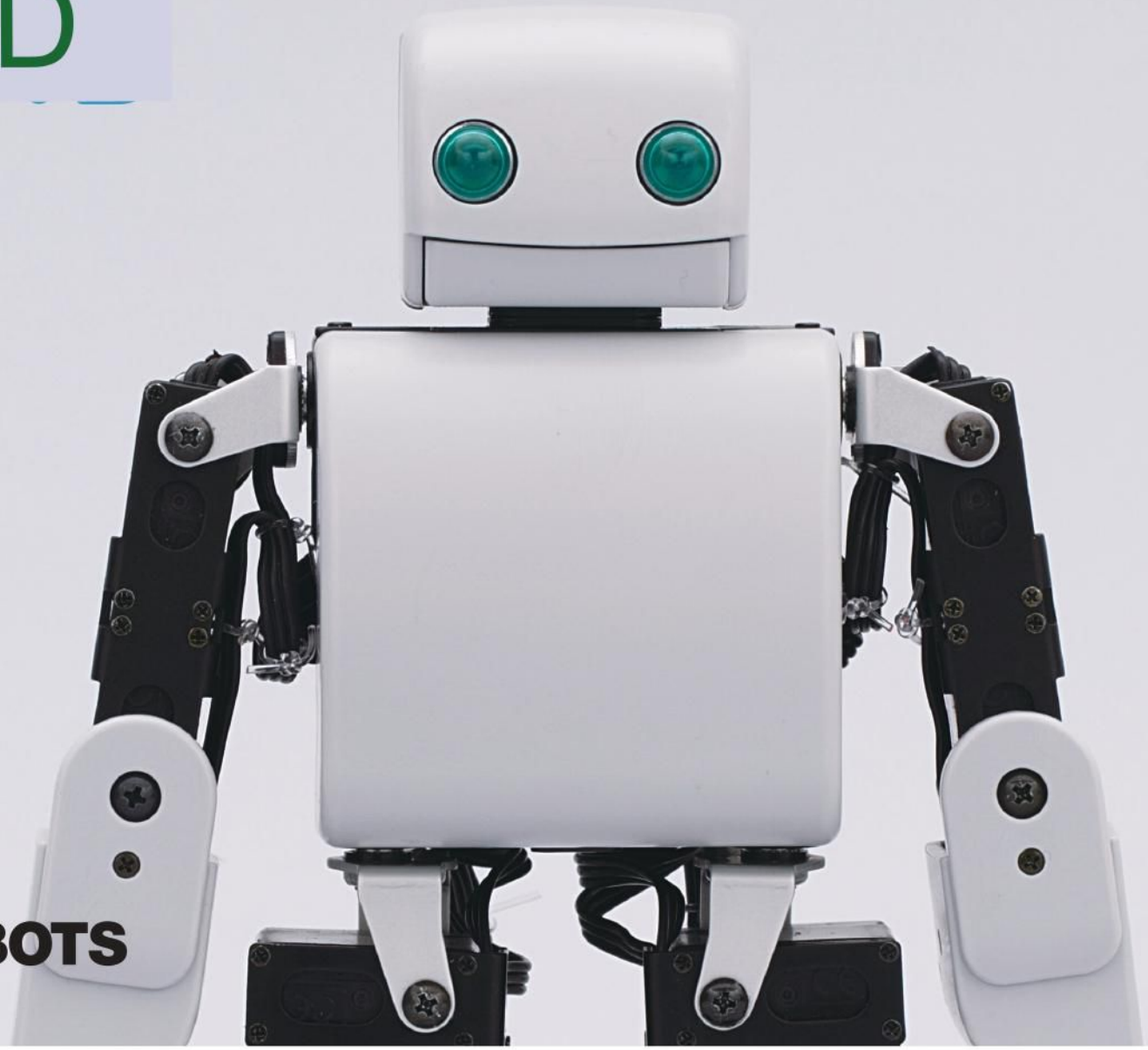
PLEN.D

desktop robot

plendy

Assembly instruction manual



PLEN
Project
Company

DMM.make ROBOTS

Precautions for safe use

□Please note that due to the nature of this product as an assembly kit, we do not necessarily guarantee the operation of the robot after assembly.

□ The target age of this product is 12 years old or older.

□ When using, assembling, or storing the product and its parts, make sure there are no small children around.
There are small parts, so be careful not to accidentally swallow them.

□ This product is not a toy. When used by children, be sure to use it under the presence of a guardian.

□Do not allow this product or its parts to get wet, or use or store it in an environment with high humidity or condensation.

□When using tools, please use them with due caution.

□ Servo motors and circuit boards are precision electronic parts, so do not disassemble or modify them. Failure to do so may result in malfunction, electric shock, or fire.

□ Do not allow conductive foreign matter to come into contact with the substrates.
Since the terminals of substrates are exposed, there is a danger of short-circuiting easily due to conductive foreign matter (metal, water, etc.). A short circuit can damage the boards and cause the battery or wiring to catch fire.

□ After completing assembly of this product, there is a possibility of injury or damage due to overturning or dropping of this product.
Also, there is a possibility that your fingers may get caught during operation, so please handle with care.

□ As a general rule, repairs will be charged after the start of assembly.

□ Check the polarity of the connectors and attach them securely. Failure to do so may result in malfunction or fire.

□ Be careful not to pinch cables. There is a possibility of disconnection or short circuit.

□ When connecting or disconnecting cables, hold the plug connector.
If you hold the cord when inserting or removing the cord, disconnection or short circuit may cause electric shock or fire.

□ Please use the dedicated option. Using non-specified battery packs, servo motors, etc. may cause malfunction, fire, or heat generation.

□ Charge the attached battery within sight. Also, do not use a battery that has a problem.

□It has been certified as wireless equipment for low-power data communication based on the Radio Law. Also, this product can only be used in Japan.

Tools to prepare

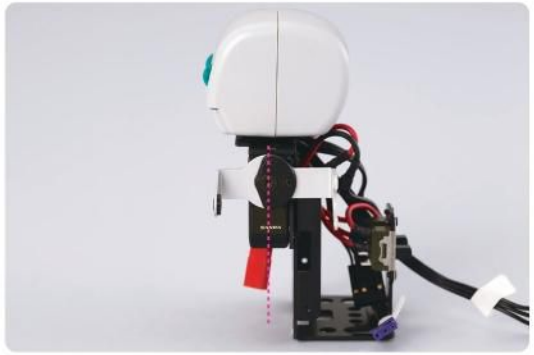
- Phillips screwdriver
  - #0 (included in kit)
  - #1 (useful for larger screws)
- Scissors
- Tweezers
- Screwing material

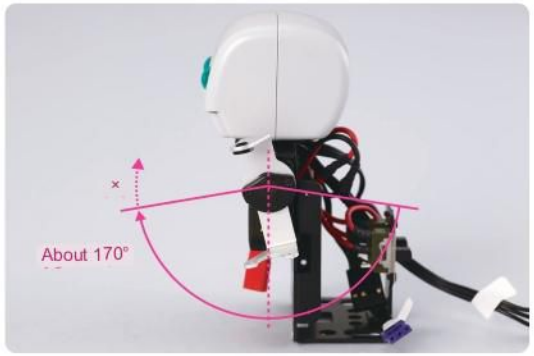
A.

