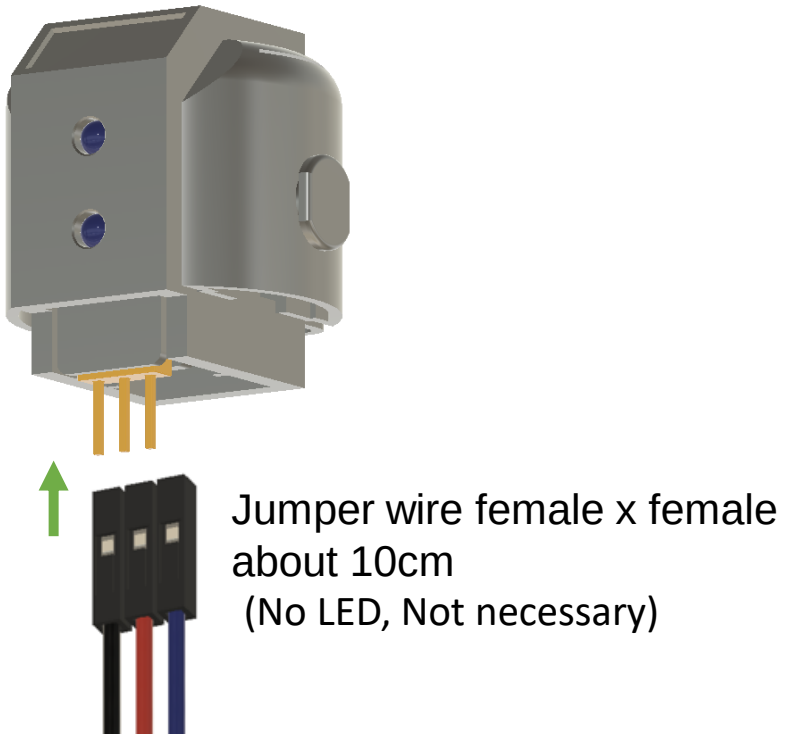
-- Layer height - 0.2mm
-- Infill - 20%
-- No generate support

3.Head

3. Head Assemble

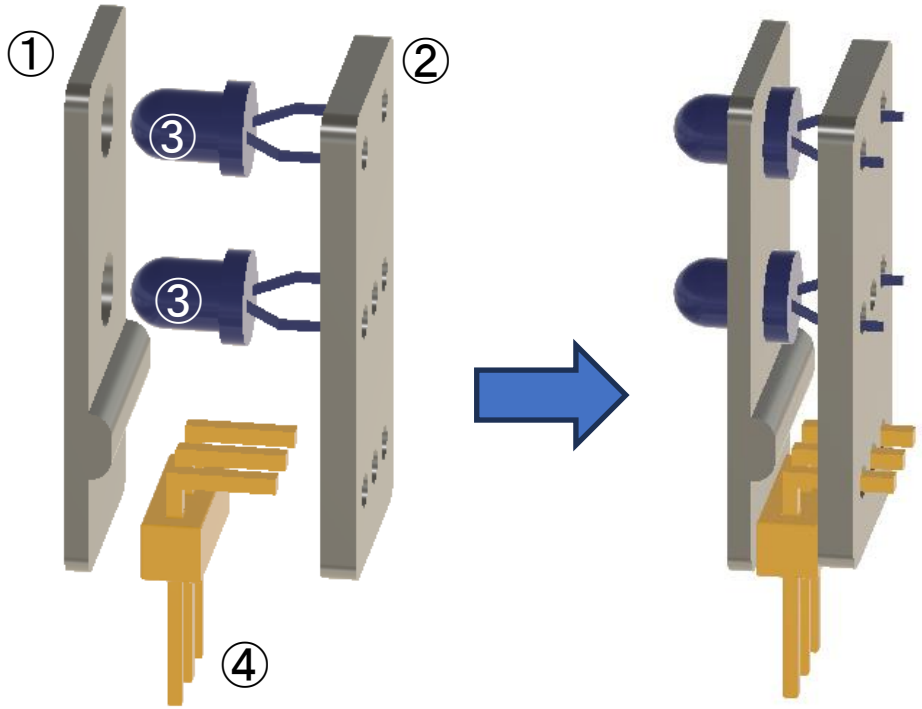
①	x1	LED Assemble (See 3-1)	not required if you don't need LED
②	x1	Head Middle	Print
③	x1	Head Back	Print
④	x2	Head Side	Print (Right and Left)
⑤	x2	M2x4mm Tapping Screw	
⑥	x2	Head Side Cover	Print (Right and Left)





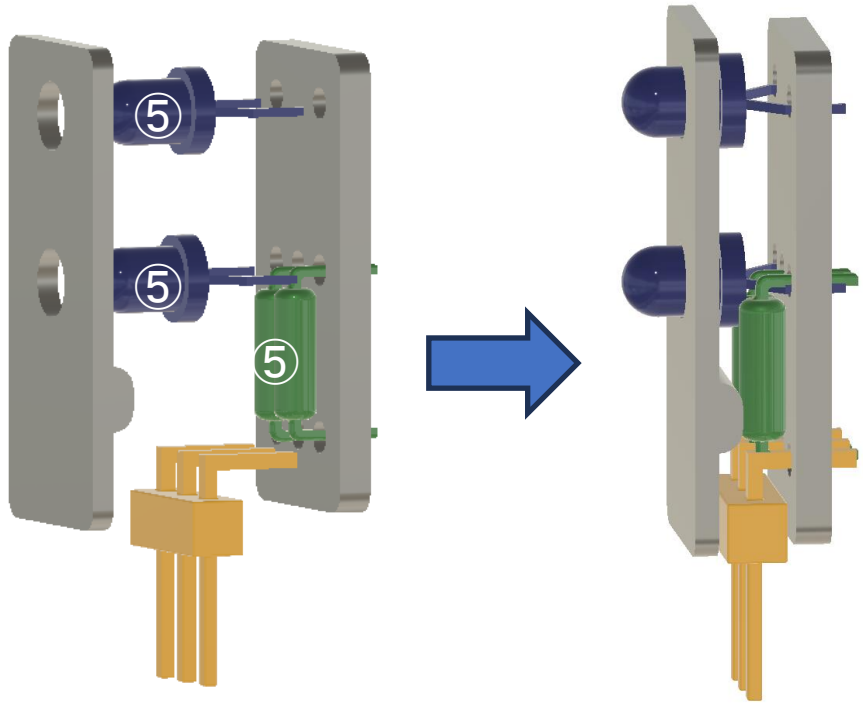
3-1. LED Assemble 1 (not required if you don't need LED)

①	x1	Head LED Socket	Print
②	x1	Head LED Board	Print or Univeral Board (3x7 hole)
③ (or ⑤)	x2	3mm LED	Built-in resistor type
④	x3	Right angle pin header	90 Degree Male header x3pin
⑤ (or ③)	x2	3mm LED and resistor	Regular LED Type



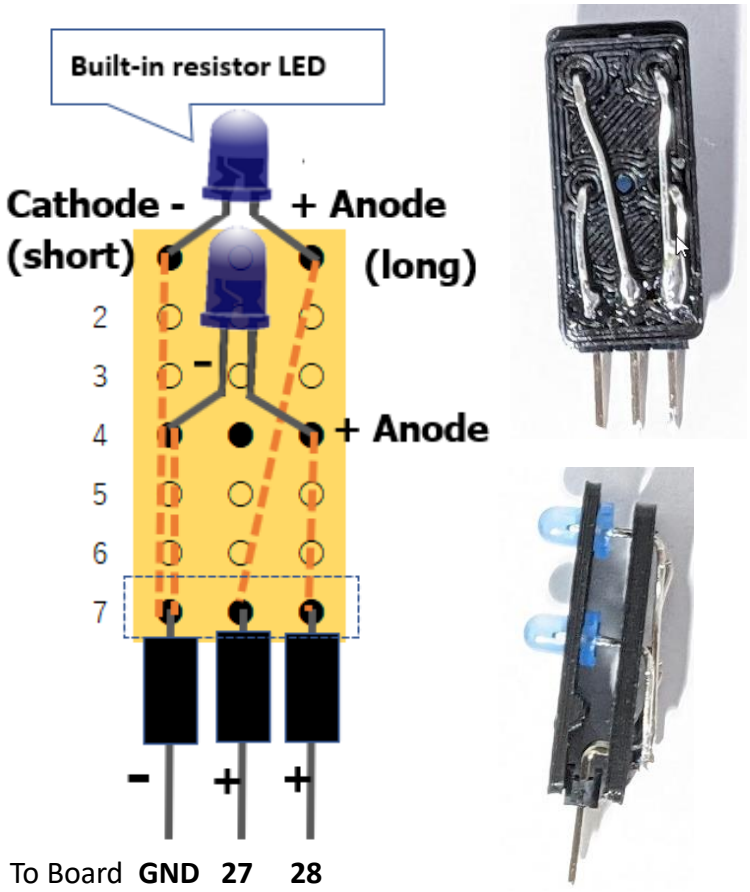
Built-in resistor type

OR



Regular LED type

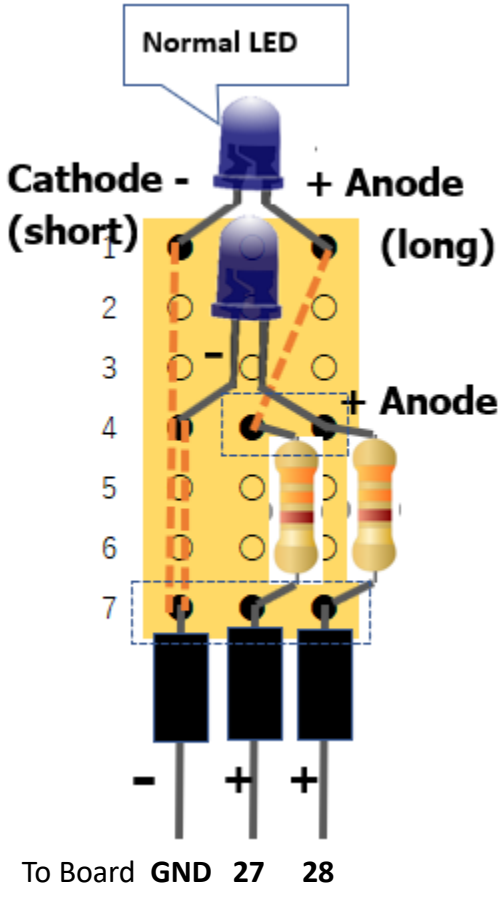
3-1. LED Assemble 2 (not required if you don't need LED)

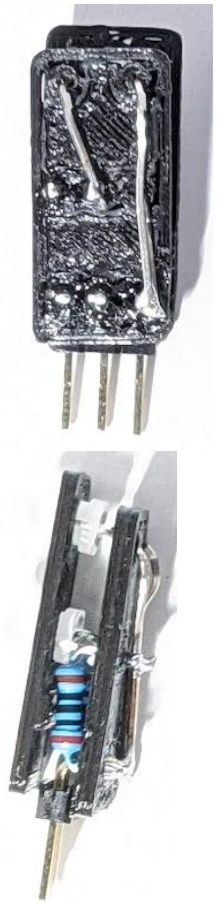


OR

BackSide

Solder the
Back side



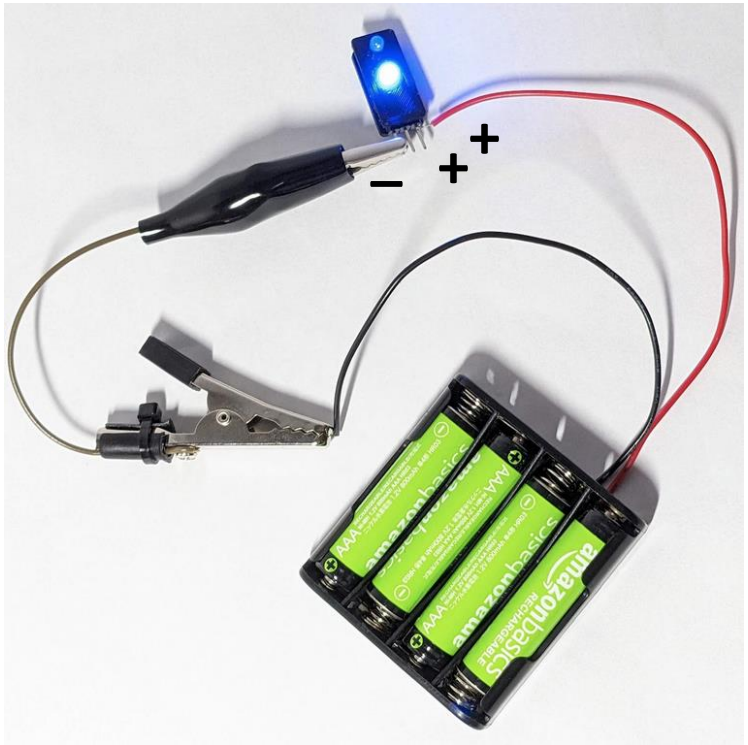


Built-in resistor type

Regular LED type

3-1. LED Assemble 3 (not required if you don't need LED)

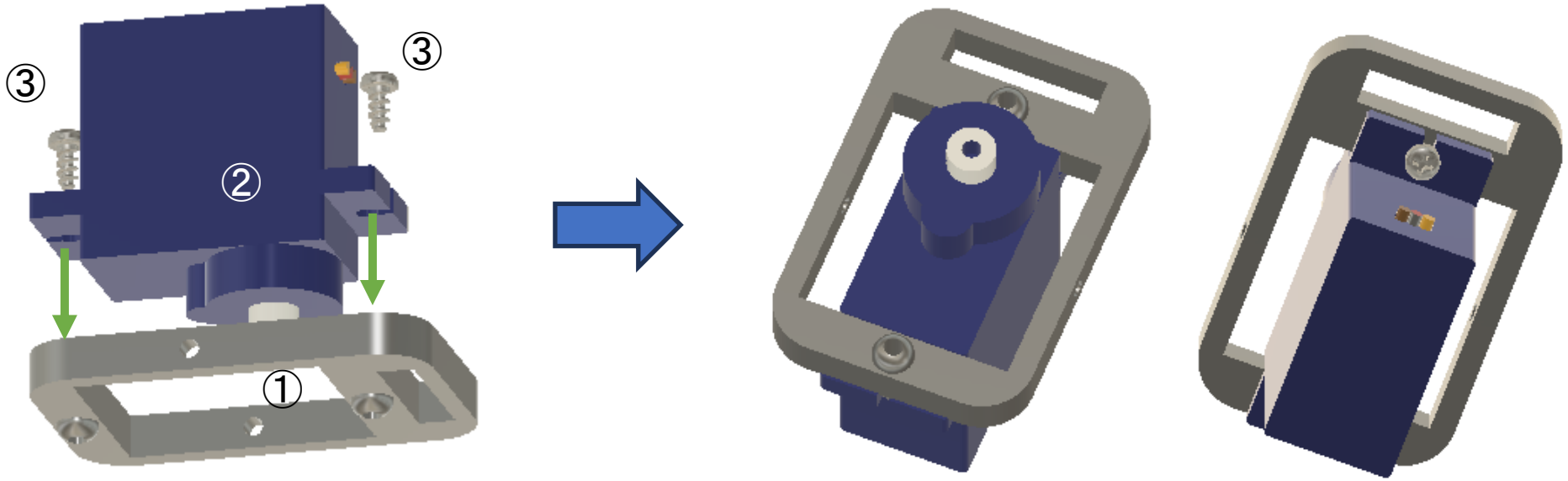
Check LED and AAA Case



Don't forget to remove batteries from case after test for safe.

4. Body

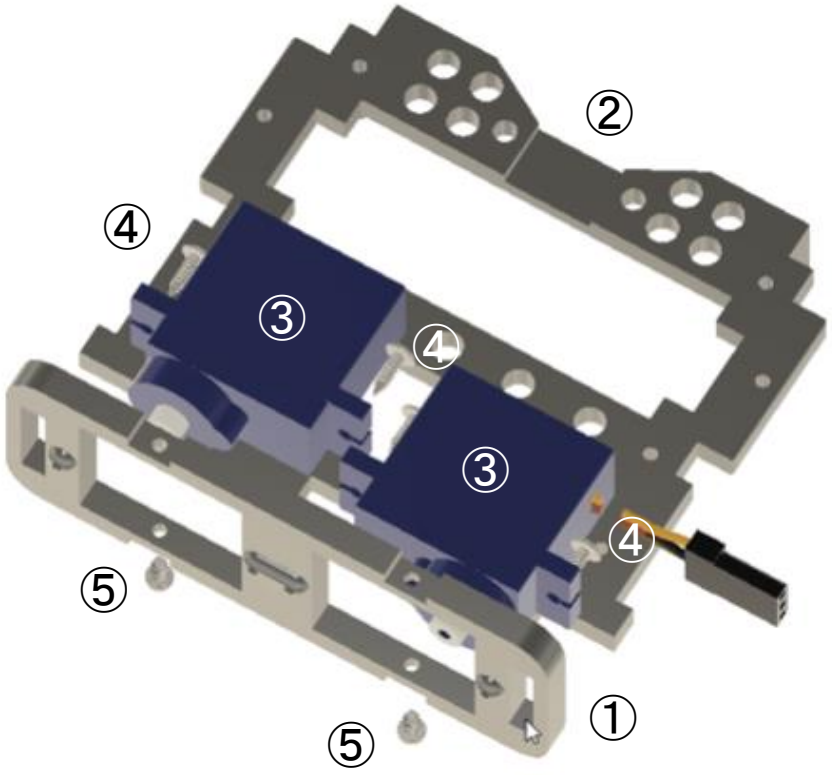
4-1. Body Base Assemble 1 (make two for Right and Left)			
①	x1	Body_Shoulder	Print
②	x1	Servo	SG90 or MS18 or FS90
③	x2	Screws for Servo	included with the servo

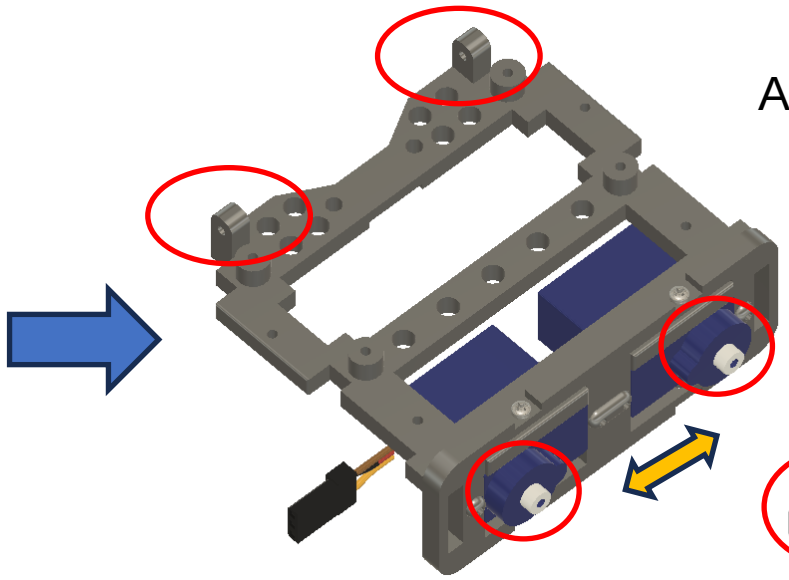


x2 for Right and Left

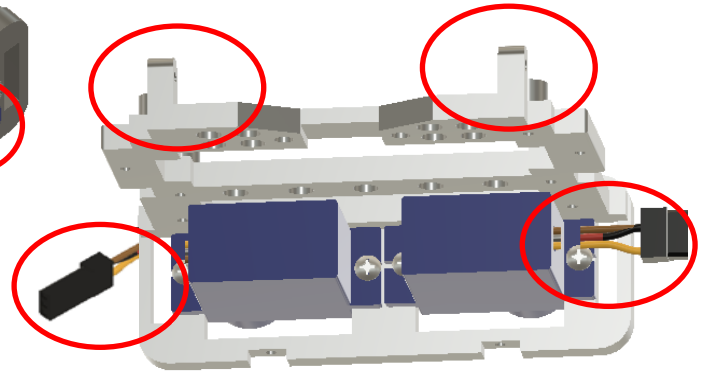
4-1. Body Base Assemble 2

①	x1	Body Under.stl	Print
②	x1	Body Front.stl	Print
③	x2	Servo	SG90 or MS18 or FS90
④	x4	Screw for Servo	included with the servo
⑤	x2	M2x4mm Tapping Screw	

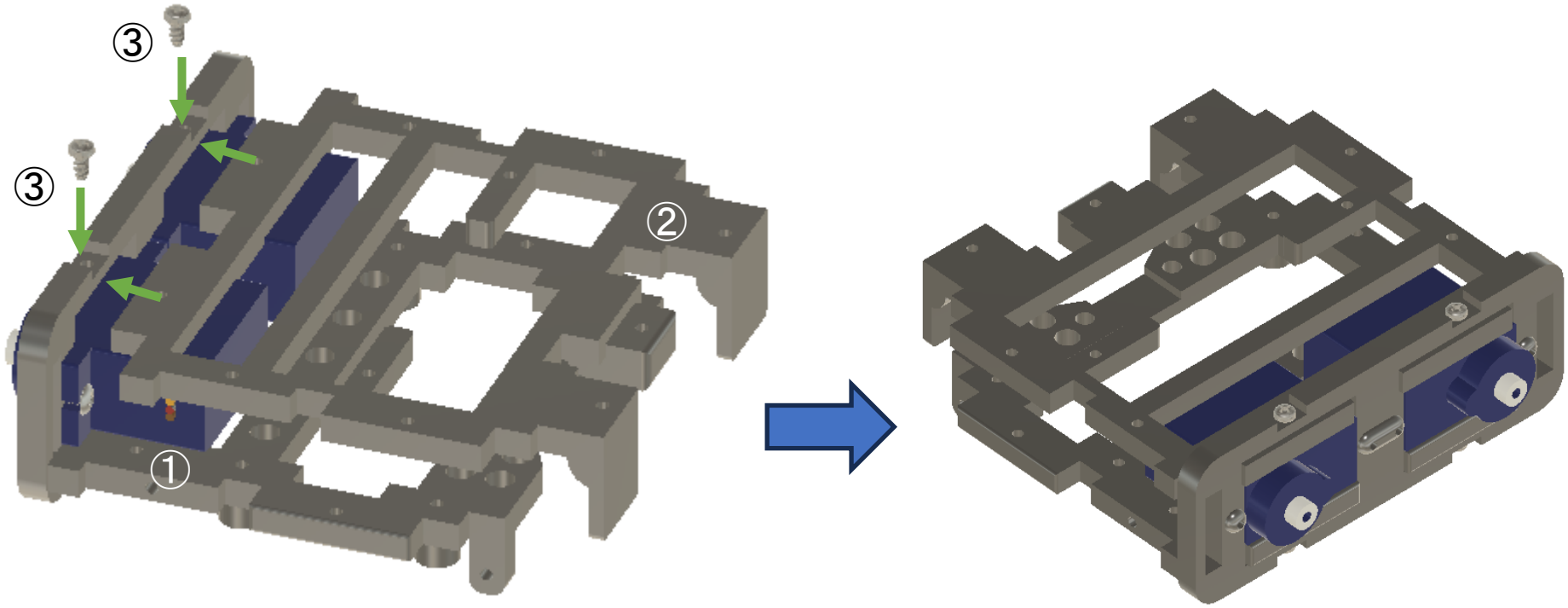




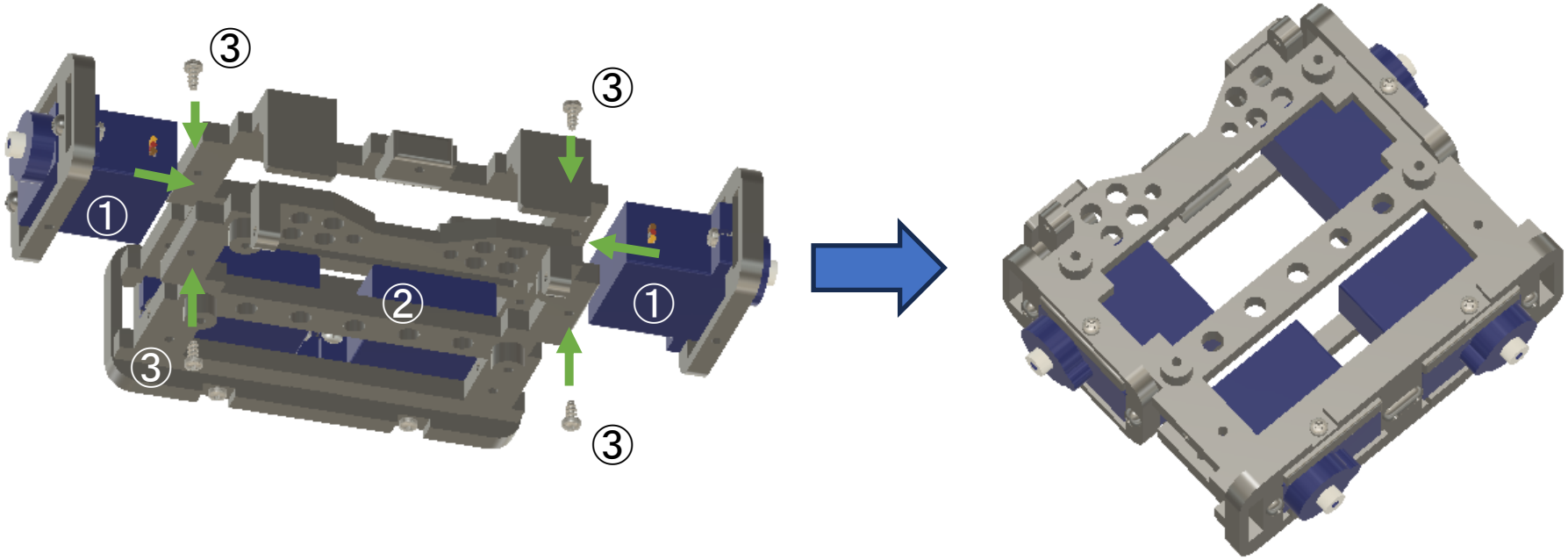
Attention to the direction



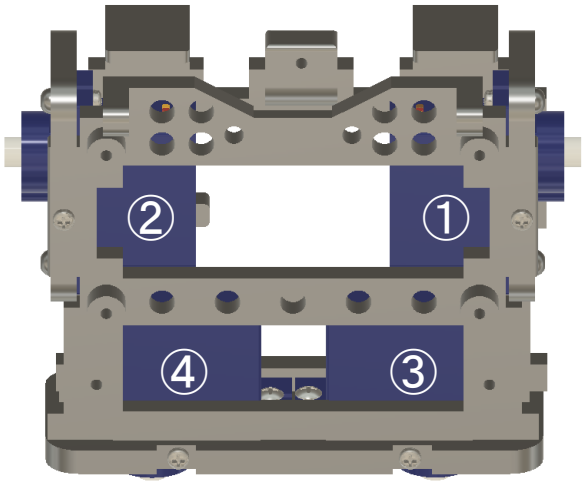
4-1. Body Base Assemble 3			
①	x1	Body Base Assemble 2	
②	x1	Body Back.stl	Print
③	x2	M2x4mm Tapping Screw	

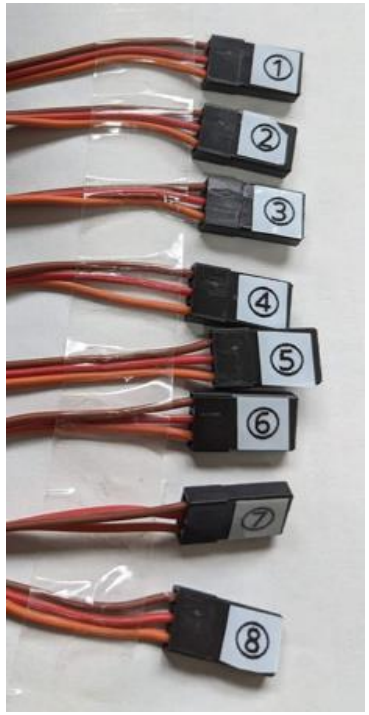


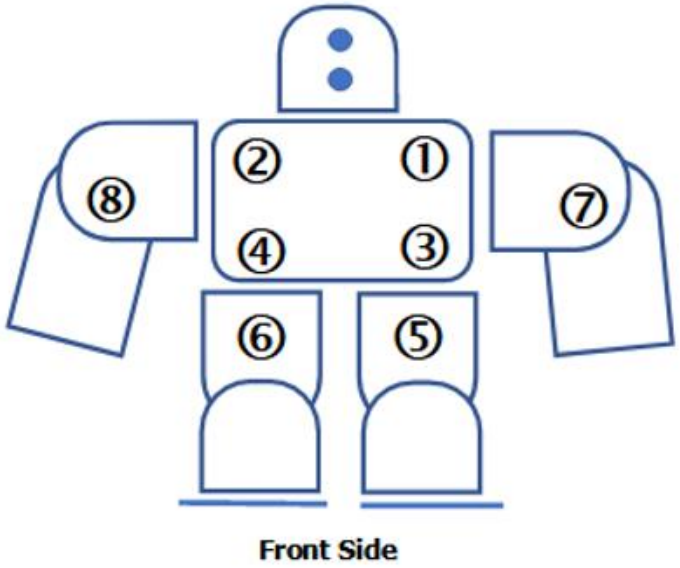
4-1. Body Base Assemble 4			
①	x1	Body Base Assemble 1	
②	x1	Body Base Assemble 3	
③	x4	M2x4mm Tapping Screw	



4-2. Servo Numbering



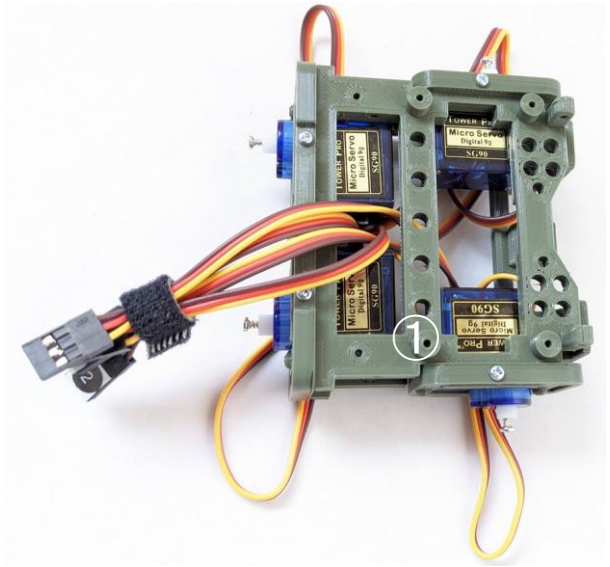




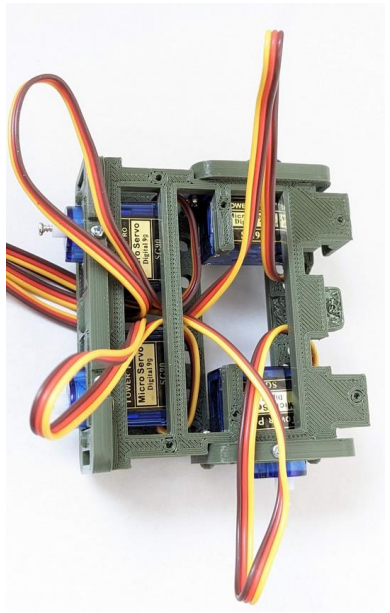
Although it is not required, it is easier to assemble if you number the servo connector.

4-3. Body Base Cable Arrangement

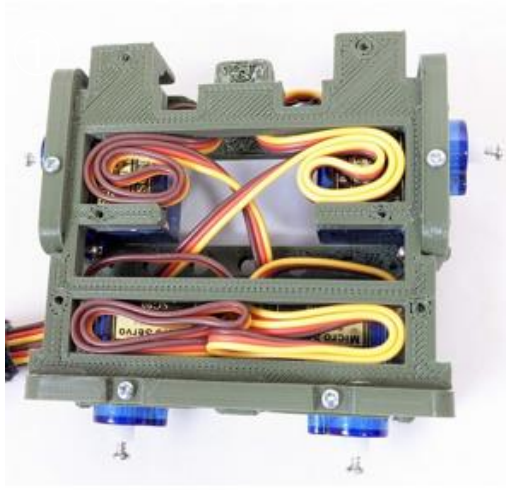
①	x1	Body Base Assemble 4	
②	x2	Temp_CableHolder	Print
③	x2	M2x4mm Tapping Screw	