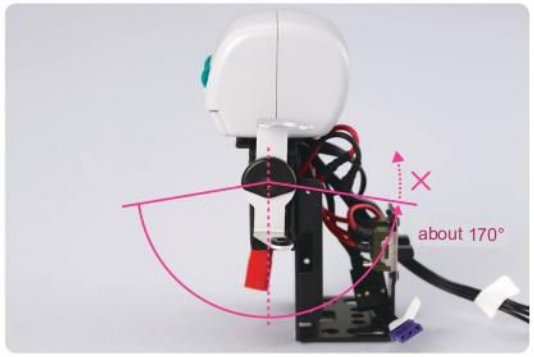
Precautions when using screw fixing materials

Secure the plastic sheath
The plastic may deteriorate
Do not use screw
or break depending
on the composition of the
non-use material.

A Notes on the operating range of the servo motor







The motion range of the servo motors used
for each joint of PLEND is about 170°.

[example]

For shoulder servo unit (cable No.1, No.10)

If you rotate it while the power is off and the movable
range is exceeded, the stopper will break and the
servo motor will malfunction.

When moving the joints when the power is
off, try to move the joints as slowly as possible
so as not to exceed the range of motion.

Contents

Parts list

1

Foot servo block R
(long lead wire)

Foot servo block L
(long lead wire)

Foot servo block R
(short lead wire)

Foot servo block L
(short lead wire)

Knee servo unit R

Knee servo unit L

arm servo unit R

arm servo unit L

waist servo unit

Elbow frame (×2) [Common
for left and right]

thigh frame R

thigh frame L

Shin frame (×2) [Common
for left and right]

ankle frame R

ankle frame L

Sole plate (×2) [Common
for left and right]

microcomputer board

battery pack

Battery Charger

vinyl binding wire

shoulder servo unit

roller skating unit

Parts list

2

belly plastic cover

back plastic cover

Elbow plastic cover (x2) [common to left and right]

Arm Plastic Parts R

Arm Plastic Parts L

Front shin plastic cover (×2) [Common for left and right]

Shin plastic cover R-out [R-out engraved on the back]

Shin plastic cover R-in [R-in engraved on the back]

Shin plastic cover L-in [L-in engraved on the back]

Shin plastic cover L-out [Engraved L-out on the back]

Thigh plastic cover (x2) [Common for left and right]

Instep plastic cover R [Engraved R on the back side]

Instep plastic cover L [L engraved on the back side]

Sole plastic cover (x2) [common to left and right]

Screw case ①- ⑥

① Screw M1.7

② Screw M2×2.5

③ Screw M2×4

④ Screw M2.6

⑤ Screw M2×8

⑥ Steel spacer Φ3×5

Screw case ⑦-1 (spare)

*Screw cases ⑦ and ⑦ are spare screws and are not used for assembly.

⑦ Screw M3 For fixing the servo horn

⑧ Screw M2×12 For neck fixing

⑨ Tapping screw For fixing the back of the head

⑪Screw M3×15 for fixing skate tire

⑫ Steel spacer Φ3×3 For fixing skate tires

⑩ Servo horn

Assembling the right leg unit

1

required parts

Foot plate (common to left and right)

Instep plastic cover R [There is R notation on the back]

*With bush

ankle frame R

*Cable No.17/18

Foot servo block R (long lead wire)

① Screw M1.7 (3 pieces)

② Screw M2×2.5 (4 pieces)

③ Screw M2×4 (4 pieces)

④ Screw M2.6 (1 piece)

1

③ Screw M2×4 (4 places)

Attach the "foot instep plastic cover R" to the "sole plate" with "③ screw M2 x 4"

【Note】
Do not use screw-fastening agent on the parts that fix the plastic exterior!

2

3

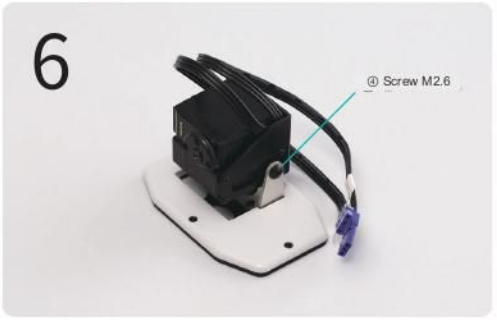
Attach "Ankle Frame R" with "② Screw M2×2.5"

4

5

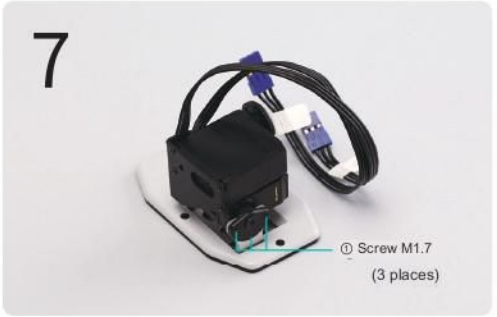
Insert the "foot servo block R (long lead wire)" into the "ankle frame"

6



Fix the front side with "④ Screw M2.6"

7



Fix the servo horn with "① screw M1.7"

To do

8

Assembling the right leg unit

2

required parts

※ with bush

Shin frame [common to left and right]

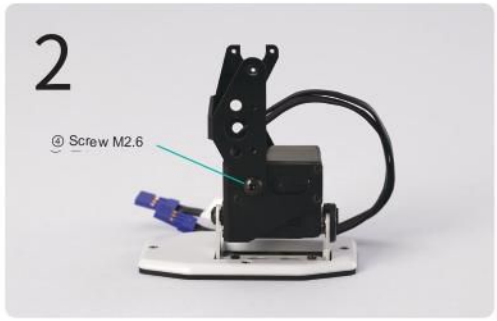
*Cable No.16

Knee servo unit R

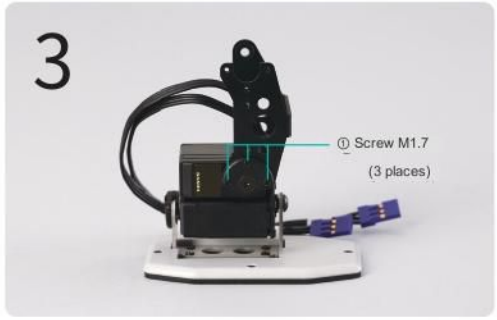
① Screw M1.7 (6 pieces)