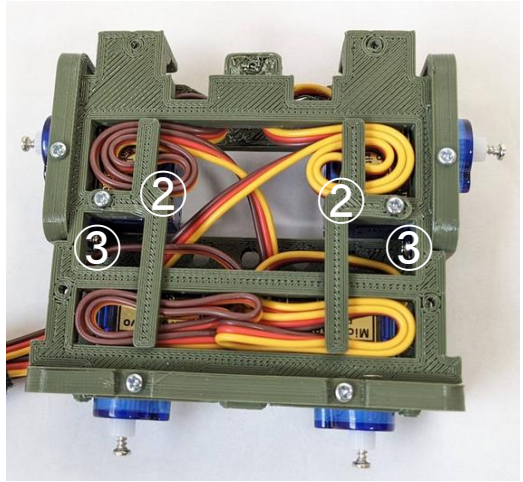


Front



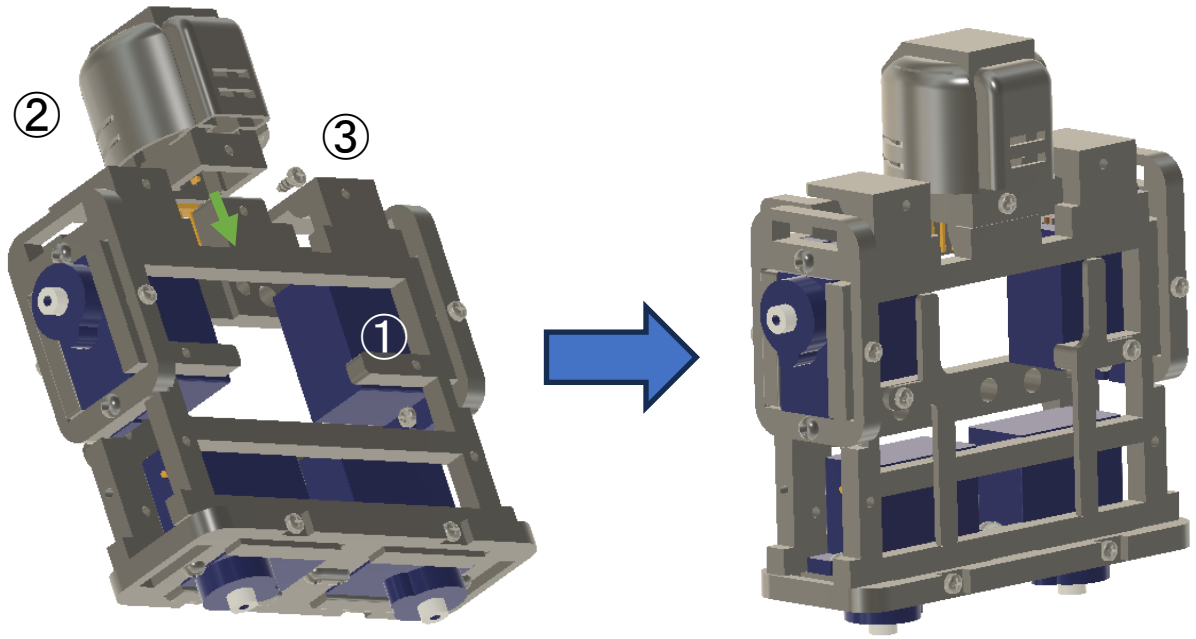
Back

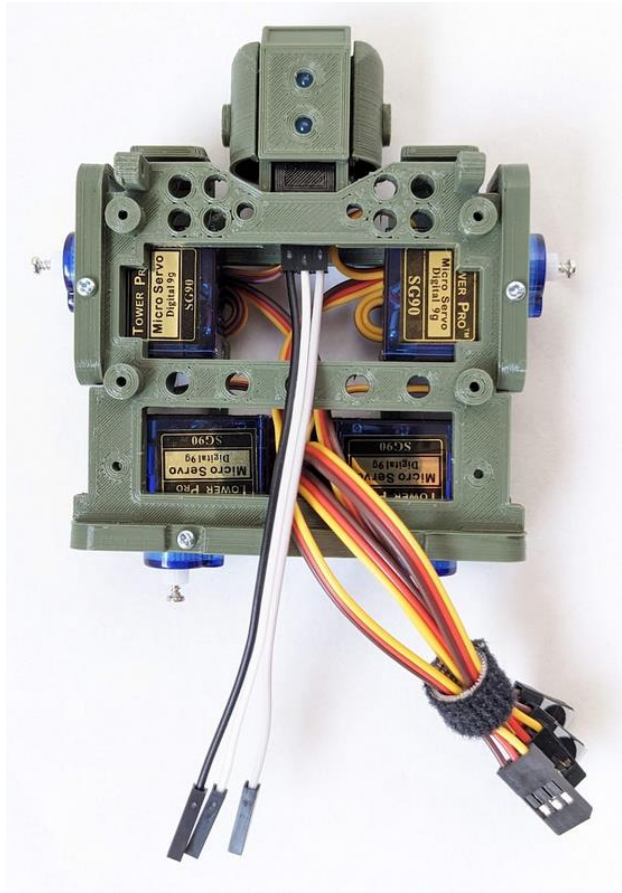




② Temp_CableHolder is temporary for easy assembly. It is changed other cable holder later.

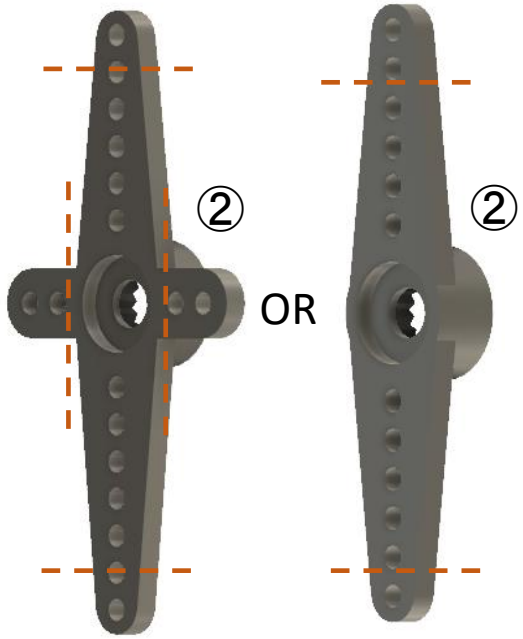
4-4. Around the Body Assemble 1			
①	x1	Body Base Assemble 4	
②	x1	Head Assemble	
③	x1	M2x4mm Tapping Screw	Not Required



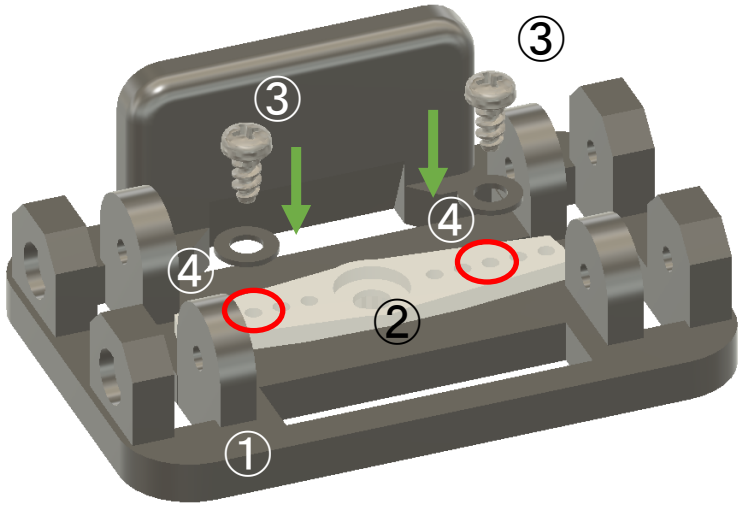


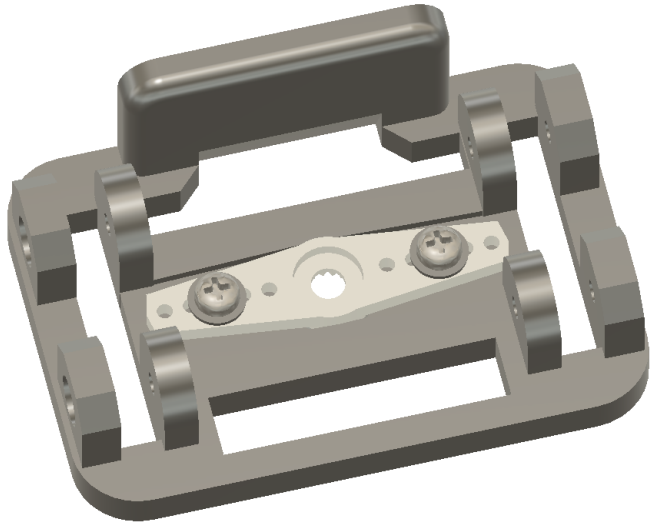
4-4. Around the Body Assemble 2 (make two for Right and Left)

①	x1	Arm_Shoulder	Print
②	x1	Servo horn on 4 (or 2) wings	included with the servo
③	x2	M2x4mm Tapping Screw	
④	x2	Washer (if ③ screws is too long)	Print



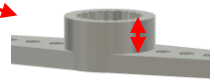
4 wings 2 wings





x2 for Right and Left

For FS90 4 wings better because this part of 2 wings is shorter.
2 wings of SG90 and MS18 are no problem.

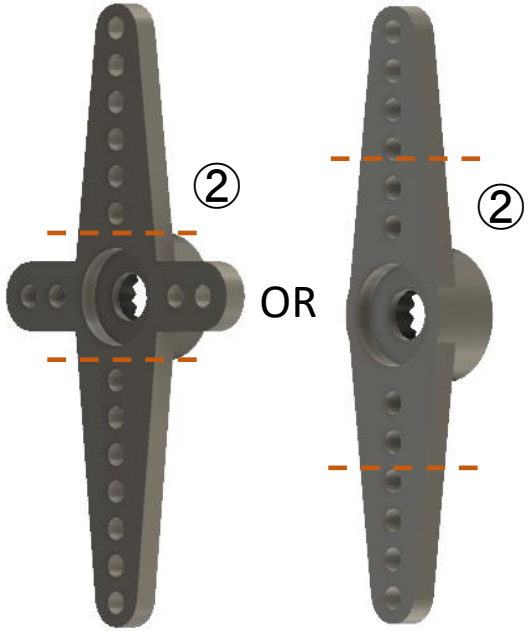


○ About 1.5mm pilot hole will make it easier for screws.

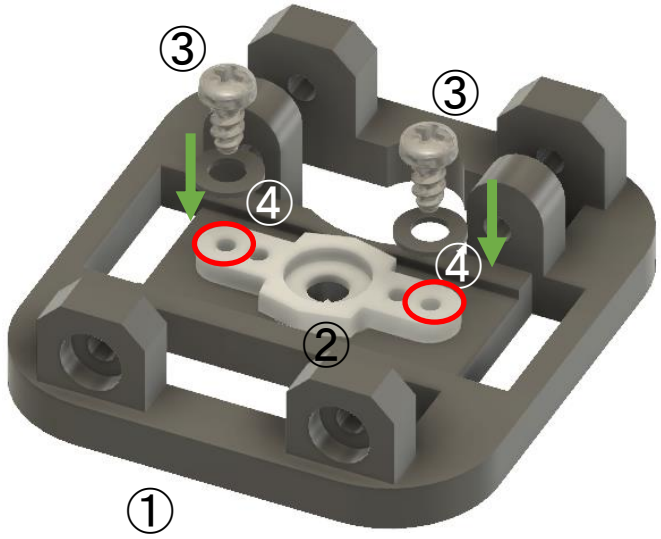
- - - - Cut if it is too long.

4-4. Around the Body Assemble 3 (make two for Right and Left)

①	x1	Leg_Base	Print
②	x1	Servo horn on 4 (or 2) wings	included with the servo
③	x2	M2x4mm Tapping Screw	
④	x2	Washer (if ③ screws is too long)	Print



4 wings 2 wings



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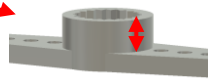
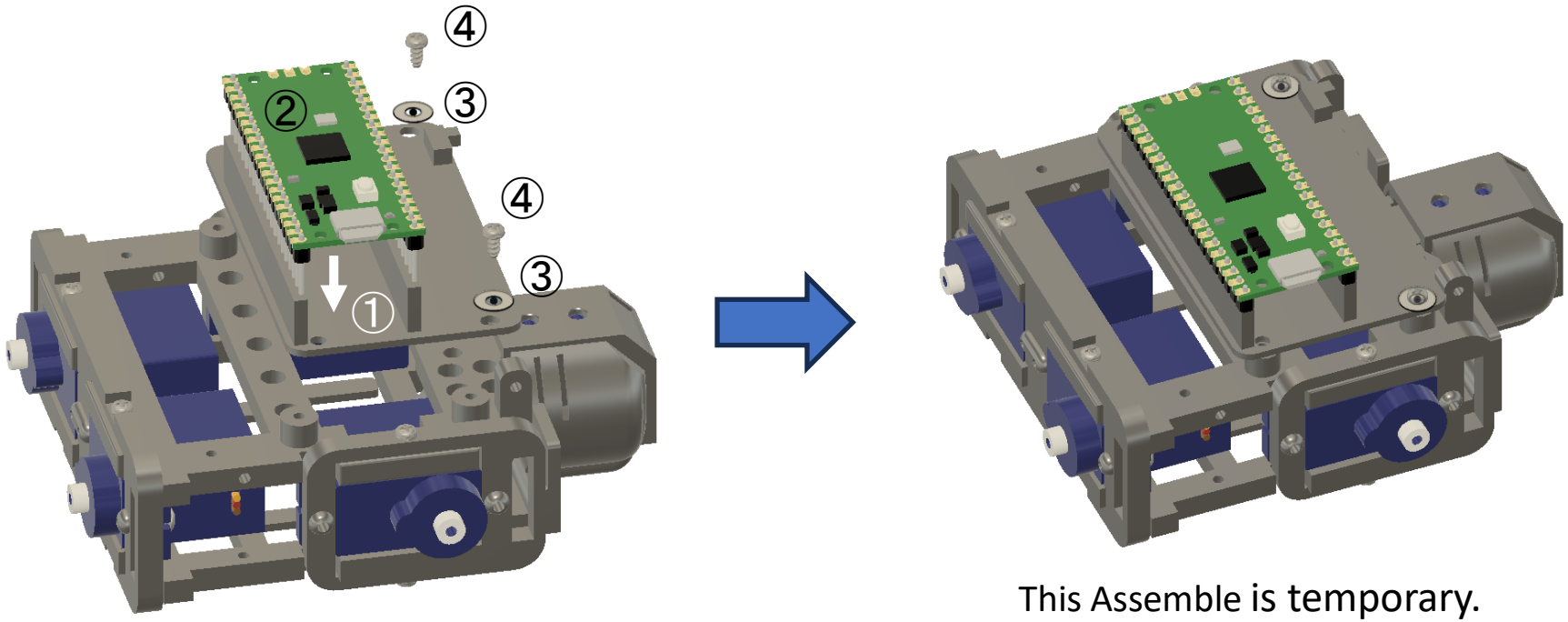


○ About 1.5mm pilot hole will make it easier for screws.

- - - - Cut if it is too long.

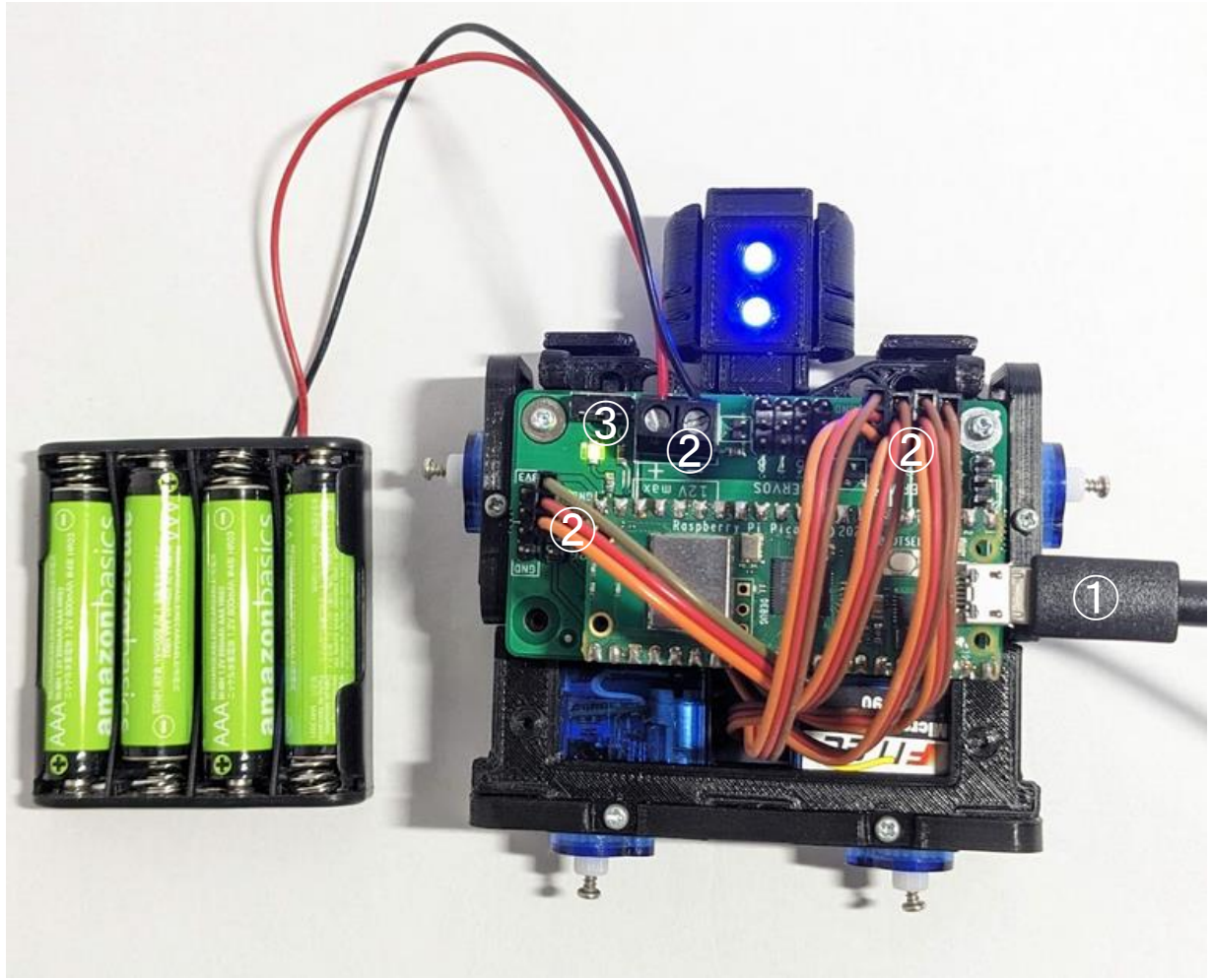
4-5. Temporary Assemble for servo position 1			
①	x1	Kitronik Simply Servos Board 5339	
②	x1	Raspberry Pi Pico WH (or W with 20x2 Pin Header)	
③	x2	Washer	print
④	x2	M2x4mm Tapping Screw	



This Assemble is temporary.