④ Screw M2.6 (2 pieces)

Insert the "shin frame" into the "leg servo block R (long lead wire)"

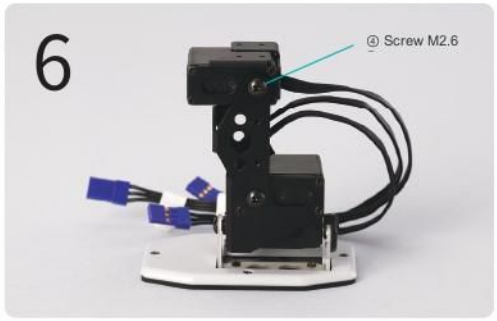


Fix the inside with "④ Screw M2.6"

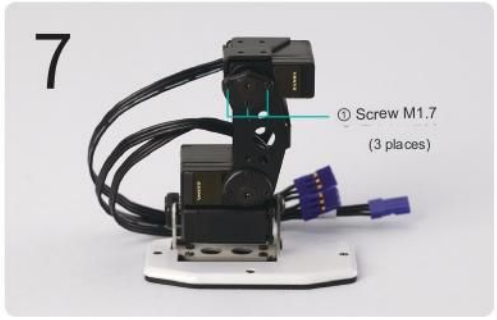


Fix the servo horn with "① screw M1.7" To do

Insert the "Knee Servo Unit R" into the "Shin Frame"



Fix the inside with "④ Screw M2.6"



Fix the servo horn with "① screw M1.7" To do

Assembling the right leg unit

3

required parts

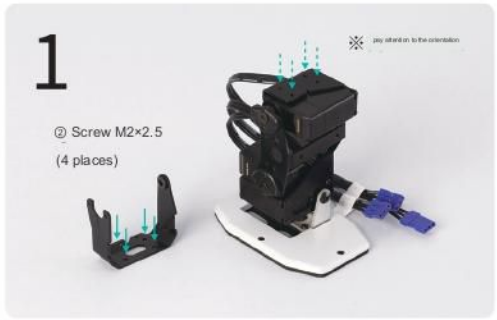
thigh frame R

Foot servo block R
(short lead wire)

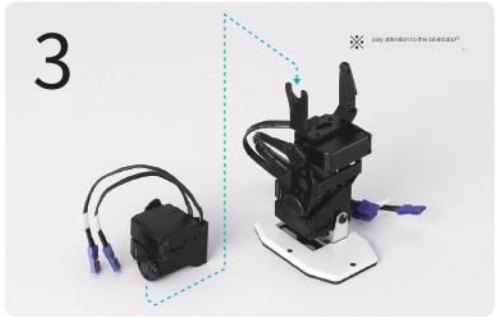
① Screw M1.7 (3 pieces)

② Screw M2×2.5 (4 pieces)

④ Screw M2.6 (1 piece)



Attach "Thigh Frame R" to "Knee Servo Unit R" with "(2) Screw M2 x 2.5".



"Momo Frame R" "Foot servo block R (short lead wire)" plug in

Fix the inside with "④ Screw M2.6"

Fix the servo horn with "① screw M1.7"

Completed right leg unit is

Assembling the left leg unit

1

required parts

Foot plate (common to left and right)

Instep plastic cover L [There is L notation on the back side)

※ with bush

ankle frame L

*Cable No.89

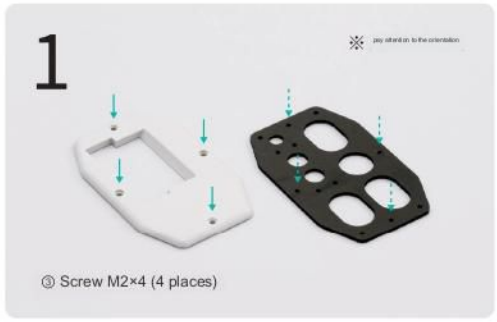
Foot servo block L (long lead wire)

① Screw M1.7 (3 pieces)

② Screw M2×2.5 (4 pieces)

③ Screw M2×4 (4 pieces)

④ Screw M2.6 (1 piece)



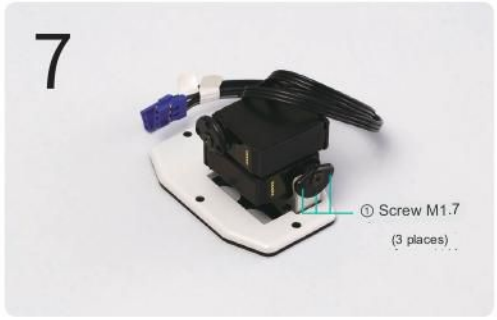
Attach "Foot Instep Plastic Cover L" to "Foot Sole Plate" with "③ Screw M2×4"

【Note】
Fix the plastic exterior
Do not use threadlocker on parts!

Attach "Ankle Frame L" with "② Screw M2×2.5"

"Foot Servo Block L (long lead wire)" into the "ankle frame"

Fix the front side with "④ Screw M2.6"



Fix the servo horn with "① screw M1.7"

To do

Assembling the left leg unit

2

required parts

※ with bush

Shin frame [common to left and right]

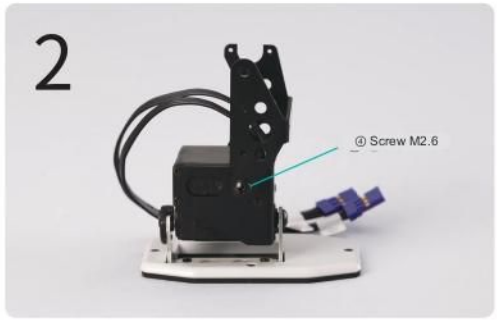
*Cable No.7

Knee servo unit L

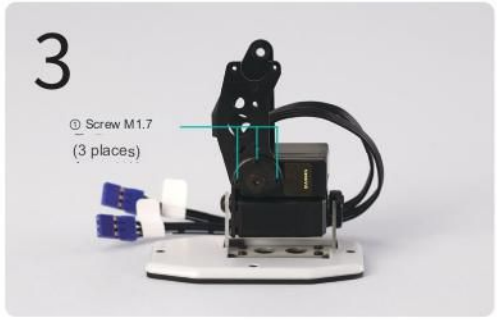
① Screw M1.7 (6 pieces)

④ Screw M2.6 (2 pieces)

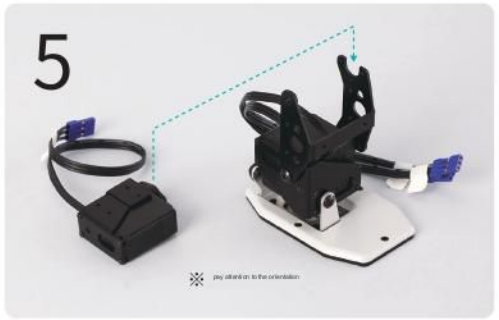
Insert the "shin frame" into the "leg servo block L (long lead wire)"



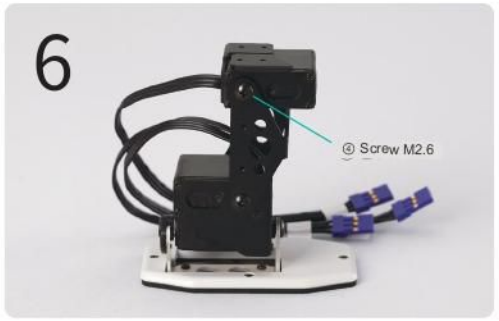
Fix the inside with "④ Screw M2.6"



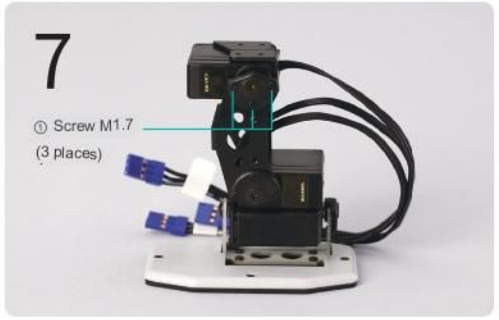
Fix the servo horn with "① screw M1.7" To do



Insert the "Knee Servo Unit L" into the "Shin Frame"



Fix the inside with "④ Screw M2.6"



Fix the servo horn with "① screw M1.7" To do

Assembling the left leg unit

3

required parts

thigh frame L

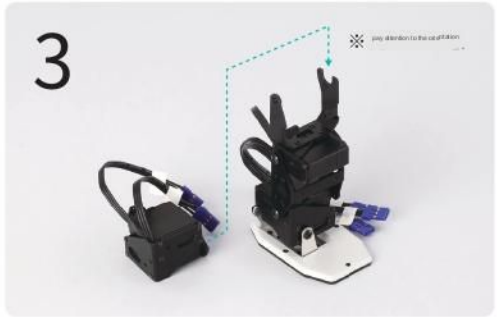
Foot servo block L (short lead wire)

① Screw M1.7 (3 pieces)

② Screw M2×2.5 (4 pieces)

④ Screw M2.6 (1 piece)

Attach "Thigh Frame L" to "Knee Servo Unit L" with "② Screw M2 x 2.5".



"Momo Frame L" "Foot servo block L (short lead wire)" plug in

Fix the inside with "④ Screw M2.6"

Fix the servo horn with "① screw M1.7"

Completed left leg unit is

Assembling the arm unit

required parts

arm servo unit R

arm servo unit L

Elbow frame (2 pieces) [Common for left and right]

① Screw M1.7 (6 pieces)

④ Screw M2.6 (2 pieces)

right arm

"Arm Servo Unit
Insert the "elbow frame" into "R"

Fix the front side with "(4) M2.6 screws (2 pieces)"
To do

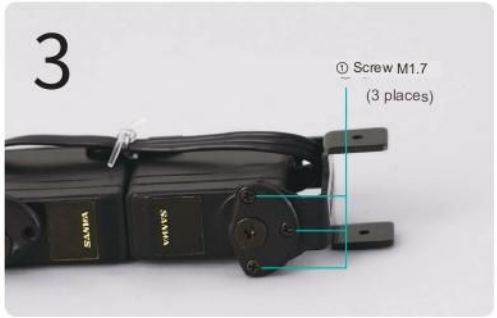
Fix the servo horn with "① screw M1.7"
To do

Completed right arm unit is

left arm

"Arm Servo Unit
Insert the "elbow frame" into "L"