(My Pico WH and servo board were very tightly connected.)

4-5. Temporary Assemble for servo position2



① Import 6 files to pico through Tonny.

SamplePythonCode.zip

- main.py
- LedAction.py
- ServoAction.py
- ServoAction2.py
- SimplyServos.py
- Config.py

  (Change file name from Config.Change.py.
  You don't have to change contents at this time.)

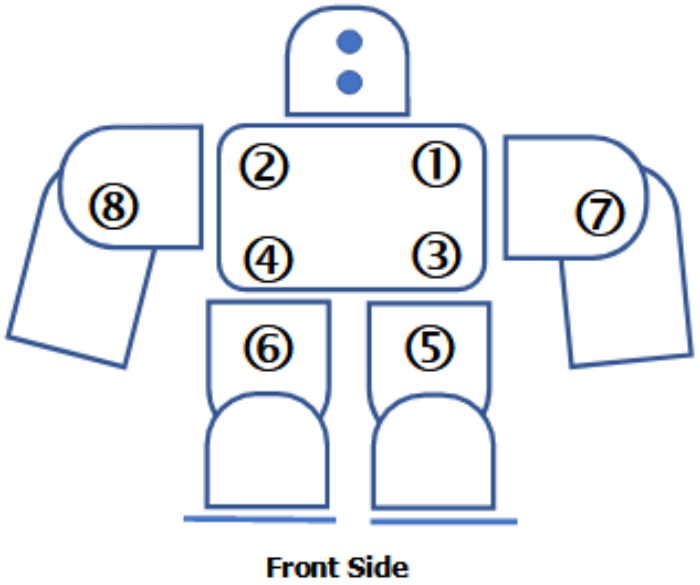
→ Head LED will light up.

② Connect Code and AAA Batteries.
This is also temporary.

③ Slide to ON side.

→ The servos move to its initial position.

(Reference) Initial servo position



Servo No.	Default Degree
①	150
②	30
③	90
④	90
⑤	90
⑥	90
⑦	30
⑧	150

Keep Servo Degree during assembling

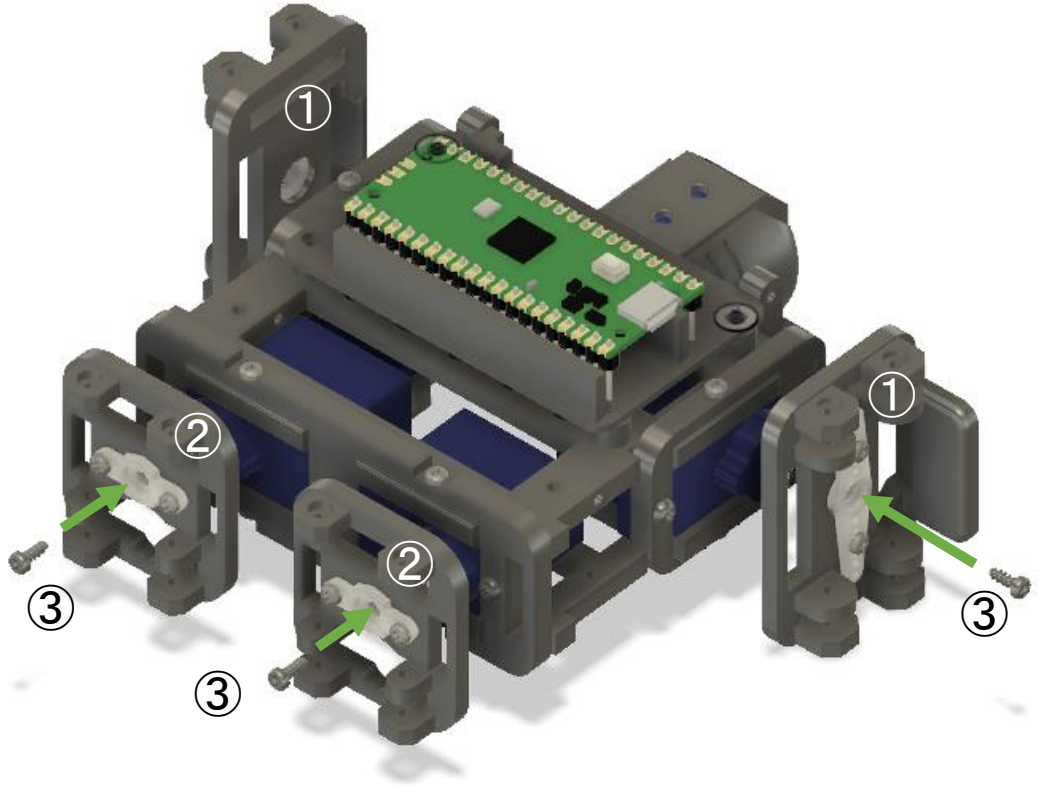
(Reference) Sample Code

SamplePythonCode.zip include following files.

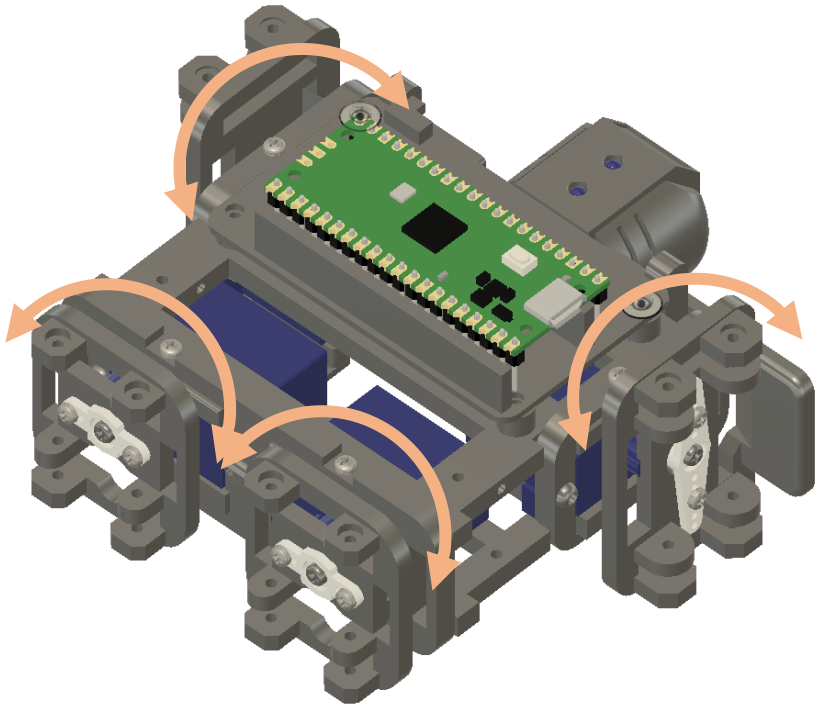
+-- main.py
+-- Config.Change.py (Save as "Config.py" and adjust for your environment)
+-- LedAction.py
+-- ServoAction.py (for exercise)
+-- ServoAction2.py (for walking forward)
+-- SimplyServos.py
(Same as https://github.com/KitronikLtd/Kitronik-Pico-Simply-Servos-MicroPython/tree/main/Library%20Without%20PIO)

4-6. Body Assemble

①	x2	Around the Body Assemble 2	
②	x2	Around the Body Assemble 3	
③	x4	Screws for Servo Horn	included with the servo



Keep Servo Initital Position.

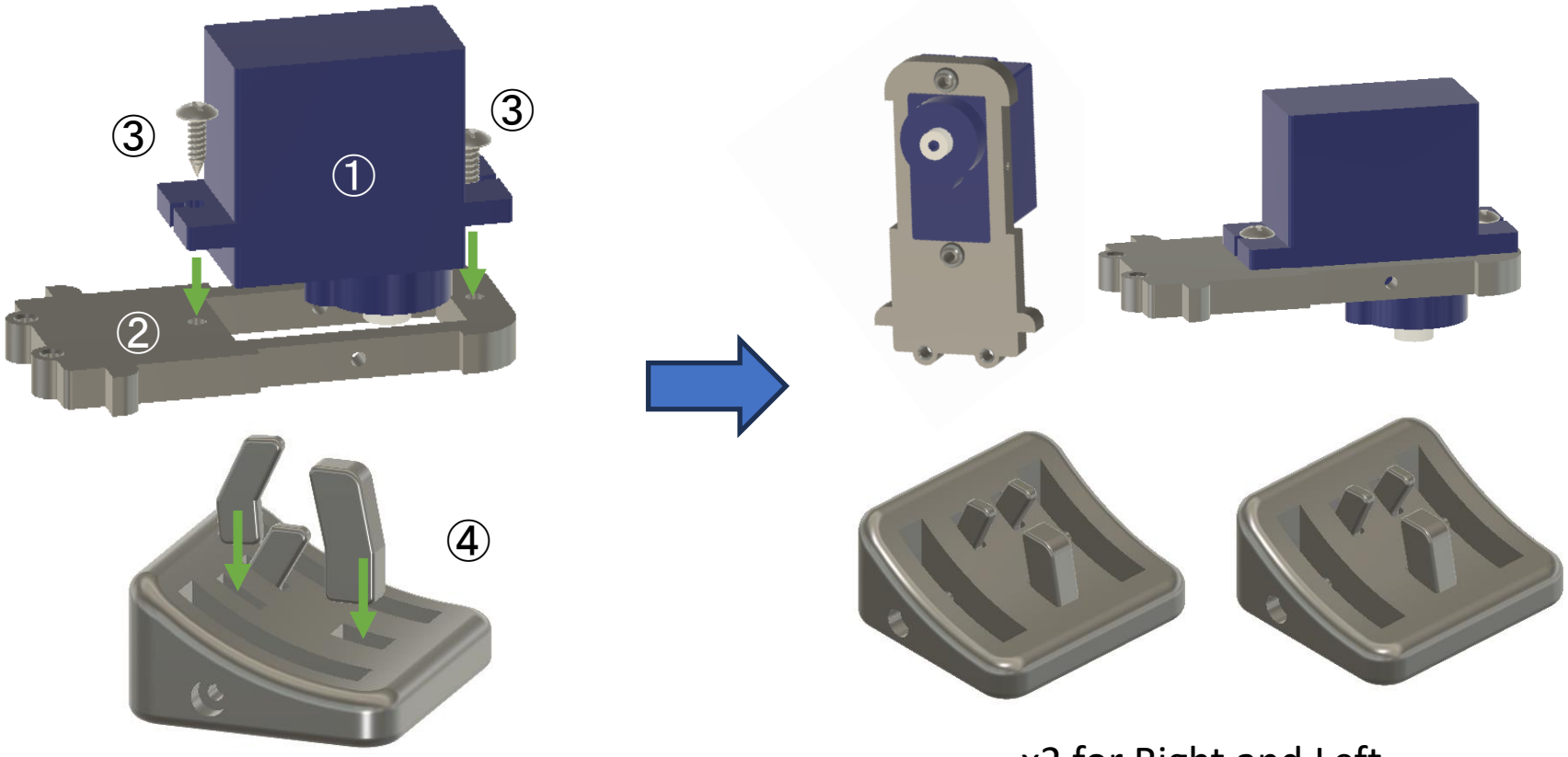


③ Check moving.
If it is hard, loosen the Servo horn screws.

5. Arms

5-1. Arm Assemble 1 (make two for Right and Left)

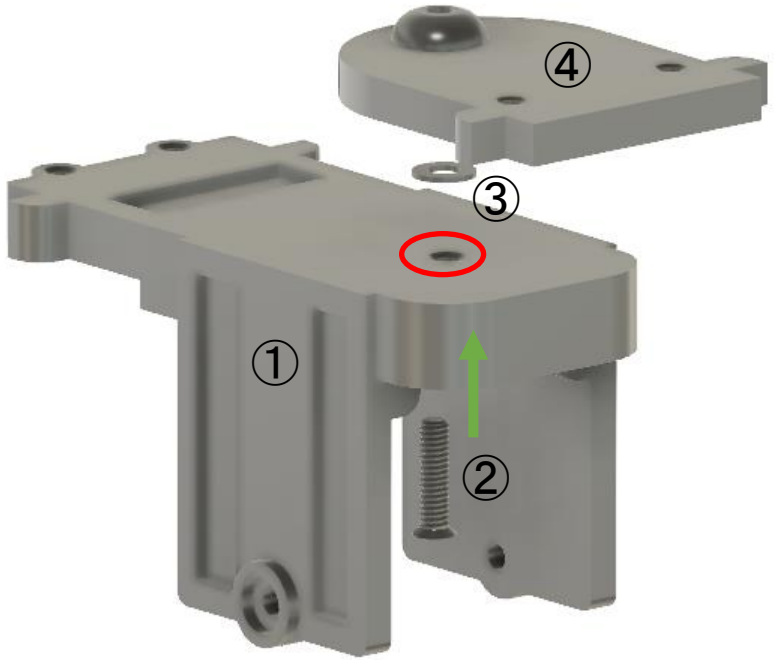
①	x1	Servo No.7 and 8	SG90 or MS18 or FS90
②	x1	Arm_Bracket (B)	Print
③	x2	Screws for Servo	included with the servo
④	x1 set	Arm_Hand	Print (4 pieces)



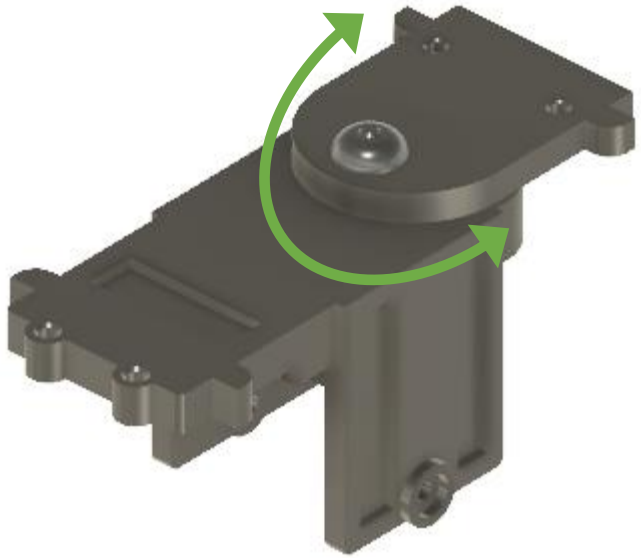
x2 for Right and Left

5-1. Arm Assemble 2 (make two for Right and Left)

①	x1	Arm_Bracket (A)	Print
②	x1	M2 x 8mm Screw	Machine, countersunk head
③	x1	Washer	Print
④	x1	Joint_Servo_B (Small hole)	Print



Check smooth moving

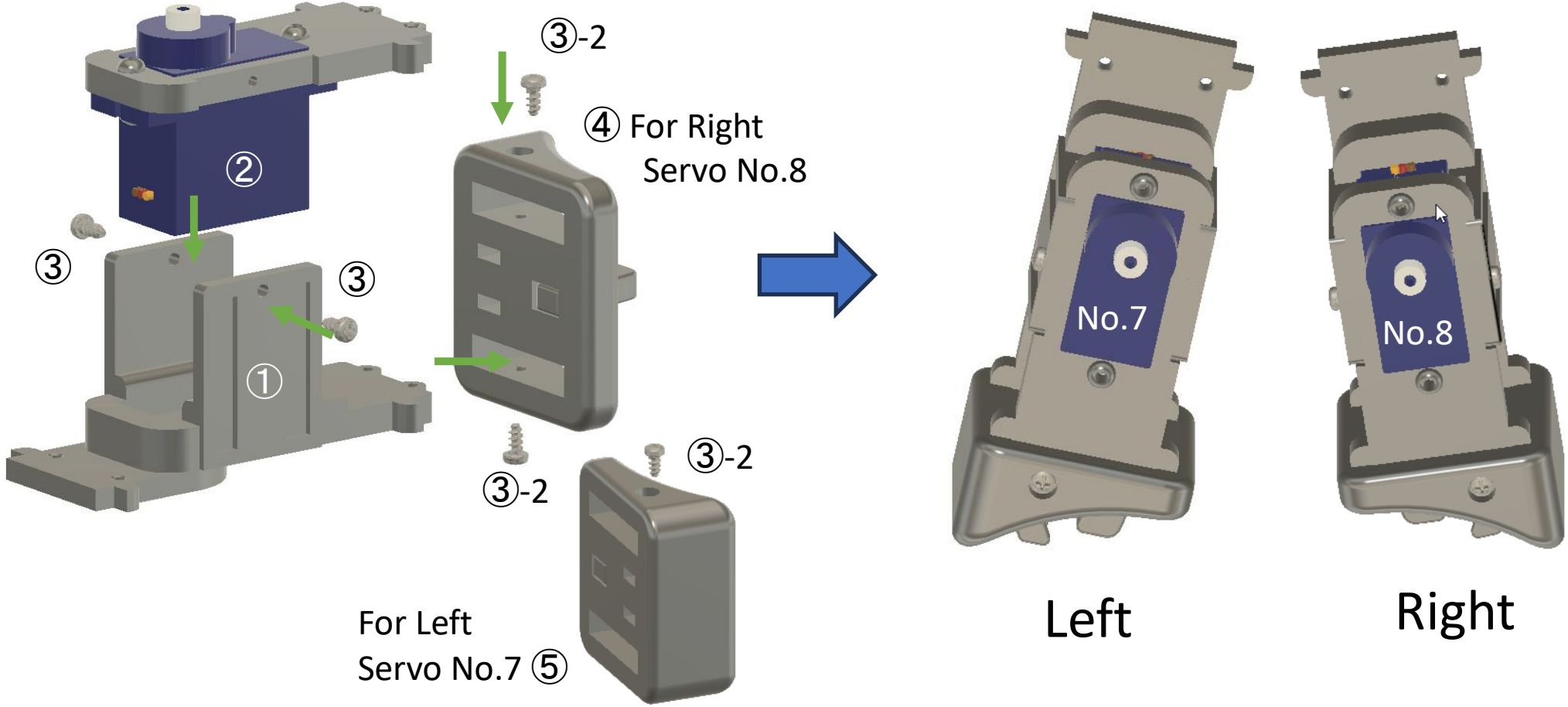


x2 for Right and Left

It may need 2mm pilot hole if 3D print is not clear.