Fix the front side with "(4) M2.6 screws (2 pieces)"
To do

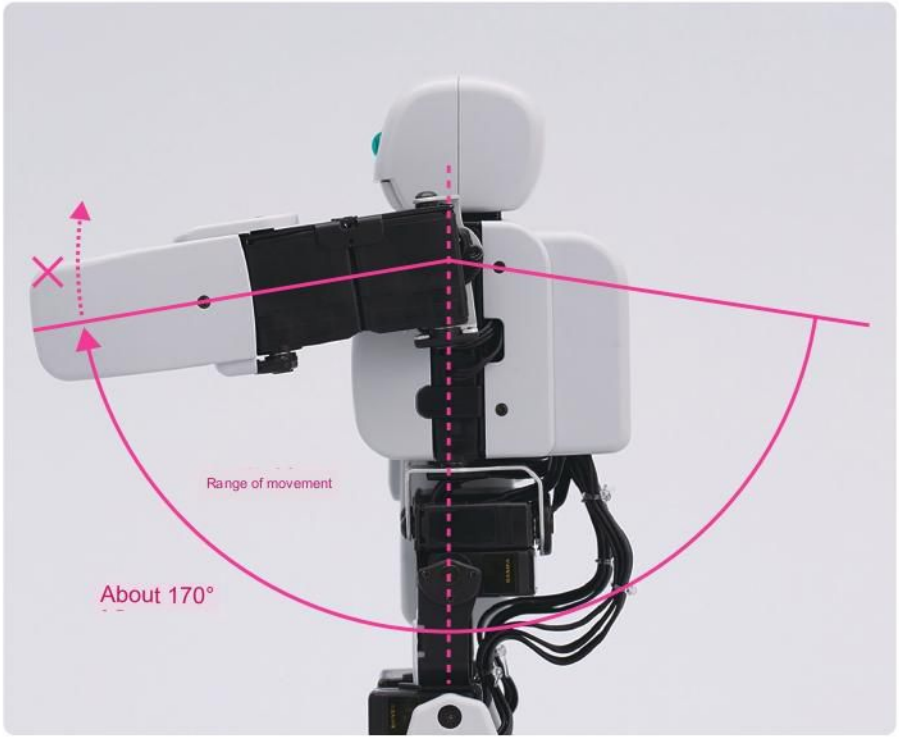


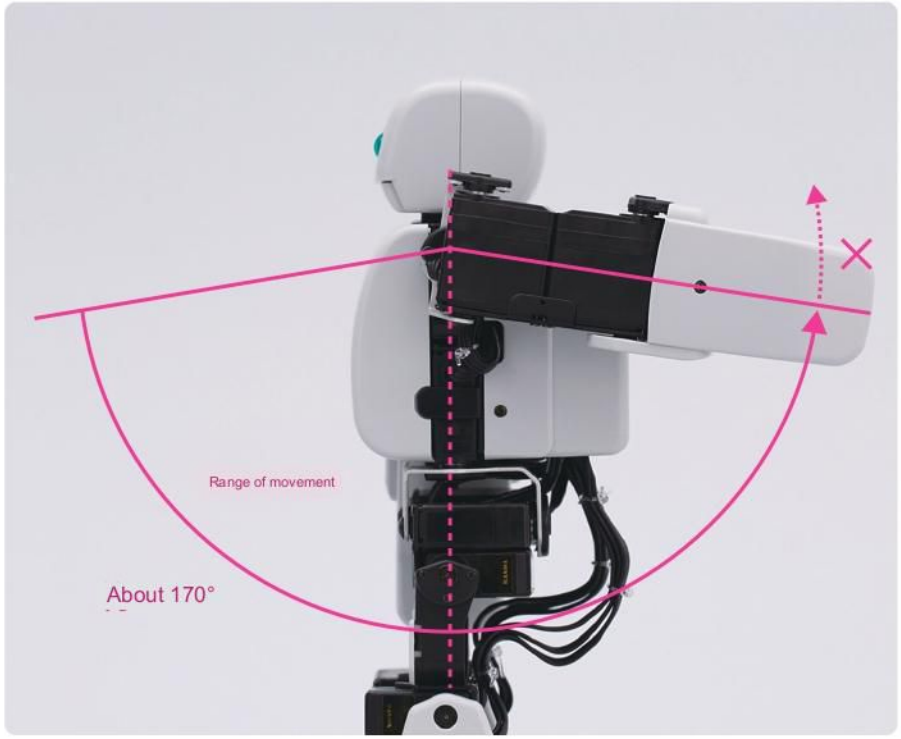
Fix the servo horn with "① screw M1.7"
To do

Completed left arm unit is

Precautions regarding the operating range of the servo motor

The servo motors used in PLEN's joints have a movable range of about 170 degrees.





*If you try to move it manually beyond its movable range, the motor will break, so please be careful when handling it when the power is off.

Assembling the fuselage unit

required parts

shoulder servo unit

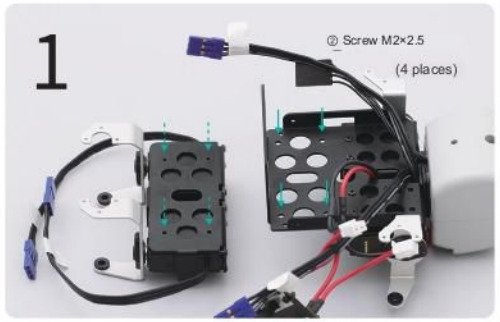
waist servo unit

right arm unit

left arm unit

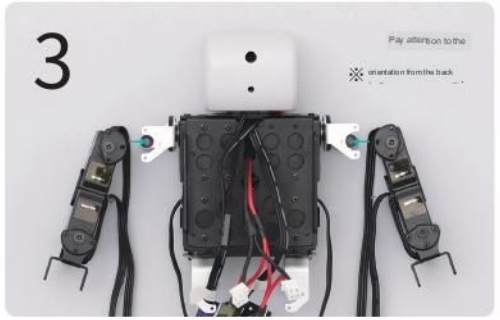
vinyl binding wire

② Screw M2×2.5 (4 pieces)

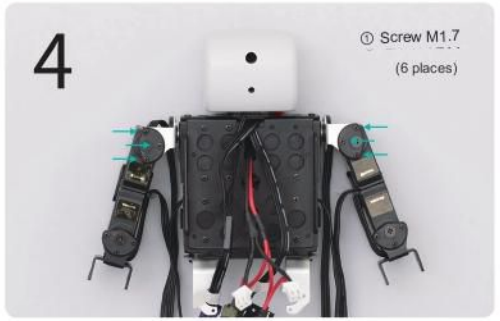


Attach the "Waist Servo Unit" to the "Shoulder Servo Unit" with "② Screw M2×2.5".

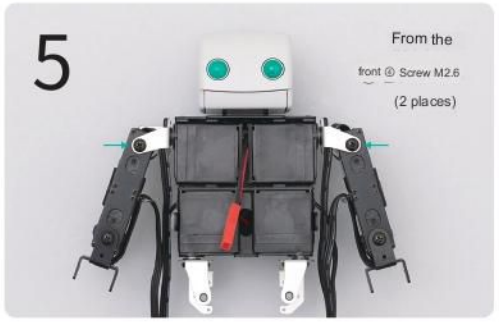
Completed fuselage unit is



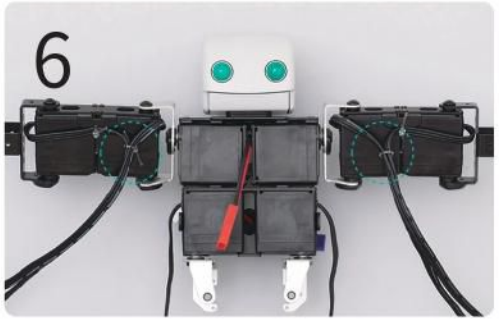
Insert the left and right arm servo unit units into the torso unit.



Fix the servo horn with "① screw M1.7"

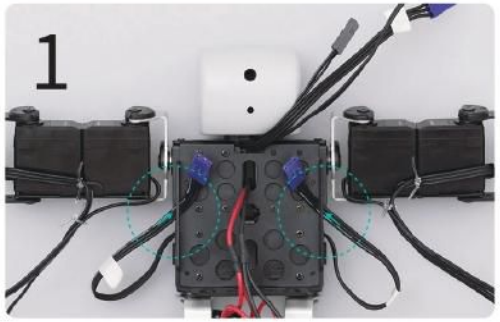


Fix the front side with "④ Screw M2.6 (2 pieces)"

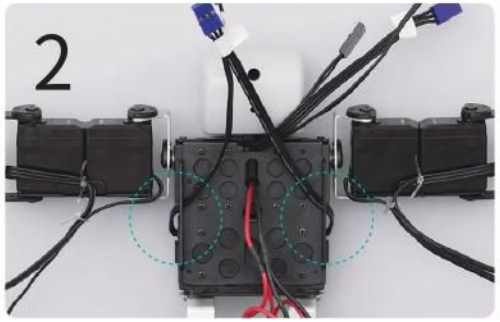


Tie the cable of the "arm servo unit" with the "vinyl binding wire"