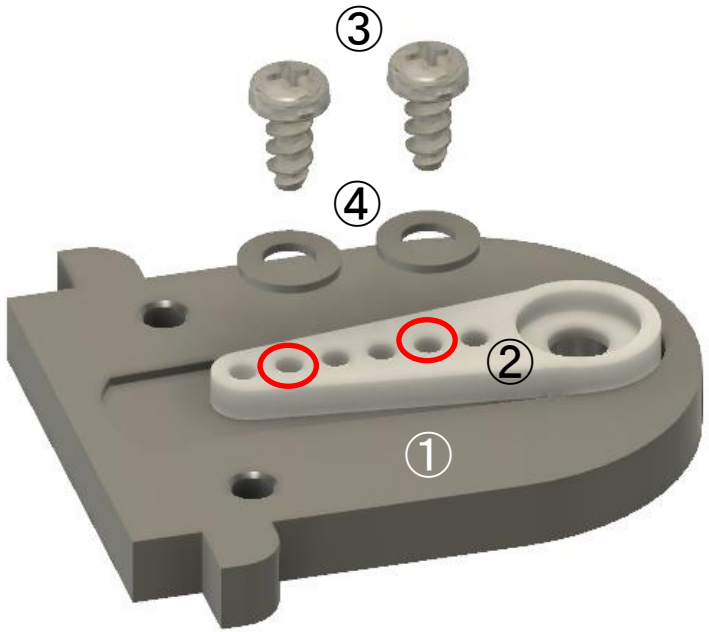
5-1. Arm Assemble 3 (make two for Right and Left)

①	x1	Arm Assemble 1	Right and Left are the same
②	x1	Arm Assemble 2	Right and Left are the same
③	x4	M2x4mm Tapping Screw	③-2 are screwed in last
④⑤	x2	Arm_Hand	④and⑤ are same parts, but different directions



5-2. Joint Assemble (make 4 Arms and Legs)

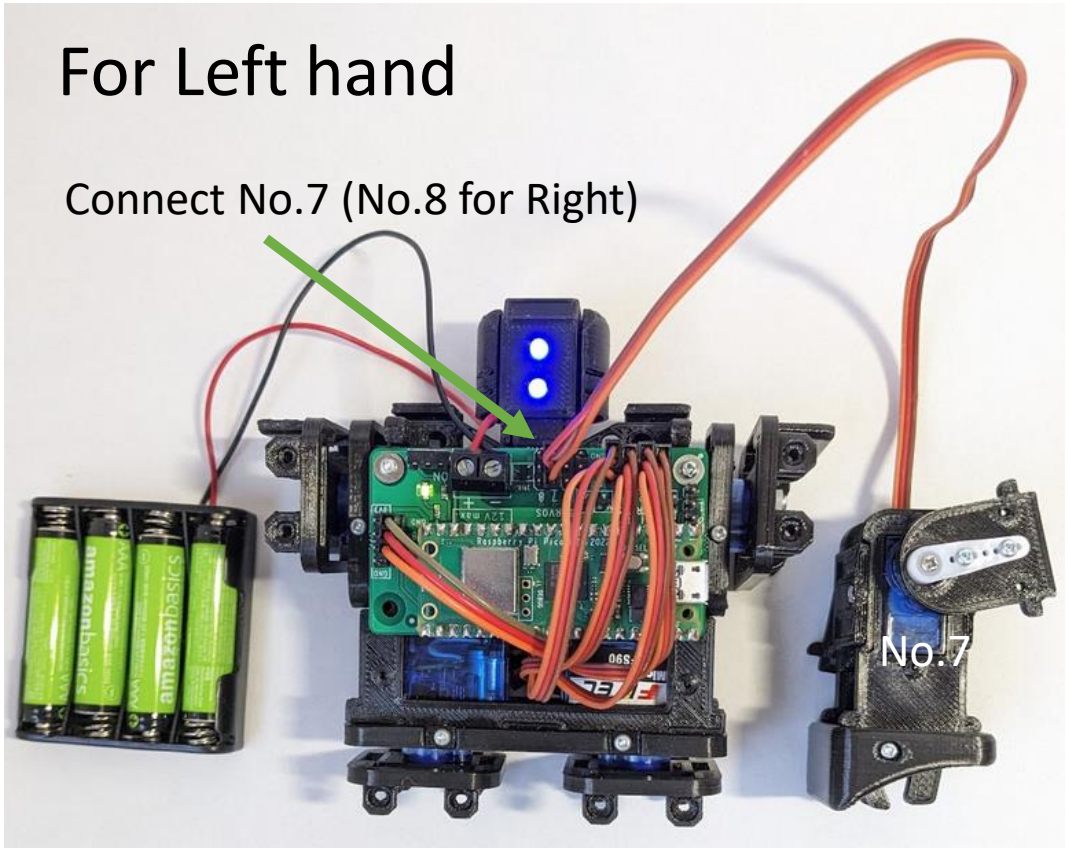
①	x1	Joint_Servo_A (Big hole)	Print
②	x1	Servo one-winged horn	included with the servo
③	x2	M2x4mm Tapping Screw	
④	x2	Washer	Print



x4 for Arms and Legs
Righ and Left

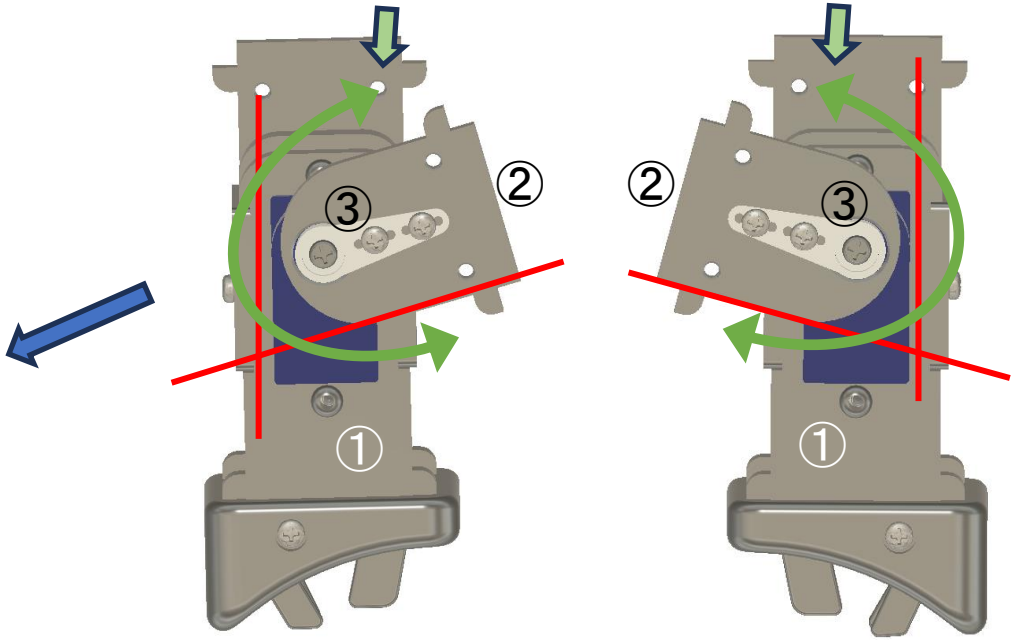
○ About 1.5mm pilot hole will make it easier for screws.

5-3. Arms Assemble			
①	x2	Arm Assemble	
②	x2	Joint Assemble	
③	x2	Screws for Servo Horn	included with the servo



Keep Servo Initial Position.

③ Check moving.
If it is hard, loosen the Servo horn screws.



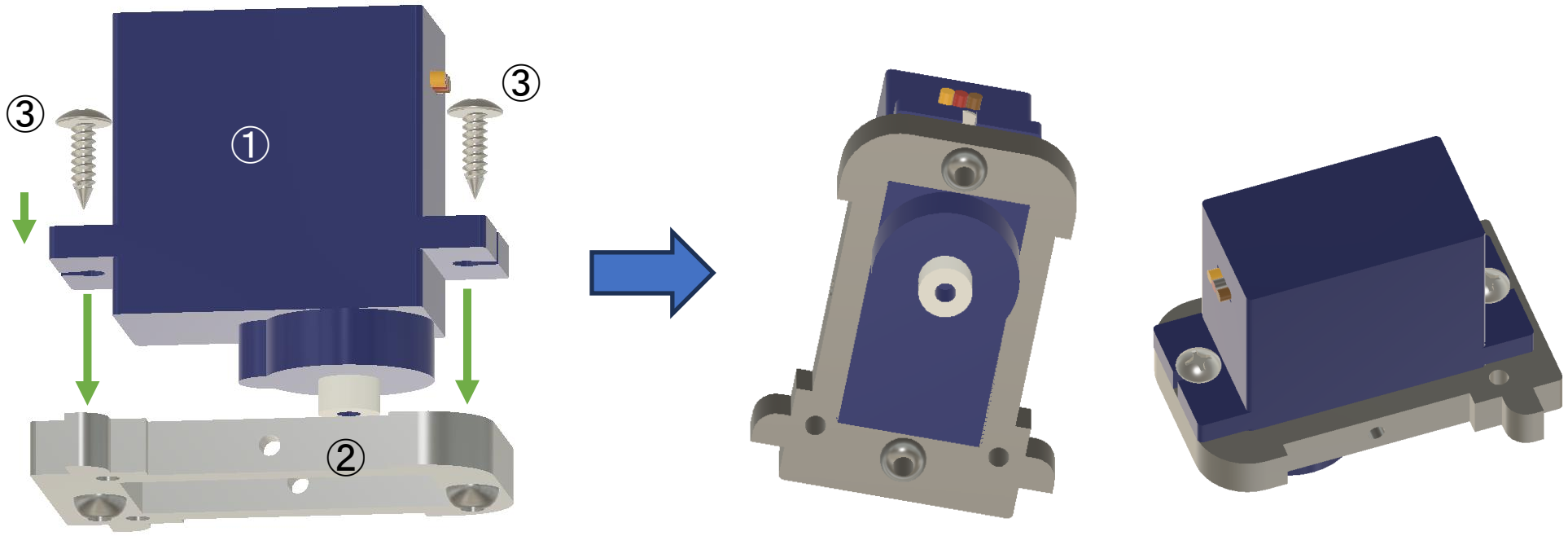
For Left

For Right

6. Legs

6. Leg Assemble 1 (make two for Right and Left)

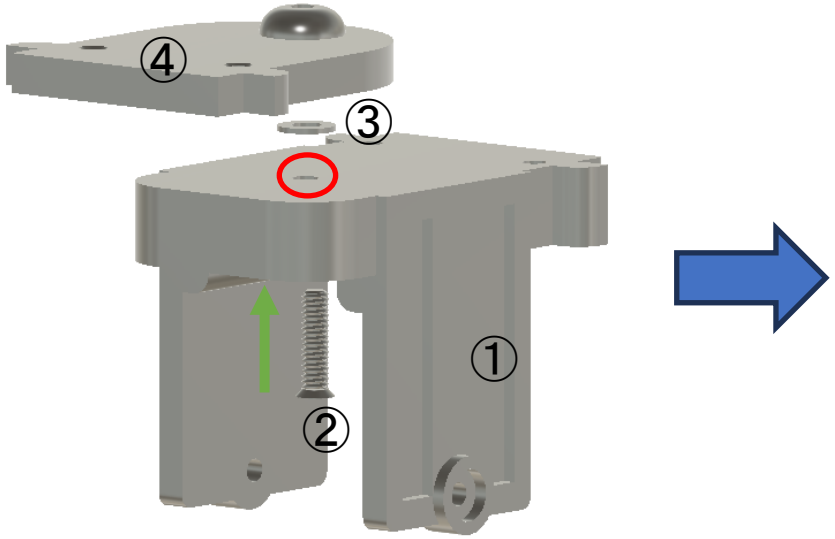
①	x1	Servo No.5 and 6	SG90 or MS18 or FS90
②	x1	Leg_Bracket (B)	Print
③	x2	Screws for Servo	included with the servo



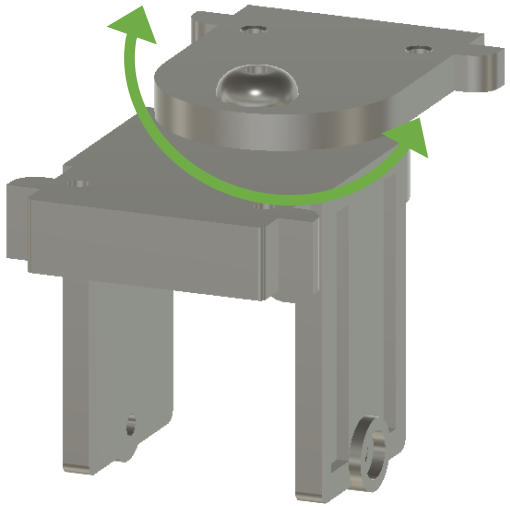
x2 for Right and Left

6. Leg Assemble 2 (make two for Right and Left)

①	x1	Leg_Bracket (A)	Print
②	x1	M2 x 8mm Screw	Machine, countersunk head
③	x1	Washer	Print
④	x1	Joint_Servo_B (Small hole)	Print



Check smooth moving



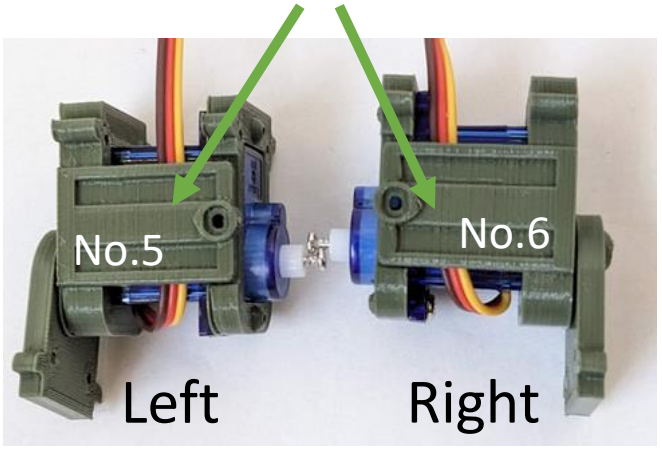
x2 for Right and Left

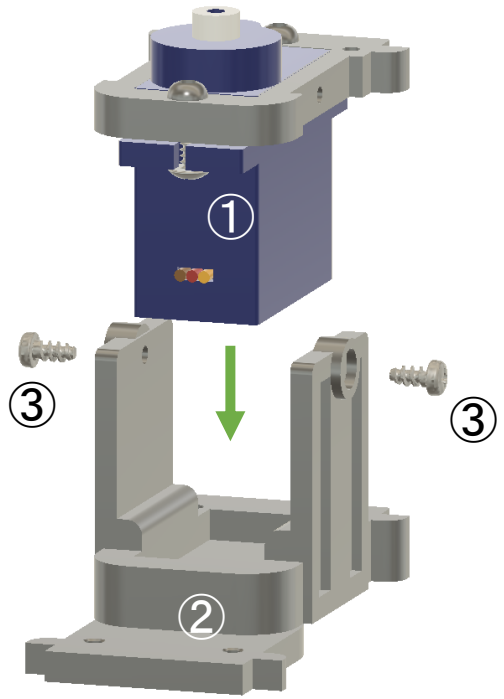
⬭ It may need 2mm pilot hole if 3D print is not clear.