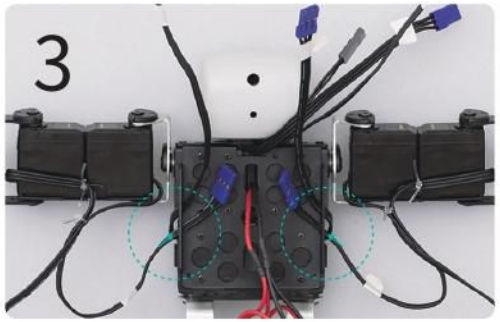
upper body wiring



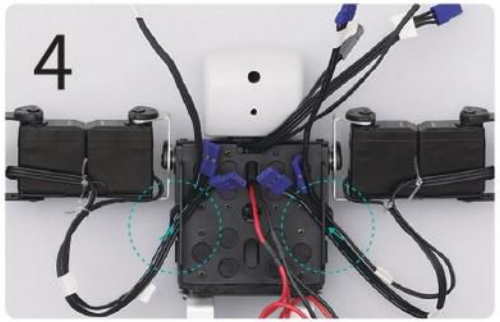
Pass No.2 and No.11 cables through the holes in the fuselage unit



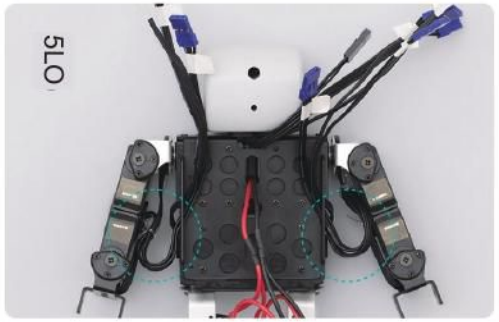
Be careful not to twist the base of the cable.



Pass the No.3 and No.12 cables through the holes in the “fuselage unit”



Pass No.4 and No.13 cables through the holes in the fuselage unit



In the same way, give the cable some slack and tie it with a “vinyl tie” line.

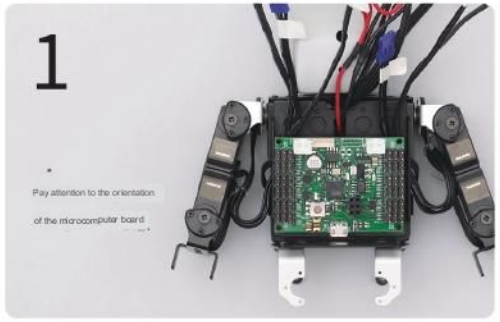
Installing the microcomputer board and power switch

required parts

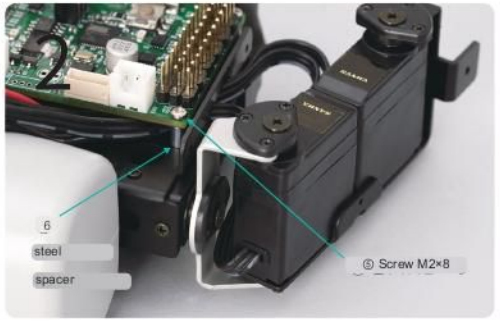
② Screw M2×2.5 (2 pieces)

⑤ Screw M2×8 (4 pieces)

⑥ Steel spacer 3×5 (4 φ pieces)

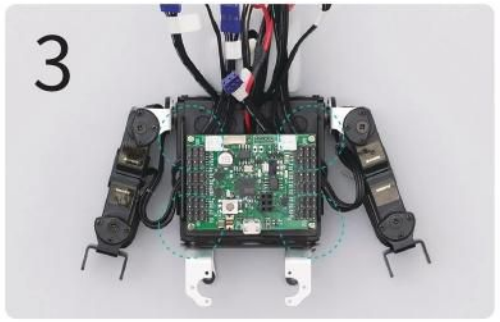


Place the "microcomputer board" on the back of the "fuselage unit"



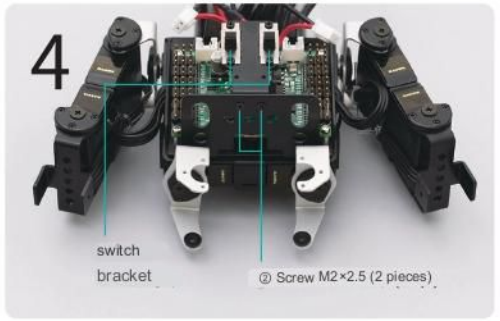
Put "⑥ Steel spacer Φ3×5 (4 pieces)" under the "microcomputer board" and fix it with "⑤ Screw M2×8 (4 pieces)".

*It is convenient to use tweezers when inserting the spacer.



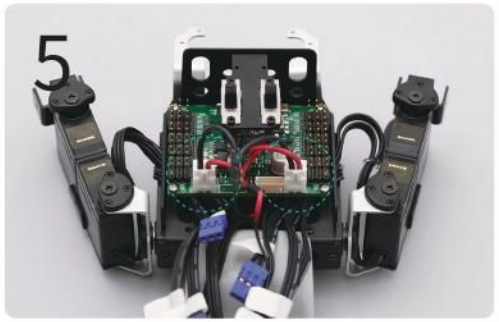
Fix the 4 points with screws

[Caution]
Be careful not to press the cable on the back side of the "microcomputer board".

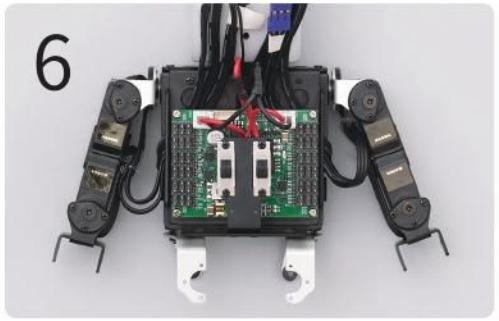


shoulder servo unit

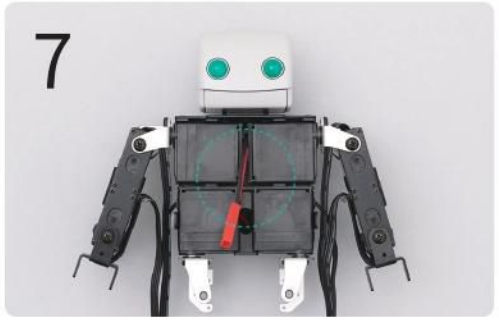
Attach the "switch bracket" attached to the kit to the "fuselage unit" with "② screw M2 x 2.5".