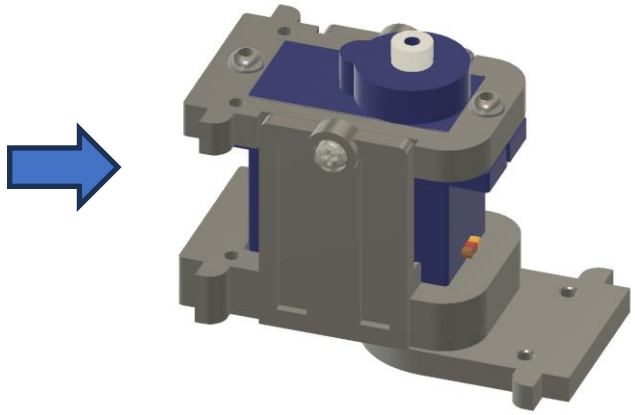
6. Leg Assemble 3 (make two for Right and Left)

①	x1	Leg Assemble 1	Right and Left are the same
②	x1	Leg Assemble 2	Right and Left are the same
③	x4	M2x4mm Tapping Screw	

1. Bend the cable
2. Assemble



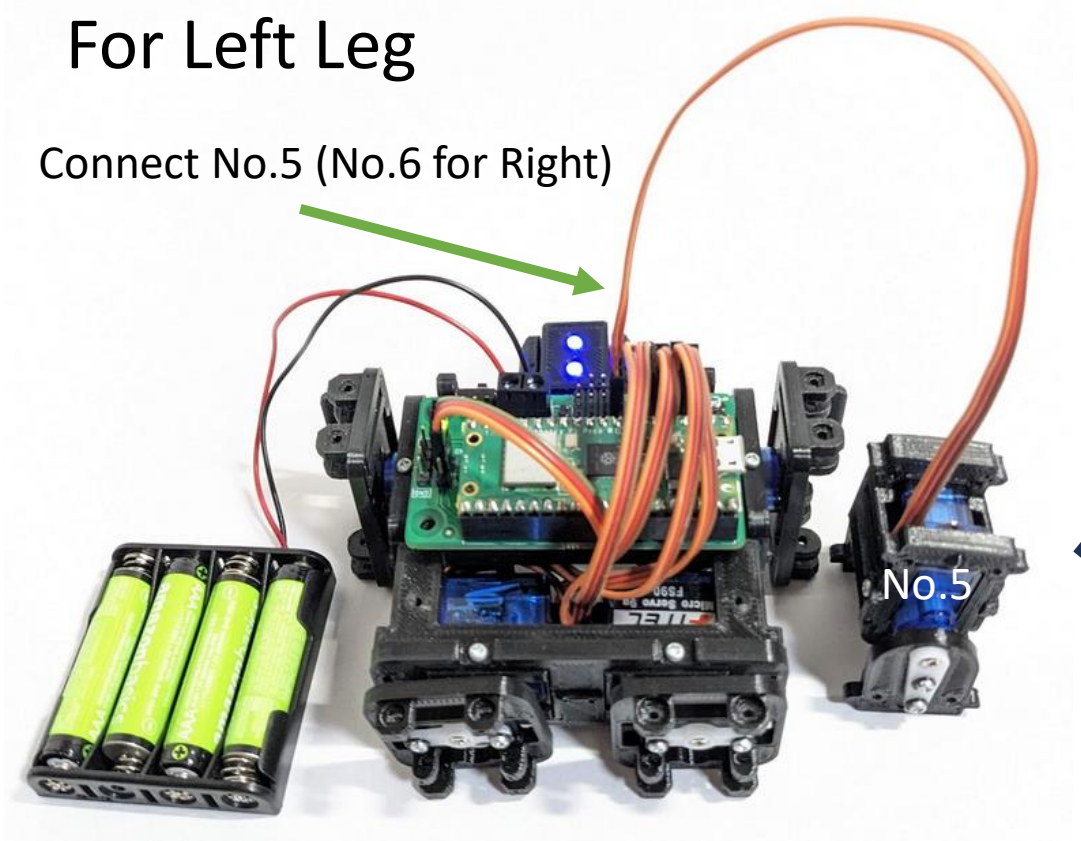




x2 for Right and Left

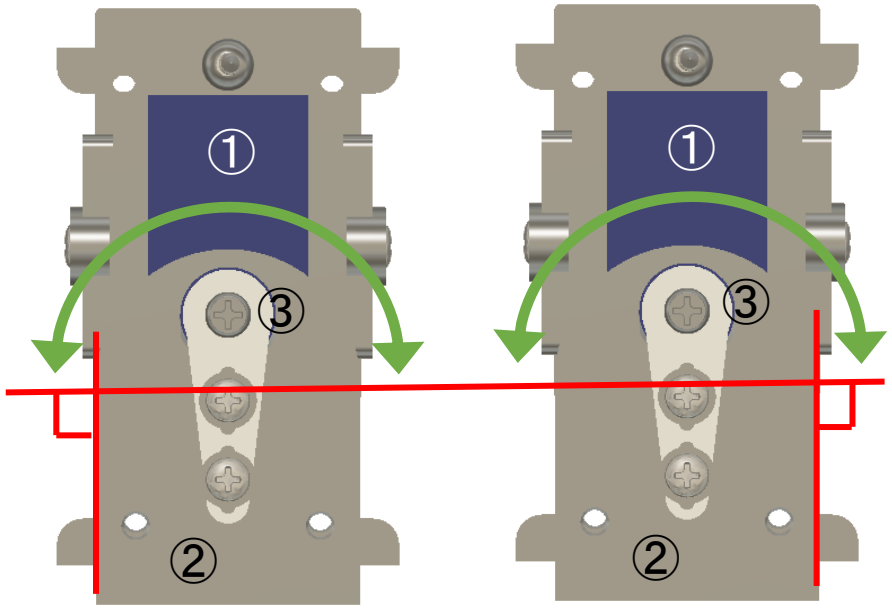
The direction of bending the cable is different.

6. Leg Assemble 4			
①	x2	Leg Assemble 3	
②	x2	Joint Assemble	
③	x2	Screws for Servo Horn	included with the servo



Keep Servo Initial Position.

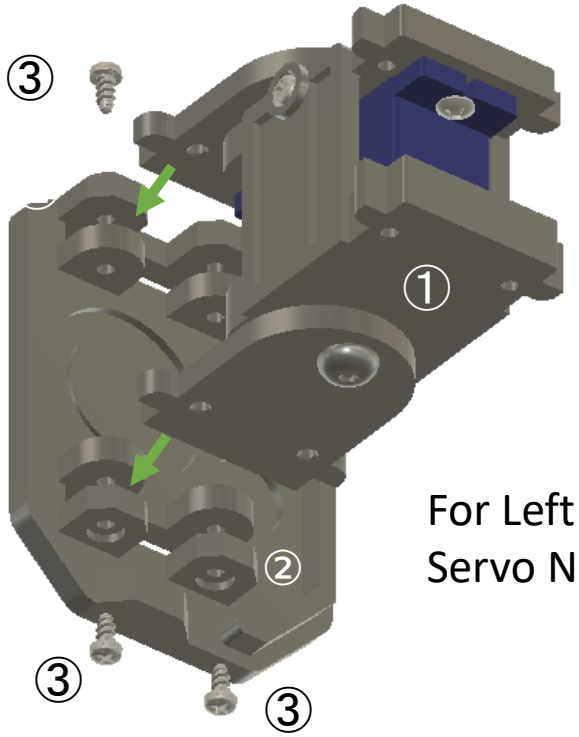
③ Check moving.
If it is hard, loosen the Servo horn screws.



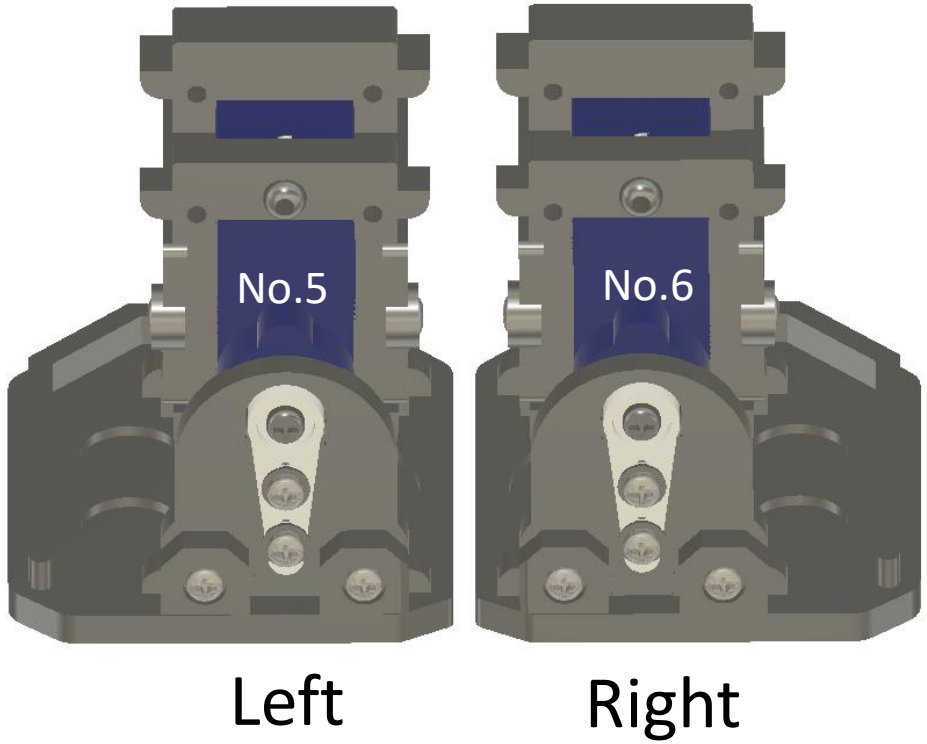
Make for Right and Left.

6. Leg Assemble 5

①	x1	Leg Assemble 4	Right and Left are the same
②	x1	Right and Left Leg Foot	Print
③	x4	M2x4mm Tapping Screw	



For Left
Servo No.5

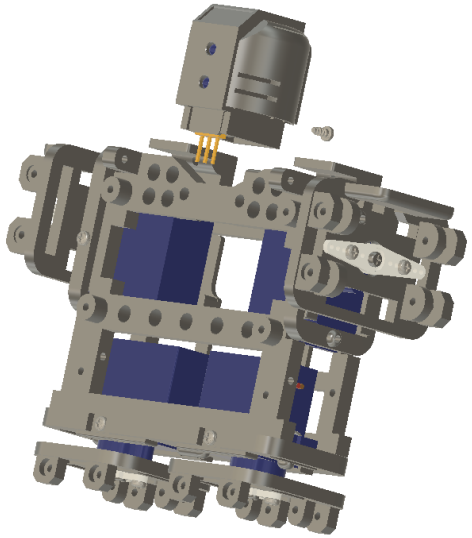


7. Combine

7-1. Arm Combine

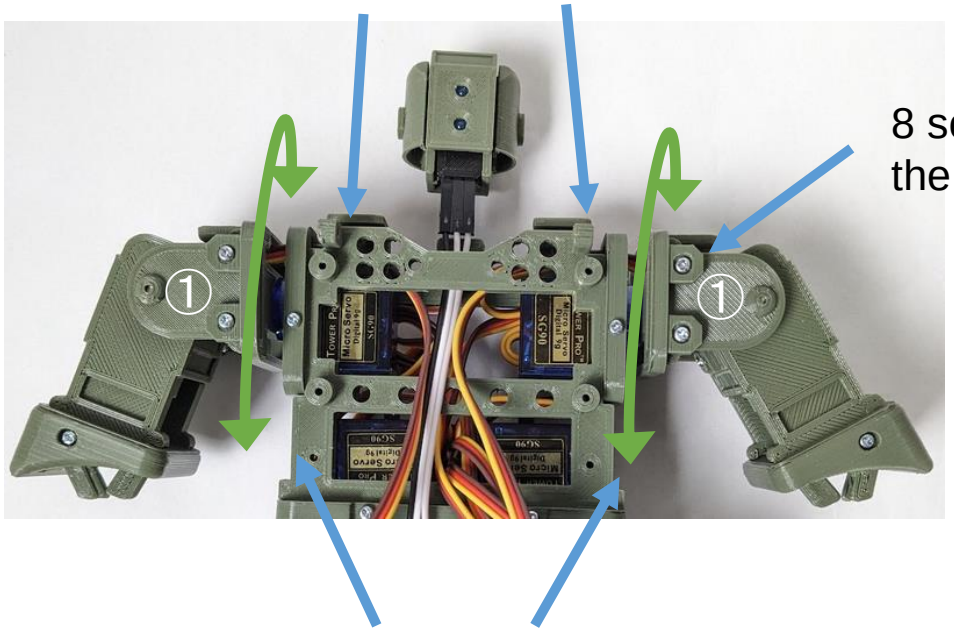
①	x8	M2x4mm Tapping Screw	

Take off battery,
servo board and head.



Don't forget to remove batteries from case.

After inserting the code, join the Arms

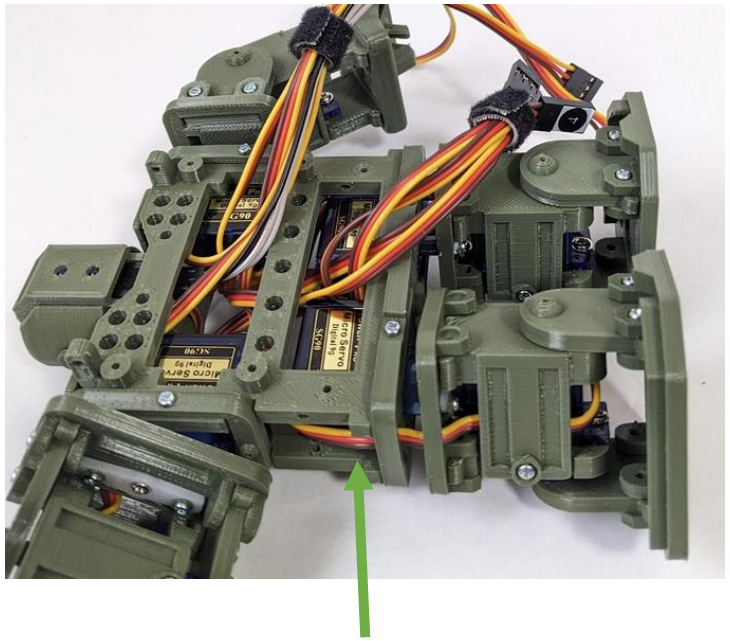


8 screws on
the front and back

Check arms go up.

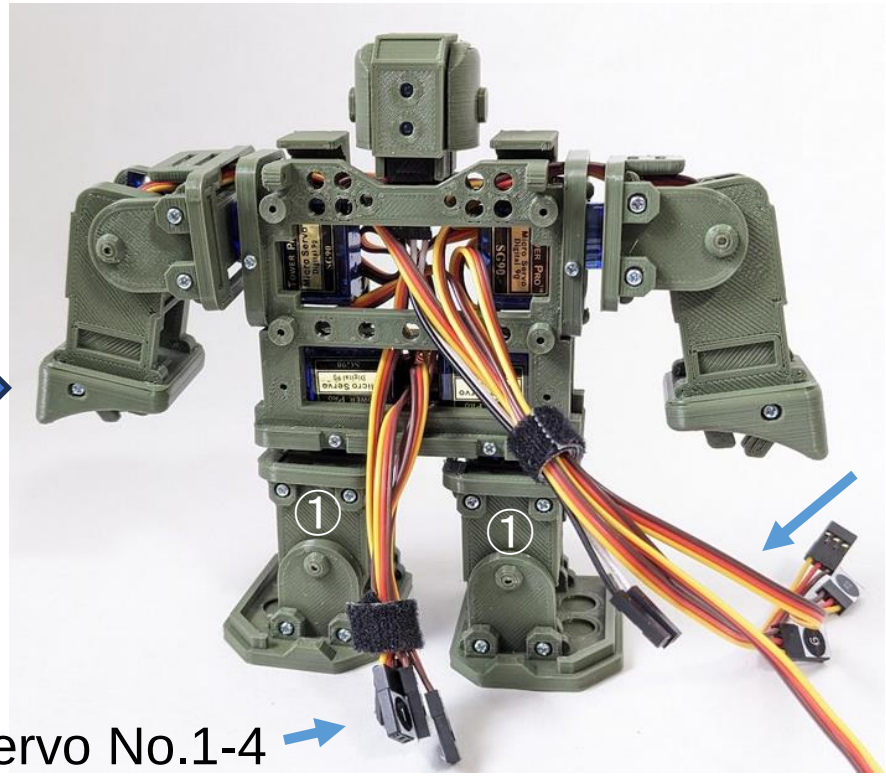
7-2. Leg Combine

①	x8	M2x4mm Tapping Screw	



After inserting the code,
join the Legs

① 8 screws on the front and back



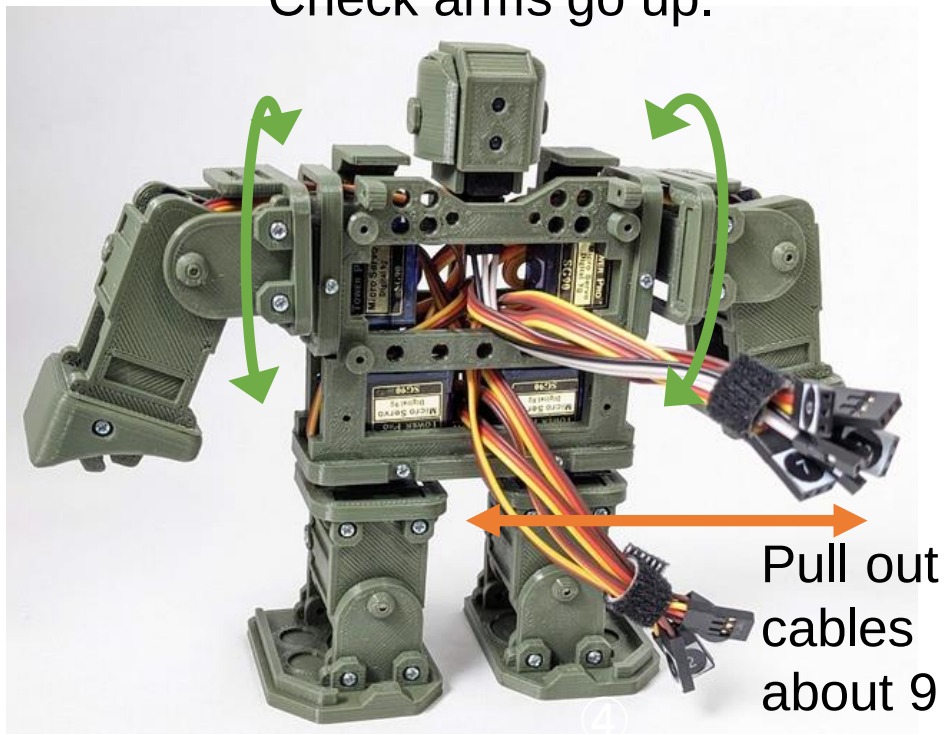
Servo
No.5-8
and LED

Servo No.1-4
(and LED)

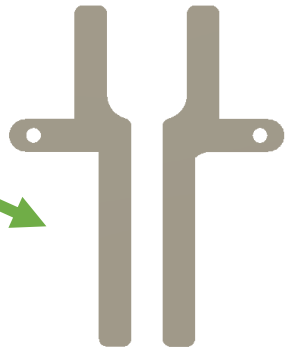
7-3. Cable Arrangement

①	x1	Cover Cable Holder	Print
②	x2	M2x4mm Tapping Screw	

Check arms go up.