Insert the switch connector into the microcomputer board



【Note】
Be careful not to insert the connector left and right



[Caution]
Leave the power cable protruding on the abdomen side long.

Attaching the foot unit

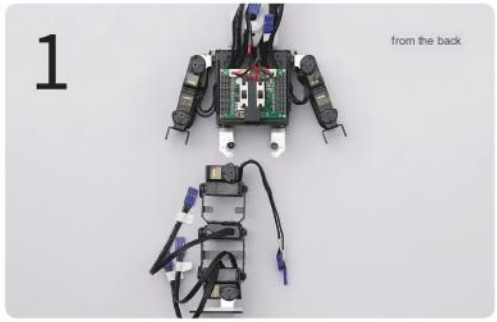
required parts

right leg unit

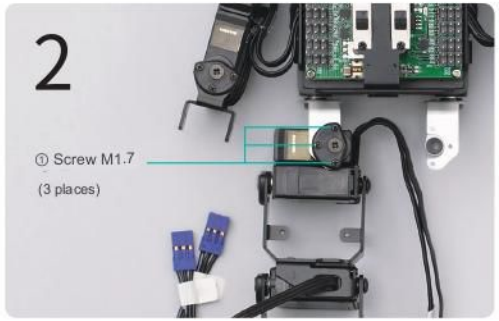
left leg unit

① Screw M1.7 (6 pieces)

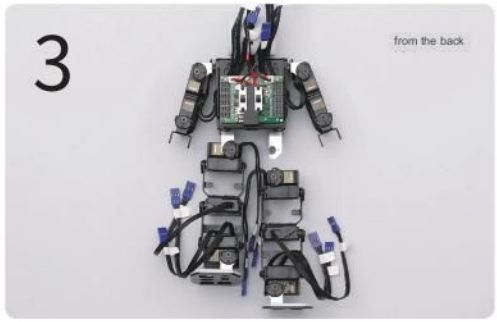
④ Screw M2.6 (2 pieces)



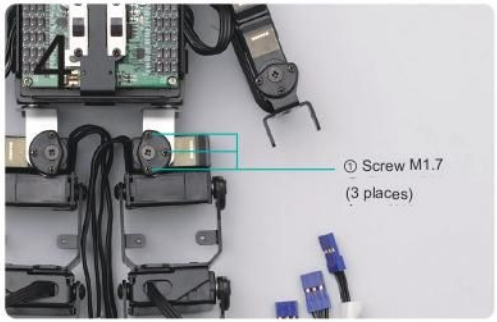
Insert the "Left Leg Unit" into the "Waist Servo Unit L"



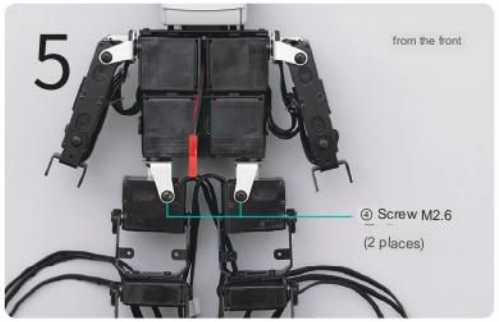
Fix the servo horn with "① screw M1.7"



Insert the "Right leg unit" into the "Waist support unit R"



Fix the servo horn with "① screw M1.7"



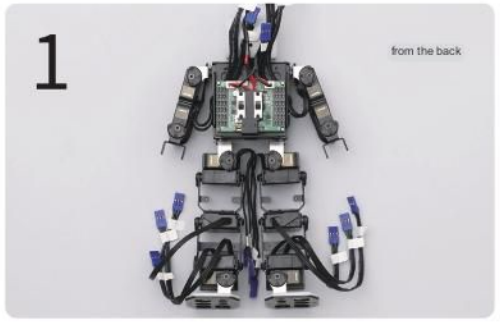
Fix the front side with "④ Screw M2.6"

cable bundling

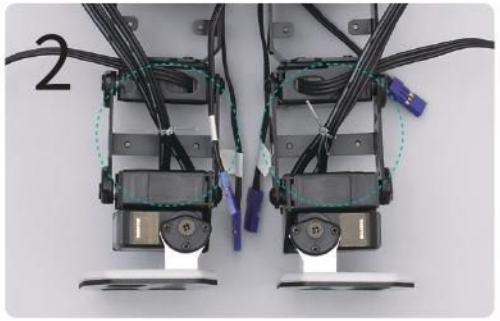
1

required parts

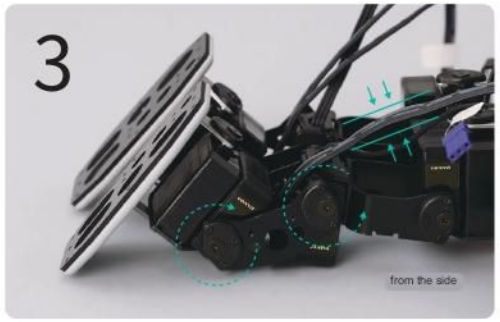
vinyl binding wire



Before cable bundling



Ankle Cable (Right: No. 17, 18/ Left: No. 89) with "vinyl binding wire"



Make the joint of the foot the angle of the photo

Left and right "knee frame" 8.9)
Pass through the "bundle".
cable under the knee
まとめ、通した「ビニール結束線」で結
(Right: No.16 17・ ・
18/ Left: No.7・
8・9)

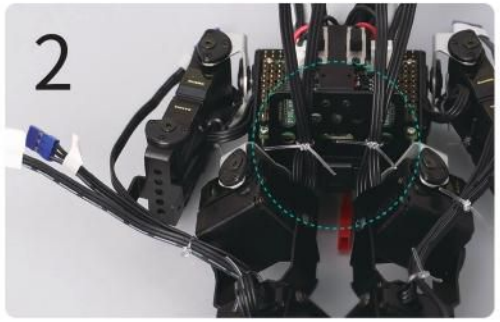
cable bundling

2

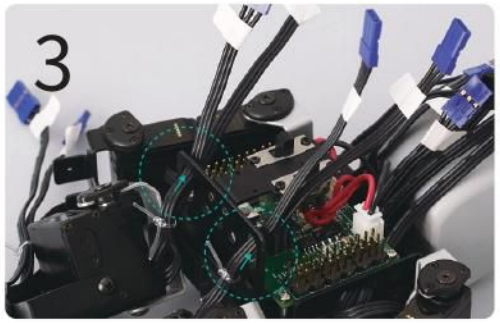
required parts

vinyl binding wire

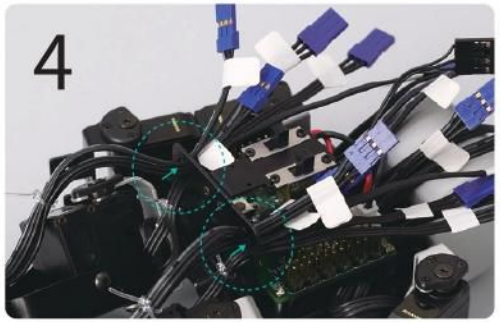
Tie the position of the photo with call



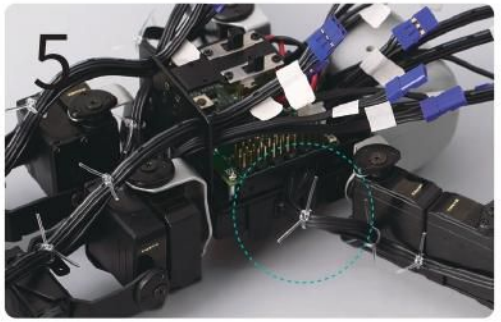
Bundle the hip joint cables (Right: No. 14, 15/Left: No. 56) and tie them with "vinyl ties" wire.



Pass each hip joint cable (Right: No.14, 15/ Left: No.56) through the hole at the bottom of the body unit.

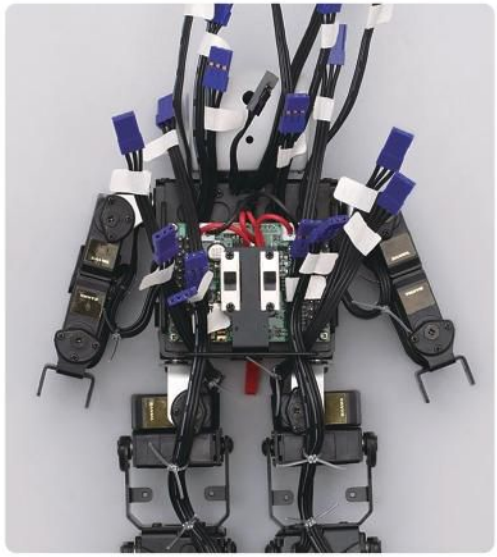


each cable below the knee (Right: No.16, 17, 18 / Left: No.7, 8, 9) pass through the hole at the bottom of the "fuselage unit"

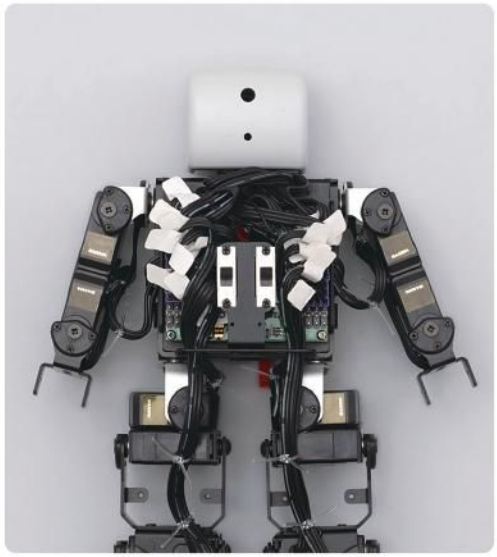


Tie the cable of the arm unit with a "vinyl tie" line.

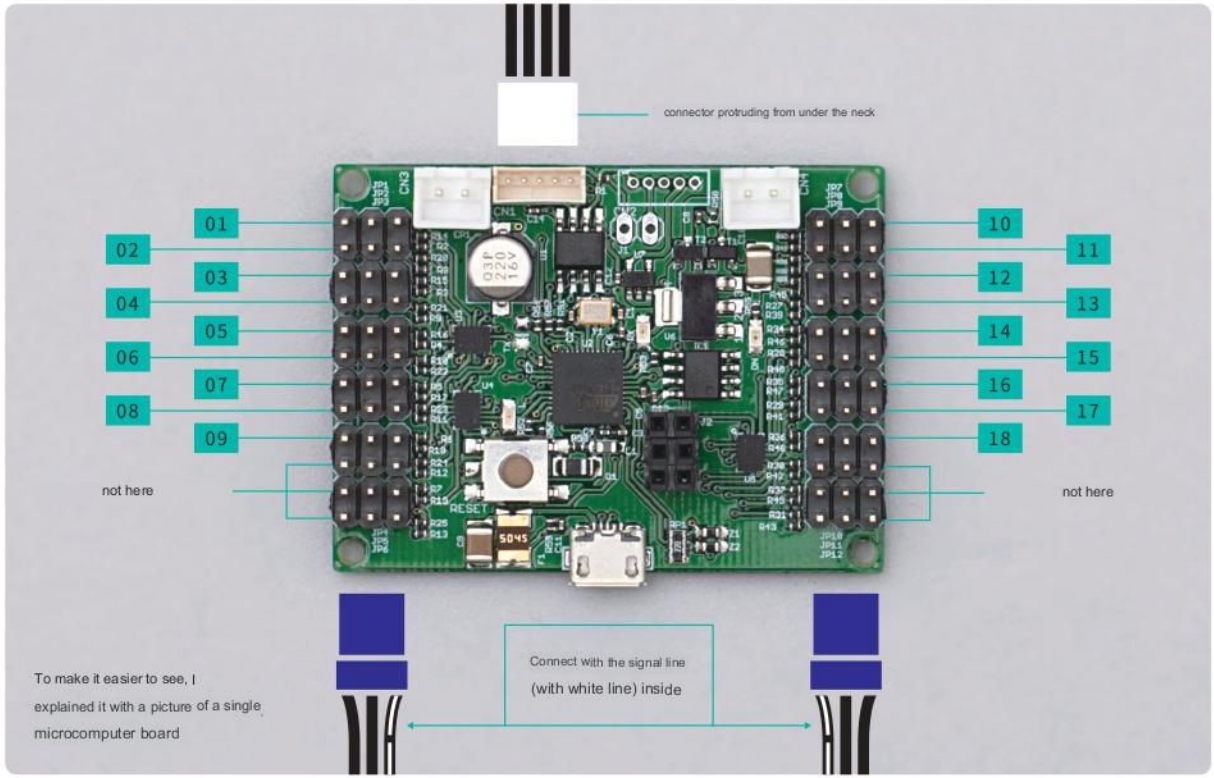
Connector connection



before connection



After connection



Insert the head connector into the pin of the "microcomputer board"

Insert the servo motor connector into the pins of the microcomputer board according to the numbers.