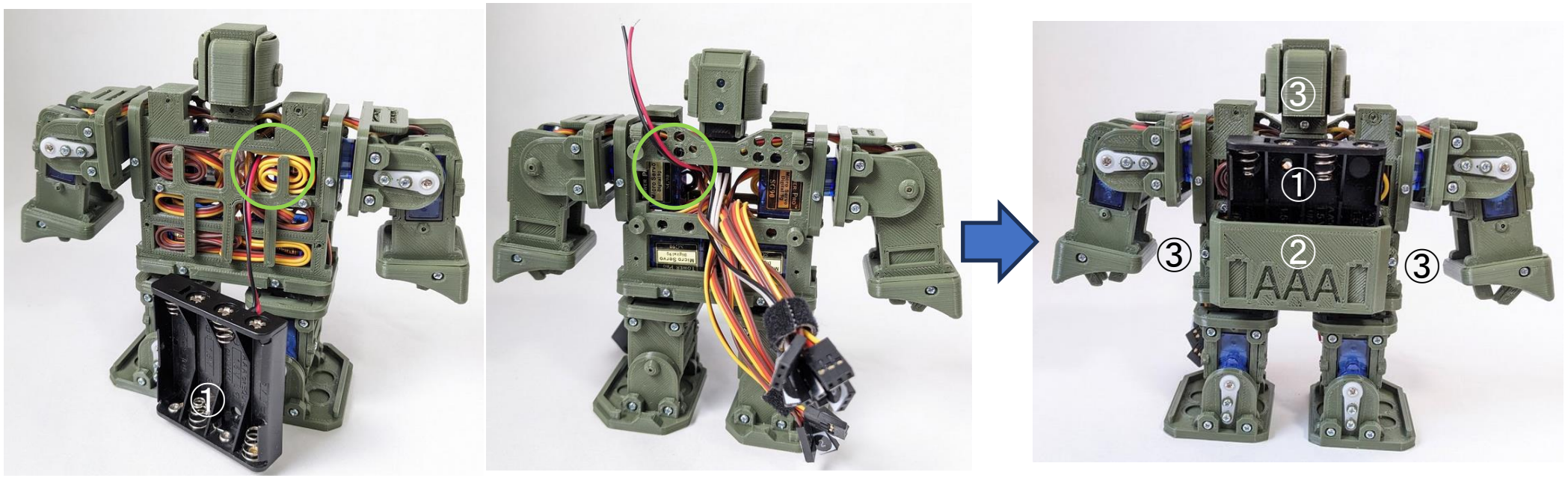
Pull out the cables about 9 cm from body.



Take off the temporary cable holder and replace it with ①

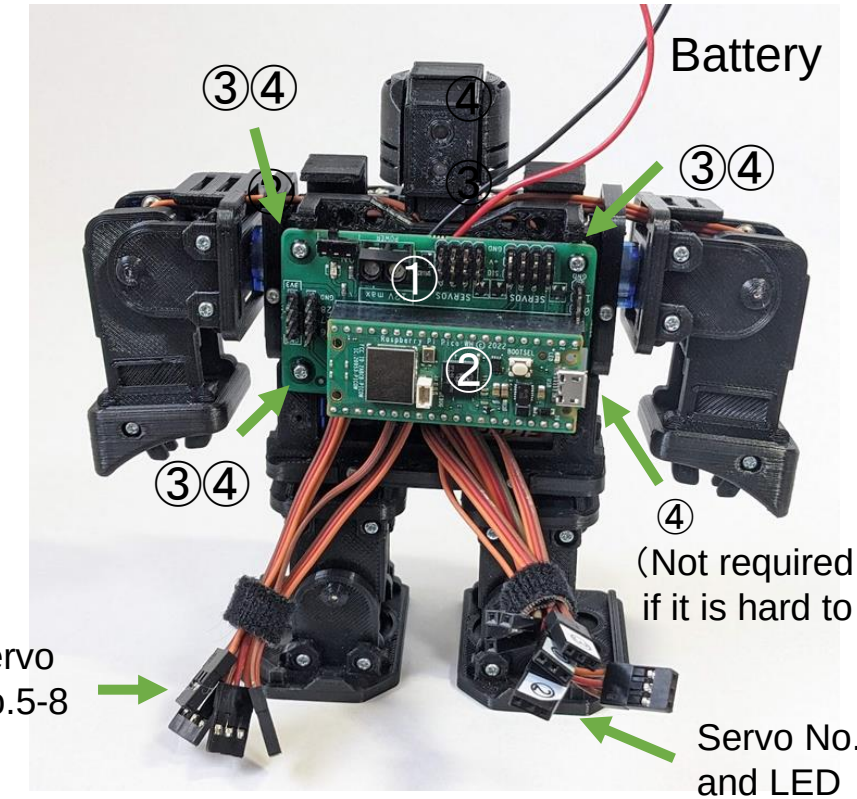
7-4. AAA Battery Case

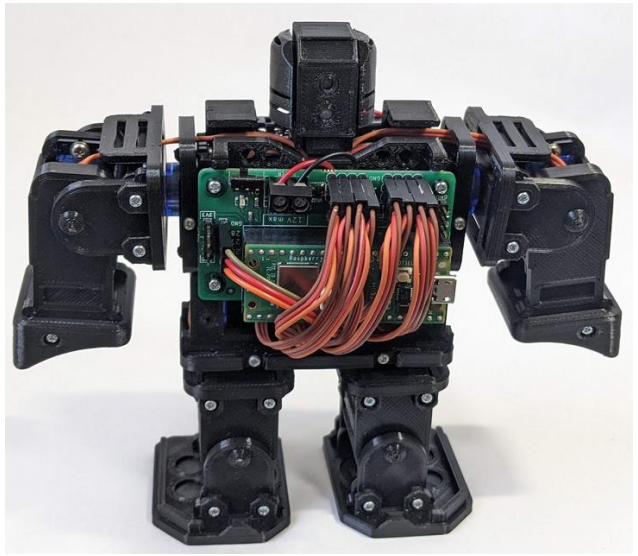
①	x1	AAAx4 Battery Case	
②	x1	Cover Back Under	Print
③	x3	M2x4mm Tapping Screw	



7-5. Servo Board and Raspberry Pi Pico

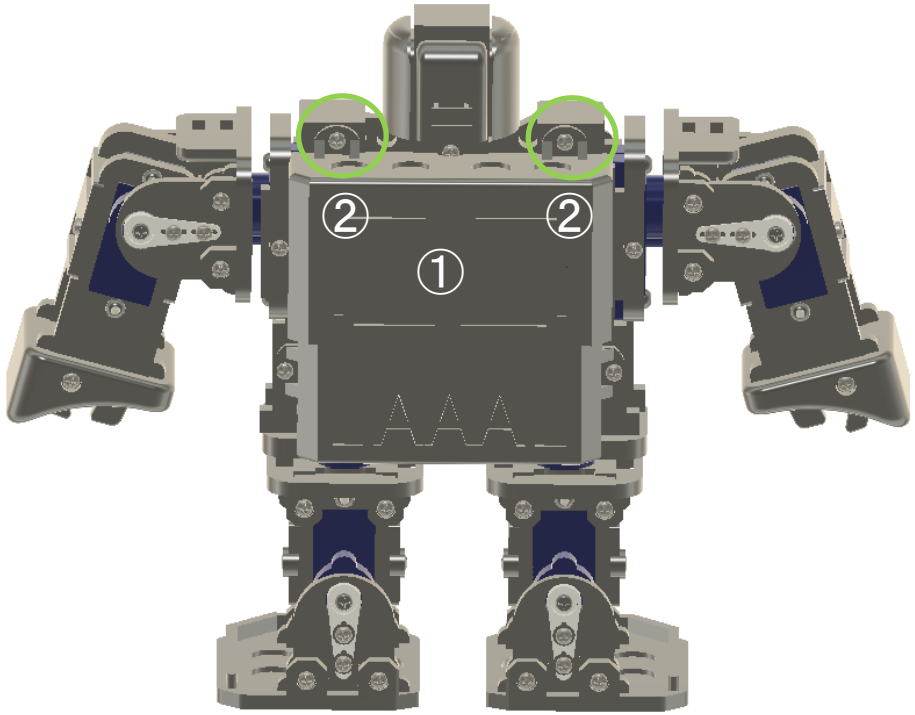
①	x1	Kitronik Simply Servos Board 5339	
②	x1	Raspberry Pi Pico WH (or W with 20x2 Pin Header)	
③	x3	Washer	print
④	x3(4)	M2x4mm Tapping Screw	

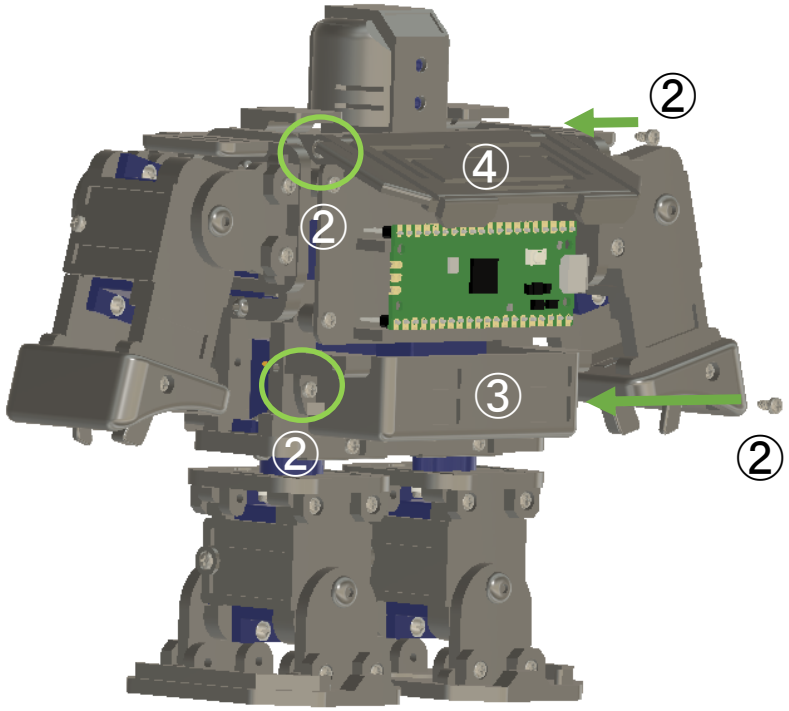




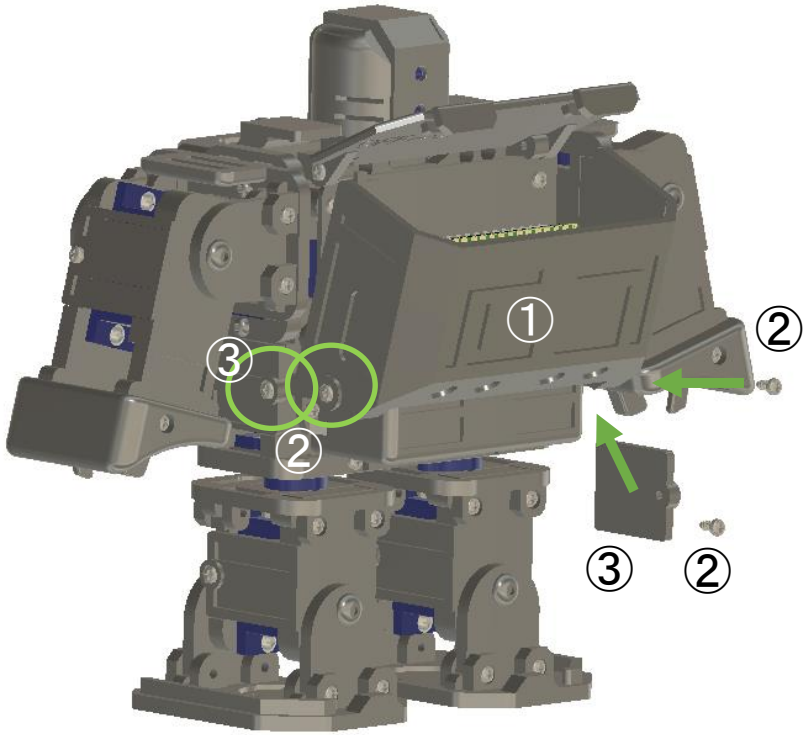
8. Covers

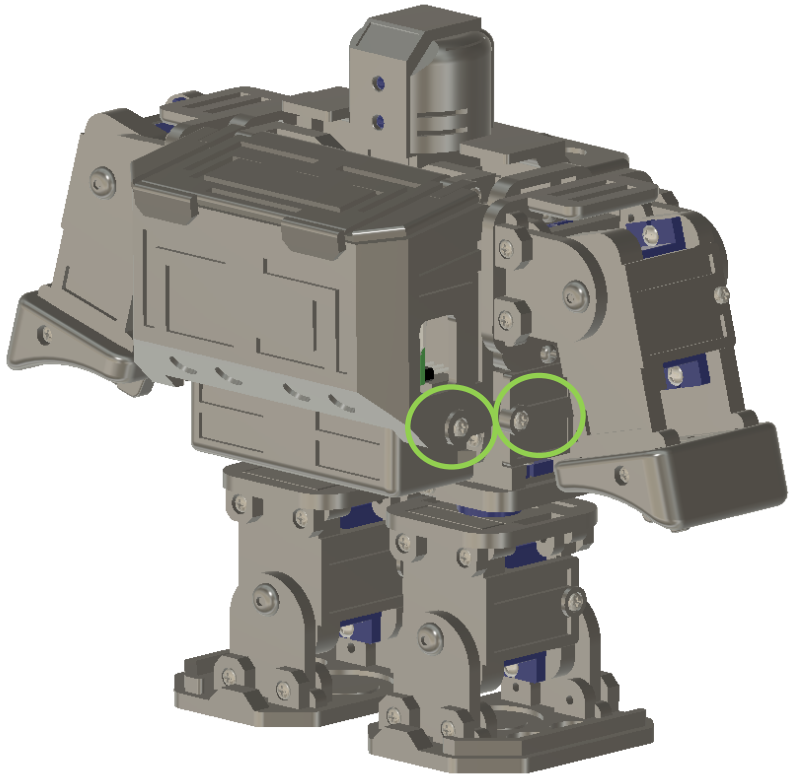
8. Cover 1			
①	x1	Cover Back Upper	Print
②	x6	M2x4mm Tapping Screw	
③	x1	Cover Front Under	Print
④	x1	Cover Front Top	Print

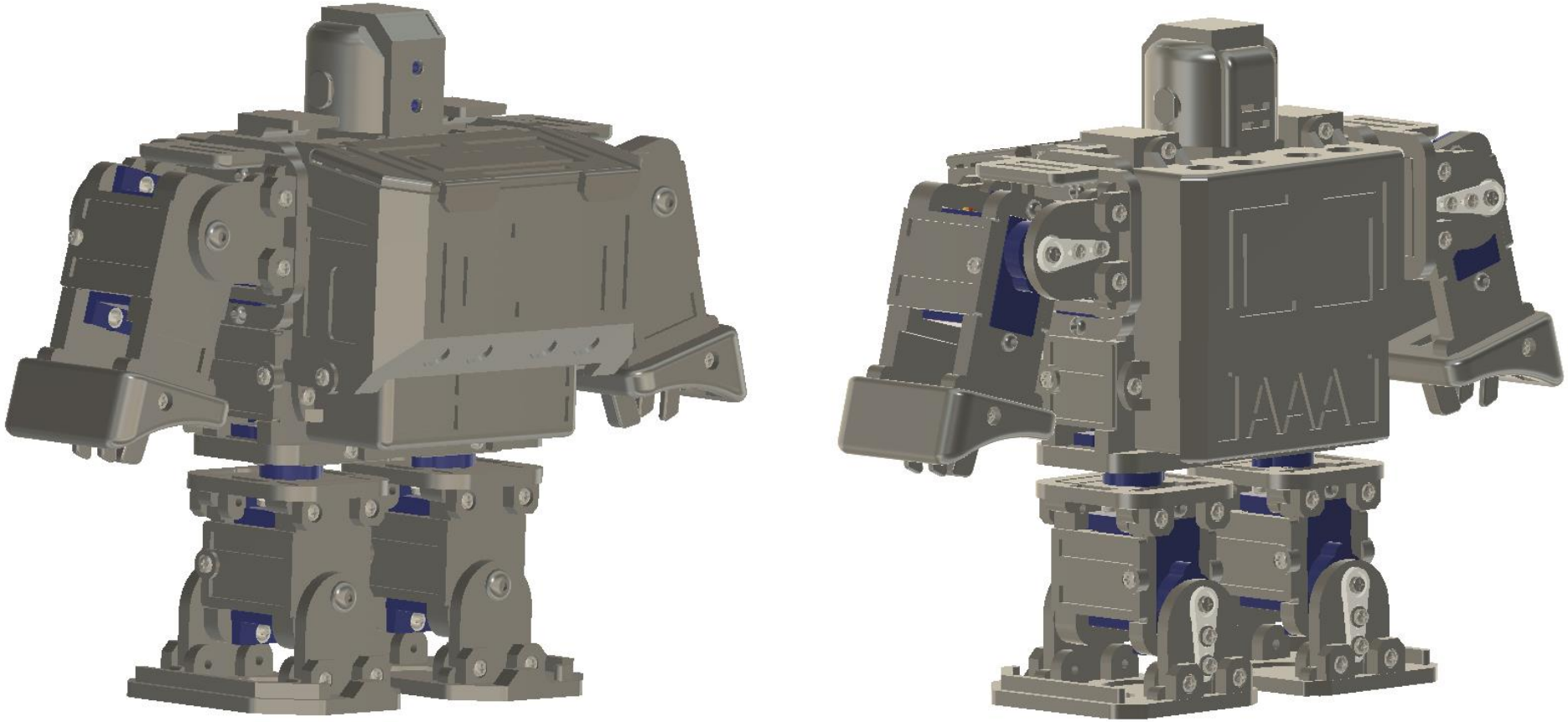




8. Cover 2			
①	x1	Cover Front Middle	Print
②	x4	M2x4mm Tapping Screw	
③	x2	Body Side Cover	Print







Assemble completed

9. Motions

9-1. Adjusting config.py

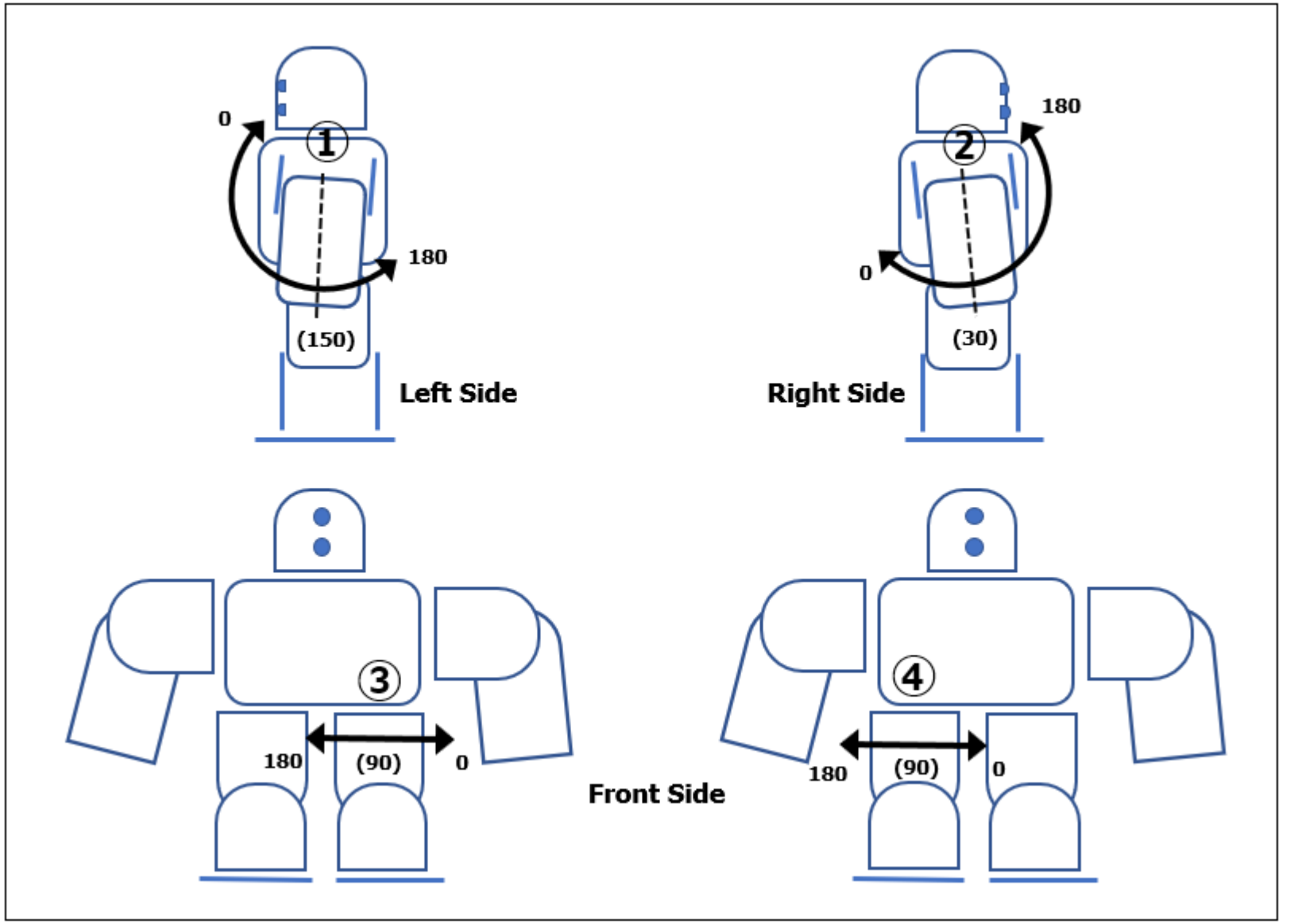
Config.py (Change file name from Config.change.py)

```
# WIFI

SSID = "Your SSID"
Password = "Your Password"


# Servo Init Position.

S1 = 150
S2 = 30
S3 = 90
S4 = 90
S5 = 90
S6 = 90
S7 = 30
S8 = 150
```

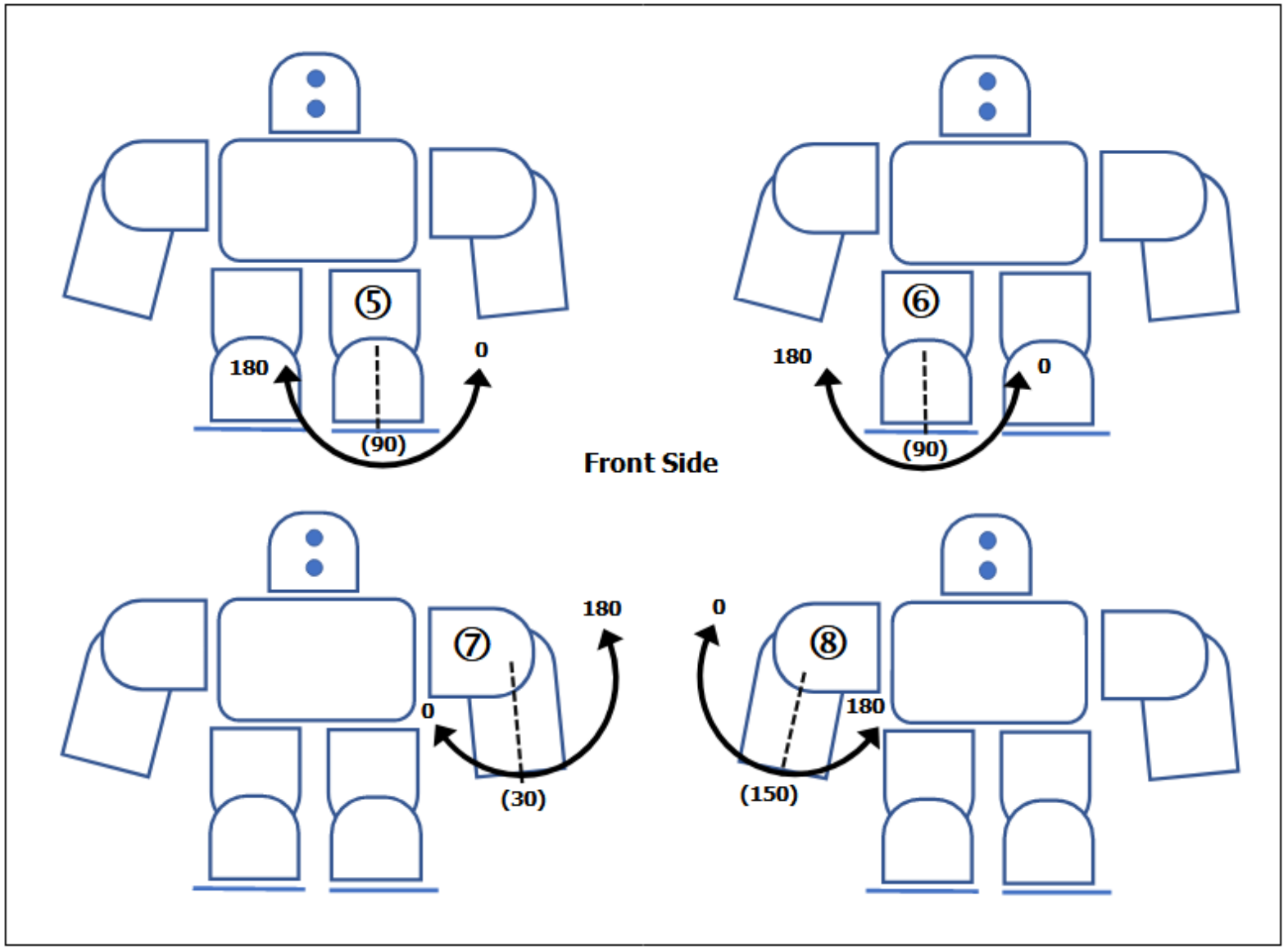
Refer to the following "Servo Number, Positon, Initial Degree ① ～⑧".
The numbers in parentheses are the default initial values.

For example, for servo number ①, if the left arm is turning backwards, set it less than 150 to turn it forwards. (example 147)
On the other hand, if left arm is too forward, set it to more than 150. (example 153)

Servo Number, Positon, Initial Degree ①～④

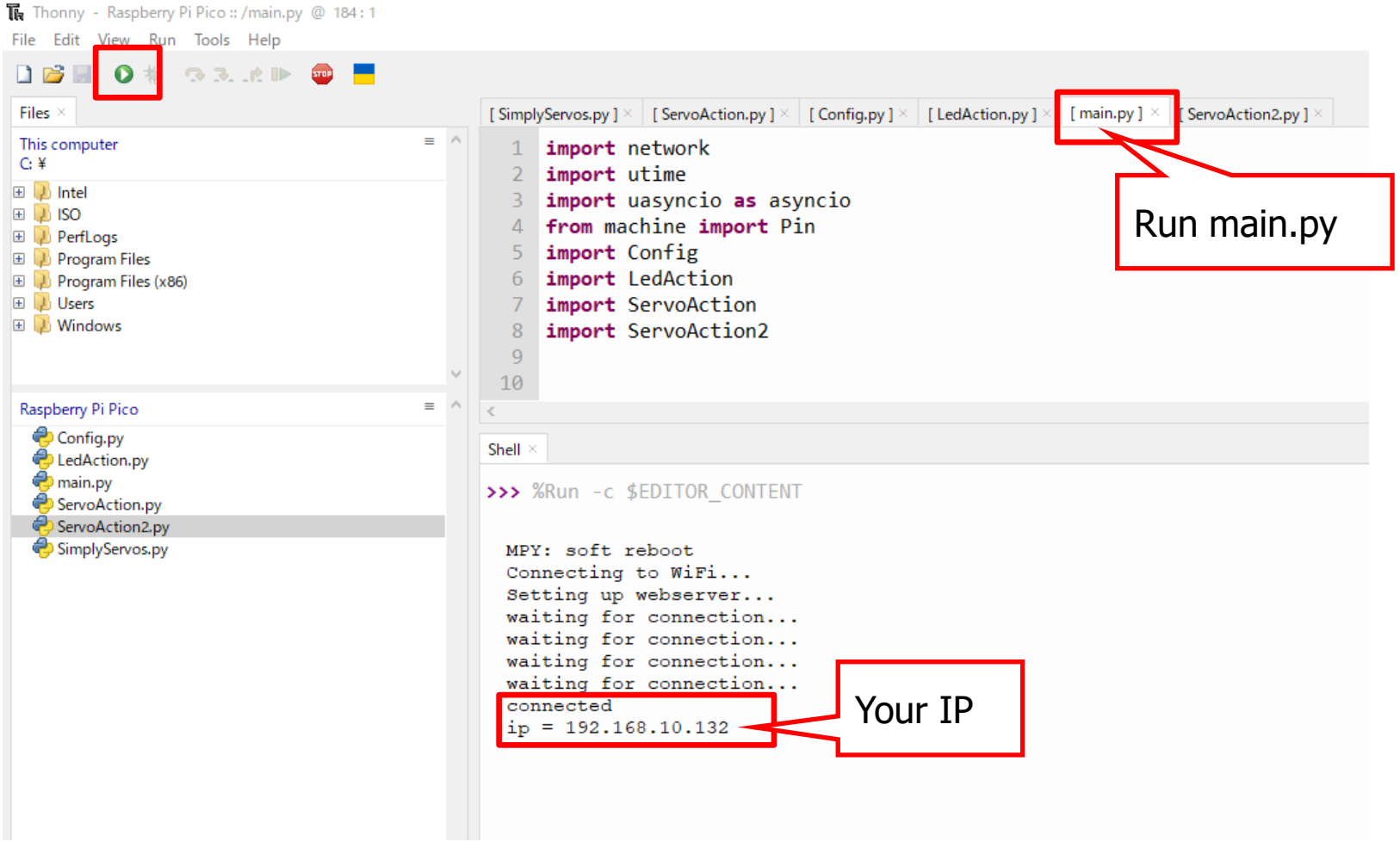


Servo Number, Positon, Initial Degree ⑤～⑧

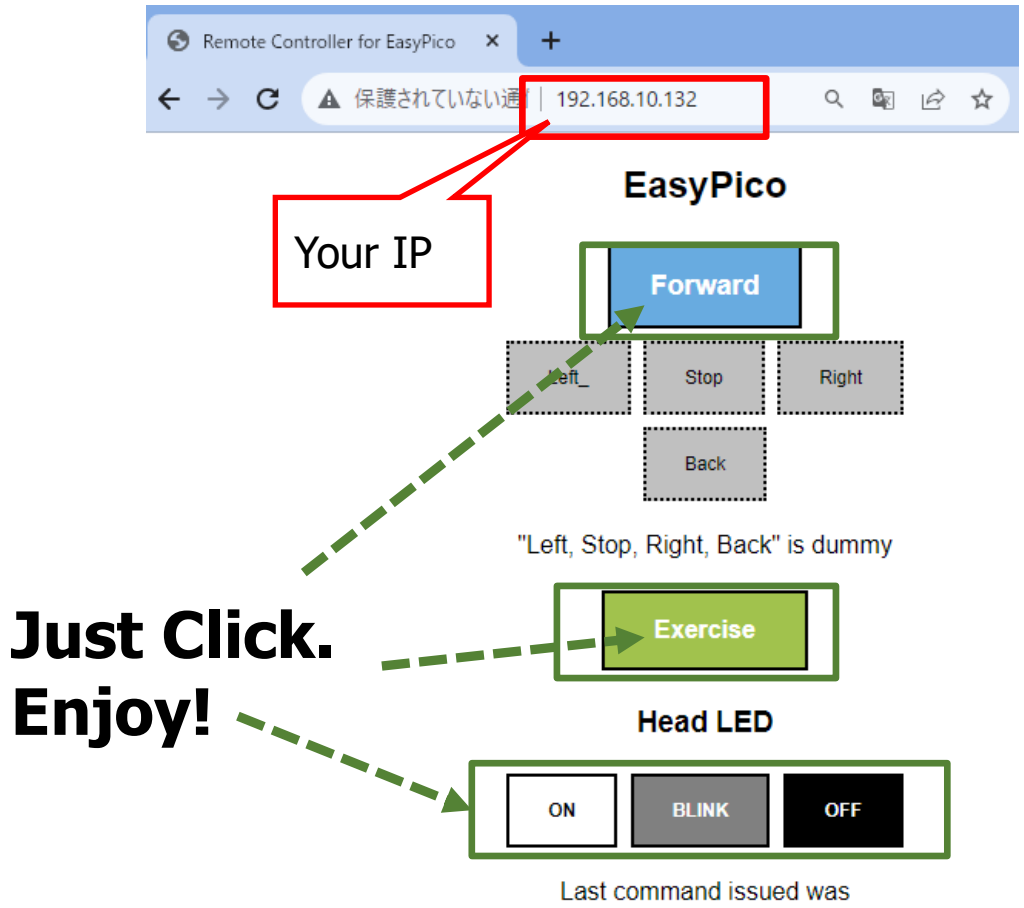


9-2. Check IP address

Check your IP with Thonny.



9-3. Access Browser



Just Click.
Enjoy!